Bore Clamps
Block-type, without centring function, double acting, for bore diameter 7.8–17.7 mm, max. operating pressure 250 bar

Advantages
- Axial clamping in simple bore holes
- S-sided machining possible
- Expand clamping bushing with spring force
- Hold workpiece without hydraulic pressure
- Clamp workpiece with adjustable hydraulics
- Hardened workpiece support
- Pneumatic seat check
- Connection for positive air pressure protection
- Standard FKM seals
- 2 sizes available
- Alternatively pipe connection or manifold-mouting connection

Function
1. Expand clamping bushing with spring force
   Hold workpiece
   Safety in case of pressure drop
2. Clamp workpiece with hydraulics
   Adjustable clamping force

Connecting possibilities
Pipe thread
Drilled channels

Application
The bore clamps are particularly suited for clamping of workpieces with smooth bore holes from diameter 7.8 to 17.7 mm in the support surface.

The required form-fit in the bore hole is obtained by the special profile of the hardened clamping bushings with penetrating points in the bore hole wall. Hardened materials cannot be clamped with these elements.

The workpiece is put directly onto the bore clamp and will not be deformed during clamping. Since clamping is effected within the bore, the remaining surfaces are free for machining on 5 sides (see application example).

The size of the possible machining forces is certainly limited using this type of clamping, especially crosswise to the clamping surface. Except the static friction force between the workpiece and the support, the bore clamp cannot compensate any side loads. Additional stops or positioning elements can help in such applications.

Workpiece sections that are subject to vibrations and deformations during machining, have to be additionally supported or clamped in a flexible (floating) position.

Functional description
See page 4.

Important notes
The bore clamp has no centring function. The clamping bushing has to be protected against too high side loads during insertion or machining by suitable stops or centring bolts. The required positioning precision is ± 0.2 mm.

The required penetration depth of the toothing depends on the strength of the material for the form-fit toothing with the workpiece. Therefore hardened or coated workpieces cannot be used. The tapering of the bore hole should not exceed 3°. In case of doubt we recommend a clamping test.

Clean the support surface and blast clean the clamping bushing before every clamping cycle. If swarf fall into an open clamping bore, blast air must be continuously switched on. Clamping bushings and wiper should be exchanged after 100,000 operations.

Part numbers for complete clamping sets: see chart on page 3.

Operating conditions, tolerances and other data see data sheet A 0.100.

Application example
Machining of an oil sump from 5 sides
Connecting the oil supply through drilled channels, the connecting threads have to be closed by a screw plug (see accessories).

For manifold mounting, remove stud screw with ball and insert O-ring into the counterbore (see accessories).

Bore hole for pneumatic seat control

Minimum support Ø of the workpiece:
- Size 1: Ø 18 mm
- Size 2: Ø 27 mm

Demands on the bore hole in the workpiece

Adjusting Ø of the clamping bushing: \( k = d_1 - 0.2 \text{ mm} \)

S = Clamping (pull down effect)
E = Unclamping (release of pull down effect and clamping bushing)
A = Seat control
L = Positive air pressure protection

Functional description see page 4.
### Technical data

<table>
<thead>
<tr>
<th>Part no. (X = Identification letter bore Ø)</th>
<th>Size 1</th>
<th>Size 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4318111X</td>
<td>4318211X</td>
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</table>

- **Expansion force, radial [kN]**
  - at 100 bar: approx. 9
  - at 250 bar: approx. 14

- **Pull-down force [kN]**
  - at 100 bar: 2
  - at 250 bar: 5.1

- **Clamping bushing, unclamping [bar]**
  - min. 100

- **Max. oil volume [cm³]**
  - Clamping: 0.5
  - Unclamping: 10

- **Max. flow rate [cm³/s]**: 25, 50

- **Operating pressure [bar]**:
  - min. 100

- **Pull-down stroke [mm]**: 2, 2

- **Max. thickness of the plate [mm]**: 9, 12

- **Weight [kg]**: 2.3, 3.9

### Bore hole Ø and part numbers

#### Size 1

- **Bore Ø**
  - d1 in mm
  - Clamping set
  - Part no.

#### Size 2

- **Bore Ø**
  - d1 in mm
  - Clamping set
  - Part no.

### Part numbers for accessories for connection through drilled channels

- **O-ring Ø 7x1.5**
  - NBR: 3000342
  - FKM: 3001077

- **Screw plug G1/4 with hexagon head**
  - 3300821

- **Screw plug G1/8 with hexagon head**
  - 3610047

- **Screw plug G1/4 with socket head cap**
  - 0361987

- **Screw plug G1/8 with socket head cap**
  - 0361986

### Dimensions

- **Size 1**
  - Bore Ø*
  - d1 in mm
  - Part no.

#### Spare clamping sets

- The clamping sets contain all required components to replace the clamping bushings. Every clamping set consists of clamping bushing and wiper. Mounting or dismounting can be made on your own as per operating instructions.
Functional description

Workpiece clamping
1. Put the workpiece onto the hardened support surfaces and position by external stops or pins, if required.
2. Start the clamping process by switching the valves.
3. With pressure relief of the unclamping port the clamping bushings will be radially expanded very quickly. According to the material, the toothing penetrates more or less deeply into the bore hole wall and a form fit will be obtained.
4. In case of pressure increase at the clamping port, the hydraulic piston pulls the expanded clamping bushing and thereby also the workpiece onto the support surface.

Function sequence

Clamping bushing only expansion

What happens in case of pressure drop of the clamping pressure?
In case of pressure drop the workpieces is no longer pulled onto the hardened support surface. The radial expansion of the clamping jaws and thereby the form fit with the workpieces are maintained by the spring tension.

Workpiece unclamping
1. For unclamping a minimum pressure of 100 bar is required. In case of pressure increase at the unclamping port, the hydraulic piston returns to its off-position and the spring tension of the clamping bushing will be released. Very light workpieces can be slightly lifted.
2. Remove the workpiece.

Note:
For operating pressures < 100 bar please contact us.

Clamping

Unclamping

Expansion

Release

V2

V1

Valves

Pull-down effect

Clamping bushing

Positive air pressure connection

Pneumatic seat check

Clamping

Unclamping

Clamping

Unclamping

Pull-down effect

Clamping bushing

Positive air pressure connection

Pneumatic seat check

Clamping

Unclamping

Note:
For operating pressures < 100 bar please contact us.