



Bore Clamps

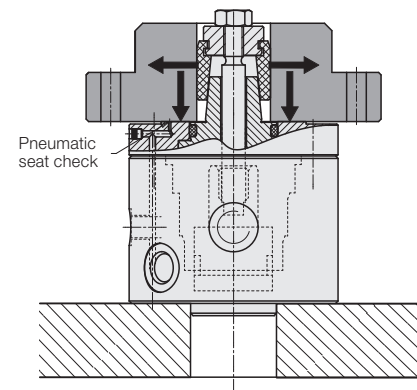
double-acting, pull-type, with and without centring function,
for bore diameter 16 to 46 mm, max. operating pressure from 50 up to 350 bar



Advantages

- Clamping and supporting with one element
- Compact design
- High clamping force
- Repetitive accuracy of clamping force 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.

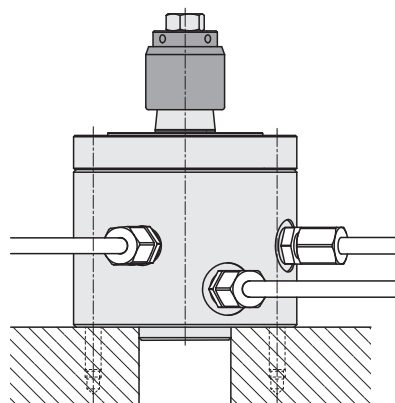
Important notes

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.

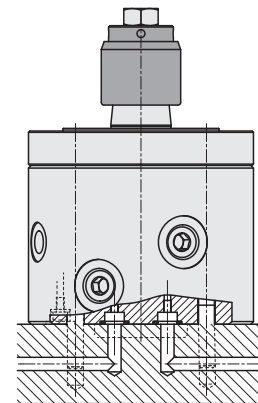
The maximum operating pressure for the segment clamping bushing is 80°C. Avoid clamping without workpiece, if possible.

Operating conditions and other data see data sheet A 0.100.

Pipe thread



Drilled channels

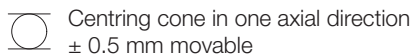


Centring function

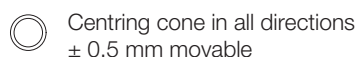
- **Bore clamp with centring**
Part no.: 4317X00



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

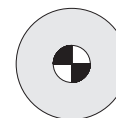


- **Bore clamp without centring**
Part no.: 4317X20

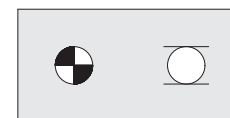


Applications

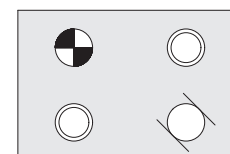
- Centre and clamp in 1 bore hole



- Centre and clamp in 2 bore holes

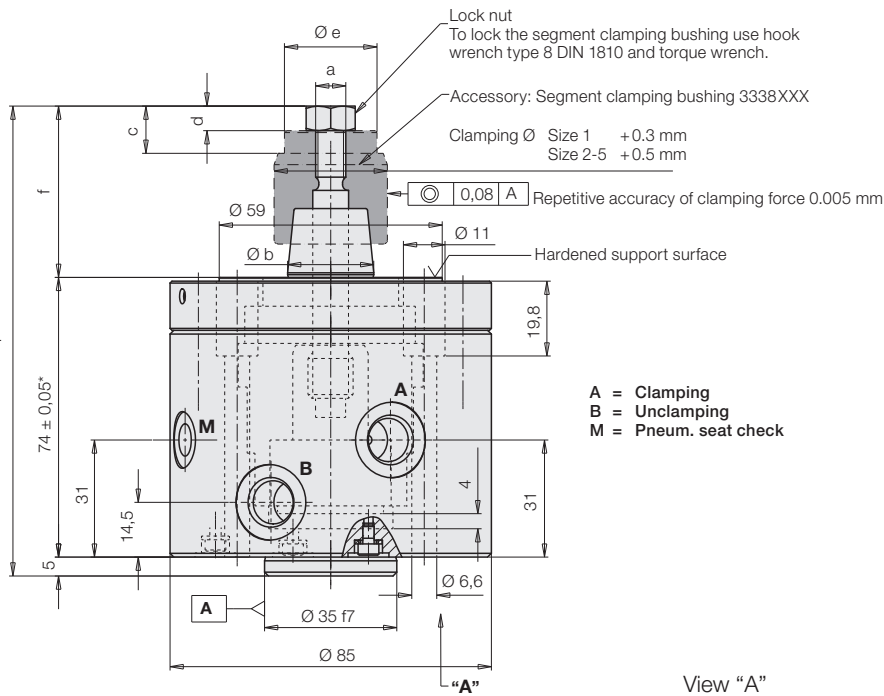


- Centre and clamp in more than 2 bore holes



Dimensions Technical data

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

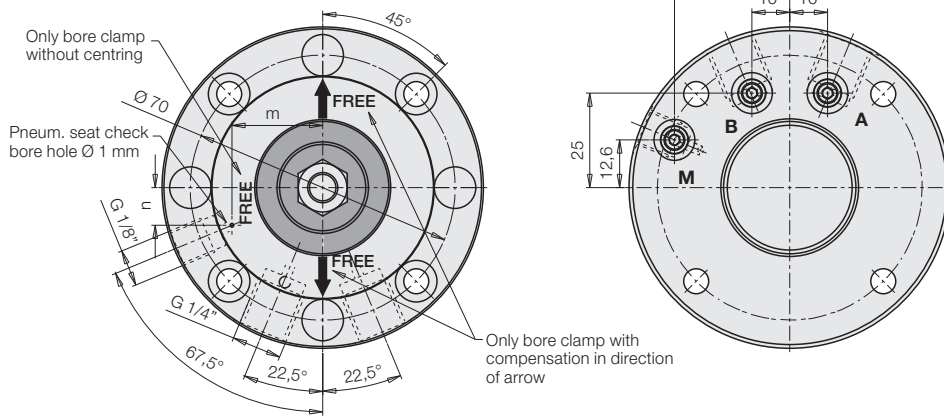


Materials

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

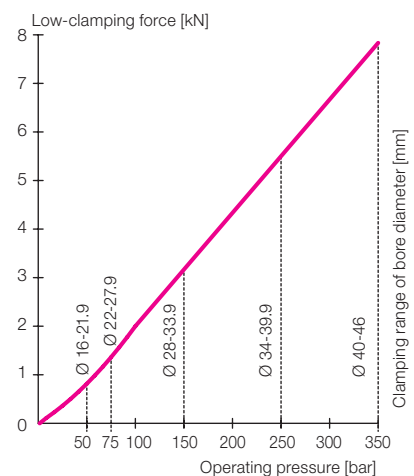
Note

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



Size	(BG)	1	2	3	4	5
Clamping range Ø	[mm]	16-21.9	22-27.9	28-33.9	34-39.9	40-46
Low-clamping force * approx.	[kN]	0.6	1.3	3.1	5.5	7.9
Specific expanding force** approx.	[N/bar]	250				
Max. operating pressure	[bar]	50	75	150	250	350
Max. oil volume Clamping/unclamping	[cm³]	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	[cm³/s]	20	20	20	20	20
Weight	[kg]	2.8	2.9	3	3.1	3.2
Part no.						
with centring		4317 100	4317 200	4317 300	4317 400	4317 500
with compensation		4317 110	4317 210	4317 310	4317 410	4317 510
without centring		4317 120	4317 220	4317 320	4317 420	4317 520

Low-clamping force*



* Workpiece: steel, unhardened, dry. Surface finish Rmax.3µm

** Friction value $\mu = 0.1$ (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)

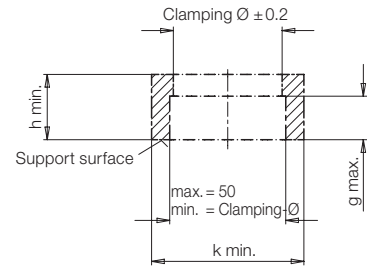
Example of ordering:

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
Clamping range Ø	[mm]	16–21.9	22–27.9	28–33.9	34–39.9	40–46
g max.	[mm]	12	12	12	15	15
h min.	[mm]	18	18	18	24	24
k min.	[mm]	35	35	55	55	55
Workpiece tolerance						
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**