



## Bore Clamps

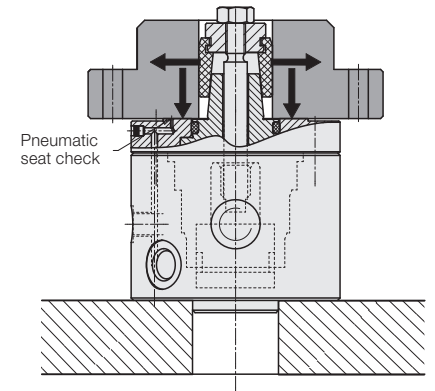
double-acting, pull-type, with and without centring function,  
 for bore diameter 16 to 46 mm, max. operating pressure from 50 up to 350 bar



### Advantages

- Clamping and supporting with one element
- Compact design
- High clamping force
- Repetitive accuracy 0.005 mm
- 5 optimised clamping ranges
- Hardened support face
- Pneumatic seat check
- Easy exchange of segment clamping bushings
- Centring at the bottom of the body
- Compensating and non-centring variants are available
- Oil supply optionally by pipe threads or drilled channels
- Standard FKM seals
- Vulcanised segment clamping bushing

### Function



### Application

The bore clamp is particularly suitable for centring and clamping of workpieces with smooth machined bores ranging from 16 to 46 mm in diameter and a support surface square to the hole axis.

### Description

The bore clamp is a combination of a double-acting pull-type cylinder equipped with a segment clamping bushing, which is pulled by a tie rod over a fixed cone. Thereby the segment clamping bushing expands radially to the bore diameter of the workpiece to be clamped.

By the simultaneous axial movement the workpiece is clamped onto the hardened support at the housing. The obtainable low-clamping force depends on the factor of friction within the bore and the operating pressure.

The sectioning of the complete clamping range from 16 to 46 mm in 5 sub-ranges (chart page 2) allows an optimum adaptation of tie rod, cone, workpiece support and operating pressure.

For detailed information on possible low-clamping forces and maximum operating pressures see charts and diagrams on page 2.

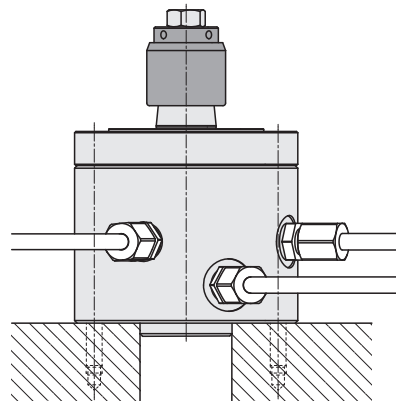
### Important notes

Since the segment clamping bushings are operated by a tie rod, it is imperative to consider the max. operating pressure depending on the clamping range. A too high operating pressure will destroy the tie rod.

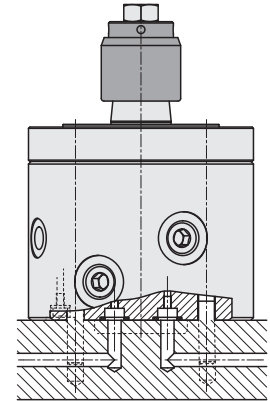
The maximum operating pressure for the segment clamping bushing is 80°C. Avoid clamping without workpiece, if possible.

Operating conditions and other data see data sheet A 0.100.

### Pipe thread

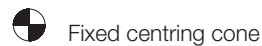


### Drilled channels



### Centring function

- Bore clamp with centring  
**Part no.: 4317X00**



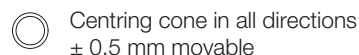
Fixed centring cone

- Bore clamp with compensation  
**Part no.: 4317X10**



Centring cone in one axial direction  
 $\pm 0.5$  mm movable

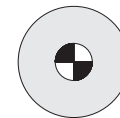
- Bore clamp without centring  
**Part no.: 4317X20**



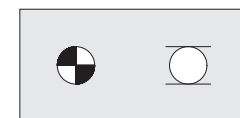
Centring cone in all directions  
 $\pm 0.5$  mm movable

### Applications

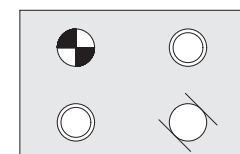
- Centre and clamp in 1 bore hole



- Centre and clamp in 2 bore holes

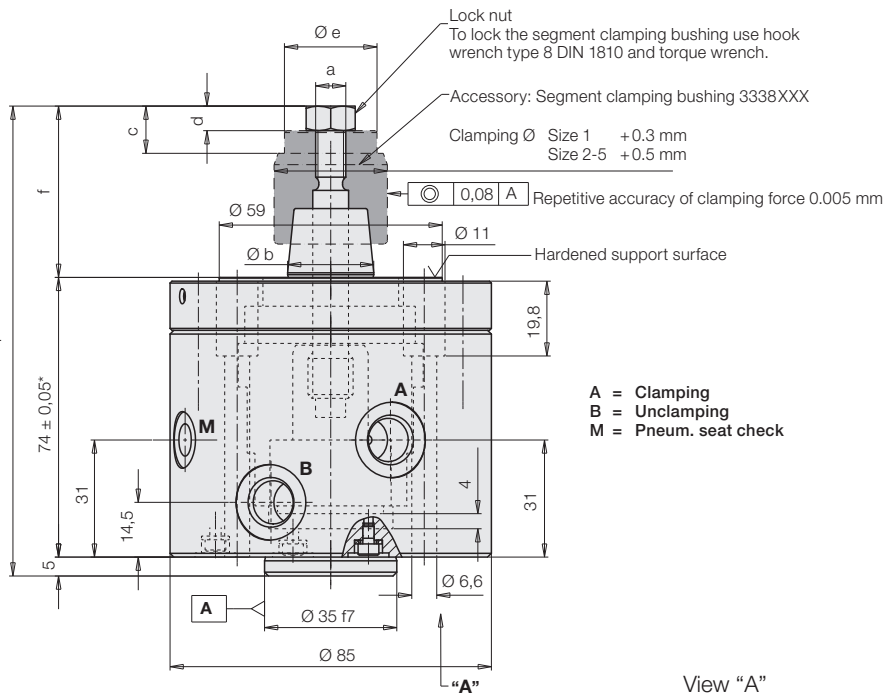


- Centre and clamp in more than 2 bore holes

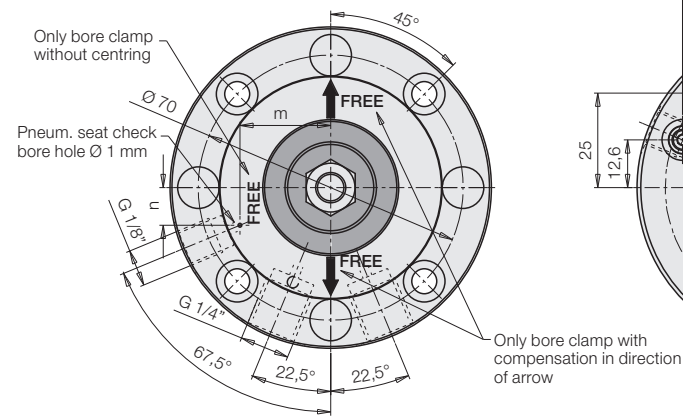


# Dimensions Technical data

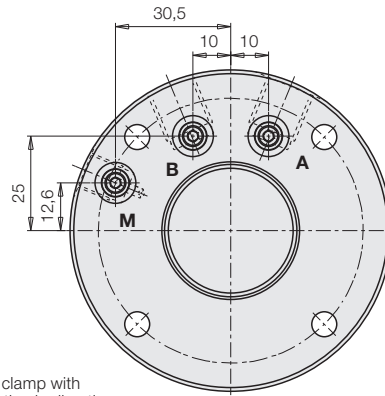
\*The height can be adapted by the customer, higher precision is available on request



A = Clamping  
B = Unclamping  
M = Pneum. seat check



View "A"



## Materials

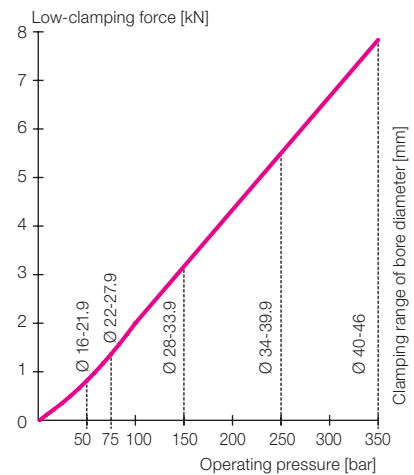
Housing	High alloy steel
Piston	Case-hardening steel
Workpiece support	Nitriding steel
Segment clamping bushing	Tool steel

## Note

The bore clamps are delivered without segment clamping bushings. These can be ordered separately as accessory.

Size	(BG)	1	2	3	4	5
<b>Clamping range Ø</b>	<b>[mm]</b>	<b>16-21.9</b>	<b>22-27.9</b>	<b>28-33.9</b>	<b>34-39.9</b>	<b>40-46</b>
Low-clamping force * approx.	[kN]	0.6	1.3	3.1	5.5	7.9
Specific expanding force** approx.	[N/bar]	250				
<b>Max. operating pressure</b>	<b>[bar]</b>	<b>50</b>	<b>75</b>	<b>150</b>	<b>250</b>	<b>350</b>
Max. oil volume Clamping/unclamping	[cm <sup>3</sup> ]	2.45/4.02	2.45/4.02	2.45/4.02	2.45/4.02	2.45/4.02
a		M5	M6	M8	M10	M12
b	[mm]	12.8	16.8	22.8	28.8	34.8
c	[mm]	8	10	12.5	15	18
d	[mm]	4	5	6.5	8	10
e	[mm]	13.5	18.5	24.5	30.5	36.5
f	[mm]	39.5	43	45.5	54	57
l	[mm]	118.5	122	124.5	133	136
m	[mm]	15	15	24	24	24
n	[mm]	6	6	10	10	10
Tightening torque Lock nut	[Nm]	6	10	25	49	85
Max. flow rate	[cm <sup>3</sup> /s]	20	20	20	20	20
Weight	[kg]	2.8	2.9	3	3.1	3.2
<b>Part no.</b>						
<b>with centring</b>		<b>4317 100</b>	<b>4317 200</b>	<b>4317 300</b>	<b>4317 400</b>	<b>4317 500</b>
<b>with compensation</b>		<b>4317 110</b>	<b>4317 210</b>	<b>4317 310</b>	<b>4317 410</b>	<b>4317 510</b>
<b>without centring</b>		<b>4317 120</b>	<b>4317 220</b>	<b>4317 320</b>	<b>4317 420</b>	<b>4317 520</b>

## Low-clamping force\*



\* Workpiece: steel, unhardened, dry. Surface finish R<sub>max</sub>.3µm  
 \*\* Friction value µ = 0.1 (steel / steel dry) between centring cone and segment clamping bushing. With lubrication, the expansion force can double!

## Accessories Workpiece dimensions

### Accessory - segment clamping bushing

For each bore hole diameter within the clamping range the appropriate segment clamping bushing has to be selected:

**Part no. 3338XXX (clamping Ø in 0.1 mm)**

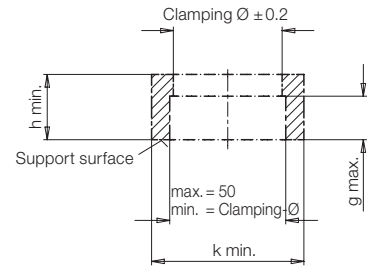
**Example of ordering:**

Clamping Ø: **16.0**    **Part no. 3338 160**

Clamping Ø: **34.8**    **Part no. 3338 348**

### Workpiece dimensions and workpiece tolerance

The workpiece to be clamped should always contact the hardened support surface and cover at least in the zone of the bore hole a minimum surface of the segment clamping bushing. This is only guaranteed, if the relevant dimensions meet the requirements shown in the drawing.



### Adjustment of the segment clamping bushing

Unclamp bore clamp (extended). Unscrew lock nut of the bore clamp and screw on segment clamping bushing onto the threaded rod. Check the diameter of the segment clamping bushing by means of a vernier calliper.

The diameter of the segment clamping bushing should be adjusted to approx. 0.1 mm up to 0.2 mm less than the clamping diameter to be in the position to insert easily the workpiece to be clamped. Clamping without workpiece should be avoided due to the overexpansion of the vulcanisation.

Size	(BG)	1	2	3	4	5
<b>Clamping range Ø</b>	<b>[mm]</b>	<b>16–21.9</b>	<b>22–27.9</b>	<b>28–33.9</b>	<b>34–39.9</b>	<b>40–46</b>
g max.	[mm]	12	12	12	15	15
h min.	[mm]	18	18	18	24	24
k min.	[mm]	35	35	55	55	55
<b>Workpiece tolerance</b>						
of selected clamping Ø	[mm]	–0.1...+0.3	–0.1...+0.5	–0.1...+0.5	–0.1...+0.5	–0.1...+0.5

Standard stepping 1 mm (intermediate stepping on request)

### Example:

Selected clamping diameter = 16 mm

Workpiece tolerance = –0.1 up to +0.3 mm

Workpiece diameter = 15.9 up to 16.3 mm

Tightening torque for the lock nut see chart on page 2.

When tightening the lock nut to hold the segment clamping bushing without this to adjust.

### Accessory for connection through drilled channels

O-ring 8x1.5    **Part no. 3000343**

Screw plug with collar and hexagon socket

G 1/4    **Part no. 3610191**

G 1/8    **Part no. 3610158**

Alternatively, sealing plug without collar with thread sealing ring

G 1/4    **Part no. 0361987**

G 1/8    **Part no. 0361986**