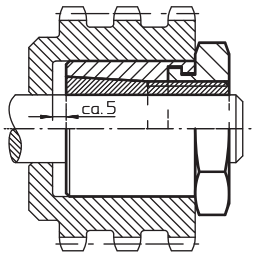
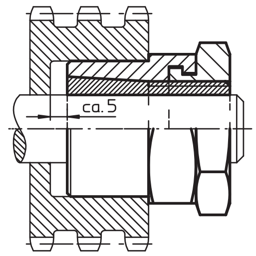
Tapered Shaft Hubs
EH 25050.

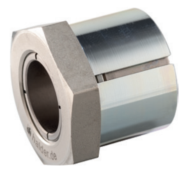
MOUNTING ARRANGEMENTS TAPERED SHAFT HUBS

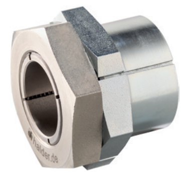


Tapered shaft hub with hexagon nut



Tapered shaft hub with hexagon nut and lock nut

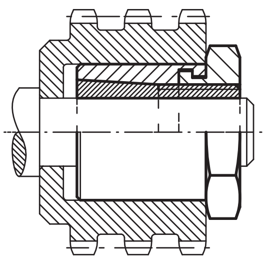


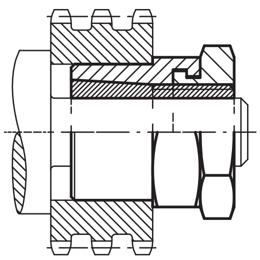


PRE-CENTERING

If longer hubs are used, additional support on the shaft can be achieved as shown in the accompanying drawings.

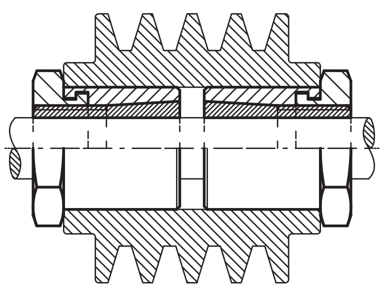
- Due to this support, forces acting outside the useful length of the tapered shaft hub can also be taken up.
- An increased rotational accuracy is achieved.





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.

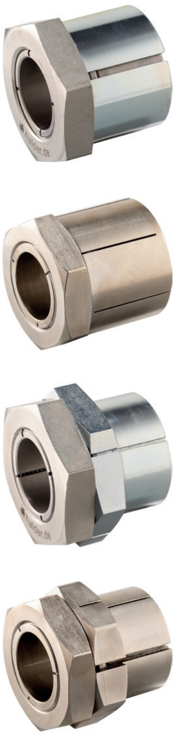


TWO TAPERED SHAFT HUBS IN ONE HUB

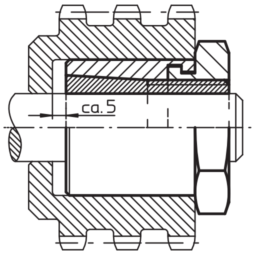
When using this version, the tapered shaft hub which is tightened first transmits 100 % of the forces mentioned in the charts.
When tightening the second tapered shaft hub, an axial offset of the hub is not possible. Therefore, this tapered shaft hub is able to transmit only 60 % of the forces.

Tapered Shaft Hubs

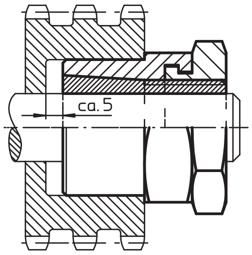
EH 25050.



ASSEMBLY INSTRUCTIONS TAPERED SHAFT HUBS



Tapered shaft hub
with hexagon nut



Tapered shaft hub with
hexagon nut and lock nut

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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.

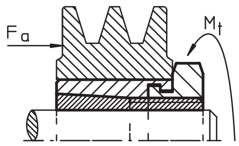
DISASSEMBLY

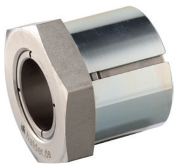
Release tapered shaft hub by turning the nut to the left until the inner part protrudes approximately 3 - 5 mm over the outer part.

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

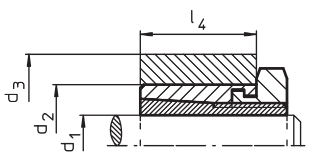
Example

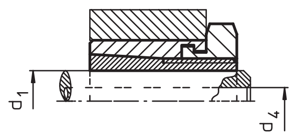
Shaft hub 25050.0125
M_t = 150 Nm
F_a = 5 kN
d_1 = 25 mm
v = 2

$$M_r = \sqrt{150^2 \text{ Nm}^2 + \left(5000 \text{ N} \times \frac{25 \text{ mm}}{2 \times 1000 \text{ mm/m}}\right)^2} \times 2 = 325 \text{ Nm}$$

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

$$d_3 \geq 42 \text{ mm} \times \sqrt{\frac{165 \text{ N/mm}^2 + 103 \text{ N/mm}^2 \times 1}{165 \text{ N/mm}^2 - 103 \text{ N/mm}^2 \times 1}} \geq 87{,}4 \text{ mm}$$

Example

Tapered shaft hub 25050.0025, hub material GG25;
$R_p0{,}1$ = 165 N/mm² C_N = 1

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 ≥ the fitting length of the tapered shaft hub ($L_N \geq L_2$)]

$$d_4 \leq 25 \text{ mm} \times \sqrt{\frac{380 \text{ N/mm}^2 - 2 \times 174 \text{ N/mm}^2 \times 1}{380 \text{ N/mm}^2}} \leq 7{,}2 \text{ mm}$$

Example

Tapered shaft hub 25050.0025, shaft materialCk45;
R_e = 380 N/mm² 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
$16 < d_1 \leq 40$	225	285	320	380	375	90	130	165	250	180	190
$40 < d_1 \leq 100$	205	265	260	300	245	90	130	165	250	180	190