

STANDARD PARTS



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1 ERWIN HALDER KG

YOUR COMPETENT PARTNER



MADE IN GERMANY

We have been serving customers in industry and retail as a reliable and proficient partner for more than 85 years. The latest chapters in the success story of this family-owned and operated business are now written by the family's third generation. Never wavering from its original mission statement, the company has remained in charge of the entire process chain – from development to production to global distribution. Remaining true to the company's original calling as instilled by our founder, we still strive to offer our customers products and service of unrivalled quality.



[www.halder.com/
HalderInside](http://www.halder.com/HalderInside)

EVERYTHING FROM A SINGLE SOURCE!

WE BRING OUR INNOVATIVE STAFF, MACHINERY AND METHODS INTO PLAY TO HELP YOU SATISFY ALL YOUR MANUFACTURING NEEDS – WHETHER YOU PRODUCE CUSTOM OR STANDARD PARTS, NEED TO COMPLETE SIMPLE INSTALLATION JOBS OR MANUFACTURE COMPLEX ASSEMBLIES.



CONVINCING REASONS FOR CHOOSING ERWIN HALDER KG



Reg.-Nr. 2460



Reg.-Nr. 2460



Reg.-Nr. 2460

DELIVERY CAPACITY

Almost 90% of our total assortment is in stock and therefore available for you at short notice. For orders placed before 4 pm, the goods leave the warehouse on the same day.

ADHERENCE TO DELIVERY DATES

98.4% of our deliveries will reach you on the previously confirmed date.

DEVELOPMENT EXPERTISE

We work every day to make existing solutions better and to develop something new. This is impressively underlined by a large number of patented in-house developments.

SERVICE AND CONSULTING

Whether by phone or video conference, on our premises or directly at your site, our technical customer advisers are at your disposal as desired in order to offer you the best customer service possible.

MANUFACTURING EXPERTISE

Because we develop and produce ourselves, we are always able to assist you with advice and support. Should you require certain adjustments, such as dimensional changes or other material properties, please contact us. As a manufacturer, we are able to implement such requests together with you.

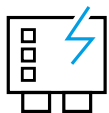
CONSTRUCTION OF FIXTURES

Do you have difficulties clamping certain workpieces? No problem! Contact us and we will make an appointment with us on site. In our fully equipped workshop, we will find the optimal solution for your workpiece together.

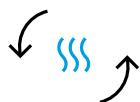
MOBILE SHOWROOM

Regardless of whether you work at a large corporation or a small business - we will come to you. True to the motto "Precision at your fingertips", we will gladly introduce you to our complete range of services in our "mobile showroom".

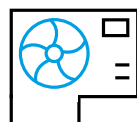
ECOLOGICAL SUSTAINABILITY



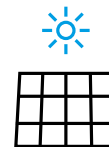
Operation of a **combined heat and power plant** to generate heat and electricity



Central machine extraction system with **heat recovery**



Energy-efficient machine cooling with ground water



Proprietary photovoltaic installation including battery storage



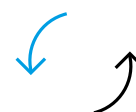
Integration of **rainwater cisterns**



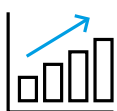
Energy consumption controlling



Ongoing projects for **saving energy**



Separation of recyclable materials in all areas



Preparation of **waste balances and waste management concepts**



Lighting of all buildings with **LED technology**



























Promotion of e-mobility by providing **charging stations** for guests, employees and fleet vehicles



Machine and Fixture Elements

Spring Plungers

<p>EH 22030. Spring Plungers with ball and internal hexagon</p>  <p>→ p. 51</p>	<p>EH 22030. Spring Plungers with pin and internal hexagon</p>  <p>→ p. 53</p>	<p>EH 22030. Spring Plungers headed, with ball and internal hexagon</p>  <p>→ p. 55</p>	<p>EH 22031. Spring Plungers with moveable ball and internal hexagon</p>  <p>→ p. 57</p>
<p>EH 22040. Spring Plungers plastic</p>  <p>→ p. 59</p>	<p>EH 22050. Spring Plungers with ball and slot</p>  <p>→ p. 60</p>	<p>EH 22050. Spring Plungers with ceramic ball and slot, stainless steel A4</p>  <p>→ p. 62</p>	<p>EH 22050. Spring Plungers with pin and slot</p>  <p>→ p. 63</p>
<p>EH 22050. Spring Plungers headed, with ball and slot</p>  <p>→ p. 65</p>	<p>EH 22051. Spring Plungers with moveable ball and slot</p>  <p>→ p. 67</p>	<p>EH 22051. Spring Plungers with moveable ceramic ball and slot, stainless steel A4</p>  <p>→ p. 69</p>	<p>EH 22060. Spring Plungers with internal hexagon</p>  <p>→ p. 70</p>
<p>EH 22060. Spring Plungers with internal hexagon and seal</p>  <p>→ p. 72</p>	<p>EH 22070. Spring Plungers smooth</p>  <p>→ p. 74</p>	<p>EH 22070. Spring Plungers long</p>  <p>→ p. 75</p>	<p>EH 22075. Spring Plungers with collar and ball, front slot</p>  <p>→ p. 77</p>
<p>EH 22080. Spring Plungers smooth, with collar and ball</p>  <p>→ p. 79</p>	<p>EH 22080. Spring Plungers smooth, long, with collar and ball</p>  <p>→ p. 81</p>	<p>EH 22080. Spring Plungers smooth, with collar and ball, self-clamping</p>  <p>→ p. 82</p>	<p>EH 22080. Spring Plungers smooth, with collar and pin</p>  <p>→ p. 83</p>
<p>EH 22080. Spring Plungers smooth, without collar</p>  <p>→ p. 84</p>	<p>EH 22081. Spring Plungers smooth, without collar, with moveable ball</p>  <p>→ p. 85</p>	<p>EH 22082. Holders for spring plungers</p>  <p>→ p. 86</p>	<p>EH 22090. Spring Plungers double-sided</p>  <p>→ p. 87</p>

Machine and Fixture Elements

EH 22100.
Spring Bodies



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EH 2B020.
Spring Plungers
with pin and slot - INCH



→ p. 90

EH 2B030.
Spring Plungers
with pin and internal hexagon
- INCH



→ p. 93

EH 2B050.
Spring Plungers
with ball and slot - INCH



→ p. 96

EH 2B080.
Spring Plungers
smooth, with collar and ball,
self-clamping - INCH



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Index Plungers / Index Bolts

EH 22110.
Index Plungers Mini
Indexes



→ p. 101

EH 22110.
Index Plungers Mini
Indexes
basic type



→ p. 102

EH 22110.
Index Plungers Mini
Indexes
stainless steel



→ p. 104

EH 22110.
Index Plungers Compact
with hexagon collar



→ p. 106

EH 22110.
Index Plungers Compact
with hexagon collar and
locking



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EH 22110.
Index Plungers Compact
with hexagon collar, with
T-Handle



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EH 22110.
Index Plungers Compact
with hexagon collar and
locking, with T-Handle



→ p. 111

EH 22110.
Index Plungers
with mounting flange,
horizontal



→ p. 113

EH 22110.
Index Plungers
with mounting flange,
horizontal, stainless steel



→ p. 114

EH 22110.
Mounting Blocks
for index bolts and index
plungers, die-cast



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EH 22110.
Locating Bushings
for index bolts and index
plungers



→ p. 116

EH 22110.
Positioning Bushings
for index bolts and index
plungers



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EH 22120.
Index Plungers
with hexagon collar



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EH 22120.
Index Plungers
with hexagon collar, stainless
steel



→ p. 119

EH 22120.
Index Plungers
with hexagon collar and
locking
























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EH 22120.
Index Plungers
with hexagon collar and
locking, stainless steel



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Machine and Fixture Elements

<p>EH 22120. Index Plungers with hexagon collar, stainless steel A4</p>  <p>→ p. 122</p>	<p>EH 22120. Index Plungers with hexagon collar and locking, stainless steel A4</p>  <p>→ p. 123</p>	<p>EH 22120. Index Plungers without hexagon collar</p>  <p>→ p. 124</p>	<p>EH 22120. Index Plungers without hexagon collar, stainless steel</p>  <p>→ p. 126</p>
<p>EH 22120. Index Plungers threadless, weldable</p>  <p>→ p. 127</p>	<p>EH 22120. Index Plungers with hexagon collar, short</p>  <p>→ p. 128</p>	<p>EH 22120. Distance Collars for index plungers</p>  <p>→ p. 129</p>	<p>EH 22120. Index Plungers with mounting flange</p>  <p>→ p. 131</p>
<p>EH 22120. Index Plungers simple finish</p>  <p>→ p. 132</p>	<p>EH 22120. Index Plungers for thin-walled pieces</p>  <p>→ p. 134</p>	<p>EH 22120. Index Plungers with pull-ring</p>  <p>→ p. 135</p>	<p>EH 22122. Index Plungers with release lock</p>  <p>→ p. 137</p>
<p>EH 22122. Index Plungers with rapid locking head</p>  <p>→ p. 138</p>	<p>EH 22123. Index Plungers with sensor</p>  <p>→ p. 139</p>	<p>EH 22120. Index Bolts</p>  <p>→ p. 141</p>	<p>EH 22120. Mounting Blocks for index bolts and index plungers</p>  <p>→ p. 143</p>
<p>EH 22120. Index Bolts with mounting flange</p>  <p>→ p. 144</p>	<p>EH 22120. Index Bolts with mounting flange, horizontal</p>  <p>→ p. 145</p>	<p>EH 22121. Index Bolts simple finish</p>  <p>→ p. 147</p>	<p>EH 22130. Precision Index Plungers with cylindrical pin</p>  <p>→ p. 148</p>
<p>EH 22130. Precision Index Plungers with tapered pin</p>  <p>→ p. 150</p>			

Machine and Fixture Elements

Lateral Spring Plungers

EH 22140.
Lateral Spring Plungers



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EH 22150.
Lateral Plungers
smooth, without seal



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EH 22150.
Lateral Plungers
smooth, with seal



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EH 22150.
Lateral Plungers
with plastic spring and pin



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EH 22150.
Lateral Plungers
smooth, without seal, with
female thread



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EH 22150.
Lateral Plungers
smooth, with seal, with
female thread



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EH 22150.
**Eccentric Mounting
Bushings**
for lateral plungers, smooth



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EH 22150.
Lateral Plungers
with thread, without seal



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EH 22150.
Lateral Plungers
with thread, with seal



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EH 22150.
Lateral Plungers
with thread, without seal, with
female thread



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EH 22150.
Lateral Plungers
with thread, with seal, with
female thread



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EH 22160.
Lateral Spring Plungers
with spring steel sheet



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EH 2B150.
Lateral Plungers
smooth, without seal - INCH



→ p. 174

EH 2B150.
Lateral Plungers
smooth, with seal - INCH



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EH 2B150.
Lateral Plungers
with plastic spring and pin -
INCH



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EH 2B150.
Lateral Plungers
smooth, without seal, with
female thread - INCH



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EH 2B150.
Lateral Plungers
smooth, with seal, with
female thread - INCH



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EH 2B150.
**Eccentric Mounting
Bushings**
for lateral plungers, smooth
- INCH



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Machine and Fixture Elements

Locking Elements

EH 22200.
Spring-Loaded Catches
DIN 6310 catches with spring



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EH 22260.
Door Catches



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EH 22260.
Clamping Catches



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Washers

EH 22270.
Shaft-End Washers



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EH 22280.
Captive C-Washers
DIN 6371 with countersunk screw DIN 923



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EH 22290.
C-Washers
DIN 6372



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Ball Lock Connectors

EH 22340.
Ball Lock Connectors
self-locking, with holding rings



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EH 22330.
Ball Lock Connectors
self-locking, with holder



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EH 22330.
Ball Lock Connectors
self-locking, with holder,
compact construction



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Lifting Pins / Threaded Lifting Pins

EH 22350.
Lifting Pins
self-locking



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EH 22350.
Lifting Pins
self-locking, stainless steel



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EH 22350.
Locating Bushings
for lifting pins



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EH 22350.
Locating Bushings, plain
for lifting pins



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EH 22350.
Locating Bushings with Seal, plain
for lifting pins



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EH 22351.
Lifting Pins
self-locking, with handle



→ p. 205

EH 22352.
Threaded Lifting Pins
self-locking



→ p. 207

EH 22352.
Threaded Lifting Pins
self-locking, for centre holes
according to DIN 332



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Machine and Fixture Elements

EH 22353.
Threaded Lifting Pins
 self-locking, with rotatable
 shackle



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EH 2B352.
Threaded Lifting Pins
 self-locking - INCH



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EH 2B353.
Threaded Lifting Pins
 self-locking, with rotatable
 shackle - INCH



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Ball Lock Pins

EH 22340. /EH 22350.
Ball Lock Pins
 self-locking, with T-handle



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EH 22340. /EH 22350.
Ball Lock Pins
 self-locking, with L-handle



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EH 22340. /EH 22350.
Ball Lock Pins
 self-locking, with button
 handle



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EH 22340. /EH 22350.
Ball Lock Pins
 self-locking, with safety
 handle



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EH 22360.
Clamping Pins
 self-locking, with span
 compensation



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EH 22370. /EH 22380.
Ball Lock Pins
 self-locking, with standard
 handle



→ p. 231

EH 22390.
Ball Lock Pins
 self-locking, with standard
 handle, titanium



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EH 22370. /EH 22380.
Ball Lock Pins
 self-locking, with elastic
 handle



→ p. 235

EH 22370.
Ball Lock Pins
 self-locking, with combination
 handle



→ p. 237

EH 22380.
Ball Lock Pins
 self-locking, with combination
 handle, precipitation-
 hardened



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EH 22370. /EH 22380.
Ball Lock Pins
 self-locking, with adjustable
 handle



→ p. 243

EH 22400.
Socket Pins
 with spring-loaded balls



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EH 22400.
Locating Bushings
 for ball lock pins and socket
 pins



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EH 22400.
Locating Bushings
 with flange, for ball lock pins
 and socket pins



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EH 22400.
Retaining Cables



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EH 22410. /EH 22420.
Clamp Lock Pins
 with button handle



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EH 4210.
Ball Lock Pins
 single acting - comply with
 NAS / MS17984



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EH 4211.
Ball Lock Pins
 single acting - comply with
 NAS / MS17985



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EH 4212.
Ball Lock Pins
 single acting - comply with
 NAS / MS17986



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EH 4213.
Ball Lock Pins
 single acting - comply with
 NAS / MS17987



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Machine and Fixture Elements

Threaded Lock Pins

EH 22355.
Threaded Lock Pins
self-locking



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EH 22356.
Threaded Lock Pins
self-locking, with axial bearing



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EH 22355.
Retaining Cables
for threaded lock pin



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Grub Screws / Thrust Pads

EH 22540.
Grub Screws
DIN 6332 with thrust point



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EH 22560.
Thrust Pads
DIN 6311 and low model



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EH 22570.
Thrust Pads
plastic



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EH 22570.
Grub Screws
ball-headed



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Mounting Pads / Fulcrum Screws

EH 22590.
Mounting Pads



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EH 22590.
Mounting Pads
protected against slipping



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EH 22590.
Mounting Pads
with fastening holes



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EH 22591.
Fulcrum Screws



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Support Legs

EH 22593.
Support Legs



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EH 22593.
Support Legs
protected against slipping



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EH 22594.
Support Legs
impact cushioning



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Locating / Seating Elements

EH 22600.
Seating Elements
with plastic bearing surface,
orienting



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EH 22620.
Grippers Round/Square
with hard metal insert, ribbed



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EH 22620.
Hard Metal Inserts
for locating hole



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EH 22620.
Hard Metal Inserts
front mounting



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Machine and Fixture Elements

EH 22620.
Hard Metal Inserts



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EH 22630.
Locating / Seating Pins
DIN 6321



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EH 22630.
Seating Pins
partially DIN 6321 (old norm)



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EH 22630.
Locating Pins
with bore hole similar to DIN 6321



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EH 22630.
Locating Pins
with ball end




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EH 22640.
Feet
DIN 6320 with threaded shank




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EH 22680.
Seating Pins
ribbed or pointed



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EH 22680.
Seating Pins
pin shape




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EH 22690.
Pins



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EH 22690.
Seating Pins
adjustable



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EH 22691.
Pins
with plastic bearing surface



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Thrust Screws / Ball-Ended Thrust Screws

EH 22700.
Ball-Ended Thrust Screws
headed, ball protected against rotating




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EH 22700.
Ball-Ended Thrust Screws
headless, ball protected against rotating




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EH 22710.
Ball-Ended Thrust Screws
headed, round ball




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EH 22710.
Ball-Ended Thrust Screws
headed, flat-faced ball




→ p. 323

EH 22720.
Ball-Ended Thrust Screws
headless, round ball




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EH 22720.
Ball-Ended Thrust Screws
headless, flat-faced ball



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EH 22720.
Ball-Ended Thrust Screws
headless, with fine-pitch thread




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EH 22720.
Ball-Ended Thrust Screws
headless, short




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EH 22720.
Ball-Ended Thrust Screws
headless, round ball and hexalobular socket




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EH 22720.
Ball-Ended Thrust Screws
headless, flat-faced ball and hexalobular socket




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EH 22760.
Thrust Screws
with brass pad



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EH 22760.
Thrust Screws
with plastic pad



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Machine and Fixture Elements

Self-Aligning Pads

EH 22730.
Self-Aligning Pads



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EH 22730.
Self-Aligning Pads
with hard metal ball, ribbed



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EH 22731.
Self-Aligning Pads
self-resetting



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EH 22731.
Self-Aligning Pads
with hard metal ball, ribbed
and self-resetting



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EH 22740.
Self-Aligning Pads
adjustable



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EH 22741.
Self-Aligning Pads
adjustable, self-resetting



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Ball Casters

EH 22750.
Ball Casters
with sheet steel housing



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EH 22750.
Tolerance Rings



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EH 22750.
Ball Casters
with mounting elements



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EH 22751.
Ball Casters
plastic



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EH 22752.
Ball Casters
screwable, plain bearing



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EH 22753.
Ball Casters
plain bearing



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Retrieval Systems

EH 22800.
Positioning Sensors
pneumatic



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EH 22800.
Positioning Sensors
pneumatic



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EH 22800.
Positioning Sensors
self-aligning, pneumatic



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EH 22800.
Positioning Sensors
self-aligning, pneumatic



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Machine and Fixture Elements

EH 22800.
Monitoring Units
for positioning sensors,
pneumatic



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EH 22810.
Retrieval Units
with sensor



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EH 22810.
Radio Transmitters
for retrieval unit



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EH 22810.
Radio Receivers
for retrieval unit



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Expander® Sealing Plugs

EH 22880.
Expander® Sealing Plugs
body from case-hardened
steel



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EH 22880.
Expander® Sealing Plugs
body from stainless steel



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EH 22880.
Expander® Sealing Plugs
body and ball from stainless steel



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EH 22880.
Setting Dies
for Expander® sealing plug



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EH 22880.
Expander® Sealing Plugs
with pull-anchor



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EH 22880.
Expander® Sealing Plugs
with elongated pull-anchor



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EH 22880.
Distance Bushings
for Expander® sealing plugs
with elongated pull-anchor



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EH 22880.
Assembly Tools
for Expander® sealing plugs
with pull-anchor



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Swing Bolts

EH 22980.
Swing Bolts
DIN 444, form B



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EH 22980.
Swing Bolts
DIN 444, form B, quality 8.8
high precision design



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Rod Ends

EH 22982.
Rod Ends
DIN 12240-4, with male
thread



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EH 22982.
Rod Ends
DIN 12240-4, with female
thread



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Clamping Elements

Nuts for T-Slots

EH 23010.
Nuts for T-Slots
DIN 508



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EH 23010.
Nuts for T-Slots
DIN 508, semi-finished



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EH 23010.
Nuts for T-Slots
DIN 508 with antislipping
device



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EH 23020.
Nuts for T-Slots
extended



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EH 23020.
Nuts for T-Slots
rhombus



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EH 23020.
Nuts for T-Slots
rhombus, semi-finished



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Clamping Screws

EH 23030.
T-Bolts
DIN 787



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EH 23040.
Studs
DIN 6379 for T-nuts



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EH 23040.
Studs
DIN 6379 b₁ long for nut for
T-Slots



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EH 23040.
Studs
with internal hexagon, similar
to DIN 6379, for nuts for
T-Slots



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Spherical / Plain Washers

EH 23050.
Spherical Washers /
Conical Seats
DIN 6319



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EH 23050.
Spherical Washers /
Conical Seats
similar to DIN 6319, stainless
steel



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EH 23050.
Compact Spherical
Washers / Conical Seats
similar to DIN 6319



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EH 23060.
Shaft / Plain Washers
DIN 6340 heat-treated



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EH 23060.
Washers
high precision design



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EH 23061.
Shaft / Plain Washers



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Clamping Elements

Clamping Nuts

EH 23070.
Fixture Nuts
 DIN 6330 (height 1,5 d)



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EH 23080.
Collar Nuts
 DIN 6331 (height 1,5 d)



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EH 23080.
Collar Nuts with Conical Seat



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EH 23090.
Extension Nuts
 (height 3 d)



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Precision Slot Nuts

EH 23100.
Drive Blocks
 DIN 2079



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EH 23110.
Fixed Slot Tenons



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EH 23110.
Fixed Slot Tenons
 with cylindrical fastening



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EH 23110.
Centering Pins



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EH 23110.
Centering Pins
 stepped



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EH 23120.
Loose Slot Tenons
 DIN 6323



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EH 23130.
Low Slot Tenons



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Positioning Clamping Elements

EH 23111.
Positioning Clamping Pins



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EH 23111.
Manual Handles
 for positioning clamping pins



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EH 23111.
Bushings
 for positioning clamping pins



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EH 23111.
Locating Bushings
 for positioning clamping pins,
 for press fit



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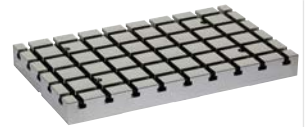
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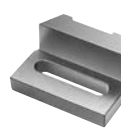
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Elements
system V40/V70



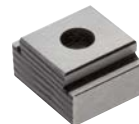
→ p. 797

EH 1068.600
Adapter Slot Centering
Blocks
system V40/V70



→ p. 798

EH 1068.800
Adapter Slot Blocks
system V40/V70



→ p. 798

T-Slot Systems

Standard Ranges T-Slot Systems V40 / V70

EH 1090
Standard Ranges V40



→ p. 799

EH 1190
Standard Ranges V70



→ p. 801

Hole and Dowel Systems

Base Elements

<p>EH 1500.200 - EH 1600.900 Base Plates</p>  <p>→ p. 807</p>	<p>EH 1501.300 - EH 1501.500 Base Plates</p>  <p>→ p. 808</p>	<p>EH 1506.200 - EH 1606.800 Clamping Angles</p>  <p>→ p. 809</p>	<p>EH 1508.200 - EH 1608.600 Clamping Cubes</p>  <p>→ p. 810</p>
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Mounting Elements

<p>EH 1505.200 - EH 1605.400 Clamping Angles</p>  <p>→ p. 811</p>	<p>EH 1605.700 Clamping Angles</p>  <p>→ p. 812</p>	<p>EH 1510.100 - EH 1610.100 Consoles</p>  <p>→ p. 813</p>	<p>EH 1510.200 - EH 1610.200 Consoles</p>  <p>→ p. 814</p>
<p>EH 1511.500 - EH 1611.500 Clamping Angles</p>  <p>→ p. 815</p>	<p>EH 1512.000 - EH 1612.400 Mounting Elements</p>  <p>→ p. 816</p>	<p>EH 1513.600 - EH 1613.800 Clamping Bars</p>  <p>→ p. 816</p>	<p>EH 1614.500 Stops</p>  <p>→ p. 817</p>
<p>EH 1514.700 - EH 1614.700 Clamping Heads</p>  <p>→ p. 818</p>	<p>EH 1617.400 - EH 1617.900 Spacers</p>  <p>→ p. 819</p>	<p>EH 1520.400 - EH 1621.700 Stop Angles</p>  <p>→ p. 819</p>	<p>EH 1533.000 - EH 1633.200 Clamping Bars</p>  <p>→ p. 820</p>
<p>EH 1644.000 Thread Bolts</p>  <p>→ p. 820</p>	<p>EH 1547.900 - EH 1647.900 Supporting Plates</p>  <p>→ p. 821</p>	<p>EH 1548.100 - EH 1648.100 V-Blocks</p>  <p>→ p. 822</p>	<p>EH 1548.500 - EH 1648.500 V-Blocks</p>  <p>→ p. 823</p>

Hole and Dowel Systems

EH 1548.700 - EH 1648.800
V-Block Elements right/left



→ p. 824

EH 1549.200 - EH 1649.200
Positioning Clamping Bars



→ p. 825

EH 1550.000 - EH 1650.000
Supporting Bars



→ p. 826

EH 1551.500 - EH 1651.700
Stops
cylindrical



→ p. 826

EH 1553.500 - EH 1653.500
Positioning Clamping
Cylinders



→ p. 827

EH 1555.500 - EH 1655.500
Position Screws



→ p. 828

EH 1557.000 - EH 1657.000
Screw Plugs



→ p. 828

EH 1580.000
System Adapter Plates



→ p. 829

EH 1581.000
System Adapter Plates



→ p. 829

EH 1681.000
System Adapter Plates



→ p. 830

Assortments Hole and Dowel Systems L12 / L16

EH 1590
Standard Ranges L12



























→ p. 831

EH 1690
Standard Ranges L16



→ p. 833

Standard Parts for Fixture Systems

<p>EH 22290. C-Washers DIN 6372</p>  <p>→ p. 838</p>	<p>EH 22540. Grub Screws DIN 6332 with thrust point</p>  <p>→ p. 839</p>	<p>EH 22680. Seating Pins ribbed or pointed</p>  <p>→ p. 840</p>	<p>EH 22680. Seating Pins pin shape</p>  <p>→ p. 840</p>
<p>EH 22690. Pins</p>  <p>→ p. 841</p>	<p>EH 22700. Ball-Ended Thrust Screws headless, ball protected against rotating</p>  <p>→ p. 843</p>	<p>EH 22730. Self-Aligning Pads</p>  <p>→ p. 844</p>	<p>EH 22731. Self-Aligning Pads self-resetting</p>  <p>→ p. 844</p>
<p>EH 22740. Self-Aligning Pads adjustable</p>  <p>→ p. 846</p>	<p>EH 22741. Self-Aligning Pads adjustable, self-resetting</p>  <p>→ p. 847</p>	<p>EH 23010. Nuts for T-Slots DIN 508</p>  <p>→ p. 848</p>	<p>EH 23020. Nuts for T-Slots extended</p>  <p>→ p. 848</p>
<p>EH 23020. Nuts for T-Slots rhombus</p>  <p>→ p. 849</p>	<p>EH 23040. Studs DIN 6379 b₁ long for nut for T-Slots</p>  <p>→ p. 850</p>	<p>EH 23050. Spherical Washers / Conical Seats DIN 6319</p>  <p>→ p. 851</p>	<p>EH 23060. Shaft / Plain Washers DIN 6340 heat-treated</p>  <p>→ p. 852</p>
<p>EH 23070. Fixture Nuts DIN 6330 (height 1,5 d)</p>  <p>→ p. 853</p>	<p>EH 23080. Collar Nuts DIN 6331 (height 1,5 d)</p>  <p>→ p. 854</p>	<p>EH 23080. Collar Nuts with Conical Seat</p>  <p>→ p. 855</p>	<p>EH 23090. Extension Nuts (height 3 d)</p>  <p>→ p. 856</p>
<p>EH 23110. Fixed Slot Tenons with cylindrical fastening</p>  <p>→ p. 857</p>	<p>EH 23110. Centering Pins</p>  <p>→ p. 858</p>	<p>EH 23110. Centering Pins stepped</p>  <p>→ p. 859</p>	<p>EH 23120. Loose Slot Tenons DIN 6323</p>  <p>→ p. 860</p>

Standard Parts for Fixture Systems

EH 23150.
Clamps
DIN 6315 B forked



→ p. 861

EH 23180.
Clamps
with nose



→ p. 862

EH 23700.
Clamping Element Systems



→ p. 863

EH 23700.
Straight Clamps
long



→ p. 864

EH 23700.
Intermediate Elements



→ p. 865

EH 23700.
Base Elements



→ p. 866

EH 23210.
Down-Hold Clamps
without clamping lever



→ p. 867

EH 23280.
Stops
cylindrical



→ p. 868

EH 23220.
Bedding Supports



→ p. 869

EH 23220.
Supporting Elements



→ p. 870

EH 23320.
Floating Clamps
compact construction,
combined clamping and
locking M 12



→ p. 872

EH 23320.
Floating Clamps
compact construction,
separate clamping and
locking M 12



→ p. 873

EH 23320.
Floating Clamps
combined clamping and
locking M 12



→ p. 874

EH 23320.
Floating Clamps
separate clamping and
locking M 12



→ p. 875

EH 23320.
Standard Clamping Jaws
for floating clamp M 12



→ p. 876

EH 23320.
Clamping Jaws
for floating clamp M 12



→ p. 877

EH 23310.
Down-Thrust Clamps
swivelling, size 25



→ p. 880

EH 23310.
Down-Thrust Clamps
swivelling, size 32



→ p. 881

EH 23310.
Down-Thrust Clamps
swivelling, size 40



→ p. 882

EH 23310.
Down-Thrust Clamps
moveable, size 40



→ p. 883

EH 23310.
Positioning Rings
for down-thrust clamp



→ p. 885

EH 23310.
Height Adjusting Cylinders



→ p. 886

EH 23690.
Compact Clamps



→ p. 887
























EH 23690.
Height Adapters
for compact clamp



→ p. 889

Multiple Clamping Systems

Components

<p>EH 1585. Clamping Bars length 100</p>  <p>→ p. 893</p>	<p>EH 1585. Clamping Bars length 200</p>  <p>→ p. 894</p>	<p>EH 1585. Clamping Bars length 300</p>  <p>→ p. 895</p>	<p>EH 1585. Clamping Bars length 400 - 700</p>  <p>→ p. 896</p>
<p>EH 23250. Taper Clamping Units plain / ribbed, M8</p>  <p>→ p. 897</p>	<p>EH 23250. Taper Clamping Units plain / ribbed, M12</p>  <p>→ p. 898</p>	<p>EH 23250. Taper Clamping Units with screw fastened thread, M12</p>  <p>→ p. 899</p>	<p>EH 23250. Adapter for Taper Clamping Units for clamping bars</p>  <p>→ p. 900</p>
<p>EH 23250. Anti-Turn Locking Devices for Taper Clamping Units for clamping bars</p>  <p>→ p. 901</p>	<p>EH 23250. Stop Plates for Taper Clamping Units for clamping bars</p>  <p>→ p. 902</p>	<p>EH 1586. Lateral Stops</p>  <p>→ p. 903</p>	<p>EH 1586. Insertion Tools</p>  <p>→ p. 904</p>
<p>EH 1586. Supports for Clamping Bar</p>  <p>→ p. 905</p>	<p>EH 1586. Supports for Clamping Bar with spring-loaded catch</p>  <p>→ p. 906</p>	<p>EH 1586. Supports for Clamping Bar magnetic</p>  <p>→ p. 906</p>	<p>EH 1586. Stops diamond coated</p>  <p>→ p. 907</p>
<p>EH 1586. Stops gripper studs</p>  <p>→ p. 908</p>	<p>EH 1586. Stops horizontal prisms</p>  <p>→ p. 909</p>	<p>EH 1586. Stops vertical prisms</p>  <p>→ p. 910</p>	<p>EH 1586. Stops soft</p>  <p>→ p. 911</p>
<p>EH 1586. Stops ribbed</p>  <p>→ p. 912</p>	<p>EH 1586. Stops plain</p>  <p>→ p. 913</p>	<p>EH 1586. Stops with mounting thread</p>  <p>→ p. 914</p>	

Multi-Vices

Clamping Units

EH 1586.
Combination Clamping
Bars



→ p. 915

Standard Ranges

EH 1586.410
Standard Ranges EH 1586.



→ p. 917

EH 1586.411
Standard Ranges EH 1586.



→ p. 917

EH 1586.412
Standard Ranges EH 1586.



→ p. 917

EH 1586.413
Standard Ranges EH 1586.



→ p. 917

EH 1586.414
Standard Ranges EH 1586.



→ p. 918

EH 1586.415
Standard Ranges EH 1586.



→ p. 918

EH 1586.416
Standard Ranges EH 1586.



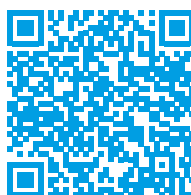
→ p. 918

Multi-Vices

EH 1700.
Multi-Vices
MS 125



→ p. 922




You will find details and your
contact persons under:
www.halder.com/Multi-Vices

Basic Elements

Clamping Angles

<p>EH 1906. Clamping Angles semi-finished</p>  <p>→ p. 932</p>	<p>EH 1906. Clamping Angles</p>  <p>→ p. 933</p>	<p>EH 1910. Clamping Angles welded, semi-finished</p>  <p>→ p. 934</p>	<p>EH 1910. Clamping Angles one-sided, welded, semi-finished</p>  <p>→ p. 935</p>
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Clamping Cubes









<p>EH 1908. Clamping Cubes semi-finished</p>  <p>→ p. 936</p>	<p>EH 1910. Clamping Cubes welded, semi-finished</p>  <p>→ p. 937</p>
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Base Plates

<p>EH 1912. Base Plates semi-finished</p>  <p>→ p. 938</p>	<p>EH 1912. Base Plates with positioning holes</p>  <p>→ p. 939</p>
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Basic Elements

Connecting Elements / Connecting Rings

<p>EH 1990. Connecting Elements hydraulically operated, double acting, with lifting-off and blow-out</p>  <p>→ p. 946</p>	<p>EH 1990. Connecting Elements hydraulically operated, single acting with lifting-off</p>  <p>→ p. 947</p>	<p>EH 1990. Connecting Elements modular, mechanically operated</p>  <p>→ p. 948</p>	<p>EH 1990. Connecting Elements modular, hydraulically operated</p>  <p>→ p. 949</p>
<p>EH 1990. Connecting Elements modular, pneumatically operated</p>  <p>→ p. 950</p>	<p>EH 1990. Connecting Elements modular, pneumatically operated, reinforced</p>  <p>→ p. 951</p>	<p>EH 1990. Connecting Elements modular, mechanically operated, protected against twisting</p>  <p>→ p. 952</p>	<p>EH 1990. Connecting Elements modular, hydraulically operated, protected against twisting</p>  <p>→ p. 953</p>

Zero-Point Clamping Systems

EH 1990.
Connecting Elements
modular, pneumatically
operated, protected against
twisting



→ p. 954

EH 1990.
Connecting Elements
modular, pneumatically
operated, reinforced,
protected against twisting



→ p. 955

EH 1990.
Control Modules



→ p. 956

EH 1990.
Connecting Rings



→ p. 957

Base Plates and Supporting Plates

EH 1990.
Base Plates
for 2 connecting elements



→ p. 960

EH 1990.
Base Plates
with 2 connecting elements



→ p. 961

EH 1990.
Base Plates
for 4 connecting elements



→ p. 962

EH 1990.
Base Plates
with 4 connecting elements



→ p. 963

EH 1990.
Base Plates
for 4 double acting
connecting elements



→ p. 964

EH 1990.
Base Plates
with 4 double acting
connecting elements



→ p. 965

EH 1990.
Base Plates
for 4 single acting
connecting elements



→ p. 966

EH 1990.
Base Plates
with 4 single acting
connecting elements



→ p. 967

EH 1990.
Supporting Plates
with 2 connecting rings



→ p. 968

EH 1990.
Supporting Plates
with 4 connecting rings



→ p. 969

Accessories for Zero-Point Clamping Systems

EH 1990.
Coverings
for connecting elements
























→ p. 970

2 MACHINE AND

FIXTURE ELEMENTS



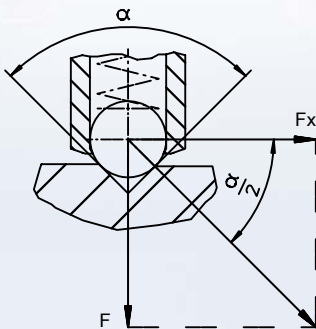
	Product group	Page
	Spring Plungers	50
	Index Plungers / Index Bolts	101
	Lateral Spring Plungers	152
	Locking Elements	183
	Shaft / C-Washers	187
	Ball Lock Connectors	190
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	Grub Screws / Thrust Pads	280
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	Support Legs	291
	Locating and Seating Elements	298
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	Self-Aligning Pads	337
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SPRING PLUNGERS

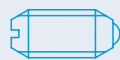
METRIC MODELS



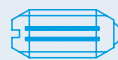
CALCULATION OF THE INDEXING RESISTANCE



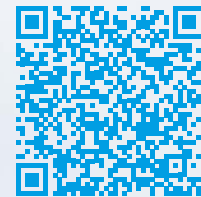
Sample calculation for:
 $\alpha = 60^\circ$, $F_x = 1,732 \times F$
 $\alpha = 90^\circ$, $F_x = F$
 $\alpha = 120^\circ$, $F_x = 0,577 \times F$



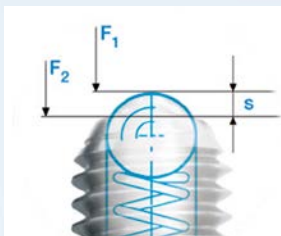
Standard spring load



Heavy spring load



www.halder.com/SpringPlungers-Video



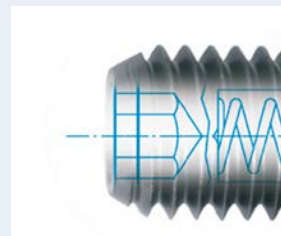
CERTIFIED

Certified spring load F_1 and F_2 and stroke s .



PREMIUM QUALITY

First-rate quality and minimum wear thanks to the use of hardened pins.



SECURE

Outstanding functional reliability thanks to - among other things - the assembly procedure used and a specific manufacturing process.



CLEAR

Coherent, uniform and clearly visible identification of the spring load thanks to a permanent marking on the body.

Spring Plungers • with ball and internal hexagon

EH 22030.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

- Body**
- Free cutting steel, blackened
 - Stainless steel 1.4305

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

Spring

- Stainless steel

Characteristic

Heavy spring load statt Reinforced spring load



Standard spring load



Heavy spring load

MORE INFORMATION

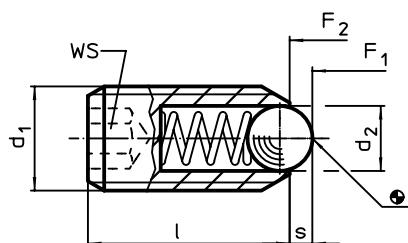
Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

References

Thread lock on request, please refer to appendix - Technical Data -
Calculation of indexing resistance, please refer to appendix - Technical Data -

DRAWING



ORDER INFORMATION

Dimensions			WS	Stroke s	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	l			F ₁ ~	F ₂ ~			
[mm]			[mm]	[mm]	[N]				
free cutting steel, standard spring load									
M 3	1.5	8	1.5	0.4	3.0	4.5	250	0.2	22030.0003
M 4	2.5	12	2.0	0.8	8.5	14.0	250	0.6	22030.0004
M 5	3.0	14	2.5	0.9	8.0	14.0	250	1.2	22030.0005
M 6	3.5	15	3.0	1.0	11.0	18.0	250	1.7	22030.0006
M 8	4.5	18	4.0	1.5	18.0	31.0	250	3.9	22030.0008
M10	6.0	23	5.0	2.0	24.0	45.0	250	8.0	22030.0010
M12	8.0	26	6.0	2.5	26.0	49.0	250	13.0	22030.0012
M16	10.0	33	8.0	3.5	41.0	86.0	250	32.0	22030.0016
M20	12.0	43	10.0	4.5	56.0	111.0	250	67.0	22030.0020
M24	15.0	48	12.0	5.5	81.0	151.0	250	105.0	22030.0024
free cutting steel, heavy spring load									
M 3	1.5	8	1.5	0.4	5.0	9.0	250	0.3	22030.0043
M 4	2.5	12	2.0	0.8	12.0	18.0	250	0.6	22030.0044
M 5	3.0	14	2.5	0.9	15.0	22.0	250	1.2	22030.0045
M 6	3.5	15	3.0	1.0	19.0	28.0	250	1.7	22030.0046
M 8	4.5	18	4.0	1.5	36.0	62.0	250	4.0	22030.0048
M10	6.0	23	5.0	2.0	57.0	104.0	250	8.2	22030.0050
M12	8.0	26	6.0	2.5	61.0	110.0	250	13.0	22030.0052
M16	10.0	33	8.0	3.5	68.0	142.0	250	32.0	22030.0056
M20	12.0	43	10.0	4.5	84.0	166.0	250	67.0	22030.0060
M24	15.0	48	12.0	5.5	127.0	237.0	250	106.0	22030.0064

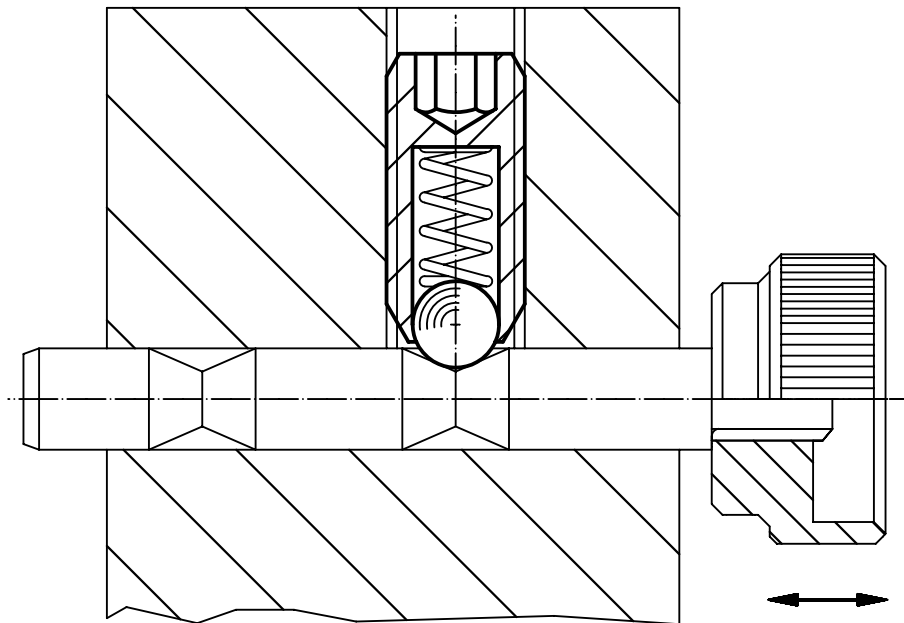
¹⁾ statistical average value



Dimensions			WS [mm]	Stroke s [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	l			F ₁ ~	F ₂ ~			
[mm]					[N]				
stainless steel, standard spring load									
M 3	1.5	8	1.5	0.4	3.0	4.5	250	0.2	22030.0203
M 4	2.5	12	2.0	0.8	8.5	14.0	250	0.6	22030.0204
M 5	3.0	14	2.5	0.9	8.0	14.0	250	1.2	22030.0205
M 6	3.5	15	3.0	1.0	11.0	18.0	250	1.7	22030.0206
M 8	4.5	18	4.0	1.5	18.0	31.0	250	4.0	22030.0208
M10	6.0	23	5.0	2.0	24.0	45.0	250	8.0	22030.0210
M12	8.0	26	6.0	2.5	26.0	49.0	250	12.0	22030.0212
M16	10.0	33	8.0	3.5	41.0	86.0	250	32.0	22030.0216
M20	12.0	43	10.0	4.5	56.0	111.0	250	67.0	22030.0220
M24	15.0	48	12.0	5.5	81.0	151.0	250	106.0	22030.0224
stainless steel, heavy spring load									
M 3	1.5	8	1.5	0.4	5.0	9.0	250	0.3	22030.0243
M 4	2.5	12	2.0	0.8	12.0	18.0	250	0.6	22030.0244
M 5	3.0	14	2.5	0.9	15.0	22.0	250	1.2	22030.0245
M 6	3.5	15	3.0	1.0	19.0	28.0	250	1.8	22030.0246
M 8	4.5	18	4.0	1.5	36.0	62.0	250	4.0	22030.0248
M10	6.0	23	5.0	2.0	57.0	104.0	250	8.2	22030.0250
M12	8.0	26	6.0	2.5	61.0	110.0	250	13.0	22030.0252
M16	10.0	33	8.0	3.5	68.0	142.0	250	32.0	22030.0256
M20	12.0	43	10.0	4.5	84.0	166.0	250	67.0	22030.0260
M24	15.0	48	12.0	5.5	127.0	237.0	250	106.0	22030.0264

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • with pin and internal hexagon

EH 22030.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

- Pin**
 - Free cutting steel, hardened, blackened
 - Stainless Steel 1.4305, nitrided

Body

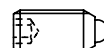
- Free cutting steel, blackened
- Stainless steel 1.4305

Spring

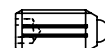
- Stainless steel

Characteristic

Heavy spring load statt Reinforced spring load



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

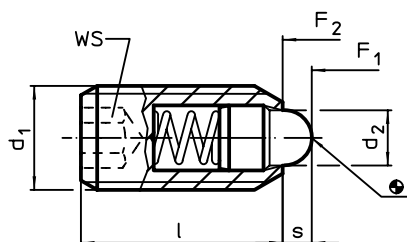
References

Thread lock on request, please refer to appendix - Technical Data -

Further products

Spring Plungers, with pin and internal hexagon - INCH..... → p. 93

DRAWING



ORDER INFORMATION

Dimensions			WS	Stroke s	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	l			F ₁ ~	F ₂ ~			
[mm]			[mm]	[mm]	[N]				
free cutting steel, standard spring load									
M 4	1.8	12	2.0	1.5	4.5	12.5	250	0.6	22030.0104
M 5	2.4	14	2.5	2.0	5.0	13.0	250	1.2	22030.0105
M 6	2.7	15	3.0	2.0	6.0	17.0	250	1.8	22030.0106
M 8	3.8	18	4.0	2.0	16.0	33.0	250	4.1	22030.0108
M10	4.5	23	5.0	2.5	19.0	42.0	250	8.4	22030.0110
M12	6.2	26	6.0	3.5	22.0	57.0	250	13.0	22030.0112
M16	8.5	33	8.0	4.5	38.0	78.0	250	32.0	22030.0116
M20	10.0	43	10.0	6.5	39.0	81.0	250	68.0	22030.0120
M24	13.0	48	12.0	8.0	72.0	155.0	250	106.0	22030.0124
free cutting steel, heavy spring load									
M 6	2.7	15	3.0	2.0	11.0	25.0	250	1.9	22030.0146
M 8	3.8	18	4.0	2.0	23.0	59.0	250	4.1	22030.0148
M10	4.5	23	5.0	2.5	20.0	54.0	250	8.4	22030.0150
M12	6.2	26	6.0	3.5	38.0	96.0	250	13.0	22030.0152
M16	8.5	33	8.0	4.5	50.0	100.0	250	32.0	22030.0156
M20	10.0	43	10.0	6.5	52.0	133.0	250	68.0	22030.0160
M24	13.0	48	12.0	8.0	91.0	223.0	250	106.0	22030.0164

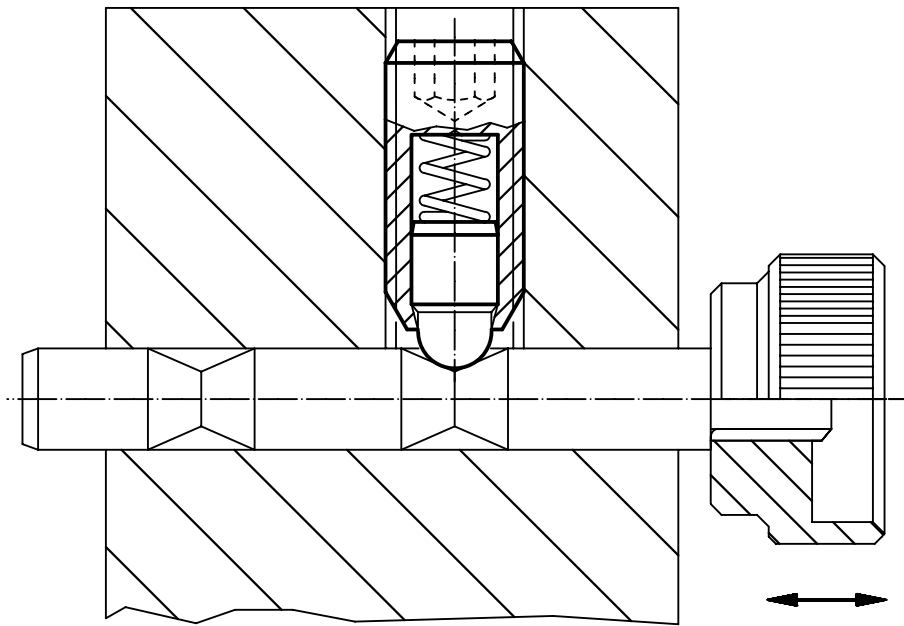
¹⁾ statistical average value



Dimensions			WS [mm]	Stroke s [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	l			F ₁ ~	F ₂ ~			
[mm]					[N]				
stainless steel, standard spring load									
M 4	1.8	12	2.0	1.5	4.5	12.5	250	0.6	22030.0304
M 5	2.4	14	2.5	2.0	5.0	13.0	250	1.2	22030.0305
M 6	2.7	15	3.0	2.0	6.0	17.0	250	1.9	22030.0306
M 8	3.8	18	4.0	2.0	16.0	33.0	250	4.2	22030.0308
M10	4.5	23	5.0	2.5	19.0	42.0	250	8.4	22030.0310
M12	6.2	26	6.0	3.5	22.0	57.0	250	13.0	22030.0312
M16	8.5	33	8.0	4.5	38.0	78.0	250	32.0	22030.0316
M20	10.0	43	10.0	6.5	39.0	81.0	250	68.0	22030.0320
M24	13.0	48	12.0	8.0	72.0	155.0	250	104.0	22030.0324
stainless steel, heavy spring load									
M 6	2.7	15	3.0	2.0	11.0	25.0	250	1.9	22030.0346
M 8	3.8	18	4.0	2.0	23.0	59.0	250	4.2	22030.0348
M10	4.5	23	5.0	2.5	20.0	54.0	250	8.4	22030.0350
M12	6.2	26	6.0	3.5	38.0	96.0	250	13.0	22030.0352
M16	8.5	33	8.0	4.5	50.0	100.0	250	32.0	22030.0356
M20	10.0	43	10.0	6.5	52.0	133.0	250	68.0	22030.0360
M24	13.0	48	12.0	8.0	91.0	223.0	250	108.0	22030.0364

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • headed, with ball and internal hexagon

EH 22030.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. Precise screwing depth due to head.

Material

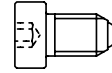
- Body**
- Free cutting steel, blackened
 - Stainless steel 1.4305

Ball

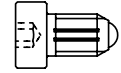
- Ball-bearing steel, hardened
- Stainless steel, hardened

Spring

- Stainless steel



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

References

Thread lock on request, please refer to appendix - Technical Data -
Calculation of indexing resistance, please refer to appendix - Technical Data -

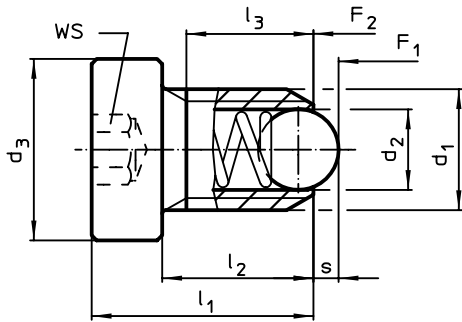
Assembly

Respect dimension l_3 for M 4 / M 5.

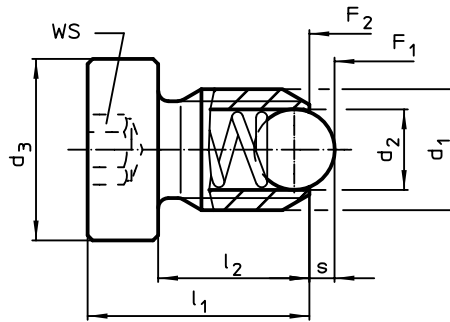
Characteristic

Heavy spring load statt Reinforced spring load

DRAWING



Size M4+M5



Size M6-M12

ORDER INFORMATION

Dimensions						WS	Stroke s	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃ min.			F ₁ ~	F ₂ ~			
[mm]						[mm]	[mm]	[N]				
free cutting steel, standard spring load												
M 4	2.5	6	12	9.0	7.5	2.0	0.8	8.0	14.0	250	1.0	22030.0930
M 5	3.0	8	14	10.0	8.2	2.5	0.9	8.0	14.0	250	2.3	22030.0931
M 6	3.5	10	15	10.0	-	3.0	1.0	11.0	18.0	250	3.9	22030.0932
M 8	4.5	13	18	12.5	-	4.0	1.5	18.0	31.0	250	7.8	22030.0933
M10	6.0	16	23	17.0	-	5.0	2.0	24.0	45.0	250	14.0	22030.0934
M12	8.0	18	26	19.0	-	6.0	2.5	26.0	49.0	250	21.0	22030.0935
free cutting steel, heavy spring load												
M 4	2.5	6	12	9.0	7.5	2.0	0.8	12.0	18.0	250	1.1	22030.1040
M 5	3.0	8	14	10.0	8.2	2.5	0.9	15.0	22.0	250	2.3	22030.1050
M 6	3.5	10	15	10.0	-	3.0	1.0	19.3	26.6	250	3.9	22030.1060
M 8	4.5	13	18	12.5	-	4.0	1.5	36.0	60.5	250	7.8	22030.1080
M10	6.0	16	23	17.0	-	5.0	2.0	57.0	103.5	250	14.0	22030.1100
M12	8.0	18	26	19.0	-	6.0	2.5	61.0	110.0	250	21.0	22030.1120

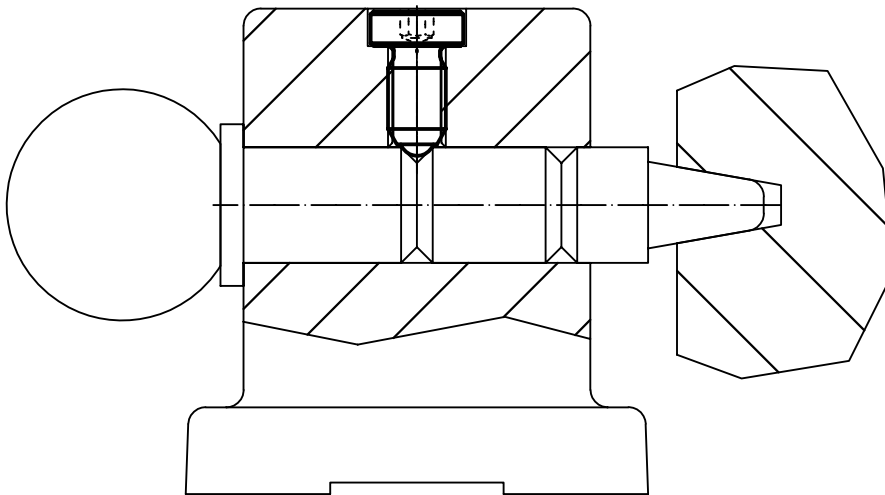
¹⁾ statistical average value



Dimensions						WS	Stroke s	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃ min.			F ₁ ~	F ₂ ~			
[mm]						[mm]	[mm]	[N]		[°C]	[g]	
stainless steel, standard spring load												
M 4	2.5	6	12	9.0	7.5	2.0	0.8	8.0	14.0	250	1.1	22030.0940
M 5	3.0	8	14	10.0	8.2	2.5	0.9	8.0	14.0	250	2.3	22030.0941
M 6	3.5	10	15	10.0	–	3.0	1.0	11.0	18.0	250	3.9	22030.0942
M 8	4.5	13	18	12.5	–	4.0	1.5	18.0	31.0	250	7.8	22030.0943
M10	6.0	16	23	17.0	–	5.0	2.0	24.0	45.0	250	14.0	22030.0944
M12	8.0	18	26	19.0	–	6.0	2.5	26.0	49.0	250	21.0	22030.0945
stainless steel, heavy spring load												
M 4	2.5	6	12	9.0	7.5	2.0	0.8	12.0	18.0	250	1.1	22030.2040
M 5	3.0	8	14	10.0	8.2	2.5	0.9	15.0	22.0	250	2.3	22030.2050
M 6	3.5	10	15	10.0	–	3.0	1.0	19.3	26.6	250	3.9	22030.2060
M 8	4.5	13	18	12.5	–	4.0	1.5	36.0	60.5	250	7.9	22030.2080
M10	6.0	16	23	17.0	–	5.0	2.0	57.0	103.5	250	14.0	22030.2100
M12	8.0	18	26	19.0	–	6.0	2.5	61.0	110.0	250	22.0	22030.2120

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • with moveable ball and internal hexagon

EH 22031.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. The running of the ball minimises wear on the counterpart, this also results in a positive locking behaviour depending on the counterpart.

Another advantage of the plastic ball is the electric insulation.

Material

- Body**
 - Free cutting steel, blackened
 - Stainless steel 1.4305

Bearing

- Plastic

Ball

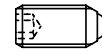
- Ball-bearing steel, hardened
- Stainless steel, hardened

Spring

- Stainless steel

Characteristic

Heavy spring load statt Reinforced spring load



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.

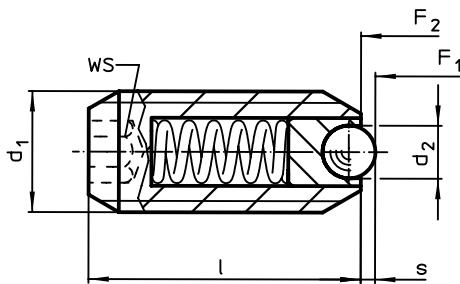
Spring plungers are specially tested for spring range and forces.

References

Thread lock on request, please refer to appendix - Technical Data -

Calculation of indexing resistance, please refer to appendix - Technical Data -

DRAWING



ORDER INFORMATION

Dimensions			WS	Stroke s	Spring load ¹⁾		min.	max.	[g]	Art. No.
d ₁	d ₂	l			F ₁ ~	F ₂ ~				
[mm]			[mm]	[mm]	[N]		[°C]			
free cutting steel, standard spring load										
M 5	2.0	14	2.5	0.50	4.8	6.8	-30	90	1.0	22031.0005
M 6	2.5	15	3.0	0.70	6.3	10.0	-30	90	1.6	22031.0006
M 8	3.5	18	4.0	0.95	16.0	24.0	-30	90	3.7	22031.0008
M10	4.5	23	5.0	1.40	18.8	31.7	-30	90	7.4	22031.0010
M12	6.5	26	6.0	2.50	24.0	49.0	-30	90	11.0	22031.0012
M16	8.5	33	8.0	3.10	38.0	68.0	-30	90	30.0	22031.0016
free cutting steel, heavy spring load										
M 5	2.0	14	2.5	0.50	10.0	14.0	-30	90	1.1	22031.0045
M 6	2.5	15	3.0	0.70	11.0	16.0	-30	90	1.6	22031.0046
M 8	3.5	18	4.0	0.95	23.0	40.0	-30	90	3.7	22031.0048
M10	4.5	23	5.0	1.40	28.0	54.3	-30	90	7.4	22031.0050
M12	6.5	26	6.0	2.50	36.5	77.3	-30	90	12.0	22031.0052
M16	8.5	33	8.0	3.10	50.0	88.7	-30	90	30.0	22031.0056

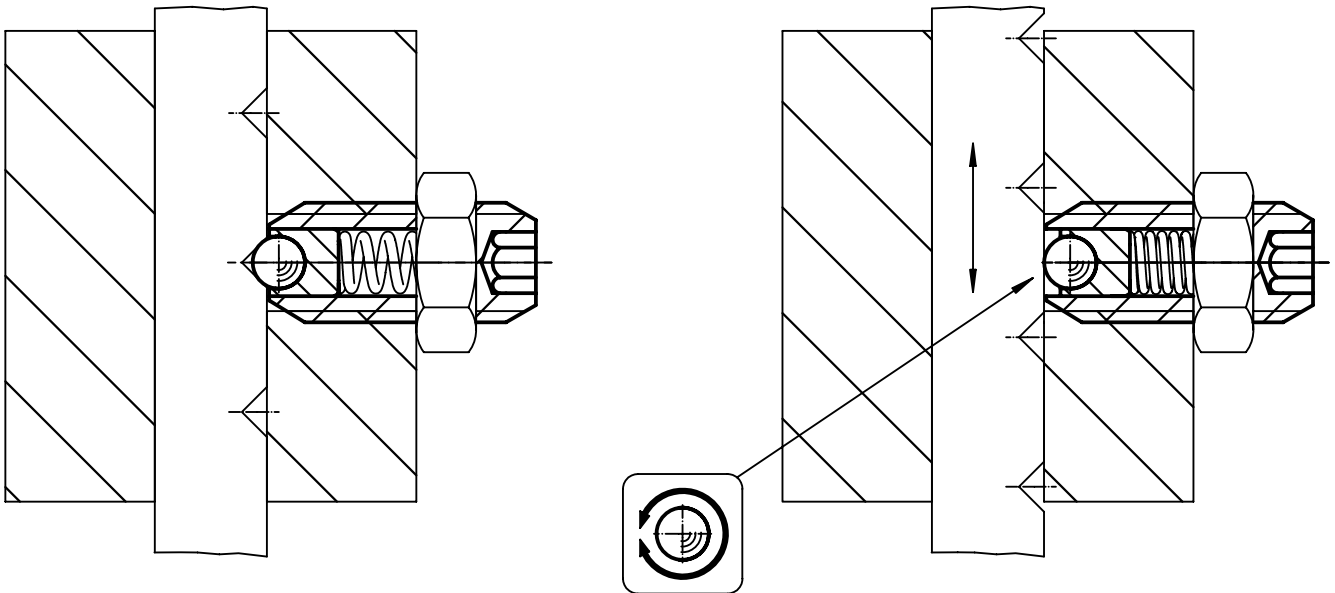
¹⁾ statistical average value



Dimensions			WS [mm]	Stroke s [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.
d ₁	d ₂	l			F ₁ ~	F ₂ ~	min.	max.		
[mm]					[N]		[°C]			
stainless steel, standard spring load										
M 5	2.0	14	2.5	0.50	4.8	6.8	-30	90	1.1	22031.0205
M 6	2.5	15	3.0	0.70	6.3	10.0	-30	90	1.6	22031.0206
M 8	3.5	18	4.0	0.95	16.0	24.0	-30	90	3.7	22031.0208
M10	4.5	23	5.0	1.40	18.8	31.7	-30	90	7.5	22031.0210
M12	6.5	26	6.0	2.50	24.0	49.0	-30	90	11.0	22031.0212
M16	8.5	33	8.0	3.10	38.0	68.0	-30	90	30.0	22031.0216
stainless steel, heavy spring load										
M 5	2.0	14	2.5	0.50	10.0	14.0	-30	90	1.1	22031.0245
M 6	2.5	15	3.0	0.70	11.0	16.0	-30	90	1.6	22031.0246
M 8	3.5	18	4.0	0.95	23.0	40.0	-30	90	3.7	22031.0248
M10	4.5	23	5.0	1.40	28.0	54.3	-30	90	7.4	22031.0250
M12	6.5	26	6.0	2.50	36.5	77.3	-30	90	11.0	22031.0252
M16	8.5	33	8.0	3.10	50.0	88.7	-30	90	31.0	22031.0256

¹⁾ statistical average value

APPLICATION EXAMPLE



**PRODUCT DESCRIPTION**

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material**Body**

- Thermoplastic POM, blue

Ball

- Stainless steel, hardened
- Thermoplastic POM, white

Spring

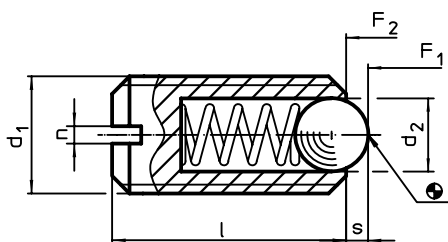
- Stainless steel

MORE INFORMATION**Notes**

Special types on request.
Spring plungers are specially tested for spring range and forces.

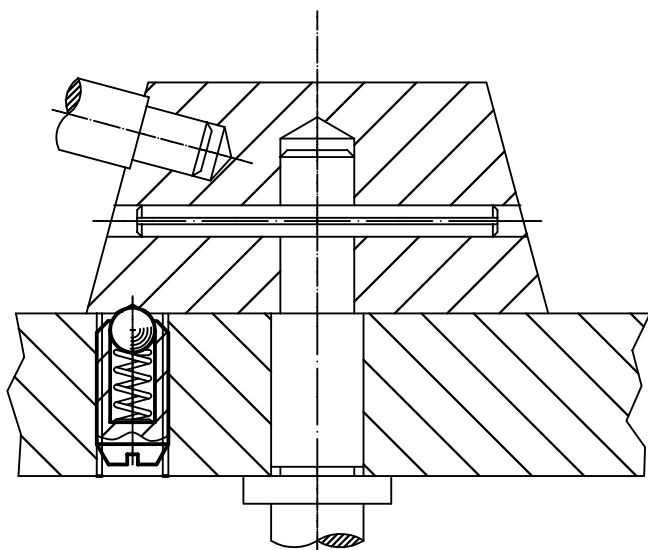
References

Thread lock on request, please refer to appendix - Technical Data -
Calculation of indexing resistance, please refer to appendix - Technical Data -

DRAWING**ORDER INFORMATION**

Dimensions				Stroke s [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.
d ₁	d ₂	l	n		F ₁ ~ [N]	F ₂ ~ [N]	min.	max.		
[mm]							[°C]			
ball from stainless steel										
M 6	3.5	14	1.0	0.9	12	17	-30	50	0.5	22040.0006
M 8	5.0	16	1.2	1.5	20	35	-30	50	1.3	22040.0008
M10	6.0	19	1.5	1.9	25	45	-30	50	2.5	22040.0010
ball from thermoplastic										
M 6	3.5	14	1.0	0.9	12	17	-30	50	0.4	22040.0406
M 8	5.0	16	1.2	1.5	20	35	-30	50	0.9	22040.0408
M10	6.0	19	1.5	1.9	25	45	-30	50	1.8	22040.0410

¹⁾ statistical average value

APPLICATION EXAMPLE

Spring Plungers • with ball and slot

EH 22050.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

Spring

- Stainless steel

Characteristic

Standard spring load: no marking

Reinforced spring load: marked with two lines

MORE INFORMATION

Notes

Special types on request.

Spring plungers are specially tested for spring range and forces.

References

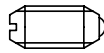
Thread lock on request, please refer to appendix - Technical Data -

Calculation of indexing resistance, please refer to appendix - Technical Data -

Further products

Spring Plungers, with ball and slot -

INCH → p. 96

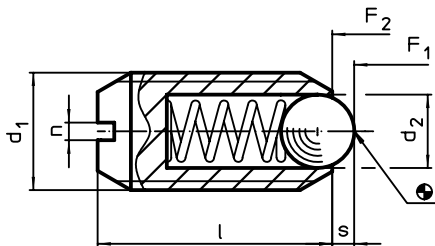


Standard spring load



Heavy spring load

DRAWING



ORDER INFORMATION

Dimensions				Stroke s	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	l	n		F ₁ ~	F ₂ ~			
[mm]				[mm]	[N]				
free cutting steel, standard spring load									
M 2	1.0	4	0.25	0.3	0.8	1.5	250	0.1	22050.0002
M 3	1.5	7	0.40	0.4	3.0	4.5	250	0.2	22050.0003
M 4	2.5	9	0.60	0.8	8.5	14.0	250	0.4	22050.0004
M 5	3.0	12	0.80	0.9	8.0	14.0	250	1.0	22050.0005
M 6	3.5	14	1.00	1.0	11.0	18.0	250	1.7	22050.0006
M 8	4.5	16	1.20	1.5	18.0	31.0	250	3.5	22050.0008
M10	6.0	19	1.50	2.0	24.0	45.0	250	6.5	22050.0010
M12	8.0	22	2.00	2.5	26.0	49.0	250	11.0	22050.0012
M16	10.0	24	2.00	3.5	41.0	86.0	250	22.0	22050.0016
M20	12.0	30	2.50	4.5	56.0	111.0	250	45.0	22050.0020
M24	15.0	34	3.00	5.5	81.0	151.0	250	72.0	22050.0024
free cutting steel, heavy spring load									
M 2	1.0	4	0.25	0.3	1.6	2.0	250	0.1	22050.0202
M 3	1.5	7	0.40	0.4	6.4	9.5	250	0.3	22050.0203
M 4	2.5	9	0.60	0.8	12.0	18.0	250	0.4	22050.0204
M 5	3.0	12	0.80	0.9	15.0	22.0	250	1.0	22050.0205
M 6	3.5	14	1.00	1.0	19.0	28.0	250	1.7	22050.0206
M 8	4.5	16	1.20	1.5	36.0	62.0	250	3.6	22050.0208
M10	6.0	19	1.50	2.0	57.0	104.0	250	6.7	22050.0210
M12	8.0	22	2.00	2.5	61.0	110.0	250	11.0	22050.0212
M16	10.0	24	2.00	3.5	68.0	142.0	250	23.0	22050.0216
M20	12.0	30	2.50	4.5	84.0	166.0	250	45.0	22050.0220
M24	15.0	34	3.00	5.5	127.0	237.0	250	72.0	22050.0224

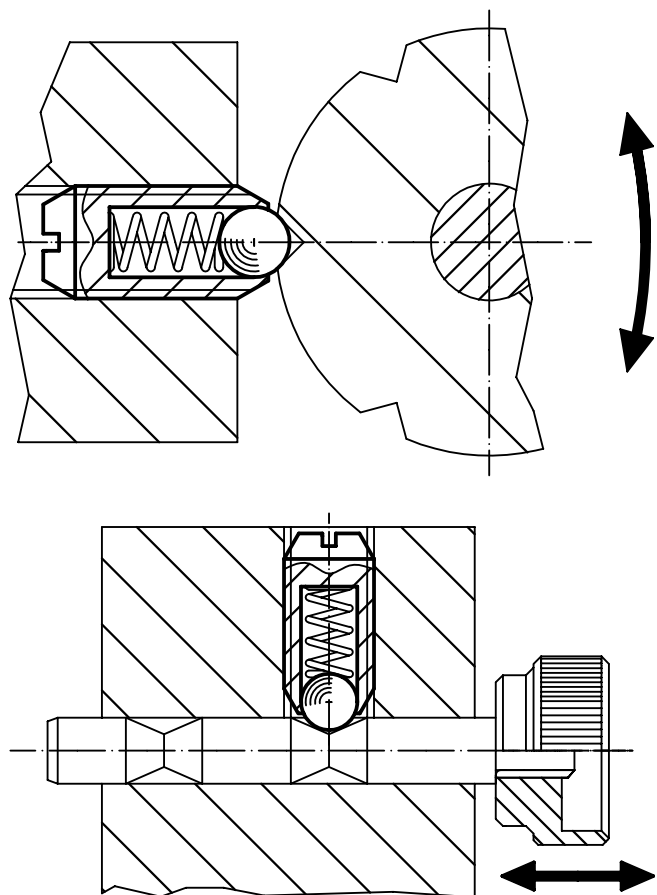
¹⁾ statistical average value



Dimensions				Stroke s [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	l	n		F ₁ ~ [N]	F ₂ ~ [N]			
stainless steel, standard spring load									
M 2	1.0	4	0.25	0.3	0.8	1.5	250	0.1	22050.0402
M 3	1.5	7	0.40	0.4	3.0	4.5	250	0.2	22050.0403
M 4	2.5	9	0.60	0.8	8.5	14.0	250	0.5	22050.0404
M 5	3.0	12	0.80	0.9	8.0	14.0	250	1.0	22050.0405
M 6	3.5	14	1.00	1.0	11.0	18.0	250	1.7	22050.0406
M 8	4.5	16	1.20	1.5	18.0	31.0	250	3.6	22050.0408
M10	6.0	19	1.50	2.0	24.0	45.0	250	6.6	22050.0410
M12	8.0	22	2.00	2.5	26.0	49.0	250	11.0	22050.0412
M16	10.0	24	2.00	3.5	41.0	86.0	250	22.0	22050.0416
M20	12.0	30	2.50	4.5	56.0	111.0	250	45.0	22050.0420
M24	15.0	34	3.00	5.5	81.0	151.0	250	73.0	22050.0424
stainless steel, heavy spring load									
M 2	1.0	4	0.25	0.3	1.6	2.0	250	0.1	22050.0602
M 3	1.5	7	0.40	0.4	6.4	9.5	250	0.3	22050.0603
M 4	2.5	9	0.60	0.8	12.0	18.0	250	0.5	22050.0604
M 5	3.0	12	0.80	0.9	15.0	22.0	250	1.0	22050.0605
M 6	3.5	14	1.00	1.0	19.0	28.0	250	1.7	22050.0606
M 8	4.5	16	1.20	1.5	36.0	62.0	250	3.7	22050.0608
M10	6.0	19	1.50	2.0	57.0	104.0	250	6.8	22050.0610
M12	8.0	22	2.00	2.5	61.0	110.0	250	11.0	22050.0612
M16	10.0	24	2.00	3.5	68.0	142.0	250	23.0	22050.0616
M20	12.0	30	2.50	4.5	84.0	166.0	250	45.0	22050.0620
M24	15.0	34	3.00	5.5	127.0	237.0	250	73.0	22050.0624

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • with ceramic ball and slot, stainless steel A4

EH 22050.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. The version from stainless steel A4 guarantees the highest corrosion protection.

Characteristics of the ceramic ball:

- Highly impact-resistant
- Abrasion resistant
- Antimagnetic
- Electrically isolating

Material

Body

- Stainless steel A4, passivated

Ball

- Ceramic

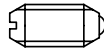
Spring

- Stainless steel A4, passivated

Characteristic

Standard spring load: no marking

Reinforced spring load: marked with two lines



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.

Spring plungers are specially tested for spring range and forces.

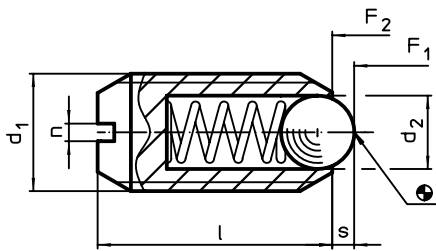
References

Thread lock on request, please refer to appendix - Technical Data - Calculation of indexing resistance, please refer to appendix - Technical Data -

Further products

Spring Plungers, with moveable ceramic ball and slot, stainless steel A4 → p. 69

DRAWING



ORDER INFORMATION

Dimensions				Stroke s [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	l	n		F ₁ ~ [N]	F ₂ ~ [N]			
stainless steel A4, standard spring load									
M 4	2.5	9	0.6	0.8	8.5	14	250	0.4	22050.1404
M 5	3.0	12	0.8	0.9	8.0	14	250	0.9	22050.1405
M 6	3.5	14	1.0	1.0	11.0	18	250	1.6	22050.1406
M 8	4.5	16	1.2	1.5	18.0	31	250	3.4	22050.1408
M10	6.0	19	1.5	2.0	24.0	45	250	6.2	22050.1410
M12	8.0	22	2.0	2.5	26.0	49	250	9.6	22050.1412
M16	10.0	24	2.0	3.5	41.0	86	250	21.0	22050.1416
stainless steel A4, heavy spring load									
M 4	2.5	9	0.6	0.8	12.0	18	250	0.4	22050.1604
M 5	3.0	12	0.8	0.9	15.0	22	250	1.0	22050.1605
M 6	3.5	14	1.0	1.0	19.0	28	250	1.6	22050.1606
M 8	4.5	16	1.2	1.5	36.0	62	250	3.5	22050.1608
M10	6.0	19	1.5	2.0	57.0	104	250	6.3	22050.1610
M12	8.0	22	2.0	2.5	61.0	110	250	9.6	22050.1612
M16	10.0	24	2.0	3.5	68.0	142	250	21.0	22050.1616

¹⁾ statistical average value

Spring Plungers • with pin and slot

EH 22050.

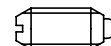


PRODUCT DESCRIPTION

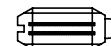
Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

- Pin**
 - Free cutting steel, hardened, blackened
 - Stainless Steel 1.4305, nitrided



Standard spring load



Heavy spring load

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Spring

- Stainless steel

MORE INFORMATION

Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

References

Thread lock on request, please refer to appendix - Technical Data -

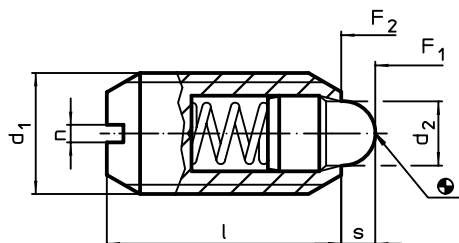
Further products

Spring Plungers, with pin and slot - INCH → p. 90

Characteristic

Standard spring load: no marking
Reinforced spring load: marked with two lines

DRAWING



ORDER INFORMATION

Dimensions				Stroke s [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	l	n		F ₁ ~ [N]	F ₂ ~ [N]			
free cutting steel, standard spring load									
M 4	1.8	9	0.6	1.5	4.5	12.5	250	0.4	22050.0104
M 5	2.4	12	0.8	2.0	5.0	13.0	250	1.1	22050.0105
M 6	2.7	14	1.0	2.0	6.0	17.0	250	1.8	22050.0106
M 8	3.8	16	1.2	2.0	16.0	33.0	250	3.7	22050.0108
M10	4.5	19	1.5	2.5	19.0	42.0	250	7.0	22050.0110
M12	6.2	22	2.0	3.5	22.0	57.0	250	11.0	22050.0112
M16	8.5	24	2.0	4.5	38.0	78.0	250	22.0	22050.0116
M20	10.0	30	2.5	6.5	39.0	81.0	250	45.0	22050.0120
M24	13.0	34	3.0	8.0	72.0	155.0	250	72.0	22050.0124
free cutting steel, heavy spring load									
M 6	2.7	14	1.0	2.0	11.0	25.0	250	1.8	22050.0306
M 8	3.8	16	1.2	2.0	23.0	59.0	250	3.8	22050.0308
M10	4.5	19	1.5	2.5	20.0	54.0	250	7.0	22050.0310
M12	6.2	22	2.0	3.5	38.0	96.0	250	11.0	22050.0312
M16	8.5	24	2.0	4.5	50.0	100.0	250	22.0	22050.0316
M20	10.0	30	2.5	6.5	52.0	133.0	250	46.0	22050.0320
M24	13.0	34	3.0	8.0	91.0	223.0	250	73.0	22050.0324

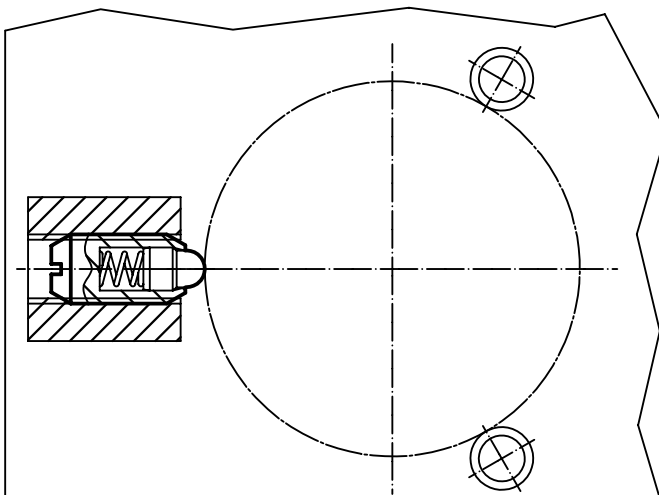
¹⁾ statistical average value



Dimensions				Stroke s [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	l	n		F ₁ ~ [N]	F ₂ ~ [N]			
stainless steel, standard spring load									
M 4	1.8	9	0.6	1.5	4.5	12.5	250	0.4	22050.0504
M 5	2.4	12	0.8	2.0	5.0	13.0	250	1.1	22050.0505
M 6	2.7	14	1.0	2.0	6.0	17.0	250	1.8	22050.0506
M 8	3.8	16	1.2	2.0	16.0	33.0	250	3.8	22050.0508
M10	4.5	19	1.5	2.5	19.0	42.0	250	7.0	22050.0510
M12	6.2	22	2.0	3.5	22.0	57.0	250	11.0	22050.0512
M16	8.5	24	2.0	4.5	38.0	78.0	250	22.0	22050.0516
M20	10.0	30	2.5	6.5	39.0	81.0	250	46.0	22050.0520
M24	13.0	34	3.0	8.0	72.0	155.0	250	73.0	22050.0524
stainless steel, heavy spring load									
M 6	2.7	14	1.0	2.0	11.0	25.0	250	1.8	22050.0706
M 8	3.8	16	1.2	2.0	23.0	59.0	250	3.8	22050.0708
M10	4.5	19	1.5	2.5	20.0	54.0	250	7.0	22050.0710
M12	6.2	22	2.0	3.5	38.0	96.0	250	11.0	22050.0712
M16	8.5	24	2.0	4.5	50.0	100.0	250	23.0	22050.0716
M20	10.0	30	2.5	6.5	52.0	133.0	250	46.0	22050.0720
M24	13.0	34	3.0	8.0	91.0	223.0	250	74.0	22050.0724

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • headed, with ball and slot

EH 22050.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. Precise screwing depth due to head.

Material

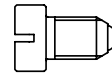
- Body**
- Free cutting steel, blackened
 - Stainless steel 1.4305

Ball

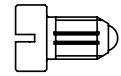
- Ball-bearing steel, hardened
- Stainless steel, hardened

Spring

- Stainless steel



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

References

Thread lock on request, please refer to appendix - Technical Data -
Calculation of indexing resistance, please refer to appendix - Technical Data -

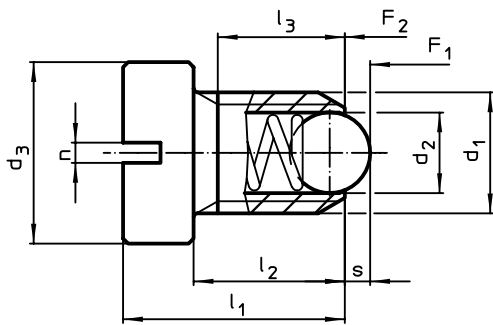
Assembly

Respect dimension l_3 for M 4 / M 5.

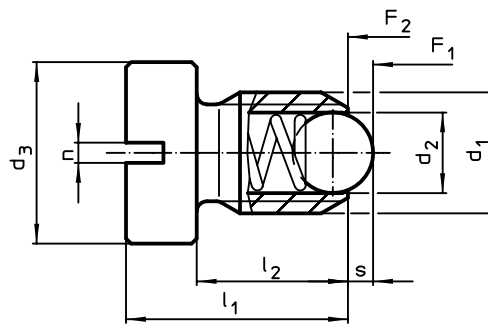
Characteristic

Standard spring load: no marking
Reinforced spring load: marked with two lines

DRAWING



Size M4+M5



Size M6-M12

ORDER INFORMATION

Dimensions							Stroke s [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃ min.	n		F ₁ ~ [N]	F ₂ ~ [N]			
free cutting steel, standard spring load												
M 4	2.5	6	9.5	6.5	5.0	0.6	0.8	8.0	14.0	250	1.0	22050.0930
M 5	3.0	8	12.5	8.5	6.7	0.8	0.9	8.0	14.0	250	2.2	22050.0931
M 6	3.5	10	14.0	9.0	-	1.0	1.0	11.0	18.0	250	3.7	22050.0932
M 8	4.5	13	16.5	11.0	-	1.2	1.5	18.0	31.0	250	7.4	22050.0933
M10	6.0	16	20.0	14.0	-	1.5	2.0	24.0	45.0	250	13.0	22050.0934
M12	8.0	18	22.0	15.0	-	2.0	2.5	26.0	49.0	250	19.0	22050.0935
free cutting steel, heavy spring load												
M 4	2.5	6	9.5	6.5	5.0	0.6	0.8	12.0	18.0	250	0.9	22050.1040
M 5	3.0	8	12.5	8.5	6.7	0.8	0.9	15.0	22.0	250	2.2	22050.1050
M 6	3.5	10	14.0	9.0	-	1.0	1.0	19.3	26.6	250	3.8	22050.1060
M 8	4.5	13	16.5	11.0	-	1.2	1.5	36.0	60.5	250	7.5	22050.1080
M10	6.0	16	20.0	14.0	-	1.5	2.0	57.0	103.5	250	13.0	22050.1100
M12	8.0	18	22.0	15.0	-	2.0	2.5	61.0	110.0	250	19.0	22050.1120

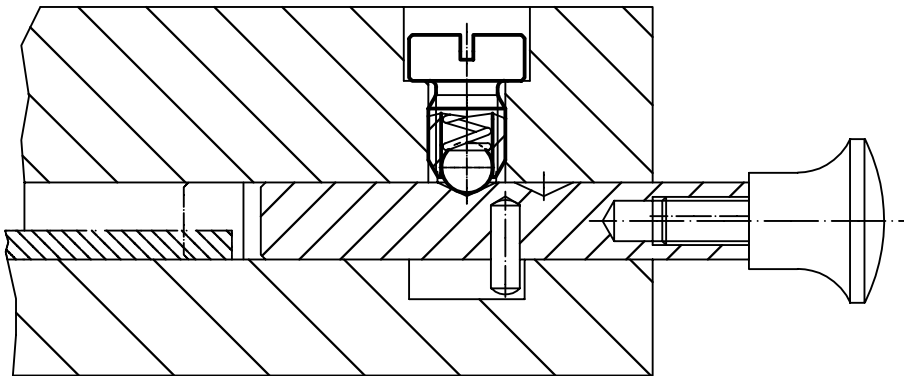
¹⁾ statistical average value



Dimensions							Stroke s [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃ min.	n		F ₁ ~ [N]	F ₂ ~ [N]			
stainless steel, standard spring load												
M 4	2.5	6	9.5	6.5	5.0	0.6	0.8	8.0	14.0	250	1.0	22050.0940
M 5	3.0	8	12.5	8.5	6.7	0.8	0.9	8.0	14.0	250	2.2	22050.0941
M 6	3.5	10	14.0	9.0	–	1.0	1.0	11.0	18.0	250	3.8	22050.0942
M 8	4.5	13	16.5	11.0	–	1.2	1.5	18.0	31.0	250	7.5	22050.0943
M10	6.0	16	20.0	14.0	–	1.5	2.0	24.0	45.0	250	13.0	22050.0944
M12	8.0	18	22.0	15.0	–	2.0	2.5	26.0	49.0	250	19.0	22050.0945
stainless steel, heavy spring load												
M 4	2.5	6	9.5	6.5	5.0	0.6	0.8	12.0	18.0	250	1.0	22050.1240
M 5	3.0	8	12.5	8.5	6.7	0.8	0.9	15.0	22.0	250	2.2	22050.1250
M 6	3.5	10	14.0	9.0	–	1.0	1.0	19.3	26.6	250	3.8	22050.1260
M 8	4.5	13	16.5	11.0	–	1.2	1.5	36.0	60.5	250	7.6	22050.1280
M10	6.0	16	20.0	14.0	–	1.5	2.0	57.0	103.5	250	13.0	22050.1300
M12	8.0	18	22.0	15.0	–	2.0	2.5	61.0	110.0	250	19.0	22050.1320

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • with moveable ball and slot

EH 22051.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. The running of the ball minimises wear on the counterpart, this also results in a positive locking behaviour depending on the counterpart.

Another advantage of the plastic ball is the electric insulation.

Material

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Bearing

- Plastic

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

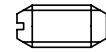
Spring

- Stainless steel

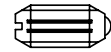
Characteristic

Standard spring load: no marking

Reinforced spring load: marked with two lines



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.

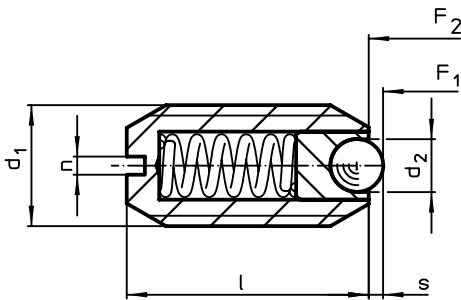
Spring plungers are specially tested for spring range and forces.

References

Thread lock on request, please refer to appendix - Technical Data -

Calculation of indexing resistance, please refer to appendix - Technical Data -

DRAWING



ORDER INFORMATION

Dimensions				Stroke s	Spring load ¹⁾		min.	max.	[g]	Art. No.
d ₁	d ₂	l	n		F ₁ ~	F ₂ ~				
[mm]				[mm]	[N]		[°C]			
free cutting steel, standard spring load										
M 5	2.0	12	0.8	0.50	4.8	6.8	-30	90	0.8	22051.0005
M 6	2.5	14	1.0	0.70	6.3	10.0	-30	90	1.5	22051.0006
M 8	3.5	16	1.2	0.95	16.0	24.0	-30	90	3.3	22051.0008
M10	4.5	19	1.5	1.40	18.8	31.7	-30	90	5.9	22051.0010
M12	6.5	22	2.0	2.50	24.0	49.0	-30	90	9.3	22051.0012
M16	8.5	24	2.0	3.10	38.0	68.0	-30	90	20.0	22051.0016
free cutting steel, heavy spring load										
M 5	2.0	12	0.8	0.50	10.0	14.0	-30	90	0.9	22051.0205
M 6	2.5	14	1.0	0.70	11.0	16.0	-30	90	1.5	22051.0206
M 8	3.5	16	1.2	0.95	23.0	40.0	-30	90	3.3	22051.0208
M10	4.5	19	1.5	1.40	28.0	54.3	-30	90	6.0	22051.0210
M12	6.5	22	2.0	2.50	36.5	77.3	-30	90	9.4	22051.0212
M16	8.5	24	2.0	3.10	50.0	88.7	-30	90	20.0	22051.0216

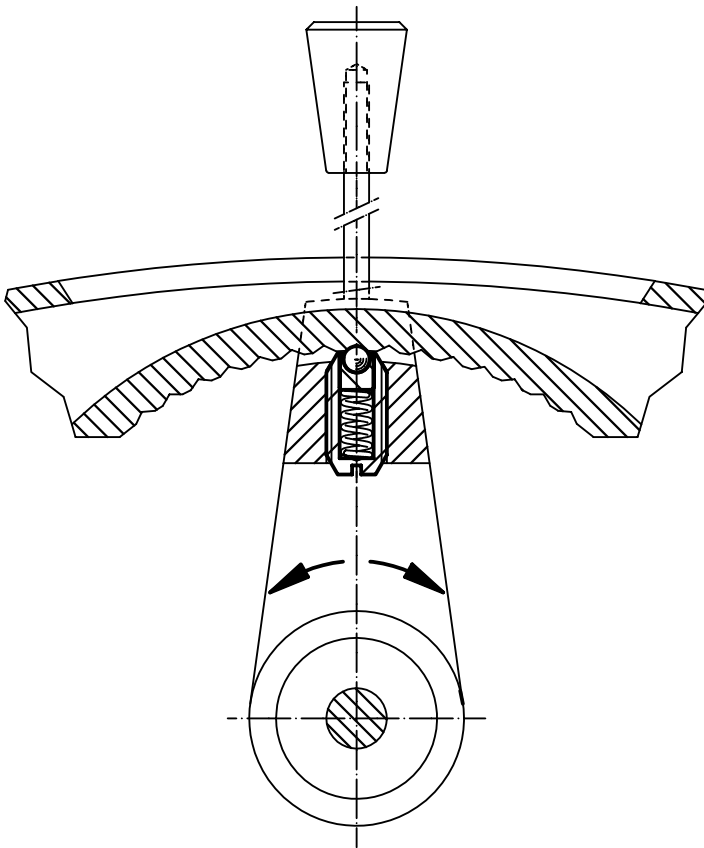
¹⁾ statistical average value



	Dimensions				Stroke s [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.
	d ₁	d ₂	l	n		F ₁ ~ [N]	F ₂ ~ [N]	min.	max.		
	[mm]					[N]		[°C]			
stainless steel, standard spring load											
M 5	2.0	12	0.8	0.50	4.8	6.8	-30	90	0.9	22051.0405	
M 6	2.5	14	1.0	0.70	6.3	10.0	-30	90	1.5	22051.0406	
M 8	3.5	16	1.2	0.95	16.0	24.0	-30	90	3.3	22051.0408	
M10	4.5	19	1.5	1.40	18.8	31.7	-30	90	5.9	22051.0410	
M12	6.5	22	2.0	2.50	24.0	49.0	-30	90	9.4	22051.0412	
M16	8.2	24	2.0	3.10	38.0	68.0	-30	90	20.0	22051.0416	
stainless steel, heavy spring load											
M 5	2.0	12	0.8	0.50	10.0	14.0	-30	90	0.9	22051.0605	
M 6	2.5	14	1.0	0.70	11.0	16.0	-30	90	1.5	22051.0606	
M 8	3.5	16	1.2	0.95	23.0	40.0	-30	90	3.4	22051.0608	
M10	4.5	19	1.5	1.40	28.0	54.3	-30	90	6.0	22051.0610	
M12	6.5	22	2.0	2.50	36.5	77.3	-30	90	9.5	22051.0612	
M16	8.5	24	2.0	3.10	50.0	88.7	-30	90	20.0	22051.0616	

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • with moveable ceramic ball and slot, stainless steel A4
EH 22051.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. The running of the ball minimises wear on the counterpart, this also results in a positive locking behaviour depending on the counterpart.

Another advantage of the moveable ceramic ball is the electric insulation.

Characteristics of the ceramic ball:

- Highly impact-resistant
- Abrasion resistant
- Antimagnetic
- Electrically isolating

The stainless steel A4 version ensures maximum corrosion resistance.

Material

- Body**
- Stainless steel A4

Bearing

- Plastic

Ball

- Ceramic

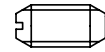
Spring

- Stainless steel

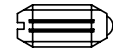
Characteristic

Standard spring load: no marking

Reinforced spring load: marked with two lines



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.

Spring plungers are specially tested for spring range and forces.

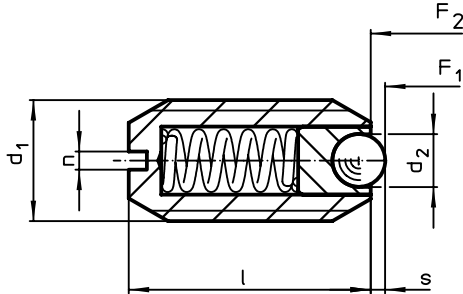
References

Thread lock on request, please refer to appendix - Technical Data - Calculation of indexing resistance, please refer to appendix - Technical Data -

Further products

Spring Plungers, with ceramic ball and slot, stainless steel A4 → p. 62

DRAWING



ORDER INFORMATION

Dimensions				Stroke s	Spring load ¹⁾		min.	max.	[g]	Art. No.
d ₁	d ₂	l	n		F ₁	F ₂				
[mm]				[mm]	[N]		[°C]			
standard spring load										
M 5	2.0	12	0.8	0.50	4.8	6.8	-30	90	0.9	22051.0505
M 6	2.5	14	1.0	0.70	6.3	10.0	-30	90	1.5	22051.0506
M 8	3.5	16	1.2	0.95	16.1	24.0	-30	90	3.2	22051.0508
M10	4.5	19	1.5	1.40	18.8	31.7	-30	90	5.8	22051.0510
M12	6.5	22	2.0	2.50	24.0	49.0	-30	90	8.9	22051.0512
M16	8.5	24	2.0	3.10	38.0	68.0	-30	90	19.0	22051.0516
heavy spring load										
M 5	2.0	12	0.8	0.50	10.0	14.0	-30	90	0.9	22051.0705
M 6	2.5	14	1.0	0.70	11.0	16.0	-30	90	1.5	22051.0706
M 8	3.5	16	1.2	0.95	22.9	40.0	-30	90	3.3	22051.0708
M10	4.5	19	1.5	1.40	28.1	54.3	-30	90	5.8	22051.0710
M12	6.5	22	2.0	2.50	36.5	77.3	-30	90	9.0	22051.0712
M16	8.5	24	2.0	3.10	50.0	88.7	-30	90	19.0	22051.0716

¹⁾ statistical average value

Spring Plungers • with internal hexagon

EH 22060.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

- Pin**
- Free cutting steel, hardened, blackened
 - Thermoplastic POM, white
 - Stainless Steel 1.4305, nitrided

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Spring

- Stainless steel

Assembly

Spring plungers can be mounted and removed by means of the slot or internal hexagon.

Please use a special assembly tool for mounting with a slot (pin side).

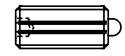
Characteristic

Standard spring load: no marking

Reinforced spring load: marked with two lines



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request. Spring plungers are specially tested for spring range and forces.

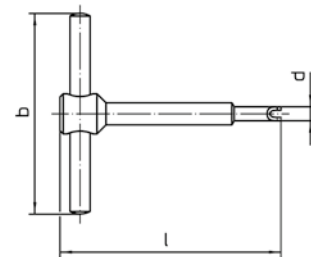
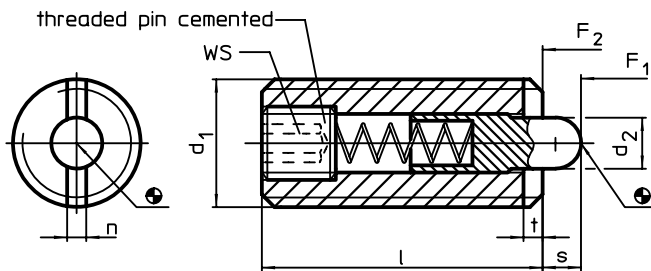
References

Thread lock on request, please refer to appendix - Technical Data -

Further products

Spring Plungers, with internal hexagon and seal. → p. 72

DRAWING



ORDER INFORMATION

Dimensions					WS	Stroke s	Spring load ¹⁾		min. max.	[g]	Art. No.	
d ₁	d ₂	l	n	t			F ₁ ~	F ₂ ~				
[mm]					[mm]	[mm]	[N]		[°C]			
free cutting steel, standard spring load												
M 3	1.0	12	0.4	0.5	0.7	1.0	2.0	4	-	250	0.4	22060.0003
M 4	1.5	15	0.6	0.6	1.3	1.5	4.5	16	-	250	0.9	22060.0004
M 5	2.4	18	1.2	0.8	1.5	2.3	6.0	19	-	250	1.7	22060.0005
M 6	2.7	20	1.3	0.9	2.0	2.5	6.0	19	-	250	2.8	22060.0006
M 8	3.5	22	1.5	1.4	2.5	3.0	10.0	39	-	250	5.7	22060.0008
M10	4.0	22	1.5	1.4	3.0	3.0	10.0	39	-	250	9.2	22060.0010
M12	6.0	28	2.7	2.0	4.0	4.0	12.0	53	-	250	16.0	22060.0012
M16	7.5	32	3.2	2.5	5.0	5.0	45.0	100	-	250	35.0	22060.0016
M20	10.0	40	3.7	3.0	6.0	7.0	52.0	125	-	250	67.0	22060.0020
M24	12.0	52	3.7	3.0	8.0	10.0	70.0	170	-	250	129.0	22060.0024
free cutting steel, heavy spring load												
M 5	2.4	18	1.2	0.8	1.5	2.3	11.0	40	-	250	1.6	22060.0105
M 6	2.7	20	1.3	0.9	2.0	2.5	15.0	43	-	250	2.8	22060.0106
M 8	3.5	22	1.5	1.4	2.5	3.0	20.0	75	-	250	5.7	22060.0108
M10	4.0	22	1.5	1.4	3.0	3.0	20.0	75	-	250	9.1	22060.0110
M12	6.0	28	2.7	2.0	4.0	4.0	45.0	120	-	250	16.0	22060.0112
M16	7.5	32	3.2	2.5	5.0	5.0	64.0	160	-	250	26.0	22060.0116
M20	10.0	40	3.7	3.0	6.0	7.0	75.0	195	-	250	67.0	22060.0120
M24	12.0	52	3.7	3.0	8.0	10.0	75.0	245	-	250	129.0	22060.0124


¹⁾ statistical average value



Dimensions					WS	Stroke s	Spring load ¹⁾		min.	max.	[g]	Art. No.
d ₁	d ₂	l	n	t			F ₁ ~	F ₂ ~				
[mm]					[mm]	[mm]	[N]	[°C]				
free cutting steel, pin from thermoplastic, standard spring load												
M 4	1.5	15	0.6	0.6	1.3	1.5	4.5	16	-30	50	0.9	22060.0204
M 5	2.4	18	1.2	0.8	1.5	2.3	6.0	19	-30	50	1.5	22060.0205
M 6	2.7	20	1.3	0.9	2.0	2.5	6.0	19	-30	50	2.3	22060.0206
M 8	3.5	22	1.5	1.4	2.5	3.0	10.0	39	-30	50	5.0	22060.0208
M10	4.0	22	1.5	1.4	3.0	3.0	10.0	39	-30	50	8.1	22060.0210
M12	6.0	28	2.7	2.0	4.0	4.0	12.0	53	-30	50	14.0	22060.0212
M16	7.5	32	3.2	2.5	5.0	5.0	45.0	100	-30	50	31.0	22060.0216
stainless steel, standard spring load												
M 3	1.0	12	0.4	0.5	0.7	1.0	2.0	4	-	250	0.9	22060.0403
M 4	1.5	15	0.6	0.6	1.3	1.5	4.5	16	-	250	0.9	22060.0404
M 5	2.4	18	1.2	0.8	1.5	2.3	6.0	19	-	250	1.7	22060.0405
M 6	2.7	20	1.3	0.9	2.0	2.5	6.0	19	-	250	2.8	22060.0406
M 8	3.5	22	1.5	1.4	2.5	3.0	10.0	39	-	250	4.6	22060.0408
M10	4.0	22	1.5	1.4	3.0	3.0	10.0	39	-	250	9.5	22060.0410
M12	6.0	28	2.7	2.0	4.0	4.0	12.0	53	-	250	16.0	22060.0412
M16	7.5	32	3.2	2.5	5.0	5.0	45.0	100	-	250	34.0	22060.0416
M20	10.0	40	3.7	3.0	6.0	7.0	52.0	125	-	250	67.0	22060.0420
stainless steel, heavy spring load												
M 5	2.4	18	1.2	0.8	1.5	2.3	15.0	44	-	250	2.2	22060.0505
M 6	2.7	20	1.3	0.9	2.0	2.5	20.0	50	-	250	4.1	22060.0506
M 8	3.5	22	1.5	1.4	2.5	3.0	26.0	70	-	250	7.4	22060.0508
M10	4.0	22	1.5	1.4	3.0	3.0	26.0	70	-	250	12.4	22060.0510
M12	6.0	28	2.7	2.0	4.0	4.0	51.0	122	-	250	22.2	22060.0512
M16	7.5	32	3.2	2.5	5.0	5.0	72.0	164	-	250	46.1	22060.0516
M20	10.0	40	3.7	3.0	7.0	7.0	93.0	211	-	250	86.5	22060.0520
M24	12.0	52	3.7	3.0	10.0	10.0	86.0	247	-	250	167.0	22060.0524
stainless steel, pin from thermoplastic, standard spring load												
M 4	1.5	15	0.6	0.6	1.3	1.5	4.5	16	-30	50	0.9	22060.0604
M 5	2.4	18	1.2	0.8	1.5	2.3	6.0	19	-30	50	1.6	22060.0605
M 6	2.7	20	1.3	0.9	2.0	2.5	6.0	19	-30	50	2.5	22060.0606
M 8	3.5	22	1.5	1.4	2.5	3.0	10.0	39	-30	50	5.1	22060.0608
M10	4.0	22	1.5	1.4	3.0	3.0	10.0	39	-30	50	8.5	22060.0610
M12	6.0	28	2.7	2.0	4.0	4.0	12.0	53	-30	50	14.0	22060.0612
M16	7.5	32	3.2	2.5	5.0	5.0	45.0	100	-30	50	31.0	22060.0616
stainless steel, pin from thermoplastic, heavy spring load												
M 5	2.4	18	1.2	0.8	1.5	2.3	15.0	44	-30	50	1.9	22060.0705
M 6	2.7	20	1.3	0.9	2.0	2.5	20.0	50	-30	50	3.6	22060.0706
M 8	3.5	22	1.5	1.4	2.5	3.0	26.0	70	-30	50	6.6	22060.0708
M10	4.0	22	1.5	1.4	3.0	3.0	26.0	70	-30	50	11.4	22060.0710
M12	6.0	28	2.7	2.0	4.0	4.0	51.0	122	-30	50	20.0	22060.0712
M16	7.5	32	3.2	2.5	5.0	5.0	72.0	164	-30	50	42.7	22060.0716

¹⁾ statistical average value

ACCESSORIES

	Dimensions				[g]	Art. No.	
	d ₁	b	d	l			
[mm]							
assembly tool for mounting via slot (pin sided)							
	M 3	50		2.35	55	17	22060.0903
	M 4	50		3.00	55	18	22060.0904
	M 5	50		4.00	60	21	22060.0905
	M 6	60		4.70	60	30	22060.0906
	M 8	60		6.45	70	39	22060.0908
	M10	80		8.00	80	66	22060.0910
	M12	80		9.80	80	72	22060.0912
	M16	100		13.50	105	144	22060.0916
	M20	100		17.00	115	162	22060.0920
	M24	100		19.90	100	258	22070.0838

Spring Plungers • with internal hexagon and seal

EH 22060.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. By means of the seal, liquid cannot penetrate into the spring plunger.

Material

Pin

- Free cutting steel, hardened, blackened
- Stainless steel 1.4305

Seal

- NBR

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Spring

- Stainless steel

Assembly

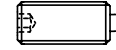
Spring plungers can be mounted and removed by means of the slot or internal hexagon.

Please use a special assembly tool for mounting with a slot (pin side).

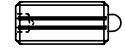
Characteristic

Standard spring load: no marking

Reinforced spring load: marked with two lines



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request. Spring plungers are specially tested for spring range and forces.

References

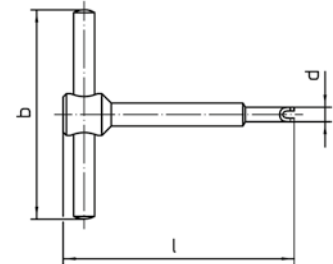
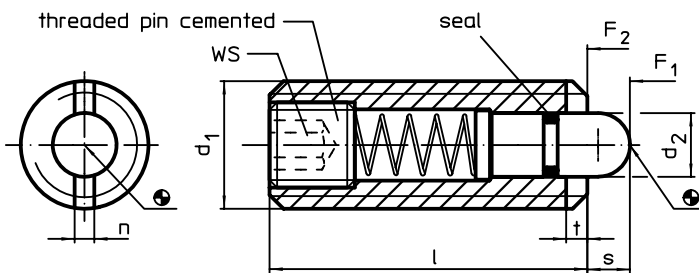
Compared to EH 22060., i.e. "no seal", there are deviations in dimension l, spring load and temperature range.

Thread lock on request, please refer to appendix - Technical Data -

Further products

Spring Plungers, with internal hexagon. → p. 70

DRAWING





ORDER INFORMATION

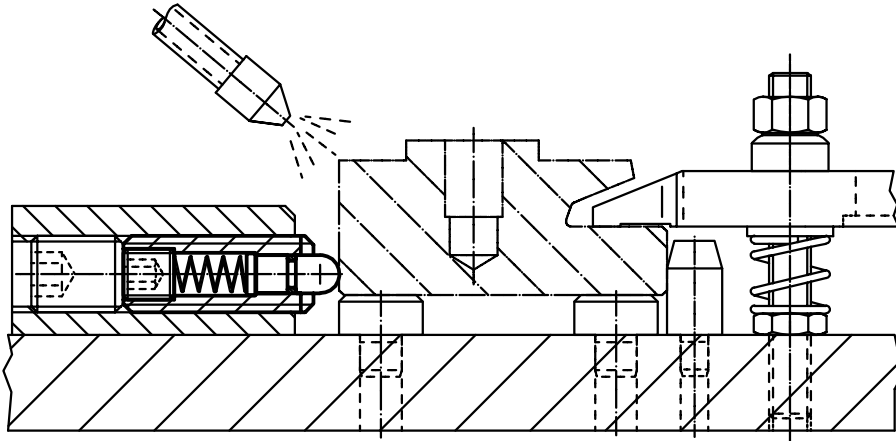
Dimensions					WS	Stroke s	Spring load ¹⁾		min.	max.	[g]	Art. No.
d ₁	d ₂	l	n	t			F ₁ ~	F ₂ ~				
[mm]					[mm]	[mm]	[N]		[°C]			
free cutting steel, standard spring load												
M 8	3.8	26	1.5	1.4	2.5	3.0	9	24	-30	80	6.7	22060.0048
M10	4.0	28	1.5	1.4	3.0	3.5	15	30	-30	80	12.0	22060.0050
M12	6.0	35	2.7	2.0	4.0	4.0	24	50	-30	80	20.0	22060.0052
M16	7.5	40	3.2	2.5	5.0	5.0	36	58	-30	80	43.0	22060.0056
free cutting steel, heavy spring load												
M 8	3.8	26	1.5	1.4	2.5	3.0	17	39	-30	80	6.7	22060.0148
M10	4.0	28	1.5	1.4	3.0	3.5	22	43	-30	80	12.0	22060.0150
M12	6.0	35	2.7	2.0	4.0	4.0	40	80	-30	80	20.0	22060.0152
M16	7.5	40	3.2	2.5	5.0	5.0	44	113	-30	80	44.0	22060.0156
stainless steel, standard spring load												
M 8	3.8	26	1.5	1.4	2.5	3.0	9	24	-30	80	6.8	22060.0448
M10	4.0	28	1.5	1.4	3.0	3.5	15	30	-30	80	12.0	22060.0450
M12	6.0	35	2.7	2.0	4.0	4.0	24	50	-30	80	20.0	22060.0452
M16	7.5	40	3.2	2.5	5.0	5.0	36	58	-30	80	43.0	22060.0456

¹⁾ statistical average value

ACCESSORIES

	Dimensions				 [g]	Art. No.
	d ₁	b	d	l		
assembly tool for mounting via slot (pin sided)						
	M 8	60	6.45	70	39	22060.0908
	M10	80	8.00	80	66	22060.0910
	M12	80	9.80	80	72	22060.0912
	M16	100	13.50	105	144	22060.0916

APPLICATION EXAMPLE



Spring Plungers • smooth

EH 22070.



PRODUCT DESCRIPTION

Especially designed for the use in tool-making.
Usable as ejection pins and spring stops.
It is impossible for the complete spring plunger or any of its individual parts to come out of the retaining bore.

Material

Pin

- Steel, case-hardened, blackened
- Stainless Steel 1.4305, nitrided

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Spring

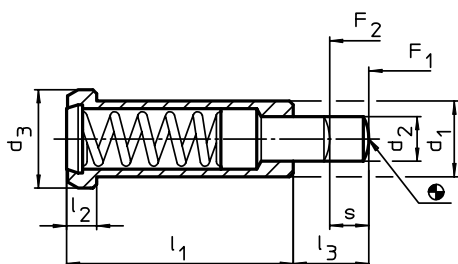
- Stainless steel

MORE INFORMATION

Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

DRAWING

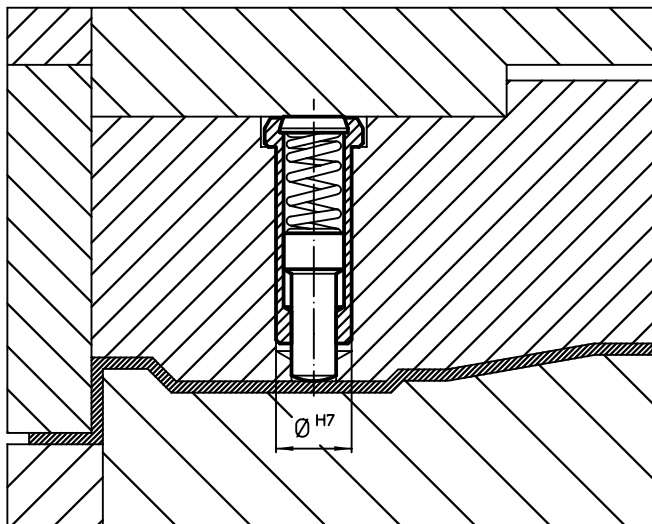


ORDER INFORMATION

Dimensions						Stroke s [mm]	Spring load ¹⁾		max. [°C]	Location hole H7 [mm]	[g]	Art. No.
d ₁ -0.05	d ₂	d ₃	l ₁	l ₂	l ₃		F ₁ ~ [N]	F ₂ ~ [N]				
free cutting steel, standard spring load												
6	2.7	8	20	3.2	6	3.5	10	22	250	6	4.0	22070.0006
8	3.9	10	24	3.2	8	4.5	30	88	250	8	7.4	22070.0008
10	5.9	13	30	4.0	10	5.5	42	110	250	10	15.0	22070.0010
12	7.9	16	36	5.0	12	6.5	50	130	250	12	27.0	22070.0012
stainless steel, standard spring load												
6	2.7	8	20	3.2	6	3.5	10	22	250	6	4.0	22070.0106
8	3.9	10	24	3.2	8	4.5	30	88	250	8	7.5	22070.0108
10	5.9	13	30	4.0	10	5.5	42	110	250	10	15.0	22070.0110
12	7.9	16	36	5.0	12	6.5	50	130	250	12	27.0	22070.0112

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • long
EH 22070.



PRODUCT DESCRIPTION

To be used for ejecting, as a detent, for applying pressure or as a shock element.

Material

- Pin**
 - Steel, case-hardened, black
 - Stainless Steel 1.4305, nitrided

Body

- Free cutting steel, blackened
- Stainless steel 1.4305
- Heat-treated steel, tempered, blackened

Spring

- Stainless steel

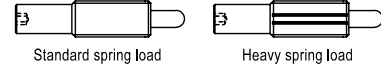
Assembly

Spring plungers can be mounted and removed by means of the slot or internal hexagon.

Please use a special assembly tool for mounting with a slot (pin side).

Characteristic

Standard spring load: no marking
Reinforced spring load: marked with two lines



MORE INFORMATION

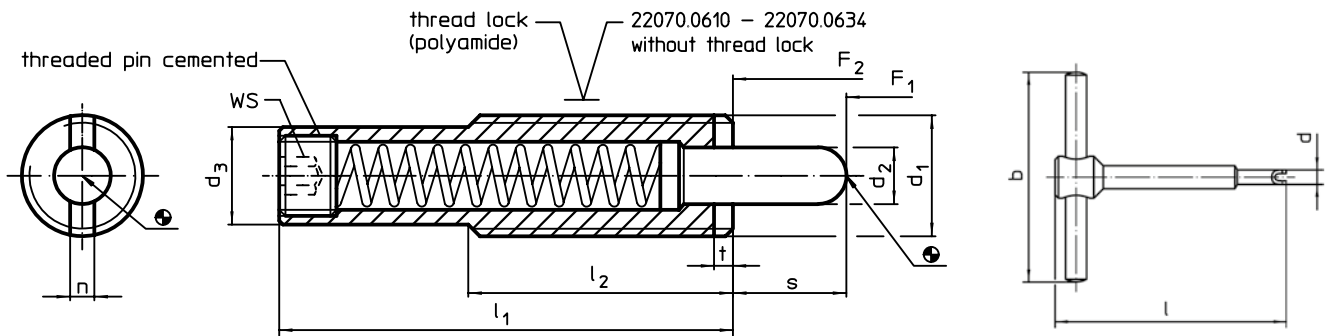
Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

References

Thread lock: polyamide all-around coating (for details please refer to the technical appendix).

DRAWING



ORDER INFORMATION

Dimensions			Stroke s	WS	Spring load ¹⁾		min.	max.	g	Art. No.				
d ₁	d ₂	d ₃			F ₁	F ₂								
[mm]			[mm]	[mm]	[N]	[N]	[°C]		[g]					
body from free cutting steel, standard spring load, with thread lock														
M10	4.0	7.8	35	25	1.5	1.4	8	3	6	16	-30	90	13	22070.0408
M12	5.5	9.5	43	35	2.7	2.0	10	4	4	18	-30	90	22	22070.0412
			48	35	3.2	3.0	10	6	7	24	-30	90	47	22070.0430
M16	8.0	13.4	58	35	3.2	3.0	10	6	15	42	-30	90	53	22070.0432
							15	6	9	33	-30	90	54	22070.0436
			20	6	4	23	-30	90	55	22070.0440				
			83	35	3.2	3.0	20	6	11	43	-30	90	69	22070.0442
			98	35	3.2	3.0	25	6	13	41	-30	90	81	22070.0444
							30	6	13	47	-30	90	83	22070.0450
			118	35	3.2	3.0	30	6	24	110	-30	90	97	22070.0452
40	6	13					63	-30	90	117	22070.0455			
148	35	3.2	3.0	50	6	7	43	-30	90	119	22070.0460			
M24	10.0	19.6	60	45	3.7	3.0	15	8	14	87	-30	90	132	22070.0480


¹⁾ statistical average value



Dimensions							Stroke s	WS	Spring load ¹⁾		min. max.		[g]	Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂	n	t			F ₁ ~	F ₂ ~	[°C]			
[mm]							[mm]	[mm]	[N]					
stainless steel, standard spring load, with thread lock														
M10	4.0	7.8	35	25	1.5	1.4	8	3	6	16	-30	90	13	22070.0208
M12	5.5	9.5	43	35	2.7	2.0	10	4	4	18	-30	90	23	22070.0212
M16	8.0	13.4	48	35	3.2	3.0	10	6	7	24	-30	90	47	22070.0230
			58	35	3.2	3.0	15	6	9	33	-30	90	54	22070.0236
			20	6	4	23	-30	90	55	22070.0240				
			25	6	13	41	-30	90	82	22070.0244				
			30	6	13	47	-30	90	84	22070.0250				
			40	6	13	63	-30	90	118	22070.0255				
148	35	3.2	3.0	50	6	7	43	-30	90	119	22070.0260			
M24	10.0	19.6	60	45	3.7	3.0	15	8	14	87	-30	90	134	22070.0280
body from free cutting steel, heavy spring load, with thread lock														
M10	4.0	7.8	35	25	1.5	1.4	8	3	12	22	-30	90	13	22070.0508
M12	5.5	9.5	43	35	2.7	2.0	10	4	7	46	-30	90	23	22070.0512
M16	8.0	13.4	48	35	3.2	3.0	10	6	10	43	-30	90	47	22070.0530
			10	6	14	84	-30	90	54	22070.0532				
			15	6	10	57	-30	90	55	22070.0536				
			20	6	8	33	-30	90	56	22070.0540				
			20	6	18	72	-30	90	71	22070.0542				
			25	6	20	70	-30	90	81	22070.0544				
			30	6	20	80	-30	90	83	22070.0550				
			40	6	21	113	-30	90	121	22070.0555				
50	6	13	75	-30	90	121	22070.0560							
M24	10.0	19.6	60	45	3.7	3.0	15	8	40	192	-30	90	134	22070.0580
stainless steel, heavy spring load, with thread lock														
M10	4.0	7.8	35	25	1.5	1.4	8	3	12	22	-30	90	13	22070.0308
M12	5.5	9.5	43	35	2.7	2.0	10	4	7	46	-30	90	23	22070.0312
M16	8.0	13.4	48	35	3.2	3.0	10	6	10	43	-30	90	47	22070.0330
			15	6	10	57	-30	90	55	22070.0336				
			20	6	8	33	-30	90	55	22070.0340				
			25	6	20	70	-30	90	82	22070.0344				
			30	6	20	80	-30	90	83	22070.0350				
			40	6	21	113	-30	90	122	22070.0355				
50	6	13	75	-30	90	122	22070.0360							
M24	10.0	19.6	60	45	3.7	3.0	15	8	40	192	-30	90	135	22070.0380
body from heat treated steel, standard spring load, without locking														
M16	7.3	13.4	80	35	3.2	3.0	11	8	17	74	-	250	69	22070.0610
			120	35	3.2	3.0	21	8	21	81	-	250	96	22070.0612
			150	35	3.2	3.0	31	8	21	89	-	250	117	22070.0614
			200	35	3.2	3.0	41	8	16	80	-	250	149	22070.0616
M22	9.0	19.0	130	50	3.5	4.0	21	8	80	214	-	250	211	22070.0630
			168	50	3.5	4.0	31	8	70	210	-	250	278	22070.0632
			226	50	3.5	4.0	41	8	76	208	-	250	358	22070.0634

¹⁾ statistical average value

ACCESSORIES

	Dimensions				[g]	Art. No.
	d ₁	b	d	l		
[mm]						
assembly tool for mounting via slot (pin sided)						
	M10	80	7.8	70	87	22070.0830
	M12	80	9.5	75	88	22070.0832
	M16	80	13.4	95	110	22070.0834
	M22	100	19.0	100	245	22070.0836
	M24	100	19.9	100	258	22070.0838

Spring Plungers • with collar and ball, front slot

EH 22075.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. This spring plunger is characterised by the collar with front slot. This makes it suitable for applications that require a flat surface when screwed in.

Material

- Body**
 - Free cutting steel, blackened
 - Stainless steel 1.4305
 - Thermoplastic POM, blue

Ball

- Stainless steel, hardened
- Thermoplastic POM, white

Spring

- Stainless steel

MORE INFORMATION

Notes

Special types on request. Spring plungers are specially tested for spring range and forces.

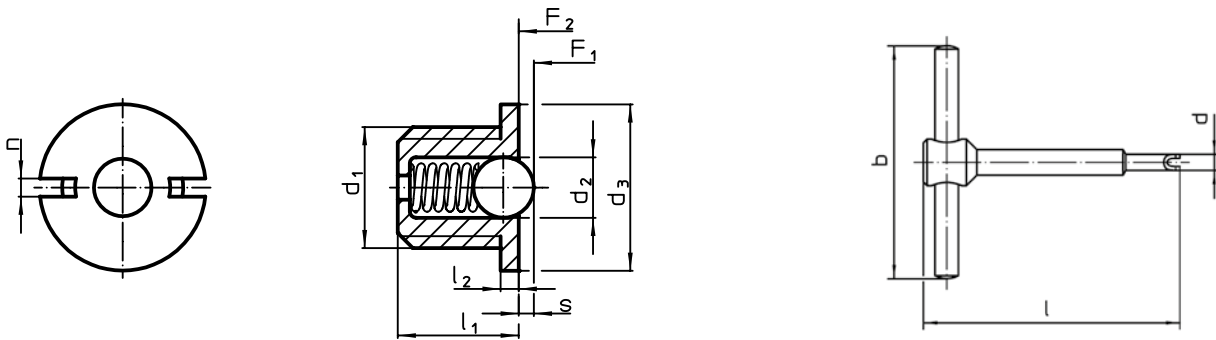
References

Thread lock on request, please refer to appendix - Technical Data - Calculation of indexing resistance, please refer to appendix - Technical Data -

Further products

Spring Plungers, smooth, with collar and ball → p. 79

DRAWING



ORDER INFORMATION

Dimensions						Stroke s +0.1 -0.1 [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.
d ₁	d ₂	d ₃ -0.1	l ₁	l ₂ -0.1	n		F ₁ ~	F ₂ ~	min.	max.		
[mm]							[N]		[°C]			
body from free cutting steel, ball from stainless steel, standard spring load												
M 4	2.00	5.5	4.0	0.6	0.6	0.6	1.7	3.9	-	250	0.3	22075.0004
M 5	3.00	7.0	5.0	0.8	1.2	0.8	2.9	4.5	-	250	0.5	22075.0005
M 6	3.50	8.0	6.0	1.0	1.3	1.0	3.6	8.7	-	250	0.8	22075.0006
M 8	5.00	10.0	7.0	1.5	1.5	1.6	5.4	10.2	-	250	1.9	22075.0008
M10	6.35	12.0	9.0	1.5	1.5	1.9	7.4	17.5	-	250	3.6	22075.0010
M12	8.00	14.0	11.5	1.5	2.7	2.4	10.8	22.3	-	250	6.0	22075.0012
body and ball from stainless steel, standard spring load												
M 4	2.00	5.5	4.0	0.6	0.6	0.6	1.7	3.9	-	250	0.3	22075.0404
M 5	3.00	7.0	5.0	0.8	1.2	0.8	2.9	4.5	-	250	0.5	22075.0405
M 6	3.50	8.0	6.0	1.0	1.3	1.0	3.6	8.7	-	250	0.9	22075.0406
M 8	5.00	10.0	7.0	1.5	1.5	1.6	5.4	10.2	-	250	1.9	22075.0408
M10	6.35	12.0	9.0	1.5	1.5	1.9	7.4	17.5	-	250	3.7	22075.0410
M12	8.00	14.0	11.5	1.5	2.7	2.4	10.8	22.3	-	250	6.1	22075.0412
body from thermoplastic, ball from stainless steel, standard spring load												
M 4	2.00	5.5	4.0	0.6	0.6	0.6	2.1	3.9	-30	50	0.1	22075.0604
M 5	3.00	7.0	5.0	0.8	1.2	0.8	3.2	4.5	-30	50	0.2	22075.0605
M 6	3.50	8.0	6.0	1.0	1.3	1.0	4.1	8.7	-30	50	0.4	22075.0606
M 8	5.00	10.0	7.0	1.5	1.5	1.6	5.7	10.2	-30	50	0.9	22075.0608
M10	6.50	12.0	9.0	1.5	1.5	1.9	9.2	17.2	-30	50	1.8	22075.0610
M12	8.00	14.0	11.5	1.5	2.7	2.4	11.2	22.3	-30	50	3.2	22075.0612


¹⁾ statistical average value



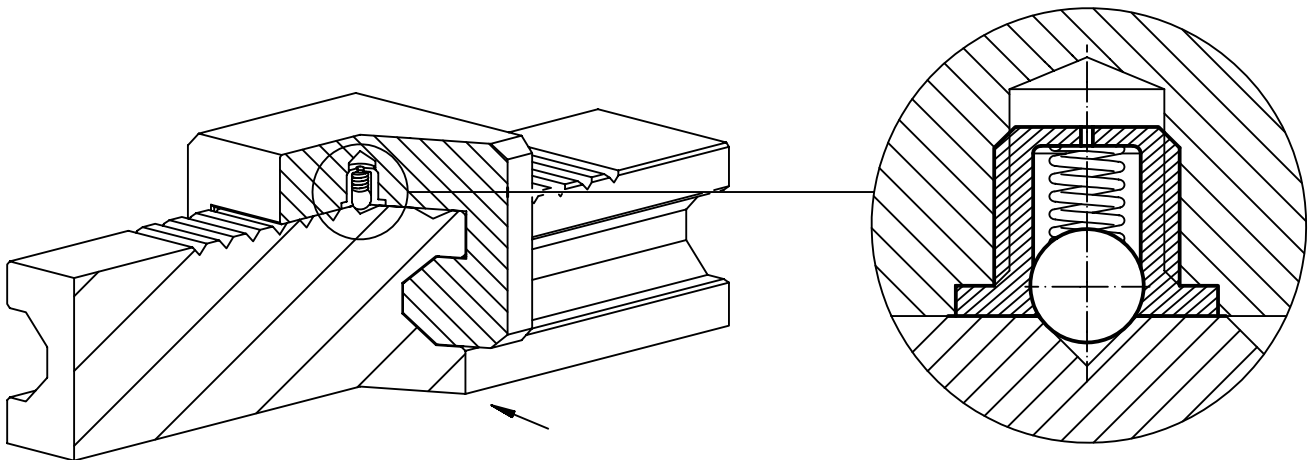
Dimensions						Stroke s +0.1 -0.1 [mm]	Spring load ¹⁾		min. max. [°C]	[g]	Art. No.	
d ₁	d ₂	d ₃ -0.1	l ₁	l ₂ -0.1	n		F ₁ ~	F ₂ ~				
[mm]						[mm]	[N]		[°C]	[g]		
body and ball from thermoplastic, standard spring load												
M 4	2.00	5.5	4.0	0.6	0.6	0.6	2.1	3.9	-30	50	0.1	22075.0804
M 5	3.00	7.0	5.0	0.8	1.2	0.8	3.2	4.5	-30	50	0.2	22075.0805
M 6	3.50	8.0	6.0	1.0	1.3	1.0	4.1	8.7	-30	50	0.4	22075.0806
M 8	5.00	10.0	7.0	1.5	1.5	1.6	5.7	10.2	-30	50	0.9	22075.0808
M10	6.50	12.0	9.0	1.5	1.5	1.9	9.2	17.2	-30	50	1.8	22075.0810
M12	8.00	14.0	11.5	1.5	2.7	2.4	11.2	22.3	-30	50	3.2	22075.0812

¹⁾ statistical average value

ACCESSORIES

	Dimensions				[g]	Art. No.
	d ₁	b	d	l		
[mm]						
assembly tool						
	M 4	50	5.2	55	20	22075.0904
	M 5	50	6.7	55	24	22075.0905
	M 6	50	7.7	60	30	22075.0906
	M 8	60	9.7	60	47	22075.0908
	M10	60	11.7	70	72	22075.0910
	M12	80	13.7	80	127	22075.0912

APPLICATION EXAMPLE



Spring Plungers • smooth, with collar and ball

EH 22080.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

- Body**
 - Stainless steel 1.4303
 - Brass
 - Thermoplastic POM, blue

Ball

- Stainless steel, hardened
- Thermoplastic POM, white

Spring

- Stainless steel

MORE INFORMATION

Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

References

Calculation of indexing resistance, please refer to appendix - Technical Data - Version with higher spring forces see "EH 22080. Spring Plungers, smooth, long, with collar and ball".

Further products

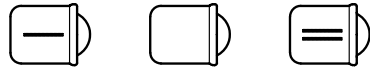
- Spring Plungers, with collar and ball, front slot. → p. 77
- Spring Plungers, smooth, long, with collar and ball → p. 81
- Spring Plungers, smooth, with collar and ball, self-clamping. → p. 82
- Holders, for spring plungers → p. 86

Assembly

A tolerance of H7 is recommended for the locating hole of d_1 .

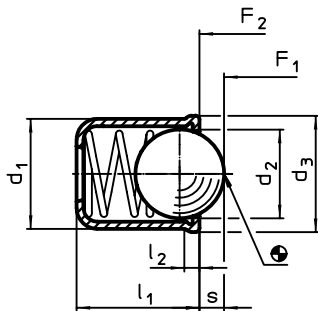
Characteristic

Light spring load: marked with one line
Standard spring load: no marking
Reinforced spring load: marked with two lines

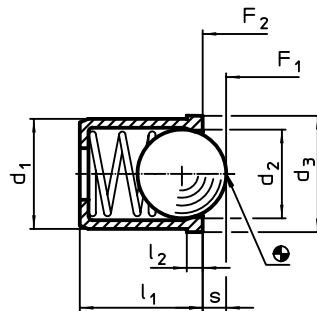


Light spring load Standard spring load Heavy spring load

DRAWING



picture 1



picture 2

ORDER INFORMATION

Dimensions					Stroke s	Spring load ¹⁾		min. max. [°C]	Location hole H7	[g]	Art. No.	
d_1 +0.1	d_2	d_3	l_1	l_2		F_1 ~	F_2 ~					
[mm]					[mm]	[N]						
body and ball from stainless steel, light spring load – picture 1												
3	2.38	3.5	4.0	0.6	0.70	0.4	1.3	–	250	3	0.1	22080.1003
4	3.00	4.6	5.0	0.9	1.00	0.4	1.0	–	250	4	0.3	22080.1004
5	4.00	5.6	6.0	0.9	1.40	0.5	4.7	–	250	5	0.6	22080.1005
6	5.00	6.5	7.0	1.0	1.80	2.3	6.5	–	250	6	1.0	22080.1006
8	6.50	8.5	9.0	1.1	2.40	4.0	9.0	–	250	8	2.0	22080.1008
10	8.50	11.0	13.0	1.5	3.30	3.9	10.0	–	250	10	4.0	22080.1010
12	10.00	13.0	16.0	2.3	4.00	6.2	14.6	–	250	12	7.0	22080.1012

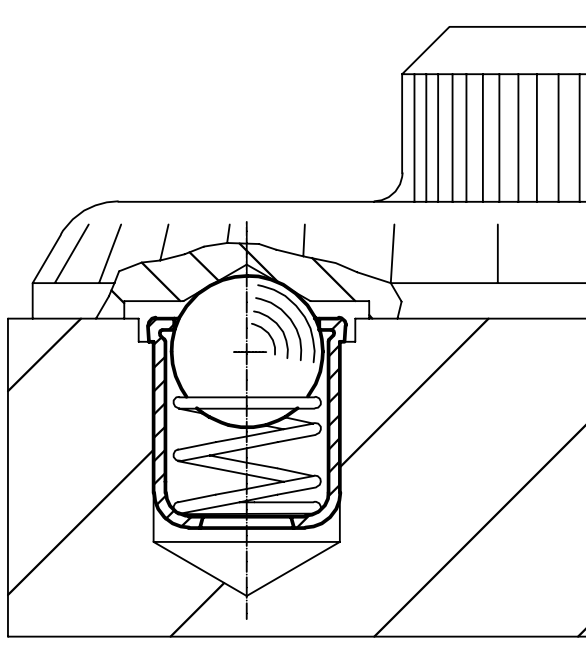
¹⁾ statistical average value



d ₁ +0.1	Dimensions				Stroke s [mm]	Spring load ¹⁾		min. max.		Location hole H7 [mm]	[g]	Art. No.
	d ₂	d ₃	l ₁	l ₂ ~		F ₁ ~ [N]	F ₂ ~	[°C]				
body and ball from stainless steel, standard spring load – picture 1												
3	2.38	3.5	4.0	0.6	0.70	1.8	3.5	–	250	3	0.1	22080.0003
4	3.00	4.6	5.0	0.9	1.00	2.5	6.0	–	250	4	0.3	22080.0004
5	4.00	5.6	6.0	0.9	1.40	3.0	6.5	–	250	5	0.6	22080.0005
6	5.00	6.5	7.0	1.0	1.80	5.5	11.5	–	250	6	1.0	22080.0006
8	6.50	8.5	9.0	1.1	2.40	7.0	12.5	–	250	8	2.1	22080.0008
10	8.50	11.0	13.0	1.5	3.30	8.5	18.5	–	250	10	4.5	22080.0010
12	10.00	13.0	16.0	2.3	4.00	12.0	26.5	–	250	12	7.2	22080.0012
body and ball from stainless steel, heavy spring load – picture 1												
3	2.38	3.5	4.0	0.6	0.70	2.4	5.5	–	250	3	0.1	22080.2003
4	3.00	4.6	5.0	0.9	1.00	5.0	10.4	–	250	4	0.3	22080.2004
5	4.00	5.6	6.0	0.9	1.40	6.0	12.0	–	250	5	0.6	22080.2005
6	5.00	6.5	7.0	1.0	1.80	7.3	19.0	–	250	6	1.0	22080.2006
8	6.50	8.5	9.0	1.1	2.40	11.0	25.0	–	250	8	2.2	22080.2008
10	8.50	11.0	13.0	1.5	3.30	17.0	37.0	–	250	10	4.6	22080.2010
12	10.00	13.0	16.0	2.3	4.00	28.0	57.0	–	250	12	7.4	22080.2012
body from brass, ball from stainless steel, standard spring load – picture 2												
3	2.38	3.6	4.0	0.6	0.60	1.8	3.5	–	250	3	0.2	22080.0203
4	3.00	4.5	5.0	1.0	0.80	3.0	6.0	–	250	4	0.4	22080.0204
5	4.00	5.5	6.0	1.0	1.00	4.0	6.5	–	250	5	0.7	22080.0205
6	5.00	6.5	7.0	1.0	1.60	6.0	11.5	–	250	6	1.2	22080.0206
8	6.50	8.5	9.0	1.0	1.90	8.0	12.5	–	250	8	2.8	22080.0208
body from thermoplastic, ball from stainless steel, standard spring load – picture 2												
3	2.00	3.6	4.0	0.6	0.55	1.7	3.5	-30	50	3	0.1	22080.0403
4	3.00	4.6	5.0	1.0	0.80	3.0	6.5	-30	50	4	0.2	22080.0404
5	4.00	5.6	6.0	1.0	1.00	6.0	9.4	-30	50	5	0.4	22080.0405
6	5.00	6.5	7.0	1.0	1.60	6.2	12.6	-30	50	6	0.7	22080.0406
8	6.50	8.5	9.0	1.0	1.90	10.0	20.4	-30	50	8	1.5	22080.0408
10	8.00	11.0	13.5	1.5	2.40	11.9	22.3	-30	50	10	3.1	22080.0410
12	10.00	13.0	16.0	1.5	3.30	14.0	25.0	-30	50	12	5.7	22080.0412
body and ball from thermoplastic, standard spring load – picture 2												
4	3.00	4.6	5.0	1.0	0.80	3.0	6.5	-30	50	4	0.1	22080.0604
5	4.00	5.6	6.0	1.0	1.00	6.0	9.4	-30	50	5	0.2	22080.0605
6	5.00	6.5	7.0	1.0	1.60	6.2	12.6	-30	50	6	0.3	22080.0606
8	6.50	8.5	9.0	1.0	1.90	10.0	20.4	-30	50	8	0.6	22080.0608
10	8.00	11.0	13.5	1.5	2.40	11.9	22.3	-30	50	10	1.4	22080.0610
12	10.00	13.0	16.0	1.5	3.30	14.0	25.0	-30	50	12	2.4	22080.0612

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • smooth, long, with collar and ball

EH 22080.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. This version has higher spring forces than the standard version. "EH 22080. Spring Plungers, smooth, with collar and ball".

Material

Body

- Stainless steel 1.4303

Ball

- Stainless steel, hardened

Spring

- Stainless steel

Spring plungers are specially tested for spring range and forces.

References

Calculation of indexing resistance, please refer to appendix - Technical Data -

Further products

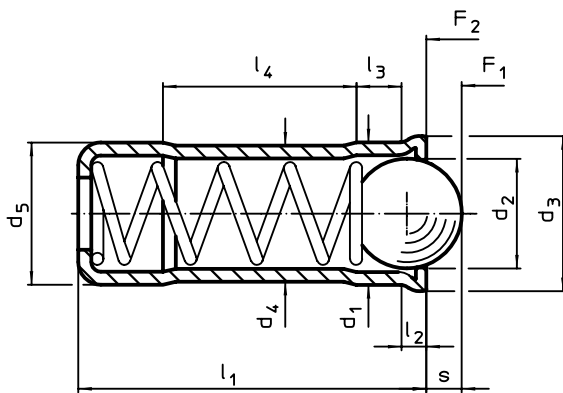
Spring Plungers, smooth, with collar and ball → p. 79

MORE INFORMATION

Notes

Special types on request.

DRAWING

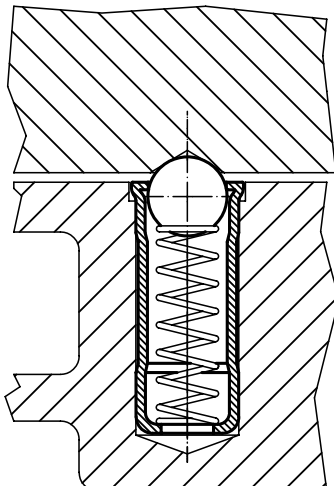


ORDER INFORMATION

Dimensions									Stroke s +0.2 -0.1 [mm]	Spring load ¹⁾		max. [°C]	Location hole H7 [mm]	[g]	Art. No.
d ₁ +0.1 +0.04	d ₂	d ₃	d ₄	d ₅ ±0.04	l ₁	l ₂ ~	l ₃ ~	l ₄ ~		F ₁ ~	F ₂ ~				
[mm]									[mm]	[N]		[°C]	[mm]	[g]	
4	3.0	4.6	3.85	4	10.7	0.9	1.8	5.6	0.9	12.9	19.0	250	4	0.6	22080.1104
5	4.0	5.6	4.85	5	12.0	0.9	2.1	6.0	1.3	19.3	29.2	250	5	1.0	22080.1105
6	5.0	6.5	5.85	6	15.0	1.0	2.3	8.2	1.7	28.0	47.5	250	6	1.7	22080.1106
8	6.5	8.5	7.55	8	18.0	1.1	2.9	9.5	2.3	40.0	67.3	250	8	3.6	22080.1108
10	8.5	11.0	9.55	10	26.0	1.5	4.2	14.3	3.1	66.0	105.0	250	10	7.6	22080.1110

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • smooth, with collar and ball, self-clamping

EH 22080.

2



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. Due to expanding fit of the body, the spring plungers can accommodate variation of up to 0,2 mm in the locating bore. A less precise locating hole means lower machining costs.

Material

Body

- Thermoplastic POM, black

Ball

- Stainless steel, hardened
- Thermoplastic POM, white

Spring

- Stainless steel

Assembly

Thanks to the flexible design of the body, a direct manual mounting and a secure overhead installation is possible.

MORE INFORMATION

Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

References

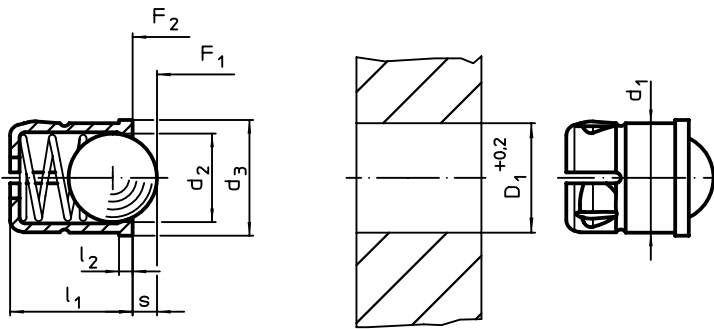
Calculation of indexing resistance, please refer to appendix - Technical Data -

Further products

Spring Plungers, smooth, with collar and ball → p. 79

Spring Plungers, smooth, with collar and ball, self-clamping – INCH → p. 99

DRAWING

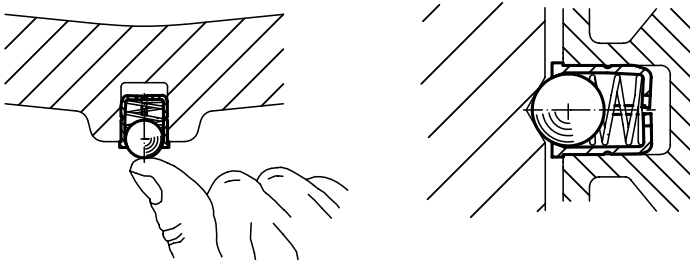


ORDER INFORMATION

Dimensions					Stroke s [mm]	Spring load ¹⁾		Temperature		Location hole D ₁ +0.2 [mm]	Weight [g]	Art. No.
d ₁ +0.1	d ₂	d ₃	l ₁ ±0.2	l ₂ ~		F ₁ ~	F ₂ ~	min.	max.			
[mm]					[mm]	[N]		[°C]		[mm]	[g]	
thermoplastic body, stainless steel ball												
4	3.0	4.6	5.0	1.0	0.8	3.0	6.5	-30	50	4	0.2	22080.0704
5	4.0	5.6	6.0	1.0	1.0	6.0	9.4	-30	50	5	0.4	22080.0705
6	5.0	6.5	7.0	1.0	1.6	6.2	12.6	-30	50	6	0.7	22080.0706
8	6.5	8.5	9.0	1.0	1.9	10.0	20.4	-30	50	8	1.5	22080.0708
10	8.0	11.0	13.5	1.5	2.4	11.9	22.3	-30	50	10	3.1	22080.0710
body and ball from thermoplastic												
4	3.0	4.6	5.0	1.0	0.8	3.0	6.5	-30	50	4	0.1	22080.0804
5	4.0	5.6	6.0	1.0	1.0	6.0	9.4	-30	50	5	0.1	22080.0805
6	5.0	6.5	7.0	1.0	1.6	6.2	12.6	-30	50	6	0.2	22080.0806
8	6.5	8.5	9.0	1.0	1.9	10.0	20.4	-30	50	8	0.5	22080.0808
10	8.0	11.0	13.5	1.5	2.4	11.9	22.3	-30	50	10	1.4	22080.0810

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • smooth, with collar and pin
EH 22080.



PRODUCT DESCRIPTION

To be used for locating, tightening, as an assembly support, for applying pressure, as a detent, for ejection or as a shock absorber.

Material

- Pin**
 - Stainless steel 1.4305
 - Thermoplastic POM, white

Body

- Stainless steel 1.4303

Spring

- Stainless steel

Assembly

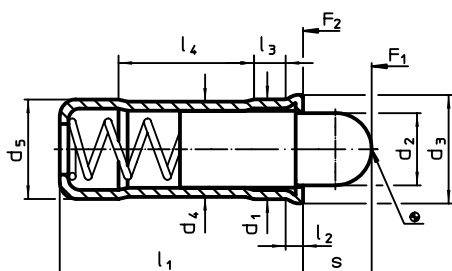
A tolerance of H7 is recommended for the locating hole of d_1 .

MORE INFORMATION

Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

DRAWING

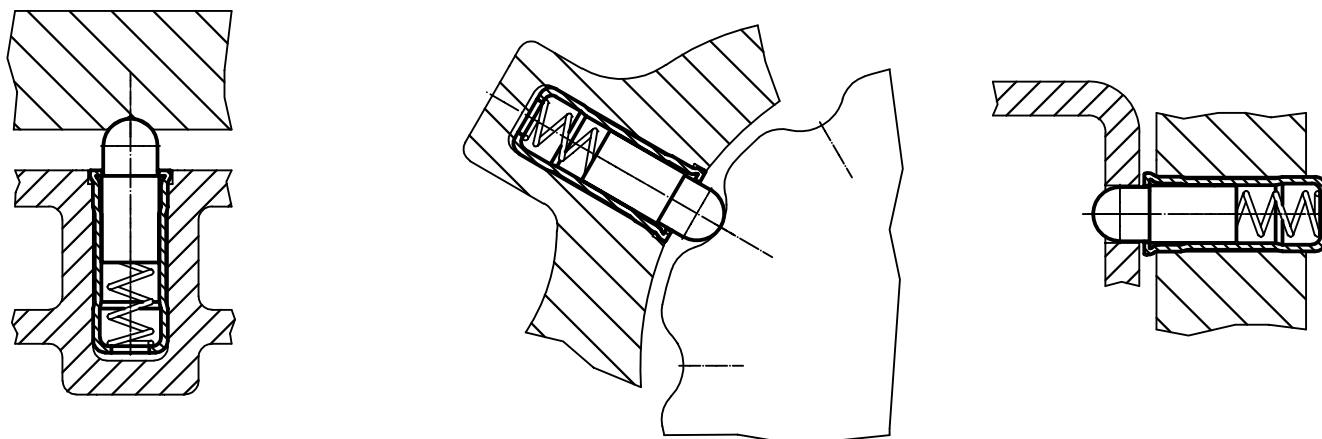


ORDER INFORMATION

Dimensions										Stroke s	Spring load ¹⁾		Temperature		Location hole H7	Weight [g]	Art. No.
d_1 +0.1 +0.04	d_2	d_3	d_4	d_5 ± 0.04	l_1	l_2 ~	l_3 ~	l_4 ~	[mm]		F_1 ~	F_2 ~	min.	max.			
body and pin from stainless steel																	
4	2.8	4.6	3.85	4	10.7	0.9	1.8	5.6	2.7	3.0	8.2	-	250	4	0.7	22080.0104	
5	3.8	5.6	4.85	5	12.0	0.9	2.1	6.0	4.0	3.3	9.0	-	250	5	1.1	22080.0105	
6	4.8	6.5	5.85	6	15.0	1.0	2.3	8.2	5.5	6.1	12.0	-	250	6	2.0	22080.0106	
8	6.2	8.5	7.55	8	18.0	1.1	2.9	9.5	6.5	9.0	20.1	-	250	8	4.0	22080.0108	
10	8.1	11.0	9.55	10	26.0	1.5	4.2	14.3	8.0	16.2	29.0	-	250	10	9.0	22080.0110	
stainless steel body, thermoplastic pin																	
4	2.8	4.6	3.85	4	10.7	0.9	1.8	5.6	2.7	3.0	8.2	-30	50	4	0.5	22080.0124	
5	3.8	5.6	4.85	5	12.0	0.9	2.1	6.0	4.0	3.3	9.0	-30	50	5	0.7	22080.0125	
6	4.8	6.5	5.85	6	15.0	1.0	2.3	8.2	5.5	6.1	12.0	-30	50	6	1.2	22080.0126	
8	6.2	8.5	7.55	8	18.0	1.1	2.9	9.5	6.5	9.0	20.1	-30	50	8	2.3	22080.0128	
10	8.1	11.0	9.55	10	26.0	1.5	4.2	14.3	8.0	16.2	29.0	-30	50	10	4.8	22080.0130	

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • smooth, without collar

EH 22080.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

Body
 ■ Stainless steel 1.4305

Ball
 ■ Stainless steel, hardened

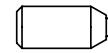
Spring
 ■ Stainless steel

Assembly

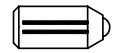
The locating hole has to be adapted to each individual application case. We recommend an F8 size location hole for easy assembly and a H9 size when tight fit is required.

Characteristic

Standard spring load: no marking
 Reinforced spring load: marked with two lines



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.
 Spring plungers are specially tested for spring range and forces.

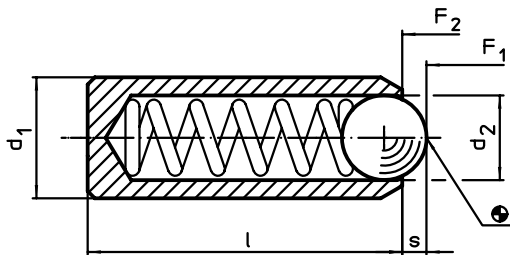
References

Calculation of indexing resistance, please refer to appendix - Technical Data -

Further products

Spring Plungers, smooth, without collar, with moveable ball → p. 85

DRAWING



ORDER INFORMATION

Dimensions			Stroke s [mm]	Spring load ¹⁾		max. [°C]	Location hole joint connection F8 / press fit H9 [mm]	[g]	Art. No.
d ₁ ±0.04	d ₂ [mm]	l		F ₁ [N]	F ₂ [N]				
stainless steel, standard spring load									
2.0	1.0	3.5	0.30	0.8	1.5	250	2.0	0.1	22080.0306
2.5	1.5	5.0	0.40	2.8	4.7	250	2.5	0.1	22080.0308
3.0	2.0	7.0	0.65	4.5	7.5	250	3.0	0.3	22080.0310
3.5	2.5	9.0	0.80	8.5	14.0	250	3.5	0.5	22080.0312
4.0	3.0	11.0	0.90	8.0	14.0	250	4.0	0.7	22080.0315
4.5	3.2	12.0	0.95	9.5	16.5	250	4.5	1.0	22080.0317
5.0	3.5	13.0	1.00	11.0	18.0	250	5.0	1.4	22080.0320
5.5	4.0	14.0	1.20	15.5	25.0	250	5.5	1.8	22080.0322
6.0	4.5	15.0	1.50	18.0	31.0	250	6.0	2.3	22080.0325
8.0	6.0	18.0	2.00	24.0	45.0	250	8.0	5.0	22080.0327
10.0	8.0	20.0	2.50	26.0	49.0	250	10.0	8.4	22080.0330
12.0	10.0	22.0	3.50	41.0	86.0	250	12.0	12.0	22080.0332
stainless steel, heavy spring load									
2.0	1.0	3.5	0.30	1.3	2.2	250	2.0	0.1	22080.0356
2.5	1.5	5.0	2.50	4.7	7.1	250	2.5	0.1	22080.0358
3.0	2.0	7.0	0.65	7.8	11.6	250	3.0	0.3	22080.0360
3.5	2.5	9.0	0.80	12.0	18.0	250	3.5	0.5	22080.0362
4.0	3.0	11.0	0.90	15.0	22.0	250	4.0	0.7	22080.0365
4.5	3.2	12.0	0.95	18.7	25.1	250	4.5	1.0	22080.0367
5.0	3.5	13.0	1.00	19.3	26.6	250	5.0	1.4	22080.0370
5.5	4.0	14.0	1.20	25.1	39.2	250	5.5	1.8	22080.0372
6.0	4.5	15.0	1.50	36.0	60.5	250	6.0	2.3	22080.0375
8.0	6.0	18.0	2.00	57.0	103.5	250	8.0	5.1	22080.0377
10.0	8.0	20.0	2.50	61.0	110.0	250	10.0	8.5	22080.0380
12.0	10.0	22.0	3.50	68.0	143.0	250	12.0	13.0	22080.0382

¹⁾ statistical average value

Spring Plungers • smooth, without collar, with moveable ball

EH 22081.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. The running of the ball minimises wear on the counterpart, this also results in a positive locking behaviour depending on the counterpart.

Another advantage of the plastic ball is the electric insulation.

Material

Body

- Stainless steel 1.4305

Ball

- Stainless steel, hardened

Bearing

- Plastic

Spring

- Stainless steel

an F8 size location hole for easy assembly and a H9 size when tight fit is required.

MORE INFORMATION

Notes

Special types on request. Spring plungers are specially tested for spring range and forces.

References

Calculation of indexing resistance, please refer to appendix - Technical Data -

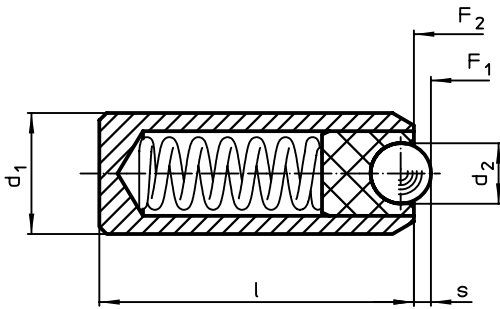
Assembly

The locating hole has to be adapted to each individual application case. We recommend

Further products

Spring Plungers, smooth, without collar → p. 84

DRAWING



ORDER INFORMATION

Dimensions			Stroke s [mm]	Spring load ¹⁾		Temperature		Location hole joint connection F8 / press fit H9 [mm]	Weight [g]	Art. No.
d ₁ ±0.04 [mm]	d ₂ [mm]	l [mm]		F ₁ [N]	F ₂ [N]	min. [°C]	max. [°C]			
body and ball from stainless steel										
4	2.0	11	0.50	4.8	6.8	-30	90	4	0.6	22081.0315
5	2.5	13	0.70	6.3	10.0	-30	90	5	1.3	22081.0320
6	3.5	15	0.95	16.0	24.0	-30	90	6	2.0	22081.0325
8	4.5	18	1.40	18.8	31.7	-30	90	8	4.4	22081.0327
10	6.5	20	2.50	24.0	49.0	-30	90	10	7.1	22081.0330
12	8.5	22	3.10	38.0	68.0	-30	90	12	11.0	22081.0332

¹⁾ statistical average value

Holders • for spring plungers

EH 22082.



PRODUCT DESCRIPTION

Holders are used to mount spring plungers, smooth, with collar (EH 22080) on the side.

Material

- Zinc die-cast, nickel-plated

Assembly

The left and right hand versions (picture 1 / picture 3) are attached using only one

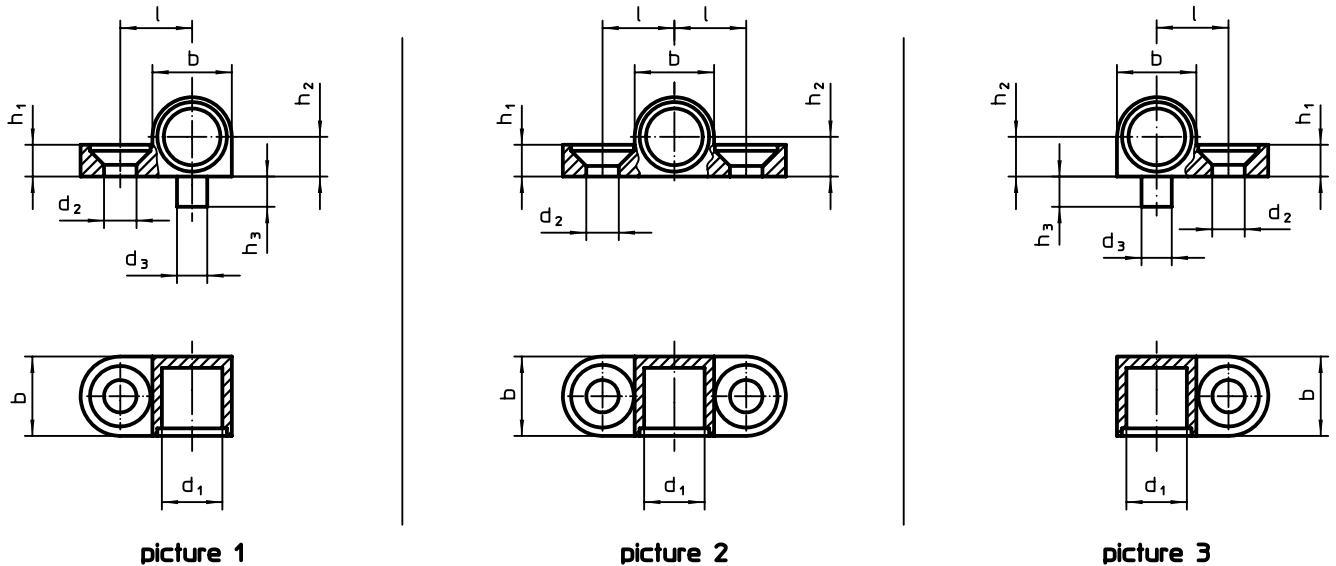
screw, and are also provided with an anti-turn locking device.

MORE INFORMATION

References

Suitable for spring plungers, smooth, with collar and ball (EH 22080.)

DRAWING




picture 1

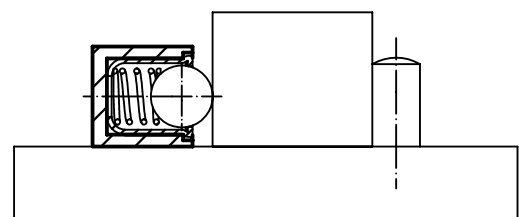
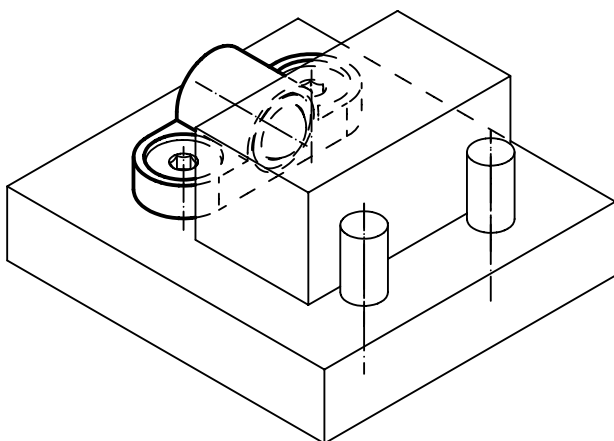
picture 2

picture 3

ORDER INFORMATION

Dimensions								Suitable screw		Art. No.
d ₁	d ₂	d ₃ -0.05	b	h ₁	h ₂ ±0.05	h ₃	l ±0.05			
[mm]								[mm]	[g]	
left – picture 1										
6	3.2	3	8.5	3.2	4.25	3	7.5	M3	2.9	22082.0006
8	4.3	4	10.5	4.2	5.25	4	9.5	M4	5.3	22082.0008
two-sided – picture 2										
6	3.2	–	8.5	3.2	4.25	–	7.5	M3	3.5	22082.0106
8	4.3	–	10.5	4.2	5.25	–	9.5	M4	6.5	22082.0108
right – picture 3										
6	3.2	3	8.5	3.2	4.25	3	7.5	M3	2.8	22082.0206
8	4.3	4	10.5	4.2	5.25	4	9.5	M4	5.2	22082.0208

APPLICATION EXAMPLE



Spring Plungers • double-sided

EH 22090.



PRODUCT DESCRIPTION

To be used for locating and securing, as well as electric connection.

Material

- Body**
- Brass
- Ball**
- Stainless steel, hardened
- Spring**
- Stainless steel

MORE INFORMATION

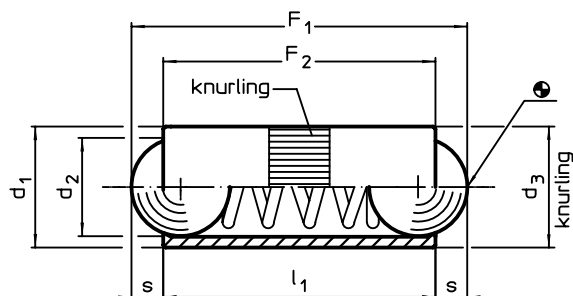
Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.

References

Calculation of indexing resistance, please refer to appendix - Technical Data -

DRAWING

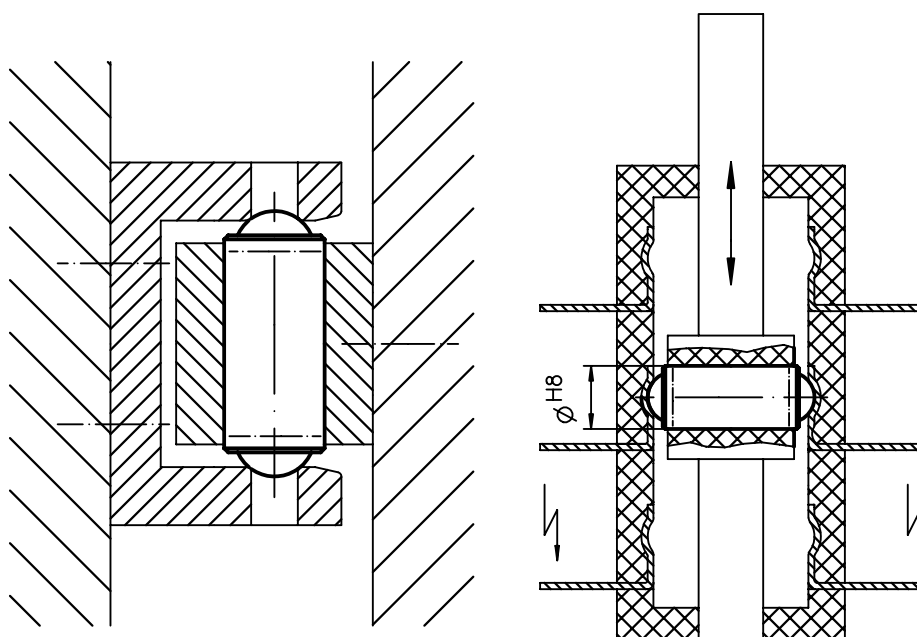


ORDER INFORMATION

Dimensions				Stroke s	Spring load ¹⁾		max. [°C]	Location hole H8	[g]	Art. No.
d ₁	d ₂	d ₃	l ₁		F ₁ ~	F ₂ ~				
[mm]				[mm]	[N]			[mm]		
2.5	2.0	2.52	5.3	0.65	1.3	2.5	250	2.5	0.1	22090.0025
3.0	2.5	3.02	7.3	0.80	2.0	4.5	250	3.0	0.3	22090.0030
4.0	3.0	4.03	9.0	0.90	2.5	7.5	250	4.0	0.6	22090.0040
5.0	4.0	5.03	10.8	1.20	3.5	8.0	250	5.0	1.2	22090.0050
6.0	5.0	6.03	12.6	1.60	3.5	10.5	250	6.0	1.9	22090.0060
7.0	6.0	7.03	14.0	2.00	4.0	12.0	250	7.0	3.0	22090.0070
8.0	6.5	8.03	18.0	2.10	6.0	15.0	250	8.0	5.1	22090.0080

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Bodies

EH 22100.



PRODUCT DESCRIPTION

Spring bodies can be used for locating.

Material

Body

- Steel, nickel-plated
- Stainless steel A2

Spring

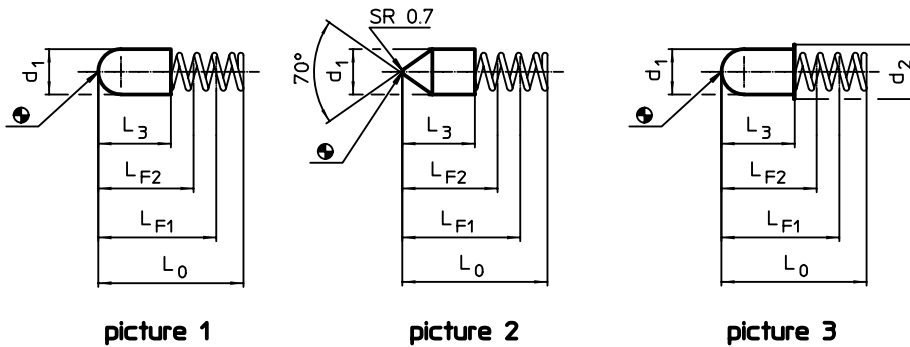
- Stainless steel 1.4310

MORE INFORMATION

Notes

Special springs on request.

DRAWING



picture 1

picture 2

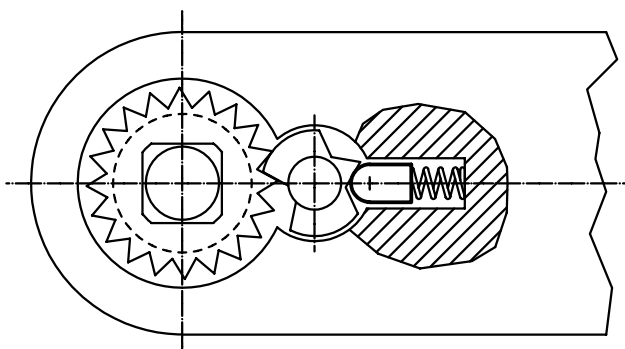
picture 3

ORDER INFORMATION

Dimensions						Stroke s [mm]	Spring load ¹⁾		Spring rate [N/mm]	max. [°C]	[g]	Art. No.
d ₁ ±0.05	L ₀	d ₂	L for F ₁	L for F ₂	L ₃		F ₁ ~	F ₂ ~				
body from steel, round – picture 1												
2.2	16	–	12.0	10.5	7.8	1.5	2.2	3.0	0.53	250	0.1	22100.0012
2.6	8	–	6.5	5.2	3.8	1.3	1.1	2.0	0.70	250	0.1	22100.0016
3.0	12	–	9.0	8.7	6.0	0.3	6.2	6.8	2.00	250	0.2	22100.0022
	16	–	13.0	10.7	8.5	2.3	4.8	8.4	1.60	250	0.3	22100.0024
3.4	12	–	9.0	7.8	6.0	1.2	5.0	7.0	1.69	250	0.2	22100.0034
	15	–	12.0	8.2	7.3	3.8	5.9	13.3	1.95	250	0.2	22100.0036
4.0	14	–	12.0	9.0	8.0	3.0	5.0	12.3	2.45	250	0.4	22100.0042
5.0	16	–	13.0	10.4	8.0	2.6	8.0	15.0	2.70	250	0.6	22100.0052
body from stainless steel, round – picture 1												
3.0	16	–	13.0	10.6	8.0	2.4	4.8	8.6	1.60	250	0.2	22100.0124
3.6	18	–	15.0	11.5	9.0	1.5	6.7	14.5	2.24	250	0.4	22100.0137
4.0	16	–	13.0	11.4	7.5	1.6	8.0	12.3	2.70	250	0.4	22100.0144
body from steel, tipped – picture 2												
2.2	16	–	12.0	10.5	7.8	1.5	2.2	3.0	0.53	250	0.2	22100.0212
3.0	11	–	9.0	6.7	5.0	2.3	1.6	3.4	0.78	250	0.1	22100.0222
	16	–	13.0	10.7	8.5	2.3	4.8	8.4	1.60	250	0.2	22100.0224
body from stainless steel, round, with collar – picture 3												
3.0	13	4.1	10.0	8.9	7.0	1.1	5.3	7.2	1.75	250	0.2	22100.0373

¹⁾ statistical average value

APPLICATION EXAMPLE

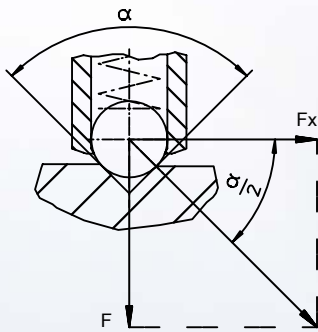


SPRING PLUNGERS

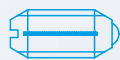
INCH MODELS



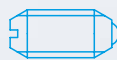
CALCULATION OF INDEXING RESISTANCE



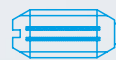
Example of calculation for:
 $\alpha = 60^\circ, F_x = 1,732 \times F$
 $\alpha = 90^\circ, F_x = F$
 $\alpha = 120^\circ, F_x = 0,577 \times F$



Light spring load



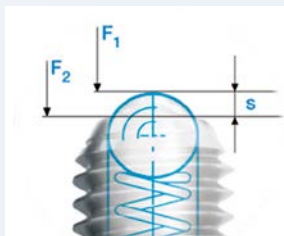
Standard spring load



Heavy spring load



www.halder.com/SpringPlungers-Video



CERTIFIED

Certified spring load F_1 and F_2 and stroke s .



PREMIUM QUALITY

First-rate quality and minimum wear thanks to the use of hardened pins.



SECURE

Outstanding functional reliability thanks to - among other things - the assembly procedure used and a specific manufacturing process.



CLEAR

Coherent, uniform and clearly visible identification of the spring load thanks to a permanent marking on the body.

Spring Plungers • with pin and slot - INCH

EH 2B020.



PRODUCT DESCRIPTION

To be used for positioning, indexing, locking, latching as well as for other similar pressure applications.

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

Pin

- Free cutting steel, hardened, blackened
- Stainless Steel 1.4305 (ASTM-A-582), nitrided

Body

- Free cutting steel, blackened
- Stainless steel 1.4305 (ASTM-A-582)

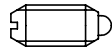
Spring

- Stainless steel

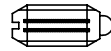
Characteristic

Standard spring load: no marking

Heavy spring load: marked with two lines



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.

Spring plungers are specially tested for spring range and forces.

- This product is manufactured in INCH dimensions.

References

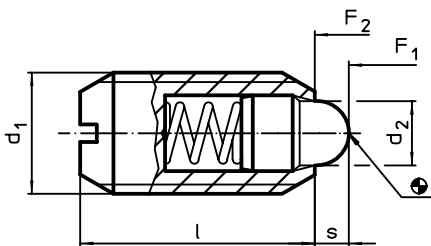
A conversion table can be found in the technical data following these product information pages.

Thread lock: polyamide spot coating (for details please refer to the technical appendix).

Further products

Spring Plungers, with pin and slot... → p. 63

DRAWING



ORDER INFORMATION

	Dimensions				Stroke s [in]	Spring load ¹⁾		min. max. [°F]	oz	Art. No.	
	d ₁ [in]	Thread	d ₂ [in]	l		F ₁ ~ [lb]	F ₂ ~			Without thread lock	With thread lock
free cutting steel, standard spring load											
#6-32	0.138	2A-UNC	0.046	3/8	0.063	0.5	1.5	-22	0.013	2B020.0033	-
									0.013	-	2B020.0233
#8-32	0.164	2A-UNC	0.070	7/16	0.052	0.8	1.5	-22	0.023	2B020.0036	-
									0.023	-	2B020.0236
#8-36	0.164	2A-UNF	0.070	7/16	0.052	0.8	1.5	-22	0.024	2B020.0038	-
									0.032	-	2B020.0238
#10-32	0.190	2A-UNF	0.093	15/32	0.065	1.0	2.5	-22	0.036	2B020.0040	-
									0.042	-	2B020.0240
1/4-20	0.250	2A-UNC	0.119	17/32	0.078	1.1	3.5	-22	0.062	2B020.0042	-
									0.064	-	2B020.0242
5/16-18	0.313	2A-UNC	0.135	37/64	0.084	1.0	4.0	-22	0.123	2B020.0046	-
									0.115	-	2B020.0246
3/8-16	0.375	2A-UNC	0.186	5/8	0.110	1.5	4.5	-22	0.187	2B020.0048	-
									0.190	-	2B020.0248
1/2-13	0.500	2A-UNC	0.248	3/4	0.151	1.8	5.5	-22	0.377	2B020.0050	-
									0.377	-	2B020.0250
5/8-11	0.625	2A-UNC	0.310	1 1/16	0.215	2.0	8.5	-22	0.885	2B020.0052	-
									0.885	-	2B020.0252

¹⁾ statistical average value

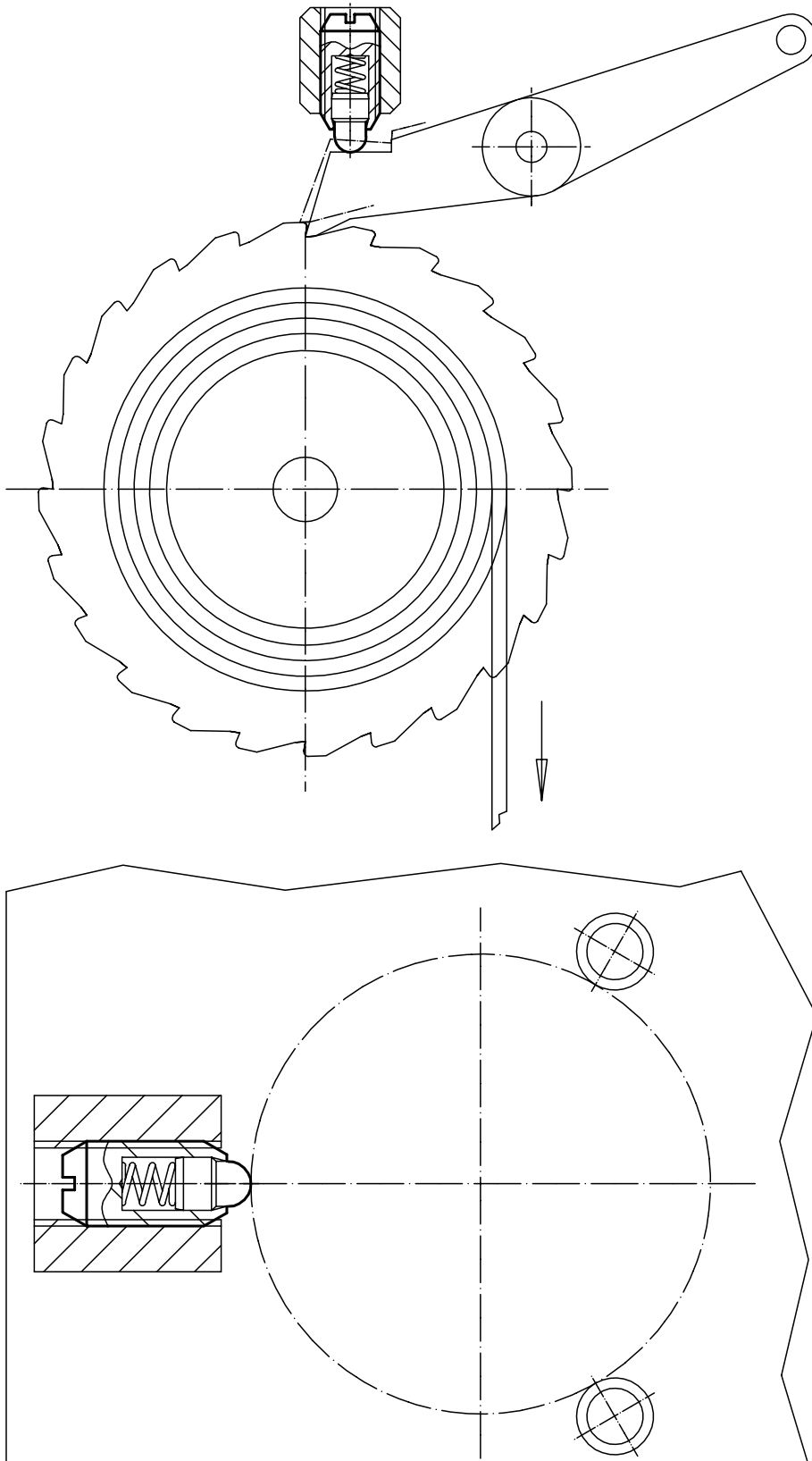


	Dimensions				Stroke s [in]	Spring load ¹⁾		min. max. [°F]	[oz]	Art. No.		
	d ₁ [in]	Thread	d ₂ [in]	l		F ₁ ~ [lb]	F ₂ ~ [lb]			Without thread lock	With thread lock	
free cutting steel, heavy spring load												
#6-32	0.138	2A-UNC	0.046	3/8	0.063	0.5	2.5	-22	482	0.022	2B020.0063	-
									194	0.021	-	2B020.0263
#8-32	0.164	2A-UNC	0.070	7/16	0.052	1.8	4.6	-22	482	0.023	2B020.0066	-
									194	0.023	-	2B020.0266
#8-36	0.164	2A-UNF	0.070	7/16	0.052	1.8	4.6	-22	482	0.032	2B020.0068	-
									194	0.032	-	2B020.0268
#10-32	0.190	2A-UNF	0.093	15/32	0.065	2.6	6.3	-22	482	0.042	2B020.0070	-
									194	0.042	-	2B020.0270
1/4-20	0.250	2A-UNC	0.119	17/32	0.078	3.0	9.7	-22	482	0.065	2B020.0072	-
									194	0.074	-	2B020.0272
5/16-18	0.313	2A-UNC	0.135	37/64	0.084	3.8	13.0	-22	482	0.116	2B020.0076	-
									194	0.123	-	2B020.0276
3/8-16	0.375	2A-UNC	0.186	5/8	0.110	4.5	16.0	-22	482	0.190	2B020.0078	-
									194	0.190	-	2B020.0278
1/2-13	0.500	2A-UNC	0.248	3/4	0.151	5.0	22.4	-22	482	0.384	2B020.0080	-
									194	0.388	-	2B020.0280
5/8-11	0.625	2A-UNC	0.310	1 1/16	0.215	7.0	43.5	-22	482	0.907	2B020.0082	-
									194	0.907	-	2B020.0282
stainless steel, standard spring load												
#6-32	0.138	2A-UNC	0.046	3/8	0.063	0.5	1.5	-22	482	0.013	2B020.0133	-
									194	0.013	-	2B020.0333
#8-32	0.164	2A-UNC	0.070	7/16	0.052	0.8	1.5	-22	482	0.023	2B020.0136	-
									194	0.023	-	2B020.0336
#8-36	0.164	2A-UNF	0.070	7/16	0.052	0.8	1.5	-22	482	0.024	2B020.0138	-
									194	0.024	-	2B020.0338
#10-32	0.190	2A-UNF	0.093	15/32	0.065	1.0	2.5	-22	482	0.042	2B020.0140	-
									194	0.035	-	2B020.0340
1/4-20	0.250	2A-UNC	0.119	17/32	0.078	1.1	3.5	-22	482	0.074	2B020.0142	-
									194	0.074	-	2B020.0342
5/16-18	0.313	2A-UNC	0.135	37/64	0.084	1.0	4.0	-22	482	0.123	2B020.0146	-
									194	0.115	-	2B020.0346
3/8-16	0.375	2A-UNC	0.186	5/8	0.110	1.5	4.5	-22	482	0.180	2B020.0148	-
									194	0.190	-	2B020.0348
1/2-13	0.500	2A-UNC	0.248	3/4	0.151	1.8	5.5	-22	482	0.388	2B020.0150	-
									194	0.377	-	2B020.0350
5/8-11	0.625	2A-UNC	0.310	1 1/16	0.215	2.0	8.5	-22	482	0.892	2B020.0152	-
									194	0.892	-	2B020.0352
stainless steel, heavy spring load												
#6-32	0.138	2A-UNC	0.046	3/8	0.063	0.5	2.5	-22	482	0.014	2B020.0163	-
									194	0.017	-	2B020.0363
#8-32	0.164	2A-UNC	0.070	7/16	0.052	1.8	4.6	-22	482	0.032	2B020.0166	-
									194	0.032	-	2B020.0366
#8-36	0.164	2A-UNF	0.070	7/16	0.052	1.8	4.6	-22	482	0.025	2B020.0168	-
									194	0.025	-	2B020.0368
#10-32	0.190	2A-UNF	0.093	15/32	0.065	2.6	6.3	-22	482	0.036	2B020.0170	-
									194	0.042	-	2B020.0370
1/4-20	0.250	2A-UNC	0.119	17/32	0.078	3.0	9.7	-22	482	0.071	2B020.0172	-
									194	0.074	-	2B020.0372
5/16-18	0.313	2A-UNC	0.135	37/64	0.084	3.8	13.0	-22	482	0.123	2B020.0176	-
									194	0.123	-	2B020.0376
3/8-16	0.375	2A-UNC	0.186	5/8	0.110	4.5	16.0	-22	482	0.183	2B020.0178	-
									194	0.185	-	2B020.0378
1/2-13	0.500	2A-UNC	0.248	3/4	0.151	5.0	22.4	-22	482	0.399	2B020.0180	-
									194	0.399	-	2B020.0380
5/8-11	0.625	2A-UNC	0.310	1 1/16	0.215	7.0	43.5	-22	482	0.914	2B020.0182	-
									194	0.910	-	2B020.0382

¹⁾ statistical average value

APPLICATION EXAMPLE

2



Spring Plungers • with pin and internal hexagon - INCH
EH 2B030.



PRODUCT DESCRIPTION

To be used for positioning, indexing, locking, latching as well as for other similar pressure applications.
Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

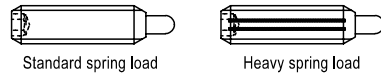
- Pin**
- Free cutting steel, hardened, blackened
 - Stainless Steel 1.4305 (ASTM-A-582), nitrided

- Body**
- Free cutting steel, blackened
 - Stainless steel 1.4305 (ASTM-A-582)

- Spring**
- Stainless steel

Characteristic

Standard spring load: no marking
Heavy spring load: marked with two lines



MORE INFORMATION

Notes

Special types on request.
Spring plungers are specially tested for spring range and forces.
This product is manufactured in INCH dimensions.

References

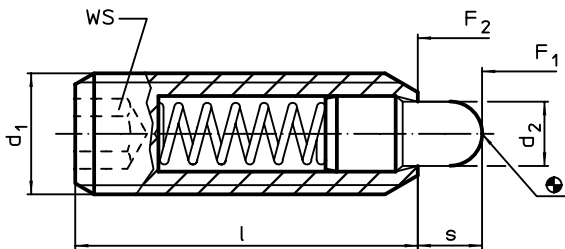
A conversion table can be found in the technical data following these product information pages.

Thread lock: polyamide spot coating (for details please refer to the technical appendix).

Further products

Spring Plungers, with pin and internal hexagon..... → p. 53

DRAWING



ORDER INFORMATION

	Dimensions				WS	Stroke s	Spring load ¹⁾		min.	max.	oz	Art. No.		
	d ₁ [in]	Thread	d ₂ [in]	l			F ₁ ~ [lb]	F ₂ ~ [lb]				Without thread lock	With thread lock	
free cutting steel, standard spring load														
#6-32	0.138	2A-UNC	0.046	17/32	1/16	0.063	0.5	1.5	-22	482	0.025	2B030.0033	-	
										194	0.028	-	2B030.0233	
#8-32	0.164	2A-UNC	0.070	5/8	5/64	0.094	0.8	2.3	-22	482	0.042	2B030.0036	-	
										194	0.033	-	2B030.0236	
#10-32	0.190	2A-UNF	0.093	3/4	3/32	0.125	1.4	2.7	-22	482	0.057	2B030.0040	-	
										194	0.057	-	2B030.0240	
1/4-20	0.250	2A-UNC	0.119	1	1/8	0.188	1.0	4.0	-22	482	0.121	2B030.0042	-	
										194	0.120	-	2B030.0242	
1/4-28	0.250	2A-UNF	0.119	1	1/8	0.188	1.0	4.0	-22	482	0.134	2B030.0044	-	
										194	0.145	-	2B030.0244	
5/16-18	0.313	2A-UNC	0.135	1	5/32	0.188	1.5	4.5	-22	482	0.205	2B030.0046	-	
										194	0.196	-	2B030.0246	
3/8-16	0.375	2A-UNC	0.186	1 1/8	3/16	0.188	2.7	7.2	-22	482	0.331	2B030.0048	-	
										194	0.331	-	2B030.0248	
1/2-13	0.500	2A-UNC	0.248	1 1/4	1/4	0.250	2.7	9.3	-22	482	0.649	2B030.0050	-	
										194	0.649	-	2B030.0250	
5/8-11	0.625	2A-UNC	0.310	1 1/2	5/16	0.313	3.5	10.6	-22	482	1.242	2B030.0052	-	
										194	1.249	-	2B030.0252	
3/4-10	0.750	2A-UNC	0.374	1 3/4	3/8	0.313	5.5	14.5	-22	482	2.172	2B030.0053	-	
										194	2.174	-	2B030.0253	
1-8	0.125	2A-UNC	0.499	2 13/32	3/8	0.500	4.0	31.0	-22	482	5.443	2B030.0054	-	
										194	7.668	-	2B030.0254	

¹⁾ statistical average value



	Dimensions				WS [in]	Stroke s [in]	Spring load ¹⁾		min. max. [°F]	oz	Art. No.		
	d ₁ [in]	Thread	d ₂ [in]	l			F ₁ ~ [lb]	F ₂ ~ [lb]			Without thread lock	With thread lock	
free cutting steel, heavy spring load													
#6-32	0.138	2A-UNC	0.046	17/32	1/16	0.063	1.5	3.4	-22	482	0.019	2B030.0063	-
										194	0.019	-	2B030.0263
#8-32	0.164	2A-UNC	0.070	5/8	5/64	0.094	2.6	6.6	-22	482	0.033	2B030.0066	-
										194	0.033	-	2B030.0266
#10-32	0.190	2A-UNF	0.093	3/4	3/32	0.125	3.2	9.0	-22	482	0.058	2B030.0070	-
										194	0.067	-	2B030.0270
1/4-20	0.250	2A-UNC	0.119	1	1/8	0.188	3.1	10.1	-22	482	0.122	2B030.0072	-
										194	0.099	-	2B030.0272
1/4-28	0.250	2A-UNF	0.119	1	1/8	0.188	3.1	10.1	-22	482	0.145	2B030.0074	-
										194	0.145	-	2B030.0274
5/16-18	0.313	2A-UNC	0.135	1	5/32	0.188	3.0	15.0	-22	482	0.208	2B030.0076	-
										194	0.199	-	2B030.0276
3/8-16	0.375	2A-UNC	0.186	1 1/8	3/16	0.188	5.5	12.7	-22	482	0.335	2B030.0078	-
										194	0.328	-	2B030.0278
1/2-13	0.500	2A-UNC	0.248	1 1/4	1/4	0.250	6.6	16.0	-22	482	0.649	2B030.0080	-
										194	0.650	-	2B030.0280
5/8-11	0.625	2A-UNC	0.310	1 1/2	5/16	0.313	10.5	22.2	-22	482	1.245	2B030.0082	-
										194	1.245	-	2B030.0282
3/4-10	0.750	2A-UNC	0.374	1 3/4	3/8	0.313	6.7	33.0	-22	482	2.174	2B030.0083	-
										194	2.176	-	2B030.0283
1-8	0.125	2A-UNC	0.499	2 13/32	3/8	0.500	16.0	60.0	-22	482	5.538	2B030.0084	-
										194	5.496	-	2B030.0284
stainless steel, standard spring load													
#6-32	0.138	2A-UNC	0.046	17/32	1/16	0.063	0.5	1.5	-22	482	0.018	2B030.0133	-
										194	0.019	-	2B030.0333
#8-32	0.164	2A-UNC	0.070	5/8	5/64	0.094	0.8	2.3	-22	482	0.033	2B030.0136	-
										194	0.039	-	2B030.0336
#10-32	0.190	2A-UNF	0.093	3/4	3/32	0.125	1.4	2.7	-22	482	0.057	2B030.0140	-
										194	0.063	-	2B030.0340
1/4-20	0.250	2A-UNC	0.119	1	1/8	0.188	1.0	4.0	-22	482	0.120	2B030.0142	-
										194	0.121	-	2B030.0342
1/4-28	0.250	2A-UNF	0.119	1	1/8	0.188	1.0	4.0	-22	482	0.141	2B030.0144	-
										194	0.141	-	2B030.0344
5/16-18	0.313	2A-UNC	0.135	1	5/32	0.188	1.5	4.5	-22	482	0.208	2B030.0146	-
										194	0.208	-	2B030.0346
3/8-16	0.375	2A-UNC	0.186	1 1/8	3/16	0.188	2.7	7.2	-22	482	0.330	2B030.0148	-
										194	0.339	-	2B030.0348
1/2-13	0.500	2A-UNC	0.248	1 1/4	1/4	0.250	2.7	9.3	-22	482	0.653	2B030.0150	-
										194	0.653	-	2B030.0350
5/8-11	0.625	2A-UNC	0.310	1 1/2	5/16	0.313	3.5	10.6	-22	482	1.249	2B030.0152	-
										194	1.249	-	2B030.0352
3/4-10	0.750	2A-UNC	0.374	1 3/4	3/8	0.313	5.5	14.5	-22	482	2.180	2B030.0153	-
										194	2.187	-	2B030.0353
1-8	0.125	2A-UNC	0.499	2 13/32	3/8	0.500	4.0	31.0	-22	482	5.475	2B030.0154	-
										194	5.464	-	2B030.0354

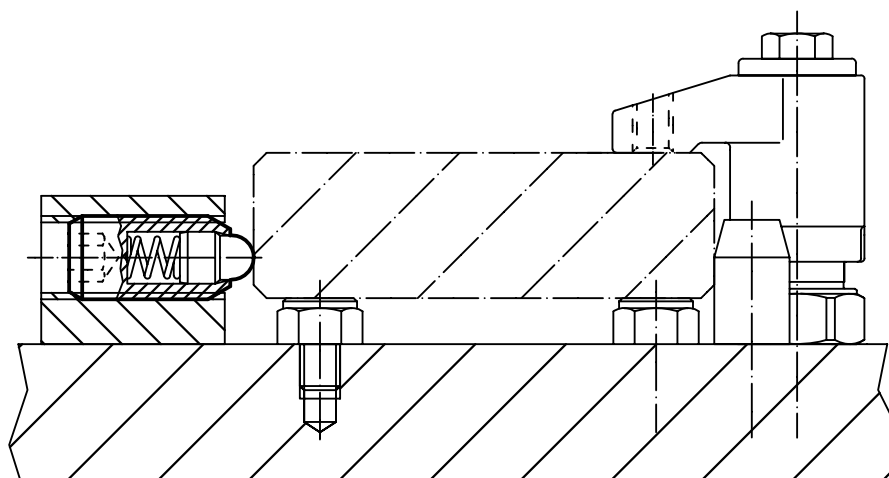
¹⁾ statistical average value



	Dimensions				WS [in]	Stroke s [in]	Spring load ¹⁾		min. max. [°F]	[oz]	Art. No.		
	d ₁	Thread	d ₂	l			F ₁	F ₂			Without thread lock	With thread lock	
	[in]		[in]				[lb]						
stainless steel, heavy spring load													
#6-32	0.138	2A-UNC	0.046	17/32	1/16	0.063	1.5	3.4	-22	482	0.019	2B030.0163	-
										194	0.019	-	2B030.0363
#8-32	0.164	2A-UNC	0.070	5/8	5/64	0.094	2.6	6.6	-22	482	0.034	2B030.0166	-
										194	0.034	-	2B030.0366
#10-32	0.190	2A-UNF	0.093	3/4	3/32	0.125	3.2	9.0	-22	482	0.063	2B030.0170	-
										194	0.057	-	2B030.0370
1/4-20	0.250	2A-UNC	0.119	1	1/8	0.188	3.1	10.1	-22	482	0.122	2B030.0172	-
										194	0.131	-	2B030.0372
1/4-28	0.250	2A-UNF	0.119	1	1/8	0.188	3.1	10.1	-22	482	0.145	2B030.0174	-
										194	0.145	-	2B030.0374
5/16-18	0.313	2A-UNC	0.135	1	5/32	0.188	3.0	15.0	-22	482	0.168	2B030.0176	-
										194	0.212	-	2B030.0376
3/8-16	0.375	2A-UNC	0.186	1 1/8	3/16	0.188	5.5	12.7	-22	482	0.339	2B030.0178	-
										194	0.339	-	2B030.0378
1/2-13	0.500	2A-UNC	0.248	1 1/4	1/4	0.250	6.6	16.0	-22	482	0.653	2B030.0180	-
										194	0.638	-	2B030.0380
5/8-11	0.625	2A-UNC	0.310	1 1/2	5/16	0.313	10.5	22.2	-22	482	1.252	2B030.0182	-
										194	1.256	-	2B030.0382
3/4-10	0.750	2A-UNC	0.374	1 3/4	3/8	0.313	6.7	33.0	-22	482	2.188	2B030.0183	-
										194	2.191	-	2B030.0383
1-8	0.125	2A-UNC	0.499	2 13/32	3/8	0.500	16.0	60.0	-22	482	5.524	2B030.0184	-
										194	5.524	-	2B030.0384

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • with ball and slot - INCH

EH 2B050.



PRODUCT DESCRIPTION

To be used for positioning, indexing, locking, latching as well as for other similar pressure applications.

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection.

Material

Body

- Free cutting steel, blackened
- Stainless steel 1.4305 (ASTM-A-582)

Ball

- Stainless steel, hardened

Spring

- Stainless steel

Characteristic

Light spring load: marked with one line

Standard spring load: no marking

Heavy spring load: marked with two lines



Light spring load



Standard spring load



Heavy spring load

MORE INFORMATION

Notes

Special types on request.

Spring plungers are specially tested for spring range and forces.

- This product is manufactured in INCH dimensions.

References

A conversion table can be found in the technical data following these product information pages.

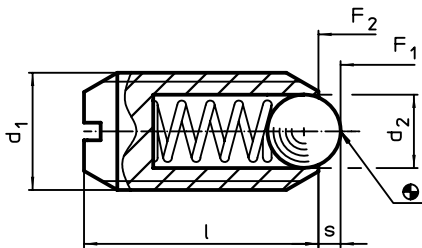
Thread lock: polyamide spot coating (for details please refer to the technical appendix).

Calculation of indexing resistance, please refer to appendix - Technical Data -

Further products

Spring Plungers, with ball and slot ... → p. 60

DRAWING



ORDER INFORMATION

	Dimensions				Stroke s [in]	Spring load ¹⁾		min. max. [°F]	[oz]	Art. No.		
	d ₁ [in]	Thread	d ₂ [in]	l		F ₁ ~ [lb]	F ₂ ~			Without thread lock	With thread lock	
free cutting steel, light spring load												
#10-32	0.190	2A-UNF	3/32	33/64	0.025	0.9	1.5	-22	482	0.049	2B050.0010	-
									194	0.049	-	2B050.0210
1/4-20	0.250	2A-UNC	1/8	17/32	0.035	2.1	4.0	-22	482	0.074	2B050.0012	-
									194	0.073	-	2B050.0212
5/16-18	0.313	2A-UNC	5/32	37/64	0.040	2.0	4.6	-22	482	0.114	2B050.0016	-
									194	0.123	-	2B050.0216
3/8-16	0.375	2A-UNC	3/16	5/8	0.048	2.5	5.0	-22	482	0.193	2B050.0018	-
									194	0.194	-	2B050.0218
1/2-13	0.500	2A-UNC	9/32	3/4	0.072	3.0	6.0	-22	482	0.397	2B050.0020	-
									194	0.399	-	2B050.0220
5/8-11	0.625	2A-UNC	3/8	63/64	0.096	4.5	9.0	-22	482	0.787	2B050.0022	-
									194	0.790	-	2B050.0222

¹⁾ statistical average value



	Dimensions				Stroke s [in]	Spring load ¹⁾		min. max. [°F]			Art. No.	
	d ₁	Thread	d ₂	l		F ₁	F ₂				Without thread lock	With thread lock
	[in]		[in]			[lb]	[lb]					
free cutting steel, standard spring load												
#4-48	0.112	2A-UNF	1/16	3/16	0.020	0.1	0.5	-22	482	0.004	2B050.0031	-
									194	0.005	-	2B050.0231
#5-40	0.125	2A-UNC	1/16	1/4	0.020	0.3	0.8	-22	482	0.008	2B050.0032	-
									194	0.007	-	2B050.0232
#6-32	0.138	2A-UNC	5/64	5/16	0.023	0.5	1.0	-22	482	0.011	2B050.0033	-
									194	0.011	-	2B050.0233
#6-40	0.138	2A-UNF	5/64	5/16	0.023	0.5	1.0	-22	482	0.012	2B050.0035	-
									194	0.020	-	2B050.0235
#8-32	0.164	2A-UNC	3/32	11/32	0.025	0.8	1.3	-22	482	0.018	2B050.0036	-
									194	0.026	-	2B050.0236
#8-36	0.164	2A-UNF	3/32	11/32	0.025	0.8	1.3	-22	482	0.026	2B050.0038	-
									194	0.027	-	2B050.0238
#10-32	0.190	2A-UNF	3/32	33/64	0.025	2.0	3.1	-22	482	0.049	2B050.0040	-
									194	0.050	-	2B050.0240
1/4-20	0.250	2A-UNC	1/8	17/32	0.035	3.8	6.8	-22	482	0.065	2B050.0042	-
									194	0.074	-	2B050.0242
5/16-18	0.313	2A-UNC	5/32	37/64	0.040	4.0	8.4	-22	482	0.123	2B050.0046	-
									194	0.115	-	2B050.0246
3/8-16	0.375	2A-UNC	3/16	5/8	0.048	5.0	10.3	-22	482	0.198	2B050.0048	-
									194	0.189	-	2B050.0248
1/2-13	0.500	2A-UNC	9/32	3/4	0.072	6.0	12.0	-22	482	0.389	2B050.0050	-
									194	0.378	-	2B050.0250
5/8-11	0.625	2A-UNC	3/8	63/64	0.096	9.0	18.0	-22	482	0.811	2B050.0052	-
									194	0.797	-	2B050.0252
free cutting steel, heavy spring load												
#10-32	0.190	2A-UNF	3/32	33/64	0.025	3.3	4.8	-22	482	0.049	2B050.0070	-
									194	0.041	-	2B050.0270
1/4-20	0.250	2A-UNC	1/8	17/32	0.035	5.6	8.6	-22	482	0.064	2B050.0072	-
									194	0.065	-	2B050.0272
5/16-18	0.313	2A-UNC	5/32	37/64	0.040	6.0	11.1	-22	482	0.113	2B050.0076	-
									194	0.113	-	2B050.0276
3/8-16	0.375	2A-UNC	3/16	5/8	0.048	7.5	15.1	-22	482	0.196	2B050.0078	-
									194	0.198	-	2B050.0278
1/2-13	0.500	2A-UNC	9/32	3/4	0.072	6.0	24.0	-22	482	0.408	2B050.0080	-
									194	0.398	-	2B050.0280
5/8-11	0.625	2A-UNC	3/8	63/64	0.096	7.0	40.0	-22	482	0.825	2B050.0082	-
									194	0.819	-	2B050.0282
stainless steel, light spring load												
#10-32	0.190	2A-UNF	3/32	33/64	0.025	0.9	1.5	-22	482	0.041	2B050.0110	-
									194	0.048	-	2B050.0310
1/4-20	0.250	2A-UNC	1/8	17/32	0.035	2.1	4.0	-22	482	0.052	2B050.0112	-
									194	0.074	-	2B050.0312
5/16-18	0.313	2A-UNC	5/32	37/64	0.040	2.0	4.6	-22	482	0.117	2B050.0116	-
									194	0.123	-	2B050.0316
3/8-16	0.375	2A-UNC	3/16	5/8	0.048	2.5	5.0	-22	482	0.190	2B050.0118	-
									194	0.188	-	2B050.0318
1/2-13	0.500	2A-UNC	9/32	3/4	0.072	3.0	6.0	-22	482	0.397	2B050.0120	-
									194	0.399	-	2B050.0320
5/8-11	0.625	2A-UNC	3/8	63/64	0.096	4.5	9.0	-22	482	0.790	2B050.0122	-
									194	0.790	-	2B050.0322

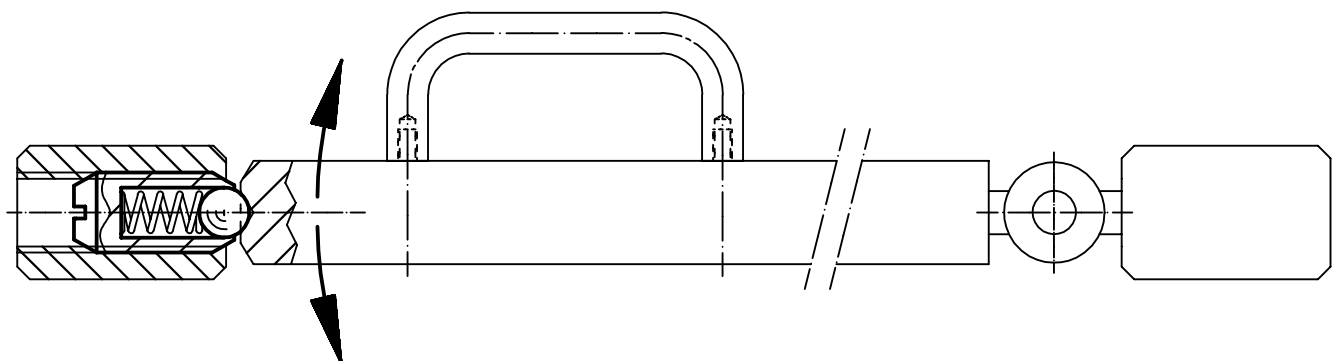
¹⁾ statistical average value

→

	Dimensions				Stroke s [in]	Spring load ¹⁾		min. max. [°F]	[oz]	Art. No.		
	d ₁ [in]	Thread	d ₂ [in]	l		F ₁ [lb]	F ₂ [lb]			Without thread lock	With thread lock	
stainless steel, standard spring load												
#4-48	0.112	2A-UNF	1/16	3/16	0.020	0.1	0.5	-22	482	0.004	2B050.0131	-
									194	0.005	-	2B050.0331
#5-40	0.125	2A-UNC	1/16	1/4	0.020	0.3	0.8	-22	482	0.007	2B050.0132	-
									194	0.015	-	2B050.0332
#6-32	0.138	2A-UNC	5/64	5/16	0.023	0.5	1.0	-22	482	0.011	2B050.0133	-
									194	0.185	-	2B050.0333
#6-40	0.138	2A-UNF	5/64	5/16	0.023	0.5	1.0	-22	482	0.012	2B050.0135	-
									194	0.020	-	2B050.0335
#8-32	0.164	2A-UNC	3/32	11/32	0.025	0.8	1.3	-22	482	0.018	2B050.0136	-
									194	0.018	-	2B050.0336
#8-36	0.164	2A-UNF	3/32	11/32	0.025	0.8	1.3	-22	482	0.019	2B050.0138	-
									194	0.026	-	2B050.0338
#10-32	0.190	2A-UNF	3/32	33/64	0.025	2.0	3.1	-22	482	0.041	2B050.0140	-
									194	0.041	-	2B050.0340
1/4-20	0.250	2A-UNC	1/8	17/32	0.035	3.8	6.8	-22	482	0.065	2B050.0142	-
									194	0.073	-	2B050.0342
5/16-18	0.313	2A-UNC	5/32	37/64	0.040	4.0	8.4	-22	482	0.123	2B050.0146	-
									194	0.123	-	2B050.0346
3/8-16	0.375	2A-UNC	3/16	5/8	0.048	5.0	10.3	-22	482	0.198	2B050.0148	-
									194	0.191	-	2B050.0348
1/2-13	0.500	2A-UNC	9/32	3/4	0.072	6.0	12.0	-22	482	0.383	2B050.0150	-
									194	0.406	-	2B050.0350
5/8-11	0.625	2A-UNC	3/8	63/64	0.096	9.0	18.0	-22	482	0.813	2B050.0152	-
									194	0.815	-	2B050.0352
stainless steel, heavy spring load												
#10-32	0.190	2A-UNF	3/32	33/64	0.025	3.3	4.8	-22	482	0.046	2B050.0170	-
									194	0.049	-	2B050.0370
1/4-20	0.250	2A-UNC	1/8	17/32	0.035	5.6	8.6	-22	482	0.074	2B050.0172	-
									194	0.071	-	2B050.0372
5/16-18	0.313	2A-UNC	5/32	37/64	0.040	6.0	11.1	-22	482	0.123	2B050.0176	-
									194	0.115	-	2B050.0376
3/8-16	0.375	2A-UNC	3/16	5/8	0.048	7.5	15.1	-22	482	0.197	2B050.0178	-
									194	0.198	-	2B050.0378
1/2-13	0.500	2A-UNC	9/32	3/4	0.072	6.0	24.0	-22	482	0.395	2B050.0180	-
									194	0.409	-	2B050.0380
5/8-11	0.625	2A-UNC	3/8	63/64	0.096	7.0	40.0	-22	482	0.825	2B050.0182	-
									194	0.825	-	2B050.0382

¹⁾ statistical average value

APPLICATION EXAMPLE



Spring Plungers • smooth, with collar and ball, self-clamping – INCH
EH 2B080.



PRODUCT DESCRIPTION

Spring plungers can be used for locating or for applying pressure, as a detent or for ejection. The spring plungers compensate tolerances of up to 0.008" (inches) of the locating hole by self-clamping. This saves costs in the machining of the locating hole.

Material

- Body**
 - Thermoplastic POM, black
- Ball**
 - Stainless steel, hardened
- Spring**
 - Stainless steel

MORE INFORMATION

Notes
Special types on request.
Spring plungers are specially tested for spring range and forces.

References

Calculation of indexing resistance, please refer to appendix - Technical Data -

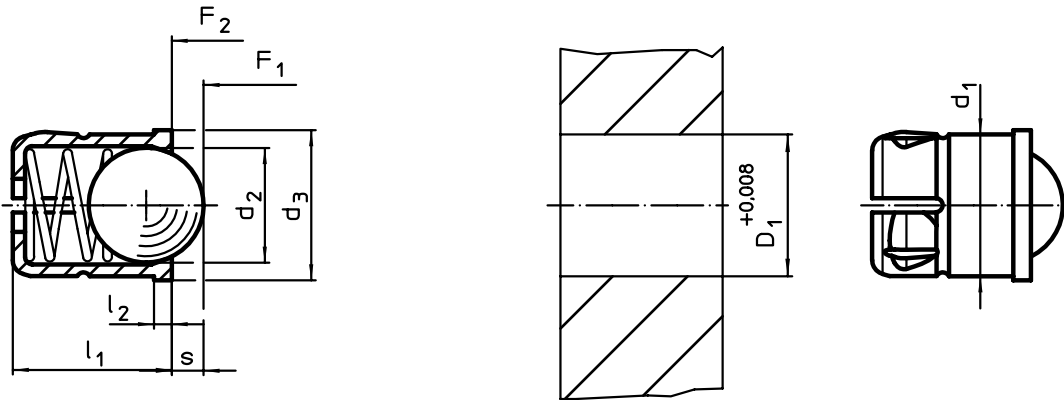
Assembly

Thanks to the flexible design of the body, a direct manual mounting and a secure overhead installation is possible.

Further products

Spring Plungers, smooth, with collar and ball, self-clamping. → p. 82

DRAWING



ORDER INFORMATION

Dimensions					Stroke s	Spring load ¹⁾		Temperature		Location hole D ₁ +0.008	Weight [oz]	Art. No.
d ₁ +0.004	d ₂	d ₃	l ₁ ±0.01	l ₂		F ₁ ~	F ₂ ~	min.	max.			
[in]					[in]	[lb]		[°F]		[in]		
3/16	0.157	0.220	0.236	0.039	0.039	1.3	2.1	-22	122	3/16	0.012	2B080.0050
1/4	0.197	0.276	0.276	0.039	0.059	1.4	2.8	-22	122	1/4	0.024	2B080.0060
5/16	0.256	0.335	0.354	0.039	0.075	1.9	4.5	-22	122	5/16	0.051	2B080.0080
3/8	0.315	0.433	0.531	0.059	0.091	2.7	5.0	-22	122	3/8	0.103	2B080.0090
1/2	0.394	0.551	0.630	0.059	0.126	3.1	5.6	-22	122	1/2	0.208	2B080.0120

¹⁾ statistical average value

CUSTOM PARTS - SPRING PLUNGERS

BARELY NOTICEABLE, YET INDISPENSABLE

Are you faced with an installation situation that requires a custom tool? We will find the solution! Apart from carrying an extensive selection of standard products, we also design custom solutions that are moulded to your specific requirements - even in small batches.



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SpringPlungers](http://www.halder.com/SpringPlungers)

Index Plungers Mini Indexes

EH 22110.



PRODUCT DESCRIPTION

Particularly suitable for screwing into thin walled pieces. Performance in the smallest space requirements.

Material

- Body**
 - Steel, zinc-plated by galvanization
 - Stainless steel 1.4305

Locking pin

- Stainless steel 1.4305

Knob

- Thermoplastic PA 6, black, dull
- Thermoplast PA 6, red, dull

Assembly

Screw in the mini index. By lifting the knob, the hexagon will be released for assembly.

The screw length can be adapted by distance collars for index plungers (EH 22120.).

Operation

When using the self-locking type the knob is pulled-out, turned 30° and secured by a notched catch.

MORE INFORMATION

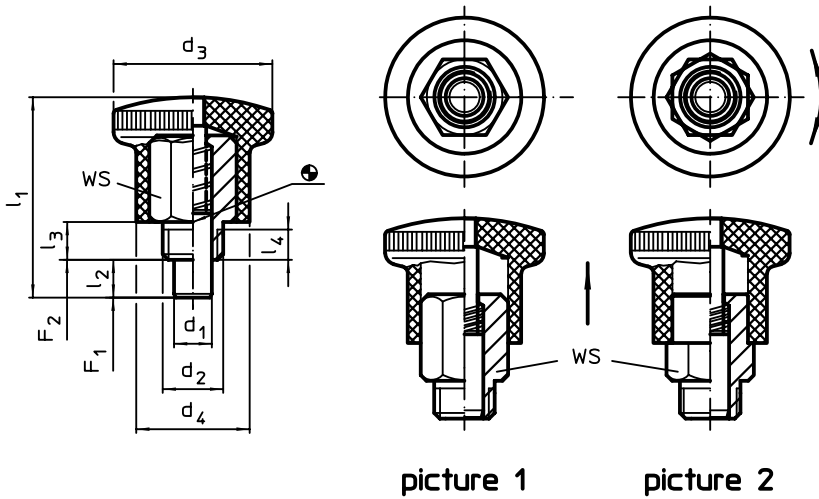
Notes

Knob not removable.

Further products

Distance Collars, for index plungers . . . → p. 129

DRAWING



ORDER INFORMATION

Dimensions								WS	Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
d ₀	d ₂	d ₃	d ₄	l ₁	l ₂ min.	l ₃	l ₄ min.		F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel
[mm]								[mm]	[N]		[°C]				
without locking, knob black – picture 1															
4	M 8 x 0,75	21	15	26.5	5	5	3.5	10	4.5	12	-30	80	14	22110.0024	22110.0044
5	M 8 x 0,75	21	15	26.5	5	5	3.5	10	4.5	12	-30	80	14	22110.0026	22110.0046
6	M10 x 1	25	18	34.0	7	7	4.5	12	5.0	18	-30	80	25	22110.0028	22110.0048
7	M10 x 1	25	18	34.0	7	7	4.5	12	5.0	18	-30	80	26	22110.0030	22110.0050
without locking, knob red – picture 1															
4	M 8 x 0,75	21	15	26.5	5	5	3.5	10	4.5	12	-30	80	14	22110.2024	22110.2044
5	M 8 x 0,75	21	15	26.5	5	5	3.5	10	4.5	12	-30	80	14	22110.2026	22110.2046
6	M10 x 1	25	18	34.0	7	7	4.5	12	5.0	18	-30	80	25	22110.2028	22110.2048
7	M10 x 1	25	18	34.0	7	7	4.5	12	5.0	18	-30	80	25	22110.2030	22110.2050
with locking, knob black – picture 2															
4	M 8 x 0,75	21	15	26.5	5	5	3.5	10	4.5	12	-30	80	13	22110.0034	22110.0054
5	M 8 x 0,75	21	15	26.5	5	5	3.5	10	4.5	12	-30	80	14	22110.0036	22110.0056
6	M10 x 1	25	18	34.0	7	7	4.5	12	5.0	18	-30	80	24	22110.0038	22110.0058
7	M10 x 1	25	18	34.0	7	7	4.5	12	5.0	18	-30	80	25	22110.0040	22110.0060
with locking, knob red – picture 2															
4	M 8 x 0,75	21	15	26.5	5	5	3.5	10	4.5	12	-30	80	13	22110.2034	22110.2054
5	M 8 x 0,75	21	15	26.5	5	5	3.5	10	4.5	12	-30	80	14	22110.2036	22110.2056
6	M10 x 1	25	18	34.0	7	7	4.5	12	5.0	18	-30	80	24	22110.2038	22110.2058
7	M10 x 1	25	18	34.0	7	7	4.5	12	5.0	18	-30	80	25	22110.2040	22110.2060

¹⁾ statistical average value

Index Plungers Mini Indexes • basic type

EH 22110.

2



PRODUCT DESCRIPTION

Particularly suitable for screwing into thin walled pieces. Performance in the smallest space requirements. Due to a thread recess the index plungers can be completely screwed in.

Material

Body

- Steel, zinc-plated by galvanization
- Stainless steel 1.4305

Locking pin

- Stainless steel 1.4305

Knob

- Thermoplastic PA 6, black, dull

Assembly

Screw in the mini index. By lifting the knob, the hexagon will be released for assembly.

The screw length can be adapted by distance collars for index plungers (EH 22120.).

Operation

When using the self-locking type the knob is pulled-out, turned 30° and secured by a notched catch.

MORE INFORMATION

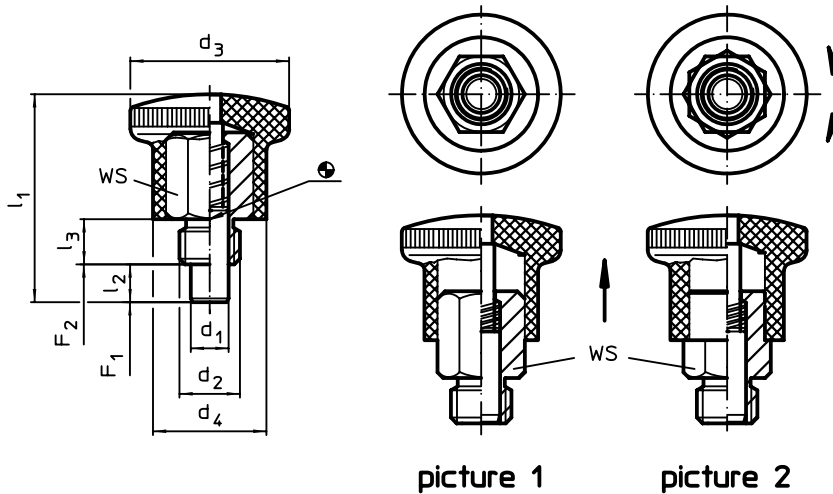
Notes

Knob not removable.

Further products

Distance Collars, for index plungers . . . → p. 129

DRAWING



ORDER INFORMATION

d ₁ h9	Dimensions						WS [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.			
	d ₂	d ₃	d ₄	l ₁	l ₂ min.	l ₃		F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel		
													[°C]			
without locking – picture 1																
4	M 8	21	15	27.5	5	6	10	4	12	-30	80	14	22110.0602	22110.0702		
	M 8 x 1	21	15	27.5	5	6	10	4	12	-30	80	14	22110.0604	22110.0704		
5	M10	25	18	34.0	6	8	12	6	16	-30	80	25	22110.0606	22110.0706		
	M10 x 1	25	18	34.0	6	8	12	6	16	-30	80	24	22110.0608	22110.0708		
6	M10	25	18	34.0	6	8	12	6	16	-30	80	25	22110.0610	22110.0710		
	M10 x 1	25	18	34.0	6	8	12	6	16	-30	80	25	22110.0612	22110.0712		
	M12	28	20	40.5	7	10	14	10	23	-30	80	40	22110.0614	22110.0714		
7	M12 x 1,5	28	20	40.5	7	10	14	10	23	-30	80	40	22110.0616	22110.0716		
	M12	28	20	40.5	7	10	14	10	23	-30	80	41	22110.0618	22110.0718		
8	M12 x 1,5	28	20	40.5	7	10	14	10	23	-30	80	40	22110.0620	22110.0720		
	M16	33	23	47.5	10	12	17	11	35	-30	80	66	22110.0622	22110.0722		
10	M16 x 1,5	33	23	47.5	10	12	17	11	35	-30	80	67	22110.0624	22110.0724		
	M16	33	23	47.5	10	12	17	11	35	-30	80	68	22110.0626	22110.0726		
10	M16 x 1,5	33	23	47.5	10	12	17	11	35	-30	80	69	22110.0628	22110.0728		

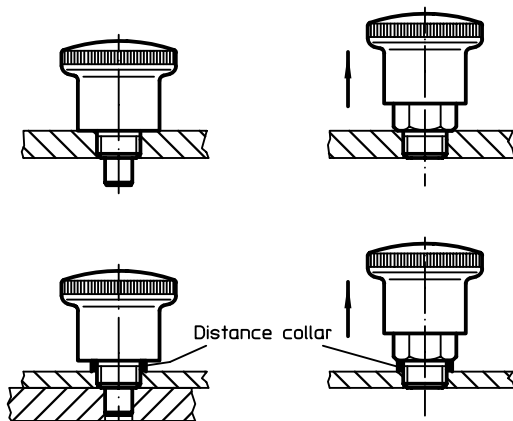
¹⁾ statistical average value



d ₁ h9	Dimensions						WS [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.					
	d ₂	d ₃	d ₄	l ₁	l ₂ min.	l ₃		F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel				
[mm]													[N]		[°C]		[g]	
with locking – picture 2																		
4	M 8	21	15	27.5	5	6	10	4	12	-30	80	14	22110.0630	22110.0730				
	M 8 x 1	21	15	27.5	5	6	10	4	12	-30	80	13	22110.0632	22110.0732				
5	M10	25	18	34.0	6	8	12	6	16	-30	80	23	22110.0634	22110.0734				
	M10 x 1	25	18	34.0	6	8	12	6	16	-30	80	23	22110.0636	22110.0736				
6	M10	25	18	34.0	6	8	12	6	16	-30	80	24	22110.0638	22110.0738				
	M10 x 1	25	18	34.0	6	8	12	6	16	-30	80	25	22110.0640	22110.0740				
	M12	28	20	40.5	7	10	14	10	23	-30	80	38	22110.0642	22110.0742				
7	M12 x 1,5	28	20	40.5	7	10	14	10	23	-30	80	39	22110.0644	22110.0744				
	M12	28	20	40.5	7	10	14	10	23	-30	80	39	22110.0646	22110.0746				
8	M12 x 1,5	28	20	40.5	7	10	14	10	23	-30	80	39	22110.0648	22110.0748				
	M16	33	23	47.5	10	12	17	11	35	-30	80	64	22110.0650	22110.0750				
10	M16 x 1,5	33	23	47.5	10	12	17	11	35	-30	80	65	22110.0652	22110.0752				
	M16	33	23	47.5	10	12	17	11	35	-30	80	66	22110.0654	22110.0754				
	M16 x 1,5	33	23	47.5	10	12	17	11	35	-30	80	67	22110.0656	22110.0756				

¹⁾ statistical average value

APPLICATION EXAMPLE



Index Plungers Mini Indexes • stainless steel

EH 22110.



PRODUCT DESCRIPTION

Particularly suitable for screwing into thin walled pieces.
Performance in the smallest space requirements.
Due to a thread recess the index plungers can be completely screwed in.

Material

Body
▪ Stainless steel 1.4305

Locking pin
▪ Stainless steel 1.4305

Knob
▪ Stainless steel 1.4308

The screw length can be adapted by distance collars for index plungers (EH 22120.).

Operation

When using the self-locking type the knob is pulled-out, turned 30° and secured by a notched catch.

MORE INFORMATION

Notes

Knob not removable.

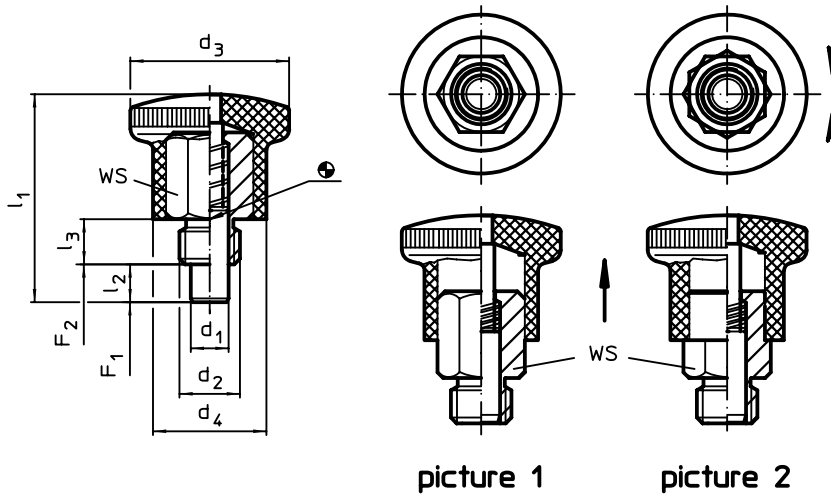
Further products

Distance Collars, for index plungers . . → p. 129

Assembly

Screw in the mini index. By lifting the knob, the hexagon will be released for assembly.

DRAWING



ORDER INFORMATION

Dimensions							WS [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁ h9	d ₂	d ₃	d ₄	l ₁	l ₂ min.	l ₃		F ₁ ~ [N]	F ₂ ~ [N]			
without locking – picture 1												
4	M 8	21	15	27.5	5	6	10	4	12	250	27	22110.1102
	M 8 x 1	21	15	27.5	5	6	10	4	12	250	28	22110.1104
5	M10	25	18	34.0	6	8	12	6	16	250	49	22110.1106
	M10 x 1	25	18	34.0	6	8	12	6	16	250	50	22110.1108
6	M10	25	18	34.0	6	8	12	6	16	250	50	22110.1110
	M10 x 1	25	18	34.0	6	8	12	6	16	250	50	22110.1112
	M12	28	20	40.5	7	10	14	10	23	250	74	22110.1114
7	M12 x 1,5	28	20	40.5	7	10	14	10	23	250	75	22110.1116
	M12	28	20	40.5	7	10	14	10	23	250	75	22110.1118
8	M12 x 1,5	28	20	40.5	7	10	14	10	23	250	75	22110.1120
	M16	33	23	47.5	10	12	17	11	34	250	110	22110.1122
10	M16 x 1,5	33	23	47.5	10	12	17	11	35	250	113	22110.1124
	M16	33	23	47.5	10	12	17	11	35	250	113	22110.1126
	M16 x 1,5	33	23	47.5	10	12	17	11	35	250	113	22110.1128

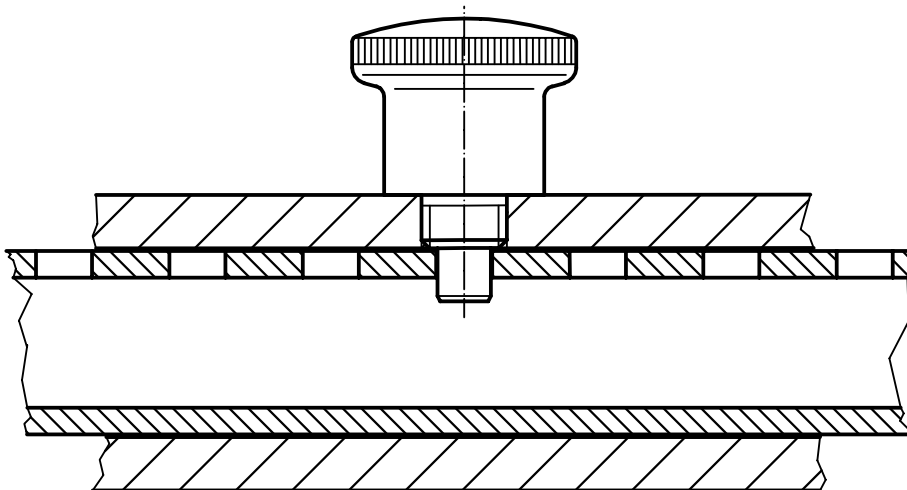
¹⁾ statistical average value



d ₁ h9	Dimensions						WS [mm]	Spring load ¹⁾		max. [°C]	[g]	Art. No.		
	d ₂	d ₃	d ₄	l ₁	l ₂ min.	l ₃		F ₁ ~	F ₂ ~					
[mm]												[N]	[°C]	[g]
with locking – picture 2														
4	M 8	21	15	27.5	5	6	10	4	12	250	27	22110.1130		
	M 8 x 1	21	15	27.5	5	6	10	4	12	250	28	22110.1132		
5	M10	25	18	34.0	6	8	12	6	16	250	48	22110.1134		
	M10 x 1	25	18	34.0	6	8	12	6	16	250	49	22110.1136		
6	M10	25	18	34.0	6	8	12	6	16	250	49	22110.1138		
	M10 x 1	25	18	34.0	6	8	12	6	16	250	50	22110.1140		
	M12	28	20	40.5	7	10	14	10	23	250	72	22110.1142		
7	M12 x 1,5	28	20	40.5	7	10	14	10	23	250	73	22110.1144		
	M12	28	20	40.5	7	10	14	10	23	250	73	22110.1146		
8	M12 x 1,5	28	20	40.5	7	10	14	10	23	250	74	22110.1148		
	M16	33	23	47.5	10	12	17	11	35	250	110	22110.1150		
10	M16 x 1,5	33	23	47.5	10	12	17	11	35	250	110	22110.1152		
	M16	33	23	47.5	10	12	17	11	35	250	112	22110.1154		
	M16 x 1,5	33	23	47.5	10	12	17	11	35	250	114	22110.1156		

¹⁾ statistical average value

APPLICATION EXAMPLE



Index Plungers Compact • with hexagon collar

EH 22110.

2



PRODUCT DESCRIPTION

Index plungers are used for indexing bores. Types with / without lock have the same building height. Due to a thread recess the index plungers can be completely screwed in.

Material

Body

- Steel, blackened
- Stainless steel 1.4305

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black, dull
- Thermoplast PA 6, red, dull

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

MORE INFORMATION

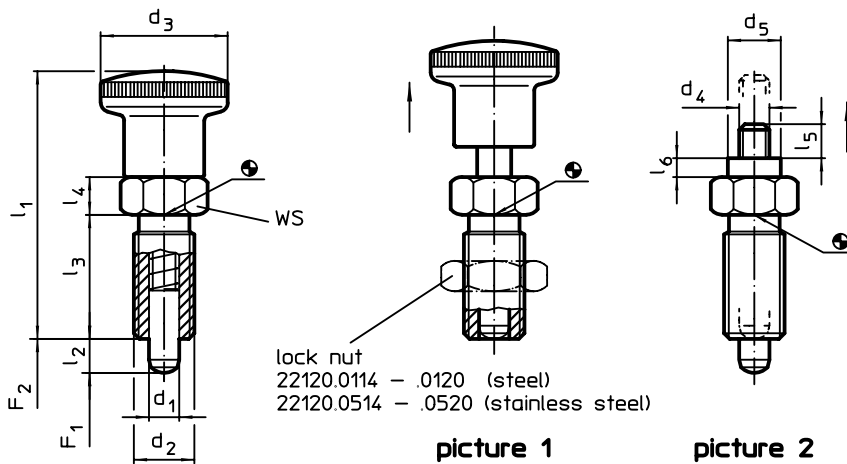
Notes

Knob not removable. Lock nuts have to be purchased separately.

Further products

- Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
- Locating Bushings, for index bolts and index plungers → p. 116
- Distance Collars, for index plungers → p. 129

DRAWING



ORDER INFORMATION

Dimensions											WS	Spring load ¹⁾		Temperature		Weight		Art. No.	
d ₁	d ₂	l ₂ min.	d ₃	d ₄	d ₅	l ₁	l ₃	l ₄	l ₅	l ₆	WS	F ₁	F ₂	min.	max.	g	g	Steel	Stainless steel
-0.02											[mm]	[N]	[N]	[°C]	[°C]	[g]	[g]		
-0.05											[mm]	[N]	[N]	[°C]	[°C]	[g]	[g]		
with knob, black – picture 1																			
4	M 8 x 1	4	16	-	-	35.0	16	5	-	-	10	4.5	12.0	-30	80	10	22110.0103	22110.0203	
		6	16	-	-	35.0	16	5	-	-	10	4.0	12.5	-30	80	10	22110.0104	22110.0204	
5	M10 x 1	5	19	-	-	40.0	18	6	-	-	12	5.0	15.0	-30	80	18	22110.0106	22110.0206	
		8	19	-	-	40.0	18	6	-	-	12	5.0	18.0	-30	80	18	22110.0107	22110.0207	
6	M12 x 1,5	6	23	-	-	48.0	22	6	-	-	14	6.5	19.0	-30	80	29	22110.0109	22110.0209	
		9	23	-	-	48.0	22	6	-	-	14	6.0	25.0	-30	80	29	22110.0110	22110.0210	
8	M16 x 1,5	8	28	-	-	58.0	26	8	-	-	17	8.5	26.0	-30	80	62	22110.0112	22110.0212	
		12	28	-	-	58.0	26	8	-	-	17	8.5	28.0	-30	80	62	22110.0113	22110.0213	
10	M16 x 1,5	12	28	-	-	58.0	26	8	-	-	17	9.5	38.0	-30	80	63	22110.0115	22110.0215	
12	M20 x 1,5	15	33	-	-	67.0	33	10	-	-	22	11.5	40.0	-30	80	128	22110.0116	22110.0216	
16	M24 x 2	20	33	-	-	78.5	38	12	-	-	27	13.0	54.0	-30	80	203	22110.0117	22110.0217	

¹⁾ statistical average value



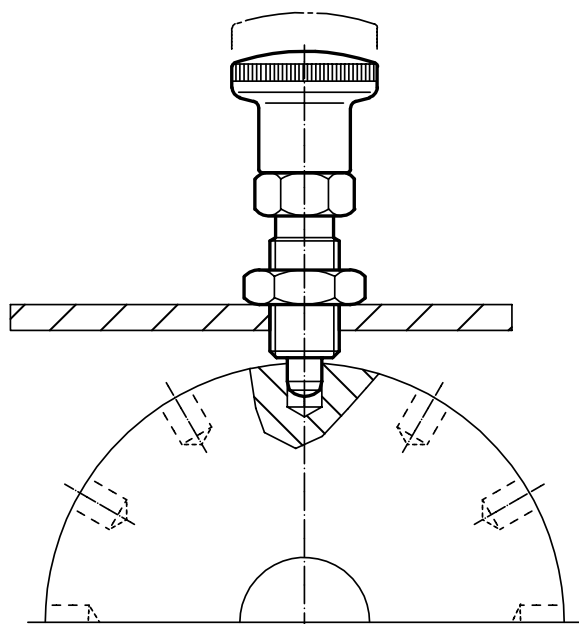
Dimensions											WS	Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
d ₁ -0.02 -0.05	d ₂	l ₂ min.	d ₃	d ₄	d ₅	l ₁	l ₃	l ₄	l ₅	l ₆		F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel
[mm]											[mm]	[N]		[°C]				
with knob – picture 1																		
4	M 8 x 1	4	16	-	-	35.0	16	5	-	-	10	4.5	12.0	-30	80	10	22110.2103	22110.2203
		6	16	-	-	35.0	16	5	-	-	10	4.0	12.5	-30	80	11	22110.2104	22110.2204
5	M10 x 1	5	19	-	-	40.0	18	6	-	-	12	5.0	15.0	-30	80	18	22110.2106	22110.2206
		8	19	-	-	40.0	18	6	-	-	12	5.0	18.0	-30	80	18	22110.2107	22110.2207
6	M12 x 1,5	6	23	-	-	48.0	22	6	-	-	14	6.5	19.0	-30	80	30	22110.2109	22110.2209
		9	23	-	-	48.0	22	6	-	-	14	6.0	25.0	-30	80	29	22110.2110	22110.2210
8	M16 x 1,5	8	28	-	-	58.0	26	8	-	-	17	8.5	26.0	-30	80	62	22110.2112	22110.2212
		12	28	-	-	58.0	26	8	-	-	17	8.5	28.0	-30	80	64	22110.2113	22110.2213
10	M16 x 1,5	12	28	-	-	58.0	26	8	-	-	17	9.5	38.0	-30	80	65	22110.2115	22110.2215
12	M20 x 1,5	15	33	-	-	71.5	33	10	-	-	22	11.5	40.0	-30	80	117	22110.2116	22110.2216
16	M24 x 2	20	33	-	-	78.5	38	12	-	-	27	13.0	54.0	-30	80	202	22110.2117	22110.2217
without knob – picture 2																		
4	M 8 x 1	4	-	M3	7	-	16	5	4.5	2.5	10	4.5	12.0	-	250	9	22110.0143	22110.0243
		6	-	M3	7	-	16	5	4.5	2.5	10	4.0	12.5	-	250	9	22110.0144	22110.0244
5	M10 x 1	5	-	M4	8	-	18	6	5.5	3.0	12	5.0	15.0	-	250	16	22110.0146	22110.0246
		8	-	M4	8	-	18	6	5.5	3.0	12	5.0	18.0	-	250	17	22110.0147	22110.0247
6	M12 x 1,5	6	-	M5	9	-	22	6	7.0	3.5	14	6.5	19.0	-	250	25	22110.0149	22110.0249
		9	-	M5	9	-	22	6	7.0	3.5	14	6.0	25.0	-	250	26	22110.0150	22110.0250
8	M16 x 1,5	8	-	M6	10	-	26	8	8.5	4.0	17	8.5	26.0	-	250	54	22110.0152	22110.0252
		12	-	M6	10	-	26	8	8.5	4.0	17	8.5	28.0	-	250	55	22110.0153	22110.0253
10	M16 x 1,5	12	-	M6	10	-	26	8	8.5	4.0	17	9.5	38.0	-	250	56	22110.0155	22110.0255
12	M20 x 1,5	15	-	M6	12	-	33	10	8.5	4.0	22	11.5	40.0	-	250	111	22110.0156	22110.0256
16	M24 x 2	20	-	M8	15	-	38	12	11.5	5.0	27	13.0	54.0	-	250	193	22110.0157	22110.0257

¹⁾ statistical average value

ACCESSORIES

Image	Dimensions	Wrench size	Weight [g]	Art. No.	
	d ₂ [mm]	[mm]		Steel	Stainless steel
lock nuts ISO 8675 (DIN 439)					
	M 8 x 1	13	2.7	22120.0114	22120.0514
	M10 x 1	16	5.2	22120.0115	22120.0515
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518
	M20 x 1,5	30	32.0	22120.0120	22120.0520
	M24 x 2	36	58.0	22120.0122	22120.0522

APPLICATION EXAMPLE



Index Plungers Compact • with hexagon collar and locking

EH 22110.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores. Types with / without lock have the same building height. Due to a thread recess the index plungers can be completely screwed in.

Material

Body

- Steel, blackened
- Stainless steel 1.4305

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black, dull
- Thermoplast PA 6, red, dull

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

Operation

The knob is pulled-out, turned 90° and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

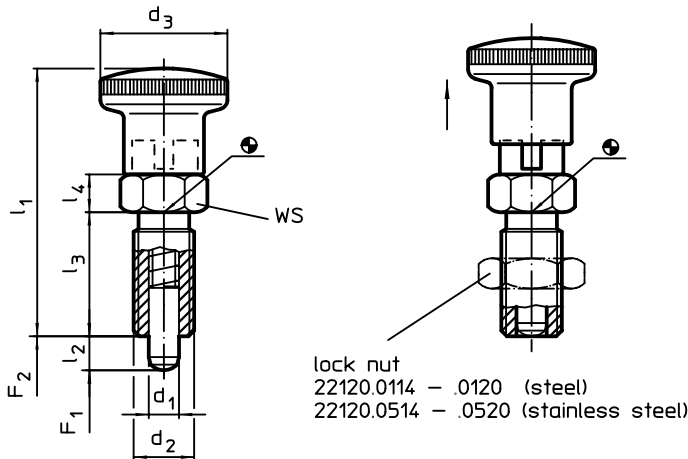
Notes

Knob not removable. Lock nuts have to be purchased separately.

Further products

- Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
- Locating Bushings, for index bolts and index plungers → p. 116
- Distance Collars, for index plungers → p. 129

DRAWING



ORDER INFORMATION

Dimensions							WS	Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
d ₁ -0.02 -0.05	d ₂	l ₂ min.	d ₃	l ₁	l ₃	l ₄		F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel
[mm]							[mm]	[N]		[°C]				
with knob, black														
4	M 8 x 1	4	16	35.0	16	5	10	4.5	12.0	-30	80	12	22110.0123	22110.0223
		6	16	35.0	16	5	10	4.0	12.5	-30	80	12	22110.0124	22110.0224
5	M10 x 1	5	19	40.0	18	6	12	5.0	15.0	-30	80	20	22110.0126	22110.0226
		8	19	40.0	18	6	12	5.0	18.0	-30	80	20	22110.0127	22110.0227
6	M12 x 1,5	6	23	48.0	22	6	14	6.5	19.0	-30	80	31	22110.0129	22110.0229
		9	23	48.0	22	6	14	6.0	25.0	-30	80	33	22110.0130	22110.0230
8	M16 x 1,5	8	28	58.0	26	8	17	8.5	26.0	-30	80	65	22110.0132	22110.0232
		12	28	58.0	26	8	17	8.5	28.0	-30	80	68	22110.0133	22110.0233
10	M16 x 1,5	12	28	58.0	26	8	17	9.5	38.0	-30	80	69	22110.0135	22110.0235
12	M20 x 1,5	15	33	67.0	33	10	22	11.5	40.0	-30	80	125	22110.0136	22110.0236
16	M24 x 2	20	33	78.5	38	12	27	13.0	54.0	-30	80	219	22110.0137	22110.0237


¹⁾ statistical average value



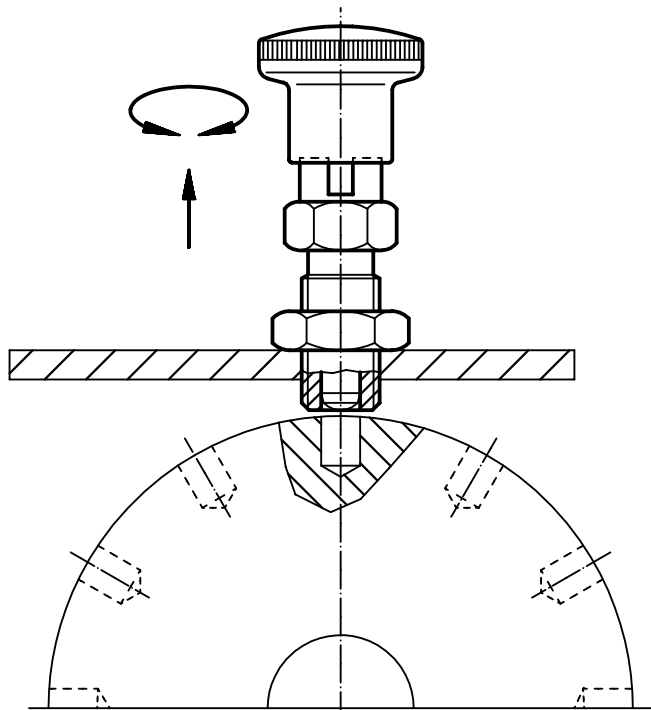
d ₁ -0.02 -0.05	d ₂	Dimensions					WS [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.		
		l ₂ min.	d ₃	l ₁	l ₃	l ₄		F ₁ ~ [N]	F ₂ ~ [N]	min. [°C]	max. [°C]		Steel	Stainless steel	
with knob, red															
4	M 8 x 1	4	16	35.0	16	5	10	4.5	12.0	-30	80	11	22110.2123	22110.2223	
		6	16	35.0	16	5	10	4.0	12.5	-30	80	13	22110.2124	22110.2224	
5	M10 x 1	5	19	40.0	18	6	12	5.0	15.0	-30	80	21	22110.2126	22110.2226	
		8	19	40.0	18	6	12	5.0	18.0	-30	80	21	22110.2127	22110.2227	
6	M12 x 1,5	6	23	48.0	22	6	14	6.5	19.0	-30	80	33	22110.2129	22110.2229	
		9	23	48.0	22	6	14	6.0	25.0	-30	80	32	22110.2130	22110.2230	
8	M16 x 1,5	8	28	58.0	26	8	17	8.5	26.0	-30	80	65	22110.2132	22110.2232	
		12	28	58.0	26	8	17	8.5	28.0	-30	80	69	22110.2133	22110.2233	
10	M16 x 1,5	12	28	58.0	26	8	17	9.5	38.0	-30	80	70	22110.2135	22110.2235	
12	M20 x 1,5	15	33	71.5	33	10	22	11.5	40.0	-30	80	127	22110.2136	22110.2236	
16	M24 x 2	20	33	78.5	38	12	27	13.0	54.0	-30	80	200	22110.2137	22110.2237	

¹⁾ statistical average value

ACCESSORIES

lock nuts ISO 8675 (DIN 439)	Dimensions	Wrench size	Weight [g]	Art. No.	
	d ₂ [mm]	[mm]		Steel	Stainless steel
	M 8 x 1	13	2.7	22120.0114	22120.0514
	M10 x 1	16	5.2	22120.0115	22120.0515
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518
	M20 x 1,5	30	32.0	22120.0120	22120.0520
	M24 x 2	36	58.0	22120.0122	22120.0522

APPLICATION EXAMPLE



Index Plungers Compact • with hexagon collar, with T-Handle

EH 22110.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores. Simple handling, e.g. when using safety gloves, with higher pull release. Types with / without lock have the same building height. Due to a thread recess the index plungers can be completely screwed in.

Material

- Body**
- Steel, blackened
 - Stainless steel 1.4305

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black, dull

MORE INFORMATION

Notes

Knob not removable. Lock nuts have to be purchased separately.

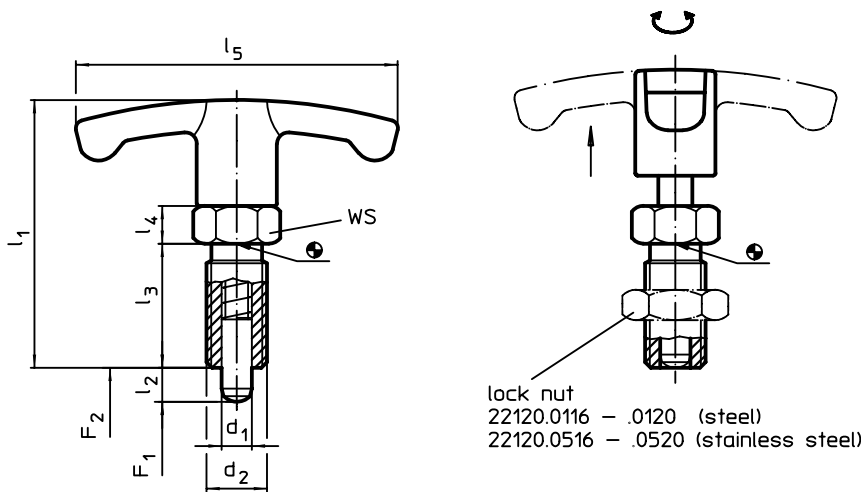
Further products

Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
 Locating Bushings, for index bolts and index plungers. → p. 116
 Distance Collars, for index plungers . . . → p. 129

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

DRAWING



ORDER INFORMATION

d ₁ -0.02 -0.05	Dimensions						WS	Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
	l ₂	d ₂	l ₁	l ₃	l ₄	l ₅		F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel
[mm]														
6	6	M12 x 1,5	48	22	6	54	14	6.5	19	-30	80	31	22110.0820	22110.0920
	9	M12 x 1,5	48	22	6	54	14	6.0	25	-30	80	31	22110.0822	22110.0922
8	8	M16 x 1,5	59	26	8	59	17	8.5	26	-30	80	64	22110.0824	22110.0924
	12	M16 x 1,5	59	26	8	59	17	8.5	28	-30	80	65	22110.0826	22110.0926
10	12	M16 x 1,5	59	26	8	59	17	9.5	38	-30	80	66	22110.0828	22110.0928
12	15	M20 x 1,5	68	33	10	59	22	11.5	40	-30	80	121	22110.0830	22110.0930

¹⁾ statistical average value

ACCESSORIES

lock nuts ISO 8675 (DIN 439)	Dimensions	Wrench size	Weight [g]	Art. No.	
	d ₂ [mm]	[mm]		Steel	Stainless steel
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518
	M20 x 1,5	30	32.0	22120.0120	22120.0520

Index Plungers Compact • with hexagon collar and locking, with T-Handle

EH 22110.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores. Simple handling, e.g. when using safety gloves, with higher pull release. Types with / without lock have the same building height. Due to a thread recess the index plungers can be completely screwed in.

Material

Body

- Steel, blackened
- Stainless steel 1.4305

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black, dull

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

Operation

The T-Handle is pulled out, turned 90° and secured by an internal notched catch (when locking pin should not overhang). The positions are defined distinctively by the T-Handle.

MORE INFORMATION

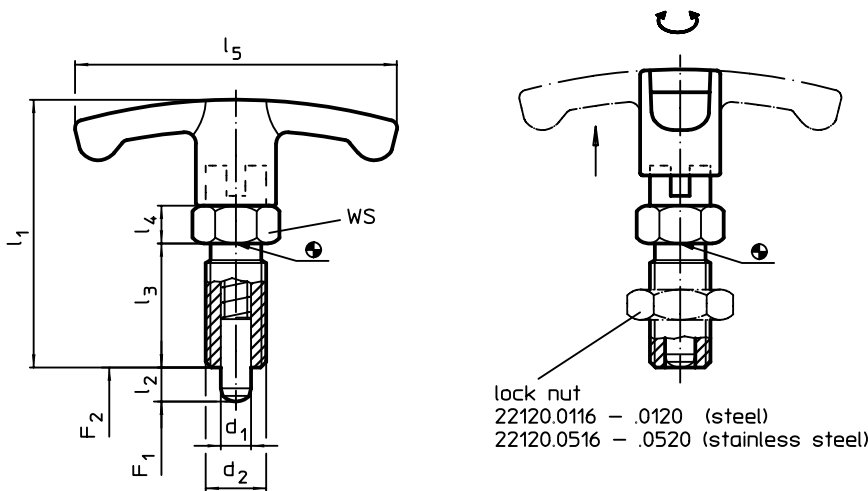
Notes

Knob not removable. Lock nuts have to be purchased separately.

Further products

- Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
- Locating Bushings, for index bolts and index plungers → p. 116
- Distance Collars, for index plungers → p. 129

DRAWING





ORDER INFORMATION

d ₁ -0.02 -0.05	Dimensions						WS [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
	l ₂	d ₂	l ₁	l ₃	l ₄	l ₅		F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel
[mm]														
6	6	M12 x 1,5	48	22	6	54	14	6.5	19	-30	80	33	22110.0832	22110.0932
	9	M12 x 1,5	48	22	6	54	14	6.0	25	-30	80	34	22110.0834	22110.0934
8	8	M16 x 1,5	59	26	8	59	17	8.5	26	-30	80	68	22110.0836	22110.0936
	12	M16 x 1,5	59	26	8	59	17	8.5	28	-30	80	71	22110.0838	22110.0938
10	12	M16 x 1,5	59	26	8	59	17	9.5	38	-30	80	72	22110.0840	22110.0940
12	15	M20 x 1,5	68	33	10	59	22	11.5	40	-30	80	127	22110.0842	22110.0942

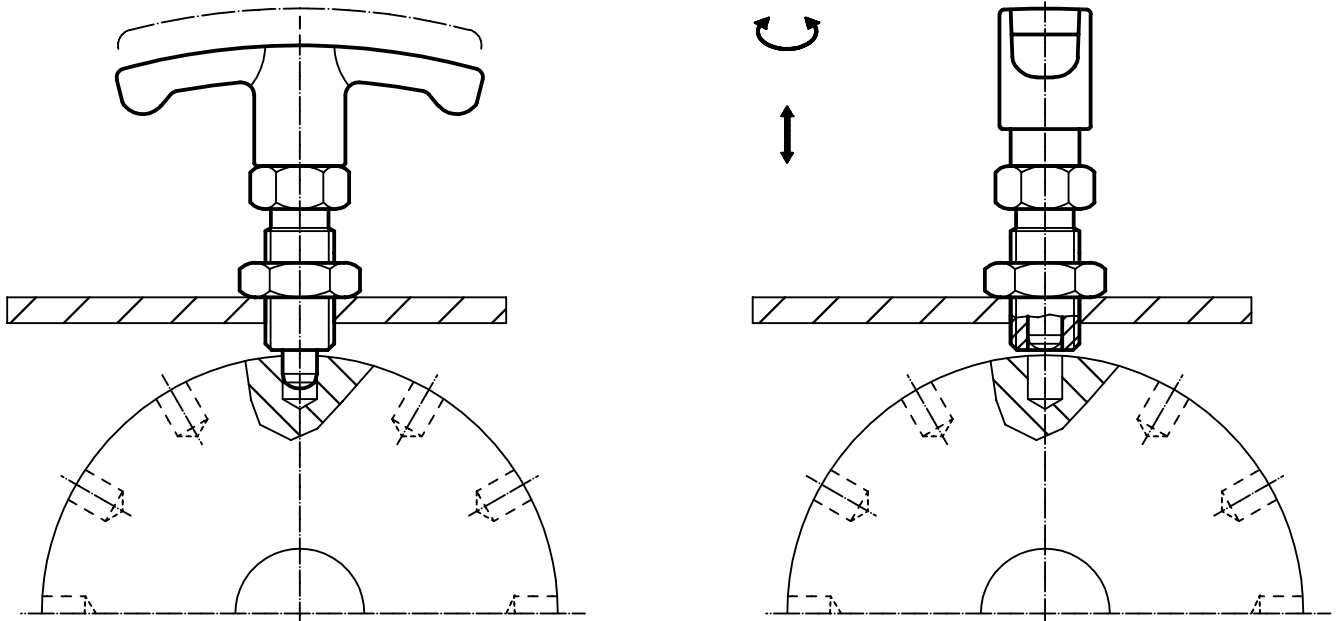
¹⁾ statistical average value

ACCESSORIES

2

	Dimensions d_2 [mm]	Wrench size [mm]	 [g]	Art. No.	
				Steel	Stainless steel
lock nuts ISO 8675 (DIN 439)					
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518
	M20 x 1,5	30	32.0	22120.0120	22120.0520

APPLICATION EXAMPLE



Index Plungers • with mounting flange, horizontal

EH 22110.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

Housing

- Zinc die-cast, plastic coated, black

Locking pin

- Stainless steel 1.4305

Knob

- Thermoplastic PA 6, black, dull

Pull-ring

- Stainless steel 1.4310

Assembly

Assembly by means of washers ISO 7092.

Operation

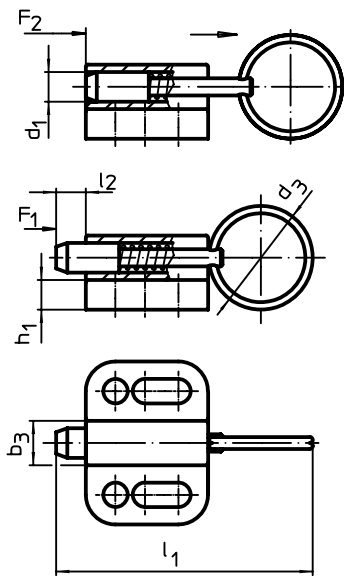
When using locking index plungers, the knob is pulled-out, turned 90° and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

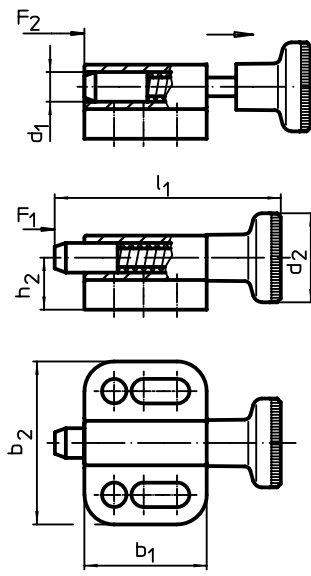
Notes

Knob not removable.

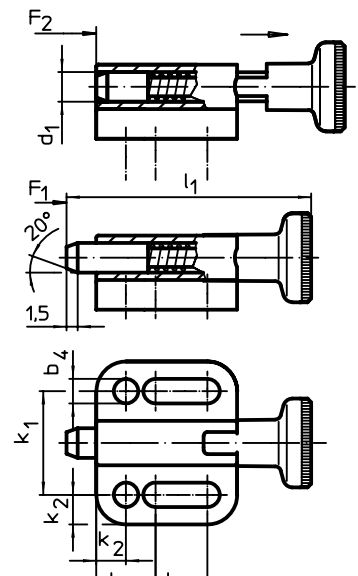
DRAWING



without locking
picture 1



without locking
picture 2



with locking
picture 3

ORDER INFORMATION

Dimensions														Spring load ¹⁾		Temperature		Art. No.		
d ₁	d ₂	d ₃	b ₁	b ₂	b ₃	b ₄ -0.2	h ₁	h ₂	k ₁ ±0.05	k ₂	k ₃	k ₄	l ₁	l ₂ min.	F ₁ ~	F ₂ ~	min.		max.	[g]
[mm]														[N]	[N]	[°C]				
with pull-ring, without locking – picture 1																				
4	-	14	16.5	22	6.0	3.3	4.0	7.0	14	4.0	8	4.5	34.5	4	3	12	-	100	11	22110.0304
5	-	18	22.0	28	8.0	4.3	4.5	9.5	18	5.0	10	7.0	45.0	5	5	24	-	100	21	22110.0305
6	-	24	27.5	32	10.0	5.4	5.0	10.5	21	5.5	12	10.0	57.5	6	5	21	-	100	40	22110.0306
8	-	30	33.0	34	12.0	5.4	6.0	12.5	23	5.5	12	15.5	71.0	8	6	22	-	100	58	22110.0308
10	-	30	35.0	39	14.5	6.5	6.0	14.5	27	6.0	15	13.5	75.0	10	4	25	-	100	83	22110.0310
with knob, without locking – picture 2																				
4	12	-	16.5	22	6.0	3.3	4.0	7.0	14	4.0	8	4.5	30.5	4	3	12	-30	80	11	22110.0324
5	16	-	22.0	28	8.0	4.3	4.5	9.5	18	5.0	10	7.0	40.0	5	5	24	-30	80	20	22110.0325
6	18	-	27.5	32	10.0	5.4	5.0	10.5	21	5.5	12	10.0	49.0	6	5	21	-30	80	37	22110.0326
8	21	-	33.0	34	12.0	5.4	6.0	12.5	23	5.5	12	15.5	59.0	8	6	22	-30	80	59	22110.0328
10	25	-	35.0	39	14.5	6.5	6.0	14.5	27	6.0	15	13.5	67.5	10	4	25	-30	80	90	22110.0330
with knob and locking – picture 3																				
4	12	-	19.0	22	6.0	3.3	4.0	7.0	14	4.0	8	7.0	33.0	4	3	12	-30	80	12	22110.0344
5	16	-	25.5	28	8.0	4.3	4.5	9.5	18	5.0	10	10.5	43.5	5	5	24	-30	80	26	22110.0345
6	18	-	30.5	32	10.0	5.4	5.0	10.5	21	5.5	12	13.0	52.0	6	5	21	-30	80	40	22110.0346
8	21	-	37.5	34	12.0	5.4	6.0	12.5	23	5.5	12	20.0	63.5	8	6	22	-30	80	67	22110.0348
10	25	-	40.0	39	14.5	6.5	6.0	14.5	27	6.0	15	18.5	72.5	10	4	25	-30	80	98	22110.0350

¹⁾ statistical average value

Index Plungers • with mounting flange, horizontal, stainless steel

EH 22110.

2



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

Housing

- Stainless steel 1.4308, precision casting, bright, matt blasted

Locking pin

- Stainless steel 1.4305

Knob

- Thermoplastic PA 6, black, dull

Pull-ring

- Stainless steel 1.4310

Assembly

Assembly by means of washers ISO 7092.

Operation

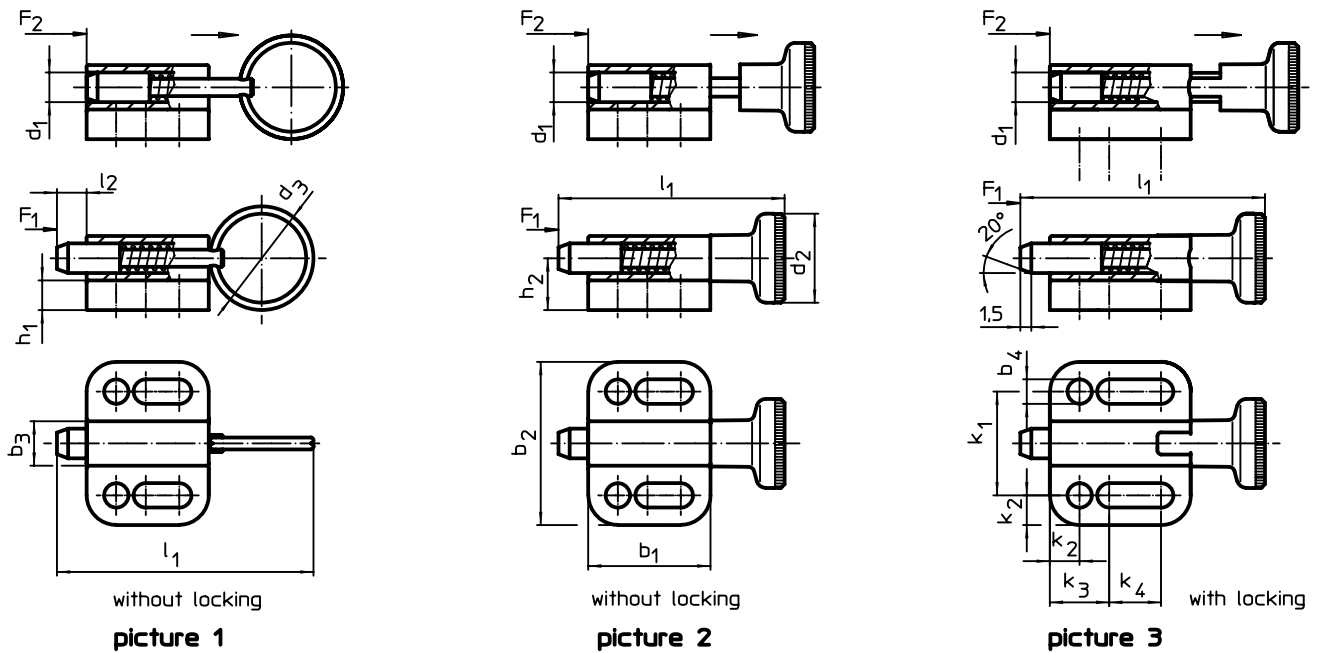
When using locking index plungers, the knob is pulled-out, turned 90° and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

Notes

Knob not removable.

DRAWING



ORDER INFORMATION

Dimensions															Spring load ¹⁾		Temperature		Weight [g]	Art. No.
d ₁ h11	d ₂	d ₃	b ₁	b ₂	b ₃	b ₄ -0.2	h ₁	h ₂	k ₁ ±0.05	k ₂	k ₃	k ₄	l ₁	l ₂ min.	F ₁ ~	F ₂ ~	min.	max.		
[mm]															[N]		[°C]		[g]	
with pull-ring, without locking – picture 1																				
4	-	14	16.5	22	6.0	3.3	4.0	7.0	14	4.0	8	4.5	34.5	4	3	12	-	100	12	22110.2304
5	-	18	22.0	28	8.0	4.3	4.5	9.5	18	5.0	10	7.0	45.0	5	5	24	-	100	24	22110.2305
6	-	24	27.5	32	10.0	5.4	5.0	10.5	21	5.5	12	10.0	57.5	6	5	21	-	100	42	22110.2306
8	-	30	33.0	34	12.0	5.4	6.0	12.5	23	5.5	12	15.5	71.0	8	6	22	-	100	67	22110.2308
10	-	30	35.0	39	14.5	6.5	6.0	14.5	27	6.0	15	13.5	75.0	10	4	25	-	100	93	22110.2310
with knob, without locking – picture 2																				
4	12	-	16.5	22	6.0	3.3	4.0	7.0	14	4.0	8	4.5	30.5	4	3	12	-30	80	14	22110.2324
5	16	-	22.0	28	8.0	4.3	4.5	9.5	18	5.0	10	7.0	40.0	5	5	24	-30	80	26	22110.2325
6	18	-	27.5	32	10.0	5.4	5.0	10.5	21	5.5	12	10.0	49.0	6	5	21	-30	80	44	22110.2326
8	21	-	33.0	34	12.0	5.4	6.0	12.5	23	5.5	12	15.5	59.0	8	6	22	-30	80	67	22110.2328
10	25	-	35.0	39	14.5	6.5	6.0	14.5	27	6.0	15	13.5	67.5	10	4	25	-30	80	99	22110.2330
with knob and locking – picture 3																				
4	12	-	19.0	22	6.0	3.3	4.0	7.0	14	4.0	8	7.0	33.0	4	3	12	-30	80	15	22110.2344
5	16	-	25.5	28	8.0	4.3	4.5	9.5	18	5.0	10	10.5	43.5	5	5	24	-30	80	30	22110.2345
6	18	-	30.5	32	10.0	5.4	5.0	10.5	21	5.5	12	13.0	52.0	6	5	21	-30	80	48	22110.2346
8	21	-	37.5	34	12.0	5.4	6.0	12.5	23	5.5	12	20.0	63.5	8	6	22	-30	80	68	22110.2348
10	25	-	40.0	39	14.5	6.5	6.0	14.5	27	6.0	15	18.5	72.5	10	4	25	-30	80	109	22110.2350

¹⁾ statistical average value

Mounting Blocks • for index bolts and index plungers, die-cast

EH 22110.



PRODUCT DESCRIPTION

Assembly support and extended applications for index bolts and index plungers. Also to be used as a seat for locating bushings EH 22110.

Material

Grub Screw

- Steel, blackened, with brass pad

Body

- Zinc die-cast, plastic coated, black

Assembly

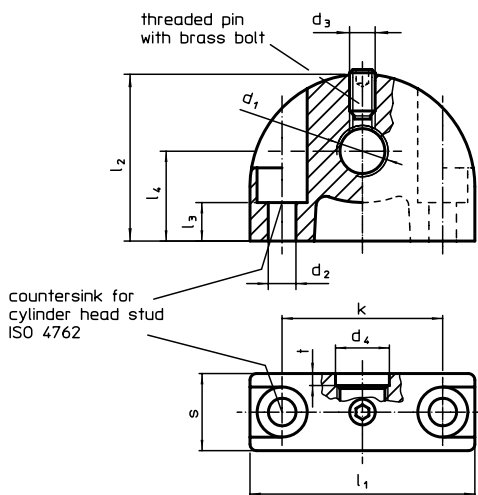
Index plunger must be assembled in hole d_1 , on countersink side.

MORE INFORMATION

Further products

Positioning Bushings, for index bolts and index plungers → p. 117

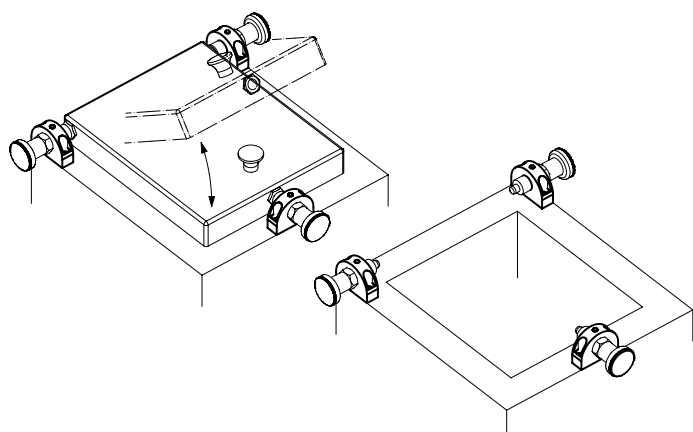
DRAWING



ORDER INFORMATION

Dimensions												max. [°C]	[g]	Art. No.
d_1	d_2	d_3	d_4	k	l_1	l_2	l_3	l_4	s	t				
[mm]														
mounting hole vertical to index bolt and index plunger														
M 8 x 1	4.3	M4	8.2	25	35	26	11.5	14	12	2	100	39	22110.0408	
M 8	4.3	M4	8.2	25	35	26	6.0	14	12	2	100	40	22110.0508	
M10 x 1	4.3	M4	10.2	25	35	26	11.5	14	12	2	100	36	22110.0410	
M10	4.3	M4	10.2	25	35	26	6.0	14	12	2	100	38	22110.0510	
M12 x 1,5	4.3	M4	12.2	25	35	26	11.5	14	12	3	100	41	22110.0412	
M12	4.3	M4	12.2	25	35	26	6.0	14	12	3	100	36	22110.0512	
M16 x 1,5	5.3	M5	16.2	35	47	34	15.5	18	14	3	100	77	22110.0416	
M16	5.3	M5	16.2	35	47	34	10.0	18	14	3	100	78	22110.0516	
M20 x 1,5	5.3	M5	20.2	35	47	34	15.5	18	14	3	100	68	22110.0420	

APPLICATION EXAMPLE



Locating Bushings • for index bolts and index plungers

EH 22110.



PRODUCT DESCRIPTION

Used for locating the locking pin of index bolts and index plungers. Suitable for mounting blocks 22110.0412 and 22110.0416.

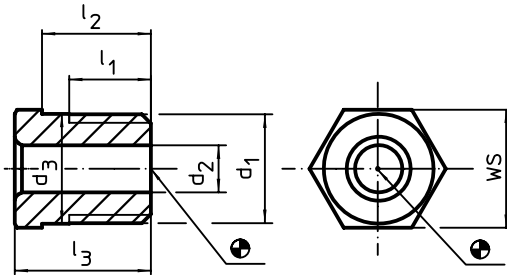
- Material**
- Steel, nitrided

MORE INFORMATION

Further products

Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115

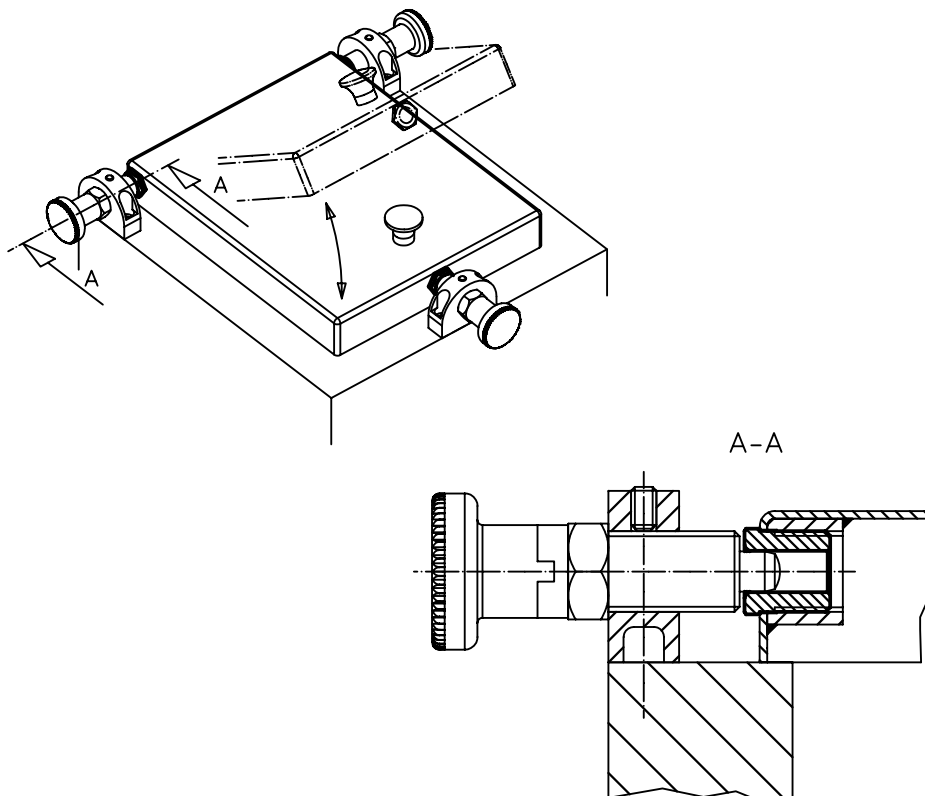
DRAWING



ORDER INFORMATION

Dimensions						For pin	WS	🌡️	🏋️	Art. No.
d ₁	d ₂ +0.1	d ₃ ±0.3	l ₁ min.	l ₂ -0.3	l ₃	[mm]	[mm]	max. [°C]	[g]	
[mm]						[mm]	[mm]			
M12 x 1,5	4.2	12.1	9	10	13	4	13	250	10.0	22110.0454
	5.2	12.1	9	10	13	5	13	250	9.6	22110.0455
	6.2	12.1	9	10	13	6	13	250	8.5	22110.0456
M16 x 1,5	8.2	16.1	11	12	15	8	17	250	18.0	22110.0458
	10.2	16.1	11	12	15	10	17	250	14.0	22110.0460
	12.2	16.1	11	12	15	12	17	250	9.1	22110.0462

APPLICATION EXAMPLE



Positioning Bushings • for index bolts and index plungers

EH 22110.



PRODUCT DESCRIPTION

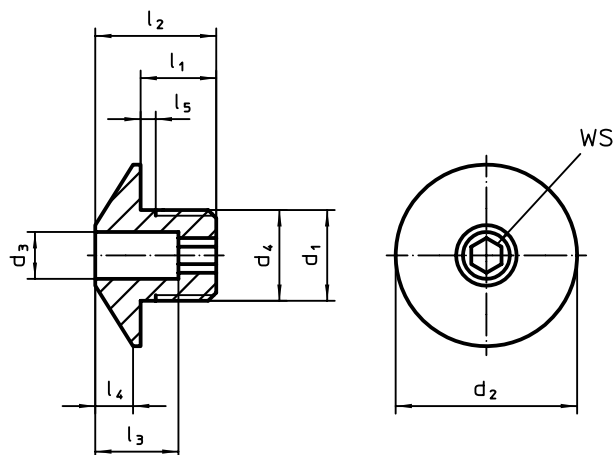
Positioning bushings are suitable for index plungers and index bolts.
Low wear thanks to hardened running ball.

Material


- Steel, hardened, blackened

- Stainless steel, hardened

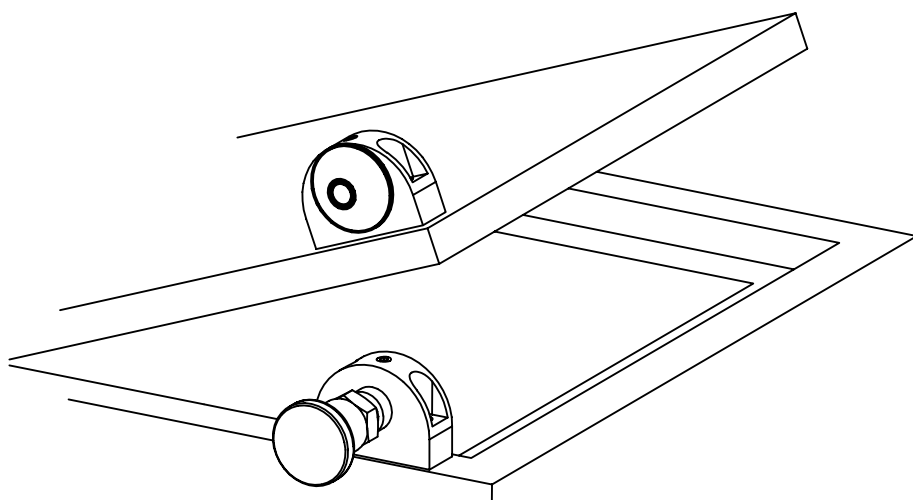
DRAWING



ORDER INFORMATION

d ₁	d ₃ +0.1	d ₂	Dimensions						For pin [mm]	WS [mm]	 [g]	Art. No.	
			d ₄ -0.05	l ₁	l ₂	l ₃	l ₄	l ₅ +0.5				Steel	Stainless steel
[mm]													
M12 x 1,5	4.2	24	12	10	16	11	5	1.5	4	4	17	22110.0464	22110.0474
	5.2	24	12	10	16	11	5	1.5	5	4	17	22110.0465	22110.0475
	6.2	24	12	10	16	11	5	1.5	6	4	16	22110.0466	22110.0476
M16 x 1,5	8.2	32	16	12	20	13	7	1.5	8	6	36	22110.0468	22110.0478
	10.2	32	16	12	20	13	7	1.5	10	6	34	22110.0470	22110.0480
	12.2	32	16	12	20	13	7	1.5	12	6	33	22110.0472	22110.0482

APPLICATION EXAMPLE



Index Plungers • with hexagon collar

EH 22120.

2



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black, dull

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

MORE INFORMATION

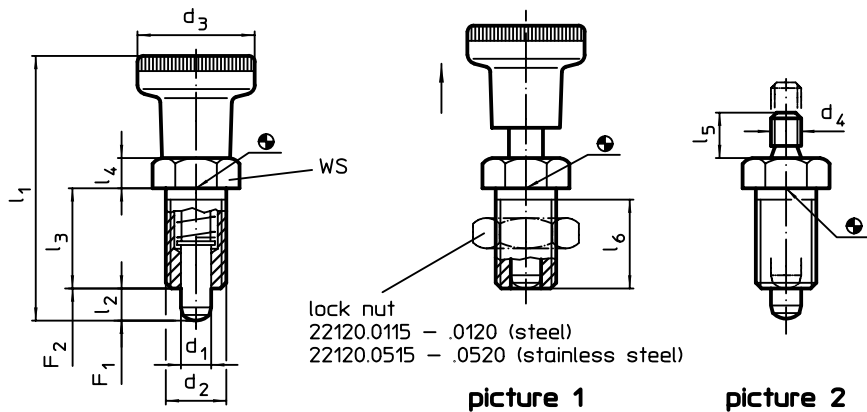
Notes

Knob not removable.
Lock nuts have to be purchased separately.

Further products

Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
Locating Bushings, for index bolts and index plungers. → p. 116
Distance Collars, for index plungers . . . → p. 129

DRAWING



ORDER INFORMATION

Dimensions										WS	Spring load ¹⁾		Temperature		Weight	Art. No.	
d ₁	d ₂	d ₃	d ₄	l ₁	l ₂ min.	l ₃	l ₄	l ₅	l ₆ min.		F ₁	F ₂	min.	max.		[g]	Free cutting steel
-0.02 -0.05				~													
[mm]																	
with knob – picture 1																	
5	M10 x 1	21	-	45.0	5	17	5	-	15	12	6.0	14	-30	80	19	22120.0005	22120.0405
6	M12 x 1,5	25	-	54.5	6	20	6	-	17	14	6.5	19	-30	80	29	22120.0006	22120.0406
8	M16 x 1,5	31	-	69.0	8	26	8	-	23	19	11.5	28	-30	80	71	22120.0008	22120.0408
10	M20 x 1,5	31	-	80.0	10	33	10	-	30	22	23.0	54	-30	80	119	22120.0010	22120.0410
without knob – picture 2																	
5	M10 x 1	-	M5	-	5	17	5	6	15	12	6.0	14	-	250	14	22120.0025	22120.0425
6	M12 x 1,5	-	M6	-	6	20	6	10	17	14	6.5	19	-	250	23	22120.0026	22120.0426
8	M16 x 1,5	-	M8	-	8	26	8	12	23	19	11.5	28	-	250	54	22120.0028	22120.0428
10	M20 x 1,5	-	M8	-	10	33	10	12	30	22	23.0	54	-	250	97	22120.0030	22120.0430

¹⁾ statistical average value

ACCESSORIES

lock nuts ISO 8675 (DIN 439)	Dimensions	Wrench size	Weight	Art. No.	
	d ₂	[mm]		Steel	Stainless steel
			[g]		
	M10 x 1	16	5.2	22120.0115	22120.0515
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518
	M20 x 1,5	30	32.0	22120.0120	22120.0520

Index Plungers • with hexagon collar, stainless steel

EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

- Body**
 - Stainless steel 1.4305
- Locking pin**
 - Stainless steel 1.4305, nickel-plated
- Knob**
 - Stainless steel 1.4305

MORE INFORMATION

Notes

Knob not removable.
Lock nuts have to be purchased separately.

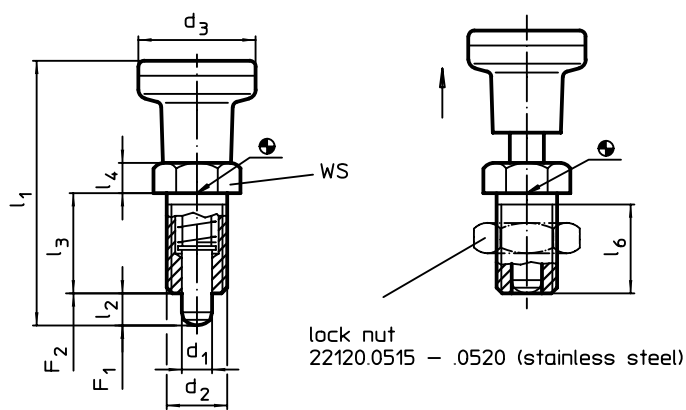
Further products

Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
Distance Collars, for index plungers . . . → p. 129

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

DRAWING



ORDER INFORMATION

Dimensions								WS	Spring load ¹⁾		max.	[g]	Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃	l ₄	l ₆		F ₁	F ₂			
-0.02 -0.05			~	min.			min.	~	~	[°C]		Stainless steel	
[mm]								[mm]	[N]				
5	M10 x 1	21	45.0	5	17	5	15	12	6.0	14	250	43	22120.0485
6	M12 x 1,5	25	54.5	6	20	6	17	14	6.5	19	250	65	22120.0486
8	M16 x 1,5	31	69.0	8	26	8	23	19	11.5	28	250	132	22120.0488
10	M20 x 1,5	31	80.0	10	33	10	30	22	23.0	54	250	179	22120.0490

¹⁾ statistical average value

ACCESSORIES

	Dimensions	Wrench size	[g]	Art. No.
	d ₂			
	[mm]	[mm]		Stainless steel
lock nuts ISO 8675 (DIN 439)				
	M10 x 1	16	5.2	22120.0515
	M12 x 1,5	18	7.5	22120.0516
	M16 x 1,5	24	15.0	22120.0518
	M20 x 1,5	30	32.0	22120.0520

Index Plungers • with hexagon collar and locking

EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black, dull

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

Operation

The knob is pulled-out, turned 90° and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

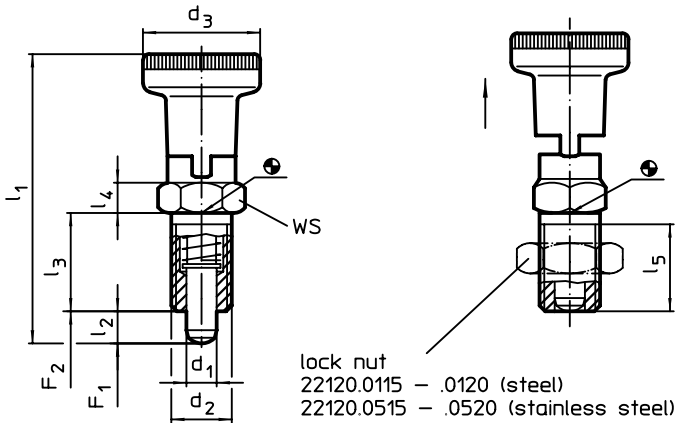
Notes

Knob not removable.
Lock nuts have to be purchased separately.

Further products

Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
Locating Bushings, for index bolts and index plungers. → p. 116
Distance Collars, for index plungers . . . → p. 129

DRAWING



ORDER INFORMATION

d ₁ -0.02 -0.05	Dimensions							WS [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
	d ₂	d ₃	l ₁ ~	l ₂ min.	l ₃	l ₄	l ₅ min.		F ₁ ~	F ₂ ~	min.	max.		Free cutting steel	Stainless steel
	[mm]								[N]		[°C]				
5	M10 x 1	21	51.0	5	17	5	15	12	6.0	14	-30	80	21	22120.0205	22120.0605
6	M12 x 1,5	25	61.0	6	20	6	17	14	6.5	19	-30	80	36	22120.0206	22120.0606
8	M16 x 1,5	31	75.5	7	26	8	23	19	11.5	28	-30	80	79	22120.0208	22120.0608
10	M20 x 1,5	31	91.0	10	33	10	30	22	28.0	54	-30	80	134	22120.0210	22120.0610

¹⁾ statistical average value

ACCESSORIES

lock nuts ISO 8675 (DIN 439)	Dimensions	Wrench size	Weight [g]	Art. No.	
	d ₂ [mm]	[mm]		Steel	Stainless steel
	M10 x 1	16	5.2	22120.0115	22120.0515
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518
	M20 x 1,5	30	32.0	22120.0120	22120.0520

Index Plungers • with hexagon collar and locking, stainless steel

EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

- Body**
 - Stainless steel 1.4305
- Locking pin**
 - Stainless steel 1.4305, nickel-plated
- Knob**
 - Stainless steel 1.4305

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

Operation

The knob is pulled-out, turned 90° and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

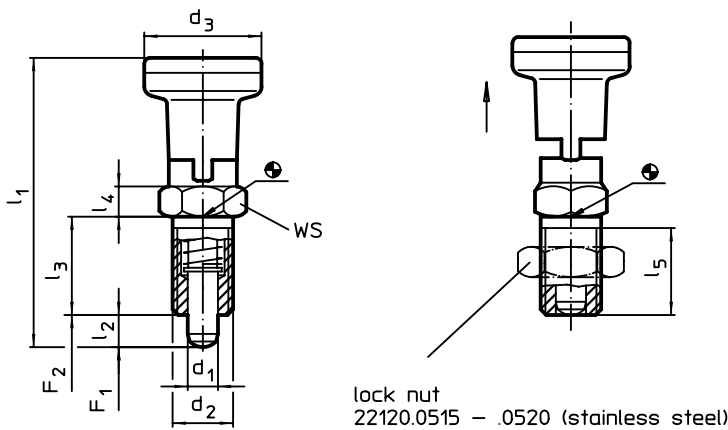
Notes

Knob not removable.
Lock nuts have to be purchased separately.

Further products

Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
Distance Collars, for index plungers . . . → p. 129

DRAWING



ORDER INFORMATION

Dimensions								WS	Spring load ¹⁾		max.	[g]	Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂ min.	l ₃	l ₄	l ₅ min.		F ₁	F ₂			
[mm]								[mm]	[N]		[°C]	[g]	Stainless steel
5	M10 x 1	21	51.0	5	17	5	15	12	6.0	14	250	43	22120.0615
6	M12 x 1,5	25	61.0	6	20	6	17	14	6.5	19	250	71	22120.0616
8	M16 x 1,5	31	75.5	7	26	8	23	19	11.5	28	250	144	22120.0618
10	M20 x 1,5	31	91.0	10	33	10	30	22	28.0	54	250	203	22120.0620

¹⁾ statistical average value

ACCESSORIES

lock nuts ISO 8675 (DIN 439)	Dimensions	Wrench size	[g]	Art. No.
	d ₂	[mm]		
	[mm]			Stainless steel
	M10 x 1	16	5.2	22120.0515
	M12 x 1,5	18	7.5	22120.0516
	M16 x 1,5	24	15.0	22120.0518
	M20 x 1,5	30	32.0	22120.0520

Index Plungers • with hexagon collar, stainless steel A4

EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores. The stainless steel A4 version ensures maximum corrosion resistance.

Material

- Stainless steel 1.4401

Body

- Stainless steel 1.4401

Lock nut

- Stainless steel 1.4401

Locking pin

- Stainless steel 1.4401 nickel-plated

MORE INFORMATION

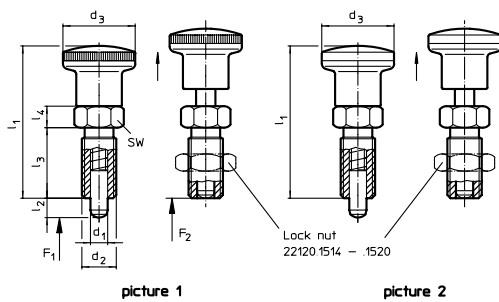
Notes

Knob not removable. Lock nuts have to be purchased separately.

Knob

- Thermoplastic PA 6, black-grey, matt

DRAWING



ORDER INFORMATION

Dimensions							Spring load ¹⁾		Temperature		Weight	Art. No.
d ₁	d ₂	l ₂ min.	d ₃	l ₁	l ₃	l ₄	F ₁ ~	F ₂ ~	min.	max.	[g]	
-0.02 -0.05												
[mm]												
[N]												
[°C]												
[g]												
with knob of thermoplastic – picture 1												
4	M 8 x 1	4	16	35.0	16	5	3.5	11	-30	80	10	22120.1044
		6	16	35.0	16	5	3.0	11	-30	80	11	22120.1064
5	M10 x 1	5	19	40.0	18	6	3.0	12	-30	80	18	22120.1045
		8	19	40.0	18	6	3.0	14	-30	80	18	22120.1065
6	M12 x 1,5	6	23	48.0	22	6	4.5	16	-30	80	30	22120.1046
		9	23	48.0	22	6	4.0	20	-30	80	30	22120.1066
8	M16 x 1,5	8	28	58.0	26	8	6.0	23	-30	80	66	22120.1068
		12	28	58.0	26	8	7.0	26	-30	80	63	22120.1048
10	M16 x 1,5	12	28	58.0	26	8	7.5	32	-30	80	64	22120.1080
12	M20 x 1,5	15	33	71.5	33	10	9.0	32	-30	80	129	22120.1082
with knob from stainless steel – picture 2												
4	M 8 x 1	8	16	35.0	16	5	3.5	11	–	100	20	22120.1054
		6	16	35.0	16	5	3.0	11	–	100	20	22120.1074
5	M10 x 1	5	18	40.0	18	6	3.0	12	–	100	32	22120.1055
		8	18	40.0	18	6	3.0	14	–	100	32	22120.1075
6	M12 x 1,5	6	22	48.0	22	6	4.5	16	–	100	63	22120.1056
		9	22	48.0	22	6	4.0	20	–	100	56	22120.1076
8	M16 x 1,5	8	27	58.0	26	8	6.0	20	–	100	107	22120.1078
		12	27	58.0	26	8	7.0	26	–	100	109	22120.1058
10	M16 x 1,5	12	27	58.0	26	8	7.5	32	–	100	111	22120.1090
12	M20 x 1,5	15	32	71.5	33	10	9.0	32	–	100	203	22120.1092

¹⁾ statistical average value

ACCESSORIES

	Dimensions d ₂ [mm]	Wrench size [mm]	Weight [g]	Art. No. Stainless steel 1.4401
lock nuts ISO 8675 (DIN 439)				
	M 8 x 1	13	2.8	22120.1514
	M10 x 1	16	5.4	22120.1515
	M12 x 1,5	18	7.6	22120.1516
	M16 x 1,5	24	18.0	22120.1518
	M20 x 1,5	30	33.0	22120.1520

Index Plungers • with hexagon collar and locking, stainless steel A4

EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores. The stainless steel A4 version ensures maximum corrosion resistance.

Material

- Body**
 - Stainless steel 1.4401
- Locking pin**
 - Stainless steel 1.4401 nickel-plated
- Knob**
 - Thermoplastic PA 6, black-grey, matt

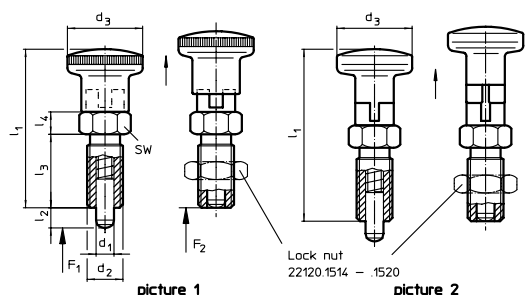
- Stainless steel 1.4401

- Lock nut**
 - Stainless steel 1.4401

MORE INFORMATION

Notes
Knob not removable.
Lock nuts have to be purchased separately.

DRAWING



ORDER INFORMATION

Dimensions							Spring load ¹⁾		Temperature		Weight	Art. No.
d ₁	d ₂	l ₂ min.	d ₃	l ₁	l ₃	l ₄	F ₁	F ₂	min.	max.	[g]	
-0.02 -0.05							~	~	[°C]			
[mm]												
[N]												
[°C]												
[g]												
with knob of thermoplastic – picture 1												
4	M 8 x 1	4	16	35.0	16	5	3.5	11	-30	80	12	22120.1144
		6	16	35.0	22	6	4.5	16	-30	80	11	22120.1164
5	M10 x 1	5	19	35.0	16	5	3.0	11	-30	80	20	22120.1145
		8	19	48.0	22	6	4.0	20	-30	80	18	22120.1165
6	M12 x 1,5	6	23	40.0	18	6	3.0	12	-30	80	33	22120.1146
		9	23	58.0	26	8	6.0	23	-30	80	33	22120.1166
8	M16 x 1,5	8	28	58.0	26	8	7.0	26	-30	80	67	22120.1168
		12	28	40.0	18	6	3.0	14	-30	80	70	22120.1148
10	M16 x 1,5	12	28	58.0	26	8	7.5	32	-30	80	70	22120.1180
12	M20 x 1,5	15	33	71.5	33	10	9.0	32	-30	80	141	22120.1182
with knob from stainless steel – picture 2												
4	M 8 x 1	4	16	35.0	16	5	3.5	11	-	100	21	22120.1154
		6	16	35.0	16	5	3.0	11	-	100	22	22120.1174
5	M10 x 1	5	18	40.0	18	6	3.0	12	-	100	36	22120.1155
		8	18	40.0	18	6	3.0	14	-	100	37	22120.1175
6	M12 x 1,5	6	22	48.0	22	6	4.5	16	-	100	60	22120.1156
		9	22	48.0	22	6	4.0	20	-	100	63	22120.1176
8	M16 x 1,5	8	27	58.0	26	8	6.0	23	-	100	117	22120.1178
		12	27	58.0	26	8	7.0	26	-	100	118	22120.1158
10	M16 x 1,5	12	27	58.0	26	8	7.5	32	-	100	135	22120.1190
12	M20 x 1,5	15	32	71.5	33	10	9.0	32	-	100	229	22120.1192

¹⁾ statistical average value

ACCESSORIES

	Dimensions	Wrench size	Weight	Art. No.
	d ₂		[g]	Stainless steel 1.4401
	[mm]	[mm]		
lock nuts ISO 8675 (DIN 439)				
	M 8 x 1	13	2.8	22120.1514
	M12 x 1,5	18	7.6	22120.1516
	M10 x 1	16	5.4	22120.1515
	M16 x 1,5	24	18.0	22120.1518
	M20 x 1,5	30	33.0	22120.1520

Index Plungers • without hexagon collar

EH 22120.

2



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black

Assembly

Suitable mounting tools are available.

MORE INFORMATION

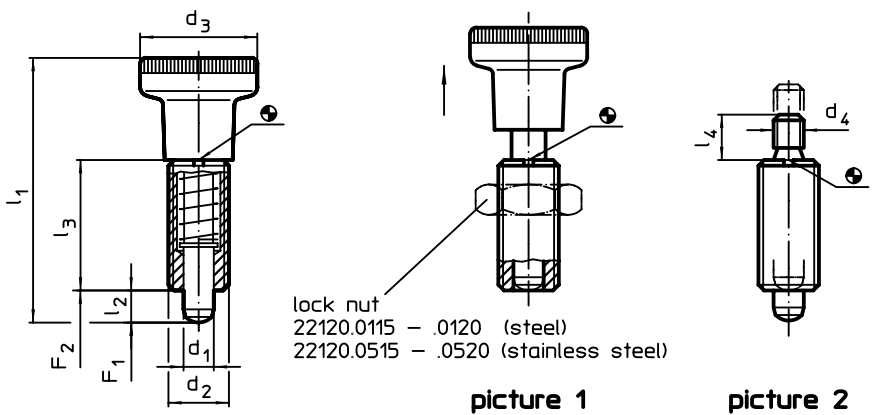
Notes

Knob not removable.
Lock nuts have to be purchased separately.

Further products

Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
Locating Bushings, for index bolts and index plungers. → p. 116
Distance Collars, for index plungers . . . → p. 129

DRAWING




ORDER INFORMATION

Dimensions								Spring load ¹⁾		Temperature		Weight		Art. No.	
d ₁	d ₂	d ₃	d ₄	l ₁	l ₂ min.	l ₃	l ₄	F ₁	F ₂	min.	max.	[g]	Free cutting steel	Stainless steel	
-0.02 -0.05				~				~	~						
[mm]															
[N]															
[°C]															
[g]															
with knob – picture 1															
5	M10 x 1	21	–	45.0	5	22	–	6.0	14	-30	80	17	22120.0045	22120.0445	
6	M12 x 1,5	25	–	54.5	6	26	–	6.5	19	-30	80	27	22120.0046	22120.0446	
8	M16 x 1,5	31	–	69.0	8	34	–	11.5	28	-30	80	63	22120.0048	22120.0448	
10	M20 x 1,5	31	–	80.0	10	41	–	23.0	54	-30	80	104	22120.0050	22120.0450	
without knob – picture 2															
5	M10 x 1	–	M5	–	5	22	6	6.0	14	–	250	12	22120.0065	22120.0465	
6	M12 x 1,5	–	M6	–	6	26	10	6.5	19	–	250	19	22120.0066	22120.0466	
8	M16 x 1,5	–	M8	–	8	34	12	11.5	28	–	250	46	22120.0068	22120.0468	
10	M20 x 1,5	–	M8	–	10	43	12	23.0	54	–	250	87	22120.0070	22120.0470	

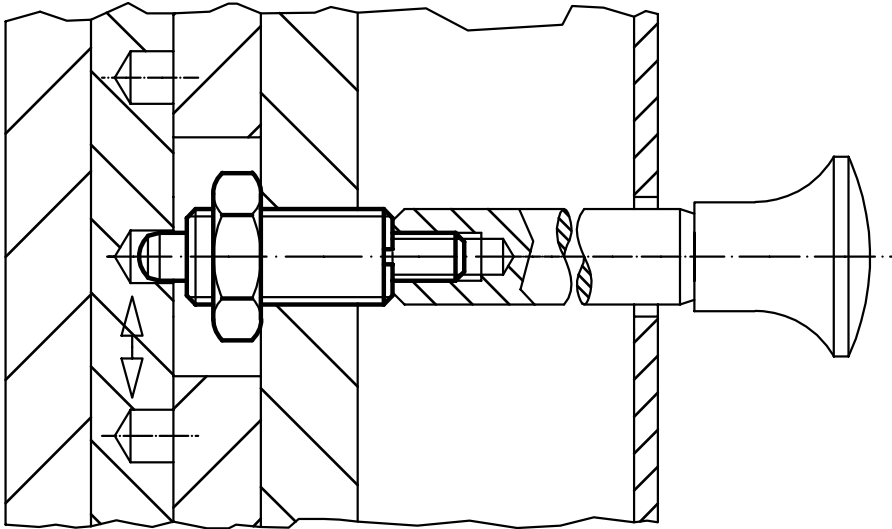
¹⁾ statistical average value

ACCESSORIES

Lock nuts ISO 8675 (DIN 439)	Dimensions	Wrench size	Weight	Art. No.	
	d ₂			Steel	Stainless steel
	[mm]	[mm]	[g]		
	M10 x 1	16	5.2	22120.0115	22120.0515
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518
	M20 x 1,5	30	32.0	22120.0120	22120.0520

	Dimensions d_2 [mm]	Wrench size [mm]	 [g]	Art. No.	
				Steel	Stainless steel
assembly tool					
	M10 x 1	-	9.3	22120.0955	-
	M12 x 1,5	-	14.0	22120.0956	-
	M16 x 1,5	-	25.0	22120.0958	-
	M20 x 1,5	-	27.0	22120.0960	-

APPLICATION EXAMPLE



Index Plungers • without hexagon collar, stainless steel

EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

Body

- Stainless steel 1.4305

Locking pin

- Stainless steel 1.4305, nickel-plated

Knob

- Stainless steel 1.4305

Assembly

Suitable mounting tools are available.

MORE INFORMATION

Notes

Knob not removable.

Lock nuts have to be purchased separately.

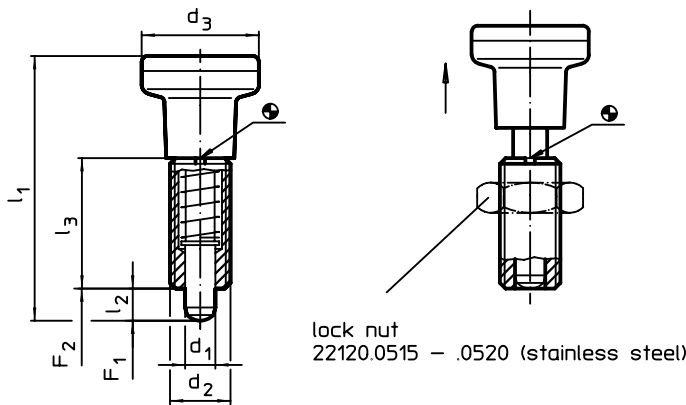
Further products

Mounting Blocks, for index bolts and

index plungers, die-cast. → p. 115

Distance Collars, for index plungers ... → p. 129

DRAWING



ORDER INFORMATION

Dimensions						Spring load ¹⁾		max. [°C]	[g]	Art. No. Stainless steel
d ₁ -0.02 -0.05	d ₂	d ₃	l ₁ ~	l ₂ min.	l ₃	F ₁ ~	F ₂ ~			
[mm]						[N]				
5	M10 x 1	21	45.0	5	22	6.0	14	250	36	22120.0475
6	M12 x 1,5	25	54.5	6	26	6.5	19	250	62	22120.0476
8	M16 x 1,5	31	69.0	8	34	11.5	28	250	124	22120.0478
10	M20 x 1,5	31	80.0	10	41	23.0	54	250	165	22120.0480

¹⁾ statistical average value

ACCESSORIES

	Dimensions	Wrench size	[g]	Art. No.	
	d ₂ [mm]	[mm]		Stainless steel	Steel
lock nuts ISO 8675 (DIN 439)					
	M10 x 1	16	5.2	22120.0515	–
	M12 x 1,5	18	7.5	22120.0516	–
	M16 x 1,5	24	15.0	22120.0518	–
	M20 x 1,5	30	32.0	22120.0520	–
assembly tool					
	M10 x 1	–	9.3	–	22120.0955
	M12 x 1,5	–	14.0	–	22120.0956
	M16 x 1,5	–	25.0	–	22120.0958
	M20 x 1,5	–	27.0	–	22120.0960

Index Plungers • threadless, weldable

EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

- Body**
 - Steel, blackened, weldable
- Locking pin**
 - Steel, hardened
- Knob**
 - Thermoplastic PA 6, black

Assembly

Attached by welding or glueing.

MORE INFORMATION

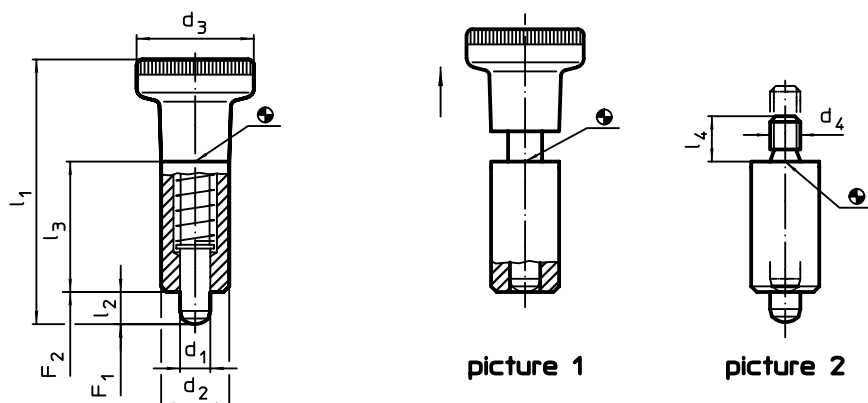
Notes

Knob not removable.

Further products

Locating Bushings, for index bolts and index plungers → p. 116

DRAWING

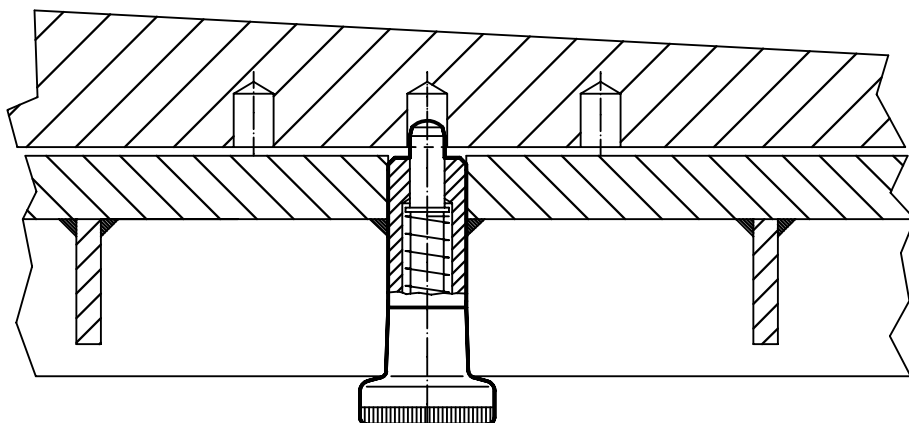


ORDER INFORMATION

Dimensions								Spring load ¹⁾		Temperature		Weight [g]	Art. No.
d ₁	d ₂	d ₃	d ₄	l ₁	l ₂ min.	l ₃	l ₄	F ₁	F ₂	min.	max.		
-0.02 -0.05	h9			~				~	~				
[mm]								[N]		[°C]		[g]	
with knob – picture 1													
5	12	21	–	45.0	5	22	–	7.0	16	-30	80	25	22120.0805
6	14	25	–	54.5	6	26	–	6.5	15	-30	80	40	22120.0806
8	18	31	–	69.0	8	34	–	12.0	31	-30	80	84	22120.0808
without knob – picture 2													
5	12	–	M5	–	5	22	6	7.0	16	–	250	19	22120.0825
6	14	–	M6	–	6	26	10	6.5	15	–	250	32	22120.0826
8	18	–	M8	–	8	34	12	12.0	31	–	250	67	22120.0828

¹⁾ statistical average value

APPLICATION EXAMPLE



Index Plungers • with hexagon collar, short

EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores. The small dimensions are a feature of these index plungers.

Material

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black, dull

Operation

When using locking index plungers, the knob is pulled-out, turned 90° and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

Notes

Knob not removable. Lock nuts have to be purchased separately.

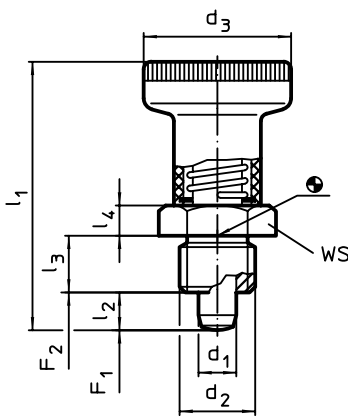
Further products

Locating Bushings, for index bolts and index plungers → p. 116
Distance Collars, for index plungers → p. 129

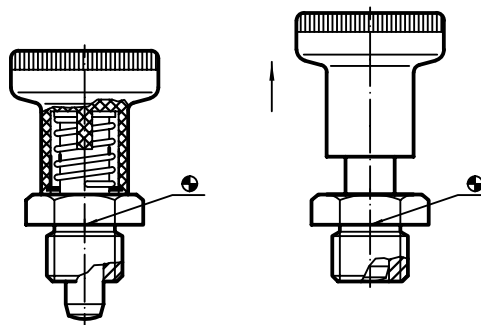
Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

DRAWING



picture 1



picture 2 with locking

ORDER INFORMATION

Dimensions							WS	Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃	l ₄		F ₁	F ₂	min.	max.		Free cutting steel	Stainless steel
-0.02 -0.05			~	min.	-0.15		[mm]	~	~	[°C]				
without locking – picture 1														
6	M12 x 1,5	25	45	6	10	5	17	7	19	-30	80	35	22120.0226	22120.0246
8	M16 x 1,5	31	54	8	12	6	19	14	24	-30	80	62	22120.0228	22120.0248
with locking – picture 2														
6	M12 x 1,5	25	45	6	10	5	17	7	19	-30	80	35	22120.0236	22120.0256
8	M16 x 1,5	31	54	8	12	6	19	14	24	-30	80	60	22120.0238	22120.0258

¹⁾ statistical average value

ACCESSORIES

lock nuts ISO 8675 (DIN 439)	Dimensions	Wrench size	Weight [g]	Art. No.	
	d ₂	[mm]		Steel	Stainless steel
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518

Distance Collars • for index plungers

EH 22120.



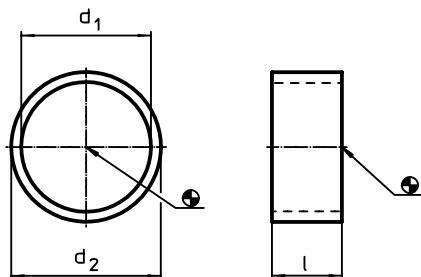
PRODUCT DESCRIPTION

Distance collars adapt the thread of index plungers to different thread reaches.

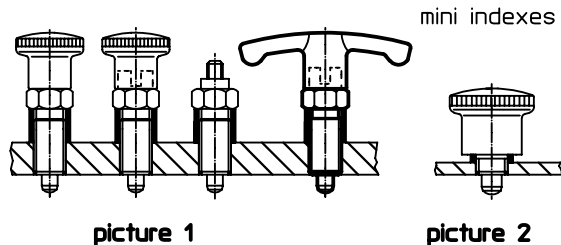
Material

- Stainless steel 1.4305

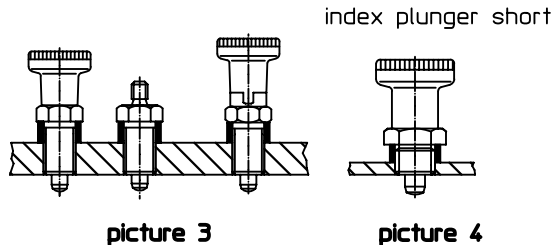
DRAWING



EH 22110.



EH 22120.



ORDER INFORMATION

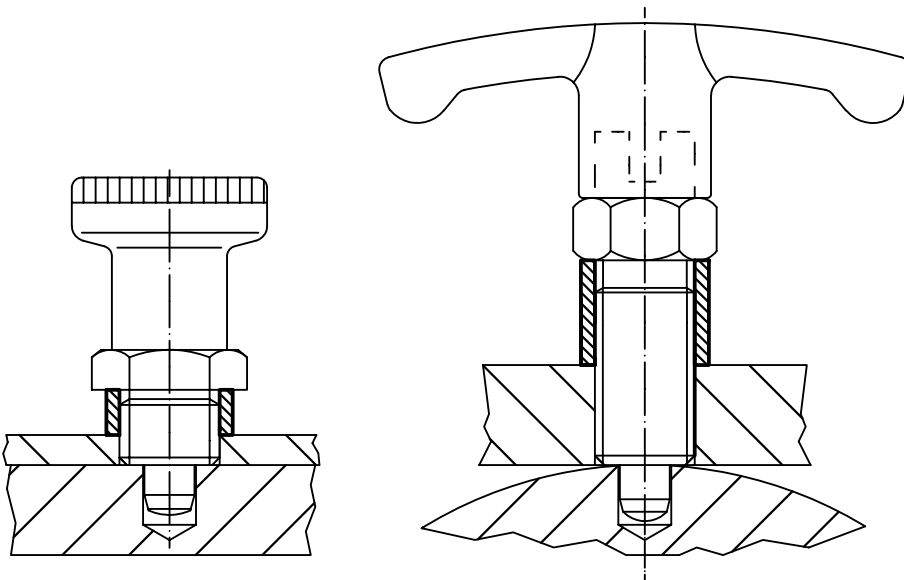
d ₁ H12	Dimensions		For index plungers size [mm]	For finish picture	max. [°C]	[g]	Art. No.
	l ±0.1 [mm]	d ₂ -0.1					
8	2	10	M 8	1/2	250	0.4	22120.0632
	3	10	M 8	1	250	0.8	22120.0633
	4	10	M 8	1	250	0.9	22120.0634
	6	10	M 8	1	250	1.2	22120.0636
	8	10	M 8	1	250	2.0	22120.0638
	10	10	M 8	1	250	2.0	22120.0640
10	2	12	M10	1/2/3	250	0.6	22120.0642
	4	12	M10	1/2/3	250	1.1	22120.0644
	6	12	M10	1/3	250	1.6	22120.0646
	8	12	M10	1/3	250	2.1	22120.0648
	10	12	M10	1/3	250	2.7	22120.0650
	12	12	M10	1/3	250	3.0	22120.0652
12	2	14	M12	1	250	0.6	22120.0662
	4	14	M12	1	250	2.5	22120.0664
	6	14	M12	1	250	1.9	22120.0666
	8	14	M12	1	250	2.4	22120.0668
	2	17	M12	3/4	250	2.0	22120.0672
	4	17	M12	3/4	250	3.4	22120.0674
	5	17	M12	3/4	250	4.4	22120.0675

→

2

d ₁ H12	Dimensions		For index plungers size [mm]	For finish picture	max. [°C]	[g]	Art. No.
	l ±0.1 [mm]	d ₂ -0.1					
16	4	17	M16	1	250	0.9	22120.0676
	6	17	M16	1	250	1.2	22120.0677
	8	17	M16	1	250	1.4	22120.0678
	10	17	M16	1	250	2.0	22120.0679
	12	17	M16	1	250	2.1	22120.0680
	2	19	M16	3/4	250	1.3	22120.0682
	4	19	M16	3/4	250	2.8	22120.0684
	6	19	M16	3/4	250	3.8	22120.0686
	8	19	M16	3/4	250	4.8	22120.0688
	10	19	M16	3	250	6.1	22120.0690
20	12	19	M16	3	250	7.3	22120.0692
	6	22	M20	1/3	250	3.0	22120.0693
	8	22	M20	1/3	250	4.0	22120.0694
	10	22	M20	1/3	250	4.9	22120.0695
	12	22	M20	1/3	250	5.9	22120.0696
	14	22	M20	1/3	250	6.9	22120.0697
	16	22	M20	1/3	250	9.3	22120.0698
	18	22	M20	1/3	250	9.0	22120.0699

APPLICATION EXAMPLE



Index Plungers • with mounting flange

EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores. For fixing onto thin walled parts. The small dimensions are a feature of these index plungers.

Material

Flange

- Zinc die-cast, zinc-plated by galvanization

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black, dull

Operation

When using locking index plungers the knob is pulled out and turned 90°.

MORE INFORMATION

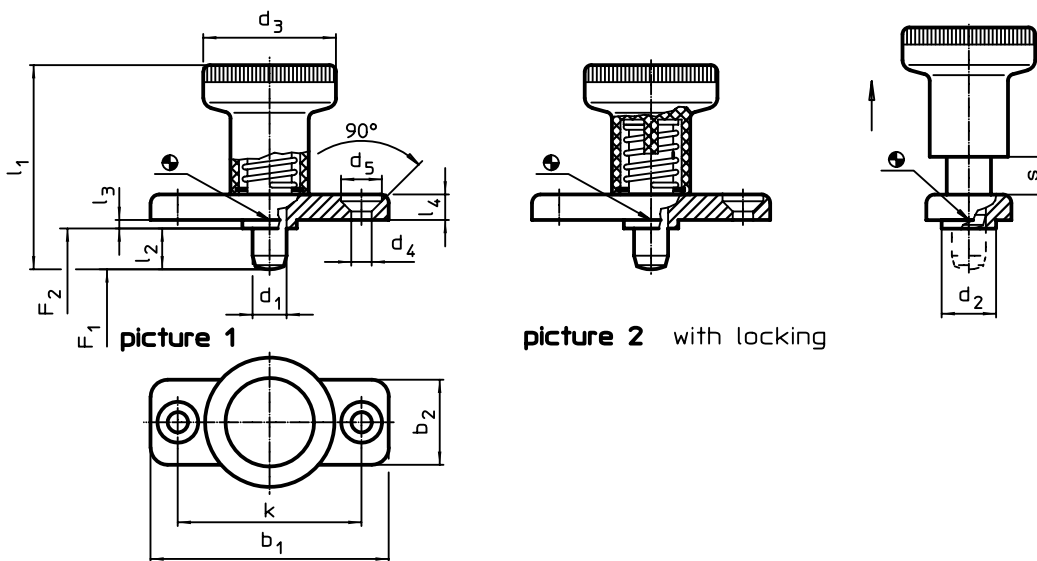
Notes

Knob not removable.

Further products

Locating Bushings, for index bolts and index plungers → p. 116

DRAWING



ORDER INFORMATION

Dimensions													Spring load ¹⁾		Temperature		Weight		Art. No.								
d ₁	l ₂	b ₁	b ₂	d ₂	d ₃	d ₄	d ₅	k	l ₁	l ₃	l ₄	s	F ₁	F ₂	min.	max.	[g]	Steel	Stainless steel								
-0.02 -0.05				-0.02 -0.1						-0.15				~	~	[°C]	[g]										
[mm]																				[N]		[°C]		[g]			
without locking – picture 1																											
6	6	40	18	10	25	4.3	8.3	30	37	2.5	4.5	6	8.5	22	-30	80	36	22120.0926	22120.0966								
	14	40	18	10	25	4.3	8.3	30	45	2.5	4.5	6	8.5	22	-30	80	37	22120.0927 ²⁾	22120.0967 ²⁾								
8	8	46	20	12	31	5.3	10.4	34	44	2.5	5.5	8	15.5	28	-30	80	60	22120.0928	22120.0968								
	18	46	20	12	31	5.3	10.4	34	54	2.5	5.5	8	15.5	28	-30	80	63	22120.0929 ²⁾	22120.0969 ²⁾								
with locking – picture 2																											
6	6	40	18	10	25	4.3	8.3	30	37	2.5	4.5	6	8.5	22	-30	80	36	22120.0936	22120.0976								
	14	40	18	10	25	4.3	8.3	30	45	2.5	4.5	6	8.5	22	-30	80	38	22120.0937 ²⁾	22120.0977 ²⁾								
8	8	46	20	12	31	5.3	10.4	34	44	2.5	5.5	8	15.5	28	-30	80	60	22120.0938	22120.0978								
	18	46	20	12	31	5.3	10.4	34	54	2.5	5.5	8	15.5	28	-30	80	63	22120.0939 ²⁾	22120.0979 ²⁾								

¹⁾ statistical average value
²⁾ Locking pin is not completely retractable

Index Plungers • simple finish

EH 22120.

2



PRODUCT DESCRIPTION

Application is limited to cases not requiring a precise positioning. Simple finish with very small dimensions.

Material

Body

- Steel, zinc-plated by galvanization
- Stainless steel 1.4305

Locking pin

- Stainless steel 1.4305

Knob

- Thermoplastic PA 6, black, dull

Pull-ring

- Stainless steel 1.4310

Operation

When using locking index plungers, the knob is pulled-out, turned 90° and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

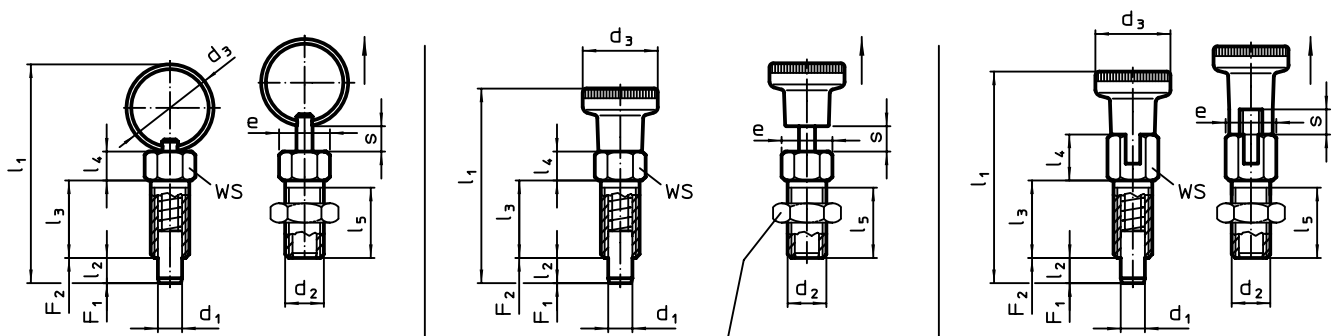
Notes

Lock nuts have to be purchased separately.

Further products

Locating Bushings, for index bolts and index plungers → p. 116

DRAWING



lock nut
22120.0704 – .0708 (Steel)
22120.0714 – .0718 (Stainless steel)

picture 1

picture 2



picture 3

ORDER INFORMATION

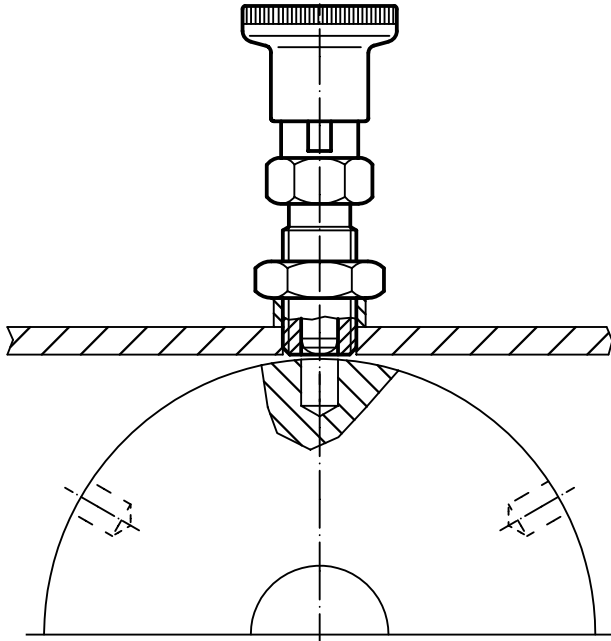
Dimensions										WS	Tightening torque max.	Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
d ₁	d ₂	d ₃	e	l ₁	l ₂ min.	l ₃	l ₄	l ₅	s min.			F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel
[mm]										[mm]	[Nm]	[N]		[°C]				
with pull-ring, without locking – picture 1																		
3	M 6	14	6.9	34.0	3.5	12	4.5	10.0	3.5	6	2	3	12	–	250	3.2	22120.0723	22120.0773
4	M 6	14	6.9	34.5	4.0	12	4.5	10.0	4.0	6	2	3	12	–	250	3.6	22120.0724	22120.0774
5	M 8	18	9.2	45.0	5.0	16	6.0	13.5	5.0	8	7	5	24	–	250	8.4	22120.0725	22120.0775
6	M10	24	11.5	57.5	6.0	20	7.5	17.0	6.0	10	15	5	21	–	250	17.0	22120.0726	22120.0776
8	M12	30	13.8	71.0	8.0	24	9.0	20.5	8.0	12	20	6	22	–	250	31.0	22120.0728	22120.0778
with knob, without locking – picture 2																		
3	M 6	12	6.9	30.0	3.5	12	4.5	10.0	3.5	6	2	3	12	-30	80	3.6	22120.0743	22120.0783
4	M 6	12	6.9	30.5	4.0	12	4.5	10.0	4.0	6	2	3	12	-30	80	3.8	22120.0744	22120.0784
5	M 8	16	9.2	40.0	5.0	16	6.0	13.5	5.0	8	7	5	24	-30	80	9.2	22120.0745	22120.0785
6	M10	18	11.5	49.0	6.0	20	7.5	17.0	6.0	10	15	5	21	-30	80	18.0	22120.0746	22120.0786
8	M12	21	13.8	59.0	8.0	24	9.0	20.5	8.0	12	20	6	22	-30	80	31.0	22120.0748	22120.0788
with knob and locking – picture 3																		
3	M 6	12	6.9	32.5	3.5	12	7.0	10.0	3.5	6	2	3	12	-30	80	3.8	22120.0763	22120.0793
4	M 6	12	6.9	33.0	4.0	12	7.0	10.0	4.0	6	2	3	12	-30	80	4.2	22120.0764	22120.0794
5	M 8	16	9.2	43.5	5.0	16	9.5	13.5	5.0	8	7	5	24	-30	80	9.8	22120.0765	22120.0795
6	M10	18	11.5	52.0	6.0	20	10.5	17.0	6.0	10	15	5	21	-30	80	18.0	22120.0766	22120.0796
8	M12	21	13.8	63.5	8.0	24	13.5	20.5	8.0	12	20	6	22	-30	80	33.0	22120.0768	22120.0798

¹⁾ statistical average value

ACCESSORIES

	Dimensions	Wrench size	 [g]	Art. No.	
	d ₂			Steel	Stainless steel
	[mm]	[mm]			
	M 6	10	1.3	22120.0704	22120.0714
	M 8	13	2.8	22120.0705	22120.0715
	M10	16	5.3	22120.0706	22120.0716
	M12	18	7.6	22120.0708	22120.0718

APPLICATION EXAMPLE



Index Plungers • for thin-walled pieces

EH 22120.



PRODUCT DESCRIPTION

Index plungers with throughgoing bore for thin-walled pieces.

Material

Body

- Steel, zinc-plated by galvanization

Locking pin

- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black, dull

Operation

When using the self-locking type, the knob is pulled-out, turned 90° and secured by a notched catch. Depending on the clamping length, the bolt may overhang.

MORE INFORMATION

Notes

Knob not removable.

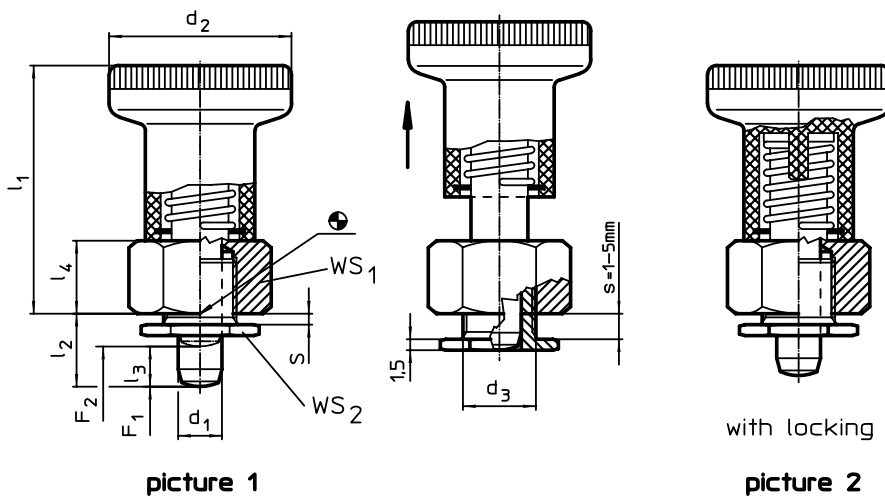
Further products

Locating Bushings, for index bolts and index plungers → p. 116

Assembly

By means of a fastening collet, the index plungers can be mounted into pieces having a wall thickness of 1-5 mm.

DRAWING



ORDER INFORMATION

Dimensions								WS ₁	WS ₂	Spring load ¹⁾		Temperature		Weight	Art. No.
d ₁	l ₂	d ₂	d ₃	l ₁	l ₃	l ₄	s			F ₁	F ₂	min.	max.		
[mm]								[mm]	[mm]	[N]		[°C]		[g]	
without locking – picture 1															
6	8.5	25	10	34	6.0	10	1 – 5	17	14	8.5	22	-30	80	39	22120.0266
	10.5	25	10	34	6.0	10	1 – 5	17	14	8.5	22	-30	80	40	22120.0267
8	10.0	31	12	40	7.5	12	1 – 5	19	16	15.5	28	-30	80	63	22120.0268
	12.0	31	12	40	7.5	12	1 – 5	19	16	15.5	28	-30	80	63	22120.0269
with locking – picture 2															
6	8.5	25	10	34	6.0	10	1 – 5	17	14	8.5	22	-30	80	39	22120.0286
	10.5	25	10	34	6.0	10	1 – 5	17	14	8.5	22	-30	80	39	22120.0287
8	10.0	31	12	40	7.5	12	1 – 5	19	16	15.5	28	-30	80	61	22120.0288
	12.0	31	12	40	7.5	12	1 – 5	19	16	15.5	28	-30	80	62	22120.0289

¹⁾ statistical average value

ACCESSORIES

	Weight	Art. No.
ring spanner, flat	[g]	
	26	22120.0299

Index Plungers • with pull-ring
EH 22120.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

Body

- Steel, blackened
- Stainless steel 1.4305

Locking pin

- Stainless steel 1.4305, nickel-plated

Pull-ring

- Stainless steel 1.4310

Assembly

Lock nuts have to be purchased separately.

Operation

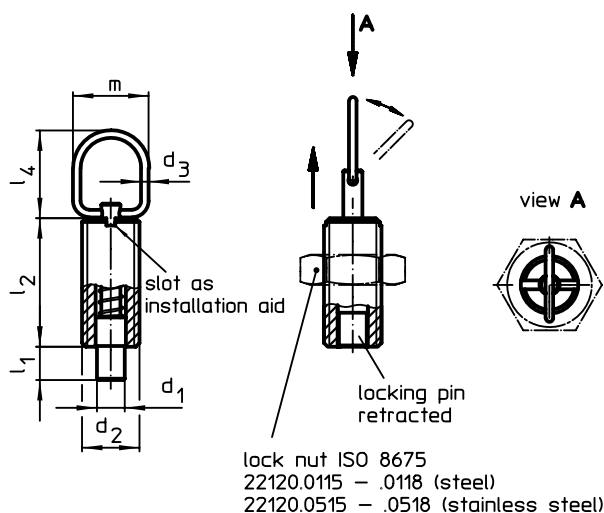
When using the model with locking mechanism, you turn the pull-ring by 90° after retracting the locking pin and secure the ring using the notched catch (if the locking pin should not overhang).

MORE INFORMATION

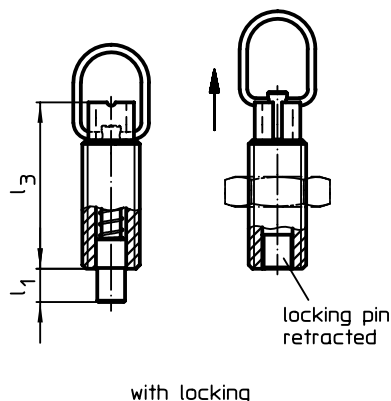
Further products

- Mounting Blocks, for index bolts and index plungers, die-cast → p. 115
- Locating Bushings, for index bolts and index plungers → p. 116
- Distance Collars, for index plungers → p. 129
- Mounting Blocks, for index bolts and index plungers → p. 143

DRAWING



picture 1



with locking




picture 2

ORDER INFORMATION

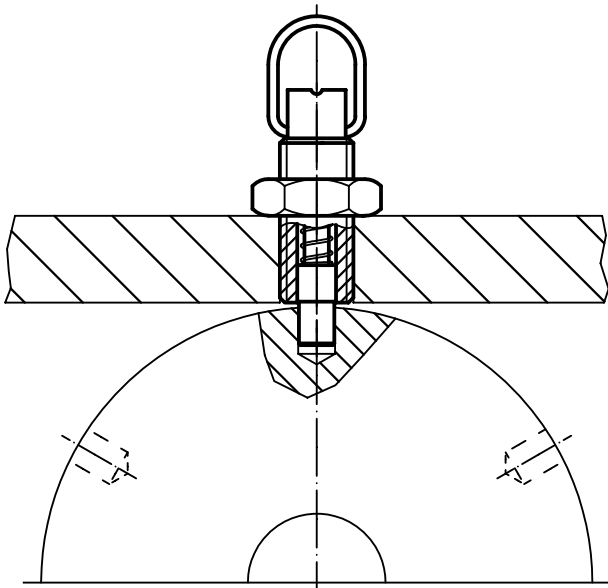
Dimensions								Stroke s	Spring load ¹⁾		max.	[g]	Art. No.	
d ₁ -0.05 -0.1	d ₂	d ₃	l ₁ min.	l ₂	l ₃	l ₄	m		F ₁ ~	F ₂ ~			°C	Steel
[mm]								[mm]	[N]		[°C]			
without locking – picture 1														
5	M10	1.5	5	22	28	23	18	5	5	15	250	11	22120.1310	22120.1410
	M10 x 1	1.5	5	22	28	23	18	5	5	15	250	12	22120.1312	22120.1412
6	M12	2.0	6	24	31	25	22	6	6	21	250	18	22120.1314	22120.1414
	M12 x 1,5	2.0	6	24	31	25	22	6	6	21	250	18	22120.1316	22120.1416
8	M16	2.0	9	34	44	25	22	9	7	27	250	43	22120.1318	22120.1418
	M16 x 1,5	2.0	9	34	44	25	22	9	7	27	250	45	22120.1320	22120.1420
10	M16	2.0	9	34	44	25	22	9	7	27	250	45	22120.1322	22120.1422
	M16 x 1,5	2.0	9	34	44	25	22	9	7	27	250	47	22120.1324	22120.1424
with locking – picture 2														
5	M10	1.5	5	22	28	23	18	5	5	15	250	12	22120.1340	22120.1440
	M10 x 1	1.5	5	22	28	23	18	5	5	15	250	13	22120.1342	22120.1442
6	M12	2.0	6	24	31	25	22	6	6	21	250	19	22120.1344	22120.1444
	M12 x 1,5	2.0	6	24	31	25	22	6	6	21	250	20	22120.1346	22120.1446
8	M16	2.0	9	34	44	25	22	9	7	27	250	48	22120.1348	22120.1448
	M16 x 1,5	2.0	9	34	44	25	22	9	7	27	250	51	22120.1350	22120.1450
10	M16	2.0	9	34	44	25	22	9	7	27	250	50	22120.1352	22120.1452
	M16 x 1,5	2.0	9	34	44	25	22	9	7	27	250	53	22120.1354	22120.1454

¹⁾ statistical average value

ACCESSORIES

	Dimensions d_2 [mm]	Wrench size [mm]	 [g]	Art. No.	
				Steel	Stainless steel
lock nuts ISO 4035					
	M10	16	5.3	22120.0706	22120.0716
	M12	18	7.6	22120.0708	22120.0718
	M16	24	18.0	22120.0710	22120.0720
lock nuts ISO 8675 (DIN 439)					
	M10 x 1	16	5.2	22120.0115	22120.0515
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518

APPLICATION EXAMPLE



Index Plungers • with release lock

EH 22122.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

Body

- Steel, blackened
- Stainless steel 1.4305

Press button

- Thermoplastic POM, red

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black-grey, matt

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

Operation

Actuate the red press button, and hold it in the pressed position. Only then can the locking pin be drawn in by pulling the knob.

MORE INFORMATION

Notes

Knob not removable.

Lock nuts have to be purchased separately.

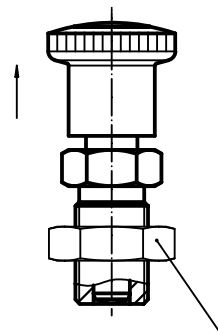
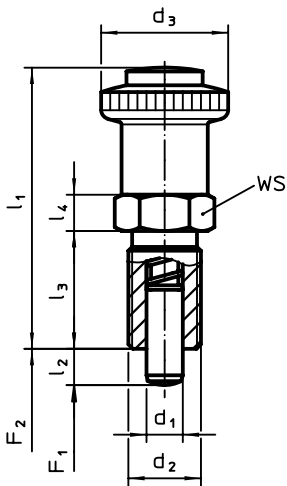
Further products

Locating Bushings, for index bolts and index plungers → p. 116

Distance Collars, for index plungers → p. 129

Mounting Blocks, for index bolts and index plungers → p. 143

DRAWING



lock nut
22120.0116 - .0118 (Steel)
22120.0516 - .0518 (Stainless steel)

ORDER INFORMATION

d ₁ -0.02 -0.04	d ₂	Dimensions					WS [mm]	Spring load ¹⁾		Temperature		Weight [g]	Art. No.					
		l ₂ min.	d ₃	l ₁ ~	l ₃	l ₄		F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel				
[mm]													[N]		[°C]			
6	M12 x 1,5	6	28	56	22	6	19	6.5	19	-30	80	45	22122.0005	22122.0105				
		9	28	56	22	6	19	6.0	25	-30	80	45	22122.0010	22122.0110				
8	M16 x 1,5	8	28	62	26	8	19	8.5	26	-30	80	73	22122.0015	22122.0115				
		12	28	62	26	8	19	8.5	28	-30	80	74	22122.0020	22122.0120				
10	M16 x 1,5	12	28	62	26	8	19	9.5	38	-30	80	75	22122.0025	22122.0125				

¹⁾ statistical average value

ACCESSORIES

Image	Dimensions	Wrench size	Weight [g]	Art. No.	
	d ₂ [mm]	[mm]		Steel	Stainless steel
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518

Index Plungers • with rapid locking head

EH 22122.



PRODUCT DESCRIPTION

Index plungers are used for indexing bores.

Material

Body

- Steel, blackened
- Stainless steel 1.4305

Press button

- Thermoplastic POM, red

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Knob

- Thermoplastic PA 6, black-grey, matt

Assembly

The screw length can be adapted by distance collars for index plungers (EH 22120.).

Operation

The locking pin is drawn in and locked by pulling the knob. The projecting red press button indicates the locking position (locking pin drawn in). Pushing the red press button causes the locking pin to jump back into the locking position.

MORE INFORMATION

Notes

Knob not removable.

Lock nuts have to be purchased separately.

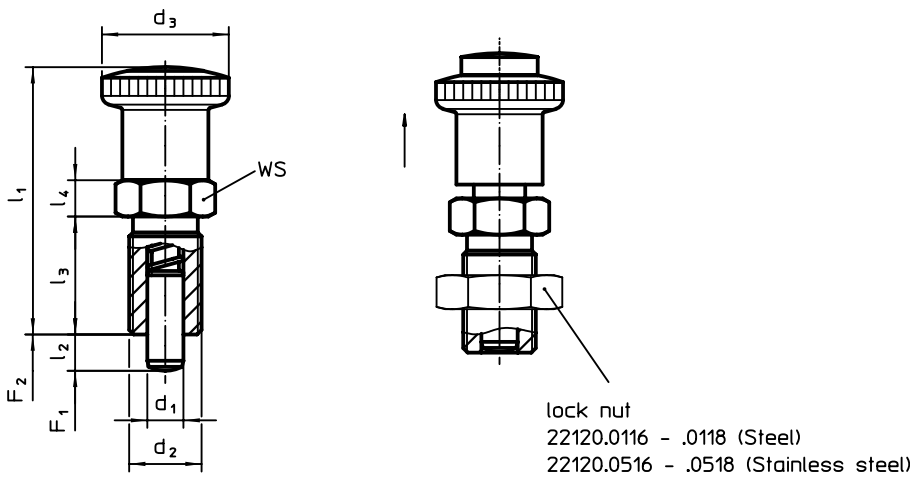
Further products

Locating Bushings, for index bolts and index plungers → p. 116

Distance Collars, for index plungers → p. 129

Mounting Blocks, for index bolts and index plungers → p. 143

DRAWING



ORDER INFORMATION

d ₁ -0.02 -0.04	d ₂	Dimensions					WS	Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
		l ₂ min.	d ₃	l ₁ ~	l ₃	l ₄		F ₁ ~	F ₂ ~	min.	max.		Steel	Stainless steel
		[mm]					[mm]	[N]		[°C]				
6	M12 x 1,5	6	30	53.5	22	6	19	6.5	19	-30	80	49	22122.0205	22122.0305
		9	30	53.5	22	6	19	6.0	25	-30	80	49	22122.0210	22122.0310
8	M16 x 1,5	8	30	59.5	26	8	19	8.5	26	-30	80	75	22122.0215	22122.0315
		12	30	59.5	26	8	19	8.5	28	-30	80	78	22122.0220	22122.0320
10	M16 x 1,5	12	30	59.5	26	8	19	9.5	38	-30	80	79	22122.0225	22122.0325

¹⁾ statistical average value

ACCESSORIES

Image	Dimensions	Wrench size	Weight [g]	Art. No.	
	d ₂	[mm]		Steel	Stainless steel
		[mm]	[g]		
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518



PRODUCT DESCRIPTION

Index plungers are used for indexing bores. The index plunger with sensor makes it possible to monitor the indexing position of the indexing plunger. When it engages, the sensor already switches after 2/3 of the indexing distance l_2 . In addition to the electronic signal, the switching status is indicated directly on the sensor via an LED.

Material

- Body**
 - Stainless steel 1.4305
- Locking pin**
 - Stainless steel 1.4305, nickel-plated
- Knob**
 - Thermoplastic PA 6, black, dull
- Cable**
 - Thermoplastic PUR, black
- Magnet**
 - Permanent magnet
- Sensor**
 - Thermoplastic PA 6, black, dull
- Lock nut**
 - Stainless steel A2 (ISO 8675)

- sensor clip.
 - 2. Tighten the internal hexagon screw of the sensor with light hand force (max. 0.1 Nm).
 - 3. Clip the sensor clip into the annular groove of the index plunger in any position.
 - 4. By turning the sensor clip, the sensor cable's derivation direction can be adjusted.
- Note:
To avoid interferences, no magnetic fields should act on the index plunger.

Operation

When using locking index plungers, the knob is pulled-out, turned 90° and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

Notes

Knob not removable. Lock nuts have to be purchased separately.

Further products

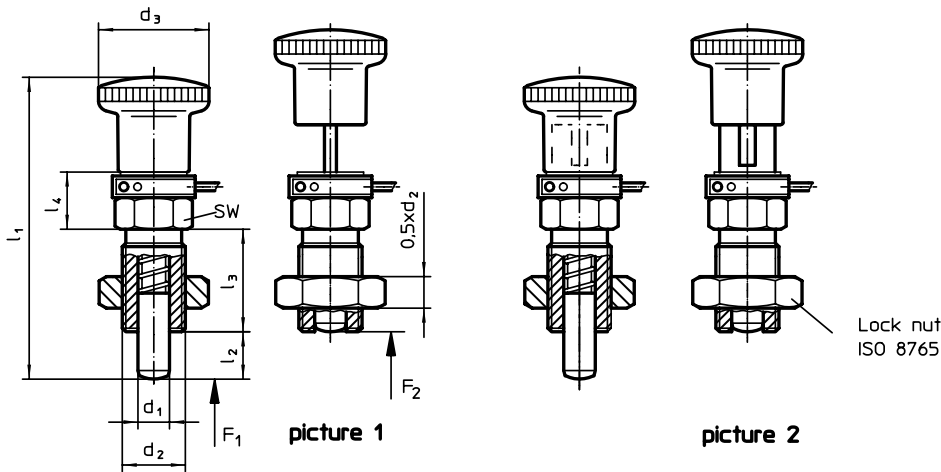
Retrieval Units, with sensor. → p. 359

Assembly

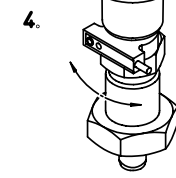
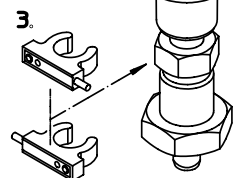
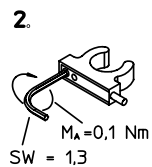
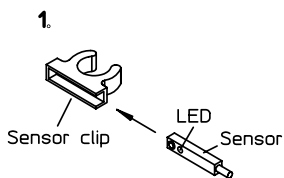
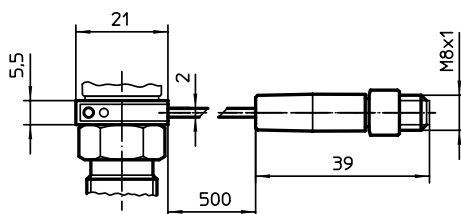
The enclosed separate sensor and sensor clip can be mounted with the enclosed Allen key. The derivation direction of the sensor cable can be determined individually.

1. Push the sensor into the side of the

DRAWING



Lock nut
ISO 8765



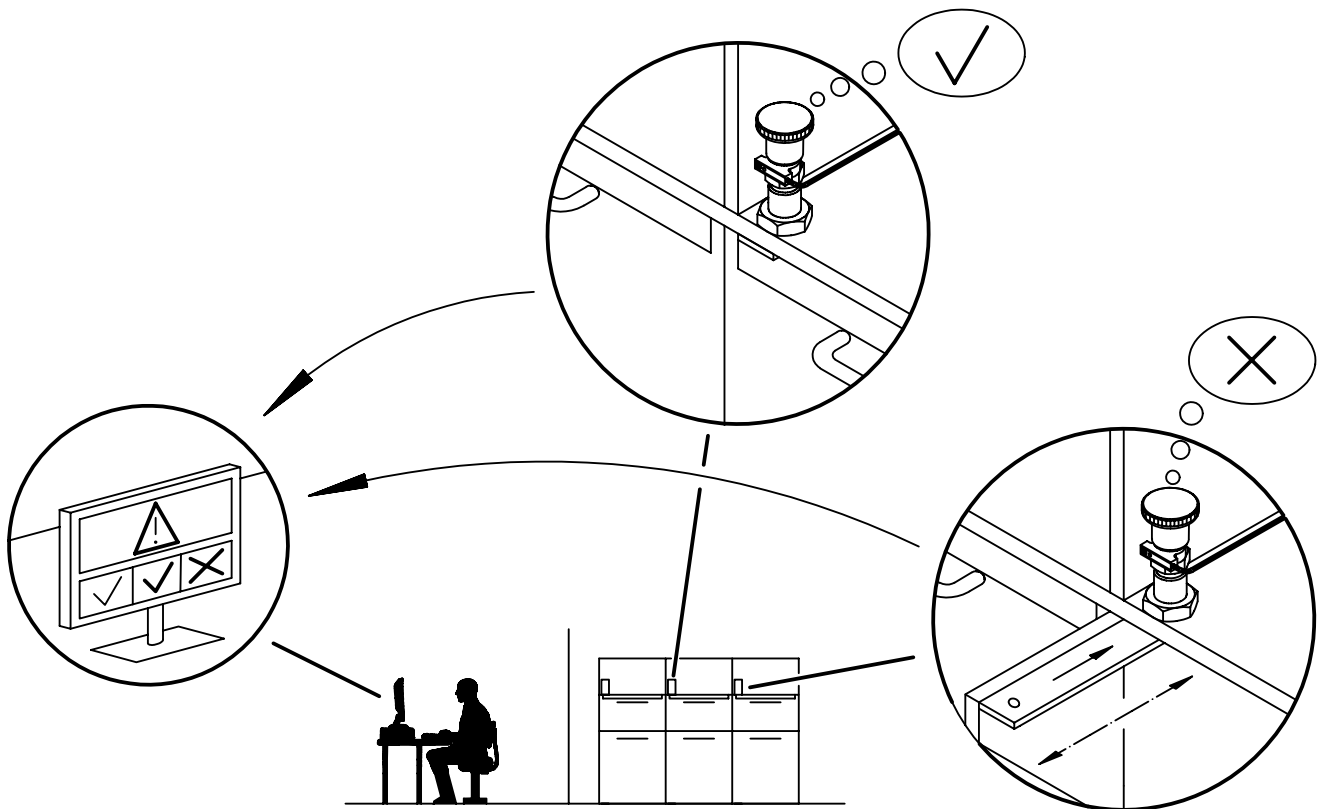
ORDER INFORMATION

2

d ₁ -0.02 -0.05	Dimensions						WS [mm]	Spring load ¹⁾		min. max.		[g]	Art. No.		
	d ₂	l ₂ min.	d ₃	l ₁	l ₃	l ₄		F ₁	F ₂	[°C]					
[mm]													[N]	[°C]	[g]
with knob, without locking – picture 1															
4	M 8 x 1	6	16	41.5	16	11.5	10	4.0	12.5	-25	75	34	22123.0004		
5	M10 x 1	8	19	46.5	18	12.5	12	5.0	18.0	-25	75	46	22123.0005		
6	M12 x 1,5	9	23	54.5	22	12.5	14	6.0	25.0	-25	75	62	22123.0006		
8	M16 x 1,5	12	28	64.5	26	14.5	17	8.5	28.0	-25	75	105	22123.0008		
10	M16 x 1,5	12	28	64.5	26	14.5	17	9.5	38.0	-25	75	106	22123.0010		
12	M20 x 1,5	15	33	78.0	33	16.5	22	11.5	40.0	-25	75	200	22123.0012		
16	M24 x 2	20	33	85.0	38	18.5	27	13.0	54.0	-25	75	296	22123.0016		
with knob and locking – picture 2															
4	M 8 x 1	6	16	41.5	16	11.5	10	4.0	12.5	-25	75	34	22123.0104		
5	M10 x 1	8	19	46.5	18	12.5	12	5.0	18.0	-25	75	49	22123.0105		
6	M12 x 1,5	9	23	54.5	22	12.5	14	6.0	25.0	-25	75	66	22123.0106		
8	M16 x 1,5	12	28	64.5	26	14.5	17	8.5	28.0	-25	75	112	22123.0108		
10	M16 x 1,5	12	28	64.5	26	14.5	17	9.5	38.0	-25	75	117	22123.0110		
12	M20 x 1,5	15	33	78.0	33	16.5	22	11.5	40.0	-25	75	206	22123.0112		
16	M24 x 2	20	33	85.0	38	18.5	27	13.0	54.0	-25	75	313	22123.0116		

¹⁾ statistical average value

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

Index bolts are used for indexing purposes. Plastic cover for grip allows better handling.

Material

Body

- Free cutting steel, blackened
- Stainless steel 1.4305

Locking pin

- Steel, hardened
- Stainless steel 1.4305, nickel-plated

Catch

- Free cutting steel, blackened
- Dry powdered metal 1.4404

Plastic cap

- Thermoplastic, black, dull

Operation

By turning the index bolt 180° the locking pin will be pulled-in and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

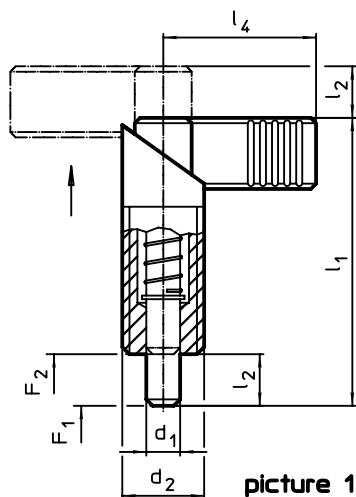
Notes

Lock nuts have to be purchased separately.

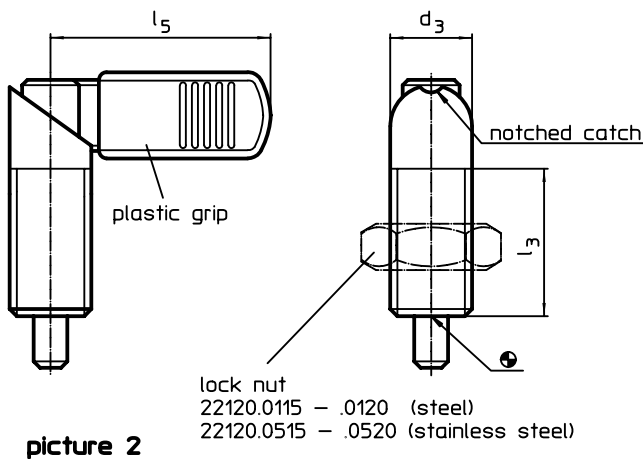
Further products

- Mounting Blocks, for index bolts and index plungers, die-cast. → p. 115
- Locating Bushings, for index bolts and index plungers. → p. 116
- Mounting Blocks, for index bolts and index plungers. → p. 143

DRAWING



picture 1





picture 2

ORDER INFORMATION

Dimensions								Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
d ₁ -0.02 -0.04	d ₂	d ₃	l ₁	l ₂	l ₃	l ₄	l ₅	F ₁ ~	F ₂ ~	min.	max.		Free cutting steel	Stainless steel
[mm]								[N]		[°C]				
without plastic cover for grip – picture 1														
4	M10 x 1	10	37.5	6	19	21	–	7.0	20.0	–	250	17	22120.0302	22120.0308
5	M10 x 1	10	37.5	6	19	21	–	7.0	20.0	–	250	18	22120.0304	22120.0310
6	M10 x 1	10	37.5	6	19	21	–	7.0	20.0	–	250	18	22120.0306	22120.0312
5	M12 x 1,5	12	47.0	8	26	26	–	8.5	19.5	–	250	29	22120.0313	22120.0323
6	M12 x 1,5	12	47.0	8	26	26	–	8.5	19.5	–	250	29	22120.0314	22120.0324
	M16 x 1,5	16	56.0	10	30	32	–	11.5	30.5	–	250	75	22120.0316	22120.0326
8	M12 x 1,5	12	47.0	8	26	26	–	8.5	19.5	–	250	30	22120.0315	22120.0325
	M16 x 1,5	16	56.0	10	30	32	–	11.5	30.5	–	250	61	22120.0317	22120.0327
	M20 x 1,5	20	69.0	12	36	37	–	21.0	57.5	–	250	121	22120.0318	22120.0328
10	M16 x 1,5	16	56.0	10	30	32	–	11.5	30.5	–	250	64	22120.0319	22120.0329
	M20 x 1,5	20	69.0	12	36	37	–	21.0	57.5	–	250	128	22120.0320	22120.0330
12	M20 x 1,5	20	69.0	12	36	37	–	21.0	57.5	–	250	127	22120.0322	22120.0332




¹⁾ statistical average value



d ₁ -0.02 -0.04	Dimensions							Spring load ¹⁾		 min. max.		 [g]	Art. No.						
	d ₂	d ₃	l ₁	l ₂	l ₃	l ₄	l ₅	F ₁ ~	F ₂ ~	[°C]			Free cutting steel	Stainless steel					
[mm]														[N]		[°C]		[g]	
with plastic cover for grip – picture 2																			
5	M12 x 1,5	12	47.0	8	26	–	32	8.5	19.5	-30	80	30	22120.0353	22120.0363					
6	M12 x 1,5	12	47.0	8	26	–	32	8.5	19.5	-30	80	30	22120.0354	22120.0364					
	M16 x 1,5	16	56.0	10	30	–	42	11.5	30.5	-30	80	61	22120.0356	22120.0366					
8	M12 x 1,5	12	47.0	8	26	–	32	8.5	19.5	-30	80	32	22120.0355	22120.0365					
	M16 x 1,5	16	56.0	10	30	–	42	11.5	30.5	-30	80	63	22120.0357	22120.0367					
	M20 x 1,5	20	69.0	12	36	–	52	21.0	57.5	-30	80	124	22120.0358	22120.0368					
10	M16 x 1,5	16	56.0	10	30	–	42	11.5	30.5	-30	80	66	22120.0359	22120.0369					
	M20 x 1,5	20	69.0	12	36	–	52	21.0	57.5	-30	80	128	22120.0360	22120.0370					
12	M20 x 1,5	20	69.0	12	36	–	52	21.0	57.5	-30	80	131	22120.0362	22120.0372					

¹⁾ statistical average value

ACCESSORIES

	Dimensions	Wrench size	 [g]	Art. No.	
	d ₂ [mm]	[mm]		Steel	Stainless steel
lock nuts ISO 8675 (DIN 439)					
	M10 x 1	16	5.2	22120.0115	22120.0515
	M12 x 1,5	18	7.5	22120.0116	22120.0516
	M16 x 1,5	24	15.0	22120.0118	22120.0518
	M20 x 1,5	30	32.0	22120.0120	22120.0520

Mounting Blocks • for index bolts and index plungers

EH 22120.



PRODUCT DESCRIPTION

Assembly support and extended applications for index bolts.
Also usable for index plungers size 6, 8 and 10.

Material

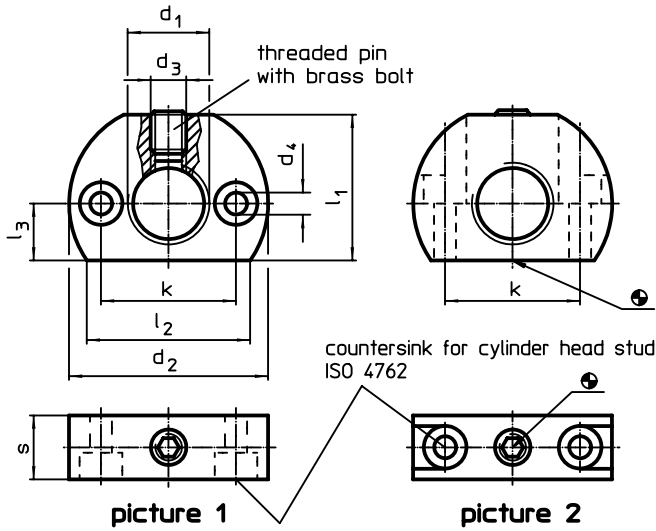
Grub Screw

- Steel, blackened, with brass pad
- Stainless steel, with brass pad

Body

- Steel, blackened
- Stainless steel 1.4305

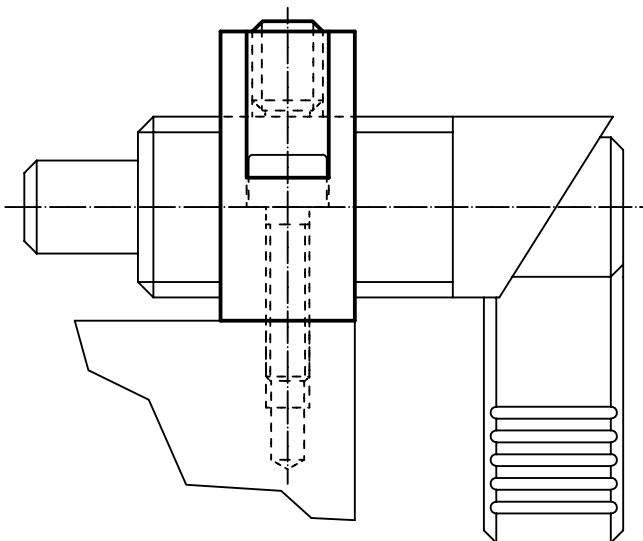
DRAWING



ORDER INFORMATION

Dimensions									max. [°C]	[g]	Art. No.	
d ₁	d ₂	d ₃	d ₄	k ±0.1	l ₁	l ₂ ~	l ₃	s			Steel	Stainless steel
mounting hole parallel to index bolt and index plunger – picture 1												
M12 x 1,5	32	M5	4.5	21	22	26.5	9	12	250	43	22120.0345	22120.0545
M16 x 1,5	46	M8	5.5	32	33	38.0	13	15	250	122	22120.0346	22120.0546
M20 x 1,5	46	M8	5.5	32	33	38.0	13	15	250	109	22120.0350	22120.0550
mounting hole vertical to index bolt and index plunger – picture 2												
M12 x 1,5	32	M5	4.5	21	22	26.5	9	12	250	37	22120.0347	22120.0547
M16 x 1,5	46	M8	5.5	32	33	38.0	13	15	250	106	22120.0348	22120.0548
M20 x 1,5	46	M8	5.5	32	33	38.0	13	15	250	94	22120.0352	22120.0552

APPLICATION EXAMPLE



Index Bolts • with mounting flange

EH 22120.



PRODUCT DESCRIPTION

Index bolts are used for indexing purposes. Plastic cover for grip allows better handling.

Material

Body

- Steel, blackened

Locking pin

- Steel, nitrided, black

Plastic cap

- Thermoplastic, black, dull

Assembly

Right and left mounting is possible due to countersinks on both sides.

Index bolt for lateral fastening.

Operation

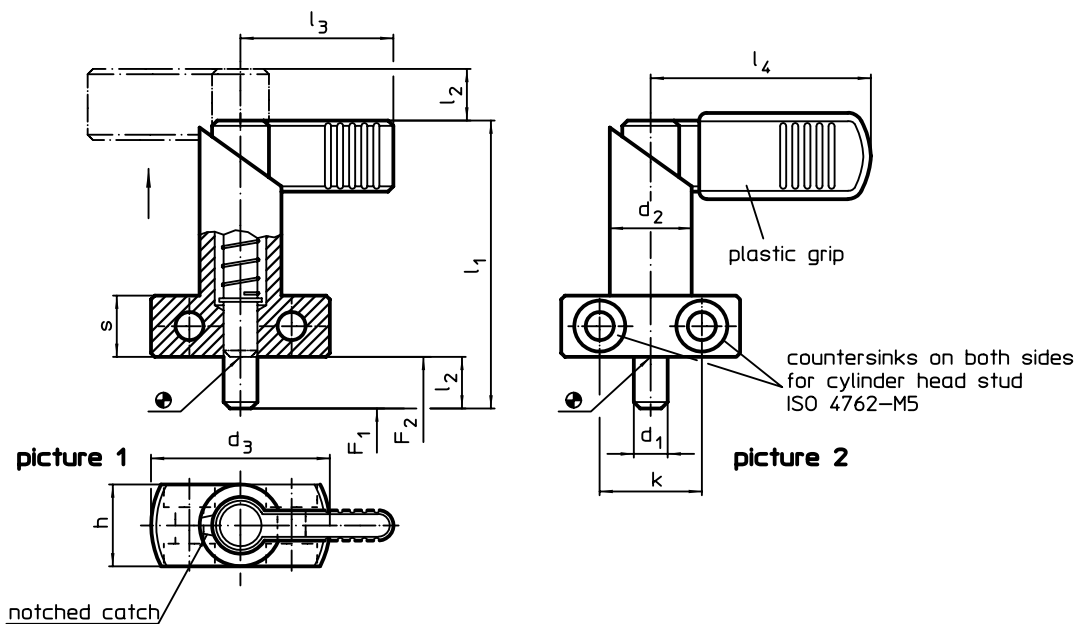
By turning the index bolt 180° the locking pin will be pulled-in and secured by a notched catch (when locking pin should not overhang).

MORE INFORMATION

Further products

Locating Bushings, for index bolts and index plungers. → p. 116

DRAWING



ORDER INFORMATION

Dimensions										Spring load ¹⁾		Temperature		Weight [g]	Art. No.	
d ₁ 0 -0.05	l ₂	d ₂	d ₃	h	k	l ₁	l ₃	l ₄	s	F ₁ ~	F ₂ ~	min.	max.			
[mm]										[N]		[°C]		[g]		
without plastic cover for grip – picture 1																
6	10	16	35	16	20	56	32	-	12	12	32	-	250	82	22120.0376	
8	10	16	35	16	20	56	32	-	12	12	32	-	250	85	22120.0378	
	12	20	40	20	22	69	37	-	15	21	58	-	250	163	22120.0379	
10	10	16	35	16	20	56	32	-	12	12	32	-	250	85	22120.0381	
	12	20	40	20	22	69	37	-	15	21	58	-	250	171	22120.0382	
12	12	20	40	20	22	69	37	-	15	21	58	-	250	174	22120.0384	
with plastic cover for grip – picture 2																
6	10	16	35	16	20	56	-	42	12	12	32	-30	80	83	22120.0386	
8	10	16	35	16	20	56	-	42	12	12	32	-30	80	85	22120.0388	
	12	20	40	20	22	69	-	52	15	21	58	-30	80	169	22120.0389	
10	10	16	35	16	20	56	-	42	12	12	32	-30	80	86	22120.0391	
	12	20	40	20	22	69	-	52	15	21	58	-30	80	171	22120.0392	
12	12	20	40	20	22	69	-	52	15	21	58	-30	80	171	22120.0394	

¹⁾ statistical average value

Index Bolts • with mounting flange, horizontal

EH 22120.



PRODUCT DESCRIPTION

Index bolts are used for indexing purposes.

Material

- Housing**
 - Zinc die-cast, plastic coated, black

Locking pin

- Steel, zinc-plated by galvanization

Catch

- Plastic

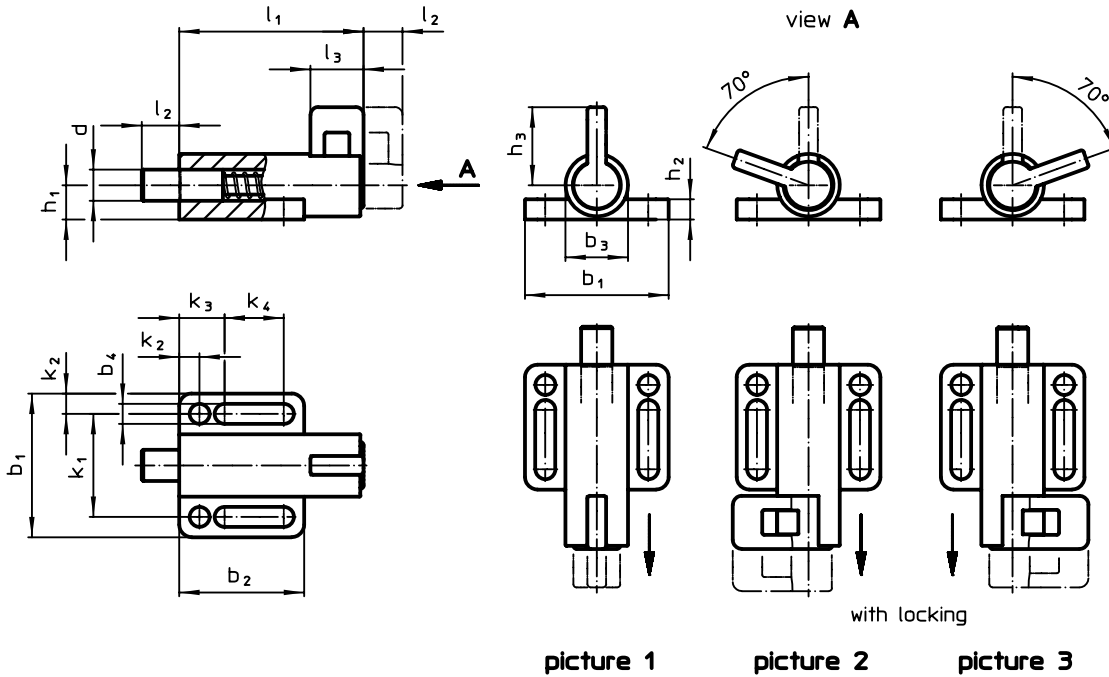
Assembly

Assembly by means of washers ISO 7092.

Operation

When using the model with locking mechanism, you pull out the bolt, turn it by 70° and secure it using the notched catch (if the locking pin should not overhang).

DRAWING



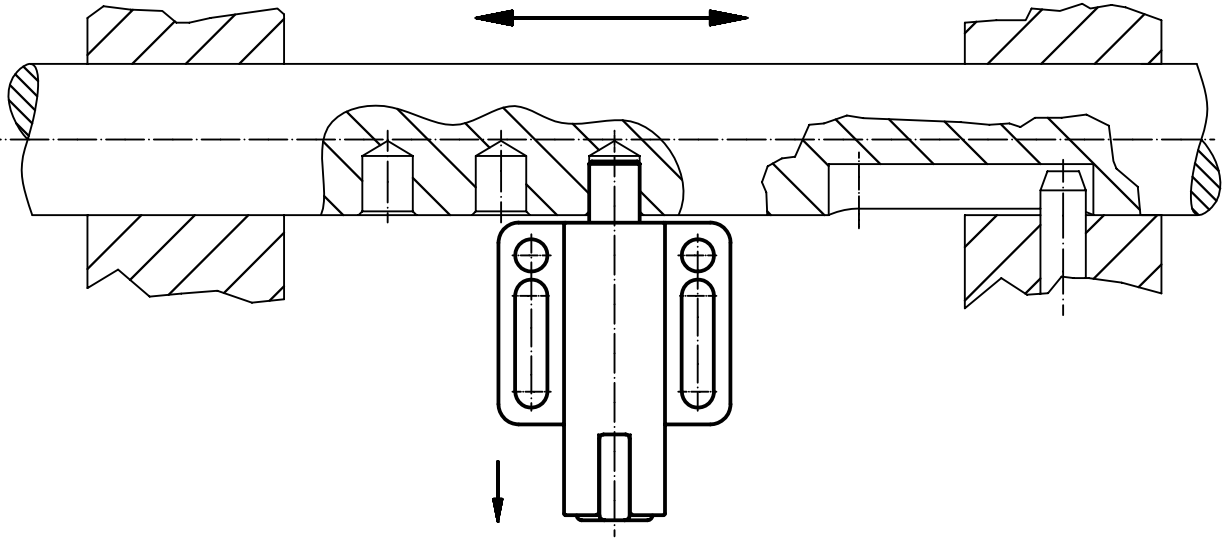
ORDER INFORMATION

Dimensions															Spring load ¹⁾		Temperature		Art. No.	
d	l ₂	b ₁	b ₂	b ₃	b ₄	h ₁	h ₂	h ₃	k ₁	k ₂	k ₃	k ₄	l ₁	l ₃	F ₁	F ₂	min.	max.		[g]
-0.05	min.														[N]	[N]	[°C]	[°C]		
without locking – picture 1																				
6	10	38	32	16	5.4	8.5	6	23	27	5.5	12.0	14.5	57	14	21	27	-30	80	68	22120.1016
8	10	38	32	16	5.4	8.5	6	23	27	5.5	12.0	14.5	57	14	21	27	-30	80	69	22120.1020
	12	46	40	20	6.4	11.0	6	29	33	6.5	14.5	19.0	71	17	25	38	-30	80	131	22120.1024
10	10	38	32	16	5.4	8.5	6	23	27	5.5	12.0	14.5	57	14	21	27	-30	80	72	22120.1028
	12	46	40	20	6.4	11.0	6	29	33	6.5	14.5	19.0	71	17	25	38	-30	80	133	22120.1032
12	12	46	40	20	6.4	11.0	6	29	33	6.5	14.5	19.0	71	17	25	38	-30	80	137	22120.1036
with locking, left – picture 2																				
6	10	38	32	16	5.4	8.5	6	23	27	5.5	12.0	14.5	57	14	21	27	-30	80	67	22120.1116
8	10	38	32	16	5.4	8.5	6	23	27	5.5	12.0	14.5	57	14	21	27	-30	80	69	22120.1120
	12	46	40	20	6.4	11.0	6	29	33	6.5	14.5	19.0	71	17	25	38	-30	80	130	22120.1124
10	10	38	32	16	5.4	8.5	6	23	27	5.5	12.0	14.5	57	14	21	27	-30	80	71	22120.1128
	12	46	40	20	6.4	11.0	6	29	33	6.5	14.5	19.0	71	17	25	38	-30	80	133	22120.1132
12	12	46	40	20	6.4	11.0	6	29	33	6.5	14.5	19.0	71	17	25	38	-30	80	136	22120.1136
with locking, right – picture 3																				
6	10	38	32	16	5.4	8.5	6	23	27	5.5	12.0	14.5	57	14	21	27	-30	80	67	22120.1216
8	10	38	32	16	5.4	8.5	6	23	27	5.5	12.0	14.5	57	14	21	27	-30	80	69	22120.1220
	12	46	40	20	6.4	11.0	6	29	33	6.5	14.5	19.0	71	17	25	38	-30	80	130	22120.1224
10	10	38	32	16	5.4	8.5	6	23	27	5.5	12.0	14.5	57	14	21	27	-30	80	71	22120.1228
	12	46	40	20	6.4	11.0	6	29	33	6.5	14.5	19.0	71	17	25	38	-30	80	132	22120.1232
12	12	46	40	20	6.4	11.0	6	29	33	6.5	14.5	19.0	71	17	25	38	-30	80	136	22120.1236

¹⁾ statistical average value

APPLICATION EXAMPLE

2





PRODUCT DESCRIPTION

Index bolts are used for indexing purposes. Application limited for cases in which no precise positioning is needed. The high stroke of the pin enables for a variety of applications, e.g. as door bolt. Simple version in compact design.

Material

- Body**
 - Free cutting steel, zinc-plated by galvanization
- Locking pin**
 - Steel, zinc-plated by galvanization
- Lock nut**
 - Steel, zinc-plated by galvanization

Operation

By lifting the index bolt the locking pin will be pulled in. The turning of the index bolt positions the pin when it is pulled in.

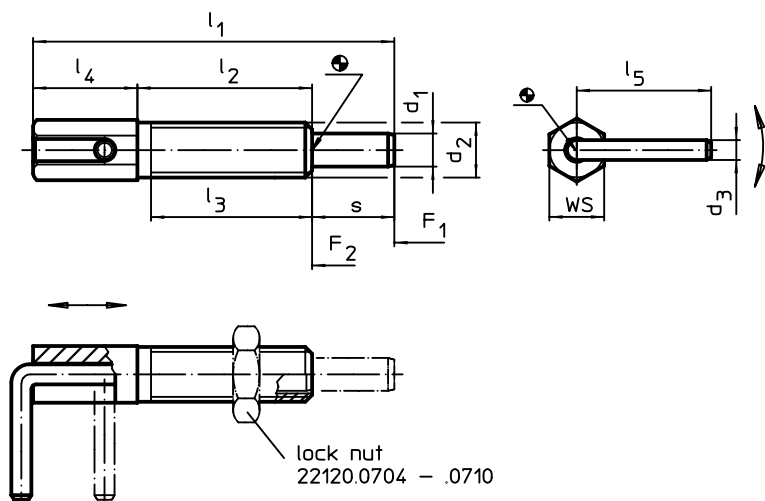
MORE INFORMATION

Notes
Lock nuts have to be purchased separately.

Further products

Locating Bushings, for index bolts and index plungers → p. 116

DRAWING





ORDER INFORMATION

Dimensions									WS	Spring load ¹⁾		Tightening torque max.	max. [°C]	[g]	Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃	l ₄	l ₅	s		F ₁ ~	F ₂ ~				
[mm]									[mm]	[N]		[Nm]	[°C]	[g]	
4	M 6	2.3	41.5	20.0	17.0	12.0	15.5	9.5	6	3.0	10.0	1.6	250	5.9	22121.0105
5	M 8	3.0	54.0	27.0	24.0	15.0	19.2	12.0	8	3.5	13.5	4.5	250	14.0	22121.0110
6	M10	3.5	65.0	33.5	30.0	17.5	22.9	14.0	10	4.0	16.0	10.0	250	26.0	22121.0115
8	M12	4.7	73.0	31.8	28.0	22.2	31.2	19.0	12	4.0	22.0	13.0	250	43.0	22121.0120
10	M16	4.7	102.5	50.5	44.5	27.0	32.7	25.0	16	4.0	23.0	42.0	250	104.0	22121.0125

¹⁾ statistical average value

ACCESSORIES

	Dimensions	Wrench size		Art. No.
	d ₂ [mm]	[mm]	[g]	Steel
	M 6	10	1.3	22120.0704
	M 8	13	2.8	22120.0705
	M10	16	5.3	22120.0706
	M12	18	7.6	22120.0708
	M16	24	18.0	22120.0710

Precision Index Plungers • with cylindrical pin

EH 22130.



PRODUCT DESCRIPTION

Precision index plungers together with bushings are a perfect combination for quick positioning and mounting. The precise tolerance of both, the precision index plunger and the bushing, guarantees a high repeatability of these two elements.

Material

Pin
 ■ Case-hardened steel, case-hardened, blackened and ground

Bushing
 ■ Case-hardened steel, case-hardened, blackened and ground

Body
 ■ Case-hardened steel, case-hardened, blackened and ground

Ball knob
 ■ Thermoplastic, greyish black

Assembly

For precise adjustment, the grip ball and plunger should be glued grease-free after assembly. Detailed assembly instructions can be downloaded as a PDF file under "Documents".

Operation

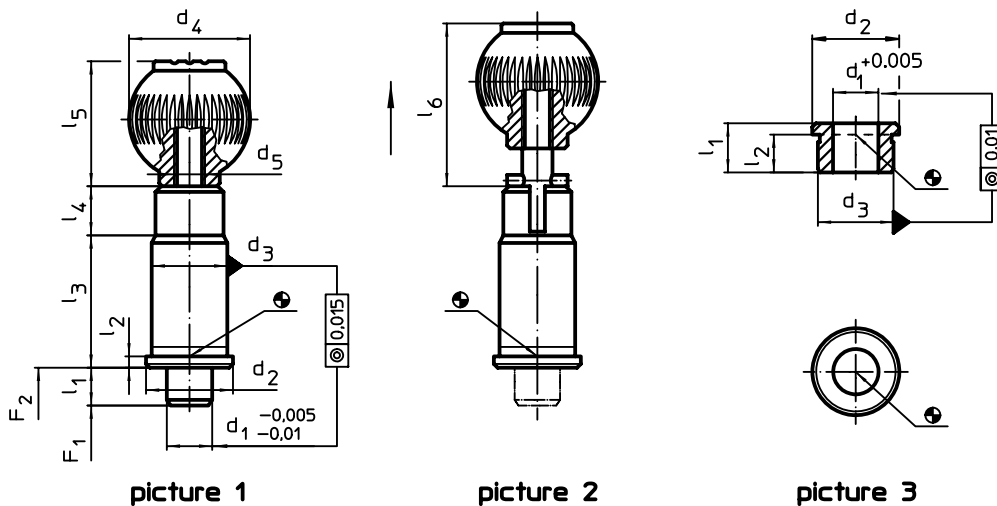
When using locking index plungers the knob is pulled out and turned 90°.

MORE INFORMATION

Notes

Bushings must be ordered separately.

DRAWING




ORDER INFORMATION

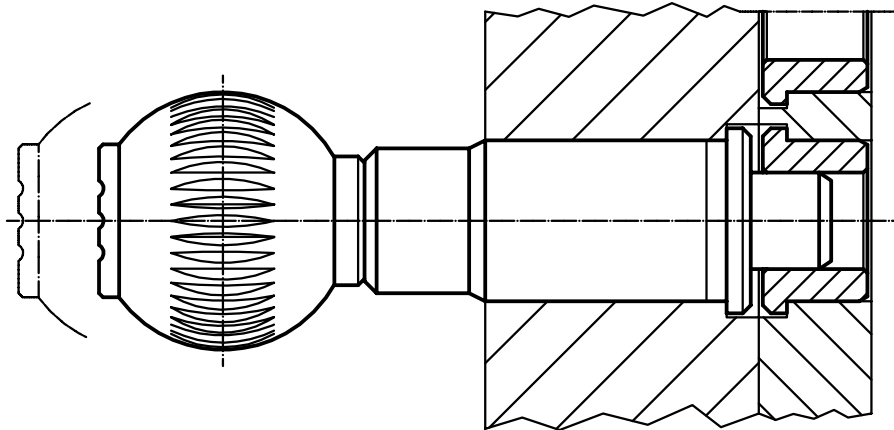
d ₁ -0.005 -0.01	d ₂	d ₃ n6	d ₄	d ₅	Dimensions						Spring load ¹⁾		[g]	Art. No.			
					l ₁ min.	l ₂	l ₃	l ₄	l ₅	l ₆	F ₁ ~	F ₂ ~					
[mm]															[N]	[g]	
without locking – picture 1																	
10	19	16	25	M 6	10	2.5	31	13	25.0	–	15	30	79	22130.0010			
12	23	20	32	M 8	10	3.0	35	13	33.0	–	15	35	138	22130.0012			
16	28	25	40	M10	10	3.0	42	13	41.5	–	20	50	226	22130.0016			
20	33	30	40	M10	10	3.0	50	13	41.5	–	36	63	350	22130.0020			
25	42	38	50	M10	10	3.0	60	13	51.0	–	20	73	649	22130.0025			
with locking – picture 2																	
10	19	16	25	M 6	10	2.5	31	13	25.0	36.5	15	30	79	22130.0060			
12	23	20	32	M 8	10	3.0	35	13	33.0	44.5	15	35	136	22130.0062			
16	28	25	40	M10	10	3.0	42	13	41.5	53.0	20	50	228	22130.0066			
20	33	30	40	M10	10	3.0	50	13	41.5	53.0	36	63	349	22130.0070			
25	42	38	50	M10	10	3.0	60	13	51.0	62.5	20	73	650	22130.0075			

¹⁾ statistical average value

ACCESSORIES

	Dimensions					[g]	Art. No.
	d_1 +0.005	d_2	d_3 n6 [mm]	l_1 min.	l_2		
socket for precision index plungers, cylindrical – picture 3							
	10	19	16	11	8.5	11	22130.0090
	12	23	20	13	10.0	22	22130.0092
	16	28	25	17	14.0	40	22130.0093
	20	33	30	16	13.0	51	22130.0094
	25	42	38	19	16.0	99	22130.0096

APPLICATION EXAMPLE



Precision Index Plungers • with tapered pin

EH 22130.



PRODUCT DESCRIPTION

Precision index plungers together with bushings are a perfect combination for quick positioning and mounting. The precise tolerance of both, the precision index plunger and the bushing, guarantees a high repeatability of these two elements.

Material

- Pin**
 - Case-hardened steel, case-hardened, blackened and ground
- Bushing**
 - Case-hardened steel, case-hardened, blackened and ground
- Body**
 - Case-hardened steel, case-hardened, blackened and ground
- Ball knob**
 - Thermoplastic, greyish black

Assembly

For precise adjustment, the grip ball and plunger should be glued grease-free after assembly. Detailed assembly instructions can be downloaded as a PDF file under "Documents".

Operation

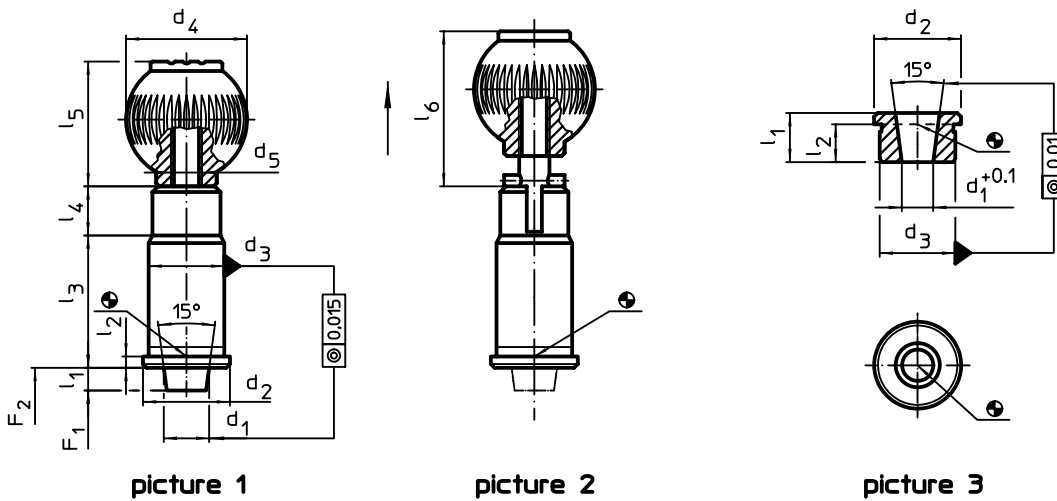
When using locking index plungers the knob is pulled out and turned 90°.

MORE INFORMATION

Notes

Bushings must be ordered separately.

DRAWING




ORDER INFORMATION

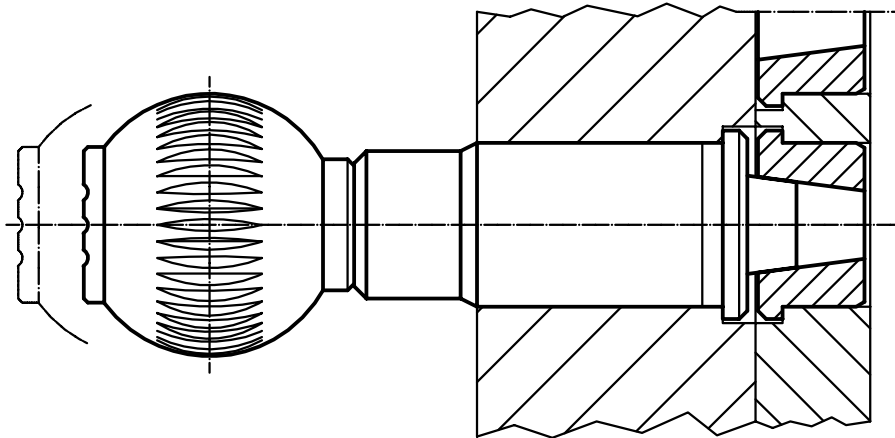
Nominal diameter [mm]	Dimensions											Spring load ¹⁾		Art. No.	
	d ₁	d ₂	d ₃ n6	d ₄	d ₅	l ₁ min.	l ₂	l ₃	l ₄	l ₅	l ₆	F ₁ ~	F ₂ ~		[g]
without locking – picture 1															
10	10	19	16	25	M 6	6	2.5	31	13	25.0	–	19	29	78	22130.0110
12	12	23	20	32	M 8	6	3.0	35	13	33.0	–	22	35	135	22130.0112
16	16	28	25	40	M10	6	3.0	42	13	41.5	–	30	50	227	22130.0116
20	20	33	30	40	M10	6	3.0	50	13	41.5	–	46	63	348	22130.0120
25	25	42	38	50	M10	6	3.0	60	13	51.0	–	39	73	654	22130.0125
with locking – picture 2															
10	10	19	16	25	M 6	6	2.5	31	13	25.0	32.5	19	29	95	22130.0160
12	12	23	20	32	M 8	6	3.0	35	13	33.0	40.5	22	35	135	22130.0162
16	16	28	25	40	M10	6	3.0	42	13	41.5	49.0	30	50	228	22130.0166
20	20	33	30	40	M10	6	3.0	50	13	41.5	49.0	46	63	348	22130.0170
25	25	42	38	50	M10	6	3.0	60	13	51.0	58.5	39	73	651	22130.0175

¹⁾ statistical average value

ACCESSORIES

	Nominal diameter [mm]	Dimensions					[g]	Art. No.
		d_1 +0.1	d_2	d_3 n6 [mm]	l_1 min.	l_2		
socket for precision index plungers, tapered – picture 3								
	10	7.10	19	16	11	8.5	13	22130.0190
	12	8.28	23	20	13	10.0	25	22130.0192
	16	11.52	28	25	17	14.0	47	22130.0193
	20	15.49	33	30	16	13.0	60	22130.0194
	25	19.70	42	38	19	16.0	114	22130.0196

APPLICATION EXAMPLE



LATERAL PLUNGERS

METRIC MODELS

Our lateral plungers are the perfect choice for all applications that require you to position and press on workpieces. The models we offer also include screw-in and press-in options as well as versions that are sealed against chips and dirt.



Lateral Spring Plungers

EH 22140.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting.

Material

- Ball**
- Stainless steel, hardened
 - Thermoplastic POM, white
 - Ball-bearing steel, hardened

Body

- Free cutting steel, blackened

Spring

- Stainless steel
- Plastic (PU)

Assembly

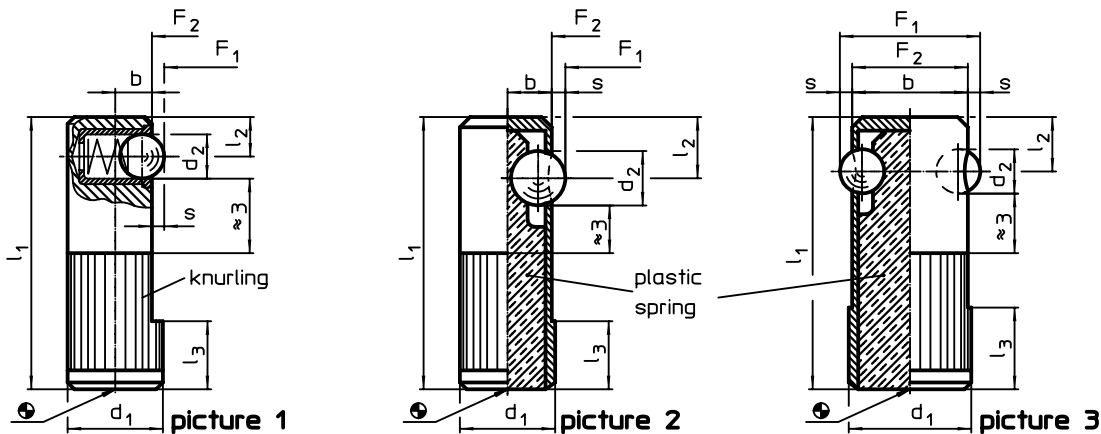
Insertion bore l_3 to be considered.

MORE INFORMATION

Notes

Special types on request.

DRAWING



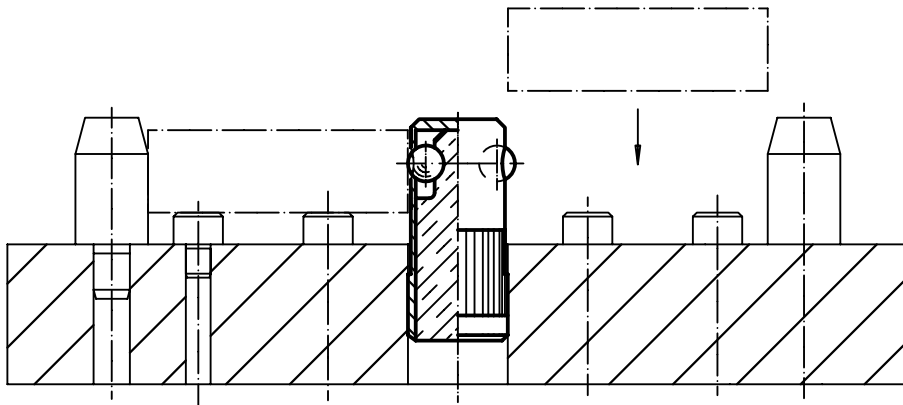
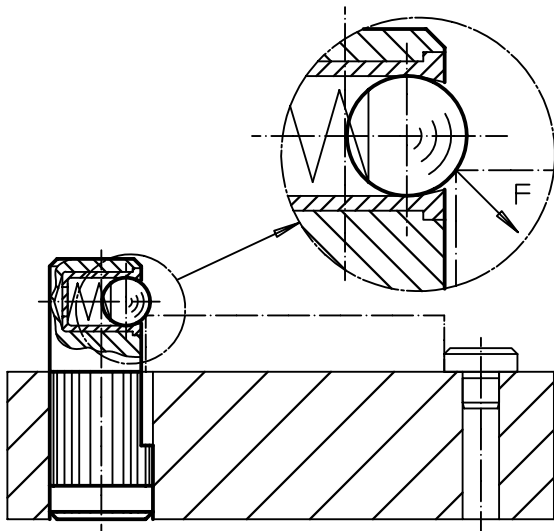
ORDER INFORMATION

Dimensions						Location hole H8	Stroke s	Spring load ¹⁾		Temperature		Weight [g]	Art. No.
d_1 +0.1	d_2	l_1	l_2	l_3	b			F_1	F_2	min.	max.		
[mm]						[mm]	[mm]	[N]	[N]	[°C]		[g]	
ball from stainless steel, standard spring load, one-sided – picture 1													
8	3.0	25	3.6	6	3.2	8	0.8	2.5	6.5	-30	50	8.9	22140.0008
10	4.0	30	4.2	7	4.0	10	1.0	4.5	9.0	-30	50	16.0	22140.0010
12	5.0	35	4.8	9	5.0	12	1.6	6.5	13.0	-30	50	28.0	22140.0012
14	6.5	40	5.8	10	5.4	14	1.9	8.0	18.0	-30	50	43.0	22140.0014
ball from thermoplastic, standard spring load, one-sided – picture 1													
8	3.0	25	3.6	6	3.2	8	0.8	2.5	6.5	-30	50	8.8	22140.0108
10	4.0	30	4.2	7	4.0	10	1.0	4.5	9.0	-30	50	16.0	22140.0110
12	5.0	35	4.8	9	5.0	12	1.6	6.5	13.0	-30	50	28.0	22140.0112
14	6.5	40	5.8	10	5.4	14	1.9	8.0	18.0	-30	50	42.0	22140.0114
ball from ball-bearing steel, heavy spring load, one-sided – picture 2													
10	5.5	30	7.0	8	4.5	10	1.0	60.0	170.0	-40	80	8.6	22140.0410
12	6.5	35	8.0	9	5.5	12	1.5	80.0	260.0	-40	80	14.0	22140.0412
14	8.0	40	9.0	10	6.5	14	2.0	120.0	480.0	-40	80	20.0	22140.0414
ball from ball-bearing steel, heavy spring load, on both sides – picture 3													
16	5.5	35	7.0	11	15.0	16	1.5	110.0	220.0	-40	80	20.0	22140.0616
18	6.5	40	8.0	12	17.0	18	1.8	120.0	330.0	-40	80	29.0	22140.0618
22	8.0	45	9.0	15	21.0	22	2.5	130.0	540.0	-40	80	43.0	22140.0622

¹⁾ statistical average value

APPLICATION EXAMPLE

2



Lateral Plungers • smooth, without seal

EH 22150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting.

Material

Body

- Aluminium Al

Spring

- Stainless steel
- Steel, blackened
- Steel, zinc-plated by galvanization

Pin

- Steel, case-hardened, zinc-plated by galvanization
- Thermoplastic POM, white

Assembly

Installation by pressing in.
Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

l_0 = center distance,
 y = workpiece height,
 w = workpiece length,

x = coordinate dimension,
 s = stroke,
 z = stop diameter
Calculation dimension x :
 y greater than or equal to $l_2 - d_2/2$,
then $x = d_2/2 - s$
or
 y smaller than $l_2 - d_2/2$,
then $x = d_2/2 - s - [(l_2 - d_2/2 - y) * 0,123]$

Characteristic

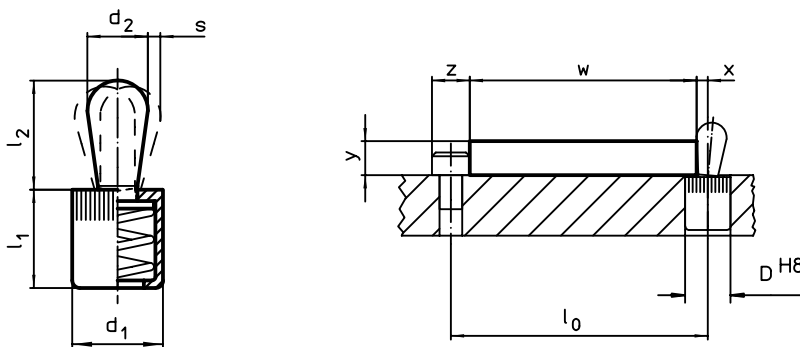
Version light spring load = spring from stainless steel
Version standard spring load = spring from steel, blackened
Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

Further products

Eccentric Mounting Bushings, for lateral plungers, smooth → p. 163

DRAWING



ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ [N]	Dimensions		Stroke s [mm]	Location hole D H8 [mm]	max. [°C]	[g]	Art. No.
d ₁	d ₂		l ₁	l ₂ ±0.5					
[mm]			[mm]						
pin: steel/pin from steel, light spring load									
6	3	10	7.0	4.0	1.0	6	250	0.6	22150.0010
10	5	20	11.0	6.7	1.6	10	250	2.6	22150.0020
	6	40	11.0	10.7	2.0	10	250	3.4	22150.0025
12	8	50	13.5	13.6	2.6	12	250	6.8	22150.0030
16	10	100	18.0	16.7	3.2	16	250	14.0	22150.0040
pin: steel/pin from steel, standard spring load									
6	3	20	7.0	4.0	1.0	6	250	0.6	22150.0011
10	5	50	11.0	6.7	1.6	10	250	2.8	22150.0021
	6	75	11.0	10.7	2.0	10	250	3.6	22150.0026
12	8	100	13.5	13.6	2.6	12	250	7.3	22150.0031
16	10	150	18.0	16.7	3.2	16	250	15.0	22150.0041
pin: steel/pin from steel, heavy spring load									
6	3	40	7.0	4.0	1.0	6	250	0.7	22150.0012
10	5	100	11.0	6.7	1.6	10	250	3.0	22150.0022
	6	100	11.0	10.7	2.0	10	250	3.9	22150.0027
12	8	150	13.5	13.6	2.6	12	250	7.8	22150.0032
16	10	200	18.0	16.7	3.2	16	250	15.0	22150.0042


¹⁾ statistical average value



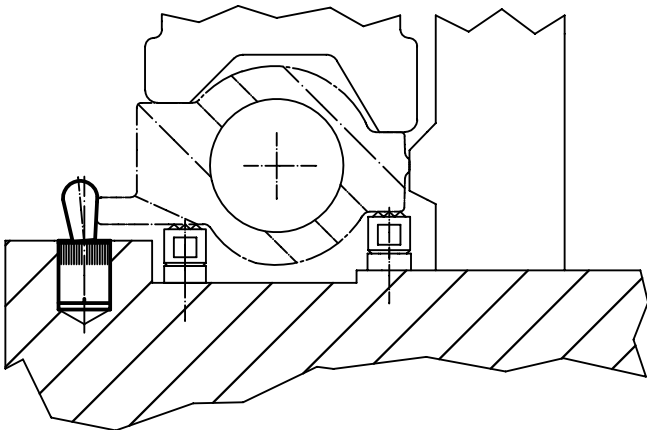
Dimensions		Spring load F max. ¹⁾ ~ [N]	Dimensions		Stroke s [mm]	Location hole D H8 [mm]	max. [°C]	[g]	Art. No.
d ₁ [mm]	d ₂ [mm]		l ₁ -1 [mm]	l ₂ ±0.5 [mm]					
pin: thermoplastic/pin from thermoplastic, light spring load									
6	3	10	7.0	4.0	1.0	6	80	0.3	22150.0050
10	5	20	11.0	6.7	1.6	10	80	1.3	22150.0060
	6	40	11.0	10.7	2.0	10	80	1.5	22150.0062
12	8	50	13.5	13.9	2.6	12	80	2.9	22150.0070
16	10	100	18.0	16.7	3.2	16	80	6.6	22150.0080

¹⁾ statistical average value

ACCESSORIES

	Dimensions d ₁ [mm]	[g]	Art. No.
assembly tool			
	6	19	22150.0830
	10	49	22150.0831
	12	86	22150.0832
	16	105	22150.0833

APPLICATION EXAMPLE



Lateral Plungers • smooth, with seal

EH 22150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting. Sealed against chips and dirt.

Material

Seal
 ■ CR

Body
 ■ Aluminium Al

Spring
 ■ Stainless steel
 ■ Steel, blackened
 ■ Steel, zinc-plated by galvanization

Pin
 ■ Steel, case-hardened, zinc-plated by galvanization
 ■ Thermoplastic POM, white

Assembly

Installation by pressing in.
 Formula for calculating the center distance for the mounting hole:
 $l_0 = z/2 + w + x$,
 l_0 = center distance,
 y = workpiece height,

w = workpiece length,
 x = coordinate dimension,
 s = stroke,
 z = stop diameter
 Calculation dimension x :
 y greater than or equal to $l_2 - d_2/2$,
 then $x = d_2/2 - s$
 or
 y smaller than $l_2 - d_2/2$,
 then $x = d_2/2 - s - [(l_2 - d_2/2 - y) * 0,123]$

Characteristic

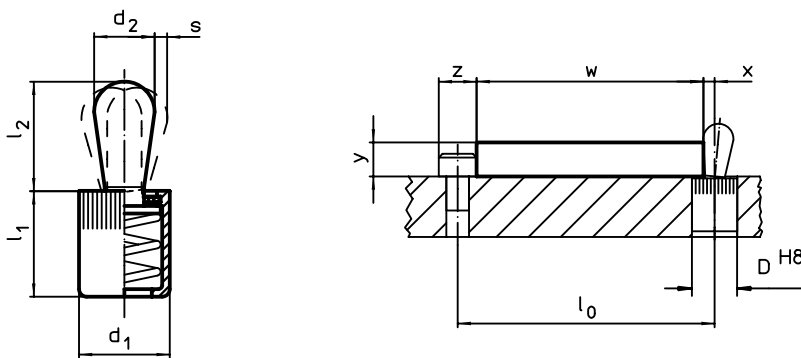
Version light spring load = spring from stainless steel
 Version standard spring load = spring from steel, blackened
 Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

Further products

Eccentric Mounting Bushings, for lateral plungers, smooth → p. 163

DRAWING



ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ [N]	Dimensions		Stroke s [mm]	Location hole D H8 [mm]	max. [°C]	[g]	Art. No.
d ₁ [mm]	d ₂ [mm]		l ₁ -2 [mm]	l ₂ ±0.5 [mm]					
pin: steel/pin from steel, light spring load									
6	3	10	7.5	4.0	1.0	6	110	0.6	22150.0110
10	5	20	12.0	6.3	1.6	10	110	2.6	22150.0120
	6	40	12.0	10.3	2.0	10	110	3.5	22150.0125
12	8	50	14.5	13.2	2.6	12	110	6.9	22150.0130
16	10	100	18.5	16.4	3.2	16	110	15.0	22150.0140
pin: steel/pin from steel, standard spring load									
6	3	20	7.5	4.0	1.0	6	110	0.6	22150.0111
10	5	50	12.0	6.3	1.6	10	110	2.9	22150.0121
	6	75	12.0	10.3	2.0	10	110	3.6	22150.0126
12	8	100	14.5	13.2	2.6	12	110	7.5	22150.0131
16	10	150	18.5	16.4	3.2	16	110	15.0	22150.0141
pin: steel/pin from steel, heavy spring load									
6	3	40	7.5	4.0	1.0	6	110	0.7	22150.0112
10	5	100	12.0	6.3	1.6	10	110	3.0	22150.0122
	6	100	12.0	10.3	2.0	10	110	3.9	22150.0127
12	8	150	14.5	13.2	2.6	12	110	7.9	22150.0132
16	10	200	18.5	16.4	3.2	16	110	16.0	22150.0142


¹⁾ statistical average value



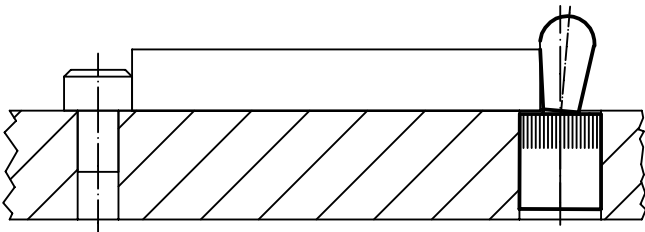
Dimensions		Spring load F max. ¹⁾ ~ [N]	Dimensions		Stroke s [mm]	Location hole D H8 [mm]	max. [°C]	[g]	Art. No.
d ₁ [mm]	d ₂ [mm]		l ₁ -2 [mm]	l ₂ ±0.5 [mm]					
pin: thermoplastic/pin from thermoplastic, light spring load									
6	3	10	7.5	4.0	1.0	6	80	0.4	22150.0150
10	5	20	12.0	6.3	1.6	10	80	1.4	22150.0160
	6	40	12.0	10.3	2.0	10	80	1.6	22150.0165
12	8	50	14.5	13.5	2.6	12	80	2.9	22150.0170
16	10	100	18.5	16.4	3.2	16	80	7.3	22150.0180

¹⁾ statistical average value

ACCESSORIES

	Dimensions d ₁ [mm]	[g]	Art. No.
assembly tool			
	6	19	22150.0830
	10	49	22150.0831
	12	86	22150.0832
	16	105	22150.0833

APPLICATION EXAMPLE



Lateral Plungers • with plastic spring and pin

EH 22150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting.

Material

- Spring
 - Plastic

Pin

- Steel, case-hardened, blackened
- Stainless steel
- Thermoplastic POM, white

Assembly

It is recommended to moisten the body.
Installation by pressing in.
Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

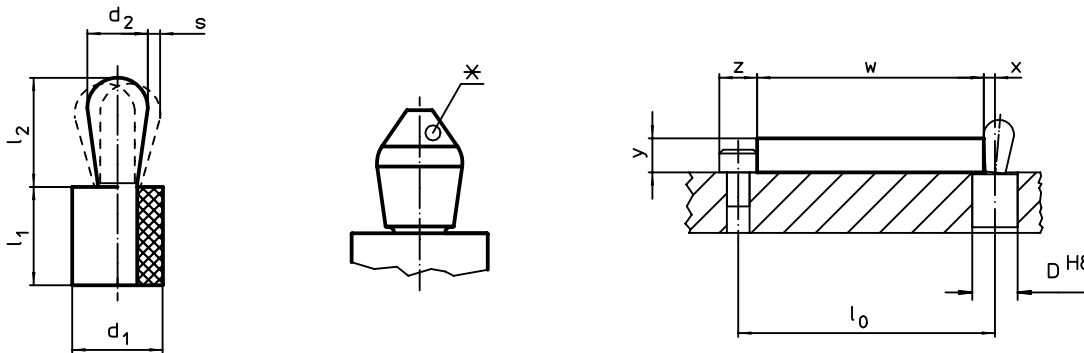
$$l_0 = \text{center distance,}$$

y = workpiece height,
w = workpiece length,
x = coordinate dimension,
s = stroke,
z = stop diameter
Calculation dimension x:
y greater than or equal to $l_2 - d_2/2$,
then $x = d_2/2 - s$
or
y smaller than $l_2 - d_2/2$,
then $x = d_2/2 - s - [(l_2 - d_2/2 - y) * 0,123]$

Characteristic

Version light spring load = blue spring
Version standard spring load = red spring
Version heavy spring load = green spring

DRAWING



*some sizes (see chart) have a deviating pin shape

ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ ~ [N]	Dimensions		Stroke s [mm]	Location hole D H8 [mm]	max. [°C]	[g]	Art. No.
d ₁	d ₂		l ₁ -1	l ₂ ±0.5					
[mm]			[mm]						
pin: steel/pin from steel, light spring load									
6	3	10	7	3.7	0.4	5.9	100	0.5	22150.0200 ²⁾
8	4	15	9	5.2	0.6	7.9	100	1.2	22150.0202
10	5	30	9	7.3	0.8	9.9	100	2.1	22150.0204
	6	20	9	10.3	1.0	9.9	100	2.9	22150.0207
pin: steel/pin from steel, standard spring load									
6	3	20	7	3.7	0.4	5.9	100	0.5	22150.0201 ²⁾
8	4	30	9	5.2	0.6	7.9	100	1.2	22150.0203
10	5	60	9	7.3	0.8	9.9	100	2.1	22150.0205
	6	30	9	10.3	1.0	9.9	100	2.9	22150.0208
12	8	50	13	13.3	1.2	11.9	100	6.8	22150.0211
16	10	80	16	16.9	1.6	15.9	100	14.0	22150.0213
pin: steel/pin from steel, heavy spring load									
10	5	90	9	7.3	0.8	9.9	100	2.1	22150.0206
	6	60	9	10.3	1.0	9.9	100	2.9	22150.0209
12	8	100	13	13.3	1.2	11.9	100	6.8	22150.0212
16	10	160	16	16.9	1.6	15.9	100	15.0	22150.0214

¹⁾ statistical average value

²⁾ deviating pin shape (see drawing)




Dimensions		Spring load F max. ¹⁾ ~ [N]	Dimensions		Stroke s [mm]	Location hole D H8 [mm]	max. [°C]	[g]	Art. No.
d ₁ [mm]	d ₂ [mm]		l ₁ -1 [mm]	l ₂ ±0.5 [mm]					
pin: stainless steel/pin from stainless steel, light spring load									
6	3	10	7	3.7	0.4	5.9	100	0.5	22150.0215²⁾
8	4	15	9	5.2	0.6	7.9	100	1.2	22150.0217
10	5	30	9	7.3	0.8	9.9	100	2.1	22150.0219
	6	20	9	10.3	1.0	9.9	100	2.9	22150.0222
pin: stainless steel/pin from stainless steel, standard spring load									
6	3	20	7	3.7	0.4	5.9	100	0.5	22150.0216²⁾
8	4	30	9	5.2	0.6	7.9	100	1.2	22150.0218
10	5	60	9	7.3	0.8	9.9	100	2.1	22150.0220
	6	30	9	10.3	1.0	9.9	100	2.9	22150.0223
12	8	50	13	13.3	1.2	11.9	100	6.8	22150.0226
16	10	80	16	16.9	1.6	15.9	100	15.0	22150.0228
pin: stainless steel/pin from stainless steel, heavy spring load									
10	5	90	9	7.3	0.8	9.9	100	2.1	22150.0221
	6	60	9	10.3	1.0	9.9	100	2.9	22150.0224
12	8	100	13	13.2	1.2	11.9	100	6.8	22150.0227
16	10	160	16	16.6	1.6	15.9	100	15.0	22150.0229
pin: thermoplastic/pin from thermoplastic, light spring load									
6	3	10	7	3.7	0.4	5.9	80	0.3	22150.0230²⁾
8	4	15	9	5.2	0.6	7.9	80	0.6	22150.0232
10	5	30	9	7.3	0.8	9.9	80	1.0	22150.0234
	6	20	9	10.3	1.0	9.9	80	1.1	22150.0237
pin: thermoplastic/pin from thermoplastic, standard spring load									
6	3	20	7	3.7	0.4	5.9	80	0.3	22150.0231²⁾
8	4	30	9	5.2	0.6	7.9	80	0.6	22150.0233
10	5	60	9	7.3	0.8	9.9	80	1.0	22150.0235
	6	30	9	10.3	1.0	9.9	80	1.1	22150.0238
12	8	50	13	13.3	1.2	11.9	80	2.3	22150.0240
16	10	80	16	16.9	1.6	15.9	80	4.9	22150.0242
pin: thermoplastic/pin from thermoplastic, heavy spring load									
10	5	90	9	7.3	0.8	9.9	80	1.0	22150.0236
	6	60	9	10.3	1.0	9.9	80	1.1	22150.0239
12	8	100	13	13.3	1.2	11.9	80	2.3	22150.0241
16	10	160	16	16.9	1.6	15.9	80	5.1	22150.0243

¹⁾ statistical average value

²⁾ deviating pin shape (see drawing)

ACCESSORIES

	Dimensions d ₁ [mm]	[g]	Art. No.
assembly tool			
	6	23	22150.0840
	8	47	22150.0841
	10	46	22150.0842
	12	96	22150.0843
	16	145	22150.0844

Lateral Plungers • smooth, without seal, with female thread

EH 22150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting.

Material

Body

- Aluminium Al

Threaded washer

- Steel, blackened

Spring

- Stainless steel
- Steel, blackened
- Steel, zinc-plated by galvanization

Assembly

Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

l_0 = center distance,

y = workpiece height,

w = workpiece length,

x = stroke,

z = stop diameter

Calculation dimension x for workpieces:

$$x = d_2/2 - s$$

Installation by pressing in.

Characteristic

Version light spring load = spring from stainless steel

Version standard spring load = spring from steel, blackened

Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

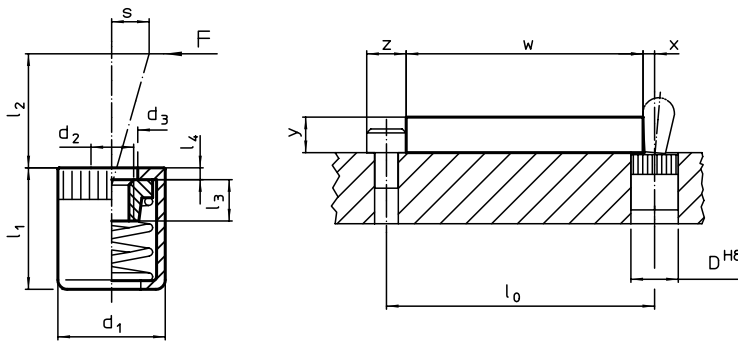
Notes

Individual set screws can be screwed in the plate with threaded hole.

Further products

Eccentric Mounting Bushings, for lateral plungers, smooth → p. 163

DRAWING



ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾	d ₃	Dimensions				Stroke s	Location hole D H8	max. °C	g	Art. No.
d ₁	d ₂			l ₁ -1	l ₂	l ₃	l ₄					
[mm]		[N]		[mm]				[mm]	[mm]	[°C]	[g]	
light spring load												
10	M4	20	6.3	11	2.5	4.5	1.2	1.6	10	250	1.8	22150.1020
		40	6.3	11	7.5	4.5	1.2	2.0	10	250	1.9	22150.1025
16	M6	100	10.2	18	11.5	7.5	1.7	3.2	16	250	9.4	22150.1040
standard spring load												
10	M4	50	6.3	11	2.5	4.5	1.2	1.6	10	250	2.1	22150.1021
		75	6.3	11	7.5	4.5	1.2	2.0	10	250	2.1	22150.1026
16	M6	150	10.2	18	11.5	7.5	1.7	3.2	16	250	9.4	22150.1041
heavy spring load												
10	M4	100	6.3	11	2.5	4.5	1.2	1.6	10	250	2.3	22150.1022
					7.5	4.5	1.2	2.0	10	250	2.5	22150.1027
16	M6	200	10.2	18	11.5	7.5	1.7	3.2	16	250	9.3	22150.1042

¹⁾ statistical average value

ACCESSORIES

	Dimensions		Art. No.
	d ₁		
	[mm]	[g]	
assembly tool			
	10	49	22150.0831
	16	105	22150.0833



Lateral Plungers • smooth, with seal, with female thread

EH 22150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting. Sealed against chips and dirt.

Material

Seal
▪ CR

Body
▪ Aluminium Al

Threaded washer
▪ Steel, blackened

Spring
▪ Stainless steel
▪ Steel, blackened
▪ Steel, zinc-plated by galvanization

Assembly

Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

l_0 = center distance,
 y = workpiece height,
 w = workpiece length,

x = stroke,
 z = stop diameter
Calculation dimension x for workpieces:
 $x = d_z/2 - s$
Installation by pressing in.

Characteristic

Version light spring load = spring from stainless steel
Version standard spring load = spring from steel, blackened
Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

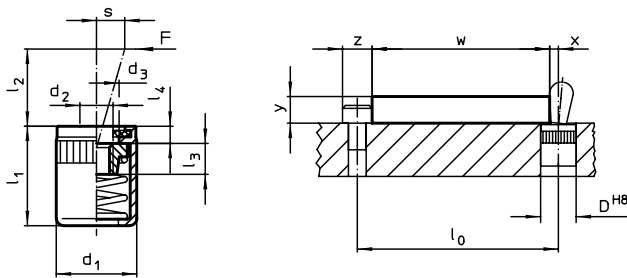
Notes

Individual set screws can be screwed in the plate with threaded hole.

Further products

Eccentric Mounting Bushings, for lateral plungers, smooth → p. 163

DRAWING



ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ ~ [N]	Dimensions				Stroke s [mm]	Location hole D H8 [mm]	max. [°C]	[g]	Art. No.	
d ₁ [mm]	d ₂ [mm]		d ₃ [mm]	l ₁₋₂ [mm]	l ₂ [mm]	l ₃ [mm]						l ₄ [mm]
light spring load												
10	M4	20	6.3	12.0	2.5	4.5	1.8	1.6	10	110	1.9	22150.1120
		40	6.3	12.0	7.5	4.5	1.8	2.0	10	110	2.0	22150.1125
16	M6	100	10.2	18.5	11.5	7.5	2.0	3.2	16	110	9.6	22150.1140
standard spring load												
10	M4	50	6.3	12.0	2.5	4.5	1.8	1.6	10	110	2.2	22150.1121
		75	6.3	12.0	7.5	4.5	1.8	2.0	10	110	2.2	22150.1126
16	M6	150	10.2	18.5	11.5	7.5	2.0	3.2	16	110	9.5	22150.1141
heavy spring load												
10	M4	100	6.3	12.0	2.5	4.5	1.8	1.6	10	110	2.3	22150.1122
					7.5	4.5	1.8	2.0	10	110	2.5	22150.1127
16	M6	200	10.2	18.5	11.5	7.5	2.0	3.2	16	110	10.0	22150.1142

¹⁾ statistical average value

ACCESSORIES

	Dimensions d ₁ [mm]	[g]	Art. No.
assembly tool			
	10	49	22150.0831
	16	105	22150.0833

Eccentric Mounting Bushings • for lateral plungers, smooth EH 22150.



PRODUCT DESCRIPTION

The eccentric mounting bushing is used in conjunction with smooth lateral plungers EH 22150. for positioning or clamping workpieces with large tolerances.

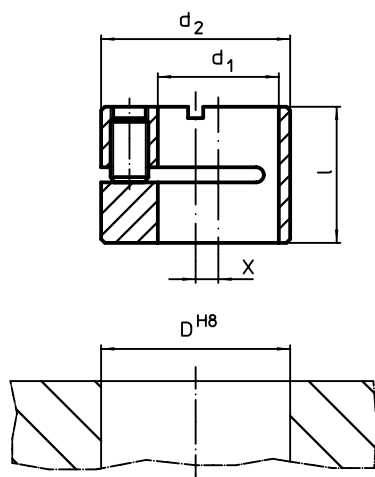
Material

- Body**
- Steel, blackened


Assembly

Mounting and position determination by means of clamping with threaded pin.

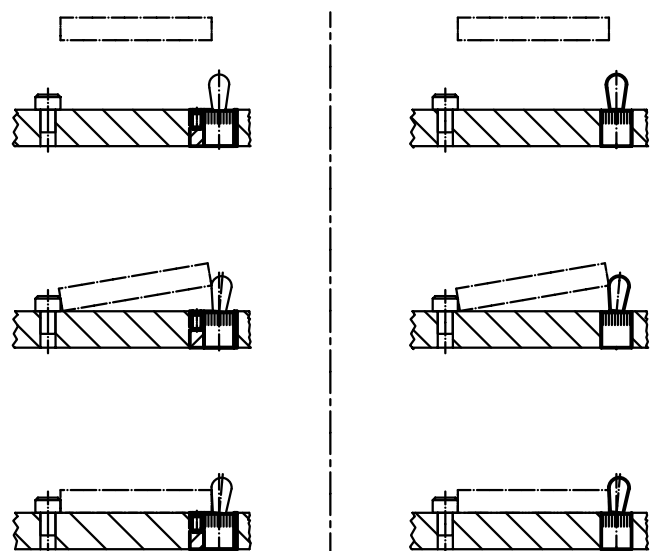
DRAWING



ORDER INFORMATION

d_1 H8	Dimensions			x	Location hole D H8		Art. No.
	d_2 h9	l	[mm]				
6	12	9.9		2	12	5.5	22150.0806
10	16	11.9		2	16	9.5	22150.0810
12	18	13.9		2	18	13.0	22150.0812
16	25	17.9		3	25	35.0	22150.0816

APPLICATION EXAMPLE



Lateral Plungers • with thread, without seal

EH 22150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting.

Material

Body

- Steel, zinc-plated by galvanization

Spring

- Stainless steel
- Steel, blackened
- Steel, zinc-plated by galvanization

Pin

- Steel, case-hardened, zinc-plated by galvanization
- Thermoplastic POM, white

Assembly

Lateral plungers are installed by screwing in by means of a mounting tool.

Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

l_0 = center distance,

y = workpiece height,

w = workpiece length,

x = coordinate dimension,

s = stroke,

z = stop diameter

Calculation dimension x :

y greater than or equal to $l_2 - d_2/2$,

then $x = d_2/2 - s$

or

y smaller than $l_2 - d_2/2$,

then $x = d_2/2 - s - [(l_2 - d_2/2 - y) * 0,123]$

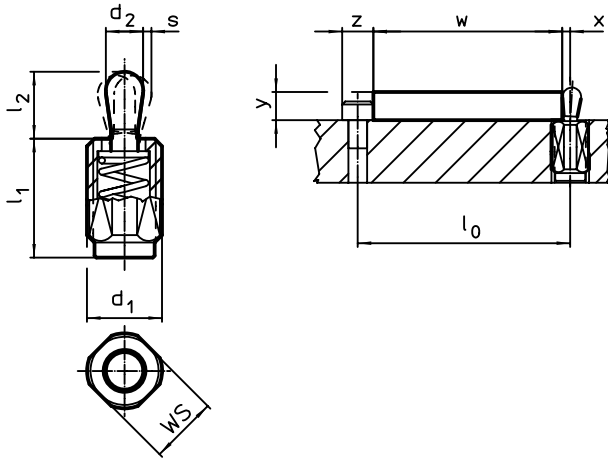
Characteristic

Version light spring load = spring from stainless steel

Version standard spring load = spring from steel, blackened

Version heavy spring load = spring from steel, zinc-plated by galvanization

DRAWING



ORDER INFORMATION

d_1	l_1 -2	Dimensions Spring load F max. ¹⁾ ~	d_2	l_2	Stroke s	WS	max. [°C]	[g]	Art. No.
pin: steel/light spring load									
M12	11.5	20	5	6.4	1.6	10	250	4.0	22150.0310
	19.0	20	5	6.4	1.6	10	250	5.9	22150.0314
	26.5	20	5	6.4	1.6	10	250	7.9	22150.0318
	11.5	40	6	10.4	2.0	10	250	4.8	22150.0330
	19.0	40	6	10.4	2.0	10	250	6.6	22150.0334
	26.5	40	6	10.4	2.0	10	250	8.6	22150.0338
M18 x 1,5	18.0	100	10	16.9	3.2	16	250	19.0	22150.0350
	31.5	100	10	16.9	3.2	16	250	28.0	22150.0354
	45.0	100	10	16.9	3.2	16	250	36.0	22150.0358


¹⁾ statistical average value



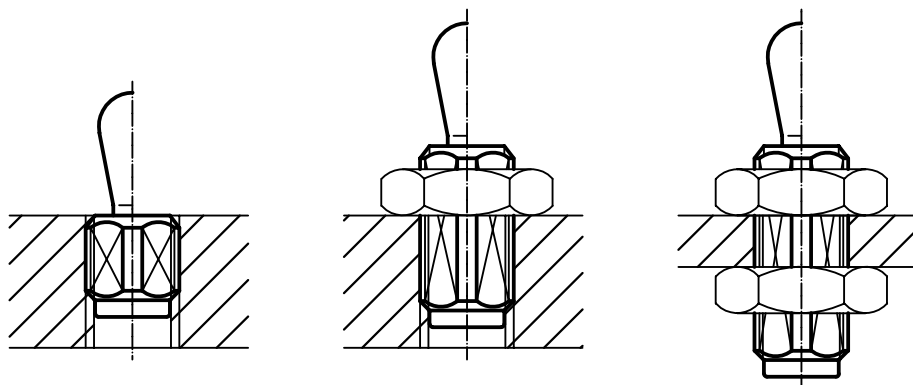
d ₁	l ₁ -2	Dimensions			Stroke s	WS	max. °C	g	Art. No.
		Spring load F max. ¹⁾ ~	d ₂	l ₂					
[mm]		[N]	[mm]	[mm]	[mm]	[mm]	[°C]	[g]	
pin: steel/standard spring load									
M12	11.5	50	5	6.4	1.6	10	250	4.1	22150.0311
	19.0	50	5	6.4	1.6	10	250	6.4	22150.0315
	26.5	50	5	6.4	1.6	10	250	8.3	22150.0319
	11.5	75	6	10.4	2.0	10	250	4.9	22150.0331
	19.0	75	6	10.4	2.0	10	250	7.1	22150.0335
	26.5	75	6	10.4	2.0	10	250	9.6	22150.0339
M18 x 1,5	18.0	150	10	16.9	3.2	16	250	20.0	22150.0351
	31.5	150	10	16.9	3.2	16	250	29.0	22150.0355
	45.0	150	10	16.9	3.2	16	250	39.0	22150.0359
pin: steel/heavy spring load									
M12	11.5	100	5	6.4	1.6	10	250	4.4	22150.0312
	19.0	100	5	6.4	1.6	10	250	6.9	22150.0316
	26.5	100	5	6.4	1.6	10	250	9.0	22150.0320
	11.5	100	6	10.4	2.0	10	250	5.4	22150.0332
	19.0	100	6	10.4	2.0	10	250	7.7	22150.0336
	26.5	100	6	10.4	2.0	10	250	10.0	22150.0340
M18 x 1,5	18.0	200	10	16.9	3.2	16	250	21.0	22150.0352
	31.5	200	10	16.9	3.2	16	250	30.0	22150.0356
	45.0	200	10	16.9	3.2	16	250	40.0	22150.0360
pin: thermoplastic/light spring load									
M12	11.5	20	5	6.4	1.6	10	80	2.7	22150.0370
	19.0	20	5	6.4	1.6	10	80	4.6	22150.0375
	26.5	20	5	6.4	1.6	10	80	6.5	22150.0383
	11.5	40	6	10.4	2.0	10	80	3.1	22150.0373
	19.0	40	6	10.4	2.0	10	80	4.8	22150.0380
	26.5	40	6	10.4	2.0	10	80	6.8	22150.0385
M18 x 1,5	18.0	100	10	16.9	3.2	16	80	12.0	22150.0390
	31.5	100	10	16.9	3.2	16	80	20.0	22150.0393
	45.0	100	10	16.9	3.2	16	80	30.0	22150.0395

¹⁾ statistical average value

ACCESSORIES

	Dimensions		g	Art. No.
	d ₁			
	[mm]			
assembly tool				
	M12		76	22150.0820
	M18 x 1,5		137	22150.0822

APPLICATION EXAMPLE



Lateral Plungers • with thread, with seal

EH 22150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting. Sealed against chips and dirt.

Material

Seal

- CR

Body

- Steel, zinc-plated by galvanization

Spring

- Stainless steel
- Steel, blackened
- Steel, zinc-plated by galvanization

Pin

- Steel, case-hardened, zinc-plated by galvanization
- Thermoplastic POM, white

Assembly

Lateral plungers are installed by screwing in by means of a mounting tool.

Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

l_0 = center distance,

y = workpiece height,

w = workpiece length,

x = coordinate dimension,

s = stroke,

z = stop diameter

Calculation dimension x :

y greater than or equal to $l_2 - d_2/2$,

then $x = d_2/2 - s$

or

y smaller than $l_2 - d_2/2$,

then $x = d_2/2 - s - [(l_2 - d_2/2 - y) * 0,123]$

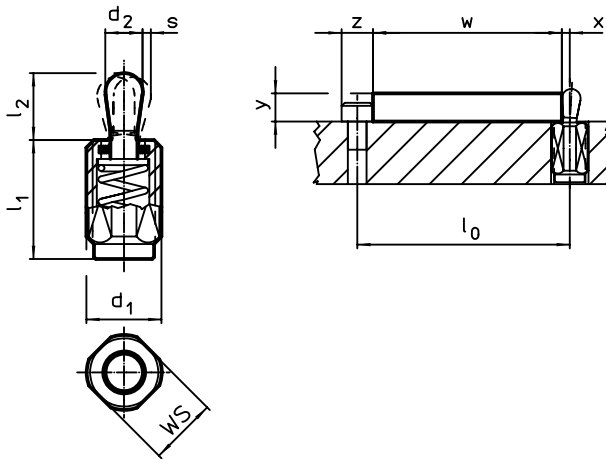
Characteristic

Version light spring load = spring from stainless steel

Version standard spring load = spring from steel, blackened

Version heavy spring load = spring from steel, zinc-plated by galvanization

DRAWING



ORDER INFORMATION

d_1	l_{1-2}	Dimensions Spring load F max. ¹⁾ ~ [N]	d_2	l_2	Stroke s [mm]	WS [mm]	max. [°C]	WS [g]	Art. No.
pin: steel/light spring load									
M12	11.5	20	5	6	0.8	10	110	3.8	22150.0410
	19.0	20	5	6	0.8	10	110	5.6	22150.0414
	26.5	20	5	6	0.8	10	110	7.5	22150.0418
	11.5	40	6	10	1.0	10	110	4.7	22150.0430
	19.0	40	6	10	1.0	10	110	6.5	22150.0434
	26.5	40	6	10	1.0	10	110	8.3	22150.0438
M18 x 1,5	18.0	100	10	16	1.6	16	110	20.0	22150.0450
	31.5	100	10	16	1.6	16	110	28.0	22150.0454
	45.0	100	10	16	1.6	16	110	36.0	22150.0458


¹⁾ statistical average value



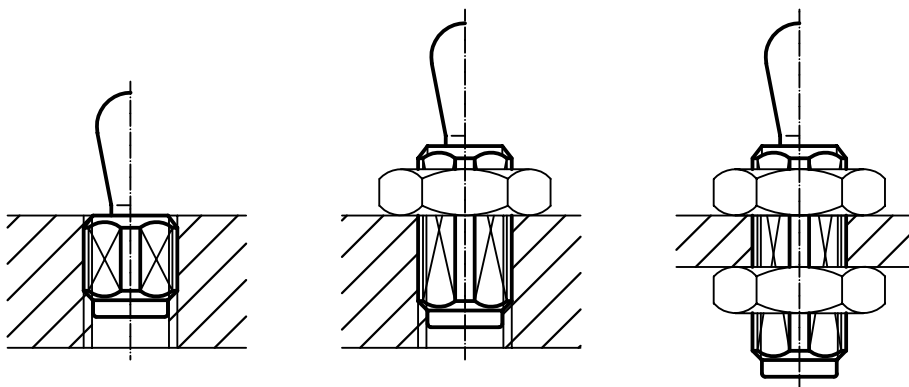
d ₁	l ₁ -2	Dimensions			Stroke s	WS	max. °C	g	Art. No.
		Spring load F max. ¹⁾ ~	d ₂	l ₂					
[mm]		[N]	[mm]	[mm]	[mm]	[mm]	[°C]	[g]	
pin: steel/standard spring load									
M12	11.5	50	5	6	0.8	10	110	4.1	22150.0411
	19.0	50	5	6	0.8	10	110	6.3	22150.0415
	26.5	50	5	6	0.8	10	110	8.1	22150.0419
	11.5	75	6	10	1.0	10	110	4.8	22150.0431
	19.0	75	6	10	1.0	10	110	6.9	22150.0435
	26.5	75	6	10	1.0	10	110	8.9	22150.0439
M18 x 1,5	18.0	150	10	16	1.6	16	110	20.0	22150.0451
	31.5	150	10	16	1.6	16	110	29.0	22150.0455
	45.0	150	10	16	1.6	16	110	40.0	22150.0459
pin: steel/heavy spring load									
M12	11.5	100	5	6	0.8	10	110	4.2	22150.0412
	19.0	100	5	6	0.8	10	110	6.6	22150.0416
	26.5	100	5	6	0.8	10	110	8.7	22150.0420
	11.5	100	6	10	1.0	10	110	5.4	22150.0432
	19.0	100	6	10	1.0	10	110	7.6	22150.0436
	26.5	100	6	10	1.0	10	110	10.0	22150.0440
M18 x 1,5	18.0	200	10	16	1.6	16	110	20.0	22150.0452
	31.5	200	10	16	1.6	16	110	29.0	22150.0456
	45.0	200	10	16	1.6	16	110	38.0	22150.0460
pin: thermoplastic/light spring load									
M12	11.5	20	5	6	0.8	10	80	2.6	22150.0470
	19.0	20	5	6	0.8	10	80	4.4	22150.0475
	26.5	20	5	6	0.8	10	80	6.1	22150.0483
	11.5	40	6	10	1.0	10	80	2.7	22150.0473
	19.0	40	6	10	1.0	10	80	4.5	22150.0480
	26.5	40	6	10	1.0	10	80	6.2	22150.0485
M18 x 1,5	18.0	100	10	16	1.6	16	80	12.0	22150.0490
	31.5	100	10	16	1.6	16	80	21.0	22150.0493
	45.0	100	10	16	1.6	16	80	30.0	22150.0495

¹⁾ statistical average value

ACCESSORIES

	Dimensions		Art. No.
	d ₁ [mm]	[g]	
assembly tool			
	M12	76	22150.0820
	M18 x 1,5	137	22150.0822

APPLICATION EXAMPLE



Lateral Plungers • with thread, without seal, with female thread

EH 22150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting.

Material

- Steel, zinc-plated

Threaded washer

- Steel, blackened

Spring

- Stainless steel
- Steel, blackened
- Steel, zinc-plated by galvanization

Assembly

Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

l_0 = center distance,

y = workpiece height,

w = workpiece length,

x = stroke,

z = stop diameter

Calculation dimension x for workpieces:

$$x = d_2/2 - s$$

Lateral plungers are installed by screwing in by means of a mounting tool.

Characteristic

Version light spring load = spring from stainless steel

Version standard spring load = spring from steel, blackened

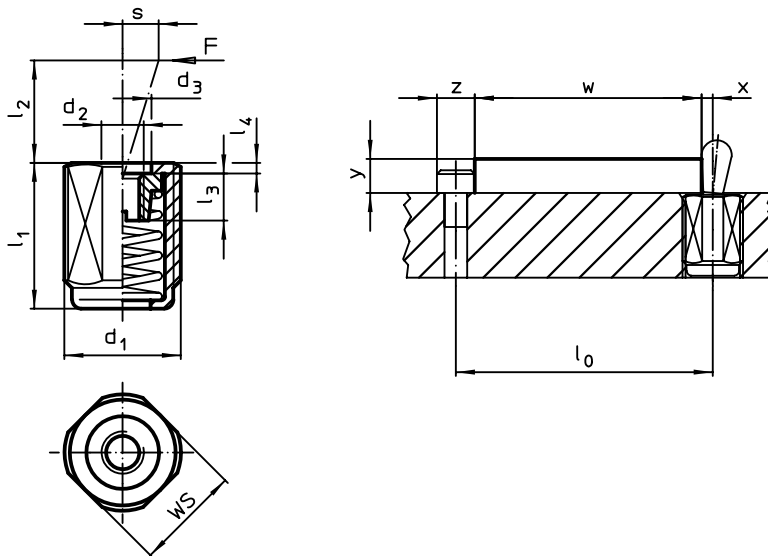
Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

Notes

Individual set screws can be screwed in the plate with threaded hole.

DRAWING



ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ ~	Dimensions					Stroke s	WS	max. [°C]	[g]	Art. No.
d ₁	l ₁₋₂		d ₂	d ₃	l ₂	l ₃	l ₄					
[mm]	[mm]	[N]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[°C]	[g]		
light spring load												
M12	11.5	20	M4	6.1	4.0	4.5	1.5	1.6	10	250	3.2	22150.1310
	19.0	20	M4	6.1	4.0	4.5	1.5	1.6	10	250	5.1	22150.1314
	26.5	20	M4	6.1	4.0	4.5	1.5	1.6	10	250	6.9	22150.1318
	11.5	40	M4	6.1	7.5	4.5	1.5	2.0	10	250	3.3	22150.1330
	19.0	40	M4	6.1	7.5	4.5	1.5	2.0	10	250	5.2	22150.1334
M18 x 1,5	26.5	40	M4	6.1	7.5	4.5	1.5	2.0	10	250	6.9	22150.1338
	18.0	100	M6	10.1	11.5	7.5	1.5	3.2	16	250	15.0	22150.1350
	31.5	100	M6	10.1	11.5	7.5	1.5	3.2	16	250	23.0	22150.1354
	45.0	100	M6	10.1	11.5	7.5	1.5	3.2	16	250	32.0	22150.1358


¹⁾ statistical average value



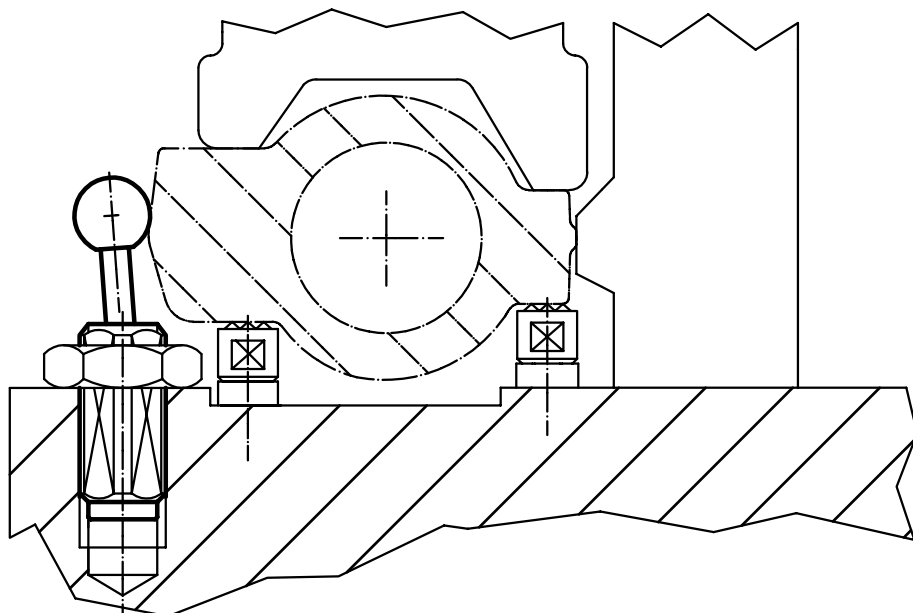
Dimensions		Spring load F max. ¹⁾ ~ [N]	Dimensions					Stroke s [mm]	WS [mm]	max. [°C]	[g]	Art. No.
d ₁ [mm]	l ₁₋₂ [mm]		d ₂ [mm]	d ₃ [mm]	l ₂ [mm]	l ₃ [mm]	l ₄ [mm]					
standard spring load												
M12	11.5	50	M4	6.1	4.0	4.5	1.5	1.6	10	250	3.5	22150.1311
	19.0	50	M4	6.1	4.0	4.5	1.5	1.6	10	250	5.6	22150.1315
	26.5	50	M4	6.1	4.0	4.5	1.5	1.6	10	250	7.5	22150.1319
	11.5	75	M4	6.1	7.5	4.5	1.5	2.0	10	250	3.5	22150.1331
	19.0	75	M4	6.1	7.5	4.5	1.5	2.0	10	250	5.6	22150.1335
	26.5	75	M4	6.1	7.5	4.5	1.5	2.0	10	250	7.7	22150.1339
M18 x 1,5	18.0	150	M6	10.1	11.5	7.5	1.5	3.2	16	250	15.0	22150.1351
	31.5	150	M6	10.1	11.5	7.5	1.5	3.2	16	250	23.0	22150.1355
	45.0	150	M6	10.1	11.5	7.5	1.5	3.2	16	250	32.0	22150.1359
heavy spring load												
M12	11.5	100	M4	6.1	4.0	4.5	1.5	1.6	10	250	3.7	22150.1312
	19.0	100	M4	6.1	4.0	4.5	1.5	1.6	10	250	6.0	22150.1316
	26.5	100	M4	6.1	4.0	4.5	1.5	1.6	10	250	8.2	22150.1320
	11.5	100	M4	6.1	7.5	4.5	1.5	2.0	10	250	3.9	22150.1332
	19.0	100	M4	6.1	7.5	4.5	1.5	2.0	10	250	6.5	22150.1336
	26.5	100	M4	6.1	7.5	4.5	1.5	2.0	10	250	8.6	22150.1340
M18 x 1,5	18.0	200	M6	10.1	11.5	7.5	1.5	3.2	16	250	14.0	22150.1352
	31.5	200	M6	10.1	11.5	7.5	1.5	3.2	16	250	24.0	22150.1356
	45.0	200	M6	10.1	11.5	7.5	1.5	3.2	16	250	34.0	22150.1360

¹⁾ statistical average value

ACCESSORIES

	Dimensions d ₁ [mm]	[g]	Art. No.
assembly tool			
	M12	76	22150.0820
	M18 x 1,5	137	22150.0822

APPLICATION EXAMPLE



Lateral Plungers • with thread, with seal, with female thread

EH 22150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting. Sealed against chips and dirt.

Material

Seal
▪ CR

Body
▪ Steel, zinc-plated

Threaded washer
▪ Steel, blackened

Spring
▪ Stainless steel
▪ Steel, blackened
▪ Steel, zinc-plated by galvanization

Assembly

Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

l_0 = center distance,

y = workpiece height,

w = workpiece length,

x = stroke,

z = stop diameter

Calculation dimension x for workpieces:

$$x = d_2/2 - s$$

Lateral plungers are installed by screwing in by means of a mounting tool.

Characteristic

Version light spring load = spring from stainless steel

Version standard spring load = spring from steel, blackened

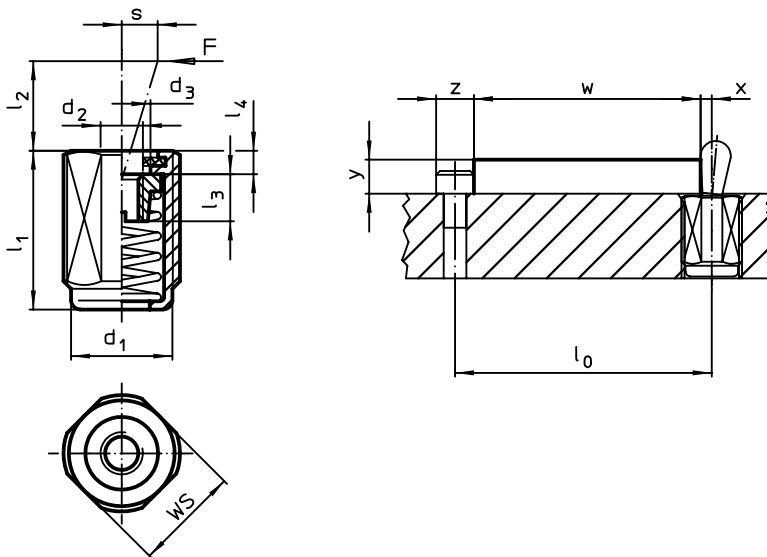
Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

Notes

Individual set screws can be screwed in the plate with threaded hole.

DRAWING



ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ ~	d ₂	d ₃	Dimensions			Stroke s	WS	max. [°C]	[g]	Art. No.
d ₁	l ₁₋₂				l ₂	l ₃	l ₄					
[mm]		[N]	[mm]					[mm]	[mm]	[°C]	[g]	
light spring load												
M12	11.5	20	M4	6.1	4.0	4.5	2.0	1.6	10	110	3.0	22150.1410
	19.0	20	M4	6.1	4.0	4.5	2.0	1.6	10	110	4.9	22150.1414
	26.5	20	M4	6.1	4.0	4.5	2.0	1.6	10	110	6.7	22150.1418
	11.5	40	M4	6.1	7.5	4.5	2.0	2.0	10	110	3.1	22150.1430
	19.0	40	M4	6.1	7.5	4.5	2.0	2.0	10	110	5.1	22150.1434
M18 x 1,5	26.5	40	M4	6.1	7.5	4.5	2.0	2.0	10	110	6.8	22150.1438
	18.0	100	M6	10.1	11.5	7.5	2.3	3.2	16	110	15.0	22150.1450
	31.5	100	M6	10.1	11.5	7.5	2.3	3.2	16	110	23.0	22150.1454
	45.0	100	M6	10.1	11.5	7.5	2.3	3.2	16	110	32.0	22150.1458


¹⁾ statistical average value



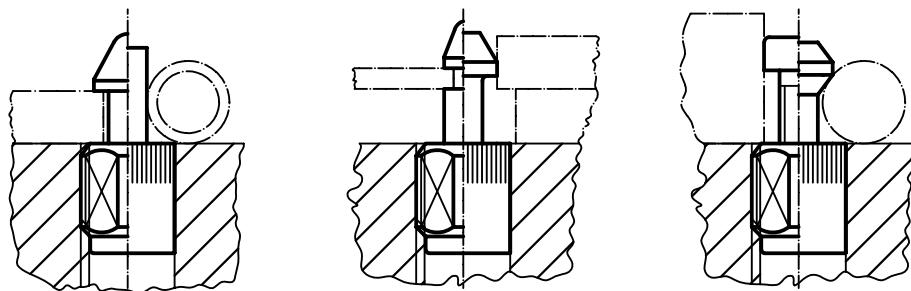
Dimensions		Spring load F max. ¹⁾ ~ [N]	Dimensions					Stroke s [mm]	WS [mm]	max. [°C]	[g]	Art. No.
d ₁ [mm]	l ₁₋₂ [mm]		d ₂ [mm]	d ₃ [mm]	l ₂ [mm]	l ₃ [mm]	l ₄ [mm]					
standard spring load												
M12	11.5	50	M4	6.1	4.0	4.5	2.0	1.6	10	110	3.3	22150.1411
	19.0	50	M4	6.1	4.0	4.5	2.0	1.6	10	110	5.4	22150.1415
	26.5	50	M4	6.1	4.0	4.5	2.0	1.6	10	110	7.3	22150.1419
	11.5	75	M4	6.1	7.5	4.5	2.0	2.0	10	110	3.3	22150.1431
	19.0	75	M4	6.1	7.5	4.5	2.0	2.0	10	110	5.5	22150.1435
	26.5	75	M4	6.1	7.5	4.5	2.0	2.0	10	110	7.4	22150.1439
M18 x 1,5	18.0	150	M6	10.1	11.5	7.5	2.3	3.2	16	110	14.0	22150.1451
	31.5	150	M6	10.1	11.5	7.5	2.3	3.2	16	110	23.0	22150.1455
	45.0	150	M6	10.1	11.5	7.5	2.3	3.2	16	110	32.0	22150.1459
heavy spring load												
M12	11.5	100	M4	6.1	4.0	4.5	2.0	1.6	10	110	3.5	22150.1412
	19.0	100	M4	6.1	4.0	4.5	2.0	1.6	10	110	5.8	22150.1416
	26.5	100	M4	6.1	4.0	4.5	2.0	1.6	10	110	8.0	22150.1420
	11.5	100	M4	6.1	7.5	4.5	2.0	2.0	10	110	3.5	22150.1432
	19.0	100	M4	6.1	7.5	4.5	2.0	2.0	10	110	6.2	22150.1436
	26.5	100	M4	6.1	7.5	4.5	2.0	2.0	10	110	8.6	22150.1440
M18 x 1,5	18.0	200	M6	10.1	11.5	7.5	2.3	3.2	16	110	15.0	22150.1452
	31.5	200	M6	10.1	11.5	7.5	2.3	3.2	16	110	23.0	22150.1456
	45.0	200	M6	10.1	11.5	7.5	2.3	3.2	16	110	32.0	22150.1460

¹⁾ statistical average value

ACCESSORIES

	Dimensions d ₁ [mm]	[g]	Art. No.
assembly tool			
	M12	76	22150.0820
	M18 x 1,5	137	22150.0822

APPLICATION EXAMPLE



Lateral Spring Plungers • with spring steel sheet

EH 22160.

2



PRODUCT DESCRIPTION

The lateral spring plunger with spring steel sheet guarantees a simple and secure positioning of workpieces or components at stops or fixture plates, e.g. in board mounting or before the clamping process in the jig and fixture construction.

The double-sided version allows for serial clamping. Below h_1 is resulting a down hold effect.

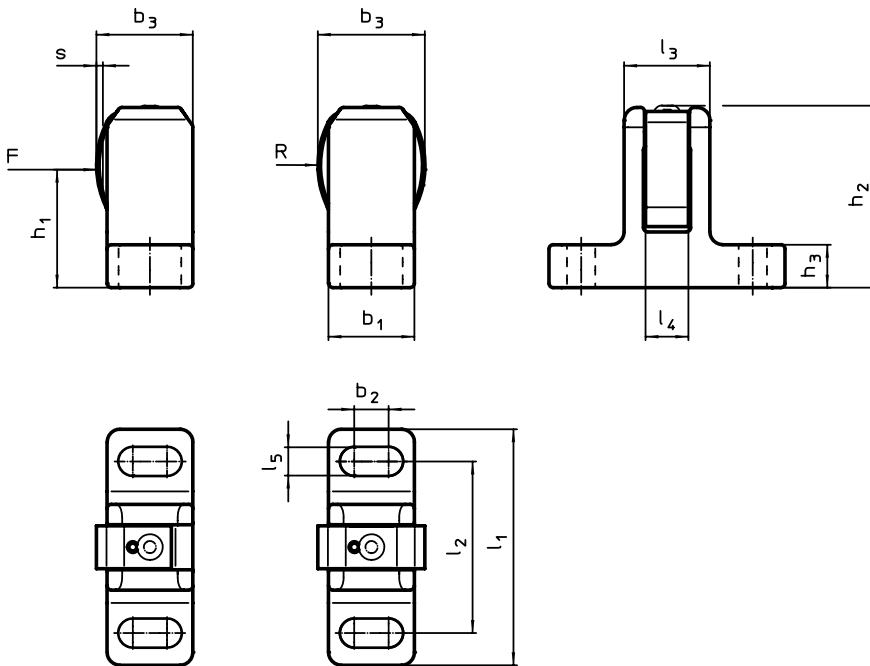
Material

- Spring element
 - Stainless steel

Body

- Steel, black

DRAWING



picture 1

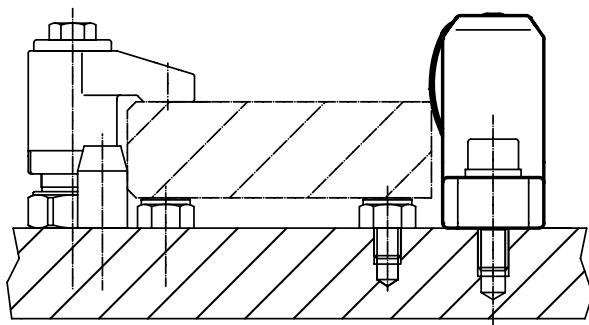
picture 2

ORDER INFORMATION

Dimensions													Stroke s	For screw	Spring load F max. ¹⁾ ~	max. °C	g	Art. No.
l_1 ± 1	l_2	l_3	l_4	l_5	b_1 ± 0.5	b_2	b_3 ~	h_1	h_2 ± 1	h_3	R							
[mm]													[mm]	[mm]	[N]	[°C]	[g]	
one-sided – picture 1																		
55	40	20	10	6.6	20	8	22.5	28.5	43.0	10	22.5	1.5	M 6	55	250	127	22160.0006	
72	50	23	12	13.5	25	6	29.0	40.5	61.5	15	32.8	1.5	M12	170	250	251	22160.0012	
double-sided – picture 2																		
55	40	20	10	6.6	20	8	25.0	28.5	42.5	10	22.5	1.5	M 6	55	250	128	22160.0206	
72	50	23	12	13.5	25	6	33.5	40.5	61.5	15	32.8	1.5	M12	170	250	256	22160.0212	

¹⁾ statistical average value

APPLICATION EXAMPLE



LATERAL PLUNGERS

INCH MODELS

Our premium-grade lateral plungers are also available as imperial versions. These models are available as press-in versions.



Lateral Plungers • smooth, without seal - INCH

EH 2B150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting.

Material

Body

- Aluminium Al

Spring

- Stainless steel
- Steel, blackened
- Steel, zinc-plated by galvanization

Pin

- Steel, case-hardened, zinc-plated by galvanization
- Thermoplastic POM, white

Assembly

Installation by pressing in.
Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

l_0 = center distance,

y = workpiece height,

w = workpiece length,

x = coordinate dimension,

s = stroke,

z = stop diameter

Calculation dimension x :

y greater than or equal to $l_2 - d_2/2$,

then $x = d_2/2 - s$

or

y smaller than $l_2 - d_2/2$,

then $x = d_2/2 - s - [(l_2 - d_2/2 - y) * 0,123]$

Characteristic

Version light spring load = spring from stainless steel

Version standard spring load = spring from steel, blackened

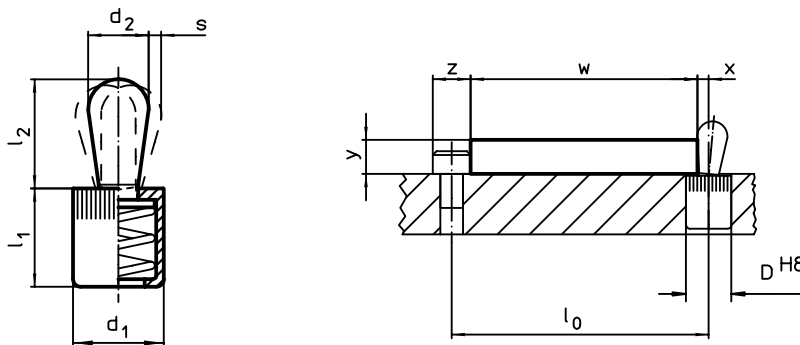
Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

Further products

Eccentric Mounting Bushings, for lateral plungers, smooth - INCH → p. 182

DRAWING



ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ [lb]	Dimensions		Stroke s [in]	Location hole D H8 [in]	max. [°F]	oz	Art. No.
d ₁	d ₂		l ₁ -0.08	l ₂					
[in]			[in]						
pin: steel/light spring load									
1/4	0.118	2.2	0.275	0.157	0.04	1/4	482	0.024	2B150.0010
7/16	0.197	4.5	0.433	0.263	0.06	7/16	482	0.107	2B150.0020
	0.236	9.0	0.433	0.421	0.08	7/16	482	0.137	2B150.0025
1/2	0.315	11.2	0.525	0.535	0.09	1/2	482	0.261	2B150.0030
5/8	0.393	22.5	0.669	0.657	0.12	5/8	482	0.527	2B150.0040
pin: steel/standard spring load									
1/4	0.118	4.5	0.275	0.157	0.04	1/4	482	0.024	2B150.0011
7/16	0.197	11.2	0.433	0.263	0.06	7/16	482	0.115	2B150.0021
	0.236	16.9	0.433	0.421	0.08	7/16	482	0.143	2B150.0026
1/2	0.315	22.5	0.525	0.535	0.09	1/2	482	0.277	2B150.0031
5/8	0.393	34.0	0.669	0.657	0.12	5/8	482	0.526	2B150.0041
pin: steel/heavy spring load									
1/4	0.118	9.0	0.275	0.157	0.04	1/4	482	0.025	2B150.0012
7/16	0.197	21.5	0.433	0.263	0.06	7/16	482	0.123	2B150.0022
	0.236	22.5	0.433	0.421	0.08	7/16	482	0.156	2B150.0027
1/2	0.315	34.0	0.525	0.535	0.09	1/2	482	0.292	2B150.0032
5/8	0.393	45.0	0.669	0.657	0.12	5/8	482	0.549	2B150.0042


¹⁾ statistical average value



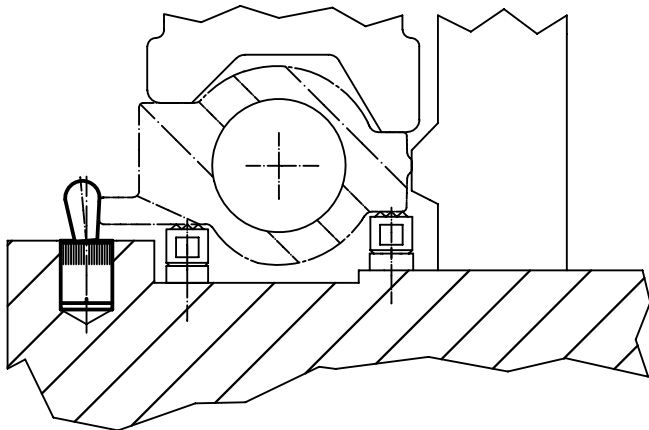
Dimensions		Spring load F max. ¹⁾ ~ [lb]	Dimensions		Stroke s [in]	Location hole D H8 [in]	max. [°F]	[oz]	Art. No.
d ₁ [in]	d ₂ [in]		l ₁ -0.08 [in]	l ₂ [in]					
pin: thermoplastic/light spring load									
1/4	0.118	2.2	0.275	0.157	0.04	1/4	176	0.014	2B150.0050
7/16	0.197	4.5	0.433	0.263	0.06	7/16	176	0.062	2B150.0060
	0.236	9.0	0.433	0.421	0.08	7/16	176	0.070	2B150.0065
1/2	0.315	11.2	0.525	0.547	0.09	1/2	176	0.118	2B150.0070
5/8	0.393	22.5	0.669	0.657	0.12	5/8	176	0.250	2B150.0080

¹⁾ statistical average value

ACCESSORIES

	Dimensions d ₁ [in]	[oz]	Art. No.
assembly tool			
	1/4	0.678	22150.0830
	7/16	1.749	22150.0831
	1/2	2.321	22150.0832
	5/8	3.749	22150.0833

APPLICATION EXAMPLE



Lateral Plungers • smooth, with seal - INCH

EH 2B150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting. Sealed against chips and dirt.

Material

Seal
 ■ CR

Body
 ■ Aluminium Al

Spring
 ■ Stainless steel
 ■ Steel, blackened
 ■ Steel, zinc-plated by galvanization

Pin
 ■ Steel, case-hardened, zinc-plated by galvanization
 ■ Thermoplastic POM, white

Assembly

Installation by pressing in.
 Formula for calculating the center distance for the mounting hole:
 $l_0 = z/2 + w + x$,
 l_0 = center distance,
 y = workpiece height,

w = workpiece length,
 x = coordinate dimension,
 s = stroke,
 z = stop diameter
 Calculation dimension x :
 y greater than or equal to $l_2 - d_2/2$,
 then $x = d_2/2 - s$
 or
 y smaller than $l_2 - d_2/2$,
 then $x = d_2/2 - s - [(l_2 - d_2/2 - y) * 0,123]$

Characteristic

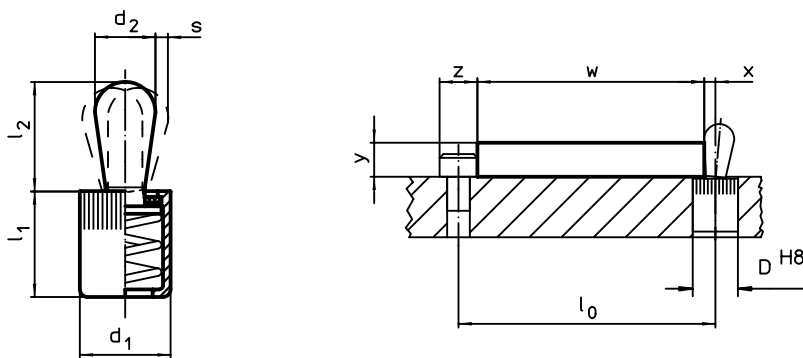
Version light spring load = spring from stainless steel
 Version standard spring load = spring from steel, blackened
 Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

Further products

Eccentric Mounting Bushings, for lateral plungers, smooth - INCH → p. 182

DRAWING




ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ [lb]	Dimensions		Stroke s [in]	Location hole D H8 [in]	max. [°F]	oz	Art. No.
d ₁	d ₂		l ₁ -0.08	l ₂					
[in]			[in]						
pin: steel/light spring load									
1/4	0.118	2.2	0.275	0.157	0.04	1/4	230	0.024	2B150.0110
7/16	0.197	4.5	0.430	0.236	0.06	7/16	230	0.109	2B150.0120
	0.236	9.0	0.430	0.393	0.08	7/16	230	0.138	2B150.0125
1/2	0.315	11.2	0.551	0.511	0.09	1/2	230	0.256	2B150.0130
5/8	0.393	22.5	0.708	0.646	0.12	5/8	230	0.574	2B150.0140
pin: steel/standard spring load									
1/4	0.118	4.5	0.275	0.157	0.04	1/4	230	0.024	2B150.0111
7/16	0.197	11.2	0.430	0.236	0.06	7/16	230	0.117	2B150.0121
	0.236	16.9	0.430	0.393	0.08	7/16	230	0.146	2B150.0126
1/2	0.315	22.5	0.551	0.511	0.09	1/2	230	0.275	2B150.0131
5/8	0.393	34.0	0.708	0.646	0.12	5/8	230	0.518	2B150.0141
pin: steel/heavy spring load									
1/4	0.118	9.0	0.275	0.157	0.04	1/4	230	0.026	2B150.0112
7/16	0.197	21.5	0.430	0.236	0.06	7/16	230	0.123	2B150.0122
	0.236	22.5	0.430	0.393	0.08	7/16	230	0.159	2B150.0127
1/2	0.315	34.0	0.551	0.511	0.09	1/2	230	0.288	2B150.0132
5/8	0.393	45.0	0.708	0.646	0.12	5/8	230	0.542	2B150.0142



¹⁾ statistical average value



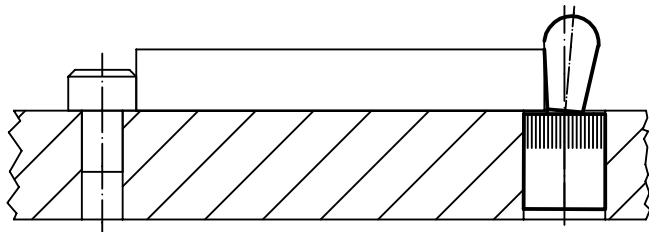
Dimensions		Spring load F max. ¹⁾ ~ [lb]	Dimensions		Stroke s [in]	Location hole D H8 [in]	max. [°F]		Art. No.
d ₁ [in]	d ₂ [in]		l ₁ -0.08 [in]	l ₂ [in]					
pin: thermoplastic/light spring load									
1/4	0.118	2.2	0.275	0.157	0.04	1/4	176	0.014	2B150.0150
7/16	0.197	4.5	0.430	0.236	0.06	7/16	176	0.064	2B150.0160
	0.236	9.0	0.393	0.472	0.08	7/16	176	0.072	2B150.0165
1/2	0.315	11.2	0.551	0.531	0.09	1/2	176	0.114	2B150.0170
5/8	0.393	22.5	0.708	0.646	0.12	5/8	176	0.296	2B150.0180

¹⁾ statistical average value

ACCESSORIES

	Dimensions d ₁ [in]	 [oz]	Art. No.
assembly tool			
	1/4	0.678	22150.0830
	7/16	1.749	22150.0831
	1/2	2.321	22150.0832
	5/8	3.749	22150.0833

APPLICATION EXAMPLE



Lateral Plungers • with plastic spring and pin - INCH

EH 2B150.

2



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting.

Material

- Body
 - Aluminium Al

Spring

- Plastic

Pin

- Steel, case-hardened, blackened
- Stainless steel
- Thermoplastic POM, white

Assembly

Installation by pressing in.

Formula for calculating the center distance for the mounting hole:

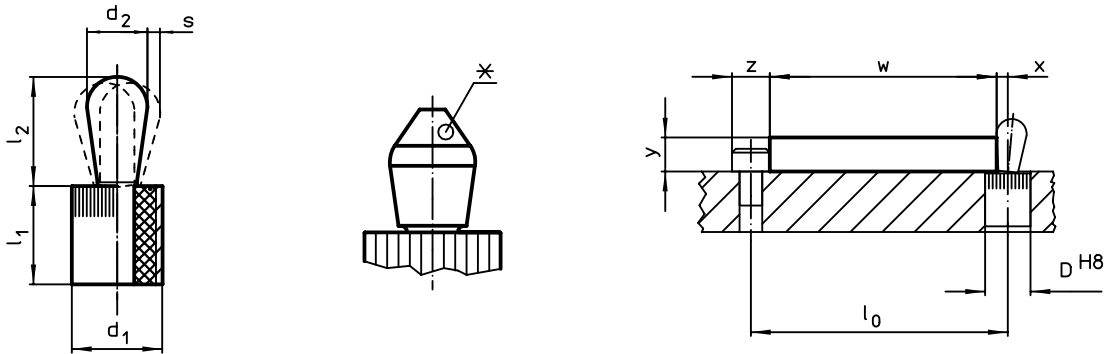
$$l_0 = z/2 + w + x,$$

l_0 = center distance,
 y = workpiece height,
 w = workpiece length,
 x = coordinate dimension,
 s = stroke,
 z = stop diameter
 Calculation dimension x :
 y greater than or equal to $l_2 - d_2/2$,
 then $x = d_2/2 - s$
 or
 y smaller than $l_2 - d_2/2$,
 then $x = d_2/2 - s - [(l_2 - d_2/2 - y) * 0,123]$

Characteristic

Version light spring load = blue spring
 Version standard spring load = red spring
 Version heavy spring load = green spring

DRAWING



*some sizes (see chart) have a deviating pin shape


ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ ~ [lb]	Dimensions		Stroke s [in]	Location hole D H8 [in]	max. [°F]	[oz]	Art. No.
d ₁ [in]	d ₂ [in]		l ₁ -0.03 [in]	l ₂ ±0.02 [in]					
pin: steel/light spring load									
1/4	0.118	2.2	0.295	0.145	0.016	0.250	212	0.020	2B150.0210 ²⁾
7/16	0.197	6.7	0.374	0.287	0.032	0.438	212	0.092	2B150.0220
	0.236	4.4	0.374	0.406	0.040	0.438	212	0.120	2B150.0225
pin: steel/standard spring load									
1/4	0.118	4.4	0.295	0.145	0.016	0.250	212	0.020	2B150.0211 ²⁾
7/16	0.197	13.5	0.374	0.287	0.032	0.438	212	0.092	2B150.0221
	0.236	6.7	0.374	0.406	0.040	0.438	212	0.120	2B150.0226
1/2	0.315	11.1	0.553	0.515	0.048	0.500	212	0.260	2B150.0230
5/8	0.394	18.0	0.675	0.678	0.062	0.625	212	0.534	2B150.0240
pin: steel/heavy spring load									
7/16	0.197	20.0	0.374	0.287	0.032	0.438	212	0.092	2B150.0222
	0.236	13.5	0.374	0.406	0.040	0.438	212	0.121	2B150.0227
1/2	0.315	22.2	0.553	0.515	0.048	0.500	212	0.262	2B150.0231
5/8	0.394	36.0	0.675	0.678	0.062	0.625	212	0.540	2B150.0241

¹⁾ statistical average value

²⁾ deviating pin shape (see drawing)





Dimensions		Spring load F max. ¹⁾ ~ [lb]	Dimensions		Stroke s [in]	Location hole D H8 [in]	max. [°F]	 [oz]	Art. No.
d ₁ [in]	d ₂ [in]		l ₁ -0.03 [in]	l ₂ ±0.02 [in]					
pin: stainless steel/light spring load									
1/4	0.118	2.2	0.295	0.145	0.016	0.250	212	0.022	2B150.0310²⁾
7/16	0.197	6.7	0.374	0.287	0.032	0.438	212	0.093	2B150.0320
	0.236	4.4	0.374	0.406	0.040	0.438	212	0.121	2B150.0325
pin: stainless steel/standard spring load									
1/4	0.118	4.4	0.295	0.145	0.016	0.250	212	0.021	2B150.0311²⁾
7/16	0.197	13.5	0.374	0.287	0.032	0.438	212	0.093	2B150.0321
	0.236	6.7	0.374	0.406	0.040	0.438	212	0.121	2B150.0326
1/2	0.315	11.1	0.553	0.515	0.048	0.500	212	0.247	2B150.0330
5/8	0.394	18.0	0.675	0.678	0.062	0.625	212	0.543	2B150.0340
pin: stainless steel/heavy spring load									
7/16	0.197	20.0	0.374	0.287	0.032	0.438	212	0.095	2B150.0322
	0.236	13.5	0.374	0.406	0.040	0.438	212	0.122	2B150.0327
1/2	0.315	22.2	0.553	0.515	0.048	0.500	212	0.263	2B150.0331
5/8	0.394	36.0	0.675	0.678	0.062	0.625	212	0.546	2B150.0341
pin: thermoplastic/light spring load									
1/4	0.118	2.2	0.295	0.145	0.016	0.250	176	0.013	2B150.0410²⁾
7/16	0.197	6.7	0.374	0.287	0.032	0.438	176	0.054	2B150.0420
	0.236	4.4	0.374	0.406	0.040	0.438	176	0.058	2B150.0425
pin: thermoplastic/standard spring load									
1/4	0.118	4.4	0.295	0.145	0.016	0.250	176	0.012	2B150.0411²⁾
7/16	0.197	13.5	0.374	0.287	0.032	0.438	176	0.052	2B150.0421
	0.236	6.7	0.374	0.406	0.040	0.438	176	0.057	2B150.0426
1/2	0.315	11.1	0.553	0.515	0.048	0.500	176	0.104	2B150.0430
5/8	0.394	18.0	0.675	0.678	0.062	0.625	176	0.196	2B150.0440
pin: thermoplastic/heavy spring load									
7/16	0.197	20.0	0.374	0.287	0.032	0.438	176	0.054	2B150.0422
	0.236	13.5	0.374	0.406	0.040	0.438	176	0.058	2B150.0427
1/2	0.315	22.2	0.553	0.515	0.048	0.500	176	0.106	2B150.0431
5/8	0.394	36.0	0.675	0.678	0.062	0.625	176	0.200	2B150.0441

¹⁾ statistical average value

²⁾ deviating pin shape (see drawing)

ACCESSORIES

	Dimensions	[oz]	Art. No.
	d ₁ [in]		
assembly tool			
	1/4	0.678	22150.0830
	7/16	1.749	22150.0831
	1/2	2.321	22150.0832
	5/8	3.749	22150.0833

Lateral Plungers • smooth, without seal, with female thread - INCH

EH 2B150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting.

Material

Body

- Aluminium Al

Threaded washer

- Steel, blackened

Spring

- Stainless steel
- Steel, blackened
- Steel, zinc-plated by galvanization

Assembly

Formula for calculating the center distance for the mounting hole:

$$l_0 = z/2 + w + x,$$

l_0 = center distance,

y = workpiece height,

w = workpiece length,

x = stroke,

z = stop diameter

Calculation dimension x for workpieces:

$$x = d_2/2 - s$$

Installation by pressing in.

Characteristic

Version light spring load = spring from stainless steel

Version standard spring load = spring from steel, blackened

Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

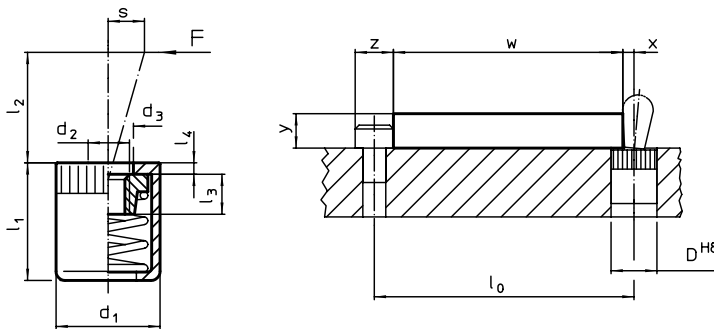
Notes

Individual set screws can be screwed in the plate with threaded hole.

Further products

Eccentric Mounting Bushings, for lateral plungers, smooth - INCH → p. 182

DRAWING



ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾	d ₃ +0.008	l ₁ -0.08	Dimensions				Stroke s	Location hole D H8	max. [°F]	oz	Art. No.
d ₁	d ₂				l ₂	l ₃	l ₄						
[in]	[in]	[lb]			[in]			[in]	[in]		[oz]		
light spring load													
7/16	#8-32	4.5	0.248	0.433	0.1000	0.177	0.047	0.063	7/16	482	0.081	2B150.1020	
		9.0	0.248	0.433	0.2950	0.177	0.047	0.079	7/16	482	0.081	2B150.1025	
5/8	1/4-20	22.5	0.409	0.669	0.4530	0.295	0.067	0.126	5/8	482	0.369	2B150.1040	
standard spring load													
7/16	#8-32	11.2	0.248	0.433	0.1000	0.177	0.047	0.063	7/16	482	0.088	2B150.1021	
		16.9	0.248	0.433	0.2950	0.177	0.047	0.079	7/16	482	0.092	2B150.1026	
5/8	1/4-20	34.0	0.409	0.669	0.4530	0.295	0.067	0.126	5/8	482	0.319	2B150.1041	
heavy spring load													
7/16	#8-32	22.5	0.248	0.433	0.1000	0.177	0.047	0.063	7/16	482	0.095	2B150.1022	
		34.0	0.248	0.433	0.2950	0.177	0.047	0.079	7/16	482	0.100	2B150.1027	
5/8	1/4-20	45.0	0.409	0.669	0.4563	0.295	0.067	0.126	5/8	482	0.342	2B150.1042	

¹⁾ statistical average value

ACCESSORIES

	Dimensions		Art. No.
	d ₁	oz	
	[in]		
assembly tool			
	7/16	1.749	22150.0831
	5/8	3.749	22150.0833

Lateral Plungers • smooth, with seal, with female thread - INCH

EH 2B150.



PRODUCT DESCRIPTION

To be used for positioning and applying pressure, e.g. during painting and sandblasting. Sealed against chips and dirt.

Material

Seal

- CR

Body

- Aluminium Al

Threaded washer

- Steel, blackened

Spring

- Stainless steel
- Steel, blackened
- Steel, zinc-plated by galvanization

x = stroke,

z = stop diameter

Calculation dimension x for workpieces:

$$x = d_2/2 - s$$

Installation by pressing in.

Characteristic

Version light spring load = spring from stainless steel

Version standard spring load = spring from steel, blackened

Version heavy spring load = spring from steel, zinc-plated by galvanization

MORE INFORMATION

Notes

Individual set screws can be screwed in the plate with threaded hole.

Further products

Eccentric Mounting Bushings, for lateral plungers, smooth - INCH..... → p. 182

Assembly

Formula for calculating the center distance for the mounting hole:

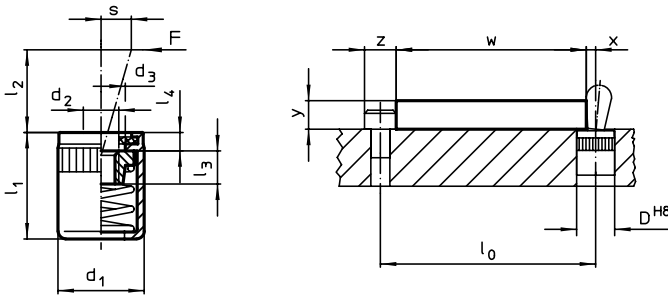
$$l_0 = z/2 + w + x,$$

l_0 = center distance,

y = workpiece height,

w = workpiece length,

DRAWING



ORDER INFORMATION

Dimensions		Spring load F max. ¹⁾ ~ [lb]	d ₃ +0.008 [mm]	l ₁ -0.08 [in]	Dimensions			Stroke s [in]	Location hole D H8 [in]	max. [°F]	[oz]	Art. No.
d ₁	d ₂				l ₂	l ₃	l ₄					
[in]	[in]	[lb]	[mm]	[in]	[in]	[in]	[in]	[in]	[°F]	[oz]		
light spring load												
7/16	#8-32	4.5	0.248	0.430	0.100	0.177	0.063	0.063	7/16	230	0.083	2B150.1120
		9.0	0.248	0.430	0.295	0.177	0.063	0.079	7/16	230	0.085	2B150.1125
5/8	1/4-20	22.5	0.401	0.709	0.453	0.295	0.079	0.126	5/8	230	0.368	2B150.1140
standard spring load												
7/16	#8-32	11.2	0.248	0.430	0.100	0.177	0.063	0.063	7/16	230	0.090	2B150.1121
		16.9	0.248	0.430	0.295	0.177	0.063	0.079	7/16	230	0.094	2B150.1126
5/8	1/4-20	34.0	0.401	0.709	0.453	0.295	0.079	0.126	5/8	230	0.312	2B150.1141
heavy spring load												
7/16	#8-32	22.5	0.248	0.430	0.100	0.177	0.063	0.063	7/16	230	0.096	2B150.1122
		34.0	0.248	0.430	0.295	0.177	0.063	0.079	7/16	230	0.107	2B150.1127
5/8	1/4-20	45.0	0.401	0.709	0.453	0.295	0.079	0.126	5/8	230	0.334	2B150.1142

¹⁾ statistical average value

ACCESSORIES

	Dimensions d ₁ [in]	[oz]	Art. No.
assembly tool			
	7/16	1.749	22150.0831
	5/8	3.749	22150.0833

Eccentric Mounting Bushings • for lateral plungers, smooth - INCH

EH 2B150.



PRODUCT DESCRIPTION

The eccentric is used in conjunction with smooth lateral plungers EH 2B150. for positioning or clamping workpieces with large tolerances.

Material

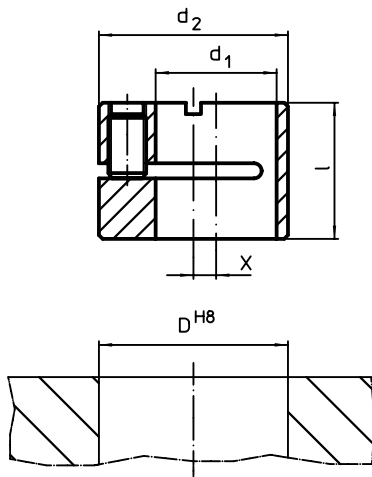
Body

- Steel, blackened

Assembly

Mounting and position determination by means of clamping with threaded pin.

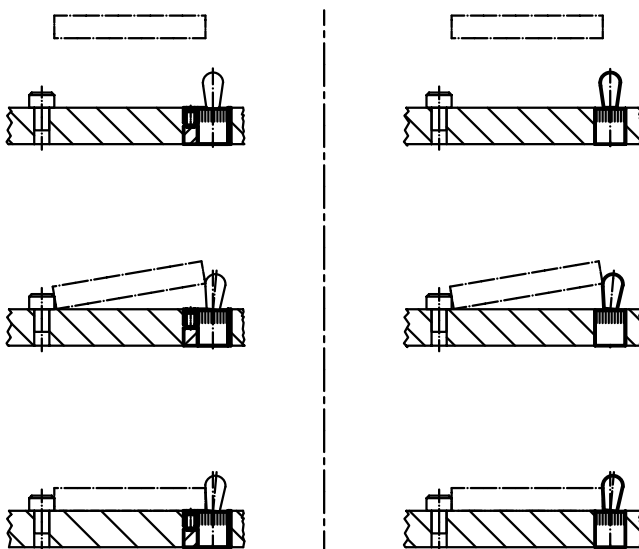
DRAWING



ORDER INFORMATION

d ₁ H8	d ₂ h9	Dimensions		Location hole D H8	oz	Art. No.
		l	x			
		[in]		[in]	[oz]	
1/4	1/2	0.390	0.079	1/2	0.211	2B150.0806
7/16	11/16	0.469	0.079	11/16	0.378	2B150.0810
1/2	3/4	0.547	0.079	3/4	0.499	2B150.0812
5/8	1	0.705	0.118	1	1.285	2B150.0816

APPLICATION EXAMPLE



Spring-Loaded Catches • DIN 6310 catches with spring
EH 22200.



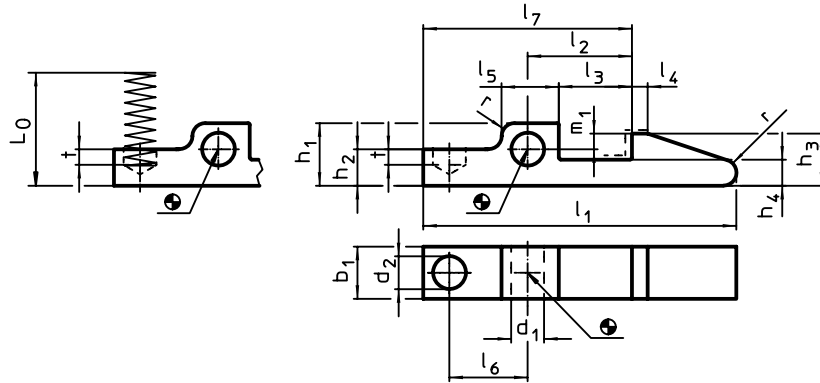
PRODUCT DESCRIPTION

The catches with spring, manufactured according to DIN 6310, are used as locking elements, for example.

Material

- Heat-treated steel, blackened. Hardened where shown by ___ line.

DRAWING

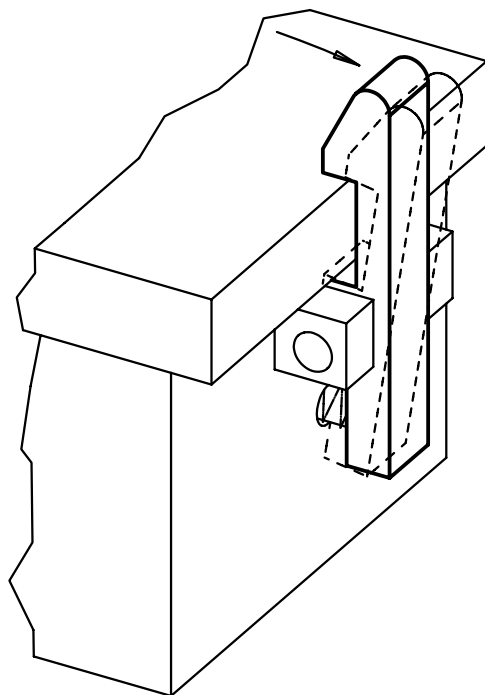


Hardened where shown by ___ line.

ORDER INFORMATION

Dimensions																	Spring rate R ~ [N/mm]	Art. No.		
l_1	b_1 -0.2	d_1 E9	d_2	h_1	h_2	h_3	h_4	l_2 ± 0.1	l_3	l_4	l_5	l_6	l_7	m_1	t	r			L_0 ~	
[mm]																	[g]			
45	8	4	5.0	9.5	5.5	8	4	15	10	2	9	11	30	2.5	1.5	1.6	17.8	3.0	15	22200.0045
60	10	5	6.3	12.0	7.0	10	5	20	14	3	11	15	40	3.0	3.0	2.5	21.2	4.0	35	22200.0060
80	14	6	8.0	15.0	9.0	14	7	30	22	5	14	23	60	5.0	5.0	4.0	25.1	4.8	80	22200.0080

APPLICATION EXAMPLE



Door Catches

EH 22260.



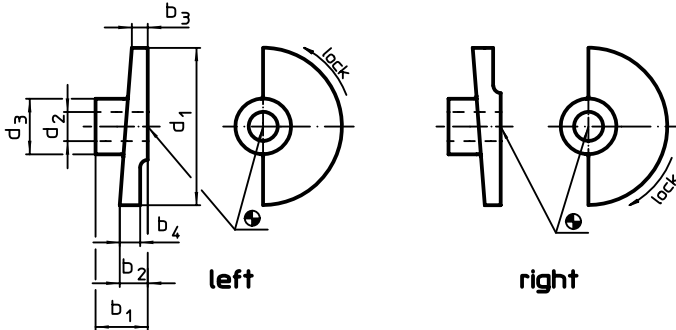
PRODUCT DESCRIPTION

Material
 ■ Sintered steel

Assembly

Not suitable for fastening by welded connection. Secure by using pins.

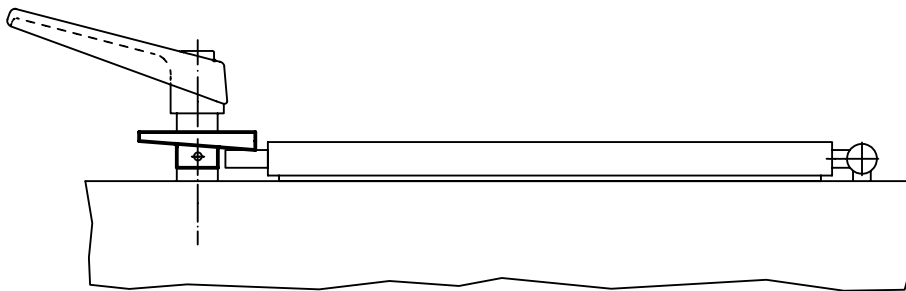
DRAWING



ORDER INFORMATION

d ₁	d ₂ H8	d ₃	Dimensions				[g]	Art. No.
			b ₁	b ₂	b ₃	b ₄		
[mm]								
locking by turning to the right								
35	8	18	15	7	3	7.0	33	22260.0008
	10	18	15	7	3	7.0	31	22260.0010
65	12	23	20	10	5	7.2	103	22260.0012
80	16	27	24	12	6	8.8	174	22260.0016
locking by turning to the left								
35	8	18	15	7	3	7.0	34	22260.0108
	10	18	15	7	3	7.0	31	22260.0110
65	12	23	20	10	5	7.2	103	22260.0112
80	16	27	24	12	6	8.8	175	22260.0116

APPLICATION EXAMPLE



Clamping Catches

EH 22260.



PRODUCT DESCRIPTION

Clamping catches have a round running taper surface and enable fast and safe clamping and releasing with a relatively large adjustment range and high tensioning force. Due to the small gradient angle of the taper surface, the clamping catch is self-locking.

Material

Body

- Steel, case-hardened, blackened
- Stainless steel 1.4305, nickel-plated

Screw

- Steel, nitrided
- Stainless steel 1.4021, heat-treated, nickel-plated

Gear lever handle

- Steel, ground, blackened
- Stainless steel 1.4305, dull blasted

Ball knob

- Thermosetting plastic PF 31, black, DIN 319

Assembly

Fix with screw bolt M 10 (WS 6). Ensure a tightening torque of max. 40 Nm.

Operation

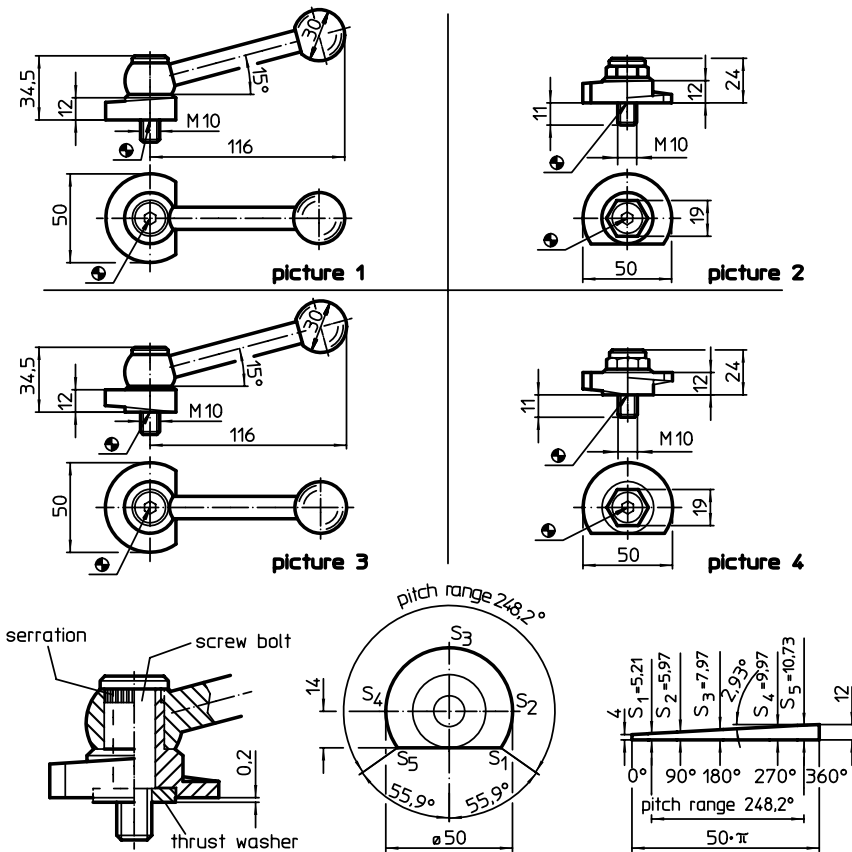
The screw bolt and the washer are adjustable. Once screwed in, the clamping catch can easily be turned to the desired position. For Art. No. 22260.0250 / .0251 and 22260.0450 / .0451, the serration helps to put the tension lever to the preferred position.

MORE INFORMATION

Notes

Left turn type can be supplied on request.

DRAWING

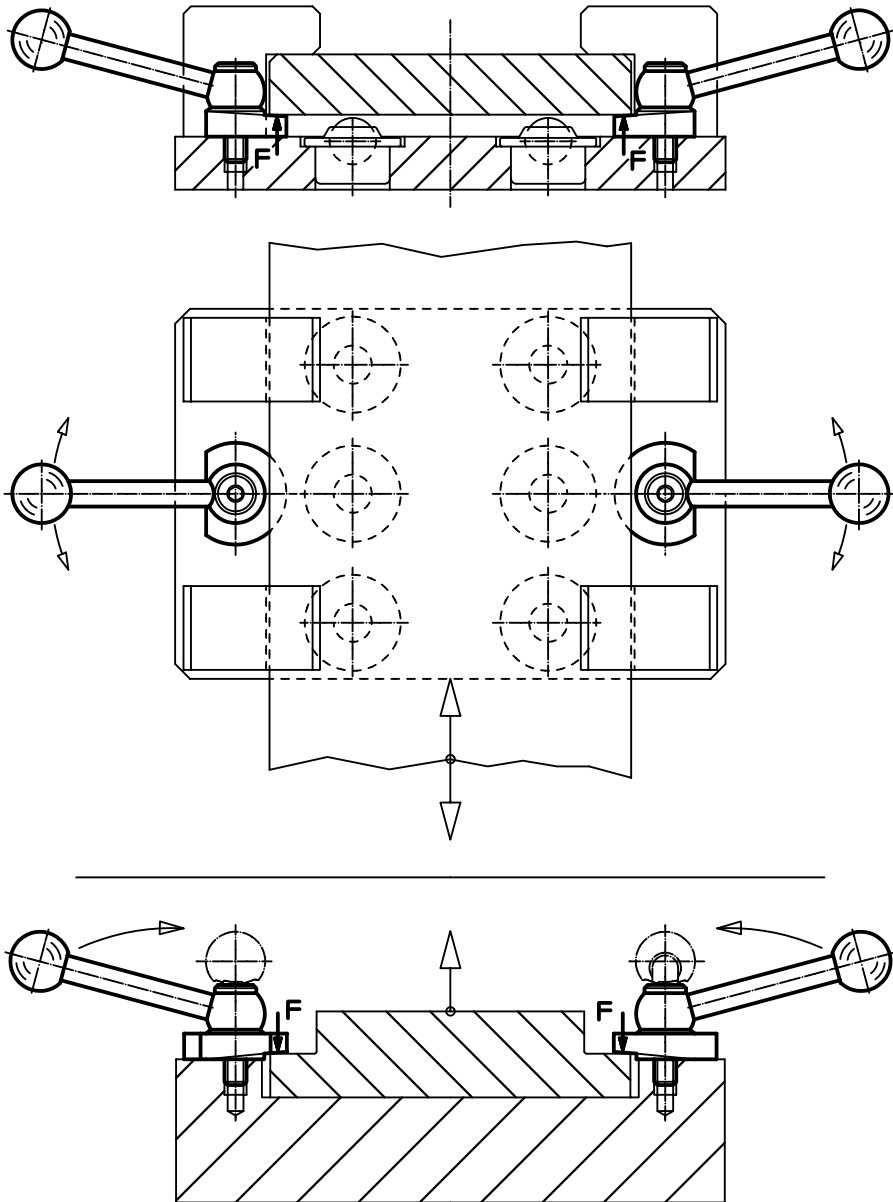


ORDER INFORMATION

Tightening torque max. [Nm]	[g]	Art. No.	
		Steel	Stainless steel
with adjustable tension lever, pitch opposite to bearing surface – picture 1			
40	304	22260.0250	22260.0251
with clamping screw, pitch opposite to bearing surface – picture 2			
40	154	22260.0350	22260.0351
with adjustable tension lever, pitch on bearing surface – picture 3			
40	312	22260.0450	22260.0451
with clamping screw, pitch on bearing surface – picture 4			
40	154	22260.0550	22260.0551

APPLICATION EXAMPLE

2



Shaft-End Washers

EH 22270.



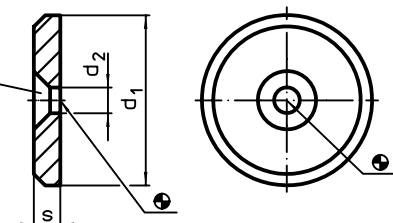
PRODUCT DESCRIPTION

Material

- Free cutting steel, unhardened, blackened
- Stainless steel 1.4305

DRAWING

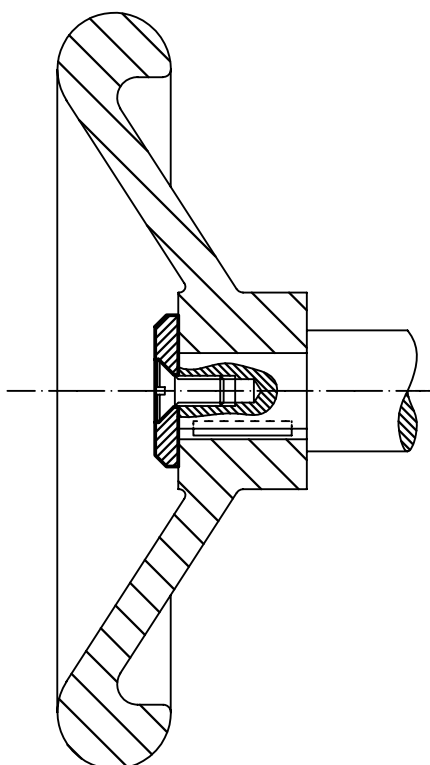
for countersunk screw
DIN EN ISO 2009
or DIN EN ISO 10642



ORDER INFORMATION

d ₁	Dimensions		[g]	Art. No.	
	d ₂	s		Free cutting steel	Stainless steel
[mm]					
16	4.5	3.0	3.6	22270.0016	22270.0116
20	4.5	3.0	6.1	22270.0020	22270.0120
22	5.5	3.5	8.1	22270.0022	22270.0122
25	5.5	3.5	11.0	22270.0025	22270.0125
28	5.5	3.5	14.0	22270.0028	22270.0128
32	6.6	4.0	22.0	22270.0032	22270.0132
36	6.6	4.0	28.0	22270.0036	22270.0136
40	6.6	5.0	44.0	22270.0040	22270.0140
45	6.6	6.0	66.0	22270.0045	22270.0145
52	6.6	6.0	91.0	22270.0052	22270.0152

APPLICATION EXAMPLE



Captive C-Washers • DIN 6371 with countersunk screw DIN 923 EH 22280.



PRODUCT DESCRIPTION

Material

Countersunk screw

- Steel, blackened, quality 5.8

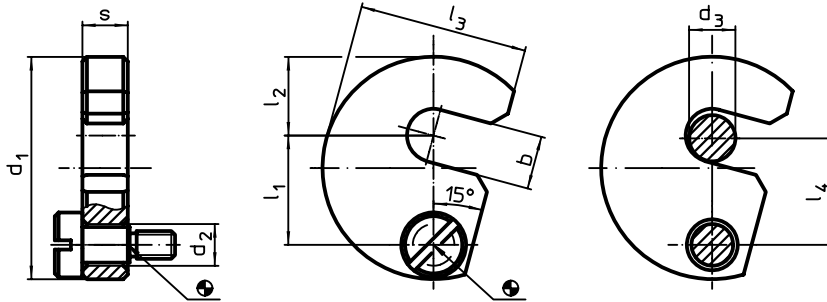
Captive C-Washer

- Heat-treated steel, tempered, blackened

Assembly

The captive C-washers can be installed on both sides using the included bolt. You can select either clockwise or anti-clockwise rotation.

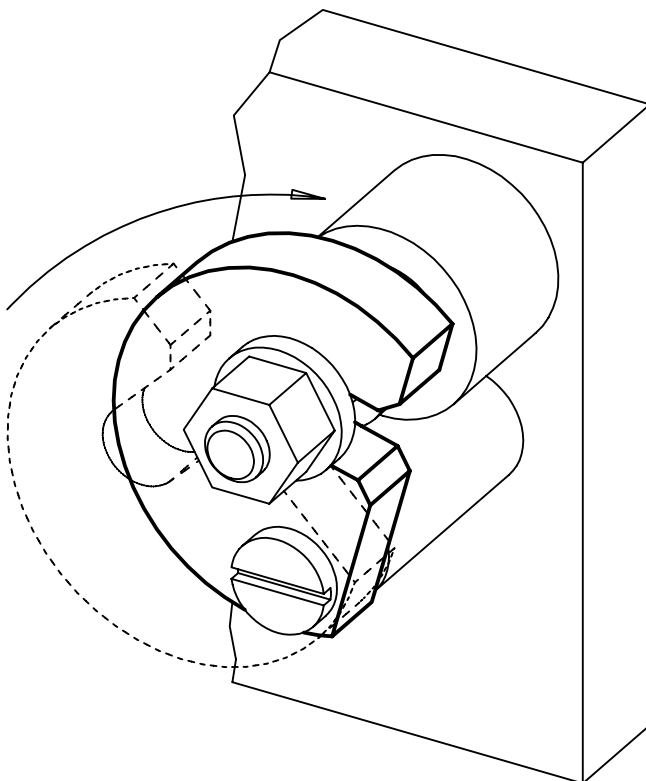
DRAWING



ORDER INFORMATION

Nominal size d_3 [mm]	b	d_1	d_2	Dimensions					s -0.2	Suitable screw [mm]	[g]	Art. No.
				l_1	l_2	l_3	l_4	[mm]				
6	7.5	38	9	19.6	11	29.0	19	9.8	M6 x 10	66	22280.0006	
8	9.5	43	9	21.6	14	32.5	21	9.8	M6 x 10	81	22280.0008	
10	11.5	48	9	23.6	17	36.5	23	9.8	M6 x 10	99	22280.0010	
12	13.5	61	11	29.6	22	45.0	29	11.8	M8 x 12	192	22280.0012	
16	17.5	68	11	33.6	25	50.0	33	11.8	M8 x 12	229	22280.0016	
20	21.5	74	11	36.6	28	55.0	36	11.8	M8 x 12	265	22280.0020	
24	25.5	82	11	40.6	32	62.0	40	15.8	M8 x 16	430	22280.0024	
30	32.0	97	11	49.0	39	73.0	48	15.8	M8 x 16	584	22280.0030	

APPLICATION EXAMPLE

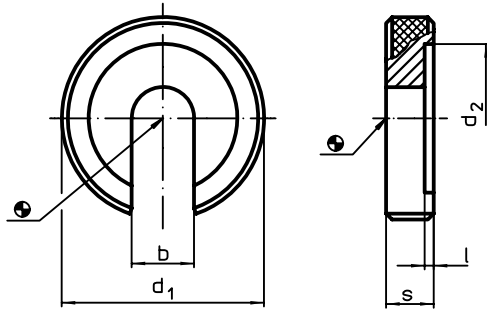


**PRODUCT DESCRIPTION**

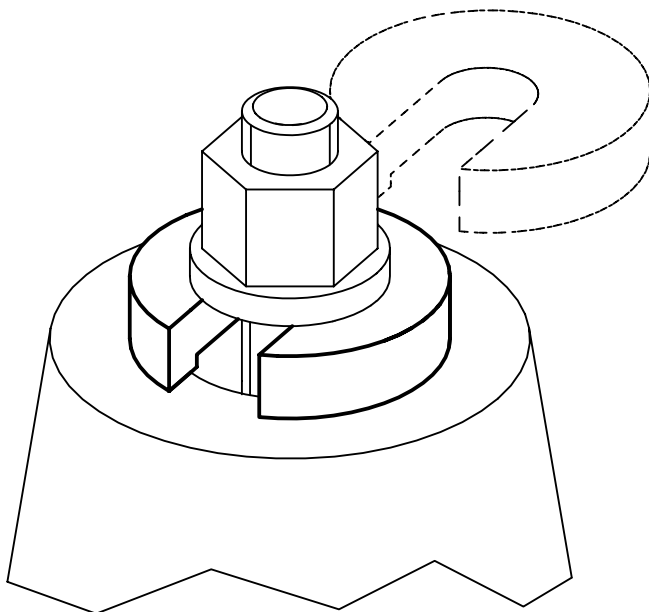
The c-washers (slotted washers) are manufactured according to DIN 6372. For better handling, the c-washers have a knurling all around.

Material

- Heat-treated steel, tempered, blackened

DRAWING**ORDER INFORMATION**

Nominal size [mm]	b	d ₁	Dimensions			[g]	Art. No.
			d ₂ [mm]	l	s		
6	6.4	22	16	0.8	6	13	22290.0006
8	8.4	28	21	1.0	7	24	22290.0008
10	10.5	34	25	1.2	8	38	22290.0010
12	13.0	40	30	1.8	9	57	22290.0012
16	17.0	56	37	1.8	12	164	22290.0016
20	21.0	64	45	2.0	14	241	22290.0020
24	25.0	75	52	2.0	16	376	22290.0024
30	31.0	90	65	2.0	18	610	22290.0030
36	37.0	100	75	2.5	20	796	22290.0036

APPLICATION EXAMPLE

Ball Lock Connectors • self-locking, with holding rings

EH 22340.

2



PRODUCT DESCRIPTION

With the ball connector, parts and tools can be secured or connected quickly and easily.

Material

- Pin**
 - Stainless steel 1.4305
- Bushing**
 - Stainless steel 1.4305
- Rings**
 - Stainless steel
- Spring**
 - Stainless Steel

Operation

The balls are unlocked by pressing the button.

MORE INFORMATION

Notes

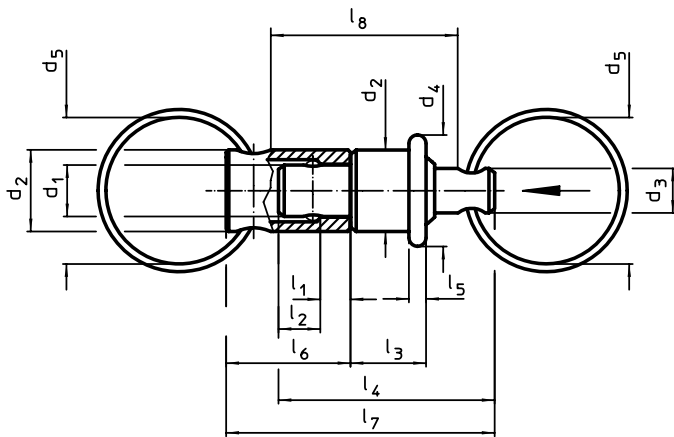
Pin and bushing separately on request.

Further products

Ball Lock Connectors, self-locking, with holder. → p. 191

Ball Lock Connectors, self-locking, with holder, compact construction. → p. 193

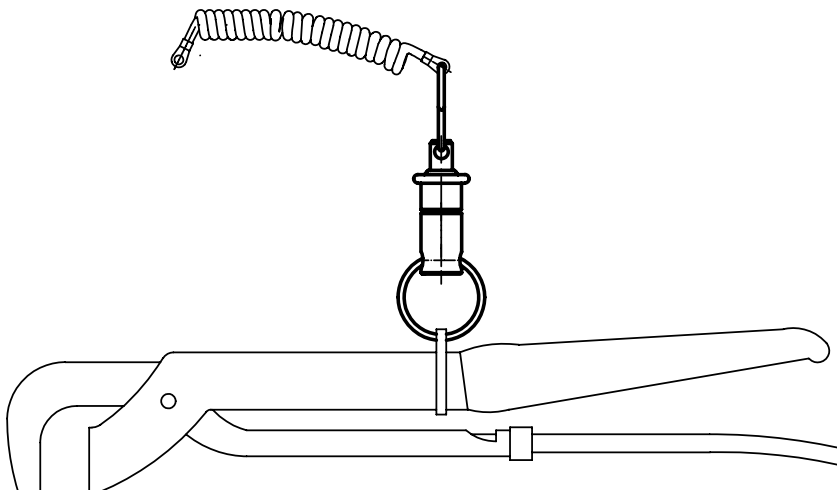
DRAWING



ORDER INFORMATION

Dimensions													Load capacity max.	max.	[g]	Art. No.
d ₁	d ₂	d ₃	d ₄	d ₅	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈				
-0.03 -0.06				~	+0.6	±1		~			~	~	[N]	[°C]		
6	9.5	6.2	13	20	3.2	4.8	8.8	25.2	2.4	14.5	31.5	26.2	30	250	14	22340.0905

APPLICATION EXAMPLE



Ball Lock Connectors • self-locking, with holder

EH 22330.

2



PRODUCT DESCRIPTION

Parts can be connected fast and easily with the ball lock connector in combination with the locating bushings.

The locating bushings are made from stainless steel. There are three versions available - mounting in wood (picture 2 and picture 4), one version that can be mounted in plastic (picture 3) and with holding (picture 5 and picture 6). In the bushings (picture 2, picture 3 and picture 5) the ball lock connector is lockable (4x90°). In the bushings (picture 4 and picture 6) the ball lock connector is rotatable.

As a robust tool, the item is made from stainless steel. The ball lock connector is maintenance-free, soundless and secured against loss.

Material

Pin part

- Stainless steel 1.4305

Holder

- Stainless steel

Bushing

- Stainless steel 1.4305

Ball

- Stainless steel

Spring

- Stainless steel

Assembly

Mounting into wood (picture 2 and picture 4)

1. Insert location hole and pilot hole for safety bolt according to specifications
 2. Optionally recommended is the use of adhesive for securing
 3. Press in bushing
 4. Secure bushing with a screw
- Note: The bore diameter (D_2) for the pilot hole of the safety bolt depends on the screw used.

Mounting into plastic (picture 3)

1. Insert location hole according to instructions
2. Optionally recommended is the use of adhesive for securing
3. Screw in bushing

Note: The bore diameter to be chosen for the location hole depends on the hardness of the plastic.

Operation

The balls are unlocked by pressing the button.

Characteristic

Marking groove if dimension = 1,5 mm for l_1 (bushings - pictures 2, 3 and 4) or l_2 (ball lock connector - picture 1).

MORE INFORMATION

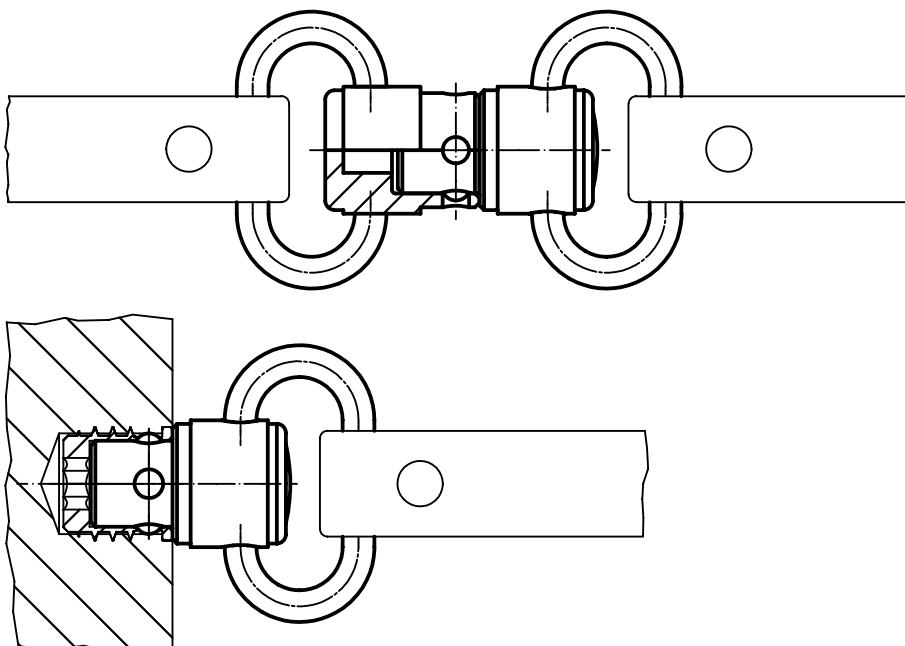
Notes

Special types on request.

Further products

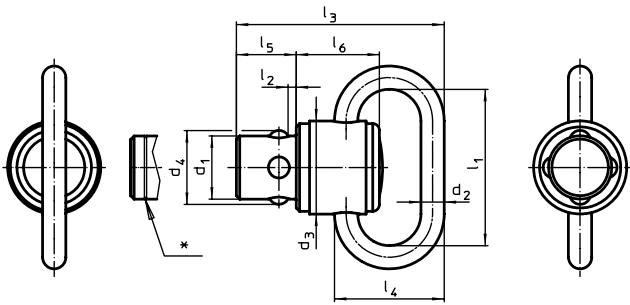
Ball Lock Connectors, self-locking, with holding rings → p. 190
 Ball Lock Connectors, self-locking, with holder, compact construction → p. 193

APPLICATION EXAMPLE

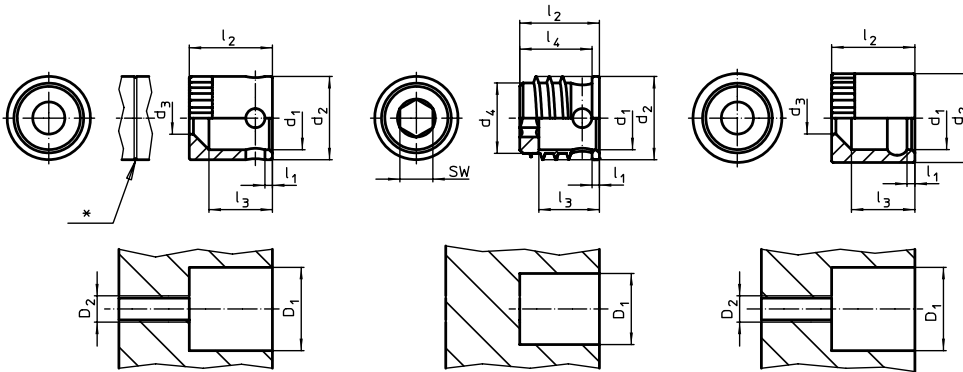


DRAWING

2



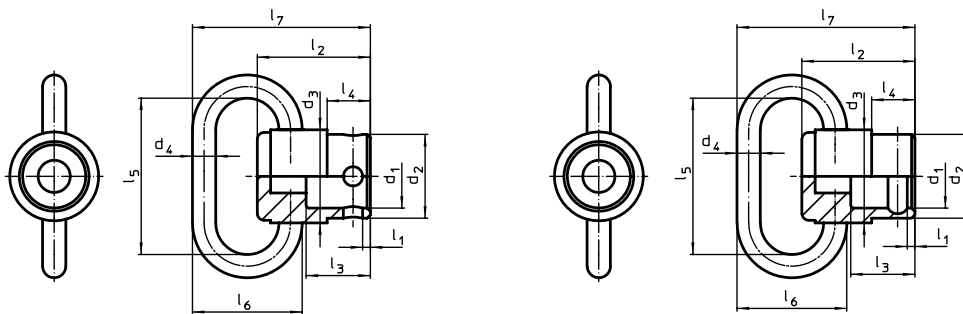
picture 1



picture 2

picture 3

picture 4



picture 5

picture 6

* Marking if dimension = 1,5 mm for l_1 (pictures 2,3 and 4) or l_2 (picture 1).

ORDER INFORMATION

Nominal diameter d_1 [mm]	Dimensions [mm]											WS [mm]	Load capacity max. [kN]	Location hole D_1 [mm]	Temperature [°C]		Weight [g]	Art. No.
	l_1	l_2	d_2	d_3	d_4	l_3	l_4	l_5	l_6	l_7	min.				max.			
ball lock connectors – picture 1																		
9.5	23.0	1.00	3.50	14.0	11.1	31.30	16.5	9	12.5	-	-	1.2	-	-50	150	22.0	22330.0110	
		1.50	3.50	14.0	11.1	31.30	16.5	9	12.5	-	-	1.2	-	-50	150	21.0	22330.0111	
	40.0	1.00	4.50	14.0	11.1	36.60	23.0	9	12.5	-	-	2.0	-	-50	150	30.0	22330.0120	
		1.50	4.50	14.0	11.1	36.60	23.0	9	12.5	-	-	2.0	-	-50	150	28.0	22330.0121	
bushing, mounting in wood, lockable – picture 2																		
9.6	1.0	12.65	12.65	4.9	-	9.65	-	-	-	-	-	-	12.7	-50	150	5.8	22330.0305	
	1.5	12.65	12.65	4.9	-	9.65	-	-	-	-	-	-	12.7	-50	150	5.5	22330.0306	
bushing, mounting in plastic, lockable – picture 3																		
9.6	1.0	12.10	12.65	-	10.7	9.20	11.0	-	-	-	5	-	11.1 ¹⁾	-50	150	3.3	22330.0310	
	1.5	12.10	12.65	-	10.7	9.20	11.0	-	-	-	5	-	11.1 ¹⁾	-50	150	3.0	22330.0311	
bushing, mounting in wood, rotatable – picture 4																		
9.6	1.0	12.65	13.50	4.9	-	9.65	-	-	-	-	-	-	13.5	-50	150	7.3	22330.0315	
	1.5	12.65	13.50	4.9	-	9.65	-	-	-	-	-	-	13.5	-50	150	8.5	22330.0316	
flexible mount, lockable – picture 5																		
9.6	1.0	17.00	12.60	14.0	3.5	9.60	6.5	23	16.5	26.8	-	1.2	-	-50	150	16.0	22330.1215	
flexible mount, rotatable – picture 6																		
9.6	1.0	17.00	12.60	14.0	3.5	9.60	6.5	23	16.5	26.8	-	1.2	-	-50	150	15.0	22330.1315	

¹⁾ depending on the hardness of the plastic

Ball Lock Connectors • self-locking, with holder, compact construction

EH 22330.



PRODUCT DESCRIPTION

Parts can be connected fast and easily with the ball lock connector in combination with the locating bushings.

The locating bushings are made from stainless steel. There are three versions available - mounting in wood (picture 2 and picture 4), one version that can be mounted in plastic (picture 3) and with holding (picture 5 and picture 6). In the bushings (picture 2, picture 3 and picture 5) the ball lock connector is lockable (4x90°). In the bushings (picture 4 and picture 6) the ball lock connector is rotatable.

As a robust tool, the item is made from stainless steel. The ball lock connector is maintenance-free, soundless and secured against loss.

Material

Pin part

- Stainless steel 1.4542

Holder

- Stainless steel

Bushing

- Stainless steel 1.4305

Ball

- Stainless steel

Spring

- Stainless steel

Assembly

Mounting into wood (picture 2 and picture 4)

1. Insert location hole and pilot hole for safety bolt according to specifications
2. Optionally recommended is the use of adhesive for securing
3. Press in bushing
4. Secure bushing with a screw

Note: The bore diameter (D₂) for the pilot hole of the safety bolt depends on the screw used.

Mounting into plastic (picture 3)

1. Insert location hole according to instructions
2. Optionally recommended is the use of adhesive for securing
3. Screw in bushing

Note: The bore diameter to be chosen for the location hole depends on the hardness of the plastic.

Operation

The balls are unlocked by pressing the button.

MORE INFORMATION

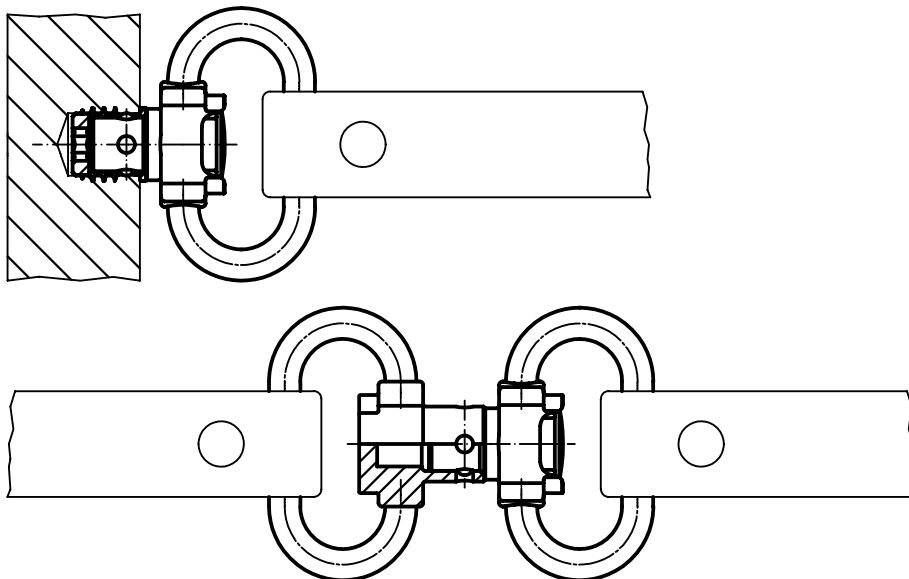
Notes

Special types on request.

Further products

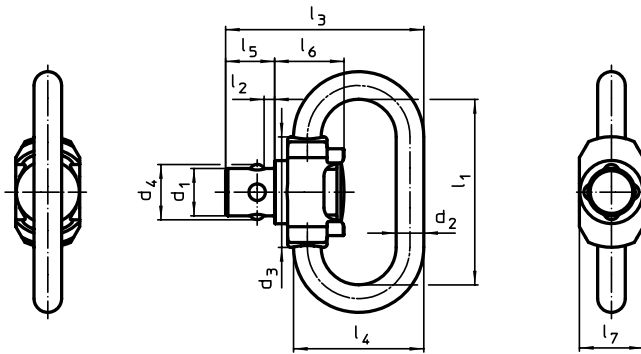
- Ball Lock Connectors, self-locking, with holding rings → p. 190
- Ball Lock Connectors, self-locking, with holder. → p. 191

APPLICATION EXAMPLE

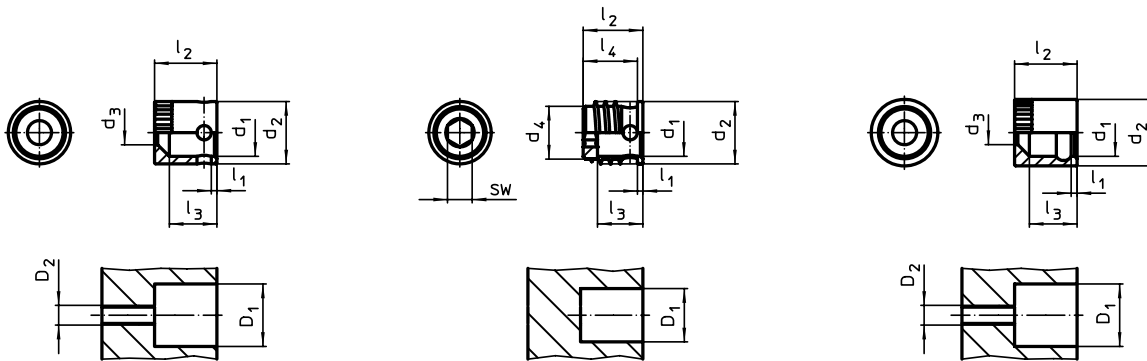


DRAWING

2



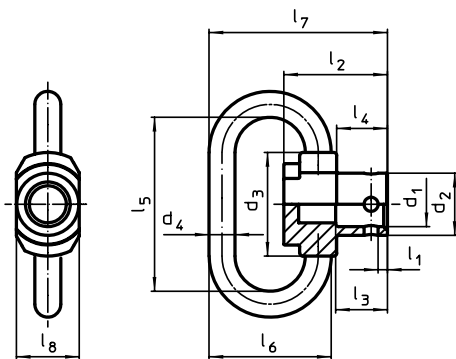
picture 1



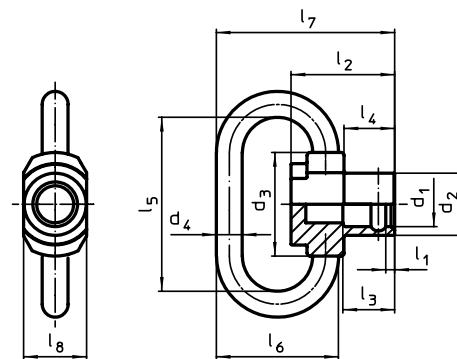
picture 2

picture 3

picture 4



picture 5



picture 6

ORDER INFORMATION

Nominal diameter d ₁ [mm]	Dimensions [mm]											WS [mm]	Load capacity max. [kN]	Location hole D ₁ [mm]	Temperature [°C]		Weight [g]	Art. No.
	l ₁	l ₂	d ₂	d ₃	d ₄	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈				min.	max.		
ball lock connectors – picture 1																		
6.0	23	1	3.50	14.0	6.9	25.1	16.5	6.2	8.8	8.1	-	-	1.5	-	-50	150	9.8	22330.0402
bushing, mounting in wood, lockable – picture 2																		
6.1	1	9	8.15	3.1	-	7.0	-	-	-	-	-	-	-	8.3	-50	150	1.6	22330.0405
bushing, mounting in plastic, lockable – picture 3																		
6.1	1	9	10.00	-	8.2	6.5	8.2	-	-	-	-	4	-	8.3 ¹⁾	-50	150	3.6	22330.0407
bushing, mounting in wood, rotatable – picture 4																		
6.1	1	9	9.15	3.1	-	7.0	-	-	-	-	-	-	-	9.1	-50	150	2.4	22330.0409
flexible mount, lockable – picture 5																		
6.1	1	14	8.40	14.0	3.5	7.0	6.8	23.0	16.5	24.1	8.5	-	1.5	-	-50	150	13.0	22330.1405
flexible mount, rotatable – picture 6																		
6.1	1	14	8.40	14.0	3.5	7.0	6.8	23.0	16.5	24.1	8.5	-	1.5	-	-50	150	10.0	22330.1409

¹⁾ depending on the hardness of the plastic

SELF-LOCKING LIFTING PINS

READY TO SUPPORT ANY LOAD

LIFTING CAPACITY OF UP TO 1,000 KG

Aside from delivering an exceptional lifting capacity, our lifting pins require next to no effort as they are in no need of a thread. Better still, they ensure maximum safety during use.

The assortment was also extended by a variant with manual handle. This allows easy, safe and reliable manual lifting and transport of unhandy components.



[www.halder.com/
LiftingDevices](http://www.halder.com/LiftingDevices)



Lifting Pins • self-locking

EH 22350.

2



PRODUCT DESCRIPTION

Heavy-duty lifting element for quick and easy use, with moveable shackle and locking stud to provide protection against unintentional unlocking. Special lifting devices, e.g. threads for ring bolts, are no longer required on the workpiece. All versions are corrosion-resistant.

Material

Pin part

- Heat-treated steel, tempered, manganese phosphated

Press button

- Aluminium, red anodised

Shackle

- Heat-treated steel, tempered, manganese phosphated

Spring

- Stainless Steel

Assembly

Simple H11 boreholes are sufficient.

Mounting:

1. Press in the button and hold it down
2. Insert the lifting pin
3. Release the button (The button must be back in its original position)

Dismantling:

1. Press in the button and hold it down.
2. Remove the lifting pin.
3. Release the button.

Operation

Each lifting pin contains an instruction manual with an EC Declaration of Conformity.

MORE INFORMATION

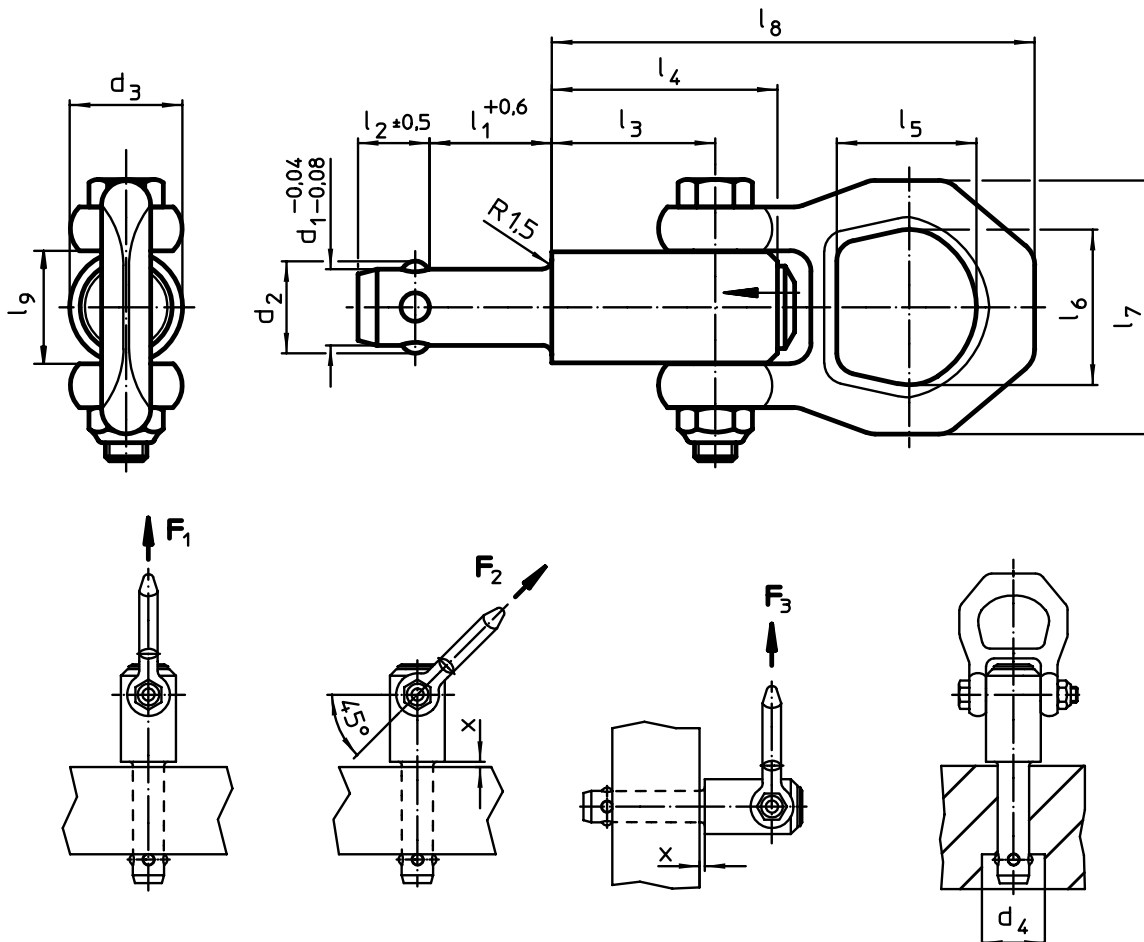
Accessories

As accessories, we offer matching locating bushings for $d_1 = 8, 10, 12, 16$ and 20

Further products

- Lifting Pins, self-locking, stainless steel → p. 198
- Locating Bushings, for lifting pins → p. 200
- Locating Bushings, plain, for lifting pins → p. 201
- Locating Bushings with Seal, plain, for lifting pins → p. 203
- Threaded Lifting Pins, self-locking. . . . → p. 207
- Threaded Lifting Pins, self-locking, for centre holes according to DIN 332 . . . → p. 209
- Threaded Lifting Pins, self-locking, with rotatable shackle → p. 211
- Threaded Lifting Pins, self-locking - INCH → p. 213
- Threaded Lifting Pins, self-locking, with rotatable shackle - INCH → p. 215

DRAWING

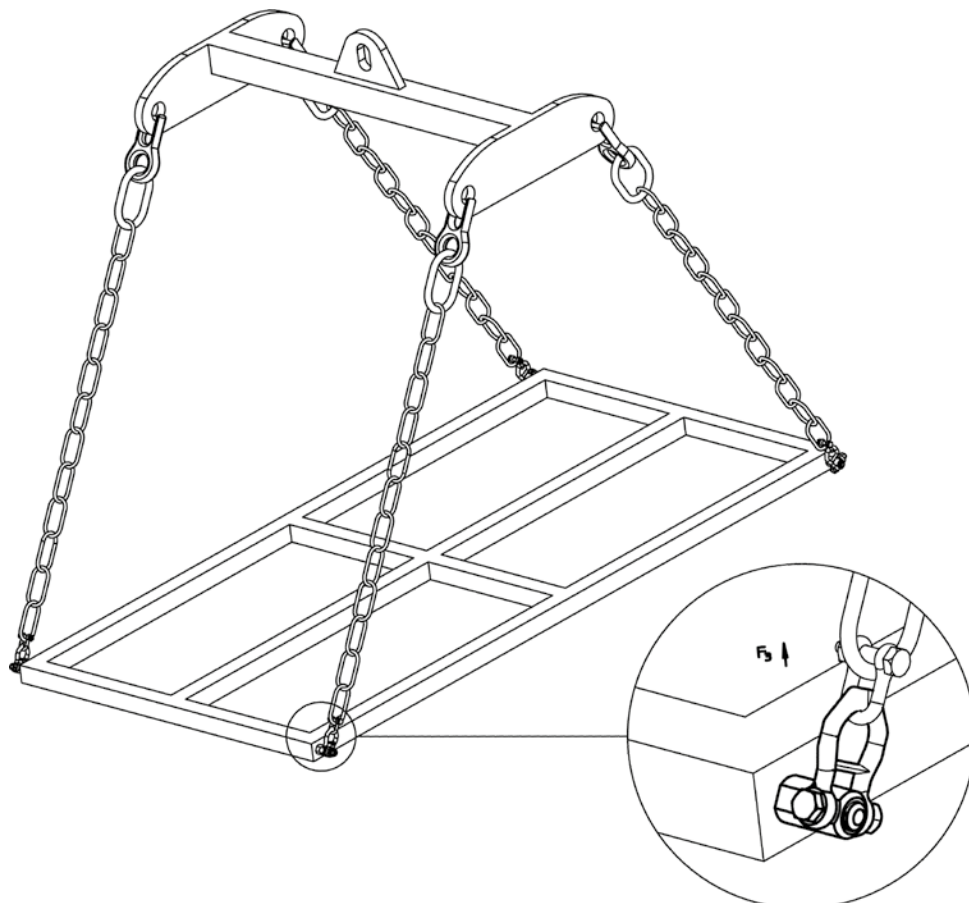


ORDER INFORMATION

d ₁ -0.04 -0.08	l ₁ +0.6	Dimensions											Load capacity ¹⁾			x		Location hole H11 [mm]	max. [°C]	[g]	Art. No.
		d ₂	d ₃	d ₄ min.	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	F ₁	F ₂	F ₃	¹⁾ min.	max.				
		[mm]											[kN]			[mm]					
8.0	10	9.35	21.5	9.85	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	5	8.0	250	266	22350.0601
	15	9.35	21.5	9.85	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	10	8.0	250	269	22350.0602
	25	9.35	21.5	9.85	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	15	8.0	250	270	22350.0604
	35	9.35	21.5	9.85	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	15	8.0	250	278	22350.0606
8.3	10	9.65	21.5	10.05	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	5	8.3	250	266	22350.0611
	15	9.65	21.5	10.05	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	10	8.3	250	266	22350.0612
	25	9.65	21.5	10.05	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	15	8.3	250	273	22350.0614
	35	9.65	21.5	10.05	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	15	8.3	250	235	22350.0616
10.0	15	11.70	21.5	12.20	10.20	25.7	36.0	27.0	30	49	87.5	21.5	2.7	2.4	2.1	1.5	10	10.0	250	277	22350.0621
	25	11.70	21.5	12.20	10.20	25.7	36.0	27.0	30	49	87.5	21.5	2.7	2.4	2.1	1.5	10	10.0	250	277	22350.0623
	35	11.70	21.5	12.20	10.20	25.7	36.0	27.0	30	49	87.5	21.5	2.7	2.4	2.1	1.5	10	10.0	250	299	22350.0625
	50	11.70	21.5	12.20	10.20	25.7	36.0	27.0	30	49	87.5	21.5	2.7	2.4	2.1	1.5	10	10.0	250	291	22350.0627
12.0	15	14.20	21.5	14.70	11.00	25.7	36.0	27.0	30	49	87.5	21.5	3.5	3.2	2.8	1.5	10	12.0	250	282	22350.0631
	25	14.20	21.5	14.70	11.00	25.7	36.0	27.0	30	49	87.5	21.5	3.5	3.2	2.8	1.5	15	12.0	250	289	22350.0633
	35	14.20	21.5	14.70	11.00	25.7	36.0	27.0	30	49	87.5	21.5	3.5	3.2	2.8	1.5	15	12.0	250	299	22350.0635
	50	14.20	21.5	14.70	11.00	25.7	36.0	27.0	30	49	87.5	21.5	3.5	3.2	2.8	1.5	15	12.0	250	309	22350.0637
13.8	25	16.20	21.5	16.70	13.00	25.7	36.0	27.0	30	49	87.5	21.5	3.8	3.5	2.8	1.5	15	13.8	250	302	22350.0651
	50	16.20	21.5	16.70	13.00	25.7	36.0	27.0	30	49	87.5	21.5	3.8	3.5	2.8	1.5	35	13.8	250	360	22350.0653
	75	16.20	21.5	16.70	13.00	25.7	36.0	27.0	30	49	87.5	21.5	3.8	3.5	2.8	1.5	35	13.8	250	391	22350.0655
16.0	25	18.60	25.0	19.20	15.10	31.0	44.5	27.0	30	49	92.8	21.5	4.8	4.5	4.1	1.5	15	16.0	250	385	22350.0641
	50	18.60	25.0	19.20	15.10	31.0	44.5	27.0	30	49	92.8	21.5	4.8	4.5	4.1	1.5	35	16.0	250	424	22350.0643
	75	18.60	25.0	19.20	15.10	31.0	44.5	27.0	30	49	92.8	21.5	4.8	4.5	4.1	1.5	40	16.0	250	467	22350.0645
20.0	50	24.50	30.0	25.00	19.70	36.5	52.0	32.6	36	56	114.0	26.0	10.0	8.5	6.5	1.5	25	20.0	250	709	22350.0673
	75	24.50	30.0	25.00	19.70	36.5	52.0	32.6	36	56	114.0	26.0	10.0	8.5	6.5	1.5	30	20.0	250	776	22350.0675

¹⁾ for a 5-fold safety against breakage

APPLICATION EXAMPLE



Lifting Pins • self-locking, stainless steel

EH 22350.



PRODUCT DESCRIPTION

Heavy-duty lifting element for quick and easy use, with moveable shackle and locking stud to provide protection against unintentional unlocking. Special lifting devices, e.g. threads for ring bolts, are no longer required on the workpiece.

Corrosion and weathering resistant, thus also suitable for outdoor application. Very solid, precipitation-hardened pin with an extreme load capacity.

Material

Pin part

- Stainless steel 1.4542, precipitation-hardened

Press button

- Aluminium, red anodised

Shackle

- Stainless steel 1.4571

Spring

- Stainless Steel

Assembly

Simple H11 boreholes are sufficient.

Mounting:

1. Press in the button and hold it down
2. Insert the lifting pin
3. Release the button (The button must be back in its original position)

Dismantling:

1. Press in the button and hold it down.
2. Remove the lifting pin.
3. Release the button.

Operation

Each lifting pin contains an instruction manual with an EC Declaration of Conformity.

MORE INFORMATION

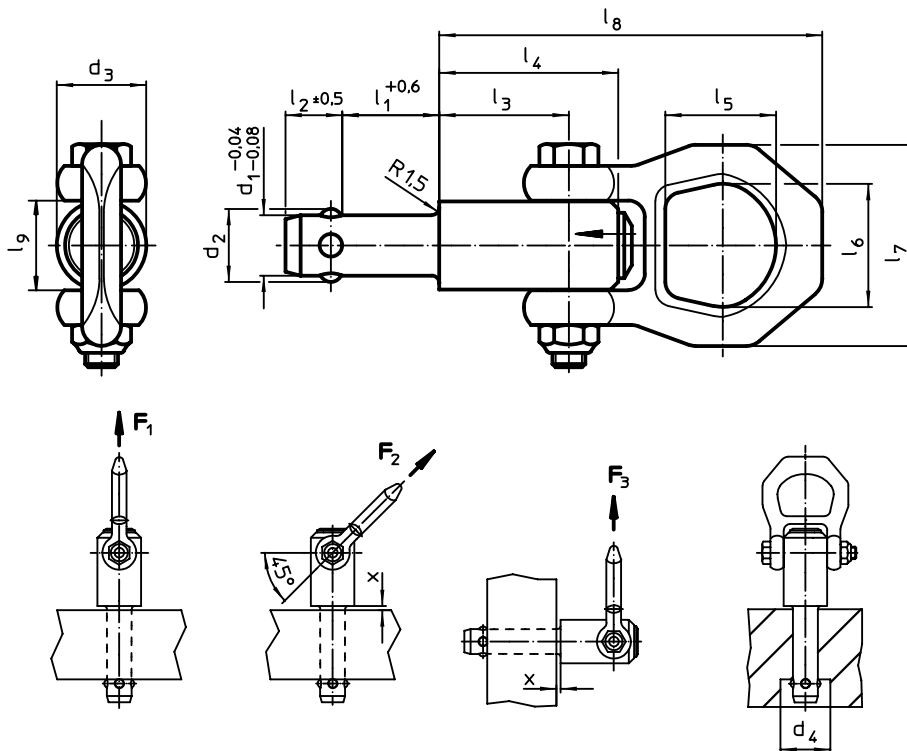
Accessories

As accessories, we offer matching locating bushings for $d_1 = 8, 10, 12, 16$ and 20

Further products

- Lifting Pins, self-locking. → p. 196
- Locating Bushings, for lifting pins → p. 200
- Locating Bushings, plain, for lifting pins → p. 201
- Locating Bushings with Seal, plain, for lifting pins. → p. 203
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- Threaded Lifting Pins, self-locking - INCH → p. 213
- Threaded Lifting Pins, self-locking, with rotatable shackle - INCH → p. 215

DRAWING

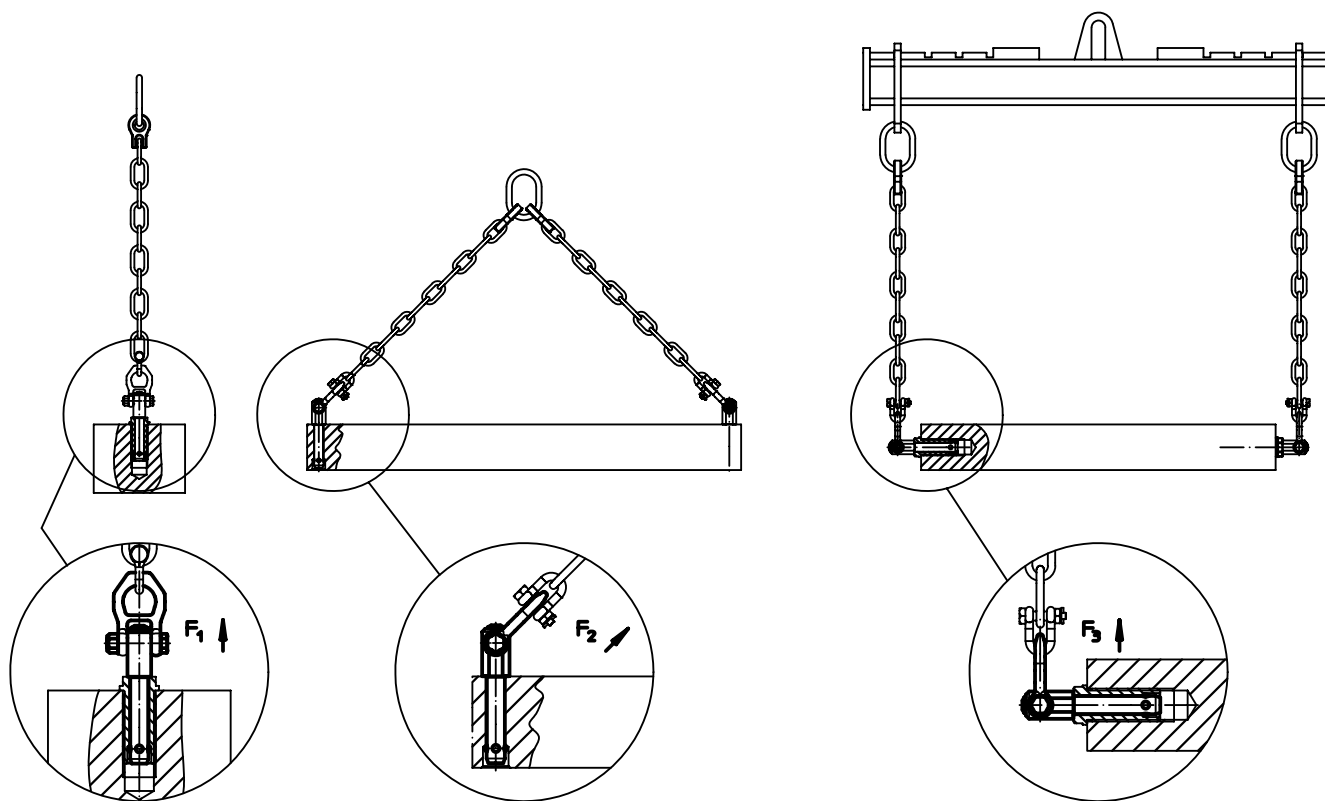


ORDER INFORMATION

d ₁ -0.04 -0.08	l ₁ +0.6	d ₂	d ₃	d ₄ min.	Dimensions									Load capacity ¹⁾			x		Location hole H11 [mm]	max. [°C]	[g]	Art. No.
					l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	F ₁	F ₂	F ₃	min.	max.					
					[mm]									[kN]			[mm]					
8.0	10	9.35	21.5	9.85	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	5	8.0	250	270	22350.0701	
	15	9.35	21.5	9.85	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	10	8.0	250	273	22350.0702	
	25	9.35	21.5	9.85	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	15	8.0	250	275	22350.0704	
	35	9.35	21.5	9.85	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	15	8.0	250	280	22350.0706	
8.3	10	9.65	21.5	10.05	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	5	8.3	250	228	22350.0711	
	15	9.65	21.5	10.05	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	10	8.3	250	229	22350.0712	
	25	9.65	21.5	10.05	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	15	8.3	250	233	22350.0714	
	35	9.65	21.5	10.05	8.75	25.7	36.0	27.0	30	49	87.5	21.5	1.5	1.2	0.5	1.5	15	8.3	250	238	22350.0716	
10.0	15	11.70	21.5	12.20	10.20	25.7	36.0	27.0	30	49	87.5	21.5	2.7	2.4	2.1	1.5	10	10.0	250	277	22350.0721	
	25	11.70	21.5	12.20	10.20	25.7	36.0	27.0	30	49	87.5	21.5	2.7	2.4	2.1	1.5	10	10.0	250	281	22350.0723	
	35	11.70	21.5	12.20	10.20	25.7	36.0	27.0	30	49	87.5	21.5	2.7	2.4	2.1	1.5	10	10.0	250	292	22350.0725	
	50	11.70	21.5	12.20	10.20	25.7	36.0	27.0	30	49	87.5	21.5	2.7	2.4	2.1	1.5	10	10.0	250	298	22350.0727	
12.0	15	14.20	21.5	14.70	11.00	25.7	36.0	27.0	30	49	87.5	21.5	3.5	3.2	2.8	1.5	10	12.0	250	285	22350.0731	
	25	14.20	21.5	14.70	11.00	25.7	36.0	27.0	30	49	87.5	21.5	3.5	3.2	2.8	1.5	15	12.0	250	292	22350.0733	
	35	14.20	21.5	14.70	11.00	25.7	36.0	27.0	30	49	87.5	21.5	3.5	3.2	2.8	1.5	15	12.0	250	304	22350.0735	
	50	14.20	21.5	14.70	11.00	25.7	36.0	27.0	30	49	87.5	21.5	3.5	3.2	2.8	1.5	15	12.0	250	316	22350.0737	
13.8	25	16.20	21.5	16.70	13.00	25.7	36.0	27.0	30	49	87.5	21.5	3.8	3.5	2.8	1.5	15	13.8	250	260	22350.0751	
	50	16.20	21.5	16.70	13.00	25.7	36.0	27.0	30	49	87.5	21.5	3.8	3.5	2.8	1.5	35	13.8	250	290	22350.0753	
	75	16.20	21.5	16.70	13.00	25.7	36.0	27.0	30	49	87.5	21.5	3.8	3.5	2.8	1.5	35	13.8	250	323	22350.0755	
16.0	25	18.60	25.0	19.20	15.10	31.0	44.5	27.0	30	49	92.8	21.5	4.8	4.5	4.1	1.5	15	16.0	250	395	22350.0741	
	50	18.60	25.0	19.20	15.10	31.0	44.5	27.0	30	49	92.8	21.5	4.8	4.5	4.1	1.5	35	16.0	250	430	22350.0743	
	75	18.60	25.0	19.20	15.10	31.0	44.5	27.0	30	49	92.8	21.5	4.8	4.5	4.1	1.5	40	16.0	250	465	22350.0745	
20.0	50	24.50	30.0	25.00	19.70	36.5	52.0	32.6	36	56	114.0	26.0	10.0	8.5	6.5	1.5	25	20.0	250	729	22350.0773	
	75	24.50	30.0	25.00	19.70	36.5	52.0	32.6	36	56	114.0	26.0	10.0	8.5	6.5	1.5	30	20.0	250	693	22350.0775	

¹⁾ for a 5-fold safety against breakage

APPLICATION EXAMPLE



Locating Bushings • for lifting pins

EH 22350.



PRODUCT DESCRIPTION

Locating bushings are used for quick and safe locating of lifting pins EH 22350 / EH 22351. Corrosion and abrasion resistant.

Material

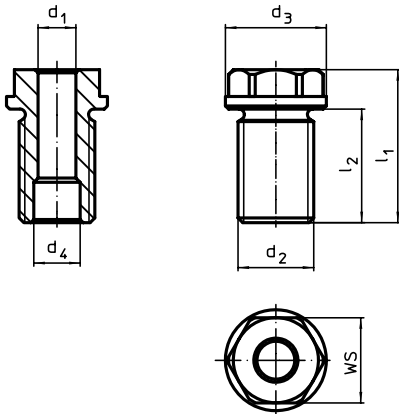
- Stainless steel 1.4542, precipitation-hardened

Easily incorporated into different materials
Can be mounted in blind holes.
For thin-walled parts, lock nuts are used for assembly.

Assembly

Safe tolerances and consistent function.

DRAWING

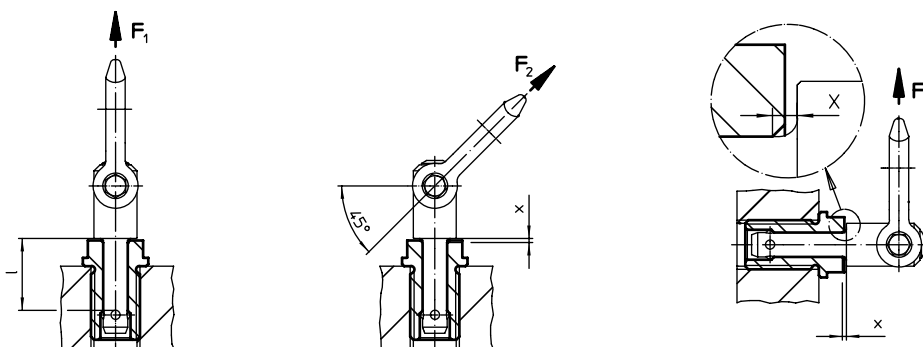


ORDER INFORMATION

Dimensions d ₁ H11	d ₂ [mm]	For nominal length [mm]	Dimensions				WS [mm]	Tightening torque max. [Nm]	x ¹⁾ [mm]	Load capacity ¹⁾			For lifting pin	Art. No.	
			d ₃ -0.2	d ₄ +0.3	l ₁	l ₂				F ₁	F ₂	F ₃			
8	M16 x 1,5	10	24	9.8	27.5	20	19	90	1.5	1.5	1.2	0.5	22350.0601 / .0701	34	22350.0900
		15	24	9.8	27.5	20	19	90	1.5	1.5	1.2	0.5	22350.0602 / .0702	34	22350.0902
	M16	25	24	9.8	37.5	25	19	75	1.5	1.5	1.2	0.5	22350.0604 / .0704	47	22350.0904
		35	24	9.8	47.5	35	19	75	1.5	1.5	1.2	0.5	22350.0606 / .0706	57	22350.0906
10	M20 x 1,5	15	28	12.2	35.5	24	24	145	1.5	2.7	2.4	2.1	22350.0621 / .0721	71	22350.0910
		25	28	12.2	35.5	24	24	145	1.5	2.7	2.4	2.1	22350.0623 / .0723	74	22350.0912
	M20	35	28	12.2	46.0	29	24	130	1.5	2.7	2.4	2.1	22350.0625 / .0725	94	22350.0914
		50	28	12.2	65.0	49	24	130	1.5	2.7	2.4	2.1	22350.0627 / .0727	117	22350.0916
		75	28	12.2	84.0	59	24	130	1.5	2.7	2.4	2.1	22350.0629 / .0729	140	22350.0918
12	M24 x 1,5	15	32	14.7	35.5	24	27	220	1.5	3.5	3.2	2.8	22350.0631 / .0731	95	22350.0920
		25	32	14.7	36.5	24	27	220	1.5	3.5	3.2	2.8	22350.0633 / .0733	103	22350.0922
	M24	35	32	14.7	48.5	36	27	200	1.5	3.5	3.2	2.8	22350.0635 / .0735	120	22350.0924
		50	32	14.7	72.5	60	27	200	1.5	3.5	3.2	2.8	22350.0637 / .0737	164	22350.0926
16	M30 x 2	25	39	19.2	44.0	29	30	440	1.5	4.8	4.5	4.1	22350.0641 / .0741	164	22350.0930
		50	39	19.2	66.0	44	30	400	1.5	4.8	4.5	4.1	22350.0643 / .0743	238	22350.0934
	M30	75	39	19.2	96.0	74	30	400	1.5	4.8	4.5	4.1	22350.0645 / .0745	325	22350.0936
20	M36 x 2	50	43	26.0	70.0	55	36	440	1.5	10.0	8.5	6.5	22350.0673 / .0773	353	22350.0954
		75	43	26.0	95.0	80	36	440	1.5	10.0	8.5	6.5	22350.0675 / .0775	470	22350.0956

¹⁾ for a 5-fold safety against breakage

APPLICATION EXAMPLE



Locating Bushings, plain • for lifting pins

EH 22350.



PRODUCT DESCRIPTION

Locating bushings are used for quick and safe locating of lifting pins EH 22350 / EH 22351. This design is suitable for applications which require installation flush to the surface. A face wrench is required for installation. As an accessory, we offer a standard adjustable face wrench, offset, and a face and socket wrench. In combination with a socket-wrench/screwdriver, the face and socket wrench is especially suitable for use if space is restricted. Corrosion and abrasion resistant.

Material

- Stainless steel 1.4542, precipitation-hardened

Assembly

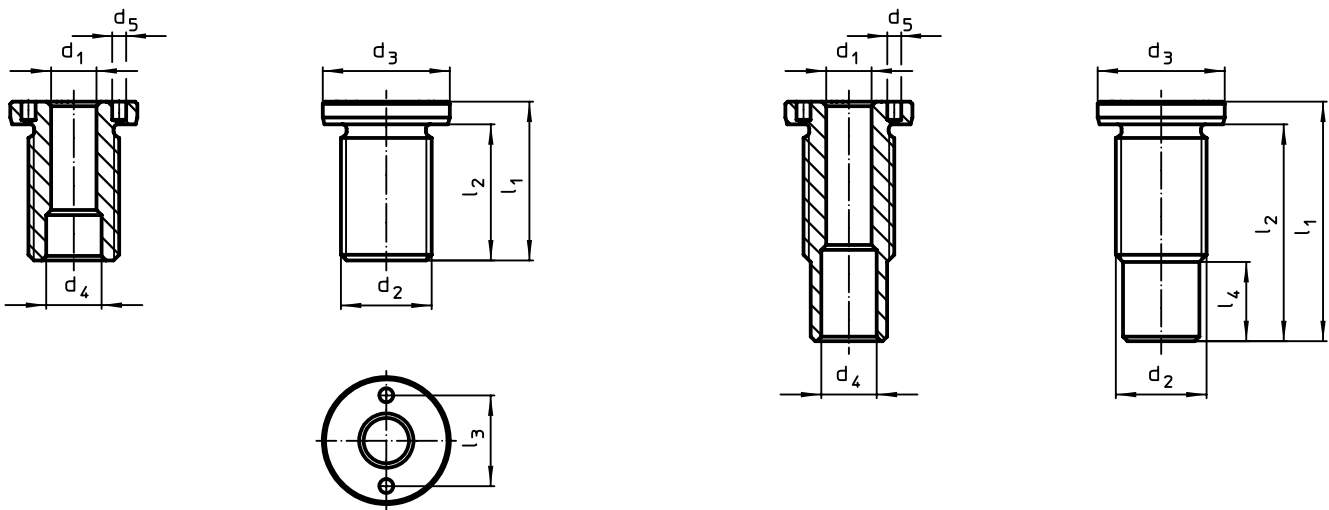
Safe tolerances and consistent function.

Easily incorporated into different materials
Bush can be easily installed via optional assembly tool.

Can be mounted in blind holes.

For thin-walled parts, lock nuts are used for assembly.

DRAWING



size M16/M16x1,5/M20
M20x1,5/M24x1,5/M30x2

size M24/M30/M36x2




ORDER INFORMATION

d ₁ H11	Dimensions		For nominal length	Dimensions								Tightening torque max.	x ¹⁾	Load capacity ¹⁾			For lifting pin	Art. No.
	d ₂	[mm]		d ₃ -0.2	d ₄ +0.3	d ₅ +0.1	l ₁	l ₂	l ₃	l ₄	[Nm]			[mm]	F ₁	F ₂		
8	M16 x 1,5		10	24	9.8	3.1	25	20	16	-	75	1.5	1.5	1.2	0.5	22350.0601 / .0701	31	22350.1900
			15	24	9.8	3.1	25	20	16	-	75	1.5	1.5	1.2	0.5	22350.0602 / .0702	32	22350.1902
	M16		25	24	9.8	3.1	35	30	16	-	75	1.5	1.5	1.2	0.5	22350.0604 / .0704	41	22350.1904
			35	24	9.8	3.1	45	40	16	-	75	1.5	1.5	1.2	0.5	22350.0606 / .0706	49	22350.1906
10	M20 x 1,5		15	28	12.2	5.1	30	24	20	-	100	1.5	2.7	2.4	2.1	22350.0621 / .0721	55	22350.1910
			25	28	12.2	5.1	35	29	20	-	100	1.5	2.7	2.4	2.1	22350.0623 / .0723	64	22350.1912
	M20		35	28	12.2	5.1	45	39	20	-	100	1.5	2.7	2.4	2.1	22350.0625 / .0725	70	22350.1914
			50	28	12.2	5.1	60	54	20	-	100	1.5	2.7	2.4	2.1	22350.0627 / .0727	93	22350.1916
12	M24 x 1,5		15	32	14.7	5.1	32	26	22	-	150	1.5	3.5	3.2	2.8	22350.0631 / .0731	80	22350.1920
			25	32	14.7	5.1	40	34	22	-	150	1.5	3.5	3.2	2.8	22350.0633 / .0733	94	22350.1922
	M24		35	32	14.7	5.1	50	44	22	3.8	150	1.5	3.5	3.2	2.8	22350.0635 / .0735	116	22350.1924
			50	32	14.7	5.1	65	59	22	18.8	150	1.5	3.5	3.2	2.8	22350.0637 / .0737	130	22350.1926
16	M30 x 2		25	39	19.2	5.1	45	39	30	-	200	1.5	4.8	4.5	4.1	22350.0641 / .0741	163	22350.1930
			50	39	19.2	5.1	65	59	30	6.0	200	1.5	4.8	4.5	4.1	22350.0643 / .0743	201	22350.1934
	M30		75	39	19.2	5.1	90	84	30	31.0	200	1.5	4.8	4.5	4.1	22350.0645 / .0745	248	22350.1936
20	M36 x 2		50	43	26.0	5.1	70	63	30	3.5	200	1.5	10.0	8.5	6.5	22350.0673 / .0773	341	22350.1954
			75	43	26.0	5.1	95	88	30	28.5	200	1.5	10.0	8.5	6.5	22350.0675 / .0775	413	22350.1956

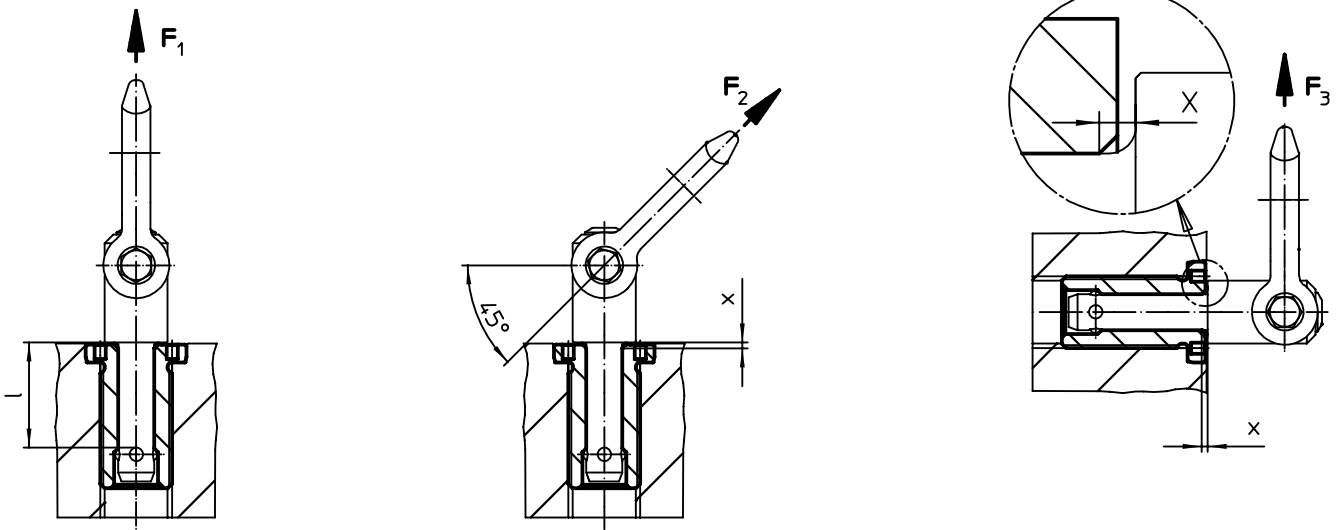
¹⁾ for a 5-fold safety against breakage

ACCESSORIES

2

	Suitable for size d_1 [mm]	Pin spacing ± 0.1 [mm]	Pin diameter -0.1 [mm]	Square drive [in]	 [g]	Art. No.
adjustable face wrench, offset						
	8	-	3		121	22350.1990
	10/12/16/20/25	-	5		309	22350.1991
face and socket wrench						
	8	16	3	1/2	116	22350.1995
	10	20	5	1/2	136	22350.1996
	12	22	5	1/2	185	22350.1997
	16/20	30	5	1/2	243	22350.1998

APPLICATION EXAMPLE



Locating Bushings with Seal, plain • for lifting pins

EH 22350.



PRODUCT DESCRIPTION

The seal prevents the penetration of liquid and dirt. The bushing is therefore especially suitable for use in the open air.

Locating bushings are used for quick and safe locating of lifting pins EH 22350 / EH 22351. This design is suitable for applications which require installation flush to the surface.

A face wrench is required for installation. As an accessory, we offer a standard adjustable face wrench, offset, and a face and socket wrench. In combination with a socket-wrench/screwdriver, the face and socket wrench is especially suitable for use if space is restricted. Corrosion and abrasion resistant.

Material

Bushing

- Stainless steel 1.4542, precipitation-hardened

O-ring

- NBR

Spring

- Stainless steel

Assembly

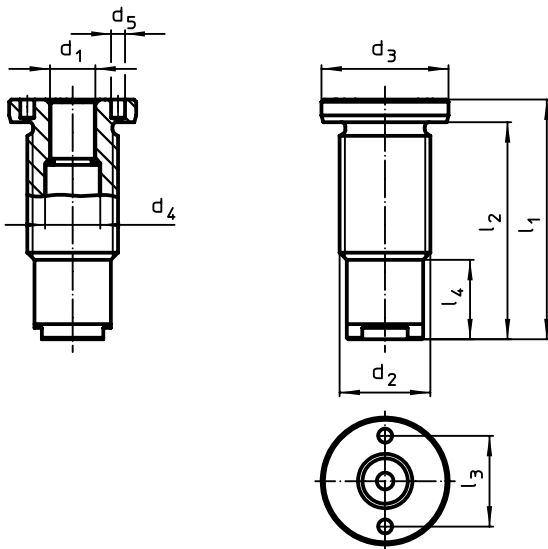
Safe tolerances and consistent function.

Easily incorporated into different materials. Bush can be easily installed via optional assembly tool.

Can be mounted in blind holes.

For thin-walled parts, lock nuts are used for assembly.

DRAWING






ORDER INFORMATION

d ₁ H11	Dimensions		Dimensions								Tightening torque max. [Nm]	x ¹⁾ [mm]	Load capacity ¹⁾ [kN]			For lifting pin		Art. No.
	d ₂ [mm]	For nominal length [mm]	d ₃ -0.2	d ₄ +0.3	d ₅ +0.1	l ₁	l ₂	l ₃	l ₄	F ₁			F ₂	F ₃	[g]			
8	M16 x 1,5	10	24	9.9	3.1	37.5	32.5	16	12.5	75	1.5	1.5	1.2	0.5	22350.0601 / .0701	47	22350.1960	
10	M20 x 1,5	15	28	12.3	5.1	51.0	45.0	20	21.0	100	1.5	2.7	2.4	2.1	22350.0621 / .0721	92	22350.1961	
12	M24 x 1,5	15	32	14.4	5.1	53.0	47.0	22	21.0	150	1.5	3.5	3.2	2.8	22350.0631 / .0731	125	22350.1962	
16	M30 x 2	25	39	19.3	5.1	78.0	72.0	30	33.0	200	1.5	4.8	4.5	4.1	22350.0641 / .0741	253	22350.1963	

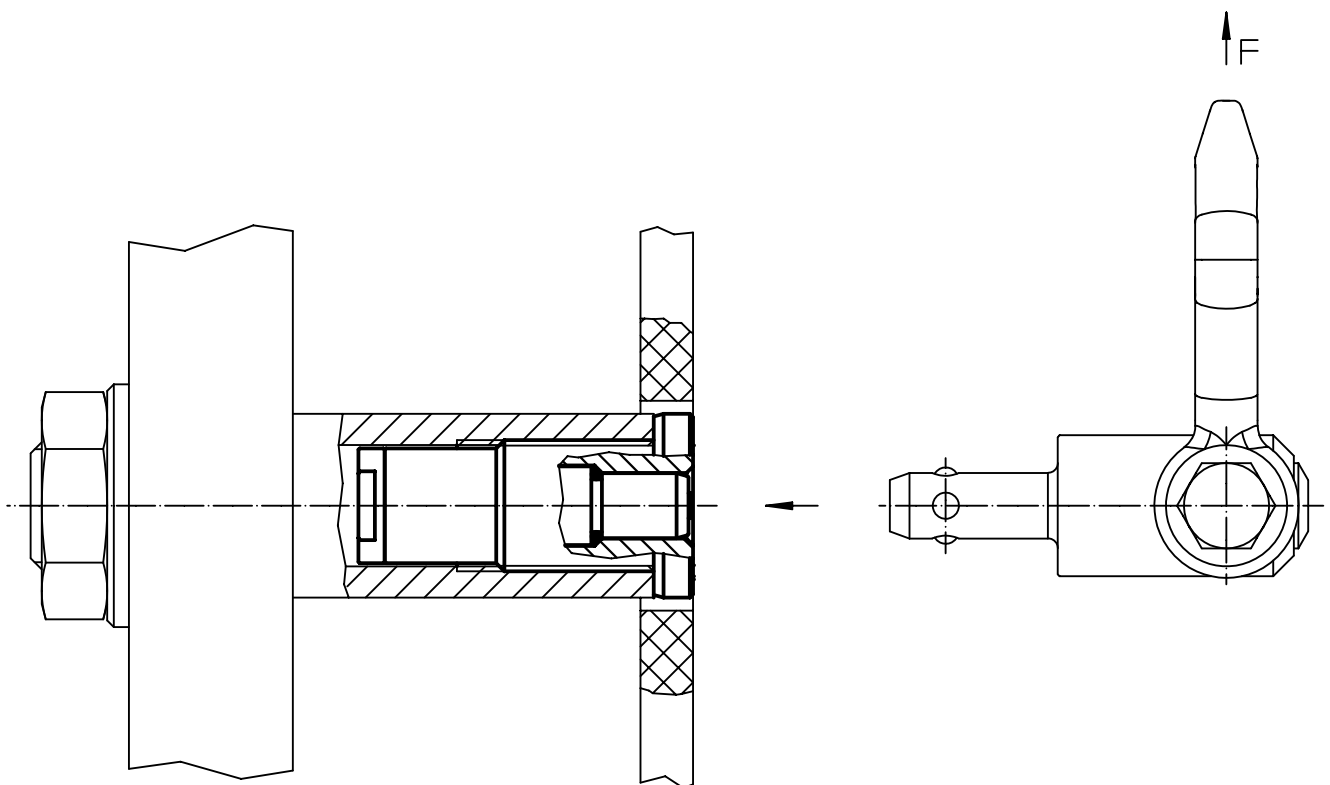
¹⁾ for a 5-fold safety against breakage

ACCESSORIES

2

	Suitable for size d ₁ [mm]	Pin spacing ±0.1 [mm]	Pin diameter -0.1 [mm]	Square drive [in]	 [g]	Art. No.
adjustable face wrench, offset						
	8	-	3		121	22350.1990
	10/12/16/20/25	-	5		309	22350.1991
face and socket wrench						
	8	16	3	1/2	116	22350.1995
	10	20	5	1/2	136	22350.1996
	12	22	5	1/2	185	22350.1997
	16/20	30	5	1/2	243	22350.1998

APPLICATION EXAMPLE



Lifting Pins • self-locking, with handle

EH 22351.



PRODUCT DESCRIPTION

The T-handled grip can be used to move or transport workpieces via hand, e.g. part finished components, workholding systems, speakers and other containers. Corrosion and weathering resistant, thus also suitable for outdoor application. Very solid, precipitation-hardened pin with an extreme load capacity.

Material

Pin part

- Stainless steel 1.4542, precipitation-hardened

Handle

- Aluminium, blue anodised

Press button

- Aluminium, blue anodised

Spring

- Stainless Steel

Dismantling:

1. Press in the button and hold it down.
2. Remove the lifting pin.
3. Release the button.

Operation

Each lifting pin contains an instruction manual with an EC Declaration of Conformity.

MORE INFORMATION

Accessories

As accessories, we offer matching locating bushings for $d_1 = 8, 10$ and 12

Assembly

Simple H11 boreholes are sufficient.

Mounting:

1. Press in the button and hold it down
2. Insert the lifting pin
3. Release the button (The button must be back in its original position)

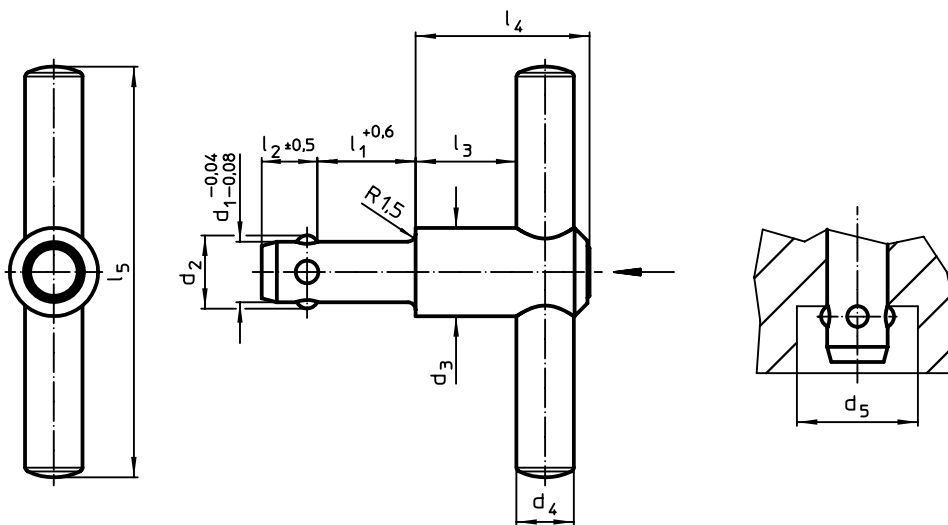
Further products

Locating Bushings, for lifting pins → p. 200

Locating Bushings, plain, for lifting pins → p. 201

Locating Bushings with Seal, plain, for lifting pins. → p. 203

DRAWING



ORDER INFORMATION

Dimensions										Load capacity F_1	Location hole H11	🌡️ max.	🏠 [g]	Art. No.
d_1	l_1	d_2	d_3	d_4	d_5 min.	l_2	l_3	l_4	l_5					
[mm]										[N]	[mm]	[°C]	[g]	
8.0 -0.04 -0.08	35 +0.6	9.35	21.5	14	9.85	8.75	18.7	36.0	100	500	8.0	250	136	22351.0005
8.3	35	9.65	21.5	14	10.05	8.75	18.7	36.0	100	500	8.3	250	142	22351.0010
10.0	50	11.70	21.5	14	12.20	10.20	18.7	36.5	100	500	10.0	250	154	22351.0015
12.0	50	14.20	21.5	14	14.70	11.00	18.7	36.5	100	500	12.0	250	177	22351.0020

ORANGE IS THE NEW THREAD

TIME IS MONEY

Eye bolts and other lifting elements have to be screwed in laboriously. In contrast, threaded lifting pins can be pushed into existing threads just by pushing a button. They thus save a great deal of time when handling very varied loads. A selection of different versions provides the right solution for every purpose.



[www.halder.com/
LiftingDevices](http://www.halder.com/LiftingDevices)



Threaded Lifting Pins • self-locking
EH 22352.



PRODUCT DESCRIPTION

Heavy-duty lifting element for quick and easy use, with moveable shackle and locking stud to provide protection against unintentional unlocking. For lifting loads, the threaded lifting pin is inserted into a threaded hole. In contrast to a ringbolt, time-consuming screwing in and out is therefore unnecessary.

All versions are corrosion-protected. The version made of stainless steel is also resistant to corrosion and weathering, so it is also suitable for external use. In addition, the high-strength, precipitation-hardened pin makes extreme loads possible.

Material

Pin part

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4542, precipitation-hardened

Press button

- Aluminium, orange, anodised

Threaded element

- Stainless steel 1.4542, precipitation-hardened

Shackle

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4571

Spring

- Stainless Steel

Assembly

Threaded lifting pins can be mounted into a thread that is true to gauge.

Mounting:

1. Press in the button and hold it down.
2. Insert the threaded lifting pin.
3. Release the button (The button must be back in its original position.)
4. Tighten the threaded lifting pin by hand,

until it bears completely on the bearing surface.

5. It must be ensured that the threaded segments are engaged in the mounting thread.

Dismantling:

1. Unscrew the threaded lifting pin approx. a quarter of a turn anticlockwise.
2. Press in the button and hold it down.
3. Remove the threaded lifting pin.
4. Release the button.

Operation

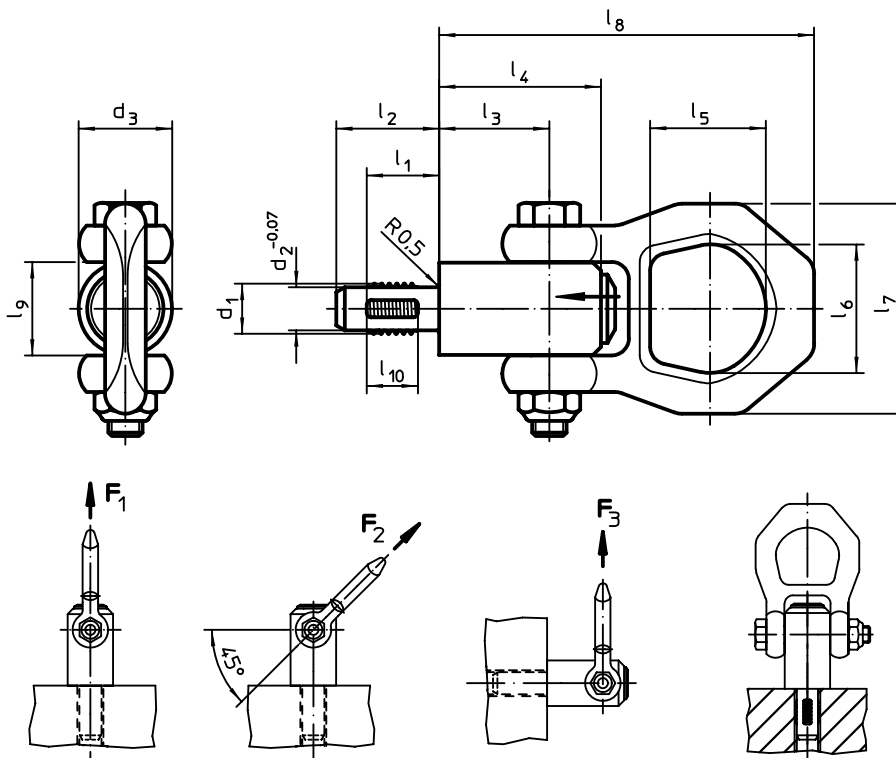
Each threaded lifting pin contains an instruction manual with an EC Declaration of Conformity.

MORE INFORMATION

Further products

- Lifting Pins, self-locking → p. 196
- Lifting Pins, self-locking, stainless steel → p. 198
- Threaded Lifting Pins, self-locking, for centre holes according to DIN 332 → p. 209
- Threaded Lifting Pins, self-locking, with rotatable shackle → p. 211
- Threaded Lifting Pins, self-locking - INCH → p. 213
- Threaded Lifting Pins, self-locking, with rotatable shackle - INCH → p. 215

DRAWING

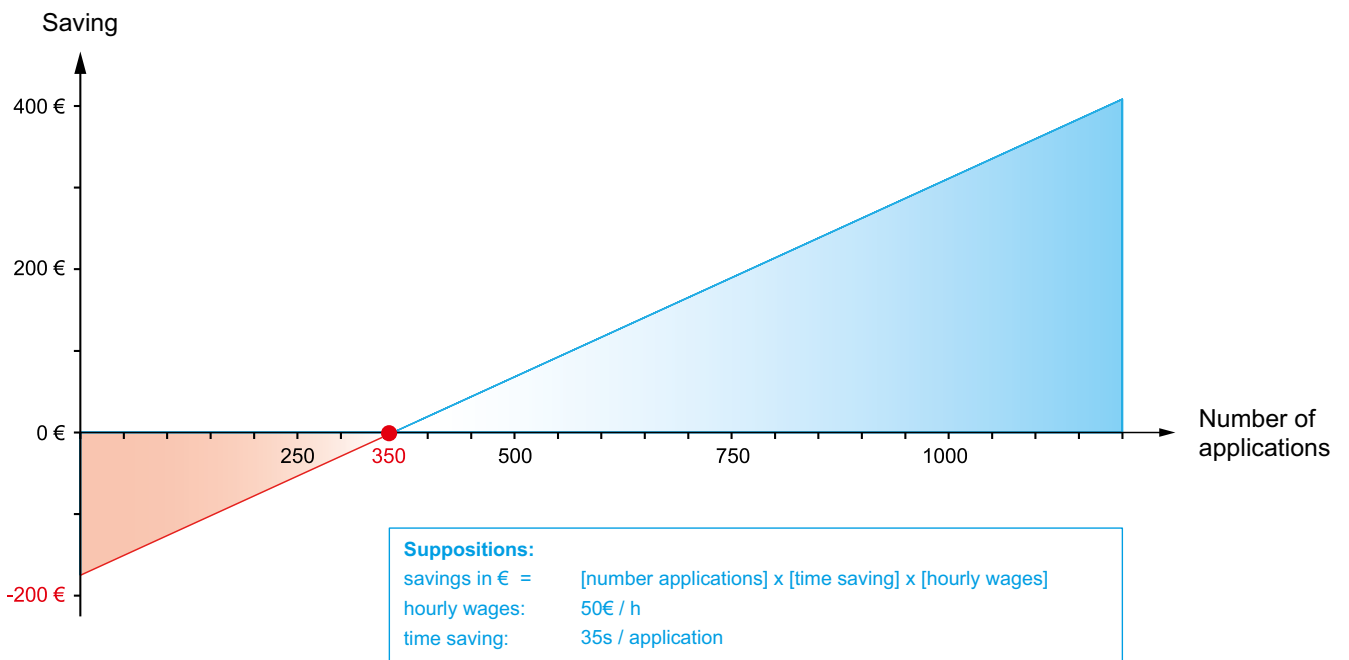


ORDER INFORMATION

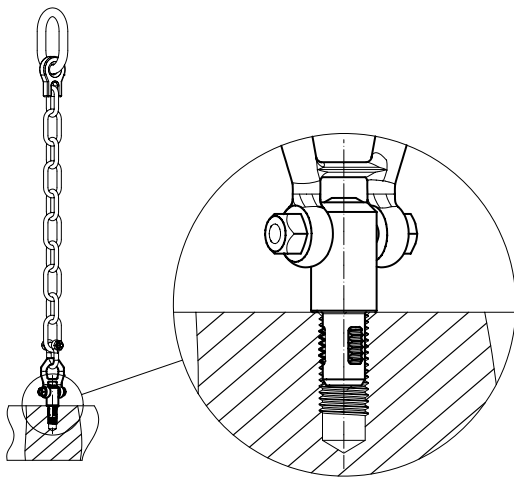
2

d ₁	l ₁	Dimensions											Load capacity ¹⁾			Locating thread	max. [°C]	[g]	Art. No.	
		d ₂ -0.07	d ₃	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	l ₁₀	F ₁	F ₂	F ₃				Heat-treated steel	Stainless steel
[mm]													[kN]			[mm]	[°C]	[g]		
M 8	12	6.62	21.5	17.8	25.7	36	27.0	30.0	49	87.5	21.5	8	2.1	0.9	0.8	M 8	250	274	22352.0008	22352.1008
M10	14	8.35	21.5	20.0	25.7	36	27.0	30.0	49	87.5	21.5	10	3.9	1.5	1.5	M10	250	268	22352.0010	22352.1010
M12	17	10.07	21.5	24.0	25.7	36	27.0	30.0	49	87.5	21.5	12	6.2	2.5	2.3	M12	250	273	22352.0012	22352.1012
M14	17	11.80	21.5	24.0	25.7	36	27.0	30.0	49	87.5	21.5	12	7.8	4.2	2.9	M14	250	279	22352.0014	-
M16	17	13.80	21.5	24.0	25.7	36	27.0	30.0	49	87.5	21.5	12	8.4	4.5	4.2	M16	250	284	22352.0016	22352.1016
M20	22	17.25	30.0	30.0	36.5	52	32.6	36.0	56	114.0	26.0	17	16.6	7.7	5.8	M20	250	586	22352.0020	-
													10.0	7.7	5.8	M20	250	519	-	22352.1020
M24	27	20.70	36.0	36.0	42.0	60	50.6	49.8	82	152.0	36.0	22	23.0	11.1	8.6	M24	250	1187	22352.0024	22352.1024
M27	31	23.67	45.0	40.0	42.0	60	50.6	49.8	82	152.0	36.0	26	33.8	15.7	13.7	M27	250	1546	22352.0027	-
M30	35	26.10	45.0	45.0	42.0	60	50.6	49.8	82	152.0	36.0	30	42.3	21.5	15.5	M30	250	1596	22352.0030	-

¹⁾ for a 5-fold safety against breakage



APPLICATION EXAMPLE



Threaded Lifting Pins • self-locking, for centre holes according to DIN 332
EH 22352.



PRODUCT DESCRIPTION

This threaded lifting pin is used when there is a threaded hole with a counterbore according to DIN 332.

Heavy-duty lifting element for quick and easy use, with moveable shackle and locking stud to provide protection against unintentional unlocking. For lifting loads, the threaded lifting pin is inserted into a threaded hole. In contrast to a ringbolt, time-consuming screwing in and out is therefore unnecessary.

All versions are corrosion-protected. The version made of stainless steel is also resistant to corrosion and weathering, so it is also suitable for external use. In addition, the high-strength, precipitation-hardened pin makes extreme loads possible.

Material

Pin part

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4542, precipitation-hardened

Press button

- Aluminium, orange, anodised

Threaded element

- Stainless steel 1.4542, precipitation-hardened

Shackle

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4571

Spring

- Stainless Steel

Assembly

Threaded lifting pins can be mounted into a thread that is true to gauge.

Mounting:

1. Press in the button and hold it down.
2. Insert the threaded lifting pin.
3. Release the button (The button must be back in its original position.).
4. Tighten the threaded lifting pin by hand,

until it bears completely on the bearing surface.

5. It must be ensured that the threaded segments are engaged in the mounting thread.

Dismantling:

1. Unscrew the threaded lifting pin approx. a quarter of a turn anticlockwise.
2. Press in the button and hold it down.
3. Remove the threaded lifting pin.
4. Release the button.

Operation

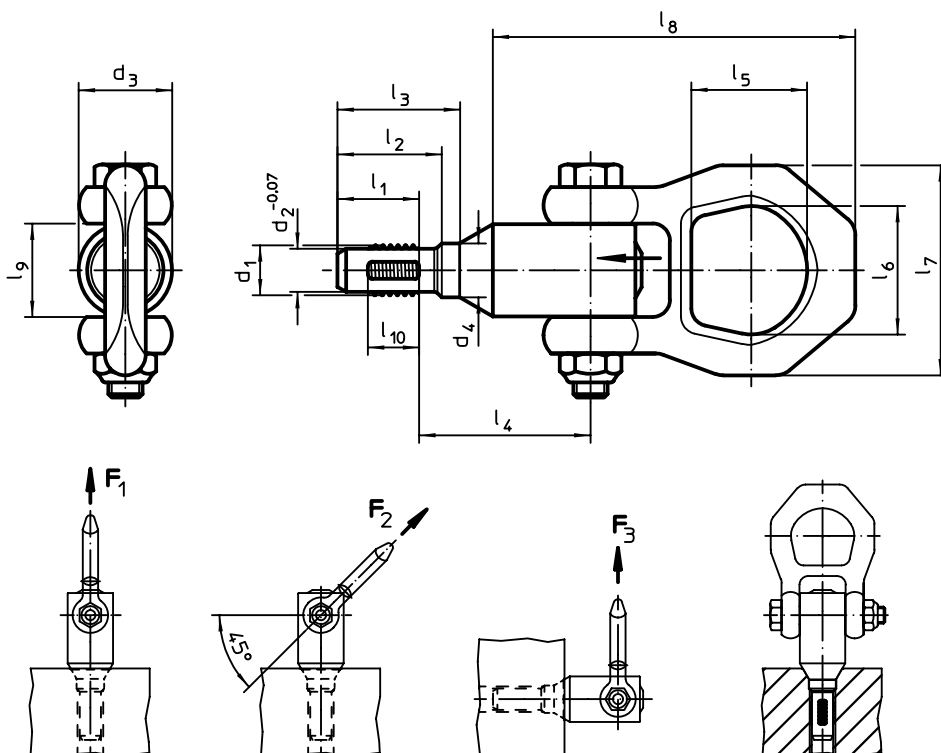
Each threaded lifting pin contains an instruction manual with an EC Declaration of Conformity.

MORE INFORMATION

Further products

- Lifting Pins, self-locking → p. 196
- Lifting Pins, self-locking, stainless steel → p. 198
- Threaded Lifting Pins, self-locking . . . → p. 207
- Threaded Lifting Pins, self-locking, with rotatable shackle → p. 211
- Threaded Lifting Pins, self-locking - INCH → p. 213
- Threaded Lifting Pins, self-locking, with rotatable shackle - INCH → p. 215

DRAWING

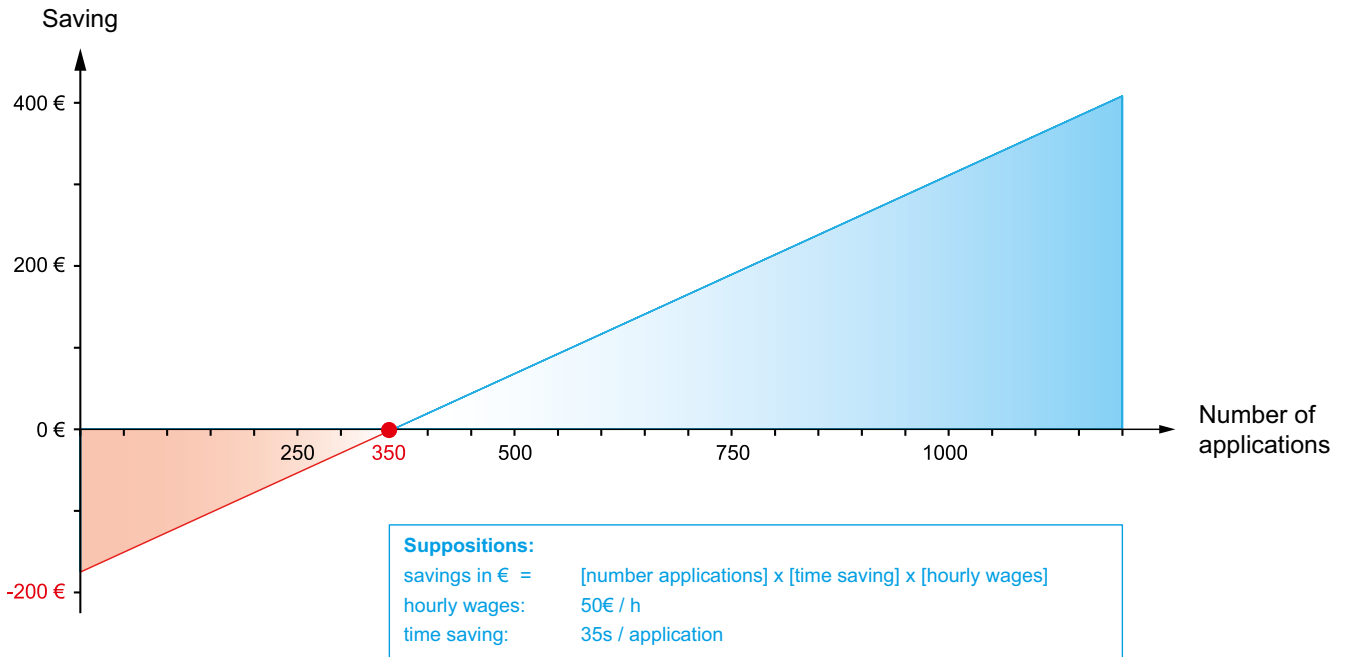


ORDER INFORMATION

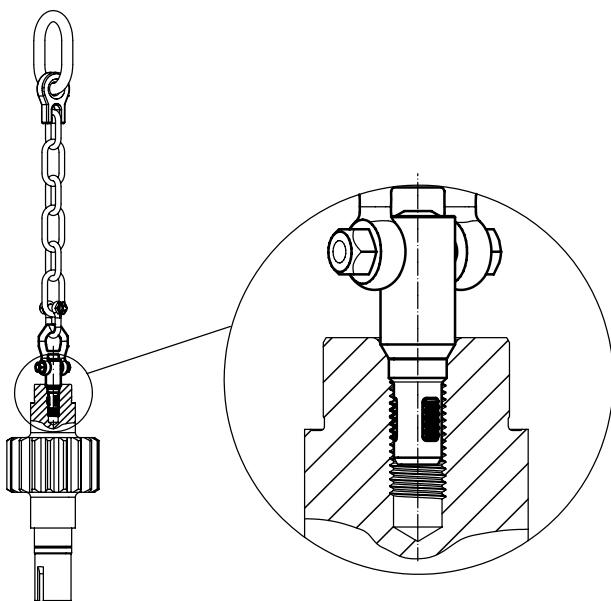
2

	Dimensions													Load capacity ¹⁾			Locating thread	max. [°C]	[g]	Art. No.	
	d ₁	l ₁	d ₂ -0.07	d ₃	d ₄	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	l ₁₀	F ₁	F ₂				F ₃	Heat-treated steel
	[mm]													[kN]			[mm]				
M 8	13.9	6.62	21.5	8.1	17.6	19.5	34.6	27.0	30.0	49	82.3	21.5	8	2.1	0.9	0.8	M 8	250	227	22352.2008	22352.3008
M10	16.0	8.35	21.5	10.2	20.0	22.9	36.4	27.0	30.0	49	83.6	21.5	10	3.9	1.5	1.5	M10	250	274	22352.2010	22352.3010
M12	19.0	10.07	21.5	12.7	24.0	28.1	39.1	27.0	30.0	49	84.3	21.5	12	6.2	2.5	2.3	M12	250	249	22352.2012	22352.3012
M16	19.0	13.80	21.5	16.7	25.0	30.5	42.3	27.0	30.0	49	88.5	21.5	12	8.4	4.5	4.2	M16	250	271	22352.2016	22352.3016
M20	25.0	17.75	30.0	20.7	31.8	39.1	53.7	32.6	36.0	56	109.2	30.0	17	16.6	7.7	5.8	M20	250	554	22352.2020	–
														10.0	7.7	5.8	M20	250	555	–	22352.3020
M24	31.0	20.70	36.0	24.7	38.9	47.3	61.4	50.6	49.8	82	145.4	36.0	22	23.0	11.1	8.6	M24	250	1234	22352.2024	22352.3024

¹⁾ for a 5-fold safety against breakage



APPLICATION EXAMPLE



Threaded Lifting Pins • self-locking, with rotatable shackle

EH 22353.



PRODUCT DESCRIPTION

Heavy-duty lifting element for quick and easy use, with moveable, rotatable shackle and locking stud to provide protection against unintentional unlocking. For lifting loads, the threaded lifting pin is inserted into a threaded hole. In contrast to a ringbolt, time-consuming screwing in and out is therefore unnecessary. The rotatable shackle will always align with the tensile direction of pull without the pin rotating. This prevents the lifting device from being turned out of the thread and the component can be lifted safely.

All versions are corrosion-protected. The version made of stainless steel is also resistant to corrosion and weathering, so it is also suitable for external use. In addition, the high-strength, precipitation-hardened pin makes extreme loads possible.

Material

Pin part

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4542, precipitation-hardened

Press button

- Aluminium, orange, anodised

Threaded element

- Stainless steel 1.4542, precipitation-hardened

Shackle

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4571

Spring

- Stainless Steel

Assembly

Threaded lifting pins can be mounted into a thread that is true to gauge.

Mounting:

1. Press in the button and hold it down.
2. Insert the threaded lifting pin.
3. Release the button (The button must be back in its original position.)
4. Tighten the threaded lifting pin by hand,

until it bears completely on the bearing surface.

5. It must be ensured that the threaded segments are engaged in the mounting thread.

Dismantling:

1. Unscrew the threaded lifting pin approx. a quarter of a turn anticlockwise.
2. Press in the button and hold it down.
3. Remove the threaded lifting pin.
4. Release the button.

Operation

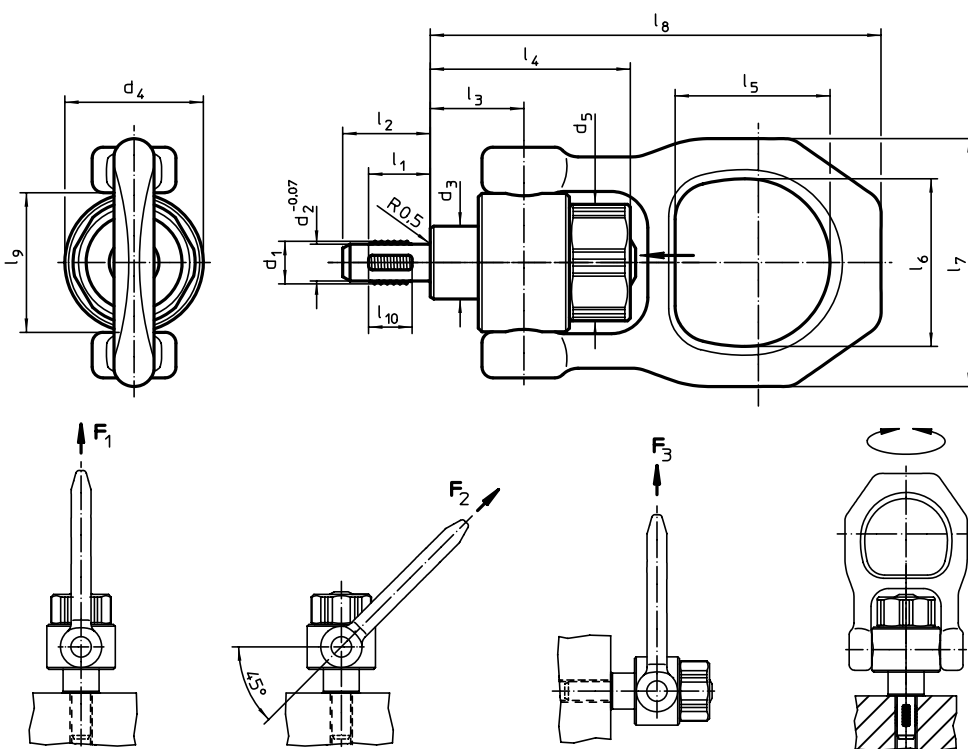
Each threaded lifting pin contains an instruction manual with an EC Declaration of Conformity.

MORE INFORMATION

Further products

- Lifting Pins, self-locking → p. 196
- Lifting Pins, self-locking, stainless steel → p. 198
- Threaded Lifting Pins, self-locking . . . → p. 207
- Threaded Lifting Pins, self-locking, for centre holes according to DIN 332 . . . → p. 209
- Threaded Lifting Pins, self-locking - INCH → p. 213
- Threaded Lifting Pins, self-locking, with rotatable shackle - INCH → p. 215

DRAWING



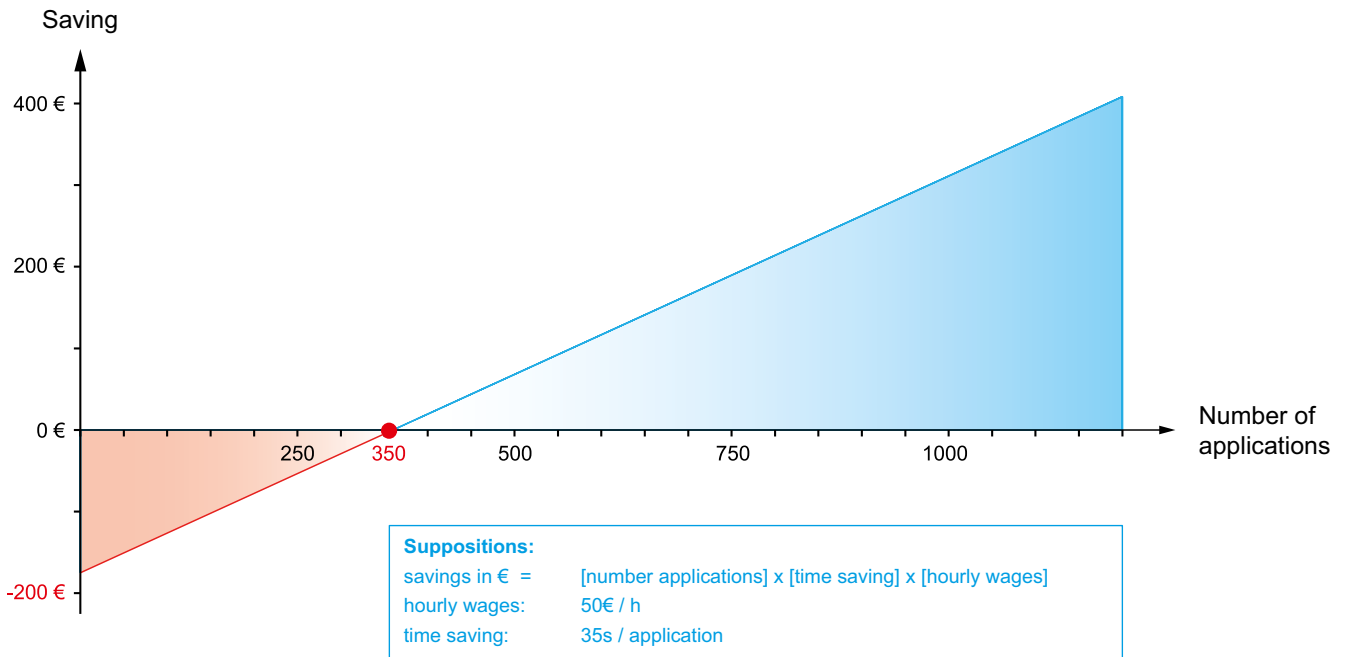
ORDER INFORMATION

2

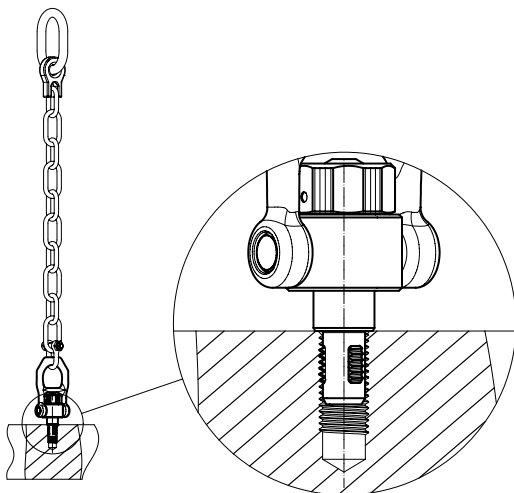
Dimensions														Load capacity ¹⁾			Locating thread	max.	Tightening torque max.		Art. No.		
d ₁	l ₁	d ₂ -0.07	d ₃	d ₄	d ₅	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	l ₁₀	F ₁	F ₂	F ₃		max.	max.		Heat-treated steel	Stainless steel
[mm]														[kN]			[mm]	[°C]	[Nm]	[g]			
M 8	12	6.62	20	38	33.5	17.8	25.7	54.9	42.5	46	68	123.7	38	8	2.1	0.9	0.8	M 8	250	2	677	22353.0008	22353.1008
M10	14	8.35	20	38	33.5	20.0	25.7	54.9	42.5	46	68	123.7	38	10	3.9	1.5	1.5	M10	250	2	691	22353.0010	22353.1010
M12	17	10.07	20	38	33.5	24.0	25.7	54.9	42.5	46	68	123.7	38	12	6.2	2.5	2.3	M12	250	2	694	22353.0012	22353.1012
M16	17	13.80	20	38	33.5	24.0	25.7	54.9	42.5	46	68	123.7	38	12	8.4	4.5	4.2	M16	250	2	698	22353.0016	22353.1016
M20	22	17.25	35	59	50.0	30.0	36.5	73.7	55.6	70	102	167.5	59	17	16.6	7.7	5.0	M20	250	3	1964	22353.0020	22353.1020
M24	27	20.70	35	59	50.0	36.0	42.0	79.2	55.6	70	102	173.0	59	22	18.5	11.1	8.6	M24	250	3	1860	22353.0024 ²⁾	-
															18.0	11.1	8.6					-	22353.1024 ²⁾

¹⁾ for a 5-fold safety against breakage

²⁾ from 150°C linear decrease of the load capacity by 23%



APPLICATION EXAMPLE



Threaded Lifting Pins • self-locking - INCH
EH 2B352.



PRODUCT DESCRIPTION

Heavy-duty lifting element for quick and easy use, with moveable shackle and locking stud to provide protection against unintentional unlocking. For lifting loads, the threaded lifting pin is inserted into a threaded hole. In contrast to a ringbolt, time-consuming screwing in and out is therefore unnecessary.

All versions are corrosion-protected. The version made of stainless steel is also resistant to corrosion and weathering, so it is also suitable for external use. In addition, the high-strength, precipitation-hardened pin makes extreme loads possible.

Material

Pin part

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4542, precipitation-hardened

Press button

- Aluminium, orange, anodised

Threaded element

- Stainless steel 1.4542, precipitation-hardened

Shackle

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4571

Spring

- Stainless Steel

Assembly

Threaded lifting pins can be mounted into a thread that is true to gauge.

Mounting:

1. Press in the button and hold it down.
2. Insert the threaded lifting pin.
3. Release the button (The button must be back in its original position.)
4. Tighten the threaded lifting pin by hand, until it bears completely on the bearing surface.

5. It must be ensured that the threaded segments are engaged in the mounting thread.

Dismantling:

1. Unscrew the threaded lifting pin approx. a quarter of a turn anticlockwise.
2. Press in the button and hold it down.
3. Remove the threaded lifting pin.
4. Release the button.

Operation

Each threaded lifting pin contains an instruction manual with an EC Declaration of Conformity.

MORE INFORMATION

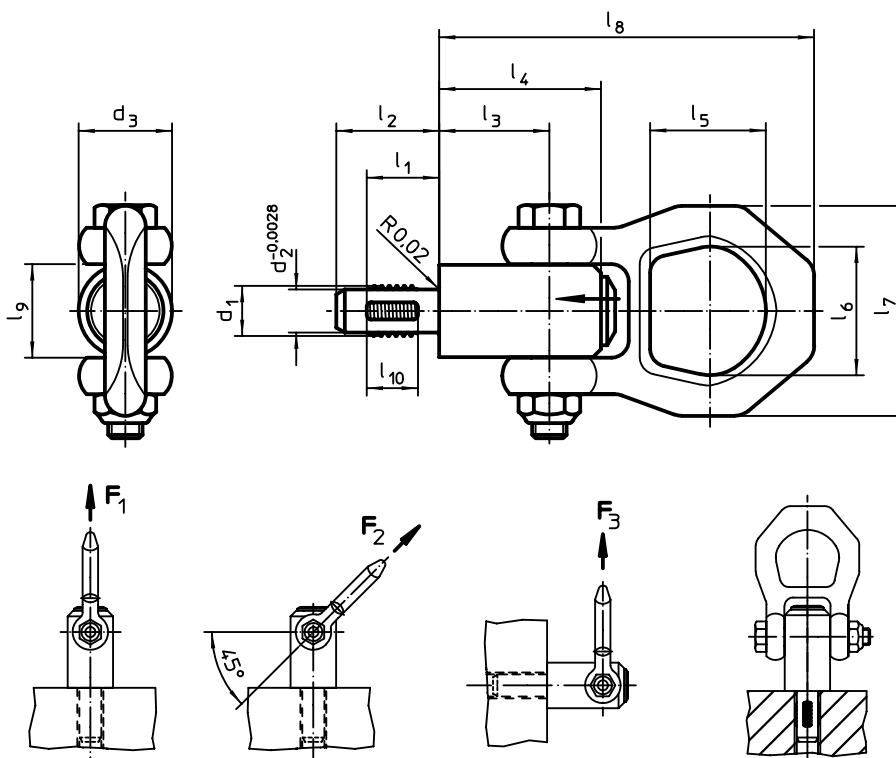
Notes

- This product is manufactured in INCH dimensions.

Further products

- Lifting Pins, self-locking → p. 196
- Lifting Pins, self-locking, stainless steel → p. 198
- Threaded Lifting Pins, self-locking . . . → p. 207
- Threaded Lifting Pins, self-locking, for centre holes according to DIN 332 . . . → p. 209
- Threaded Lifting Pins, self-locking, with rotatable shackle → p. 211
- Threaded Lifting Pins, self-locking, with rotatable shackle - INCH → p. 215

DRAWING

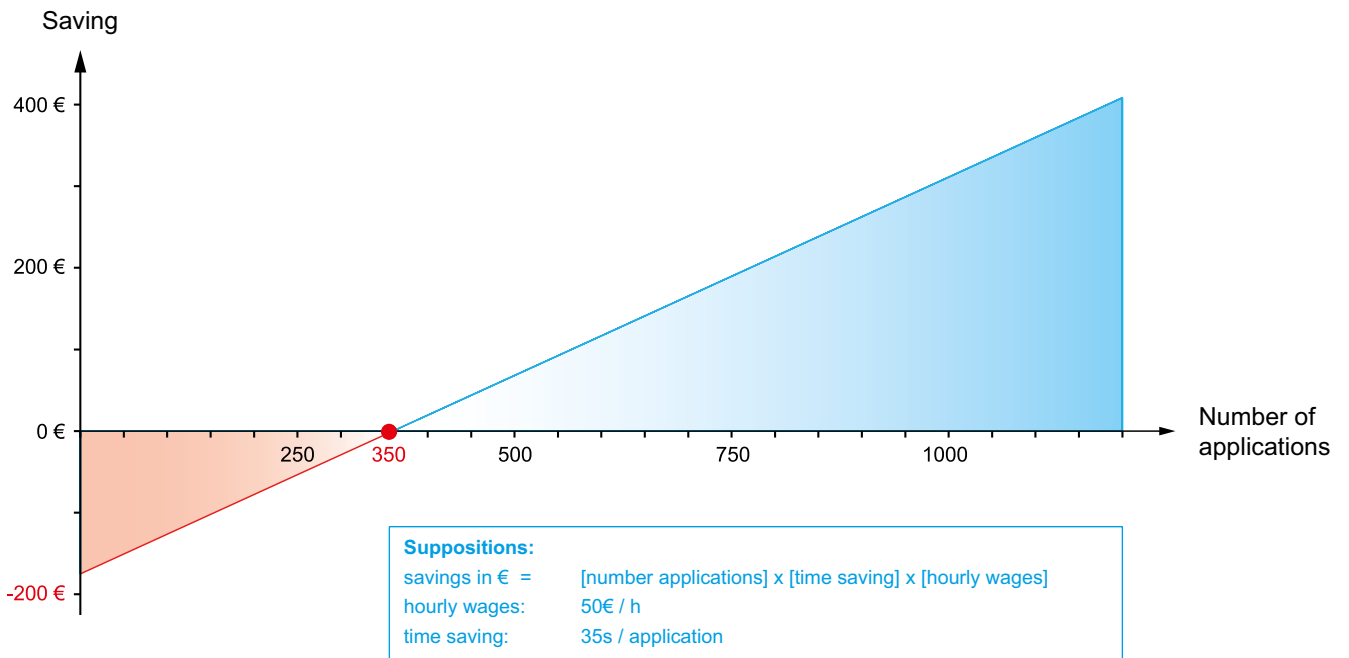


ORDER INFORMATION

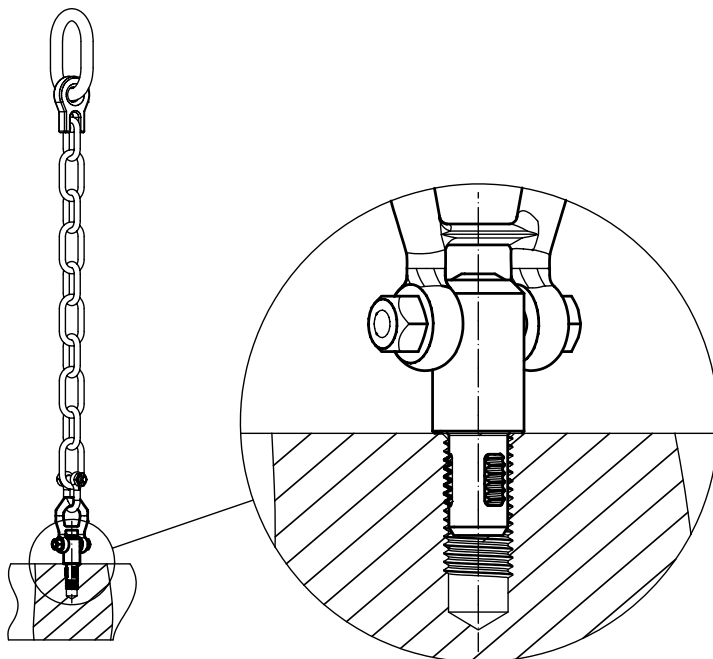
2

d ₁	l ₁	Dimensions											Load capacity ¹⁾			Locating thread	max. [°F]	[oz]	Art. No.	
		d ₂ -0.0028	d ₃	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	l ₁₀	F ₁	F ₂	F ₃				Heat-treated steel	Stainless steel
		[in]											[lbf]							
1/2-13	0.669	0.416	0.846	0.945	1.012	1.417	1.063	1.181	1.929	3.445	0.846	0.472	1528	764	607	1/2-13	482	9.830	2B352.0012	2B352.1012
3/4-10	0.866	0.640	1.181	1.181	1.437	2.047	1.283	1.417	2.205	4.488	1.181	0.669	3619	1731	1281	3/4-10	482	18.080	2B352.0020	-
													2248	1731	1281	3/4-10	482	18.080	-	2B352.1020
1-8	1.063	0.863	1.417	1.417	1.654	2.362	1.992	1.961	3.228	5.984	1.417	0.866	6766	3147	2225	1-8	482	42.153	2B352.0024	2B352.1024

¹⁾ for a 5-fold safety against breakage



APPLICATION EXAMPLE



Threaded Lifting Pins • self-locking, with rotatable shackle - INCH
EH 2B353.



PRODUCT DESCRIPTION

Heavy-duty lifting element for quick and easy use, with moveable, rotatable shackle and locking stud to provide protection against unintentional unlocking. For lifting loads, the threaded lifting pin is inserted into a threaded hole. In contrast to a ringbolt, time-consuming screwing in and out is therefore unnecessary. The rotatable shackle will always align with the tensile direction of pull without the pin rotating. This prevents the lifting device from being turned out of the thread and the component can be lifted safely. All versions are corrosion-protected. The version made of stainless steel is also resistant to corrosion and weathering, so it is also suitable for external use. In addition, the high-strength, precipitation-hardened pin makes extreme loads possible.

Material

Pin part

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4542, precipitation-hardened

Press button

- Aluminium, orange, anodised

Threaded element

- Stainless steel 1.4542, precipitation-hardened

Shackle

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4571

Spring

- Stainless Steel

Assembly

Threaded lifting pins can be mounted into a thread that is true to gauge.

Mounting:

1. Press in the button and hold it down.
2. Insert the threaded lifting pin.
3. Release the button (The button must be back in its original position.).
4. Tighten the threaded lifting pin by hand, until it bears completely on the bearing surface.

5. It must be ensured that the threaded segments are engaged in the mounting thread.

Dismantling:

1. Unscrew the threaded lifting pin approx. a quarter of a turn anticlockwise.
2. Press in the button and hold it down.
3. Remove the threaded lifting pin.
4. Release the button.

Operation

Each threaded lifting pin contains an instruction manual with an EC Declaration of Conformity.

MORE INFORMATION

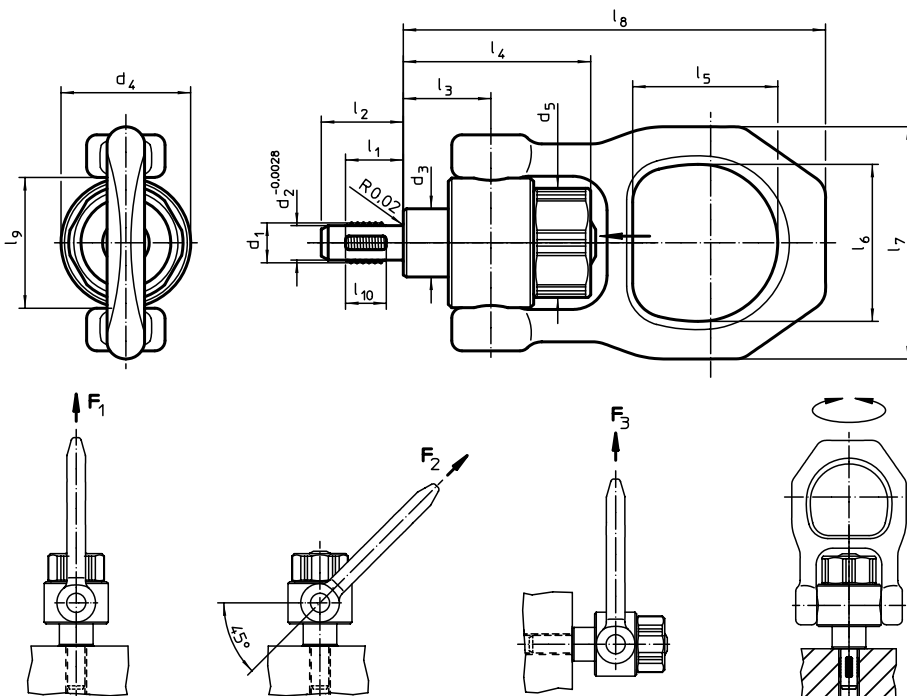
Notes

- This product is manufactured in INCH dimensions.

Further products

- Lifting Pins, self-locking → p. 196
- Lifting Pins, self-locking, stainless steel → p. 198
- Threaded Lifting Pins, self-locking . . . → p. 207
- Threaded Lifting Pins, self-locking, for centre holes according to DIN 332 . . . → p. 209
- Threaded Lifting Pins, self-locking, with rotatable shackle → p. 211
- Threaded Lifting Pins, self-locking - INCH → p. 213

DRAWING



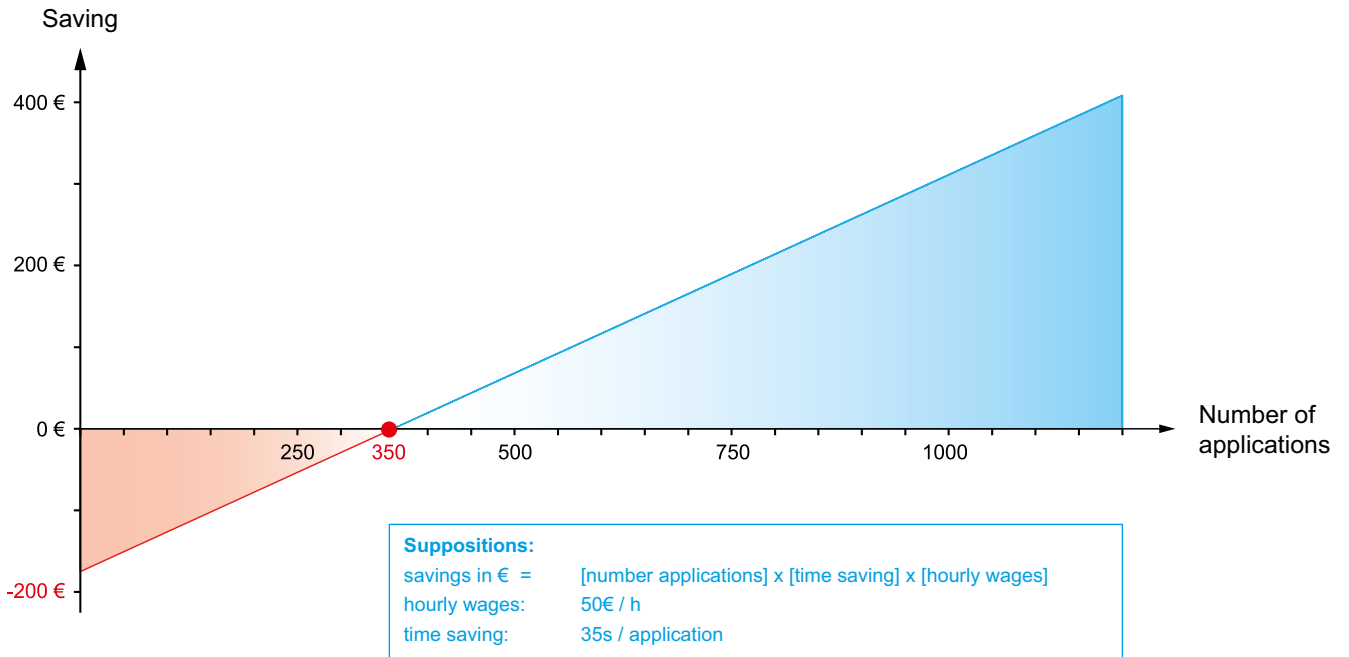
ORDER INFORMATION

2

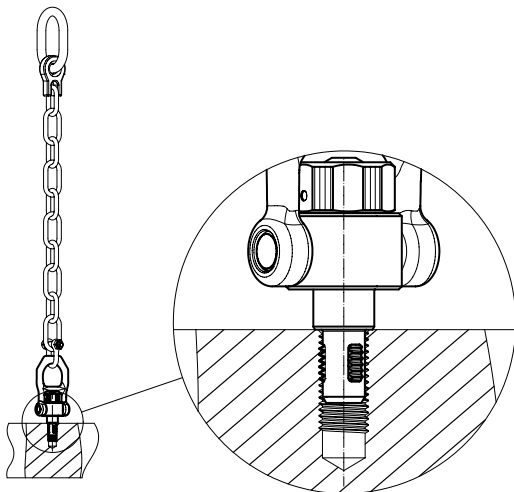
Dimensions														Load capacity ¹⁾			Lo-cating thread	Tightening torque max.	Tightening torque max.	Art. No.			
d ₁	l ₁	d ₂ +0.0028	d ₃	d ₄	d ₅	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	l ₁₀	F ₁	F ₂				F ₃	Heat-treated steel	Stainless steel	
[in]														[lbf]			[°F]	[lbf ft]	[oz]				
1/2-13	0.669	0.416	0.787	1.496	1.319	0.945	1.012	2.161	1.673	1.811	2.677	4.870	1.496	0.472	1528	764	607	1/2-13	482	1.48	24.601	2B353.0012	2B353.1012
3/4-10	0.866	0.640	1.378	2.323	1.969	1.181	1.437	2.902	2.189	2.756	4.016	6.594	2.323	0.669	3619	1731	1124	3/4-10	482	2.21	64.973	2B353.0020	2B353.1020
1-8	1.063	0.863	1.378	2.323	1.969	1.417	1.654	3.118	2.189	2.756	4.016	6.811	2.323	0.866	4159	3147	2225	1-8	482 ²⁾	2.21	67.529	2B353.0024 ³⁾	-
															4046	3147	2225		1-8			482 ²⁾	2.21

¹⁾ for a 5-fold safety against breakage

²⁾ from 302°F linear decrease of the load capacity by 23%



APPLICATION EXAMPLE



BALL LOCK PINS

LEADERS IN THE METRIC RANGE: THE CHOICE IS YOURS

We offer more than 2,000 different variants including matching accessories, the selection is enormous.

The applications the products can be used for are almost as manifold as our product selection. Fixing, locking, connecting, adjusting and quickly changing different positions. Better yet, all of these operations are self-locking and do not require additional tools. Other key benefits of ball lock pins are their unique ability to withstand enormous shearing loads and their perfect resistance to corrosion and, thus, wear.



[www.halder.com/
BallLockPins-Video](http://www.halder.com/BallLockPins-Video)



Ball Lock Pins • self-locking, with T-handle

EH 22340. /EH 22350.



PRODUCT DESCRIPTION

For quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections.

All versions are corrosion resistant. When using stainless steel 1.4542: high-strength, hardened, abrasion resistant pin with high load capacity.

Version with ergonomic grip.

Material

Pin part

- Stainless steel 1.4305
- Stainless steel 1.4542, precipitation-hardened

Handle

- Aluminium, black similar to RAL 9005

Press button

- Stainless steel, black

Spring

- Stainless steel

Operation

The balls are unlocked by pressing the button.

Characteristic

Types from stainless steel 1.4542 with marking below the balls.

MORE INFORMATION

Notes

Special types on request.

- This product is also available in INCH dimensions.

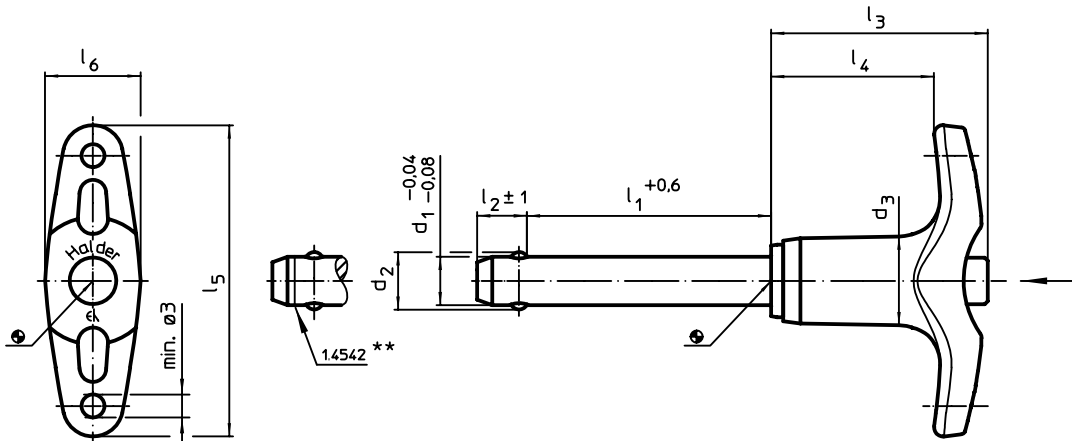
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

- Locating Bushings, for ball lock pins and socket pins → p. 246
- Locating Bushings, with flange, for ball lock pins and socket pins → p. 248
- Retaining Cables → p. 249
- Positioning Bushings, with collar, DIN 172 A → p. 424
- Positioning Bushings, without collar, DIN 179 A → p. 427
- Ball Lock Pins with T-Handle, single acting - comply with NAS / MS17985 → p. 261

DRAWING



** Types from stainless steel 1.4542 with marking.

ORDER INFORMATION

Dimensions									Location hole H11	Temperature		Weight [g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
d ₁	l ₁	d ₂	d ₃	l ₂ ± 1	l ₃	l ₄	l ₅	l ₆		min.	max.		Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
[mm]									[mm]	[°C]		[g]	[kN]		[kN]	
5	10	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	19	14	22340.0012	24	22350.0012
	15	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	20	14	22340.0013	24	22350.0013
	20	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	21	14	22340.0014	24	22350.0014
	25	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	22	14	22340.0015	24	22350.0015
	30	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	22	14	22340.0016	24	22350.0016
	35	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	23	14	22340.0017	24	22350.0017
	40	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	24	14	22340.0018	24	22350.0018
	45	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	24	14	22340.0007	24	22350.0007
	50	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	25	14	22340.0008	24	22350.0008
	60	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	27	14	22340.0009	24	22350.0009
70	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	28	14	22340.0010	24	22350.0010	
80	5.5	11.8	6.0	31.6	24.1	45.2	12.7	5	-30	150	30	14	22340.0011	24	22350.0011	

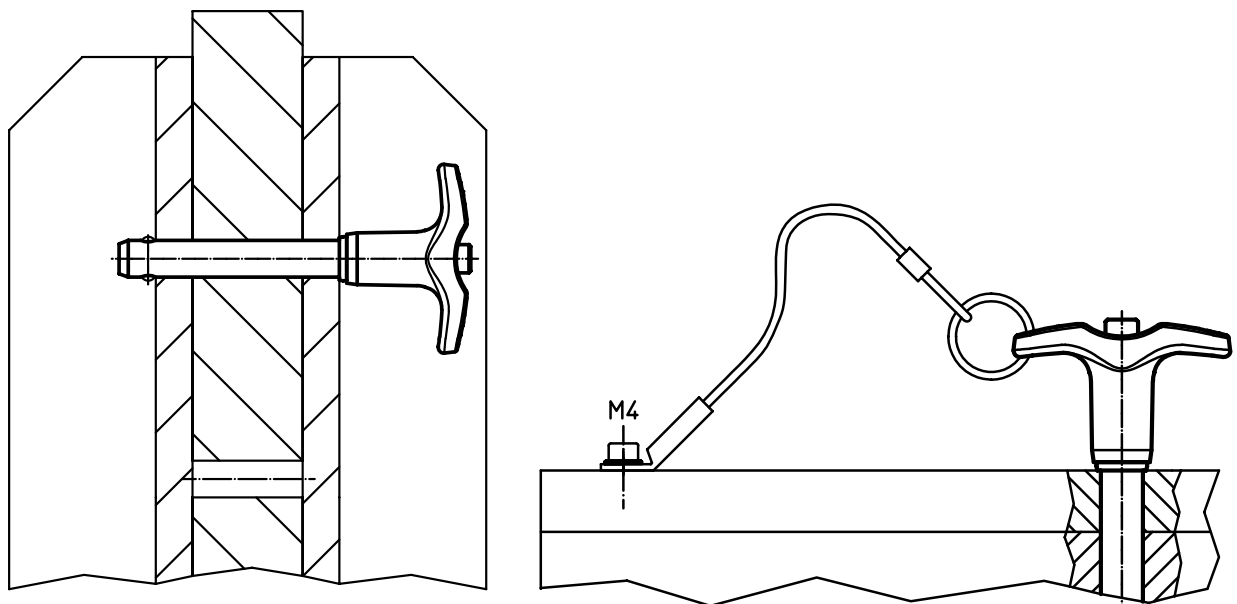
¹⁾ Shearing resistance similar to DIN 50141



Dimensions										Location hole H11	Temperature		Weight [g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
d ₁ -0.04 -0.08	l ₁ +0.6	d ₂	d ₃	l ₂ ±1	l ₃	l ₄	l ₅	l ₆	[mm]		min.	max.		Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
[mm]										[mm]	[°C]		[g]	[kN]		[kN]	
16	30	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	153	155	22340.0071	257	22350.0071	
	35	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	161	155	22340.0073	257	22350.0073	
	40	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	168	155	22340.0075	257	22350.0075	
	45	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	172	155	22340.0077	257	22350.0077	
	50	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	184	155	22340.0078	257	22350.0078	
	60	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	200	155	22340.0079	257	22350.0079	
	70	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	214	155	22340.0080	257	22350.0080	
	80	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	231	155	22340.0081	257	22350.0081	
	90	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	245	155	22340.0082	257	22350.0082	
	100	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	260	155	22340.0083	257	22350.0083	
	110	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	277	155	22340.0084	257	22350.0084	
	120	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	293	155	22340.0085	257	22350.0085	
	130	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	309	155	22340.0086	257	22350.0086	
	140	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	324	155	22340.0087	257	22350.0087	
	150	19.0	23.4	14.0	42.2	29.8	74.8	24.7	16	-30	150	339	155	22340.0088	257	22350.0088	
20	50	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	245	244	22340.0089	403	22350.0089	
	60	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	269	244	22340.0090	403	22350.0090	
	70	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	293	244	22340.0091	403	22350.0091	
	80	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	315	244	22340.0092	403	22350.0092	
	90	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	340	244	22340.0093	403	22350.0093	
	100	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	364	244	22340.0094	403	22350.0094	
	110	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	390	244	22340.0095	403	22350.0095	
	120	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	413	244	22340.0096	403	22350.0096	
	130	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	436	244	22340.0097	403	22350.0097	
140	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	462	244	22340.0098	403	22350.0098		
150	24.8	23.4	17.0	43.1	29.8	74.8	24.7	20	-30	150	487	244	22340.0099	403	22350.0099		
25	50	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	449	386	22340.0100	631	22350.0100	
	60	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	487	386	22340.0101	631	22350.0101	
	70	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	526	386	22340.0102	631	22350.0102	
	80	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	559	386	22340.0103	631	22350.0103	
	90	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	600	386	22340.0104	631	22350.0104	
	100	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	640	386	22340.0001	631	22350.0001	
	110	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	669	386	22340.0002	631	22350.0002	
	120	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	713	386	22340.0003	631	22350.0003	
	130	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	751	386	22340.0004	631	22350.0004	
	140	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	788	386	22340.0005	631	22350.0005	
150	31.0	30.4	22.0	54.8	37.5	88.7	33.2	25	-30	150	825	386	22340.0006	631	22350.0006		

¹⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE



Ball Lock Pins • self-locking, with L-handle

EH 22340. /EH 22350.



PRODUCT DESCRIPTION

For quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections. All versions are corrosion resistant. When using stainless steel 1.4542: high-strength, hardened, abrasion resistant pin with high load capacity. Version with ergonomic grip.

Material

Pin part

- Stainless steel 1.4305
- Stainless steel 1.4542, precipitation-hardened

Handle

- Aluminium, black similar to RAL 9005

Press button

- Stainless steel, black

Spring

- Stainless steel

Operation

The balls are unlocked by pressing the button.

Characteristic

Types from stainless steel 1.4542 with marking below the balls.

MORE INFORMATION

Notes

Special types on request.

- This product is also available in INCH dimensions.

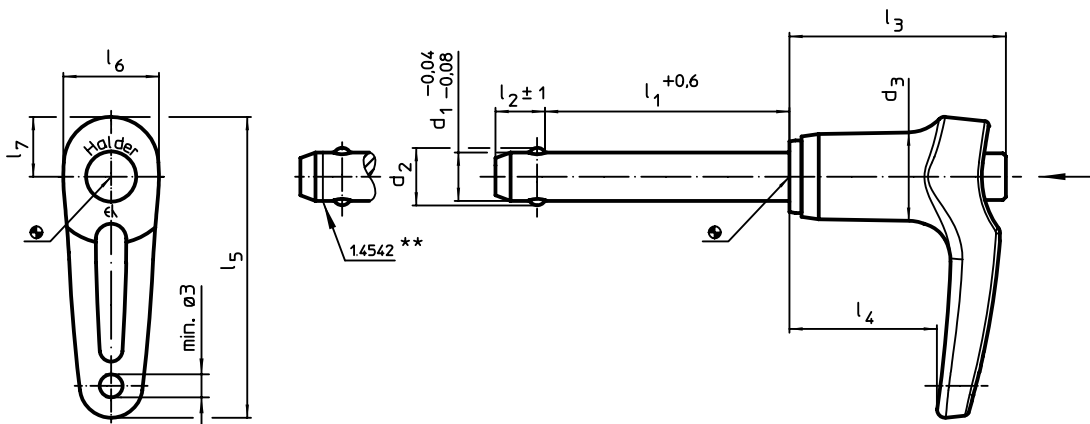
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

- Locating Bushings, for ball lock pins and socket pins → p. 246
- Locating Bushings, with flange, for ball lock pins and socket pins. → p. 248
- Retaining Cables → p. 249
- Positioning Bushings, with collar, DIN 172 A → p. 424
- Positioning Bushings, without collar, DIN 179 A → p. 427
- Ball Lock Pins with L-handle, single acting - comply with NAS / MS17986 → p. 266

DRAWING



** Types from stainless steel 1.4542 with marking.

ORDER INFORMATION

Dimensions										Location hole H11		Temperature	Weight	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
d ₁	l ₁	d ₂	d ₃	l ₂ ±1	l ₃	l ₄	l ₅	l ₆	l ₇	min.	max.			Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
[mm]										[mm]		[°C]	[g]	[kN]		[kN]	
5	10	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	20	14	22340.0112	24	22350.0112
	15	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	21	14	22340.0113	24	22350.0113
	20	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	22	14	22340.0114	24	22350.0114
	25	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	22	14	22340.0115	24	22350.0115
	30	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	23	14	22340.0116	24	22350.0116
	35	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	24	14	22340.0117	24	22350.0117
	40	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	23	14	22340.0118	24	22350.0118
	45	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	25	14	22340.0107	24	22350.0107
	50	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	26	14	22340.0108	24	22350.0108
	60	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	26	14	22340.0109	24	22350.0109
70	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	29	14	22340.0110	24	22350.0110	
80	5.5	11.8	6.0	31.6	21.9	43.8	12.6	8.5	5	-30	150	30	14	22340.0111	24	22350.0111	

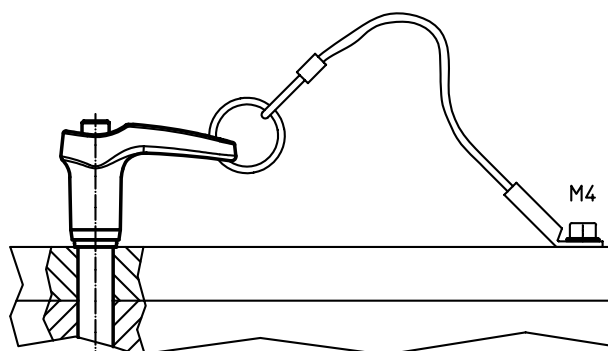
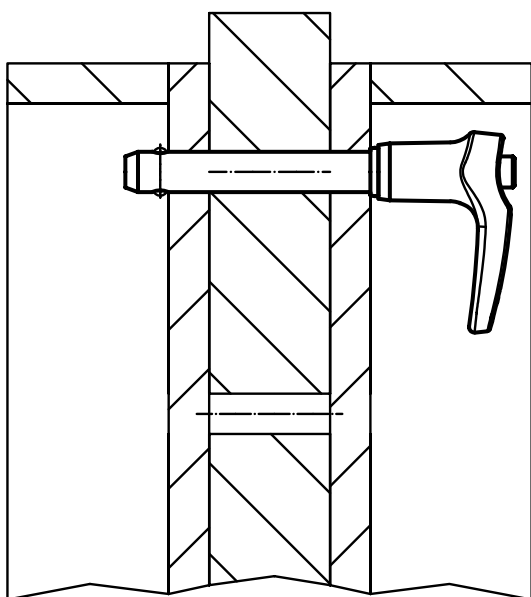
¹⁾ Shearing resistance similar to DIN 50141



Dimensions										Location hole H11	Temperature		Weight		Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
d ₁ -0.04 -0.08	l ₁ +0.6	d ₂	d ₃	l ₂ ±1	l ₃	l ₄	l ₅	l ₆	l ₇	[mm]	min.	max.	[g]	Shearing resistance, two-shear ¹⁾ min. [kN]	Art. No.	Shearing resistance, two-shear ¹⁾ min. [kN]	Art. No.	
[mm]										[mm]	[°C]		[g]	[kN]		[kN]		
16	30	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	149	155	22340.0171	257	22350.0171	
	35	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	161	155	22340.0173	257	22350.0173	
	40	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	165	155	22340.0175	257	22350.0175	
	45	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	172	155	22340.0177	257	22350.0177	
	50	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	180	155	22340.0178	257	22350.0178	
	60	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	200	155	22340.0179	257	22350.0179	
	70	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	216	155	22340.0180	257	22350.0180	
	80	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	231	155	22340.0181	257	22350.0181	
	90	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	246	155	22340.0182	257	22350.0182	
	100	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	262	155	22340.0183	257	22350.0183	
	110	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	272	155	22340.0184	257	22350.0184	
	120	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	287	155	22340.0185	257	22350.0185	
	130	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	302	155	22340.0186	257	22350.0186	
	140	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	318	155	22340.0187	257	22350.0187	
	150	19.0	23.4	14.0	42.2	27.3	67.6	24.7	15.1	16	-30	150	333	155	22340.0188	257	22350.0188	
20	50	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	245	244	22340.0189	403	22350.0189	
	60	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	272	244	22340.0190	403	22350.0190	
	70	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	292	244	22340.0191	403	22350.0191	
	80	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	313	244	22340.0192	403	22350.0192	
	90	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	337	244	22340.0193	403	22350.0193	
	100	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	362	244	22340.0194	403	22350.0194	
	110	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	392	244	22340.0195	403	22350.0195	
	120	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	413	244	22340.0196	403	22350.0196	
	130	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	437	244	22340.0197	403	22350.0197	
	140	24.8	23.4	17.0	43.1	27.3	67.6	24.7	15.1	20	-30	150	457	244	22340.0198	403	22350.0198	
25	50	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	453	386	22340.0200	631	22350.0200	
	60	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	490	386	22340.0201	631	22350.0201	
	70	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	523	386	22340.0202	631	22350.0202	
	80	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	567	386	22340.0203	631	22350.0203	
	90	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	596	386	22340.0204	631	22350.0204	
	100	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	635	386	22340.0205	631	22350.0205	
	110	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	672	386	22340.0206	631	22350.0206	
	120	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	710	386	22340.0207	631	22350.0207	
	130	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	754	386	22340.0208	631	22350.0208	
	140	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	784	386	22340.0105	631	22350.0105	
150	31.0	30.4	22.0	54.8	34.2	83.9	33.3	20.1	25	-30	150	830	386	22340.0106	631	22350.0106		

¹⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE



Ball Lock Pins • self-locking, with button handle

EH 22340. /EH 22350.



PRODUCT DESCRIPTION

For quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections. All versions are corrosion resistant. When using stainless steel 1.4542: high-strength, hardened, abrasion resistant pin with high load capacity. Compact design with button handle.

Material

Pin part

- Stainless steel 1.4305
- Stainless steel 1.4542, precipitation-hardened

Handle

- Aluminium, black similar to RAL 9005

Press button

- Stainless steel, black

Spring

- Stainless steel

Operation

The balls are unlocked by pressing the button.

Characteristic

Types from stainless steel 1.4542 with marking below the balls.

MORE INFORMATION

Notes

Special types on request.

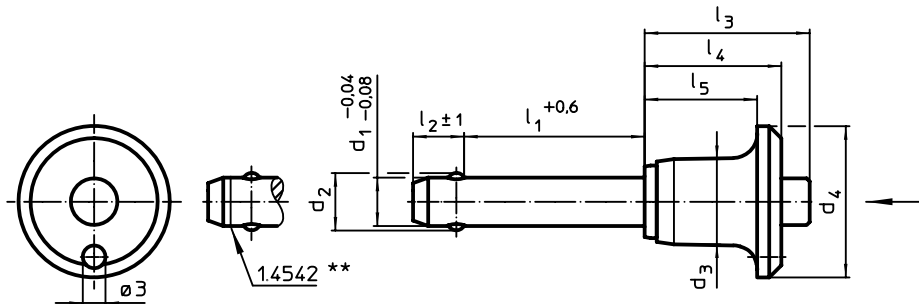
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

- Locating Bushings, for ball lock pins and socket pins → p. 246
- Locating Bushings, with flange, for ball lock pins and socket pins..... → p. 248
- Retaining Cables..... → p. 249
- Positioning Bushings, with collar, DIN 172 A..... → p. 424
- Positioning Bushings, without collar, DIN 179 A..... → p. 427
- Ball Lock Pins with Button Handle, single acting - comply with NAS / MS17984..... → p. 257

DRAWING



** Types from stainless steel 1.4542 with marking.

ORDER INFORMATION

	Dimensions									Location hole H11	min.	max.	g	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
	d ₁	l ₁	d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄	l ₅					Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
	-0.04 -0.08	+0.6												[kN]		[kN]	
	[mm]									[mm]	[°C]			[kN]		[kN]	
5	10	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	12	14	22340.0212	24	22350.0212	
	15	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	12	14	22340.0213	24	22350.0213	
	20	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	13	14	22340.0214	24	22350.0214	
	25	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	14	14	22340.0215	24	22350.0215	
	30	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	15	14	22340.0216	24	22350.0216	
	35	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	15	14	22340.0217	24	22350.0217	
	40	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	16	14	22340.0218	24	22350.0218	
	45	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	17	14	22340.0311	24	22350.0311	
	50	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	18	14	22340.0312	24	22350.0312	
	60	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	19	14	22340.0209	24	22350.0209	
70	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	20	14	22340.0210	24	22350.0210		
80	5.5	11.3	20	6.0	20.7	17.6	14.6	5	-30	150	22	14	22340.0211	24	22350.0211		

¹⁾ Shearing resistance similar to DIN 50141



Dimensions										Location hole H11	min.	max.	g	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
d ₁ -0.04 -0.08	l ₁ +0.6	d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄	l ₅	[mm]	[°C]				Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
[mm]										[mm]	[°C]	[g]	[kN]		[kN]		
6	10	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	13	21	22340.0222	35	22350.0222	
	15	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	14	21	22340.0223	35	22350.0223	
	20	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	15	21	22340.0224	35	22350.0224	
	25	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	16	21	22340.0225	35	22350.0225	
	30	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	17	21	22340.0226	35	22350.0226	
	35	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	18	21	22340.0227	35	22350.0227	
	40	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	19	21	22340.0228	35	22350.0228	
	45	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	20	21	22340.0229	35	22350.0229	
	50	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	21	21	22340.0230	35	22350.0230	
	60	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	23	21	22340.0219	35	22350.0219	
	70	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	25	21	22340.0220	35	22350.0220	
	80	7.0	11.3	20	7.0	20.7	17.6	14.6	6	-30	150	27	21	22340.0221	35	22350.0221	
8	10	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	25	38	22340.0232	63	22350.0232	
	15	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	27	38	22340.0233	63	22350.0233	
	20	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	29	38	22340.0234	63	22350.0234	
	25	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	31	38	22340.0235	63	22350.0235	
	30	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	33	38	22340.0236	63	22350.0236	
	35	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	35	38	22340.0237	63	22350.0237	
	40	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	36	38	22340.0238	63	22350.0238	
	45	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	38	38	22340.0239	63	22350.0239	
	50	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	40	38	22340.0240	63	22350.0240	
	60	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	44	38	22340.0231	63	22350.0231	
	70	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	47	38	22340.0241	63	22350.0241	
	80	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	51	38	22340.0242	63	22350.0242	
90	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	55	38	22340.0243	63	22350.0243		
100	9.5	14.1	25	8.2	27.3	22.6	18.6	8	-30	150	58	38	22340.0251	63	22350.0251		
10	15	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	33	60	22340.0259	100	22350.0259	
	20	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	36	60	22340.0244	100	22350.0244	
	25	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	38	60	22340.0245	100	22350.0245	
	30	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	42	60	22340.0246	100	22350.0246	
	35	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	44	60	22340.0247	100	22350.0247	
	40	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	47	60	22340.0248	100	22350.0248	
	45	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	50	60	22340.0249	100	22350.0249	
	50	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	53	60	22340.0250	100	22350.0250	
	60	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	59	60	22340.0252	100	22350.0252	
	70	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	65	60	22340.0253	100	22350.0253	
	80	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	71	60	22340.0254	100	22350.0254	
	90	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	77	60	22340.0255	100	22350.0255	
100	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	83	60	22340.0256	100	22350.0256		
12	10	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	88	60	22340.0257	100	22350.0257	
	120	12.0	14.1	25	9.6	27.3	22.6	18.6	10	-30	150	94	60	22340.0258	100	22350.0258	
	20	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	66	87	22340.0264	144	22350.0264	
	25	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	70	87	22340.0265	144	22350.0265	
	30	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	75	87	22340.0266	144	22350.0266	
	35	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	79	87	22340.0267	144	22350.0267	
	40	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	83	87	22340.0268	144	22350.0268	
	45	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	88	87	22340.0269	144	22350.0269	
	50	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	92	87	22340.0270	144	22350.0270	
	60	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	100	87	22340.0272	144	22350.0272	
	70	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	109	87	22340.0274	144	22350.0274	
	80	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	117	87	22340.0276	144	22350.0276	
90	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	126	87	22340.0260	144	22350.0260		
100	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	134	87	22340.0261	144	22350.0261		
110	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	143	87	22340.0262	144	22350.0262		
120	14.5	17.7	35	10.6	33.2	27.3	22.3	12	-30	150	151	87	22340.0263	144	22350.0263		

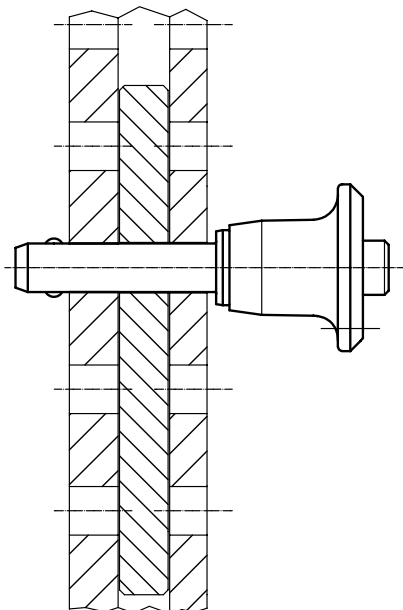
¹⁾ Shearing resistance similar to DIN 50141



Dimensions									Location hole H11	Temperature		Weight [g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
d_1 -0.04 -0.08	l_1 +0.6	d_2	d_3	d_4	l_2 ± 1	l_3	l_4	l_5	[mm]	min.	max.		Shearing resistance, two-shear ¹⁾ min. [kN]	Art. No.	Shearing resistance, two-shear ¹⁾ min. [kN]	Art. No.
[mm]									[mm]	[°C]		[g]	[kN]		[kN]	
16	30	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	151	155	22340.0271	257	22350.0271
	35	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	156	155	22340.0273	257	22350.0273
	40	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	163	155	22340.0275	257	22350.0275
	45	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	171	155	22340.0277	257	22350.0277
	50	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	182	155	22340.0278	257	22350.0278
	60	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	197	155	22340.0279	257	22350.0279
	70	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	213	155	22340.0280	257	22350.0280
	80	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	224	155	22340.0281	257	22350.0281
	90	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	244	155	22340.0282	257	22350.0282
	100	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	255	155	22340.0283	257	22350.0283
	110	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	270	155	22340.0284	257	22350.0284
	120	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	291	155	22340.0285	257	22350.0285
	130	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	301	155	22340.0286	257	22350.0286
	140	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	317	155	22340.0287	257	22350.0287
	150	19.0	23.4	40	14.0	42.2	34.5	28.5	16	-30	150	337	155	22340.0288	257	22350.0288
20	50	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	244	244	22340.0289	403	22350.0289
	60	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	265	244	22340.0290	403	22350.0290
	70	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	291	244	22340.0291	403	22350.0291
	80	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	316	244	22340.0292	403	22350.0292
	90	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	335	244	22340.0293	403	22350.0293
	100	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	363	244	22340.0294	403	22350.0294
	110	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	384	244	22340.0295	403	22350.0295
	120	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	413	244	22340.0296	403	22350.0296
	130	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	432	244	22340.0297	403	22350.0297
	140	24.8	23.4	40	17.0	43.1	34.5	28.5	20	-30	150	455	244	22340.0298	403	22350.0298
25	50	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	441	386	22340.0300	631	22350.0300
	60	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	473	386	22340.0301	631	22350.0301
	70	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	517	386	22340.0302	631	22350.0302
	80	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	555	386	22340.0303	631	22350.0303
	90	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	585	386	22340.0304	631	22350.0304
	100	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	623	386	22340.0305	631	22350.0305
	110	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	658	386	22340.0306	631	22350.0306
	120	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	698	386	22340.0307	631	22350.0307
	130	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	742	386	22340.0308	631	22350.0308
	140	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	773	386	22340.0309	631	22350.0309
150	31.0	30.4	50	22.0	54.8	43.5	36.5	25	-30	150	822	386	22340.0310	631	22350.0310	

¹⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE



Ball Lock Pins • self-locking, with safety handle

EH 22340. /EH 22350.



PRODUCT DESCRIPTION

For quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections. All versions are corrosion resistant. When using stainless steel 1.4542: high-strength, hardened, abrasion resistant pin with high load capacity. Robust safety handle (press button not overlaying). Shape of grip protects from unintentional use of the press button.

Material

Pin part

- Stainless steel 1.4305
- Stainless steel 1.4542, precipitation-hardened

Handle

- Stainless steel

Press button

- Stainless steel

Spring

- Stainless steel

Operation

The balls are unlocked by pressing the button.

Characteristic

Types from stainless steel 1.4542 with marking below the balls.

MORE INFORMATION

Notes

Special types on request.

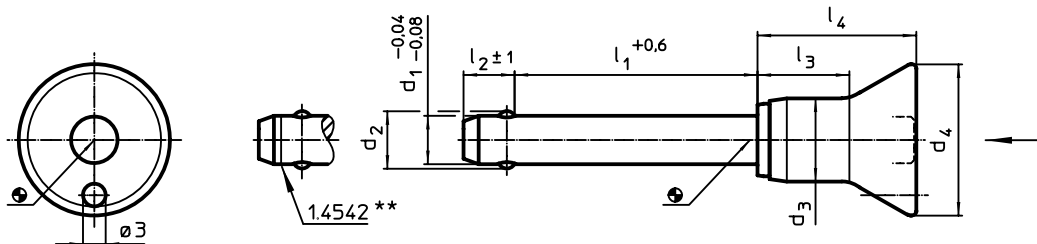
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

- Locating Bushings, for ball lock pins and socket pins → p. 246
- Locating Bushings, with flange, for ball lock pins and socket pins. → p. 248
- Retaining Cables. → p. 249
- Positioning Bushings, with collar, DIN 172 A. → p. 424
- Positioning Bushings, without collar, DIN 179 A → p. 427

DRAWING



** Types from stainless steel 1.4542 with marking.

ORDER INFORMATION

d ₁ -0.04 -0.08	l ₁ +0.6	Dimensions					Location hole H11	max.	[°C]	[g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
		d ₂	d ₃	d ₄	l ₂ ±1	l ₃					l ₄	Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.
[mm]														
5	10	5.5	10.3	20	6.0	11.6	21.0	5	250	18	14	22340.1012	24	22350.1012
	15	5.5	10.3	20	6.0	11.6	21.0	5	250	19	14	22340.1013	24	22350.1013
	20	5.5	10.3	20	6.0	11.6	21.0	5	250	20	14	22340.1014	24	22350.1014
	25	5.5	10.3	20	6.0	11.6	21.0	5	250	20	14	22340.1015	24	22350.1015
	30	5.5	10.3	20	6.0	11.6	21.0	5	250	21	14	22340.1016	24	22350.1016
	35	5.5	10.3	20	6.0	11.6	21.0	5	250	22	14	22340.1017	24	22350.1017
	40	5.5	10.3	20	6.0	11.6	21.0	5	250	23	14	22340.1018	24	22350.1018
	45	5.5	10.3	20	6.0	11.6	21.0	5	250	23	14	22340.1007	24	22350.1007
	50	5.5	10.3	20	6.0	11.6	21.0	5	250	24	14	22340.1008	24	22350.1008
	60	5.5	10.3	20	6.0	11.6	21.0	5	250	25	14	22340.1009	24	22350.1009
70	5.5	10.3	20	6.0	11.6	21.0	5	250	27	14	22340.1010	24	22350.1010	
80	5.5	10.3	20	6.0	11.6	21.0	5	250	28	14	22340.1011	24	22350.1011	

¹⁾ Shearing resistance similar to DIN 50141



d ₁ -0.04 -0.08	l ₁ +0.6	Dimensions						Location hole H11	max.	[g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
		d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄				Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
[mm]											[kN]		[kN]	
6	10	7.0	10.3	20	7.0	11.6	21.0	6	250	19	21	22340.1022	35	22350.1022
	15	7.0	10.3	20	7.0	11.6	21.0	6	250	20	21	22340.1023	35	22350.1023
	20	7.0	10.3	20	7.0	11.6	21.0	6	250	21	21	22340.1024	35	22350.1024
	25	7.0	10.3	20	7.0	11.6	21.0	6	250	22	21	22340.1025	35	22350.1025
	30	7.0	10.3	20	7.0	11.6	21.0	6	250	23	21	22340.1026	35	22350.1026
	35	7.0	10.3	20	7.0	11.6	21.0	6	250	24	21	22340.1027	35	22350.1027
	40	7.0	10.3	20	7.0	11.6	21.0	6	250	25	21	22340.1028	35	22350.1028
	45	7.0	10.3	20	7.0	11.6	21.0	6	250	26	21	22340.1029	35	22350.1029
	50	7.0	10.3	20	7.0	11.6	21.0	6	250	27	21	22340.1030	35	22350.1030
	60	7.0	10.3	20	7.0	11.6	21.0	6	250	29	21	22340.1019	35	22350.1019
	70	7.0	10.3	20	7.0	11.6	21.0	6	250	31	21	22340.1020	35	22350.1020
80	7.0	10.3	20	7.0	11.6	21.0	6	250	33	21	22340.1021	35	22350.1021	
8	10	9.5	13.3	24	8.2	17.4	27.5	8	250	36	38	22340.1032	63	22350.1032
	15	9.5	13.3	24	8.2	17.4	27.5	8	250	38	38	22340.1033	63	22350.1033
	20	9.5	13.3	24	8.2	17.4	27.5	8	250	40	38	22340.1034	63	22350.1034
	25	9.5	13.3	24	8.2	17.4	27.5	8	250	41	38	22340.1035	63	22350.1035
	30	9.5	13.3	24	8.2	17.4	27.5	8	250	43	38	22340.1036	63	22350.1036
	35	9.5	13.3	24	8.2	17.4	27.5	8	250	45	38	22340.1037	63	22350.1037
	40	9.5	13.3	24	8.2	17.4	27.5	8	250	47	38	22340.1038	63	22350.1038
	45	9.5	13.3	24	8.2	17.4	27.5	8	250	49	38	22340.1039	63	22350.1039
	50	9.5	13.3	24	8.2	17.4	27.5	8	250	51	38	22340.1040	63	22350.1040
	60	9.5	13.3	24	8.2	17.4	27.5	8	250	54	38	22340.1031	63	22350.1031
	70	9.5	13.3	24	8.2	17.4	27.5	8	250	58	38	22340.1041	63	22350.1041
	80	9.5	13.3	24	8.2	17.4	27.5	8	250	62	38	22340.1042	63	22350.1042
90	9.5	13.3	24	8.2	17.4	27.5	8	250	65	38	22340.1043	63	22350.1043	
100	9.5	13.3	24	8.2	17.4	27.5	8	250	69	38	22340.1051	63	22350.1051	
10	15	12.0	13.3	24	9.6	17.4	27.5	10	250	43	60	22340.1059	100	22350.1059
	20	12.0	13.3	24	9.6	17.4	27.5	10	250	46	60	22340.1044	100	22350.1044
	25	12.0	13.3	24	9.6	17.4	27.5	10	250	49	60	22340.1045	100	22350.1045
	30	12.0	13.3	24	9.6	17.4	27.5	10	250	52	60	22340.1046	100	22350.1046
	35	12.0	13.3	24	9.6	17.4	27.5	10	250	55	60	22340.1047	100	22350.1047
	40	12.0	13.3	24	9.6	17.4	27.5	10	250	58	60	22340.1048	100	22350.1048
	45	12.0	13.3	24	9.6	17.4	27.5	10	250	61	60	22340.1049	100	22350.1049
	50	12.0	13.3	24	9.6	17.4	27.5	10	250	64	60	22340.1050	100	22350.1050
	60	12.0	13.3	24	9.6	17.4	27.5	10	250	70	60	22340.1052	100	22350.1052
	70	12.0	13.3	24	9.6	17.4	27.5	10	250	76	60	22340.1053	100	22350.1053
	80	12.0	13.3	24	9.6	17.4	27.5	10	250	82	60	22340.1054	100	22350.1054
	90	12.0	13.3	24	9.6	17.4	27.5	10	250	88	60	22340.1055	100	22350.1055
100	12.0	13.3	24	9.6	17.4	27.5	10	250	93	60	22340.1056	100	22350.1056	
110	12.0	13.3	24	9.6	17.4	27.5	10	250	99	60	22340.1057	100	22350.1057	
120	12.0	13.3	24	9.6	17.4	27.5	10	250	105	60	22340.1058	100	22350.1058	
12	20	14.5	16.5	28	10.6	23.1	33.5	12	250	72	87	22340.1064	144	22350.1064
	25	14.5	16.5	28	10.6	23.1	33.5	12	250	77	87	22340.1065	144	22350.1065
	30	14.5	16.5	28	10.6	23.1	33.5	12	250	81	87	22340.1066	144	22350.1066
	35	14.5	16.5	28	10.6	23.1	33.5	12	250	86	87	22340.1067	144	22350.1067
	40	14.5	16.5	28	10.6	23.1	33.5	12	250	90	87	22340.1068	144	22350.1068
	45	14.5	16.5	28	10.6	23.1	33.5	12	250	94	87	22340.1069	144	22350.1069
	50	14.5	16.5	28	10.6	23.1	33.5	12	250	98	87	22340.1070	144	22350.1070
	60	14.5	16.5	28	10.6	23.1	33.5	12	250	106	87	22340.1072	144	22350.1072
	70	14.5	16.5	28	10.6	23.1	33.5	12	250	115	87	22340.1074	144	22350.1074
	80	14.5	16.5	28	10.6	23.1	33.5	12	250	124	87	22340.1076	144	22350.1076
	90	14.5	16.5	28	10.6	23.1	33.5	12	250	132	87	22340.1060	144	22350.1060
100	14.5	16.5	28	10.6	23.1	33.5	12	250	140	87	22340.1061	144	22350.1061	
110	14.5	16.5	28	10.6	23.1	33.5	12	250	149	87	22340.1062	144	22350.1062	
120	14.5	16.5	28	10.6	23.1	33.5	12	250	157	87	22340.1063	144	22350.1063	

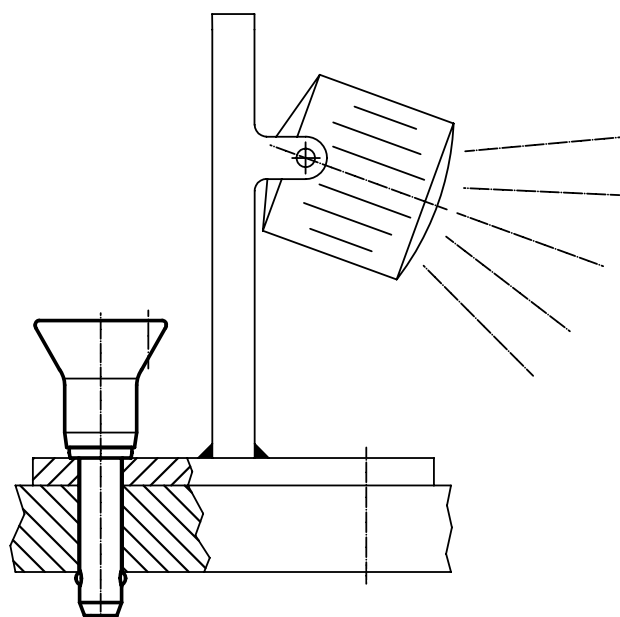
¹⁾ Shearing resistance similar to DIN 50141



d ₁ -0.04 -0.08	l ₁ +0.6	Dimensions						Location hole H11 [mm]	max. [°C]	[g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
		d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄				Shearing resistance, two-shear ¹⁾ min. [kN]	Art. No.	Shearing resistance, two-shear ¹⁾ min. [kN]	Art. No.
[mm]														
16	30	19.0	23.4	38	14.0	29.5	43.1	16	250	193	155	22340.1071	257	22350.1071
	35	19.0	23.4	38	14.0	29.5	43.1	16	250	200	155	22340.1073	257	22350.1073
	40	19.0	23.4	38	14.0	29.5	43.1	16	250	207	155	22340.1075	257	22350.1075
	45	19.0	23.4	38	14.0	29.5	43.1	16	250	215	155	22340.1077	257	22350.1077
	50	19.0	23.4	38	14.0	29.5	43.1	16	250	223	155	22340.1078	257	22350.1078
	60	19.0	23.4	38	14.0	29.5	43.1	16	250	239	155	22340.1079	257	22350.1079
	70	19.0	23.4	38	14.0	29.5	43.1	16	250	254	155	22340.1080	257	22350.1080
	80	19.0	23.4	38	14.0	29.5	43.1	16	250	268	155	22340.1081	257	22350.1081
	90	19.0	23.4	38	14.0	29.5	43.1	16	250	284	155	22340.1082	257	22350.1082
	100	19.0	23.4	38	14.0	29.5	43.1	16	250	299	155	22340.1083	257	22350.1083
	110	19.0	23.4	38	14.0	29.5	43.1	16	250	317	155	22340.1084	257	22350.1084
	120	19.0	23.4	38	14.0	29.5	43.1	16	250	333	155	22340.1085	257	22350.1085
	130	19.0	23.4	38	14.0	29.5	43.1	16	250	349	155	22340.1086	257	22350.1086
	140	19.0	23.4	38	14.0	29.5	43.1	16	250	363	155	22340.1087	257	22350.1087
150	19.0	23.4	38	14.0	29.5	43.1	16	250	376	155	22340.1088	257	22350.1088	
20	50	24.8	23.4	38	17.0	29.5	43.1	20	250	282	244	22340.1089	406	22350.1089
	60	24.8	23.4	38	17.0	29.5	43.1	20	250	309	244	22340.1090	406	22350.1090
	70	24.8	23.4	38	17.0	29.5	43.1	20	250	333	244	22340.1091	403	22350.1091
	80	24.8	23.4	38	17.0	29.5	43.1	20	250	356	244	22340.1092	403	22350.1092
	90	24.8	23.4	38	17.0	29.5	43.1	20	250	381	244	22340.1093	403	22350.1093
	100	24.8	23.4	38	17.0	29.5	43.1	20	250	406	244	22340.1094	403	22350.1094
	110	24.8	23.4	38	17.0	29.5	43.1	20	250	424	244	22340.1095	403	22350.1095
	120	24.8	23.4	38	17.0	29.5	43.1	20	250	452	244	22340.1096	403	22350.1096
	130	24.8	23.4	38	17.0	29.5	43.1	20	250	472	244	22340.1097	403	22350.1097
	140	24.8	23.4	38	17.0	29.5	43.1	20	250	501	244	22340.1098	403	22350.1098
150	24.8	23.4	38	17.0	29.5	43.1	20	250	520	244	22340.1099	403	22350.1099	
25	50	31.0	30.4	50	22.0	36.8	54.8	25	250	524	386	22340.1100	631	22350.1100
	60	31.0	30.4	50	22.0	36.8	54.8	25	250	562	386	22340.1101	631	22350.1101
	70	31.0	30.4	50	22.0	36.8	54.8	25	250	600	386	22340.1102	631	22350.1102
	80	31.0	30.4	50	22.0	36.8	54.8	25	250	643	386	22340.1103	631	22350.1103
	90	31.0	30.4	50	22.0	36.8	54.8	25	250	672	386	22340.1104	631	22350.1104
	100	31.0	30.4	50	22.0	36.8	54.8	25	250	713	386	22340.1105	631	22350.1105
	110	31.0	30.4	50	22.0	36.8	54.8	25	250	748	386	22340.1106	631	22350.1106
	120	31.0	30.4	50	22.0	36.8	54.8	25	250	798	386	22340.1107	631	22350.1107
	130	31.0	30.4	50	22.0	36.8	54.8	25	250	825	386	22340.1108	631	22350.1108
	140	31.0	30.4	50	22.0	36.8	54.8	25	250	873	386	22340.1109	631	22350.1109
150	31.0	30.4	50	22.0	36.8	54.8	25	250	893	386	22340.1110	631	22350.1110	

¹⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE



Clamping Pins • self-locking, with span compensation

EH 22360.



PRODUCT DESCRIPTION

Used for fixing and simultaneously tightly connecting thin walled plates. Clamping distance of 5 mm for clamping of sheets for welding work, for protection, coverings, to close doors etc.

All versions are corrosion resistant.
Version with ergonomic grip.

Material

Pin part
▪ Stainless steel 1.4305

Handle
▪ Thermoplastic PA 6, grey

Spring
▪ Stainless steel

Operation

The balls are unlocked by pressing the button.

MORE INFORMATION

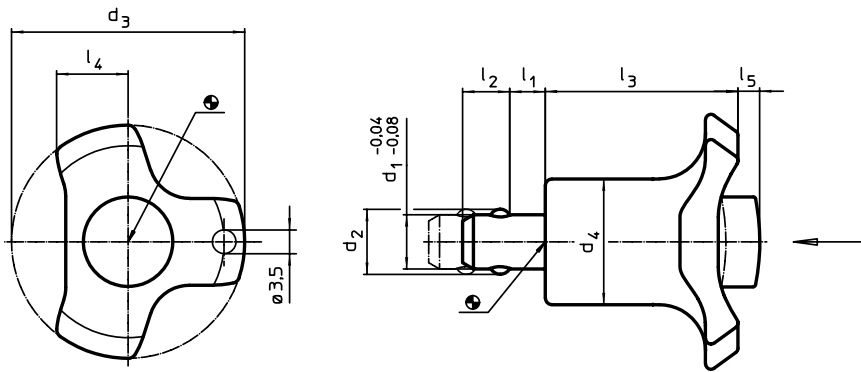
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

Locating Bushings, for ball lock pins and socket pins → p. 246
Locating Bushings, with flange, for ball lock pins and socket pins. → p. 248
Retaining Cables → p. 249

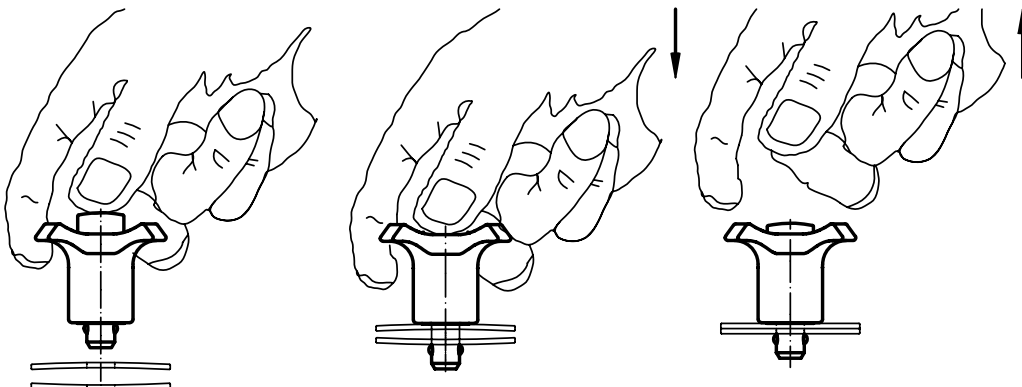
DRAWING



ORDER INFORMATION

d ₁ -0.04 -0.08	Dimensions								Location hole H11 [mm]	Clamp- ing force max. [N]	Temperature		Weight [g]	Art. No.
	l ₁	d ₂	d ₃	d ₄	l ₂	l ₃	l ₄	l ₅ Un- clamped			min.	max.		
[mm]														
6	0 – 5	7.0	38	17.5	5.0	30.2	11.0	3	6	16	-30	80	22	22360.0010
	5 – 10	7.0	38	17.5	5.0	30.2	11.0	3	6	18	-30	80	23	22360.0012
8	0 – 5	9.5	38	17.5	6.5	30.2	11.0	3	8	16	-30	80	24	22360.0020
	5 – 10	9.5	38	17.5	6.5	30.2	11.0	3	8	18	-30	80	26	22360.0022
10	0 – 5	12.0	47	23.0	8.7	36.0	11.0	4	10	21	-30	80	48	22360.0030
	5 – 10	12.0	47	23.0	8.7	36.0	11.0	4	10	23	-30	80	51	22360.0032
12	0 – 5	14.0	47	23.0	9.4	36.0	13.5	4	12	21	-30	80	51	22360.0040
	5 – 10	14.0	47	23.0	9.4	36.0	13.5	4	12	23	-30	80	55	22360.0042

APPLICATION EXAMPLE



Ball Lock Pins • self-locking, with standard handle

EH 22370. /EH 22380.



PRODUCT DESCRIPTION

For quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections. All versions are corrosion resistant. When using stainless steel 1.4542: high-strength, hardened, abrasion resistant pin with high load capacity. Compact design with standard handle.

Material

Pin part

- Stainless steel 1.4305
- Stainless steel 1.4542, precipitation-hardened

Spring

- Stainless steel

Operation

The balls are unlocked by pressing the button.

Characteristic

Types from stainless steel 1.4542 with marking below the balls.

MORE INFORMATION

Notes

Special types on request.

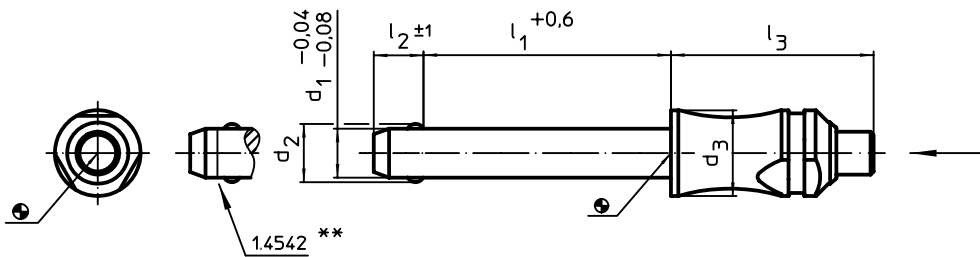
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

- Ball Lock Pins, self-locking, with standard handle, titanium → p. 234
- Locating Bushings, for ball lock pins and socket pins → p. 246
- Locating Bushings, with flange, for ball lock pins and socket pins → p. 248
- Retaining Cables → p. 249
- Positioning Bushings, with collar, DIN 172 A → p. 424
- Positioning Bushings, without collar, DIN 179 A → p. 427

DRAWING





** Types from stainless steel 1.4542 with marking.

ORDER INFORMATION

Dimensions						Location hole H11	🌡️	🏋️	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
d ₁ -0.04 -0.08	l ₁ +0.6	d ₂	d ₃	l ₂ ±1	l ₃		max.		Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
[mm]						[mm]	[°C]	[g]	[kN]		[kN]	
5	10	5.5	10	6.0	26.2	5	250	10	14	22370.0012	24	22380.0012
	15	5.5	10	6.0	26.2	5	250	11	14	22370.0013	24	22380.0013
	20	5.5	10	6.0	26.2	5	250	12	14	22370.0014	24	22380.0014
	25	5.5	10	6.0	26.2	5	250	12	14	22370.0015	24	22380.0015
	30	5.5	10	6.0	26.2	5	250	13	14	22370.0016	24	22380.0016
	35	5.5	10	6.0	26.2	5	250	14	14	22370.0017	24	22380.0017
	40	5.5	10	6.0	26.2	5	250	14	14	22370.0018	24	22380.0018
	45	5.5	10	6.0	26.2	5	250	15	14	22370.0007	24	22380.0007
	50	5.5	10	6.0	26.2	5	250	16	14	22370.0008	24	22380.0008
	60	5.5	10	6.0	26.2	5	250	17	14	22370.0009	24	22380.0009
70	5.5	10	6.0	26.2	5	250	19	14	22370.0010	24	22380.0010	
80	5.5	10	6.0	26.2	5	250	20	14	22370.0011	24	22380.0011	

¹⁾ Shearing resistance similar to DIN 50141



	Dimensions					Location hole H11	 max.	 [g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
	d ₁ -0.04 -0.08	l ₁ +0.6	d ₂	d ₃	l ₂ ±1				l ₃	Shearing resistance, two-shear ¹⁾ min. [kN]	Art. No.	Shearing resistance, two-shear ¹⁾ min. [kN]
	[mm]					[mm]	[°C]					
6	10	7.0	10	7.0	26.2	6	250	11	21	22370.0022	35	22380.0022
	15	7.0	10	7.0	26.2	6	250	12	21	22370.0023	35	22380.0023
	20	7.0	10	7.0	26.2	6	250	13	21	22370.0024	35	22380.0024
	25	7.0	10	7.0	26.2	6	250	14	21	22370.0025	35	22380.0025
	30	7.0	10	7.0	26.2	6	250	15	21	22370.0026	35	22380.0026
	35	7.0	10	7.0	26.2	6	250	16	21	22370.0027	35	22380.0027
	40	7.0	10	7.0	26.2	6	250	17	21	22370.0028	35	22380.0028
	45	7.0	10	7.0	26.2	6	250	18	21	22370.0029	35	22380.0029
	50	7.0	10	7.0	26.2	6	250	19	21	22370.0030	35	22380.0030
	60	7.0	10	7.0	26.2	6	250	21	21	22370.0019	35	22380.0019
70	7.0	10	7.0	26.2	6	250	23	21	22370.0020	35	22380.0020	
80	7.0	10	7.0	26.2	6	250	25	21	22370.0021	35	22380.0021	
8	10	9.5	14	8.2	33.1	8	250	29	38	22370.0032	63	22380.0032
	15	9.5	14	8.2	33.1	8	250	31	38	22370.0033	63	22380.0033
	20	9.5	14	8.2	33.1	8	250	32	38	22370.0034	63	22380.0034
	25	9.5	14	8.2	33.1	8	250	34	38	22370.0035	63	22380.0035
	30	9.5	14	8.2	33.1	8	250	36	38	22370.0036	63	22380.0036
	35	9.5	14	8.2	33.1	8	250	38	38	22370.0037	63	22380.0037
	40	9.5	14	8.2	33.1	8	250	40	38	22370.0038	63	22380.0038
	45	9.5	14	8.2	33.1	8	250	42	38	22370.0039	63	22380.0039
	50	9.5	14	8.2	33.1	8	250	44	38	22370.0040	63	22380.0040
	60	9.5	14	8.2	33.1	8	250	47	38	22370.0031	63	22380.0031
	70	9.5	14	8.2	33.1	8	250	51	38	22370.0041	63	22380.0041
	80	9.5	14	8.2	33.1	8	250	54	38	22370.0042	63	22380.0042
90	9.5	14	8.2	33.1	8	250	58	38	22370.0043	63	22380.0043	
100	9.5	14	8.2	33.1	8	250	62	38	22370.0051	63	22380.0051	
10	15	12.0	14	9.6	33.1	10	250	36	60	22370.0059	100	22380.0059
	20	12.0	14	9.6	33.1	10	250	39	60	22370.0044	100	22380.0044
	25	12.0	14	9.6	33.1	10	250	42	60	22370.0045	100	22380.0045
	30	12.0	14	9.6	33.1	10	250	45	60	22370.0046	100	22380.0046
	35	12.0	14	9.6	33.1	10	250	48	60	22370.0047	100	22380.0047
	40	12.0	14	9.6	33.1	10	250	51	60	22370.0048	100	22380.0048
	45	12.0	14	9.6	33.1	10	250	54	60	22370.0049	100	22380.0049
	50	12.0	14	9.6	33.1	10	250	57	60	22370.0050	100	22380.0050
	60	12.0	14	9.6	33.1	10	250	63	60	22370.0052	100	22380.0052
	70	12.0	14	9.6	33.1	10	250	69	60	22370.0053	100	22380.0053
	80	12.0	14	9.6	33.1	10	250	74	60	22370.0054	100	22380.0054
	90	12.0	14	9.6	33.1	10	250	80	60	22370.0055	100	22380.0055
100	12.0	14	9.6	33.1	10	250	86	60	22370.0056	100	22380.0056	
110	12.0	14	9.6	33.1	10	250	92	60	22370.0057	100	22380.0057	
120	12.0	14	9.6	33.1	10	250	98	60	22370.0058	100	22380.0058	
12	20	14.5	20	10.6	39.5	12	250	79	87	22370.0064	144	22380.0064
	25	14.5	20	10.6	39.5	12	250	84	87	22370.0065	144	22380.0065
	30	14.5	20	10.6	39.5	12	250	88	87	22370.0066	144	22380.0066
	35	14.5	20	10.6	39.5	12	250	92	87	22370.0067	144	22380.0067
	40	14.5	20	10.6	39.5	12	250	97	87	22370.0068	144	22380.0068
	45	14.5	20	10.6	39.5	12	250	101	87	22370.0069	144	22380.0069
	50	14.5	20	10.6	39.5	12	250	105	87	22370.0070	144	22380.0070
	60	14.5	20	10.6	39.5	12	250	113	87	22370.0072	144	22380.0072
	70	14.5	20	10.6	39.5	12	250	122	87	22370.0074	144	22380.0074
	80	14.5	20	10.6	39.5	12	250	130	87	22370.0076	144	22380.0076
	90	14.5	20	10.6	39.5	12	250	139	87	22370.0060	144	22380.0060
	100	14.5	20	10.6	39.5	12	250	147	87	22370.0061	144	22380.0061
110	14.5	20	10.6	39.5	12	250	156	87	22370.0062	144	22380.0062	
120	14.5	20	10.6	39.5	12	250	165	87	22370.0063	144	22380.0063	

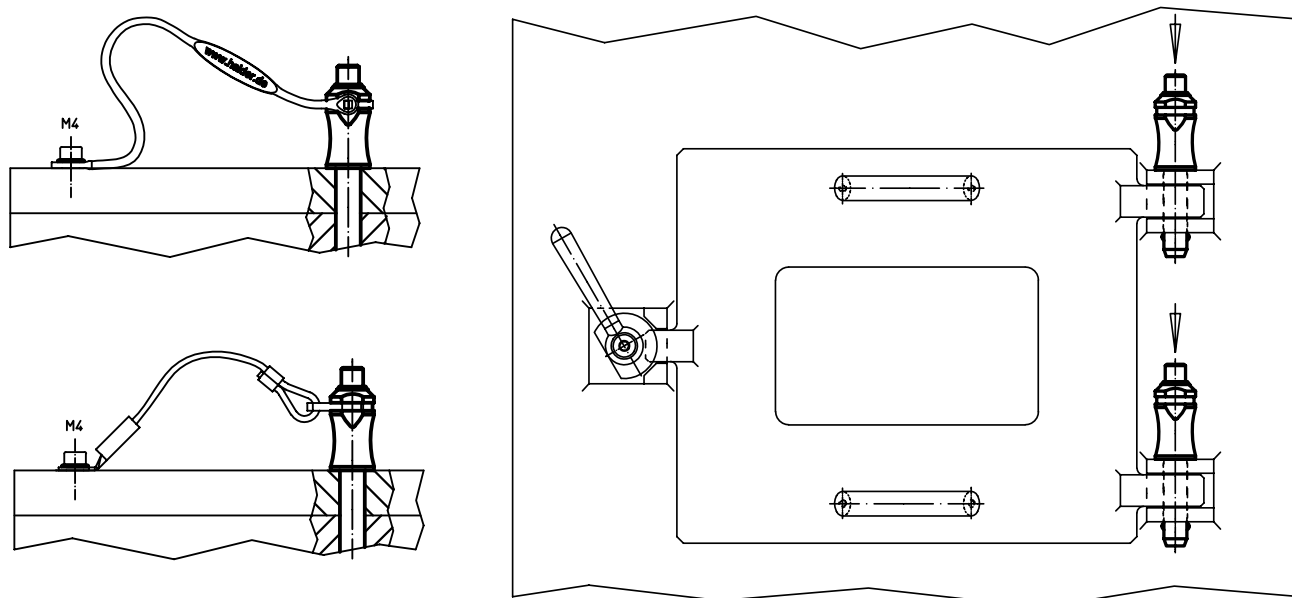
¹⁾ Shearing resistance similar to DIN 50141



Dimensions						Location hole H11	🌡️ max.	🏋️ [g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
d_1 -0.04 -0.08	l_1 +0.6	d_2	d_3	l_2 ± 1	l_3				Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
[mm]						[mm]	[°C]	[g]	[kN]		[kN]	
16	30	19.0	20	14.0	39.5	16	250	123	155	22370.0086	257	22380.0086
	35	19.0	20	14.0	39.5	16	250	130	155	22370.0087	257	22380.0087
	40	19.0	20	14.0	39.5	16	250	138	155	22370.0088	257	22380.0088
	45	19.0	20	14.0	39.5	16	250	146	155	22370.0089	257	22380.0089
	50	19.0	20	14.0	39.5	16	250	154	155	22370.0090	257	22380.0090
	60	19.0	20	14.0	39.5	16	250	169	155	22370.0092	257	22380.0092
	70	19.0	20	14.0	39.5	16	250	185	155	22370.0094	257	22380.0094
	80	19.0	20	14.0	39.5	16	250	200	155	22370.0096	257	22380.0096
	90	19.0	20	14.0	39.5	16	250	216	155	22370.0097	257	22380.0097
	100	19.0	20	14.0	39.5	16	250	232	155	22370.0098	257	22380.0098
	110	19.0	20	14.0	39.5	16	250	248	155	22370.0099	257	22380.0099
	120	19.0	20	14.0	39.5	16	250	263	155	22370.0100	257	22380.0100
	130	19.0	20	14.0	39.5	16	250	278	155	22370.0101	257	22380.0101
20	50	25.0	28	20.5	49.9	20	250	301	244	22370.0111	403	22380.0111
	60	25.0	28	20.5	49.9	20	250	326	244	22370.0112	403	22380.0112
	70	25.0	28	20.5	49.9	20	250	351	244	22370.0113	403	22380.0113
	80	25.0	28	20.5	49.9	20	250	375	244	22370.0116	403	22380.0116
	90	25.0	28	20.5	49.9	20	250	399	244	22370.0117	403	22380.0117
	100	25.0	28	20.5	49.9	20	250	423	244	22370.0120	403	22380.0120
	110	25.0	28	20.5	49.9	20	250	448	244	22370.0121	403	22380.0121
	120	25.0	28	20.5	49.9	20	250	472	244	22370.0124	403	22380.0124
	130	25.0	28	20.5	49.9	20	250	498	244	22370.0125	403	22380.0125
25	50	30.8	28	22.0	49.9	25	250	399	386	22370.0129	631	22380.0129
	60	30.8	28	22.0	49.9	25	250	437	386	22370.0130	631	22380.0130
	70	30.8	28	22.0	49.9	25	250	477	386	22370.0131	631	22380.0131
	80	30.8	28	22.0	49.9	25	250	513	386	22370.0132	631	22380.0132
	90	30.8	28	22.0	49.9	25	250	551	386	22370.0133	631	22380.0133
	100	30.8	28	22.0	49.9	25	250	588	386	22370.0134	631	22380.0134
	110	30.8	28	22.0	49.9	25	250	627	386	22370.0135	631	22380.0135
	120	30.8	28	22.0	49.9	25	250	664	386	22370.0136	631	22380.0136
	130	30.8	28	22.0	49.9	25	250	703	386	22370.0137	631	22380.0137
	140	30.8	28	22.0	49.9	25	250	743	386	22370.0138	631	22380.0138
	150	30.8	28	22.0	49.9	25	250	779	386	22370.0139	631	22380.0139

¹⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE



Ball Lock Pins • self-locking, with standard handle, titanium

EH 22390.

2



PRODUCT DESCRIPTION

Ball lock pins made from titanium stand out due to the following positive material features:

- Over 40% lighter weight compared to a steel variant
- Absolutely corrosion resistant.

The version made from titanium is used in areas such as lightweight construction, maritime environments and chemical manufacturing.

For quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections.

Compact design with standard handle.

Material

Pin part

- Titanium

Ball

- Ceramic

Spring

- Corrosion resistant alloy

Operation

The balls are unlocked by pressing the button.

MORE INFORMATION

Notes

Special types on request.

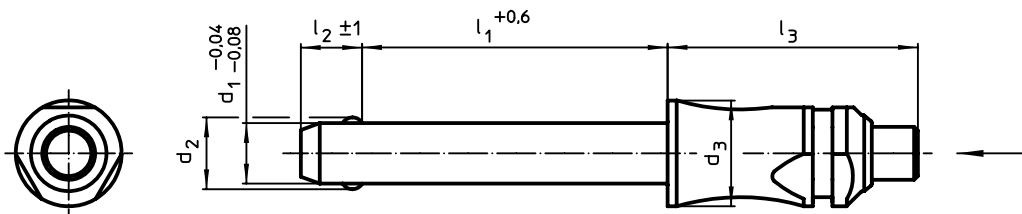
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

Ball Lock Pins, self-locking, with standard handle → p. 231
 Retaining Cables → p. 249

DRAWING



ORDER INFORMATION

d ₁ -0.04 -0.08	l ₁ +0.6	Dimensions				Location hole H11	Shearing resistance, two- shear ¹⁾ min.	max.	[g]	Art. No.
		d ₂	d ₃	l ₂ ±1	l ₃					
6	10	7.0	10	7.0	26.2	6	23	400	6.6	22390.0022
	20	7.0	10	7.0	26.2	6	23	400	7.7	22390.0024
	30	7.0	10	7.0	26.2	6	23	400	8.8	22390.0026
	40	7.0	10	7.0	26.2	6	23	400	9.9	22390.0028
	50	7.0	10	7.0	26.2	6	23	400	11.0	22390.0030
8	20	9.5	14	8.2	33.1	8	43	400	18.0	22390.0034
	30	9.5	14	8.2	33.1	8	43	400	20.0	22390.0036
	40	9.5	14	8.2	33.1	8	43	400	23.0	22390.0038
	50	9.5	14	8.2	33.1	8	43	400	25.0	22390.0040
10	20	12.0	14	9.6	33.1	10	43	400	22.0	22390.0044
	30	12.0	14	9.6	26.2	10	69	400	25.0	22390.0046
	40	12.0	14	9.6	26.2	10	69	400	29.0	22390.0048
	50	12.0	14	9.6	26.2	10	69	400	32.0	22390.0050
	60	12.0	14	9.6	26.2	10	69	400	35.0	22390.0052

¹⁾ Shearing resistance similar to DIN 50141 (determined by tests)

Ball Lock Pins • self-locking, with elastic handle

EH 22370. /EH 22380.



PRODUCT DESCRIPTION

For quick fastening, locking, adjusting, changing and securing. Various applications in different sectors, e.g. sports, leisure, medical healing and remedial instruments and apparatuses, machine construction and engineering etc. Quickly and easily unlockable for frequently repeated connections.

All versions are corrosion resistant. When using stainless steel 1.4542: high-strength, hardened, abrasion resistant pin with high load capacity.

Elastic and ergonomic handle with integrated reset (locking). New, modern, patented design.

Material

Pin part

- Stainless steel 1.4305
- Stainless steel 1.4542, precipitation-hardened

Handle

- Thermoplastic (PBT/TPE), grey / orange

Operation

The balls are unlocked by pressing the button.

Characteristic

Types from stainless steel 1.4542 with marking below the balls.

MORE INFORMATION

Notes

Special types on request.

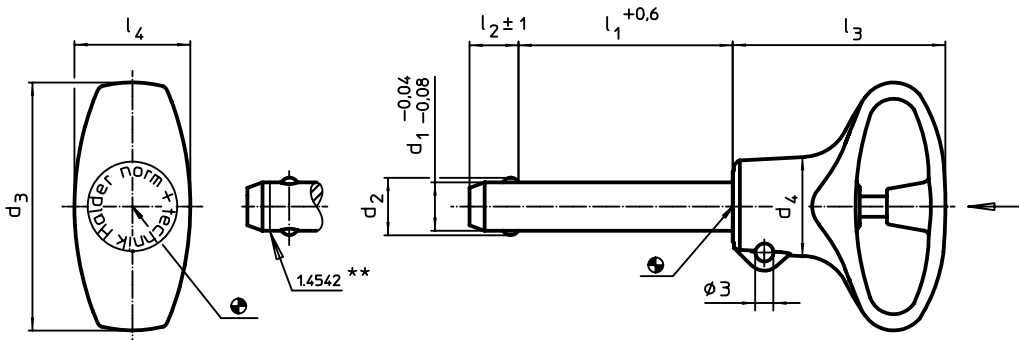
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

- Locating Bushings, for ball lock pins and socket pins → p. 246
- Locating Bushings, with flange, for ball lock pins and socket pins. → p. 248
- Retaining Cables → p. 249
- Positioning Bushings, with collar, DIN 172 A → p. 424
- Positioning Bushings, without collar, DIN 179 A → p. 427

DRAWING





** Types from stainless steel 1.4542 with marking.

ORDER INFORMATION

	Dimensions								Location hole H11	Temperature		Weight	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
	d ₁ -0.04 -0.08	l ₁ +0.6	d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄		min.	max.		Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
	[mm]								[mm]	[°C]		[g]	[kN]		[kN]	
5	10	5.5	36	12.7	6.0	31.0	15.9	5	-30	80	9.2	14	22370.0712	24	22380.0712	
	15	5.5	36	12.7	6.0	31.0	15.9	5	-30	80	9.9	14	22370.0713	24	22380.0713	
	20	5.5	36	12.7	6.0	31.0	15.9	5	-30	80	11.0	14	22370.0714	24	22380.0714	
	25	5.5	36	12.7	6.0	31.0	15.9	5	-30	80	11.0	14	22370.0715	24	22380.0715	
	30	5.5	36	12.7	6.0	31.0	15.9	5	-30	80	12.0	14	22370.0716	24	22380.0716	
6	10	7.0	36	12.7	7.0	31.0	15.9	6	-30	80	10.0	21	22370.0722	35	22380.0722	
	15	7.0	36	12.7	7.0	31.0	15.9	6	-30	80	11.0	21	22370.0723	35	22380.0723	
	20	7.0	36	12.7	7.0	31.0	15.9	6	-30	80	12.0	21	22370.0724	35	22380.0724	
	25	7.0	36	12.7	7.0	31.0	15.9	6	-30	80	13.0	21	22370.0725	35	22380.0725	
	30	7.0	36	12.7	7.0	31.0	15.9	6	-30	80	14.0	21	22370.0726	35	22380.0726	
	35	7.0	36	12.7	7.0	31.0	15.9	6	-30	80	15.0	21	22370.0727	35	22380.0727	
	40	7.0	36	12.7	7.0	31.0	15.9	6	-30	80	16.0	21	22370.0728	35	22380.0728	
	45	7.0	36	12.7	7.0	31.0	15.9	6	-30	80	17.0	21	22370.0729	35	22380.0729	
50	7.0	36	12.7	7.0	31.0	15.9	6	-30	80	18.0	21	22370.0730	35	22380.0730		

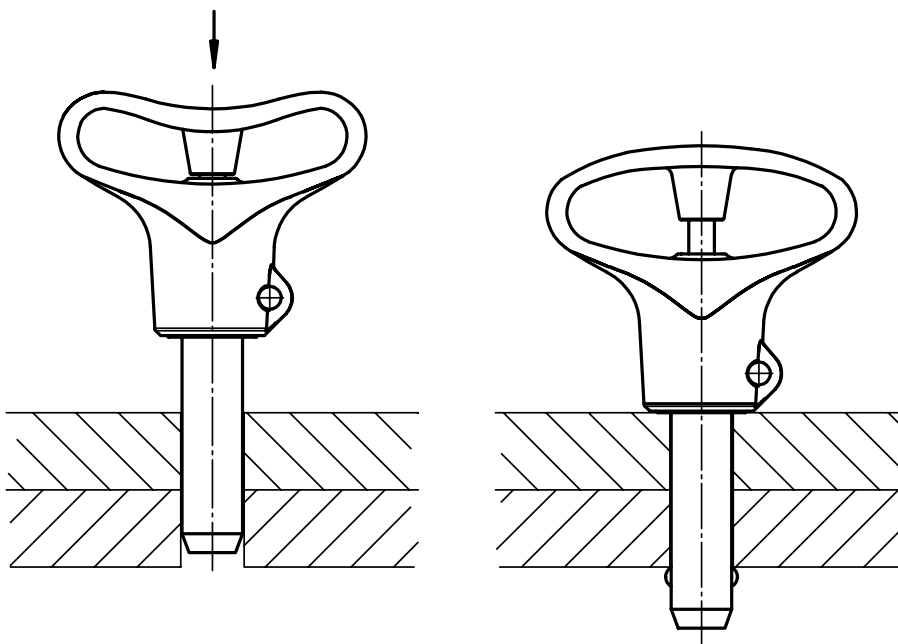
¹⁾ Shearing resistance similar to DIN 50141



	Dimensions							Location hole H11				Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened		
	d_1	l_1	d_2	d_3	d_4	l_2	l_3		l_4	min.		max.	Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
	[mm]								[°C]			[g]				
8	20	9.5	41	16.4	8.2	34.8	19.2	8	-30	80	23.0	38	22370.0734	63	22380.0734	
	25	9.5	41	16.4	8.2	34.8	19.2	8	-30	80	24.0	38	22370.0735	63	22380.0735	
	30	9.5	41	16.4	8.2	34.8	19.2	8	-30	80	26.0	38	22370.0736	63	22380.0736	
	35	9.5	41	16.4	8.2	34.8	19.2	8	-30	80	28.0	38	22370.0737	63	22380.0737	
	40	9.5	41	16.4	8.2	34.8	19.2	8	-30	80	30.0	38	22370.0738	63	22380.0738	
	45	9.5	41	16.4	8.2	34.8	19.2	8	-30	80	32.0	38	22370.0739	63	22380.0739	
	50	9.5	41	16.4	8.2	34.8	19.2	8	-30	80	34.0	38	22370.0740	63	22380.0740	
10	20	12.0	41	16.4	9.6	34.8	19.2	10	-30	80	30.0	60	22370.0744	100	22380.0744	
	25	12.0	41	16.4	9.6	34.8	19.2	10	-30	80	32.0	60	22370.0745	100	22380.0745	
	30	12.0	41	16.4	9.6	34.8	19.2	10	-30	80	35.0	60	22370.0746	100	22380.0746	
	35	12.0	41	16.4	9.6	34.8	19.2	10	-30	80	38.0	60	22370.0747	100	22380.0747	
	40	12.0	41	16.4	9.6	34.8	19.2	10	-30	80	41.0	60	22370.0748	100	22380.0748	
	45	12.0	41	16.4	9.6	34.8	19.2	10	-30	80	44.0	60	22370.0749	100	22380.0749	
	50	12.0	41	16.4	9.6	34.8	19.2	10	-30	80	47.0	60	22370.0750	100	22380.0750	
12	25	14.5	49	21.2	10.6	40.5	24.8	12	-30	80	54.0	87	22370.0765	144	22380.0765	
	30	14.5	49	21.2	10.6	40.5	24.8	12	-30	80	58.0	87	22370.0766	144	22380.0766	
	35	14.5	49	21.2	10.6	40.5	24.8	12	-30	80	63.0	87	22370.0767	144	22380.0767	
	40	14.5	49	21.2	10.6	40.5	24.8	12	-30	80	67.0	87	22370.0768	144	22380.0768	
	45	14.5	49	21.2	10.6	40.5	24.8	12	-30	80	71.0	87	22370.0769	144	22380.0769	
	50	14.5	49	21.2	10.6	40.5	24.8	12	-30	80	75.0	87	22370.0770	144	22380.0770	
	60	14.5	49	21.2	10.6	40.5	24.8	12	-30	80	83.0	87	22370.0772	144	22380.0772	
	70	14.5	49	21.2	10.6	40.5	24.8	12	-30	80	111.0	87	22370.0774	144	22380.0774	
16	30	19.0	49	21.2	14.0	40.5	24.8	16	-30	80	92.0	155	22370.0786	257	22380.0786	
	35	19.0	49	21.2	14.0	40.5	24.8	16	-30	80	98.0	155	22370.0787	257	22380.0787	
	40	19.0	49	21.2	14.0	40.5	24.8	16	-30	80	109.0	155	22370.0788	257	22380.0788	
	45	19.0	49	21.2	14.0	40.5	24.8	16	-30	80	114.0	155	22370.0789	257	22380.0789	
	50	19.0	49	21.2	14.0	40.5	24.8	16	-30	80	125.0	155	22370.0790	257	22380.0790	
	60	19.0	49	21.2	14.0	40.5	24.8	16	-30	80	139.0	155	22370.0792	257	22380.0792	
	70	19.0	49	21.2	14.0	40.5	24.8	16	-30	80	156.0	155	22370.0794	257	22380.0794	
	80	19.0	49	21.2	14.0	40.5	24.8	16	-30	80	171.0	155	22370.0796	257	22380.0796	

¹⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE



Ball Lock Pins • self-locking, with combination handle

EH 22370.



PRODUCT DESCRIPTION

For quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections. All versions are corrosion resistant. Ergonomic grip, different colour combinations available. The grip design provides protection of unintentional unlocking.

Material

Pin part

- Stainless steel 1.4305

Handle

- Thermoplastic PA 6 grey / orange
- Thermoplastic PA 6 grey / grey
- Thermoplastic PA 6 grey / blue
- Thermoplastic PA 6 black / black

Spring

- Stainless steel

Operation

The balls are unlocked by pressing the button.

MORE INFORMATION

Notes

Special types on request.

References

Stainless steel 1.4542, see EH 22380.

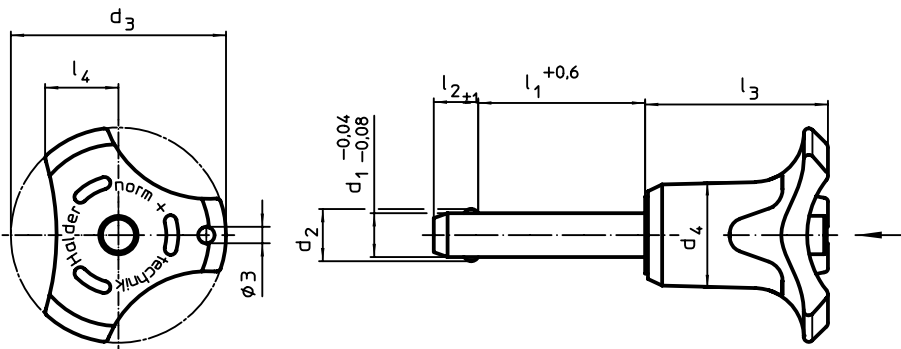
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

- Ball Lock Pins, self-locking, with combination handle, precipitation-hardened. → p. 240
- Locating Bushings, for ball lock pins and socket pins → p. 246
- Locating Bushings, with flange, for ball lock pins and socket pins → p. 248
- Retaining Cables → p. 249
- Positioning Bushings, with collar, DIN 172 A → p. 424
- Positioning Bushings, without collar, DIN 179 A → p. 427

DRAWING



ORDER INFORMATION

d ₁ -0.04 -0.08	l ₁ +0.6	Dimensions						Location hole H11 [mm]	Shearing resistance, two- shear ¹⁾ min. [kN]	Temperature		Weight [g]	Art. No.							
		d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄			min.	max.		orange	grey	blue	black				
													[mm]				[°C]			
5	10	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	21	22370.0152	22370.0292	22370.0432	22370.0812				
	15	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	15	22370.0153	22370.0293	22370.0433	22370.0813				
	20	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	16	22370.0154	22370.0294	22370.0434	22370.0814				
	25	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	17	22370.0155	22370.0295	22370.0435	22370.0815				
	30	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	18	22370.0156	22370.0296	22370.0436	22370.0816				
	35	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	19	22370.0145	22370.0285	22370.0425	22370.0805				
	40	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	20	22370.0146	22370.0286	22370.0426	22370.0806				
	45	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	21	22370.0147	22370.0287	22370.0427	22370.0807				
	50	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	23	22370.0148	22370.0288	22370.0428	22370.0808				
	60	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	21	22370.0149	22370.0289	22370.0429	22370.0809				
70	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	18	22370.0150	22370.0290	22370.0430	22370.0810					
80	5.5	33.2	14.5	6.0	26.7	10.8	5	14	-30	80	19	22370.0151	22370.0291	22370.0431	22370.0811					

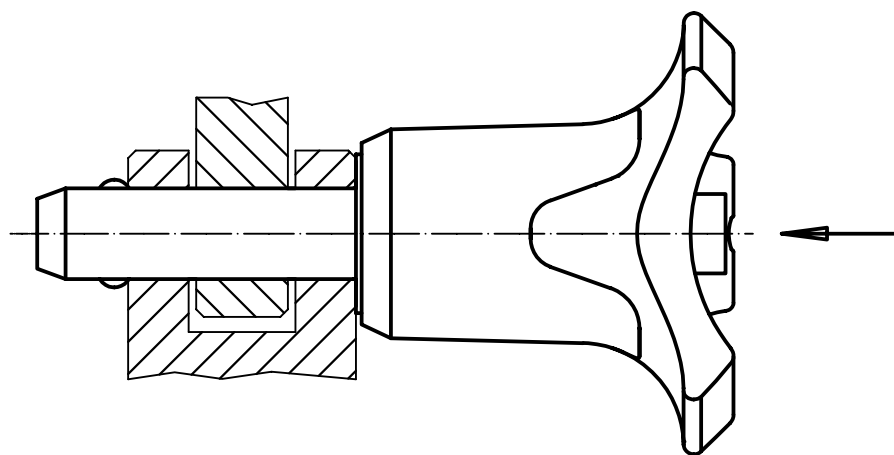
¹⁾ Shearing resistance similar to DIN 50141



	Dimensions								Location hole H11 [mm]	Shearing resistance, two-shear ¹⁾		min. max. [°C]	[g]	Art. No.			
	d ₁	l ₁	d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄		min.	max.			orange	grey	blue	black
	[mm]									[kN]							
16	30	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	132	22370.0226	22370.0366	22370.0506	22370.0886	
	35	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	140	22370.0227	22370.0367	22370.0507	22370.0887	
	40	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	148	22370.0228	22370.0368	22370.0508	22370.0888	
	45	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	155	22370.0229	22370.0369	22370.0509	22370.0889	
	50	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	168	22370.0230	22370.0370	22370.0510	22370.0890	
	60	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	178	22370.0232	22370.0372	22370.0512	22370.0892	
	70	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	194	22370.0234	22370.0374	22370.0514	22370.0894	
	80	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	208	22370.0236	22370.0376	22370.0516	22370.0896	
	90	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	234	22370.0237	22370.0377	22370.0517	22370.0897	
	100	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	251	22370.0238	22370.0378	22370.0518	22370.0898	
	110	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	266	22370.0239	22370.0379	22370.0519	22370.0899	
	120	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	281	22370.0240	22370.0380	22370.0520	22370.0900	
	130	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	297	22370.0241	22370.0381	22370.0521	22370.0901	
	140	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	313	22370.0242	22370.0382	22370.0522	22370.0902	
	150	19.0	47.6	25.2	14.0	39.7	16.7	16	155	-30	80	328	22370.0243	22370.0383	22370.0523	22370.0903	
20	50	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	329	22370.0251	22370.0391	22370.0531	22370.0905	
	60	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	343	22370.0252	22370.0392	22370.0532	22370.0904	
	70	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	377	22370.0253	22370.0393	22370.0533	22370.0906	
	80	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	392	22370.0256	22370.0396	22370.0536	22370.0908	
	90	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	426	22370.0257	22370.0397	22370.0537	22370.0909	
	100	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	444	22370.0260	22370.0400	22370.0540	22370.0912	
	110	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	474	22370.0261	22370.0401	22370.0541	22370.0913	
	120	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	488	22370.0264	22370.0404	22370.0544	22370.0916	
	130	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	523	22370.0265	22370.0405	22370.0545	22370.0917	
	140	25.0	57.1	33.8	20.5	50.7	21.5	20	244	-30	80	546	22370.0266	22370.0406	22370.0546	22370.0918	
25	50	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	415	22370.0269	22370.0409	22370.0549	22370.0921	
	60	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	453	22370.0270	22370.0410	22370.0550	22370.0922	
	70	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	503	22370.0271	22370.0411	22370.0551	22370.0923	
	80	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	536	22370.0272	22370.0412	22370.0552	22370.0924	
	90	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	565	22370.0273	22370.0413	22370.0553	22370.0925	
	100	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	612	22370.0274	22370.0414	22370.0554	22370.0926	
	110	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	640	22370.0275	22370.0415	22370.0555	22370.0927	
	120	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	689	22370.0276	22370.0416	22370.0556	22370.0928	
	130	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	715	22370.0277	22370.0417	22370.0557	22370.0929	
	140	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	753	22370.0278	22370.0418	22370.0558	22370.0930	
150	30.8	57.1	33.8	22.0	50.7	21.5	25	386	-30	80	811	22370.0279	22370.0419	22370.0559	22370.0931		

¹⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE



Ball Lock Pins • self-locking, with combination handle, precipitation-hardened

EH 22380.



PRODUCT DESCRIPTION

For quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections. All versions are corrosion resistant. When using stainless steel 1.4542: high-strength, hardened, abrasion resistant pin with high load capacity. Ergonomic grip, different colour combinations available. The grip design provides protection of unintentional unlocking.

Material

Pin part

- Stainless steel 1.4542, precipitation-hardened

Handle

- Thermoplastic PA 6 grey / orange
- Thermoplastic PA 6 grey / grey
- Thermoplastic PA 6 grey / blue
- Thermoplastic PA 6 black / black

Spring

- Stainless steel

Operation

The balls are unlocked by pressing the button.

Characteristic

Types from stainless steel 1.4542 with marking below the balls.

MORE INFORMATION

Notes

Special types on request.

References

Stainless steel 1.4305, see EH 22370.

Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

Ball Lock Pins, self-locking, with combination handle. → p. 237

Locating Bushings, for ball lock pins and socket pins → p. 246

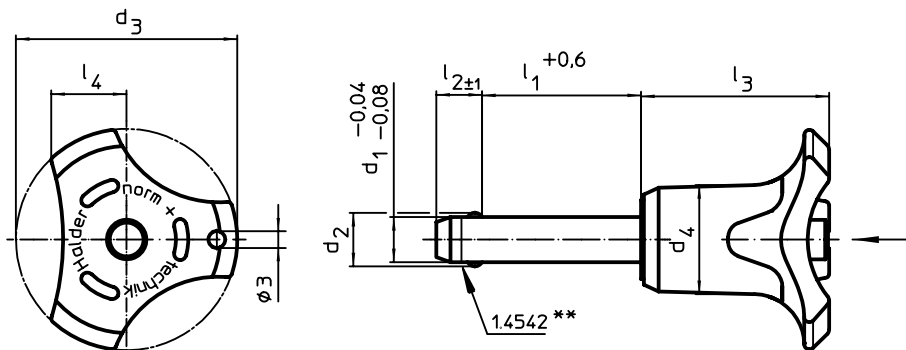
Locating Bushings, with flange, for ball lock pins and socket pins. → p. 248

Retaining Cables → p. 249

Positioning Bushings, with collar, DIN 172 A → p. 424

Positioning Bushings, without collar, DIN 179 A → p. 427

DRAWING



** Types from stainless steel 1.4542 with marking.

ORDER INFORMATION

Dimensions								Location hole H11	Shearing resistance, two-shear ¹⁾ min.	Temperature		Weight	Art. No.			
d ₁	l ₁	d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄			min.	max.		orange	grey	blue	black
[mm]								[mm]	[kN]	[°C]		[g]				
5	10	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	15	22380.0152	22380.0292	22380.0432	22380.0812
	15	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	15	22380.0153	22380.0293	22380.0433	22380.0813
	20	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	16	22380.0154	22380.0294	22380.0434	22380.0814
	25	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	17	22380.0155	22380.0295	22380.0435	22380.0815
	30	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	18	22380.0156	22380.0296	22380.0436	22380.0816
	35	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	19	22380.0145	22380.0285	22380.0425	22380.0805
	40	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	20	22380.0146	22380.0286	22380.0426	22380.0806
	45	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	21	22380.0147	22380.0287	22380.0427	22380.0807
	50	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	23	22380.0148	22380.0288	22380.0428	22380.0808
	60	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	24	22380.0149	22380.0289	22380.0429	22380.0809
70	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	18	22380.0150	22380.0290	22380.0430	22380.0810	
80	5.5	33.2	14.5	6.0	26.7	10.8	5	24	-30	80	19	22380.0151	22380.0291	22380.0431	22380.0811	

¹⁾ Shearing resistance similar to DIN 50141



Dimensions		Dimensions						Location hole H11	Shearing resistance, two-shear ¹⁾	Temperature		Weight	Art. No.											
													[mm]				[kN]	[°C]		[g]	orange	grey	blue	black
													d ₁	l ₁	d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄	min.	max.	orange	grey
-0.04 -0.08	+0.6																							
6	10	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	16	22380.0162	22380.0302	22380.0442	22380.0822								
	15	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	12	22380.0163	22380.0303	22380.0443	22380.0823								
	20	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	18	22380.0164	22380.0304	22380.0444	22380.0824								
	25	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	19	22380.0165	22380.0305	22380.0445	22380.0825								
	30	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	20	22380.0166	22380.0306	22380.0446	22380.0826								
	35	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	21	22380.0167	22380.0307	22380.0447	22380.0827								
	40	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	22	22380.0168	22380.0308	22380.0448	22380.0828								
	45	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	23	22380.0169	22380.0309	22380.0449	22380.0829								
	50	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	24	22380.0170	22380.0310	22380.0450	22380.0830								
	60	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	26	22380.0157	22380.0297	22380.0437	22380.0817								
70	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	28	22380.0158	22380.0298	22380.0438	22380.0818									
80	7.0	33.2	14.5	7.0	26.7	10.8	6	35	-30	80	30	22380.0159	22380.0299	22380.0439	22380.0819									
8	10	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	38	22380.0172	22380.0312	22380.0452	22380.0832								
	15	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	58	22380.0173	22380.0313	22380.0453	22380.0833								
	20	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	40	22380.0174	22380.0314	22380.0454	22380.0834								
	25	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	42	22380.0175	22380.0315	22380.0455	22380.0835								
	30	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	42	22380.0176	22380.0316	22380.0456	22380.0836								
	35	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	46	22380.0177	22380.0317	22380.0457	22380.0837								
	40	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	47	22380.0178	22380.0318	22380.0458	22380.0838								
	45	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	49	22380.0179	22380.0319	22380.0459	22380.0839								
	50	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	51	22380.0180	22380.0320	22380.0460	22380.0840								
	60	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	62	22380.0181	22380.0321	22380.0461	22380.0841								
	70	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	65	22380.0182	22380.0322	22380.0462	22380.0842								
	80	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	69	22380.0183	22380.0323	22380.0463	22380.0843								
90	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	36	22380.0171	22380.0311	22380.0451	22380.0831									
100	9.5	39.2	18.4	8.2	33.3	13.4	8	63	-30	80	54	22380.0161	22380.0301	22380.0441	22380.0821									
10	15	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	86	22380.0191	22380.0331	22380.0471	22380.0851								
	20	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	47	22380.0184	22380.0324	22380.0464	22380.0844								
	25	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	49	22380.0185	22380.0325	22380.0465	22380.0845								
	30	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	53	22380.0186	22380.0326	22380.0466	22380.0846								
	35	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	55	22380.0187	22380.0327	22380.0467	22380.0847								
	40	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	58	22380.0188	22380.0328	22380.0468	22380.0848								
	45	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	61	22380.0189	22380.0329	22380.0469	22380.0849								
	50	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	64	22380.0190	22380.0330	22380.0470	22380.0850								
	60	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	70	22380.0192	22380.0332	22380.0472	22380.0852								
	70	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	91	22380.0193	22380.0333	22380.0473	22380.0853								
	80	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	97	22380.0194	22380.0334	22380.0474	22380.0854								
	90	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	103	22380.0195	22380.0335	22380.0475	22380.0855								
	100	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	109	22380.0196	22380.0336	22380.0476	22380.0856								
	110	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	115	22380.0197	22380.0337	22380.0477	22380.0857								
120	12.0	39.2	18.4	9.6	33.3	13.4	10	100	-30	80	53	22380.0198	22380.0338	22380.0478	22380.0858									
12	20	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	156	22380.0204	22380.0344	22380.0484	22380.0864								
	25	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	96	22380.0205	22380.0345	22380.0485	22380.0865								
	30	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	100	22380.0206	22380.0346	22380.0486	22380.0866								
	35	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	105	22380.0207	22380.0347	22380.0487	22380.0867								
	40	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	109	22380.0208	22380.0348	22380.0488	22380.0868								
	45	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	113	22380.0209	22380.0349	22380.0489	22380.0869								
	50	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	117	22380.0210	22380.0350	22380.0490	22380.0870								
	60	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	126	22380.0212	22380.0352	22380.0492	22380.0872								
	70	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	134	22380.0214	22380.0354	22380.0494	22380.0874								
	80	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	143	22380.0216	22380.0356	22380.0496	22380.0876								
	90	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	165	22380.0217	22380.0357	22380.0497	22380.0877								
	100	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	173	22380.0218	22380.0358	22380.0498	22380.0878								
110	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	182	22380.0219	22380.0359	22380.0499	22380.0879									
120	14.5	47.6	25.2	10.6	39.7	16.7	12	144	-30	80	177	22380.0220	22380.0360	22380.0500	22380.0880									

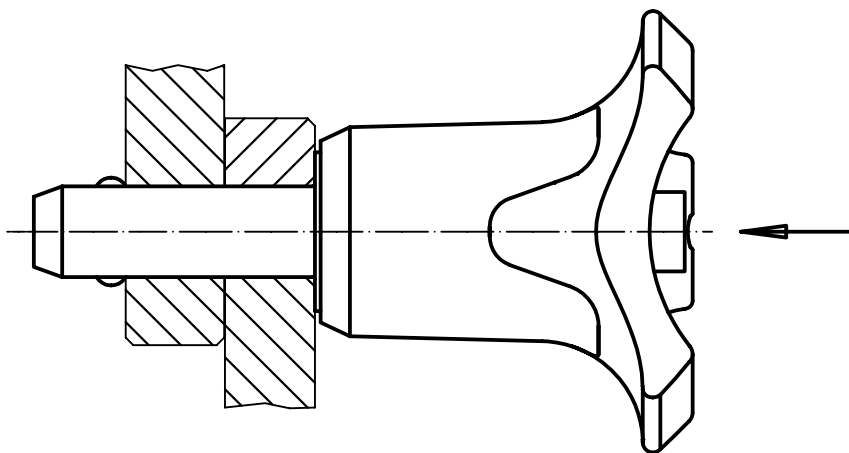
¹⁾ Shearing resistance similar to DIN 50141



	Dimensions								Location hole H11	Shearing resistance, two-shear ¹⁾		min. max.	[g]	Art. No.			
	d ₁	l ₁	d ₂	d ₃	d ₄	l ₂	l ₃	l ₄		[kN]	[°C]			orange	grey	blue	black
	-0.04 +0.6 -0.08					±1								[mm]	[mm]		
16	30	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	132	22380.0226	22380.0366	22380.0506	22380.0886	
	35	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	140	22380.0227	22380.0367	22380.0507	22380.0887	
	40	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	148	22380.0228	22380.0368	22380.0508	22380.0888	
	45	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	155	22380.0229	22380.0369	22380.0509	22380.0889	
	50	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	168	22380.0230	22380.0370	22380.0510	22380.0890	
	60	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	178	22380.0232	22380.0372	22380.0512	22380.0892	
	70	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	194	22380.0234	22380.0374	22380.0514	22380.0894	
	80	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	208	22380.0236	22380.0376	22380.0516	22380.0896	
	90	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	234	22380.0237	22380.0377	22380.0517	22380.0897	
	100	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	251	22380.0238	22380.0378	22380.0518	22380.0898	
	110	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	266	22380.0239	22380.0379	22380.0519	22380.0899	
	120	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	281	22380.0240	22380.0380	22380.0520	22380.0900	
	130	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	297	22380.0241	22380.0381	22380.0521	22380.0901	
	140	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	313	22380.0242	22380.0382	22380.0522	22380.0902	
	150	19.0	47.6	25.2	14.0	39.7	16.7	16	257	-30	80	328	22380.0243	22380.0383	22380.0523	22380.0903	
20	50	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	329	22380.0251	22380.0391	22380.0531	22380.0905	
	60	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	343	22380.0252	22380.0392	22380.0532	22380.0904	
	70	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	377	22380.0253	22380.0393	22380.0533	22380.0906	
	80	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	392	22380.0256	22380.0396	22380.0536	22380.0908	
	90	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	426	22380.0257	22380.0397	22380.0537	22380.0909	
	100	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	440	22380.0260	22380.0400	22380.0540	22380.0912	
	110	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	474	22380.0261	22380.0401	22380.0541	22380.0913	
	120	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	488	22380.0264	22380.0404	22380.0544	22380.0916	
	130	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	523	22380.0265	22380.0405	22380.0545	22380.0917	
	140	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	546	22380.0266	22380.0406	22380.0546	22380.0918	
150	25.0	57.1	33.8	20.5	50.7	21.5	20	403	-30	80	571	22380.0267	22380.0407	22380.0547	22380.0919		
25	50	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	425	22380.0269	22380.0409	22380.0549	22380.0921	
	60	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	457	22380.0270	22380.0410	22380.0550	22380.0922	
	70	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	490	22380.0271	22380.0411	22380.0551	22380.0923	
	80	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	540	22380.0272	22380.0412	22380.0552	22380.0924	
	90	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	573	22380.0273	22380.0413	22380.0553	22380.0925	
	100	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	603	22380.0274	22380.0414	22380.0554	22380.0926	
	110	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	640	22380.0275	22380.0415	22380.0555	22380.0927	
	120	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	678	22380.0276	22380.0416	22380.0556	22380.0928	
	130	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	715	22380.0277	22380.0417	22380.0557	22380.0929	
	140	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	753	22380.0278	22380.0418	22380.0558	22380.0930	
150	30.8	57.1	33.8	22.0	50.7	21.5	25	631	-30	80	790	22380.0279	22380.0419	22380.0559	22380.0931		

¹⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE



Ball Lock Pins • self-locking, with adjustable handle

EH 22370. /EH 22380.



PRODUCT DESCRIPTION

For fixing and clamping of two parts or play-free application to the counterpart. Clamping range infinitely variable by hand via nut/lock nut. All versions are corrosion resistant. When using stainless steel 1.4542: high-strength, hardened, abrasion resistant pin with high load capacity.

Material

- Pin part**
 - Stainless steel 1.4305
 - Stainless steel 1.4542, precipitation-hardened

Lock nut

- Thermoplastic, black

Spring

- Stainless steel

Adjusting nut

- Thermoplastic, silver

Operation

The balls are unlocked by pressing the button.

Characteristic

Types from stainless steel 1.4542 with marking below the balls.

MORE INFORMATION

Notes

Special types on request.

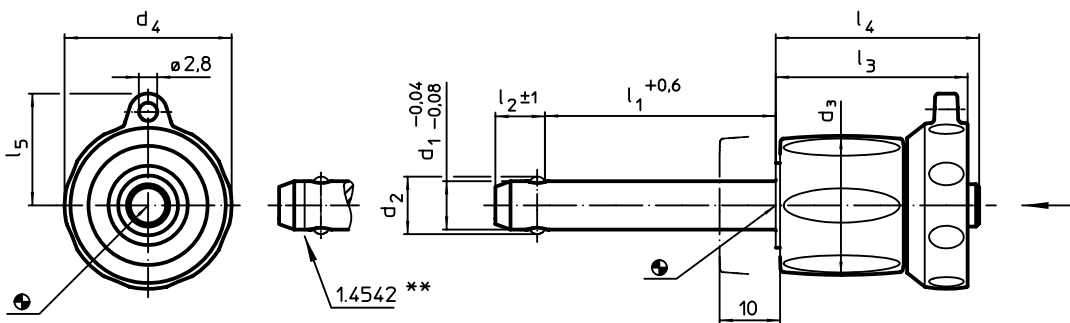
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

- Locating Bushings, for ball lock pins and socket pins → p. 246
- Locating Bushings, with flange, for ball lock pins and socket pins → p. 248
- Retaining Cables → p. 249
- Positioning Bushings, with collar, DIN 172 A → p. 424
- Positioning Bushings, without collar, DIN 179 A → p. 427

DRAWING



** Types from stainless steel 1.4542 with marking.

ORDER INFORMATION

d ₁ -0.04 -0.08	Dimensions								Location hole H11	Temperature		Weight	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened						
	l ₁ +0.6	d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄	l ₅		min.	max.		Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.					
[mm]															[mm]	[°C]	[g]	[kN]		[kN]	
5	0 – 10	5.5	17.6	23.6	6.0	25.7	26.2	15.9	5	-30	80	24	14	22370.0592	24	22380.0592					
	5 – 15	5.5	17.6	23.6	6.0	25.7	26.2	15.9	5	-30	80	25	14	22370.0593	24	22380.0593					
	10 – 20	5.5	17.6	23.6	6.0	25.7	26.2	15.9	5	-30	80	26	14	22370.0594	24	22380.0594					
	15 – 25	5.5	17.6	23.6	6.0	25.7	26.2	15.9	5	-30	80	26	14	22370.0595	24	22380.0595					
	20 – 30	5.5	17.6	23.6	6.0	25.7	26.2	15.9	5	-30	80	27	14	22370.0596	24	22380.0596					
6	0 – 10	7.0	17.6	23.6	7.0	25.7	26.2	15.9	6	-30	80	26	21	22370.0602	35	22380.0602					
	5 – 15	7.0	17.6	23.6	7.0	25.7	26.2	15.9	6	-30	80	27	21	22370.0603	35	22380.0603					
	10 – 20	7.0	17.6	23.6	7.0	25.7	26.2	15.9	6	-30	80	27	21	22370.0604	35	22380.0604					
	15 – 25	7.0	17.6	23.6	7.0	25.7	26.2	15.9	6	-30	80	28	21	22370.0605	35	22380.0605					
	20 – 30	7.0	17.6	23.6	7.0	25.7	26.2	15.9	6	-30	80	27	21	22370.0606	35	22380.0606					
	25 – 35	7.0	17.6	23.6	7.0	25.7	26.2	15.9	6	-30	80	30	21	22370.0607	35	22380.0607					
	30 – 40	7.0	17.6	23.6	7.0	25.7	26.2	15.9	6	-30	80	31	21	22370.0608	35	22380.0608					
35 – 45	7.0	17.6	23.6	7.0	25.7	26.2	15.9	6	-30	80	32	21	22370.0609	35	22380.0609						
40 – 50	7.0	17.6	23.6	7.0	25.7	26.2	15.9	6	-30	80	33	21	22370.0610	35	22380.0610						

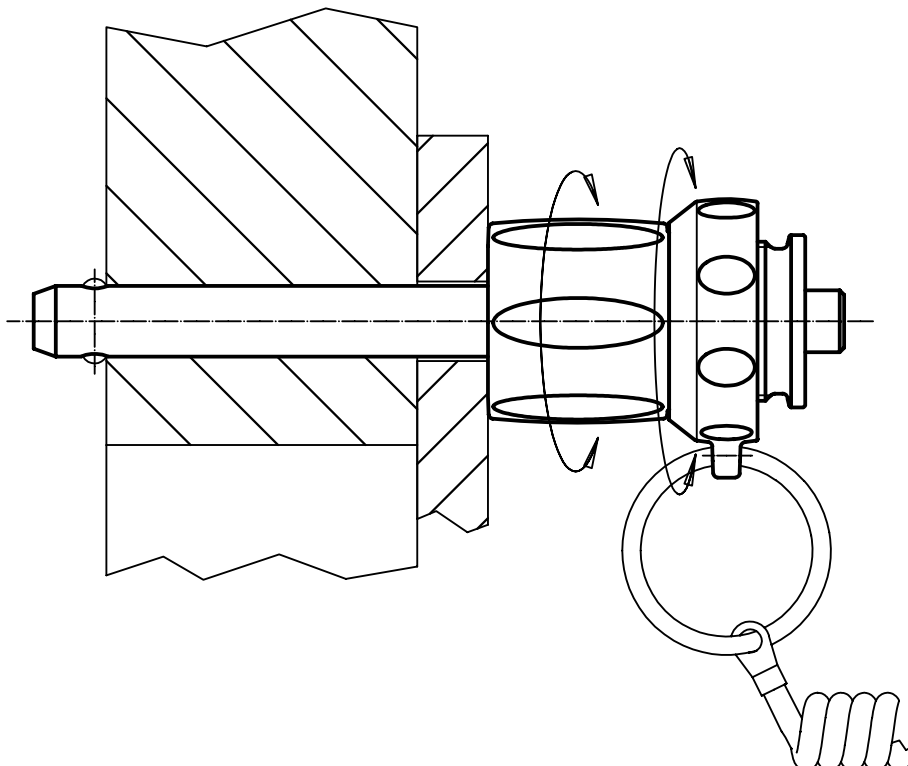
¹⁾ Shearing resistance similar to DIN 50141



	Dimensions								Location hole H11	Temperature		Weight [g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened		
	d_1	l_1	d_2	d_3	d_4	l_2	l_3	l_4		l_5	min.		max.	Shearing resistance, two-shear ¹⁾ min.	Art. No.	Shearing resistance, two-shear ¹⁾ min.	Art. No.
	[mm]									[mm]	[°C]		[kN]		[kN]		
8	10 – 20	9.5	23.0	27.6	8.2	31.2	33.1	18.0	8	-30	80	58	38	22370.0614	63	22380.0614	
	15 – 25	9.5	23.0	27.6	8.2	31.2	33.1	18.0	8	-30	80	60	38	22370.0615	63	22380.0615	
	20 – 30	9.5	23.0	27.6	8.2	31.2	33.1	18.0	8	-30	80	60	38	22370.0616	63	22380.0616	
	25 – 35	9.5	23.0	27.6	8.2	31.2	33.1	18.0	8	-30	80	62	38	22370.0617	63	22380.0617	
	30 – 40	9.5	23.0	27.6	8.2	31.2	33.1	18.0	8	-30	80	64	38	22370.0618	63	22380.0618	
	35 – 45	9.5	23.0	27.6	8.2	31.2	33.1	18.0	8	-30	80	65	38	22370.0619	63	22380.0619	
10	40 – 50	9.5	23.0	27.6	8.2	31.2	33.1	18.0	8	-30	80	65	38	22370.0620	63	22380.0620	
	10 – 20	12.0	23.0	27.6	9.6	31.2	33.1	18.0	10	-30	80	65	60	22370.0624	100	22380.0624	
	15 – 25	12.0	23.0	27.6	9.6	31.2	33.1	18.0	10	-30	80	66	60	22370.0625	100	22380.0625	
	20 – 30	12.0	23.0	27.6	9.6	31.2	33.1	18.0	10	-30	80	69	60	22370.0626	100	22380.0626	
	25 – 35	12.0	23.0	27.6	9.6	31.2	33.1	18.0	10	-30	80	72	60	22370.0627	100	22380.0627	
	30 – 40	12.0	23.0	27.6	9.6	31.2	33.1	18.0	10	-30	80	75	60	22370.0628	100	22380.0628	
	35 – 45	12.0	23.0	27.6	9.6	31.2	33.1	18.0	10	-30	80	78	60	22370.0629	100	22380.0629	
	40 – 50	12.0	23.0	27.6	9.6	31.2	33.1	18.0	10	-30	80	80	60	22370.0630	100	22380.0630	
12	50 – 60	12.0	23.0	27.6	9.6	31.2	33.1	18.0	10	-30	80	86	60	22370.0632	100	22380.0632	
	15 – 25	14.5	29.0	34.6	10.6	36.7	39.5	21.8	12	-30	80	121	87	22370.0635	144	22380.0635	
	20 – 30	14.5	29.0	34.6	10.6	36.7	39.5	21.8	12	-30	80	130	87	22370.0636	144	22380.0636	
	25 – 35	14.5	29.0	34.6	10.6	36.7	39.5	21.8	12	-30	80	130	87	22370.0637	144	22380.0637	
	30 – 40	14.5	29.0	34.6	10.6	36.7	39.5	21.8	12	-30	80	134	87	22370.0638	144	22380.0638	
	35 – 45	14.5	29.0	34.6	10.6	36.7	39.5	21.8	12	-30	80	138	87	22370.0639	144	22380.0639	
	40 – 50	14.5	29.0	34.6	10.6	36.7	39.5	21.8	12	-30	80	142	87	22370.0640	144	22380.0640	
	50 – 60	14.5	29.0	34.6	10.6	36.7	39.5	21.8	12	-30	80	150	87	22370.0642	144	22380.0642	
	60 – 70	14.5	29.0	34.6	10.6	36.7	39.5	21.8	12	-30	80	159	87	22370.0644	144	22380.0644	
	70 – 80	14.5	29.0	34.6	10.6	36.7	39.5	21.8	12	-30	80	167	87	22370.0646	144	22380.0646	
16	20 – 30	19.0	29.0	34.6	14.0	36.7	39.5	21.8	16	-30	80	159	155	22370.0656	257	22380.0656	
	25 – 35	19.0	29.0	34.6	14.0	36.7	39.5	21.8	16	-30	80	165	155	22370.0657	257	22380.0657	
	30 – 40	19.0	29.0	34.6	14.0	36.7	39.5	21.8	16	-30	80	173	155	22370.0658	257	22380.0658	
	35 – 45	19.0	29.0	34.6	14.0	36.7	39.5	21.8	16	-30	80	180	155	22370.0659	257	22380.0659	
	40 – 50	19.0	29.0	34.6	14.0	36.7	39.5	21.8	16	-30	80	188	155	22370.0660	257	22380.0660	
	50 – 60	19.0	29.0	34.6	14.0	36.7	39.5	21.8	16	-30	80	203	155	22370.0662	257	22380.0662	
	60 – 70	19.0	29.0	34.6	14.0	36.7	39.5	21.8	16	-30	80	218	155	22370.0664	257	22380.0664	
	70 – 80	19.0	29.0	34.6	14.0	36.7	39.5	21.8	16	-30	80	234	155	22370.0666	257	22380.0666	

¹⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE



Socket Pins • with spring-loaded balls

EH 22400.



PRODUCT DESCRIPTION

For quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections. All versions are corrosion resistant. Version with ergonomic grip.

Material

- Pin part**
 - Stainless steel 1.4305
- Handle**
 - Thermoplastic PA 6, grey
- Spring**
 - Stainless steel

Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

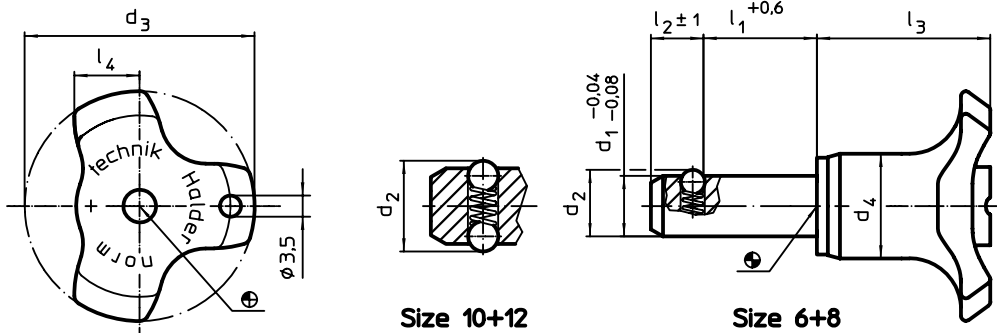
- Locating Bushings, for ball lock pins and socket pins → p. 246
- Locating Bushings, with flange, for ball lock pins and socket pins. → p. 248
- Retaining Cables → p. 249
- Positioning Bushings, with collar, DIN 172 A → p. 424
- Positioning Bushings, without collar, DIN 179 A → p. 427

MORE INFORMATION

Notes

Security note: balls are spring-loaded and not locked as in article groups EH 22340., EH 22350., EH 22360., EH 22370. and EH 22380.

DRAWING



ORDER INFORMATION

Dimensions								Location hole H11	Shearing resist- ance, two-shear	Tensile force max. unlubri- cated	Temperature		Weight	Art. No.
d ₁ -0.04 -0.08	l ₁ +0.6	d ₂	d ₃	d ₄	l ₂ ±1	l ₃	l ₄				min.	max.		
[mm]								[mm]	[kN]	[N]	[°C]		[g]	
6	10	6.5	38	17.3	5.0	27.0	10.8	6	22	8	-30	80	16	22400.0062
	15	6.5	38	17.3	5.0	27.0	10.8	6	22	8	-30	80	17	22400.0064
	20	6.5	38	17.3	5.0	27.0	10.8	6	22	8	-30	80	18	22400.0066
	25	6.5	38	17.3	5.0	27.0	10.8	6	22	8	-30	80	19	22400.0068
	30	6.5	38	17.3	5.0	27.0	10.8	6	22	8	-30	80	19	22400.0070
	50	6.5	38	17.3	5.0	27.0	10.8	6	22	8	-30	80	24	22400.0075
8	15	8.7	38	17.3	6.3	28.6	10.8	8	40	15	-30	80	21	22400.0084
	20	8.7	38	17.3	6.3	28.6	10.8	8	40	15	-30	80	23	22400.0086
	25	8.7	38	17.3	6.3	28.6	10.8	8	40	15	-30	80	25	22400.0088
	30	8.7	38	17.3	6.3	28.6	10.8	8	40	15	-30	80	27	22400.0090
	50	8.7	38	17.3	6.3	28.6	10.8	8	40	15	-30	80	40	22400.0095
10	15	12.0	38	17.3	8.7	28.6	10.8	10	62	30	-30	80	30	22400.0104
	20	12.0	38	17.3	8.7	28.6	10.8	10	62	30	-30	80	34	22400.0106
	25	12.0	38	17.3	8.7	28.6	10.8	10	62	30	-30	80	37	22400.0108
	30	12.0	38	17.3	8.7	28.6	10.8	10	62	30	-30	80	40	22400.0110
	50	12.0	38	17.3	8.7	28.6	10.8	10	62	30	-30	80	52	22400.0115
12	20	14.5	38	17.3	9.5	28.6	10.8	12	90	32	-30	80	42	22400.0122
	30	14.5	38	17.3	9.5	28.6	10.8	12	90	32	-30	80	51	22400.0124
	40	14.5	38	17.3	9.5	28.6	10.8	12	90	32	-30	80	60	22400.0126
	50	14.5	38	17.3	9.5	28.6	10.8	12	90	32	-30	80	69	22400.0128



Locating Bushings • for ball lock pins and socket pins

EH 22400.

2



PRODUCT DESCRIPTION

This design with holes on the front face (picture 2) is suitable for applications which require installation flush to the surface.

Locating bushings are used for quick and safe locating of ball lock pins EH 22340., EH 22350., EH 22370. and EH 22380. and socket pins EH 22400.

Optimised centering due to precise collar (e.g. quick mounting of plates and components). All versions are corrosion and abrasion resistant.

Material

- Stainless steel 1.4305

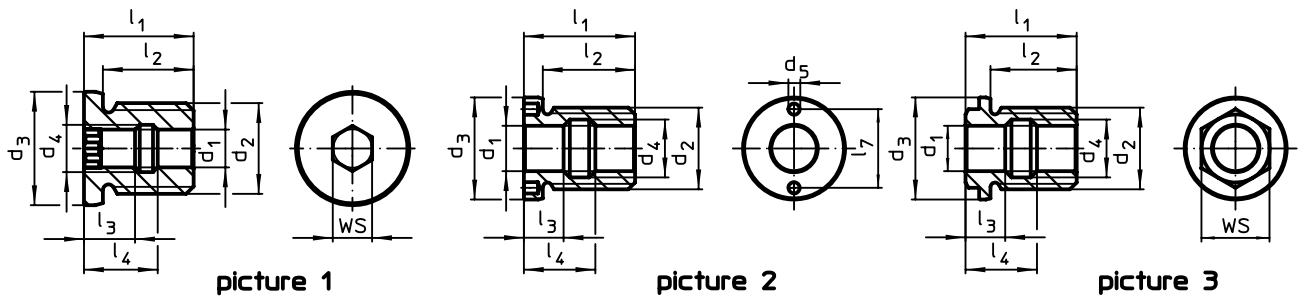
Assembly

This design with holes on the front face (picture 2) can be installed via a cranked pin

face wrench or alternatively via a pin faced socket wrench.

Ensure safe tolerances and consistent function. Easily incorporable into different materials. Can be used in thin-walled pieces. Application from both sides.

DRAWING



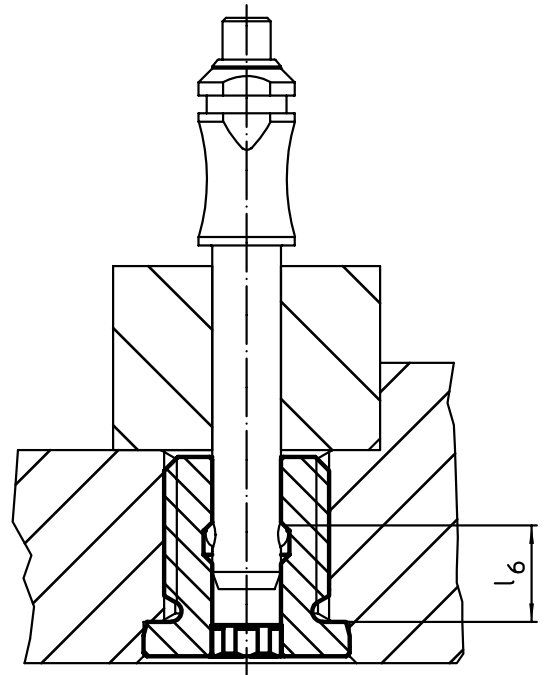
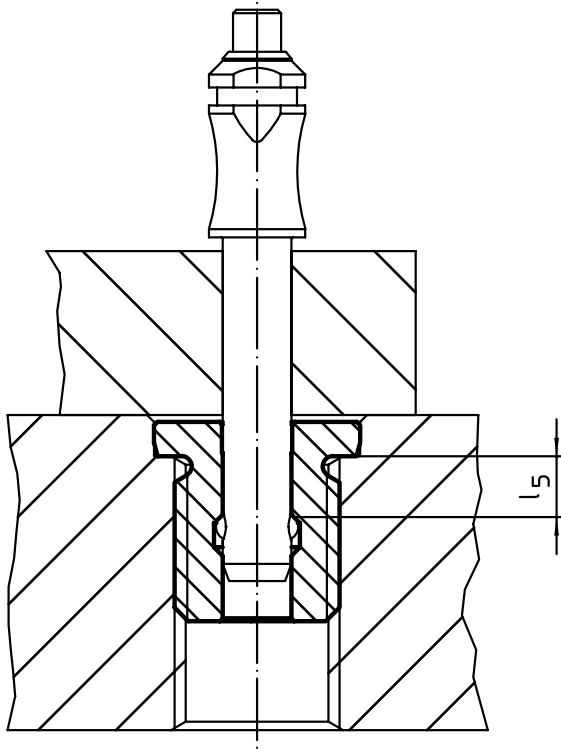
ORDER INFORMATION

d ₁ H11	d ₂	d ₃ h9	d ₄	d ₅ +0.1	Dimensions							WS [mm]	[g]	Art. No.	
					l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇				
with internal hexagon – picture 1															
5	M12	18	6.0	–	19	15	9.0	13.0	5.1	9.0	–	5	15	22400.0905	
6	M12	18	7.5	–	19	15	9.4	13.0	5.6	8.8	–	6	19	22400.0906	
8	M16	22	10.0	–	25	20	12.0	17.0	7.3	11.7	–	8	29	22400.0908	
10	M24	30	12.5	–	29	24	13.5	19.5	8.9	14.1	–	10	76	22400.0910	
12	M24	30	15.0	–	29	24	14.0	20.0	9.6	14.4	–	12	66	22400.0912	
plain, with face hole – picture 2															
16	M30	39	19.5	5.1	39	33	15.5	23.5	10.4	16.6	30	–	248	22400.0925	
20	M36	43	25.5	5.1	49	42	17.5	31.5	11.9	23.1	30	–	364	22400.0926	
25	M42	50	32.0	5.1	65	57	26.5	38.5	13.3	21.8	36	–	350	22400.0927	
with outer hexagon – picture 3															
16	M30	36	19.5	–	39	29	15.5	23.5	6.1	12.8	–	24	124	22400.0916	
20	M36	45	25.5	–	49	38	17.5	31.5	7.7	19.3	–	30	208	22400.0920	
25	M42	50	32.0	–	65	50	26.5	38.5	13.3	21.8	–	36	350	22400.0924	

ACCESSORIES

	Suitable for size d ₁ [mm]	For finish picture	Pin spacing ±0.1 [mm]	Pin diameter -0.1 [mm]	Square drive [in]	[g]	Art. No.
adjustable face wrench, offset							
	10/12/16/20/25	2	–	5		309	22350.1991
face and socket wrench							
	16/20	2	30	5	1/2	243	22350.1998
	25	2	36	5	1/2	363	22350.1999

APPLICATION EXAMPLE



Locating Bushings • with flange, for ball lock pins and socket pins

EH 22400.

2



PRODUCT DESCRIPTION

Used for thin sheet materials, e.g. in vehicle construction, apparatus engineering, container construction and the aviation industry.

Locating bushings are used for quick and safe locating of ball lock pins EH 22340., EH 22350., EH 22370. and EH 22380. and socket pins EH 22400.

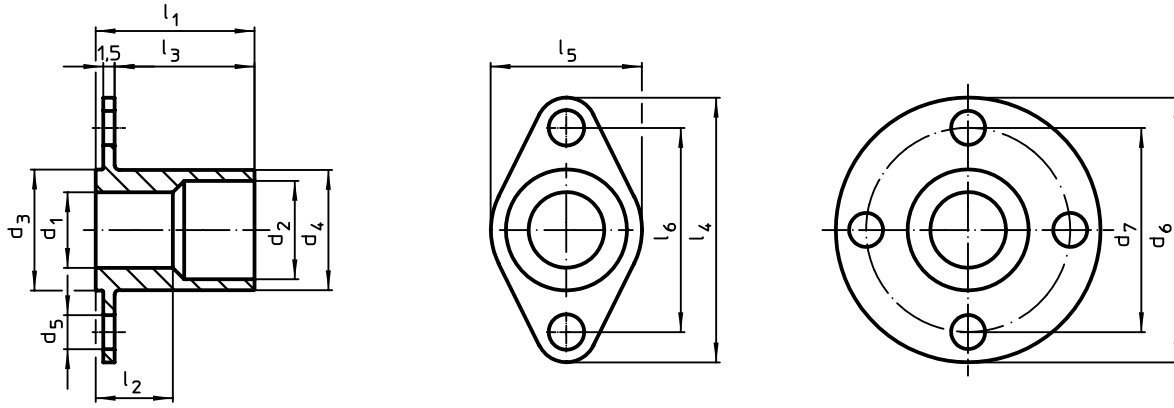
The bearing surface of the flange ensures optimum force distribution at components with thin walls.

All versions are corrosion and abrasion resistant.

Material

- Stainless steel 1.4305

DRAWING



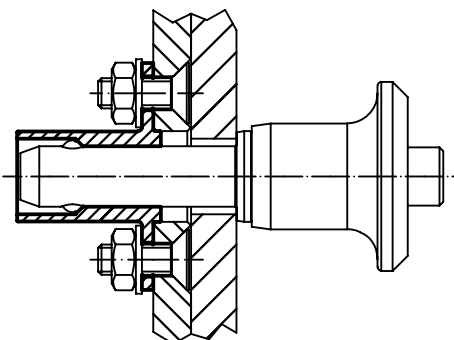
picture 1

picture 2

ORDER INFORMATION

Dimensions														[g]	Art. No.
d ₁ H11	d ₂	d ₃ -0.05	d ₄ -0.1	d ₅	d ₆	d ₇	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆			
[mm]															
with oval flange – picture 1															
5	8	10	9.9	3.4	-	-	12	5.4	9.5	25	15	19	5.8	22400.0305	
6	8	10	9.9	3.4	-	-	13	5.3	10.5	25	15	19	5.5	22400.0306	
8	10	12	11.9	4.5	-	-	19	10.3	16.5	30	18	22	9.8	22400.0308	
10	13	16	15.9	4.5	-	-	21	10.2	18.5	35	20	27	18.0	22400.0310	
12	15	19	18.9	4.5	-	-	27	15.2	24.5	40	24	30	33.0	22400.0312	
16	20	24	23.9	5.5	-	-	30	15.3	27.5	50	30	40	51.0	22400.0316	
with round flange – picture 2															
5	8	10	9.9	3.4	25	19	12	5.4	9.5	-	-	-	8.3	22400.0405	
6	8	10	9.9	3.4	25	19	13	5.3	10.5	-	-	-	8.1	22400.0406	
8	10	12	11.9	4.5	30	22	19	10.3	16.5	-	-	-	15.0	22400.0408	
10	13	16	15.9	4.5	35	27	21	10.2	18.5	-	-	-	23.0	22400.0410	
12	15	19	18.9	4.5	40	30	27	15.2	24.5	-	-	-	40.0	22400.0412	
16	20	24	23.9	5.5	50	40	30	15.3	27.5	-	-	-	62.0	22400.0416	

APPLICATION EXAMPLE



Retaining Cables
EH 22400.



PRODUCT DESCRIPTION

These retaining cables secure the single-acting ball lock pin EH 22340., EH 22350., EH 22370. and EH 22380., as well as clamping pin EH 22360., and socket pin EH 22400. against possible loss.

Material

Attaching ring
 ■ Stainless steel

Eyelet
 ■ Stainless steel
 ■ Brass, tin-plated

Retaining cable
 ■ Stainless steel
 ■ Thermoplastic PA 6, grey
 ■ Thermoplastic PUR, black, with filling thread

Coating retaining cable
 ■ Without coating
 ■ Thermoplastic PA 6 coated, black
 ■ Thermoplastic PA 6 coated, clear
 ■ Thermoplastic PVC coated, green (transparent)
 ■ Thermoplastic PA 6, grey
 ■ Thermoplastic PUR, black

Assembly

Attached holding clips (picture 5/6) to the ball lock pin with a soft-face mallet. Disassemble via levering it with a screw driver. Thermoplastic version (picture 7): cut-off projecting ends without burr after being fastened. Spiral form design (picture 8) with very high effective working length.

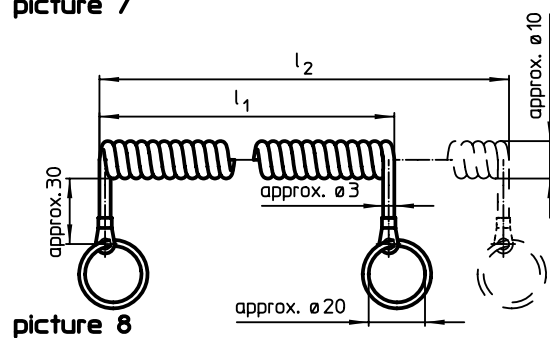
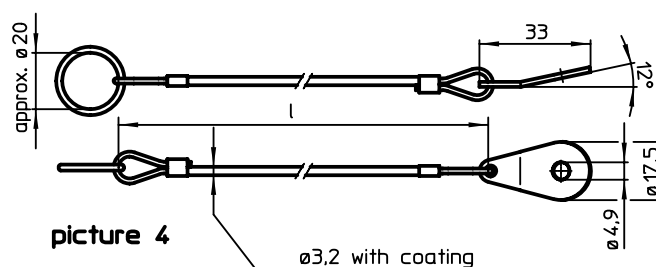
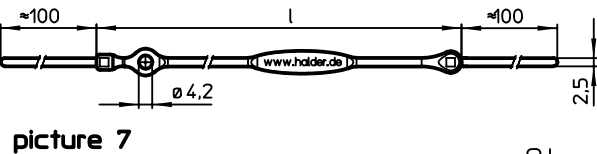
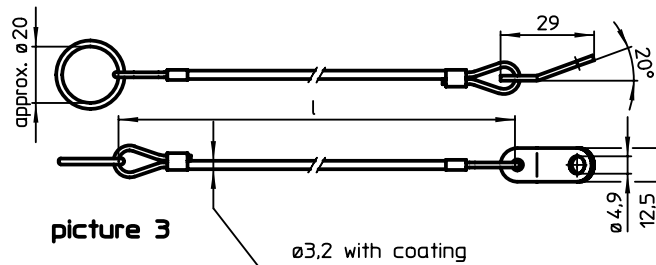
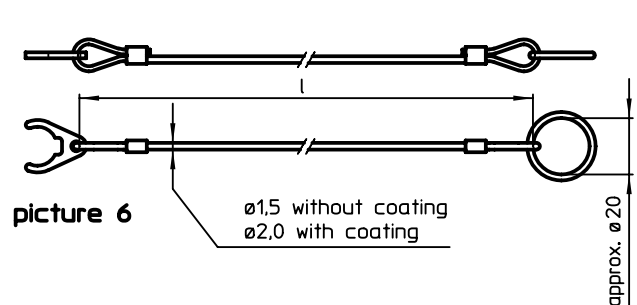
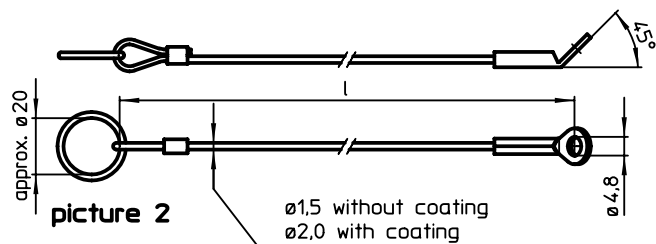
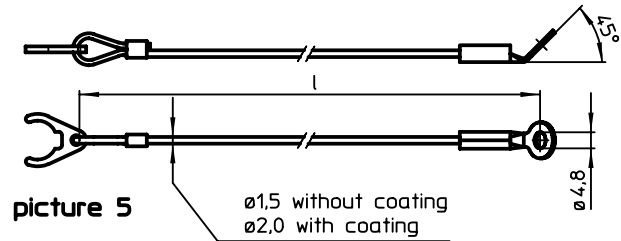
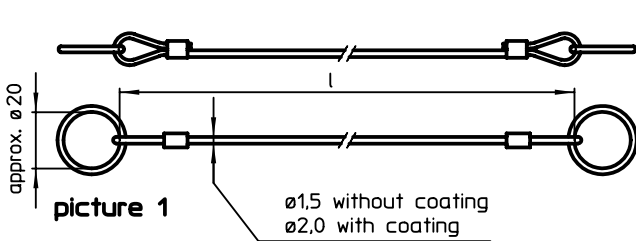
MORE INFORMATION

Notes
 Special types on request. Models picture 3 and picture 4 correspond to MIL-DTL-83420.

Further products

Retaining Cables, for threaded lock pin → p. 279

DRAWING



ORDER INFORMATION

2

l	Dimensions		Suitable for size [mm]	max. [°C]	[g]	Art. No.					
	l ₁ [mm]	l ₂ max. [mm]				Thermo- plastic PA 6 coated, black	Thermo- plastic PA 6 coated, clear	Without coating	Thermoplas- tic PVC coat- ed, green (transparent)	Thermo- plastic PA 6, grey	Thermo- plastic PUR, black
stainless steel, with 2 attaching rings – picture 1											
150	-	-	-	80	7.8	22400.0940 ¹⁾	22400.0950 ¹⁾	-	-	-	-
				250	7.4	-	-	22400.0930 ¹⁾	-	-	-
200	-	-	-	80	8.4	22400.0941 ¹⁾	22400.0952 ¹⁾	-	-	-	-
				250	7.9	-	-	22400.0931 ¹⁾	-	-	-
300	-	-	-	80	9.7	22400.0943 ¹⁾	22400.0956 ¹⁾	-	-	-	-
				250	8.9	-	-	22400.0933 ¹⁾	-	-	-
stainless steel, with attaching ring and eyelet – picture 2											
150	-	-	-	80	7.7	22400.0945 ¹⁾	22400.0960 ¹⁾	-	-	-	-
				250	6.6	-	-	22400.0935 ¹⁾	-	-	-
200	-	-	-	80	7.5	22400.0946 ¹⁾	22400.0962 ¹⁾	-	-	-	-
				250	7.0	-	-	22400.0936 ¹⁾	-	-	-
300	-	-	-	80	8.6	22400.0948 ¹⁾	22400.0966 ¹⁾	-	-	-	-
				250	8.0	-	-	22400.0938 ¹⁾	-	-	-
stainless steel, with fixing tab, rectangular and attaching ring – picture 3											
150	-	-	-	80	11.0	-	-	-	22400.1301 ¹⁾	-	-
200	-	-	-	80	12.0	-	-	-	22400.1302 ¹⁾	-	-
300	-	-	-	80	14.0	-	-	-	22400.1303 ¹⁾	-	-
stainless steel, with fixing tab in drop shape and attaching ring – picture 4											
150	-	-	-	80	11.0	-	-	-	22400.1311 ¹⁾	-	-
200	-	-	-	80	12.0	-	-	-	22400.1312 ¹⁾	-	-
300	-	-	-	80	14.0	-	-	-	22400.1313 ¹⁾	-	-
stainless steel, with holding clip and eyelet – picture 5											
150	-	-	5/ 6	80	6.2	22400.1101 ²⁾	22400.1001 ²⁾	-	-	-	-
				250	5.8	-	-	22400.1201 ²⁾	-	-	-
			8/10	80	7.1	22400.1121 ²⁾	22400.1021 ²⁾	-	-	-	-
				250	6.7	-	-	22400.1221 ²⁾	-	-	-
			12/16	80	8.2	22400.1141 ²⁾	22400.1041 ²⁾	-	-	-	-
				250	7.9	-	-	22400.1241 ²⁾	-	-	-
20/25	80	11.0	22400.1161 ²⁾	22400.1061 ²⁾	-	-	-	-			
	250	11.0	-	-	22400.1261 ²⁾	-	-	-			
200	-	-	5/ 6	80	6.8	22400.1102 ²⁾	22400.1002 ²⁾	-	-	-	-
				250	6.3	-	-	22400.1202 ²⁾	-	-	-
			8/10	80	7.7	22400.1122 ²⁾	22400.1022 ²⁾	-	-	-	-
				250	7.2	-	-	22400.1222 ²⁾	-	-	-
			12/16	80	8.9	22400.1142 ²⁾	22400.1042 ²⁾	-	-	-	-
				250	8.4	-	-	22400.1242 ²⁾	-	-	-
20/25	80	12.0	22400.1162 ²⁾	22400.1062 ²⁾	-	-	-	-			
	250	11.0	-	-	22400.1262 ²⁾	-	-	-			
300	-	-	5/ 6	80	8.0	22400.1103 ²⁾	22400.1003 ²⁾	-	-	-	-
				250	7.3	-	-	22400.1203 ²⁾	-	-	-
			8/10	80	8.9	22400.1123 ²⁾	22400.1023 ²⁾	-	-	-	-
				250	8.2	-	-	22400.1223 ²⁾	-	-	-
			12/16	80	10.0	22400.1143 ²⁾	22400.1043 ²⁾	-	-	-	-
				250	9.5	-	-	22400.1243 ²⁾	-	-	-
20/25	80	13.0	22400.1163 ²⁾	22400.1063 ²⁾	-	-	-	-			
	250	13.0	-	-	22400.1263 ²⁾	-	-	-			
stainless steel, with holding clip and attaching ring – picture 6											
150	-	-	5/ 6	80	6.3	22400.1111 ²⁾	22400.1011 ²⁾	-	-	-	-
				250	5.9	-	-	22400.1211 ²⁾	-	-	-
			8/10	80	7.3	22400.1131 ²⁾	22400.1031 ²⁾	-	-	-	-
				250	6.8	-	-	22400.1231 ²⁾	-	-	-
			12/16	80	8.4	22400.1151 ²⁾	22400.1051 ²⁾	-	-	-	-
				250	8.0	-	-	22400.1251 ²⁾	-	-	-
20/25	80	11.0	22400.1171 ²⁾	22400.1071 ²⁾	-	-	-	-			
	250	11.0	-	-	22400.1271 ²⁾	-	-	-			

¹⁾ not for ball lock pins, basic type

²⁾ for ball lock pins, basic type



I	Dimensions		Suitable for size	max.	[g]	Art. No.								
	I ₁	I ₂ max.				Thermo-plastic PA 6 coated, black	Thermo-plastic PA 6 coated, clear	Without coating	Thermoplastic PVC coated, green (transparent)	Thermo-plastic PA 6, grey	Thermo-plastic PUR, black			
	[mm]		[mm]	[°C]										
200	-	-	5/ 6	80	7.0	22400.1112 ²⁾	22400.1012 ²⁾	-	-	-	-			
				250	6.4	-	-	22400.1212 ²⁾	-	-	-			
			8/10	80	7.8	22400.1132 ²⁾	22400.1032 ²⁾	-	-	-	-			
				250	7.3	-	-	22400.1232 ²⁾	-	-	-			
			12/16	80	9.0	22400.1152 ²⁾	22400.1052 ²⁾	-	-	-	-			
				250	8.5	-	-	22400.1252 ²⁾	-	-	-			
			20/25	80	12.0	22400.1172 ²⁾	22400.1072 ²⁾	-	-	-	-			
				250	12.0	-	-	22400.1272 ²⁾	-	-	-			
			300	-	-	5/ 6	80	8.2	22400.1113 ²⁾	22400.1013 ²⁾	-	-	-	-
							250	7.4	-	-	22400.1213 ²⁾	-	-	-
8/10	80	9.0				22400.1133 ²⁾	22400.1033 ²⁾	-	-	-	-			
	250	8.6				-	-	22400.1233 ²⁾	-	-	-			
12/16	80	10.0				22400.1153 ²⁾	22400.1053 ²⁾	-	-	-	-			
	250	9.5				-	-	22400.1253 ²⁾	-	-	-			
20/25	80	13.0				22400.1173 ²⁾	22400.1073 ²⁾	-	-	-	-			
	250	13.0				-	-	22400.1273 ²⁾	-	-	-			
with double sided clamping/indexing mechanism – picture 7														
150	-	-				-	80	1.8	-	-	-	-	22400.0970	-
250	-	-	-	80	2.4	-	-	-	-	22400.0974	-			
spiral form, with attaching rings – picture 8														
-	100	600	-	80	15.0	-	-	-	-	-	22400.0980 ¹⁾			
	200	1200	-	80	16.0	-	-	-	-	-	22400.0982 ¹⁾			

¹⁾ not for ball lock pins, basic type

²⁾ for ball lock pins, basic type

Clamp Lock Pins • with button handle

EH 22410. /EH 22420.



PRODUCT DESCRIPTION

For rapid fastening, locking, adjusting, replacing, and securing in blind holes (H11) without additional locating bushings. Quick and easy to release for connections which are made repeatedly. Flexible use because the balls are clamped between bolt and hole. All versions are corrosion resistant. When using stainless steel 1.4542: high-strength, hardened, abrasion resistant pin with high load capacity.

Material

Pin part

- Stainless steel 1.4305
- Stainless steel 1.4542, precipitation-hardened

Handle

- Aluminium, black similar to RAL 9005

Press button

- Case-hardened steel, nitrided, yellow similar to RAL 1016

Spring

- Stainless steel

Assembly

Simple H11 boreholes are sufficient.

Mounting:

1. Press in the button and hold it down
2. Insert the lifting pin
3. Release the button (The button must be back in its original position)

Dismantling:

1. Press in the button and hold it down.

2. Remove the lifting pin.
3. Release the button.

Operation

Clamp lock pins can be used in blind holes. The holding forces achieved in an H11 borehole depends on the material of the counterpart:

- Steel, hardened - min. 30 N
- Steel, soft - min. 120 N
- Stainless steel, soft - min. 120 N
- Al, aluminum alloy - min. 250 N

MORE INFORMATION

Notes

Special types on request. The clamp lock pin must not be used for lifting loads.

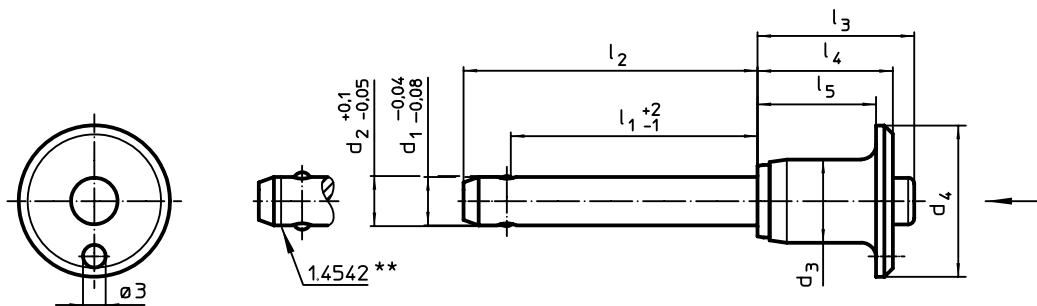
Accessories

Can easily be fitted with retaining cable EH 22400.

Further products

Retaining Cables → p. 249

DRAWING



** Types from stainless steel 1.4542 with marking.

ORDER INFORMATION

	Dimensions									Holding force ¹⁾ min. Steel, soft [N]	Location hole H11 [mm]	Temperature		Weight [g]	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
	d ₁ -0.04 -0.08	l ₁ +2 -1	d ₂ +0.1 -0.05	d ₃	d ₄	l ₂	l ₃	l ₄	l ₅			min.	max.		Shearing resistance, two-shear ²⁾ min. [kN]	Art. No.	Shearing resistance, two-shear ²⁾ min. [kN]	Art. No.
6	10	6.2	11.3	20	17.4	20.7	17.6	14.6	120	6	-30	150	13	21	22410.0022	35	22420.0022	
	20	6.2	11.3	20	27.4	20.7	17.6	14.6	120	6	-30	150	15	21	22410.0024	35	22420.0024	
	40	6.2	11.3	20	47.4	20.7	17.6	14.6	120	6	-30	150	19	21	22410.0028	35	22420.0028	
	60	6.2	11.3	20	67.4	20.7	17.6	14.6	120	6	-30	150	23	21	22410.0032	35	22420.0032	
8	10	8.3	14.1	25	18.6	27.3	22.6	18.6	120	8	-30	150	25	38	22410.0042	63	22420.0042	
	20	8.3	14.1	25	28.6	27.3	22.6	18.6	120	8	-30	150	29	38	22410.0044	63	22420.0044	
	40	8.3	14.1	25	48.6	27.3	22.6	18.6	120	8	-30	150	36	38	22410.0048	63	22420.0048	
	60	8.3	14.1	25	68.6	27.3	22.6	18.6	120	8	-30	150	43	38	22410.0052	63	22420.0052	
	80	8.3	14.1	25	88.6	27.3	22.6	18.6	120	8	-30	150	51	38	22410.0056	63	22420.0056	

¹⁾ The holding force depends on the material of the counterpart - for further values see "operation".

²⁾ Shearing resistance similar to DIN 50141

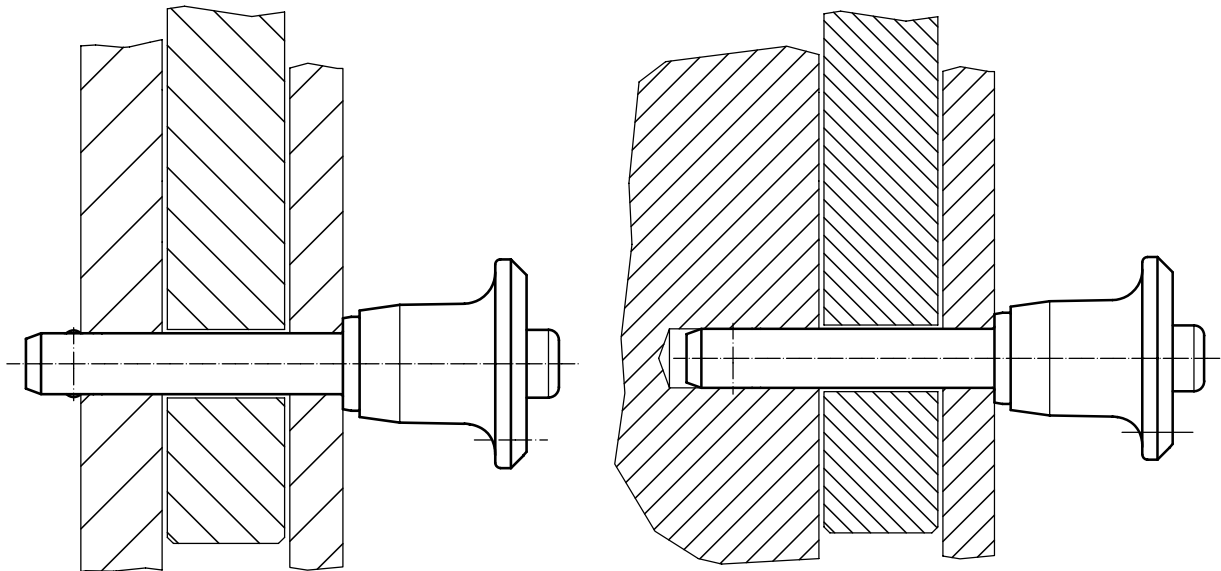


	Dimensions									Holding force ¹⁾ min. Steel, soft	Location hole H11	Temperature		Weight	Stainless steel 1.4305		Stainless steel 1.4542, precipitation-hardened	
	d ₁	l ₁	d ₂	d ₃	d ₄	l ₂	l ₃	l ₄	l ₅			min.	max.		Shearing resistance, two-shear ²⁾ min.	Art. No.	Shearing resistance, two-shear ²⁾ min.	Art. No.
	[mm]									[N]	[mm]	[°C]		[g]	[kN]		[kN]	
10	20	10.3	14.1	25	30.0	27.3	22.6	18.6	120	10	-30	150	35	60	22410.0062	100	22420.0062	
	40	10.3	14.1	25	50.0	27.3	22.6	18.6	120	10	-30	150	47	60	22410.0066	100	22420.0066	
	60	10.3	14.1	25	70.0	27.3	22.6	18.6	120	10	-30	150	59	60	22410.0070	100	22420.0070	
	80	10.3	14.1	25	90.0	27.3	22.6	18.6	120	10	-30	150	70	60	22410.0072	100	22420.0072	
	100	10.3	14.1	25	110.0	27.3	22.6	18.6	120	10	-30	150	82	60	22410.0074	100	22420.0074	
12	20	12.3	17.7	35	31.0	33.2	27.3	22.3	120	12	-30	150	66	87	22410.0082	144	22420.0082	
	40	12.3	17.7	35	51.0	33.2	27.3	22.3	120	12	-30	150	82	87	22410.0086	144	22420.0086	
	60	12.3	17.7	35	71.0	33.2	27.3	22.3	120	12	-30	150	100	87	22410.0090	144	22420.0090	
	80	12.3	17.7	35	91.0	33.2	27.3	22.3	120	12	-30	150	117	87	22410.0092	144	22420.0092	
	100	12.3	17.7	35	111.0	33.2	27.3	22.3	120	12	-30	150	134	87	22410.0094	144	22420.0094	
16	30	16.5	23.4	40	44.4	42.2	34.5	28.5	120	16	-30	150	150	155	22410.0102	257	22420.0102	
	60	16.5	23.4	40	74.4	42.2	34.5	28.5	120	16	-30	150	196	155	22410.0107	257	22420.0107	
	90	16.5	23.4	40	104.4	42.2	34.5	28.5	120	16	-30	150	242	155	22410.0110	257	22420.0110	
	120	16.5	23.4	40	134.4	42.2	34.5	28.5	120	16	-30	150	290	155	22410.0113	257	22420.0113	

¹⁾ The holding force depends on the material of the counterpart - for further values see "operation".

²⁾ Shearing resistance similar to DIN 50141

APPLICATION EXAMPLE

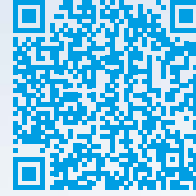


BALL LOCK PINS

SPECIAL TYPES

Almost all branches and sectors of industry rely on the power of ball lock pins - anywhere where connections need to be released and established again frequently and quickly.

With special solutions developed in-house, the requirements of various branches can be met, e.g. in motor sports, aviation or medical engineering.



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BALL LOCK PINS

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The aviation industry is one of the fastest growing markets on the planet. The factors of durability and safety play a key role in the manufacturing of aircraft components. Their long years of experience have turned Erwin Halder KG into the ideal partner of the aviation industry.

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www.halder.aero



Ball Lock Pins • single acting - comply with NAS / MS17984

EH 4210.



PRODUCT DESCRIPTION

Ball Lock Pins according to MS17984 / NAS1333 - 1343 are used for quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections.

Ball Lock Pins (Quick Release Pins) are produced according to Aviation Norm MS / NAS and tested to NAS 1332.

Surface treatment:

- All stainless steel parts are passivated according AMS2700
- All aluminium parts alloy anodized according MIL-A-8625

Heat treatment:

- Body: Rc. 40 min. (AMS2759, Condition H900)
- Spindle: Rc. 40 min. (AMS2759, Condition H900)
- Ball: Rc. 58-62 min. (AMS2759)

Material

Body

- Stainless steel, precipitation-hardened, passivated - CRES 17-4PH (specification AMS5643)

Spindle

- Stainless steel, precipitation-hardened, passivated - CRES 17-4PH (specification AMS5643)

Spring

- Stainless steel, passivated - CRES 302 (specification ASTM-A-313)

Handle

- Aluminium, black anodised - Alum.Alloy A380 (specification ASTM B85/B85)
- From 3/8" - Aluminium, black anodised - Alum.Alloy 6061-T6 (specification AMS-QQ-A200/8)

Attaching ring

- Stainless steel, passivated - CRES 302 (specification ASTM A-313/A313M)

Press button

- Stainless steel, passivated - CRES 303 (specification ASTM A484/484M)

Ball

- Stainless steel, precipitation-hardened, passivated - CRES 440C (specification AMS5630)

Operation

Ball lock pins single acting are self-locking and require a push of the button to release the balls.

MORE INFORMATION

Notes

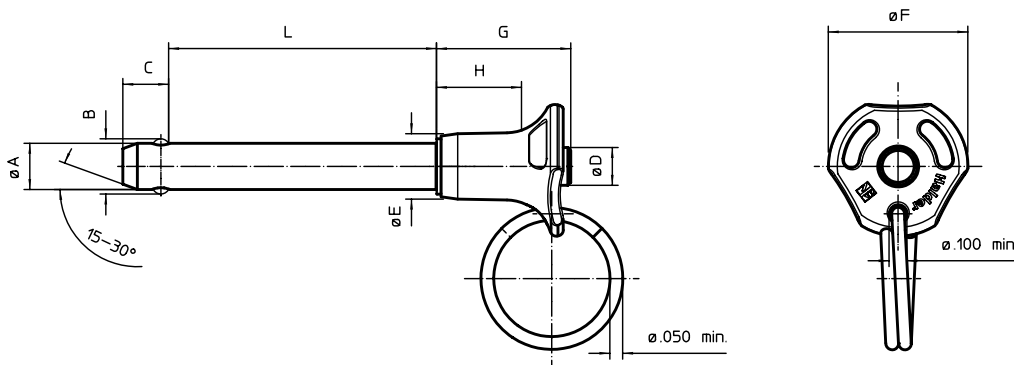
All further dimensions are available on request.

Other diameter / length combinations not listed which comply with the standard can be produced at short notice on customer request.

Special types on request.

- This product is manufactured in INCH dimensions.

DRAWING





ORDER INFORMATION



Nominal diameter A	A min.	A max.	Clamping length L +0.02 0	Dimensions							Location hole max.	Shearing resistance, two-shear min.	Temperature		Weight [g]	Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.			min.	max.		
[in]	[in]	[in]	[in]	[in]							[in]	[lbf]	[°F]		[g]	
3/16	0.1870	0.1885	0.3	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	13.1	4210.A03
			0.4	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	13.4	4210.A04
			0.5	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	13.7	4210.A05
			0.6	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	14.1	4210.A06
			0.7	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	14.4	4210.A07
			0.8	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	14.8	4210.A08
			1.0	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	15.4	4210.A10



2



Nominal diameter A	A min.	A max.	Clamp- ing length L +0.02 0	Dimensions							Location hole max.	Shearing resistance, two-shear min.				Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.			min.	max.		
[in]	[in]	[in]	[in]	[in]							[in]	[lbf]	[°F]		[g]	
3/16	0.1870	0.1885	1.1	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	15.8	4210.A11
			1.2	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	16.1	4210.A12
			1.3	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	16.5	4210.A13
			1.4	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	16.8	4210.A14
			1.5	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	17.1	4210.A15
			1.6	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	17.5	4210.A16
			1.8	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	18.2	4210.A18
			2.0	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	18.8	4210.A20
			2.2	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	19.5	4210.A22
			2.8	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	21.6	4210.A28
1/4	0.2470	0.2485	3.0	0.220	0.26	0.31	0.44	0.800	0.83	0.48	0.1940	5,150	-65	200	22.2	4210.A30
			4.0	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	15.5	4210.B04
			0.5	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	16.1	4210.B05
			0.6	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	16.7	4210.B06
			0.7	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	17.3	4210.B07
			0.8	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	17.9	4210.B08
			0.9	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	18.5	4210.B09
			1.0	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	19.1	4210.B10
			1.1	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	19.8	4210.B11
			1.2	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	20.4	4210.B12
			1.3	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	21.0	4210.B13
			1.4	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	21.6	4210.B14
			1.5	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	22.2	4210.B15
			1.6	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	22.8	4210.B16
			1.7	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	23.4	4210.B17
			1.8	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	24.1	4210.B18
			1.9	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	24.7	4210.B19
			2.0	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	25.3	4210.B20
			2.1	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	25.9	4210.B21
			2.2	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	26.5	4210.B22
2.3	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	27.1	4210.B23			
2.4	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	27.7	4210.B24			
2.5	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	28.4	4210.B25			
2.6	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	29.0	4210.B26			
2.8	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	30.2	4210.B28			
2.9	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	30.8	4210.B29			
3.1	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	32.0	4210.B31			
3.5	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	34.5	4210.B35			
4.2	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	38.8	4210.B42			
4.5	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	40.6	4210.B45			
5.0	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	43.7	4210.B50			
6.4	0.289	0.29	0.31	0.44	0.800	0.89	0.48	0.2540	9,200	-65	200	52.3	4210.B64			
5/16	0.3095	0.3110	0.3	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	18.7	4210.C03
			0.5	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	20.6	4210.C05
			0.6	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	21.6	4210.C06
			0.7	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	22.5	4210.C07
			0.8	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	23.4	4210.C08
			1.0	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	25.3	4210.C10
			1.2	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	27.2	4210.C12
			1.3	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	28.2	4210.C13
			1.4	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	29.1	4210.C14
			1.5	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	30.1	4210.C15
			1.6	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	31.0	4210.C16
			1.7	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	32.0	4210.C17
1.8	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	32.9	4210.C18			
1.9	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	33.8	4210.C19			
2.0	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	34.8	4210.C20			



Nominal diameter A	A min.	A max.	Clamping length L +0.02 0	Dimensions							Location hole max.	Shearing resistance, two-shear min.				Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.			min.	max.		
[in]	[in]	[in]	[in]	[in]							[in]	[lbf]	[°F]		[g]	
5/16	0.3095	0.3110	2.1	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	35.8	4210.C21
			2.2	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	36.7	4210.C22
			2.3	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	37.6	4210.C23
			2.5	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	39.6	4210.C25
			2.6	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	40.5	4210.C26
			2.7	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	41.4	4210.C27
			2.9	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	43.3	4210.C29
			3.0	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	44.3	4210.C30
			3.2	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	46.2	4210.C32
			3.4	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	48.0	4210.C34
			3.5	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	49.0	4210.C35
			3.6	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	50.0	4210.C36
			3.8	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	51.8	4210.C38
			4.9	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	62.3	4210.C49
6.2	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	74.6	4210.C62			
6.7	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	79.3	4210.C67			
7.1	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	83.1	4210.C71			
7.4	0.375	0.33	0.31	0.49	1.135	0.93	0.48	0.3165	14,400	-65	200	85.9	4210.C74			
3/8	0.3720	0.3735	0.7	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	31.8	4210.D07
			0.9	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	34.6	4210.D09
			1.0	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	35.9	4210.D10
			1.2	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	38.6	4210.D12
			1.3	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	40.0	4210.D13
			1.4	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	41.3	4210.D14
			1.5	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	42.7	4210.D15
			1.8	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	46.8	4210.D18
			2.0	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	49.5	4210.D20
			2.2	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	52.2	4210.D22
			2.4	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	54.9	4210.D24
			3.0	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	63.1	4210.D30
			3.2	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	65.8	4210.D32
			3.3	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	67.2	4210.D33
5.0	0.440	0.36	0.39	0.57	1.135	1.04	0.62	0.3790	20,700	-65	200	90.3	4210.D50			
7/16	0.4345	0.4360	1.2	0.509	0.38	0.39	0.63	1.400	1.16	0.62	0.4425	28,500	-65	200	49.8	4210.E12
			1.6	0.509	0.38	0.39	0.63	1.400	1.16	0.62	0.4425	28,500	-65	200	57.2	4210.E16
			2.0	0.509	0.38	0.39	0.63	1.400	1.16	0.62	0.4425	28,500	-65	200	64.6	4210.E20
			2.5	0.509	0.38	0.39	0.63	1.400	1.16	0.62	0.4425	28,500	-65	200	73.9	4210.E25
			2.6	0.509	0.38	0.39	0.63	1.400	1.16	0.62	0.4425	28,500	-65	200	75.7	4210.E26
			3.2	0.509	0.38	0.39	0.63	1.400	1.16	0.62	0.4425	28,500	-65	200	86.9	4210.E32
			4.0	0.509	0.38	0.39	0.63	1.400	1.16	0.62	0.4425	28,500	-65	200	102.0	4210.E40
			5.0	0.509	0.38	0.39	0.63	1.400	1.16	0.62	0.4425	28,500	-65	200	120.0	4210.E50
1/2	0.4970	0.4985	0.5	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	53.0	4210.F05
			0.8	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	61.0	4210.F08
			1.3	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	73.0	4210.F13
			1.4	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	75.0	4210.F14
			1.5	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	78.0	4210.F15
			1.7	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	82.0	4210.F17
			1.8	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	85.0	4210.F18
			2.0	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	90.0	4210.F20
			2.2	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	95.0	4210.F22
			2.4	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	100.0	4210.F24
			2.8	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	109.0	4210.F28
			3.0	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	114.0	4210.F30
			3.2	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	119.0	4210.F32
			4.0	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	138.0	4210.F40
6.0	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	187.0	4210.F60			
9.0	0.594	0.46	0.56	0.72	1.400	1.19	0.72	0.5050	36,900	-65	200	260.0	4210.F90			

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2

Nominal diameter A	A min.	A max.	Clamp- ing length L +0.02 0	Dimensions							Location hole max.	Shearing resistance, two-shear min.	 min. max.		 [g]	Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.			[in]	[lb]		
[in]	[in]	[in]	[in]	[in]							[in]	[lb]	[°F]		[g]	
9/16	0.5595	0.5610	1.3	0.666	0.51	0.56	0.77	1.650	1.41	0.95	0.5675	46,700	-65	200	90.2	4210.G13
			1.5	0.666	0.51	0.56	0.77	1.650	1.41	0.95	0.5675	46,700	-65	200	96.4	4210.G15
			1.7	0.666	0.51	0.56	0.77	1.650	1.41	0.95	0.5675	46,700	-65	200	103.0	4210.G17
			2.0	0.666	0.51	0.56	0.77	1.650	1.41	0.95	0.5675	46,700	-65	200	112.0	4210.G20
			2.5	0.666	0.51	0.56	0.77	1.650	1.41	0.95	0.5675	46,700	-65	200	127.0	4210.G25
			3.4	0.666	0.51	0.56	0.77	1.650	1.41	0.95	0.5675	46,700	-65	200	155.0	4210.G34
5/8	0.6220	0.6235	4.0	0.666	0.51	0.56	0.77	1.650	1.41	0.95	0.5675	46,700	-65	200	174.0	4210.G40
			1.5	0.750	0.58	0.58	0.87	1.700	0.95	0.95	0.6300	57,800	-65	200	134.0	4210.H15
			1.8	0.750	0.58	0.58	0.87	1.700	0.95	0.95	0.6300	57,800	-65	200	146.0	4210.H18
			3.7	0.750	0.58	0.58	0.87	1.700	0.95	0.95	0.6300	57,800	-65	200	219.0	4210.H37
3/4	0.7470	0.7485	4.0	0.750	0.58	0.58	0.87	1.700	0.95	0.95	0.6300	57,800	-65	200	231.0	4210.H40
			2.0	0.887	0.67	0.70	1.00	1.900	1.68	1.14	0.7570	83,200	-65	200	218.0	4210.K20
			2.5	0.887	0.67	0.70	1.00	1.900	1.68	1.14	0.7570	83,200	-65	200	246.0	4210.K25
			3.0	0.887	0.67	0.70	1.00	1.900	1.68	1.14	0.7570	83,200	-65	200	274.0	4210.K30
7/8	0.8735	0.8750	4.0	0.887	0.67	0.70	1.00	1.900	1.68	1.14	0.7570	83,200	-65	200	329.0	4210.K40
			4.0	1.046	0.76	0.84	1.13	2.250	1.98	1.27	0.8820	112,500	-65	200	477.0	4210.L40
1	0.9970	0.9985	4.0	1.219	0.89	0.95	1.25	2.250	2.14	1.49	1.0100	147,200	-65	200	615.0	4210.M40

Ball Lock Pins • single acting - comply with NAS / MS17985

EH 4211.



PRODUCT DESCRIPTION

Ball Lock Pins according to MS17985 / NAS1333-1343 are used for quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections.

Ball Lock Pins (Quick Release Pins) are produced according to Aviation Norm MS / NAS and tested to NAS 1332.

Surface treatment:

- All stainless steel parts are passivated according AMS2700
- All aluminium parts alloy anodized according MIL-A-8625

Heat treatment:

- Body: Rc. 40 min. (AMS2759, Condition H900)
- Spindle: Rc. 40 min. (AMS2759, Condition H900)
- Ball: Rc. 58-62 min. (AMS2759)

Material

Body

- Stainless steel, precipitation-hardened, passivated - CRES 17-4PH (specification AMS5643)

Spindle

- Stainless steel, precipitation-hardened, passivated - CRES 17-4PH (specification AMS5643)

Spring

- Stainless steel, passivated - CRES 302 (specification ASTM-A-313)

Handle

- Aluminium, black anodised - Alum.Alloy A380 (specification ASTM B85/B85)

Attaching ring

- Stainless steel, passivated - CRES 302 (specification ASTM A-313/A313M)

Press button

- Stainless steel, passivated - CRES 303 (specification ASTM A484/484M)

Ball

- Stainless steel, precipitation-hardened, passivated - CRES 440C (specification AMS5630)

Operation

Ball lock pins single acting are self-locking and require a push of the button to release the balls.

MORE INFORMATION

Notes

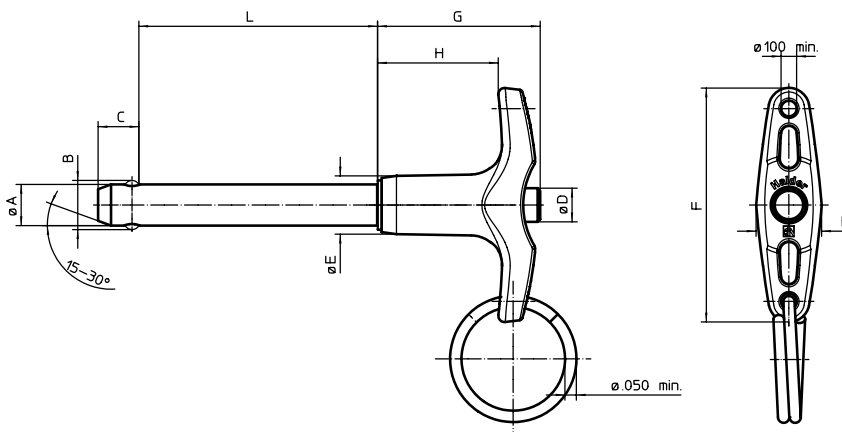
All further dimensions are available on request.

Other diameter / length combinations not listed which comply with the standard can be produced at short notice on customer request.

Special types on request.

- This product is manufactured in INCH dimensions.

DRAWING



ORDER INFORMATION

Nominal diameter A	A min.	A max.	Clamping length L +0.02 0	Dimensions							Location hole max.	Shearing resistance, two-shear min.	Temperature		Weight [g]	Art. No.
				B	C	D	E	F	G	H			min.	max.		
[in]	[in]	[in]	[in]	±0.005	0 -0.04	max.	max.	max.	max.	min.	[in]	[lbf]	[°F]	[g]		
3/16	0.1870	0.1885	0.3	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	18.5	4211.A03
			0.4	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	18.8	4211.A04
			0.5	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	19.1	4211.A05
			0.6	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	19.5	4211.A06
			0.7	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	19.8	4211.A07
			0.8	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	20.2	4211.A08







Nominal diameter A	A min.	A max.	Clamping length L +0.02 0	Dimensions							Location hole max.	Shearing resistance, two-shear min.	 min. max.		 [g]	Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.			[in]	[lbF]		
[in]	[in]	[in]	[in]	[in]							[in]	[lbF]	[°F]		[g]	
3/16	0.1870	0.1885	1.0	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	20.8	4211.A10
			1.1	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	21.2	4211.A11
			1.2	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	21.5	4211.A12
			1.3	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	21.9	4211.A13
			1.4	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	22.2	4211.A14
			1.5	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	22.5	4211.A15
			2.0	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	24.2	4211.A20
			2.1	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	24.6	4211.A21
			2.2	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	24.9	4211.A22
			2.3	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	25.3	4211.A23
			2.5	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	25.9	4211.A25
			2.6	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	26.3	4211.A26
4.5	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	32.7	4211.A45			
6.0	0.220	0.260	0.310	0.500	1.815	1.27	0.800	0.1940	5,150	-65	200	37.8	4211.A60			
1/4	0.2470	0.2485	0.5	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	21.5	4211.B05
			0.6	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	22.1	4211.B06
			0.7	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	22.7	4211.B07
			0.8	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	23.3	4211.B08
			0.9	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	23.9	4211.B09
			1.0	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	24.5	4211.B10
			1.1	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	25.2	4211.B11
			1.2	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	25.8	4211.B12
			1.3	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	26.4	4211.B13
			1.4	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	27.0	4211.B14
			1.5	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	27.6	4211.B15
			1.6	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	28.2	4211.B16
			1.7	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	28.8	4211.B17
			1.8	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	29.5	4211.B18
			2.0	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	30.7	4211.B20
			2.1	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	31.3	4211.B21
			2.3	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	32.5	4211.B23
			2.4	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	33.1	4211.B24
			2.5	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	33.8	4211.B25
			2.6	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	34.4	4211.B26
			2.7	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	35.0	4211.B27
			2.8	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	35.6	4211.B28
			2.9	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	36.2	4211.B29
			3.0	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	36.8	4211.B30
			3.1	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	37.4	4211.B31
			3.2	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	38.1	4211.B32
3.5	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	39.9	4211.B35			
4.0	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	43.0	4211.B40			
5.0	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	49.1	4211.B50			
5.2	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	50.4	4211.B52			
6.0	0.289	0.290	0.310	0.500	1.815	1.27	0.800	0.2540	9,200	-65	200	55.3	4211.B60			
5/16	0.3095	0.3110	0.3	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	23.1	4211.C03
			0.4	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	24.0	4211.C04
			0.5	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	25.0	4211.C05
			0.6	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	26.0	4211.C06
			0.8	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	27.8	4211.C08
			0.9	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	28.8	4211.C09
			1.0	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	29.7	4211.C10
			1.1	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	30.7	4211.C11
			1.2	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	31.6	4211.C12
			1.3	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	32.6	4211.C13
			1.5	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	34.5	4211.C15
			1.6	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	35.4	4211.C16
			1.8	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	37.3	4211.C18
			2.0	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	39.2	4211.C20
			2.2	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	41.1	4211.C22
			2.3	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	42.0	4211.C23
			2.4	0.375	0.330	0.310	0.500	1.815	1.27	0.800	0.3165	14,400	-65	200	43.0	4211.C24



2

Nominal diameter A	A min.	A max.	Clamping length L +0.02 0	Dimensions							Location hole max.	Shearing resistance, two-shear min.	Temperature		Weight [g]	Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.			min.	max.		
[in]	[in]	[in]	[in]	[in]							[in]	[lbf]	[°F]		[g]	
7/16	0.4345	0.4360	2.9	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	87.1	4211.E29
			3.0	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	88.9	4211.E30
			3.1	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	90.8	4211.E31
			3.2	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	92.6	4211.E32
			3.6	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	100.0	4211.E36
			4.0	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	107.0	4211.E40
			4.2	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	111.0	4211.E42
			4.6	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	119.0	4211.E46
			5.0	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	126.0	4211.E50
			5.3	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	132.0	4211.E53
			5.5	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	135.0	4211.E55
			5.6	0.509	0.380	0.390	0.625	2.065	1.47	0.850	0.4425	28,500	-65	200	137.0	4211.E56
			7.2	0.509	0.380	0.390	0.625	2.065	1.60	0.850	0.4425	28,500	-65	200	167.0	4211.E72
1/2	0.4970	0.4985	0.8	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	69.6	4211.F08
			0.9	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	72.1	4211.F09
			1.0	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	74.4	4211.F10
			1.1	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	76.9	4211.F11
			1.2	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	79.3	4211.F12
			1.3	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	81.8	4211.F13
			1.4	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	84.2	4211.F14
			1.5	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	86.6	4211.F15
			1.6	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	89.1	4211.F16
			1.7	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	91.5	4211.F17
			1.8	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	94.0	4211.F18
			1.9	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	96.4	4211.F19
			2.0	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	98.8	4211.F20
			2.1	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	101.0	4211.F21
			2.2	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	104.0	4211.F22
			2.3	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	106.0	4211.F23
			2.4	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	109.0	4211.F24
			2.5	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	111.0	4211.F25
			2.6	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	114.0	4211.F26
			2.8	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	118.0	4211.F28
			2.9	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	121.0	4211.F29
			3.1	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	126.0	4211.F31
			3.2	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	128.0	4211.F32
			3.3	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	138.0	4211.F33
			3.4	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	133.0	4211.F34
			3.5	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	135.0	4211.F35
			3.6	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	138.0	4211.F36
			3.7	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	140.0	4211.F37
4.0	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	148.0	4211.F40			
4.2	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	153.0	4211.F42			
4.3	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	155.0	4211.F43			
4.4	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	157.0	4211.F44			
4.5	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	160.0	4211.F45			
4.7	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	165.0	4211.F47			
4.8	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	167.0	4211.F48			
5.0	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	172.0	4211.F50			
5.5	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	184.0	4211.F55			
6.4	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	206.0	4211.F64			
8.0	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	245.0	4211.F80			
9.0	0.594	0.460	0.565	0.800	2.345	1.60	0.885	0.5050	36,900	-65	200	270.0	4211.F90			

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Nominal diameter A	A min.	A max.	Clamping length L +0.02 0	Dimensions							Location hole max.	Shearing resistance, two-shear min.				Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.			min.	max.		
[in]	[in]	[in]	[in]	[in]							[in]	[lbf]	[°F]		[g]	
9/16	0.5595	0.5610	1.0	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	84.9	4211.G10
			1.2	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	91.2	4211.G12
			1.7	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	107.0	4211.G17
			2.4	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	128.0	4211.G24
			2.5	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	132.0	4211.G25
			3.2	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	153.0	4211.G32
			3.6	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	166.0	4211.G36
			4.0	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	178.0	4211.G40
			5.0	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	209.0	4211.G50
			5.5	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	225.0	4211.G55
			6.1	0.666	0.510	0.565	0.800	2.345	1.60	0.885	0.5675	46,700	-65	200	244.0	4211.G61
5/8	0.6220	0.6240	1.5	0.750	0.580	0.580	0.975	3.100	1.70	0.980	0.6300	57,800	-65	200	151.0	4211.H15
			2.6	0.750	0.580	0.580	0.975	3.100	1.70	0.980	0.6300	57,800	-65	200	193.0	4211.H26
			4.0	0.750	0.580	0.580	0.975	3.100	1.70	0.980	0.6300	57,800	-65	200	247.0	4211.H40
			4.5	0.750	0.580	0.580	0.975	3.100	1.70	0.980	0.6300	57,800	-65	200	267.0	4211.H45
			6.0	0.750	0.580	0.580	0.975	3.100	1.70	0.980	0.6300	57,800	-65	200	324.0	4211.H60
3/4	0.7470	0.7485	1.6	0.887	0.670	0.700	1.000	3.100	1.72	1.030	0.7570	83,200	-65	200	198.0	4211.K16
			2.5	0.887	0.670	0.700	1.000	3.100	1.72	1.030	0.7570	83,200	-65	200	248.0	4211.K25
			4.0	0.887	0.670	0.700	1.000	3.100	1.72	1.030	0.7570	83,200	-65	200	331.0	4211.K40
			5.0	0.887	0.670	0.700	1.000	3.100	1.72	1.030	0.7570	83,200	-65	200	387.0	4211.K50
			8.0	0.887	0.670	0.700	1.000	3.100	1.72	1.030	0.7570	83,200	-65	200	553.0	4211.K80
7/8	0.8720	0.8735	4.0	1.046	0.760	0.840	1.320	3.520	2.17	1.310	0.8820	112,500	-65	200	506.0	4211.L40
1	0.9970	0.9985	1.0	1.219	0.810	0.950	1.320	3.520	2.17	1.310	1.0100	147,200	-65	200	333.0	4211.M10
			1.5	1.219	0.810	0.950	1.320	3.520	2.17	1.310	1.0100	147,200	-65	200	383.0	4211.M15
			4.0	1.219	0.810	0.950	1.320	3.520	2.17	1.310	1.0100	147,200	-65	200	631.0	4211.M40
			5.0	1.219	0.810	0.950	1.320	3.520	2.17	1.310	1.0100	147,200	-65	200	581.0	4211.M50

Ball Lock Pins • single acting - comply with NAS / MS17986
EH 4212.



PRODUCT DESCRIPTION

Ball Lock Pins according to MS17986 / NAS1333-1343 are used for quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections.

Ball Lock Pins (Quick Release Pins) are produced according to Aviation Norm MS / NAS and tested to NAS 1332.

Surface treatment:

- All stainless steel parts are passivated according AMS2700
- All aluminium parts alloy anodized according MIL-A-8625

Heat treatment:

- Body: Rc. 40 min. (AMS2759, Condition H900)
- Spindle: Rc. 40 min. (AMS2759, Condition H900)
- Ball: Rc. 58-62 min. (AMS2759)

Material

Body

- Stainless steel, precipitation-hardened, passivated - CRES 17-4PH (specification AMS5643)

Spindle

- Stainless steel, precipitation-hardened, passivated - CRES 17-4PH (specification AMS5643)

Spring

- Stainless steel, passivated - CRES 302 (specification ASTM-A-313)

Handle

- Aluminium, black anodised - Alum.Alloy A380 (specification ASTM B85/B85)

Attaching ring

- Stainless steel, passivated - CRES 302 (specification ASTM A-313/A313M)

Press button

- Stainless steel, passivated - CRES 303 (specification ASTM A484/484M)

Ball

- Stainless steel, precipitation-hardened, passivated - CRES 440C (specification AMS5630)

Operation

Ball lock pins single acting are self-locking and require a push of the button to release the balls.

MORE INFORMATION

Notes

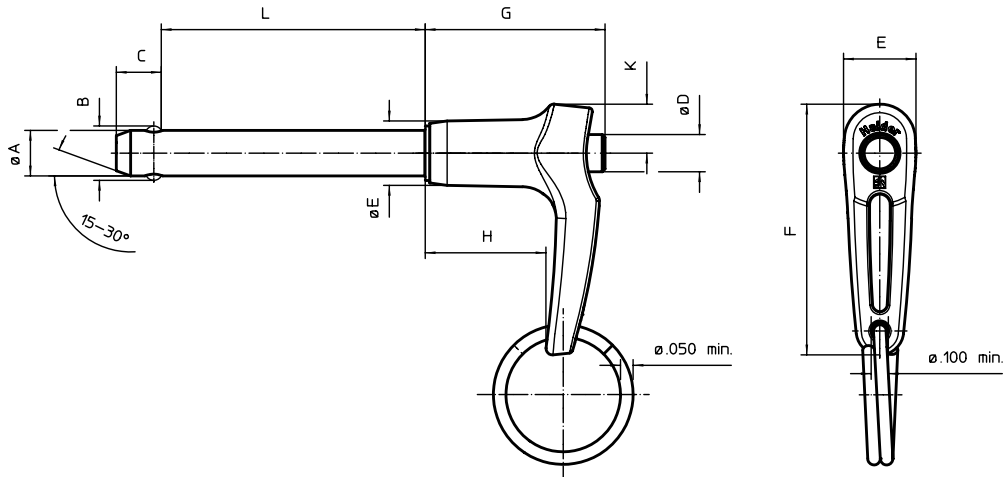
All further dimensions are available on request.

Other diameter / length combinations not listed which comply with the standard can be produced at short notice on customer request.

Special types on request.

- This product is manufactured in INCH dimensions.

DRAWING





ORDER INFORMATION

Nominal diameter A	A min.	A max.	Clamp- ing length L +0.02 0	Dimensions									Location hole max.	Shearing resistance, two-shear min.	Temperature		Weight [g]	Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.	K max.	min.			max.			
[in]	[in]	[in]	[in]	[in]									[in]	[lbf]	[°F]	[g]		
3/16	0.1870	0.1885	0.4	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	18.6	4212.A04	
			0.5	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	18.9	4212.A05	
			0.6	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	19.2	4212.A06	
			0.8	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	19.9	4212.A08	





Nominal diameter A	A min.	A max.	Clamp- ing length L +0.02 0	Dimensions								Location hole max.	Shearing resistance, two-shear min.	Temperature		Weight [g]	Art. No.			
				B	C	D	E	F	G	H	K			min.	max.					
				± 0.005	0 -0.04													max.	max.	max.
[in]	[in]	[in]	[in]	[in]								[in]	[lbf]	[°F]		[g]				
3/16	0.1870	0.1885	1.0	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	20.6	4212.A10			
			1.3	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	21.6	4212.A13			
			1.4	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	22.0	4212.A14			
			1.6	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	22.6	4212.A16			
			1.7	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	23.0	4212.A17			
			1.8	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	23.3	4212.A18			
			2.0	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	24.0	4212.A20			
			2.2	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	24.7	4212.A22			
			2.3	0.220	0.260	0.310	0.500	1.80	1.27	0.76	0.34	0.1940	5,150	-65	200	25.0	4212.A23			
			2.4	0.289	0.290	0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	32.9	4212.B24			
			2.5	0.289	0.290	0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	33.5	4212.B25			
			1/4	0.2470	0.2485	0.4	0.289	0.290	0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	20.6	4212.B04
0.5	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	21.2	4212.B05			
0.6	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	21.8	4212.B06			
0.7	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	22.5	4212.B07			
0.8	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	23.1	4212.B08			
1.0	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	24.3	4212.B10			
1.2	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	25.6	4212.B12			
1.3	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	26.2	4212.B13			
1.4	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	26.8	4212.B14			
1.5	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	27.4	4212.B15			
1.6	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	28.0	4212.B16			
1.7	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	28.6	4212.B17			
1.8	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	29.2	4212.B18			
2.0	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	30.4	4212.B20			
2.1	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	31.1	4212.B21			
2.6	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	34.2	4212.B26			
2.8	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	35.4	4212.B28			
3.0	0.289	0.290				0.310	0.500	1.80	1.27	0.76	0.34	0.2540	9,200	-65	200	36.6	4212.B30			
5/16	0.3095	0.3110				0.4	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	23.8	4212.C04
						0.5	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	24.8	4212.C05
			0.6	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	25.7	4212.C06			
			0.7	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	26.7	4212.C07			
			0.8	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	27.6	4212.C08			
			1.0	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	29.5	4212.C10			
			1.1	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	30.4	4212.C11			
			1.2	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	31.4	4212.C12			
			1.3	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	32.3	4212.C13			
			1.4	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	33.3	4212.C14			
			1.5	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	34.2	4212.C15			
			1.6	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	35.2	4212.C16			
			1.7	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	36.1	4212.C17			
			1.8	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	37.1	4212.C18			
			2.0	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	39.0	4212.C20			
			2.3	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	41.8	4212.C23			
			2.4	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	42.8	4212.C24			
			2.5	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	43.7	4212.C25			
			2.8	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	46.5	4212.C28			
			2.9	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	47.5	4212.C29			
			3.0	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	48.4	4212.C30			
			3.3	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	51.3	4212.C33			
			3.4	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	52.2	4212.C34			
			3.6	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	54.1	4212.C36			
			3.8	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	56.0	4212.C38			
			4.0	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	64.0	4212.C40			
			7.0	0.375	0.330	0.310	0.500	1.80	1.27	0.76	0.34	0.3165	14,400	-65	200	86.3	4212.C70			

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Nominal diameter A	A min.	A max.	Clamp- ing length L +0.02 0	Dimensions									Location hole max.	Shearing resistance, two-shear min.				Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.	K max.	min.			max.			
[in]	[in]	[in]	[in]	[in]									[in]	[lbf]	[°F]		[g]	
3/8	0.3720	0.3735	0.5	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	38.4	4212.D05	
			0.8	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	42.5	4212.D08	
			1.0	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	45.2	4212.D10	
			1.2	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	48.0	4212.D12	
			1.3	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	49.3	4212.D13	
			1.4	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	50.7	4212.D14	
			1.5	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	52.0	4212.D15	
			1.6	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	53.4	4212.D16	
			1.4	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	54.8	4212.D17	
			1.8	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	56.1	4212.D18	
			2.0	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	58.8	4212.D20	
			2.2	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	61.6	4212.D22	
			2.4	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	64.3	4212.D24	
			2.5	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	65.6	4212.D25	
			2.6	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	67.0	4212.D26	
			3.0	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	72.4	4212.D30	
			4.0	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	86.0	4212.D40	
			4.5	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	92.8	4212.D45	
4.3	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	90.1	4212.D43				
4.8	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	96.9	4212.D48				
5.0	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	99.6	4212.D50				
6.0	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	113.0	4212.D60				
6.3	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	117.0	4212.D63				
6.5	0.440	0.365	0.390	0.625	2.03	1.45	0.85	0.39	0.3790	20,700	-65	200	120.0	4212.D65				
7/16	0.4345	0.4360	1.0	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	52.1	4212.E10	
			1.2	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	55.8	4212.E12	
			1.3	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	57.7	4212.E13	
			1.4	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	59.6	4212.E14	
			1.5	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	61.4	4212.E15	
			2.0	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	70.7	4212.E20	
			2.1	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	72.5	4212.E21	
			2.5	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	80.0	4212.E25	
			2.6	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	81.8	4212.E26	
			2.8	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	85.6	4212.E28	
			3.0	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	89.2	4212.E30	
			3.2	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	93.0	4212.E32	
			3.5	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	98.5	4212.E35	
			4.0	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	108.0	4212.E40	
			4.2	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	112.0	4212.E42	
5.5	0.509	0.380	0.390	0.625	2.03	1.47	0.85	0.39	0.4425	28,500	-65	200	136.0	4212.E55				
0.7	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	67.8	4212.F07				
1.0	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	75.1	4212.F10				
1.2	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	80.0	4212.F12				
1.4	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	84.9	4212.F14				
1.5	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	87.2	4212.F15				
1.6	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	89.7	4212.F16				
1.7	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	92.2	4212.F17				
1.8	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	94.6	4212.F18				
1.9	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	97.0	4212.F19				
2.0	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	99.5	4212.F20				
2.1	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	102.0	4212.F21				
2.2	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	104.0	4212.F22				
2.3	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	107.0	4212.F23				
2.4	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	109.0	4212.F24				
2.5	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	112.0	4212.F25				
2.6	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	114.0	4212.F26				
2.8	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	119.0	4212.F28				



Nominal diameter A	A min.	A max.	Clamp- ing length L +0.02 0	Dimensions								Location hole max.	Shearing resistance, two-shear min.	 min. max.		 [g]	Art. No.
				B ±0.005	C 0 -0.04	D max.	E max.	F max.	G max.	H min.	K max.			[in]	[lbf]		
[in]	[in]	[in]	[in]	[in]								[in]	[lbf]	[°F]		[g]	
1/2	0.4970	0.4985	2.9	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	121.0	4212.F29
			3.0	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	124.0	4212.F30
			3.1	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	126.0	4212.F31
			3.4	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	134.0	4212.F34
			3.5	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	136.0	4212.F35
			3.6	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	138.0	4212.F36
			3.7	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	141.0	4212.F37
			4.0	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	148.0	4212.F40
			4.1	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	151.0	4212.F41
			4.2	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	153.0	4212.F42
			4.5	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	160.0	4212.F45
			4.8	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	168.0	4212.F48
			5.3	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	180.0	4212.F53
			5.5	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	185.0	4212.F55
6.0	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	197.0	4212.F60			
7.0	0.594	0.460	0.565	0.800	2.36	1.60	0.85	0.50	0.5050	36,900	-65	200	221.0	4212.F70			
9/16	0.5595	0.5610	1.6	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	104.0	4212.G16
			1.7	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	107.0	4212.G17
			2.0	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	117.0	4212.G20
			2.5	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	132.0	4212.G25
			3.6	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	166.0	4212.G36
			4.0	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	179.0	4212.G40
			5.0	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	210.0	4212.G50
			5.5	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	226.0	4212.G55
6.0	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	241.0	4212.G60			
7.5	0.666	0.510	0.565	0.800	2.36	1.60	0.85	0.50	0.5675	46,700	-65	200	288.0	4212.G75			
5/8	0.6220	0.6235	0.9	0.750	0.580	0.580	0.970	3.07	1.70	0.97	0.60	0.6300	57,800	-65	200	127.0	4212.H09
			2.0	0.750	0.580	0.580	0.970	3.07	1.70	0.97	0.60	0.6300	57,800	-65	200	170.0	4212.H20
			4.0	0.750	0.580	0.580	0.970	3.07	1.70	0.97	0.60	0.6300	57,800	-65	200	247.0	4212.H40
3/4	0.7470	0.7485	2.4	0.887	0.670	0.700	1.000	3.07	1.72	0.98	0.60	0.7570	83,200	-65	200	242.0	4212.K24
			3.5	0.887	0.670	0.700	1.000	3.07	1.72	0.98	0.60	0.7570	83,200	-65	200	303.0	4212.K35
			3.6	0.887	0.670	0.700	1.000	3.07	1.72	0.98	0.60	0.7570	83,200	-65	200	309.0	4212.K36
			4.0	0.887	0.670	0.700	1.000	3.07	1.72	0.98	0.60	0.7570	83,200	-65	200	331.0	4212.K40
7/8	0.8720	0.8735	4.0	1.046	0.760	0.840	1.320	3.70	2.17	1.20	0.80	0.8820	112,500	-65	200	509.0	4212.L40
1	0.9970	0.9985	4.0	1.219	0.890	0.840	1.320	3.70	2.17	1.20	0.80	1.0100	147,200	-65	200	631.0	4212.M40
			6.0	1.219	0.890	0.840	1.320	3.70	2.17	1.20	0.80	1.0100	147,200	-65	200	832.0	4212.M60

Ball Lock Pins • single acting - comply with NAS / MS17987

EH 4213.



PRODUCT DESCRIPTION

Ball Lock Pins according to MS17987 / NAS1333-1343 are used for quick fastening, locking, adjusting, changing and securing. Quickly and easily unlockable for frequently repeated connections.

Ball Lock Pins (Quick Release Pins) are produced according to Aviation Norm MS / NAS and tested to NAS 1332.

Protective treatment:

- All CRES parts are passivated according AMS2700

Heat treatment:

- Body: Rc. 40 min. (AMS2759, Condition H900)
- Spindle: Rc. 40 min. (AMS2759, Condition H900)
- Ball: Rc. 58-62 min. (AMS2759)

Material

Body

- Stainless steel, precipitation-hardened, passivated - CRES 17-4PH (specification AMS5643)

Spindle

- Stainless steel, precipitation-hardened, passivated - CRES 17-4PH (specification AMS5643)

Spring

- Stainless steel, passivated - CRES 302 (specification ASTM-A-313)

Handle

- Stainless steel, passivated - CRES 17-4PH (specification AMS5643)

Attaching ring

- Stainless steel, passivated - CRES 302 (specification ASTM A-313/A313M)

Press button

- Stainless steel, passivated - CRES 303 (specification ASTM A484/484M)

Ball

- Stainless steel, precipitation-hardened, passivated - CRES 440C (specification AMS5630)

Operation

Ball lock pins single acting are self-locking and require a push of the button to release the balls.

MORE INFORMATION

Notes

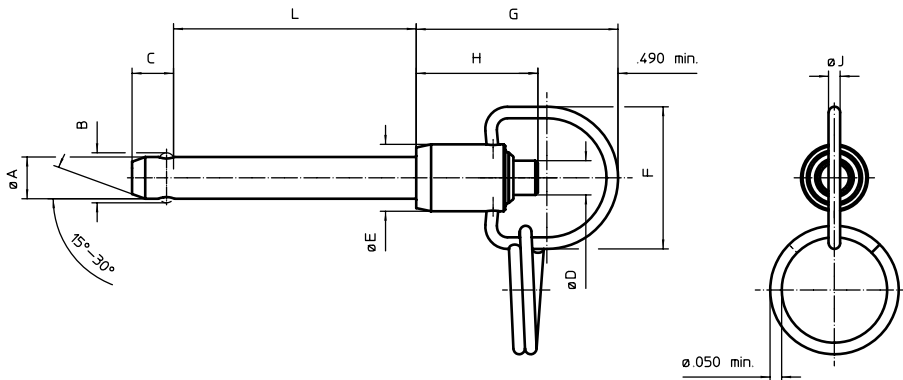
All further dimensions are available on request.

Other diameter / length combinations not listed which comply with the standard can be produced at short notice on customer request.

Special types on request.

- This product is manufactured in INCH dimensions.



DRAWING



ORDER INFORMATION




Nominal diameter A	Dimensions											Location hole max.	Shearing resistance, two-shear min.	Temperature		Weight	Art. No.
	A min.	A max.	Clamping length L +0.02 0	B ±0.005	C 0 -0.04	D max.	E max.	F min.	G max.	H min.	J min.			min.	max.		
	[in]	[in]		[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]			[°F]	[g]		
3/16	0.1870	0.1885	0.3	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	20.1	4213.A03
			0.5	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	20.8	4213.A05
			0.6	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	21.1	4213.A06
			0.7	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	21.4	4213.A07
			0.8	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	21.8	4213.A08
			0.9	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	22.1	4213.A09



Nominal diameter A	Dimensions											Location hole max.	Shearing resistance, two-shear min.					Art. No.
	A min.	A max.	Clamping length L +0.02 0	±0.005	0	D max.	E max.	F min.	G max.	H min.	J min.				min.	max.		
	[in]											[in]	[lbf]	[°F]				
3/16	0.1870	0.1885	1.0	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	22.5	4213.A10	
			1.1	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	22.8	4213.A11	
			1.2	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	23.1	4213.A12	
			1.3	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	23.5	4213.A13	
			1.4	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	23.8	4213.A14	
			1.5	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	24.2	4213.A15	
			1.6	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	24.5	4213.A16	
			1.7	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	24.8	4213.A17	
			1.8	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	25.2	4213.A18	
			2.0	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	25.9	4213.A20	
			2.2	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	26.5	4213.A22	
			2.3	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	26.9	4213.A23	
			2.5	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	27.6	4213.A25	
			2.6	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	27.9	4213.A26	
			3.1	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	29.6	4213.A31	
			3.4	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	30.6	4213.A34	
4.0	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	32.7	4213.A40				
4.3	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	33.7	4213.A43				
4.5	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	34.4	4213.A45				
4.6	0.220	0.260	0.310	0.53	1.06	1.45	0.73	0.08	0.1940	5,150	-65	200	34.7	4213.A46				
1/4	0.2470	0.2485	0.3	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	21.8	4213.B03	
			0.4	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	22.4	4213.B04	
			0.5	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	23.0	4213.B05	
			0.6	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	23.6	4213.B06	
			0.7	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	24.2	4213.B07	
			0.8	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	24.9	4213.B08	
			0.9	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	25.5	4213.B09	
			1.0	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	26.1	4213.B10	
			1.1	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	26.7	4213.B11	
			1.2	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	27.3	4213.B12	
			1.3	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	27.9	4213.B13	
			1.4	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	28.5	4213.B14	
			1.5	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	29.2	4213.B15	
			1.6	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	29.8	4213.B16	
			1.7	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	30.4	4213.B17	
			1.8	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	31.0	4213.B18	
			1.9	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	31.6	4213.B19	
			2.0	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	32.2	4213.B20	
			2.1	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	32.8	4213.B21	
			2.2	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	33.5	4213.B22	
2.3	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	34.1	4213.B23				
2.4	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	34.7	4213.B24				
2.5	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	35.3	4213.B25				
2.6	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	35.9	4213.B26				
2.7	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	36.5	4213.B27				
2.8	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	37.2	4213.B28				
2.9	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	37.8	4213.B29				
3.0	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	38.4	4213.B30				
3.2	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	39.6	4213.B32				
3.3	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	40.2	4213.B33				
3.5	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	41.4	4213.B35				
3.6	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	42.1	4213.B36				
4.0	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	44.5	4213.B40				
4.2	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	45.8	4213.B42				
4.3	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	46.4	4213.B43				
4.7	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	48.8	4213.B47				
5.4	0.289	0.290	0.310	0.53	1.06	1.50	0.78	0.08	0.2540	9,200	-65	200	53.1	4213.B54				





2

Nominal diameter A	A min.	A max.	Dimensions									Location hole max.	Shearing resistance, two-shear min.				Art. No.
			Clamping length L +0.02 0	B ±0.005	C 0 -0.04	D max.	E max.	F min.	G max.	H min.	J min.						
														min.			
			[in]											[in]	[lbf]		
5/16	0.3095	0.3110	0.5	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	27.0	4213.C05
			0.6	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	27.9	4213.C06
			0.7	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	28.9	4213.C07
			0.8	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	29.8	4213.C08
			0.9	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	30.8	4213.C09
			1.0	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	31.7	4213.C10
			1.1	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	32.7	4213.C11
			1.2	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	33.6	4213.C12
			1.3	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	34.6	4213.C13
			1.4	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	35.5	4213.C14
			1.5	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	36.5	4213.C15
			1.6	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	37.4	4213.C16
			1.7	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	38.4	4213.C17
			1.8	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	39.3	4213.C18
			1.9	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	40.2	4213.C19
			2.0	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	41.2	4213.C20
			2.1	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	42.2	4213.C21
			2.2	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	43.1	4213.C22
			2.3	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	44.0	4213.C23
			2.5	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	45.9	4213.C25
			2.6	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	46.9	4213.C26
2.9	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	49.7	4213.C29			
3.0	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	50.7	4213.C30			
3.2	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	52.6	4213.C32			
3.3	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	53.5	4213.C33			
3.4	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	54.4	4213.C34			
3.5	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	55.4	4213.C35			
3.6	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	56.3	4213.C36			
3.9	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	59.2	4213.C39			
4.0	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	60.1	4213.C40			
4.9	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	68.6	4213.C49			
6.0	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	79.1	4213.C60			
6.7	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	85.7	4213.C67			
6.9	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	87.6	4213.C69			
7.0	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	88.5	4213.C70			
7.1	0.375	0.330	0.310	0.59	1.06	1.65	0.83	0.08	0.3165	14,400	-65	200	89.5	4213.C71			
3/8	0.3720	0.3735	0.5	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	41.2	4213.D05
			0.6	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	42.6	4213.D06
			0.7	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	44.0	4213.D07
			0.8	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	45.3	4213.D08
			0.9	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	46.6	4213.D09
			1.0	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	48.0	4213.D10
			1.1	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	49.4	4213.D11
			1.2	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	50.7	4213.D12
			1.3	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	52.1	4213.D13
			1.4	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	53.5	4213.D14
			1.5	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	54.8	4213.D15
			1.6	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	56.2	4213.D16
			1.7	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	57.5	4213.D17
			1.8	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	58.9	4213.D18
			1.9	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	60.2	4213.D19
			2.0	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	61.6	4213.D20
			2.2	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	64.4	4213.D22
			2.3	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	65.7	4213.D23
			2.4	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	67.1	4213.D24
			2.5	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	68.4	4213.D25
			2.6	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	69.8	4213.D26
2.8	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	72.5	4213.D28			
2.9	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	73.9	4213.D29			

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Nominal diameter A	Dimensions											Location hole max.	Shearing resistance, two-shear min.	Temperature		Weight	Art. No.
	A min.	A max.	Clamping length L +0.02 0	B ±0.005	C 0 -0.04	D max.	E max.	F min.	G max.	H min.	J min.			min.	max.		
	[in]	[in]		[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]			[°F]	[g]		
3/8	0.3720	0.3735	3.0	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	75.2	4213.D30
			3.1	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	76.6	4213.D31
			3.3	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	79.3	4213.D33
			3.4	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	80.7	4213.D34
			3.5	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	82.0	4213.D35
			3.6	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	83.4	4213.D36
			3.9	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	87.4	4213.D39
			4.0	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	88.8	4213.D40
			4.1	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	90.2	4213.D41
			4.3	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	92.9	4213.D43
5.0	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	102.0	4213.D50			
7.0	0.440	0.365	0.390	0.65	1.06	1.65	0.94	0.08	0.3790	20,700	-65	200	130.0	4213.D70			
7/16	0.4345	0.4360	0.6	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	48.3	4213.E06
			0.8	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	52.0	4213.E08
			1.0	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	55.7	4213.E10
			1.2	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	59.4	4213.E12
			1.3	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	61.3	4213.E13
			1.4	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	63.2	4213.E14
			1.5	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	65.0	4213.E15
			1.6	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	66.8	4213.E16
			1.9	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	72.4	4213.E19
			2.0	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	74.3	4213.E20
			2.1	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	76.1	4213.E21
			2.2	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	78.0	4213.E22
			2.4	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	81.7	4213.E24
			2.5	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	83.6	4213.E25
			2.6	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	85.4	4213.E26
2.8	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	89.2	4213.E28			
3.0	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	92.8	4213.E30			
3.2	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	96.6	4213.E32			
4.0	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	111.0	4213.E40			
5.5	0.509	0.380	0.390	0.71	1.09	1.85	0.98	0.08	0.4425	28,500	-65	200	139.0	4213.E55			
1/2	0.4970	0.4985	0.8	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	73.4	4213.F08
			0.9	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	75.8	4213.F09
			1.0	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	78.2	4213.F10
			1.1	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	80.7	4213.F11
			1.2	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	83.1	4213.F12
			1.3	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	85.6	4213.F13
			1.4	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	88.0	4213.F14
			1.5	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	90.4	4213.F15
			1.6	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	92.9	4213.F16
			1.8	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	97.7	4213.F18
			1.9	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	100.0	4213.F19
			2.0	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	103.0	4213.F20
			2.1	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	105.0	4213.F21
			2.3	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	110.0	4213.F23
			2.5	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	115.0	4213.F25
			2.8	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	122.0	4213.F28
			2.9	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	125.0	4213.F29
			3.0	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	127.0	4213.F30
			3.1	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	129.0	4213.F31
			3.3	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	134.0	4213.F33
3.4	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	137.0	4213.F34			
3.5	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	139.0	4213.F35			
3.7	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	144.0	4213.F37			
3.9	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	149.0	4213.F39			
4.0	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	151.0	4213.F40			
4.2	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	156.0	4213.F42			
4.4	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	161.0	4213.F44			
4.5	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	164.0	4213.F45			
4.6	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	166.0	4213.F46			
4.8	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	171.0	4213.F48			

Nominal diameter A	A min.	A max.	Clamping length L +0.02 0	Dimensions								Location hole max.	Shearing resistance, two-shear min.				Art. No.	
				B	C	D	E	F	G	H	J			min.	max.			
				±0.005	0 -0.04	max.	max.	min.	max.	min.	min.							
[in]													[in]	[lbf]	[°F]		[g]	
1/2	0.4970	0.4985	5.0	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	176.0	4213.F50	
			5.3	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	183.0	4213.F53	
			5.5	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	188.0	4213.F55	
			5.8	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	195.0	4213.F58	
			6.5	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	212.0	4213.F65	
			8.0	0.594	0.460	0.565	0.80	1.16	1.85	1.14	0.08	0.5050	36,900	-65	200	249.0	4213.F80	
9/16	0.5595	0.5610	1.0	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	94.2	4213.G10	
			1.2	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	100.0	4213.G12	
			1.3	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	104.0	4213.G13	
			1.5	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	110.0	4213.G15	
			2.0	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	125.0	4213.G20	
			2.2	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	132.0	4213.G22	
			2.5	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	141.0	4213.G25	
			2.7	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	147.0	4213.G27	
			2.8	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	150.0	4213.G28	
			3.0	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	156.0	4213.G30	
			3.7	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	178.0	4213.G37	
			4.2	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	194.0	4213.G42	
			5.5	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	234.0	4213.G55	
			6.5	0.666	0.510	0.565	0.84	1.16	2.03	1.14	0.08	0.5675	46,700	-65	200	265.0	4213.G65	
5/8	0.6220	0.6235	3.9	0.750	0.580	0.580	0.90	1.24	2.25	1.40	0.12	0.6300	57,800	-65	200	252.0	4213.H39	
			4.0	0.750	0.580	0.580	0.90	1.24	2.25	1.40	0.12	0.6300	57,800	-65	200	256.0	4213.H40	
3/4	0.7470	0.7485	4.0	0.887	0.670	0.700	1.04	1.64	2.65	1.63	0.12	0.7570	83,200	-65	200	373.0	4213.K40	
7/8	0.8720	0.8735	4.0	0.890	0.760	0.840	1.23	1.64	3.00	1.86	0.12	0.8820	112,500	-65	200	515.0	4213.L40	
1	0.9970	0.9985	2.6	1.219	0.890	0.950	1.33	1.64	3.10	2.00	0.12	1.0100	147,200	-65	200	527.0	4213.M26	
			4.0	1.219	0.890	0.950	1.33	1.64	3.10	2.00	0.12	1.0100	147,200	-65	200	665.0	4213.M40	

Threaded Lock Pins • self-locking
EH 22355.



PRODUCT DESCRIPTION

Threaded lock pins are used for quick fastening, locking, adjusting, changing, clamping, connecting and securing. Quickly and easily unlockable for frequently repeated connections. By pressing the button, the threaded segments unlock and the threaded lock pin can be inserted into or removed from a threaded hole. A time-consuming screwing in and out is unnecessary.

The threaded lock pin is characterised by the following features:

- Corrosion-protected
- No time-consuming screwing in and out
- Self-locking due to spring load

Material

Pin part

- Steel, manganese-phosphated
- Stainless Steel

Handle

- Thermoplastic PA 6, black, dull similar to RAL 9005

Press button

- Aluminium, orange, anodised

Threaded element

- Stainless steel 1.4542, precipitation-hardened

Spring

- Stainless Steel

Assembly

Threaded lock pins can only be mounted into a thread that is true to gauge.

Mounting:

1. Press in the button and hold it down.
2. Insert the threaded lock pin.
3. Release the button (The button must be back in its original position.).
4. Tighten the threaded lock pin by hand as required.
5. It must be ensured that the threaded

segments are engaged in the mounting thread.

Dismantling:

1. Unscrew the threaded lock pin approx. a quarter of a turn anticlockwise.
2. Press in the button and hold it down.
3. Remove the threaded lock pin.
4. Release the button.

Operation

The threaded segments are unlocked by pressing the button.

MORE INFORMATION

Notes

Special types on request.
Due to the thread geometry, the clamping force is higher with the smaller thread sizes.

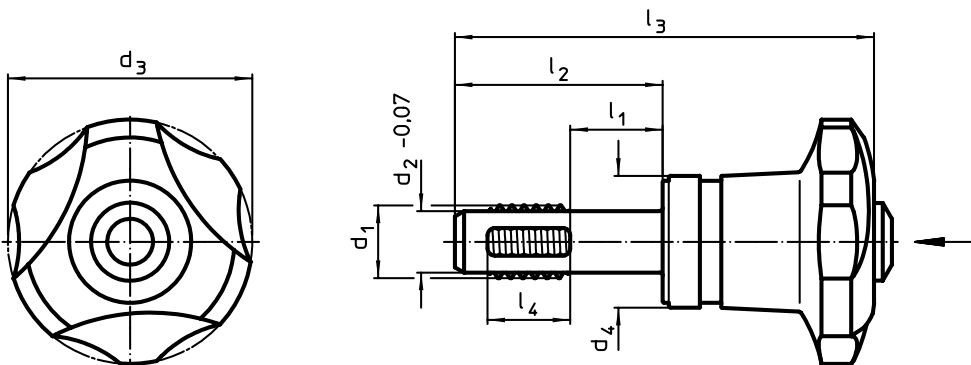
Accessories

Can easily be fitted with retaining cable EH 22355.

Further products

Threaded Lock Pins, self-locking, with axial bearing → p. 277
Retaining Cables, for threaded lock pin → p. 279

DRAWING



ORDER INFORMATION

2

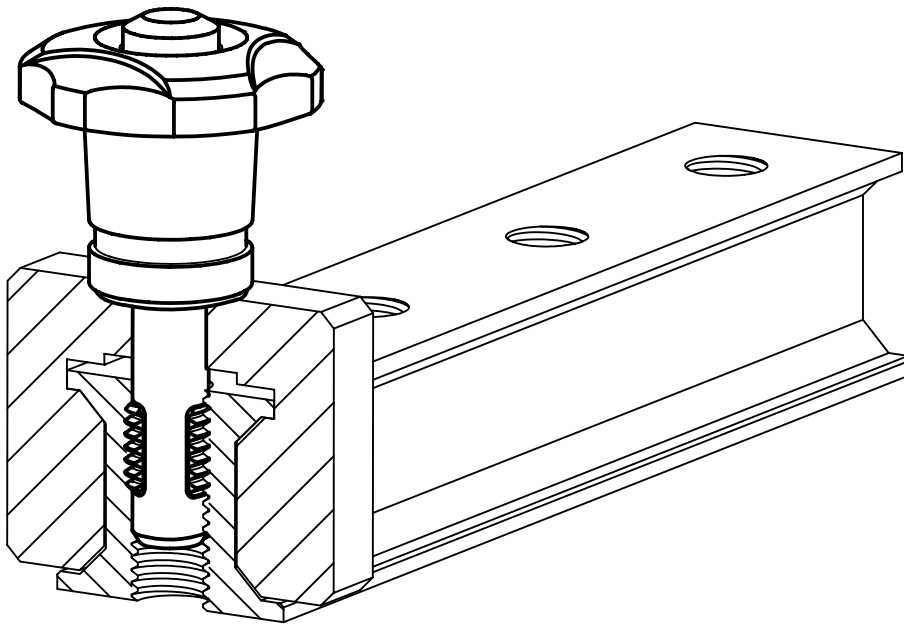
	Dimensions								Locating thread	Temperature		Tightening torque max.	Clamping force max.	Established tightening torque ~ ¹⁾	Clamping force ~ ²⁾	Weight [g]	Steel, manganese-phosphated		Stainless Steel	
	d ₁	l ₁	d ₂ -0.07	d ₃ -1	d ₄	l ₂	l ₃	l ₄		min.	max.						Shearing resistance, two-shear ³⁾ min.	Art. No.	Shearing resistance, two-shear ³⁾ min.	Art. No.
	[mm]									[°C]							[Nm]	[kN]	[Nm]	[kN]
M 8	10	6.62	40	21.6	23.8	58.4	8	M 8	-30	80	5	3.3	3.5	2.3	86	12.7	22355.0102	16.7	22355.1102	
	20	6.62	40	21.6	33.8	68.4	8	M 8	-30	80	5	3.3	3.5	2.3	90	12.7	22355.0104	16.7	22355.1104	
	30	6.62	40	21.6	43.8	78.4	8	M 8	-30	80	5	3.3	3.5	2.3	93	12.7	22355.0106	16.7	22355.1106	
M10	10	8.35	40	21.6	26.0	60.6	10	M10	-30	80	5	2.9	3.5	2.0	93	20.6	22355.0202	27.1	22355.1202	
	20	8.35	40	21.6	36.0	70.6	10	M10	-30	80	5	2.9	3.5	2.0	94	20.6	22355.0204	27.1	22355.1204	
	30	8.35	40	21.6	46.0	80.6	10	M10	-30	80	5	2.9	3.5	2.0	99	20.6	22355.0206	27.1	22355.1206	
M12	15	10.07	40	21.6	34.0	68.6	12	M12	-30	80	5	2.5	3.5	1.8	99	30.4	22355.0303	40.0	22355.1303	
	30	10.07	40	21.6	49.0	83.6	12	M12	-30	80	5	2.5	3.5	1.8	108	30.4	22355.0306	40.0	22355.1306	
	50	10.07	40	21.6	69.0	103.6	12	M12	-30	80	5	2.5	3.5	1.8	122	30.4	22355.0310	40.0	22355.1310	
M16	15	13.80	40	21.6	34.0	68.6	12	M16	-30	80	5	2.1	3.5	1.5	116	62.9	22355.0503	82.7	22355.1503	
	30	13.80	40	21.6	49.0	83.6	12	M16	-30	80	5	2.1	3.5	1.5	133	62.9	22355.0506	82.7	22355.1506	
	50	13.80	40	21.6	69.0	103.6	12	M16	-30	80	5	2.1	3.5	1.5	155	62.9	22355.0510	82.7	22355.1510	

¹⁾ Average hand force established in trials.

²⁾ Average value established in trials.

³⁾ Shearing resistance similar to DIN 50141; values apply to applications in plugged condition (without applied tightening torque).

APPLICATION EXAMPLE



Threaded Lock Pins • self-locking, with axial bearing

EH 22356.



PRODUCT DESCRIPTION

Threaded lock pins are used for quick fastening, locking, adjusting, changing, clamping, connecting and securing. Quickly and easily unlockable for frequently repeated connections. By pressing the button, the threaded segments unlock and the threaded lock pin can be inserted into or removed from a threaded hole. A time-consuming screwing in and out is unnecessary.

The thread lock pin is characterised by the following features and advantages:

- Corrosion-protected
- No time-consuming screwing in and unscrewing
- Self-locking due to spring force
- With axial bearing

The advantages of the axial bearing:

- Double clamping force with the same grip size by reducing surface friction.
- Protection of the component due to fixed contact surface.
- Low setting behaviour due to higher pretensioning force in the bolt or thread.
- Less force required to release.

Material

Pin part

- Heat-treated steel, tempered, manganese phosphated
- Stainless steel 1.4542, precipitation-hardened

Handle

- Thermoplastic PA 6, black, dull similar to RAL 9005

Press button

- Aluminium, orange, anodised

Threaded element

- Stainless steel 1.4542, precipitation-hardened

Axial bearing

- Steel, nitrided, blackened
- Stainless steel

Spring

- Stainless Steel

Assembly

Threaded lock pins can only be mounted into a thread that is true to gauge.

Mounting:

1. Press in the button and hold it down.
2. Insert the threaded lock pin.
3. Release the button (The button must be

back in its original position.).

4. Tighten the threaded lock pin by hand as required.
5. It must be ensured that the threaded segments are engaged in the mounting thread.

Dismantling:

1. Unscrew the threaded lock pin approx. a quarter of a turn anticlockwise.
2. Press in the button and hold it down.
3. Remove the threaded lock pin.
4. Release the button.

Operation

The threaded segments are unlocked by pressing the button.

MORE INFORMATION

Notes

Special types on request.

Due to the thread geometry, the clamping force is higher with the smaller thread sizes.

Accessories

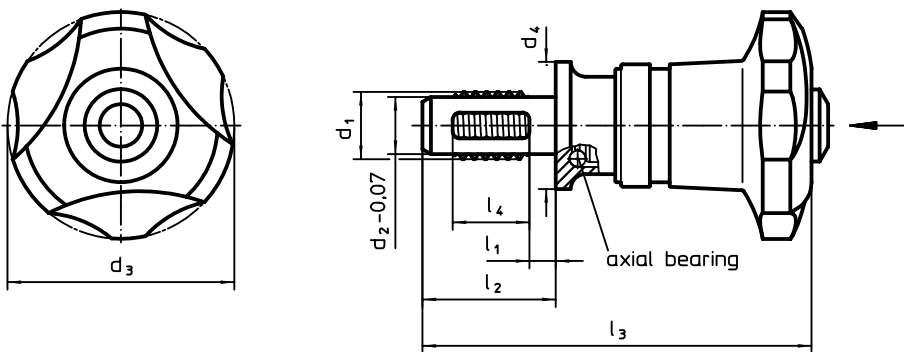
Can easily be fitted with retaining cable EH 22355.

Further products

Threaded Lock Pins, self-locking. → p. 275

Retaining Cables, for threaded lock pin → p. 279

DRAWING



ORDER INFORMATION

2

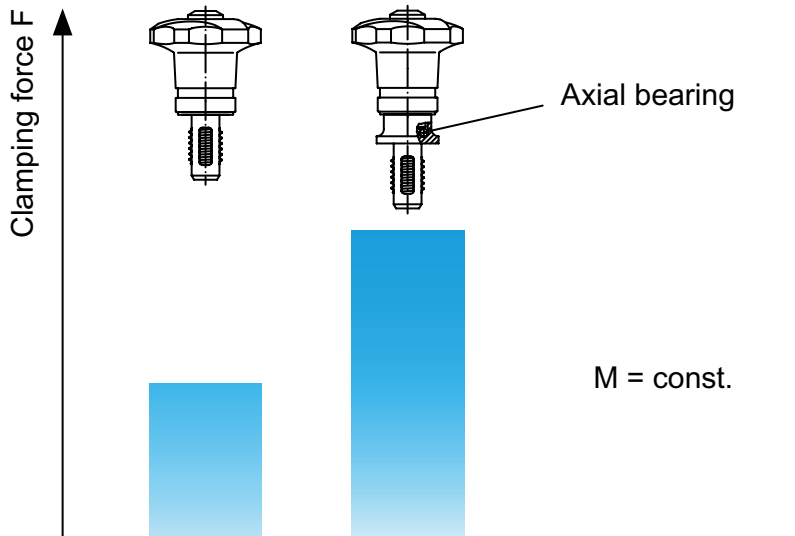
	Dimensions								Locating thread	Temperature		Tightening torque max.	Clamping force max.	Established tightening torque ~ ¹⁾	Clamping force ~ ²⁾	Weight [g]	Heat-treated steel		Stainless steel	
	d ₁	l ₁	d ₂ -0.07	d ₃	d ₄	l ₂	l ₃	l ₄		min.	max.						Shearing resistance, two-shear ³⁾ min.	Art. No.	Shearing resistance, two-shear ³⁾ min.	Art. No.
	[mm]									[°C]										
M 8	10	6.62	40	30	23.8	72.2	8	M 8	-30	80	5	4.8	3.5	3.3	96	35.9	22356.0102	36.4	22356.1102	
	20	6.62	40	30	33.8	82.2	8	M 8	-30	80	5	4.8	3.5	3.3	98	35.9	22356.0104	36.4	22356.1104	
	30	6.62	40	30	43.8	92.2	8	M 8	-30	80	5	4.8	3.5	3.3	101	35.9	22356.0106	36.4	22356.1106	
M10	10	8.35	40	30	26.0	74.4	10	M10	-30	80	5	4.2	3.5	2.9	100	59.3	22356.0202	62.5	22356.1202	
	20	8.35	40	30	36.0	84.4	10	M10	-30	80	5	4.2	3.5	2.9	180	59.3	22356.0204	62.5	22356.1204	
	30	8.35	40	30	46.0	94.4	10	M10	-30	80	5	4.2	3.5	2.9	108	59.3	22356.0206	62.5	22356.1206	
M12	15	10.07	40	30	34.0	82.4	12	M12	-30	80	5	3.7	3.5	2.6	184	85.4	22356.0303	86.8	22356.1303	
	30	10.07	40	30	49.0	97.4	12	M12	-30	80	5	3.7	3.5	2.6	193	85.4	22356.0306	86.8	22356.1306	
	50	10.07	40	30	69.0	117.4	12	M12	-30	80	5	3.7	3.5	2.6	206	85.4	22356.0310	86.8	22356.1310	
M16	15	13.80	40	30	34.0	83.4	12	M16	-30	80	5	3.0	3.5	2.2	134	176.5	22356.0503	179.4	22356.1503	
	30	13.80	40	30	49.0	98.4	12	M16	-30	80	5	3.0	3.5	2.2	150	176.5	22356.0506	179.4	22356.1506	
	50	13.80	40	30	69.0	118.4	12	M16	-30	80	5	3.0	3.5	2.2	174	176.5	22356.0510	179.4	22356.1510	

¹⁾ Average hand force established in trials.

²⁾ Average value established in trials.

³⁾ Shearing resistance similar to DIN 50141; values apply to applications in plugged condition (without applied tightening torque).

**Increase of clamping force with axial bearing
(while manual force is unchanged)**



Retaining Cables • for threaded lock pin
EH 22355.



PRODUCT DESCRIPTION

These retaining cables are provided for attachment to the threaded lock pins EH 22355./EH22356 and act as loss prevention device.

Material

Attaching ring
▪ Stainless Steel

Holding clip
▪ Thermoplastic PA 6, black, dull similar to RAL 9005

Eyelet
▪ Stainless steel

Retaining cable

▪ Stainless steel

Coating retaining cable

▪ Thermoplastic PA 6 coated, black

MORE INFORMATION

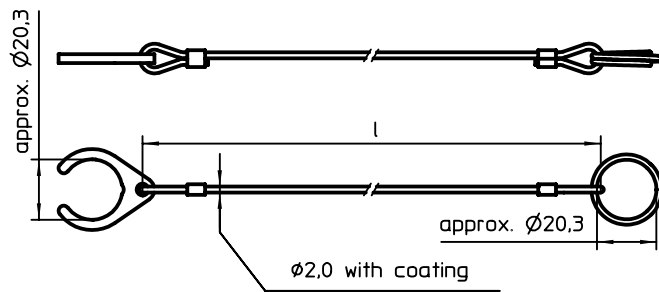
Notes

Special types on request.

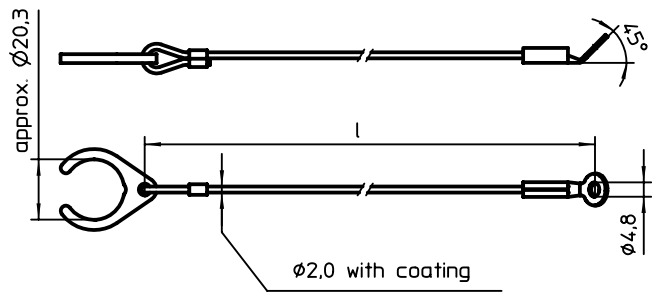
Further products

Retaining Cables. → p. 249

DRAWING




picture 1

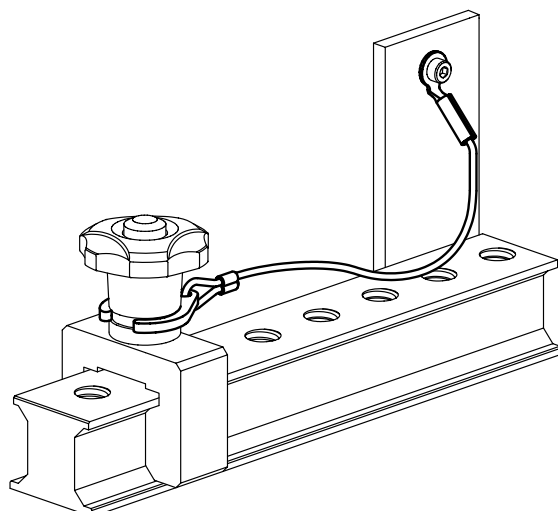


picture 2

ORDER INFORMATION

Dimensions l [mm]	 [g]	Art. No.
stainless steel, with holding clip and attaching ring – picture 1		
150	13.0	22355.6001
200	8.2	22355.6002
300	15.0	22355.6003
stainless steel, with holding clip and eyelet – picture 2		
150	9.9	22355.6011
200	10.0	22355.6012
300	15.0	22355.6013

APPLICATION EXAMPLE



Grub Screws • DIN 6332 with thrust point

EH 22540.



PRODUCT DESCRIPTION

Grub screws are clamping screws that can directly transmit forces via the thrust point. The pressure surface of the thrust point of the steel version is hardened. For clamping sensitive surfaces, thrust pads EH 22560. (DIN 6311 and low version) can be attached on the thrust point. The snap ring of the thrust pad achieves a connection between the grub screw and the thrust pad that can be released by hand. These grub screws with thrust points are particularly characterised by the additional radius "r" on the thrust point (optimisation compared to DIN 6332), which makes assembly in the thrust pad much easier. The thrust point diameter of the grub screws is smaller than the core diameter of the thread, so that they can also be screwed in on the pin side.

Material

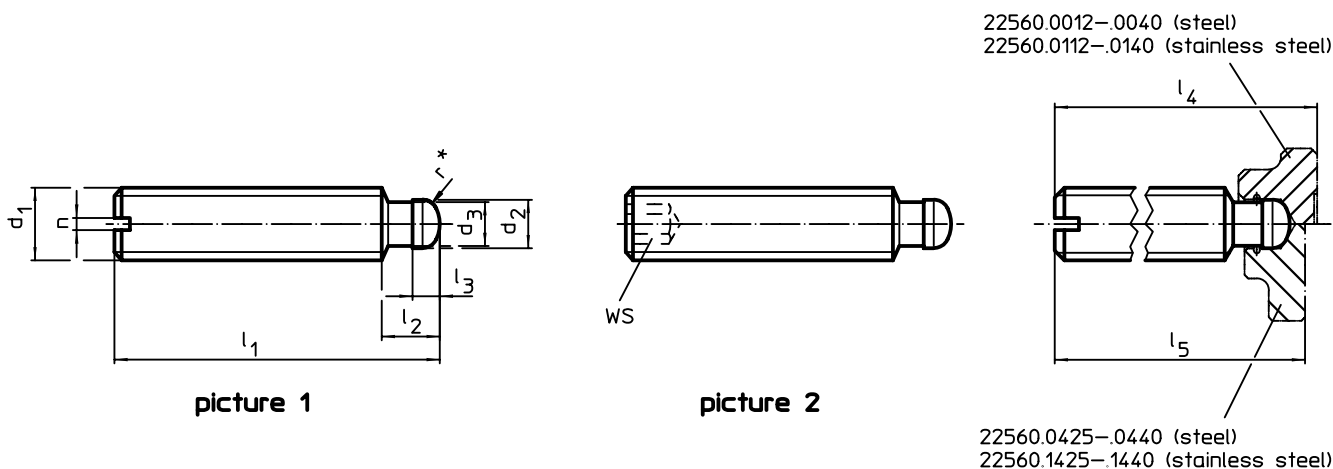
- Steel, blackened, quality 5.8, thrust point hardened
- Stainless steel

MORE INFORMATION

Further products

Thrust Pads, DIN 6311 and low model → p. 282

DRAWING




* to ease assembly the DIN 6332 specification has been completed by r

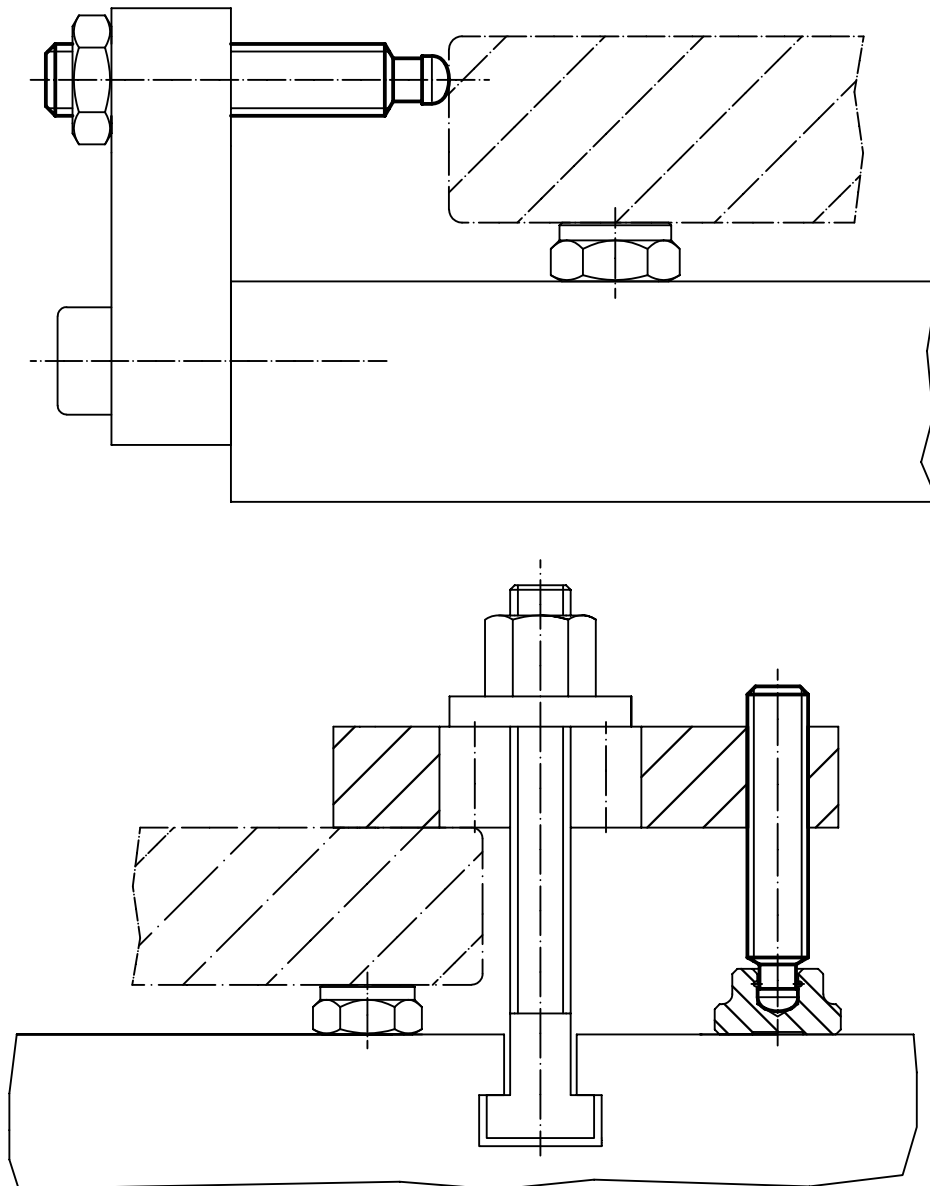
ORDER INFORMATION

d ₁	l ₁	d ₂ h11	d ₃	Dimensions					n	WS [mm]	[g]	Art. No.		
				l ₂	l ₃	l ₄ ~	l ₅ ~	Steel				Stainless steel		
[mm]														
slotted (S) – picture 1														
M 6	30	4.5	4.0	6.0	2.5	32.1	–	1.0	–	4.5	22540.0061	22540.1061		
	50	4.5	4.0	6.0	2.5	52.1	–	1.0	–	7.8	22540.0062	22540.1062		
M 8	40	6.0	5.4	7.5	3.0	43.0	42.5	1.2	–	11.0	22540.0081	22540.1081		
	60	6.0	5.4	7.5	3.0	63.0	62.5	1.2	–	17.0	22540.0082	22540.1082		
M10	60	8.0	7.2	9.0	4.5	63.6	62.6	1.6	–	27.0	22540.0101	22540.1101		
	80	8.0	7.2	9.0	4.5	83.6	82.6	1.6	–	37.0	22540.0102	22540.1102		
M12	60	8.0	7.2	10.0	4.5	64.6	62.6	2.0	–	38.0	22540.0121	22540.1121		
	80	8.0	7.2	10.0	4.5	84.6	82.6	2.0	–	51.0	22540.0122	22540.1122		
	100	8.0	7.2	10.0	4.5	104.6	102.6	2.0	–	65.0	22540.0123	22540.1123		
M16	80	12.0	11.0	12.0	5.0	85.4	82.9	2.5	–	100.0	22540.0161	22540.1161		
	100	12.0	11.0	12.0	5.0	105.4	102.9	2.5	–	124.0	22540.0162	22540.1162		
	125	12.0	11.0	12.0	5.0	130.4	127.9	2.5	–	160.0	22540.0163	22540.1163		
M20	100	15.5	14.4	14.0	5.5	105.5	–	3.0	–	190.0	22540.0201	22540.1201		
	125	15.5	14.4	14.0	5.5	130.5	–	3.0	–	240.0	22540.0202	22540.1202		
	150	15.5	14.4	14.0	5.5	155.5	–	3.0	–	290.0	22540.0203	22540.1203		
with internal hexagon (IS) – picture 2														
M 6	30	4.5	4.0	6.0	2.5	32.1	–	–	3	4.3	22540.0361	22540.1361		
	50	4.5	4.0	6.0	2.5	52.1	–	–	3	7.6	22540.0362	22540.1362		
M 8	40	6.0	5.4	7.5	3.0	43.0	42.5	–	4	11.0	22540.0381	22540.1381		
	60	6.0	5.4	7.5	3.0	63.0	62.5	–	4	17.0	22540.0382	22540.1382		
M10	60	8.0	7.2	9.0	4.5	63.6	62.6	–	5	26.0	22540.0401	22540.1401		
	80	8.0	7.2	9.0	4.5	83.6	82.6	–	5	36.0	22540.0402	22540.1402		



d ₁	l ₁	d ₂ h11	Dimensions						n	WS [mm]	 [g]	Art. No.	
			d ₃	l ₂	l ₃	l ₄ ~	l ₅ ~	Steel				Stainless steel	
[mm]													
M12	60	8.0	7.2	10.0	4.5	64.6	62.6	-	6	36.0	22540.0421	22540.1421	
	80	8.0	7.2	10.0	4.5	84.6	82.6	-	6	51.0	22540.0422	22540.1422	
	100	8.0	7.2	10.0	4.5	104.6	102.6	-	6	117.0	22540.0423	22540.1423	
M16	80	12.0	11.0	12.0	5.0	85.4	82.9	-	8	91.0	22540.0461	22540.1461	
	100	12.0	11.0	12.0	5.0	105.4	102.9	-	8	119.0	22540.0462	22540.1462	
	125	12.0	11.0	12.0	5.0	130.4	127.9	-	8	154.0	22540.0463	22540.1463	
M20	100	15.5	14.4	14.0	5.5	105.5	-	-	10	178.0	22540.0501	22540.1501	
	125	15.5	14.4	14.0	5.5	130.5	-	-	10	230.0	22540.0502	22540.1502	
	150	15.5	14.4	14.0	5.5	155.5	-	-	10	284.0	22540.0503	22540.1503	

APPLICATION EXAMPLE



Thrust Pads • DIN 6311 and low model

EH 22560.

2



PRODUCT DESCRIPTION

Combinable with grub screws DIN 6332 with thrust point EH 22540.

Material

- Steel, case-hardened, blackened. Snap ring inlaid.
- Stainless steel

open side at the bottom. The grub screw is inclined as far as possible in the direction of the open side of the ring and pressed in.

Assembly

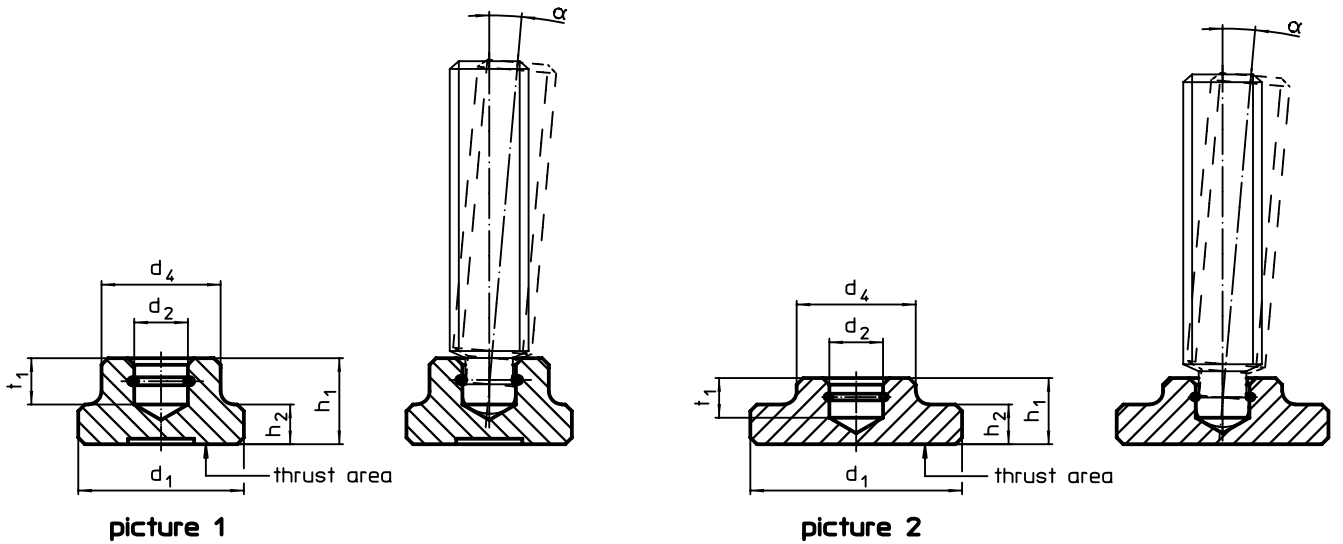
The thrust pad is to be held the way the spring retainer lies in the recess with its

MORE INFORMATION

Further products

Grub Screws, DIN 6332 with thrust point. → p. 280

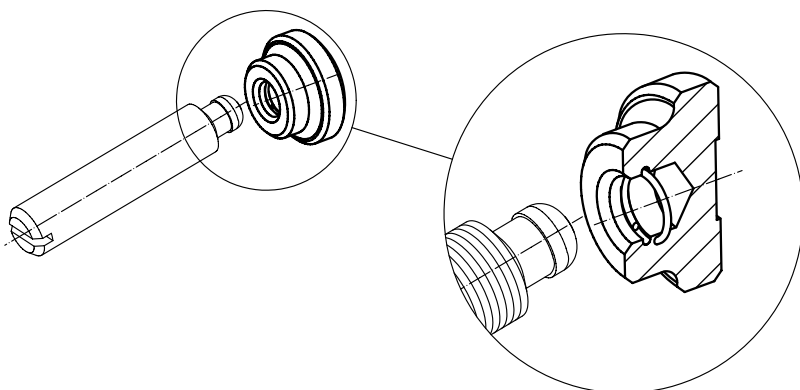
DRAWING



ORDER INFORMATION

d ₁	d ₂ H12	Dimensions				t ₁	For grub screws with thrust point DIN 6332	α min.	[g]	Art. No.	
		d ₄	h ₁	h ₂	[mm]					Steel	Stainless steel
DIN 6311 with snap ring, form S – picture 1											
12	4.6	10	7	2.5	4.0	M 6	7°	4.3	22560.0012	22560.0112	
16	6.1	12	9	4.0	5.0	M 8	4°	9.4	22560.0016	22560.0116	
20	8.1	15	11	5.0	6.0	M10	3°	18.0	22560.0020	22560.0120	
25	8.1	18	13	6.0	7.0	M12	3°	33.0	22560.0025	22560.0125	
32	12.1	22	15	7.0	7.5	M16	5°	58.0	22560.0032	22560.0132	
40	15.6	28	16	9.0	8.0	M20	4°	105.0	22560.0040	22560.0140	
low model, with increased thrust area and spring retainer – picture 2											
25	6.1	12	8	4.0	4.5	M 8	4°	18.0	22560.0425	22560.1425	
32	8.1	18	10	6.0	6.0	M10/M12	3°	43.0	22560.0432	22560.1432	
40	12.1	22	12	7.0	7.0	M16	5°	75.0	22560.0440	22560.1440	

APPLICATION EXAMPLE



Thrust Pads • plastic
EH 22570.



PRODUCT DESCRIPTION

The plastic thrust pads (EH 22570.) can be combined with ball-headed grub screws (EH 22570.).

Material

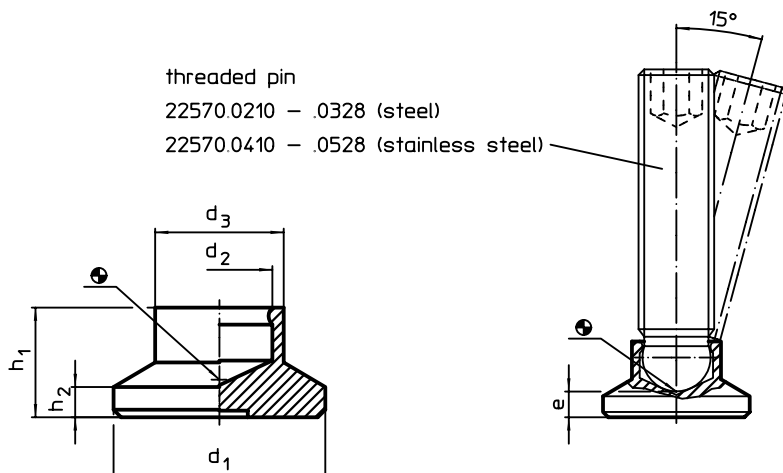
- Thermoplastic POM, black, dull

MORE INFORMATION

Further products

Grub Screws, ball-headed..... → p. 284

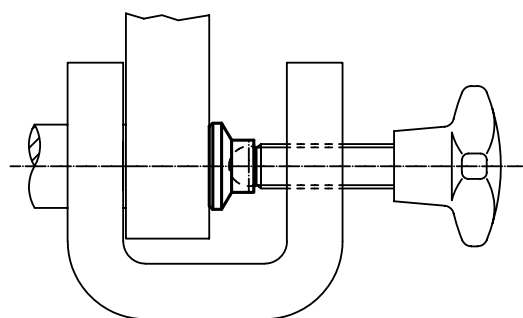
DRAWING



ORDER INFORMATION

d ₁	Dimensions				h ₁	h ₂	Load capacity for static load max. [kN]	For grub screws EH 22570. [mm]	Temperature range [°C]		Weight [g]	Art. No.
	d ₂	d ₃	e						min.	max.		
[mm]												
15	4.5	8.6	3.6		7.6	2.5	3.5	M 6	-30	80	1.1	22570.0014
	6.1	8.6	2.5		7.6	2.5	3.5	M 8	-30	80	1.0	22570.0015
18	6.1	10.8	4.2		9.2	2.5	3.5	M 8	-30	80	1.7	22570.0017
	7.8	10.8	3.4		9.2	2.5	3.5	M10	-30	80	2.0	22570.0018
21	6.1	12.8	5.0		10.0	3.0	3.5	M 8	-30	80	3.0	22570.0019
	7.8	12.8	4.3		10.0	3.0	3.5	M10	-30	80	2.6	22570.0020
	9.4	12.8	3.4		10.0	3.0	3.5	M12	-30	80	2.4	22570.0021
25	6.1	13.0	5.5		10.5	3.0	3.5	M 8	-30	80	4.0	22570.0023
	7.8	13.0	4.6		10.5	3.0	3.5	M10	-30	80	3.6	22570.0024
	9.4	13.0	3.6		10.5	3.0	3.5	M12	-30	80	3.4	22570.0025
32	6.1	14.0	6.0		11.0	3.0	3.5	M 8	-30	80	6.4	22570.0032
	7.8	14.0	5.0		11.0	3.0	3.5	M10	-30	80	5.0	22570.0033
	9.4	14.0	4.2		11.0	3.0	3.5	M12	-30	80	5.0	22570.0034
40	6.1	16.0	8.0		13.0	4.0	3.5	M 8	-30	80	11.0	22570.0040
	7.8	16.0	7.0		13.0	4.0	3.5	M10	-30	80	10.0	22570.0041
	9.4	16.0	6.2		13.0	4.0	3.5	M12	-30	80	10.0	22570.0042

APPLICATION EXAMPLE



Grub Screws • ball-headed

EH 22570.



PRODUCT DESCRIPTION

The ball-headed grub screws (EH 22570.) can be combined with plastic thrust pads (EH 22570.).

Material

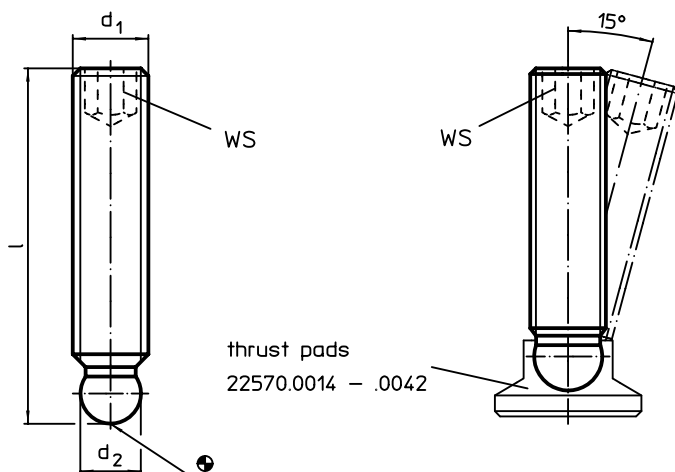
- Free cutting steel, quality 5.8, blackened
- Stainless steel 1.4305

MORE INFORMATION

Further products

Thrust Pads, plastic..... → p. 283

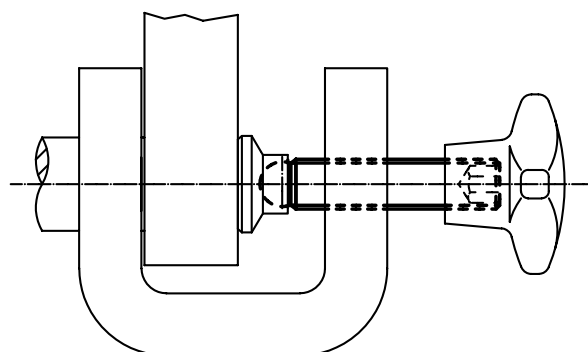
DRAWING



ORDER INFORMATION

d ₁	Dimensions		WS	[g]	Art. No.	
	l	d ₂ +0.05			Free cutting steel	Stainless steel
	[mm]		[mm]			
M 6	30	4.5	3	5.1	22570.0210	22570.0410
	40	4.5	3	5.9	22570.0214	22570.0414
	50	4.5	3	7.6	22570.0218	22570.0418
M 8	25	6.1	4	5.8	22570.0219	22570.0419
	40	6.1	4	11.0	22570.0220	22570.0420
	50	6.1	4	14.0	22570.0224	22570.0424
	63	6.1	4	18.0	22570.0228	22570.0428
M10	40	7.8	5	16.0	22570.0248	22570.0448
	50	7.8	5	21.0	22570.0250	22570.0450
	63	7.8	5	27.0	22570.0254	22570.0454
	80	7.8	5	36.0	22570.0258	22570.0458
M12	40	9.4	6	23.0	22570.0316	22570.0516
	63	9.4	6	39.0	22570.0320	22570.0520
	80	9.4	6	51.0	22570.0324	22570.0524
	100	9.4	6	65.0	22570.0328	22570.0528

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

Mounting pads can be used as foot or thrust pad. Not parallel bearing surfaces up to 15° degrees can be compensated.

Material

Ball element

- Heat-treated steel, tempered, blackened
- Stainless steel 1.4305

Ball element with bolt

- Heat-treated steel, tempered, blackened
- Stainless steel 1.4305

Lock nut

- Steel, blackened, ISO 4032
- Steel, blackened, DIN 934

- Stainless Steel A2, ISO 4032
- Stainless Steel A2, DIN 934

Pad

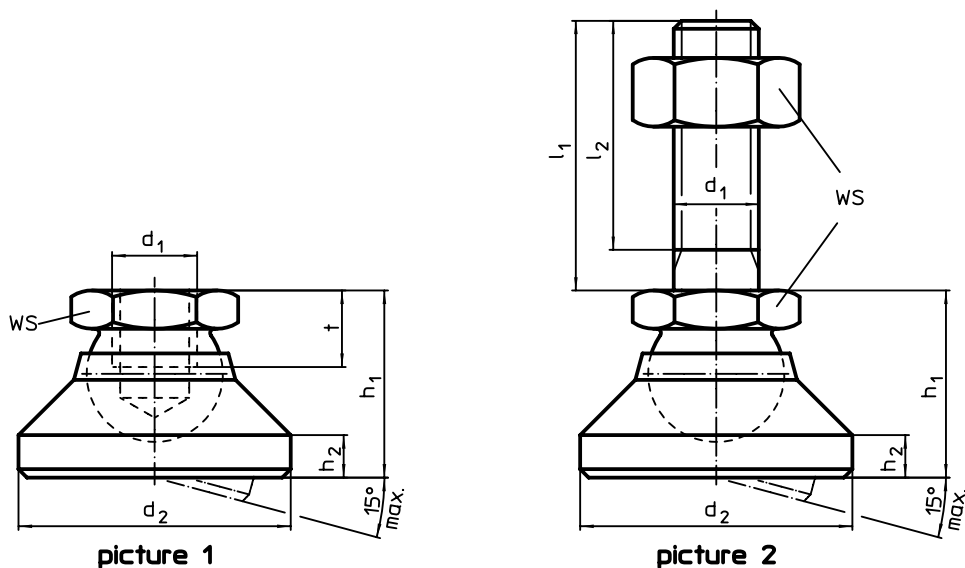
- Heat-treated steel, blackened
- Stainless steel 1.4305
- Thermoplastic POM, white

MORE INFORMATION

Notes

For the versions $d_1 = M10$ and $M12$ the lock nut conforms to DIN 934.

DRAWING



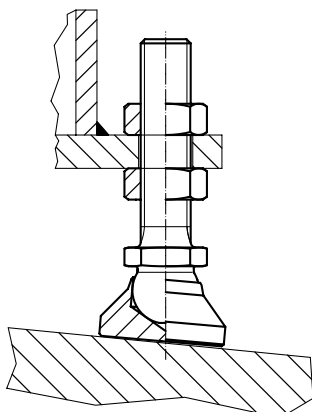
ORDER INFORMATION

Dimensions							WS	Load capacity for static load max.	Temperature		Weight [g]	Art. No.		
d_1	l_1	d_2	l_2	h_1	h_2	t			min.	max.		Heat-treated steel	Stainless steel	Thermoplastic
[mm]							[mm]	[°C]						
pad and ball element – picture 1														
M 6	-	20	-	14	2.5	5.0	10	10	-	250	15.0	22590.0006	-	-
								8	-	250	15.0	-	22590.0206	-
M 8	-	25	-	18	4.0	7.0	13	18	-	250	33.0	22590.0008	-	-
								14	-	250	33.0	-	22590.0208	-
M10	-	32	-	22	5.0	9.0	17	20	-	250	67.0	22590.0010	-	-
								16	-	250	67.0	-	22590.0210	-
M12	-	40	-	26	6.0	11.0	19	35	-	250	112.0	22590.0012	-	-
								28	-	250	113.0	-	22590.0212	-
M16	-	50	-	32	7.0	13.5	24	45	-	250	254.0	22590.0016	-	-
								36	-	250	256.0	-	22590.0216	-
M20	-	60	-	42	8.0	17.0	30	55	-	250	451.0	22590.0020	-	-
								44	-	250	452.0	-	22590.0220	-
M24	-	60	-	45	9.5	19.0	36	65	-	250	498.0	22590.0024	-	-
								52	-	250	504.0	-	22590.0224	-



Dimensions							WS	Load capacity for static load max.	Temperature		Weight	Art. No.		
d ₁	l ₁	d ₂	l ₂	h ₁	h ₂	t			min.	max.		Heat-treated steel	Stainless steel	Thermoplastic
[mm]							[mm]	[kN]	[°C]		[g]			
pad from thermoplastic, ball element from stainless steel – picture 1														
M 6	–	20	–	14	2.5	5.0	10	4	-30	80	6.1	–	–	22590.0106
M 8	–	25	–	18	4.0	7.0	13	7	-30	80	13.0	–	–	22590.0108
M10	–	32	–	22	5.0	9.0	17	10	-30	80	26.0	–	–	22590.0110
M12	–	40	–	26	6.0	11.0	19	18	-30	80	40.0	–	–	22590.0112
M16	–	50	–	32	7.0	13.5	24	20	-30	80	75.0	–	–	22590.0116
M20	–	60	–	42	8.0	17.0	30	22	-30	80	150.0	–	–	22590.0120
M24	–	60	–	45	9.5	19.0	36	25	-30	80	184.0	–	–	22590.0124
pad and ball element with bolt from steel – picture 2														
M 6	60	20	57.0	14	2.5	–	10	10	–	250	29.0	22590.0410	–	–
								8	–	250	29.0	–	22590.0610	–
M 8	80	25	76.0	18	4.0	–	13	18	–	250	66.0	22590.0422	–	–
								14	–	250	66.0	–	22590.0622	–
M10	100	32	95.5	22	5.0	–	17	20	–	250	133.0	22590.0438	–	–
								16	–	250	134.0	–	22590.0638	–
								20	–	250	156.0	22590.0442	–	–
M12	100	40	94.5	26	6.0	–	19	16	–	250	158.0	–	22590.0642	–
								35	–	250	237.0	22590.0452	–	–
								28	–	250	212.0	–	22590.0652	–
M16	100	40	144.5	26	6.0	–	19	35	–	250	283.0	22590.0456	–	–
								28	–	250	248.0	–	22590.0656	–
								45	–	250	460.0	22590.0468	–	–
M16	200	50	194.0	32	7.0	–	24	36	–	250	412.0	–	22590.0668	–
								45	–	250	608.0	22590.0472	–	–
								36	–	250	624.0	–	22590.0672	–
M20	100	60	92.5	42	8.0	–	30	55	–	250	781.0	22590.0482	–	–
								44	–	250	790.0	–	22590.0682	–
								55	–	250	1015.0	22590.0488	–	–
M20	200	60	192.5	42	8.0	–	30	44	–	250	1031.0	–	22590.0688	–
								65	–	250	994.0	22590.0495	–	–
								52	–	250	1001.0	–	22590.0695	–
M24	100	60	91.0	45	9.5	–	36	65	–	250	1320.0	22590.0498	–	–
								52	–	250	1323.0	–	22590.0698	–
pad from thermoplastic, ball element with bolt from stainless steel – picture 2														
M 6	60	20	57.0	14	2.5	–	10	4	-30	80	20.0	–	–	22590.0510
M 8	80	25	76.0	18	4.0	–	13	7	-30	80	46.0	–	–	22590.0522
M10	100	32	95.5	22	5.0	–	17	10	-30	80	93.0	–	–	22590.0538
								10	-30	80	117.0	–	–	22590.0542
M12	100	40	94.5	26	6.0	–	19	18	-30	80	139.0	–	–	22590.0552
								18	-30	80	175.0	–	–	22590.0556
M16	100	50	94.0	32	7.0	–	24	20	-30	80	300.0	–	–	22590.0568
								20	-30	80	399.0	–	–	22590.0572
M20	100	60	92.5	42	8.0	–	30	22	-30	80	523.0	–	–	22590.0582
								22	-30	80	759.0	–	–	22590.0588
M24	100	60	91.0	45	9.5	–	36	25	-30	80	735.0	–	–	22590.0595
								25	-30	80	1041.0	–	–	22590.0598

APPLICATION EXAMPLE



Mounting Pads • protected against slipping

EH 22590.



PRODUCT DESCRIPTION

Mounting pads can be used as foot or thrust pad. Not parallel bearing surfaces up to 15° degrees can be compensated. The plastic cover on the mounting pad prevents slipping.

Material

Ball element

- Free cutting steel, induction-hardened, blackened.
- Stainless steel 1.4305

Ball element with bolt

- Heat-treated steel, blackened
- Stainless steel 1.4305

Rubber cap

- Rubber, black

Lock nut

- Steel, blackened, ISO 4032

- Steel, blackened, DIN 934
- Stainless Steel A2, ISO 4032
- Stainless Steel A2, DIN 934

Pad

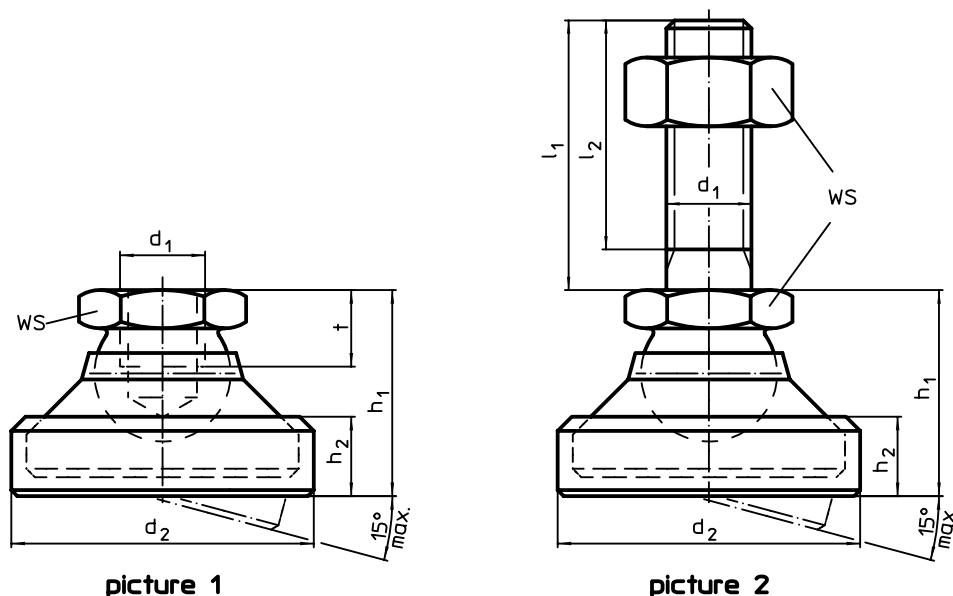
- Heat-treated steel, tempered, blackened
- Stainless steel 1.4305
- Thermoplastic POM, white

MORE INFORMATION

Notes

For the versions $d_1 = M10$ and $M12$ the lock nut conforms to DIN 934.


DRAWING



ORDER INFORMATION

d ₁	l ₁	Dimensions				h ₁	h ₂	t	WS	Load capacity for static load max.	[g]	Art. No.		
		d ₂	l ₂	[mm]	[mm]							Heat-treated steel	Stainless steel	Thermoplastic
pad and ball element – picture 1														
M 6	–	22.5	–	16.5	6.4	5.0	10	10	19.0	22590.1006	–	–		
								8	17.0	–	22590.1206	–		
M 8	–	28.0	–	20.6	8.3	7.0	13	18	40.0	22590.1008	–	–		
								14	36.0	–	22590.1208	–		
M10	–	36.0	–	26.0	11.0	9.0	17	20	80.0	22590.1010	–	–		
								16	74.0	–	22590.1210	–		
M12	–	45.0	–	30.5	13.2	11.0	19	35	126.0	22590.1012	–	–		
								28	123.0	–	22590.1212	–		
M16	–	56.0	–	37.5	15.5	13.5	24	45	241.0	22590.1016	–	–		
								36	241.0	–	22590.1216	–		
M20	–	67.0	–	49.5	19.5	17.0	30	55	480.0	22590.1020	–	–		
								44	500.0	–	22590.1220	–		
M24	–	69.0	–	55.0	24.0	19.0	36	65	554.0	22590.1024	–	–		
								52	517.0	–	22590.1224	–		



d ₁	l ₁	Dimensions					t	WS	Load capacity for static load max.		Weight [g]	Art. No.					
		d ₂	l ₂	h ₁	h ₂	~						Heat-treated steel	Stainless steel	Thermoplastic			
[mm]												[mm]	[kN]	[g]			
pad from thermoplastic, ball element from stainless steel – picture 1																	
M 6	–	22.5	–	16.5	6.4	5.0	10	4	7.8	–	–	22590.1106					
M 8	–	28.0	–	20.6	8.3	7.0	13	7	17.0	–	–	22590.1108					
M10	–	36.0	–	26.0	11.0	9.0	17	10	34.0	–	–	22590.1110					
M12	–	45.0	–	30.5	13.2	11.0	19	18	57.0	–	–	22590.1112					
M16	–	56.0	–	37.5	15.5	13.5	24	20	96.0	–	–	22590.1116					
M20	–	67.0	–	49.5	19.5	17.0	30	22	190.0	–	–	22590.1120					
M24	–	69.0	–	55.0	24.0	19.0	36	25	240.0	–	–	22590.1124					
pad and ball element with bolt from steel – picture 2																	
M 6	60	22.5	57.0	16.5	6.4	–	10	10	32.0	22590.1410	–	–					
								8	30.0	–	22590.1610	–					
M 8	80	28.0	76.0	20.6	8.3	–	13	18	69.0	22590.1422	–	–					
								14	71.0	–	22590.1622	–					
M10	100	36.0	95.5	26.0	11.0	–	17	20	139.0	22590.1438	–	–					
								16	150.0	–	22590.1638	–					
	150	36.0	145.5	26.0	11.0	–	17	20	165.0	22590.1442	–	–					
								16	169.0	–	22590.1642	–					
M12	100	45.0	94.5	30.5	13.2	–	19	35	252.0	22590.1452	–	–					
								28	227.0	–	22590.1652	–					
	150	45.0	144.5	30.5	13.2	–	19	35	258.0	22590.1456	–	–					
								28	258.0	–	22590.1656	–					
M16	100	56.0	94.0	37.5	15.5	–	24	45	440.0	22590.1468	–	–					
								36	441.0	–	22590.1668	–					
	200	56.0	194.0	37.5	15.5	–	24	45	600.0	22590.1472	–	–					
								36	630.0	–	22590.1672	–					
M20	100	67.0	92.5	49.5	19.5	–	30	55	762.0	22590.1482	–	–					
								44	762.0	–	22590.1682	–					
	200	67.0	192.5	49.5	19.5	–	30	55	1080.0	22590.1488	–	–					
								44	1065.0	–	22590.1688	–					
M24	100	69.0	91.0	55.0	24.0	–	36	65	1020.0	22590.1495	–	–					
								52	1000.0	–	22590.1695	–					
	200	69.0	191.0	55.0	24.0	–	36	65	1287.0	22590.1498	–	–					
								52	1287.0	–	22590.1698	–					
pad from thermoplastic, ball element with bolt from stainless steel – picture 2																	
M 6	60	22.5	57.0	16.5	6.4	–	10	4	21.0	–	–	22590.1510					
M 8	80	28.0	76.0	20.6	8.3	–	13	7	49.0	–	–	22590.1522					
M10	100	36.0	95.5	26.0	11.0	–	17	10	100.0	–	–	22590.1538					
	150	36.0	145.5	26.0	11.0	–	17	10	124.0	–	–	22590.1542					
M12	100	45.0	94.5	30.5	13.2	–	19	18	150.0	–	–	22590.1552					
	150	45.0	144.5	30.5	13.2	–	19	18	184.0	–	–	22590.1556					
M16	100	56.0	94.0	37.5	15.5	–	24	20	285.0	–	–	22590.1568					
	200	56.0	194.0	37.5	15.5	–	24	20	414.0	–	–	22590.1572					
M20	100	67.0	92.5	49.5	19.5	–	30	22	573.0	–	–	22590.1582					
	200	67.0	192.5	49.5	19.5	–	30	22	704.0	–	–	22590.1588					
M24	100	69.0	91.0	55.0	24.0	–	36	25	718.0	–	–	22590.1595					
	200	69.0	191.0	55.0	24.0	–	36	25	1016.0	–	–	22590.1598					

Mounting Pads • with fastening holes

EH 22590.



PRODUCT DESCRIPTION

Mounting pads can be used as foot or thrust pad. Not parallel bearing surfaces up to 15° degrees can be compensated. Including two fastening holes in pad.

Material

Ball element
 ▪ Stainless steel 1.4305

Ball element with bolt
 ▪ Stainless steel 1.4305

Lock nut
 ▪ Stainless Steel A2, ISO 4032

▪ Stainless Steel A2, DIN 934

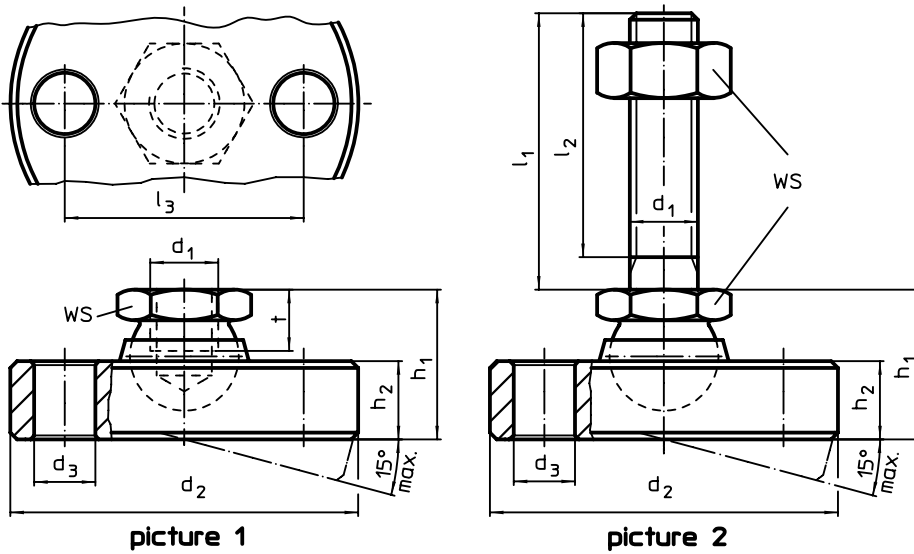
Pad
 ▪ Stainless steel 1.4305

MORE INFORMATION

Notes

For the versions $d_1 = M10$ and $M12$ the lock nut conforms to DIN 934.

DRAWING



ORDER INFORMATION

d_1	l_1	d_2 -0.5	Dimensions						WS	Load capacity for static load max.	[g]	Art. No.			
			d_3	l_2	l_3	h_1	h_2	t							
[mm]												[mm]	[kN]	[g]	
pad and ball element from stainless steel – picture 1															
M 6	–	45	6.6	–	32	14	6.5	5.0	10	8	79	22590.0706			
M 8	–	50	6.6	–	38	18	8.5	7.0	13	14	131	22590.0708			
M10	–	60	9.0	–	44	22	11.5	9.0	17	16	251	22590.0710			
M12	–	65	9.0	–	48	26	12.5	11.0	19	28	324	22590.0712			
M16	–	70	9.0	–	54	32	13.5	13.5	24	36	492	22590.0716			
M20	–	80	9.0	–	64	42	16.5	17.0	30	44	784	22590.0720			
M24	–	100	11.0	–	78	45	20.5	19.0	36	52	1392	22590.0724			
pad and ball element with bolt from stainless steel – picture 2															
M 6	60	45	6.6	57.0	32	14	6.5	–	10	8	93	22590.0810			
M 8	80	50	6.6	76.0	38	18	8.5	–	13	14	163	22590.0822			
M10	100	60	9.0	95.5	44	22	11.5	–	17	16	316	22590.0838			
	150	60	9.0	145.5	44	22	11.5	–	17	16	340	22590.0842			
M12	100	65	9.0	94.5	48	26	12.5	–	19	28	481	22590.0852			
	150	65	9.0	144.5	48	26	12.5	–	19	28	510	22590.0856			
M16	100	70	9.0	94.0	54	32	13.5	–	24	36	617	22590.0868			
	200	70	9.0	194.0	54	32	13.5	–	24	36	905	22590.0872			
M20	100	80	9.0	92.5	64	42	16.5	–	30	44	1125	22590.0882			
	200	80	9.0	192.5	64	42	16.5	–	30	44	1408	22590.0888			
M24	100	100	11.0	91.0	78	45	20.5	–	36	52	1906	22590.0895			
	200	100	11.0	191.0	78	45	20.5	–	36	52	2000	22590.0898			

Fulcrum Screws

EH 22591.

2



PRODUCT DESCRIPTION

Can be used as screw-in foot or thrust pad. Compact design for simple levelling by means of the spanner flat at the bushing or preferably by means of an internal hexagon.

Material

- Stainless steel 1.4305

Body

- Heat-treated steel, tempered, blackened
- Stainless steel 1.4305

MORE INFORMATION

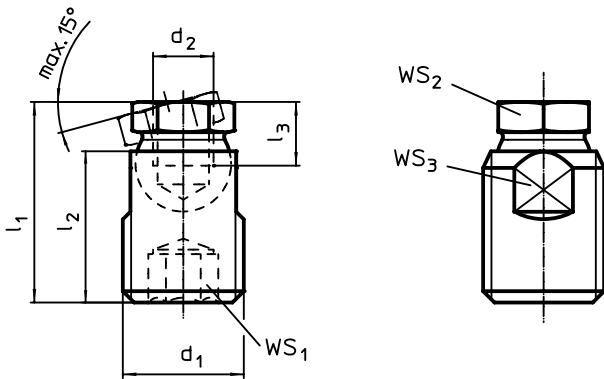
Notes

The fulcrum screws may exclusively be exposed to static loading.

Ball element

- Heat-treated steel, tempered, blackened

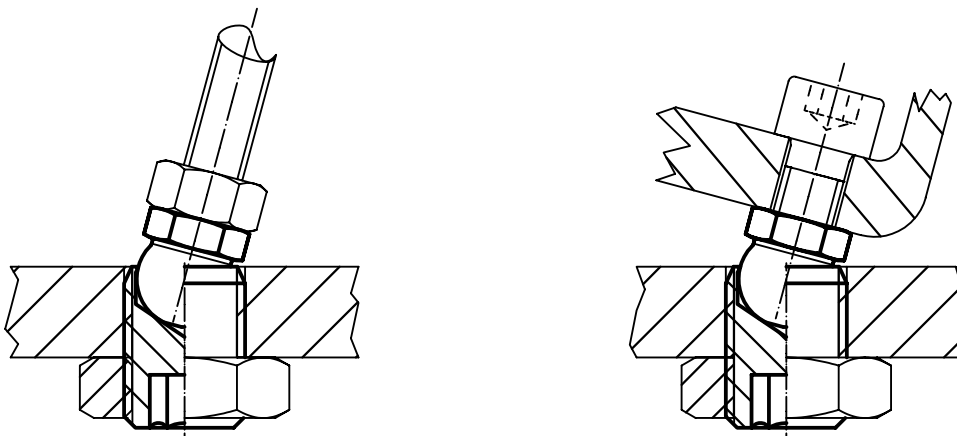
DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions			WS ₁	WS ₂	WS ₃	Load capacity for static load max.	[g]	Art. No.
		l ₁ ±0.5	l ₂	l ₃ min.						
steel										
M12	M 6	21.2	16	5.0	6	9	10	10	10	22591.0006
M16	M 8	26.5	20	7.0	8	12	14	18	24	22591.0008
M24	M10	39.9	30	9.0	12	19	20	35	87	22591.0010
	M12	39.9	30	11.0	12	19	20	35	82	22591.0012
M30 x 2	M16	47.4	36	13.5	12	24	27	45	173	22591.0016
stainless steel										
M12	M 6	21.2	16	5.0	6	9	10	8	10	22591.0206
M16	M 8	26.5	20	7.0	8	12	14	14	24	22591.0208
M24	M10	39.9	30	9.0	12	19	20	28	87	22591.0210
	M12	39.9	30	11.0	12	19	20	28	82	22591.0212
M30 x 2	M16	47.4	36	13.5	12	24	27	36	173	22591.0216

APPLICATION EXAMPLE



Support Legs

EH 22593.



PRODUCT DESCRIPTION

The support legs are universally usable as adjustable legs. The plate is screwed to the threaded pin and nut by a stainless steel fastening screw, and is also glued.

Material

Grub Screw

- Steel, zinc-plated by galvanization, passivated
- Stainless steel 1.4305

Nut

- Steel, zinc-plated by galvanization, passivated
- Stainless steel 1.4305

Lock nut

- Steel, zinc-coated by galvanisation, passivated, ISO 4032

- Stainless Steel A2, ISO 4032

Pad

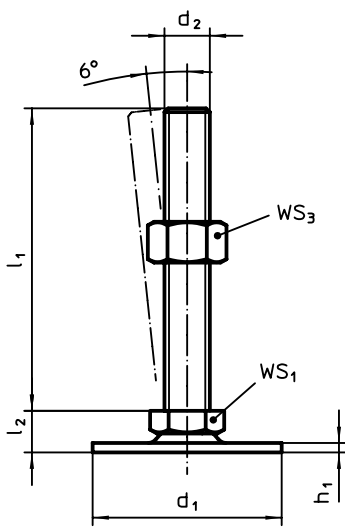
- Steel, zinc-plated by galvanization, passivated
- Stainless steel 1.4301, vibratory ground

MORE INFORMATION

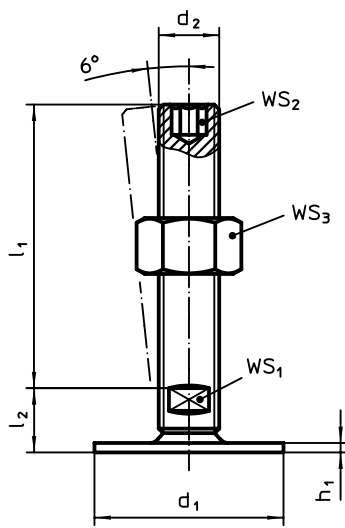
Further products

Support Legs, protected against slipping → p. 294

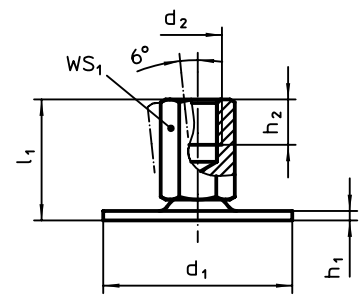
DRAWING



picture 1



picture 2




picture 3


ORDER INFORMATION

d ₁	d ₂	Dimensions				WS ₁	WS ₂	WS ₃	[g]	Art. No.	
		l ₁	h ₁	h ₂	l ₂					Steel	Stainless steel
[mm]											
with screw – picture 1											
40	M 8	40	2.0	–	11	17	–	13	45	22593.0005	22593.1505
		50	2.0	–	11	17	–	13	48	22593.0010	22593.1510
		63	2.0	–	11	17	–	13	48	22593.0015	22593.1515
	M10	50	2.0	–	11	17	–	16	62	22593.0020	22593.1520
		60	2.0	–	11	17	–	16	69	22593.0025	22593.1525
		80	2.0	–	11	17	–	16	76	22593.0030	22593.1530
	M12	100	2.0	–	11	17	–	16	87	22593.0035	22593.1535
		60	2.0	–	11	17	–	18	85	22593.0040	22593.1540
		80	2.0	–	11	17	–	18	98	22593.0045	22593.1545
		100	2.0	–	11	17	–	113	22593.0050	22593.1550	
		125	2.0	–	11	17	–	132	22593.0055	22593.1555	

→

d ₁	d ₂	Dimensions				WS ₁	WS ₂	WS ₃		Art. No.		
		l ₁	h ₁	h ₂	l ₂					Steel	Stainless steel	
		[mm]				[mm]	[mm]	[mm]	[g]			
50	M 8	40	2.5	–	11	17	–	13	62	22593.0060	22593.1560	
		50	2.5	–	11	17	–	13	68	22593.0065	22593.1565	
		63	2.5	–	11	17	–	13	70	22593.0070	22593.1570	
	M10	50	2.5	–	11	17	–	16	80	22593.0075	22593.1575	
		60	2.5	–	11	17	–	16	86	22593.0080	22593.1580	
		80	2.5	–	11	17	–	16	95	22593.0085	22593.1585	
	M12	100	2.5	–	11	17	–	16	106	22593.0090	22593.1590	
		60	2.5	–	11	17	–	18	102	22593.0095	22593.1595	
		80	2.5	–	11	17	–	18	117	22593.0100	22593.1600	
	60	M 8	100	2.5	–	11	17	–	18	132	22593.0105	22593.1605
			125	2.5	–	11	17	–	18	150	22593.0110	22593.1610
			40	2.5	–	11	17	–	13	81	22593.0115	22593.1615
M10		50	2.5	–	11	17	–	13	83	22593.0120	22593.1620	
		63	2.5	–	11	17	–	13	87	22593.0125	22593.1625	
		50	2.5	–	11	17	–	16	97	22593.0130	22593.1630	
M12	60	2.5	–	11	17	–	16	103	22593.0135	22593.1635		
	80	2.5	–	11	17	–	16	111	22593.0140	22593.1640		
	100	2.5	–	11	17	–	16	122	22593.0145	22593.1645		
80	M 8	60	2.5	–	11	17	–	18	120	22593.0150	22593.1650	
		80	2.5	–	11	17	–	18	134	22593.0155	22593.1655	
		100	2.5	–	11	17	–	18	150	22593.0160	22593.1660	
	M10	125	2.5	–	11	17	–	18	167	22593.0165	22593.1665	
		40	3.0	–	12	17	–	13	144	22593.0170	22593.1670	
		50	3.0	–	12	17	–	13	148	22593.0175	22593.1675	
	M12	63	3.0	–	12	17	–	13	152	22593.0180	22593.1680	
		50	3.0	–	12	17	–	16	163	22593.0185	22593.1685	
		60	3.0	–	12	17	–	16	167	22593.0190	22593.1690	
	with screw – picture 2	M10	80	3.0	–	12	17	–	16	176	22593.0195	22593.1695
			100	3.0	–	12	17	–	16	187	22593.0200	22593.1700
			60	3.0	–	12	17	–	18	186	22593.0205	22593.1705
M12		80	3.0	–	12	17	–	18	199	22593.0210	22593.1710	
		100	3.0	–	12	17	–	18	218	22593.0215	22593.1715	
		125	3.0	–	12	17	–	18	231	22593.0220	22593.1720	
40	M16	75	2.0	–	17	12	8	24	154	22593.0605	22593.2105	
		100	2.0	–	17	12	8	24	183	22593.0610	22593.2110	
		125	2.0	–	17	12	8	24	217	22593.0615	22593.2115	
		150	2.0	–	17	12	8	24	252	22593.0620	22593.2120	
		200	2.0	–	17	12	8	24	315	22593.0625	22593.2125	
50	M16	75	2.5	–	17	12	8	24	172	22593.0630	22593.2130	
		100	2.5	–	17	12	8	24	205	22593.0635	22593.2135	
		125	2.5	–	17	12	8	24	236	22593.0640	22593.2140	
		150	2.5	–	17	12	8	24	270	22593.0645	22593.2145	
		200	2.5	–	17	12	8	24	335	22593.0650	22593.2150	
60	M16	75	2.5	–	17	12	8	24	187	22593.0655	22593.2155	
		100	2.5	–	17	12	8	24	221	22593.0660	22593.2160	
		125	2.5	–	17	12	8	24	252	22593.0665	22593.2165	
		150	2.5	–	17	12	8	24	288	22593.0670	22593.2170	
		200	2.5	–	17	12	8	24	352	22593.0675	22593.2175	
80	M16	75	3.0	–	18	12	8	24	251	22593.0680	22593.2180	
		100	3.0	–	18	12	8	24	285	22593.0685	22593.2185	
		125	3.0	–	18	12	8	24	317	22593.0690	22593.2190	
		150	3.0	–	18	12	8	24	349	22593.0695	22593.2195	
		200	3.0	–	18	12	8	24	414	22593.0700	22593.2200	
	M20	75	3.0	–	19	15	10	30	340	22593.0705	22593.2205	
		100	3.0	–	19	15	10	30	393	22593.0710	22593.2210	
		125	3.0	–	19	15	10	30	441	22593.0715	22593.2215	
		150	3.0	–	19	15	10	30	494	22593.0720	22593.2220	
		200	3.0	–	19	15	10	30	600	22593.0725	22593.2225	
	M24	100	3.0	–	22	19	12	36	537	22593.0730	22593.2230	
		125	3.0	–	22	19	12	36	610	22593.0735	22593.2235	
150		3.0	–	22	19	12	36	681	22593.0740	22593.2240		
		200	3.0	–	22	19	12	829	22593.0745	22593.2245		



d ₁	d ₂	Dimensions				WS ₁	WS ₂	WS ₃		Art. No.	
		l ₁	h ₁	h ₂	l ₂					Steel	Stainless steel
		[mm]				[mm]	[mm]	[mm]	[g]		
with female thread – picture 3											
40	M 8	25	2.0	8	–	14	–	–	41	22593.1005	22593.2505
	M10	28	2.0	10	–	14	–	–	40	22593.1010	22593.2510
	M12	31	2.0	12	–	17	–	–	57	22593.1015	22593.2515
	M16	37	2.0	16	–	22	–	–	93	22593.1020	22593.2520
50	M 8	25	2.5	8	–	14	–	–	59	22593.1025	22593.2525
	M10	28	2.5	10	–	14	–	–	58	22593.1030	22593.2530
	M12	32	2.5	12	–	17	–	–	76	22593.1035	22593.2535
	M16	37	2.5	16	–	22	–	–	112	22593.1040	22593.2540
60	M 8	25	2.5	8	–	14	–	–	76	22593.1045	22593.2545
	M10	28	2.5	10	–	14	–	–	77	22593.1050	22593.2550
	M12	32	2.5	12	–	17	–	–	92	22593.1055	22593.2555
	M16	37	2.5	16	–	22	–	–	127	22593.1060	22593.2560
80	M 8	26	3.0	8	–	14	–	–	140	22593.1065	22593.2565
	M10	29	3.0	10	–	14	–	–	144	22593.1070	22593.2570
	M12	32	3.0	12	–	17	–	–	160	22593.1075	22593.2575
	M16	38	3.0	16	–	22	–	–	195	22593.1080	22593.2580
	M20	45	3.0	20	–	27	–	–	256	22593.1085	22593.2585

Support Legs • protected against slipping

EH 22593.

2



PRODUCT DESCRIPTION

The support legs are universally usable as adjustable legs. In this version with a rubber cap, sensitive support surfaces are protected, and slipping is prevented. The plate is screwed to the threaded pin and nut by a stainless steel fastening screw, and is also glued.

Material

Grub Screw

- Steel, zinc-plated by galvanization, passivated
- Stainless steel 1.4305

Rubber cap

- Rubber, black

Nut

- Steel, zinc-plated by galvanization, passivated
- Stainless steel 1.4305

Lock nut

- Steel, zinc-coated by galvanisation, passivated, ISO 4032
- Stainless Steel A2, ISO 4032

Pad

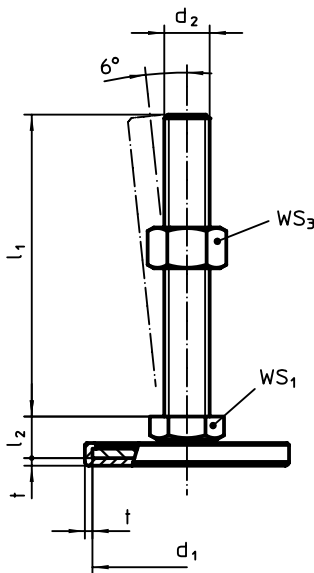
- Steel, zinc-plated by galvanization, passivated
- Stainless steel 1.4301, vibratory ground

MORE INFORMATION

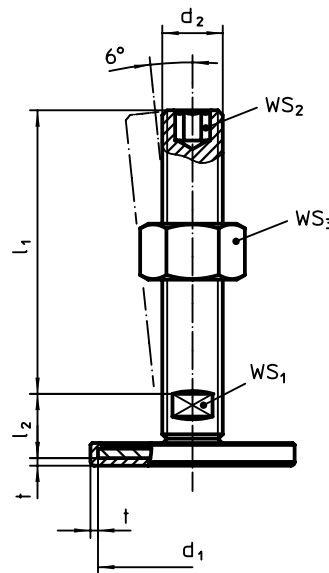
Further products

Support Legs → p. 291

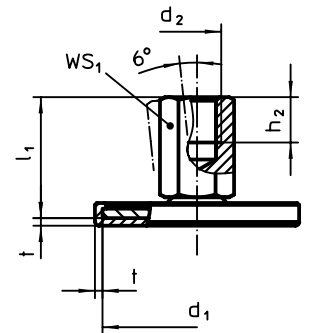
DRAWING



picture 1



picture 2




picture 3


ORDER INFORMATION

d ₁	d ₂	Dimensions					WS ₁	WS ₂	WS ₃	[g]	Art. No.	
		l ₁	h ₂	l ₂	t	[mm]					[mm]	[mm]
[mm]												
with screw – picture 1												
40	M 8	40	–	11	1.5	17	–	13	51	22593.0305	22593.1805	
		50	–	11	1.5	17	–	13	51	22593.0310	22593.1810	
		63	–	11	1.5	17	–	13	56	22593.0315	22593.1815	
	M10	50	–	11	1.5	17	–	16	65	22593.0320	22593.1820	
		60	–	11	1.5	17	–	16	71	22593.0325	22593.1825	
		80	–	11	1.5	17	–	16	80	22593.0330	22593.1830	
		100	–	11	1.5	17	–	16	94	22593.0335	22593.1835	
	M12	60	–	11	1.5	17	–	18	86	22593.0340	22593.1840	
		80	–	11	1.5	17	–	18	102	22593.0345	22593.1845	
		100	–	11	1.5	17	–	18	118	22593.0350	22593.1850	
		125	–	11	1.5	17	–	18	136	22593.0355	22593.1855	

→

d ₁	d ₂	Dimensions				t	WS ₁	WS ₂	WS ₃		Art. No.	
		l ₁	h ₂	l ₂	[mm]						[mm]	[mm]
50	M 8	40	–	11	2.0	17	–	13	70	22593.0360	22593.1860	
		50	–	11	2.0	17	–	13	74	22593.0365	22593.1865	
		63	–	11	2.0	17	–	13	77	22593.0370	22593.1870	
	M10	50	–	11	2.0	17	–	16	87	22593.0375	22593.1875	
		60	–	11	2.0	17	–	16	91	22593.0380	22593.1880	
		80	–	11	2.0	17	–	16	103	22593.0385	22593.1885	
		100	–	11	2.0	17	–	16	113	22593.0390	22593.1890	
	M12	60	–	11	2.0	17	–	18	109	22593.0395	22593.1895	
		80	–	11	2.0	17	–	18	110	22593.0400	22593.1900	
		100	–	11	2.0	17	–	18	139	22593.0405	22593.1905	
		125	–	11	2.0	17	–	18	156	22593.0410	22593.1910	
	60	M 8	40	–	11	2.0	17	–	13	90	22593.0415	22593.1915
50			–	11	2.0	17	–	13	91	22593.0420	22593.1920	
63			–	11	2.0	17	–	13	98	22593.0425	22593.1925	
M10		50	–	11	2.0	17	–	16	110	22593.0430	22593.1930	
		60	–	11	2.0	17	–	16	110	22593.0435	22593.1935	
		80	–	11	2.0	17	–	16	122	22593.0440	22593.1940	
		100	–	11	2.0	17	–	16	132	22593.0445	22593.1945	
M12		60	–	11	2.0	17	–	18	129	22593.0450	22593.1950	
		80	–	11	2.0	17	–	18	143	22593.0455	22593.1955	
		100	–	11	2.0	17	–	18	158	22593.0460	22593.1960	
		125	–	11	2.0	17	–	18	177	22593.0465	22593.1965	
		150	–	11	2.0	17	–	18	199	22593.0470	22593.1970	
80	M 8	40	–	12	2.0	17	–	13	158	22593.0475	22593.1975	
		50	–	12	2.0	17	–	13	164	22593.0480	22593.1980	
		63	–	12	2.0	17	–	13	166	22593.0485	22593.1985	
	M10	50	–	12	2.0	17	–	16	176	22593.0485	22593.1985	
		60	–	12	2.0	17	–	16	181	22593.0490	22593.1990	
		80	–	12	2.0	17	–	16	192	22593.0495	22593.1995	
		100	–	12	2.0	17	–	16	201	22593.0500	22593.2000	
	M12	60	–	12	2.0	17	–	18	199	22593.0505	22593.2005	
		80	–	12	2.0	17	–	18	213	22593.0510	22593.2010	
		100	–	12	2.0	17	–	18	230	22593.0515	22593.2015	
		125	–	12	2.0	17	–	18	245	22593.0520	22593.2020	
		150	–	12	2.0	17	–	18	270	22593.0525	22593.2025	
with screw – picture 2												
40	M16	75	–	17	1.5	12	8	24	154	22593.0805	22593.2305	
		100	–	17	1.5	12	8	24	186	22593.0810	22593.2310	
		125	–	17	1.5	12	8	24	219	22593.0815	22593.2315	
		150	–	17	1.5	12	8	24	254	22593.0820	22593.2320	
		200	–	17	1.5	12	8	24	318	22593.0825	22593.2325	
50	M16	75	–	17	2.0	12	8	24	177	22593.0830	22593.2330	
		100	–	17	2.0	12	8	24	209	22593.0835	22593.2335	
		125	–	17	2.0	12	8	24	244	22593.0840	22593.2340	
		150	–	17	2.0	12	8	24	278	22593.0845	22593.2345	
60	M16	200	–	17	2.0	12	8	24	342	22593.0850	22593.2350	
		75	–	17	2.0	12	8	24	196	22593.0855	22593.2355	
		100	–	17	2.0	12	8	24	228	22593.0860	22593.2360	
		125	–	17	2.0	12	8	24	262	22593.0865	22593.2365	
		150	–	17	2.0	12	8	24	295	22593.0870	22593.2370	
80	M16	200	–	17	2.0	12	8	24	358	22593.0875	22593.2375	
		75	–	18	2.0	12	8	24	266	22593.0880	22593.2380	
		100	–	18	2.0	12	8	24	299	22593.0885	22593.2385	
		125	–	18	2.0	12	8	24	332	22593.0890	22593.2390	
		150	–	18	2.0	12	8	24	358	22593.0895	22593.2395	
	M20	200	–	18	2.0	12	8	24	432	22593.0900	22593.2400	
		75	–	19	2.0	15	10	30	355	22593.0905	22593.2405	
		100	–	19	2.0	15	10	30	405	22593.0910	22593.2410	
		125	–	19	2.0	15	10	30	454	22593.0915	22593.2415	
		150	–	19	2.0	15	10	30	507	22593.0920	22593.2420	
		200	–	19	2.0	15	10	30	614	22593.0925	22593.2425	
		M24	100	–	22	2.0	19	12	36	546	22593.0930	22593.2430
			125	–	22	2.0	19	12	36	626	22593.0935	22593.2435
150	–		22	2.0	19	12	36	693	22593.0940	22593.2440		
200	–		22	2.0	19	12	36	847	22593.0945	22593.2445		

→

d ₁	d ₂	Dimensions				t	WS ₁	WS ₂	WS ₃		Art. No.	
		l ₁	h ₂	l ₂	[mm]						[mm]	[mm]
with female thread – picture 3												
40	M 8	25	8	–	1.5	14	–	–	46	22593.1105	22593.2605	
	M10	28	10	–	1.5	14	–	–	46	22593.1110	22593.2610	
	M12	31	12	–	1.5	17	–	–	63	22593.1115	22593.2615	
	M16	37	16	–	1.5	22	–	–	98	22593.1120	22593.2620	
50	M 8	25	8	–	2.0	14	–	–	69	22593.1125	22593.2625	
	M10	28	10	–	2.0	14	–	–	67	22593.1130	22593.2630	
	M12	32	12	–	2.0	17	–	–	84	22593.1135	22593.2635	
	M16	37	16	–	2.0	22	–	–	121	22593.1140	22593.2640	
60	M 8	25	8	–	2.0	14	–	–	88	22593.1145	22593.2645	
	M10	28	10	–	2.0	14	–	–	88	22593.1150	22593.2650	
	M12	32	12	–	2.0	17	–	–	104	22593.1155	22593.2655	
	M16	37	16	–	2.0	22	–	–	142	22593.1160	22593.2660	
80	M 8	26	8	–	2.0	14	–	–	156	22593.1165	22593.2665	
	M10	29	10	–	2.0	14	–	–	159	22593.1170	22593.2670	
	M12	32	12	–	2.0	17	–	–	173	22593.1175	22593.2675	
	M16	38	16	–	2.0	22	–	–	209	22593.1180	22593.2680	
	M20	45	20	–	2.0	27	–	–	268	22593.1185	22593.2685	



PRODUCT DESCRIPTION

The support legs are universally usable as adjustable legs. These support legs with a rubber foot have a damping, noise-reducing effect, and prevent damage to the support surface.

Material

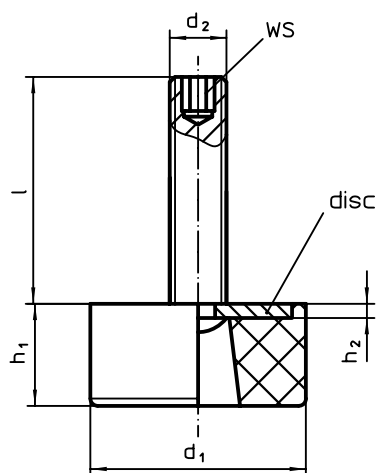
- Body**
 - NBR
- Screw**
 - Steel, zinc-plated by galvanization
- Disc**
 - Steel, zinc-plated by galvanization

MORE INFORMATION

Further products

- Rubber Endstop Buffers, cylindrical . . . → p. 718
- Rubber Endstop Buffers, parabolic . . . → p. 720
- Rubber Endstop Buffers, truncated cone form. → p. 721

DRAWING



ORDER INFORMATION

d ₁	l	Dimensions				WS	Load capacity for static load max.	Temperature		Weight	Art. No.
		d ₂	h ₁	h ₂	[mm]			min.	max.		
19	30	M 6	14	1.5	3	240	-30	120	12	22594.0005	
	45	M 6	14	1.5	3	240	-30	120	14	22594.0010	
25	30	M 6	16	1.5	3	540	-30	120	18	22594.0015	
	45	M 6	16	1.5	3	540	-30	120	21	22594.0020	
32	40	M 8	18	2.0	4	840	-30	120	37	22594.0025	
	65	M 8	18	2.0	4	840	-30	120	44	22594.0030	
38	40	M 8	20	2.0	4	920	-30	120	50	22594.0035	
	65	M 8	20	2.0	4	920	-30	120	58	22594.0040	
50	45	M10	22	2.5	5	2500	-30	120	98	22594.0045	
	70	M10	22	2.5	5	2500	-30	120	111	22594.0050	
64	45	M10	26	2.5	5	3700	-30	120	165	22594.0055	
	70	M10	26	2.5	5	3700	-30	120	177	22594.0060	

Seating Elements • with plastic bearing surface, orienting

EH 22600.



PRODUCT DESCRIPTION

Can be used as screw-in foot or thrust pad. The plastic coating is gentle and protects high-quality surfaces. In addition, the oscillating seating is suitable for non-parallel surfaces.

Material

Ball element

- Stainless steel 1.4305

Nut

- Stainless steel A2

Pad

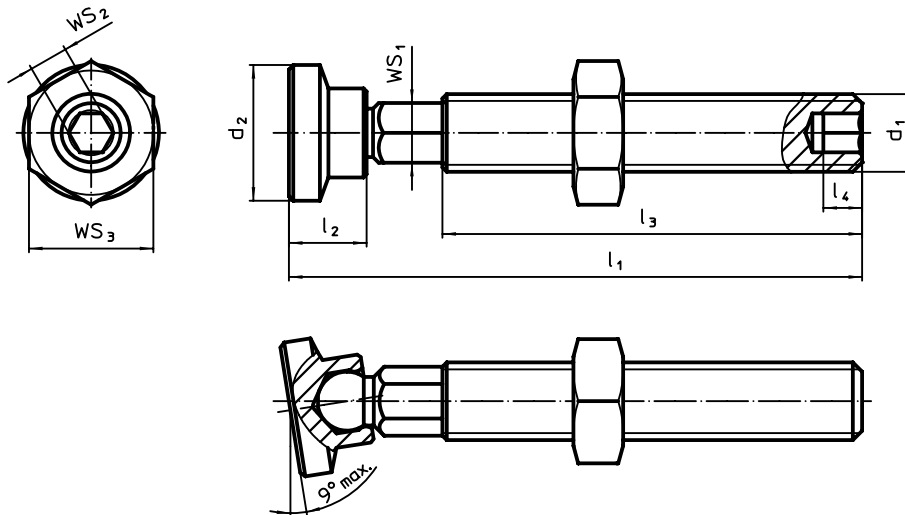
- Plastic (PEEK), blue

MORE INFORMATION

Notes

Special types on request.

DRAWING



ORDER INFORMATION

d ₁	l ₁ ±1	Dimensions				WS ₁	WS ₂	WS ₃	Temperature		Weight	Art. No.
		d ₂	l ₂	l ₃	l ₄				min.	max.		
[mm]						[mm]	[mm]	[mm]	[°C]		[g]	
M 5	37.0	8.5	5.0	27.0	2.5	4.0	2.5	8	-60	250	4.9	22600.0005
M 6	44.0	8.5	5.0	31.5	3.0	4.5	3.0	10	-60	250	7.5	22600.0006
M 8	63.3	12.5	8.7	49.0	4.0	6.0	4.0	13	-60	250	20.0	22600.0008
M10	73.3	12.5	8.7	56.9	5.0	8.0	5.0	17	-60	250	37.0	22600.0010
M12	84.4	16.8	12.0	64.3	6.0	9.0	6.0	19	-60	250	61.0	22600.0012
M16	84.4	16.8	12.0	62.7	8.0	11.0	8.0	24	-60	250	106.0	22600.0016

Grippers Round/Square • with hard metal insert, ribbed

EH 22620.



PRODUCT DESCRIPTION

Basic element to be mounted into clamping devices, clamping jaws, clamping arms, claw feed systems and so forth.

For transmission of high turning moments and holding forces, e.g. on cast and forged pieces.

Material

Body

- Tool steel, blackened

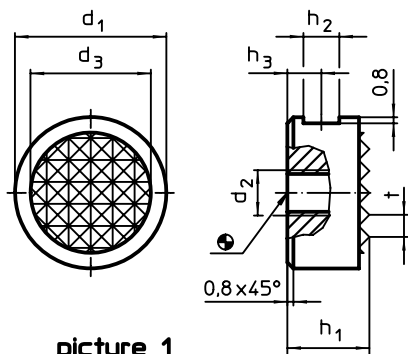
Ribbing

- Hard metal plate, brazed-in

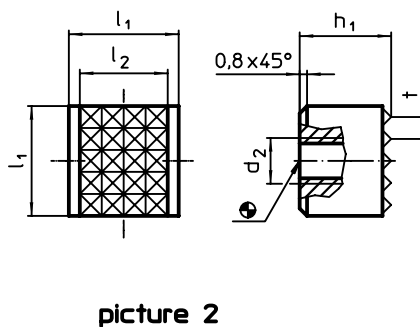
Assembly

Square type suitable for alignments, thus providing a bearing surface for high holding forces.

DRAWING



picture 1

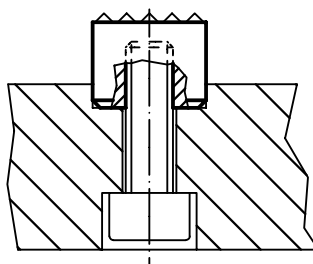
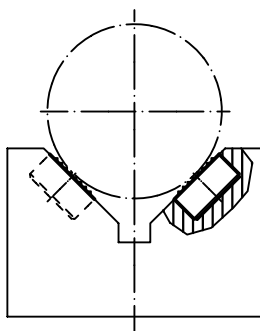


picture 2

ORDER INFORMATION

d ₁ -0.13		h ₁ -0.13		l ₁ -0.13		Dimensions			[g]	Art. No.
d ₂	d ₃	h ₂	h ₃	l ₂	t	[mm]				
round – picture 1										
10	10	–	M5	7.9	4.75	4.5	–	2.3	5.1	22620.0010
	12	–	M5	7.9	4.75	6.0	–	2.3	6.1	22620.0012
12	10	–	M5	9.5	4.75	4.5	–	3.0	7.6	22620.0020
	12	–	M5	9.5	4.75	6.0	–	3.0	9.1	22620.0022
16	10	–	M6	12.7	4.75	4.5	–	3.0	14.0	22620.0060
	12	–	M6	12.7	4.75	6.0	–	3.0	17.0	22620.0062
20	10	–	M6	15.9	4.75	4.5	–	3.0	23.0	22620.0080
	12	–	M6	15.9	4.75	6.0	–	3.0	27.0	22620.0082
25	10	–	M6	19.0	4.75	4.5	–	3.0	36.0	22620.0100
	12	–	M6	19.0	4.75	6.0	–	3.0	43.0	22620.0102
square – picture 2										
–	10	12	M5	–	–	–	10.3	3.0	11.0	22620.0152
	12	12	M5	–	–	–	10.3	3.0	12.0	22620.0154

APPLICATION EXAMPLE



Hard Metal Inserts • for locating hole

EH 22620.

2



PRODUCT DESCRIPTION

Basic element to be mounted into clamping devices, clamping jaws, clamping arms, claw feed systems and so forth.
Zero play transmission of high holding forces, e.g. on cast or forged pieces.

Material

Insert

- Hard metal, ribbed
- Hard metal, pointed

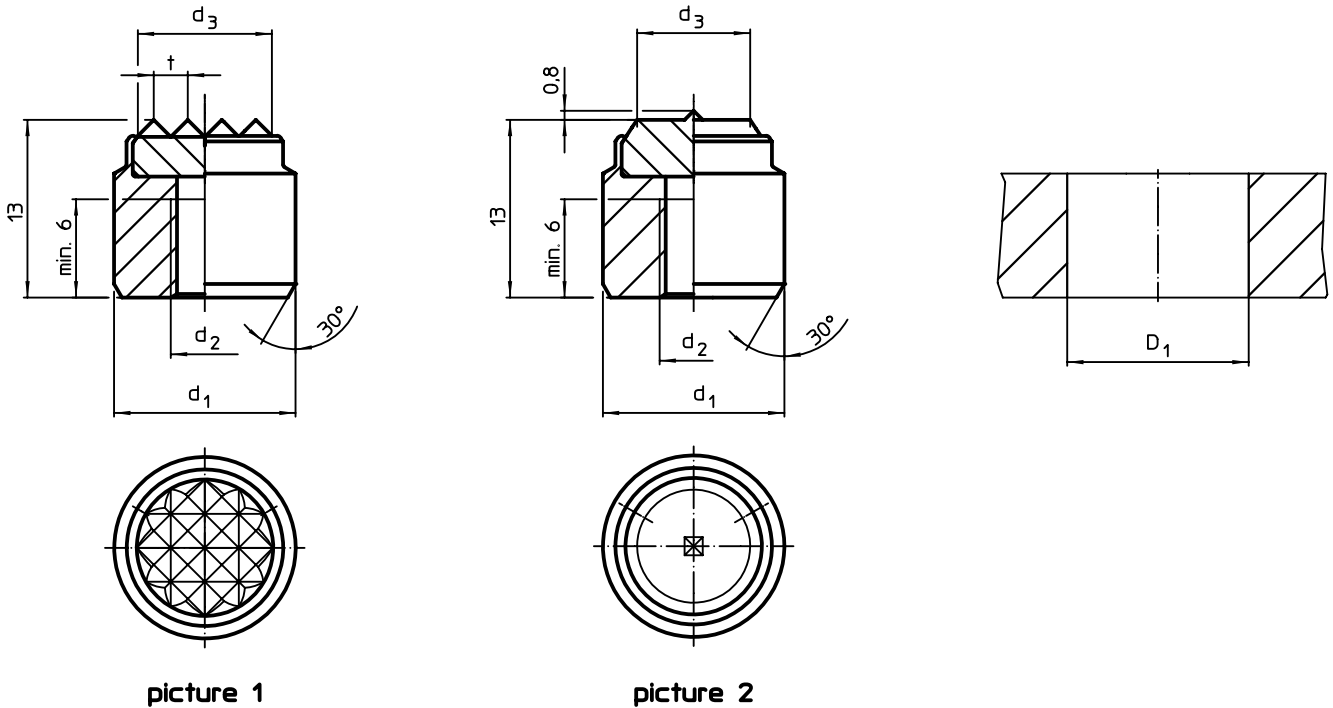
Body

- Heat-treated steel, tempered, phosphated

Assembly

Assembly via a locating hole, the insert can be fastened by means of a screw.

DRAWING



picture 1

picture 2

ORDER INFORMATION

d ₁ n6	Dimensions			t	Location hole D ₁ H7	[g]	Art. No.
	d ₂	d ₃	[mm]				
ribbed – picture 1							
10	M5	7.7	2	10	7.2	22620.0208	
14	M6	10.6	2	14	15.0	22620.0211	
16	M6	11.9	3	16	19.0	22620.0213	
20	M6	16.0	3	20	31.0	22620.0215	
25	M6	21.0	3	25	52.0	22620.0217	
pointed – picture 2							
10	M5	6.3	–	10	7.5	22620.0228	
14	M6	9.3	–	14	15.0	22620.0231	
16	M6	10.0	–	16	20.0	22620.0233	

Hard Metal Inserts • front mounting

EH 22620.



PRODUCT DESCRIPTION

Basic element to be mounted into clamping devices, clamping jaws, clamping arms, claw feed systems and so forth.

The model with front installation is a particularly good option for applications that cannot be mounted from the rear.

Material

Insert

- Hard metal, ribbed

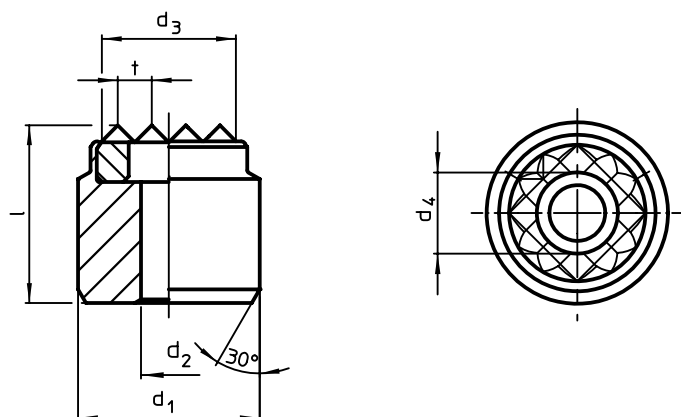
Body

- Heat-treated steel, tempered, phosphated

Assembly

Installation is performed using a locating hole, and the insert can be fastened from the front using a cap screw.

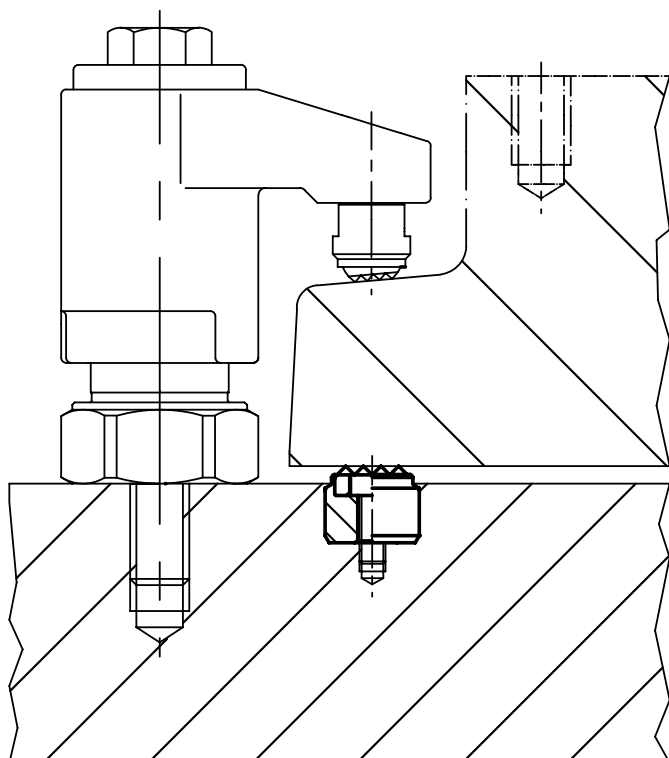
DRAWING



ORDER INFORMATION

d ₁ n6	d ₂	d ₃ ~	Dimensions			t	For screws [mm]	[g]	Art. No.
			d ₄	l	[mm]				
20	4.5	16	7.5	13	3	M4	29	22620.0415	
25	4.5	21	7.5	13	3	M4	49	22620.0417	

APPLICATION EXAMPLE



Hard Metal Inserts

EH 22620.



PRODUCT DESCRIPTION

Basic element to be mounted into clamping devices, clamping jaws, clamping arms, claw feed systems and so forth.

For an abrasion-proof transmission of high holding forces, e. g. on cast or forged pieces.

Material

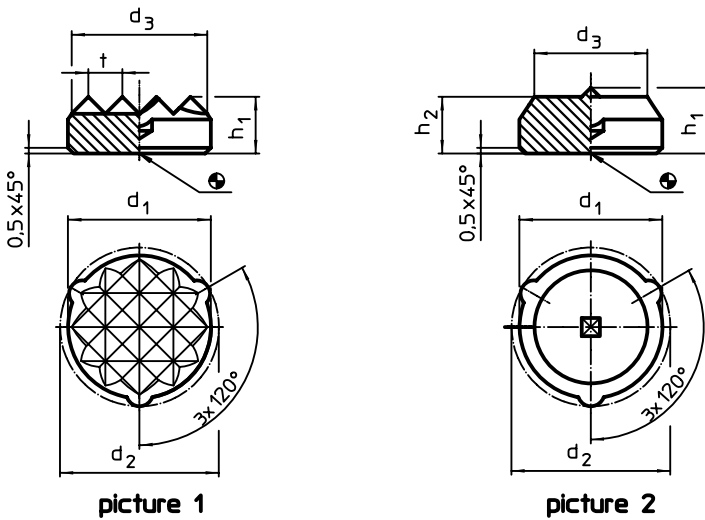
Insert

- Hard metal, ribbed
- Hard metal, pointed

Assembly

Mounting can take place by either soldering, glueing or pressing in. The three positioning tabs guarantee exact centering and when being glued or pressed in, article is secured against rotating. Depending on the individual element choose a mounting diameter between d_1 and d_2 .

DRAWING



picture 1

picture 2

ORDER INFORMATION

d_1	d_2 ± 0.2	Dimensions				t	[g]	Art. No.
		d_3	h_1	h_2	[mm]			
ribbed – picture 1								
8.3 ± 0.10	9.1	7.7	5.0	–	2	3.3	22620.0608	
11.3 ± 0.10	12.1	10.6	5.0	–	2	5.8	22620.0611	
12.6 ± 0.10	13.4	11.9	5.0	–	3	6.7	22620.0613	
16.6 ± 0.15	17.4	16.0	5.0	–	3	12.0	22620.0615	
21.6 ± 0.15	22.4	21.0	5.0	–	3	21.0	22620.0617	
pointed – picture 2								
8.3 ± 0.10	9.1	6.3	5.8	5	–	3.6	22620.0628	
11.3 ± 0.10	12.1	9.3	5.8	5	–	6.7	22620.0631	
12.6 ± 0.10	13.4	10.0	5.8	5	–	8.2	22620.0633	

Locating / Seating Pins • DIN 6321

EH 22630.



PRODUCT DESCRIPTION

Cylindric locating pins for locating workpieces in toleranced holes and also to be used as stops and feet.

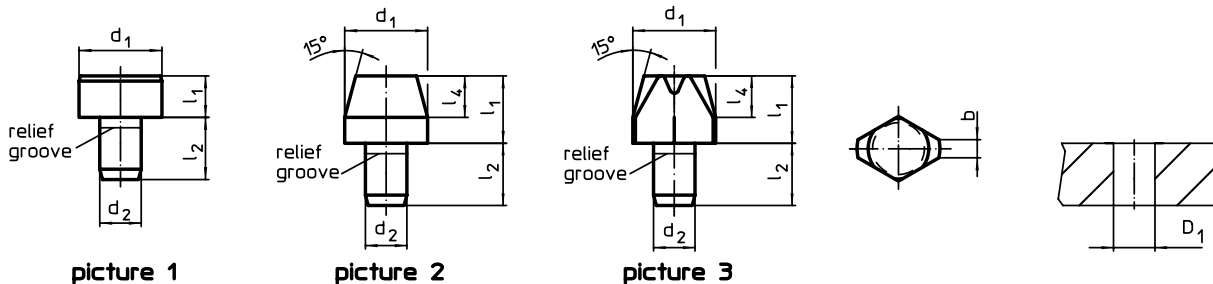
Flattened locating pin used to overcome differences in tolerances, between holes or to position an element in one direction only.

The bearing surface of the seating pin has no centre (picture 1).

Material

- Tool steel, hardened, ground

DRAWING



ORDER INFORMATION

Dimensions						Location hole		Art. No.
d ₁ g6	l ₁	b	d ₂ n6	l ₂	l ₄	D ₁ H7		
[mm]						[mm]	[g]	
seating pin, DIN 6321 form A, tolerance l₁ = h9 – picture 1								
6	5	–	4	6	–	4	1.8	22630.0011
10	6	–	6	9	–	6	5.7	22630.0012
16	8	–	8	12	–	8	17.0	22630.0013
25	10	–	12	18	–	12	53.0	22630.0014
locating pin, cylindric, DIN 6321, form B – picture 2								
6	7	–	4	6	4	4	1.7	22630.0020
	12	–	4	6	4	4	3.0	22630.0021
8	10	–	6	9	6	6	4.9	22630.0022
	16	–	6	9	6	6	8.0	22630.0023
10	10	–	6	9	6	6	6.9	22630.0024
	18	–	6	9	6	6	12.0	22630.0025
12	10	–	6	9	6	6	10.0	22630.0026
	18	–	6	9	6	6	17.0	22630.0027
16	13	–	8	12	8	8	22.0	22630.0028
	22	–	8	12	8	8	36.0	22630.0029
20	15	–	12	18	9	12	58.0	22630.0030
	25	–	12	18	9	12	73.0	22630.0031
25	15	–	12	18	9	12	66.0	22630.0032
	25	–	12	18	9	12	106.0	22630.0033
locating pin, flattened, DIN 6321, form C – picture 3								
6	7	1.0	4	6	4	4	1.3	22630.0040
	12	1.0	4	6	4	4	2.2	22630.0041
8	10	1.6	6	9	6	6	4.0	22630.0042
	16	1.6	6	9	6	6	5.5	22630.0043
10	10	2.5	6	9	6	6	5.6	22630.0044
	18	2.5	6	9	6	6	8.9	22630.0045
12	10	2.5	6	9	6	6	7.0	22630.0046
	18	2.5	6	9	6	6	11.0	22630.0047
16	13	3.5	8	12	8	8	17.0	22630.0048
	22	3.5	8	12	8	8	26.0	22630.0049
20	15	5.0	12	18	9	12	39.0	22630.0050
	25	5.0	12	18	9	12	55.0	22630.0051
25	15	5.0	12	18	9	12	49.0	22630.0052
	25	5.0	12	18	9	12	72.0	22630.0053

Seating Pins • partially DIN 6321 (old norm)

EH 22630.



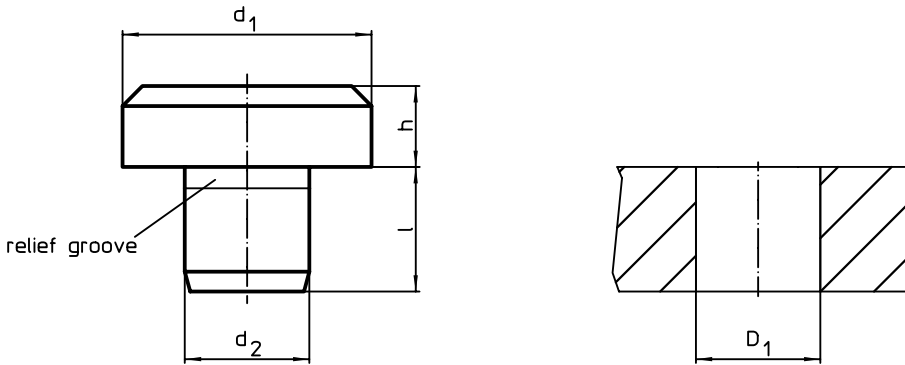
PRODUCT DESCRIPTION

To be used as feet and bearings.
Bearing surface without distortion.

Material

- Tool steel, hardened, ground

DRAWING



ORDER INFORMATION

d ₁	Dimensions			l	Location hole D ₁ H7	[g]	Art. No.
	h h9	d ₂ n6	[mm]				
DIN 6321 old norm							
6	5.0	4	6.0	4	1.8	22630.0001	
10	8.0	6	8.0	6	6.2	22630.0002	
16	5.0	8	10.0	8	11.0	22630.0003	
	13.0	8	10.0	8	24.0	22630.0004	
25	8.0	12	14.0	12	41.0	22630.0005	
	20.0	12	14.0	12	88.0	22630.0006	
40	13.0	20	20.0	20	171.0	22630.0007	
	32.0	20	20.0	20	358.0	22630.0008	
intermediate sizes							
6	2.5	4	6.5	4	1.2	22630.0110	
	4.5	4	8.5	4	1.9	22630.0112	
8	4.0	5	8.0	5	3.1	22630.0116	
	7.0	5	8.0	5	4.2	22630.0118	
10	4.5	6	8.5	6	4.4	22630.0120	
12	6.0	6	10.0	6	7.6	22630.0124	
	10.0	6	10.0	6	11.0	22630.0126	
20	6.0	10	12.0	10	21.0	22630.0130	
	12.0	10	12.0	10	36.0	22630.0132	
25	30.0	12	14.0	12	124.0	22630.0135	
30	25.0	16	20.0	16	164.0	22630.0137	
	40.0	16	20.0	16	248.0	22630.0140	
	50.0	16	20.0	16	305.0	22630.0144	
	65.0	16	20.0	16	385.0	22630.0148	
	80.0	20	20.0	20	485.0	22630.0152	
	100.0	20	20.0	20	594.0	22630.0156	

Locating Pins • with bore hole similar to DIN 6321

EH 22630.



PRODUCT DESCRIPTION

Cylindric locating pins for locating workpieces in toleranced holes and also to be used as stops and feet.

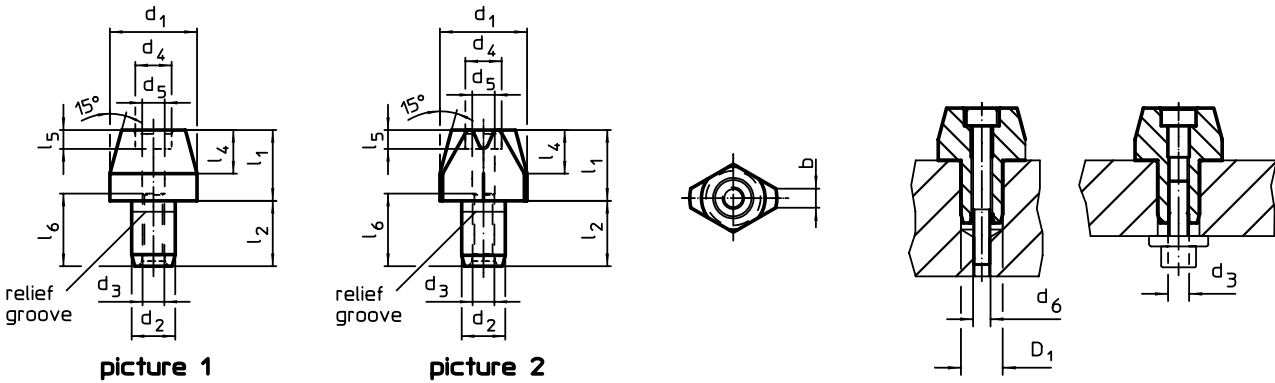
Flattened locating pins used to overcome differences in tolerances, between holes or to position an element in one direction only.

Apart from size 6 additional safety by fastening possibilities from up and down (can be used also for dismounting). The outer dimensions are similar to DIN 6321.

Material

- Case-hardened steel, case-hardened, blackened and ground

DRAWING



ORDER INFORMATION

d ₁ g6	l ₁	b	d ₂ k6	l ₂	Dimensions							Location hole D ₁ H7	[g]	Art. No.	
					d ₃	d ₄	l ₄	d ₅	l ₅	d ₆	l ₆				
[mm]													[mm]	[g]	
locating pin, cylindric, with bore hole – picture 1															
6	7	–	4	6	–	–	4	2.1	–	M 2	–	4	1.4	22630.0220 ¹⁾	
	12	–	4	6	–	–	4	2.1	–	M 2	–	4	2.9	22630.0221 ¹⁾	
8	10	–	6	9	M3	–	6	2.6	–	M2,5	10	6	4.2	22630.0222	
	16	–	6	9	M3	–	6	2.6	–	M2,5	10	6	6.4	22630.0223	
10	10	–	6	9	M3	5.0	6	2.6	2.6	M2,5	10	6	6.1	22630.0224	
	18	–	6	9	M3	5.0	6	2.6	2.6	M2,5	10	6	10.0	22630.0225	
12	10	–	6	9	M3	5.0	6	2.6	2.6	M2,5	10	6	8.0	22630.0226	
	18	–	6	9	M3	5.0	6	2.6	2.6	M2,5	10	6	15.0	22630.0227	
16	13	–	8	12	M4	6.5	8	3.3	3.1	M 3	13	8	19.0	22630.0228	
	22	–	8	12	M4	6.5	8	3.3	3.1	M 3	13	8	32.0	22630.0229	
20	15	–	12	18	M6	10.0	9	5.2	5.1	M 5	19	12	46.0	22630.0230	
	25	–	12	18	M6	10.0	9	5.2	5.1	M 5	19	12	60.0	22630.0231	
25	15	–	12	18	M6	10.0	9	5.2	5.1	M 5	19	12	59.0	22630.0232	
	25	–	12	18	M6	10.0	9	5.2	5.1	M 5	19	12	96.0	22630.0233	
locating pin, flattened, with bore hole – picture 2															
6	7	1.0	4	6	–	–	4	2.1	–	M 2	–	4	1.0	22630.0240 ¹⁾	
	12	1.0	4	6	–	–	4	2.1	–	M 2	–	4	1.5	22630.0241 ¹⁾	
8	10	1.6	6	9	M3	–	6	2.6	–	M2,5	10	6	3.4	22630.0242	
	16	1.6	6	9	M3	–	6	2.6	–	M2,5	10	6	4.4	22630.0243	
10	10	2.5	6	9	M3	5.0	6	2.6	2.6	M2,5	10	6	4.6	22630.0244	
	18	2.5	6	9	M3	5.0	6	2.6	2.6	M2,5	10	6	7.3	22630.0245	
12	10	2.5	6	9	M3	5.0	6	2.6	2.6	M2,5	10	6	5.8	22630.0246	
	18	2.5	6	9	M3	5.0	6	2.6	2.6	M2,5	10	6	10.0	22630.0247	
16	13	3.5	8	12	M4	6.5	8	3.3	3.1	M 3	13	8	14.0	22630.0248	
	22	3.5	8	12	M4	6.5	8	3.3	3.1	M 3	13	8	22.0	22630.0249	
20	15	5.0	12	18	M6	10.0	9	5.2	5.1	M 5	19	12	30.0	22630.0250	
	25	5.0	12	18	M6	10.0	9	5.2	5.1	M 5	19	12	44.0	22630.0251	
25	15	5.0	12	18	M6	10.0	9	5.2	5.1	M 5	19	12	41.0	22630.0252	
	25	5.0	12	18	M6	10.0	9	5.2	5.1	M 5	19	12	62.0	22630.0253	

¹⁾ can only be mounted from the top

Locating Pins • with ball end

EH 22630.



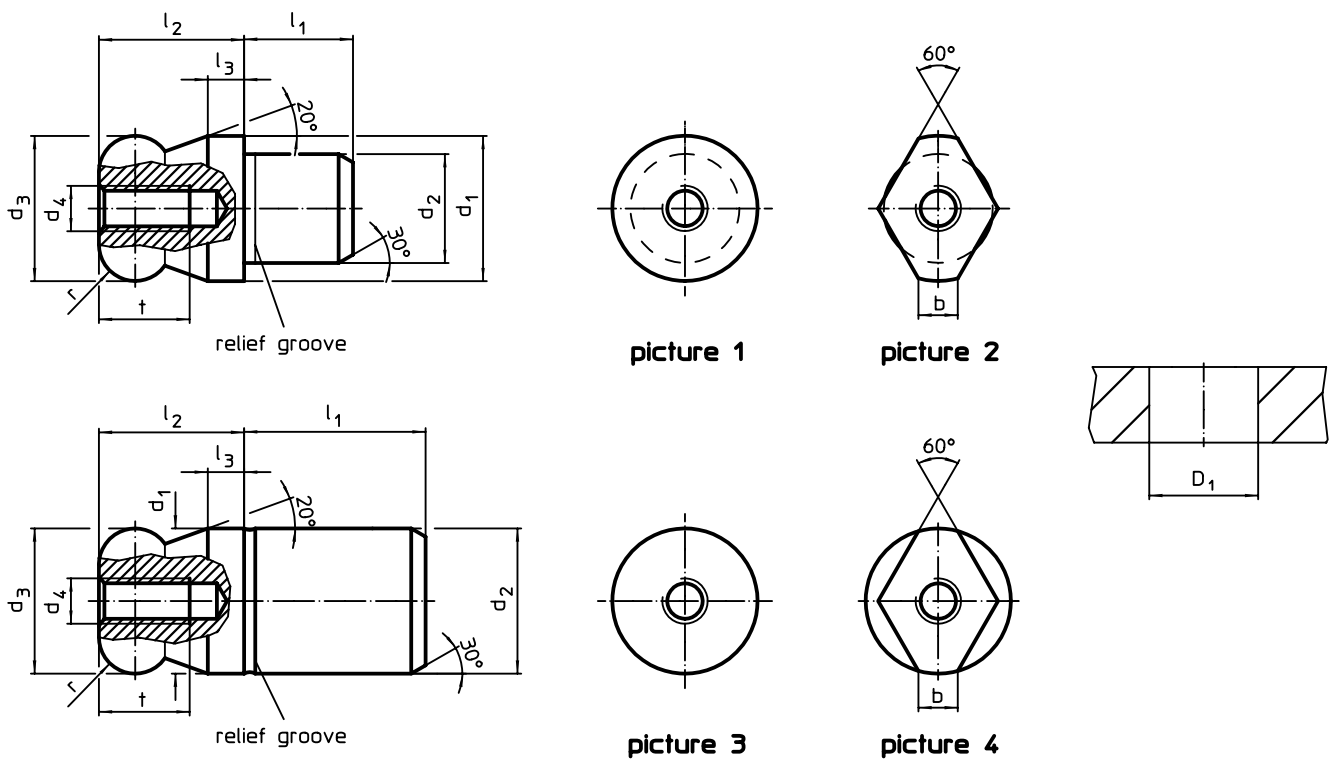
PRODUCT DESCRIPTION

Ball ended locating pins facilitate easy inserting and removing avoiding clamping inclination.

Material

- Tool steel, hardened, blackened and ground
- Stainless steel 1.4305, ground, surface heat-treated


DRAWING



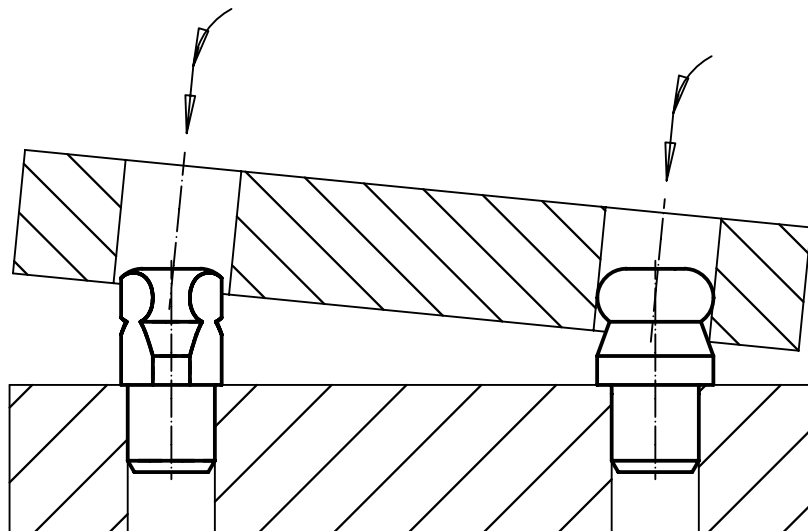
ORDER INFORMATION

d ₁ g6	d ₂ n6	d ₃ -0.01 -0.05	d ₄	Dimensions						Location hole D ₁ H7	[g]	Art. No.	
				l ₁	l ₂	l ₃	t	r	b			Tool steel	Stainless steel
[mm]													
with ball end plain – picture 1													
10	7	10	M3	7	10	2.5	6	2.5	–	7	6.7	22630.0310	22630.0350
12	8	12	M4	8	12	3.0	8	3.0	–	8	11.0	22630.0312	22630.0352
16	12	16	M5	12	16	4.0	10	4.0	–	12	31.0	22630.0316	22630.0356
20	14	20	M5	14	20	5.0	10	5.0	–	14	58.0	22630.0320	22630.0360
22	16	22	M5	16	22	5.5	10	5.5	–	16	81.0	22630.0322	–
25	18	25	M5	18	25	6.0	10	6.0	–	18	118.0	22630.0325	–



d ₁ g6	d ₂ n6	d ₃ -0.01 -0.05	d ₄	Dimensions						Location hole D ₁ H7		Art. No.			
				l ₁	l ₂	l ₃	t	r	b			Tool steel	Stainless steel		
[mm]													[g]		
with ball end flattened – picture 2															
10	7	10	M3	7	10	2.5	6	2.5	2.5	7	5.3	22630.0410	22630.0450		
12	8	12	M4	8	12	3.0	8	3.0	2.5	8	8.0	22630.0412	22630.0452		
16	12	16	M5	12	16	4.0	10	4.0	4.3	12	25.0	22630.0416	22630.0456		
20	14	20	M5	14	20	5.0	10	5.0	5.0	14	46.0	22630.0420	22630.0460		
22	16	22	M5	16	22	5.5	10	5.5	5.0	16	63.0	22630.0422	–		
25	18	25	M5	18	25	6.0	10	6.0	5.6	18	92.0	22630.0425	–		
with ball end plain, not stepped – picture 3															
8	8	8	M3	10	8	2.0	6	2.0	–	8	6.0	22630.0508	22630.0568		
10	10	10	M3	13	10	2.5	6	2.5	–	10	12.0	22630.0510	22630.0570		
12	12	12	M4	15	12	3.0	8	3.0	–	12	21.0	22630.0512	22630.0572		
16	16	16	M5	20	16	4.0	10	4.0	–	16	51.0	22630.0516	22630.0576		
20	20	20	M5	25	20	5.0	10	5.0	–	20	101.0	22630.0520	22630.0580		
25	25	25	M5	25	25	6.0	10	6.0	–	25	176.0	22630.0525	–		
30	30	30	M6	30	30	8.0	12	8.0	–	30	307.0	22630.0530	–		
40	40	40	M6	40	40	10.0	12	10.0	–	40	729.0	22630.0540	–		
50	50	50	M6	50	50	12.0	12	12.0	–	50	1422.0	22630.0550	–		
with ball end flattened, not stepped – picture 4															
8	8	8	M3	10	8	2.0	6	2.0	1.9	8	5.0	22630.0608	22630.0668		
10	10	10	M3	13	10	2.5	6	2.5	2.5	10	11.0	22630.0610	22630.0670		
12	12	12	M4	15	12	3.0	8	3.0	2.5	12	17.0	22630.0612	22630.0672		
16	16	16	M5	20	16	4.0	10	4.0	4.3	16	44.0	22630.0616	22630.0676		
20	20	20	M5	25	20	5.0	10	5.0	5.0	20	88.0	22630.0620	22630.0680		
25	25	25	M5	25	25	6.0	10	6.0	5.6	25	149.0	22630.0625	–		
30	30	30	M6	30	30	8.0	12	8.0	8.8	30	270.0	22630.0630	–		
40	40	40	M6	40	40	10.0	12	10.0	12.8	40	657.0	22630.0640	–		
50	50	50	M6	50	50	12.0	12	12.0	16.7	50	1243.0	22630.0650	–		

APPLICATION EXAMPLE



Feet • DIN 6320 with threaded shank
EH 22640.



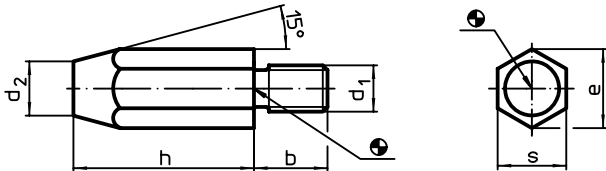
PRODUCT DESCRIPTION

Feet can be used both as a foot and as a seating element and stop. Bearing surface without distortion.

Material

- Heat-treated steel, unhardened, blackened

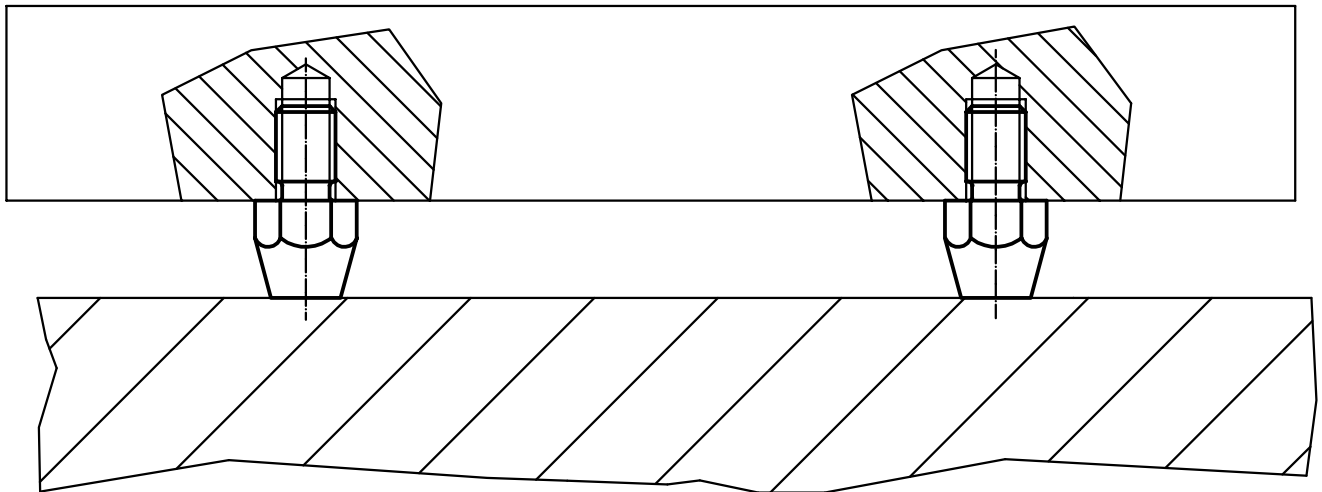
DRAWING



ORDER INFORMATION

h	d ₁	Dimensions				Tightening torque max. [Nm]	[g]	Art. No.
		b	d ₂	e	s			
10	M 6	11	8	11.5	10	7	7.8	22640.0061
20	M 6	11	6	11.5	10	7	13.0	22640.0062
15	M 8	13	10	15.0	13	7	19.0	22640.0081
30	M 8	13	9	15.0	13	18	35.0	22640.0082
20	M10	16	13	19.6	17	32	41.0	22640.0101
40	M10	16	13	19.6	17	32	80.0	22640.0102
25	M12	20	15	21.9	19	60	70.0	22640.0121
50	M12	20	15	21.9	19	60	129.0	22640.0122

APPLICATION EXAMPLE



Seating Pins • ribbed or pointed

EH 22680.

2



PRODUCT DESCRIPTION

For workpieces showing a rough surface. Pointed type (picture 2) especially suitable for cast parts.

Material

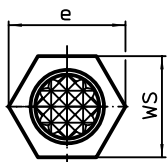
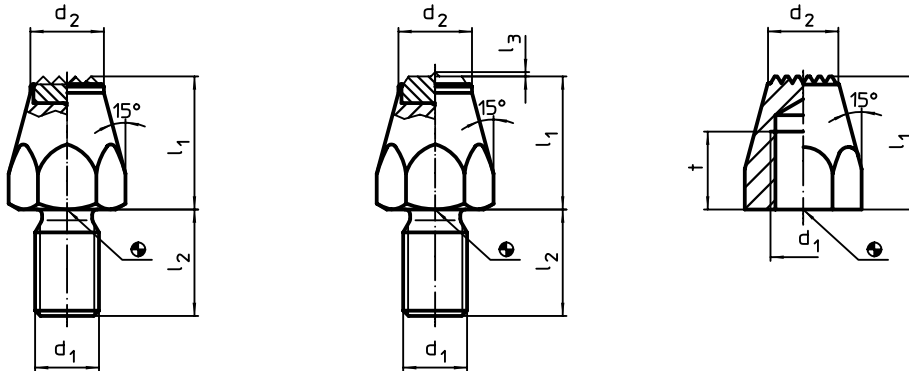
Insert

- Hard metal, ribbed
- Hard metal, pointed

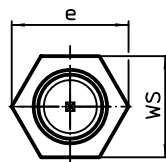
Body

- Heat-treated steel, tempered, blackened
- Free cutting steel, case-hardened, blackened

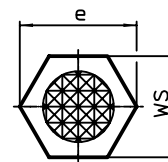
DRAWING



picture 1



picture 2



picture 3

ORDER INFORMATION

l ₁	d ₁	l ₂	Dimensions				e	WS	Tightening torque max.	[g]	Art. No.
			l ₃	t	d ₂	[mm]					
with hard metal insert, ribbed, and threaded shank – picture 1											
10	M 6	11	–	–	9.5	11.5	10	7	8.8	22680.0061	
15	M 8	13	–	–	12.5	15.0	13	18	22.0	22680.0081	
20	M10	15	–	–	12.5	19.6	17	32	39.0	22680.0101	
25	M12	20	–	–	13.8	21.9	19	60	64.0	22680.0121	
with hard metal insert, pointed, and threaded shank – picture 2											
10	M 6	11	0.8	–	9.5	11.5	10	7	9.1	22680.0063	
15	M 8	13	0.8	–	12.5	15.0	13	18	22.0	22680.0083	
20	M10	15	0.8	–	12.5	19.6	17	32	40.0	22680.0103	
25	M12	20	0.8	–	13.8	21.9	19	60	65.0	22680.0123	
case-hardened, ribbed, with female thread – picture 3											
20	M 8	–	–	10	9.0	15.0	13	18	14.0	22680.0142	
25	M 8	–	–	10	9.0	15.0	13	18	20.0	22680.0144	
	M10	–	–	13	12.5	19.6	17	32	31.0	22680.0164	
30	M10	–	–	13	12.5	19.6	17	32	40.0	22680.0166	
40	M10	–	–	13	12.5	19.6	17	32	60.0	22680.0168	
25	M12	–	–	15	13.0	21.9	19	60	33.0	22680.0184	
30	M12	–	–	15	13.0	21.9	19	60	44.0	22680.0186	
40	M12	–	–	15	13.0	21.9	19	60	69.0	22680.0188	

Seating Pins • pin shape

EH 22680.

2



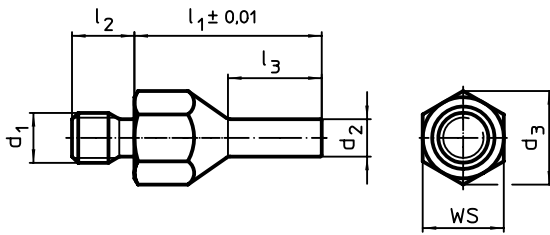
PRODUCT DESCRIPTION

To be used as solid and precise seat and stop. The pin-shaped form of this locating pin allows an application in components with narrow seating points. Bearing surface induction hardened and grounded.

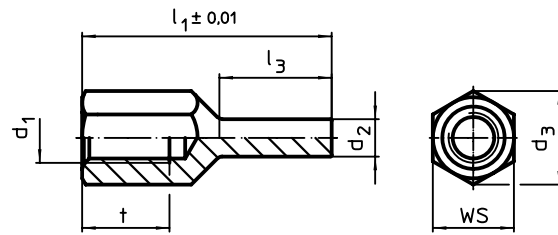
Material

- Heat-treated steel, tempered, blackened

DRAWING



picture 1



picture 2

ORDER INFORMATION

l ₁ ±0.01	d ₁	d ₂	Dimensions				d ₃	WS [mm]	Tightening torque max. [Nm]	[g]	Art. No.
			l ₂	l ₃	t	[mm]					
with male thread – picture 1											
20	M 6	4	8	10.0	–	11.0	10	7	7.7	22680.0402	
30	M 6	4	8	15.0	–	11.0	10	7	12.0	22680.0404	
	M 8	4	10	15.0	–	14.4	13	18	17.0	22680.0412	
40	M 8	4	10	20.0	–	14.4	13	18	23.0	22680.0414	
30	M 8	6	10	15.0	–	14.4	13	18	20.0	22680.0416	
40	M 8	6	10	20.0	–	14.4	13	18	30.0	22680.0418	
30	M10	6	14	15.0	–	19.0	17	32	30.0	22680.0422	
50	M10	6	14	25.0	–	19.0	17	32	51.0	22680.0424	
30	M10	8	14	15.0	–	19.0	17	32	35.0	22680.0426	
50	M10	8	14	25.0	–	19.0	17	32	58.0	22680.0428	
40	M12	6	14	20.0	–	21.2	19	60	48.0	22680.0432	
60	M12	6	14	30.0	–	21.2	19	60	75.0	22680.0434	
40	M12	8	14	20.0	–	21.2	19	60	56.0	22680.0436	
60	M12	8	14	30.0	–	21.2	19	60	83.0	22680.0438	
with female thread – picture 2											
20	M 6	4	–	8.5	6	11.0	10	7	5.7	22680.0452	
30	M 6	4	–	13.5	9	11.0	10	7	8.9	22680.0454	
	M 8	4	–	13.0	10	14.4	13	18	13.0	22680.0462	
40	M 8	4	–	18.0	14	14.4	13	18	18.0	22680.0464	
30	M 8	6	–	13.0	10	14.4	13	18	16.0	22680.0466	
40	M 8	6	–	18.0	14	14.4	13	18	21.0	22680.0468	
30	M10	6	–	12.0	10	19.0	17	32	24.0	22680.0472	
50	M10	6	–	25.0	15	19.0	17	32	38.0	22680.0474	
30	M10	8	–	12.0	10	19.0	17	32	28.0	22680.0476	
50	M10	8	–	25.0	15	19.0	17	32	44.0	22680.0478	
40	M12	6	–	18.0	12	21.2	19	60	36.0	22680.0482	
60	M12	6	–	28.0	18	21.2	19	60	56.0	22680.0484	
40	M12	8	–	18.0	12	21.2	19	60	41.0	22680.0486	
60	M12	8	–	28.0	18	21.2	19	60	63.0	22680.0488	



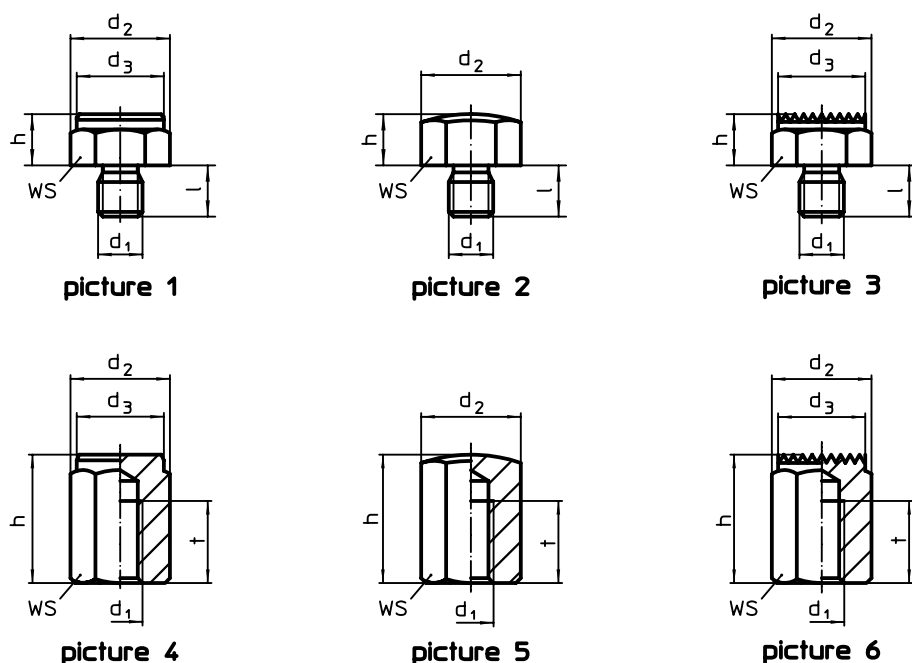
PRODUCT DESCRIPTION

To be used as seats, stops and thrust pads.

Material

- Steel, case-hardened, blackened


DRAWING




ORDER INFORMATION

h	d ₁	Dimensions				l	t	WS	Tightening torque max.	[g]	Art. No.
		d ₂	d ₃	[mm]							
with male thread, bearing surface plain – picture 1											
10 ±0.01	M 8	19.4	17	10	–	17	18	21	22690.0021		
	M10	21.9	19	12	–	19	32	28	22690.0031		
15 ±0.01	M10	21.9	19	12	–	19	32	40	22690.0032		
10 ±0.01	M12	25.2	22	14	–	22	60	40	22690.0001		
15 ±0.01	M12	25.2	22	14	–	22	60	55	22690.0002		
	M16	33.0	30	19	–	30	140	110	22690.0042		
20 ±0.01	M16	33.0	30	19	–	30	140	140	22690.0043		
	M20	40.0	36	24	–	36	290	214	22690.0052		
25 ±0.01	M20	40.0	36	24	–	36	290	257	22690.0053		
20 ±0.01	M24	46.0	41	29	–	41	498	300	22690.0062		
25 ±0.01	M24	46.0	41	29	–	41	498	356	22690.0063		
30 ±0.01	M24	46.0	41	29	–	41	498	412	22690.0064		

¹⁾ The tightening torque of bolts with female thread is for threaded pins, quality 8. The bolt has to be tightened over the total thread length. →

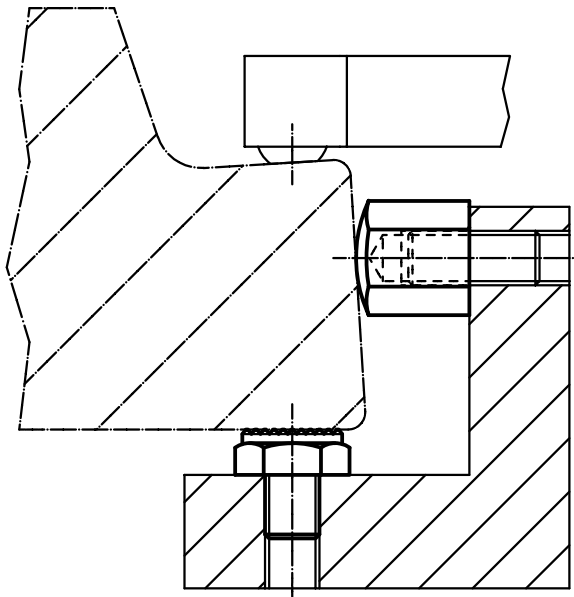
h	Dimensions					WS	Tightening torque max.		Art. No.
	d ₁	d ₂	d ₃	l	t				
[mm]					[mm]	[Nm]	[g]		
with male thread, bearing surface spherical – picture 2									
10 ±0.10	M 8	19.4	–	10	–	17	18	20	22690.0121
	M10	21.9	–	12	–	19	32	27	22690.0131
15 ±0.10	M10	21.9	–	12	–	19	32	40	22690.0132
10 ±0.10	M12	25.2	–	14	–	22	60	37	22690.0101
	M12	25.2	–	14	–	22	60	53	22690.0102
15 ±0.10	M16	33.0	–	19	–	30	140	105	22690.0142
	M16	33.0	–	19	–	30	140	135	22690.0143
20 ±0.10	M20	40.0	–	24	–	36	290	206	22690.0152
	M20	40.0	–	24	–	36	290	249	22690.0153
25 ±0.10	M24	46.0	–	29	–	41	498	285	22690.0162
25 ±0.10	M24	46.0	–	29	–	41	498	342	22690.0163
30 ±0.10	M24	46.0	–	29	–	41	498	398	22690.0164
with male thread, bearing surface ribbed – picture 3									
10 ±0.10	M 8	19.4	17	10	–	17	18	20	22690.0221
	M10	21.9	19	12	–	19	32	27	22690.0231
15 ±0.10	M10	21.9	19	12	–	19	32	39	22690.0232
10 ±0.10	M12	25.2	22	14	–	22	60	38	22690.0201
	M12	25.2	22	14	–	22	60	54	22690.0202
15 ±0.10	M16	33.0	30	19	–	30	140	106	22690.0242
	M16	33.0	30	19	–	30	140	136	22690.0243
20 ±0.10	M20	40.0	36	24	–	36	290	200	22690.0252
	M20	40.0	36	24	–	36	290	243	22690.0253
25 ±0.10	M24	46.0	41	29	–	41	498	282	22690.0262
25 ±0.10	M24	46.0	41	29	–	41	498	338	22690.0263
30 ±0.10	M24	46.0	41	29	–	41	498	395	22690.0264
with female thread, bearing surface plain tolerance l₁ = ±0,01 – picture 4									
15 ±0.01	M 8	19.4	17	15	6	17	25 ¹⁾	25	22690.0321
25 ±0.01	M 8	19.4	17	25	12	17	25 ¹⁾	42	22690.0323
20 ±0.01	M10	21.9	19	20	10	19	46 ¹⁾	40	22690.0333
30 ±0.01	M10	21.9	19	30	15	19	46 ¹⁾	61	22690.0335
40 ±0.01	M10	21.9	19	40	15	19	46 ¹⁾	85	22690.0337
20 ±0.01	M12	25.2	22	20	10	22	82 ¹⁾	52	22690.0301
25 ±0.01	M12	25.2	22	25	15	22	82 ¹⁾	65	22690.0302
30 ±0.01	M12	25.2	22	30	18	22	82 ¹⁾	79	22690.0303
40 ±0.01	M12	25.2	22	40	18	22	82 ¹⁾	111	22690.0304
50 ±0.01	M12	25.2	22	50	18	22	82 ¹⁾	142	22690.0305
30 ±0.01	M16	33.0	30	30	20	30	206 ¹⁾	141	22690.0343
50 ±0.01	M16	33.0	30	50	24	30	206 ¹⁾	256	22690.0345
40 ±0.01	M20	40.0	36	40	26	36	407 ¹⁾	268	22690.0353
60 ±0.01	M20	40.0	36	60	38	36	407 ¹⁾	415	22690.0355
40 ±0.01	M24	46.0	41	40	26	41	698 ¹⁾	341	22690.0363
60 ±0.01	M24	46.0	41	60	38	41	698 ¹⁾	530	22690.0365
with female thread, bearing surface spherical – picture 5									
15 ±0.10	M 8	19.4	–	15	6	17	25 ¹⁾	24	22690.0421
25 ±0.10	M 8	19.4	–	25	12	17	25 ¹⁾	41	22690.0423
20 ±0.10	M10	21.9	–	20	10	19	46 ¹⁾	38	22690.0433
30 ±0.10	M10	21.9	–	30	15	19	46 ¹⁾	60	22690.0435
40 ±0.10	M10	21.9	–	40	15	19	46 ¹⁾	84	22690.0437
20 ±0.10	M12	25.2	–	20	10	22	82 ¹⁾	50	22690.0401
25 ±0.10	M12	25.2	–	25	15	22	82 ¹⁾	62	22690.0402
30 ±0.10	M12	25.2	–	30	18	22	82 ¹⁾	76	22690.0403
40 ±0.10	M12	25.2	–	40	18	22	82 ¹⁾	109	22690.0404
50 ±0.10	M12	25.2	–	50	18	22	82 ¹⁾	141	22690.0405
30 ±0.10	M16	33.0	–	30	20	30	206 ¹⁾	136	22690.0443
50 ±0.10	M16	33.0	–	50	24	30	206 ¹⁾	252	22690.0445
40 ±0.10	M20	40.0	–	40	26	36	407 ¹⁾	261	22690.0453
60 ±0.10	M20	40.0	–	60	38	36	407 ¹⁾	408	22690.0455
40 ±0.10	M24	46.0	–	40	26	41	698 ¹⁾	327	22690.0463
60 ±0.10	M24	46.0	–	60	38	41	698 ¹⁾	514	22690.0465

¹⁾ The tightening torque of bolts with female thread is for threaded pins, quality 8. The bolt has to be tightened over the total thread length. →

h	Dimensions					WS	Tightening torque max.		Art. No.
	d ₁	d ₂	d ₃	l	t				
[mm]						[mm]	[Nm]	[g]	
with female thread, bearing surface ribbed – picture 6									
15 ±0.10	M 8	19.4	17	15	6	17	25 ¹⁾	24	22690.0521
25 ±0.10	M 8	19.4	17	25	12	17	25 ¹⁾	41	22690.0523
20 ±0.10	M10	21.9	19	20	10	19	46 ¹⁾	38	22690.0533
30 ±0.10	M10	21.9	19	30	15	19	46 ¹⁾	60	22690.0535
40 ±0.10	M10	21.9	19	40	15	19	46 ¹⁾	84	22690.0537
20 ±0.10	M12	25.2	22	20	10	22	82 ¹⁾	50	22690.0501
25 ±0.10	M12	25.2	22	25	15	22	82 ¹⁾	63	22690.0502
30 ±0.10	M12	25.2	22	30	18	22	82 ¹⁾	77	22690.0503
40 ±0.10	M12	25.2	22	40	18	22	82 ¹⁾	109	22690.0504
50 ±0.10	M12	25.2	22	50	18	22	82 ¹⁾	141	22690.0505
30 ±0.10	M16	33.0	30	30	20	30	206 ¹⁾	137	22690.0543
50 ±0.10	M16	33.0	30	50	24	30	206 ¹⁾	254	22690.0545
40 ±0.10	M20	40.0	36	40	26	36	407 ¹⁾	254	22690.0553
60 ±0.10	M20	40.0	36	60	38	36	407 ¹⁾	401	22690.0555
40 ±0.10	M24	46.0	41	40	26	41	698 ¹⁾	322	22690.0563
60 ±0.10	M24	46.0	41	60	38	41	698 ¹⁾	408	22690.0565

¹⁾ The tightening torque of bolts with female thread is for threaded pins, quality 8. The bolt has to be tightened over the total thread length.

APPLICATION EXAMPLE



Seating Pins • adjustable

EH 22690.



PRODUCT DESCRIPTION

The adjustable seating pins with induction hardened bearing surface can be used as seats and stops.

Material

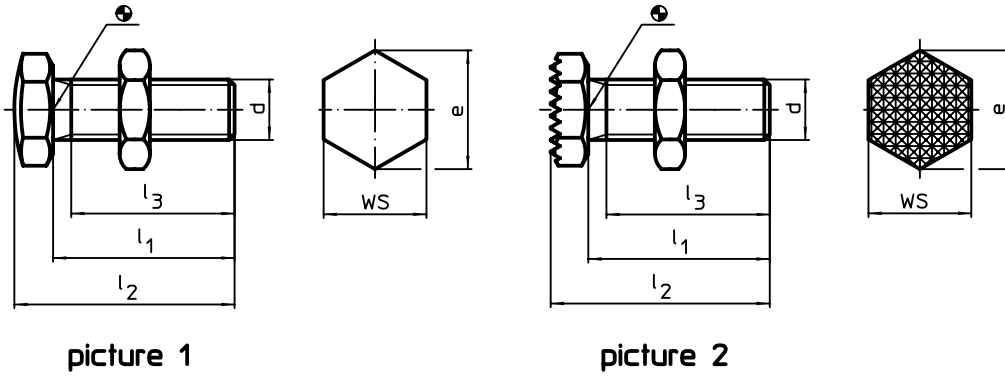
Seating Pins

- Heat-treated steel, tempered, quality 10.9, blackened / bearing surface induction hardened

Nut

- Heat-treated steel, tempered, quality 8.8 (ISO 4035), blackened

DRAWING



ORDER INFORMATION

d	l ₁ ±1.5	Dimensions			e	WS [mm]	[g]	Art. No.
		l ₂ ±1.5 [mm]	l ₃ min.					
bearing surface spherical – picture 1								
M 6	20	23.5	19.0	11.5	10	6.7	22690.0606	
M 8	25	30.0	21.0	14.5	13	15.0	22690.0608	
M10	30	36.0	25.5	19.6	17	31.0	22690.0610	
M12	35	42.0	29.7	21.9	19	48.0	22690.0612	
M16	40	49.5	34.0	27.7	24	102.0	22690.0616	
M20	45	57.0	37.0	34.6	30	187.0	22690.0620	
M24	50	64.0	40.0	41.6	36	309.0	22690.0624	
bearing surface ribbed – picture 2								
M 6	20	23.5	19.0	11.5	10	6.7	22690.0626	
M 8	25	30.0	21.0	14.5	13	16.0	22690.0628	
M10	30	36.0	25.5	19.6	17	31.0	22690.0630	
M12	35	42.0	29.7	21.9	19	49.0	22690.0632	
M16	40	49.5	34.0	27.7	24	102.0	22690.0636	
M20	45	57.0	37.0	34.6	30	184.0	22690.0640	
M24	50	64.0	40.0	41.6	36	308.0	22690.0644	

Pins • with plastic bearing surface

EH 22691.



PRODUCT DESCRIPTION

Pins with plastic bearing surface can be used as protective supports, stops, and thrust pads. This protects high-quality surfaces from damage.

Material

- Insert**
- Plastic (PEEK), blue

Threaded bushing

- Stainless steel

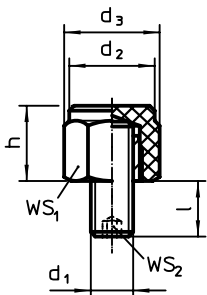
Grub Screw

- Stainless steel

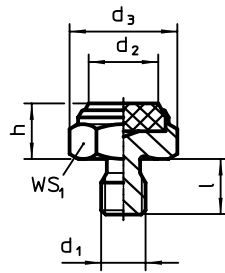
Body

- Plastic (PEEK), blue
- Stainless steel 1.4305

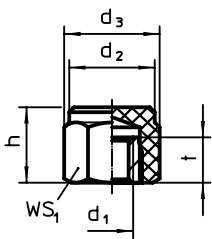
DRAWING



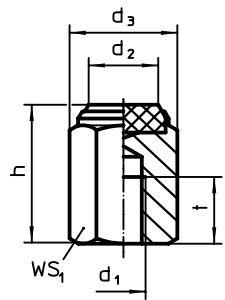
picture 1



picture 2



picture 3



picture 4

ORDER INFORMATION

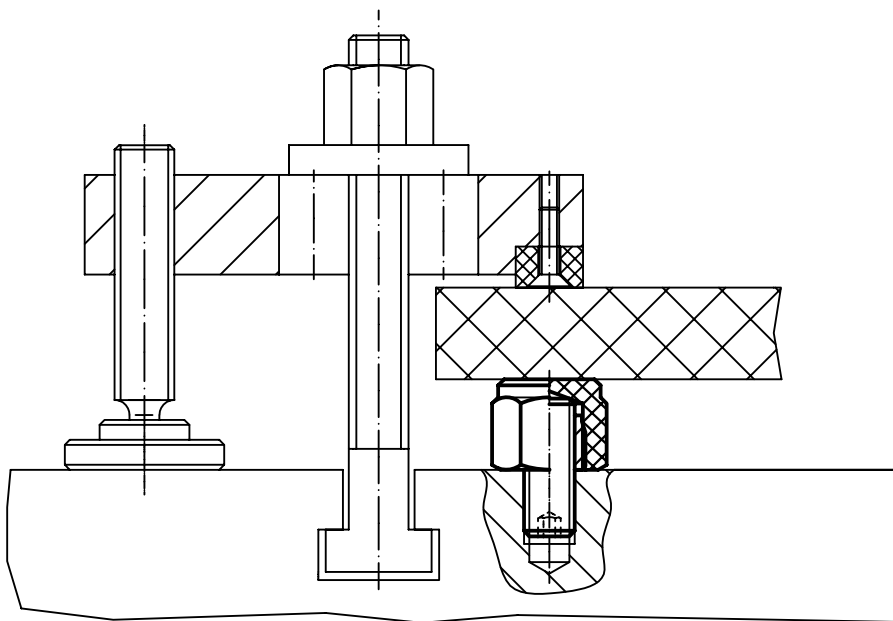
h ±0.1	d ₁	Dimensions				WS ₁ [mm]	WS ₂ [mm]	Load capacity for static load max. [kN]	Tightening torque max. [Nm]	Temperature		Weight [g]	Art. No.
		d ₂	d ₃	l	t					min.	max.		
[mm]													[°C]
with male thread, body made of plastic (PEEK), bearing surface plain – picture 1													
15	M 8	17.0	19.0	8 ±1	–	17	4	8.5	10	-60	250	12.0	22691.0122
20	M10	19.0	21.5	10 ±1	–	19	5	9.5	10	-60	250	21.0	22691.0133
	M12	22.0	25.0	14 ±1	–	22	6	14.0	10	-60	250	32.0	22691.0143
with male thread, plastic insert, bearing surface plain – picture 2													
10	M 8	12.5	19.4	10	–	17	–	11.5	18	-60	250	14.0	22691.0021
	M10	14.5	21.9	12	–	19	–	15.5	32	-60	250	20.0	22691.0031
15	M10	14.5	21.9	12	–	19	–	15.5	32	-60	250	32.0	22691.0032
10	M12	17.5	25.2	14	–	22	–	22.5	60	-60	250	28.0	22691.0041
15	M12	17.5	25.2	14	–	22	–	22.5	60	-60	250	45.0	22691.0042

¹⁾ The tightening torque of bolts with female thread is for threaded pins, quality 8. The bolt has to be tightened over the total thread length. →

h ±0.1	Dimensions					WS ₁ [mm]	WS ₂ [mm]	Load capacity for static load max. [kN]	Tightening torque max. [Nm]	Temperature		Weight [g]	Art. No.
	d ₁	d ₂	d ₃	l	t					min.	max.		
[mm]													[°C]
with female thread, body made of plastic (PEEK), bearing surface plain – picture 3													
15	M 8	17.0	19.0	–	9	17	–	8.5	10	-60	250	6.4	22691.0222
20	M10	19.0	21.5	–	10	19	–	9.5	10	-60	250	21.0	22691.0233
	M12	22.0	25.0	–	12	22	–	14.0	10	-60	250	13.0	22691.0243
with female thread, plastic insert (PEEK), bearing surface plain – picture 4													
25	M 8	12.5	19.4	–	12	17	–	11.5	18 ¹⁾	-60	250	35.0	22691.0324
30	M10	14.5	21.9	–	15	19	–	15.5	32 ¹⁾	-60	250	53.0	22691.0335
	M12	17.5	25.2	–	18	22	–	22.5	60 ¹⁾	-60	250	68.0	22691.0345

¹⁾ The tightening torque of bolts with female thread is for threaded pins, quality 8. The bolt has to be tightened over the total thread length.

APPLICATION EXAMPLE



BALL-ENDED THRUST SCREWS FOR CLAMPING NON-PARALLEL SURFACES

MAKE THE SLANT BALL ITS EYES OUT

Whether sporting a fine-pitch thread for pin-point adjustments or a regular thread – they are the preferred tool for fastening, clamping, positioning or supporting non-parallel surfaces.

A particular highlight of these ball-ended thrust screws is their internal hexagon drive. It provides for optimum force transmission by channelling the driving forces through surfaces rather than edges (contrary to, for instance, an internal hexagon). This optimised force transmission keeps tool wear at a minimum, extending the service life of the tool.



Ball-Ended Thrust Screws • headed, ball protected against rotating

EH 22700.

2



PRODUCT DESCRIPTION

Ball-ended thrust screws can also be used for clamping, tightening or supporting of non-parallel surfaces. The flat-faced, movable ball enables a flat load transmission.

Material

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

Screw

- Heat-treated steel, 1200 ±100 N/mm²
- Stainless steel 1.4305

Ball protected against rotating. Special types on request.

References

Thread lock on request, please refer to appendix - Technical Data -

Further products

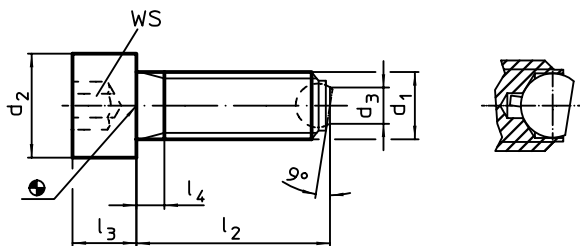
Ball-Ended Thrust Screws, headed, flat-faced ball..... → p. 323

MORE INFORMATION

Notes

Note: Thread runout I₄ !

DRAWING



ORDER INFORMATION

d ₁	l ₂	d ₂	Dimensions				Ball diameter	WS	Load capacity for static load ¹⁾ max.	g	Art. No.	
			d ₃	l ₃	l ₄	[mm]					Heat-treated steel	Stainless steel
flat-faced ball, bearing surface plain												
M 6	20	10	3.2	6	3.0	4.0	5	6	6.1	22700.0062	22700.0302	
	30	10	3.2	6	3.0	4.0	5	6	7.7	22700.0064	22700.0304	
	40	10	3.2	6	16.0	4.0	5	6	10.0	22700.0066	22700.0306	
M 8	20	13	4.5	8	3.5	5.5	6	9	12.0	22700.0082	22700.0312	
	35	13	4.5	8	3.5	5.5	6	9	17.0	22700.0084	22700.0314	
	50	13	4.5	8	22.0	5.5	6	9	23.0	22700.0086	22700.0316	
M10	25	16	6.0	10	4.5	7.0	8	12	24.0	22700.0102	22700.0322	
	40	16	6.0	10	4.5	7.0	8	12	31.0	22700.0104	22700.0324	
	60	16	6.0	10	28.0	7.0	8	12	44.0	22700.0106	22700.0326	
M12	30	18	7.2	12	5.0	8.5	10	18	38.0	22700.0122	22700.0332	
	50	18	7.2	12	5.0	8.5	10	18	52.0	22700.0124	22700.0334	
	80	18	7.2	12	44.0	8.5	10	18	80.0	22700.0126	22700.0336	
M16	40	24	10.7	16	6.0	12.0	14	36	93.0	22700.0162	22700.0342	
	60	24	10.7	16	6.0	12.0	14	36	121.0	22700.0164	22700.0344	
	80	24	10.7	16	36.0	12.0	14	36	153.0	22700.0166	22700.0346	
M20	50	30	13.5	20	7.5	15.0	17	60	183.0	22700.0172	–	
	80	30	13.5	20	28.0	15.0	17	60	254.0	22700.0174	–	
	100	30	13.5	20	48.0	15.0	17	60	303.0	22700.0176	–	
M24	60	36	15.8	24	9.0	18.0	19	80	325.0	22700.0182	–	
	90	36	15.8	24	30.0	18.0	19	80	422.0	22700.0184	–	
	120	36	15.8	24	60.0	18.0	19	80	528.0	22700.0186	–	

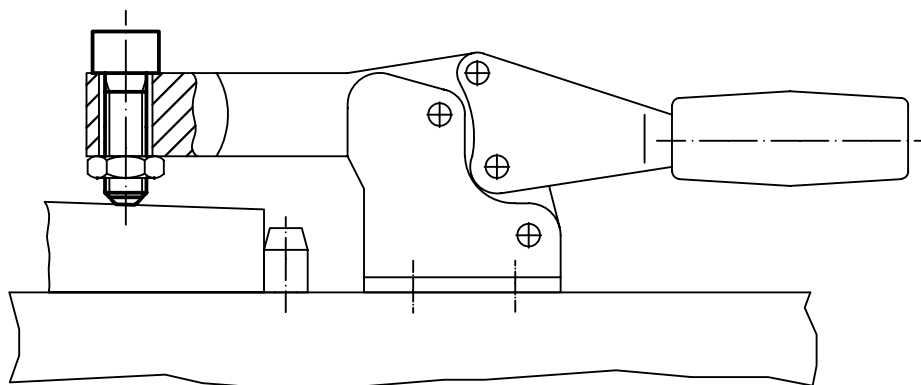
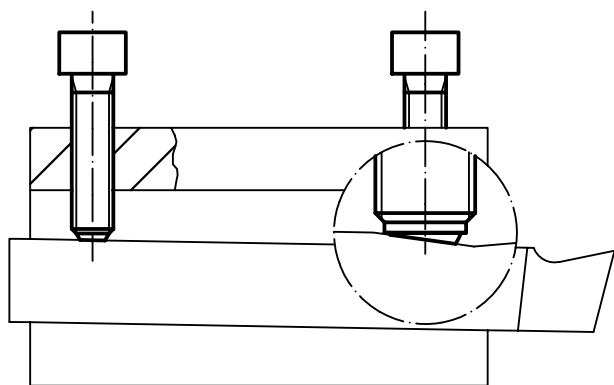
¹⁾ Statements on load capacity are not valid for the stainless steel type.



d ₁	l ₂ ~	Dimensions				Ball diameter	WS [mm]	Load capacity for static load ¹⁾ max. [kN]	[g]	Art. No.	
		d ₂	d ₃	l ₃	l ₄					Heat-treated steel	Stainless steel
[mm]											
flat-faced ball, bearing surface ribbed											
M 8	20	13	4.5	8	3.5	5.5	6	9	12.0	22700.0192	–
	35	13	4.5	8	3.5	5.5	6	9	17.0	22700.0194	–
	50	13	4.5	8	22.0	5.5	6	9	23.0	22700.0196	–
M10	25	16	6.0	10	4.5	7.0	8	12	24.0	22700.0202	–
	40	16	6.0	10	4.5	7.0	8	12	31.0	22700.0204	–
	60	16	6.0	10	28.0	7.0	8	12	44.0	22700.0206	–
M12	30	18	7.2	12	5.0	8.5	10	18	38.0	22700.0222	–
	50	18	7.2	12	5.0	8.5	10	18	52.0	22700.0224	–
	80	18	7.2	12	44.0	8.5	10	18	80.0	22700.0226	–
M16	40	24	10.7	16	6.0	12.0	14	36	94.0	22700.0262	–
	60	24	10.7	16	6.0	12.0	14	36	121.0	22700.0264	–
	80	24	10.7	16	36.0	12.0	14	36	153.0	22700.0266	–
M20	50	30	13.5	20	7.5	15.0	17	60	185.0	22700.0272	–
	80	30	13.5	20	28.0	15.0	17	60	253.0	22700.0274	–
	100	30	13.5	20	48.0	15.0	17	60	303.0	22700.0276	–
M24	60	36	15.8	24	9.0	18.0	19	80	321.0	22700.0282	–
	90	36	15.8	24	30.0	18.0	19	80	422.0	22700.0284	–
	120	36	15.8	24	60.0	18.0	19	80	535.0	22700.0286	–

¹⁾ Statements on load capacity are not valid for the stainless steel type.

APPLICATION EXAMPLE



Ball-Ended Thrust Screws • headless, ball protected against rotating

EH 22700.



PRODUCT DESCRIPTION

Ball-ended thrust screws can also be used for clamping, tightening or supporting of non-parallel surfaces.

The flat-faced, movable ball enables a flat load transmission.

Material

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

Screw

- Heat-treated steel, 1200 ±100 N/mm²
- Stainless steel 1.4305

References

Thread lock on request, please refer to appendix - Technical Data -

Further products

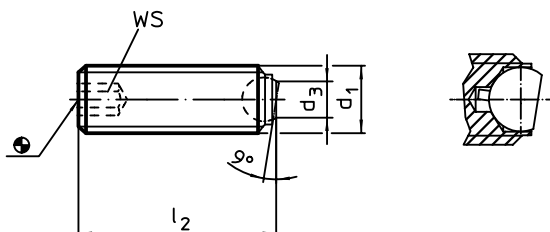
Ball-Ended Thrust Screws, headless, flat-faced ball → p. 327
 Ball-Ended Thrust Screws, headless, with fine-pitch thread → p. 330
 Ball-Ended Thrust Screws, headless, flat-faced ball and hexalobular socket. → p. 333

MORE INFORMATION

Notes

Ball protected against rotating.
 Special types on request.

DRAWING




ORDER INFORMATION

d ₁	Dimensions			Ball diameter	WS	Load capacity for static load ¹⁾ max.	[g]	Art. No.	
	l ₂	d ₃	[mm]					Heat-treated steel	Stainless steel
flat-faced ball, bearing surface plain									
M 6	12	3.2	4.0	3	6	1.6	22700.0563	22700.0803	
	16	3.2	4.0	3	6	2.3	22700.0564	22700.0804	
	20	3.2	4.0	3	6	3.0	22700.0565	22700.0805	
	25	3.2	4.0	3	6	3.8	22700.0566	22700.0806	
M 8	16	4.5	5.5	4	9	3.9	22700.0583	22700.0813	
	20	4.5	5.5	4	9	5.1	22700.0584	22700.0814	
	25	4.5	5.5	4	9	6.6	22700.0585	22700.0815	
	30	4.5	5.5	4	9	8.3	22700.0586	22700.0816	
M10	20	6.0	7.0	5	12	7.7	22700.0603	22700.0823	
	25	6.0	7.0	5	12	10.0	22700.0604	22700.0824	
	35	6.0	7.0	5	12	15.0	22700.0606	22700.0826	
	40	6.0	7.0	5	12	17.0	22700.0608	22700.0828	
M12	20	7.2	8.5	6	18	11.0	22700.0622	22700.0832	
	30	7.2	8.5	6	18	18.0	22700.0624	22700.0834	
	40	7.2	8.5	6	18	25.0	22700.0626	22700.0836	
	50	7.2	8.5	6	18	32.0	22700.0628	22700.0838	
M16	20	10.7	12.0	8	36	22.0	22700.0661	22700.0841	
	25	10.7	12.0	8	36	28.0	22700.0662	22700.0842	
	35	10.7	12.0	8	36	38.0	22700.0664	22700.0844	
	50	10.7	12.0	8	36	60.0	22700.0666	22700.0846	
M20	30	13.5	15.0	10	60	53.0	22700.0672	–	
	40	13.5	15.0	10	60	70.0	22700.0674	–	
	50	13.5	15.0	10	60	90.0	22700.0675	–	
	60	13.5	15.0	10	60	111.0	22700.0676	–	
M24	35	15.8	18.0	12	80	85.0	22700.0682	–	
	50	15.8	18.0	12	80	125.0	22700.0684	–	
	80	15.8	18.0	12	80	215.0	22700.0686	–	

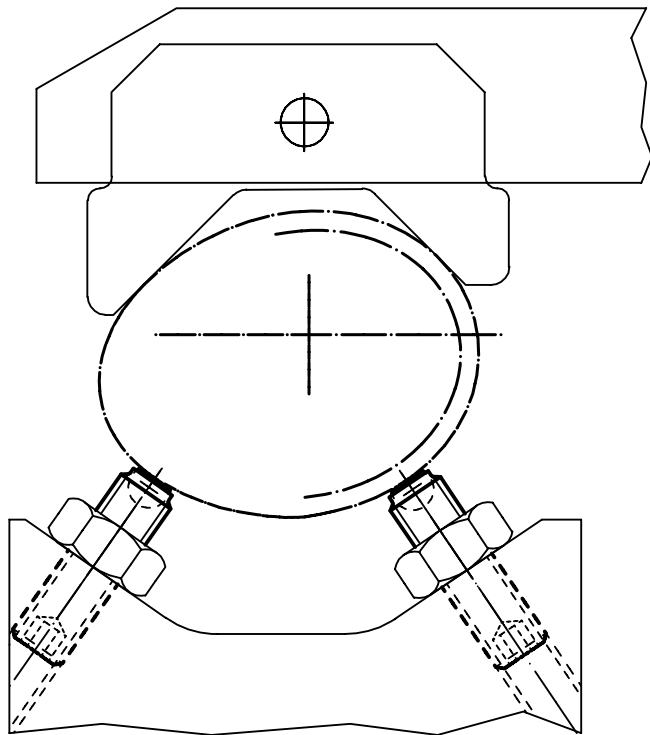
¹⁾ Statements on load capacity are not valid for the stainless steel type.



d ₁	Dimensions			Ball diameter	WS [mm]	Load capacity for static load ¹⁾ max. [kN]	 [g]	Art. No.	
	l ₂	d ₃	[mm]					Heat-treated steel	Stainless steel
flat-faced ball, bearing surface ribbed									
M 8	16	4.5	5.5	4	9	3.9	22700.0693	–	
	20	4.5	5.5	4	9	5.1	22700.0694	–	
	25	4.5	5.5	4	9	6.6	22700.0695	–	
	30	4.5	5.5	4	9	8.3	22700.0696	–	
M10	20	6.0	7.0	5	12	7.7	22700.0703	–	
	25	6.0	7.0	5	12	10.0	22700.0704	–	
	35	6.0	7.0	5	12	15.0	22700.0706	–	
	40	6.0	7.0	5	12	17.0	22700.0708	–	
M12	20	7.2	8.5	6	18	11.0	22700.0722	–	
	30	7.2	8.5	6	18	18.0	22700.0724	–	
	40	7.2	8.5	6	18	25.0	22700.0726	–	
	50	7.2	8.5	6	18	31.0	22700.0728	–	
M16	20	10.7	12.0	8	36	22.0	22700.0761	–	
	25	10.7	12.0	8	36	27.0	22700.0762	–	
	35	10.7	12.0	8	36	40.0	22700.0764	–	
	50	10.7	12.0	8	36	60.0	22700.0766	–	
M20	30	13.5	15.0	10	60	52.0	22700.0772	–	
	40	13.5	15.0	10	60	70.0	22700.0774	–	
	50	13.5	15.0	10	60	89.0	22700.0775	–	
	60	13.5	15.0	10	60	111.0	22700.0776	–	
M24	35	15.8	18.0	12	80	85.0	22700.0782	–	
	50	15.8	18.0	12	80	125.0	22700.0784	–	
	80	15.8	18.0	12	80	215.0	22700.0786	–	

¹⁾ Statements on load capacity are not valid for the stainless steel type.

APPLICATION EXAMPLE



Ball-Ended Thrust Screws • headed, round ball

EH 22710.

2



PRODUCT DESCRIPTION

Ball-ended thrust screws can also be used for positioning and clamping, tightening or supporting of non-parallel surfaces.

Material

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

Screw

- Heat-treated steel, 1200 ±100 N/mm²
- Stainless steel 1.4305

MORE INFORMATION

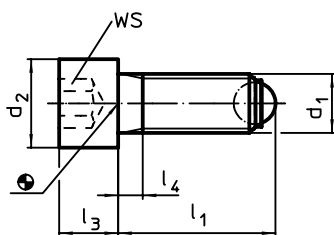
Notes

Special types on request.

References

Thread lock on request, please refer to appendix - Technical Data -

DRAWING



ORDER INFORMATION

d ₁	Dimensions				Ball diameter	WS	Load capacity for static load ¹⁾ max.	[g]	Art. No.	
	l ₁	d ₂	l ₃	l ₄					Heat-treated steel	Stainless steel
[mm]										
round ball										
M 6	20.8	10	6	3.0	4.0	5	9	6.1	22710.0062	22710.0752
	30.8	10	6	3.0	4.0	5	9	7.9	22710.0064	22710.0754
	40.8	10	6	16.0	4.0	5	9	9.9	22710.0066	22710.0756
M 8	21.2	13	8	3.5	5.5	6	15	13.0	22710.0082	22710.0762
	36.2	13	8	3.5	5.5	6	15	17.0	22710.0084	22710.0764
	51.2	13	8	22.0	5.5	6	15	23.0	22710.0086	22710.0766
M10	26.7	16	10	4.5	7.0	8	20	24.0	22710.0102	22710.0772
	41.7	16	10	4.5	7.0	8	20	32.0	22710.0104	22710.0774
	61.7	16	10	28.0	7.0	8	20	44.0	22710.0106	22710.0776
M12	32.0	18	12	5.0	8.5	10	30	39.0	22710.0122	22710.0782
	52.0	18	12	5.0	8.5	10	30	52.0	22710.0124	22710.0784
	82.0	18	12	44.0	8.5	10	30	80.0	22710.0126	22710.0786
M16	43.3	24	16	6.0	12.0	14	60	94.0	22710.0162	22710.0792
	63.3	24	16	6.0	12.0	14	60	122.0	22710.0164	22710.0794
	83.3	24	16	36.0	12.0	14	60	154.0	22710.0166	22710.0796
M20	54.2	30	20	7.5	15.0	17	90	186.0	22710.0202	–
	84.2	30	20	28.0	15.0	17	90	255.0	22710.0204	–
	104.2	30	20	48.0	15.0	17	90	306.0	22710.0206	–
M24	64.7	36	24	9.0	18.0	19	120	327.0	22710.0242	–
	94.7	36	24	30.0	18.0	19	120	428.0	22710.0244	–
	124.7	36	24	60.0	18.0	19	120	532.0	22710.0246	–

¹⁾ Statements on load capacity are not valid for the stainless steel type.

Ball-Ended Thrust Screws • headed, flat-faced ball
EH 22710.



PRODUCT DESCRIPTION

Ball-ended thrust screws can also be used for clamping, tightening or supporting of non-parallel surfaces. The flat-faced, movable ball enables a flat load transmission.

Material

Special types on request.

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

References

Thread lock on request, please refer to appendix - Technical Data -

Screw

- Heat-treated steel, 1200 ±100 N/mm²
- Stainless steel 1.4305

Further products

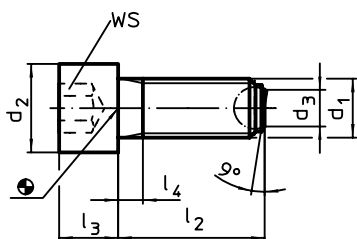
Ball-Ended Thrust Screws, headed, ball protected against rotating → p. 318

MORE INFORMATION

Notes

Ball not secured against rotating.

DRAWING




ORDER INFORMATION

d ₁	l ₂	d ₂	Dimensions			Ball diameter	WS	Load capacity for static load ¹⁾ max.	[g]	Art. No.	
			d ₃	l ₃	l ₄					Heat-treated steel	Stainless steel
[mm]											
bearing surface plain											
M 6	20	10	3.2	6	3.0	4.0	5	9	6.1	22710.0562	22710.0832
	30	10	3.2	6	3.0	4.0	5	9	7.8	22710.0564	22710.0834
	40	10	3.2	6	16.0	4.0	5	9	9.9	22710.0566	22710.0836
M 8	20	13	4.5	8	3.5	5.5	6	15	12.0	22710.0582	22710.0842
	35	13	4.5	8	3.5	5.5	6	15	17.0	22710.0584	22710.0844
	50	13	4.5	8	22.0	5.5	6	15	23.0	22710.0586	22710.0846
M10	25	16	6.0	10	4.5	7.0	8	20	24.0	22710.0602	22710.0852
	40	16	6.0	10	4.5	7.0	8	20	32.0	22710.0604	22710.0854
	60	16	6.0	10	28.0	7.0	8	20	44.0	22710.0606	22710.0856
M12	30	18	7.2	12	5.0	8.5	10	30	38.0	22710.0622	22710.0862
	50	18	7.2	12	5.0	8.5	10	30	52.0	22710.0624	22710.0864
	80	18	7.2	12	44.0	8.5	10	30	80.0	22710.0626	22710.0866
M16	40	24	10.7	16	6.0	12.0	14	60	95.0	22710.0662	22710.0872
	60	24	10.7	16	6.0	12.0	14	60	121.0	22710.0664	22710.0874
	80	24	10.7	16	36.0	12.0	14	60	153.0	22710.0666	22710.0876
M20	50	30	13.5	20	7.5	15.0	17	90	185.0	22710.0702	-
	80	30	13.5	20	28.0	15.0	17	90	254.0	22710.0704	-
	100	30	13.5	20	48.0	15.0	17	90	304.0	22710.0706	-
M24	60	36	15.8	24	9.0	18.0	19	120	323.0	22710.0742	-
	90	36	15.8	24	30.0	18.0	19	120	424.0	22710.0744	-
	120	36	15.8	24	60.0	18.0	19	120	526.0	22710.0746	-

¹⁾ Statements on load capacity are not valid for the stainless steel type.



d ₁	l ₂ ~	Dimensions				Ball diameter	WS [mm]	Load capacity for static load ¹⁾ max. [kN]	 [g]	Art. No.	
		d ₂	d ₃	l ₃	l ₄					Heat-treated steel	Stainless steel
[mm]											
bearing surface ribbed											
M 8	20	13	4.5	8	3.5	5.5	6	15	12.0	22710.0892	–
	35	13	4.5	8	3.5	5.5	6	15	17.0	22710.0894	–
	50	13	4.5	8	22.0	5.5	6	15	23.0	22710.0896	–
M10	25	16	6.0	10	4.5	7.0	8	20	24.0	22710.0902	–
	40	16	6.0	10	4.5	7.0	8	20	31.0	22710.0904	–
	60	16	6.0	10	28.0	7.0	8	20	44.0	22710.0906	–
M12	30	18	7.2	12	5.0	8.5	10	30	38.0	22710.0922	–
	50	18	7.2	12	5.0	8.5	10	30	52.0	22710.0924	–
	80	18	7.2	12	44.0	8.5	10	30	80.0	22710.0926	–
M16	40	24	10.7	16	6.0	12.0	14	60	93.0	22710.0962	–
	60	24	10.7	16	6.0	12.0	14	60	121.0	22710.0964	–
	80	24	10.7	16	36.0	12.0	14	60	152.0	22710.0966	–
M20	50	30	13.5	20	7.5	15.0	17	90	184.0	22710.0972	–
	80	30	13.5	20	28.0	15.0	17	90	255.0	22710.0974	–
	100	30	13.5	20	48.0	15.0	17	90	303.0	22710.0976	–
M24	60	36	15.8	24	9.0	18.0	19	120	324.0	22710.0982	–
	90	36	15.8	24	30.0	18.0	19	120	426.0	22710.0984	–
	120	36	15.8	24	60.0	18.0	19	120	528.0	22710.0986	–

¹⁾ Statements on load capacity are not valid for the stainless steel type.

Ball-Ended Thrust Screws • headless, round ball

EH 22720.



PRODUCT DESCRIPTION

Ball-ended thrust screws with thermoplastic ball are used for pressure sensitive pieces. Ball-ended thrust screws can also be used for positioning and clamping, tightening or supporting of non-parallel surfaces.

Material

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened
- Thermoplastic POM, white

Screw

- Heat-treated steel, 1200 ±100 N/mm²
- Stainless steel 1.4305

MORE INFORMATION

Notes

Ball not secured against rotating.

Special types on request.

References

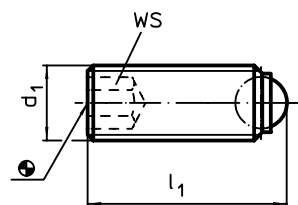
Thread lock on request, please refer to appendix - Technical Data -

Further products

Ball-Ended Thrust Screws, headless, with fine-pitch thread → p. 330

Ball-Ended Thrust Screws, headless, round ball and hexalobular socket. → p. 332



DRAWING



ORDER INFORMATION

d ₁	Dimensions		WS	Load capacity for static load ¹⁾ max.	Temperature range		Weight	Art. No.	
	l ₁	Ball diameter			min.	max.		Heat-treated steel	Stainless steel
	[mm]	[mm]	[mm]	[kN]	[°C]		[g]		
round ball									
M 3	5.0	1.5	1.5	2.5	–	250	0.1	22720.0032	22720.0747
	7.5	1.5	1.5	2.5	–	250	0.2	22720.0033	22720.0748
	10.0	1.5	1.5	2.5	–	250	0.3	22720.0034	22720.0749
M 4	6.0	2.5	2.0	3.5	–	250	0.3	22720.0042	22720.0750
	8.0	2.5	2.0	3.5	–	250	0.4	22720.0043	22720.0752
	10.0	2.5	2.0	3.5	–	250	0.5	22720.0044	22720.0754
	12.0	2.5	2.0	3.5	–	250	0.7	22720.0045	22720.0756
	16.0	2.5	2.0	3.5	–	250	1.0	22720.0046	22720.0758
M 5	8.0	3.0	2.5	4.5	–	250	0.7	22720.0052	22720.0760
	10.0	3.0	2.5	4.5	–	250	0.9	22720.0053	22720.0761
	12.0	3.0	2.5	4.5	–	250	1.1	22720.0054	22720.0762
	16.0	3.0	2.5	4.5	–	250	1.6	22720.0055	22720.0763
	20.0	3.0	2.5	4.5	–	250	2.0	22720.0056	22720.0764
M 6	25.0	3.0	2.5	4.5	–	250	2.6	22720.0058	22720.0765
	10.8	4.0	3.0	9.0	–	250	1.3	22720.0062	22720.0770
	12.8	4.0	3.0	9.0	–	250	1.7	22720.0063	22720.0772
	16.8	4.0	3.0	9.0	–	250	2.3	22720.0064	22720.0774
	20.8	4.0	3.0	9.0	–	250	3.0	22720.0065	22720.0775
M 8	25.8	4.0	3.0	9.0	–	250	3.8	22720.0066	22720.0776
	11.2	5.5	4.0	15.0	–	250	2.5	22720.0081	22720.0780
	13.2	5.5	4.0	15.0	–	250	2.8	22720.0082	22720.0782
	17.2	5.5	4.0	15.0	–	250	4.0	22720.0083	22720.0783
	21.2	5.5	4.0	15.0	–	250	5.2	22720.0084	22720.0784
M 8	26.2	5.5	4.0	15.0	–	250	6.7	22720.0085	22720.0785
	31.2	5.5	4.0	15.0	–	250	8.3	22720.0086	22720.0786

¹⁾ Statements on load capacity are not valid for the stainless steel type (except the type fitted with thermoplastic balls). →

d ₁	Dimensions		WS	Load capacity for static load ¹⁾ max.	 min. max.		 [g]	Art. No.	
	l ₁	Ball diameter			[mm]	[kN]		[°C]	
M10	13.7	7.0	5.0	20.0	-	250	4.7	22720.0101	22720.0790
	17.7	7.0	5.0	20.0	-	250	6.0	22720.0102	22720.0792
	21.7	7.0	5.0	20.0	-	250	8.0	22720.0103	22720.0793
	26.7	7.0	5.0	20.0	-	250	10.0	22720.0104	22720.0794
	31.7	7.0	5.0	20.0	-	250	13.0	22720.0105	22720.0795
	36.7	7.0	5.0	20.0	-	250	15.0	22720.0106	22720.0796
	41.7	7.0	5.0	20.0	-	250	18.0	22720.0108	22720.0798
M12	18.0	8.5	6.0	30.0	-	250	9.2	22720.0121	22720.0800
	22.0	8.5	6.0	30.0	-	250	11.0	22720.0122	22720.0802
	27.0	8.5	6.0	30.0	-	250	14.0	22720.0123	22720.0803
	32.0	8.5	6.0	30.0	-	250	18.0	22720.0124	22720.0804
	42.0	8.5	6.0	30.0	-	250	25.0	22720.0126	22720.0806
	52.0	8.5	6.0	30.0	-	250	32.0	22720.0128	22720.0808
M16	23.3	12.0	8.0	60.0	-	250	22.0	22720.0161	22720.0810
	28.3	12.0	8.0	60.0	-	250	27.0	22720.0162	22720.0812
	38.3	12.0	8.0	60.0	-	250	41.0	22720.0164	22720.0814
	53.3	12.0	8.0	60.0	-	250	61.0	22720.0166	22720.0816
M20	34.2	15.0	10.0	90.0	-	250	52.0	22720.0202	-
	44.2	15.0	10.0	90.0	-	250	73.0	22720.0204	-
	54.2	15.0	10.0	90.0	-	250	94.0	22720.0205	-
	64.2	15.0	10.0	90.0	-	250	114.0	22720.0206	-
M24	39.7	18.0	12.0	120.0	-	250	89.0	22720.0242	-
	54.7	18.0	12.0	120.0	-	250	133.0	22720.0244	-
	84.7	18.0	12.0	120.0	-	250	223.0	22720.0246	-
round ball from thermoplastic									
M 4	6.0	2.5	2.0	0.3	-30	80	0.2	22720.0342	22720.0252
	8.0	2.5	2.0	0.3	-30	80	0.4	22720.0343	22720.0253
	10.0	2.5	2.0	0.3	-30	80	0.5	22720.0344	22720.0254
	12.0	2.5	2.0	0.3	-30	80	0.6	22720.0345	22720.0255
	16.0	2.5	2.0	0.3	-30	80	0.9	22720.0346	22720.0256
M 5	8.0	3.0	2.5	0.5	-30	80	0.8	22720.0352	22720.0262
	10.0	3.0	2.5	0.5	-30	80	0.7	22720.0353	22720.0263
	12.0	3.0	2.5	0.5	-30	80	1.0	22720.0354	22720.0264
	16.0	3.0	2.5	0.5	-30	80	1.5	22720.0355	22720.0265
	20.0	3.0	2.5	0.5	-30	80	1.9	22720.0356	22720.0266
	25.0	3.0	2.5	0.5	-30	80	2.5	22720.0358	22720.0267
M 6	10.8	4.0	3.0	0.9	-30	80	1.1	22720.0362	22720.0272
	12.8	4.0	3.0	0.9	-30	80	1.4	22720.0363	22720.0273
	16.8	4.0	3.0	0.9	-30	80	2.1	22720.0364	22720.0274
	20.8	4.0	3.0	0.9	-30	80	2.8	22720.0365	22720.0275
	25.8	4.0	3.0	0.9	-30	80	3.6	22720.0366	22720.0276
M 8	11.2	5.5	4.0	1.5	-30	80	1.9	22720.0381	22720.0281
	13.2	5.5	4.0	1.5	-30	80	2.3	22720.0382	22720.0282
	17.2	5.5	4.0	1.5	-30	80	3.6	22720.0383	22720.0283
	21.2	5.5	4.0	1.5	-30	80	4.6	22720.0384	22720.0284
	26.2	5.5	4.0	1.5	-30	80	6.3	22720.0385	22720.0285
	31.2	5.5	4.0	1.5	-30	80	7.7	22720.0386	22720.0286
M10	13.7	7.0	5.0	2.0	-30	80	3.5	22720.0401	22720.0291
	17.7	7.0	5.0	2.0	-30	80	4.9	22720.0402	22720.0292
	21.7	7.0	5.0	2.0	-30	80	6.8	22720.0403	22720.0293
	26.7	7.0	5.0	2.0	-30	80	9.2	22720.0404	22720.0294
	31.7	7.0	5.0	2.0	-30	80	12.0	22720.0405	22720.0295
	36.7	7.0	5.0	2.0	-30	80	14.0	22720.0406	22720.0296
	41.7	7.0	5.0	2.0	-30	80	16.0	22720.0408	22720.0297
M12	18.0	8.5	6.0	3.0	-30	80	7.1	22720.0421	22720.0301
	22.0	8.5	6.0	3.0	-30	80	8.8	22720.0422	22720.0302
	27.0	8.5	6.0	3.0	-30	80	12.0	22720.0423	22720.0303
	32.0	8.5	6.0	3.0	-30	80	16.0	22720.0424	22720.0304
	42.0	8.5	6.0	3.0	-30	80	23.0	22720.0426	22720.0306
	52.0	8.5	6.0	3.0	-30	80	30.0	22720.0428	22720.0308

¹⁾ Statements on load capacity are not valid for the stainless steel type (except the type fitted with thermoplastic balls).

Ball-Ended Thrust Screws • headless, flat-faced ball

EH 22720.



PRODUCT DESCRIPTION

Ball-ended thrust screws with thermoplastic ball are used for pressure sensitive pieces. Ball-ended thrust screws can also be used for clamping, tightening or supporting of non-parallel surfaces. The flat-faced, movable ball enables a flat load transmission.

Material

- Ball**
- Ball-bearing steel, hardened
 - Stainless steel, hardened
 - Thermoplastic POM, red

Screw

- Heat-treated steel, 1200 ±100 N/mm²
- Stainless steel 1.4305

MORE INFORMATION

Notes

Ball not secured against rotating. Special types on request.

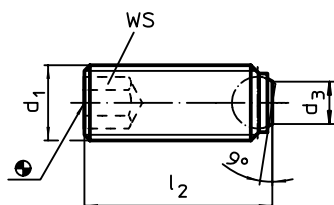
References

Thread lock on request, please refer to appendix - Technical Data -

Further products

- Ball-Ended Thrust Screws, headless, ball protected against rotating → p. 320
- Ball-Ended Thrust Screws, headless, with fine-pitch thread → p. 330
- Ball-Ended Thrust Screws, headless, short → p. 331
- Ball-Ended Thrust Screws, headless, flat-faced ball and hexalobular socket → p. 333

DRAWING





ORDER INFORMATION

d ₁	Dimensions			WS	Load capacity for static load ¹⁾ max.	Temperature		Weight	Art. No.	
	l ₂	d ₃	Ball diameter			min.	max.		Heat-treated steel	Stainless steel
	[mm]			[mm]	[kN]	[°C]		[g]		
bearing surface plain										
M 4	5.6	1.8	2.5	2.0	3.5	-	250	0.3	22720.0542	22720.0827
	7.6	1.8	2.5	2.0	3.5	-	250	0.4	22720.0543	22720.0828
	9.6	1.8	2.5	2.0	3.5	-	250	0.6	22720.0544	22720.0829
	11.6	1.8	2.5	2.0	3.5	-	250	0.7	22720.0545	22720.0830
	15.6	1.8	2.5	2.0	3.5	-	250	1.0	22720.0546	22720.0832
M 5	7.5	2.2	3.0	2.5	4.5	-	250	0.6	22720.0552	22720.0833
	9.5	2.2	3.0	2.5	4.5	-	250	0.9	22720.0553	22720.0834
	11.5	2.2	3.0	2.5	4.5	-	250	1.1	22720.0554	22720.0835
	15.5	2.2	3.0	2.5	4.5	-	250	1.6	22720.0555	22720.0836
	19.5	2.2	3.0	2.5	4.5	-	250	2.0	22720.0556	22720.0837
M 6	24.5	2.2	3.0	2.5	4.5	-	250	2.6	22720.0558	22720.0838
	10.0	3.2	4.0	3.0	9.0	-	250	1.3	22720.0562	22720.0840
	12.0	3.2	4.0	3.0	9.0	-	250	1.6	22720.0563	22720.0842
	16.0	3.2	4.0	3.0	9.0	-	250	2.3	22720.0564	22720.0844
	20.0	3.2	4.0	3.0	9.0	-	250	3.0	22720.0565	22720.0845
M 8	25.0	3.2	4.0	3.0	9.0	-	250	3.8	22720.0566	22720.0846
	10.0	4.5	5.5	4.0	15.0	-	250	2.4	22720.0581	22720.0850
	12.0	4.5	5.5	4.0	15.0	-	250	2.8	22720.0582	22720.0852
	16.0	4.5	5.5	4.0	15.0	-	250	4.1	22720.0583	22720.0853
	20.0	4.5	5.5	4.0	15.0	-	250	5.1	22720.0584	22720.0854
M 8	25.0	4.5	5.5	4.0	15.0	-	250	6.7	22720.0585	22720.0855
	30.0	4.5	5.5	4.0	15.0	-	250	8.2	22720.0586	22720.0856



¹⁾ Statements on load capacity are not valid for the stainless steel type (except the type fitted with thermoplastic balls).



d ₁	Dimensions			WS [mm]	Load capacity for static load ¹⁾ max. [kN]	 min. max. [°C]		 [g]	Art. No.	
	l ₂	d ₃	Ball diameter			Heat-treated steel	Stainless steel			
[mm]										
M10	12.0	6.0	7.0	5.0	20.0	-	250	4.5	22720.0601	22720.0860
	16.0	6.0	7.0	5.0	20.0	-	250	5.9	22720.0602	22720.0862
	20.0	6.0	7.0	5.0	20.0	-	250	7.8	22720.0603	22720.0863
	25.0	6.0	7.0	5.0	20.0	-	250	10.0	22720.0604	22720.0864
	30.0	6.0	7.0	5.0	20.0	-	250	13.0	22720.0605	22720.0865
	35.0	6.0	7.0	5.0	20.0	-	250	15.0	22720.0606	22720.0866
	40.0	6.0	7.0	5.0	20.0	-	250	18.0	22720.0608	22720.0868
M12	16.0	7.2	8.5	6.0	30.0	-	250	8.8	22720.0621	22720.0870
	20.0	7.2	8.5	6.0	30.0	-	250	11.0	22720.0622	22720.0872
	25.0	7.2	8.5	6.0	30.0	-	250	14.0	22720.0623	22720.0873
	30.0	7.2	8.5	6.0	30.0	-	250	18.0	22720.0624	22720.0874
	40.0	7.2	8.5	6.0	30.0	-	250	25.0	22720.0626	22720.0876
	50.0	7.2	8.5	6.0	30.0	-	250	32.0	22720.0628	22720.0878
M16	20.0	10.7	12.0	8.0	60.0	-	250	21.0	22720.0661	22720.0880
	25.0	10.7	12.0	8.0	60.0	-	250	26.0	22720.0662	22720.0882
	35.0	10.7	12.0	8.0	60.0	-	250	40.0	22720.0664	22720.0884
	50.0	10.7	12.0	8.0	60.0	-	250	60.0	22720.0666	22720.0886
M20	30.0	13.5	15.0	10.0	90.0	-	250	50.0	22720.0702	-
	40.0	13.5	15.0	10.0	90.0	-	250	71.0	22720.0704	-
	50.0	13.5	15.0	10.0	90.0	-	250	92.0	22720.0705	-
	60.0	13.5	15.0	10.0	90.0	-	250	111.0	22720.0706	-
M24	35.0	15.8	18.0	12.0	120.0	-	250	85.0	22720.0742	-
	50.0	15.8	18.0	12.0	120.0	-	250	129.0	22720.0744	-
	80.0	15.8	18.0	12.0	120.0	-	250	218.0	22720.0746	-
flat-faced ball from thermoplastic, bearing surface plain (protected against rotating)										
M 4	5.9	1.8	2.5	2.0	0.3	-30	80	0.4	22720.0452	22720.0492
	7.9	1.8	2.5	2.0	0.3	-30	80	0.3	22720.0453	22720.0493
	9.9	1.8	2.5	2.0	0.3	-30	80	0.5	22720.0454	22720.0494
	11.9	1.8	2.5	2.0	0.3	-30	80	0.7	22720.0455	22720.0495
	15.9	1.8	2.5	2.0	0.3	-30	80	0.9	22720.0456	22720.0496
M 5	7.8	2.1	3.0	2.5	0.5	-30	80	0.6	22720.0462	22720.0502
	9.8	2.1	3.0	2.5	0.5	-30	80	0.8	22720.0463	22720.0503
	11.8	2.1	3.0	2.5	0.5	-30	80	1.0	22720.0464	22720.0504
	15.8	2.1	3.0	2.5	0.5	-30	80	1.5	22720.0465	22720.0505
	19.8	2.1	3.0	2.5	0.5	-30	80	1.9	22720.0466	22720.0506
	24.8	2.1	3.0	2.5	0.5	-30	80	2.5	22720.0467	22720.0507
M 6	10.3	3.0	4.0	3.0	0.9	-30	80	1.1	22720.0472	22720.0512
	12.3	3.0	4.0	3.0	0.9	-30	80	1.4	22720.0473	22720.0513
	16.3	3.0	4.0	3.0	0.9	-30	80	2.1	22720.0474	22720.0514
	20.3	3.0	4.0	3.0	0.9	-30	80	2.8	22720.0475	22720.0515
	25.3	3.0	4.0	3.0	0.9	-30	80	3.6	22720.0476	22720.0516
M 8	10.4	4.2	5.5	4.0	1.5	-30	80	1.9	22720.0482	22720.0522
	12.4	4.2	5.5	4.0	1.5	-30	80	2.3	22720.0483	22720.0523
	16.4	4.2	5.5	4.0	1.5	-30	80	3.4	22720.0484	22720.0524
	20.4	4.2	5.5	4.0	1.5	-30	80	4.6	22720.0485	22720.0525
	25.4	4.2	5.5	4.0	1.5	-30	80	6.2	22720.0486	22720.0526
	30.4	4.2	5.5	4.0	1.5	-30	80	7.8	22720.0487	22720.0527
bearing surface ribbed										
M 8	10.0	4.5	5.5	4.0	15.0	-	250	2.4	22720.0891	-
	12.0	4.5	5.5	4.0	15.0	-	250	2.7	22720.0892	-
	16.0	4.5	5.5	4.0	15.0	-	250	3.9	22720.0893	-
	20.0	4.5	5.5	4.0	15.0	-	250	5.1	22720.0894	-
	25.0	4.5	5.5	4.0	15.0	-	250	6.7	22720.0895	-
	30.0	4.5	5.5	4.0	15.0	-	250	8.2	22720.0896	-
	40.0	4.5	5.5	4.0	15.0	-	250	11.0	22720.0897	-
M10	12.0	6.0	7.0	5.0	20.0	-	250	4.5	22720.0901	-
	16.0	6.0	7.0	5.0	20.0	-	250	5.8	22720.0902	-
	20.0	6.0	7.0	5.0	20.0	-	250	7.7	22720.0903	-
	25.0	6.0	7.0	5.0	20.0	-	250	10.0	22720.0904	-
	30.0	6.0	7.0	5.0	20.0	-	250	13.0	22720.0905	-
	35.0	6.0	7.0	5.0	20.0	-	250	15.0	22720.0906	-
	40.0	6.0	7.0	5.0	20.0	-	250	17.0	22720.0908	-

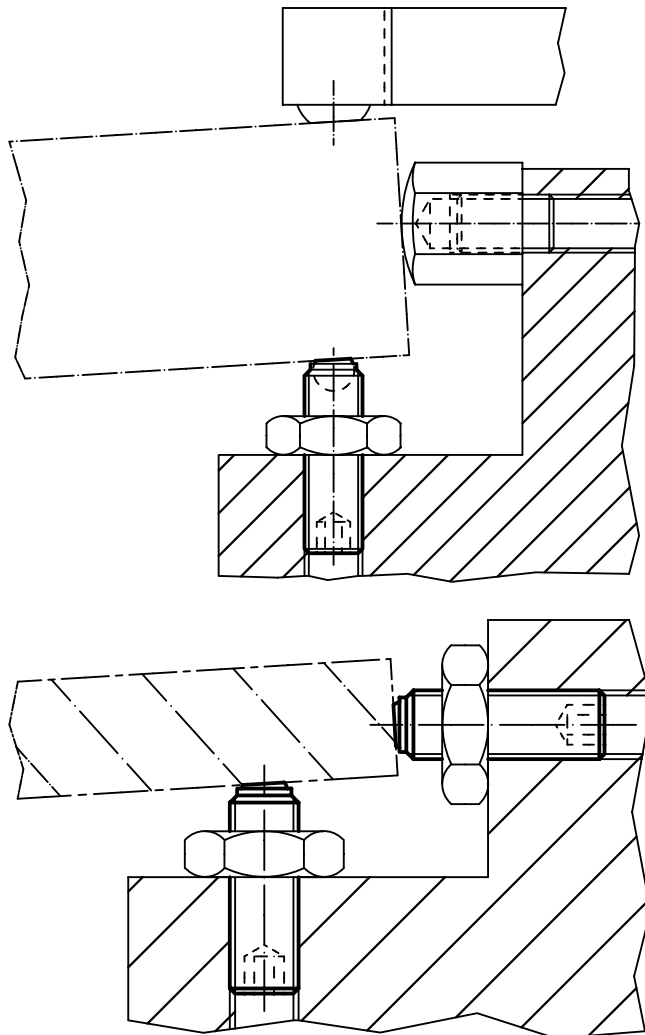
¹⁾ Statements on load capacity are not valid for the stainless steel type (except the type fitted with thermoplastic balls).



d ₁	Dimensions			WS [mm]	Load capacity for static load ¹⁾ max. [kN]	 min. max. [°C]		 [g]	Art. No.	
	l ₂	d ₃	Ball diameter			Heat-treated steel	Stainless steel			
	[mm]									
M12	16.0	7.2	8.5	6.0	30.0	–	250	8.8	22720.0921	–
	20.0	7.2	8.5	6.0	30.0	–	250	10.0	22720.0922	–
	25.0	7.2	8.5	6.0	30.0	–	250	14.0	22720.0923	–
	30.0	7.2	8.5	6.0	30.0	–	250	18.0	22720.0924	–
	40.0	7.2	8.5	6.0	30.0	–	250	25.0	22720.0926	–
	50.0	7.2	8.5	6.0	30.0	–	250	32.0	22720.0928	–
M16	20.0	10.7	12.0	8.0	60.0	–	250	21.0	22720.0961	–
	25.0	10.7	12.0	8.0	60.0	–	250	26.0	22720.0962	–
	35.0	10.7	12.0	8.0	60.0	–	250	40.0	22720.0964	–
	50.0	10.7	12.0	8.0	60.0	–	250	60.0	22720.0966	–
M20	30.0	13.5	15.0	10.0	90.0	–	250	49.0	22720.0972	–
	40.0	13.5	15.0	10.0	90.0	–	250	70.0	22720.0974	–
	50.0	13.5	15.0	10.0	90.0	–	250	91.0	22720.0975	–
	60.0	13.5	15.0	10.0	90.0	–	250	111.0	22720.0976	–
M24	35.0	15.8	18.0	12.0	120.0	–	250	84.0	22720.0982	–
	50.0	15.8	18.0	12.0	120.0	–	250	125.0	22720.0984	–
	80.0	15.8	18.0	12.0	120.0	–	250	217.0	22720.0986	–

¹⁾ Statements on load capacity are not valid for the stainless steel type (except the type fitted with thermoplastic balls).

APPLICATION EXAMPLE



Ball-Ended Thrust Screws • headless, with fine-pitch thread

EH 22720.

2



PRODUCT DESCRIPTION

Ball-ended thrust screws can also be used for positioning and clamping, tightening or supporting of non-parallel surfaces. The fine-pitch thread allows a precise adjustment. The flat-faced, movable ball enables a flat load transmission.

Material

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

Screw

- Heat-treated steel, 1200 ±100 N/mm²
- Stainless steel 1.4305

MORE INFORMATION

Notes

Ball not secured against rotating.
Special types on request.

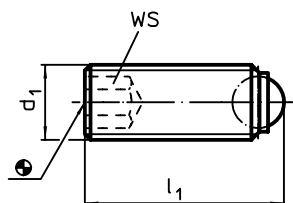
References

Thread lock on request, please refer to appendix - Technical Data -

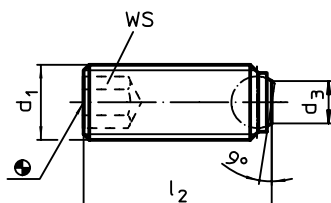
Further products

Ball-Ended Thrust Screws, headless, ball protected against rotating → p. 320
Ball-Ended Thrust Screws, headless, round ball → p. 325
Ball-Ended Thrust Screws, headless, flat-faced ball → p. 327

DRAWING



picture 1



picture 2

ORDER INFORMATION

d ₁	Dimensions				WS	Load capacity for static load ¹⁾ max.	max. [°C]	[g]	Art. No.	
	l ₁	l ₂	d ₃	Ball diameter					Heat-treated steel	Stainless steel
[mm]										
round ball – picture 1										
M4 x 0,35	6.0	–	–	2.5	2.0	3.5	250	0.4	22720.5030	22720.6030
	10.0	–	–	2.5	2.0	3.5	250	0.7	22720.5032	22720.6032
M4 x 0,5	6.0	–	–	2.5	2.0	3.5	250	0.3	22720.5040	22720.6040
	10.0	–	–	2.5	2.0	3.5	250	0.6	22720.5042	22720.6042
M5 x 0,5	8.0	–	–	3.0	2.5	4.5	250	0.7	22720.5050	22720.6050
	12.0	–	–	3.0	2.5	4.5	250	1.2	22720.5052	22720.6052
M6 x 0,5	10.8	–	–	4.0	3.0	9.0	250	1.5	22720.5060	22720.6060
	12.8	–	–	4.0	3.0	9.0	250	2.2	22720.5061	22720.6061
	16.8	–	–	4.0	3.0	9.0	250	2.7	22720.5062	22720.6062
	20.8	–	–	4.0	3.0	9.0	250	3.4	22720.5063	22720.6063
	25.8	–	–	4.0	3.0	9.0	250	4.4	22720.5064	22720.6064
M8 x 1	11.2	–	–	5.5	4.0	15.0	250	2.5	22720.5070	22720.6070
	21.2	–	–	5.5	4.0	15.0	250	5.5	22720.5073	22720.6073
flat-faced ball, bearing surface plain – picture 2										
M4 x 0,35	–	5.6	1.3	2.5	2.0	3.5	250	0.3	22720.5230	22720.6230
		9.6	1.3	2.5	2.0	3.5	250	0.7	22720.5232	22720.6232
M4 x 0,5	–	5.6	1.3	2.5	2.0	3.5	250	0.3	22720.5240	22720.6240
		9.6	1.3	2.5	2.0	3.5	250	0.6	22720.5242	22720.6242
M5 x 0,5	–	7.5	2.2	3.0	2.5	4.5	250	0.7	22720.5250	22720.6250
		11.5	2.2	3.0	2.5	4.5	250	1.2	22720.5252	22720.6252
M6 x 0,5	–	10.0	3.2	4.0	3.0	9.0	250	1.5	22720.5260	22720.6260
		12.0	3.2	4.0	3.0	9.0	250	1.8	22720.5261	22720.6261
		16.0	3.2	4.0	3.0	9.0	250	2.6	22720.5262	22720.6262
		20.0	3.2	4.0	3.0	9.0	250	3.4	22720.5263	22720.6263
		25.0	3.2	4.0	3.0	9.0	250	4.4	22720.5264	22720.6264
M8 x 1	–	10.0	4.5	5.5	4.0	15.0	250	2.5	22720.5270	22720.6270
		20.0	4.5	5.5	4.0	15.0	250	5.4	22720.5273	22720.6273

¹⁾ Statements on load capacity are not valid for the stainless steel type.

Ball-Ended Thrust Screws • headless, short
EH 22720.



PRODUCT DESCRIPTION

Ball-ended thrust screws, short execution, are particularly suitable for parallel shanks DIN 1835 E in combination, for instance, with Whistle Notch and Weldon Tool Holding Fixtures. Ball-ended thrust screws can also be used for clamping, tightening or supporting of non-parallel surfaces. The flat-faced, movable ball enables a flat load transmission.

Material

Special types on request.

Ball

- Ball-bearing steel, hardened

References

Thread lock on request, please refer to appendix - Technical Data -

Screw

- Heat-treated steel, 1200 ±100 N/mm²

Further products

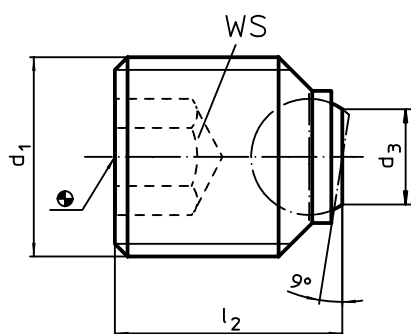
Ball-Ended Thrust Screws, headless, flat-faced ball → p. 327

MORE INFORMATION

Notes

Ball not secured against rotating.

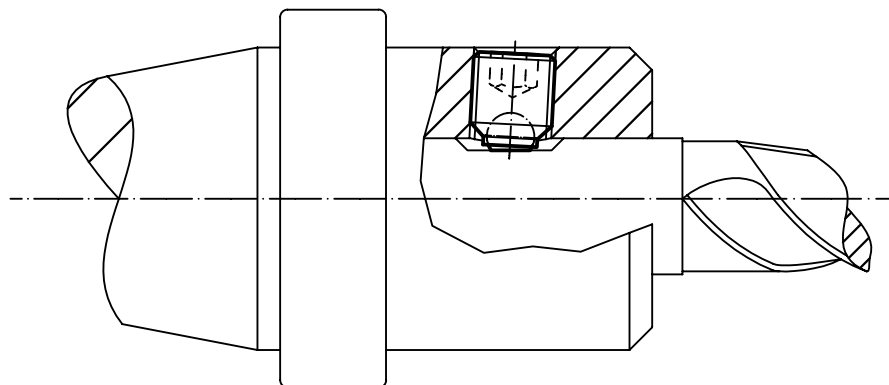
DRAWING



ORDER INFORMATION

d ₁	Dimensions			Ball diameter	WS	Load capacity for static load max.	[g]	Art. No.
	l ₂	d ₃	[mm]					
flat-faced ball, bearing surface plain, for straight shanks DIN 1835 E								
M14	16	7.2	8.5	6	30	12	22720.0641	
M16	16	7.2	8.5	8	30	15	22720.0660	
M18 x 2	20	10.7	12.0	10	60	25	22720.0682	
M20 x 2	20	10.7	12.0	10	60	32	22720.0692	
	25	10.7	12.0	10	60	42	22720.0693	
M24 x 2	25	13.5	15.0	12	90	59	22720.0730	

APPLICATION EXAMPLE



Ball-Ended Thrust Screws • headless, round ball and hexalobular socket

EH 22720.



PRODUCT DESCRIPTION

Ball-ended thrust screws can also be used for positioning and clamping, tightening or supporting of non-parallel surfaces. The hexalobular drive enables an optimal load transmission. The driving forces are not transmitted by edges (e.g. with the internal hexagon) but by surfaces. Due to the optimal load transmission, the tool wear is reduced and, as a result of this, the tool life is increased.

Material

Special types on request.

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

References

Thread lock on request, please refer to appendix - Technical Data -

Screw

- Heat-treated steel, 1200 ±100 N/mm²
- Stainless steel 1.4305

Further products

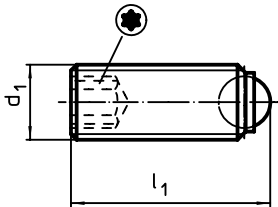
Ball-Ended Thrust Screws, headless, round ball. → p. 325
 Ball-Ended Thrust Screws, headless, flat-faced ball and hexalobular socket. → p. 333

MORE INFORMATION

Notes

Ball not secured against rotating.

DRAWING



ORDER INFORMATION

d ₁	Dimensions			Load capacity for static load ¹⁾ max.			Art. No.	
	l ₁ [mm]	Ball diameter					Heat-treated steel	Stainless steel
round ball								
M4	6.0	2.5	8	3.5	250	0.3	22720.1042	22720.2042
	10.0	2.5	8	3.5	250	0.6	22720.1044	22720.2044
M5	8.0	3.0	10	4.5	250	0.7	22720.1052	22720.2052
	12.0	3.0	10	4.5	250	1.2	22720.1054	22720.2054
M6	10.8	4.0	15	9.0	250	1.4	22720.1062	22720.2062
	16.8	4.0	15	9.0	250	2.5	22720.1064	22720.2064

¹⁾ Statements on load capacity are not valid for the stainless steel type (except the type fitted with thermoplastic balls).

Ball-Ended Thrust Screws • headless, flat-faced ball and hexalobular socket

EH 22720.



PRODUCT DESCRIPTION

Ball-ended thrust screws can also be used for clamping, tightening or supporting of non-parallel surfaces. The hexalobular drive enables an optimal load transmission. The driving forces are not transmitted by edges (e.g. with the internal hexagon) but by surfaces. Due to the optimal load transmission, the tool wear is reduced and, as a result of this, the tool life is increased.

Material

- Ball**
 - Ball-bearing steel, hardened
 - Stainless steel, hardened
- Screw**
 - Heat-treated steel, 1200 ±100 N/mm²
 - Stainless steel 1.4305

References

Thread lock on request, please refer to appendix - Technical Data -

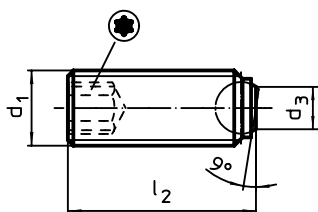
Further products

- Ball-Ended Thrust Screws, headless, ball protected against rotating → p. 320
- Ball-Ended Thrust Screws, headless, flat-faced ball → p. 327
- Ball-Ended Thrust Screws, headless, round ball and hexalobular socket. → p. 332

MORE INFORMATION

Notes
 Ball not secured against rotating.
 Special types on request.

DRAWING



ORDER INFORMATION

Dimensions					Load capacity for static load ¹⁾ max.	 max.	 [g]	Art. No.	
d ₁	l ₂	d ₃	Ball diameter					Heat-treated steel	Stainless steel
[mm]					[kN]	[°C]			
flat-faced ball, bearing surface plain									
M4	5.6	1.8	2.5	8	3.5	250	0.3	22720.1542	22720.2542
	9.6	1.8	2.5	8	3.5	250	0.6	22720.1544	22720.2544
M5	7.5	2.2	3.0	10	4.5	250	0.7	22720.1552	22720.2552
	11.5	2.2	3.0	10	4.5	250	1.2	22720.1554	22720.2554
M6	10.0	3.2	4.0	15	9.0	250	1.4	22720.1562	22720.2562
	16.0	3.2	4.0	15	9.0	250	2.4	22720.1564	22720.2564

¹⁾ Statements on load capacity are not valid for the stainless steel type (except the type fitted with thermoplastic balls).

Thrust Screws • with brass pad

EH 22760.



PRODUCT DESCRIPTION

Thrust screws can be used for a gentle clamping or pressing of thread spindles, axes, shafts and surface treated parts.

Material

- Stainless steel 1.4305

Pad

- Brass

MORE INFORMATION

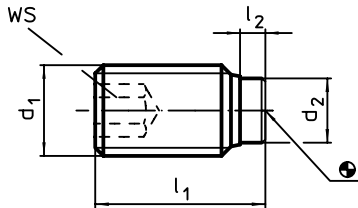
Further products

Thrust Screws, with plastic pad. → p. 335

Screw

- Heat-treated steel, 1200 ±100 N/mm²

DRAWING



ORDER INFORMATION

d ₁	Dimensions			WS	max. [°C]	[g]	Art. No.	
	l ₁	l ₂	d ₂				Heat-treated steel	Stainless steel
	[mm]			[mm]				
M 3	5.0	1.0	1.5	1.5	250	0.1	22760.0032	22760.0432
	7.5	1.0	1.5	1.5	250	0.2	22760.0034	22760.0434
	10.0	1.0	1.5	1.5	250	0.3	22760.0036	22760.0436
M 4	5.0	1.0	2.5	2.0	250	0.3	22760.0040	–
	6.5	1.2	2.5	2.0	250	0.3	22760.0042	22760.0442
	10.5	1.2	2.5	2.0	250	0.6	22760.0044	22760.0444
M 5	16.5	1.2	2.5	2.0	250	1.0	22760.0046	22760.0446
	6.0	1.0	3.0	2.5	250	0.5	22760.0050	–
	8.5	1.3	3.0	2.5	250	0.7	22760.0052	22760.0452
M 6	12.5	1.3	3.0	2.5	250	1.2	22760.0054	22760.0454
	20.5	1.3	3.0	2.5	250	2.1	22760.0056	22760.0456
	6.0	1.0	4.0	3.0	250	0.7	22760.0060	–
M 8	11.5	1.9	4.0	3.0	250	1.5	22760.0062	22760.0462
	17.5	1.9	4.0	3.0	250	2.5	22760.0064	22760.0464
	26.5	1.9	4.0	3.0	250	4.0	22760.0066	22760.0466
M 10	8.0	1.4	5.5	4.0	250	1.7	22760.0080	–
	12.0	2.5	5.5	4.0	250	2.9	22760.0082	22760.0482
	22.0	2.5	5.5	4.0	250	5.7	22760.0086	22760.0486
M 12	32.0	2.5	5.5	4.0	250	8.7	22760.0088	22760.0488
	10.0	1.5	7.0	5.0	250	3.4	22760.0100	–
	14.0	2.7	7.0	5.0	250	5.4	22760.0102	22760.0502
M 10	18.0	2.7	7.0	5.0	250	6.7	22760.0104	22760.0504
	27.0	2.7	7.0	5.0	250	11.0	22760.0106	22760.0506
	37.0	2.7	7.0	5.0	250	16.0	22760.0108	22760.0508
M 12	12.0	1.5	8.5	6.0	250	6.4	22760.0120	–
	18.5	3.4	8.5	6.0	250	10.0	22760.0122	22760.0522
	22.5	3.4	8.5	6.0	250	12.0	22760.0124	22760.0524
M 12	32.5	3.4	8.5	6.0	250	19.0	22760.0126	22760.0526
	42.5	3.4	8.5	6.0	250	26.0	22760.0128	22760.0528

Thrust Screws • with plastic pad

EH 22760.



PRODUCT DESCRIPTION

Thrust screws can be used for a gentle clamping or pressing of thread spindles, axes, shafts and surface treated parts.

Material

- Stainless steel 1.4305

Pad

- Thermoplastic POM, white

MORE INFORMATION

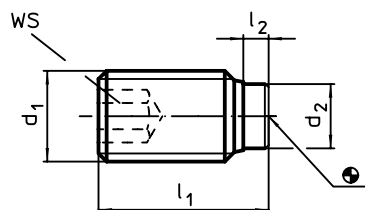
Further products

Thrust Screws, with brass pad → p. 334

Screw

- Steel, blackened

DRAWING





ORDER INFORMATION

	Dimensions			WS				Art. No.		
	d ₁	l ₁ ~ [mm]	l ₂ ~ [mm]		d ₂	min.		max.	Stainless steel	Steel
M 3		3.8	0.8	1.5	1.5	-30	80	0.1	22760.0632	–
		5.8	0.8	1.5	1.5	-30	80	0.3	22760.0634	–
		8.8	0.8	1.5	1.5	-30	80	0.4	22760.0636	–
		10.8	0.8	1.5	1.5	-30	80	0.4	22760.0638	–
M 4		7.0	1.0	2.0	1.5	-30	80	0.3	22760.0642	22760.0242
		9.0	1.0	2.0	1.5	-30	80	0.4	–	22760.0243
					2.0	-30	80	0.5	22760.0643	–
		11.0	1.0	2.0	1.5	-30	80	0.6	–	22760.0244
					2.0	-30	80	0.7	22760.0644	–
		13.0	1.0	2.0	1.5	-30	80	0.7	–	22760.0245
					2.0	-30	80	0.7	22760.0645	–
M 5		17.0	1.0	2.0	1.5	-30	80	1.0	–	22760.0246
					2.0	-30	80	1.1	22760.0646	–
		9.0	1.0	3.0	2.5	-30	80	0.7	22760.0652	22760.0252
		11.0	1.0	3.0	2.5	-30	80	0.9	22760.0653	22760.0253
		13.0	1.0	3.0	2.5	-30	80	1.2	22760.0654	22760.0254
		17.0	1.0	3.0	2.5	-30	80	1.6	22760.0655	22760.0255
M 6		21.0	1.0	3.0	2.5	-30	80	2.2	22760.0656	22760.0256
		26.0	1.0	3.0	2.5	-30	80	2.6	–	22760.0257
		11.3	1.3	3.5	3.0	-30	80	1.3	22760.0662	22760.0262
		13.3	1.3	3.5	3.0	-30	80	1.7	22760.0663	22760.0263
		17.3	1.3	3.5	3.0	-30	80	2.2	22760.0664	22760.0264
		21.3	1.3	3.5	3.0	-30	80	3.0	22760.0665	22760.0265
		26.3	1.3	3.5	3.0	-30	80	3.8	22760.0666	22760.0266
		33.3	1.3	3.5	3.0	-30	80	5.1	22760.0667	22760.0267
M 8		41.3	1.3	3.5	3.0	-30	80	6.3	–	22760.0268
		51.3	1.3	3.5	3.0	-30	80	7.9	–	22760.0270
		13.6	1.6	5.0	4.0	-30	80	2.5	22760.0682	22760.0282
		17.6	1.6	5.0	4.0	-30	80	3.7	22760.0683	22760.0283
		21.6	1.6	5.0	4.0	-30	80	5.0	22760.0684	22760.0284
		26.6	1.6	5.0	4.0	-30	80	6.5	22760.0685	22760.0285
		33.6	1.6	5.0	4.0	-30	80	8.8	22760.0686	22760.0286
		41.6	1.6	5.0	4.0	-30	80	11.0	22760.0687	22760.0287
	51.6	1.6	5.0	4.0	-30	80	14.0	–	22760.0288	
	64.6	1.6	5.0	4.0	-30	80	18.0	–	22760.0290	

→

2

d ₁	Dimensions			WS [mm]	 min. max. [°C]		 [g]	Art. No.	
	l ₁ ~ [mm]	l ₂ ~ [mm]	d ₂		Stainless steel	Steel			
M10	17.9	1.9	6.5	5.0	-30	80	5.4	22760.0702	22760.0302
	21.9	1.9	6.5	5.0	-30	80	7.2	22760.0703	22760.0303
	26.9	1.9	6.5	5.0	-30	80	9.9	22760.0704	22760.0304
	33.9	1.9	6.5	5.0	-30	80	13.0	22760.0705	22760.0305
	41.9	1.9	6.5	5.0	-30	80	17.0	22760.0706	22760.0306
	51.9	1.9	6.5	5.0	-30	80	22.0	22760.0707	22760.0307
	64.9	1.9	6.5	5.0	-30	80	28.0	–	22760.0308
M12	81.9	1.9	6.5	5.0	-30	80	36.0	–	22760.0310
	22.1	2.1	8.0	6.0	-30	80	9.1	22760.0722	22760.0322
	27.1	2.1	8.0	6.0	-30	80	13.0	22760.0723	22760.0323
	34.1	2.1	8.0	6.0	-30	80	18.0	22760.0724	22760.0324
	42.1	2.1	8.0	6.0	-30	80	23.0	22760.0725	22760.0325
	52.1	2.1	8.0	6.0	-30	80	30.0	22760.0726	22760.0326
	65.1	2.1	8.0	6.0	-30	80	40.0	22760.0727	22760.0327
	82.1	2.1	8.0	6.0	-30	80	53.0	–	22760.0330
102.1	2.1	8.0	6.0	-30	80	66.0	–	22760.0332	

SELF-ALIGNING PADS

NO TRICK TO PARALLEL

Offering maximum versatility, a self-aligning pad can handle the most varied applications across a wide range of industries: fastening, clamping or supporting all sorts of surfaces - including non-parallel ones.

A self-aligning pad is used as a stop, support, plunger and can also be installed in clamping elements. The extensive product range includes various types ex stock:



[www.halder.com/
SelfAligningPads-Video](http://www.halder.com/SelfAligningPads-Video)

SELF-ALIGNING PADS

- ribbed / plain ball
- with hard metal ball, ribbed
- adjustable, with ribbed / plain ball
- made from steel or stainless steel
- optionally self-resetting



Self-Aligning Pads

EH 22730.

2



PRODUCT DESCRIPTION

Self-aligning pads are used as stop, support and thrust pad and are suitable for installation in clamping elements.

Material

- Stainless steel 1.4057, heat-treated

Ball

- Ball-bearing steel, hardened, bright
- Stainless steel 1.3541, nickel-plated

Body

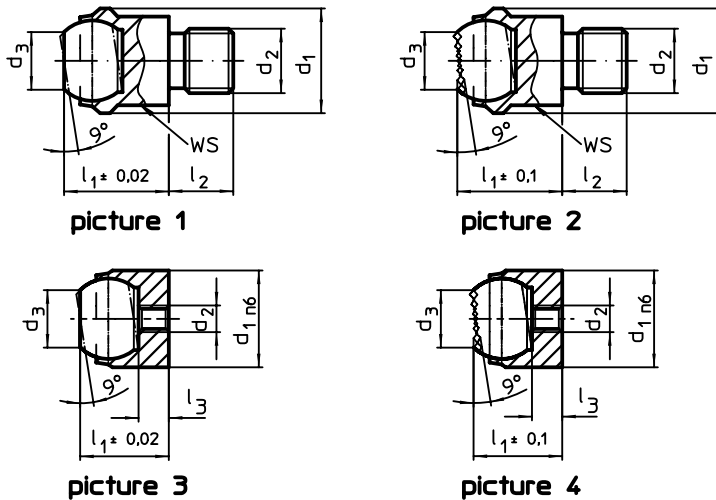
- Heat-treated steel, tempered, phosphated

MORE INFORMATION

Notes

Ball protected against rotating.
Loading capacity valid for steel and stainless steel designs.

DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₃	Dimensions			Ball diameter	Location hole		WS	Load capacity for static load max.	Tightening torque max.	Tightening torque [g]	Art. No.	
			l ₁	l ₂ -0.5	l ₃ max.		Ø H7	Depth min.					Heat-treated steel	Stainless steel
[mm]														
with male thread, flat-faced ball, bearing surface plain – picture 1														
13	M 6	7.2	13	8	–	10	–	–	11	10	10.0	12.0	22730.0012	22730.0112
	M 8	7.2	13	8	–	10	–	–	11	10	25.0	13.0	22730.0013	22730.0113
20	M 8	10.5	18	10	–	16	–	–	17	25	25.0	39.0	22730.0018	22730.0118
	M10	10.5	18	10	–	16	–	–	17	25	46.0	40.0	22730.0019	22730.0119
30	M12	10.5	18	12	–	16	–	–	17	25	82.0	43.0	22730.0020	22730.0120
	M16	20.0	27	16	–	25	–	–	27	90	206.0	151.0	22730.0030	22730.0130
50	M20	34.5	35	20	–	40	–	–	41	165	407.0	489.0	22730.0050	22730.0150
	M24	34.5	35	24	–	40	–	–	41	165	698.0	518.0	22730.0060	22730.0160
with male thread, flat-faced ball, bearing surface ribbed – picture 2														
13	M 6	7.2	13	8	–	10	–	–	11	10	10.0	12.0	22730.0312	–
	M 8	7.2	13	8	–	10	–	–	11	10	25.0	13.0	22730.0313	–
20	M 8	10.5	18	10	–	16	–	–	17	25	25.0	38.0	22730.0318	–
	M10	10.5	18	10	–	16	–	–	17	25	46.0	40.0	22730.0319	–
30	M12	10.5	18	12	–	16	–	–	17	25	82.0	43.0	22730.0320	–
	M16	20.0	27	16	–	25	–	–	27	90	206.0	149.0	22730.0330	–
50	M20	34.5	35	20	–	40	–	–	41	165	407.0	484.0	22730.0350	–
	M24	34.5	35	24	–	40	–	–	41	165	698.0	513.0	22730.0360	–
for locating hole, flat-faced ball, bearing surface plain – picture 3														
12 n6	M 3	7.2	11	–	3.2	10	12	6	–	10 ¹⁾	1.3	8.0	22730.0412	22730.0452
18 n6	M 4	10.5	17	–	4.0	16	18	8	–	25 ¹⁾	2.9	29.0	22730.0418	22730.0458
28 n6	M 5	20.0	25	–	5.5	25	28	13	–	90 ¹⁾	6.0	109.0	22730.0428	22730.0468
for locating hole, flat-faced ball, bearing surface ribbed – picture 4														
12 n6	M 3	7.2	11	–	3.2	10	12	6	–	10 ¹⁾	1.3	7.9	22730.0712	–
18 n6	M 4	10.5	17	–	4.0	16	18	8	–	25 ¹⁾	2.9	29.0	22730.0718	–
28 n6	M 5	20.0	25	–	5.5	25	28	13	–	90 ¹⁾	6.0	108.0	22730.0728	–

¹⁾ Applies only when the minimum bore depth is kept to.

Self-Aligning Pads • with hard metal ball, ribbed

EH 22730.



PRODUCT DESCRIPTION

Especially designed for cast parts (hard casting crust). To be used as support, thrust pad and for build into clamping elements.

Material

- Stainless steel 1.4057, heat-treated

Ball

- Hard metal, ribbed, nickel-plated

MORE INFORMATION

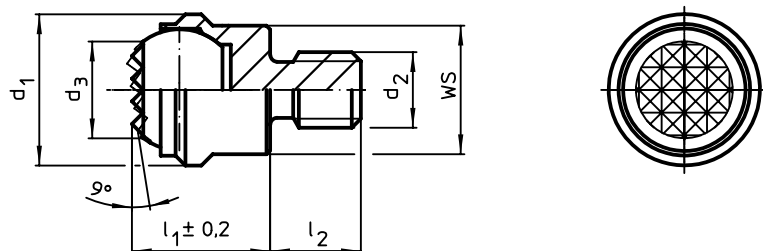
Notes

Ball protected against rotating.
Loading capacity valid for steel and stainless steel designs.

Body

- Heat-treated steel, tempered, phosphated

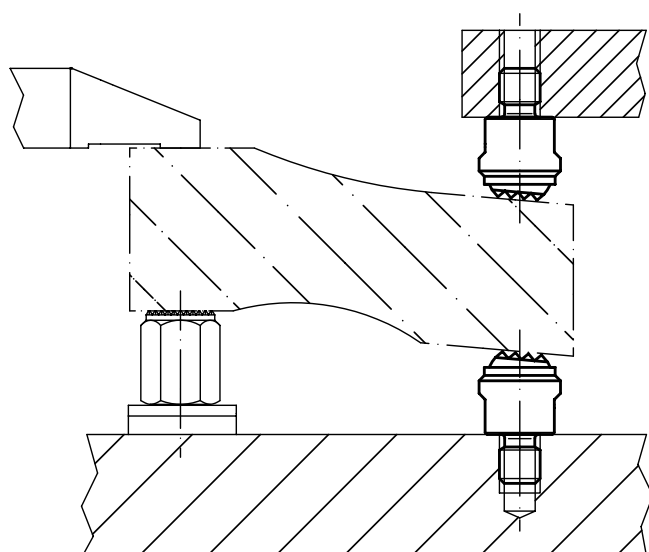
DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions			Ball diameter	WS	Load capacity for static load max.	Tightening torque max.	g	Art. No.	
		d ₃	l ₁ ±0.2	l ₂ -0.5						Heat-treated steel	Stainless steel
[mm]											
with male thread, flat-faced ball, bearing surface ribbed											
13	M 6	8.3	13	8	10	11	10	10	14	22730.0362	22730.0390
	M 8	8.3	13	8	10	11	10	25	15	22730.0363	22730.0392
20	M 8	13.2	18	10	16	17	25	25	49	22730.0378	22730.0394
	M10	13.2	18	10	16	17	25	46	50	22730.0379	22730.0396
30	M12	13.2	18	12	16	17	25	82	54	22730.0380	22730.0398
	M16	20.0	27	16	25	27	90	206	186	22730.0381	22730.0399
50	M20	34.5	35	20	40	41	165	407	633	22730.0382	22730.0400
	M24	34.5	35	24	40	41	165	698	664	22730.0383	22730.0401

APPLICATION EXAMPLE



Self-Aligning Pads • self-resetting

EH 22731.

2



PRODUCT DESCRIPTION

Self-aligning pads are used as stop, support and thrust pad and are suitable for installation in clamping elements.

By resetting to the parallel position the contact point of the self-aligning pad provides a defined initial position, thus preventing the pad clamping in an oblique position when inserting the workpiece.

Material

- Spring element
 - Thermoplastic PUR

Ball

- Ball-bearing steel, hardened, bright
- Stainless steel 1.3541, nickel-plated

Body

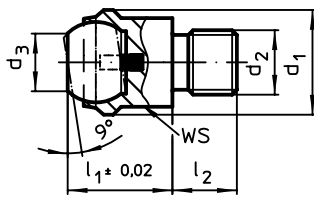
- Heat-treated steel, tempered, phosphated
- Stainless steel 1.4057, heat-treated

MORE INFORMATION

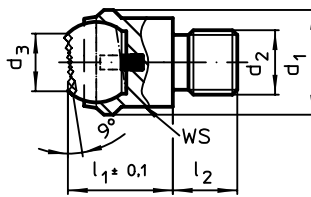
Notes

Ball protected against rotating.
Loading capacity valid for steel and stainless steel designs.

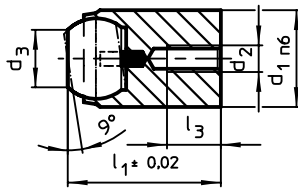
DRAWING



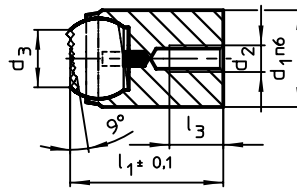
picture 1



picture 2



picture 3




picture 4

ORDER INFORMATION

Dimensions							Location hole		WS	Load capacity for static load max.	Tightening torque max.	Weight [g]	Art. No.	
d ₁	d ₂	d ₃	l ₁	l ₂ -0.5	l ₃ max.	Ball diameter	Ø H7	Depth min.	[kN]	[Nm]	Heat-treated steel		Stainless steel	
[mm]								[mm]	[mm]					
with male thread, flat-faced ball, bearing surface plain – picture 1														
13	M 6	7.2	13	8	–	10	–	–	11	10	10.0	12	22731.0012	22731.0112
	M 8	7.2	13	8	–	10	–	–	11	10	25.0	13	22731.0013	22731.0113
20	M 8	10.5	18	10	–	16	–	–	17	25	25.0	38	22731.0018	22731.0118
	M10	10.5	18	10	–	16	–	–	17	25	46.0	40	22731.0019	22731.0119
30	M12	10.5	18	12	–	16	–	–	17	25	82.0	43	22731.0020	22731.0120
	M16	20.0	27	16	–	25	–	–	27	90	206.0	149	22731.0030	22731.0130
50	M20	34.5	35	20	–	40	–	–	41	165	407.0	486	22731.0050	22731.0150
	M24	34.5	35	24	–	40	–	–	41	165	698.0	516	22731.0060	22731.0160
with male thread, flat-faced ball, bearing surface ribbed – picture 2														
13	M 6	7.2	13	8	–	10	–	–	11	10	10.0	12	22731.0312	–
	M 8	7.2	13	8	–	10	–	–	11	10	25.0	13	22731.0313	–
20	M 8	10.5	18	10	–	16	–	–	17	25	25.0	37	22731.0318	–
	M10	10.5	18	10	–	16	–	–	17	25	46.0	40	22731.0319	–
30	M12	10.5	18	12	–	16	–	–	17	25	82.0	43	22731.0320	–
	M16	20.0	27	16	–	25	–	–	27	90	206.0	149	22731.0330	–
50	M20	34.5	35	20	–	40	–	–	41	165	407.0	482	22731.0350	–
	M24	34.5	35	24	–	40	–	–	41	165	698.0	511	22731.0360	–

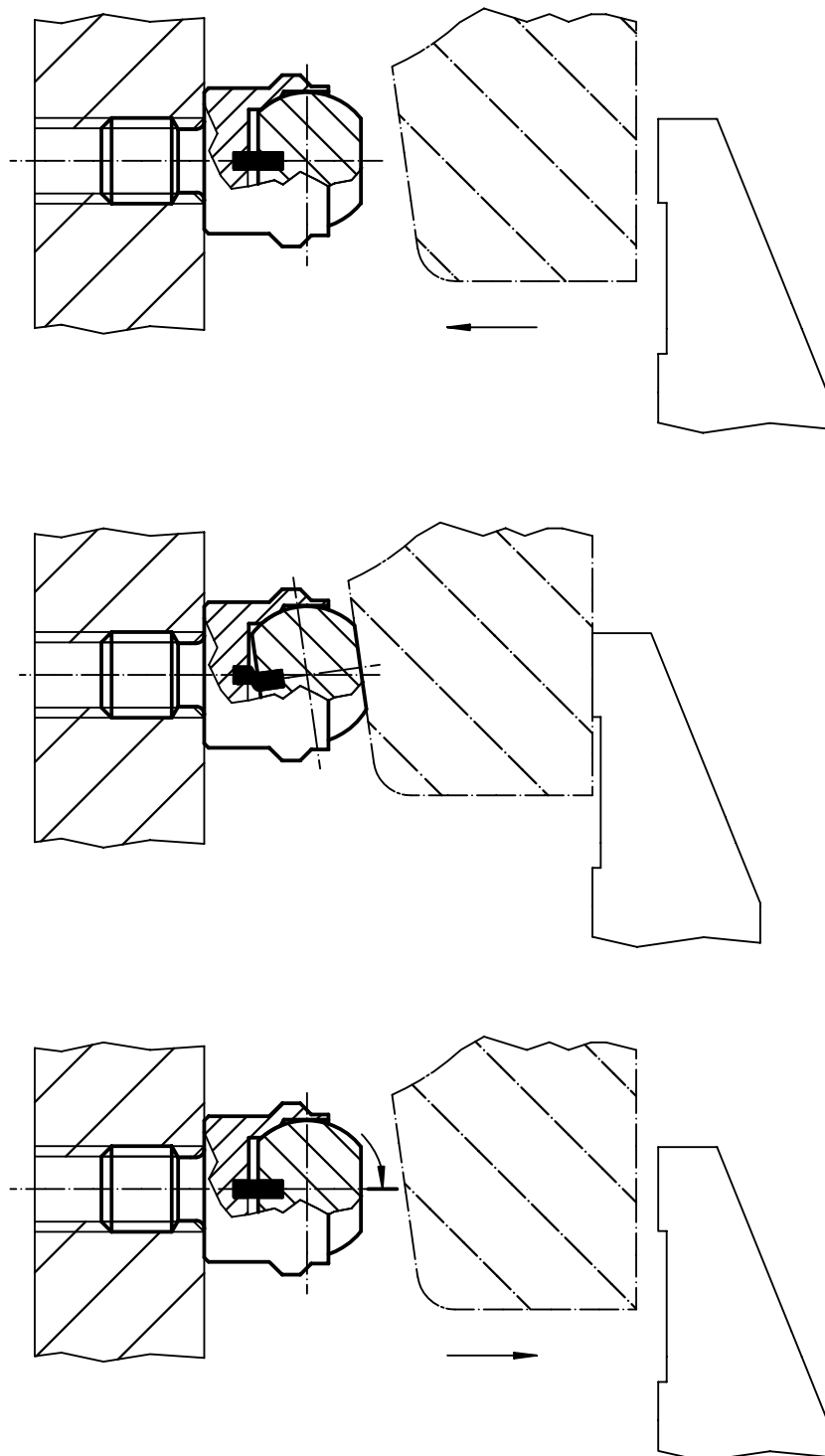
¹⁾ Applies only when the minimum bore depth is kept to.



Dimensions							Location hole		WS	Load capacity for static load max.	Tightening torque max.		Art. No.	
d ₁	d ₂	d ₃	l ₁	l ₂ -0.5	l ₃ max.	Ball diameter	Ø H7	Depth min.					Heat-treated steel	Stainless steel
[mm]							[mm]		[mm]	[kN]	[Nm]	[g]		
for locating hole, flat-faced ball, bearing surface plain – picture 3														
12 n6	M 3	7.2	17	–	3.2	10	12	12	–	10 ¹⁾	1.3	13	22731.0412	22731.0452
18 n6	M 4	10.5	23	–	4.0	16	18	14	–	25 ¹⁾	2.9	40	22731.0418	22731.0458
28 n6	M 5	20.0	34	–	6.0	25	28	22	–	90 ¹⁾	6.0	151	22731.0428	22731.0468
for locating hole, flat-faced ball, bearing surface ribbed – picture 4														
12 n6	M 3	7.2	17	–	3.2	10	12	12	–	10 ¹⁾	1.3	13	22731.0712	–
18 n6	M 4	10.5	23	–	4.0	16	18	14	–	25 ¹⁾	2.9	40	22731.0718	–
28 n6	M 5	20.0	34	–	6.0	25	28	22	–	90 ¹⁾	6.0	150	22731.0728	–

¹⁾ Applies only when the minimum bore depth is kept to.

APPLICATION EXAMPLE



Self-Aligning Pads • with hard metal ball, ribbed and self-resetting

EH 22731.



PRODUCT DESCRIPTION

Especially designed for cast parts (hard casting crust). To be used as support, thrust pad and for build into clamping elements.

By resetting to the parallel position the contact point of the self-aligning pad provides a defined initial position, thus preventing the pad clamping in an oblique position when inserting the workpiece.

Material

- Spring element
 - Thermoplastic PUR

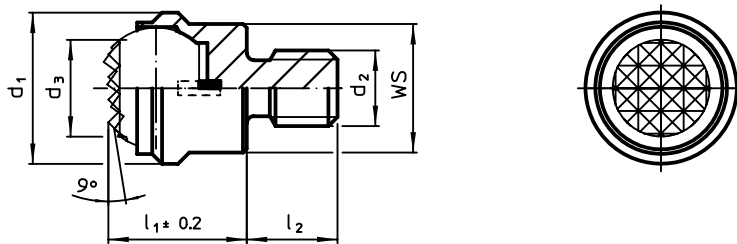
Ball

- Hard metal, ribbed, nickel-plated

Body

- Heat-treated steel, tempered, phosphated
- Stainless steel 1.4057, heat-treated

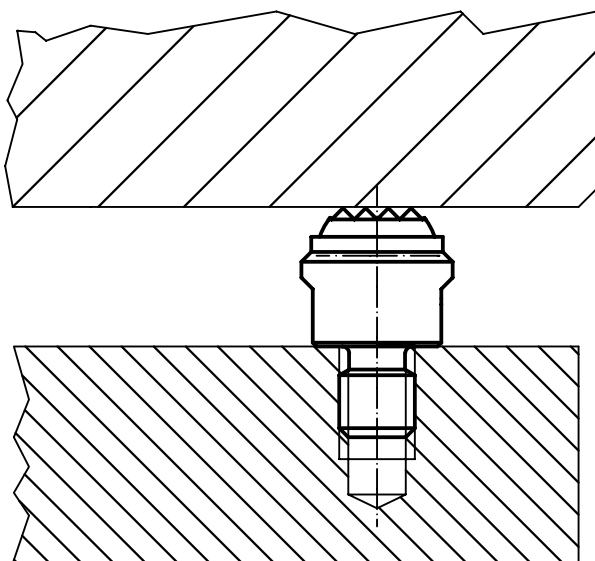
DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions			Ball diameter	WS	Load capacity for static load max.	Tightening torque max.	Weight	Art. No.	
		d ₃	l ₁ ±0.2	l ₂ -0.5						Heat-treated steel	Stainless steel
[mm]											
with male thread, flat-faced ball, bearing surface ribbed											
13	M 6	8.3	13	8	10	11	10	10	14	22731.0362	22731.0390
	M 8	8.3	13	8	10	11	10	25	15	22731.0363	22731.0392
20	M 8	13.2	18	10	16	17	25	25	48	22731.0378	22731.0394
	M10	13.2	18	10	16	17	25	46	50	22731.0379	22731.0396
	M12	13.2	18	12	16	17	25	82	53	22731.0380	22731.0398
30	M16	20.0	27	16	25	27	90	206	186	22731.0381	22731.0399
50	M20	34.5	35	20	40	41	165	407	639	22731.0382	22731.0400
	M24	34.5	35	24	40	41	165	698	673	22731.0383	22731.0401

APPLICATION EXAMPLE



Self-Aligning Pads • adjustable

EH 22740.



PRODUCT DESCRIPTION

Self-aligning pads are used as stop, support and thrust pad and are suitable for installation in clamping elements.

Material

Ball

- Ball-bearing steel, hardened, bright
- Stainless steel 1.3541, nickel-plated

Body

- Heat-treated steel, tempered, phosphated
- Stainless steel 1.4057, heat-treated

Nut

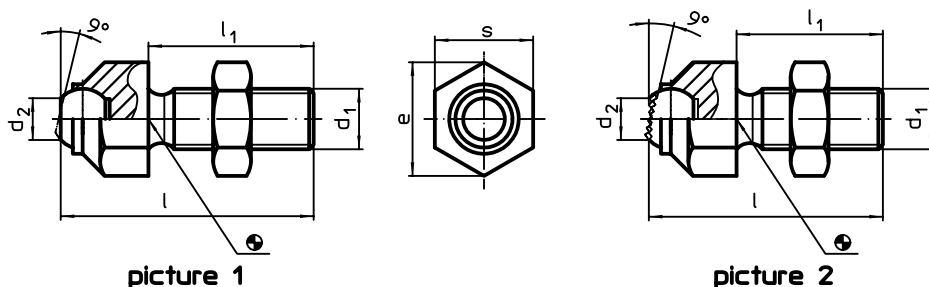
- Steel, blackened (ISO 4035)
- Stainless steel

MORE INFORMATION

Notes

Ball protected against rotating. Loading capacity valid for steel and stainless steel designs. Special types on request.

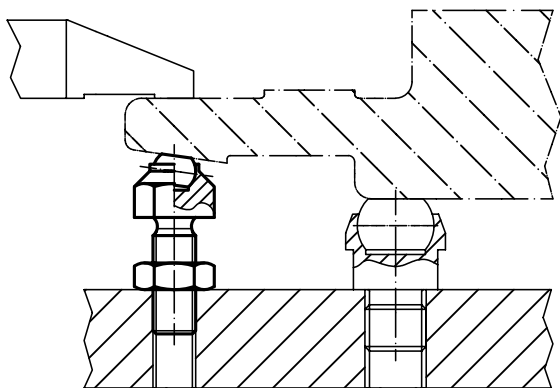
DRAWING



ORDER INFORMATION

d ₁	l	Dimensions			Ball diameter	Load capacity for static load max.	Tightening torque max.	[g]	Art. No.	
		l ₁	d ₂	e					Heat-treated steel	Stainless steel
[mm]										
with flat-faced ball, bearing surface plain – picture 1										
M 8	36.6	25	5.8	14.5	8.5	8	25	20	22740.0013	22740.0113
M10	45.7	30	8.6	19.0	12.0	8	46	44	22740.0016	22740.0116
M12	50.7	35	8.6	19.0	12.0	15	82	57	22740.0017	22740.0117
M16	60.7	40	10.5	27.0	16.0	25	206	131	22740.0024	22740.0124
M20	77.3	50	20.0	33.0	25.0	90	407	277	22740.0030	22740.0130
M24	100.0	70	20.0	40.0	25.0	90	698	471	22740.0036	22740.0136
M30 x 1,5	100.0	65	34.6	51.0	40.0	165	1355	975	22740.0046	22740.0146
with flat-faced ball, bearing surface ribbed – picture 2										
M 8	36.6	25	5.8	14.5	8.5	8	25	20	22740.0313	–
M10	45.7	30	8.6	19.0	12.0	8	46	44	22740.0316	–
M12	50.7	35	8.6	19.0	12.0	15	82	56	22740.0317	–
M16	60.7	40	10.5	27.0	16.0	25	206	130	22740.0324	–
M20	77.3	50	20.0	33.0	25.0	90	407	276	22740.0330	–
M24	100.0	70	20.0	40.0	25.0	90	698	472	22740.0336	–
M30 x 1,5	100.0	65	34.6	51.0	40.0	165	1355	920	22740.0346	–

APPLICATION EXAMPLE



Self-Aligning Pads • adjustable, self-resetting

EH 22741.

2



PRODUCT DESCRIPTION

Self-aligning pads are used as stop, support and thrust pad and are suitable for installation in clamping elements. By resetting to the parallel position the contact point of the self-aligning pad provides a defined initial position, thus preventing the pad clamping in an oblique position when inserting the workpiece.

Material

Spring element

- Thermoplastic PUR

Ball

- Ball-bearing steel, hardened, bright
- Stainless steel 1.3541, nickel-plated

Body

- Heat-treated steel, tempered, phosphated
- Stainless steel 1.4057, heat-treated

Nut

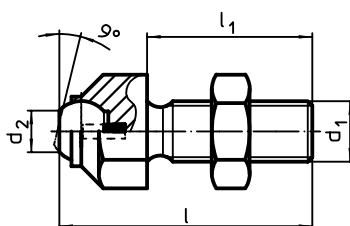
- Steel, blackened (ISO 4035)
- Stainless steel

MORE INFORMATION

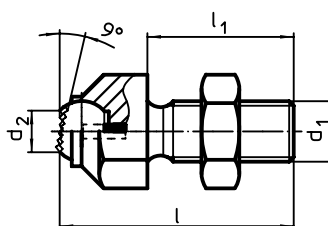
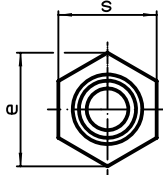
Notes

Ball protected against rotating. Loading capacity valid for steel and stainless steel designs. Special types on request.

DRAWING



picture 1

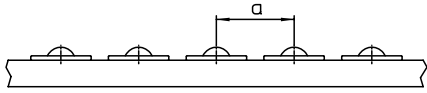


picture 2

ORDER INFORMATION

d ₁	l	Dimensions			Ball diameter	Load capacity for static load max. [kN]	Tightening torque max. [Nm]	g	Art. No.	
		l ₁	d ₂	e					Heat-treated steel	Stainless steel
[mm]										
with flat-faced ball, bearing surface plain – picture 1										
M 8	36.6	25	5.8	14.5	8.5	8	25	20	22741.0013	22741.0113
M10	45.7	30	8.6	19.0	12.0	8	46	44	22741.0016	22741.0116
M12	50.7	35	8.6	19.0	12.0	15	82	56	22741.0017	22741.0117
M16	60.7	40	10.5	27.0	16.0	25	206	128	22741.0024	22741.0124
M20	77.3	50	20.0	33.0	25.0	90	407	273	22741.0030	22741.0130
M24	100.0	70	20.0	40.0	25.0	90	698	466	22741.0036	22741.0136
M30 x 1,5	100.0	65	34.6	51.0	40.0	165	1355	885	22741.0046	22741.0146
with flat-faced ball, bearing surface ribbed – picture 2										
M 8	36.6	25	5.8	14.5	8.5	8	25	20	22741.0313	–
M10	45.7	30	8.6	19.0	12.0	8	46	44	22741.0316	–
M12	50.7	35	8.6	19.0	12.0	15	82	56	22741.0317	–
M16	60.7	40	10.5	27.0	16.0	25	206	128	22741.0324	–
M20	77.3	50	20.0	33.0	25.0	90	407	278	22741.0330	–
M24	100.0	70	20.0	40.0	25.0	90	698	466	22741.0336	–
M30 x 1,5	100.0	65	34.6	51.0	40.0	165	1355	915	22741.0346	–

TECHNICAL DATA



ARRANGEMENT OF BALL TRANSFER UNITS

How the ball transfer units should be arranged depends on the under-surface of the load to be transported. For loads with a uniform, even bottom surface, e.g. packing cases, the distance between the ball transfer units is calculated by dividing the smallest dimension by 2.5.

Example: under-surface of the load to be transported = 500 x 1000 mm
Distance between ball transfer units:

$$a = \frac{500 \text{ mm}}{2,5} = 200 \text{ mm}$$

CONVEYING SPEED AND LOAD CAPACITY

The maximum conveying speed allowed amounts to 2 m/s. The load capacities specified apply to any mounting position and are based on 10⁶ rotations of the load ball. With the units being used over a longer time at speeds exceeding 1 m/s, an increase in temperature as well as a reduction in travel life must be expected depending on the load, in particular with sizes 22750.0016/22750.0036.

Computation of Travel Life

$$L = \left(\frac{C}{F} \right)^3 10^6 \text{ rotations}$$

- L = Travel life
- C = Load capacity (N)
- F = Load (N)

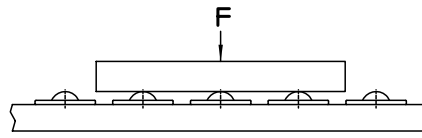
TEMPERATURE RESISTANCE

Ball transfer units with felt seals are temperatureresistant up to a permanent operating temperature of 100 °C. At temperatures exceeding 100 °C, only non-galvanized ball transfer units with steel load ball and without felt seal should be used. Observe the reduction in load capacity! The load capacity should be multiplied with the temperature factor (see table).

Attention:

Only use high-temperature lubricants!
Observe the manufacturers' instructions!
If necessary, wash-off any present lubricating oil.

Temperature	Temperature Factor
°C	fT
125	0,9
150	0,8
175	0,7
200	0,5



LOAD DETERMINATION OF BALL TRANSFER UNITS

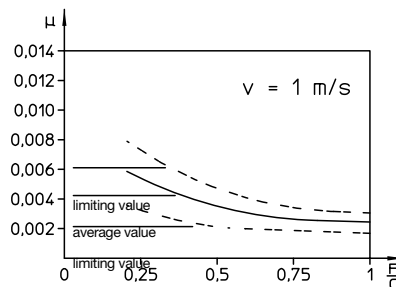
To determine the load of a ball transfer unit, the weight of the article to be conveyed should be divided by 3. If the height tolerance of the load balls is good and the surface of the work-piece to be conveyed suitable, the calculation can be based on the number of ball transfer units under load.

Example:
Weight of the article to be conveyed = 300 kg

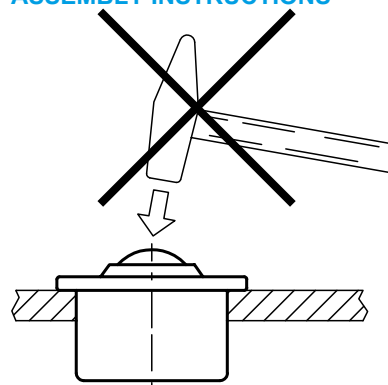
Ball transfer unit load
 $a = \frac{300 \text{ kg}}{3} = 100 \text{ kg}$

FRICTION

The diagram shows the friction values as a function of load and speed for ball transfer units. These approximate values apply to all mounting positions with operation on a hardened steel plate.



ASSEMBLY INSTRUCTIONS



Note:
Information is valid for former steel designs.



Ball Casters • with sheet steel housing

EH 22750.



PRODUCT DESCRIPTION

Ball casters are module for transport systems, conveyances, to working and packing facilities.

For example, parts can be easily moved, turned and controlled.

As from $d_1 = 36$ fitted with an oil drenched felt seal to protect against dirt.

Material

Cap

- Steel, zinc-plated by galvanization
- Stainless steel

Housing

- Steel, zinc-plated by galvanization
- Stainless steel

Ball

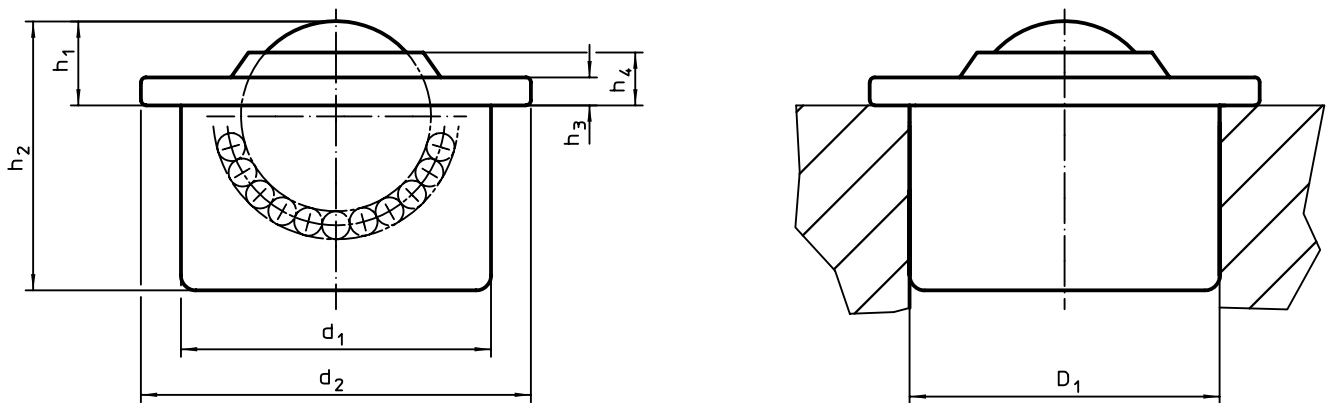
- Ball-bearing steel
- Stainless steel

MORE INFORMATION

Further products

Tolerance Rings → p. 347

DRAWING



ORDER INFORMATION

d ₁	Ball diameter	d ₂	Dimensions				Location hole D ₁ ¹⁾	Dynamic carrying figure C	[g]	Art. No.
			h ₁	h ₂	h ₃	h ₄				
[mm]										
cap and housing zinc-plated										
12.6 ±0.055	8	17	4.8 ±0.15	11.2	1.8	3.2	12.57 +0.03	100	6.8	22750.0000 ²⁾
18.0 ±0.055	12	23	7.4 ±0.15	15.5	2.0	4.3	17.97 +0.03	250	18.0	22750.0002 ²⁾
24.0 ±0.065	15	31	9.5 ±0.20	21.5	2.5	6.1	23.95 +0.05	500	40.0	22750.0004 ²⁾
36.0 ±0.080	22	45	9.8 ±0.20	29.5	2.9	5.7	35.90 +0.05	1300	131.0	22750.0008
45.0 ±0.080	30	55	13.8 ±0.30	37.5	3.7	7.9	44.85 +0.05	2500	277.0	22750.0012
62.0 ±0.095	45	75	19.0 ±0.40	53.7	4.2	10.3	61.83 +0.07	6000	741.0	22750.0016
all parts zinc-plated, ball from stainless steel										
12.6 ±0.055	8	17	4.8 ±0.15	11.2	1.8	3.2	12.57 +0.03	70	7.0	22750.0020 ²⁾
18.0 ±0.055	12	23	7.4 ±0.15	15.5	2.0	4.3	17.97 +0.03	180	18.0	22750.0022 ²⁾
24.0 ±0.065	15	31	9.5 ±0.20	21.5	2.5	6.1	23.95 +0.05	370	40.0	22750.0024 ²⁾
36.0 ±0.080	22	45	9.8 ±0.20	29.5	2.9	5.7	35.90 +0.05	970	132.0	22750.0028
45.0 ±0.080	30	55	13.8 ±0.30	37.5	3.7	7.9	44.85 +0.05	1900	273.0	22750.0032
62.0 ±0.095	45	75	19.0 ±0.40	53.7	4.2	10.3	61.83 +0.07	4500	739.0	22750.0036
all parts from stainless steel										
12.6 ±0.055	8	17	4.8 ±0.15	11.2	1.8	3.2	12.57 +0.03	70	7.0	22750.0040 ²⁾
18.0 ±0.055	12	23	7.4 ±0.15	15.5	2.0	4.3	17.97 +0.03	180	17.0	22750.0042 ²⁾
24.0 ±0.065	15	31	9.5 ±0.20	21.5	2.5	6.1	23.95 +0.05	370	39.0	22750.0044 ²⁾
36.0 ±0.080	22	45	9.8 ±0.20	29.5	2.9	5.7	35.90 +0.05	970	133.0	22750.0048
45.0 ±0.080	30	55	13.8 ±0.30	37.5	3.7	7.9	44.85 +0.05	1900	272.0	22750.0052

¹⁾ Reference value for 2 mm sheet steel/ 5 mm aluminium (force fit)

²⁾ without felt seal

Tolerance Rings

EH 22750.



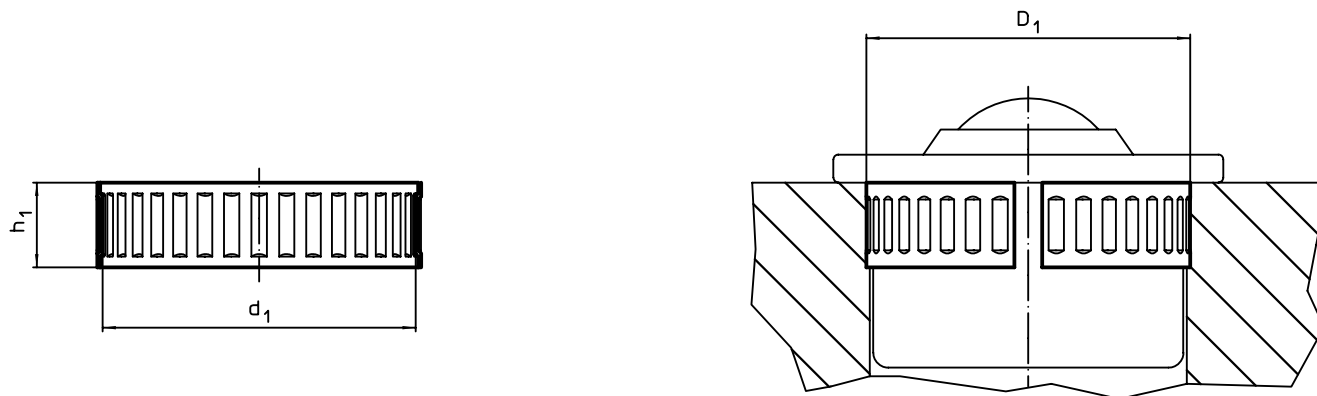
PRODUCT DESCRIPTION

The use of tolerance rings (for ball casters with sheet steel housing) allows larger tolerances between the parts to be connected.


Material

- Spring steel strip

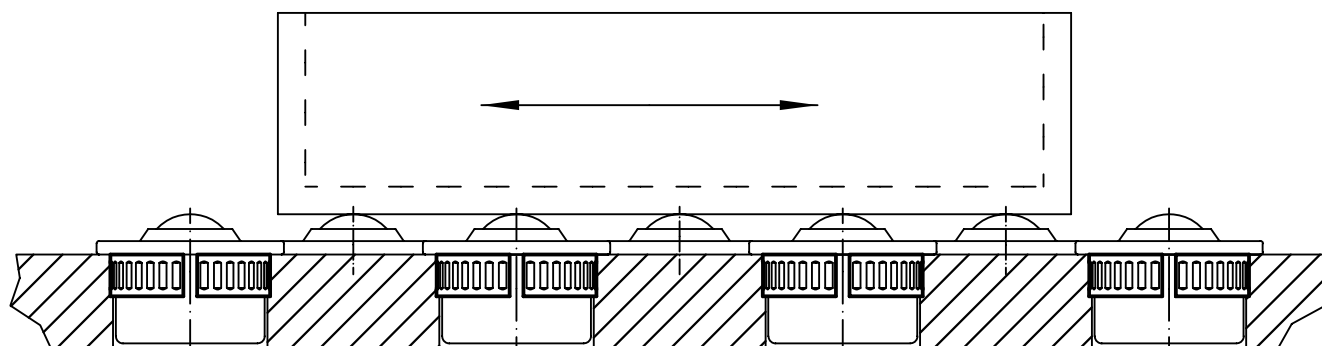
DRAWING



ORDER INFORMATION

d ₁	Dimensions		Location hole D ₁		Art. No.
	[mm]	h ₁ +0.2			
12.6		6.1	13.87 +0.15	0.4	22750.0060
18.0		6.1	19.70 +0.20	0.9	22750.0062
24.0		7.1	25.70 +0.20	1.4	22750.0064
36.0		12.1	37.70 +0.20	4.3	22750.0068
45.0		12.1	46.70 +0.20	5.3	22750.0072
62.0		15.1	64.10 +0.30	12.0	22750.0076

APPLICATION EXAMPLE



Ball Casters • with mounting elements

EH 22750.

2



PRODUCT DESCRIPTION

Ball casters are module for transport systems, conveyances, to working and packing facilities. For example, parts can be easily moved, turned and controlled.

Material

Cap

- Steel, zinc-plated by galvanization

Housing

- Steel, zinc-plated by galvanization

Ball

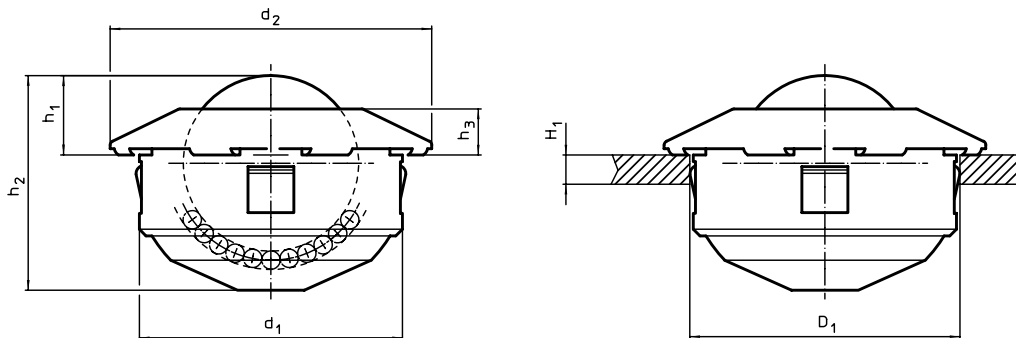
- Ball-bearing steel
- Stainless steel

Assembly

Mounting is carried-out by means of spring-loaded claws allowing big tolerances in the location hole.

The ball casters can easily be mounted and disassembled from their functional side. Due to the inclined cap form, the assembly mandrel EH 22750. should be used.

DRAWING



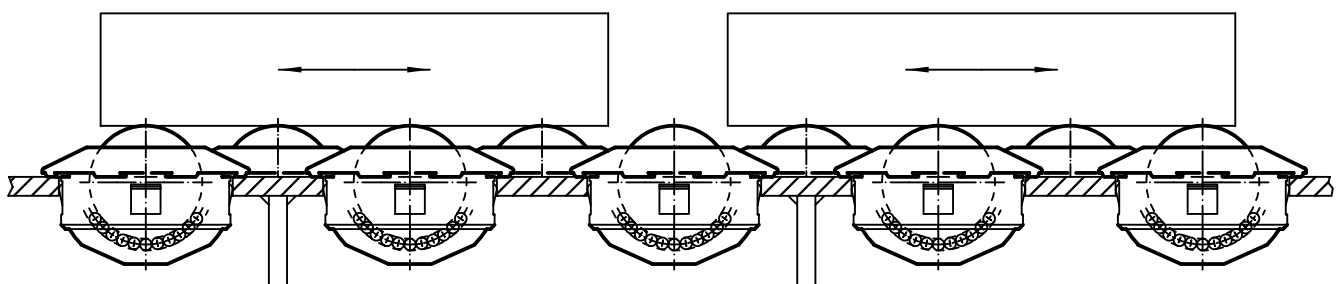
ORDER INFORMATION

d ₁	Ball diameter	Dimensions				H ₁ min.	Location hole D ₁	Dynamic carrying figure C	[g]	Art. No.
		d ₂	h ₁	h ₂	h ₃					
[mm]										
ball from ball-bearing steel										
24 -0.13	15	31	9.5 ±0.2	20.5	5.5	1.5	24	500	42	22750.0104
36 -0.16	22	45	9.8 ±0.2	28.6	6.0	2.0	36	1300	144	22750.0108
45 -0.16	30	55	13.8 ±0.3	37.5	8.0	2.5	45	2500	292	22750.0112
ball from stainless steel										
24 -0.13	15	31	9.5 ±0.2	20.5	5.5	1.5	24	370	42	22750.0124
36 -0.16	22	45	9.8 ±0.2	28.6	6.0	2.0	36	970	143	22750.0128
45 -0.16	30	55	13.8 ±0.3	37.5	8.0	2.5	45	1900	290	22750.0132

ACCESSORIES

	Suitable for ball caster		Art. No.
	[mm]	[g]	
assembly tool			
	24	451	22750.0144
	36	480	22750.0148
	45	503	22750.0152

APPLICATION EXAMPLE



**PRODUCT DESCRIPTION**

Ball casters are module for transport systems, conveyances, to working and packing facilities.

For example, parts can be easily moved, turned and controlled.

Thanks to the technical properties of the plastic, the component does not require maintenance or lubrication and is also resistant to abrasion. In contrast to the steel model, the plastic model offers additional benefits such as electrical insulation and anti-magnetic characteristics thanks to the properties of its material.

Material**Cap**

- Plastic, white

Housing

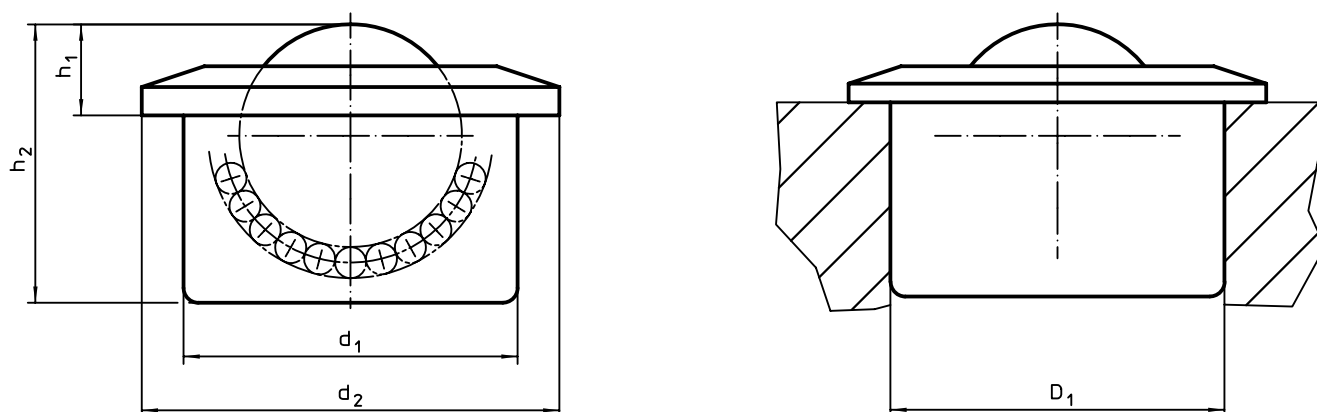
- Plastic, white

Ball

- Thermoplastic POM, white

Bearing ball

- Plastic
- Stainless steel

DRAWING**ORDER INFORMATION**

d ₁	Dimensions				Location hole D ₁ H7 [mm]	Dynamic carrying figure C [N]	Temperature range		Weight [g]	Art. No.
	Ball diameter	d ₂ [mm]	h ₁	h ₂			min.	max.		
bearing ball: plastic										
24	16	31	9.8	21	23.95	80	-40	80	11	22751.0015
36	24	45	9.8	30	35.95	110	-40	80	30	22751.0022
bearing ball: stainless steel										
24	16	31	9.8	21	23.95	300	-40	80	11	22751.0115
36	24	45	9.8	30	35.95	500	-40	80	30	22751.0122

Ball Casters • screwable, plain bearing

EH 22752.



PRODUCT DESCRIPTION

For positioning and aligning of workpieces.

Because of the slide bearing, the ball can roll permanently, and the surface of the workpiece is protected.

At temperatures > 20°C, the carrying figure decreases linearly. (Example: at 90°C the load bearing capacity is max. 60%)

Material

Bearing

- Plastic

Ball

- Ball-bearing steel, hardened
- Stainless steel, hardened

Screw

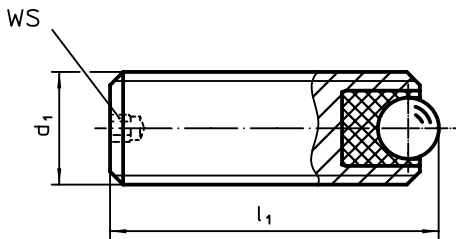
- Free cutting steel, blackened
- Stainless steel 1.4305

MORE INFORMATION

Notes

Special types on request.

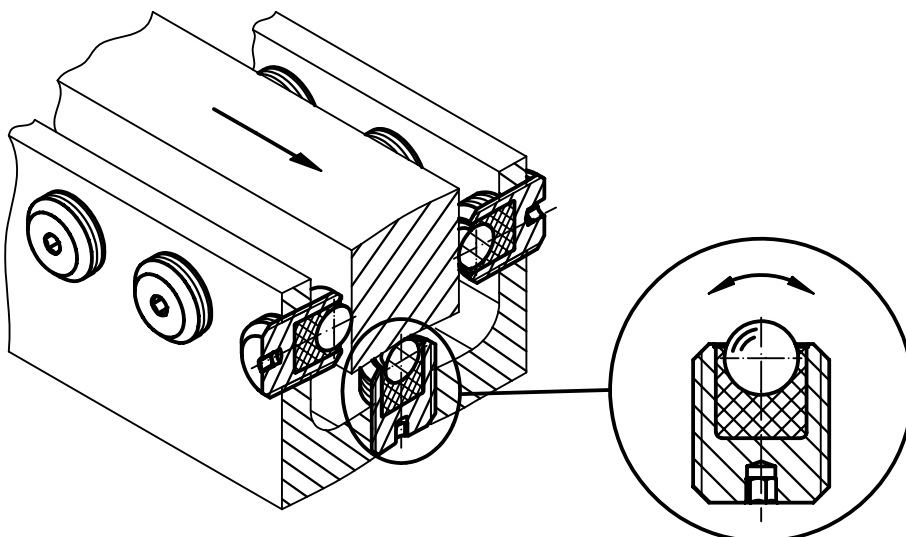
DRAWING



ORDER INFORMATION

d ₁	Dimensions		WS	Static carry- ing figure C ₀	Tightening torque max.	Temperature		Weight	Art. No.	
	l ₁	Ball diameter				min.	max.		Free cutting steel	Stainless steel
	[mm]	[mm]	[mm]	[N]	[Nm]	[°C]		[g]		
M 6	8	2.5	1.5	172	0.11	-50	90	1.0	22752.0061	22752.0561
	16	2.5	1.5	172	0.11	-50	90	2.4	22752.0064	22752.0564
M 8	10	3.5	1.5	336	0.28	-50	90	2.4	22752.0081	22752.0581
	20	3.5	1.5	336	0.28	-50	90	5.5	22752.0084	22752.0584
M10	12	4.5	2.0	556	0.58	-50	90	4.2	22752.0101	22752.0601
	25	4.5	2.0	556	0.58	-50	90	11.0	22752.0104	22752.0604
M12	16	6.5	2.5	1161	1.44	-50	90	7.7	22752.0121	22752.0621
	35	6.5	2.5	1161	1.44	-50	90	21.0	22752.0124	22752.0624
M16	20	8.5	3.0	1986	3.21	-50	90	20.0	22752.0161	22752.0661
	50	8.5	3.0	1986	3.21	-50	90	58.0	22752.0166	22752.0666

APPLICATION EXAMPLE



Ball Casters • plain bearing

EH 22753.



PRODUCT DESCRIPTION

Ball casters are module for transport systems, conveyances, to working and packing facilities.

For example, parts can be easily moved, turned and controlled.

The ball casters are maintenance-free.

At temperatures > 20°C, the carrying figure decreases linearly. (Example: at 90°C the load bearing capacity is max. 60%)

Material

Housing

- Stainless steel

Bearing

- Plastic

Ball

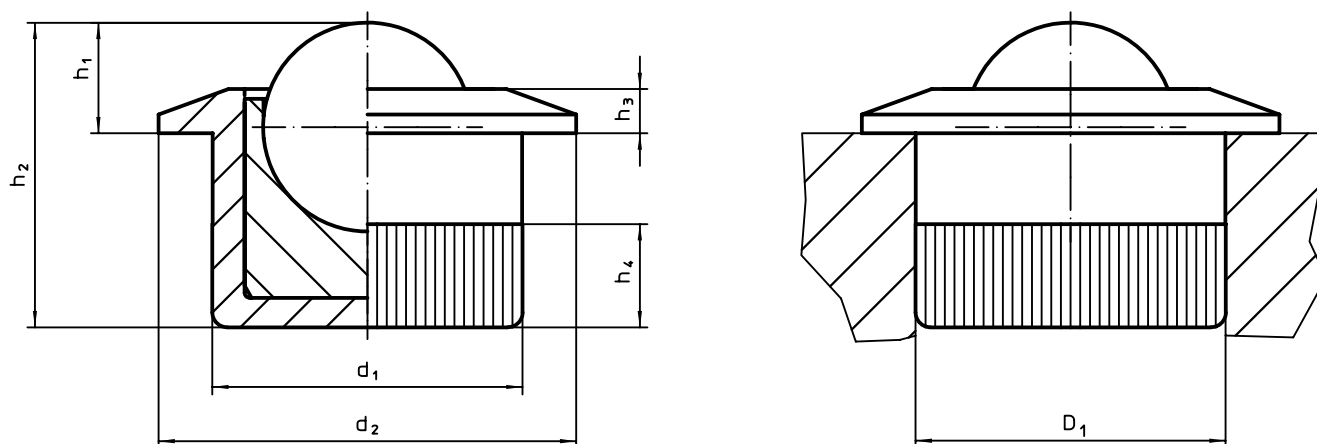
- Stainless steel, hardened

Assembly

Locking in place is achieved by pressing-in the knurled contour ball caster. Ball casters can be mounted from the functional side, using the assembly tool.

Knurling on the external contour allows installation into bore holes without additional preparatory steps.

DRAWING



ORDER INFORMATION

d ₁	Ball diameter	Dimensions					Location hole D ₁ H7	Static carrying figure C ₀	Temperature		Weight	Art. No.
		d ₂	h ₁	h ₂	h ₃	h ₄			min.	max.		
		[mm]					[mm]	[N]	[°C]		[g]	
10.0	6.5	13	3.2	11.2	1.2	4.2	10.0	1161	-50	90	4.1	22753.0065
12.6	8.5	17	4.5	12.4	1.8	4.2	12.6	1986	-50	90	8.1	22753.0085

ACCESSORIES

	Suitable for ball caster		Weight	Art. No.
	[mm]			
assembly tool				
	10.0		118	22753.9965
	12.6		125	22753.9985

Positioning Sensors • pneumatic

EH 22800.



PRODUCT DESCRIPTION

Used in jigs and fixtures as positioning control for pre-machined workpieces. Sensitivity accuracy is 0.015-0.075 mm, depending on the workpiece surface. Contact control is achieved through compressed air backwash and is indicated on the monitoring unit.

Material

Seating Pins

- Tool steel, hardened, ground

Seal

- PVC

Screw

- Steel, zinc-plated by galvanization, quality 4.8 (ISO 1207)

Plug-in nipple

- Brass

MORE INFORMATION

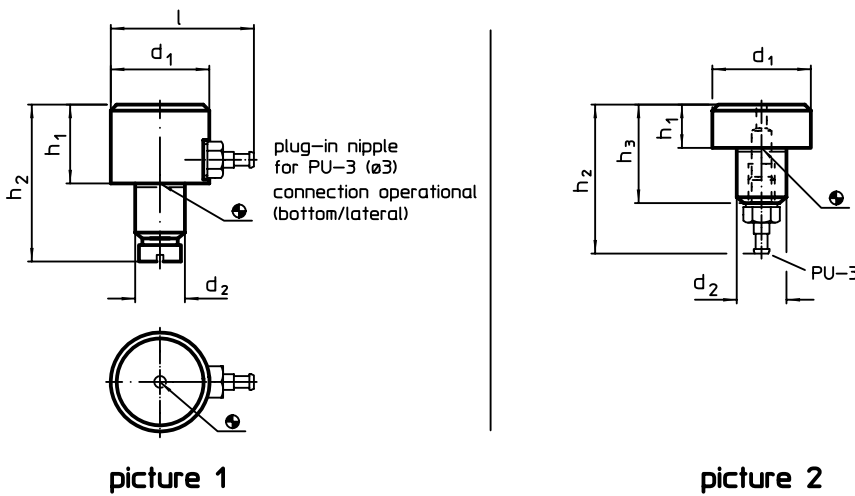
Notes

Further information on request.

Further products

Monitoring Units, for positioning sensors, pneumatic → p. 356

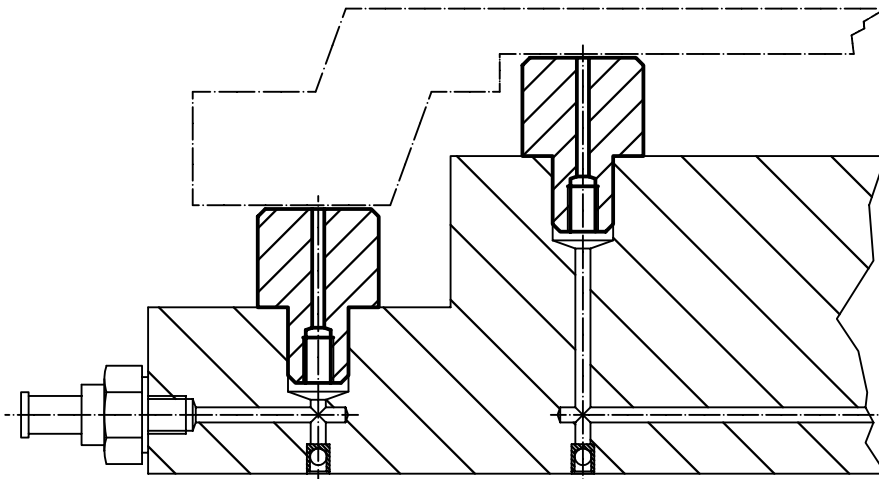
DRAWING



ORDER INFORMATION

Dimensions						[g]	Art. No.
d ₁	h ₁ h ₉	d ₂ n ₆	h ₂	h ₃	l		
[mm]							
bottom/lateral connection – picture 1							
16	13	8	27.0	–	28.0	24	22800.0010
25	20	12	39.0	–	36.5	93	22800.0020
bottom connection – picture 2							
16	5	8	28.5	15	–	12	22800.0100

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

Used in jigs and fixtures as positioning control for pre-machined workpieces. Sensitivity accuracy is 0.015-0.075 mm, depending on the workpiece surface. Contact control is achieved through compressed air backwash and is indicated on the monitoring unit.

Material

Seating Pins
 ■ Tool steel, hardened, ground

Seal
 ■ PVC

Supporting bar
 ■ Steel, blackened

Plug-in nipple
 ■ Brass

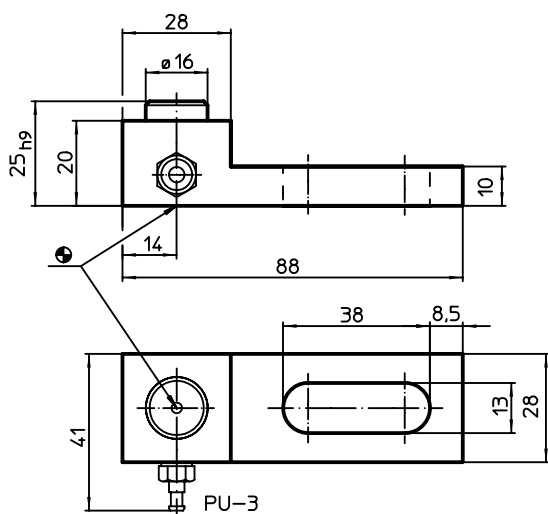
MORE INFORMATION

Notes
 Further information on request.

Further products

Monitoring Units, for positioning sensors, pneumatic → p. 356

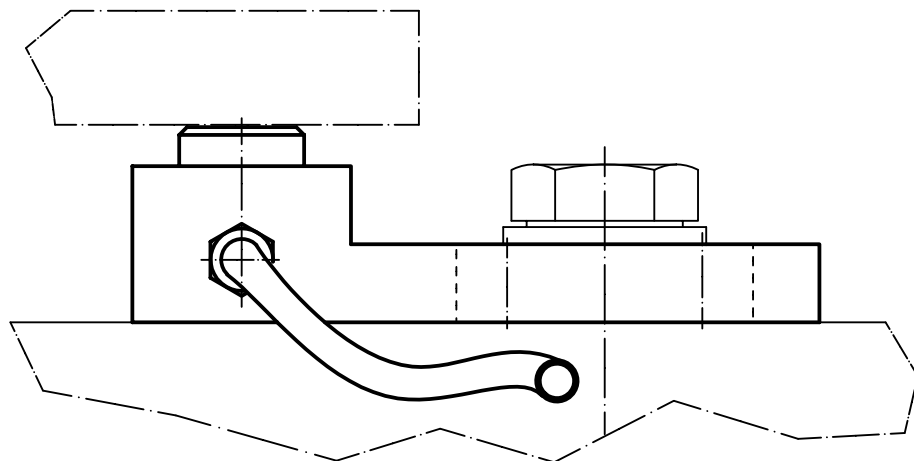
DRAWING



ORDER INFORMATION

	[g]	Art. No.
with holding bar	237	22800.0400

APPLICATION EXAMPLE



Positioning Sensors • self-aligning, pneumatic

EH 22800.



PRODUCT DESCRIPTION

Used in jigs and fixtures as positioning control for unmachined workpieces (version flat-faced ball, bearing surface ribbed) or pre-machined workpieces (flat-faced ball, bearing surface plain).

The response accuracy for the flat-faced ball version with plain bearing surface is in the range of 0.015-0.075 mm depending on the workpiece and for the flat-faced ball version with ribbed bearing surface constant at 0.005 mm.

The system is monitored by the compressed-air backwash which indicated on the monitoring unit (Art. No. 22800.0701).

Material

Ball

- Ball-bearing steel, hardened

Body

- Heat-treated steel, tempered, phosphated

MORE INFORMATION

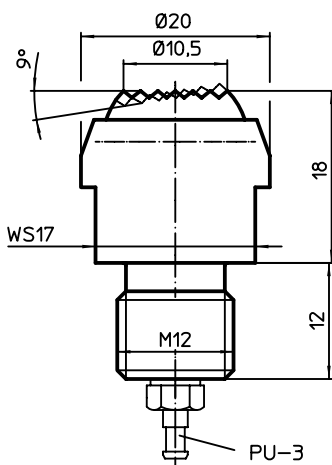
Notes

Further information on request.

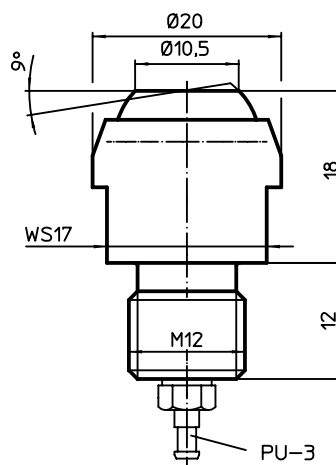
Further products

Monitoring Units, for positioning sensors, pneumatic → p. 356

DRAWING



picture 1

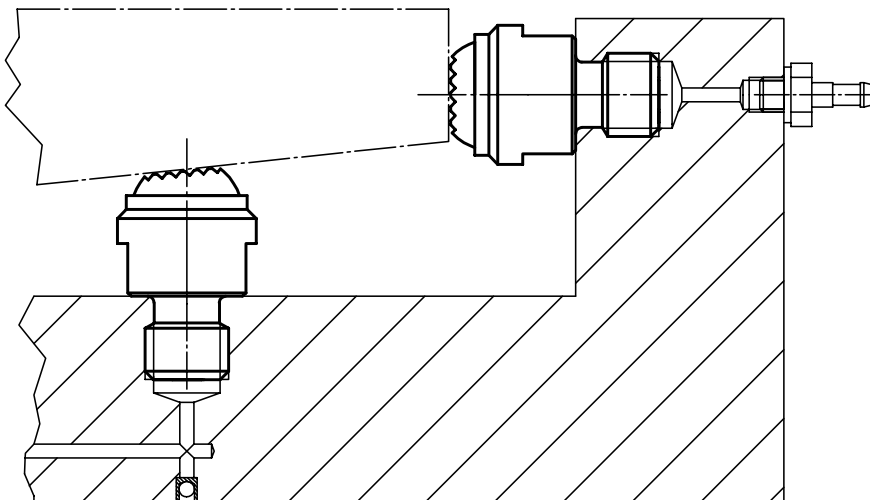


picture 2

ORDER INFORMATION

Load capacity for static load max. [kN]	[g]	Art. No.
flat-faced ball, bearing surface ribbed		
15	49	22800.0220
flat-faced ball, bearing surface plain		
15	49	22800.0320

APPLICATION EXAMPLE



Positioning Sensors • self-aligning, pneumatic
EH 22800.



PRODUCT DESCRIPTION

Used in jigs and fixtures as positioning control for unmachined workpieces. The response accuracy is constantly at 0,005 mm and can be achieved with a working pressure of 2,5 bar. The system is monitored by the compressed-air backwash which indicated on the monitoring unit (Art. No. 22800.0701).

Material

Seal

- PVC

Supporting bar

- Steel, blackened

Ball

- Ball-bearing steel, hardened

Body

- Heat-treated steel, tempered, phosphated

Plug-in nipple

- Brass

MORE INFORMATION

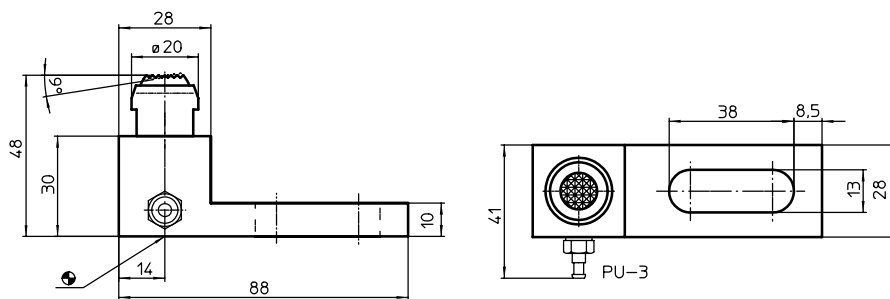
Notes

Further information on request.

Further products

Monitoring Units, for positioning sensors, pneumatic → p. 356

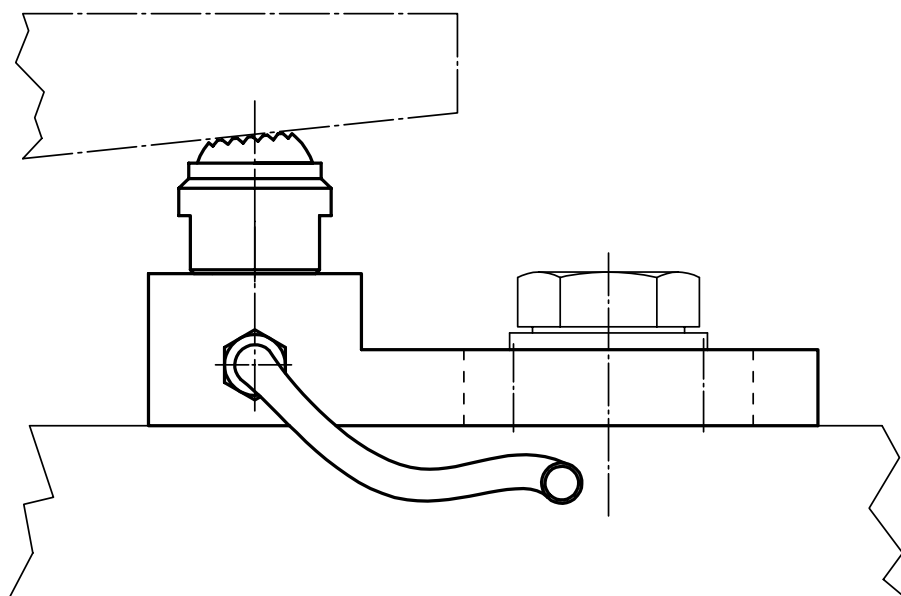
DRAWING



ORDER INFORMATION

Load capacity for static load max. [kN]	[g]	Art. No.
with holding bar		
15	321	22800.0410

APPLICATION EXAMPLE



Monitoring Units • for positioning sensors, pneumatic

EH 22800.



PRODUCT DESCRIPTION

The monitoring unit is used in combination with positioning sensors (EH 22800). Together with the positioning sensors, the backwash pressure sensor makes it possible to poll the correct workpiece positioning.

Material

- Housing**
 - Plastic

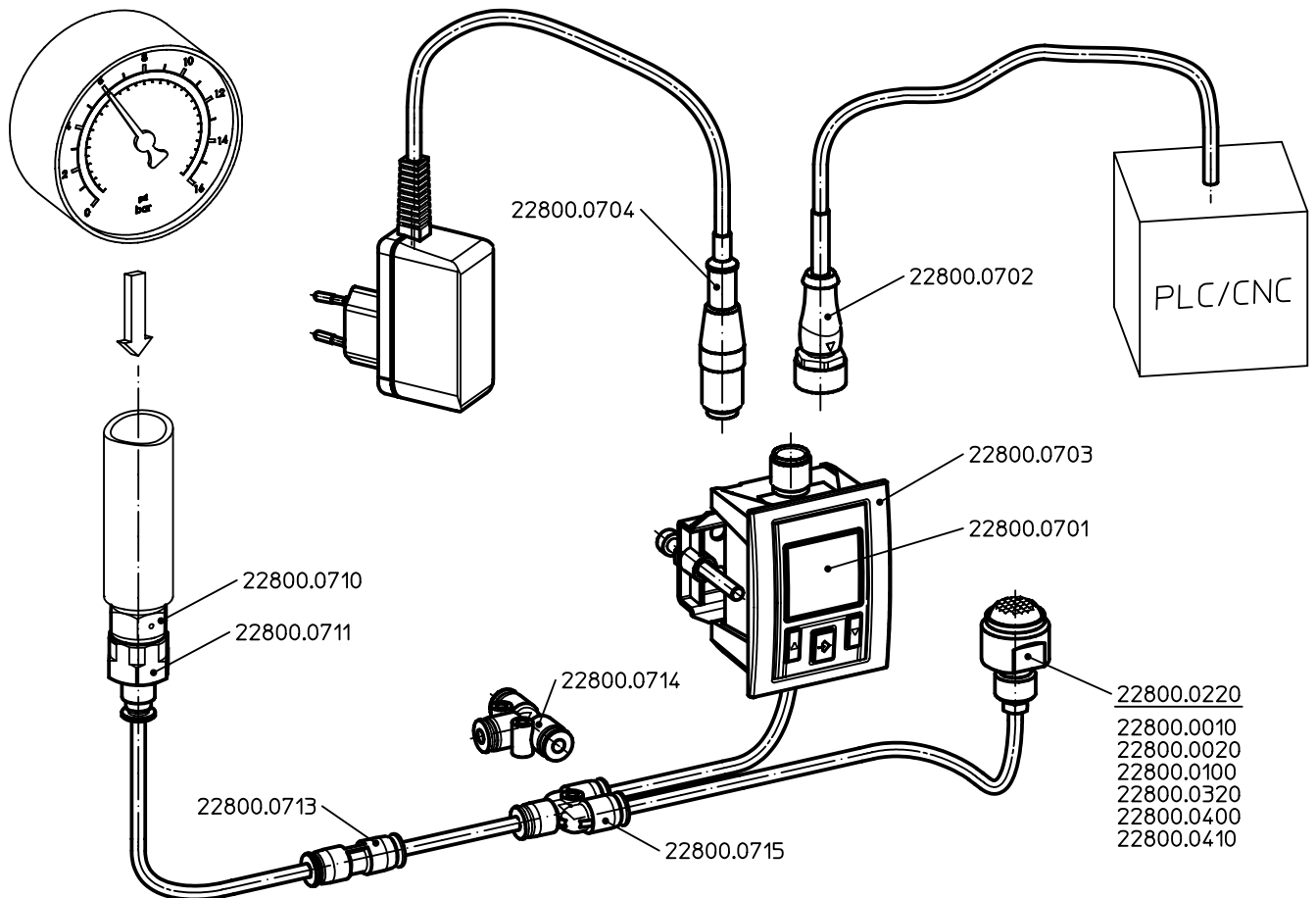
MORE INFORMATION

Notes

Further information on request.



DRAWING



ORDER INFORMATION

Working pressure [bar]	[g]	Art. No.
backwash pressure sensor with LCD display, Ø 4 mm pneumatic hose connection, analogue and digital output signals		
0 – 10	162	22800.0701

ACCESSORIES

	L [mm]	D [mm]	 [g]	Art. No.
circular connector cable for connecting backwash pressure sensor to control / bus system, M12 connection on free cable end (4-pin)				
	2000	-	84.0	22800.0702
installation frame for backwash pressure sensor, for installation into a control panel (max. wall thickness 5 mm)				
	-	-	26.0	22800.0703
plug-in power supply, input 100-240 V AC / output 24 V DC 500 mA, with M12 plug socket				
	1500	-	100.0	22800.0704
pressure regulator, max. input pressure 12 bar / output pressure 2 bar, 1/4" male thread two-sided				
	-	-	22.0	22800.0710
connection piece for connecting pressure regulator and pneumatic hose, 1/4" female thread on push-in connector (pneumatic hose Ø 4 mm)				
	-	-	17.0	22800.0711
pneumatic hose Ø 4 mm				
	5000	4	43.0	22800.0712
push-in connector, for pneumatic hose Ø 4 mm				
	-	-	4.7	22800.0713
T-push-in connector for pneumatic hose Ø 4 mm				
	-	-	7.6	22800.0714
Y-push-in connector for pneumatic hose Ø 4 mm				
	-	-	7.5	22800.0715

Retrieval Units • with sensor
EH 22810.

2



The retrieval unit is used to verify the position of a workpiece. The unit can be easily installed and removed from a fixture in combination with other seating elements. A compact sensor checks whether a workpiece makes contact at specific positions.

The system can be extended to monitor multiple positions. The information is output via an electrical signal. The signal can be transmitted both via a hard-wired connection or via radio signal. The wireless connection requires an additional transceiver unit including antenna.

PRODUCT BENEFITS AT A GLANCE

- Improved process reliability
- Automatic workpiece monitoring
- Enhanced error detection
- Option to connect to a machine control
- Optional wireless monitoring



Retrieval Unit with sensor



Radio transmitter



Radio receiver (antenna + receiver)



You will find further information as well as your contact persons under: www.halder.com/RetrievalUnits

Retrieval Units • with sensor

EH 22810.

2



PRODUCT DESCRIPTION

For retrieve a workpiece on a seating element.

The retrieval unit is always built into a seating element as a single system. By means of a simple plug-in connection, it transmits whether a part is located at a specific position, as an electrical signal.

The retrieval unit can be used in combination with various seating elements. For example, the EH 22690 pins from the Halder standard parts are suitable.

Data is transferred via a cable connection. Optionally, the retrieval signal can be transferred by radio. The version with bushing must be used to connect the retrieval unit to the radio transmitter.

The retrieval unit meets the requirements of protection class IP6K7 (highly temperature-resistant and robust).

Material

Cable

- Silicone

Sensor

- Plastic, black

Plug

- Metal

Body

- Aluminium, blue anodised

Body

- Heat-treated steel, tempered, blackened

MORE INFORMATION

Notes

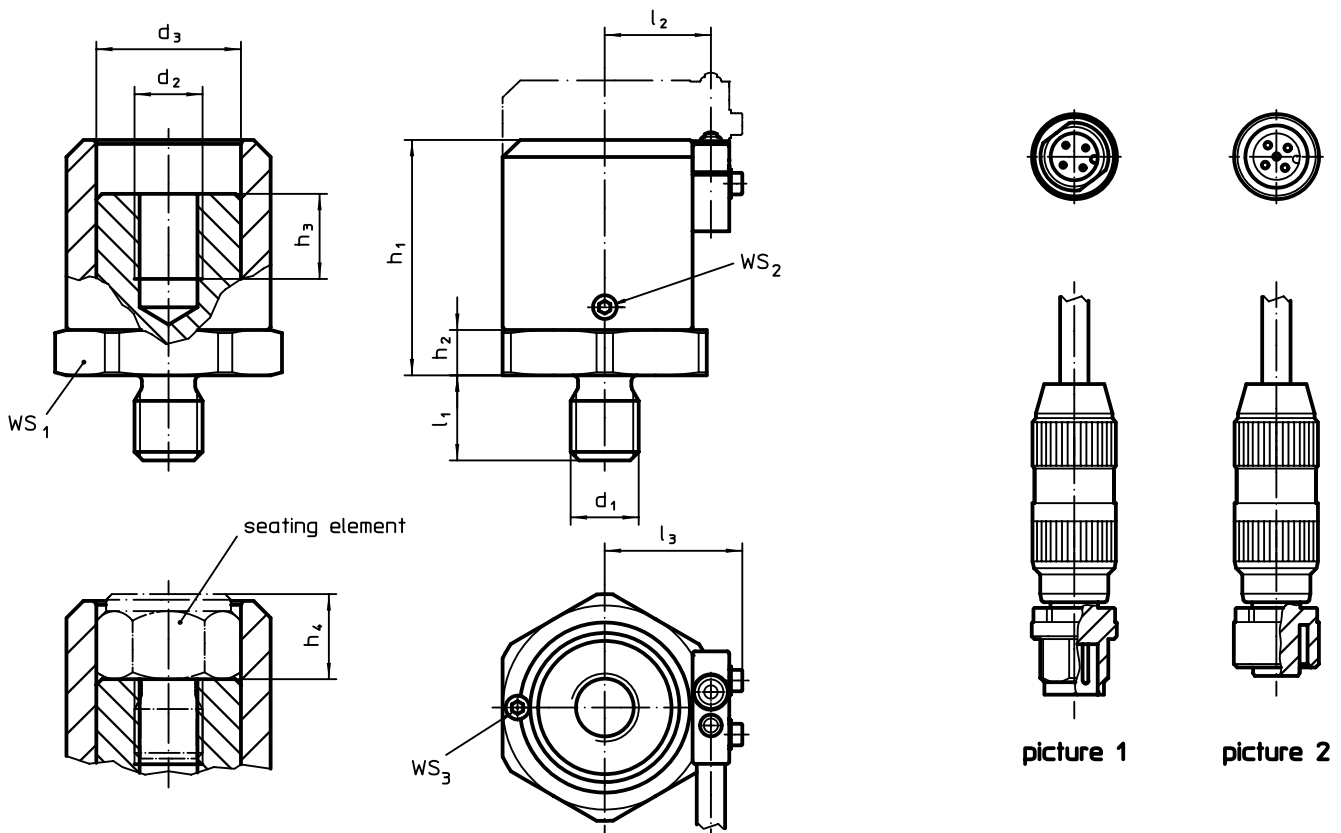
Further information on request.

Erwin Halder KG is a registered electrical equipment manufacturer (WEEE-Reg. No. DE 47048902).

Further products



Index Plungers, with sensor	→ p. 139
Pins	→ p. 311
Pins, with plastic bearing surface	→ p. 315
Radio Transmitters, for retrieval unit	→ p. 361
Radio Receivers, for retrieval unit	→ p. 362
Sensing Elements, with sensor adapter	→ p. 690
Sensing Elements, with actuating bolt, protected against rotating	→ p. 691

DRAWING






ORDER INFORMATION

2

Dimensions												WS			 min. max.		 [g]	Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃	h ₁ min.	h ₁ max.	h ₂	h ₃	h ₄ min.	h ₄ max.	WS ₁	WS ₂	WS ₃	[°C]		[g]	
[mm]												[mm]						
retrieval unit with bushing – picture 1																		
M 8	M 8	20.3	12	15.8	21.4	30.5	40.5	5	12	10	20.0	30	1.5	1.5	-25	85	180	22810.0008
M12	M12	25.5	15	18.7	24.3	41.5	59.0	8	15	10	27.5	36	2.0	2.0	-25	85	344	22810.0012
retrieval unit with plug – picture 2																		
M 8	M 8	20.3	12	15.8	21.4	30.5	40.5	5	12	10	20.0	30	1.5	1.5	-25	85	180	22810.1008
M12	M12	25.5	15	18.7	24.3	41.5	59.0	8	15	10	27.5	36	2.0	2.0	-25	85	408	22810.1012

ACCESSORIES

	 [g]	Art. No.
	sensor with bush and silicone cable	
	99	22810.9001
	sensor with plug and silicone cable	
	96	22810.9002

Radio Transmitters • for retrieval unit
EH 22810.

2



PRODUCT DESCRIPTION

For cable-free transfer of the retrieval signal.
The radio transmitter is installed close to the retrieval unit, and connected to the bushing of the silicone cable. The transmitter makes the polled signal available by radio, and does not require additional cable connection. Power is supplied by a battery.
The radio transmitter meets the requirements of protection class IP 67 (robust material) and is therefore suitable for use with cooling lubricants.
Frequency: 868.3 MHz (EU, Switzerland)
Other frequencies available on request.



MORE INFORMATION

Notes

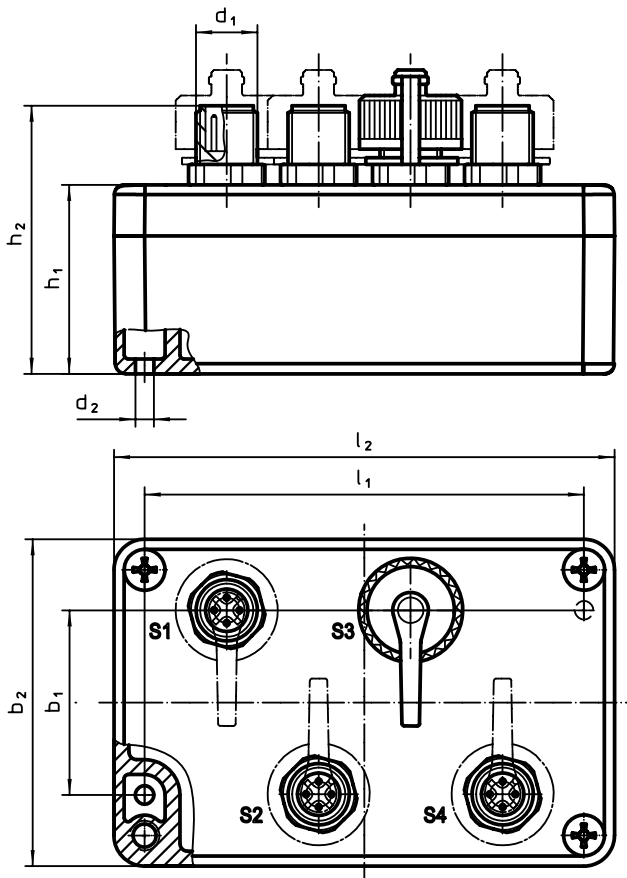
An AA battery (3.6 V) is included in the scope of delivery.

Further information on request.

Further products

Radio Receivers, for retrieval unit . . . → p. 362


DRAWING



ORDER INFORMATION

Dimensions								For art. no.	[g]	Art. No.
l_2	b_2	h_2	b_1	d_1	d_2	h_1	l_1			
universal radio transmitter with protective caps										
98	64	52.5	36	M12 x 1	4.5	37	86	22810.0008 / .0012	288	22810.9010

ACCESSORIES

	[g]	Art. No.
protection cap		
	4.9	22810.9011

Radio Receivers • for retrieval unit

EH 22810.

2



PRODUCT DESCRIPTION

For cable-free reception of the signal from the retrieval unit. The antenna receives the radio signal from the retrieval unit, and transmits it via a cable connection to an input for the receiver. This activates the corresponding output (the make-contact). For each receiver, a maximum of four radio channels can be received.

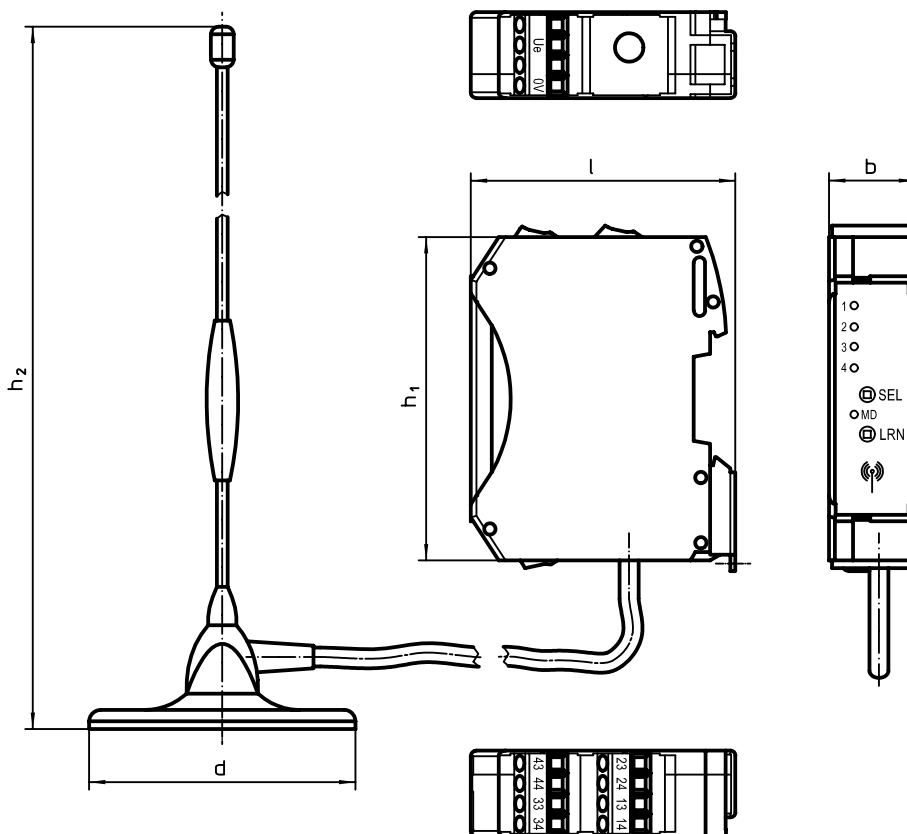
MORE INFORMATION

Notes

Further information on request.



DRAWING



ORDER INFORMATION

Dimensions					[g]	Art. No.
l	b	h ₁ [mm]	d	h ₂		
universal radio receiver and radio antenna						
70	23	90	70	350	447	22810.9020

Expander® Sealing Plugs • body from case-hardened steel

EH 22880.



PRODUCT DESCRIPTION

Expander® sealing plugs are used for safe, quick and economic sealing of bore holes in fluid technology, e.g. hydraulic drilling holes in jig and fixture construction. Assembly is effected by pressing in the sealing plug into the drilling hole by means of the prescribed setting die.

Please refer to the technical data following these product information pages.

Material

Body

- Case-hardened steel, zinc-plated, thick-film passivated

Ball

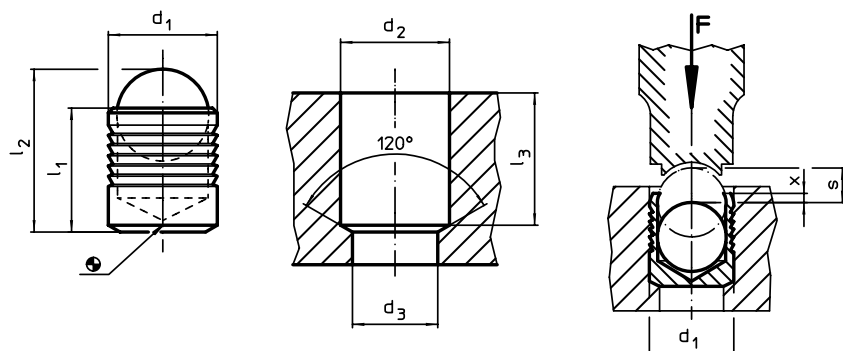
- Roller bearing steel, heat-treated, tempered

MORE INFORMATION

Further products

- Expander® Sealing Plugs, body from stainless steel → p. 364
- Expander® Sealing Plugs, body and ball from stainless steel → p. 365
- Setting Dies, for Expander® sealing plug → p. 367

DRAWING



ORDER INFORMATION

Dimensions								[g]	Art. No.
d ₁	l ₁	l ₂ ~	d ₂ +0.1	d ₃ max.	l ₃ min.	x ±0.2	s		
[mm]									
4	4.0	5.2	4	3.3	3.8	0.2	1.50	0.4	22880.0004
5	5.5	7.0	5	4.3	5.3	0.4	2.00	0.8	22880.0005
6	6.5	8.6	6	5.3	6.3	0.4	2.50	1.2	22880.0006
7	7.5	10.1	7	6.4	7.3	0.4	3.00	1.9	22880.0007
8	8.5	11.7	8	7.4	8.3	0.3	3.50	2.8	22880.0008
9	10.0	13.7	9	8.4	9.8	0.4	4.00	4.2	22880.0009
10	11.0	15.2	10	9.4	10.8	0.4	4.50	6.1	22880.0010
12	13.0	18.0	12	10.6	12.8	0.4	5.50	9.6	22880.0012
14	15.0	20.8	14	12.7	14.5	0.4	6.35	15.0	22880.0014
16	17.0	23.7	16	14.7	16.5	0.6	7.00	22.0	22880.0016
18	19.0	26.3	18	16.7	18.5	0.6	8.00	32.0	22880.0018
20	22.0	30.5	20	18.7	21.5	0.8	9.00	44.0	22880.0020
22	25.0	34.2	22	20.7	24.5	0.8	10.00	58.0	22880.0022

Working and control pressures for Expander® sealing plug, sleeve from case hardened steel 1.0403							
basic material	ETG-100 AISI 1144	C15Pb 1.0403	GG-25 DIN 1691	GGG-50 DIN 1693	AlCuMg2 3.1354	AlMgSiPb 3.0615	G-AISI7Mg 3.2371
d ₁ 4-10 mm	p [bar]						
	350	350	350	350	350	320	320
	pTest [bar]						
	1100	1100	1100	1100	1100	1000	1000
d ₁ 12-22 mm	p [bar]						
	280	280	280	280	280	250	250
	pTest [bar]						
	900	900	900	900	900	800	800



Expander® Sealing Plugs • body from stainless steel

EH 22880.



PRODUCT DESCRIPTION

Expander® sealing plugs are used for safe, quick and economic sealing of bore holes in fluid technology, e.g. hydraulic drilling holes in jig and fixture construction. Assembly is effected by pressing in the sealing plug into the drilling hole by means of the prescribed setting die. **Please refer to the technical data following these product information pages.**

Material

Body

- Stainless steel 1.4305

Ball

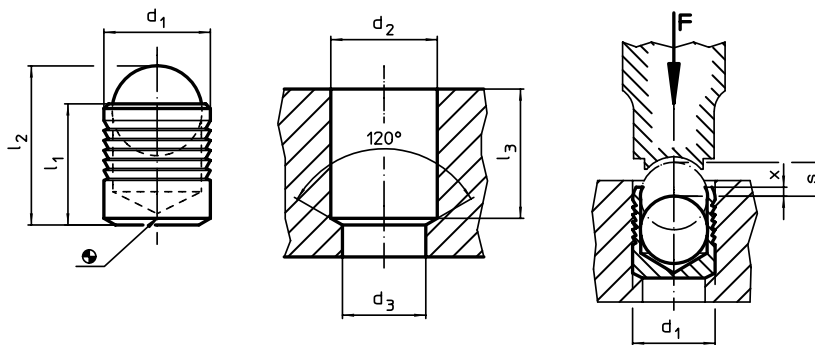
- Roller bearing steel, heat-treated, tempered

MORE INFORMATION

Further products

- Expander® Sealing Plugs, body from case-hardened steel → p. 363
- Expander® Sealing Plugs, body and ball from stainless steel → p. 365
- Setting Dies, for Expander® sealing plug → p. 367

DRAWING



ORDER INFORMATION

Dimensions								[g]	Art. No.
d ₁	l ₁	l ₂	d ₂ +0.1	d ₃ max.	l ₃ min.	x ±0.2	s		
[mm]									
body from stainless steel, ball from steel									
3	3.6	4.6	3	2.2	3.4	0.4	1.20	0.2	22880.0053
4	4.0	5.2	4	3.3	3.8	0.2	1.50	0.4	22880.0054
5	5.5	7.0	5	4.3	5.3	0.4	2.00	0.7	22880.0055
6	6.5	8.6	6	5.3	6.3	0.4	2.50	1.3	22880.0056
7	7.5	10.1	7	6.4	7.3	0.4	3.00	1.9	22880.0057
8	8.5	11.7	8	7.4	8.3	0.3	3.50	3.2	22880.0058
9	10.0	13.7	9	8.4	9.8	0.4	4.00	4.5	22880.0059
10	11.0	15.2	10	9.4	10.8	0.4	4.50	6.1	22880.0060
12	13.0	18.0	12	10.6	12.8	0.4	5.50	9.7	22880.0062
14	15.0	20.8	14	12.7	14.5	0.4	6.35	15.0	22880.0064
16	17.0	23.7	16	14.7	16.5	0.6	7.00	22.0	22880.0066
18	19.0	26.3	18	16.7	18.5	0.6	8.00	31.0	22880.0068
20	22.0	30.5	20	18.7	21.5	0.8	9.00	46.0	22880.0070
22	25.0	34.2	22	20.7	24.5	0.8	10.00	58.0	22880.0072

Working and control pressures for Expander® sealing plug, sleeve from stainless steel 1.4305							
basic material	ETG-100 AISI 1144	C15Pb 1.0403	GG-25 DIN 1691	GGG-50 DIN 1693	AlCuMg2 3.1354	AlMgSiPb 3.0615	G-AISI7Mg 3.2371
d ₁ 3-10 mm	p [bar]						
	450	450	450	450	450	380	380
	pTest [bar]						
	1400	1400	1400	1400	1400	1200	1200
d ₁ 12-22 mm	p [bar]						
	350	350	350	350	350	280	280
	pTest [bar]						
	1150	1150	1150	1150	1150	900	900

Expander® Sealing Plugs • body and ball from stainless steel

EH 22880.



PRODUCT DESCRIPTION

Expander® sealing plugs are used for safe, quick and economic sealing of bore holes in fluid technology, e.g. hydraulic drilling holes in jig and fixture construction. Assembly is effected by pressing in the sealing plug into the drilling hole by means of the prescribed setting die. Please refer to the technical data following these product information pages.

Material

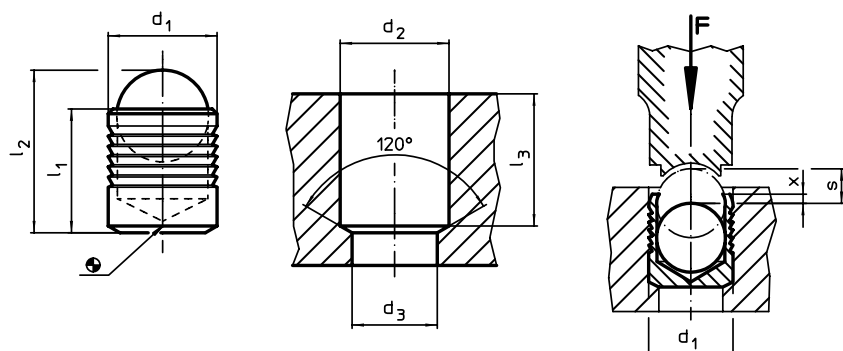
- Body**
 - Stainless steel 1.4305
- Ball**
 - Stainless steel 1.4301

MORE INFORMATION

Further products

- Expander® Sealing Plugs, body from case-hardened steel → p. 363
- Expander® Sealing Plugs, body from stainless steel → p. 364

DRAWING



ORDER INFORMATION

Dimensions								[g]	Art. No.
d ₁	l ₁	l ₂	d ₂ +0.1	d ₃ max.	l ₃ min.	x ±0.2	s		
[mm]									
body and ball from stainless steel									
3	3.6	4.55	3	2.2	3.4	0.4	1.20	0.2	22880.0083
4	4.0	5.10	4	3.3	3.8	0.2	1.50	0.3	22880.0084
5	5.5	7.05	5	4.3	5.3	0.4	2.00	0.7	22880.0085
6	6.5	8.60	6	5.3	6.3	0.4	2.50	1.2	22880.0086
7	7.5	10.05	7	6.4	7.3	0.4	3.00	1.9	22880.0087
8	8.5	11.60	8	7.4	8.3	0.3	3.50	2.9	22880.0088
9	10.0	13.50	9	8.4	9.8	0.4	4.00	4.0	22880.0089
10	11.0	15.05	10	9.4	10.8	0.4	4.50	5.5	22880.0090
12	13.0	17.80	12	10.6	12.8	0.4	5.50	9.4	22880.0092
14	15.0	20.45	14	12.7	14.5	0.4	6.35	14.8	22880.0094

Working and control pressures for Expander® sealing plug, sleeve from stainless steel 1.4305							
basic material	ETG-100 AISI 1144	C15Pb 1.0403	GG-25 DIN 1691	GGG-50 DIN 1693	AlCuMg2 3.1354	AlMgSiPb 3.0615	G-AISI7Mg 3.2371
d ₁ 3-10 mm	p [bar]						
	450	450	450	450	450	380	380
d ₁ 12-22 mm	pTest [bar]						
	1400	1400	1400	1400	1400	1200	1200
d ₁ 12-22 mm	p [bar]						
	350	350	350	350	350	280	280
d ₁ 12-22 mm	pTest [bar]						
	1150	1150	1150	1150	1150	900	900

Expander® Sealing Plugs • body from case-hardened steel / stainless steel
EH 22880.

CONSTRUCTIONAL GUIDELINES, ASSEMBLY INSTRUCTIONS

2



COMPONENT REQUIREMENTS
(22880.0004 – 22880.0094)



Drilling Holes

- The counterbore relation d_2/d_3 has to be according to the catalogue specification.
- Roundness tolerances have to be within $t = 0,05$ mm.
- With hard materials (see picture 1) the drilling roughness has to be $R_z=10$ to 30 μm .
- Drilling tolerance $d_1 = + 0,1$ mm.
- Longitudinal rifles and spiral grooves have to be avoided as they have a negative influence on the sealing.
- **Drilling holes have to be kept absolutely free from oil, grease and chips.**

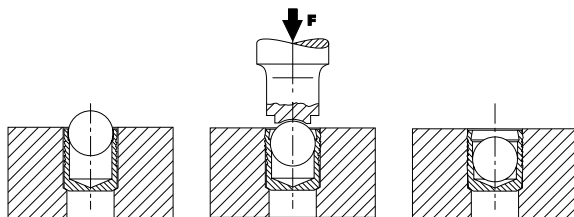


ASSEMBLY INSTRUCTIONS – MOUNTING PROCEDURE

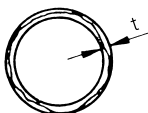
- The Expander® Sealing Plug has to be inserted into the counterbore hole with the ball facing out. The upper sleeve edge must not protrude the working piece. Mounting dimensions given in the catalogue have to be considered.
- When having only a small or no counterbore hole at all the sleeve bottom has to be supported sufficiently.
- Press in the ball by means of a press or setting die until the upper crown is lying underneath the sleeve edge. Respective standard values for stroke s and dimension x can be seen from the table below.

Tools

For the assembly of Expander® Sealing Plugs, please use setting dies according to the catalogue specification.



Roundness Tolerance



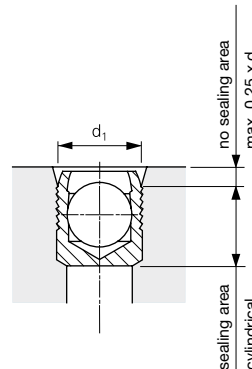
To achieve a secure functioning of the Expander® Sealing Plugs in respect to pressure effectiveness and sealing, a roundness tolerance of $t = 0,05$ mm has to be adhered to.

Drilling Tolerance

The drilling tolerance is $+ 0,1$ mm.

Drilling Conicity

Within the active sealing area, the drilling hole has to be cylindrical. The drilling hole entrance may be conical up to $0,25 \times d_1$ as this zone does not have any primary influence on the sealing function.



Galvanic Corrosion

An eventual contact corrosion has to be considered.

DISASSEMBLY PROCESS

Thanks to their strength of approx. 45 HRC, the balls can be drilled out using a drill fitted with a hard-metal bit.

- Drill out Expander® Sealing Plugs with diameters of up to $\varnothing 6$ mm to the **next larger diameter** directly in a single step.
- Use multiple steps to drill out Expander® Sealing Plugs with diameters of $\varnothing 6$ mm or more and **then bore to the next larger diameter** according standard sheet.
- Clear the hole of chips or any left-over body remnants and clean the hole (oil-free and grease-free).
- Insert a new Expander® Sealing Plug.

Important

Always insert the Expander® Sealing Plugs with the next larger size following disassembly.

Please refer to the technical data following these product information pages.

Setting Dies • for Expander® Sealing plug

EH 22880.



PRODUCT DESCRIPTION

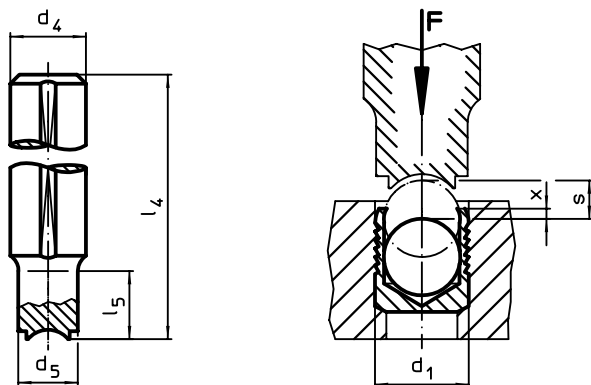
Expander® sealing plugs are used for safe, quick and economic sealing of bore holes in fluid technology, e.g. hydraulic drilling holes in jig and fixture construction. Assembly is effected by pressing in the sealing plug into the drilling hole by means of the prescribed setting die.

Please refer to the technical data following these product information pages.

Material

- Tool steel, heat-treated

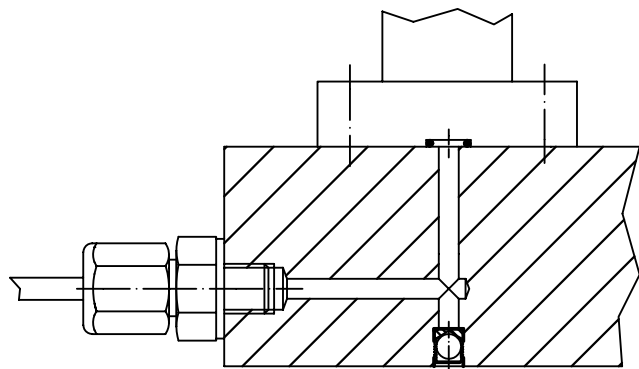
DRAWING



ORDER INFORMATION

d ₁	d ₄ h9	d ₅	Dimensions				s	[g]	Art. No.
			l ₄	l ₅	x ±0.2	[mm]			
3	10	2.8	100	10	0.4	1.20	53	22880.0153	
4	10	3.8	100	10	0.2	1.50	54	22880.0154	
5	10	4.8	100	12	0.4	2.00	53	22880.0155	
6	10	5.8	100	15	0.4	2.50	53	22880.0156	
7	10	6.8	100	18	0.4	3.00	54	22880.0157	
8	10	7.8	100	20	0.3	3.50	55	22880.0158	
9	14	8.8	100	22	0.4	4.00	102	22880.0159	
10	14	9.8	100	25	0.4	4.50	103	22880.0160	
12	14	11.7	150	30	0.4	5.50	167	22880.0162	
14	20	13.7	150	35	0.4	6.35	316	22880.0164	
16	20	15.7	150	40	0.6	7.00	326	22880.0166	
18	20	17.7	150	45	0.6	8.00	340	22880.0168	
20	25	19.7	150	50	0.8	9.00	495	22880.0170	
22	25	21.7	150	55	0.8	10.00	516	22880.0172	

APPLICATION EXAMPLE



Expander® Sealing Plugs • with pull-anchor

EH 22880.



PRODUCT DESCRIPTION

Expander® sealing plugs are used for safe, quick and economic sealing of bore holes in fluid technology, e.g. hydraulic drilling holes in jig and fixture construction. When using sealing plugs with pull-anchor, assembly is made by means of user friendly assembly devices. Body and pin are pre-assembled and suitable for automated processing.

Please refer to the technical data following these product information pages.

Material

Body

- Case-hardened steel, annealed

Pin

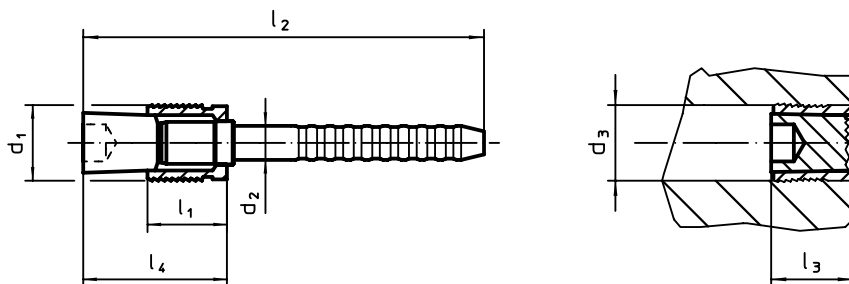
- Steel

MORE INFORMATION

Further products

Assembly Tools, for Expander® sealing plugs with pull-anchor → p. 371

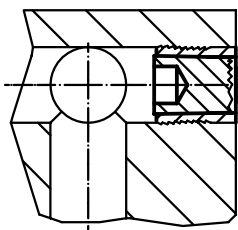
DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₃ +0.12 0	Dimensions				[g]	Art. No.
			l ₁	l ₂	l ₃ max.	l ₄ max.		
[mm]								
4	2.50	4	4.5	39	6.5	9	1.7	22880.0304
5	3.00	5	5.5	41	7.5	10	2.5	22880.0305
6	3.40	6	6.5	38	8.5	12	3.5	22880.0306
7	4.10	7	7.5	38	9.5	14	5.1	22880.0307
8	4.20	8	8.5	40	10.5	15	6.4	22880.0408
9	4.50	9	9.5	43	11.0	17	8.1	22880.0409
10	4.75	10	10.5	45	12.5	19	10.0	22880.0410

APPLICATION EXAMPLE



Working and control pressures for Expander® sealing plug with pull-anchor							
basic material	ETG-100 AISI 1144	C15Pb 1.0403	GG-25 DIN 1691	GGG-50 DIN 1693	AlCuMg2 3.1354	AlMgSiPb 3.0615	G-AlSi7Mg 3.2371
d ₁ 4-10 mm	p [bar]						
	500	500	500	500	500	450	450
	pTest [bar]						
	1600	1600	1600	1600	1600	1400	1400

Expander® Sealing Plugs • with elongated pull-anchor

EH 22880.



PRODUCT DESCRIPTION

Expander® sealing plugs are used for safe, quick and economic sealing of bore holes in fluid technology, e.g. hydraulic drilling holes in jig and fixture construction. When using sealing plugs with elongated pull-anchor, assembly is made by means of user friendly assembly devices.

Body and pin are pre-assembled and suitable for automated processing.

ATTENTION:

If Expander® sealing plugs with pull-anchor are applied to separate grooves, the admissible working pressure at the setting side has to be reduced by 50 %!

Please refer to the technical data following these product information pages.

Material

- Body**
 - Case-hardened steel, annealed
- Pin**
 - Steel

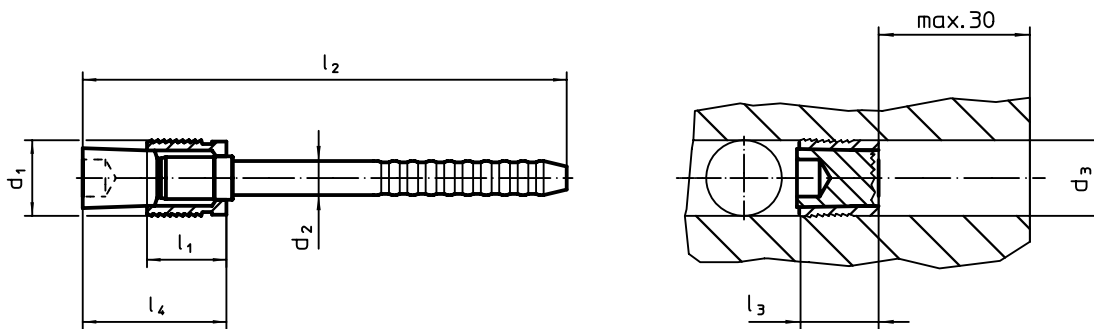
MORE INFORMATION

Further products

Distance Bushings, for Expander® sealing plugs with elongated pull-anchor . . . → p. 370

Assembly Tools, for Expander® sealing plugs with pull-anchor → p. 371

DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₃ +0.12 0	Dimensions				[g]	Art. No.
			l ₁	l ₂	l ₃ max.	l ₄ max.		
[mm]								
4	2.50	4	4.5	69	6.5	9	3.5	22880.0414
5	3.00	5	5.5	71	7.5	10	4.3	22880.0415
6	3.40	6	6.5	73	8.0	12	6.4	22880.0416
7	4.10	7	7.5	68	9.0	14	7.9	22880.0417
8	4.20	8	8.5	70	10.5	15	10.0	22880.0418
9	4.50	9	9.5	73	11.0	17	12.0	22880.0419
10	4.75	10	10.5	75	12.5	19	15.0	22880.0420

Working and control pressures for Expander® sealing plug with elongated pull-anchor							
basic material	ETG-100 AISI 1144	C15Pb 1.0403	GG-25 DIN 1691	GGG-50 DIN 1693	AlCuMg2 3.1354	AlMgSiPb 3.0615	G-AISI7Mg 3.2371
d ₁ 4-10 mm	p [bar]						
	500	500	500	500	500	450	450
	pTest [bar]						
	1600	1600	1600	1600	1600	1400	1400

Distance Bushings • for Expander® sealing plugs with elongated pull-anchor

EH 22880.



PRODUCT DESCRIPTION

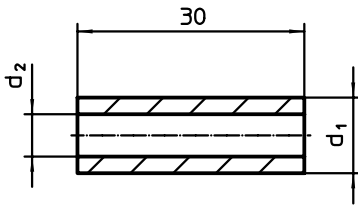
To be used for Expander® sealing plugs with elongated pull-anchor.

Material

Body

- Case-hardened steel, case-hardened

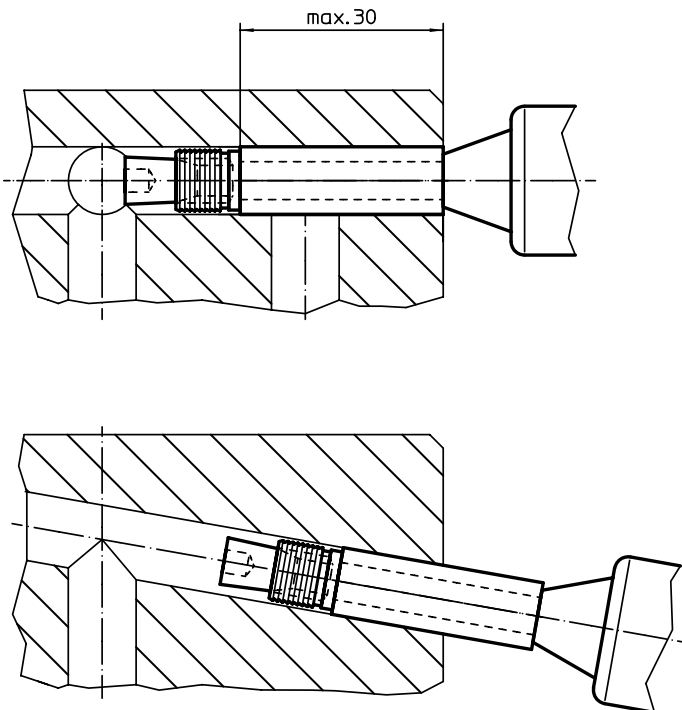
DRAWING



ORDER INFORMATION

d ₁	Dimensions		[g]	Art. No.
	[mm]			
	d ₁	d ₂		
	4	2.7	1.4	22880.0424
	5	3.2	2.5	22880.0425
	6	3.7	3.8	22880.0426
	7	4.6	4.8	22880.0427
	8	4.8	7.2	22880.0428
	9	5.2	9.6	22880.0429
	10	5.6	12.0	22880.0430

APPLICATION EXAMPLE



Assembly Tools • for Expander® sealing plugs with pull-anchor

EH 22880.



PRODUCT DESCRIPTION

Assembly tool for the safe and easy assembly of Expander® sealing plugs with pull-anchor/ elongated pull-anchor.

Technical details of the pneumatic assembly tools:

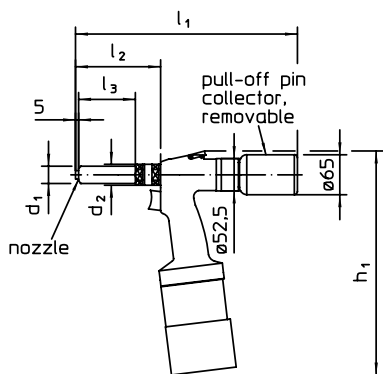
- Working pressure min. 5 bar / max. 7 bar
- Air volume required at 5.6 bar = 3.5 l
- Working noise < 75 dB(A)
- Cycle time 2 s

Attention: For original equipment the assembly tools include the ram, the clamping jaws, and the housing for the clamping jaws. In the original equipment nozzles are not included. They have to be ordered separately.

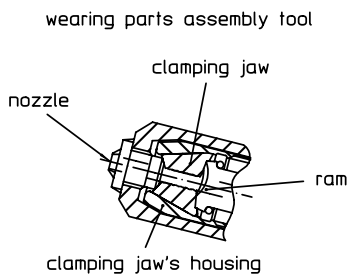
Material

- On request

DRAWING



picture 1



picture 2

ORDER INFORMATION

Tensile force	Stroke	Dimensions						Art. No.
		d ₁	d ₂	l ₁	l ₂	l ₃	h ₁	
[kN]	[mm]	[mm]						[g]
assembly tool, pneumatically operated (ExTool 030), for sizes (d₁) 4 to 6 – picture 1								
19 [at 7 bar]	25	23	26	353	133	73.5	356	5350 22880.0510
assembly tool, pneumatically operated (ExTool 040-1), for sizes (d₁) 7 to 10 – picture 1								
24 [at 7 bar]	18	28	34	353	133	92.0	356	408 22880.0520

ACCESSORIES

Description	Dimensions Nominal size d ₁	Art. No.			
			[mm]	[g]	
ExTool 030 (22880.0510)					
	nozzle – picture 2	4	6.3	22880.0532	
		5	7.1	22880.0533	
		6	7.0	22880.0534	
	ram – picture 2	–	13.0	22880.0560	
	clamping jaw – picture 2	–	7.1	22880.0561	
	clamping jaw's housing – picture 2	–	39.0	22880.0562	
ExTool 040-1 (22880.0520)					
	nozzle – picture 2	7	9.5	22880.0535	
		8	11.0	22880.0526	
		9	9.5	22880.0527	
		10	9.7	22880.0528	
		ram – picture 2	–	20.0	22880.0570
		clamping jaw – picture 2	–	10.0	22880.0571
	clamping jaw's housing – picture 2	–	41.0	22880.0572	

Expander® Sealing Plugs • with pull-anchor / elongated pull-anchor

EH 22880.

CONSTRUCTIONAL GUIDELINES, ASSEMBLY INSTRUCTIONS

2



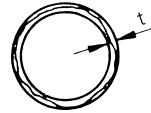
COMPONENT REQUIREMENTS (22880.0304 – 22880.0420)

Drilling Holes

- Roundness tolerances have to be within $t = 0,05$ mm.
- With hard materials the drilling roughness has to be $R_z = 10$ to 30 μm .
- Drilling tolerance $d_1 = + 0,12$ mm.
- Longitudinal rifles and spiral grooves have to be avoided as they have a negative influence on the sealing.
- **Drilling holes have to be kept absolutely free from oil, grease and chips.**

Roundness Tolerance

To achieve a secure functioning of the Expander® Sealing Plugs in respect to pressure effectiveness and sealing, a roundness tolerance of $t = 0,05$ mm has to be adhered to.



Drilling Tolerance

The drilling tolerance $d_1 = + 0,12$ mm with pull-anchor.

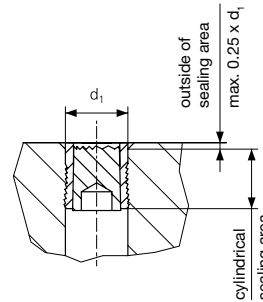
Drilling Conicity

Within the active sealing area, the drilling hole has to be cylindrical. The drilling hole entrance may be conical up to $0,25 \times d_1$ as this zone does not have any primary influence on the sealing function.

ASSEMBLY INSTRUCTIONS – MOUNTING PROCEDURE

Mounting Procedure

- The Expander® Sealing Plug with pull-anchor has to be flush mounted into the sleeve of the assembling tool.
- The Expander® Sealing Plug has to be mounted into the bore hole to be sealed. The assembly operation has to be activated until the pull-anchor breaks when having achieved the nominal breaking load.

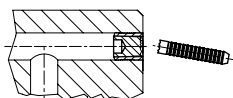
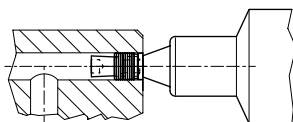
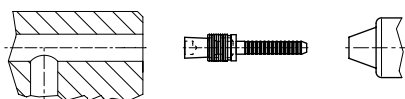


Attention

- The assembly of the Expander® Sealing Plug has to be effected only in a clean working environment.
- The anchor and sleeve of the Sealing Plug must neither be cleaned nor greased.

Galvanic Corrosion

An eventual contact corrosion has to be considered.



DISASSEMBLY PROCESS

For the Expander® Sealing Plug type with pull-anchor a disassembly is possible.

1. Strike back the anchor inside of the sleeve with the help of the punch.
2. Break out the sleeve and remove the struck anchor.
3. Redrill the bore hole to the **Expander® Sealing Plug diameter next in size** according to the standard sheet.
4. Clean the bore and free it from chips and possible leftovers of the sleeve (without oil and grease).
5. Insert a new Expander® Sealing Plug **(take care of point 3)**.

Tools

- For a failure-free assembly of the Expander® Sealing Plug the original tools and the appropriate equipment according to the technical data sheet are to be used.

Attention

After the disassembly always insert the Expander® Sealing Plug diameter next in size!

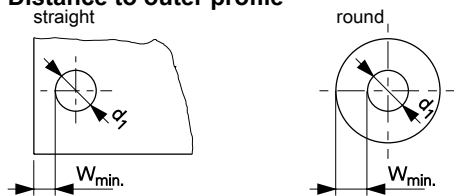
Please refer to the technical data following these product information pages.

CONSTRUCTIONAL GUIDELINES, ASSEMBLY INSTRUCTIONS

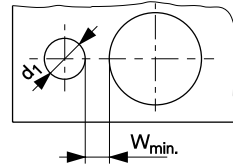
WALL THICKNESSES / EDGE DISTANCES

The Expander® Sealing Plug is anchored to the basic material by radial expansion of the sleeve. Depending on the basic materials' characteristics forces resulting from this type of anchorage as well as the hydraulic pressures and temperature loads will necessitate minimum wall thicknesses and edge distances.

Distance to outer profile



Wall Thickness



For standard values of minimum wall thicknesses and edge distances (Wmin) refer to table.

Calculation of standard values

Diameter of the Expander® Sealing Plug: $d_1 \geq 4 \text{ mm}: W_{\min} = f_{\min} \times d_1$

$d_1 < 4 \text{ mm}: W_{\min} = f_{\min} \times d_1 + 0,5$

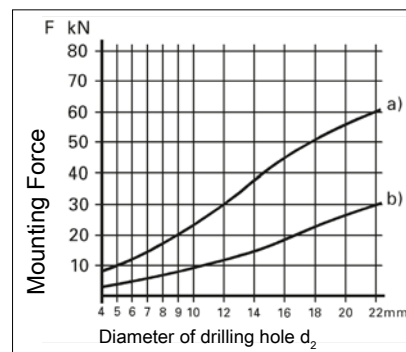
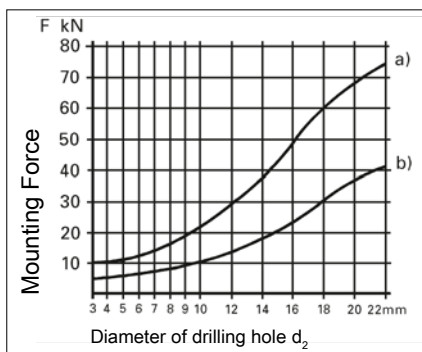


Description	ETG -100 AISI 1144	C 15 Pb 1.0403	GG - 25 DIN 1691	GGG - 50 DIN 1693	AlCuMg ₂ 3.1354	AlMgSiPb 3.0615	G-AISi7Mg 3.2371
Tensile strength Rm N/mm ²	1000	560	250	500	480	340	300
Min. breaking elongation A5 / %	6	6	-	7	8	8	4
Average permanent elongation limit R _{p0.2} N/mm ²	865	300	-	320	380	300	250
Basic material				Factor f_{min}			
Sleeve from stainless steel	0,6	0,8	1,0	0,8	0,8	1,0	1,0
Sleeve from steel	0,5	0,6	1,0	0,6	0,6	1,0	1,0
Type with pull-anchor	0,5	0,6	1,0	0,6	0,6	1,0	1,0

MOUNTING / ASSEMBLY FORCES

Expander® Sealing Plug sleeve from stainless steel
Art. No. 22880.0053 to 22880.0094

Expander® Sealing Plug sleeve from steel
Art. No. 22880.0004 to 22880.0022



Measured in steel having a tensile strength of Rm = 1000 N/mm². When using basic materials with lower tensile strengths values are lower

a) Force at min. drilling tolerance
b) Force at max. drilling tolerance

Expander® Sealing Plugs

EH 22880.

2

ANCHORAGE PRINCIPLE



There is a direct connection between the necessary drilling roughness required and both, the hardness and the tensile characteristics of the basic material. Depending on the mounting combination of sealing plug and basic material, anchorage can either take place via the rifle profile of the Expander® body (automatic anchorage) or via the surface roughness of the drilling hole.



Attention

Depending on the type of Expander® Sealing Plug and the hardness of the basic material a bore roughness of $R_z = 10-30 \mu\text{m}$ has to be adhered to.



Expander® Sealing Plug

Art. No. 22880.0004 to 22880.0094

Requirements to achieve maximum operation reliability

- Drilling tolerance $d_1 = + 0,1 \text{ mm}$,
- Consideration of counterbore hole relations,
- Consideration of counterbore hole relations,
- Roundness tolerance $t = 0,05 \text{ mm}$,
- Longitudinal rifles and spiral grooves that may have a negative influence on the sealing effectiveness have to be avoided,
- Drilling holes have to be free from oil and grease.

Expander® Sealing, type with pull-anchor

Art. No. 22880.0304 to 22880.0420

Requirements to achieve maximum operation reliability

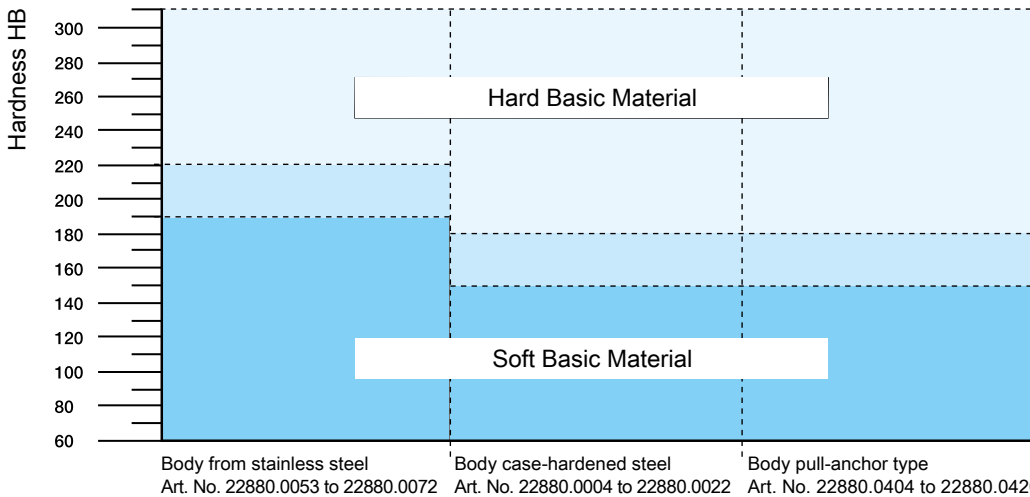
- Drilling tolerance $d_1 = + 0,12 \text{ mm}$,
- Roundness tolerance $t = 0,05 \text{ mm}$,
- Longitudinal rifles and spiral grooves that may have a negative influence on the sealing effectiveness have to be avoided,
- Drilling holes have to be free from oil and grease.



Note

In case where an automatic anchorage is not possible when building in the Expander® Sealing Plug into a hard basic material a drilling roughness of $> R_z = 10-30 \mu\text{m}$ is necessary to achieve the required pressure values. When having roughness $> R_z = 30 \mu\text{m}$, leakages may occur.

Expander® Sealing Plug



= For the allowed working pressures, the anchorage must be achieved via the drilling roughness. Roughness: $R_z = 10-30 \mu\text{m}$.

= Intermediate area: For the allowed working pressures anchorage has to be achieved via the drilling roughness of the basic material. Roughness: $R_z = 10-30 \mu\text{m}$.

= The anchorage within the drilling hole of the basic material will automatically be achieved via the rifle profile of the Expander® sealing plug (automatic anchorage).

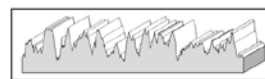
Picture 1 Selection Diagram



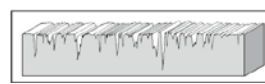
Picture 2



Picture 3



Picture 4



Picture 5

Anchorage by Rifle Profile (Automatic Anchorage)

Example (Picture 2):

Expander® Sealing Plug made from case-hardened-steel HB = 180, in aluminium alloy HB = 90

Example (Picture 3):

Expander® Sealing Plug, pull-anchor type from case-hardened-steel HB = 180, in aluminium alloy HB = 90

Anchorage by Bore Roughness

Required Roughness Design (Picture 4):

An ideal bore roughness for the anchor can be achieved by using a twist drill or countersink.

Undesirable Roughness Design

Friction will cause a smooth roughness profile that is not desired (Picture 5).

Swing Bolts • DIN 444, form B

EH 22980.



PRODUCT DESCRIPTION

Swing bolts similar to DIN 444 however, steel design with higher quality 8.8. The stainless steel A2-50 design has a tensile strength of min. 500 N/mm².

Material

- Heat-treated steel, tempered, quality 8.8, black
- Stainless steel 1.4301

References

For torques please refer to appendix - Technical Data -

MORE INFORMATION

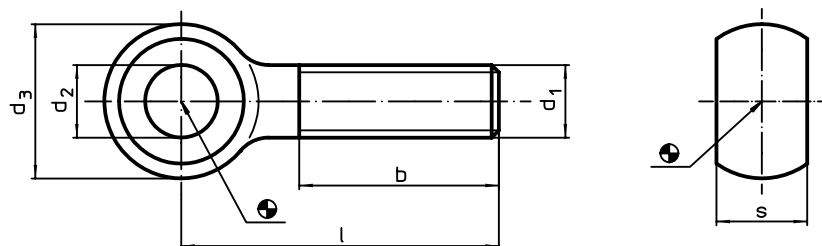
Notes

Special types on request.

Further products

Swing Bolts, DIN 444, form B, quality 8.8 high precision design. → p. 376

DRAWING



ORDER INFORMATION

d ₁	l	Dimensions				s	[g]	Art. No.	
		d ₂ H9	d ₃	b	Heat-treated steel			Stainless steel	
[mm]									
M 5	25	5	12	16	6	5.6	22980.0202	22980.0402	
	30	5	12	16	6	6.4	22980.0203	22980.0403	
	35	5	12	16	6	7.1	22980.0204	22980.0404	
	40	5	12	16	6	7.9	22980.0205	22980.0405	
M 6	30	6	14	18	7	9.5	22980.0212	22980.0412	
	40	6	14	18	7	11.0	22980.0214	22980.0414	
	50	6	14	18	7	14.0	22980.0216	22980.0416	
	60	6	14	18	7	16.0	22980.0218	22980.0418	
	80	6	14	18	7	20.0	22980.0222	22980.0422	
M 8	40	8	18	22	9	22.0	22980.0232	22980.0432	
	50	8	18	22	9	26.0	22980.0234	22980.0434	
	60	8	18	22	9	30.0	22980.0236	22980.0436	
	80	8	18	22	9	37.0	22980.0240	22980.0440	
	100	8	18	22	9	44.0	22980.0244	22980.0444	
M10	50	10	20	26	12	40.0	22980.0252	22980.0452	
	60	10	20	26	12	43.0	22980.0254	22980.0454	
	75	10	20	26	12	51.0	22980.0257	22980.0457	
	100	10	20	26	12	67.0	22980.0262	22980.0462	
	120	10	20	26	12	72.0	22980.0266	22980.0466	
M12	50	12	25	30	14	59.0	22980.0272	22980.0472	
	60	12	25	30	14	68.0	22980.0274	22980.0474	
	80	12	25	30	14	85.0	22980.0278	22980.0478	
	100	12	25	30	14	102.0	22980.0282	22980.0482	
	120	12	25	30	14	119.0	22980.0286	22980.0486	
M16	60	16	32	38	17	128.0	22980.0292	22980.0492	
	80	16	32	38	17	159.0	22980.0294	22980.0494	
	100	16	32	38	17	190.0	22980.0298	22980.0498	
	120	16	32	38	17	220.0	22980.0302	22980.0502	
	150	16	32	44	17	265.0	22980.0308	22980.0508	
M20	100	18	40	46	22	323.0	22980.0312	22980.0512	
	120	18	40	46	22	373.0	22980.0316	22980.0516	
	160	18	40	52	22	466.0	22980.0324	22980.0524	
	200	18	40	52	22	562.0	22980.0332	22980.0532	
M24	100	22	45	54	25	443.0	22980.0342	22980.0542	
	120	22	45	54	25	512.0	22980.0346	22980.0546	
	160	22	45	60	25	649.0	22980.0354	22980.0554	
	200	22	45	60	25	787.0	22980.0362	22980.0562	

Swing Bolts • DIN 444, form B, quality 8.8 high precision design

EH 22980.



PRODUCT DESCRIPTION

The high precision design swing bolts exceed the DIN Version's quality. The thread is rolled - the shaft diameter is equal to the roll diameter. The surfaces -s- are machined. Bore tolerance $d_2 = H7$.

Material

- Heat-treated steel, tempered, quality 8.8, black

MORE INFORMATION

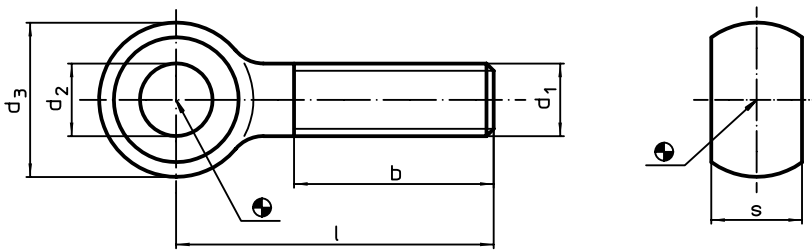
References

For torques please refer to appendix - Technical Data -

Further products

Swing Bolts, DIN 444, form B → p. 375

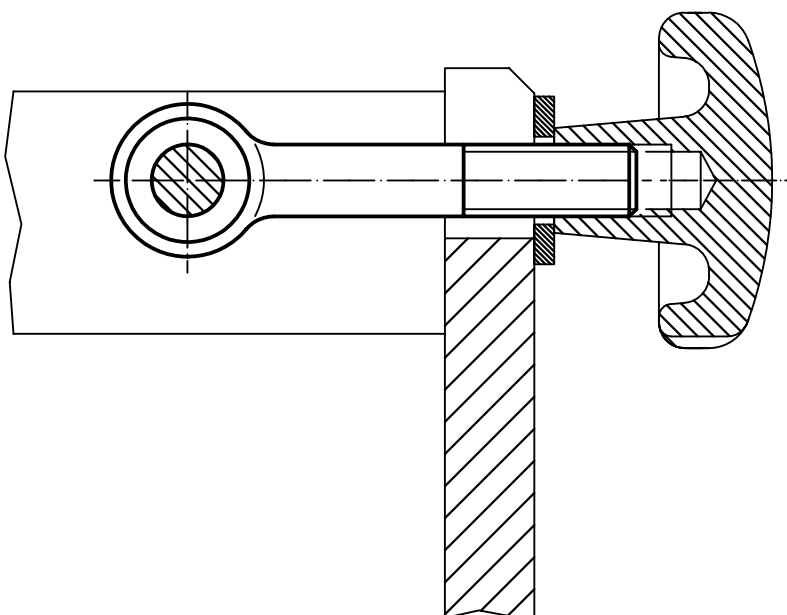
DRAWING



ORDER INFORMATION

d ₁	l	Dimensions				s -0.2	Art. No.
		d ₂ H7	d ₃	b	[mm]		
M 8	40	8	18	22	9	28	22980.0081
	60	8	18	22	9	28	22980.0084
M10	50	10	20	26	12	38	22980.0103
	75	10	20	26	12	50	22980.0106
	100	10	20	26	12	62	22980.0108
M12	60	12	25	30	14	70	22980.0122
	80	12	25	30	14	84	22980.0125
	120	12	25	30	14	113	22980.0128
M16	80	16	32	38	17	153	22980.0163
	150	16	32	44	17	245	22980.0168

APPLICATION EXAMPLE



Rod Ends • DIN 12240-4, with male thread
EH 22982.



PRODUCT DESCRIPTION

Rod ends are suitable for universal use in applications subject to dynamic loads. As well as use in corrosion-risk areas, the design in stainless steel can also be used under higher dynamic loads.

Rod ends are used for bearings where movements between shaft and housing are necessary, and where the movements are not in a straight line.

Rod ends are ready-to-install elements manufactured to DIN ISO 12240-4 (dimension series K). The PTFE fabric inserted into the bearing shell means that the rod ends are maintenance-free.

Please take note of the technical information which follows these product pages.

Material

Body

- Free cutting steel, turned, zinc-plated
- Stainless steel 1.4057, forged, polished

Joint ball

- Roller bearing steel, hardened, ground, polished

- Stainless steel 1.4034, hardened, ground, polished

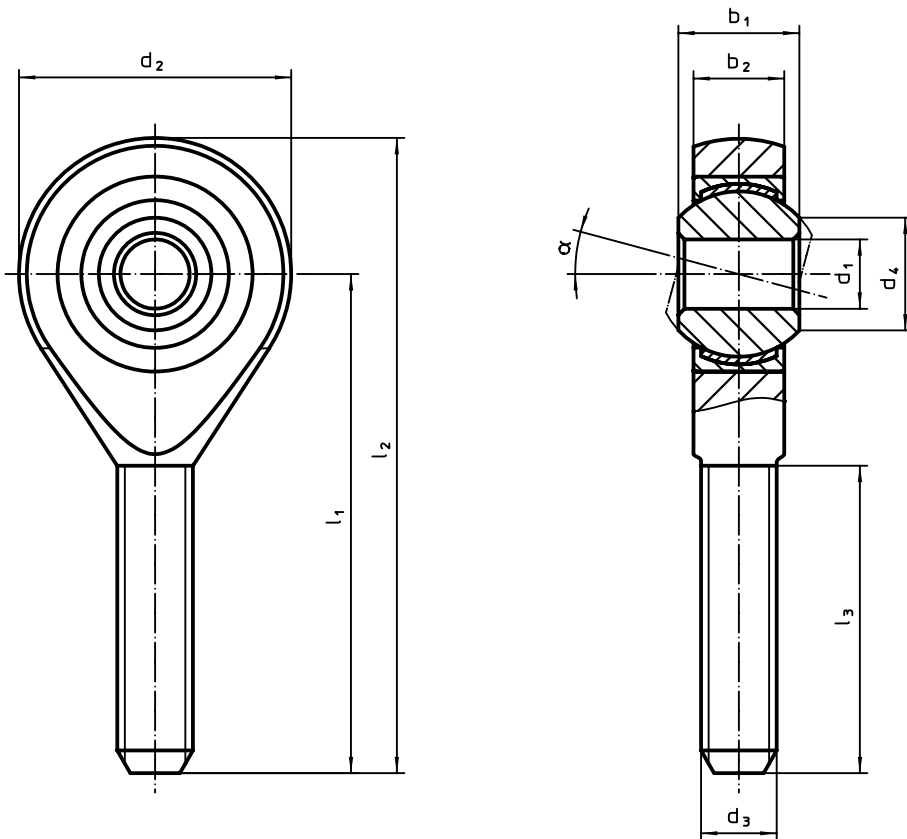
Bearing

- PTFE fabric

Bearing shell

- Free cutting steel, zinc-plated by galvanization
- Stainless steel 1.4571

DRAWING




ORDER INFORMATION

d ₁	l ₁	Dimensions							α	Dynamic carrying figure C	Permitted rotational speed	Free cutting steel	Stainless steel						
		b ₁	b ₂	d ₂	d ₃	d ₄	l ₂	l ₃					Static carrying figure C ₀	Art. No.	Static carrying figure C ₀	Art. No.			
[mm]													[kN]	[U/min]	[g]	[kN]		[kN]	
right hand thread																			
5	33	8	6.00	18	M 5	7.7	42	19	13°	7.5	600	14	4.3	22982.0102	6.2	22982.0302			
6	36	9	6.75	20	M 6	8.9	46	21	13°	9.3	530	20	6.0	22982.0104	8.8	22982.0304			
8	42	12	9.00	24	M 8	10.4	54	25	14°	16.7	420	38	11.0	22982.0106	16.1	22982.0306			
10	48	14	10.50	28	M10	12.9	62	28	13°	23.4	350	62	17.4	22982.0108	25.5	22982.0308			
12	54	16	12.00	32	M12	15.4	70	32	13°	32.0	300	94	23.5	22982.0110	34.5	22982.0310			
14	60	19	13.50	36	M14	16.8	78	38	16°	42.0	260	135	21.0	22982.0112	39.5	22982.0312			



2

d ₁	l ₁	b ₁	Dimensions						α	Dynamic carrying figure C	Permitted rotational speed		Free cutting steel		Stainless steel		
			b ₂	d ₂	d ₃	d ₄	l ₂	l ₃					Static carrying figure C ₀	Art. No.	Static carrying figure C ₀	Art. No.	
[mm]											[kN]	[U/min]	[g]	[kN]		[kN]	
16	66	21	15.00	42	M16	19.3	87	40	15°	52.5	230	202	32.0	22982.0114	60.5	22982.0314	
18	72	23	16.50	46	M18 x 1,5	21.8	95	44	15°	64.0	210	270	38.5	22982.0116	73.0	22982.0316	
20	78	25	18.00	50	M20 x 1,5	24.3	103	47	14°	78.0	190	350	44.0	22982.0118	83.0	22982.0318	
22	84	28	20.00	54	M22 x 1,5	25.8	111	51	15°	97.0	170	459	53.0	22982.0120	100.0	22982.0320	
25	94	31	22.00	60	M24 x 2	29.6	124	57	15°	122.0	150	607	61.0	22982.0122	118.0	22982.0322	
left hand thread																	
5	33	8	6.00	18	M 5	7.7	42	19	13°	7.5	600	14	4.3	22982.0124	6.2	22982.0324	
6	36	9	6.75	20	M 6	8.9	46	21	13°	9.3	530	20	6.0	22982.0126	8.8	22982.0326	
8	42	12	9.00	24	M 8	10.4	54	25	14°	16.7	420	39	11.0	22982.0128	16.1	22982.0328	
10	48	14	10.50	28	M10	12.9	62	28	13°	23.4	350	61	17.4	22982.0130	25.5	22982.0330	
12	54	16	12.00	32	M12	15.4	70	32	13°	32.0	300	93	23.5	22982.0132	34.5	22982.0332	
14	60	19	13.50	36	M14	16.8	78	38	16°	42.0	260	133	21.0	22982.0134	39.5	22982.0334	
16	66	21	15.00	42	M16	19.3	87	40	15°	52.5	230	202	32.0	22982.0136	60.5	22982.0336	
18	72	23	16.50	46	M18 x 1,5	21.8	95	44	15°	64.0	210	269	38.5	22982.0138	73.0	22982.0338	
20	78	25	18.00	50	M20 x 1,5	24.3	103	47	14°	78.0	190	347	44.0	22982.0140	83.0	22982.0340	
22	84	28	20.00	54	M22 x 1,5	25.8	111	51	15°	97.0	170	455	53.0	22982.0142	100.0	22982.0342	
25	94	31	22.00	60	M24 x 2	29.6	124	57	15°	122.0	150	604	61.0	22982.0144	118.0	22982.0344	

Rod Ends • DIN 12240-4, with female thread
EH 22982.



PRODUCT DESCRIPTION

Rod ends are suitable for universal use in applications subject to dynamic loads. As well as use in corrosion-risk areas, the design in stainless steel can also be used under higher dynamic loads.

Rod ends are used for bearings where movements between shaft and housing are necessary, and where the movements are not in a straight line.

Rod ends are ready-to-install elements manufactured to DIN ISO 12240-4 (dimension series K). The PTFE fabric inserted into the bearing shell means that the rod ends are maintenance-free.

Please take note of the technical information which follows these product pages.

Material

- Stainless steel 1.4034, hardened, ground, polished

Body

- Free cutting steel, turned, zinc-plated
- Stainless steel 1.4057, forged, polished

Bearing

- PTFE fabric

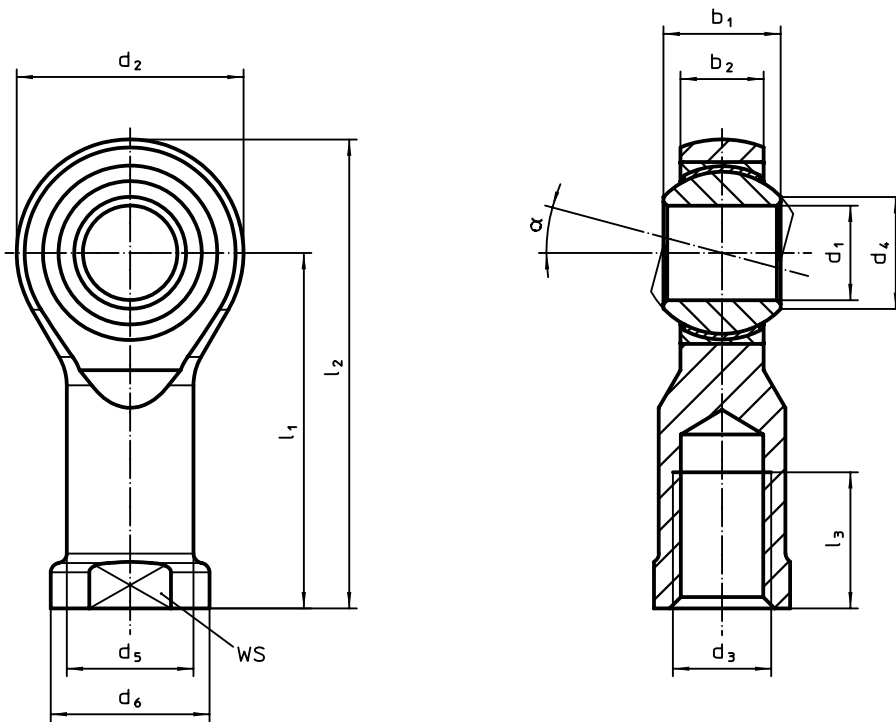
Joint ball

- Roller bearing steel, hardened, ground, polished

Bearing shell

- Free cutting steel, zinc-plated by galvanization
- Stainless steel 1.4571

DRAWING



ORDER INFORMATION

Dimensions												α	WS	Dynamic carrying figure C	Permitted rotational speed	Free cutting steel	Stainless steel		
d ₁	l ₁	b ₁	b ₂	d ₂	d ₃	d ₄	d ₅	d ₆	l ₂	l ₃	Static carrying figure C ₀						Art. No.	Static carrying figure C ₀	Art. No.
[mm]												[mm]	[kN]	[U/min]	[g]	[kN]		[kN]	
right hand thread																			
5	27	8	6.00	18	M 5	7.7	9.0	11	36	10	13°	9	7.5	600	18	8.0	22982.0202	11.8	22982.0402
6	30	9	6.75	20	M 6	8.9	10.0	13	40	12	13°	11	9.3	530	26	8.9	22982.0204	13.1	22982.0404
8	36	12	9.00	24	M 8	10.4	12.5	16	48	16	14°	13	16.7	420	47	14.1	22982.0206	20.7	22982.0406
10	43	14	10.50	28	M10	12.9	15.0	19	57	20	13°	17	23.4	350	76	19.3	22982.0208	28.3	22982.0408
12	50	16	12.00	32	M12	15.4	17.5	22	66	22	13°	19	32.0	300	113	23.5	22982.0210	34.5	22982.0410
14	57	19	13.50	36	M14	16.8	20.0	25	75	25	16°	22	42.0	260	165	21.0	22982.0212	39.5	22982.0412



2

d ₁	l ₁	b ₁	Dimensions										α	WS	Dynamic carrying figure C	Permitted rotational speed	Free cutting steel	Stainless steel		
			b ₂	d ₂	d ₃	d ₄	d ₅	d ₆	l ₂	l ₃	Static carrying figure C ₀	Art. No.						Static carrying figure C ₀	Art. No.	
[mm]													[mm]	[kN]	[U/min]	[g]	[kN]		[kN]	
16	64	21	15.00	42	M16	19.3	22.0	27	85	28	15°	22	52.5	230	235	32.0	22982.0214	60.5	22982.0414	
18	71	23	16.50	46	M18 x 1,5	21.8	25.0	31	94	32	15°	27	64.0	210	317	38.5	22982.0216	73.0	22982.0416	
20	77	25	18.00	50	M20 x 1,5	24.3	27.5	34	102	33	14°	32	78.0	190	413	44.0	22982.0218	83.0	22982.0418	
22	84	28	20.00	54	M22 x 1,5	25.8	30.0	37	111	37	15°	32	97.0	170	528	53.0	22982.0220	100.0	22982.0420	
25	94	31	22.00	60	M24 x 2	29.6	33.5	42	124	42	15°	36	122.0	150	725	62.0	22982.0222	118.0	22982.0422	
left hand thread																				
5	27	8	6.00	18	M 5	7.7	9.0	11	36	10	13°	9	7.5	600	19	8.0	22982.0224	11.8	22982.0424	
6	30	9	6.75	20	M 6	8.9	10.0	13	40	12	13°	11	9.3	530	26	8.9	22982.0226	13.1	22982.0426	
8	36	12	9.00	24	M 8	10.4	12.5	16	48	16	14°	13	16.7	420	47	14.1	22982.0228	20.7	22982.0428	
10	43	14	10.50	28	M10	12.9	15.0	19	57	20	13°	17	23.4	350	76	19.3	22982.0230	28.3	22982.0430	
12	50	16	12.00	32	M12	15.4	17.5	22	66	22	13°	19	32.0	300	113	23.5	22982.0232	34.5	22982.0432	
14	57	19	13.50	36	M14	16.8	20.0	25	75	25	16°	22	42.0	260	164	21.0	22982.0234	39.5	22982.0434	
16	64	21	15.00	42	M16	19.3	22.0	27	85	28	15°	22	52.5	230	235	32.0	22982.0236	60.5	22982.0436	
18	71	23	16.50	46	M18 x 1,5	21.8	25.0	31	94	32	15°	27	64.0	210	318	38.5	22982.0238	73.0	22982.0438	
20	77	25	18.00	50	M20 x 1,5	24.3	27.5	34	102	33	14°	32	78.0	190	416	44.0	22982.0240	83.0	22982.0440	
22	84	28	20.00	54	M22 x 1,5	25.8	30.0	37	111	37	15°	32	97.0	170	526	53.0	22982.0242	100.0	22982.0442	
25	94	31	22.00	60	M24 x 2	29.6	33.5	42	124	42	15°	36	122.0	150	716	62.0	22982.0244	118.0	22982.0444	

TECHNICAL DATA

RADIAL PLAY

Radial bearing play is a measure taken at room temperature and used to determine the degree by which the inner ring can be shifted relative to the outer ring in radial direction from one end position to the opposite end position.

d ₁	Radial play [mm]	
	min.	max
5	0,005	0,030
6	0,005	0,030
8	0,005	0,030
10	0,005	0,030
12	0,005	0,035
14	0,005	0,035
16	0,005	0,035
18	0,005	0,035
20	0,005	0,045
22	0,005	0,045
25	0,005	0,045

TEMPERATURE RANGE FOR USE

The temperature range for use is -50°C to 150°C.

CARRYING FIGURES

Carrying figures are properties that are bearing-specific and derived from the material data of the material used. They are used as an aid to select rod ends. Increasing or alternating loads require that the dynamic bearing capacity of the rod end housing be considered separately.

STATIC CARRYING FIGURE C₀

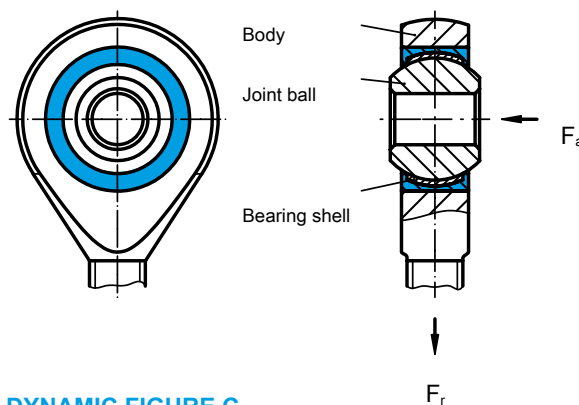
C₀ identifies the permissible radial load at standstill and with the load at rest which a rod end is capable of withstanding at the weakest cross section without deforming. The specified C₀ values are determined by way of calculation based on the respective material properties and verified by subjecting a representative quantity of rod ends to a tensile test at room temperature: each test was assuming 80% utilization of the yield strength, incorporating a 1.25 margin of safety.

The static carrying figure C₀ also serves as a means to calculate the permissible axial load, which is limited by additional bending stresses occurring at the rod shaft, but, primarily, by the axial attachment of the inner part.

Push-out tests were used to establish the maximum axial force.

$$F_a = 0,4 \times C_0$$

RADIAL AND AXIAL FORCES



DYNAMIC FIGURE C

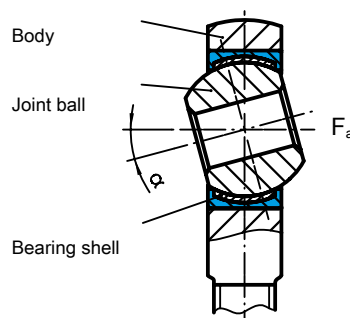
The specified dynamic carrying figures form the basis for the calculation of the service life rod ends will be able to enjoy when subjected to dynamic stresses, i.e. loads exerted by swinging or tipping. However, these figures merely refer to the bearing and can therefore not be applied to the rod end housing.

LUBRICATION

Maintenance-free rod ends must not be re-lubricated. The inner ring slides on a PTFE fabric embedded in the bearing shell.









TILT ANGLE

The tilt angle varies with every version. You will find the corresponding values in the product data table.



3 CLAMPING ELEMENTS



	Product group	Page
	Nuts for T-Slots	384
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	Toggle Clamps	530
	Compact Clamps	557
	Centering Clamping Elements	561
	Shaft Clamps	572
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Nuts for T-Slots • DIN 508

EH 23010.



PRODUCT DESCRIPTION

These nuts for T-slots (slot nuts) are manufactured according to DIN 508. The range is extended by other dimensions that are not included in DIN.

Material

- Heat-treated steel, quality 8, bright
- Heat-treated steel, tempered, quality 10, blackened
- Stainless steel 1.4301

Assembly

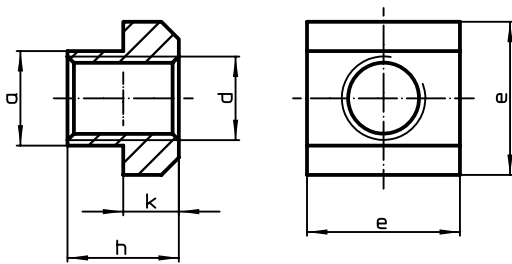
The entire loading capacity of the T-nut can only be applied if the screwing is guaranteed to be made over the total thread length of the T-nut.

MORE INFORMATION


Notes

Special types on request.

DRAWING




ORDER INFORMATION

T-slot size	Dimensions					For T-slots DIN 650	Testing force to DIN 508 F min.		Art. No.		
	d	a	e	h	k				Heat-treated steel, quality 8, bright	Heat-treat- ed steel, tempered, quality 10, blackened	Stainless steel 1.4301
[mm]	[mm]					[mm]	[kN]	[g]			
5	M 4	4.6	9	6.5	3	5	7.0	2.4	23010.0051	23010.0052	–
6	M 5	5.6	10	8.0	4	6	11.4	3.4	23010.0061	23010.0062	–
8	M 6	7.6	13	10.0	6	8	16.0	8.3	23010.0081	23010.0082	23010.0721
10	M 6	9.6	15	12.0	6	10	16.0	14.0	23010.0103¹⁾	23010.0104¹⁾	–
	M 8	9.6	15	12.0	6	10	29.0	12.0	23010.0101	23010.0102	23010.0731
12	M 8	11.6	18	14.0	7	12	29.0	23.0	23010.0123¹⁾	23010.0124¹⁾	–
	M10	11.6	18	14.0	7	12	46.0	20.0	23010.0121	23010.0122	23010.0741
14	M 6	13.6	22	16.0	8	14	16.0	43.0	–	23010.0146¹⁾	–
	M 8	13.6	22	16.0	8	14	29.0	41.0	–	23010.0145¹⁾	–
	M10	13.6	22	16.0	8	14	46.0	38.0	23010.0143¹⁾	23010.0144¹⁾	–
	M12	13.6	22	16.0	8	14	67.0	34.0	23010.0141	23010.0142	23010.0751
16	M 8	15.6	25	18.0	9	16	29.0	62.0	–	23010.0166¹⁾	–
	M10	15.6	25	18.0	9	16	46.0	58.0	–	23010.0165¹⁾	–
	M12	15.6	25	18.0	9	16	67.0	55.0	23010.0163¹⁾	23010.0164¹⁾	–
	M14	15.6	25	18.0	9	16	–	49.0	23010.0161¹⁾	23010.0162¹⁾	23010.0761¹⁾
18	M 8	17.6	28	20.0	10	18	29.0	89.0	–	23010.0187¹⁾	–
	M10	17.6	28	20.0	10	18	46.0	85.0	–	23010.0186¹⁾	–
	M12	17.6	28	20.0	10	18	67.0	98.0	–	23010.0185¹⁾	–
	M14	17.6	28	20.0	10	18	–	74.0	23010.0183¹⁾	23010.0184¹⁾	–
	M16	17.6	28	20.0	10	18	128.0	68.0	23010.0181	23010.0182	23010.0781
20	M12	19.6	32	24.0	12	20	67.0	131.0	–	23010.0205¹⁾	–
	M16	19.6	32	24.0	12	20	128.0	116.0	23010.0203¹⁾	23010.0204¹⁾	–
	M18	19.6	32	24.0	12	20	–	107.0	23010.0201¹⁾	23010.0202¹⁾	–

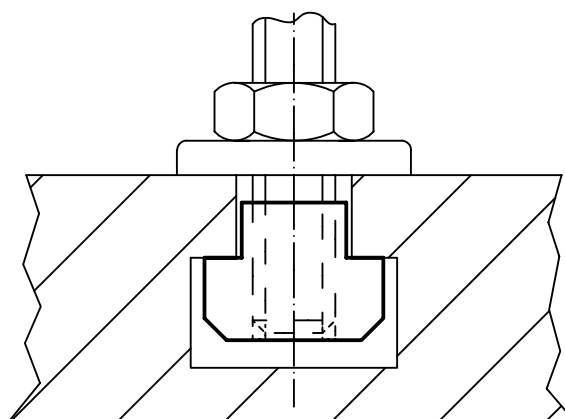
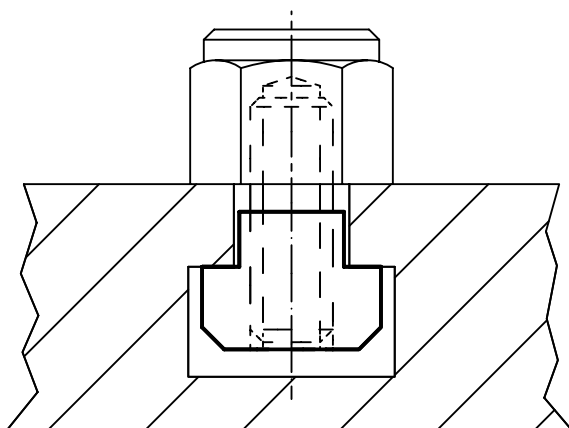
¹⁾ DIN standards do not include these dimensions.



T-slot size	Dimensions					For T-slots DIN 650	Testing force to DIN 508 F min.		Art. No.		
	d	a	e	h	k				Heat-treated steel, quality 8, bright	Heat-treat- ed steel, tempered, quality 10, blackened	Stainless steel 1.4301
[mm]	[mm]					[mm]	[kN]	[g]			
22	M12	21.6	35	28.0	14	22	67.0	189.0	–	23010.0225 ¹⁾	–
	M16	21.6	35	28.0	14	22	128.0	172.0	–	23010.0226 ¹⁾	–
	M18	21.6	35	28.0	14	22	–	162.0	23010.0223 ¹⁾	23010.0224 ¹⁾	–
	M20	21.6	35	28.0	14	22	196.0	149.0	23010.0221	23010.0222	–
24	M16	23.6	40	32.0	16	24	128.0	262.0	–	23010.0246 ¹⁾	–
	M20	23.6	40	32.0	16	24	196.0	236.0	23010.0243 ¹⁾	23010.0244 ¹⁾	–
	M22	23.6	40	32.0	16	24	–	221.0	23010.0241 ¹⁾	23010.0242 ¹⁾	–
28	M16	27.6	44	36.0	18	28	128.0	375	–	23010.0286 ¹⁾	–
	M20	27.6	44	36.0	18	28	196.0	349	–	23010.0284 ¹⁾	–
	M22	27.6	44	36.0	18	28	–	332	–	23010.0283 ¹⁾	–
	M24	27.6	44	36.0	18	28	282.0	317	23010.0281	23010.0282	–
32	M27	31.5	50	40.0	20	32	–	460	–	23010.0322 ¹⁾	–
36	M24	35.5	54	44.0	22	36	282.0	663	–	23010.0364 ¹⁾	–
	M30	35.5	54	44.0	22	36	448.0	585	23010.0361	23010.0362	–
42	M36	41.5	65	52.0	26	42	653.0	1000	23010.0421	23010.0422	–
48	M42	47.5	75	60.0	30	48	653.0	1500	23010.0481	23010.0482	–
54	M48	53.4	85	70.0	34	54	653.0	2264	23010.0541	23010.0542	–

¹⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE



Nuts for T-Slots • DIN 508, semi-finished

EH 23010.



PRODUCT DESCRIPTION

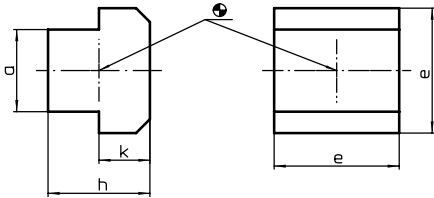
These nuts for T-slots (slot nuts) semi-finished are manufactured according to DIN 508. The range is extended by other dimensions that are not included in DIN.

Material

- Heat-treated steel, bright

- Stainless steel 1.4301

DRAWING



ORDER INFORMATION

T-slot size [mm]	Dimensions [mm]				[g]	Art. No.	
	a	e	h	k		Heat-treated steel	Stainless steel
6	5.6	10	8	4	4.4	23010.0060	–
8	7.6	13	10	6	10.0	23010.0080	23010.0720
10	9.6	15	12	6	17.0	23010.0100	23010.0730
12	11.6	18	14	7	27.0	23010.0120	23010.0740
14	13.6	22	16	8	46.0	23010.0140	23010.0750
16	15.6	25	18	9	68.0	23010.0160¹⁾	23010.0760¹⁾
18	17.6	28	20	10	95.0	23010.0180	23010.0780
20	19.6	32	24	12	149.0	23010.0200¹⁾	–
22	21.6	35	28	14	210.0	23010.0220	–
24	23.6	40	32	16	300.0	23010.0240¹⁾	–
28	27.6	44	36	18	430.0	23010.0280	–
32	31.5	50	40	20	580.0	23010.0320¹⁾	–
36	35.5	54	44	22	800.0	23010.0360	–
42	41.5	65	52	26	1250.0	23010.0420	–
48	47.5	75	60	30	1900.0	23010.0480	–
54	53.4	85	70	34	3141.0	23010.0540	–

¹⁾ DIN standards do not include these dimensions.

Nuts for T-Slots • DIN 508 with antislipping device
EH 23010.



PRODUCT DESCRIPTION

These nuts for T-slots (slot nuts) are manufactured according to DIN 508. The spring element avoids vertical and horizontal slipping of the nut.

Material

Ball

- Ball-bearing steel, hardened

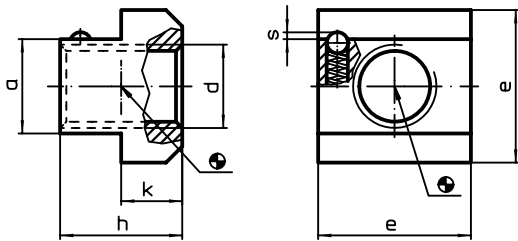
T-nut

- Heat-treated steel, tempered, quality 10, blackened

Spring

- Stainless steel

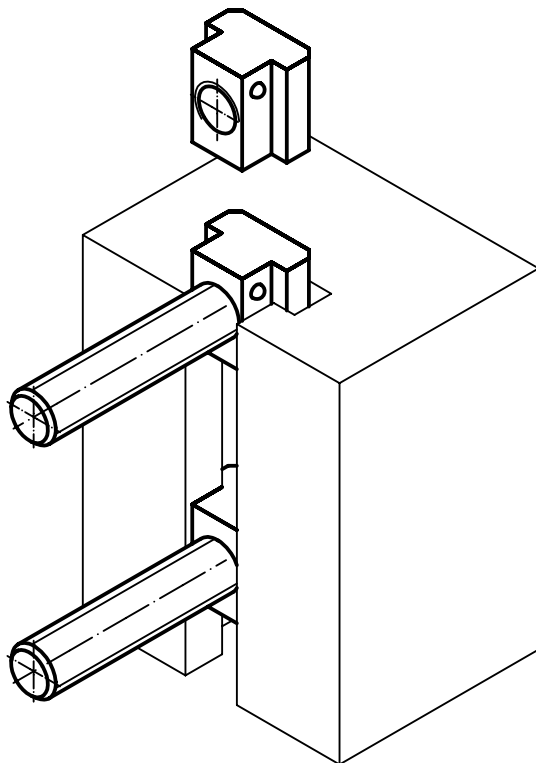
DRAWING



ORDER INFORMATION

T-slot size [mm]	d	a	Dimensions				Spring load		[g]	Art. No.
			e	h	k	s	F_1 [N]	F_2 [N]		
10	M 8	9.6	15	12	6	0.65	3.25	4.75	12	23010.0811
12	M10	11.6	18	14	7	0.80	4.70	12.60	20	23010.0813
14	M12	13.6	22	16	8	0.90	8.50	14.20	34	23010.0815
18	M16	17.6	28	20	10	1.00	7.80	13.50	68	23010.0819
22	M20	21.6	35	28	14	1.60	5.00	12.80	147	23010.0823

APPLICATION EXAMPLE



Nuts for T-Slots • extended

EH 23020.



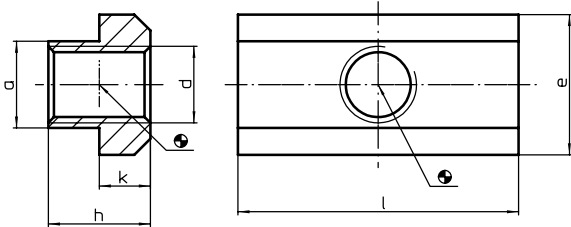
PRODUCT DESCRIPTION

Nuts for T-slots "extended" are, in comparison to the version according to DIN 508, of an extended design and are particularly suitable for assembly in the slot cross.

Material

- Heat-treated steel, tempered, quality 10, blackened

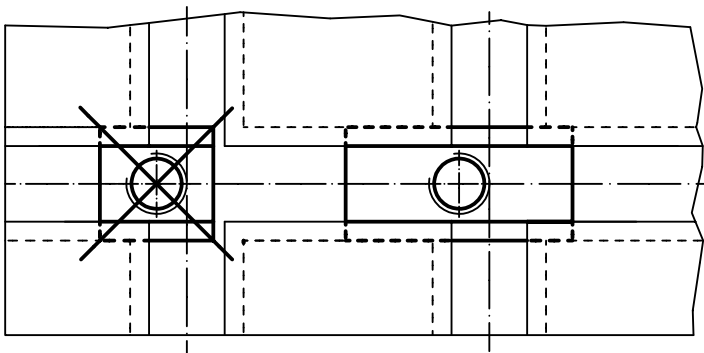
DRAWING



ORDER INFORMATION

T-slot size [mm]	Dimensions						Art. No.	
	d	a	e	l	h	k		
6	M 5	5.6	10	20	8	4	7.9	23020.0060
8	M 6	7.6	13	26	10	6	19.0	23020.0080
10	M 8	9.6	15	30	12	6	29.0	23020.0100
12	M10	11.6	18	36	14	7	48.0	23020.0120
14	M 6	13.6	22	44	16	8	91.0	23020.0146
	M12	13.6	22	44	16	8	80.0	23020.0140
16	M14	15.6	25	50	18	9	120.0	23020.0160
18	M16	17.6	28	56	20	10	160.0	23020.0180
20	M18	19.6	32	64	24	12	257.0	23020.0200
22	M20	21.6	35	70	28	14	359.0	23020.0220
28	M24	27.6	44	88	36	18	741.0	23020.0280
36	M30	35.5	54	108	44	22	1394.0	23020.0360

APPLICATION EXAMPLE



Nuts for T-Slots • rhombus

EH 23020.



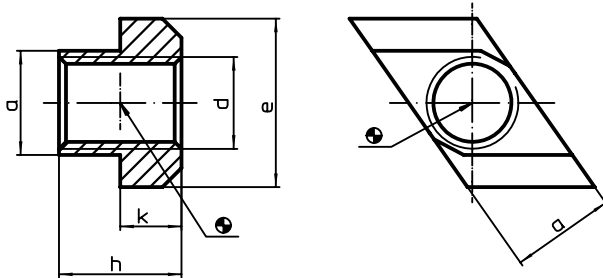
PRODUCT DESCRIPTION

Nuts for T-slots "rhombus" do not have to be inserted lengthwise, but can be inserted directly into the slot.

Material

- Heat-treated steel, tempered, blackened

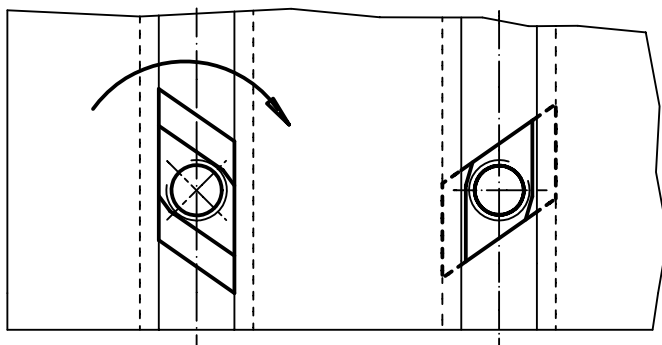
DRAWING



ORDER INFORMATION

T-slot size [mm]	Dimensions					[g]	Art. No.
	d	a	e [mm]	h	k		
6	M 5	5.7	10	8	4	2.1	23020.0560
8	M 6	7.6	13	10	6	5.4	23020.0580
10	M 8	9.6	15	12	6	8.8	23020.0600
12	M10	11.6	18	14	7	14.0	23020.0620
14	M12	13.6	22	16	8	23.0	23020.0640
16	M14	15.6	25	18	9	33.0	23020.0660
18	M16	17.6	28	20	10	46.0	23020.0680
20	M18	19.6	32	24	12	69.0	23020.0700
22	M20	21.6	35	28	14	98.0	23020.0720
28	M24	27.6	44	36	18	213.0	23020.0780
36	M30	35.5	54	44	22	423.0	23020.0860
42	M36	41.5	65	52	26	676.0	23020.0920

APPLICATION EXAMPLE



Nuts for T-Slots • rhombus, semi-finished

EH 23020.



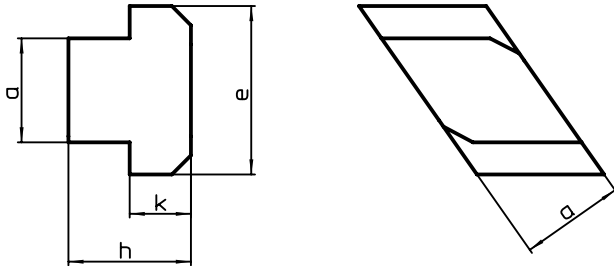
PRODUCT DESCRIPTION

Nuts for T-slots "rhombus" do not have to be inserted lengthwise, but can be inserted directly into the slot.

Material

- Heat-treated steel, bright

DRAWING



ORDER INFORMATION

T-slot size [mm]	Dimensions				Art. No.
	a	e	h	k	
6	5.7	10	8	4	23020.0561
8	7.6	13	10	6	23020.0581
10	9.6	15	12	6	23020.0601
12	11.6	18	14	7	23020.0621
14	13.6	22	16	8	23020.0641
16	15.6	25	18	9	23020.0661
18	17.6	28	20	10	23020.0681
20	19.6	32	24	12	23020.0701
22	21.6	35	28	14	23020.0721
28	27.6	44	36	18	23020.0781
36	35.5	54	44	22	23020.0861

T-Bolts • DIN 787
EH 23030.



PRODUCT DESCRIPTION

T-bolts when combined with DIN 6330 fixture nuts (EH 23070.) and DIN 6340 plain washers (EH 23060.) become complete clamping bolts. These T-bolts are characterised by the rolled thread.

Material

- Heat-treated steel, black, forged, T-slot guidance milled

Further products

- Shaft / Plain Washers, DIN 6340 heat-treated..... → p. 403
- Fixture Nuts, DIN 6330 (height 1,5 d) . → p. 406

MORE INFORMATION

Notes

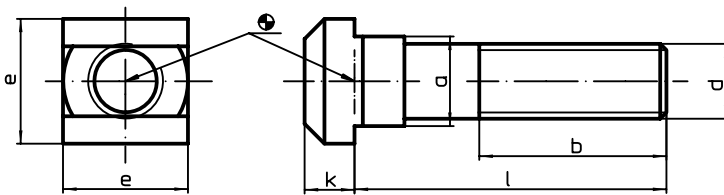
Special types on request.

References

For torques and strengths please refer to appendix - Technical Data -



DRAWING



ORDER INFORMATION

T-slot size	Dimensions						[g]	Art. No.	
	d	l	a	b	e	k			
[mm]	[mm]								
quality 10.9									
6	M 6	25		5.6	15	10	4	7.7	23030.0061
		40		5.6	28	10	4	10.0	23030.0062
		63		5.6	40	10	4	14.0	23030.0063
8	M 8	32		7.6	22	13	6	19.0	23030.0081
		50		7.6	35	13	6	25.0	23030.0082
		80		7.6	50	13	6	34.0	23030.0083
10	M10	40		9.6	30	15	6	33.0	23030.0101
		63		9.6	45	15	6	44.0	23030.0102
		100		9.6	60	15	6	61.0	23030.0103
12	M12	50		11.6	35	18	7	54.0	23030.0121
		63		11.6	40	18	7	66.0	23030.0125 ¹⁾
		80		11.6	55	18	7	79.0	23030.0122
		125		11.6	75	18	7	111.0	23030.0123
		160		11.6	100	18	7	136.0	23030.0126
14	M12	200		11.6	120	18	7	164.0	23030.0124
		50		13.6	35	22	8	76.0	23030.0141
		63		13.6	45	22	8	85.0	23030.0145 ¹⁾
		80		13.6	55	22	8	97.0	23030.0142
		125		13.6	75	22	8	129.0	23030.0143
		160		13.6	100	22	8	170.0	23030.0146
		200		13.6	120	22	8	182.0	23030.0144

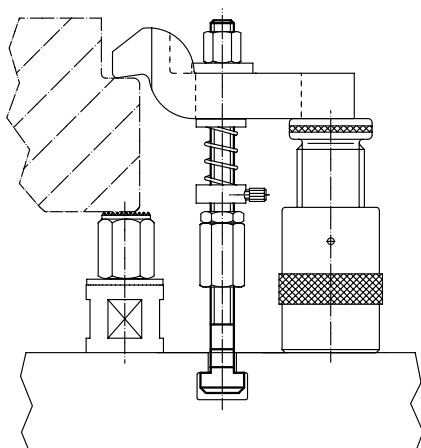
¹⁾ DIN standards do not include these dimensions.



T-slot size [mm]	Dimensions						[g]	Art. No.
	d	l	a	b	e	k		
quality 8.8								
16	M14	63	15.6	45	25	9	116.0	23030.0150 ¹⁾
		100	15.6	65	25	9	154.0	23030.0152 ¹⁾
		160	15.6	100	25	9	213.0	23030.0154 ¹⁾
		250	15.6	150	25	9	301.0	23030.0156 ¹⁾
	M16	63	15.6	45	25	9	136.0	23030.0161 ¹⁾
		80	15.6	55	25	9	158.0	23030.0165 ¹⁾
		100	15.6	63	25	9	185.0	23030.0162 ¹⁾
		160	15.6	100	25	9	263.0	23030.0163 ¹⁾
		200	15.6	125	25	9	315.0	23030.0166 ¹⁾
M16	250	15.6	150	25	9	381.0	23030.0164 ¹⁾	
	63	17.6	45	28	10	162.0	23030.0181	
	80	17.6	55	28	10	178.0	23030.0185 ¹⁾	
	100	17.6	63	28	10	210.0	23030.0182	
	160	17.6	100	28	10	289.0	23030.0183	
18	M16	200	17.6	125	28	10	335.0	23030.0186 ¹⁾
		250	17.6	150	28	10	406.0	23030.0184
		80	19.6	55	32	12	282.0	23030.0201 ¹⁾
		100	19.6	65	32	12	320.0	23030.0205 ¹⁾
		125	19.6	85	32	12	450.0	23030.0202 ¹⁾
20	M20	160	19.6	100	32	12	442.0	23030.0206 ¹⁾
		200	19.6	125	32	12	523.0	23030.0203 ¹⁾
		250	19.6	150	32	12	624.0	23030.0207 ¹⁾
		315	19.6	190	32	12	757.0	23030.0204 ¹⁾
		80	21.6	55	35	14	330.0	23030.0221
22	M20	100	21.6	65	35	14	371.0	23030.0225 ¹⁾
		125	21.6	85	35	14	422.0	23030.0222
		160	21.6	100	35	14	498.0	23030.0226 ¹⁾
		200	21.6	125	35	14	550.0	23030.0223
		250	21.6	150	35	14	678.0	23030.0227 ¹⁾
		315	21.6	190	35	14	800.0	23030.0224
28	M24	100	27.6	70	44	18	639.0	23030.0281
		125	27.6	85	44	18	713.0	23030.0285 ¹⁾
		160	27.6	110	44	18	808.0	23030.0282
		200	27.6	125	44	18	914.0	23030.0286 ¹⁾
		250	27.6	150	44	18	1068.0	23030.0283
		315	27.6	190	44	18	1275.0	23030.0287
36	M30	400	27.6	240	44	18	1497.0	23030.0284 ¹⁾
		125	35.5	80	54	22	1203.0	23030.0361
		200	35.5	135	54	22	1562.0	23030.0362
		315	35.5	200	54	22	2061.0	23030.0363
42	M36	500	35.5	300	54	22	4825.0	23030.0364
		160	41.5	100	65	26	2167.0	23030.0421
		250	41.5	175	65	26	2779.0	23030.0422
		400	41.5	250	65	26	7325.0	23030.0423
600	41.5	340	65	26	5500.0	23030.0424 ¹⁾		

¹⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE



Studs • DIN 6379 for T-nuts
EH 23040.



PRODUCT DESCRIPTION

Studs combined with T-nuts DIN 508 (EH 23010./23020.), fixture nuts DIN 6330 (EH 23070.) and plain washers DIN 6340 (EH 23060.) become complete clamping studs. These studs are characterised by the rolled thread.

Material

- Heat-treated steel

MORE INFORMATION

References

For torques and strengths please refer to appendix - Technical Data - Studs with elongated dimension b_1 also available.

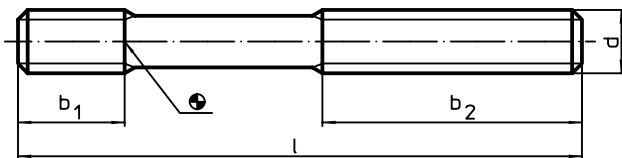
Further products

- Nuts for T-Slots, DIN 508 → p. 384
- Studs, DIN 6379 b_1 long for nut for T-Slots..... → p. 395

- Studs, with internal hexagon, similar to DIN 6379, for nuts for T-Slots → p. 397
- Shaft / Plain Washers, DIN 6340 heat-treated..... → p. 403
- Fixture Nuts, DIN 6330 (height 1,5 d) . → p. 406



DRAWING



ORDER INFORMATION

d	Dimensions			[g]	Art. No.	
	l	b_1	b_2			
quality 10.9						
		[mm]				
M 6	32	9	16	5.3	23040.0061 ¹⁾	
	50	9	30	8.4	23040.0062	
	63	9	40	11.0	23040.0064 ¹⁾	
	80	9	50	13.0	23040.0063	
M 8	40	11	20	12.0	23040.0081	
	63	11	40	19.0	23040.0082	
	100	11	63	31.0	23040.0083	
	160	11	100	49.0	23040.0084 ¹⁾	
M10	50	13	25	24.0	23040.0101	
	80	13	50	39.0	23040.0102	
	100	13	75	50.0	23040.0106 ¹⁾	
	125	13	75	61.0	23040.0103	
	200	13	122 ²⁾	98.0	23040.0104	
M12	50	15	25	35.0	23040.0121	
	63	15	32	44.0	23040.0122 ¹⁾	
	80	15	50	56.0	23040.0123	
	100	15	63	70.0	23040.0124 ¹⁾	
	125	15	75	88.0	23040.0125	
	160	15	100	112.0	23040.0127 ¹⁾	
	200	15	122 ²⁾	141.0	23040.0126	

¹⁾ DIN standards do not include these dimensions.

²⁾ Dimension differ from DIN standard.

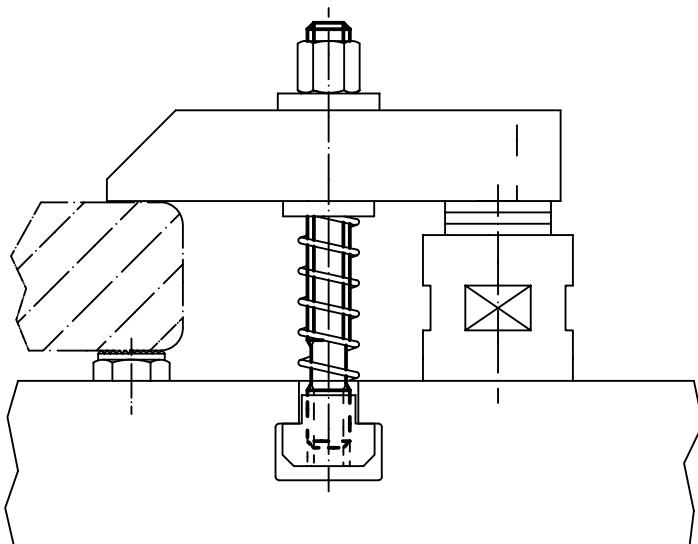


d	Dimensions			Art. No.	
	l	b ₁	b ₂		
[mm]				[g]	
quality 8.8					
M14	63	17	32	60.0	23040.0141¹⁾
	100	17	63	96.0	23040.0142¹⁾
	160	17	100	154.0	23040.0143¹⁾
	250	17	160	241.0	23040.0144¹⁾
M16	63	19	32	80.0	23040.0161
	80	19	50	103.0	23040.0162¹⁾
	100	19	63	129.0	23040.0163
	125	19	75	162.0	23040.0164¹⁾
	160	19	100	207.0	23040.0165
	200	19	122 ²⁾	260.0	23040.0167¹⁾
	250	19	160	325.0	23040.0166
	315	19	180	409.0	23040.0168¹⁾
	500	19	315	652.0	23040.0169¹⁾
	M20	80	27	32	160.0
125		27	70	252.0	23040.0202
160		27	100	323.0	23040.0207¹⁾
200		27	122 ²⁾	405.0	23040.0203
250		27	160	508.0	23040.0204¹⁾
315		27	200 ²⁾	639.0	23040.0205
400		27	250	815.0	23040.0208¹⁾
500		27	315	548.0	23040.0206¹⁾
M24	100	35	45	289.0	23040.0241
	125	35	70 ²⁾	380.0	23040.0246¹⁾
	160	35	100	466.0	23040.0242
	200	35	122 ²⁾	585.0	23040.0247¹⁾
	250	35	160	730.0	23040.0243
	315	35	190	923.0	23040.0248¹⁾
	400	35	250	1173.0	23040.0244
	500	35	315	1466.0	23040.0249¹⁾
M30	125	43	56	573.0	23040.0301
	200	43	122 ²⁾	921.0	23040.0302
	315	43	200 ²⁾	1462.0	23040.0303
	500	43	315	2000.0	23040.0304
	700	43	400	3000.0	23040.0305¹⁾
M36	160	51	80	1065.0	23040.0361
	250	51	160	1674.0	23040.0362
	400	51	250	3000.0	23040.0363
	700	51	400	8000.0	23040.0364¹⁾

¹⁾ DIN standards do not include these dimensions.

²⁾ Dimension differ from DIN standard.

APPLICATION EXAMPLE



Studs • DIN 6379 b₁ long for nut for T-Slots

EH 23040.



PRODUCT DESCRIPTION

Studs combined with T-nuts DIN 508 (EH 23010./23020.), fixture nuts DIN 6330 (EH 23070.) and plain washers DIN 6340 (EH 23060.) become complete clamping studs. These studs are characterised by the rolled thread.

Material

- Heat-treated steel

MORE INFORMATION

References

For torques and strengths please refer to appendix - Technical Data -

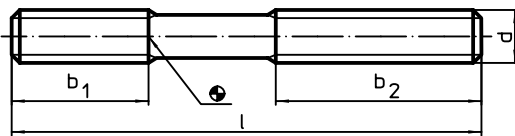
Further products

- Nuts for T-Slots, DIN 508 → p. 384
- Studs, DIN 6379 for T-nuts → p. 393

- Studs, with internal hexagon, similar to DIN 6379, for nuts for T-Slots → p. 397
- Shaft / Plain Washers, DIN 6340 heat-treated → p. 403
- Fixture Nuts, DIN 6330 (height 1,5 d) → p. 406



DRAWING



ORDER INFORMATION

d	Dimensions			[g]	Art. No.
	l	b ₁	b ₂		
[mm]					
quality 10.9					
M 6	50	15	30	8.4	23040.0562
	63	15	40	11.0	23040.0563
	80	15	50	14.0	23040.0564
M 8	63	20	40	19.0	23040.0582
	100	20	63	31.0	23040.0583
	160	20	100	49.0	23040.0584
M10	80	25	50	39.0	23040.0602
	100	25	75	49.0	23040.0603
	125	25	75	61.0	23040.0604
	160	25	100	78.0	23040.0605 ¹⁾
	200	25	122	98.0	23040.0606
M12	63 ²⁾	–	–	44.0	23040.0622
	80 ²⁾	–	–	56.0	23040.0623
	100	30	63	71.0	23040.0624 ¹⁾
	125	30	75	88.0	23040.0625
	160	30	100	112.0	23040.0626
	200	30	122	140.0	23040.0627
quality 8.8					
M16	80 ²⁾	–	–	100.0	23040.0662
	125	40	63	161.0	23040.0664
	160	40	75	207.0	23040.0665
	200	40	100	260.0	23040.0666 ¹⁾
	250	40	125	325.0	23040.0667
	315	40	200	402.0	23040.1168 ¹⁾

¹⁾ DIN standards do not include these dimensions.

²⁾ Throughgoing thread

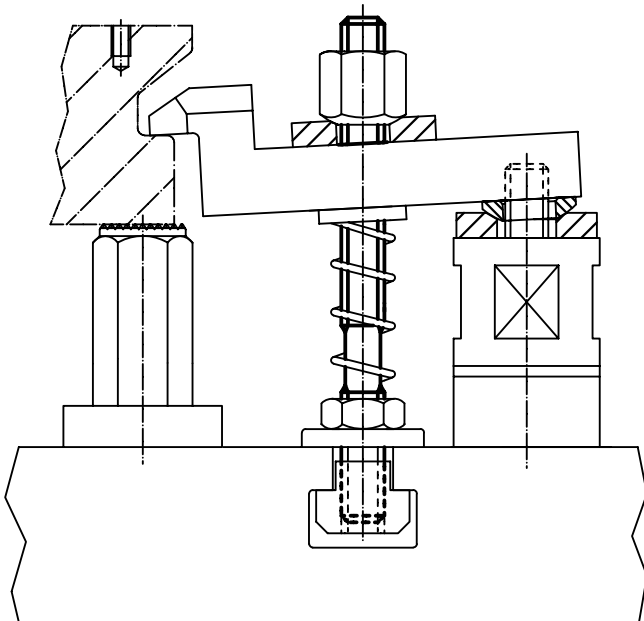


d	Dimensions			[g]	Art. No.
	l	b ₁	b ₂		
[mm]					
M20	125 ²⁾	–	–	253.0	23040.1202¹⁾
	160 ²⁾	–	–	328.0	23040.1207¹⁾
	200	55	100	404.0	23040.1203¹⁾
	250	55	125	509.0	23040.1204¹⁾
	315	55	180	641.0	23040.1205¹⁾
	400	55	250	815.0	23040.1208¹⁾
	500	55	315	1071.0	23040.1206¹⁾
M24	125 ²⁾	–	–	365.0	23040.1246¹⁾
	160 ²⁾	–	–	467.0	23040.1242¹⁾
	200 ²⁾	–	–	585.0	23040.1247¹⁾
	250 ²⁾	–	–	733.0	23040.1243¹⁾
	315	70	180	926.0	23040.1248¹⁾
	400	70	250	1175.0	23040.1244¹⁾
	500	70	315	1468.0	23040.1249¹⁾

¹⁾ DIN standards do not include these dimensions.

²⁾ Throughgoing thread

APPLICATION EXAMPLE



Studs • with internal hexagon, similar to DIN 6379, for nuts for T-Slots
EH 23040.



PRODUCT DESCRIPTION

Studs combined with T-nuts DIN 508 (EH 23010./23020.), fixture nuts DIN 6330 (EH 23070.) and plain washers DIN 6340 (EH 23060.) become complete clamping studs. These studs are characterised by the rolled thread.

Material

- Heat-treated steel

Assembly

The stud has an internal hexagon additionally. This guarantees a fast and simple assembling and dismounting.

MORE INFORMATION

References

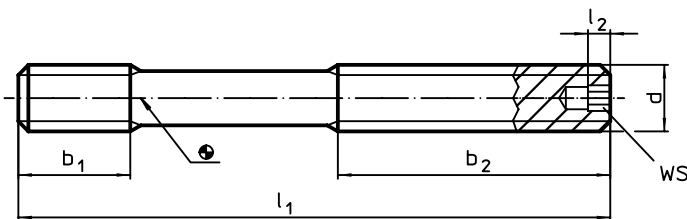
For torques and strengths please refer to appendix - Technical Data -

Further products

- Nuts for T-Slots, DIN 508 → p. 384
- Studs, DIN 6379 for T-nuts → p. 393
- Studs, DIN 6379 b1 long for nut for T-Slots → p. 395
- Shaft / Plain Washers, DIN 6340 heat-treated → p. 403
- Fixture Nuts, DIN 6330 (height 1,5 d) . → p. 406



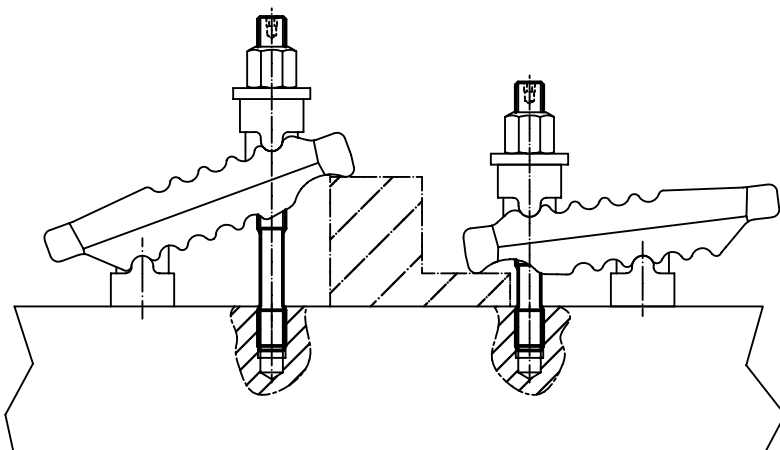
DRAWING



ORDER INFORMATION

d	l ₁	Dimensions			l ₂	WS [mm]	WS [g]	Art. No.
		b ₁ [mm]	b ₂					
quality 10.9								
M12	100	15	63	4	4	73	23040.0724	
	125	15	75	4	4	91	23040.0725	
	160	15	100	4	4	115	23040.0726	
quality 12.9								
M16	125	19	75	4	4	165	23040.0763	
	160	19	100	4	4	212	23040.0764	
	200	19	122	4	4	262	23040.0765	
M20	160	27	100	5	5	320	23040.0783	
	200	27	122	5	5	411	23040.0784	
	250	27	160	5	5	522	23040.0785	
M24	200	35	122	5	5	589	23040.0804	
	250	35	160	5	5	745	23040.0805	

APPLICATION EXAMPLE



Spherical Washers / Conical Seats • DIN 6319

EH 23050.



PRODUCT DESCRIPTION

Spherical washers / Conical seats are used as washers in a screw connection to compensate non-parallel surfaces.

Material

Conical seat

- Case-hardened steel, case-hardened, manganese phosphated
- Heat-treated steel, tempered, manganese phosphated

Spherical washer

- Case-hardened steel, case-hardened, manganese phosphated

Assembly

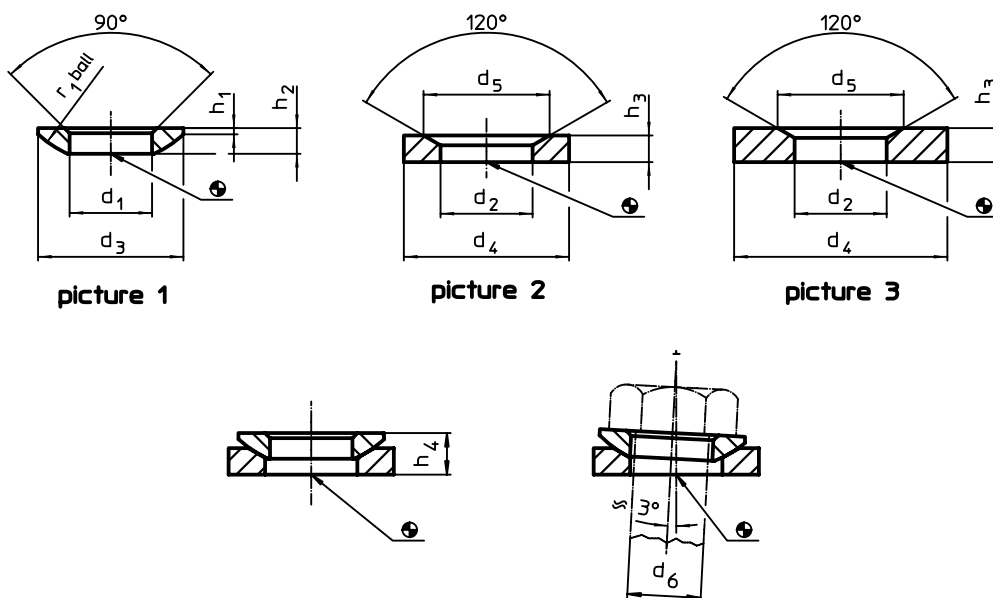
Conical seats form D are to be used only for plain, closed round areas. For larger holes only use form G!

MORE INFORMATION

Further products

Spherical Washers / Conical Seats, similar to DIN 6319, stainless steel . . . → p. 400
 Fixture Nuts, DIN 6330 (height 1,5 d) . . . → p. 406

DRAWING



ORDER INFORMATION


Dimensions											For pin d ₆	For screws d ₆	Load capacity for static load max.	Torque for screwed connections max.	Art. No.	
d ₁ H13	d ₂ H13	d ₃	d ₄	d ₅	h ₁	h ₂	h ₃	with conical seat form D ~	with conical seat form G ~	r ₁						
[mm]											[mm]	[mm]	[kN]	[Nm]	[g]	
spherical washers from case-hardened steel, form C – picture 1																
6.4	-	12	-	-	0.7	2.3	-	4.2	5.4	9.0	6	M 6	9	10 ¹⁾	1.0	23050.0006
8.4	-	17	-	-	0.6	3.2	-	5.6	7.1	12.0	8	M 8	17	25 ¹⁾	2.8	23050.0008
10.5	-	21	-	-	0.8	4.0	-	6.5	7.3	15.0	10	M10	26	46 ¹⁾	5.1	23050.0010
13.0	-	24	-	-	1.1	4.6	-	8.0	9.0	17.0	12	M12	38	82 ¹⁾	8.0	23050.0012
15.0	-	28	-	-	1.4	5.0	-	8.5	9.5	22.0	14	M14	53	130 ¹⁾	12.0	23050.0014
17.0	-	30	-	-	1.3	5.3	-	9.6	10.4	22.0	16	M16	73	206 ¹⁾	13.0	23050.0016
21.0	-	36	-	-	2.0	6.3	-	11.7	12.2	27.0	20	M20	117	407 ¹⁾	23.0	23050.0020
23.0	-	40	-	-	2.5	7.6	-	13.5	-	29.5	22	M22	146	542 ¹⁾	35.0	23050.0022 ²⁾
25.0	-	44	-	-	2.4	8.2	-	15.2	15.7	32.0	24	M24	168	698 ¹⁾	43.0	23050.0024
28.0	-	50	-	-	3.3	10.2	-	17.0	-	36.0	27	M27	221	1021 ¹⁾	74.0	23050.0027 ²⁾
31.0	-	56	-	-	3.6	11.2	-	19.2	19.7	41.0	30	M30	269	1355 ¹⁾	103.0	23050.0030
34.0	-	62	-	-	4.4	13.0	-	21.8	-	45.0	33	M33	326 ³⁾	1969 ³⁾¹⁾	150.0	23050.0033 ²⁾
37.0	-	68	-	-	4.6	14.0	-	23.5	-	50.0	36	M36	394	2372 ¹⁾	193.0	23050.0036
40.0	-	75	-	-	5.6	16.0	-	26.8	-	54.0	39	M39	460 ³⁾	3276 ³⁾¹⁾	280.0	23050.0039 ²⁾
43.0	-	78	-	-	6.5	17.0	-	29.0	-	58.0	42	M42	542	3802 ¹⁾	310.0	23050.0042

¹⁾ Torques of screws with standard thread, eventual pre-loads to be considered, coefficient of friction μ_{total} 0.14.

²⁾ DIN standards do not include these dimensions.

³⁾ Figures theoretically determined



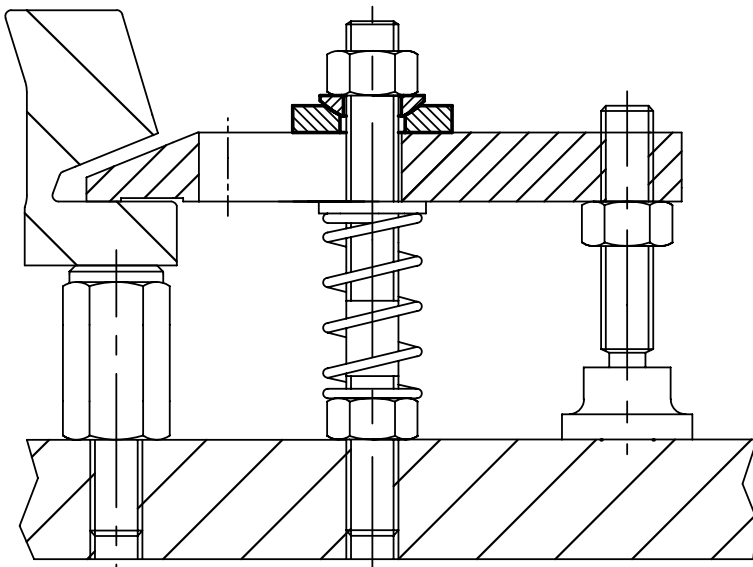
d ₁ H13	d ₂ H13	d ₃	d ₄	Dimensions							r ₁	For pin d ₆	For screws d ₆	Load capacity for static load max.	Torque for screwed connections max.		Art. No.
				d ₅	h ₁	h ₂	h ₃	with conical seat form D ~	h ₄	with conical seat form G ~							
[mm]											[mm]	[mm]	[kN]	[Nm]	[g]		
50.0	-	92	-	-	8.0	21.0	-	35.5	-	67.0	48	M48	714	5730 ¹⁾	549.0	23050.0048	
54.0	-	96	-	-	9.3	22.0	-	38.3	-	72.0	52	M52	832 ³⁾	7876 ³⁾¹⁾	610.0	23050.0052 ²⁾	
58.0	-	103	-	-	9.8	23.0	-	39.3	-	79.0	56	M56	960 ³⁾	9793 ³⁾¹⁾	760.0	23050.0056 ²⁾	
62.0	-	112	-	-	11.0	25.0	-	43.6	-	86.0	60	M60	1122 ³⁾	12219 ³⁾¹⁾	990.0	23050.0060 ²⁾	
66.0	-	120	-	-	12.0	27.0	-	46.6	-	93.0	64	M64	1269 ³⁾	14762 ³⁾¹⁾	1220.0	23050.0064 ²⁾	
conical seats from case-hardened steel, form D – picture 2																	
-	7.1	-	12	11.0	-	-	2.8	-	-	-	6	M 6	9	10 ¹⁾	1.3	23050.0106	
-	9.6	-	17	14.5	-	-	3.5	-	-	-	8	M 8	17	25 ¹⁾	3.7	23050.0108	
-	12.0	-	21	18.5	-	-	4.2	-	-	-	10	M10	26	46 ¹⁾	13.0	23050.0110	
-	14.2	-	24	20.0	-	-	5.0	-	-	-	12	M12	38	82 ¹⁾	10.0	23050.0112	
-	16.5	-	28	24.8	-	-	5.6	-	-	-	14	M14	53	130 ¹⁾	15.0	23050.0114	
-	19.0	-	30	26.0	-	-	6.2	-	-	-	16	M16	73	206 ¹⁾	18.0	23050.0116	
-	23.2	-	36	31.0	-	-	7.5	-	-	-	20	M20	117	407 ¹⁾	31.0	23050.0120	
-	26.0	-	40	34.0	-	-	8.5	-	-	-	22	M22	146	542 ¹⁾	44.0	23050.0122 ²⁾	
-	28.0	-	44	37.0	-	-	9.5	-	-	-	24	M24	168	698 ¹⁾	61.0	23050.0124	
-	31.5	-	50	43.0	-	-	10.5	-	-	-	27	M27	221	1021 ¹⁾	87.0	23050.0127 ²⁾	
-	35.0	-	56	49.0	-	-	12.0	-	-	-	30	M30	269	1355 ¹⁾	125.0	23050.0130	
-	38.5	-	62	55.0	-	-	14.0	-	-	-	33	M33	326 ³⁾	1969 ³⁾¹⁾	180.0	23050.0133 ²⁾	
-	42.0	-	68	60.0	-	-	15.0	-	-	-	36	M36	394	2372 ¹⁾	230.0	23050.0136	
-	45.0	-	75	67.0	-	-	17.0	-	-	-	39	M39	460 ³⁾	3276 ³⁾¹⁾	330.0	23050.0139 ²⁾	
-	49.0	-	78	70.0	-	-	18.0	-	-	-	42	M42	542	3802 ¹⁾	360.0	23050.0142	
-	56.0	-	92	82.0	-	-	22.0	-	-	-	48	M48	714	5730 ¹⁾	640.0	23050.0148	
-	60.0	-	96	85.0	-	-	24.0	-	-	-	52	M52	832 ³⁾	7876 ³⁾¹⁾	740.0	23050.0152 ²⁾	
-	65.0	-	103	93.0	-	-	25.0	-	-	-	56	M56	960 ³⁾	9793 ³⁾¹⁾	900.0	23050.0156 ²⁾	
-	70.0	-	112	102.0	-	-	28.0	-	-	-	60	M60	1122 ³⁾	12219 ³⁾¹⁾	1160.0	23050.0160 ²⁾	
-	75.0	-	120	110.0	-	-	30.0	-	-	-	64	M64	1269 ³⁾	14762 ³⁾¹⁾	1430.0	23050.0164 ²⁾	
conical seats from heat-treated steel, form G – picture 3																	
-	7.1	-	17	11.0	-	-	4.0	-	-	-	6	M 6	9	10 ¹⁾	5.6	23050.0206	
-	9.6	-	24	14.5	-	-	5.0	-	-	-	8	M 8	17	25 ¹⁾	14.0	23050.0208	
-	12.0	-	30	18.5	-	-	5.0	-	-	-	10	M10	26	46 ¹⁾	22.0	23050.0210	
-	14.2	-	36	20.0	-	-	6.0	-	-	-	12	M12	38	82 ¹⁾	39.0	23050.0212	
-	16.5	-	40	24.8	-	-	6.0	-	-	-	14	M14	53	130 ¹⁾	47.0	23050.0214	
-	19.0	-	44	26.0	-	-	7.0	-	-	-	16	M16	73	206 ¹⁾	65.0	23050.0216	
-	23.2	-	50	31.0	-	-	8.0	-	-	-	20	M20	117	407 ¹⁾	93.0	23050.0220	
-	28.0	-	60	37.0	-	-	10.0	-	-	-	24	M24	168	698 ¹⁾	165.0	23050.0224	
-	35.0	-	68	49.0	-	-	12.0	-	-	-	30	M30	269	1355 ¹⁾	235.0	23050.0230	

¹⁾ Torques of screws with standard thread, eventual pre-loads to be considered, coefficient of friction μ_{total} 0.14.

²⁾ DIN standards do not include these dimensions.

³⁾ Figures theoretically determined

APPLICATION EXAMPLE



Spherical Washers / Conical Seats • similar to DIN 6319, stainless steel

EH 23050.



PRODUCT DESCRIPTION

Spherical washers / Conical seats are used as washers in a screw connection to compensate non-parallel surfaces.

Material

For larger holes only use form G!

Conical seat

- Stainless steel 1.4305
- Stainless steel A4

Characteristic

Types from stainless steel A4 with marking (knurling) according drawing.

Spherical washer

- Stainless steel 1.4305
- Stainless steel A4

MORE INFORMATION

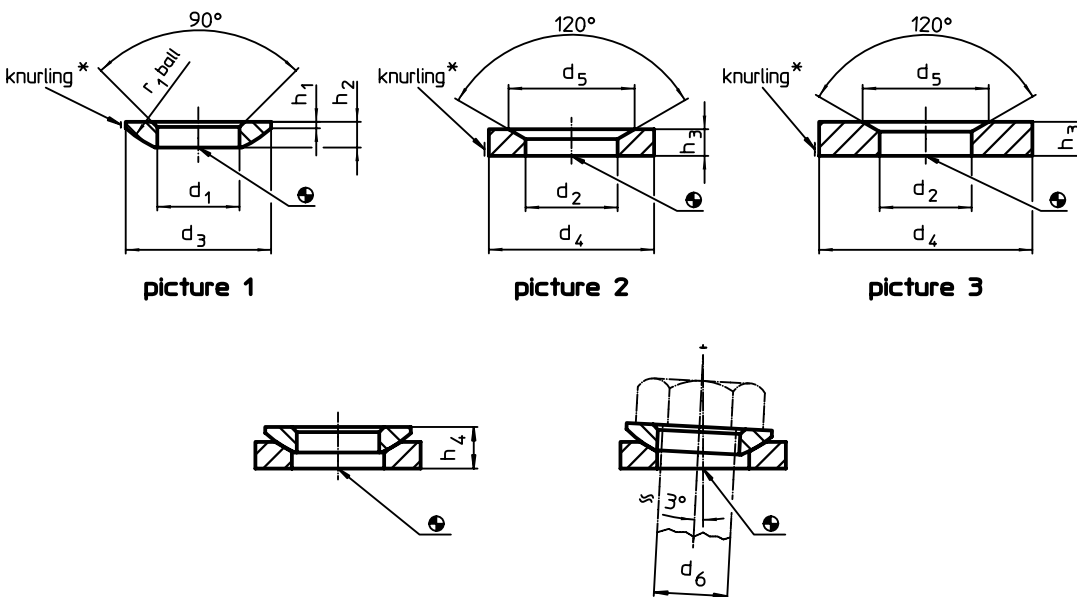
Further products

Spherical Washers / Conical Seats,
 DIN 6319 → p. 398
 Fixture Nuts, DIN 6330 (height 1,5 d) . → p. 406

Assembly

Conical seats form D are to be used only for plain, closed round areas.

DRAWING



* Knurling = material identification for stainless steel A4 type

ORDER INFORMATION

Dimensions											For pin d ₆	For screws d ₆	Load capacity for static load max.	Torque for screwed connections ¹⁾ max.	g	Art. No.	
d ₁ H13	d ₂ H13	d ₃	d ₄	d ₅	h ₁	h ₂	h ₃	h ₄ with conical seat form D ~	h ₄ with conical seat form G ~	r ₁						Stainless steel 1.4305	Stainless steel A4
[mm]											[mm]	[mm]	[kN]	[Nm]	[g]		
spherical washers from stainless steel, form C – picture 1																	
6.4	-	12	-	-	0.7	2.3	-	4.0	5.2	9	6	M 6	6	6	1.0	23050.0306	23050.0606
8.4	-	17	-	-	0.6	3.2	-	5.3	6.8	12	8	M 8	12	16	2.8	23050.0308	23050.0608
10.5	-	21	-	-	0.8	4.0	-	6.3	7.1	15	10	M10	16	32	5.0	23050.0310	23050.0610
13.0	-	24	-	-	1.1	4.6	-	7.9	8.9	17	12	M12	24	56	7.7	23050.0312	23050.0612
17.0	-	30	-	-	1.3	5.3	-	9.3	10.1	22	16	M16	45	135	13.0	23050.0316	23050.0616
21.0	-	36	-	-	2.0	6.3	-	11.6	12.1	27	20	M20	71	280	23.0	23050.0320	23050.0620
25.0	-	44	-	-	2.4	8.2	-	14.9	15.4	32	24	M24	105	455	46.0	23050.0324	23050.0624
31.0	-	56	-	-	3.6	11.2	-	18.8	18.8	41	30	M30	191	1050	104.0	23050.0330	23050.0630
37.0	-	68	-	-	4.6	14.0	-	23.4	-	50	36	M36	-	-	193.0	23050.0336	23050.0636
43.0	-	78	-	-	6.5	17.0	-	28.3	-	58	42	M42	-	-	313.0	23050.0342	23050.0642
50.0	-	92	-	-	8.0	21.0	-	35.0	-	67	48	M48	-	-	545.0	23050.0348	23050.0648

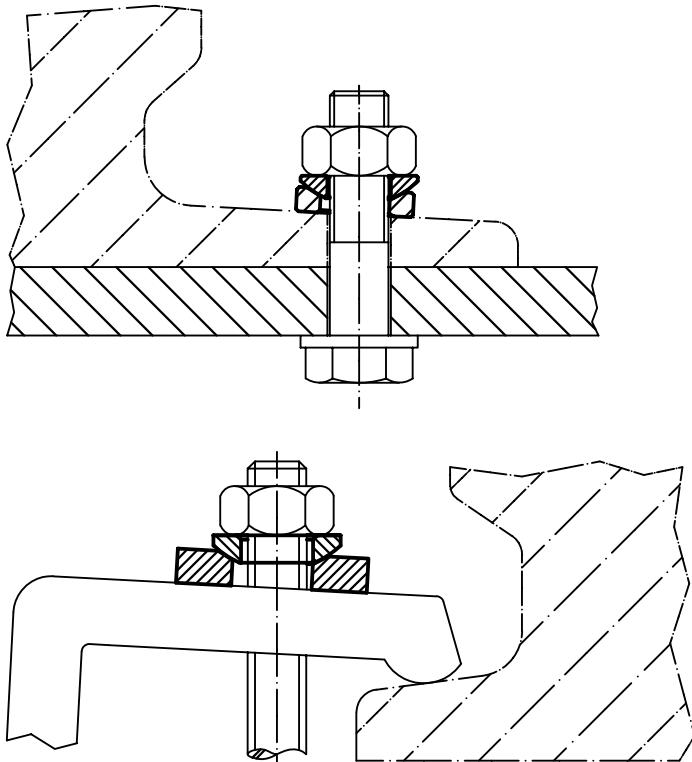
¹⁾ Torques of screws with standard thread, eventual pre-loads to be considered, coefficient of friction μ_{total} 0.14.



d ₁ H13	d ₂ H13	d ₃	d ₄	d ₅	Dimensions					r ₁	For pin d ₆	For screws d ₆	Load capacity for static load max.	Torque for screwed connections ¹⁾ max.	Art. No.	Stainless steel 1.4305	Stainless steel A4
					h ₁	h ₂	h ₃	h ₄ with conical seat form D ~	h ₄ with conical seat form G ~								
conical seats from stainless steel, form D – picture 2																	
-	7.1	-	12	11.0	-	-	2.8	-	-	-	6	M 6	6	6	1.3	23050.0406	23050.0666
	9.6	-	17	14.5	-	-	3.5	-	-	-	8	M 8	12	16	3.7	23050.0408	23050.0668
	12.0	-	21	18.5	-	-	4.2	-	-	-	10	M10	16	32	6.6	23050.0410	23050.0670
	14.2	-	24	20.0	-	-	5.0	-	-	-	12	M12	24	56	10.0	23050.0412	23050.0672
	19.0	-	30	26.0	-	-	6.2	-	-	-	16	M16	45	135	19.0	23050.0416	23050.0676
	23.2	-	36	31.0	-	-	7.5	-	-	-	20	M20	71	280	32.0	23050.0420	23050.0680
	28.0	-	44	37.0	-	-	9.5	-	-	-	24	M24	105	455	63.0	23050.0424	23050.0684
	35.0	-	56	49.0	-	-	12.0	-	-	-	30	M30	191	1050	127.0	23050.0430	23050.0686
	42.0	-	68	60.0	-	-	15.0	-	-	-	36	M36	-	-	234.0	23050.0436	23050.0688
	49.0	-	78	70.0	-	-	18.0	-	-	-	42	M42	-	-	362.0	23050.0442	23050.0692
	56.0	-	92	82.0	-	-	22.0	-	-	-	48	M48	-	-	642.0	23050.0448	23050.0694
conical seats from stainless steel, form G – picture 3																	
-	7.1	-	17	11.0	-	-	4.0	-	-	-	6	M 6	6	6	5.8	23050.0466	23050.0706
	9.6	-	24	14.5	-	-	5.0	-	-	-	8	M 8	12	16	15.0	23050.0468	23050.0708
	12.0	-	30	18.5	-	-	5.0	-	-	-	10	M10	16	32	22.0	23050.0470	23050.0710
	14.2	-	36	20.0	-	-	6.0	-	-	-	12	M12	24	56	40.0	23050.0472	23050.0712
	19.0	-	44	26.0	-	-	7.0	-	-	-	16	M16	45	135	66.0	23050.0476	23050.0716
	23.2	-	50	31.0	-	-	8.0	-	-	-	20	M20	71	280	95.0	23050.0480	23050.0720
	28.0	-	60	37.0	-	-	10.0	-	-	-	24	M24	105	455	171.0	23050.0484	23050.0724
	35.0	-	68	49.0	-	-	12.0	-	-	-	30	M30	191	1050	236.0	23050.0490	23050.0730

¹⁾ Torques of screws with standard thread, eventual pre-loads to be considered, coefficient of friction μ_{total} 0.14.

APPLICATION EXAMPLE



Compact Spherical Washers / Conical Seats • similar to DIN 6319

EH 23050.



PRODUCT DESCRIPTION

The compact spherical washer / conical seat is a permanently fastened component of spherical washer and conical seat offering the following benefits:

- Function-safety
- Secured against loss
- Quick and rational assembly
- Simplified stock holding
- Swiveling range max. 4°.

Material

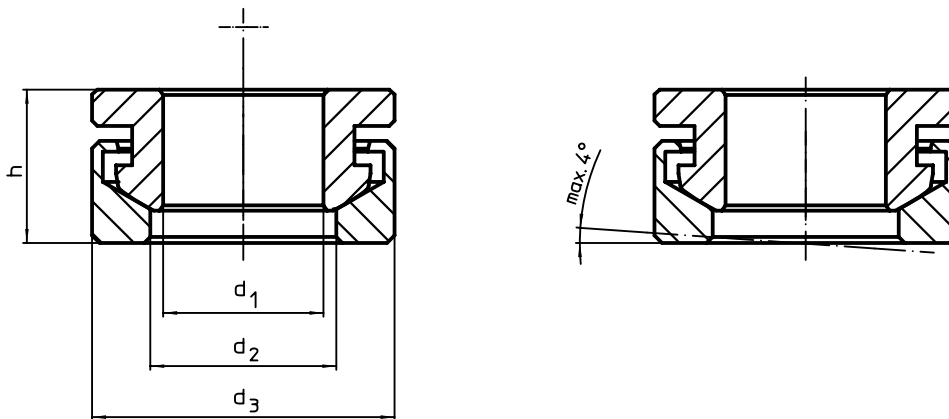
Conical seat

- Heat-treated steel, heat treated
- Stainless steel 1.4305

Spherical washer

- Case-hardened steel, case-hardened
- Stainless steel 1.4305

DRAWING

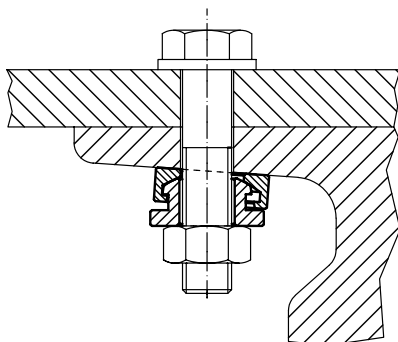


ORDER INFORMATION

d ₁ H13	Dimensions			For pin d ₆	For screws d ₆	Load capacity for static load max.	Torque for screwed connections ¹⁾ max.	[g]	Load capacity for static load max.	Torque for screwed connections ¹⁾ max.	Art. No.	
	d ₂	d ₃	h								Heat-treated steel	Stainless steel
[mm]				[mm]	[mm]	[kN]	[Nm]	[g]	[kN]	[Nm]		
6.4	7.4	13	7.0	6	M 6	9	10	4.0	9	10	23050.0506	–
8.4	9.7	17	8.5	8	M 8	17	25	9.1	17	25	23050.0508	–
10.5	12.0	21	10.4	10	M10	26	46	17.0	26	46	23050.0510	–
13.0	14.8	25	13.1	12	M12	38	82	28.0	38	82	23050.0512	–
17.0	19.7	32	17.0	16	M16	73	206	60.0	73	206	23050.0516	–
21.0	24.6	40	20.3	20	M20	117	407	113.0	117	407	23050.0520	–
6.4	7.4	13	7.0	6	M 6	6	6	4.0	6	6	–	23050.0556
8.4	9.7	17	8.5	8	M 8	12	16	9.1	12	16	–	23050.0558
10.5	12.0	21	10.4	10	M10	16	32	17.0	16	32	–	23050.0560
13.0	14.8	25	13.1	12	M12	24	56	28.0	24	56	–	23050.0562
17.0	19.7	32	17.0	16	M16	45	135	60.0	45	135	–	23050.0566
21.0	24.6	40	20.3	20	M20	71	280	113.0	71	280	–	23050.0570

¹⁾ Torques of screws with standard thread, eventual pre-loads to be considered, coefficient of friction μ_{total} 0.14.

APPLICATION EXAMPLE



Shaft / Plain Washers • DIN 6340 heat-treated EH 23060.



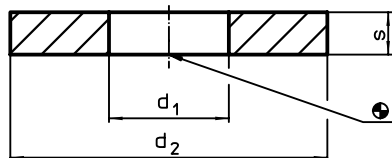
PRODUCT DESCRIPTION

The heat-treated shaft / plain washers (washers) are manufactured according to DIN 6340.


Material

- Heat-treated steel, tempered, punched, mechanically trued, phosphatized

DRAWING

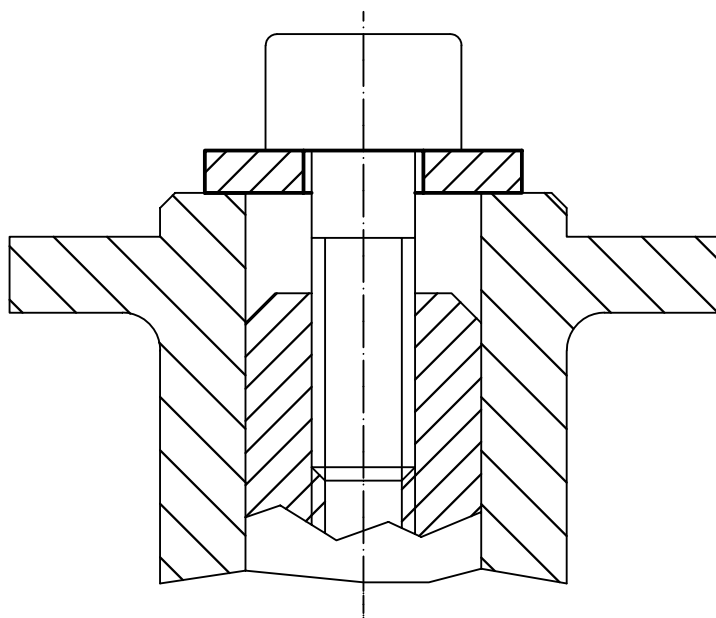


ORDER INFORMATION

d ₁	Dimensions		For screws		Art. No.
	d ₂ [mm]	s			
6.4	17	3	M 6	3.8	23060.0006
8.4	23	4	M 8	9.8	23060.0008
10.5	28	4	M10	15.0	23060.0010
13.0	35	5	M12	28.0	23060.0012
15.0	40	5	M14	40.0	23060.0014¹⁾
17.0	45	6	M16	55.0	23060.0016
19.0	45	6	M18	53.0	23060.0018¹⁾
21.0	50	6	M20	65.0	23060.0020
23.0	50	8	M22	86.0	23060.0022¹⁾
25.0	60	8	M24	122.0	23060.0024
31.0	68	10	M30	199.0	23060.0030
38.0	80	12	M36	360.0	23060.0036¹⁾

¹⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE



Washers • high precision design

EH 23060.



PRODUCT DESCRIPTION

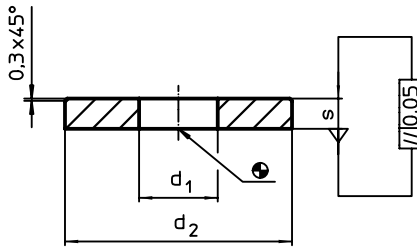
The precisely manufactured washers have an allowance in parallelism of 0,05 mm.

Material


- Heat-treated steel, tempered, blackened

- Stainless steel 1.4305

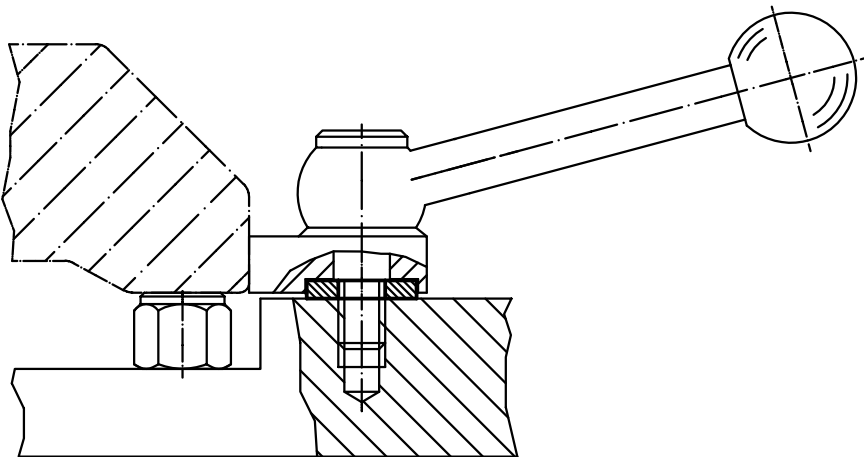
DRAWING



ORDER INFORMATION

d ₁	Dimensions		For screws	 [g]	Art. No.	
	d ₂	s			Heat-treated steel	Stainless steel
	[mm]		[mm]			
3.2	8	2	M 3	0.7	–	23060.0153
4.2	12	2	M 4	1.5	–	23060.0154
5.3	13	3	M 5	2.5	23060.0105	23060.0155
6.4	17	3	M 6	4.6	23060.0106	23060.0156
8.4	24	4	M 8	12.0	23060.0108	23060.0158
10.5	30	4	M10	19.0	23060.0110	23060.0160
13.0	36	5	M12	34.0	23060.0113	23060.0163
17.0	45	5	M16	52.0	23060.0117	23060.0167

APPLICATION EXAMPLE

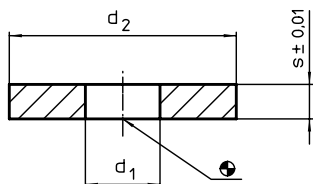



**PRODUCT DESCRIPTION**

For extending the clamping height of the EH 23310. down-thrust clamps and as height compensation for support points.

Material

- Steel, case-hardened, ground

DRAWING**ORDER INFORMATION**

d ₁	Dimensions		For screws		Art. No.
	d ₂	s ±0.01			
	[mm]				
25	59.5	3	M24	53	23061.2403
		4	M24	71	23061.2404
		5	M24	89	23061.2405
		10	M24	178	23061.2410
		20	M24	358	23061.2420

Fixture Nuts • DIN 6330 (height 1,5 d)

EH 23070.



PRODUCT DESCRIPTION

Fixture nuts according to DIN 6330 have a spherical surface to match conical seats DIN 6319 (EH 23050).

With this combination of fixture nut and conical seat, non-parallel clamping surfaces can be compensated.

Material

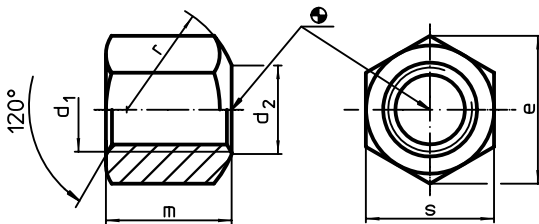
- Heat-treated steel, tempered, quality 10, phosphated
- Stainless steel 1.4305

MORE INFORMATION

References

For torques and strengths please refer to appendix - Technical Data -

DRAWING



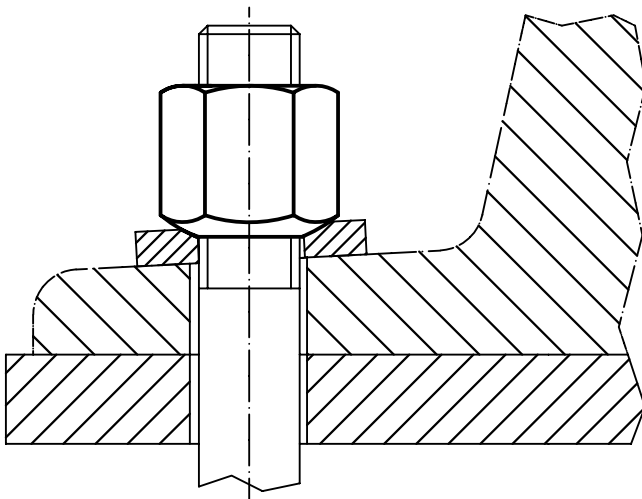
ORDER INFORMATION

Dimensions						Art. No.	Art. No.	
d ₁	d ₂	e	m	r	s		Heat-treated steel	Stainless steel
[mm]						[g]		
with lateral spherical bearing surface, form B								
M 6	7.0	11.5	9	9.0	10	3.8	23070.0006	–
M 8	9.0	15.0	12	11.0	13	8.4	23070.0008	23070.0108 ¹⁾
M10	11.5	18.5	15	15.0	16	20.0	23070.0010	–
					17	20.0	–	23070.0110 ¹⁾
M12	14.0	20.8	18	17.0	18	24.0	23070.0012	–
					19	29.0	–	23070.0112 ¹⁾
M14	16.0	24.2	21	20.0	21	39.0	23070.0014 ²⁾	–
M16	18.0	27.7	24	22.0	24	55.0	23070.0016	23070.0116 ¹⁾
M18	20.0	31.2	27	24.5	27	82.0	23070.0018 ²⁾	–
M20	22.0	34.6	30	27.0	30	110.0	23070.0020	23070.0120 ¹⁾
M22	24.0	39.3	33	29.0	34	162.0	23070.0022 ²⁾	–
M24	26.0	41.6	36	32.0	36	192.0	23070.0024	–
M30	32.0	53.1	45	41.0	46	396.0	23070.0030	–
M36	38.0	63.5	54	50.0	55	684.0	23070.0036	–

¹⁾ DIN standard do not include these material.

²⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE



Collar Nuts • DIN 6331 (height 1,5 d)
EH 23080.



PRODUCT DESCRIPTION

The collar nuts (flanged nuts) are manufactured according to DIN 6331.

Material

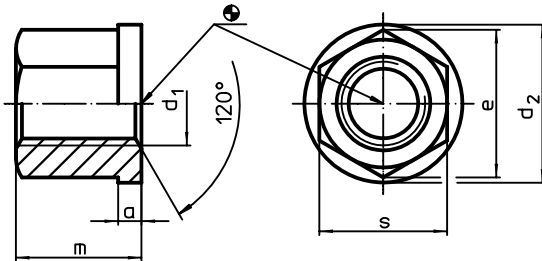
- Heat-treated steel, tempered, quality 10, phosphated
- Stainless steel 1.4305

MORE INFORMATION

References

For torques and strengths please refer to appendix - Technical Data -

DRAWING



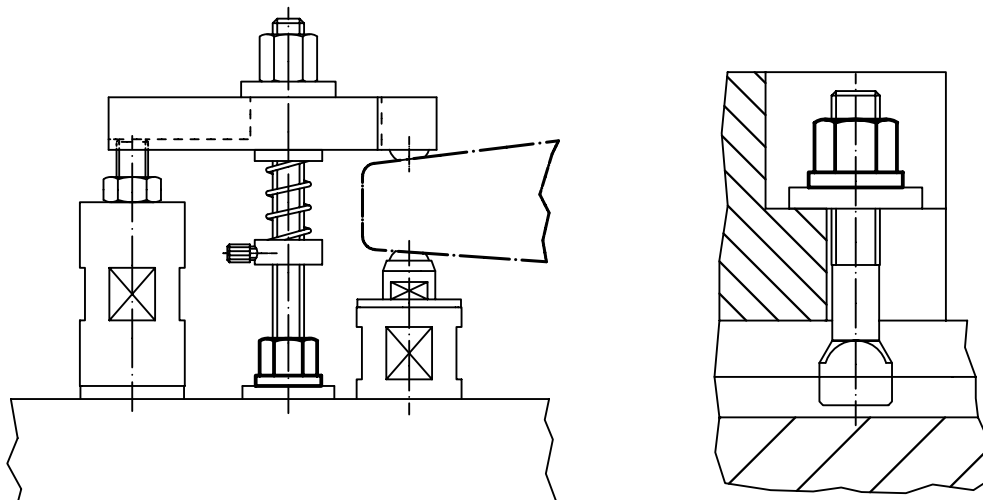
ORDER INFORMATION

d ₁	a	Dimensions				s	[g]	Art. No.	
		d ₂	e	m	Heat-treated steel			Stainless steel	
[mm]									
M 6	3.0	14	11.5	9	10	5.4	23080.0006	-	
M 8	3.5	18	15.0	12	13	12.0	23080.0008	23080.0108 ¹⁾	
M10	4.0	22	18.5	15	16	22.0	23080.0010	-	
					17	25.0	-	23080.0110 ¹⁾	
M12	4.0	25	20.8	18	18	30.0	23080.0012	-	
					19	36.0	-	23080.0112 ¹⁾	
M14	4.5	28	24.2	21	21	47.0	23080.0014 ²⁾	-	
M16	5.0	31	27.7	24	24	67.0	23080.0016	23080.0116 ¹⁾	
M18	5.5	34	31.2	27	27	97.0	23080.0018 ²⁾	-	
M20	6.0	37	34.6	30	30	129.0	23080.0020	23080.0120 ¹⁾	
M22	6.0	40	39.3	33	34	179.0	23080.0022 ²⁾	-	
M24	6.0	45	41.6	36	36	213.0	23080.0024	-	
M30	8.0	58	53.1	45	46	468.0	23080.0030	-	
M36	10.0	68	63.5	54	55	783.0	23080.0036	-	

¹⁾ DIN standard do not include these material.

²⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE



Collar Nuts with Conical Seat

EH 23080.



PRODUCT DESCRIPTION

With this combination of fixture nut and conical seat, non-parallel clamping surfaces can be compensated.

The fixture nut with conical seat is a fixed unit consisting of fixture nut and conical seat with the following advantages / characteristics:

- Functionally reliable
- Captive
- Fast and efficient mounting
- Simplified storage
- Swivel range max. 3°

Material

Conical seat

- Heat-treated steel, tempered, blackened

Nut

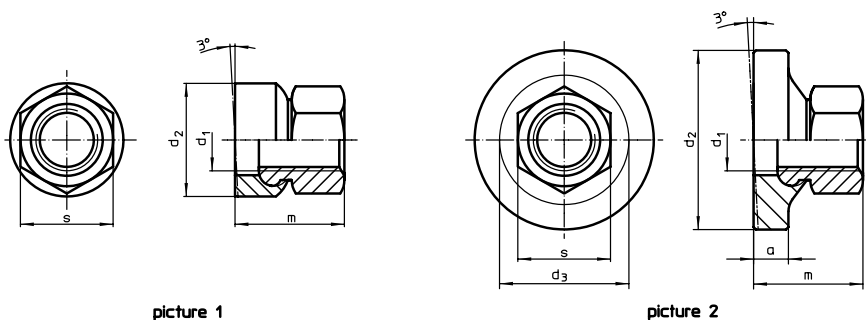
- Heat-treated steel, tempered, blackened

MORE INFORMATION

References

For torques and strengths please refer to appendix - Technical Data -

DRAWING



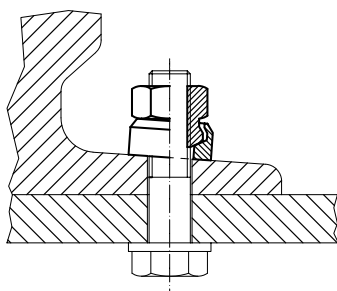
picture 1

picture 2

ORDER INFORMATION

d ₁	a	Dimensions				s	[g]	Art. No.
		d ₂	d ₃	m	[mm]			
with small bearing surface – picture 1								
M 8	–	17	–	14.0	13	13	23080.0508	
M10	–	21	–	17.5	16	24	23080.0510	
M12	–	24	–	21.5	18	37	23080.0512	
M16	–	30	–	28.0	24	73	23080.0516	
M20	–	36	–	35.0	30	141	23080.0520	
M24	–	44	–	42.5	36	259	23080.0524	
M30	–	55	–	56.0	46	544	23080.0530	
with large bearing surface – picture 2								
M 8	4.0	24	17.8	14.0	13	20	23080.0608	
M10	5.5	30	21.2	17.5	16	39	23080.0610	
M12	7.0	36	25.2	21.5	18	68	23080.0612	
M16	8.0	44	30.9	28.0	24	124	23080.0616	
M20	9.5	50	39.9	35.0	30	213	23080.0620	
M24	11.0	60	49.6	42.5	36	378	23080.0624	
M30	14.0	68	61.3	56.0	46	691	23080.0630	

APPLICATION EXAMPLE



Extension Nuts • (height 3 d)

EH 23090.



PRODUCT DESCRIPTION

In comparison to a hexagon nut according to DIN 6330, the extension nuts are elongated and are particularly suitable as a connecting piece for stud bolts.

Material

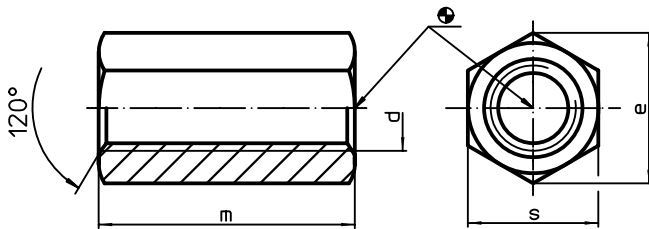
- Heat-treated steel, tempered, quality 10, phosphated

MORE INFORMATION


References

For torques and strengths please refer to appendix - Technical Data -

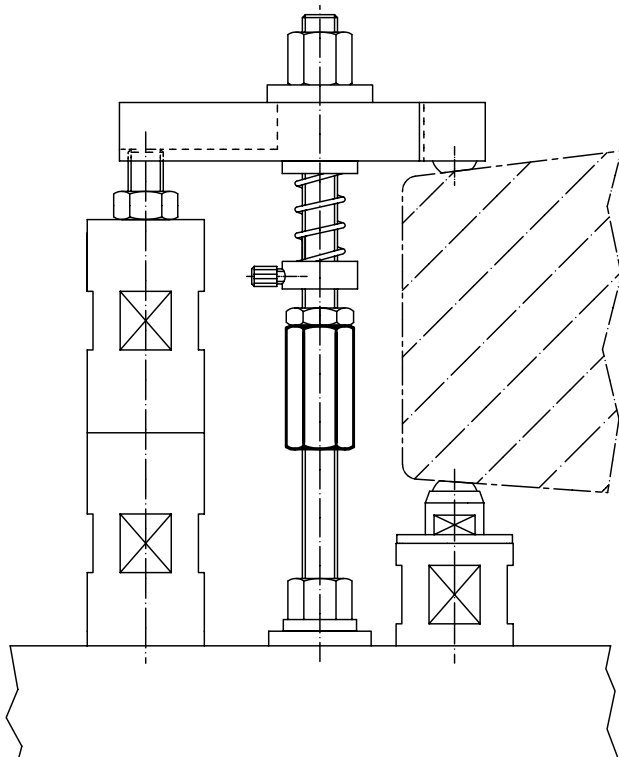
DRAWING



ORDER INFORMATION

d	Dimensions			s	 [g]	Art. No.
	e	[mm]				
M 6	11.5		18	10	8.7	23090.0006
M 8	15.0		24	13	19.0	23090.0008
M10	18.5		30	16	35.0	23090.0010
M12	20.8		36	18	50.0	23090.0012
M14	24.2		42	21	79.0	23090.0014
M16	27.7		48	24	119.0	23090.0016
M20	34.6		60	30	228.0	23090.0020
M24	41.6		72	36	403.0	23090.0024
M30	53.1		90	46	819.0	23090.0030
M36	63.5		108	55	1386.0	23090.0036

APPLICATION EXAMPLE



Drive Blocks • DIN 2079

EH 23100.

PRODUCT DESCRIPTION

These drive blocks are manufactured according to DIN 2079.

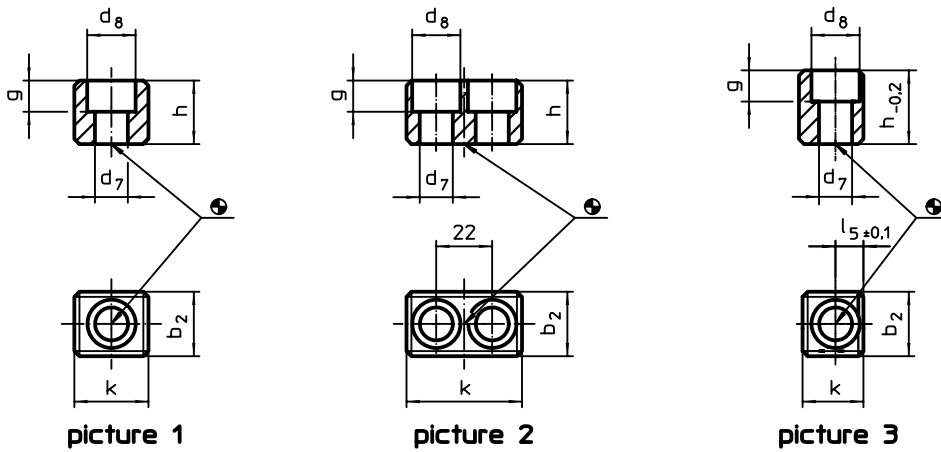
Material

- Alloyed case-hardened steel, case-hardened, blackened, ground



3

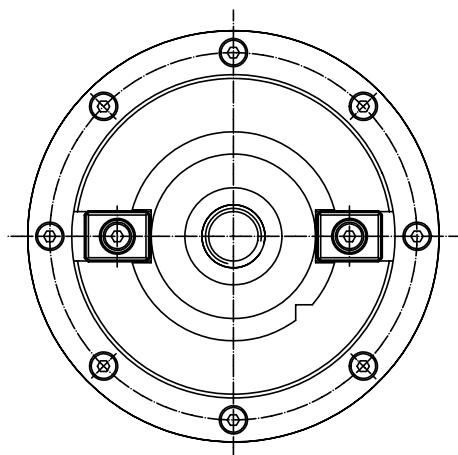
DRAWING



ORDER INFORMATION

Spindle head No.	Dimensions							For screws ISO 4762	[g]	Art. No.
	k	b ₂ h5	d ₇	d ₈	g	h	l ₅ ±0.1			
[mm]										
for spindle heads no. 30 to 60, form A – picture 1										
30	16.5	15.9	6.4	10.4	6.2	16.0	–	M 6 x 16	26	23100.0030
40	19.5	15.9	6.4	10.4	6.2	16.0	–	M 6 x 16	32	23100.0040
45	19.5	19.0	8.4	13.5	8.3	19.0	–	M 8 x 20	40	23100.0045
50 – 55	26.5	25.4	13.0	19.0	12.3	25.0	–	M12 x 25	88	23100.0050
60	45.5	25.4	13.0	19.0	12.3	25.0	–	M12 x 25	181	23100.0060
for spindle heads no. 60 form B – picture 2										
60	45.5	25.4	13.0	19.0	12.3	25.0	–	M12 x 25	140	23100.0160
for spindle heads no. 30 to 50, form C – picture 3										
30	13.5	15.9	6.4	10.4	6.2	24.5	5.5	M 6 x 25	32	23100.0230
40	16.5	15.9	6.4	10.4	6.2	24.5	7.0	M 6 x 25	40	23100.0240
45	17.5	19.0	8.4	13.5	10.0	26.0	7.5	M 8 x 25	48	23100.0245
50	24.0	25.4	13.0	19.0	12.3	29.0	11.0	M12 x 30	90	23100.0250

APPLICATION EXAMPLE



Fixed Slot Tenons

EH 23110.



PRODUCT DESCRIPTION

To be used for locating fixtures and clamping elements onto machine tables with T-slots to DIN 650.

Material

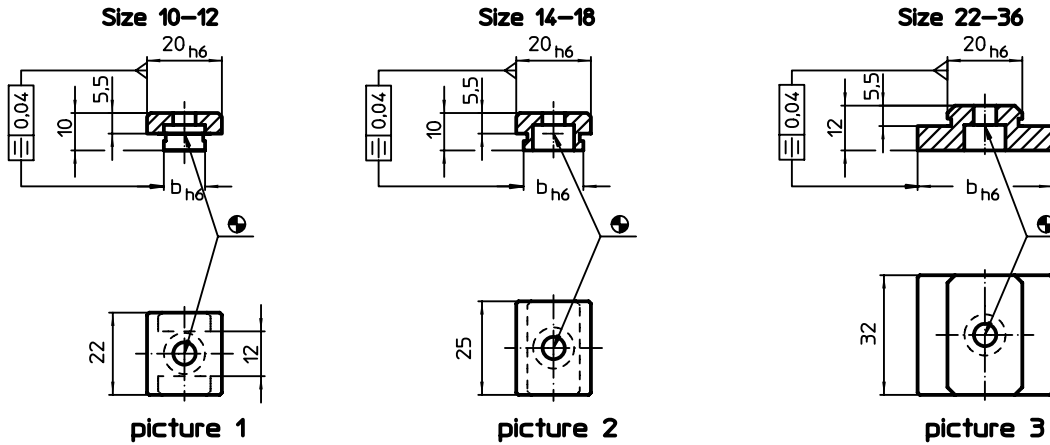
- Steel, case-hardened, blackened, ground

MORE INFORMATION


References

For size 20 refer to 23130.0020.

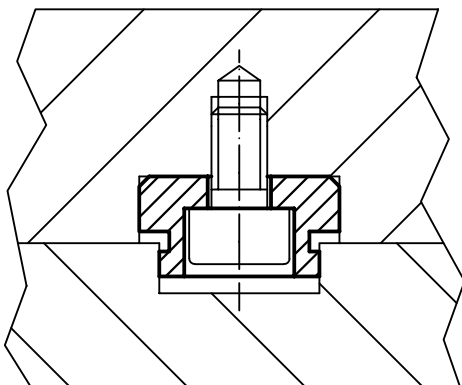
DRAWING



ORDER INFORMATION

T-slot size machine b h6 [mm]	For screws ISO 4762 [mm]	 [g]	Art. No.
size 10-12 – picture 1			
10	M6	19	23110.0010
12	M6	20	23110.0012
size 14-18 – picture 2			
14	M6	28	23110.0014
16	M6	30	23110.0016
18	M6	32	23110.0018
size 22-36 – picture 3			
22	M6	58	23110.0022
24	M6	63	23110.0024
28	M6	68	23110.0028
36	M6	81	23110.0036

APPLICATION EXAMPLE



Fixed Slot Tenons • with cylindrical fastening

EH 23110.



PRODUCT DESCRIPTION

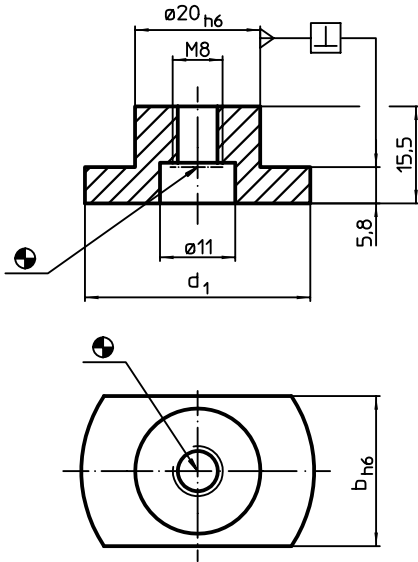
To be used for locating fixtures and clamping elements onto mounting pallets or pallets with cylindrical location holes. They can be inserted in holes as well as in slots.

Material

- Steel, case-hardened, blackened, ground

3

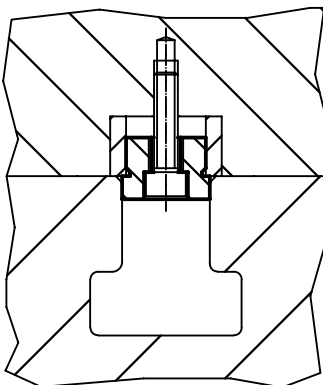
DRAWING



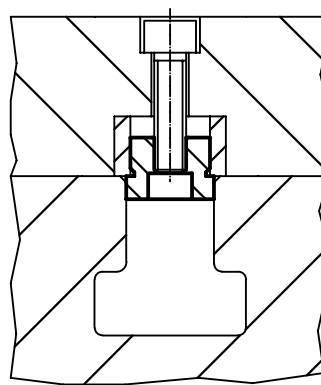
ORDER INFORMATION

T-slot size machine b h6 [mm]	Dimensions d ₁ [mm]	For screws ISO 4762		[g]	Art. No.
		(picture 1)	(picture 2)		
10	30	M6	M8	28	23110.0110
12	30	M6	M8	30	23110.0112
14	30	M6	M8	33	23110.0114
16	30	M6	M8	36	23110.0116
18	30	M6	M8	45	23110.0118
20	36	M6	M8	45	23110.0120
22	40	M6	M8	54	23110.0122
28	42	M6	M8	65	23110.0128
36	48	M6	M8	86	23110.0136

APPLICATION EXAMPLE



picture 1



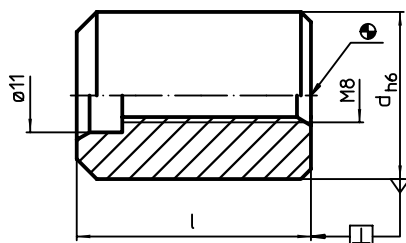
picture 2

**PRODUCT DESCRIPTION**

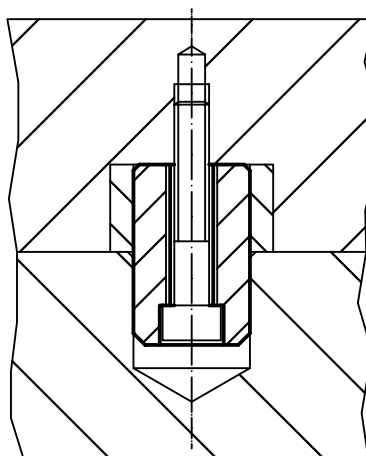
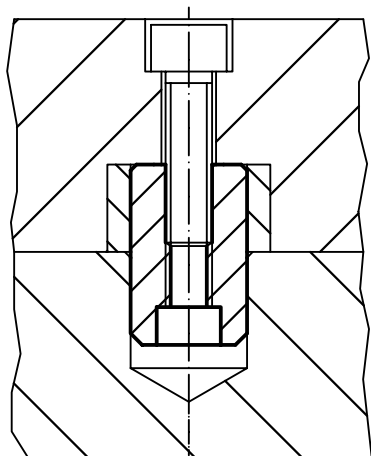
The centering pins are used for centering fixtures on pallets.

Material

- Alloyed case-hardened steel, case-hardened, ground

DRAWING**ORDER INFORMATION**

d h6	Dimensions		[g]	Art. No.
	[mm]			
20	31		70	23110.0510
25	35		118	23110.0520
50	31		473	23110.0530
	45		695	23110.0540

APPLICATION EXAMPLE

Centering Pins • stepped

EH 23110.



PRODUCT DESCRIPTION

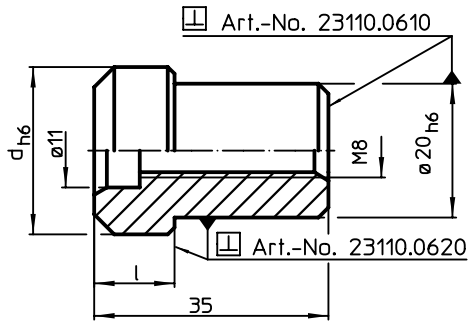
The stepped centering pins are used for centering fixtures on pallets.

Material

- Alloyed case-hardened steel, case-hardened, ground

3

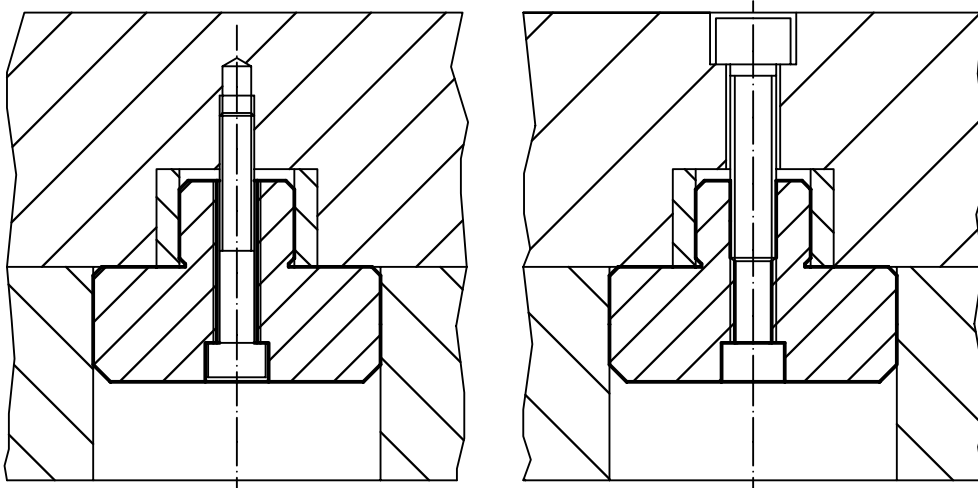
DRAWING



ORDER INFORMATION

d h6	Dimensions		[g]	Art. No.
	[mm]			
25		12	87	23110.0610
50		20	330	23110.0620

APPLICATION EXAMPLE



Loose Slot Tenons • DIN 6323
EH 23120.



PRODUCT DESCRIPTION

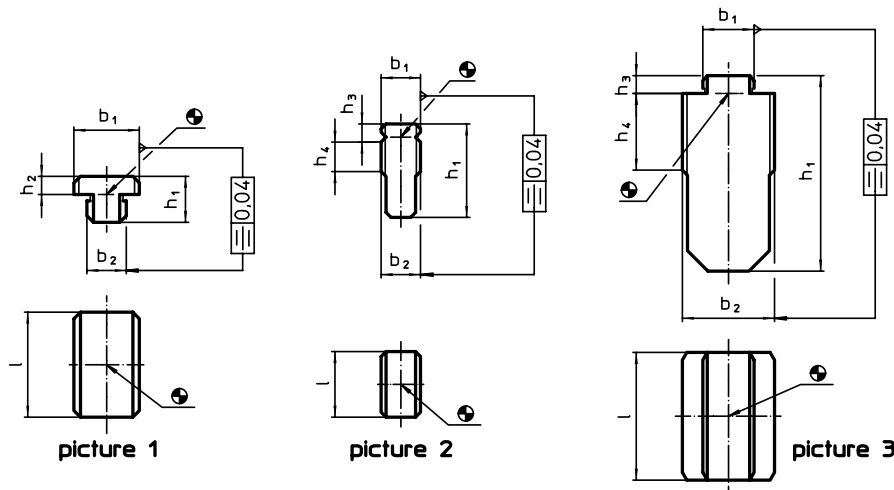
To be used for locating fixtures and clamping elements onto machine tables with T-slots to DIN 650.

Being simply pushed into position after fixture or clamping element has been roughly positioned, they cannot cause damage to the machine as could protruding fixed slot tenons or low slot tenons.

Material

- Steel, case-hardened, blackened, ground

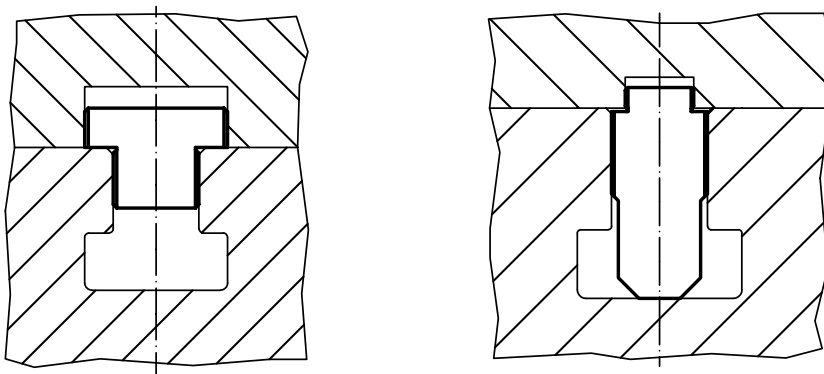
DRAWING



ORDER INFORMATION

T-slot size fixture b_1 h6 [mm]	T-slot size machine b_2 h6 [mm]	Dimensions					l	[g]	Art. No.
		h_1	h_2	h_3	h_4	[mm]			
form A, $b_1 > b_2$ – picture 1									
12	10	12.0	3.6	–	–	20	20	23120.0010	
20	12	14.0	5.5	–	–	32	52	23120.0012	
	14	14.0	5.5	–	–	32	56	23120.0014	
	16	14.0	5.5	–	–	32	61	23120.0016	
	18	14.0	5.5	–	–	32	65	23120.0018	
form B, $b_1 = b_2$ – picture 2									
12	12	28.6	–	5.5	9	20	45	23120.0011	
20	20	45.5	–	7.0	16	32	199	23120.0020	
form C, $b_1 < b_2$ – picture 3									
20	22	50.5	–	7.0	18	40	305	23120.0022	
	28	61.5	–	7.0	24	40	472	23120.0028	
	36	76.5	–	7.0	30	50	952	23120.0036	

APPLICATION EXAMPLE



Low Slot Tenons

EH 23130.



PRODUCT DESCRIPTION

To be used for locating fixtures and clamping elements onto machine tables with T-slots to DIN 650.

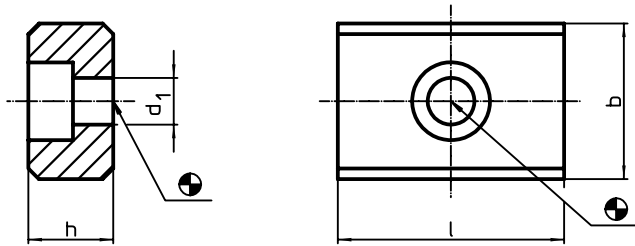
Material

- Steel, case-hardened, blackened, ground

Assembly

They are bolted into the alignment slots of the fixture. Low slot tenons are suitable for use where a fixture will only be used on machines having an identical slot width.

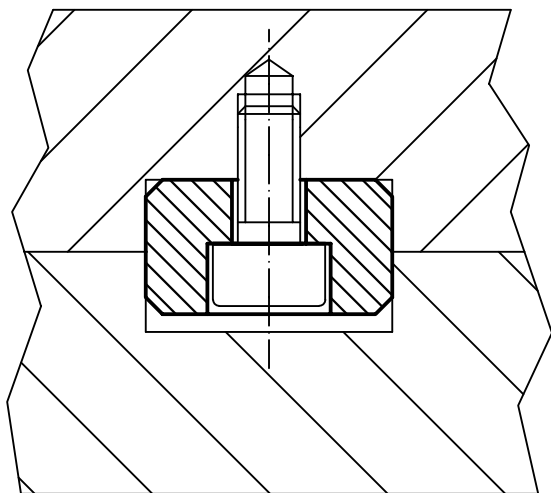
DRAWING



ORDER INFORMATION

b h6	Dimensions			d ₁	For screws ISO 4762 [mm]	[g]	Art. No.
	h	l	[mm]				
10	8	20		4.5	M4	11	23130.0010
12	8	20		5.5	M5	11	23130.0012
14	10	22		6.6	M6	18	23130.0014
16	10	22		6.6	M6	22	23130.0016
18	10	22		6.6	M6	25	23130.0018
20	10	22		6.6	M6	29	23130.0020
22	12	32		6.6	M6	60	23130.0022
24	12	32		6.6	M6	65	23130.0024

APPLICATION EXAMPLE



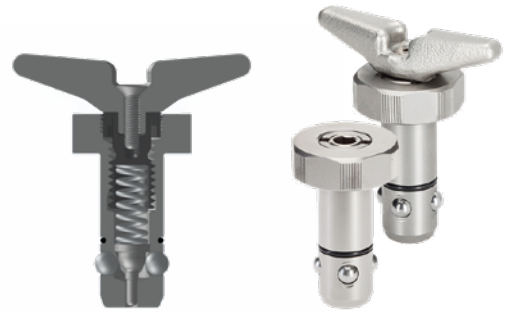
POSITIONING CLAMPING PINS

QUICK AND EASY

The positioning clamping pin is centred and clamped with four balls in the locating bush by tightening the clamping bolt. The clamping bolt can be operated manually via a removable handle or using a hex key.

PRODUCT BENEFITS AT A GLANCE

- Benefits thanks to spring pre-loading:
 - Low-wear.
 - Clamping balls and locating hole are protected from being overloaded.
 - No overstressing of the clamping bolt, preventing the pin from jamming.
- Spring pre-loading also dampens vibrations during chip removal.
- Protection against inadvertent loosening of the pin (e.g. caused by vibration).
- High repeatability of ± 0.03 mm.
- Handling facilitated during installation / disassembly thanks to spanner flats and knurls.
- Flat construction height.
- Operation by optional removable handle or using a hex key.

**Sample application EH 23111.**

Positioning clamping pin for quick workpiece changes at the machine table.



[www.halder.com/
PositioningClampingPins-Video](http://www.halder.com/PositioningClampingPins-Video)

Positioning Clamping Pins

EH 23111.



PRODUCT DESCRIPTION

The positioning clamping pin allows fast clamping, fastening, adjusting, changing and securing of workpieces, plates, fixture systems etc.

Material

- Heat-treated steel, tempered, blackened
- Stainless steel 1.4542, precipitation-hardened

Operation

By tightening the clamping bolt, the positioning clamping pin is centred and clamped in the locating bushing by means of four balls. The clamping bolt can be operated manually via a removable handle (Art. No. 23111.0900/.0902) or using a hexagon key.

MORE INFORMATION

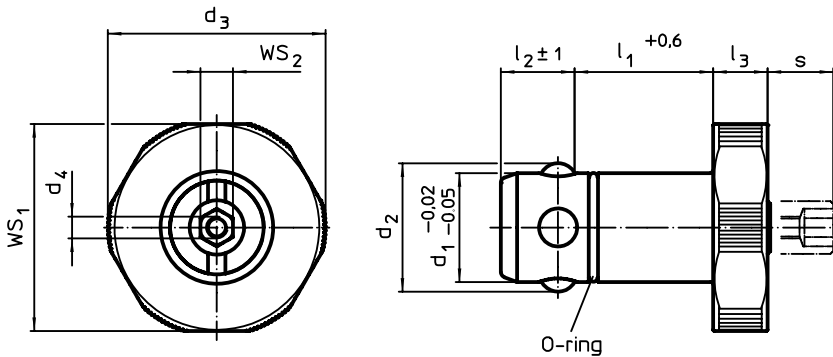
Accessories

Suitable bushings are available.

Further products

Manual Handles, for positioning clamping pins → p. 420
 Bushings, for positioning clamping pins → p. 421
 Locating Bushings, for positioning clamping pins, for press fit → p. 422
 Locating Bushings, for positioning clamping pins, for screw fit → p. 423

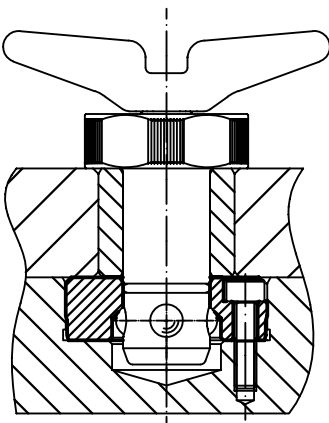
DRAWING

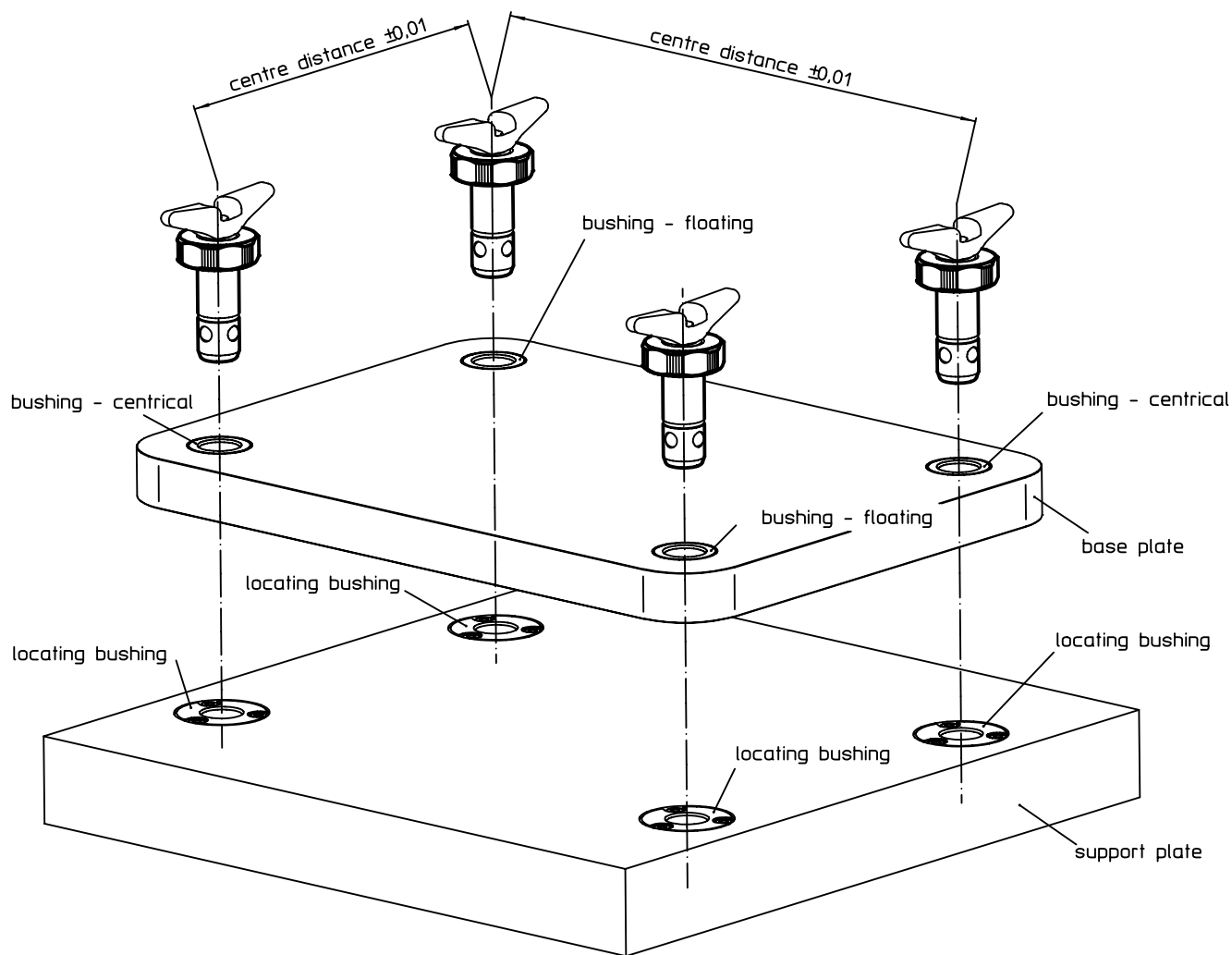


ORDER INFORMATION

d ₁ -0.02 -0.05	l ₁ +0.6	d ₂	Dimensions					For base plates ±0.05	WS ₁	WS ₂	Holding force	🔩	Art. No.			
			d ₃	d ₄	l ₂ ±1	l ₃	s max.						Heat-treated steel	Stainless steel		
[mm]													[kN]	[g]		
16	25	18.7	32	M4	13.6	10	9	20	30	6	5	116	23111.0016	23111.0116		
	30	18.7	32	M4	13.6	10	9	25	30	6	5	125	23111.0018	23111.0118		
20	25	23.6	40	M4	13.6	10	9	20	38	6	6	178	23111.0020	23111.0120		
	30	23.6	40	M4	13.6	10	9	25	38	6	6	191	23111.0022	23111.0122		
25	25	29.0	45	M4	18.6	10	9	20	43	10	8	270	23111.0025	23111.0125		
	30	29.0	45	M4	18.6	10	9	25	43	10	8	287	23111.0027	23111.0127		
30	25	34.6	55	M4	18.6	10	9	20	53	10	10	390	23111.0030	23111.0130		
	30	34.6	55	M4	18.6	10	9	25	53	10	10	416	23111.0032	23111.0132		

APPLICATION EXAMPLE





Manual Handles • for positioning clamping pins

EH 23111.



PRODUCT DESCRIPTION

The manual handle enables an easy and fast operation of the positioning clamping pin.

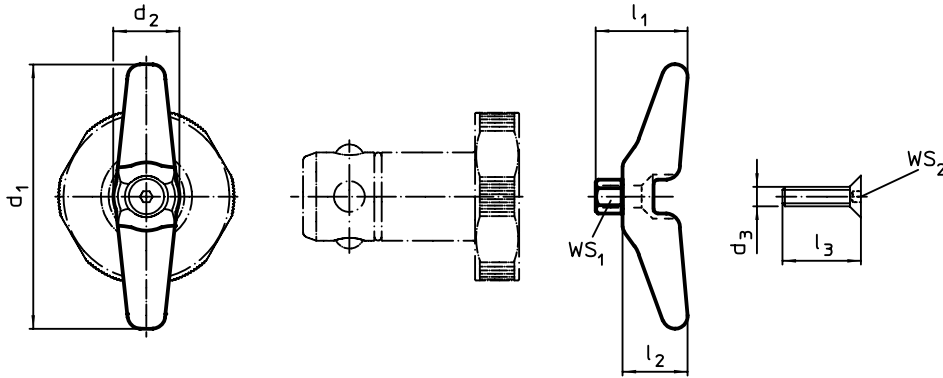
Material

- Stainless steel

Assembly

The handle is tightened to the positioning clamping pin with the M 4 screw included in the delivery.

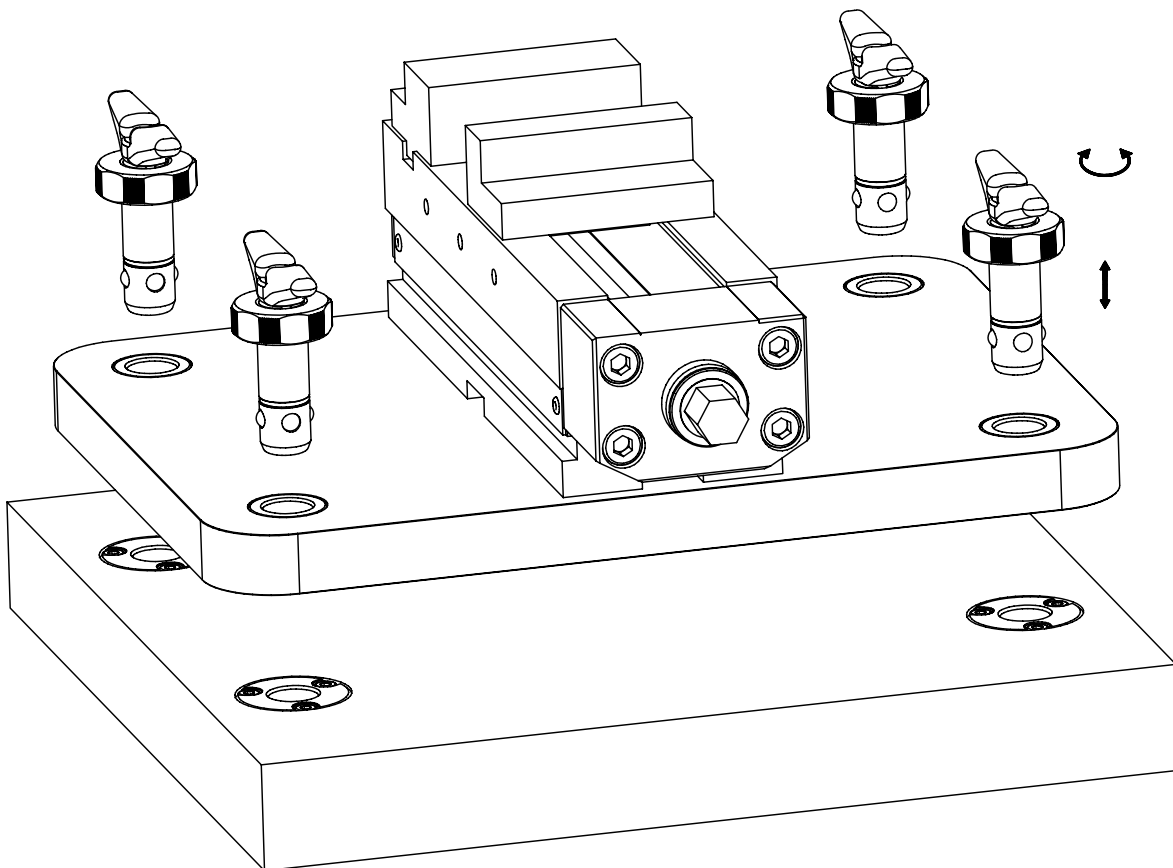
DRAWING



ORDER INFORMATION

For pin Ø [mm]	Dimensions						WS ₁ [mm]	WS ₂ [mm]	[g]	Art. No.
	d ₁	d ₂	d ₃	l ₁	l ₂	l ₃				
16/20	60	15	M4	20	15	16	6	2.5	48	23111.0900
25/30	80	15	M4	25	20	20	10	2.5	76	23111.0902

APPLICATION EXAMPLE



Bushings • for positioning clamping pins

EH 23111.



PRODUCT DESCRIPTION

These bushings for positioning clamping pins are available as centric and floating versions. Please observe the mounting instruction.

Material

- Case-hardened steel, case-hardened, blackened
- Stainless steel 1.4112, hardened

Assembly

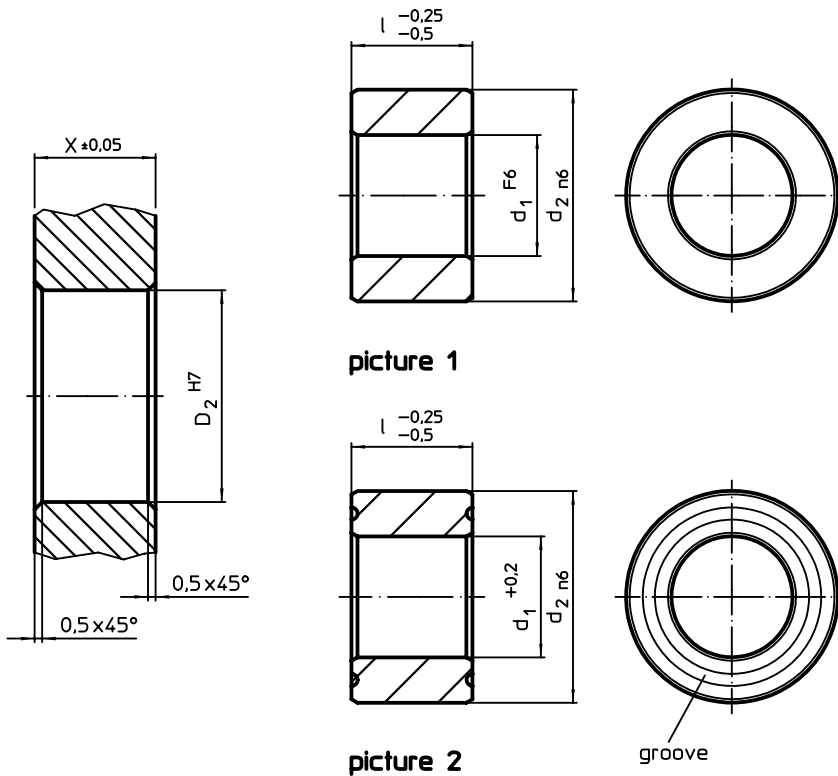
Two centering bushings and two floating bushings are to be mounted into the plate to

be clamped in order to guarantee an optimal repeatability.

Characteristic

The floating bushing has a groove that serves as a differentiation mark.

DRAWING



ORDER INFORMATION

d ₁	Dimensions		Location hole		[g]	Art. No.	
	l -0.25 -0.5 [mm]	d ₂ n6	X ±0.05 [mm]	D ₂ H7		Case-hardened steel	Stainless steel
centric – picture 1							
16.0 F6	20	25	20	25	44	23111.0702	23111.0802
	25	25	25	25	56	23111.0704	23111.0804
20.0 F6	20	35	20	35	110	23111.0706	23111.0806
	25	35	25	35	120	23111.0708	23111.0808
25.0 F6	20	35	20	35	73	23111.0710	23111.0810
	25	35	25	35	92	23111.0712	23111.0812
30.0 F6	20	45	20	45	136	23111.0714	23111.0814
	25	45	25	45	171	23111.0716	23111.0816
floating – picture 2							
16.8 +0.2	20	25	20	25	41	23111.0732	23111.0832
	25	25	25	25	51	23111.0734	23111.0834
20.8 +0.2	20	35	20	35	95	23111.0736	23111.0836
	25	35	25	35	120	23111.0738	23111.0838
25.8 +0.2	20	35	20	35	66	23111.0740	23111.0840
	25	35	25	35	84	23111.0742	23111.0842
30.8 +0.2	20	45	20	45	129	23111.0744	23111.0844
	25	45	25	45	161	23111.0746	23111.0846

Locating Bushings • for positioning clamping pins, for press fit

EH 23111.



PRODUCT DESCRIPTION

These locating bushes for positioning clamping pins are mounted in the counterpart.

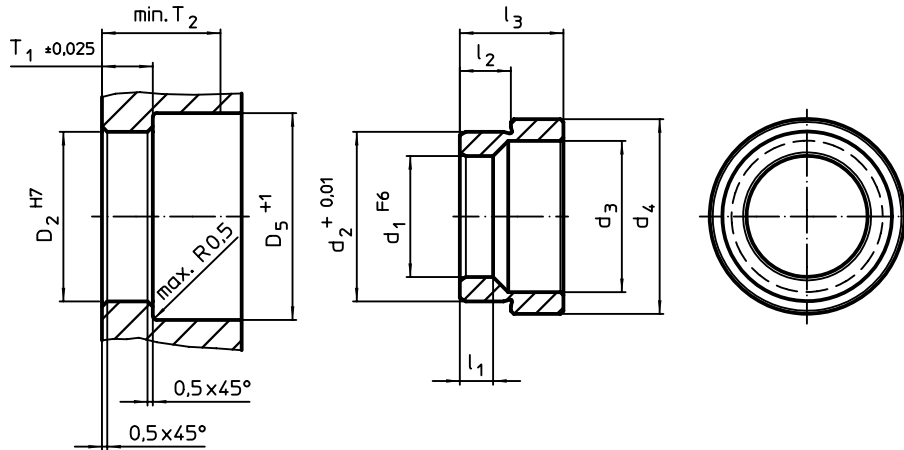
Material

- Case-hardened steel, case-hardened, blackened
- Stainless steel 1.4112, hardened

Assembly

The press fit locating bushing for positioning clamping pins are inserted in the machine table or the base plate with light pressure.

DRAWING



ORDER INFORMATION

Dimensions							Location hole				[g]	Art. No.	
d ₁ F6	d ₂ +0.01	d ₃	d ₄	l ₁	l ₂	l ₃	D ₂ H7	D ₅ +1	T ₁ ±0.02	T2 min.		Case-hard- ened steel	Stainless steel
[mm]							[mm]						
16	22.03	20	28.6	5.25	6.90	12.1	22	31	7.25	22	22	23111.0762	23111.0862
20	28.03	25	32.2	5.25	8.42	17.1	28	34	8.75	22	39	23111.0764	23111.0864
25	35.03	31	40.2	5.25	10.22	21.0	35	42	10.55	28	79	23111.0766	23111.0866
30	42.03	37	48.2	5.25	10.63	21.8	42	50	10.95	28	118	23111.0768	23111.0868

Locating Bushings • for positioning clamping pins, for screw fit

EH 23111.



PRODUCT DESCRIPTION

These locating bushes for positioning clamping pins are mounted in the counterpart.

Material

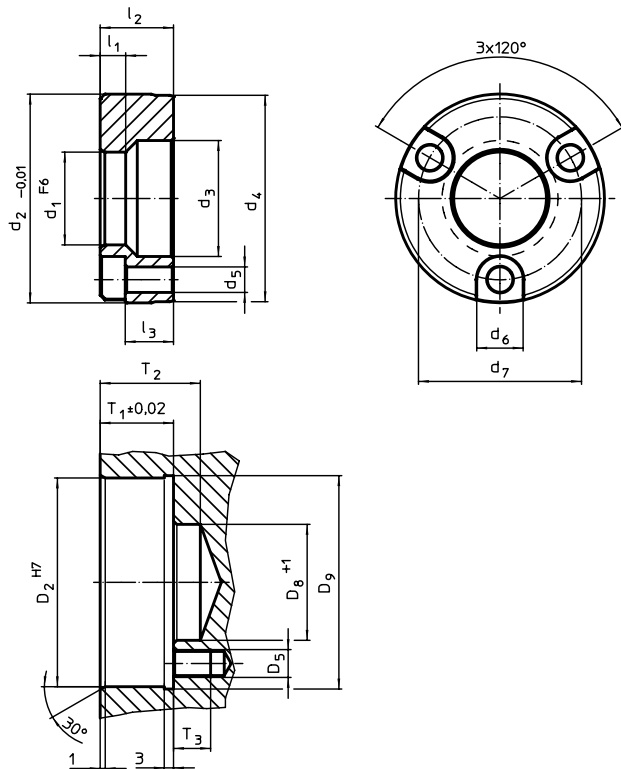
- Case-hardened steel, case-hardened, blackened
- Stainless steel 1.4112, hardened

Assembly

The screw fit locating bushings for positioning clamping pins are inserted in the machine table or in the base plate and are screwed on.

Supplied with mounting screws.

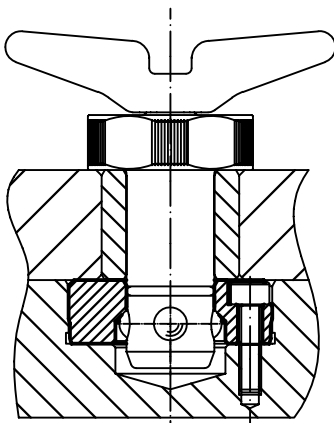
DRAWING



ORDER INFORMATION

Dimensions										Location hole							Art. No.		
d ₁ F6	d ₂ -0.01	d ₃	d ₄	d ₅	d ₆	d ₇	l ₁	l ₂	l ₃ ~	D ₂ H7	D ₅	D ₆ +1	D ₉	T ₁ ±0.02	T2	T3		[g]	Case-hardened steel
[mm]										[mm]									
16	36.99	20	36.5	4.5	8	29	5.25	11.56	7.0	37	M4	20	38.5	11.91	22	12	73	23111.0782	23111.0882
20	44.99	25	44.5	5.5	10	35	5.25	15.82	10.0	45	M5	25	46.5	16.21	22	12	132	23111.0784	23111.0884
25	54.99	31	54.5	6.6	11	42	5.25	19.94	13.5	55	M6	31	56.5	20.32	28	14	264	23111.0786	23111.0886
30	59.99	37	59.5	6.6	11	48	5.25	21.77	15.0	60	M6	37	61.5	22.15	28	14	318	23111.0788	23111.0888

APPLICATION EXAMPLE



Positioning Bushings • with collar, DIN 172 A

EH 23112.



PRODUCT DESCRIPTION

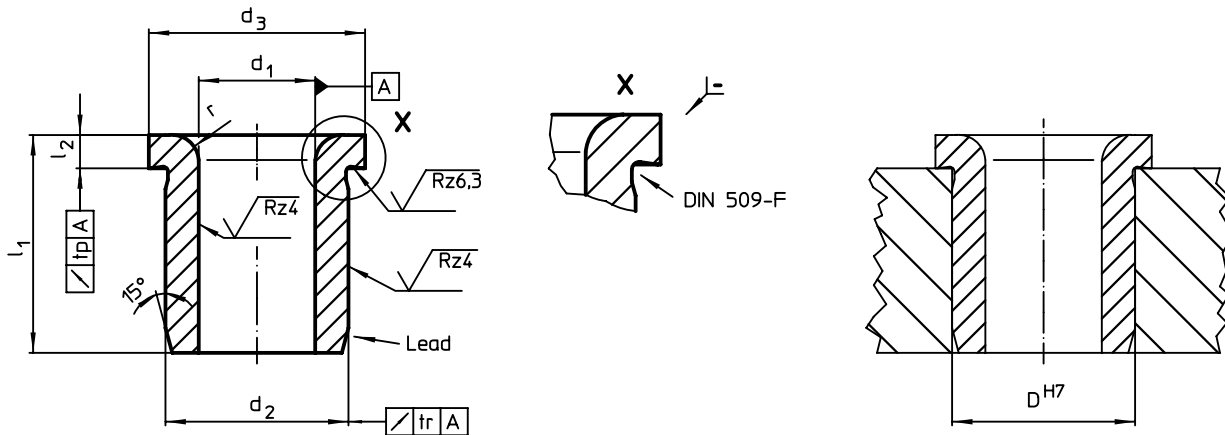
Positioning or drill bushings are used to drill repetitive holes in the same location to ensure repeatability.

The hardened and ground positioning bushings can be used as wear-resistant guide for drills, shafts etc.

Material

- Case-hardened steel, case-hardened


DRAWING




ORDER INFORMATION

d ₁ F7	l ₁	Dimensions				r	Location hole D H7	[g]	Art. No.
		d ₂ n6	d ₃	l ₂	[mm]				
2.0	6	5	8	2.0	1.0	5	1.2	23112.0020	
	9	5	8	2.0	1.0	5	1.6	23112.0021	
2.1	6	5	8	2.0	1.0	5	1.2	23112.0022	
	9	5	8	2.0	1.0	5	1.5	23112.0023	
2.5	6	5	8	2.0	1.0	5	1.1	23112.0024	
	9	5	8	2.0	1.0	5	1.4	23112.0025	
3.0	8	6	9	2.5	1.0	6	1.9	23112.0030	
	12	6	9	2.5	1.0	6	2.6	23112.0031	
	16	6	9	2.5	1.0	6	3.2	23112.0032	
3.1	8	6	9	2.5	1.0	6	1.9	23112.0033	
	12	6	9	2.5	1.0	6	2.5	23112.0034	
	16	6	9	2.5	1.0	6	3.2	23112.0035	
3.5	8	7	10	2.5	1.0	7	2.4	23112.0036	
	12	7	10	2.5	1.0	7	3.4	23112.0037	
	16	7	10	2.5	1.0	7	4.3	23112.0038	
4.0	8	7	10	2.5	1.0	7	2.3	23112.0040	
	12	7	10	2.5	1.0	7	3.1	23112.0041	
	16	7	10	2.5	1.0	7	3.9	23112.0042	
4.1	8	8	11	2.5	1.0	8	3.0	23112.0043	
	12	8	11	2.5	1.0	8	4.2	23112.0044	
	16	8	11	2.5	1.0	8	5.3	23112.0045	
4.5	8	8	11	2.5	1.0	8	2.9	23112.0046	
	12	8	11	2.5	1.0	8	3.9	23112.0047	
	16	8	11	2.5	1.0	8	5.0	23112.0048	
5.0	8	8	11	2.5	1.0	8	1.8	23112.0050	
	12	8	11	2.5	1.0	8	3.6	23112.0051	
	16	8	11	2.5	1.0	8	4.5	23112.0052	

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d ₁ F7	Dimensions					Location hole D H7		Art. No.
	l ₁	d ₂ n6	d ₃	l ₂	r			
5.1	10	10	13	3.0	1.5	10	5.5	23112.0053
	16	10	13	3.0	1.5	10	8.2	23112.0054
	20	10	13	3.0	1.5	10	10.0	23112.0055
5.5	10	10	13	3.0	1.5	10	5.3	23112.0056
	16	10	13	3.0	1.5	10	7.9	23112.0057
	20	10	13	3.0	1.5	10	9.6	23112.0058
6.0	10	10	13	3.0	1.5	10	4.9	23112.0060
	16	10	13	3.0	1.5	10	7.3	23112.0061
	20	10	13	3.0	1.5	10	8.8	23112.0062
6.1	10	12	15	3.0	1.5	12	7.7	23112.0063
	16	12	15	3.0	1.5	12	12.0	23112.0064
	20	12	15	3.0	1.5	12	14.0	23112.0065
6.5	10	12	15	3.0	1.5	12	7.4	23112.0066
	16	12	15	3.0	1.5	12	11.0	23112.0067
	20	12	15	3.0	1.5	12	14.0	23112.0068
7.0	10	12	15	3.0	1.5	12	7.0	23112.0070
	16	12	15	3.0	1.5	12	10.0	23112.0071
	20	12	15	3.0	1.5	12	13.0	23112.0072
7.1	10	12	15	3.0	1.5	12	6.9	23112.0073
	16	12	15	3.0	1.5	12	10.0	23112.0074
	20	12	15	3.0	1.5	12	13.0	23112.0075
7.5	10	12	15	3.0	1.5	12	6.5	23112.0076
	16	12	15	3.0	1.5	12	9.7	23112.0077
	20	12	15	3.0	1.5	12	12.0	23112.0078
8.0	10	12	15	3.0	1.5	12	6.0	23112.0080
	16	12	15	3.0	1.5	12	9.0	23112.0081
	20	12	15	3.0	1.5	12	11.0	23112.0082
8.1	12	15	18	3.0	2.0	15	13.0	23112.0083
	20	15	18	3.0	2.0	15	25.0	23112.0084
	25	15	18	3.0	2.0	15	26.0	23112.0085
8.5	12	15	18	3.0	2.0	15	13.0	23112.0086
	20	15	18	3.0	2.0	15	20.0	23112.0087
	25	15	18	3.0	2.0	15	25.0	23112.0088
9.0	12	15	18	3.0	2.0	15	12.0	23112.0090
	20	15	18	3.0	2.0	15	19.0	23112.0091
	25	15	18	3.0	2.0	15	23.0	23112.0092
9.1	12	15	18	3.0	2.0	15	12.0	23112.0093
	20	15	18	3.0	2.0	15	19.0	23112.0094
	25	15	18	3.0	2.0	15	23.0	23112.0095
9.5	12	15	18	3.0	2.0	15	11.0	23112.0096
	20	15	18	3.0	2.0	15	18.0	23112.0097
	25	15	18	3.0	2.0	15	22.0	23112.0098
10.0	12	15	18	3.0	2.0	15	10.0	23112.0100
	20	15	18	3.0	2.0	15	17.0	23112.0101
	25	15	18	3.0	2.0	15	20.0	23112.0102
10.1	12	18	22	4.0	2.0	18	19.0	23112.0103
	20	18	22	4.0	2.0	18	30.0	23112.0104
	25	18	22	4.0	2.0	18	37.0	23112.0105
10.5	12	18	22	4.0	2.0	18	19.0	23112.0106
	20	18	22	4.0	2.0	18	29.0	23112.0107
	25	18	22	4.0	2.0	18	36.0	23112.0108
11.0	12	18	22	4.0	2.0	18	18.0	23112.0110
	20	18	22	4.0	2.0	18	28.0	23112.0111
	25	18	22	4.0	2.0	18	34.0	23112.0112
11.1	12	18	22	4.0	2.0	18	18.0	23112.0113
	20	18	22	4.0	2.0	18	28.0	23112.0114
	25	18	22	4.0	2.0	18	34.0	23112.0115
11.5	12	18	22	4.0	2.0	18	17.0	23112.0116
	20	18	22	4.0	2.0	18	26.0	23112.0117
	25	18	22	4.0	2.0	18	33.0	23112.0118
12.0	12	18	22	4.0	2.0	18	16.0	23112.0120
	20	18	22	4.0	2.0	18	25.0	23112.0121
	25	18	22	4.0	2.0	18	31.0	23112.0122

→

d ₁ F7	l ₁	Dimensions				r	Location hole D H7		Art. No.
		d ₂ n6	d ₃	l ₂	[mm]				
12.1	16	22	26	4.0	2.0	22	37.0	23112.0123	
	28	22	26	4.0	2.0	22	62.0	23112.0124	
	36	22	26	4.0	2.0	22	78.0	23112.0125	
12.5	16	22	26	4.0	2.0	22	36.0	23112.0126	
	28	22	26	4.0	2.0	22	60.0	23112.0127	
	36	22	26	4.0	2.0	22	76.0	23112.0128	
13.0	16	22	26	4.0	2.0	22	34.0	23112.0130	
	28	22	26	4.0	2.0	22	58.0	23112.0131	
	36	22	26	4.0	2.0	22	73.0	23112.0132	
14.0	16	22	26	4.0	2.0	22	32.0	23112.0140	
	28	22	26	4.0	2.0	22	53.0	23112.0141	
	36	22	26	4.0	2.0	22	67.0	23112.0142	
15.0	16	22	26	4.0	2.0	22	29.0	23112.0150	
	28	22	26	4.0	2.0	22	48.0	23112.0151	
	36	22	26	4.0	2.0	22	61.0	23112.0152	
16.0	16	26	30	4.0	2.0	26	45.0	23112.0160	
	28	26	30	4.0	2.0	26	76.0	23112.0161	
	36	26	30	4.0	2.0	26	97.0	23112.0162	
16.1	16	26	30	4.0	2.0	26	45.0	23112.0163	
	28	26	30	4.0	2.0	26	76.0	23112.0164	
	36	26	30	4.0	2.0	26	96.0	23112.0165	
16.5	16	26	30	4.0	2.0	26	44.0	23112.0166	
	28	26	30	4.0	2.0	26	73.0	23112.0167	
	36	26	30	4.0	2.0	26	93.0	23112.0168	
17.0	16	26	30	4.0	2.0	26	42.0	23112.0171	
	28	26	30	4.0	2.0	26	70.0	23112.0172	
	36	26	30	4.0	2.0	26	89.0	23112.0173	
18.0	16	26	30	4.0	2.0	26	39.0	23112.0181	
	28	26	30	4.0	2.0	26	64.0	23112.0182	
	36	26	30	4.0	2.0	26	82.0	23112.0183	
19.0	20	30	34	5.0	3.0	30	71.0	23112.0191	
	36	30	34	5.0	3.0	30	125.0	23112.0192	
	45	30	34	5.0	3.0	30	154.0	23112.0193	
20.0	20	30	34	5.0	3.0	30	67.0	23112.0201	
	36	30	34	5.0	3.0	30	117.0	23112.0202	
	45	30	34	5.0	3.0	30	143.0	23112.0203	
20.1	20	30	34	5.0	3.0	30	66.0	23112.0204	
	36	30	34	5.0	3.0	30	115.0	23112.0205	
	45	30	34	5.0	3.0	30	142.0	23112.0206	
22.0	20	30	34	5.0	3.0	30	56.0	23112.0221	
	36	30	34	5.0	3.0	30	96.0	23112.0222	
	45	30	34	5.0	3.0	30	120.0	23112.0223	
25.0	20	35	39	5.0	3.0	35	80.0	23112.0251	
	36	35	39	5.0	3.0	35	138.0	23112.0252	
	45	35	39	5.0	3.0	35	171.0	23112.0253	
30.0	25	42	46	5.0	3.0	42	139.0	23112.0301	
	45	42	46	5.0	3.0	42	245.0	23112.0302	
	56	42	46	5.0	3.0	42	303.0	23112.0303	

Positioning Bushings • without collar, DIN 179 A

EH 23112.



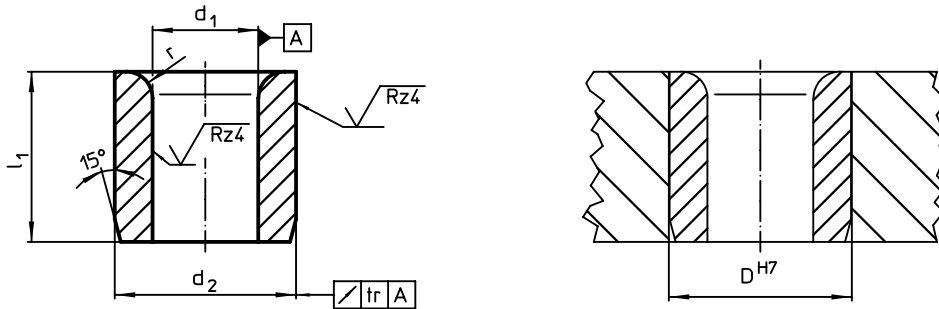
PRODUCT DESCRIPTION

Positioning or drill bushings are used to drill repetitive holes in the same location to ensure repeatability. The hardened and ground positioning bushings can be used as wear-resistant guide for drills, shafts etc.

Material

- Case-hardened steel, case-hardened


DRAWING




ORDER INFORMATION

d ₁ F7	Dimensions			r	Location hole D H7	[g]	Art. No.
	l ₁	d ₂ n6	[mm]				
2.0	6	5	1.0	5	0.7	23112.0520	
	9	5	1.0	5	1.1	23112.0521	
2.1	6	5	1.0	5	0.7	23112.0522	
	9	5	1.0	5	1.1	23112.0523	
2.5	6	5	1.0	5	0.7	23112.0524	
	9	5	1.0	5	1.0	23112.0525	
3.0	8	6	1.0	6	1.9	23112.0530	
	12	6	1.0	6	1.9	23112.0531	
	16	6	1.0	6	2.6	23112.0532	
3.1	8	6	1.0	6	1.2	23112.0533	
	12	6	1.0	6	1.9	23112.0534	
	16	6	1.0	6	3.2	23112.0535	
3.5	8	7	1.0	7	2.4	23112.0536	
	12	7	1.0	7	2.6	23112.0537	
	16	7	1.0	7	3.6	23112.0538	
4.0	8	7	1.0	7	1.5	23112.0540	
	12	7	1.0	7	3.0	23112.0541	
	16	7	1.0	7	3.2	23112.0542	
4.1	8	8	1.0	8	2.2	23112.0543	
	12	8	1.0	8	3.4	23112.0544	
	16	8	1.0	8	4.6	23112.0545	
4.5	8	8	1.0	8	2.1	23112.0546	
	12	8	1.0	8	3.1	23112.0547	
	16	8	1.0	8	4.2	23112.0548	
5.0	8	8	1.0	8	1.8	23112.0550	
	12	8	1.0	8	3.4	23112.0551	
	16	8	1.0	8	3.7	23112.0552	
5.1	10	10	1.5	10	4.4	23112.0553	
	16	10	1.5	10	7.1	23112.0554	
	20	10	1.5	10	8.9	23112.0555	
5.5	10	10	1.5	10	4.1	23112.0556	
	16	10	1.5	10	6.7	23112.0557	
	20	10	1.5	10	8.4	23112.0558	

→

d ₁ F7	Dimensions			Location hole D H7		Art. No.
	l ₁	d ₂ n6	r			
6.0	10	10	1.5	10	3.8	23112.0560
	16	10	1.5	10	6.1	23112.0561
	20	10	1.5	10	7.7	23112.0562
6.1	10	12	1.5	12	6.3	23112.0563
	16	12	1.5	12	10.0	23112.0564
	20	12	1.5	12	13.0	23112.0565
6.5	10	12	1.5	12	6.0	23112.0566
	16	12	1.5	12	9.7	23112.0567
	20	12	1.5	12	12.0	23112.0568
7.0	10	12	1.5	12	5.6	23112.0570
	16	12	1.5	12	9.1	23112.0571
	20	12	1.5	12	11.0	23112.0572
7.1	10	12	1.5	12	5.5	23112.0573
	16	12	1.5	12	9.0	23112.0574
	20	12	1.5	12	11.0	23112.0575
7.5	10	12	1.5	12	5.1	23112.0576
	16	12	1.5	12	8.4	23112.0577
	20	12	1.5	12	11.0	23112.0578
8.0	10	12	1.5	12	4.7	23112.0580
	16	12	1.5	12	7.6	23112.0581
	20	12	1.5	12	9.6	23112.0582
8.1	12	15	2.0	15	11.0	23112.0583
	20	15	2.0	15	19.0	23112.0584
	25	15	2.0	15	24.0	23112.0585
8.5	12	15	2.0	15	11.0	23112.0586
	20	15	2.0	15	18.0	23112.0587
	25	15	2.0	15	23.0	23112.0588
9.0	12	15	2.0	15	10.0	23112.0590
	20	15	2.0	15	17.0	23112.0591
	25	15	2.0	15	22.0	23112.0592
9.1	12	15	2.0	15	10.0	23112.0593
	20	15	2.0	15	17.0	23112.0594
	25	15	2.0	15	21.0	23112.0595
9.5	12	15	2.0	15	9.5	23112.0596
	20	15	2.0	15	16.0	23112.0597
	25	15	2.0	15	20.0	23112.0598
10.0	12	15	2.0	15	8.8	23112.0600
	20	15	2.0	15	15.0	23112.0601
	25	15	2.0	15	19.0	23112.0602
10.1	12	18	2.0	18	16.0	23112.0603
	20	18	2.0	18	27.0	23112.0604
	25	18	2.0	18	33.0	23112.0605
10.5	12	18	2.0	18	15.0	23112.0606
	20	18	2.0	18	26.0	23112.0607
	25	18	2.0	18	32.0	23112.0608
11.0	12	18	2.0	18	14.0	23112.0610
	20	18	2.0	18	24.0	23112.0611
	25	18	2.0	18	31.0	23112.0612
11.1	12	18	2.0	18	14.0	23112.0613
	20	18	2.0	18	24.0	23112.0614
	25	18	2.0	18	30.0	23112.0615
11.5	12	18	2.0	18	13.0	23112.0616
	20	18	2.0	18	23.0	23112.0617
	25	18	2.0	18	29.0	23112.0618
12.0	12	18	2.0	18	13.0	23112.0620
	20	18	2.0	18	22.0	23112.0621
	25	18	2.0	18	27.0	23112.0622
12.1	16	22	2.0	22	32.0	23112.0623
	28	22	2.0	22	57.0	23112.0624
	36	22	2.0	22	74.0	23112.0625
12.5	16	22	2.0	22	31.0	23112.0626
	28	22	2.0	22	66.0	23112.0627
	36	22	2.0	22	69.0	23112.0628

→

d ₁ F7	Dimensions			r	Location hole D H7		Art. No.
	l ₁	d ₂ n6	[mm]				
13.0	16	22		2.0	22	30.0	23112.0630
	28	22		2.0	22	53.0	23112.0631
	36	22		2.0	22	69.0	23112.0632
14.0	16	22		2.0	22	27.0	23112.0640
	28	22		2.0	22	49.0	23112.0641
	36	22		2.0	22	63.0	23112.0642
15.0	16	22		2.0	22	24.0	23112.0650
	28	22		2.0	22	44.0	23112.0651
	36	22		2.0	22	56.0	23112.0652
16.0	16	26		2.0	26	45.0	23112.0660
	28	26		2.0	26	71.0	23112.0661
	36	26		2.0	26	92.0	23112.0662
16.1	16	26		2.0	26	40.0	23112.0663
	28	26		2.0	26	71.0	23112.0664
	36	26		2.0	26	91.0	23112.0665
16.5	16	26		2.0	26	39.0	23112.0666
	28	26		2.0	26	68.0	23112.0667
	36	26		2.0	26	88.0	23112.0668
17.0	16	26		2.0	26	37.0	23112.0671
	28	26		2.0	26	65.0	23112.0672
	36	26		2.0	26	84.0	23112.0673
18.0	16	26		2.0	26	33.0	23112.0681
	28	26		2.0	26	59.0	23112.0682
	36	26		2.0	26	76.0	23112.0683
19.0	20	30		3.0	30	64.0	23112.0691
	36	30		3.0	30	117.0	23112.0692
	45	30		3.0	30	147.0	23112.0693
20.0	20	30		3.0	30	59.0	23112.0701
	36	30		3.0	30	108.0	23112.0702
	45	30		3.0	30	136.0	23112.0703
20.1	20	30		3.0	30	59.0	23112.0704
	36	30		3.0	30	108.0	23112.0705
	45	30		3.0	30	135.0	23112.0706
22.0	20	30		3.0	30	49.0	23112.0721
	36	30		3.0	30	90.0	23112.0722
	45	30		3.0	30	113.0	23112.0723
25.0	20	35		3.0	35	71.0	23112.0751
	36	35		3.0	35	130.0	23112.0752
	45	35		3.0	35	163.0	23112.0753
30.0	25	42		3.0	42	129.0	23112.0801
	45	42		3.0	42	235.0	23112.0802
	56	42		3.0	42	293.0	23112.0803

Clamps • DIN 6314 flat

EH 23140.



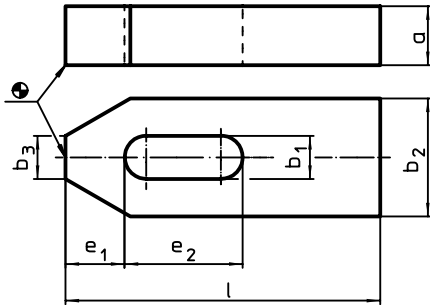
PRODUCT DESCRIPTION

This clamp (clamping claw) according to DIN 6314 is mainly used in mechanical clamping technology for clamping workpieces.

Material

- Heat-treated steel, varnished

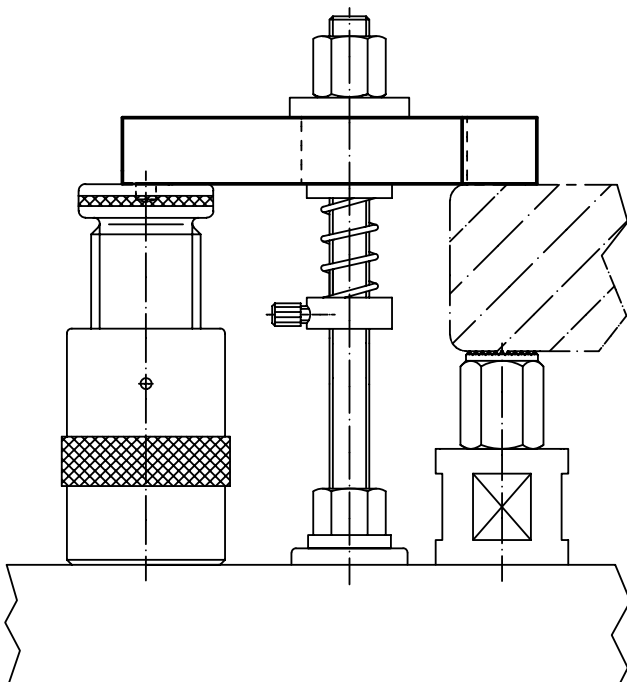
DRAWING



ORDER INFORMATION

Nominal dimension b_1 [mm]	l	a	Dimensions				For screws		[g]	Art. No.
			b_2	b_3	e_1	e_2	[mm]	[in]		
6.6	50	10	20	8	10	20	M 6	1/4	61	23140.0007
9.0	60	12	25	10	13	22	M 8	5/16	112	23140.0009
11.0	80	15	30	12	15	30	M10	3/8	228	23140.0011
14.0	100	20	40	14	21	40	M12, M14	1/2	492	23140.0014
	125	20	40	14	21	50	M12, M14	1/2	623	23140.0015
18.0	125	25	50	18	26	45	M16, M18	5/8	980	23140.0018
	160	25	50	18	26	65	M16, M18	5/8	1246	23140.0019
22.0	160	30	60	22	30	60	M20, M22	3/4	1793	23140.0022
	200	30	60	22	30	80	M20, M22	3/4	2244	23140.0023
26.0	200	30	70	26	35	80	M24	1	2617	23140.0026
	250	30	70	26	35	105	M24	1	3823	23140.0027
33.0	250	40	80	34	45	100	M30	1 1/4	4980	23140.0034
	315	50	80	34	45	130	M30	1 1/4	7840	23140.0035

APPLICATION EXAMPLE

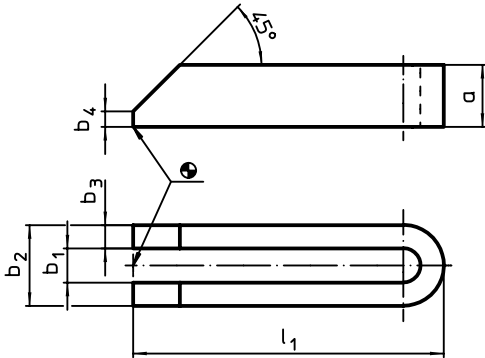


**PRODUCT DESCRIPTION**

This clamp (clamping claw) according to DIN 6314 B is forked and is mainly used in mechanical clamping technology for clamping workpieces.

Material

- Heat-treated steel, varnished

DRAWING**ORDER INFORMATION**

Nominal dimension b_1 [mm]	Dimensions					For screws		[g]	Art. No.
	l_1	a	b_2 [mm]	b_3	b_4	[mm]	[in]		
6.6	60	12	19	6	3	M 6	1/4	65	23150.0007
9.0	80	15	25	8	4	M 8	5/16	141	23150.0009
11.0	100	20	31	10	5	M10	3/8	299	23150.0011
14.0	125	25	38	12	6	M12, M14	1/2	578	23150.0014
	160	25	38	12	6	M12, M14	1/2	715	23150.0015
	200	25	38	12	6	M12, M14	1/2	905	23150.0016
18.0	160	30	48	15	8	M16, M18	5/8	1077	23150.0018
	200	30	48	15	8	M16, M18	5/8	1346	23150.0019
	250	40	48	15	10	M16, M18	5/8	2300	23150.0020
22.0	200	40	52	15	10	M20, M22	3/4	1809	23150.0022
	250	40	62	20	10	M20, M22	3/4	3020	23150.0023
	315	40	62	20	10	M20, M22	3/4	3800	23150.0024
26.0	200	40	66	20	10	M24	1	2359	23150.0026
	250	40	66	20	10	M24	1	2360	23150.0027
	315	40	66	20	10	M24	1	3802	23150.0028
	500	50	66	20	10	M24	1	7640	23150.0030
33.0	250	50	74	20	12	M30	1 1/4	3720	23150.0034
	315	50	74	20	12	M30	1 1/4	4780	23150.0035
	400	50	74	20	12	M30	1 1/4	6458	23150.0036
40.0	400	60	100	30	12	M36	1 1/2	10920	23150.0040¹⁾
	600	60	100	30	12	M36	1 1/2	18002	23150.0041¹⁾

¹⁾ DIN standards do not include these dimensions.

Clamps • DIN 6316 with goose-neck

EH 23160.



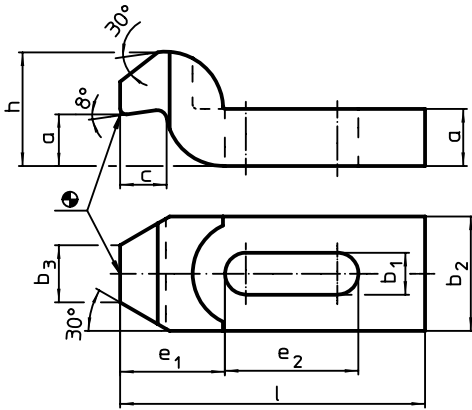
PRODUCT DESCRIPTION

This clamp (clamping claw) according to DIN 6316 with goose-neck is mainly used in mechanical clamping technology for clamping workpieces.

Material

- Heat-treated steel, varnished

DRAWING

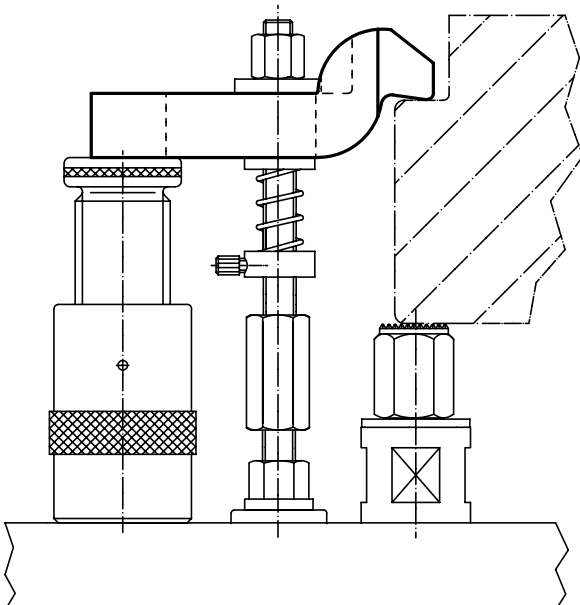


ORDER INFORMATION

Nominal dimension b_1 [mm]	l	a	b_2	Dimensions					For screws		[g]	Art. No.
				b_3	c	e_1	e_2	h	[mm]	[in]		
6.6	60	10	20	10	8	20	20	20	M 6	1/4	81	23160.0007
9.0	80	12	25	12	9	25	25	24	M 8	5/16	165	23160.0009
11.0	100	15	30	15	12	32	32	30	M10	3/8	307	23160.0011
14.0	125	20	40	20	16	40	40	40	M12, M14	1/2	680	23160.0014
18.0	125	25	50	25	20	49	40	50	M16, M18	5/8	1059	23160.0018¹⁾
	160	25	50	25	20	49	50	50	M16, M18	5/8	1356	23160.0019
22.0	160	30	60	30	24	55	55	60	M20	3/4	1937	23160.0022¹⁾
	200	30	60	30	24	55	70	60	M20	3/4	2100	23160.0023
26.0	200	35	70	35	28	72	60	70	M24	1	3364	23160.0026¹⁾
	250	35	70	35	28	72	80	70	M24	1	4115	23160.0027
33.0	250	40	80	40	40	91	80	80	M30	1 1/4	4500	23160.0034¹⁾
	315	50	80	40	40	91	100	100	M30	1 1/4	8340	23160.0035

¹⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE





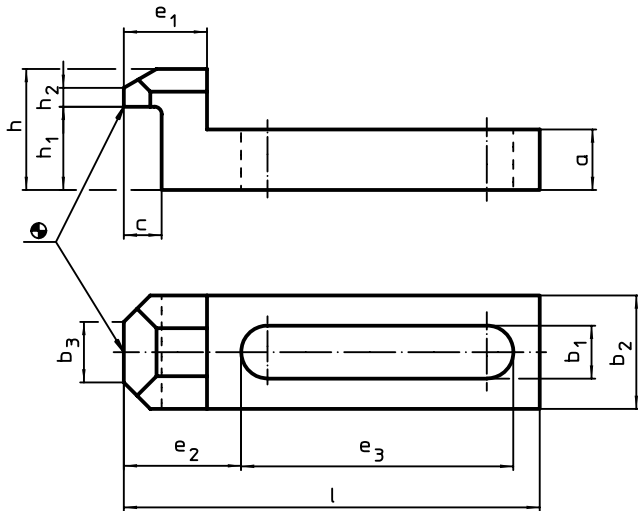
PRODUCT DESCRIPTION

This clamp (clamping claw) according to DIN 6314 B is stepped and is mainly used in mechanical clamping technology for clamping workpieces.

Material

- Heat-treated steel, tempered, blackened

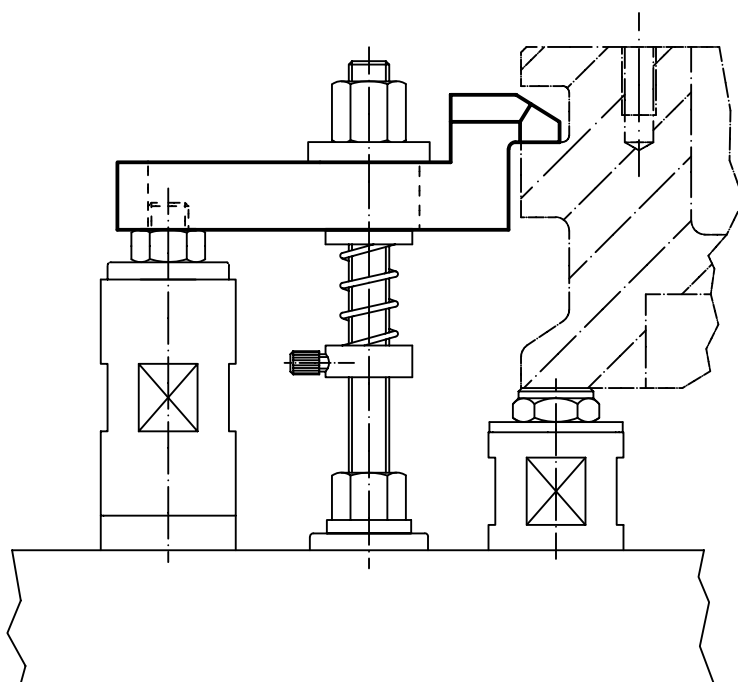
DRAWING



ORDER INFORMATION

Nominal dimension b_1 [mm]	Dimensions											For screws		Art. No.	
	l	a	b_2	b_3	c	e_1	e_2	e_3	h	h_1	h_2	[mm]	[in]		[g]
												[mm]	[mm]		
6.6	55	8	15	8	5	11	15.5	36	16	11	2	M 6	1/4	39	23160.0107
9.0	70	10	20	10	8	15	19.5	46	20	14	3	M 8	5/16	80	23160.0109
11.0	90	13	25	12	10	19	26.5	58	25	18	4	M10	3/8	168	23160.0111
13.0	115	16	30	15	12	24	32.5	75	32	23	5	M12	1/2	325	23160.0113
17.0	145	20	40	20	14	29	38.5	99	40	28	6	M16	5/8	685	23160.0117

APPLICATION EXAMPLE



Clamps • with nose, closed

EH 23170.



PRODUCT DESCRIPTION

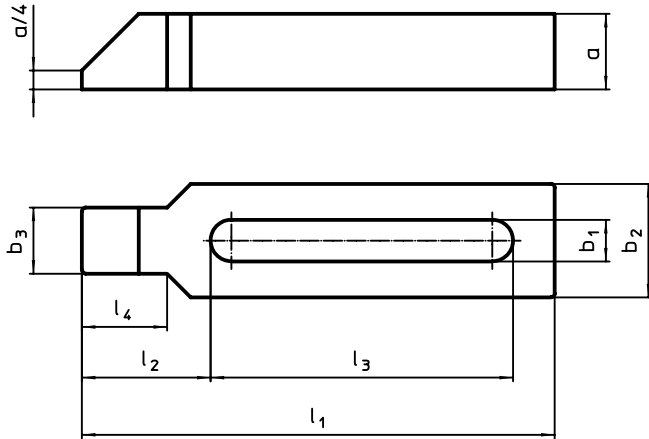
This clamp (clamping claw) according to DIN 6317 with nose is mainly used in mechanical clamping technology for clamping workpieces. Due to the closed design of the clamp, it is suitable for use with rotating workpieces.

Thanks to the closed slot, the clamp is suitable for an application with rotating workpieces.

Material

- Heat-treated steel, varnished

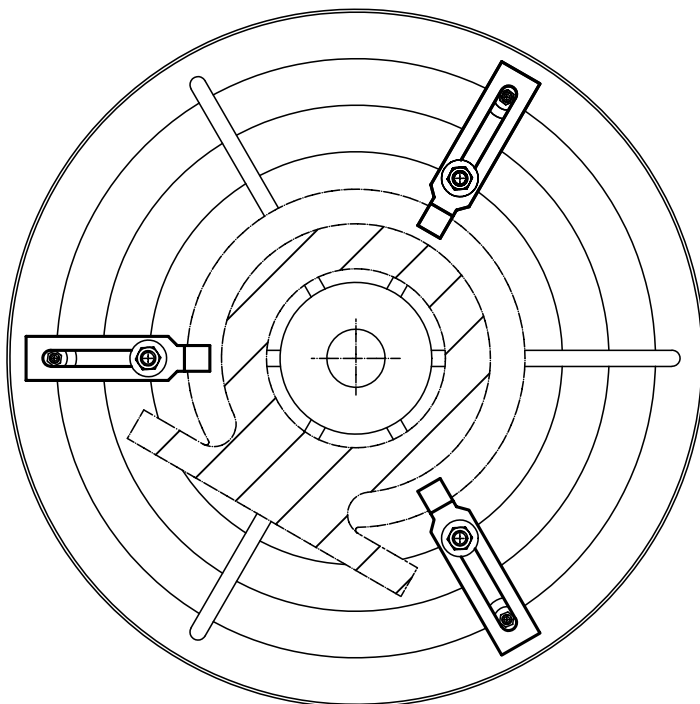
DRAWING



ORDER INFORMATION

Nominal dimension b_1 [mm]	l_1	a	Dimensions					For screws		[g]	Art. No.
			b_2	b_3	l_2	l_3	l_4	[mm]	[in]		
22	250	40	60	35	68	160	45	M20, M22	3/4	3025	23170.0022
	315	40	60	35	68	220	45	M20, M22	3/4	3810	23170.0023
26	250	40	70	43	83	140	56	M24	1	3639	23170.0026
	315	40	70	43	83	200	56	M24	1	4560	23170.0027
	500	50	70	43	83	370	56	M24	1	9483	23170.0029
33	315	50	80	50	88	200	56	M30	1 1/4	6242	23170.0030
	400	50	80	50	88	283	56	M30	1 1/4	7798	23170.0031

APPLICATION EXAMPLE



Clamps • with flat-faced ball, similar to DIN 6314
EH 23180.



PRODUCT DESCRIPTION

This clamp (clamping claw) according to DIN 6314 with flat-faced ball is mainly used in mechanical clamping technology for clamping workpieces.

Material

Ball

- Ball-bearing steel, hardened, bright

Clamp

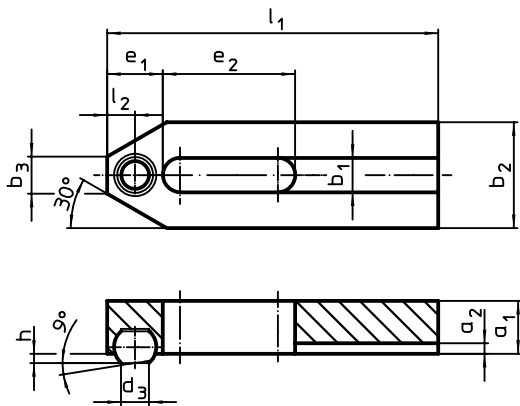
- Heat-treated steel, blackened

MORE INFORMATION

Notes

Ball protected against rotating.

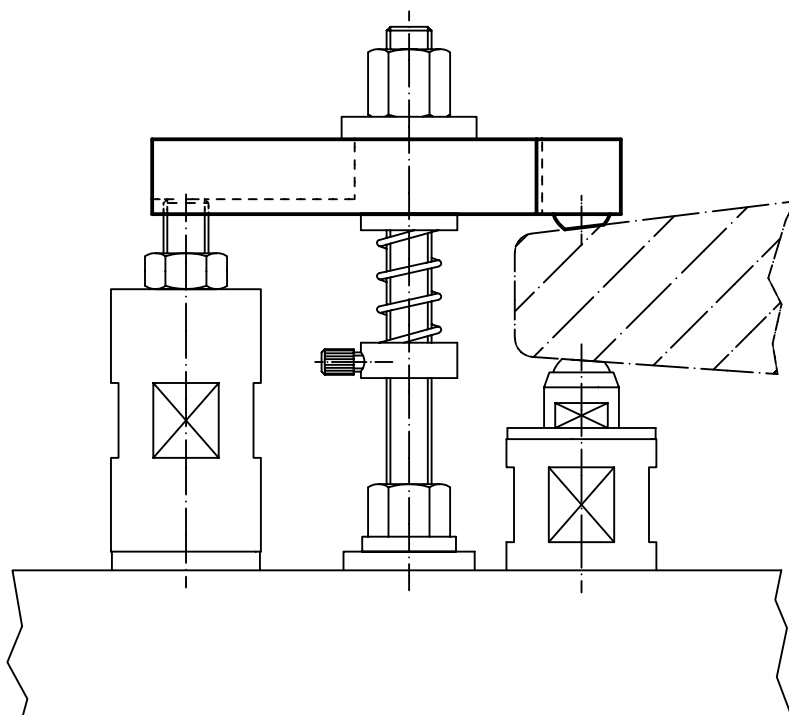
DRAWING



ORDER INFORMATION

Nominal dimension b_1 [mm]	Dimensions											Art. No.	
	l_1	d_3	a_1	a_2	b_2	b_3	e_1	e_2	h	l_2	ball diameter		
6.6	50	5.8	10	2.5	20	8	10	20	1.6	5.0	8.5	60	23180.0007
9.0	60	7.2	12	3.0	25	10	13	22	2.0	6.5	10.0	109	23180.0009
11.0	80	8.6	15	3.5	30	12	15	30	2.7	7.5	12.0	218	23180.0011
13.0	125	10.5	20	4.0	40	14	21	50	3.5	10.5	16.0	616	23180.0014

APPLICATION EXAMPLE



Clamps • with nose

EH 23180.



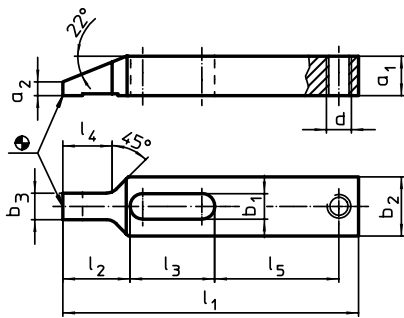
PRODUCT DESCRIPTION

This clamp (clamping claw) with nose is mainly used in mechanical clamping technology for clamping workpieces.

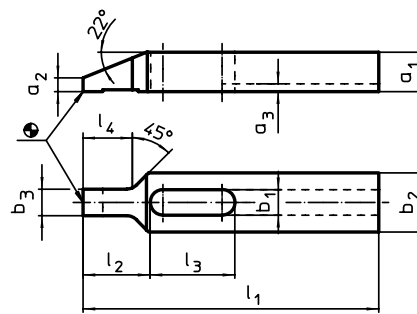
Material

- Heat-treated steel, tempered, blackened

DRAWING



picture 1

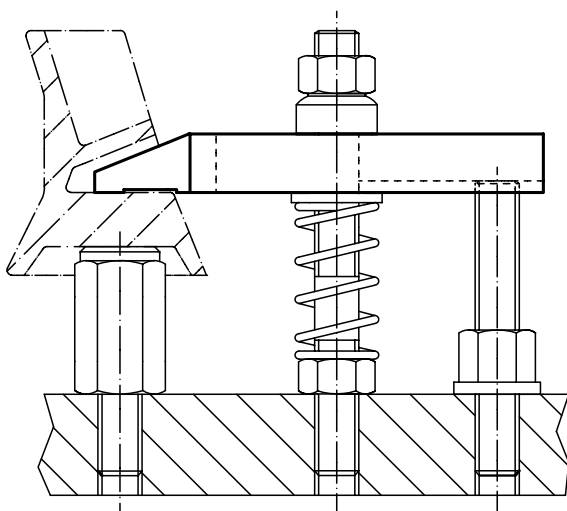


picture 2

ORDER INFORMATION

Nominal dimension b_1 [mm]	Dimensions											Art. No.	
	l_1	a_1	a_2	a_3	b_2	b_3	d	l_2	l_3	l_4	l_5		[g]
with thread for adjusting screw – picture 1													
6.6	80	8	2.5	–	15	7.5	M 6	17	23	13	34	54	23180.0107
9.0	100	12	4.0	–	20	9.5	M 8	22	29	17	42	133	23180.0109
11.0	125	15	5.0	–	25	11.5	M10	28	36	21	52	261	23180.0111
13.0	150	20	7.0	–	30	13.5	M12	34	43	25	63	504	23180.0113
17.0	175	25	9.0	–	35	15.5	M16	40	52	29	70	828	23180.0117
with keyway – picture 2													
6.6	80	8	2.5	2.5	15	7.5	–	17	23	13	–	50	23180.0207
9.0	100	12	4.0	3.0	20	9.5	–	22	29	17	–	127	23180.0209
11.0	125	15	5.0	3.5	25	11.5	–	28	36	21	–	251	23180.0211
13.0	150	20	7.0	4.0	30	13.5	–	34	43	25	–	488	23180.0213
17.0	175	25	9.0	4.5	35	15.5	–	40	52	29	–	812	23180.0217
22.0	225	35	15.5	5.5	50	19.5	–	52	62	33	–	2200	23180.0222
26.0	250	40	17.5	5.5	60	21.5	–	60	71	36	–	3340	23180.0226

APPLICATION EXAMPLE



Clamps • with soft face, similar to DIN 6314
EH 23190.



PRODUCT DESCRIPTION

This clamp (clamping claw) according to DIN 6314 with soft face is mainly used in mechanical clamping technology for clamping workpieces. The soft face protects the workpiece from damage. With the combination of nut DIN 6330 B (EH 23070.) / conical seat DIN 6319 G (EH 23050.) on the clamping bolt and thrust pad DIN 6311 (EH 22560. removable) on the adjusting screw compensates for the lack of parallelity. The clamp can be used either way (soft or hard clamping surface).

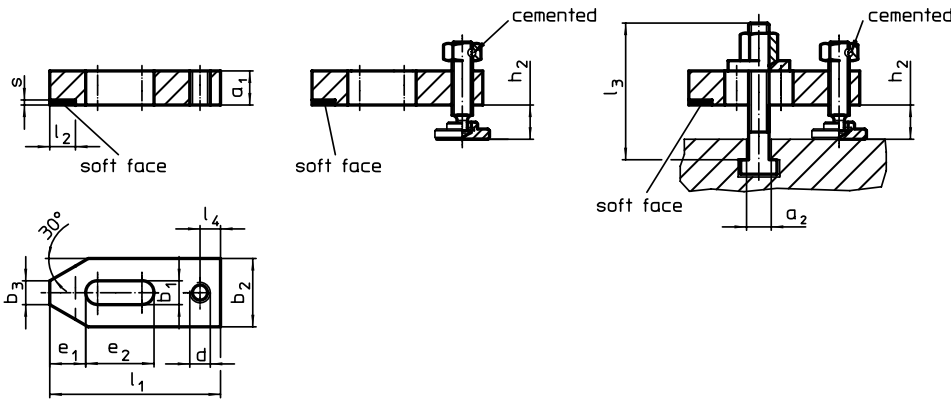
Material

- Soft face
 - Brass, brazed

Clamp

- Heat-treated steel, blackened

DRAWING



picture 1

picture 2

picture 3

ORDER INFORMATION

Nominal dimension b ₁	Dimensions													T-slot size	Clamping height		Art. No.
	a ₁	l ₃	a ₂	b ₂	b ₃	d	e ₁	e ₂	l ₁	l ₂ ±1	l ₄	s	h ₂ min.		h ₂ max.	[g]	
[mm]	[mm]													[mm]	[mm]		
without accessories – picture 1																	
9	12	-	-	25	10	M 8	13	22	60	10	8	2	-	-	-	111	23190.0010
11	15	-	-	30	12	M10	15	30	80	12	10	2	-	-	-	221	23190.0020
14	20	-	-	40	14	M12	21	40	100	15	12	3-0.5	-	-	-	478	23190.0030
18	25	-	-	50	18	M16	26	45	125	20	16	3-0.5	-	-	-	949	23190.0040
only with adjusting screw – picture 2																	
9	12	-	-	25	10	M 8	13	22	60	10	8	2	-	8	23	150	23190.0011
															43	160	23190.0012
11	15	-	-	30	12	M10	15	30	80	12	10	2	-	10	38	295	23190.0021
															58	310	23190.0022
14	20	-	-	40	14	M12	21	40	100	15	12	3-0.5	-	10	31	590	23190.0031
															71	620	23190.0032
18	25	-	-	50	18	M16	26	45	125	20	16	3-0.5	-	12	42	1150	23190.0041
															87	1220	23190.0042
with adjusting screw and clamping bolt – picture 3																	
9	12	50	7.6	25	10	M 8	13	22	60	10	8	2	8	8	16	200	23190.0015
		80	7.6	25	10	M 8	13	22	60	10	8	2	8	8	43	220	23190.0016
11	15	65	9.6	30	12	M10	15	30	80	12	10	2	10	10	22	385	23190.0025
		100	9.6	30	12	M10	15	30	80	12	10	2	10	10	58	420	23190.0026
14	20	80	11.6	40	14	M12	21	40	100	15	12	3-0.5	12	10	28	740	23190.0035
		125	11.6	40	14	M12	21	40	100	15	12	3-0.5	12	10	71	805	23190.0036
		80	13.6	40	14	M12	21	40	100	15	12	3-0.5	14	10	26	755	23190.0037
18	25	125	13.6	40	14	M12	21	40	100	15	12	3-0.5	14	10	71	820	23190.0038
		100	15.6	50	18	M16	26	45	125	20	16	3-0.5	16	12	31	1470	23190.0045
		160	15.6	50	18	M16	26	45	125	20	16	3-0.5	16	12	87	1630	23190.0046
18	25	100	17.6	50	18	M16	26	45	125	20	16	3-0.5	18	12	32	1490	23190.0047
		160	17.6	50	18	M16	26	45	125	20	16	3-0.5	18	12	87	1650	23190.0048

Clamps • with exchangeable soft jaw

EH 23190.



PRODUCT DESCRIPTION

This clamp (clamping claw) with exchangeable soft jaw is mainly used in mechanical clamping technology for clamping workpieces. The soft jaw made from brass or plastic protects the workpiece from damage.

Material

Soft jaw

- Brass
- Plastic

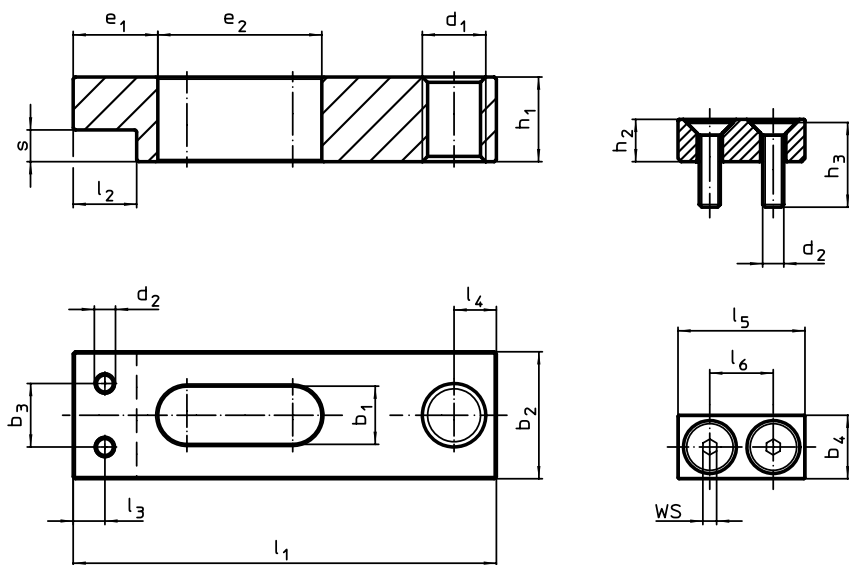
Clamp

- Heat-treated steel, blackened

Assembly

The soft jaws are mounted or disassembled with two screws. These are included in the scope of delivery.

DRAWING



picture 1

picture 2

ORDER INFORMATION

Nominal dimension b ₁ +0.5 [mm]	Dimensions																WS [mm]	Temperature		Weight [g]	Art. No.	
	l ₁	b ₂	b ₃	b ₄	d ₁	d ₂	e ₁	e ₂	h ₁	h ₂	h ₃	l ₂	l ₃	l ₄	l ₅	l ₆		s	min.			max.
	[mm]																	[°C]				
plain clamp without soft jaw – picture 1																						
5.5	40	12	6	–	M 6	M 2	8	15.5	8	–	–	6	3.0	4	–	–	3	–	–	–	21.0	23190.0050
7.0	50	16	9	–	M 6	M2,5	10	22.0	10	–	–	8	4.0	5	–	–	4	–	–	–	46.0	23190.0051
9.0	63	20	11	–	M 8	M 3	12	29.0	12	–	–	10	5.0	6	–	–	4	–	–	–	86.0	23190.0052
11.0	80	25	14	–	M10	M 4	15	36.0	16	–	–	13	6.5	8	–	–	6	–	–	–	183.0	23190.0053
14.0	100	32	16	–	M12	M 5	18	44.0	20	–	–	16	8.0	10	–	–	8	–	–	–	366.0	23190.0054
18.0	160	50	30	–	M16	M 8	30	63.0	30	–	–	28	14.0	16	–	–	12	–	–	–	1440.0	23190.0055
soft jaw from brass – picture 2																						
5.5	–	–	–	6	–	M 2	–	–	–	4	8	–	–	–	12	6	–	1.3	–	250	3.9	23190.0060
7.0	–	–	–	8	–	M2,5	–	–	–	6	10	–	–	–	16	9	–	1.5	–	250	7.8	23190.0061
9.0	–	–	–	10	–	M 3	–	–	–	6	12	–	–	–	20	11	–	2.0	–	250	11.0	23190.0062
11.0	–	–	–	13	–	M 4	–	–	–	9	16	–	–	–	25	14	–	2.5	–	250	26.0	23190.0063
14.0	–	–	–	16	–	M 5	–	–	–	12	20	–	–	–	32	16	–	3.0	–	250	53.0	23190.0064
18.0	–	–	–	28	–	M 8	–	–	–	16	30	–	–	–	50	30	–	5.0	–	250	187.0	23190.0065
soft jaw from plastic – picture 2																						
5.5	–	–	–	6	–	M 2	–	–	–	4	8	–	–	–	12	6	–	1.3	0	50	2.2	23190.0070
7.0	–	–	–	8	–	M2,5	–	–	–	6	10	–	–	–	16	9	–	1.5	0	50	3.4	23190.0071
9.0	–	–	–	10	–	M 3	–	–	–	6	12	–	–	–	20	11	–	2.0	0	50	4.0	23190.0072
11.0	–	–	–	13	–	M 4	–	–	–	9	16	–	–	–	25	14	–	2.5	0	50	7.7	23190.0073
14.0	–	–	–	16	–	M 5	–	–	–	12	20	–	–	–	32	16	–	3.0	0	50	14.0	23190.0074
18.0	–	–	–	28	–	M 8	–	–	–	16	30	–	–	–	50	30	–	5.0	0	50	49.0	23190.0075

**PRODUCT DESCRIPTION**

Supporting elements are used in combination with clamps.

Material

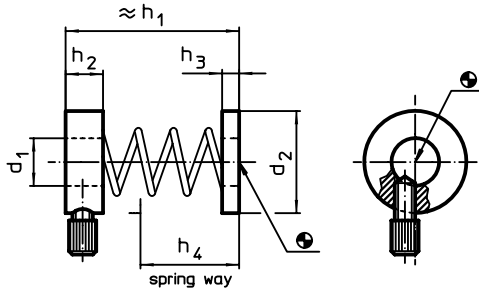
- Knurled screw**
- Brass

Rings

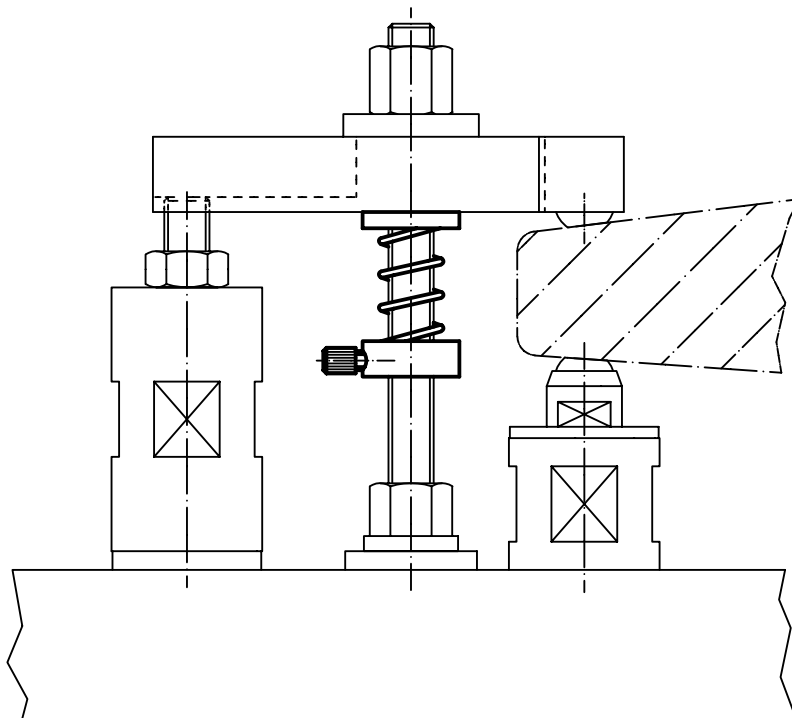
- Aluminium, highly refractory

Spring

- Stainless steel

DRAWING**ORDER INFORMATION**

Dimensions						For screw		Art. No.
d ₁	d ₂	h ₁	h ₂	h ₃	h ₄	[mm]	[g]	
[mm]								
8.5	24	35	11	5	14	M 6, M8	24	23200.0010
14.0	28	51	11	5	29	M10, M12	28	23200.0020
16.5	35	60	12	5	35	M16	44	23200.0030

APPLICATION EXAMPLE

Clamps • slotted, with adjustable counter piece

EH 23185.



PRODUCT DESCRIPTION

The thrust pad and the counter element are connected with the clamp and therefore secured against loss. Consequently, the clamp is quickly ready for use. The clamp is equipped with two flat noses and can be turned around depending on the case of application.

Material

- Steel, tempered, zinc-plated by galvanization

T-bolts DIN 787 (EH 23030.) or alternatively studs DIN 6379 (EH 23040.) can be used for the clamping.

MORE INFORMATION

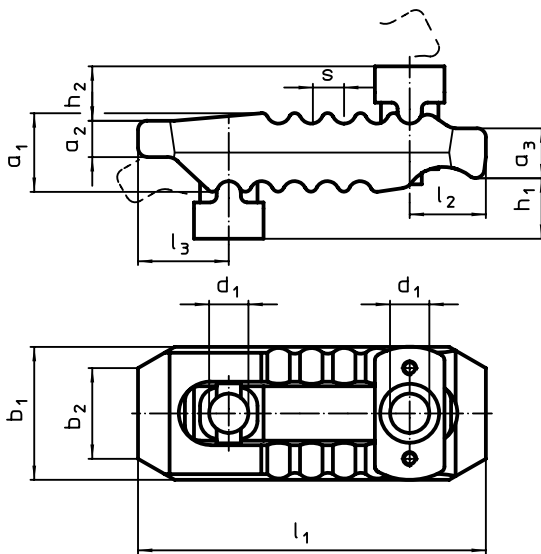
References

Larger clamping heights can be reached by the use of a support extension (EH 23185.).

Further products

Support Extensions, for straight clamps, slotted, with adjustable counter piece → p. 444

DRAWING



ORDER INFORMATION

Nominal dimension d ₁ [mm]	Dimensions											T-slot size [mm]	Clamping force ¹⁾ max. [kN]	[g]	Art. No.
	h ₁	h ₂	a ₁	a ₂	a ₃	b ₁	b ₂	l ₁	l ₂	l ₃	s				
13	0 – 55	18	27	12	17	44	30	115	25	30	11	10, 12, 14	30	650	23185.0013
17	0 – 70	20	36	17	21	55	41	150	35	36	12	12, 14, 16, 18	40	1382	23185.0017
21	0 – 80	30	42	20	27	62	30	187	44	44	14	16, 18, 20, 22	60	2241	23185.0021
25	0 – 100	31	51	24	34	70	30	235	60	47	17	20, 22, 24, 28	75	3479	23185.0025
		35	56	24	35	73	30	285	62	51	17	20, 22, 24, 28	75	4282	23185.0026

¹⁾ stated clamping forces in optimal clamping position (smallest distance of the socket head screw to the clamping position). Clamping forces can vary depending on clamping, strength class of the socket head screw and condition of the thread (lubrication).

3

Clamps • slotted, with adjustable counter piece, with T-bolt

EH 23185.



PRODUCT DESCRIPTION

The thrust pad and the counter element are connected with the clamp and therefore secured against loss. Consequently, the clamp is quickly ready for use. The clamp is equipped with two flat noses and can be turned around depending on the case of application.

Material

- Screw**
 - Heat-treated steel
- Nut**
 - Heat-treated steel
- Disc**
 - Heat-treated steel
- Clamp**
 - Steel, tempered, zinc-plated by galvanization

MORE INFORMATION

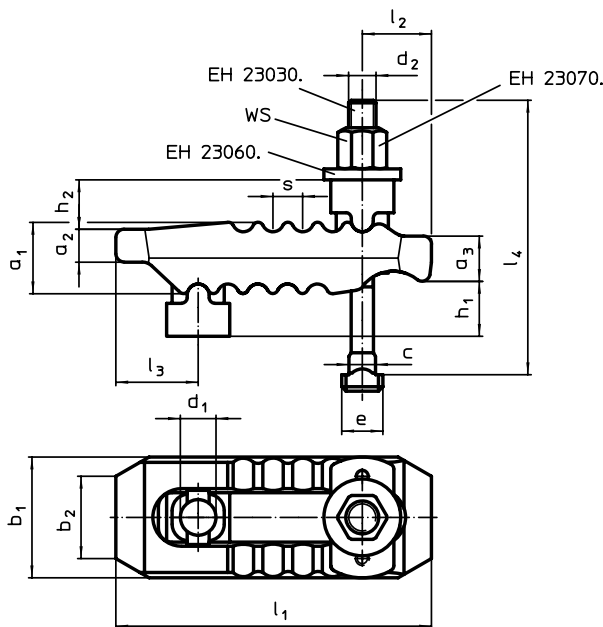
References

Larger clamping heights can be reached by the use of a support extension (EH 23185.).

Further products

Support Extensions, for straight clamps, slotted, with adjustable counter piece → p. 444

DRAWING



ORDER INFORMATION

Nominal dimension d ₁ [mm]	T-slot size [mm]	Dimensions															WS [mm]	Clamping force ¹⁾ max. [kN]	[g]	Art. No.
		d ₂	l ₄	h ₁	h ₂	a ₁	a ₂	a ₃	b ₁	b ₂	l ₁	l ₂	l ₃	e	c	s				
13	10	M10	100	0 – 40	18	27	12	17	44	30	115	25	30	15	9.6	11	16	25	660	23185.0110
	12	M12	125	0 – 55	18	27	12	17	44	30	115	25	30	18	11.6	11	18	30	821	23185.0112
	14	M12	125	0 – 55	18	27	12	17	44	30	115	25	30	18	11.6	11	18	30	841	23185.0113
17	12	M12	160	0 – 70	20	36	17	21	55	41	150	35	36	18	11.6	12	18	35	1683	23185.0114
	14	M12	160	0 – 70	20	36	17	21	55	41	150	35	36	22	13.6	12	18	35	1701	23185.0115
	16	M16	160	0 – 70	20	36	17	21	55	41	150	35	36	25	15.6	12	24	40	1850	23185.0116
21	18	M16	160	0 – 70	20	36	17	21	55	41	150	35	36	25	17.6	12	24	40	1895	23185.0117
	16	M16	200	0 – 80	30	42	20	27	62	30	187	44	44	25	15.6	14	24	55	2679	23185.0118
	18	M16	200	0 – 80	30	42	20	27	62	30	187	44	44	25	17.6	14	24	55	2703	23185.0119
	20	M20	200	0 – 80	30	42	20	27	62	30	187	44	44	32	19.6	14	30	60	2780	23185.0120
25	22	M20	200	0 – 80	30	42	20	27	62	30	187	44	44	32	21.6	14	30	60	3005	23185.0121
	20	M20	250	0 – 100	31	51	24	34	70	30	235	60	47	32	19.6	17	30	70	4420	23185.0122
	22	M20	250	0 – 100	31	51	24	34	70	30	235	60	47	32	21.6	17	30	70	4460	23185.0123
	24	M24	250	0 – 100	31	51	24	34	70	30	235	60	47	44	23.6	17	36	75	4900	23185.0124
	28	M24	250	0 – 100	31	51	24	34	70	30	235	60	47	44	27.7	17	36	75	5000	23185.0125

¹⁾ stated clamping forces in optimal clamping position (smallest distance of the socket head screw to the clamping position). Clamping forces can vary depending on clamping, strength class of the socket head screw and condition of the thread (lubrication).



Clamps • slotted, with adjustable counter piece, with stud

EH 23185.



PRODUCT DESCRIPTION

The thrust pad and the counter element are connected with the clamp and therefore secured against loss. Consequently, the clamp is quickly ready for use. The clamp is equipped with two flat noses and can be turned around depending on the case of application.

Material

Screw

- Heat-treated steel

Nut

- Heat-treated steel

Disc

- Heat-treated steel

Clamp

- Steel, tempered, zinc-plated by galvanization

MORE INFORMATION

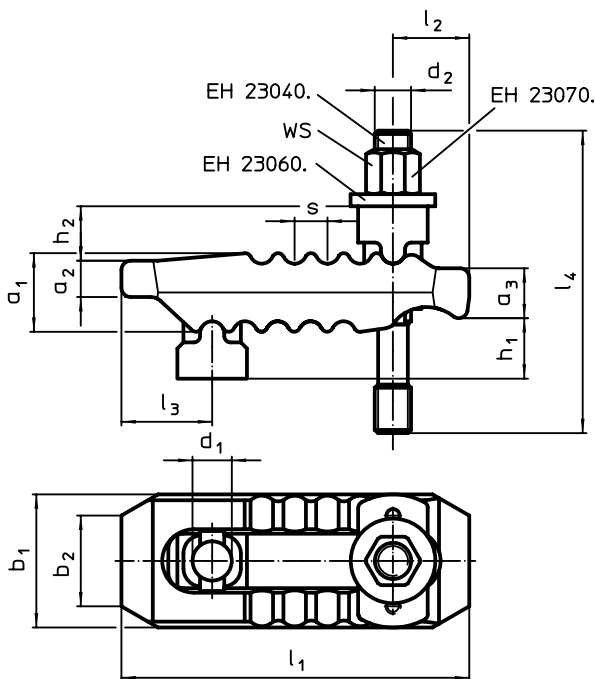
References

Larger clamping heights can be reached by the use of a support extension (EH 23185.).

Further products

Support Extensions, for straight clamps, slotted, with adjustable counter piece → p. 444

DRAWING



ORDER INFORMATION

Nominal dimension d ₁ [mm]		Dimensions												WS [mm]	Clamping force ¹⁾ max. [kN]	[g]	Art. No.
		d ₂	l ₄	h ₁	h ₂	a ₁	a ₂	a ₃	b ₁	b ₂	l ₁	l ₂	l ₃				
13	M12	100	0 – 30	18	27	12	17	44	30	115	25	30	11	18	30	789	23185.0212
		125	0 – 55	18	27	12	17	44	30	115	25	30	11	18	30	803	23185.0213
17	M12	125	0 – 50	20	36	17	21	55	41	150	35	36	12	18	40	1599	23185.0214
		160	0 – 70	20	36	17	21	55	41	150	35	36	12	18	40	1623	23185.0215
	M16	125	0 – 40	20	36	17	21	55	41	150	35	36	12	24	40	1731	23185.0216
21	M16	160	0 – 70	20	36	17	21	55	41	150	35	36	12	24	40	1779	23185.0217
		160	0 – 40	30	42	20	27	62	30	187	44	44	14	24	60	2512	23185.0218
	M20	200	0 – 80	30	42	20	27	62	30	187	44	44	14	24	60	2621	23185.0219
		160	0 – 40	30	42	20	27	62	30	187	44	44	14	30	60	2749	23185.0220
25	M20	200	0 – 80	30	42	20	27	62	30	187	44	44	14	30	60	2831	23185.0221
		200	0 – 70	31	51	24	34	70	30	235	60	47	17	30	75	4220	23185.0222
		250	0 – 100	31	51	24	34	70	30	235	60	47	17	30	75	4320	23185.0223
	M24	200	0 – 50	31	51	24	34	70	30	235	60	47	17	36	75	4540	23185.0224
		250	0 – 100	31	51	24	34	70	30	235	60	47	17	36	75	4680	23185.0225

¹⁾ stated clamping forces in optimal clamping position (smallest distance of the socket head screw to the clamping position). Clamping forces can vary depending on clamping, strength class of the socket head screw and condition of the thread (lubrication).

Clamps • slotted, with adjustable counter piece, with stud with internal hexagon
EH 23185.



PRODUCT DESCRIPTION

The thrust pad and the counter element are connected with the clamp and therefore secured against loss. Consequently, the clamp is quickly ready for use. The clamp is equipped with two flat noses and can be turned around depending on the case of application.

Material

- Screw**
 - Heat-treated steel
- Nut**
 - Heat-treated steel
- Disc**
 - Heat-treated steel
- Clamp**
 - Steel, tempered, zinc-plated by galvanization

Assembly

The internal hexagon in the stud enables quick assembly and disassembly.

MORE INFORMATION

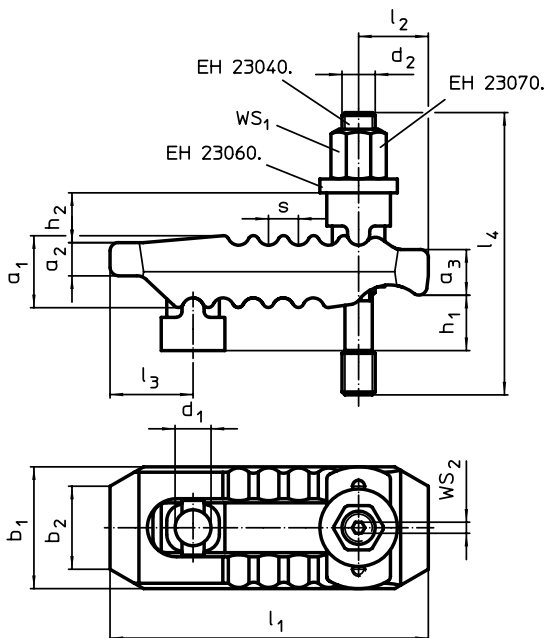
References

Larger clamping heights can be reached by the use of a support extension (EH 23185.).

Further products

Support Extensions, for straight clamps, slotted, with adjustable counter piece → p. 444

DRAWING



ORDER INFORMATION

Nominal dimension d ₁ [mm]	d ₂	l ₄	h ₁	h ₂	a ₁	Dimensions							WS ₁ [mm]	WS ₂ [mm]	Clamping force ¹⁾ max. [kN]	[g]	Art. No.	
						a ₂	a ₃	b ₁	b ₂	l ₁	l ₂	l ₃						s
13	M12	100	0 – 30	18	27	12	17	44	30	115	25	30	11	18	4	30	1700	23185.0312
		125	0 – 55	18	27	12	17	44	30	115	25	30	11	18	4	30	800	23185.0313
17	M12	125	0 – 50	20	36	17	21	55	41	150	35	36	12	18	4	40	1632	23185.0314
		160	0 – 70	20	36	17	21	55	41	150	35	36	12	18	4	40	1659	23185.0315
	M16	125	0 – 40	20	36	17	21	55	41	150	35	36	12	24	4	40	1766	23185.0316
		160	0 – 70	20	36	17	21	55	41	150	35	36	12	24	4	40	1812	23185.0317
21	M16	160	0 – 40	30	42	20	27	62	30	187	44	44	14	24	4	60	2578	23185.0318
		200	0 – 80	30	42	20	27	62	30	187	44	44	14	24	4	60	2629	23185.0319
	M20	160	0 – 40	30	42	20	27	62	30	187	44	44	14	30	5	60	2758	23185.0320
		200	0 – 80	30	42	20	27	62	30	187	44	44	14	30	5	60	2836	23185.0321
25	M20	200	0 – 70	31	51	24	34	70	30	235	60	47	17	30	5	75	4180	23185.0322
		250	0 – 100	31	51	24	34	70	30	235	60	47	17	30	5	75	4361	23185.0323
	M24	200	0 – 50	31	51	24	34	70	30	235	60	47	17	36	5	75	4500	23185.0324
		250	0 – 100	31	51	24	34	70	30	235	60	47	17	36	5	75	4650	23185.0325

¹⁾ stated clamping forces in optimal clamping position (smallest distance of the socket head screw to the clamping position). Clamping forces can vary depending on clamping, strength class of the socket head screw and condition of the thread (lubrication).



Support Extensions • for straight clamps, slotted, with adjustable counter piece

EH 23185.



PRODUCT DESCRIPTION

The support extension is screwed on the counter piece of the clamp EH 23185. for an extension of the clamping height (dimension h_2). The clamping height can be adjusted steplessly by means of the support extension.

Material

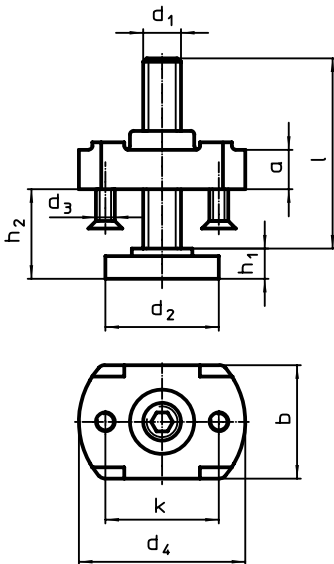
Body

- Steel, tempered, zinc-plated by galvanization

Supporting bolt

- Heat-treated steel, quality 8.8, black

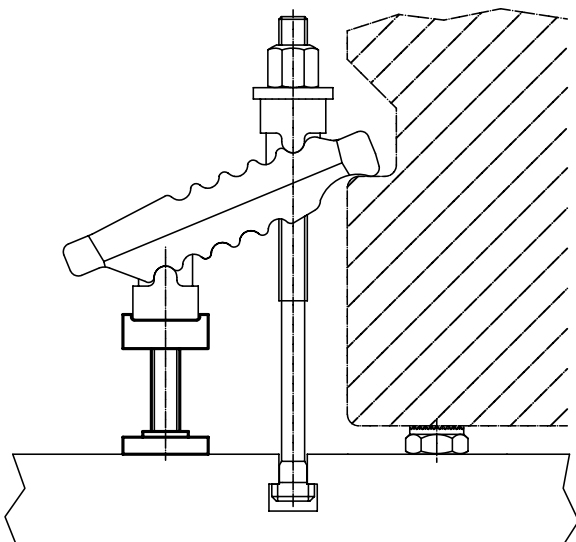
DRAWING



ORDER INFORMATION

d ₁	l	d ₂	d ₃	Dimensions						for clamps d ₁ [mm]	[g]	Art. No.
				d ₄	h ₁	h ₂	a	b	k			
[mm]												
M10	39	30	M5	44	8	8 – 30	10	30	30	13	148	23185.0410
	49	36	M5	54	10	10 – 37	16	42	35	17	345	23185.0412
M12	94	36	M5	54	10	10 – 80	16	42	35	17	473	23185.0413
	55	42	M5	60	13	13 – 41	20	50	40	21	494	23185.0416
M16	90	42	M5	60	13	13 – 73	20	50	40	21	640	23185.0417
	69	50	M6	70	16	16 – 52	25	46	50	25	925	23185.0420
M20	109	50	M6	70	16	16 – 91	25	46	50	25	1001	23185.0421

APPLICATION EXAMPLE



Clamping Element Systems

EH 23700.



PRODUCT DESCRIPTION

Material

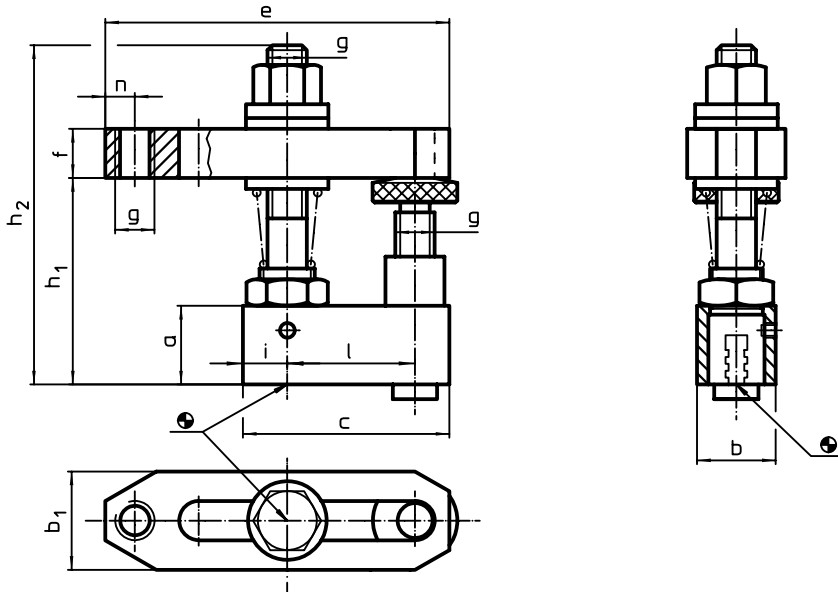
- Body**
 - Steel, blackened
- Wearing parts**
 - Heat-treated steel
- Pull-rod**
 - Special steel

MORE INFORMATION

Further products

- Straight Clamps, long → p. 447
- Intermediate Elements → p. 448
- Intermediate Elements, with support... → p. 449
- Base Elements → p. 450
- Base Elements, swivelling → p. 451
- Base Elements, low → p. 452
- Base Elements, for location hole → p. 453

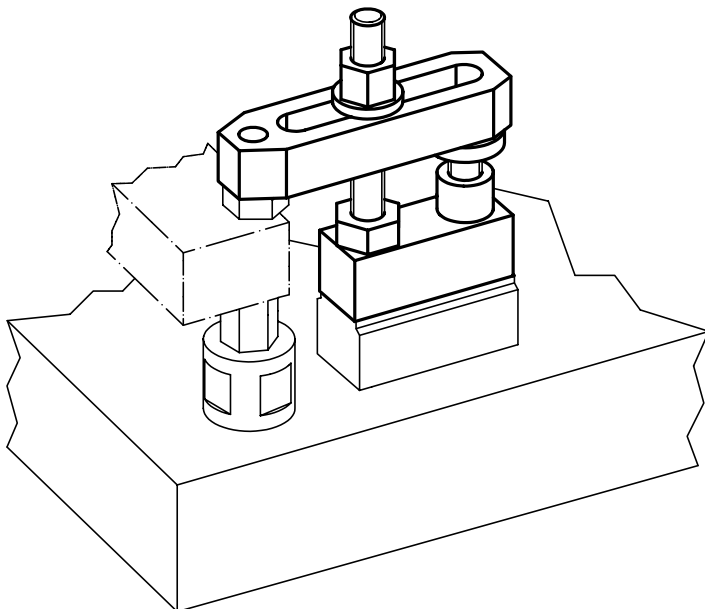
DRAWING



ORDER INFORMATION

Dimensions												[g]	Art. No.
a	b	c	b ₁	e	f	g	h ₁	h ₂	i	l	n		
25	25	65	35	110	20	M12	48 – 78	112	12.5	40	10	870	23700.0012
30	30	78	40	142	30	M16	60 – 96	145	14.0	50	13	1703	23700.0016

APPLICATION EXAMPLE



Straight Clamps • short

EH 23700.

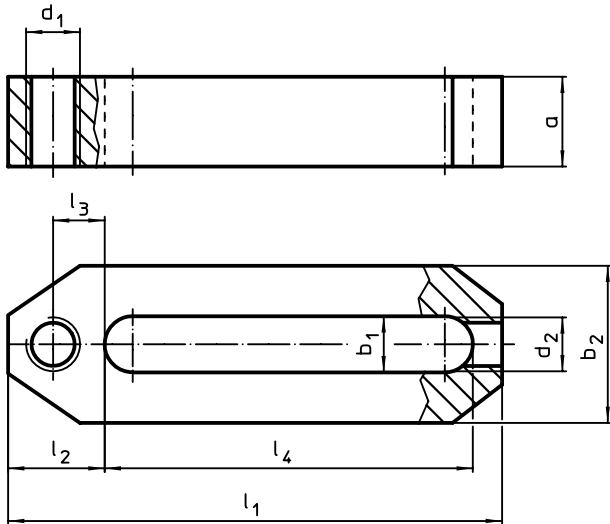


PRODUCT DESCRIPTION

Material

- Heat-treated steel, tempered, blackened

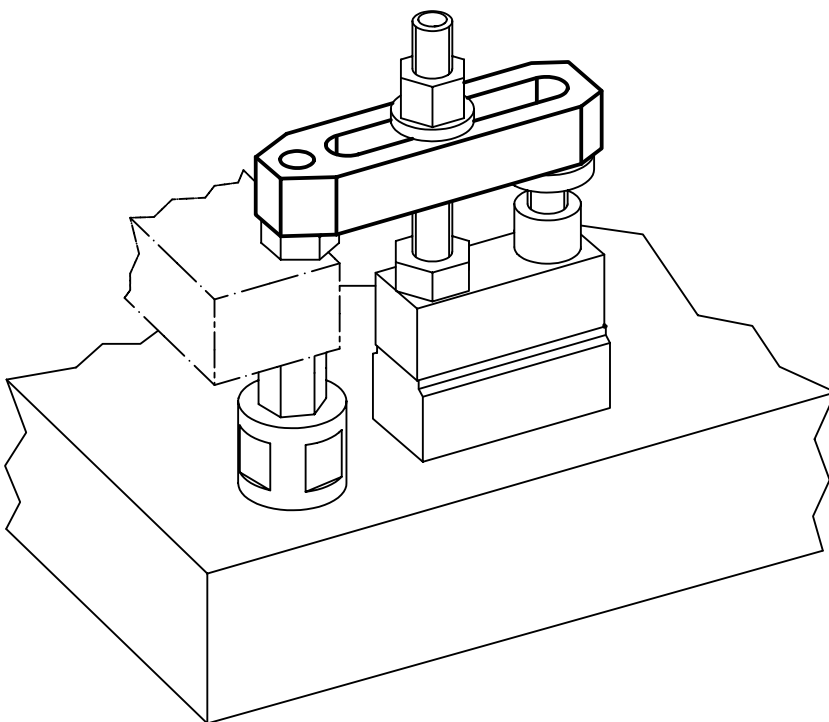
DRAWING



ORDER INFORMATION

Dimensions									Art. No.	
b_1	l_1	a	b_2	d_1 [mm]	d_2	l_2	l_3	l_4		[g]
12.5	110	20	35	M12	M10	21.5	11.5	82	370	23700.0022
17.0	142	30	40	M16	M12	28.0	15.0	107	781	23700.0026

APPLICATION EXAMPLE



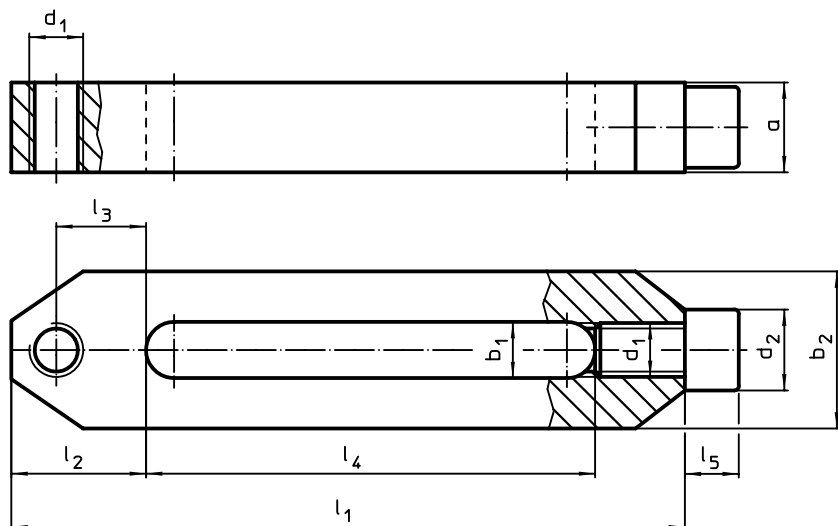


PRODUCT DESCRIPTION

Material

- Heat-treated steel, tempered, blackened

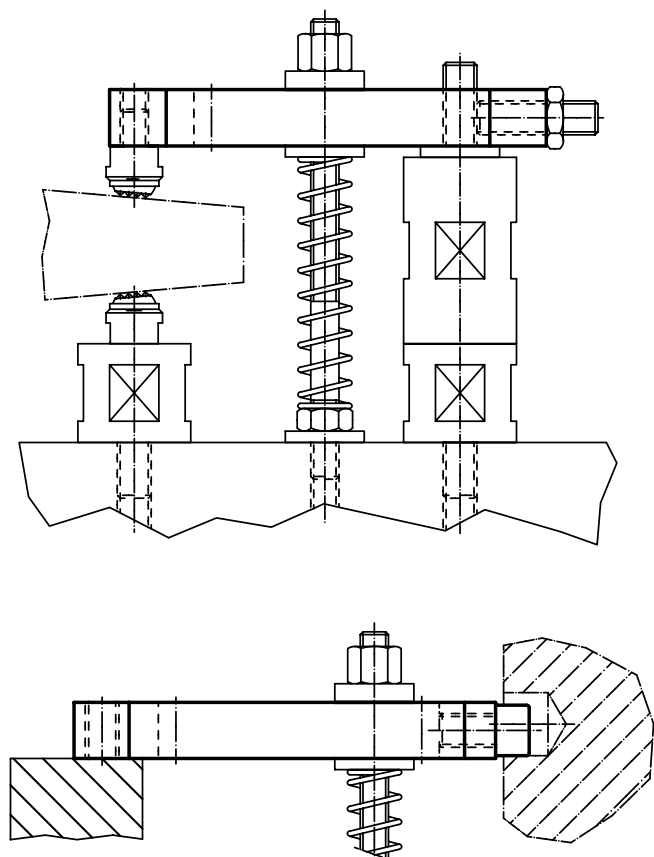
DRAWING



ORDER INFORMATION

Dimensions											Art. No.
b ₁	l ₁	a	b ₂	d ₁	l ₂	l ₃	l ₄	l ₅	d ₂	[g]	
12.5	156	20	35.0	M12	30	20	106	12	18	601	23700.0042
17.0	196	30	45.5	M16	35	22	136	16	24	1430	23700.0046

APPLICATION EXAMPLE



Intermediate Elements

EH 23700.



PRODUCT DESCRIPTION

Material

Body

- Steel, blackened

Wearing parts

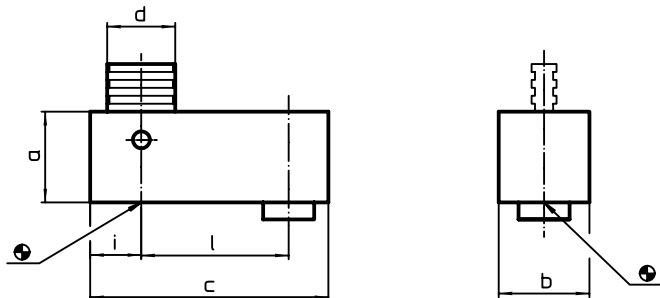
- Heat-treated steel

Pull-rod


- Special steel

3

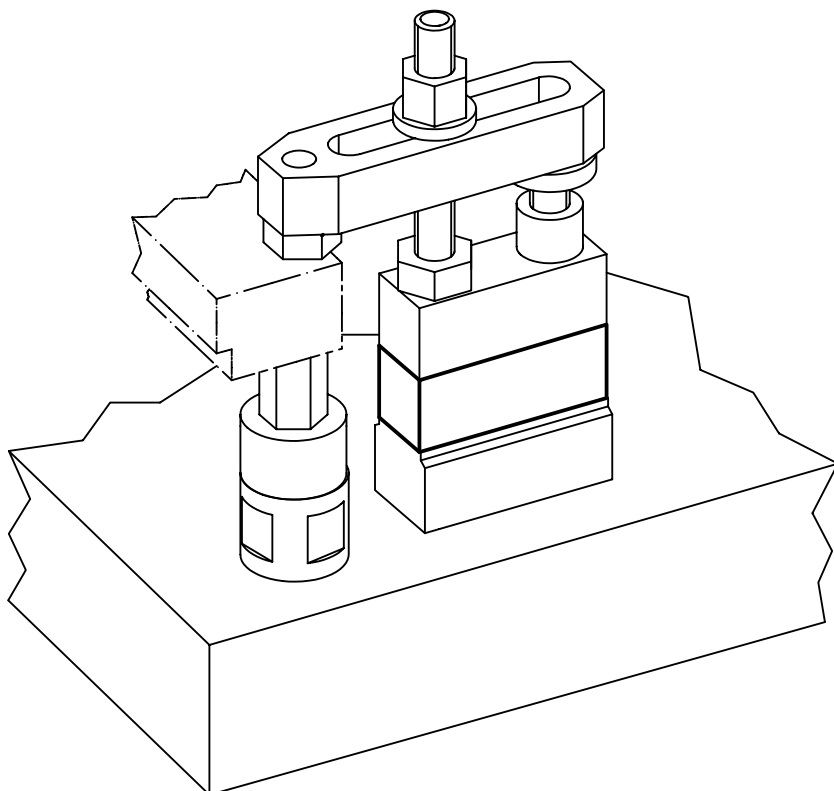
DRAWING



ORDER INFORMATION

a	b	Dimensions				i	l	 [g]	Art. No.
		c	d	[mm]					
25	25	65	16			12.5	40	261	23700.0121
50	25	65	16			12.5	40	580	23700.0122
100	25	65	16			12.5	40	1201	23700.0123
30	30	78	22			14.0	50	468	23700.0161
60	30	78	22			14.0	50	1032	23700.0162
120	30	78	22			14.0	50	2149	23700.0163
240	30	78	22			14.0	50	4340	23700.0164

APPLICATION EXAMPLE



**PRODUCT DESCRIPTION****Material****Body**

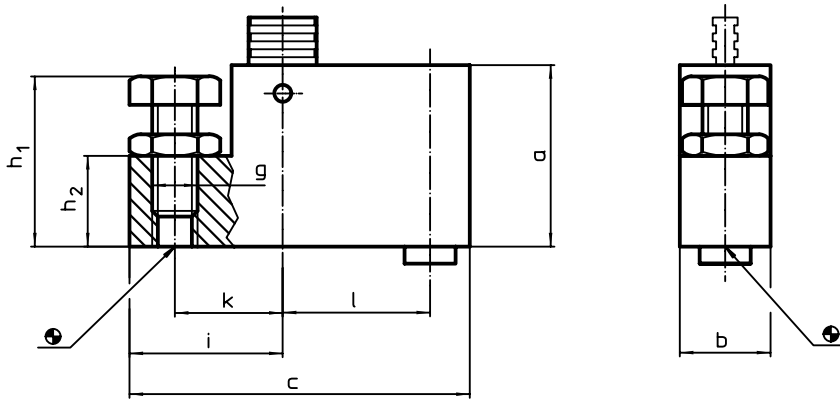
- Steel, blackened

Wearing parts

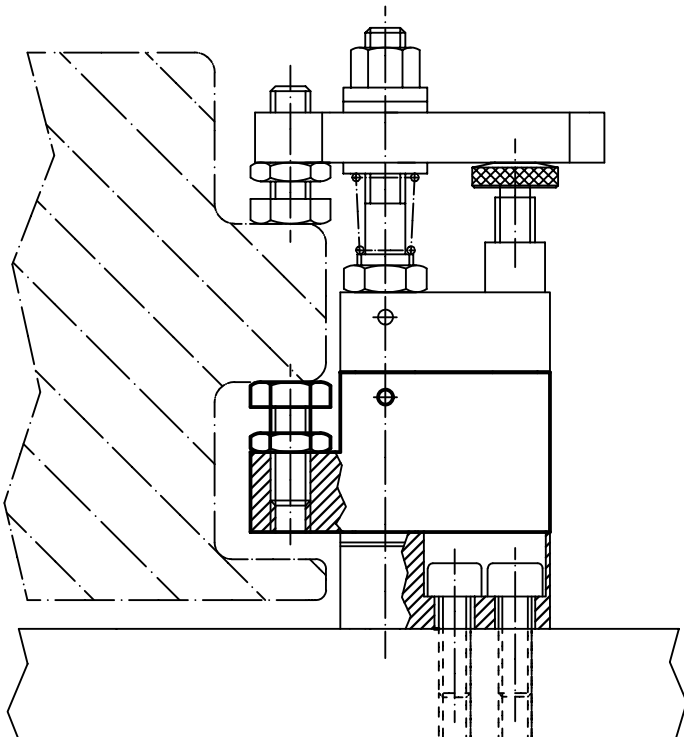
- Heat-treated steel

Pull-rod

- Special steel

DRAWING**ORDER INFORMATION**

Dimensions										Art. No.
a	b	c	g	h ₁	h ₂	i	k	l	[g]	
50	25	92	M12	38 – 53	25	39.5	28	40	733	23700.0212
60	30	112	M16	48 – 68	30	48.0	34	50	1331	23700.0216

APPLICATION EXAMPLE

Base Elements

EH 23700.



PRODUCT DESCRIPTION

Material

Body

- Steel, blackened

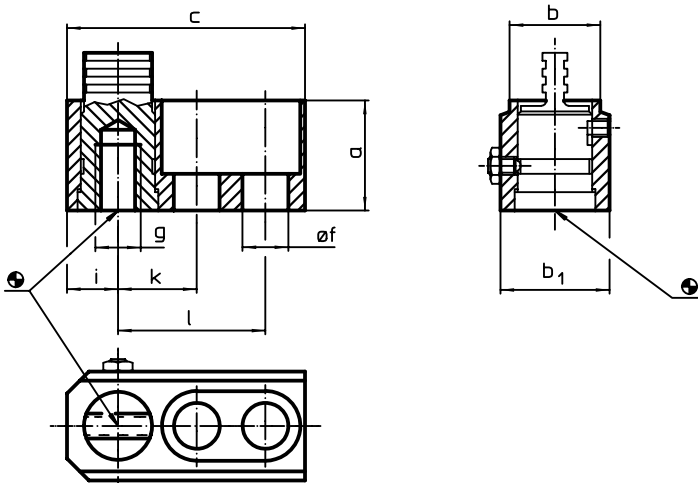
Wearing parts

- Heat-treated steel

Pull-rod

- Special steel

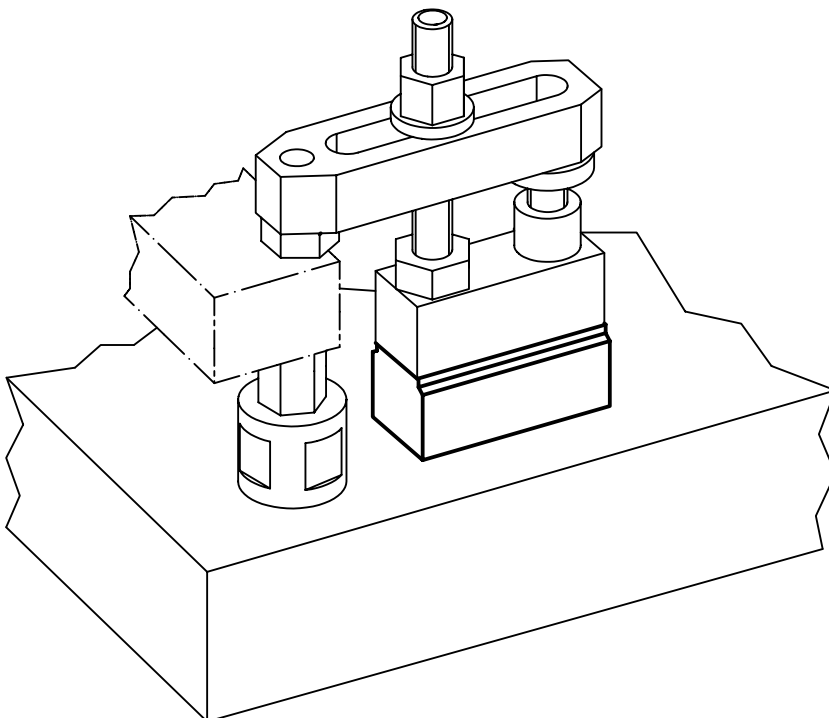
DRAWING



ORDER INFORMATION

Dimensions									📦 [g]	Art. No.
a	b	c	b ₁	f [mm]	g	i	k	l		
30	25	65	30	12.5	M12	12.5	20	40	297	23700.0312
40	30	80	40	17.0	M16	16.0	25	50	641	23700.0316

APPLICATION EXAMPLE



**PRODUCT DESCRIPTION****Material**

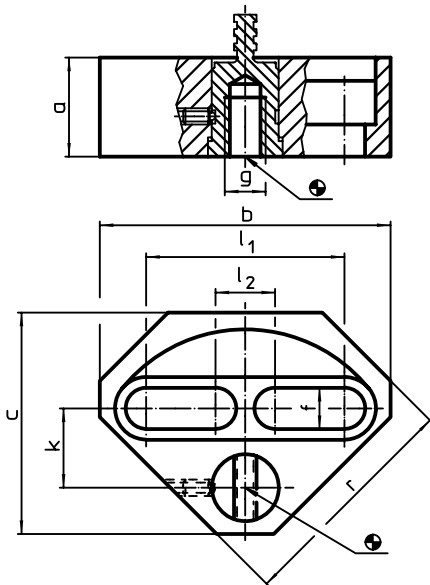
- Body**
- Steel, blackened

Wearing parts

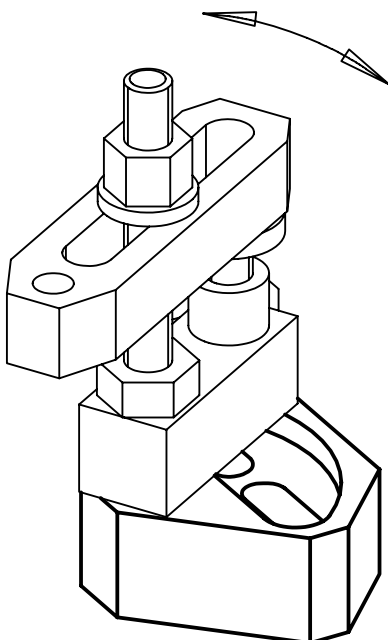
- Heat-treated steel

Pull-rod

- Special steel

DRAWING**ORDER INFORMATION**

Dimensions										Art. No.
a	b	c	f	g	k	l ₁	l ₂	r		
[mm]										[g]
29.7	90	70	12.5	M12	24	57	25	73	758	23700.0412
39.7	110	86	17.0	M16	30	71	31	90	1507	23700.0416

APPLICATION EXAMPLE

Base Elements • low

EH 23700.



PRODUCT DESCRIPTION

Material

Body

- Steel, blackened

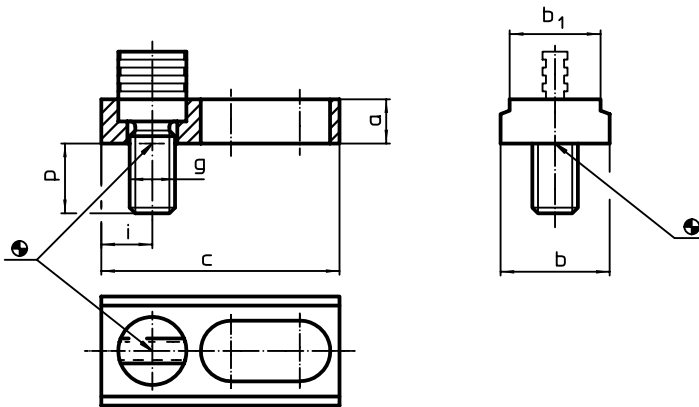
Wearing parts

- Heat-treated steel

Pull-rod

- Special steel

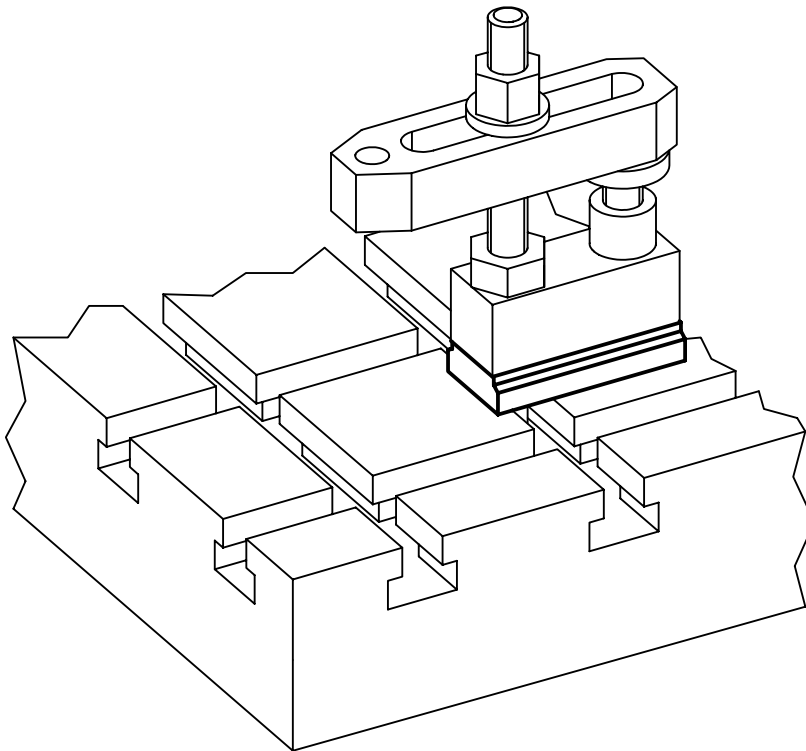
DRAWING



ORDER INFORMATION

Dimensions							Art. No.
a	b	c	b ₁ [mm]	g	i	p	
12	30	65	25	M12	12.5	23	146

APPLICATION EXAMPLE



Base Elements • for location hole
EH 23700.



PRODUCT DESCRIPTION

Material

- Body**
- Steel, blackened

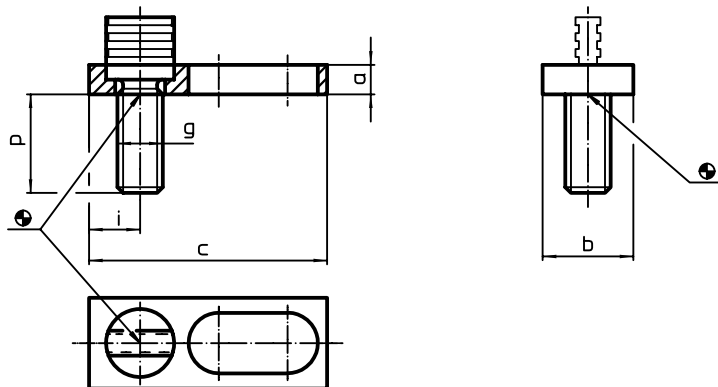
Wearing parts

- Heat-treated steel

Pull-rod

- Special steel

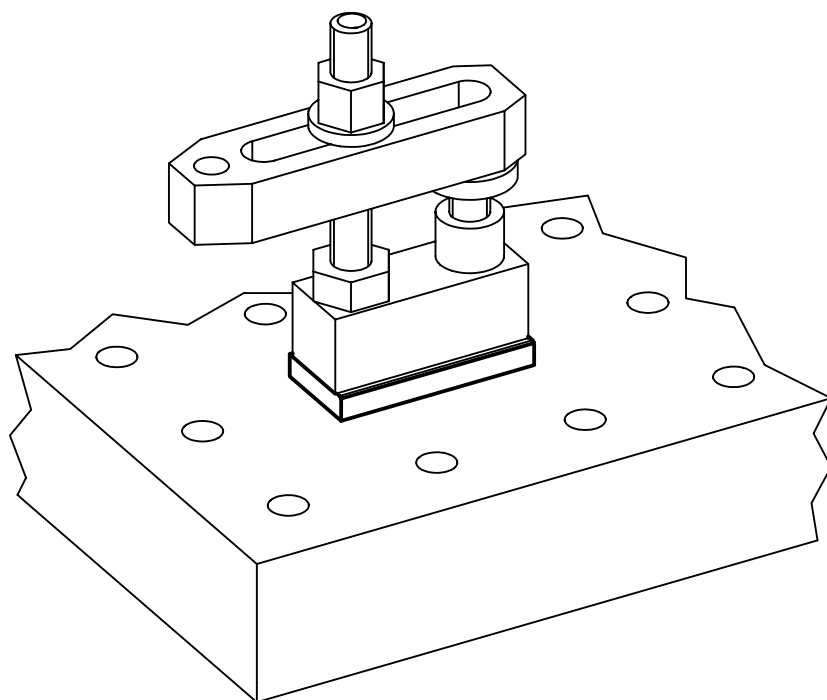
DRAWING



ORDER INFORMATION

Dimensions						Art. No.
a	b	c	g	i	p	
8	25	65	M12	12.5	27	23700.0712
12	30	78	M16	14.0	33	23700.0716

APPLICATION EXAMPLE



Down-Hold Clamps • with cranked tension lever

EH 23210.



PRODUCT DESCRIPTION

The quick-acting clamping element simultaneously presses the workpieces towards both, the stops and fixture plate. The low profile construction enables the entire surface to be machined. In conjunction with cylindrical stops EH 23280., a special fixture can be replaced.

Material

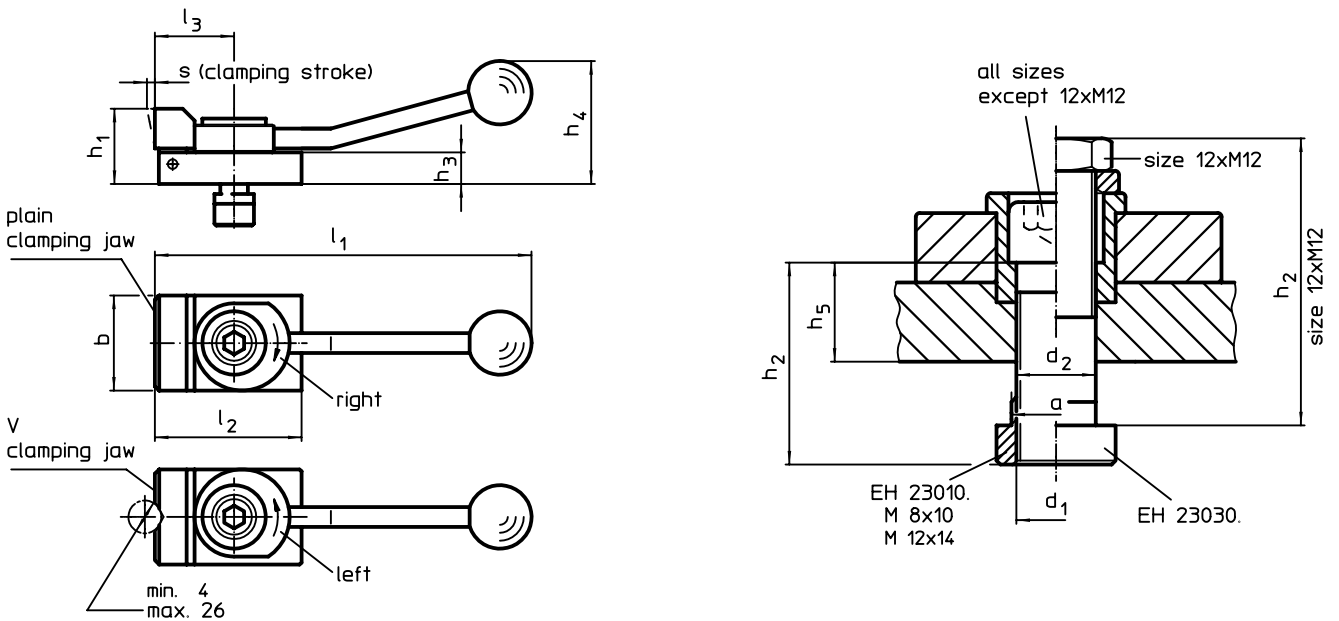
- Steel, case-hardened, blackened

MORE INFORMATION

Further products

Stops, cylindrical → p. 473

DRAWING



ORDER INFORMATION

T-slot size	Dimensions														Clamping force horizontal max.	Art. No.
	d ₁	a	b	d ₂	h ₁	h ₂	h ₃	h ₄	h ₅	l ₁	l ₂	l ₃	s	[mm]		
[mm]	[mm]														[kN]	
with flat clamping jaw, clamping to the right																
10	M 8	9.6	32	8.4	20	30	8	40	12.6	132	50	32	3	3.5	266	23210.0101
12	M12	11.6	48	12.5	38	63	16	62	–	190	72	40	4	7.0	880	23210.0321
14	M12	13.6	48	12.5	38	40	16	62	19.1	190	72	40	4	7.0	858	23210.0341
with flat clamping jaw, clamping to the left																
10	M 8	9.6	32	8.4	20	30	8	40	12.6	132	50	32	3	3.5	265	23210.0105
12	M12	11.6	48	12.5	38	63	16	62	–	190	72	40	4	7.0	868	23210.0325
14	M12	13.6	48	12.5	38	40	16	62	19.1	190	72	40	4	7.0	860	23210.0345
with V-clamping jaw, clamping to the right																
10	M 8	9.6	32	8.4	20	30	8	40	12.6	132	50	32	3	3.5	264	23210.0102
12	M12	11.6	48	12.5	38	63	16	62	–	190	72	40	4	7.0	889	23210.0322
14	M12	13.6	48	12.5	38	40	16	62	19.1	190	72	40	4	7.0	838	23210.0342
with V-clamping jaw, clamping to the left																
10	M 8	9.6	32	8.4	20	30	8	40	12.6	132	50	32	3	3.5	263	23210.0106
12	M12	11.6	48	12.5	38	63	16	62	–	190	72	40	4	7.0	900	23210.0326
14	M12	13.6	48	12.5	38	40	16	62	19.1	190	72	40	4	7.0	841	23210.0346

Down-Hold Clamps • without clamping lever

EH 23210.



PRODUCT DESCRIPTION

By tightening the ball-ended thrust screw the workpiece is simultaneously pressed towards the stops and fixture plate. The favourable leverage enables high horizontal clamping forces. When using T-Nuts EH 23010. / EH 23020. (DIN 508) they can also be applied to other slot sizes.

Material

- Steel, case-hardened, blackened, ground

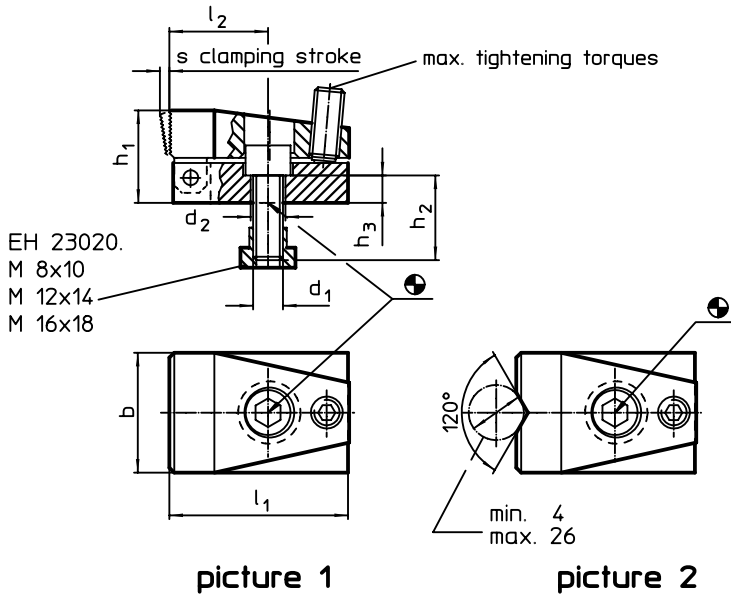
MORE INFORMATION

Further products

Nuts for T-Slots, DIN 508 → p. 384

Nuts for T-Slots, extended..... → p. 388

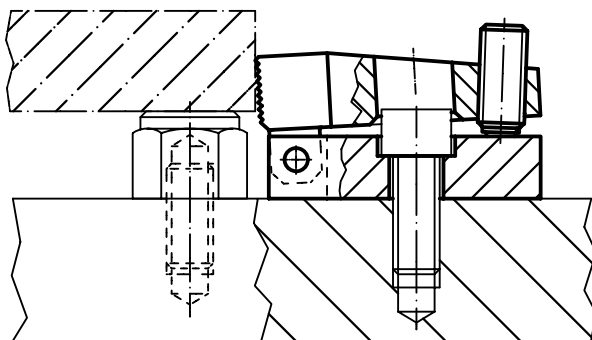
DRAWING



ORDER INFORMATION

T-slot size	Dimensions									Clamping force horizontal max.	Tightening torque max.	Art. No.	
	d ₁	d ₂	b	h ₁	h ₂	h ₃	l ₁	l ₂	s				
[mm]	[mm]									[kN]	[Nm]	[g]	
with flat clamping jaw – picture 1													
10	M 8	8.4	32	24	20	8	52	28	3	7.0	3	265	23210.0501
14	M12	12.5	48	37	30	11	72	40	4	15.0	9	838	23210.0521
18	M16	16.5	68	47	35	13	86	41	7	21.5	20	1760	23210.0541
with V-clamping jaw – picture 2													
10	M 8	8.4	32	24	20	8	52	28	3	7.0	3	266	23210.0502
14	M12	12.5	48	37	30	11	72	40	4	15.0	9	829	23210.0522
18	M16	16.5	68	47	35	13	86	41	7	21.5	20	1730	23210.0542

APPLICATION EXAMPLE



Down-Hold Clamps • without clamping lever, with support

EH 23210.



PRODUCT DESCRIPTION

By tightening the ball-ended thrust screw the workpiece is simultaneously pressed towards the stops and fixture plate. The favourable leverage enables high horizontal clamping forces. When using T-Nuts EH 23010. / EH 23020. (DIN 508) they can also be applied to other slot sizes.

Material

- Steel, case-hardened, blackened, ground

rest buttons EH 22690., self-aligning pads EH 22730. / EH 22740.

MORE INFORMATION

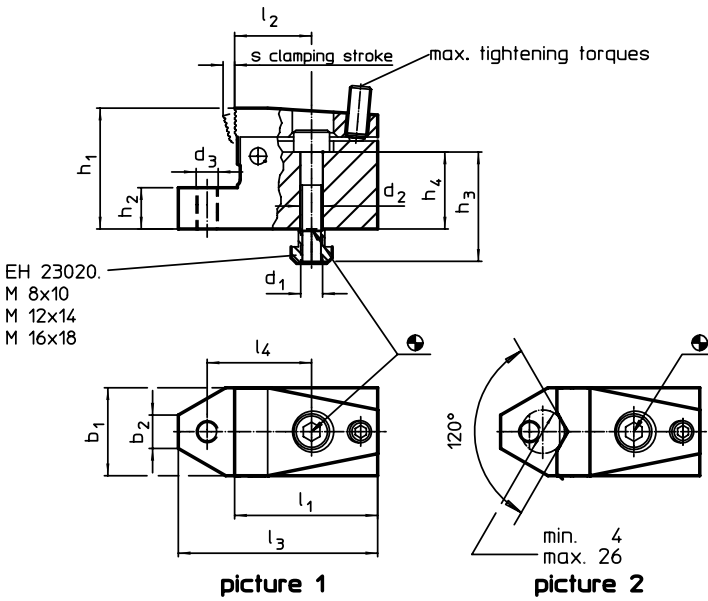
References

The integrated support is equipped with a locating thread to fit for example screwed

Further products

- Nuts for T-Slots, DIN 508 → p. 384
- Nuts for T-Slots, extended → p. 388

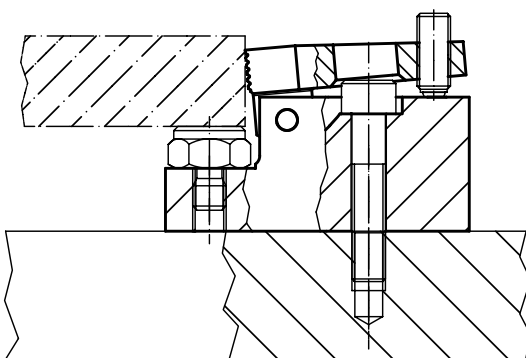
DRAWING



ORDER INFORMATION

T-slot size	Dimensions														Clamping force horizontal max.	Tightening torque max.	Weight	Art. No.
	d ₁	d ₂	d ₃	b ₁	b ₂	h ₁	h ₂ ±0.01	h ₃ ~	h ₄ ~	l ₁	l ₂	l ₃	l ₄	s				
[mm]	[mm]																	
with flat clamping jaw – picture 1																		
10	M 8	8.4	M 8	32	12.1	44	15	40	28	52	28	72.5	38	3	7.0	3	566	23210.0551
14	M 12	13.0	M 12	48	16.0	53	15	45	27	72	40	100.0	55	4	15.0	9	1349	23210.0561
18	M 16	17.0	M 16	68	18.8	72	20	60	38	86	41	126.0	63	7	21.5	20	3000	23210.0571
with V-clamping jaw – picture 2																		
10	M 8	8.4	M 8	32	12.1	44	15	40	28	52	28	72.5	38	3	7.0	3	571	23210.0552
14	M 12	13.0	M 12	48	16.0	53	15	45	27	72	40	100.0	55	4	15.0	9	1340	23210.0562
18	M 16	17.0	M 16	68	18.8	72	20	60	38	86	41	126.0	63	7	21.5	20	3000	23210.0572

APPLICATION EXAMPLE



Holding Plates • for down-hold clamps

EH 23210.



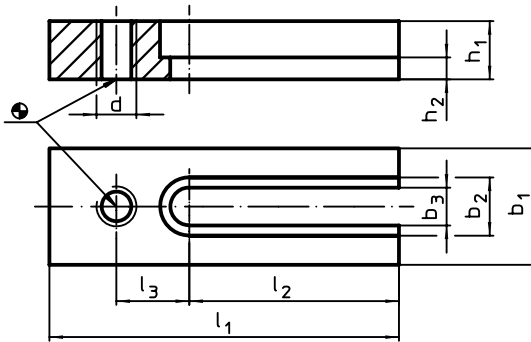
PRODUCT DESCRIPTION

By using the holding plates, the down-hold clamps can also be placed in any desired position across the T-slots.


Material

- Heat-treated steel, tempered, blackened

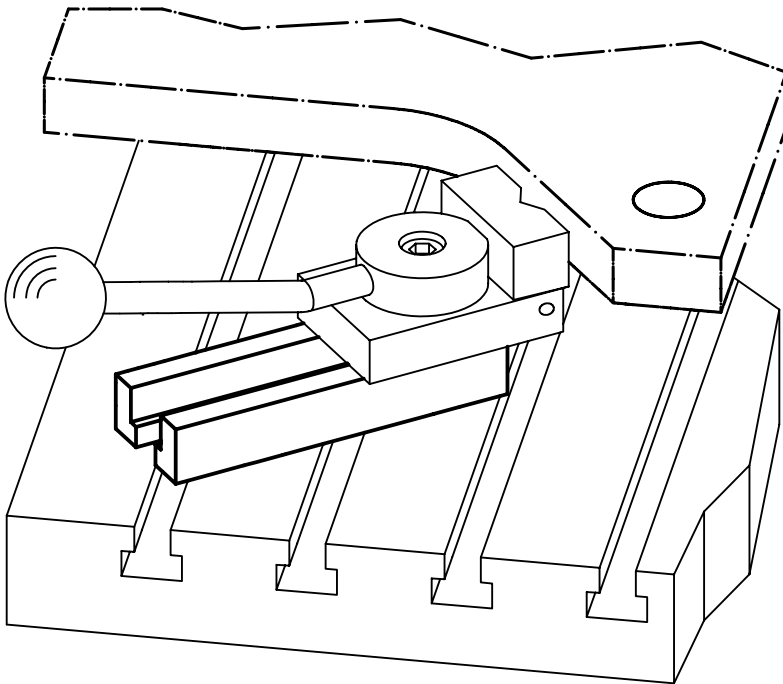
DRAWING



ORDER INFORMATION

Dimensions									For down-hold clamps	 [g]	Art. No.
b ₁	b ₂	b ₃	d	h ₁ -0.4	h ₂	l ₁	l ₂	l ₃			
30	15	9	M 8	15	6.5	100	63	20	M 8	243	23210.0730
40	20	13	M12	20	7.5	120	72	25	M12	515	23210.0740
60	26	17	M16	30	13.0	140	80	30	M16	1456	23210.0760
80	32	21	M20	40	18.0	200	110	50	–	3900	23210.0770
90	38	25	M24	50	24.0	220	130	55	–	5850	23210.0780

APPLICATION EXAMPLE



Sub-Part Clamps

EH 23211.



PRODUCT DESCRIPTION

The sub-part clamp and the sub-part stop enable workpieces to be clamped on the front face. This allows the full area of the machine table to be used to clamp the workpiece.

- Hold-down effect due to inclined arrangement of the clamping jaw
- Clamping of large workpieces on the whole of the machine table
- Large clamping forces up to 20 kN
- Clamping path 10.6 mm by means of clamping screw M 16 (WS 14)
- Solid version made of vibration-eliminating ductile iron
- Optimum adaptation to the workpiece and material, through the use of clamping inserts and interchangeable jaws
- Form and forced-fit assembly in a T-slot is possible
- Minimum interference contours, even for large workpieces
- Location holes at the sides for fastening of longitudinal stops

Material

- Ductile cast iron (GGG 60)

Assembly

The workpiece is positioned and then clamped on the ground precision support. The machine and fixture system parts in the Halder product range can be installed in the locating thread to reach a customised clamping. The location holes on the sides allow optional longitudinal stops to be installed.

MORE INFORMATION

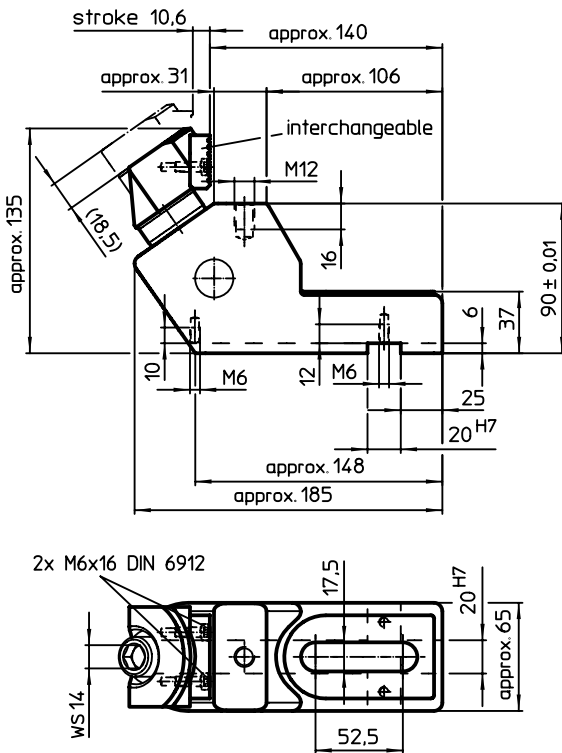
Notes

The delivery includes the interchangeable jaw 1138.400 (ribbed/smooth) - this can be changed to the interchangeable jaw 1138.100 (soft).

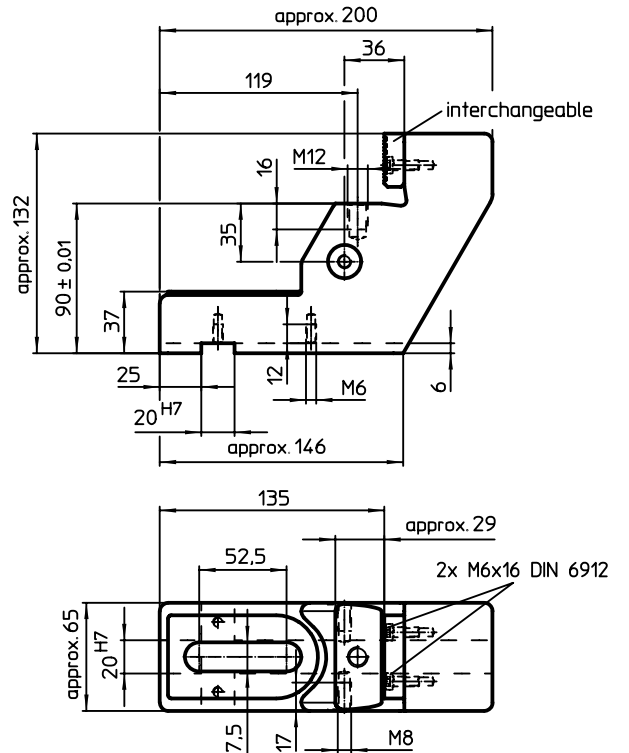
Further products

- Nuts for T-Slots, DIN 508 → p. 384
- Nuts for T-Slots, extended → p. 388
- Fixed Slot Tenons → p. 411
- Fixed Slot Tenons, with cylindrical fastening → p. 412
- Clamping Vices, replacement jaw, soft → p. 785

DRAWING




picture 1

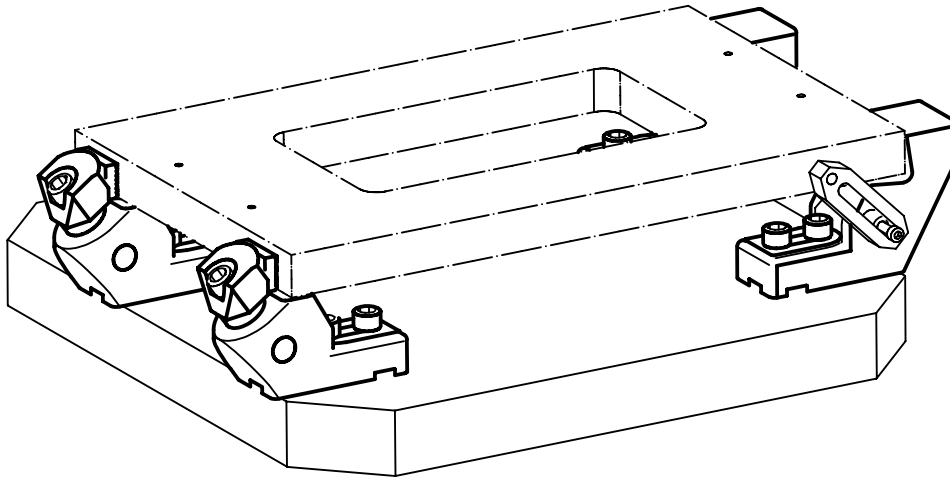


picture 2

ORDER INFORMATION

Clamping force horizontal max. [kN]	Tightening torque max. [Nm]	 [kg]	Art. No.
sub-part clamp – picture 1			
20	50	5	23211.0010
sub-part stop – picture 2			
–	–	5	23211.0020

APPLICATION EXAMPLE



Push-Pull Clamps

EH 23229.



PRODUCT DESCRIPTION

The clamp is suitable for easy and safe positioning of workpieces or components prior to clamping or assembly.

As the push/pull clamp is threaded on both sides it is possible to fix elements that are adapted to the workpiece, e.g. prisms, clamping bolts, self-aligning pads.

Material

Pin

- Steel, blackened

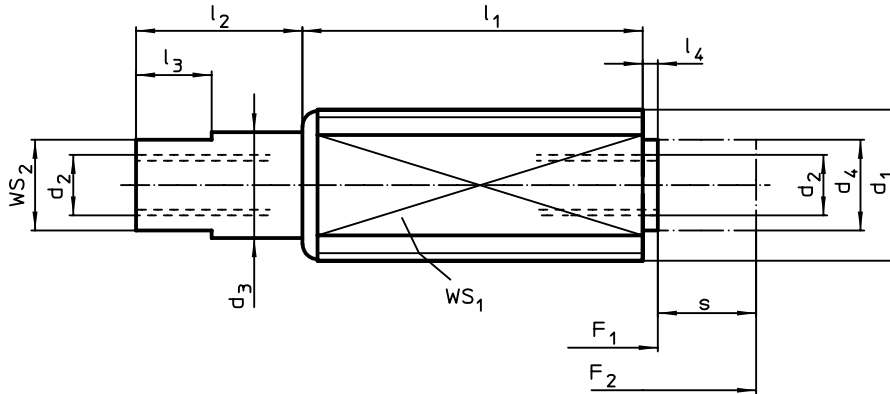
Body

- Steel, zinc-plated

Spring

- Stainless steel 1.4310

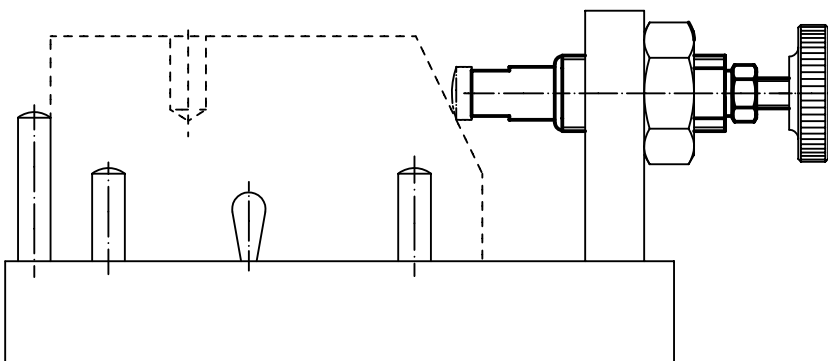
DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₃	Dimensions				Stroke s [mm]	WS		Spring load		[g]	Art. No.	
			d ₄	l ₁ -1	l ₂ ±0.5	l ₃		l ₄ -0.5	WS ₁	WS ₂	F ₁ ~			F ₂ ~
[mm]														
light spring load														
M12	M4 x 8	7	6	11.0	4.5	5	1.5	3.5	10	6	5	20	5.1	23229.0005
				18.5	7.0	5	1.5	6.0	10	6	5	20	8.7	23229.0010
				26.0	11.0	5	1.5	10.0	10	6	5	20	13.0	23229.0015
standard spring load														
M12	M4 x 8	7	6	11.0	4.5	5	1.5	3.0	10	6	10	45	5.3	23229.0020
				18.5	7.0	5	1.5	5.0	10	6	10	45	8.7	23229.0025
				26.0	11.0	5	1.5	8.0	10	6	10	45	14.0	23229.0030
M18 x 1,5	M6 x 12	11	10	18.0	6.0	6	2.0	4.0	16	9	30	120	22.0	23229.0050
				31.5	11.5	6	2.0	7.0	16	9	30	120	42.0	23229.0055
				45.0	16.0	6	2.0	12.5	16	9	60	180	63.0	23229.0060
heavy spring load														
M12	M4 x 8	7	6	11.0	4.5	5	1.5	3.0	10	6	20	90	5.4	23229.0035
				18.5	7.0	5	1.5	5.0	10	6	20	90	9.0	23229.0040
				26.0	11.0	5	1.5	8.0	10	6	20	90	14.0	23229.0045

APPLICATION EXAMPLE



Push Plungers • with pin, protected against rotating

EH 23230.



PRODUCT DESCRIPTION

The push plunger is suitable for easy and safe positioning of workpieces or components prior to clamping or assembly. Locating pins of your own profile or design can be attached to our threaded pin types.

Material

- Pin**
 - Steel, case-hardened, blackened
- Body**
 - Steel, zinc-plated by galvanization
- Grub Screw**
 - Steel, blackened, with brass pad

Mounting block

- Zinc die-cast, plastic coated, black

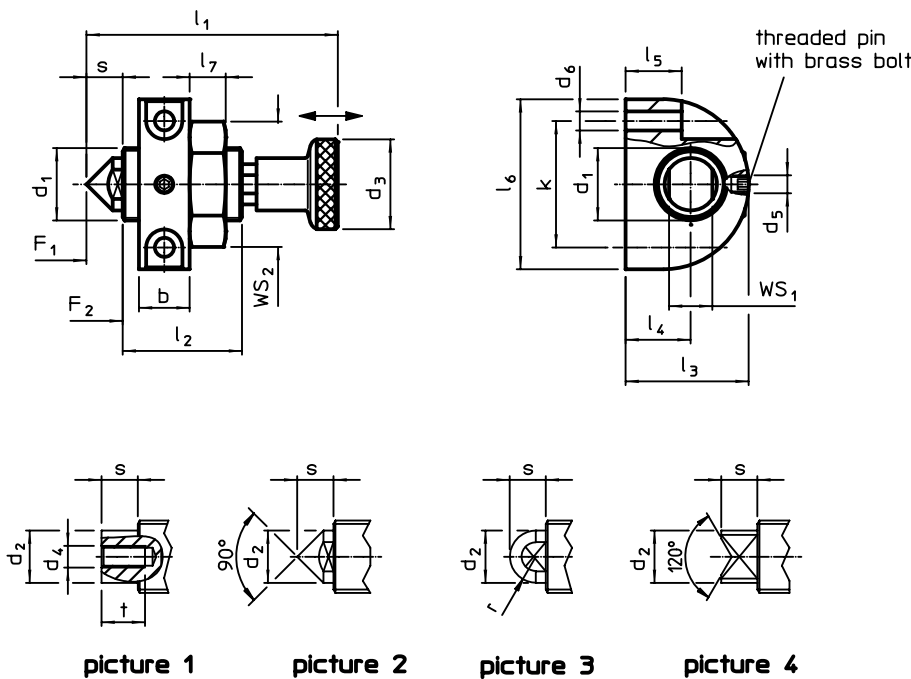
Knob

- Steel, blackened

Lock nut

- Steel, blackened

DRAWING



ORDER INFORMATION

Dimensions																	Stroke s	WS		Spring load ¹⁾		max. [°C]	[g]	Art. No.
d ₁	d ₂	d ₃	d ₄	d ₅	d ₆	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	t min.	r	b	k		WS ₁	WS ₂	F ₁	F ₂			
[mm]																	[mm]	[mm]		[N]				
with female thread – picture 1																								
M12 x 1,5	9.0	21	M4	M4	4.3	46.0	19	26	14	11.5	35	6	8	-	12	25	6	8	19	16	35	100	85	23230.0510
M16 x 1,5	12.0	21	M5	M5	5.3	56.0	27	34	18	15.5	47	8	10	-	14	35	8	10	24	25	71	100	153	23230.0512
M20 x 1,5	14.5	25	M6	M5	5.3	69.5	33	34	18	15.5	47	10	12	-	14	35	10	12	30	40	130	100	213	23230.0514
with tipped point – picture 2																								
M12 x 1,5	9.0	21	-	M4	4.3	46.0	19	26	14	11.5	35	6	-	-	12	25	6	8	19	16	35	100	85	23230.0530
M16 x 1,5	12.0	21	-	M5	5.3	56.0	27	34	18	15.5	47	8	-	-	14	35	8	10	24	25	71	100	152	23230.0532
M20 x 1,5	14.5	25	-	M5	5.3	69.5	33	34	18	15.5	47	10	-	-	14	35	10	12	30	40	130	100	209	23230.0534
with rounded pin – picture 3																								
M12 x 1,5	9.0	21	-	M4	4.3	46.0	19	26	14	11.5	35	6	-	4.5	12	25	6	8	19	16	35	100	84	23230.0550
M16 x 1,5	12.0	21	-	M5	5.3	56.0	27	34	18	15.5	47	8	-	6.0	14	35	8	10	24	25	71	100	155	23230.0552
M20 x 1,5	14.5	25	-	M5	5.3	69.5	33	34	18	15.5	47	10	-	7.2	14	35	10	12	30	40	130	100	213	23230.0554
with prism – picture 4																								
M12 x 1,5	9.0	21	-	M4	4.3	46.0	19	26	14	11.5	35	6	-	-	12	25	6	4	19	16	35	100	84	23230.0570
M16 x 1,5	12.0	21	-	M5	5.3	56.0	27	34	18	15.5	47	8	-	-	14	35	8	6	24	25	71	100	152	23230.0572
M20 x 1,5	14.5	25	-	M5	5.3	69.5	33	34	18	15.5	47	10	-	-	14	35	10	8	30	40	130	100	208	23230.0574

¹⁾ statistical average value

Locating Clamps

EH 23230.



PRODUCT DESCRIPTION

Suitable for a simultaneous "positioning" and "clamping" of workpieces. The locating element is a precision element which can be assembled from either side. The clamping and locating part adapted to the workpiece is screwed to the cylindrical support. Clamping and locating parts are manufactured by the user according to the individual requirements.

Material

Handle

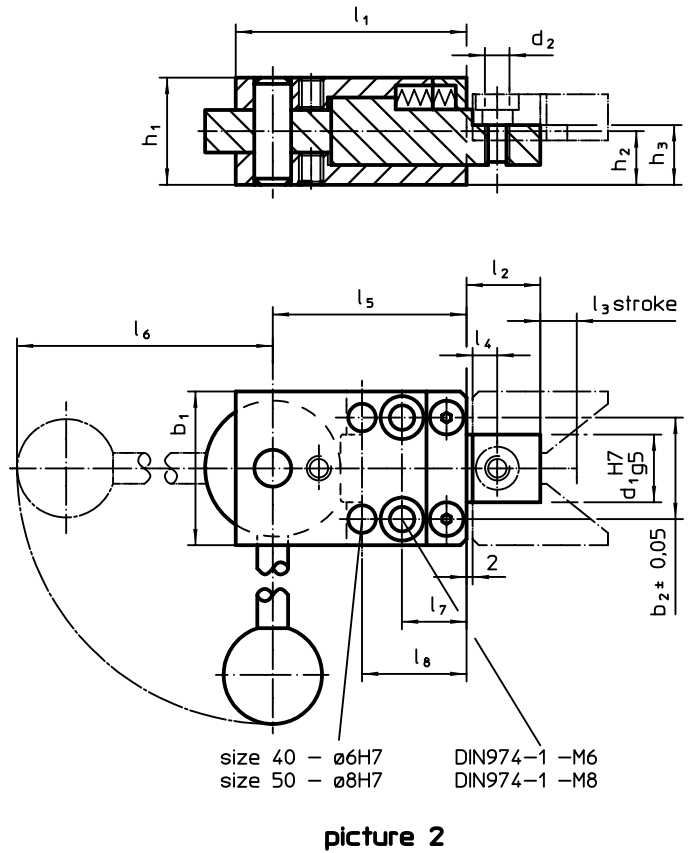
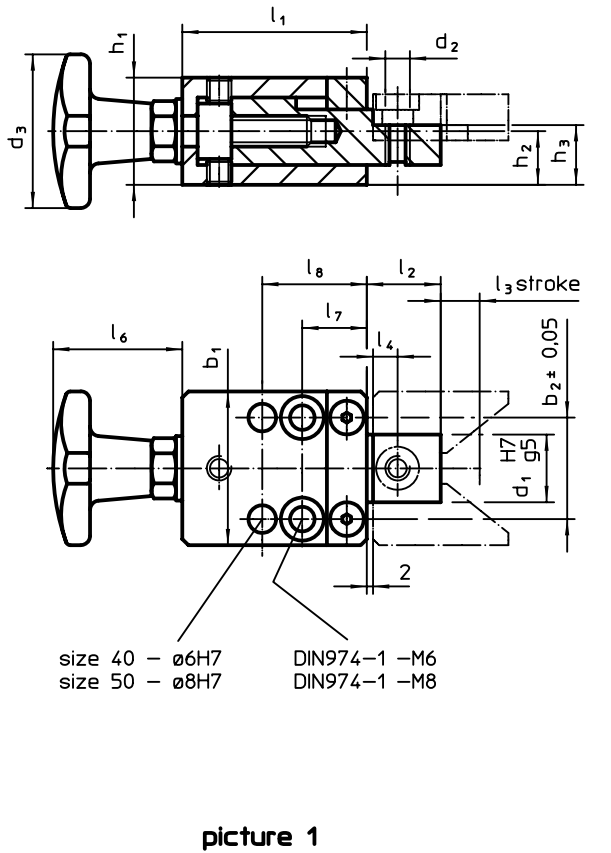
- Grey cast iron DIN 6335, orange plastic-coated

- Thermosetting plastic PF 31, black, DIN 319

Clamp

- Steel, case-hardened, blackened, ground

DRAWING



ORDER INFORMATION

Dimensions																Art. No.	
b ₁	b ₂ ±0.05	d ₁ H7 g5	d ₂	d ₃	h ₁	h ₂	h ₃	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈		[g]
[mm]																	
with palm grip – picture 1																	
40	27	18	M6	40	29.8	14.9	16.9	50	19	9	8	–	33	17	28	505	23230.0040
50	33	22	M8	50	34.8	17.4	19.4	60	24	10	10	–	42	21	34	862	23230.0050
with spiral eccentric clamping lever – picture 2																	
40	27	18	M6	–	29.8	14.9	16.9	60	19	3	8	50	96	17	28	566	23230.0440
50	33	22	M8	–	34.8	17.4	19.4	75	24	4	10	63	145	21	34	1071	23230.0450

Clamping Vices

EH 23231.



PRODUCT DESCRIPTION

The clamping vice is a solid, compact clamping module with a horizontally acting clamping force and a robust mechanical spindle.

- Clamping force up to max. 80 kN
- Clamping stroke 25 mm via screw drive WS 36
- Fixture via 4 cap screws M 24, quality 8.8 (tightening torque 600 Nm) with a hole spacing 100 x 100 mm
- Suitable clamping jaws 23231.0020 - .0033 are available

Material

- Steel, case-hardened, ground

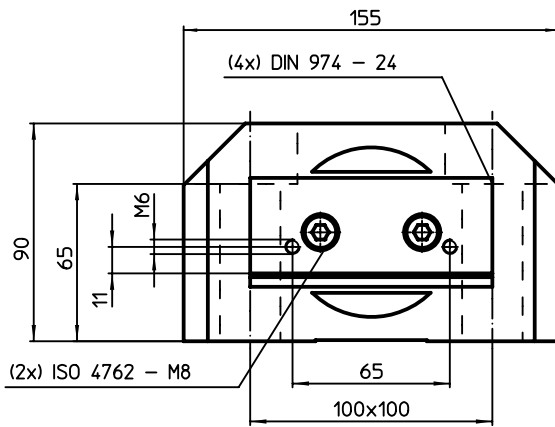
MORE INFORMATION

Further products

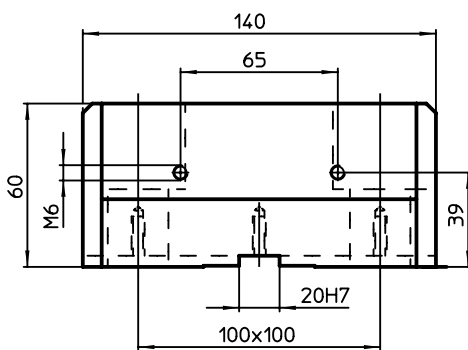
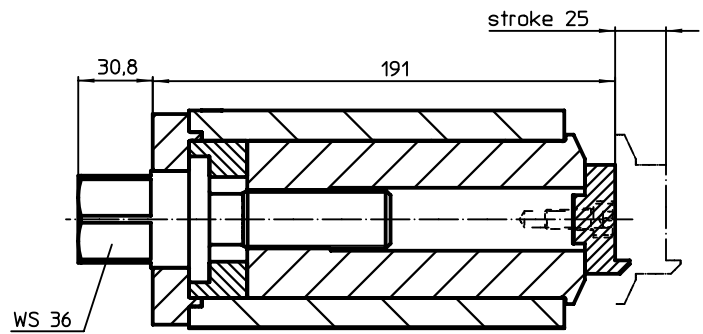
Standard Jaws, for vices → p. 465

Interchangeable Jaws, for vices, with pull-down effect → p. 466
 Clamping Vices, moveable jaw → p. 784
 Clamping Vices, fixed jaw → p. 784
 Clamping Vices, replacement jaw, soft → p. 785
 Clamping Vices, replacement jaw, ribbed/flat. → p. 785

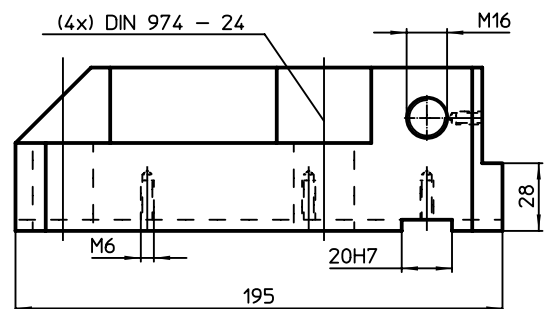
DRAWING




picture 1



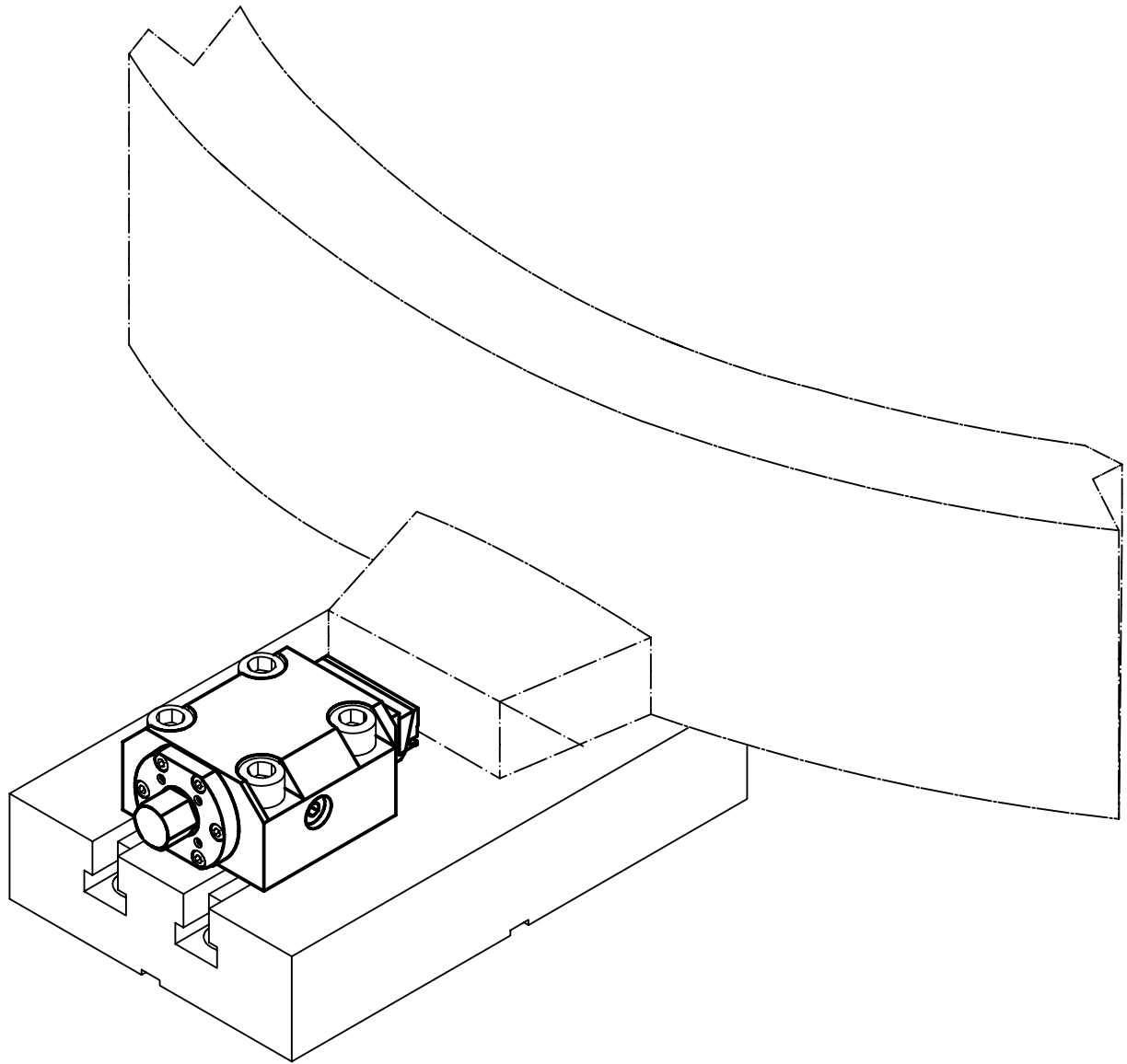
picture 2



ORDER INFORMATION

Clamping force horizontal max. [kN]	Tightening torque max. [Nm]	 [kg]	Art. No.
moveable jaw – picture 1			
80	200	16	23231.0010
fixed jaw – picture 2			
-	-	10	23231.0011

APPLICATION EXAMPLE



3

Standard Jaws • for vices
EH 23231.



PRODUCT DESCRIPTION

These jaws are accessories for the clamping vice EH 23231.

Material

Thrust Pad

- Heat-treated steel, induction hardened

Jaw

- Case-hardened steel

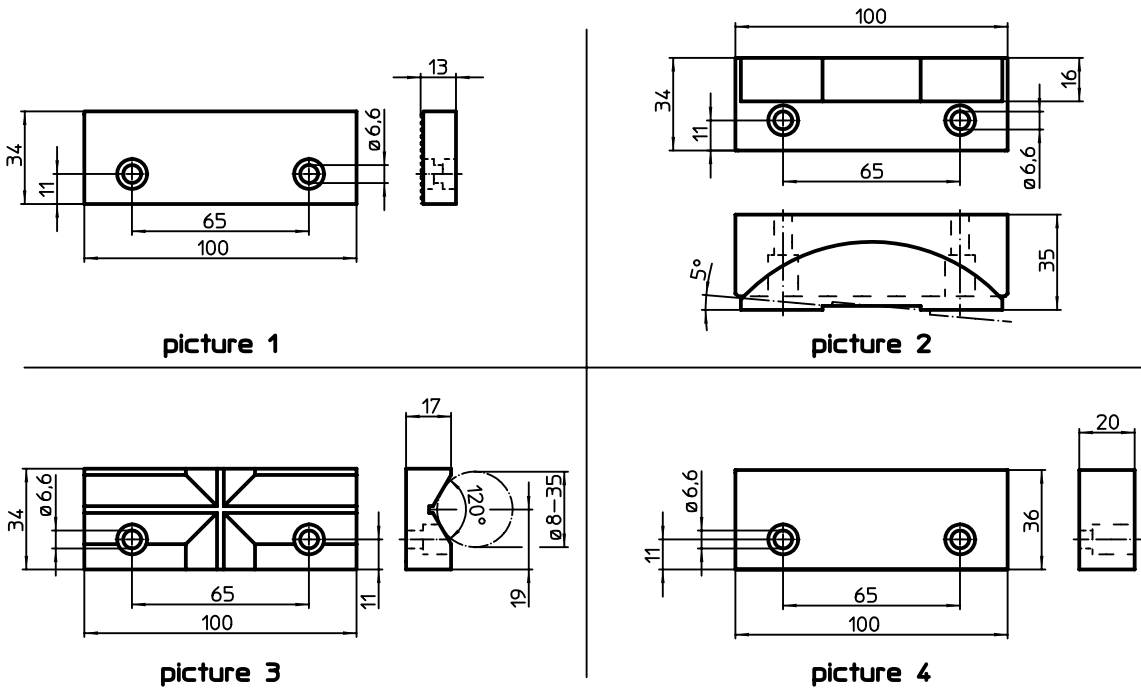
- Case-hardened steel, case-hardened
- Heat-treated steel
- Tool steel

MORE INFORMATION


Notes

The delivery includes tightening screws.

DRAWING



ORDER INFORMATION

Nominal dimension [mm]	 [g]	Art. No.
reversible jaw, smooth/ribbed made of tool steel – picture 1		
100	333	23231.0020
floating jaw (body: of heat-treated steel, plunger: of heat-treated steel, induction-hardened) – picture 2		
100	810	23231.0021
V-clamping jaw of case-hardened steel, case-hardened – picture 3		
100	372	23231.0022
clamping jaw, soft of case-hardened steel – picture 4		
100	554	23231.0023

Interchangeable Jaws • for vices, with pull-down effect

EH 23231.

3



PRODUCT DESCRIPTION

These jaws are accessories for the clamping vice EH 23231.

Material

Base support

- Case-hardened steel, case-hardened

Roller

- Cold worked steel, hardened

Jaw

- Case-hardened steel, case-hardened
- Heat-treated steel, hardened

standardly delivered screws. The interchangeable jaws - held by 2 permanent magnets - can be inserted and exchanged with a manual handle.

Assembly-/Disassembly instruction:

1. Pull the jaw upwards with the manual handle until the alignment pin strikes against the slot.
2. Twist the jaw sideways and remove.
3. New jaw can be inserted.

Assembly

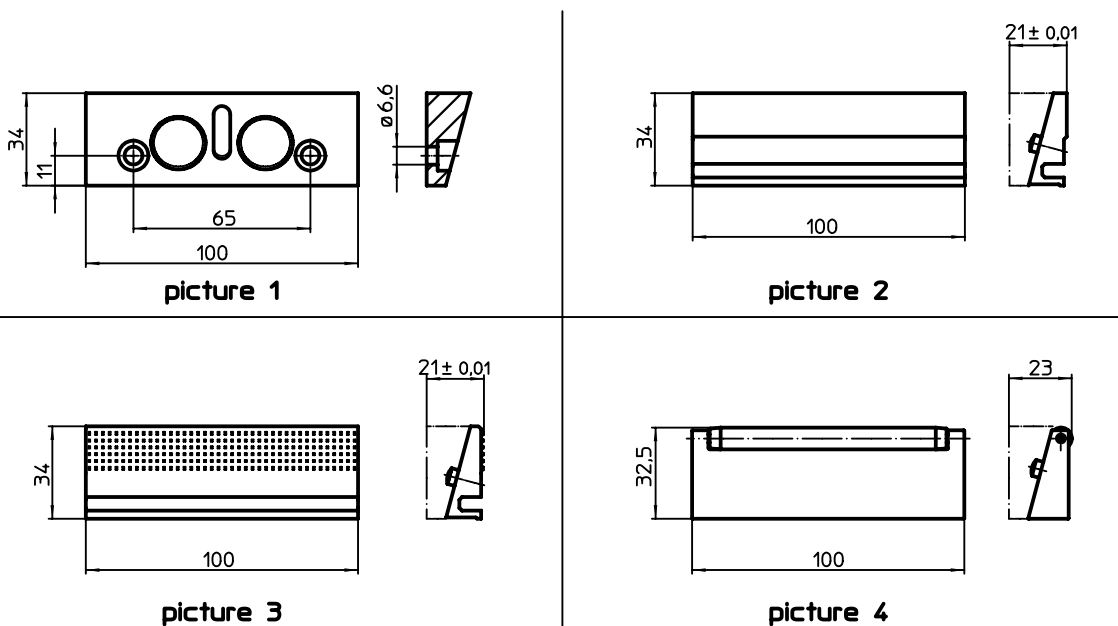
The base support (picture 1) is fixtured at the adapter of the clamping vice with the

MORE INFORMATION

Notes

The delivery includes tightening screws.

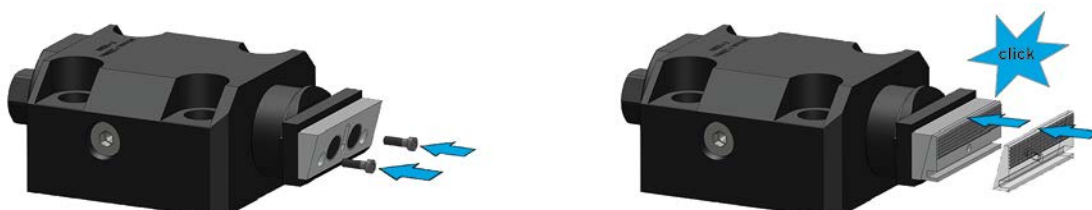
DRAWING



ORDER INFORMATION

Nominal dimension [mm]	[g]	Art. No.
base support of case-hardened steel – picture 1		
100	289	23231.0030
interchangeable jaw, smooth of case-hardened steel – picture 2		
100	246	23231.0031
interchangeable jaw, ribbed of case-hardened steel – picture 3		
100	246	23231.0032
interchangeable jaw with roller (body: head-treated steel, hardened / roller: cold worked steel, hardened) – picture 4		
100	313	23231.0033

APPLICATION EXAMPLE



Stabilizing Clamping Jaws

EH 23240.



PRODUCT DESCRIPTION

Due to the big clamping jaw, this clamping element is suitable for lateral clamping of high workpieces. The clamping force acts forwards and downwards. Clamping plate is turnable, i.e. to the ground or ribbed side.

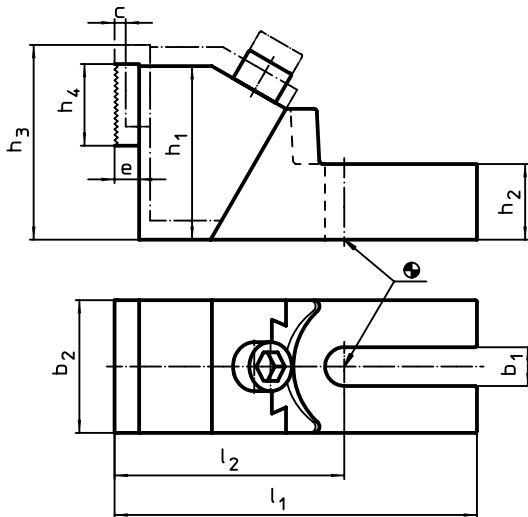
Material

- Body
 - Cast iron

Clamping jaws

- Steel, case-hardened

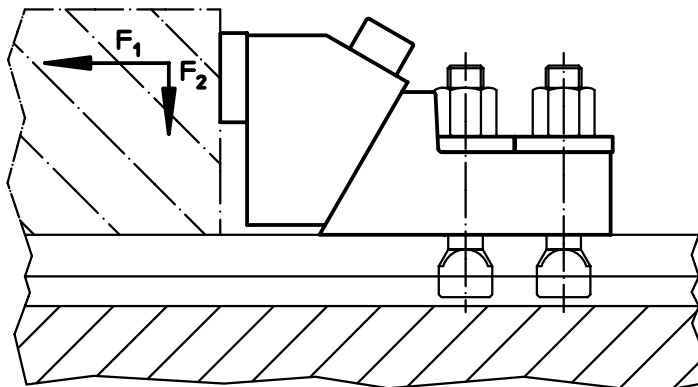
DRAWING



ORDER INFORMATION

b ₁	c	h ₁	h ₂	Dimensions				b ₂	l ₁	l ₂	e	T-slot size a	Clamping force		Art. No.
				h ₃	h ₄	[mm]							F ₁	F ₂	
													[kN]	[kg]	
19	8	85	37	99	40	65	177.5	112.5	12	12	14	8	1.2	4	23240.0012
												15	2.2		
												20	3.0		
												28	4.2		
26	11	100	45	118	40	75	226.5	136.5	12	20	30	4.5	7	23240.0020	
											22	4.5			
											24	4.8			
											32	4.8			
											30	5.4			

APPLICATION EXAMPLE



Taper Clamping Units

EH 23250.



PRODUCT DESCRIPTION

Taper clamping units are particularly suitable for horizontal and vertical multiple clampings. The taper clamps are compact in build and therefore enable clamping without geometric interference.

Material

Body

- Tool steel, hardened, bright

Screw

- Heat-treated steel, tempered, quality 12.9

Spring

- Spring steel wire
- NBR (O-Ring)

Clamping jaws

- Tool steel, hardened, blackened and ground

Assembly

Can be mounted in a threaded hole or with T-nuts for horizontal or vertical multiple clamping.

Operation

Inserting the socket head screw moves the two clamping chucks outwards and presses the workpieces against a stop. Using the double taper, an additional vertical

clamping force will be achieved. Stroke of taper clamping units with M 5 = ±0,5, M 8 = ±0,5, M 12 = ±1 and M 16 = ±1,5. Can be mounted in a threaded hole or with T-nuts for horizontal or vertical multiple clamping.

MORE INFORMATION

References

For further taper clamping units, refer to section "Multiple Clamping Systems"

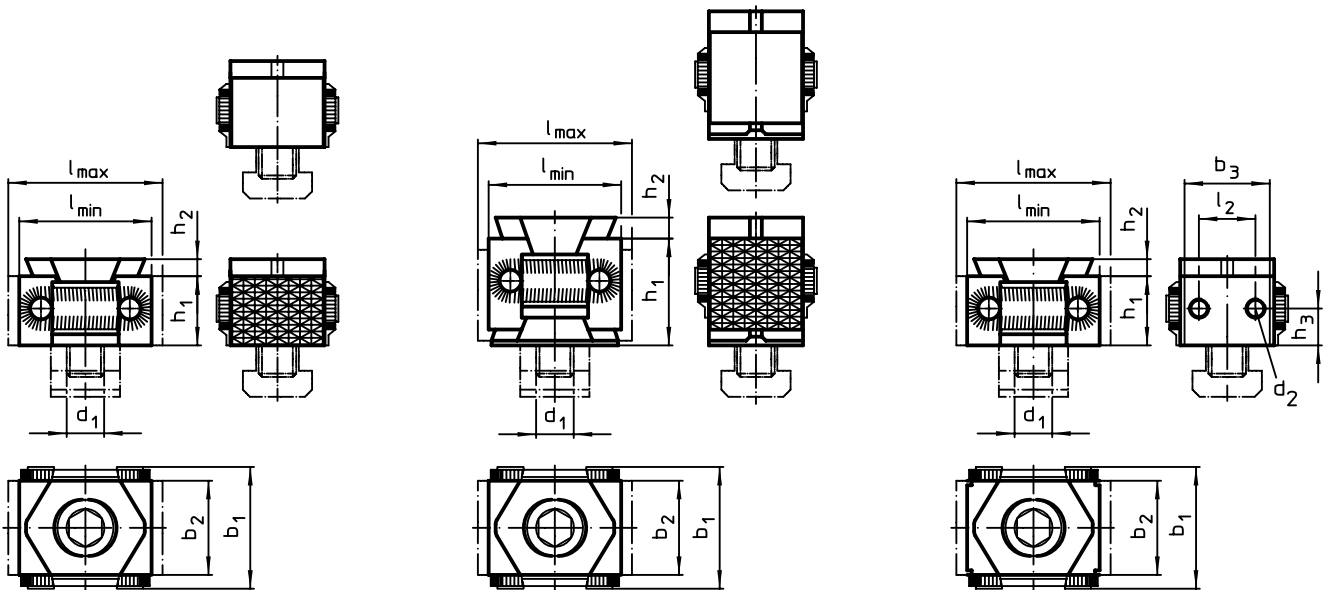
Accessories

T-nuts EH 23010. have to be purchased separately.

Further products

- Nuts for T-Slots, DIN 508 → p. 384
- Coverings, for taper clamping units . . . → p. 470
- Taper Clamping Units, plain / ribbed, M8 → p. 897
- Taper Clamping Units, plain / ribbed, M12 → p. 898
- Taper Clamping Units, with screw fastened thread, M12 → p. 899

DRAWING



picture 1

picture 2


picture 3

ORDER INFORMATION

d ₁	l	l ₂	b ₁	Dimensions						Clamping force max.	Tightening torque max.	[g]	Art. No.
				b ₂	b ₃	d ₂	h ₁	h ₂	h ₃				
[mm]													
single taper, ribbed clamping jaw, two-sided – picture 1													
M 8	27 – 31	–	29	21	–	–	15	2.5	–	20	43	72	23250.0008
M12	42 – 49	–	41	30	–	–	22	4.0	–	30	85	233	23250.0012
M16	57 – 65	–	56	42	–	–	29	5.0	–	50	210	581	23250.0016

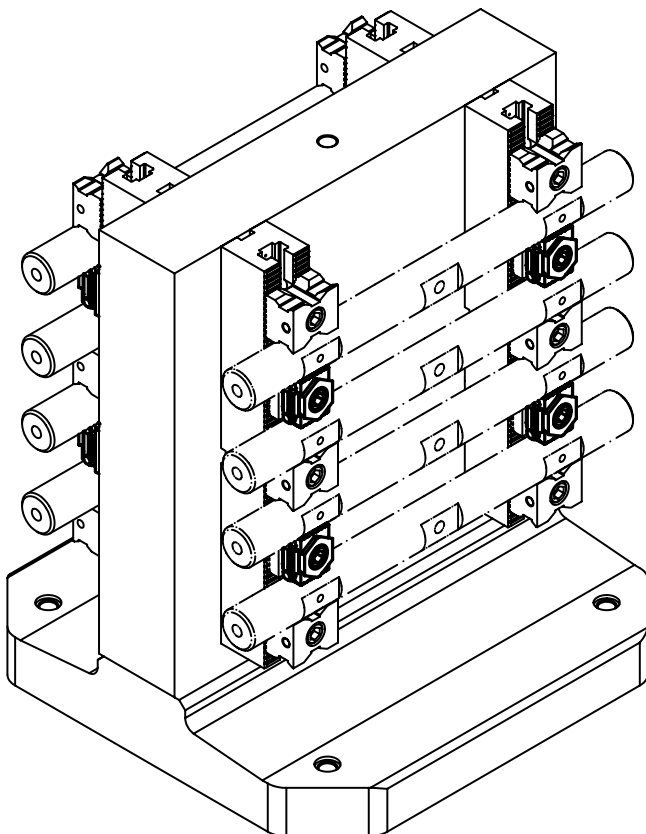
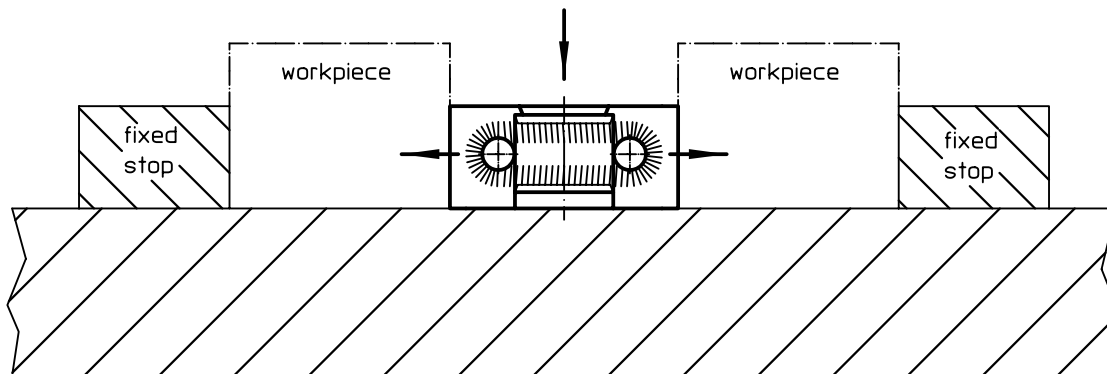
¹⁾ Taper surfaces not ground, spring: O-ring (NBR)



d ₁	l	l ₂	Dimensions							Clamping force max. [kN]	Tightening torque max. [Nm]		Art. No.
			b ₁	b ₂	b ₃	d ₂	h ₁	h ₂	h ₃				
[mm]													
single taper, flat clamping jaw, two-sided – picture 1													
M 5	20 – 25	–	22	15	–	–	11	4.2	–	7	10	30	23250.0065¹⁾
M 8	27 – 31	–	29	21	–	–	15	2.5	–	20	43	73	23250.0048
M12	42 – 49	–	41	30	–	–	22	4.0	–	30	85	234	23250.0052
M16	57 – 64	–	56	42	–	–	29	5.0	–	50	210	577	23250.0056
double taper, ribbed clamping jaw, two-sided – picture 2													
M12	42 – 49	–	41	30	–	–	36	5.0	–	50	85	350	23250.0112
M16	58 – 66	–	56	42	–	–	50	5.0	–	80	210	906	23250.0116
double taper, flat clamping jaw, two-sided – picture 2													
M12	41 – 48	–	41	30	–	–	36	5.0	–	50	85	343	23250.0142
M16	58 – 66	–	56	42	–	–	50	5.0	–	80	210	895	23250.0146
single taper, clamping jaw with screw-fastened thread, two-sided – picture 3													
M 8	33 – 37	12	29	21	–	M5	15	2.5	7.5	20	43	84	23250.0158
M12	46 – 53	18	41	30	28	M5	22	4.0	11.0	30	85	247	23250.0162
M16	61 – 70	26	56	42	40	M5	29	5.0	14.5	50	210	618	23250.0166

¹⁾ Taper surfaces not ground, spring: O-ring (NBR)

APPLICATION EXAMPLE



Coverings • for taper clamping units

EH 23250.

**PRODUCT DESCRIPTION**

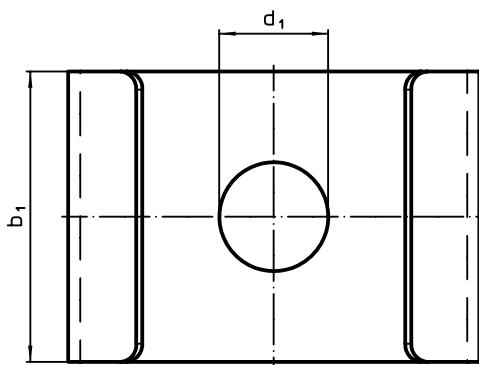
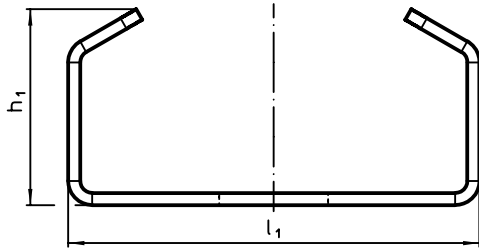
Protects against damage from scales of wood and dirt.


Material

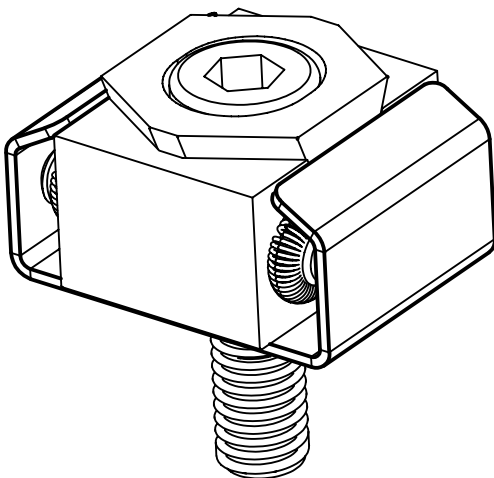
- Steel

Assembly

The cover is mounted under the taper clamping unit.

DRAWING**ORDER INFORMATION**

d ₁	For screw	Dimensions			For taper clamping units	 [g]	Art. No.
		b ₁ [mm]	h ₁	l ₁			
9	M 8	24	16.2	34	23250.0008/.0048/.0158	12	23250.0408
13	M12	38	22.1	44	23250.0012/.0052/.0142/.0162	26	23250.0412

APPLICATION EXAMPLE

Double Edge Clamps

EH 23251.



PRODUCT DESCRIPTION

Inserting the socket head screw moves the two clamping chucks outwards and presses the workpiece against a stop.

Material

Body

- Aluminium Al

Taper

- Case-hardened steel, blackened

Screw

- Steel

Assembly

Can be mounted in a threaded hole or with T-nuts for horizontal or vertical multiple clamping.

MORE INFORMATION

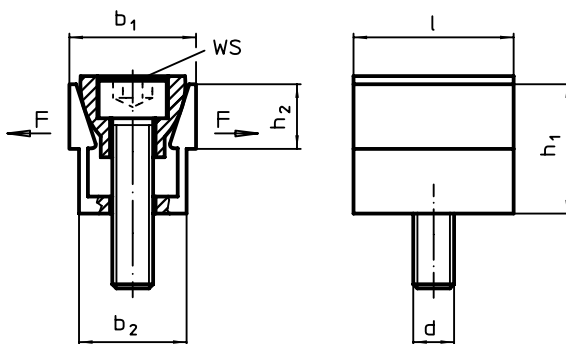
Accessories

T-nuts EH 23010. have to be purchased separately.

Further products

Nuts for T-Slots, DIN 508 → p. 384

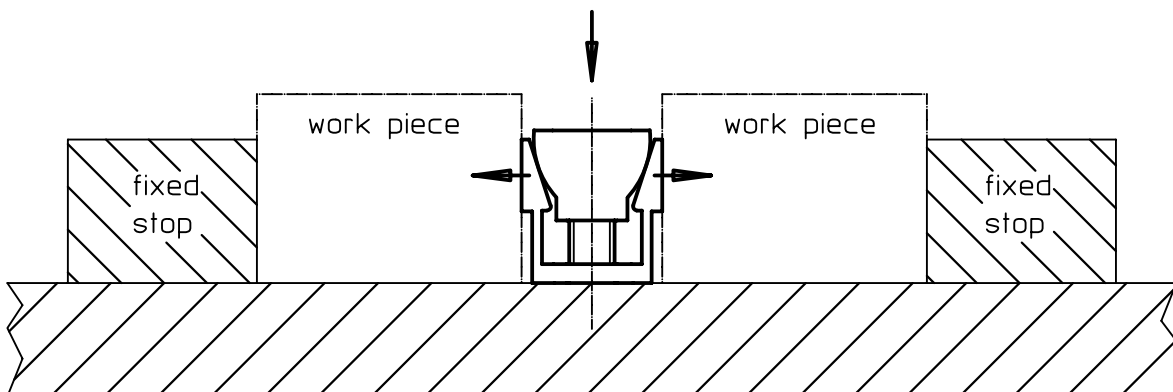
DRAWING



ORDER INFORMATION

b ₁	b ₁ max. spread	b ₂	Dimensions				d	WS	Clamping force max.	Tightening torque max.	🔩	Art. No.
			h ₁	h ₂	l	[mm]						
18.6	20.3	16.1	19.0	9.5	23.8	M 6	5	6.7	14.3	37	23251.0006	
24.8	26.9	20.8	25.9	12.7	31.7	M 8	6	8.9	14.5	87	23251.0008	
37.3	39.9	30.8	38.6	19.0	47.6	M12	10	15.6	38.4	280	23251.0012	
49.7	53.0	41.2	51.5	25.4	63.5	M16	14	26.7	74.6	700	23251.0016	

APPLICATION EXAMPLE



Double Edge Clamps • machinable chucks

EH 23251.



PRODUCT DESCRIPTION

Inserting the socket head screw moves the two clamping chucks outwards and presses the workpiece against a stop. The chucks can be machined to the needed workpiece contour. The locking plate is needed only for this machining, not for the workpiece clamping.

Material

Body

- Aluminium Al

Taper

- Case-hardened steel, blackened

Screw

- Steel

Locking plate

- Aluminium Al

Assembly

Can be mounted in a threaded hole or with T-nuts for horizontal or vertical multiple clamping.

MORE INFORMATION

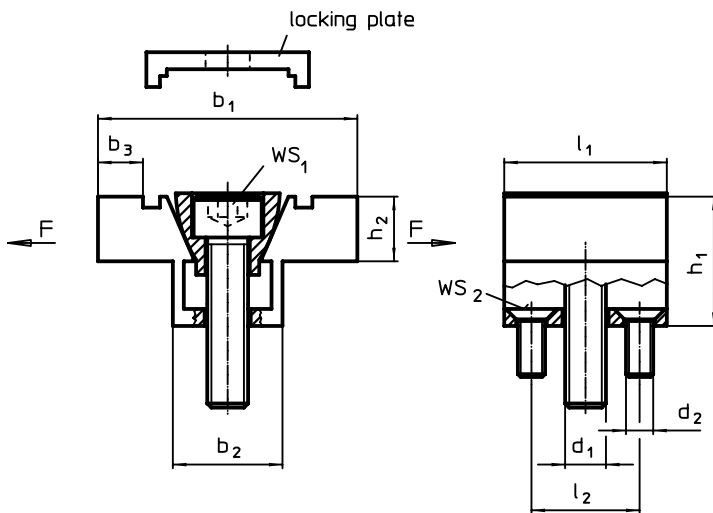
Accessories

T-nuts EH 23010. have to be purchased separately.

Further products

Nuts for T-Slots, DIN 508 → p. 384

DRAWING

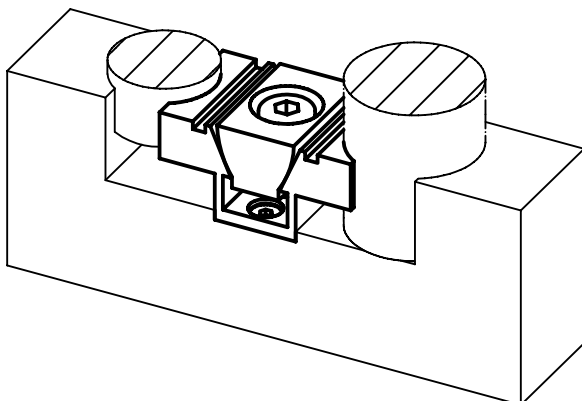


ORDER INFORMATION

Dimensions									WS ₁	WS ₂	Clamping force max.	Tightening torque max.		Art. No.
b ₁	b ₂	b ₃ ¹⁾	h ₁	h ₂	l ₁	l ₂	d ₁	d ₂	[mm]	[mm]	[kN]	[Nm]		
[mm]									[mm]	[mm]				
38.1	16.1	6.6	19.1	9.4	23.9	15.9	M 6	M4	5	2.5	6.7	14.3	67	23251.0106
50.8	20.8	9.9	25.4	12.7	31.8	20.6	M 8	M4	6	2.5	8.9	14.5	128	23251.0108
76.2	30.9	14.8	38.1	19.1	47.5	30.5	M12	M5	10	3.0	15.6	38.4	427	23251.0112
101.6	41.3	20.3	50.8	25.4	63.5	41.3	M16	M6	14	4.0	26.7	74.6	1068	23251.0116

¹⁾ machinable material allowance

APPLICATION EXAMPLE



**PRODUCT DESCRIPTION**

The T-slot guide enables a quick and precise location of the workpiece. The cylindrical form of the stop facilitates to determine the 0-point coordinate. The short form, which is ground to a height tolerance of $\pm 0,01$ mm, can also be used for locating.

Material**Stop**

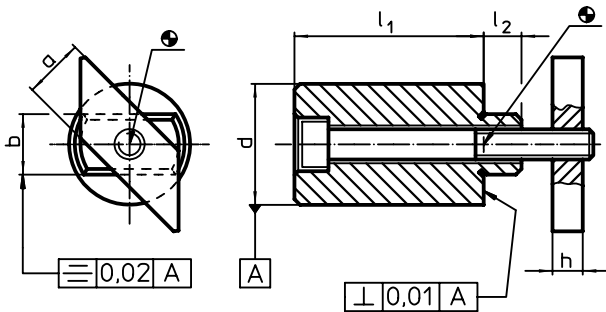
- Steel, case-hardened, ground

Holding plate

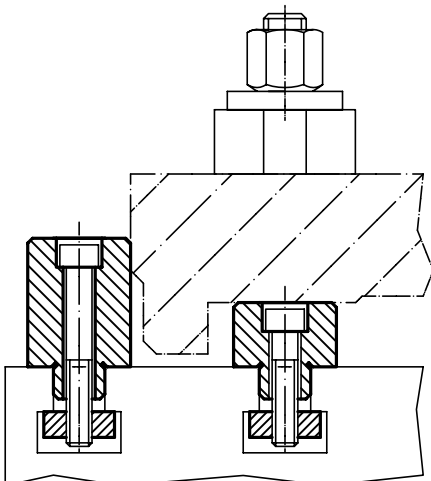
- Steel, blackened

Screw

- Steel, quality 8.8 (ISO 4762)

DRAWING**ORDER INFORMATION**

T-slot size [mm]	Dimensions						Screw ISO 4762 [mm]	[g]	Art. No.
	l_1	a -0.6	b h6	d ± 0.01	h	l_2			
10	15 ± 0.01	10	10	20	6	8	M 6 x 25	53	23280.0110
	25 ± 0.20	10	10	20	6	8	M 6 x 35	76	23280.0210
12	15 ± 0.01	12	12	20	6	8	M 6 x 25	59	23280.0112
	25 ± 0.20	12	12	20	6	8	M 6 x 35	82	23280.0212
14	25 ± 0.01	14	14	32	8	9	M 8 x 35	203	23280.0114
	50 ± 0.20	14	14	32	8	9	M 8 x 60	354	23280.0214
16	25 ± 0.01	16	16	32	8	10	M 8 x 45	221	23280.0116
	50 ± 0.20	16	16	32	8	10	M 8 x 70	378	23280.0216
18	25 ± 0.01	18	18	40	10	15	M10 x 50	367	23280.0118
	50 ± 0.20	18	18	40	10	15	M10 x 75	615	23280.0218
22	25 ± 0.01	20	22	40	14	15	M10 x 55	440	23280.0122
	50 ± 0.20	20	22	40	14	15	M10 x 80	716	23280.0222
28	25 ± 0.01	22	28	46	16	20	M12 x 60	661	23280.0128
	50 ± 0.20	22	28	46	16	20	M12 x 90	1259	23280.0228

APPLICATION EXAMPLE

Pitbull® Clamps

EH 23290.



PRODUCT DESCRIPTION

Pitbull® clamps for low mounting height with a high clamping force and down hold effect. The O-ring serves to lift the clamp off when releasing.

Material

- Body**
 - Steel, hardened

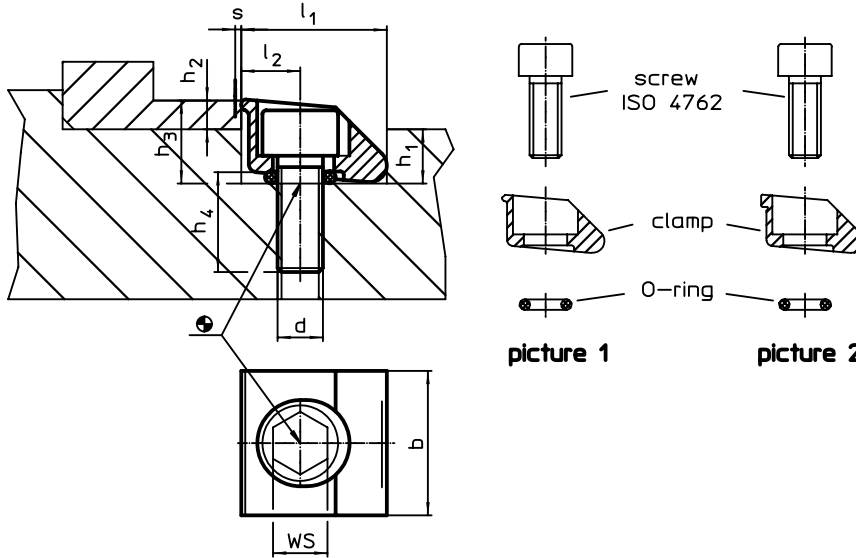
Screw

- Heat-treated steel, heat treated

O-ring

- NBR

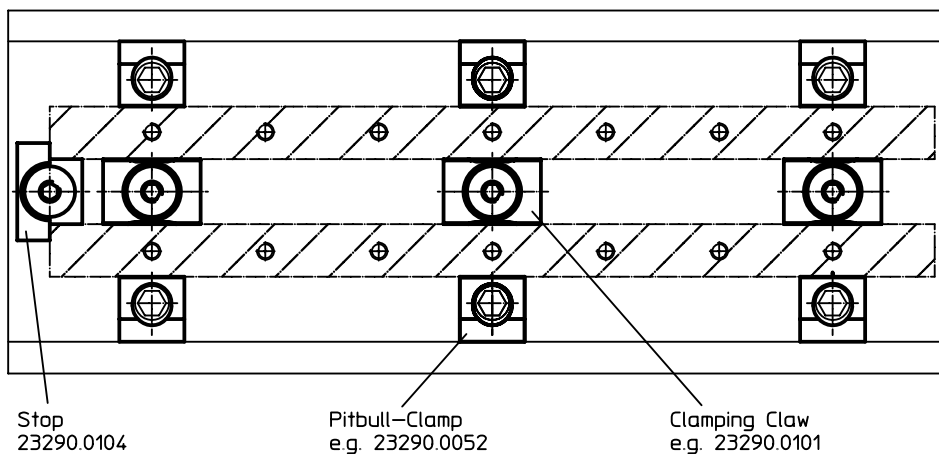
DRAWING



ORDER INFORMATION

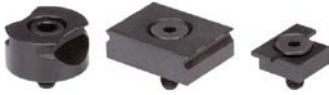
d	b	Dimensions						Clamping way s	WS	Clamping force max. [kN]	Tightening torque max. [Nm]	Temperature		Weight [g]	Art. No.
		l_1 H9	l_2	h_1	$h_{2\text{ min.}}$	h_3	h_4					min.	max.		
[mm]															
with knife edge – picture 1															
M 4	12.7	12.70	5.1	4.8	2.6	7.4	8	0.4	3	2.6	6	-30	80	7.5	23290.0052
M 6	19.1	19.05	7.6	7.1	3.8	10.9	11	0.6	5	3.8	17	-30	80	22.0	23290.0054
M10	25.4	25.40	10.2	11.4	6.4	17.8	17	1.2	8	15.0	80	-30	80	66.0	23290.0056
M12	38.1	38.10	15.2	16.3	9.5	25.8	21	1.9	10	20.8	140	-30	80	195.0	23290.0058
blunt edged – picture 2															
M 4	12.7	12.70	5.1	4.8	2.6	7.4	8	0.4	3	2.6	6	-30	80	6.2	23290.0062
M 6	19.1	19.05	7.6	7.1	3.8	10.9	11	0.6	5	5.7	17	-30	80	22.0	23290.0064
M10	25.4	25.40	10.2	11.4	6.4	17.8	17	1.2	8	15.1	80	-30	80	65.0	23290.0066
M12	38.1	38.10	15.2	16.3	9.5	25.8	21	1.9	10	22.0	140	-30	80	201.0	23290.0068

APPLICATION EXAMPLE



Clamping Claws

EH 23290.



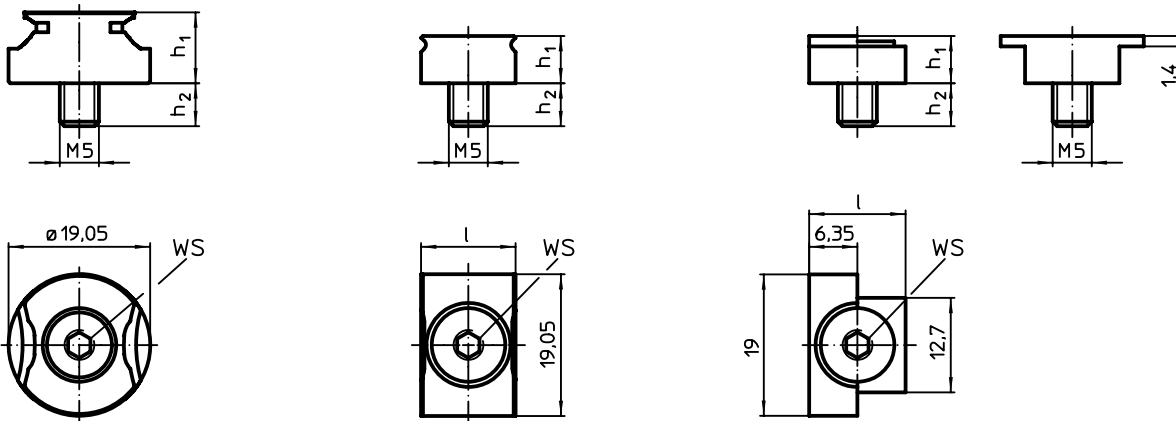
PRODUCT DESCRIPTION

The clamping claws are designated for the installation in clamping chucks and fixtures. Only a counterbore or rather a nut with threaded hole is needed for the installation. The sharp edges of the clamping claw are impressed in the workpiece and therefore they avoid a lateral and horizontal movement. The stop can be used for the positioning of workpieces.

Material

- Steel, hardened, blackened

DRAWING



picture 1

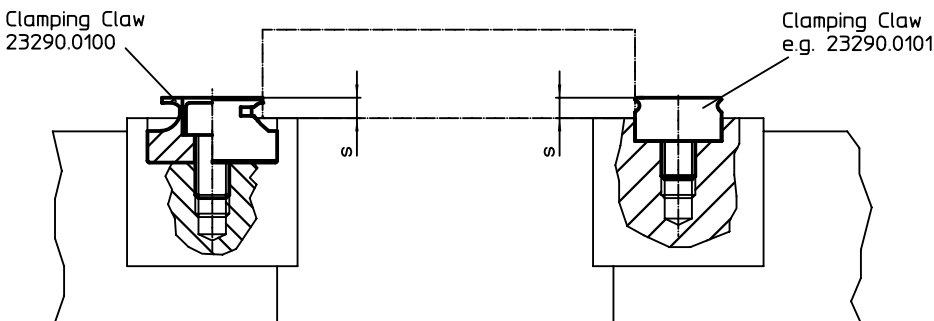
picture 2

picture 3

ORDER INFORMATION

l	Dimensions			WS	[g]	Art. No.
	h ₁	h ₂	s			
[mm]			[mm]			
clamping claw, round – picture 1						
–	9.53	5.9	1.5 – 3.0	4	20.0	23290.0100
clamping claw – picture 2						
12.70	6.35	6.0	1.5 – 1.9	3	12.0	23290.0101
19.05	7.92	8.1	1.5 – 3.0	3	22.0	23290.0102
25.40	7.92	8.1	1.5 – 3.0	3	31.0	23290.0103
stop – picture 3						
12.70	6.35	6.0	–	3	9.5	23290.0104

APPLICATION EXAMPLE



Supporting Plates

EH 23210.



PRODUCT DESCRIPTION

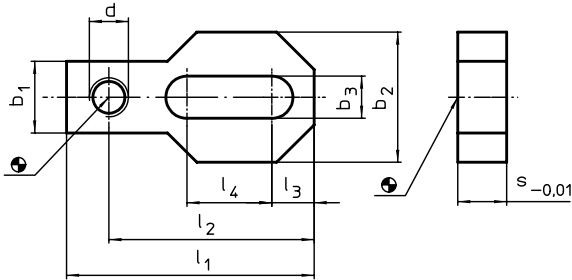
Various seating elements (e.g. pins EH 22690. or self-aligning pads EH 22730., EH 22731. and EH 22740.) can be mounted on the supporting plates.

The supporting plate can be moved flexibly between two threads or T-slots. Suitable for clamping devices M 20 - M 24.

Material

- Steel, case-hardened

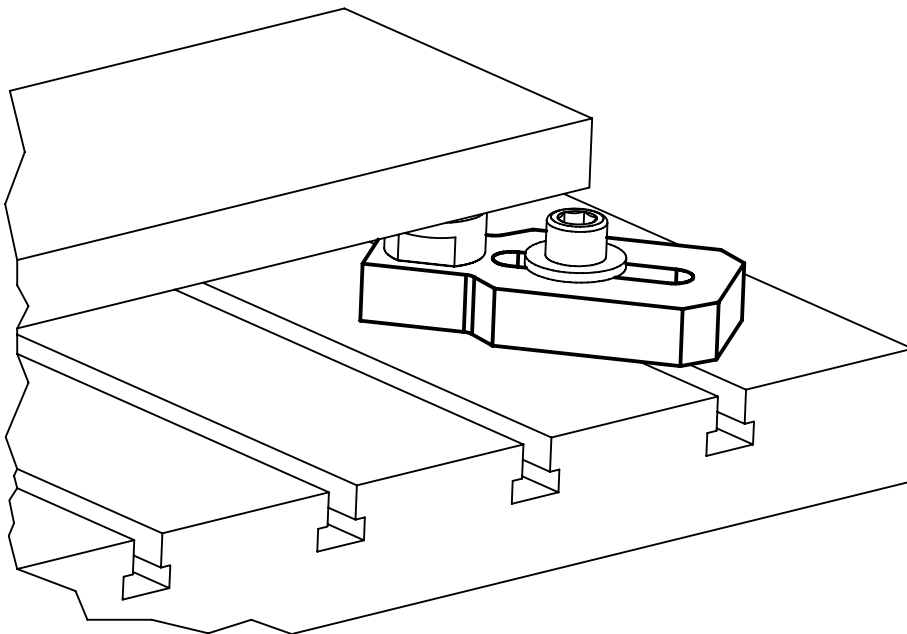
DRAWING



ORDER INFORMATION

d	l ₁	l ₂	l ₃	Dimensions				s -0.01	Art. No.	
				l ₄	b ₁	b ₂	b ₃			
[mm]										
M20	180	150	30	80	60	90	21	30	3	23210.0870
M24	220	188	35	100	70	100	25	30	4	23210.0880

APPLICATION EXAMPLE

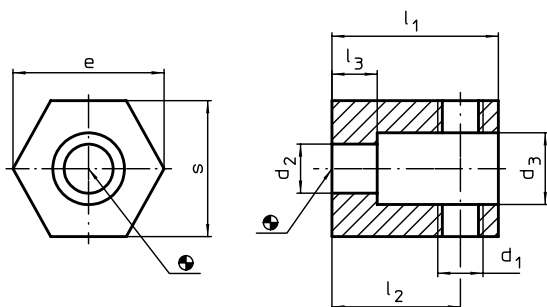


**PRODUCT DESCRIPTION**

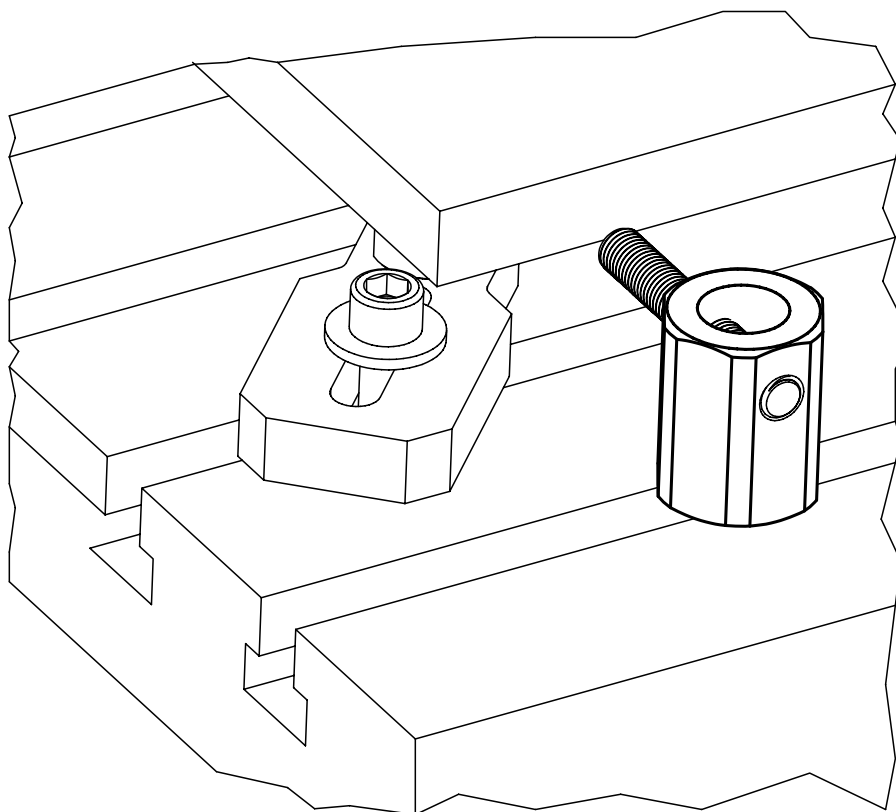
With the stop a flexible stop for a workpiece can be realised. Together with a grub screw (e.g. EH 22540.), a workpiece can be mounted and aligned. The grub screw should be secured in position with a hexagon nut. Suitable for clamping devices M 20 - M 24.

Material

- Steel, blackened

DRAWING**ORDER INFORMATION**

Dimensions								[g]	Art. No.
d_1	d_2	d_3	l_1	l_2	l_3	s	e		
M20	26	38	85	60	20	65	70	1659	23281.0024

APPLICATION EXAMPLE

Bedding Supports

EH 23220.



PRODUCT DESCRIPTION

The bedding support is used to **support** overdetermined clamping points on components. The benefits of the bedding support are:

- Support for unstable components, without distortion
- Eliminates tool vibration during machining
- Compact, low construction
- Supports ribs, beads and shackles, for reinforcement of clamped components
- Distortion-free support of raw parts
- Easy handling
- Flat and long design allows clamping with adjustable clamping lever even outside the workpiece.

Material

Handle

- Zinc die-cast

Clamp

- Steel, case-hardened, blackened, ground

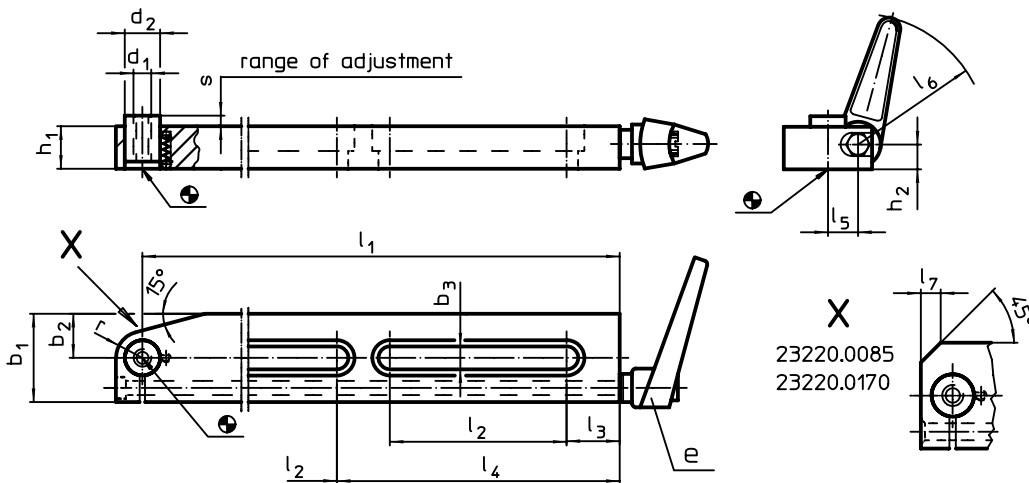
Operation

1. By releasing the clamping lever, the support bolt contacts the workpiece with a light spring load.

2. By clamping the clamping lever, the support pin is blocked without displacement.
3. The clamping lever is released after removal of the workpiece. Then push the support pin into the starting position and clamp using the lever.


By screwing grub screws or supports into the support pin's female thread, the support height can be adjusted.

DRAWING

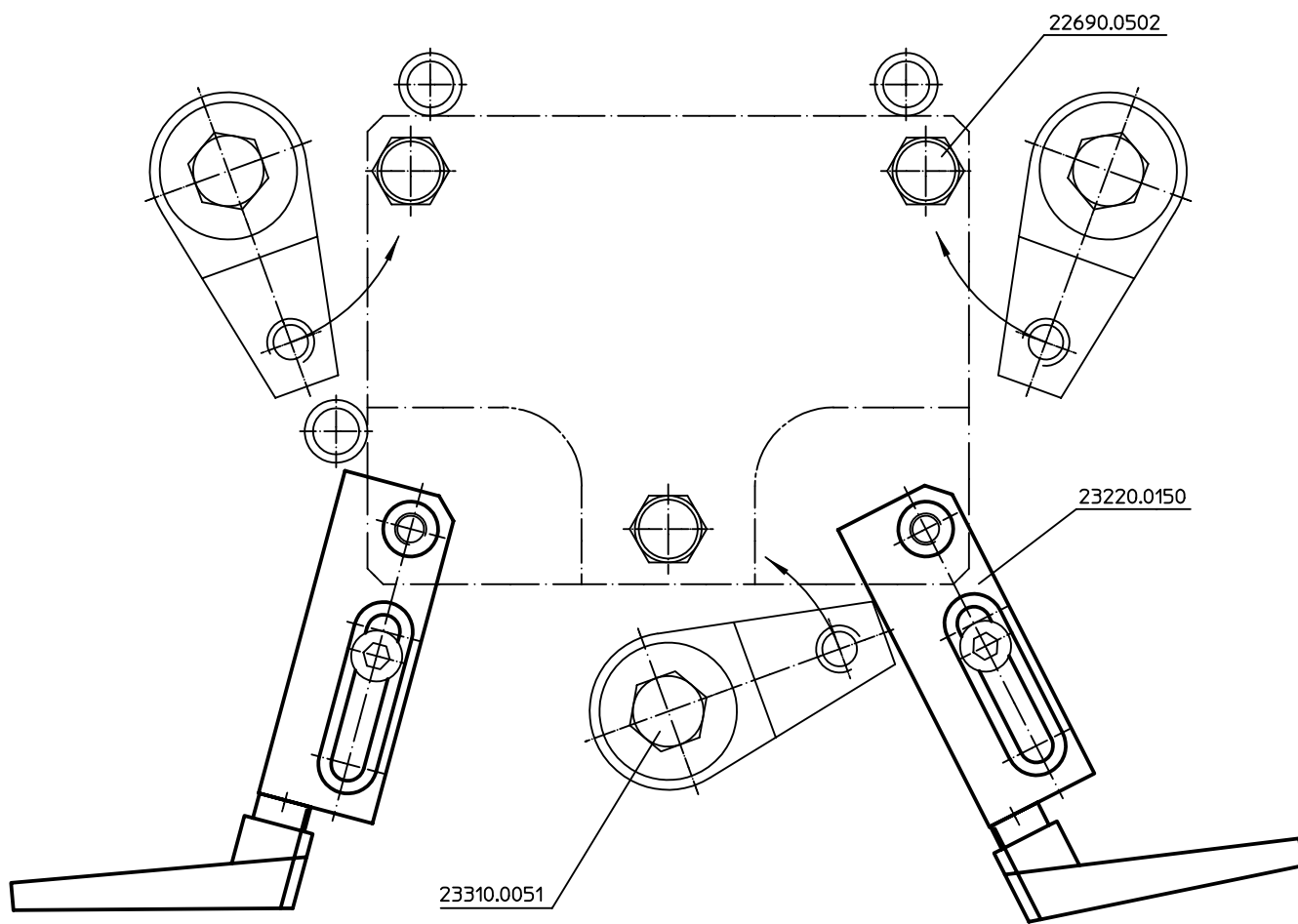


Sizes 8,5 x 75, 13 x 150 and 17 x 170 have only one slot.

ORDER INFORMATION

Dimensions															Stroke s [mm]	Load capacity max. [kN]	e		Art. No.
b ₃	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	b ₁	b ₂	d ₁	d ₂	h ₁	h ₂	r					
[mm]																			
8.5	75	35	13	-	13	62	5	30	10	M 8	13	19.5	11.5	-	3	0.5	24400.0311	342	23220.0085
13.0	150	90	20	-	17	74	-	50	25	M10	20	24.0	14.0	15	6	2.5	24400.0411	1379	23220.0150
17.0	170	100	25	-	27	108	11	60	20	M16	26	34.0	21.5	-	11	5.0	24400.0611	2721	23220.0170
13.0	300	100	30	160	17	74	-	50	25	M10	20	24.0	14.0	15	6	2.5	24400.0411	2448	23220.0300
25.0	387	110	30	200	30	89	-	85	40	M20	32	40.0	25.0	24	11	10.0	24420.0210	7350	23220.0450

APPLICATION EXAMPLE



Supporting Elements

EH 23220.



PRODUCT DESCRIPTION

The support element is used to **support** overdetermined clamping points on components. The benefits of the support element are:

- Support for unstable components
- Eliminates tool vibration during machining
- Supports ribs, beads and shackles, for reinforcement of clamped components
- Distortion-free support of raw parts
- Easy handling

Material

Housing

- Aluminium, red anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Assembly

Fix the support element (2 x M 6 thread) onto the device. Pay attention to the operator's side!

Alternative: Dismantle the M 12 x 10 threaded pin and replace it by an M 12 x 30 threaded pin and assemble the support element with a wrench (WS 21), e.g. for T-slot mounting (no defined operator's side ensured). Threaded pin M 12 x 30 and T-nut DIN 508 M 12 x 14, quality 10, are part of the standard supply volume.

Lowering of the support element by 16 mm is possible.

Operation

By turning the clamping cam (WS 6 internal hexagon) on the outer surface of the red protective sleeve, the support pin contacts the workpiece with a slight spring load.

1. By turning on (15 Nm) as far as possible (lock), total of 180°, the clamping

mechanism locks the support pin without moving. The support element has been placed onto the workpiece and locked.

2. If turned in the opposite direction (unlock), the clamping is released. If turned back as far as possible, i.e. total of 180° the support pin moves to the end position.

MORE INFORMATION

Notes

For safe functioning, the thread bore M 12 must always be closed.

References

Additional flexible possibility of fitting with holding plate 23210.0740.

In the M 8 threaded pin on the support bolt various locating and seating pins (EH 22...) can be mounted. Custom-made extensions can also be fitted.

The clamping height can be increased using height adjusting cylinders EH 23310. and with spacers EH 1107. and EH 1108.

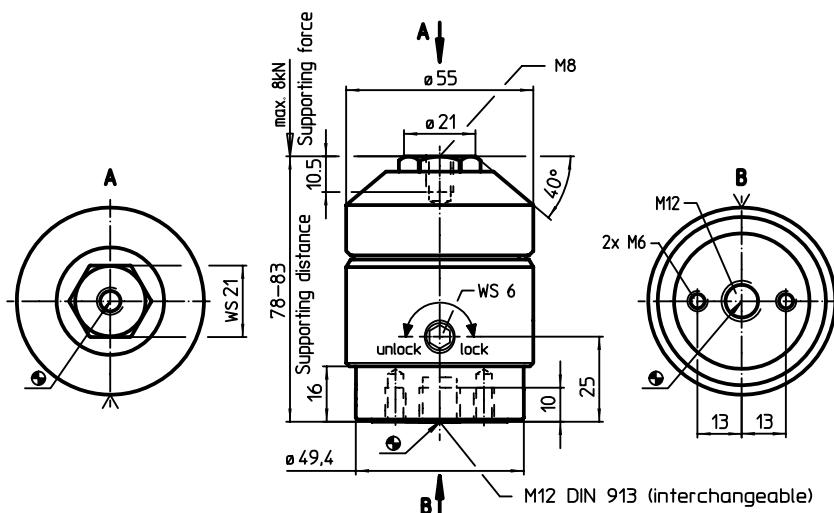
Further products

Holding Plates, for down-hold clamps. → p. 457

Height Adjusting Cylinders → p. 527

Spacers → p. 763

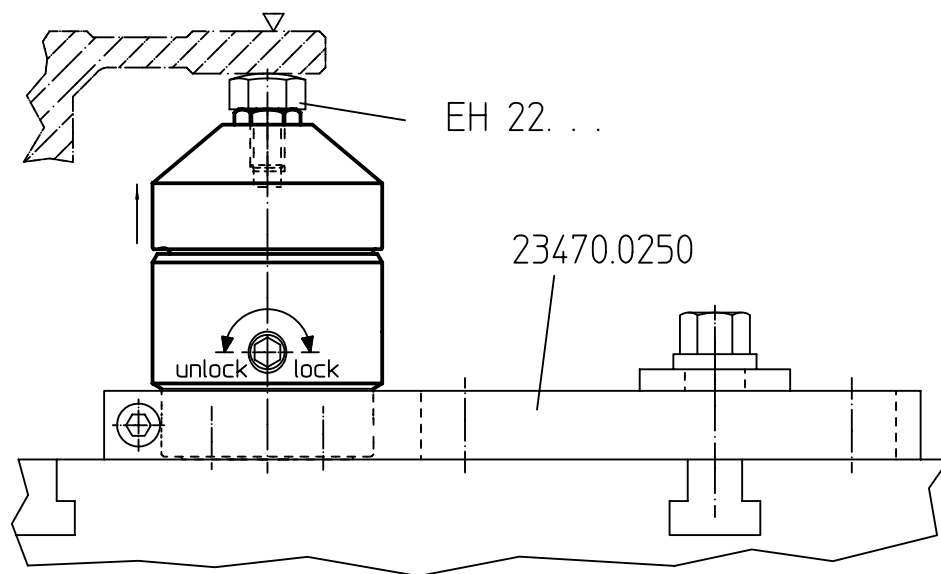
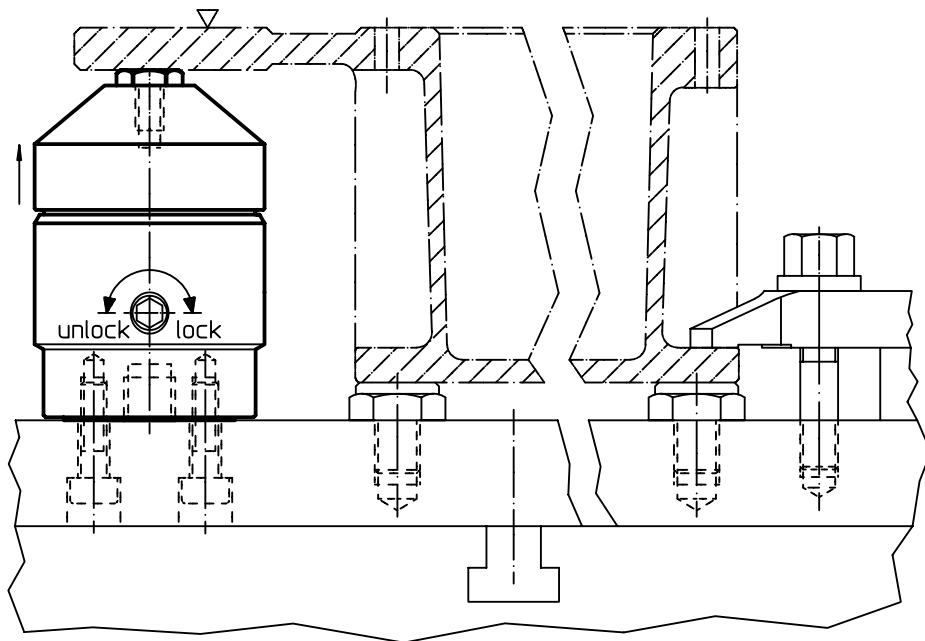
DRAWING



ORDER INFORMATION

[g]	Art. No.
1137	23220.0400

APPLICATION EXAMPLE



FLOATING CLAMPS

COMPLICATED... AND SENSITIVE? NO PROBLEM.

3

THE RIGHT CLAMPING ELEMENT FOR EVERY WORKPIECE.

The floating clamp is used to clamp and support additional clamping points on components. A big plus is the distortion-free clamping of raw materials. Vibrations are avoided during processing. This allows for the distortion-free clamping of such components as ribs and beads.



[www.halder.com/
FloatingClamps-Video](http://www.halder.com/FloatingClamps-Video)

THEY ARE AVAILABLE IN FIVE MODELS:

- M12: combined clamping and locking & separate clamping and locking

Each is also available as a compact design – suitable for low clamping heights

- M16: combined clamping and locking



Floating Clamps • compact construction, combined clamping and locking M 12
EH 23320.



PRODUCT DESCRIPTION

The floating clamp is used to **clamp and support** additional clamping points on components.

The benefits of the floating clamp are:

- Avoids vibration during the processing
- Clamps ribs, beads and shackles to reinforce clamped components
- Distortion-free clamping of raw parts
- Compact version with reduced height.

Material

Adjustable body

- Aluminium, red anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

Assembly

1. Mount the floating clamp onto the device (mounting holes for M 6, see drawing).
2. Adjust the height limit stop and the rotating area with the sleeve, and clamp with set screw (4x WS 2.5). When setting the height limit upwards provide generous clearance (workpiece tolerance).

Operation

1. Push the floating clamp downwards.
2. Pivot the clamping jaws in as far as possible. The floating clamp contacts the bottom of the workpiece with a slight spring load.

3. Tighten the floating clamp with a hexagonal nut (WS 18) having a min. torque of 15 Nm and a maximum torque of 30 Nm.

In the clamping process, the workpiece is clamped and simultaneously supported.

4. Releasing is done in reverse order.

MORE INFORMATION

Notes

For specific clamping situations, the standard clamping jaws supplied can be exchanged or replaced (see catalogue drawing: screw ISO 4762 - M8 - 12.9, M max. = 43 Nm).

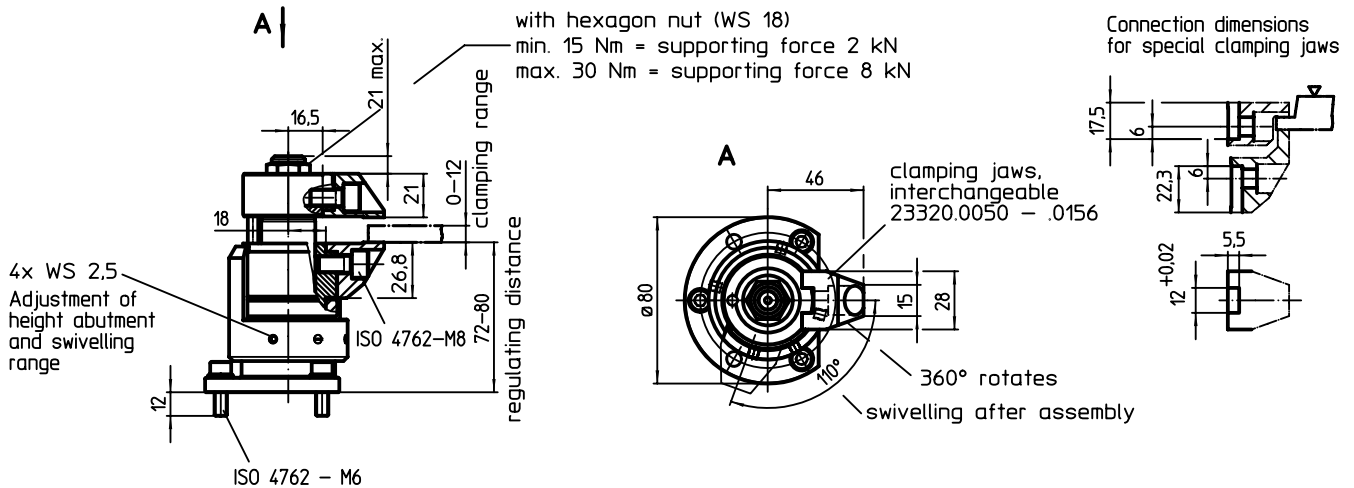
Accessories

As an accessory, we offer clamping jaws with an increased clamping range, refer to 23320.0050-.0058, as well as pivot jaws, refer to 23320.0148-.0156.


Further products

- Nuts for T-Slots, DIN 508 → p. 384
- Nuts for T-Slots, extended..... → p. 388
- Standard Clamping Jaws, for floating clamp M 12 → p. 491
- Clamping Jaws, for floating clamp M 12..... → p. 492

DRAWING

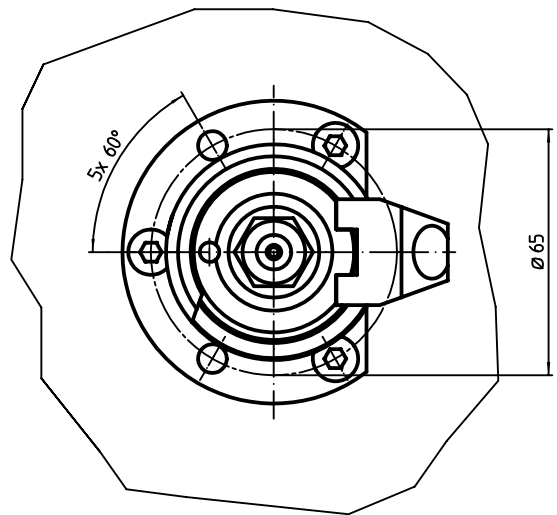
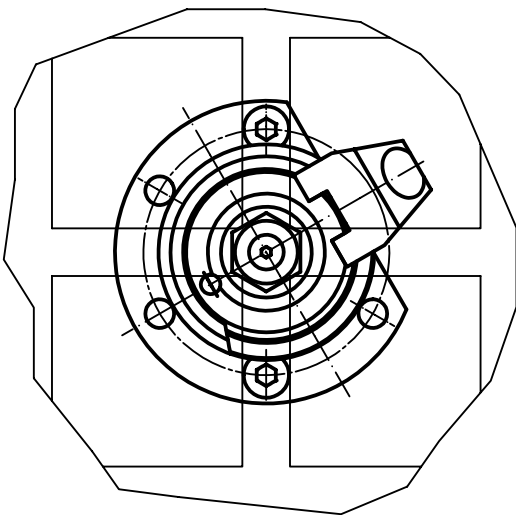
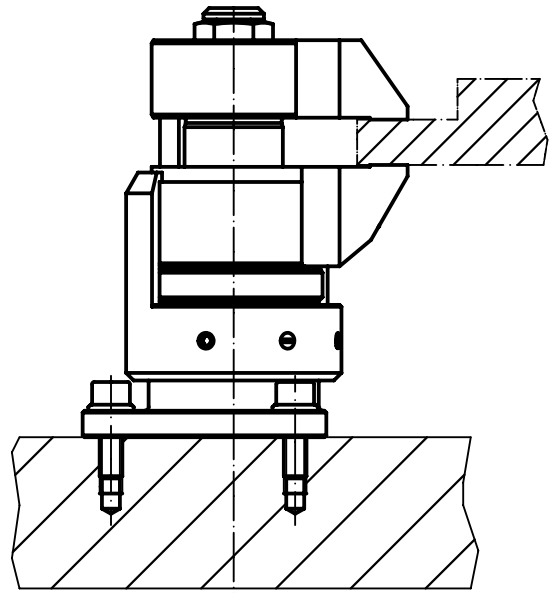
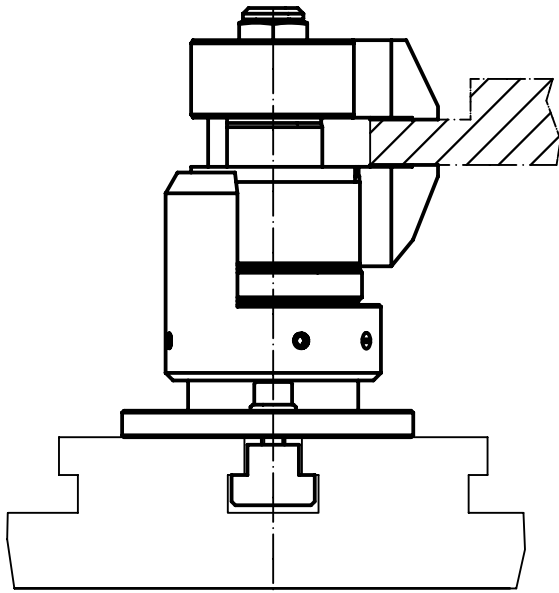


ORDER INFORMATION

	Art. No.
[g] 1654	23320.0008

APPLICATION EXAMPLE

3



Floating Clamps • compact construction, separate clamping and locking M 12
EH 23320.



PRODUCT DESCRIPTION

Floating clamps with separate clamping and locking are used to clamp and support additional clamping points on extremely pliable workpieces. Both, clamping and supporting force can be designed individually.

The benefits of the floating clamp are:

- Avoids vibration during the processing
- Clamps ribs, beads and shackles to reinforce clamped components
- Distortion-free clamping of raw parts
- Compact version with reduced height.

Material

Adjustable body

- Aluminium, blue anodised

Body

- Case-hardened steel, nitrated, manganese phosphated and ground

Clamping jaws

- Case-hardened steel, nitrated, manganese phosphated

Assembly

1. Mount the floating clamp onto the device (mounting holes for M 6, see drawing).
2. Adjust the height limit stop and the rotating area with the sleeve, and clamp with set screw (4x WS 2.5). When setting the height limit upwards provide generous clearance (workpiece tolerance).

Operation

1. Push the floating clamp downwards.
2. Pivot the clamping jaws inwards.
3. Release floating clamp. The bottom jaw contacts the workpiece with the force of the contact spring.
4. Tighten the fixture nut (WS 18) (max. torque 15 Nm). **The jaws clamp the workpiece - the clamp is still floating.**
5. Then tighten the hexagon collar nut (WS

- 10) (max. torque 10 Nm).
6. The workpiece clamping process is complete.
7. Releasing is performed in the reverse order: Release hexagon collar nut (WS 10) - release hexagon nut (WS 18) - pivot out the clamping jaws
8. Floating clamp is in end position.

MORE INFORMATION

Notes

For specific clamping situations, the standard clamping jaws supplied can be exchanged or replaced (see catalogue drawing: screw ISO 4762 - M8 - 12.9, M max. = 43 Nm).

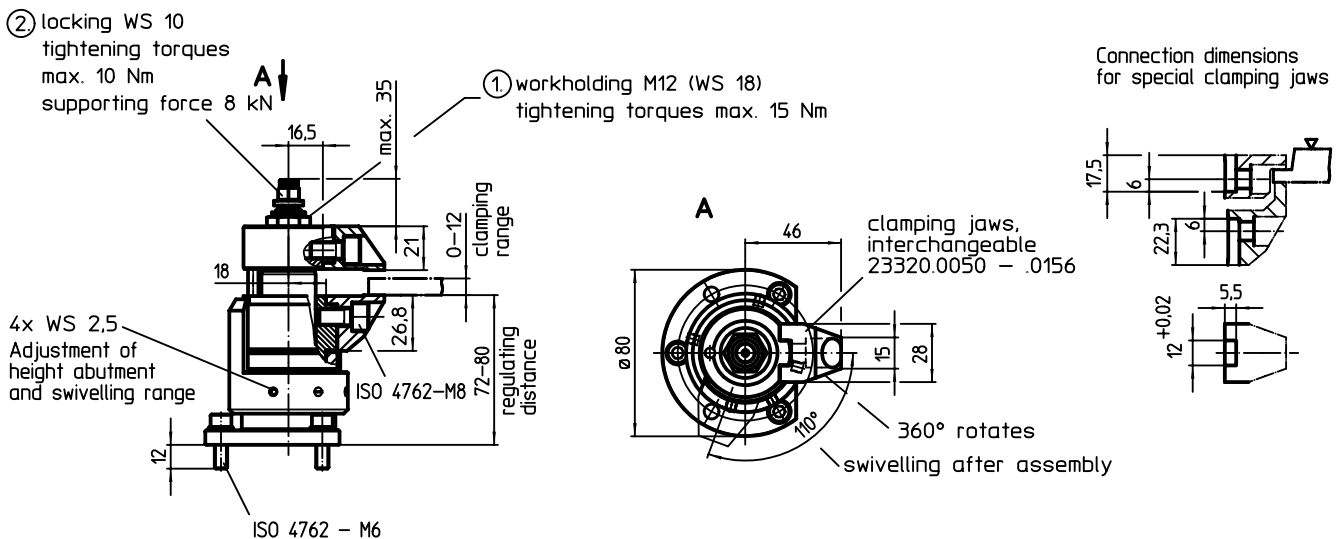
Accessories

As an accessory, we offer clamping jaws with an increased clamping range, refer to 23320.0050-.0058, as well as pivot jaws, refer to 23320.0148-.0156.


Further products

- Nuts for T-Slots, DIN 508 → p. 384
- Nuts for T-Slots, extended..... → p. 388
- Standard Clamping Jaws, for floating clamp M 12 → p. 491
- Clamping Jaws, for floating clamp M 12..... → p. 492

DRAWING

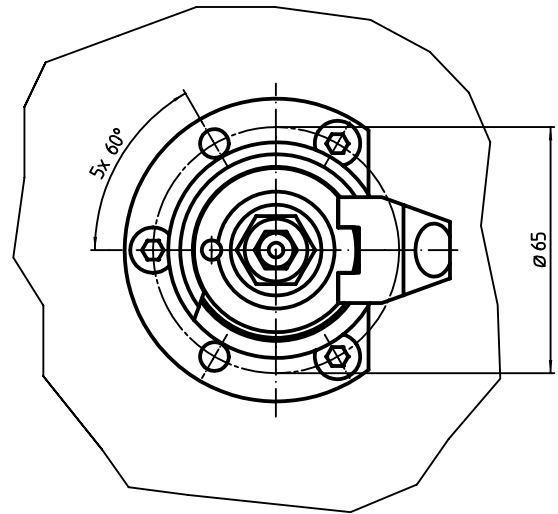
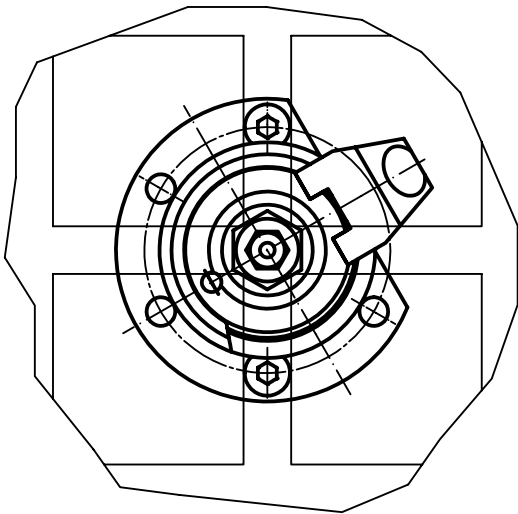
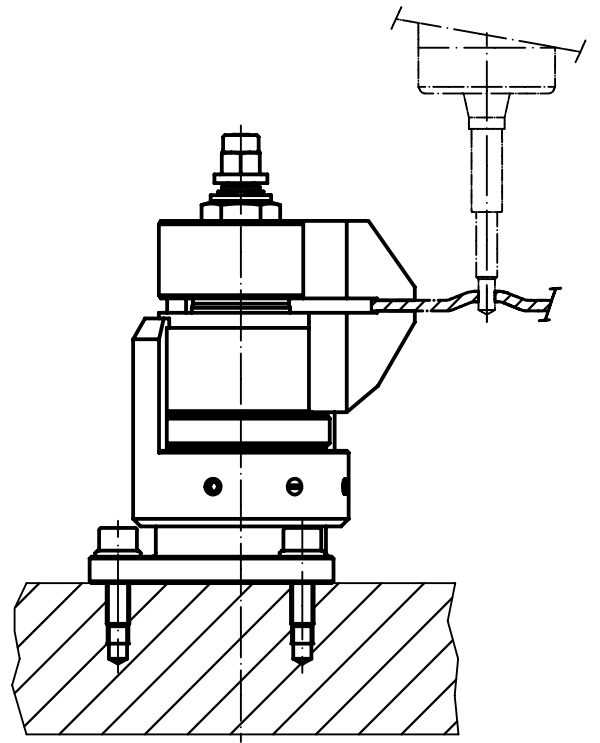
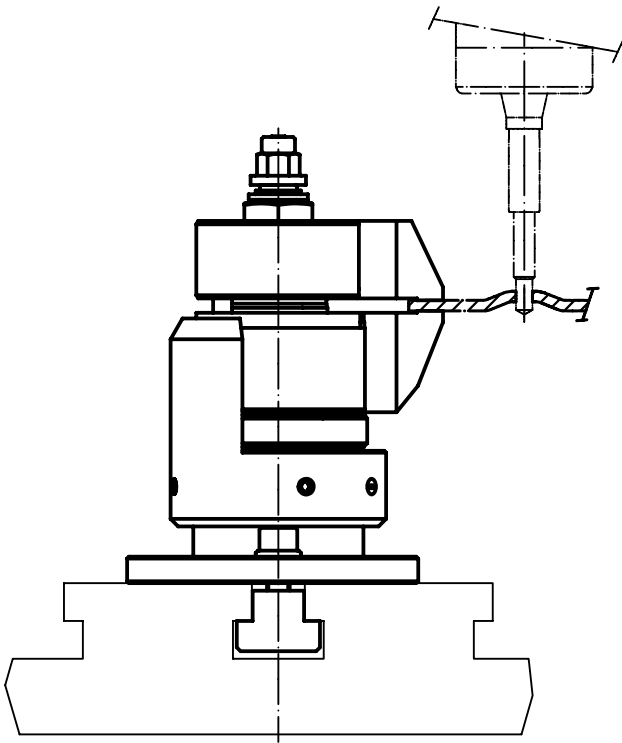


ORDER INFORMATION

 [g]	Art. No.
1663	23320.0010

APPLICATION EXAMPLE

3



Floating Clamps • combined clamping and locking M 12
EH 23320.



PRODUCT DESCRIPTION

The floating clamp is used to **clamp and support** additional clamping points on components.

The benefits of the floating clamp are:

- Avoids vibration during the processing
- Clamps ribs, beads and shackles to reinforce clamped components
- Distortion-free clamping of raw parts.

Material

Adjustable body

- Aluminium, red anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

Assembly

1. Mount the floating clamp (M 12 connection thread) onto the device with a wrench (WS 46).
2. Adjust the height limit and the rotating area with the red sleeve and clamp with a set screw (3 x WS 2.5). When setting the height limit, consider tolerance of workpiece.

Operation

1. Push the floating clamp downwards.
2. Pivot the clamping jaws in as far as possible. The floating clamp contacts the bottom of the workpiece with a slight spring load.
3. Tighten the floating clamp with a hexagonal nut (WS 18) having a min. torque of 15 Nm and a maximum torque of 30 Nm.

In the clamping process, the workpiece is clamped and simultaneously

supported.

4. Releasing is done in reverse order.

MORE INFORMATION

Notes

The thread bore must always be closed for safe functioning, e.g. set screw M 12 x 10. For specific clamping situations, the standard clamping jaws supplied can be exchanged or replaced (see catalogue drawing: screw ISO 4762 - M8 - 12.9, M max. = 43 Nm).

References

Additional flexible possibility of fitting with holder 23470.0250 or holding plate for down-hold clamps 23210.0740.

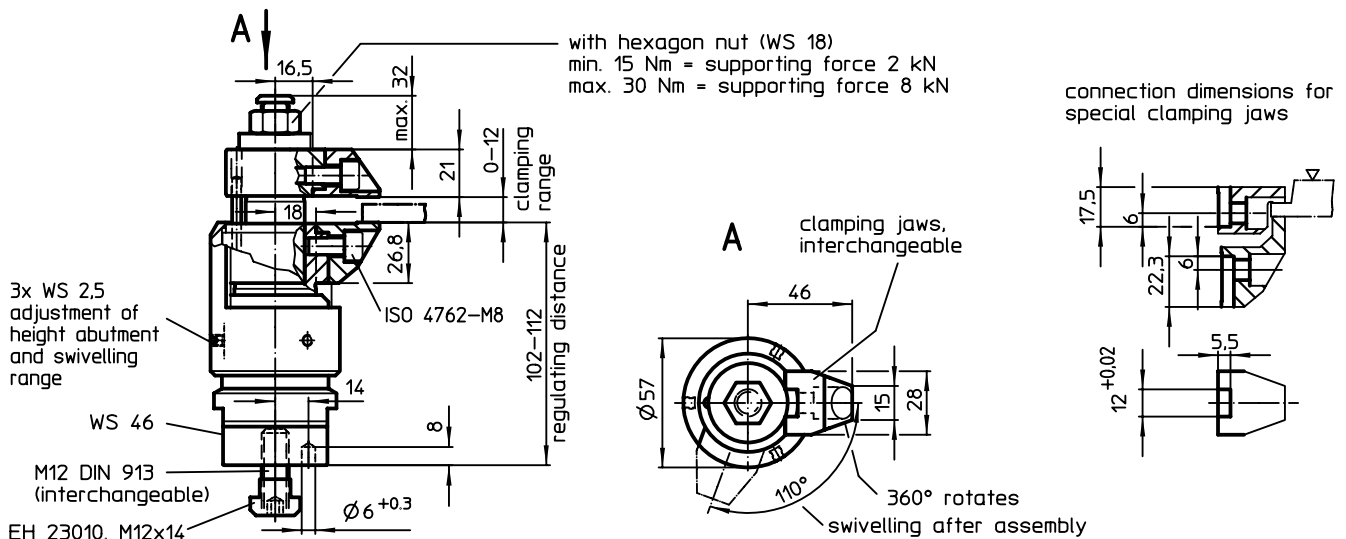
Accessories

As an accessory, we offer clamping jaws with an increased clamping range, refer to 23320.0050-.0058, as well as pivot jaws, refer to 23320.0148-.0156.

Further products

- Holding Plates, for down-hold clamps → p. 457
- Floating Clamps, separate clamping and locking M 12 → p. 489
- Standard Clamping Jaws, for floating clamp M 12 → p. 491
- Clamping Jaws, for floating clamp M 12 → p. 492

DRAWING



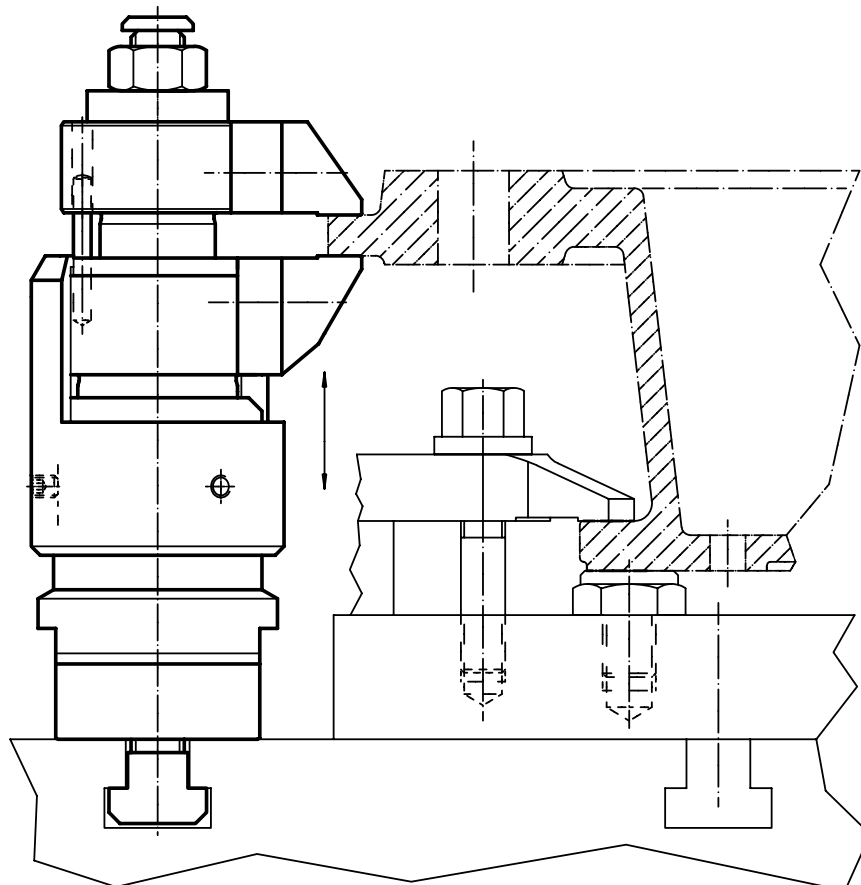
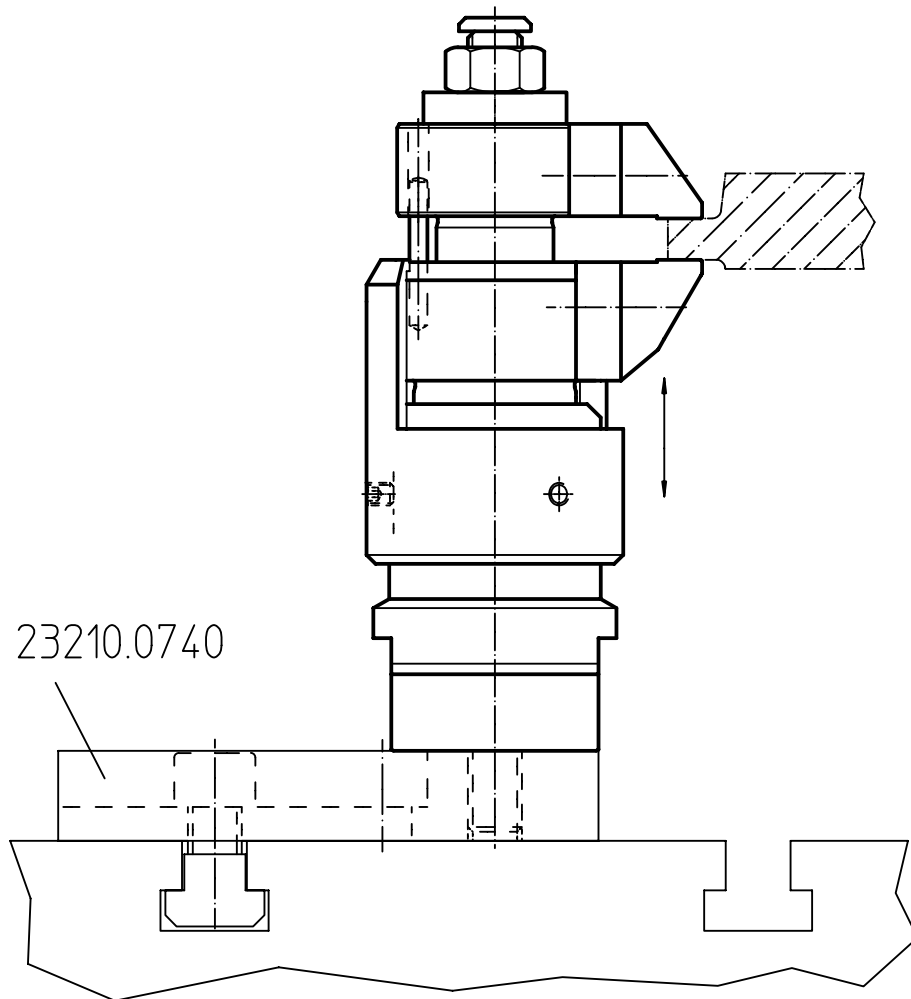
ORDER INFORMATION

[g]	Art. No.
2103	23320.0012



APPLICATION EXAMPLE

3



Floating Clamps • separate clamping and locking M 12
EH 23320.



PRODUCT DESCRIPTION

Floating clamps with separate clamping and locking are used to clamp and support additional clamping points on extremely pliable workpieces. Both, clamping and supporting force can be designed individually.

The benefits of the floating clamp are:

- Avoids vibration during the processing
- Clamps ribs, beads and shackles to reinforce clamped components
- Distortion-free clamping of raw parts.

Material

Adjustable body

- Aluminium, blue anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

Assembly

1. Mount the floating clamp (M 12 connection thread) onto the device with a wrench (WS 46).
2. Adjust the height limit stop and the rotating area with the blue sleeve and clamp with a set screw (3 x WS 2.5). When setting the height limit, consider tolerance of workpiece.

Operation

1. Push the floating clamp downwards.
2. Pivot the clamping jaws inwards.
3. Release floating clamp. The bottom jaw contacts the workpiece with the force of the contact spring.
4. Tighten the fixture nut (WS 18) (max. torque 15 Nm). **The jaws clamp the workpiece - the clamp is still floating.**
5. Then tighten the hexagon collar nut (WS 10) (max. torque 10 Nm).
6. The workpiece clamping process is complete.

7. Releasing is performed in the reverse order: Release hexagon collar nut (WS 10) - release hexagon nut (WS 18) - pivot out the clamping jaws
8. Floating clamp is in end position.

MORE INFORMATION

Notes

The thread bore must always be closed for safe functioning, e.g. set screw M 12 x 10. For specific clamping situations, the standard clamping jaws supplied can be exchanged or replaced (see catalogue drawing: screw ISO 4762 - M8 - 12.9, M max. = 43 Nm).

References

Additional flexible possibility of fitting with holder 23470.0250 or holding plate for down-hold clamps 23210.0740.

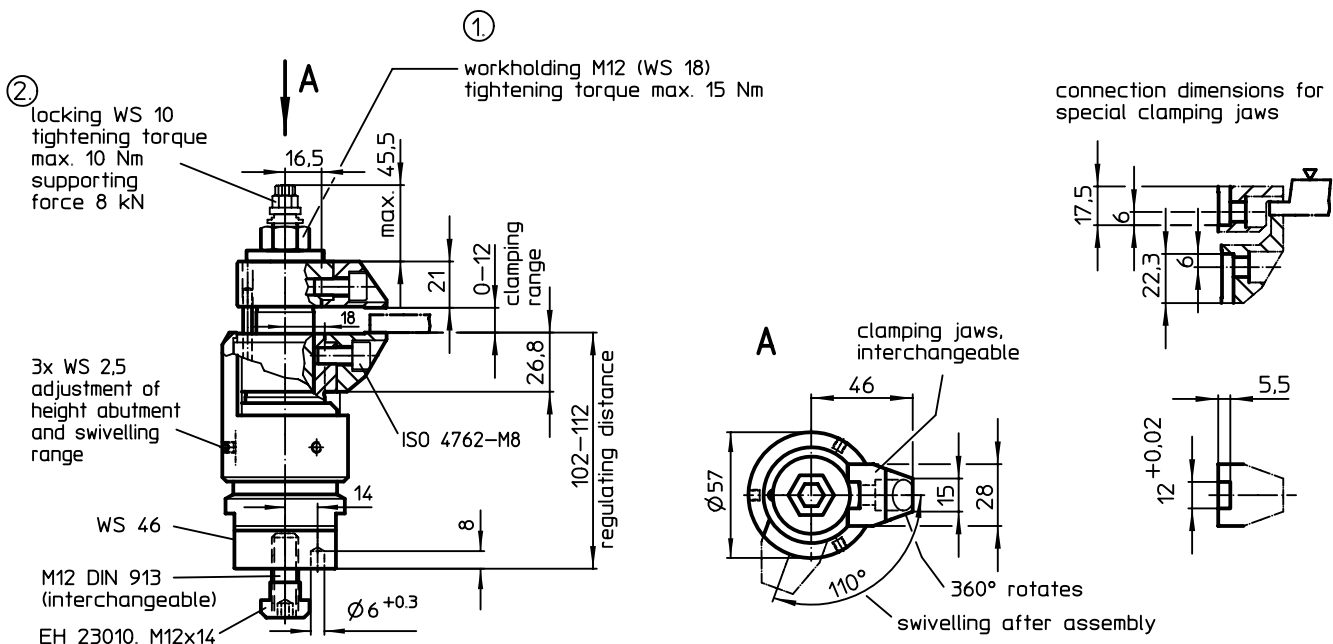
Accessories

As an accessory, we offer clamping jaws with an increased clamping range, refer to 23320.0050-.0058, as well as pivot jaws, refer to 23320.0148-.0156.


Further products

- Holding Plates, for down-hold clamps → p. 457
- Floating Clamps, combined clamping and locking M 12. → p. 487
- Standard Clamping Jaws, for floating clamp M 12 → p. 491
- Clamping Jaws, for floating clamp M 12. → p. 492

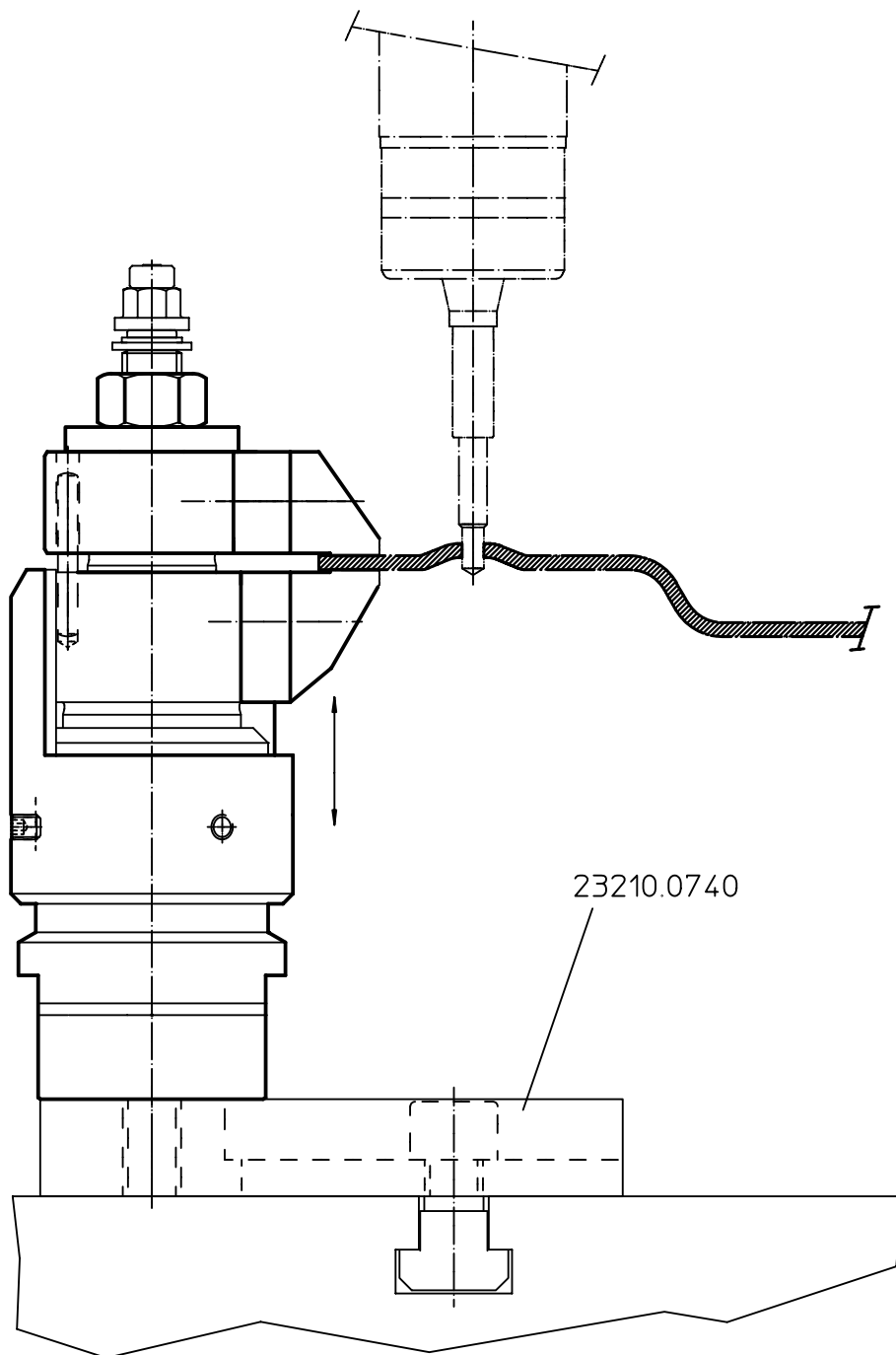
DRAWING



ORDER INFORMATION

 [g] 379	Art. No. 23320.0014
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APPLICATION EXAMPLE



3

Standard Clamping Jaws • for floating clamp M 12

EH 23320.



PRODUCT DESCRIPTION

The clamping jaws can be used for floating clamps 23320.0008, 23320.0010, 23320.0012, and 23320.0014.

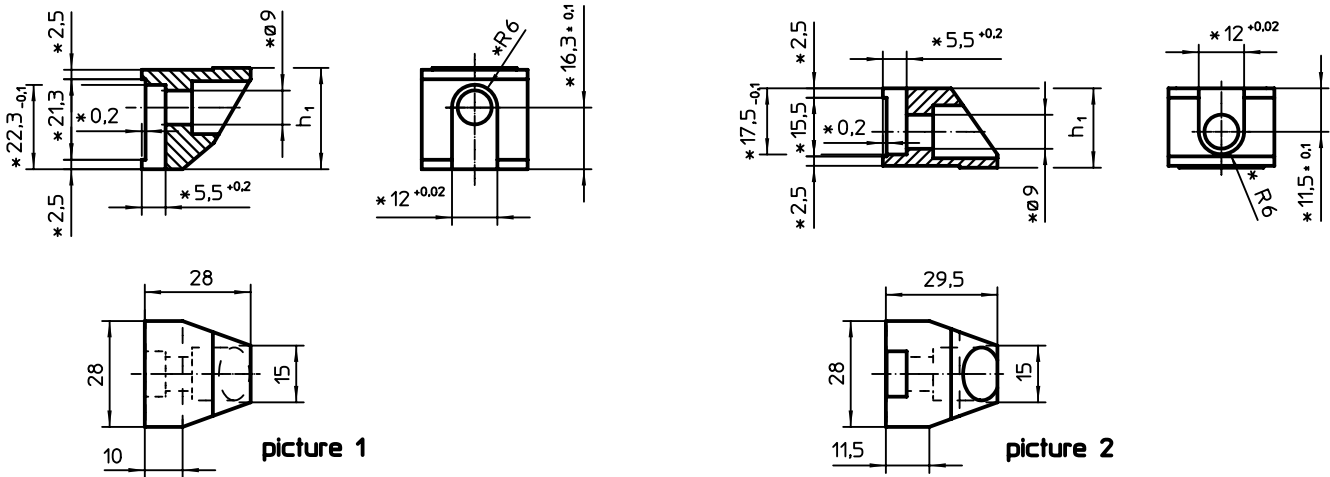
Material

- Case-hardened steel, nitrided, manganese phosphated

Assembly


When using custom-made jaws, it is important to insert the tightening screw (M 8-12.9, 43 Nm) 10 mm deep into the clamp housing on the upper clamping jaw and 9 mm deep into the clamp housing on the lower clamping jaw.

DRAWING



* Specifications and material of especially designed jaws have to be taken into consideration.

ORDER INFORMATION

Clamping range	Dimensions		Art. No.
[mm]	h_1 -0.1 [mm]	[g]	
lower standard clamping jaw – picture 1			
–	26.8	99	23320.0050
upper standard clamping jaw – picture 2			
0 – 12	21.0	69	23320.0052

Clamping Jaws • for floating clamp M 12

EH 23320.



PRODUCT DESCRIPTION

The clamping jaws can be used for floating clamps 23320.0008, 2332.0010, 23320.0012, and 23320.0014.

The upper clamping jaw (23320.0054, 23320.0056, and 23320.0058 - pictures 1 to 3) can be used to extend the clamping range.

Various standard parts can be screwed into the upper clamping jaw as required, using locating thread M 8 (23320.0154 / .0156 - pictures 4 + 5) - see "Further products".

The lower clamping jaw with pivot function (23320.0148 - picture 6) adapts to the profiles of the workpiece.

Material

Ball

- Ball-bearing steel

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

MORE INFORMATION

Notes

The tightening torque of the floating clamp must be adapted/reduced situationally.

Observe the surface pressure due to the

reduced contact surface of the clamping jaws.

Further products

Seating Pins, ribbed or pointed → p. 309

Ball-Ended Thrust Screws, headless, ball protected against rotating → p. 320

Ball-Ended Thrust Screws, headless, flat-faced ball → p. 327

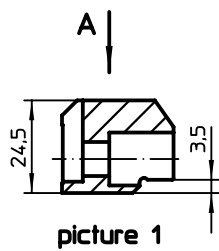
Thrust Screws, with brass pad → p. 334

Thrust Screws, with plastic pad → p. 335

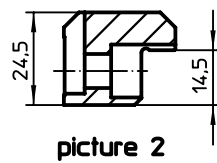
Self-Aligning Pads, adjustable → p. 343

Self-Aligning Pads, adjustable, self-resetting → p. 344

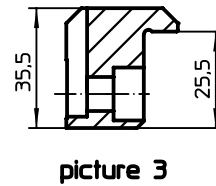
DRAWING



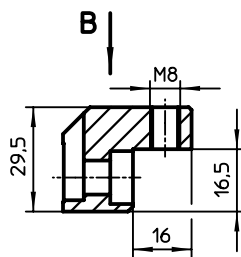
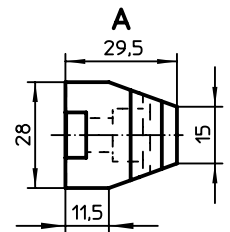
picture 1



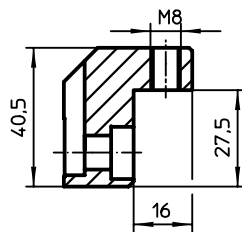
picture 2



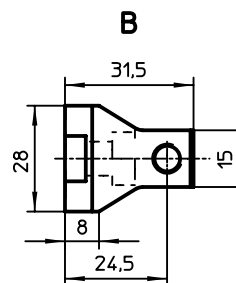
picture 3



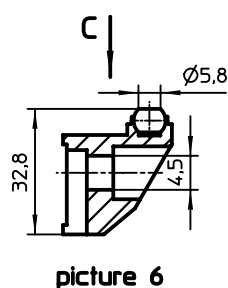
picture 4



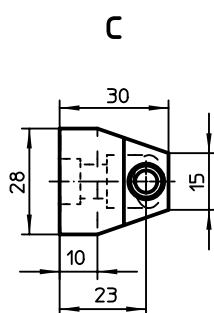
picture 5



B




picture 6

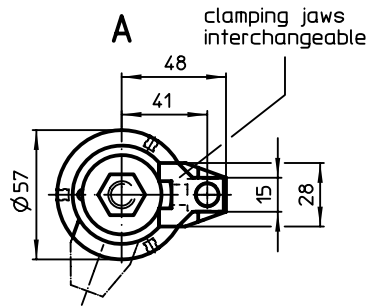
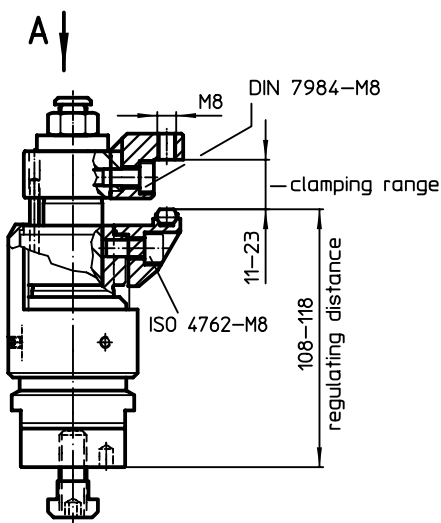


C

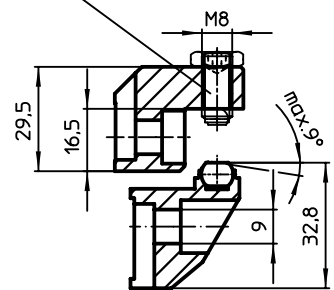
ORDER INFORMATION

Clamping range max. in combination with 23320.0050 [mm]	Clamping range max. in combination with 23320.0148 [mm]	 [g]	Art. No.
upper exchange clamping jaw – picture 1			
4 – 16	–	91	23320.0054
upper exchange clamping jaw – picture 2			
15 – 27	–	88	23320.0056
upper exchange clamping jaw – picture 3			
26 – 38	–	130	23320.0058
upper clamping jaw with location hole – picture 4			
29	23	83	23320.0154
upper clamping jaw with location hole – picture 5			
40	34	112	23320.0156
lower clamping jaw with flat-faced ball and pivot function, plain surface, protected against rotating – picture 6			
–	–	98	23320.0148

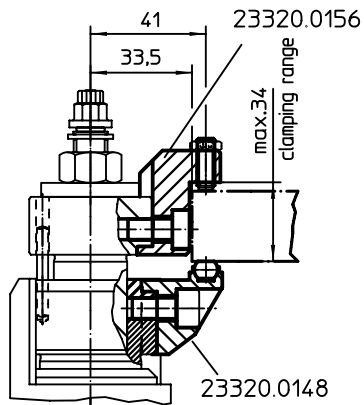
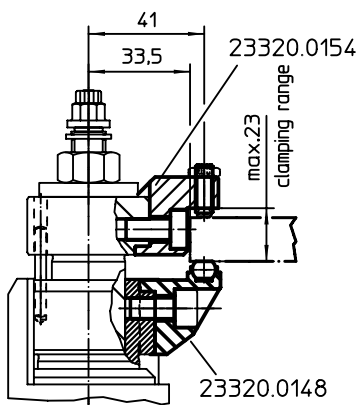
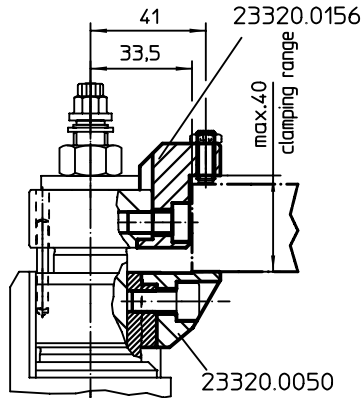
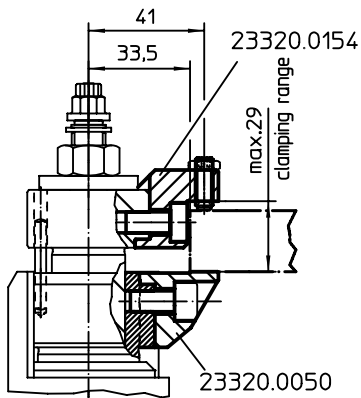
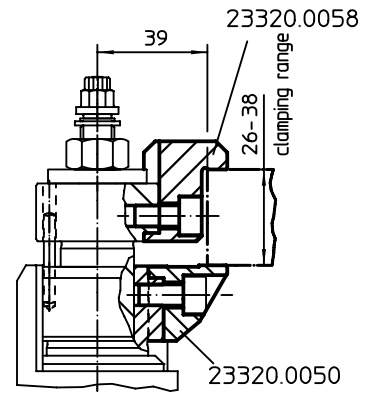
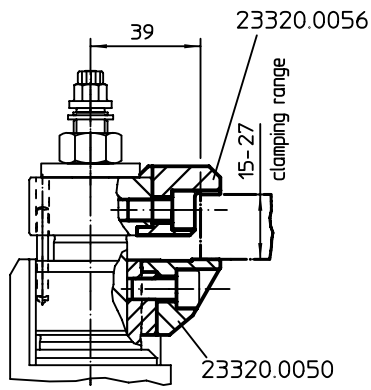
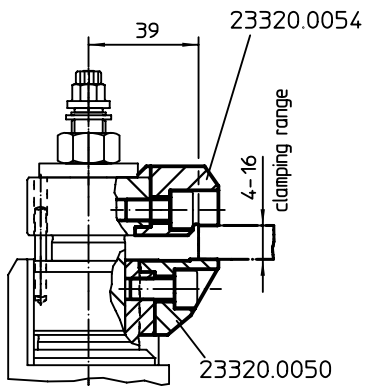
APPLICATION EXAMPLE



e.g. Ball-Ended Thrust Screw (EH 22720.)



3



Floating Clamps • combined clamping and locking M 16

EH 23320.



PRODUCT DESCRIPTION

The floating clamp is used to **clamp and support** additional clamping points on components.

The benefits of the floating clamp are:

- Especially suitable for large workpieces with heavy machining
- Avoids vibration during the processing
- Clamps ribs, beads and shackles to reinforce clamped components
- Distortion-free clamping of raw parts

Material

Adjustable body

- Aluminium, red anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

Assembly

1. Mount the floating clamp (M 16 connection thread) onto the device with a wrench (WS 55).
2. Adjust the height limit stop and the rotating area with the red sleeve and clamp with a set screw (3 x WS 3). When setting the height limit, consider tolerance of workpiece.

Operation

1. Push the floating clamp downwards.

2. Pivot the clamping jaws in as far as possible. The floating clamp contacts the bottom of the workpiece with a low spring load.
3. Tighten the floating clamp with a hexagonal nut (WS 24) having a min. torque of 50 Nm and a maximum torque of 115 Nm. **In the clamping process, the workpiece is clamped and simultaneously supported.**
4. Releasing is done in reverse order.

MORE INFORMATION

Accessories

For custom clamping situation, the standard upper clamping jaw supplied can be replaced by the exchange clamping jaws (23320.0062 / .0064 / .0066).

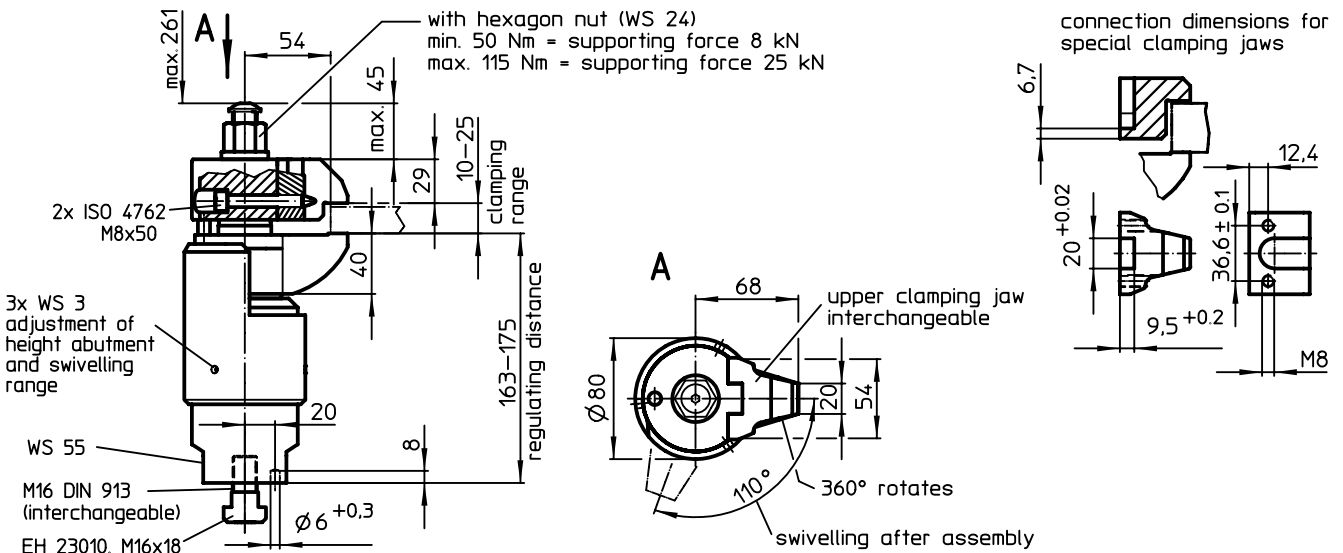
Further products

Clamping Jaws, for floating clamp


M 16. → p. 497

Wrenches → p. 786

DRAWING

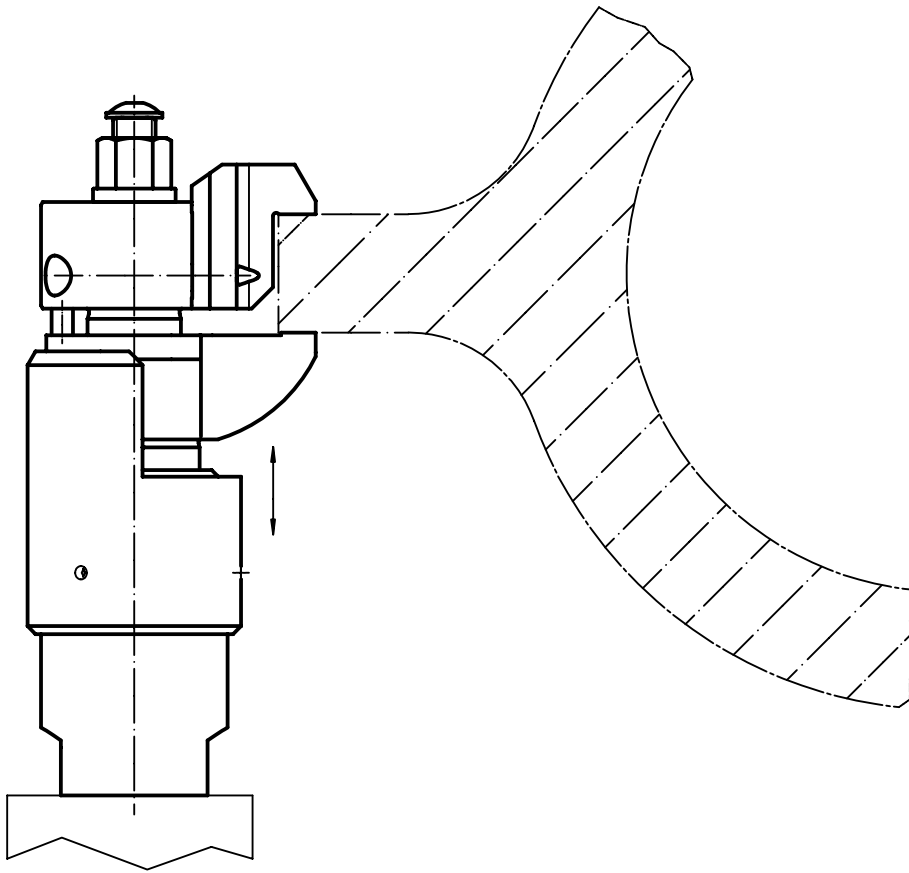


ORDER INFORMATION

	Art. No.
[g]	
6597	23320.0016

APPLICATION EXAMPLE

3



Clamping Jaws • for floating clamp M 16

EH 23320.



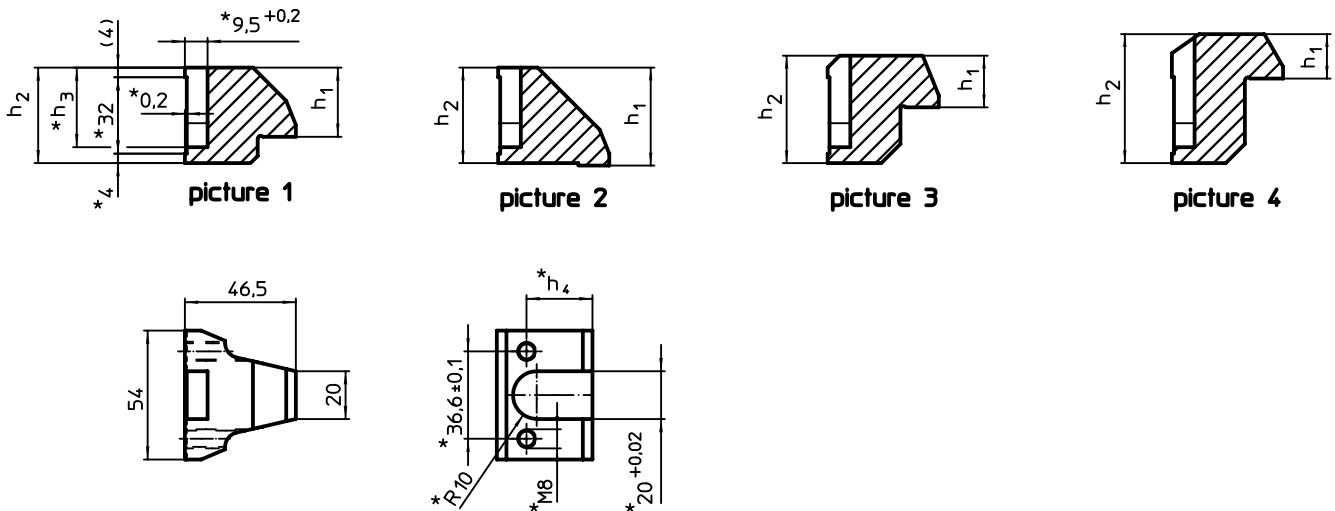
PRODUCT DESCRIPTION

The clamping jaws can be used for the floating clamp 23320.0016 to increase or decrease the clamping range.

Material

- Case-hardened steel, nitrided, manganese phosphated

DRAWING

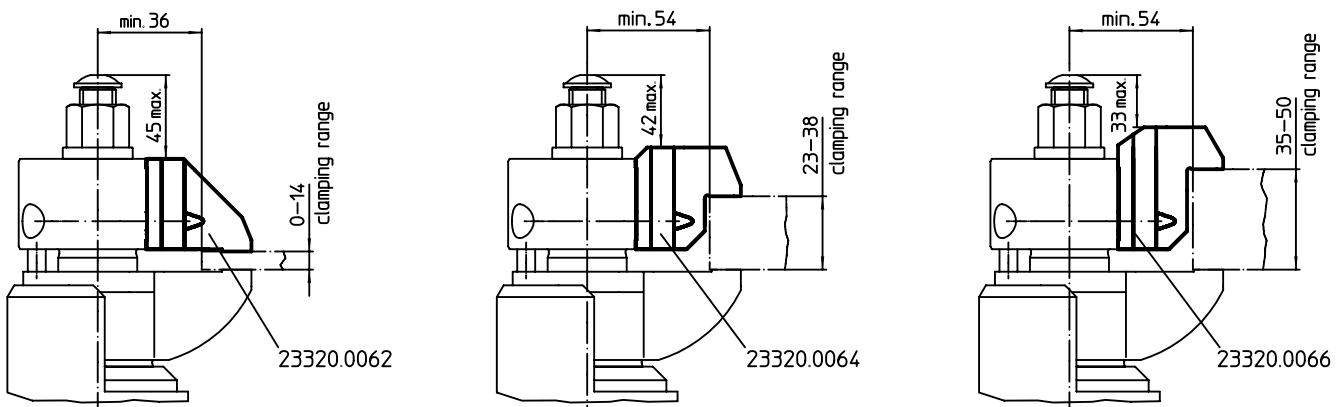


* Specifications and material of especially designed jaws have to be taken into consideration.

ORDER INFORMATION

Clamping range [mm]	Dimensions				Art. No.
	h ₁	h ₂	h ₃	h ₄	
upper standard clamping jaw – picture 1					
10 – 25	29.0	40	33.3	27.6	23320.0060
upper exchange clamping jaw – picture 2					
0 – 14	41.0	40	33.3	27.6	23320.0062
upper exchange clamping jaw – picture 3					
23 – 38	21.6	45	38.3	32.6	23320.0064
upper exchange clamping jaw – picture 4					
35 – 50	18.6	54	47.3	41.6	23320.0066

APPLICATION EXAMPLE



Clamping Devices Actima

EH 23260.



PRODUCT DESCRIPTION

The compact clamping element can be converted between pull and push clamping strain, depending on the model. The travel path is 10 mm. Within the short clamp travel of 2 mm, self-locking occurs in any position. The maximum permitted clamping force is 4.9 kN.

Material

Housing

- Thermoplastic, black

Body

- Steel, blackened

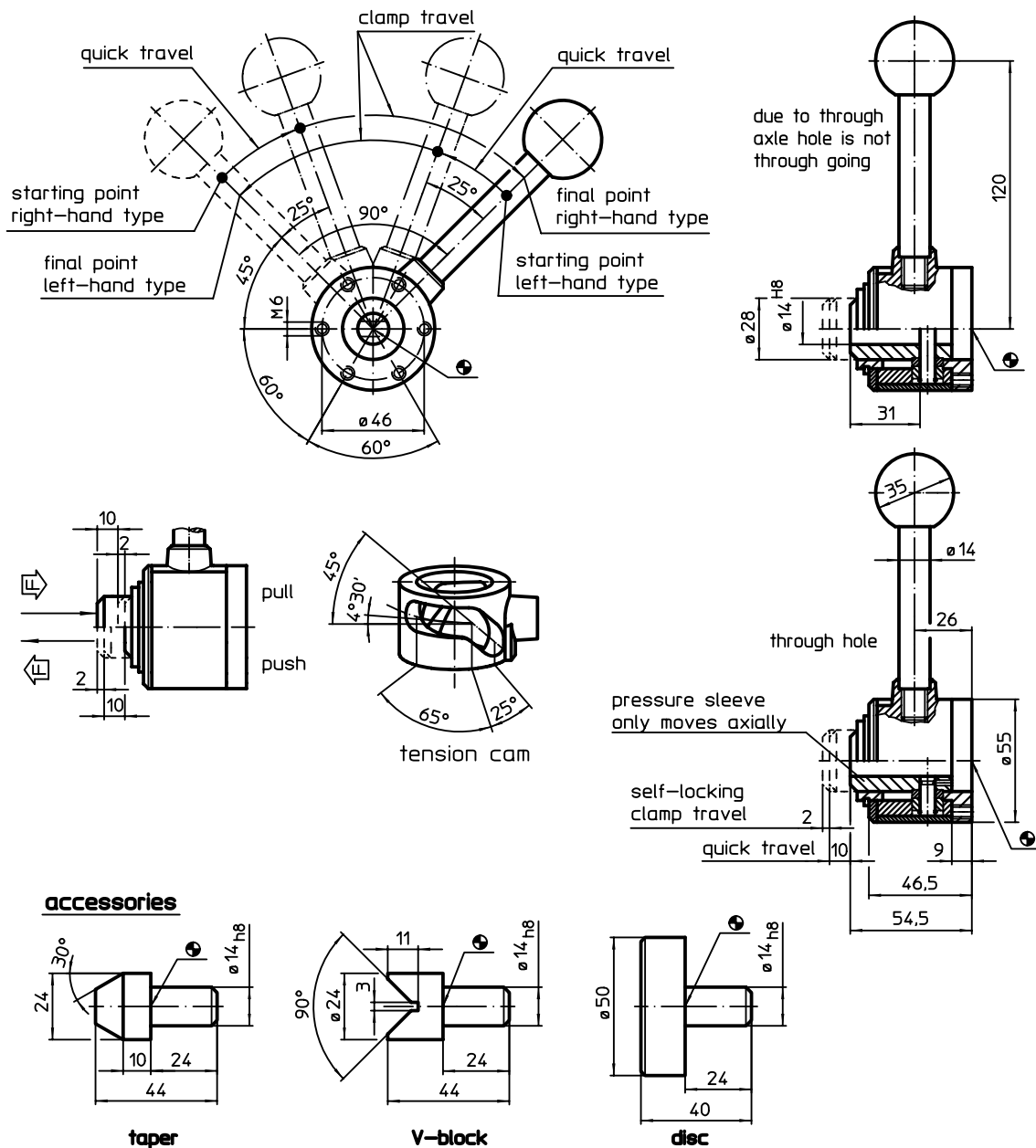
Ball knob

- DIN 7708 - thermosetting plastic (PF 31), red similar to RAL 3003


Accessories

- Steel, blackened





DRAWING



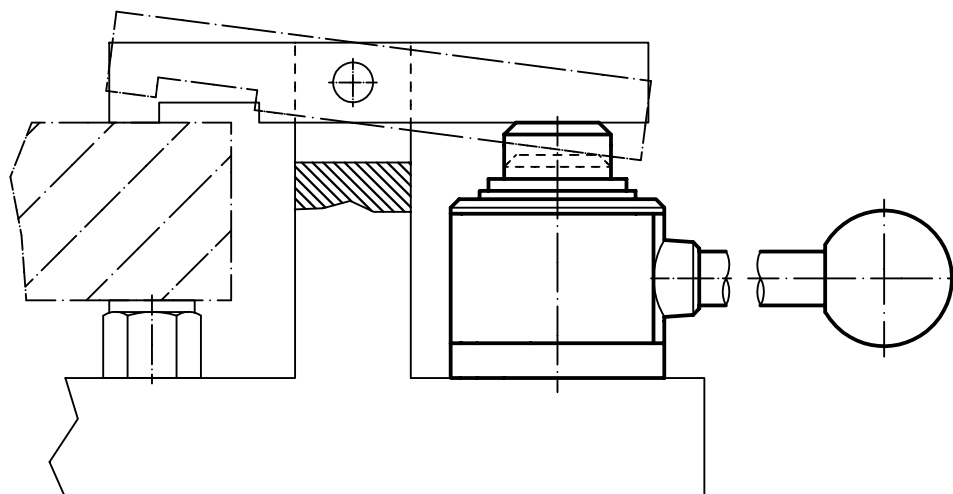
ORDER INFORMATION

Travel path [mm]	s Clamping way [mm]	Clamping force max. [kN]	 [g]	Art. No.	
				with transverse axis in the bore	with throughgoing bore
pull to right					
10	2	4.9	751	23260.0003	23260.0013
pull to left					
10	2	4.9	749	23260.0005	23260.0015
push to right					
10	2	4.9	751	23260.0002	23260.0012
push to left					
10	2	4.9	749	23260.0004	23260.0014

ACCESSORIES

	 [g]	Art. No.
disc		
	270	23260.0042
taper		
	85	23260.0044
V-block		
	82	23260.0046

APPLICATION EXAMPLE



Eccentric Clamping Clamps

EH 23270.



PRODUCT DESCRIPTION

These clamps have a high clamping force for low clamping heights. The body from brass provides a gentle but safe clamping.

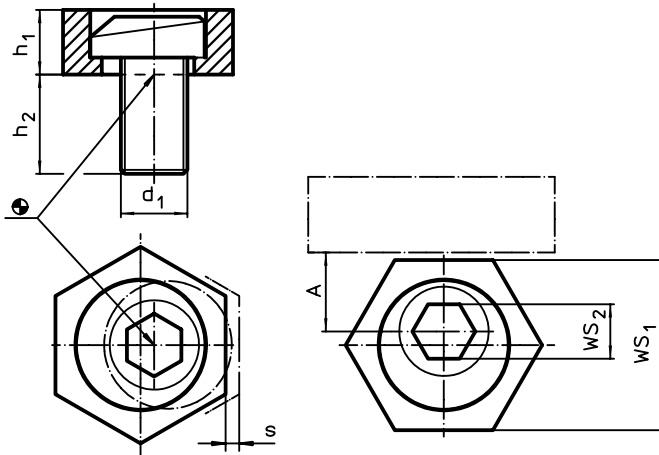
Material

- Eccentric screw**
 - Steel


Body

- Brass

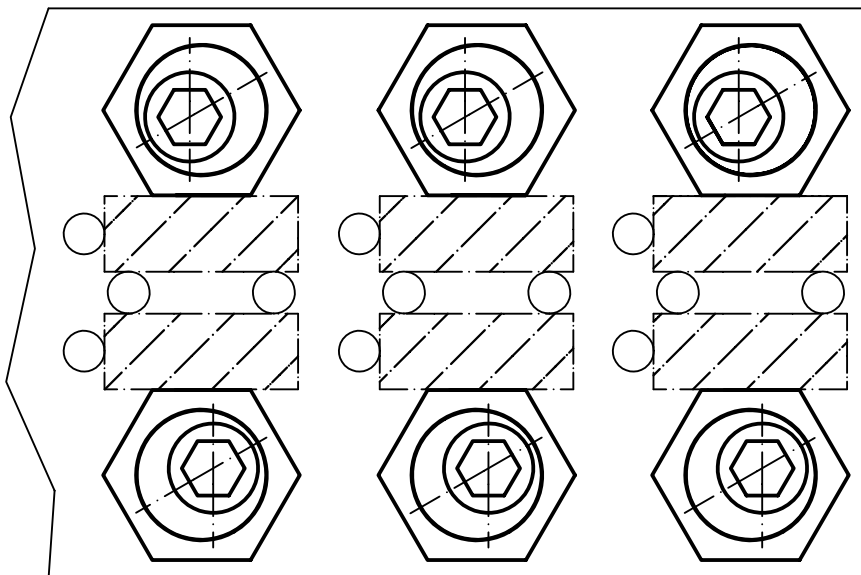
DRAWING



ORDER INFORMATION

d ₁	Dimensions			A	WS ₁	WS ₂	Clamping force max.	Tightening torque max.		Art. No.
	h ₁	h ₂	s							
M 4	2.8	9.6	0.75	3.8	7.93	3	0.9	2.5	3.5	23270.0104
M 6	4.8	11.2	1.00	7.8	15.86	4	3.4	10.0	11.0	23270.0106
M 8	4.8	15.0	1.00	10.2	20.60	5	3.6	18.0	20.0	23270.0108
M10	6.3	19.0	1.30	10.2	20.60	7	7.0	26.0	27.0	23270.0110
M12	9.5	22.8	2.00	12.7	25.40	8	9.0	75.0	54.0	23270.0112
M16	12.7	28.5	2.50	15.0	30.13	12	12.0	120.0	108.0	23270.0116

APPLICATION EXAMPLE



Eccentric Clamping Washers

EH 23270.



PRODUCT DESCRIPTION

The eccentric clamping washers are especially suitable for the clamping of raw parts, e.g. cut-off portions, cast iron parts and forgings.

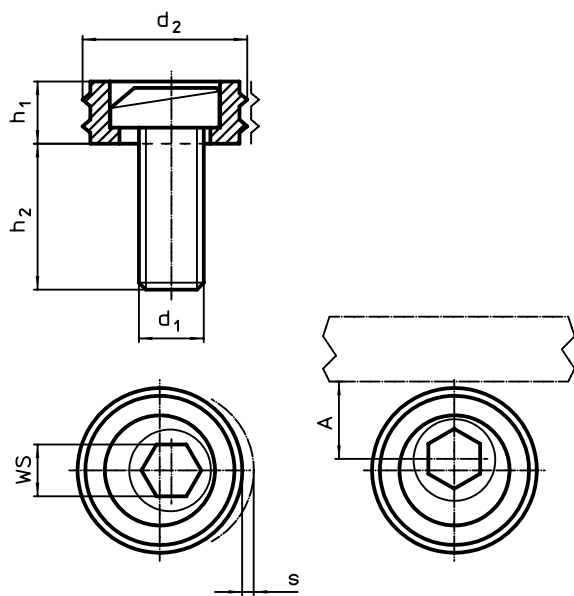
Material

Eccentric screw
 ▪ Steel


Body

▪ Steel, case-hardened

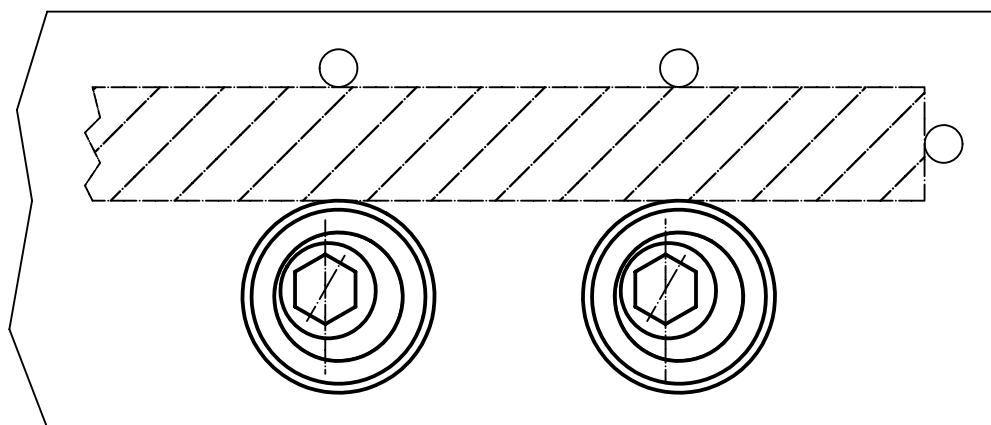
DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions			s	A	WS	Clamping force max.	Tightening torque max.		Art. No.
		h ₁	h ₂	[mm]							
M10	20.6	6.4	16.0	1.6	10.3	7	9.0	26	23	23270.0210	
M12	25.4	9.6	22.5	2.0	12.7	8	17.8	88	41	23270.0212	
M16	30.1	12.7	26.8	2.5	15.0	12	26.7	135	92	23270.0216	

APPLICATION EXAMPLE



Eccentric Clamps

EH 23271.



PRODUCT DESCRIPTION

The eccentric clamp allows clamping with pull-down effect on different workpiece forms at low height.

Material

- Case-hardened steel, case-hardened and blue zinc-plated

Assembly

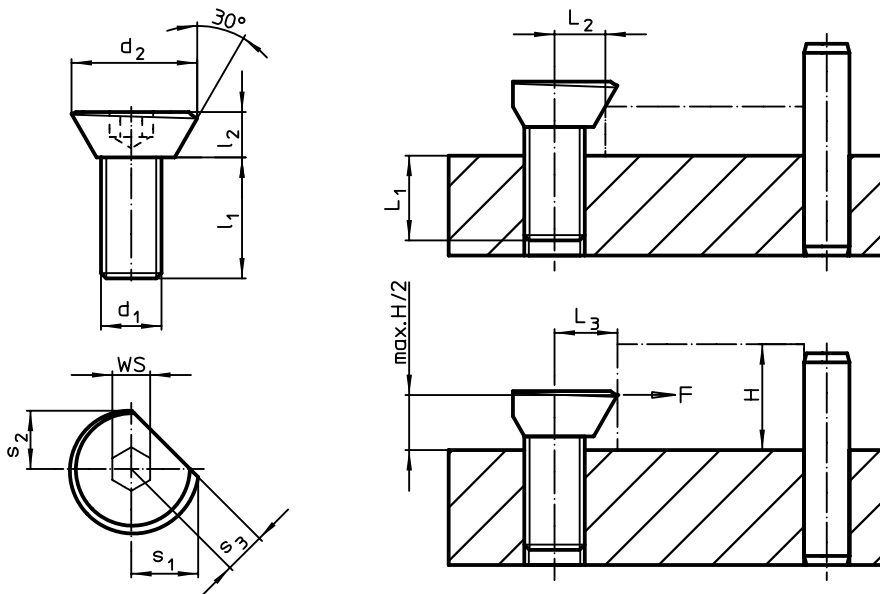
1. Manufacture a thread with the corresponding distance L_2 / L_3 to the workpiece.
2. Screw in the eccentric clamp at the necessary height and set it relative to the workpiece with its flat side.

3. Insert the workpiece and tighten the clamping pin using the internal hexagon. The proper tension is achieved after approx. 1/3 turn.

The threaded hole must be lubricated on a regular basis.

The rotational movement during tightening must always be completed towards the stops in order to prevent the workpiece from turning away from the stops.

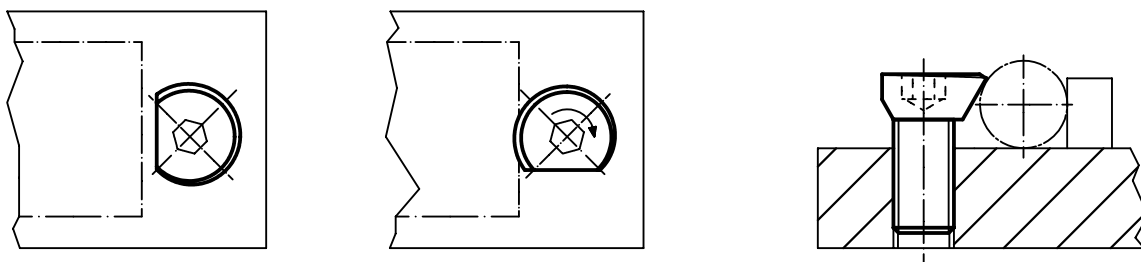
DRAWING



ORDER INFORMATION

	Dimensions						L_1	L_2	L_3 ± 0.2	WS	Clamping force max.	Tightening torque max.	Art. No.	
	d_1	d_2	l_1	l_2	s_1	s_2								s_3
M 3	6.7	6	2	3.5	2.9	2.2	3	3.0	3.2	2.0	0.05	1.0	0.6	23271.0003
M 4	8.7	8	3	4.6	4.0	3.0	4	3.5	4.2	2.5	0.09	1.5	1.4	23271.0004
M 5	10.9	10	4	5.7	5.0	3.5	5	4.2	5.2	3.0	0.10	2.0	2.8	23271.0005
M 6	13.5	12	5	7.1	6.1	4.5	6	5.4	6.4	4.0	0.30	4.5	4.9	23271.0006
M 8	16.9	16	6	8.9	7.7	5.5	8	6.6	8.0	5.0	2.70	20.0	11.0	23271.0008
M10	20.9	20	7	11.1	9.4	6.5	10	8.3	9.8	6.0	4.00	30.0	20.0	23271.0010
M12	26.1	24	9	13.5	11.6	8.0	12	10.1	12.0	8.0	5.40	44.0	35.0	23271.0012

APPLICATION EXAMPLE



Double Eccentric Levers • with fulcrum pin
EH 23380.



PRODUCT DESCRIPTION

Clamping on both sides.

Material

Fulcrum Pins

- Steel, case-hardened

Lever

- Alloyed case-hardened steel, case-hardened, blackened

Safety ring

- Spring steel

MORE INFORMATION

References

Can be used in combination with swing bolts DIN 444, M12 (EH 22980.).

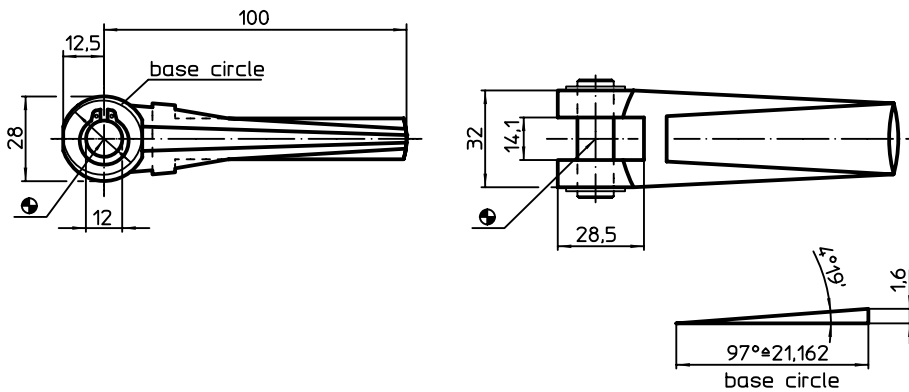
Further products

Swing Bolts, DIN 444, form B → p. 375


Swing Bolts, DIN 444, form B, quality

8.8 high precision design. → p. 376

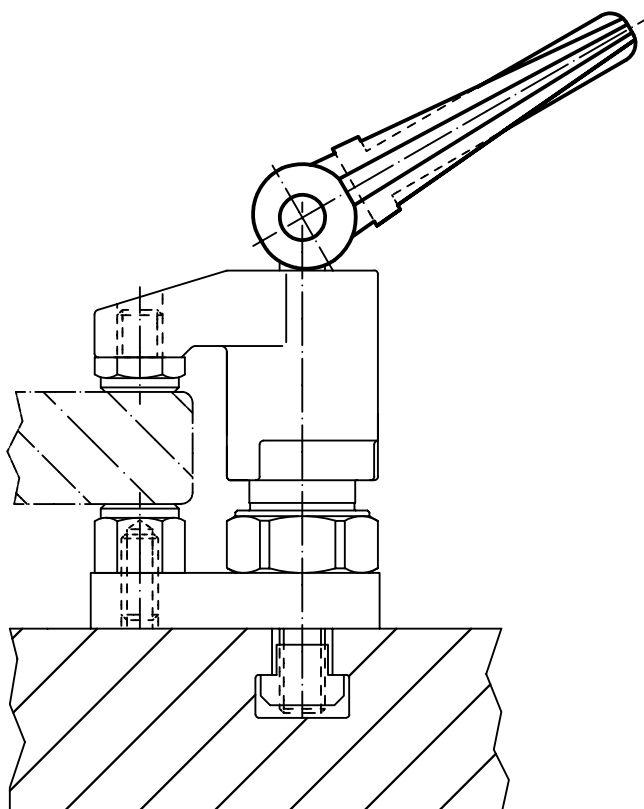
DRAWING



ORDER INFORMATION

Dimensions		Art. No.
Bore Hole		
[mm]	[g]	
12	341	23380.0012

APPLICATION EXAMPLE



Eccentric Levers • with fulcrum pin

EH 23390.



PRODUCT DESCRIPTION

The eccentric levers have an eccentric clamping range of 160°.

Material

- Stainless steel 1.4301

Fulcrum Pins

- Stainless steel 1.4021, heat-treated

Safety ring

- Stainless steel 1.4310

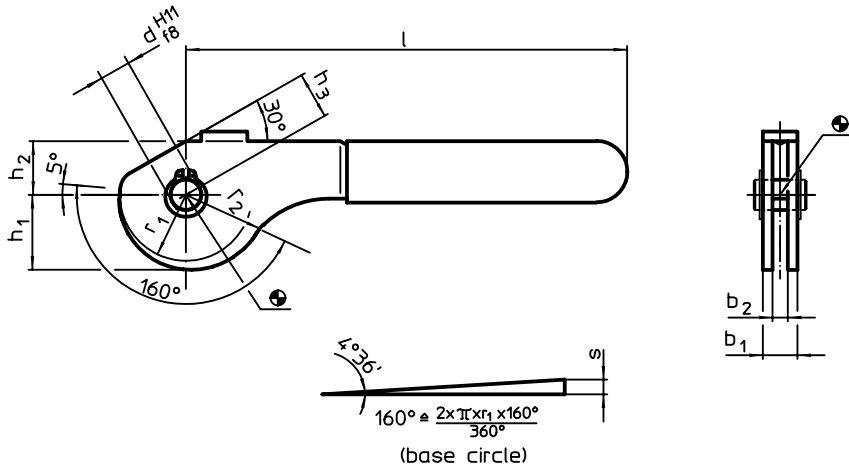
Eccentric part

- Steel St. 52-3, zinc phosphated

Plastic cap

- PVC, red

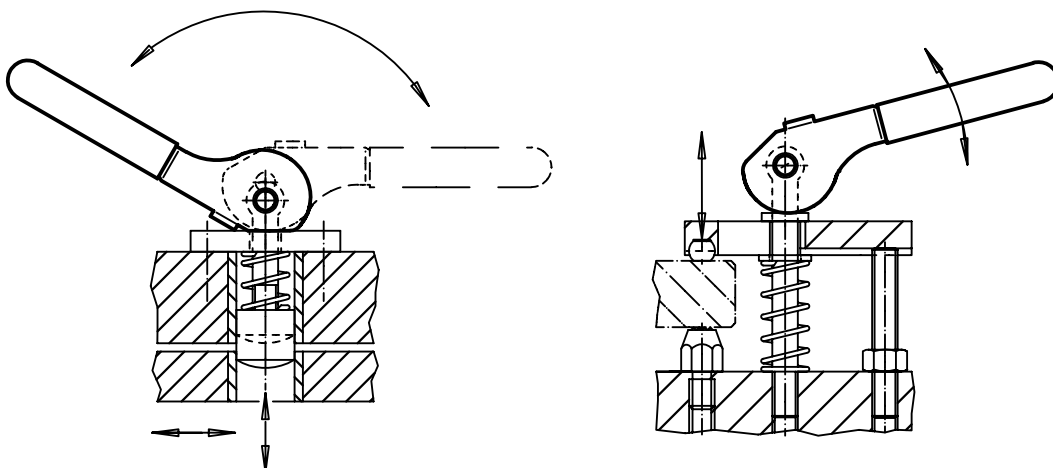
DRAWING



ORDER INFORMATION

Dimensions										Eccentric stroke s	Total stroke r ₂ -h ₃	max. [°C]	[g]	Art. No.
b ₁	d H11 f8	l ~	r ₁	r ₂	b ₂	h ₁	h ₂	h ₃ ~	[mm]					
steel														
13	8	114	17.2	21.07	9	19.54	14	12	3.87	9.07	60	92	23390.0408	
17	10	138	21.6	26.45	12	24.54	17	15	4.85	11.45	60	179	23390.0410	
20	12	157	28.0	34.29	14	31.81	21	18	6.29	16.29	60	286	23390.0412	
stainless steel														
13	8	114	17.2	21.07	9	19.54	14	12	3.87	9.07	60	94	23390.0508	
17	10	138	21.6	26.45	12	24.54	17	15	4.85	11.45	60	179	23390.0510	
20	12	157	28.0	34.29	14	31.81	21	18	6.29	16.29	60	290	23390.0512	

APPLICATION EXAMPLE



Eccentric Quick Clamps • with female thread

EH 23390.



PRODUCT DESCRIPTION

For quick and easy clamping and releasing of workpieces.
When using the "adjustable" design (picture 2) the lever position can be moved.

Material

Support washer

- Thermoplastic PA, glass-fiber reinforced
- Thermoplastic POM, glass-fiber reinforced

Lever

- Zinc die-cast, plastic coated, black, similar to RAL 9005

Threaded part

- Steel, zinc-plated by galvanization
- Stainless steel 1.4305

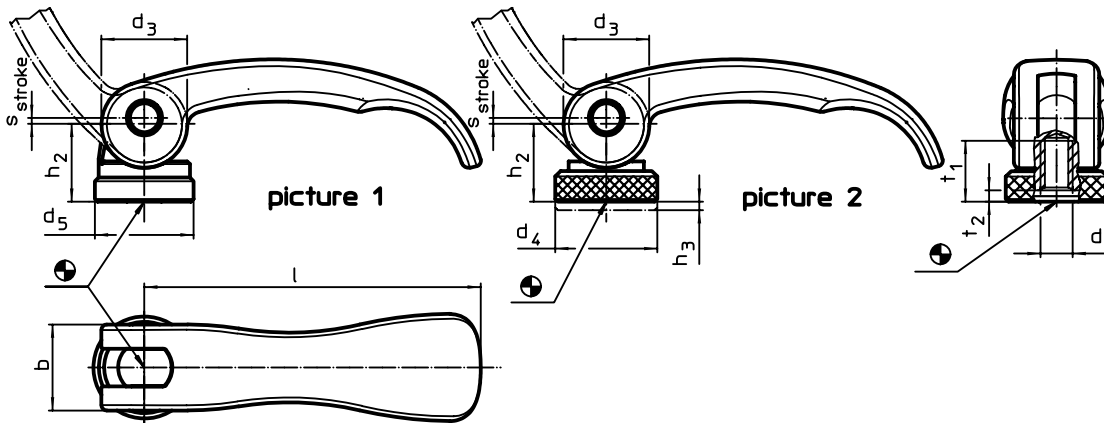
Inner parts

- Steel, zinc-plated by galvanization
- Stainless steel 1.4305

Adjusting nut

- Steel, zinc-plated by galvanization
- Stainless steel 1.4305

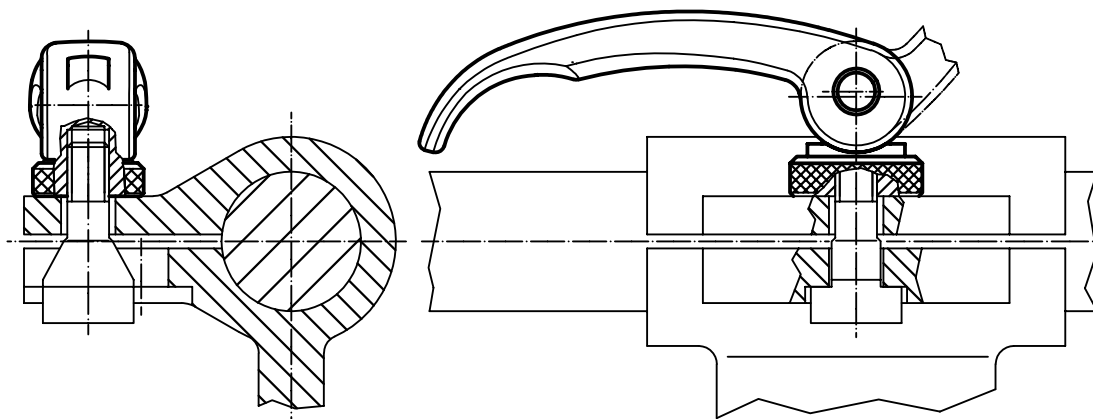
DRAWING



ORDER INFORMATION

Dimensions										Stroke s at 90° lever position	max.	max.	Art. No.	
l	d ₁	d ₃	d ₄	d ₅	h ₂ max.	Regulating- range h ₃ min.	b	t ₁	t ₂ min. in clamp- ing position				Steel	Stainless steel
[mm]										[mm]	[°C]	[g]		
with female thread – picture 1														
63	M5	16	–	18.5	16.4	–	16	13	3.0	0.75	80	60	23390.0003	23390.0203
	M6	16	–	18.5	16.4	–	16	13	3.0	0.75	80	58	23390.0001	23390.0201
82	M8	20	–	22.5	19.5	–	20	15	3.7	1.00	80	118	23390.0002	23390.0202
with female thread, adjustable – picture 2														
63	M5	16	19	–	16.4	1.5	16	13	3.0	0.75	80	66	23390.0103	23390.0303
	M6	16	19	–	16.4	1.5	16	13	3.0	0.75	80	65	23390.0101	23390.0301
82	M8	20	25	–	19.5	2.5	20	15	3.7	1.00	80	131	23390.0102	23390.0302

APPLICATION EXAMPLE



Eccentric Quick Clamps • with screw

EH 23390.



PRODUCT DESCRIPTION

For quick and easy clamping and releasing of workpieces.
When using the "adjustable" design (picture 2) the lever position can be moved.

Material

Support washer

- Thermoplastic PA, glass-fiber reinforced
- Thermoplastic POM, glass-fiber reinforced

Lever

- Zinc die-cast, plastic coated, black, similar to RAL 9005

Inner parts

- Steel, zinc-plated by galvanization
- Stainless steel 1.4305

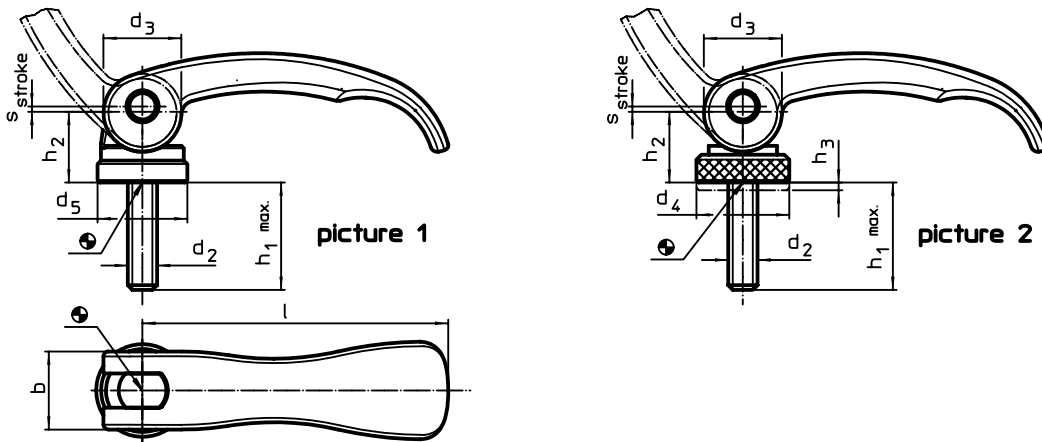
Screw

- Steel, zinc-plated by galvanization
- Stainless steel 1.4305

Adjusting nut

- Steel, zinc-plated by galvanization
- Stainless steel 1.4305

DRAWING



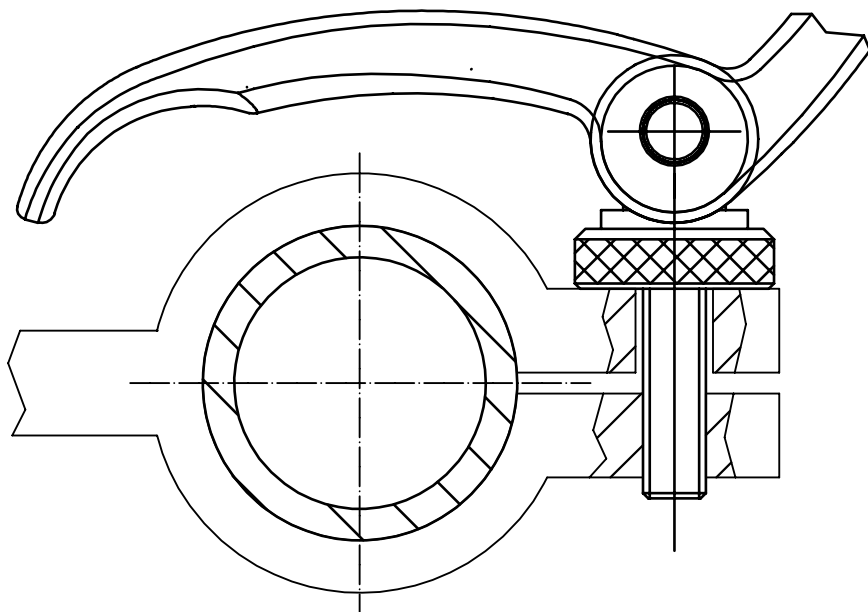
ORDER INFORMATION

l	Dimensions								Stroke s at 90° lever position	max.	g	Art. No.					
	d ₂	h ₁ max. in clamping position	d ₃	d ₄	d ₅	h ₂ max.	Regulating-range h ₃ min.	b				Steel	Stainless steel				
												[mm]		[°C]	[g]		
with screw – picture 1																	
63	M5	16	16	-	18.5	16.4	-	16	0.75	80	62	23390.0030	23390.0230				
		20	16	-	18.5	16.4	-	16	0.75	80	63	23390.0031	23390.0231				
		25	16	-	18.5	16.4	-	16	0.75	80	63	23390.0032	23390.0232				
		30	16	-	18.5	16.4	-	16	0.75	80	65	23390.0033	23390.0233				
		35	16	-	18.5	16.4	-	16	0.75	80	65	23390.0034	23390.0234				
	M6	40	16	-	18.5	16.4	-	16	0.75	80	65	23390.0035	23390.0235				
		50	16	-	18.5	16.4	-	16	0.75	80	67	23390.0036	23390.0236				
		16	16	-	18.5	16.4	-	16	0.75	80	63	23390.0009	23390.0209				
		20	16	-	18.5	16.4	-	16	0.75	80	65	23390.0010	23390.0210				
		25	16	-	18.5	16.4	-	16	0.75	80	65	23390.0011	23390.0211				
82	M6	30	16	-	18.5	16.4	-	16	0.75	80	65	23390.0012	23390.0212				
		35	16	-	18.5	16.4	-	16	0.75	80	66	23390.0013	23390.0213				
		40	16	-	18.5	16.4	-	16	0.75	80	68	23390.0014	23390.0214				
		50	16	-	18.5	16.4	-	16	0.75	80	69	23390.0016	23390.0216				
		20	20	-	22.5	19.5	-	20	1.00	80	128	23390.0019	23390.0219				
	M8	25	20	-	22.5	19.5	-	20	1.00	80	129	23390.0020	23390.0220				
		30	20	-	22.5	19.5	-	20	1.00	80	132	23390.0021	23390.0221				
		35	20	-	22.5	19.5	-	20	1.00	80	134	23390.0022	23390.0222				
		40	20	-	22.5	19.5	-	20	1.00	80	136	23390.0023	23390.0223				
		50	20	-	22.5	19.5	-	20	1.00	80	138	23390.0025	23390.0225				
60	20	-	22.5	19.5	-	20	1.00	80	142	23390.0027	23390.0227						



l	d ₂	h ₁ max. in clamping position	Dimensions					Regulating- range h ₃ min.	b	Stroke s at 90° lever position [mm]	max. [°C]	[g]	Art. No.	
			d ₃	d ₄	d ₅	h ₂ max.	[mm]						Steel	Stainless steel
with screw, adjustable – picture 2														
63	M5	16	16	19	–	16.4	1.5	16	0.75	80	68	23390.0130	23390.0330	
		20	16	19	–	16.4	1.5	16	0.75	80	69	23390.0131	23390.0331	
		25	16	19	–	16.4	1.5	16	0.75	80	69	23390.0132	23390.0332	
		30	16	19	–	16.4	1.5	16	0.75	80	71	23390.0133	23390.0333	
		35	16	19	–	16.4	1.5	16	0.75	80	71	23390.0134	23390.0334	
		40	16	19	–	16.4	1.5	16	0.75	80	72	23390.0135	23390.0335	
	M6	50	16	19	–	16.4	1.5	16	0.75	80	73	23390.0136	23390.0336	
		16	16	19	–	16.4	1.5	16	0.75	80	69	23390.0109	23390.0309	
		20	16	19	–	16.4	1.5	16	0.75	80	70	23390.0110	23390.0310	
		25	16	19	–	16.4	1.5	16	0.75	80	72	23390.0111	23390.0311	
		30	16	19	–	16.4	1.5	16	0.75	80	72	23390.0112	23390.0312	
		35	16	19	–	16.4	1.5	16	0.75	80	70	23390.0113	23390.0313	
	82	M8	40	16	19	–	16.4	1.5	16	0.75	80	74	23390.0114	23390.0314
			50	16	19	–	16.4	1.5	16	0.75	80	75	23390.0116	23390.0316
			20	20	25	–	19.5	2.5	20	1.00	80	142	23390.0119	23390.0319
			25	20	25	–	19.5	2.5	20	1.00	80	145	23390.0120	23390.0320
30			20	25	–	19.5	2.5	20	1.00	80	146	23390.0121	23390.0321	
35			20	25	–	19.5	2.5	20	1.00	80	140	23390.0122	23390.0322	
40			20	25	–	19.5	2.5	20	1.00	80	149	23390.0123	23390.0323	
50			20	25	–	19.5	2.5	20	1.00	80	152	23390.0125	23390.0325	
		60	20	25	–	19.5	2.5	20	1.00	80	155	23390.0127	23390.0327	

APPLICATION EXAMPLE



Fulcrum Pins

EH 23400.



PRODUCT DESCRIPTION

Material

Fulcrum Pins

- Stainless steel 1.4021, heat-treated

Safety ring

- Stainless steel 1.4310

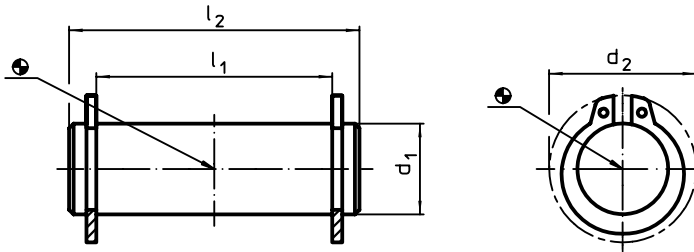
MORE INFORMATION

References

Suitable for eccentric levers EH 23390. and similar applications.

3

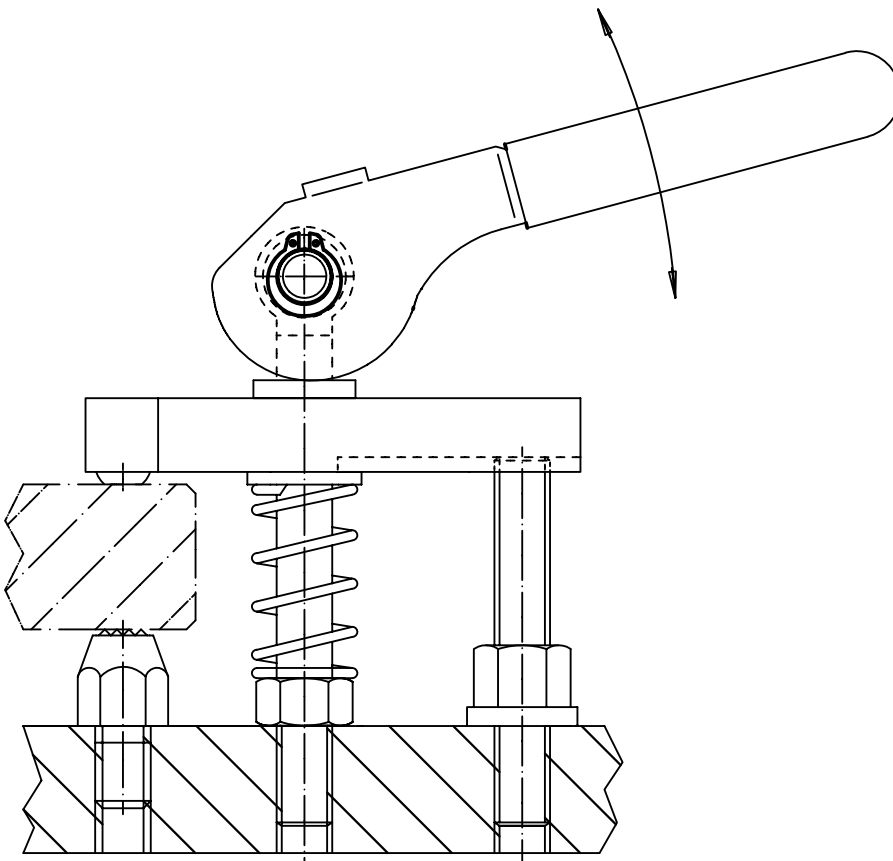
DRAWING



ORDER INFORMATION

d ₁ f8	Dimensions			[g]	Art. No.
	l ₁ -0.5	d ₂	l ₂		
[mm]					
8	14	14.7	18	9.8	23400.0082
	21	14.7	27	12.0	23400.0085
10	18	17.0	24	19.0	23400.0102
	29	17.0	35	21.0	23400.0105
12	21	19.0	27	26.0	23400.0122
	31	19.0	37	34.0	23400.0125

APPLICATION EXAMPLE



Eccentric Clamps

EH 23410.

3



PRODUCT DESCRIPTION

Eccentric clamps enable fast and safe clamping and releasing with a relatively large adjustment range and high tensioning force. The eccentric plain washer enables a stepless radial clamping effect in any clamping position. Furthermore, the eccentric clamp is self-locking. The clamp can be used as a stepless stop by removing the thrust washer.

Material

Gear lever handle

- Steel, ground, blackened
- Stainless steel 1.4305, dull blasted

Body

- Steel, case-hardened, blackened
- Stainless steel 1.4305, nickel-plated

Screw

- Steel, hardened, blackened
- Stainless steel 1.4021, heat-treated, nickel-plated

Ball knob

- Thermosetting plastic PF 31, black, DIN 319

Assembly

Fix with screw bolt M 10 (WS 6). Ensure a tightening torque of max. 40 Nm.

Operation

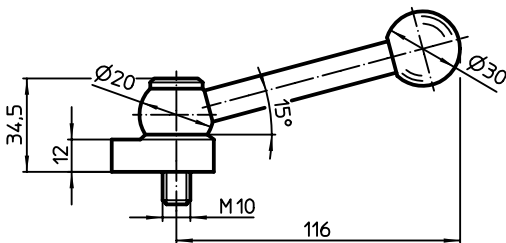
The screw bolt and the washer are adjustable. Once screwed in, the clamping catch can easily be turned to the desired position. For Art. No. 23410.0050 / .0051, the serration helps to put the tension lever to the preferred position.

MORE INFORMATION

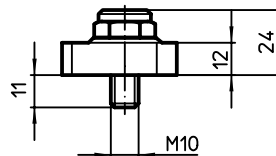
Notes

Left turn type can be supplied on request.

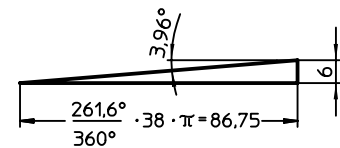
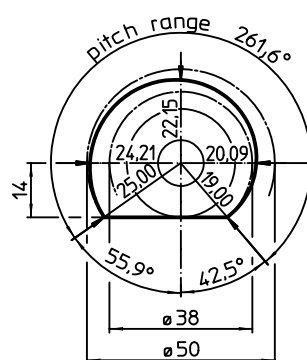
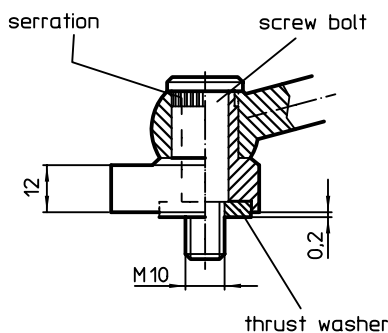
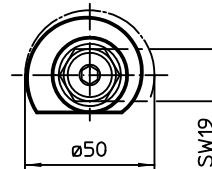
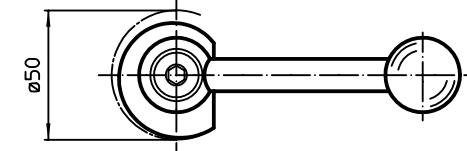
DRAWING



picture 1



picture 2



ORDER INFORMATION

	[g]	Art. No.	
		Steel	Stainless steel
with tension lever – picture 1	317	23410.0050	23410.0051
with clamping screw – picture 2	159	23410.0150	23410.0151

Eccentric Clamping Modules • with shaft location

EH 23410.



PRODUCT DESCRIPTION

The clamping effect remains unchanged and is self-locking in any angle position.

Material

- Sintered steel, case-hardened

Further products

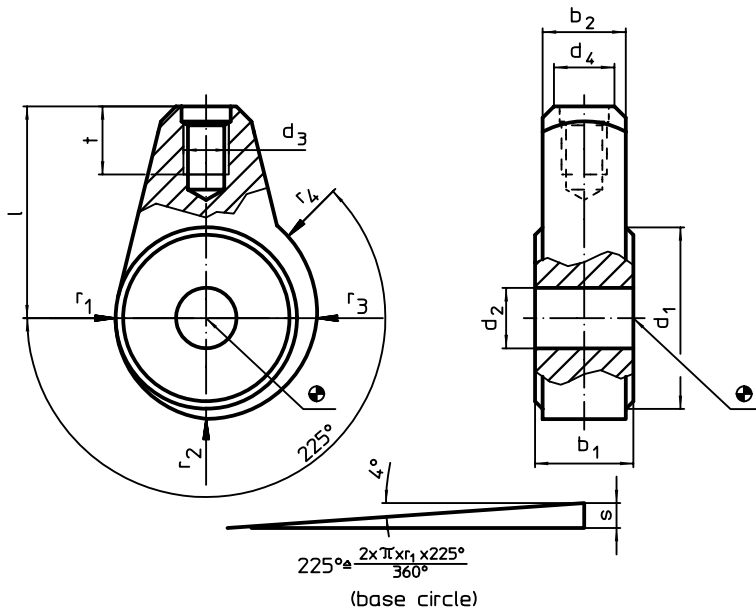
Gear Lever Handles → p. 597

MORE INFORMATION

References

Possible applications in combination with e.g. gear lever handles EH 24350.

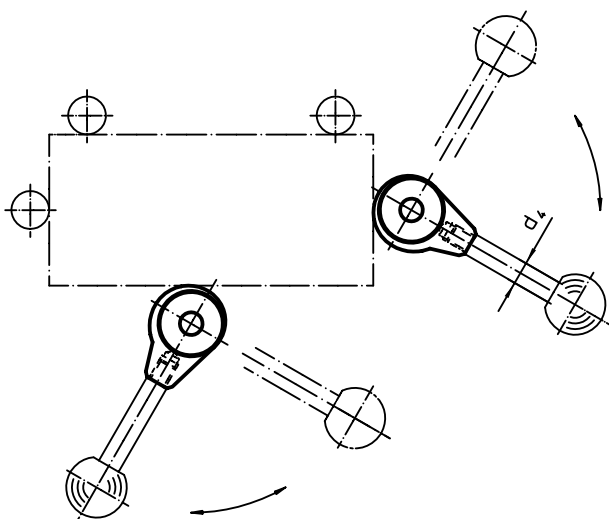
DRAWING



ORDER INFORMATION

Dimensions												d ₄ Gear lever handle Ø EH 24350.		Art. No.
d ₁	d ₂ H9	b ₁ -0.05 -0.15	b ₂	d ₃	l	r ₁	r ₂	r ₃	r ₄	s	t			
24	8	13	11	M 6	28	12.0	13.32	14.64	15.30	3.3	9	8	50	23410.0210
30	10	15	13	M 8	32	15.0	16.65	18.30	19.12	4.1	12	10	100	23410.0220
35	12	17	15	M10	36	17.5	19.42	21.34	22.31	4.8	15	12	150	23410.0230

APPLICATION EXAMPLE



DOWN-THRUST CLAMPS

CLAMPED TO EXACTLY THE RIGHT SPOT

The down-thrust clamp is a universal mechanical clamping element for the fast and convenient changing and clamping of workpieces using clamping elements that can be swivelled by hand. Fast tool changes are important to cost-efficient production. The various down-thrust clamps from Erwin Halder KG offer simple and compact handling and, thanks to their height adjusting cylinders, are able to reach high clamping heights.

A special version has been created for point-accurate repeat clamping: a special positioning ring allows workpieces to always be securely clamped to the same point.



Down-Thrust Clamps • swivelling, size 25

EH 23310.



PRODUCT DESCRIPTION

Universal mechanical clamping element for fast and comfortable changing and clamping of workpieces by means of manually swivelling clamping claw.

The clamps have the following advantages:

- Rapid manual clamping by means of clamping screw, adjustable clamping lever or adjustable eccentric quick clamp.
 - Easy and quick changing of the workpiece by swinging away the clamping claw to the left or right. The positioning ring 23310.0345 allows infinitely variable adjustment (only with variants art no. 23310.0027 - .0029).
 - The use of positioning ring 23310.0345 allows a repeatable precise clamping. Here h_1 min. increases by at least 6 mm (stroke minus 6 mm).
 - Compact design, thus little space taken-up for clamping.
 - Easy adjustment even to large clamping heights due to the height adjusting cylinders.
- As the force applied by the operator is not known for the versions with levers, the clamping force is given in the tables as a guide value. The average value was determined by tests.

Material

Clamp

- Case-hardened steel, case-hardened, blackened and ground

Tension lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)

2. with the set screw directly in the mountingplate of, for example, a fixture
The cylinder must make contact over the whole surface.

MORE INFORMATION

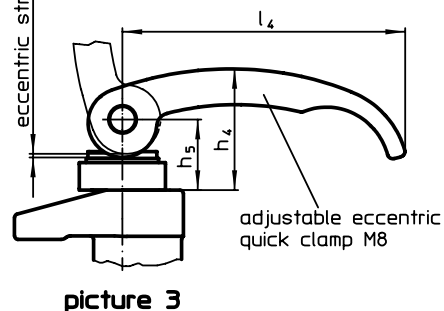
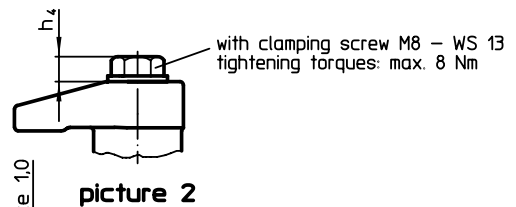
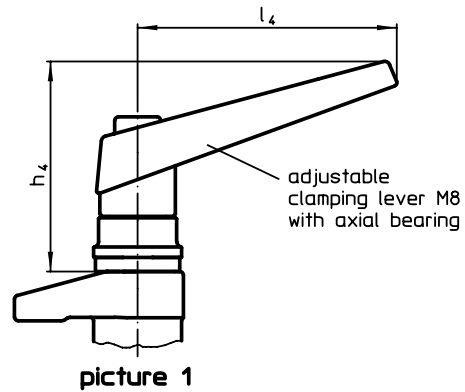
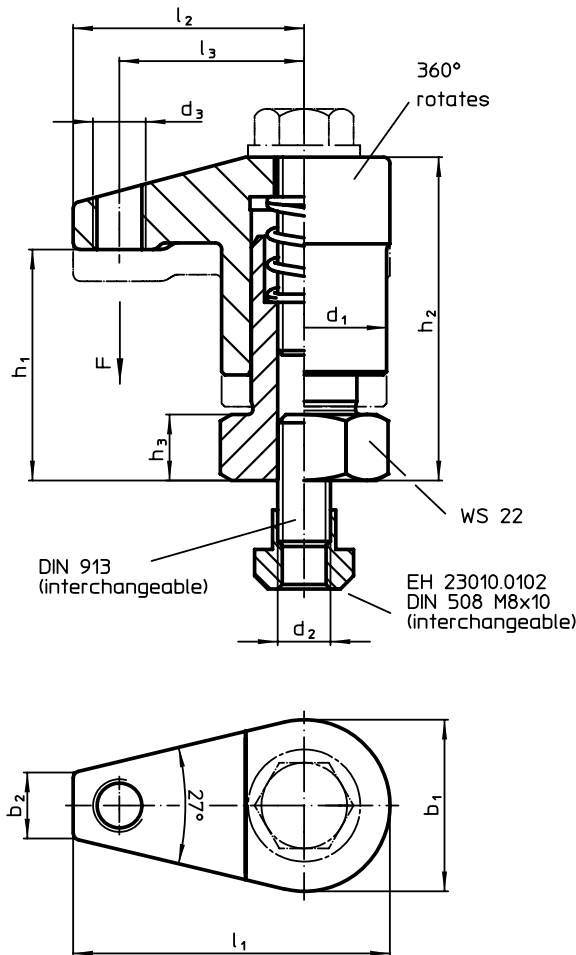
References

The clamping height can be increased with EH 23310. height adjusting cylinders and EH 1007. washers, and equally lowered by using clamping elements e.g. EH 22730.


Further products

- Positioning Rings, for down-thrust clamp → p. 526
- Height Adjusting Cylinders → p. 527
- Spacers → p. 763

DRAWING

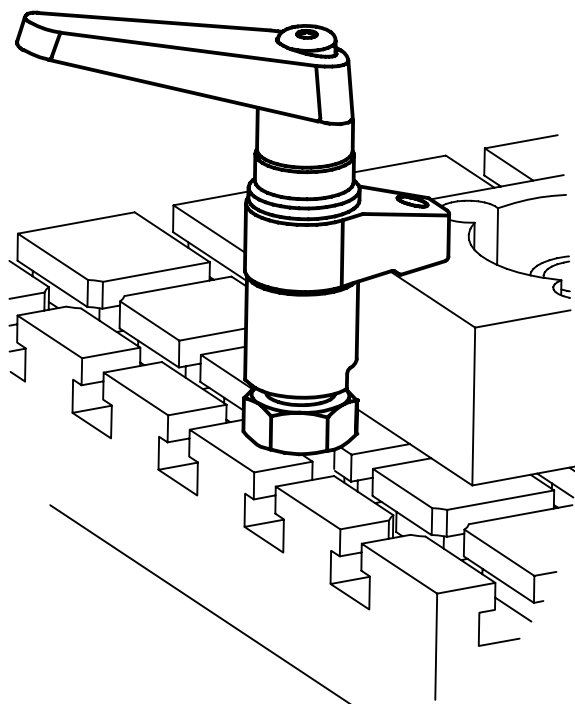


ORDER INFORMATION

d ₁	b ₁	b ₂	d ₂	d ₃	Dimensions									Stroke [mm]	Clamp- ing force [kN]	Tight- ening torque max. [Nm]		Art. No.
					h ₁	h ₂	h ₃	h ₄	h ₅	l ₁	l ₂	l ₃	l ₄					
[mm]																		
with adjustable clamping lever with axial bearing – picture 1																		
25	26	10	M8	M8	30 – 35	44 – 49	10	60.0	–	48	35	28	74	5	3 ¹⁾	–	377	23310.0024
					35 – 45	54 – 64	10	60.0	–	48	35	28	74	10	3 ¹⁾	–	259	23310.0028
with clamping screw – picture 2																		
25	26	10	M8	M8	30 – 35	44 – 49	10	6.9	–	48	35	28	–	5	5	8	212	23310.0025
					35 – 45	54 – 64	10	6.9	–	48	35	28	–	10	5	8	419	23310.0027
with eccentric quick clamp, adjustable – picture 3																		
25	26	10	M8	M8	30 – 35	44 – 49	10	35.0	20.5	48	35	28	82	5	2 ¹⁾	–	203	23310.0026
					35 – 45	54 – 64	10	35.0	20.5	48	35	28	82	10	2 ¹⁾	–	261	23310.0029

¹⁾ Average value established in trials.

APPLICATION EXAMPLE



Down-Thrust Clamps • swivelling, size 32

EH 23310.



PRODUCT DESCRIPTION

Universal mechanical clamping element for fast and comfortable changing and clamping of workpieces by means of manually swivelling clamping claw.

The clamps have the following advantages:

- Rapid manual clamping by means of clamping screw, adjustable clamping lever or adjustable eccentric quick clamp.
- Easy and quick changing of the workpiece by swinging away the clamping claw to the left or right. The positioning ring 23310.0348 allows infinitely variable adjustment.
- The use of positioning ring 23310.0348 allows a repeatable precise clamping. Here h_1 min. increases by at least 6 mm (stroke minus 6 mm).
- Compact design, thus little space taken-up for clamping.
- Easy adjustment even to large clamping heights due to the height adjusting cylinders.

As the force applied by the operator is not known for the versions with levers, the clamping force is given in the tables as a guide value. The average value was determined by tests.

Material

Clamp

- Case-hardened steel, case-hardened, blackened and ground

Tension lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)

2. with the set screw directly in the mounting plate of, for example, a fixture
The cylinder must make contact over the whole surface.

MORE INFORMATION

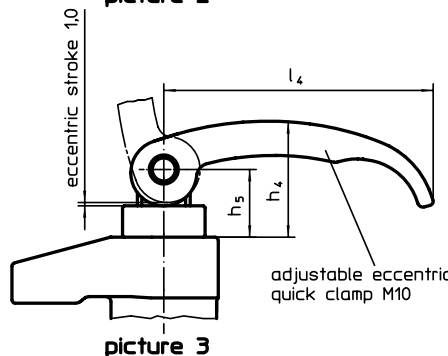
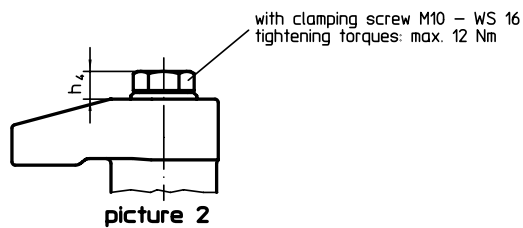
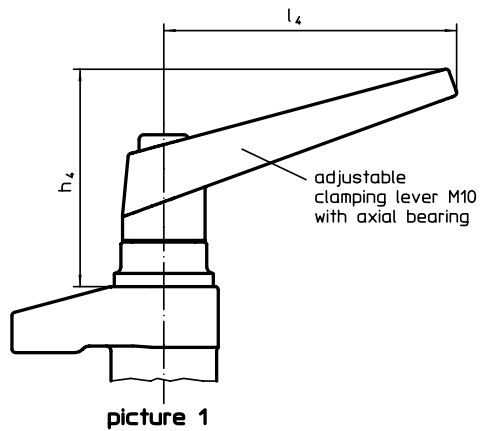
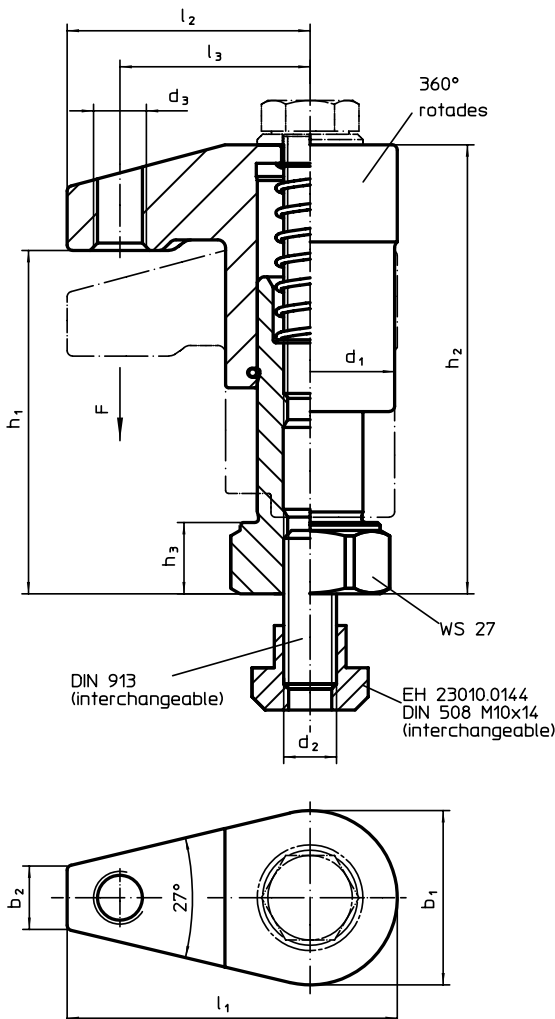
References

The clamping height can be increased with height adjusting cylinders EH 23310. and reduced with the clamping inserts, e.g. EH 22730.


Further products

- Positioning Rings, for down-thrust clamp → p. 526
- Height Adjusting Cylinders → p. 527

DRAWING

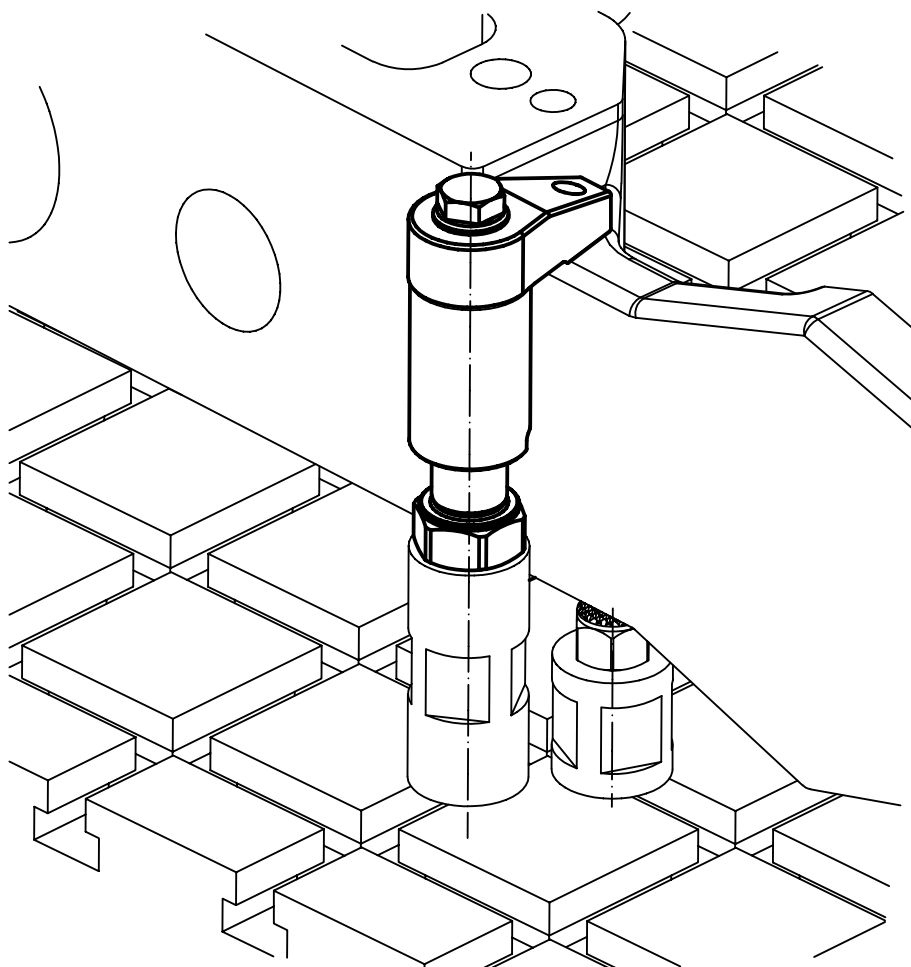


ORDER INFORMATION

d ₁	b ₁	b ₂	d ₂	d ₃	Dimensions									Stroke [mm]	Clamp- ing force [kN]	Tight- ening torque max. [Nm]		Art. No.
					h ₁	h ₂	h ₃	h ₄	h ₅	l ₁	l ₂	l ₃	l ₄					
[mm]														[mm]	[kN]	[Nm]	[g]	
with adjustable clamping lever with axial bearing – picture 1																		
32	33	12	M10	M10	45 – 65	65 – 85	13	66.0	–	62.5	46	36	89	20	4.5 ¹⁾	–	729	23310.0040
					63 – 88	83 – 108	13	66.0	–	62.5	46	36	89	20	4.5 ¹⁾	–	838	23310.0043
with clamping screw – picture 2																		
32	33	12	M10	M10	45 – 65	65 – 85	13	8.4	–	62.5	46	36	–	20	7.5	12	512	23310.0041
					63 – 88	83 – 108	13	8.4	–	62.5	46	36	–	20	7.5	12	620	23310.0044
with eccentric quick clamp, adjustable – picture 3																		
32	33	12	M10	M10	45 – 65	65 – 85	13	35.0	20.5	62.5	46	36	82	20	3.0 ¹⁾	–	559	23310.0042
					63 – 88	83 – 108	13	35.0	20.5	62.5	46	36	82	20	3.0 ¹⁾	–	666	23310.0045

¹⁾ Average value established in trials.

APPLICATION EXAMPLE



Down-Thrust Clamps • swivelling, size 40

EH 23310.



PRODUCT DESCRIPTION

Universal mechanical clamping element for fast and comfortable changing and clamping of workpieces by means of manually swivelling clamping claw.

The clamps have the following advantages:

- Rapid manual clamping by means of clamping screw, adjustable clamping lever, or double eccentric lever.
 - Easy and rapid changing of workpieces by swinging away the clamping claw to the left or right. The positioning ring 23310.0350 allows infinitely variable adjustment.
 - Continuously variable setting by means of positioning ring 23310.0350.
 - The use of positioning ring 23310.0350 allows a repeatable precise clamping. Here h_1 min. increases by at least 7 mm (stroke minus 7 mm).
 - Compact design, thus only a small amount of space is required for clamping.
 - Easy adjustment even to large clamping heights due to the height adjusting cylinders.
- As the force applied by the operator is not known for the versions with levers, the clamping force is given in the tables as a guide value. The average value was determined by tests.

Material

Clamp

- Case-hardened steel, case-hardened, blackened and ground

Tension lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Alloyed case-hardened steel, case-hardened, blackened

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)
2. with the set screw directly in the mounting plate of, for example, a fixture

The cylinder must make contact over the whole surface.

Exceeding of the clamping height is inhibited by the height limitation.

MORE INFORMATION

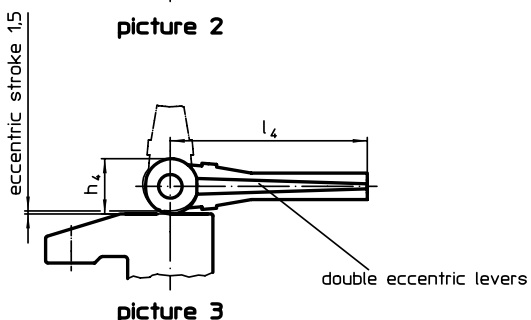
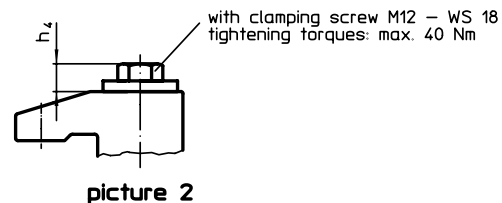
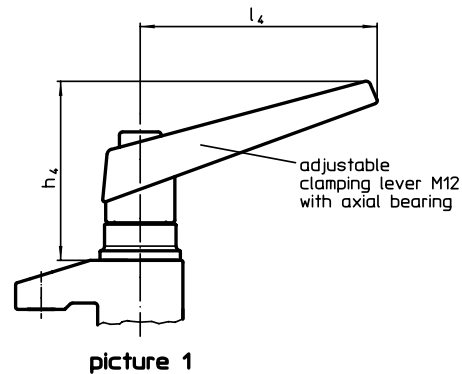
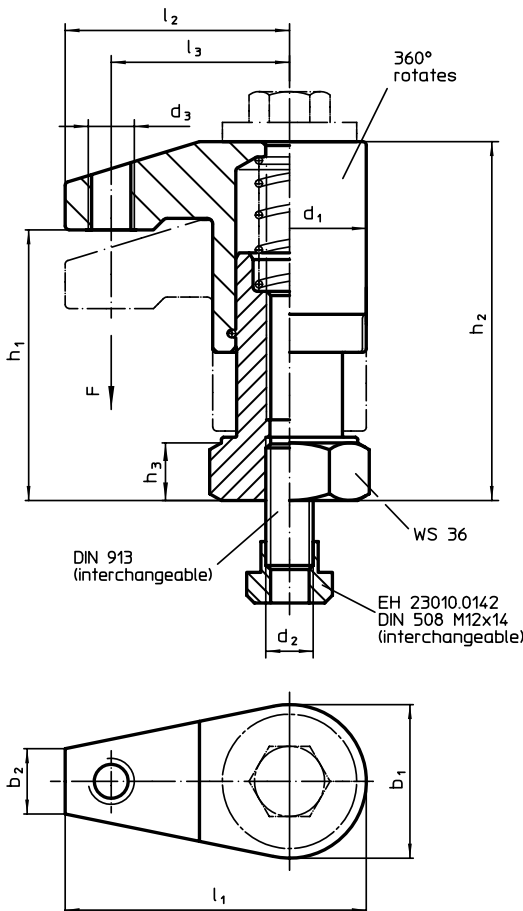
References

The clamping height can be increased by using height adjusting cylinders EH 23310. and disks EH 1107. and EH 1108. It can be reduced by employing clamping inserts, e.g. EH 22730.


Further products

- Positioning Rings, for down-thrust clamp → p. 526
- Height Adjusting Cylinders → p. 527
- Spacers → p. 763
- Wrenches → p. 786

DRAWING

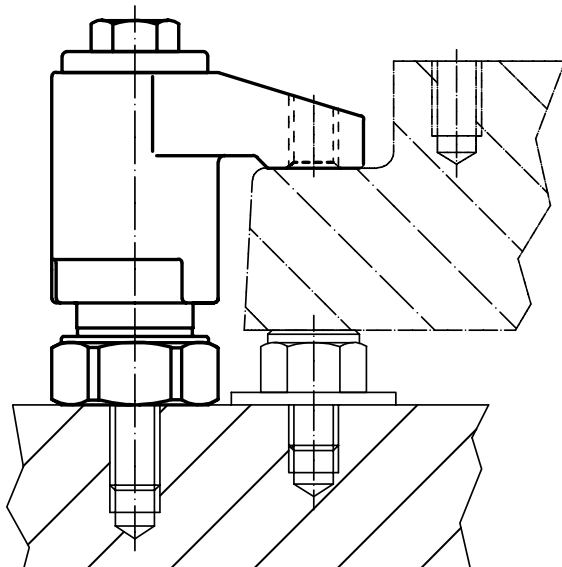
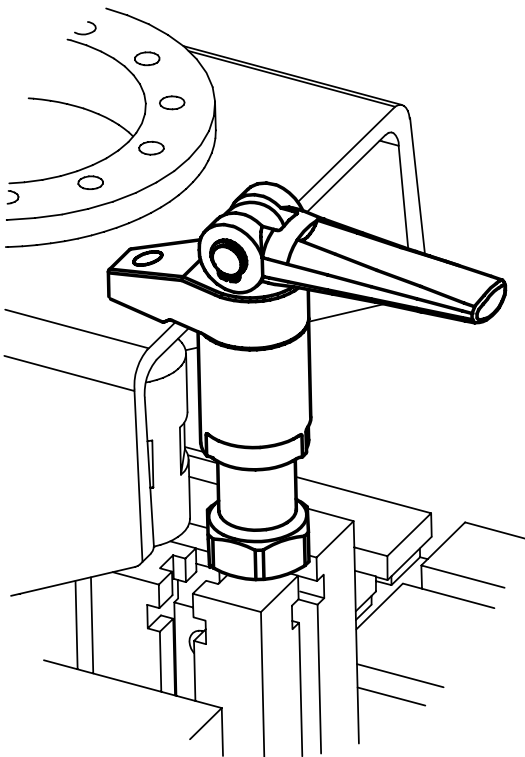


ORDER INFORMATION

d ₁	b ₁	b ₂	d ₂	d ₃	Dimensions								Stroke [mm]	Clamp- ing force [kN]	Tightening torque max. [Nm]		Art. No.
					h ₁	h ₂	h ₃	h ₄	l ₁	l ₂	l ₃	l ₄					
[mm]																	
with adjustable clamping lever with axial bearing – picture 1																	
40	40	17	M12	M12	50 – 70	73 – 93	15	82	75	55	43	108	20	6 ¹⁾	–	1194	23310.0050
					68 – 98	91 – 121	15	82	75	55	43	108	30	6 ¹⁾	–	1359	23310.0053
					95 – 135	118 – 158	22	82	75	55	43	108	40	6 ¹⁾	–	1639	23310.0056
with clamping screw – picture 2																	
40	40	17	M12	M12	50 – 70	73 – 93	15	13	75	55	43	–	20	10	40	853	23310.0051
					68 – 98	91 – 121	15	13	75	55	43	–	30	10	40	964	23310.0054
					95 – 135	118 – 158	22	13	75	55	43	–	40	10	40	1266	23310.0057
with double eccentric levers – picture 3																	
40	40	17	M12	M12	50 – 70	73 – 93	15	28	75	55	43	100	20	4 ¹⁾	–	1213	23310.0052
					68 – 98	91 – 121	15	28	75	55	43	100	30	4 ¹⁾	–	1370	23310.0055
					95 – 135	118 – 158	22	28	75	55	43	100	40	4 ¹⁾	–	1616	23310.0058

¹⁾ Average value established in trials.

APPLICATION EXAMPLE



Down-Thrust Clamps • swivelling, low construction, size 44

EH 23310.



PRODUCT DESCRIPTION

Universal mechanical clamping element for fast and comfortable changing and clamping of workpieces by means of manually swivelling clamping claw.

The clamps have the following advantages:

- Rapid manual clamping by means of clamping screw or double eccentric lever.
- Easy and rapid changing of workpieces by swinging away the clamping claw to the left or right.
- Low design, thus little space taken-up for clamping.
- Easy adjustment even to large clamping heights due to the height adjusting cylinders.

As the force applied by the operator is not known for the versions with levers, the clamping force is given in the tables as a guide value. The average value was determined by tests.

Material

- Case-hardened steel, case-hardened, blackened and ground

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)
2. with the set screw directly in the mounting plate of, for example, a fixture

The cylinder must make contact over the whole surface.

MORE INFORMATION

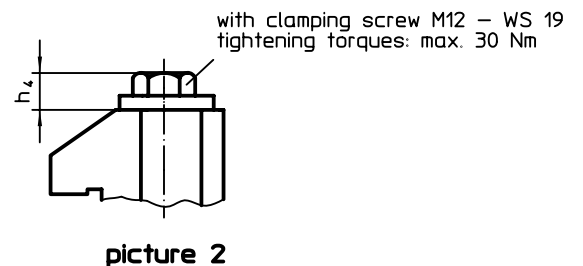
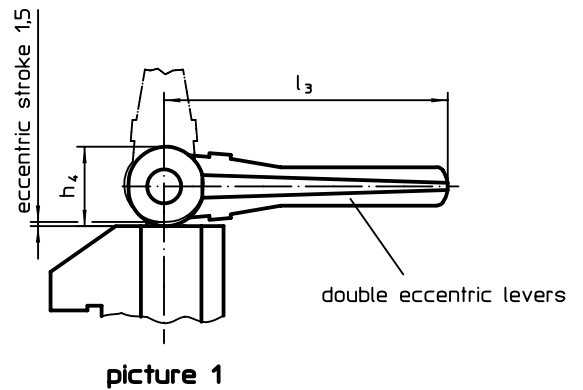
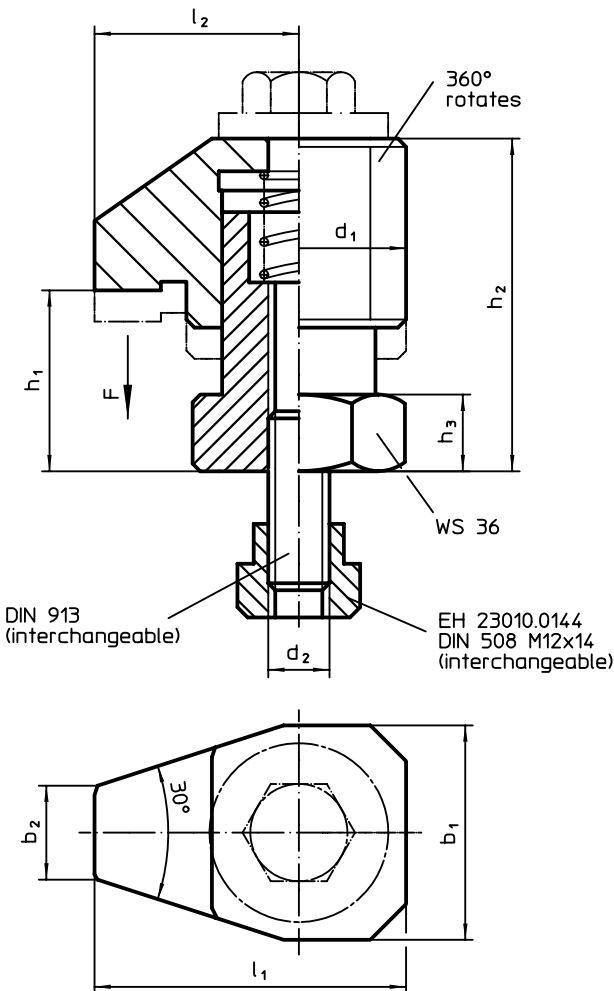
References

The clamping height can be increased using height adjusting cylinders EH 23310. and with spacers EH 1107. and EH 1108.


Further products

- Height Adjusting Cylinders → p. 527
- Spacers → p. 763
- Wrenches → p. 786

DRAWING

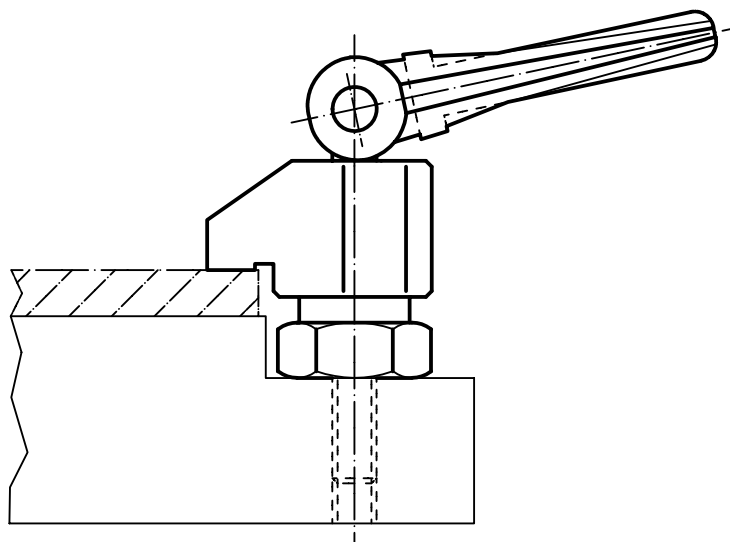
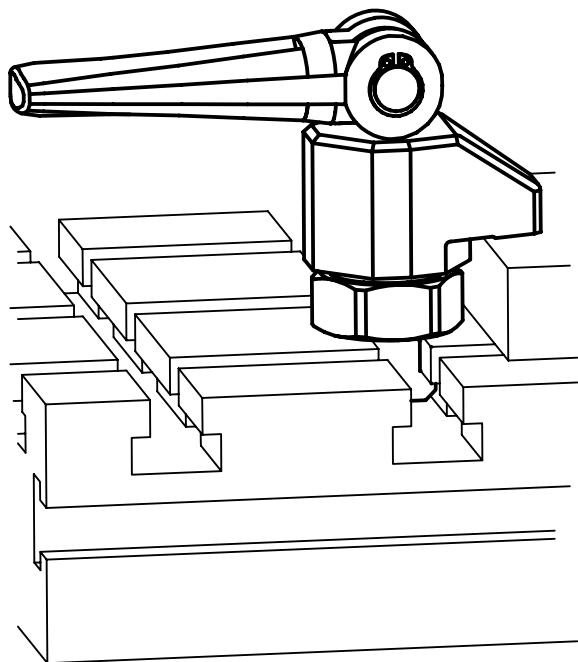


ORDER INFORMATION

Dimensions											Stroke [mm]	Clamp- ing force [kN]	Tightening torque max. [Nm]		Art. No.
d ₁	b ₁	b ₂	d ₂	h ₁	h ₂	h ₃	h ₄	l ₁	l ₂	l ₃					
with double eccentric levers – picture 1															
44	42	18	M12	25 – 30	54 – 59	15	28	61	40	100	5	4 ¹⁾	–	1022	23310.0034
with clamping screw – picture 2															
44	42	18	M12	25 – 30	54 – 59	15	13	61	40	–	5	10	30	708	23310.0035

¹⁾ Average value established in trials.

APPLICATION EXAMPLE



Down-Thrust Clamps • swivelling, size 60

EH 23310.



PRODUCT DESCRIPTION

Universal mechanical clamping element for fast and comfortable changing and clamping of workpieces by means of manually swivelling clamping claw.

The clamps have the following advantages:

- Rapid manual clamping by means of clamping screw.
- Easy and rapid changing of workpieces by swinging away the clamping claw to the left or right. The positioning ring 23310.0360 allows infinitely variable adjustment.
- The use of positioning ring 23310.0360 allows a repeatable precise clamping. Here h_1 min. increases by at least 10 mm (stroke minus 10 mm).
- Compact design, thus little space taken-up for clamping.
- Easy adjustment even to large clamping heights due to the height adjusting cylinders.

Material

Clamp

- Case-hardened steel, case-hardened, blackened and ground

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)
2. with the set screw directly in the mounting plate of, for example, a fixture

The cylinder must make contact over the whole surface.

MORE INFORMATION

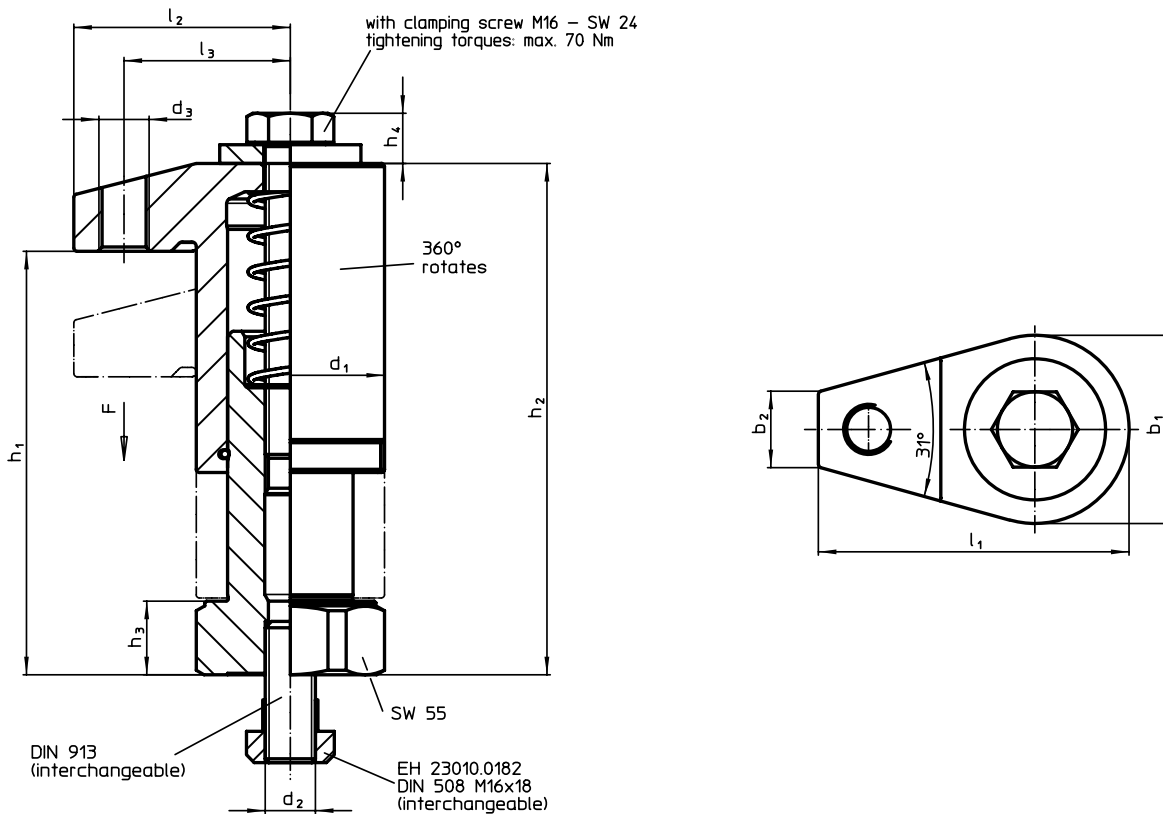
References

The clamping height can be increased with height adjusting cylinders EH 23310. and with spacers EH 1617. and reduced with clamping inserts.

Further products

- Positioning Rings, for down-thrust clamp..... → p. 526
- Wrenches → p. 786
- Spacers → p. 819

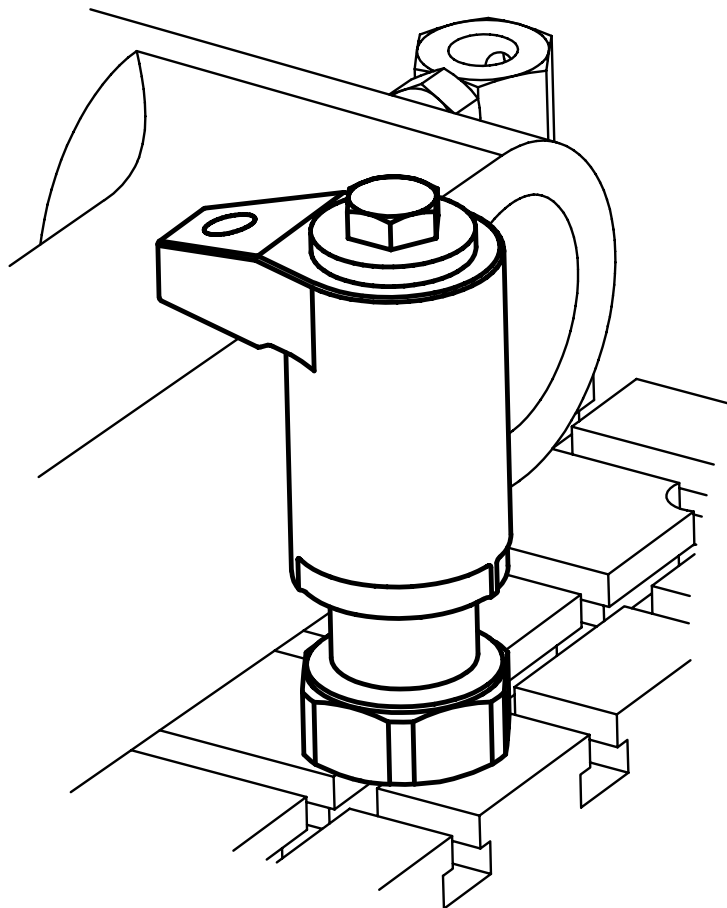
DRAWING



ORDER INFORMATION

Dimensions										Stroke	Clamping force	Tightening torque max.	Art. No.	
d_1	b_1	b_2	d_3	h_1	h_2	h_3	l_1	l_2	l_3					[mm]
[mm]										[mm]	[kN]	[Nm]	[g]	
with clamping screw														
60	60	24	M16	68 – 98	96 – 123	17	99	69	53	30	15	70	2307	23310.0065
				95 – 135	126 – 163	24	99	69	53	40	15	70	3020	23310.0067

APPLICATION EXAMPLE



Down-Thrust Clamps • swivelling, size 82.5

EH 23310.



PRODUCT DESCRIPTION

The down-thrust clamp is a universal mechanical clamp that allows fast and easy exchange and clamping of workpieces - as the clamping claw can be easily manually swivelled to clear the workpiece.

The down-thrust clamps have the following advantages:

- Compact design
 - Clamping force of up to max. 30 kN via a clamping screw WS 36
 - Clamping claw swivels 360°
 - Clamping stroke 30 mm
 - Clamping height max. 250 mm
 - Integrated clamping height stop for safe use
 - Easy and quick workpiece change by swivelling the clamping claw to the left or right.
- The positioning ring 23310.0351 allows infinitely variable adjustment and permits precise repeat clamping.

Material

- Case-hardened steel, case-hardened, blackened and ground

Assembly

Fixture via 4 cap screws M 24 with a hole spacing 100 x 100 mm

MORE INFORMATION

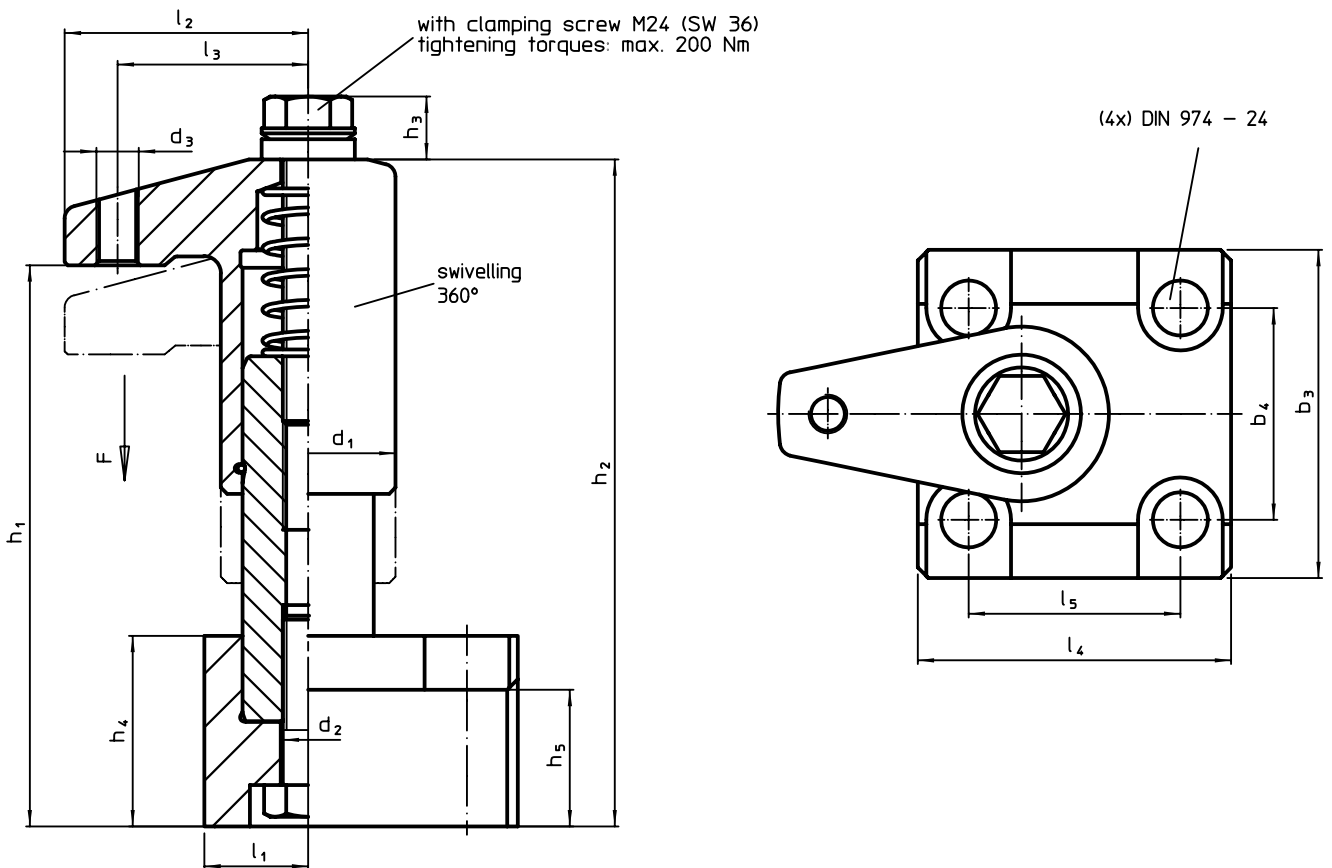
References

The clamping height can be reduced by using clamping inserts, e.g. EH 22730.

Further products

- Positioning Rings, for down-thrust clamp → p. 526
- Wrenches → p. 786

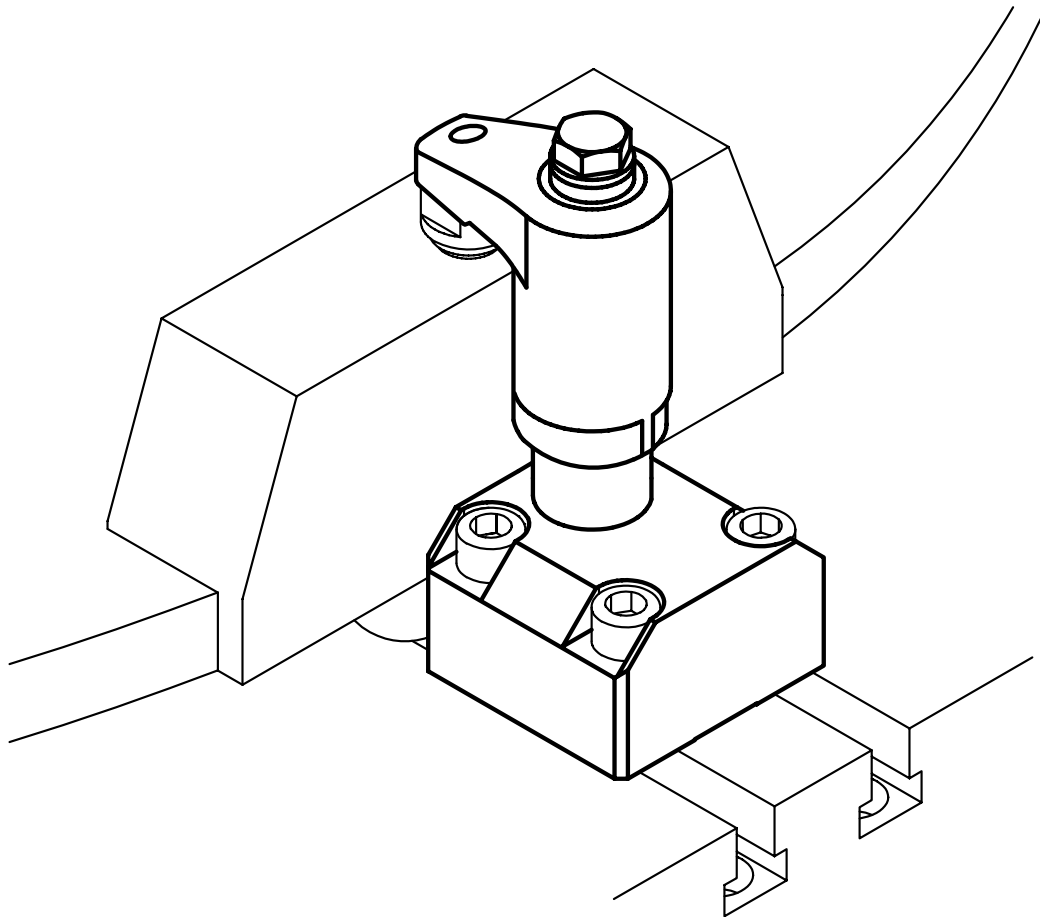
DRAWING



ORDER INFORMATION

Dimensions															Stroke	Clamp- ing force	Tightening torque max.	🔩	Art. No.	
d ₁	b ₃	b ₄	d ₂	d ₃	d ₄	h ₁	h ₂	h ₃	h ₄	h ₅	l ₁	l ₂	l ₃	l ₄						l ₅
[mm]															[mm]					
82.5	155	100	M24	M20	49	220 - 250	270 - 320	30	90	65	49	115	91.5	148	100	30	30	200	21	23310.0070

APPLICATION EXAMPLE



Down-Thrust Clamps • moveable, size 40

EH 23310.



PRODUCT DESCRIPTION

The moveable down-thrust clamps are used, amongst other things, when swivel movements are not possible because of the workpiece.

The clamps have the following advantages:

- Easier and quicker workpiece change by moving the clamping claws forwards or backwards.
 - The clamping range in horizontal direction is between l_1 min. and l_1 max.
 - To change the workpiece, the clamping claw can be pushed back from l_1 max. by dimension l_2 .
 - Rapid manual clamping by means of the clamping screw, the adjustable clamping lever, or the double eccentric tension lever.
 - As with all down-thrust clamps, the clamping claw of this version can also be swivelled away to the left or right. The use of positioning ring 23310.0350 allows the clamping position to be fixed. Here h_1 min. increases by at least 7 mm (stroke minus 7 mm).
 - Compact design, therefore less space requirement when clamping.
 - Easily adjustable even to large clamping heights, using the height adjusting cylinders.
- As the force applied by the operator is not known for the versions with levers, the clamping force is given in the tables as a guide value. The average value was determined by tests.

Material

Clamp

- Case-hardened steel, case-hardened, blackened and ground

Tension lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Alloyed case-hardened steel, case-hardened, blackened

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)
2. with the set screw directly in the mounting plate of, for example, a fixture

The cylinder must make contact over the whole surface.

Operation

1. Push clamping claw backwards.

2. Insert workpiece.

3. Push clamping claw forwards.

4. Adjust clamping position of clamping claw using the knurled screw.

5. Secure / lock the clamping position using the knurled nut.

MORE INFORMATION

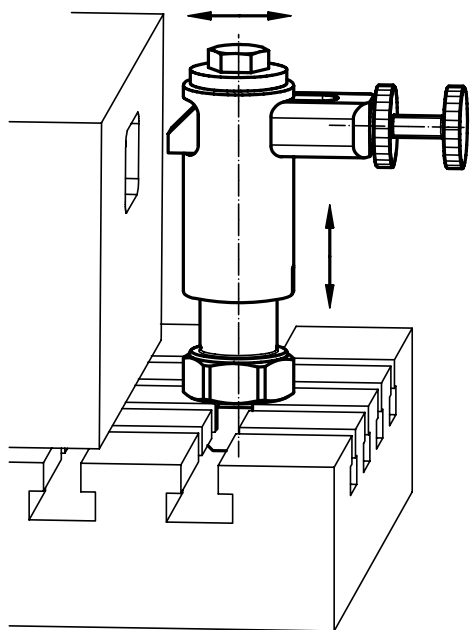
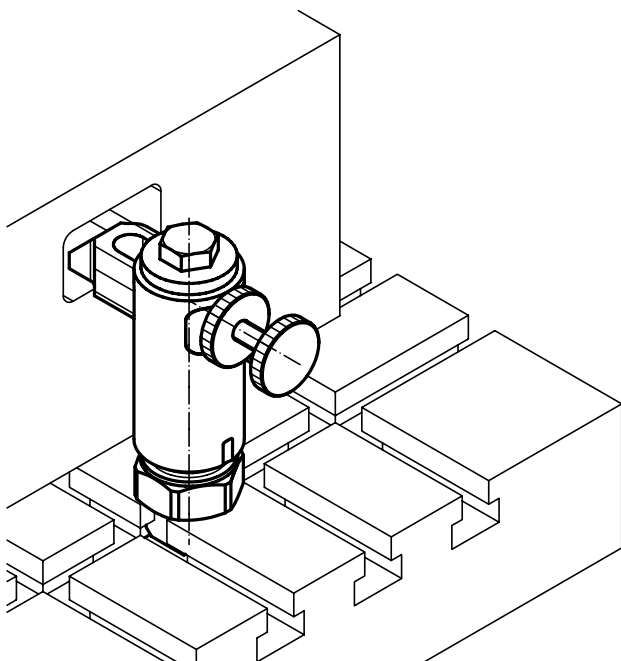
References

The clamping height can be increased by using height adjusting cylinders EH 23310. and disks EH 1107. and EH 1108. It can be reduced by employing clamping inserts, e.g. EH 22730.

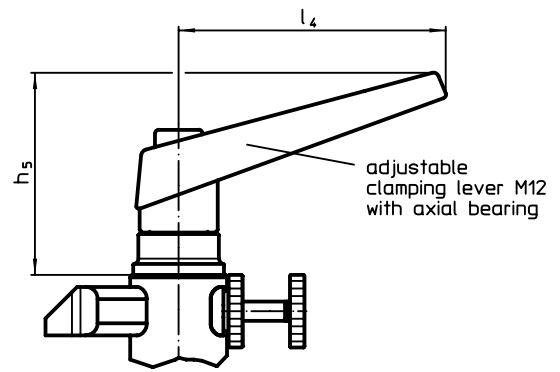
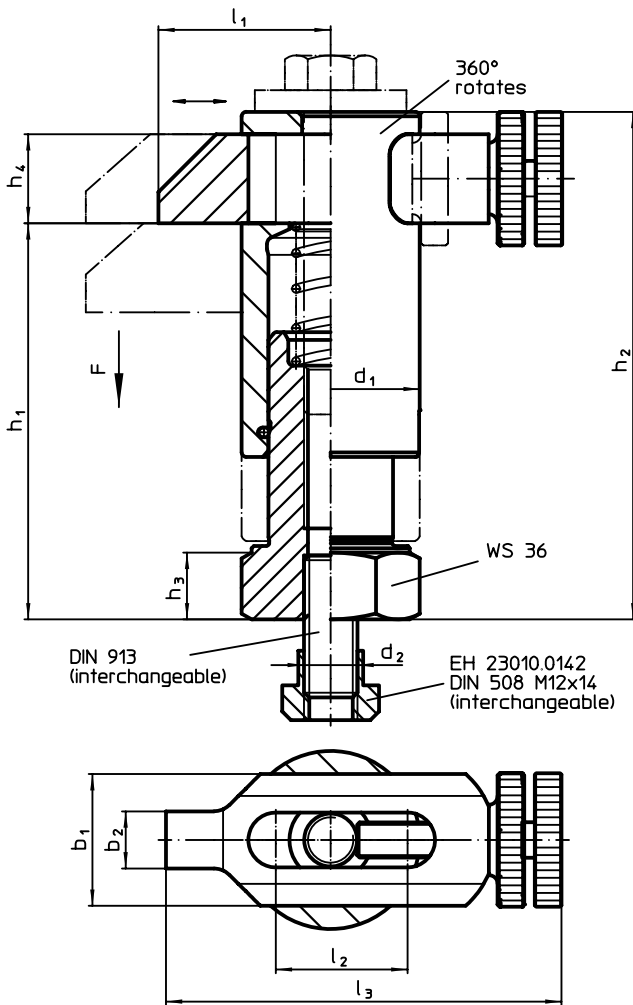
Further products

Positioning Rings, for down-thrust clamp	→ p. 526
Height Adjusting Cylinders	→ p. 527
Spacers	→ p. 763
Wrenches	→ p. 786

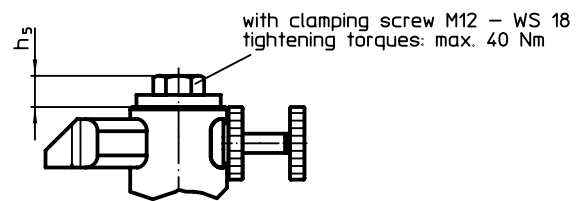
APPLICATION EXAMPLE



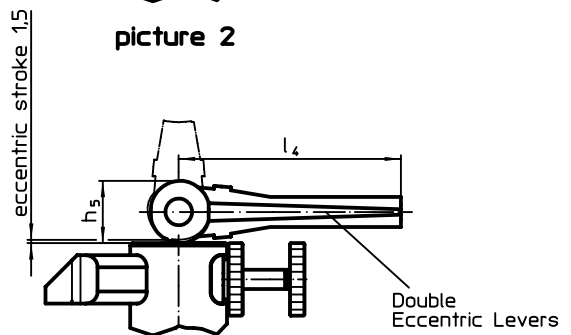
DRAWING



picture 1



picture 2



picture 3

ORDER INFORMATION

Dimensions													Stroke	Clamp- ing force	Tightening torque max.	🔩	Art. No.
d ₁	b ₁	b ₂	d ₂	h ₁	h ₂	h ₃	h ₄	h ₅	l ₁	l ₂	l ₃	l ₄					
with adjustable clamping lever with axial bearing – picture 1																	
40	30	13	M12	70 – 90	95 – 115	15	20	82	38 – 55	30	90 – 107	108	20	6 ¹⁾	–	1400	23310.0083
				88 – 118	113 – 143	15	20	82	38 – 55	30	90 – 107	108	30	6 ¹⁾	–	1560	23310.0086
with clamping screw – picture 2																	
40	30	13	M12	70 – 90	95 – 115	15	20	13	38 – 55	30	90 – 107	–	20	10	40	1075	23310.0084
				88 – 118	113 – 143	15	20	13	38 – 55	30	90 – 107	–	30	10	40	1239	23310.0087
with double eccentric levers – picture 3																	
40	30	13	M12	70 – 90	95 – 115	15	20	28	38 – 55	30	90 – 107	100	20	4 ¹⁾	–	1396	23310.0085
				88 – 118	113 – 143	15	20	28	38 – 55	30	90 – 107	100	30	4 ¹⁾	–	1562	23310.0088

¹⁾ Average value established in trials.

Positioning Rings • for down-thrust clamp

EH 23310.



PRODUCT DESCRIPTION

After aligning, the clamp positioning ring is fitted on the spindle with the effect, that repeated clamping is always exactly on the same point. The positioning ring is adjustable 360° on the down-thrust clamp. After mounting, the clamping claw can swing 110° to the left or right (only for the swiveling versions).

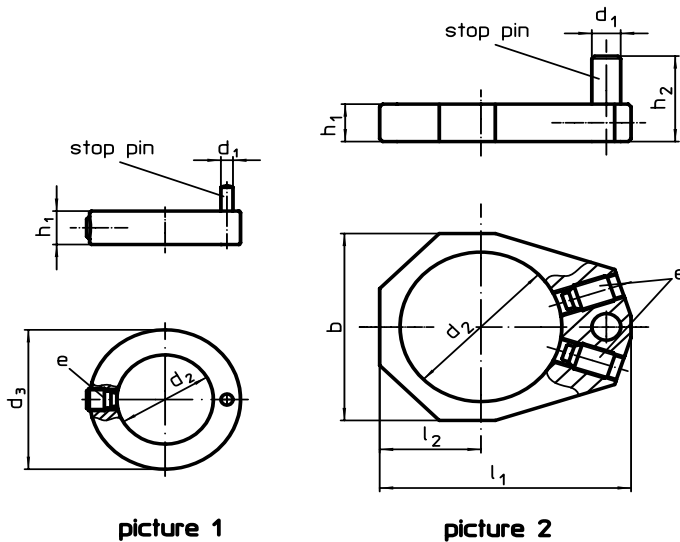
Material

- Steel, blackened

Assembly

Before mounting the positioning ring, pull-off the clamping claw of down-thrust clamp.

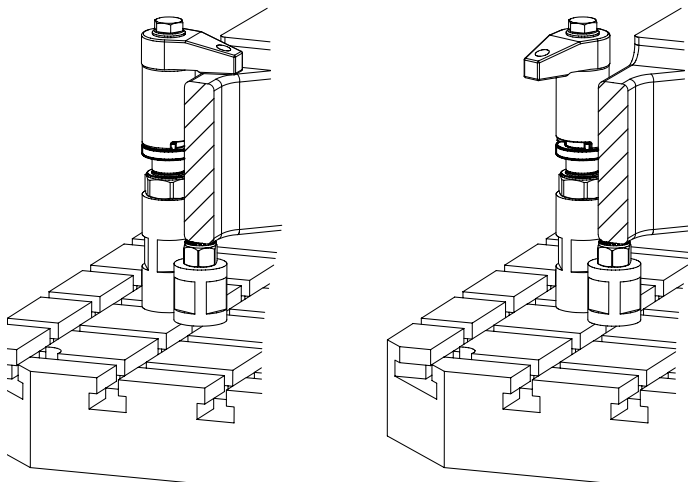
DRAWING



ORDER INFORMATION

Dimensions									For down-thrust clamp	Art. No.	
h_1	h_2	d_1	d_2	d_3	l_1	l_2	b	e			[g]
for down-thrust clamps size 25 – picture 1											
6	10	2	16	25	–	–	–	22760.0040	23310.0027 - 23310.0029	14	23310.0345
for down-thrust clamps size 32 – picture 1											
6	10	3	20	32	–	–	–	22760.0042	23310.0040 - 23310.0045	23	23310.0348
for down-thrust clamps, size 40 – picture 2											
7	16	5	28	–	43.5	17.5	35	22760.0052	23310.0050-.0058/23310.0083-.0088	32	23310.0350
for down-thrust clamps size 60 – picture 2											
10	20	8	40	–	66.5	27.5	56	22760.0064	23310.0065, 23310.0067	151	23310.0360
for down-thrust clamps, size 82,5 – picture 2											
15	40	10	62	–	93.0	39.0	78	22760.0104	23310.0070	355	23310.0351

APPLICATION EXAMPLE



Height Adjusting Cylinders

EH 23310.



PRODUCT DESCRIPTION

The height adjusting cylinders can be used to extend the clamping height of down-thrust clamps EH 23310. They are also used in combination with seating pins (EH 22680.), pins (EH 22690.) and self-aligning pads (EH 22730. - EH 22741.).

Material

- Steel, case-hardened, blackened, ground

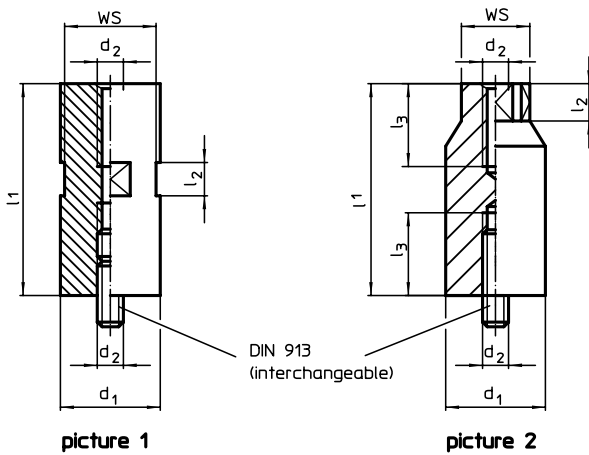
MORE INFORMATION

Further products

- Seating Pins, ribbed or pointed → p. 309
- Seating Pins, pin shape. → p. 310
- Pins → p. 311
- Seating Pins, adjustable → p. 314

- Self-Aligning Pads → p. 338
- Self-Aligning Pads, with hard metal ball, ribbed. → p. 339
- Self-Aligning Pads, self-resetting. → p. 340
- Self-Aligning Pads, with hard metal ball, ribbed and self-resetting → p. 342
- Self-Aligning Pads, adjustable. → p. 343
- Self-Aligning Pads, adjustable, self-resetting → p. 344

DRAWING



ORDER INFORMATION

d ₁ -0.1	l ₁	Dimensions			WS	[g]	Art. No.
		d ₂	l ₂	l ₃			
		[mm]			[mm]		
picture 1							
25	20 ±0.01	M 8	10	-	22	75	23310.0125
	40 ±0.01	M 8	20	-	22	150	23310.0126
	80 ±0.01	M 8	20	-	22	306	23310.0127
32	35 ±0.01	M10	20	-	27	202	23310.0130
	70 ±0.01	M10	20	-	27	411	23310.0132
	140 ±0.01	M10	20	-	27	848	23310.0134
40	35 ±0.01	M12	20	-	36	336	23310.0140
	70 ±0.01	M12	20	-	36	673	23310.0141
	140 ±0.01	M12	20	-	36	1366	23310.0142
	35 ±0.01	M16	20	-	36	331	23310.0145
	70 ±0.01	M16	20	-	36	663	23310.0146
60	140 ±0.01	M16	20	-	36	1330	23310.0147
	35 ±0.01	M12	20	-	55	765	23310.0160
	70 ±0.01	M12	20	-	55	1533	23310.0161
	140 ±0.01	M12	20	-	55	3096	23310.0162
	35 ±0.01	M16	20	-	55	763	23310.0165
	70 ±0.01	M16	20	-	55	1522	23310.0166
	140 ±0.01	M16	20	-	55	3056	23310.0167
	50 ±0.01	M20	20	-	55	1087	23310.0170
100 ±0.01	M20	20	-	55	2130	23310.0171	
70	200 ±0.01	M20	20	-	55	4335	23310.0172
	50 ±0.01	M24	25	-	65	1361	23310.0241
	100 ±0.01	M24	25	-	65	2721	23310.0242
picture 2							
90	200 ±0.02	M24	35	50	65	8860	23310.0243
	300 ±0.02	M24	35	50	65	13820	23310.0244

Clamping Claws

EH 23370.



PRODUCT DESCRIPTION

Clamping claws are used as precision clamping element in conventional fixtures. A locating hole is provided in the body of the fixture. The hole depth has to be adapted to the desired clamping height.

For the version with ground support surface (picture 1), a support can be attached to the rounded claw part (radius 22) to absorb the counter force. This support can be flat, half-rounded or V-shaped.

For the version with positioning bushing (picture 2), a support to absorb the counterforce is not necessary. The positioning bushing, which must be inserted into the fixture, serves as a support for the clamping claw. This bushing is included in the scope of delivery and can also be ordered separately as an accessory.

Clamping is achieved by means of an enclosed hexagon screw DIN 933 (ISO 4017).

Material

Bushing

- Case-hardened steel, case-hardened

Body

- Case-hardened steel, case-hardened, blackened and ground

Disc

- Heat-treated steel, tempered, punched, mechanically trued, phosphatized

Spring

- Spring steel wire

Clamping screw

- Heat-treated steel

MORE INFORMATION

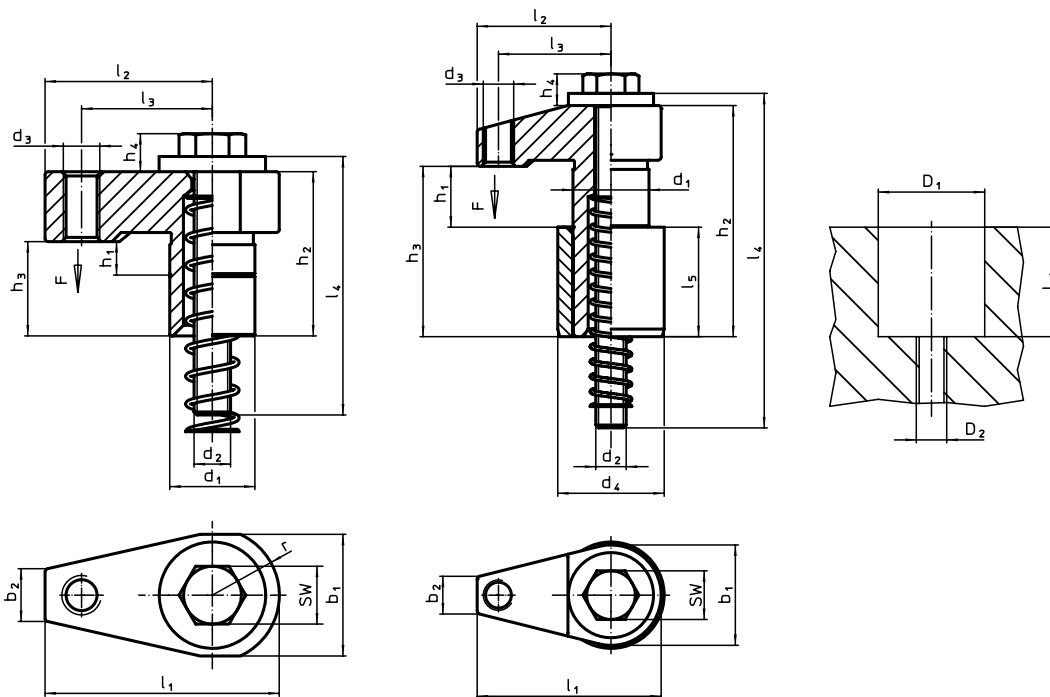
Notes

The tightening torque depends on the specific mounting situation.

References

The clamping height can be reduced by using clamping inserts, e.g. EH 22730.

DRAWING




picture 1

picture 2

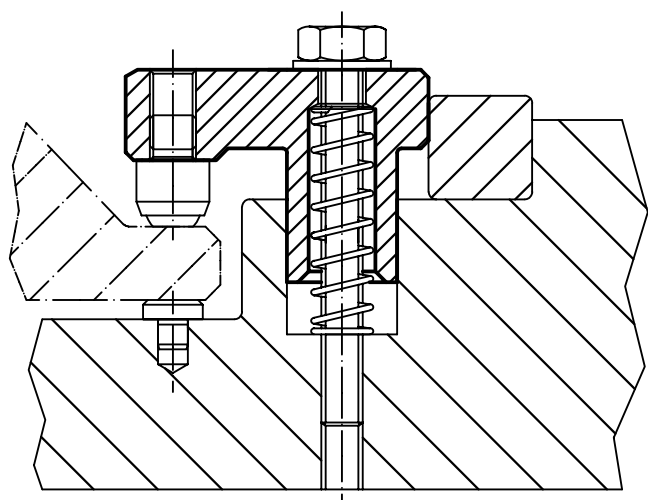
ORDER INFORMATION

d ₁ f7	h ₁	b ₁	d ₂	d ₃	Dimensions										Stroke	WS	Location hole			Clamp- ing force	Tight- ening torque max.	Art. No.	
					d ₄ n6	h ₂	h ₃	h ₄	l ₁	l ₂	l ₃	l ₄	l ₅	r ±0.02			D1 H7	D2	L1				[mm]
with ground supporting surface – picture 1																							
28	0 – 11	40.0	M12	M12	–	31	54	13	77.0	55.0	43	85	–	22	11	18	28	M12	49	10.0	30	523	23370.0031
	0 – 25	40.0	M12	M12	–	53	76	13	77.0	55.0	43	120	–	22	25	18	28	M12	51	10.0	30	614	23370.0053
	20 – 41	40.0	M12	M12	–	83	106	13	77.0	55.0	43	150	–	22	21	18	28	M12	64	10.0	30	770	23370.0083



d ₁ f7	h ₁	b ₁	d ₂	d ₃	Dimensions										Stroke [mm]	WS [mm]	Location hole			Clamp- ing force [kN]	Tight- ening torque max. [Nm]		Art. No.												
					d ₄ n6	h ₂	h ₃	h ₄	l ₁	l ₂	l ₃	l ₄	l ₅	r ±0.02			D1 H7	D2	L1																
[mm]																		[mm]	[mm]	[mm]			[kN]	[Nm]	[g]										
with positioning bushing – picture 2																																			
16	0 – 5	2.0	M 6	M 6	26	31	18	7	37.0	27.0	22	50	16	–	5	10	26	M 6	19	2.5	5	118	23370.0118												
	3 – 8	20.0	M 6	M 6	26	37	24	7	37.0	27.0	22	60	16	–	5	10	26	M 6	22	2.5	5	128	23370.0124												
20	0 – 8	26.0	M 8	M 8	30	40	24	10	48.0	35.0	28	65	20	–	8	13	30	M 8	25	5.0	10	218	23370.0128												
	6 – 15	26.0	M 8	M 8	30	51	35	10	48.0	35.0	28	75	20	–	9	13	30	M 8	30	5.0	10	243	23370.0135												
25	0 – 15	33.0	M10	M10	35	60	40	11	60.5	43.5	37	90	36	–	15	16	35	M10	41	7.5	20	483	23370.0140												
	10 – 20	33.0	M10	M10	35	78	58	11	60.5	43.5	37	110	36	–	10	16	35	M10	49	7.5	20	552	23370.0145												
30	0 – 25	40.3	M12	M12	42	73	50	13	75.0	55.0	43	120	45	–	25	18	42	M12	51	10.0	30	859	23370.0150												
	20 – 41	40.3	M12	M12	42	106	83	13	75.0	55.0	43	150	45	–	21	18	42	M12	64	10.0	30	1034	23370.0183												

APPLICATION EXAMPLE



picture 1

TOGGLE CLAMPS

FULL CLAMPING FORCE, EXTRA EASY

3

CLAMP PARTS SECURELY AND WITH NO EFFORT.

Short set-up times are paramount for an economical production process. Even a minor cog in the production machinery - like a clamping system - can increase cost significantly. Aside from precise and secure clamping of the workpieces, the toggle clamps engineered by Erwin Halder KG afford the user superior ease of use and let them exchange the parts they need to process with unsurpassed speed and ease. The Halder toggle clamp sets itself apart further by its ergonomic handle combined with the sturdy and long-lasting design and a safety clamping piece.



Vertical Toggle Clamps • with horizontal base

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated
- Stainless steel

Rivet

- Stainless steel
- Steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization
- Stainless Steel

Clamping cap

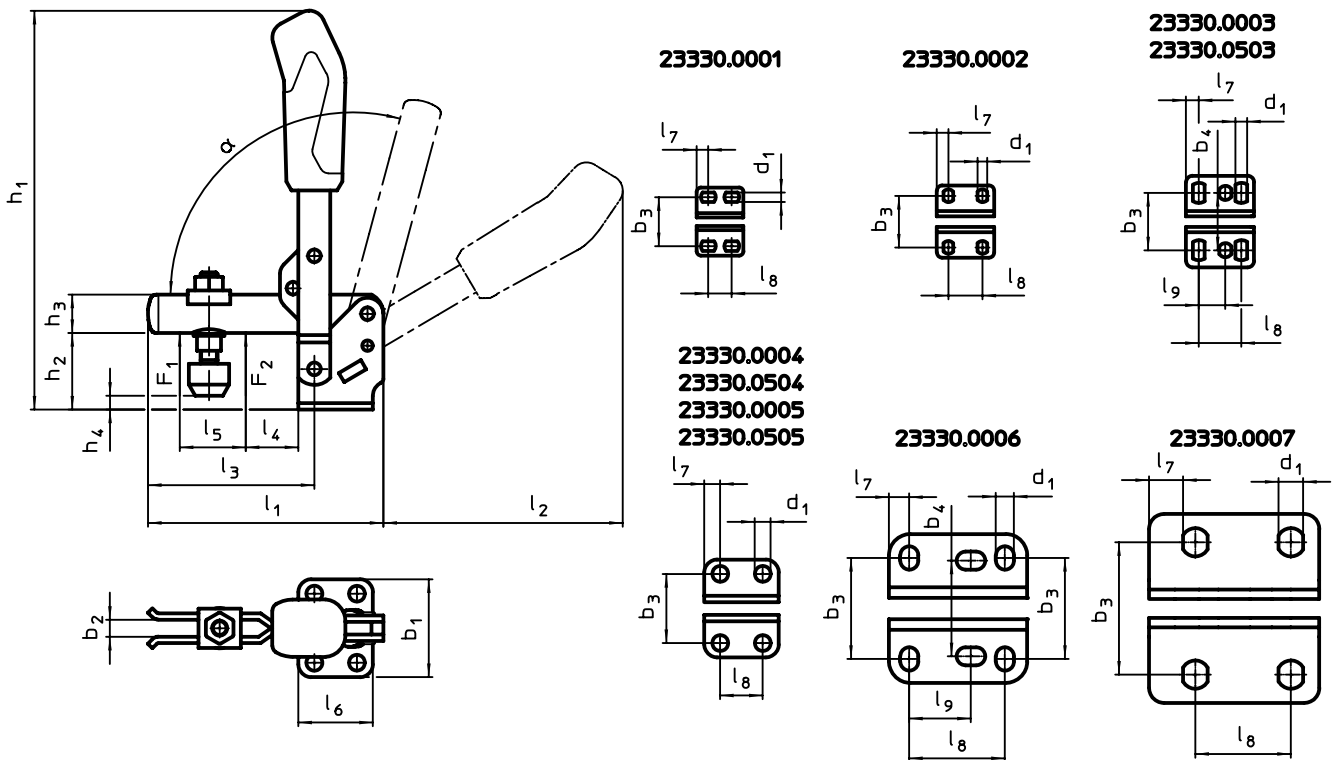
- Rubber, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.

DRAWING




ORDER INFORMATION

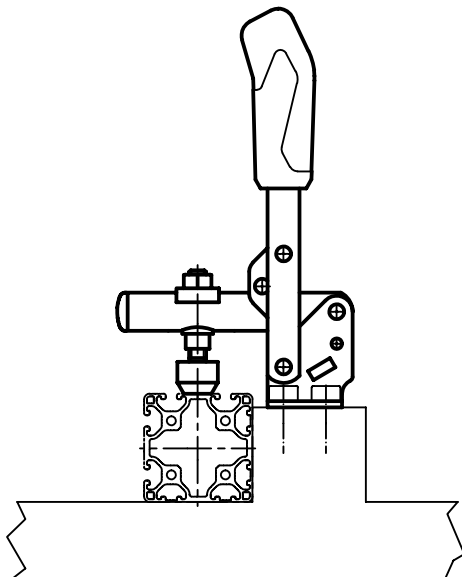
Nominal size	Clamping screw	Dimensions																			Holding force		α	Temperature		Weight	Art. No.
		d_1	b_1	b_2	b_3	b_4	h_1	h_2	h_3	h_4 min.	h_4 max.	l_1	l_2	l_3	l_4	l_5	l_6	l_7	l_8	l_9	F_1	F_2		min.	max.		
	[mm]	[mm]																			[kN]			[°C]			
steel																											
1	M 4 x 25	4.5	32	4	23.0	-	81.0	18.0	8	-1.5	3.5	49	50	31.0	5.5	14	22	5.5	8.5-13.5	-	0.5	0.7	95°	-10	80	66	23330.0001
2	M 5 x 30	4.5	34	5	22.5-26.0	-	98.5	19.0	10	-4.0	2.0	61	59	39.0	6.0	18	27	5.5	16.0	-	0.6	1.1	95°	-10	80	114	23330.0002
3	M 6 x 35	5.5	43	6	23.0-31.0	27	129.0	23.0	12	-3.0	4.5	78	80	52.0	11.0	25	32	6.0	20.0	12.5	0.8	1.2	105° ¹⁾	-10	80	192	23330.0003
4	M 8 x 45	7.5	46	8	32.5	-	186.0	33.0	18	2.0	11.0	112	112	79.0	19.0	37	35	7.5	20.0	-	1.2	2.5	105° ¹⁾	-10	80	410	23330.0004
5	M 8 x 65	8.6	64	10	43.5-46.5	-	221.0	42.5	20	-6.0	22.5	141	130	101.0	16.0	54	53	13.0	32.0	-	1.7	3.0	105° ¹⁾	-10	80	687	23330.0005
6	M12 x 80	8.5	70	14	45.0-50.0	45	281.0	55.8	25	-3.0	27.5	195	185	140.0	34.0	73	65	9.5	45.0	26.5-31.5	3.0	5.0	115° ¹⁾	-10	80	1492	23330.0006
7	M12 x 110	13.0	100	14	37.5-72.5	-	333.0	81.0	30	-2.5	55.0	231	206	165.5	28.0	89	90	24.5	50.5	-	3.4	5.5	140° ¹⁾	-10	80	2000	23330.0007
stainless steel																											
3	M 6 x 35	5.5	43	6	23.0-31.0	27	129.0	23.0	12	-3.0	4.5	78	80	52.0	11.0	25	32	6.0	20.0	12.5	0.8	1.2	105° ¹⁾	-10	80	195	23330.0503
4	M 8 x 45	7.5	46	8	32.5	-	186.0	33.0	18	2.0	11.0	112	112	79.0	19.0	37	35	7.5	20.0	-	1.2	2.5	105° ¹⁾	-10	80	430	23330.0504
5	M 8 x 65	8.6	64	10	43.5-46.5	-	221.0	42.5	20	-6.0	22.5	141	130	101.0	16.0	54	53	13.0	32.0	-	1.7	3.0	105° ¹⁾	-10	80	697	23330.0505

¹⁾ The opening angle of the handle can be changed to 60° by pressing in a stop pin.

ACCESSORIES

	Dimensions	Weight	Art. No.	
			Steel	Stainless Steel
	d_2	[g]		
	[mm]			
clamping screw				
	M 4 x 25	6.2	23330.9001	-
	M 5 x 30	11.0	23330.9002	-
	M 6 x 35	16.0	23330.9003	23330.9503
	M 8 x 45	38.0	23330.9005	23330.9504
	M 8 x 65	57.0	23330.9006	23330.9505
	M12 x 80	147.0	23330.9007	-
	M12 x 110	170.0	23330.9008	-

APPLICATION EXAMPLE



Vertical Toggle Clamps • with vertical base

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

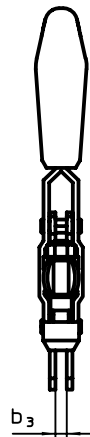
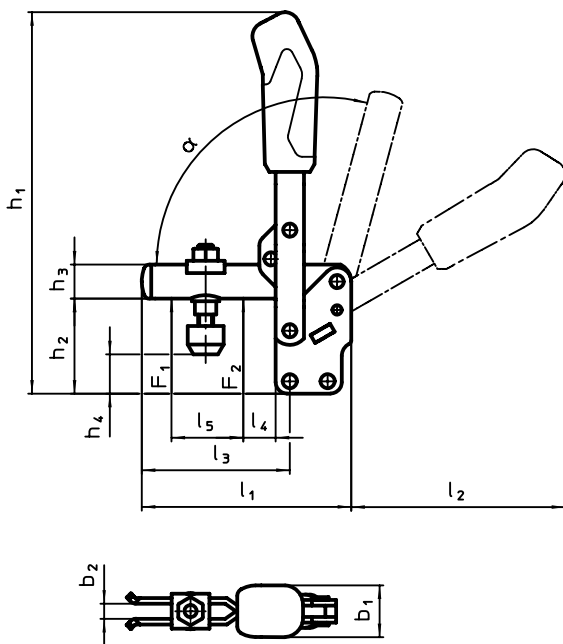
- Rubber, black

MORE INFORMATION

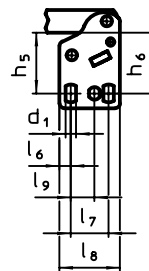
References

Replacement clamping screws are available as accessories in the online shop.

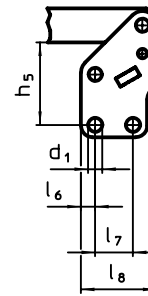
DRAWING



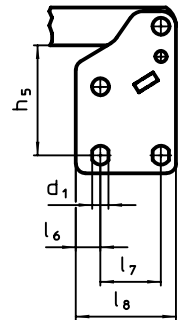
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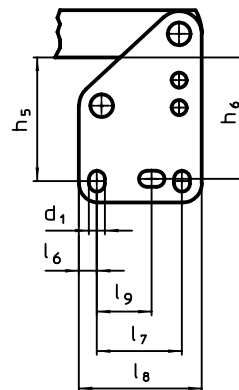
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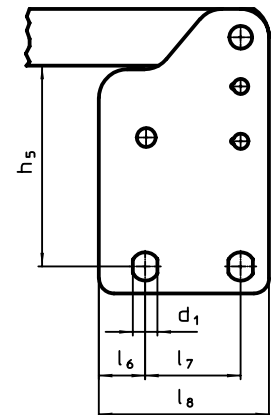
23330.0015



23330.0016




23330.0017



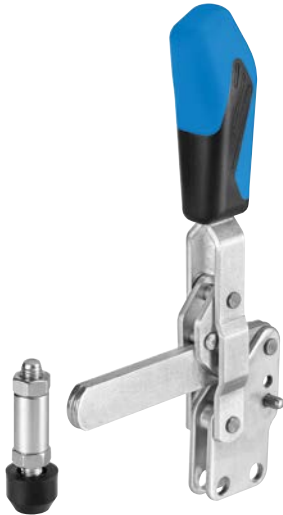
ORDER INFORMATION

Nominal size	Clamping screw [mm]	Dimensions																				Holding force		α	Temperature range		Weight [g]	Art. No.
		d_1	b_1	b_2	b_3	h_1	h_2	h_3	h_4 min.	h_4 max.	h_5	h_6	l_1	l_2	l_3	l_4	l_5	l_6	l_7	l_8	l_9	F_1	F_2		min.	max.		
		[mm]																				[kN]		[°C]				
3	M 6 x 35	5.5	21	6	5	144.5	38	12	11.5	19.5	28.5 – 32	30	78	80	52	11	25	6.0	20.0	32	12.5	0.8	1.2	60°	-10	80	197	23330.0013
4	M 8 x 45	7.5	27	8	6	200.0	48	18	16.5	25.0	41.0	-	112	114	79	19	36	7.5	20.0	40	-	1.2	2.5	60°	-10	80	417	23330.0014
5	M 8 x 65	8.6	35	10	8	244.0	65	20	16.5	45.5	55.5	-	141	130	101	16	54	13.0	32.0	53	-	1.7	3.0	60°	-10	80	689	23330.0015
6	M12 x 80	8.5	36	14	10	301.0	77	25	18.0	49.0	66.0	64	195	183	140	35	72	9.5	45.0	65	26.5 – 31.5	3.0	5.0	60°	-10	80	1511	23330.0016
7	M12 x 110	13.0	39	14	10	369.0	117	30	33.0	90.5	102.0	-	231	206	165	28	89	24.5	50.5	90	-	3.4	5.5	60°	-10	80	2000	23330.0017

ACCESSORIES

	d_2 [mm]	Weight [g]	Art. No.
clamping screw			
	M 6 x 35	16	23330.9003
	M 8 x 45	38	23330.9005
	M 8 x 65	57	23330.9006
	M12 x 80	147	23330.9007
	M12 x 110	170	23330.9008

Vertical Toggle Clamps • with vertical base and solid support arm
EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for maintenance-free continuous use.

An oil resistant ergonomic 2-component handle, with slip-proof, soft surface and large grip area for high ease of use.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

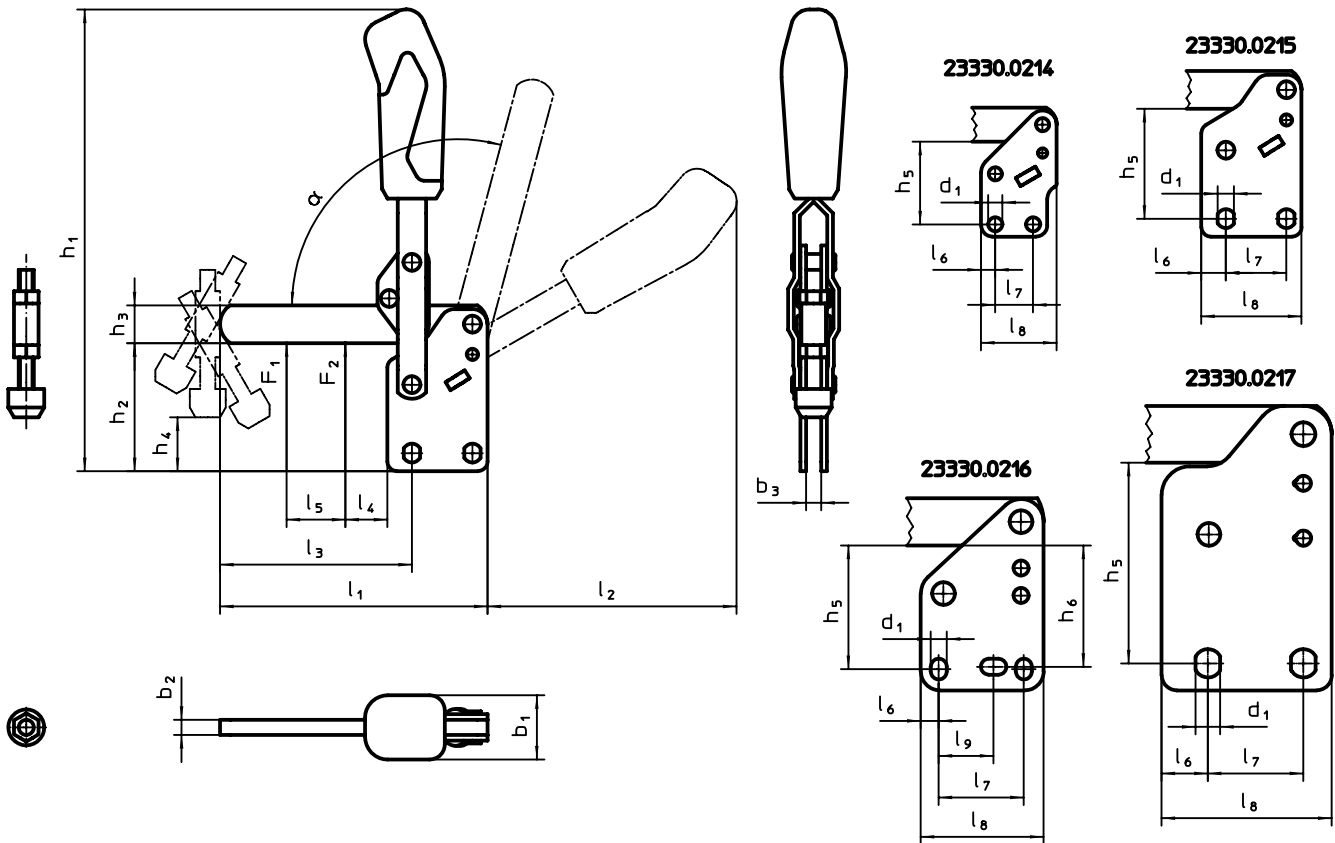
Clamping cap

- Rubber, black

Assembly

The clamping screw must be welded to the support arm in the desired position.

DRAWING



ORDER INFORMATION

Nominal size	Clamp- ing screw	Dimensions																			Holding force		α	min. max.	[g]	Art. No.		
		d ₁	b ₁	b ₂	b ₃	h ₁	h ₂	h ₃	h ₄ min.	h ₄ max.	h ₅	h ₆	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	F ₁					F ₂	[kN]
4	M 8 x 45	7.5	27	6	6	200	48	18	14.5	26.0	41.0	-	108.5	116.0	81.0	19.5	43	7.5	20.0	40	-	1.4	2.5	105°	-10	80	426	23330.0214
5	M 8 x 65	8.6	34	8	8	244	65	20	13.0	44.0	55.5	-	141.5	129.5	101.0	17.0	61	13.0	32.0	53	-	2.0	3.0	105°	-10	80	679	23330.0215
6	M12 x 80	8.5	36	10	10	302	77	25	15.0	47.0	66.0	64	196.5	184.0	141.0	30.5	88	9.5	45.0	65	26.5-31.5	3.0	5.0	115°	-10	80	1506	23330.0216
7	M12 x 110	13.0	39	10	10	369	117	30	28.5	86.5	102.0	-	232.0	206.0	165.5	20.5	90	24.5	50.5	90	-	3.5	5.5	140°	-10	80	2000	23330.0217

Vertical Toggle Clamps • with vertical base and safety lock

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

- Rubber, black

Plastic cap

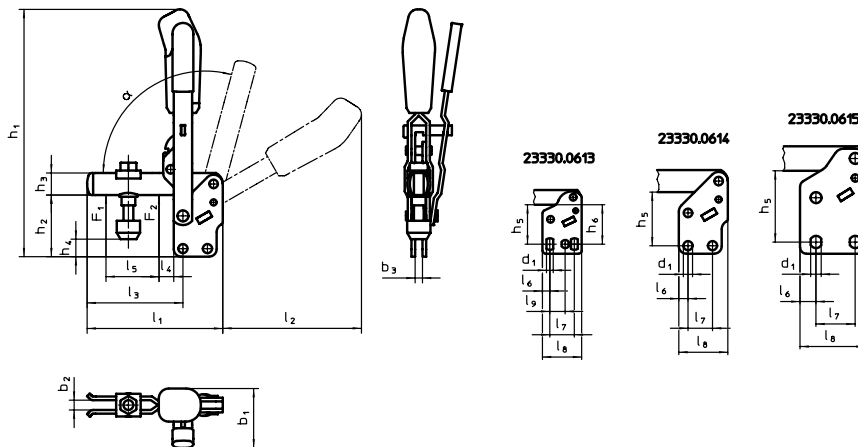
- PVC, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.


DRAWING



ORDER INFORMATION

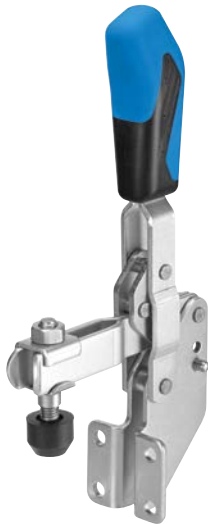
Nominal size	Clamping screw [mm]	Dimensions																			Holding force		α	Temperature		Weight [g]	Art. No.	
		d ₁	b ₁	b ₂	b ₃	h ₁	h ₂	h ₃	h ₄ min.	h ₄ max.	h ₅	h ₆	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	F ₁		F ₂	min.			max.
3	M6 x 35	5.5	38	6	5	154	38	12	11.5	19.5	28.5 – 32	30	78	89	52	11	25	6.0	20	32	12.5	1.0	1.2	95°	-10	80	237	23330.0613
4	M8 x 45	7.5	48	8	6	200	48	18	10.0	18.5	41.0	–	111	114	79	19	37	7.5	20	40	–	1.4	2.5	105°	-10	80	484	23330.0614
5	M8 x 65	8.6	53	10	8	244	65	20	16.5	45.5	55.5	–	141	130	101	16	54	13.0	32	53	–	2.0	3.0	105°	-10	80	776	23330.0615

ACCESSORIES

	d ₂ [mm]	Weight [g]	Art. No.
clamping screw			
	M6 x 35	16	23330.9003
	M8 x 45	38	23330.9005
	M8 x 65	57	23330.9006

Vertical Toggle Clamps • with angle base

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

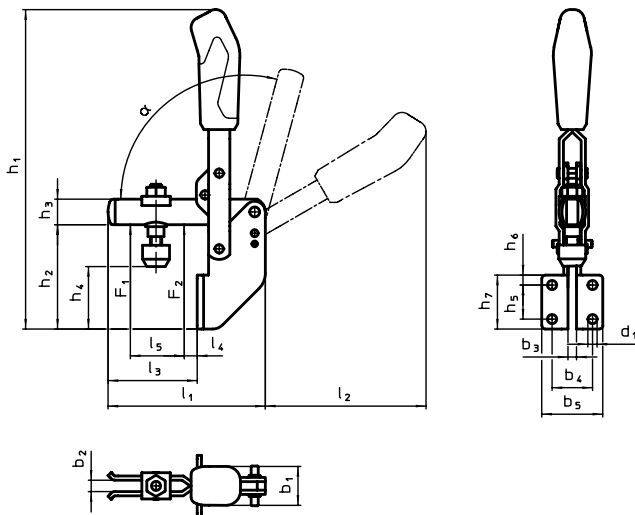
- Rubber, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.


DRAWING



ORDER INFORMATION

Nominal size	Clamp- ing screw [mm]	Dimensions															Holding force		α	Temperature range [°C]	Weight [g]	Art. No.					
		d ₁	b ₁	b ₂	b ₃	b ₄	b ₅	h ₁	h ₂	h ₃	h ₄ min.	h ₄ max.	h ₅	h ₆	h ₇	l ₁	l ₂	l ₃					l ₄	l ₅	F ₁ [kN]	F ₂ [kN]	
3	M6 x 35	5.5	21	6	5	25.5	37.0	176.5	60	12	34	41.5	20	6	32	77	81	41	6	25	1.0	1.2	60°	-10	80	231	23330.0023
4	M8 x 45	6.5	27	8	6	28.5	42.5	223.0	71	18	40	48.5	24	7	38	111	112	63	11	37	1.4	2.5	60°	-10	80	483	23330.0024
5	M8 x 65	8.5	35	10	8	32.0	52.0	280.0	102	20	53	81.5	32	54	96	141	129	84	11	54	2.0	3.0	60°	-10	80	802	23330.0025

ACCESSORIES

	d ₂ [mm]	Weight [g]	Art. No.
clamping screw			
	M6 x 35	16	23330.9003
	M8 x 45	38	23330.9005
	M8 x 65	57	23330.9006

Vertical Toggle Clamps • with angle base and safety lock

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

- Rubber, black

Plastic cap

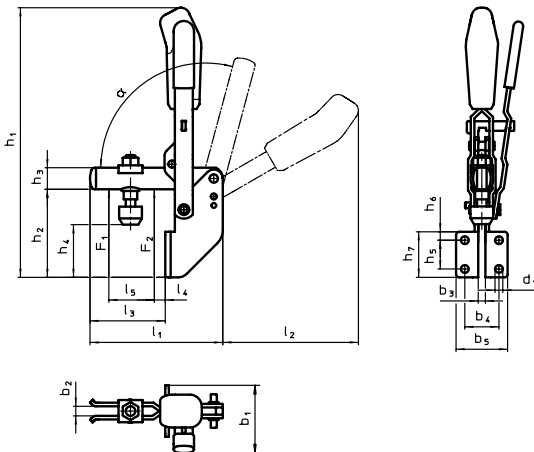
- PVC, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.


DRAWING



ORDER INFORMATION

Nominal size	Clamping screw [mm]	Dimensions															Holding force		α	Temperature		Weight [g]	Art. No.				
		d ₁	b ₁	b ₂	b ₃	b ₄	b ₅	h ₁	h ₂	h ₃	h ₄ min.	h ₄ max.	h ₅	h ₆	h ₇	l ₁	l ₂	l ₃		l ₄	l ₅			F ₁	F ₂	min.	max.
		[mm]															[kN]		[°C]								
3	M6 x 35	6.1	45	6	5	25.5	37	176.5	61	12	34	41.5	20	6	32	77	63	40	9	25	1.0	1.2	105°	-10	80	272	23330.0623
4	M8 x 45	6.5	55	8	6	28.5	43	223.0	71	18	40	48.5	24	7	38	112	111	65	11	43	1.4	2.5	105°	-10	80	551	23330.0624
5	M8 x 65	8.5	63	10	8	32.0	52	280.0	102	20	53	81.5	32	54	96	140	129	84	17	50	2.0	3.0	105°	-10	80	885	23330.0625

ACCESSORIES

	d ₂ [mm]	Weight [g]	Art. No.
clamping screw			
	M6 x 35	16	23330.9003
	M8 x 45	38	23330.9005
	M8 x 65	57	23330.9006

Vertical Toggle Clamps • with horizontal base and solid support arm
EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for maintenance-free continuous use.

An oil resistant ergonomic 2-component handle, with slip-proof, soft surface and large grip area for high ease of use.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

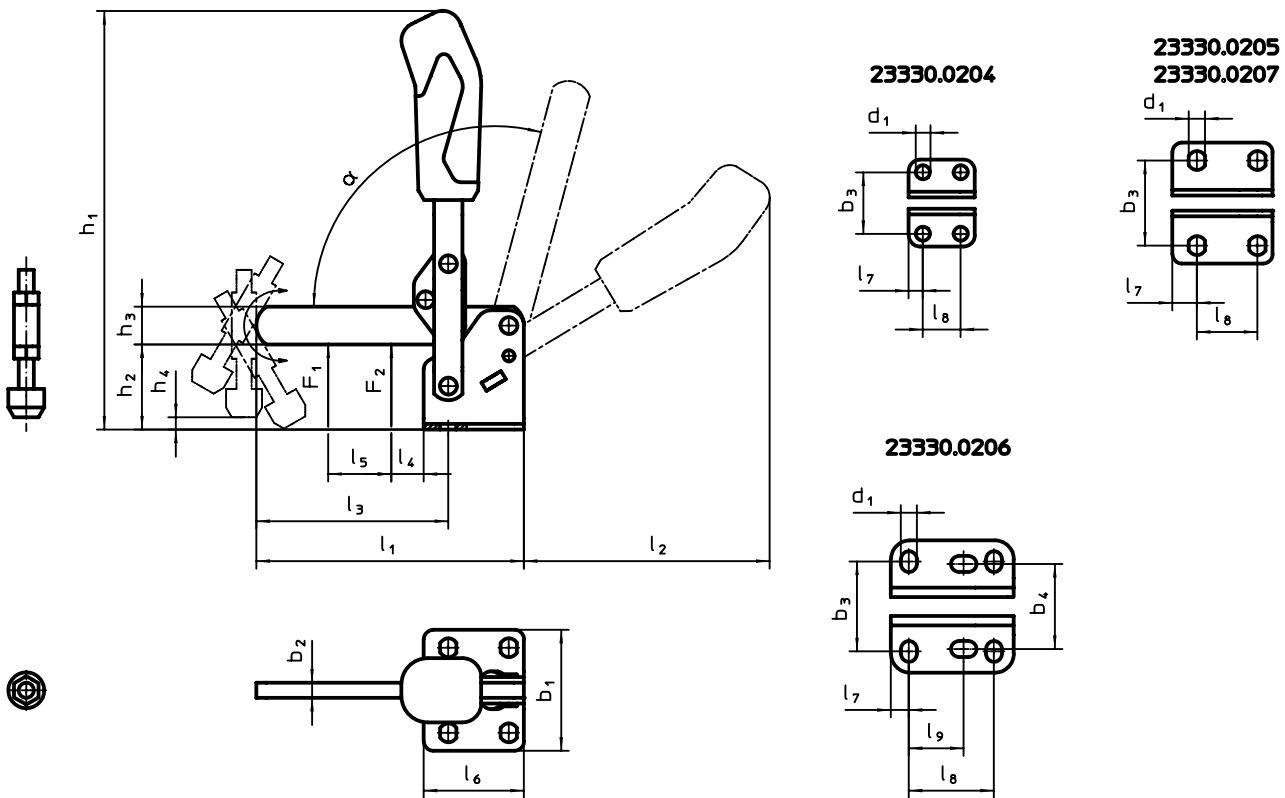
Clamping cap

- Rubber, black

Assembly

The clamping screw must be welded to the support arm in the desired position.

DRAWING



ORDER INFORMATION

Nominal size	Clamping screw [mm]	Dimensions																	Holding force		α	Temperature		Weight [g]	Art. No.	
		d ₁	b ₁	b ₂	b ₄	h ₁	h ₂	h ₃	h ₄ min.	h ₄ max.	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	F ₁		F ₂	min.			max.
4	M 8 x 45	7.5	46	6	-	186	33.5	18	0	12.0	108.5	116.5	81.0	19.5	43	35	7.5	20.0	-	1.4	2.5	105°	-10	80	426	23330.0204
5	M 8 x 65	8.6	64	8	-	221	42.5	20	-8	21.0	141.5	129.5	101.0	17.0	61	53	13.0	32.0	-	2.0	3.0	105°	-10	80	686	23330.0205
6	M12 x 80	8.5	70	10	45	281	55.5	25	-6	25.5	196.5	184.0	141.0	30.5	88	65	9.5	45.0	26.5 - 31.5	3.0	5.0	105°	-10	80	1503	23330.0206
7	M12 x 110	13.0	100	10	-	331	81.0	30	-5	51.0	232.0	206.0	166.5	20.5	90	90	24.5	50.5	-	3.5	5.5	105°	-10	80	2000	23330.0207

Vertical Toggle Clamps • with horizontal base and safety lock

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

- Rubber, black

Plastic cap

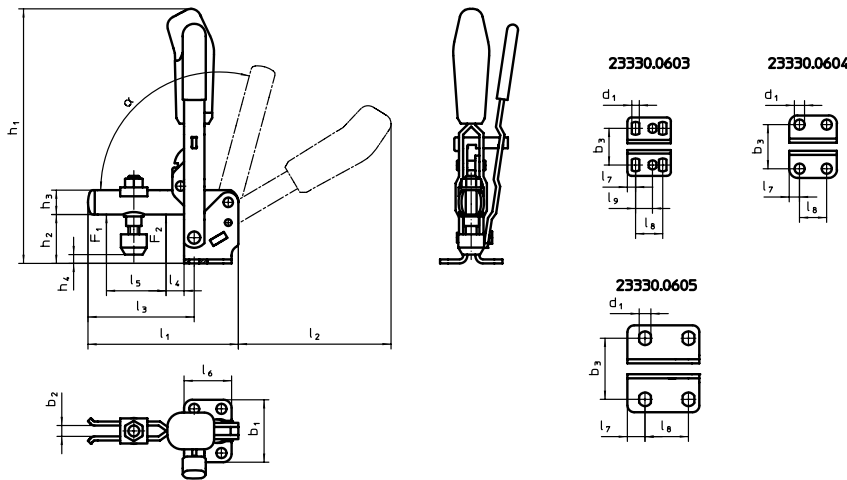
- PVC, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.


DRAWING



ORDER INFORMATION

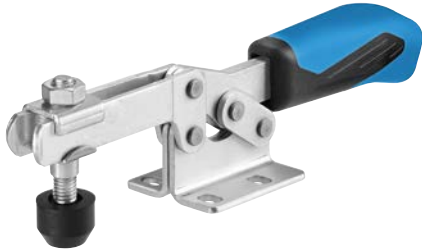
Nominal size	Clamping screw	Dimensions																	Holding force		α	Temperature		Weight	Art. No.	
		d ₁	b ₁	b ₂	b ₃	h ₁	h ₂	h ₃	h ₄ min.	h ₄ max.	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈	l ₉	F ₁		F ₂	min.			max.
	[mm]	[mm]																	[kN]			[°C]				
3	M6 x 35	5.5	43	6	23.0 - 31	139.5	23.0	12	-3	4.5	78	89	52	11	25	32	6.0	20	12.5	1.0	1.2	105°	-10	80	238	23330.0603
4	M8 x 45	7.5	46	8	32.5	186.0	33.0	18	2	11.0	112	112	79	19	36	35	7.5	20	-	1.4	2.5	105°	-10	80	484	23330.0604
5	M8 x 65	8.6	64	10	45.0	221.0	42.5	20	-6	22.5	141	130	101	16	54	53	13.0	32	-	2.0	3.0	105°	-10	80	775	23330.0605

ACCESSORIES

	d ₂	Weight	Art. No.
	[mm]	[g]	
clamping screw			
	M6 x 35	16	23330.9003
	M8 x 45	38	23330.9005
	M8 x 65	57	23330.9006

Horizontal Toggle Clamps • with horizontal base

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated
- Stainless steel

Rivet

- Stainless steel
- Steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization
- Stainless Steel

Clamping cap

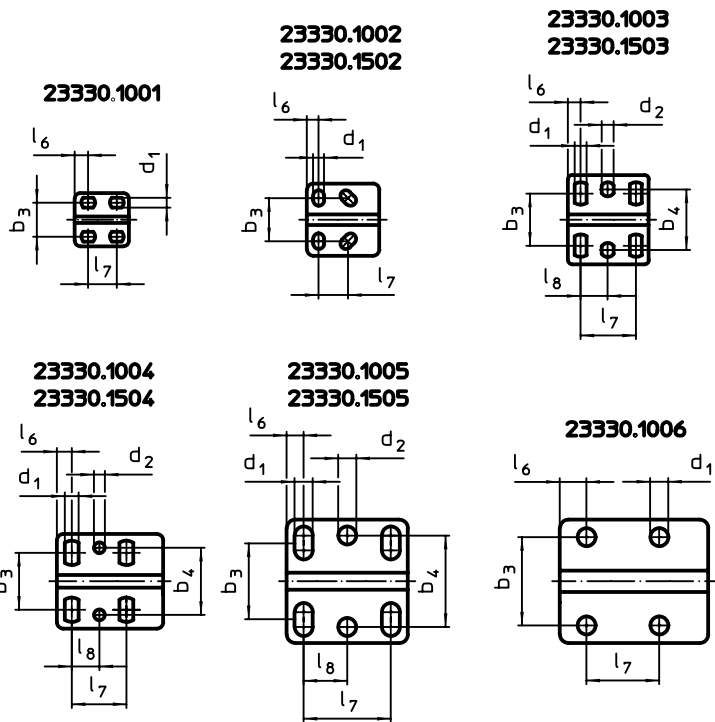
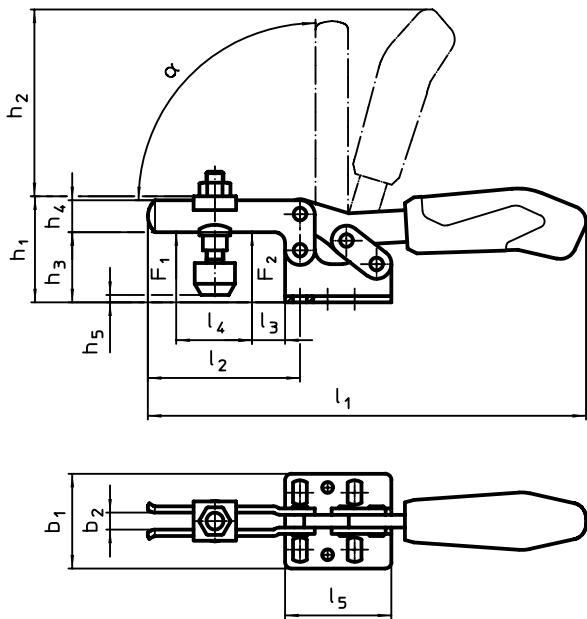
- Rubber, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.


DRAWING



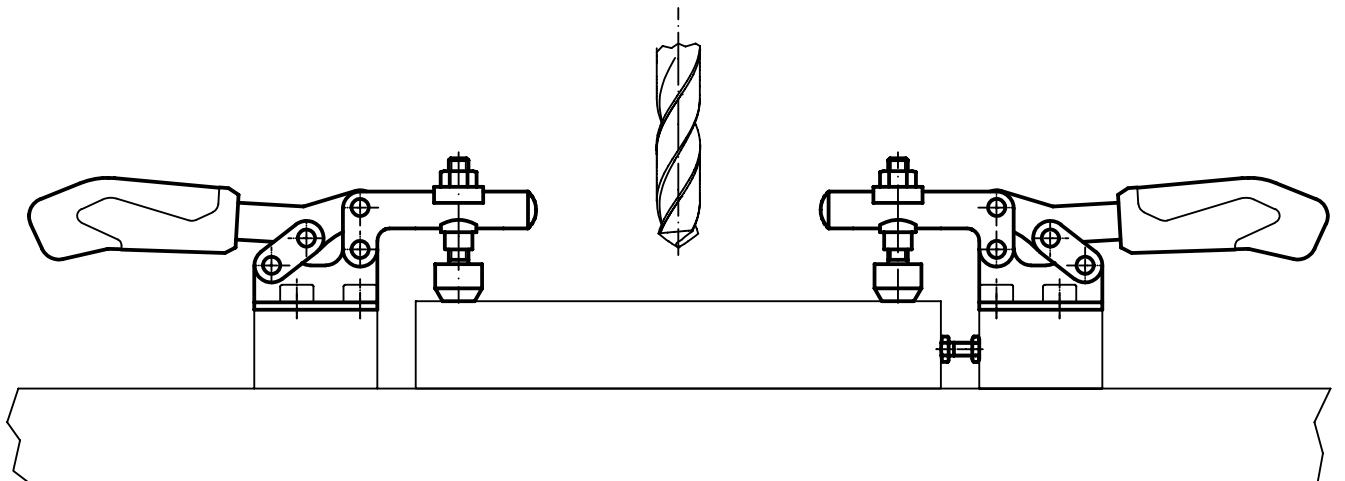
ORDER INFORMATION

Nominal size	Clamp- ing screw	Dimensions																		Holding force		α	Temperature		Weight	Art. No.		
		d_1	d_2	b_1	b_2	b_3	b_4	h_1	h_2	h_3	h_4	h_5 min. max.	l_1	l_2	l_3	l_4	l_5	l_6	l_7	l_8	F_1		F_2	min.			max.	[g]
	[mm]	[mm]																		[kN]			[°C]					
steel																												
1	M 4 x 25	4.6	-	25.0	4	16.0	-	23.0	34	14.5	7.5	-5.5	0.0	79	28	5.5	9.0	25.5	6.3	11.5-15.5	-	0.25	0.4	90°	-10	80	38	23330.1001
2	M 5 x 30	5.2	-	34.0	5	18.0-21.5	-	30.0	49	19.0	10.0	-3.0	2.5	120	42	8.0	18.7	34.0	5.5	13.0-14.5	-	0.80	1.1	90°	-10	80	112	23330.1002
3	M 6 x 35	5.6	5.6	42.0	6	19.5-29.5	28.5	45.0	68	24.0	13.2	-1.5	5.0	162	64	16.0	32.0	38.0	6.0	26.0	12.7	1.00	1.2	90°	-10	80	190	23330.1003
4	M 8 x 45	6.5	5.1	45.5	8	22.0-31.8	31.6	48.5	86	32.0	15.0	-2.0	9.0	206	73	14.0	38.0	50.0	7.0	25.7	13.0	1.80	2.5	90°	-10	80	337	23330.1004
5	M 8 x 65	8.5	8.5	58.0	10	29.0-43.0	43.0	75.0	126	45.0	20.0	-4.0	24.0	287	113	27.0	63.0	57.0	8.0	41.0	20.5	2.00	3.0	90°	-10	80	726	23330.1005
6	M12 x 80	8.5	-	58.0	10	41.5	-	73.0	128	46.0	25.0	1.7	25.0	321	123	16.0	78.0	77.0	12.5	41.5	-	3.00	5.0	90°	-10	80	1112	23330.1006
stainless steel																												
2	M 5 x 30	5.2	-	34.0	5	18.0-21.5	-	30.0	49	19.0	10.0	-3.0	2.5	120	42	8.0	18.7	34.0	5.5	13.0-14.5	-	0.80	1.1	90°	-10	80	113	23330.1502
3	M 6 x 35	5.6	5.6	42.0	6	19.5-29.5	28.5	45.0	68	24.0	13.2	-1.5	5.0	162	64	16.0	32.0	38.0	6.0	26.0	12.7	1.00	1.2	90°	-10	80	189	23330.1503
4	M 8 x 45	6.5	5.1	45.5	8	22.0-31.8	31.6	48.5	86	32.0	15.0	-2.0	9.0	206	73	14.0	38.0	50.0	7.0	25.7	13.0	1.80	2.5	90°	-10	80	341	23330.1504
5	M 8 x 65	8.5	8.5	58.0	10	29.0-43.0	43.0	75.0	126	45.0	20.0	-4.0	24.0	287	113	27.0	63.0	57.0	8.0	41.0	20.5	2.00	3.0	90°	-10	80	744	23330.1505

ACCESSORIES

	Dimensions d_2 [mm]	Weight [g]	Art. No.	
			Steel	Stainless Steel
clamping screw				
	M 4 x 25	6.2	23330.9001	-
	M 5 x 30	11.0	23330.9002	23330.9502
	M 6 x 35	16.0	23330.9003	23330.9503
	M 8 x 45	38.0	23330.9005	23330.9504
	M 8 x 65	57.0	23330.9006	23330.9505
	M12 x 80	147.0	23330.9007	-

APPLICATION EXAMPLE



Horizontal Toggle Clamps • with horizontal base / increased holding force

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide rang of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, pas-sivated

Rivet

- Stainless steel

Handle

- Plastic

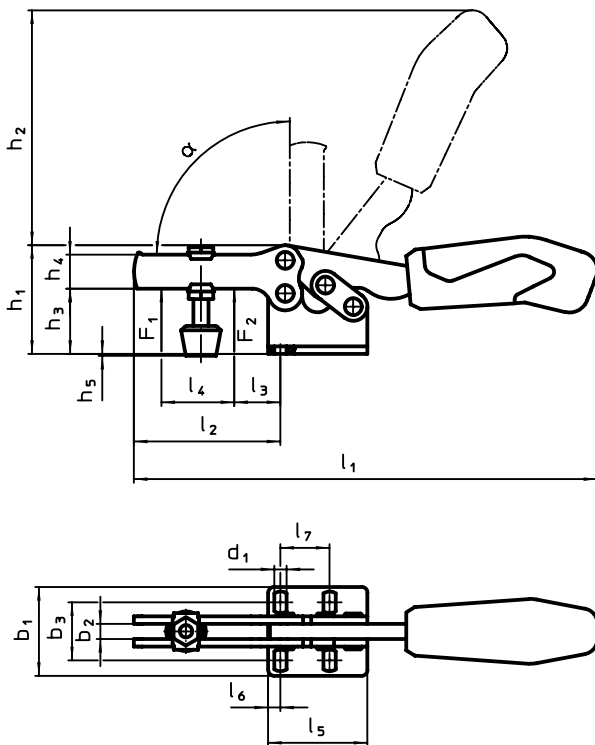
Clamping screw

- Steel, tempered, zinc-plated by galvani-zation

Clamping cap

- Rubber, black

DRAWING



ORDER INFORMATION

Nominal size	Clamping screw [mm]	Dimensions															Holding force		α	Temperature		Weight	Art. No.	
		d ₁	b ₁	b ₂	h ₁	h ₂	h ₃	h ₄	h ₅ min.	h ₅ max.	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	F ₁		F ₂	min.			max.
		[mm]															[kN]		[°C]					
2	M 5 x 35	4.3	27.5	5	35	46	19.0	12	0	10.0	126	46	16.5	20	38.0	6.0	13.5	1.1	1.7	90°	-10	80	136	23330.1302
4	M 8 x 58	6.5	47.0	8	58	112	33.5	18	-1	13.0	242	78	22.0	43	52.5	6.5	26.0	2.5	4.0	90°	-10	80	557	23330.1304
5	M10 x 76	8.6	60.0	10	77	135	41.0	24	-2	16.5	329	120	23.0	69	76.0	10.5	41.5	3.5	8.0	90°	-10	80	1261	23330.1305

Horizontal Toggle Clamps • with horizontal base and solid support arm

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for maintenance-free continuous use.

An oil resistant ergonomic 2-component handle, with slip-proof, soft surface and large grip area for high ease of use.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

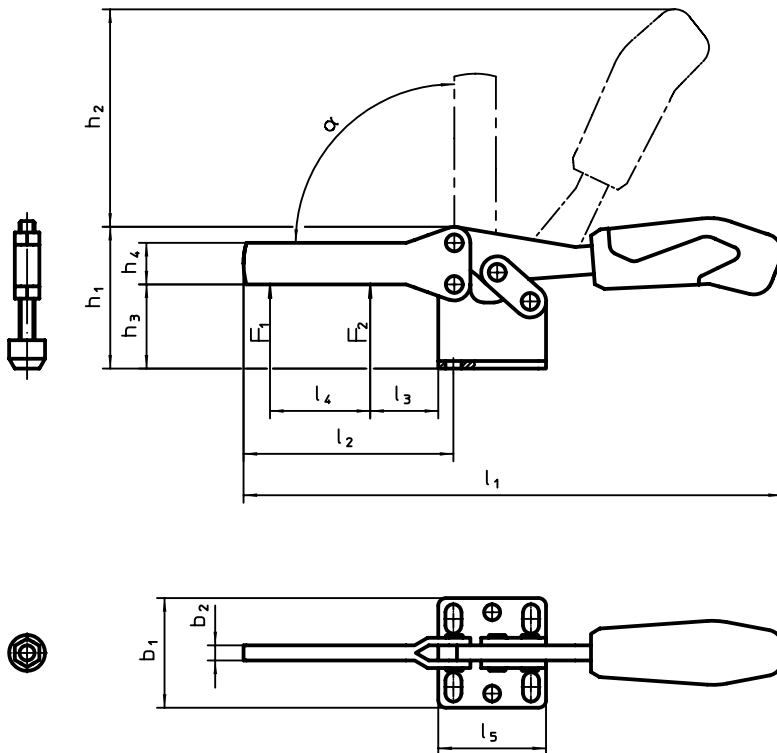
Clamping cap

- Rubber, black

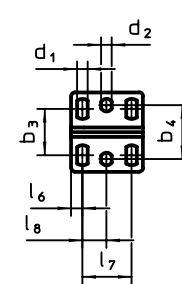
Assembly

The clamping screw must be welded to the support arm in the desired position.

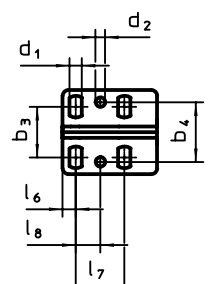
DRAWING



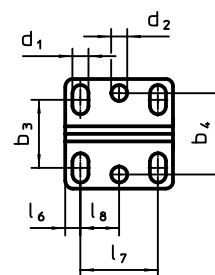
23330.1203



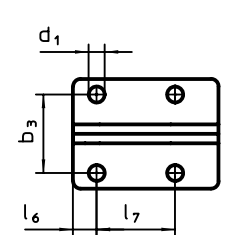
23330.1204



23330.1205



23330.1206

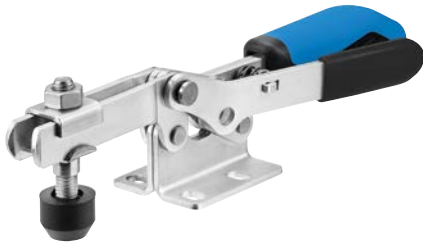


ORDER INFORMATION

Nominal size	Clamping screw	Dimensions																		Holding force		α	Temperature		Weight [g]	Art. No.		
		d_1	d_2	b_1	b_2	b_3	b_4	h_1	h_2	h_3	h_4	h_5 min.	h_5 max.	l_1	l_2	l_3	l_4	l_5	l_6	l_7	l_8		F_1	F_2			min.	max.
	[mm]	[mm]																		[kN]			[°C]					
3	M 6 x 35	5.6	5.6	42.0	5	19.5 - 29.5	28.5	45.0	66	24	13	-2.0	7.5	161	63	24	35	38	6.0	26.0	13	1.0	1.2	90°	-10	80	196	23330.1203
4	M 8 x 45	6.5	5.1	45.5	6	22.0 - 31.8	32.0	48.5	86	32	15	-3.5	11.0	205	72	32	44	50	7.0	26.0	13	1.8	2.5	90°	-10	80	400	23330.1204
5	M 8 x 65	8.5	8.5	58.0	8	29.0 - 43.0	43.0	75.0	114	45	20	-6.0	22.0	280	111	45	66	57	8.0	41.0	21	2.0	3.0	90°	-10	80	716	23330.1205
6	M12 x 80	8.5	-	58.0	10	41.5	-	73.0	128	46	25	-13.0	12.5	320	121	46	78	77	12.5	41.5	-	3.0	5.0	90°	-10	80	1222	23330.1206

Horizontal Toggle Clamps • with horizontal base and safety lock
EH 23330.

3



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses. These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs. The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components. The toggle clamps are manufactured from high quality components and are designed for continuous use. A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use. The quickly adjustable clamping screws are provided by a retainer.

Material

- Clamp**
 - Steel, zinc-plated by galvanization, passivated
- Rivet**
 - Stainless steel
- Handle**
 - Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

- Rubber, black

Plastic cap

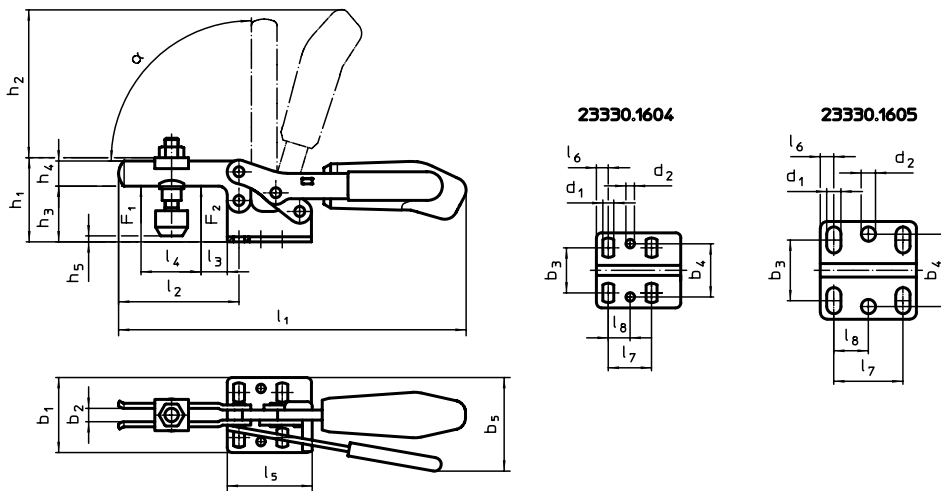
- PVC, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.


DRAWING



ORDER INFORMATION

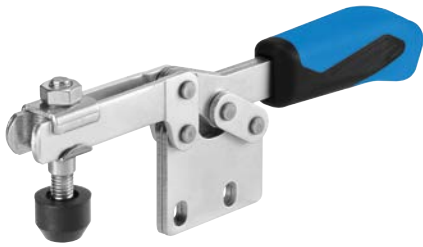
Nominal size	Clamping screw [mm]	Dimensions																	Holding force		α	Temperature		Weight [g]	Art. No.		
		d ₁	d ₂	b ₁	b ₂	b ₃	b ₄	b ₅	h ₁	h ₂	h ₃	h ₄	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	l ₈		F ₁	F ₂			min.	max.
		[mm]																	[kN]		[°C]						
4	M8 x 45	6.5	5.1	45.5	8	22-31.8	31.6	56	48.5	86.0	32	15	206	73	14	38	50	7	25.7	13	1.8	2.5	90°	-10	80	401	23330.1604
5	M8 x 65	8.5	8.5	58.0	10	29-43.0	43.0	83	75.0	126.5	45	20	287	113	27	63	57	8	41.0	21	2.0	3.0	90°	-10	80	833	23330.1605

ACCESSORIES

	d ₂ [mm]	Weight [g]	Art. No.
clamping screw			
	M8 x 45	38	23330.9005
	M8 x 65	57	23330.9006

Horizontal Toggle Clamps • with vertical base

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide rang of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, pas-sivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvani-zation

Clamping cap

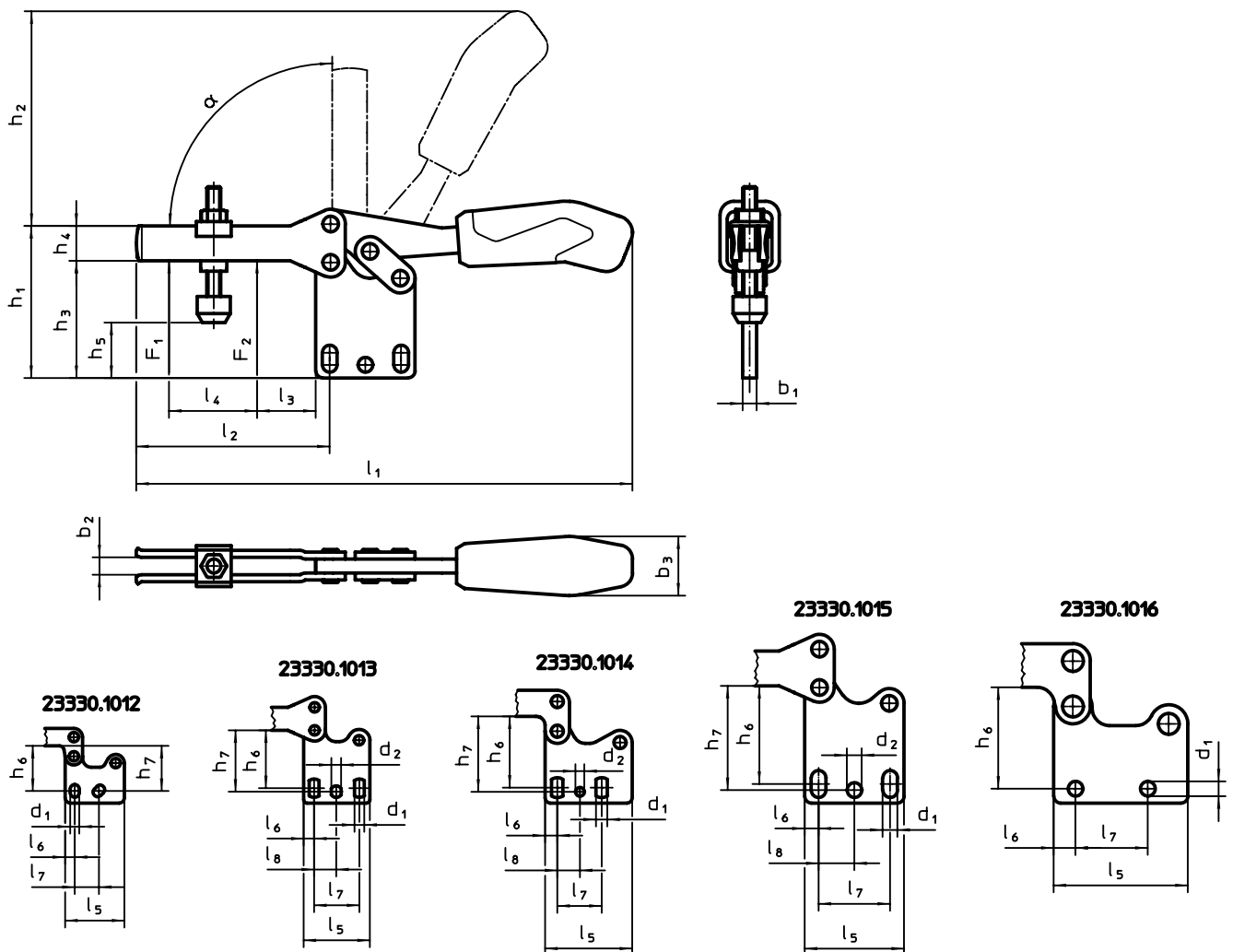
- Rubber, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.


DRAWING



ORDER INFORMATION

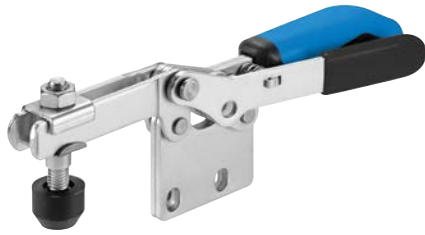
Nominal size	Clamp- ing screw	Dimensions																				Holding force		α	Temperature		Art. No.		
		d_1	d_2	b_1	b_2	b_3	h_1	h_2	h_3	h_4	h_5 min.	h_5 max.	h_6	h_7	l_1	l_2	l_3	l_4	l_5	l_6	l_7	l_8	F_1		F_2	min.		max.	
	[mm]	[mm]																				[kN]			[°C]		[g]		
2	M5 x 30	5.2	-	5	5	18	43.0	49	31.5	10.0	8.0	15	23.5-25.5	24.5	120	42	8	18.5	34	5.5	13.0-14.5	-	0.8	1.1	90°	-10	80	112	23330.1012
3	M6 x 35	5.6	5.6	5	6	21	55.0	68	40.0	13.2	15.0	22	29.5-34.0	34.0	164	64	16	32.0	38	6.0	26.0	12.7	1.0	1.2	90°	-10	80	194	23330.1013
4	M8 x 45	6.5	5.1	6	8	27	65.0	86	49.0	15.0	14.5	26	37.5-42.5	42.0	206	73	14	38.5	50	7.0	25.7	13.0	1.8	2.5	90°	-10	80	341	23330.1014
5	M8 x 65	8.5	8.5	8	10	34	97.0	115	66.5	20.0	17.5	46	52.0-59.0	59.0	287	113	27	63.0	57	8.0	41.0	20.5	2.0	3.0	90°	-10	80	726	23330.1015
6	M8 x 65	8.5	-	10	10	35	92.5	128	65.0	25.0	21.5	45	57.0	-	321	123	16	78.0	77	12.5	41.5	-	3.0	5.0	90°	-10	80	1132	23330.1016

ACCESSORIES

	d_2		Art. No.
	[mm]	[g]	
clamping screw			
	M5 x 30	11	23330.9002
	M6 x 35	16	23330.9003
	M8 x 45	38	23330.9005
	M8 x 65	57	23330.9006

Horizontal Toggle Clamps • with vertical base and safety lock

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in gluing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

- Rubber, black

Plastic cap

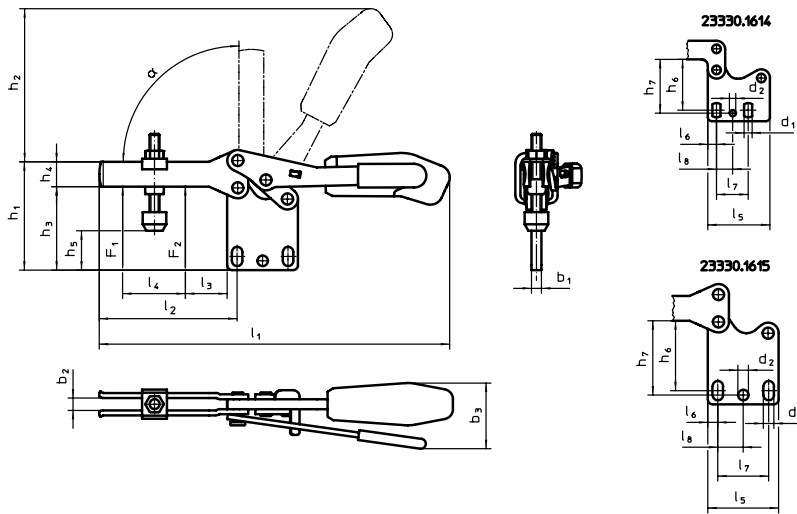
- PVC, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.


DRAWING



ORDER INFORMATION

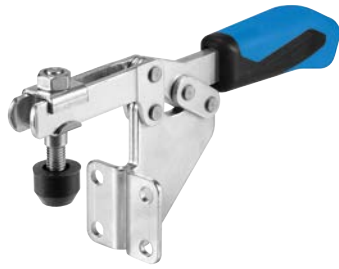
Nominal size	Clamping screw [mm]	Dimensions																		Holding force		α	Temperature		Weight	Art. No.			
		d ₁	d ₂	b ₁	b ₂	b ₃	h ₁	h ₂	h ₃	h ₄	h ₅ min.	h ₅ max.	h ₆	h ₇	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇		l ₈	F ₁			F ₂	min.	max.
		[mm]																		[kN]			[°C]						
4	M8 x 45	6.5	5.1	6	8	48	65	86	49.0	15	14.5	26	37.5 – 42.5	42	206	73	14	38	50	7	25.7	13.0	1.8	2.5	90°	-10	80	401	23330.1614
5	M8 x 65	8.5	8.5	8	10	51	97	115	66.5	20	17.5	46	52.0 – 59.0	59	287	113	27	63	57	8	41.0	20.5	2.0	3.0	90°	-10	80	834	23330.1615

ACCESSORIES

	d ₂ [mm]	Weight [g]	Art. No.
clamping screw			
	M8 x 45	38	23330.9005
	M8 x 65	57	23330.9006

Horizontal Toggle Clamps • with angle base

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for continuous use.

A oil resistant ergonomic 2-component handle, with increased grip area with soft surface for high ease of use.

The quickly adjustable clamping screws are provided by a retainer.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

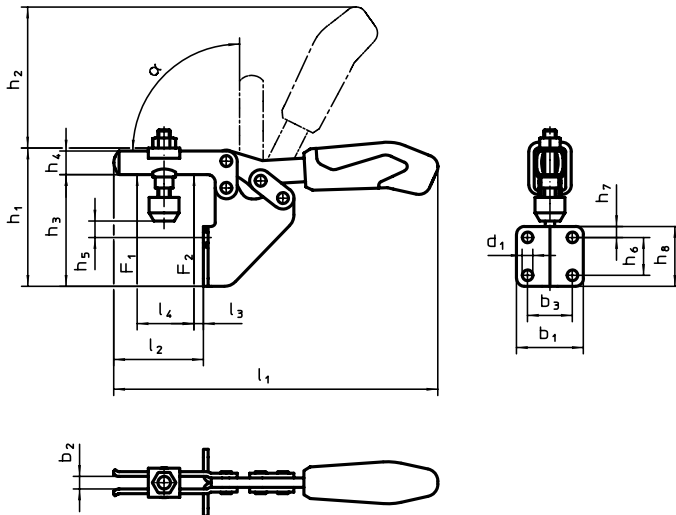
- Rubber, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.


DRAWING



ORDER INFORMATION

Nominal size	Clamping screw [mm]	Dimensions																Holding force		α	Temperature		Weight [g]	Art. No.	
		d ₁	b ₁	b ₂	b ₃	h ₁	h ₂	h ₃	h ₄	h ₅ min.	h ₅ max.	h ₆	h ₇	h ₈	l ₁	l ₂	l ₃	l ₄	F ₁		F ₂	min.			max.
2	M5 x 30	5.2	31.0	5.0	19.0	68.0	49	57	10.0	14	20.0	13.5	8	28	120	32	4.0	18.5	0.8	1.1	90°	-10	80	154	23330.1022
3	M6 x 35	5.6	37.0	6.2	25.5	94.0	68	73	13.2	22	29.5	20.0	6	32	162	52	10.5	32.0	1.0	1.2	90°	-10	80	247	23330.1023
4	M8 x 45	6.8	42.5	8.0	28.5	86.5	86	70	15.0	5	16.0	24.0	7	38	206	59	6.5	37.0	1.8	2.5	90°	-10	80	400	23330.1024
5	M8 x 65	8.5	52.0	10.0	32.0	133.0	120	102	20.0	11	40.0	32.0	40	82	282	93	15.0	63.0	2.0	3.0	90°	-10	80	901	23330.1025

ACCESSORIES

	d ₂ [mm]	Weight [g]	Art. No.
clamping screw			
	M5 x 30	11	23330.9002
	M6 x 35	16	23330.9003
	M8 x 45	38	23330.9005
	M8 x 65	57	23330.9006

Toggle Clamps Push-Pull Type • with angle base

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for maintenance-free continuous use.

An oil resistant ergonomic 2-component handle, with slip-proof, soft surface and large grip area for high ease of use.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel
- Steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

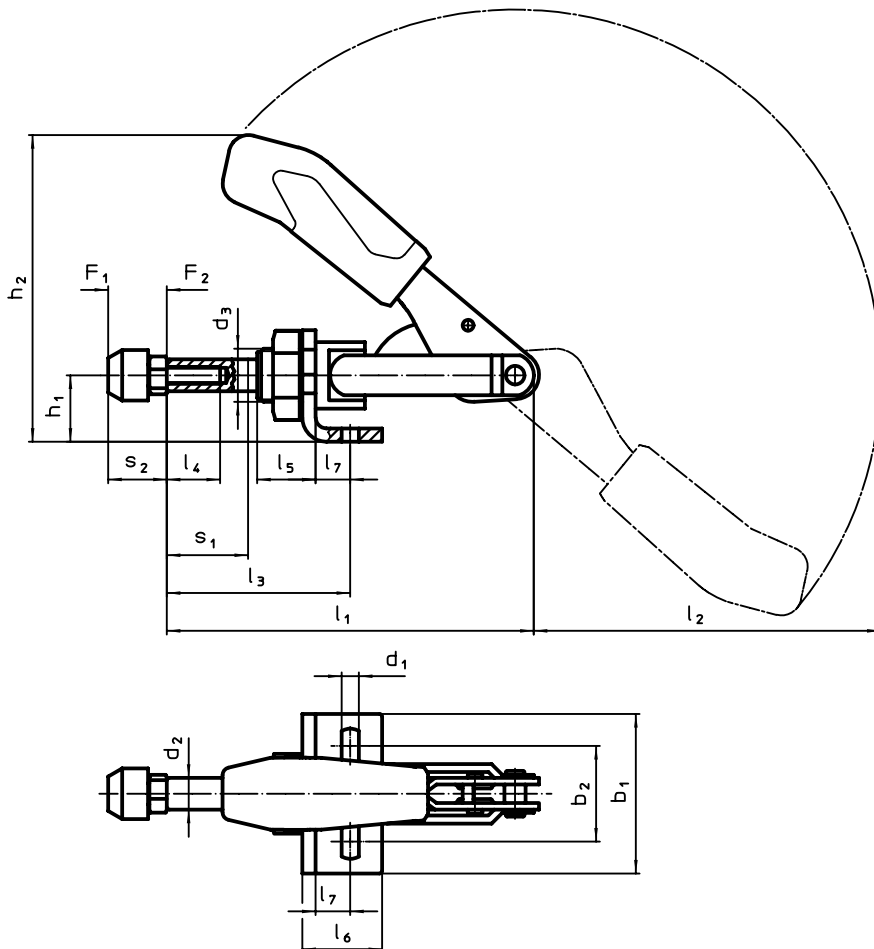
- Rubber, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.

DRAWING



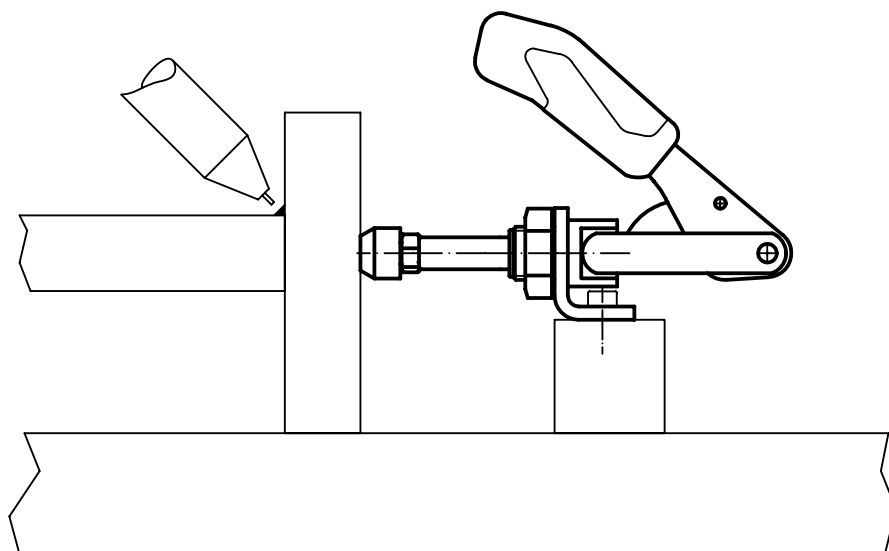
ORDER INFORMATION

Nominal size	Clamp- ing screw [mm]	Dimensions																Stroke s ₁ [mm]	Holding force		Temperature		Art. No.		
		d ₁	d ₂	d ₃	b ₁	b ₂	h ₁	h ₂	l ₁	l ₂	l ₃ min.	l ₃ max.	l ₄	l ₅	l ₆	l ₇	s ₂ min.		s ₂ max.	F ₁	F ₂	min.		max.	[g]
		[mm]																[kN]		[°C]					
1	M 4 x 20	4.5	6.5	M10 x 1	25	16.0	12	49.3	66.5	54.0	17.0	33.0	13	10	16	6.5	12	20	16	0.8	0.8	-10	80	73	23330.2001
2	M 4 x 20	4.5	8.0	M12 x 1,5	30	16.0 – 19.5	15	60.5	91.0	74.0	24.5	44.5	20	16	20	7.0	12	20	20	1.0	1.0	-10	80	124	23330.2002
3	M 6 x 25	5.6	10.0	M16 x 1,5	50	31.8 – 36.0	20	85.5	114.0	105.0	32.5	58.5	20	19	34	12.5	17	25	26	2.0	2.0	-10	80	328	23330.2003
4	M 8 x 35	6.5	12.0	M20 x 1,5	60	29.5 – 42.5	25	108.0	140.0	127.5	37.0	69.0	30	22	30	13.0	22	35	32	2.5	2.5	-10	80	505	23330.2004
6	M12 x 50	8.5	16.0	M24 x 1,5	65	29.0 – 46.0	30	129.5	171.5	158.0	41.5	81.5	50	25	35	15.5	30	50	40	4.5	4.5	-10	80	927	23330.2006

ACCESSORIES

d ₂ [mm]	[g]	Art. No.
clamping screw		
M 4 x 20	3.6	23330.9011
M 6 x 25	11.0	23330.9013
M 8 x 35	25.0	23330.9014
M12 x 50	73.0	23330.9016

APPLICATION EXAMPLE



Toggle Clamps Push-Pull Type • with fastening thread

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

These toggle clamps can be used in the metal working industry when drilling, welding, bending, grinding, testing and fitting as well as in the wood and plastic industry in glueing, drilling, cutting and milling jigs.

The "toggle" principle of the toggle clamp allows a large and quick opening of the clamp. If unclamped the workpieces are completely cleared for unimpeded removal. The large power transmission results maximum clamping force by low hand force. The clamps are self-arresting they remain locked, resisting the force produced when machining components.

The toggle clamps are manufactured from high quality components and are designed for maintenance-free continuous use.

An oil resistant ergonomic 2-component handle, with slip-proof, soft surface and large grip area for high ease of use.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

Clamping cap

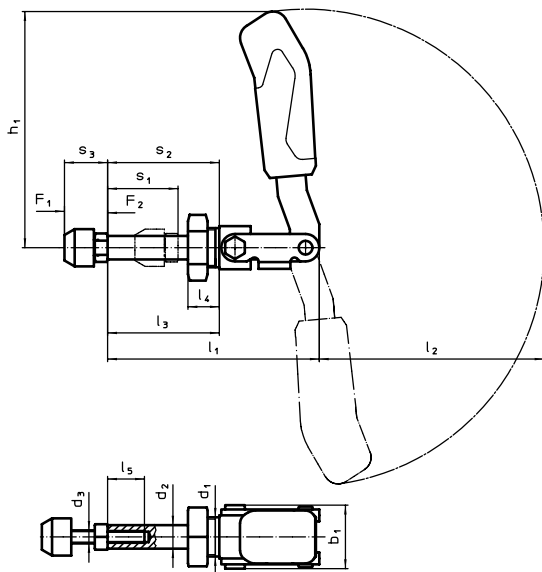
- Rubber, black

MORE INFORMATION

References

Replacement clamping screws are available as accessories in the online shop.

DRAWING



ORDER INFORMATION

Nominal size	Clamping screw	Dimensions													Stroke s_1	Holding force		Temperature		Weight	Art. No.
		d_1	d_2	d_3	b_1	h_1	l_1	l_2	l_3	l_4	l_5	s_2	s_3 min.	s_3 max.		F_1	F_2	min.	max.		
	[mm]	[mm]													[mm]	[kN]		[°C]		[g]	
3	M 6 x 25	M16 x 1,5	10	M 6	30.5	73	68.5	68	36	13	15	36	17	25	21.5	1.0	1.0	-10	80	152	23330.2103
4	M 8 x 35	M20 x 1,5	12	M 8	33.0	123	108.0	115	57	16	25	57	22	35	40.0	2.5	2.5	-10	80	327	23330.2104
6	M12 x 50	M24 x 1,5	16	M12	49.0	149	175.0	139	92	24	45	92	30	50	67.0	4.0	4.0	-10	80	927	23330.2106

ACCESSORIES

d_2	Weight	Art. No.
[mm]	[g]	
clamping screw		
M 6 x 25	11	23330.9013
M 8 x 35	25	23330.9014
M12 x 50	73	23330.9016

Toggle Clamps Hook Type • with horizontal base

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide rang of uses. The toggle clamps are manufactured from high quality components and are designed for maintenance-free continuous use. An oil resistant ergonomic 2-component handle, with slip-proof, soft surface and large grip area for high ease of use.

Material

- Clamp**
 - Steel, zinc-plated by galvanization, pas-sivated
 - Stainless steel
- Rivet**
 - Stainless steel

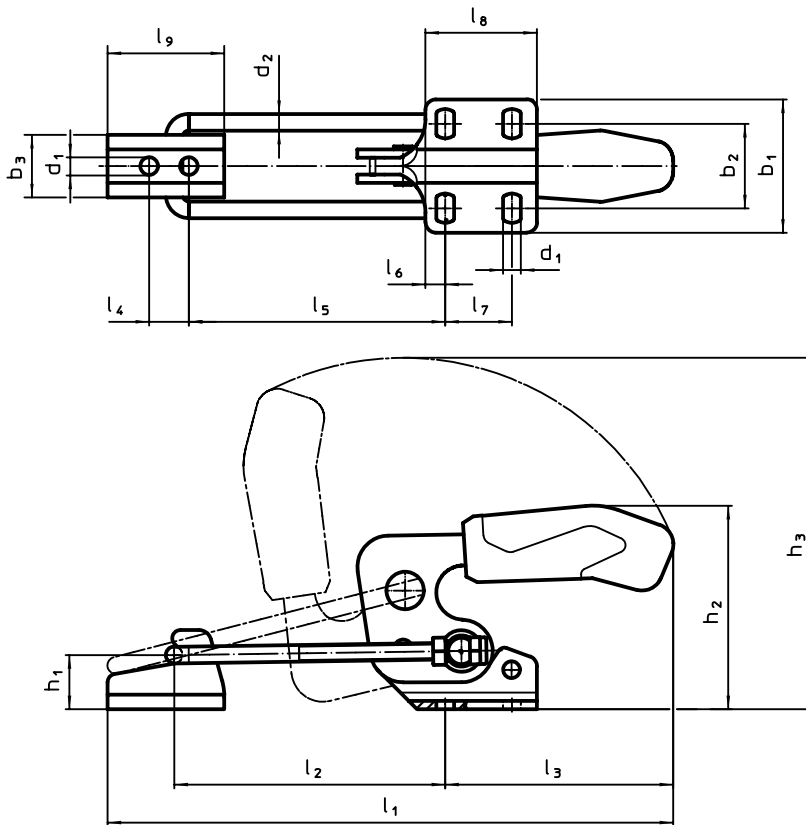
Handle

- Plastic

Counter catch

- Steel, zinc-plated by galvanization, pas-sivated
- Stainless steel



DRAWING



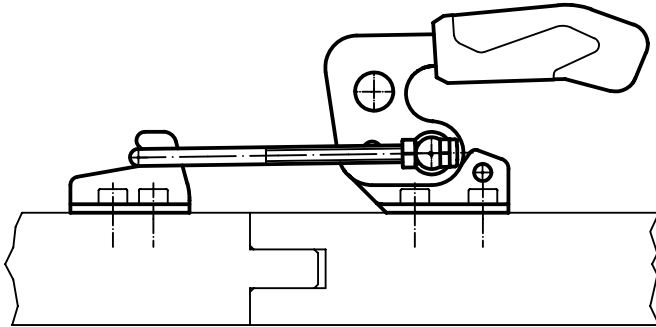
ORDER INFORMATION

Nominal size	Dimensions																			Hold-ing force		Art. No.			
	d ₁	d ₂	b ₁	b ₂	b ₃	h ₁	h ₂	h ₃	l ₁ min.	l ₁ max.	l ₂ min.	l ₂ max.	l ₃	l ₄	l ₅ min.	l ₅ max.	l ₆	l ₇	l ₈	l ₉	F ₁ [kN]		min. [°C]	max. [°C]	[g]
[mm]																									
steel																									
3	5.2	4	38.0	19.5 – 23.5	18	12	47.0	99.0	125	159	42.0	76	69	11	38.0	72	6.4	13	26.0	26	1.6	-10	80	143	23330.3003
4	6.5	6	48.0	24.5 – 32.0	23	19	70.0	135.5	169	216	53.5	101	93	14	48.6	96	8.0	19	35.0	39	3.2	-10	80	365	23330.3004
5	8.5	8	64.3	35.0 – 46.0	30	26	94.5	171.5	209	273	66.0	130	111	19	59.0	123	9.5	32	53.5	56	7.0	-10	80	821	23330.3005
stainless steel																									
3	5.2	4	38.0	19.5 – 23.5	18	12	47.0	99.0	125	159	42.0	76	69	11	38.0	72	6.4	13	26.0	26	1.6	-10	80	144	23330.3103
4	6.5	6	48.0	24.5 – 32.0	23	19	70.0	135.5	169	216	53.5	101	93	14	48.6	96	8.0	19	35.0	39	3.2	-10	80	365	23330.3104
5	8.5	8	64.3	35.0 – 46.0	30	26	94.5	171.5	209	273	66.0	130	111	19	59.0	123	9.5	32	53.5	56	7.0	-10	80	821	23330.3105

ACCESSORIES

	Nominal size	l ₉ [mm]	b ₃ [mm]	d ₁ [mm]	l ₄ [mm]	 [g]	Art. No.	
							Steel	Stainless steel
counter catch (accessories for toggle clamps hook type)								
	3	26	18	5.2	11	15	23330.9023	23330.9523
	4	39	23	6.5	14	42	23330.9024	23330.9524
	5	56	30	8.5	19	108	23330.9025	23330.9525

APPLICATION EXAMPLE



Toggle Clamps Hook Type • vertical, with horizontal base

EH 23330.



PRODUCT DESCRIPTION

Due to their favourable power to movement ratio and their easy action the toggle clamps are versatile applicable for a wide range of uses.

The toggle clamps are manufactured from high quality components and are designed for maintenance-free continuous use.

An oil resistant ergonomic 2-component handle, with slip-proof, soft surface and large grip area for high ease of use.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

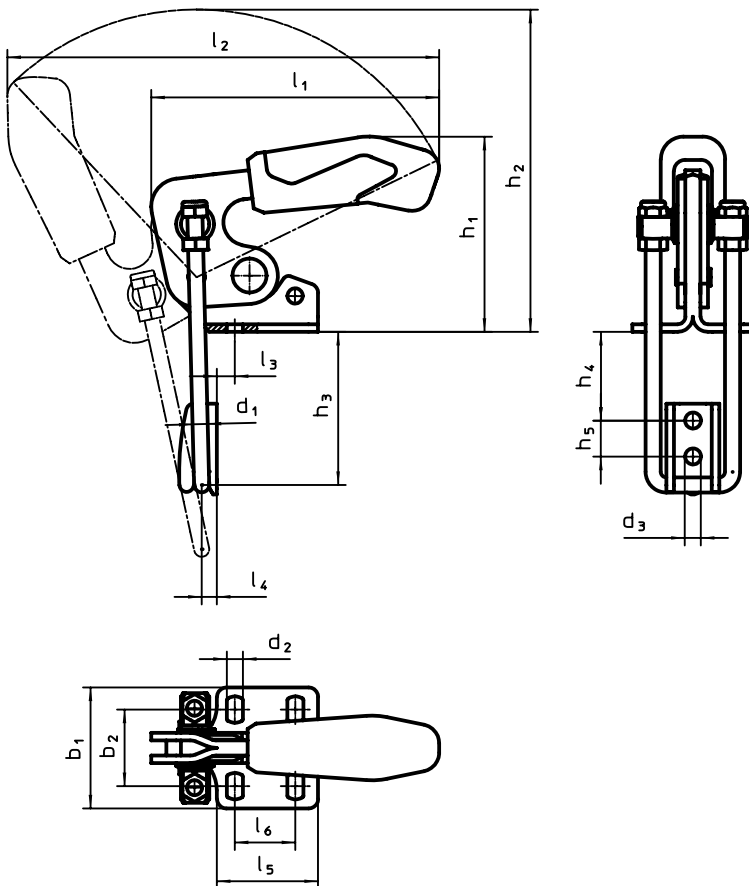
Handle

- Plastic

Counter catch

- Steel, zinc-plated by galvanization, passivated

DRAWING



ORDER INFORMATION

Nominal size	Dimensions																Holding force F ₁ [kN]	Temperature		Weight [g]	Art. No.			
	d ₁	d ₂	d ₃	b ₁	b ₂	h ₁	h ₂	h ₃ min.	h ₃ max.	h ₄ min.	h ₄ max.	h ₅	l ₁	l ₂	l ₃	l ₄		l ₅	l ₆			min.	max.	
[mm]																				[kN]	[°C]		[g]	
3	4	5.2	5.2	38	19.5 – 23.5	47.0	99	24.0	49	5	30	11	91	158	6.4	5	26	13	1.6	-10	80	150	23330.5003	
4	6	6.5	6.5	48	24.5 – 32.0	70.0	136	34.5	64	7	36	14	125	190	8.0	6	35	19	3.2	-10	80	358	23330.5004	
5	8	8.5	8.5	65	35.0 – 46.0	94.5	168	43.0	81	9	47	19	151	239	9.5	8	54	32	7.0	-10	80	791	23330.5005	

Combination Clamps • with horizontal base

EH 23330.



PRODUCT DESCRIPTION

The combination clamp combines a toggle clamp push-pull type and a vertical toggle clamp in one clamp. Thus the use of different toggle clamps is not necessary. The horizontal and vertical clamping movement is achieved by simple operation using an ergonomic handle. Simultaneous exact positioning and secure clamping of the component is guaranteed. The toggle clamps are manufactured from high quality components and are designed for maintenance-free continuous use.

An oil resistant ergonomic 2-component handle, with slip-proof, soft surface and large grip area for high ease of use.

Material

Clamp

- Steel, zinc-plated by galvanization, passivated

Rivet

- Stainless steel

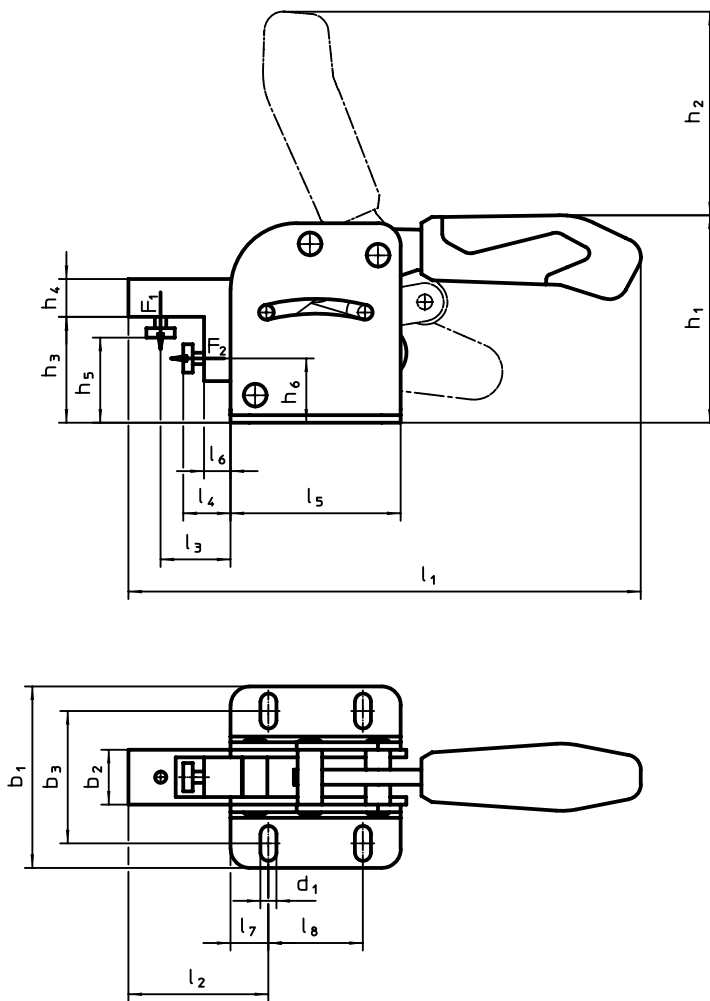
Handle

- Plastic

Clamping screw

- Steel, tempered, zinc-plated by galvanization

DRAWING



ORDER INFORMATION

Nominal size	Dimensions																			Holding force		Temperature		Weight [g]	Art. No.			
	d ₁	b ₁	b ₂	b ₃	h ₁	h ₂	h ₃	h ₄	h ₅	h ₅	h ₆	l ₁	l ₂	l ₃	l ₄	l ₄	l ₅	l ₆	l ₇	l ₈	F ₁	F ₂	min.			max.	min.	max.
	[mm]																			[kN]		[°C]						
2	5.5	53	17.0	34.5 – 39.5	74	62	36.0	12	25	32	22	150	33	15	5	10	55	0.5	7.5	40	1	1	-10	80	330	23330.4002		
3	6.5	75	19.5	48.5 – 61.5	94	87	46.0	16	30	40	28	219	56	32	14	24	75	9.0	12.5	50	2	2	-10	80	714	23330.4003		
4	8.5	96	29.0	60.0 – 80.0	110	106	55.5	20	40	50	34	270	74	37	20	30	90	14.0	20.0	50	3	3	-10	80	1618	23330.4004		

COMPACT CLAMPS

PRECISE IN ANY POSITION

Our compact clamps are suitable for use as all-purpose clamping elements on machined and non-machined parts. Their self-locking clamping lever makes it possible to use the clamps in both vertical and horizontal position.

FEATURES

- Exact clamping with pin-point accuracy.
- Simple and universal handling.
- High clamping force at low tightening torque levels and abrasion-resistant thanks to clamping lever with bearings.
- Large and continuous clamping area.
- Clamping lever entirely retractable for hindrance-free exchange of workpieces.
- Threaded clamping lever can be used with many clamping elements, e.g. ball-ended thrust screws (EH 22700. - EH 22720.), self-aligning pads (EH 22730./EH 22740.) etc.
- Large adjusting range at constant clamping force.
- Continuous height adjustment by height adapters 23690.0112/.0116.
- Simple and versatile attachment options.
- Corrosion-resistant.
- Resistant to dirt and chips.



Compact Clamps

EH 23690.

3



PRODUCT DESCRIPTION

The compact clamps are all purpose clamping elements. Due to the self-locking tension lever application can either take place in horizontal or vertical position in both, machined and raw workpieces.

Features:

- Exact and position precise clamping
- Easy, universal handling
- High clamping force at low tightening torques, abrasion-resistant due to tension lever with bearings
- Continuous, large clamping area
- Tension lever entirely retractable for hindrance-free exchange of workpieces
- Tension lever with locating thread for various clamping elements, e.g. ball-ended thrust screws (EH 22700. - EH 22720.), self-aligning pads (EH 22730. / EH 22740.) etc.
- Large adjusting range at constant clamping force
- Continuous increase of the clamping range by height adapters 23690.0112 / .0116
- Easy and flexible mounting options
- Corrosion-resistant
- Resistant to dirt and chips

Material

Body

- Heat-treated steel, black coated

Tension lever

- Heat-treated steel, tempered, silver coated

Assembly

Assembly and Set-Up:

1. Take out stop pin ISO 4762-M 6 x 10.
2. Move back and take out tension lever.
3. Tightening by 2 screws with internal hexagon (included in supply volume).

4. Place tension lever in sliding rail and then insert.
5. Tighten stop pin ISO 4762 - M 6 x 10.

Operation

Clamping Process:

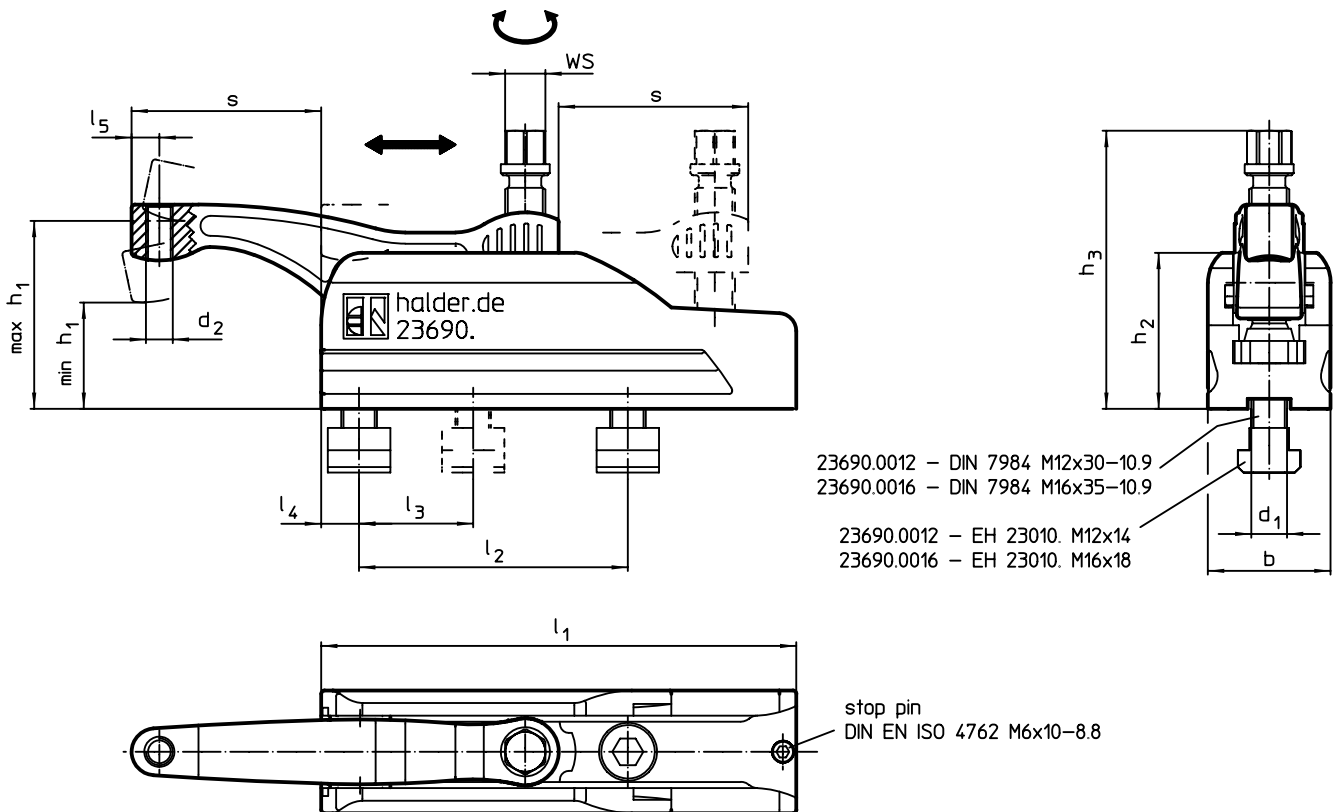
1. Slide tension lever to clamping position.
2. Clamping is made via a hexagon collar screw.
3. Releasing is done in reverse order.

MORE INFORMATION


Further products

Height Adapters, for compact clamp . . . → p. 560

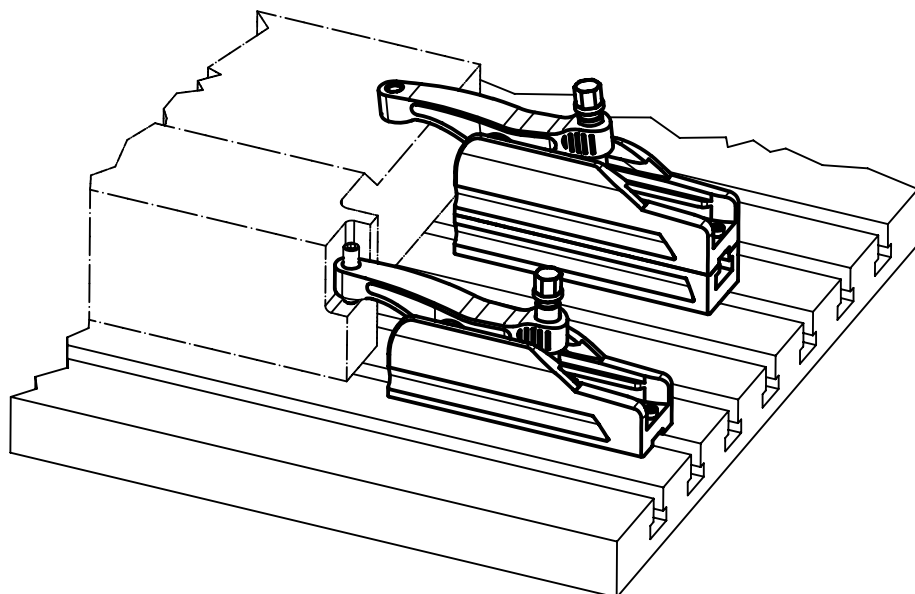
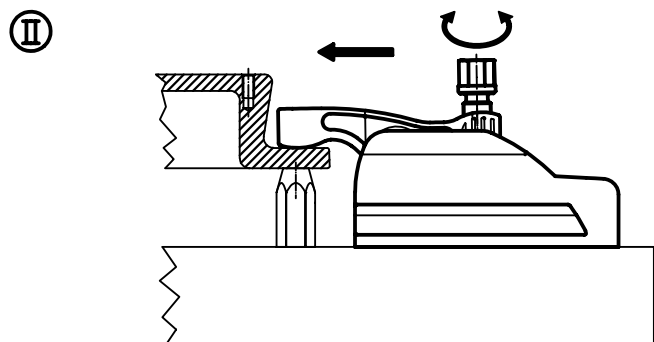
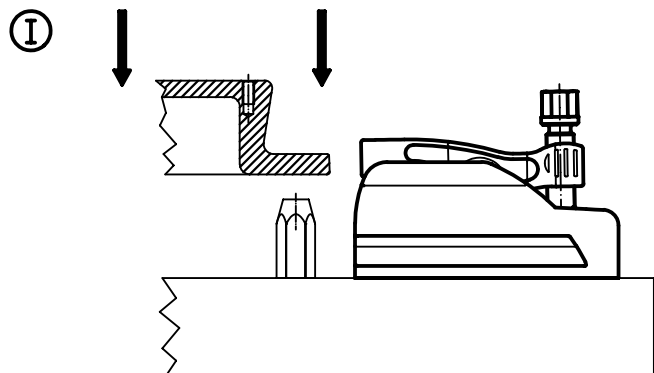
DRAWING



ORDER INFORMATION

d ₁	d ₂	h ₁ min.	h ₁ max.	h ₂	Dimensions									WS [mm]	Clamp- ing force max. [kN]	Tightening torque max. [Nm]		Art. No.
					h ₃	s max.	l ₁	l ₂ +1	l ₃	l ₄	l ₅	b						
[mm]														[mm]	[kN]	[Nm]	[g]	
M12	M 8	40	60	59	95	43	134	70	50	13	10.0	45	16	15	45	1840	23690.0012	
M16	M12	47	85	70	126	85	213	120	50	17	12.5	55	18	25	75	4000	23690.0016	

APPLICATION EXAMPLE



Height Adapters • for compact clamp

EH 23690.



PRODUCT DESCRIPTION

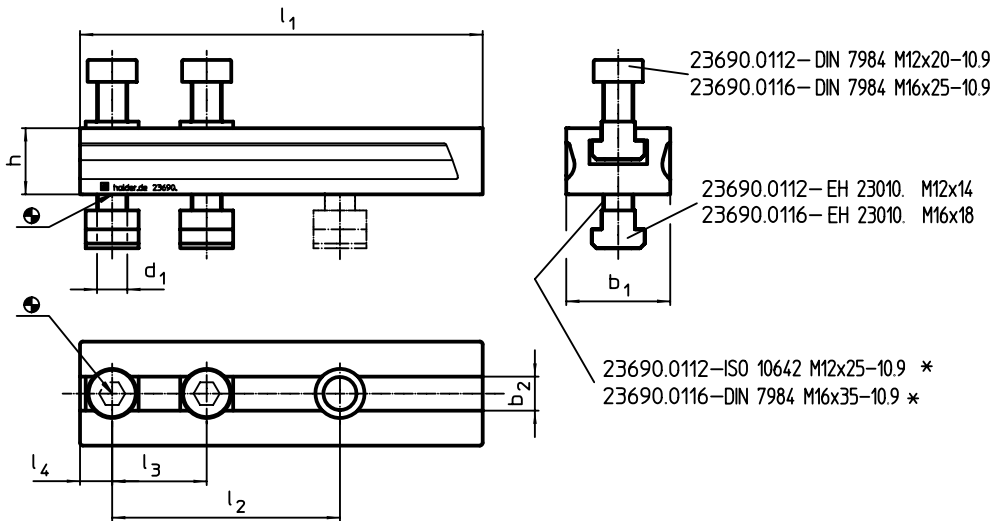
The height adapter for compact clamps allows a clamping height increase and has the following characteristics:

- Continuous covering of clamping height
- T-slot in the height adapter allows exact positioning by moving the compact clamp at specified grid spacings
- Height can be expanded user-defined

Material

- Heat-treated steel, black coated

DRAWING

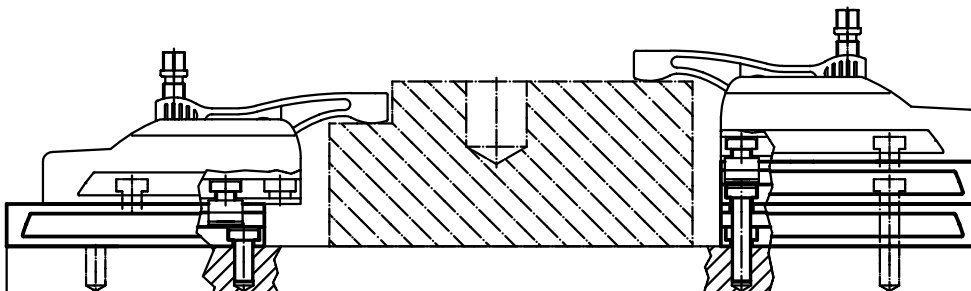


* When using more height adapters the screws ISO 10642 or DIN 7984 have to be replaced by screws extended by the dimension h.

ORDER INFORMATION

Dimensions								Art. No.	
d_1	l_1	l_2 +1	l_3	l_4	h	b_1	b_2 H12		
[mm]								[g]	
M12	134	70	50	13	20	45	14	874	23690.0112
M16	213	120	50	17	35	55	18	3000	23690.0116

APPLICATION EXAMPLE



CENTERING CLAMPING ELEMENTS

THE FORCE LIES AT THE CENTRE

Centering clamping elements are used to centre and clamp parts that come with a location hole. Precise self-centring with an accuracy of ± 0.025 mm. The ground clamping segments make it possible to achieve force closure when centring parts with a rough or machined surface and pull the parts down to fixture plates. The centering clamping element is distinguished by its long adjustment travel and low construction height. Can be screwed on at the top and the bottom.



[www.halder.com/
CenteringClampingElements-Video](http://www.halder.com/CenteringClampingElements-Video)



Centering Clamping Elements • with clamping segments

EH 23340.



PRODUCT DESCRIPTION

For clamping and centering of workpieces with internal bore. Exact self centering with a precision of $\pm 0,025$ mm. Due to the clamping segments being ground, workpieces with raw and/or machined surfaces can be frictionally connected, centered and held down at the seats. Large adjustment stroke and a low building height are a feature of the centering clamping element.

Mounting from either top or bottom.

Material

Body

- Tool steel, hardened, blackened

Spring

- Stainless steel

Clamping segments

- Stainless steel 1.4112, hardened and ground

Assembly

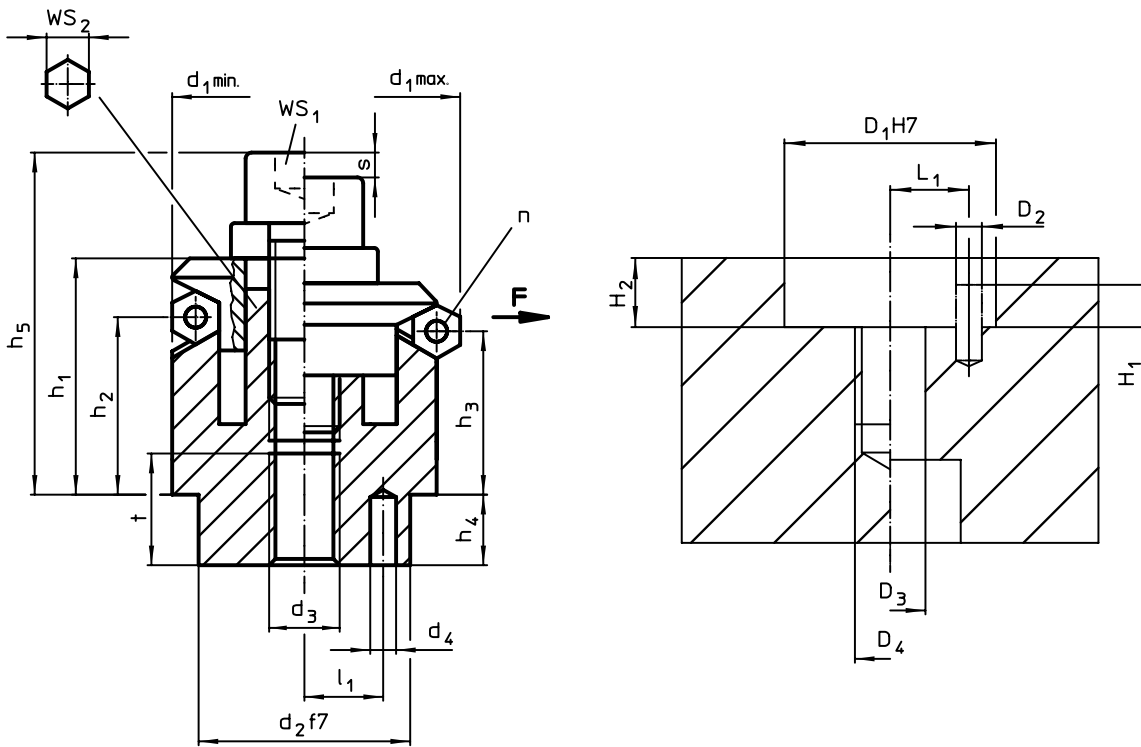
Assembly instructions for mounting from above: Remove clamping plate and screw. Screw in threaded pin from below, and tighten from above using female WS_2 .

MORE INFORMATION

Further products

Centering Clamping Elements, with clamping balls → p. 564

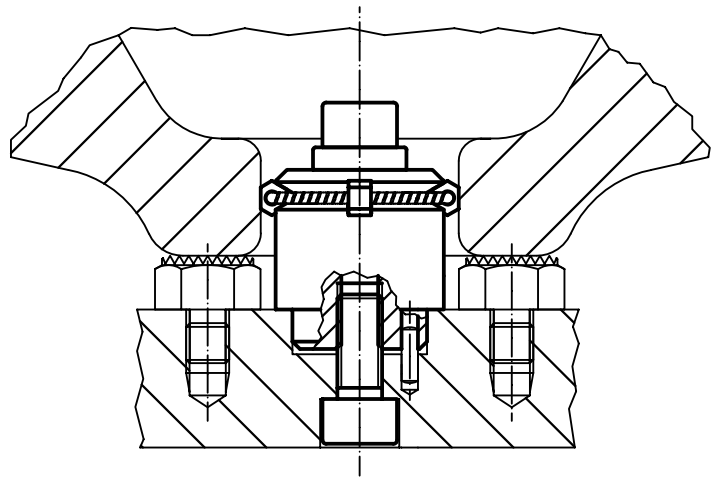
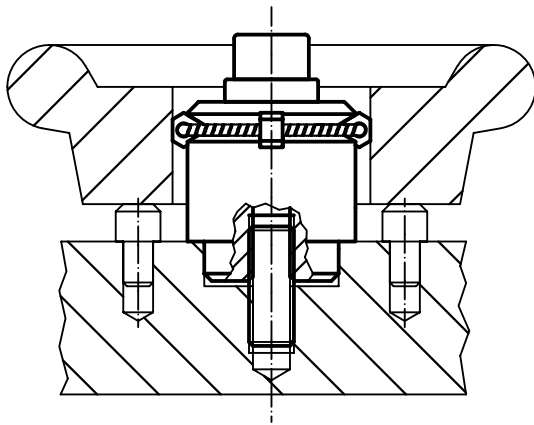
DRAWING



ORDER INFORMATION

Dimensions													Number of segments n	Stroke s [mm]	WS		Clamping force F max. [kN]	Tightening torque max. [Nm]	Location hole							Art. No.
d ₁ min.	d ₁ max.	d ₂ f7	d ₃	d ₄ +0.3	h ₁ -1	h ₂	h ₃	h ₄	h ₅ -2	l ₁ ±0.1	t	WS ₁			WS ₂	D ₁ H7			D ₂	D ₃	D ₄	H ₁	H ₂ +0.5	L ₁ ±0.1	[g]	
[mm]															[mm]			[mm]								
14.5	18.5	12	M 4	2.0	14.3	9.8	8.6	5.5	19.3	4.5	6	3	2.3	3	5	3.5	5	12	2.0	4	M 4	2.0	5.5	4.5	26	23340.0014
18.5	22.5	15	M 5	2.5	16.6	11.5	10.4	7.5	22.8	5.5	7	3	2.3	4	5	4.5	10	15	2.5	5	M 5	2.5	7.5	5.5	45	23340.0018
22.5	26.5	20	M 6	3.0	19.7	14.1	13.0	6.0	28.7	7.0	8	3	2.3	5	6	5.0	17	20	3.0	6	M 6	3.0	6.0	7.0	72	23340.0022
26.5	30.5	20	M 6	3.0	19.9	14.2	13.0	6.0	28.9	7.0	8	3	2.3	5	6	5.0	17	20	3.0	6	M 6	3.0	6.0	7.0	96	23340.0026
30.5	38.5	25	M 6	4.0	23.2	14.0	11.7	7.0	32.2	9.0	8	3	4.6	5	6	5.0	17	25	4.0	6	M 6	4.0	7.0	9.0	131	23340.0030
38.5	46.5	30	M 8	4.0	27.2	18.0	15.5	7.5	39.2	11.0	10	6	4.6	6	8	6.5	43	30	4.0	8	M 8	4.0	7.5	11.0	259	23340.0038
46.5	54.5	30	M 8	4.0	27.2	18.0	15.7	7.5	39.2	11.0	10	6	4.6	6	8	6.5	43	30	4.0	8	M 8	4.0	7.5	11.0	348	23340.0046
54.5	70.5	45	M10	5.0	40.7	23.7	19.1	9.0	54.7	15.0	12	6	9.2	8	10	8.0	79	45	5.0	10	M10	5.0	9.0	15.0	675	23340.0054
70.5	86.5	60	M12	5.0	46.0	28.3	23.6	10.0	63.0	17.0	15	6	9.2	10	12	10.0	141	60	5.0	12	M12	5.0	10.0	17.0	1346	23340.0070
86.5	102.5	60	M16	5.0	51.1	30.3	25.6	10.0	72.1	25.0	15	6	9.2	14	17	10.0	354	60	5.0	16	M16	5.0	10.0	25.0	2000	23340.0086

APPLICATION EXAMPLE



Centering Clamping Elements • with clamping balls

EH 23340.



PRODUCT DESCRIPTION

To be used for accurate centering and clamping of workpieces with locating hole on which light spherical marks are acceptable. Exact self-centering with a precision of $\pm 0,025$ mm. The clamping balls frictionally center and hold workpieces with raw or pre-machined surfaces down to the bearing points. Large adjustment stroke and a small building height are a feature of this center clamping element.

Mounting from either top or bottom.

Material

Body

- Tool steel, hardened, blackened

Spring

- Stainless steel

Clamping balls

- Stainless steel 1.4112, hardened and ground

Assembly

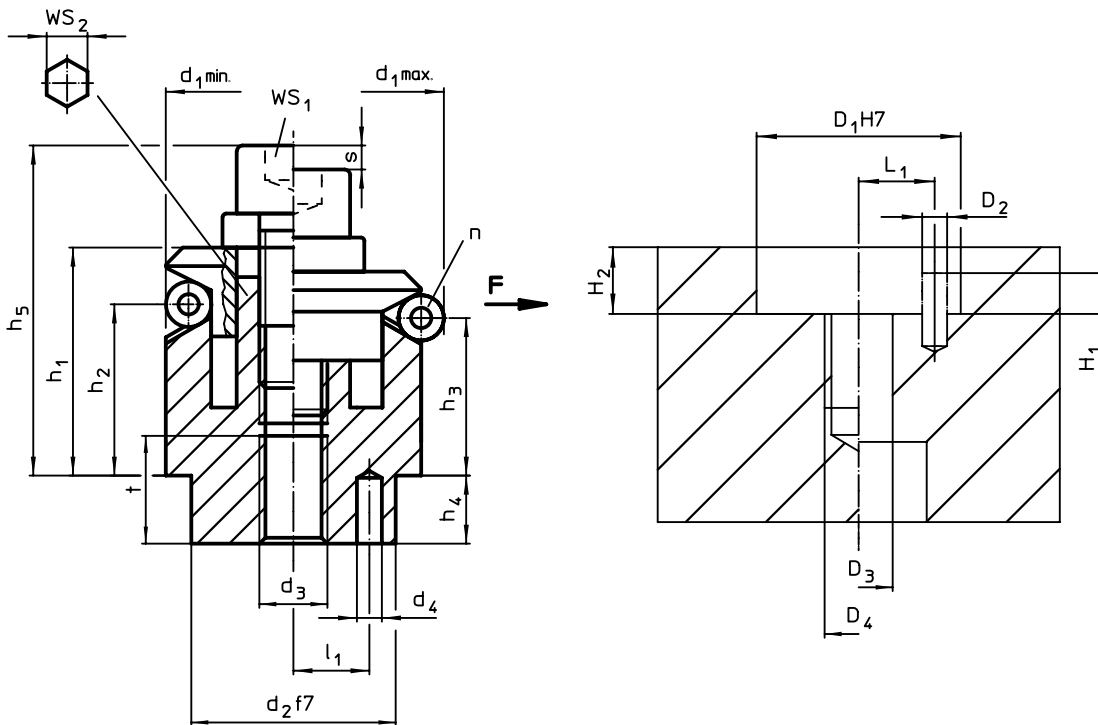
Assembly instructions for mounting from above: Remove clamping plate and screw. Screw in threaded pin from below, and tighten from above using female WS_2 .

MORE INFORMATION

Further products

Centering Clamping Elements, with clamping segments → p. 562

DRAWING



ORDER INFORMATION

Dimensions														Number of balls n	Stroke s [mm]	WS		Clamping force F max. [kN]	Tightening torque max. [Nm]	Location hole						Art. No.	
d ₁ min.	d ₁ max.	d ₂ f7	d ₃	d ₄ +0.3	h ₁ -1	h ₂	h ₃	h ₄	h ₅ -2	l ₁ ±0.1	ball diameter	t	WS ₁			WS ₂	D ₁ H7			D ₂	D ₃	D ₄	H ₁	H ₂ +0.5	L ₁ ±0.1		[g]
[mm]																											
11.7	14.2	10	M 4	1.5	8.6	3.9	3.2	3.5	14.7	3.5	2.5	4	3	1.3	3	-	0.5	5	10	1.5	4	M 4	2.0	3.5	3.5	18	23340.0212 ¹⁾
14.5	18.5	12	M 4	2.0	14.2	9.8	8.6	5.5	19.2	4.5	4.0	6	3	2.3	3	5	3.5	5	12	2.0	4	M 4	2.5	5.5	4.5	26	23340.0214
18.5	22.5	15	M 5	2.5	16.5	11.6	10.4	7.5	22.7	5.5	4.0	7	3	2.3	4	5	4.5	10	15	2.5	5	M 5	3.5	7.5	5.5	38	23340.0218
22.5	26.5	20	M 6	3.0	19.6	14.1	12.9	6.0	28.6	7.0	4.0	8	3	2.3	5	6	5.0	17	20	3.0	6	M 6	3.5	6.0	7.0	73	23340.0222
26.5	30.5	20	M 6	3.0	19.8	14.1	13.0	6.0	28.8	7.0	4.0	8	3	2.3	5	6	5.0	17	20	3.0	6	M 6	3.5	6.0	7.0	93	23340.0226
30.5	38.5	25	M 6	4.0	23.2	14.1	11.8	7.0	32.2	9.0	8.0	8	3	4.6	5	6	5.0	17	25	4.0	6	M 6	3.5	7.0	9.0	119	23340.0230

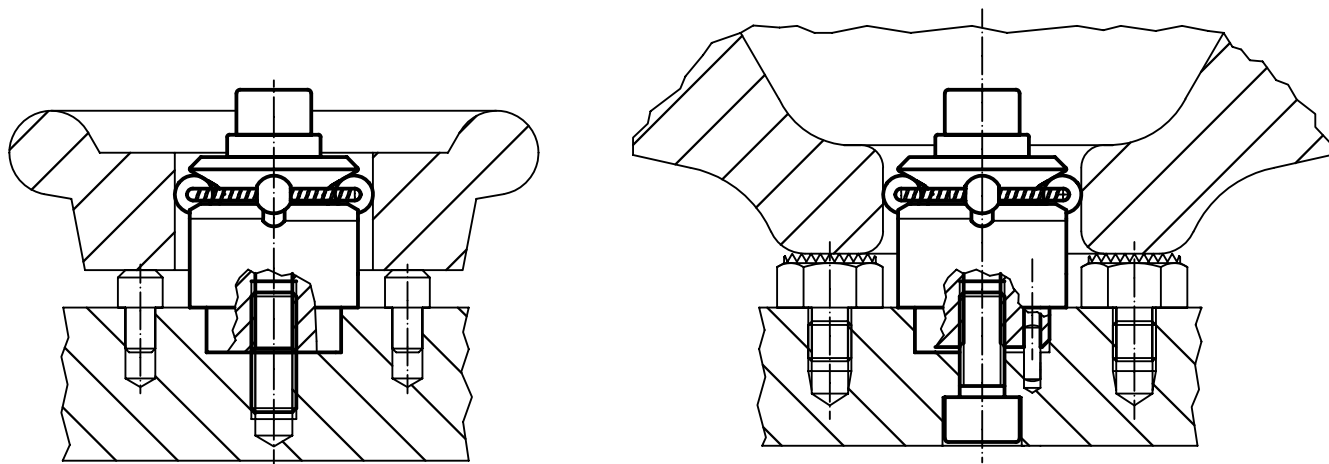
¹⁾ no WS_2 clamping screw and threaded pin to be mounted from top



Dimensions														Number of balls n	Stroke s	WS		Clamp- ing force F max.	Tight- ening torque max.	Location hole							Art. No.
d ₁ min.	d ₁ max.	d ₂ f7	d ₃	d ₄ +0.3	h ₁ -1	h ₂	h ₃	h ₄	h ₅ -2	l ₁ ±0.1	ball diam- eter	t	WS ₁			WS ₂	D ₁ H7			D ₂	D ₃	D ₄	H ₁	H ₂ +0.5 ±0.1	L ₁	[g]	
[mm]														[mm]	[mm]		[kN]	[Nm]	[mm]								
38.5	46.5	30	M 8	4.0	27.2	18.0	15.7	7.5	39.2	11.0	8.0	10	6	4.6	6	8	6.5	43	30	4.0	8	M 8	4.5	7.5	11.0	254	23340.0238
46.5	54.5	30	M 8	4.0	27.1	18.0	15.7	7.5	39.2	11.0	8.0	10	6	4.6	6	8	6.5	43	30	4.0	8	M 8	6.5	7.5	11.0	342	23340.0246
54.5	70.5	45	M10	5.0	40.6	23.7	19.1	9.0	54.6	15.0	16.0	12	6	9.2	8	10	8.0	79	45	5.0	10	M10	6.5	9.0	15.0	664	23340.0254
70.5	86.5	60	M12	5.0	46.1	28.3	23.7	10.0	63.1	17.0	16.0	15	6	9.2	10	12	10.0	141	60	5.0	12	M12	6.5	10.0	17.0	1312	23340.0270
86.5	102.5	60	M16	5.0	51.2	30.3	25.6	10.0	72.2	25.0	16.0	15	6	9.2	14	17	10.0	354	60	5.0	16	M16	6.5	10.0	25.0	2000	23340.0286

¹⁾ no WS₂ clamping screw and threaded pin to be mounted from top

APPLICATION EXAMPLE



Centering Clamping Elements • with clamping segments, operation from the bottom

EH 23340.



PRODUCT DESCRIPTION

For centering and clamping in blind holes of workpieces with locating hole. Exact self-centering with a precision of $\pm 0,025$ mm. Components with raw or machined surface can be centered positively and are pulled down on the contact points due to the ground clamping elements. The centering clamping element is characterised by large setting ranges and a compact construction height.

Mounting from either top or bottom.

Material

Body

- Tool steel, hardened, blackened

Spring

- Stainless steel

Clamping segments

- Stainless steel 1.4112, hardened and ground

Assembly

Assembly instructions for mounting from above: Remove clamping plate and screw.

Screw in threaded pin from below, and tighten from above using female WS_2 .

Operation

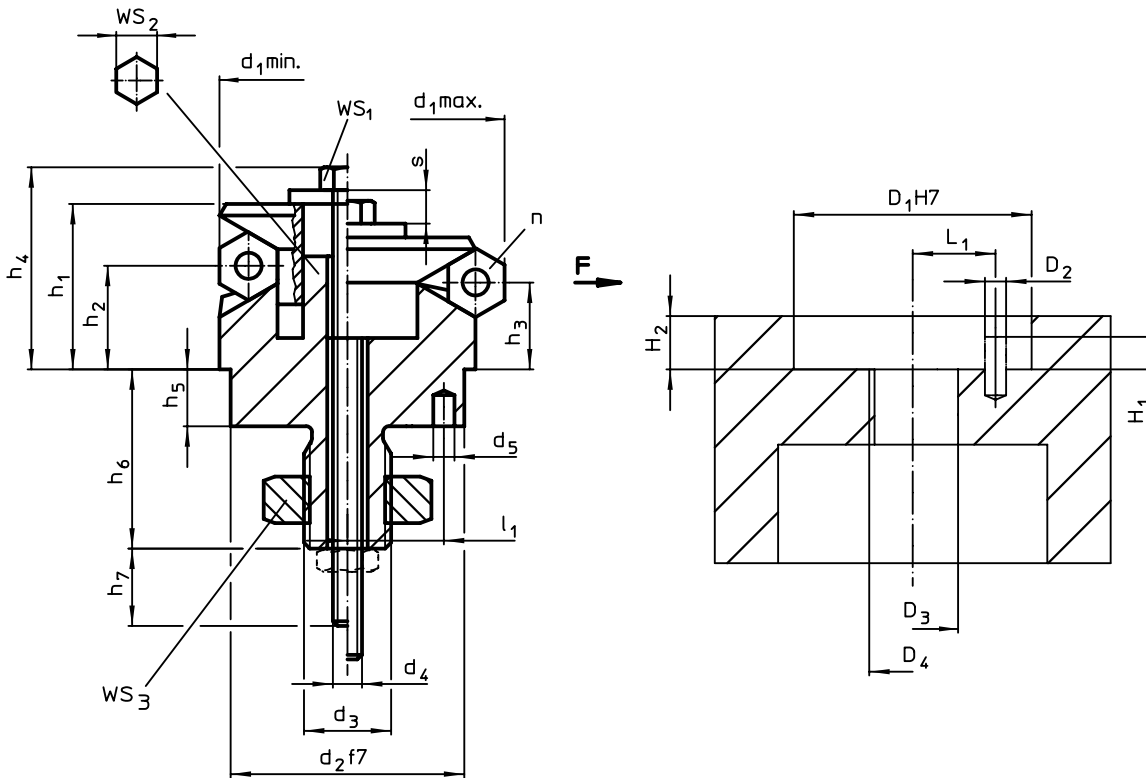
Operation from bottom manually or automatically with either pneumatic or hydraulic actuation.

MORE INFORMATION

Further products

Centering Clamping Elements, with clamping balls, operation from the bottom → p. 568

DRAWING



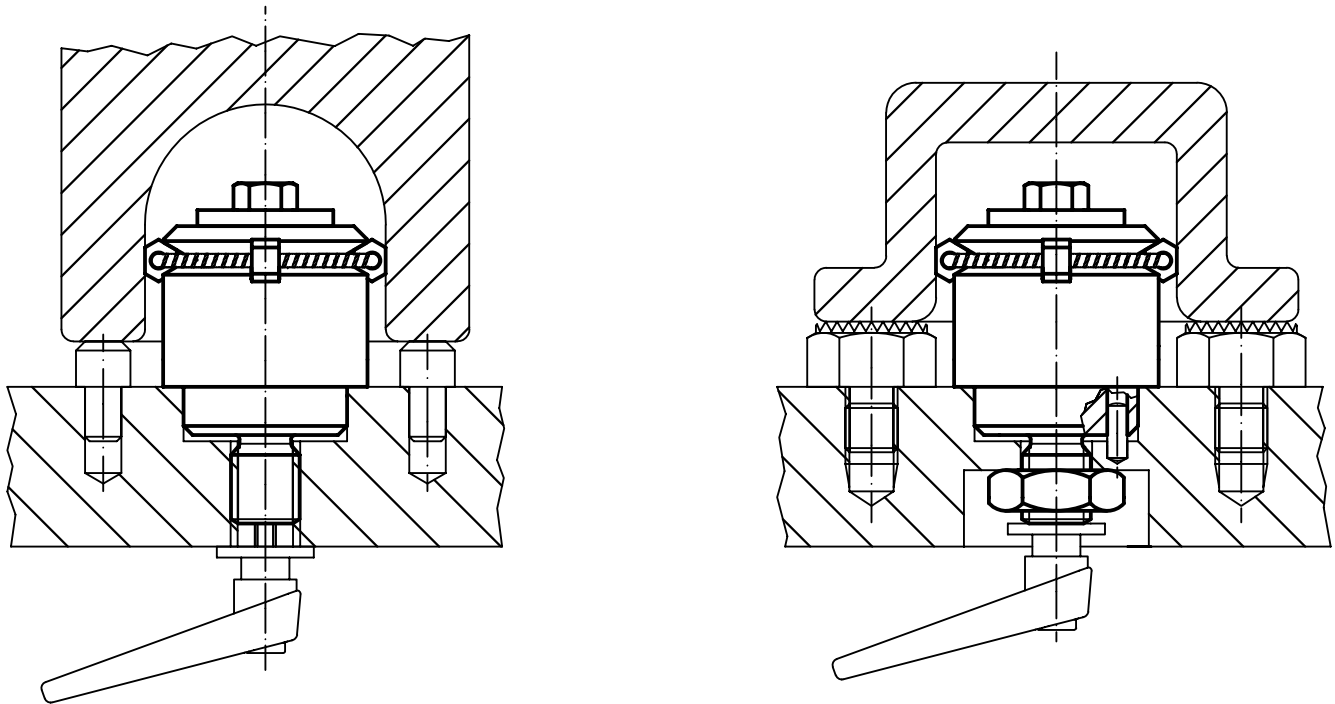
ORDER INFORMATION

Dimensions														Number of segments n	Stroke s	WS			Clamping force F max.	Tightening torque max.	Location hole							Art. No.	
d ₁ min.	d ₁ max.	d ₂ f7	d ₃	d ₄	d ₅ +0.3	h ₁	h ₂	h ₃	h ₄ -2	h ₅	h ₆ +1	h ₇ ~	l ₁ ±0.1			WS ₁	WS ₂	WS ₃			D ₁ H7	D ₂	D ₃	D ₄	H ₁	H ₂ +0.5 ±0.1	L ₁		[g]
[mm]														[mm]	[mm]			[kN]	[Nm]	[mm]							[g]		
14.5	18.5	12	M 6	M 3	2.0	14.2	9.8	8.6	17.0	5.5	14.1	12	4.5	3	2.3	5.5	3	10	3.5	2	12	2.0	6	M 6	2.5	5.5	4.5	21	23340.0114
18.5	22.5	15	M 8	M 4	2.5	16.6	11.5	10.4	20.5	7.5	18.2	14	5.5	3	2.3	7.0	5	13	4.0	5	15	2.5	8	M 8	3.5	7.5	5.5	51	23340.0120
22.5	26.5	20	M10	M 5	3.0	19.7	14.1	13.0	24.4	6.0	17.4	15	7.0	3	2.3	8.0	6	16	4.5	10	20	3.0	10	M10	3.5	6.0	7.0	82	23340.0122
26.5	30.5	20	M10	M 5	3.0	19.9	14.2	13.0	24.6	6.0	17.4	15	7.0	3	2.3	8.0	6	16	4.5	10	20	3.0	10	M10	3.5	6.0	7.0	104	23340.0126
30.5	38.5	25	M12	M 6	4.0	23.2	14.0	11.7	28.8	7.0	21.9	20	9.0	3	4.6	10.0	6	18	4.5	17	25	4.0	12	M12	3.5	7.0	9.0	154	23340.0130



Dimensions															Number of segments n	Stroke s [mm]	WS			Clamping force F max. [kN]	Tightening torque max. [Nm]	Location hole							Art. No.
d ₁ min.	d ₁ max.	d ₂ f7	d ₃	d ₄	d ₅ +0.3	h ₁	h ₂	h ₃	h ₄ -2	h ₅	h ₆ +1	h ₇ ~ ±0.1	l ₁				WS ₁	WS ₂	WS ₃			D ₁ H7	D ₂	D ₃	D ₄	H ₁	H ₂ +0.5 ±0.1	L ₁	
[mm]																[mm]	[mm]					[mm]							[g]
38.5	46.5	30	M12	M 6	4.0	27.2	18.0	15.5	33.1	7.5	22.5	20	11.0	6	4.6	10.0	8	18	6.5	17	30	4.0	12	M12	4.5	7.5	11.0	272	23340.0138
46.5	54.5	30	M12	M 6	4.0	27.2	18.0	15.7	33.1	7.5	22.5	20	11.0	6	4.6	10.0	8	18	6.5	17	30	4.0	12	M12	6.5	7.5	11.0	339	23340.0146
54.5	70.5	45	M14 x 1,5	M 8	5.0	40.7	23.7	19.1	50.0	9.0	24.5	32	15.0	6	9.2	13.0	10	21	8.0	43	45	5.0	14	M14 x 1,5	6.5	9.0	15.0	690	23340.0154
70.5	86.5	60	M16 x 1,5	M 8	5.0	46.0	28.1	23.5	55.3	10.0	29.4	20	17.0	6	9.2	13.0	12	24	10.0	43	60	5.0	16	M16 x 1,5	6.5	10.0	17.0	1349	23340.0170
86.5	102.5	60	M16 x 1,5	M10	5.0	51.1	30.1	25.5	61.5	10.0	29.4	25	25.0	6	9.2	16.0	12	24	12.5	79	60	5.0	16	M16 x 1,5	6.5	10.0	25.0	2000	23340.0186

APPLICATION EXAMPLE



Centering Clamping Elements • with clamping balls, operation from the bottom

EH 23340.



PRODUCT DESCRIPTION

To be used for accurate centering and clamping in blind holes of workpieces with locating hole. Exact self-centering with a precision of $\pm 0,025$ mm. The clamping balls frictionally center and hold workpieces with raw or pre-machined surfaces down to the bearing points. Large adjustment stroke and a small building height are a feature of this center clamping element.

Mounting from either top or bottom.

Material

Body

- Tool steel, hardened, blackened

Spring

- Stainless steel

Clamping balls

- Stainless steel 1.4112, hardened and ground

Assembly

Assembly instructions for mounting from above: Remove clamping plate and screw.

Screw in threaded pin from below, and tighten from above using female WS₂.

Operation

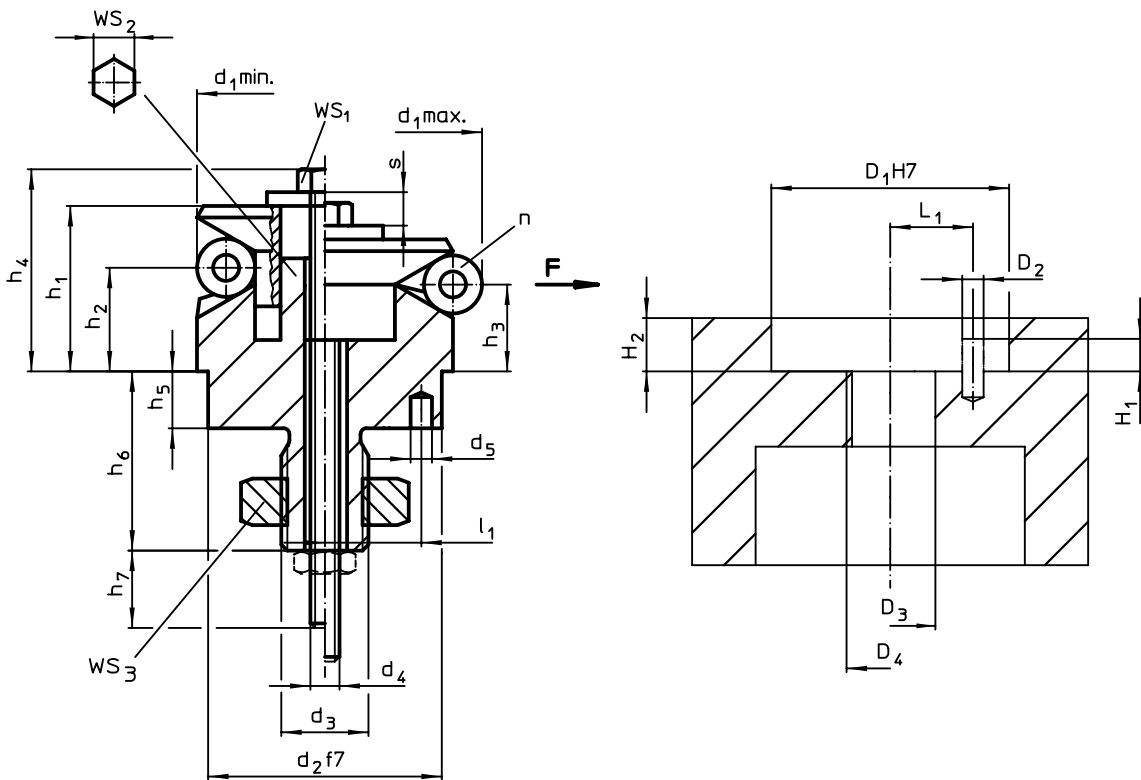
Operation from bottom manually or automatically with either pneumatic or hydraulic actuation.

MORE INFORMATION

Further products

Centering Clamping Elements, with clamping segments, operation from the bottom → p. 566

DRAWING



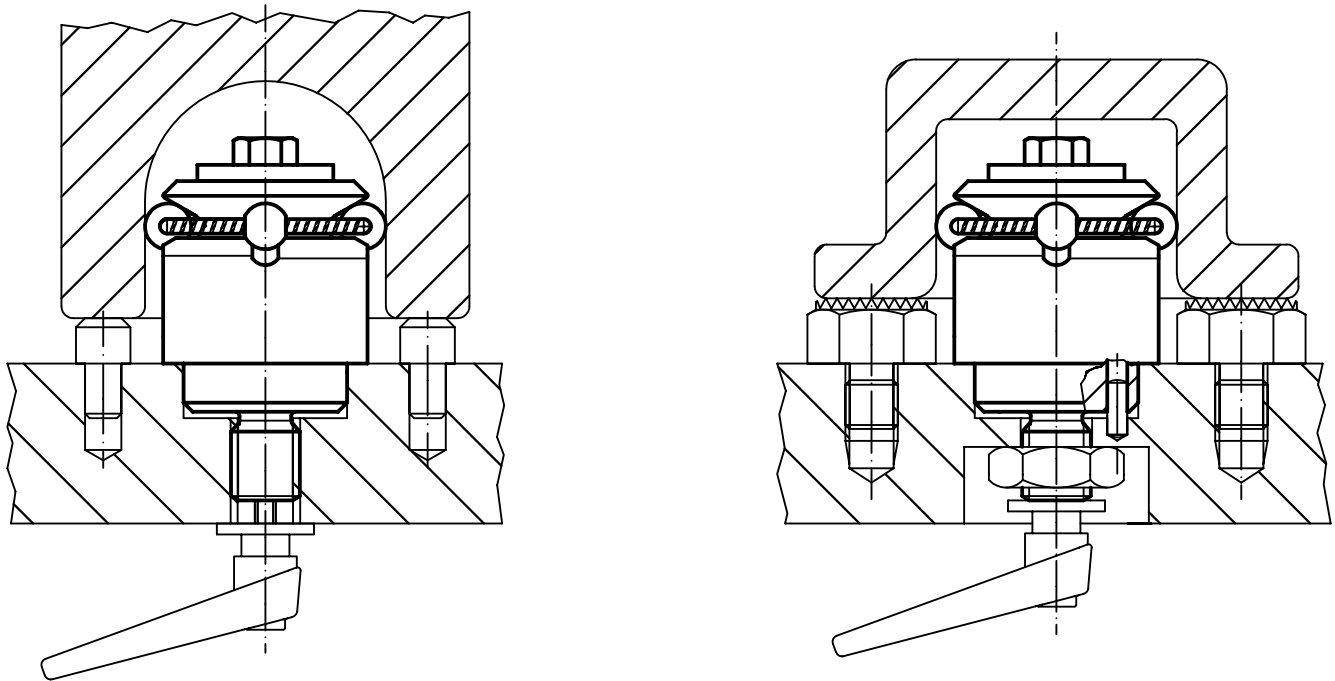
ORDER INFORMATION

Dimensions															Number of balls n	Stroke s [mm]	WS			Clamping force F max. [kN]	Tightening torque max. [Nm]	Location hole							Art. No.	
d ₁ min.	d ₁ max.	d ₂ f7	d ₃	d ₄	d ₅ +0.3	h ₁	h ₂	h ₃	h ₄ -2	h ₅	h ₆ +1	h ₇ ~	l ₁ ±0.1	ball diameter			WS ₁	WS ₂	WS ₃			D ₁ H7	D ₂	D ₃	D ₄	H ₁	H ₂ +0.5	L ₁ ±0.1		[g]
[mm]																	[mm]					[mm]								
11.7	14.2	10	M 5	M 3	1.5	9.9	3.9	3.2	12.7	3.5	11.0	13	3.5	2.5	3	1.3	5.5	4	8	0.5	2	10	1.5	5	M 5	2.0	3.5	3.5	13	23340.0312
14.5	18.5	12	M 6	M 3	2.0	14.2	9.8	8.6	17.0	5.5	14.1	12	4.5	4.0	3	2.3	5.5	3	10	3.5	2	12	2.0	6	M 6	2.5	5.5	4.5	28	23340.0314
18.5	22.5	15	M 8	M 4	2.5	16.5	11.6	10.4	20.4	7.5	18.2	14	5.5	4.0	3	2.3	7.0	5	13	4.0	5	15	2.5	8	M 8	3.5	7.5	5.5	52	23340.0318
22.5	26.5	20	M10	M 5	3.0	19.6	14.1	12.9	24.3	6.0	17.4	15	7.0	4.0	3	2.3	8.0	6	16	4.5	10	20	3.0	10	M10	3.5	6.0	7.0	83	23340.0322
26.5	30.5	20	M10	M 5	3.0	19.8	14.1	13.0	24.5	6.0	17.4	15	7.0	4.0	3	2.3	8.0	6	16	4.5	10	20	3.0	10	M10	3.5	6.0	7.0	103	23340.0326
30.5	38.5	25	M12	M 6	4.0	23.2	14.1	11.8	28.8	7.0	21.9	20	9.0	8.0	3	4.6	10.0	6	18	4.5	17	25	4.0	12	M12	3.5	7.0	9.0	153	23340.0330



Dimensions															Number of balls n	Stroke s [mm]	WS [mm]			Clamping force F max. [kN]	Tightening torque max. [Nm]	Location hole [mm]							Art. No.	
d ₁ min.	d ₁ max.	d ₂ f7	d ₃	d ₄	d ₅ +0.3	h ₁	h ₂	h ₃	h ₄ -2	h ₅	h ₆ +1	h ₇ ~	l ₁ ±0.1	ball diameter			WS ₁	WS ₂	WS ₃			D ₁ H7	D ₂	D ₃	D ₄	H ₁	H ₂ +0.5	L ₁ ±0.1		[g]
38.5	46.5	30	M12	M 6	4.0	27.1	18.0	15.5	33.0	7.5	22.5	20	11.0	8.0	6	4.6	10.0	8	18	6.5	17	30	4.0	12	M12	4.5	7.5	11.0	269	23340.0338
46.5	54.5	30	M12	M 6	4.0	27.2	18.0	15.7	33.1	7.5	22.5	20	11.0	8.0	6	4.6	10.0	8	18	6.5	17	30	4.0	12	M12	6.5	7.5	11.0	353	23340.0346
54.5	70.5	45	M14 x 1,5	M 8	5.0	40.6	23.7	19.1	49.9	9.0	24.5	32	15.0	16.0	6	9.2	13.0	10	21	8.0	43	45	5.0	14	M14 x 1,5	6.5	9.0	15.0	702	23340.0354
70.5	86.5	60	M16 x 1,5	M 8	5.0	46.1	28.3	23.7	55.4	10.0	29.4	20	17.0	16.0	6	9.2	13.0	12	24	10.0	43	60	5.0	16	M16 x 1,5	6.5	10.0	17.0	1326	23340.0370
86.5	102.5	60	M16 x 1,5	M10	5.0	51.2	30.3	25.7	61.6	10.0	29.4	25	25.0	16.0	6	9.2	16.0	12	24	12.5	79	60	5.0	16	M16 x 1,5	6.5	10.0	25.0	2000	23340.0386

APPLICATION EXAMPLE



Centering Clamping Mandrels

EH 23340.



PRODUCT DESCRIPTION

For clamping and centering of workpieces with internal bore.

Material

Body

- Steel, blackened

Clamping screw

- Case-hardened steel, case-hardened

Assembly

The centering clamping mandrel can be machined to the required seating diameter (e.g. by turning/milling). It must be noticed that before machining the centering clamping

mandrel, it will be expanded approx. 0.1 mm over the clamping diameter. To machine the mandrel, a nut will be provided.

MORE INFORMATION

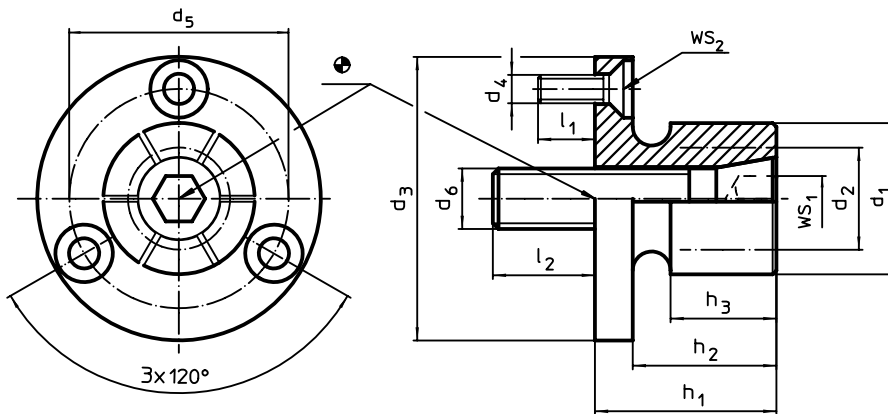
Notes

Special types on request.

Further products

Centering Clamping Mandrels, with lateral handling → p. 571

DRAWING

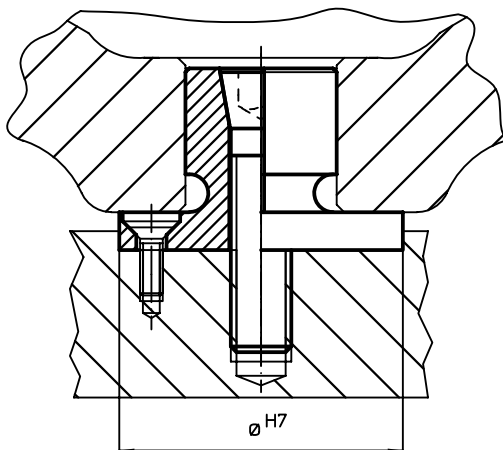


ORDER INFORMATION

Dimensions												WS		Clamping force max.	Tightening torque max.	Location hole H7	g	Art. No.
d ₁	d ₂ min.	d ₃ -0.05	d ₄	d ₅	d ₆	h ₁	h ₂	h ₃	l ₁ ~	l ₂	Number of segments	WS ₁	WS ₂					
[mm]												[mm]		[kN]	[Nm]	[mm]	[g]	
12.4	8.0	29.72	M3	21.0	M 4	21.8	16.0	15.0	6	8	4	3	2.0	3	3.5	29.72	58	23340.0104
14.2	12.2	31.50	M3	23.1	M 6	24.9	19.0	15.0	6	12	4	5	2.0	6	12.0	31.50	62	23340.0106
20.0	13.5	37.50	M3	29.0	M 8	24.9	19.0	15.0	6	14	6	6	2.0	8	24.0	37.50	99	23340.0108
27.0	18.0	50.00	M4	39.4	M10	28.6	22.2	17.5	7	17	6	8	2.5	13	42.0	50.00	191	23340.0111
35.3	25.4	56.00	M4	45.5	M12	31.8	25.4	20.6	7	21	6	10	2.5	15	105.0	56.00	306	23340.0112
51.0	30.0	75.50	M5	63.9	M16	39.6	31.8	27.0	11	22	6	14	3.0	26	200.0	75.50	762	23340.0116
77.0	30.0	107.50	M6	92.5	M16	45.5	37.6	32.3	12	20	8	14	4.0	26	200.0	107.50	1832	23340.0118¹⁾

¹⁾ including clamping nut and clamping ring to enable machining as described in note

APPLICATION EXAMPLE



Centering Clamping Mandrels • with lateral handling

EH 23340.



PRODUCT DESCRIPTION

For clamping and centering of workpieces with internal bore.

Material

- Body
 - Steel, blackened

Clamping screw

- Heat-treated steel

Assembly

The centering clamping mandrel can be machined to the required seating diameter (e.g. by turning/milling). It must be noticed that before machining the centering clamping

mandrel, it will be expanded approx. 0,1 mm over the clamping diameter. To machine the mandrel, a locking ring will be provided.

Operation

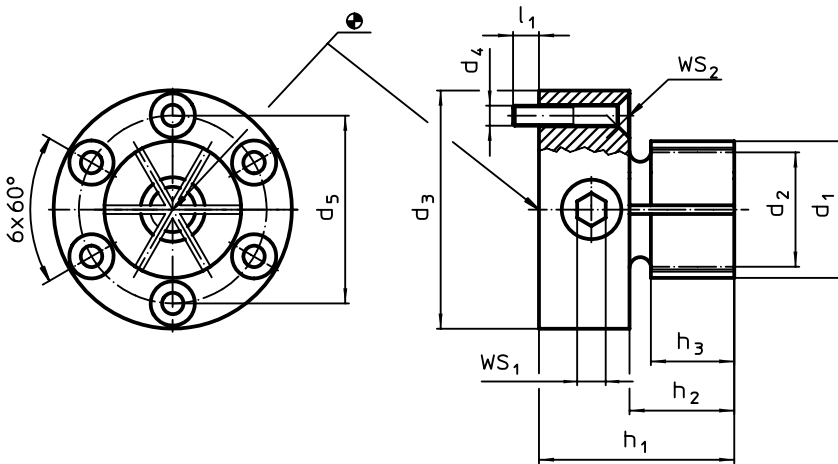
Thanks to the lateral handling it can also be used for blind hole drilling.

MORE INFORMATION

Further products

Centering Clamping Mandrels..... → p. 570

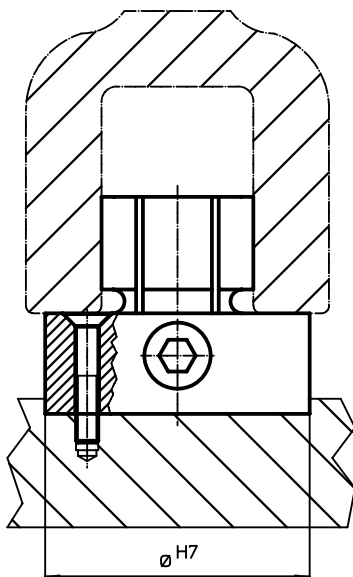
DRAWING



ORDER INFORMATION

Dimensions										WS		Clamping force max. [kN]	Tightening torque max. [Nm]	Location hole H7 [mm]	Art. No.
d ₁	d ₂ min.	d ₃ -0.05	d ₄	d ₅	h ₁	h ₂	h ₃	l ₁	WS ₁	WS ₂					
[mm]										[mm]					
28.7	17.8	50	M4	39.4	41	22	17.5	7	6	2.5	20	66	50	363	23340.0125

APPLICATION EXAMPLE



Shaft Clamps

EH 23341.



PRODUCT DESCRIPTION

Shaft clamps are used to clamp round workpieces, e.g. shafts, axels, tubes or rods both axially and radially.

Material

Body

- Steel, blackened
- Stainless steel 1.4305

Spring

- Stainless steel

Clamping screw

- Steel, zinc-plated
- Stainless Steel

Assembly

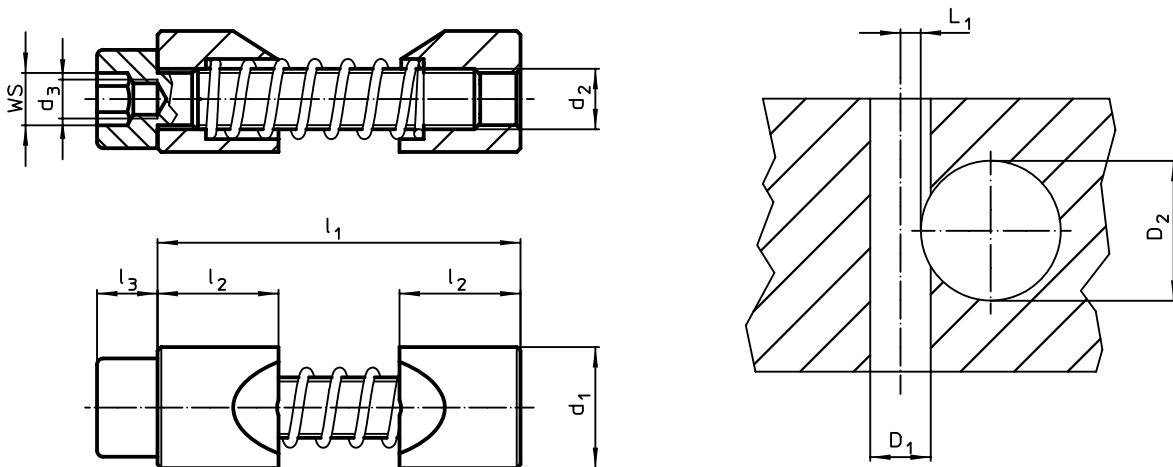
1. Expand the clamping jaws to the diameter of the shaft to be clamped.
2. Insert shaft clamp into hole using the assembly tool.
3. Insert and position the shaft.
4. Clamp using cylinder screw WS (observe tightening torque).

MORE INFORMATION

Notes

The thread d_3 serves to hold the assembly tool (optional).

DRAWING



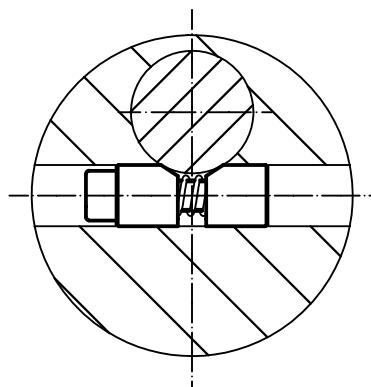
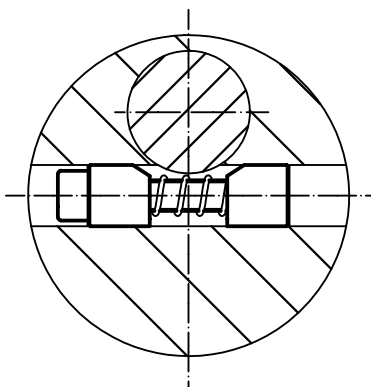
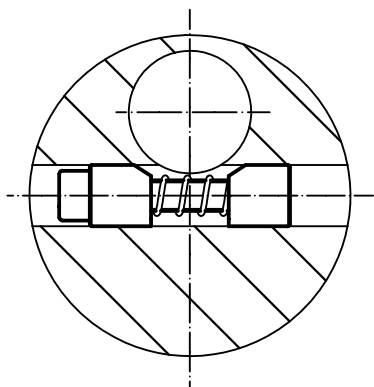
ORDER INFORMATION

d_1 h11	d_2	Dimensions				WS [mm]	Tightening torque max. [Nm]	Location hole			Art. No.	Steel	Stainless steel
		d_3	l_1 max.	l_2	l_3			Hub bore D_1 H7	Shaft diameter D_2	L_1 +0.2			
[mm]													
8	M 4	M2,5	27	8	4	3	2.9	8	6 – 10	2.8	8	23341.0008	23341.0508
10	M 5	M 3	33	10	5	4	6.0	10	10 – 15	3.3	12	23341.0010	23341.0510
12	M 6	M 4	39	12	6	5	10.0	12	15 – 20	3.5	21	23341.0012	23341.0512
16	M 8	M 5	46	16	8	6	25.0	16	20 – 30	4.0	52	23341.0016	23341.0516
20	M10	M 6	53	20	10	8	46.0	20	30 – 40	4.8	98	23341.0020	23341.0520
25	M12	M 8	70	25	12	10	82.0	25	40 – 60	5.6	183	23341.0025	23341.0525
30	M16	M 10	81	30	16	14	206.0	30	60 – 125	7.9	344	23341.0030	23341.0530

ACCESSORIES

special hexagon key	WS	d	Art. No.
	[mm]	[mm]	
	3	M2,5	23341.1008
	4	M 3	23341.1010
	5	M 4	23341.1012
	6	M 5	23341.1016
	8	M 6	23341.1020
	10	M 8	23341.1025
	14	M 10	23341.1030

APPLICATION EXAMPLE



Screw Jacks

EH 23470.



PRODUCT DESCRIPTION

Trapezoidal self-locking thread, spindle with final safety device. The holders, which can be secured by means of the T-slots, make it possible to tighten the jacks so that they will not slip out of position when a workpiece is changed. They also allow to fit screw jacks to vertical clamping surfaces. Screw jacks are frequently used for supporting workpieces. Use of the self-aligning cap ensures a correctly aligned bearing surface. Using the centering plate as an intermediate element, it is possible to fit a number of screw jacks sizes 52, 70 and 100 together one above the other.

Material

Caps

- Steel, case-hardened, blackened

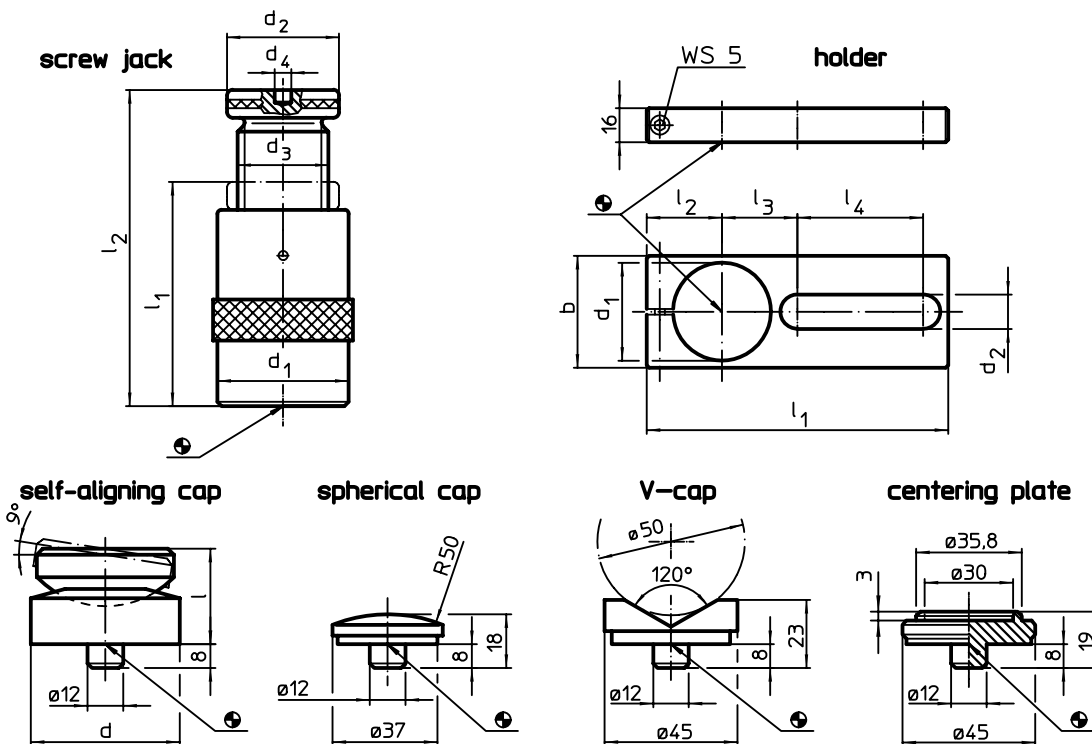
Holders

- Steel, blackened

Screw Jacks

- Steel 1.0503 varnished







DRAWING



ORDER INFORMATION

Clamping height max. [mm]	l_1 min.	Dimensions				Load capacity [kN]	[g]	Art. No.
		d_1 [mm]	d_2	d_3	d_4 [mm]			
screw jack								
50	38	31	31	Tr 20 x 4	–	15	191	23470.0005
52	42	50	50	Tr 30 x 4	12	60	539	23470.0006
70	50	50	50	Tr 30 x 4	12	60	645	23470.0007
100	70	50	50	Tr 30 x 4	12	60	900	23470.0010
140	100	69	69	Tr 40 x 7	12	100	2614	23470.0014
210	140	80	70	Tr 50 x 8	12	170	4336	23470.0021
300	190	100	80	Tr 65 x 10	12	350	9680	23470.0030

ACCESSORIES

	Dimensions										For screw jacks [mm]	 [g]	Art. No.
	d	d ₁	b	d ₂	l [mm]	l ₁	l ₂	l ₃	l ₄				
holder													
	-	31	40	18.5	-	175	30	35	90	50	516	23470.0232	
		50	60	20.5	-	190	38	46	90	52/ 70/100	879	23470.0250	
		69	80	24.5	-	210	48	54	90	140	1279	23470.0270	
self-aligning cap													
	50	-	-	-	32	-	-	-	-	52/ 70/100	399	23470.0350	
	65	-	-	-	35	-	-	-	-	140/210	716	23470.0365	
spherical cap													
	-	-	-	-	-	-	-	-	-	52/ 70/100/140/210/300	75	23470.0171	
V-cap													
	-	-	-	-	-	-	-	-	-	52/ 70/100/140/210/300	138	23470.0172	
centering plate													
	-	-	-	-	-	-	-	-	-	52/ 70/100	107	23470.0170	

4 OPERATING ELEMENTS



	Product group	Page
	Retaining Latches	578
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Retaining Latches • one-sided

EH 24100.



PRODUCT DESCRIPTION

To be used for door locking, drawers and as handling aid etc. The retaining catch is indexing 4 x 90°.

Material

Lever

- Zinc die-cast, silver, similar to RAL 9006
- Zinc die-cast, black, similar to RAL 9005

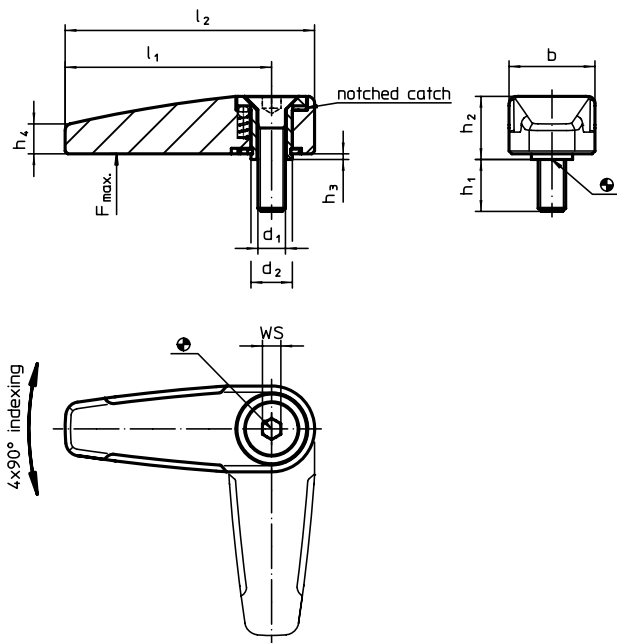
Inner parts

- Dry powdered metal

Screw

- Stainless steel A2 (ISO 10642)

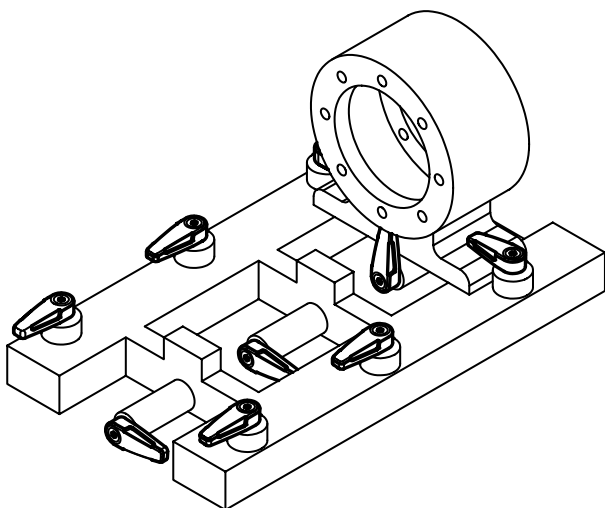
DRAWING



ORDER INFORMATION

Dimensions										WS	Load capacity max.	🔩	Art. No.	
d ₁	d ₂	l ₁	l ₂	b	h ₁	h ₂	h ₃	h ₄	[mm]				[N]	[g]
M6	9	45	55	19.0	12	13.3	0.8	6.5	4	500	60	24100.0101	24100.0102	
M8	14	65	78	25.2	14	15.8	0.8	9.0	5	1000	136	24100.0151	24100.0152	

APPLICATION EXAMPLE



Retaining Latches • double-sided
EH 24100.



PRODUCT DESCRIPTION

To be used for door locking, drawers and as handling aid etc.
The retaining catch is indexing 4 x 90°.

Material

Lever

- Zinc die-cast, silver, similar to RAL 9006
- Zinc die-cast, black, similar to RAL 9005

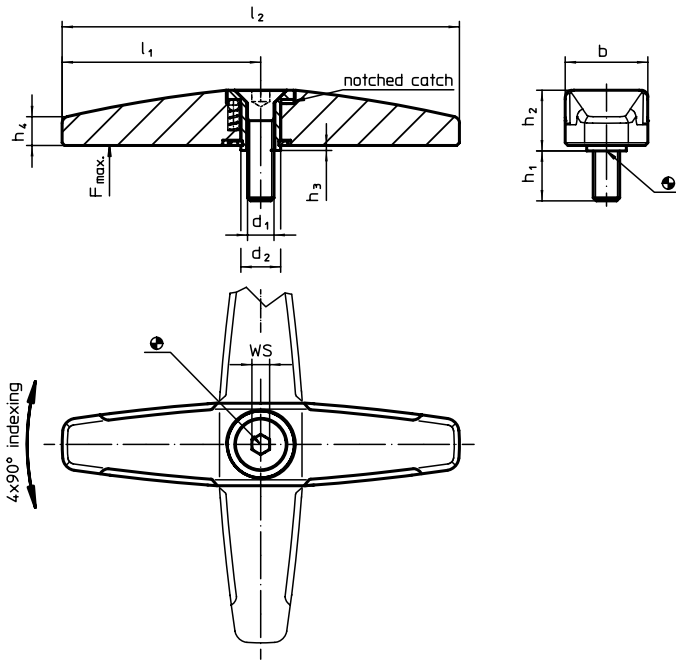
Inner parts

- Dry powdered metal

Screw

- Stainless steel A2 (ISO 10642)

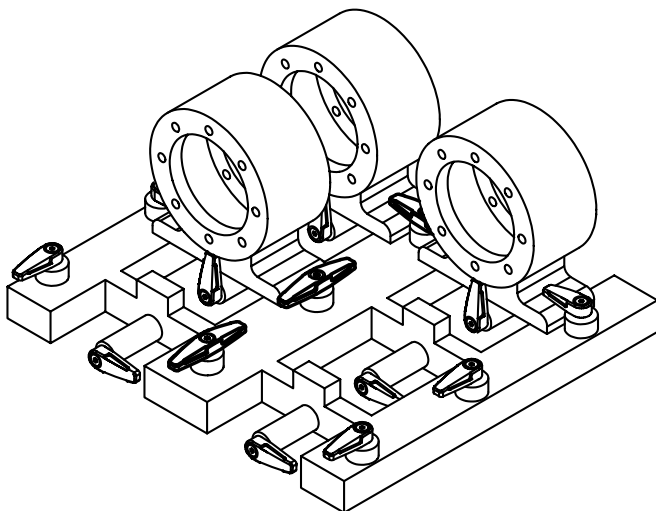
DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions							WS	Load capacity max.	🔩	Art. No.	
		l ₁	l ₂	b	h ₁	h ₂	h ₃	h ₄				silver	black
[mm]											[g]		
M6	9	45	90	19.0	12	13.3	0.8	6.5	4	500	94	24100.0601	24100.0602
M8	14	65	130	25.2	14	15.8	0.8	9.0	5	1000	225	24100.0651	24100.0652

APPLICATION EXAMPLE



Retaining Latches • wing grip, one-sided

EH 24101.



PRODUCT DESCRIPTION

To be used for door locking, drawers and as handling aid etc. The retaining catch is indexing 4 x 90°.

Material

- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Flange

- Zinc die-cast, plastic coated, black

Inner parts

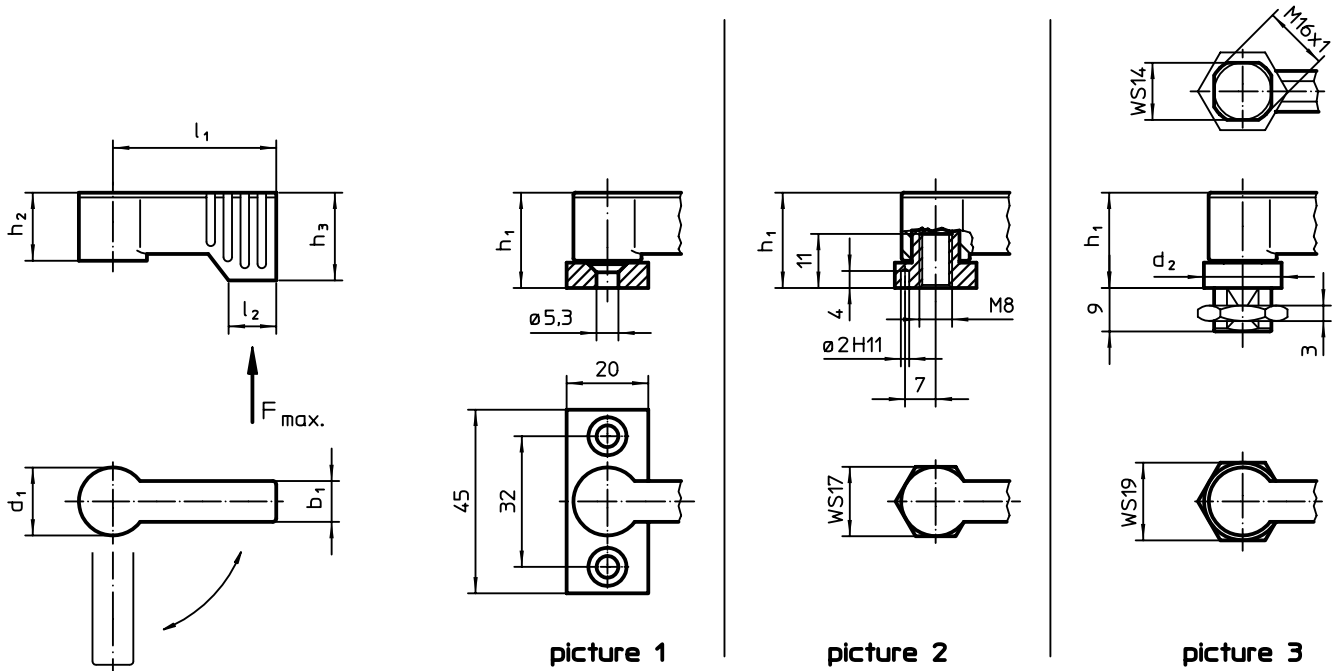
- Zinc die-cast
- Steel
- Plastic

Lever

- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure

4

DRAWING



ORDER INFORMATION

d ₁	l ₁	b ₁	Dimensions					Load capacity F max. [N]	[g]	Art. No.	
			d ₂	h ₁	h ₂	h ₃ min.	l ₂			silver	black
[mm]											
with mounting flange – picture 1											
17	40	10	–	22	16.5	21.5	11	450	75	24101.0201	24101.0202
	55	10	–	22	16.5	21.5	11	450	83	24101.0204	24101.0203
with female thread – picture 2											
17	40	10	–	22	16.5	21.5	11	450	57	24101.0231	24101.0232
	55	10	–	22	16.5	21.5	11	450	65	24101.0234	24101.0233
with male thread – picture 3											
17	40	10	19	22	16.5	21.5	11	450	69	24101.0261	24101.0262
	55	10	19	22	16.5	21.5	11	450	76	24101.0264	24101.0263

U-Handles
EH 24300.



PRODUCT DESCRIPTION

U-handles are used, for example, on machine doors, furniture doors, cabinet doors, drawers and drawer units.

These U-handles are characterised by their ergonomic profile design with very high stability and their simple and timeless design.

Material

- Stainless steel 1.4301, dull blasted
- Stainless steel, slide polished, shiny metallic finish

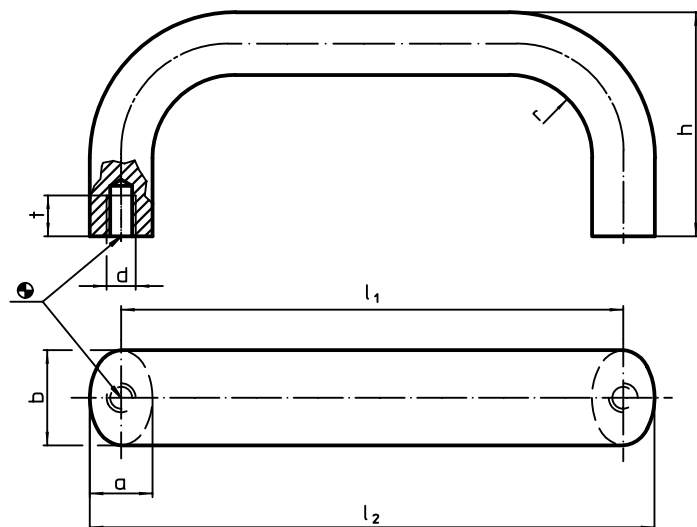
Handle

- Aluminium, drawn, bright, vibratory grinded
- Aluminium, plastic coated, similar to RAL 9005, black

Assembly

Back mount handle.

DRAWING



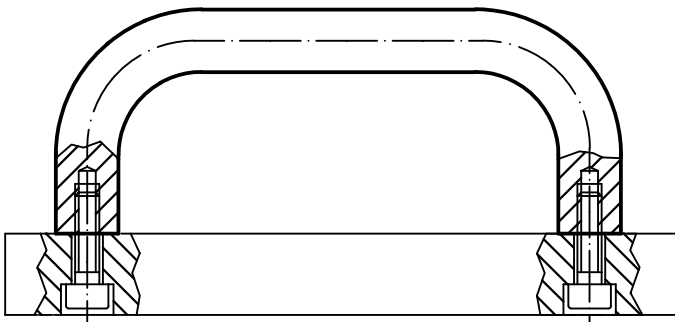
ORDER INFORMATION

b	l ₁ ±0.25	l ₂	Dimensions					[g]	Art. No.
			a	d	h	r	t		
[mm]									
aluminium, bright									
20	100	113	13	M6	49	13	10	90	24300.0100
	112	125	13	M6	49	13	10	97	24300.0110
	117	130	13	M6	49	13	10	100	24300.0112
	120	133	13	M6	49	13	10	97	24300.0114
	128	141	13	M6	51	13	10	107	24300.0120
	160	173	13	M6	51	13	10	122	24300.0130
	180	193	13	M6	51	13	10	128	24300.0132
	200	213	13	M6	51	13	10	150	24300.0134
	235	248	13	M6	51	13	10	180	24300.0136
26	112	129	17	M8	55	17	12	163	24300.0140
	117	134	17	M8	55	17	12	166	24300.0142
	120	137	17	M8	55	17	12	200	24300.0144
	125	142	17	M8	55	17	12	176	24300.0146
	128	154	17	M8	55	17	12	180	24300.0150
	160	177	17	M8	57	17	12	217	24300.0160
	179	196	17	M8	57	17	12	234	24300.0162
	192	209	17	M8	57	17	12	240	24300.0170
	300	317	17	M8	57	17	12	344	24300.0180
	400	417	17	M8	57	17	12	436	24300.0190
500	517	17	M8	57	17	12	538	24300.0200	



b	l ₁ ±0.25	l ₂	Dimensions					t	[g]	Art. No.
			a	d	h	r	[mm]			
aluminium, black										
20	100	113	13	M6	49	13	10	100	24300.0300	
	112	125	13	M6	49	13	10	98	24300.0310	
	117	130	13	M6	49	13	10	100	24300.0312	
	120	133	13	M6	49	13	10	104	24300.0314	
	128	141	13	M6	51	13	10	110	24300.0320	
	160	173	13	M6	51	13	10	126	24300.0330	
	180	193	13	M6	51	13	10	128	24300.0332	
	200	213	13	M6	51	13	10	150	24300.0334	
26	235	248	13	M6	51	13	10	180	24300.0336	
	112	129	17	M8	55	17	12	167	24300.0340	
	117	134	17	M8	55	17	12	166	24300.0342	
	120	137	17	M8	55	17	12	160	24300.0344	
	125	142	17	M8	55	17	12	178	24300.0346	
	128	145	17	M8	55	17	12	181	24300.0350	
	160	177	17	M8	57	17	12	217	24300.0360	
	179	196	17	M8	57	17	12	234	24300.0362	
	192	209	17	M8	57	17	12	250	24300.0370	
	300	317	17	M8	57	17	12	347	24300.0380	
400	417	17	M8	57	17	12	445	24300.0390		
500	517	17	M8	57	17	12	538	24300.0400		
stainless steel, dull blasted										
20	112	125	13	M6	49	13	10	271	24300.0510	
	128	141	13	M6	51	13	10	300	24300.0520	
	160	173	13	M6	51	13	10	366	24300.0530	
	200	213	13	M6	51	13	10	440	24300.0540	
	250	263	13	M6	51	13	10	517	24300.0550	
	300	313	13	M6	51	13	10	597	24300.0560	
	400	413	13	M6	51	13	10	737	24300.0580	
26	128	145	17	M8	57	19	12	517	24300.0651	
	160	177	17	M8	57	19	12	606	24300.0661	
	200	217	17	M8	57	19	12	708	24300.0671	
	300	317	17	M8	57	19	12	986	24300.0680	
	400	417	17	M8	57	19	12	1259	24300.0690	
500	517	17	M8	57	19	12	1519	24300.0700		
stainless steel, slide polished, shiny metallic finish										
20	112	125	13	M6	49	13	10	274	24300.0610	
	128	141	13	M6	51	13	10	309	24300.0620	
	160	173	13	M6	51	13	10	362	24300.0630	
	200	213	13	M6	51	13	10	420	24300.0640	
26	128	145	17	M8	57	19	12	518	24300.0650	
	160	177	17	M8	57	19	12	603	24300.0660	
	200	217	17	M8	57	19	12	711	24300.0670	

APPLICATION EXAMPLE



U-Handles • front mounting

EH 24300.



PRODUCT DESCRIPTION

U-handles are used, for example, on machine doors, furniture doors, cabinet doors, drawers and drawer units.

These U-handles are characterised by their ergonomic profile design with very high stability and their simple and timeless design.

Material

- Stainless steel, dull blasted

Handle

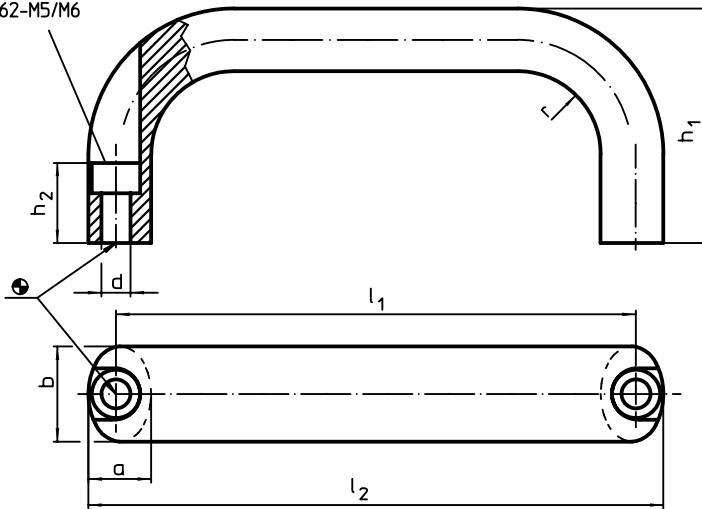
- Aluminium, drawn, bright, vibratory grinded
- Aluminium, plastic coated, similar to RAL 9005, black

Assembly

Mounting is done from the operating side by means of a cylinder screw.

DRAWING

bore for cylinder head stud ISO 4762-M5/M6



ORDER INFORMATION

b	l ₁ ±0.25	l ₂	Dimensions					For cylinder screw	[g]	Art. No.		
			a	d	h ₁	h ₂	r			aluminium, bright	aluminium, black	stainless steel, dull blasted
[mm]												
20	100	112	13	5.4	49	19	13	M5	80	24300.0101	24300.0301	-
	112	124	13	5.4	49	19	13	M5	82	24300.0111	24300.0311	24300.0511
	117	129	13	5.4	49	19	13	M5	84	24300.0113	24300.0313	-
	120	132	13	5.4	51	19	13	M5	90	24300.0115	24300.0315	-
	128	140	13	5.4	51	19	13	M5	100	24300.0121	24300.0321	24300.0521
	160	172	13	5.4	51	19	13	M5	100	24300.0131	24300.0331	24300.0531
26	116	130	17	6.4	55	17	17	M6	146	24300.0141	24300.0341	-
	120	134	17	6.4	55	17	17	M6	152	24300.0143	24300.0343	-
	128	140	17	6.4	57	17	19	M6	455	-	-	24300.0655
	132	146	17	6.4	55	17	17	M6	161	24300.0151	24300.0351	-
	160	172	17	6.4	57	17	19	M6	542	-	-	24300.0665
	164	178	17	6.4	57	17	17	M6	196	24300.0161	24300.0361	-
	179	193	17	6.4	57	17	17	M6	215	24300.0166	24300.0366	-
	196	210	17	6.4	57	17	17	M6	229	24300.0171	24300.0371	-
200	216	17	6.4	57	17	19	M6	651	-	-	24300.0675	

U-Handles • diagonal

EH 24300.



PRODUCT DESCRIPTION

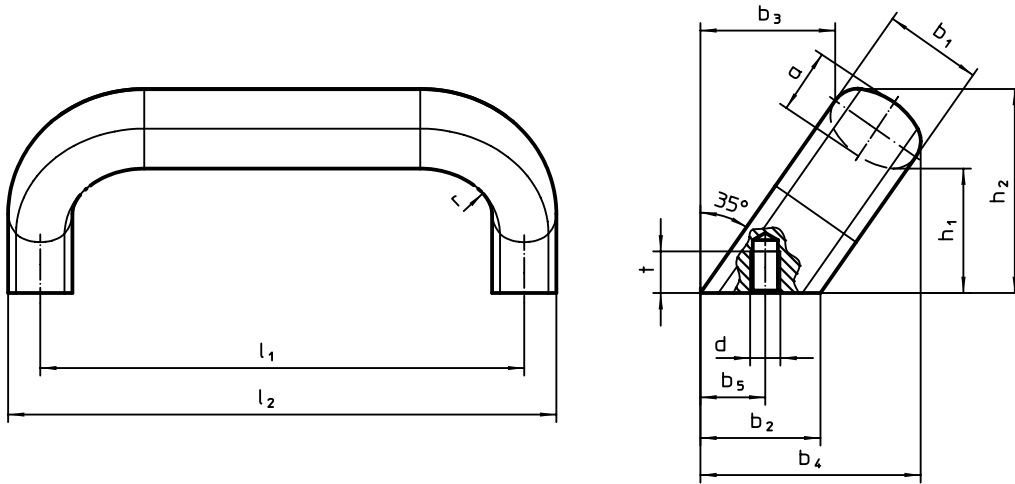
U-handles are used, for example, on machine doors, furniture doors, cabinet doors, drawers and drawer units.

Material

Handle

- Stainless steel 1.4301, dull blasted

DRAWING



ORDER INFORMATION

b ₁	l ₁ ±0.25	l ₂	a	b ₂	Dimensions								[g]	Art. No.
					b ₃	b ₄	b ₅ +1	d	h ₁	h ₂	r	t		
[mm]														
20	112	125	13	24	32	50	13.5	M6	32	48	13	10	301	24300.0805
	128	141	13	24	32	50	13.5	M6	32	48	13	10	325	24300.0810
26	128	145	17	32	34	57	18.0	M8	34	54	17	12	550	24300.0815
	160	177	17	32	34	57	18.0	M8	34	54	17	12	631	24300.0820

U-Handles • with support washer
EH 24310.



PRODUCT DESCRIPTION

U-handles are used, for example, on machine doors, furniture doors, cabinet doors, drawers and drawer units. These rounded U-handles are characterised by their ergonomic and stable construction and their simple and timeless design.

Material

- Handle**
- Steel, chromium-plated
 - Steel, plastic coated, black
 - Stainless steel 1.4305, dull blasted

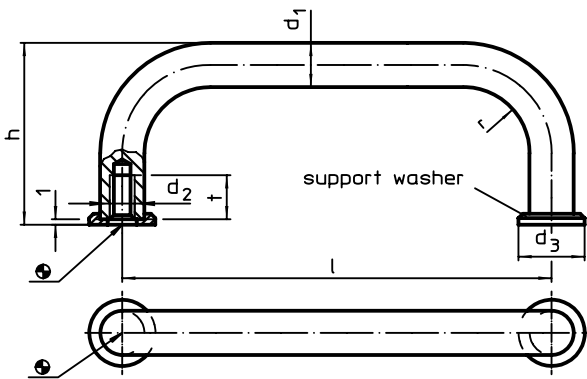
Support washer

- Zinc die-cast, nickel-plated
- Stainless steel

Assembly

The supporting washer provides a good bearing surface. Suitable washers are joined in loose form.

DRAWING



ORDER INFORMATION

d ₁	l ±0.5	Dimensions					t min.	[g]	Art. No.		
		d ₂	d ₃	h	r	Steel, chromium-plated			Steel, plastic coated, black	Stainless steel 1.4305	
[mm]											
6	32	M3	9	26	7	7	20	–	24310.0205	24310.0210	
	45	M3	9	26	7	7	21	–	24310.0215	24310.0220	
	55	M3	9	26	7	7	22	–	24310.0225	24310.0230	
	64	M3	9	26	7	7	24	–	24310.0235	24310.0240	
	88	M3	9	26	7	7	29	–	24310.0245	24310.0250	
8	55	M4	12	35	10	8	41	24310.0010	24310.0310	24310.0510	
	64	M4	12	35	10	8	44	24310.0020	24310.0320	24310.0520	
	88	M4	12	35	10	8	54	24310.0030	24310.0330	24310.0530	
	96	M4	12	35	10	8	57	24310.0040	24310.0340	24310.0540	
	100	M4	12	35	10	8	60	24310.0050	24310.0350	24310.0550	
	120	M4	12	35	10	8	66	24310.0060	24310.0360	24310.0560	
	128	M4	12	35	10	8	69	24310.0110	24310.0410	24310.0610	
10	88	M5	15	43	12	12	91	24310.0120	24310.0420	24310.0620	
	100	M5	15	43	12	12	98	24310.0130	24310.0430	24310.0630	
	120	M5	15	43	12	12	109	24310.0140	24310.0440	24310.0640	
	180	M5	15	43	12	12	146	24310.0150	24310.0450	24310.0650	
	200	M5	15	43	12	12	161	24310.0160	24310.0460	24310.0660	
	235	M5	15	43	12	12	183	24310.0170	24310.0470	24310.0670	

U-Handles

EH 24310.



PRODUCT DESCRIPTION

U-handles are used, for example, on machine doors, furniture doors, cabinet doors, drawers and drawer units.

These rounded U-handles are characterised by their ergonomic and stable construction and their simple and timeless design.

Same design as version with bearing washer.

Thanks to the larger bearing surface, no bearing washers are needed.

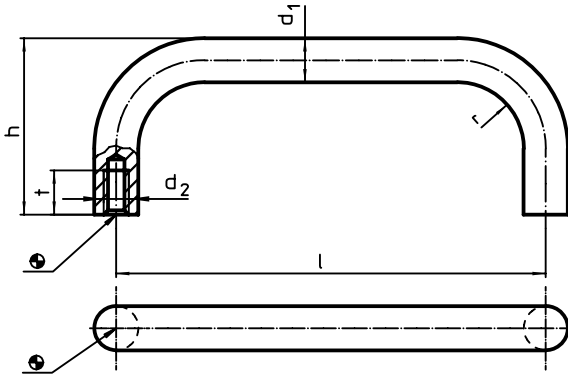
Material

- Steel, plastic coated, black

Handle

- Stainless steel 1.4301, dull blasted

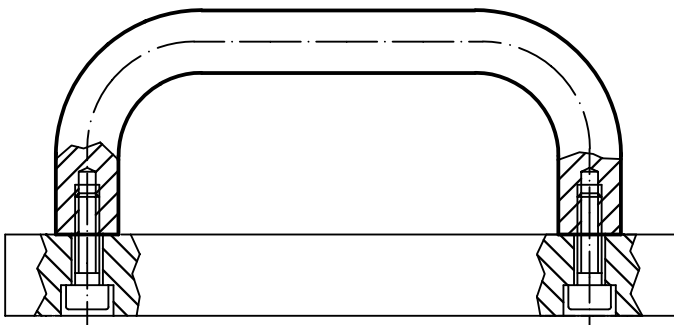
DRAWING



ORDER INFORMATION

d ₁	l ±0.5	Dimensions				t min.	[g]	Art. No.	
		d ₂	h	r				Stainless steel	Steel
[mm]									
12	125	M6	51	14	12	197	24310.0710	24310.0910	
	160	M6	51	14	12	201	24310.0720	24310.0920	
	200	M6	51	14	12	237	24310.0730	24310.0930	
	250	M6	51	14	12	282	24310.0740	24310.0940	
16	160	M6	59	18	12	373	24310.0750	24310.0950	
	200	M6	59	18	12	437	24310.0760	24310.0960	
	250	M6	59	18	12	523	24310.0770	24310.0970	
	300	M6	59	18	12	603	24310.0780	24310.0980	

APPLICATION EXAMPLE



U-Handles • plastic, front mounting
EH 24320.



PRODUCT DESCRIPTION

U-handles are used, for example, on machine doors, furniture doors, cabinet doors, drawers and drawer units. These U-handles made of glass fibre reinforced plastic are characterised by their ergonomic and stable construction and their simple and timeless design.

Material

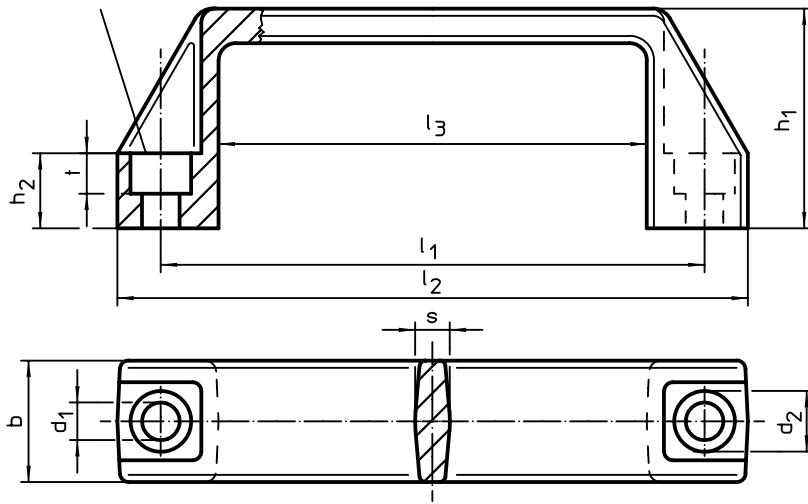
- Handle**
- Thermoplastic PA, glass-fibre reinforced, black

Assembly

Mounting is done from the operating side by means of a cylinder screw.

DRAWING

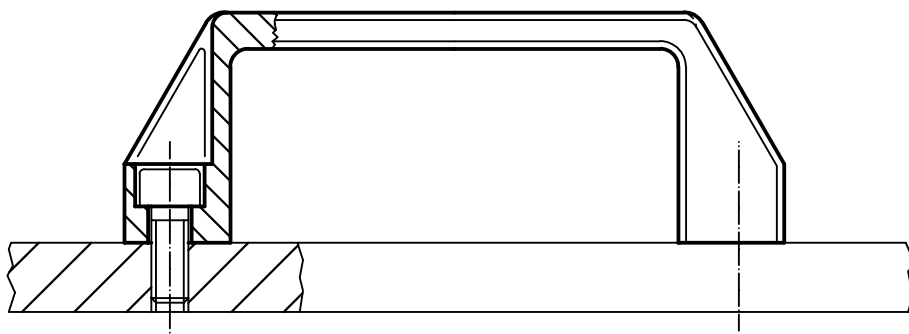
For for cylinder head stud
ISO4762 – M6/M8/M10



ORDER INFORMATION

Dimensions										For cylinder screw	max. [°C]	[g]	Art. No.
l_1 ±0.5	d_1	b	l_2	d_2	h_1	h_2	l_3	s	t				
93.5	6.5	21	109	10.5	38	13	74	6.0	7.0	M 6	100	28	24320.0010
117.0	8.5	26	137	13.5	41	15	93	7.0	8.5	M 8	100	42	24320.0020
132.0	8.5	27	150	13.5	45	16	108	7.0	8.5	M 8	100	48	24320.0030
179.0	8.5	28	196	13.5	50	17	151	7.5	8.5	M 8	100	70	24320.0040
235.0	10.5	30	260	16.5	54	20	201	8.5	10.5	M10	100	118	24320.0050

APPLICATION EXAMPLE



U-Handles • plastic

EH 24320.



PRODUCT DESCRIPTION

U-handles are used, for example, on machine doors, furniture doors, cabinet doors, drawers and drawer units.

These U-handles made of glass fibre reinforced plastic are characterised by their ergonomic and stable construction and their simple and timeless design.

Material

Bushing

- Brass

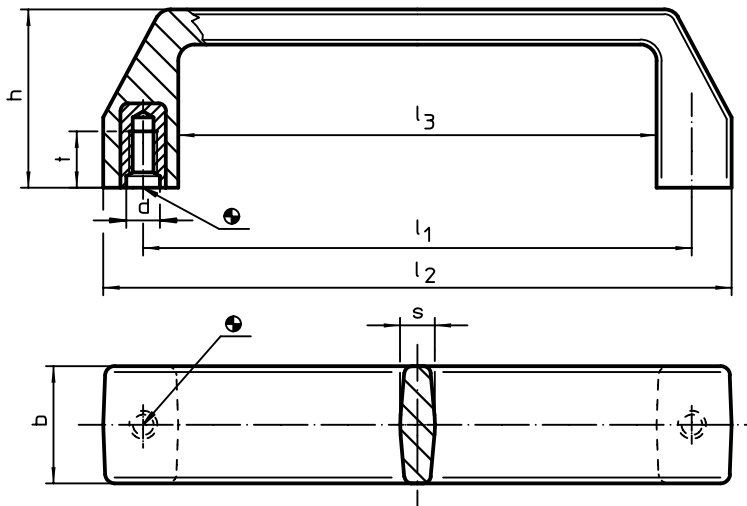
Handle

- Thermoplastic PA, glass-fibre reinforced, black

Assembly

Back mount handle.

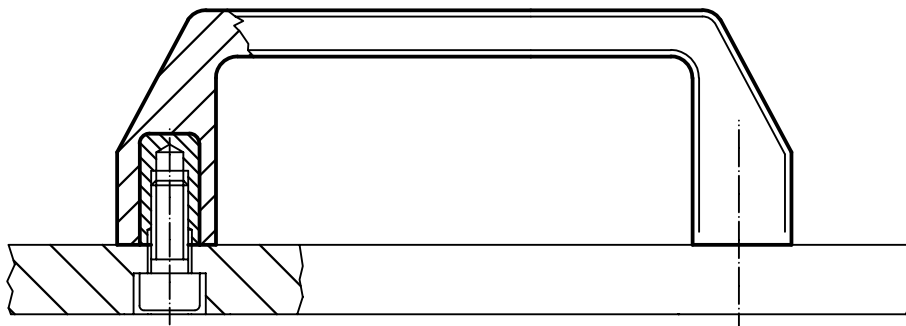
DRAWING



ORDER INFORMATION

Dimensions								max. [°C]	[g]	Art. No.
l_1 ±0.5	d	b	h	l_2	l_3	s	t			
[mm]										
93.5	M6	21	36	107	79	6.0	10	100	31	24320.0210
117.0	M6	25	38	134	102	7.5	12	100	54	24320.0220
	M8	25	38	134	102	7.5	12	100	50	24320.0230
132.0	M8	26	45	150	116	8.0	13	100	59	24320.0240

APPLICATION EXAMPLE



Tubular Handles

EH 24321.



PRODUCT DESCRIPTION

Tubular handles are used, for example, on machine doors. These tubular handles made of aluminium are characterised by their ergonomic and robust construction and modern design. This version is equipped with angled handle legs (legs).

Material

Cap

- Plastic, light grey

Handle

- Aluminium, anodised
- Aluminium, plastic coated, similar to RAL 9005 black, matt structure

Assembly

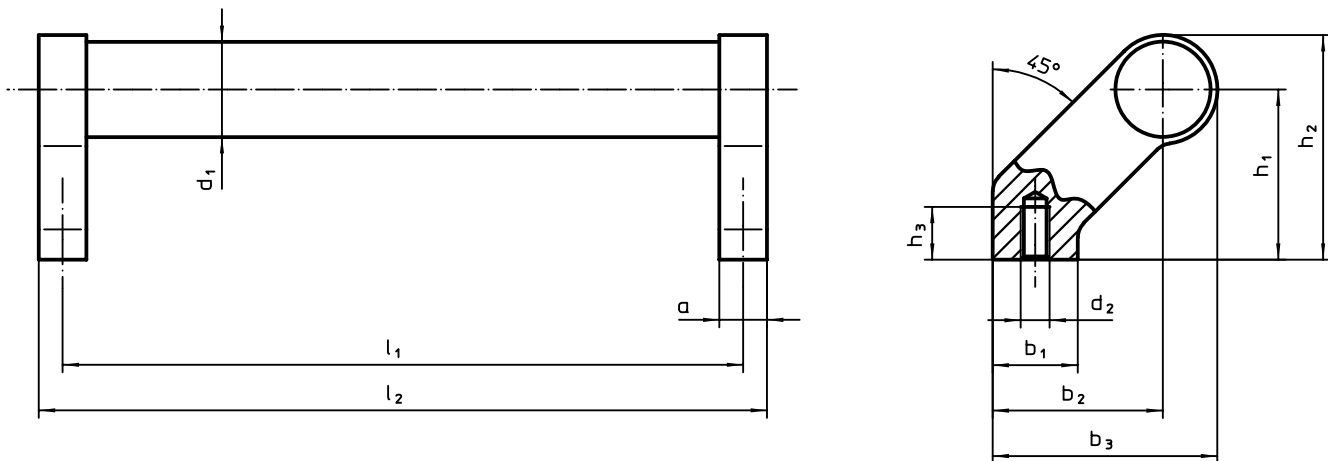
Back mount handle.

MORE INFORMATION

Notes

Special types on request.

DRAWING



ORDER INFORMATION

d ₁	l ₁ ±0.25	a	Dimensions						h ₃ min.	l ₂	[g]	Art. No.		
			b ₁	b ₂	b ₃	d ₂	h ₁	h ₂				silver	black	
[mm]														
20	180	12	24	42	54	M6	42	54	12	192	244	24321.0005	24321.0505	
	200	12	24	42	54	M6	42	54	12	212	244	24321.0010	24321.0510	
	250	12	24	42	54	M6	42	54	12	262	265	24321.0015	24321.0515	
	300	12	24	42	54	M6	42	54	12	312	280	24321.0020	24321.0520	
	350	12	24	42	54	M6	42	54	12	362	296	24321.0025	24321.0525	
28	400	12	24	42	54	M6	42	54	12	412	317	24321.0030	24321.0530	
	200	14	25	50	66	M8	50	66	15	214	424	24321.0035	24321.0535	
	250	14	25	50	66	M8	50	66	15	264	455	24321.0040	24321.0540	
	300	14	25	50	66	M8	50	66	15	314	480	24321.0045	24321.0545	
	350	14	25	50	66	M8	50	66	15	364	501	24321.0050	24321.0550	
	400	14	25	50	66	M8	50	66	15	414	536	24321.0055	24321.0555	
30	500	14	25	50	66	M8	50	66	15	514	593	24321.0060	24321.0560	
	600	14	25	50	66	M8	50	66	15	614	570	24321.0065	24321.0565	
	200	17	27	51	68	M8	51	68	15	217	429	24321.0070	24321.0570	
	300	17	27	51	68	M8	51	68	15	317	489	24321.0075	24321.0575	
	350	17	27	51	68	M8	51	68	15	367	501	24321.0080	24321.0580	
	400	17	27	51	68	M8	51	68	15	417	538	24321.0085	24321.0585	
30	500	17	27	51	68	M8	51	68	15	517	613	24321.0090	24321.0590	
	600	17	27	51	68	M8	51	68	15	617	669	24321.0095	24321.0595	

Tubular Handles • front mounting

EH 24321.



PRODUCT DESCRIPTION

Tubular handles are used, for example, on machine doors. These tubular handles made of aluminium are characterised by their ergonomic and robust construction and modern design. This version is equipped with angled handle legs (legs).

Material

- Plastic, black

Cap

- Plastic, light grey

Handle

- Aluminium, anodised
- Aluminium, plastic coated, similar to RAL 9005 black, matt structure

Covering

- Plastic, light grey

Assembly

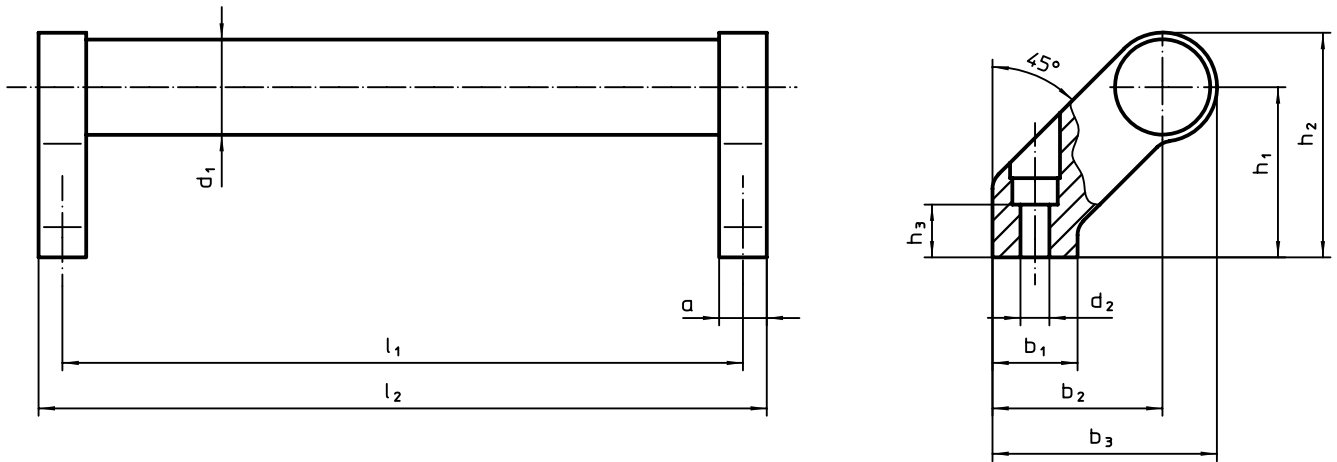
The handles can be mounted to the component from the front (operating side) using cylinder screws. The hole is closed with a plastic covering.

MORE INFORMATION

Notes

Special types on request.

DRAWING



ORDER INFORMATION

d ₁	l ₁ ±0.25	a	b ₁	Dimensions			d ₂	h ₁	h ₂	h ₃ min.	l ₂	[g]	Art. No.	
				b ₂	b ₃	[mm]							silver	black
28	200	14	25	50	66	6.5	50	66	17	214	406	24321.0100	24321.0600	
	250	14	25	50	66	6.5	50	66	17	264	437	24321.0105	24321.0605	
	300	14	25	50	66	6.5	50	66	17	314	448	24321.0110	24321.0610	
	350	14	25	50	66	6.5	50	66	17	364	493	24321.0115	24321.0615	
	400	14	25	50	66	6.5	50	66	17	414	520	24321.0120	24321.0620	
	500	14	25	50	66	6.5	50	66	17	514	556	24321.0125	24321.0625	
600	14	25	50	66	6.5	50	66	17	614	631	24321.0130	24321.0630		

Crank Handles • DIN 469 straight with square end DIN 79
EH 24330.



PRODUCT DESCRIPTION

With these crank handles, the seam is ground and blasted. The hub is machined.

Material

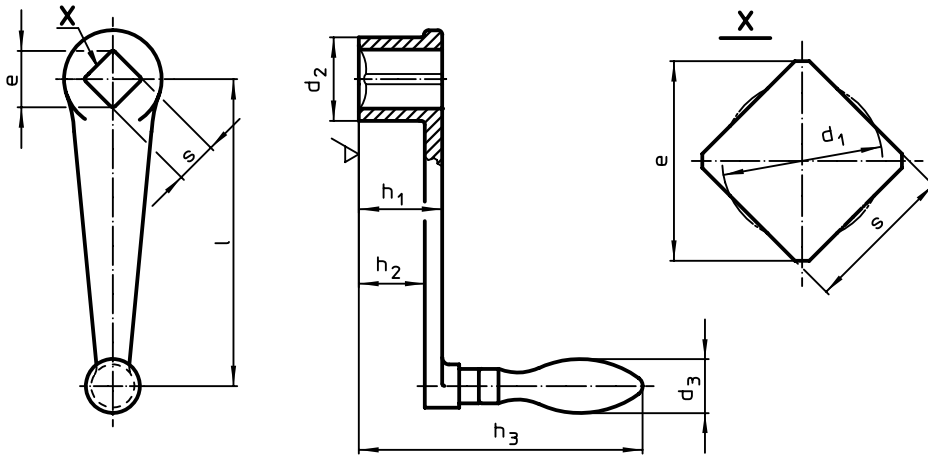
Machine handle

- Steel, turned, zinc-plated by galvanization, passivated

Handle body

- Cast iron (GTW), plastic coated, black
- Nodular cast iron, plastic coated, black

DRAWING



ORDER INFORMATION

l	s H11	e min.	Dimensions					d ₃ Machine handle Ø	[g]	Art. No.
			d ₁	d ₂	h ₁	h ₂	h ₃			
[mm]										
with rotating machine handle (EH 24460., DIN 98), form D										
63	10	13.1	10.5	20	20	15	79	16	118	24330.0010 ¹⁾
80	10	13.1	10.5	24	24	18	97	18	211	24330.0020
	12	16.1	12.6	24	24	18	97	18	197	24330.0021
100	12	16.1	12.6	28	28	21	100	20	297	24330.0030
	14	18.1	14.7	28	28	21	100	20	293	24330.0031
125	14	18.1	14.7	34	34	26	122	22	468	24330.0040
	17	22.2	17.9	34	34	26	122	22	433	24330.0041
160	17	22.2	17.9	38	38	29	126	25	667	24330.0050
	19	25.2	20.0	38	38	29	126	25	665	24330.0051
200	19	25.2	20.0	44	44	34	160	28	1054	24330.0060
	22	28.2	23.1	44	44	34	160	28	992	24330.0061
250	22	28.2	23.1	48	48	36	162	32	1441	24330.0070
	24	32.2	25.3	48	48	36	162	32	1409	24330.0071
with fixed machine handle (EH 24450., DIN 39), form F										
63	10	13.1	10.5	20	20	15	74	16	109	24330.0110 ¹⁾
80	10	13.1	10.5	24	24	18	94	18	183	24330.0120
	12	16.1	12.6	24	24	18	94	18	186	24330.0121
100	12	16.1	12.6	28	28	21	98	20	278	24330.0130
	14	18.1	14.7	28	28	21	98	20	259	24330.0131
125	14	18.1	14.7	34	34	26	120	22	444	24330.0140
	17	22.2	17.9	34	34	26	120	22	433	24330.0141
160	17	22.2	17.9	38	38	29	122	25	786	24330.0150
	19	25.2	20.0	38	38	29	122	25	633	24330.0151
200	19	25.2	20.0	44	44	34	154	28	962	24330.0160
	22	28.2	23.1	44	44	34	154	28	983	24330.0161
250	22	28.2	23.1	48	48	36	157	32	1360	24330.0170
	24	32.2	25.3	48	48	36	157	32	1678	24330.0171

¹⁾ Handle body made from cast iron (GTW)

Crank Handles • DIN 468 goose-neck form with square end DIN 79

EH 24330.



PRODUCT DESCRIPTION

With these crank handles, the seam is ground and blasted. The hub is machined.

Material

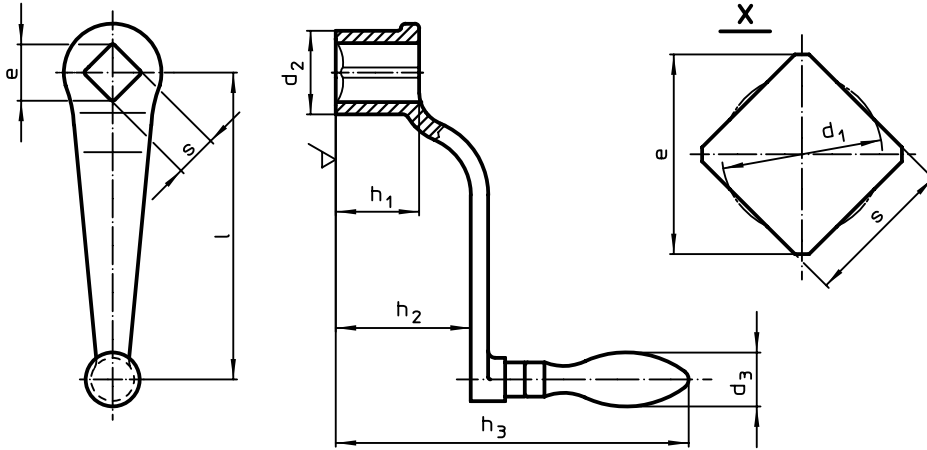
Machine handle

- Steel, turned, zinc-plated by galvanization, passivated

Handle body

- Cast iron (GTW), plastic coated, black
- Nodular cast iron, plastic coated, black

DRAWING



ORDER INFORMATION

l	s H11	e min.	Dimensions					d ₃ Machine handle Ø	[g]	Art. No.
			d ₁	d ₂	h ₁	h ₂	h ₃			
[mm]										
with rotating machine handle (EH 24460., DIN 98), form D										
63	10	13.1	10.5	20	20	32	96	16	128	24330.0210 ¹⁾
80	10	13.1	10.5	24	24	38	116	18	201	24330.0220
	12	16.1	12.6	24	24	38	116	18	200	24330.0221
100	12	16.1	12.6	28	28	48	126	20	310	24330.0230
	14	18.1	14.7	28	28	48	126	20	291	24330.0231
125	14	18.1	14.7	34	34	55	150	22	464	24330.0240
	17	22.2	17.9	34	34	55	150	22	455	24330.0241
160	17	22.2	17.9	38	38	65	160	25	674	24330.0250
	19	25.2	20.0	38	38	65	160	25	664	24330.0251
200	19	25.2	20.0	44	44	78	202	28	1083	24330.0260
	22	28.2	23.1	44	44	78	202	28	1048	24330.0261
250	22	28.2	23.1	48	48	90	214	32	1466	24330.0270
	24	32.2	25.3	48	48	90	214	32	1478	24330.0271
315	24	32.2	25.3	54	54	105	248	36	2303	24330.0280
	27	36.2	28.4	54	54	105	248	36	2200	24330.0281
with fixed machine handle (EH 24450., DIN 39), form F										
63	10	13.1	10.5	20	20	32	92	16	136	24330.0310 ¹⁾
80	10	13.1	10.5	24	24	38	114	18	187	24330.0320
	12	16.1	12.6	24	24	38	114	18	183	24330.0321
100	12	16.1	12.6	28	28	48	124	20	288	24330.0330
	14	18.1	14.7	28	28	48	124	20	292	24330.0331
125	14	18.1	14.7	34	34	55	148	22	460	24330.0340
	17	22.2	17.9	34	34	55	148	22	439	24330.0341
160	17	22.2	17.9	38	38	65	158	25	661	24330.0350
	19	25.2	20.0	38	38	65	158	25	627	24330.0351
200	19	25.2	20.0	44	44	78	197	28	1020	24330.0360
	22	28.2	23.1	44	44	78	197	28	1004	24330.0361
250	22	28.2	23.1	48	48	90	209	32	1490	24330.0370
	24	32.2	25.3	48	48	90	209	32	1415	24330.0371
315	24	32.2	25.3	54	54	105	243	36	2200	24330.0380
	27	36.2	28.4	54	54	105	243	36	2100	24330.0381

¹⁾ Handle body made from cast iron (GTW)

Crank Handles
EH 24330.



PRODUCT DESCRIPTION

Material

Handle body

- Zinc die-cast, plastic coated, black, matt structure
- Aluminium, plastic coated, black, matt structure

Cylindrical handle

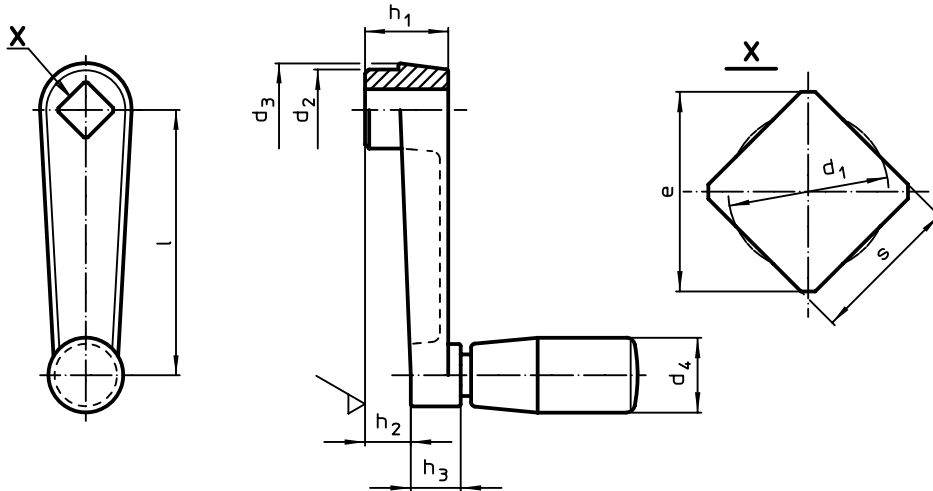
- Thermosetting plastic PF 31, black

MORE INFORMATION

References

Alternative to crank handles DIN 469.

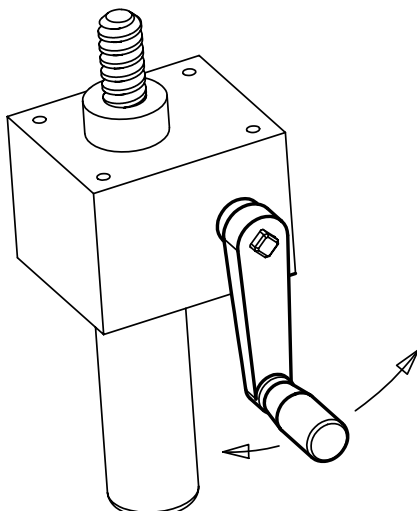
DRAWING



ORDER INFORMATION

Dimensions									d ₄ Cylindrical handle Ø EH 24530. [mm]	🌡️ max. [°C]	📦 [g]	Art. No.
l	s H11	e min.	d ₁ max.	d ₂	d ₃	h ₁	h ₂	h ₃				
[mm]												
zinc die-cast												
50	8	10.1	8.4	16	18	18	10	10	14	80	58	24330.0420
64	10	13.1	10.5	19	22	20	11	12	18	80	97	24330.0422
80	10	13.1	10.5	23	26	24	14	14	21	80	166	24330.0424
100	12	16.1	12.6	27	30	28	17	15	23	80	270	24330.0436
aluminium Al												
80	10	13.1	10.5	23	26	24	14	14	21	80	97	24330.0410
100	12	16.1	12.6	27	30	28	17	15	23	80	161	24330.0412
125	14	18.1	14.7	32	35	34	22	18	26	80	251	24330.0414
160	17	22.2	17.9	35	39	38	26	18	26	80	280	24330.0416

APPLICATION EXAMPLE



Crank Handles • stainless steel precision casting

EH 24330.



PRODUCT DESCRIPTION

Flat side of the hub is machined.

Material

Axle part

- Stainless steel 1.4301

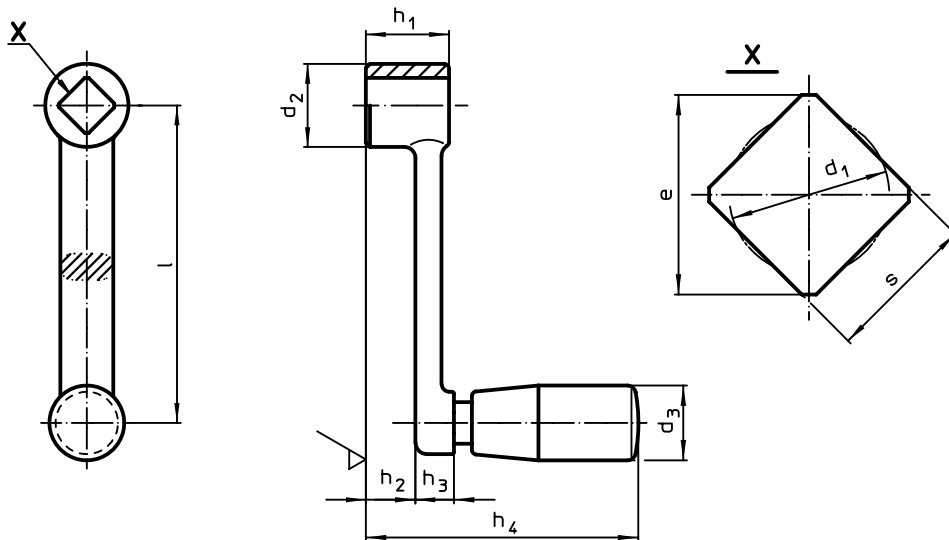
Handle body

- Stainless steel 1.4308

Cylindrical handle

- Thermosetting plastic PF 31, black

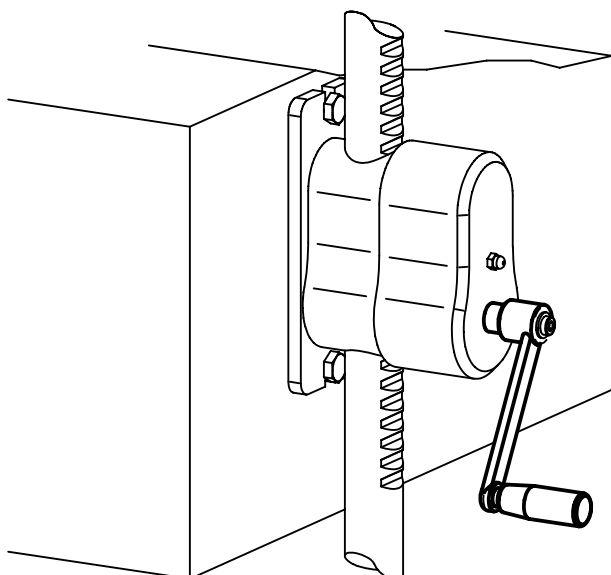
DRAWING



ORDER INFORMATION

Dimensions									d ₃ Cylindrical handle Ø EH 24530.		Art. No.
l	s H11	e min.	d ₁ max.	d ₂	h ₁	h ₂ ~	h ₃	h ₄ ~			
[mm]									[mm]	[g]	
80	10	13.1	10.5	22	22	15.4	6.6	64.5	18	124	24330.0520
100	12	16.1	12.6	26	26	17.7	8.3	78.5	21	191	24330.0530
125	14	18.1	14.7	28	28	18.8	9.2	95.5	23	320	24330.0540
160	17	22.2	17.9	32	32	22.6	9.4	99.5	23	370	24330.0550

APPLICATION EXAMPLE



Crank Handles • with folding handle

EH 24331.



PRODUCT DESCRIPTION

Material

Axle part

- Steel, blackened

Handle

- Thermoplastic, black, dull

Handle body

- Aluminium, plastic coated, similar to RAL 9006 silver, structural matt

- Aluminium, plastic coated, similar to RAL 9005 black, matt structure

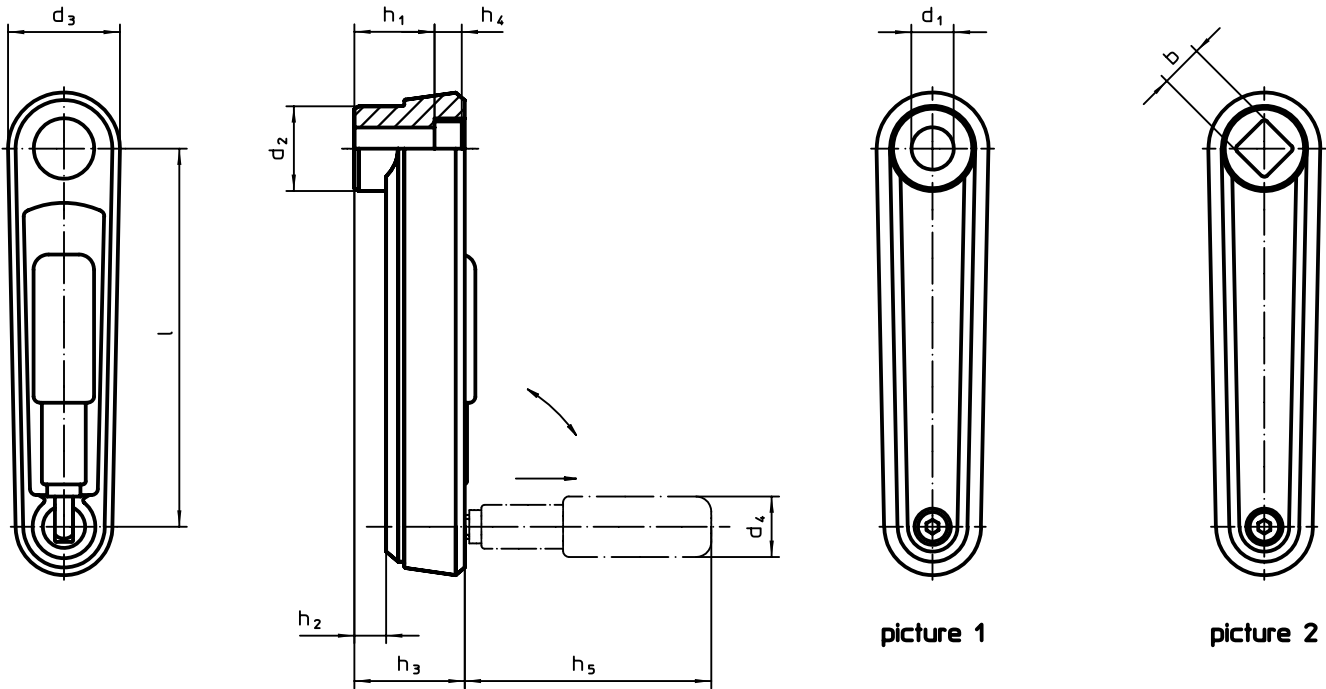
Covering

- Plastic, light grey

Operation

In the operating position the handle is locked. To move the handle to the rest position, it must be pulled out axially and flipped round.

DRAWING



ORDER INFORMATION

l	d ₁ H7	b H11	Dimensions								d ₄ Cylindrical handle ∅	[g]	Art. No.	
			d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	h ₅	silver			black	
[mm]														
with smooth bore – picture 1														
80	10	–	23.0	30	19.5	4.0	25.5	4.3	43.0	16	116	24331.0005	24331.0105	
100	12	–	26.7	35	23.5	5.5	29.5	4.2	57.5	18	172	24331.0010	24331.0110	
125	14	–	28.0	37	30.5	10.5	36.5	4.2	76.5	24	261	24331.0015	24331.0115	
with square shaft – picture 2														
80	–	10	23.0	30	19.5	4.0	25.5	4.3	43.0	16	115	24331.0205	24331.0305	
100	–	12	26.7	35	23.5	5.5	29.5	4.2	57.5	18	170	24331.0210	24331.0310	
125	–	14	28.0	37	30.5	10.5	36.5	4.2	76.5	24	256	24331.0215	24331.0315	

Crank Handles • with folding handle, stainless steel

EH 24331.



PRODUCT DESCRIPTION

Material

Axle part

- Stainless steel 1.4305

Handle

- Thermoplastic, black, dull

Handle body

- Aluminium, plastic coated, similar to RAL 9006 silver, structural matt

- Aluminium, plastic coated, similar to RAL 9005 black, matt structure

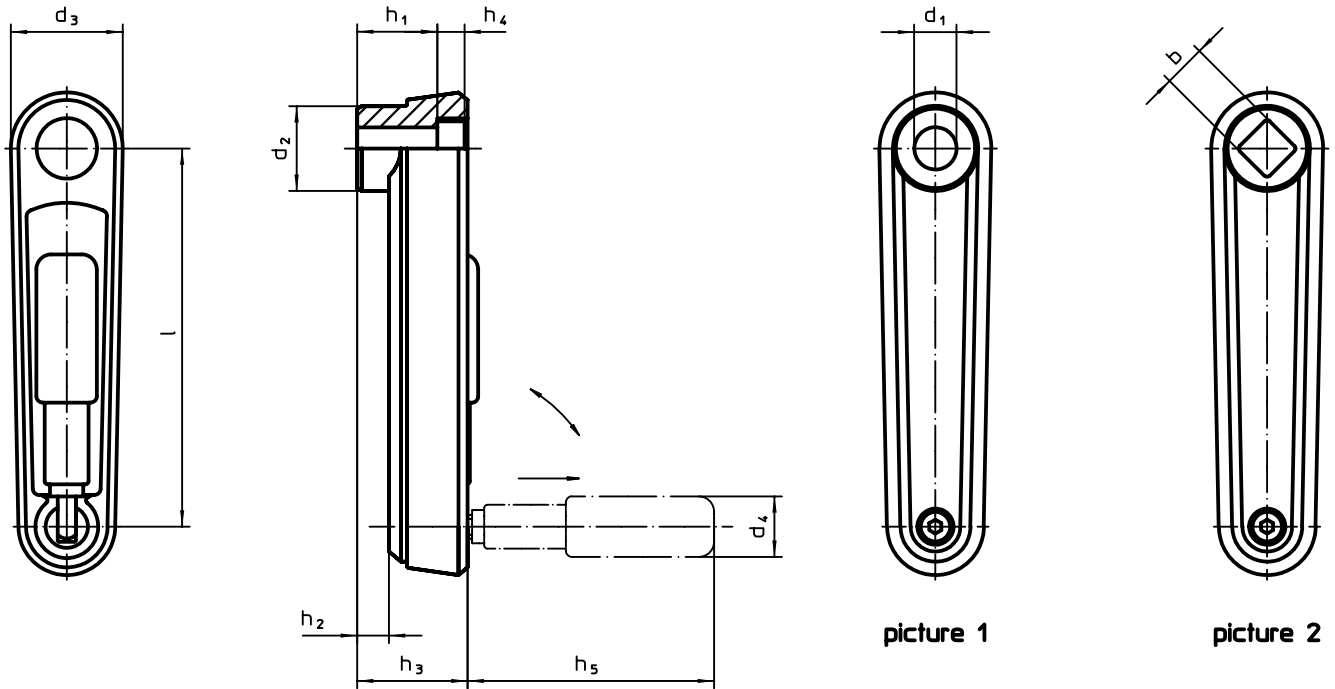
Covering

- Plastic, light grey

Operation

In the operating position the handle is locked. To move the handle to the rest position, it must be pulled out axially and flipped round.

DRAWING



picture 1

picture 2

ORDER INFORMATION

l	d ₁ H7	b H11	Dimensions								d ₄ Cylindrical handle ∅	[g]	Art. No.	
			d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	h ₅	silver			black	
[mm]														
with smooth bore – picture 1														
80	10	–	23.0	30	19.5	4.0	25.5	4.3	43.0	16	119	24331.0405	24331.0505	
100	12	–	26.7	35	23.5	5.5	29.5	4.2	57.5	18	174	24331.0410	24331.0510	
125	14	–	28.0	37	30.5	10.5	36.5	4.2	76.5	24	246	24331.0415	24331.0515	
with square shaft – picture 2														
80	–	10	23.0	30	19.5	4.0	25.5	4.3	43.0	16	117	24331.0605	24331.0705	
100	–	12	26.7	35	23.5	5.5	29.5	4.2	57.5	18	171	24331.0610	24331.0710	
125	–	14	28.0	37	30.5	10.5	36.5	4.2	76.5	24	240	24331.0615	24331.0715	

Gear Lever Handles

EH 24350.



PRODUCT DESCRIPTION

Material

Gear lever handle

- Steel, zinc-plated by galvanization, passivated
- Stainless steel 1.4305, dull blasted

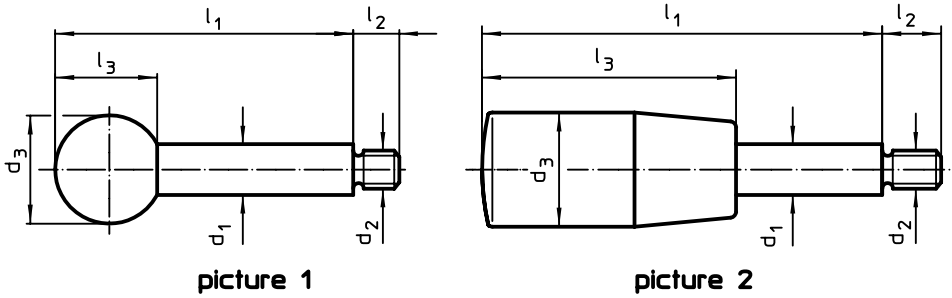
Ball knob

- Thermosetting plastic PF 31, black, DIN 319

Cylindrical handle

- Thermosetting plastic PF 31, black

DRAWING



ORDER INFORMATION

Dimensions						max. [°C]	[g]	Art. No.	
d ₁	l ₁	d ₂	d ₃	l ₂	l ₃			Steel	Stainless steel
[mm]									
with spherical knob – picture 1									
8	63	M 6	20	9	18.0	110	30	24350.0020	24350.0520
	80	M 6	20	9	18.0	110	34	24350.0022	24350.0522
	100	M 6	20	9	18.0	110	39	24350.0024	24350.0524
10	80	M 8	25	11	22.5	110	50	24350.0030	24350.0530
	100	M 8	25	11	22.5	110	62	24350.0032	24350.0532
	125	M 8	25	11	22.5	110	76	24350.0034	24350.0534
12	100	M10	32	14	29.0	110	96	24350.0040	24350.0540
	125	M10	32	14	29.0	110	118	24350.0042	24350.0542
	160	M10	32	14	29.0	110	149	24350.0044	24350.0544
14	125	M12	35	16	32.5	110	157	24350.0050	24350.0550
	160	M12	35	16	32.5	110	203	24350.0052	24350.0552
	200	M12	35	16	32.5	110	251	24350.0054	24350.0554
16	160	M14	40	18	37.0	110	310	24350.0060	–
	200	M14	40	18	37.0	110	326	24350.0062	–
	250	M14	40	18	37.0	110	397	24350.0064	–
with cylindrical handle – picture 2									
8	63	M 6	18	9	40.0	110	26	24350.0120	24350.0620
	80	M 6	18	9	40.0	110	33	24350.0122	24350.0622
	100	M 6	18	9	40.0	110	42	24350.0124	24350.0624
10	80	M 8	21	11	50.0	110	50	24350.0130	24350.0630
	100	M 8	21	11	50.0	110	62	24350.0132	24350.0632
	125	M 8	21	11	50.0	110	78	24350.0134	24350.0634
12	100	M10	23	14	65.0	110	81	24350.0140	24350.0640
	125	M10	23	14	65.0	110	103	24350.0142	24350.0642
	160	M10	23	14	65.0	110	133	24350.0144	24350.0644
14	125	M12	26	16	80.0	110	125	24350.0150	24350.0650
	160	M12	26	16	80.0	110	168	24350.0152	24350.0652
	200	M12	26	16	80.0	110	216	24350.0154	24350.0654
16	160	M14	28	18	90.0	110	214	24350.0160	–
	200	M14	28	18	90.0	110	273	24350.0162	–
	250	M14	28	18	90.0	110	352	24350.0164	–

Adjustable Clamping Levers • inner parts from stainless steel, with female thread

EH 24390.



PRODUCT DESCRIPTION

Adjustable clamping levers with rust-proof inner parts. Suitable for multiple applications, e.g. medical environments, chemical industry, and so on.

Material

Lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Threaded part

- Stainless steel 1.4305

Inner parts

- Stainless steel 1.4305

Operation

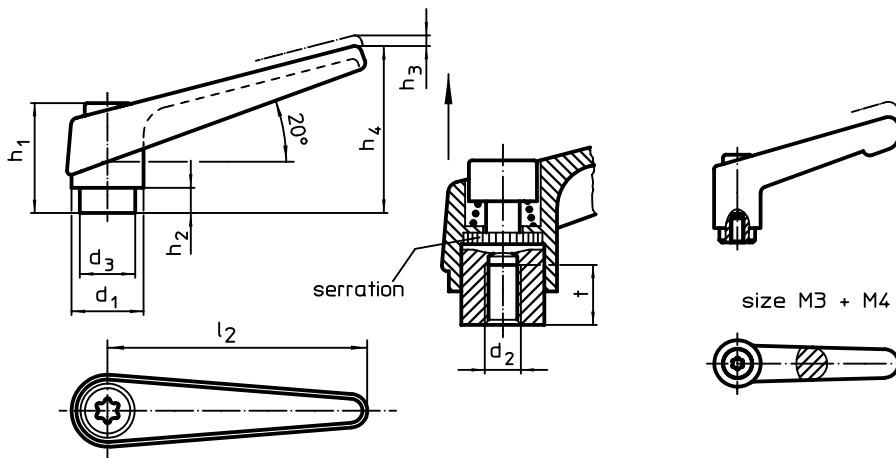
By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

MORE INFORMATION

Notes

The threaded portion can be exchanged.

DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₃	Dimensions						t _≥	[g]	Art. No.	
			h ₁	h ₂	h ₃	h ₄	l ₂	orange			black	
[mm]												
13	M 3	10.0	24.5	4.0	3.5	30.5	30	7	26	24390.0032	24390.0034	
	M 4	10.0	24.5	4.0	3.5	30.5	30	9	25	24390.0036	24390.0038	
14	M 5	10.0	24.5	4.0	3.0	35.0	45	8	33	24390.0111	24390.0114	
	M 6	10.0	24.5	4.0	3.0	35.0	45	8	33	24390.0121	24390.0124	
18	M 8	13.5	31.0	6.5	3.0	45.0	62	10	67	24390.0321	24390.0324	
22	M 8	16.0	36.0	8.0	3.5	52.0	74	14	112	24390.0411	24390.0414	
	M10	16.0	36.0	8.0	3.5	52.0	74	14	109	24390.0421	24390.0424	
25	M10	19.0	43.0	11.0	4.0	63.0	89	17	175	24390.0511	24390.0514	
	M12	19.0	43.0	11.0	4.0	63.0	89	17	171	24390.0521	24390.0524	
30	M12	23.0	50.5	12.0	5.0	76.0	108	22	286	24390.0611	24390.0614	
	M16	23.0	50.5	12.0	5.0	76.0	108	22	269	24390.0621	24390.0624	

Adjustable Clamping Levers • inner parts from stainless steel, with screw
EH 24390.



PRODUCT DESCRIPTION

Adjustable clamping levers with rust-proof inner parts. Suitable for multiple applications, e.g. medical environments, chemical industry, and so on.

Material

Lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Inner parts

- Stainless steel 1.4305

Screw

- Stainless steel 1.4305

Operation

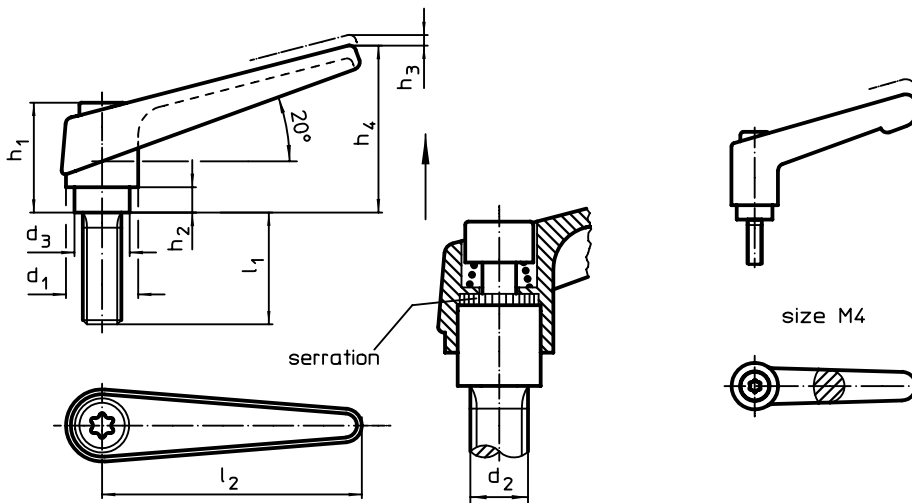
By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

MORE INFORMATION

Notes

The screw part can be exchanged.

DRAWING



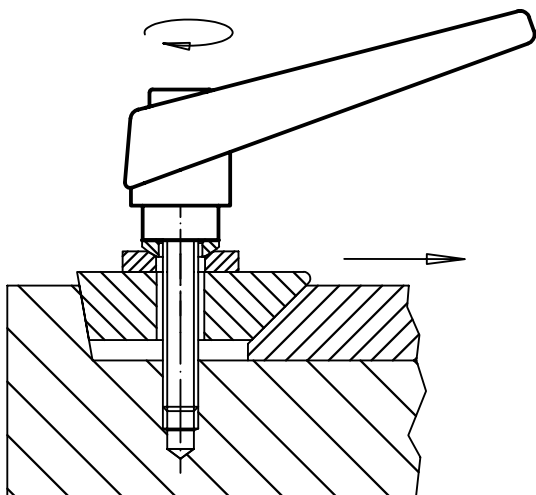
ORDER INFORMATION

d ₁	d ₂	l ₁	d ₃	Dimensions					[g]	Art. No.	
				h ₁	h ₂	h ₃	h ₄	l ₂		orange	black
				[mm]							
13	M 4	12	10.0	24.5	4.0	3.5	30.5	30	27	24390.0010	24390.0012
		16	10.0	24.5	4.0	3.5	30.5	30	30	24390.0014	24390.0016
		20	10.0	24.5	4.0	3.5	30.5	30	28	24390.0018	24390.0020
		25	10.0	24.5	4.0	3.5	30.5	30	28	24390.0022	24390.0024
		32	10.0	24.5	4.0	3.5	30.5	30	29	24390.0026	24390.0028
14	M 5	12	10.0	24.5	4.0	3.0	35.0	45	36	24390.0041	24390.0044
		16	10.0	24.5	4.0	3.0	35.0	45	36	24390.0051	24390.0054
		20	10.0	24.5	4.0	3.0	35.0	45	37	24390.0061	24390.0064
		25	10.0	24.5	4.0	3.0	35.0	45	38	24390.0071	24390.0074
		32	10.0	24.5	4.0	3.0	35.0	45	38	24390.0081	24390.0084
		40	10.0	24.5	4.0	3.0	35.0	45	39	24390.0086	24390.0089
	M 6	12	10.0	24.5	4.0	3.0	35.0	45	37	24390.0131	24390.0134
		16	10.0	24.5	4.0	3.0	35.0	45	37	24390.0141	24390.0144
		20	10.0	24.5	4.0	3.0	35.0	45	38	24390.0151	24390.0154
		25	10.0	24.5	4.0	3.0	35.0	45	39	24390.0161	24390.0164
		32	10.0	24.5	4.0	3.0	35.0	45	40	24390.0171	24390.0174
		40	10.0	24.5	4.0	3.0	35.0	45	41	24390.0181	24390.0184
		50	10.0	24.5	4.0	3.0	35.0	45	43	24390.0191	24390.0194



d ₁	d ₂	Dimensions							[g]	Art. No.	
		l ₁	d ₃	h ₁ [mm]	h ₂	h ₃	h ₄	l ₂		orange	black
18	M 8	16	13.5	31.0	6.5	3.0	45.0	62	74	24390.0331	24390.0334
		20	13.5	31.0	6.5	3.0	45.0	62	76	24390.0341	24390.0344
		25	13.5	31.0	6.5	3.0	45.0	62	77	24390.0351	24390.0354
		32	13.5	31.0	6.5	3.0	45.0	62	79	24390.0361	24390.0364
		40	13.5	31.0	6.5	3.0	45.0	62	81	24390.0371	24390.0374
		50	13.5	31.0	6.5	3.0	45.0	62	84	24390.0381	24390.0384
22	M10	63	13.5	31.0	6.5	3.0	45.0	62	89	24390.0391	24390.0394
		20	16.0	36.0	8.0	3.5	52.0	74	128	24390.0441	24390.0444
		25	16.0	36.0	8.0	3.5	52.0	74	130	24390.0451	24390.0454
		32	16.0	36.0	8.0	3.5	52.0	74	134	24390.0461	24390.0464
		40	16.0	36.0	8.0	3.5	52.0	74	138	24390.0471	24390.0474
		50	16.0	36.0	8.0	3.5	52.0	74	143	24390.0481	24390.0484
25	M12	63	16.0	36.0	8.0	3.5	52.0	74	148	24390.0486	24390.0489
		80	16.0	36.0	8.0	3.5	52.0	74	157	24390.0491	24390.0494
		25	19.0	43.0	11.0	4.0	63.0	89	205	24390.0541	24390.0544
		32	19.0	43.0	11.0	4.0	63.0	89	209	24390.0551	24390.0554
		40	19.0	43.0	11.0	4.0	63.0	89	215	24390.0561	24390.0564
		50	19.0	43.0	11.0	4.0	63.0	89	222	24390.0571	24390.0574
30	M16	63	19.0	43.0	11.0	4.0	63.0	89	232	24390.0581	24390.0584
		80	19.0	43.0	11.0	4.0	63.0	89	240	24390.0591	24390.0594
		32	23.0	50.5	12.0	5.0	76.0	108	348	24390.0641	24390.0644
		40	23.0	50.5	12.0	5.0	76.0	108	357	24390.0651	24390.0654
		50	23.0	50.5	12.0	5.0	76.0	108	370	24390.0661	24390.0664
		63	23.0	50.5	12.0	5.0	76.0	108	386	24390.0671	24390.0674
		80	23.0	50.5	12.0	5.0	76.0	108	407	24390.0681	24390.0684

APPLICATION EXAMPLE



Adjustable Clamping Levers • with female thread

EH 24400.



PRODUCT DESCRIPTION

Adjustable clamping levers find versatile applications when the area of use is confined or a specific lever position is required.

Material

Lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Threaded part

- Steel, blackened, quality 5

Inner parts

- Steel, blackened, quality 5.8

Operation

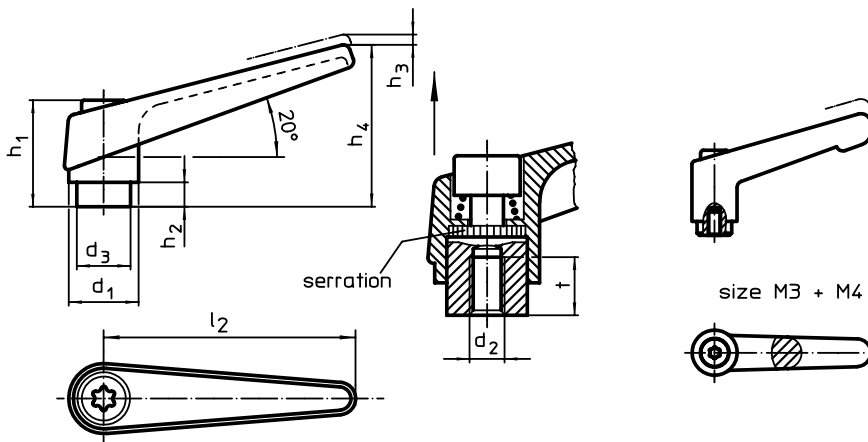
By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

MORE INFORMATION

Notes

The threaded portion can be exchanged.

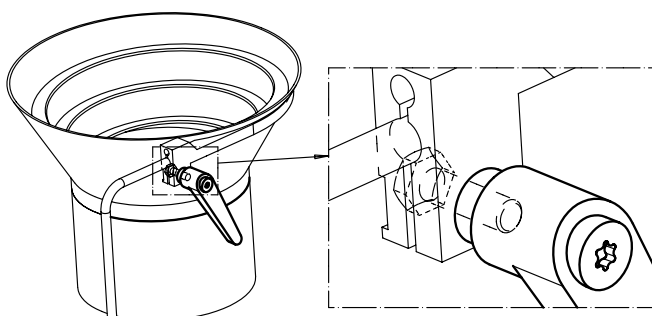
DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₃	Dimensions						l ₂	t	[g]	Art. No.		
			h ₁	h ₂	h ₃	h ₄	orange	silver				black		
[mm]														
13	M 3	10.0	24.5	4.0	3.5	30.5	30	7	26	24400.0032	–	24400.0034		
	M 4	10.0	24.5	4.0	3.5	30.5	30	9	25	24400.0036	–	24400.0038		
14	M 5	10.0	24.5	4.0	3.0	35.0	45	8	33	24400.0111	24400.0113	24400.0114		
	M 6	10.0	24.5	4.0	3.0	35.0	45	8	33	24400.0121	24400.0123	24400.0124		
18	M 6	13.5	31.0	6.5	3.0	45.0	62	10	67	24400.0311	24400.0313	24400.0314		
	M 8	13.5	31.0	6.5	3.0	45.0	62	10	71	24400.0321	24400.0323	24400.0324		
22	M 8	16.0	36.0	8.0	3.5	52.0	74	14	112	24400.0411	24400.0413	24400.0414		
	M10	16.0	36.0	8.0	3.5	52.0	74	14	109	24400.0421	24400.0423	24400.0424		
25	M10	19.0	43.0	11.0	4.0	63.0	89	17	176	24400.0511	24400.0513	24400.0514		
	M12	19.0	43.0	11.0	4.0	63.0	89	17	171	24400.0521	24400.0523	24400.0524		
30	M12	23.0	50.5	12.0	5.0	76.0	108	22	286	24400.0611	24400.0613	24400.0614		
	M16	23.0	50.5	12.0	5.0	76.0	108	22	269	24400.0621	24400.0623	24400.0624		

APPLICATION EXAMPLE



Adjustable Clamping Levers • with screw

EH 24400.



PRODUCT DESCRIPTION

Adjustable clamping levers find versatile applications when the area of use is confined or a specific lever position is required.

Material

Lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Inner parts

- Steel, blackened, quality 5.8

Screw

- Steel, blackened, quality 5.8

Operation

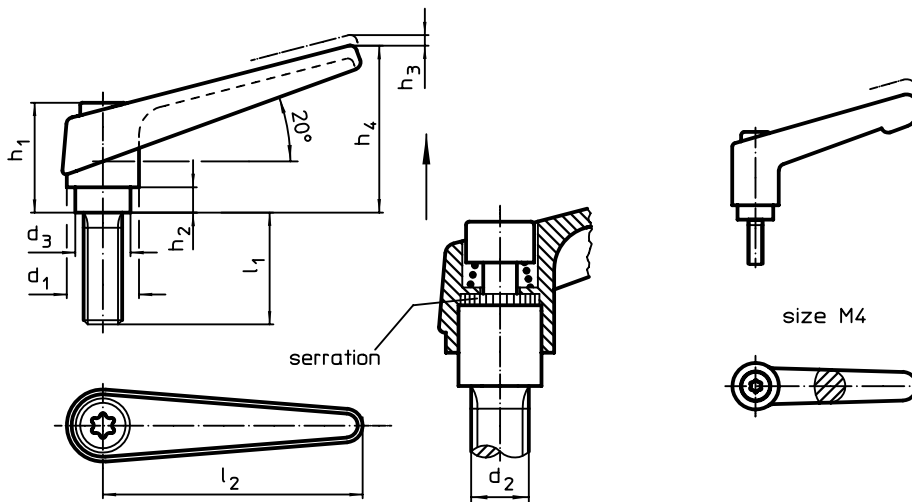
By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

MORE INFORMATION

Notes

The screw part can be exchanged.

DRAWING



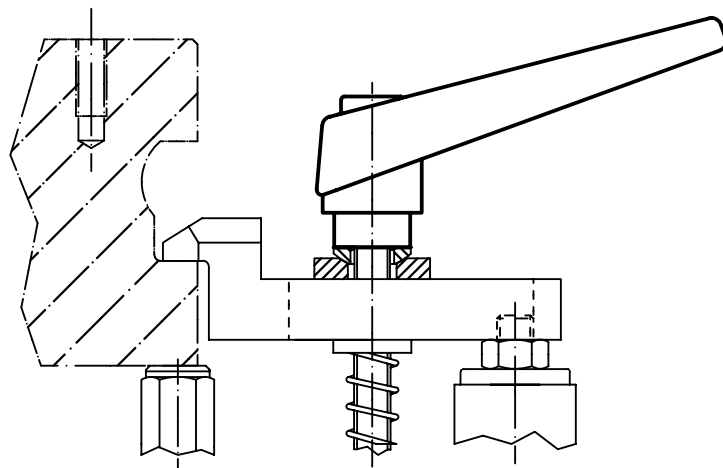
ORDER INFORMATION

d_1	d_2	l_1	d_3	Dimensions					[g]	Art. No.		
				h_1	h_2	h_3	h_4	l_2		orange	silver	black
[mm]												
13	M 4	12	10.0	24.5	4.0	3.5	30.5	30	27	24400.0010	–	24400.0012
		16	10.0	24.5	4.0	3.5	30.5	30	27	24400.0014	–	24400.0016
		20	10.0	24.5	4.0	3.5	30.5	30	28	24400.0018	–	24400.0020
		25	10.0	24.5	4.0	3.5	30.5	30	28	24400.0022	–	24400.0024
		32	10.0	24.5	4.0	3.5	30.5	30	28	24400.0026	–	24400.0028
14	M 5	12	10.0	24.5	4.0	3.0	35.0	45	36	24400.0041	24400.0043	24400.0044
		16	10.0	24.5	4.0	3.0	35.0	45	36	24400.0051	24400.0053	24400.0054
		20	10.0	24.5	4.0	3.0	35.0	45	37	24400.0061	24400.0063	24400.0064
		25	10.0	24.5	4.0	3.0	35.0	45	38	24400.0071	24400.0073	24400.0074
		32	10.0	24.5	4.0	3.0	35.0	45	38	24400.0081	24400.0083	24400.0084
	M 6	40	10.0	24.5	4.0	3.0	35.0	45	39	24400.0086	24400.0088	24400.0089
		12	10.0	24.5	4.0	3.0	35.0	45	37	24400.0131	24400.0133	24400.0134
		16	10.0	24.5	4.0	3.0	35.0	45	37	24400.0141	24400.0143	24400.0144
		20	10.0	24.5	4.0	3.0	35.0	45	39	24400.0151	24400.0153	24400.0154
		25	10.0	24.5	4.0	3.0	35.0	45	41	24400.0161	24400.0163	24400.0164
		32	10.0	24.5	4.0	3.0	35.0	45	40	24400.0171	24400.0173	24400.0174
		40	10.0	24.5	4.0	3.0	35.0	45	41	24400.0181	24400.0183	24400.0184
		50	10.0	24.5	4.0	3.0	35.0	45	43	24400.0191	24400.0193	24400.0194



d ₁	d ₂	l ₁	Dimensions						[g]	Art. No.			
			d ₃	h ₁	h ₂	h ₃	h ₄	l ₂		orange	silver	black	
											[mm]		
18	M 6	16	13.5	31.0	6.5	3.0	45.0	62	72	24400.0221	24400.0223	24400.0224	
		20	13.5	31.0	6.5	3.0	45.0	62	72	24400.0231	24400.0233	24400.0234	
		25	13.5	31.0	6.5	3.0	45.0	62	74	24400.0241	24400.0243	24400.0244	
		32	13.5	31.0	6.5	3.0	45.0	62	74	24400.0251	24400.0253	24400.0254	
		40	13.5	31.0	6.5	3.0	45.0	62	76	24400.0261	24400.0263	24400.0264	
		50	13.5	31.0	6.5	3.0	45.0	62	76	24400.0271	24400.0273	24400.0274	
		63	13.5	31.0	6.5	3.0	45.0	62	80	24400.0281	24400.0283	24400.0284	
	M 8	16	13.5	31.0	6.5	3.0	45.0	62	74	24400.0331	24400.0333	24400.0334	
		20	13.5	31.0	6.5	3.0	45.0	62	76	24400.0341	24400.0343	24400.0344	
		25	13.5	31.0	6.5	3.0	45.0	62	86	24400.0351	24400.0353	24400.0354	
		32	13.5	31.0	6.5	3.0	45.0	62	86	24400.0361	24400.0363	24400.0364	
		40	13.5	31.0	6.5	3.0	45.0	62	88	24400.0371	24400.0373	24400.0374	
		50	13.5	31.0	6.5	3.0	45.0	62	89	24400.0381	24400.0383	24400.0384	
		63	13.5	31.0	6.5	3.0	45.0	62	96	24400.0391	24400.0393	24400.0394	
22	M10	20	16.0	36.0	8.0	3.5	52.0	74	128	24400.0441	24400.0443	24400.0444	
		25	16.0	36.0	8.0	3.5	52.0	74	130	24400.0451	24400.0453	24400.0454	
		32	16.0	36.0	8.0	3.5	52.0	74	134	24400.0461	24400.0463	24400.0464	
		40	16.0	36.0	8.0	3.5	52.0	74	138	24400.0471	24400.0473	24400.0474	
		50	16.0	36.0	8.0	3.5	52.0	74	143	24400.0481	24400.0483	24400.0484	
		63	16.0	36.0	8.0	3.5	52.0	74	152	24400.0486	24400.0488	24400.0489	
		80	16.0	36.0	8.0	3.5	52.0	74	166	24400.0491	24400.0493	24400.0494	
25	M12	25	19.0	43.0	11.0	4.0	63.0	89	205	24400.0541	24400.0543	24400.0544	
		32	19.0	43.0	11.0	4.0	63.0	89	209	24400.0551	24400.0553	24400.0554	
		40	19.0	43.0	11.0	4.0	63.0	89	215	24400.0561	24400.0563	24400.0564	
		50	19.0	43.0	11.0	4.0	63.0	89	222	24400.0571	24400.0573	24400.0574	
		63	19.0	43.0	11.0	4.0	63.0	89	232	24400.0581	24400.0583	24400.0584	
		80	19.0	43.0	11.0	4.0	63.0	89	244	24400.0591	24400.0593	24400.0594	
30	M16	32	23.0	50.5	12.0	5.0	76.0	108	348	24400.0641	24400.0643	24400.0644	
		40	23.0	50.5	12.0	5.0	76.0	108	357	24400.0651	24400.0653	24400.0654	
		50	23.0	50.5	12.0	5.0	76.0	108	370	24400.0661	24400.0663	24400.0664	
		63	23.0	50.5	12.0	5.0	76.0	108	386	24400.0671	24400.0673	24400.0674	
		80	23.0	50.5	12.0	5.0	76.0	108	407	24400.0681	24400.0683	24400.0684	

APPLICATION EXAMPLE



Adjustable Clamping Levers • with clamping screw

EH 24410.



PRODUCT DESCRIPTION

Adjustable clamping levers find versatile applications when the area of use is confined or a specific lever position is required.

Material

Lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Inner parts

- Steel, blackened, quality 5.8

Screw

- Steel, blackened, quality 5.8

Operation

By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

MORE INFORMATION

Notes

The screw part can be exchanged.

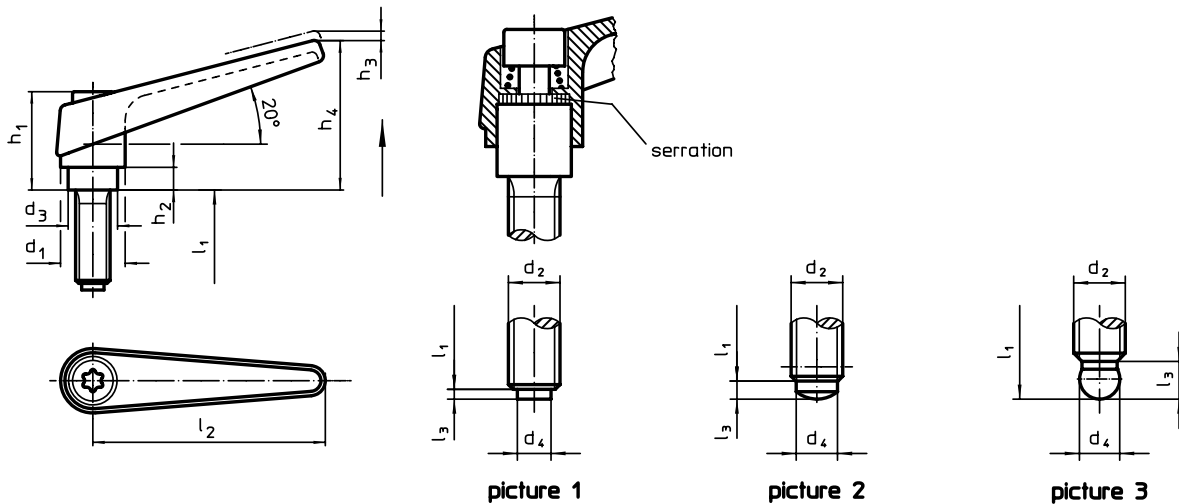
References

The version with ball-headed (picture 3) can be combined with the thrust piece, plastic (EH 22570.).

Further products

Thrust Pads, plastic. → p. 283

DRAWING



ORDER INFORMATION

	d ₁	d ₂	l ₁	d ₃	Dimensions						[g]	Art. No.		
					d ₄	h ₁	h ₂	h ₃	h ₄	l ₂		l ₃	orange	silver
[mm]														
with plastic thrust pin – picture 1														
14	M 6	16	10.0	4.0	24.5	4.0	3	35	45	1.0	40	24410.0141	24410.0143	24410.0144
		20	10.0	4.0	24.5	4.0	3	35	45	1.0	38	24410.0151	24410.0153	24410.0154
		25	10.0	4.0	24.5	4.0	3	35	45	1.0	38	24410.0161	24410.0163	24410.0164
		32	10.0	4.0	24.5	4.0	3	35	45	1.0	40	24410.0171	24410.0173	24410.0174
		40	10.0	4.0	24.5	4.0	3	35	45	1.0	41	24410.0181	24410.0183	24410.0184
		50	10.0	4.0	24.5	4.0	3	35	45	1.0	45	24410.0191	24410.0193	24410.0194
18	M 8	20	13.5	6.0	31.0	6.5	3	45	62	1.0	81	24410.0341	24410.0343	24410.0344
		25	13.5	6.0	31.0	6.5	3	45	62	1.0	80	24410.0351	24410.0353	24410.0354
		32	13.5	6.0	31.0	6.5	3	45	62	1.0	86	24410.0361	24410.0363	24410.0364
		40	13.5	6.0	31.0	6.5	3	45	62	1.0	81	24410.0371	24410.0373	24410.0374
		50	13.5	6.0	31.0	6.5	3	45	62	1.0	84	24410.0381	24410.0383	24410.0384
		63	13.5	6.0	31.0	6.5	3	45	62	1.0	95	24410.0391	24410.0393	24410.0394
18	M10	20	13.5	8.0	31.0	6.5	3	45	62	2.0	128	24410.0441	24410.0443	24410.0444
		25	13.5	8.0	31.0	6.5	3	45	62	2.0	130	24410.0451	24410.0453	24410.0454
		32	13.5	8.0	31.0	6.5	3	45	62	2.0	134	24410.0461	24410.0463	24410.0464
		40	13.5	8.0	31.0	6.5	3	45	62	2.0	94	24410.0471	24410.0473	24410.0474
		50	13.5	8.0	31.0	6.5	3	45	62	2.0	100	24410.0481	24410.0483	24410.0484
		63	13.5	8.0	31.0	6.5	3	45	62	2.0	148	24410.0491	24410.0493	24410.0494



		Dimensions										[g]	Art. No.		
d ₁	d ₂	l ₁	d ₃	d ₄	h ₁	h ₂	h ₃	h ₄	l ₂	l ₃	orange		silver	black	
		[mm]													
with brass thrust pin – picture 1															
14	M 6	16	10.0	3.5	24.5	4.0	3	35	45	1.3	36	24410.1141	24410.1143	24410.1144	
		20	10.0	3.5	24.5	4.0	3	35	45	1.3	37	24410.1151	24410.1153	24410.1154	
		25	10.0	3.5	24.5	4.0	3	35	45	1.3	44	24410.1161	24410.1163	24410.1164	
		32	10.0	3.5	24.5	4.0	3	35	45	1.3	45	24410.1171	24410.1173	24410.1174	
		40	10.0	3.5	24.5	4.0	3	35	45	1.3	40	24410.1181	24410.1183	24410.1184	
18	M 8	50	10.0	3.5	24.5	4.0	3	35	45	1.3	42	24410.1191	24410.1193	24410.1194	
		20	13.5	5.0	31.0	6.5	3	45	62	1.3	83	24410.1341	24410.1343	24410.1344	
		25	13.5	5.0	31.0	6.5	3	45	62	1.3	76	24410.1351	24410.1353	24410.1354	
		32	13.5	5.0	31.0	6.5	3	45	62	1.3	78	24410.1361	24410.1363	24410.1364	
		40	13.5	5.0	31.0	6.5	3	45	62	1.3	80	24410.1371	24410.1373	24410.1374	
	M 10	50	13.5	5.0	31.0	6.5	3	45	62	1.3	91	24410.1381	24410.1383	24410.1384	
		63	13.5	5.0	31.0	6.5	3	45	62	1.3	88	24410.1391	24410.1393	24410.1394	
		20	13.5	6.5	31.0	6.5	3	45	62	1.9	127	24410.1441	24410.1443	24410.1444	
		25	13.5	6.5	31.0	6.5	3	45	62	1.9	129	24410.1451	24410.1453	24410.1454	
		32	13.5	6.5	31.0	6.5	3	45	62	1.9	133	24410.1461	24410.1463	24410.1464	
		40	13.5	6.5	31.0	6.5	3	45	62	1.9	137	24410.1471	24410.1473	24410.1474	
		50	13.5	6.5	31.0	6.5	3	45	62	1.9	142	24410.1481	24410.1483	24410.1484	
		63	13.5	6.5	31.0	6.5	3	45	62	1.9	147	24410.1491	24410.1493	24410.1494	
with thrust pin – picture 2															
14	M 6	16	10.0	4.0	24.5	4.0	3	35	45	1.8	39	24410.2141	24410.2143	24410.2144	
		20	10.0	4.0	24.5	4.0	3	35	45	1.8	40	24410.2151	24410.2153	24410.2154	
		25	10.0	4.0	24.5	4.0	3	35	45	1.8	41	24410.2161	24410.2163	24410.2164	
		32	10.0	4.0	24.5	4.0	3	35	45	1.8	42	24410.2171	24410.2173	24410.2174	
		40	10.0	4.0	24.5	4.0	3	35	45	1.8	43	24410.2181	24410.2183	24410.2184	
18	M 8	50	10.0	4.0	24.5	4.0	3	35	45	1.8	45	24410.2191	24410.2193	24410.2194	
		20	13.5	6.0	31.0	6.5	3	45	62	1.8	78	24410.2341	24410.2343	24410.2344	
		25	13.5	6.0	31.0	6.5	3	45	62	1.8	79	24410.2351	24410.2353	24410.2354	
		32	13.5	6.0	31.0	6.5	3	45	62	1.8	81	24410.2361	24410.2363	24410.2364	
		40	13.5	6.0	31.0	6.5	3	45	62	1.8	83	24410.2371	24410.2373	24410.2374	
	M 10	50	13.5	6.0	31.0	6.5	3	45	62	1.8	86	24410.2381	24410.2383	24410.2384	
		63	13.5	6.0	31.0	6.5	3	45	62	1.8	91	24410.2391	24410.2393	24410.2394	
		20	13.5	8.0	31.0	6.5	3	45	62	3.5	80	24410.2441	24410.2443	24410.2444	
		25	13.5	8.0	31.0	6.5	3	45	62	3.5	132	24410.2451	24410.2453	24410.2454	
		32	13.5	8.0	31.0	6.5	3	45	62	3.5	136	24410.2461	24410.2463	24410.2464	
		40	13.5	8.0	31.0	6.5	3	45	62	3.5	140	24410.2471	24410.2473	24410.2474	
		50	13.5	8.0	31.0	6.5	3	45	62	3.5	145	24410.2481	24410.2483	24410.2484	
		63	13.5	8.0	31.0	6.5	3	45	62	3.5	150	24410.2491	24410.2493	24410.2494	
ball-headed – picture 3															
14	M 6	16	10.0	4.5 +0.05	24.5	4.0	3	35	45	3.6	35	24410.3141	24410.3143	24410.3144	
		20	10.0	4.5 +0.05	24.5	4.0	3	35	45	3.6	36	24410.3151	24410.3153	24410.3154	
		25	10.0	4.5 +0.05	24.5	4.0	3	35	45	3.6	37	24410.3161	24410.3163	24410.3164	
		32	10.0	4.5 +0.05	24.5	4.0	3	35	45	3.6	38	24410.3171	24410.3173	24410.3174	
		40	10.0	4.5 +0.05	24.5	4.0	3	35	45	3.6	39	24410.3181	24410.3183	24410.3184	
18	M 8	50	10.0	4.5 +0.05	24.5	4.0	3	35	45	3.6	41	24410.3191	24410.3193	24410.3194	
		20	13.5	6.1 +0.05	31.0	6.5	3	45	62	3.6	74	24410.3341	24410.3343	24410.3344	
		25	13.5	6.1 +0.05	31.0	6.5	3	45	62	3.6	75	24410.3351	24410.3353	24410.3354	
		32	13.5	6.1 +0.05	31.0	6.5	3	45	62	3.6	77	24410.3361	24410.3363	24410.3364	
		40	13.5	6.1 +0.05	31.0	6.5	3	45	62	3.6	90	24410.3371	24410.3373	24410.3374	
	M 10	50	13.5	6.1 +0.05	31.0	6.5	3	45	62	3.6	82	24410.3381	24410.3383	24410.3384	
		63	13.5	6.1 +0.05	31.0	6.5	3	45	62	3.6	87	24410.3391	24410.3393	24410.3394	
		20	13.5	7.8 +0.05	31.0	6.5	3	45	62	4.3	126	24410.3441	24410.3443	24410.3444	
		25	13.5	7.8 +0.05	31.0	6.5	3	45	62	4.3	128	24410.3451	24410.3453	24410.3454	
		32	13.5	7.8 +0.05	31.0	6.5	3	45	62	4.3	132	24410.3461	24410.3463	24410.3464	
		40	13.5	7.8 +0.05	31.0	6.5	3	45	62	4.3	136	24410.3471	24410.3473	24410.3474	
		50	13.5	7.8 +0.05	31.0	6.5	3	45	62	4.3	141	24410.3481	24410.3483	24410.3484	
		63	13.5	7.8 +0.05	31.0	6.5	3	45	62	4.3	146	24410.3491	24410.3493	24410.3494	

Adjustable Clamping Levers • with axial bearing

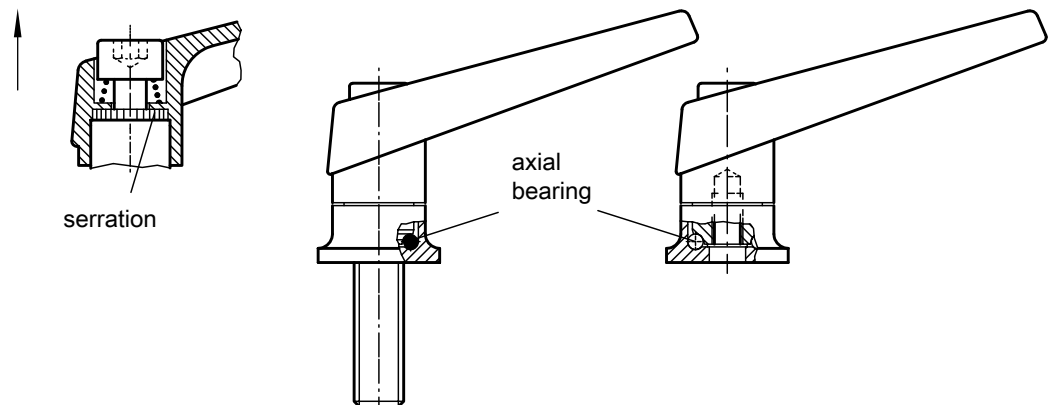
EH 24420.

TWICE THE CLAMPING FORCE AT THE SAME HAND FORCE

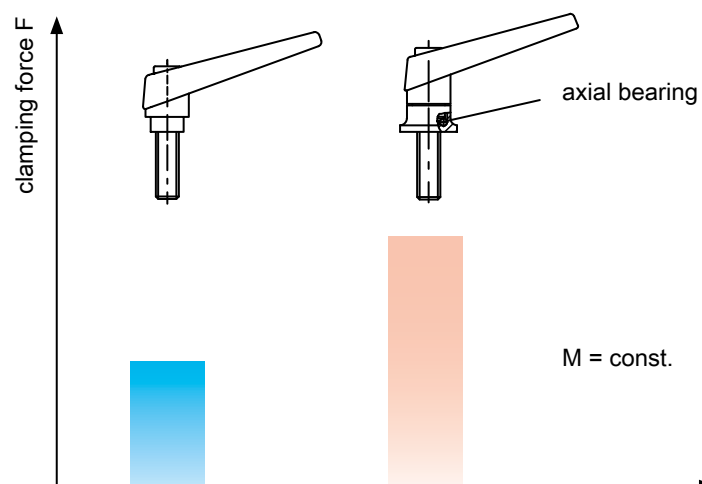
Tests have proven that vital advantages can be achieved when using clamping levers with integrated axial thrust bearing

ADVANTAGES

- The clamping force is greater in comparison to the clamping levers, by up to 100% (please refer to diagram) using the same amount of strength.
- Screwed connections can be replaced with clamping connections for technical applications.
- Smaller clamping levers can be used because of the improved clamping force, thus reducing the necessary construction space.
- Considerably less force loss due to settling; no releasing due to vibrations.
- Non-damaging to clamped parts due to the rotating bearing surface.



Increase of clamping force with axial bearing
(while manual force is unchanged)



Adjustable Clamping Levers • with axial bearing, with female thread
EH 24420.



PRODUCT DESCRIPTION

Adjustable clamping levers find versatile applications when the area of use is confined or a specific lever position is required.

Advantages of axial bearing:

- Double clamping force with same lever size, by reducing the surface friction.
- Protection of workpiece by a fixed locating surface.
- Little setting due to higher pre-clamping force of bolt, e.g. thread.

Material

Lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Threaded part

- Steel, nitrided, blackened

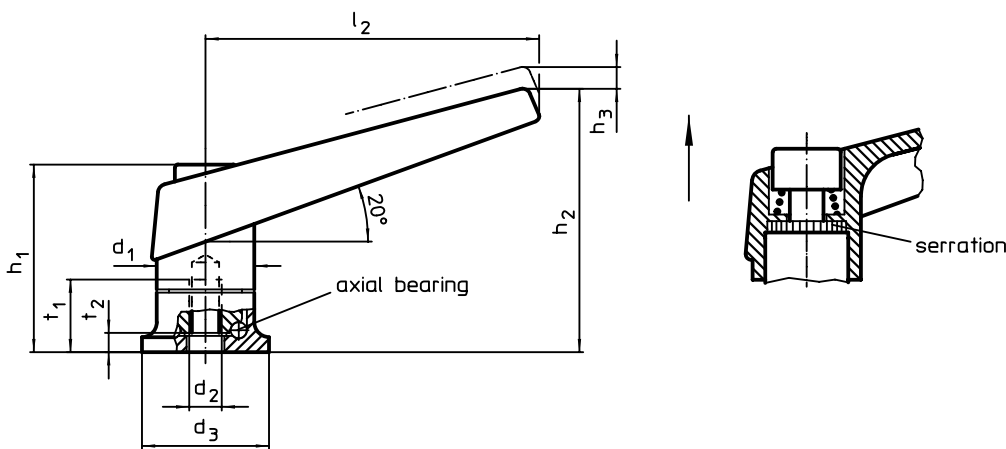
Inner parts

- Steel, nitrided, blackened

Operation

By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

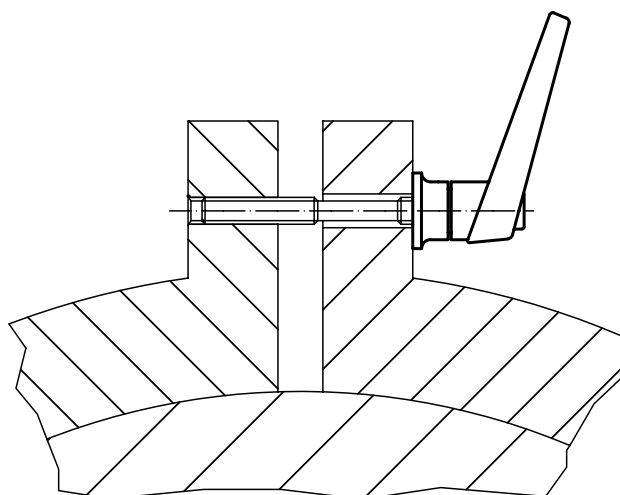
DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₃	Dimensions						[g]	Art. No.	
			h ₁	h ₂	h ₃	l ₂	t ₁ min.	t ₂		orange	black
[mm]											
18	M 6	24	34.5	50	3.0	62	12.5	5.0	91	24420.0010	24420.0012
22	M 8	25	39.5	56	3.5	74	14.0	4.2	138	24420.0110	24420.0112
25	M10	30	46.5	66	4.0	89	18.0	5.4	205	24420.0210	24420.0212
30	M12	35	56.5	82	5.0	108	26.5	6.6	358	24420.0310	24420.0312

APPLICATION EXAMPLE



Adjustable Clamping Levers • with axial bearing, with screw

EH 24420.



PRODUCT DESCRIPTION

Adjustable clamping levers find versatile applications when the area of use is confined or a specific lever position is required.

Advantages of axial bearing:

- Double clamping force with same lever size, by reducing the surface friction.
- Protection of workpiece by a fixed locating surface.
- Little setting due to higher pre-clamping force of bolt, e.g. thread.

Material

Lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Inner parts

- Steel, nitrided, blackened

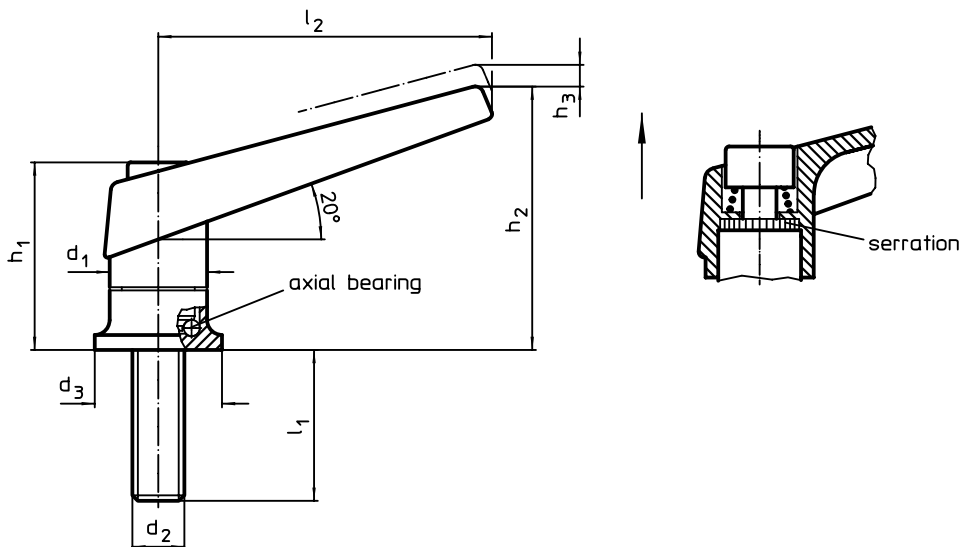
Screw

- Steel, nitrided, blackened

Operation

By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

DRAWING



ORDER INFORMATION

d ₁	d ₂	l ₁	Dimensions					[g]	Art. No.	
			d ₃	h ₁	h ₂	h ₃	l ₂		orange	black
18	M 6	20	24	34.5	50	3.0	62	91	24420.0030	24420.0032
		27	24	34.5	50	3.0	62	98	24420.0050	24420.0052
22	M 8	21	25	39.5	56	3.5	74	151	24420.0130	24420.0132
		36	25	39.5	56	3.5	74	154	24420.0150	24420.0152
25	M10	29	30	46.5	66	4.0	89	230	24420.0230	24420.0232
		47	30	46.5	66	4.0	89	239	24420.0250	24420.0252
30	M12	34	35	56.5	82	5.0	108	407	24420.0330	24420.0332
		50	35	56.5	82	5.0	108	418	24420.0346	24420.0348
		57	35	56.5	82	5.0	108	425	24420.0350	24420.0352
		65	35	56.5	82	5.0	108	429	24420.0364	24420.0366
		85	35	56.5	82	5.0	108	444	24420.0384	24420.0386

Adjustable Clamping Levers • with axial bearing from stainless steel, with female thread
EH 24420.



PRODUCT DESCRIPTION

Adjustable clamping levers with rust-proof inner parts. Suitable for multiple applications, e.g. medical environments, chemical industry, and so on.

Advantages of axial bearing:

- Double clamping force with same lever size, by reducing the surface friction.
- Protection of workpiece by a fixed locating surface.
- Little setting due to higher pre-clamping force of bolt, e.g. thread.

Material

Lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Threaded part

- Stainless steel

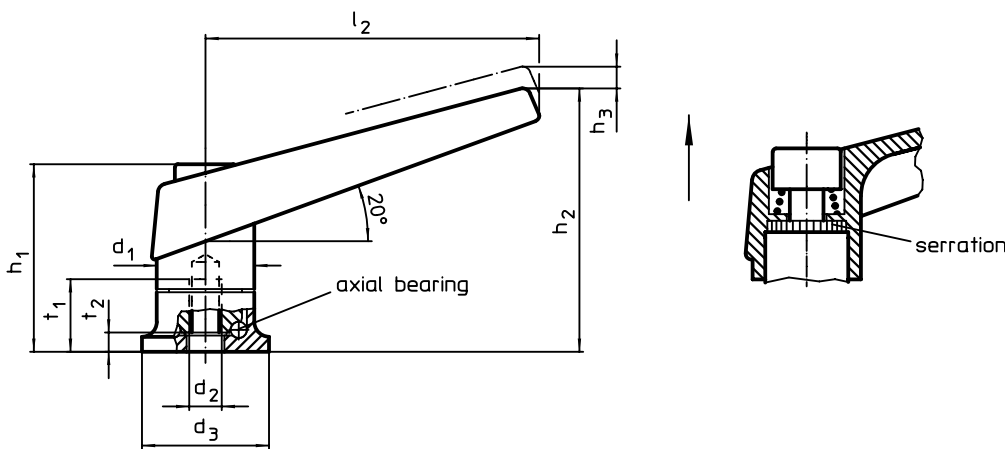
Inner parts

- Stainless steel

Operation

By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

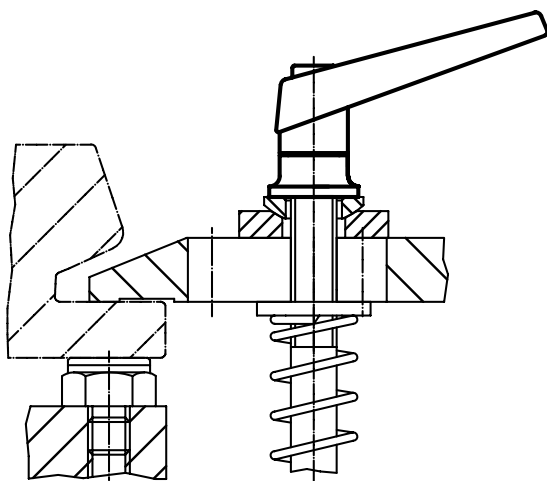
DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₃	Dimensions						t ₁ min.	t ₂	[g]	Art. No.	
			h ₁	h ₂	h ₃	l ₂	orange	black					
[mm]													
18	M 6	24	34.5	50	3.0	62	12.5	5.0	92	24420.1010	24420.1012		
22	M 8	25	39.5	56	3.5	74	14.0	4.2	135	24420.1110	24420.1112		
25	M10	30	46.5	66	4.0	89	18.0	5.4	204	24420.1210	24420.1212		
30	M12	35	56.5	82	5.0	108	26.5	6.6	359	24420.1310	24420.1312		

APPLICATION EXAMPLE



Adjustable Clamping Levers • with axial bearing from stainless steel, with screw

EH 24420.



PRODUCT DESCRIPTION

Adjustable clamping levers with rust-proof inner parts. Suitable for multiple applications, e.g. medical environments, chemical industry, and so on.

Advantages of axial bearing:

- Double clamping force with same lever size, by reducing the surface friction.
- Protection of workpiece by a fixed locating surface.
- Little setting due to higher pre-clamping force of bolt, e.g. thread.

Material

Lever

- Zinc die-cast, plastic coated, orange similar to RAL 2004, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Inner parts

- Stainless steel

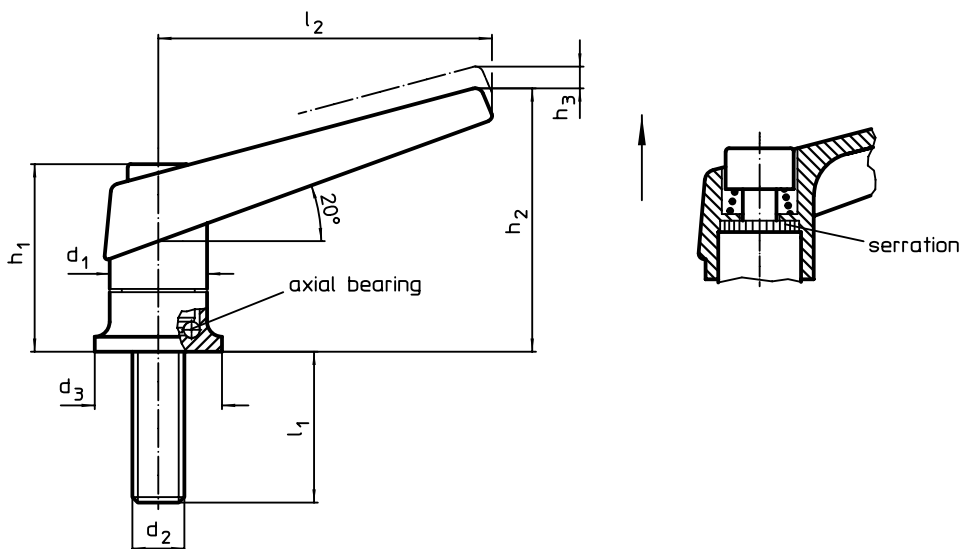
Screw

- Stainless steel

Operation

By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions						[g]	Art. No.	
		l ₁	d ₃	h ₁	h ₂	h ₃	l ₂		orange	black
18	M 6	20	24	34.5	50	3.0	62	96	24420.1030	24420.1032
		27	24	34.5	50	3.0	62	99	24420.1050	24420.1052
22	M 8	21	25	39.5	56	3.5	74	148	24420.1130	24420.1132
		36	25	39.5	56	3.5	74	152	24420.1150	24420.1152
25	M10	29	30	46.5	66	4.0	89	227	24420.1230	24420.1232
		47	30	46.5	66	4.0	89	239	24420.1250	24420.1252
30	M12	34	35	56.5	82	5.0	108	404	24420.1330	24420.1332
		50	35	56.5	82	5.0	108	419	24420.1346	24420.1348
		57	35	56.5	82	5.0	108	420	24420.1350	24420.1352
		65	35	56.5	82	5.0	108	430	24420.1364	24420.1366
		85	35	56.5	82	5.0	108	444	24420.1384	24420.1386



PRODUCT DESCRIPTION

Material

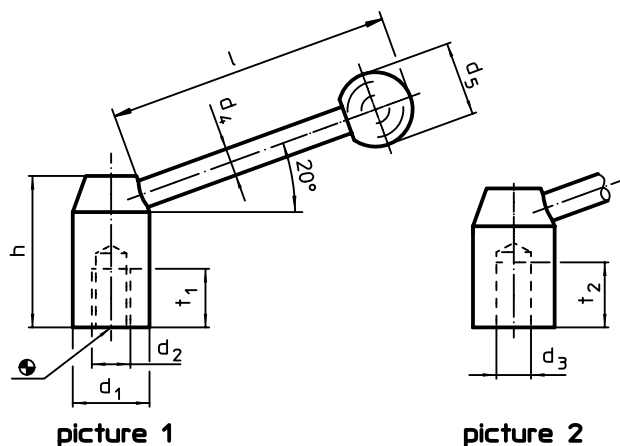
Lever

- Steel, blackened
- Stainless steel 1.4305, dull blasted

Ball knob

- Thermosetting plastic PF 31, black, DIN 319

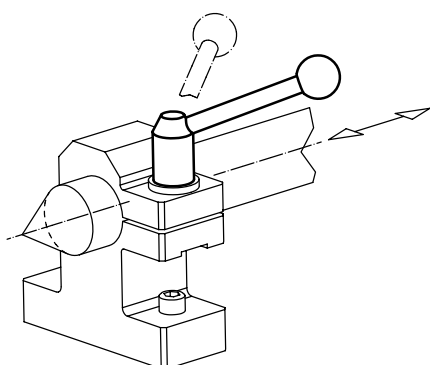
DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₃ H7	d ₄	Dimensions					[g]	Art. No.		
				d ₅	h	l	t ₁	t ₂		Steel	Stainless steel	
[mm]												
with female thread – picture 1												
20	M 8	–	8	20	33	67	15	–	97	24430.0022	–	
22	M 8	–	8	20	37	85	15	–	121	–	24430.0230	
	M10	–	8	20	37	85	15	–	115	24430.0032	–	
25	M10	–	10	25	42	95	18	–	186	–	24430.0236	
	M12	–	10	25	42	95	18	–	165	24430.0038	–	
28	M12	–	12	30	47	108	18	–	262	24430.0042	24430.0242	
32	M16	–	12	32	52	126	23	–	354	24430.0048	24430.0248	
36	M16	–	14	35	58	138	24	–	519	24430.0052	–	
40	M20	–	16	40	64	154	27	–	708	24430.0058	–	
with smooth bore – picture 2												
20	–	10	8	20	33	67	–	16	85	24430.0020	–	
22	–	10	8	20	37	85	–	19	113	24430.0030	–	
25	–	12	10	25	42	95	–	21	170	24430.0035	–	
28	–	12	12	30	47	108	–	23	268	24430.0040	–	
32	–	16	12	32	52	126	–	28	351	24430.0045	–	
36	–	16	14	35	58	138	–	28	524	24430.0050	–	
40	–	20	16	40	64	154	–	30	706	24430.0055	–	

APPLICATION EXAMPLE



Adjustable Tension Levers

EH 24440.



PRODUCT DESCRIPTION

Material

Lever

- Steel, blackened
- Stainless steel 1.4305, dull blasted

Inner parts

- Steel, blackened, quality 5.8
- Stainless steel 1.4305, dull blasted

Screw

- Steel, blackened, quality 5.8
- Stainless steel 1.4305

Ball knob

- Thermosetting plastic PF 31, black, DIN 319

Operation

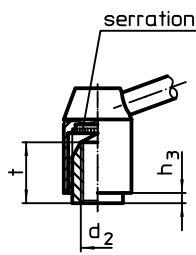
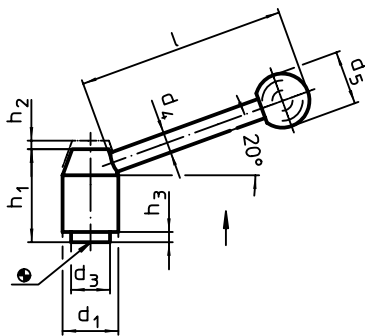
By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

MORE INFORMATION

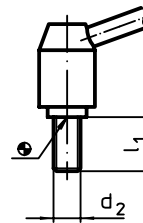
Notes

The threaded portion can be exchanged.

DRAWING



picture 1




picture 2

ORDER INFORMATION

d ₁	d ₂	l ₁	d ₃	d ₄	Dimensions						t min.	[g]	Art. No.		
					d ₅	h ₁	h ₂	h ₃	l ~	Steel			Stainless steel		
[mm]															
with female thread – picture 1															
21	M 6	–	13.5	8	20	33.5	4.0	1.0	70	11	91	24440.0101	24440.0601		
	M 8	–	13.5	8	20	33.5	4.0	1.0	70	11	89	24440.0102	24440.0602		
24	M 8	–	16.0	10	25	40.0	4.5	2.5	96	14	159	24440.0201	24440.0611		
	M10	–	16.0	10	25	40.0	4.5	2.5	96	14	153	24440.0202	24440.0612		
28	M10	–	19.0	12	30	48.5	4.5	4.5	110	17	255	24440.0301	24440.0621		
	M12	–	19.0	12	30	48.5	4.5	4.5	110	17	248	24440.0302	24440.0622		
33	M12	–	23.0	12	32	55.0	5.5	6.0	124	23	365	24440.0401	–		
	M16	–	23.0	12	32	55.0	5.5	6.0	124	23	347	24440.0402	–		
40	M16	–	30.0	14	35	68.0	5.5	6.0	138	36	622	24440.0501	–		
	M20	–	30.0	14	35	68.0	5.5	6.0	138	36	599	24440.0502	–		
with screw – picture 2															
21	M 8	12	13.5	8	20	33.5	4.0	1.0	70	–	98	24440.0120	–		
		16	13.5	8	20	33.5	4.0	1.0	70	–	99	24440.0122	24440.0702		
		20	13.5	8	20	33.5	4.0	1.0	70	–	103	24440.0124	24440.0704		
		25	13.5	8	20	33.5	4.0	1.0	70	–	102	24440.0126	24440.0706		
		32	13.5	8	20	33.5	4.0	1.0	70	–	105	24440.0128	24440.0708		
		40	13.5	8	20	33.5	4.0	1.0	70	–	112	24440.0130	24440.0710		
		50	13.5	8	20	33.5	4.0	1.0	70	–	109	24440.0132	24440.0712		
		63	13.5	8	20	33.5	4.0	1.0	70	–	114	24440.0134	24440.0714		
24	M10	16	16.0	10	25	40.0	4.5	2.5	96	–	172	24440.0220	–		
		20	16.0	10	25	40.0	4.5	2.5	96	–	173	24440.0222	24440.0722		
		25	16.0	10	25	40.0	4.5	2.5	96	–	174	24440.0224	24440.0724		
		32	16.0	10	25	40.0	4.5	2.5	96	–	177	24440.0226	24440.0726		
		40	16.0	10	25	40.0	4.5	2.5	96	–	184	24440.0228	24440.0728		
		50	16.0	10	25	40.0	4.5	2.5	96	–	185	24440.0230	24440.0730		
		63	16.0	10	25	40.0	4.5	2.5	96	–	195	24440.0232	24440.0732		
		80	16.0	10	25	40.0	4.5	2.5	96	–	205	24440.0234	24440.0734		



d ₁	d ₂	Dimensions										Art. No.		
		l ₁	d ₃	d ₄	d ₅	h ₁	h ₂	h ₃	l ~	t min.		Steel	Stainless steel	
[mm]												[g]		
28	M12	16	19.0	12	30	48.5	4.5	4.5	110	–	277	24440.0318	–	
		20	19.0	12	30	48.5	4.5	4.5	110	–	282	24440.0320	–	
		25	19.0	12	30	48.5	4.5	4.5	110	–	283	24440.0322	24440.0742	
		32	19.0	12	30	48.5	4.5	4.5	110	–	287	24440.0324	24440.0744	
		40	19.0	12	30	48.5	4.5	4.5	110	–	298	24440.0326	24440.0746	
		50	19.0	12	30	48.5	4.5	4.5	110	–	302	24440.0328	24440.0748	
		63	19.0	12	30	48.5	4.5	4.5	110	–	312	24440.0330	24440.0750	
33	M16	32	23.0	12	32	55.0	5.5	6.0	124	–	422	24440.0422	–	
		40	23.0	12	32	55.0	5.5	6.0	124	–	435	24440.0424	–	
		50	23.0	12	32	55.0	5.5	6.0	124	–	446	24440.0426	–	
		63	23.0	12	32	55.0	5.5	6.0	124	–	461	24440.0428	–	
		80	23.0	12	32	55.0	5.5	6.0	124	–	486	24440.0430	–	
40	M20	40	30.0	14	35	68.0	5.5	6.0	138	–	772	24440.0520	–	
		50	30.0	14	35	68.0	5.5	6.0	138	–	792	24440.0522	–	
		63	30.0	14	35	68.0	5.5	6.0	138	–	826	24440.0524	–	
		80	30.0	14	35	68.0	5.5	6.0	138	–	859	24440.0526	–	

Adjustable Flat Tension Levers

EH 24441.



PRODUCT DESCRIPTION

Adjustable flat tension levers are used when the swivel range is limited or a specific lever position is required.

Adjustable flat tension levers are characterised by their low construction height and are particularly suitable for use in restricted spaces or when the lever should not overhang.

Material

Lever

- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure

Inner parts

- Steel, blackened

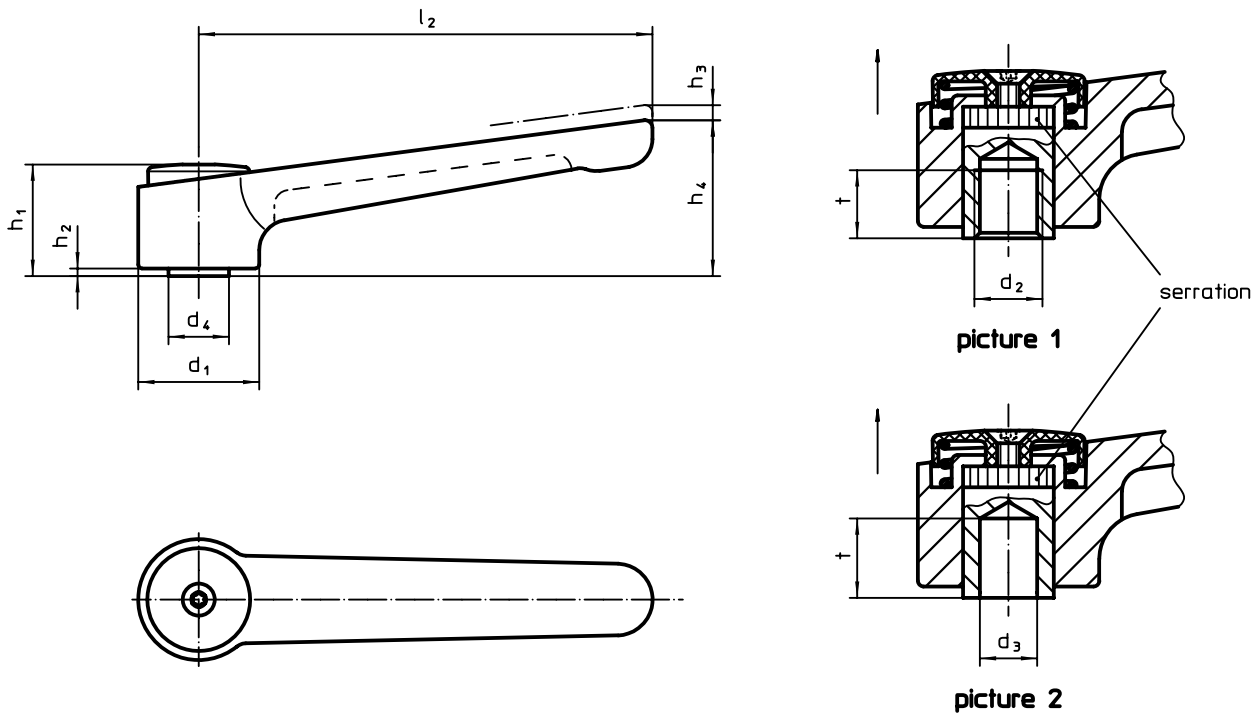
Covering

- Plastic, black
- Plastic, light grey

Operation

By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

DRAWING



ORDER INFORMATION

Dimensions										Temperature		Weight [g]	Art. No.	
d ₁	d ₂	d ₃ H7	d ₄	h ₁	h ₂	h ₃	h ₄	l ₂	t min.	min.	max.		black	silver
[mm]										[°C]				
with female thread – picture 1														
32	M 8	–	16	29.5	2	2.5	41.5	120	14	-30	80	186	24441.0005	24441.0105
	M10	–	16	29.5	2	2.5	41.5	120	14	-30	80	183	24441.0010	24441.0110
	M12	–	16	29.5	2	2.5	41.5	120	14	-30	80	182	24441.0015	24441.0115
40	M12	–	23	42.0	4	4.0	56.0	145	22	-30	80	399	24441.0020	24441.0120
	M16	–	23	42.0	4	4.0	56.0	145	22	-30	80	384	24441.0025	24441.0125
with smooth bore – picture 2														
32	–	8	16	29.5	2	2.5	41.5	120	14	-30	80	188	24441.0050	24441.0150
	–	10	16	29.5	2	2.5	41.5	120	14	-30	80	185	24441.0055	24441.0155
40	–	12	23	42.0	4	4.0	56.0	145	22	-30	80	394	24441.0060	24441.0160
	–	16	23	42.0	4	4.0	56.0	145	22	-30	80	373	24441.0065	24441.0165

Adjustable Flat Tension Levers • stainless steel

EH 24441.



PRODUCT DESCRIPTION

Adjustable flat tension levers are used when the swivel range is limited or a specific lever position is required.

Adjustable flat tension levers are characterised by their low construction height and are particularly suitable for use in restricted spaces or when the lever should not overhang.

Material

Lever

- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure

Inner parts

- Stainless steel 1.4305

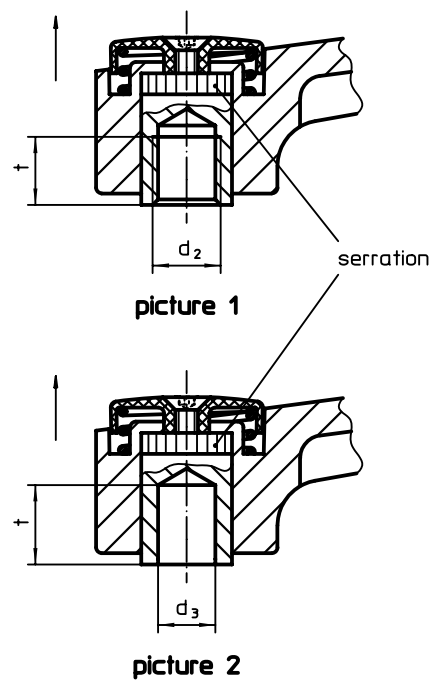
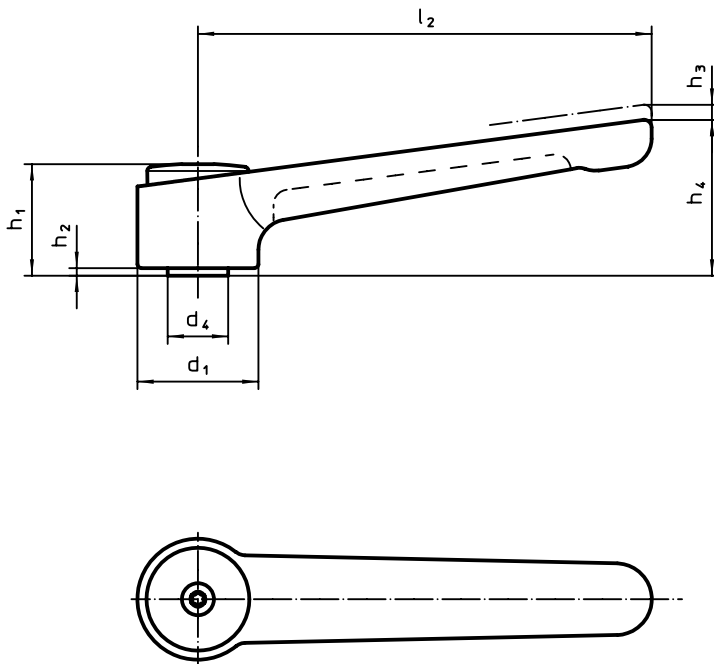
Covering

- Plastic, black
- Plastic, light grey

Operation

By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

DRAWING



ORDER INFORMATION

Dimensions										Temperature		Weight [g]	Art. No.	
d ₁	d ₂	d ₃ H7	d ₄	h ₁	h ₂	h ₃	h ₄	l ₂	t min.	min.	max.		black	silver
[mm]										[°C]				
with female thread – picture 1														
32	M 8	–	16	29.5	2	2.5	41.5	120	14	-30	80	192	24441.0205	24441.0305
	M10	–	16	29.5	2	2.5	41.5	120	14	-30	80	183	24441.0210	24441.0310
	M12	–	16	29.5	2	2.5	41.5	120	14	-30	80	181	24441.0215	24441.0315
40	M12	–	23	42.0	4	4.0	56.0	145	22	-30	80	403	24441.0220	24441.0320
	M16	–	23	42.0	4	4.0	56.0	145	22	-30	80	381	24441.0225	24441.0325
with smooth bore – picture 2														
32	–	8	16	29.5	2	2.5	41.5	120	14	-30	80	188	24441.0250	24441.0350
	–	10	16	29.5	2	2.5	41.5	120	14	-30	80	181	24441.0255	24441.0355
40	–	12	23	42.0	4	4.0	56.0	145	22	-30	80	395	24441.0260	24441.0360
	–	16	23	42.0	4	4.0	56.0	145	22	-30	80	380	24441.0265	24441.0365

Adjustable Flat Tension Levers • with screw

EH 24441.



PRODUCT DESCRIPTION

Adjustable flat tension levers are used when the swivel range is limited or a specific lever position is required.

Adjustable flat tension levers are characterised by their low construction height and are particularly suitable for use in restricted spaces or when the lever should not overhang.

Material

Lever

- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure

Inner parts

- Steel, blackened

Screw

- Steel, blackened

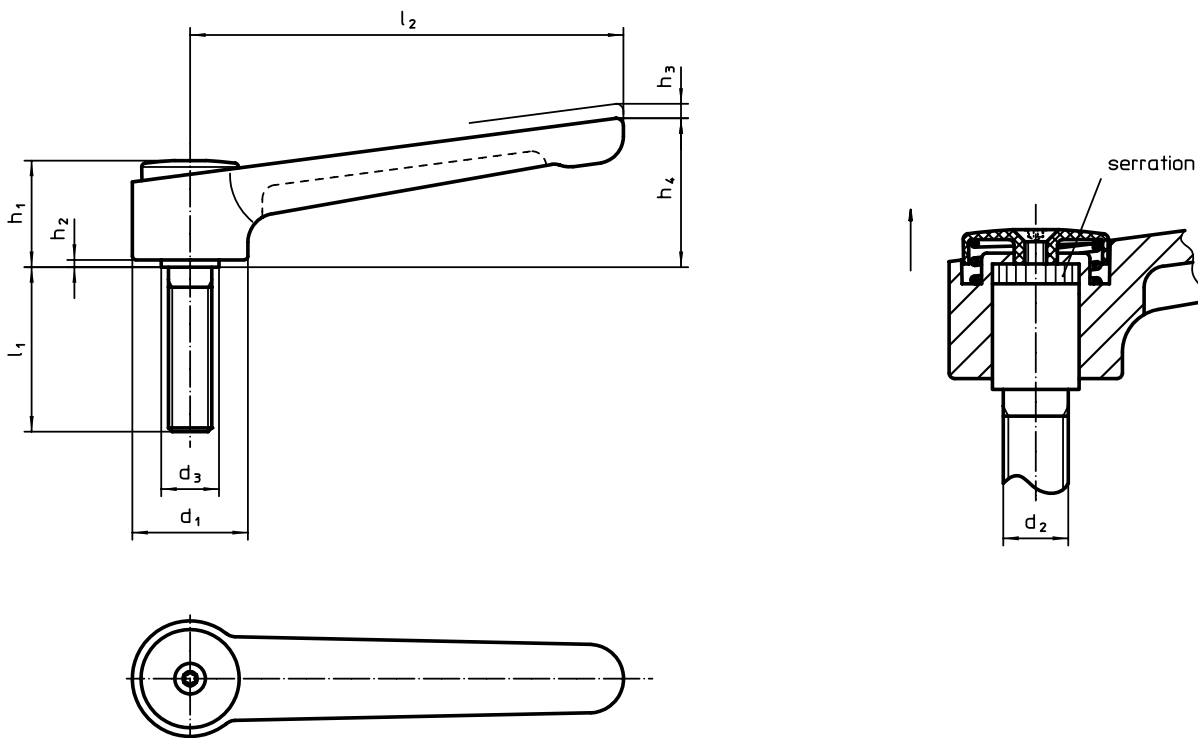
Covering

- Plastic, black
- Plastic, light grey

Operation

By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.

DRAWING



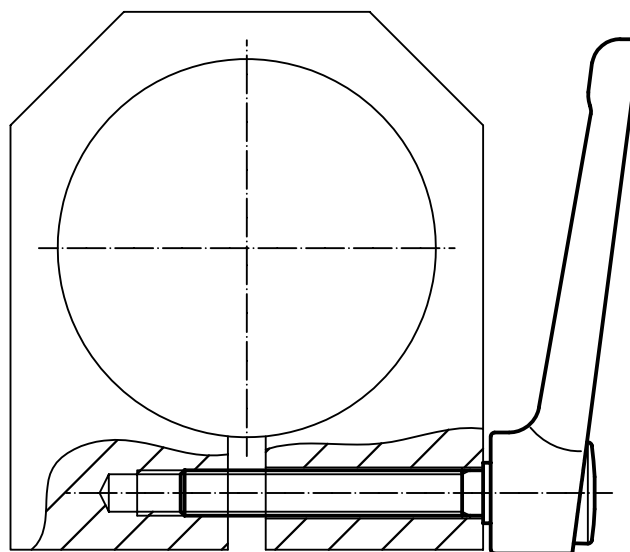
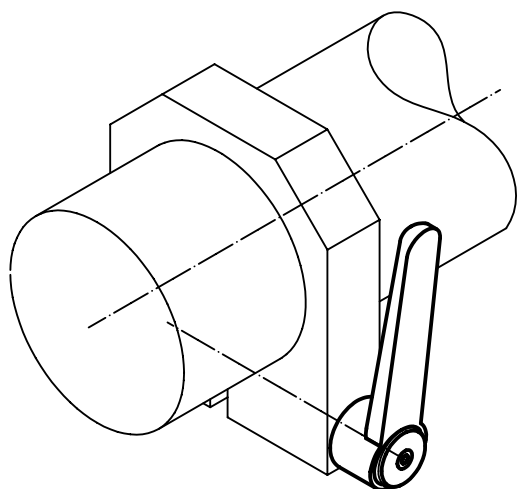
ORDER INFORMATION

d ₁	d ₂	l ₁	Dimensions						min.	max.	[g]	Art. No.		
			d ₃	h ₁	h ₂	h ₃	h ₄	l ₂				[°C]	black	silver
[mm]														
32	M10	20	16	29.5	2	2.5	41.5	120	-30	80	209	24441.0450	24441.0850	
		25	16	29.5	2	2.5	41.5	120	-30	80	208	24441.0455	24441.0855	
		32	16	29.5	2	2.5	41.5	120	-30	80	207	24441.0460	24441.0860	
		40	16	29.5	2	2.5	41.5	120	-30	80	210	24441.0465	24441.0865	
		50	16	29.5	2	2.5	41.5	120	-30	80	220	24441.0470	24441.0870	
		63	16	29.5	2	2.5	41.5	120	-30	80	226	24441.0475	24441.0875	
	M12	20	16	29.5	2	2.5	41.5	120	-30	80	207	24441.0485	24441.0885	
		25	16	29.5	2	2.5	41.5	120	-30	80	211	24441.0490	24441.0890	
		32	16	29.5	2	2.5	41.5	120	-30	80	215	24441.0495	24441.0895	
		40	16	29.5	2	2.5	41.5	120	-30	80	220	24441.0500	24441.0900	
		50	16	29.5	2	2.5	41.5	120	-30	80	228	24441.0505	24441.0905	
		63	16	29.5	2	2.5	41.5	120	-30	80	238	24441.0510	24441.0910	
		80	16	29.5	2	2.5	41.5	120	-30	80	251	24441.0515	24441.0915	



d ₁	d ₂	Dimensions							Temperature		Weight [g]	Art. No.	
		l ₁	d ₃	h ₁	h ₂	h ₃	h ₄	l ₂	min.	max.		black	silver
									[°C]				
40	M12	32	23	42.0	4	4.0	56.0	145	-30	80	440	24441.0525	24441.0925
		40	23	42.0	4	4.0	56.0	145	-30	80	446	24441.0530	24441.0930
		50	23	42.0	4	4.0	56.0	145	-30	80	450	24441.0535	24441.0935
		63	23	42.0	4	4.0	56.0	145	-30	80	461	24441.0540	24441.0940
		80	23	42.0	4	4.0	56.0	145	-30	80	477	24441.0545	24441.0945
	M16	32	23	42.0	4	4.0	56.0	145	-30	80	461	24441.0550	24441.0950
		40	23	42.0	4	4.0	56.0	145	-30	80	472	24441.0555	24441.0955
		50	23	42.0	4	4.0	56.0	145	-30	80	482	24441.0560	24441.0960
		63	23	42.0	4	4.0	56.0	145	-30	80	498	24441.0565	24441.0965
		80	23	42.0	4	4.0	56.0	145	-30	80	523	24441.0570	24441.0970

APPLICATION EXAMPLE



Adjustable Flat Tension Levers • with screw, stainless steel

EH 24441.



PRODUCT DESCRIPTION

Adjustable flat tension levers are used when the swivel range is limited or a specific lever position is required.

Adjustable flat tension levers are characterised by their low construction height and are particularly suitable for use in restricted spaces or when the lever should not overhang.

Material

Lever

- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure

Inner parts

- Stainless steel 1.4305

Screw

- Stainless steel 1.4305

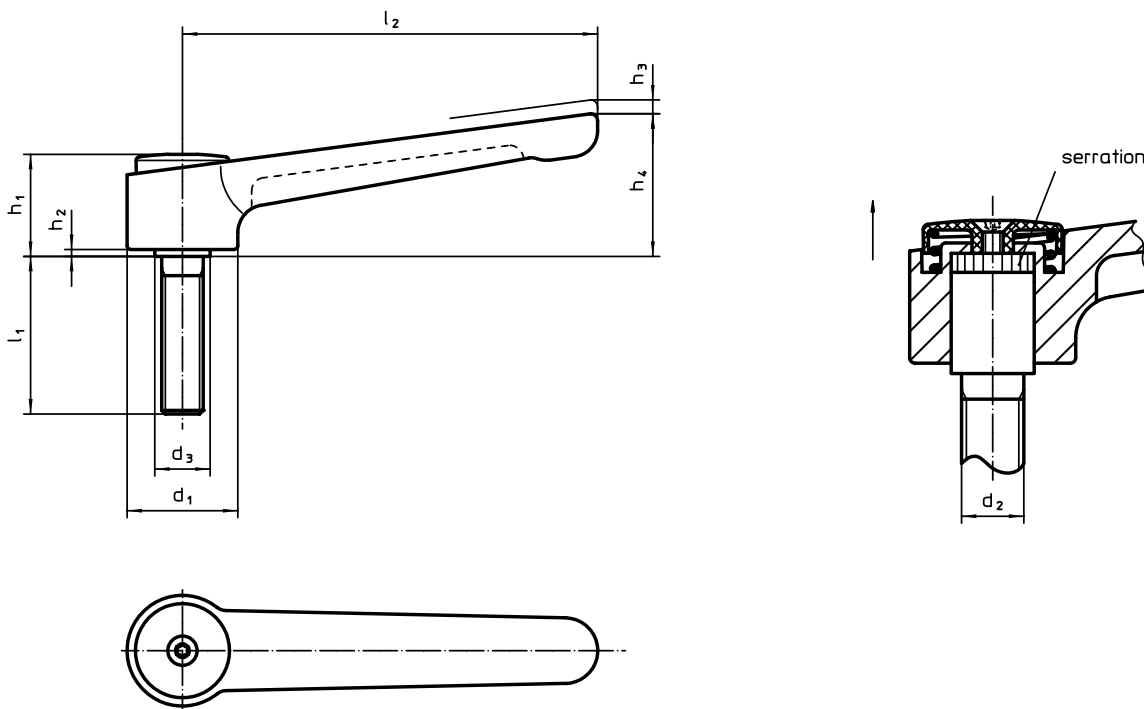
Covering

- Plastic, black
- Plastic, light grey

Operation

By lifting the lever the serrations are disengaged. The lever can be positioned by the serrations. On releasing the lever, the serrations are automatically re-engaged.



DRAWING



ORDER INFORMATION

d ₁	d ₂	l ₁	Dimensions						min.	max.	[g]	Art. No.		
			d ₃	h ₁	h ₂	h ₃	h ₄	l ₂				[°C]	black	silver
[mm]														
32	M10	20	16	29.5	2	2.5	41.5	120	-30	80	205	24441.0650	24441.1650	
		25	16	29.5	2	2.5	41.5	120	-30	80	206	24441.0655	24441.1655	
		32	16	29.5	2	2.5	41.5	120	-30	80	209	24441.0660	24441.1660	
		40	16	29.5	2	2.5	41.5	120	-30	80	211	24441.0665	24441.1665	
		50	16	29.5	2	2.5	41.5	120	-30	80	217	24441.0670	24441.1670	
		63	16	29.5	2	2.5	41.5	120	-30	80	223	24441.0675	24441.1675	
	M12	20	16	29.5	2	2.5	41.5	120	-30	80	207	24441.0685	24441.1685	
		25	16	29.5	2	2.5	41.5	120	-30	80	214	24441.0690	24441.1690	
		32	16	29.5	2	2.5	41.5	120	-30	80	218	24441.0695	24441.1695	
		40	16	29.5	2	2.5	41.5	120	-30	80	223	24441.0700	24441.1700	
		50	16	29.5	2	2.5	41.5	120	-30	80	230	24441.0705	24441.1705	
		63	16	29.5	2	2.5	41.5	120	-30	80	237	24441.0710	24441.1710	
		80	16	29.5	2	2.5	41.5	120	-30	80	250	24441.0715	24441.1715	



d ₁	d ₂	Dimensions							 min. max. [°C]		 [g]	Art. No.	
		l ₁	d ₃	h ₁	h ₂	h ₃	h ₄	l ₂	black	silver			
40	M12	32	23	42.0	4	4.0	56.0	145	-30	80	442	24441.0725	24441.1725
		40	23	42.0	4	4.0	56.0	145	-30	80	453	24441.0730	24441.1730
		50	23	42.0	4	4.0	56.0	145	-30	80	456	24441.0735	24441.1735
		63	23	42.0	4	4.0	56.0	145	-30	80	463	24441.0740	24441.1740
		80	23	42.0	4	4.0	56.0	145	-30	80	460	24441.0745	24441.1745
	M16	32	23	42.0	4	4.0	56.0	145	-30	80	460	24441.0750	24441.1750
		40	23	42.0	4	4.0	56.0	145	-30	80	472	24441.0755	24441.1755
		50	23	42.0	4	4.0	56.0	145	-30	80	482	24441.0760	24441.1760
		63	23	42.0	4	4.0	56.0	145	-30	80	499	24441.0765	24441.1765
		80	23	42.0	4	4.0	56.0	145	-30	80	522	24441.0770	24441.1770

Tapered Levers • DIN 99

EH 24470.



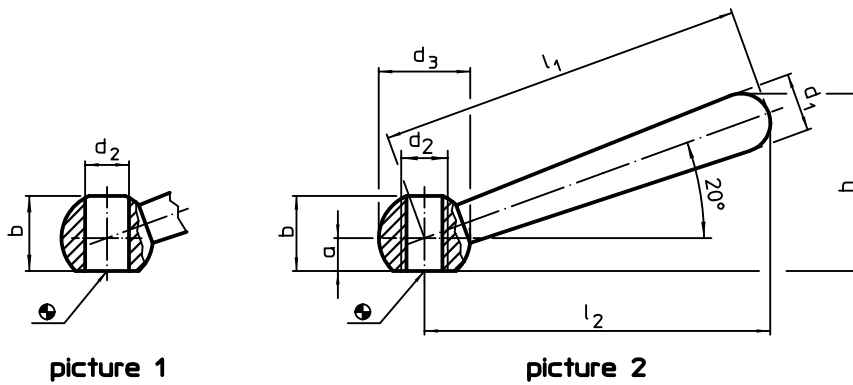
PRODUCT DESCRIPTION

Material

- Steel, blackened
- Stainless steel 1.4305, dull blasted

4

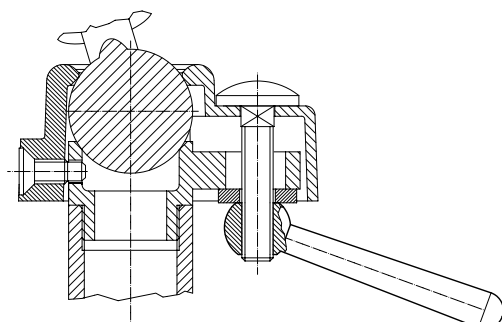
DRAWING



ORDER INFORMATION

Dimensions								[g]	Art. No.	
l_1	l_2	a	b	d_1	d_2	d_3	h		Steel	Stainless steel
[mm]										
slanted, with smooth bore, form L – picture 1										
50	48	4.0	9.5	8	6 H7	12	24.0	16	24470.0105	–
63	60	5.0	12.0	10	8 H7	16	30.5	37	24470.0106	24470.0206
80	76	6.0	14.5	13	10 H7	20	38.0	73	24470.0108	24470.0208
100	95	7.5	18.5	16	12 H7	25	47.0	140	24470.0110	24470.0210
125	119	10.0	24.0	20	16 H7	32	59.5	282	24470.0112	–
160	152	12.5	30.0	25	20 H7	40	75.7	553	24470.0116	–
200	190	18.0	40.0	32	24 H7	50	97.0	1096	24470.0120	–
slanted, with thread, form N – picture 2										
50	48	4.0	9.5	8	M 6	12	24.0	17	24470.0305	24470.0405
63	60	5.0	12.5	10	M 8	16	30.5	38	24470.0306	24470.0406
80	76	6.0	15.0	13	M10	20	38.0	74	24470.0308	24470.0408
100	95	7.5	19.0	16	M12	25	47.0	142	24470.0310	24470.0410
125	119	10.0	25.0	20	M16	32	59.5	297	24470.0312	24470.0412
160	152	12.5	31.0	25	M20	40	75.7	574	24470.0316	–
200	190	18.0	41.0	32	M24	50	97.0	1140	24470.0320	–

APPLICATION EXAMPLE



Clamping Nuts • welded
EH 24470.



PRODUCT DESCRIPTION

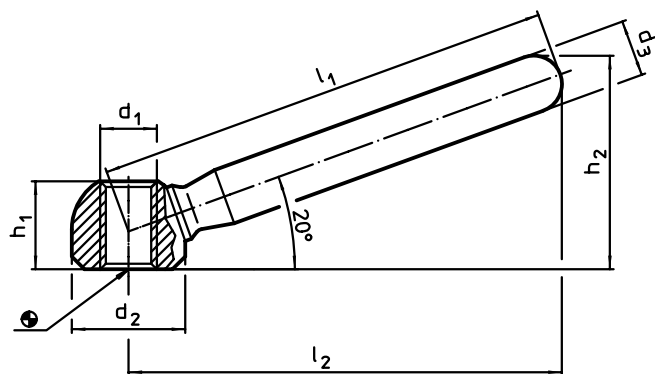
Low-price version to DIN 99.

Material

▪ Steel, zinc-plated by galvanization

▪ Stainless steel 1.4301, dull blasted

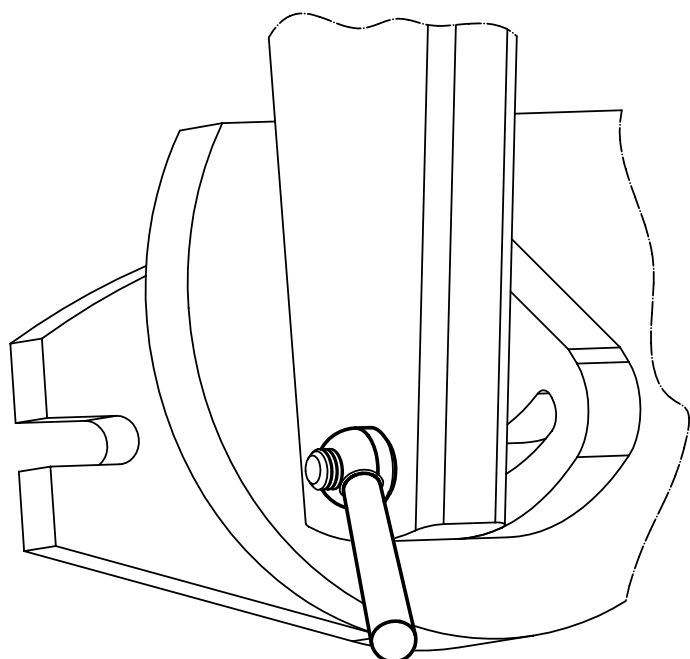
DRAWING



ORDER INFORMATION

l ₁	l ₂	Dimensions					[g]	Art. No.	
		d ₁	d ₂	d ₃	h ₁	h ₂		Steel	Stainless steel
[mm]									
63	60	M 8	16	10	12.5	30.5	39	24470.0506	24470.0606
80	76	M10	20	12	15.0	37.0	83	24470.0508	24470.0608
100	95	M12	25	14	19.0	46.0	149	24470.0510	24470.0610
125	119	M16	32	18	25.0	58.5	313	24470.0512	24470.0612
160	152	M20	40	20	31.0	73.0	533	24470.0516	24470.0616

APPLICATION EXAMPLE



Clamping Nuts • welded, double-sided

EH 24470.



PRODUCT DESCRIPTION

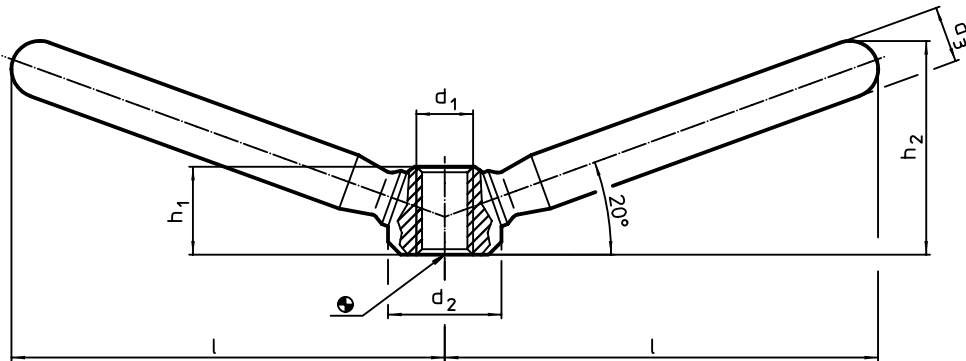
Allows for two-handed operating.

Material

▪ Steel, zinc-plated by galvanization

▪ Stainless steel 1.4301, dull blasted

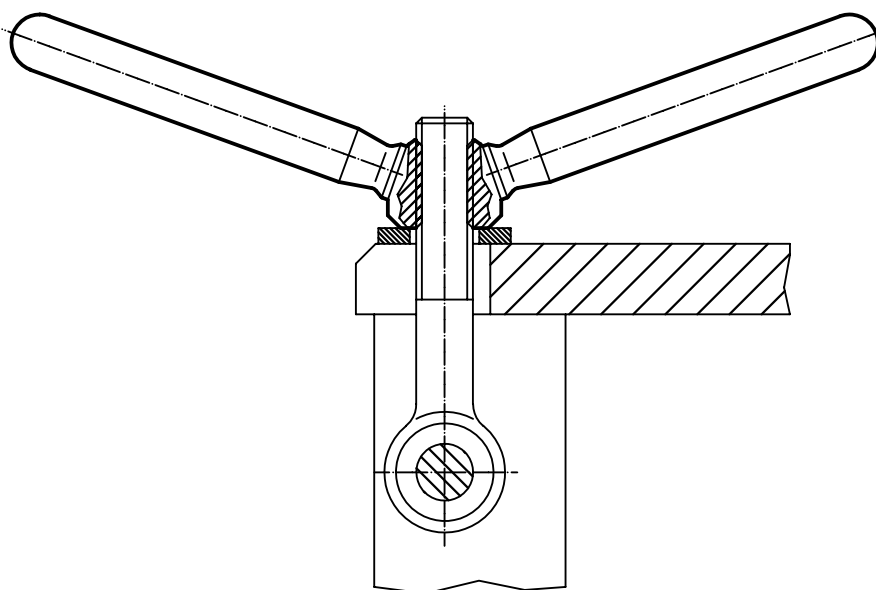
DRAWING



ORDER INFORMATION

l ~	d ₁	Dimensions				[g]	Art. No.	
		d ₂	d ₃	h ₁	h ₂		Steel	Stainless steel
[mm]								
47.5	M 8	16	10	12.5	26	63	24470.0706	24470.0806
59.5	M10	20	12	15.0	32	116	24470.0708	24470.0808
75.5	M12	25	14	19.0	40	210	24470.0710	24470.0810
94.5	M16	32	18	25.0	52	432	24470.0712	24470.0812
118.0	M20	40	20	31.0	62	716	24470.0716	24470.0816

APPLICATION EXAMPLE



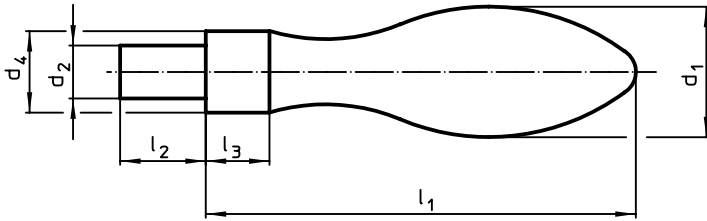


PRODUCT DESCRIPTION

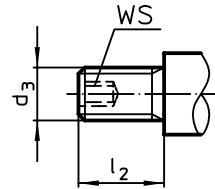
Material

- Steel, turned, zinc-plated by galvanization, passivated
- Stainless steel 1.4404

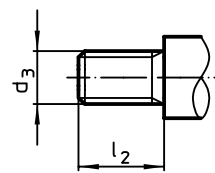
DRAWING



picture 1



picture 2

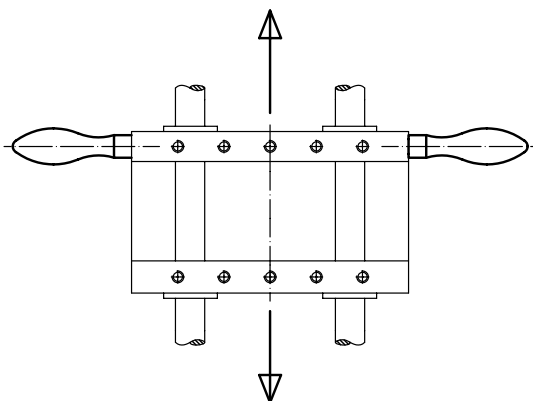


picture 3

ORDER INFORMATION

d ₁	d ₂ h8	d ₃	Dimensions				WS	[g]	Art. No.	
			d ₄ h13 [mm]	l ₁ ~	l ₂	l ₃			Steel	Stainless steel
with smooth lug, form D – picture 1										
16	7	–	10	50	11	7	–	45	24450.0016	–
20	8	–	13	64	13	8	–	92	24450.0020	–
25	10	–	16	80	14	10	–	179	24450.0025	–
32	13	–	20	100	21	13	–	356	24450.0032	–
36	16	–	22	112	26	14	–	519	24450.0036	–
with male thread lug, form E – picture 2										
16	–	M 6	10	50	11	7	3	43	24450.0116	–
20	–	M 8	13	64	13	8	4	88	24450.0120	–
25	–	M10	16	80	14	10	5	175	24450.0125	–
32	–	M12	20	100	21	13	6	340	24450.0132	–
36	–	M16	22	112	26	14	8	509	24450.0136	–
with male thread lug, form E – picture 3										
16	–	M 6	10	50	11	7	–	45	–	24450.0316
20	–	M 8	13	64	13	8	–	92	–	24450.0320
25	–	M10	16	80	14	10	–	186	–	24450.0325

APPLICATION EXAMPLE



Rotating Machine Handles • DIN 98

EH 24460.

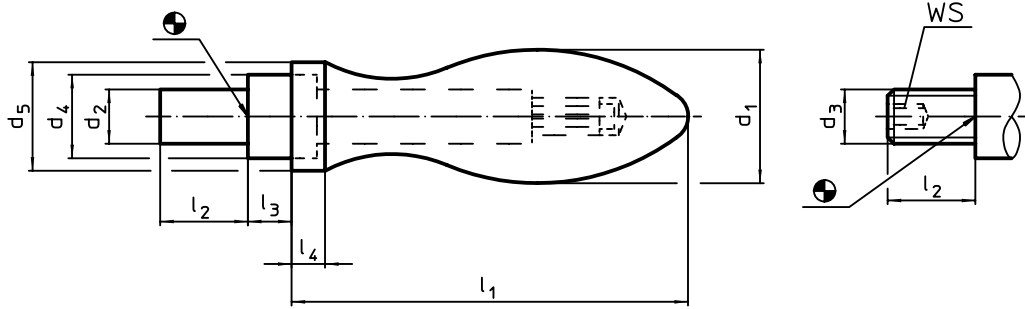


PRODUCT DESCRIPTION

Material

- Steel, turned, zinc-plated by galvanization, passivated

DRAWING



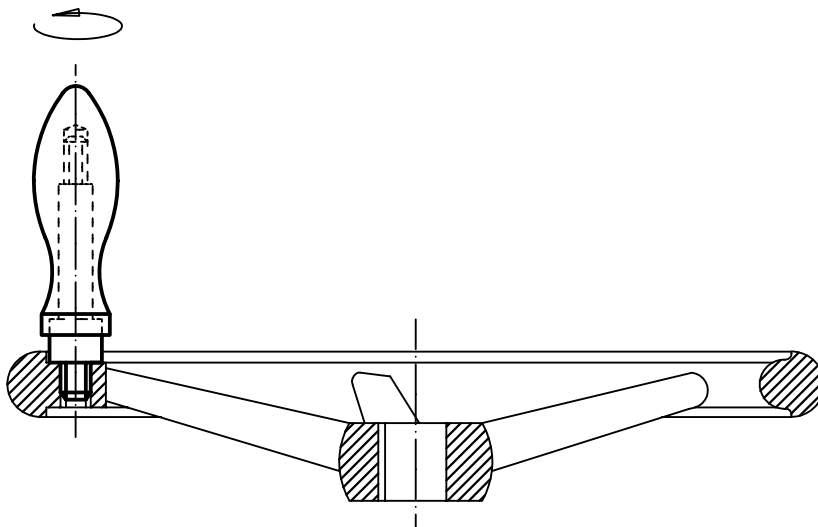
picture 1

picture 2

ORDER INFORMATION

Dimensions									WS		Art. No.
d ₁	d ₂ h8	d ₃	d ₄ h13	d ₅	l ₁ ~	l ₂	l ₃	l ₄	WS		
[mm]									[mm]	[g]	
with smooth lug, form D – picture 1											
16	7	–	10	14	49	11	5.5	5.0	–	69	24460.0016
20	8	–	13	18	61	13	6.0	6.0	–	109	24460.0020
25	10	–	16	21	75	14	8.0	6.5	–	200	24460.0025
32	13	–	20	26	95	21	10.5	8.0	–	395	24460.0032
36	16	–	22	29	106	26	11.0	9.0	–	569	24460.0036
with male thread lug, form E – picture 2											
16	–	M 6	10	14	49	11	5.5	5.0	3	51	24460.0116
20	–	M 8	13	18	61	13	6.0	6.0	4	105	24460.0120
25	–	M10	16	21	75	14	8.0	6.5	5	190	24460.0125
32	–	M12	20	26	95	21	10.5	8.0	6	387	24460.0132
36	–	M16	22	29	106	26	11.0	9.0	8	566	24460.0136

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

Material

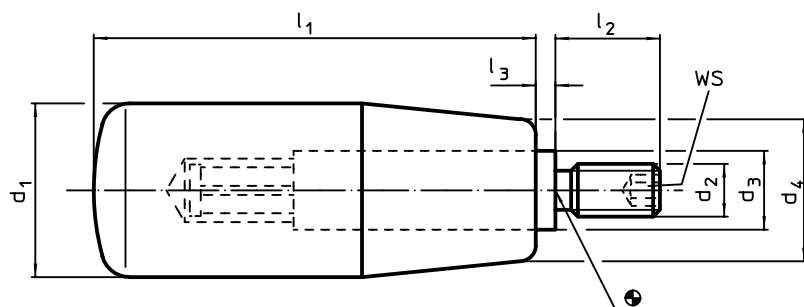
Axle part

- Steel, zinc-plated by galvanization
- Stainless steel 1.4305

Cylindrical handle

- Thermoplastic PA, black, dull
- Thermosetting plastic PF 31, black

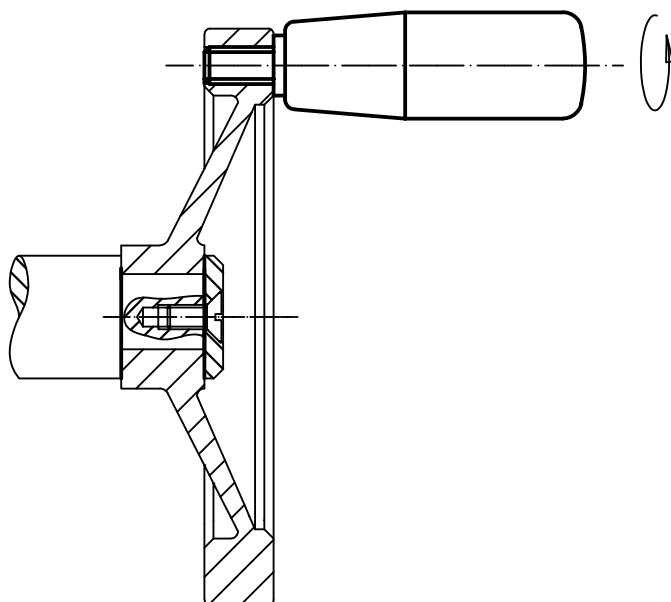
DRAWING



ORDER INFORMATION

Dimensions							WS	max. [°C]	[g]	Art. No.	
d ₁	d ₂	d ₃	d ₄	l ₁	l ₂	l ₃				Steel	Stainless steel
[mm]							[mm]				
cylindrical handle: thermoplastic											
14	M 6	8	11	28	10	0.5	3	80	13	24530.0008	–
cylindrical handle: thermosetting plastic											
18	M 6	10	15	40	12	2.5	3	110	29	24530.0010	24530.0210
21	M 6	10	17	50	13	2.5	3	110	42	24530.0020	24530.0220
	M 8	10	17	50	13	2.5	4	110	43	24530.0021	–
22	M 6	10	18	56	13	2.5	3	110	47	24530.0030	–
	M 8	10	18	56	13	2.5	4	110	48	24530.0031	–
23	M 8	13	19	65	14	2.5	4	110	79	24530.0040	24530.0240
	M10	13	19	65	14	2.5	5	110	80	24530.0041	–
26	M 8	13	21	80	16	2.5	4	110	107	24530.0050	–
	M10	13	21	80	16	2.5	5	110	100	24530.0051	24530.0251
28	M10	13	22	90	16	2.5	5	110	126	24530.0060	24530.0260
31	M12	14	25	102	20	2.5	6	110	177	24530.0071	24530.0271

APPLICATION EXAMPLE



Folding Handles • rotating

EH 24532.



PRODUCT DESCRIPTION

Material

Axle part

- Steel, blackened
- Stainless steel 1.4305

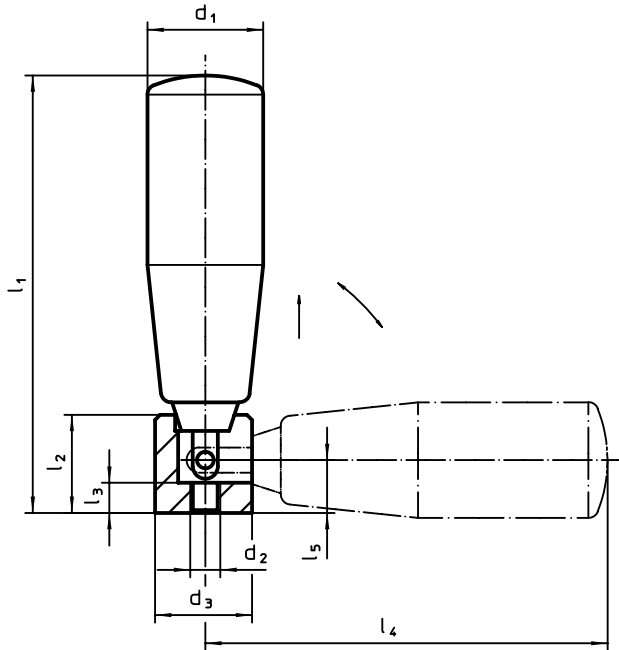
Handle

- Thermoplastic, black, dull

Operation

In the operating position the handle is locked. To move the handle to the rest position, it must be pulled out axially and flipped round.

DRAWING



ORDER INFORMATION

Dimensions								max. [°C]	[g]	Art. No.	
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃	l ₄	l ₅			Steel	Stainless steel
[mm]											
18	M5	16	57	15.0	5	52	9.5	110	53	24532.0018	–
21	M5	16	67	15.0	5	62	9.5	110	63	24532.0021	–
22	M5	16	73	15.0	5	68	9.5	110	67	24532.0022	–
23	M6	20	87	19.5	6	80	10.5	110	111	24532.0023	24532.0123
26	M6	20	102	19.5	6	95	10.5	110	137	24532.0026	24532.0126
28	M8	26	118	26.0	10	106	16.0	110	225	24532.0028	24532.0128

Knurled Nuts • DIN 6303

EH 24480.



PRODUCT DESCRIPTION

Material

- Free cutting steel, blackened
- Stainless steel 1.4305

Assembly

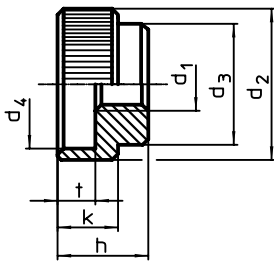
Form B: after being bored through the pin hole is to be situated within the tolerance field H7.

MORE INFORMATION

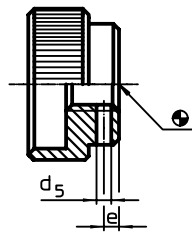
Notes

Knurling pitch and knurling depth may differ from DIN.

DRAWING



picture 1

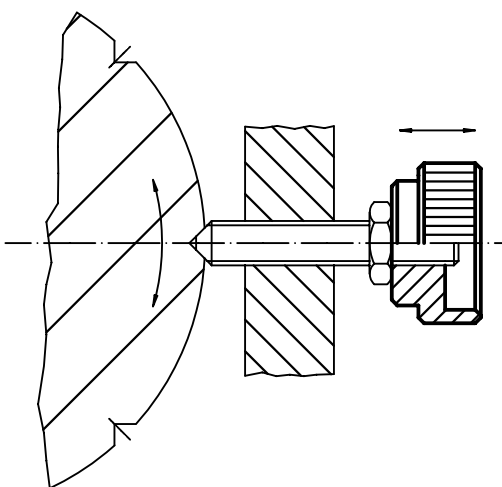


picture 2

ORDER INFORMATION

d ₁	d ₂	d ₃	d ₄	Dimensions					Suitable straight pin DIN 7	[g]	Art. No.	
				d ₅ Predrilled [mm]	e	h	k	t			Free cutting steel	Stainless steel
without pin hole, form A – picture 1												
M 5	20	14	15	–	–	12	8	5	–	16	24480.0005	24480.0205
M 6	24	16	18	–	–	14	10	6	–	27	24480.0006	24480.0206
M 8	30	20	24	–	–	17	12	7	–	46	24480.0008	24480.0208
M10	36	28	30	–	–	20	14	8	–	83	24480.0010	24480.0210
M12	40	32	34	–	–	24	16	10	–	123	24480.0012	24480.0212
with pin hole, form B – picture 2												
M 5	20	14	15	1.4	2.5	12	8	5	1,5 m6 x 14	15	24480.0105	24480.0305
M 6	24	16	18	1.4	2.5	14	10	6	1,5 m6 x 16	25	24480.0106	24480.0306
M 8	30	20	24	1.9	3.0	17	12	7	2,0 m6 x 20	45	24480.0108	24480.0308
M10	36	28	30	2.9	4.0	20	14	8	3,0 m6 x 28	86	24480.0110	24480.0310
M12	40	32	34	3.9	4.0	24	16	10	4,0 m6 x 32	121	24480.0112	24480.0312

APPLICATION EXAMPLE



Flat Knurled Nuts • DIN 467

EH 24760.



PRODUCT DESCRIPTION

Material

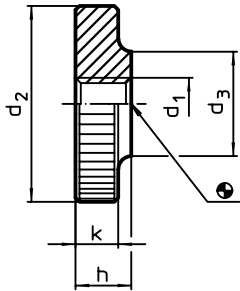
- Steel, blackened, quality 5
- Stainless steel 1.4305, dull blasted

MORE INFORMATION

Notes

Knurling pitch and knurling depth may differ from DIN.

DRAWING

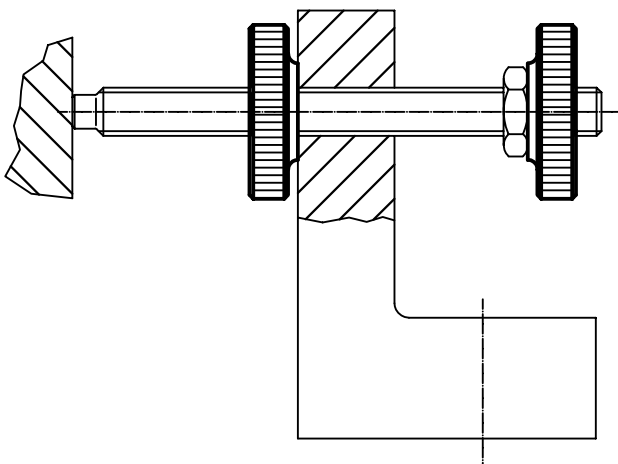


ORDER INFORMATION

d ₁	d ₂	Dimensions			[g]	Art. No.	
		d ₃	h	k		Steel	Stainless steel
[mm]							
M 3	12	6	3	2.5	2.1	24760.0030	24760.0230
M 4	16	8	4	3.5	5.1	24760.0040	24760.0240
M 5	20	10	5	4.0	9.4	24760.0050	24760.0250
M 6	24	12	6	5.0	17.0	24760.0060	24760.0260
M 8	30	16	8	6.0	32.0	24760.0080	24760.0280
M10	36	20	10	8.0	61.0	24760.0100	24760.0300
M12	40	22	12	10.0	92.0	24760.0120¹⁾	–

¹⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE



Flat Knurled Thumb Screws • DIN 653

EH 24770.



PRODUCT DESCRIPTION

All knurled screws are one-piece manufactured with thread up to the head (DIN-designation A).

Material

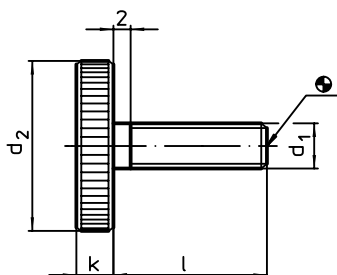
- Steel, blackened, quality 5.8
- Stainless steel 1.4305, dull blasted

MORE INFORMATION

Notes

Knurling pitch and knurling depth may differ from DIN.

DRAWING



ORDER INFORMATION

d ₁	Dimensions			[g]	Art. No.	
	l	d ₂	k		Steel	Stainless steel
	[mm]					
M 3	6	12	2.5	2.3	24770.0072	–
	8	12	2.5	2.4	24770.0073	–
	10	12	2.5	2.5	24770.0074	–
	16	12	2.5	2.7	24770.0077	–
	20	12	2.5	2.9	24770.0079	–
M 4	8	16	3.5	5.6	24770.0092	24770.0292
	10	16	3.5	5.7	24770.0093	24770.0293
	12	16	3.5	6.1	24770.0094	24770.0294
	16	16	3.5	6.2	24770.0096	24770.0296
	20	16	3.5	6.6	24770.0098	–
M 5	25	16	3.5	7.1	24770.0100	–
	10	20	4.0	10.0	24770.0112	24770.0312
	12	20	4.0	11.0	24770.0113	24770.0313
	16	20	4.0	12.0	24770.0115	24770.0315
	20	20	4.0	12.0	24770.0117	24770.0317
M 6	25	20	4.0	12.0	24770.0119	–
	30	20	4.0	13.0	24770.0121	–
	12	24	5.0	18.0	24770.0132	24770.0332
	16	24	5.0	20.0	24770.0134	24770.0334
	20	24	5.0	21.0	24770.0136	24770.0336
	25	24	5.0	21.0	24770.0138	24770.0338
M 8	30	24	5.0	22.0	24770.0140	–
	40	24	5.0	23.0	24770.0142	–
	16	30	6.0	36.0	24770.0152	24770.0352
	20	30	6.0	37.0	24770.0154	24770.0354
	25	30	6.0	39.0	24770.0156	24770.0356
	30	30	6.0	40.0	24770.0158	24770.0358
M10	35	30	6.0	42.0	24770.0160	–
	40	30	6.0	44.0	24770.0161	–
	20	36	8.0	71.0	24770.0172	24770.0372
	25	36	8.0	72.0	24770.0174	24770.0374
	30	36	8.0	76.0	24770.0176	24770.0376
	35	36	8.0	78.0	24770.0178	–
	40	36	8.0	80.0	24770.0180	24770.0380

High Knurled Nuts (with Collar) • DIN 466

EH 24780.



PRODUCT DESCRIPTION

Material

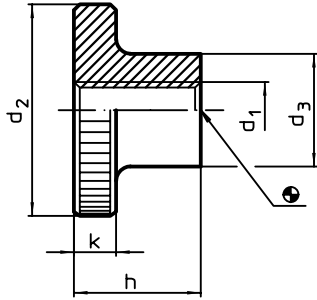
- Steel, blackened, quality 5
- Stainless steel 1.4301, dull blasted

MORE INFORMATION

Notes

Knurling pitch and knurling depth may differ from DIN.

DRAWING

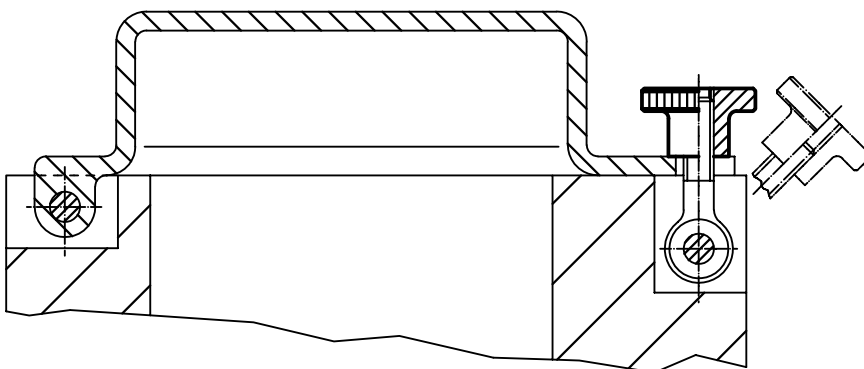


ORDER INFORMATION

d ₁	d ₂	Dimensions			[g]	Art. No.	
		d ₃	h	k		Steel	Stainless steel
[mm]							
M 3	12	6	7.5	2.5	2.9	24780.0030	–
M 4	16	8	9.5	3.5	6.7	24780.0040	24780.0240
M 5	20	10	11.5	4.0	12.0	24780.0050	24780.0250
M 6	24	12	15.0	5.0	23.0	24780.0060	24780.0260
M 8	30	16	18.0	6.0	44.0	24780.0080	24780.0280
M10	36	20	23.0	8.0	85.0	24780.0100	24780.0300
M12	40	22	25.0	10.0	119.0	24780.0120 ¹⁾	–

¹⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE



High Knurled Thumb Screws • DIN 464

EH 24790.



PRODUCT DESCRIPTION

All knurled screws are one-piece manufactured. Contrary to the Official Standard Sheet, they all have a thread up to the head, but no recess at the thread end.

Material

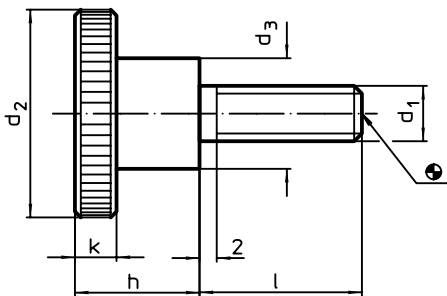
- Steel, blackened, quality 5.8
- Stainless steel 1.4305, dull blasted

MORE INFORMATION

Notes

Knurling pitch and knurling depth may differ from DIN.

DRAWING



ORDER INFORMATION

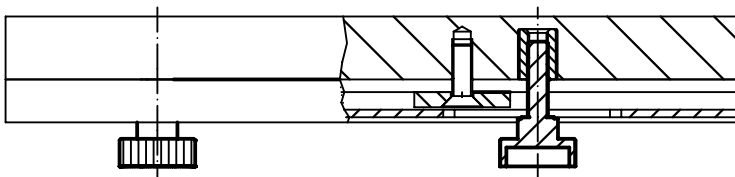
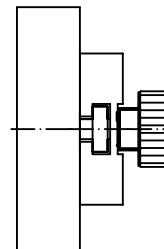
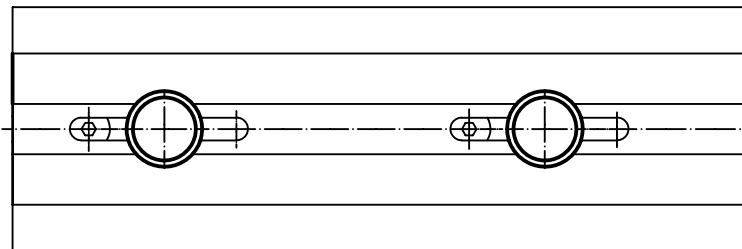
d ₁	l	Dimensions				[g]	Art. No.	
		d ₂	d ₃	h	k		Steel	Stainless steel
[mm]								
M 3	6	12	6	7.5	2.5	3.7	24790.0074	24790.0274
	10	12	6	7.5	2.5	3.8	24790.0076	24790.0276
	12	12	6	7.5	2.5	4.0	24790.0077	24790.0277
	16	12	6	7.5	2.5	4.0	24790.0079	24790.0279
	20	12	6	7.5	2.5	4.5	24790.0081	–
M 4	5	16	8	9.5	3.5	7.7	24790.0092	–
	8	16	8	9.5	3.5	8.0	24790.0094	24790.0294
	10	16	8	9.5	3.5	8.1	24790.0095	24790.0295
	12	16	8	9.5	3.5	8.6	24790.0096	24790.0296
	16	16	8	9.5	3.5	8.4	24790.0098	24790.0298
	20	16	8	9.5	3.5	9.1	24790.0100	24790.0300
M 5	25	16	8	9.5	3.5	9.0	24790.0102	24790.0302
	6	20	10	11.5	4.0	14.0	24790.0112	–
	8	20	10	11.5	4.0	15.0	24790.0113	–
	10	20	10	11.5	4.0	15.0	24790.0114	24790.0314
	12	20	10	11.5	4.0	15.0	24790.0115	24790.0315
	16	20	10	11.5	4.0	16.0	24790.0117	24790.0317
	20	20	10	11.5	4.0	16.0	24790.0119	24790.0319
	25	20	10	11.5	4.0	17.0	24790.0121	24790.0321
M 6	30	20	10	11.5	4.0	17.0	24790.0123	24790.0323
	8	24	12	15.0	5.0	28.0	24790.0132	–
	10	24	12	15.0	5.0	27.0	24790.0133	–
	12	24	12	15.0	5.0	28.0	24790.0134	24790.0334
	16	24	12	15.0	5.0	28.0	24790.0136	24790.0336
	20	24	12	15.0	5.0	29.0	24790.0138	24790.0338
	25	24	12	15.0	5.0	30.0	24790.0140	24790.0340
	30	24	12	15.0	5.0	31.0	24790.0142	24790.0342
	35	24	12	15.0	5.0	31.0	24790.0144	24790.0344

→

d ₁	l	Dimensions				[g]	Art. No.	
		d ₂	d ₃	h	k		Steel	Stainless steel
[mm]								
M 8	12	30	16	18.0	6.0	53.0	24790.0152	–
	16	30	16	18.0	6.0	55.0	24790.0154	24790.0354
	20	30	16	18.0	6.0	56.0	24790.0156	24790.0356
	25	30	16	18.0	6.0	58.0	24790.0158	24790.0358
	30	30	16	18.0	6.0	60.0	24790.0160	24790.0360
	35	30	16	18.0	6.0	62.0	24790.0162	24790.0362
M10	40	30	16	18.0	6.0	61.0	24790.0164	–
	15	36	20	23.0	8.0	104.0	24790.0171	–
	20	36	20	23.0	8.0	106.0	24790.0173	–
	25	36	20	23.0	8.0	109.0	24790.0175	–
	30	36	20	23.0	8.0	112.0	24790.0177	–
	35	36	20	23.0	8.0	116.0	24790.0179	–
	40	36	20	23.0	8.0	116.0	24790.0181	–

4

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

Material

- Stainless steel 1.4305

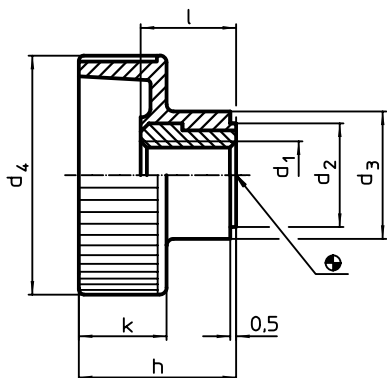
Bushing

- Steel, zinc-plated by galvanization

Handle

- Thermoplastic PA, black

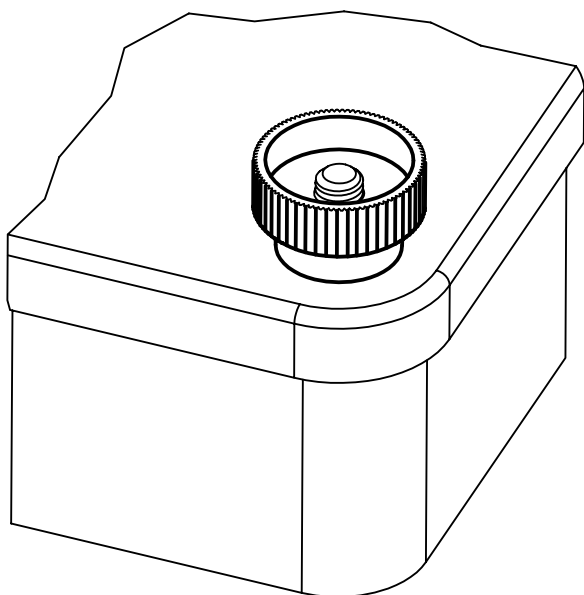
DRAWING



ORDER INFORMATION

Dimensions							min.	max.	[g]	Art. No.	
d ₁	d ₂	d ₃	d ₄	h	k	l				Steel	Stainless steel
[mm]							[°C]				
M 4	9	12	19	14.0	8.0	9.0	-30	80	4.5	24820.0004	–
M 5	9	12	19	14.0	8.0	9.0	-30	80	4.0	24820.0005	24820.0205
M 6	12	14	24	16.5	9.5	10.5	-30	80	7.0	24820.0006	24820.0206
M 8	14	16	30	19.5	11.0	11.5	-30	80	10.0	24820.0008	24820.0208
M10	16	18	36	22.5	12.5	14.0	-30	80	15.0	24820.0010	–

APPLICATION EXAMPLE



Knurled Thumb Screws • plastic

EH 24830.



PRODUCT DESCRIPTION

Material

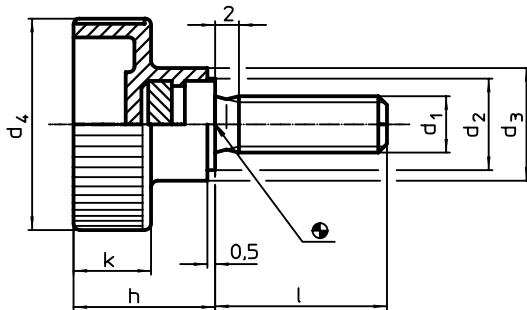
Handle

- Thermoplastic PA, black

Screw

- Steel, zinc-plated by galvanization
- Stainless steel 1.4567

DRAWING



ORDER INFORMATION

	Dimensions						Temperature		Weight [g]	Art. No.		
	d ₁	l	d ₂	d ₃	d ₄	h	k	min.		max.	Steel	Stainless steel
	[mm]						[°C]					
M 4	10	9	12	19	14.0	8.0	-30	80	3.8	24830.0030	–	
	15	9	12	19	14.0	8.0	-30	80	4.0	24830.0032	–	
	20	9	12	19	14.0	8.0	-30	80	4.2	24830.0034	–	
	30	9	12	19	14.0	8.0	-30	80	7.0	24830.0036	–	
M 5	10	9	12	19	14.0	8.0	-30	80	4.3	24830.0042	24830.0242	
	15	9	12	19	14.0	8.0	-30	80	5.0	24830.0043	24830.0243	
	20	9	12	19	14.0	8.0	-30	80	5.5	24830.0045	24830.0245	
	25	9	12	19	14.0	8.0	-30	80	6.0	24830.0046	24830.0246	
M 6	10	12	14	24	16.5	9.5	-30	80	7.0	24830.0050	24830.0250	
	16	12	14	24	16.5	9.5	-30	80	7.9	24830.0053	24830.0253	
	20	12	14	24	16.5	9.5	-30	80	8.5	24830.0054	24830.0254	
	25	12	14	24	16.5	9.5	-30	80	9.0	24830.0055	24830.0255	
M 8	30	12	14	24	16.5	9.5	-30	80	10.0	24830.0057	24830.0257	
	16	14	16	30	19.5	11.0	-30	80	14.0	24830.0060	–	
	20	14	16	30	19.5	11.0	-30	80	16.0	24830.0062	24830.0262	
	25	14	16	30	19.5	11.0	-30	80	17.0	24830.0064	24830.0264	
	30	14	16	30	19.5	11.0	-30	80	19.0	24830.0065	24830.0265	
M10	40	14	16	30	19.5	11.0	-30	80	20.0	24830.0067	24830.0267	
	20	16	18	36	22.5	12.5	-30	80	30.0	24830.0070	24830.0270	
	25	16	18	36	22.5	12.5	-30	80	31.0	24830.0072	24830.0272	
	30	16	18	36	22.5	12.5	-30	80	33.0	24830.0074	24830.0274	
	40	16	18	36	22.5	12.5	-30	80	38.0	24830.0076	–	
	45	16	18	36	22.5	12.5	-30	80	38.0	–	24830.0278	
	55	16	18	36	22.5	12.5	-30	80	48.0	–	24830.0280	

Tommy Screws • DIN 6304 with fixed pin
EH 24490.



PRODUCT DESCRIPTION

With this version, the pin is pressed in.

Material

- Free cutting steel, blackened, pressure lug hardened.

MORE INFORMATION

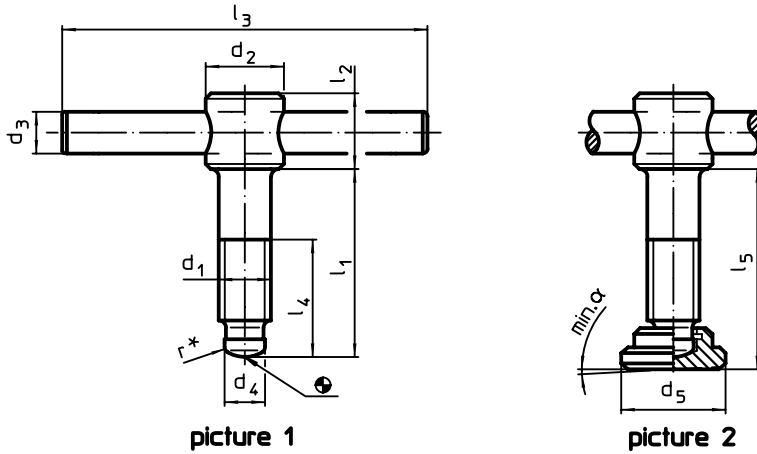
References

Thrust point for thrust pad DIN 6311 form S, EH 22560.

Further products

Thrust Pads, DIN 6311 and low model → p. 282

DRAWING



* to ease assembly the DIN 6304 specification has been completed by r

ORDER INFORMATION

Dimensions										α min.	[g]	Art. No.
d ₁	l ₁	d ₂	d ₃	d ₄	d ₅	l ₂	l ₃	l ₄	l ₅			
[mm]												
without thrust pad, form E – picture 1												
M 6	40	12	5	4.5	–	10	50	30	–	–	21	24490.0006
	50	12	5	4.5	–	10	50	40	–	–	23	24490.0007
M 8	50	14	6	6.0	–	12	60	35	–	–	39	24490.0008
	60	14	6	6.0	–	12	60	45	–	–	43	24490.0009
M10	60	18	8	8.0	–	14	80	40	–	–	81	24490.0010
	70	18	8	8.0	–	14	80	50	–	–	86	24490.0011
M12	70	20	10	8.0	–	18	100	50	–	–	141	24490.0012
	80	20	10	8.0	–	18	100	60	–	–	148	24490.0013
M16	75	24	12	12.0	–	20	120	55	–	–	249	24490.0016
	90	24	12	12.0	–	20	120	70	–	–	268	24490.0017
	110	24	12	12.0	–	20	120	90	–	–	294	24490.0018
M20	75	30	16	15.5	–	28	140	55	–	–	475	24490.0020
	90	30	16	15.5	–	28	140	70	–	–	504	24490.0021
	110	30	16	15.5	–	28	140	90	–	–	544	24490.0022
with thrust pad, form F – picture 2												
M 6	40	12	5	4.5	12	10	50	30	42.1	7°	24	24490.0106
	50	12	5	4.5	12	10	50	40	52.1	7°	28	24490.0107
M 8	50	14	6	6.0	16	12	60	35	53.0	4°	49	24490.0108
	60	14	6	6.0	16	12	60	45	63.0	4°	54	24490.0109
M10	60	18	8	8.0	20	14	80	40	63.6	3°	97	24490.0110
	70	18	8	8.0	20	14	80	50	73.6	3°	102	24490.0111
M12	70	20	10	8.0	25	18	100	50	74.6	3°	173	24490.0112
	80	20	10	8.0	25	18	100	60	84.6	3°	178	24490.0113
M16	75	24	12	12.0	32	20	120	55	80.4	5°	317	24490.0116
	90	24	12	12.0	32	20	120	70	95.4	5°	342	24490.0117
	110	24	12	12.0	32	20	120	90	115.4	5°	367	24490.0118
M20	75	30	16	15.5	40	28	140	55	80.5	4°	573	24490.0120
	90	30	16	15.5	40	28	140	70	95.5	4°	603	24490.0121
	110	30	16	15.5	40	28	140	90	115.5	4°	643	24490.0122

Tommy Screws • DIN 6306 with moveable pin

EH 24500.



PRODUCT DESCRIPTION

With this version, the pin is moveable and held by the spring.

Material

- Free cutting steel, blackened, pressure lug hardened.

MORE INFORMATION

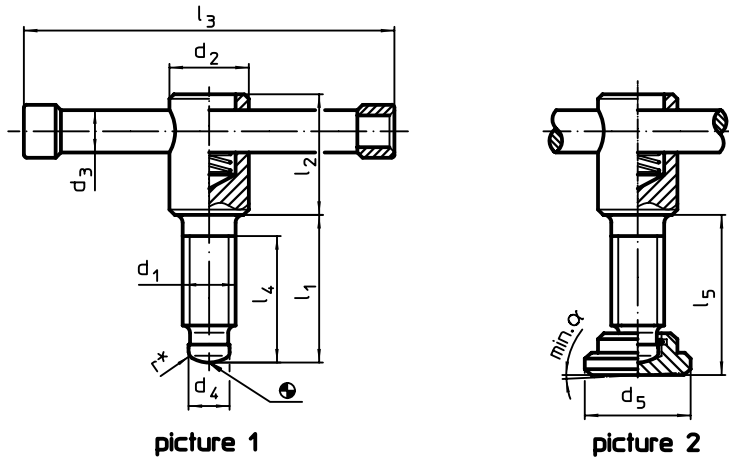
References

Thrust point for thrust pad DIN 6311 form S, EH 22560.

Further products

Thrust Pads, DIN 6311 and low model → p. 282

DRAWING



picture 1

picture 2

* to ease assembly the DIN 6306 specification has been completed by r

ORDER INFORMATION

		Dimensions								α min.		Art. No.
d_1	l_1	d_2	d_3	d_4	d_5	l_2	l_3	l_4	l_5			
[mm]												
without thrust pad, form D – picture 1												
M 8	40	14	6	6.0	–	25	60	32	–	–	44	24500.0008
	50	14	6	6.0	–	25	60	42	–	–	47	24500.0009
M10	40	18	8	8.0	–	32	80	30	–	–	92	24500.0010
	50	18	8	8.0	–	32	80	40	–	–	96	24500.0011
M12	50	20	10	8.0	–	35	100	40	–	–	154	24500.0012
	60	20	10	8.0	–	35	100	50	–	–	162	24500.0013
M16	55	24	13	12.0	–	40	120	45	–	–	298	24500.0016
	70	24	13	12.0	–	40	120	60	–	–	319	24500.0017
	90	24	13	12.0	–	40	120	60	–	–	344	24500.0018
M20	55	30	16	15.5	–	45	140	45	–	–	520	24500.0020
	70	30	16	15.5	–	45	140	60	–	–	550	24500.0021
	90	30	16	15.5	–	45	140	80	–	–	593	24500.0022
with thrust pad, form E – picture 2												
M 8	40	14	6	6.0	16	25	60	32	43.0	3°	53	24500.0108
	50	14	6	6.0	16	25	60	42	53.0	3°	56	24500.0109
M10	40	18	8	8.0	20	32	80	30	43.6	3°	110	24500.0110
	50	18	8	8.0	20	32	80	40	53.6	3°	114	24500.0111
M12	50	20	10	8.0	25	35	100	40	54.6	3°	193	24500.0112
	60	20	10	8.0	25	35	100	50	64.6	3°	198	24500.0113
M16	55	24	13	12.0	32	40	120	45	60.4	5°	357	24500.0116
	70	24	13	12.0	32	40	120	60	75.4	5°	377	24500.0117
	90	24	13	12.0	32	40	120	80	95.4	5°	402	24500.0118
M20	55	30	16	15.5	40	45	140	45	60.5	4°	623	24500.0120
	70	30	16	15.5	40	45	140	60	75.5	4°	653	24500.0121
	90	30	16	15.5	40	45	140	80	95.5	4°	693	24500.0122

Tommy Nuts • DIN 6305 with fixed pin
EH 24510.



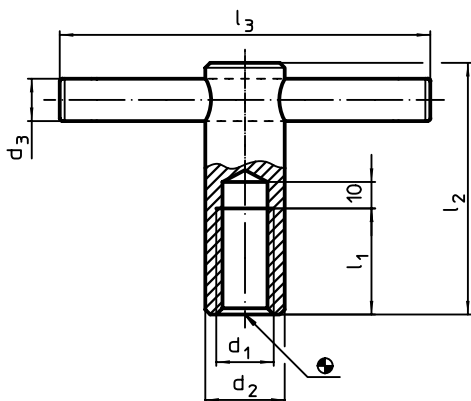
PRODUCT DESCRIPTION

With this version, the pin is pressed in.

Material

- Free cutting steel, blackened

DRAWING

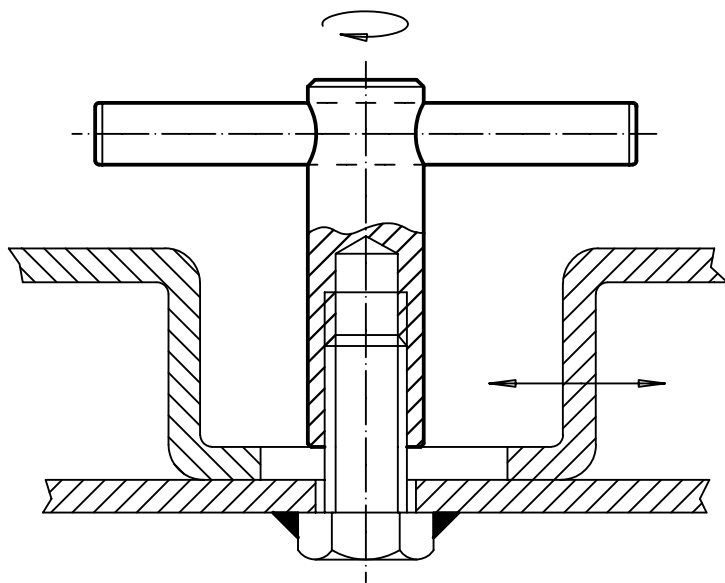


ORDER INFORMATION

Dimensions						Art. No.
d ₁	d ₂	d ₃	l ₁	l ₂	l ₃	
[mm]						[g]
M 8	16	6	16	50	60	24510.0508 ¹⁾
M10	18	8	20	60	80	24510.0510
M12	20	10	25	70	100	24510.0512
M16	24	12	35	85	120	24510.0516
M20	30	16	40	95	140	24510.0520

¹⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE



Tommy Nuts • DIN 6307 with moveable pin

EH 24510.



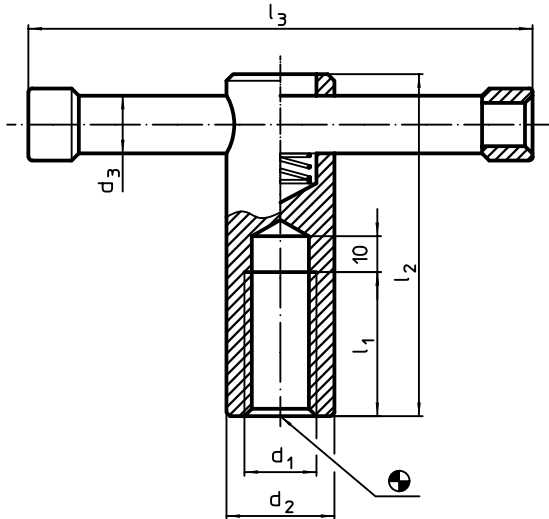
PRODUCT DESCRIPTION

With this version, the pin is moveable and held by the spring.

Material

- Free cutting steel, blackened

DRAWING

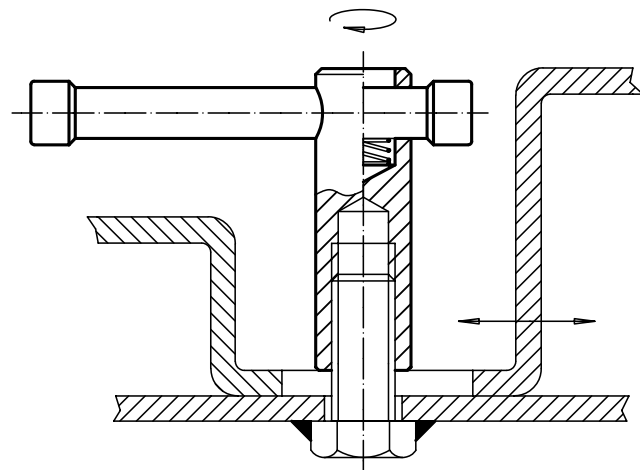


ORDER INFORMATION

d ₁	d ₂	Dimensions				[g]	Art. No.
		d ₃	l ₁	l ₂	l ₃		
M 8	16	6	16	50	60	71	24510.0708¹⁾
M10	18	8	20	60	80	112	24510.0710
M12	20	10	25	70	100	180	24510.0712
M16	24	13	35	85	120	328	24510.0716
M20	30	16	40	95	140	582	24510.0720

¹⁾ DIN standards do not include these dimensions.

APPLICATION EXAMPLE



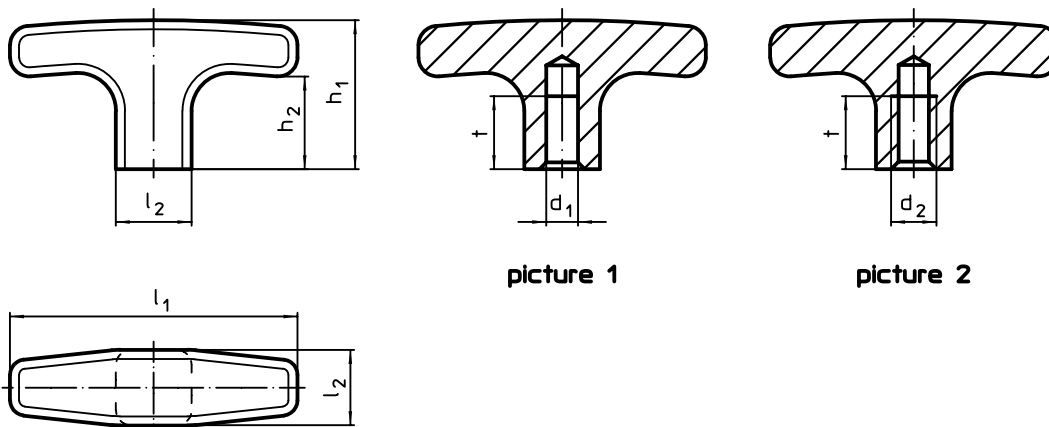


PRODUCT DESCRIPTION


Material

- Aluminium, plastic coated, similar to RAL 9005 black, matt structure

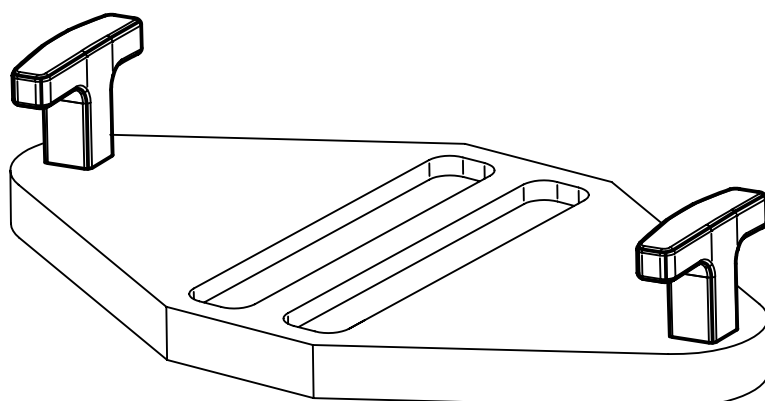
DRAWING



ORDER INFORMATION

d ₁ H7	d ₂	l ₁	Dimensions				t		Art. No.
			l ₂	h ₁	h ₂	[mm]			
with smooth blind hole – picture 1									
6	–	55	14	33	22	12	31	24512.0020	
8	–	67	16	37	25	16	46	24512.0030	
		80	20	41	26	16	80	24512.0035	
with threaded blind hole – picture 2									
–	M 6	55	14	33	22	12	34	24512.0120	
		55	14	33	22	12	31	24512.0125	
	M 8	67	16	37	25	16	48	24512.0130	
		80	20	41	26	16	80	24512.0135	
		M10	80	20	41	26	16	80	24512.0140

APPLICATION EXAMPLE



Mushroom-Type Knobs

EH 24540.



PRODUCT DESCRIPTION

Material

Mushroom-type knob

- Thermosetting plastic PF 31, black

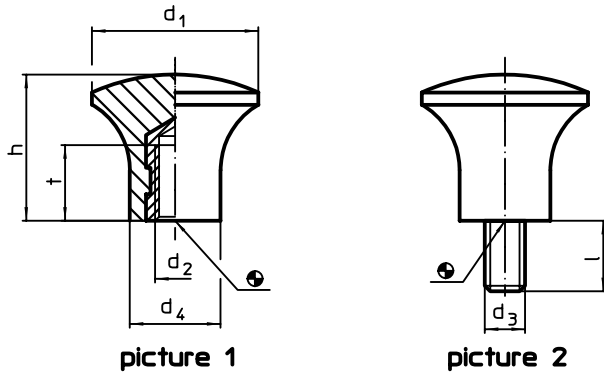
Bushing

- Brass

Screw

- Steel, zinc-plated by galvanization

DRAWING



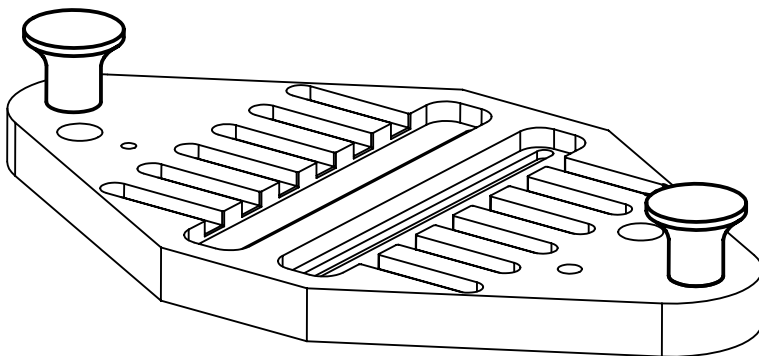
picture 1

picture 2

ORDER INFORMATION

Dimensions							max. [°C]	[g]	Art. No.
d ₁	d ₂	d ₃	l [mm]	d ₄	h	t			
with female thread – picture 1									
17	M5	–	–	10	14	7	110	3.8	24540.0017
21	M6	–	–	12	17	11	110	6.2	24540.0021
25	M6	–	–	14	21	11	110	11.0	24540.0025
33	M8	–	–	18	29	12	110	21.0	24540.0033
with screw – picture 2									
17	–	M5	9	10	14	–	110	4.2	24540.0117
21	–	M6	10	12	17	–	110	7.1	24540.0121
25	–	M6	10	14	21	–	110	10.0	24540.0125
33	–	M8	14	18	29	–	110	23.0	24540.0133

APPLICATION EXAMPLE



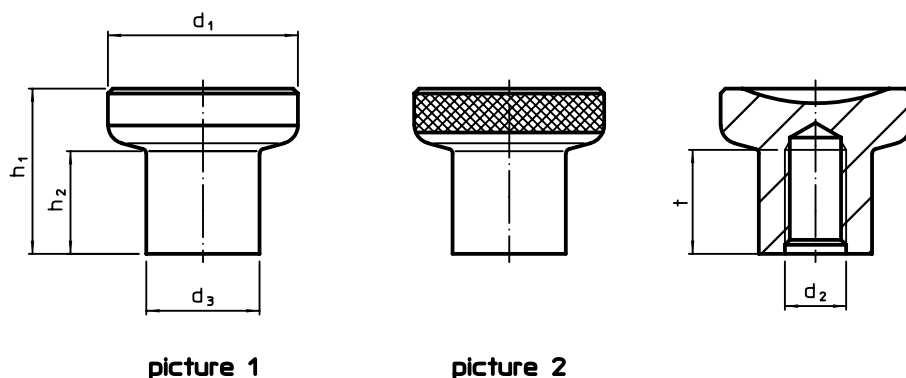


PRODUCT DESCRIPTION

Material

- Steel, blackened
- Stainless steel 1.4305, dull blasted

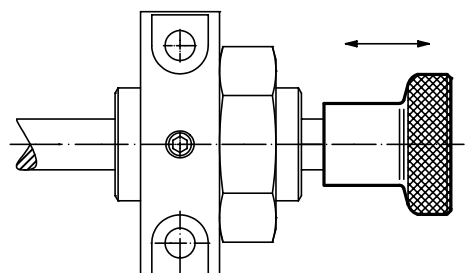
DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions				t min.	[g]	Art. No.	
		d ₃	h ₁	h ₂	Steel			Stainless steel	
[mm]									
without knurling – picture 1									
21	M 4	12.5	18.0	10.5	10	26	24520.0002	24520.0102	
	M 5	12.5	18.0	10.5	10	25	24520.0003	24520.0103	
25	M 6	14.5	22.5	14.0	12	42	24520.0005	24520.0105	
	M 8	14.5	22.5	14.0	12	38	24520.0006	24520.0106	
31	M 8	18.5	27.0	17.0	15	75	24520.0008	24520.0108	
	M10	18.5	27.0	17.0	17	70	24520.0009	24520.0109	
with knurling – picture 2									
21	M 4	12.5	18.0	10.5	10	26	24520.0022	24520.0122	
	M 5	12.5	18.0	10.5	10	25	24520.0023	24520.0123	
25	M 6	14.5	22.5	14.0	12	42	24520.0025	24520.0125	
	M 8	14.5	22.5	14.0	12	39	24520.0026	24520.0126	
31	M 8	18.5	27.0	17.0	15	75	24520.0028	24520.0128	
	M10	18.5	27.0	17.0	17	70	24520.0029	24520.0129	

APPLICATION EXAMPLE



Conical Knobs

EH 24550.

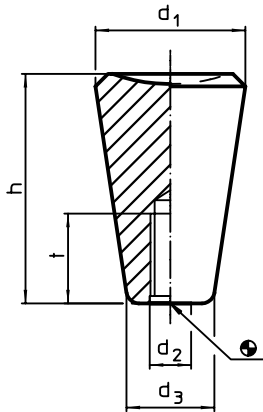


PRODUCT DESCRIPTION

Material

- Thermosetting plastic PF 31, black

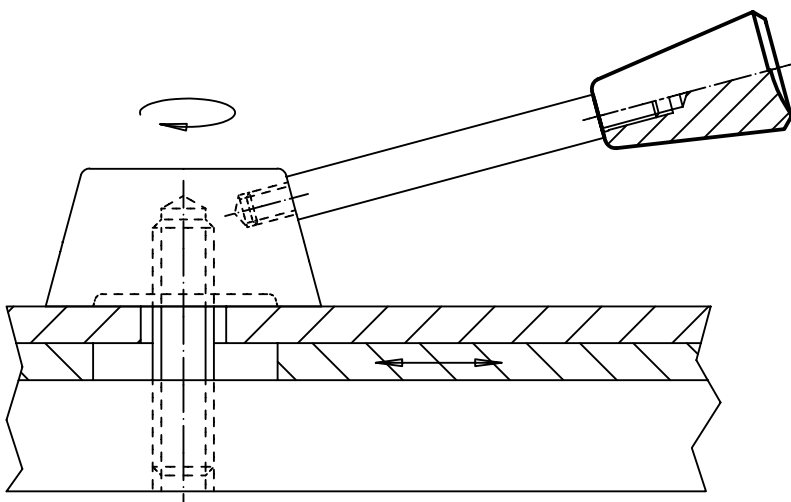
DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions			t min.	max. [°C]	[g]	Art. No.
		d ₃ ~ [mm]	h					
20	M 5	12	30	18	110	7.8	24550.0010	
	M 6	12	30	18	110	7.4	24550.0011	
25	M 6	15	38	18	110	18.0	24550.0020	
	M 8	15	38	18	110	17.0	24550.0021	
30	M 8	18	46	18	110	26.0	24550.0030	
	M10	18	46	18	110	25.0	24550.0031	
35	M10	21	53	21	110	46.0	24550.0040	
	M12	21	53	21	110	43.0	24550.0041	

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

The DIN 319 ball knobs are jointless and polished.

Material

- DIN 7708 - thermosetting plastic (PF 31), red similar to RAL 3003

Bushing

- Steel, zinc-plated by galvanization
- Brass

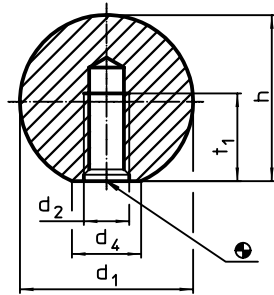
Assembly

Assembly instruction for form M: Fitted by lightly tapping with a hammer, holds in position without being cemented. For the counter element a h9-fit is sufficient.

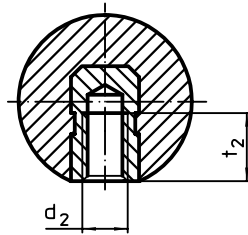
Ball

- DIN 7708 - thermosetting plastic (PF 31), black similar to RAL 9005

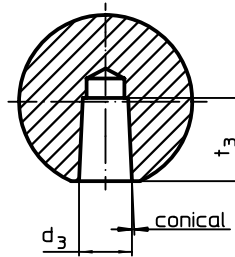
DRAWING



picture 1



picture 2



picture 3

ORDER INFORMATION

Dimensions									For pin h9	max. [°C]	[g]	Art. No.	
d ₁	d ₂	d ₃	d ₄ ~	h ~	t ₁ min.	t ₂ min.	t ₃ min.	black				red	
[mm]									[mm]	[°C]	[g]		
with moulded material thread, form C – picture 1													
16	M 4	-	8	15.0	7	-	-	-	-	110	3.2	24560.0016	24560.0516
20	M 5	-	12	18.0	9	-	-	-	-	110	5.2	24560.0020	24560.0520
25	M 6	-	15	22.5	11	-	-	-	-	110	10.0	24560.0025	24560.0525
32	M 8	-	18	29.0	14	-	-	-	-	110	22.0	24560.0032	24560.0532
40	M10	-	22	37.0	18	-	-	-	-	110	42.0	24560.0040	24560.0540
50	M12	-	28	46.0	21	-	-	-	-	110	86.0	24560.0050	24560.0550
with threaded bushing, form E – picture 2													
16	M 4	-	8	15.0	-	6.0	-	-	-	110	3.9	24560.0116 ¹⁾	24560.0616 ¹⁾
20	M 5	-	12	18.0	-	7.5	-	-	-	110	8.0	24560.0120	24560.0620
25	M 6	-	15	22.5	-	9.0	-	-	-	110	14.0	24560.0125	24560.0625
32	M 8	-	18	29.0	-	12.0	-	-	-	110	26.0	24560.0132	24560.0632
40	M10	-	22	37.0	-	15.0	-	-	-	110	56.0	24560.0140	24560.0640
50	M12	-	28	46.0	-	18.0	-	-	-	110	108.0	24560.0150	24560.0650
with taper bore form M – picture 3													
16	-	4	8	15.0	-	-	9	4	110	2.7	24560.0216	-	
20	-	5	12	18.0	-	-	12	5	110	5.1	24560.0220	-	
25	-	6	15	22.5	-	-	15	6	110	9.3	24560.0225	-	
32	-	8	18	29.0	-	-	15	8	110	19.0	24560.0232	-	
40	-	10	22	37.0	-	-	20	10	110	39.0	24560.0240	-	
50	-	12	28	46.0	-	-	22	12	110	84.0	24560.0250	-	

¹⁾ bushing from brass

Ball Knobs • metal types similar to DIN 319

EH 24561.



PRODUCT DESCRIPTION

Material

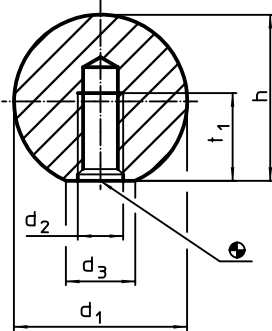
- Steel, polished, bright
- Stainless steel 1.4305, dull blasted
- Aluminium, polished

MORE INFORMATION

Notes

Supplement DIN 319 Form C about metallic versions.

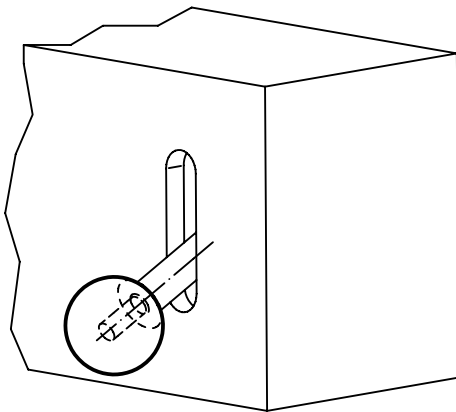
DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions			[g]	Art. No.		
		d ₃ ~ [mm]	h ~	t ₁ min.		Steel	Stainless steel	Aluminium Al
16	M 4	8	15.0	7.0	16	24561.0016	24561.0216	24561.0116
20	M 5	12	18.0	9.0	26	24561.0020	24561.0220	24561.0120
25	M 6	15	22.5	11.0	58	24561.0025	24561.0225	24561.0125
32	M 8	18	29.0	14.5	116	24561.0032	24561.0232	24561.0132
40	M10	22	37.0	18.0	241	24561.0040	24561.0240	24561.0140
50	M12	27	46.0	21.0	475	24561.0050	-	24561.0150

APPLICATION EXAMPLE



Star Grips • DIN 6336 grey cast iron
EH 24650.



PRODUCT DESCRIPTION

These star grips are manufactured according to DIN 6336. Sandblasted or tumbled.

Material

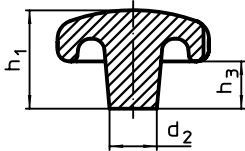
- Handle**
- Grey cast iron GG 20, bright

MORE INFORMATION

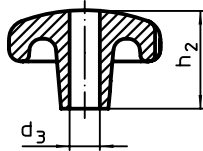
Notes

Grips with different bores or surface treatment can be obtained on request.

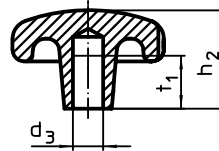
DRAWING



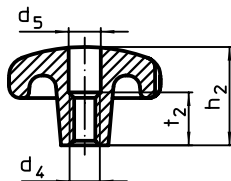
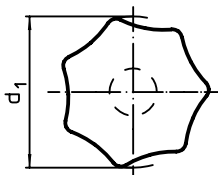
picture 1



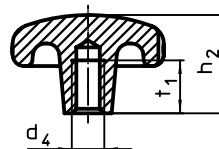
picture 2



picture 3



picture 4



picture 5

ORDER INFORMATION

Dimensions											[g]	Art. No.
d ₁	d ₂	d ₃ H7	d ₄	d ₅	h ₁	h ₂	h ₃	t ₁ min.	t ₂			
[mm]												
raw part, form A – picture 1												
32	12	–	–	–	21	–	10	–	–	55	24650.0032	
40	14	–	–	–	26	–	13	–	–	77	24650.0040	
50	18	–	–	–	34	–	17	–	–	147	24650.0050	
63	20	–	–	–	42	–	21	–	–	314	24650.0063	
80	25	–	–	–	52	–	25	–	–	629	24650.0080	
with smooth throughgoing bore, form B – picture 2												
32	12	6	–	–	–	20	–	–	–	186	24650.0132	
40	14	8	–	–	–	25	–	–	–	72	24650.0140	
50	18	10	–	–	–	32	–	–	–	130	24650.0150	
63	20	12	–	–	–	40	–	–	–	275	24650.0163	
80	25	16	–	–	–	50	–	–	–	548	24650.0180	
with smooth blind hole, form C – picture 3												
32	12	6	–	–	–	20	–	12	–	40	24650.0232	
40	14	8	–	–	–	25	–	15	–	74	24650.0240	
50	18	10	–	–	–	32	–	18	–	133	24650.0250	
63	20	12	–	–	–	40	–	22	–	280	24650.0263	
80	25	16	–	–	–	50	–	28	–	573	24650.0280	
with thread, drilled out, form D – picture 4												
32	12	–	M 6	6.4	–	20	–	–	10	39	24650.0332	
40	14	–	M 8	8.4	–	25	–	–	13	72	24650.0340	
50	18	–	M10	10.5	–	32	–	–	16	125	24650.0350	
63	20	–	M12	13.0	–	40	–	–	20	277	24650.0363	
80	25	–	M16	17.0	–	50	–	–	20	541	24650.0380	
with threaded blind hole, form E – picture 5												
32	12	–	M 6	–	–	20	–	12	–	40	24650.0432	
40	14	–	M 8	–	–	25	–	15	–	186	24650.0440	
50	18	–	M10	–	–	32	–	18	–	132	24650.0450	
63	20	–	M12	–	–	40	–	22	–	280	24650.0463	
80	25	–	M16	–	–	50	–	28	–	572	24650.0480	

Star Grips • DIN 6336 light metal

EH 24660.



PRODUCT DESCRIPTION

These star grips are manufactured according to DIN 6336.

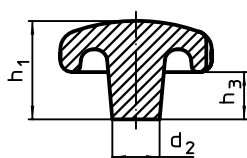
Material

- Light metal Al, polished

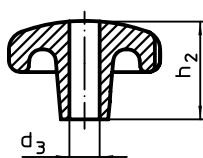
Handle

- Light metal Al, unpolished

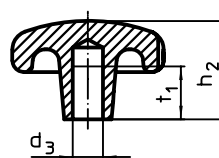
DRAWING



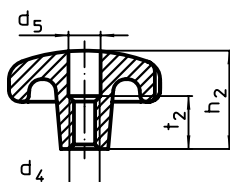
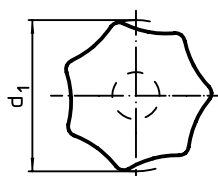
picture 1



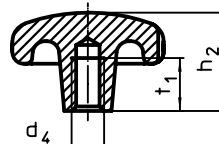
picture 2



picture 3



picture 4



picture 5

ORDER INFORMATION

d ₁	d ₂	d ₃ H7	d ₄	Dimensions						[g]	Art. No.		
				d ₅	h ₁	h ₂	h ₃	t ₁ min.	t ₂		unpolished	polished	
[mm]													
raw part, form A – picture 1													
40	14	–	–	–	26	–	13	–	–	36	24660.0040	–	
50	18	–	–	–	34	–	17	–	–	70	24660.0050	–	
63	20	–	–	–	42	–	21	–	–	128	24660.0063	–	
80	25	–	–	–	52	–	25	–	–	245	24660.0080	–	
with smooth blind hole, form C – picture 3													
40	14	8	–	–	–	25	–	15	–	30	24660.0240	24660.0640	
50	18	10	–	–	–	32	–	18	–	63	24660.0250	24660.0650	
63	20	12	–	–	–	40	–	22	–	117	24660.0263	24660.0663	
80	25	16	–	–	–	50	–	28	–	223	24660.0280	24660.0680	
with thread, drilled out, form D – picture 4													
40	14	–	M 8	8.4	–	25	–	–	–	13	32	24660.0340	24660.0740
50	18	–	M10	10.5	–	32	–	–	–	16	62	24660.0350	24660.0750
63	20	–	M12	13.0	–	40	–	–	–	20	109	24660.0363	24660.0763
80	25	–	M16	17.0	–	50	–	–	–	20	218	24660.0380	24660.0780
with threaded blind hole, form E – picture 5													
40	14	–	M 8	–	–	25	–	15	–	33	24660.0440	24660.0840	
50	18	–	M10	–	–	32	–	18	–	63	24660.0450	24660.0850	
63	20	–	M12	–	–	40	–	22	–	118	24660.0463	24660.0863	
80	25	–	M16	–	–	50	–	28	–	227	24660.0480	24660.0880	

Star Grips • DIN 6336 stainless steel die-cast
EH 24661.



PRODUCT DESCRIPTION

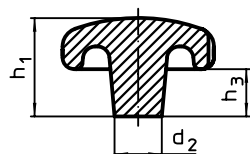
These star grips are manufactured according to DIN 6336.

Material

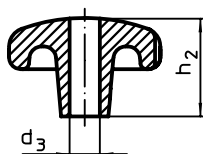
Handle

- Stainless steel A2, dull blasted

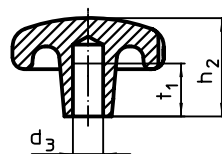
DRAWING



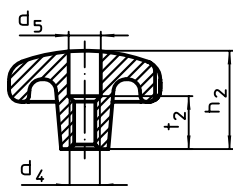
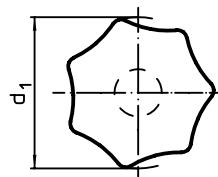
picture 1



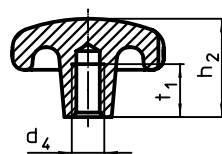
picture 2



picture 3




picture 4



picture 5

ORDER INFORMATION

Dimensions											Art. No.
d ₁	d ₂	d ₄	d ₅	h ₁	h ₂	h ₃	t _{1 min.}	t ₂	[g]		
[mm]											
raw part, form A – picture 1											
32	12	–	–	21	–	10	–	–	–	56	24661.0032
40	14	–	–	26	–	13	–	–	–	85	24661.0040
50	18	–	–	34	–	17	–	–	–	181	24661.0050
63	20	–	–	42	–	21	–	–	–	319	24661.0063
with thread, drilled out, form D – picture 4											
32	12	M 6	6.4	–	20	–	–	10	–	52	24661.0332
40	14	M 8	8.4	–	25	–	–	13	–	75	24661.0340
50	18	M10	10.5	–	32	–	–	16	–	149	24661.0350
63	20	M12	13.0	–	40	–	–	20	–	279	24661.0363
with threaded blind hole, form E – picture 5											
32	12	M 6	–	–	20	–	12	–	–	53	24661.0432
40	14	M 8	–	–	25	–	15	–	–	77	24661.0440
50	18	M10	–	–	32	–	18	–	–	158	24661.0450
63	20	M12	–	–	40	–	22	–	–	296	24661.0463

Star Grips • DIN 6336 plastic

EH 24670.



PRODUCT DESCRIPTION

Material

- Stainless steel A2

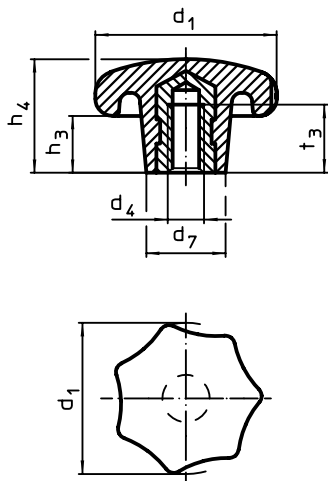
Bushing

- Brass
- Steel, zinc-plated by galvanization

Handle

- DIN 7708 - thermosetting plastic (PF 31), black similar to RAL 9005

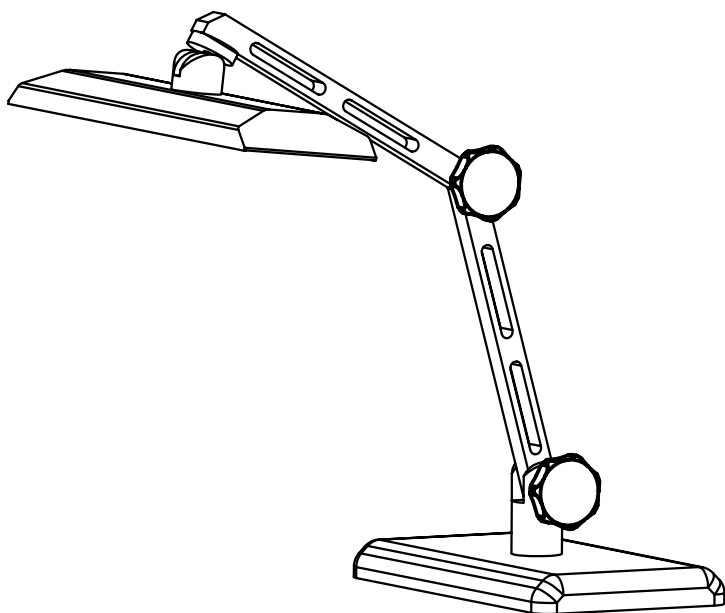
DRAWING



ORDER INFORMATION

Dimensions						max. [°C]	[g]	Art. No.		
d ₁	d ₄	d ₇	h ₃	h ₄	t ₃			Brass	Steel	Stainless steel
[mm]										
with threaded bushing, form K										
20	M 4	10	7	13	6.5	110	3.4	24670.0220	–	–
25	M 5	12	8	16	9.5	110	7.4	–	24670.0225	24670.1225
32	M 6	14	10	20	12.0	110	13.0	–	24670.0232	24670.1232
40	M 8	18	13	25	14.0	110	20.0	–	24670.0240	24670.1240
50	M10	22	17	32	18.0	110	40.0	–	24670.0250	24670.1250
63	M12	26	21	40	22.0	110	83.0	–	24670.0263	24670.1263
80	M16	35	25	50	30.0	110	161.0	–	24670.0280	24670.1280

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

Material

Handle

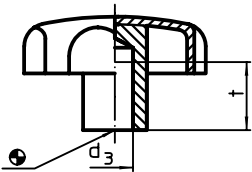
- Stainless steel 1.4301, dull blasted

MORE INFORMATION

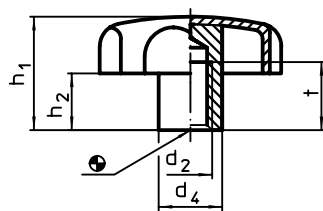
Notes

Grip: Sheet-iron drawn. **Hub:** Butt-welded

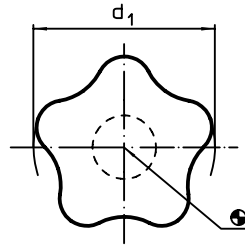
DRAWING



picture 1



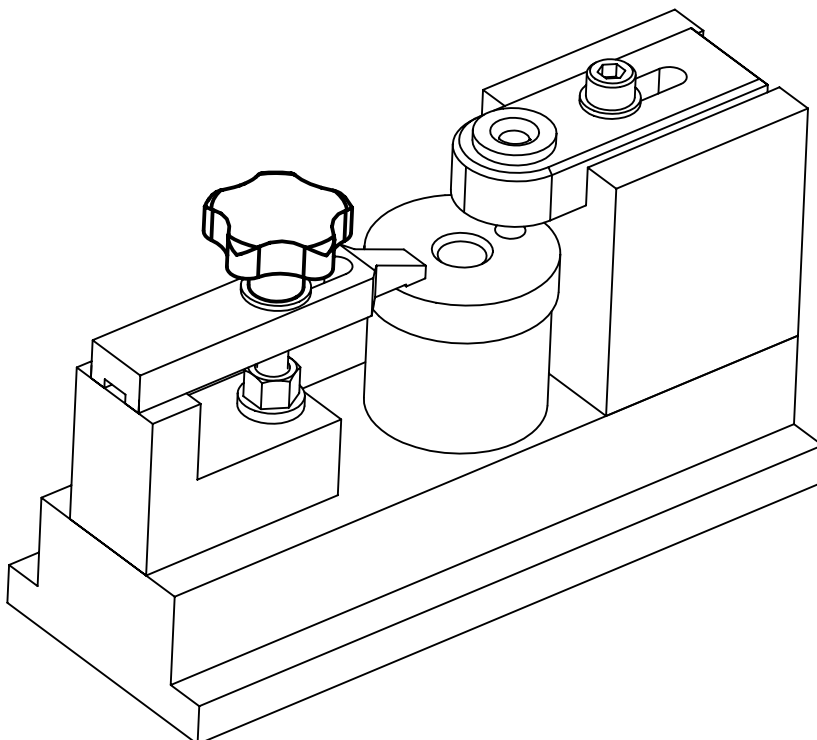
picture 2



ORDER INFORMATION

d ₁	d ₂	d ₃ H7	Dimensions				t min.	[g]	Art. No.
			d ₄ [mm]	h ₁ ~	h ₂ ~				
with smooth blind hole – picture 1									
40	–	8	14	25	12.5	15	37	24690.0240	
50	–	10	18	32	17.5	18	68	24690.0250	
60	–	12	20	40	21.0	22	110	24690.0260	
with threaded blind hole – picture 2									
40	M 8	–	14	25	12.5	15	37	24690.0440	
50	M10	–	18	32	17.5	18	69	24690.0450	
60	M12	–	20	40	21.0	22	112	24690.0460	

APPLICATION EXAMPLE



Star Grips • similar to DIN 6336, stainless steel A4

EH 24691.



PRODUCT DESCRIPTION

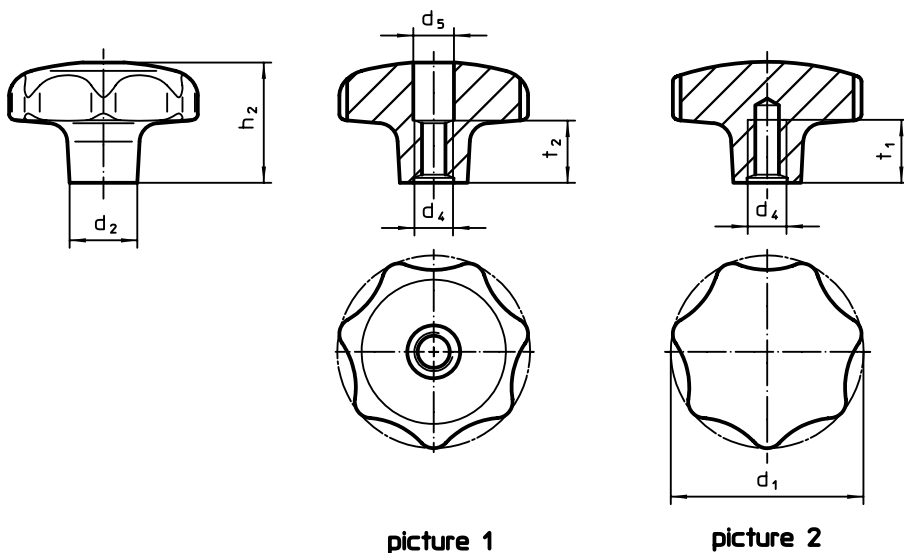
Version without dirt trap. Convenient for all applications having high hygienic requirements (e.g. food industry). The stainless steel A4 version ensures maximum corrosion resistance.

Material

Handle

- Stainless steel 1.4408, precision casting, polished

DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₄	Dimensions				[g]	Art. No.
			d ₅	h ₂	t ₁ min.	t ₂		
[mm]								
with thread, drilled-out – picture 1								
32	12	M 6	6.4	20	–	10	57	24691.1332
40	14	M 8	8.4	25	–	13	103	24691.1340
50	18	M10	10.0	32	–	16	209	24691.1350
63	20	M12	13.0	40	–	20	384	24691.1363
with threaded blind hole – picture 2								
32	12	M 6	–	20	12	–	59	24691.1432
40	14	M 8	–	25	15	–	107	24691.1440
50	18	M10	–	32	18	–	221	24691.1450
63	20	M12	–	40	22	–	389	24691.1463



PRODUCT DESCRIPTION

Material

Handle

- Stainless steel 1.4301, dull blasted

Screw

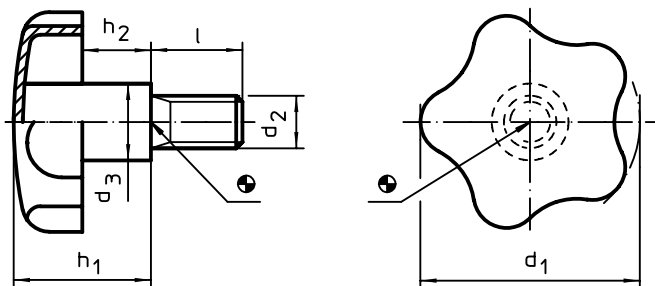
- Stainless steel 1.4301

MORE INFORMATION

Notes

Grip: Sheet-iron drawn. **Hub:** Butt-welded

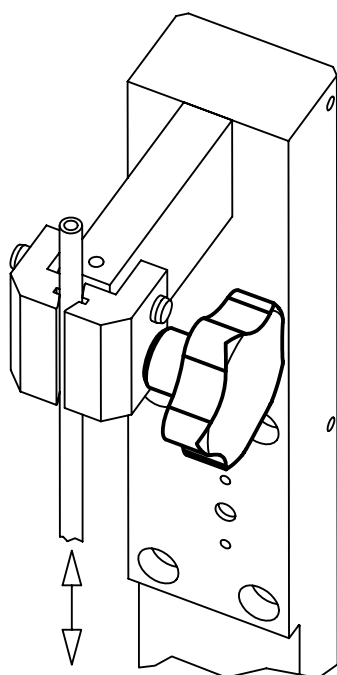
DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions				[g]	Art. No.
		l	d ₃	h ₁ ~	h ₂ ~		
[mm]							
40	M 8	20	14	24.0	12.0	50	24690.0140
		30	14	24.0	12.0	55	24690.0142
		40	14	24.0	12.0	57	24690.0144
50	M10	20	18	30.0	16.5	95	24690.0150
		30	18	30.0	16.5	97	24690.0152
		40	18	30.0	16.5	102	24690.0154
60	M12	30	20	37.5	20.0	155	24690.0160
		40	20	37.5	20.0	162	24690.0162
		50	20	37.5	20.0	169	24690.0164

APPLICATION EXAMPLE



Star Grips • stainless steel, solid

EH 24690.



PRODUCT DESCRIPTION

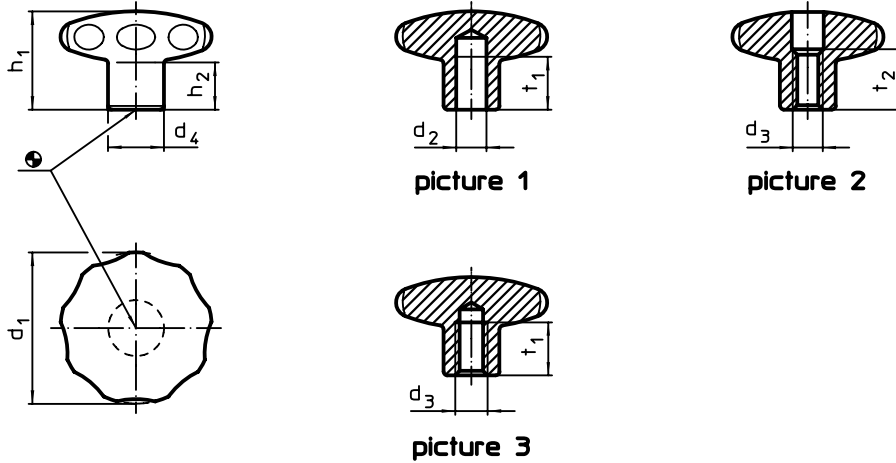
Version without dirt trap. Convenient for all applications having high hygienic requirements (e.g. food industry).

Material

Handle

- Stainless steel 1.4305, dull blasted

DRAWING



ORDER INFORMATION

d ₁	d ₂ h ₇	d ₃	Dimensions					[g]	Art. No.
			d ₄	h ₁	h ₂	t ₁ min.	t ₂		
[mm]									
with smooth blind hole – picture 1									
40	8	–	18	30.5	15	12	–	131	24690.0643
50	10	–	21	34.0	17	15	–	223	24690.0653
60	12	–	25	39.0	18	18	–	388	24690.0663
with thread, drilled-out – picture 2									
40	–	M 8	18	30.5	15	–	13	140	24690.0644
50	–	M10	21	34.0	17	–	16	216	24690.0654
60	–	M12	25	39.0	18	–	20	362	24690.0664
with threaded blind hole – picture 3									
40	–	M 6	18	30.5	15	12	–	134	24690.0645
		M 8	18	30.5	15	12	–	132	24690.0646
50	–	M 8	21	34.0	17	15	–	226	24690.0655
		M10	21	34.0	17	15	–	270	24690.0656
60	–	M10	25	39.0	18	18	–	395	24690.0665
		M12	25	39.0	18	18	–	384	24690.0666

Star Grip Screws • DIN 6336 plastic
EH 24740.



PRODUCT DESCRIPTION

Material

- Stainless steel A2

Handle

- DIN 7708 - thermosetting plastic (PF 31), black similar to RAL 9005

MORE INFORMATION

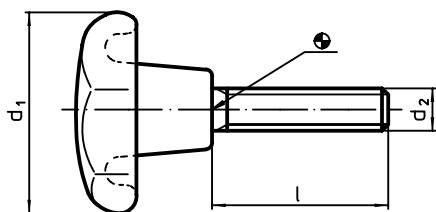
Notes

Special types, e.g. differing lengths or screws from brass / stainless steel on request.

Screw

- Steel, zinc-plated by galvanization

DRAWING



ORDER INFORMATION

Dimensions			max. [°C]	[g]	Art. No.	
d ₁	d ₂ [mm]	l			Steel	Stainless steel
form L						
25	M 5	10	110	7.3	24740.0051	24740.1051
		15	110	7.4	24740.0053	24740.1053
		20	110	8.7	24740.0056	24740.1056
		25	110	8.7	24740.0058	24740.1058
		30	110	9.2	24740.0059	24740.1059
32	M 6	15	110	14.0	24740.0101	24740.1101
		20	110	15.0	24740.0104	24740.1104
		25	110	14.0	24740.0106	24740.1106
		30	110	16.0	24740.0107	24740.1107
		40	110	17.0	24740.0110	24740.1110
40	M 8	20	110	28.0	24740.0152	24740.1152
		25	110	31.0	24740.0154	24740.1154
		30	110	32.0	24740.0155	24740.1155
		40	110	35.0	24740.0158	24740.1158
		50	110	38.0	24740.0160	24740.1160
50	M10	25	110	51.0	24740.0202	24740.1202
		30	110	54.0	24740.0203	24740.1203
		40	110	60.0	24740.0206	24740.1206
		50	110	64.0	24740.0208	24740.1208
		60	110	73.0	24740.0209	24740.1209
63	M12	30	110	101.0	24740.0251	24740.1251
		40	110	108.0	24740.0254	24740.1254
		50	110	115.0	24740.0256	24740.1256
		60	110	121.0	24740.0257	24740.1257
		80	110	143.0	24740.0260	24740.1260
80	M16	40	110	223.0	24740.0302	24740.1302
		50	110	237.0	24740.0304	24740.1304
		60	110	249.0	24740.0305	24740.1305
		80	110	274.0	24740.0308	24740.1308

Star Grip Screws • similar to DIN 6336, stainless steel

EH 24741.



PRODUCT DESCRIPTION

These star grip screws are manufactured according to DIN 6336, but it is a version without dirty edges. This makes these star grip screws suitable for all areas of application with high hygienic requirements.

Material

Handle

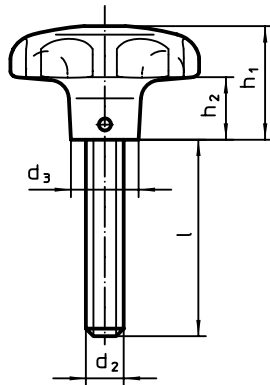
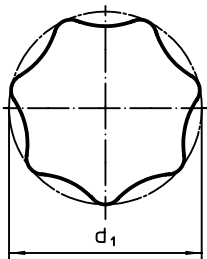
- Stainless steel 1.4308, precision casting, matt blasted

Screw

- Stainless steel 1.4305

4

DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions				[g]	Art. No.
		l	d ₃	h ₁	h ₂		
		[mm]					
40	M 8	20	14	25	12	89	24741.0005
		25	14	25	12	87	24741.0010
		30	14	25	12	97	24741.0015
		40	14	25	12	93	24741.0020
50	M10	20	18	32	15	171	24741.0025
		25	18	32	15	172	24741.0030
		30	18	32	15	177	24741.0035
		45	18	32	15	187	24741.0040
		55	18	32	15	194	24741.0045
63	M12	30	20	40	19	343	24741.0050
		40	20	40	19	338	24741.0055
		50	20	40	19	329	24741.0060

Star Grip Screws • similar to DIN 6336, stainless steel A4
EH 24741.



PRODUCT DESCRIPTION

These star grip screws are manufactured according to DIN 6336, but it is a version without dirty edges. This makes these star grip screws suitable for all areas of application with high hygienic requirements. The stainless steel A4 version ensures maximum corrosion resistance.

Material

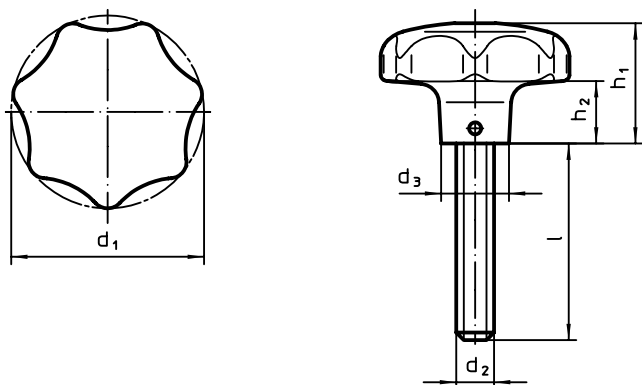
Handle

- Stainless steel 1.4408, precision casting, polished

Screw

- Stainless steel A4

DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions				[g]	Art. No.
		l	d ₃	h ₁	h ₂		
[mm]							
40	M 8	20	14	25	12	118	24741.0105
		25	14	25	12	115	24741.0110
		30	14	25	12	120	24741.0115
		40	14	25	12	124	24741.0120
50	M10	20	18	32	15	229	24741.0125
		25	18	32	15	232	24741.0130
		30	18	32	15	234	24741.0135
		45	18	32	15	242	24741.0140
		55	18	32	15	252	24741.0145
63	M12	30	20	40	19	429	24741.0150
		40	20	40	19	435	24741.0155
		50	20	40	19	442	24741.0160

Star Grips • plastic

EH 24750.



PRODUCT DESCRIPTION

Material

Cap

- Thermoplastic PA, black similar to RAL 9005
- Thermoplastic PA, white similar to RAL 9019
- Thermoplastic PA, orange similar to RAL 2004
- Thermoplastic PA, yellow similar to RAL 1016
- Thermoplastic PA, blue similar to RAL 5015

Handle

- Thermoplastic PA 6, black similar to RAL 9005

Threaded bushing

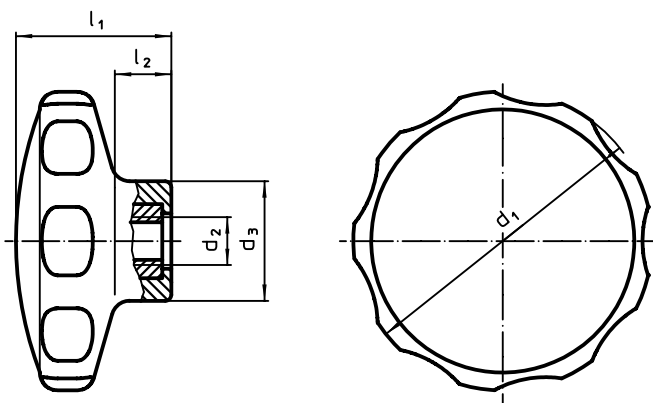
- Stainless steel

MORE INFORMATION

Notes

Special types, e.g. differing threads, on request.

DRAWING



ORDER INFORMATION

Dimensions					Temperature		Weight [g]	Art. No.				
d ₁	d ₂	d ₃	l ₁	l ₂	min.	max.		black	white	orange	yellow	blue
[mm]					[°C]							
30	M 4	14.0	19	7	-30	80	5.5	24750.0030	24750.0031	24750.0032	24750.0033	24750.0034
	M 5	14.0	19	7	-30	80	5.7	24750.0035	24750.0036	24750.0037	24750.0038	24750.0039
40	M 5	16.5	22	9	-30	80	8.2	24750.0040	24750.0041	24750.0042	24750.0043	24750.0044
	M 6	16.5	22	9	-30	80	9.5	24750.0045	24750.0046	24750.0047	24750.0048	24750.0049
50	M 6	22.0	26	10	-30	80	16.0	24750.0050	24750.0051	24750.0052	24750.0053	24750.0054
	M 8	22.0	26	10	-30	80	19.0	24750.0055	24750.0056	24750.0057	24750.0058	24750.0059
62	M 8	22.0	35	13	-30	80	30.0	24750.0060	24750.0061	24750.0062	24750.0063	24750.0064
	M10	22.0	35	13	-30	80	39.0	24750.0065	24750.0066	24750.0067	24750.0068	24750.0069

Star Grip Screws • plastic
EH 24750.



PRODUCT DESCRIPTION

Material

Cap

- Thermoplastic PA, black similar to RAL 9005
- Thermoplastic PA, white similar to RAL 9019
- Thermoplastic PA, orange similar to RAL 2004
- Thermoplastic PA, yellow similar to RAL 1016
- Thermoplastic PA, blue similar to RAL 5015

Handle

- Thermoplastic PA 6, black similar to RAL 9005

Screw

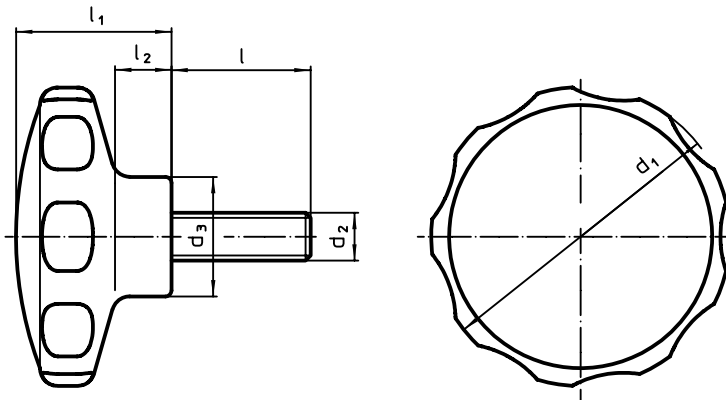
- Stainless steel

MORE INFORMATION

Notes

Special types, e.g. differing threads or thread lengths, on request.



DRAWING



ORDER INFORMATION

Dimensions						Temperature		Weight	Art. No.				
d ₁	d ₂	l	d ₃	l ₁	l ₂	min.	max.	[g]	black	white	orange	yellow	blue
[mm]						[°C]							
30	M 4	10	14.0	19	7	-30	80	6.1	24750.0100	24750.0101	24750.0102	24750.0103	24750.0104
		14	14.0	19	7	-30	80	6.6	24750.0110	24750.0111	24750.0112	24750.0113	24750.0114
		18	14.0	19	7	-30	80	6.9	24750.0120	24750.0121	24750.0122	24750.0123	24750.0124
		23	14.0	19	7	-30	80	7.3	24750.0130	24750.0131	24750.0132	24750.0133	24750.0134
		28	14.0	19	7	-30	80	7.7	24750.0140	24750.0141	24750.0142	24750.0143	24750.0144
	M 5	10	14.0	19	7	-30	80	7.5	24750.0150	24750.0151	24750.0152	24750.0153	24750.0154
		14	14.0	19	7	-30	80	7.9	24750.0160	24750.0161	24750.0162	24750.0163	24750.0164
		18	14.0	19	7	-30	80	8.4	24750.0170	24750.0171	24750.0172	24750.0173	24750.0174
		23	14.0	19	7	-30	80	9.0	24750.0180	24750.0181	24750.0182	24750.0183	24750.0184
		28	14.0	19	7	-30	80	9.0	24750.0190	24750.0191	24750.0192	24750.0193	24750.0194
40	M 5	10	16.5	22	9	-30	80	9.6	24750.0200	24750.0201	24750.0202	24750.0203	24750.0204
		14	16.5	22	9	-30	80	10.0	24750.0210	24750.0211	24750.0212	24750.0213	24750.0214
		18	16.5	22	9	-30	80	11.0	24750.0220	24750.0221	24750.0222	24750.0223	24750.0224
		23	16.5	22	9	-30	80	12.0	24750.0230	24750.0231	24750.0232	24750.0233	24750.0234
		28	16.5	22	9	-30	80	12.0	24750.0240	24750.0241	24750.0242	24750.0243	24750.0244
	M 6	14	16.5	22	9	-30	80	12.0	24750.0250	24750.0251	24750.0252	24750.0253	24750.0254
		18	16.5	22	9	-30	80	13.0	24750.0260	24750.0261	24750.0262	24750.0263	24750.0264
		23	16.5	22	9	-30	80	14.0	24750.0270	24750.0271	24750.0272	24750.0273	24750.0274
		28	16.5	22	9	-30	80	15.0	24750.0280	24750.0281	24750.0282	24750.0283	24750.0284
		38	16.5	22	9	-30	80	16.0	24750.0290	24750.0291	24750.0292	24750.0293	24750.0294

→

d ₁	d ₂	Dimensions				 min. max. [°C]		 [g]	Art. No.				
		l	d ₃	l ₁	l ₂	black	white		orange	yellow	blue		
[mm]													
50	M 6	14	22.0	26	10	-30	80	19.0	24750.0300	24750.0301	24750.0302	24750.0303	24750.0304
		18	22.0	26	10	-30	80	19.0	24750.0310	24750.0311	24750.0312	24750.0313	24750.0314
		23	22.0	26	10	-30	80	20.0	24750.0320	24750.0321	24750.0322	24750.0323	24750.0324
		28	22.0	26	10	-30	80	21.0	24750.0330	24750.0331	24750.0332	24750.0333	24750.0334
		38	22.0	26	10	-30	80	23.0	24750.0340	24750.0341	24750.0342	24750.0343	24750.0344
	M 8	18	22.0	26	10	-30	80	26.0	24750.0350	24750.0351	24750.0352	24750.0353	24750.0354
		23	22.0	26	10	-30	80	27.0	24750.0360	24750.0361	24750.0362	24750.0363	24750.0364
		28	22.0	26	10	-30	80	29.0	24750.0370	24750.0371	24750.0372	24750.0373	24750.0374
		38	22.0	26	10	-30	80	32.0	24750.0380	24750.0381	24750.0382	24750.0383	24750.0384
		48	22.0	26	10	-30	80	35.0	24750.0390	24750.0391	24750.0392	24750.0393	24750.0394
62	M 8	18	22.0	35	13	-30	80	40.0	24750.0400	24750.0401	24750.0402	24750.0403	24750.0404
		23	22.0	35	13	-30	80	41.0	24750.0410	24750.0411	24750.0412	24750.0413	24750.0414
		28	22.0	35	13	-30	80	43.0	24750.0420	24750.0421	24750.0422	24750.0423	24750.0424
		38	22.0	35	13	-30	80	46.0	24750.0430	24750.0431	24750.0432	24750.0433	24750.0434
		48	22.0	35	13	-30	80	49.0	24750.0440	24750.0441	24750.0442	24750.0443	24750.0444
	M10	23	22.0	35	13	-30	80	51.0	24750.0450	24750.0451	24750.0452	24750.0453	24750.0454
		28	22.0	35	13	-30	80	54.0	24750.0460	24750.0461	24750.0462	24750.0463	24750.0464
		38	22.0	35	13	-30	80	59.0	24750.0470	24750.0471	24750.0472	24750.0473	24750.0474
		48	22.0	35	13	-30	80	64.0	24750.0480	24750.0481	24750.0482	24750.0483	24750.0484
		58	22.0	35	13	-30	80	69.0	24750.0490	24750.0491	24750.0492	24750.0493	24750.0494

4

Palm Grips • DIN 6335 grey cast iron
EH 24620.



PRODUCT DESCRIPTION

These palm grips are manufactured according to DIN 6335. Sandblasted or tumbled.

Material

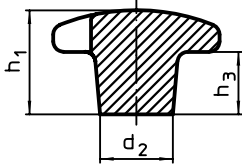
- Handle**
- Grey cast iron GG 20, bright

MORE INFORMATION

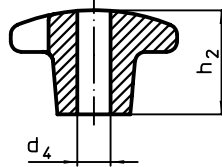
Notes

Grips with different bores or surface treatment can be obtained on request.

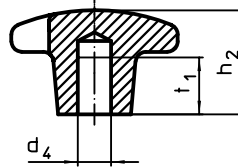
DRAWING



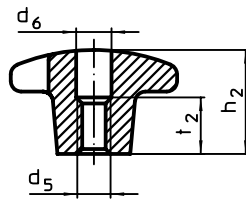
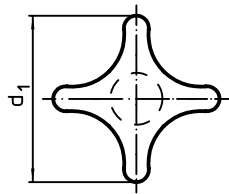
picture 1



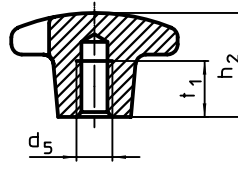
picture 2



picture 3



picture 4




picture 5

ORDER INFORMATION

Dimensions										[g]	Art. No.
d ₁	d ₂	d ₂ H7	d ₅	d ₆	h ₁	h ₂	h ₃	t ₁	t ₂		
[mm]											
raw part, form A – picture 1											
32	12	–	–	–	21	–	10	–	–	38	24620.0032
40	14	–	–	–	26	–	14	–	–	69	24620.0040
50	18	–	–	–	34	–	20	–	–	115	24620.0050
63	20	–	–	–	42	–	25	–	–	224	24620.0063
80	25	–	–	–	52	–	30	–	–	415	24620.0080
100	32	–	–	–	65	–	38	–	–	855	24620.0090
with smooth throughgoing bore, form B – picture 2											
32	12	6	–	–	–	20	–	–	–	34	24620.0132
40	14	8	–	–	–	25	–	–	–	59	24620.0140
50	18	10	–	–	–	32	–	–	–	95	24620.0150
63	20	12	–	–	–	40	–	–	–	171	24620.0163
80	25	16	–	–	–	50	–	–	–	338	24620.0180
100	32	20	–	–	–	63	–	–	–	709	24620.0190
with smooth blind hole, form C – picture 3											
32	12	6	–	–	–	20	–	12	–	36	24620.0232
40	14	8	–	–	–	25	–	15	–	61	24620.0240
50	18	10	–	–	–	32	–	18	–	99	24620.0250
63	20	12	–	–	–	40	–	22	–	195	24620.0263
80	25	16	–	–	–	50	–	28	–	380	24620.0280
100	32	20	–	–	–	63	–	36	–	648	24620.0290

→

Dimensions											Art. No.
d ₁	d ₂	d ₄ H7	d ₅	d ₆	h ₁	h ₂	h ₃	t ₁	t ₂		
[mm]											
with thread, drilled out, form D – picture 4											
32	12	–	M 6	6.4	–	20	–	–	10	34	24620.0332
40	14	–	M 8	8.4	–	25	–	–	13	188	24620.0340
50	18	–	M10	10.5	–	32	–	–	16	97	24620.0350
63	20	–	M12	13.0	–	40	–	–	20	186	24620.0363
80	25	–	M16	17.0	–	50	–	–	20	339	24620.0380
100	32	–	M20	21.0	–	63	–	–	25	673	24620.0390
with threaded blind hole, form E – picture 5											
32	12	–	M 6	–	–	20	–	12	–	35	24620.0432
40	14	–	M 8	–	–	25	–	15	–	56	24620.0440
50	18	–	M10	–	–	32	–	18	–	104	24620.0450
63	20	–	M12	–	–	40	–	22	–	199	24620.0463
80	25	–	M16	–	–	50	–	28	–	363	24620.0480
100	32	–	M20	–	–	63	–	36	–	725	24620.0490

4

Palm Grips • DIN 6335 grey cast iron, plastic-coated
EH 24620.



PRODUCT DESCRIPTION

These palm grips are manufactured according to DIN 6335.

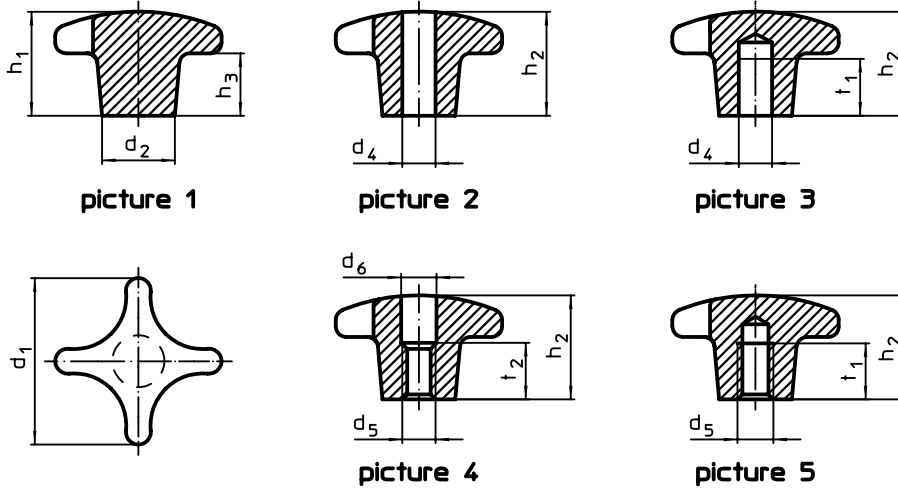
Material

- Grey cast iron GG 20, plastic-coated, black similar to RAL 9005

Handle

- Grey cast iron GG 20, plastic-coated, orange similar to RAL 2004

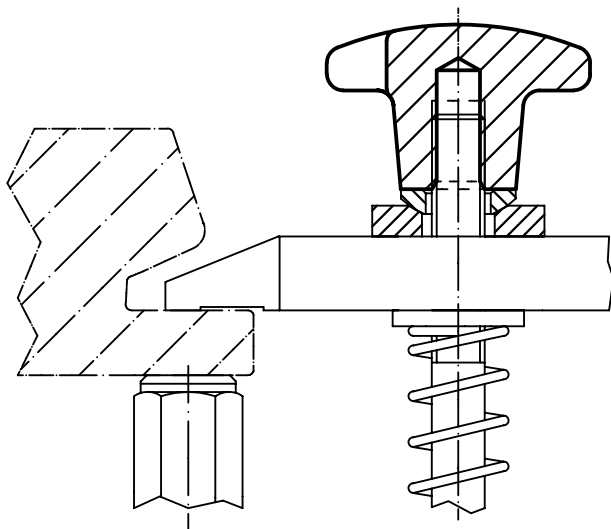
DRAWING



ORDER INFORMATION

d_1	d_2	Dimensions				h_2	t_1	[g]	Art. No.	
		d_4 H7	d_5	[mm]	orange				black	
with smooth blind hole, form C – picture 3										
40	14	8	–		25	15	62	24620.0540	24620.0640	
50	18	10	–		32	18	106	24620.0550	24620.0650	
63	20	12	–		40	22	201	24620.0563	24620.0663	
80	25	16	–		50	28	353	24620.0580	24620.0680	
with threaded blind hole, form E – picture 5										
40	14	–	M 8		25	15	56	24620.0541	24620.0641	
50	18	–	M10		32	18	105	24620.0551	24620.0651	
63	20	–	M12		40	22	198	24620.0564	24620.0664	
80	25	–	M16		50	28	369	24620.0581	24620.0681	

APPLICATION EXAMPLE



Palm Grips • DIN 6335 light metal

EH 24630.



PRODUCT DESCRIPTION

These palm grips are manufactured according to DIN 6335.

Material

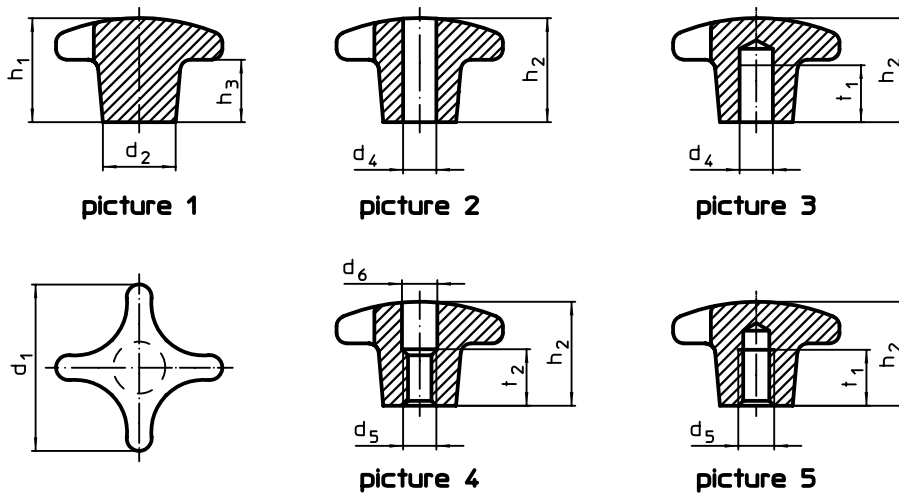
- Light metal Al, polished

Handle

- Light metal Al, unpolished

4

DRAWING



ORDER INFORMATION

d ₁	d ₂	d ₄ H7	d ₅	Dimensions						[g]	Art. No.		
				d ₆	h ₁	h ₂	h ₃	t ₁	t ₂		unpolished	polished	
[mm]													
raw part, form A – picture 1													
40	14	–	–	–	26	–	14	–	–	27	24630.0040	–	
50	18	–	–	–	34	–	20	–	–	51	24630.0050	–	
63	20	–	–	–	42	–	25	–	–	95	24630.0063	–	
80	25	–	–	–	52	–	30	–	–	161	24630.0080	–	
with smooth blind hole, form C – picture 3													
40	14	8	–	–	–	25	–	15	–	23	24630.0240	24630.0640	
50	18	10	–	–	–	32	–	18	–	42	24630.0250	24630.0650	
63	20	12	–	–	–	40	–	22	–	73	24630.0263	24630.0663	
80	25	16	–	–	–	50	–	28	–	138	24630.0280	24630.0680	
with thread, drilled out, form D – picture 4													
40	14	–	M 8	8.4	–	25	–	–	13	23	24630.0340	24630.0740	
50	18	–	M10	10.5	–	32	–	–	16	44	24630.0350	24630.0750	
63	20	–	M12	13.0	–	40	–	–	20	70	24630.0363	24630.0763	
80	25	–	M16	17.0	–	50	–	–	20	129	24630.0380	24630.0780	
with threaded blind hole, form E – picture 5													
40	14	–	M 8	–	–	25	–	15	–	24	24630.0440	24630.0840	
50	18	–	M10	–	–	32	–	18	–	46	24630.0450	24630.0850	
63	20	–	M12	–	–	40	–	22	–	74	24630.0463	24630.0863	
80	25	–	M16	–	–	50	–	28	–	142	24630.0480	24630.0880	

Palm Grips • DIN 6335 stainless steel, die-cast
EH 24631.



PRODUCT DESCRIPTION

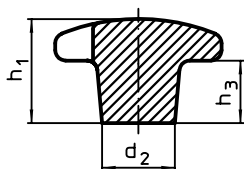
These palm grips are manufactured according to DIN 6335.

Material

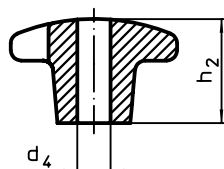
Handle

- Stainless steel A2, dull blasted

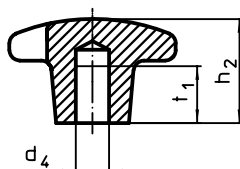
DRAWING



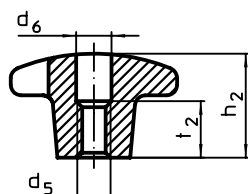
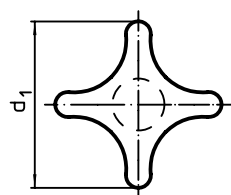
picture 1



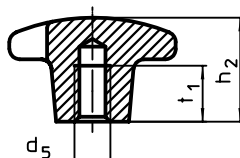
picture 2



picture 3



picture 4

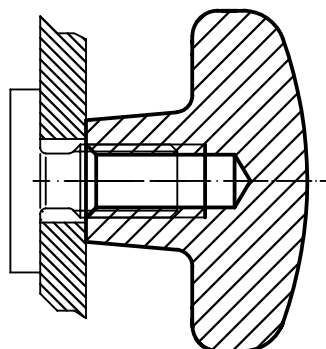


picture 5

ORDER INFORMATION

d ₁	d ₂	d ₅	d ₆	Dimensions					[g]	Art. No.
				h ₁	h ₂	h ₃	t _{1 min.}	t ₂		
[mm]										
raw part, form A – picture 1										
32	12	–	–	21	–	10	–	–	41	24631.0032
40	14	–	–	26	–	14	–	–	70	24631.0040
50	18	–	–	34	–	20	–	–	128	24631.0050
63	20	–	–	42	–	25	–	–	227	24631.0063
with thread, drilled out, form D – picture 4										
32	12	M 6	6.4	–	20	–	–	10	36	24631.0332
40	14	M 8	8.4	–	25	–	–	13	60	24631.0340
50	18	M10	10.5	–	32	–	–	16	100	24631.0350
63	20	M12	13.0	–	40	–	–	20	186	24631.0363
with threaded blind hole, form E – picture 5										
32	12	M 6	–	–	20	–	12	–	38	24631.0432
40	14	M 8	–	–	25	–	15	–	70	24631.0440
50	18	M10	–	–	32	–	18	–	114	24631.0450
63	20	M12	–	–	40	–	22	–	205	24631.0463

APPLICATION EXAMPLE



Palm Grips • similar to DIN 6335, stainless steel A4

EH 24631.



PRODUCT DESCRIPTION

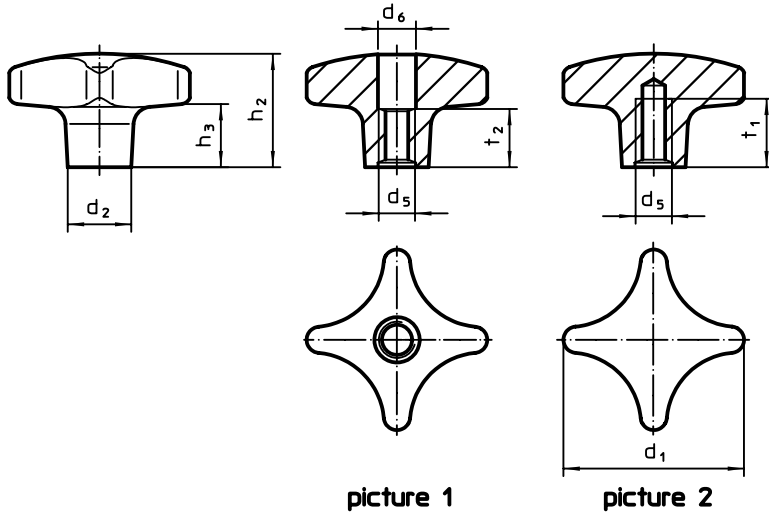
Version without dirt trap. Convenient for all applications having high hygienic requirements (e.g. food industry). The stainless steel A4 version ensures maximum corrosion resistance.

Material


Handle

- Stainless steel A4, polished

DRAWING



ORDER INFORMATION

Dimensions									Art. No.
d ₁	d ₂	d ₅	d ₆	h ₂	h ₃	t ₁ min.	t ₂		
[mm]								[g]	
with thread, drilled-out – picture 1									
32	12	M 6	6.4	20	9	–	10	37	24631.1332
40	14	M 8	8.4	25	13	–	13	60	24631.1340
50	18	M10	10.5	32	18	–	16	110	24631.1350
63	20	M12	13.0	40	23	–	20	200	24631.1363
with threaded blind hole – picture 2									
32	12	M 6	–	20	9	12	–	39	24631.1432
40	14	M 8	–	25	13	15	–	62	24631.1440
50	18	M10	–	32	18	18	–	117	24631.1450
63	20	M12	–	40	23	22	–	213	24631.1463

Palm Grips • DIN 6335 plastic
EH 24640.



PRODUCT DESCRIPTION

Material

- Stainless steel A2

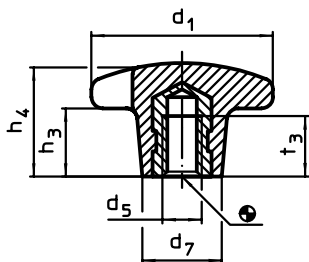
Bushing

- Brass
- Steel, zinc-plated by galvanization

Handle

- DIN 7708 - thermosetting plastic (PF 31), black similar to RAL 9005

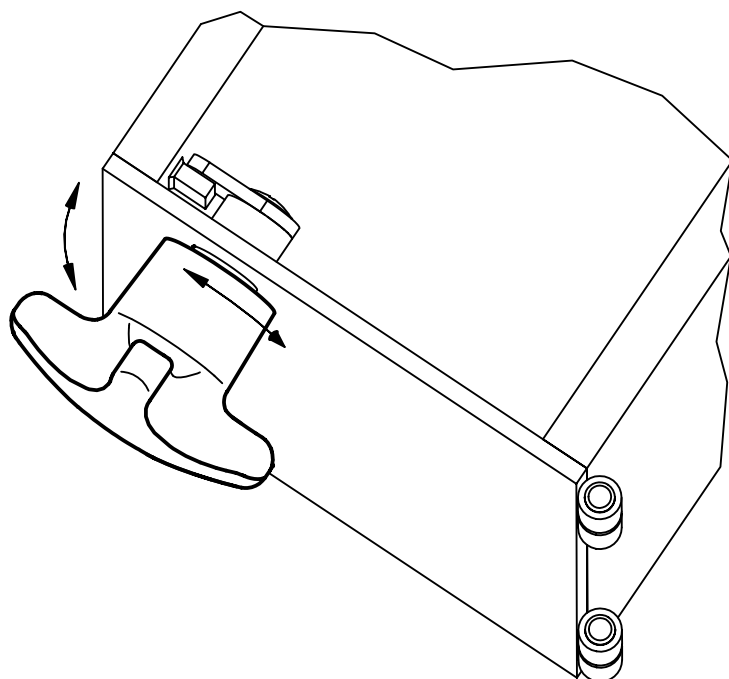
DRAWING



ORDER INFORMATION

Dimensions						max. [°C]	[g]	Art. No.		
d ₁	d ₅	d ₇	h ₃	h ₄	t ₃			Brass	Steel	Stainless steel
[mm]										
with threaded bushing, form K										
20	M 4	10	6	13	6.5	110	3.3	24640.0220	–	–
25	M 5	12	8	16	9.5	110	7.0	–	24640.0225	24640.1225
32	M 6	14	10	20	12.0	110	11.0	–	24640.0232	24640.1232
40	M 8	18	13	25	14.0	110	16.0	–	24640.0240	24640.1240
50	M10	22	20	32	18.0	110	34.0	–	24640.0250	24640.1250
63	M12	26	25	40	22.0	110	66.0	–	24640.0263	24640.1263
80	M16	35	30	50	30.0	110	137.0	–	24640.0280	24640.1280

APPLICATION EXAMPLE



Palm Grips • with axial bearing

EH 24700.



PRODUCT DESCRIPTION

Advantages of axial bearing:

- Double clamping force with same grip size, by reducing the surface friction.
- Protection of workpiece by a fixed locating surface.
- Little setting due to higher pre-clamping force of bolt resp. thread.

Material

Handle

- Thermoplastic PA

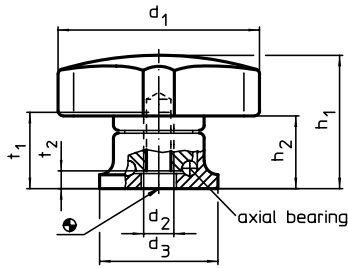
Inner part

- Steel, nitrided, blackened

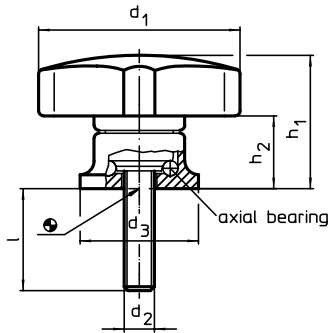
Screw

- Steel, blackened, quality 8.8

DRAWING



picture 1

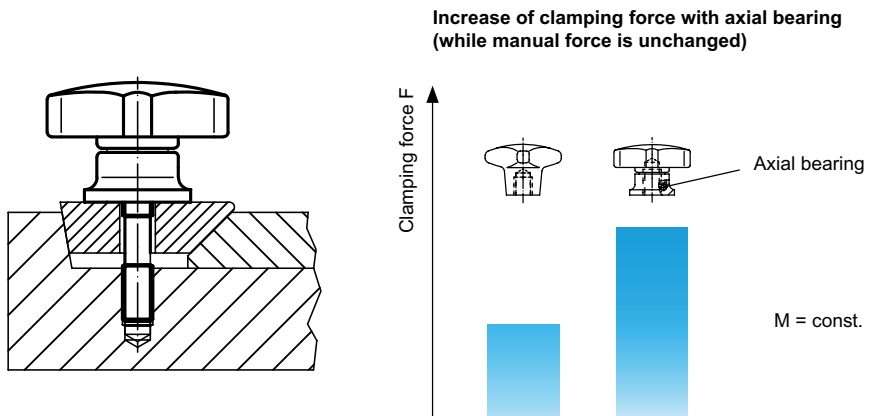


picture 2

ORDER INFORMATION

Dimensions								max. [°C]	[g]	Art. No.
d ₁	d ₂	l +2	d ₃	h ₁ ~	h ₂ ~	t ₁ min.	t ₂			
[mm]										
with female thread – picture 1										
40	M 6	–	24	27	15.0	12.5	5.0	80	45	24700.0040
50	M 8	–	25	34	22.5	14.0	4.2	80	68	24700.0050
63	M10	–	30	41	26.5	18.0	5.4	80	109	24700.0063
80	M12	–	35	54	34.0	26.5	6.6	80	213	24700.0080
with screw – picture 2										
40	M 6	15	24	27	15.0	–	–	80	51	24700.0042
		25	24	27	15.0	–	–	80	52	24700.0044
50	M 8	20	25	34	22.5	–	–	80	81	24700.0053
		35	25	34	22.5	–	–	80	86	24700.0056
63	M10	30	30	41	26.5	–	–	80	136	24700.0066
		40	30	41	26.5	–	–	80	141	24700.0068
80	M12	30	35	54	34.0	–	–	80	259	24700.0083
		50	35	54	34.0	–	–	80	273	24700.0087

APPLICATION EXAMPLE



Palm Grip Screws • DIN 6335 plastic
EH 24730.



PRODUCT DESCRIPTION

Material

- Stainless steel A2

Handle

- DIN 7708 - thermosetting plastic (PF 31), black similar to RAL 9005

MORE INFORMATION

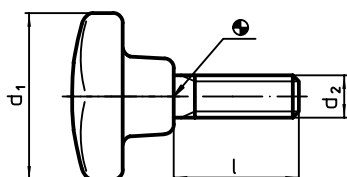
Notes

Special types, e.g. differing lengths or screws from brass / stainless steel on request.

Screw

- Steel, zinc-plated by galvanization

DRAWING



ORDER INFORMATION

Dimensions			max. [°C]	[g]	Art. No.	
d ₁	d ₂ [mm]	l			Steel	Stainless steel
form L						
25	M 5	10	110	6.6	24730.0051	24730.1051
		15	110	7.0	24730.0053	24730.1053
		20	110	7.5	24730.0056	24730.1056
		25	110	8.1	24730.0058	24730.1058
		30	110	8.9	24730.0059	24730.1059
32	M 6	15	110	11.0	24730.0101	24730.1101
		20	110	13.0	24730.0104	24730.1104
		25	110	13.0	24730.0106	24730.1106
		30	110	14.0	24730.0107	24730.1107
		40	110	16.0	24730.0110	24730.1110
40	M 8	20	110	24.0	24730.0152	24730.1152
		25	110	25.0	24730.0154	24730.1154
		30	110	26.0	24730.0155	24730.1155
		40	110	30.0	24730.0158	24730.1158
		50	110	32.0	24730.0160	24730.1160
50	M10	25	110	41.0	24730.0202	24730.1202
		30	110	48.0	24730.0203	24730.1203
		40	110	51.0	24730.0206	24730.1206
		50	110	56.0	24730.0208	24730.1208
		60	110	68.0	24730.0209	24730.1209
63	M12	30	110	99.0	24730.0251	24730.1251
		40	110	93.0	24730.0254	24730.1254
		50	110	99.0	24730.0256	24730.1256
		60	110	105.0	24730.0257	24730.1257
		80	110	112.0	24730.0260	24730.1260
80	M16	40	110	198.0	24730.0302	24730.1302
		50	110	214.0	24730.0304	24730.1304
		60	110	219.0	24730.0305	24730.1305
		80	110	251.0	24730.0308	24730.1308

Palm Grip Screws • similar to DIN 6335, stainless steel

EH 24731.



PRODUCT DESCRIPTION

These grub screws with palm grip are manufactured according to DIN 6335, but it is a version without dirty edges. This makes these grub screws with palm grip suitable for all areas of application with high hygienic requirements.

Material

Handle

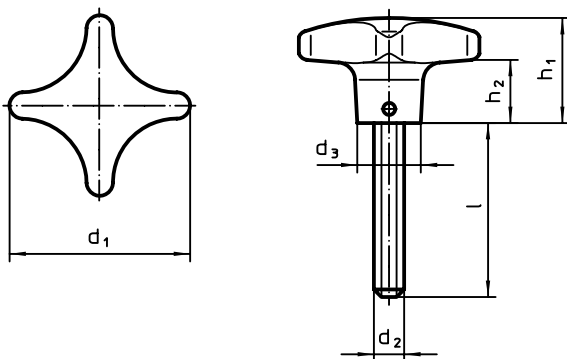
- Stainless steel, dull blasted

Screw

- Stainless steel 1.4305

4

DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions				[g]	Art. No.
		l	d ₃	h ₁	h ₂		
[mm]							
40	M 8	20	14	25	13	76	24731.0005
		25	14	25	13	70	24731.0010
		30	14	25	13	70	24731.0015
		40	14	25	13	82	24731.0020
50	M10	20	18	32	18	135	24731.0025
		25	18	32	18	138	24731.0030
		30	18	32	18	138	24731.0035
		45	18	32	18	160	24731.0040
		55	18	32	18	149	24731.0045
63	M12	30	20	40	23	249	24731.0050
		40	20	40	23	240	24731.0055
		50	20	40	23	250	24731.0060

Palm Grip Screws • similar to DIN 6335, stainless steel A4
EH 24731.



PRODUCT DESCRIPTION

These grub screws with palm grip are manufactured according to DIN 6335, but it is a version without dirty edges. This makes these grub screws with palm grip suitable for all areas of application with high hygienic requirements. The stainless steel A4 version ensures maximum corrosion resistance.

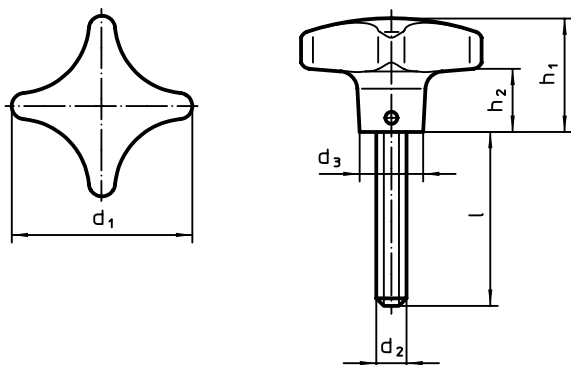
Material

- Handle**
- Stainless steel A4, polished

Screw

- Stainless steel A4

DRAWING



ORDER INFORMATION

d ₁	d ₂	Dimensions				[g]	Art. No.
		l	d ₃	h ₁	h ₂		
[mm]							
40	M 8	20	14	25	13	73	24731.0105
		25	14	25	13	75	24731.0110
		30	14	25	13	76	24731.0115
		40	14	25	13	80	24731.0120
50	M10	20	18	32	18	132	24731.0125
		25	18	32	18	136	24731.0130
		30	18	32	18	137	24731.0135
		45	18	32	18	144	24731.0140
		55	18	32	18	152	24731.0145
63	M12	30	20	40	23	248	24731.0150
		40	20	40	23	256	24731.0155
		50	20	40	23	263	24731.0160

Torque Handles

EH 24710.



PRODUCT DESCRIPTION

Torque handles are used wherever a limitation of the exerted hand force is required. The handle, similar to a knurled nut / knurled thumb screw, with integrated torque mechanism allows a defined torque limit during tightening. Reaching the torque results in an "over-locking". For releasing the torque is transmitted indefinitely. These handles combine the functionality of a ratchet wrench with the modern and ergonomic design of a knurled nut / knurled thumb screw.

Material

Cap

- Thermoplastic PA 6, light grey, similar to RAL 7035

Torque mechanism

- Steel, hardened

Handle

- Aluminium, black anodised

Inner part

- Steel, blackened

Screw

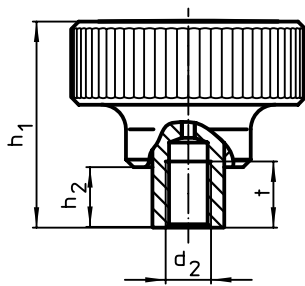
- Steel, blackened

MORE INFORMATION

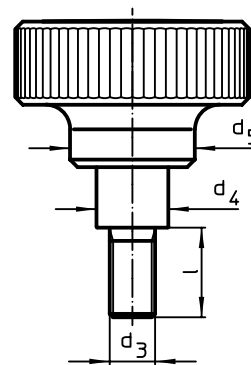
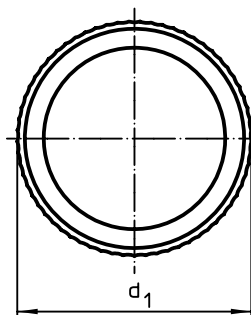
Further products

Three-Lobed Torque Handles → p. 672

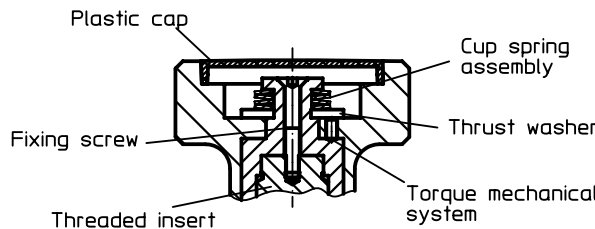
DRAWING



picture 1





picture 2



ORDER INFORMATION

Dimensions									Tightening torque +/- 10% max. [Nm]	Art. No.		
d ₁	d ₂	d ₃	l	d ₄	d ₅	h ₁	h ₂	t				
[mm]									max. [°C]	[g]		
with female thread – picture 1												
34	M 3	–	–	10.0	21	37.5	9.5	7	100	1.0	48	24710.0020
	M 4	–	–	10.0	21	37.5	9.5	9	100	1.0	60	24710.0022
	M 5	–	–	10.0	21	37.5	9.5	9	100	1.0	62	24710.0024
	M 6	–	–	10.0	21	37.5	9.5	9	100	1.0	60	24710.0026
42	M 6	–	–	13.5	27	43.5	11.5	11	100	2.0	111	24710.0030
	M 8	–	–	13.5	27	43.5	11.5	11	100	2.0	112	24710.0032
52	M10	–	–	19.0	32	54.0	15.5	17	100	3.0	221	24710.0040
	M12	–	–	19.0	32	54.0	15.5	17	100	3.0	208	24710.0042
62	M10	–	–	19.0	33	54.0	15.5	17	100	4.0	244	24710.0050
	M12	–	–	19.0	33	54.0	15.5	17	100	4.0	285	24710.0052
	M10	–	–	19.0	33	54.0	15.5	17	100	5.5	245	24710.0060
	M12	–	–	19.0	33	54.0	15.5	17	100	5.5	285	24710.0062



		Dimensions							 max. [°C]	Tightening torque +/- 10% max. [Nm]	 [g]	Art. No.
d ₁	d ₂	d ₃	l	d ₄	d ₅	h ₁	h ₂	t				
[mm]												
with screw – picture 2												
34	-	M 5	12	10.0	21	37.5	9.5	-	100	1.0	62	24710.0300
			16	10.0	21	37.5	9.5	-	100	1.0	63	24710.0301
			20	10.0	21	37.5	9.5	-	100	1.0	60	24710.0302
			25	10.0	21	37.5	9.5	-	100	1.0	64	24710.0303
		32	10.0	21	37.5	9.5	-	100	1.0	65	24710.0304	
		M 6	12	10.0	21	37.5	9.5	-	100	1.0	60	24710.0305
			16	10.0	21	37.5	9.5	-	100	1.0	65	24710.0306
			20	10.0	21	37.5	9.5	-	100	1.0	65	24710.0307
25	10.0		21	37.5	9.5	-	100	1.0	67	24710.0308		
42	-	M 8	32	10.0	21	37.5	9.5	-	100	1.0	70	24710.0309
			16	13.5	27	43.5	11.5	-	100	2.0	152	24710.0400
			20	13.5	27	43.5	11.5	-	100	2.0	153	24710.0401
			25	13.5	27	43.5	11.5	-	100	2.0	123	24710.0402
		M10	32	13.5	27	43.5	11.5	-	100	2.0	158	24710.0403
			40	13.5	27	43.5	11.5	-	100	2.0	128	24710.0404
			20	13.5	27	43.5	11.5	-	100	2.0	120	24710.0405
			25	13.5	27	43.5	11.5	-	100	2.0	120	24710.0406
52	-	M10	32	13.5	27	43.5	11.5	-	100	2.0	131	24710.0407
			40	13.5	27	43.5	11.5	-	100	2.0	179	24710.0408
			50	13.5	27	43.5	11.5	-	100	2.0	187	24710.0409
			25	19.0	32	54.0	15.5	-	100	3.0	241	24710.0500
		M12	32	19.0	32	54.0	15.5	-	100	3.0	246	24710.0501
			40	19.0	32	54.0	15.5	-	100	3.0	248	24710.0502
			50	19.0	32	54.0	15.5	-	100	3.0	254	24710.0503
			63	19.0	32	54.0	15.5	-	100	3.0	254	24710.0504
62	-	M10	25	19.0	32	54.0	15.5	-	100	3.0	251	24710.0505
			32	19.0	32	54.0	15.5	-	100	3.0	254	24710.0506
			40	19.0	32	54.0	15.5	-	100	3.0	262	24710.0507
			50	19.0	32	54.0	15.5	-	100	3.0	270	24710.0508
			63	19.0	32	54.0	15.5	-	100	3.0	274	24710.0509
		M12	25	19.0	33	54.0	15.5	-	100	4.0	334	24710.0600
			32	19.0	33	54.0	15.5	-	100	4.0	339	24710.0601
			40	19.0	33	54.0	15.5	-	100	4.0	341	24710.0602
			50	19.0	33	54.0	15.5	-	100	4.0	347	24710.0603
			63	19.0	33	54.0	15.5	-	100	4.0	355	24710.0604
			25	19.0	33	54.0	15.5	-	100	4.0	344	24710.0605
		M10	32	19.0	33	54.0	15.5	-	100	4.0	347	24710.0606
			40	19.0	33	54.0	15.5	-	100	4.0	355	24710.0607
			50	19.0	33	54.0	15.5	-	100	4.0	363	24710.0608
			63	19.0	33	54.0	15.5	-	100	4.0	367	24710.0609
			25	19.0	33	54.0	15.5	-	100	5.5	266	24710.0700
M12	32	19.0	33	54.0	15.5	-	100	5.5	339	24710.0701		
	40	19.0	33	54.0	15.5	-	100	5.5	277	24710.0702		
	50	19.0	33	54.0	15.5	-	100	5.5	280	24710.0703		
	63	19.0	33	54.0	15.5	-	100	5.5	355	24710.0704		
M10	25	19.0	33	54.0	15.5	-	100	5.5	344	24710.0705		
	32	19.0	33	54.0	15.5	-	100	5.5	347	24710.0706		
	40	19.0	33	54.0	15.5	-	100	5.5	355	24710.0707		
	50	19.0	33	54.0	15.5	-	100	5.5	363	24710.0708		
M12	63	19.0	33	54.0	15.5	-	100	5.5	367	24710.0709		



Three-Lobed Torque Handles

EH 24711.



PRODUCT DESCRIPTION

Torque handles are used wherever a limitation of the exerted hand force is required. The three-lobed torque handle with integrated torque mechanism allows a defined torque limit during tightening. Reaching the torque results in an "over-locking". For releasing the torque is transmitted indefinitely. These handles combine the functionality of a ratchet wrench with the modern and ergonomic design of a three-lobed handle.

Material

Cap

- Plastic, light grey

Torque mechanism

- Steel, hardened

Handle

- Thermoplastic PA-HP, glass fibre reinforced, black, matt

Inner part

- Steel, blackened

Screw

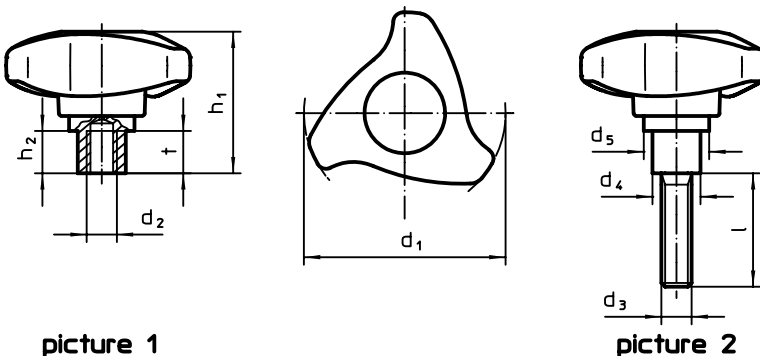
- Steel, blackened

MORE INFORMATION

Further products

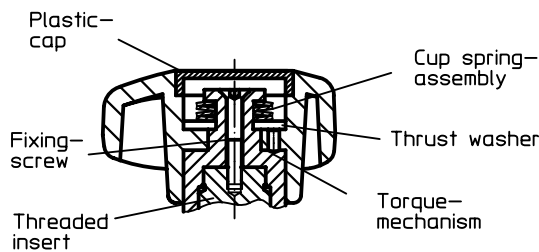
Torque Handles → p. 670

DRAWING



picture 1


picture 2



ORDER INFORMATION

d ₁	d ₂	d ₃	l	Dimensions					t	Tightening torque +/- 10% max. [Nm]	[g]	Art. No.
				d ₄	d ₅	h ₁	h ₂	[mm]				
with female thread – picture 1												
50	M 6	-	-	13.5	23.6	41.6	10.7	11	2.0	65	24711.0020	
									3.0	62	24711.0021	
									4.0	63	24711.0022	
	M 8	-	-	13.5	23.6	41.6	10.7	11	2.0	60	24711.0023	
									3.0	60	24711.0024	
									4.0	64	24711.0025	
63	M 8	-	-	16.0	28.1	46.6	12.9	14	3.2	104	24711.0030	
									4.0	105	24711.0031	
									4.7	107	24711.0032	
	M10	-	-	16.0	28.1	46.6	12.9	14	3.2	103	24711.0033	
									4.0	102	24711.0034	
									4.7	105	24711.0035	



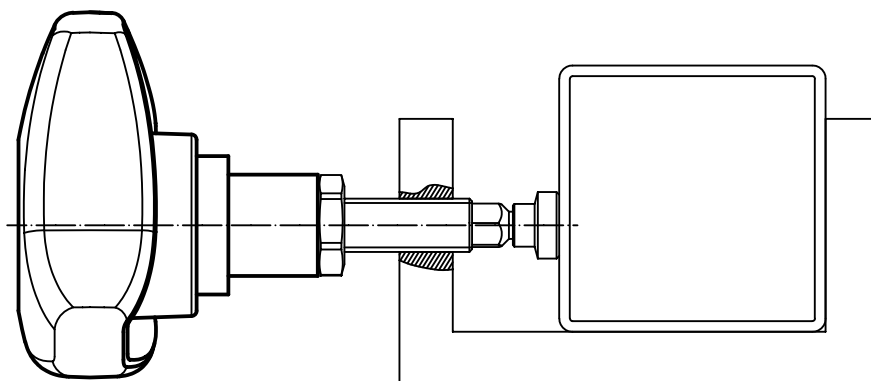
d ₁	d ₂	d ₃	Dimensions						t	Tightening torque +/- 10% max. [Nm]		Art. No.
			l	d ₄	d ₅	h ₁	h ₂	[mm]				
80	M10	-	-	19.0	34.1	56.2	16.8	17	4.0	172	24711.0040	
									5.5	173	24711.0041	
									7.5	174	24711.0042	
	M12	-	-	19.0	34.1	56.2	16.8	17	4.0	180	24711.0043	
									5.5	168	24711.0044	
									7.5	171	24711.0045	
with screw – picture 2												
50	-	M 8	-	16	13.5	23.6	41.6	10.7	-	2.0	72	24711.0300
										3.0	75	24711.0301
										4.0	76	24711.0302
				20	13.5	23.6	41.6	10.7	-	2.0	70	24711.0303
										3.0	73	24711.0304
										4.0	71	24711.0305
				25	13.5	23.6	41.6	10.7	-	2.0	72	24711.0306
										3.0	72	24711.0307
										4.0	73	24711.0308
				32	13.5	23.6	41.6	10.7	-	2.0	77	24711.0309
										3.0	74	24711.0310
										4.0	75	24711.0311
		40	13.5	23.6	41.6	10.7	-	2.0	76	24711.0312		
								3.0	76	24711.0313		
								4.0	77	24711.0314		
		M10	-	20	13.5	23.6	41.6	10.7	-	2.0	73	24711.0315
										3.0	73	24711.0316
										4.0	74	24711.0317
				25	13.5	23.6	41.6	10.7	-	2.0	76	24711.0318
										3.0	76	24711.0319
										4.0	77	24711.0320
				32	13.5	23.6	41.6	10.7	-	2.0	80	24711.0321
										3.0	80	24711.0322
										4.0	81	24711.0323
40	13.5			23.6	41.6	10.7	-	2.0	87	24711.0324		
								3.0	82	24711.0325		
								4.0	83	24711.0326		
50	13.5	23.6	41.6	10.7	-	2.0	87	24711.0327				
						3.0	87	24711.0328				
						4.0	88	24711.0329				
63	-	M 8	-	25	16.0	28.1	46.6	12.9	-	3.2	116	24711.0400
										4.0	117	24711.0401
										4.7	118	24711.0402
				32	16.0	28.1	46.6	12.9	-	3.2	119	24711.0403
										4.0	120	24711.0404
										4.7	121	24711.0405
				40	16.0	28.1	46.6	12.9	-	3.2	82	24711.0406
										4.0	83	24711.0407
										4.7	83	24711.0408
				50	16.0	28.1	46.6	12.9	-	3.2	128	24711.0409
										4.0	127	24711.0410
										4.7	128	24711.0411
63	16.0	28.1	46.6	12.9	-	3.2	130	24711.0412				
						4.0	131	24711.0413				
						4.7	132	24711.0414				

→

4

d ₁	d ₂	d ₃	Dimensions						t	Tightening torque +/- 10% max. [Nm]	[g]	Art. No.		
			l	d ₄	d ₅	h ₁	h ₂	[mm]						
63	-	M10	25	16.0	28.1	46.6	12.9	-	3.2	122	24711.0415			
									4.0	123	24711.0416			
									4.7	124	24711.0417			
			32	16.0	28.1	46.6	12.9	-	3.2	125	24711.0418			
									4.0	126	24711.0419			
									4.7	127	24711.0420			
			40	16.0	28.1	46.6	12.9	-	3.2	129	24711.0421			
									4.0	130	24711.0422			
									4.7	131	24711.0423			
			50	16.0	28.1	46.6	12.9	-	3.2	134	24711.0424			
									4.0	135	24711.0425			
									4.7	136	24711.0426			
			63	16.0	28.1	46.6	12.9	-	3.2	140	24711.0427			
									4.0	141	24711.0428			
									4.7	142	24711.0429			
			80	-	M10	25	19.0	34.1	56.2	16.8	-	4.0	194	24711.0500
												5.5	195	24711.0501
												7.5	196	24711.0502
32	19.0	34.1				56.2	16.8	-	4.0	198	24711.0503			
									5.5	199	24711.0504			
									7.5	200	24711.0505			
40	19.0	34.1				56.2	16.8	-	4.0	202	24711.0506			
									5.5	203	24711.0507			
									7.5	204	24711.0508			
50	19.0	34.1				56.2	16.8	-	4.0	208	24711.0509			
									5.5	209	24711.0510			
									7.5	210	24711.0511			
63	19.0	34.1				56.2	16.8	-	4.0	213	24711.0512			
									5.5	223	24711.0513			
									7.5	215	24711.0514			
M12	25	19.0			34.1	56.2	16.8	-	4.0	206	24711.0515			
									5.5	202	24711.0516			
									7.5	203	24711.0517			
	32	19.0			34.1	56.2	16.8	-	4.0	205	24711.0518			
									5.5	206	24711.0519			
									7.5	207	24711.0520			
	40	19.0			34.1	56.2	16.8	-	4.0	210	24711.0521			
									5.5	211	24711.0522			
									7.5	212	24711.0523			
	50	19.0			34.1	56.2	16.8	-	4.0	218	24711.0524			
									5.5	219	24711.0525			
									7.5	220	24711.0526			
	63	19.0			34.1	56.2	16.8	-	4.0	227	24711.0527			
									5.5	228	24711.0528			
									7.5	229	24711.0529			

APPLICATION EXAMPLE



Disc-Type Handwheels • DIN 3670
EH 24570.



PRODUCT DESCRIPTION

There are gripping indentations on the rear sides.
Hub machined; rim turned and mirror-finished on all sides, non-machined surfaces cleanly blasted.

Material

Handwheel

- Aluminium permanent-mould casting

Assembly

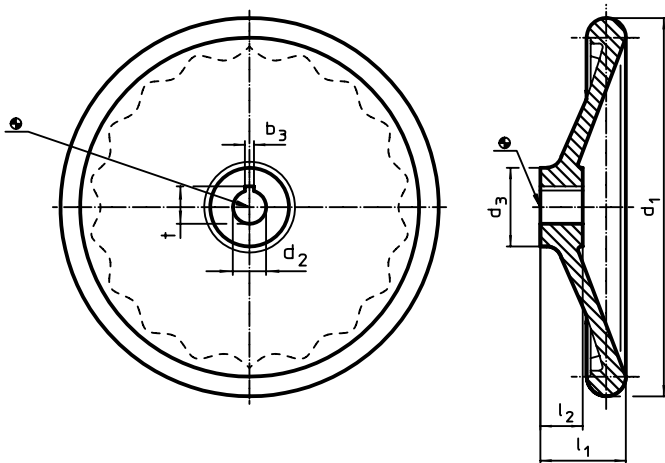
Shaft-end washers EH 22270. for axial fastening.

MORE INFORMATION

Further products

Shaft-End Washers → p. 187

DRAWING




The orientation of the hub keyway may be different than shown in the drawing.

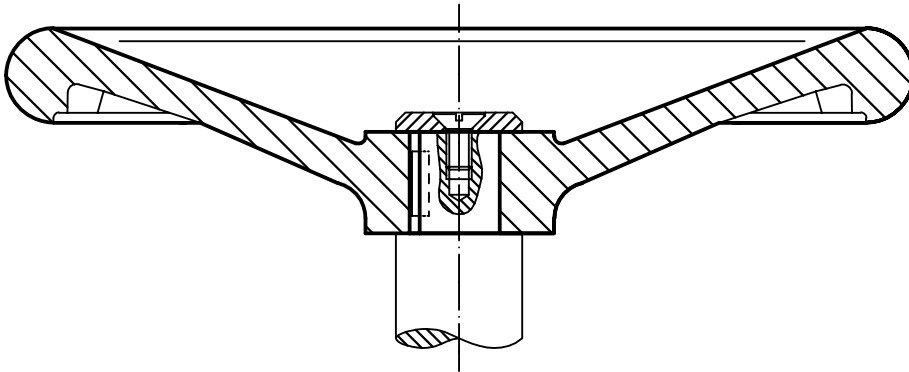
ORDER INFORMATION

d ₁	d ₂ H7	Dimensions			Hub keyway, DIN 6885 sheet 1		[g]	Art. No.
		d ₃	l ₁	l ₂	b ₃	t		
[mm]								
without steel bushing, form B, without hub keyway								
80	10	26	29	16	–	–	119	24570.0103
	12	26	29	16	–	–	116	24570.0104
100	10	28	33	17	–	–	194	24570.0105
	12	28	33	17	–	–	189	24570.0106
125	12	31	36	18	–	–	288	24570.0110
	14	31	36	18	–	–	284	24570.0111
160	14	36	40	20	–	–	477	24570.0120
	16	36	40	20	–	–	501	24570.0121
200	18	42	45	24	–	–	955	24570.0130
	22	42	45	24	–	–	940	24570.0131
250	22	48	50	28	–	–	1685	24570.0140
	26	48	50	28	–	–	1674	24570.0141
315	26	56	56	33	–	–	2710	24570.0150
	28	56	56	33	–	–	2695	24570.0151
400	30	65	63	38	–	–	4720	24570.0160
	32	65	63	38	–	–	5700	24570.0161
without steel bushing, form N, with hub keyway								
80	10	26	29	16	3	11.4	120	24570.0303
	12	26	29	16	4	13.8	129	24570.0304
100	10	28	33	17	3	11.4	244	24570.0305
	12	28	33	17	4	13.8	183	24570.0306
125	12	31	36	18	4	13.8	250	24570.0310
	14	31	36	18	5	16.3	290	24570.0311
160	14	36	40	20	5	16.3	491	24570.0320
	16	36	40	20	5	18.3	481	24570.0321

→

d ₁	d ₂ H7	Dimensions			Hub keyway, DIN 6885 sheet 1			Art. No.
		d ₃ [mm]	l ₁ ~	l ₂	b ₃ [mm]	t [mm]		
200	18	42	45	24	6	20.8	880	24570.0330
	22	42	45	24	6	24.8	928	24570.0331
250	22	48	50	28	6	24.8	1681	24570.0340
	26	48	50	28	8	29.3	1670	24570.0341
315	26	56	56	33	8	29.3	2700	24570.0350
	28	56	56	33	8	31.3	2670	24570.0351
400	30	65	63	38	8	33.3	4771	24570.0360
	32	65	63	38	10	35.3	4720	24570.0361

APPLICATION EXAMPLE



Handwheels • DIN 950 grey cast iron
EH 24580.



PRODUCT DESCRIPTION

Hub machined; rim turned and mirror-finished on all sides, non-machined surfaces cleanly blasted.

Material

Handwheel

- Grey cast iron GG

Machine handle DIN 39 EH 24450.

- Steel, turned, zinc-plated by galvanization, passivated

Machine handle DIN 98 EH 24460. rotating

- Steel, turned, zinc-plated by galvanization, passivated

Assembly

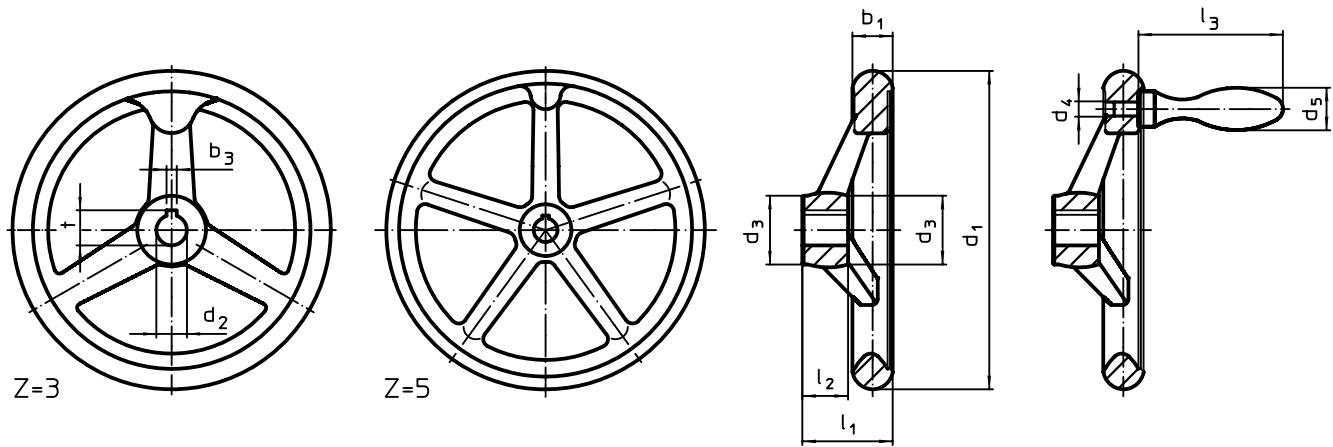
Shaft-end washers EH 22270. for axial fastening.

MORE INFORMATION

Further products

Shaft-End Washers → p. 187
Rotating Machine Handles, DIN 98... → p. 624

DRAWING



picture 1


picture 2

The orientation of the hub keyway may be different than shown in the drawing.


ORDER INFORMATION

d ₁	d ₂ H7	Dimensions						Hub keyway, DIN 6885 sheet 1		Number of spokes z	Corresponding machine handle DIN 39 / DIN 98	[g]	Art. No.
		d ₃	d ₄	d ₅	l ₁	l ₂	l ₃	b ₃	t				
[mm]													
without hub keyway, without handle, form B-F/A (formerly: A 4) – picture 1													
80	10	24	-	-	29	16	-	-	-	3	-	304	24580.0000
	12	24	-	-	29	16	-	-	-	3	-	319	24580.0001
100	10	26	-	-	33	17	-	-	-	3	-	486	24580.0005
	12	26	-	-	33	17	-	-	-	3	-	506	24580.0006
125	12	28	-	-	36	18	-	-	-	3	-	720	24580.0010
	14	28	-	-	36	18	-	-	-	3	-	750	24580.0011
140	14	30	-	-	39	19	-	-	-	3	-	865	24580.0015
	16	30	-	-	39	19	-	-	-	3	-	907	24580.0016
160	14	32	-	-	40	20	-	-	-	3	-	1151	24580.0020
	16	32	-	-	40	20	-	-	-	3	-	1145	24580.0021
200	18	38	-	-	45	24	-	-	-	3	-	2218	24580.0030
	22	38	-	-	45	24	-	-	-	3	-	2168	24580.0031
250	22	45	-	-	50	28	-	-	-	5	-	3740	24580.0040
	26	45	-	-	50	28	-	-	-	5	-	3621	24580.0041
315	26	53	-	-	56	33	-	-	-	5	-	6180	24580.0045
	30	53	-	-	56	33	-	-	-	5	-	5800	24580.0046
400	30	65	-	-	63	38	-	-	-	5	-	9500	24580.0050
	34	65	-	-	63	38	-	-	-	5	-	9500	24580.0051



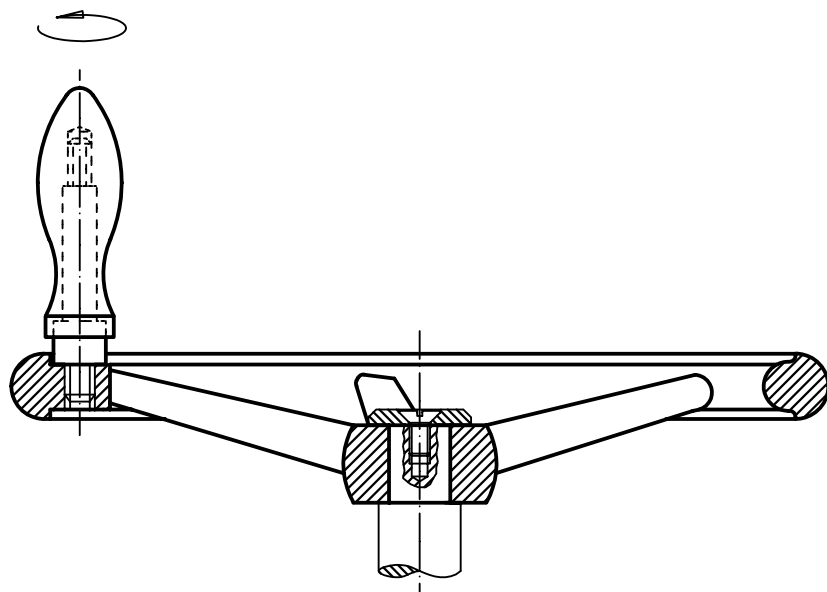
d ₁	d ₂ H7	Dimensions						Hub keyway, DIN 6885 sheet 1		Number of spokes z	Corresponding machine handle DIN 39 / DIN 98		Art. No.
		d ₃	d ₄	d ₅	l ₁ ~	l ₂	l ₃ ~	b ₃	t				
with hub keyway, without handle, form N-F/A (formerly: A 3) – picture 1													
80	10	24	–	–	29	16	–	3	11.4	3	–	288	24580.0100
	12	24	–	–	29	16	–	4	13.8	3	–	287	24580.0101
100	10	26	–	–	33	17	–	3	11.4	3	–	500	24580.0105
	12	26	–	–	33	17	–	4	13.8	3	–	500	24580.0106
125	12	28	–	–	36	18	–	4	13.8	3	–	750	24580.0110
	14	28	–	–	36	18	–	5	16.3	3	–	723	24580.0111
140	14	30	–	–	39	19	–	5	16.3	3	–	902	24580.0115
	16	30	–	–	39	19	–	5	18.3	3	–	940	24580.0116
160	14	32	–	–	40	20	–	5	16.3	3	–	1139	24580.0120
	16	32	–	–	40	20	–	5	18.3	3	–	1217	24580.0121
200	18	38	–	–	45	24	–	6	20.8	3	–	2142	24580.0130
	22	38	–	–	45	24	–	6	24.8	3	–	1909	24580.0131
250	22	45	–	–	50	28	–	6	24.8	5	–	3652	24580.0140
	26	45	–	–	50	28	–	8	29.3	5	–	3635	24580.0141
315	26	53	–	–	56	33	–	8	29.3	5	–	1157	24580.0145
	30	53	–	–	56	33	–	8	33.3	5	–	5800	24580.0146
400	30	65	–	–	63	38	–	8	33.3	5	–	10650	24580.0150
	34	65	–	–	63	38	–	10	37.3	5	–	11600	24580.0151
without hub keyway, with rotating handle EH 24460., assembled form B-F/G (formerly D 4) – picture 2													
80	10	24	M 6	16	29	16	49	–	–	3	16	410	24580.0200
	12	24	M 6	16	29	16	49	–	–	3	16	410	24580.0201
100	10	26	M 6	16	33	17	49	–	–	3	16	550	24580.0205
	12	26	M 6	16	33	17	49	–	–	3	16	550	24580.0206
125	12	28	M 8	20	36	18	61	–	–	3	20	850	24580.0210
	14	28	M 8	20	36	18	61	–	–	3	20	850	24580.0211
140	14	30	M 8	20	39	19	61	–	–	3	20	1040	24580.0215
	16	30	M 8	20	39	19	61	–	–	3	20	1040	24580.0216
160	14	32	M10	25	40	20	75	–	–	3	25	1390	24580.0220
	16	32	M10	25	40	20	75	–	–	3	25	1390	24580.0221
200	18	38	M10	25	45	24	75	–	–	3	25	2190	24580.0230
	22	38	M10	25	45	24	75	–	–	3	25	2190	24580.0231
250	22	45	M12	32	50	28	95	–	–	5	32	4185	24580.0240
	26	45	M12	32	50	28	95	–	–	5	32	4185	24580.0241
315	26	53	M12	32	56	33	95	–	–	5	32	6185	24580.0245
	30	53	M12	32	56	33	95	–	–	5	32	6185	24580.0246
400	30	65	M16	36	63	38	106	–	–	5	36	10500	24580.0250
	34	65	M16	36	63	38	106	–	–	5	36	10500	24580.0251
with hub keyway, with rotating handle EH 24460. assembled, form N-F/G (formerly: D 3) – picture 2													
80	10	24	M 6	16	29	16	49	3	11.4	3	16	410	24580.0300
	12	24	M 6	16	29	16	49	4	13.8	3	16	410	24580.0301
100	10	26	M 6	16	33	17	49	3	11.4	3	16	550	24580.0305
	12	26	M 6	16	33	17	49	4	13.8	3	16	550	24580.0306
125	12	28	M 8	20	36	18	61	4	13.8	3	20	850	24580.0310
	14	28	M 8	20	36	18	61	5	16.3	3	20	850	24580.0311
140	14	30	M 8	20	39	19	61	5	16.3	3	20	1040	24580.0315
	16	30	M 8	20	39	19	61	5	18.3	3	20	1040	24580.0316
160	14	32	M10	25	40	20	75	5	16.3	3	25	1390	24580.0320
	16	32	M10	25	40	20	75	5	18.3	3	25	1390	24580.0321
200	18	38	M10	25	45	24	75	6	20.8	3	25	2190	24580.0330
	22	38	M10	25	45	24	75	6	24.8	3	25	2190	24580.0331
250	22	45	M12	32	50	28	95	6	24.8	5	32	4185	24580.0340
	26	45	M12	32	50	28	95	8	29.3	5	32	4185	24580.0341
315	26	53	M12	32	56	33	95	8	29.3	5	32	6185	24580.0345
	30	53	M12	32	56	33	95	8	33.3	5	32	6185	24580.0346
400	30	65	M16	36	63	38	106	8	33.3	5	36	10500	24580.0350
	34	65	M16	36	63	38	106	10	37.3	5	36	10500	24580.0351



d ₁	d ₂ H7	d ₃	Dimensions					Hub keyway, DIN 6885 sheet 1		Number of spokes z	Corresponding machine handle DIN 39 / DIN 98		Art. No.
			d ₄	d ₅	l ₁ ~	l ₂	l ₃ ~	b ₃	t				
[mm]								[mm]		[mm]	[g]		
without hub keyway, with machine handle EH 24450., assembled, form B-F/G (formerly: F 4) – picture 2													
80	10	24	M 6	16	29	16	50	–	–	3	16	410	24580.0400
	12	24	M 6	16	29	16	50	–	–	3	16	410	24580.0401
100	10	26	M 6	16	33	17	50	–	–	3	16	550	24580.0405
	12	26	M 6	16	33	17	50	–	–	3	16	550	24580.0406
125	12	28	M 8	20	36	18	64	–	–	3	20	835	24580.0410
	14	28	M 8	20	36	18	64	–	–	3	20	835	24580.0411
140	14	30	M 8	20	39	19	64	–	–	3	20	1025	24580.0415
	16	30	M 8	20	39	19	64	–	–	3	20	1025	24580.0416
160	14	32	M10	25	40	20	80	–	–	3	25	1380	24580.0420
	16	32	M10	25	40	20	80	–	–	3	25	1380	24580.0421
200	18	38	M10	25	45	24	80	–	–	3	25	2180	24580.0430
	22	38	M10	25	45	24	80	–	–	3	25	2180	24580.0431
250	22	45	M12	32	50	28	100	–	–	5	32	4160	24580.0440
	26	45	M12	32	50	28	100	–	–	5	32	4160	24580.0441
315	26	53	M12	32	56	33	100	–	–	5	32	6160	24580.0445
	30	53	M12	32	56	33	100	–	–	5	32	6160	24580.0446
400	30	65	M16	36	63	38	112	–	–	5	36	10460	24580.0450
	34	65	M16	36	63	38	112	–	–	5	36	10460	24580.0451
with hub keyway, with machine handle EH 24450. assembled, form N-F/G (formerly: F 3) – picture 2													
80	10	24	M 6	16	29	16	50	3	11.4	3	16	410	24580.0500
	12	24	M 6	16	29	16	50	4	13.8	3	16	410	24580.0501
100	10	26	M 6	16	33	17	50	3	11.4	3	16	550	24580.0505
	12	26	M 6	16	33	17	50	4	13.8	3	16	550	24580.0506
125	12	28	M 8	20	36	18	64	4	13.8	3	20	835	24580.0510
	14	28	M 8	20	36	18	64	5	16.3	3	20	835	24580.0511
140	14	30	M 8	20	39	19	64	5	16.3	3	20	1025	24580.0515
	16	30	M 8	20	39	19	64	5	18.3	3	20	1025	24580.0516
160	14	32	M10	25	40	20	80	5	16.3	3	25	1380	24580.0520
	16	32	M10	25	40	20	80	5	18.3	3	25	1380	24580.0521
200	18	38	M10	25	45	24	80	6	20.8	3	25	2180	24580.0530
	22	38	M10	25	45	24	80	6	24.8	3	25	2180	24580.0531
250	22	45	M12	32	50	28	100	6	24.8	5	32	4160	24580.0540
	26	45	M12	32	50	28	100	8	29.3	5	32	4160	24580.0541
315	26	53	M12	32	56	33	100	8	29.3	5	32	6160	24580.0545
	30	53	M12	32	56	33	100	8	33.3	5	32	6160	24580.0546
400	30	65	M16	36	63	38	112	8	33.3	5	36	10460	24580.0550
	34	65	M16	36	63	38	112	10	37.3	5	36	10460	24580.0551

4

APPLICATION EXAMPLE



Handwheels • DIN 950 light metal

EH 24590.



PRODUCT DESCRIPTION

Hub machined; rim turned and mirror-finished on all sides, non-machined surfaces cleanly blasted.

Material

Handwheel

- Light metal Al

Machine handle DIN 39 EH 24450.

- Steel, turned, zinc-plated by galvanization, passivated

Machine handle DIN 98 EH 24460. rotating

- Steel, turned, zinc-plated by galvanization, passivated

Assembly

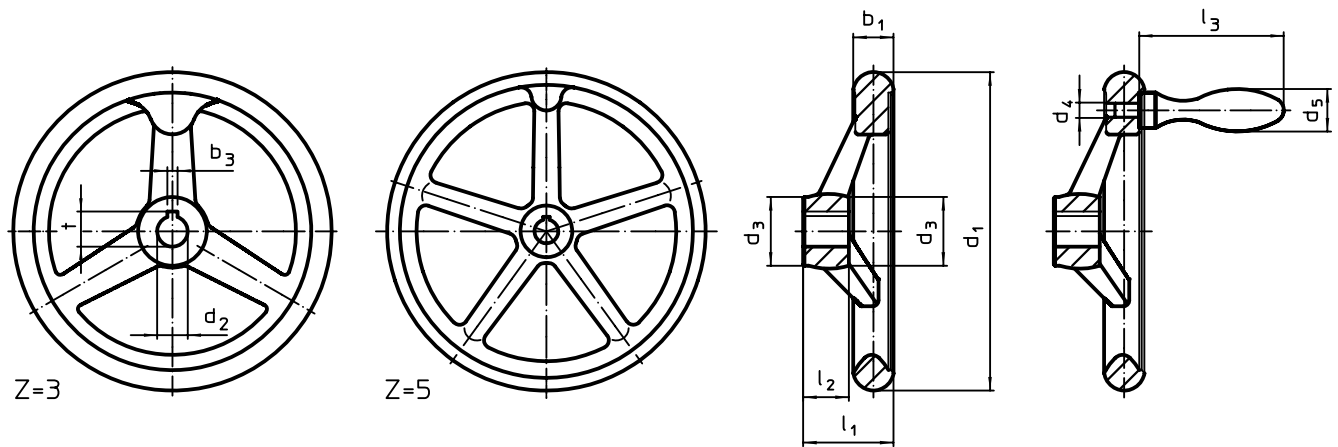
Shaft-end washers EH 22270. for axial fastening.

MORE INFORMATION

Further products

Shaft-End Washers → p. 187
Rotating Machine Handles, DIN 98 ... → p. 624

DRAWING



picture 1


picture 2

The orientation of the hub keyway may be different than shown in the drawing.

ORDER INFORMATION

d ₁	d ₂ H7	Dimensions						Hub keyway, DIN 6885 sheet 1		Number of spokes z	Corresponding machine handle DIN 39 / DIN 98	[g]	Art. No.
		d ₃	d ₄	d ₅	l ₁ ~	l ₂	l ₃ ~	b ₃	t				
[mm]													
without hub keyway, without handle, form B-F/A (formerly: A 4) – picture 1													
80	10	24	–	–	29	16	–	–	–	3	–	129	24590.0000
	12	24	–	–	29	16	–	–	–	3	–	128	24590.0001
100	10	26	–	–	33	17	–	–	–	3	–	207	24590.0005
	12	26	–	–	33	17	–	–	–	3	–	205	24590.0006
125	12	28	–	–	36	18	–	–	–	3	–	292	24590.0010
	14	28	–	–	36	18	–	–	–	3	–	298	24590.0011
140	14	30	–	–	39	19	–	–	–	3	–	394	24590.0015
	16	30	–	–	39	19	–	–	–	3	–	363	24590.0016
160	14	32	–	–	40	20	–	–	–	3	–	480	24590.0020
	16	32	–	–	40	20	–	–	–	3	–	471	24590.0021
200	18	38	–	–	45	24	–	–	–	3	–	783	24590.0030
	22	38	–	–	45	24	–	–	–	3	–	770	24590.0031
250	22	45	–	–	50	28	–	–	–	5	–	1509	24590.0040
	26	45	–	–	50	28	–	–	–	5	–	1510	24590.0041
315	26	53	–	–	56	33	–	–	–	5	–	2350	24590.0045
	30	53	–	–	56	33	–	–	–	5	–	2314	24590.0046
400	30	65	–	–	63	38	–	–	–	5	–	3740	24590.0050
	34	65	–	–	63	38	–	–	–	5	–	3700	24590.0051

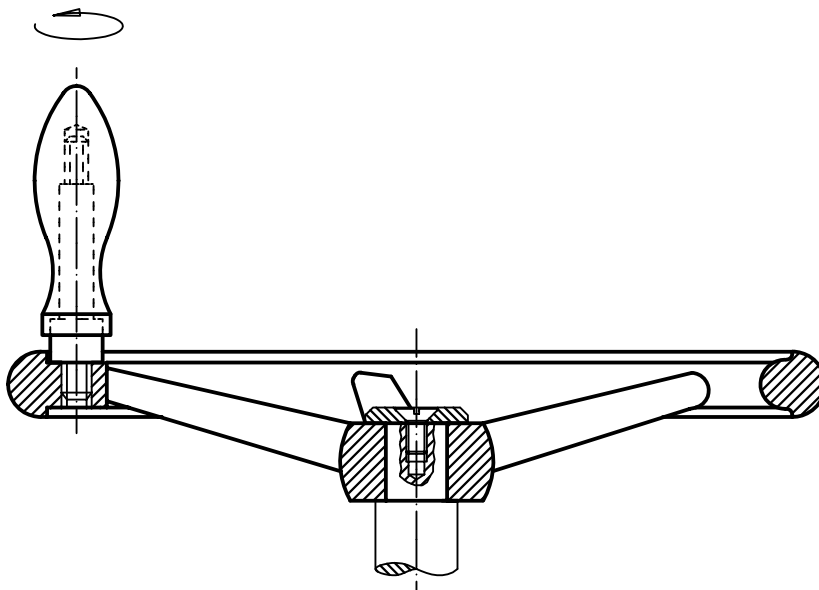


d ₁	d ₂ H7	Dimensions						Hub keyway, DIN 6885 sheet 1		Number of spokes z	Corresponding machine handle DIN 39 / DIN 98		Art. No.
		d ₃	d ₄	d ₅	l ₁ ~	l ₂	l ₃ ~	b ₃	t				
[mm]													[g]
with hub keyway, without handle, form N-F/A (formerly: A 3) – picture 1													
80	10	24	–	–	29	16	–	3	11.4	3	–	128	24590.0100
	12	24	–	–	29	16	–	4	13.8	3	–	127	24590.0101
100	10	26	–	–	33	17	–	3	11.4	3	–	208	24590.0105
	12	26	–	–	33	17	–	4	13.8	3	–	199	24590.0106
125	12	28	–	–	36	18	–	4	13.8	3	–	299	24590.0110
	14	28	–	–	36	18	–	5	16.3	3	–	291	24590.0111
140	14	30	–	–	39	19	–	5	16.3	3	–	374	24590.0115
	16	30	–	–	39	19	–	5	18.3	3	–	318	24590.0116
160	14	32	–	–	40	20	–	5	16.3	3	–	422	24590.0120
	16	32	–	–	40	20	–	5	18.3	3	–	422	24590.0121
200	18	38	–	–	45	24	–	6	20.8	3	–	779	24590.0130
	22	38	–	–	45	24	–	6	24.8	3	–	758	24590.0131
250	22	45	–	–	50	28	–	6	24.8	5	–	1441	24590.0140
	26	45	–	–	50	28	–	8	29.3	5	–	1472	24590.0141
315	26	53	–	–	56	33	–	8	29.3	5	–	2500	24590.0145
	30	53	–	–	56	33	–	8	33.3	5	–	2304	24590.0146
400	30	65	–	–	63	38	–	8	33.3	5	–	3600	24590.0150
	34	65	–	–	63	38	–	10	37.3	5	–	4725	24590.0151
without hub keyway, with rotating handle EH 24460., assembled form B-F/G (formerly D 4) – picture 2													
80	10	24	M 6	16	29	16	49	–	–	3	16	150	24590.0200
	12	24	M 6	16	29	16	49	–	–	3	16	150	24590.0201
100	10	26	M 6	16	33	17	49	–	–	3	16	210	24590.0205
	12	26	M 6	16	33	17	49	–	–	3	16	220	24590.0206
125	12	28	M 8	20	36	18	61	–	–	3	20	340	24590.0210
	14	28	M 8	20	36	18	61	–	–	3	20	340	24590.0211
140	14	30	M 8	20	39	19	61	–	–	3	20	430	24590.0215
	16	30	M 8	20	39	19	61	–	–	3	20	430	24590.0216
160	14	32	M10	25	40	20	75	–	–	3	25	615	24590.0220
	16	32	M10	25	40	20	75	–	–	3	25	615	24590.0221
200	18	38	M10	25	45	24	75	–	–	3	25	970	24590.0230
	22	38	M10	25	45	24	75	–	–	3	25	970	24590.0231
250	22	45	M12	32	50	28	95	–	–	5	32	1885	24590.0240
	26	45	M12	32	50	28	95	–	–	5	32	1885	24590.0241
315	26	53	M12	32	56	33	95	–	–	5	32	2737	24590.0245
	30	53	M12	32	56	33	95	–	–	5	32	2701	24590.0246
400	30	65	M16	36	63	38	106	–	–	5	36	4250	24590.0250
	34	65	M16	36	63	38	106	–	–	5	36	4250	24590.0251
with hub keyway, with rotating handle EH 24460. assembled, form N-F/G (formerly: D 3) – picture 2													
80	10	24	M 6	16	29	16	49	3	11.4	3	16	150	24590.0300
	12	24	M 6	16	29	16	49	4	13.8	3	16	150	24590.0301
100	10	26	M 6	16	33	17	49	3	11.4	3	16	210	24590.0305
	12	26	M 6	16	33	17	49	4	13.8	3	16	210	24590.0306
125	12	28	M 8	20	36	18	61	4	13.8	3	20	340	24590.0310
	14	28	M 8	20	36	18	61	5	16.3	3	20	340	24590.0311
140	14	30	M 8	20	39	19	61	5	16.3	3	20	456	24590.0315
	16	30	M 8	20	39	19	61	5	18.3	3	20	430	24590.0316
160	14	32	M10	25	40	20	75	5	16.3	3	25	615	24590.0320
	16	32	M10	25	40	20	75	5	18.3	3	25	615	24590.0321
200	18	38	M10	25	45	24	75	6	20.8	3	25	970	24590.0330
	22	38	M10	25	45	24	75	6	24.8	3	25	970	24590.0331
250	22	45	M12	32	50	28	95	6	24.8	5	32	1885	24590.0340
	26	45	M12	32	50	28	95	8	29.3	5	32	1885	24590.0341
315	26	53	M12	32	56	33	95	8	29.3	5	32	2885	24590.0345
	30	53	M12	32	56	33	95	8	33.3	5	32	2885	24590.0346
400	30	65	M16	36	63	38	106	8	33.3	5	36	4250	24590.0350
	34	65	M16	36	63	38	106	10	37.3	5	36	4250	24590.0351



d ₁	d ₂ H7	Dimensions						Hub keyway, DIN 6885 sheet 1		Number of spokes z	Corresponding machine handle DIN 39 / DIN 98	Art. No.	
		d ₃	d ₄	d ₅	l ₁ ~	l ₂	l ₃ ~	b ₃	t				
[mm]												[g]	
without hub keyway, with machine handle EH 24450., assembled, form B-F/G (formerly: F 4) – picture 2													
80	10	24	M 6	16	29	16	50	–	–	3	16	150	24590.0400
	12	24	M 6	16	29	16	50	–	–	3	16	150	24590.0401
100	10	26	M 6	16	33	17	50	–	–	3	16	210	24590.0405
	12	26	M 6	16	33	17	50	–	–	3	16	210	24590.0406
125	12	28	M 8	20	36	18	64	–	–	3	20	340	24590.0410
	14	28	M 8	20	36	18	64	–	–	3	20	340	24590.0411
140	14	30	M 8	20	39	19	64	–	–	3	20	420	24590.0415
	16	30	M 8	20	39	19	64	–	–	3	20	420	24590.0416
160	14	32	M10	25	40	20	80	–	–	3	25	615	24590.0420
	16	32	M10	25	40	20	80	–	–	3	25	615	24590.0421
200	18	38	M10	25	45	24	80	–	–	3	25	970	24590.0430
	22	38	M10	25	45	24	80	–	–	3	25	970	24590.0431
250	22	45	M12	32	50	28	100	–	–	5	32	1860	24590.0440
	26	45	M12	32	50	28	100	–	–	5	32	1860	24590.0441
315	26	53	M12	32	56	33	100	–	–	5	32	2860	24590.0445
	30	53	M12	32	56	33	100	–	–	5	32	2860	24590.0446
400	30	65	M16	36	63	38	112	–	–	5	36	4210	24590.0450
	34	65	M16	36	63	38	112	–	–	5	36	4210	24590.0451
with hub keyway, with machine handle EH 24450. assembled, form N-F/G (formerly: F 3) – picture 2													
80	10	24	M 6	16	29	16	50	3	11.4	3	16	150	24590.0500
	12	24	M 6	16	29	16	50	4	13.8	3	16	150	24590.0501
100	10	26	M 6	16	33	17	50	3	11.4	3	16	210	24590.0505
	12	26	M 6	16	33	17	50	4	13.8	3	16	210	24590.0506
125	12	28	M 8	20	36	18	64	4	13.8	3	20	330	24590.0510
	14	28	M 8	20	36	18	64	5	16.3	3	20	330	24590.0511
140	14	30	M 8	20	39	19	64	5	16.3	3	20	420	24590.0515
	16	30	M 8	20	39	19	64	5	18.3	3	20	420	24590.0516
160	14	32	M10	25	40	20	80	5	16.3	3	25	610	24590.0520
	16	32	M10	25	40	20	80	5	18.3	3	25	610	24590.0521
200	18	38	M10	25	45	24	80	6	20.8	3	25	960	24590.0530
	22	38	M10	25	45	24	80	6	24.8	3	25	960	24590.0531
250	22	45	M12	32	50	28	100	6	24.8	5	32	1860	24590.0540
	26	45	M12	32	50	28	100	8	29.3	5	32	1860	24590.0541
315	26	53	M12	32	56	33	100	8	29.3	5	32	2860	24590.0545
	30	53	M12	32	56	33	100	8	33.3	5	32	2860	24590.0546
400	30	65	M16	36	63	38	112	8	33.3	5	36	4210	24590.0550
	34	65	M16	36	63	38	112	10	37.3	5	36	4210	24590.0551

APPLICATION EXAMPLE



Handwheels • similar to DIN 950, stainless steel
EH 24591.



PRODUCT DESCRIPTION

Hub machined; rim turned and mirror-finished on all sides, non-machined surfaces cleanly blasted.

Material

- Handwheel**
 - Stainless steel A4
- Machine handle**
 - Stainless steel A4

Assembly

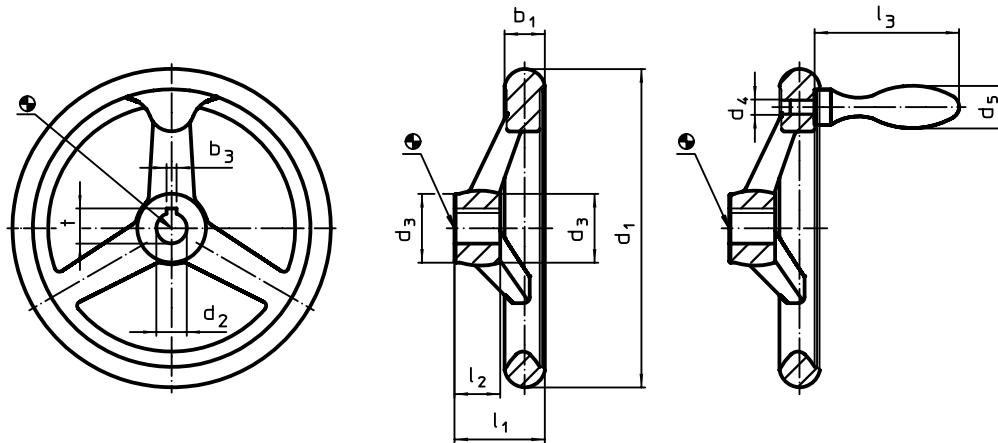
Shaft-end washers EH 22270. for axial fastening.

MORE INFORMATION

Further products

Shaft-End Washers → p. 187

DRAWING



picture 1

picture 2

The orientation of the hub keyway may be different than shown in the drawing.

ORDER INFORMATION

Dimensions								Hub keyway, DIN 6885 sheet 1		Number of spokes	Corresponding machine handle DIN 39	[g]	Art. No.
d ₁	d ₂ H9	d ₃	d ₄	d ₅	l ₁	l ₂	l ₃	b ₃	t				
[mm]								[mm]					
without hub keyway, without handle, form B-F/A (formerly: A 4) – picture 1													
100	10	25.5	–	–	33.0	17	–	–	–	3	–	431	24591.0005
125	12	27.0	–	–	35.5	18	–	–	–	3	–	633	24591.0010
140	14	29.0	–	–	38.5	19	–	–	–	3	–	851	24591.0015
160	14	31.0	–	–	39.5	20	–	–	–	3	–	1112	24591.0020
200	18	37.0	–	–	44.5	24	–	–	–	3	–	1877	24591.0030
with hub keyway, without handle, form N-F/A (formerly: A 3) – picture 1													
100	10	25.5	–	–	33.0	17	–	3	11.4	3	–	434	24591.0105
125	12	27.0	–	–	35.5	18	–	4	13.8	3	–	659	24591.0110
140	14	29.0	–	–	38.5	19	–	5	16.3	3	–	854	24591.0115
160	14	31.0	–	–	39.5	20	–	5	16.3	3	–	1115	24591.0120
200	18	37.0	–	–	44.5	24	–	6	20.8	3	–	1882	24591.0130
without hub keyway, with machine handle EH 24450., assembled, form B-F/G (formerly: F 4) – picture 2													
100	10	25.5	M 6	16	33.0	17	50	–	–	3	16	472	24591.0405
125	12	27.0	M 8	20	35.5	18	64	–	–	3	20	748	24591.0410
140	14	29.0	M 8	20	38.5	19	64	–	–	3	20	939	24591.0415
160	14	31.0	M10	25	39.5	20	80	–	–	3	25	1273	24591.0420
200	18	37.0	M10	25	44.5	24	80	–	–	3	25	2000	24591.0430
with hub keyway, with machine handle EH 24450. assembled, form N-F/G (formerly: F 3) – picture 2													
100	10	25.5	M 6	16	33.0	17	50	3	11.4	3	16	473	24591.0505
125	12	27.0	M 8	20	35.5	18	64	4	13.8	3	20	753	24591.0510
140	14	29.0	M 8	20	38.5	19	64	5	16.3	3	20	939	24591.0515
160	14	31.0	M10	25	39.5	20	80	5	16.3	3	25	1282	24591.0520
200	18	37.0	M10	25	44.5	24	80	6	20.8	3	25	2000	24591.0530

Disc-Type Handwheels • light metal

EH 24600.



PRODUCT DESCRIPTION

There are gripping indentations on the rear sides. For all handwheels, the hub is machined, rim is turned and mirror-finished on all sides. The unmachined raw surfaces have been blasted clean. Together with their mirror-polished rim, these handwheels therefore present a finish which generally does not require additional lacquering.

Material

Axle part

- Steel, zinc-plated by galvanization

Handwheel

- Aluminium permanent-mould casting

Cylindrical handle EH 24530

- DIN 7708 - thermosetting plastic (PF 31), black similar to RAL 9005

Assembly

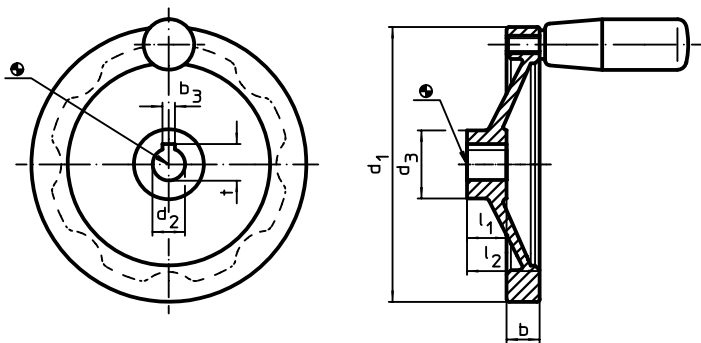
Shaft-end washers EH 22270. for axial fastening.

MORE INFORMATION

Further products

Shaft-End Washers → p. 187
Cylindrical Handles, rotating → p. 625

DRAWING





The orientation of the hub keyway may be different than shown in the drawing.

ORDER INFORMATION

Dimensions						Hub keyway, DIN 6885 sheet 1		Corresponding cylindrical handle EH 24530.	max. [°C]	[g]	Art. No.
d ₁	d ₂ H7	d ₃	b	l ₁	l ₂ ~	b ₃	t				
[mm]						[mm]		[mm]			
without hub keyway, without cylindrical handle											
80	10	26	13.0	16	26	-	-	-	-	121	24600.0000
	12	26	13.0	16	26	-	-	-	-	139	24600.0001
100	10	28	14.0	17	30	-	-	-	-	203	24600.0005
	12	28	14.0	17	30	-	-	-	-	205	24600.0006
125	12	31	15.0	18	33	-	-	-	-	307	24600.0010
	14	31	15.0	18	33	-	-	-	-	298	24600.0011
140	14	36	16.5	19	36	-	-	-	-	430	24600.0015
	16	36	16.5	19	36	-	-	-	-	417	24600.0016
160	14	36	18.0	20	39	-	-	-	-	540	24600.0020
	16	36	18.0	20	39	-	-	-	-	533	24600.0021
200	18	42	20.5	24	45	-	-	-	-	849	24600.0030
	20	42	20.5	24	45	-	-	-	-	866	24600.0031
250	22	48	23.0	28	51	-	-	-	-	1495	24600.0040
	26	48	23.0	28	51	-	-	-	-	1441	24600.0041
with hub keyway, without cylindrical handle											
80	10	26	13.0	16	26	3	11.4	-	-	139	24600.0100
	12	26	13.0	16	26	4	13.8	-	-	128	24600.0101
100	10	28	14.0	17	30	3	11.4	-	-	201	24600.0105
	12	28	14.0	17	30	4	13.8	-	-	194	24600.0106
125	12	31	15.0	18	33	4	13.8	-	-	291	24600.0110
	14	31	15.0	18	33	5	16.3	-	-	288	24600.0111
140	14	36	16.5	19	36	5	16.3	-	-	413	24600.0115
	16	36	16.5	19	36	5	18.3	-	-	397	24600.0116
160	14	36	18.0	20	39	5	16.3	-	-	529	24600.0120
	16	36	18.0	20	39	5	18.3	-	-	528	24600.0121

→

d ₁	d ₂ H7	Dimensions				Hub keyway, DIN 6885 sheet 1		Corresponding cylindrical handle EH 24530.	 max. [°C]	 [g]	Art. No.
		d ₃	b	l ₁	l ₂ ~	b ₃	t				
200	18	42	20.5	24	45	6	20.8	–	–	880	24600.0130
	20	42	20.5	24	45	6	22.8	–	–	870	24600.0131
250	22	48	23.0	28	51	6	24.8	–	–	1515	24600.0140
	26	48	23.0	28	51	8	29.3	–	–	1496	24600.0141
without hub keyway, with cylindrical handle EH 24530.											
80	10	26	13.0	16	26	–	–	18 x M 6	110	160	24600.0200
	12	26	13.0	16	26	–	–	18 x M 6	110	160	24600.0201
100	10	28	14.0	17	30	–	–	21 x M 6	110	255	24600.0205
	12	28	14.0	17	30	–	–	21 x M 6	110	255	24600.0206
125	12	31	15.0	18	33	–	–	23 x M 8	110	390	24600.0210
	14	31	15.0	18	33	–	–	23 x M 8	110	390	24600.0211
140	14	36	16.5	19	36	–	–	23 x M 8	110	510	24600.0215
	16	36	16.5	19	36	–	–	23 x M 8	110	510	24600.0216
160	14	36	18.0	20	39	–	–	26 x M10	110	675	24600.0220
	16	36	18.0	20	39	–	–	26 x M10	110	675	24600.0221
200	18	42	20.5	24	45	–	–	26 x M10	110	995	24600.0230
	20	42	20.5	24	45	–	–	26 x M10	110	995	24600.0231
250	22	48	23.0	28	51	–	–	28 x M10	110	1625	24600.0240
	26	48	23.0	28	51	–	–	28 x M10	110	1625	24600.0241
with hub keyway, with cylindrical handle EH 24530.											
80	10	26	13.0	16	26	3	11.4	18 x M 6	110	160	24600.0300
	12	26	13.0	16	26	4	13.8	18 x M 6	110	160	24600.0301
100	10	28	14.0	17	30	3	11.4	21 x M 6	110	255	24600.0305
	12	28	14.0	17	30	4	13.8	21 x M 6	110	255	24600.0306
125	12	31	15.0	18	33	4	13.8	23 x M 8	110	390	24600.0310
	14	31	15.0	18	33	5	16.3	23 x M 8	110	390	24600.0311
140	14	36	16.5	19	36	5	16.3	23 x M 8	110	510	24600.0315
	16	36	16.5	19	36	5	18.3	23 x M 8	110	510	24600.0316
160	14	36	18.0	20	39	5	16.3	26 x M10	110	572	24600.0320
	16	36	18.0	20	39	5	18.3	26 x M10	110	675	24600.0321
200	18	42	20.5	24	45	6	20.8	26 x M10	110	995	24600.0330
	20	42	20.5	24	45	6	22.8	26 x M10	110	995	24600.0331
250	22	48	23.0	28	51	6	24.8	28 x M10	110	1625	24600.0340
	26	48	23.0	28	51	8	29.3	28 x M10	110	1625	24600.0341

Spoked Handwheels • light metal

EH 24610.



PRODUCT DESCRIPTION

For all handwheels, the hub is machined, rim is turned and mirror-finished on all sides. The unmachined raw surfaces have been blasted clean. Together with their mirror-polished rim, these handwheels therefore present a finish which generally does not require additional lacquering.

Material

Axle part

- Steel, zinc-plated by galvanization

Handwheel

- Aluminium permanent-mould casting

Cylindrical handle EH 24530

- DIN 7708 - thermosetting plastic (PF 31), black similar to RAL 9005

Assembly

Shaft-end washers EH 22270. for axial fastening.

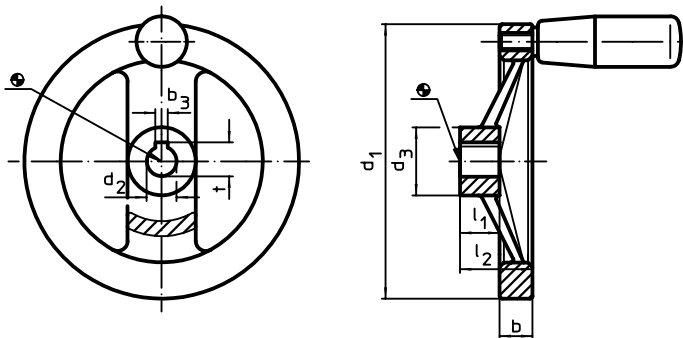
MORE INFORMATION

Further products

Shaft-End Washers → p. 187
Cylindrical Handles, rotating → p. 625

4

DRAWING





The orientation of the hub keyway may be different than shown in the drawing.

ORDER INFORMATION

Dimensions						Hub keyway, DIN 6885 sheet 1		Corresponding cylindrical handle EH 24530.	max. [°C]	[g]	Art. No.	
d ₁	d ₂ H7	d ₃	b	l ₁	l ₂	b ₃	t					
[mm]						[mm]		[mm]	[°C]	[g]		
without hub keyway, without cylindrical handle												
125	12		31	15.0	18	33	-	-	-	-	301	24610.0010
	14		31	15.0	18	33	-	-	-	-	300	24610.0011
140	14		36	16.5	19	36	-	-	-	-	400	24610.0015
	16		36	16.5	19	36	-	-	-	-	396	24610.0016
160	14		36	18.0	20	39	-	-	-	-	520	24610.0020
	16		36	18.0	20	39	-	-	-	-	526	24610.0021
200	18		42	20.5	24	45	-	-	-	-	886	24610.0030
	20		42	20.5	24	45	-	-	-	-	876	24610.0031
250	22		48	23.0	28	51	-	-	-	-	1454	24610.0040
	26		48	23.0	28	51	-	-	-	-	1516	24610.0041
with hub keyway, without cylindrical handle												
125	12		31	15.0	18	33	4	13.8	-	-	303	24610.0110
	14		31	15.0	18	33	5	16.3	-	-	306	24610.0111
140	14		36	16.5	19	36	5	16.3	-	-	406	24610.0115
	16		36	16.5	19	36	5	18.3	-	-	404	24610.0116
160	14		36	18.0	20	39	5	16.3	-	-	542	24610.0120
	16		36	18.0	20	39	5	18.3	-	-	525	24610.0121
200	18		42	20.5	24	45	6	20.8	-	-	887	24610.0130
	20		42	20.5	24	45	6	22.8	-	-	875	24610.0131
250	22		48	23.0	28	51	6	24.8	-	-	1446	24610.0140
	26		48	23.0	28	51	8	29.3	-	-	1443	24610.0141



d ₁	d ₂ H7	Dimensions				Hub keyway, DIN 6885 sheet 1		Corresponding cylindrical handle EH 24530. [mm]	 max. [°C]	 [g]	Art. No.
		d ₃	b	l ₁	l ₂ ~	b ₃	t				
[mm]											
without hub keyway, with cylindrical handle EH 24530.											
125	12	31	15.0	18	33	–	–	23 x M 8	110	390	24610.0210
	14	31	15.0	18	33	–	–	23 x M 8	110	390	24610.0211
140	14	36	16.5	19	36	–	–	23 x M 8	110	490	24610.0215
	16	36	16.5	19	36	–	–	23 x M 8	110	490	24610.0216
160	14	36	18.0	20	39	–	–	26 x M10	110	645	24610.0220
	16	36	18.0	20	39	–	–	26 x M10	110	645	24610.0221
200	18	42	20.5	24	45	–	–	26 x M10	110	1000	24610.0230
	20	42	20.5	24	45	–	–	26 x M10	110	1000	24610.0231
250	22	48	23.0	28	51	–	–	28 x M10	110	1585	24610.0240
	26	48	23.0	28	51	–	–	28 x M10	110	1585	24610.0241
with hub keyway, with cylindrical handle EH 24530.											
125	12	31	15.0	18	33	4	13.8	23 x M 8	110	390	24610.0310
	14	31	15.0	18	33	5	16.3	23 x M 8	110	387	24610.0311
140	14	36	16.5	19	36	5	16.3	23 x M 8	110	490	24610.0315
	16	36	16.5	19	36	5	18.3	23 x M 8	110	490	24610.0316
160	14	36	18.0	20	39	5	16.3	26 x M10	110	645	24610.0320
	16	36	18.0	20	39	5	18.3	26 x M10	110	645	24610.0321
200	18	42	20.5	24	45	6	20.8	26 x M10	110	1000	24610.0330
	20	42	20.5	24	45	6	22.8	26 x M10	110	1000	24610.0331
250	22	48	23.0	28	51	6	24.8	28 x M10	110	1585	24610.0340
	26	48	23.0	28	51	8	29.3	28 x M10	110	1585	24610.0341

5 MACHINE ELEMENTS





Product group	Page
Initiator Elements	690



Tapered Shaft Elements	693
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Set Collars	702
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Locking Nuts	707
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Quick Plug Couplings	709
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Levelling Feet	713
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Damping Elements	716
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Hinges	726
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Sensing Elements • with sensor adapter

EH 25010.



PRODUCT DESCRIPTION

Spring plunger in robust and compact design with fine-pitch thread and integrated position sensing using standard proximity sensors. Suitable for multiple applications, e.g. for locking including position control and for proximity sensors with **flush contact**. Switching range adjustable via screwed position of sensor. Sensitivity of switching operations can be adjusted throughout the entire stroke.

Material

- Pin**
- Stainless steel 1.4305

Housing

- Stainless steel 1.4305

Nut

- Brass (ISO 4035), nickel-plated

Spring

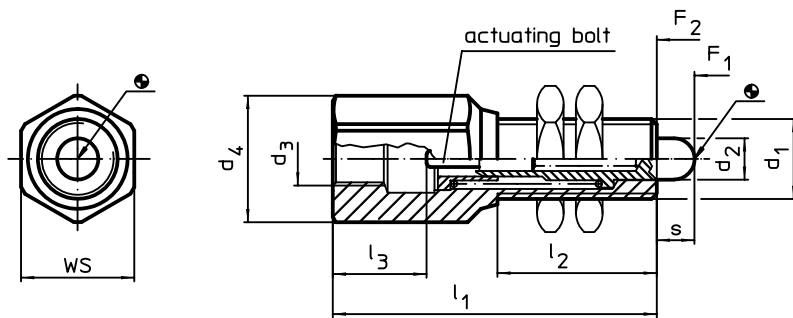
- Stainless steel

MORE INFORMATION

Further products

Retrieval Units, with sensor. → p. 359

DRAWING

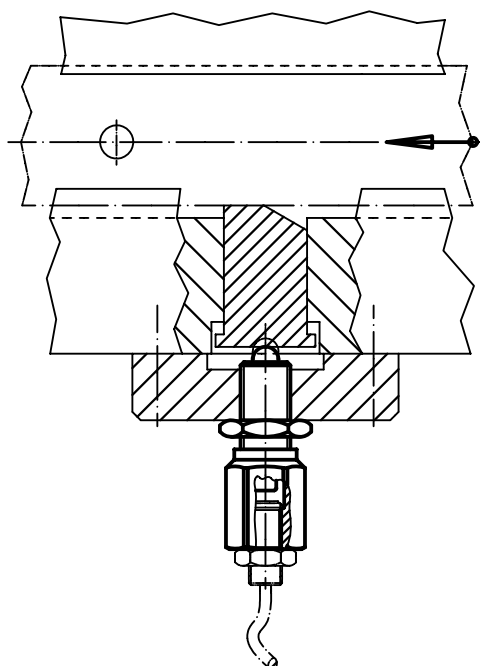


ORDER INFORMATION

d ₁	d ₂	d ₃	Dimensions					WS	Spring load ¹⁾		[g]	Art. No.
			d ₄	l ₁	l ₂	l ₃	s		F ₁ ~	F ₂ ~		
[mm]								[mm]	[N]			
M12 x 1	6.2	M 8 x 1	19.0	44	20	15.5	5.6	17	24.0	41.5	57	25010.0012
M16 x 1	8.5	M12 x 1	21.5	65	32	20.0	7.5	19	32.5	65.5	102	25010.0016

¹⁾ statistical average value

APPLICATION EXAMPLE



Sensing Elements • with actuating bolt, protected against rotating
EH 25020.



PRODUCT DESCRIPTION

Spring plunger with position sensing by means of an actuating bolt which is protected against rotating. Suitable for multiple applications, e.g. as lift-off pin in tools with position control. Depending on the selected version, the tip is either round or pointed or fitted with a connection thread for all-purpose use. At the fastening thread of the actuating bolt, a switching element can be fitted which is secured against rotating and suitable for all commonly used switches.

Material

- Body**
 - Free cutting steel, blackened
- Nut**
 - Steel, black (ISO 4035)
- Actuating bolt**
 - Steel, nitrided, black

Spring

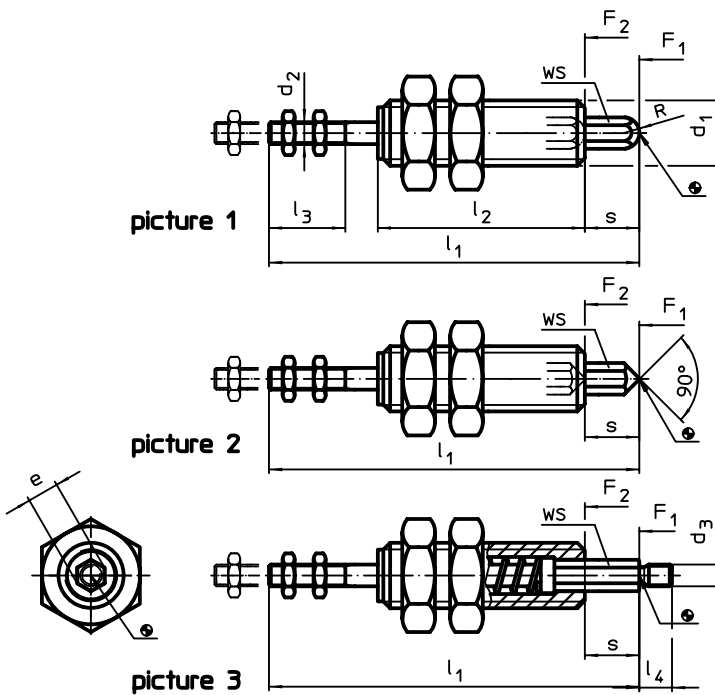
- Stainless steel

MORE INFORMATION

Further products

Retrieval Units, with sensor. → p. 359

DRAWING



ORDER INFORMATION

d ₁	s	d ₂	d ₃	Dimensions						R	WS [mm]	Spring load ¹⁾		Art. No.	
				e ~	l ₁	l ₂	l ₃ min.	l ₄	F ₁ ~			F ₂ ~			
[mm]														[N]	[g]
probe tip, round – picture 1															
M 8	6	M2,5	–	3.5	50	32	9	–	1.75	3	4.1	7.6	22	25020.0008	
M10	8	M 3	–	4.6	59	35	11	–	2.30	4	5.0	9.0	35	25020.0010	
M12	10	M 4	–	5.8	68	38	14	–	2.90	5	5.1	11.0	51	25020.0012	
M16	12	M 5	–	6.9	78	42	16	–	3.50	6	7.5	13.8	102	25020.0016	
probe tip, pointed – picture 2															
M 8	6	M2,5	–	3.5	50	32	9	–	–	3	4.1	7.6	20	25020.0058	
M10	8	M 3	–	4.6	59	35	11	–	–	4	5.0	9.0	29	25020.0060	
M12	10	M 4	–	5.8	68	38	14	–	–	5	5.1	11.0	44	25020.0062	
M16	12	M 5	–	6.9	78	42	16	–	–	6	7.5	13.8	87	25020.0066	
tip with connection thread – picture 3															
M 8	6	M2,5	M2,5	3.5	50	32	9	4	–	3	4.1	7.6	29	25020.0108	
M10	8	M 3	M 3	4.6	59	35	11	5	–	4	5.0	9.0	36	25020.0110	
M12	10	M 4	M 4	5.8	68	38	14	6	–	5	5.1	11.0	54	25020.0112	
M16	12	M 5	M 5	6.9	78	42	16	7	–	6	7.5	13.8	102	25020.0116	

¹⁾ statistical average value

Sensing Elements

EH 25010./EH 25020.

INSTALLATION EXAMPLES

5



Sensing elements designed for position sensing using standard proximity sensors. The image shows the model with a compact design and fine-pitch thread.



The tools are also available with an actuating bolt that is protected against rotating.



Tapered Shaft Hubs • without lock nut

EH 25050.



PRODUCT DESCRIPTION

By using tapered shaft hubs, all shaft-hub joints of machine elements such as sprocket wheels, gear wheels, belt pulleys, cams, levers etc. can be easily and efficiently established. It is a self-centering and non-floating tapered shaft hub in corrosion-protected design with a hexagon nut.

The rotational accuracy of the tapered shaft hubs is 0,03 mm.

Material

- External part
 - Steel, zinc-plated by galvanization

Inner part

- Steel, nickel-plated

Nut

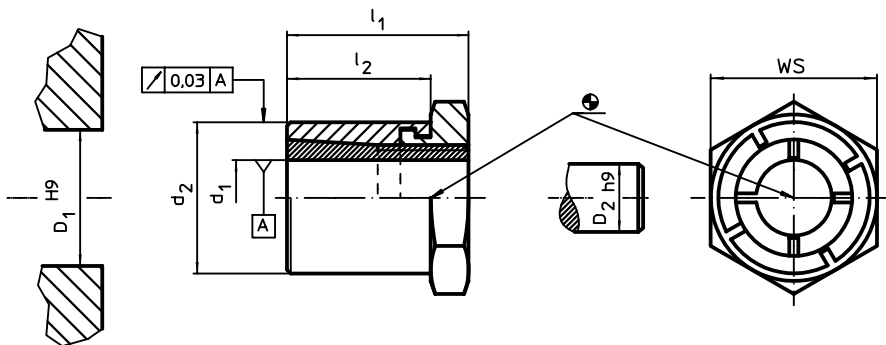
- Steel, nickel-plated

MORE INFORMATION

References

Comply with mounting instructions, mounting examples, and technical data.



DRAWING



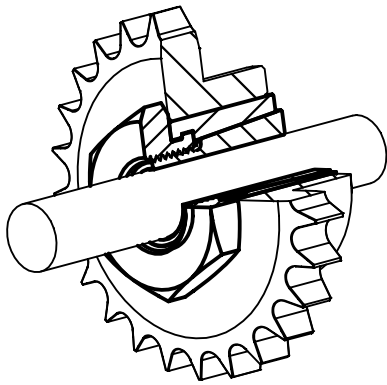
ORDER INFORMATION

Dimensions				WS	Tightening torque of the nut T_A max.	Transferable torque M max.	Transferable axial load F_a max.	Surface pressure of shaft P_w max.	Surface pressure of hub P_N max.	Hub bore D_1 H9	Shaft diameter D_2 h9	[g]	Art. No.
d_1	d_2	l_1	l_2										
[mm]				[mm]	[Nm]	[Nm]	[kN]	[N/mm ²]	[N/mm ²]	[mm]	[mm]		
5	14	19	15	14	9.9	10.1	4.0	264	96	14	5	18	25050.0005
6	14	19	15	14	9.9	12.1	4.0	220	96	14	6	17	25050.0006
8	16	22	17	16	16.9	23.4	5.8	179	91	16	8	24	25050.0008
9	20	24	19	22	34.9	43.7	9.7	245	115	20	9	47	25050.0009
10	20	24	19	22	34.9	48.6	9.7	221	115	20	10	45	25050.0010
11	22	24	19	22	43.8	59.9	10.9	225	117	22	11	51	25050.0011
12	22	24	19	22	43.8	65.3	10.9	206	117	22	12	47	25050.0012
14	26	28	22	27	65.0	93.0	13.3	178	99	26	14	81	25050.0014
15	26	28	22	27	65.0	99.0	13.3	166	99	26	15	76	25050.0015
16	26	28	22	27	65.0	106.0	13.3	156	99	26	16	71	25050.0016
18	35	36	27	36	161.0	223.0	24.8	224	125	35	18	197	25050.0018
19	35	36	27	36	161.0	235.0	24.8	212	125	35	19	190	25050.0019
20	35	36	27	36	161.0	248.0	24.8	201	125	35	20	181	25050.0020
22	42	41	30	46	250.0	349.0	31.8	197	110	42	22	344	25050.0022
24	42	41	30	46	250.0	381.0	31.8	180	110	42	24	322	25050.0024
25	42	41	30	46	250.0	397.0	31.8	173	110	42	25	310	25050.0025
28	47	44	33	50	355.0	565.0	40.4	174	110	47	28	403	25050.0028
30	47	44	33	50	355.0	605.0	40.4	162	110	47	30	372	25050.0030
32	55	51	38	55	490.0	764.0	47.8	166	102	55	32	632	25050.0032
35	55	51	38	55	490.0	836.0	47.8	151	102	55	35	568	25050.0035
38	62	58	43	65	720.0	1179.0	62.1	159	111	62	38	895	25050.0038
40	62	58	43	65	720.0	1241.0	62.1	151	111	62	40	844	25050.0040

ACCESSORIES

	WS		Art. No.
	[mm]	[g]	
special fork wrench			
	14	45	25050.0814
	16	72	25050.0816
	22	195	25050.0822
	27	195	25050.0827
	36	428	25050.0836
	46	610	25050.0846
	50	870	25050.0850
	55	1125	25050.0855
	65	1125	25050.0865

APPLICATION EXAMPLE



Tapered Shaft Hubs • without lock nut, stainless steel

EH 25050.



PRODUCT DESCRIPTION

By using tapered shaft hubs, all shaft-hub joints of machine elements such as sprocket wheels, gear wheels, belt pulleys, cams, levers etc. can be easily and efficiently established. It is a self-centering and non-floating tapered shaft hub in corrosion-protected design with a hexagon nut.

The rotational accuracy of the tapered shaft hubs is 0,03 mm.

Material

External part
 ▪ Stainless steel, nickel-plated

Inner part
 ▪ Stainless steel, nickel-plated

Nut

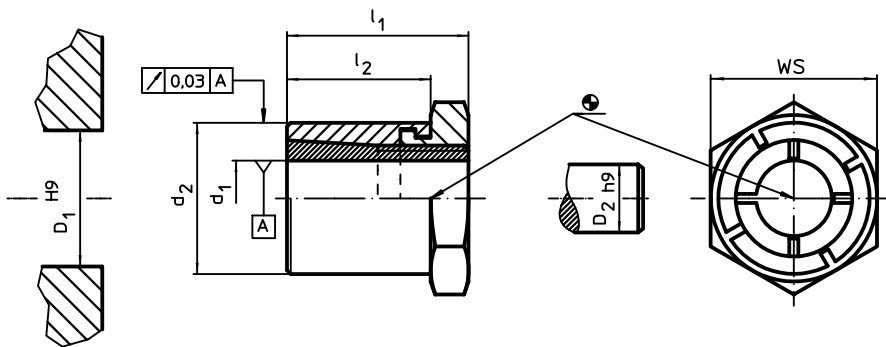
▪ Stainless steel, nickel-plated, hardened

MORE INFORMATION

References

Comply with mounting instructions, mounting examples, and technical data.

DRAWING



ORDER INFORMATION

Dimensions		WS	Tightening torque of the nut T_A max.	Transferable torque M max.	Transferable axial load F_a max.	Surface pressure of shaft p_w max.	Surface pressure of hub p_N max.	Hub bore D_1 H9	Shaft diameter D_2 h9	[g]	Art. No.		
d_1	d_2											l_1	l_2
[mm]				[Nm]	[Nm]	[kN]	[N/mm ²]	[N/mm ²]	[mm]	[mm]	[g]		
6	14	19	15	14	7	8.5	2.8	154	67	14	6	16	25050.0206
8	16	22	17	16	12	16.4	4.1	125	64	16	8	23	25050.0208
10	20	24	19	22	24	34.0	6.8	155	81	20	10	44	25050.0210
12	22	24	19	22	31	45.7	7.6	144	82	22	12	47	25050.0212
16	26	28	22	27	46	74.2	9.3	109	69	26	16	71	25050.0216
20	35	36	27	36	113	173.6	17.4	141	88	35	20	180	25050.0220
25	42	41	30	46	175	277.9	22.3	121	77	42	25	307	25050.0225
30	47	44	33	50	249	423.5	28.3	113	77	47	30	370	25050.0230

ACCESSORIES

	WS	[g]	Art. No.
	[mm]	[g]	
special fork wrench			
	14	45	25050.0814
	16	72	25050.0816
	22	195	25050.0822
	27	195	25050.0827
	36	428	25050.0836
	46	610	25050.0846
	50	870	25050.0850

Tapered Shaft Hubs • with lock nut

EH 25050.



PRODUCT DESCRIPTION

It is a self-centering and non-floating tapered shaft hub in corrosion-protected design with a hexagon nut and a lock nut.

The rotational accuracy of the tapered shaft hubs is 0,03 mm.

By using tapered shaft hubs, all shaft-hub joints of machine elements such as sprocket wheels, gear wheels, belt pulleys, cams, levers etc. can be easily and efficiently established.

Material

External part

- Steel, zinc-plated by galvanization

Inner part

- Steel, nickel-plated

Nut

- Steel, nickel-plated

Assembly

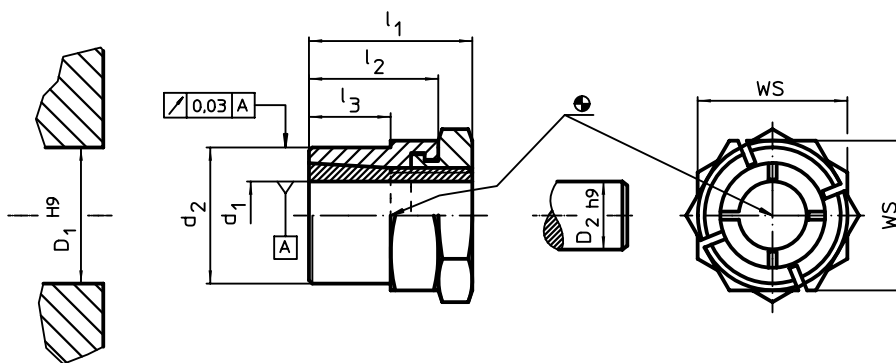
The lock nut at the outer part facilitates locking of the shaft-hub joint if freely rotating shafts are involved. For mounting, a crescent wrench (thickness max. l_2-l_3) is used.

MORE INFORMATION

References

Comply with mounting instructions, mounting examples, and technical data.



DRAWING



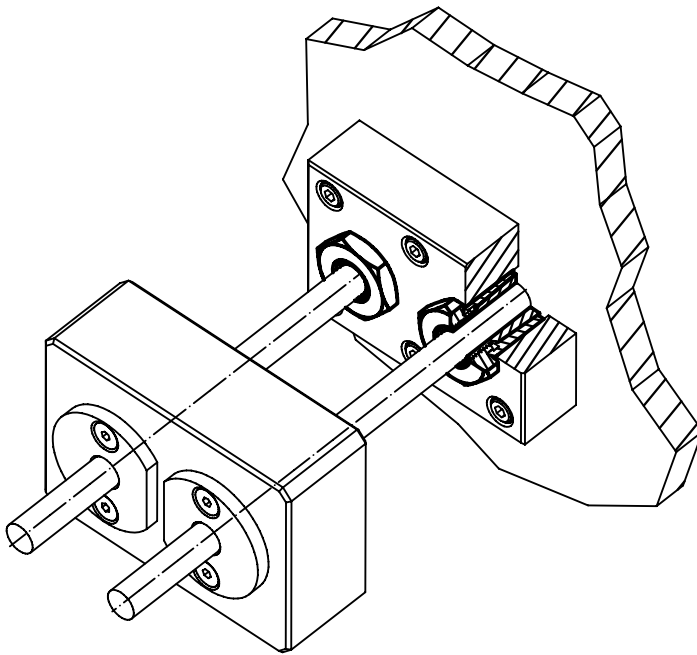
ORDER INFORMATION

Dimensions					WS	Tightening torque of the nut T_A max.	Transferable torque M max.	Transferable axial load F_a max.	Surface pressure of shaft p_w max.	Surface pressure of hub p_N max.	Hub bore D_1 H9	Shaft diameter D_2 h9	Art. No.	
d_1	d_2	l_1	l_2	l_3										
[mm]					[mm]	[Nm]	[Nm]	[kN]	[N/mm ²]	[N/mm ²]	[mm]	[mm]	[g]	
5	12	19	15	9	14	9.9	10.1	4.0	264	119	12	5	16	25050.0105
6	12	19	15	9	14	9.9	12.1	4.0	220	119	12	6	15	25050.0106
8	14	22	17	11	16	16.9	23.4	5.8	179	121	14	8	21	25050.0108
9	18	24	19	12	22	34.9	43.7	9.7	245	127	18	9	47	25050.0109
10	18	24	19	12	22	34.9	48.6	9.7	221	127	18	10	44	25050.0110
11	20	24	19	12	22	43.8	59.9	10.9	225	128	20	11	47	25050.0111
12	20	24	19	12	22	43.8	65.3	10.9	206	128	20	12	43	25050.0112
14	24	28	22	15	27	65.0	93.0	13.3	178	107	24	14	77	25050.0114
15	24	28	22	15	27	65.0	99.0	13.3	166	107	24	15	72	25050.0115
16	24	28	22	15	27	65.0	106.0	13.3	156	107	24	16	68	25050.0116
18	30	36	27	17	36	161.0	223.0	24.8	224	145	30	18	177	25050.0118
19	30	36	27	17	36	161.0	235.0	24.8	212	145	30	19	169	25050.0119
20	30	36	27	17	36	161.0	248.0	24.8	201	145	30	20	161	25050.0120
22	38	41	30	20	46	250.0	349.0	31.8	197	122	38	22	339	25050.0122
24	38	41	30	20	46	250.0	381.0	31.8	180	122	38	24	317	25050.0124
25	38	41	30	20	46	250.0	397.0	31.8	173	122	38	25	304	25050.0125
28	42	44	33	23	50	355.0	565.0	40.4	174	123	42	28	370	25050.0128
30	42	44	33	23	50	355.0	605.0	40.4	162	123	42	30	342	25050.0130
32	50	51	38	28	55	490.0	764.0	47.8	166	112	50	32	555	25050.0132
35	50	51	38	28	55	490.0	836.0	47.8	151	112	50	35	494	25050.0135

ACCESSORIES

	WS		Art. No.
	[mm]	[g]	
special fork wrench			
	14	45	25050.0814
	16	72	25050.0816
	22	195	25050.0822
	27	195	25050.0827
	36	428	25050.0836
	46	610	25050.0846
	50	870	25050.0850
	55	1125	25050.0855

APPLICATION EXAMPLE



Tapered Shaft Hubs • with lock nut, stainless steel

EH 25050.



PRODUCT DESCRIPTION

It is a self-centering and non-floating tapered shaft hub in corrosion-protected design with a hexagon nut and a lock nut.

The rotational accuracy of the tapered shaft hubs is 0,03 mm.

By using tapered shaft hubs, all shaft-hub joints of machine elements such as sprocket wheels, gear wheels, belt pulleys, cams, levers etc. can be easily and efficiently established.

Material

External part

- Stainless steel, nickel-plated

Inner part

- Stainless steel, nickel-plated

Nut

- Stainless steel, nickel-plated, hardened

Assembly

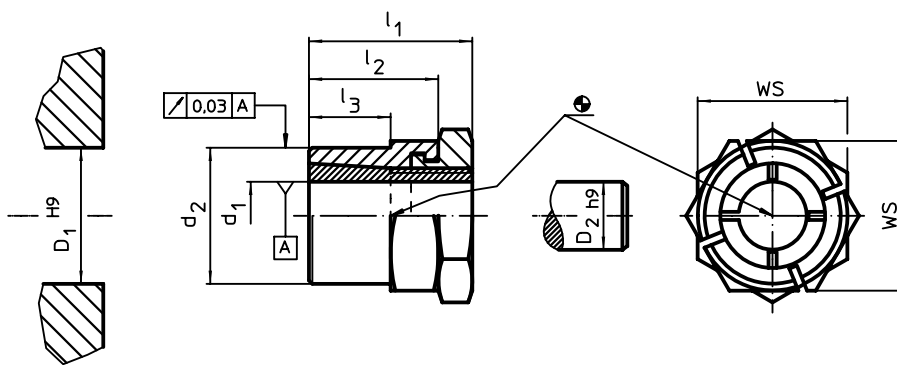
The lock nut at the outer part facilitates locking of the shaft-hub joint if freely rotating shafts are involved. For mounting, a crescent wrench (thickness max. l_2-l_3) is used.

MORE INFORMATION

References

Comply with mounting instructions, mounting examples, and technical data.

DRAWING



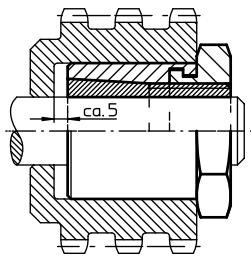
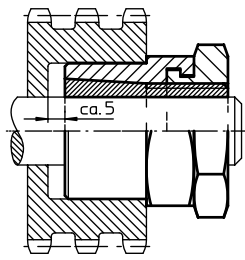
ORDER INFORMATION

Dimensions					WS	Tightening torque of the nut T_A max.	Transferable torque M max.	Transferable axial load F_a max.	Surface pressure of shaft P_w max.	Surface pressure of hub P_N max.	Hub bore D_1 H9	Shaft diameter D_2 h9	[g]	Art. No.
d_1	d_2	l_1	l_2	l_3										
[mm]					[mm]	[Nm]	[Nm]	[kN]	[N/mm ²]	[N/mm ²]	[mm]	[mm]	[g]	
6	12	19	15	9	14	7	8.5	2.8	154	119	12	6	14	25050.0306
8	14	22	17	11	16	12	16.4	4.1	125	121	14	8	20	25050.0308
10	18	24	19	12	22	24	34.0	6.8	155	127	18	10	45	25050.0310
12	20	24	19	12	22	31	45.7	7.6	144	128	20	12	43	25050.0312
16	24	28	22	15	27	46	74.2	9.3	109	107	24	16	68	25050.0316
20	30	36	27	17	36	113	173.6	17.4	141	145	30	20	161	25050.0320
25	38	41	30	20	46	175	277.9	22.3	121	122	38	25	305	25050.0325
30	42	44	33	23	50	249	423.5	28.3	113	123	42	30	341	25050.0330

ACCESSORIES

	WS		Art. No.
	[mm]	[g]	
special fork wrench			
	14	45	25050.0814
	16	72	25050.0816
	22	195	25050.0822
	27	195	25050.0827
	36	428	25050.0836
	46	610	25050.0846
	50	870	25050.0850

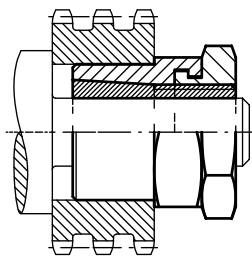
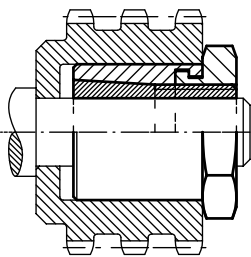
MOUNTING ARRANGEMENTS TAPERED SHAFT HUBS

Tapered shaft hub
with hexagon nutTapered shaft hub with
hexagon nut and lock nut

PRE-CENTERING

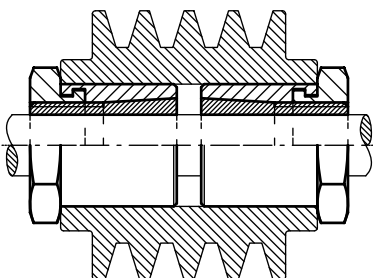
If longer hubs are used, additional support on the shaft can be achieved as shown in the accompanying drawings.

- Due to this support, forces acting outside the useful length of the tapered shaft hub can also be taken up.
- An increased rotational accuracy is achieved.



NO AXIAL SHIFT

If, on mounting, the hub sits close to a collar, an axial offset is not possible when tightening the tapered shaft hub. In this case, only 60 % of the forces mentioned in the charts can be transmitted.



TWO TAPERED SHAFT HUBS IN ONE HUB

When using this version, the tapered shaft hub which is tightened first transmits 100 % of the forces mentioned in the charts.

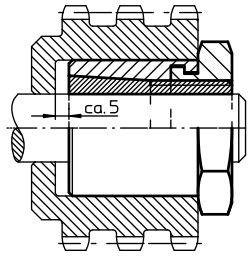
When tightening the second tapered shaft hub, an axial offset of the hub is not possible. Therefore, this tapered shaft hub is able to transmit only 60 % of the forces.



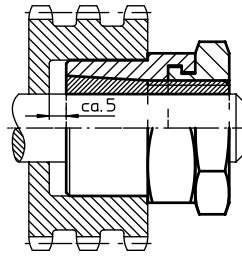
Tapered Shaft Hubs

EH 25050.

ASSEMBLY INSTRUCTIONS TAPERED SHAFT HUBS



Tapered shaft hub
with hexagon nut



Tapered shaft hub with
hexagon nut and lock nut

By using tapered shaft hubs, all shaft hub joints of machine elements such as sprocket wheels, gear wheels, belt pulleys, cams, levers etc. can be easily and efficiently established. Tapered shaft hubs are available with or without lock nut.

ASSEMBLY

1. The contact surfaces of the shaft and the hub must be free from oil and dirt.
2. Rotate nut to the left until the inner part protrudes approximately 3-5 mm over the outer part.
3. Install tapered shaft hub in the hub hole using a soft-face mallet.
4. Slightly tighten the nut when located in the desired position. Compensate the axial offset thus produced with a soft-face mallet. Tighten the tapered shaft hub.

DISASSEMBLY

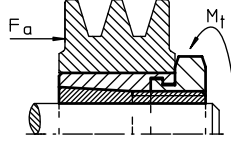
Release tapered shaft hub by turning the nut to the left until the inner part protrudes approximately 3-5 mm over the outer part.

During installation in a blind hole, remove the tapered shaft hub from the hole with an extractor.

TECHNICAL DATA

SIMULTANEOUS EXPOSURE TO DIFFERENT FORCES

If torques (M_t) and axial forces (F_a) are transmitted simultaneously, a resultant total torque (M_r) is obtained which must be less than or equal to the maximum torque (M_{max}) indicated in the charts. ($M_r \leq M_{max}$).



$$M_r = \sqrt{M_t^2 + \left(F_a \times \frac{d_1}{2 \times 1000} \right)^2} \times v \text{ [Nm]}$$

- (M_r) = Resultant total torque
- (M_t) = Torque
- F_a = Axial force
- d_1 = Shaft diameter
- v = Safety factor

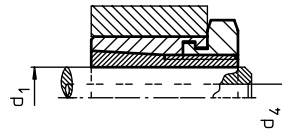
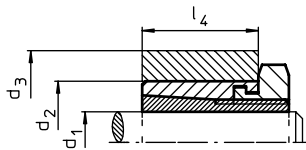
Example

Shaft hub 25050.0125
 $M_t = 150 \text{ Nm}$
 $F_a = 5 \text{ kN}$
 $d_1 = 25 \text{ mm}$
 $v = 2$

$$M_r = \sqrt{150^2 \text{ Nm}^2 + \left(5000 \text{ N} \times \frac{25 \text{ mm}}{2 \times 1000 \text{ mm/m}} \right)^2} \times 2 = 325 \text{ Nm}$$

A maximum torque (M_{max}) of 397 Nm is transmitted by the tapered shaft hub 25050.0125. The forces can be transmitted because M_r (325 Nm) is less than M_{max} .

OUTSIDE DIAMETER OF HUB AND INSIDE DIAMETER OF HOLLOW SHAFT



When fitting tapered shaft hubs, the outside diameter of the hub and the inside diameter of the hollow shaft have to be taken into account.

SMALLEST POSSIBLE OUTSIDE DIAMETER OF HUB

$$d_3 \geq d_2 \times \sqrt{\frac{R_e + P_N \times C_N}{R_e - P_N \times C_N}} \text{ [mm]}$$

- d_1 = Shaft diameter
- d_2 = Hub hole
- d_3 = Outside diameter of hub
- d_4 = Inside diameter of hollow shaft
- R_e = Apparent yielding point
- $R_{p0,2}$, $R_{p0,1}$ = Permanent elongation limit

LARGEST POSSIBLE INSIDE DIAMETER OF HOLLOW SHAFT

$$d_4 \leq d_1 \times \sqrt{\frac{R_e + 2p_w}{R_e (R_e)}} \text{ [mm]}$$

- p_N = Surface pressure hub
- p_w = Surface pressure shaft
- C_N = Factor [is "1", if the hub length is \geq the fitting length of the tapered shaft hub ($L_N \geq L_2$)]

$$d_3 \geq 42 \text{ mm} \times \sqrt{\frac{165 \text{ N/mm}^2 + 103 \text{ N/mm}^2 \times 1}{165 \text{ N/mm}^2 - 103 \text{ N/mm}^2 \times 1}} \geq 87,4 \text{ mm}$$

$$d_4 \leq 25 \text{ mm} \times \sqrt{\frac{380 \text{ N/mm}^2 - 2 \times 174 \text{ N/mm}^2 \times 1}{380 \text{ N/mm}^2}} \leq 7,2 \text{ mm}$$

Example

Tapered shaft hub 25050.0025, hub material GG25;
 $R_{p0,1} = 165 \text{ N/mm}^2$ $C_N = 1$

Example

Tapered shaft hub 25050.0025, shaft material Ck45;
 $R_e = 380 \text{ N/mm}^2$ $C_N = 1$

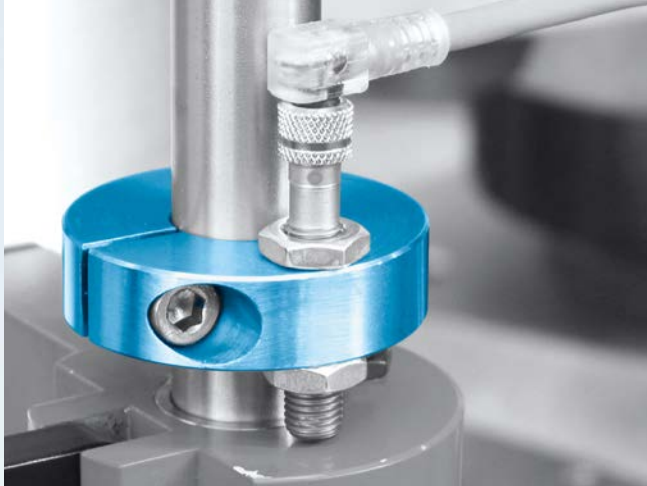
MATERIAL CHART

	Material										
	St 37-2 Ust 37-2	St 50-2	Ck 35	Ck 45	11 SMn 30 11 SMn Pb 30	GG 15	GG 20	GG 25	GGG-40	AlMg 3 F 25	1.4301 1.4305
Diameter	Minimum strength values in N/mm²										
	R_e	R_e	R_e	R_e	R_e	R_e	$R_p 0,1$	$R_p 0,1$	$R_p 0,1$	$R_p 0,2$	$R_p 0,2$
16 < d_1 ≤ 40	225	285	320	380	375	90	130	165	250	180	190
40 < d_1 ≤ 100	205	265	260	300	245	90	130	165	250	180	190

Set Collars

EH 25069. – EH 25071.

INSTALLATION EXAMPLES



Set collars offer universal applicability, e.g. as a fixed stop. The image shows the model with sensor adapter.



The tools are also available as quick-setting models.

5





PRODUCT DESCRIPTION

Set collars with universal applicability, e.g. as a fixed stop.
Set collars with strong clamping force.

Material

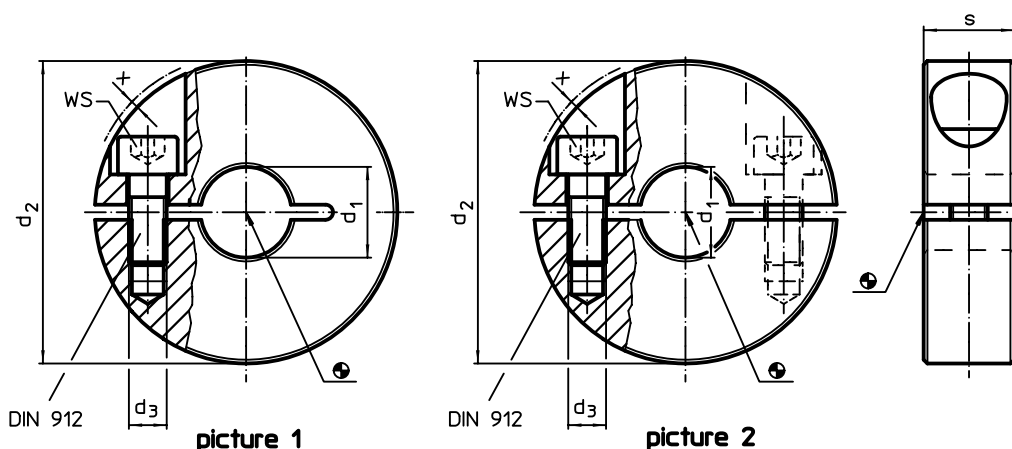
Screw

- Steel
- Stainless steel

Set collar

- Steel, black, steam oxidized
- Stainless steel 1.4404


DRAWING



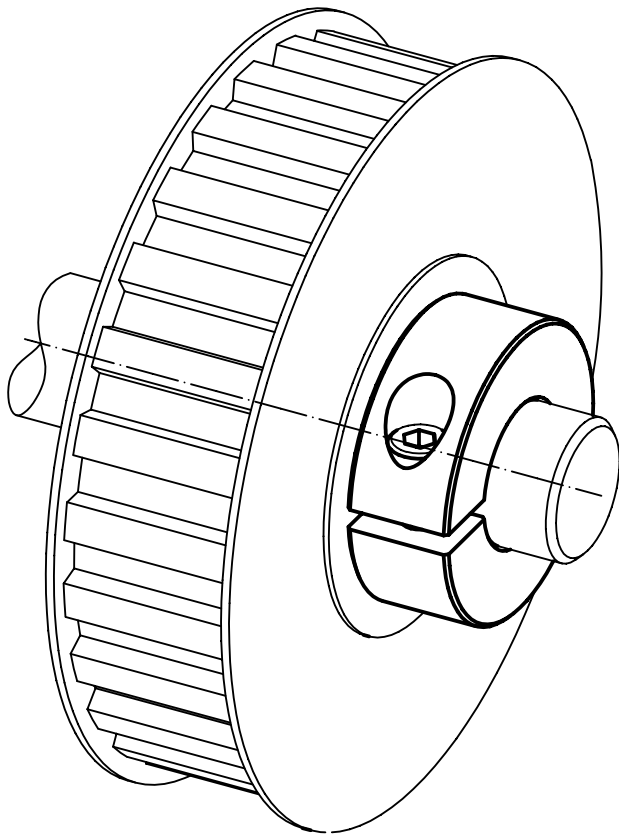
ORDER INFORMATION

d ₁ H10	d ₂	Dimensions			x	WS	[g]	Art. No.	
		d ₃	s	[mm]				Steel	Stainless steel
slotted – picture 1									
6	20	M3	9	1.2	2.5	20	25069.0006	25069.0106	
8	22	M3	9	1.0	2.5	18	25069.0008	25069.0108	
10	26	M4	11	1.6	3.0	32	25069.0010	25069.0110	
12	30	M4	11	0.7	3.0	42	25069.0012	25069.0112	
14	32	M4	11	0.7	3.0	40	25069.0014	25069.0114	
15	36	M5	13	1.4	4.0	70	25069.0015	25069.0115	
16	36	M5	13	1.4	4.0	68	25069.0016	25069.0116	
18	42	M5	15	0.6	4.0	109	25069.0018	25069.0118	
20	42	M5	15	0.6	4.0	103	25069.0020	25069.0120	
22	48	M5	15	0.0	4.0	138	25069.0022	25069.0122	
25	48	M5	15	0.0	4.0	126	25069.0025	25069.0125	
28	55	M6	15	0.5	5.0	171	25069.0028	25069.0128	
30	55	M6	15	0.5	5.0	162	25069.0030	25069.0130	
32	60	M6	15	0.4	5.0	196	25069.0032	25069.0132	
35	60	M6	15	0.4	5.0	178	25069.0035	25069.0135	
40	65	M6	15	0.5	5.0	200	25069.0040	25069.0140	
divided – picture 2									
6	20	M3	9	1.2	2.5	15	25069.0206	25069.0306	
8	22	M3	9	1.0	2.5	20	25069.0208	25069.0308	
10	26	M4	11	1.6	3.0	31	25069.0210	25069.0310	
12	30	M4	11	0.7	3.0	39	25069.0212	25069.0312	
14	32	M4	11	0.7	3.0	43	25069.0214	25069.0314	
15	36	M5	13	1.4	4.0	65	25069.0215	25069.0315	
16	36	M5	13	1.4	4.0	64	25069.0216	25069.0316	

→

d ₁ H10	d ₂	Dimensions			x	WS [mm]	 [g]	Art. No.	
		d ₃ [mm]	s					Steel	Stainless steel
18	42	M5	15	0.6	4.0	103	25069.0218	25069.0318	
20	42	M5	15	0.6	4.0	100	25069.0220	25069.0320	
22	48	M5	15	0.0	4.0	135	25069.0222	25069.0322	
25	48	M5	15	0.0	4.0	122	25069.0225	25069.0325	
28	55	M6	15	0.5	5.0	165	25069.0228	25069.0328	
30	55	M6	15	0.5	5.0	153	25069.0230	25069.0330	
32	60	M6	15	0.4	5.0	187	25069.0232	25069.0332	
35	60	M6	15	0.4	5.0	170	25069.0235	25069.0335	
40	65	M6	15	0.5	5.0	189	25069.0240	25069.0340	

APPLICATION EXAMPLE



Set Collars • with sensor adapter
EH 25070.



PRODUCT DESCRIPTION

Clamping rings are provided with a fastening possibility for sensors, switches etc. Universal applicability, e.g. as a limit switch on a piston rod. Clamping ring made of stainless steel with strong clamping force.

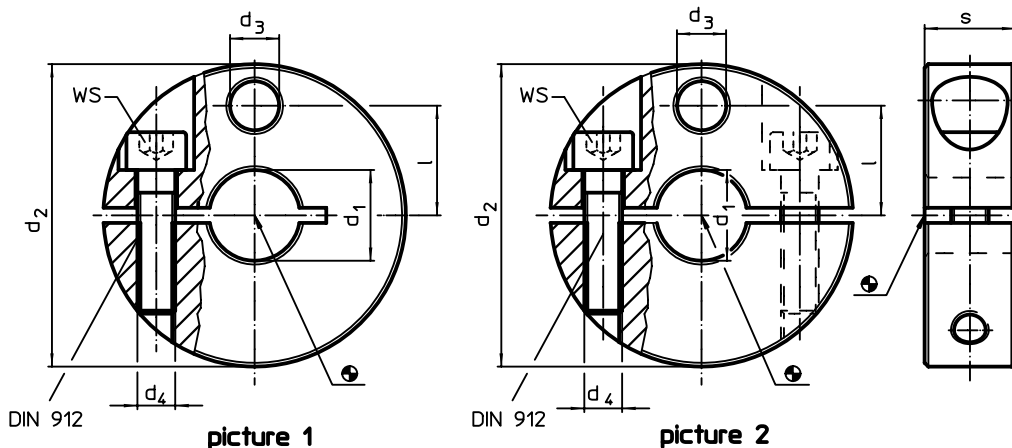
Material

- Screw**
 - Stainless steel

Set collar

- Stainless steel 1.4021

DRAWING



ORDER INFORMATION

d ₁ H8	d ₂ -0.5	Dimensions				l	s	WS [mm]	[g]	Art. No.
		d ₃	d ₄	[mm]						
slotted – picture 1										
10	40	6.5	M5	14.5	12	4	99	25070.0010		
12	40	6.5	M5	14.5	12	4	93	25070.0012		
14	45	9.0	M6	16.5	13	5	125	25070.0014		
15	45	9.0	M6	16.5	13	5	122	25070.0015		
16	45	9.0	M6	16.5	13	5	120	25070.0016		
18	50	9.0	M6	18.5	13	5	151	25070.0018		
20	50	9.0	M6	18.5	13	5	144	25070.0020		
22	65	13.0	M8	23.5	18	6	359	25070.0022		
24	65	13.0	M8	23.5	18	6	349	25070.0024		
25	65	13.0	M8	23.5	18	6	345	25070.0025		
30	75	13.0	M8	27.0	20	6	506	25070.0030		
32	80	13.0	M8	30.0	20	6	588	25070.0032		
35	80	13.0	M8	30.0	20	6	566	25070.0035		
divided – picture 2										
10	40	6.5	M5	14.5	12	4	94	25070.0110		
12	40	6.5	M5	14.5	12	4	90	25070.0112		
14	45	9.0	M6	16.5	13	5	114	25070.0114		
15	45	9.0	M6	16.5	13	5	112	25070.0115		
16	45	9.0	M6	16.5	13	5	110	25070.0116		
18	50	9.0	M6	18.5	13	5	142	25070.0118		
20	50	9.0	M6	18.5	13	5	139	25070.0120		
22	65	13.0	M8	23.5	18	6	341	25070.0122		
24	65	13.0	M8	23.5	18	6	330	25070.0124		
25	65	13.0	M8	23.5	18	6	330	25070.0125		
30	75	13.0	M8	27.0	20	6	488	25070.0130		
32	80	13.0	M8	30.0	20	6	564	25070.0132		
35	80	13.0	M8	30.0	20	6	542	25070.0135		

Set Collars • with quick setting

EH 25071.



PRODUCT DESCRIPTION

To be used for positioning, gripping, clamping and as a quick adjustment element on shafts. Quick, self-clamping and vibration-free mounting by one-hand operation in pull-direction.

Material

Body

- Thermoplastic PA 6, black

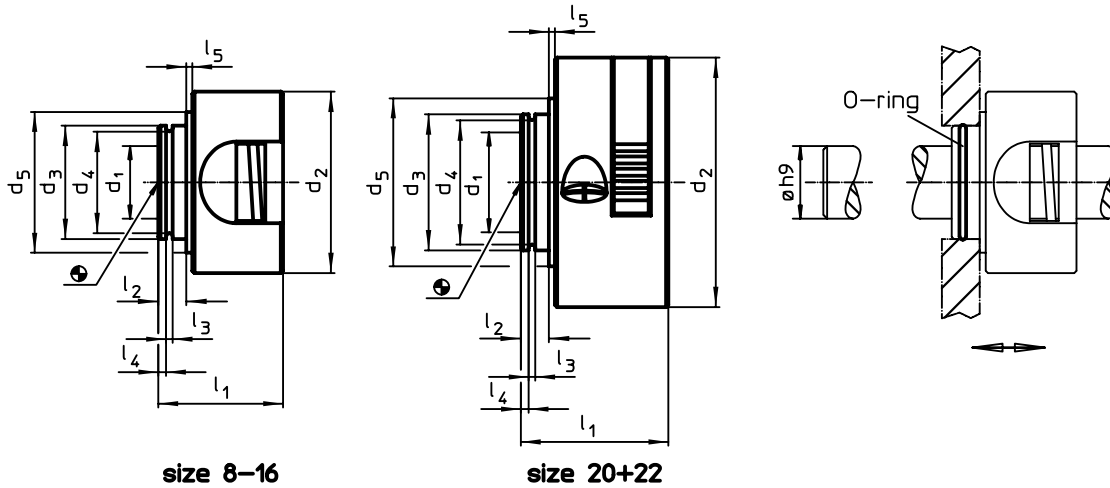
Inner parts

- Stainless steel

O-ring

- NBR

DRAWING



ORDER INFORMATION

Dimensions										F			Art. No.
d_1 +0.1	d_2	d_3	d_4	d_5	l_1	l_2	l_3	l_4	l_5	Holding force axial, one-sided	max.		
[mm]										[N]	[°C]	[g]	
8	40	25	22.4	31	27.5	7	1.7	3.15	0.5	250	80	31	25071.0008
10	40	25	22.4	31	27.5	7	1.7	3.15	0.5	250	80	34	25071.0010
12	40	25	22.4	31	27.5	7	1.7	3.15	0.5	350	80	30	25071.0012
15	40	25	22.4	31	27.5	7	1.7	3.15	0.5	350	80	28	25071.0015
16	40	25	22.4	31	27.5	7	1.7	3.15	0.5	380	80	27	25071.0016
20	55	30	27.4	37	32.5	7	1.7	2.65	0.5	320	80	51	25071.0020
22	55	30	27.4	37	32.5	7	1.7	2.65	0.5	320	80	49	25071.0022

ACCESSORIES

	Dimensions d [mm]	Suitable for size [mm]	 [g]	Art. No.
O-ring				
	22 x 1.5	8, 10, 12, 15, 16	0.2	25071.0052
	27 x 1.5	20, 22	0.2	25071.0054

Clamping Nuts • self-locking

EH 25030.



PRODUCT DESCRIPTION

Clamping nuts are used for rotating parts, especially for reversible shafts, for example for fixing the grinding wheel. The compact construction ensures a safe function and allows quick installation using a face wrench.

Compared with other backup methods, the clamping nut has the following advantages:

- Self-locking (even with changing direction of rotation of the shaft)
- Easy installation / dismantling
- Also for repetitive clamping operations

Material

- Heat-treated steel, blackened

Assembly

The clamping nut consists of an outer and inner ring, which form a unit.

The outer ring has a conical bore, the slotted inner ring has a conical outer surface and a female thread.

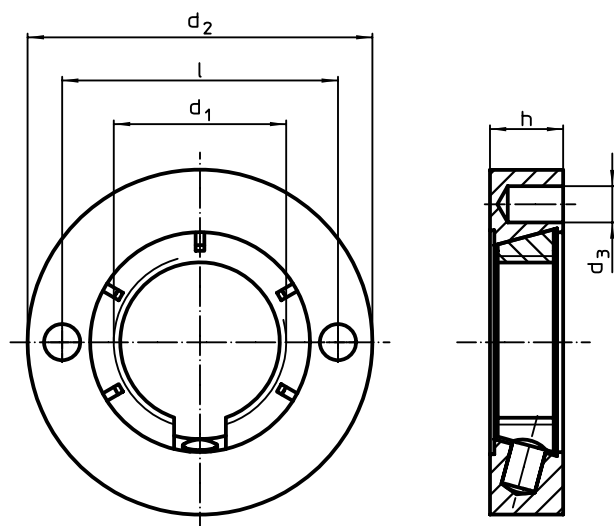
When tightening the clamping nut using a face pin wrench, the two conical surfaces move against each other. As a result, the slotted inner ring narrows like a collet. The nut clamps itself on the flanks of the thread so much, that they do not detach even with opposite axis rotation.

MORE INFORMATION

Notes

Further dimensions on request.


DRAWING



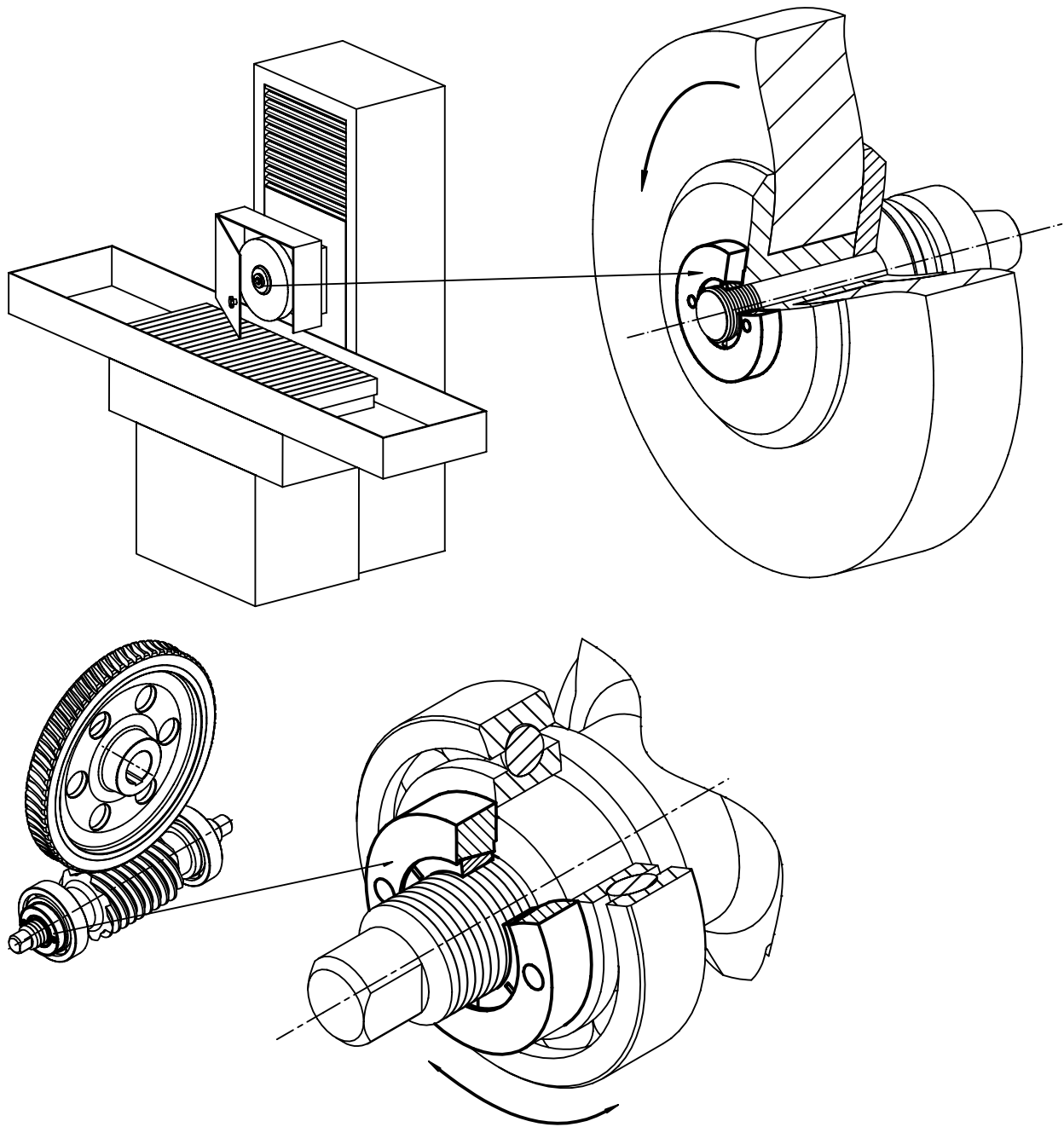
ORDER INFORMATION

d ₁	d ₂	Dimensions			[g]	Art. No.
		d ₃	h	l		
		[mm]				
M20 x 1,5	40	4.1	8.5	32	58	25030.0020
	50	4.1	8.5	32	104	25030.0021

ACCESSORIES

	[g]	Art. No.
adjustable face wrench, offset		
	112	25030.0022

APPLICATION EXAMPLE



Quick Plug Couplings • with radial offset compensation

EH 25100.



PRODUCT DESCRIPTION

Quick plug coupling with radial offset compensation for multiple applications, e.g. as a link between a piston rod and a linear movement unit.

Material

Claw

- Heat-treated steel, tempered, phosphated

Coupling part

- Heat-treated steel, tempered, phosphated

Lock nut

- Steel, black (ISO 4035/8675)

Assembly

Assembly and disassembly of this simple, solid and two-part coupling is by means

of a T-slot; a manual re-adjustment is not necessary.

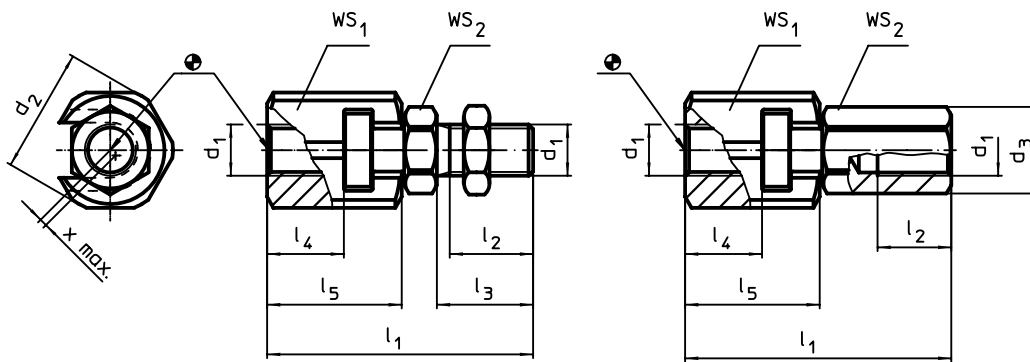
The quick plug coupling can be linked to all commonly used pneumatic and hydraulic lifting cylinders via the connecting thread.

MORE INFORMATION

Notes

The quick plug coupling does not transmit any torque.

DRAWING



picture 1

picture 2

ORDER INFORMATION

d ₁	d ₂	d ₃	Dimensions					WS		Radial offset compensation x max.	Maximum tensile and compressive load max.	[g]	Art. No.
			l ₁	l ₂ min.	l ₃	l ₄ min.	l ₅	WS ₁	WS ₂				
[mm]													
with coupling screw – picture 1													
M 6	21.0	–	37.5	11.0	14	9.0	18.0	19	10	0.6	2.5	44	25100.0006
M 8	26.0	–	45.0	13.5	17	11.5	22.5	24	13	0.7	4.5	86	25100.0008
M10	30.0	–	56.2	16.0	20	16.0	29.0	27	17	0.7	6.5	148	25100.0010
M12	32.5	–	66.7	21.0	25	17.0	34.0	30	19	0.8	10.0	209	25100.0012
M16	39.0	–	83.0	25.0	30	23.0	42.0	36	24	1.0	18.0	382	25100.0016
M20	44.0	–	93.5	29.0	35	23.5	45.5	41	30	1.0	30.0	572	25100.0020
M10 x 1,25	30.0	–	56.2	16.0	20	16.0	29.0	27	17	0.7	6.5	148	25100.0030
M12 x 1,25	32.5	–	66.7	21.0	25	17.0	34.0	30	19	0.8	10.0	209	25100.0032
M16 x 1,5	39.0	–	83.0	25.0	30	23.0	42.0	36	24	1.0	18.0	381	25100.0036
M20 x 1,5	44.0	–	93.5	29.0	35	23.5	45.5	41	30	1.0	30.0	571	25100.0040
with coupling nut – picture 2													
M 6	21.0	11.0	37.5	11.0	–	9.0	18.0	19	10	0.6	2.5	46	25100.0056
M 8	26.0	14.4	45.0	13.5	–	11.5	22.5	24	13	0.7	4.5	91	25100.0058
M10	30.0	19.0	56.2	15.0	–	16.0	29.0	27	17	0.7	6.5	159	25100.0060
M12	32.5	21.2	66.7	17.5	–	17.0	34.0	30	19	0.8	10.0	224	25100.0062
M16	39.0	27.0	83.0	22.0	–	23.0	42.0	36	24	1.0	18.0	403	25100.0066
M20	44.0	34.0	93.5	25.0	–	23.5	45.5	41	30	1.0	30.0	606	25100.0070
M10 x 1,25	30.0	19.0	56.2	15.0	–	16.0	29.0	27	17	0.7	6.5	159	25100.0080
M12 x 1,25	32.5	21.2	66.7	17.5	–	17.0	34.0	30	19	0.8	10.0	223	25100.0082
M16 x 1,5	39.0	27.0	83.0	22.0	–	23.0	42.0	36	24	1.0	18.0	403	25100.0086
M20 x 1,5	44.0	34.0	93.5	25.0	–	23.5	45.5	41	30	1.0	30.0	596	25100.0090

Quick Plug Couplings • with radial offset compensation and screwed flange

EH 25100.



PRODUCT DESCRIPTION

Quick plug coupling with radial offset compensation requiring only little space. Suitable for multiple applications, e.g. as a link between a piston rod and a linear-movement unit.

Material

Flange

- Heat-treated steel, tempered, phosphated

Coupling part

- Heat-treated steel, tempered, phosphated

Lock nut

- Steel, black (ISO 4035/8675)

Assembly

Assembly and disassembly of this simple, solid and two-part coupling is by means

of a T-slot; a manual re-adjustment is not necessary.

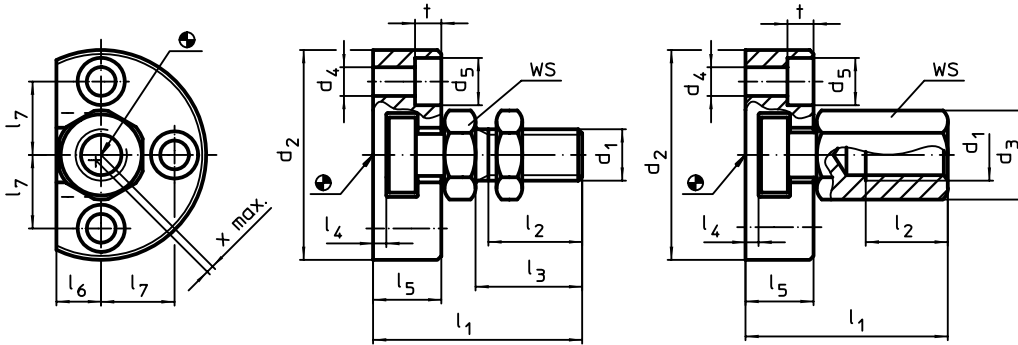
The quick plug coupling can be linked to all commonly used pneumatic and hydraulic lifting cylinders via the connecting thread.

MORE INFORMATION

Notes

The quick plug coupling does not transmit any torque.

DRAWING



picture 1

picture 2

ORDER INFORMATION

Dimensions													WS	Radial offset compensation x max.	Maximum tensile and compressive load max.	Art. No.	
d ₁	d ₂	d ₃	d ₄	d ₅	l ₁	l ₂ min.	l ₃	l ₄	l ₅	l ₆	l ₇	t					[mm]
[mm]													[mm]	[mm]	[kN]	[g]	
with coupling screw – picture 1																	
M 6	42	–	5.5	10	30.5	11.0	14	3.0	11.0	7.0	14.0	5.4	10	0.6	2.5	75	25100.0206
M 8	48	–	6.6	11	35.5	13.5	17	3.0	13.0	8.0	16.0	6.4	13	0.7	4.5	118	25100.0208
M10	50	–	6.6	11	43.2	16.0	20	4.2	16.0	9.0	17.0	6.4	17	0.7	6.5	175	25100.0210
M12	55	–	6.6	11	53.2	21.0	25	4.2	20.5	10.0	19.0	6.4	19	0.8	10.0	279	25100.0212
M16	65	–	9.0	15	64.0	25.0	30	5.0	23.0	12.5	22.5	8.5	24	1.0	18.0	455	25100.0216
M20	80	–	11.0	18	74.0	29.0	35	5.0	26.0	17.0	28.0	10.0	30	1.0	30.0	810	25100.0220
M10 x 1,25	50	–	6.6	11	43.2	16.0	20	4.2	16.0	9.0	17.0	6.4	17	0.7	6.5	176	25100.0230
M12 x 1,25	55	–	6.6	11	53.2	21.0	25	4.2	20.5	10.0	19.0	6.4	19	0.8	10.0	280	25100.0232
M16 x 1,5	65	–	9.0	15	64.0	25.0	30	5.0	23.0	12.5	22.5	8.5	24	1.0	18.0	454	25100.0236
M20 x 1,5	80	–	11.0	18	74.0	29.0	35	5.0	26.0	17.0	28.0	10.0	30	1.0	30.0	812	25100.0240
with coupling nut – picture 2																	
M 6	42	11.0	5.5	10	30.5	11.0	–	3.0	11.0	7.0	14.0	5.4	10	0.6	2.5	77	25100.0256
M 8	48	14.4	6.6	11	35.5	13.5	–	3.0	13.0	8.0	16.0	6.4	13	0.7	4.5	123	25100.0258
M10	50	19.0	6.6	11	43.2	15.0	–	4.2	16.0	9.0	17.0	6.4	17	0.7	6.5	187	25100.0260
M12	55	21.2	6.6	11	53.2	17.5	–	4.2	20.5	10.0	19.0	6.4	19	0.8	10.0	295	25100.0262
M16	65	27.0	9.0	15	64.0	22.0	–	5.0	23.0	12.5	22.5	8.5	24	1.0	18.0	471	25100.0266
M20	80	34.0	11.0	18	74.0	25.0	–	5.0	26.0	17.0	28.0	10.0	30	1.0	30.0	850	25100.0270
M10 x 1,25	50	19.0	6.6	11	43.2	15.0	–	4.2	16.0	9.0	17.0	6.4	17	0.7	6.5	188	25100.0280
M12 x 1,25	55	21.2	6.6	11	53.2	17.5	–	4.2	20.5	10.0	19.0	6.4	19	0.8	10.0	294	25100.0282
M16 x 1,5	65	27.0	9.0	15	64.0	22.0	–	5.0	23.0	12.5	22.5	8.5	24	1.0	18.0	471	25100.0286
M20 x 1,5	80	34.0	11.0	18	74.0	25.0	–	5.0	26.0	17.0	28.0	10.0	30	1.0	30.0	836	25100.0290

Quick Plug Couplings • with angular and radial offset compensation

EH 25100.



PRODUCT DESCRIPTION

Quick plug coupling, adjustable without axial play, including angular and radial offset compensation. Suitable for multiple applications, e.g. for non-aligned linear movements. Solid and compact design, no loose elements.

Material

Claw

- Heat-treated steel, tempered, phosphated

Seat

- Heat-treated steel, tempered, phosphated

Coupling part

- Heat-treated steel, nitrided, black

Nut

- Heat-treated steel, phosphated

Lock nut

- Steel, black (ISO 4035/8675)

Spring

- Stainless steel

Assembly

Assembly and disassembly is by means of a T-slot; a manual re-adjustment is not necessary.

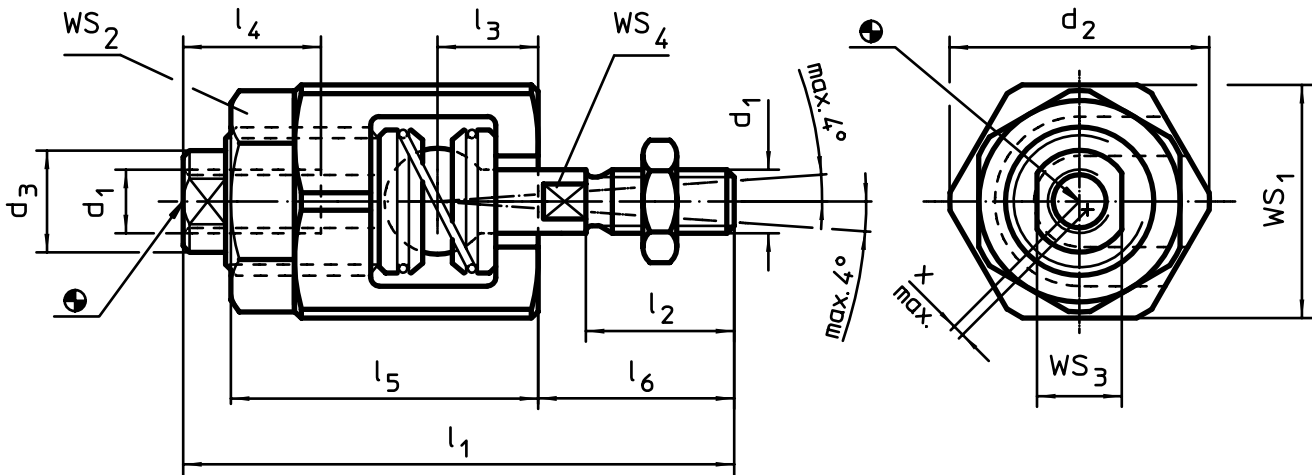
The quick plug coupling can be linked to all commonly used pneumatic and hydraulic lifting cylinders via the connecting thread.

MORE INFORMATION

Notes

The quick plug coupling does not transmit any torque.

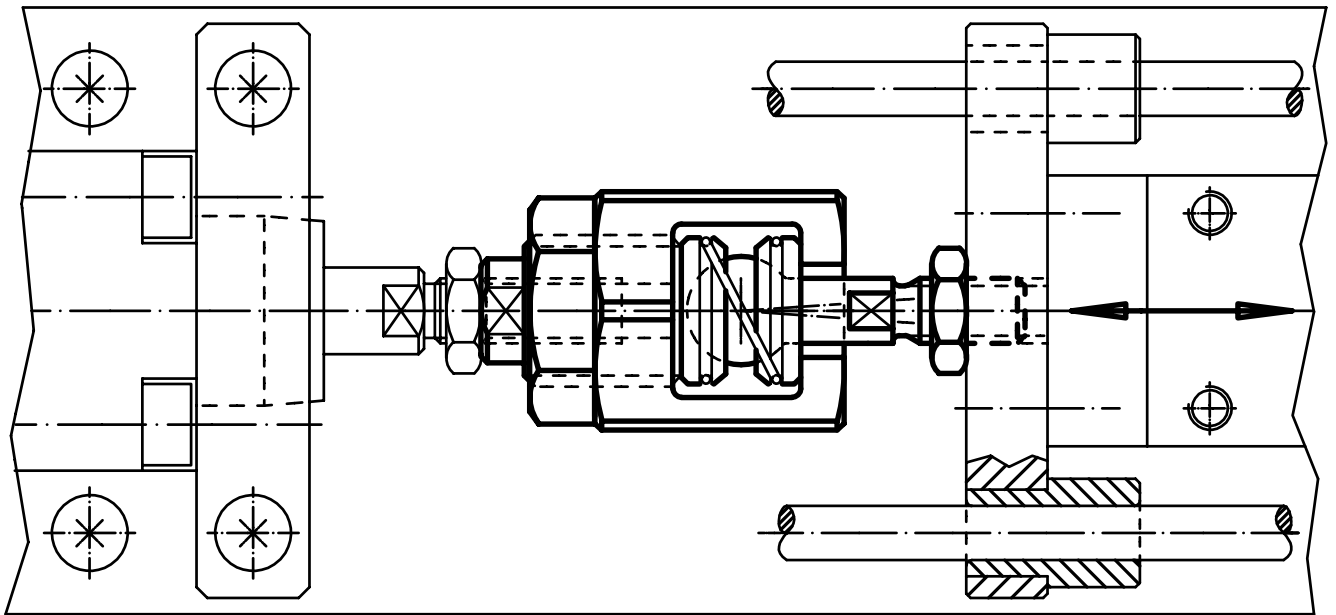
DRAWING



ORDER INFORMATION

d_1	d_2	d_3	Dimensions						WS				Radial offset compensation x max.	Maximum tensile and compressive load max.	[g]	Art. No.
			l_1	l_2	l_3	l_4 min.	l_5	l_6	WS_1	WS_2	WS_3	WS_4				
[mm]													[mm]	[kN]		
M 6	24.5	9.6	52	14	9.5	13	29	18.5	22	19	8	5	0.6	2.5	75	25100.0406
M 8	30.0	15.0	63	18	11.5	16	33	23.5	27	24	13	7	0.6	4.5	138	25100.0408
M10	44.0	21.0	81	22	16.0	24	43	30.5	41	36	18	12	0.7	6.5	396	25100.0410
M12	44.0	21.0	85	26	16.0	24	43	34.5	41	36	18	12	0.7	10.0	399	25100.0412
M16	60.0	32.0	121	34	26.0	34	62	45.0	55	46	27	18	1.0	18.0	1119	25100.0416
M20	60.0	32.0	129	42	26.0	34	62	53.0	55	46	27	18	1.0	30.0	1152	25100.0420
M10 x 1,25	44.0	21.0	81	22	16.0	24	43	30.5	41	36	18	12	0.7	6.5	396	25100.0430
M12 x 1,25	44.0	21.0	85	26	16.0	24	43	34.5	41	36	18	12	0.7	10.0	401	25100.0432
M16 x 1,5	60.0	32.0	121	34	26.0	34	62	45.0	55	46	27	18	1.0	18.0	1118	25100.0436
M20 x 1,5	60.0	32.0	129	42	26.0	34	62	53.0	55	46	27	18	1.0	30.0	1148	25100.0440

APPLICATION EXAMPLE



5

Height-Adjusting Elements

EH 25120.



PRODUCT DESCRIPTION

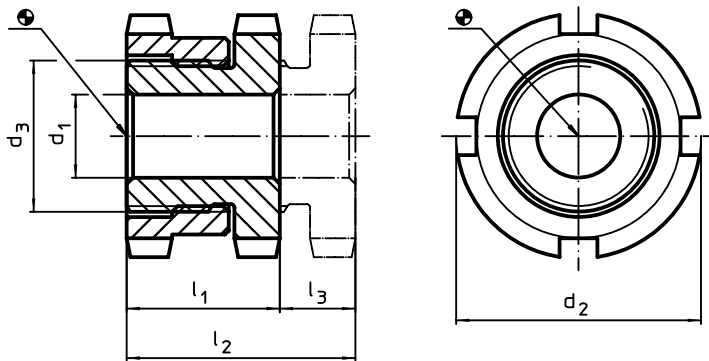
For levelling of machines and installations.

For vertical adjustment, the self-locking height-adjusting elements are fitted with a fine-pitch thread. All elements have a throughgoing bore for fastening purposes. A turn-out lock serves as height limit for the maximum adjustment height.

Material

- Heat-treated steel, zinc-plated by galvanization, chromalized

DRAWING



ORDER INFORMATION

d ₁	Dimensions				Stroke l ₃ [mm]	For screw [mm]	Load capacity for static load max. [kN]	Load capacity max. [kN]	📦 [g]	Art. No.
	d ₂	d ₃	l ₁ ~	l ₂ ~						
6.6	25	M15 x 1	15	19	4	M 6	40	30.7	42	25120.0006
	32	M20 x 1	18	23	5	M 6	65	55.7	95	25120.0012
9.0	32	M20 x 1	18	23	5	M 8	65	48.0	86	25120.0014
11.0	32	M20 x 1	18	23	5	M10	65	37.9	79	25120.0016
	45	M30 x 1,5	22	29	7	M10	120	92.9	210	25120.0022
13.5	45	M30 x 1,5	22	29	7	M12	120	80.4	202	25120.0024
17.5	45	M30 x 1,5	22	29	7	M16	120	45.5	219	25120.0026
	58	M40 x 1,5	28	37	9	M16	210	136.0	450	25120.0032
22.0	58	M40 x 1,5	28	37	9	M20	210	90.0	392	25120.0034
26.0	58	M40 x 1,5	28	37	9	M24	210	37.0	364	25120.0036
22.0	70	M50 x 1,5	33	43	10	M20	330	210.0	773	25120.0042
26.0	70	M50 x 1,5	33	43	10	M24	330	157.0	748	25120.0044
33.0	70	M50 x 1,5	33	43	10	M30	330	53.0	640	25120.0046

ACCESSORIES

📦 [g]	Art. No.	For height adjusting element size	Dimensions of sickle spanner
		d ₂ [mm]	DIN 1810, form A [mm]
sickle spanner for vertical adjustment			
45	25120.0981	25	25 – 28
46	25120.0982	32	30 – 32
156	25120.0983	45	45 – 50
250	25120.0984	58	58 – 62
253	25120.0985	70	68 – 75



Height-Adjusting Elements • high

EH 25120.



PRODUCT DESCRIPTION

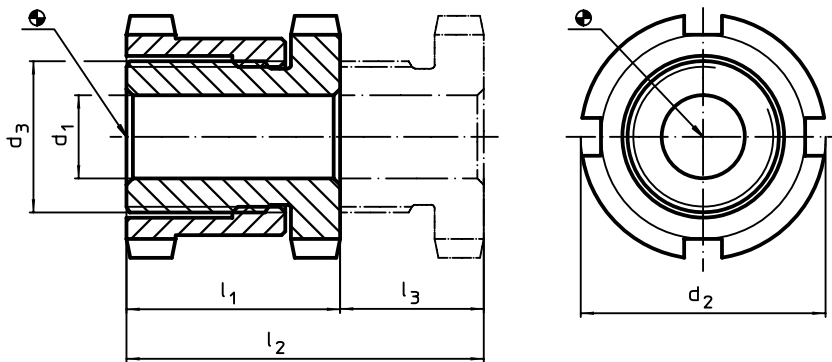
For levelling of machines and installations.

For vertical adjustment, the self-locking height-adjusting elements are fitted with a fine-pitch thread. All elements have a throughgoing bore for fastening purposes. A turn-out lock serves as height limit for the maximum adjustment height.

Material

- Heat-treated steel, zinc-plated by galvanization, chromalized

DRAWING



ORDER INFORMATION

d ₁	Dimensions				Stroke l ₃ [mm]	For screw [mm]	Load capacity for static load max. [kN]	Load capacity max. [kN]	📦 [g]	Art. No.
	d ₂	d ₃	l ₁	l ₂						
[mm]										
6.6	25	M15 x 1	28	43	15	M 6	40	30.7	68	25120.0106
	32	M20 x 1	35	55	20	M 6	65	55.7	161	25120.0112
9.0	32	M20 x 1	35	55	20	M 8	65	48.0	152	25120.0114
	32	M20 x 1	35	55	20	M10	65	37.9	142	25120.0116
11.0	45	M30 x 1,5	42	67	25	M10	120	92.9	371	25120.0122
	45	M30 x 1,5	42	67	25	M12	120	80.4	356	25120.0124
17.5	45	M30 x 1,5	42	67	25	M16	120	45.5	326	25120.0126
	58	M40 x 1,5	54	86	32	M16	210	136.0	835	25120.0132
22.0	58	M40 x 1,5	54	86	32	M20	210	90.0	771	25120.0134
26.0	58	M40 x 1,5	54	86	32	M24	210	37.0	705	25120.0136
22.0	70	M50 x 1,5	66	106	40	M20	330	210.0	1421	25120.0142
26.0	70	M50 x 1,5	66	106	40	M24	330	157.0	1329	25120.0144
33.0	70	M50 x 1,5	66	106	40	M30	330	53.0	1167	25120.0146

ACCESSORIES

📦	For height adjusting element size	Dimensions of sickle spanner	📦	Art. No.
	d ₂ [mm]	DIN 1810, form A [mm]		
sickle spanner for vertical adjustment				
	25	25 – 28	45	25120.0981
	32	30 – 32	46	25120.0982
	45	45 – 50	156	25120.0983
	58	58 – 62	250	25120.0984
	70	68 – 75	253	25120.0985

Height-Adjusting Elements • orienting

EH 25120.



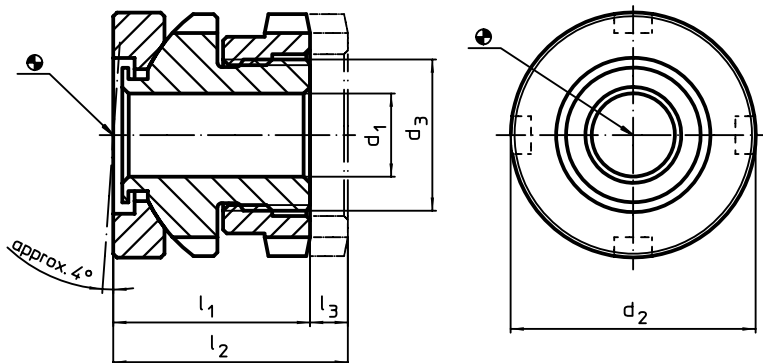
PRODUCT DESCRIPTION

For levelling of machines and installations when bearing surfaces are not parallel. For vertical adjustment, the self-locking height-adjusting elements are fitted with a fine-pitch thread. All elements have a throughgoing bore for fastening purposes. A turn-out lock serves as height limit for the maximum adjustment height.

Material

- Heat-treated steel, zinc-plated by galvanization, chromalized

DRAWING



ORDER INFORMATION

d ₁	Dimensions				Stroke l ₃ [mm]	For screw [mm]	Load capacity for static load max. [kN]	Load capacity max. [kN]	[g]	Art. No.
	d ₂	d ₃	l ₁	l ₂						
[mm]										
6.6	25	M15 x 1	22	26	4	M 6	40	30.7	66	25120.0206
	32	M20 x 1	26	31	5	M 6	65	55.7	131	25120.0212
9.0	32	M20 x 1	26	31	5	M 8	65	48.0	124	25120.0214
	32	M20 x 1	26	31	5	M10	65	37.9	117	25120.0216
11.0	45	M30 x 1,5	34	41	7	M10	120	92.9	340	25120.0222
	45	M30 x 1,5	34	41	7	M12	120	80.4	320	25120.0224
17.5	45	M30 x 1,5	34	41	7	M16	120	45.5	324	25120.0226
	58	M40 x 1,5	44	53	9	M16	210	136.0	775	25120.0232
22.0	58	M40 x 1,5	44	53	9	M20	210	90.0	641	25120.0234
26.0	58	M40 x 1,5	44	53	9	M24	210	37.0	683	25120.0236
22.0	70	M50 x 1,5	50	60	10	M20	330	210.0	1157	25120.0242
26.0	70	M50 x 1,5	50	60	10	M24	330	157.0	1114	25120.0244
33.0	70	M50 x 1,5	50	60	10	M30	330	53.0	1167	25120.0246

ACCESSORIES

	For height adjusting element size d ₂ [mm]	Dimensions of sickle spanner DIN 1810, form A [mm]	[g]	Art. No.
sickle spanner for vertical adjustment				
	25	25 – 28	45	25120.0981
	32	30 – 32	46	25120.0982
	45	45 – 50	156	25120.0983
	58	58 – 62	250	25120.0984
	70	68 – 75	253	25120.0985

Rubber Metal Buffers

EH 25150.



PRODUCT DESCRIPTION

To be used for elastic bearing of motors, compressors, pumps etc. The hardness is $55 \pm 5^\circ$ shore A. Further shore hardnesses ($40 \pm 5^\circ$ shore A and $70 \pm 5^\circ$ shore A) on request.

Material

Support washer

- Steel, zinc-plated, blue chromated

Threaded bushing

- Steel, zinc-plated, blue chromated

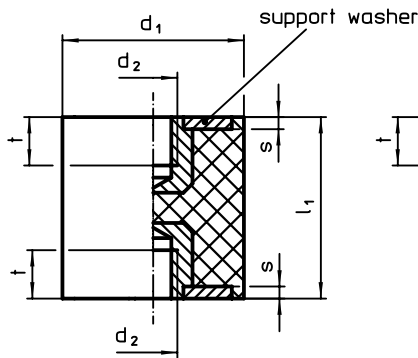
Body

- Rubber natural caoutchouc (NR), black

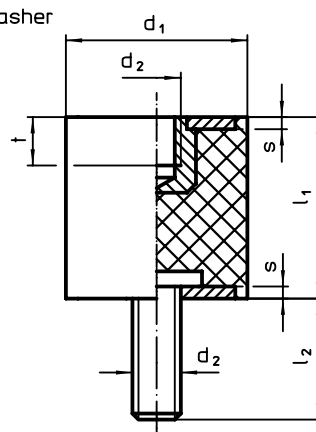
Screw

- Steel, zinc-plated, blue chromated

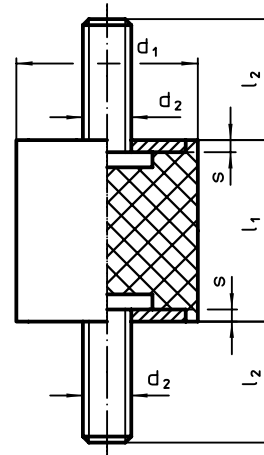
DRAWING



picture 1



picture 2





picture 3

ORDER INFORMATION

Dimensions						Spring rate R ~ [N/mm]	Load capacity max. [N]	Spring range ~ [mm]	Temperature range		Weight [g]	Art. No.
d ₁ ±1.5	l ₁ ±1.5	d ₂	l ₂	s	t min.				min.	max.		
[mm]									[°C]			
with female thread, on both sides – picture 1												
8	8	M 3	–	1.0	3.0	38	75	2.00	-30	80	1.0	25150.0003
10	10	M 4	–	1.2	4.0	36	90	2.50	-30	80	2.5	25150.0006
	15	M 4	–	1.2	4.0	17	65	3.75	-30	80	2.9	25150.0007
15	10	M 4	–	1.4	4.0	80	200	2.50	-30	80	5.2	25150.0008
	15	M 4	–	1.4	4.0	36	135	3.75	-30	80	6.2	25150.0009
	20	M 4	–	1.4	4.0	30	152	5.00	-30	80	7.4	25150.0010
20	15	M 6	–	2.0	5.0	95	355	3.75	-30	80	13.0	25150.0021
	20	M 6	–	2.0	5.0	53	267	5.00	-30	80	14.0	25150.0022
	25	M 6	–	2.0	5.0	50	315	6.25	-30	80	16.0	25150.0023
25	20	M 6	–	2.0	5.0	121	605	5.00	-30	80	22.0	25150.0026
	25	M 6	–	2.0	5.0	85	530	6.25	-30	80	30.0	25150.0027
	30	M 6	–	2.0	5.0	77	575	7.50	-30	80	30.0	25150.0028
30	30	M 8	–	2.0	6.5	114	855	7.50	-30	80	50.0	25150.0031
	40	M 8	–	2.0	6.5	76	757	10.00	-30	80	50.0	25150.0032
40	30	M 8	–	2.0	6.5	205	1535	7.50	-30	80	80.0	25150.0041
	40	M 8	–	2.0	6.5	164	1635	10.00	-30	80	100.0	25150.0042
50	30	M10	–	2.0	7.0	343	2570	7.50	-30	80	130.0	25150.0051
	40	M10	–	2.0	7.0	245	2445	10.00	-30	80	150.0	25150.0052
	50	M10	–	2.0	7.0	178	2225	12.50	-30	80	166.0	25150.0053
60	30	M10	–	2.0	7.0	453	3400	7.50	-30	80	190.0	25150.0061
	40	M10	–	2.0	7.0	330	3300	10.00	-30	80	220.0	25150.0062
70	45	M10	–	3.0	7.0	356	4000	11.25	-30	80	340.0	25150.0071
75	40	M12	–	3.0	9.0	465	4650	10.00	-30	80	360.0	25150.0076
	55	M12	–	3.0	9.0	327	4500	13.75	-30	80	450.0	25150.0077



Dimensions						Spring rate R ~ [N/mm]	Load capacity max. [N]	Spring range ~ [mm]	 min. max. [°C]		 [g]	Art. No.
d ₁ ±1.5	l ₁ ±1.5	d ₂	l ₂	s	t min.				[mm]			
with female thread and screw – picture 2												
8	8	M 3	6	1.0	3.0	38	75	2.00	-30	80	1.2	25150.0103
10	10	M 4	10	1.2	4.0	36	90	2.50	-30	80	2.4	25150.0106
	15	M 4	10	1.2	4.0	17	65	3.75	-30	80	2.8	25150.0107
15	10	M 4	10	1.4	4.0	80	200	2.50	-30	80	5.7	25150.0108
	15	M 4	10	1.4	4.0	35	130	3.75	-30	80	6.6	25150.0109
	20	M 4	10	1.4	4.0	30	150	5.00	-30	80	7.6	25150.0110
20	15	M 6	18	2.0	5.0	95	355	3.75	-30	80	15.0	25150.0121
	20	M 6	18	2.0	5.0	53	265	5.00	-30	80	17.0	25150.0122
	25	M 6	18	2.0	5.0	50	315	6.25	-30	80	18.0	25150.0123
25	15	M 6	18	2.0	5.0	184	690	3.75	-30	80	26.0	25150.0126
	20	M 6	18	2.0	5.0	121	605	5.00	-30	80	26.0	25150.0127
	30	M 6	18	2.0	5.0	76	570	7.50	-30	80	36.0	25150.0128
30	15	M 8	20	2.0	6.5	143	535	3.75	-30	80	41.0	25150.0131
	30	M 8	20	2.0	6.5	113	850	7.50	-30	80	50.0	25150.0132
40	20	M 8	23	2.0	6.5	302	1510	5.00	-30	80	72.0	25150.0141
	30	M 8	23	2.0	6.5	204	1530	7.50	-30	80	85.0	25150.0142
	40	M 8	23	2.0	6.5	163	1630	10.00	-30	80	98.0	25150.0143
50	20	M10	28	2.0	7.0	720	3600	5.00	-30	80	115.0	25150.0151
	30	M10	28	2.0	7.0	343	2575	7.50	-30	80	135.0	25150.0152
	40	M10	28	2.0	7.0	244	2440	10.00	-30	80	160.0	25150.0153
	50	M10	28	2.0	7.0	176	2200	12.50	-30	80	185.0	25150.0154
60	30	M10	28	2.0	7.0	453	3400	7.50	-30	80	200.0	25150.0161
	40	M10	28	2.0	7.0	333	3330	10.00	-30	80	220.0	25150.0162
70	45	M10	27	3.0	7.0	356	4000	11.25	-30	80	372.0	25150.0171
75	40	M12	37	3.0	9.0	460	4600	10.00	-30	80	385.0	25150.0176
	55	M12	37	3.0	9.0	328	4510	13.75	-30	80	453.0	25150.0177
with screw, on both sides – picture 3												
8	8	M 3	6	1.0	–	35	70	2.00	-30	80	1.4	25150.0203
10	10	M 4	10	1.2	–	36	89	2.50	-30	80	3.0	25150.0206
	15	M 4	10	1.2	–	16	60	3.75	-30	80	3.5	25150.0207
15	10	M 4	10	1.4	–	79	198	2.50	-30	80	6.1	25150.0208
	15	M 4	10	1.4	–	33	125	3.75	-30	80	7.1	25150.0209
	20	M 4	10	1.4	–	29	145	5.00	-30	80	8.1	25150.0210
20	15	M 6	18	2.0	–	94	352	3.75	-30	80	18.0	25150.0221
	20	M 6	18	2.0	–	52	260	5.00	-30	80	19.0	25150.0222
	25	M 6	18	2.0	–	50	310	6.25	-30	80	20.0	25150.0223
25	15	M 6	18	2.0	–	183	687	3.75	-30	80	28.0	25150.0226
	20	M 6	18	2.0	–	120	602	5.00	-30	80	32.0	25150.0227
	30	M 6	18	2.0	–	75	562	7.50	-30	80	39.0	25150.0228
30	15	M 8	20	2.0	–	142	534	3.75	-30	80	45.0	25150.0231
	30	M 8	20	2.0	–	112	843	7.50	-30	80	58.0	25150.0232
40	20	M 8	23	2.0	–	300	1500	5.00	-30	80	80.0	25150.0241
	30	M 8	23	2.0	–	204	1527	7.50	-30	80	95.0	25150.0242
	40	M 8	23	2.0	–	162	1620	10.00	-30	80	100.0	25150.0243
50	20	M10	28	2.0	–	718	3589	5.00	-30	80	130.0	25150.0251
	30	M10	28	2.0	–	343	2570	7.50	-30	80	150.0	25150.0252
	40	M10	28	2.0	–	244	2436	10.00	-30	80	170.0	25150.0253
	50	M10	28	2.0	–	176	2198	12.50	-30	80	187.0	25150.0254
60	30	M10	28	2.0	–	453	3400	7.50	-30	80	210.0	25150.0261
	40	M10	28	2.0	–	330	3300	10.00	-30	80	236.0	25150.0262
70	45	M10	27	3.0	–	356	4000	11.25	-30	80	380.0	25150.0271
75	40	M12	37	3.0	–	450	4500	10.00	-30	80	410.0	25150.0276
	55	M12	37	3.0	–	320	4400	13.75	-30	80	515.0	25150.0277

Rubber Endstop Buffers • cylindrical

EH 25150.



PRODUCT DESCRIPTION

To be used as an elastic end-stop, bearing foot etc.
The hardness is 55 ±5° shore A. Further shore hardnesses (40 ±5° shore A and 70 ±5° shore A) on request.

Material

Support washer

- Steel, zinc-plated, blue chromated
- Stainless steel 1.4301

Threaded bushing

- Steel, zinc-plated, blue chromated
- Stainless steel 1.4301

Body

- Rubber natural caoutchouc (NR), black

Screw

- Steel, zinc-plated, blue chromated
- Stainless steel 1.4301

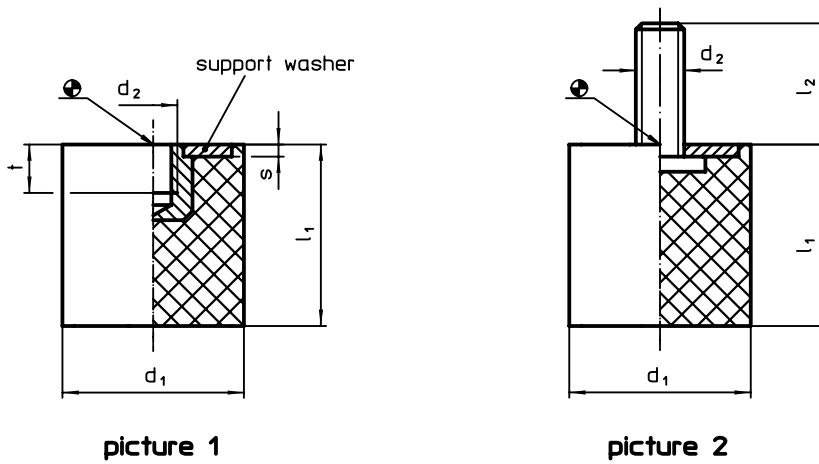
MORE INFORMATION

Further products

Support Legs, impact cushioning → p. 297

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DRAWING



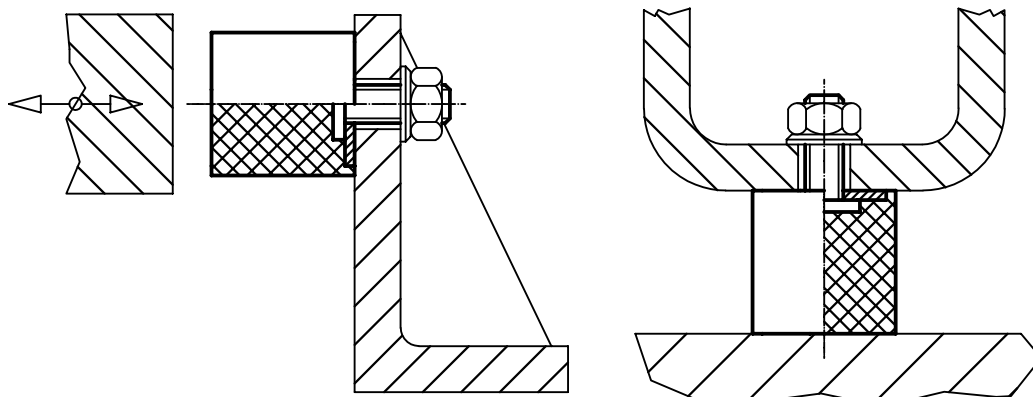
ORDER INFORMATION

Dimensions						Spring rate R ~ [N/mm]	Load capacity max. [N]	Spring range ~ [mm]	Temperature		Weight [g]	Art. No.	
d ₁	l ₁	d ₂	l ₂	s	t				min.	max.		Steel	Stainless steel
[mm]										[°C]			
with female thread – picture 1													
10	10	M 4	–	1.2	4.0	24	59	2.50	-30	80	1.7	25150.0306	25150.1306
15	15	M 4	–	1.4	4.0	64	241	3.75	-30	80	4.6	25150.0309	25150.1309
	20	M 4	–	1.4	4.0	57	287	5.00	-30	80	5.7	25150.0310	25150.1310
20	15	M 6	–	2.0	5.0	77	289	3.75	-30	80	10.0	25150.0321	25150.1321
	20	M 6	–	2.0	5.0	60	302	5.00	-30	80	10.0	25150.0322	25150.1322
	25	M 6	–	2.0	5.0	48	297	6.25	-30	80	13.0	25150.0323	25150.1323
25	15	M 6	–	2.0	5.0	163	612	3.75	-30	80	14.0	25150.0326	25150.1326
	20	M 6	–	2.0	5.0	112	560	5.00	-30	80	20.0	25150.0327	25150.1327
	30	M 6	–	2.0	5.0	68	509	7.50	-30	80	20.0	25150.0328	25150.1328
30	15	M 8	–	2.0	6.5	294	934	3.75	-30	80	20.0	25150.0331	25150.1331
	20	M 8	–	2.0	6.5	185	924	5.00	-30	80	30.0	25150.0332	25150.1332
	30	M 8	–	2.0	6.5	117	876	7.50	-30	80	30.0	25150.0333	25150.1333
40	20	M 8	–	2.0	6.5	247	1235	5.00	-30	80	50.0	25150.0341	25150.1341
	30	M 8	–	2.0	6.5	213	1600	7.50	-30	80	55.0	25150.0342	25150.1342
	40	M 8	–	2.0	6.5	182	1820	10.00	-30	80	80.0	25150.0343	25150.1343
50	20	M10	–	2.0	7.0	517	2587	5.00	-30	80	80.0	25150.0351	25150.1351
	30	M10	–	2.0	7.0	327	2453	7.50	-30	80	100.0	25150.0352	25150.1352
	40	M10	–	2.0	7.0	247	2468	10.00	-30	80	120.0	25150.0353	25150.1353



d ₁	l ₁	Dimensions				Spring rate R ~ [N/mm]	Load capacity max. [N]	Spring range ~ [mm]	 min. max. [°C]		 [g]	Art. No.	
		d ₂	l ₂	s	t				Steel	Stainless steel			
60	30	M10	–	2.0	7.0	467	3500	7.50	-30	80	140.0	25150.0361	25150.1361
	50	M10	–	2.0	7.0	269	3367	12.50	-30	80	210.0	25150.0362	25150.1362
70	40	M10	–	3.0	7.0	410	4100	10.00	-30	80	260.0	25150.0371	25150.1371
	55	M10	–	3.0	7.0	327	4500	13.75	-30	80	340.0	25150.0372	25150.1372
75	30	M12	–	3.0	9.0	600	4500	7.50	-30	80	210.0	25150.0376	25150.1376
	40	M12	–	3.0	9.0	450	4500	10.00	-30	80	290.0	25150.0377	25150.1377
	50	M12	–	3.0	9.0	352	4400	12.50	-30	80	350.0	25150.0378	25150.1378
100	40	M16	–	3.0	16.0	810	8100	10.00	-30	80	514.0	25150.0382	25150.1382
	50	M16	–	3.0	16.0	640	8000	12.50	-30	80	512.0	25150.0384	25150.1384
	60	M16	–	3.0	16.0	520	7800	15.00	-30	80	698.0	25150.0386	25150.1386
with screw – picture 2													
8	8	M 3	6	1.0	–	20	40	2.00	-30	80	1.0	25150.0403	25150.1403
10	10	M 4	10	1.2	–	24	59	2.50	-30	80	1.9	25150.0406	25150.1406
	15	M 4	10	1.2	–	21	78	3.75	-30	80	2.4	25150.0407	25150.1407
15	10	M 4	10	1.4	–	77	154	2.00	-30	80	4.0	25150.0408	25150.1408
	15	M 4	10	1.4	–	64	241	3.75	-30	80	5.0	25150.0409	25150.1409
	20	M 4	10	1.4	–	57	287	5.00	-30	80	6.2	25150.0410	25150.1410
	30	M 4	10	1.4	–	48	300	6.25	-30	80	8.0	25150.0411	25150.1411
20	10	M 6	18	2.0	–	126	315	2.50	-30	80	10.0	25150.0421	25150.1421
	15	M 6	18	2.0	–	77	289	3.75	-30	80	10.0	25150.0422	25150.1422
	20	M 6	18	2.0	–	60	302	5.00	-30	80	13.0	25150.0423	25150.1423
	30	M 6	18	2.0	–	38	285	7.50	-30	80	20.0	25150.0424	25150.1424
25	15	M 6	18	2.0	–	163	612	3.75	-30	80	18.0	25150.0426	25150.1426
	20	M 6	18	2.0	–	112	560	5.00	-30	80	20.0	25150.0427	25150.1427
	30	M 6	18	2.0	–	68	509	7.50	-30	80	25.0	25150.0428	25150.1428
30	15	M 8	20	2.0	–	294	934	3.75	-30	80	28.0	25150.0431	25150.1431
	20	M 8	20	2.0	–	185	924	5.00	-30	80	32.0	25150.0432	25150.1432
	25	M 8	20	2.0	–	130	815	6.25	-30	80	38.0	25150.0433	25150.1433
	30	M 8	20	2.0	–	117	876	7.50	-30	80	43.0	25150.0434	25150.1434
40	20	M 8	23	2.0	–	247	1235	5.00	-30	80	55.0	25150.0441	25150.1441
	25	M 8	23	2.0	–	247	1546	6.25	-30	80	60.0	25150.0442	25150.1442
	30	M 8	23	2.0	–	213	1600	7.50	-30	80	73.0	25150.0443	25150.1443
	40	M 8	23	2.0	–	182	1820	10.00	-30	80	83.0	25150.0444	25150.1444
50	20	M10	28	2.0	–	517	2587	5.00	-30	80	90.0	25150.0451	25150.1451
	30	M10	28	2.0	–	327	2453	7.50	-30	80	118.0	25150.0452	25150.1452
	40	M10	28	2.0	–	247	2468	10.00	-30	80	140.0	25150.0453	25150.1453
60	20	M10	28	2.0	–	726	3630	5.00	-30	80	110.0	25150.0461	25150.1461
	40	M10	28	2.0	–	340	3400	10.00	-30	80	195.0	25150.0462	25150.1462
70	40	M10	27	3.0	–	410	4100	10.00	-30	80	265.0	25150.0471	25150.1471
	55	M10	27	3.0	–	327	4500	13.75	-30	80	357.0	25150.0472	25150.1472
75	25	M12	37	3.0	–	752	4700	6.25	-30	80	223.0	25150.0476	25150.1476
	40	M12	37	3.0	–	450	4500	10.00	-30	80	310.0	25150.0477	25150.1477
	50	M12	37	3.0	–	352	4400	12.50	-30	80	340.0	25150.0478	25150.1478
100	40	M16	41	3.0	–	810	8100	10.00	-30	80	570.0	25150.0482	25150.1482
	50	M16	41	3.0	–	640	8000	12.50	-30	80	656.0	25150.0484	25150.1484
	60	M16	41	3.0	–	520	7800	15.00	-30	80	750.0	25150.0486	25150.1486

APPLICATION EXAMPLE



Rubber Endstop Buffers • parabolic

EH 25150.



PRODUCT DESCRIPTION

To be used as an elastic end-stop.

Due to the parabolic form the absorption is first soft and raises progressively.

The hardness is $55 \pm 5^\circ$ shore A. Further shore hardnesses ($40 \pm 5^\circ$ shore A and $70 \pm 5^\circ$ shore A) on request.

Material

Support washer

- Steel, zinc-plated, blue chromated

Threaded bushing

- Steel, zinc-plated, blue chromated

Body

- Rubber natural caoutchouc (NR), black

Screw

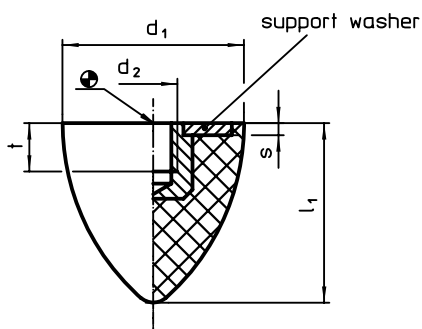
- Steel, zinc-plated, blue chromated

MORE INFORMATION

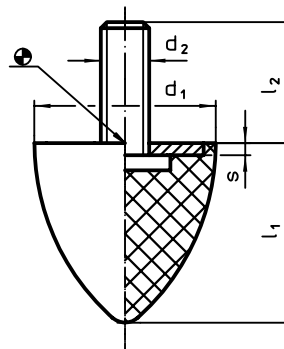
Further products

Support Legs, impact cushioning → p. 297

DRAWING



picture 1



picture 2

ORDER INFORMATION

Dimensions						Average spring range	Load capacity max.	Spring range	Temperature		Weight	Art. No.
d_1 ± 1.5	l_1 ± 1.5	d_2	l_2	s	t min.				min.	max.		
[mm]						[N/mm]	[N]	[mm]	[°C]			
with female thread – picture 1												
20	24	M 6	–	2	5.0	16.6	100	6.00	-30	80	8.5	25150.0522
30	30	M 8	–	2	6.5	24.0	150	6.25	-30	80	23.0	25150.0532
	36	M 8	–	2	6.5	26.6	200	7.50	-30	80	30.0	25150.0533
35	40	M 8	–	2	6.5	65.0	650	10.00	-30	80	40.0	25150.0537
50	61	M 8	–	2	6.5	50.0	750	15.00	-30	80	110.0	25150.0552
	68	M10	–	2	7.0	50.0	850	17.00	-30	80	120.0	25150.0553
with screw – picture 2												
20	24	M 6	18	2	–	16.6	100	6.00	-30	80	11.0	25150.0622
30	30	M 8	18	2	–	24.0	150	6.25	-30	80	29.0	25150.0632
	36	M 8	20	2	–	26.6	200	7.50	-30	80	33.0	25150.0633
35	40	M 8	23	2	–	65.0	650	10.00	-30	80	45.0	25150.0637
50	61	M 8	28	2	–	50.0	750	15.00	-30	80	114.0	25150.0652
	68	M10	28	2	–	50.0	850	17.00	-30	80	136.0	25150.0653

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Rubber Endstop Buffers • truncated cone form

EH 25150.



PRODUCT DESCRIPTION

To be used as an elastic end-stop, bearing foot etc.
The hardness is 55 ±5° shore A. Further shore hardnesses (40 ±5° shore A and 70 ±5° shore A) on request.

Material

Support washer

- Steel, zinc-plated by galvanization, pas-sivated
- Stainless steel 1.4301

Threaded bushing

- Steel, zinc-plated by galvanization, pas-sivated
- Stainless steel 1.4301

Body

- NBR

Screw

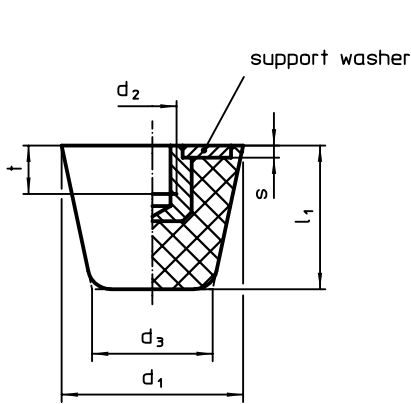
- Steel, zinc-plated by galvanization, pas-sivated
- Stainless steel 1.4301

MORE INFORMATION

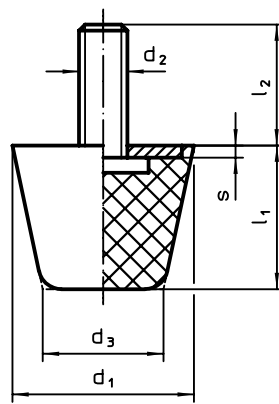
Further products

Support Legs, Impact cushioning → p. 297
Silicone Endstop Buffers, truncated cone form. → p. 722

DRAWING



picture 1



picture 2

ORDER INFORMATION

Dimensions							Spring rate R ~ [N/mm]	Load capacity max. [N]	Spring range ~ [mm]	Temperature range		Weight [g]	Art. No.	
d ₁	d ₂	l ₂	d ₃	l ₁	s	t				min.	max.		Steel	Stainless steel
[mm]										[°C]				
with female thread – picture 1														
19	M 5	–	12.0	16.0	2	5	28	110	4.00	-30	80	7.0	25150.0719	25150.0919
25	M 6	–	16.5	20.5	2	6	82	430	5.25	-30	80	14.0	25150.0725	25150.0925
32	M 8	–	21.0	26.0	2	8	140	910	6.50	-30	80	27.0	25150.0732	25150.0932
38	M 8	–	24.5	32.0	2	8	125	1200	9.50	-30	80	43.0	25150.0738	25150.0938
50	M10	–	32.0	43.0	2	10	155	1620	10.50	-30	80	93.0	25150.0750	25150.0950
with screw – picture 2														
19	M 5	6	12.0	16.0	2	–	28	110	4.00	-30	80	8.0	25150.0819	25150.1019
		10	12.0	16.0	2	–	28	110	4.00	-30	80	6.1	25150.0820	25150.1020
		20	12.0	16.0	2	–	28	110	4.00	-30	80	8.7	25150.0821	25150.1021
25	M 6	8	16.5	20.5	2	–	82	430	5.25	-30	80	16.0	25150.0825	25150.1025
		12	16.5	20.5	2	–	82	430	5.25	-30	80	17.0	25150.0826	25150.1026
		25	16.5	20.5	2	–	82	430	5.25	-30	80	19.0	25150.0827	25150.1027
32	M 8	10	21.0	26.0	2	–	140	910	6.50	-30	80	30.0	25150.0832	25150.1032
		16	21.0	26.0	2	–	140	910	6.50	-30	80	32.0	25150.0833	25150.1033
		30	21.0	26.0	2	–	140	910	6.50	-30	80	36.0	25150.0834	25150.1034
38	M 8	10	24.5	32.0	2	–	125	1200	9.50	-30	80	47.0	25150.0838	25150.1038
		16	24.5	32.0	2	–	125	1200	9.50	-30	80	48.0	25150.0839	25150.1039
		30	24.5	32.0	2	–	125	1200	9.50	-30	80	52.0	25150.0840	25150.1040
50	M10	12	32.0	43.0	2	–	155	1620	10.50	-30	80	101.0	25150.0850	25150.1050
		20	32.0	43.0	2	–	155	1620	10.50	-30	80	104.0	25150.0851	25150.1051
		40	32.0	43.0	2	–	155	1620	10.50	-30	80	112.0	25150.0852	25150.1052

Silicone Endstop Buffers • truncated cone form

EH 25151.



PRODUCT DESCRIPTION

Because of the high material purity, this version is suitable for all types of application which have demanding hygienic requirements (e.g. foodstuffs industry).

To be used as an elastic end-stop, bearing foot etc.

Endstop buffers made from silicone rubber have a wider temperature range for use than rubber endstop buffers.

The hardness is 55 ±5° shore A. Further shore hardnesses (40 ±5° shore A and 70 ±5° shore A) on request.

Material

Support washer

- Stainless steel 1.4301

Threaded bushing

- Stainless steel 1.4301

Body

- Silicone rubber

Screw

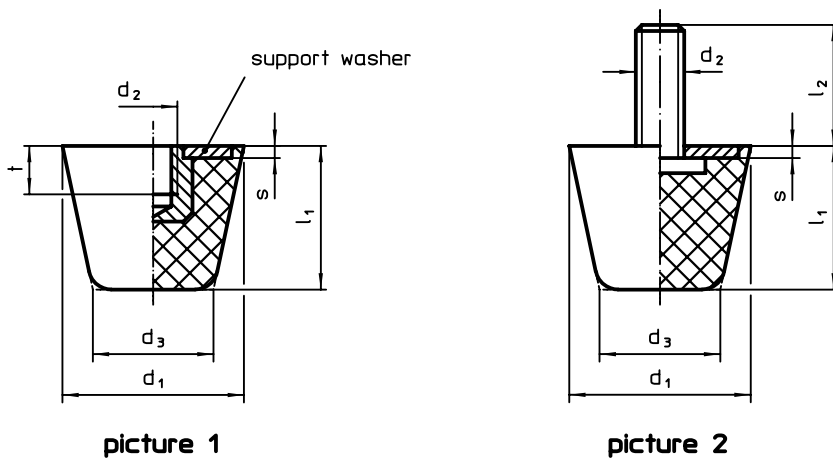
- Stainless steel 1.4301

MORE INFORMATION

Further products

Rubber Endstop Buffers, truncated cone form. → p. 721

DRAWING



picture 1

picture 2

ORDER INFORMATION

Dimensions							Spring rate R ~ [N/mm]	Load capacity max. [N]	Spring range ~ [mm]	Temperature range		Weight [g]	Art. No.
d ₁	d ₂	l ₂	d ₃	l ₁	s	t				min.	max.		
[mm]										[°C]			
with female thread – picture 1													
19	M 5	–	12.0	16.0	2	5	63	250	4.0	-30	200	6.1	25151.0019
25	M 6	–	16.5	20.5	2	6	90	460	5.1	-30	200	13.0	25151.0025
32	M 8	–	21.0	26.0	2	8	117	760	6.5	-30	200	23.0	25151.0032
38	M 8	–	24.5	32.0	2	8	113	900	8.0	-30	200	38.0	25151.0038
50	M10	–	32.0	43.0	2	10	148	1580	10.7	-30	200	94.0	25151.0050
with screw – picture 2													
19	M 5	6	12.0	16.0	2	–	63	250	4.0	-30	200	7.5	25151.0119
		10	12.0	16.0	2	–	63	250	4.0	-30	200	8.0	25151.0120
		20	12.0	16.0	2	–	63	250	4.0	-30	200	9.2	25151.0121
25	M 6	8	16.5	20.5	2	–	90	460	5.1	-30	200	16.0	25151.0125
		12	16.5	20.5	2	–	90	460	5.1	-30	200	17.0	25151.0126
		25	16.5	20.5	2	–	90	460	5.1	-30	200	19.0	25151.0127
32	M 8	10	21.0	26.0	2	–	117	760	6.5	-30	200	30.0	25151.0132
		16	21.0	26.0	2	–	117	760	6.5	-30	200	32.0	25151.0133
		30	21.0	26.0	2	–	117	760	6.5	-30	200	36.0	25151.0134
38	M 8	10	24.5	32.0	2	–	113	900	8.0	-30	200	44.0	25151.0138
		16	24.5	32.0	2	–	113	900	8.0	-30	200	46.0	25151.0139
		30	24.5	32.0	2	–	113	900	8.0	-30	200	50.0	25151.0140
50	M10	12	32.0	43.0	2	–	148	1580	10.7	-30	200	95.0	25151.0150
		20	32.0	43.0	2	–	148	1580	10.7	-30	200	99.0	25151.0151
		40	32.0	43.0	2	–	148	1580	10.7	-30	200	108.0	25151.0152

Rubber Endstop Buffers • low structure

EH 25150.



PRODUCT DESCRIPTION

For elastic, damping, and noise-reducing bearings. They also protect the surfaces. The rubber endstop buffers can also be used as spacers and foot ends. Hardness is 70 ±5° Shore A.

Material

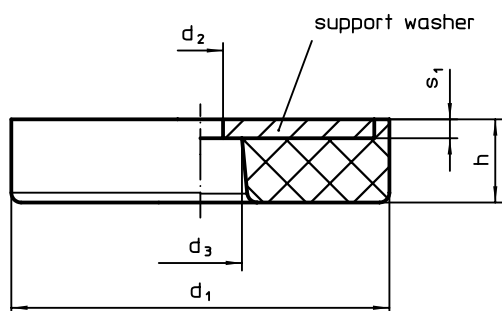
Support washer

- Steel, zinc-plated by galvanization, passivated

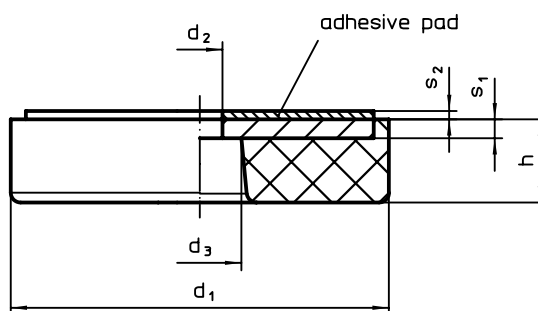
Body

- NBR

DRAWING



picture 1



picture 2

ORDER INFORMATION

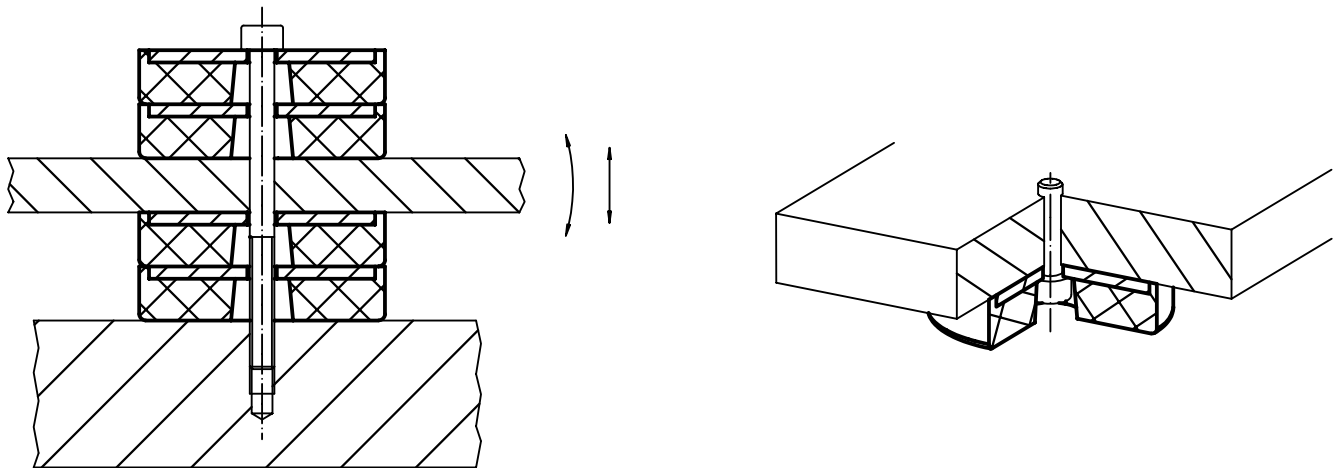
d ₁	h	Dimensions		s ₁	s ₂	Spring rate R	Load capacity max.	Spring range	Temperature range		Weight	Art. No.
		d ₂ +0.5	d ₃ +0.5						min.	max.		
[mm]												
[N/mm]												
[N]												
[mm]												
[°C]												
[g]												
with through-bore – picture 1												
19	3	4	7.5	1.5	1.1	282	480	1.70	-30	120	2.8	25150.1119
	7	4	7.5	1.5	1.1	213	373	1.75	-30	120	3.8	25150.1120
	14	4	7.5	1.5	1.1	68	240	3.50	-30	120	5.6	25150.1121
25	3	4	7.5	1.5	1.1	1870	1870	1.00	-30	120	5.4	25150.1125
	8	4	7.5	1.5	1.1	349	698	2.00	-30	120	8.0	25150.1126
	16	4	7.5	1.5	1.1	135	540	4.00	-30	120	12.0	25150.1127
32	4	5	9.0	2.0	1.1	1680	1680	1.00	-30	120	12.0	25150.1132
	9	5	9.0	2.0	1.1	548	1233	2.25	-30	120	16.0	25150.1133
	18	5	9.0	2.0	1.1	212	850	4.00	-30	120	23.0	25150.1134
38	4	5	9.0	2.0	1.1	1500	1500	1.00	-30	120	17.0	25150.1138
	10	5	9.0	2.0	1.1	704	1760	2.50	-30	120	25.0	25150.1139
	20	5	9.0	2.0	1.1	230	920	4.00	-30	120	37.0	25150.1140
50	5	6	11.0	2.5	1.1	3600	3600	1.00	-30	120	39.0	25150.1150
	11	6	11.0	2.5	1.1	1223	3670	3.00	-30	120	51.0	25150.1151
	22	6	11.0	2.5	1.1	500	2500	5.00	-30	120	74.0	25150.1152
64	5	6	11.0	2.5	1.1	1460	1460	1.00	-30	120	66.0	25150.1164
	13	6	11.0	2.5	1.1	2016	6050	3.00	-30	120	95.0	25150.1165
	26	6	11.0	2.5	1.1	616	3700	6.00	-30	120	141.0	25150.1166



d ₁	h	Dimensions				Spring rate R	Load capacity max.	Spring range	Temperature		Weight	Art. No.					
		d ₂ +0.5	d ₃ +0.5	s ₁	s ₂				min.	max.							
[mm]												[N/mm]	[N]	[mm]	[°C]	[g]	
with through-bore and adhesive pad – picture 2																	
19	3	4	7.5	1.5	1.1	282	480	1.70	-30	120	2.9	25150.1219					
	7	4	7.5	1.5	1.1	213	373	1.75	-30	120	5.1	25150.1220					
	14	4	7.5	1.5	1.1	68	240	3.50	-30	120	6.9	25150.1221					
25	3	4	7.5	1.5	1.1	1870	1870	1.00	-30	120	6.9	25150.1225					
	8	4	7.5	1.5	1.1	349	698	2.00	-30	120	9.3	25150.1226					
	16	4	7.5	1.5	1.1	135	540	4.00	-30	120	13.0	25150.1227					
32	4	5	9.0	2.0	1.1	1680	1680	1.00	-30	120	13.0	25150.1232					
	9	5	9.0	2.0	1.1	548	1233	2.25	-30	120	18.0	25150.1233					
	18	5	9.0	2.0	1.1	212	850	4.00	-30	120	25.0	25150.1234					
38	4	5	9.0	2.0	1.1	1500	1500	1.00	-30	120	19.0	25150.1238					
	10	5	9.0	2.0	1.1	704	1760	2.50	-30	120	26.0	25150.1239					
	20	5	9.0	2.0	1.1	230	920	4.00	-30	120	38.0	25150.1240					
50	5	6	11.0	2.5	1.1	3600	3600	1.00	-30	120	41.0	25150.1250					
	11	6	11.0	2.5	1.1	1223	3670	3.00	-30	120	54.0	25150.1251					
	22	6	11.0	2.5	1.1	500	2500	5.00	-30	120	77.0	25150.1252					
64	5	6	11.0	2.5	1.1	1460	1460	1.00	-30	120	71.0	25150.1264					
	13	6	11.0	2.5	1.1	2016	6050	3.00	-30	120	99.0	25150.1265					
	26	6	11.0	2.5	1.1	616	3700	6.00	-30	120	149.0	25150.1266					

5

APPLICATION EXAMPLE



Rubber Endstop Buffers • cylindrical, front mounting

EH 25150.



PRODUCT DESCRIPTION

To be used as an elastic end-stop, bearing foot etc.
The hardness is $55 \pm 5^\circ$ shore A. Further shore hardnesses ($40 \pm 5^\circ$ shore A and $70 \pm 5^\circ$ shore A) on request.

Material

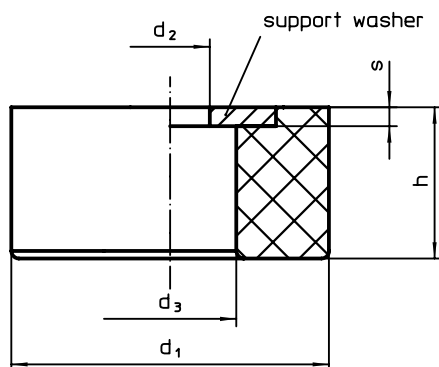
Support washer

- Stainless steel 1.4301

Body

- NBR

DRAWING



ORDER INFORMATION

d ₁	h	Dimensions			s	Spring rate R ~ [N/mm]	Load capacity max. [N]	Spring range ~ [mm]	Temperature range		Weight [g]	Art. No.
		d ₂	d ₃	[mm]					min.	max.		
16	8	4.3	8.0	1.0	140	280	2.0	-30	120	1.9	25150.1516	
20	10	5.3	9.5	1.2	148	370	2.5	-30	120	3.8	25150.1520	
25	12	6.4	12.2	1.6	210	630	3.0	-30	120	7.4	25150.1525	
35	16	8.4	14.0	2.0	345	1380	4.0	-30	120	19.0	25150.1535	
42	20	8.4	17.5	2.0	360	1800	5.0	-30	120	31.0	25150.1542	
		10.5	17.5	2.5	360	1800	5.0	-30	120	37.0	25150.1543	
56	24	8.4	19.5	2.0	577	3460	6.0	-30	120	63.0	25150.1556	
		13.0	19.5	3.0	577	3460	6.0	-30	120	79.0	25150.1557	

Hinges
EH 25160.



PRODUCT DESCRIPTION

These hinges are characterised by their compact and stable construction.

Material

Body

- Zinc die-cast, chromed
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure
- Stainless steel 1.4308

Axis

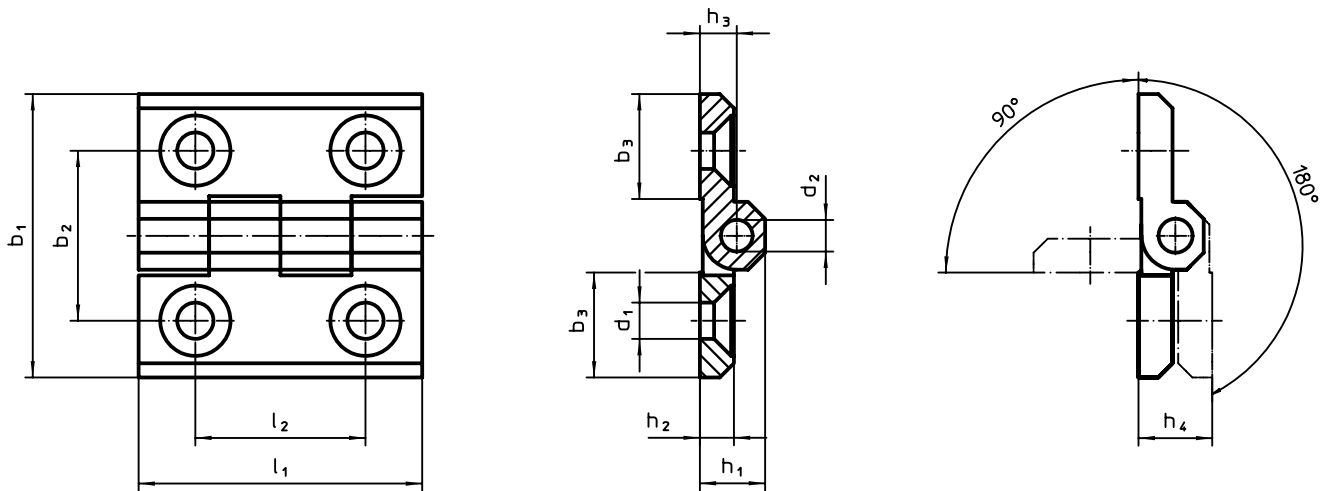
- Stainless steel

MORE INFORMATION

Further products

- Spacer Plates, for hinges → p. 729
- Threaded Plates, for hinges → p. 730
- Stops, for hinges → p. 731

DRAWING



ORDER INFORMATION

Dimensions												[g]	Art. No.					
b ₁	b ₂	b ₃	d ₁	d ₂	h ₁	h ₂	h ₃	h ₄ +0.5	l ₁	l ₂	Zinc die-cast, chromed		Zinc die-cast, silver	Zinc die-cast, black	Stainless steel			
[mm]																		
30	18	10.7	4.3	3	7.5	4	4.5	9	30	18	19	25160.0005	25160.0105	25160.0205	25160.0305			
40	25	14.0	5.3	4	9.0	5	5.5	11	40	25	48	25160.0010	25160.0110	25160.0210	25160.0310			
50	30	18.5	6.4	6	11.5	6	6.5	13	50	30	88	25160.0015	25160.0115	25160.0215	25160.0315			
60	36	21.5	8.3	8	15.0	8	8.5	17	60	36	165	25160.0020	25160.0120	25160.0220	25160.0320			

Hinges • with mounting thread
EH 25160.



PRODUCT DESCRIPTION

These hinges are characterised by the compact, robust design and the integrated mounting threads.

Material

Grub Screw

- Stainless steel

Body

- Zinc die-cast, chromed
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure

- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure
- Stainless steel 1.4308

Axis

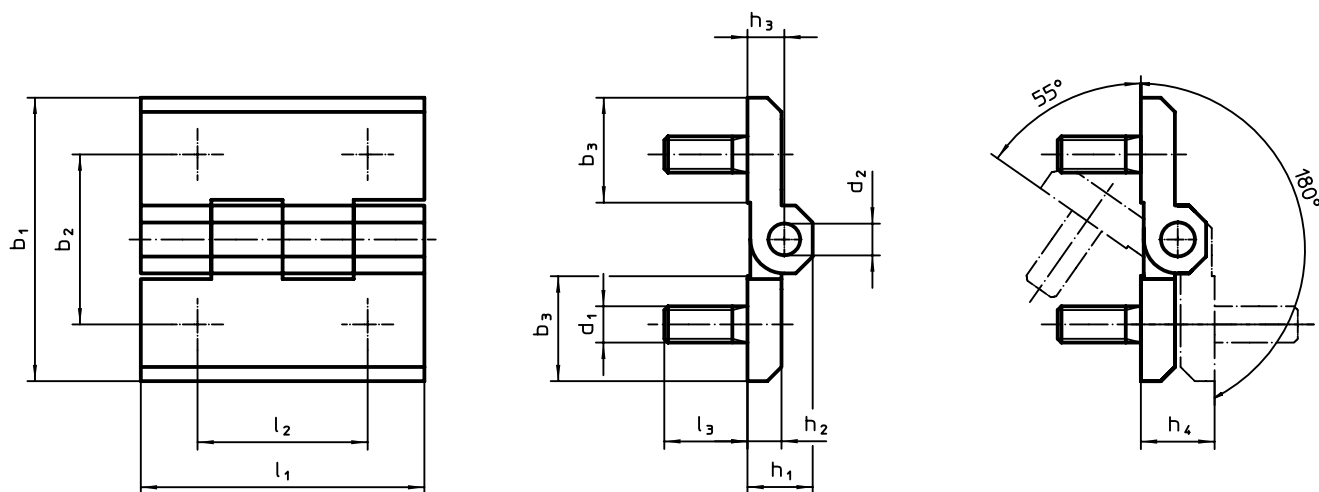
- Stainless steel

MORE INFORMATION

Further products

Spacer Plates, for hinges → p. 729

DRAWING



ORDER INFORMATION

Dimensions													Art. No.				
b ₁	b ₂	b ₃	d ₁	d ₂	h ₁	h ₂	h ₃	h ₄ +0.5	l ₁	l ₂	l ₃	[g]		Zinc die-cast, chromed	Zinc die-cast, silver	Zinc die-cast, black	Stainless steel
[mm]																	
40	25	14.0	M5	4	9.0	5	5.5	11	40	25	12	61	25160.0050	25160.0150	25160.0250	-	
											11	68	-	-	-	25160.0350	
50	30	18.5	M6	6	11.5	6	6.5	13	50	30	12	103	25160.0055	25160.0155	25160.0255	-	
											13	128	-	-	-	25160.0355	
60	36	21.5	M8	8	15.0	8	8.5	17	60	36	14	194	25160.0060	25160.0160	25160.0260	-	
											17	252	-	-	-	25160.0360	

Hinges • with adjustable friction resistance

EH 25160.



PRODUCT DESCRIPTION

These Hinges are characterised by their compact and stable construction, and by the ability to set the friction.
The design ensures that the hinge has no play (either radially or axially).

Material

Friction cone

- Thermoplastic POM

Body

- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Hinge pin

- Steel, zinc-plated by galvanization, pas-sivated

Nut

- Steel, zinc-plated by galvanization, pas-sivated

Assembly

Installation of the hinge on the component. The hinge's ease of pivoting can then be adjusted by tightening or loosening the hinge pin. This allows a constant braking torque to be applied throughout the pivot range.

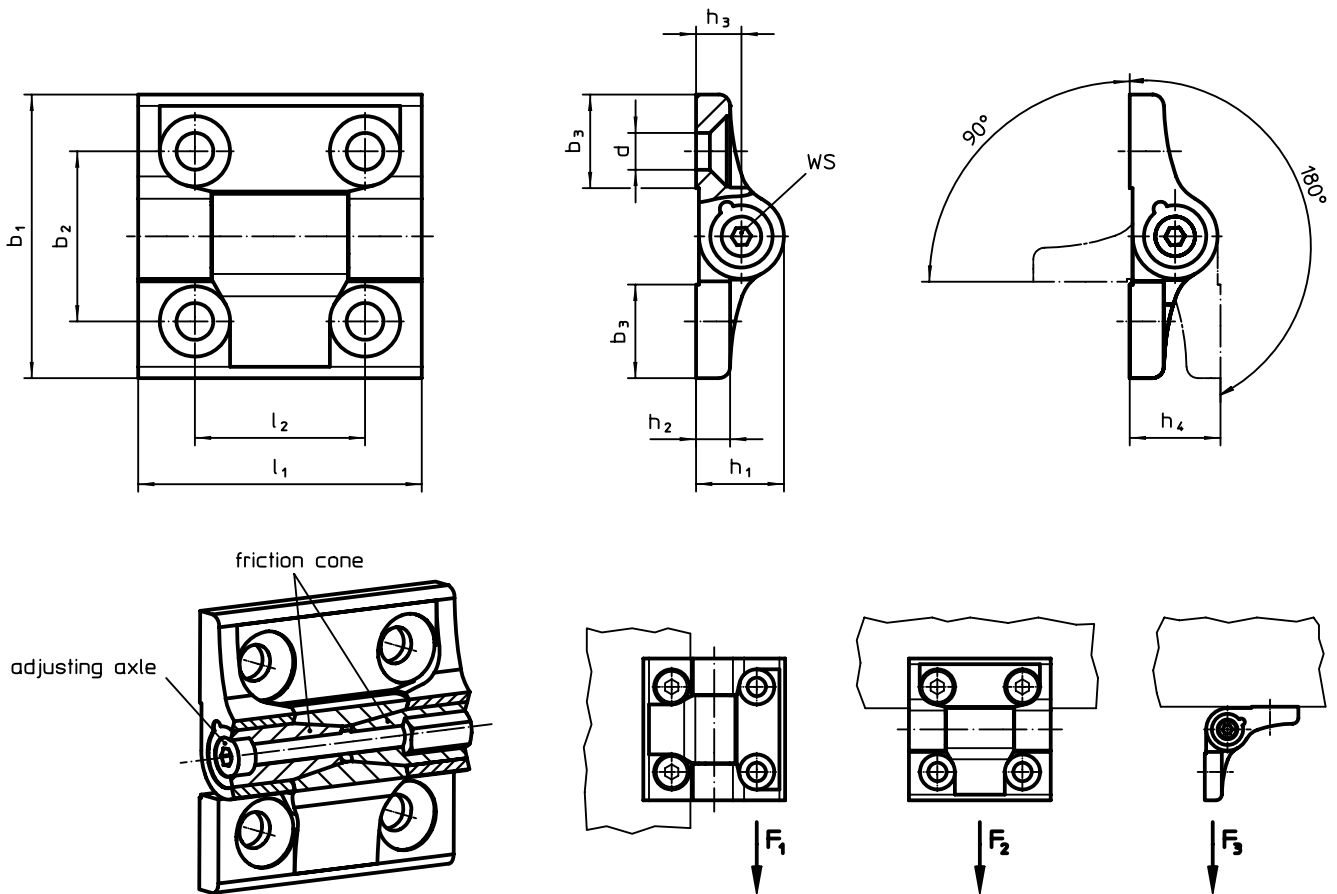
MORE INFORMATION

Further products

- Spacer Plates, for hinges → p. 729
- Threaded Plates, for hinges → p. 730
- Stops, for hinges → p. 731

5

DRAWING



ORDER INFORMATION

Dimensions											WS	Load capacity			Hinge pin			Art. No.		
b ₁	b ₂	b ₃	d	h ₁	h ₂	h ₃	h ₄	l ₁	l ₂			Radial load bearing capacity F ₁ max.	Axial load bearing capacity F ₂ max.	Load capacity F ₃ max.	Tight-ening torque max.	Friction torque max.	max.	max.	silver	black
[mm]											[mm]	[kN]			[Nm]		[°C]	[g]		
40	25	13.0	5.3	13.5	5.0	7.0	14	40	25	2.5	2.4	1.2	1.5	0.50	2.0	80	55	25160.0400	25160.0500	
50	30	16.5	6.5	15.5	6.0	8.0	16	50	30	3.0	3.2	1.6	2.0	0.75	4.0	80	94	25160.0405	25160.0505	
60	36	20.0	8.3	18.5	7.5	9.5	19	60	36	4.0	4.5	2.0	2.4	1.50	6.5	80	162	25160.0410	25160.0510	

Spacer Plates • for hinges

EH 25160.



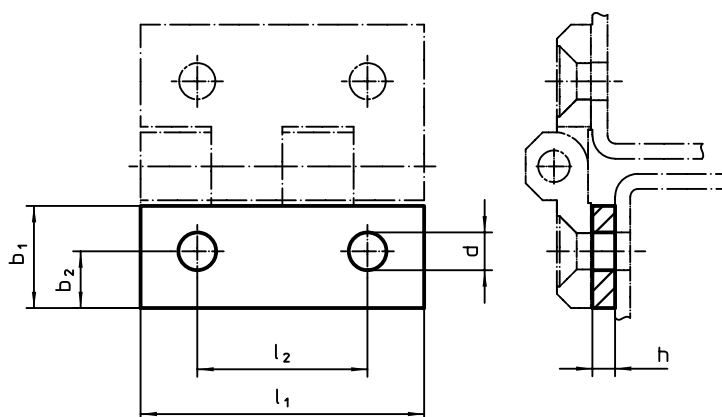
PRODUCT DESCRIPTION

Spacer plates are used for height compensation when installing hinges.


Material

- Stainless steel 1.4301, matt, vibratory ground

DRAWING



ORDER INFORMATION

l ₁	b ₁	Dimensions				l ₂	 [g]	Art. No.
		h	b ₂	d	[mm]			
30	10.8	1.0	6.0	4	18	2.2	25160.0605	
		1.5	6.0	4	18	3.3	25160.0610	
		3.0	6.0	4	18	6.5	25160.0615	
		5.0	6.0	4	18	11.0	25160.0620	
40	14.5	1.0	7.5	5	25	4.3	25160.0625	
		1.5	7.5	5	25	6.4	25160.0630	
		3.0	7.5	5	25	12.0	25160.0635	
		5.0	7.5	5	25	20.0	25160.0640	
50	18.0	1.0	10.0	6	30	6.6	25160.0645	
		1.5	10.0	6	30	9.8	25160.0650	
		3.0	10.0	6	30	19.0	25160.0655	
		5.0	10.0	6	30	31.0	25160.0660	
60	21.5	1.0	12.5	8	36	9.2	25160.0665	
		1.5	12.5	8	36	14.0	25160.0670	
		3.0	12.5	8	36	27.0	25160.0675	
		5.0	12.5	8	36	44.0	25160.0680	

Threaded Plates • for hinges

EH 25160.



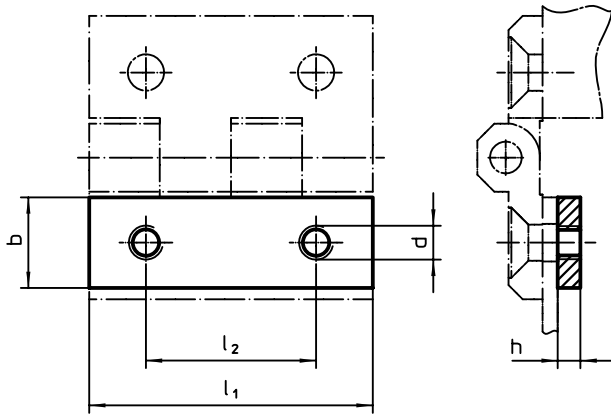
PRODUCT DESCRIPTION

Threaded plates simplify the installation of hinges, without requiring an additional nut or washer. Counter-holding while tightening is unnecessary.


Material

- Stainless steel 1.4301, matt, vibratory ground

DRAWING



ORDER INFORMATION

l ₁	b	Dimensions			l ₂	 [g]	Art. No.
		h	d	[mm]			
30	9	3	M4	18	5.6	25160.0705	
40	12	3	M5	25	10.0	25160.0710	
50	15	4	M6	30	21.0	25160.0715	
60	18	4	M8	36	29.0	25160.0720	

**PRODUCT DESCRIPTION**

Stops are used in order to restrict the hinge's pivot angle. The component also acts as a damping stop element.

Material**Holding plate**

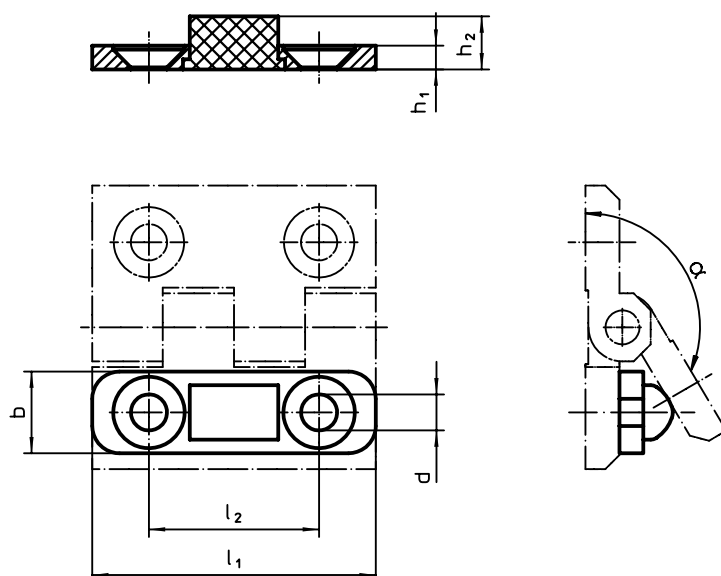
- Steel investment casting, galvanised, plastic coated, similar to RAL 9005, black, structural matt

Stop

- NBR

Assembly

The stop is screwed onto the hinge.

DRAWING**ORDER INFORMATION**

Dimensions						α			Art. No.
l_1	h_1	b	d	h_2	l_2		max.		
[mm]							[°C]	[g]	
40	3.5	12	5.3	7.8	25	150°	120	7.1	25160.0805
50	4.0	15	6.3	9.2	30	150°	120	13.0	25160.0810
60	5.0	18	8.3	10.9	36	150°	120	22.0	25160.0815

Hinges • adjustable

EH 25161.



PRODUCT DESCRIPTION

Adjustable hinges can be positioned horizontally or vertically by moving the adjusting bushings in a form-fit and finely adjusted manner.

Material

Body

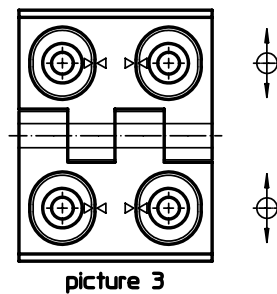
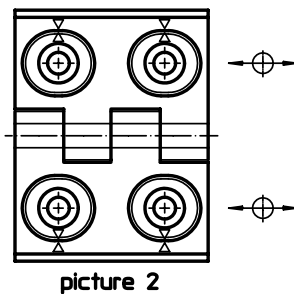
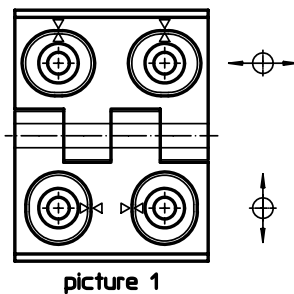
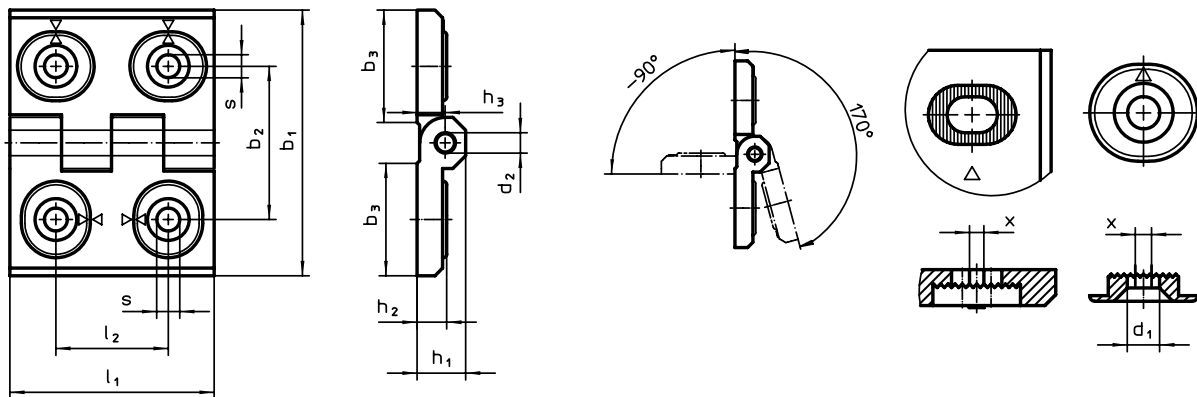
- Stainless steel 1.4408, dull blasted
- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure

- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Axis

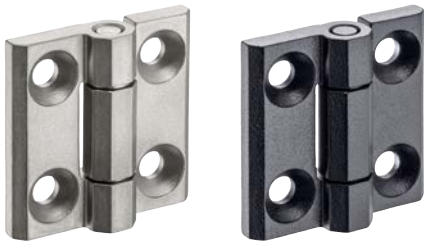
- Stainless Steel

DRAWING



ORDER INFORMATION

Dimensions												Art. No.	Stainless steel	Zinc die-cast, silver	Zinc die-cast, black
b ₁	l ₁	b ₂	b ₃	d ₁	d ₂	h ₁	h ₂	h ₃	l ₂	x	[g]				
[mm]															
adjustable in width – picture 3															
40	52	30	22.0	4.5	4	9.5	6	5.5	22	1.00	82	25161.0305	–	–	
40	52	30	22.0	4.5	4	9.5	6	5.5	22	0.50	82	–	25161.0105	25161.0205	
50	64	37	28.0	5.5	6	11.5	7	6.5	27	1.50	141	25161.0310	–	–	
50	64	37	28.0	5.5	6	11.5	7	6.5	27	0.75	141	–	25161.0110	25161.0210	
60	76	42	33.5	6.5	8	15.0	9	8.5	34	2.00	255	25161.0315	–	–	
60	76	42	33.5	6.5	8	15.0	9	8.5	34	1.00	255	–	25161.0115	25161.0215	
adjustable in height – picture 2															
40	52	30	22.0	4.5	4	9.5	6	5.5	22	1.00	83	25161.0320	–	–	
40	52	30	22.0	4.5	4	9.5	6	5.5	22	0.50	83	–	25161.0120	25161.0220	
50	64	37	28.0	5.5	6	11.5	7	6.5	27	1.50	142	25161.0325	–	–	
50	64	37	28.0	5.5	6	11.5	7	6.5	27	0.75	142	–	25161.0125	25161.0225	
60	76	42	33.5	6.5	8	15.0	9	8.5	34	2.00	257	25161.0330	–	–	
60	76	42	33.5	6.5	8	15.0	9	8.5	34	1.00	257	–	25161.0130	25161.0230	
adjustable in height and width – picture 1															
40	52	30	22.0	4.5	4	9.5	6	5.5	22	1.00	79	25161.0335	–	–	
40	52	30	22.0	4.5	4	9.5	6	5.5	22	0.50	79	–	25161.0135	25161.0235	
50	64	37	28.0	5.5	6	11.5	7	6.5	27	1.50	138	25161.0340	–	–	
50	64	37	28.0	5.5	6	11.5	7	6.5	27	0.75	138	–	25161.0140	25161.0240	
60	76	42	33.5	6.5	8	15.0	9	8.5	34	2.00	260	25161.0345	–	–	
60	76	42	33.5	6.5	8	15.0	9	8.5	34	1.00	260	–	25161.0145	25161.0245	



PRODUCT DESCRIPTION

These hinges from stainless steel are characterised by the compact design. The hinge pins are form-fit pressed and are therefore suitable for use in case of strong vibrations and shocks. Appropriate friction pairings of the hinge components and the lubrication reduce abrasion to a minimum. The version with centering steps avoids lateral slipping under high loads and thus protects the fixing screws from unacceptable lateral forces.

Material

Body

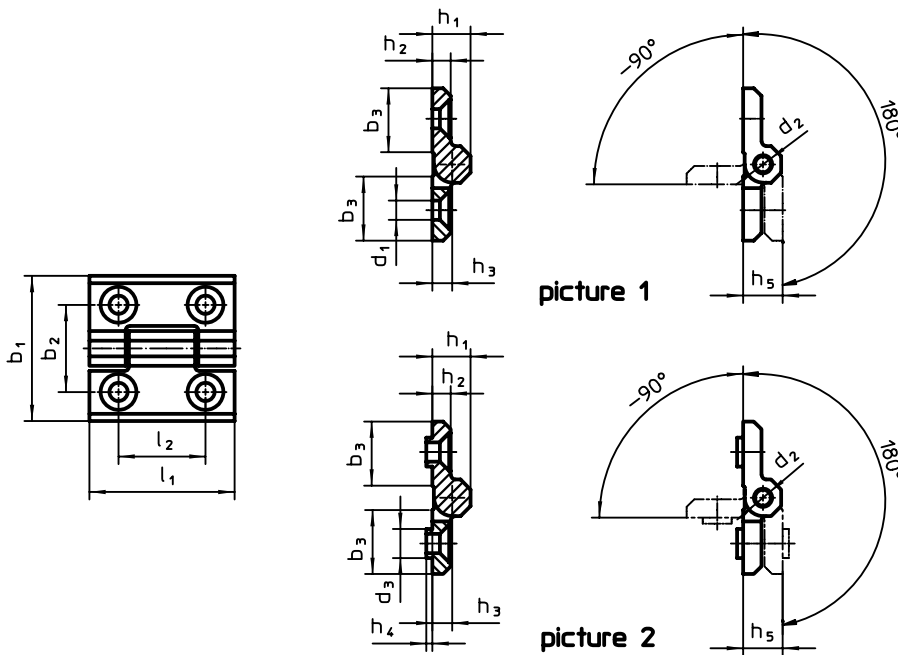
- Stainless steel 1.4405, dull blasted

- Stainless steel 1.4405, plastic-coated, black similar to RAL 9005, structure matt

Axis

- Stainless steel

DRAWING



ORDER INFORMATION

Dimensions														[g]	Art. No.	
b ₁	l ₁	b ₂	b ₃	d ₁	d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	h ₅	l ₂	dull blasted		black	
[mm]																
without centering steps – picture 1																
50	50	30	21.0	6.3	6	9.5	12.5	6	6.5	2	13	30	109	25162.0035	25162.0135	
60	60	36	25.5	8.3	8	12.5	16.0	8	8.5	3	17	36	210	25162.0045	25162.0145	
80	80	50	36.0	10.3	10	14.5	20.0	10	10.5	4	21	50	470	25162.0075	25162.0175	
with centering steps – picture 2																
50	50	30	21.0	6.3	6	9.5	12.5	6	6.5	2	13	30	110	25162.0040	25162.0140	
60	60	36	25.5	8.3	8	12.5	16.0	8	8.5	3	17	36	218	25162.0050	25162.0150	
80	80	50	36.0	10.3	10	14.5	20.0	10	10.5	4	21	50	481	25162.0080	25162.0180	

Hinges • stainless steel, elongated on one side

EH 25162.



PRODUCT DESCRIPTION

These hinges from stainless steel are characterised by the compact design. The hinge pins are form-fit pressed and are therefore suitable for use in case of strong vibrations and shocks. Appropriate friction pairings of the hinge components and the lubrication reduce abrasion to a minimum. The version with centering steps avoids lateral slipping under high loads and thus protects the fixing screws from unacceptable lateral forces.

Material

Body

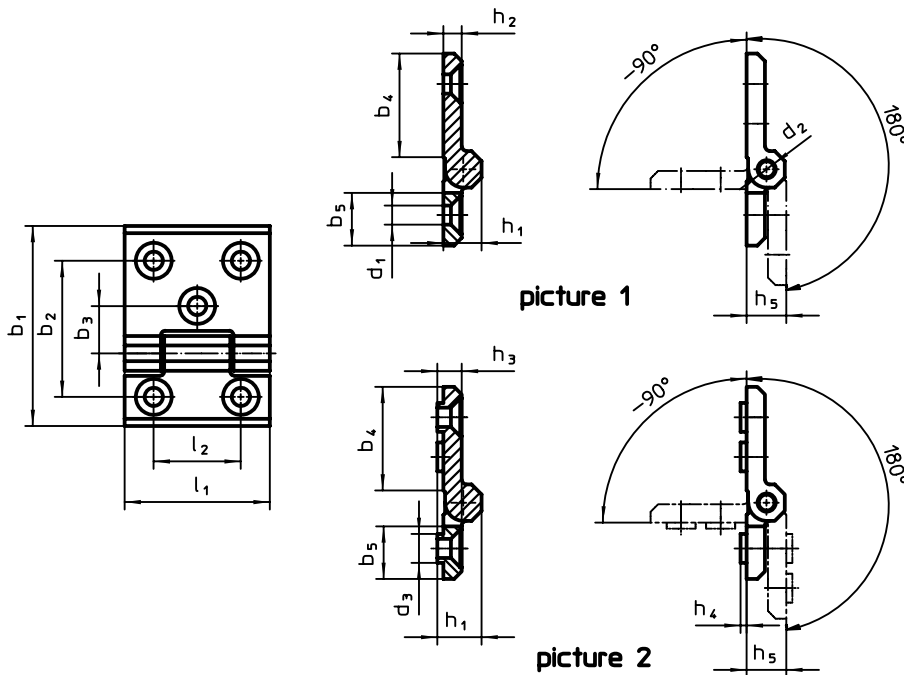
- Stainless steel 1.4405, dull blasted

- Stainless steel 1.4405, plastic-coated, black similar to RAL 9005, structure matt

Axis

- Stainless steel

DRAWING



ORDER INFORMATION

Dimensions																Art. No.	
b ₁	l ₁	b ₂	b ₃	b ₄	b ₅	d ₁	d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	h ₅	l ₂	[g]		dull blasted
one-sided with additional mounting hole – picture 1																	
63	50	43	15.0	34	21.0	6.3	6	9.5	12.5	6	6.5	2	13	30	135	25162.0055	25162.0155
90	60	63	22.5	56	25.5	8.3	8	12.5	16.0	8	8.5	3	17	36	309	25162.0085	25162.0185
120	80	85	30.0	75	36.0	10.3	10	14.5	20.0	10	10.5	4	21	50	677	25162.0015	25162.0115
one-sided with additional mounting hole and centering inserts – picture 2																	
63	50	43	15.0	34	21.0	6.3	6	9.5	12.5	6	6.5	2	13	30	142	25162.0060	25162.0160
90	60	63	22.5	56	25.5	8.3	8	12.5	16.0	8	8.5	3	17	36	317	25162.0090	25162.0190
120	80	85	30.0	75	36.0	10.3	10	14.5	20.0	10	10.5	4	21	50	690	25162.0020	25162.0120

5

Hinges • stainless steel, elongated on both sides

EH 25162.



PRODUCT DESCRIPTION

These hinges from stainless steel are characterised by the compact design. The hinge pins are form-fit pressed and are therefore suitable for use in case of strong vibrations and shocks. Appropriate friction pairings of the hinge components and the lubrication reduce abrasion to a minimum. The version with centering steps avoids lateral slipping under high loads and thus protects the fixing screws from unacceptable lateral forces.

Material

Body

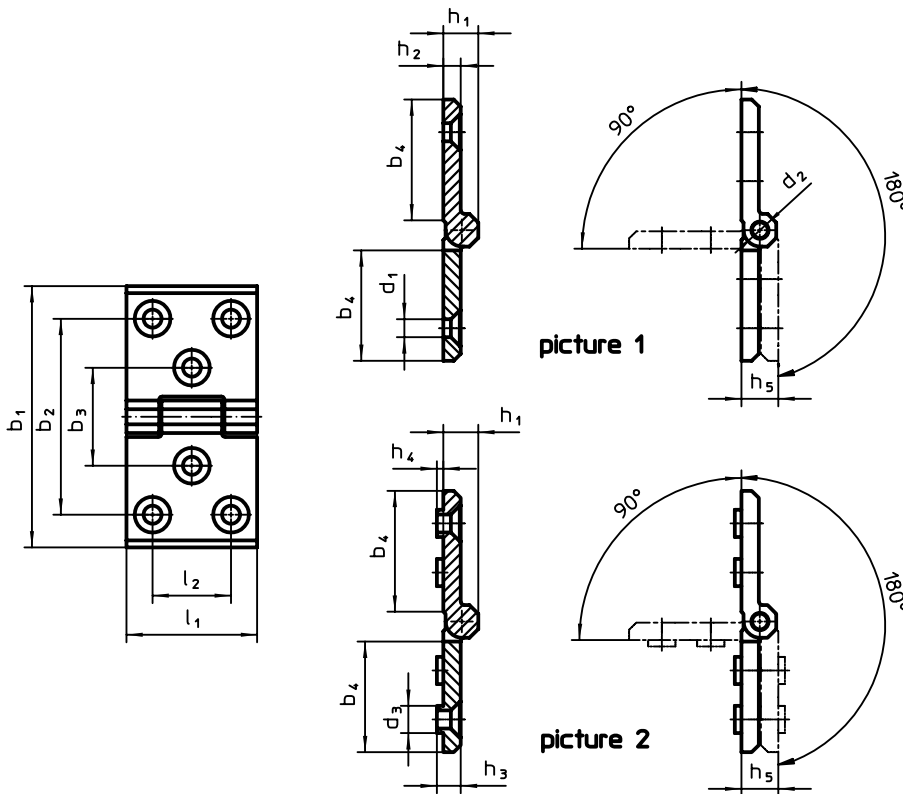
- Stainless steel 1.4405, dull blasted

- Stainless steel 1.4405, plastic-coated, black similar to RAL 9005, structure matt

Axis

- Stainless steel

DRAWING



ORDER INFORMATION

Dimensions														[g]	Art. No.	
b ₁	l ₁	b ₂	b ₃	b ₄	d ₁	d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	h ₅	l ₂		dull blasted	black
with additional mounting hole on both sides – picture 1																
76	50	56	30	34	6.3	6	9.5	12.5	6	6.5	2	13	30	160	25162.0065	25162.0165
120	60	90	45	56	8.3	8	12.5	16.0	8	8.5	3	17	36	400	25162.0005	25162.0105
160	80	120	60	75	10.3	10	14.5	20.0	10	10.5	4	21	50	896	25162.0025	25162.0125
with additional mounting hole and centering inserts on both sides – picture 2																
76	50	56	30	34	6.3	6	9.5	12.5	6	6.5	2	13	30	163	25162.0070	25162.0170
120	60	90	45	56	8.3	8	12.5	16.0	8	8.5	3	17	36	414	25162.0010	25162.0110
160	80	120	60	75	10.3	10	14.5	20.0	10	10.5	4	21	50	906	25162.0030	25162.0130

Hinges • zinc die-cast

EH 25163.



PRODUCT DESCRIPTION

These hinges from zinc die-cast are characterised by their simple and timeless design.

Material

Body

- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Covering

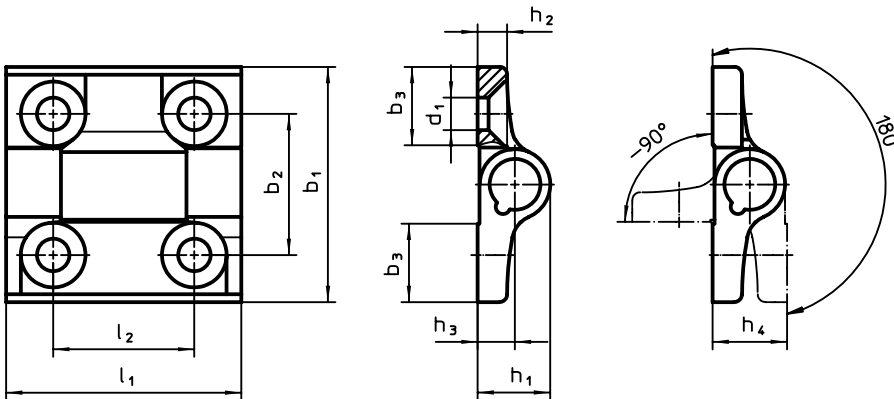
- Thermoplastic POM

MORE INFORMATION

Further products

- Spacer Plates, for hinges → p. 729
- Threaded Plates, for hinges → p. 730

DRAWING



ORDER INFORMATION

Dimensions										max. [°C]	[g]	Art. No.	
b ₁	l ₁	b ₂	b ₃	d ₁	h ₁	h ₂	h ₃	h ₄	l ₂			Zinc die-cast, silver	Zinc die-cast, black
60	60	36	20	8.3	18.5	7.5	9.5	19	36	80	137	25163.0005	25163.0105

5

Hinges • zinc die-cast, with spring return

EH 25163.



PRODUCT DESCRIPTION

Hinges from zinc die-cast with spring return allow doors to be automatically opened or closed. The torque of the reset depends on the opening angle of the hinge (refer to the drawing). Endurance tests have shown that the torque of the reset does not change even after 100,000 cycles. These hinges from zinc die-cast are characterised by their simple and timeless design.

Material

Body

- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Spring

- Spring steel wire

Covering

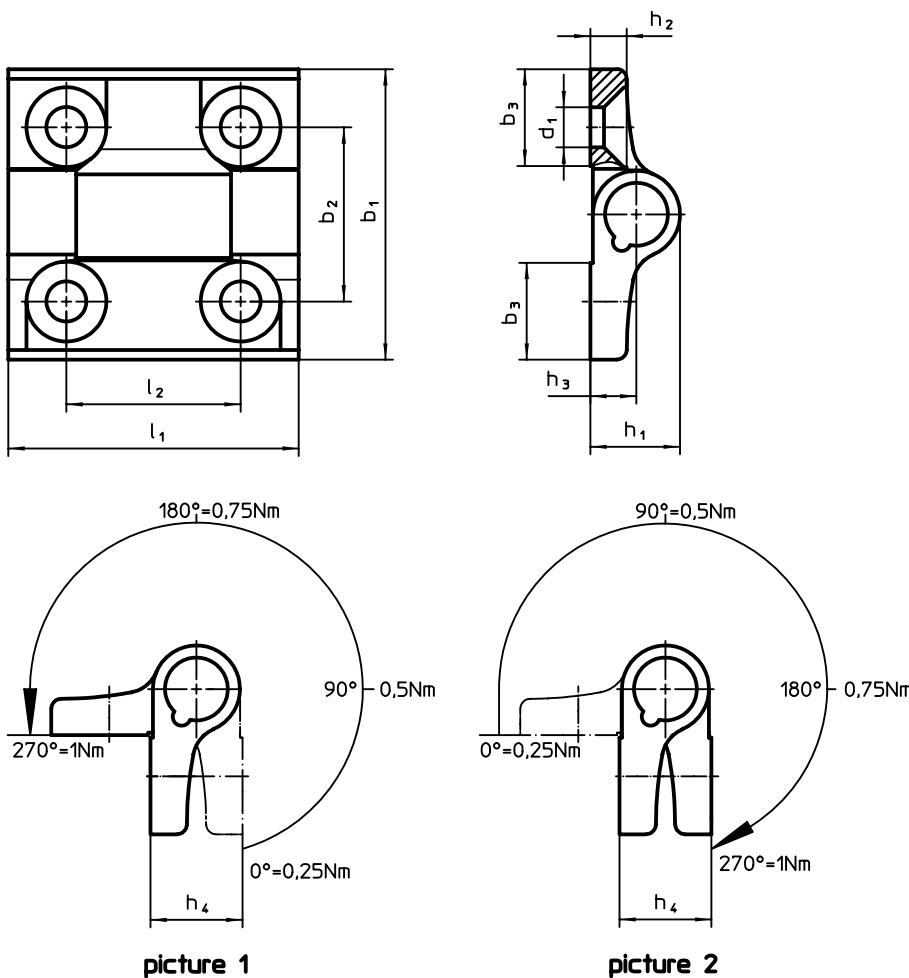
- Thermoplastic POM

MORE INFORMATION

Further products

- Spacer Plates, for hinges → p. 729
- Threaded Plates, for hinges → p. 730

DRAWING



ORDER INFORMATION

Dimensions										max. [°C]	[g]	Art. No.	
b ₁	l ₁	b ₂	b ₃	d ₁	h ₁	h ₂	h ₃	h ₄	l ₂			Zinc die-cast, silver	Zinc die-cast, black
[mm]													
spring-loaded return closing – picture 1													
60	60	36	20	8.3	18.5	7.5	9.5	19	36	80	149	25163.0010	25163.0110
spring-loaded return opening – picture 2													
60	60	36	20	8.3	18.5	7.5	9.5	19	36	80	146	25163.0015	25163.0115

Hinges • zinc die-cast, with indexing positions

EH 25164.



PRODUCT DESCRIPTION

Hinges from zinc die-cast with indexing positions hold door and covers in fixed positions. It avoids undesired automatic closing or opening. This is an advantage for example when filling machines and facilities or during maintenance and repairs.

The version with the indexing positions -3° and 117° (picture 2) also ensures that the door or cover presses slightly against the housing frame by the -3° when closed.

These hinges from zinc die-cast are characterised by their simple and timeless design.

Material

Body

- Zinc die-cast, plastic coated, silver, similar to RAL 9006, matt structure
- Zinc die-cast, plastic coated, black, similar to RAL 9005, matt structure

Axis

- Stainless steel 1.4305

Spring

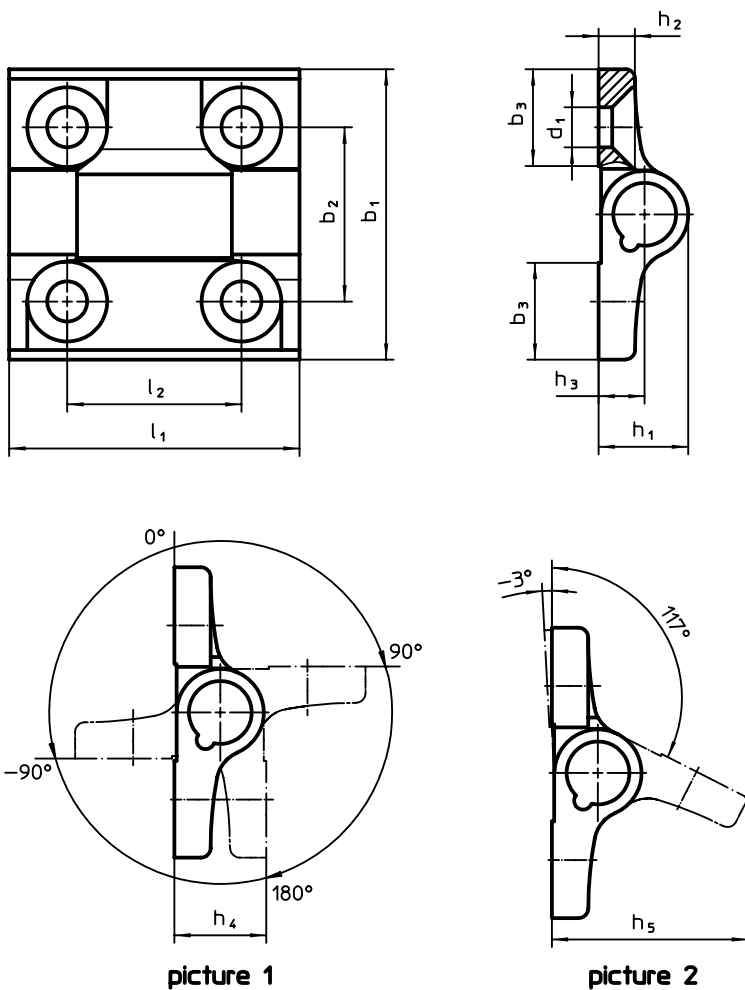
- Spring steel wire

MORE INFORMATION

Further products

- Spacer Plates, for hinges → p. 729
- Threaded Plates, for hinges → p. 730

DRAWING



picture 1

picture 2

ORDER INFORMATION

Dimensions												max. [°C]	[g]	Art. No.			
b ₁	l ₁	b ₂	b ₃	d ₁	h ₁	h ₂	h ₃	h ₄	h ₅	l ₂	Zinc die-cast, silver			Zinc die-cast, black			
indexing positions -90° , 0° , 90° and 180° – picture 1																	
60	60	36	20	8.3	18.5	7.5	9.5	19	40.5	36	80	152	25164.0005	25164.0105			
indexing positions -3° and 117° – picture 2																	
60	60	36	20	8.3	18.5	7.5	9.5	19	40.5	36	80	152	25164.0010	25164.0110			

NOTES

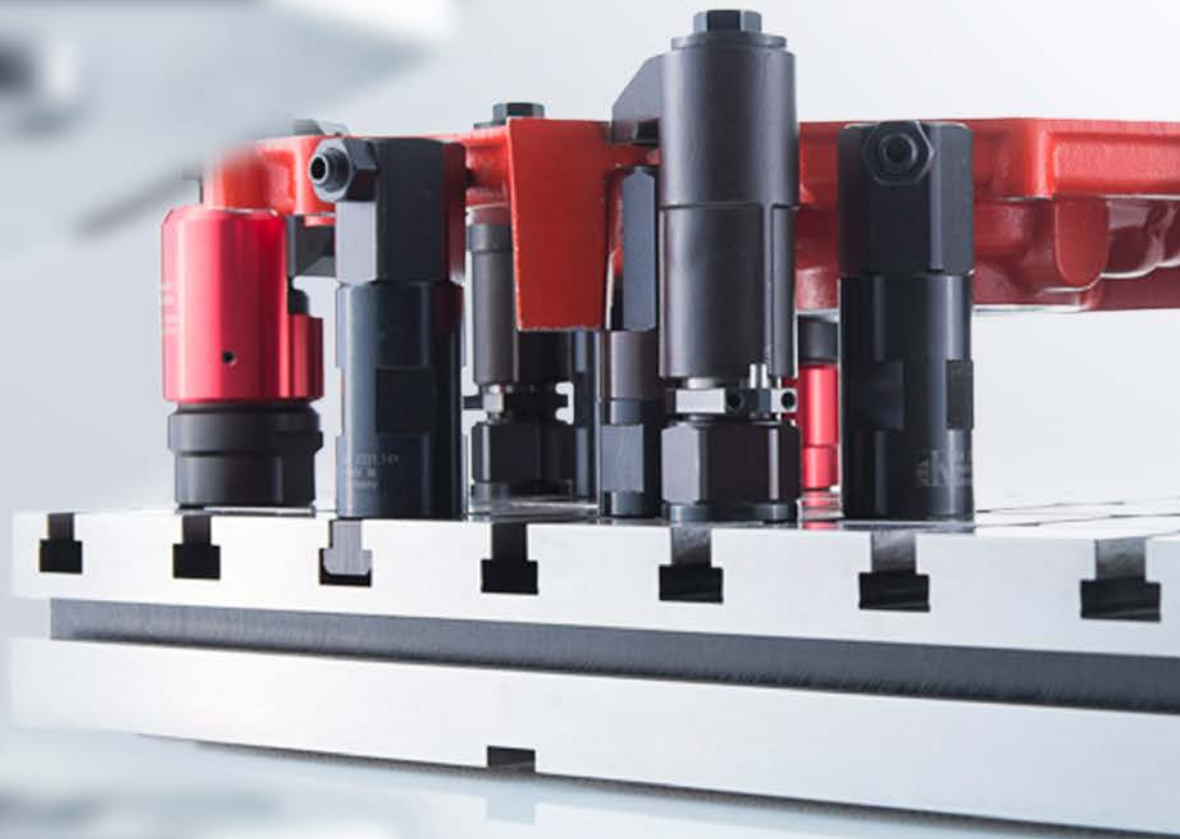
A large grid of small squares, intended for taking notes. The grid consists of 20 columns and 30 rows of small, light gray squares.

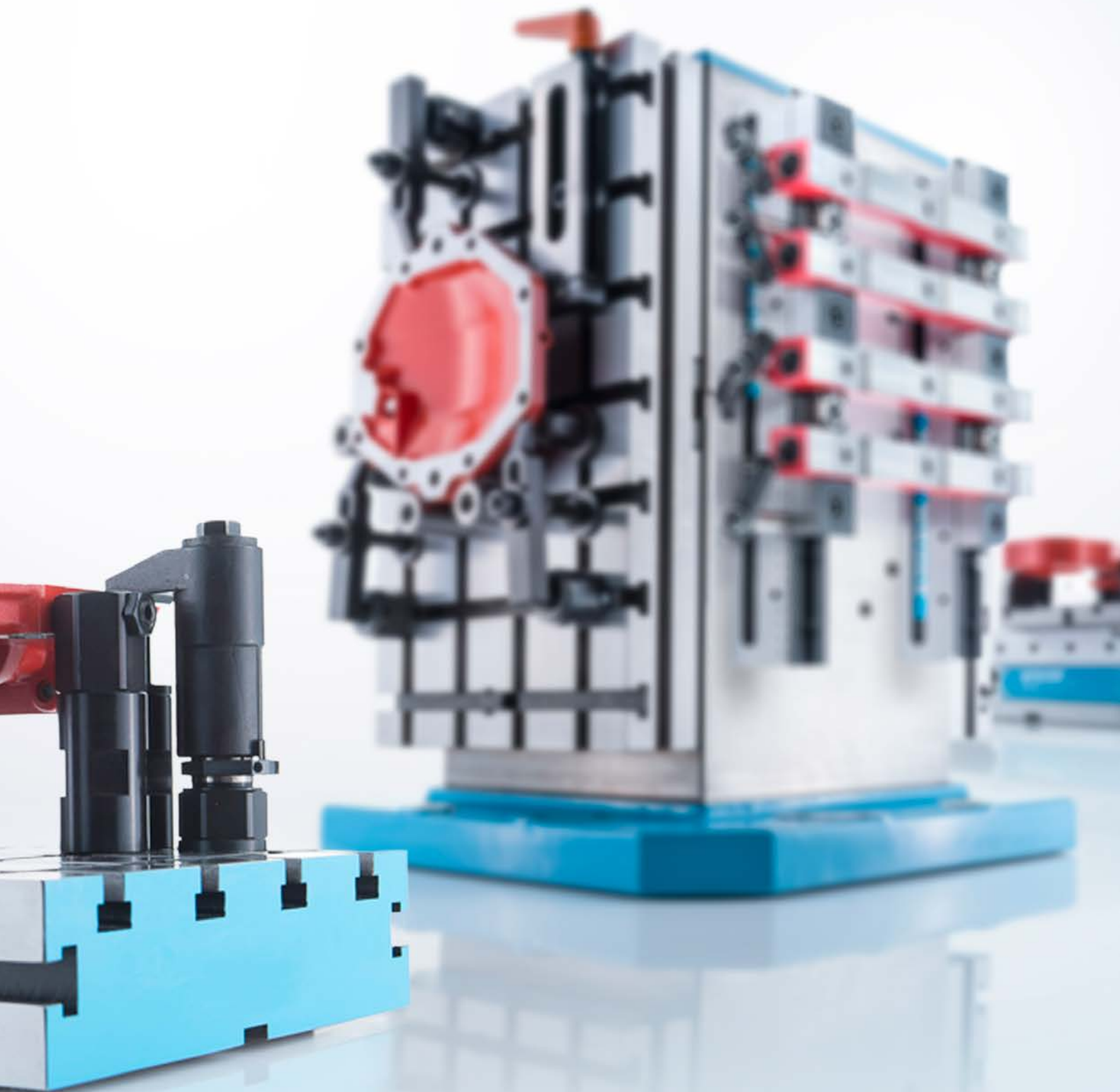
THE MOST EXCITING VARIETY IN THE REALM OF WORKPIECE CLAMPING EVERYTHING FROM A SINGLE SOURCE

Finding the solution to a „clamping challenge“ is paramount to an optimised and efficient manufacturing process. Adapting to the constantly increasing demands in the marketplace for precision and flexibility ties up a great amount of resources, especially in the area of tool design and construction. All the more reason to team up with a partner who can help you succeed by affording you synergy effects that arise from long years of experience as well as an unsurpassed level of expertise and know-how. Offering a wide selection of products ranging from modular fixtures to basic elements to our innovative zero-point clamping system with individual combo elements, Erwin Halder KG is uniquely equipped to find the right solution to any requirement your customers can throw at you.



[www.halder.com/
ModularFixtureSystems-Video](http://www.halder.com/ModularFixtureSystems-Video)





MODULAR FIXTURE SYSTEMS

THE RIGHT SOLUTION FOR ANY PURPOSE

Two systems that are effortlessly interchangeable allow you to perfectly adapt the fixture to the specific requirements at hand. The systems can be selected based on workpiece and production process and offer maximum flexibility thanks to their modular design.

T-SLOT SYSTEMS

Tempered base plates are fitted with a T-slot system. This feature makes it possible to fix system components in place and clamp them at the same time. A particularly good choice for machining complex workpieces.

HOLE AND DOWEL SYSTEMS

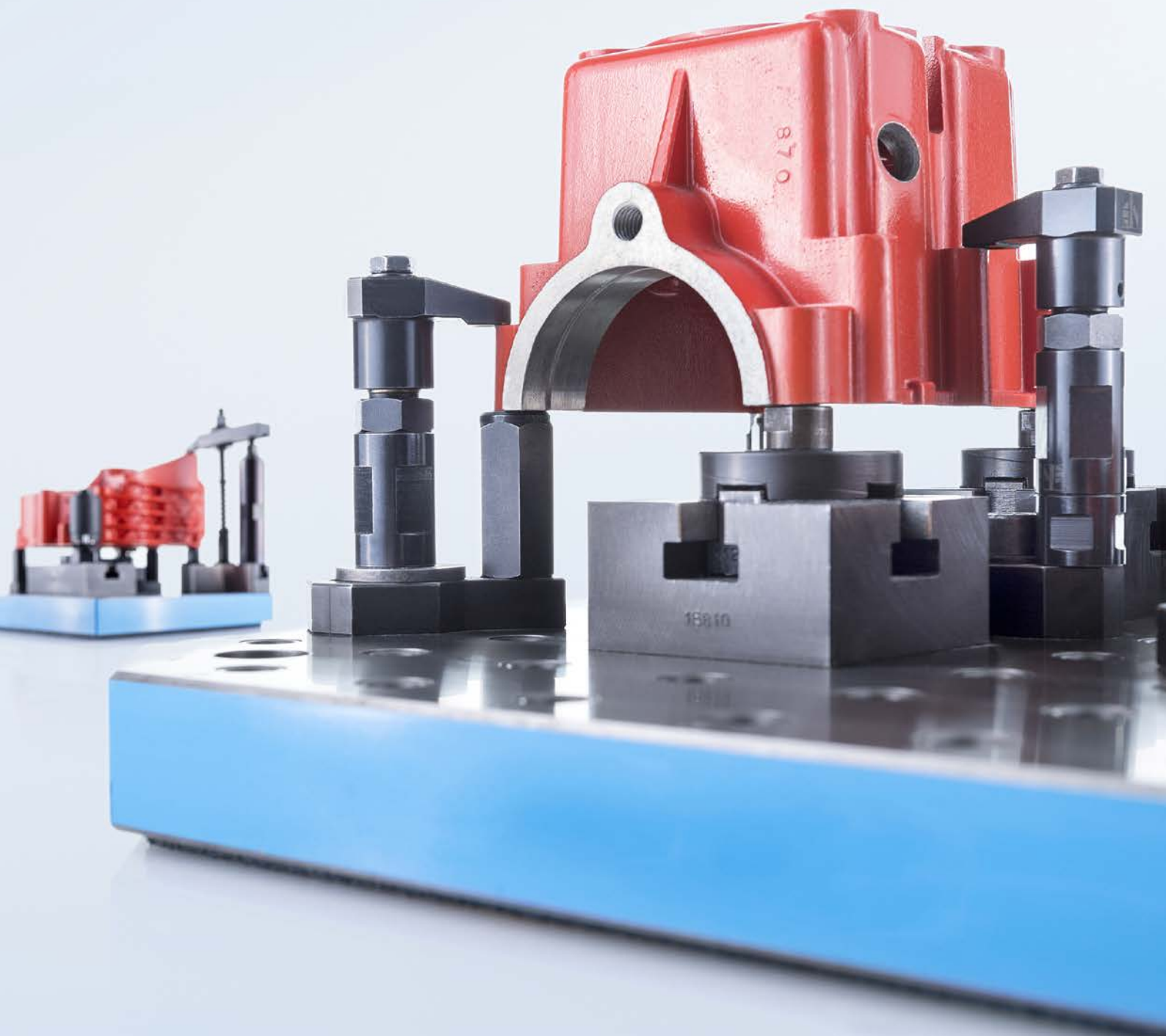
The base plates with hole and dowel system allow operators to quickly set up and precisely machine workpieces with simple geometries. Hole and dowel systems can achieve the flexibility of the T-slot system through assembled combination parts.

PERSONALISED CUSTOMER SERVICE

In an effort to furnish you with the resources you need to perfectly plan and implement your projects - especially in the area of modular fixture systems - we are offering you the following services:

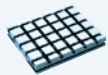
- Sample design of fixtures.
- Mobile Showroom for on-site demonstrations.
- Introductory seminars and user seminars.
- Training courses for customers at our training centre.





6 T-SLOT SYSTEMS





Product group

Page

Base Elements

748

Mounting Elements

763

Standard Ranges

799



T-SLOT SYSTEMS

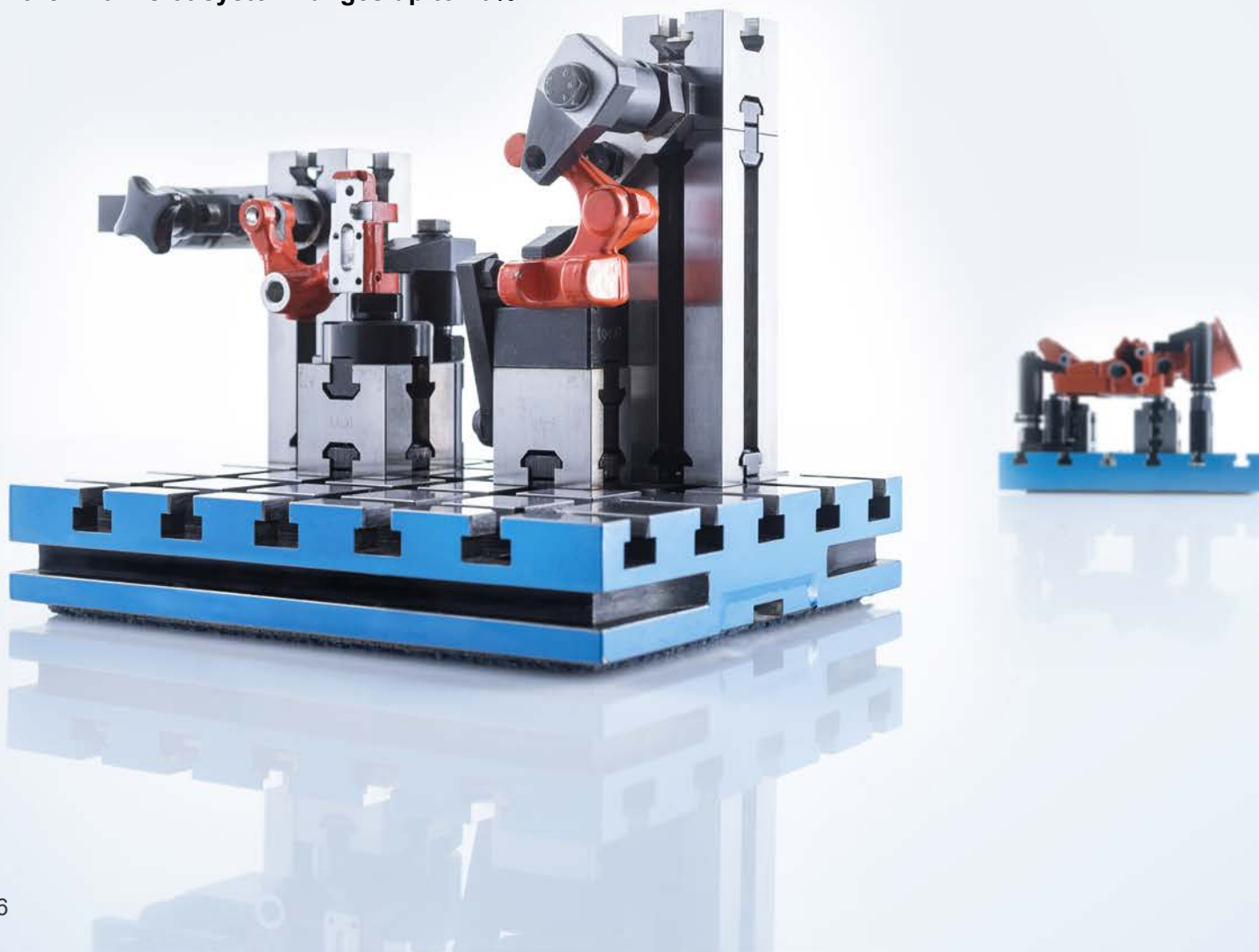
T-SLOT SYSTEMS V40/V70

Our V40 and V70 systems are the classics among T-slot systems and have proven their merits for years. The T-slot system is based on tempered base plates with grid dimensions of 40 mm or 70 mm.

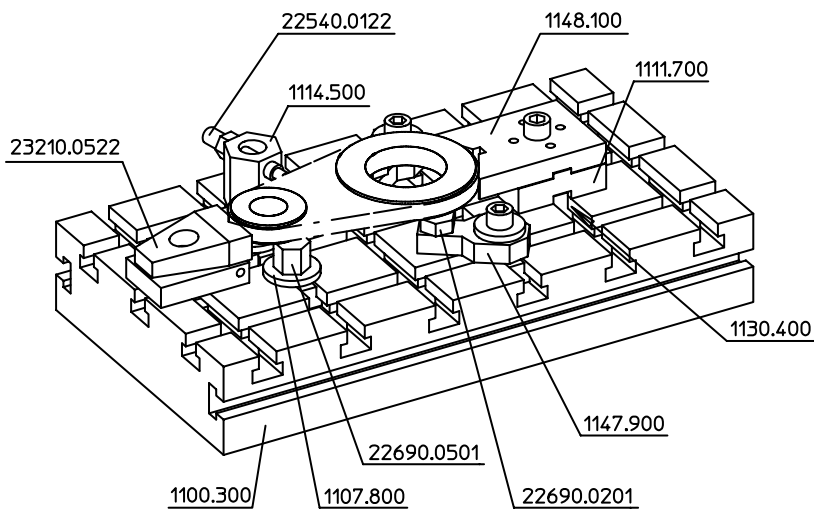
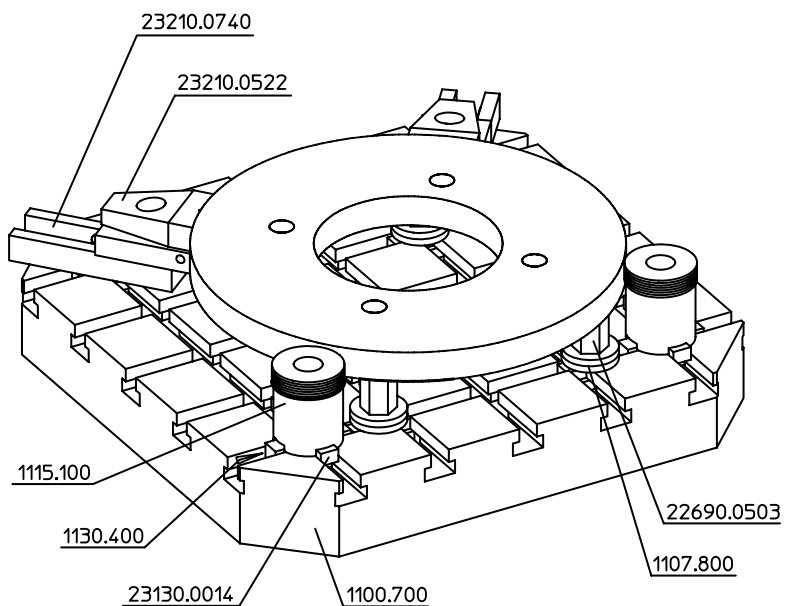
Since the system parts can be fixed in place and clamped at the same time, you can set up the fixture quickly and with no effort at all. This outstanding level of flexibility during set-up makes the T-slot system a stellar choice for machining complex workpieces

T-SLOT SYSTEM V70ECO

Taking the V70 series to the next level of performance, the V70eco delivers exceptional quality at unbeatable prices. The V70eco is composed of base plates made of high-strength steel with 70 mm grid dimensions and comes with mounting blocks that are fully compatible with the V70 system. **The cost benefit compared to the V70 T-slot system ranges up to 40%!**



APPLICATION SAMPLE



Base Plates

EH 1000.400 - EH 1000.500



PRODUCT DESCRIPTION

Material

- Steel, hardened, ground

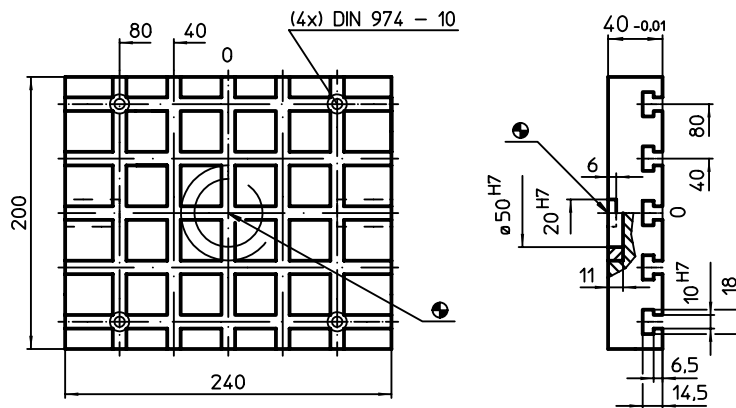
MORE INFORMATION

Notes

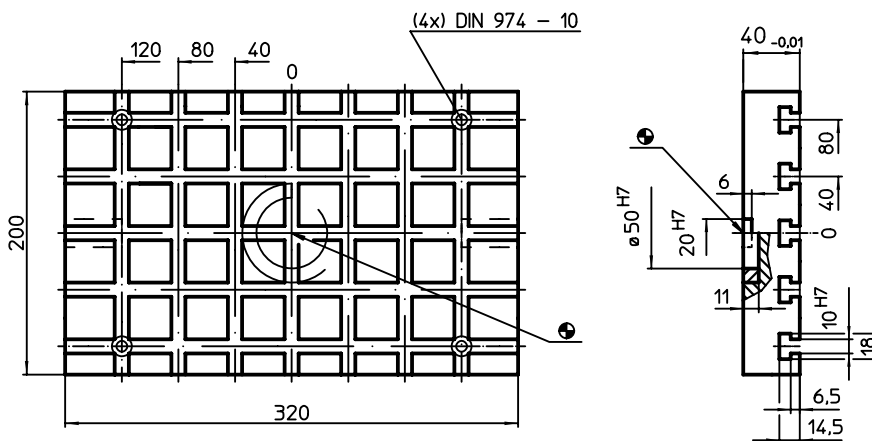
Special types on request.

DRAWING

1000.400



1000.500



Slot spacing 40 ±0,01.

ORDER INFORMATION

System	b ₁	Dimensions				y	Number of T-slots	[kg]	Art. No.
		b ₂	[mm]		l ₂				
V40	200	80	240	80	10	5 x 5	13	1000.400	
			320	40	10	5 x 7	14	1000.500	

Base Plates • suitable on pallets DIN 55 201
EH 1000.800



PRODUCT DESCRIPTION

Material

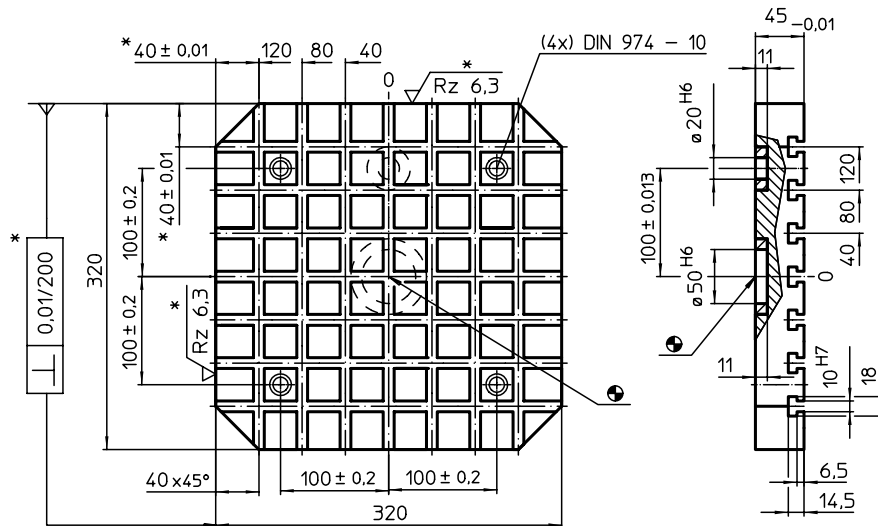
- Steel, hardened, ground

MORE INFORMATION

Notes

Special types on request.

DRAWING

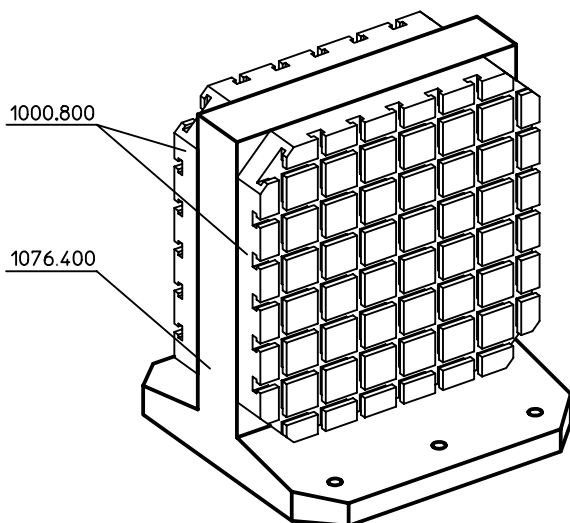


* These tolerances are valid only for optional exterior stop type. Slot spacing 40 ± 0,01.

ORDER INFORMATION

System	Dimensions									y [mm]	Number of T-slots	[kg]	Art. No.
	a	b ₁	b ₂	b ₃	c [mm]	d	l ₁	l ₂	l ₃				
V40	100	320	100	40	40	20	320	100	40	10	7 x 7	28	1000.800

APPLICATION EXAMPLE



Base Plates

EH 1002.100



PRODUCT DESCRIPTION

Material

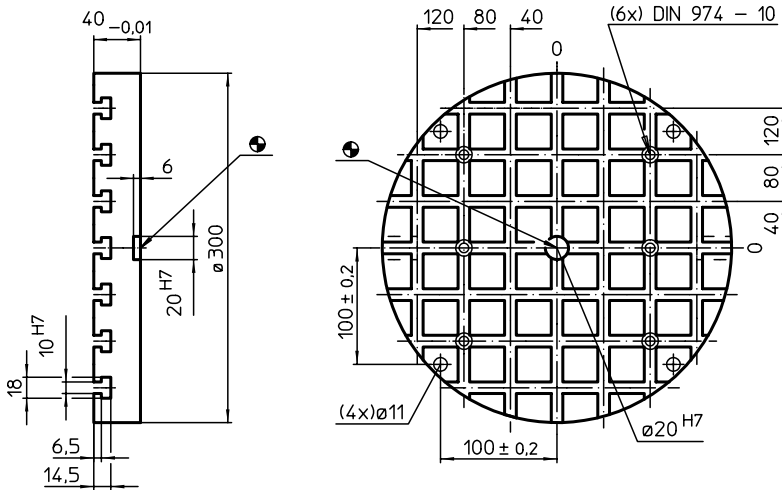
- Steel, hardened, ground

MORE INFORMATION


Notes

Special types on request.

DRAWING



ORDER INFORMATION

System	Dimensions		Number of T-slots	 [kg]	Art. No.
	b_1	d_1			
V40	100	300	7 x 7	15	1002.100

Base Plates

EH 1100.300 - EH 1100.500



PRODUCT DESCRIPTION

Material

- Steel, hardened, ground

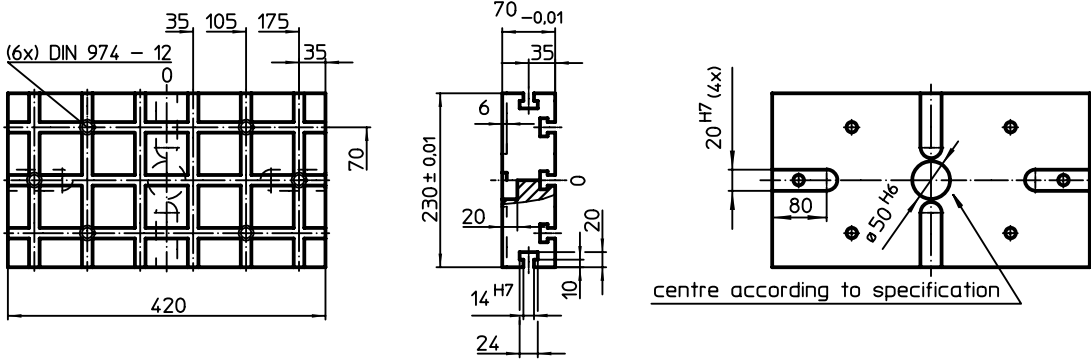
MORE INFORMATION

Notes

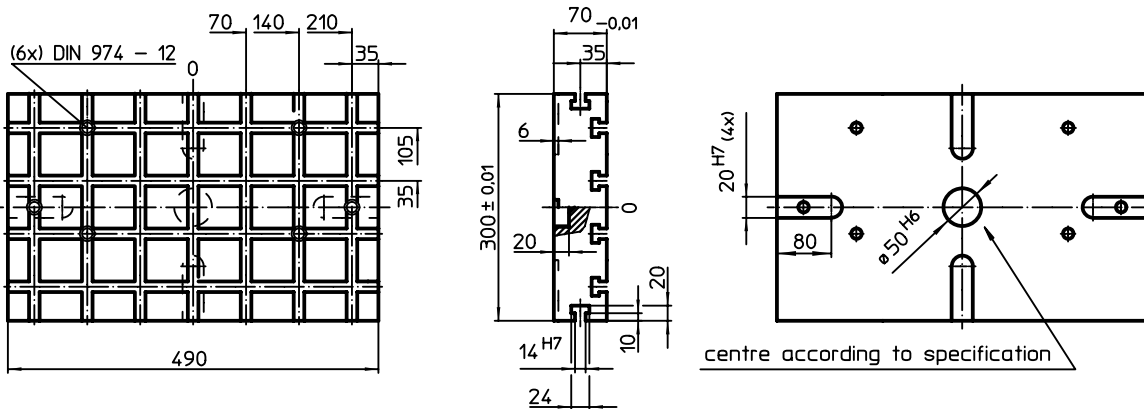
Special types on request.

DRAWING

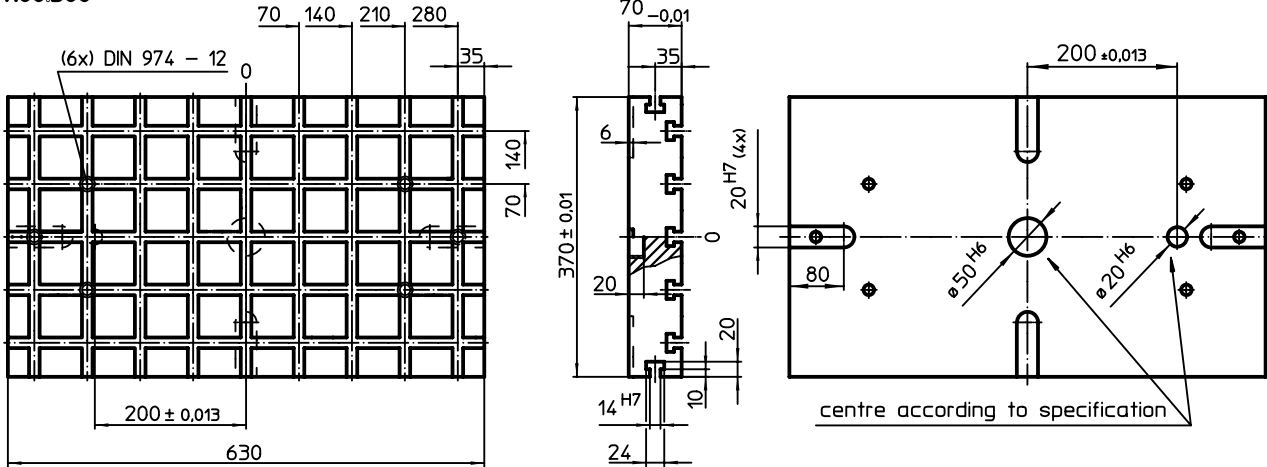
1100.300



1100.400



1100.500

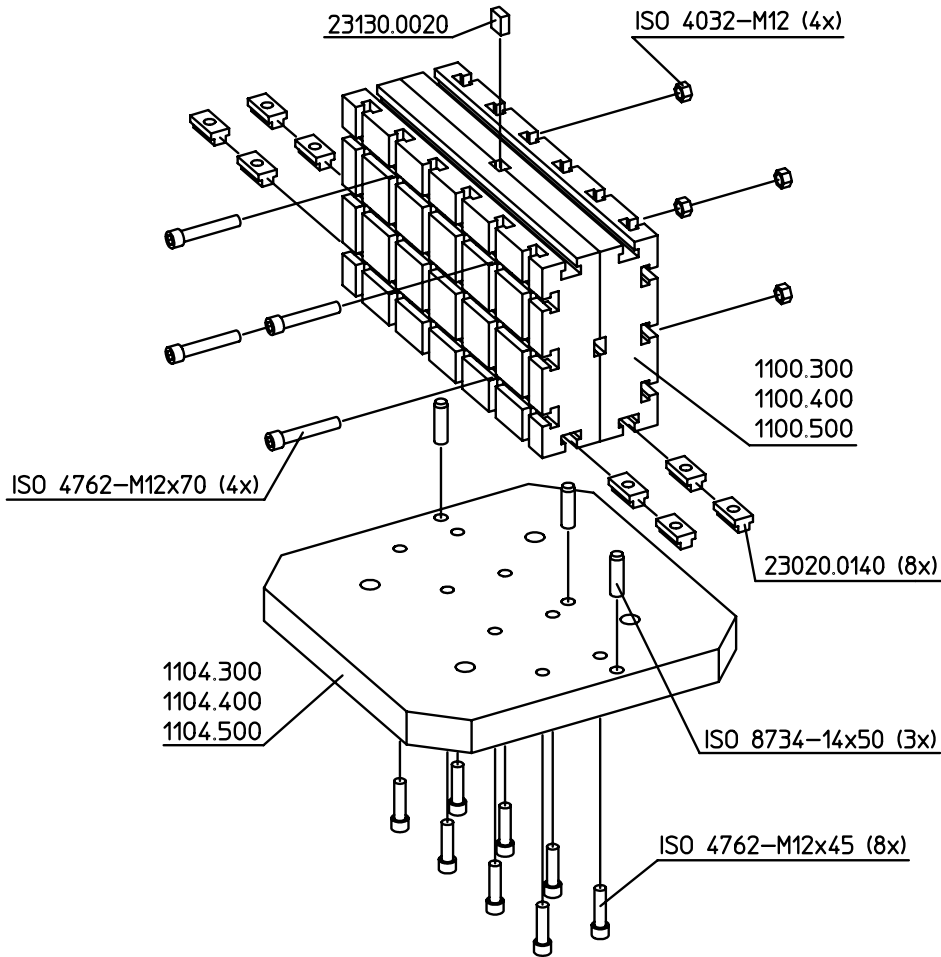


Slot spacing 70 ± 0,01.

ORDER INFORMATION

System	Dimensions				y [mm]	Number of T-slots	[kg]	Art. No.
	b ₁	b ₂	l ₁	l ₂				
V70	230	70	420	105	12	3 x 6	40	1100.300
	300	140	490	140	12	4 x 7	65	1100.400
	370	70	630	210	12	5 x 9	104	1100.500

APPLICATION EXAMPLE



6

Base Plates • suitable on pallets DIN 55 201
EH 1100.700 - EH 1103.500



PRODUCT DESCRIPTION

Material

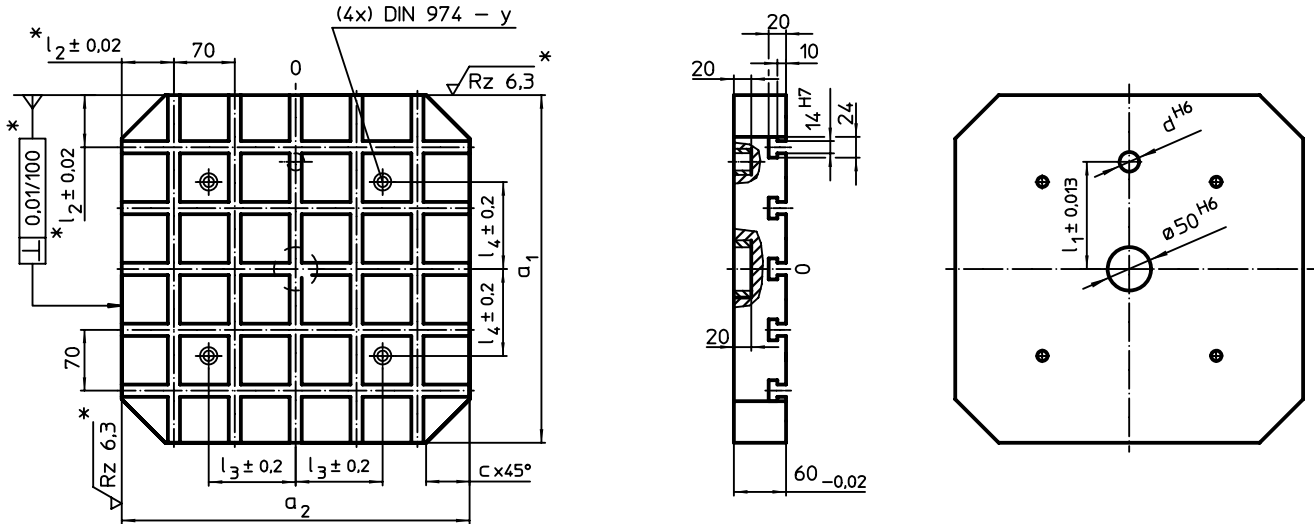
- Steel, hardened, ground

MORE INFORMATION

Notes

Special types on request.

DRAWING



* These tolerances are valid only for optional exterior stop type. Slot spacing $70 \pm 0,01$.

ORDER INFORMATION

System	Dimensions							For screws	y	Number of T-slots	[kg]	Art. No.
	$a_1 \times a_2$	c	d	l_1 $\pm 0,013$ [mm]	l_2	l_3	l_4					
V70	400 x 400	50	20	150	60	100	100	M12	12	5 x 5	56	1100.700
	500 x 500	60	20	200	40	200	200	M12	12	7 x 7	84	1100.800
	630 x 630	70	25	200	35	200	200	M16	16	9 x 9	155	1100.900
	400 x 500	50	20	150	60/40	200	100	M12	12	5 x 7	69	1103.300
	500 x 630	60	20	200	40/35	200	200	M12	12	7 x 9	121	1103.500

Connecting Elements

EH 1101.300 - EH 1101.500

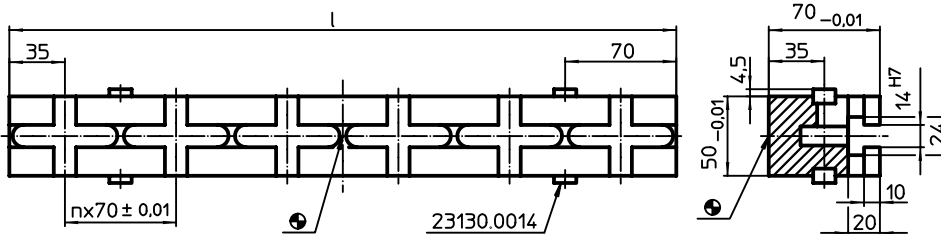


PRODUCT DESCRIPTION


Material

- Steel, hardened, ground

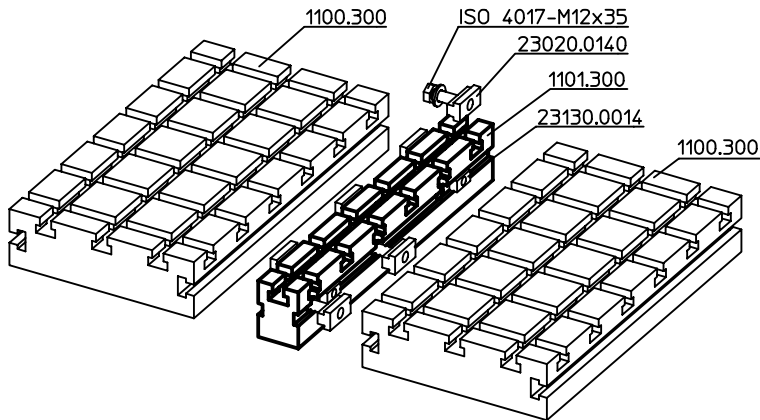
DRAWING



ORDER INFORMATION

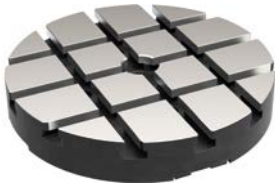
System	Dimensions l [mm]	Amount n	Number of T-slots	For base plates	 [kg]	Art. No.
V70	420	5	1 x 6	1100.300	8	1101.300
	490	6	1 x 7	1100.400	9	1101.400
	630	8	1 x 9	1100.500	12	1101.500

APPLICATION EXAMPLE



Base Plates

EH 1102.100 - EH 1102.200



PRODUCT DESCRIPTION

Material

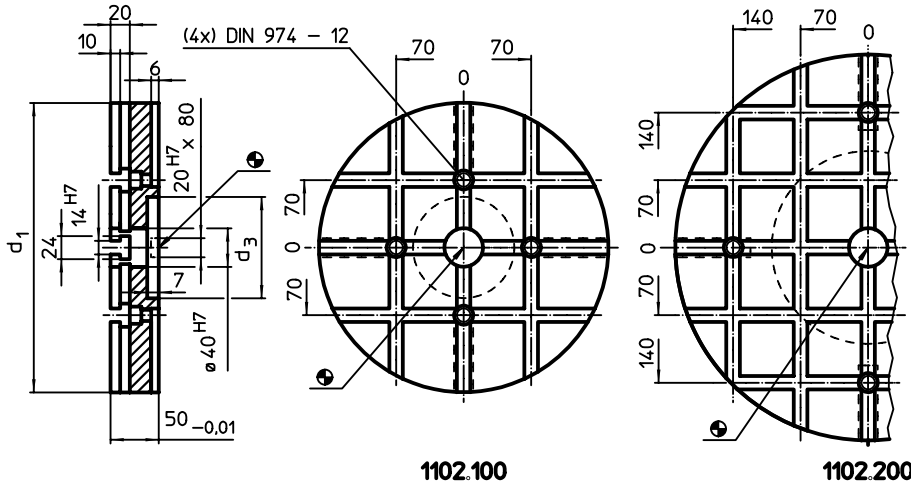
- Steel, hardened, ground

MORE INFORMATION

Notes

Special types on request.

DRAWING



Slot spacing 70 ± 0.01.

ORDER INFORMATION

System	Dimensions		Number of T-slots	[kg]	Art. No.
	d ₁	d ₃			
	[mm]				
V70	300	105	3 x 3	21	1102.100
	400	200	5 x 5	37	1102.200

Base Plates • V70eco

EH 1200.300 - EH 1200.500



PRODUCT DESCRIPTION

V70eco base plates are a further development of the established V70 product line, optimized in quality and price.

They are fully compatible with the existing V70 T-slot System.

- Locating holes in quality H6 and slots in quality H8.
- Alignment of the base plate on the machine table by means of locating holes and/or centering slot.
- Fastening holes on a 100 mm pitch.
- High-strength tool steel.

Available options (delivery time approx. 10 working days):

- Additional mounting holes on a 63 mm pitch
- Additional mounting holes on a 125 mm pitch
- Exterior stop
- With connecting rings for Halder Zero-Point Clamping System

Material

- Tool steel, high-strength

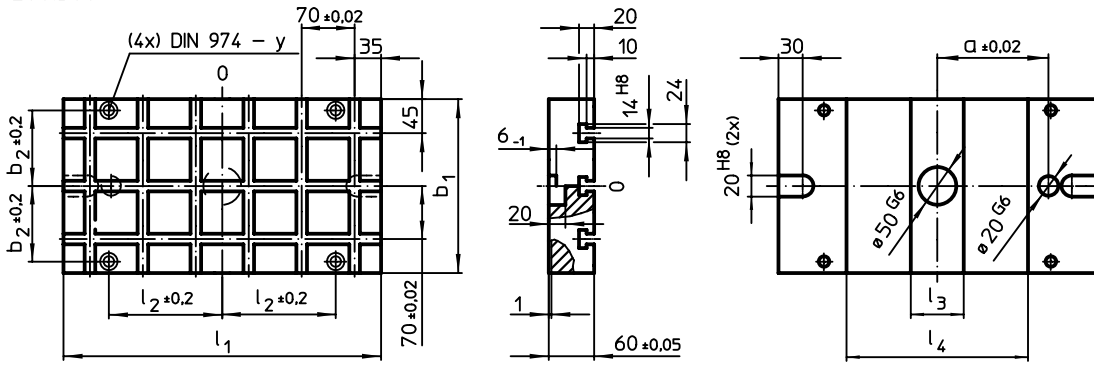
MORE INFORMATION

Notes

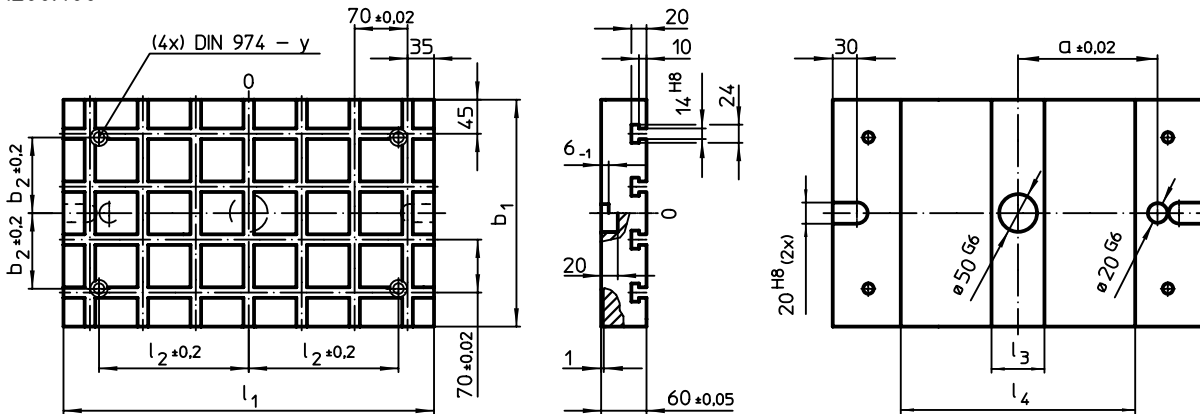
Special requests and larger dimensions are available on request.

DRAWING

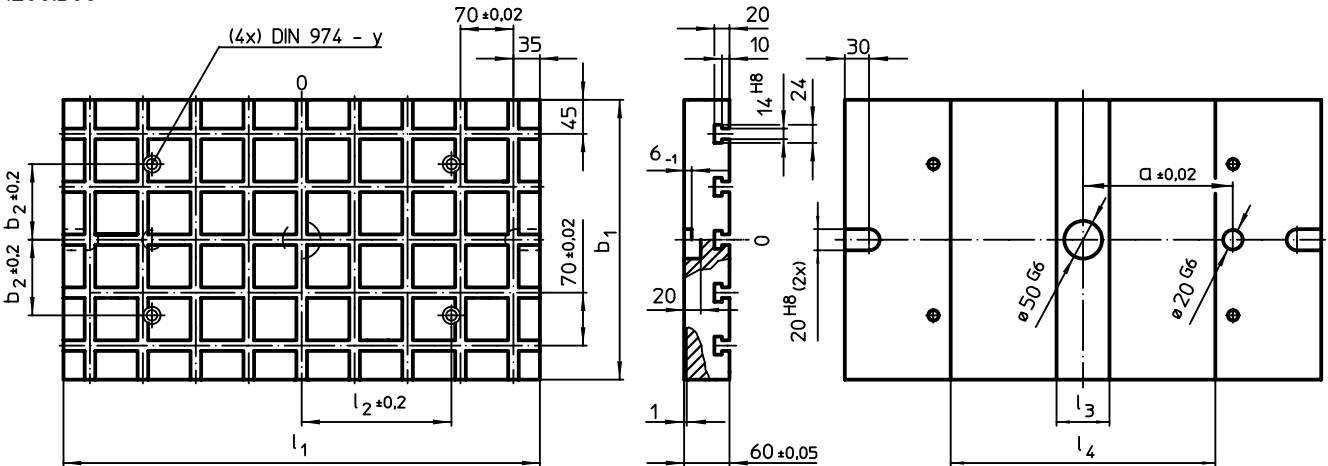
1200.300



1200.400



1200.500



ORDER INFORMATION

System	Dimensions								Number of connecting rings Zero-Point Clamping System (optional)	Number of T-slots	[kg]	Art. No.
	l_1	b_1	$a \pm 0.02$	$b_2 \pm 0.2$	$l_2 \pm 0.2$	l_3	l_4	y				
	[mm]											
V70	420	230	150	100	150	70	240	12	2	3 x 6	37	1200.300
	490	300	200	100	200	70	310	12	2	4 x 7	57	1200.400
	630	370	200	100	200	70	350	12	4	5 x 9	92	1200.500

Base Plates • V70eco, suitable for pallets DIN 55201
EH 1200.700 - EH 1203.500



PRODUCT DESCRIPTION

V70eco base plates are a further development of the established V70 product line, optimized in quality and price.

They are fully compatible with the existing V70 T-slot System.

- Locating holes in quality H6 and slots in quality H8.
- Alignment of the base plate on the machine table by means of locating holes and/or centering slot.
- Fastening holes on a 100 mm pitch.
- High-strength tool steel.

Available options (delivery time approx. 10 working days):

- a) Additional mounting holes on a 63 mm pitch
- b) Additional mounting holes on a 125 mm pitch
- c) Exterior stop
- d) With connecting rings for Halder Zero-Point Clamping System

Material

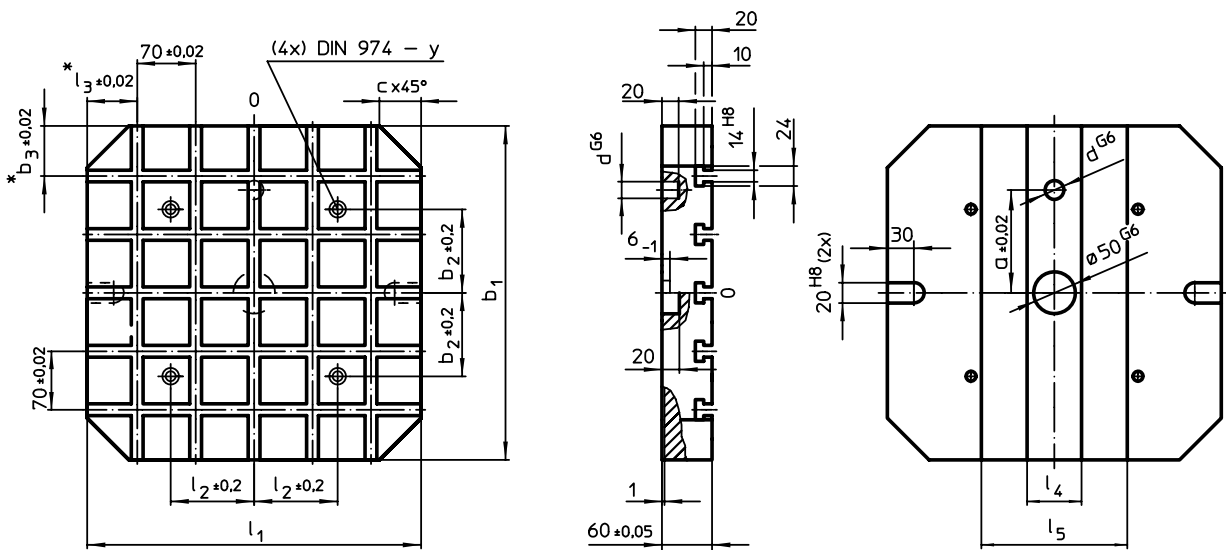
- Tool steel, high-strength

MORE INFORMATION

Notes

Special types on request.

DRAWING



* These tolerances are valid only for optional exterior stop type.

ORDER INFORMATION

System	Dimensions												Number of connecting rings Zero-Point Clamping System (optional)	Number of T-slots	[kg]	Art. No.
	l_1	b_1	a ± 0.02	b_2 ± 0.2	b_3 ± 0.02	c	d G6	l_2 ± 0.2	l_3 ± 0.02	l_4	l_5	y				
[mm]																
V70	400	400	150	100	60	50	20	100	–	65	175	12	4	5 x 5	61	1200.700
	500	500	200	200	40	60	20	200	–	70	310	12	4	7 x 7	95	1200.800
	630	630	200	200	35	70	25	200	–	70	340	16	4	9 x 9	150	1200.900
	500	400	150	100	60	50	20	200	40	70	310	12	4	5 x 7	77	1203.300
	630	500	200	200	40	60	20	200	35	70	340	12	4	7 x 9	120	1203.500

Supporting Plates • including accessories
EH 1104.300 - EH 1104.500

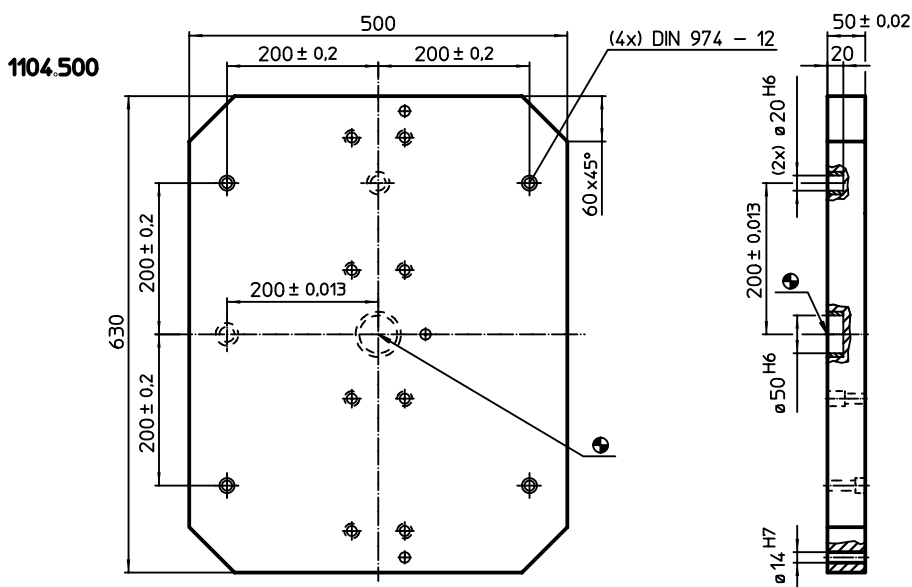
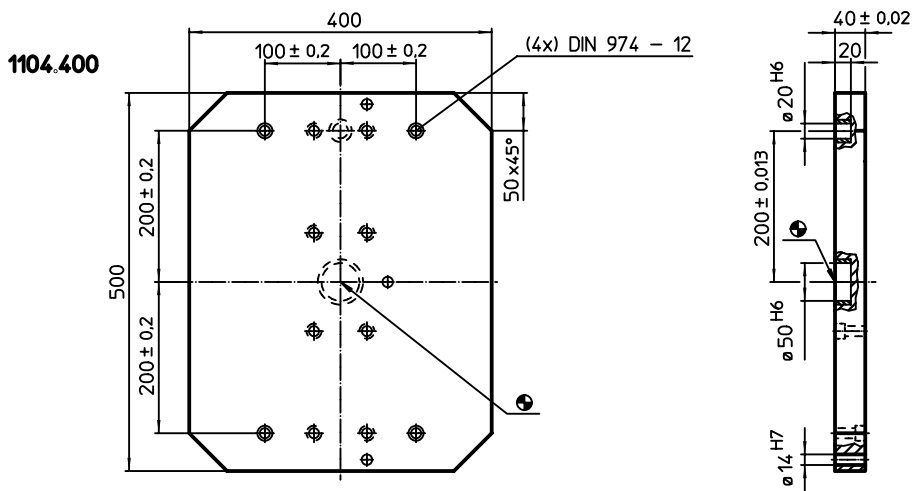
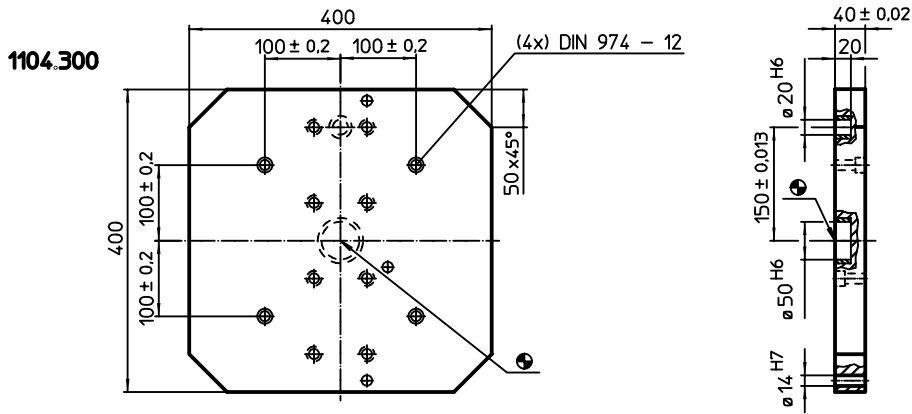


PRODUCT DESCRIPTION


Material

- Grey cast iron GG

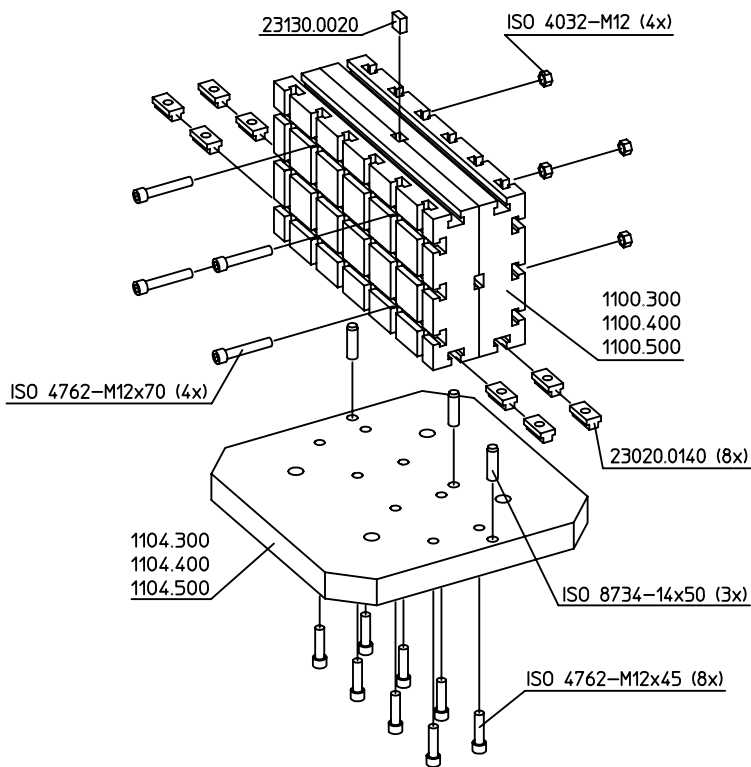
DRAWING



ORDER INFORMATION

System	 [kg]	Art. No.
V70	42	1104.300
	53	1104.400
	108	1104.500

APPLICATION EXAMPLE



Clamping Angles • modular design

EH 1104.700 - EH 1104.900

PRODUCT DESCRIPTION

The modular clamping angle is a unit consisting of a support plate and two base plates. Assembly or disassembly is possible within a very short time. The base plates used correspond to the respective standard version.

Material

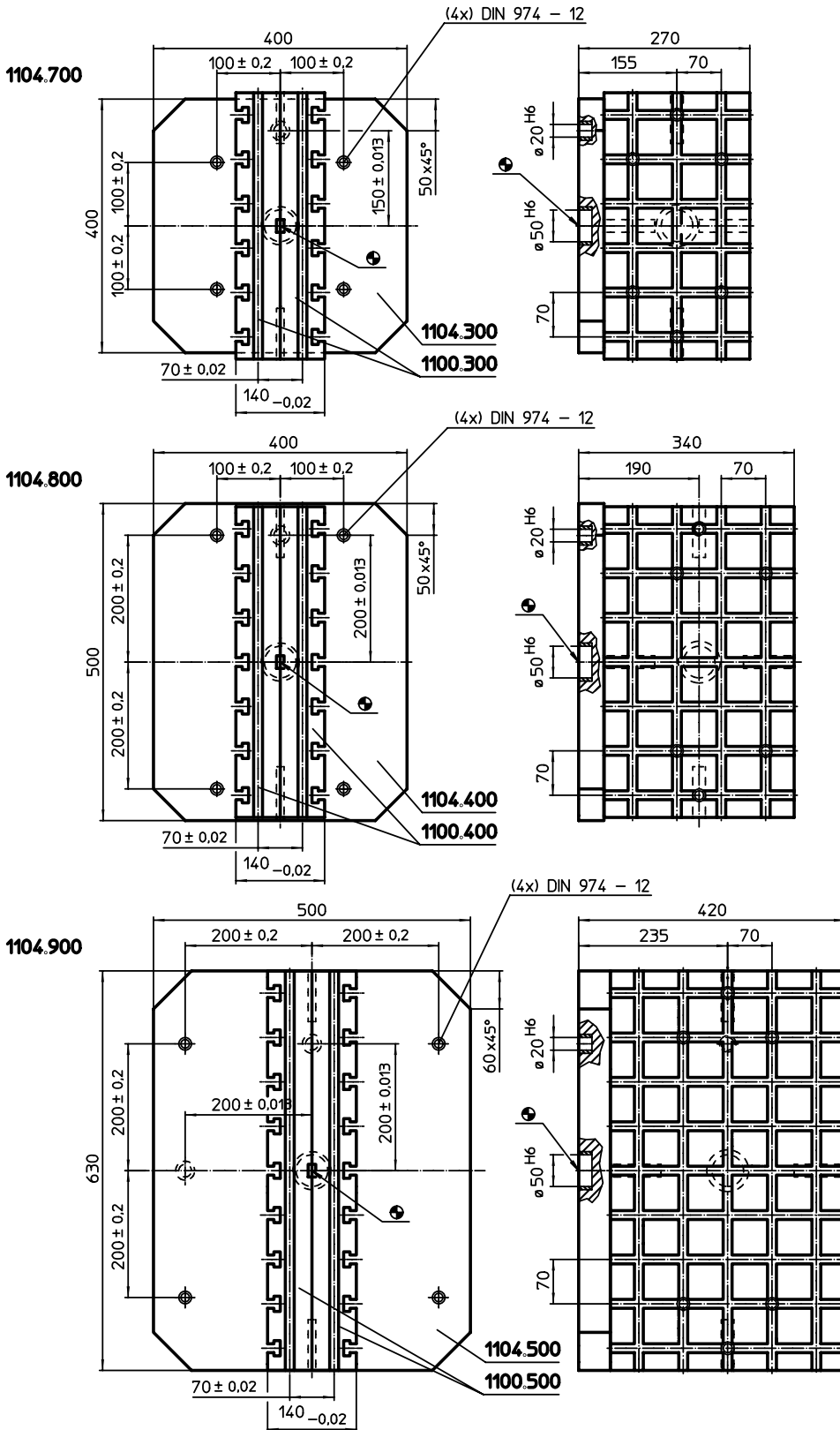
- Body**
- Grey cast iron GG

Base plate


- Steel, case-hardened, ground



DRAWING



ORDER INFORMATION

System	 [kg]	Art. No.
V70	123	1104.700
	174	1104.800
	299	1104.900

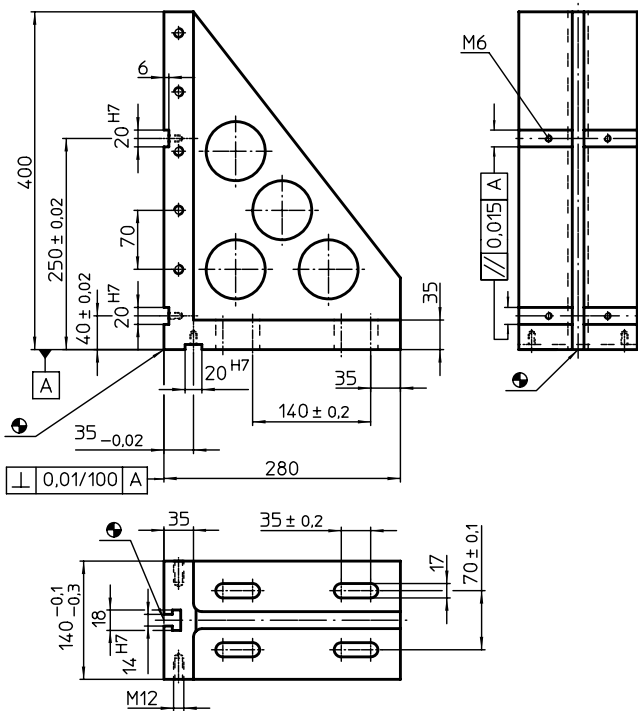


PRODUCT DESCRIPTION

Material

- Grey cast iron, phosphatized

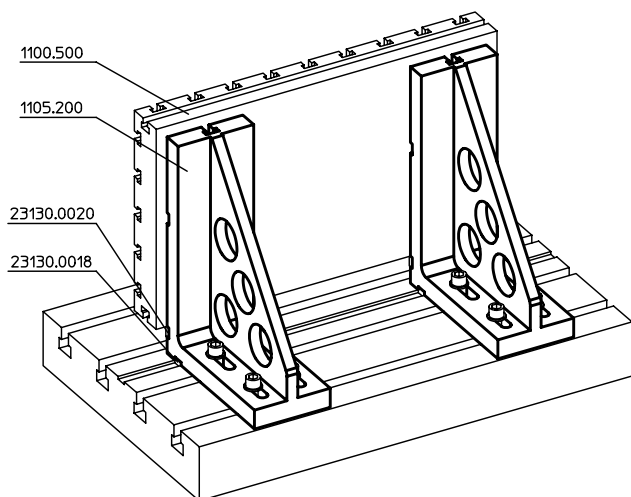
DRAWING



ORDER INFORMATION

System	 [kg]	Art. No.
V70	26	1105.200

APPLICATION EXAMPLE



Clamping Angles

EH 1076.400



PRODUCT DESCRIPTION

Material
 ■ Aluminium Al

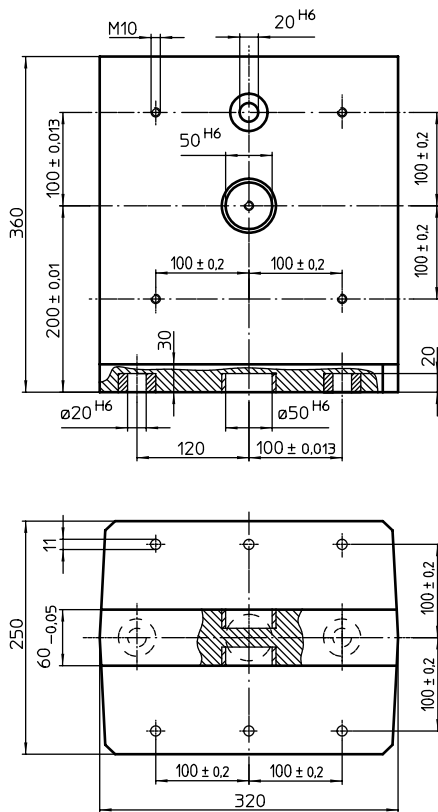
MORE INFORMATION

Notes
 Special types on request.


Further products

Threaded Lifting Pins, self-locking. . . . → p. 207

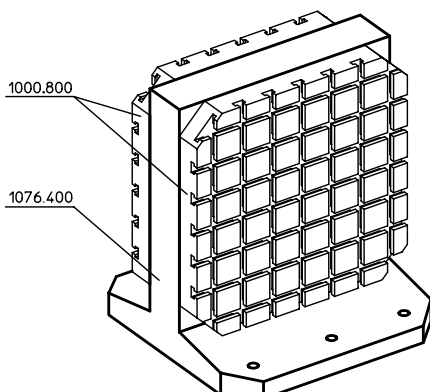
DRAWING



ORDER INFORMATION

System	 [kg]	Art. No.
V40	22	1076.400

APPLICATION EXAMPLE



Spacers

EH 1007.400 - EH 1108.300



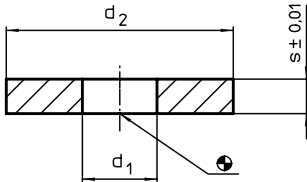
PRODUCT DESCRIPTION

This mounting element is a system part of the T-slot system.

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	d ₁	Dimensions		[g]	Art. No.
		d ₂ [mm]	s		
V40	8.5	24.0	3	9	1007.400
		39.5	3	30	1007.500
		24.0	4	12	1007.600
		39.5	4	37	1007.700
		24.0	5	15	1007.800
		39.5	5	46	1007.900
V70/L12	13.0	39.5	3	27	1107.400
		59.5	3	65	1107.500
		39.5	4	36	1107.600
		59.5	4	86	1107.700
		39.5	5	44	1107.800
		59.5	5	107	1107.900
		39.5	10	85	1108.000
		59.5	10	208	1108.100
		39.5	20	170	1108.200
59.5	20	417	1108.300		

Mounting Blocks

EH 1010.100 - EH 1110.100



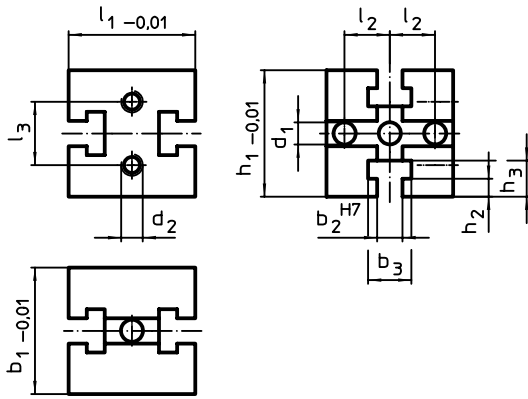
PRODUCT DESCRIPTION

This mounting element is a system part of the T-slot system.

Material

- Steel, hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions											Art. No.	
	b ₁	l ₁	b ₂	b ₃	l ₂	l ₃	h ₁	h ₂	h ₃	d ₁	d ₂		[g]
[mm]													
V40	40	40	10	17.2	13	–	40	6.5	12.5	8.25	–	281	1010.100
V70	70	70	14	24.0	25	35	70	10.0	20.0	12.25	M12	1677	1110.100

Mounting Blocks

EH 1010.200 - EH 1110.300



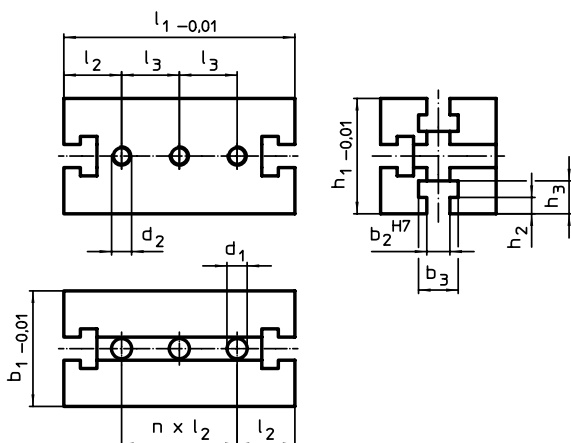
PRODUCT DESCRIPTION

This mounting element is a system part of the T-slot system.

Material

- Steel, hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions											Amount n	Art. No.	
	b ₁	l ₁	b ₂	b ₃	l ₂	l ₃	h ₁	h ₂	h ₃	d ₁	d ₂			[g]
[mm]														
V40	40	80	10	17.2	20	–	40	6.5	12.5	8.25	–	2	587	1010.200
		120	10	17.2	20	–	40	6.5	12.5	8.25	–	4	1149	1010.300
V70	70	140	14	24.0	35	35	70	10.0	20.0	12.25	M12	2	3800	1110.200
		210	14	24.0	35	70	70	10.0	20.0	12.25	M12	4	5820	1110.300

Mounting Blocks
EH 1011.100 - EH 1111.100



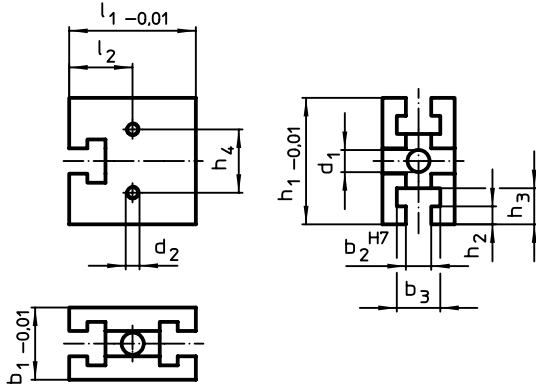
PRODUCT DESCRIPTION

This mounting element is a system part of the T-slot system.

Material

- Steel, hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions											Amount n	[g]	Art. No.
	b ₁	l ₁	b ₂	b ₃	l ₂	h ₁	h ₂	h ₃	h ₄	d ₁	d ₂			
V40	25	40	10	17.2	20	40	6.5	12.5	-	8.25	-	1	149	1011.100
V70	40	70	14	24.0	35	70	10.0	20.0	35	12.25	M12	1	1050	1111.100

Mounting Blocks
EH 1011.200 - EH 1111.300



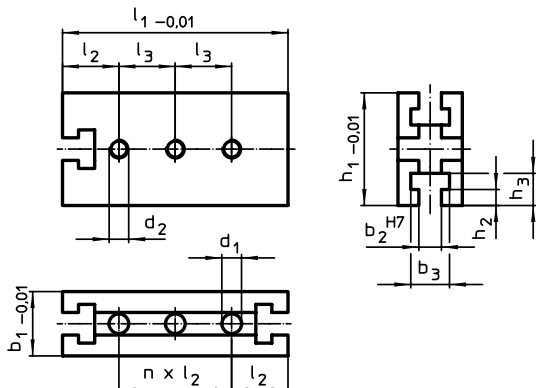
PRODUCT DESCRIPTION

This mounting element is a system part of the T-slot system.

Material

- Steel, hardened, ground

DRAWING



ORDER INFORMATION

System	b ₁	l ₁	b ₂	b ₃	Dimensions							Amount n	[g]	Art. No.
					l ₂	l ₃	h ₁	h ₂	h ₃	d ₁	d ₂			
V40	25	40	10	17.2	20	–	80	6.5	12.5	8.25	–	3	339	1011.200
							120	6.5	12.5	8.25	–	5	527	1011.300
V70	40	70	14	24.0	35	35	140	10.0	20.0	12.25	M12	3	2060	1111.200
						70	210	10.0	20.0	12.25	M12	5	3246	1111.300

Mounting Blocks • V70eco

EH 1210.100



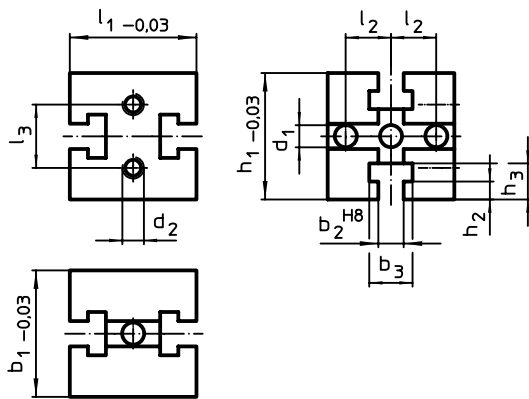
PRODUCT DESCRIPTION

V70eco mounting blocks are a further development of the established V70 product line, optimized in quality and price. They are fully compatible with the existing V70 T-slot System.

Material

- Tool steel, high-strength

DRAWING



ORDER INFORMATION

System	b ₁	l ₁	b ₂	b ₃	Dimensions							[g]	Art. No.
					h ₁	h ₂	h ₃	l ₂	l ₃	d ₁	d ₂		
V70	70	70	14	24	70	10	20	25	35	12.25	M12	1837	1210.100

6

Mounting Blocks • V70eco
EH 1210.200 - EH 1210.300



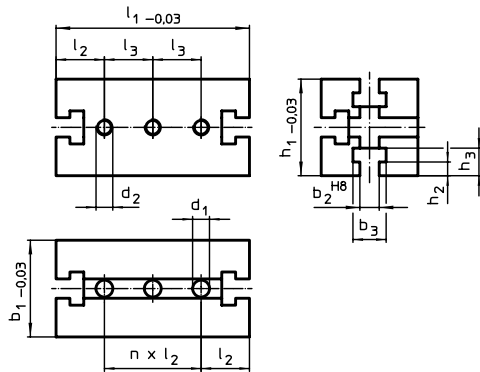
PRODUCT DESCRIPTION

V70eco mounting blocks are a further development of the established V70 product line, optimized in quality and price. They are fully compatible with the existing V70 T-slot System.

Material

- Tool steel, high-strength

DRAWING



ORDER INFORMATION

System	Dimensions												Art. No.	
	b ₁	l ₁	b ₂	b ₃	h ₁	h ₂	h ₃	l ₂	l ₃	n	d ₁	d ₂		[kg]
[mm]														
V70	70	140	14	24	70	10	20	35	35	2	12.25	M12	3	1210.200
		210	14	24	70	10	20	35	70	4	12.25	M12	6	1210.300

Mounting Blocks • V70eco
EH 1211.100



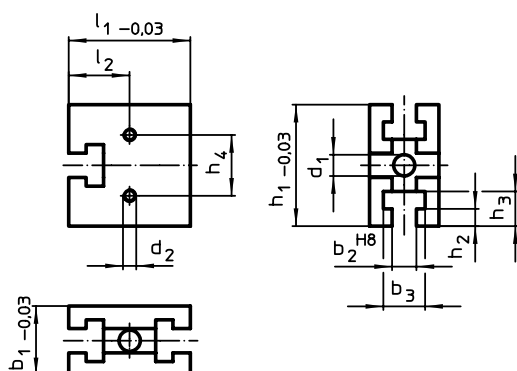
PRODUCT DESCRIPTION

V70eco mounting blocks are a further development of the established V70 product line, optimized in quality and price. They are fully compatible with the existing V70 T-slot System.

Material

- Tool steel, high-strength

DRAWING



ORDER INFORMATION

System	Dimensions											[g]	Art. No.
	b ₁	l ₁	b ₂	b ₃	l ₂	h ₁	h ₂	h ₃	h ₄	d ₁	d ₂		
V70	40	70	14	24	35	70	10	20	35	12.25	M8	1013	1211.100

Mounting Blocks • V70eco

EH 1211.200 - EH 1211.300

PRODUCT DESCRIPTION

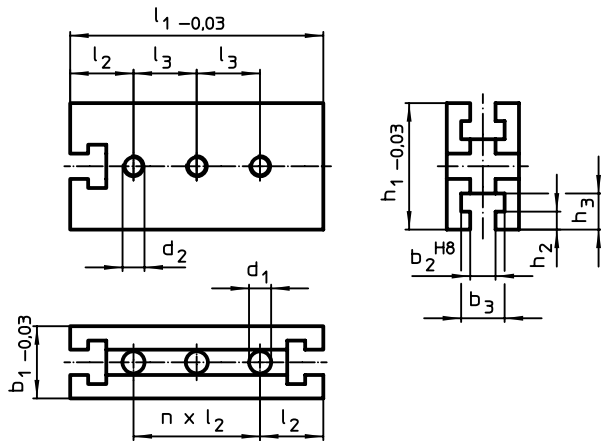
V70eco mounting blocks are a further development of the established V70 product line, optimized in quality and price. They are fully compatible with the existing V70 T-slot System.

Material

- Tool steel, high-strength



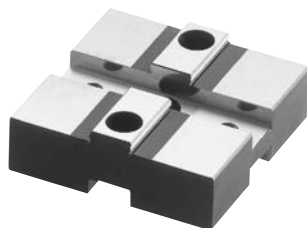
DRAWING



ORDER INFORMATION

System	Dimensions											[g]	Art. No.	
	b ₁	l ₁	b ₂	b ₃	h ₁	h ₂	h ₃	l ₂	l ₃	n	d ₁			d ₂
V70	40	140	14	24	70	10	20	35	35	2	12.25	M12	1901	1211.200
		210	14	24	70	10	20	35	70	4	12.25	M12	3039	1211.300

6

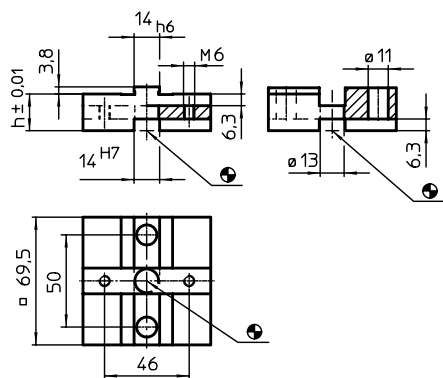


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING



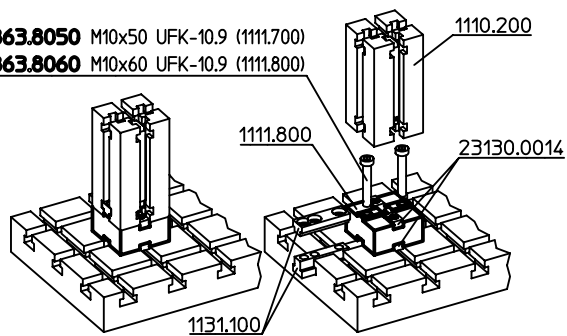
ORDER INFORMATION

System	Dimensions		Art. No.
	h [mm]		
V70	20	598	1111.700
	30	947	1111.800

APPLICATION EXAMPLE

1863.8050 M10x50 UFK-10.9 (1111.700)

1863.8060 M10x60 UFK-10.9 (1111.800)



Slotted Clamping Angles

EH 1012.100 - EH 1112.400

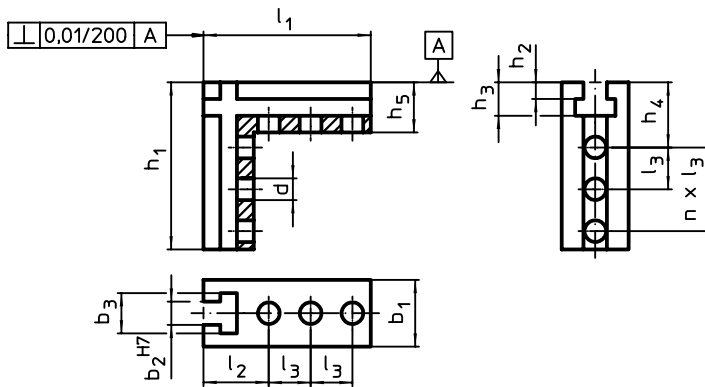


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

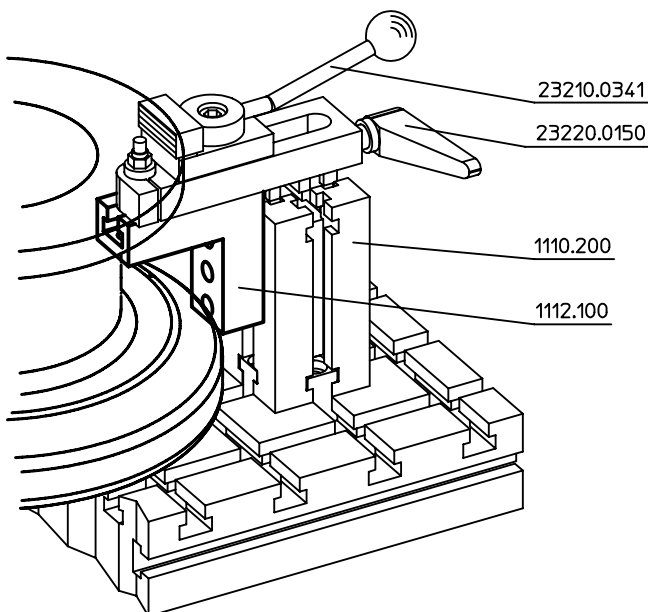
DRAWING



ORDER INFORMATION

System	Dimensions												Amount n	Art. No.	
	b ₁	h ₁	l ₁	l ₂	l ₃	b ₂	b ₃	h ₂	h ₃	h ₄	h ₅	d			[g]
V40	25	63	63	29	26	10	18	6.5	14.5	29	22	8.25	1	248	1012.100
		105	63	29	26	10	18	6.5	14.5	45	22	8.25	2	356	1012.200
	40	63	63	29	26	10	18	6.5	14.5	29	22	8.25	1	520	1012.300
		105	63	29	26	10	18	6.5	14.5	45	22	8.25	2	738	1012.400
V70	40	100	100	39	25	14	24	10.0	20.0	39	30	13.00	2	1000	1112.100
		180	100	39	25	14	24	10.0	20.0	39	30	13.00	5	1468	1112.200
	70	100	100	39	25	14	24	10.0	20.0	39	30	13.00	2	2150	1112.300
		180	100	39	25	14	24	10.0	20.0	39	30	13.00	5	3253	1112.400

APPLICATION EXAMPLE



Intermediate Elements

EH 1112.600 - EH 1112.800

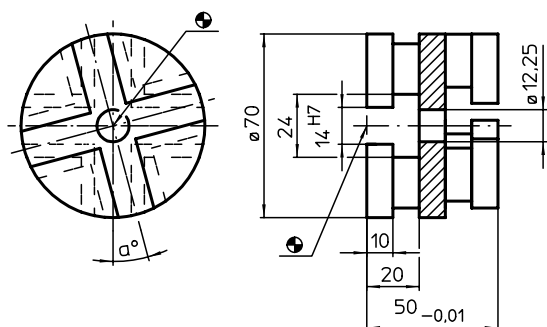


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	α	 [g]	Art. No.
V70	15°	800	1112.600
	30°	804	1112.700
	45°	789	1112.800

6

Clamping Bars

EH 1013.600 - EH 1113.800

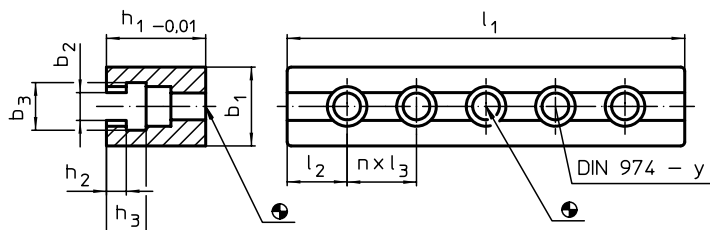


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

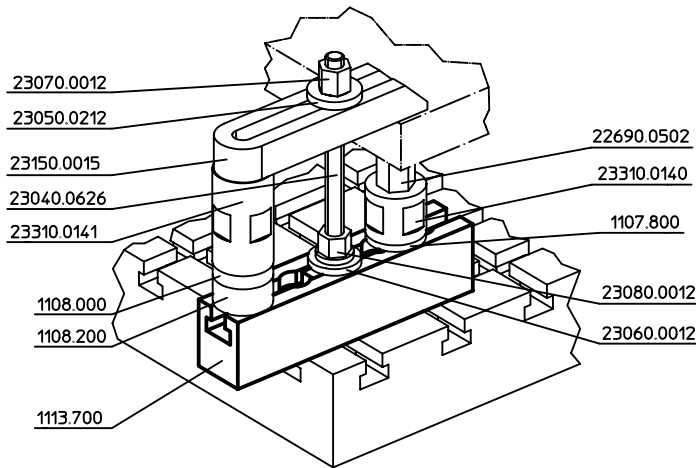
DRAWING



ORDER INFORMATION

System	Dimensions									Amount n	For screws [mm]	y [mm]	[g]	Art. No.
	l ₁	b ₁	b ₂	b ₃	h ₁	h ₂	h ₃	l ₂	l ₃					
V40	80	24	10.3	18	30	6.5	14.5	20.0	40	1	M 8	8	288	1013.600
	120	24	10.3	18	30	6.5	14.5	20.0	40	2	M 8	8	443	1013.700
	160	24	10.3	18	30	6.5	14.5	20.0	40	3	M 8	8	577	1013.800
V70	140	40	14.3	24	50	10.0	20.0	35.0	35	2	M12	12	1604	1113.600
	200	40	14.3	24	50	10.0	20.0	30.0	35	4	M12	12	2230	1113.700
	300	40	14.3	24	50	10.0	20.0	27.5	35	7	M12	12	3320	1113.800

APPLICATION EXAMPLE



Support Clamping Bars

EH 1114.000 - EH 1114.100

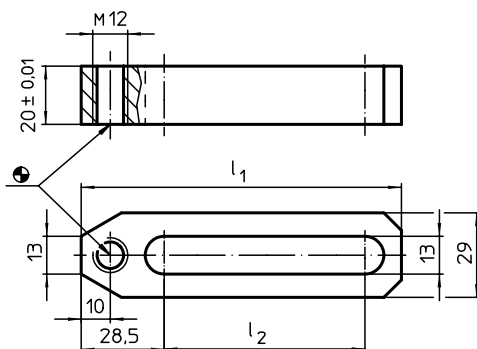
PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground



DRAWING



ORDER INFORMATION

System	Dimensions		[g]	Art. No.
	l ₁	l ₂		
V70/L12	110	69	301	1114.000
	150	109	422	1114.100

Stops

EH 1014.500 - EH 1114.500

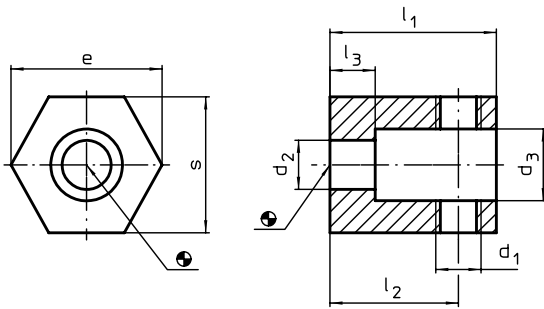


PRODUCT DESCRIPTION

Material

- Steel, blackened

DRAWING



ORDER INFORMATION

System	Dimensions								Art. No.	
	d ₁	d ₂	d ₃	l ₁	l ₂	l ₃	s	e		
V40	M 8	8.4	14	26	20	8	22	25.4	56	1014.500
V70/L12	M12	13.0	19	44	34	12	36	40.0	283	1114.500

6

Stops • cylindrical

EH 1115.100

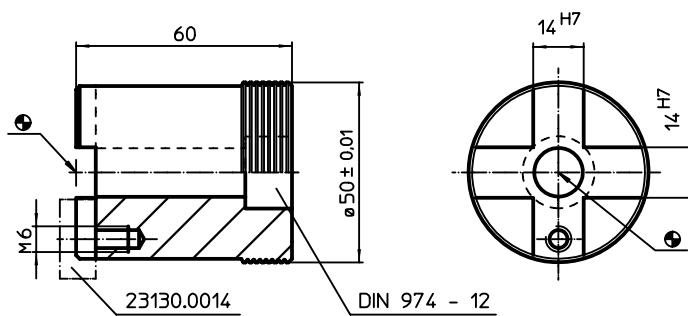


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
V70	758	1115.100

Stops

EH 1116.000 - EH 1116.100

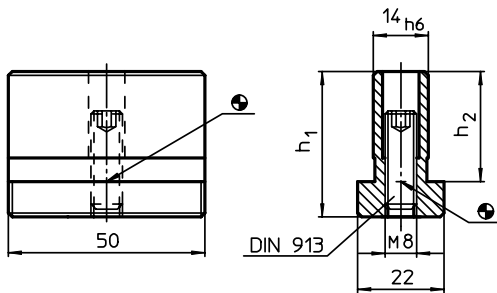


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions		 [g]	Art. No.
	h_1	h_2		
V70	37	28	214	1116.000
	57	48	314	1116.100

6

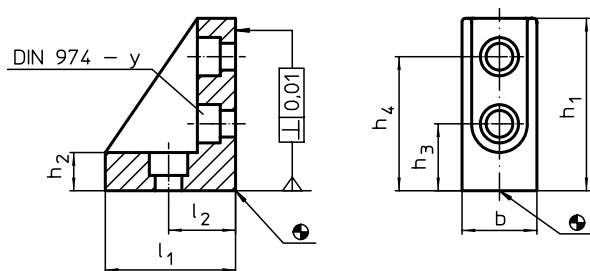


PRODUCT DESCRIPTION


Material

- Grey cast iron, phosphatized, ground

DRAWING



ORDER INFORMATION

System	Dimensions							For screws [mm]	y [mm]	 [g]	Art. No.
	b	l ₁	l ₂	h ₁ [mm]	h ₂	h ₃	h ₄				
V40	24.5	42	20	52	10.5	20	40	M 8	8	167	1020.300
	38.0	42	20	52	10.5	20	40	M 8	8	303	1021.500
V70	37.0	67	35	90	20.0	35	70	M12	12	770	1120.300
	66.0	67	35	90	20.0	35	70	M12	12	1501	1121.500

Thrust Angles

EH 1021.600 - EH 1021.700

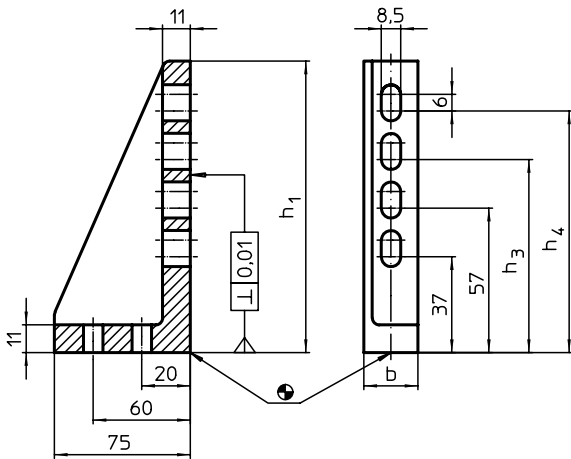


PRODUCT DESCRIPTION


Material

- Grey cast iron, phosphatized, ground

DRAWING



ORDER INFORMATION

System	b	Dimensions			Position of web	 [g]	Art. No.
		h ₁	h ₃	h ₄			
V40	39	75	–	–	left	473	1021.600
		115	77	97	left	593	1021.700

6

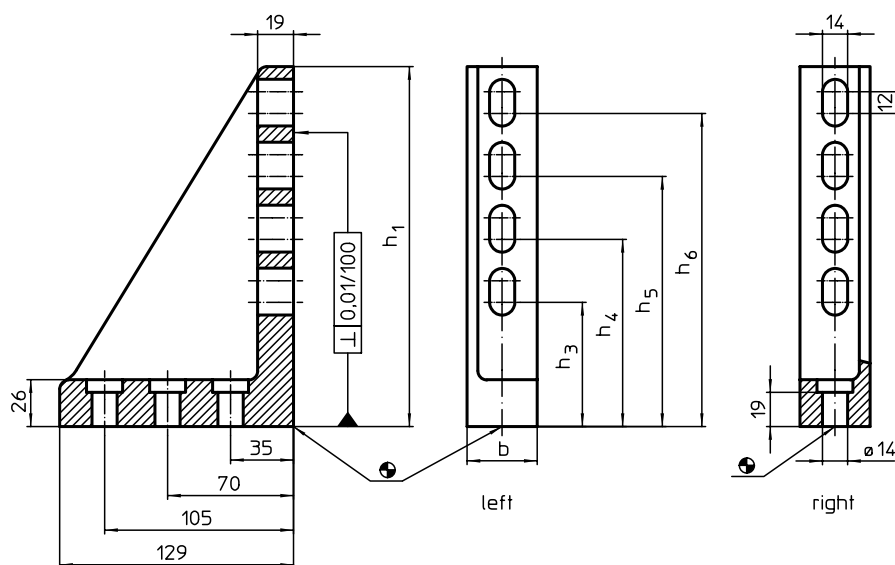


PRODUCT DESCRIPTION

Material

- Grey cast iron, phosphatized, ground

DRAWING



ORDER INFORMATION

System	Dimensions						Position of web	[g]	Art. No.
	b	h ₁	h ₃	h ₄	h ₅	h ₆			
V70	37	140	69	104	-	-	left	1546	1120.400
		200	69	104	139	174	left	1820	1120.500
		140	69	104	-	-	right	1450	1121.000
		200	69	104	139	174	right	1840	1121.100
	66	140	69	104	-	-	left	2970	1121.600
		200	69	104	139	174	left	3753	1121.700
		140	69	104	-	-	right	2970	1122.200
		200	69	104	139	174	right	3466	1122.300

T-Slot Centering Blocks

EH 1029.600 - EH 1129.600

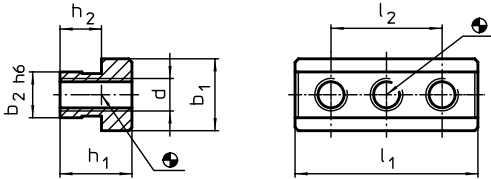


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions							[g]	Art. No.
	h_1	h_2	b_1	b_2 [mm]	d	l_1	l_2		
V40	13.5	8.5	15	10	M 6	38	26	41	1029.600
V70	22.0	12.7	22	14	M10	56	34	144	1129.600

Nuts for T-Slots

EH 1030.000 - EH 1030.300

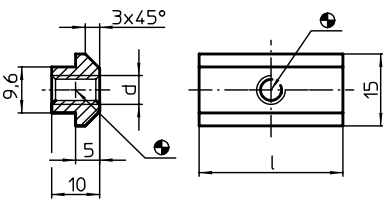


PRODUCT DESCRIPTION

Material

- Heat-treated steel, tempered, quality 10, black

DRAWING



ORDER INFORMATION

System	Dimensions		[g]	Art. No.
	l	d		
		[mm]		
V40	15	M6	12.0	1030.000
		M8	9.7	1030.100
	30	M6	24.0	1030.200
		M8	23.0	1030.300

T-Blocks

EH 1130.400 - EH 1130.600

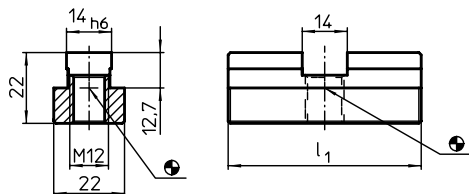


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

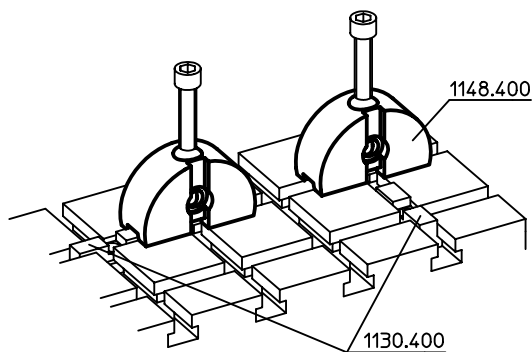
DRAWING



ORDER INFORMATION

System	Dimensions		Art. No.
	l_1 [mm]		
V70	60	154	1130.400
	30	66	1130.600

APPLICATION EXAMPLE



T-Clamping Blocks

EH 1031.100 - EH 1131.200



PRODUCT DESCRIPTION

Material

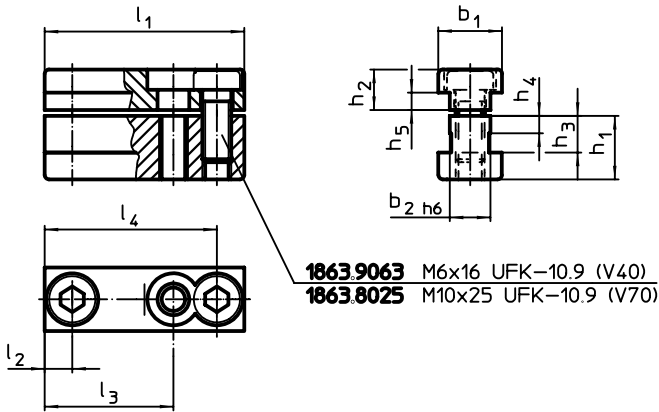
- Steel, case-hardened, ground

MORE INFORMATION

Further products

Wrenches → p. 781

DRAWING



ORDER INFORMATION

System	Dimensions											Art. No.	
	l_1	l_2	l_3	l_4	b_1	b_2	h_1	h_2	h_3	h_4	h_5		[g]
V40	39.6	6.6	-	32.6	15	10	13.5	7.5	8.5	4	3.5	69	1031.100
	13.0	6.5	-	-	15	10	13.5	7.5	8.5	4	3.5	25	1031.200
	24.0	12.0	-	-	15	10	13.5	7.5	8.5	4	3.5	43	1031.300
V70	69.0	9.5	44.5	59.5	22	14	22.0	14.0	12.7	6	6.0	292	1131.100
	22.0	11.0	-	-	22	14	22.0	14.0	12.7	6	6.0	96	1131.200

T-Clamping Blocks
EH 1131.500 - EH 1131.700

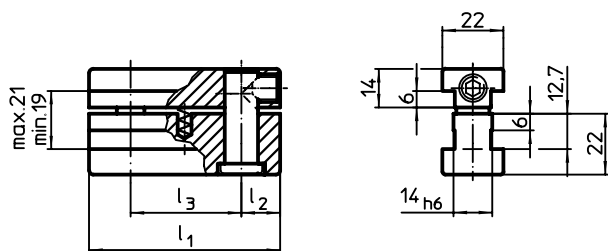


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions			[g]	Art. No.
	l_1	l_2 [mm]	l_3		
V70	23.5	13.5	-	106	1131.500
	40.0	14.0	12	183	1131.600
	69.0	14.5	40	326	1131.700



Wrenches

EH 1032.100 - EH 1132.100

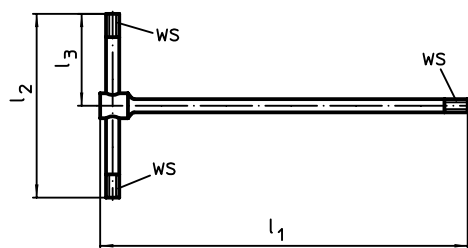


PRODUCT DESCRIPTION

Material

- Steel, case-hardened

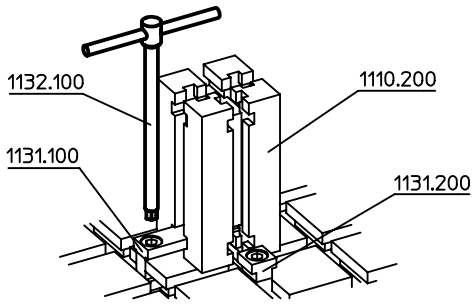
DRAWING



ORDER INFORMATION

System	Dimensions			WS [mm]	Suitable for [mm]	[g]	Art. No.
	l_1	l_2 [mm]	l_3				
V40	210	105	52.5	5	M 6	99	1032.100
V70	250	125	62.5	8	M10	197	1132.100

APPLICATION EXAMPLE



Butt Straps

EH 1132.500 - EH 1132.800

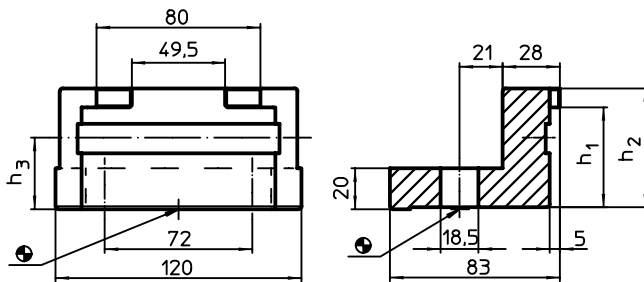


PRODUCT DESCRIPTION

Material

- Heat-treated steel, tempered, blackened

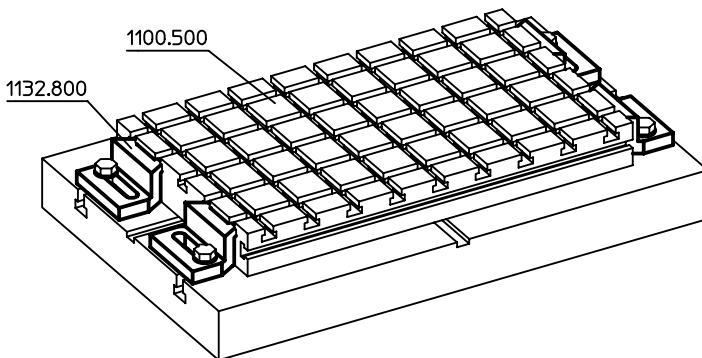
DRAWING



ORDER INFORMATION

System	Dimensions			Art. No.
	h_1	h_2 [mm]	h_3	
V70	39.7	49	-	1566
	49.7	59	35	1708

APPLICATION EXAMPLE



6

Clamping Heads

EH 1132.900

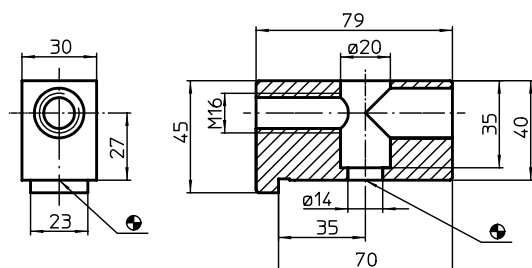


PRODUCT DESCRIPTION


Material

- Steel, blackened

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
V70	544	1132.900

6

Clamping Bars

EH 1133.000 - EH 1133.200

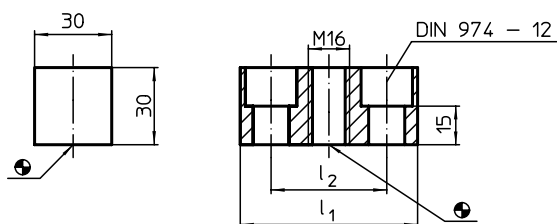


PRODUCT DESCRIPTION


Material

- Steel, blackened

DRAWING



ORDER INFORMATION

System	Dimensions		 [g]	Art. No.
	l_1	l_2		
V70	69	45	335	1133.000
	94	70	507	1133.200

Clamping Vices • moveable jaw

EH 1137.300



PRODUCT DESCRIPTION

Max. torque 140 Nm, clamping power F = 30 kN

Material

- Steel, case-hardened, ground

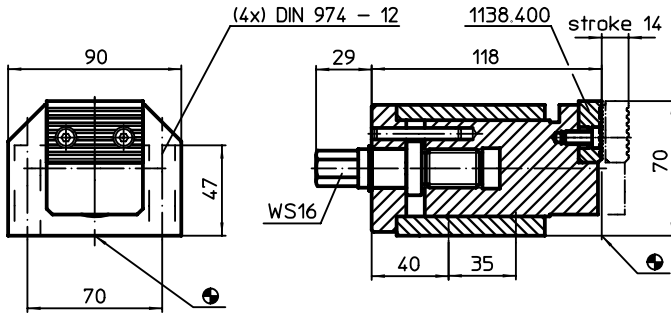
MORE INFORMATION

Further products

Clamping Vices → p. 463

- Clamping Vices, fixed jaw → p. 784
- Clamping Vices, replacement jaw, soft → p. 785
- Clamping Vices, replacement jaw, ribbed/flat..... → p. 785

DRAWING



ORDER INFORMATION

System	[kg]	Art. No.
V70	4	1137.300

Clamping Vices • fixed jaw

EH 1137.400



PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

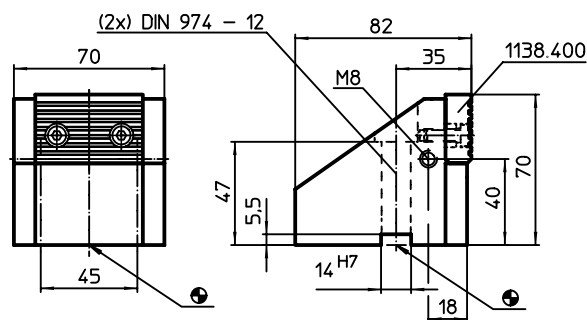
MORE INFORMATION

Further products

Clamping Vices → p. 463

- Clamping Vices, moveable jaw → p. 784
- Clamping Vices, replacement jaw, soft → p. 785
- Clamping Vices, replacement jaw, ribbed/flat..... → p. 785

DRAWING



ORDER INFORMATION

System	[kg]	Art. No.
V70	2	1137.400

Clamping Vices • replacement jaw, soft
EH 1138.100



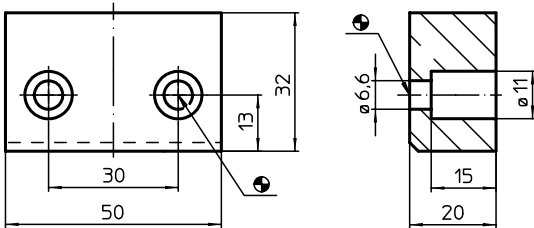
PRODUCT DESCRIPTION

- Material**
- Aluminium Al


MORE INFORMATION

Further products
Clamping Vices → p. 463

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
V70	77	1138.100

Clamping Vices • replacement jaw, ribbed/flat
EH 1138.400



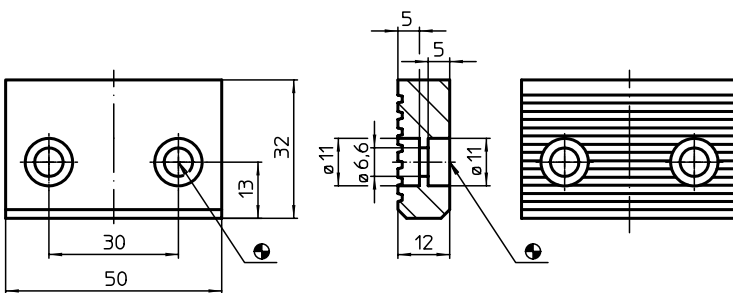
PRODUCT DESCRIPTION

- Material**
- Steel, case-hardened, blackened


MORE INFORMATION

Further products
Clamping Vices → p. 463

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
V70	132	1138.400

Wrenches

EH 1139.400 - EH 1139.500

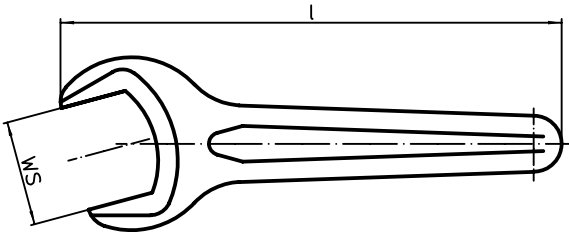


PRODUCT DESCRIPTION

Material

- Heat-treated steel, heat treated

DRAWING



ORDER INFORMATION

System	WS	Dimensions	[g]	Art. No.
	[mm]	I [mm]		
V70	36	300	429	1139.400
	46	300	688	1139.450
	55	300	960	1139.500

Locating Pins

EH 1040.300 - EH 1040.700

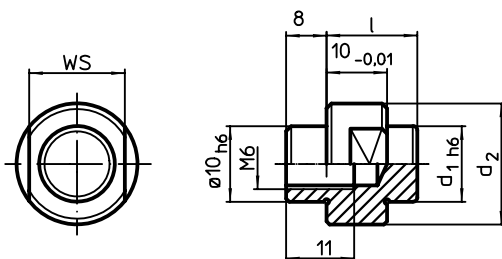


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions			WS	[g]	Art. No.
	d ₁	d ₂ [mm]	I			
V40	6	15	14	13	18	1040.300
	10	19	14	13	25	1040.500
	13	19	15	17	30	1040.700

Locating Pins
EH 1140.300 - EH 1141.500

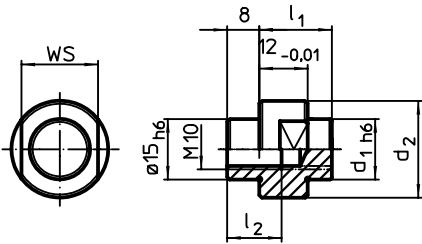


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

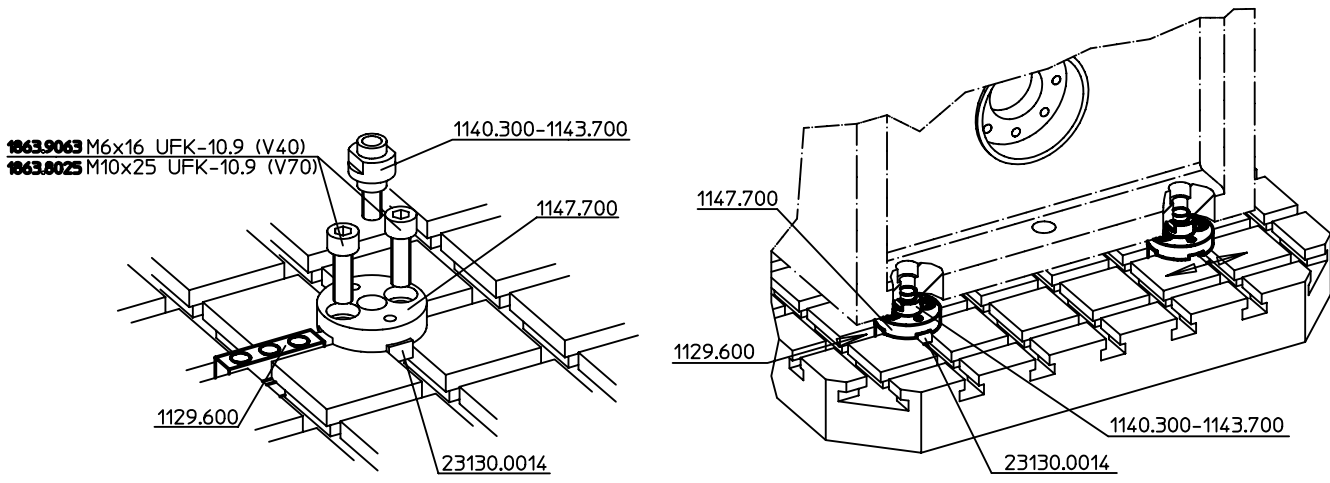
DRAWING



ORDER INFORMATION

System	Dimensions				WS	[g]	Art. No.
	d ₁	d ₂	l ₁	l ₂			
V70	4	19	16	13.5	15	28	1140.300
	5	19	16	13.5	15	29	1140.400
	6	19	16	13.5	15	30	1140.500
	8	19	17	13.5	15	28	1140.600
	10	19	17	13.5	15	31	1140.700
	12	19	18	13.5	15	33	1140.800
	14	24	18	13.5	19	51	1140.900
	15	24	18	[throughgoing thread]	19	49	1141.000
	16	24	18	[throughgoing thread]	19	48	1141.100
	18	29	19	[throughgoing thread]	22	70	1141.200
	20	29	19	[throughgoing thread]	22	72	1141.300
	22	34	20	[throughgoing thread]	27	101	1141.400
24	34	20	[throughgoing thread]	27	105	1141.500	

APPLICATION EXAMPLE



Locating Pins

EH 1141.600 - EH 1143.700

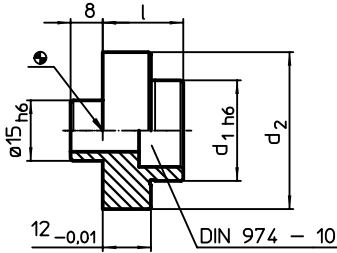


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions			Art. No.	
	d ₁	d ₂ [mm]	l		
V70	25	39	20	126	1141.600
	26	39	20	121	1141.700
	28	39	20	128	1141.800
	30	49	22	216	1141.900
	32	49	22	216	1142.000
	34	49	22	222	1142.100
	35	49	22	226	1142.200
	36	49	22	230	1142.300
	38	49	22	230	1142.400
	40	59	24	361	1142.500
	42	59	24	358	1142.600
	44	59	24	372	1142.700
	45	59	24	378	1142.800
	46	59	24	384	1142.900
	48	59	24	399	1143.000
	50	69	26	537	1143.100
	52	69	26	551	1143.200
	54	69	26	570	1143.300
	55	69	26	593	1143.400
	56	69	26	589	1143.500
58	69	26	610	1143.600	
60	69	26	630	1143.700	

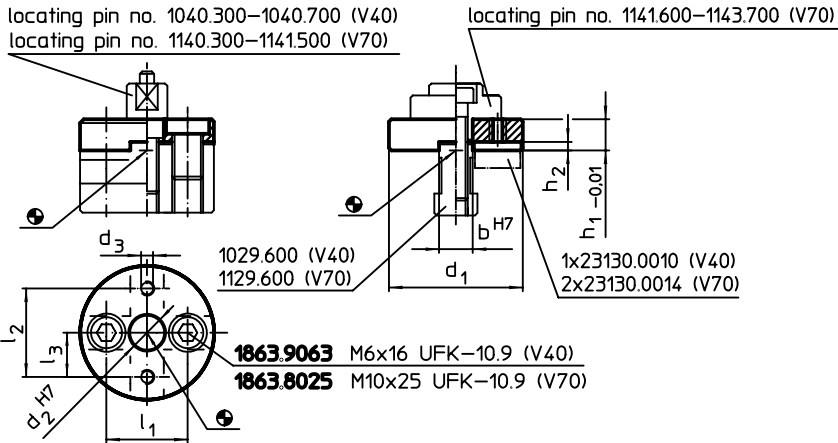


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

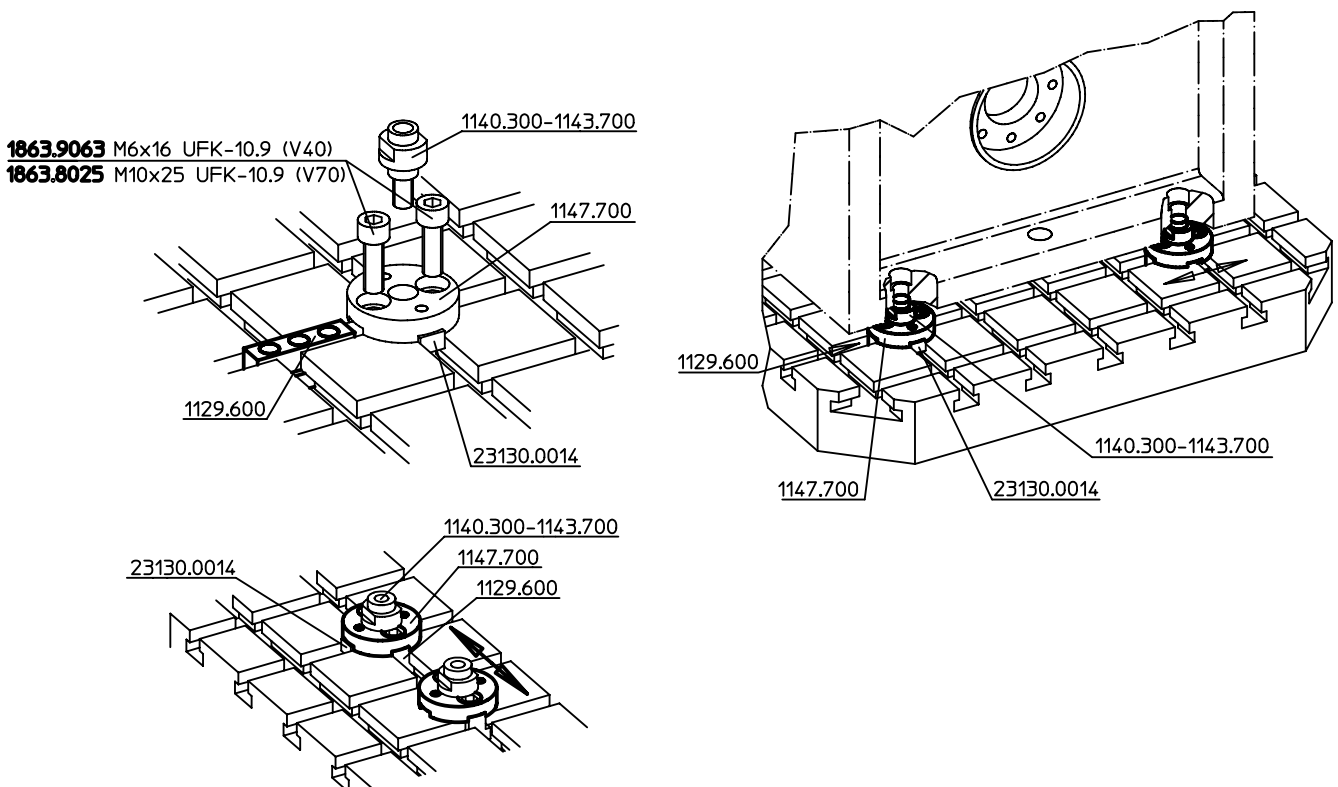
DRAWING



ORDER INFORMATION

System	Dimensions									Art. No.	
	d ₁	d ₂	d ₃	h ₁	h ₂	b	l ₁	l ₂	l ₃		
V40	40	10	M4	15	2.6	10	26	–	16	125	1047.700
V70	56	15	M6	13	3.5	14	34	37	–	171	1147.700

APPLICATION EXAMPLE



Support Clamping Bars

EH 1047.800 - EH 1147.800

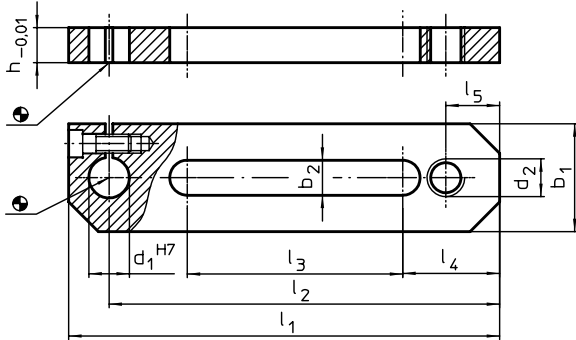


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions										Art. No.	
	b ₁	b ₂	d ₁	d ₂	h	l ₁	l ₂	l ₃	l ₄	l ₅		[g]
V40	25	8.5	10	M 8	15	100	88	45	23	12	214	1047.800
V70	40	13.0	15	M12	13	160	145	80	36	20	484	1147.800

Supporting Plates

EH 1047.900 - EH 1147.900

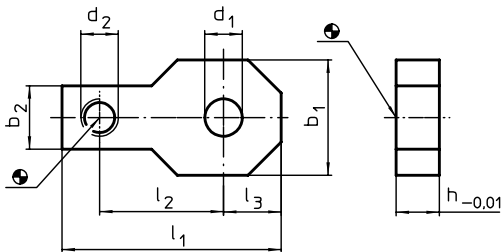


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions								Art. No.	
	h	d ₁	d ₂	b ₁	b ₂	l ₁	l ₂	l ₃		[g]
V40	10	8.5	M 8	25	18	51	28	12.5	74	1047.900
V70	15	13.0	M12	40	22	76	43	20.0	237	1147.900

V-Blocks

EH 1048.200 - EH 1148.300

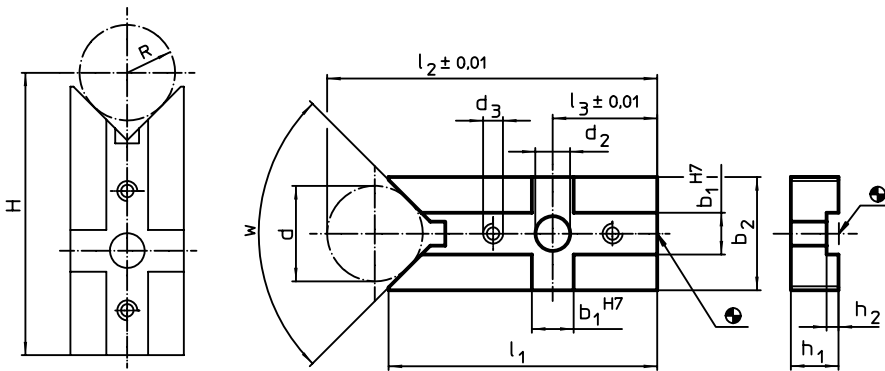
PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground



DRAWING

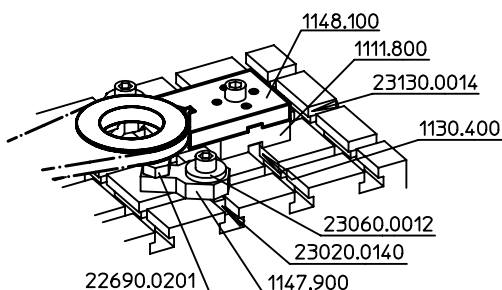


- $H = (R \times 1,414) + 49,497$ [1048.200]
- $H = (R \times 1,414) + 48,996$ [1048.300]
- $H = (R \times 1,155) + 77,025$ [1148.000]
- $H = (R \times 1,155) + 81,204$ [1148.100]
- $H = (R \times 1,414) + 72,872$ [1148.200]
- $H = (R \times 1,414) + 73,159$ [1148.300]

ORDER INFORMATION

System	Dimensions												w	[g]	Art. No.
	b ₁	d	b ₂	d ₂	d ₃	l ₁	l ₂	l ₃	h ₁	h ₂	d min.	d max.			
[mm]															
V40	10	20	25	6.6	M4	60	73.64	20	10	2.6	8	25	90°	90	1048.200
		30	38	6.6	M4	66	85.21	20	10	2.6	8	44	90°	155	1048.300
V70	14	32	38	13.0	M6	87	111.50	35	16	4.0	18	66	120°	331	1148.000
		62	68	13.0	M6	100	148.00	35	16	4.0	18	126	120°	694	1148.100
		32	38	13.0	M6	90	111.50	35	16	4.0	14	44	90°	328	1148.200
		62	68	13.0	M6	104	148.00	35	16	4.0	14	83	90°	690	1148.300

APPLICATION EXAMPLE



Locating Segments

EH 1048.400 - EH 1148.400

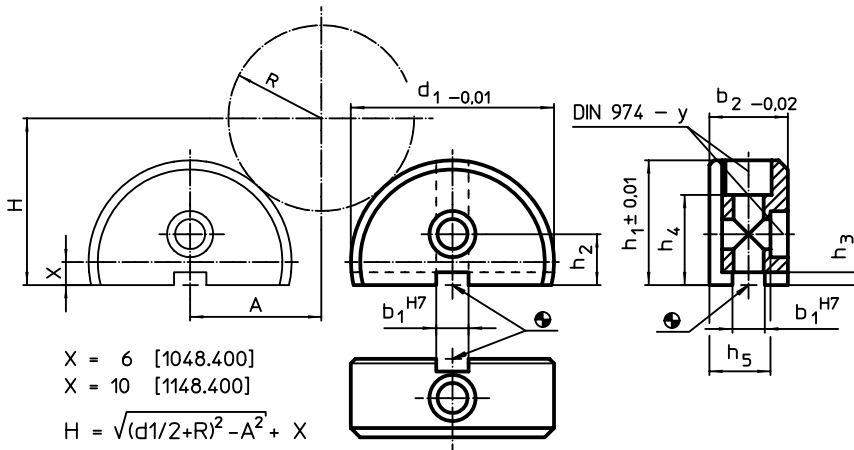


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

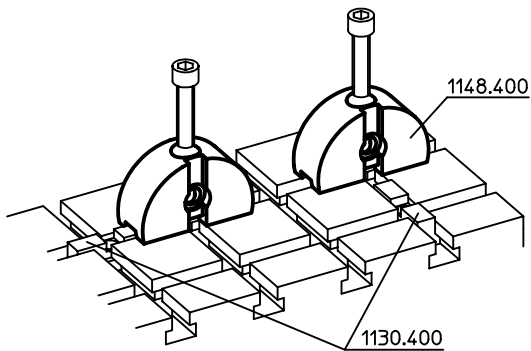
DRAWING



ORDER INFORMATION

System	Dimensions								For screws	y	[g]	Art. No.
	b ₁	b ₂	d ₁	h ₁	h ₂	h ₃	h ₄	h ₅				
V40	10	20	50	31	13	2.6	21	17.0	M 6	6	165	1048.400
V70	14	34	88	54	22	6.0	39	26.5	M12	12	834	1148.400

APPLICATION EXAMPLE



V-Blocks

EH 1048.500 - EH 1148.500

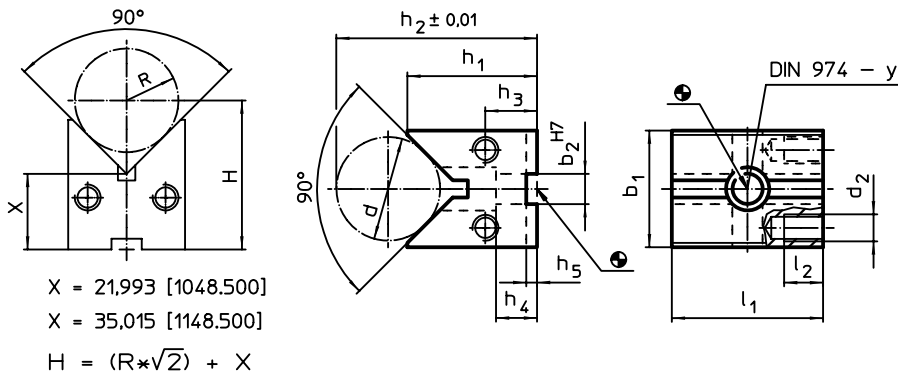


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING

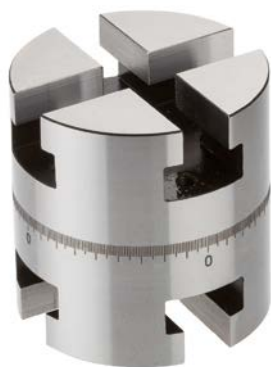


ORDER INFORMATION

System	Dimensions													For screws	y		Art. No.
	l_1	b_1	b_2	h_1	h_2	h_3	h_4	h_5	l_2	d	d_2	d min.	d max.				
V40	40	32	10	36	48.55	14.5	13	2.6	10	22	M 8	8	35	M 6	6	262	1048.500
V70	70	54	14	60	83.30	24.0	19	5.0	18	40	M12	12	67	M12	12	1251	1148.500

Adjustable Rotating Elements

EH 1048.600 - EH 1148.600

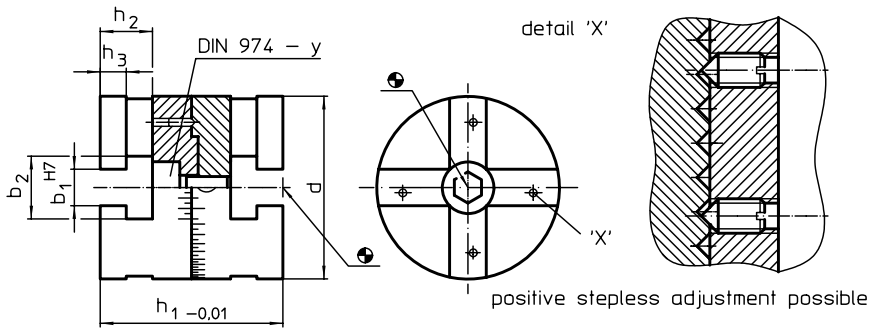


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions							[g]	Art. No.
	d	b ₁	b ₂	h ₁	h ₂	h ₃	y		
V40	40	10	17	40	12.5	6.5	6	286	1048.600
V70	70	14	24	70	20.0	10.0	12	1421	1148.600

Positioning Clamping Bars

EH 1149.000

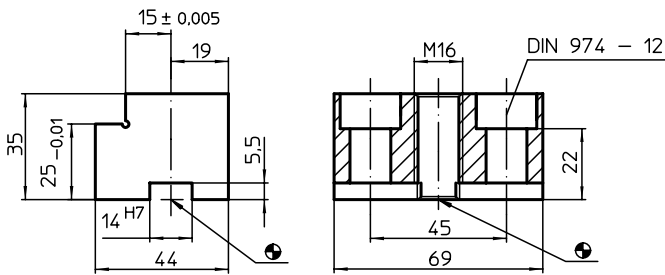


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

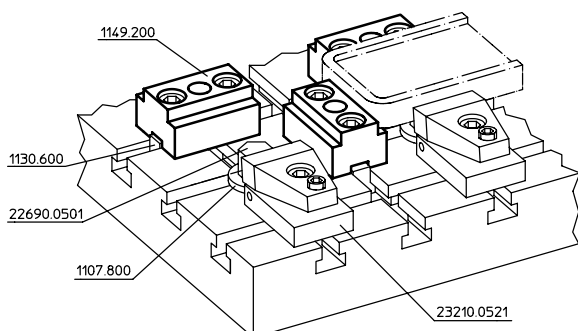
DRAWING



ORDER INFORMATION

System	[g]	Art. No.
V70	660	1149.000

APPLICATION EXAMPLE



Positioning Clamping Bars • two-sided

EH 1049.200 - EH 1149.200

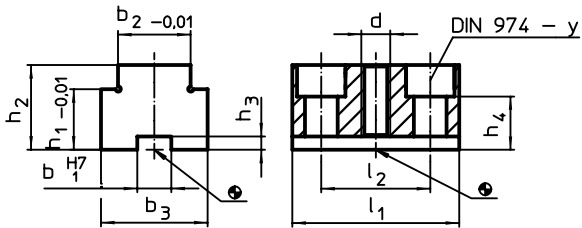


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions										y	For screws	[g]	Art. No.
	b ₁	b ₂	b ₃	h ₁	h ₂	h ₃	h ₄	l ₁	l ₂	d				
V40	10	20	28	20	23	2.6	13	40	26	M 8	6	M 6	160	1049.200
V70	14	30	44	25	35	5.5	22	69	45	M12	12	M12	580	1149.200

Fixed Drilling Supports • fix

EH 1162.000 - EH 1162.300

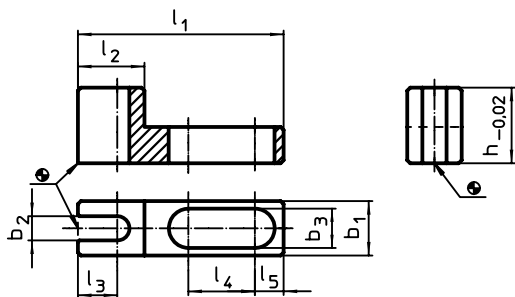


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions										[g]	Art. No.
	l ₁	l ₂	l ₃	l ₄	l ₅	b ₁	b ₂	b ₃	h			
V70/L12	68	22	13	22	9.5	18	8	13	25	92	1162.000	
	88	38	20	26	9.5	28	16	13	25	214	1162.100	
	98	40	20	31	9.5	38	24	13	25	321	1162.200	
	108	45	20	37	11.5	48	35	17	25	399	1162.300	

Fixed Drilling Supports • adjustable

EH 1163.000 - EH 1163.300

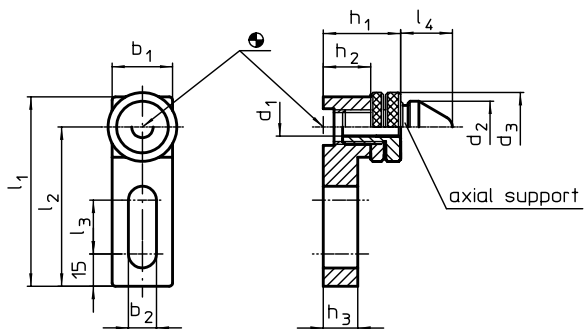


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions												[g]	Art. No.
	b ₁	b ₂	d ₁	d ₂	d ₃	l ₁	l ₂	l ₃	l ₄	h ₁	h ₂	h ₃		
[mm]														
V70/L12	28	13	9.9	24	32	88	74	25	24	36 – 45	22	16	381	1163.000
	38	13	16.9	30	42	108	89	40	27	44 – 54	26	20	800	1163.100
	48	17	24.8	45	55	108	84	25	27	54 – 68	32	26	1391	1163.200
	58	17	34.9	52	68	128	99	40	27	68 – 82	44	38	3000	1163.300

6

Adapter Slot Clamping Elements • system V40/V70

EH 1068.100 - EH 1068.300

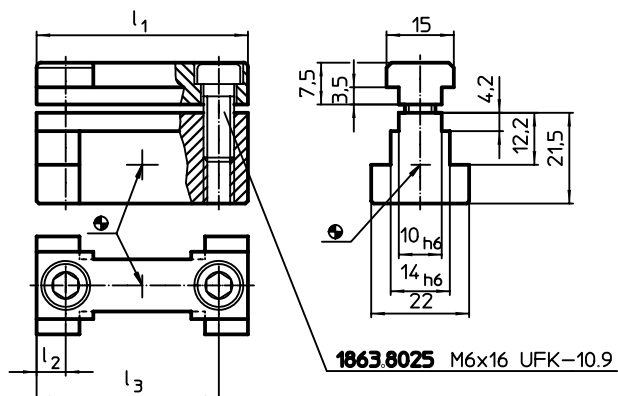


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions			Art. No.
	l_1	l_2 [mm]	l_3	
V40/V70	39.6	6.8	32.8	111
	13.0	6.5	-	42
	24.0	12.0	-	80

Adapter Slot Centering Blocks • system V40/V70

EH 1068.600

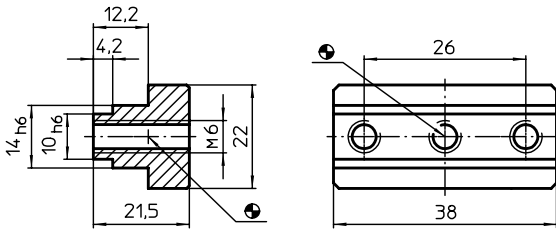


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
V40/V70	98	1068.600

6

Adapter Slot Blocks • system V40/V70

EH 1068.800

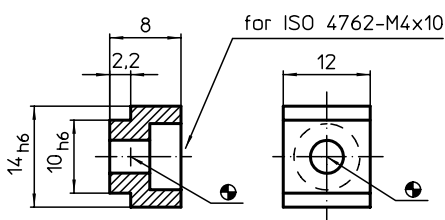


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
V40/V70	7	1068.800

STANDARD RANGES V40

ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 2 FIXTURES, ART. NO. 1090.110

Qty.	Description	Art. No.	Qty	Description	Art. No.
System parts			Standard parts		
2	Base plate	1000.400	3	Grub screw	22540.0381
5	Spacer	1007.400	3	Grub screw	22540.0382
5	Spacer	1007.600	3	Screwed rest button, plain	22690.0021
5	Spacer	1007.700	3	Screwed rest button, plain	22690.0321
5	Spacer	1007.800	3	Self-aligning pad, plain	22730.0013
5	Spacer	1007.900	3	Self-aligning pad, ribbed	22730.0313
6	Mounting block	1010.100	5	Stud for T-nuts	23040.0582
2	Mounting block	1010.200	3	Stud for T-nuts	23040.0583
1	Mounting block	1010.300	3	Stud for T-nuts	23040.0584
3	Mounting block	1011.100	2	Conical seat	23050.0208
1	Mounting block	1011.200	5	Plain washer	23060.0008
1	Mounting block	1011.300	5	Fixture nut	23070.0008
1	Clamping bar	1013.600	2	Collar nut	23080.0008
3	Stop	1014.500	5	Extension nut	23090.0008
4	T-slot centering block	1029.600	2	Clamp	23150.0009
10	T-nuts	1030.100	3	Clamp with nose	23180.0209
15	T-nuts	1030.300	2	Down-hold clamp	23210.0502
8	T-clamping block	1031.100	1	Bedding support	23220.0085
3	T-clamping block	1031.200	4	Height adjusting cylinder	23310.0125
4	T-clamping block	1031.300	2	Height adjusting cylinder	23310.0126
1	Wrench	1032.100	2	Height adjusting cylinder	23310.0127
2	Intermediate plate	1047.700			
1	Support clamping bar	1047.800			
3	Supporting plate	1047.900			

ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 3 FIXTURES, ART. NO. 1090.120

Qty	Description	Art. No.	Qty	Description	Art. No.
System parts			Standard parts		
2	Base plate	1000.400	5	Grub screw	22540.0381
1	Base plate	1000.500	5	Grub screw	22540.0382
5	Spacer	1007.400	4	Screwed rest button, plain	22690.0021
5	Spacer	1007.600	3	Screwed rest button, spherical	22690.0121
5	Spacer	1007.700	3	Screwed rest button, ribbed	22690.0221
20	Spacer	1007.800	4	Screwed rest button, plain	22690.0321
5	Spacer	1007.900	3	Screwed rest button, spherical	22690.0421
8	Mounting block	1010.100	3	Screwed rest button, spherical	22690.0423
4	Mounting block	1010.200	3	Screwed rest button, ribbed	22690.0521
2	Mounting block	1010.300	4	Self-aligning pad, plain	22730.0013
6	Mounting block	1011.100	3	Self-aligning pad, ribbed	22730.0313
4	Mounting block	1011.200	5	Stud for T-nut	23040.0582
2	Mounting block	1011.300	5	Stud for T-nut	23040.0583
1	Slotted clamping angle	1012.100	3	Stud for T-nut	23040.0584
1	Clamping bar	1013.600	3	Conical seat	23050.0208
1	Clamping bar	1013.700	10	Plain washer	23060.0008
6	Stop	1014.500	5	Fixture nut	23070.0008
1	Thrust angle	1020.300	3	Collar nut	23080.0008
1	Thrust angle	1021.600	5	Extension nut	23090.0008
1	Thrust angle	1021.700	2	Clamp	23150.0009
5	T-slot centering block	1029.600	3	Clamp with nose	23180.0209
20	T-nut	1030.100	2	Down-hold clamp	23210.0501
37	T-nut	1030.300	2	Down-hold clamp	23210.0502
15	T-clamping block	1031.100	2	Bedding support	23220.0085
5	T-clamping block	1031.200	2	Down-thrust clamp	23310.0025
5	T-clamping block	1031.300	6	Height adjusting cylinder	23310.0125
1	Wrench	1032.100	4	Height adjusting cylinder	23310.0126
2	Intermediate plate	1047.700	2	Height adjusting cylinder	23310.0127
2	Support clamping bar	1047.800			
6	Supporting plate	1047.900			

The specified ranges are intended as recommendations.
The required parts vary with the workpiece.
The ranges can be modified as necessary

STANDARD RANGES V40

ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 5 FIXTURES, ART. NO. 1090.140

Qty.	Description	Art. No.	Qty.	Description	Art. No.
System parts			Standard parts		
3	Base plate	1000.400	10	Grub screw	22540.0381
2	Base plate	1000.500	10	Grub screw	22540.0382
5	Spacer	1007.400	4	Screwed rest button, plain	22690.0021
5	Spacer	1007.500	3	Screwed rest button, spherical	22690.0121
5	Spacer	1007.600	3	Screwed rest button, ribbed	22690.0221
15	Spacer	1007.700	4	Screwed rest button, plain	22690.0321
20	Spacer	1007.800	4	Screwed rest button, plain	22690.0323
5	Spacer	1007.900	3	Screwed rest button, spherical	22690.0421
12	Mounting block	1010.100	3	Screwed rest button, spherical	22690.0423
5	Mounting block	1010.200	3	Screwed rest button, ribbed	22690.0521
3	Mounting block	1010.300	3	Screwed rest button, ribbed	22690.0523
6	Mounting block	1011.100	5	Ball-ended thrust screw	22700.0584
5	Mounting block	1011.200	6	Self-aligning pad, plain	22730.0013
3	Mounting block	1011.300	6	Self-aligning pad, ribbed	22730.0313
2	Slotted clamping angle	1012.100	5	Stud for T-nut	23040.0582
2	Slotted clamping angle	1012.300	10	Stud for T-nut	23040.0583
1	Clamping bar	1013.700	10	Stud for T-nut	23040.0584
1	Clamping bar	1013.800	10	Conical seat	23050.0208
8	Stop	1014.500	50	Plain washer	23060.0008
1	Thrust angle	1020.300	15	Fixture nut	23070.0008
1	Thrust angle	1021.500	10	Collar nut	23080.0008
1	Thrust angle	1021.600	10	Extension nut	23090.0008
1	Thrust angle	1021.700	4	Clamp	23150.0009
8	T-slot centering block	1029.600	6	Clamp with nose	23180.0209
30	T-nut	1030.100	6	Down-hold clamp	23210.0501
55	T-nut	1030.300	2	Down-hold clamp	23210.0502
25	T-clamping block	1031.100	5	Bedding support	23220.0085
20	T-clamping block	1031.200	5	Down-thrust clamp	23310.0025
10	T-clamping block	1031.300	20	Height adjusting cylinder	23310.0125
1	Wrench	1032.100	10	Height adjusting cylinder	23310.0126
1	Locating pin	1040.300	6	Height adjusting cylinder	23310.0127
1	Locating pin	1040.500			
2	Intermediate plate	1047.700			
2	Support clamping bar	1047.800			
9	Supporting plate	1047.900			
2	V-block	1048.200			
2	V-block	1048.300			
2	Locating segment	1048.400			
1	V-block	1048.500			
1	Adjustable rotating element	1048.600			
3	Positioning clamping bar, twinfaced	1049.200			

The specified ranges are intended as recommendations.
The required parts vary with the workpiece.
The ranges can be modified as necessary

STANDARD RANGES V70

ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 2 FIXTURES, ART. NO. 1190.110 (V70) / 1290.110 (V70ECO)

Qty.	Description	Art. No.	Qty.	Description	Art. No.
System parts			Standard parts		
2	Base plate	1100.700	2	Grub screw	22540.0401
5	Spacer	1107.400	3	Grub screw	22540.0422
5	Spacer	1107.600	1	Grub screw	22540.0423
5	Spacer	1107.700	3	Screwed rest button, plain	22690.0001
5	Spacer	1107.800	3	Screwed rest button, ribbed	22690.0201
5	Spacer	1107.900	3	Screwed rest button, plain	22690.0303
6	Mounting block	1110.100	3	Screwed rest button, ribbed	22690.0503
2	Mounting block	1110.200	3	Self-aligning pad, plain	22730.0020
1	Mounting block	1110.300	3	Self-aligning pad, ribbed	22730.0320
3	Mounting block	1111.100	10	T-nut	23010.0142
1	Mounting block	1111.200	20	T-nut, extended	23020.0140
1	Mounting block	1111.300	2	Stud for T-nut	23040.0602
1	Mounting block	1113.700	5	Stud for T-nut	23040.0623
4	Stop	1114.500	3	Stud for T-nut	23040.0625
2	T-slot centering block	1129.600	4	Conical seat	23050.0212
8	T-clamping block	1131.100	15	Plain washer	23060.0012
4	T-clamping block	1131.200	4	Fixture nut	23070.0012
2	T-clamping block	1131.500	6	Collar nut	23080.0012
2	T-clamping block	1131.600	5	Extension nut	23090.0012
2	T-clamping block	1131.700	2	Clamp	23150.0015
1	Wrench	1132.100	2	Down-hold clamp	23210.0522
1	Butt strap	1139.400	2	Bedding support	23220.0150
2	Clamping head	1147.700	3	Cylindrical stop	23280.0114
1	Support clamping bar	1147.800	6	Height adjusting cylinder	23310.0140
4	Supporting plate	1147.900	4	Height adjusting cylinder	23310.0141
4	Clamp	23180.0213	1	Height adjusting cylinder	23310.0142
4	Down-thrust clamp	23310.0054			
4	Positioning ring	23310.0350			

As required

	Locating pin	1140.300- 1143.700
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The specified ranges are intended as recommendations.
The required parts vary with the workpiece.
The ranges can be modified as necessary

STANDARD RANGES V70

ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 3 FIXTURES, ART. NO. 1190.120 (V70) / 1290.120 (V70ECO)

Qty.	Description	Art. No.	Qty.	Description	Art. No.
System parts			Standard parts		
1	Base plate	1100.800	3	Grub screw	22540.0401
2	Base plate	1100.700	5	Grub screw	22540.0421
5	Spacer	1107.400	5	Grub screw	22540.0423
5	Spacer	1107.600	6	Screwed rest button, plain	22690.0001
10	Spacer	1107.700	3	Screwed rest button, plain	22690.0301
20	Spacer	1107.800	4	Screwed rest button, ribbed	22690.0201
8	Mounting block	1110.100	4	Screwed rest button, plain	22690.0303
4	Mounting block	1110.200	3	Screwed rest button, spherical	22690.0403
2	Mounting block	1110.300	3	Screwed rest button, ribbed	22690.0501
6	Mounting block	1111.100	3	Screwed rest button, ribbed	22690.0503
4	Mounting block	1111.200	3	Self-aligning pad, plain	22730.0020
2	Mounting block	1111.300	3	Self-aligning pad, ribbed	22730.0320
1	Clamping block	1113.600	3	Self-aligning pad	22740.0317
1	Clamping block	1113.700	20	T-nut	23010.0142
6	Stop	1114.500	50	T-nut, extended	23020.0140
2	Thrust angle	1120.300	5	T-nut, rhombus	23020.0640
1	Thrust angle	1120.400	3	Stud for T-nut	23040.0602
2	T-slot centering block	1129.600	6	Stud for T-nut	23040.0623
18	T-clamping block	1131.100	5	Stud for T-nut	23040.0624
7	T-clamping block	1131.200	6	Stud for T-nut	23040.0625
4	T-clamping block	1131.500	4	Stud for T-nut	23040.0626
4	T-clamping block	1131.600	6	Conical seat	23050.0212
2	T-clamping block	1131.700	20	Plain washer	23060.0012
1	Wrench	1132.100	6	Fixture nut	23070.0012
1	Wrench	1139.400	10	Collar nut	23080.0012
1	Wrench	1139.500	6	Extension nut	23090.0012
2	Intermediate plate	1147.700	2	Clamp	23150.0015
2	Support clamping bar	1147.800	2	Clamp	23150.0016
6	Supporting plate	1147.900	4	Clamp with nose	23180.0213
As required			2	Down-hold clamp	23210.0521
			2	Down-hold clamp	23210.0522
			3	Bedding support	23220.0150
	Locating pin	1140.300-1143.700	3	Cylindrical stop	23280.0114
			4	Down-thrust clamp	23310.0054
			8	Height adjusting cylinder	23310.0140
			6	Height adjusting cylinder	23310.0141
			2	Height adjusting cylinder	23310.0142
			2	Height adjusting cylinder	23310.0160
			4	Positioning ring	23310.0350

The specified ranges are intended as recommendations.
The required parts vary with the workpiece.
The ranges can be modified as necessary

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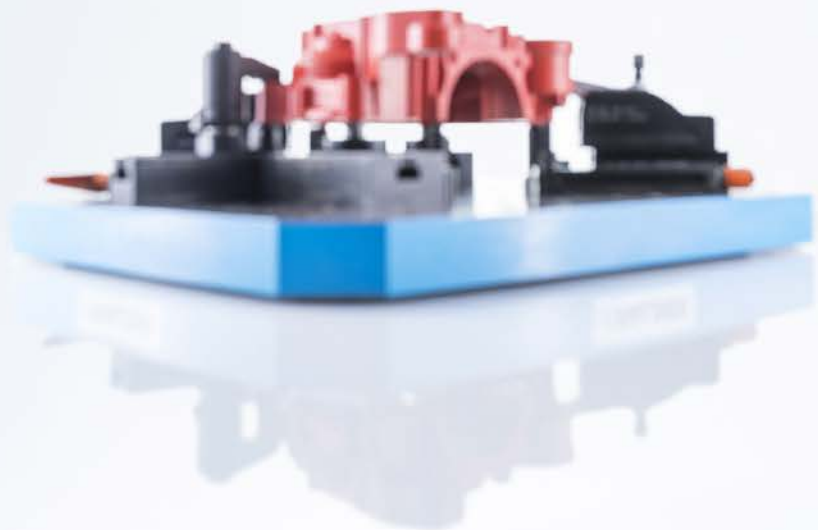
STANDARD RANGES V70

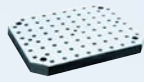
ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 5 FIXTURES, ART. NO. 1190.140 (V70) / 1290.140 (V70ECO)

Qty.	Description	Art. No.	Qty.	Description	Art. No.
System parts			Standard parts		
2	Base plate	1100.700	5	Grub screw	22540.0401
2	Base plate	1100.800	10	Grub screw	22540.0421
1	Base plate	1100.500	10	Grub screw	22540.0422
5	Spacer	1107.400	10	Grub screw	22540.0423
5	Spacer	1107.500	6	Screwed rest button, plain	22690.0001
5	Spacer	1107.600	3	Screwed rest button, plain	22690.0002
5	Spacer	1107.700	4	Screwed rest button, ribbed	22690.0201
20	Spacer	1107.800	3	Screwed rest button, plain	22690.0301
5	Spacer	1107.900	6	Screwed rest button, plain	22690.0303
10	Spacer	1108.000	3	Screwed rest button, plain	22690.0305
5	Spacer	1108.200	3	Screwed rest button, spherical	22690.0401
12	Mounting block	1110.100	3	Screwed rest button, spherical	22690.0403
5	Mounting block	1110.200	3	Screwed rest button, ribbed	22690.0501
3	Mounting block	1110.300	6	Screwed rest button, ribbed	22690.0503
6	Mounting block	1111.100	3	Screwed rest button, ribbed	22690.0505
5	Mounting block	1111.200	6	Self-aligning pad, plain	22730.0020
2	Mounting block	1111.300	3	Self-aligning pad, plain	22740.0017
1	Slotted clamping angle	1112.100	6	Self-aligning pad, ribbed	22730.0320
2	Clamping bar	1113.700	3	Self-aligning pad, ribbed	22740.0317
1	Clamping bar	1113.800	30	T-nut	23010.0142
4	Support clamping bar	1114.000	80	T-nut, extended	23020.0140
12	Stop	1114.500	10	T-nut, rhombus	23020.0640
2	Thrust angle	1120.300	5	Stud for T-nut	23040.0602
1	Thrust angle	1120.400	5	Stud for T-nut	23040.0622
4	T-slot centering block	1129.600	10	Stud for T-nut	23040.0623
3	T-block	1130.400	10	Stud for T-nut	23040.0624
30	T-clamping block	1131.100	10	Stud for T-nut	23040.0625
20	T-clamping block	1131.200	10	Stud for T-nut	23040.0626
5	T-clamping block	1131.500	10	Stud for T-nut	23040.0627
5	T-clamping block	1131.600	10	Conical seat	23050.0212
3	T-clamping block	1131.700	40	Plain washer	23060.0012
1	Wrench	1132.100	10	Fixture nut	23070.0012
1	Wrench	1139.400	15	Collar nut	23080.0012
1	Wrench	1139.500	10	Extension nut	23090.0012
4	Intermediate plate	1147.700	3	Clamp	23150.0015
3	Support clamping bar	1147.800	3	Clamp	23150.0016
10	Supporting plate	1147.900	6	Clamp with nose	23180.0213
2	Locating segment	1148.400	4	Down-hold clamp	23210.0521
1	V-block	1148.500	2	Down-hold clamp	23210.0522
3	Positioning clamping bar	1149.000	5	Bedding support	23220.0150
			3	Cylindrical stop	23280.0114
			3	Cylindrical stop	23280.0214
			2	Down-thrust clamp	23310.0051
As required					
	Locating pin	1140.300- 1143.700	4	Down-thrust clamp	23310.0054
			2	Down-thrust clamp	23310.0057
			15	Height adjusting cylinder	23310.0140
			8	Height adjusting cylinder	23310.0141
			4	Height adjusting cylinder	23310.0142
			5	Height adjusting cylinder	23310.0160
			4	Height adjusting cylinder	23310.0161
			2	Height adjusting cylinder	23310.0162
			8	Positioning ring	23310.0350

The specified ranges are intended as recommendations.
The required parts vary with the workpiece.
The ranges can be modified as necessary

7 HOLE AND DOWEL SYSTEMS





Product group

Page

Base Elements

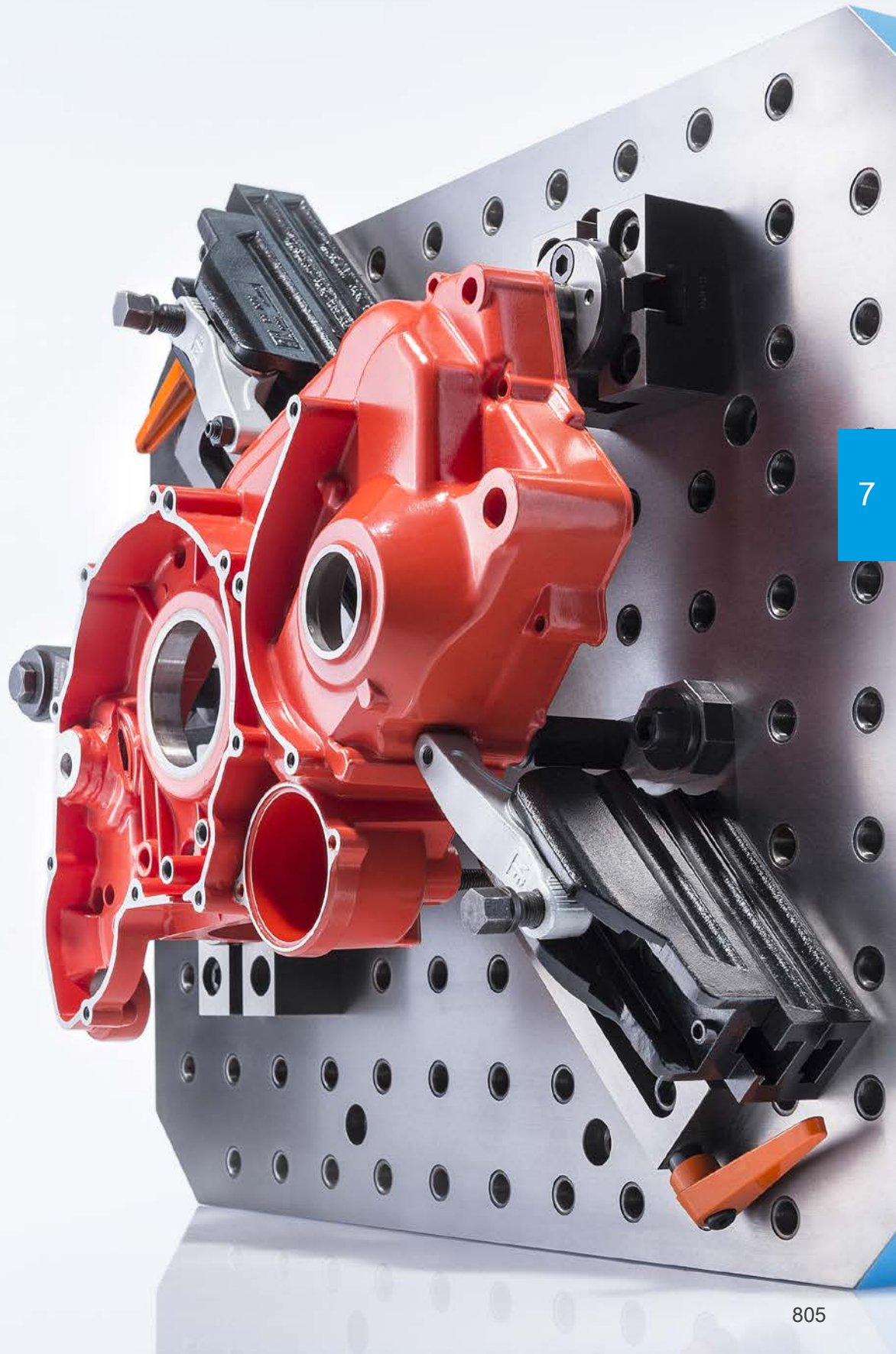
807

Mounting Elements

811

Standard Ranges

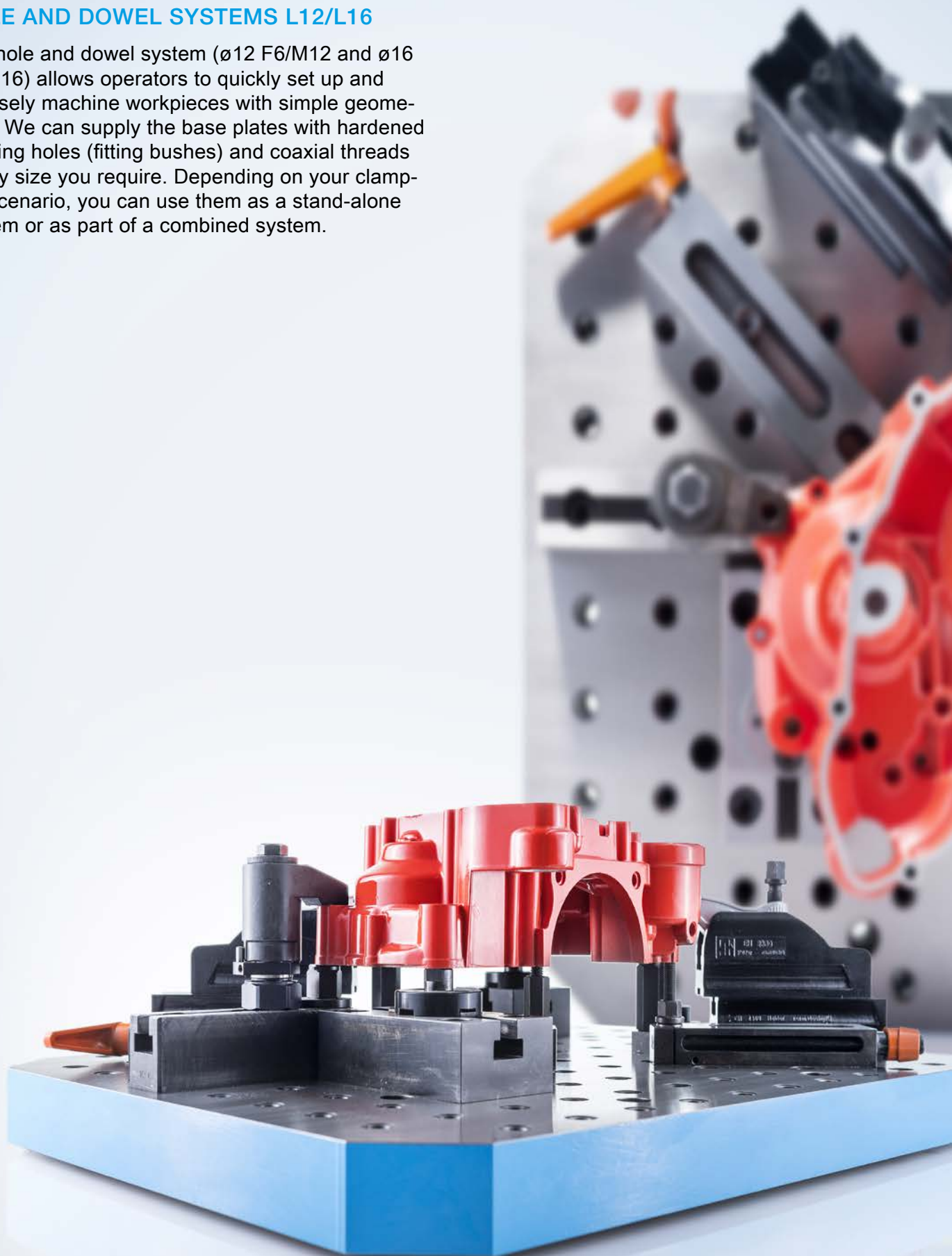
831



HOLE AND DOWEL SYSTEMS

HOLE AND DOWEL SYSTEMS L12/L16

The hole and dowel system ($\varnothing 12$ F6/M12 and $\varnothing 16$ F6/M16) allows operators to quickly set up and precisely machine workpieces with simple geometries. We can supply the base plates with hardened locating holes (fitting bushes) and coaxial threads in any size you require. Depending on your clamping scenario, you can use them as a stand-alone system or as part of a combined system.



Base Plates

EH 1500.200 - EH 1600.900



PRODUCT DESCRIPTION

Material

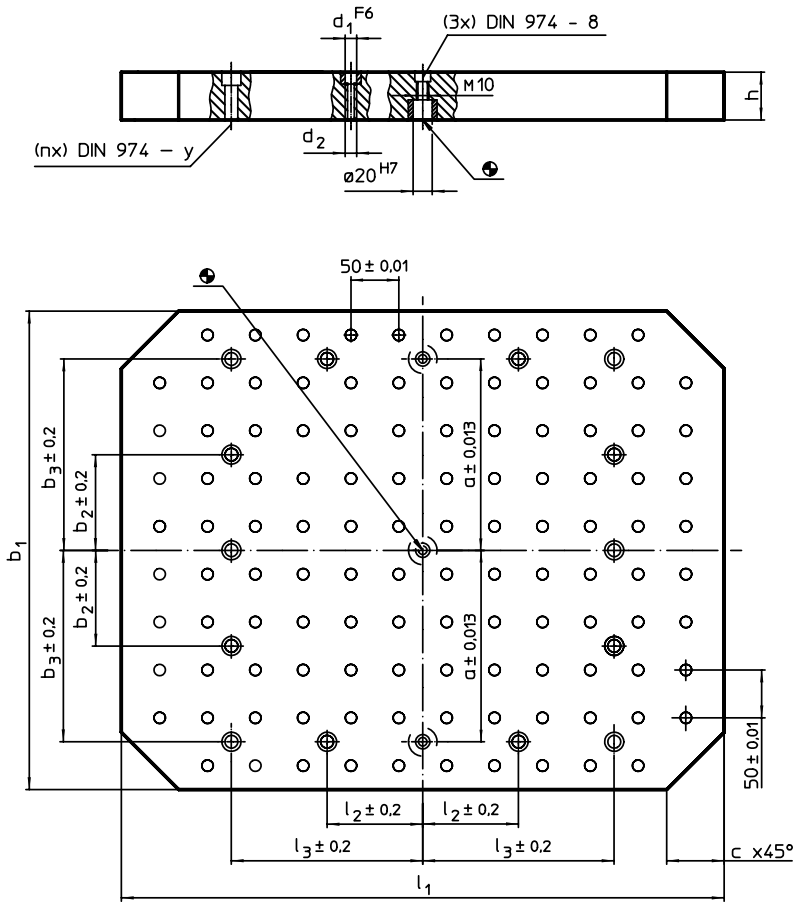
- Grey cast iron, ground

MORE INFORMATION

Notes

Special types on request.

DRAWING



ORDER INFORMATION

System	Dimensions										y	For screws	Number of fastening holes n	Number of hole rows	[kg]	Art. No.
	b ₁ x l ₁	h	d ₁	d ₂	a	b ₂	b ₃	c	l ₂	l ₃						
[mm]											[mm]	[mm]				
L12	400 x 400	40 ± 0.02	12	M12	150	-	150	50	-	100	12	M12	4	8 x 8	43	1500.200
	400 x 500	40 ± 0.02	12	M12	150	-	150	50	-	200	12	M12	4	8 x 10	56	1500.300
	500 x 500	40 ± 0.02	12	M12	200	100	200	60	100	200	12	M12	8	10 x 10	65	1500.400
	500 x 630	50 ± 0.03	12	M12	200	100	200	60	100	200	12	M12	8	10 x 12	105	1500.500
L16	630 x 630	50 ± 0.03	12	M12	200	-	200	70	-	200	16	M16	6	12 x 12	132	1500.600
	630 x 630	50 ± 0.03	16	M16	200	-	200	70	-	200	16	M16	6	12 x 12	131	1600.600
	630 x 800	50 ± 0.03	16	M16	200	-	200	70	-	300	16	M16	6	12 x 16	170	1600.700
	800 x 800	50 ± 0.03	16	M16	300	100	300	100	100	300	16	M16	12	16 x 16	205	1600.800
	800 x 1000	60 ± 0.03	16	M16	300	100	300	100	100	400	16	M16	12	16 x 20	325	1600.900

Base Plates

EH 1501.300 - EH 1501.500



PRODUCT DESCRIPTION

Material

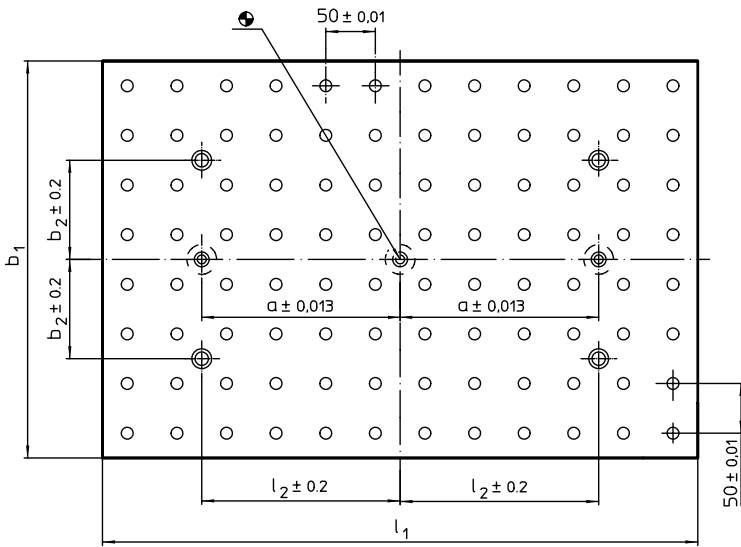
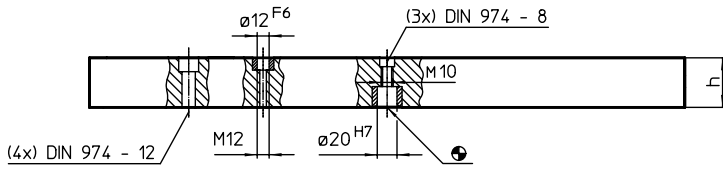
- Grey cast iron, ground

MORE INFORMATION

Notes

Special types on request.

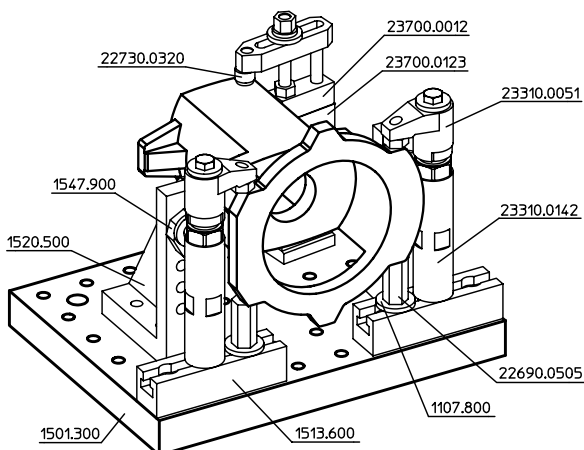
DRAWING



ORDER INFORMATION

System	$b_1 \times l_1$	$h \pm 0.02$	Dimensions			Number of hole rows	[kg]	Art. No.
			a	l_2	b_2			
[mm]								
L12	300 x 400	40	150	150	100	6 x 8	34	1501.300
	400 x 600	40	200	200	100	8 x 12	69	1501.500

APPLICATION EXAMPLE



Clamping Angles
EH 1506.200 - EH 1606.800



PRODUCT DESCRIPTION

Material

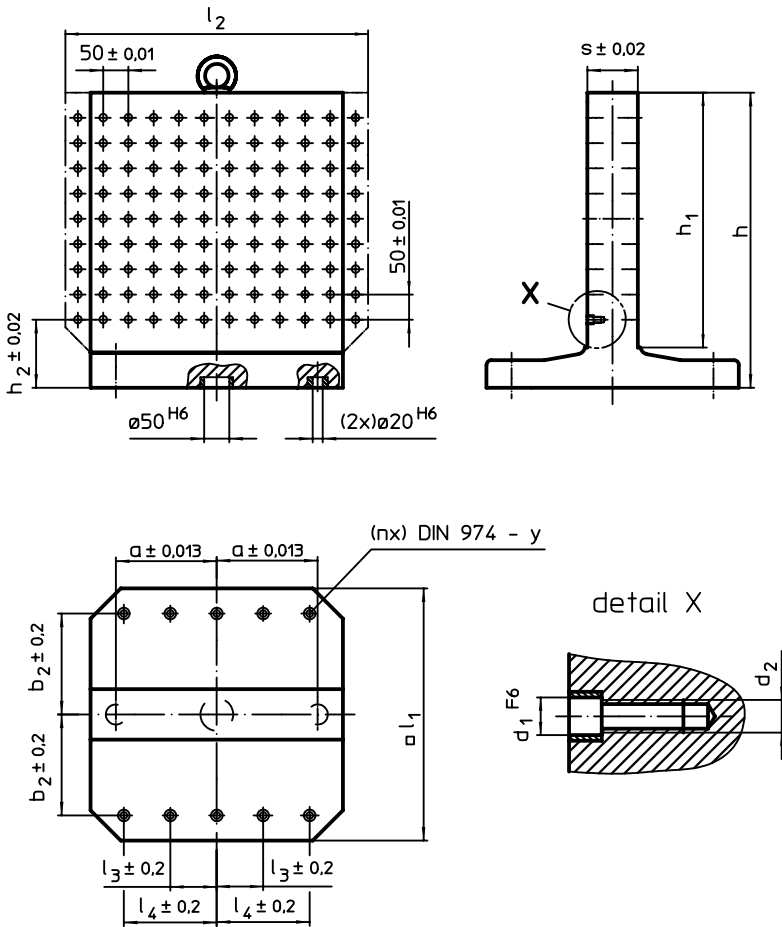
- Grey cast iron GG

MORE INFORMATION


Notes

Special types on request.

DRAWING



ORDER INFORMATION

System	Dimensions												y	For screws	Number of fastening holes n	Number of hole rows		Art. No.
	l ₁	l ₂	h ₁	h	h ₂	d ₁	d ₂	a	b ₂	l ₃	l ₄	s						
L12	400	-	400	475	100	12	M12	150	150	-	150	80	12	M12	4	8 x 8	153	1506.200
		500	400	475	100	12	M12	150	150	-	150	80	12	M12	4	10 x 8	168	1506.300
	500	-	500	595	120	12	M12	200	200	-	200	100	12	M12	6	10 x 10	295	1506.400
		630	500	595	120	12	M12	200	200	-	200	100	12	M12	6	12 x 10	326	1506.500
L16	630	-	630	725	135	16	M16	200	200	-	200	130	16	M16	6	12 x 12	440	1606.600
	800	-	800	910	135	16	M16	300	300	100	300	150	16	M16	8	16 x 16	745	1606.800

Clamping Cubes

EH 1508.200 - EH 1608.600



PRODUCT DESCRIPTION

Material

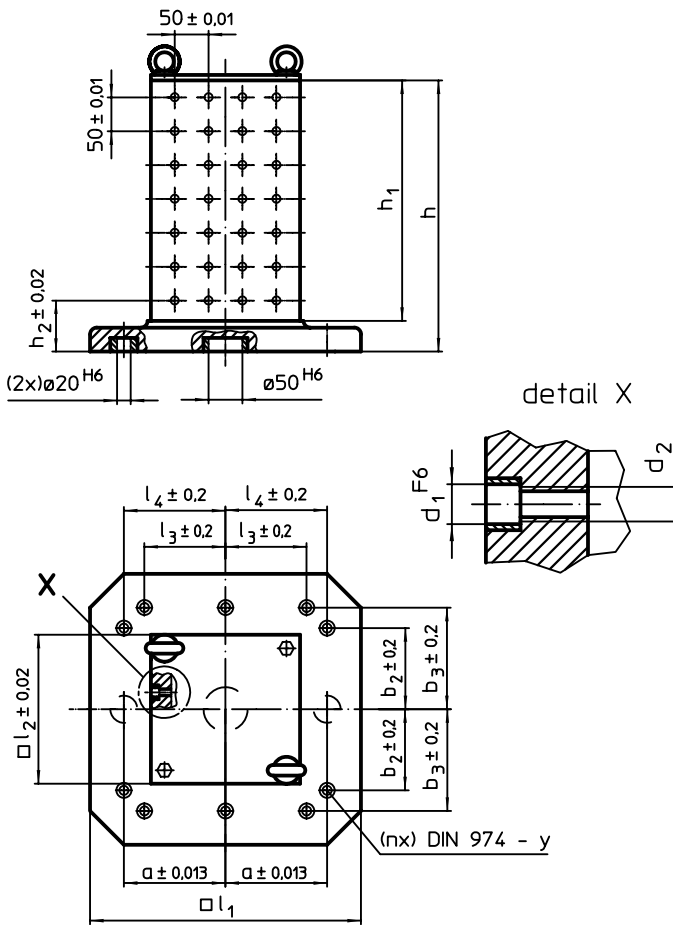
- Grey cast iron GG

MORE INFORMATION

Notes

Special types on request.

DRAWING



7

ORDER INFORMATION

System	Dimensions											y	For screws	Number of fastening holes n	Number of hole rows	[kg]	Art. No.	
	l ₁	l ₂	h ₁	h	h ₂	d ₁	d ₂	a	b ₂	b ₃	l ₃							l ₄
L12	400	230	358	408	75	12	M12	150	150	-	-	150	12	M12	4	4 x 7	97	1508.200
	500	330	510	565	85	12	M12	200	200	-	-	200	12	M12	6	6 x 10	204	1508.400
	630	450	640	700	100	12	M12	200	200	300	200	300	16	M16	8	8 x 12	426	1508.600
L16	630	450	640	700	100	16	M16	200	200	300	200	300	16	M16	8	8 x 12	420	1608.600

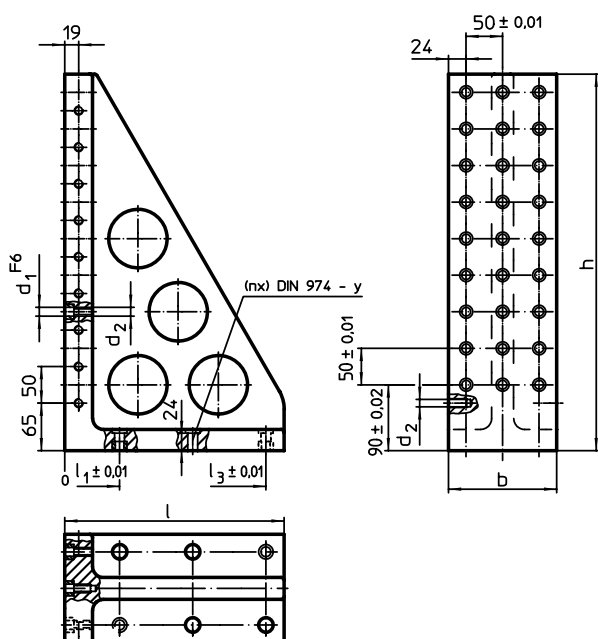


PRODUCT DESCRIPTION


Material

- Grey cast iron, phosphatized

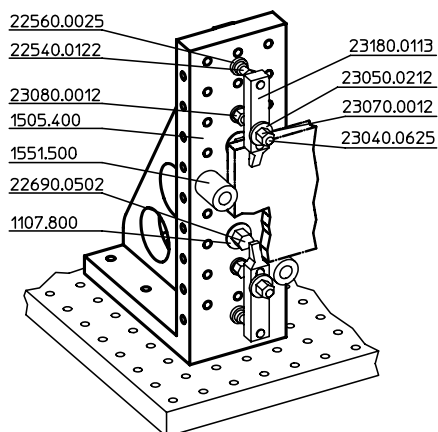
DRAWING



ORDER INFORMATION

System	Dimensions			Dimensions					y	For screws	Number of fastening holes n	Number of hole rows		Art. No.
	l	b	h	l_1	l_2	l_3	d_1	d_2						
L12	230	98	415	75	175	-	12	M12	12	M12	4	2 x 7	19	1505.200
	300	148	515	75	175	275	12	M12	12	M12	6	3 x 9	39	1505.400
L16	230	98	415	75	175	-	16	M16	16	M16	4	2 x 7	19	1605.200
	300	148	515	75	175	275	16	M16	16	M16	6	3 x 9	38	1605.400

APPLICATION EXAMPLE



Clamping Angles

EH 1605.700

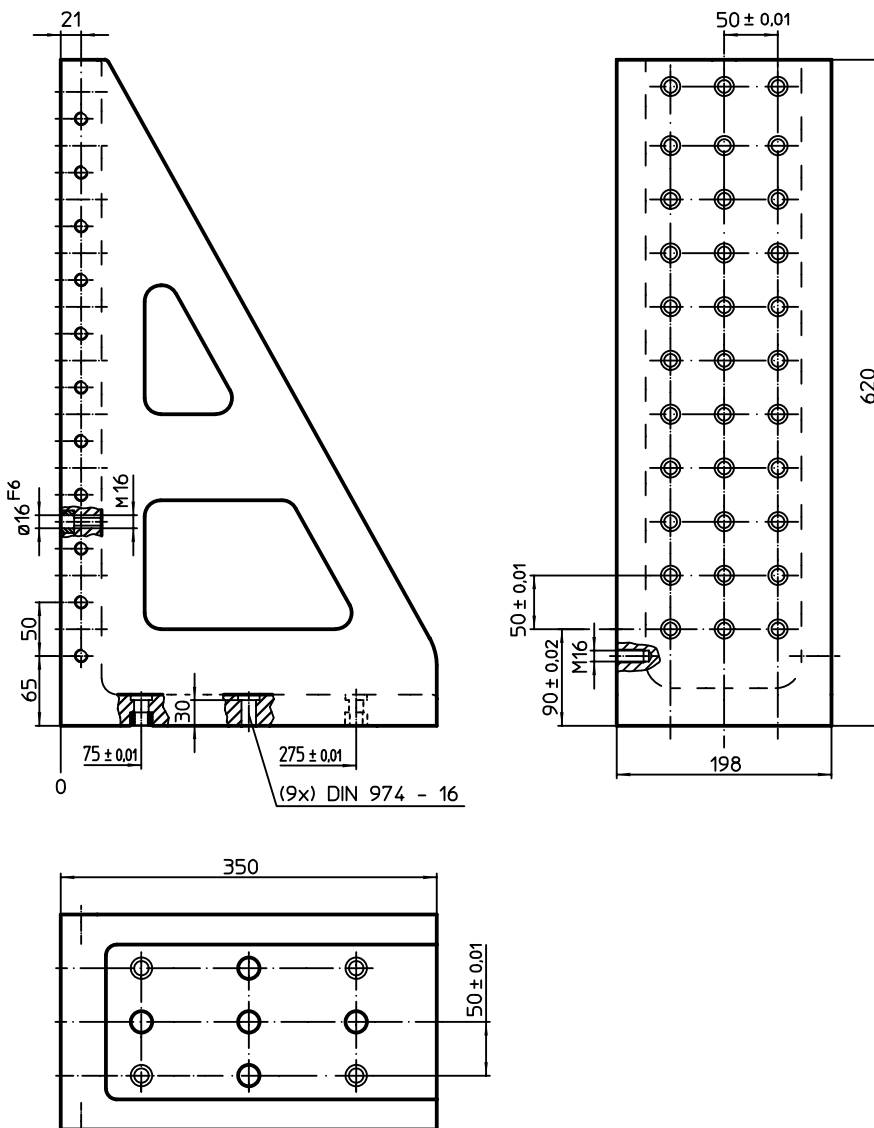


PRODUCT DESCRIPTION


Material

- Grey cast iron, phosphatized

DRAWING



ORDER INFORMATION

System	 [kg]	Art. No.
L16	76	1605.700

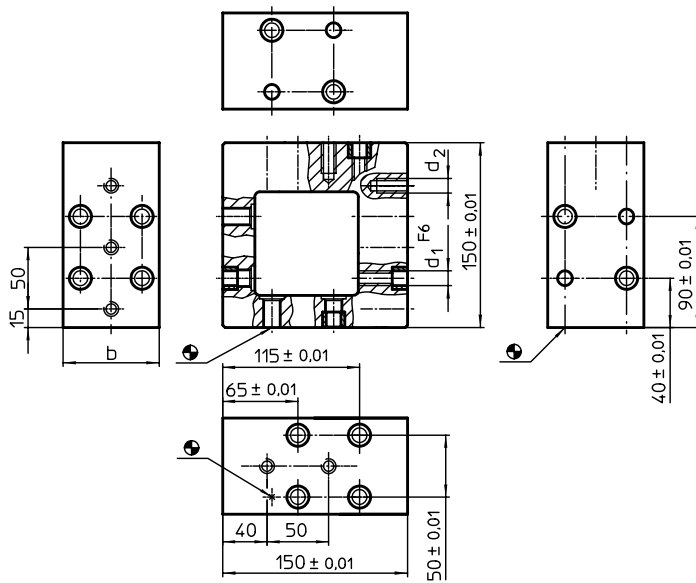


PRODUCT DESCRIPTION

Material

- Grey cast iron, phosphatized

DRAWING



ORDER INFORMATION

System	b	Dimensions		[g]	Art. No.
		d ₁ [mm]	d ₂		
L12	78	12	M12	8177	1510.100
L16	98	16	M16	14597	1610.100



Consoles

EH 1510.200 - EH 1610.200

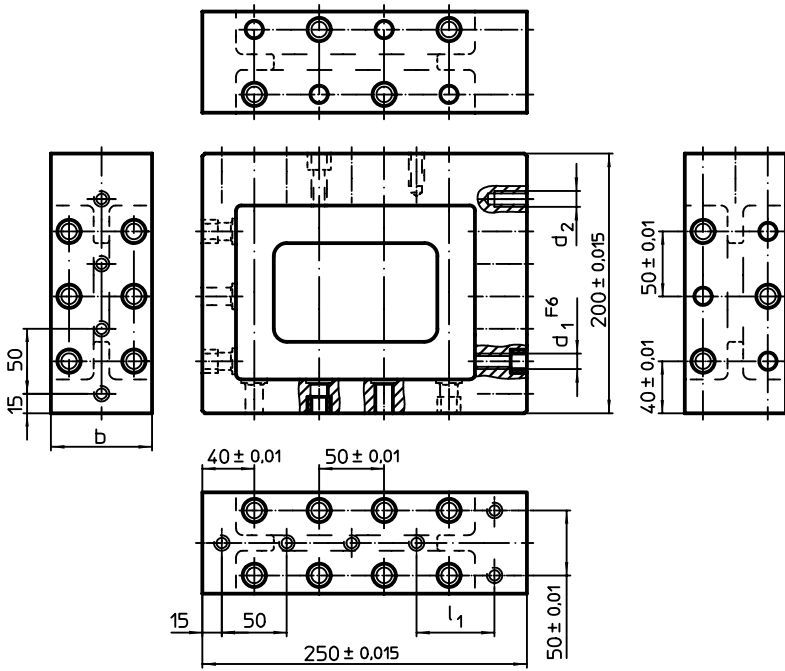


PRODUCT DESCRIPTION

Material

- Grey cast iron, phosphatized

DRAWING



ORDER INFORMATION

System	Dimensions				[kg]	Art. No.
	b	d ₁	d ₂	l ₁		
L12	78	12	M12	-	15	1510.200
L16	98	16	M16	60	16	1610.200

7

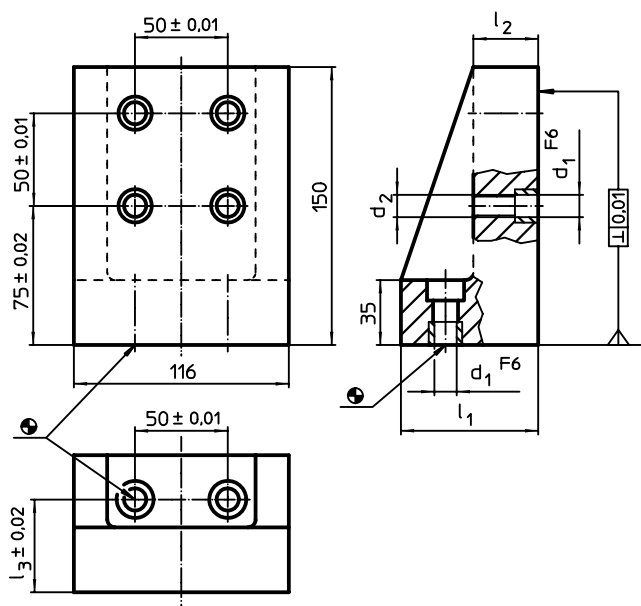
PRODUCT DESCRIPTION

Material

- Grey cast iron, phosphatized



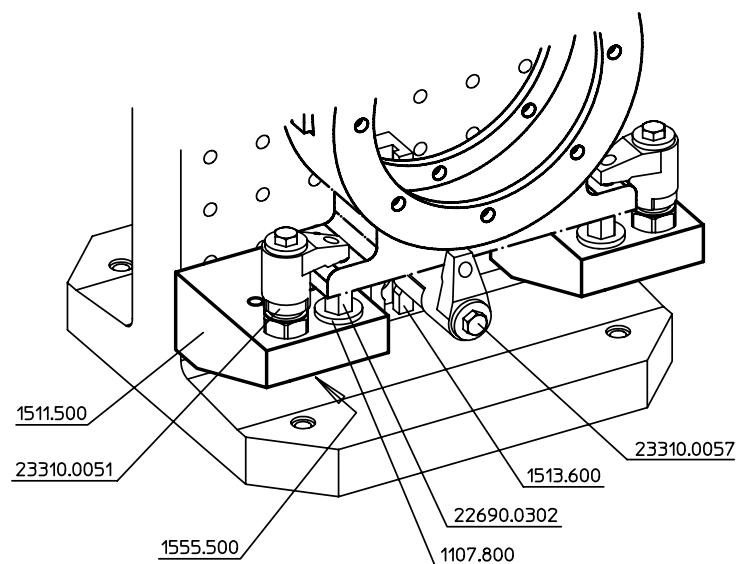
DRAWING



ORDER INFORMATION

System	Dimensions					[kg]	Art. No.
	l_1	l_2	l_3 [mm]	d_1	d_2		
L12	74	35	50	12	M12	6	1511.500
L16	79	40	55	16	M16	6	1611.500

APPLICATION EXAMPLE



Mounting Elements

EH 1512.000 - EH 1612.400

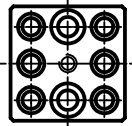
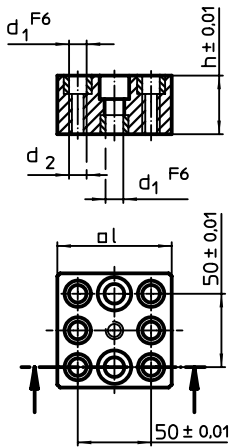


PRODUCT DESCRIPTION

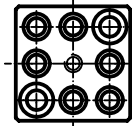
Material

- Grey cast iron, ground

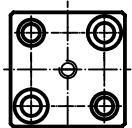
DRAWING



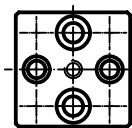
1512.000



1512.100



1612.200



1612.400

ORDER INFORMATION

System	Dimensions				[g]	Art. No.
	l	h	d ₁	d ₂		
L12	74.8	40	12	M12	1431	1512.000
					1287	1512.100
L16	90.0	50	16	M16	2645	1612.200
					2433	1612.400

Clamping Bars

EH 1513.600 - EH 1613.800

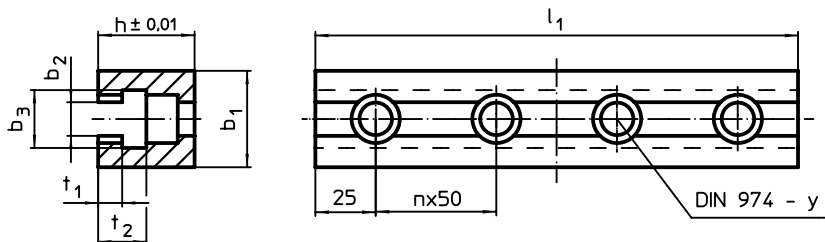


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

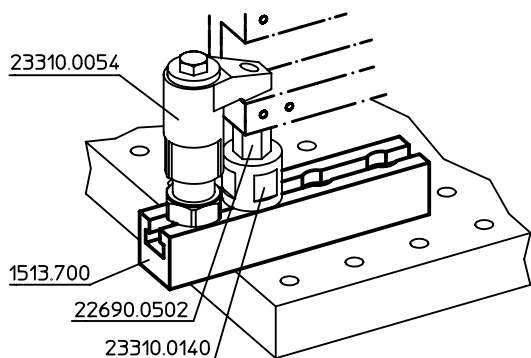
DRAWING



ORDER INFORMATION

System	Dimensions							y [mm]	For screws [mm]	Amount n	 [g]	Art. No.
	l ₁	b ₁	b ₂	b ₃	h	t ₁	t ₂					
L12	150	40	14.3	24	40	10	20	12	M12	2	1240	1513.600
	200	40	14.3	24	40	10	20	12	M12	3	1663	1513.700
L16	200	60	18.3	30	50	12	24	16	M16	3	3153	1613.700
	300	60	18.3	30	50	12	24	16	M16	5	4986	1613.800

APPLICATION EXAMPLE



Stops
EH 1614.500



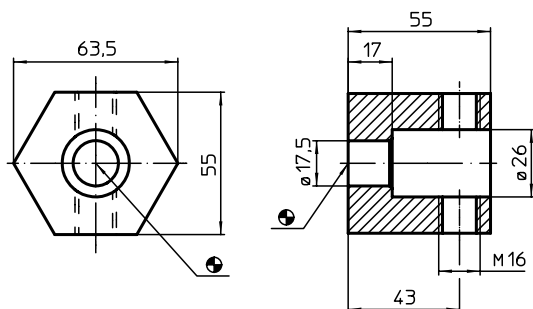
PRODUCT DESCRIPTION

For the L-12 hole and dowel system the abutment 1114.500 is used.


Material

- Steel, blackened

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
L16	894	1614.500

Clamping Heads

EH 1514.700 - EH 1614.700

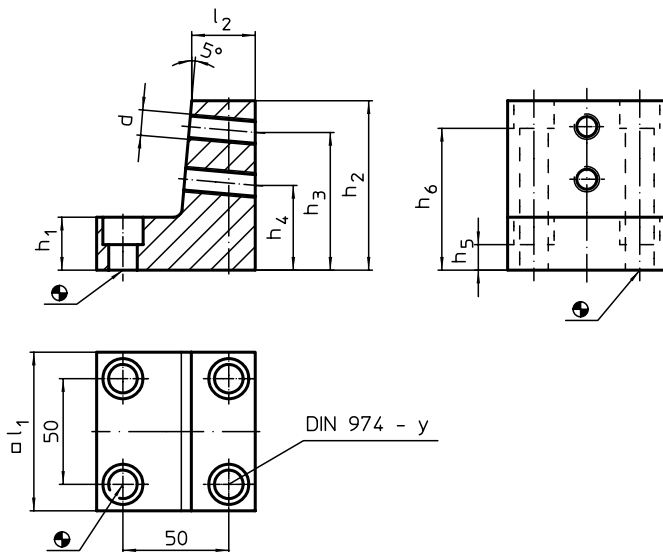


PRODUCT DESCRIPTION


Material

- Steel, blackened

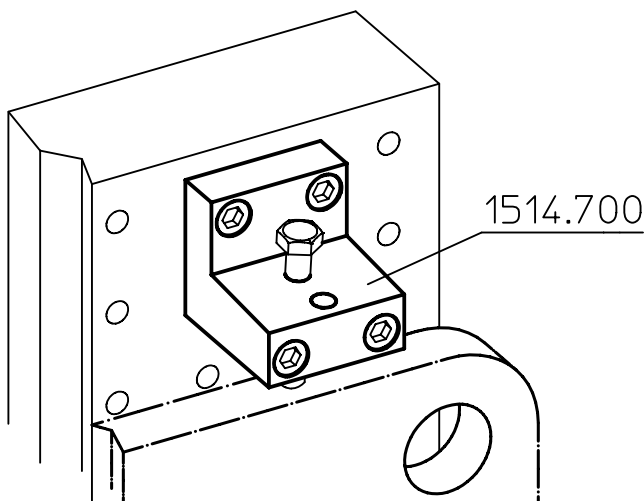
DRAWING



ORDER INFORMATION

System	Dimensions									y [mm]	For screws [mm]	 [g]	Art. No.
	l_1	l_2	h_1	h_2	h_3	h_4	h_5	h_6	d				
L12	74.8	30	25	80	65	40	12.0	67.0	M12	12	M12	1800	1514.700
L16	90.0	35	30	90	75	50	12.5	72.5	M16	16	M16	2800	1614.700

APPLICATION EXAMPLE



7

Spacers

EH 1617.400 - EH 1617.900



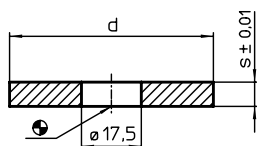
PRODUCT DESCRIPTION

For the L-12 hole and dowel system the disks 1107.400 - 1108.300 are used.

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions		[g]	Art. No.
	d	s		
	[mm]			
L16	39.5	3	24	1617.400
	59.5	3	62	1617.500
	39.5	4	30	1617.600
	59.5	4	79	1617.700
	39.5	5	40	1617.800
	59.5	5	99	1617.900

Stop Angles

EH 1520.400 - EH 1621.700

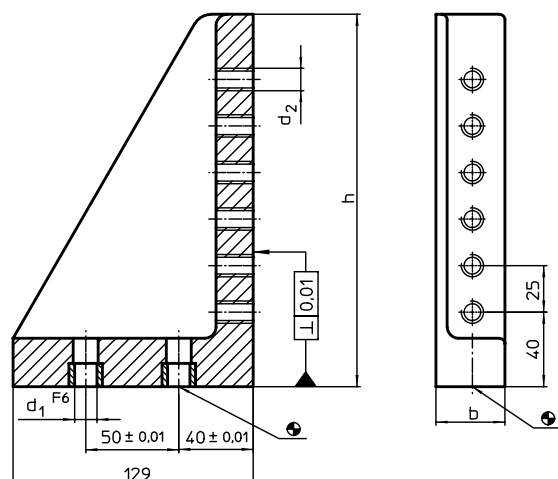


PRODUCT DESCRIPTION


Material

- Grey cast iron, phosphatized, ground

DRAWING



ORDER INFORMATION

System	b	Dimensions			Number of threads	 [g]	Art. No.
		h	d ₁	d ₂			
L12	37	140	12	M12	4	1688	1520.400
		200	12	M12	6	2167	1520.500
L16	66	140	16	M16	4	3121	1621.600
		200	16	M16	6	3642	1621.700

Clamping Bars

EH 1533.000 - EH 1633.200

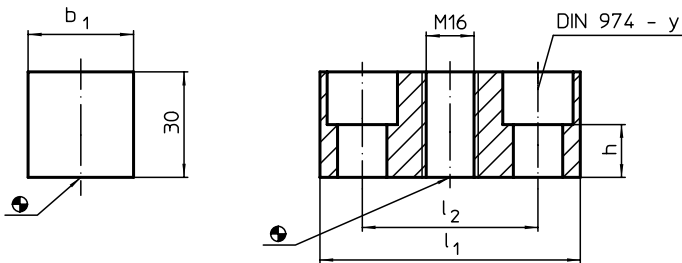


PRODUCT DESCRIPTION

Material


- Steel, blackened

DRAWING



7

ORDER INFORMATION

System	Dimensions				y	For screws	 [g]	Art. No.
	l ₁	b ₁	l ₂	h				
L12	74	30	50.0	15	12	M12	364	1533.000
	95	30	70.3	15	12	M12	510	1533.200
L16	85	35	50.0	14	16	M16	467	1633.000
	105	35	70.3	14	16	M16	629	1633.200

Thread Bolts

EH 1644.000

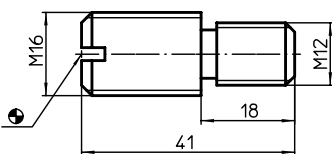


PRODUCT DESCRIPTION


Material

- Heat-treated steel, tempered, quality 10.9

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
L16	40	1644.000

Supporting Plates
EH 1547.900 - EH 1647.900

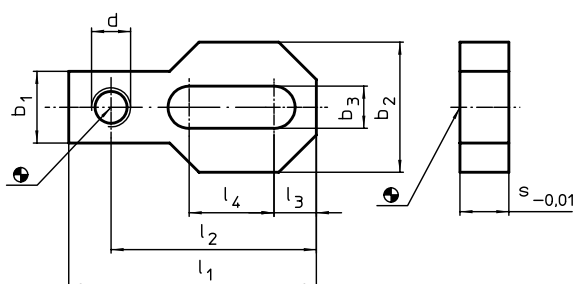


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions									 [g]	Art. No.
	l_1	l_2	l_3	l_4	b_1	b_2	b_3	s	d		
L12	76	63	13	26	22	40	13	15	M12	213	1547.900
L16	100	83	21	33	34	60	17	20	M16	567	1647.900



V-Blocks

EH 1548.100 - EH 1648.100

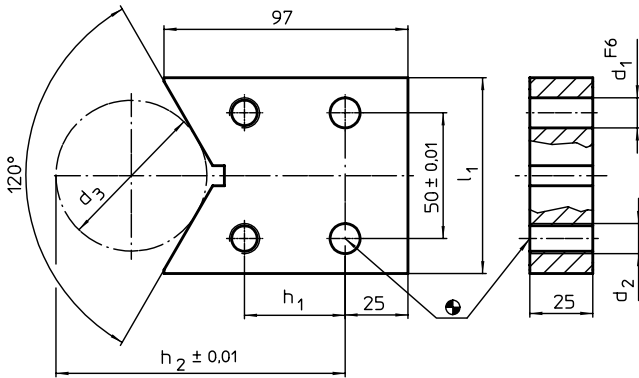


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

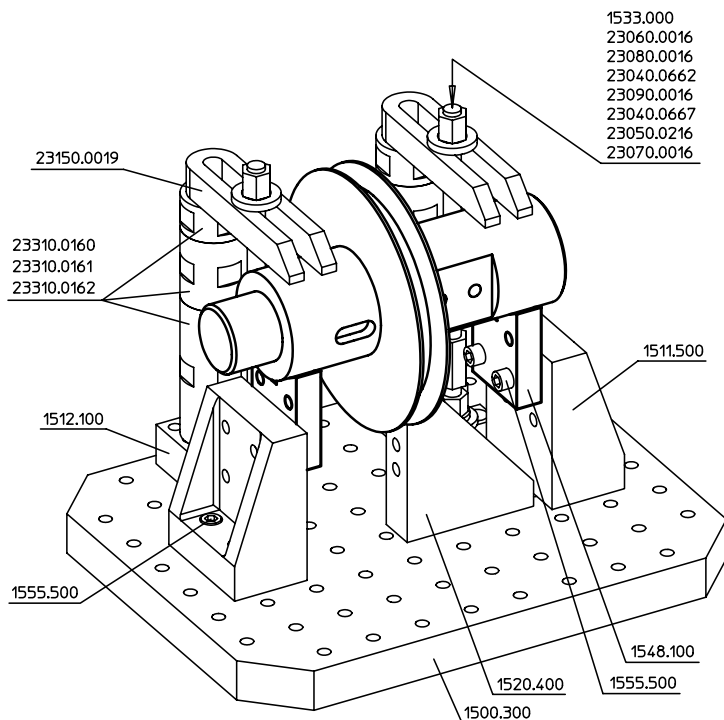
DRAWING



ORDER INFORMATION

System	Dimensions								[g]	Art. No.
	l_1	h_1	h_2	d_1	d_2	d_3	d_3 min.	d_3 max.		
[mm]										
L12	78	40	115	12	M12	60	18	148	1249	1548.100
L16	98	35	152	16	M16	100	18	190	1451	1648.100

APPLICATION EXAMPLE



V-Blocks

EH 1548.500 - EH 1648.500

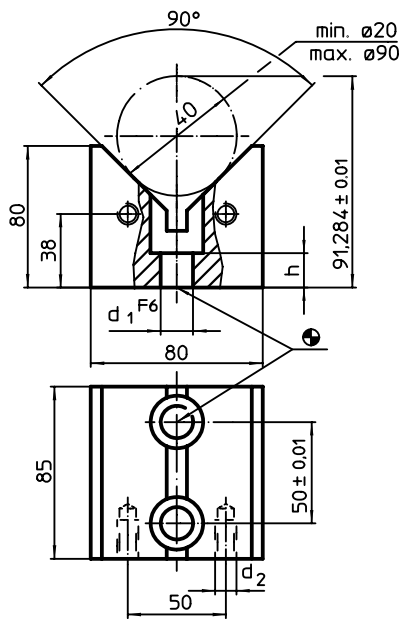
PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground



DRAWING



ORDER INFORMATION

System	Dimensions			Art. No.
	d ₁	d ₂ [mm]	h	
L12	12	M12	24	1548.500
L16	16	M16	25	1648.500



V-Block Elements right/left

EH 1548.700 - EH 1648.800

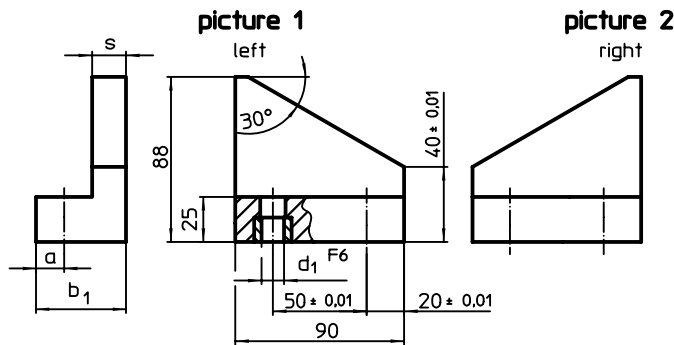


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



D1 (mm) ø-Area	n x T (mm) Distance	X
40-330	1x50= 50	190
140-430	2x50=100	240
240-530	3x50=150	290
340-630	4x50=200	340
440-730	5x50=250	390
540-830	6x50=300	440
640-930	7x50=350	490
740-1030	8x50=400	540
840-1130	9x50=450	590

ORDER INFORMATION

System	Dimensions				[g]	Art. No.
	b ₁	d ₁	s	a		
right – picture 2						
L12	48	12	18	15	1296	1548.700
L16	53	16	20	17	1437	1648.700
left – picture 1						
L12	48	12	18	15	1308	1548.800
L16	53	16	20	17	1431	1648.800

Positioning Clamping Bars

EH 1549.200 - EH 1649.200

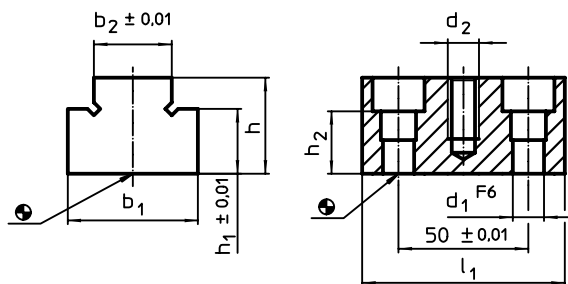


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

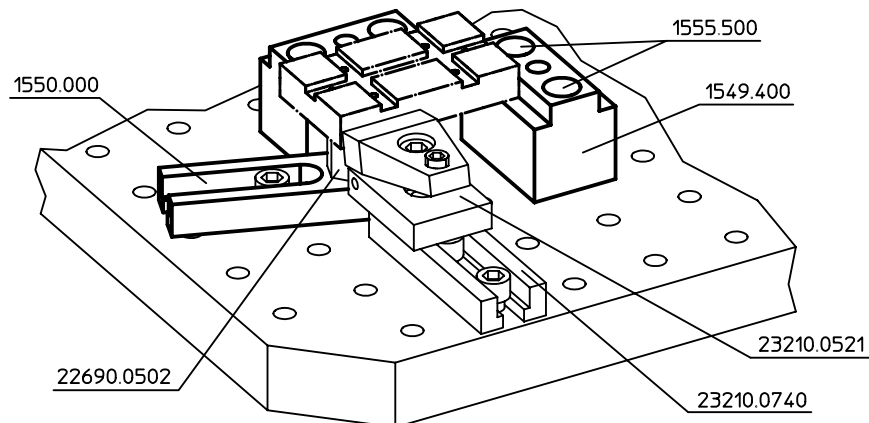
DRAWING



ORDER INFORMATION

System	Dimensions								Art. No.	
	l_1	b_1	h	b_2	h_1	h_2	d_1	d_2		[g]
L12	78	50	37	30	25	24	12	M12	834	1549.200
			57	30	45	24	12	M12	1317	1549.400
L16	90	60	45	40	35	25	16	M16	1439	1649.200

APPLICATION EXAMPLE



Supporting Bars

EH 1550.000 - EH 1650.000

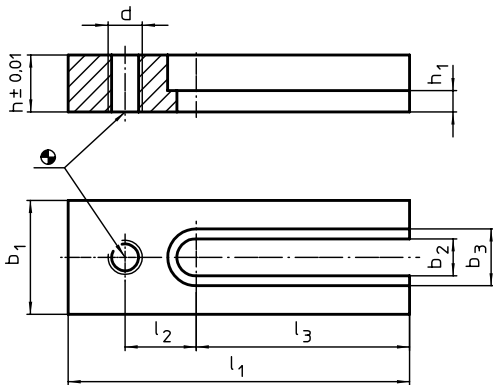


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions									Art. No.	
	l_1	b_1	h	l_2	l_3	b_2	b_3	h_1	d		
L12	120	40	20	25	75	13	20	7.5	M12	492	1550.000
L16	140	60	30	30	80	17	26	13.0	M16	1435	1650.000

Stops • cylindrical

EH 1551.500 - EH 1651.700

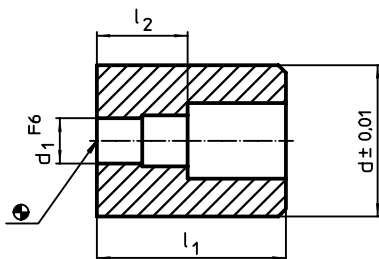


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	Dimensions				[g]	Art. No.
	l_1	l_2	d	d_1		
L12	50	24	40	12	400	1551.500
	70	24	40	12	552	1551.700
L16	60	25	50	16	737	1651.500
	90	25	50	16	1065	1651.700

Positioning Clamping Cylinders

EH 1553.500 - EH 1653.500

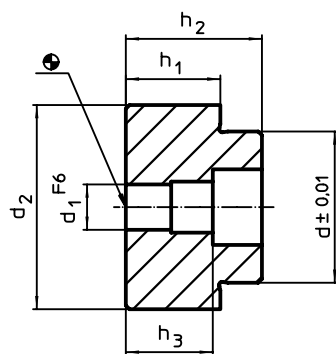


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

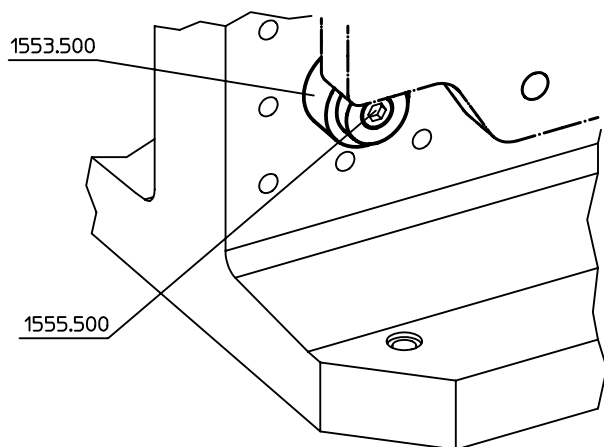
DRAWING



ORDER INFORMATION

System	Dimensions						[g]	Art. No.
	h_1 ± 0.01	h_2	d	d_1	d_2	h_3		
L12	25	36	40	12	54	24	502	1553.500
L16	35	46	50	16	70	25	1093	1653.500

APPLICATION EXAMPLE



Position Screws

EH 1555.500 - EH 1655.500

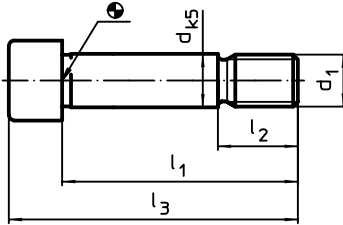


PRODUCT DESCRIPTION

Material

- Heat-treated steel, tempered, quality 10.9

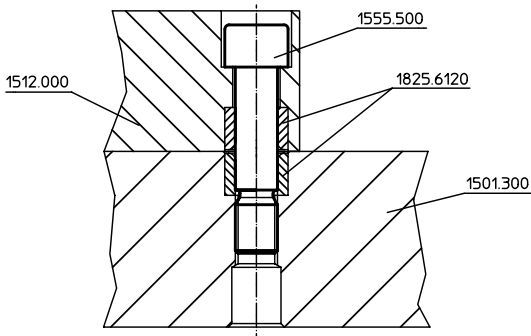
DRAWING



ORDER INFORMATION

System	Dimensions					[g]	Art. No.
	d ₁	l ₁	d [mm]	l ₂	l ₃		
L12	M12	53	12	18	65	61	1555.500
L16	M16	64	16	24	80	140	1655.500

APPLICATION EXAMPLE



7

Screw Plugs

EH 1557.000 - EH 1657.000

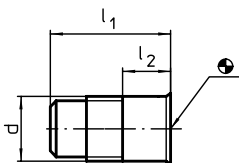


PRODUCT DESCRIPTION

Material

- Plastic

DRAWING

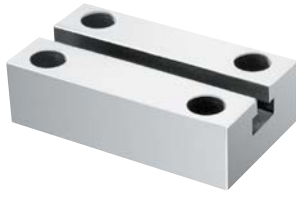


ORDER INFORMATION

System	Dimensions			[g]	Art. No.
	d	l ₁ [mm]	l ₂		
L12	M12	25	10	2.5	1557.000
L16	M16	30	12	5.8	1657.000

System Adapter Plates

EH 1580.000

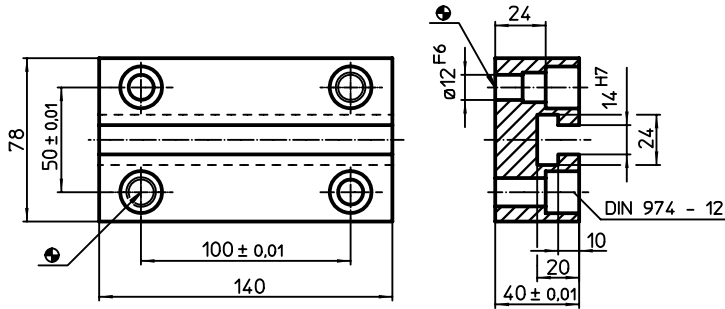


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System		Art. No.
L12	[g] 2743	1580.000

System Adapter Plates

EH 1581.000

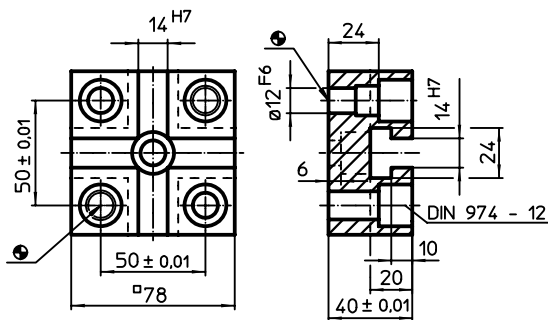


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING

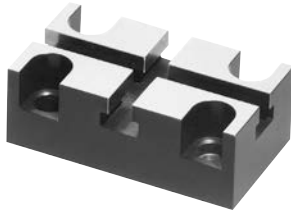


ORDER INFORMATION

System		Art. No.
L12	[g] 1202	1581.000

System Adapter Plates

EH 1681.000

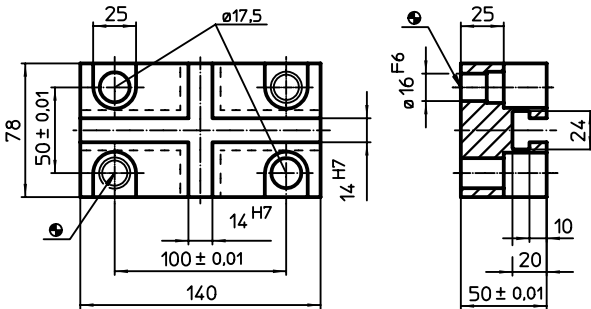


PRODUCT DESCRIPTION


Material

- Steel, case-hardened, ground

DRAWING



ORDER INFORMATION

System	 [kg]	Art. No.
L16	3	1681.000

STANDARD RANGES L12

ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 2 FIXTURES, ART. NO. 1590.110

Qty.	Description	Art. No.	Qty.	Description	Art. No.
System parts			Standard parts		
2	Base plate	1501.300	2	Grub screw	22540.0421
1	Console	1510.100	2	Grub screw	22540.0422
3	Mounting element	1512.000	2	Grub screw	22540.0423
3	Clamping block	1513.600	2	Screwed rest button, plain	22690.0001
2	Clamping block	1513.700	2	Screwed rest button, spherical	22690.0102
1	Stop angle	1520.400	2	Screwed rest button, plain	22690.0302
1	Stop angle	1520.500	2	Screwed rest button, plain	22690.0304
3	Supporting plate	1547.900	3	Screwed rest button, ribbed	22690.0502
1	V-block	1548.500	1	Self-aligning pad, plain, adjustable	22740.0017
2	Positioning clamping bar	1549.400	8	T-nut	23010.0142
5	Supporting bar	1550.000	2	Stud for T-nut	23040.0624
3	Stop	1551.500	2	Stud for T-nut	23040.0625
3	Stop	1551.700	2	Stud for T-nut	23040.0626
3	Positioning clamping cylinder	1553.500	2	Stud for T-nut	23040.0627
20	Position screw	1555.500	4	Plain washer	23060.0012
100	Screw plug	1557.000	4	Collar nut	23080.0012
1	Nut-adapter	1581.000	4	Extension nut	23090.0012
2	Plain washer	1107.400	2	Clamp	23150.0015
4	Plain washer	1107.600	2	Clamp	23150.0016
8	Plain washer	1107.800	2	Down-hold clamp	23210.0521
2	Plain washer	1107.900	1	Down-thrust clamp	23310.0051
5	Cylindrical stop	1114.500	1	Down-thrust clamp	23310.0054
1	Wrench	1139.400	5	Height adjusting cylinder	23310.0140
2	Supporting plate	1147.900	3	Height adjusting cylinder	23310.0141
1	Adjustable drilling support	1163.000	1	Height adjusting cylinder	23310.0142

The specified ranges are intended as recommendations.
The required parts vary with the workpiece.
The ranges can be modified as necessary

STANDARD RANGES L12

ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 5 FIXTURES, ART. NO. 1590.140

Qty.	Description	Art. No.	Qty.	Description	Art. No.
System parts			Standard parts		
3	Base plate	1501.300	5	Grub screw	22540.0421
2	Base plate	1501.500	5	Grub screw	22540.0422
2	Clamping angle	1505.200	5	Grub screw	22540.0423
6	Console	1510.100	3	Screwed rest button, plain	22690.0001
2	Console	1510.200	3	Screwed rest button, plain	22690.0002
8	Mounting element	1512.000	3	Screwed rest button, spherical	22690.0101
6	Clamping block	1513.600	3	Screwed rest button, spherical	22690.0102
6	Clamping block	1513.700	3	Screwed rest button, ribbed	22690.0201
3	Clamping head	1514.700	3	Screwed rest button, ribbed	22690.0202
3	Stop angle	1520.400	3	Screwed rest button, plain	22690.0302
3	Stop angle	1520.500	3	Screwed rest button, plain	22690.0303
5	Clamping block	1533.000	2	Screwed rest button, spherical	22690.0402
3	Clamping block	1533.200	3	Screwed rest button, spherical	22690.0404
6	Supporting plate	1547.900	3	Screwed rest button, ribbed	22690.0502
2	V-block	1548.100	3	Screwed rest button, ribbed	22690.0504
2	V-block	1548.500	2	Ball-ended thrust screw	22700.0624
2	V-Block element right	1548.700	2	Ball-ended thrust screw	22700.0626
2	V-Block element left	1548.800	3	Self-aligning pad, plain,	22730.0020
3	Positioning clamping bar	1549.200	2	Self-aligning pad, plain, adjustable	22740.0017
3	Positioning clamping bar	1549.400	15	T-nut	23010.0142
12	Supporting bar	1550.000	5	Stud for T-nut	23040.0624
6	Stop	1551.500	5	Stud for T-nut	23040.0625
6	Stop	1551.700	5	Stud for T-nut	23040.0626
6	Positioning clamping cylinder	1553.500	5	Stud for T-nut	23040.0627
30	Position screw	1555.500	3	Stud for T-nut	23040.0664
300	Screw plug	1557.000	3	Stud for T-nut	23040.0665
4	Nut-adapter	1580.000	3	Stud for T-nut	23040.0666
4	Nut-adapter	1581.000	6	Conical seat	23050.0212
5	Plain washer	1107.400	4	Conical seat	23050.0216
10	Plain washer	1107.600	25	Plain washer	23060.0012
20	Plain washer	1107.800	10	Plain washer	23060.0016
10	Plain washer	1107.900	6	Fixture nut	23070.0012
1	Slotted clamping angle	1112.100	4	Fixture nut	23070.0016
1	Slotted clamping angle	1112.400	10	Collar nut	23080.0012
10	Cylindrical stop	1114.500	10	Collar nut	23080.0016
2	T-slot centering block	1129.600	6	Extension nut	23090.0012
1	Wrench	1139.400	4	Extension nut	23090.0016
1	Locating pin	1140.700	4	Clamp	23150.0015
1	Locating pin	1140.800	4	Clamp	23150.0016
2	Intermediate plate	1147.700	2	Clamp	23150.0019
2	Support clamping bar	1147.800	2	Clamp	23150.0020
5	Supporting plate	1147.900	3	Clamp with nose	23180.0213
1	Adjustable drilling support	1163.000	2	Down-hold clamp	23210.0521
1	Adjustable drilling support	1163.100	2	Down-hold clamp	23210.0522
			2	Bedding support	23220.0150
			2	Down-thrust clamp	23310.0051
			1	Down-thrust clamp	23310.0054
			1	Down-thrust clamp	23310.0057
			16	Height adjusting cylinder	23310.0140
			8	Height adjusting cylinder	23310.0141
			6	Height adjusting cylinder	23310.0142

The specified ranges are intended as recommendations.
The required parts vary with the workpiece.
The ranges can be modified as necessary

STANDARD RANGES L16

ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 2 FIXTURES, ART. NO. 1690.110

Qty.	Description	Art. No.	Qty.	Description	Art. No.
System parts			Standard parts		
2	Base plate	1600.600	2	Grub screw	22540.0462
2	Console	1610.100	2	Grub screw	22540.0463
2	Mounting element	1612.200	2	Screwed rest button, plain	22690.0042
2	Mounting element	1612.400	2	Screwed rest button, spherical	22690.0142
2	Clamping block	1613.700	2	Screwed rest button, plain	22690.0343
5	Cylindrical stop	1614.500	2	Screwed rest button, plain	22690.0345
4	Plain washer	1617.400	2	Screwed rest button, ribbed	22690.0543
4	Plain washer	1617.600	3	Self-aligning pad, plain	22730.0030
6	Plain washer	1617.800	2	Self-aligning pad, plain, verstellbar	22740.0240
4	Plain washer	1617.900	5	T-nut	23010.0182
1	Stop angle	1621.600	2	Stud for T-nut	23040.0662
1	Stop angle	1621.700	2	Stud for T-nut	23040.0664
2	Clamping block	1633.000	2	Stud for T-nut	23040.0665
1	Clamping block	1633.200	2	Stud for T-nut	23040.0666
4	Thread bolt	1644.000	2	Stud for T-nut	23040.0667
3	Supporting plate	1647.900	10	Plain washer	23060.0016
1	V-block	1648.500	5	Collar nut	23080.0016
4	Supporting bar	1650.000	4	Extension nut	23090.0016
3	Stop	1651.500	2	Clamp	23150.0019
3	Positioning clamping cylinder	1653.500	2	Clamp	23150.0020
12	Position screw	1655.500	3	Clamp	23180.0217
100	Screw plug	1657.000	5	Height adjusting cylinder	23310.0165
			3	Height adjusting cylinder	23310.0166
			2	Height adjusting cylinder	23310.0167

The specified ranges are intended as recommendations.
The required parts vary with the workpiece.
The ranges can be modified as necessary

STANDARD RANGES L16

ASSORTMENT FOR THE SIMULTANEOUS CONSTRUCTION OF 4 FIXTURES, ART. NO. 1690.130

Qty.	Description	Art. No.	Qty.	Description	Art. No.
System parts			Standard parts		
3	Base plate	1600.600	5	C-washer	22290.0016
1	Base plate	1600.700	5	Grub screw	22540.0462
2	Clamping angle	1605.200	5	Grub screw	22540.0463
6	Console	1610.100	3	Screwed rest button, plain	22690.0042
2	Console	1610.200	3	Screwed rest button, plain	22690.0043
6	Mounting element	1612.200	3	Screwed rest button, spherical	22690.0142
4	Mounting element	1612.400	3	Screwed rest button, spherical	22690.0143
4	Clamping block	1613.700	3	Screwed rest button, ribbed	22690.0242
4	Clamping block	1613.800	3	Screwed rest button, ribbed	22690.0243
10	Cylindrical stop	1614.500	3	Screwed rest button, plain	22690.0343
3	Clamping head	1614.700	3	Screwed rest button, plain	22690.0345
5	Plain washer	1617.400	3	Screwed rest button, spherical	22690.0443
5	Plain washer	1617.500	3	Screwed rest button, spherical	22690.0445
10	Plain washer	1617.600	3	Screwed rest button, ribbed	22690.0543
5	Plain washer	1617.700	3	Screwed rest button, ribbed	22690.0545
20	Plain washer	1617.800	3	Self-aligning pad, plain	22730.0030
10	Plain washer	1617.900	3	Self-aligning pad, ribbed	22730.0330
2	Stop angle	1621.600	2	Self-aligning pad, plain, adjustable	22740.0024
2	Stop angle	1621.700	10	T-nut	23010.0182
5	Clamping block	1633.000	4	Stud for T-nut	23040.0662
3	Clamping block	1633.200	4	Stud for T-nut	23040.0664
10	Thread bolt	1644.000	4	Stud for T-nut	23040.0665
6	Supporting plate	1647.900	4	Stud for T-nut	23040.0666
2	V-block	1648.100	4	Stud for T-nut	23040.0667
2	V-block	1648.500	4	Conical seat	23050.0216
2	V-Block element right	1648.700	30	Plain washer	23060.0016
2	V-Block element left	1648.800	5	Fixture nut	23070.0016
3	Positioning clamping bar	1649.200	10	Collar nut	23080.0016
12	Supporting bar	1650.000	10	Extension nut	23090.0016
6	Stop	1651.500	4	Clamp	23150.0018
3	Stop	1651.700	4	Clamp	23150.0019
5	Positioning clamping cylinder	1653.500	2	Clamp	23150.0020
25	Position screw	1655.500	3	Clamp	23180.0217
300	Screw plug	1657.000	2	Down-hold clamp	23210.0541
			8	Height adjusting cylinder	23310.0145
			4	Height adjusting cylinder	23310.0146
			3	Height adjusting cylinder	23310.0147
			8	Height adjusting cylinder	23310.0165
			4	Height adjusting cylinder	23310.0166
			3	Height adjusting cylinder	23310.0167

The specified ranges are intended as recommendations.
The required parts vary with the workpiece.
The ranges can be modified as necessary

NOTES

A large grid of small squares, intended for taking notes. The grid consists of 20 columns and 30 rows of small, light gray squares.

8 STANDARD PARTS

FOR FIXTURE SYSTEMS



STANDARD PARTS

FOR FIXTURE SYSTEMS

We carry a comprehensive selection of clamping and fixture elements that complement our fixture systems.



C-Washers • DIN 6372

EH 22290.

**PRODUCT DESCRIPTION**

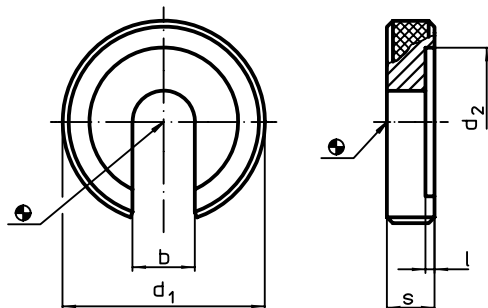
The c-washers (slotted washers) are manufactured according to DIN 6372. For better handling, the c-washers have a knurling all around.

Material

- Heat-treated steel, tempered, blackened

MORE INFORMATION**Further products**

Complete Range → p. 189

DRAWING**ORDER INFORMATION**

System	Nominal size [mm]	Dimensions					[g]	Art. No.
		b	d ₁	d ₂ [mm]	l	s		
V40	8	8.4	28	21	1.0	7	24	22290.0008
V70/L12	12	13.0	40	30	1.8	9	57	22290.0012
V70/L16	16	17.0	56	37	1.8	12	164	22290.0016



PRODUCT DESCRIPTION

Grub screws are clamping screws that can directly transmit forces via the thrust point. The pressure surface of the thrust point of the steel version is hardened. For clamping sensitive surfaces, thrust pads EH 22560. (DIN 6311 and low version) can be attached on the thrust point. The snap ring of the thrust pad achieves a connection between the grub screw and the thrust pad that can be released by hand. These grub screws with thrust points are particularly characterised by the additional radius "r" on the thrust point (optimisation compared to DIN 6332), which makes assembly in the thrust pad much easier. The thrust point diameter of the grub screws is smaller than the core diameter of the thread, so that they can also be screwed in on the pin side.

Material

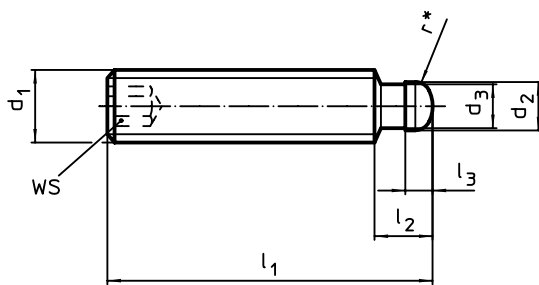
- Steel, blackened, quality 5.8, thrust point hardened

MORE INFORMATION

Further products

- Complete Range → p. 280
- Thrust Pads, DIN 6311 and low model → p. 282

DRAWING



picture 2

ORDER INFORMATION

System	Dimensions								WS [mm]	[g]	Art. No. Steel
	d ₁	l ₁	d ₂ h11	d ₃	l ₂	l ₃	l ₄	l ₅			
with internal hexagon (IS) – picture 2											
V40	M 8	40	6	5.4	7.5	3.0	43.0	42.5	4	11	22540.0381
		60	6	5.4	7.5	3.0	63.0	62.5	4	17	22540.0382
V70	M10	60	8	7.2	9.0	4.5	63.6	62.6	5	26	22540.0401
		80	8	7.2	10.0	4.5	64.6	62.6	6	36	22540.0421
V70/L12	M12	80	8	7.2	10.0	4.5	84.6	82.6	6	51	22540.0422
		100	8	7.2	10.0	4.5	104.6	102.6	6	117	22540.0423
V70/L16	M16	100	12	11.0	12.0	5.0	105.4	102.9	8	119	22540.0462
		125	12	11.0	12.0	5.0	130.4	127.9	8	154	22540.0463

Seating Pins • ribbed or pointed

EH 22680.



PRODUCT DESCRIPTION

For workpieces showing a rough surface. Pointed type (picture 2) especially suitable for cast parts.

Material

Body

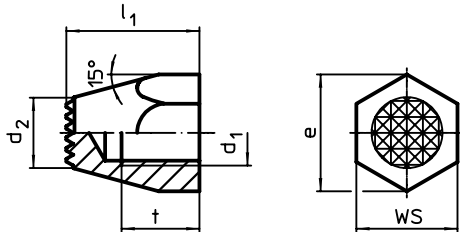
- Free cutting steel, case-hardened, blackened

MORE INFORMATION

Further products

Complete Range → p. 309

DRAWING



picture 3

ORDER INFORMATION

System	Dimensions					WS	Tightening torque max.	[g]	Art. No.
	l_1	d_1	t	d_2	e				
case-hardened, ribbed, with female thread – picture 3									
V40	20	M 8	10	9	15.0	13	18	14	22680.0142
	25	M 8	10	9	15.0	13	18	20	22680.0144
V70/L12	25	M12	15	13	21.9	19	60	33	22680.0184
	30	M12	15	13	21.9	19	60	44	22680.0186
	40	M12	15	13	21.9	19	60	69	22680.0188

Seating Pins • pin shape

EH 22680.



PRODUCT DESCRIPTION

To be used as solid and precise seat and stop. The pin-shaped form of this locating pin allows an application in components with narrow seating points. Bearing surface induction hardened and grounded.

Material

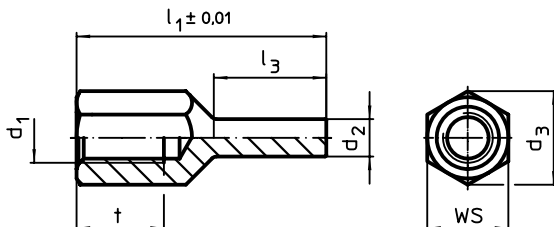
- Heat-treated steel, tempered, blackened

MORE INFORMATION

Further products


Complete Range → p. 310

DRAWING

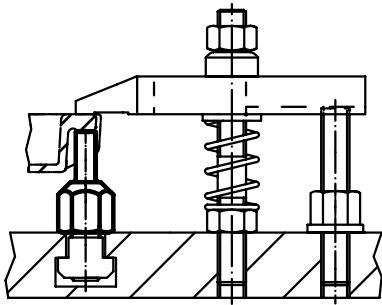


picture 2

ORDER INFORMATION

System	l_1 ± 0.01	d_1	Dimensions				d_3	WS [mm]	Tightening torque max. [Nm]	 [g]	Art. No.
			d_2	l_3	t	[mm]					
with female thread – picture 2											
V40	30	M 8	4	13	10	14.4	13	18	13	22680.0462	
	40	M 8	4	18	14	14.4	13	18	18	22680.0464	
V70/L12	40	M12	8	18	12	21.2	19	60	41	22680.0486	
	60	M12	8	28	18	21.2	19	60	63	22680.0488	

APPLICATION EXAMPLE



Pins
EH 22690.



PRODUCT DESCRIPTION

To be used as seats, stops and thrust pads.

Material

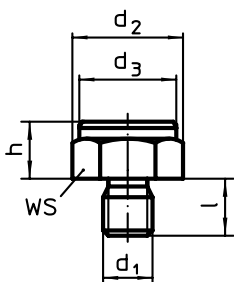
- Steel, case-hardened, blackened

MORE INFORMATION

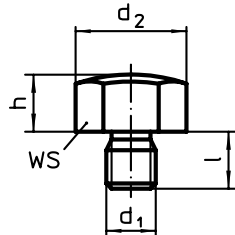
Further products

Complete Range → p. 311

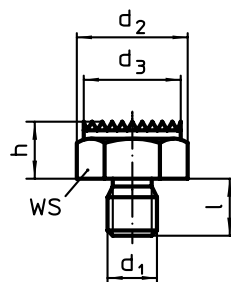
DRAWING



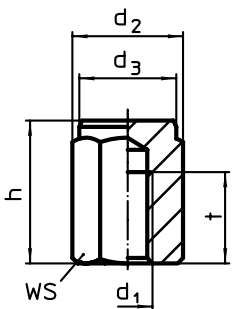
picture 1



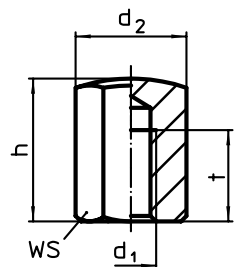
picture 2



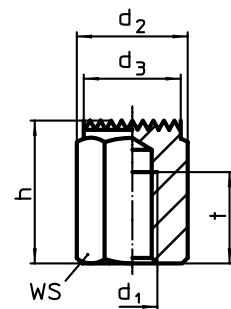
picture 3



picture 4




picture 5



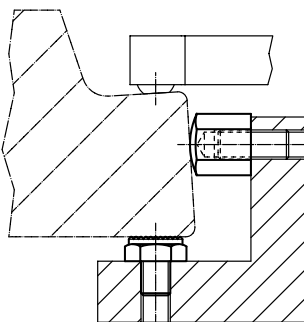
picture 6

ORDER INFORMATION

System	Dimensions						WS	Tightening torque max.		Art. No.
	h	d ₁	d ₂	d ₃	l	t				
with male thread, bearing surface plain – picture 1										
V40	10 ±0.01	M 8	19.4	17	10	–	17	18	21	22690.0021
V70/L12	10 ±0.01	M12	25.2	22	14	–	22	60	40	22690.0001
	15 ±0.01	M12	25.2	22	14	–	22	60	55	22690.0002
L16	15 ±0.01	M16	33.0	30	19	–	30	140	110	22690.0042
	20 ±0.01	M16	33.0	30	19	–	30	140	140	22690.0043
with male thread, bearing surface spherical – picture 2										
V40	10 ±0.10	M 8	19.4	–	10	–	17	18	20	22690.0121
V70	10 ±0.10	M12	25.2	–	14	–	22	60	37	22690.0101
	15 ±0.10	M12	25.2	–	14	–	22	60	53	22690.0102
L16	15 ±0.10	M16	33.0	–	19	–	30	140	105	22690.0142
	20 ±0.10	M16	33.0	–	19	–	30	140	135	22690.0143
with male thread, bearing surface ribbed – picture 3										
V40	10 ±0.10	M 8	19.4	17	10	–	17	18	20	22690.0221
V70/L12	10 ±0.10	M12	25.2	22	14	–	22	60	38	22690.0201
	15 ±0.10	M12	25.2	22	14	–	22	60	54	22690.0202
L16	15 ±0.10	M16	33.0	30	19	–	30	140	106	22690.0242
	20 ±0.10	M16	33.0	30	19	–	30	140	136	22690.0243
with female thread, bearing surface plain tolerance l₁ = ±0,01 – picture 4										
V40	15 ±0.01	M 8	19.4	17	15	6	17	25 ¹⁾	25	22690.0321
	25 ±0.01	M 8	19.4	17	25	12	17	25 ¹⁾	42	22690.0323
V70/L12	20 ±0.01	M12	25.2	22	20	10	22	82 ¹⁾	52	22690.0301
	25 ±0.01	M12	25.2	22	25	15	22	82 ¹⁾	65	22690.0302
	30 ±0.01	M12	25.2	22	30	18	22	82 ¹⁾	79	22690.0303
	40 ±0.01	M12	25.2	22	40	18	22	82 ¹⁾	111	22690.0304
	50 ±0.01	M12	25.2	22	50	18	22	82 ¹⁾	142	22690.0305
L16	30 ±0.01	M16	33.0	30	30	20	30	206 ¹⁾	141	22690.0343
	50 ±0.01	M16	33.0	30	50	24	30	206 ¹⁾	256	22690.0345
with female thread, bearing surface spherical – picture 5										
V40	15 ±0.10	M 8	19.4	–	15	6	17	25 ¹⁾	24	22690.0421
	25 ±0.10	M 8	19.4	–	25	12	17	25 ¹⁾	41	22690.0423
V70/L12	20 ±0.10	M12	25.2	–	20	10	22	82 ¹⁾	50	22690.0401
	25 ±0.10	M12	25.2	–	25	15	22	82 ¹⁾	62	22690.0402
	30 ±0.10	M12	25.2	–	30	18	22	82 ¹⁾	76	22690.0403
	40 ±0.10	M12	25.2	–	40	18	22	82 ¹⁾	109	22690.0404
	50 ±0.10	M12	25.2	–	50	18	22	82 ¹⁾	141	22690.0405
L16	30 ±0.10	M16	33.0	–	30	20	30	206 ¹⁾	136	22690.0443
	50 ±0.10	M16	33.0	–	50	24	30	206 ¹⁾	252	22690.0445
with female thread, bearing surface ribbed – picture 6										
V40	15 ±0.10	M 8	19.4	17	15	6	17	25 ¹⁾	24	22690.0521
	25 ±0.10	M 8	19.4	17	25	12	17	25 ¹⁾	41	22690.0523
V70/L12	20 ±0.10	M12	25.2	22	20	10	22	82 ¹⁾	50	22690.0501
	25 ±0.10	M12	25.2	22	25	15	22	82 ¹⁾	63	22690.0502
	30 ±0.10	M12	25.2	22	30	18	22	82 ¹⁾	77	22690.0503
	40 ±0.10	M12	25.2	22	40	18	22	82 ¹⁾	109	22690.0504
	50 ±0.10	M12	25.2	22	50	18	22	82 ¹⁾	141	22690.0505
L16	30 ±0.10	M16	33.0	30	30	20	30	206 ¹⁾	137	22690.0543
	50 ±0.10	M16	33.0	30	50	24	30	206 ¹⁾	254	22690.0545

¹⁾ The tightening torque of bolts with female thread is for threaded pins, quality 8. The bolt has to be tightened over the total thread length.

APPLICATION EXAMPLE



Ball-Ended Thrust Screws • headless, ball protected against rotating
EH 22700.



PRODUCT DESCRIPTION

Ball-ended thrust screws can also be used for clamping, tightening or supporting of non-parallel surfaces.
The flat-faced, movable ball enables a flat load transmission.

Material

- Ball**
 - Ball-bearing steel, hardened
- Screw**
 - Heat-treated steel, 1200 ±100 N/mm²

MORE INFORMATION

Notes
Ball protected against rotating.
Special types on request.

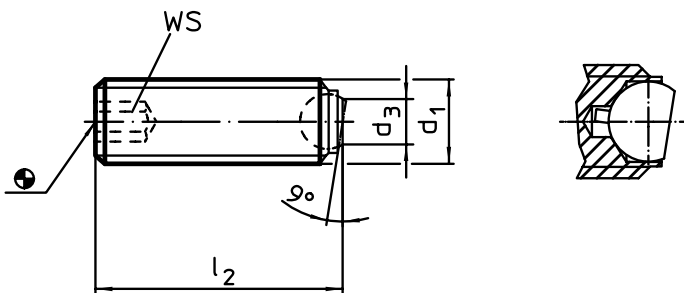
References

Thread lock on request, please refer to appendix - Technical Data -

Further products

- Complete Range → p. 320
- Ball-Ended Thrust Screws, headless, flat-faced ball → p. 327
- Ball-Ended Thrust Screws, headless, with fine-pitch thread → p. 330
- Ball-Ended Thrust Screws, headless, flat-faced ball and hexalobular socket → p. 333

DRAWING



ORDER INFORMATION

System	Dimensions				WS	Load capacity for static load ¹⁾ max.	[g]	Art. No.
	d ₁	l ₂	d ₃	ball diameter				
[mm]								
flat-faced ball, bearing surface plain								
V40	M 8	20	4.5	5.5	4	9	5.1	22700.0584
V70/L12	M12	30	7.2	8.5	6	18	18.0	22700.0624
		40	7.2	8.5	6	18	25.0	22700.0626
V70/L16	M16	50	10.7	12.0	8	36	60.0	22700.0666
flat-faced ball, bearing surface ribbed								
V70/L12	M12	30	7.2	8.5	6	18	18.0	22700.0724
		40	7.2	8.5	6	18	25.0	22700.0726
V70/L16	M16	50	10.7	12.0	8	36	60.0	22700.0766

¹⁾ Statements on load capacity are not valid for the stainless steel type.

Self-Aligning Pads

EH 22730.



PRODUCT DESCRIPTION

Self-aligning pads are used as stop, support and thrust pad and are suitable for installation in clamping elements.

Material

Ball

- Ball-bearing steel, hardened, bright

Body

- Heat-treated steel, tempered, phosphated

MORE INFORMATION

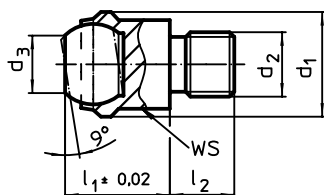
Notes

Ball protected against rotating.
Loading capacity valid for steel and stainless steel designs.

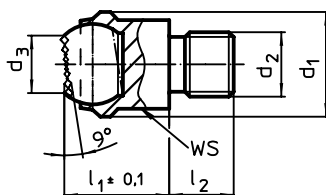
Further products

Complete Range → p. 338

DRAWING



picture 1



picture 2

ORDER INFORMATION

System	Dimensions						WS	Load capacity for static load max.	Tightening torque max.	[g]	Art. No.
	d ₁	d ₂	d ₃	l ₁	l ₂	ball diameter					
with male thread, flat-faced ball, bearing surface plain – picture 1											
V40	13	M 8	7.2	13	8	10	11	10	25	13	22730.0013
V70/L12	20	M12	10.5	18	12	16	17	25	82	43	22730.0020
V70/L16	30	M16	20.0	27	16	25	27	90	206	151	22730.0030
with male thread, flat-faced ball, bearing surface ribbed – picture 2											
V40	13	M 8	7.2	13	8	10	11	10	25	13	22730.0313
V70/L12	20	M12	10.5	18	12	16	17	25	82	43	22730.0320
V70/L16	30	M16	20.0	27	16	25	27	90	206	149	22730.0330

Self-Aligning Pads • self-resetting

EH 22731.



PRODUCT DESCRIPTION

Self-aligning pads are used as stop, support and thrust pad and are suitable for installation in clamping elements.

By resetting to the parallel position the contact point of the self-aligning pad provides a defined initial position, thus preventing the pad clamping in an oblique position when inserting the workpiece.

Material

Spring element

- Thermoplastic PUR

Ball

- Ball-bearing steel, hardened, bright

Body

- Heat-treated steel, tempered, phosphated

MORE INFORMATION

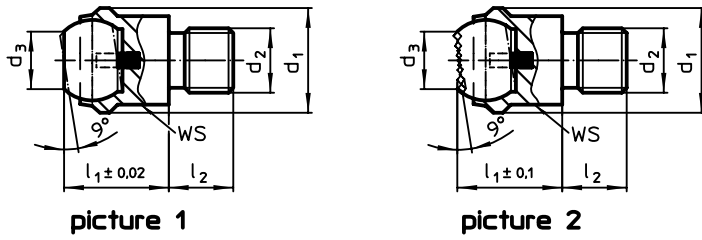
Notes

Ball protected against rotating.
Loading capacity valid for steel and stainless steel designs.

Further products

Complete Range → p. 340

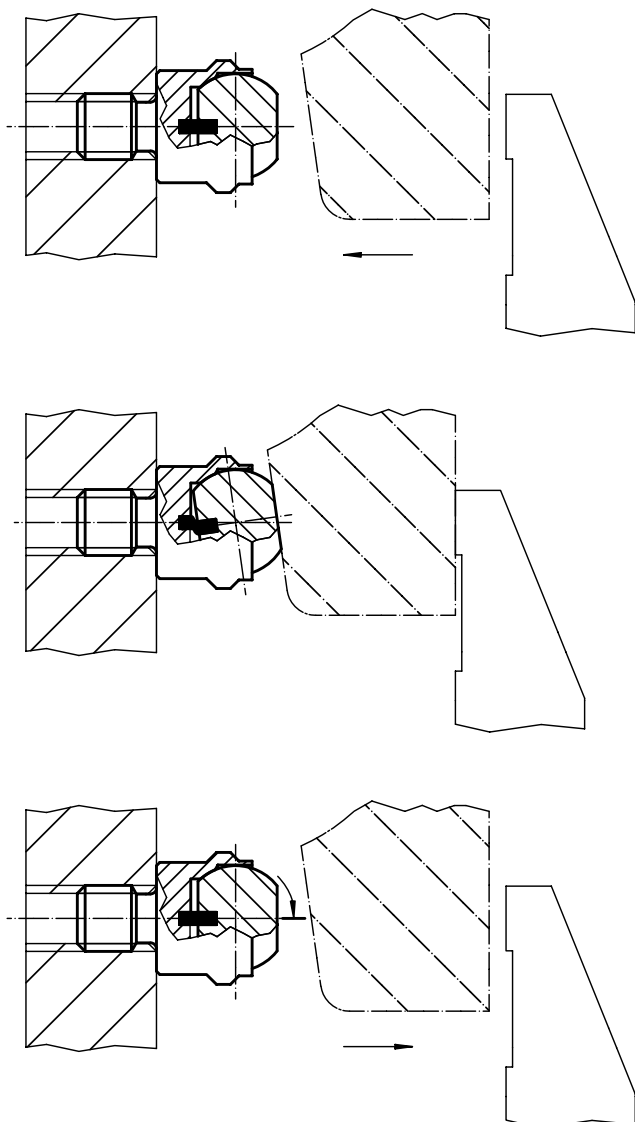
DRAWING



ORDER INFORMATION

System	d ₁	d ₂	Dimensions				ball diameter	WS	Load capacity for static load max. [kN]	Tightening torque max. [Nm]	[g]	Art. No. Heat-treated steel
			d ₃	l ₁	l ₂	l ₂ -0.5						
with male thread, flat-faced ball, bearing surface plain – picture 1												
V40	13	M 8	7.2	13	8	10	11	10	25	13	22731.0013	
	20	M 8	10.5	18	10	16	17	25	25	38	22731.0018	
V70/L12	20	M12	10.5	18	12	16	17	25	82	43	22731.0020	
V70/L16	30	M16	20.0	27	16	25	27	90	206	149	22731.0030	
with male thread, flat-faced ball, bearing surface ribbed – picture 2												
V40	13	M 8	7.2	13	8	10	11	10	25	13	22731.0313	
	20	M 8	10.5	18	10	16	17	25	25	37	22731.0318	
V70/L12	20	M12	10.5	18	12	16	17	25	82	43	22731.0320	
V70/L16	30	M16	20.0	27	16	25	27	90	206	149	22731.0330	

APPLICATION EXAMPLE



Self-Aligning Pads • adjustable

EH 22740.



PRODUCT DESCRIPTION

Self-aligning pads are used as stop, support and thrust pad and are suitable for installation in clamping elements.

Material

Ball

- Ball-bearing steel, hardened, bright

Body

- Heat-treated steel, tempered, phosphated

Nut

- Steel, blackened (ISO 4035)

MORE INFORMATION

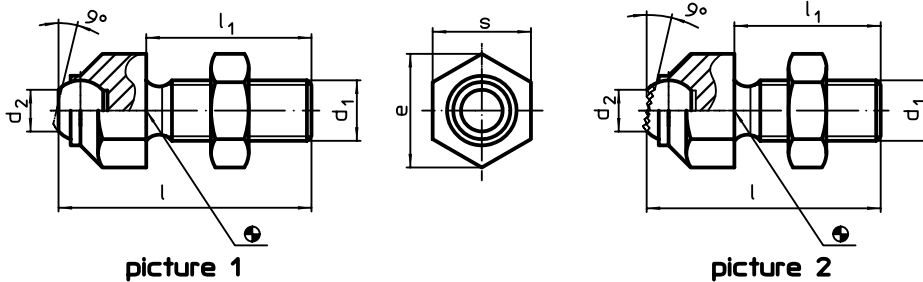
Notes

Ball protected against rotating.
Loading capacity valid for steel and stainless steel designs.
Special types on request.

Further products

Complete Range → p. 343

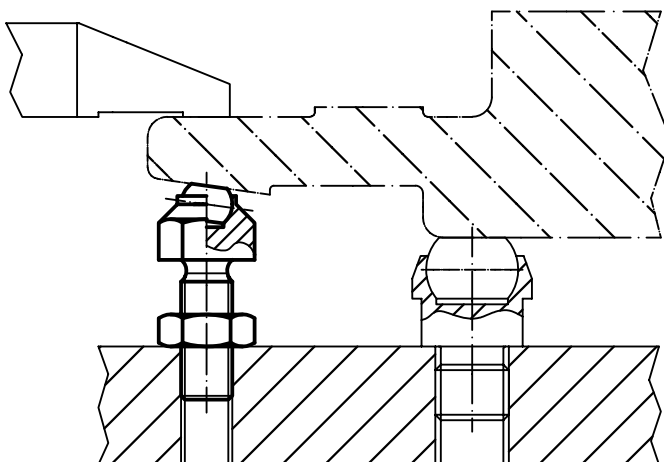
DRAWING



ORDER INFORMATION

System	Dimensions						Load capacity for static load max. [kN]	Tightening torque max. [Nm]	[g]	Art. No.
	d ₁	l	l ₁	d ₂	e	ball diameter				
with flat-faced ball, bearing surface plain – picture 1										
V40	M 8	36.6	25	5.8	14.5	8.5	8	25	20	22740.0013
V70	M10	45.7	30	8.6	19.0	12.0	8	46	44	22740.0016
V70/L12	M12	50.7	35	8.6	19.0	12.0	15	82	57	22740.0017
V70/L16	M16	60.7	40	10.5	27.0	16.0	25	206	131	22740.0024
with flat-faced ball, bearing surface ribbed – picture 2										
V40	M 8	36.6	25	5.8	14.5	8.5	8	25	20	22740.0313
V70	M10	45.7	30	8.6	19.0	12.0	8	46	44	22740.0316
V70/L12	M12	50.7	35	8.6	19.0	12.0	15	82	56	22740.0317
V70/L16	M16	60.7	40	10.5	27.0	16.0	25	206	130	22740.0324

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

Self-aligning pads are used as stop, support and thrust pad and are suitable for installation in clamping elements.

By resetting to the parallel position the contact point of the self-aligning pad provides a defined initial position, thus preventing the pad clamping in an oblique position when inserting the workpiece.

Material

Spring element

- Thermoplastic PUR

Ball

- Ball-bearing steel, hardened, bright

Body

- Heat-treated steel, tempered, phosphated

Nut

- Steel, blackened (ISO 4035)

MORE INFORMATION

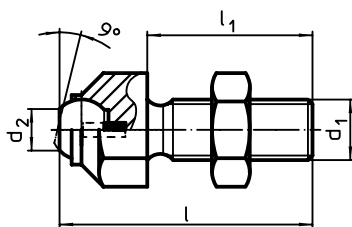
Notes

Ball protected against rotating.
Loading capacity valid for steel and stainless steel designs.
Special types on request.

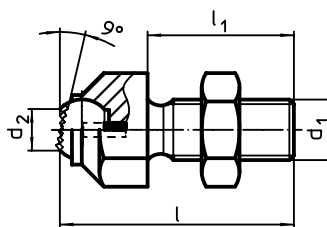
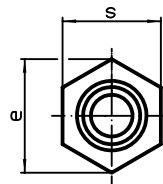
Further products

Complete Range → p. 344

DRAWING



picture 1



picture 2

ORDER INFORMATION

System	Dimensions						Load capacity for static load max. [kN]	Tightening torque max. [Nm]	Weight [g]	Art. No.
	d ₁	l	l ₁	d ₂	e	ball diameter				
[mm]										
with flat-faced ball, bearing surface plain – picture 1										
V40	M 8	36.6	25	5.8	14.5	8.5	8	25	20	22741.0013
V70	M10	45.7	30	8.6	19.0	12.0	8	46	44	22741.0016
V70/L12	M12	50.7	35	8.6	19.0	12.0	15	82	56	22741.0017
V70/L16	M16	60.7	40	10.5	27.0	16.0	25	206	128	22741.0024
with flat-faced ball, bearing surface ribbed – picture 2										
V40	M 8	36.6	25	5.8	14.5	8.5	8	25	20	22741.0313
V70	M10	45.7	30	8.6	19.0	12.0	8	46	44	22741.0316
V70/L12	M12	50.7	35	8.6	19.0	12.0	15	82	56	22741.0317
V70/L16	M16	60.7	40	10.5	27.0	16.0	25	206	128	22741.0324

Nuts for T-Slots • DIN 508

EH 23010.



PRODUCT DESCRIPTION

These nuts for T-slots (slot nuts) are manufactured according to DIN 508. The range is extended by other dimensions that are not included in DIN.

Material

- Heat-treated steel, tempered, quality 10, blackened

Assembly

The entire loading capacity of the T-nut can only be applied if the screwing is guaranteed to be made over the total thread length of the T-nut.

MORE INFORMATION

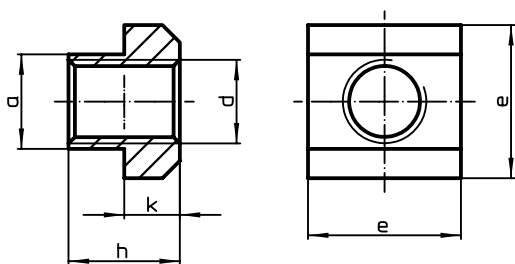
Notes

Special types on request.

Further products

Complete Range → p. 384

DRAWING



ORDER INFORMATION

System	T-slot size [mm]	Dimensions					For T-slots DIN 650 [mm]	Testing force to DIN 508 F min. [kN]	[g]	Art. No. Heat-treated steel
		d	a	e	h	k				
V70	14	M 6	13.6	22	16	8	14	16	43	23010.0146 ¹⁾
		M 8	13.6	22	16	8	14	29	41	23010.0145 ¹⁾
		M10	13.6	22	16	8	14	46	38	23010.0144 ¹⁾
		M12	13.6	22	16	8	14	67	34	23010.0142
L16	18	M16	17.6	28	20	10	18	128	68	23010.0182

¹⁾ DIN standards do not include these dimensions.

Nuts for T-Slots • extended

EH 23020.



PRODUCT DESCRIPTION

Nuts for T-slots "extended" are, in comparison to the version according to DIN 508, of an extended design and are particularly suitable for assembly in the slot cross.

Material

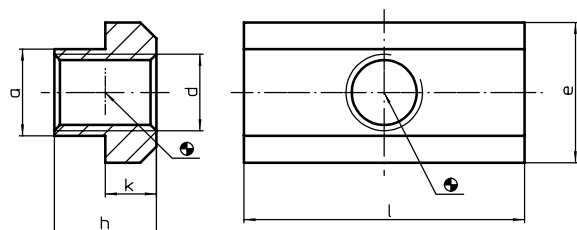
- Heat-treated steel, tempered, quality 10, blackened

MORE INFORMATION

Further products

Complete Range → p. 388

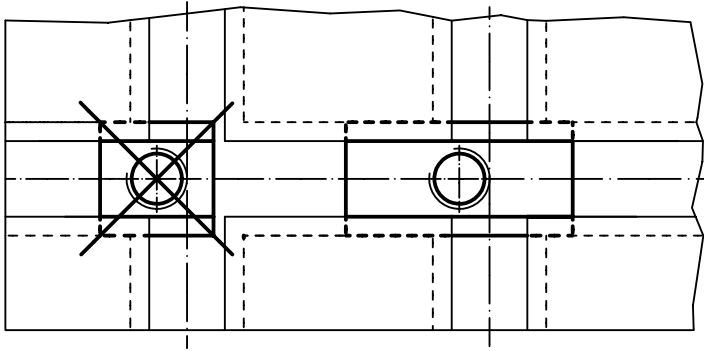
DRAWING



ORDER INFORMATION

System	T-slot size [mm]	Dimensions						[g]	Art. No.
		d	a	e	l	h	k		
V70	14	M 6	13.6	22	44	16	8	91	23020.0146
		M12	13.6	22	44	16	8	80	23020.0140
L16	18	M16	17.6	28	56	20	10	160	23020.0180

APPLICATION EXAMPLE



Nuts for T-Slots • rhombus
EH 23020.



PRODUCT DESCRIPTION

Nuts for T-slots "rhombus" do not have to be inserted lengthwise, but can be inserted directly into the slot.

Material

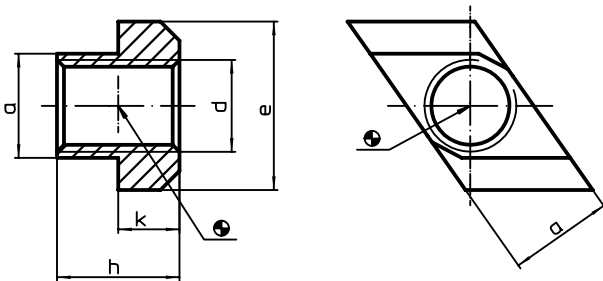
- Heat-treated steel, tempered, blackened

MORE INFORMATION

Further products

Complete Range → p. 389

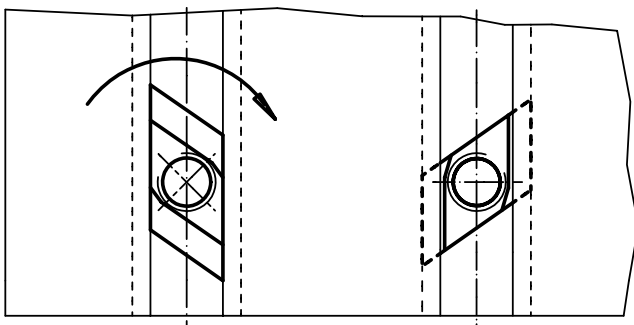
DRAWING



ORDER INFORMATION

System	T-slot size [mm]	Dimensions					[g]	Art. No.
		d	a	e	h	k		
V70	14	M12	13.6	22	16	8	23	23020.0640

APPLICATION EXAMPLE



Studs • DIN 6379 b₁ long for nut for T-Slots
EH 23040.



PRODUCT DESCRIPTION

Studs combined with T-nuts DIN 508 (EH 23010./23020.), fixture nuts DIN 6330 (EH 23070.) and plain washers DIN 6340 (EH 23060.) become complete clamping studs. These studs are characterised by the rolled thread.

Material

- Heat-treated steel

MORE INFORMATION

References

For torques and strengths please refer to appendix - Technical Data -

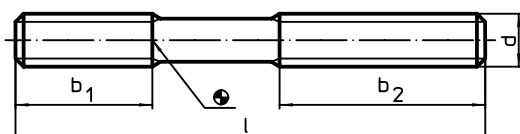
Further products

- Complete Range → p. 395
- Nuts for T-Slots, DIN 508 → p. 384

- Studs, DIN 6379 for T-nuts → p. 393
- Studs, with internal hexagon, similar to DIN 6379, for nuts for T-Slots → p. 397
- Shaft / Plain Washers, DIN 6340 heat-treated → p. 403
- Fixture Nuts, DIN 6330 (height 1,5 d) → p. 406



DRAWING

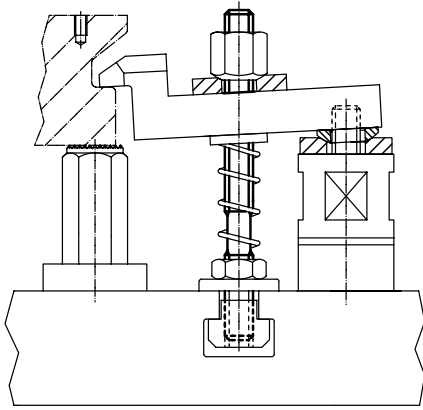


ORDER INFORMATION

System	d	Dimensions			[g]	Art. No.
		l	b ₁	b ₂		
[mm]						
quality 10.9						
V40	M 8	63	20	40	19	23040.0582
		100	20	63	31	23040.0583
		160	20	100	49	23040.0584
V70	M10	80	25	50	39	23040.0602
		100	25	75	49	23040.0603
		125	25	75	61	23040.0604
		160	25	100	78	23040.0605¹⁾
		200	25	122	98	23040.0606
V70/L12	M12	63 ²⁾	-	-	44	23040.0622
		80 ²⁾	-	-	56	23040.0623
		100	30	63	71	23040.0624¹⁾
		125	30	75	88	23040.0625
		160	30	100	112	23040.0626
		200	30	122	140	23040.0627
quality 8.8						
V70/L16	M16	80 ²⁾	-	-	100	23040.0662
		125	40	63	161	23040.0664
		160	40	75	207	23040.0665
		200	40	100	260	23040.0666¹⁾
		250	40	125	325	23040.0667
		315	40	200	402	23040.1168¹⁾

¹⁾ DIN standards do not include these dimensions.
²⁾ Throughgoing thread

APPLICATION EXAMPLE



Spherical Washers / Conical Seats • DIN 6319
EH 23050.



PRODUCT DESCRIPTION

Spherical washers / Conical seats are used as washers in a screw connection to compensate non-parallel surfaces.

Material

- Conical seat**
 - Heat-treated steel, tempered, manganese phosphated
- Spherical washer**
 - Case-hardened steel, case-hardened, manganese phosphated

For larger holes only use form G!

MORE INFORMATION

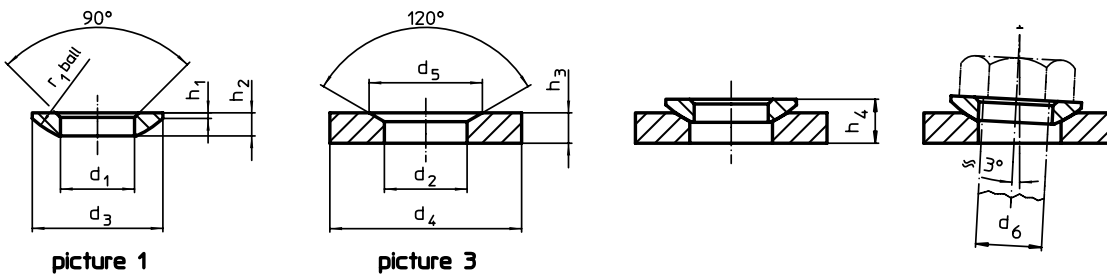
Further products

- Complete Range → p. 398
- Spherical Washers / Conical Seats, DIN 6319 → p. 398
- Spherical Washers / Conical Seats, similar to DIN 6319, stainless steel . . . → p. 400
- Fixture Nuts, DIN 6330 (height 1,5 d) . → p. 406

Assembly

Conical seats form D are to be used only for plain, closed round areas.

DRAWING

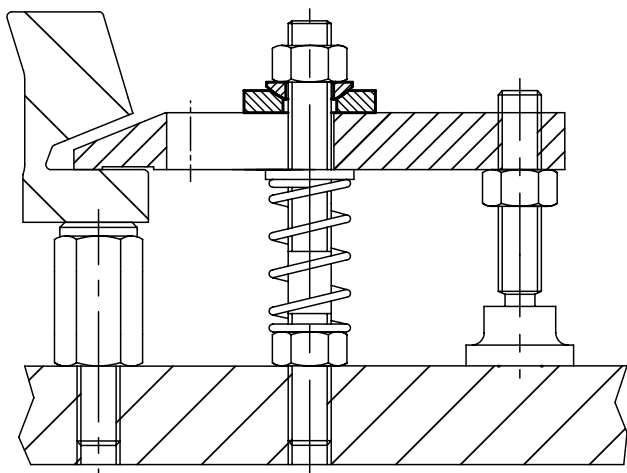


ORDER INFORMATION

System	Dimensions											For pin d ₆	For screws d ₆	Load capacity for static load max.	Torque for screwed connections ¹⁾ max.	[g]	Art. No.
	d ₁ H13	d ₂ H13	d ₃	d ₄	d ₅	h ₁	h ₂	h ₃	h ₄ with conical seat form D ~ with conical seat form G ~	r ₁	[mm]						
spherical washers from case-hardened steel, form C – picture 1																	
V40	8.4	–	17	–	–	0.6	3.2	–	5.6	7.1	12	8	M 8	17	25	2.8	23050.0008
V70	10.5	–	21	–	–	0.8	4.0	–	6.5	7.3	15	10	M10	26	46	5.1	23050.0010
V70/L12	13.0	–	24	–	–	1.1	4.6	–	8.0	9.0	17	12	M12	38	82	8.0	23050.0012
V70/L16	17.0	–	30	–	–	1.3	5.3	–	9.6	10.4	22	16	M16	73	206	13.0	23050.0016
conical seats from heat-treated steel, form G – picture 3																	
V40	–	9.6	–	24	14.5	–	–	5	–	–	–	8	M 8	17	25	14.0	23050.0208
V70	–	12.0	–	30	18.5	–	–	5	–	–	–	10	M10	26	46	22.0	23050.0210
V70/L12	–	14.2	–	36	20.0	–	–	6	–	–	–	12	M12	38	82	39.0	23050.0212
V70/L16	–	19.0	–	44	26.0	–	–	7	–	–	–	16	M16	73	206	65.0	23050.0216

¹⁾ Torques of screws with standard thread, eventual pre-loads to be considered, coefficient of friction μ_{total} 0.14.

APPLICATION EXAMPLE



Shaft / Plain Washers • DIN 6340 heat-treated

EH 23060.



PRODUCT DESCRIPTION

The heat-treated shaft / plain washers (washers) are manufactured according to DIN 6340.

Material

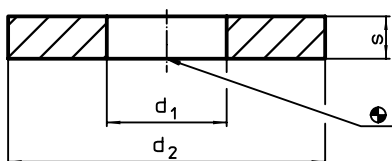
- Heat-treated steel, tempered, punched, mechanically trued, phosphatized

MORE INFORMATION


Further products

Complete Range → p. 403

DRAWING



ORDER INFORMATION

System	Dimensions			For screws [mm]	 [g]	Art. No.
	d_1	d_2 [mm]	s			
V40	8.4	23	4	M 8	9.8	23060.0008
V70	10.5	28	4	M10	15.0	23060.0010
V70/L12	13.0	35	5	M12	28.0	23060.0012
V70/L16	17.0	45	6	M16	55.0	23060.0016



PRODUCT DESCRIPTION

Fixture nuts according to DIN 6330 have a spherical surface to match conical seats DIN 6319 (EH 23050.).

With this combination of fixture nut and conical seat, non-parallel clamping surfaces can be compensated.

Material

- Heat-treated steel, tempered, quality 10, phosphated

MORE INFORMATION

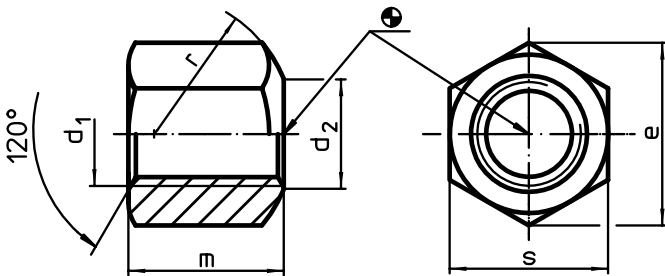
References

For torques and strengths please refer to appendix - Technical Data -

Further products

Complete Range → p. 406

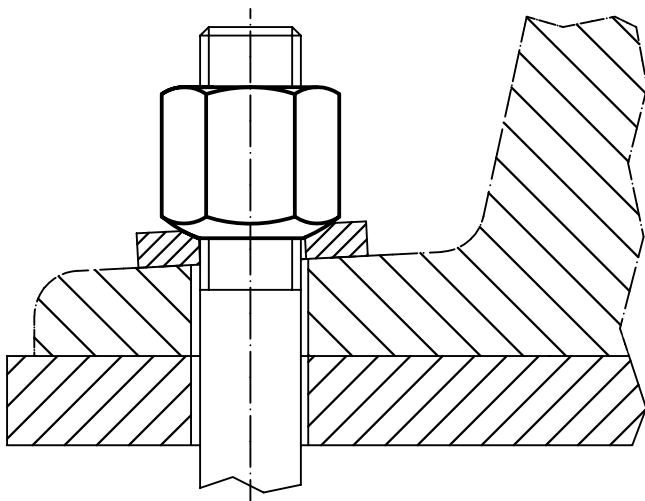
DRAWING



ORDER INFORMATION

System	Dimensions						[g]	Art. No. Heat-treated steel
	d ₁	d ₂	e	m	r	s		
with lateral spherical bearing surface, form B								
V40	M 8	9.0	15.0	12	11	13	8.4	23070.0008
V70	M10	11.5	18.5	15	15	16	20.0	23070.0010
V70/L12	M12	14.0	20.8	18	17	18	24.0	23070.0012
V70/L16	M16	18.0	27.7	24	22	24	55.0	23070.0016

APPLICATION EXAMPLE



Collar Nuts • DIN 6331 (height 1,5 d)

EH 23080.



PRODUCT DESCRIPTION

The collar nuts (flanged nuts) are manufactured according to DIN 6331.

Material

- Heat-treated steel, tempered, quality 10, phosphated

MORE INFORMATION

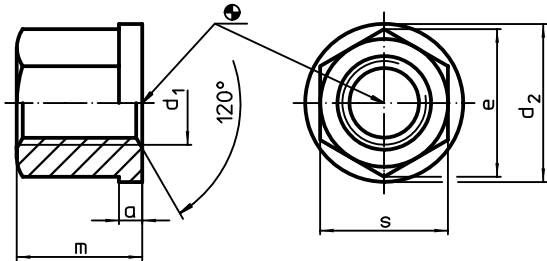
References

For torques and strengths please refer to appendix - Technical Data -

Further products

Complete Range → p. 407

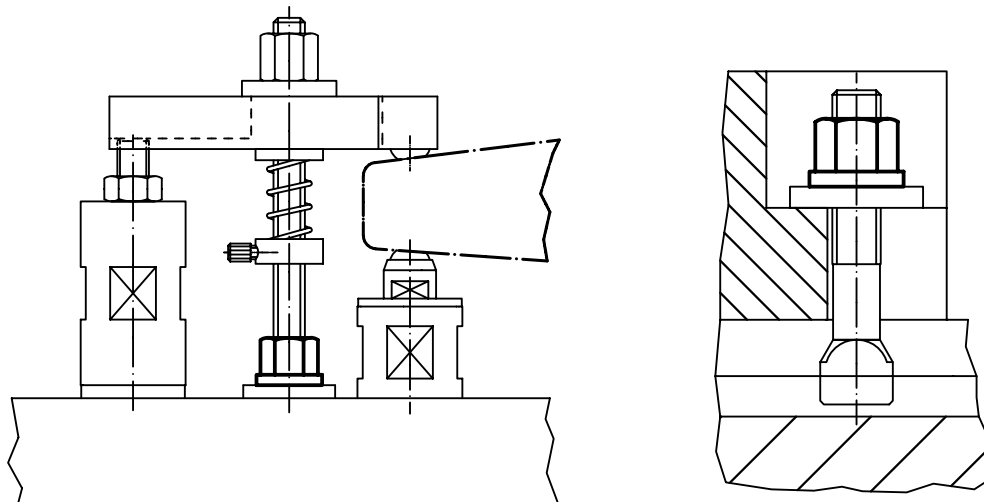
DRAWING



ORDER INFORMATION

System	Dimensions						Art. No.	
	d ₁	a	d ₂	e	m	s		
	[mm]						[g]	
V40	M 8	3.5	18	15.0	12	13	12	23080.0008
V70	M10	4.0	22	18.5	15	16	22	23080.0010
V70/L12	M12	4.0	25	20.8	18	18	30	23080.0012
V70/L16	M16	5.0	31	27.7	24	24	67	23080.0016

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

With this combination of fixture nut and conical seat, non-parallel clamping surfaces can be compensated.

The fixture nut with conical seat is a fixed unit consisting of fixture nut and conical seat with the following advantages / characteristics:

- Functionally reliable
- Captive
- Fast and efficient mounting
- Simplified storage
- Swivel range max. 3°

Material

Conical seat

- Heat-treated steel, tempered, blackened

Nut

- Heat-treated steel, tempered, blackened

MORE INFORMATION

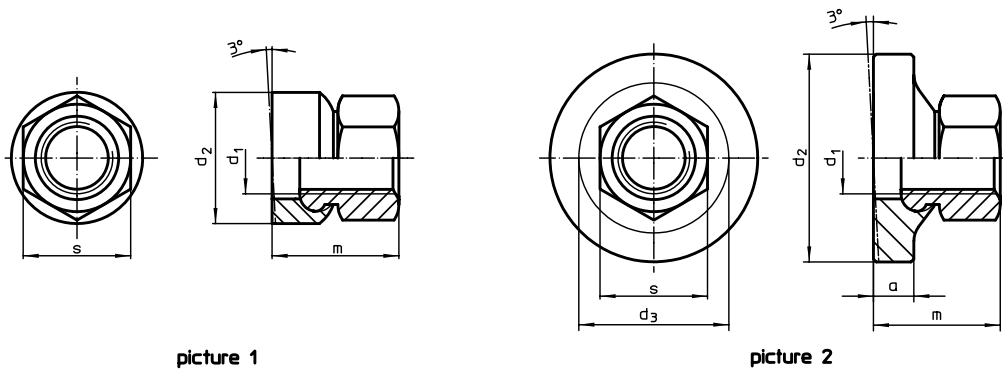
References

For torques and strengths please refer to appendix - Technical Data -

Further products

Complete Range → p. 408

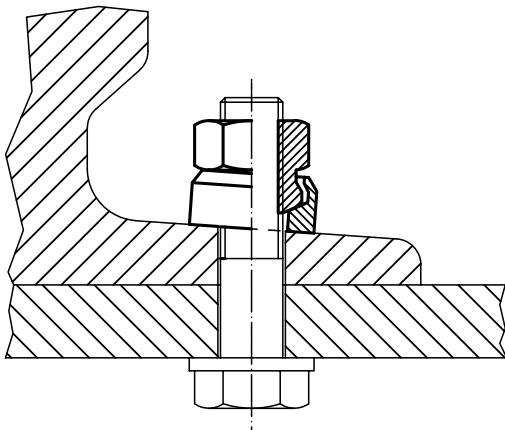
DRAWING



ORDER INFORMATION

System	d ₁	a	Dimensions			s	[g]	Art. No.
			d ₂	d ₃	m			
			[mm]			[mm]		
with small bearing surface – picture 1								
V40	M 8	–	17	–	14.0	13	13	23080.0508
V70	M10	–	21	–	17.5	16	24	23080.0510
V70/L12	M12	–	24	–	21.5	18	37	23080.0512
V70/L16	M16	–	30	–	28.0	24	73	23080.0516
with large bearing surface – picture 2								
V40	M 8	4.0	24	17.8	14.0	13	20	23080.0608
V70	M10	5.5	30	21.2	17.5	16	39	23080.0610
V70/L12	M12	7.0	36	25.2	21.5	18	68	23080.0612
V70/L16	M16	8.0	44	30.9	28.0	24	124	23080.0616

APPLICATION EXAMPLE



Extension Nuts • (height 3 d)

EH 23090.



PRODUCT DESCRIPTION

In comparison to a hexagon nut according to DIN 6330, the extension nuts are elongated and are particularly suitable as a connecting piece for stud bolts.

Material

- Heat-treated steel, tempered, quality 10, phosphated

MORE INFORMATION

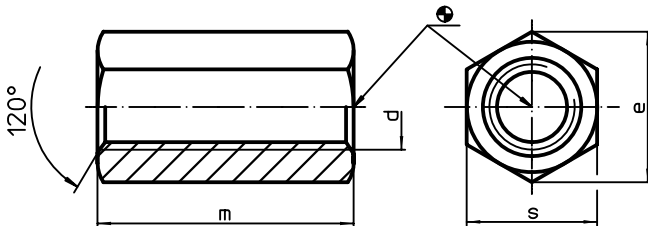
References

For torques and strengths please refer to appendix - Technical Data -

Further products

Complete Range → p. 409

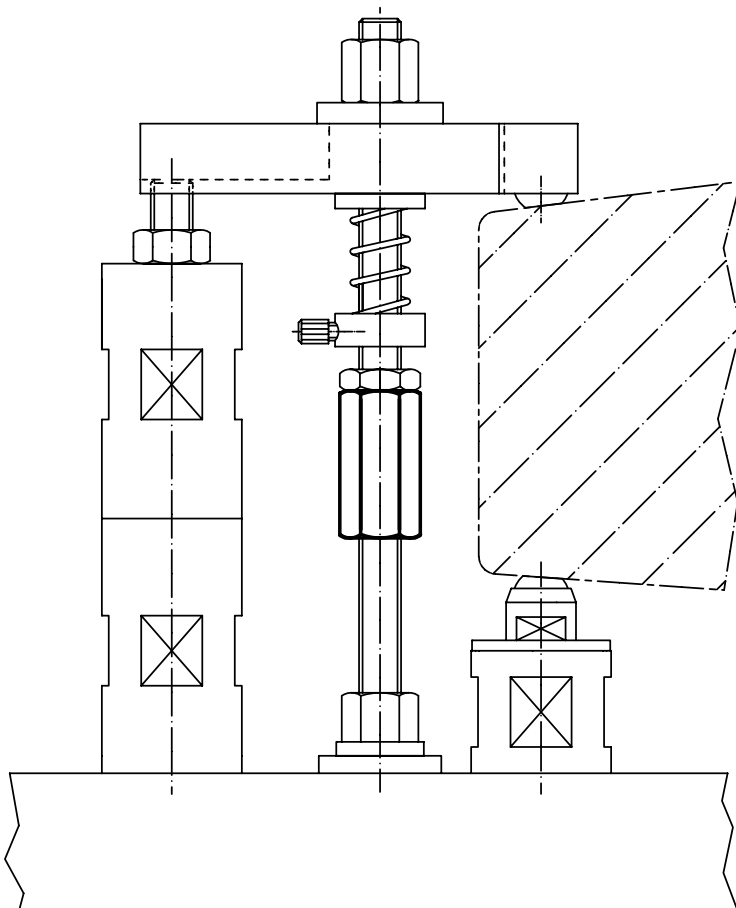
DRAWING



ORDER INFORMATION

System	Dimensions				Art. No.
	d	e	m	s	
	[mm]				
V40	M 8	15.0	24	13	23090.0008
V70	M10	18.5	30	16	23090.0010
V70/L12	M12	20.8	36	18	23090.0012
V70/L16	M16	27.7	48	24	23090.0016

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

To be used for locating fixtures and clamping elements onto mounting pallets or pallets with cylindrical location holes. They can be inserted in holes as well as in slots.

Material

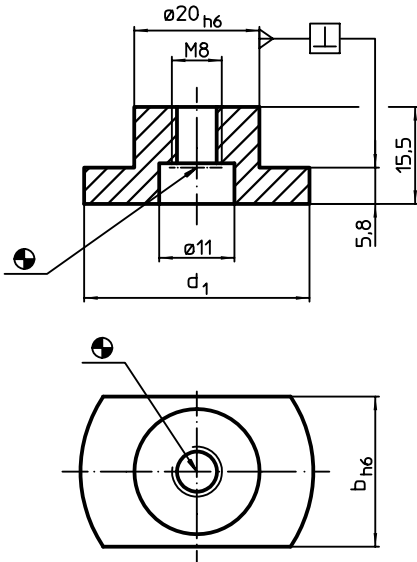
- Steel, case-hardened, blackened, ground

MORE INFORMATION

Further products

Complete Range → p. 412

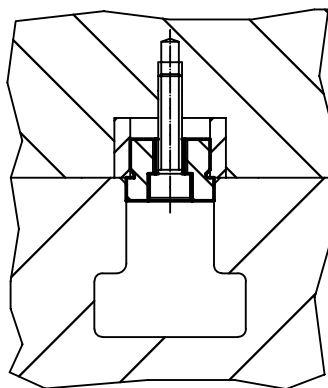
DRAWING



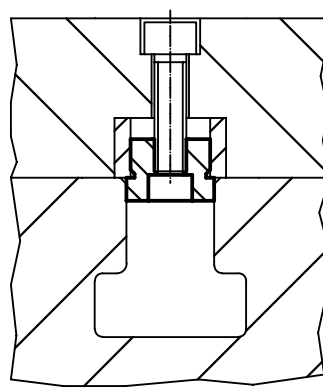
ORDER INFORMATION

System	T-slot size machine b h6 [mm]	Dimensions d ₁ [mm]	For screws ISO 4762		[g]	Art. No.
			(picture 1)	(picture 2)		
V40/V70/L12/L16	12	30	M6	M8	30	23110.0112
	14	30	M6	M8	33	23110.0114
	16	30	M6	M8	36	23110.0116
	18	30	M6	M8	45	23110.0118
	20	36	M6	M8	45	23110.0120

APPLICATION EXAMPLE



picture 1



picture 2

Centering Pins

EH 23110.



PRODUCT DESCRIPTION

The centering pins are used for centering fixtures on pallets.

Material

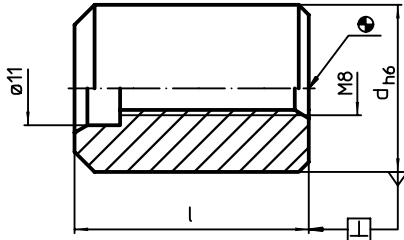
- Alloyed case-hardened steel, case-hardened, ground

MORE INFORMATION


Further products

Complete Range → p. 413

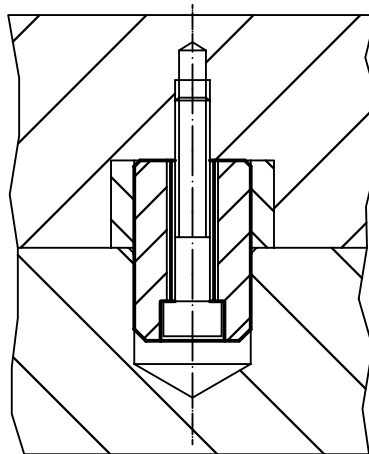
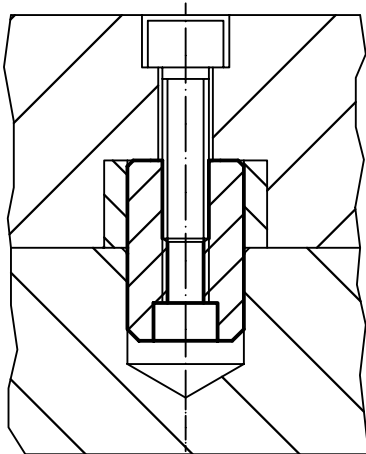
DRAWING



ORDER INFORMATION

System	Dimensions		 [g]	Art. No.
	d h6	l [mm]		
V40/V70/L12/L16	20	31	70	23110.0510
V70	25	35	118	23110.0520
V40/V70	50	31	473	23110.0530
V70	50	45	695	23110.0540

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

The stepped centering pins are used for centering fixtures on pallets.

Material

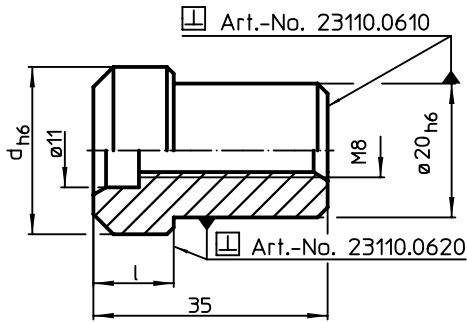
- Alloyed case-hardened steel, case-hardened, ground

MORE INFORMATION

Further products

Complete Range → p. 414

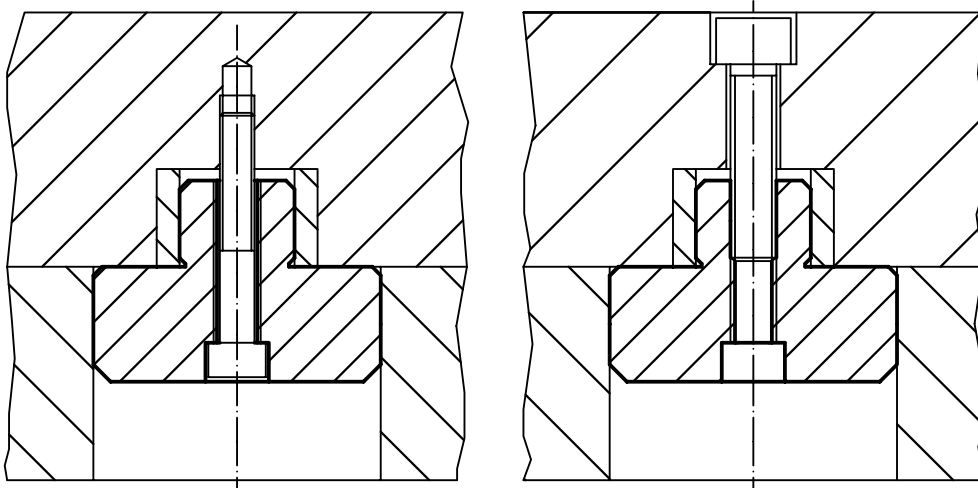
DRAWING



ORDER INFORMATION

System	Dimensions		[g]	Art. No.
	d h6	l		
	[mm]			
V70/L12/L16	25	12	87	23110.0610
	50	20	330	23110.0620

APPLICATION EXAMPLE



Loose Slot Tenons • DIN 6323

EH 23120.



PRODUCT DESCRIPTION

To be used for locating fixtures and clamping elements onto machine tables with T-slots to DIN 650.

Being simply pushed into position after fixture or clamping element has been roughly positioned, they cannot cause damage to the machine as could protruding fixed slot tenons or low slot tenons.

Material

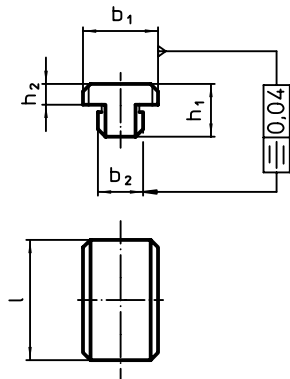
- Steel, case-hardened, blackened, ground

MORE INFORMATION

Further products

Complete Range → p. 415

DRAWING

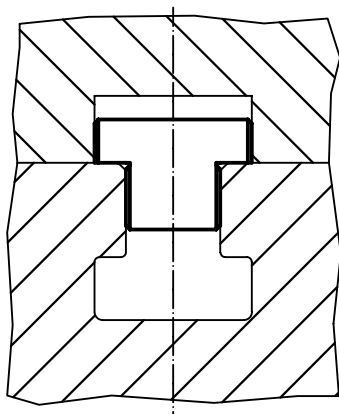


picture 1

ORDER INFORMATION

System	T-slot size fixture b_1 h6 [mm]	T-slot size machine b_2 h6 [mm]	Dimensions			[g]	Art. No.
			h_1	h_2	l		
form A, $b_1 > b_2$ – picture 1							
V40/V70	20	12	14	5.5	32	52	23120.0012
		14	14	5.5	32	56	23120.0014
		16	14	5.5	32	61	23120.0016
		18	14	5.5	32	65	23120.0018

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

This clamp (clamping claw) according to DIN 6314 B is forked and is mainly used in mechanical clamping technology for clamping workpieces.

Material

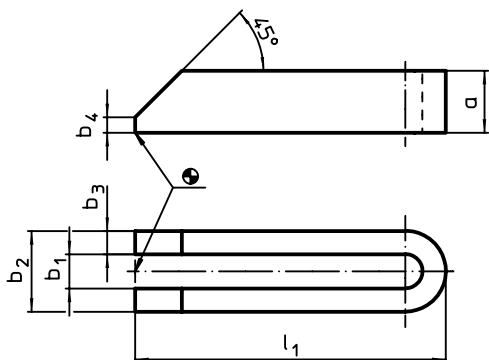
- Heat-treated steel, varnished

MORE INFORMATION

Further products

Complete Range → p. 431

DRAWING



ORDER INFORMATION

System	Nominal dimension b ₁ [mm]	Dimensions					For screws		[g]	Art. No.
		l ₁	a	b ₂	b ₃	b ₄	[mm]	[in]		
V40	9	80	15	25	8	4	M 8	5/16	141	23150.0009
V70/L12	14	125	25	38	12	6	M12, M14	1/2	578	23150.0014
		160	25	38	12	6	M12, M14	1/2	715	23150.0015
		200	25	38	12	6	M12, M14	1/2	905	23150.0016
	18	160	30	48	15	8	M16, M18	5/8	1077	23150.0018
		200	30	48	15	8	M16, M18	5/8	1346	23150.0019
	250	40	48	15	10	M16, M18	5/8	2300	23150.0020	

Clamps • with nose

EH 23180.



PRODUCT DESCRIPTION

This clamp (clamping claw) with nose is mainly used in mechanical clamping technology for clamping workpieces.

Material

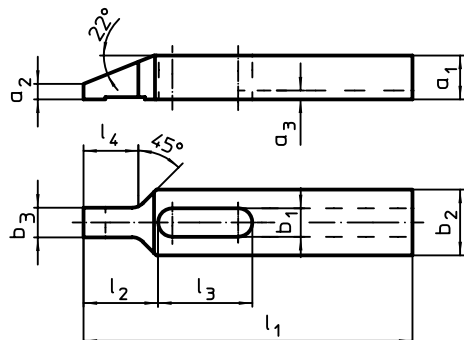
- Heat-treated steel, tempered, blackened

MORE INFORMATION

Further products

Complete Range → p. 436

DRAWING

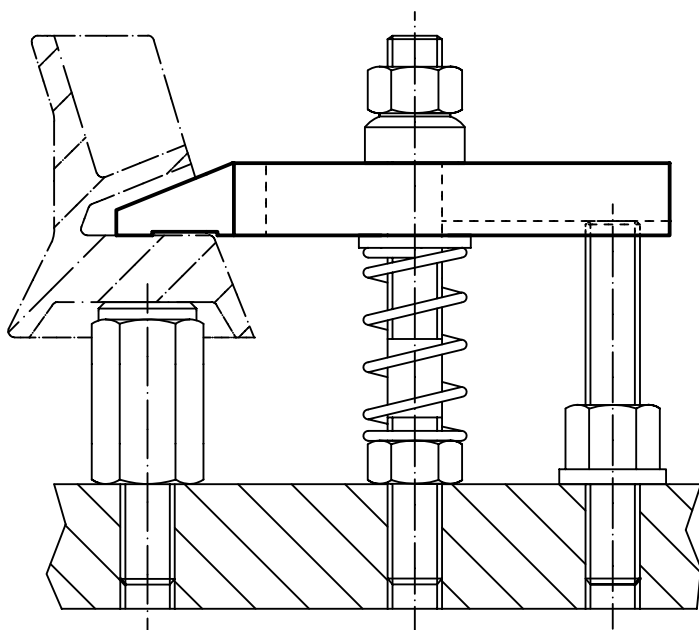


picture 2

ORDER INFORMATION

System	Nominal dimension b_1 [mm]	Dimensions									Art. No.	
		l_1	a_1	a_2	a_3	b_2	b_3	l_2	l_3	l_4		[g]
with keyway – picture 2												
V40	9	100	12	4	3.0	20	9.5	22	29	17	127	23180.0209
V70	11	125	15	5	3.5	25	11.5	28	36	21	251	23180.0211
V70/L12	13	150	20	7	4.0	30	13.5	34	43	25	488	23180.0213
V70/L16	17	175	25	9	4.5	35	15.5	40	52	29	812	23180.0217

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

Material

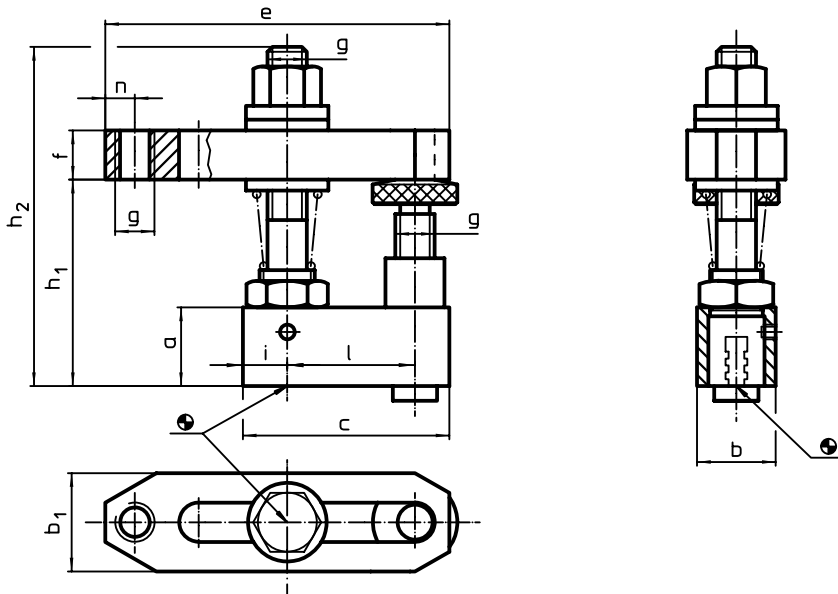
- Body**
 - Steel, blackened
- Wearing parts**
 - Heat-treated steel
- Pull-rod**
 - Special steel

MORE INFORMATION

Further products

- Complete Range → p. 445
- Straight Clamps, long → p. 447
- Intermediate Elements. → p. 448
- Intermediate Elements, with support. . . → p. 449
- Base Elements → p. 450
- Base Elements, swivelling. → p. 451
- Base Elements, low → p. 452
- Base Elements, for location hole. → p. 453

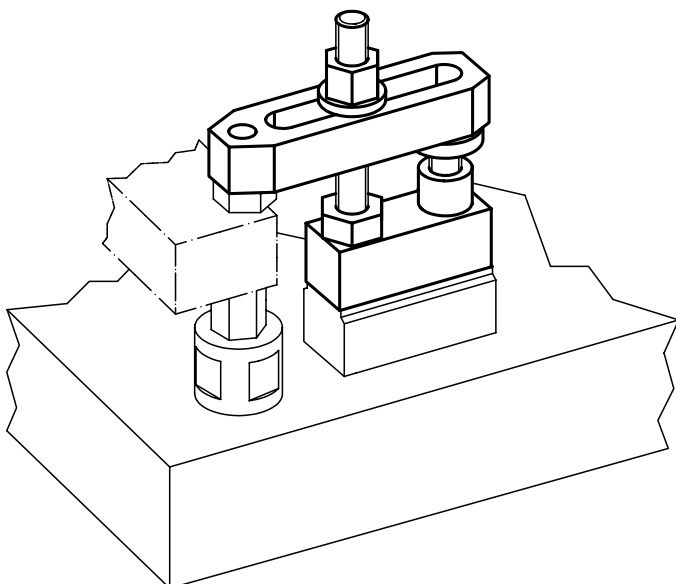
DRAWING



ORDER INFORMATION

System	Dimensions													Art. No.	
	a	b	c	b ₁	e	f	g	h ₁	h ₂	i	l	n			
	[mm]													[g]	
V70/L12	25	25	65	35	110	20	M12	48 – 78	112	12.5	40	10	870	23700.0012	
L16	30	30	78	40	142	30	M16	60 – 96	145	14.0	50	13	1703	23700.0016	

APPLICATION EXAMPLE



Straight Clamps • long

EH 23700.



PRODUCT DESCRIPTION

Material

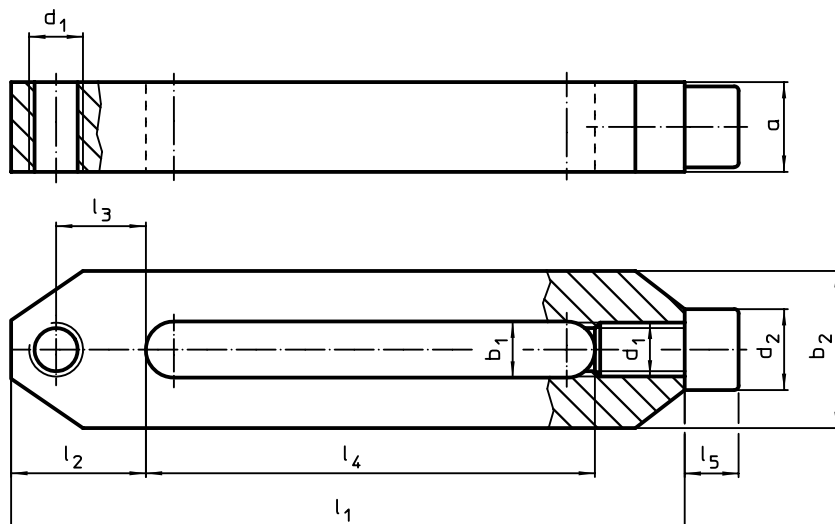
- Heat-treated steel, tempered, blackened

MORE INFORMATION

Further products

Complete Range → p. 447

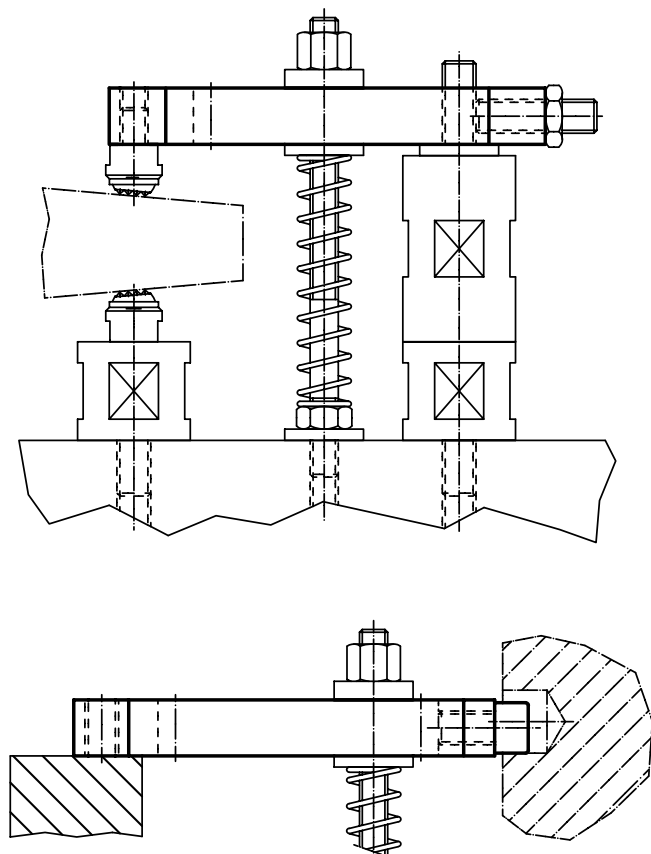
DRAWING



ORDER INFORMATION

System	Dimensions											Art. No.
	b ₁	l ₁	a	b ₂	d ₁	l ₂	l ₃	l ₄	l ₅	d ₂	[g]	
V70/L12	12.5	156	20	35.0	M12	30	20	106	12	18	601	23700.0042
V70/L16	17.0	196	30	45.5	M16	35	22	136	16	24	1430	23700.0046

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

Material

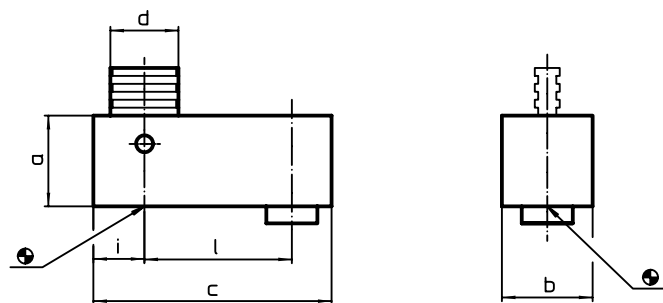
- Body**
 - Steel, blackened
- Wearing parts**
 - Heat-treated steel

- Pull-rod**
- Special steel

MORE INFORMATION

Further products
 Complete Range → p. 448

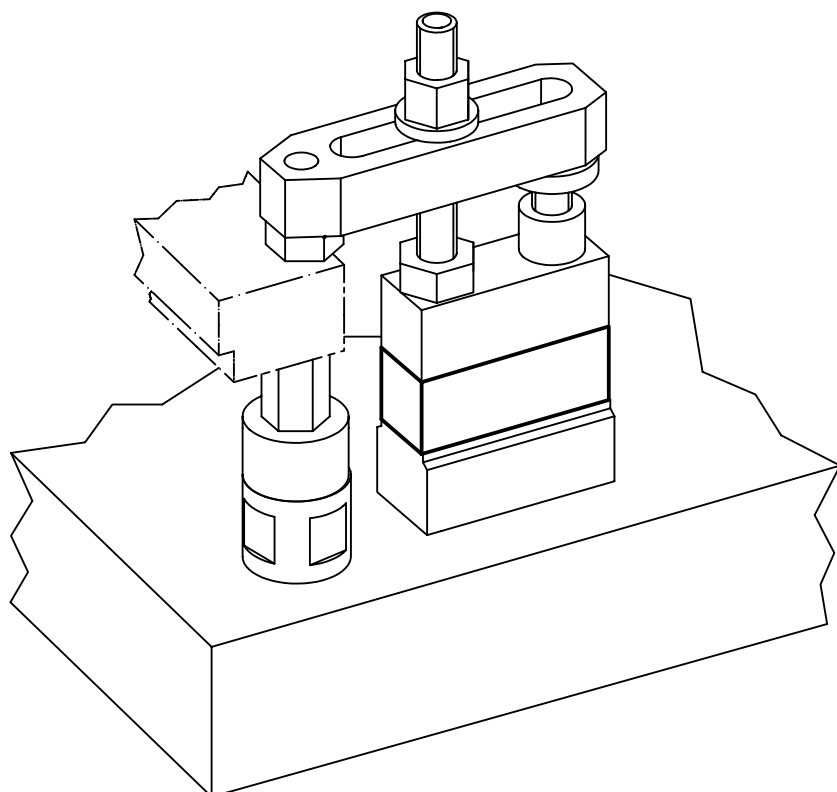
DRAWING



ORDER INFORMATION

System	Dimensions						[g]	Art. No.
	a	b	c	d	i	l		
V70/L12	25	25	65	16	12.5	40	261	23700.0121
	50	25	65	16	12.5	40	580	23700.0122
	100	25	65	16	12.5	40	1201	23700.0123
L16	30	30	78	22	14.0	50	468	23700.0161
	60	30	78	22	14.0	50	1032	23700.0162
	120	30	78	22	14.0	50	2149	23700.0163
	240	30	78	22	14.0	50	4340	23700.0164

APPLICATION EXAMPLE



Base Elements

EH 23700.



PRODUCT DESCRIPTION

Material

Body

- Steel, blackened

Wearing parts

- Heat-treated steel

Pull-rod

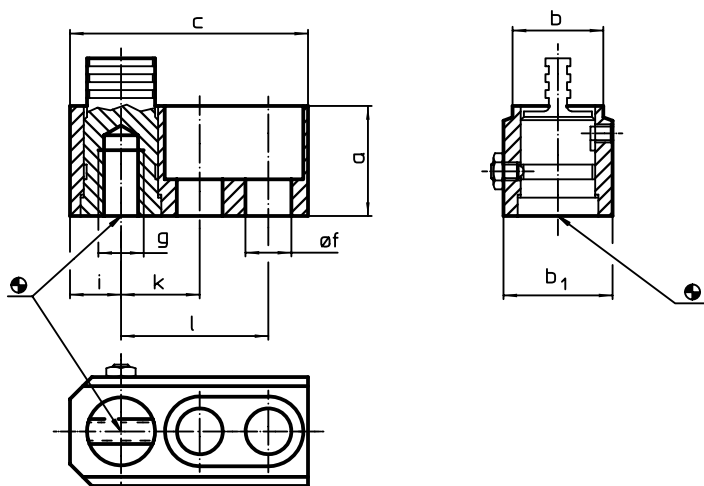
- Special steel

MORE INFORMATION

Further products

Complete Range → p. 450

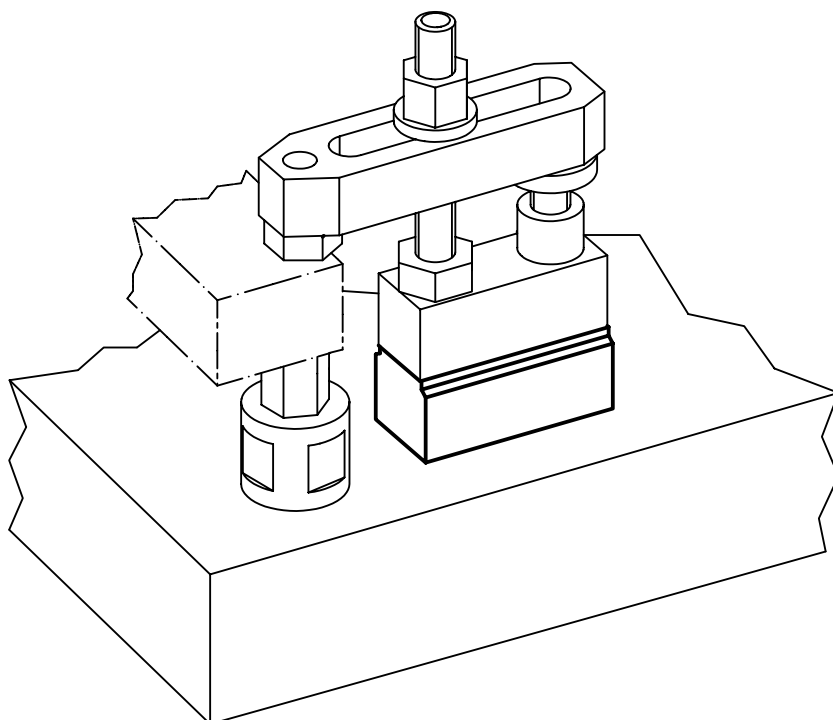
DRAWING



ORDER INFORMATION

System	Dimensions										Art. No.
	a	b	c	b ₁	f [mm]	g	i	k	l	[g]	
V70/L12	30	25	65	30	12.5	M12	12.5	20	40	297	23700.0312
L16	40	30	80	40	17.0	M16	16.0	25	50	641	23700.0316

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

By tightening the ball-ended thrust screw the workpiece is simultaneously pressed towards the stops and fixture plate. The favourable leverage enables high horizontal clamping forces. When using T-Nuts EH 23010. / EH 23020. (DIN 508) they can also be applied to other slot sizes.

Material

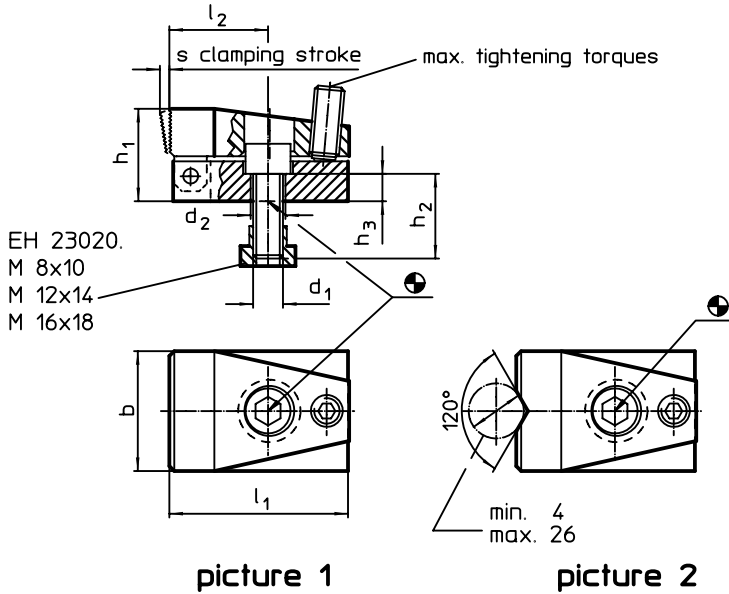
- Steel, case-hardened, blackened, ground

MORE INFORMATION

Further products

- Complete Range → p. 455
- Nuts for T-Slots, DIN 508 → p. 384
- Nuts for T-Slots, extended. → p. 388

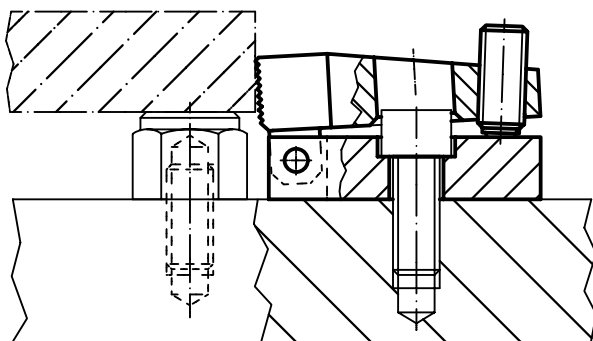
DRAWING



ORDER INFORMATION

System	T-slot size	Dimensions									Clamping force horizontal max.	Tightening torque max.	Art. No.	
		d ₁	d ₂	b	h ₁	h ₂	h ₃	l ₁	l ₂	s				[kN]
	[mm]	[mm]												
with flat clamping jaw – picture 1														
V40	10	M 8	8.4	32	24	20	8	52	28	3	7.0	3	265	23210.0501
V70/ L12	14	M12	12.5	48	37	30	11	72	40	4	15.0	9	838	23210.0521
L16	18	M16	16.5	68	47	35	13	86	41	7	21.5	20	1760	23210.0541
with V-clamping jaw – picture 2														
V40	10	M 8	8.4	32	24	20	8	52	28	3	7.0	3	266	23210.0502
V70/ L12	14	M12	12.5	48	37	30	11	72	40	4	15.0	9	829	23210.0522
L16	18	M16	16.5	68	47	35	13	86	41	7	21.5	20	1730	23210.0542

APPLICATION EXAMPLE



Stops • cylindrical

EH 23280.



PRODUCT DESCRIPTION

The T-slot guide enables a quick and precise location of the workpiece. The cylindrical form of the stop facilitates to determine the 0-point coordinate. The short form, which is ground to a height tolerance of $\pm 0,01$ mm, can also be used for locating.

Material

Stop

- Steel, case-hardened, ground

Holding plate

- Steel, blackened

Screw

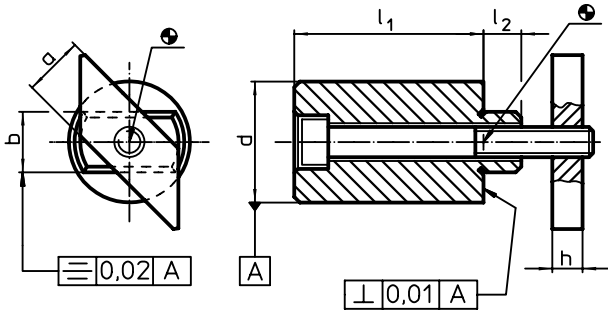
- Steel, quality 8.8 (ISO 4762)

MORE INFORMATION

Further products

Complete Range → p. 473

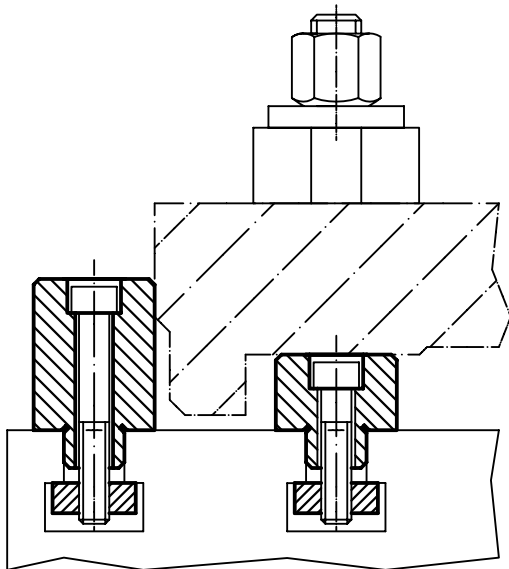
DRAWING



ORDER INFORMATION

System	T-slot size [mm]	Dimensions						Screw ISO 4762 [mm]	[g]	Art. No.
		l_1	a -0.6	b h6	d ± 0.01	h	l_2			
V70	14	25 ± 0.01	14	14	32	8	9	M8 x 35	203	23280.0114
		50 ± 0.20	14	14	32	8	9	M8 x 60	354	23280.0214

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

The bedding support is used to **support** overdetermined clamping points on components. The benefits of the bedding support are:

- Support for unstable components, without distortion
- Eliminates tool vibration during machining
- Compact, low construction
- Supports ribs, beads and shackles, for reinforcement of clamped components
- Distortion-free support of raw parts
- Easy handling
- Flat and long design allows clamping with adjustable clamping lever even outside the workpiece.

Material

Handle

- Zinc die-cast

Clamp

- Steel, case-hardened, blackened, ground

Operation

1. By releasing the clamping lever, the support bolt contacts the workpiece with a light spring load.
2. By clamping the clamping lever, the support pin is blocked without displacement.
3. The clamping lever is released after removal of the workpiece. Then push the support pin into the starting position and clamp using the lever.

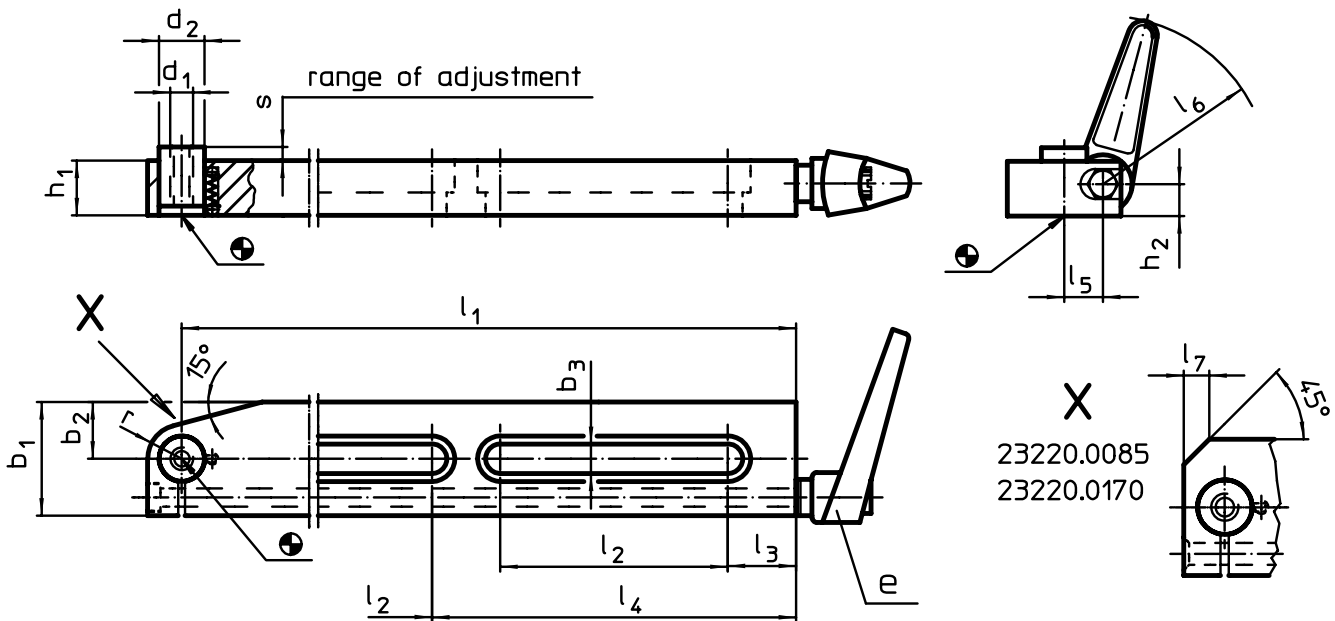
By screwing grub screws or supports into the support pin's female thread, the support height can be adjusted.

MORE INFORMATION

Further products

Complete Range → p. 478

DRAWING



Sizes 8,5 x 75, 13 x 150 and 17 x 170 have only one slot.

ORDER INFORMATION

System	Dimensions															Stroke s [mm]	Load capacity max. [kN]	e		Art. No.
	b ₃	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	b ₁	b ₂	d ₁	d ₂	h ₁	h ₂	r					
	[mm]																			
V40	8.5	75	35	13	-	13	62	5	30	10	M 8	13	19.5	11.5	-	3	0.5	24400.0311	342	23220.0085
V70/L12	13.0	150	90	20	-	17	74	-	50	25	M10	20	24.0	14.0	15	6	2.5	24400.0411	1379	23220.0150
L16	17.0	170	100	25	-	27	108	11	60	20	M16	26	34.0	21.5	-	11	5.0	24400.0611	2721	23220.0170
V70/L12	13.0	300	100	30	160	17	74	-	50	25	M10	20	24.0	14.0	15	6	2.5	24400.0411	2448	23220.0300

Supporting Elements

EH 23220.



PRODUCT DESCRIPTION

The support element is used to **support** overdetermined clamping points on components. The benefits of the support element are:

- Support for unstable components
- Eliminates tool vibration during machining
- Supports ribs, beads and shackles, for reinforcement of clamped components
- Distortion-free support of raw parts
- Easy handling

Material

Housing

- Aluminium, red anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Assembly

Fix the support element (2 x M 6 thread) onto the device. Pay attention to the operator's side!

Alternative: Dismantle the M 12 x 10 threaded pin and replace it by an M 12 x 30 threaded pin and assemble the support element with a wrench (WS 21), e.g. for T-slot mounting (no defined operator's side ensured). Threaded pin M 12 x 30 and T-nut DIN 508 M 12 x 14, quality 10, are part of the standard supply volume.

Lowering of the support element by 16 mm is possible.

Operation

By turning the clamping cam (WS 6 internal hexagon) on the outer surface of the red protective sleeve, the support pin contacts the workpiece with a slight spring load.

1. By turning on (15 Nm) as far as possible (lock), total of 180°, the clamping

mechanism locks the support pin without moving. The support element has been placed onto the workpiece and locked.

2. If turned in the opposite direction (unlock), the clamping is released. If turned back as far as possible, i.e. total of 180° the support pin moves to the end position.

MORE INFORMATION

Notes

For safe functioning, the thread bore M 12 must always be closed.

References

Additional flexible possibility of fitting with holding plate 23210.0740.

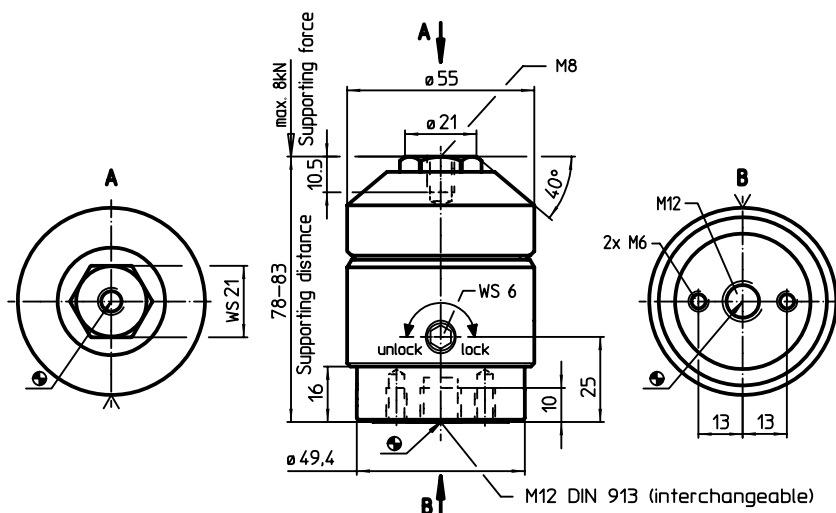
In the M 8 threaded pin on the support bolt various locating and seating pins (EH 22...) can be mounted. Custom-made extensions can also be fitted.

The clamping height can be increased using height adjusting cylinders EH 23310. and with spacers EH 1107. and EH 1108.


Further products

- Complete Range → p. 480
- Holding Plates, for down-hold clamps. → p. 457
- Height Adjusting Cylinders → p. 527
- Spacers → p. 763

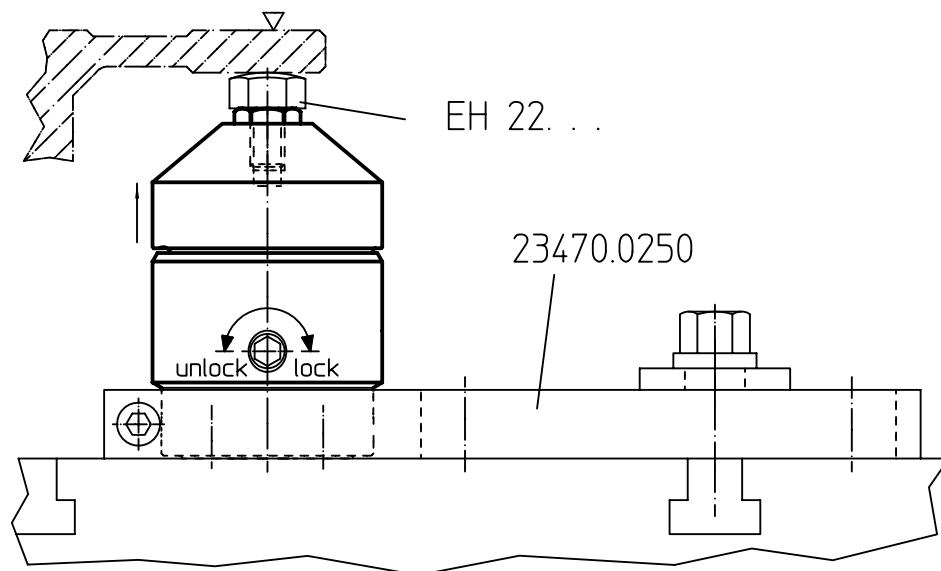
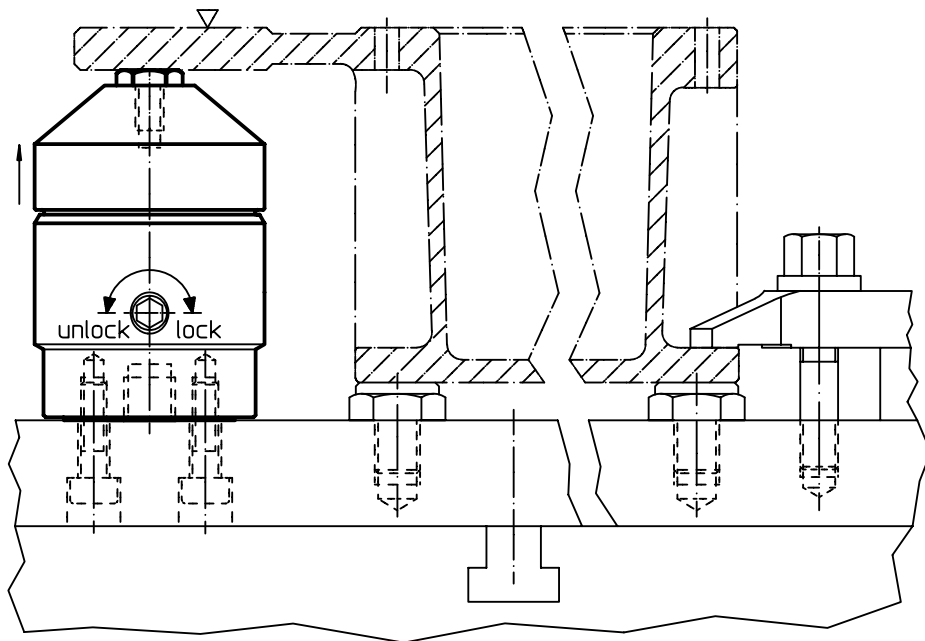
DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
V70/L12/L16	1137	23220.0400

APPLICATION EXAMPLE



Floating Clamps • compact construction, combined clamping and locking M 12

EH 23320.



PRODUCT DESCRIPTION

The floating clamp is used to **clamp and support** additional clamping points on components.

The benefits of the floating clamp are:

- Avoids vibration during the processing
- Clamps ribs, beads and shackles to reinforce clamped components
- Distortion-free clamping of raw parts
- Compact version with reduced height.

Material

Adjustable body

- Aluminium, red anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

Assembly

1. Mount the floating clamp onto the device (mounting holes for M 6, see drawing).
2. Adjust the height limit stop and the rotating area with the sleeve, and clamp with set screw (4x WS 2.5). When setting the height limit upwards provide generous clearance (workpiece tolerance).
3. Tighten the floating clamp with a hexagonal nut (WS 18) having a min. torque of

Operation

1. Push the floating clamp downwards.
2. Pivot the clamping jaws in as far as possible. The floating clamp contacts the bottom of the workpiece with a slight spring load.
3. Tighten the floating clamp with a hexagonal nut (WS 18) having a min. torque of

15 Nm and a maximum torque of 30 Nm.

In the clamping process, the workpiece is clamped and simultaneously supported.

4. Releasing is done in reverse order.

MORE INFORMATION

Notes

For specific clamping situations, the standard clamping jaws supplied can be exchanged or replaced (see catalogue drawing: screw ISO 4762 - M8 - 12.9, M max. = 43 Nm).

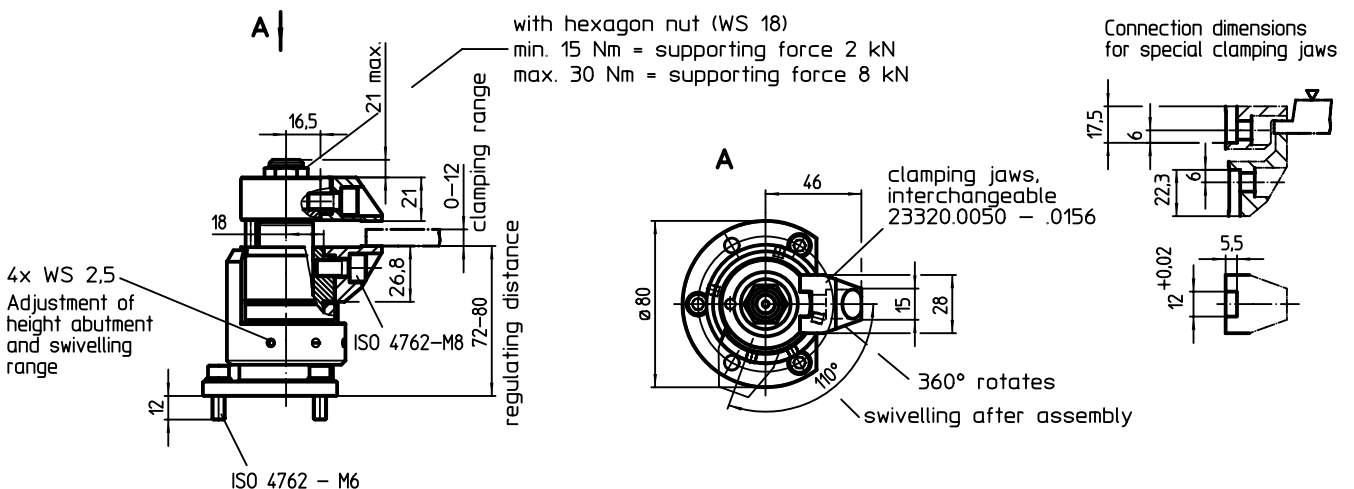
Accessories

As an accessory, we offer clamping jaws with an increased clamping range, refer to 23320.0050-.0058, as well as pivot jaws, refer to 23320.0148-.0156.


Further products

Complete Range	→ p. 482
Nuts for T-Slots, DIN 508	→ p. 384
Nuts for T-Slots, extended	→ p. 388
Standard Clamping Jaws, for floating clamp M 12	→ p. 491
Clamping Jaws, for floating clamp M 12	→ p. 492

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
V70/L12/L16	1654	23320.0008

Floating Clamps • compact construction, separate clamping and locking M 12

EH 23320.



PRODUCT DESCRIPTION

Floating clamps with separate clamping and locking are used to clamp and support additional clamping points on extremely pliable workpieces. Both, clamping and supporting force can be designed individually.

The benefits of the floating clamp are:

- Avoids vibration during the processing
- Clamps ribs, beads and shackles to reinforce clamped components
- Distortion-free clamping of raw parts
- Compact version with reduced height.

Material

Adjustable body

- Aluminium, blue anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

Assembly

1. Mount the floating clamp onto the device (mounting holes for M 6, see drawing).
2. Adjust the height limit stop and the rotating area with the sleeve, and clamp with set screw (4x WS 2.5). When setting the height limit upwards provide generous clearance (workpiece tolerance).

Operation

1. Push the floating clamp downwards.
2. Pivot the clamping jaws inwards.
3. Release floating clamp. The bottom jaw contacts the workpiece with the force of the contact spring.
4. Tighten the fixture nut (WS 18) (max. torque 15 Nm). **The jaws clamp the workpiece - the clamp is still floating.**
5. Then tighten the hexagon collar nut (WS 10) (max. torque 10 Nm).

6. The workpiece clamping process is complete.

7. Releasing is performed in the reverse order: Release hexagon collar nut (WS 10) - release hexagon nut (WS 18) - pivot out the clamping jaws

8. Floating clamp is in end position.

MORE INFORMATION

Notes

For specific clamping situations, the standard clamping jaws supplied can be exchanged or replaced (see catalogue drawing: screw ISO 4762 - M8 - 12.9, M max. = 43 Nm).

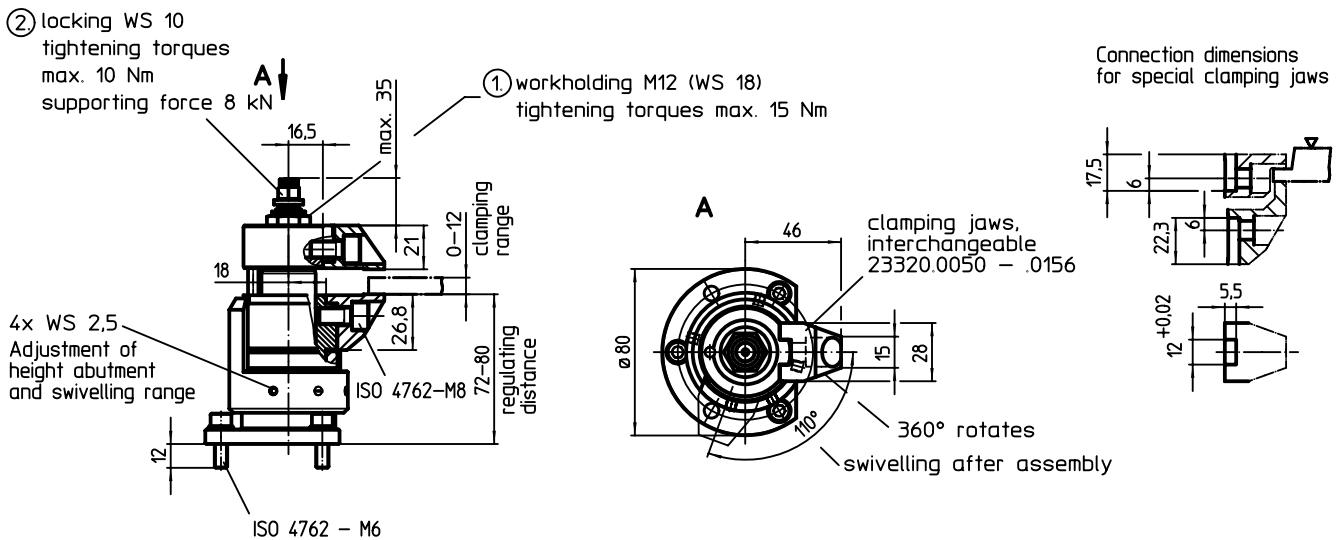
Accessories

As an accessory, we offer clamping jaws with an increased clamping range, refer to 23320.0050-.0058, as well as pivot jaws, refer to 23320.0148-.0156.


Further products

- Complete Range → p. 485
- Nuts for T-Slots, DIN 508 → p. 384
- Nuts for T-Slots, extended → p. 388
- Standard Clamping Jaws, for floating clamp M 12 → p. 491
- Clamping Jaws, for floating clamp M 12 → p. 492

DRAWING



ORDER INFORMATION

System		Art. No.
V70/L12/L16	[g] 1663	23320.0010

Floating Clamps • combined clamping and locking M 12

EH 23320.



PRODUCT DESCRIPTION

The floating clamp is used to **clamp and support** additional clamping points on components.

The benefits of the floating clamp are:

- Avoids vibration during the processing
- Clamps ribs, beads and shackles to reinforce clamped components
- Distortion-free clamping of raw parts.

Material

Adjustable body

- Aluminium, red anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

Assembly

1. Mount the floating clamp (M 12 connection thread) onto the device with a wrench (WS 46).
2. Adjust the height limit stop and the rotating area with the red sleeve and clamp with a set screw (3 x WS 2.5). When setting the height limit, consider tolerance of workpiece.

Operation

1. Push the floating clamp downwards.
2. Pivot the clamping jaws in as far as possible. The floating clamp contacts the bottom of the workpiece with a slight spring load.
3. Tighten the floating clamp with a hexagonal nut (WS 18) having a min. torque of 15 Nm and a maximum torque of 30 Nm.

In the clamping process, the workpiece is clamped and simultaneously supported.

4. Releasing is done in reverse order.

MORE INFORMATION

Notes

The thread bore must always be closed for safe functioning, e.g. set screw M 12 x 10. For specific clamping situations, the standard clamping jaws supplied can be exchanged or replaced (see catalogue drawing: screw ISO 4762 - M8 - 12.9, M max. = 43 Nm).

References

Additional flexible possibility of fitting with holder 23470.0250 or holding plate for down-hold clamps 23210.0740.

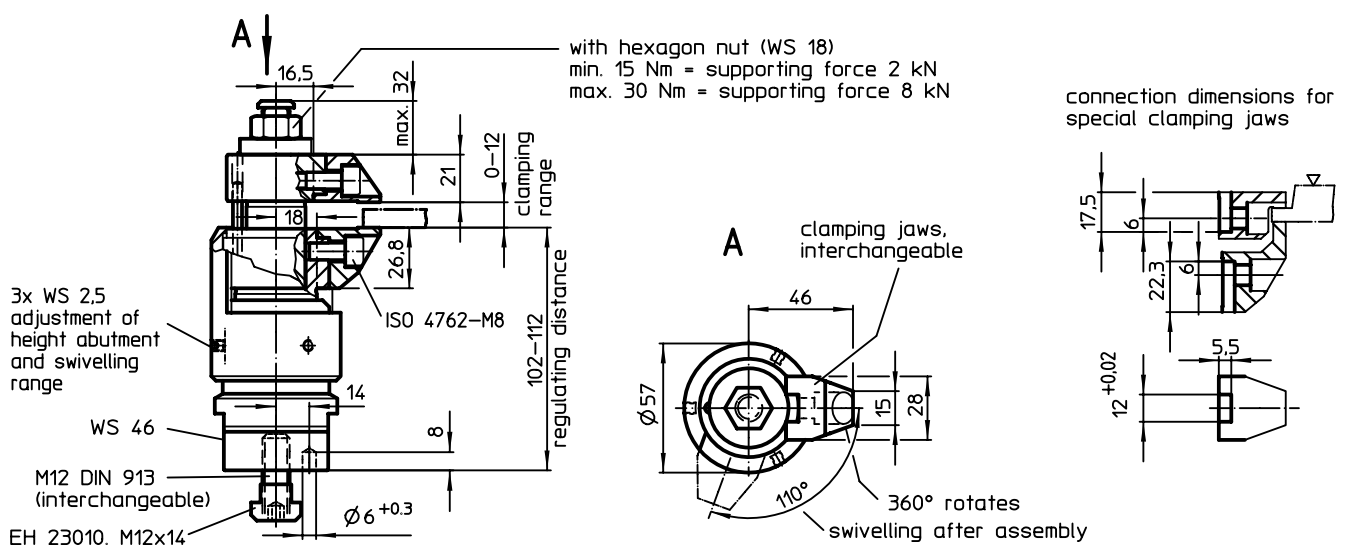
Accessories

As an accessory, we offer clamping jaws with an increased clamping range, refer to 23320.0050-.0058, as well as pivot jaws, refer to 23320.0148-.0156.

Further products

Complete Range	→ p. 487
Holding Plates, for down-hold clamps	→ p. 457
Floating Clamps, separate clamping and locking M 12	→ p. 489
Standard Clamping Jaws, for floating clamp M 12	→ p. 491
Clamping Jaws, for floating clamp M 12	→ p. 492

DRAWING



ORDER INFORMATION

System	Art. No.
V70/L12/L16	23320.0012
	[g]
	2103

Floating Clamps • separate clamping and locking M 12

EH 23320.



PRODUCT DESCRIPTION

Floating clamps with separate clamping and locking are used to clamp and support additional clamping points on extremely pliable workpieces. Both, clamping and supporting force can be designed individually.

The benefits of the floating clamp are:

- Avoids vibration during the processing
- Clamps ribs, beads and shackles to reinforce clamped components
- Distortion-free clamping of raw parts.

Material

Adjustable body

- Aluminium, blue anodised

Body

- Case-hardened steel, nitrided, manganese phosphated and ground

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

Assembly

1. Mount the floating clamp (M 12 connection thread) onto the device with a wrench (WS 46).
2. Adjust the height limit stop and the rotating area with the blue sleeve and clamp with a set screw (3 x WS 2.5). When setting the height limit, consider tolerance of workpiece.

Operation

1. Push the floating clamp downwards.
2. Pivot the clamping jaws inwards.
3. Release floating clamp. The bottom jaw contacts the workpiece with the force of the contact spring.
4. Tighten the fixture nut (WS 18) (max. torque 15 Nm). **The jaws clamp the workpiece - the clamp is still floating.**
5. Then tighten the hexagon collar nut (WS 10) (max. torque 10 Nm).
6. The workpiece clamping process is complete.
7. Releasing is performed in the reverse

- order: Release hexagon collar nut (WS 10) - release hexagon nut (WS 18) - pivot out the clamping jaws
 8. Floating clamp is in end position.

MORE INFORMATION

Notes

The thread bore must always be closed for safe functioning, e.g. set screw M 12 x 10. For specific clamping situations, the standard clamping jaws supplied can be exchanged or replaced (see catalogue drawing: screw ISO 4762 - M8 - 12.9, M max. = 43 Nm).

References

Additional flexible possibility of fitting with holder 23470.0250 or holding plate for down-hold clamps 23210.0740.

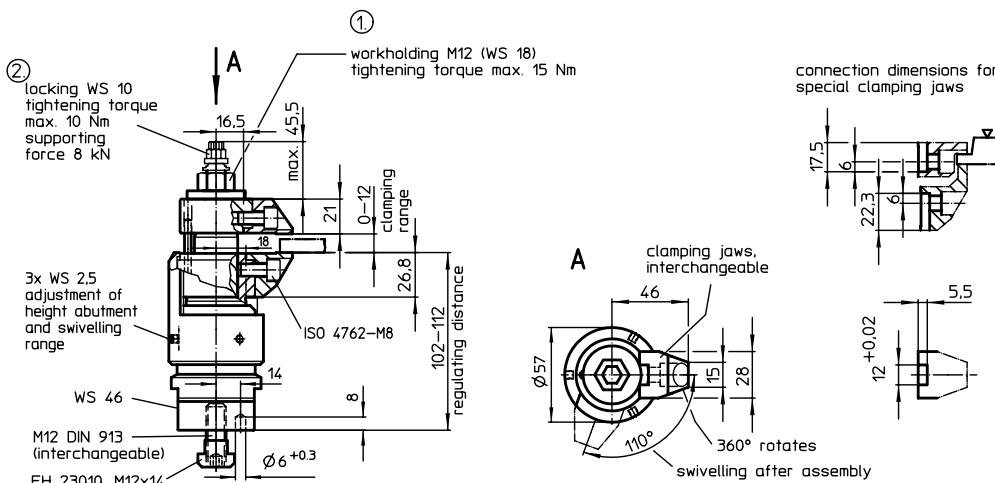
Accessories

As an accessory, we offer clamping jaws with an increased clamping range, refer to 23320.0050-.0058, as well as pivot jaws, refer to 23320.0148-.0156.


Further products

- Complete Range → p. 489
- Holding Plates, for down-hold clamps → p. 457
- Floating Clamps, combined clamping and locking M 12 → p. 487
- Standard Clamping Jaws, for floating clamp M 12 → p. 491
- Clamping Jaws, for floating clamp M 12 → p. 492

DRAWING



ORDER INFORMATION

System	 [g]	Art. No.
V70/L12/L16	379	23320.0014

Standard Clamping Jaws • for floating clamp M 12

EH 23320.



PRODUCT DESCRIPTION

The clamping jaws can be used for floating clamps 23320.0008, 23320.0010, 23320.0012, and 23320.0014.

Material

- Case-hardened steel, nitrided, manganese phosphated

on the upper clamping jaw and 9 mm deep into the clamp housing on the lower clamping jaw.

Assembly

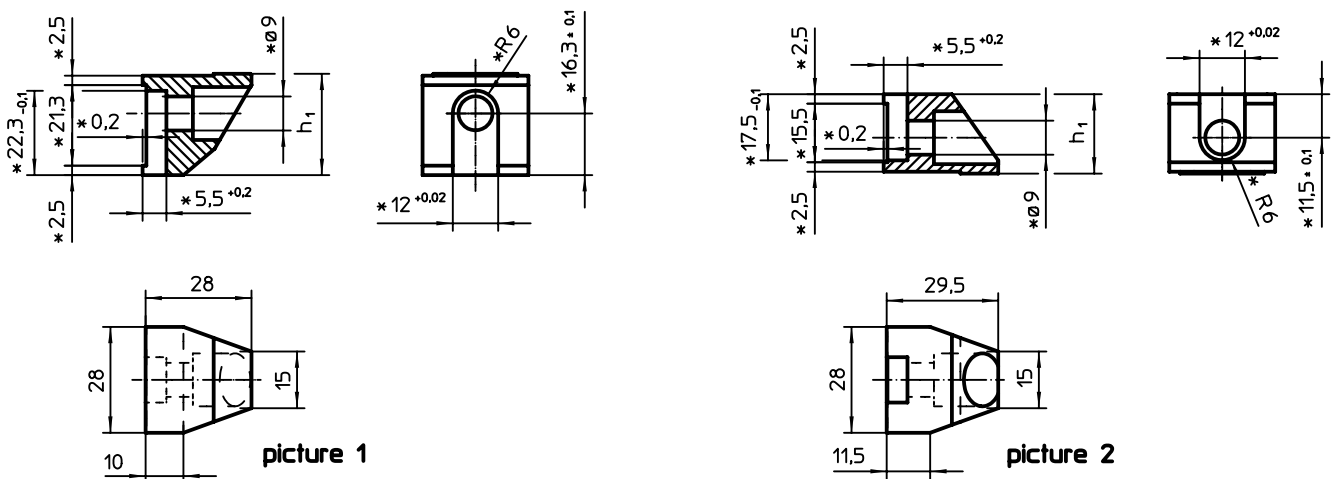
When using custom-made jaws, it is important to insert the tightening screw (M 8-12.9, 43 Nm) 10 mm deep into the clamp housing

MORE INFORMATION

Further products

Complete Range → p. 491

DRAWING



* Specifications and material of especially designed jaws have to be taken into consideration.

ORDER INFORMATION

System	Clamping range	Dimensions		Art. No.
		h_1 -0.1 [mm]	[g]	
lower standard clamping jaw – picture 1				
V70/L12/L16	–	26.8	99	23320.0050
upper standard clamping jaw – picture 2				
V70/L12/L16	0 – 12	21.0	69	23320.0052



PRODUCT DESCRIPTION

The clamping jaws can be used for floating clamps 23320.0008, 2332.0010, 23320.0012, and 23320.0014.

The upper clamping jaw (23320.0054, 23320.0056, and 23320.0058 - pictures 1 to 3) can be used to extend the clamping range.

Various standard parts can be screwed into in the upper clamping jaw as required, using locating thread M 8 (23320.0154 / .0156 - pictures 4 + 5) - see "Further products".

The lower clamping jaw with pivot function (23320.0148 - picture 6) adapts to the profiles of the workpiece.

Material

Ball

- Ball-bearing steel

Clamping jaws

- Case-hardened steel, nitrided, manganese phosphated

MORE INFORMATION

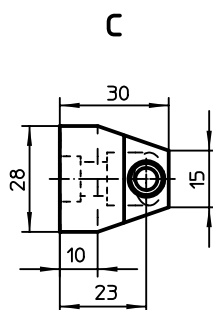
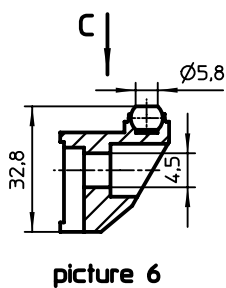
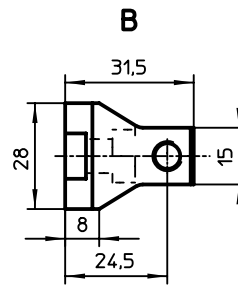
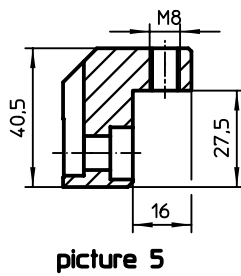
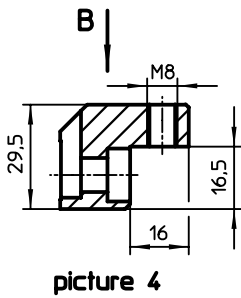
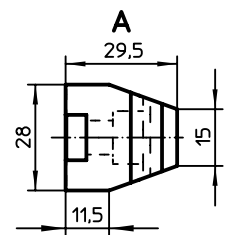
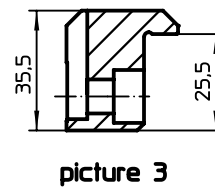
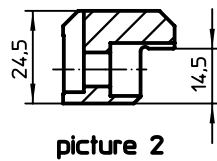
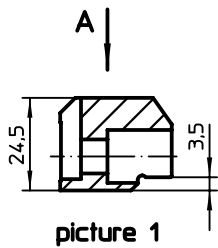
Notes

The tightening torque of the floating clamp must be adapted/reduced situationally. Observe the surface pressure due the the reduced contact surface of the clamping jaws.


Further products

- Complete Range → p. 492
- Seating Pins, ribbed or pointed → p. 309
- Ball-Ended Thrust Screws, headless, ball protected against rotating → p. 320
- Ball-Ended Thrust Screws, headless, flat-faced ball → p. 327
- Thrust Screws, with brass pad → p. 334
- Thrust Screws, with plastic pad → p. 335
- Self-Aligning Pads, adjustable → p. 343
- Self-Aligning Pads, adjustable, self-setting → p. 344

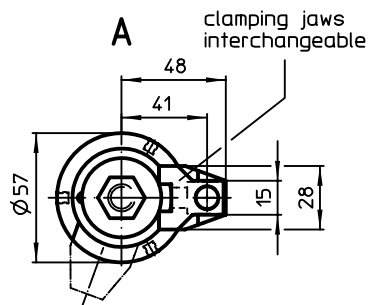
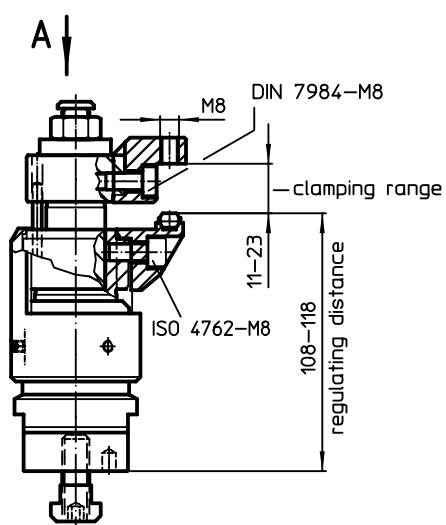
DRAWING



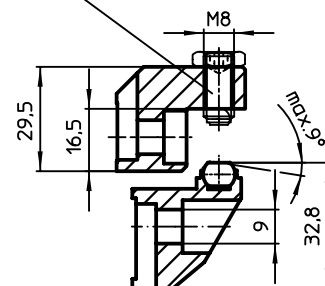
ORDER INFORMATION

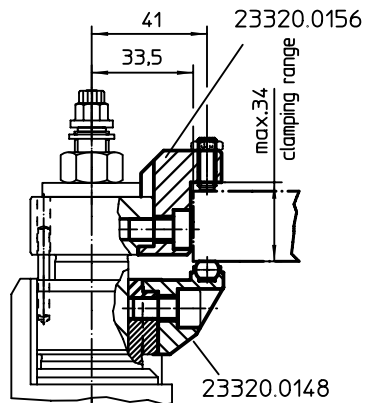
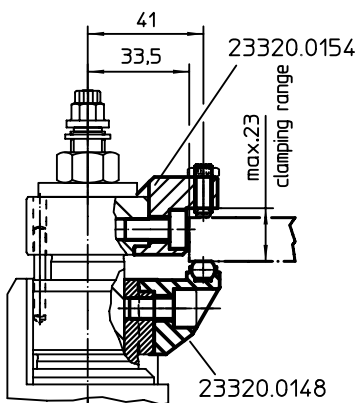
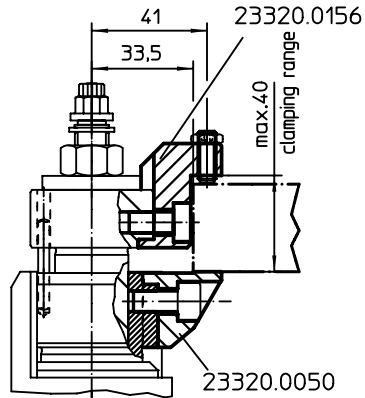
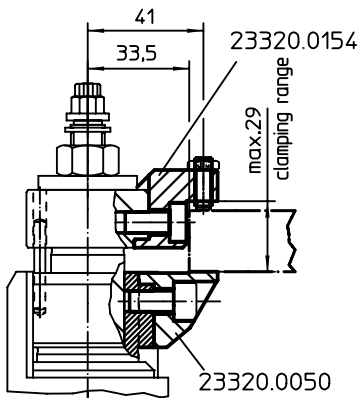
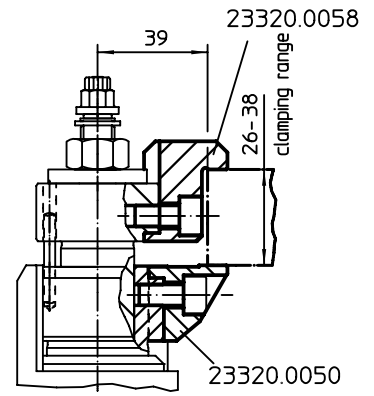
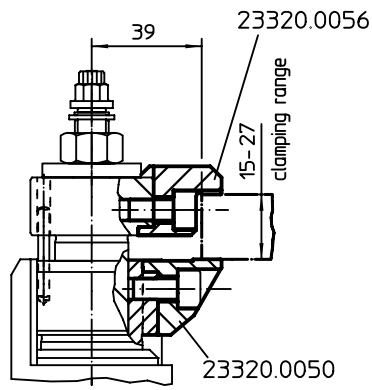
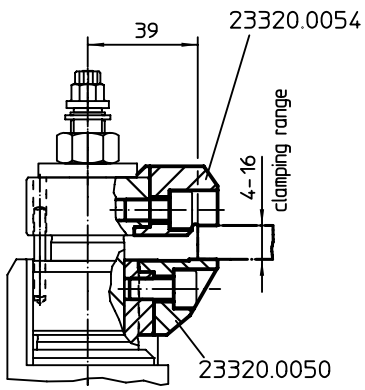
System	Clamping range max. in combination with 23320.0050 [mm]	Clamping range max. in combination with 23320.0148 [mm]	 [g]	Art. No.
upper exchange clamping jaw – picture 1				
V70/L12/L16	4 – 16	–	91	23320.0054
upper exchange clamping jaw – picture 2				
V70/L12/L16	15 – 27	–	88	23320.0056
upper exchange clamping jaw – picture 3				
V70/L12/L16	26 – 38	–	130	23320.0058
upper clamping jaw with location hole – picture 4				
V70/L12/L16	29	23	83	23320.0154
upper clamping jaw with location hole – picture 5				
V70/L12/L16	40	34	112	23320.0156
lower clamping jaw with flat-faced ball and pivot function, plain surface, protected against rotating – picture 6				
V70/L12/L16	–	–	98	23320.0148

APPLICATION EXAMPLE



e.g. Ball-Ended Thrust Screw (EH 22720.)





Down-Thrust Clamps • swivelling, size 25

EH 23310.



PRODUCT DESCRIPTION

Universal mechanical clamping element for fast and comfortable changing and clamping of workpieces by means of manually swivelling clamping claw.

The clamps have the following advantages:

- Rapid manual clamping by means of clamping screw, adjustable clamping lever or adjustable eccentric quick clamp.
 - Easy and quick changing of the workpiece by swinging away the clamping claw to the left or right. The positioning ring 23310.0345 allows infinitely variable adjustment (only with variants art no. 23310.0027 - .0029).
 - The use of positioning ring 23310.0345 allows a repeatable precise clamping. Here h_1 min. increases by at least 6 mm (stroke minus 6 mm).
 - Compact design, thus little space taken-up for clamping.
 - Easy adjustment even to large clamping heights due to the height adjusting cylinders.
- As the force applied by the operator is not known for the versions with levers, the clamping force is given in the tables as a guide value. The average value was determined by tests.

Material

Clamp

- Case-hardened steel, case-hardened, blackened and ground

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)
2. with the set screw directly in the mounting plate of, for example, a fixture

The cylinder must make contact over the whole surface.

MORE INFORMATION

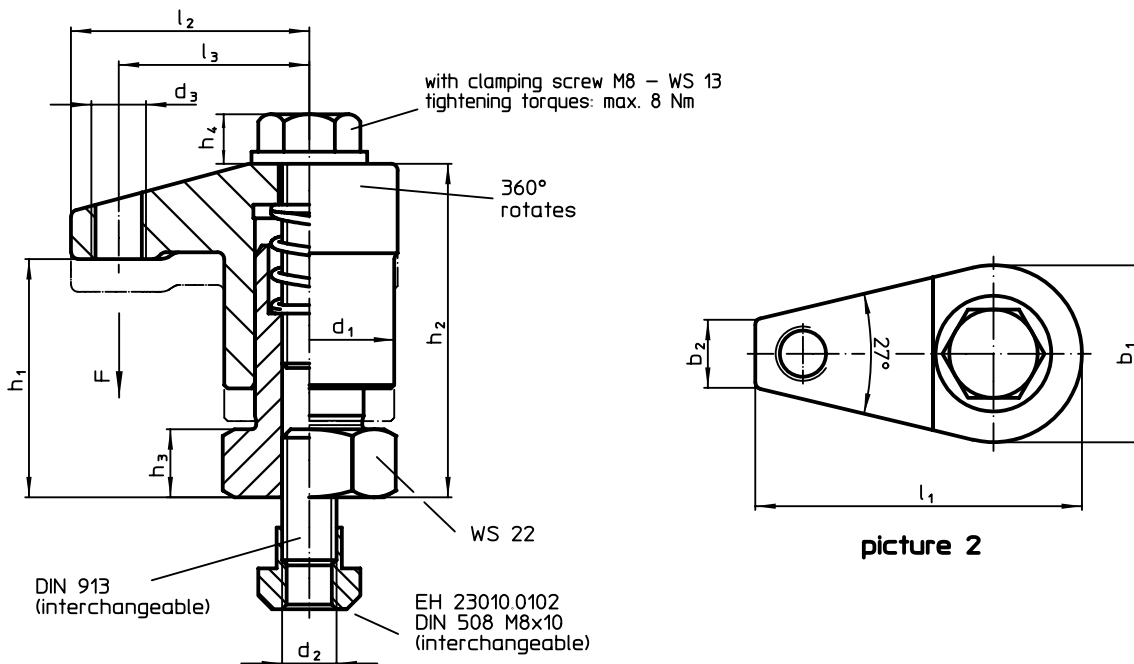
References

The clamping height can be increased with EH 23310. height adjusting cylinders and EH 1007. washers, and equally lowered by using clamping elements e.g. EH 22730.

Further products

- Complete Range → p. 512
- Positioning Rings, for down-thrust clamp → p. 526
- Height Adjusting Cylinders → p. 527
- Spacers → p. 763

DRAWING



ORDER INFORMATION

System	d ₁	b ₁	b ₂	d ₂	d ₃	Dimensions						Stroke	Clamp- ing force	Tight- ening torque max.	Art. No.		
						h ₁	h ₂	h ₃	h ₄	l ₁	l ₂					l ₃	[mm]
with clamping screw – picture 2																	
V40	25	26	10	M8	M8	30 – 35	44 – 49	10	6.9	48	35	28	5	5	8	212	23310.0025
						35 – 45	54 – 64	10	6.9	48	35	28	10	5	8	419	23310.0027



PRODUCT DESCRIPTION

Universal mechanical clamping element for fast and comfortable changing and clamping of workpieces by means of manually swivelling clamping claw.

- The clamps have the following advantages:
- Rapid manual clamping by means of clamping screw, adjustable clamping lever or adjustable eccentric quick clamp.
 - Easy and quick changing of the workpiece by swinging away the clamping claw to the left or right. The positioning ring 23310.0348 allows infinitely variable adjustment.
 - The use of positioning ring 23310.0348 allows a repeatable precise clamping. Here h_1 min. increases by at least 6 mm (stroke minus 6 mm).
 - Compact design, thus little space taken-up for clamping.
 - Easy adjustment even to large clamping heights due to the height adjusting cylinders.
- As the force applied by the operator is not known for the versions with levers, the clamping force is given in the tables as a guide value. The average value was determined by tests.

Material

- Clamp**
- Case-hardened steel, case-hardened, blackened and ground

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)
2. with the set screw directly in the mounting plate of, for example, a fixture

The cylinder must make contact over the whole surface.

MORE INFORMATION

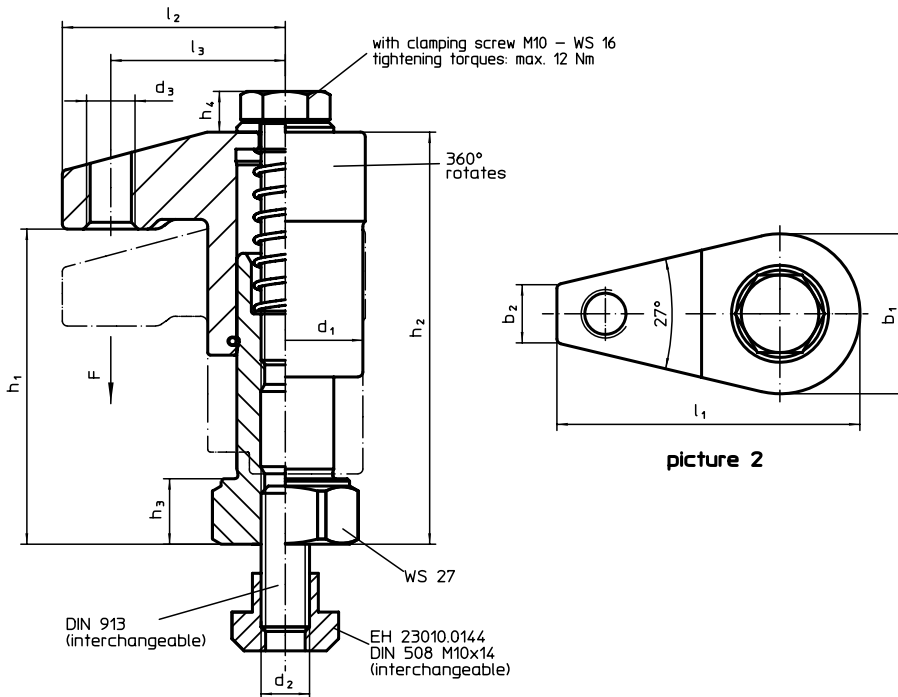
References

The clamping height can be increased with height adjusting cylinders EH 23310. and reduced with the clamping inserts, e.g. EH 22730.

Further products

- Complete Range → p. 514
- Positioning Rings, for down-thrust clamp → p. 526
- Height Adjusting Cylinders → p. 527

DRAWING



ORDER INFORMATION

System	Dimensions											Stroke	Clamping force	Tightening torque max.	Art. No.		
	d_1	b_1	b_2	d_2	d_3	h_1	h_2	h_3	h_4	l_1	l_2					l_3	[mm]
with clamping screw – picture 2																	
V70	32	33	12	M10	M10	45 – 65	65 – 85	13	8.4	62.5	46	36	20	7.5	12	512	23310.0041
						63 – 88	83 – 108	13	8.4	62.5	46	36	20	7.5	12	620	23310.0044

Down-Thrust Clamps • swivelling, size 40

EH 23310.



PRODUCT DESCRIPTION

Universal mechanical clamping element for fast and comfortable changing and clamping of workpieces by means of manually swivelling clamping claw.

The clamps have the following advantages:

- Rapid manual clamping by means of clamping screw, adjustable clamping lever, or double eccentric lever.
 - Easy and rapid changing of workpieces by swinging away the clamping claw to the left or right. The positioning ring 23310.0350 allows infinitely variable adjustment.
 - Continuously variable setting by means of positioning ring 23310.0350.
 - The use of positioning ring 23310.0350 allows a repeatable precise clamping. Here h_1 min. increases by at least 7 mm (stroke minus 7 mm).
 - Compact design, thus only a small amount of space is required for clamping.
 - Easy adjustment even to large clamping heights due to the height adjusting cylinders.
- As the force applied by the operator is not known for the versions with levers, the clamping force is given in the tables as a guide value. The average value was determined by tests.

Material

Clamp

- Case-hardened steel, case-hardened, blackened and ground

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)
2. with the set screw directly in the mounting plate of, for example, a fixture

The cylinder must make contact over the whole surface.

Exceeding of the clamping height is inhibited by the height limitation.

MORE INFORMATION

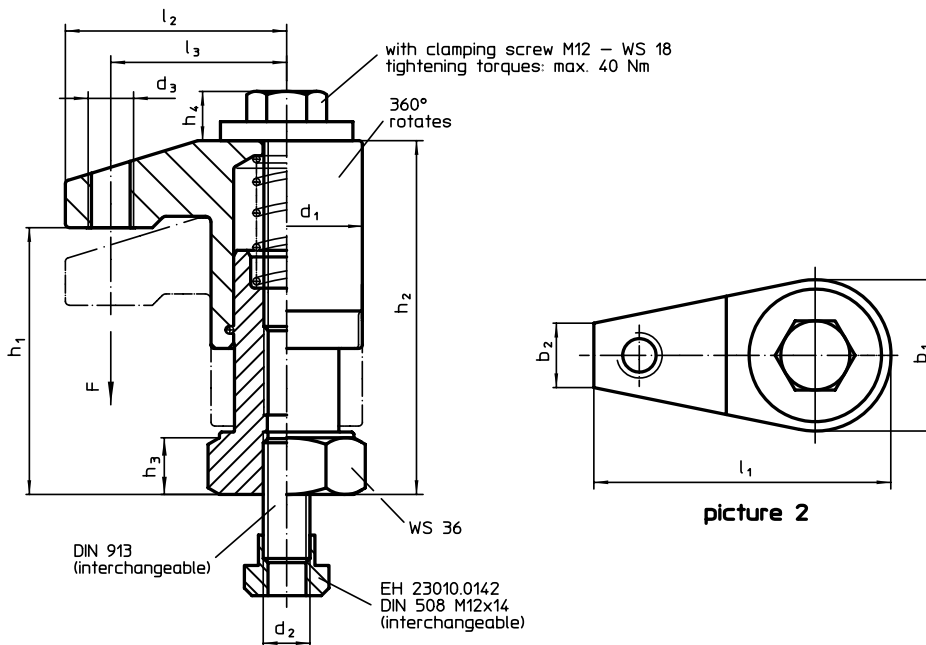
References

The clamping height can be increased by using height adjusting cylinders EH 23310. and disks EH 1107. and EH 1108. It can be reduced by employing clamping inserts, e.g. EH 22730.

Further products

Complete Range	→ p. 516
Positioning Rings, for down-thrust clamp	→ p. 526
Height Adjusting Cylinders	→ p. 527
Spacers	→ p. 763
Wrenches	→ p. 786

DRAWING



ORDER INFORMATION

System	Dimensions											Stroke [mm]	Clamp- ing force [kN]	Tightening torque max. [Nm]	🔩 [g]	Art. No.	
	d_1	b_1	b_2	d_2	d_3	h_1	h_2	h_3	h_4	l_1	l_2						l_3
with clamping screw – picture 2																	
V70/L12	40	40	17	M12	M12	50 – 70	73 – 93	15	13	75	55	43	20	10	40	853	23310.0051
						68 – 98	91 – 121	15	13	75	55	43	30	10	40	964	23310.0054
						95 – 135	118 – 158	22	13	75	55	43	40	10	40	1266	23310.0057



PRODUCT DESCRIPTION

The moveable down-thrust clamps are used, amongst other things, when swivel movements are not possible because of the workpiece.

The clamps have the following advantages:

- Easier and quicker workpiece change by moving the clamping claws forwards or backwards.
- The clamping range in horizontal direction is between l_1 min. and l_1 max.
- To change the workpiece, the clamping claw can be pushed back from l_1 max. by dimension l_2 .
- Rapid manual clamping by means of the clamping screw, the adjustable clamping lever, or the double eccentric tension lever.
- As with all down-thrust clamps, the clamping claw of this version can also be swivelled away to the left or right. The use of positioning ring 23310.0350 allows the clamping position to be fixed. Here h_1 min. increases by at least 7 mm (stroke minus 7 mm).
- Compact design, therefore less space requirement when clamping.
- Easily adjustable even to large clamping heights, using the height adjusting cylinders.

As the force applied by the operator is not known for the versions with levers, the clamping force is given in the tables as a guide value. The average value was determined by tests.

Material

Clamp

- Case-hardened steel, case-hardened, blackened and ground

Assembly

Down-thrust clamps can be attached in two ways:

1. in a T-slot, using a nut for T-slots DIN 508 (EH 23010.)
2. with the set screw directly in the mounting plate of, for example, a fixture

The cylinder must make contact over the whole surface.

Operation

1. Push clamping claw backwards.
2. Insert workpiece.
3. Push clamping claw forwards.

4. Adjust clamping position of clamping claw using the knurled screw.

5. Secure / lock the clamping position using the knurled nut.

MORE INFORMATION

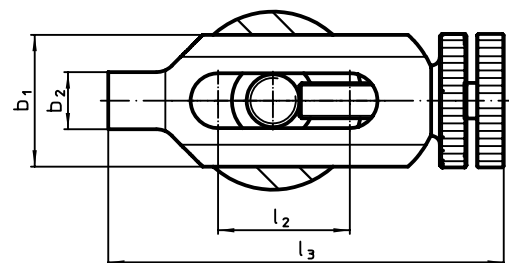
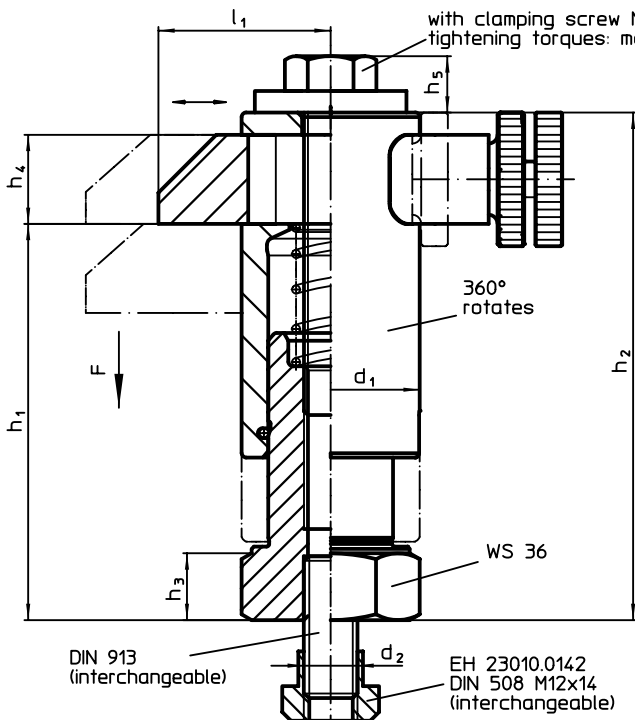
References

The clamping height can be increased by using height adjusting cylinders EH 23310. and disks EH 1107. and EH 1108. It can be reduced by employing clamping inserts, e.g. EH 22730.

Further products

- Complete Range → p. 524
- Positioning Rings, for down-thrust clamp → p. 526
- Height Adjusting Cylinders → p. 527
- Spacers → p. 763
- Wrenches → p. 786

DRAWING

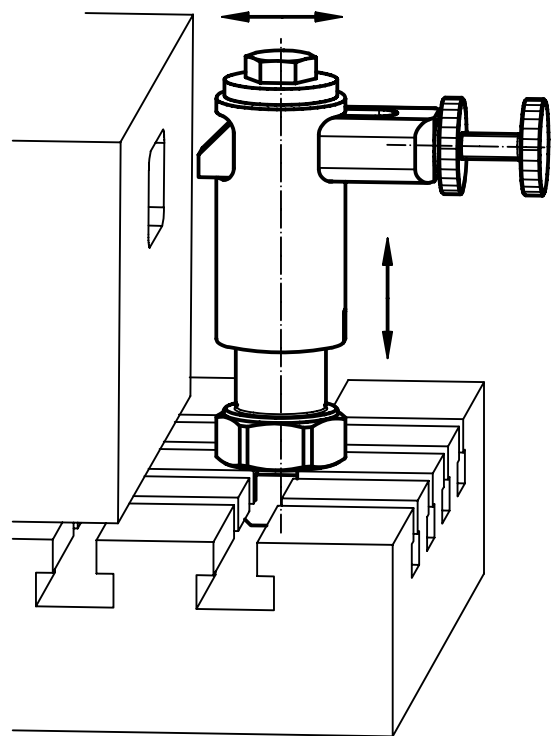
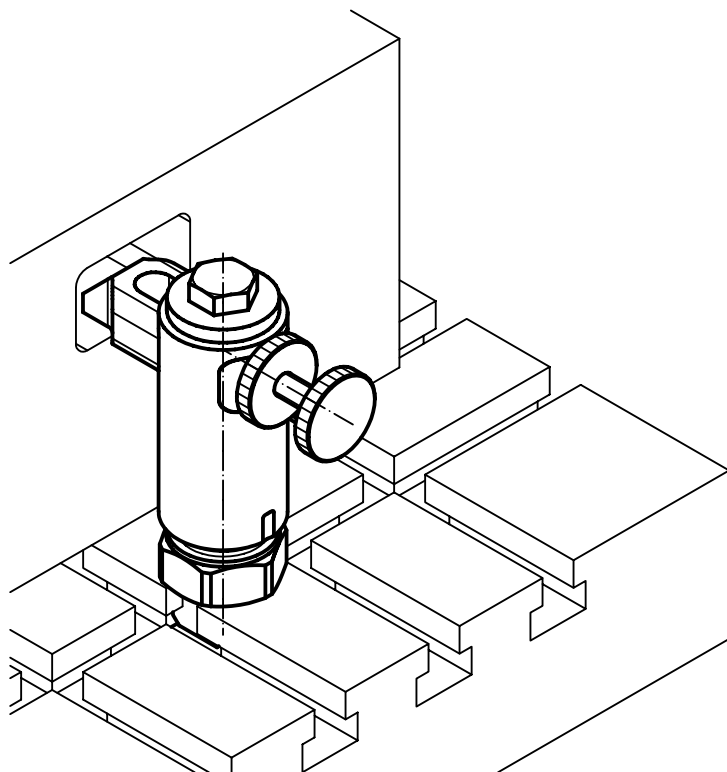


picture 2

ORDER INFORMATION

System	Dimensions												Stroke [mm]	Clamp- ing force [kN]	Tightening torque max. [Nm]	📦 [g]	Art. No.
	d ₁	b ₁	b ₂	d ₂	h ₁	h ₂	h ₃	h ₄	h ₅	l ₁	l ₂	l ₃					
with clamping screw – picture 2																	
V70/ L12	40	30	13	M12	70 – 90	95 – 115	15	20	13	38 – 55	30	90 – 107	20	10	40	1075	23310.0084
					88 – 118	113 – 143	15	20	13	38 – 55	30	90 – 107	30	10	40	1239	23310.0087

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

After aligning, the clamp positioning ring is fitted on the spindle with the effect, that repeated clamping is always exactly on the same point. The positioning ring is adjustable 360° on the down-thrust clamp. After mounting, the clamping claw can swing 110° to the left or right (only for the swiveling versions).

Material

- Steel, blackened

MORE INFORMATION

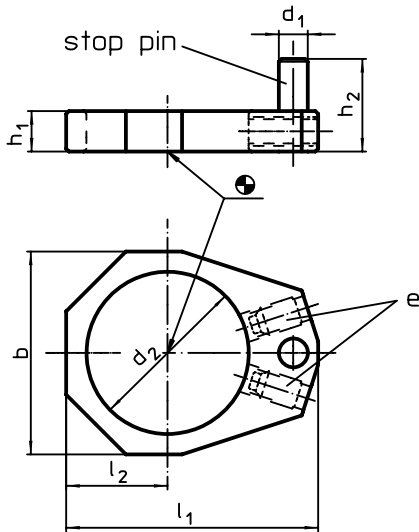
Further products

Complete Range → p. 526

Assembly

Before mounting the positioning ring, pull-off the clamping claw of down-thrust clamp.

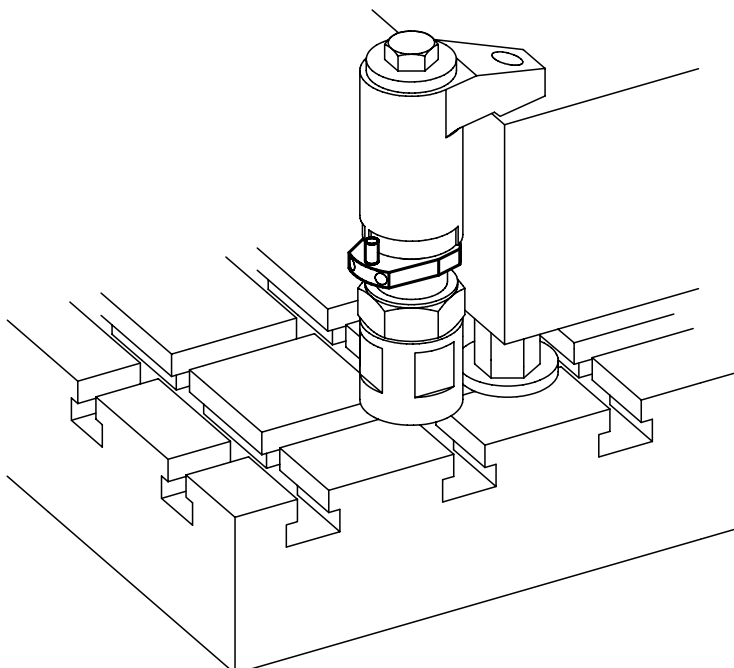
DRAWING



ORDER INFORMATION

System	Dimensions									For down-thrust clamp	Art. No.
	h ₁	h ₂	d ₁	d ₂	l ₁	l ₂	b	e	[g]		
for down-thrust clamp, size 40 – picture 2											
V70/L12	7	16	5	28	43.5	17.5	35	22760.0052	23310.0050-0058/23310.0083-0088	32	23310.0350

APPLICATION EXAMPLE



Height Adjusting Cylinders

EH 23310.



PRODUCT DESCRIPTION

The height adjusting cylinders can be used to extend the clamping height of down-thrust clamps EH 23310. They are also used in combination with seating pins (EH 22680.), pins (EH 22690.) and self-aligning pads (EH 22730. - EH 22741.).

Material

- Steel, case-hardened, blackened, ground

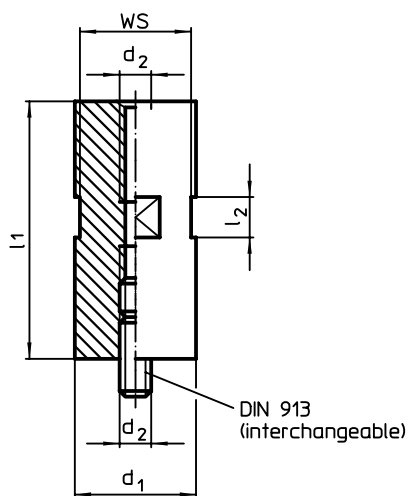
MORE INFORMATION

Further products

- Complete Range → p. 527
- Seating Pins, ribbed or pointed → p. 309
- Seating Pins, pin shape → p. 310
- Pins → p. 311

- Seating Pins, adjustable → p. 314
- Self-Aligning Pads → p. 338
- Self-Aligning Pads, with hard metal ball, ribbed → p. 339
- Self-Aligning Pads, self-resetting → p. 340
- Self-Aligning Pads, with hard metal ball, ribbed and self-resetting → p. 342
- Self-Aligning Pads, adjustable → p. 343
- Self-Aligning Pads, adjustable, self-resetting → p. 344

DRAWING



picture 1

ORDER INFORMATION

System	Dimensions				WS	[g]	Art. No.
	d ₁ -0.1	l ₁ ±0.01	d ₂	l ₂			
[mm]							
picture 1							
V40	25	20	M 8	10	22	75	23310.0125
		40	M 8	20	22	150	23310.0126
		80	M 8	20	22	306	23310.0127
V40	32	35	M10	20	27	202	23310.0130
		70	M10	20	27	411	23310.0132
		140	M10	20	27	848	23310.0134
V70/L12	40	35	M12	20	36	336	23310.0140
		70	M12	20	36	673	23310.0141
		140	M12	20	36	1366	23310.0142
L16	40	35	M16	20	36	331	23310.0145
		70	M16	20	36	663	23310.0146
		140	M16	20	36	1330	23310.0147
V70/L12	60	35	M12	20	55	765	23310.0160
		70	M12	20	55	1533	23310.0161
		140	M12	20	55	3096	23310.0162
L16	60	35	M16	20	55	763	23310.0165
		70	M16	20	55	1522	23310.0166
		140	M16	20	55	3056	23310.0167



PRODUCT DESCRIPTION

The compact clamps are all purpose clamping elements. Due to the self-locking tension lever application can either take place in horizontal or vertical position in both, machined and raw workpieces.

Features:

- Exact and position precise clamping
- Easy, universal handling
- High clamping force at low tightening torques, abrasion-resistant due to tension lever with bearings
- Continuous, large clamping area
- Tension lever entirely retractable for hindrance-free exchange of workpieces
- Tension lever with locating thread for various clamping elements, e.g. ball-ended thrust screws (EH 22700. - EH 22720.), self-aligning pads (EH 22730. / EH 22740.) etc.
- Large adjusting range at constant clamping force
- Continuous increase of the clamping range by height adapters 23690.0112 / .0116
- Easy and flexible mounting options
- Corrosion-resistant
- Resistant to dirt and chips

Material

Body

- Heat-treated steel, black coated

Tension lever

- Heat-treated steel, tempered, silver coated

Assembly

Assembly and Set-Up:

1. Take out stop pin ISO 4762-M 6 x 10.
2. Move back and take out tension lever.
3. Tightening by 2 screws with internal hexagon (included in supply volume).
4. Place tension lever in sliding rail and then

insert.

5. Tighten stop pin ISO 4762 - M 6 x 10.

Operation

Clamping Process:

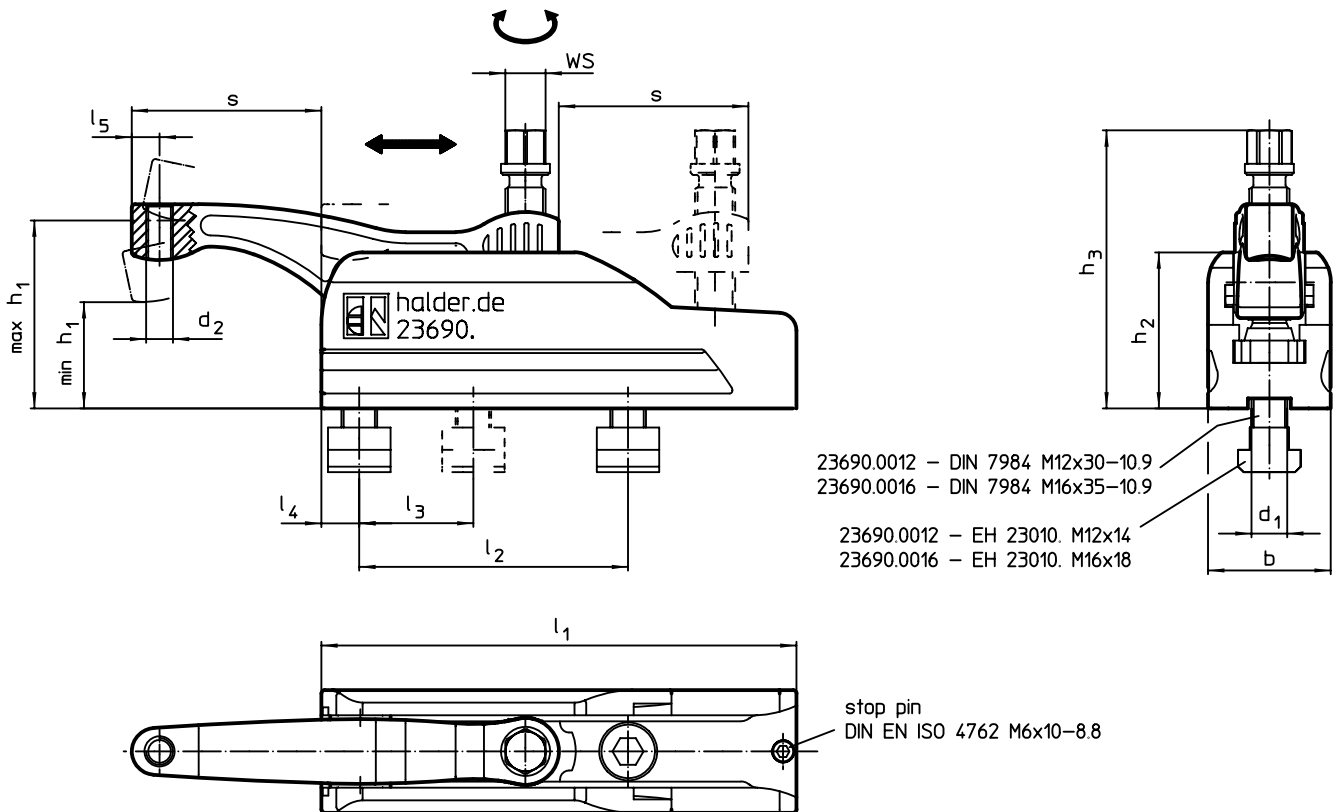
1. Slide tension lever to clamping position.
2. Clamping is made via a hexagon collar screw.
3. Releasing is done in reverse order.

MORE INFORMATION

Further products

- Complete Range → p. 558
- Height Adapters, for compact clamp . . . → p. 560

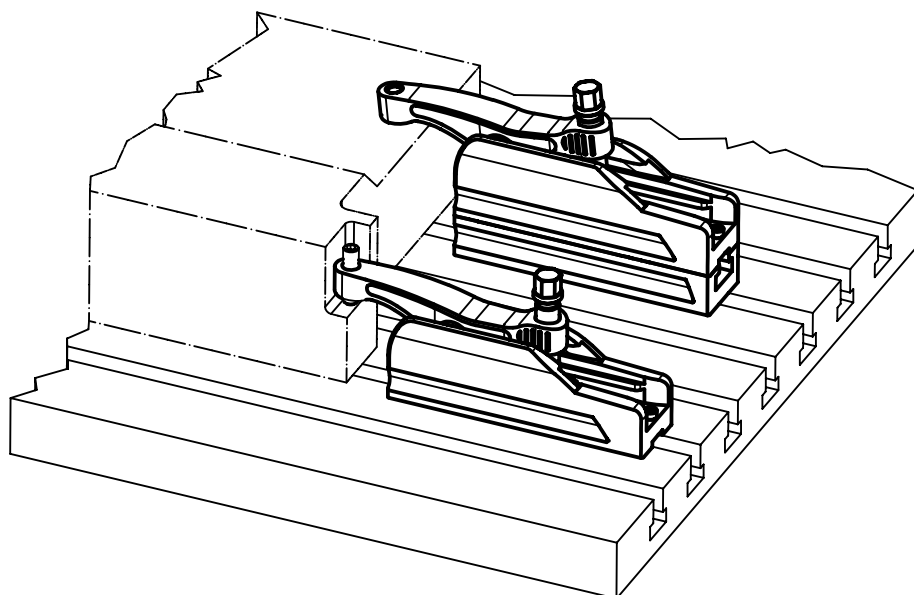
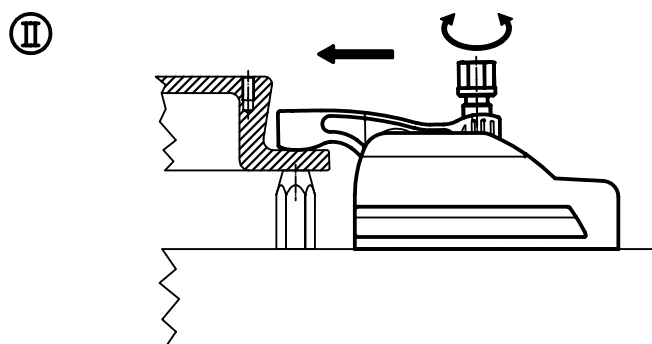
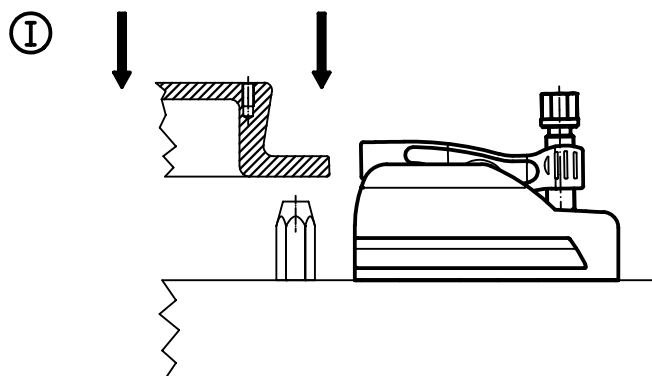
DRAWING



ORDER INFORMATION

System	Dimensions													WS [mm]	Clamp- ing force max. [kN]	Tightening torque max. [Nm]	Art. No.	
	d ₁	d ₂	h ₁ min.	h ₁ max.	h ₂	h ₃	s max.	l ₁	l ₂ +1	l ₃	l ₄	l ₅	b					
[mm]														[mm]	[kN]	[Nm]	[g]	
V70/ L12	M12	M 8	40	60	59	95	43	134	70	50	13	10.0	45	16	15	45	1840	23690.0012
L16	M16	M12	47	85	70	126	85	213	120	50	17	12.5	55	18	25	75	4000	23690.0016

APPLICATION EXAMPLE





PRODUCT DESCRIPTION

The height adapter for compact clamps allows a clamping height increase and has the following characteristics:

- Continuous covering of clamping height
- T-slot in the height adapter allows exact positioning by moving the compact clamp at specified grid spacings
- Height can be expanded user-defined

Material

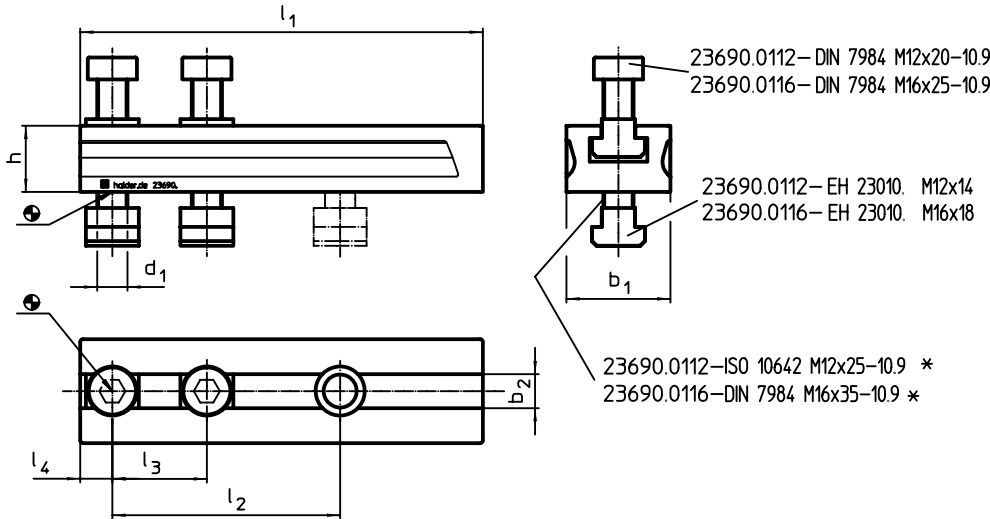
- Heat-treated steel, black coated

MORE INFORMATION

Further products

Complete Range → p. 560

DRAWING

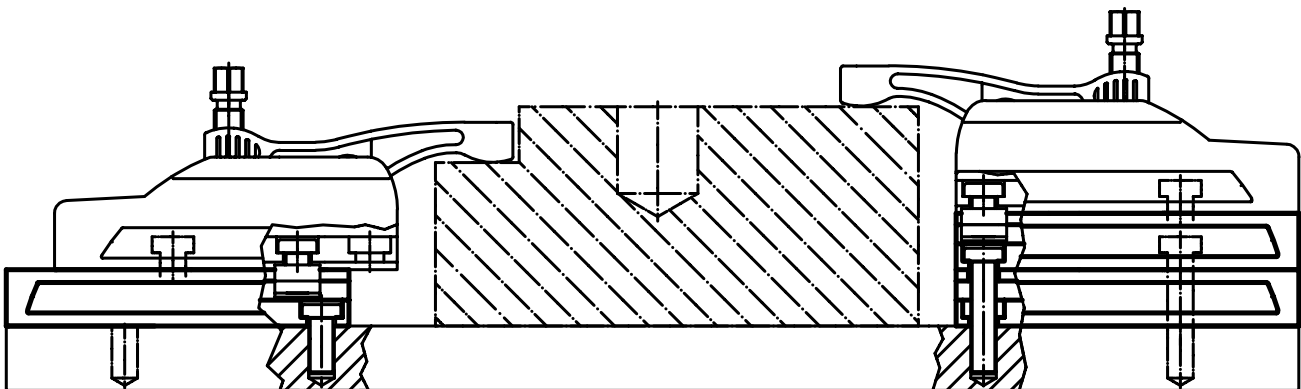


* When using more height adapters the screws ISO 10642 or DIN 7984 have to be replaced by screws extended by the dimension h.

ORDER INFORMATION

System	Dimensions								Art. No.	
	d ₁	l ₁	l ₂ +1	l ₃	l ₄	h	b ₁	b ₂ H12		
[mm]									[g]	
V70/L16	M12	134	70	50	13	20	45	14	874	23690.0112
L16	M16	213	120	50	17	35	55	18	3000	23690.0116

APPLICATION EXAMPLE





9 MULTIPLE CLAMPING SYSTEMS



Product group	Page
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Components	893
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Clamping Units	915
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Standard Ranges	917
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MULTIPLE CLAMPING SYSTEM

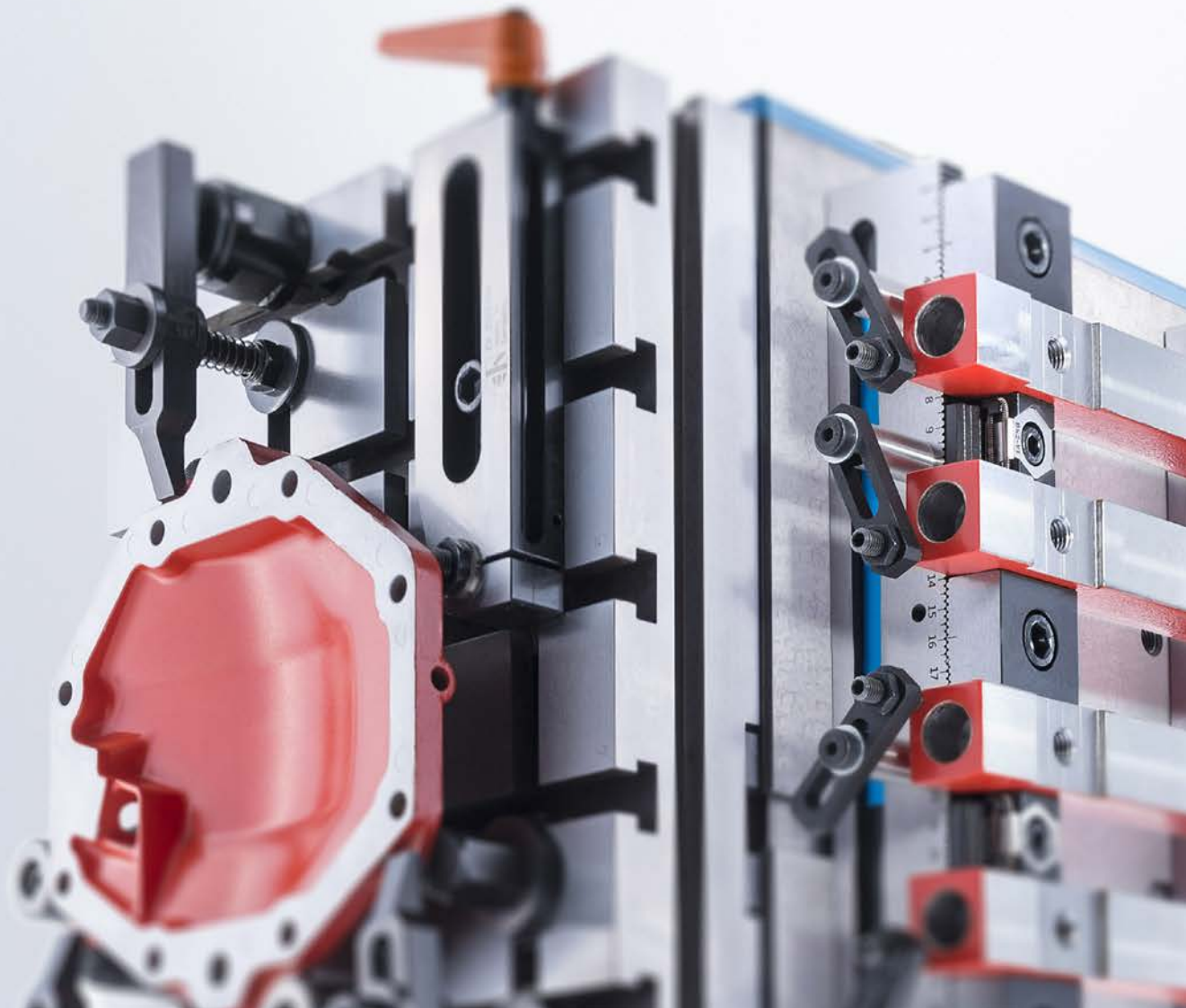
Boasting a modular design, our multiple clamping system lets you clamp workpieces in a quick and secure manner. The system is made up of serrated clamping bars, stops, taper clamping units, supports and a lateral stop. Thanks to our wide selection of single parts you can clamp workpiece of various dimensions with perfect ease – either one at a time or simultaneously as a batch of workpieces.

GENERAL PROPERTIES

- The clamping bars are designed to accommodate taper clamping units in the sizes of M8 and M12.
- Their serrated profile makes it possible to securely clamp components with a clamping force of up to 4 tonnes.
- The pitch of the serration amounts to 2.5 mm.
- The accuracy of each row of teeth relative to the positioning holes is +/- 0.01 mm.
- In addition, the M6 threads fitted on both sides allow for the attachment of lateral stops.
New: A magnetic version is also available – for fast assembly / dismantling.



[www.halder.com/
MultipleClampingSystems-Video](http://www.halder.com/MultipleClampingSystems-Video)



Clamping Bars • length 100
EH 1585.

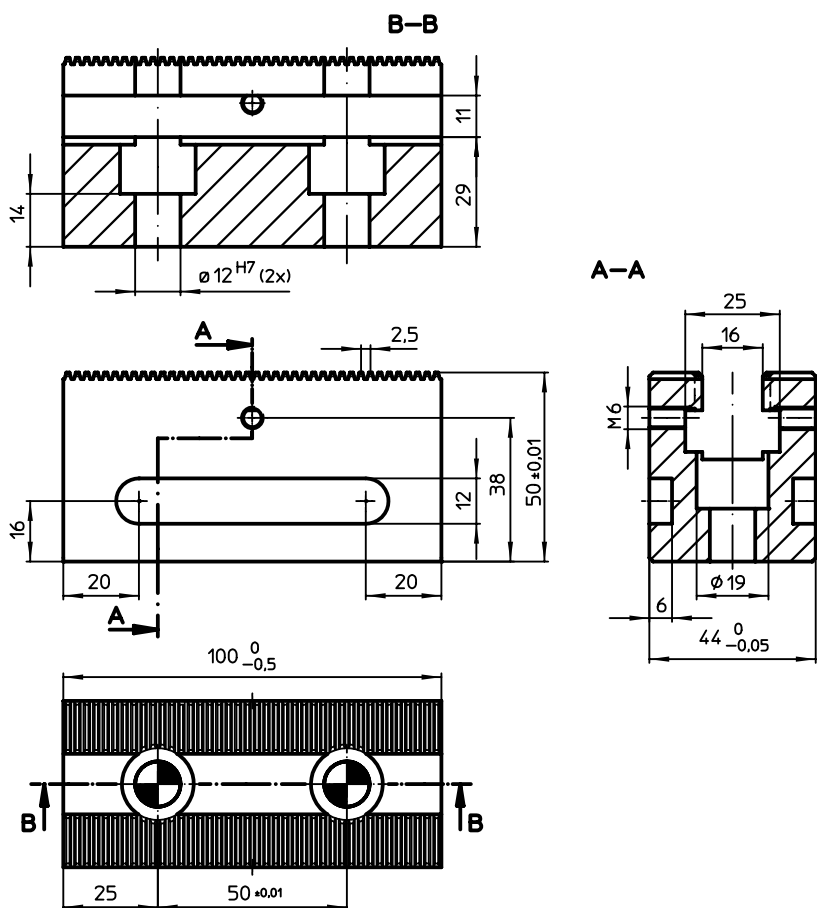


PRODUCT DESCRIPTION

Material

- Tool steel, hardened



DRAWING



ORDER INFORMATION

	Art. No.
[g]	
1168	1585.100

ACCESSORIES

	Number locating screws M12 x 45		Art. No.
		[g]	
fixing screws for clamping bars			
	2	106	1585.101

Clamping Bars • length 200

EH 1585.

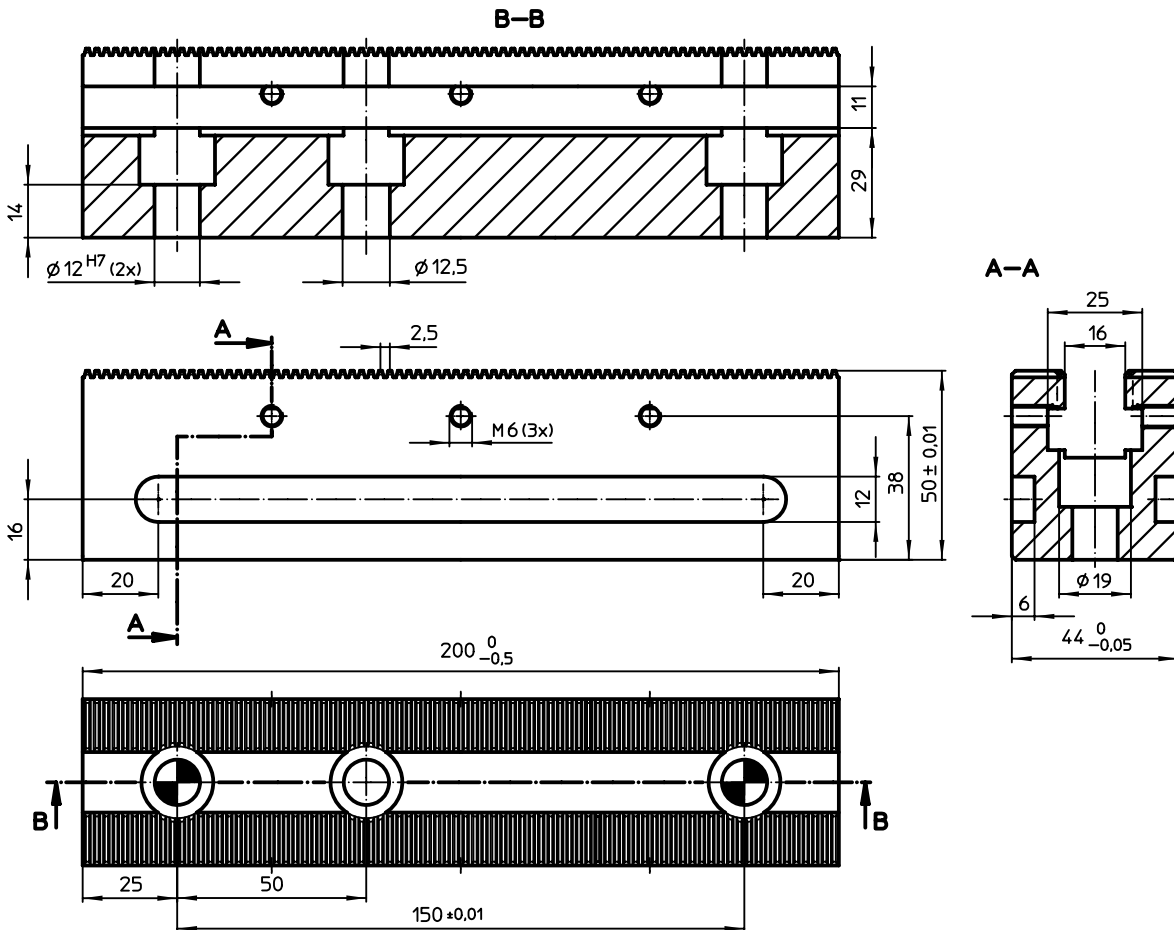


PRODUCT DESCRIPTION


Material

- Tool steel, hardened


DRAWING



ORDER INFORMATION

	Art. No.
 [kg] 2	1585.200

ACCESSORIES

	Number locating screws M12 x 45	Number cap screws M12 x 45	Art. No.
 fixing screws for clamping bars			
	2	1	1585.201

Clamping Bars • length 300

EH 1585.

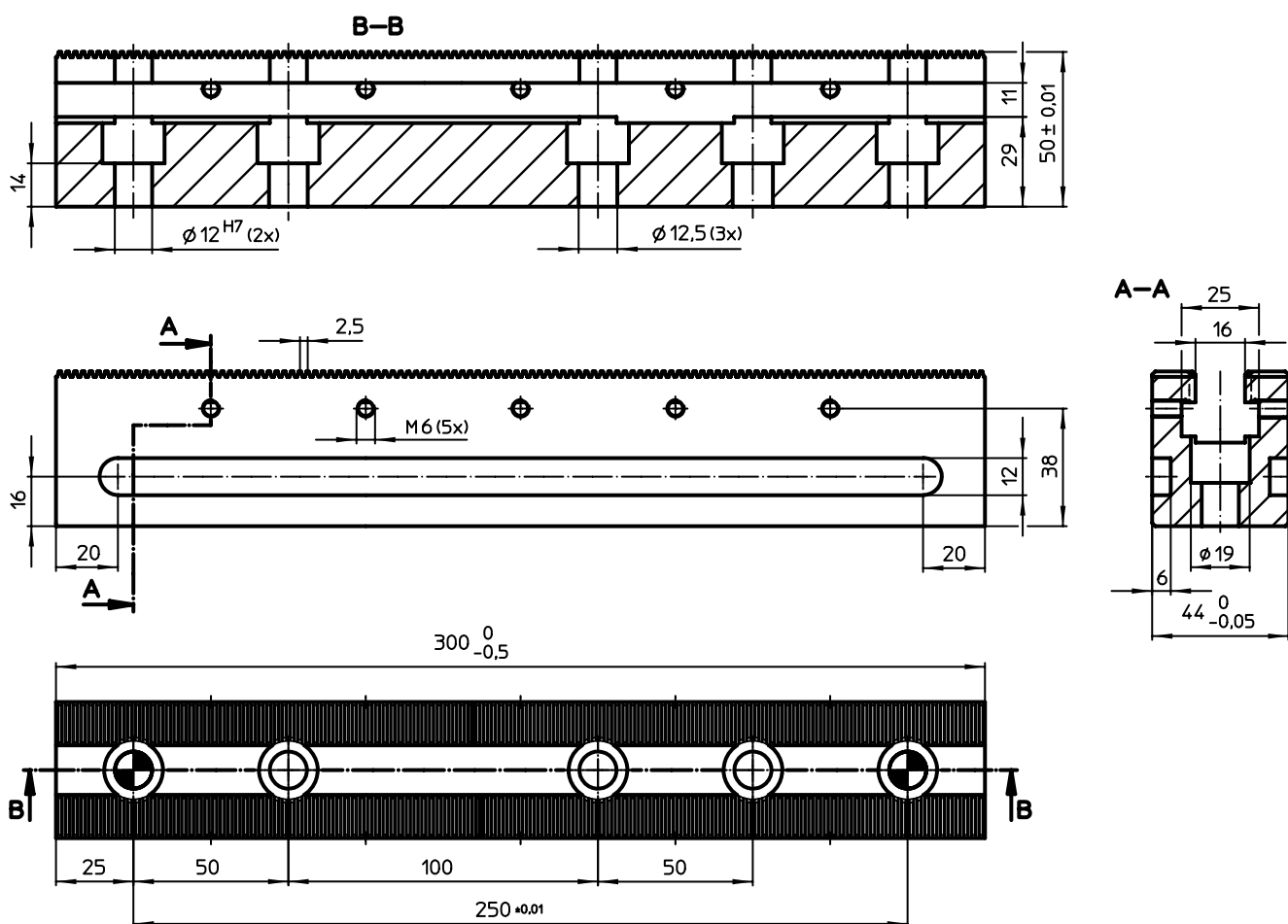
PRODUCT DESCRIPTION

Material


- Tool steel, hardened





DRAWING



ORDER INFORMATION

 [kg]	Art. No.
4	1585.300

ACCESSORIES

	Number locating screws M12 x 45	Number cap screws M12 x 45	 [g]	Art. No.
fixing screws for clamping bars				
	2	3	254	1585.301

Clamping Bars • length 400 - 700

EH 1585.

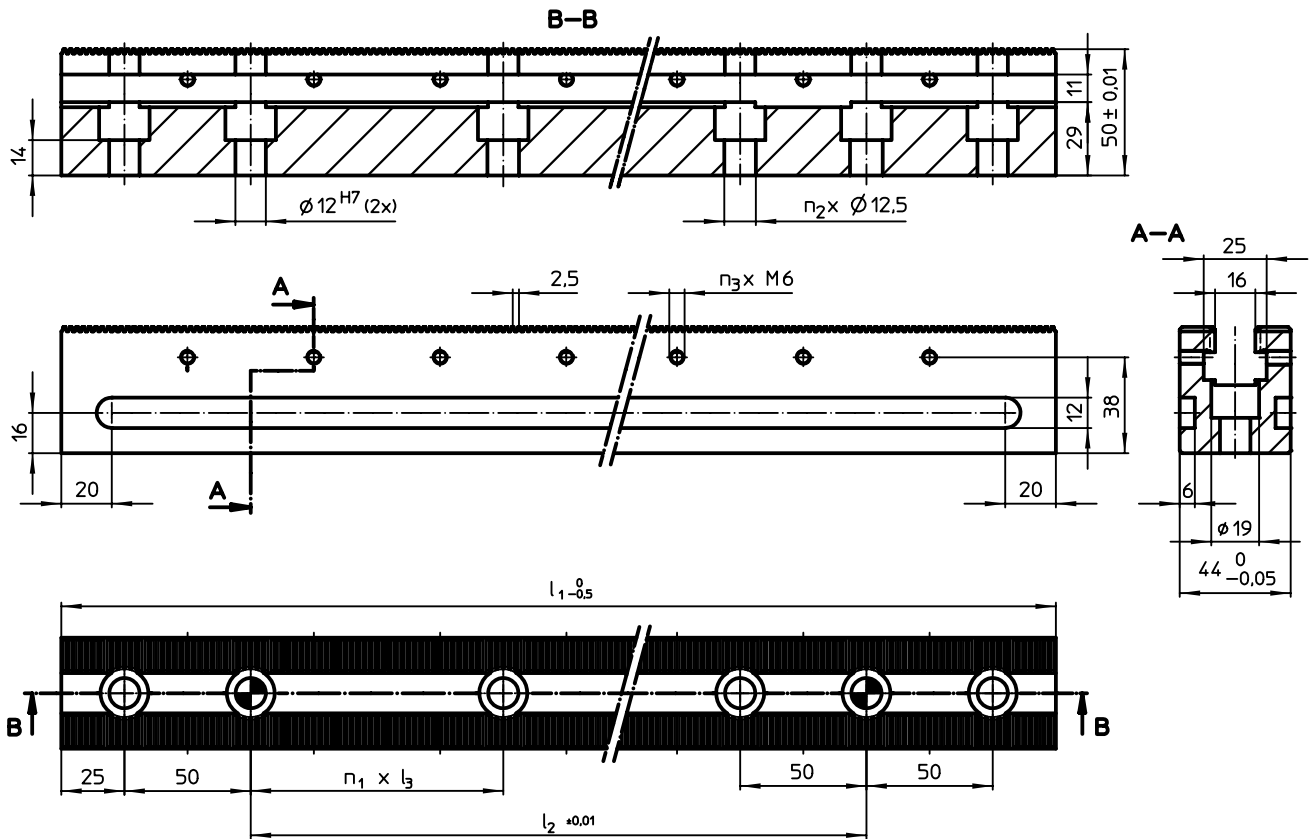


PRODUCT DESCRIPTION

Material

- Tool steel, hardened

DRAWING



ORDER INFORMATION

Dimensions			Amount			[kg]	Art. No.
l_1	l_2 [mm]	l_3	n_1	n_2	n_3		
400	250	100	2	4	7	5	1585.400
500	350	100	3	5	9	6	1585.500
600	450	100	4	6	11	6	1585.600
700	550	100	5	7	13	8	1585.700

ACCESSORIES

	Number locating screws M12 x 45	Number cap screws M12 x 45	[g]	Art. No.
	2	4	304	1585.401
		5	354	1585.501
		6	446	1585.601
		7	453	1585.701

Taper Clamping Units • plain / ribbed, M8

EH 23250.



PRODUCT DESCRIPTION

Inserting the socket head screw moves the two clamping chucks outwards and presses the workpieces against a stop. Stroke of taper clamping units with M8 = +/- 0.5 mm, M12 = +/- 1 mm.

Material

- Body**
 - Tool steel, hardened, bright
- Screw**
 - Heat-treated steel, tempered, quality 12.9
- Spring**
 - Spring steel wire

Clamping jaws

- Tool steel, hardened, blackened and ground

MORE INFORMATION

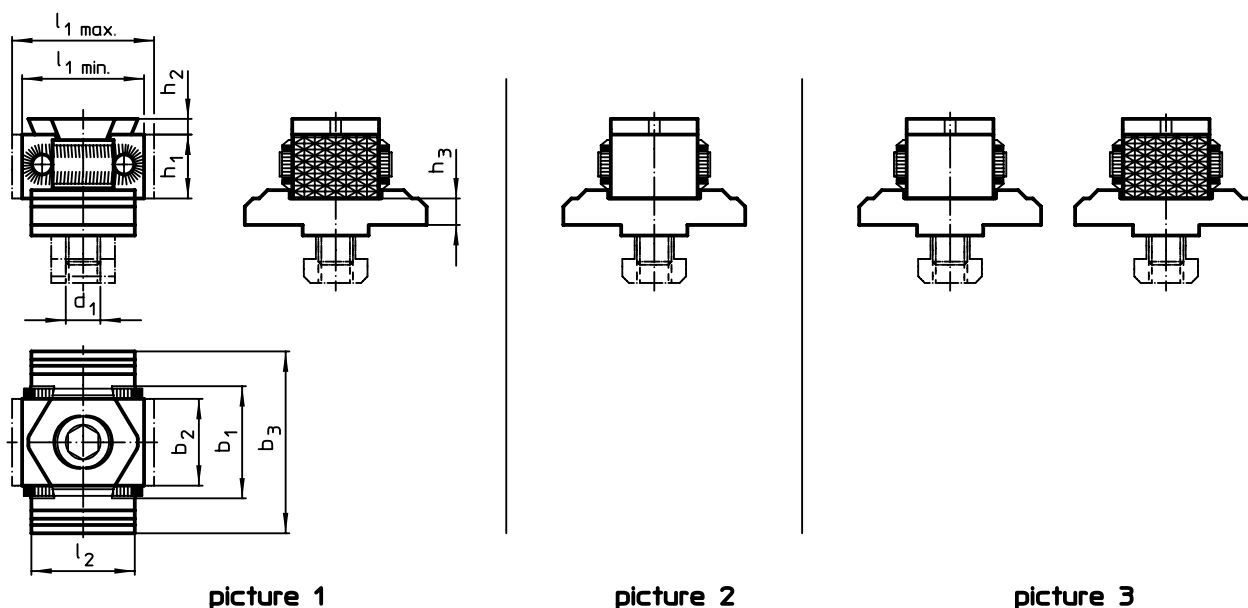
Notes

Clamping jaws protected against rotating

Further products

Taper Clamping Units → p. 468

DRAWING



ORDER INFORMATION

d ₁	l ₁ min.	l ₁ max.	l ₂	Dimensions			h ₁	h ₂	h ₃	[g]	Art. No.
				b ₁	b ₂	b ₃					
[mm]											
clamping jaw, ribbed on both sides – picture 1											
M8	27	31	25	29	21	44	15	2.5	6.4	206	23250.0501
clamping jaw, plain on both sides – picture 2											
M8	27	31	25	29	21	44	15	2.5	6.4	200	23250.0502
clamping jaw, plain and ribbed – picture 3											
M8	27	31	25	29	21	44	15	2.5	6.4	210	23250.0503

Taper Clamping Units • plain / ribbed, M12

EH 23250.



PRODUCT DESCRIPTION

Inserting the socket head screw moves the two clamping chucks outwards and presses the workpieces against a stop. Stroke of taper clamping units with M8 = +/- 0.5 mm, M12 = +/- 1 mm.

Material

Body

- Tool steel, hardened, bright

Screw

- Heat-treated steel, tempered, quality 12.9

Spring

- Spring steel wire

Clamping jaws

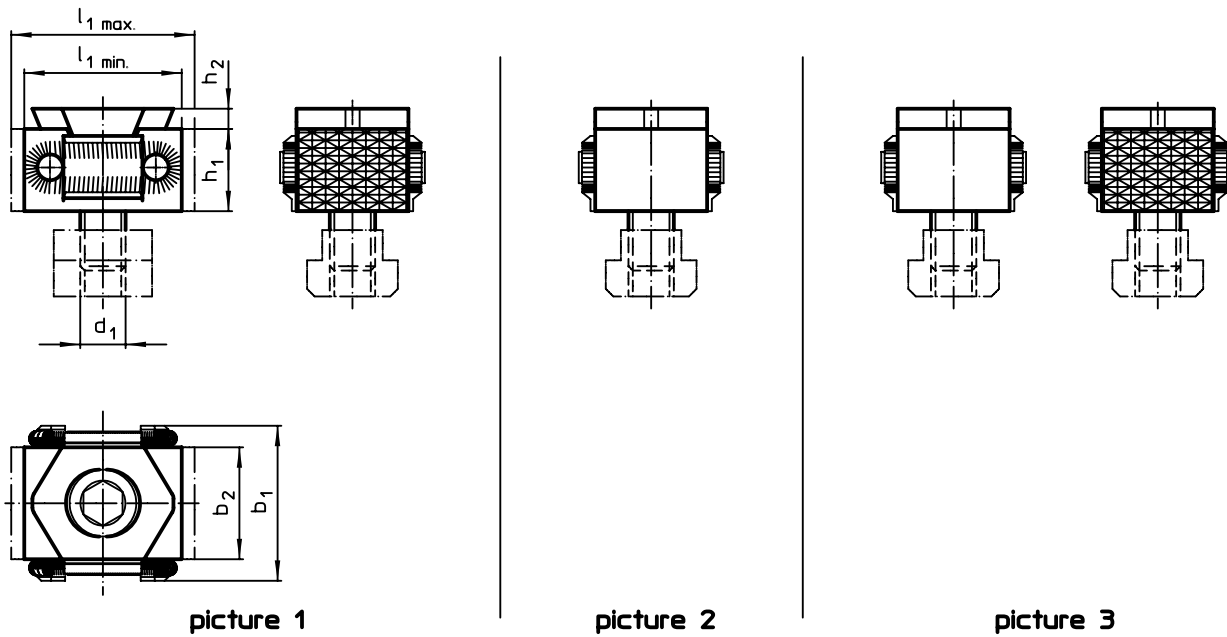
- Tool steel, hardened, blackened and ground

MORE INFORMATION

Further products

Taper Clamping Units → p. 468

DRAWING



ORDER INFORMATION

d ₁	l ₁ min.	l ₁ max.	Dimensions				h ₂	[g]	Art. No.
			b ₁	b ₂	h ₁	[mm]			
clamping jaw, ribbed on both sides – picture 1									
M12	42	49	41	30	22	4	282	23250.0510	
clamping jaw, plain on both sides – picture 2									
M12	42	49	41	30	22	4	282	23250.0511	
clamping jaw, plain and ribbed – picture 3									
M12	42	49	41	30	22	4	290	23250.0512	

Taper Clamping Units • with screw fastened thread, M12

EH 23250.



PRODUCT DESCRIPTION

Inserting the socket head screw moves the two clamping chucks outwards and presses the workpieces against a stop. Stroke of taper clamping units with M8 = +/- 0.5 mm, M12 = +/- 1 mm.

Material

Body

- Tool steel, hardened, bright

Screw

- Heat-treated steel, tempered, quality 12.9

Spring

- Spring steel wire

Clamping jaws

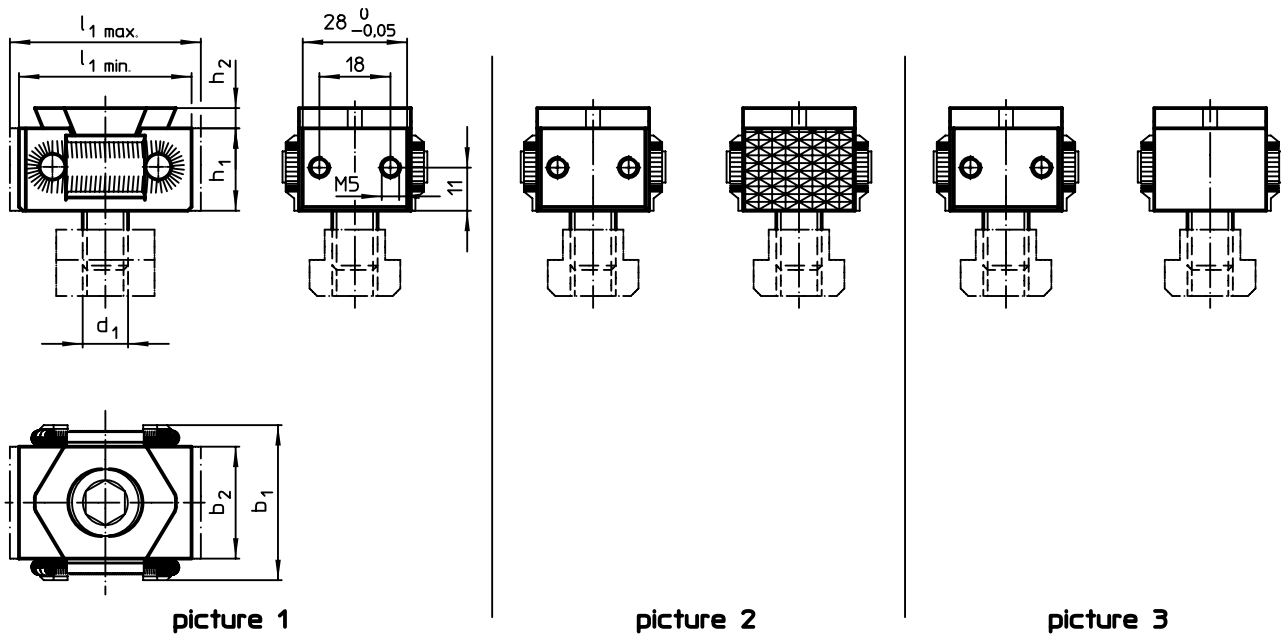
- Tool steel, hardened, blackened and ground

MORE INFORMATION

Further products

Taper Clamping Units → p. 468

DRAWING



ORDER INFORMATION

d ₁	l ₁ min.	l ₁ max.	Dimensions				[g]	Art. No.
			b ₁	b ₂	h ₁	h ₂		
[mm]								
clamping jaw with mounting thread on both sides – picture 1								
M12	47.0	54.0	41	30	22	4	303	23250.0513
clamping jaw, ribbed and with mounting thread – picture 2								
M12	44.5	51.5	41	30	22	4	297	23250.0514
clamping jaw, plain and with mounting thread – picture 3								
M12	44.5	51.5	41	30	22	4	297	23250.0515

Adapter for Taper Clamping Units • for clamping bars

EH 23250.



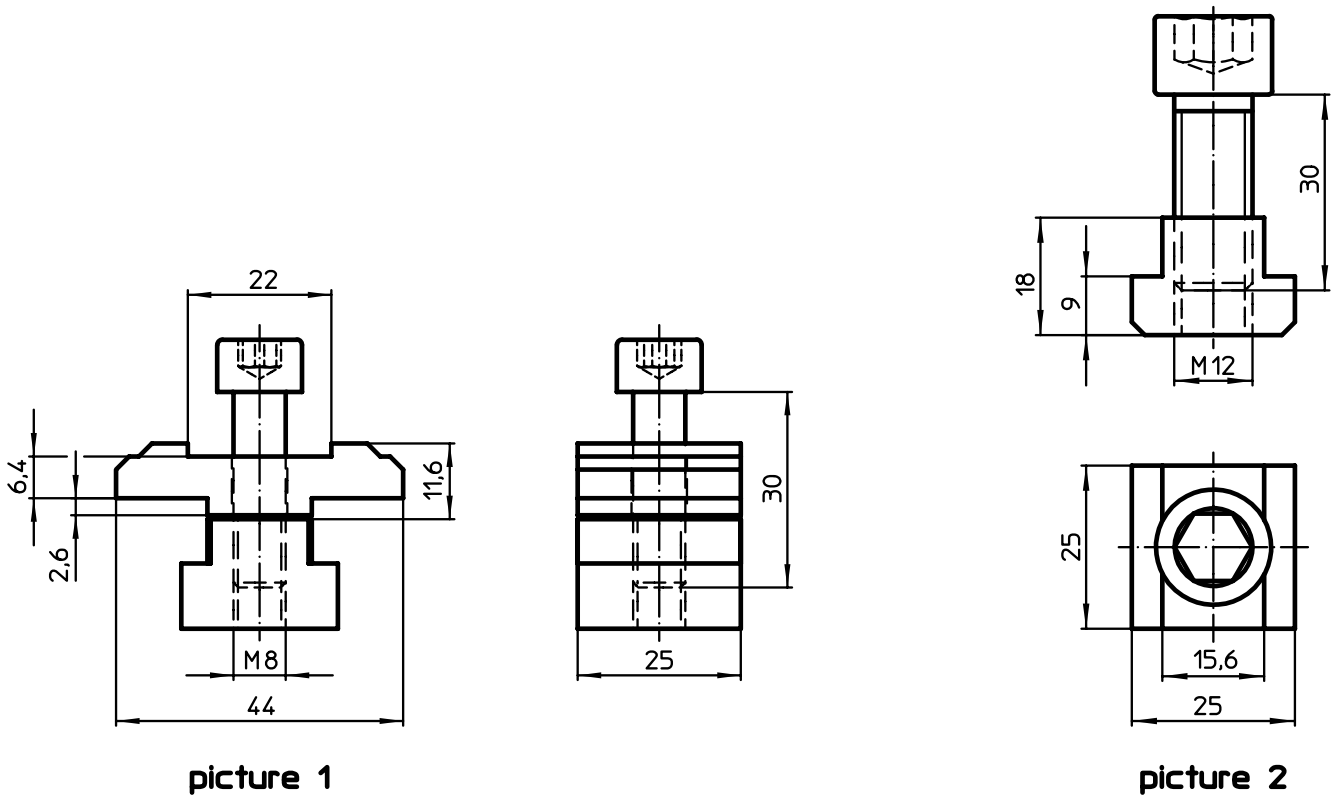
PRODUCT DESCRIPTION

With the adapter, all taper clamping units M8 - M12 can be mounted on the clamping bars. The adapter for the size M8 includes a twist-lock.


Material

- Tool steel

DRAWING



ORDER INFORMATION

	 [g]	Art. No.
picture 1	153	23250.0530
picture 2	105	23250.0531

Anti-Turn Locking Devices for Taper Clamping Units • for clamping bars

EH 23250.



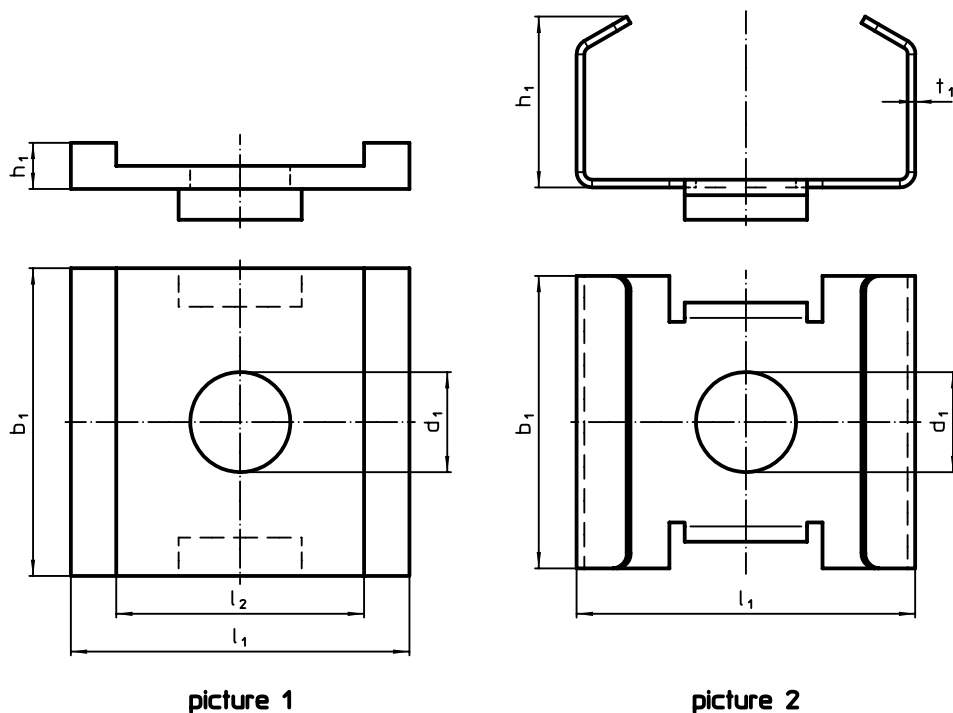
PRODUCT DESCRIPTION

Both versions prevent turning of the taper clamping unit on the clamping bar. The version "picture 2" additionally protects against damage from scales of wood and dirt.

Material

- Steel

DRAWING



ORDER INFORMATION

d ₁	b ₁	Dimensions				t ₁	[g]	Art. No.
		h ₁	l ₁	l ₂	[mm]			
picture 1								
13	40	3	44	32.2	-	55	23250.0532	
picture 2								
13	38	23	44	-	1	26	23250.0535	

Stop Plates for Taper Clamping Units • for clamping bars

EH 23250.



PRODUCT DESCRIPTION

The stop plate is used when clamping only on one side of the taper clamping unit. One side of the taper clamping unit rests against the step of the stop plate and is thus fixed.

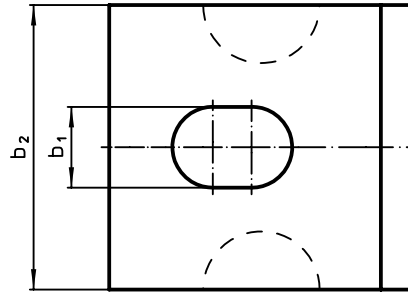
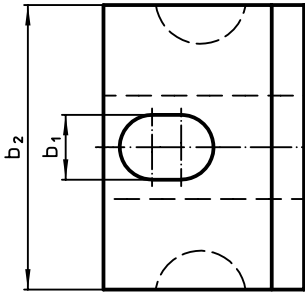
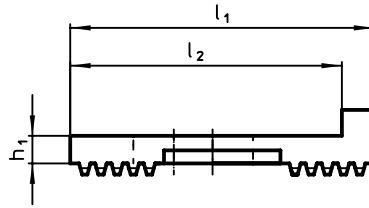
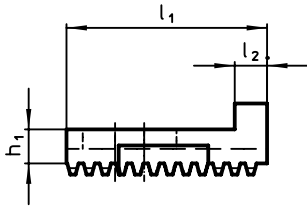
Material

- Tool steel, hardened

Assembly

The stop plate is mounted between the clamping bar and the taper clamping unit.


DRAWING



picture 1

picture 2

ORDER INFORMATION

l_1	l_2	Dimensions			for taper clamping units	 [g]	Art. No.
		b_1 [mm]	b_2	h_1			
picture 1							
31	5	10.0	44	6.4	23250.0501 - .0503	61	23250.0540
picture 2							
47	42	12.5	44	4.4	23250.0510 - .0515	60	23250.0541

Lateral Stops

EH 1586.



PRODUCT DESCRIPTION

Material

- Steel

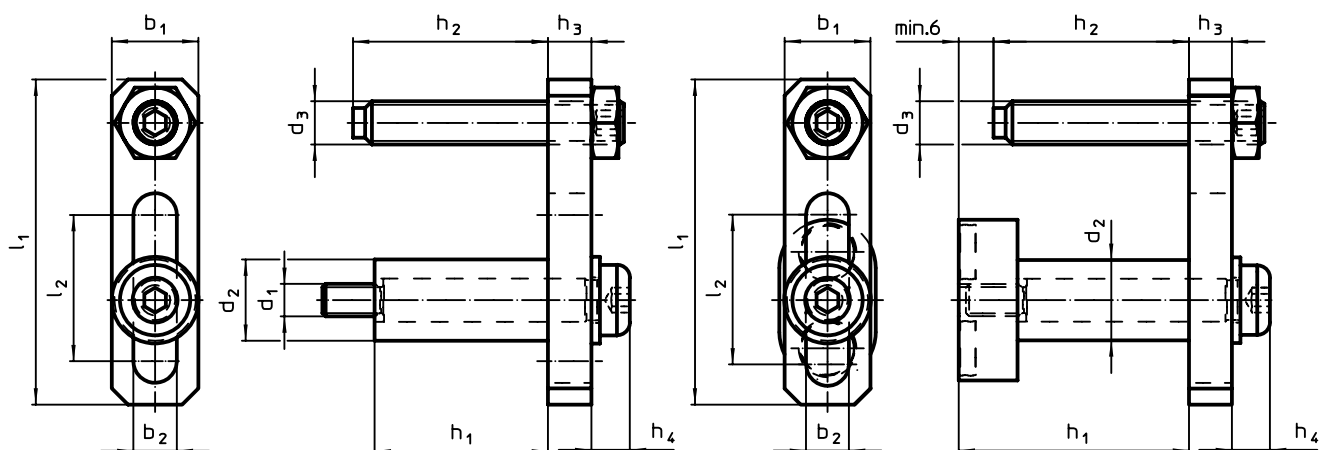
Assembly

The stop can be mounted on both sides of the clamping bar.

Magnetic version - picture 2:

The stop can be quickly and easily removed before machining the workpiece due to the tool-free mounting.

DRAWING



picture 1

picture 2

ORDER INFORMATION

Dimensions											Art. No.	
d ₁	d ₂	d ₃	l ₁	l ₂	b ₁	b ₂	h ₁	h ₂	h ₃	h ₄		[g]
[mm]												
picture 1												
M6	15	M8	60	27	16	8	32	0 - 37	8	7	110	1586.250
picture 2												
-	15	M8	60	27	16	8	43	0 - 37	8	7	151	1586.252

Insertion Tools

EH 1586.



PRODUCT DESCRIPTION

Keeps the workpiece in position during the clamping process.

Material

- Steel, blackened

Assembly

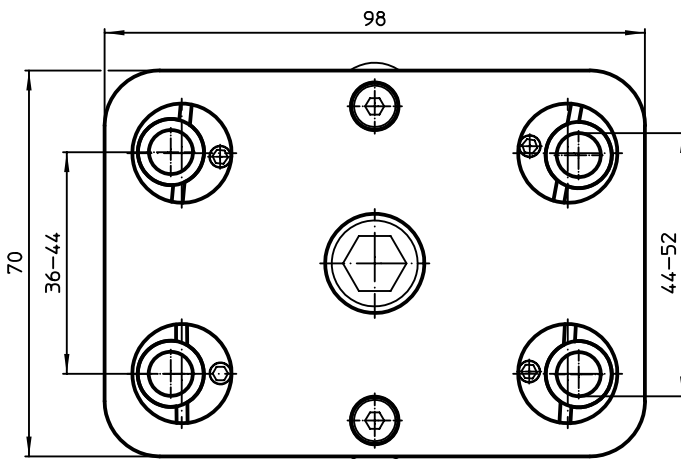
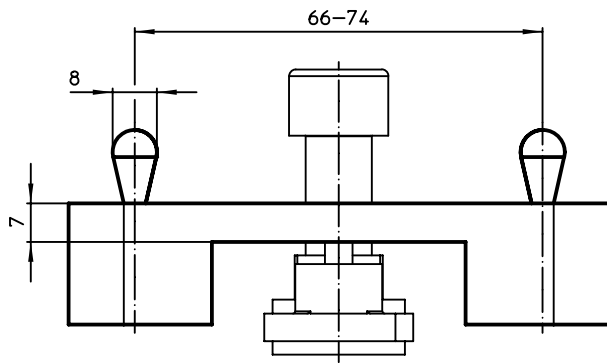
The supports (Art. No. 1586.200, 1586.201 and 1586.202) are required.

MORE INFORMATION

Notes

Spring load of 100 N per lateral spring plunger.

DRAWING



ORDER INFORMATION

[g]	Art. No.
800	1586.260

Supports for Clamping Bar

EH 1586.

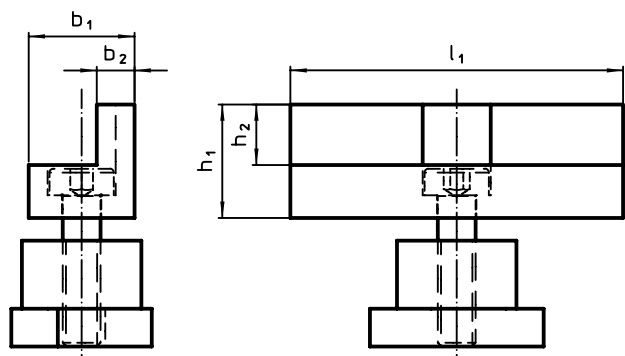


PRODUCT DESCRIPTION

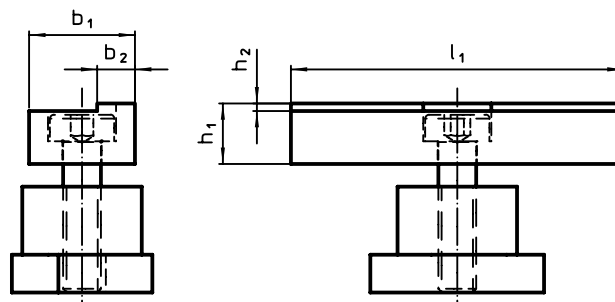
Material

- Tool steel, hardened

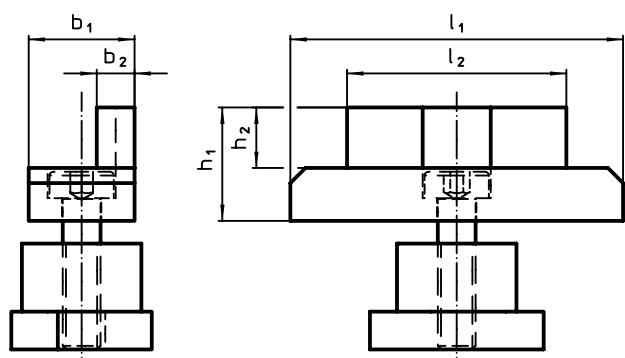
DRAWING



picture 1



picture 2



picture 3

ORDER INFORMATION

Dimensions						[g]	Art. No.
l_1	l_2	b_1	b_2	h_1 ± 0.01	h_2		
[mm]							
high – picture 1							
44	–	14	5	15	8	72	1586.200
low – picture 2							
44	–	14	5	8	1	60	1586.202
high, width shortened – picture 3							
44	29	14	5	15	8	64	1586.201

Supports for Clamping Bar • with spring-loaded catch

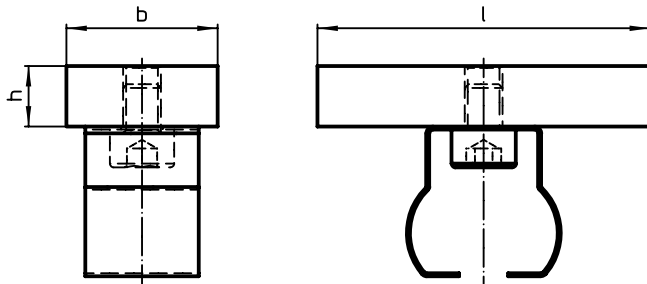
EH 1586.



PRODUCT DESCRIPTION

- Material**
- Aluminium Al

DRAWING



ORDER INFORMATION

l	Dimensions		[g]	Art. No.
	b [mm]	h		
44	20	8	25	1586.210

Supports for Clamping Bar • magnetic

EH 1586.



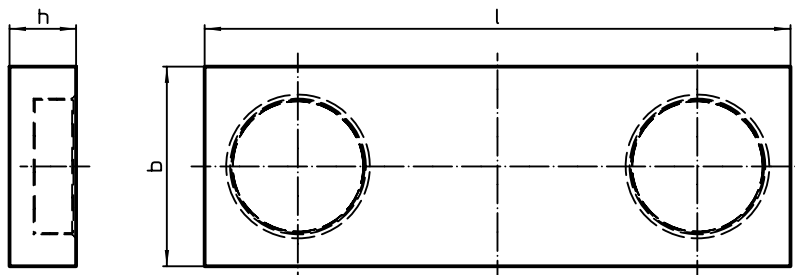
PRODUCT DESCRIPTION

- Material**
- Tool steel, hardened

Assembly

Tool-free mounting on the clamping bar or a stop by means of an integrated magnet.

DRAWING



ORDER INFORMATION

l	Dimensions		[g]	Art. No.
	b ±0.02 [mm]	h ±0.01		
44	15	5	26	1586.205

9



PRODUCT DESCRIPTION

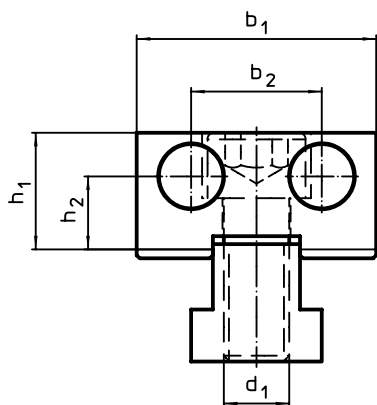
Material

- Pin**
- Diamond coating

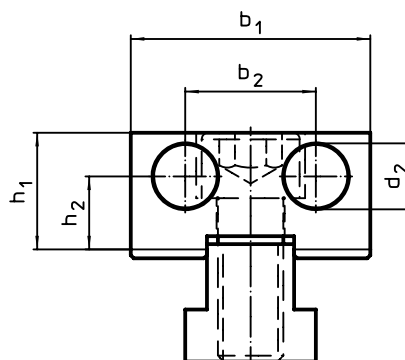
Body

- Tool steel, hardened

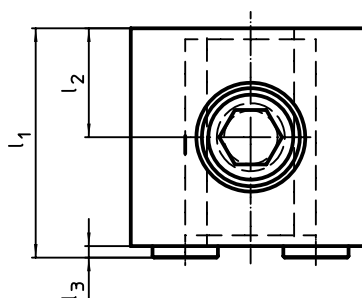
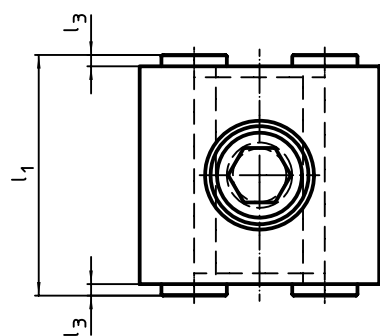
DRAWING



picture 1



picture 2



ORDER INFORMATION

d ₁	d ₂	l ₁	Dimensions						[g]	Art. No.
			l ₂ ±0.01	l ₃	b ₁ -0.05	b ₂	h ₁	h ₂		
[mm]										
diamond coated, two-sided – picture 1										
M12	12	44	–	2	44	24	21.4	13.4	406	1586.010
diamond coated and flat – picture 2										
M12	12	42	20	2	44	24	21.4	13.4	403	1586.011

Stops • gripper studs

EH 1586.



PRODUCT DESCRIPTION

Gripper insert consists of two pins from HSS, when clamped they penetrate into the work-piece surface and may leave residual marks.

Material

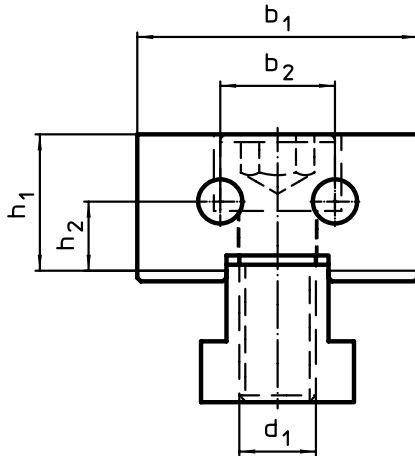
Insert

- Hard metal, pointed

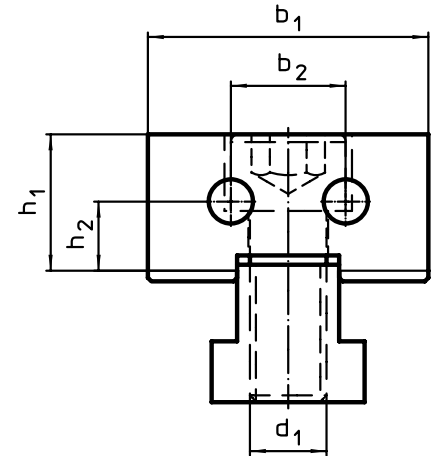
Body

- Tool steel, hardened

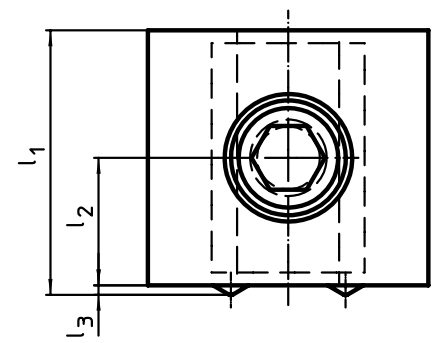
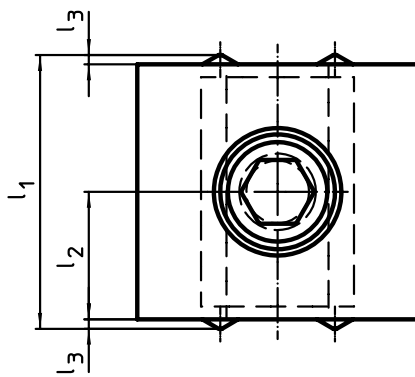
DRAWING



picture 1



picture 2



ORDER INFORMATION

d ₁	l ₁	l ₂ ±0.01	Dimensions					[g]	Art. No.
			l ₃	b ₁ -0.05	b ₂	h ₁	h ₂		
[mm]									
gripper studs, two-sided – picture 1									
M12	42	20	1	44	18	21.4	11	406	1586.020
gripper studs and plain – picture 2									
M12	41	20	1	44	18	21.4	11	395	1586.021

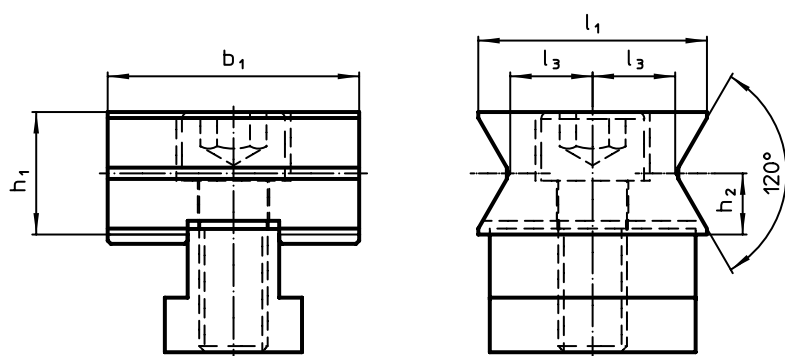


PRODUCT DESCRIPTION

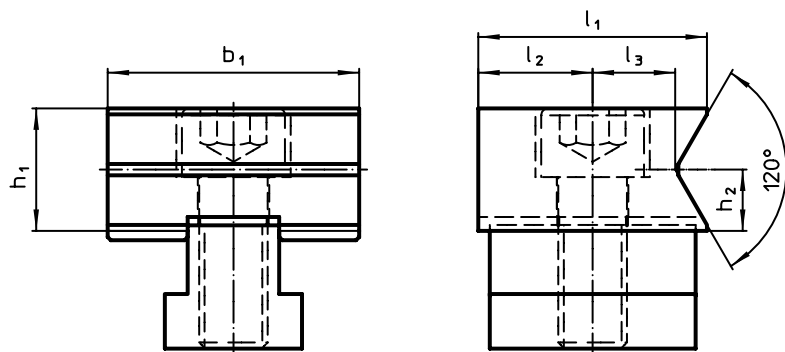
Material

- Tool steel, hardened

DRAWING



picture 1



picture 2

ORDER INFORMATION

Dimensions								[g]	Art. No.
d ₁	d ₂	l ₁	l ₂ ±0.01	l ₃	b ₁ -0.05	h ₁	h ₂		
[mm]									
horizontal prisms on both sides – picture 1									
M12	8 – 20	40	–	14.4	44	21.4	10.7	367	1586.030
horizontal prism and plain – picture 2									
M12	8 – 20	40	20	14.4	44	21.4	10.7	377	1586.031

Stops • vertical prisms
EH 1586.

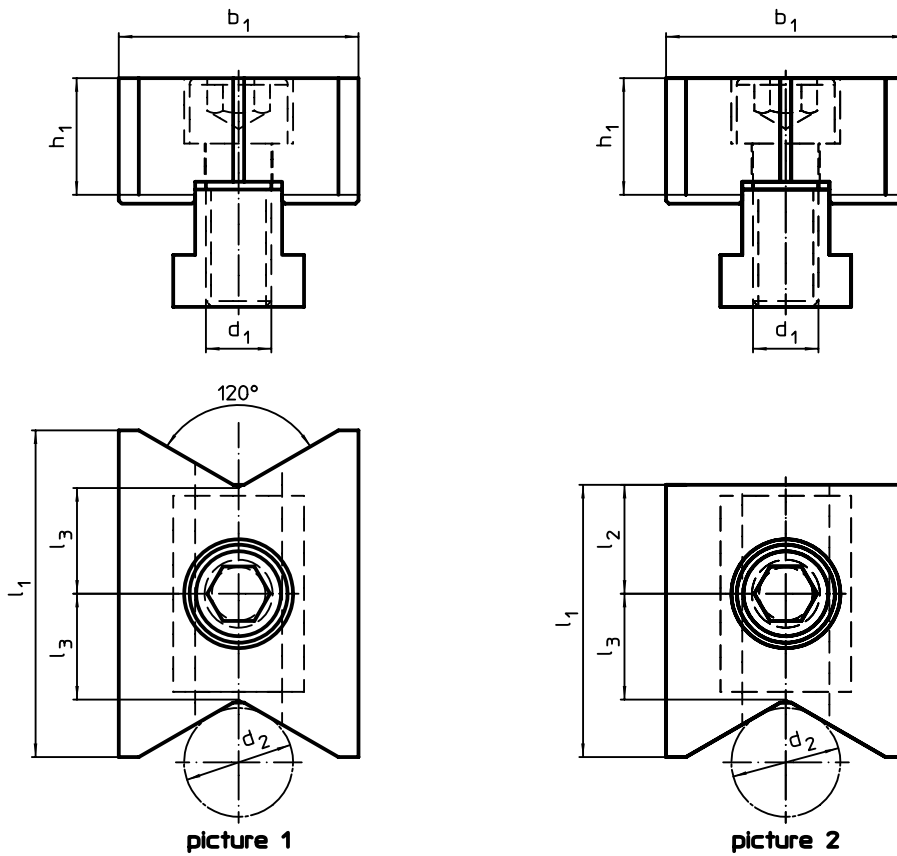


PRODUCT DESCRIPTION


Material

- Tool steel, hardened

DRAWING



ORDER INFORMATION

d ₁	d ₂	l ₁	Dimensions			h ₁		Art. No.
			l ₂ ±0.01 [mm]	l ₃	b ₁ -0.05			
vertical prisms on both sides – picture 1								
M12	10 – 70	60	–	19.4	44	21.4	485	1586.040
vertical prism and plain – picture 2								
M12	10 – 70	50	20	19.4	44	21.4	444	1586.041



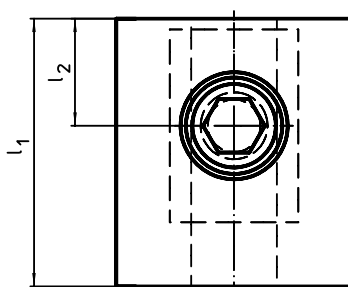
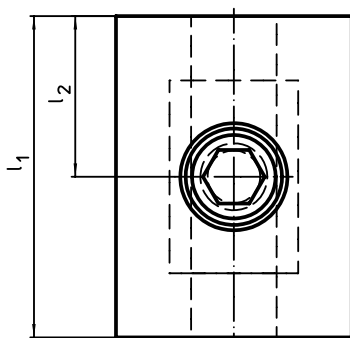
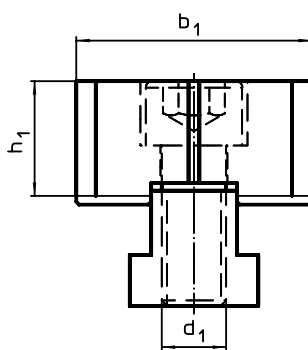
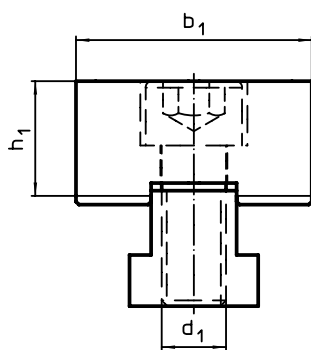
PRODUCT DESCRIPTION

The chucks can be machined to the needed workpiece contour.

Material

- Tool steel

DRAWING



picture 1

picture 2

ORDER INFORMATION

d ₁	l ₁	Dimensions			[g]	Art. No.
		l ₂ ±0.01 [mm]	b ₁ -0.05	h ₁		
soft, on both sides – picture 1						
M12	60	30	44	21.4	537	1586.050
soft, two-sided / one side short – picture 2						
M12	50	20	44	21.4	467	1586.051

Stops • ribbed

EH 1586.



PRODUCT DESCRIPTION

Material

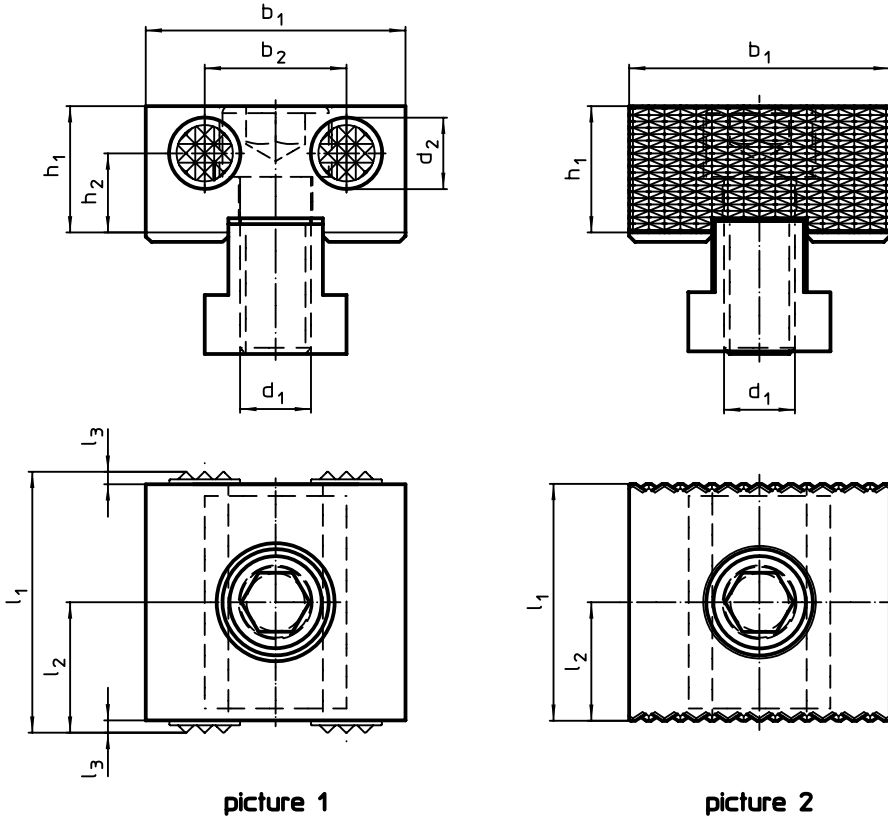
Inserts

- Hard metal

Body

- Tool steel, hardened

DRAWING



picture 1

picture 2

ORDER INFORMATION

d ₁	d ₂	l ₁	l ₂	Dimensions					[g]	Art. No.
				l ₃	b ₁ -0.05	b ₂	h ₁	h ₂		
[mm]										
ribbed on both sides – picture 1										
M12	12	44	22	2	44	24	21.4	13.4	402	1586.060
ribbed over the entire surface, on both sides – picture 2										
M12	-	40	20	-	44	-	21.4	-	395	1586.062



PRODUCT DESCRIPTION

Material

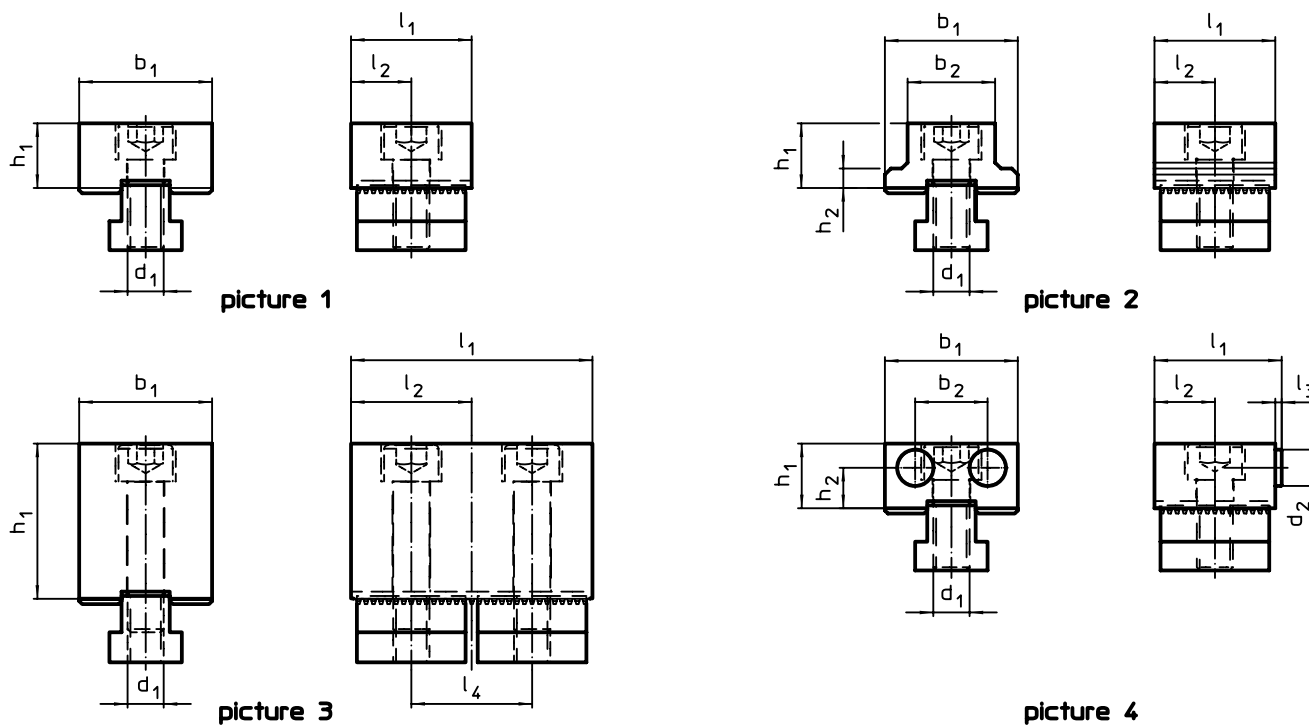
Inserts

- Hard metal

Body

- Tool steel, hardened

DRAWING



ORDER INFORMATION

Dimensions										Art. No.	
d ₁	d ₂	l ₁	l ₂	l ₃	l ₄	b ₁	b ₂	h ₁	h ₂		[g]
[mm]											
plain, on both sides – picture 1											
M12	–	40	20 ±0.01	–	–	44 -0.05	–	21.4	–	395	1586.070
plain, two-sided / width shortened – picture 2											
M12	–	40	20 ±0.01	–	–	44	29	21.4	6.4	324	1586.071
plain, two-sided / high version – picture 3											
M12	–	80	40	–	40	44 -0.10	–	51.4	–	1601	1586.072
ribbed and plain – picture 4											
M12	12	42	20 ±0.01	2	–	44 -0.05	24	21.4	13.4	407	1586.073

Stops • with mounting thread
EH 1586.



PRODUCT DESCRIPTION

Material

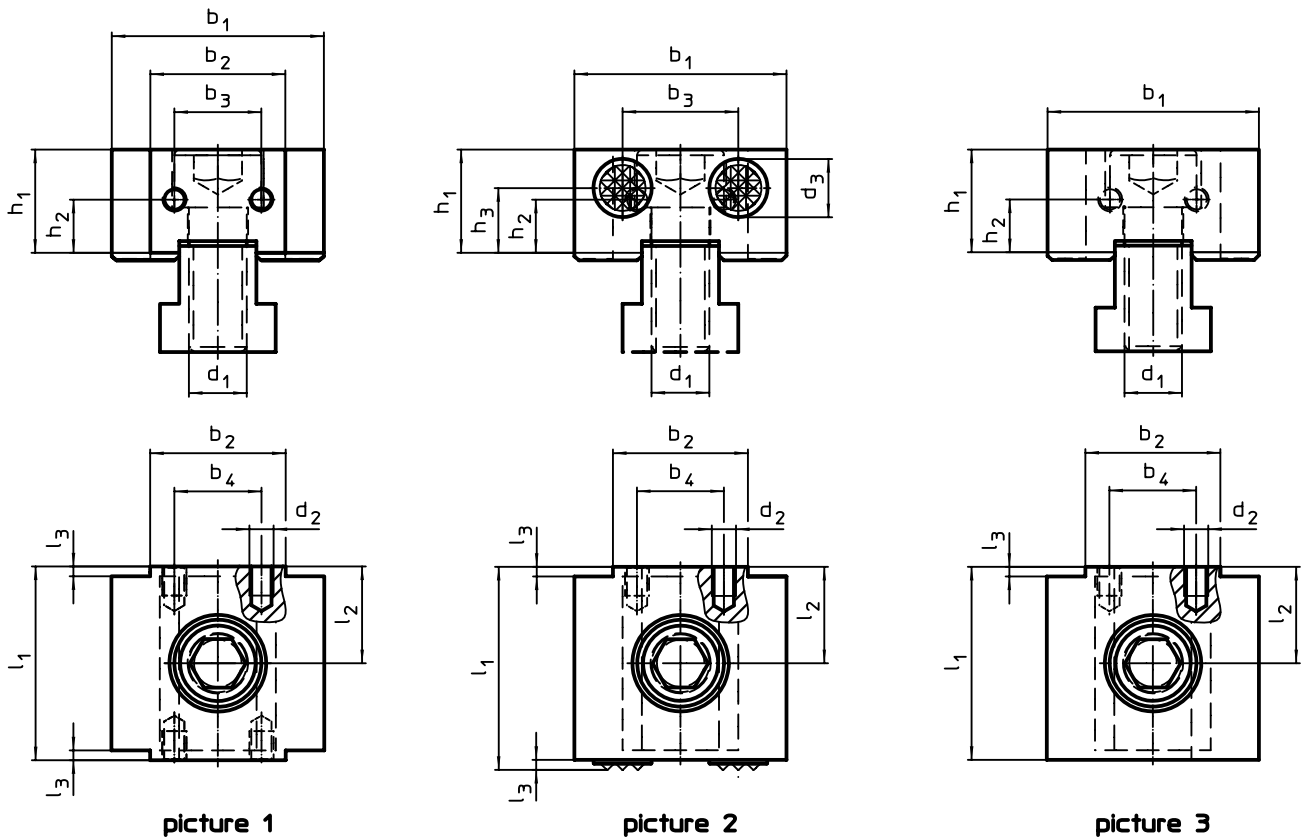
Inserts

- Hard metal

Body

- Tool steel, hardened

DRAWING




picture 1

picture 2

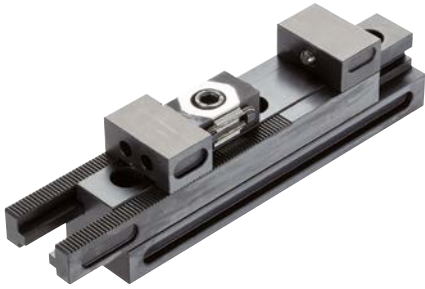
picture 3

ORDER INFORMATION

Dimensions															Art. No.	
d ₁	d ₂	d ₃	l ₁	l ₂ ±0.01	l ₃	b ₁ -0.05	b ₂ -0.05	b ₃	b ₄	h ₁	h ₂	h ₃	[g]			
mounting thread on both sides – picture 1																
M12	M5	-	40	20	2	44	28	18	18	21.4	11	11.0	379	1586.080		
ribbed and mounting thread – picture 2																
M12	M5	12	42	20	2	44	28	24	18	21.4	11	13.4	397	1586.081		
plain and mounting thread – picture 3																
M12	M5	-	40	20	2	44	28	-	18	21.4	11	-	397	1586.082		

Combination Clamping Bars

EH 1586.



PRODUCT DESCRIPTION

The combination clamping bar offers 3 ways to clamp/support the workpiece:

▪ Floating mode:

Floating mode is used to clamp and support additional clamping points on components. The fixture adapts to the position of the workpiece.

▪ Centric mode:

The jaws of the clamping bar move in sync. The centre axis of the workpiece remains unchanged even if the outer diameters are modified.

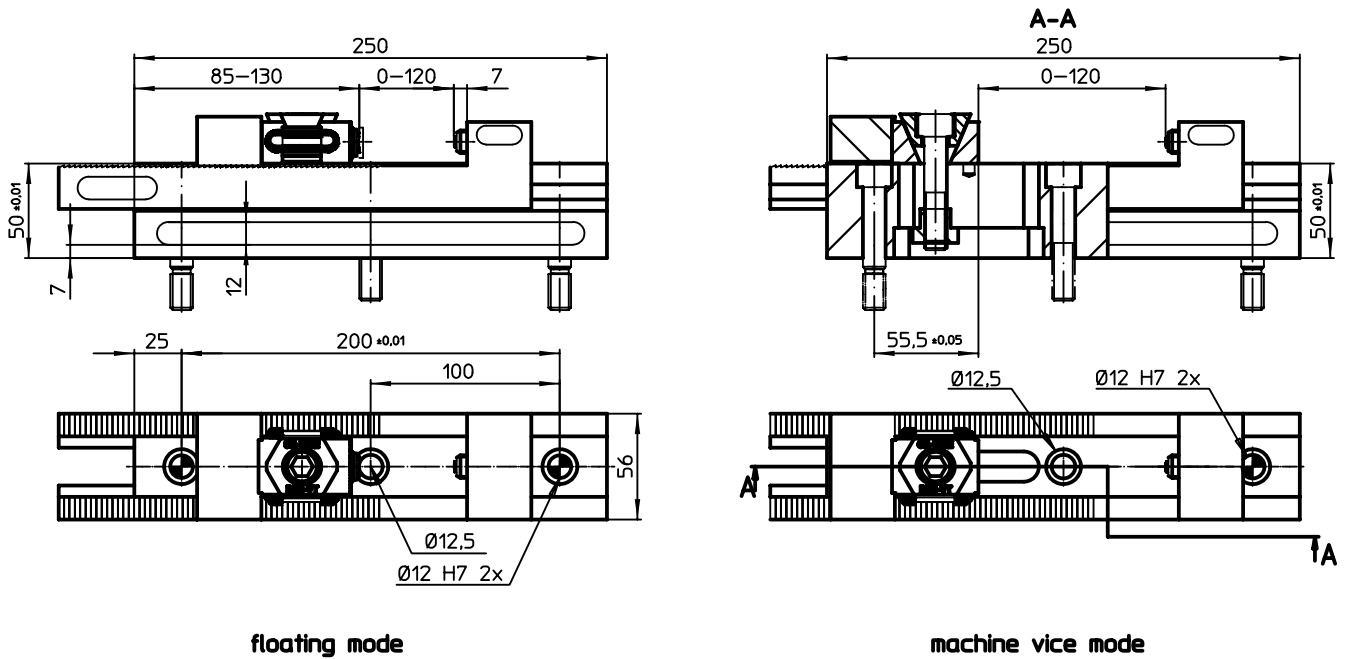
▪ Machine vice mode:

When this mode is selected, one of the jaws is locked in place on the clamping bar. The second jaw remains movable.

Material

- Tool steel, hardened

DRAWING





floating mode

machine vice mode

ORDER INFORMATION

	Art. No.
[kg]	
5	1586.400

ACCESSORIES

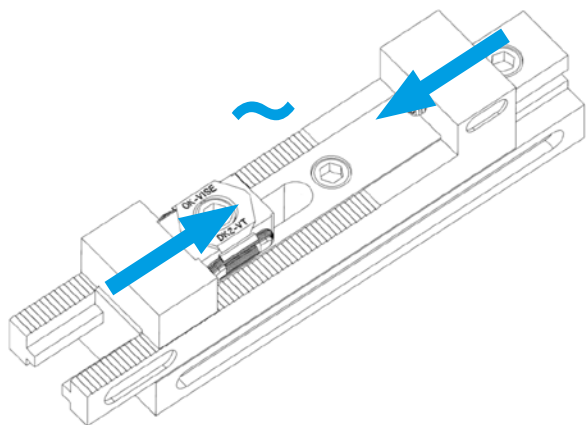
	Number locating screws M12 x 45	Number cap screws M12 x 45		Art. No.
			[g]	
fixing screws for clamping bars				
	2	1	203	1586.401

Combination Clamping Bars

1586.400

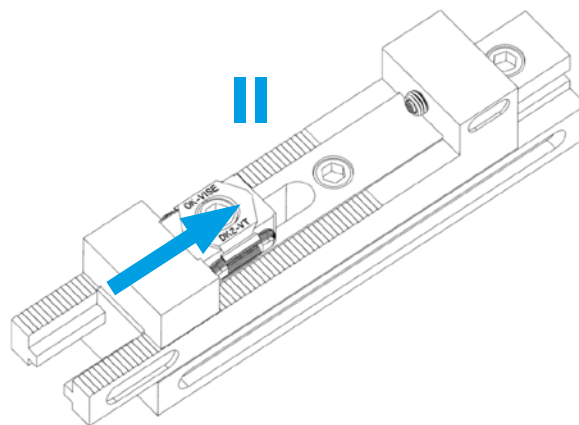
FUNCTIONS

The combination clamping bar offers 3 different functions by means of which the workpiece can be clamped/supported.



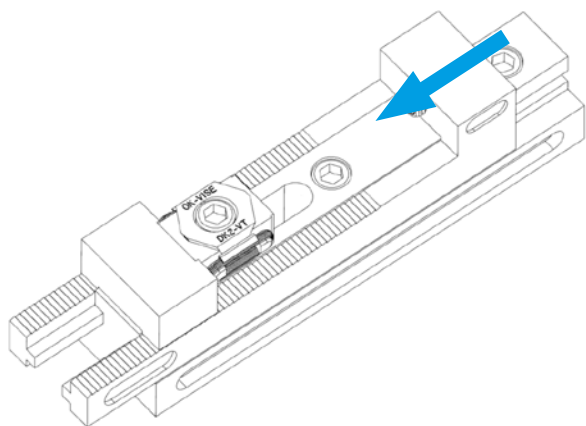
FLOATING MODE

- Floating mode is used to clamp and support additional clamping points on components.
- The fixture adapts to the position of the workpiece.



CENTRIC MODE

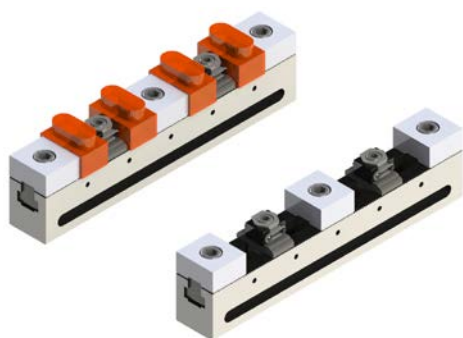
- The jaws of the clamping bar move in sync. The centre axis of the workpiece remains unchanged even if the outer diameters are modified.



MACHINE VICE MODE

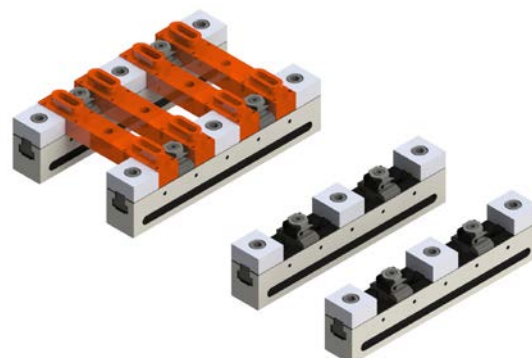
- When this mode is selected, one of the jaws is locked in place on the clamping bar. The second jaw remains movable.

STANDARD RANGES



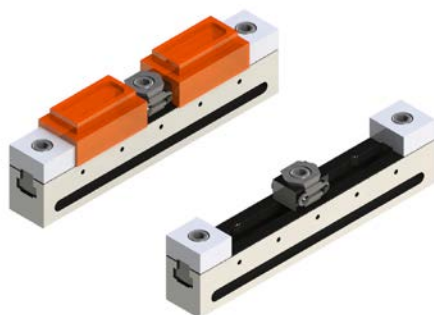
Flexible 3-sided machining.
You can machine up to 4 workpieces at once. Art. No. 1586.410

Units	Designation	Art. No.
1	Clamping bar	1585.300
1	Fixing screws	1585.301
3	Stop, flat, two-sided	1586.070
2	Taper clamping unit, M8 clamping jaw flat, two-sided	23250.0502



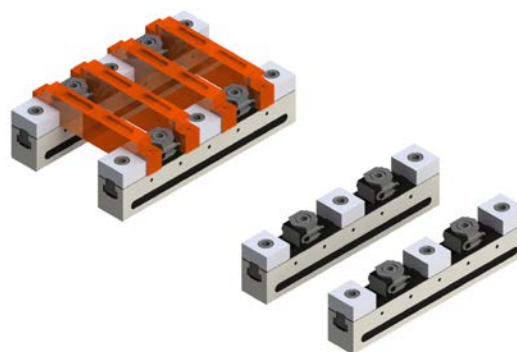
Two ranges of 1586.410. Particularly well suited for machining long workpieces. Art. No. 1586.411

Units	Designation	Art. No.
2	Clamping bar	1585.300
2	Fixing screws	1585.301
6	Stop, flat, two-sided	1586.070
4	Taper clamping unit, M8 clamping jaw flat, two-sided	23250.0502



Flexible 3-sided machining. 1-2 workpieces can be machined at the same time. Art. No. 1586.412

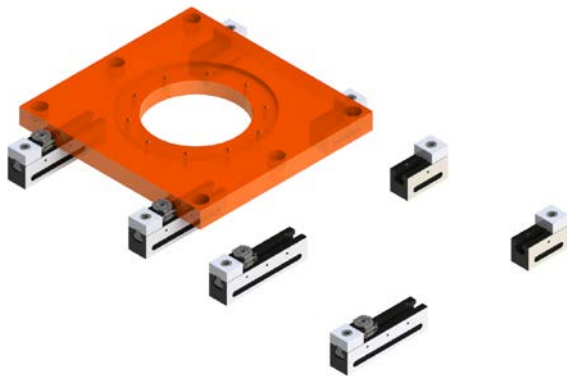
Units	Designation	Art. No.
1	Clamping bar	1585.300
1	Fixing screws	1585.301
2	Stop, flat, two-sided	1586.070
1	Taper clamping unit, M12 clamping jaw flat, two-sided	23250.0511



Flexible 3-sided machining. Particularly well suited for machining long workpieces. Art. No. 1586.413

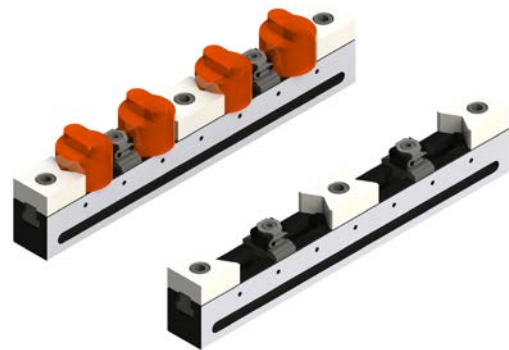
Units	Designation	Art. No.
2	Clamping bar	1585.300
2	Fixing screws	1585.301
6	Stop, flat, two-sided	1586.070
4	Taper clamping unit, M12 clamping jaw flat, two-sided	23250.0511

STANDARD RANGES



For machining large workpieces. Art. No. 1586.414

Units	Designation	Art. No.
2	Clamping bar	1585.100
2	Fixing screws	1585.101
2	Clamping bar	1585.200
2	Fixing screws	1585.201
4	Stop, flat, two-sided	1586.070
2	Taper clamping unit, M8 clamping jaw flat, two-sided	23250.0511



For machining cylindrical workpieces. 4 workpieces can be machined at the same time. Art. No. 1586.415

Units	Designation	Art. No.
1	Clamping bar	1585.400
1	Fixing screws	1585.401
1	Stop, V-blocks vertical, two-sided	1586.040
2	Stop, 1-sided, V-blocks vertical and flat	1586.041
2	Taper clamping unit, M8 clamping jaw flat, two-sided	23250.0502

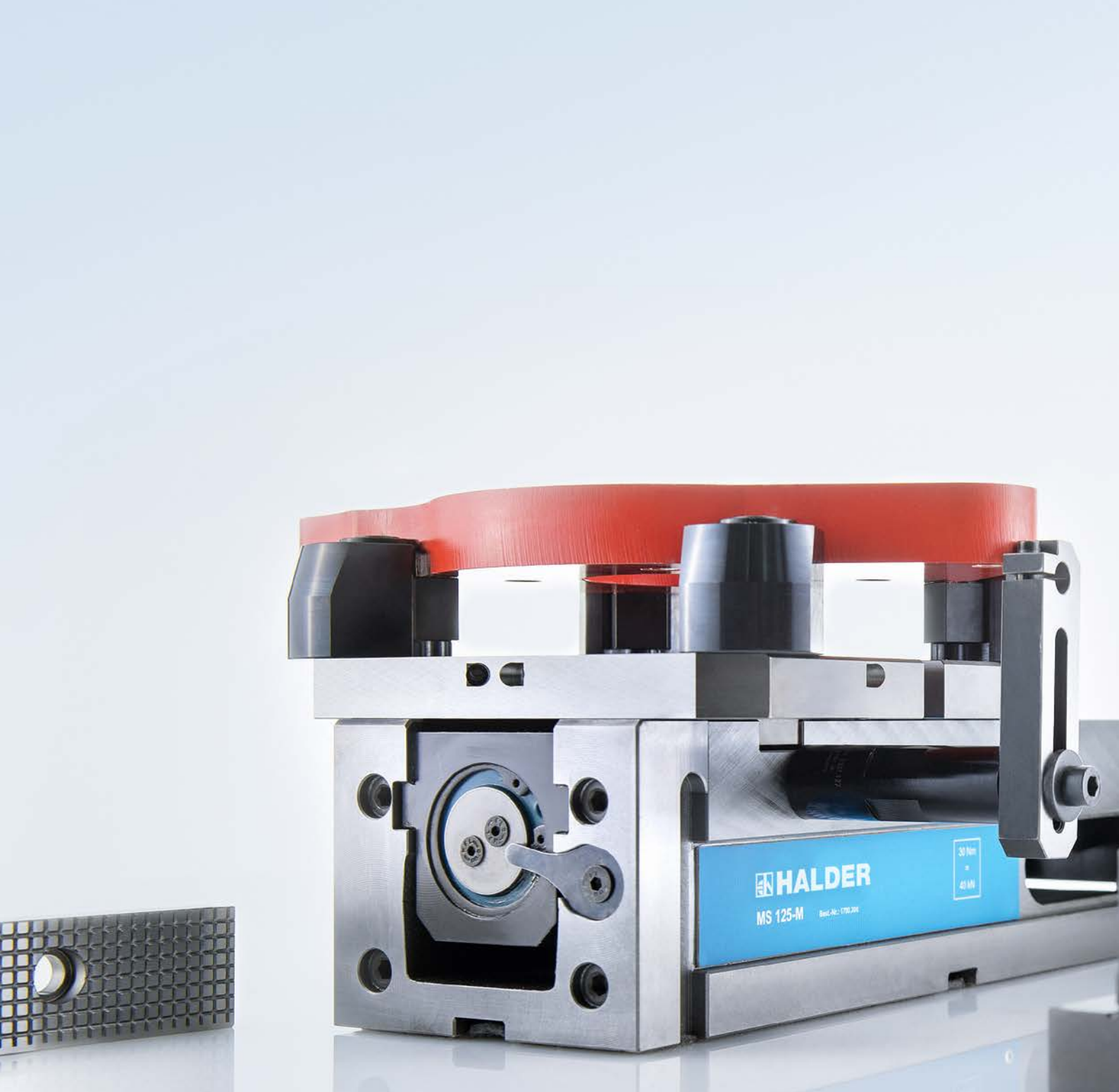


For machining large workpieces. Including supports with a height of 15 mm. Art. No. 1586.416

Units	Designation	Art. No.
2	Clamping bar	1585.300
2	Fixing screws	1585.301
4	Stop, flat, two-sided	1586.070
4	Support for clamping bar	1586.200
2	Taper clamping unit, M12 clamping jaw flat, two-sided	23250.0511

NOTES

A large grid of small squares, intended for taking notes. The grid consists of 20 columns and 30 rows of small, light gray squares.



10 MULTI-VICES



Product group

Page

Multi-Vices MS 125

[922](#)



Conventional Clamping

[923](#)



Gripp Clamping

[924](#)



Pull-Down Clamping

[926](#)



Five-Sided Machining

[928](#)



Multi-Vices MS 125

EH 1700.

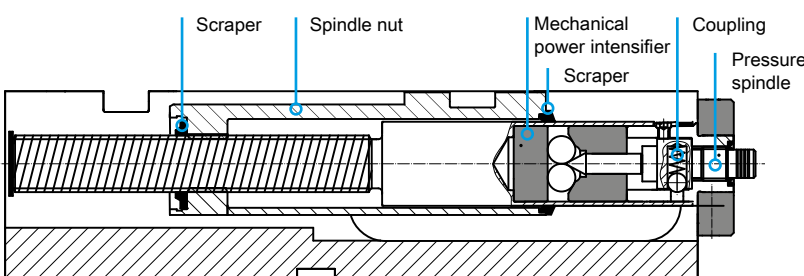
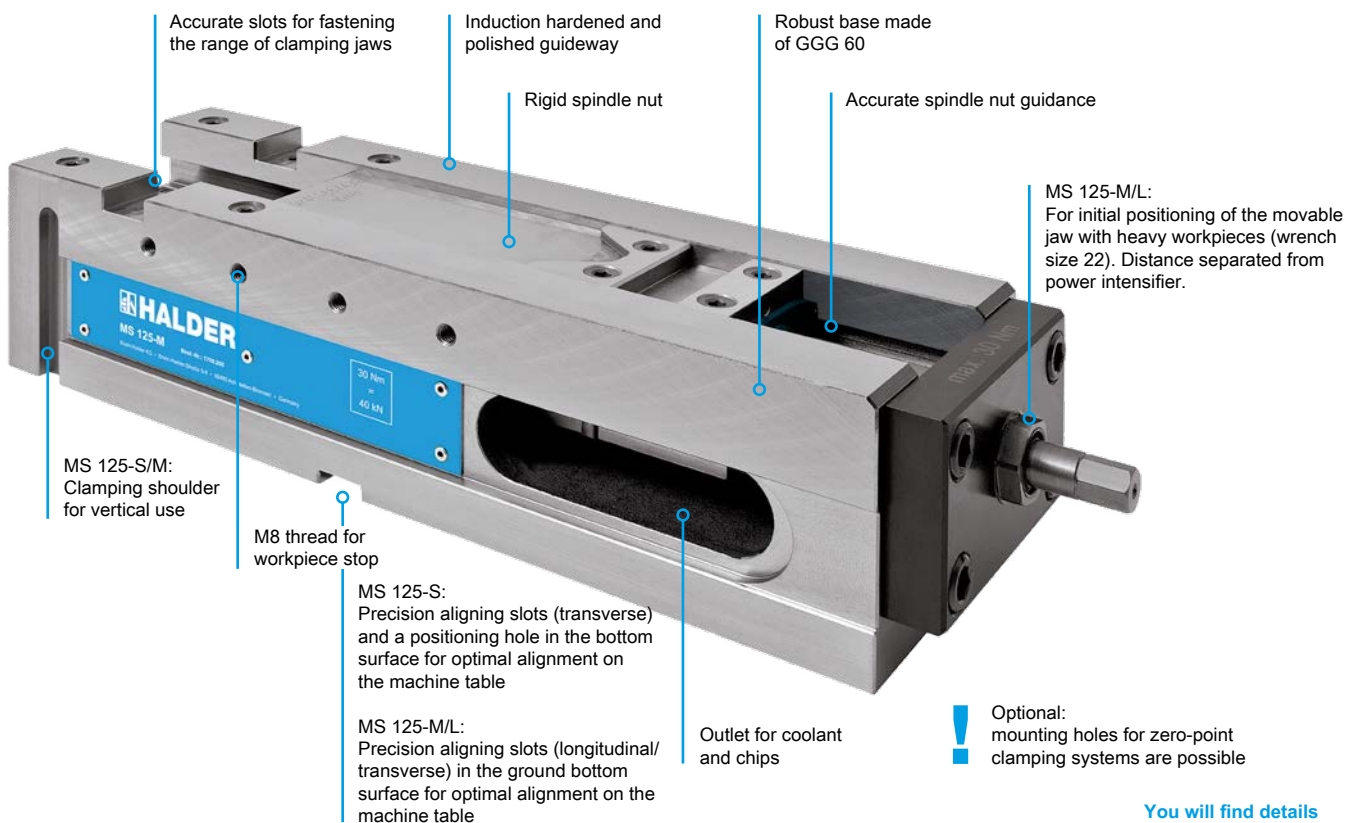
**MULTI-VICE – MECHANICAL
VERSION MS 125-S/M/L**

SCOPE OF APPLICATION

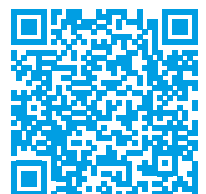
- Can be applied horizontally or vertically - therefore suitable for vertical and horizontal CNC milling machines.
- Conventional clamping, gripper clamping or pull-down clamping are all possible.
- MS 125-S – ideal for use on five-axis machining centres.
- Clamping unmachined parts, saw-cut or flame-cut material by penetration of hardened, replaceable gripper elements into the workpiece.
- With the support jaws, unmachined parts in highly varied materials, or with complex geometries, can be clamped securely and economically.

PRODUCT FEATURES

- High versatility: the modular clamping system combines practically all the possibilities of our tried-and-tested models.
- High-pressure spindle with power intensification - clamping force does not slacken.
- Enlarged clamping span for secure clamping of unmachined parts.
- Lost clamping margin 8 mm with pull-down clamping, 3 mm with gripp clamping.
- Clamping with torque wrench (max. 30 Nm) - this makes it possible to work above the table with an unfavourable clamping arrangement on the tool.



You will find details and your contact persons under:

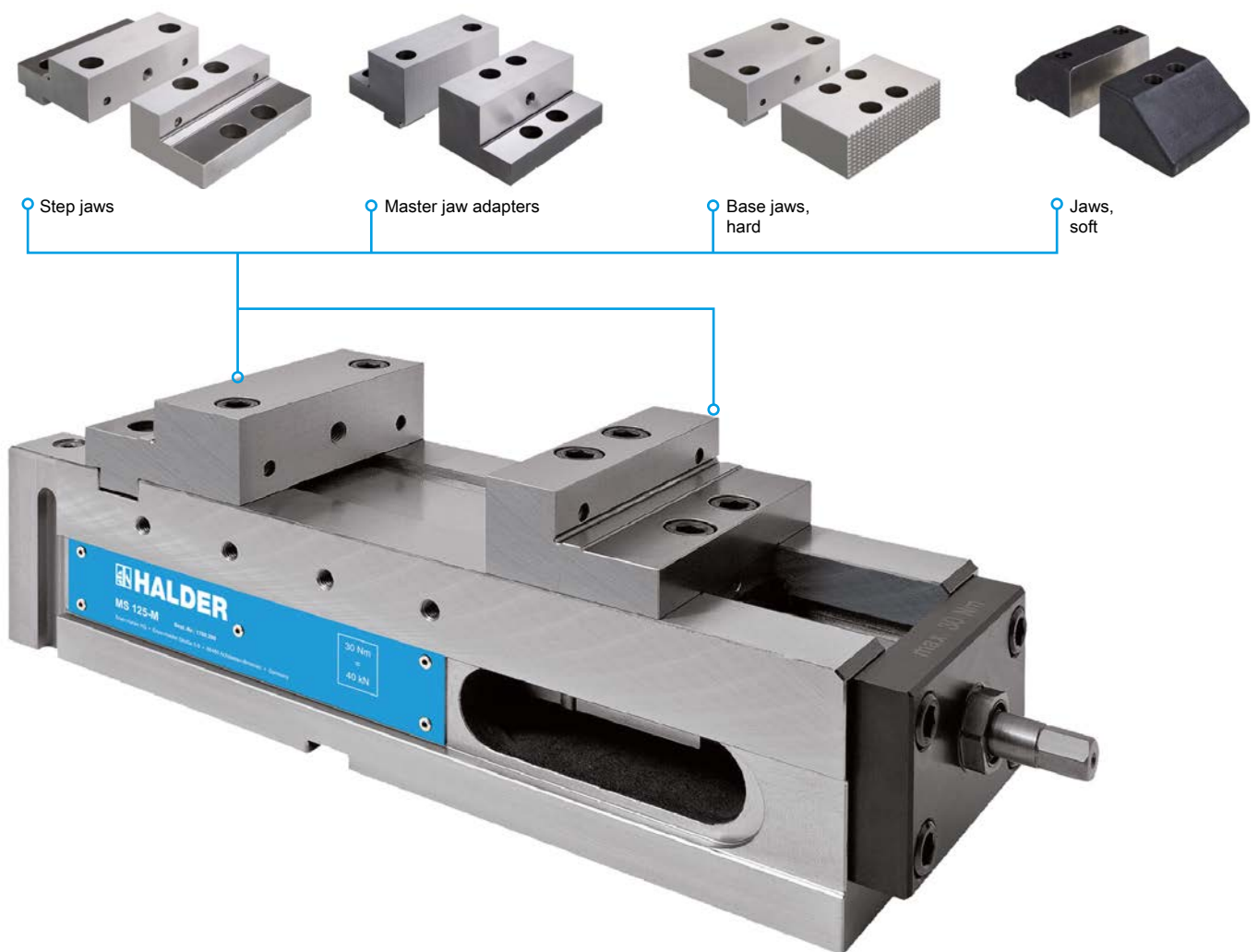


[www.halder.com/
Multi-Vices](http://www.halder.com/Multi-Vices)

MULTI-VICE CONVENTIONAL CLAMPING VERSION MS 125-S/M/L

FOR CONVENTIONAL CLAMPING OF WORKPIECES

On the following pages you will find a wide range of jaws suitable for clamping pre-machined workpieces.



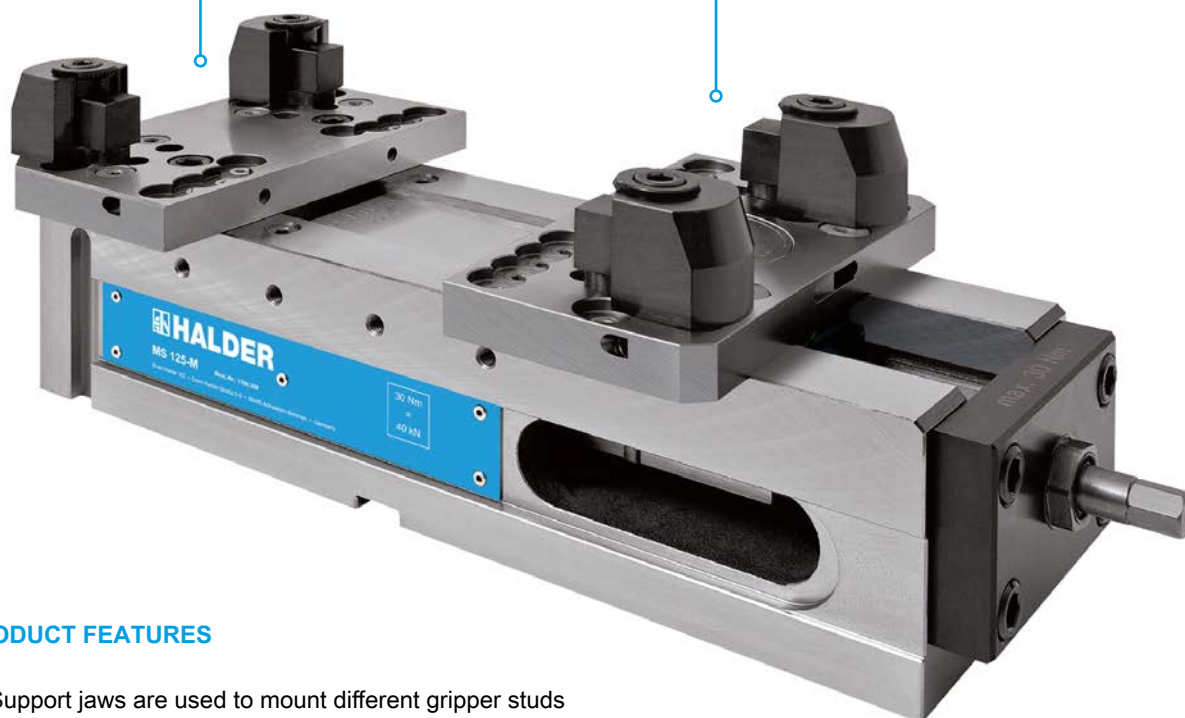
Gripp Clamping

EH 1702.

MULTI-VICE GRIPP CLAMPING VERSION MS 125-S/M/L

FOR CLAMPING COMPLEX UNMACHINED PARTS

The support jaws enable you to clamp different unmachined parts quickly and securely.
You will find products for gripp clamping on the following pages.



PRODUCT FEATURES

- Support jaws are used to mount different gripper studs (threaded gripper studs or universal gripper set).
- Gripper studs can be screwed in various positions on the grid plate in order to securely clamp various work-piece shapes.
- Additional pivot function of the support jaws compensates for non-parallel clamping surfaces and is required to clamp uneven workpieces.
- Three-point clamping is possible due to the rigid support jaw.

You will find details
and your contact
persons under:



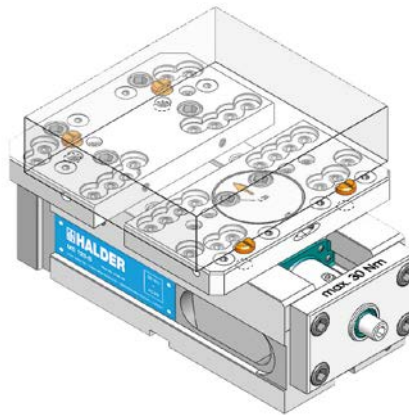
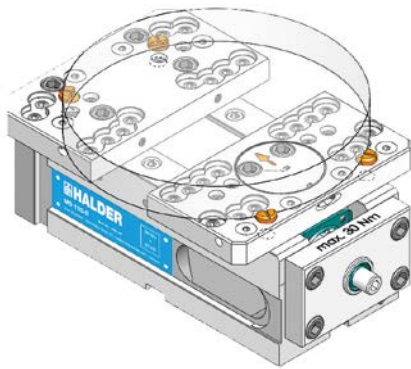
[www.halder.com/
Multi-Vices](http://www.halder.com/Multi-Vices)

CLAMPING WIDTHS GRIPP CLAMPING

SUPPORT JAWS WITH GRIPPER STUDS



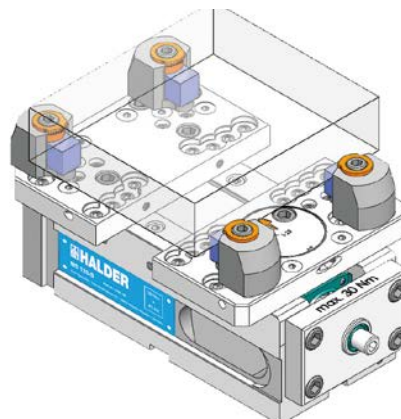
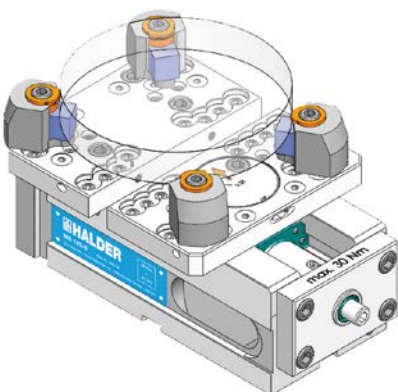
MS 125 - support jaws with gripper studs					
Dimensions	Rectangular workpiece			Round workpiece	
	Clamping range (mm)			Clamping range (mm)	
	min.	max.	min.	min.	max.
MS 125-S	28	202	70	Ø 70	Ø 240
MS 125-M	28	320	70	Ø 70	Ø 330
MS 125-L	28	452	70	Ø 70	Ø 330



SUPPORT JAWS WITH UNIVERSAL GRIPPER SET



MS 125 - support jaws with universal gripper set					
Dimensions	Rectangular workpiece			Round workpiece	
	Clamping range (mm)			Clamping range (mm)	
	min.	max.	min.	min.	max.
MS 125-S	25	192	80	Ø 70	Ø 230
MS 125-M	25	310	80	Ø 70	Ø 330
MS 125-L	25	442	80	Ø 70	Ø 330



Pull-Down Clamping

EH 1703.

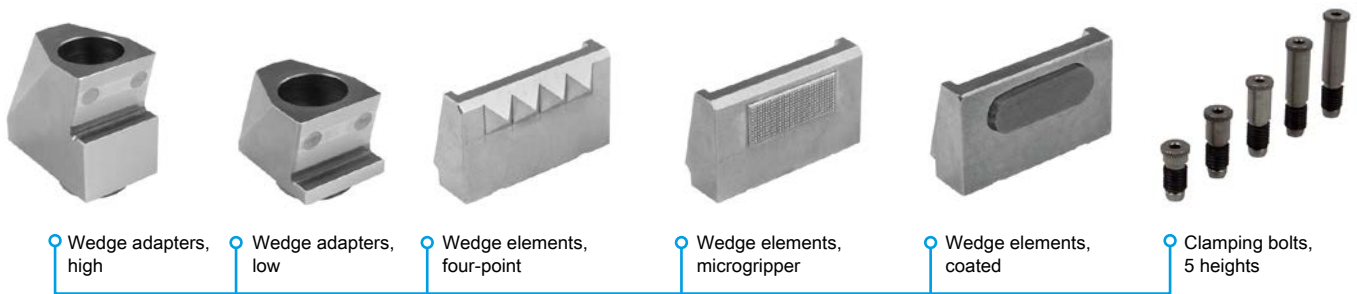
MULTI-VICE PULL-DOWN CLAMPING VERSION MS 125-S/M/L

ACCURACY THROUGH PULL-DOWN

The support jaws and the pull-down system ensure accurate, versatile and secure clamping of the unmachined parts. The workpiece is positioned on ground clamping bolts which make the connection to the guideway. In this way, the parallelism of the guideway or of the machine table is transferred

to the workpiece, thus achieving even greater clamping accuracy. Vibrations in the workpiece during machining are to a large extent avoided.

The pull-down clamping products can be found on the following pages.



Wedge adapters, high

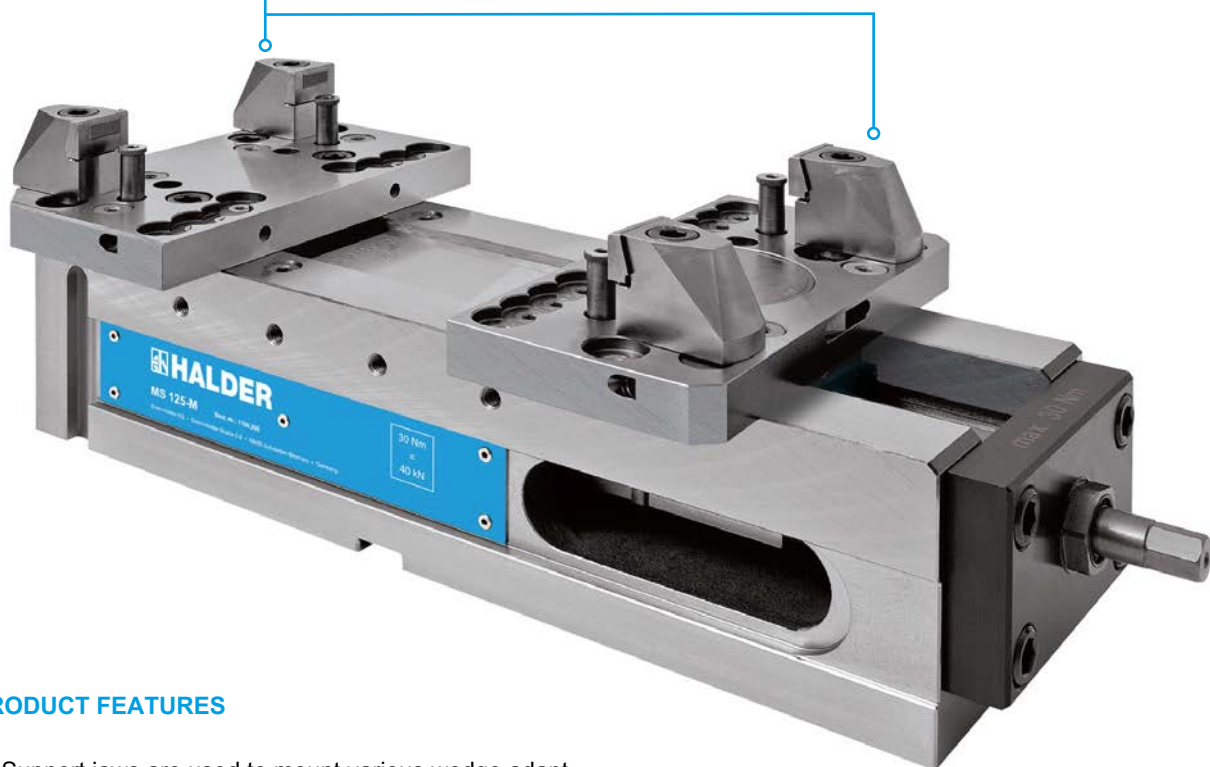
Wedge adapters, low

Wedge elements, four-point

Wedge elements, microgripper

Wedge elements, coated

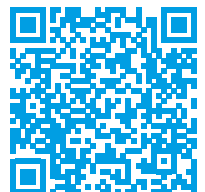
Clamping bolts, 5 heights



PRODUCT FEATURES

- Support jaws are used to mount various wedge adapters and clamping bolts.
- Wedge adapters can be bolted in various positions on the grid plate.
- The various wedge elements can be changed quickly on the wedge adapters.
- Additional pivot function of the support jaws compensates for non-parallel clamping surfaces and is required to clamp uneven workpieces.
- Accuracy through pull-down.
- Clamping in the neutral filament can be optimised using the 5 different heights of the clamping bolts.

You will find details and your contact persons under:



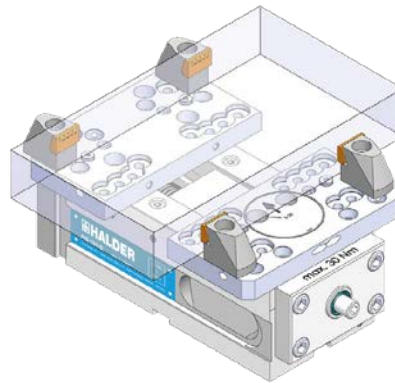
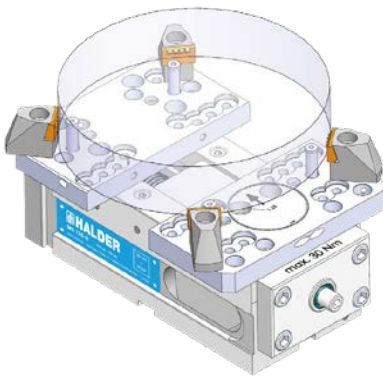
[www.halder.com/
Multi-Vices](http://www.halder.com/Multi-Vices)

CLAMPING WIDTHS PULL-DOWN CLAMPING

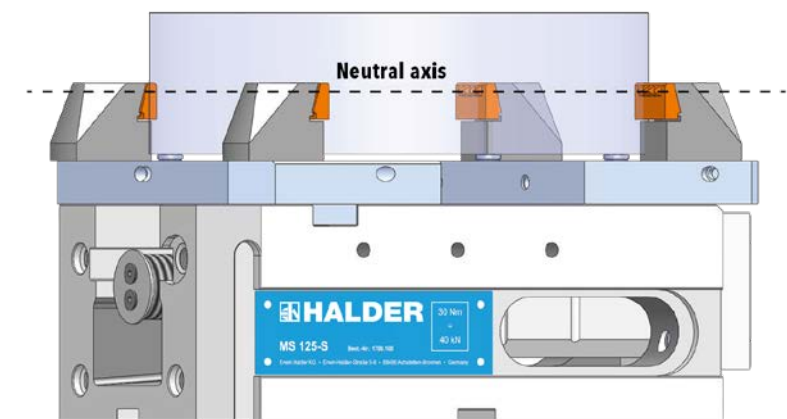
SUPPORT JAWS WITH PULL-DOWN



MS 125 - support jaws with pull-down				
Dimensions	Square workpiece		Round workpiece	
	Clamping range (mm)		Clamping range (mm)	
	min.	max.	min.	max.
MS 125-S	18	185	Ø 65	Ø 226
MS 125-M	18	305	Ø 65	Ø 330
MS 125-L	18	435	Ø 65	Ø 330



CLAMPING IN THE NEUTRAL AXIS



Five-Sided Machining

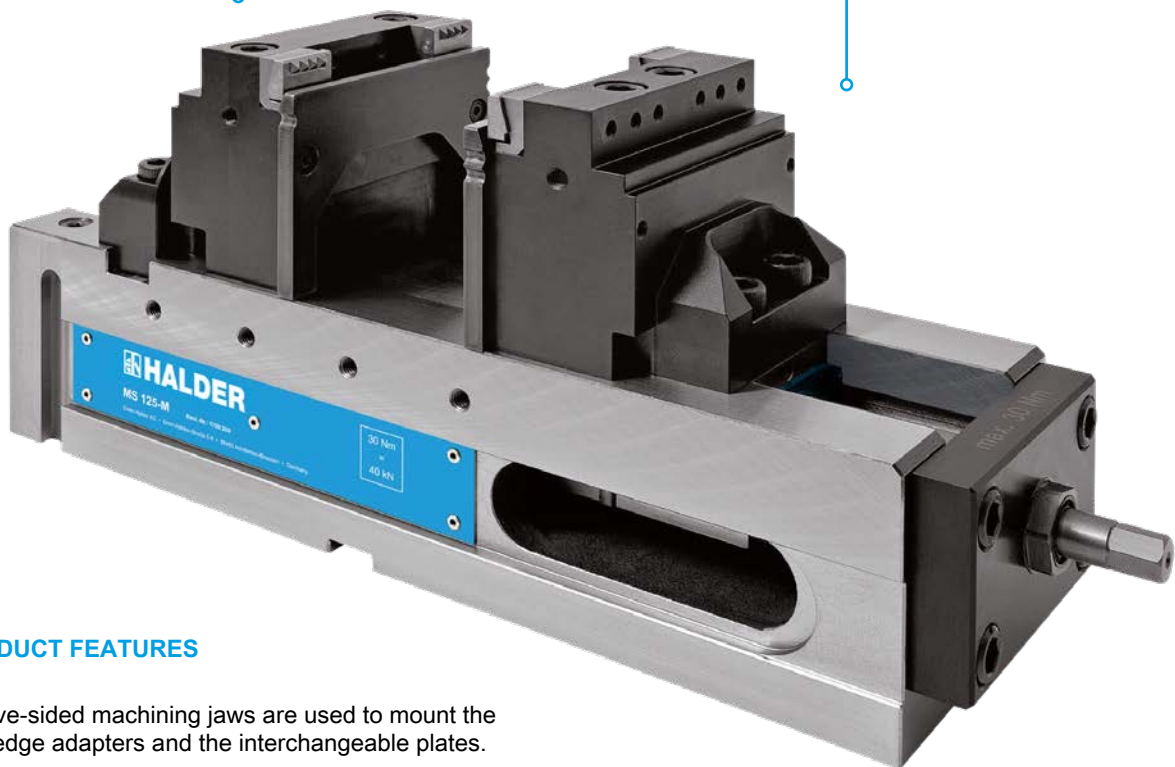
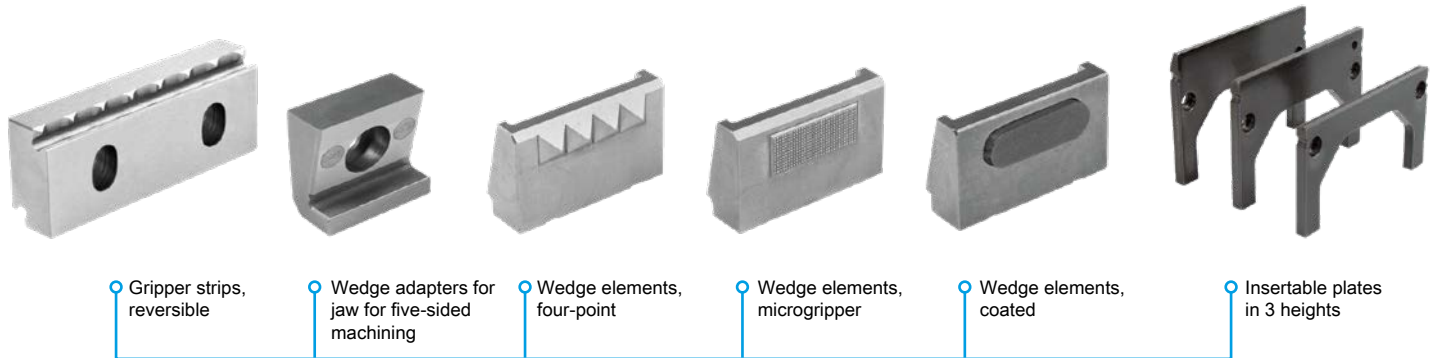
EH 1704.

MULTI-VICE FIVE-SIDED MACHINING VERSION MS 125-S/M/L

FIVE-SIDED MACHINING PLUS PULL-DOWN

The five-sided machining jaws with pull-down can clamp workpieces up to a height of 90 mm onto the guideway of the MS 125. The insertable plates are pressed onto the guideway using the pull-down effect, thus establishing an accurate parallel workpiece position.

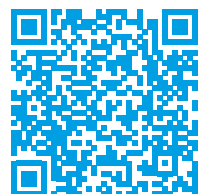
This largely avoids any vibration of the workpiece during machining. Accessibility with short tools is a particular advantage of the five-sided machining jaws. You will find products for five-sided machining on the following pages.



PRODUCT FEATURES

- Five-sided machining jaws are used to mount the wedge adapters and the interchangeable plates.
- Wedge adapters can be bolted in various positions on the grid plate.
- The various wedge elements can be quickly changed on the wedge adapters.
- Suitable for five-sided machining with short tools.
- Accuracy through pull-down.
- Stability through form-locking.
- Clamping in the neutral filament can be optimised using the three support heights of the interchangeable plates.

You will find details and your contact persons under:



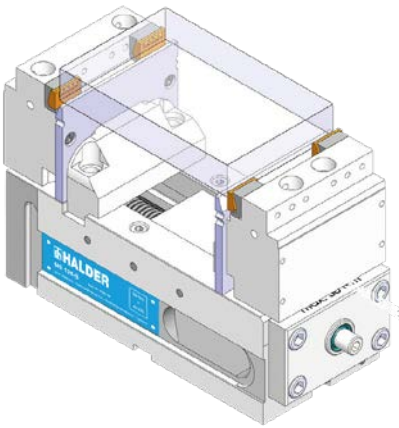
[www.halder.com/
Multi-Vices](http://www.halder.com/Multi-Vices)

CLAMPING WIDTHS FIVE-SIDED MACHINING

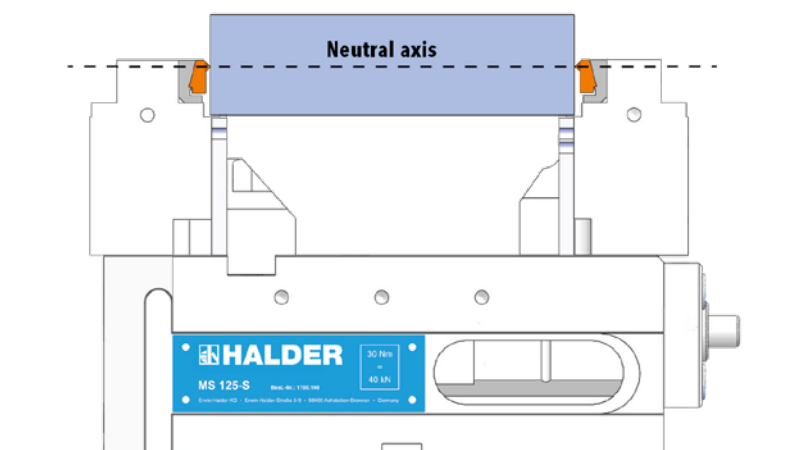
90-MM JAW FOR FIVE-SIDED MACHINING WITH PULL-DOWN



MS 125 - jaw for five-sided machining with pull-down		
Dimensions	Square workpiece	
	Clamping range (mm) min.	Clamping range (mm) max.
MS 125-S	18	180
MS 125-M	18	300
MS 125-L	18	430



CLAMPING IN THE NEUTRAL AXIS





11 BASIC ELEMENTS



Product group

Page

Clamping Angles

[932](#)

Clamping Cubes

[936](#)

Base Plates

[938](#)



Clamping Angles • semi-finished

EH 1906.



PRODUCT DESCRIPTION

Material

- Grey cast iron GG

MORE INFORMATION

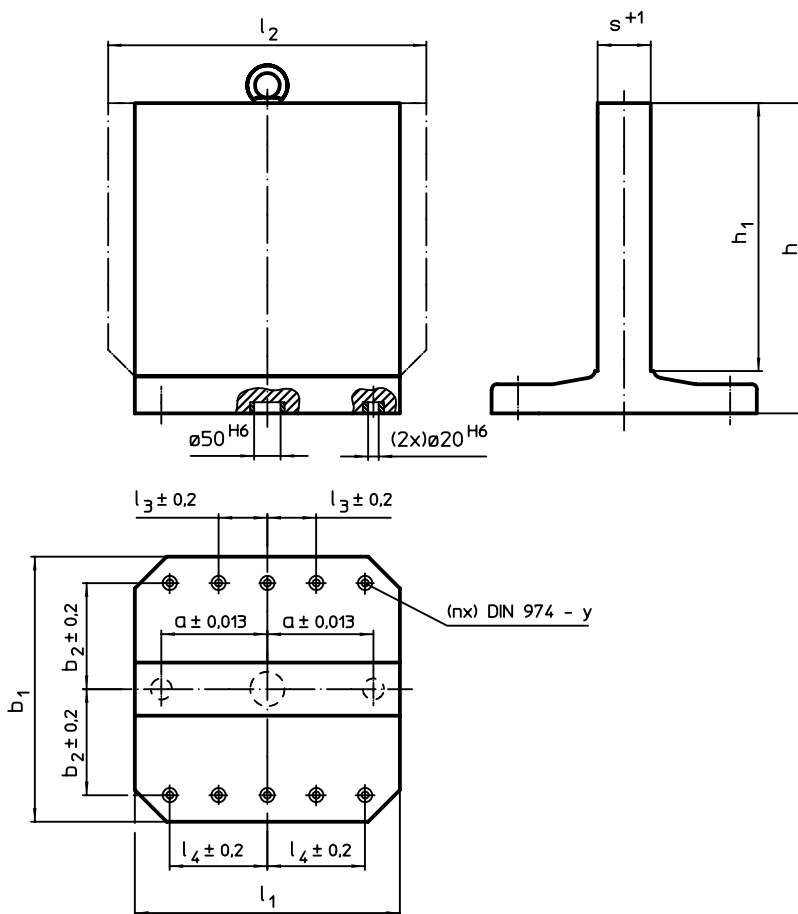
Notes

Special plates on request.

Further products

Threaded Lifting Pins, self-locking. . . → p. 207

DRAWING



ORDER INFORMATION

b ₁ x l ₁	l ₂	h ₁	h	Dimensions					y	For screws	Number of fastening holes n	[kg]	Art. No.
				a ±0.013	b ₂ ±0.2	l ₃ ±0.2	l ₄ ±0.2	s +1					
[mm]													
400 x 400	–	400	475	150	150	–	150	81	12	M12	4	150	1906.210
	500	400	475	150	150	–	150	81	12	M12	4	173	1906.310
500 x 500	–	500	595	200	200	–	200	101	12	M12	6	284	1906.410
	630	500	595	200	200	–	200	101	12	M12	6	334	1906.510
630 x 630	–	630	725	200	200	–	200	131	16	M16	6	455	1906.610
800 x 800	–	800	910	300	300	100	300	151	16	M16	8	805	1906.810



PRODUCT DESCRIPTION

Material

- Grey cast iron GG

MORE INFORMATION

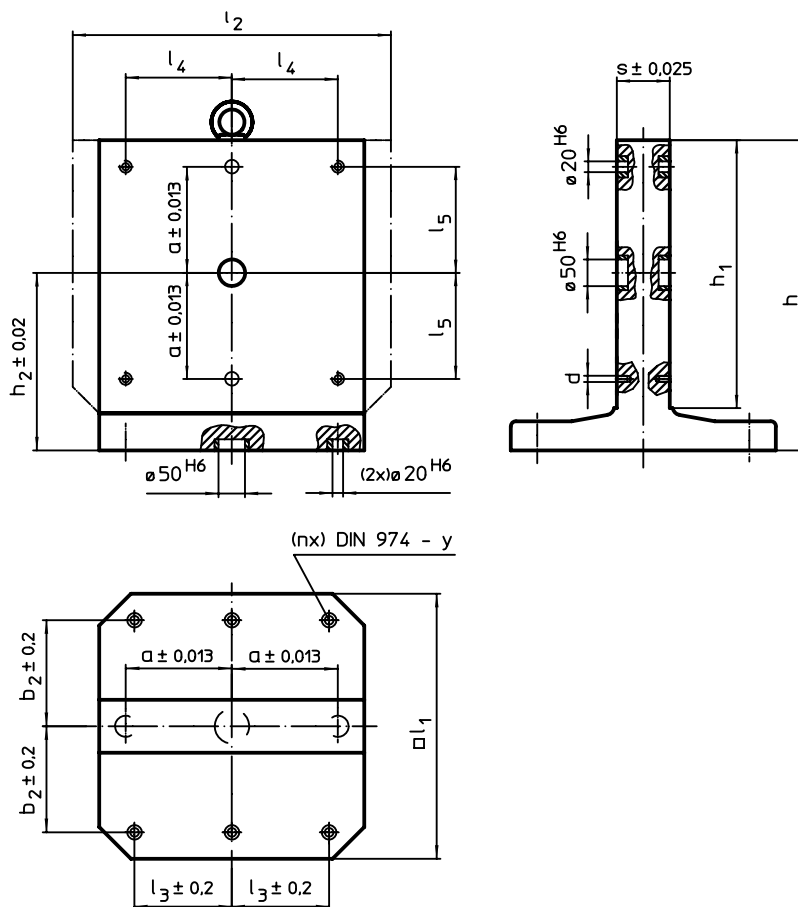
Notes

Special plates on request.


Further products

Threaded Lifting Pins, self-locking. . . . → p. 207

DRAWING



ORDER INFORMATION

	Dimensions											y	For screws	Number of fastening holes n		Art. No.
	l_1	l_2	h_1	h	$a \pm 0.013$	$b_2 \pm 0.2$	$l_3 \pm 0.2$	l_4	l_5	$h_2 \pm 0.02$	$s \pm 0.025$					
400	-	400	475	150	150	150	100	100	275	80	M12	12	M12	4	147	1906.240
	500	400	475	150	150	150	200	100	275	80	M12	12	M12	4	168	1906.340
500	-	500	595	200	200	200	200	200	345	100	M12	12	M12	6	295	1906.440
	630	500	595	200	200	200	200	200	345	100	M12	12	M12	6	326	1906.540
630	-	630	725	200	200	200	200	200	410	130	M16	16	M12	6	445	1906.640

Clamping Angles • welded, semi-finished

EH 1910.



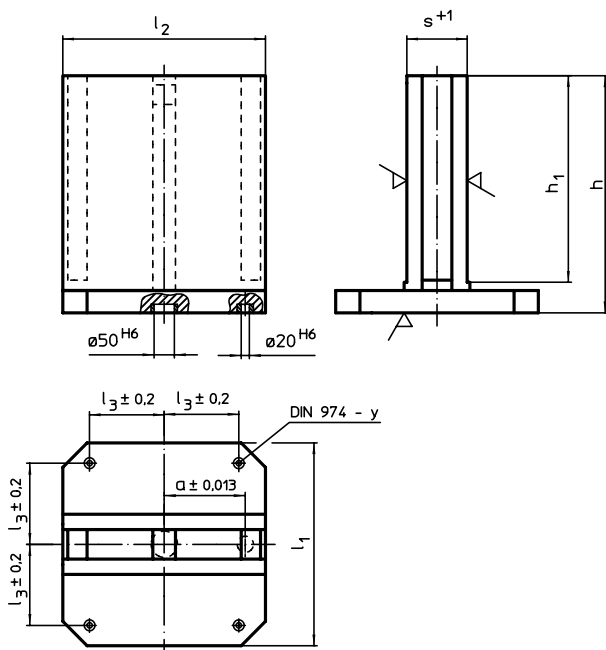
PRODUCT DESCRIPTION

Material
 ■ Steel, welded

MORE INFORMATION

Notes
 Special plates on request.

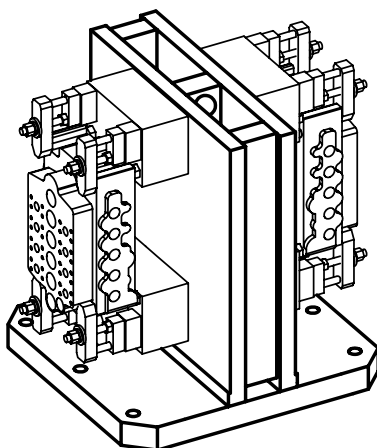
DRAWING



ORDER INFORMATION

l ₁	l ₂	Dimensions					y	For screws	📦	Art. No.
		l ₃ ± 0.2	h	h ₁	s + 1	a ± 0.013				
[mm]										
400	400	150	475	425	121	150	12	M12	148	1910.120
500	500	200	600	545	151	200	12	M12	260	1910.140
630	630	200	725	660	181	200	16	M16	409	1910.160

APPLICATION EXAMPLE



11

Clamping Angles • one-sided, welded, semi-finished
EH 1910.

PRODUCT DESCRIPTION

Material

- Steel, welded

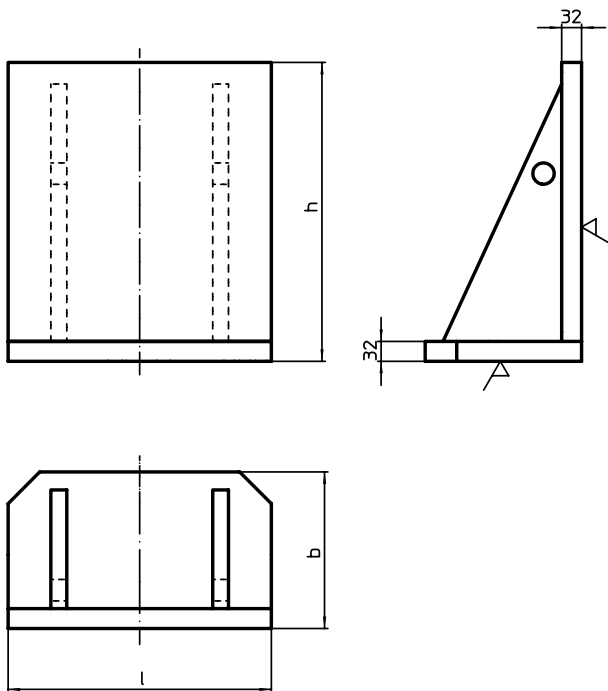
MORE INFORMATION

Notes

Special plates on request.



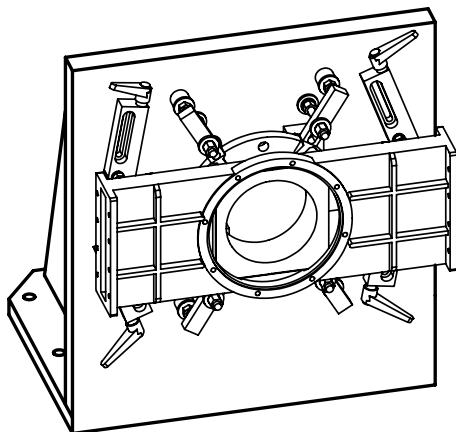
DRAWING



ORDER INFORMATION

l	Dimensions		[kg]	Art. No.
	b [mm]	h		
400	250	450	76	1910.020
500	330	550	125	1910.040
630	370	650	180	1910.060

APPLICATION EXAMPLE



Clamping Cubes • semi-finished

EH 1908.



PRODUCT DESCRIPTION

Material

- Grey cast iron GG

MORE INFORMATION

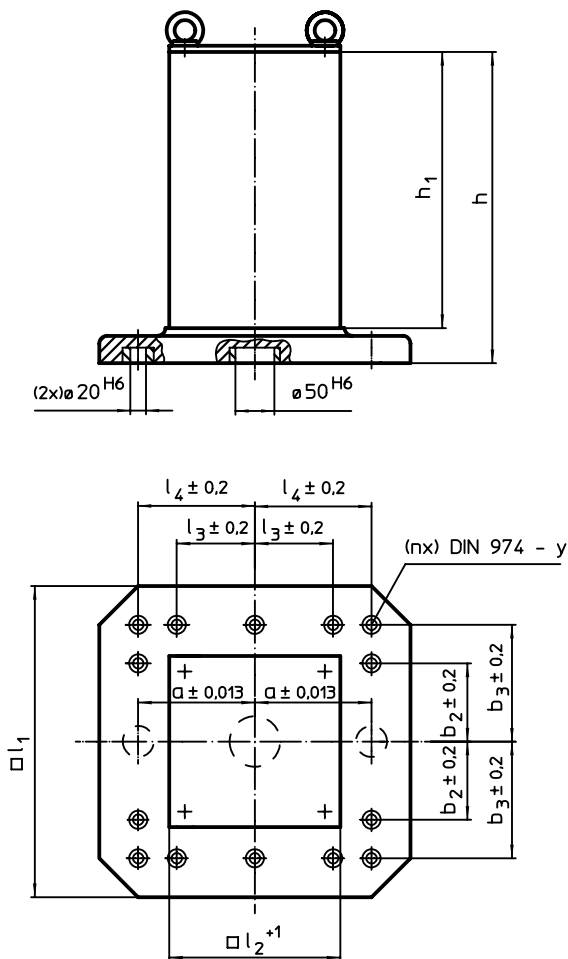
Notes

Special plates on request.


Further products

Threaded Lifting Pins, self-locking. . . → p. 207

DRAWING



ORDER INFORMATION

l_1	l_2^{+1}	h_1	h	Dimensions					y	For screws	Number of fastening holes n		Art. No.
				a ± 0.013	b_2 ± 0.2	b_3 ± 0.2	l_3 ± 0.2	l_4 ± 0.2					
400	231	358	408	150	-	150	-	150	12	M12	4	100	1908.210
500	331	510	565	200	-	200	-	200	12	M12	6	209	1908.410
630	451	640	700	200	200	300	200	300	16	M16	8	495	1908.610

Clamping Cubes • welded, semi-finished
EH 1910.



PRODUCT DESCRIPTION

Material

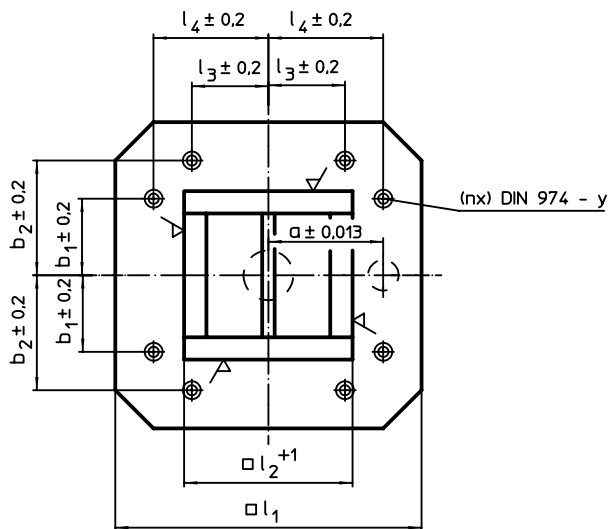
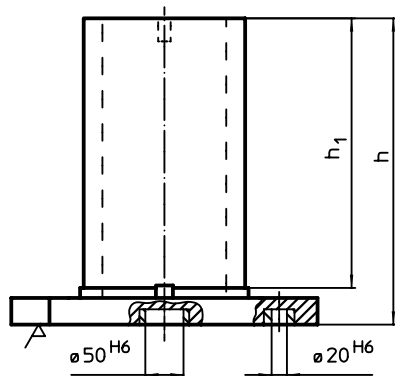
- Steel, welded

MORE INFORMATION


Notes

Special plates on request.

DRAWING



ORDER INFORMATION

Dimensions									y	For screws	Number of fastening holes n		Art. No.
l_1	$l_2 + 1$	$l_3 \pm 0.2$	$l_4 \pm 0.2$	h	h_1	a ± 0.013	$b_1 \pm 0.2$	$b_2 \pm 0.2$					
400	231	–	150	500	450	150	150	–	12	M12	4	134	1910.220
500	331	–	200	650	595	200	200	–	12	M12	4	265	1910.240
630	451	200	300	800	740	200	200	300	16	M16	8	427	1910.260

Base Plates • semi-finished

EH 1912.



PRODUCT DESCRIPTION

Material

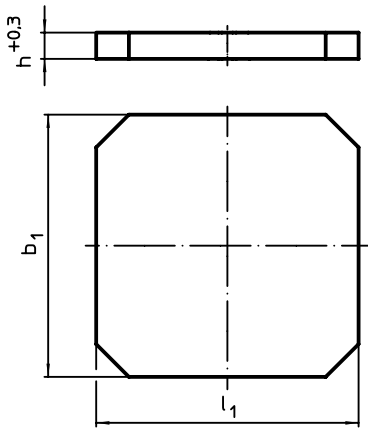
- Grey cast iron GG

MORE INFORMATION


Notes

Special plates on request.

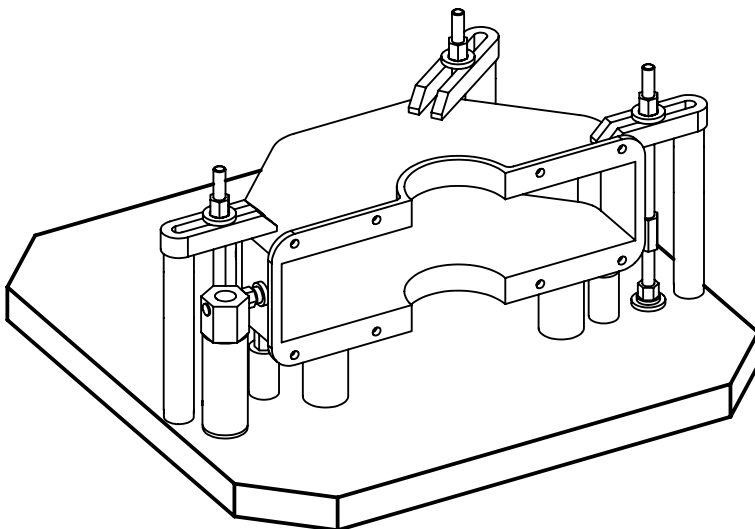
DRAWING



ORDER INFORMATION

$b_1 \times l_1$	Dimensions			Art. No.
	[mm]	h +0.3		
400 x 400		40.3	45	1912.210
400 x 500		40.3	57	1912.310
500 x 500		40.3	71	1912.410
500 x 630		50.3	112	1912.510
630 x 630		50.3	142	1912.610

APPLICATION EXAMPLE



Base Plates • with positioning holes
EH 1912.



PRODUCT DESCRIPTION

Material

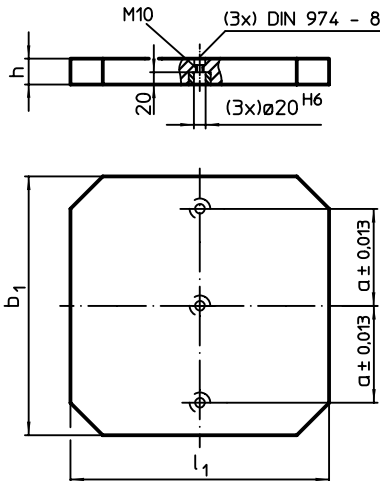
- Grey cast iron GG

MORE INFORMATION


Notes

Special plates on request.

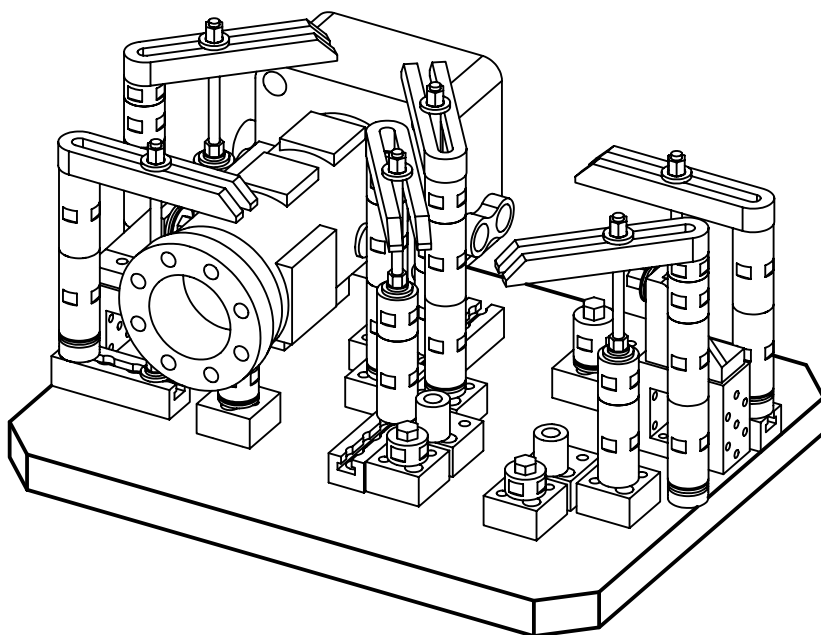
DRAWING



ORDER INFORMATION

$b_1 \times l_1$	Dimensions			Art. No.
	h	a		
	[mm]	± 0.013	[kg]	
400 x 400	40 ± 0.02	150	45	1912.220
400 x 500	40 ± 0.02	150	57	1912.320
500 x 500	40 ± 0.02	200	71	1912.420
500 x 630	50 ± 0.03	200	112	1912.520
630 x 630	50 ± 0.03	200	141	1912.620

APPLICATION EXAMPLE





12 ZERO-POINT CLAMPING SYSTEMS



Product group

Page

Connecting Elements / Connecting Rings

946

Base Plates / Supporting Plates

960

Accessories for Zero-Point Clamping Systems

970



ZERO-POINT CLAMPING SYSTEMS

Coupling elements for clamping and at the same time centring jigs and fixtures, developed as a quick-change system for shortening set-up times.

- Referenced clamping of jigs and fixtures provided by repeatedly accurate placement at the „zero-point“.
- For machining workpieces in several working steps on different machines.

In addition to the maximum of flexibility zero-point clamping systems – be this hydraulic operation in a built-in version with integrated lifting of the jigs and fixtures or through a modular design – the way the system is designed (with the peg of the base element mounted pointing upwards and the connecting ring integrated on the jig) guarantees a high degree of production reliability, continuous accuracy, and soiling of the reference point is avoided.

FEATURES

- Holding force of up to 30 kN.
- Mechanical, pneumatic and hydraulic operation.
- Also with locking device against twisting when using individual elements.
- High efficiency, repeatedly accurate and cost-saving.
- Can be used on all machinery.
- Can also be integrated in Halder jig and fixture systems.



Built-in double acting connecting elements
Holding force of 30 kN



Built-in single acting connecting elements
Holding force of 20 kN



Connecting rings suited for all zero-point clamping systems



Modular connecting elements
Holding force up to 10 kN



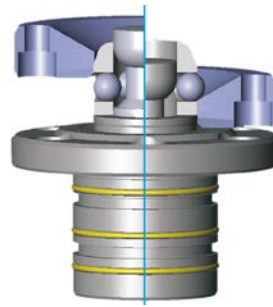
Control modules interchangeable



ZERO-POINT CLAMPING SYSTEMS

HYDRAULIC, DOUBLE ACTING, BUILT-IN CONNECTING ELEMENT HOLDING FORCE OF 30 kN

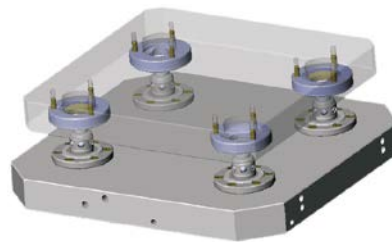
- Hydraulic clamping and centring.
- Releasing and lifting with integrated retraction cylinder, hydraulic.
- Suited for automation.
- Integrated pneumatic blow-out of the supporting surfaces.
- Pneumatic sensing check on the supporting surface during clamping.
- Can be integrated in base plates, angles, cubes, etc.



Functional Principle:
clamp and lift-off

HYDRAULIC, SINGLE-ACTING, BUILT-IN CONNECTING ELEMENT HOLDING FORCE OF 20 kN

- Clamping and centring by spring load.
- Releasing and lifting with integrated retraction cylinder, hydraulic.
- Suited for automation.
- Can be integrated in base plates, angles, cubes, etc.



Mounting principle

MODULAR CONNECTING ELEMENT HOLDING FORCE OF UP TO 10 kN

- Clamping and centring by spring load.
- Release: mechanical, pneumatic, hydraulic. (Control modules interchangeable).
- Can be integrated in base plates, angles, cubes, etc.
- Provided with screw thread for bolting to tables, plates, etc.



Machine table: Base plate with 4 connecting elements

DESIGNS OF THE CONNECTING RINGS

The connecting rings are suited for all Halder zero-point clamping systems.

Can be bolted to and integrated on jigs and fixtures or directly on the workpiece.

The connecting rings are split into the following designs for positioning and simultaneous clamping of jigs and fixtures:

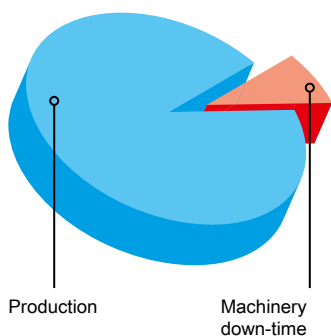
1. „Central“ connecting ring for aligning and clamping at the zero-point.
2. „Sword-shaped“ connecting ring for two-point placement for alignment in one axial direction.
3. „Floating“ connecting ring without centring function for over-determined additional clamping.

TIME IS MONEY

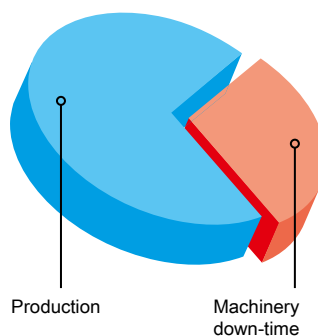
Halder zero-point clamping systems are a worthwhile investment that pay off within a very short period of time through simpler retooling procedures, less downtime for machinery and nearly unlimited flexibility. Make the comparison yourself as to the cost advantages obtained using Halder zero-point clamping systems.

COMPARE PRODUCTION TIME / SET-UP TIME

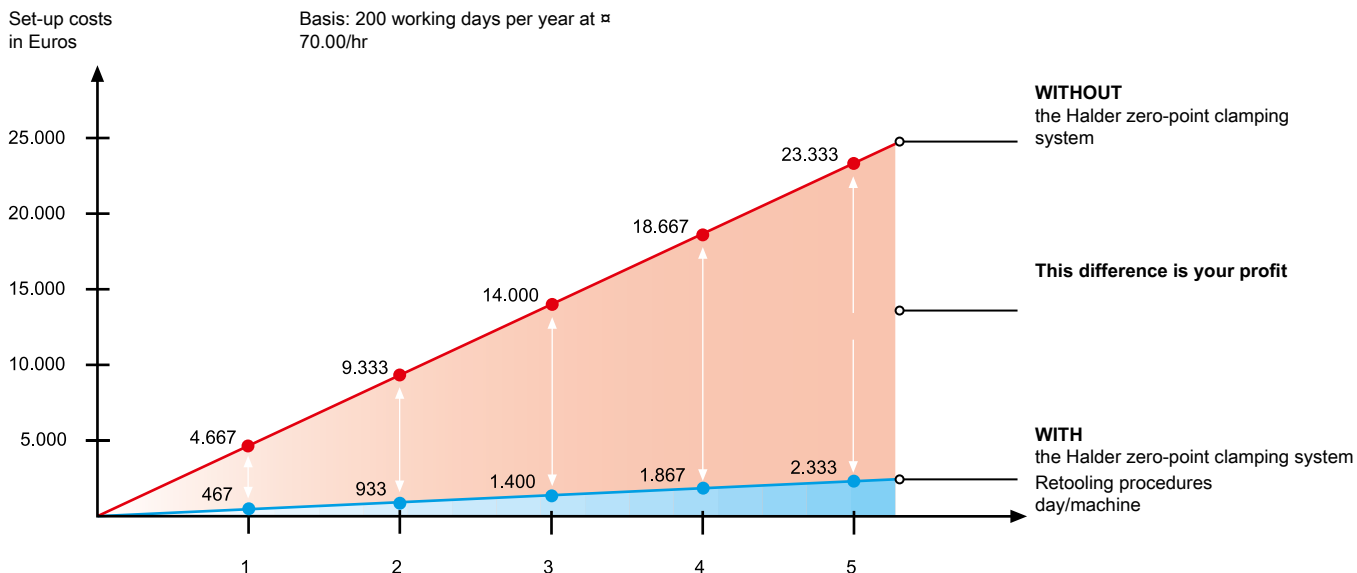
WITH the Halder zero-point clamping system



WITHOUT the Halder zero-point clamping system



COST COMPARISON OF SET-UP COSTS WITH AND WITHOUT THE HALDER ZERO-POINT CLAMPING SYSTEM



CALCULATION OF AMORTISATION TIME

Example

With five retooling procedures/shift/machine

Without the Halder zero-point clamping system: 5 x ~20 Min. = 100 Min.

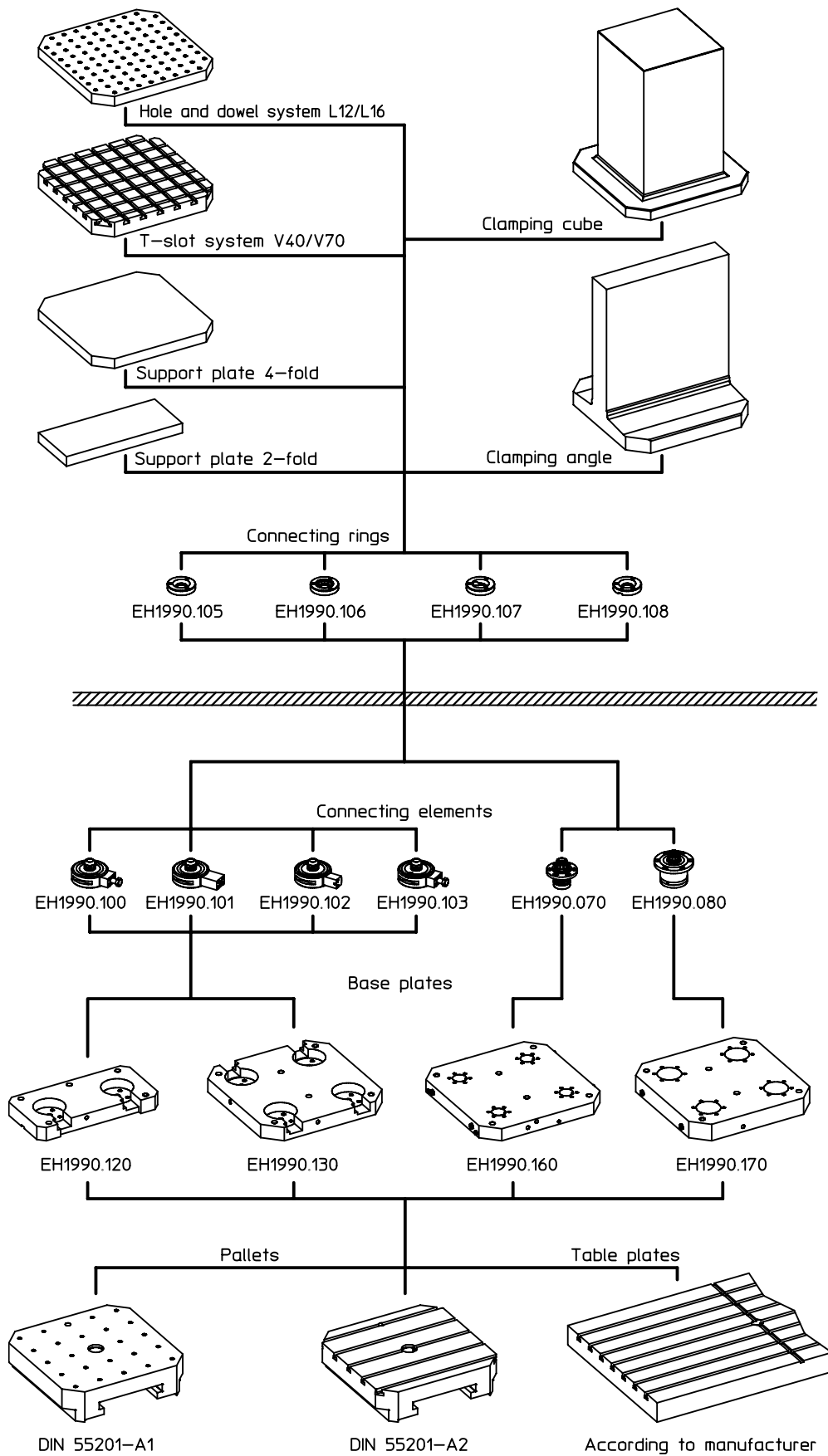
With the Halder zero-point clamping system: 5 x ~2 Min. = 10 Min.

Saving/shift/net = 90 Min.

Saving/year/200 working days = 300 h

Cost advantage/year at € 70.00/hr = € 21.000.-

OVERVIEW



Connecting Elements • hydraulically operated, double acting, with lifting-off and blow-out

EH 1990.



PRODUCT DESCRIPTION

Material

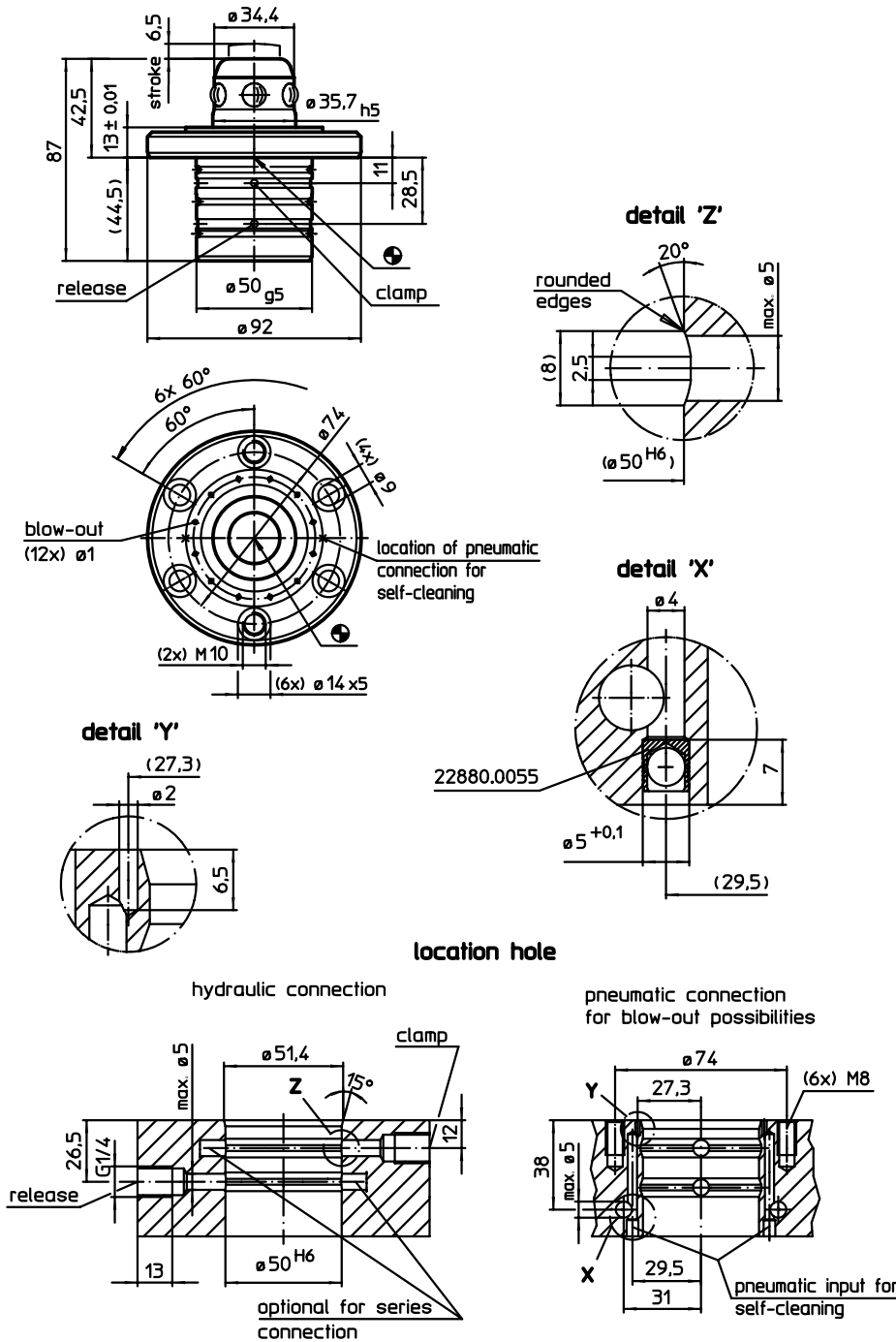
- Steel, case-hardened, ground

MORE INFORMATION

Further products

- Connecting Rings → p. 957
- Coverings, for connecting elements ... → p. 970

DRAWING



ORDER INFORMATION

Holding force	Centering accuracy	Release pressure		Art. No.
[N]	< [mm]	max. [bar]	[g]	
30000	0.01	60 – 80	1376	1990.070

Connecting Elements • hydraulically operated, single acting with lifting-off
EH 1990.



PRODUCT DESCRIPTION

Material

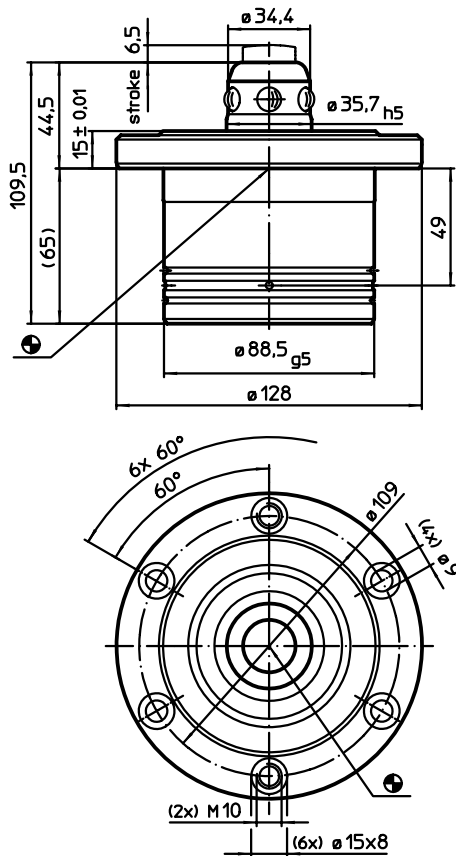
- Steel, case-hardened, ground

MORE INFORMATION

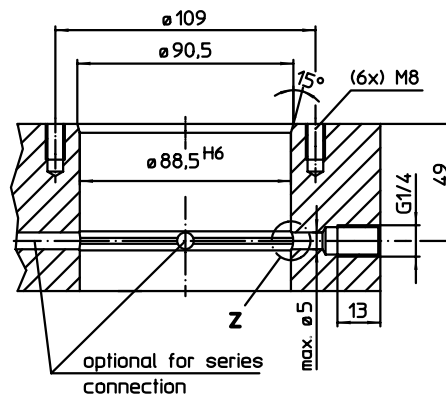
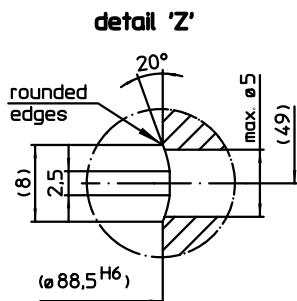
Further products

- Connecting Rings → p. 957
- Coverings, for connecting elements ... → p. 970

DRAWING



location hole
hydraulic connection



ORDER INFORMATION

Holding force	Centering accuracy	Release pressure max.		Art. No.
[N]	< [mm]	[bar]	[kg]	
20000	0.01	60 – 80	4	1990.080

Connecting Elements • modular, mechanically operated

EH 1990.



PRODUCT DESCRIPTION

Material

Body

- Steel, case-hardened, ground

Control module

- Steel, blackened

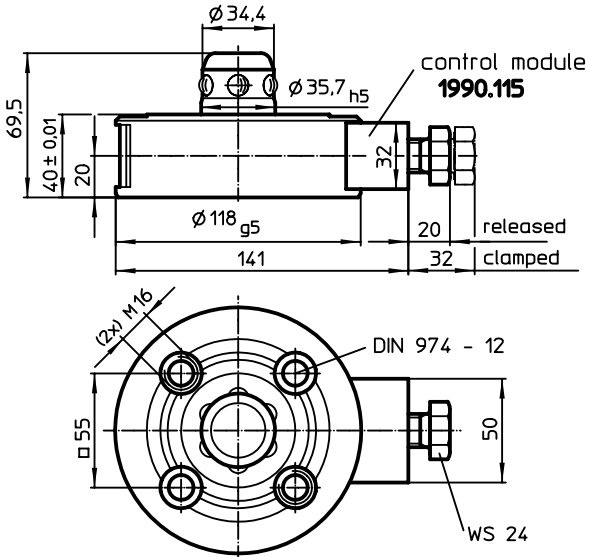
MORE INFORMATION

Further products

Connecting Rings → p. 957

Coverings, for connecting elements .. → p. 970

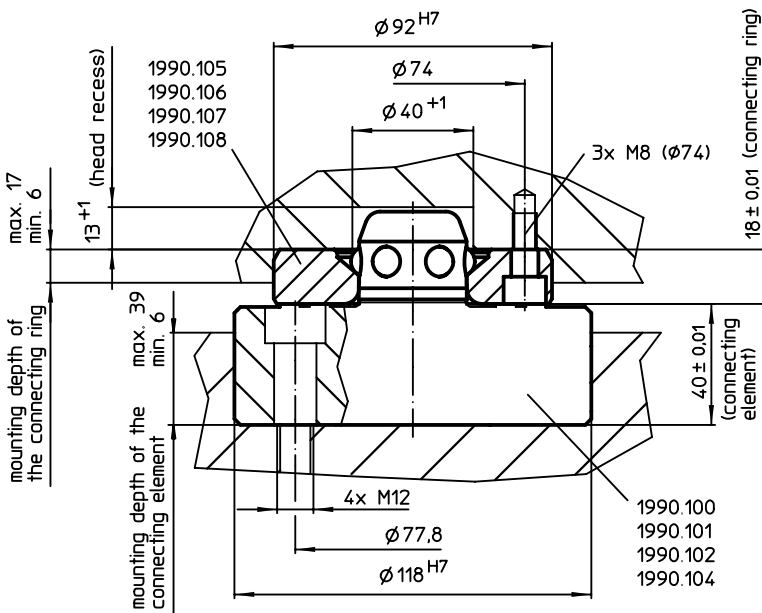
DRAWING



ORDER INFORMATION

Holding force [N]	Centering accuracy < [mm]	Release moment [Nm]	 [kg]	Art. No.
10000	0.01	10	4	1990.100

APPLICATION EXAMPLE



Connecting Elements • modular, hydraulically operated

EH 1990.



PRODUCT DESCRIPTION

Material

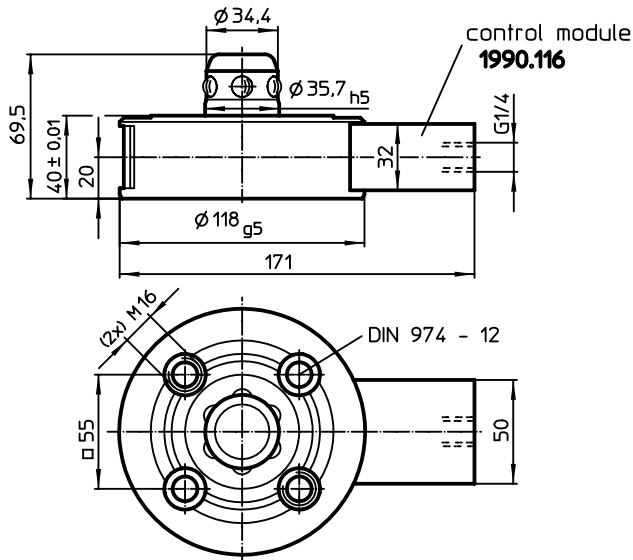
- Body**
 - Steel, case-hardened, ground
- Control module**
 - Steel, blackened

MORE INFORMATION

Further products

- Connecting Rings → p. 957
- Coverings, for connecting elements ... → p. 970

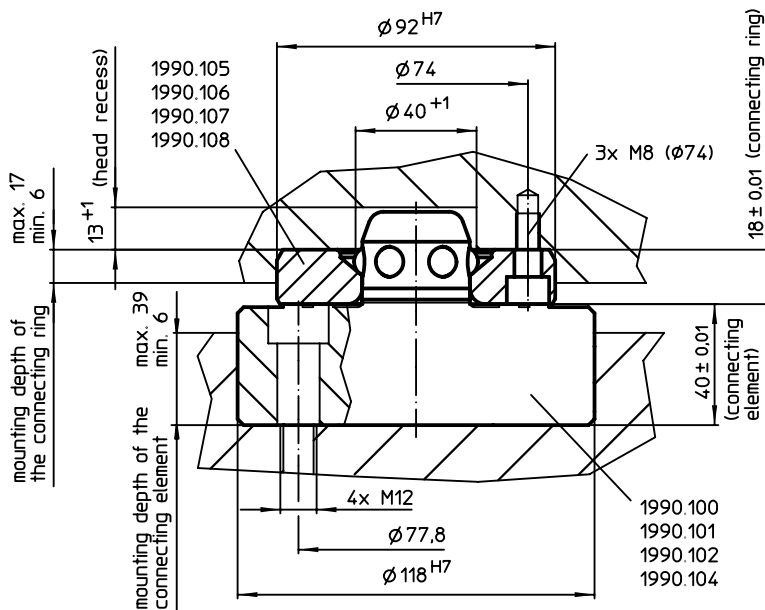
DRAWING



ORDER INFORMATION

Holding force	Centering accuracy	Release pressure		Art. No.
[N]	[mm]	[bar]	[kg]	
10000	0.01	80 – 120	4	1990.101

APPLICATION EXAMPLE



Connecting Elements • modular, pneumatically operated

EH 1990.



PRODUCT DESCRIPTION

Material

Body

- Steel, case-hardened, ground

Control module

- Aluminium Al

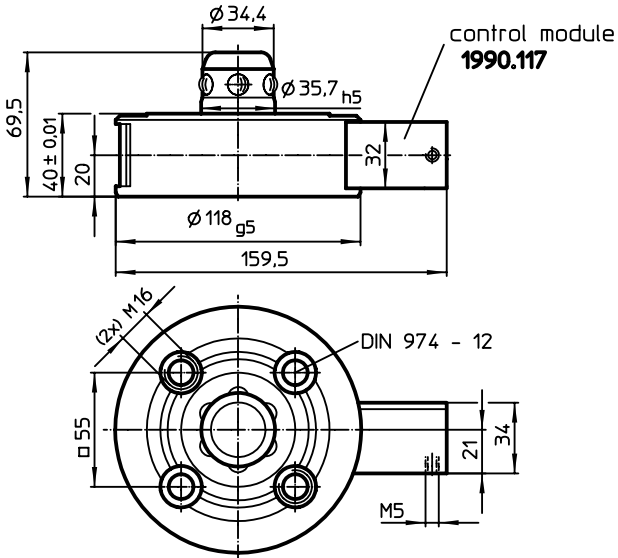
MORE INFORMATION

Further products

Connecting Rings → p. 957

Coverings, for connecting elements .. → p. 970

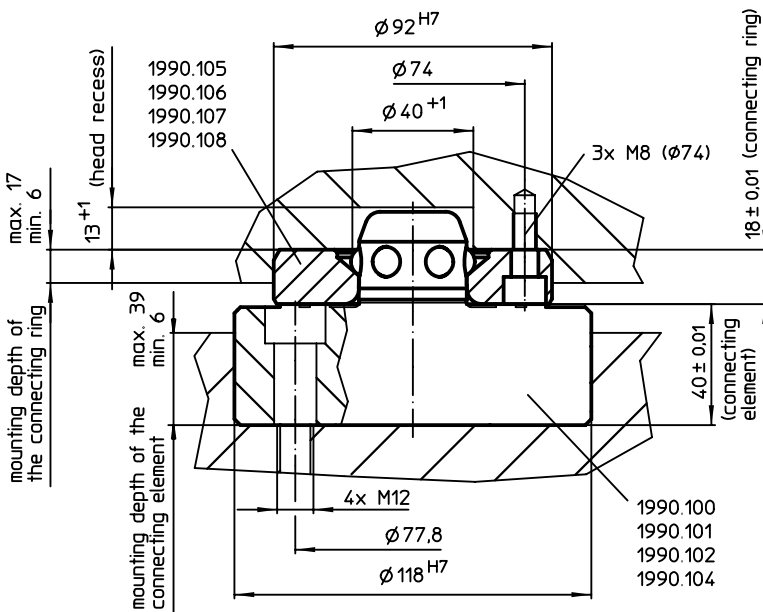
DRAWING



ORDER INFORMATION

Holding force	Centering accuracy	Release pressure		Art. No.
[N]	[mm]	[bar]	[kg]	
5000	0.01	6	3	1990.102

APPLICATION EXAMPLE



Connecting Elements • modular, pneumatically operated, reinforced

EH 1990.



PRODUCT DESCRIPTION

Material

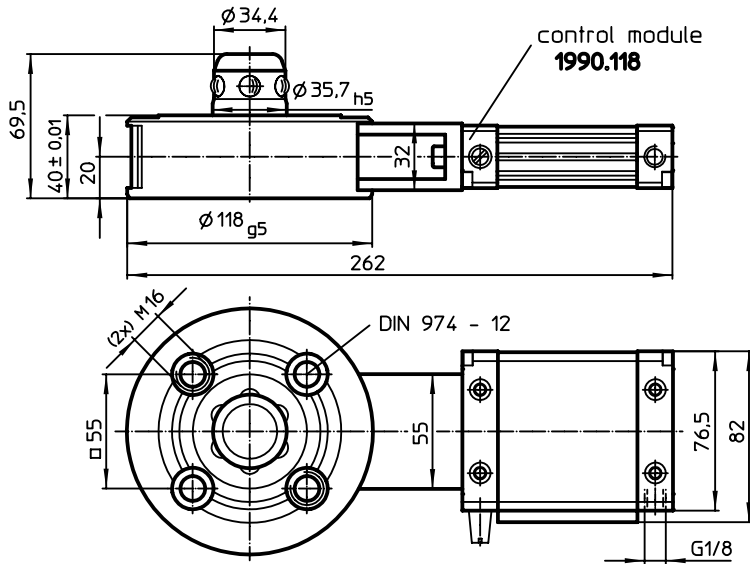
- Body**
 - Steel, case-hardened, ground
- Control module**
 - Aluminium Al

MORE INFORMATION

Further products

- Connecting Rings → p. 957
- Coverings, for connecting elements ... → p. 970

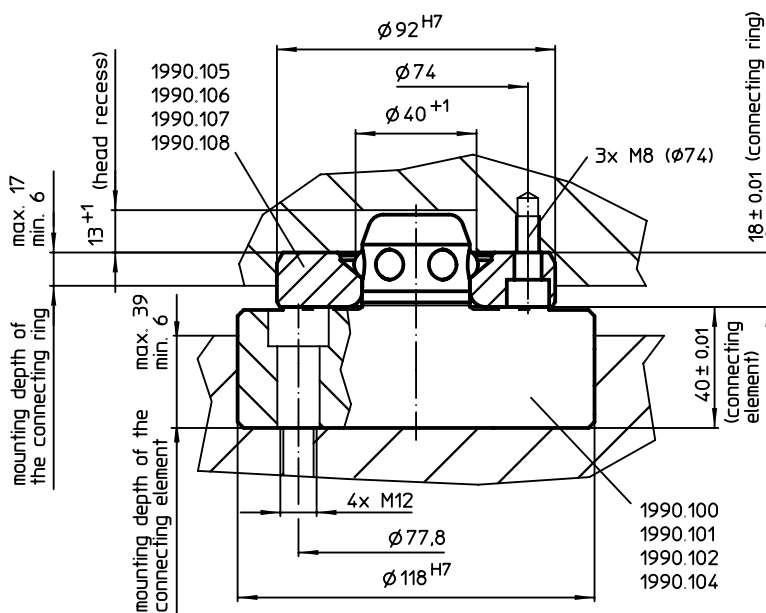
DRAWING



ORDER INFORMATION

Holding force	Centering accuracy	Release pressure		Art. No.
[N]	[mm]	[bar]	[kg]	
10000	0.01	6	4	1990.104

APPLICATION EXAMPLE



Connecting Elements • modular, mechanically operated, protected against twisting

EH 1990.



PRODUCT DESCRIPTION

Material

Body

- Steel, case-hardened, ground

Control module

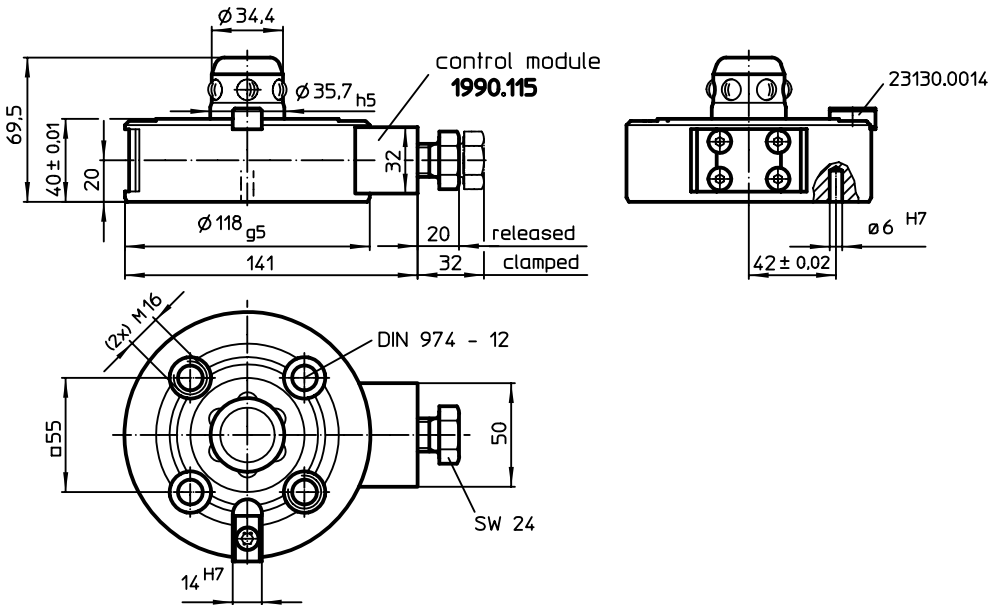
- Steel, blackened

MORE INFORMATION

Further products

- Connecting Rings → p. 957
- Coverings, for connecting elements ... → p. 970

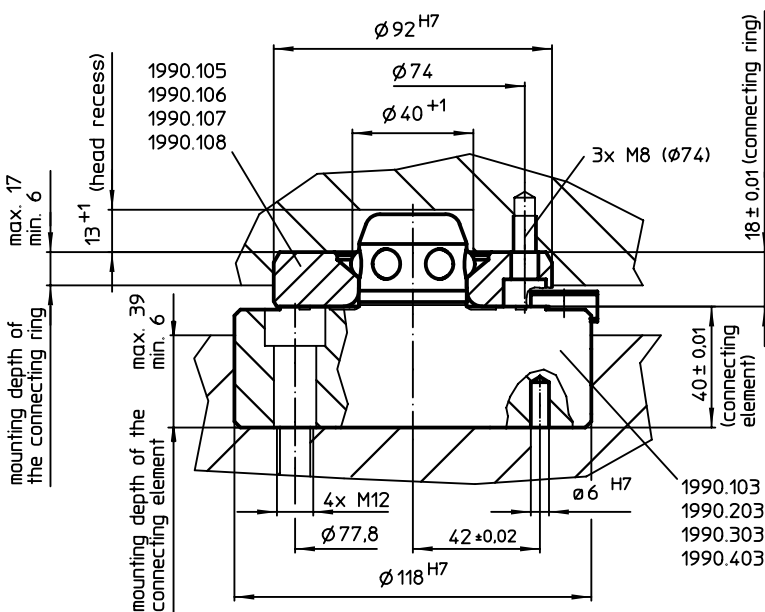
DRAWING



ORDER INFORMATION

Holding force [N]	Centering accuracy < [mm]	Release moment [Nm]	[kg]	Art. No.
10000	0.01	10	3	1990.103

APPLICATION EXAMPLE



Connecting Elements • modular, hydraulically operated, protected against twisting

EH 1990.



PRODUCT DESCRIPTION

Material

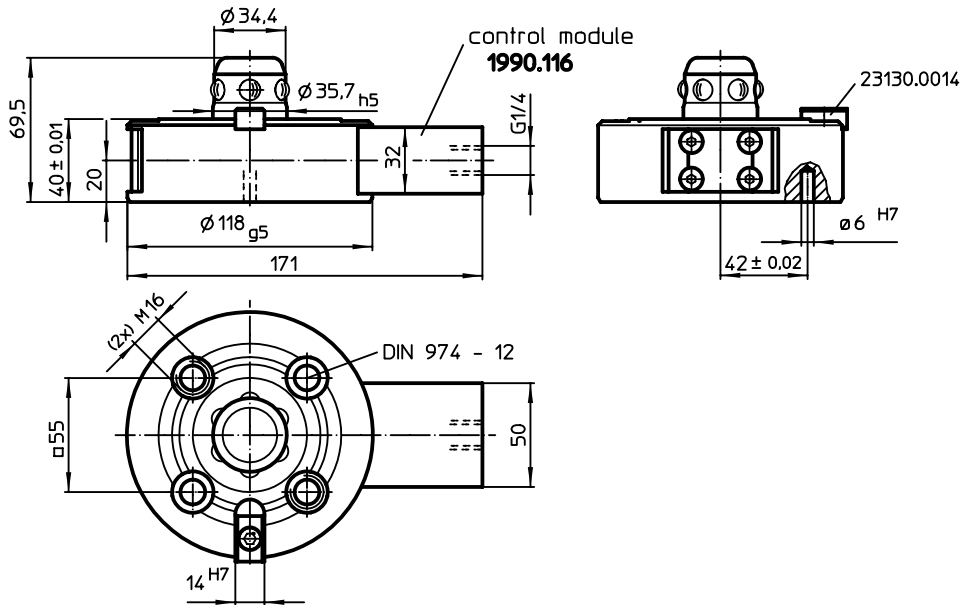
- Body**
- Steel, case-hardened, blackened, ground
- Control module**
- Steel, blackened

MORE INFORMATION

Further products

- Connecting Rings → p. 957
- Coverings, for connecting elements ... → p. 970

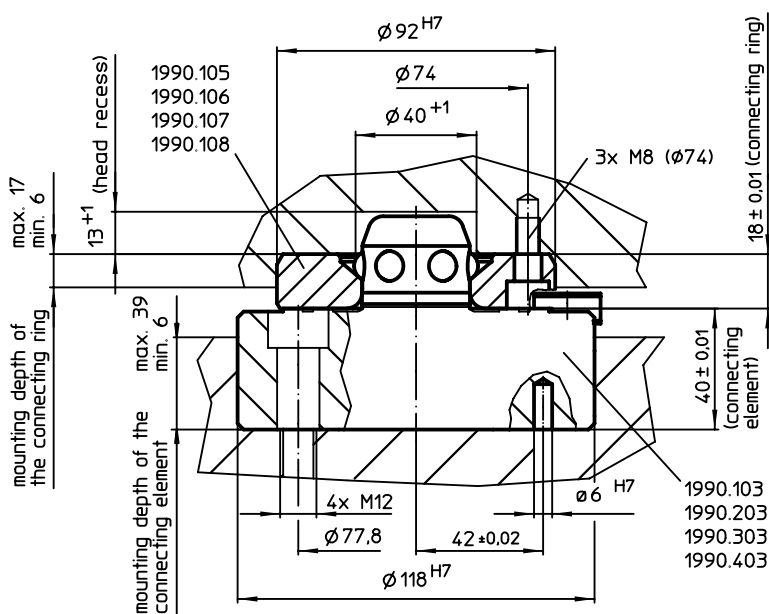
DRAWING



ORDER INFORMATION

Holding force	Centering accuracy	Release pressure		Art. No.
[N]	[mm]	[bar]	[kg]	
10000	0.01	80 – 120	4	1990.203

APPLICATION EXAMPLE



Connecting Elements • modular, pneumatically operated, protected against twisting

EH 1990.



PRODUCT DESCRIPTION

Material

Body

- Steel, case-hardened, ground

Control module

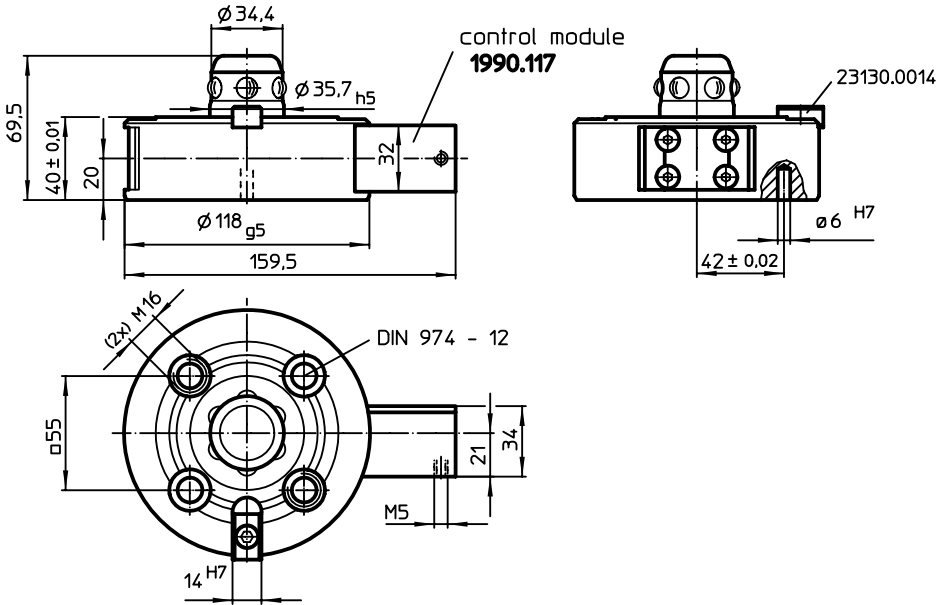
- Aluminium Al

MORE INFORMATION

Further products

- Connecting Rings → p. 957
- Coverings, for connecting elements ... → p. 970

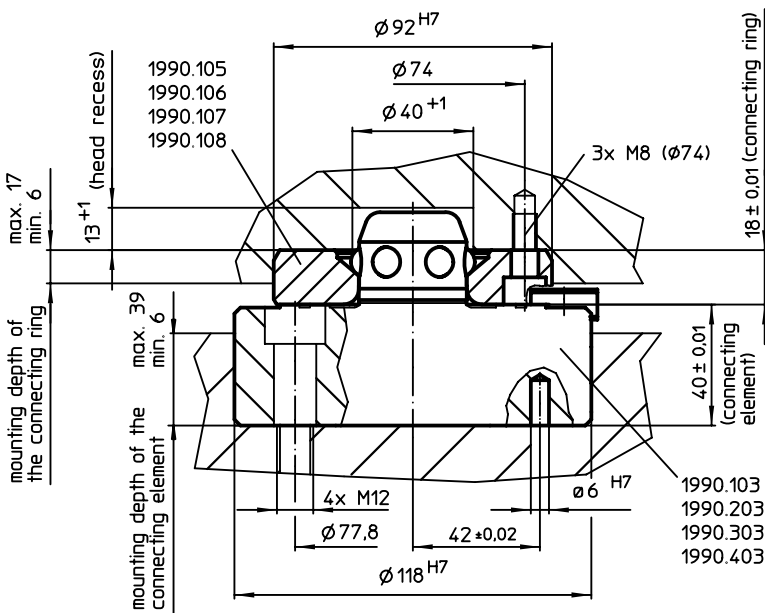
DRAWING



ORDER INFORMATION

Holding force	Centering accuracy	Release pressure		Art. No.
[N]	[mm]	[bar]	[kg]	
5000	0.01	6	3	1990.303

APPLICATION EXAMPLE



Connecting Elements • modular, pneumatically operated, reinforced, protected against twisting

EH 1990.



PRODUCT DESCRIPTION

Material

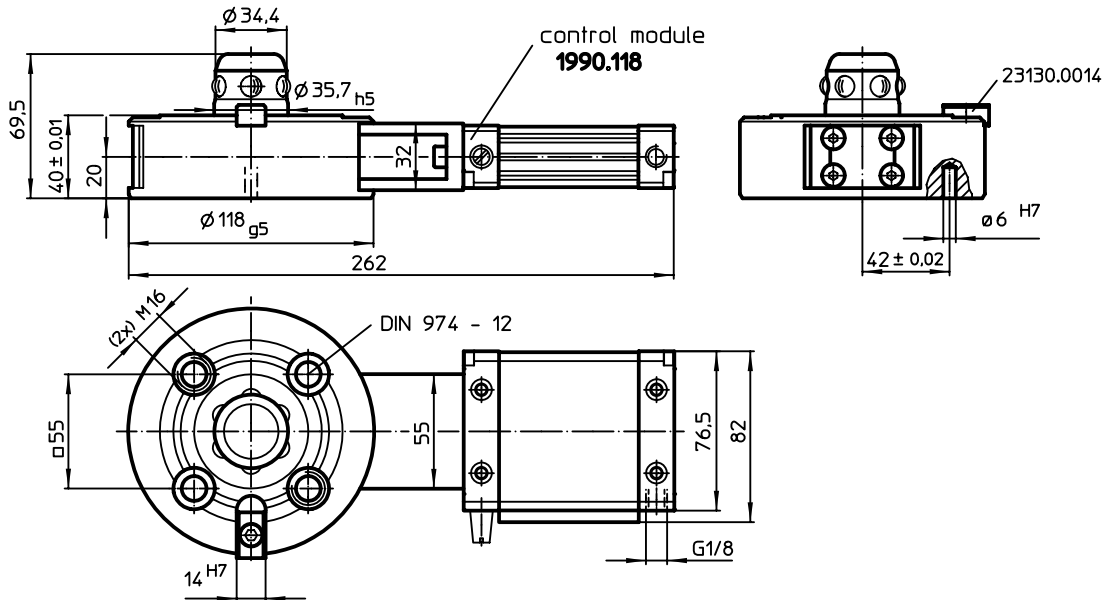
- Body**
 - Steel, case-hardened, ground
- Control module**
 - Aluminium Al

MORE INFORMATION

Further products

- Connecting Rings → p. 957
- Coverings, for connecting elements ... → p. 970

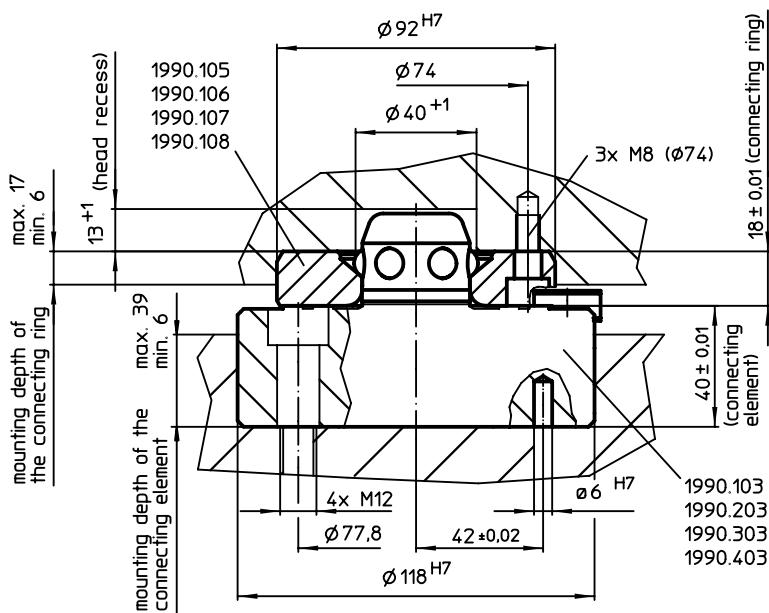
DRAWING



ORDER INFORMATION

Holding force	Centering accuracy	Release pressure		Art. No.
[N]	[mm]	[bar]	[kg]	
10000	0.01	6	4	1990.403

APPLICATION EXAMPLE



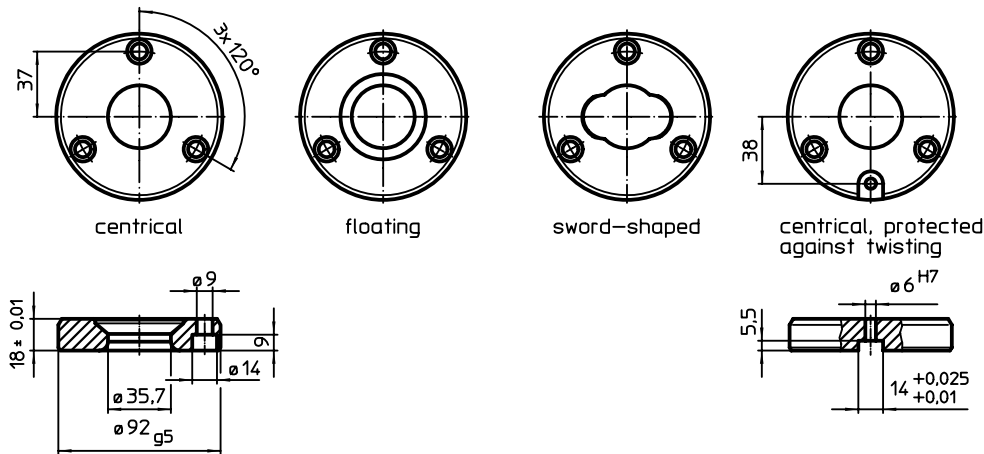


PRODUCT DESCRIPTION

Material

- Steel, case-hardened, ground

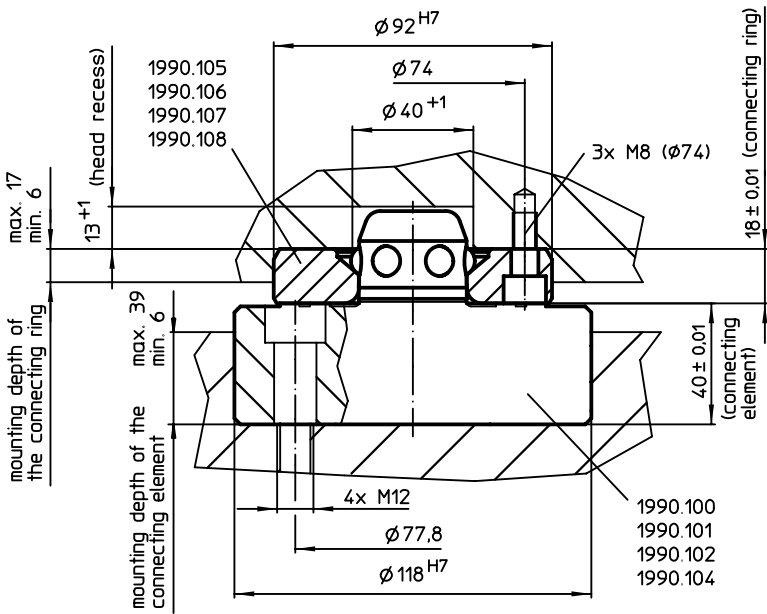
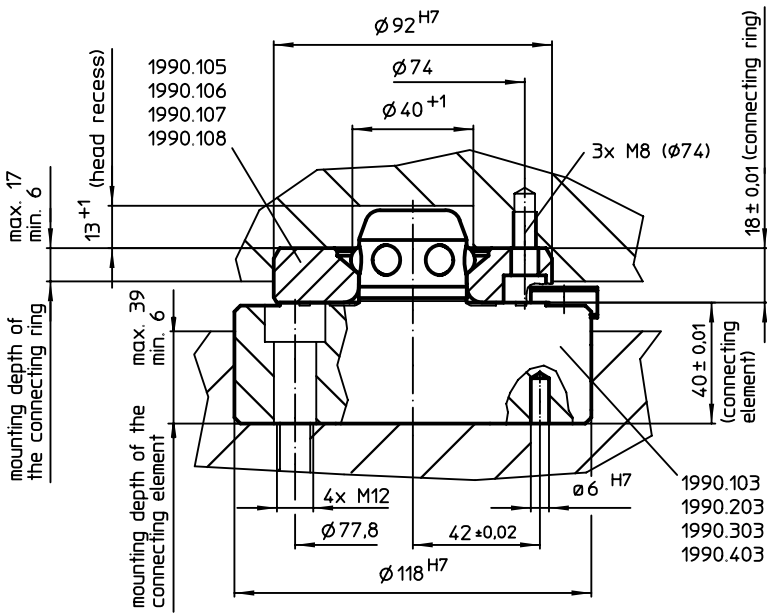
DRAWING



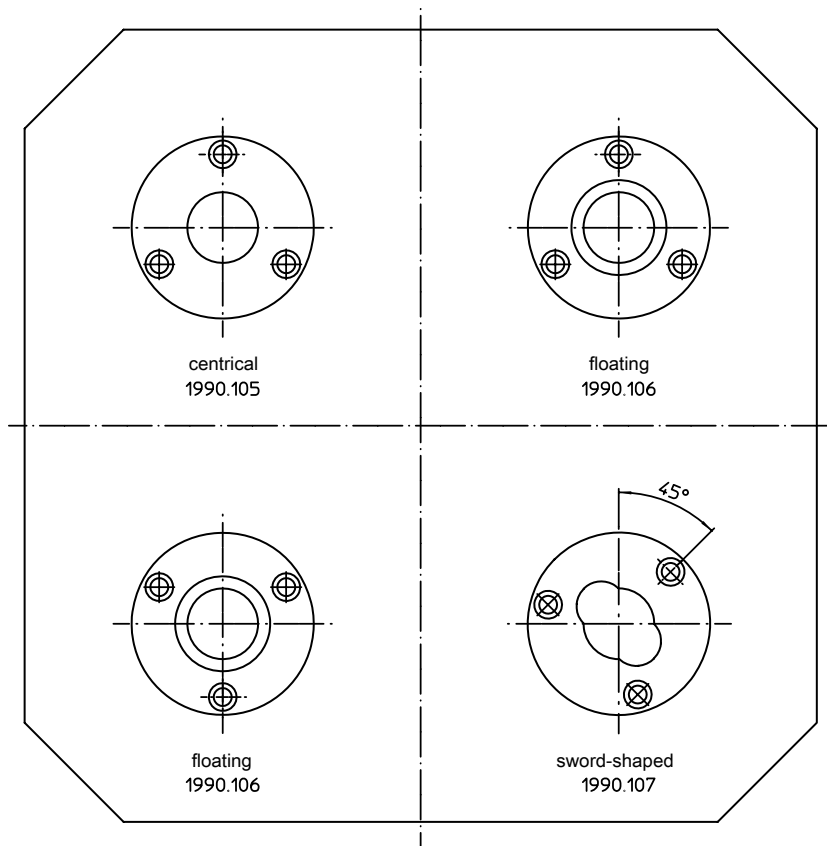
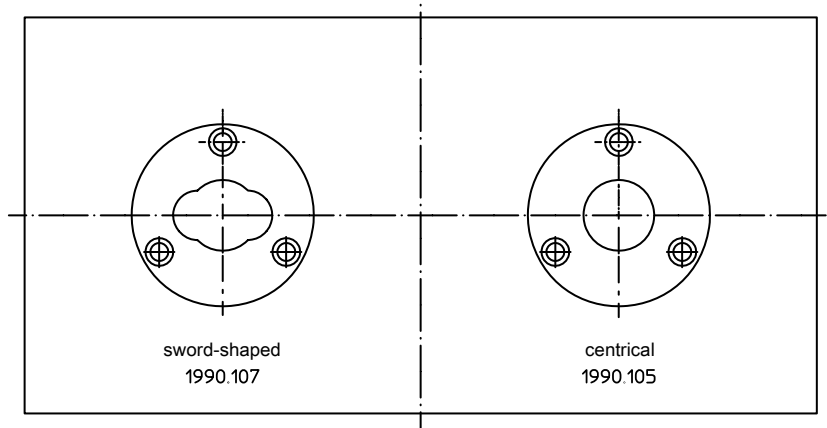
ORDER INFORMATION

	[g]	Art. No.
central	698	1990.105
floating	728	1990.106
sword-shaped	845	1990.107
central, protected against twisting	686	1990.108

APPLICATION EXAMPLE



ASSEMBLY POSITION OF CONNECTING RINGS INDEPENDENT FROM DISTANCE



Base Plates • for 2 connecting elements

EH 1990.



PRODUCT DESCRIPTION

Material

- Aluminium Al

MORE INFORMATION

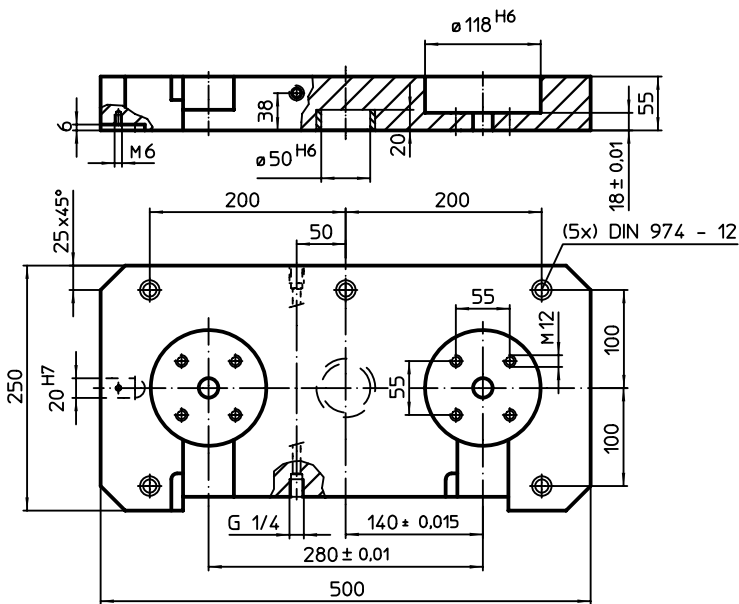
Notes

Special types on request.

Further products

- Connecting Elements, modular, mechanically operated → p. 948
- Connecting Elements, modular, hydraulically operated → p. 949
- Connecting Elements, modular, pneumatically operated → p. 950
- Supporting Plates, with 2 connecting rings → p. 968

DRAWING



ORDER INFORMATION

	Art. No.
[kg]	
14	1990.120

Base Plates • with 2 connecting elements

EH 1990.



PRODUCT DESCRIPTION

Material

Connecting element
 ■ Refer to Art. No. 1990.100-102

Base plate
 ■ Aluminium Al

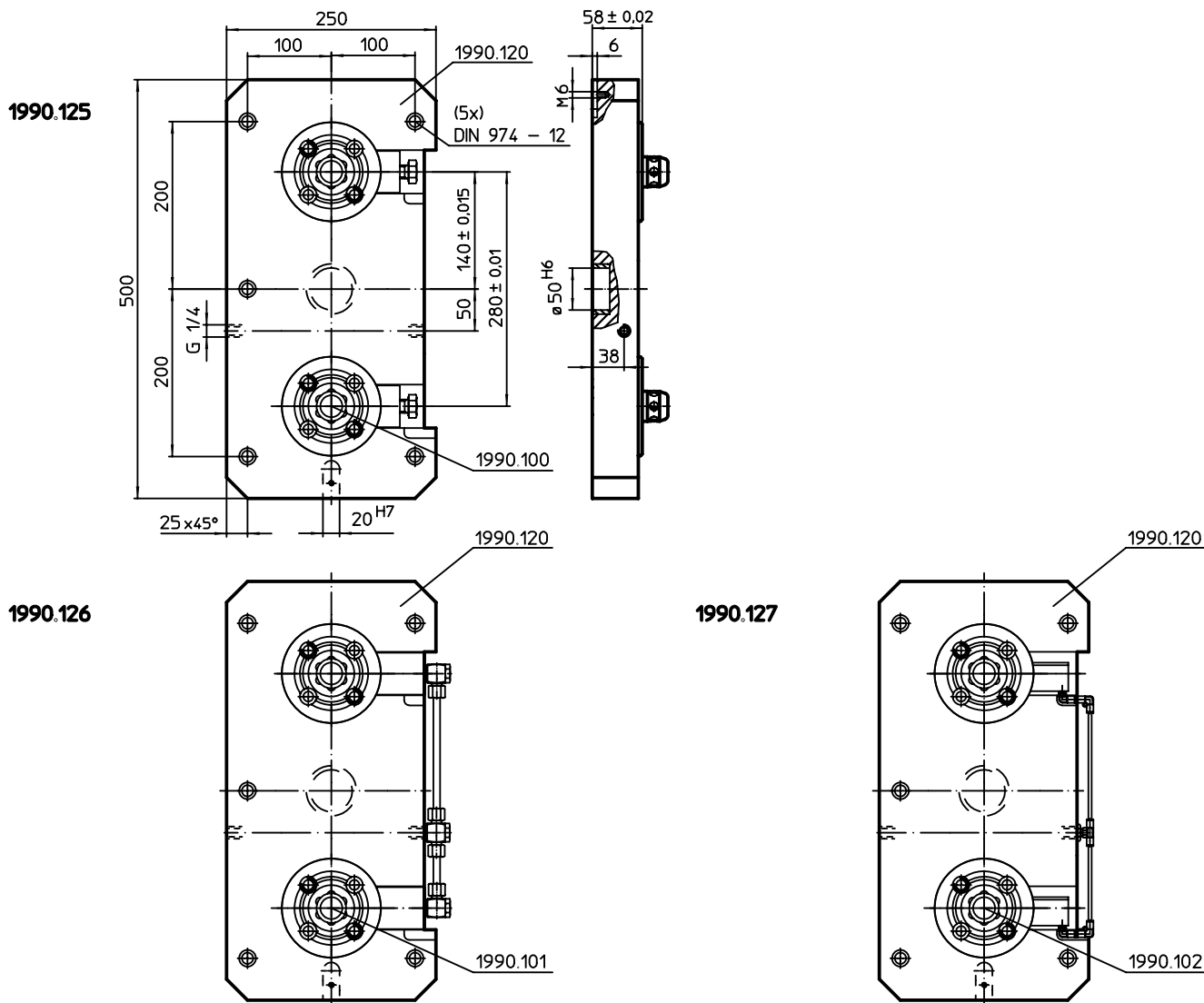
MORE INFORMATION

Notes
 Special types on request.

Further products

- Connecting Elements, modular, mechanically operated → p. 948
- Connecting Elements, modular, hydraulically operated → p. 949
- Connecting Elements, modular, pneumatically operated → p. 950
- Supporting Plates, with 2 connecting rings → p. 968

DRAWING



ORDER INFORMATION

	[kg]	Art. No.
mechanical	16.5	1990.125
hydraulic	17.0	1990.126
pneumatic	16.0	1990.127

Base Plates • for 4 connecting elements

EH 1990.



PRODUCT DESCRIPTION

Material

- Aluminium Al

MORE INFORMATION

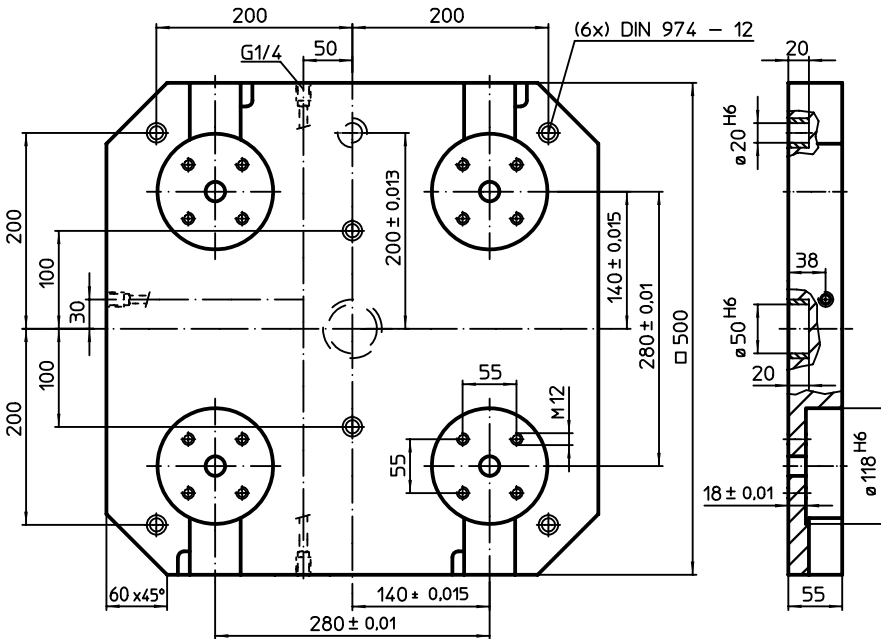
Notes

Special types on request.

Further products

- Connecting Elements, modular, mechanically operated → p. 948
- Connecting Elements, modular, hydraulically operated → p. 949
- Connecting Elements, modular, pneumatically operated → p. 950
- Supporting Plates, with 4 connecting rings → p. 969

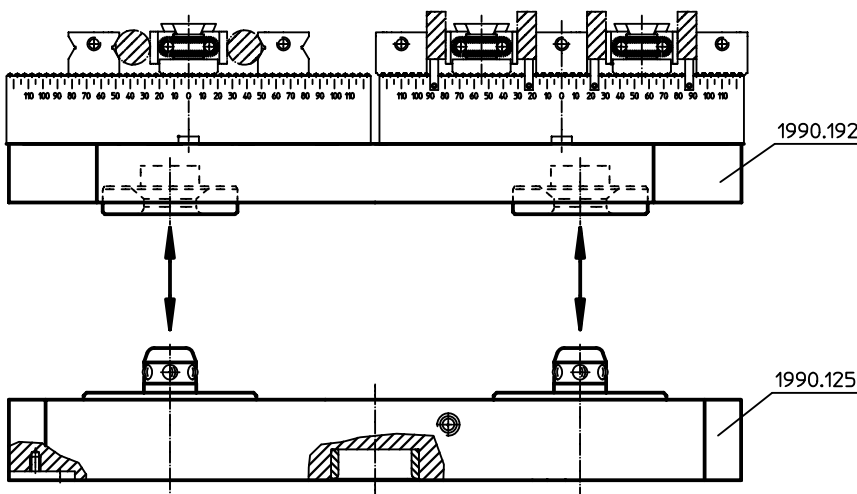
DRAWING



ORDER INFORMATION

[kg]	Art. No.
30	1990.130

APPLICATION EXAMPLE



Base Plates • with 4 connecting elements

EH 1990.



PRODUCT DESCRIPTION

Material

- Connecting element**
 - Refer to Art. No. 1990.100-102

- Base plate**
 - Aluminium Al

MORE INFORMATION

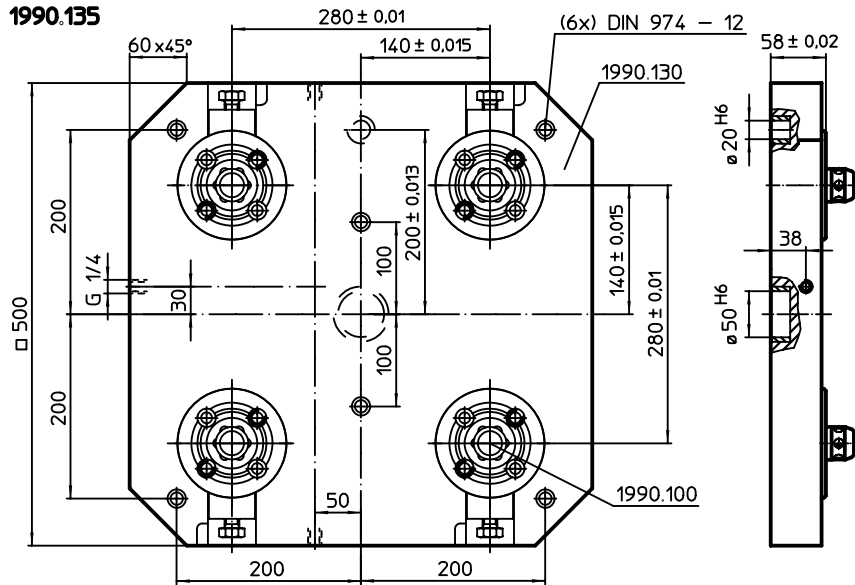
- Notes**
 - Special types on request.

Further products

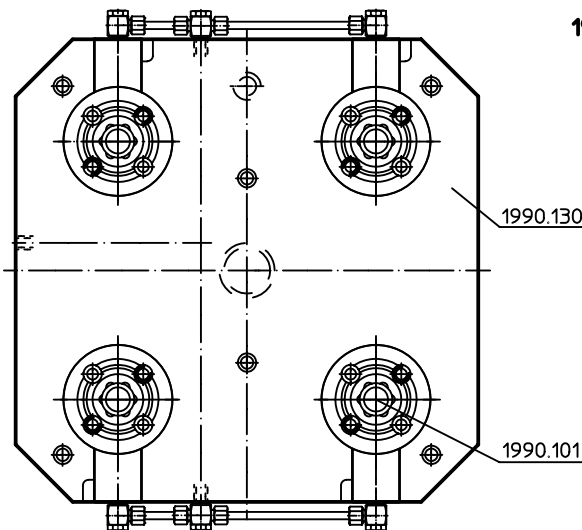
- Connecting Elements, modular, mechanically operated → p. 948
- Connecting Elements, modular, hydraulically operated → p. 949
- Connecting Elements, modular, pneumatically operated → p. 950
- Supporting Plates, with 4 connecting rings → p. 969

DRAWING

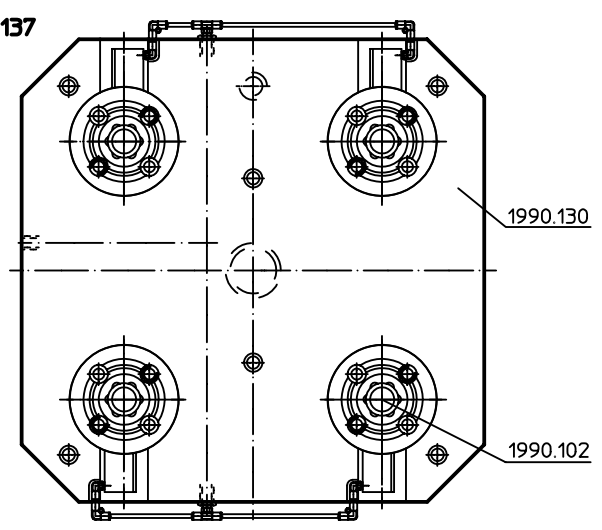
1990.135




1990.136



1990.137



ORDER INFORMATION

	 [kg]	Art. No.
mechanical	44	1990.135
hydraulic	44	1990.136
pneumatic	42	1990.137

Base Plates • for 4 double acting connecting elements

EH 1990.



PRODUCT DESCRIPTION

Material

- Aluminium Al

MORE INFORMATION

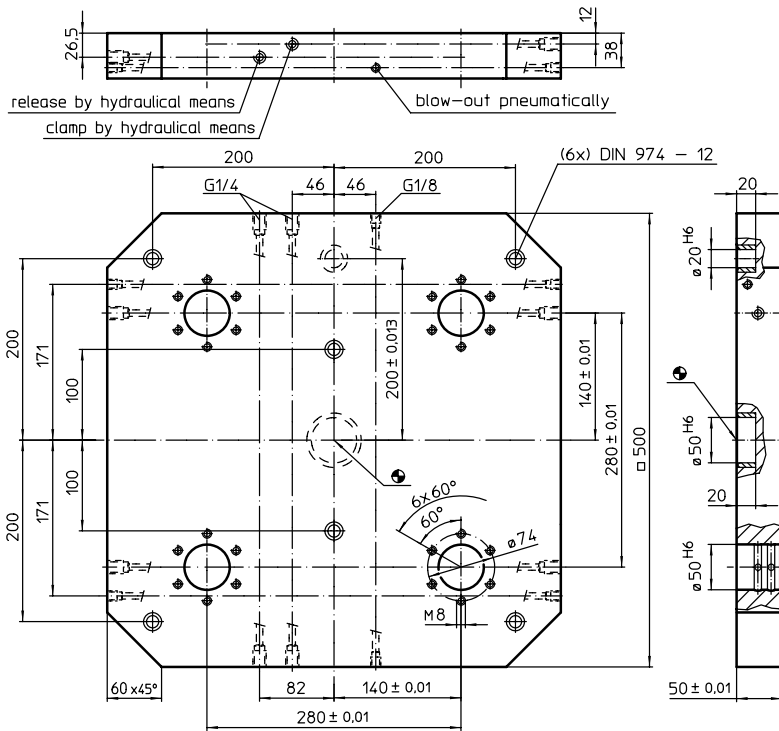
Notes

Special types on request.

Further products

- Connecting Elements, hydraulically operated, double acting, with lifting-off and blow-out → p. 946
- Supporting Plates, with 4 connecting rings → p. 969

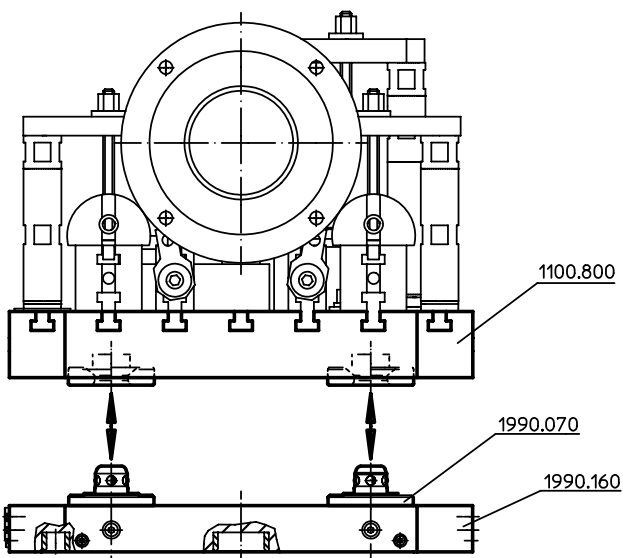
DRAWING



ORDER INFORMATION

[kg]	Art. No.
30	1990.160

APPLICATION EXAMPLE



Base Plates • with 4 double acting connecting elements

EH 1990.



PRODUCT DESCRIPTION

Material

- Connecting element**
 - Steel, case-hardened, ground
- Base plate**
 - Aluminium Al

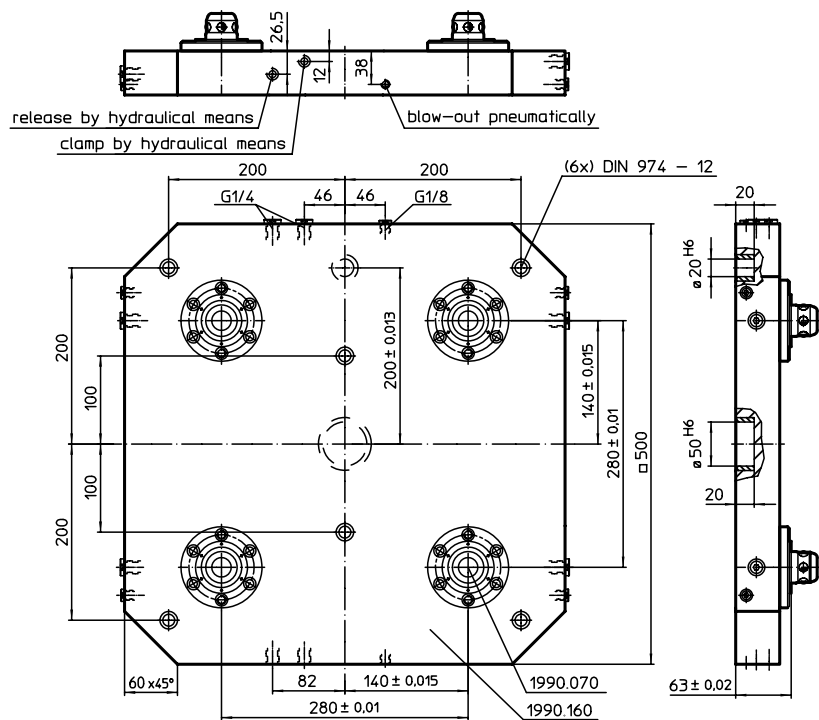
MORE INFORMATION

Notes
Special types on request.


Further products

- Connecting Elements, hydraulically operated, double acting, with lifting-off and blow-out → p. 946
- Supporting Plates, with 4 connecting rings..... → p. 969

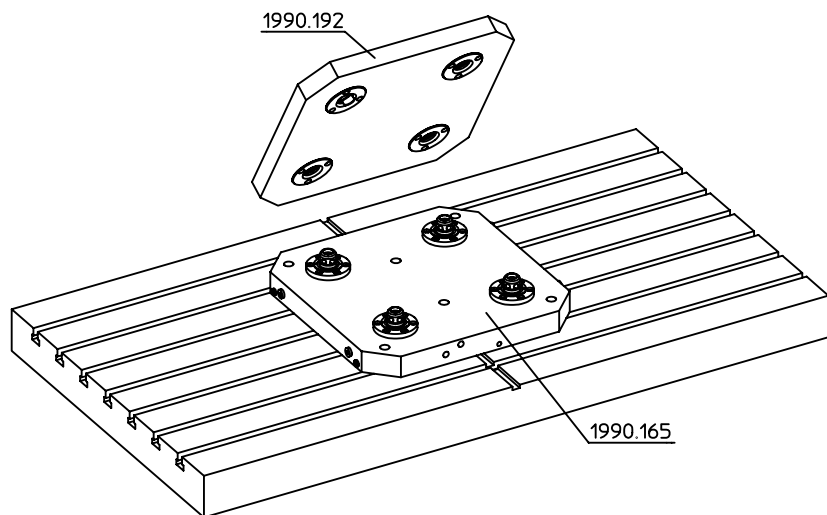
DRAWING



ORDER INFORMATION

 [kg]	Art. No.
35	1990.165

APPLICATION EXAMPLE



Base Plates • for 4 single acting connecting elements

EH 1990.



PRODUCT DESCRIPTION

Material

- Aluminium Al

MORE INFORMATION

Notes

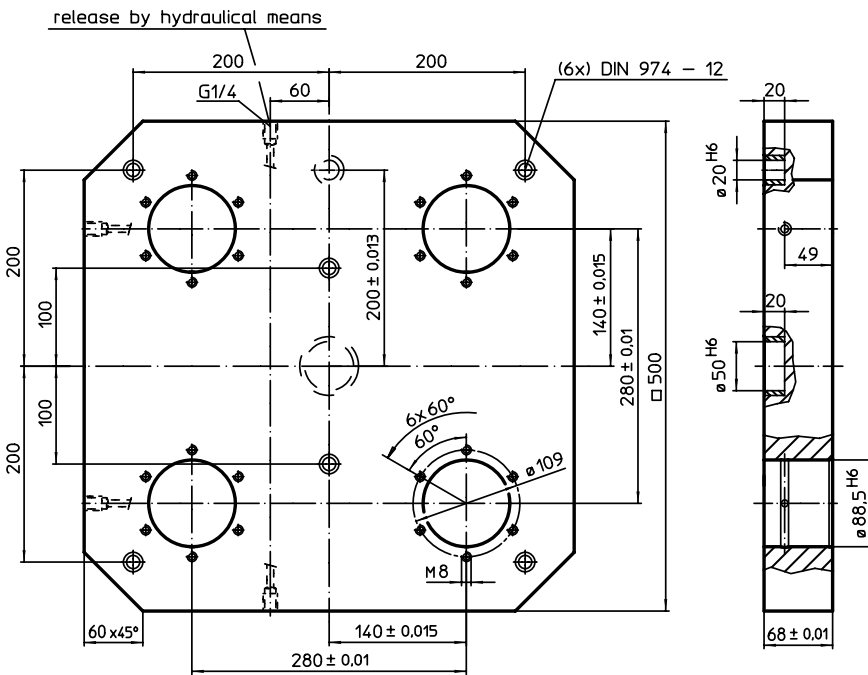
Special types on request.

Further products


Connecting Elements, hydraulically operated, single acting with lifting-off → p. 947

Supporting Plates, with 4 connecting rings..... → p. 969

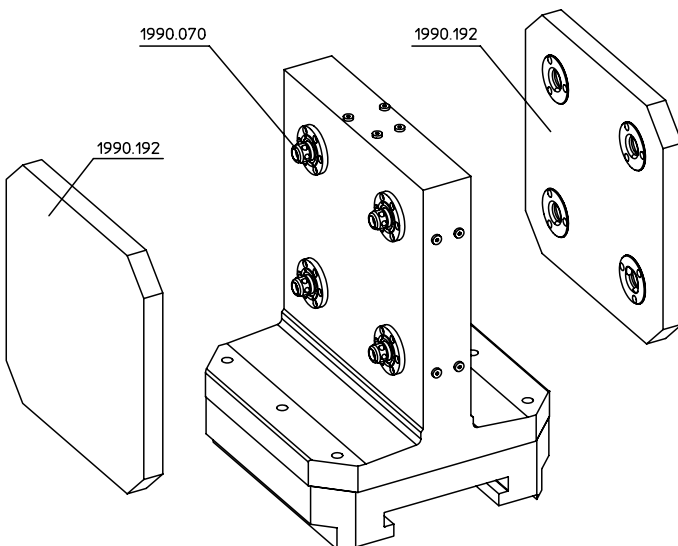
DRAWING



ORDER INFORMATION

 [kg]	Art. No.
35	1990.170

APPLICATION EXAMPLE



Base Plates • with 4 single acting connecting elements

EH 1990.



PRODUCT DESCRIPTION

Material

- Connecting element**
 - Steel, case-hardened, ground

Base plate

- Aluminium Al

MORE INFORMATION

Notes

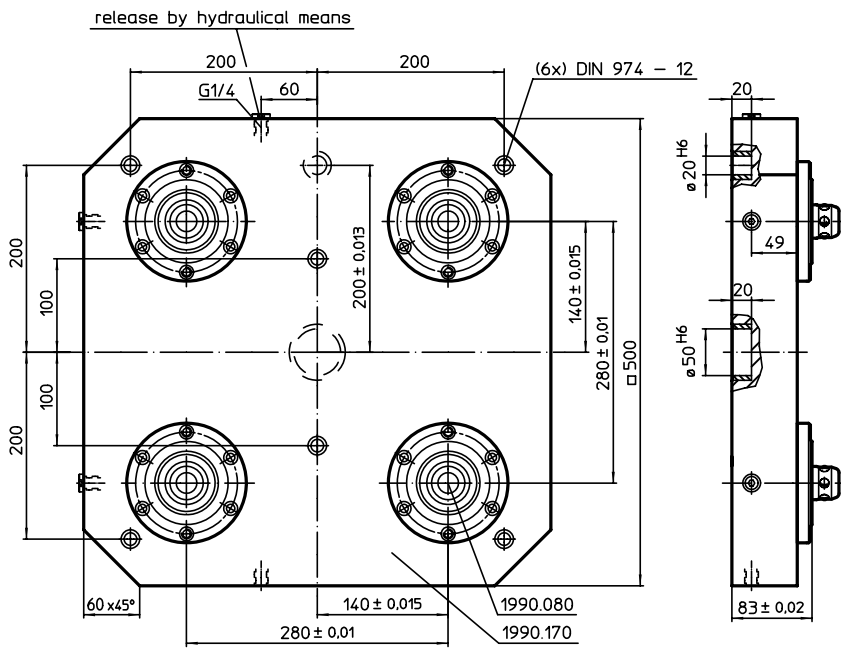
Special types on request.

Further products


Connecting Elements, hydraulically operated, single acting with lifting-off → p. 947

Supporting Plates, with 4 connecting rings → p. 969

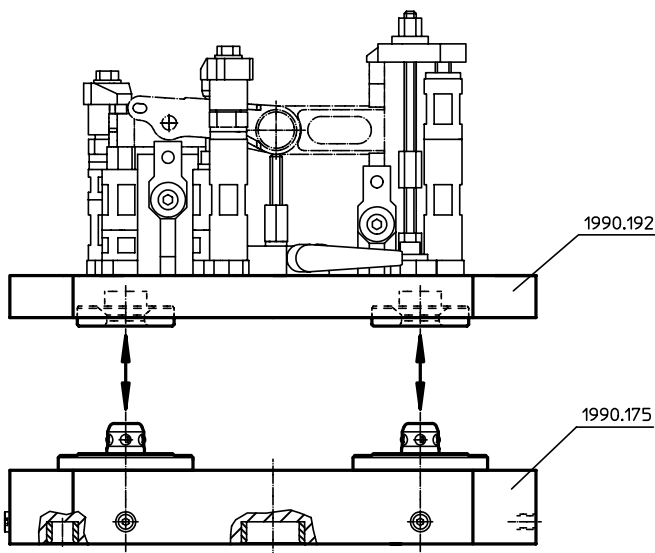
DRAWING



ORDER INFORMATION

 [kg]	Art. No.
50	1990.175

APPLICATION EXAMPLE



Supporting Plates • with 2 connecting rings

EH 1990.



PRODUCT DESCRIPTION

Material

Connecting rings

- Steel, case-hardened, ground

Base plate

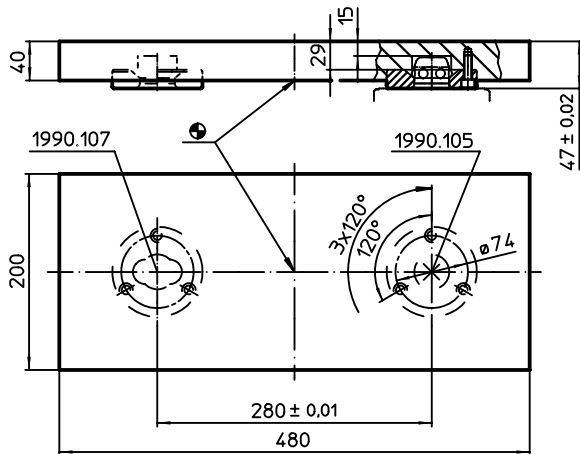
- Aluminium Al

MORE INFORMATION

Notes

Special types on request.

DRAWING



ORDER INFORMATION

[kg]	Art. No.
11	1990.190

Supporting Plates • with 4 connecting rings

EH 1990.



PRODUCT DESCRIPTION

Material

Connecting rings

- Steel, case-hardened, ground

Base plate

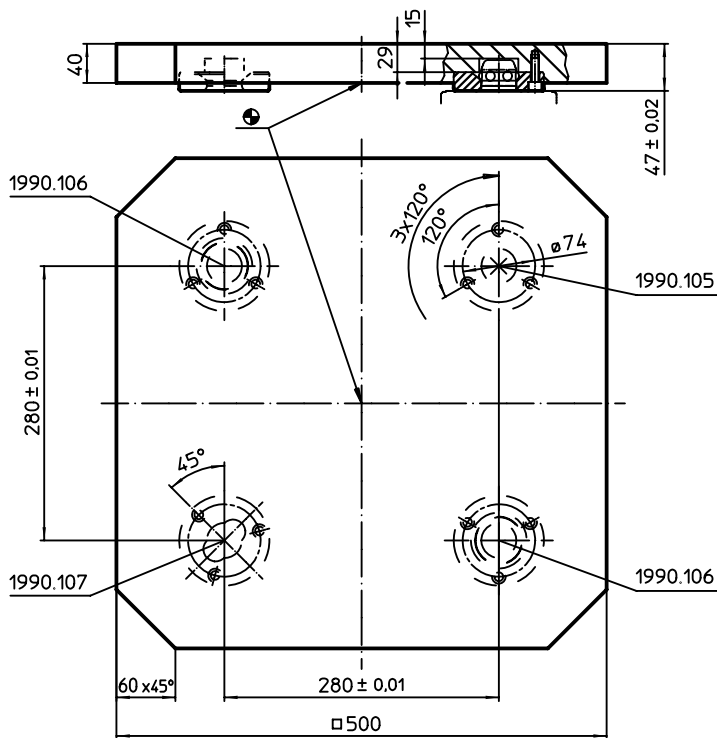
- Aluminium Al

MORE INFORMATION


Notes

Special types on request.

DRAWING



ORDER INFORMATION

 [kg]	Art. No.
27	1990.192

Coverings • for connecting elements

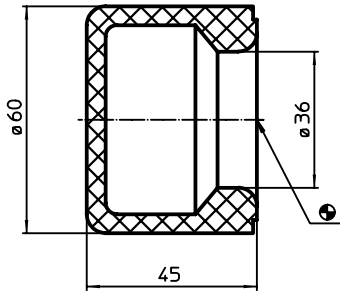
EH 1990.



PRODUCT DESCRIPTION

- Material**
- Plastic

DRAWING



ORDER INFORMATION

	Art. No.
 [g] 84	1990.114

APPLICATION SAMPLE

EH 1990.080 CLAMPING ELEMENT, HYDRAULICALLY OPERATED, SINGLE ACTING WITH LIFT-OFF

This sample shows the application of a zero-point clamping system on a machine center.

PICTURE 1

The base plate with the clamped workpiece is being put onto the zero-point clamping system by means of a crane.

Example

Multifunctional base plate with 9 clamping elements for the use of different supporting plates, i.e. with 2, 3 or 4 clamping rings.

PICTURE 2

Easy insertion of the base plate due to:

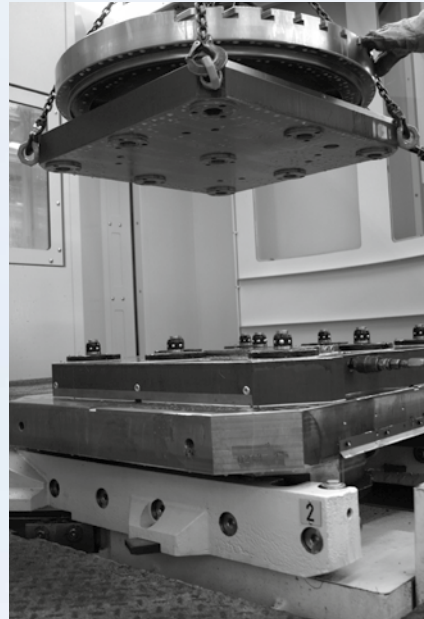
- Alignment by means of a critical taper on both the base plate and the counter piece, i.e. clamping ring.
- Base plate is supported by a retractable rest pad, plate is lowered 5 mm into position (when releasing, the base plate will be re-lifted by 5 mm).

Lowering, centering and clamping is achieved simultaneously by releasing the hydraulic pressure.

PICTURE 3

The workpiece is now ready for machining.

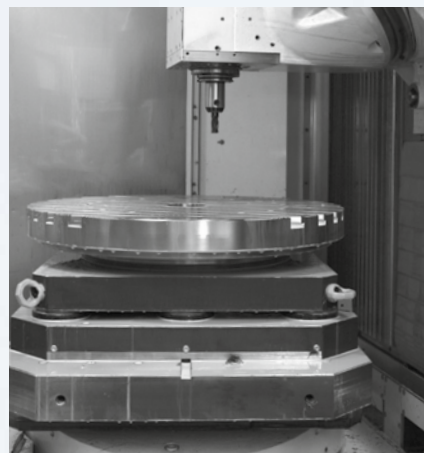
1.



2.



3.



Product group	Page
Units	974
ISO Fittings and Tolerances	975
Torques	977
Thread Lockings	979



UNITS

CONVERSION TABLE

Dimensions		
Inch (in)	in millimetres (mm)	$\text{in} \times 25,4 = \text{mm}$
Millimetres (mm)	in inches (in)	$\text{mm} \times 0,03937 = \text{in}$
Weight/force		
Ounces (oz)	in grammes (g)	$\text{oz} \times 28 = \text{g}$
Grammes (g)	in ounces (oz)	$\text{g} \times 0,3527 = \text{oz}$
Pounds (lbs)	in kilogrammes (kg)	$\text{lbs} \times 0,4536 = \text{kg}$
Kilogrammes (kg)	in pounds (lbs)	$\text{kg} \times 2,205 = \text{lbs}$
Kilogrammes (kg)	in Newton (N)	$\text{kg} \times 9,81 = \text{N}$
Newton (N)	in kilogrammes (kg)	$\text{N} / 9,81 = \text{kg}$
Temperature		
Degree Fahrenheit (°F)	in degree Celsius (°C)	$(\text{°F} - 32) \times 5/9 = \text{°C}$
Degree Celsius (°C)	in degree Fahrenheit (°F)	$\text{°C} \times 9/5 + 32 = \text{°F}$
Torque		
Foot-pounds (ft-lbs)	in Newton metres (Nm)	$\text{ft/lbs} \times 1,35 = \text{Nm}$
Newton metres (Nm)	in foot pounds (ft-lbs)	$\text{Nm} \times 0,74 = \text{ft/lbs}$

ISO FITS

ISO 286-2 (DIN 7154 AND DIN 7155)

Values in µm

Range of nominal sizes in mm

Tolerance zone	H6	H7	H8	H9	H11	H12	H13	F7	F6	E9	D12	C13	JS12	h5	g5	g6	k6	n6	h6	f7	f8	h8	h9	h11	h13
from 1 to 3	+6 0	+10 0	+14 0	+25 0	+60 0	+100 0	+140 0	+16 +6	+12 +6	+39 14	+120 20	+200 +60	+50 -50	0 -4	-2 -6	-2 -8	+6 0	+10 +4	0 -6	-6 -16	-6 -20	0 -14	0 -25	0 -60	0 -140
over 3 to 6	+8 0	+12 0	+18 0	+30 0	+75 0	+120 0	+180 0	+22 +10	+18 +10	+50 +20	+150 +30	+250 +70	+60 -60	0 -5	-4 -9	-4 -12	+9 1	+16 +8	0 -8	-10 -22	-10 -28	0 -18	0 -30	0 -75	0 -180
over 6 to 10	+9 0	+15 0	+22 0	+36 0	+90 0	+150 0	+220 0	+28 +13	+22 +13	+61 +25	+190 +40	+300 +80	+75 -75	0 -6	-5 -11	-5 -14	+10 +1	+19 +10	0 -9	-13 -28	-13 -35	0 -22	0 -36	0 -90	0 -220
over 10 to 18	+11 0	+18 0	+27 0	+43 0	+110 0	+180 0	+270 0	+34 +16	+27 +16	+75 +32	+230 +50	+365 +95	+90 -90	0 -8	-6 -14	-6 -17	+12 +1	+23 +12	0 -11	-16 -34	-16 -43	0 -27	0 -43	0 -110	0 -270
over 18 to 30	+13 0	+21 0	+33 0	+52 0	+130 0	+210 0	+320 0	+41 +20	+33 +20	+92 +40	+275 +65	+440 +110	+105 -105	0 -9	-7 -16	-7 -20	+15 +2	+28 +15	0 -13	-20 -41	-20 -53	0 -33	0 -52	0 -130	0 -330
over 30 to 40	+16 0	+25 0	+39 0	+62 0	+160 0	+250 0	+390 0	+50 +25	+41 +25	+112 +50	+330 +80	+510 +120	+125 -125	0 -11	-9 -20	-9 -25	+18 +2	+33 +17	0 -16	-25 -50	-25 -64	0 -39	0 -62	0 -160	0 -390
over 40 to 50	+16 0	+25 0	+39 0	+62 0	+160 0	+250 0	+390 0	+50 +25	+49 +30	+112 +50	+330 +80	+520 +130	+125 -125	0 -11	-9 -20	-9 -25	+18 +2	+33 +17	0 -16	-25 -50	-25 -64	0 -39	0 -62	0 -160	0 -390
over 50 to 65	+19 0	+30 0	+46 0	+74 0	+190 0	+300 0	+460 0	+60 +30	+49 +30	+134 +60	+400 +100	+600 +140	+150 -150	0 -13	-10 -23	-10 -29	+21 +2	+39 +20	0 -19	-30 -60	-30 -76	0 -46	0 -74	0 -190	0 -460
over 65 to 80	+19 0	+30 0	+46 0	+74 0	+190 0	+300 0	+460 0	+60 +30	+58 +36	+134 +60	+400 +100	+690 +150	+150 -150	0 -13	-10 -23	-10 -29	+21 +2	+39 +20	0 -19	-30 -60	-30 -76	0 -46	0 -74	0 -190	0 -460
over 80 to 100	+22 0	+35 0	+54 0	+87 0	+220 0	+350 0	+540 0	+71 +36	+58 +36	+159 +72	+470 -120	+710 +170	+175 -175	0 -15	-12 -27	-12 -34	+25 +3	+45 +23	0 -22	-36 -71	-36 -90	0 -54	0 -87	0 -220	0 -540
over 100 to 120	+22 0	+35 0	+54 0	+87 0	+220 0	+350 0	+540 0	+71 +36	+58 +36	+159 +72	+470 -120	+720 +180	+175 -175	0 -15	-12 -27	-12 -34	+25 +3	+45 +23	0 -22	-36 -71	-36 -90	0 -54	0 -87	0 -220	0 -540

GENERAL TOLERANCES

DIN ISO 2768, PART 1

Table 1. Limit deviations for linear sizes with the exception of cut-off edges (for radius of curvature and chamfer heights, please refer to table 2)

Values in mm

Tolerance class		Limit deviations for ranges of nominal sizes							
Symbol	Designation	von 0,5* to 3	over 3 to 6	over 6 to 30	over 30 to 120	over 120 to 400	over 400 to 1000	over 1000 to 2000	over 2000 to 4000
f	fine	± 0,05	± 0,05	± 0,1	± 0,15	± 0,2	± 0,3	± 0,5	–
m	medium	± 0,1	± 0,1	± 0,2	± 0,3	± 0,5	± 0,8	± 1,2	± 2
c	coarse	± 0,2	± 0,3	± 0,5	± 0,8	± 1,2	± 2	± 3	± 4
v	very coarse	–	± 0,5	± 1	± 1,5	± 2,5	± 4	± 6	± 8

*For nominal sizes below 0.5 mm, the limit deviations are to be indicated directly on the relevant nominal size(s).

Table 2. Limit deviations for cut-off edges (radius of curvature and chamfer heights)

Values in mm

Tolerance class		Limit deviations for ranges of nominal sizes		
Symbol	Designation	over 0,5* to 3	over 3 to 6	over 6 to 30
f	fine	± 0,2	± 0,5	± 1
m	medium	± 0,2	± 0,5	± 1
c	coarse	± 0,4	± 1	± 2
v	very coarse	± 0,4	± 1	± 2

*For nominal sizes below 0.5 mm, the limit deviations are to be indicated directly on the relevant nominal size(s).

Table 3. Limit deviations for angular dimensions

Values in mm

Tolerance class		Limit deviations for linear ranges, expressed in mm, for the shorter leg of relevant angle				
Symbol	Designation	to 10	over 10 to 50	over 50 to 120	over 120 to 400	over 400
f	fine	± 1°	± 0° 30'	± 0° 20'	± 0° 10'	± 0° 5'
m	medium	± 1°	± 0° 30'	± 0° 20'	± 0° 10'	± 0° 5'
c	coarse	± 1° 30'	± 1°	± 0° 30'	± 0° 15'	± 0° 10'
v	very coarse	± 3°	± 2°	± 1°	± 0° 30'	± 0° 20'

DIN ISO 2768, PART 2

Table 1. General tolerances for straightness and evenness

Values in mm

Tolerance class	General tolerances for straightness and evenness for ranges of nominal sizes					
	to 10	over 10 to 30	over 30 to 100	over 100 to 300	over 300 to 1000	over 1000 to 3000
H	0,02	0,05	0,1	0,2	0,3	0,4
K	0,05	0,1	0,2	0,4	0,6	0,8
L	0,1	0,2	0,4	0,8	1,2	1,6

Table 2. General tolerances for perpendicularity

Values in mm

Tolerance class	Perpendicularity tolerances for ranges of nominal sizes for the shorter leg of the angle			
	to 100	over 100 to 300	over 300 to 1000	over 1000 to 3000
H	0,2	0,3	0,4	0,5
K	0,4	0,6	0,8	1
L	0,6	1	1,5	2

Table 3. General tolerances for symmetry

Values in mm

Tolerance class	Symmetry tolerances for ranges of nominal sizes			
	up to 100	over 100 to 300	over 300 to 1000	over 1000 to 3000
H	0,05	0,05	0,05	0,05
K	0,6	0,6	0,8	1
L	0,6	1	1,5	2

SHAPE AND POSITIONING TOLERANCE

for all Halder jig and fixture systems (except V70eco)

Positioning tolerance: 0 – 250 mm \pm 0,015Parallelism: 0 – 200 mm \pm 0,015Angle precision: 0 – 200 mm \pm 0,015

ARTICLE BASED TORQUES

(NOT VALID FOR STAINLESS STEEL)



EH 23070.
Fixture Nuts
DIN 6330
Quality 10



EH 23080.
Collar Nuts
with collar DIN 6331
Quality 10



EH 23080.
Collar Nuts
with ball seat



EH 23090.
Extension Nuts
Quality 10

Thread		M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30	M36	M42	M48
Pitch (mm)		1	1,25	1,50	1,75	2	2	2,50	2,50	2,50	3	3	3,50	4	4,50	5
Nuts	Strength Class															
Hardness (HRC) DIN 6330/6331	10	22-32														
Test force (kN) DIN EN 20898-2	10	20,9	38,1	60	88	121	165	203	260	321	374	486	595	866	-	-



EH 23030.
T-Bolts
DIN 787
Up to M12 Quality 10.9
From M14 Quality 8.8



EH 23040.
Studs for T-Nuts
DIN 6379
Up to M12 Quality 10.9
From M14 Quality 8.8



EH 22980.
Swing Bolts
DIN 444
Quality 8.8

Thread		M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30	M36	M42	M48
Pitch (mm)		1	1,25	1,5	1,75	2	2	2,50	2,50	2,50	3	3	3,50	4	4,50	5
Nuts	Strength Class															
Permissible prestressing force with 90 % utilization yield point and friction $\mu = 0,14$	8.8 10.9	9 13	17 25	26 38	38 55	53 77	73 107	91 130	117 167	146 208	168 240	221 315	269 284	394 561	542 773	714 1018
Required tightening moment of permissible prestressing force and friction $\mu = 0,14$	8.8 10.9	10 14	25 36	46 67	82 120	130 191	206 302	284 405	407 580	542 772	698 994	1021 1455	1355 1930	2372 3378	3802 5415	5730 8162

GENERAL TORQUES STRENGTHS FOR SCREWED CONNECTIONS

Thread		M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30	M36	M42	M48	
Pitch (mm)		1	1,25	1,50	1,75	2	2	2,50	2,50	3	3	3,50	4	4,50	5		
Nuts	Strength Class																
Hardness (HRC) DIN 6330/6331	10	22–32															
Test force (kN) ($A_s \times S_p$) DIN EN 20898-2	10	20,9	38,1	60	88	121	165	203	260	321	374	486	595	866	–	–	
Screws																	
Hardness (HRC)	8.8	22–32									23–24						
	10.9	32–39															
	12.9	39–44															
Tightening values																	
Specified failing load ($A_s \times R_m$) (kN)	8.8	16	29	46	67	92	125	159	203	252	293	381	466	678	930	1222	
	10.9	21	38	60	88	120	163	200	255	315	367	477	583	850	1165	1531	
	12.9	24	45	71	103	140	192	234	299	370	431	560	684	997	1367	1797	
Permissible load on screws max. 80 % of yield point	8.8	10	19	30	43	59	80	101	129	160	186	242	296	431	591	777	
	10.9	14	27	43	63	86	118	144	184	228	265	345	421	614	843	1107	
	12.9	17	32	51	74	101	138	169	215	266	310	404	493	719	986	1296	
Test force ($A_s \times S_p$) acc. to DIN ISO 898, part 1 (kN)	8.8	12	21	34	49	67	91	115	147	182	212	275	337	490	672	882	
	10.9	17	30	48	70	96	130	159	203	252	293	381	466	678	930	1222	
	12.9	20	35	56	82	112	152	186	238	294	342	445	544	792	1087	1428	
Permissible prestressing force with 90 % utilization yield point and friction $\mu = 0,14$ (kN)	8.8	9	17	26	38	53	73	91	117	146	168	221	269	394	542	714	
	10.9	13	25	38	55	77	107	130	167	208	240	315	384	561	773	1018	
	12.9	15	29	44	65	91	125	152	196	243	281	369	449	657	904	1191	
Required tightening moment for permissible prestressing force and $\mu = 0,14$ (Nm)	8.8	10	25	46	82	130	206	284	407	542	698	1021	1355	2372	3802	5730	
	10.9	14	36	67	120	191	302	405	580	772	994	1455	1930	3378	5415	8162	
	12.9	17	43	79	141	223	354	474	679	903	1163	1703	2258	3953	6337	9571	
Required lever length to obtain the permissible prestressing force with normal manual force (mm)	8.8	30	65	125	215	330	490	650	870	1100	1350	–	–	–	–	–	
	10.9	42	90	175	300	450	700	920	1200	1560	–	–	–	–	–	–	
	12.9	51	110	210	360	550	830	1100	1470	1860	–	–	–	–	–	–	
Possible torque with normal ring spanner and torsional force. *Presstressing force resulting thereof	Nm	–	60	80	90	100	110	125	140	150	170	185	225	240	300	330	410
	kN	–	54	53	48	45	43	43	43	42	42	43	45	43	45	46	50
	8.8	breaking (B)			yielding hazard (F)		danger of a loosening of clamped parts on application of operational force										
* When applying this prestressing force, there exists a	10.9	(B)		(F)		danger of a loosening of clamped parts on application of operational force											
	12.9	(B)		(F)		danger of a loosening of clamped parts on application of operational force											

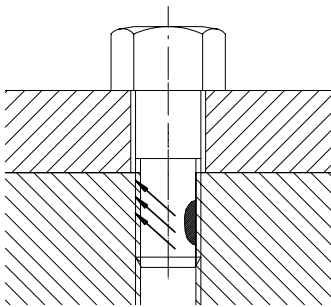
A_s = nominal load cross section in mm^2 / S_p = test load in N/mm^2 / R_m = minimum tensile strength N/mm^2 / μ = coefficient of friction

POLYAMIDE THREAD LOCKINGS

POLYAMIDE SPOT COATING AND ALL-AROUND COATING IN COMPLIANCE WITH THE REQUIREMENTS OF DIN 267, PART 28

Description

Polyamide spot coating is a plastics material which is applied onto a part of a thread and which develops a clamping effect when screwed in. The axial play existing between the screw thread and the nut thread is filled up by the Polyamide material. Thus, a high surface pressure between the opposing uncoated flanks of the threads is achieved. This connection prevents a loosening of the threaded parts when subject to dynamic load.



Polyamide spot coating is a favourably priced method of counteracting a self-loosening and self-releasing of screws and threaded parts. By applying Polyamide spot coating, a connection is created which can be released at any time while maintaining its locking effect even after a repeated insertion or removal of the screw.

Field of application M 3 - M 16

Polyamide spot coating can be applied onto screws and threaded pins made of steel or stainless steel. This method is suitable for galvanic as well as organic/ anorganic surface treatments.

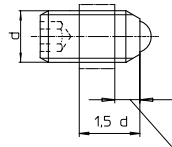
Dimensions and designation

Clamping thread lockings include all-around coatings, spot coatings and strip coatings.

Standard version - DIN 267, part 28

If not specified otherwise, the coating is located within a linear range of $1,5 \times d \pm 2 P$ for $P < 1$ and $1,5 \times d \pm P$ for $P \geq 1$

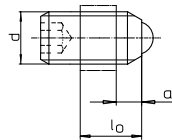
measured from the tip of the screw. The first 2 or 3 threads remain uncoated in order to facilitate the screwing-in procedure.



2 to 3 thread turns almost free from coating
 d = nominal diameter
 P = thread lead

Versions with coating in special length or in special place

The measurements l_0 and a must be stated in your order.



l_0 = length of coating
 a = position of coating from screw end
 P = thread lead

For l_0 and a , the tolerances $\pm 2 P$ when $P < 1$ and $\pm P$ when $P \geq 1$ apply.

Properties

- Reusable (up to 5 times).
- Temperature-resistant from $- 50^\circ \text{C}$ up to $+ 90^\circ \text{C}$, for short intervals up to $+ 120^\circ \text{C}$.
- Unlimited shelf life.
- The screw and the locking element form a unity.
- Forgetting to apply the locking element does not happen any more.
- Mounting aid (red or blue colour).
- Can be inserted immediately - no cure time.
- Resistant against almost all aggressive substances (documentation can be made available on request).
- Polyamide spot coating can be adapted to suit specific requirements.



In conformity with DIN 267, part 28

Thread	Test tightening moment M_A^*		Screw-in torque	Clamping torque	
	Nm	Nm		Nm	Nm
*Determined on the basis of a total coefficient of friction $f = 0,12$ with a 90% utilization of the minimum values for the yield point or the tensile yield strength of the respective lowest strength class.	5,6	8,8	1. screw. in	1. screw. out	3. screw. out
	5,8	10,9	M_{in}	M_{out}	M_{out}
	6,8	12,9	max.	min.	min.
M3	0,6	1,2	0,43	0,10	0,08
M4	1,4	2,8	0,90	0,12	0,10
M5	2,6	5,5	1,60	0,18	0,15
M6	4,5	9,5	3,00	0,35	0,23
M8 - M8 x 1	11,0	23,0	6,00	0,85	0,45
M10 - M10 x 1,25	22,0	46,0	10,50	1,50	0,75
M12 - M12 x 1,25					
M12 - M12 x 1,5	38,0	79,0	15,50	2,30	1,60
M14 - M14 x 1,5	60,0	125,0	24,00	3,30	2,30
M16 - M16 x 1,5	90,0	195,0	32,00	4,00	2,80

Requirements applicable to screwed joints with prestressing.

For spring plungers

Thread	Inch UNC/UNF	Screwing-/clamping turning moment
		Nm $M_{in} \text{ max.} / M_{out} \text{ max.}$
M3	4-48	0,3
	5-40	
	6-32	
	6-40	
M4	8-32	0,5
	8-36	
M5	10-32	0,6
M6	1/4-20	1,2
	1/4-28	
M8	5/16-18	2
M10	3/8-16	3,5
M12	1/2-13	5
M16	5/8-11	7
M20	3/4-10	10
M24	1-8	12

MICRO-ENCAPSULATED THREAD LOCKINGS

MICRO-ENCAPSULATED ADHESIVES FOR LOCKING AND SEALING IN COMPLIANCE WITH THE REQUIREMENTS OF DIN 267, PART 27

Micro-encapsulated systems maintain their strength for a period of approx. 4 years when stored under normal conditions in a dry climate at temperatures between 20 °C and 25 °C without major fluctuations.

PRECOTE® 80

Based on the system of Omni-Technik, preCOTE is a liquid plastics material including a hardening agent both of which are encapsulated into a thin polymer layer and embedded into a lacquer-type carrier system. PreCOTE is applied onto the Thread of screws yielding a dry and non-tacky safety coating which is ready for use at any time.

FUNCTION

On assembly of Threaded parts which are coated with preCOTE material, the micro capsules are ruptured by pressure and/or shearing force. During this, the liquid plastics material and the hardening agent are set free and mixed with each other thus initiating a chemical reaction (polymerization). Due to the curing of the adhesive, a locking effect as well as an additional sealing effect is created.

Product	OT preCOTE 80
Product colour	red
Temperature range	x _i - 50 °C up to + 170 °C
Thread friction coefficient μ Thread	0,26 – 0,28
Function	high-strength universal screw locking

PROPERTIES

The cured preCOTE material serves as a locking element for joints even when subject to highest dynamic transverse stress. This means that a loss of prestressing exceeding the settling rate will not occur. The settling rate depends on the material to be clamped and its surface roughness. Besides, a corrosion within threaded assemblies is avoided. Mounting is performed according to almost the same procedures as with uncoated mating threads. Only the friction coefficient of the thread may be increased in some cases and therefore has to be compensated for by a correction of the tightening torque. Threaded joints which are locked and sealed with preCOTE material can be released without any damage being done to the threads using normal hand tools.

CURING

Curing will be initiated approx. 10 -15 minutes after mounting. Curing will be fully completed after 24 hours, however, it can be accelerated by temperature exposure.



Test without prestressing

Test torques at room temperature

Threads*	Torques in Nm		
	M _{in} max.	M _{out} min.	M _{out} max.
M 5	1	1	6,5
M 6	1,5	1,8	10
M 8 M 8 x 1	3	4	26
M 10 M 10 x 1,25	5,5	10	55
M 12 M 12 x 1,25 · M 12 x 1,5	7,5	16	95
M 14 M 14 x 1,5	11	22	160
M 16 M 16 x 1,5	14	35	250
M 18 M 18 x 1,5 · M 18 x 2	19	40	335
M 20 M 20 x 1,5 · M 20 x 2	22	45	500
M 22 M 22 x 1,5 · M 22 x 2	30	65	800
M 24 M 24 x 2	36	90	1050
M 27 M 27 x 2	42	120	1300
M 30 M 30 x 2	49	165	1700
M 33 M 33 x 2	55	210	2400
M 36 M 36 x 2	60	280	3000
M 39 M 39 x 2	70	330	4000

Requirements applicable to threaded joints without prestressing with test nut. Tolerance of thread 6 H.

*For nominal thread diameters < 5 mm and > 39 mm the testing torques have to be agreed upon between the supplier and the purchaser.

DIN overview

DIN parts	Description	Group	Page
DIN 39	Machine Handles, DIN 39	EH 24450.	623
DIN 98	Rotating Machine Handles, DIN 98	EH 24460.	624
DIN 99	Tapered Levers, DIN 99	EH 24470.	620
DIN 172	Positioning Bushings, with collar, DIN 172 A	EH 23112.	424
DIN 179	Positioning Bushings, without collar, DIN 179 A	EH 23112.	427
DIN 319	Ball Knobs, DIN 319	EH 24560.	643
DIN 319	Ball Knobs, metal types similar to DIN 319	EH 24561.	644
DIN 444	Swing Bolts, DIN 444, form B	EH 22980.	375
DIN 444	Swing Bolts, DIN 444, form B, quality 8.8 high precision design	EH 22980.	376
DIN 464	High Knurled Thumb Screws, DIN 464	EH 24790.	631
DIN 466	High Knurled Nuts (with Collar), DIN 466	EH 24780.	630
DIN 467	Flat Knurled Nuts, DIN 467	EH 24760.	628
DIN 468	Crank Handles, DIN 468 goose-neck form with square end DIN 79	EH 24330.	592
DIN 469	Crank Handles, DIN 469 straight with square end DIN 79	EH 24330.	591
DIN 508	Nuts for T-Slots, DIN 508	EH 23010.	384
DIN 508	Nuts for T-Slots, DIN 508, semi-finished	EH 23010.	386
DIN 508	Nuts for T-Slots, DIN 508 with antislipping device	EH 23010.	387
DIN 508	Nuts for T-Slots, DIN 508	EH 23010.	848
DIN 653	Flat Knurled Thumb Screws, DIN 653	EH 24770.	629
DIN 787	T-Bolts, DIN 787	EH 23030.	391
DIN 950	Handwheels, DIN 950 grey cast iron	EH 24580.	677
DIN 950	Handwheels, DIN 950 light metal	EH 24590.	680
DIN 950	Handwheels, similar to DIN 950, stainless steel	EH 24591.	683
DIN 2079	Drive Blocks, DIN 2079	EH 23100.	410
DIN 3670	Disc-Type Handwheels, DIN 3670	EH 24570.	675
DIN 6303	Knurled Nuts, DIN 6303	EH 24480.	627
DIN 6304	Tommy Screws, DIN 6304 with fixed pin	EH 24490.	635
DIN 6305	Tommy Nuts, DIN 6305 with fixed pin	EH 24510.	637
DIN 6306	Tommy Screws, DIN 6306 with moveable pin	EH 24500.	636
DIN 6307	Tommy Nuts, DIN 6307 with moveable pin	EH 24510.	638
DIN 6310	Spring-Loaded Catches, DIN 6310 catches with spring	EH 22200.	183
DIN 6311	Thrust Pads, DIN 6311 and low model	EH 22560.	282
DIN 6314	Clamps, DIN 6314 flat	EH 23140.	430
DIN 6314	Clamps, with flat-faced ball, similar to DIN 6314	EH 23180.	435
DIN 6314	Clamps, with soft face, similar to DIN 6314	EH 23190.	437
DIN 6315 B	Clamps, DIN 6315 B forked	EH 23150.	431
DIN 6315 B	Clamps, DIN 6315 B forked	EH 23150.	861
DIN 6316	Clamps, DIN 6316 with goose-neck	EH 23160.	432
DIN 6319	Spherical Washers / Conical Seats, DIN 6319	EH 23050.	398
DIN 6319	Spherical Washers / Conical Seats, similar to DIN 6319, stainless steel	EH 23050.	400
DIN 6319	Compact Spherical Washers / Conical Seats, similar to DIN 6319	EH 23050.	402
DIN 6319	Spherical Washers / Conical Seats, DIN 6319	EH 23050.	851
DIN 6320	Feet, DIN 6320 with threaded shank	EH 22640.	373

DIN parts	Description	Group	Page
DIN 6321	Locating / Seating Pins, DIN 6321	EH 22630.	303
DIN 6321	Seating Pins, partially DIN 6321 (old norm)	EH 22630.	304
DIN 6321	Locating Pins, with bore hole similar to DIN 6321	EH 22630.	305
DIN 6323	Loose Slot Tenons, DIN 6323	EH 23120.	415
DIN 6323	Loose Slot Tenons, DIN 6323	EH 23120.	860
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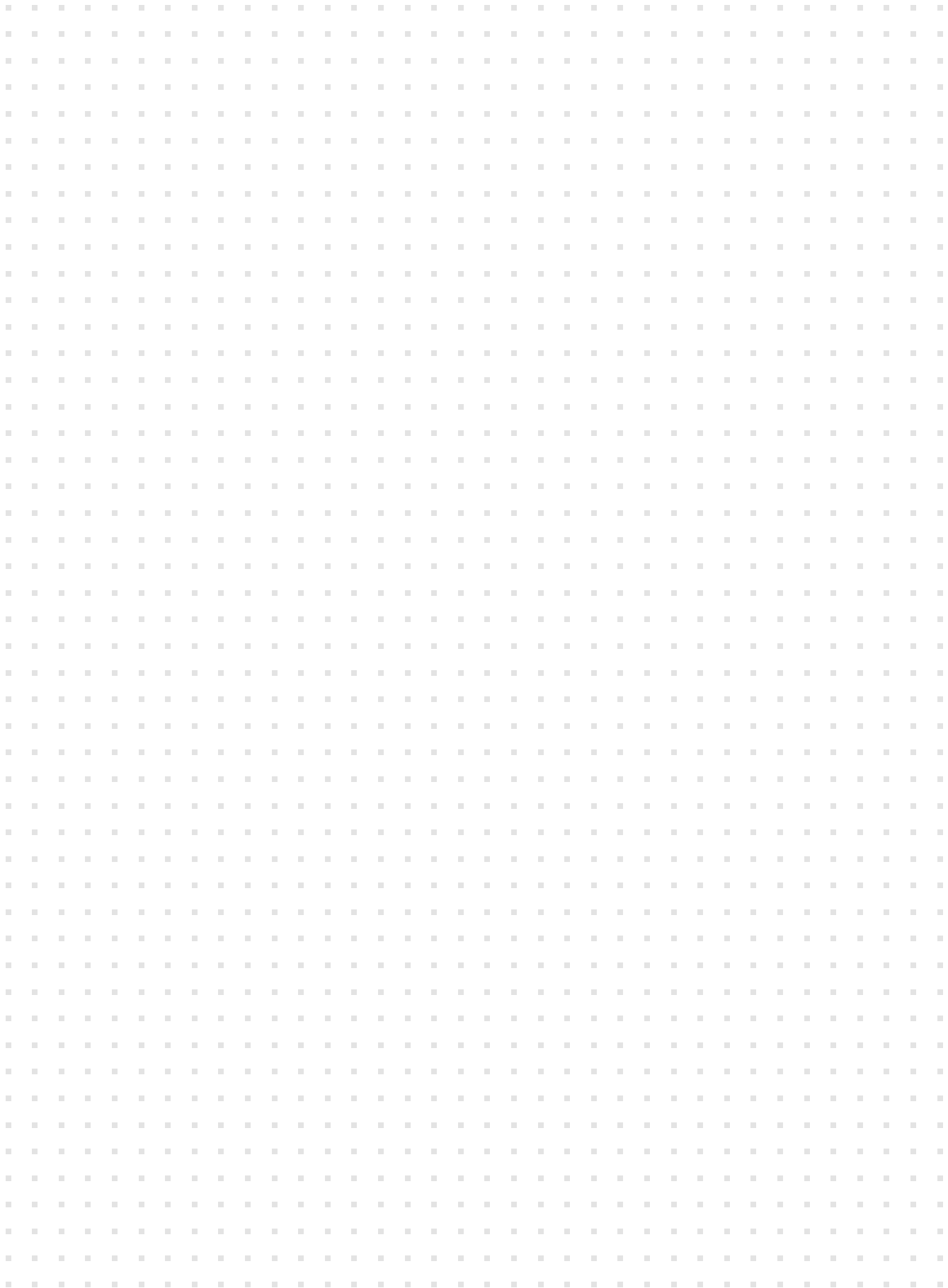
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NOTES

A large grid of small squares, intended for taking notes. The grid consists of 20 columns and 30 rows of small, light gray squares, providing a structured space for writing.

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