

Pressure limitation and feed valve, pilot-operated Type MHDBN



- ▶ Sizes 16, 32
- ▶ Series 3X
- ▶ Maximum working pressure 420 bar
- ▶ Maximum flow 400 l/min

Features

- ▶ Screw-in cartridge valve
- ▶ For mobile applications
- ▶ Pressure stages from 100 to 420 bar
- ▶ Available in 2 sizes (16, 32)
- ▶ Versatile applications for pressure limitation and feed functions

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Type code

01	02	03	04	05	06	07	08	09	10	11	12
MH	DBN		K	2	-	3X	/				*

Valve type

01	Mobile hydraulics	MH
02	Pressure limitation and feed valve, pilot-operated ¹⁾	DBN

Size

03	Size 16	16
	Size 32	32

04	Screw-in cartridge valve	K
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Adjustment type

05	Grub screw with internal hexagon	2
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Series

06	Series 30 to 39 (unchanged installation and connection dimensions)	3X
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Pressure stage²⁾

07	Set pressure up to 100 bar	100
	Set pressure up to 420 bar	420

Pressure adjustment

08	Without pressure adjustment, without protective cap ³⁾	no code
	With pressure adjustment, with protective cap ⁴⁾	-...

Pilot oil supply and pilot oil return

09	Pilot oil supply internal, pilot oil return internal	no code
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Sealing material

10	NBR (nitrile rubber)	M
	FKM (fluoroelastomer)	V

Mounting cavity

11	Size 16	M24 × 1.5	FH
	Size 32	M33 × 1	FK
		M36 × 1.5	LM

12	Further details in plain text	*
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Notice

Valves set at the factory are protected by means of a protective cap. In the case of subsequent re-adjustment, the warranty will become void!

- 1) Minimum cracking pressure, see characteristic curves page 7 and 8
- 2) The values refer to the screw-in cartridge valve. If the valve is installed in a housing, it has to be made sure that the set pressure of the screw-in cartridge valve does not exceed the value of the housing that might be lower!
- 3) Protective cap separately available, material no. R900168151; valves without pressure adjustment at the factory are delivered in a pressure-relieved state.

- 4) Example:
Set to 300 bar: ...420-**300**...
(pressure adjustment at $q_{Vmax} = 10$ l/min)

Preferred types

Type	Material no.	Mounting cavity (see page 10)	Characteristic curves (see pages 7 and 8)
MHDBN 16 K2-3X/420VFH	R901162185	FH	D1 / E2
MHDBN 32 K2-3X/100VFK	R901162658	FK	D4 / E6
MHDBN 32 K2-3X/420VFK	R901162717	FK	D4 / E6
MHDBN 32 K2-3X/420VLM	R901162838	LM	D4 / E7

Functional description

General

The pressure valve type MHDBN is a pilot-operated pressure relief valve for installation in block designs. It is used to limit a system pressure. The system pressure can be set steplessly via the adjustment spindle (4).

Pressure relief function

The valve is closed in initial position. The pressure in port **P** acts on the spool (1). Simultaneously, pressure is applied to the spring-loaded side of the spool (1) and to the pilot poppet (6) via the nozzle (2).

If the pressure in port **P** exceeds the value set at the spring (5), the pilot poppet (6) opens. Hydraulic fluid flows from the spring-loaded side of the spool (1) via the nozzle (3) and the channel (7) directly into port **T**.

The resulting pressure drop causes the spool (1) to move and thus opens the connection from port **P** to **T** while maintaining the pressure adjustment on the spring (5).

The pilot oil return is implemented internally via the channel (7) into port **T**.

Feed function

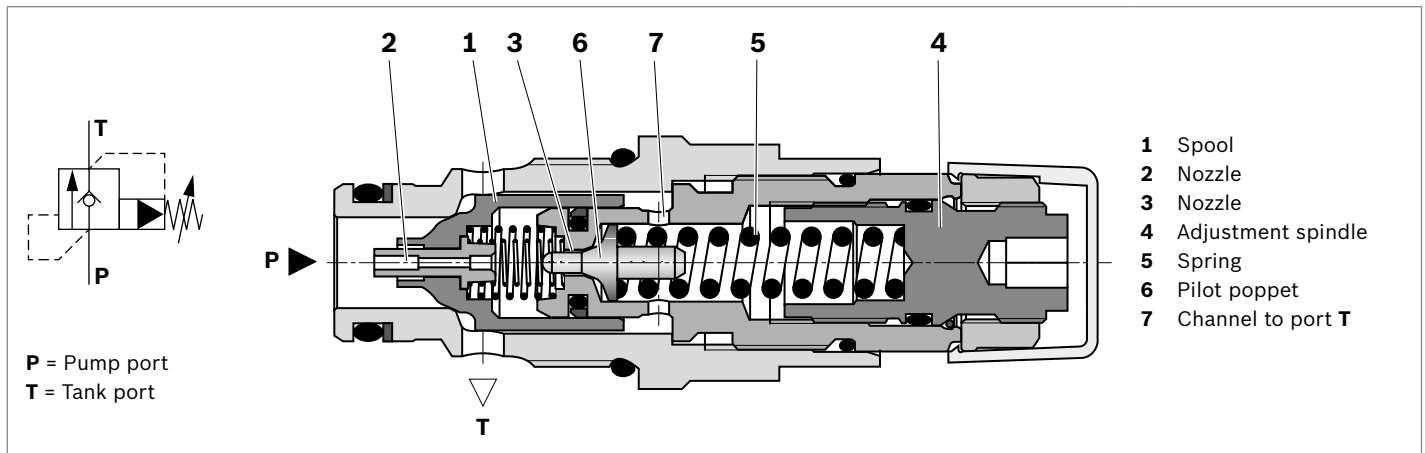
The feed function makes up for lacking hydraulic fluid volumes caused, for example, by leakage when pressure valves respond or in the case of leading loads.

If the pressure at port **P** is lower than the one at port **T**, the spool (1) will be lifted out of its seat. Hydraulic fluid flows from port **T** to port **P**.

Notice

- ▶ The maximum operating pressure is the sum of the set pressure and the return flow pressure at port **T**.
- ▶ The pilot-operated pressure valves are virtually leakage-free thanks to their design.

▼ Section and symbol MHDBN



Technical data

General				
Weight	kg	See table on page 9		
Installation position	Any			
Ambient temperature range	°C	-20 to +80		
Storage temperature range	°C	-20 to +80		
Surface protection	Without – surface protection has to be ensured by painting the components or the whole assembly (e.g. valve with housing).			
Hydraulic				
Maximum working pressure	Port P	p	bar	100; 420
	Port T	p_T	bar	50
Maximum flow		q_v	l/min	See characteristic curves on page 7 and 8
Hydraulic fluid	See table on page 6			
Hydraulic fluid temperature range		ϑ	°C	-30 to +80 (NBR seal) -20 to +80 (FKM seal)
Viscosity range		ν	mm ² /s	10 to 380
Maximum admissible degree of contamination of hydraulic fluid, cleanliness level as per ISO 4406 (c)				Class 20/18/15 ¹⁾
Load cycles				2 million

Notice

- ▶ Please contact us if the unit is to be used outside the specified range of values!
- ▶ The technical data was determined with a viscosity of $\nu = 41 \text{ mm}^2/\text{s}$ (HLP46; $\vartheta_{\text{oil}} = 40 \pm 5 \text{ °C}$).
- ▶ Under application conditions with a working pressure of <30 bar and a flow of <30 l/min, valves of another design are to be selected from our valve program. The maximum working pressure is the sum of the set pressure and counter pressure!
- ▶ Minimum cracking pressure, see characteristic curves page 7 and 8

1) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components. Available filters can be found at www.boschrexroth.com/filter. We recommend using a filter with a minimum retention rate of $\beta_{10} \geq 75$.

Hydraulic fluid

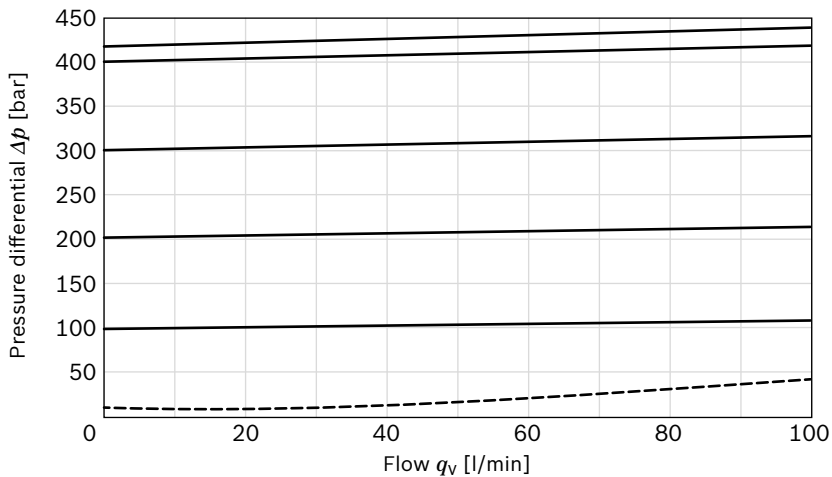
Hydraulic fluid		Classification	Suitable seal materials	Standards	Data sheet
Mineral oils		HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable	insoluble in water	HEES	NBR, FKM	ISO 15380	90221
	soluble in water	HEPG	FKM	ISO 15380	90221

Notice

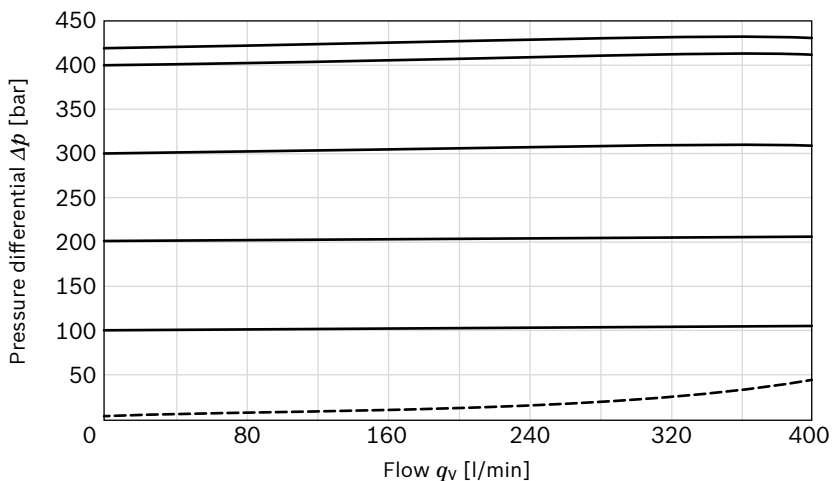
- ▶ Further information and details on using other hydraulic fluids are available in the above data sheets or on request!
- ▶ Restrictions are possible with the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable:** When using bio-degradable hydraulic fluids that are also zinc-soluble, zinc may accumulate in the fluid (700 mg zinc per pole tube).

Characteristic curves

▼ p_E - q_V characteristic curves - "D1"



▼ p_E - q_V characteristic curves - "D4"

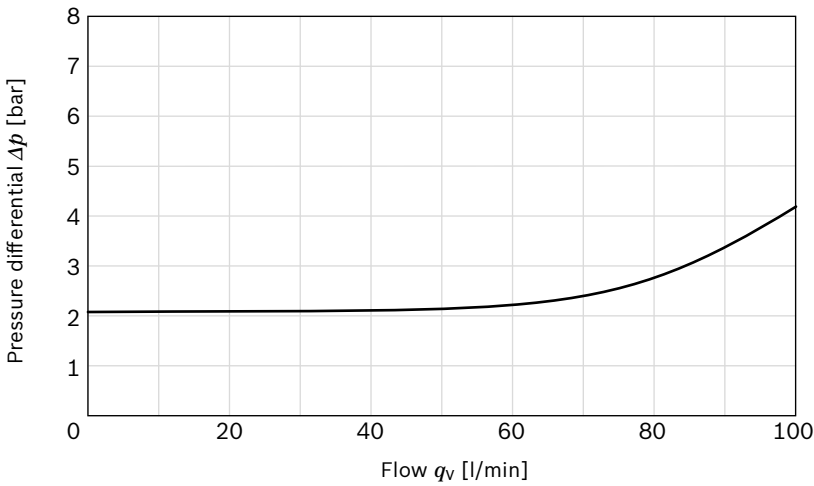


----- = Performance limit

Notice

- ▶ Characteristic curves measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$.
- ▶ The characteristic curves apply to an output pressure $p_T = 0 \text{ bar}$ over the entire flow range and without housing resistance.
- ▶ They refer to the specified nominal value of the pressure stage (100, 420).
- ▶ Below the nominal pressure, the characteristic curves become increasingly steeper.

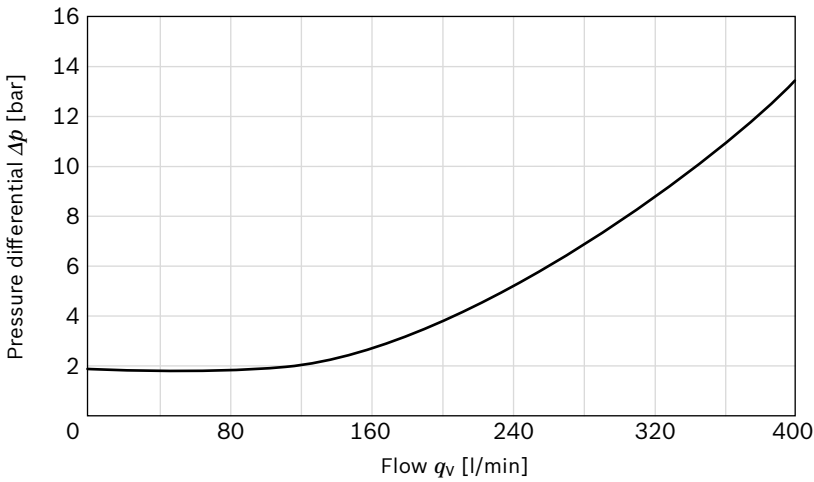
▼ p_E - q_V characteristic curves - "E2"



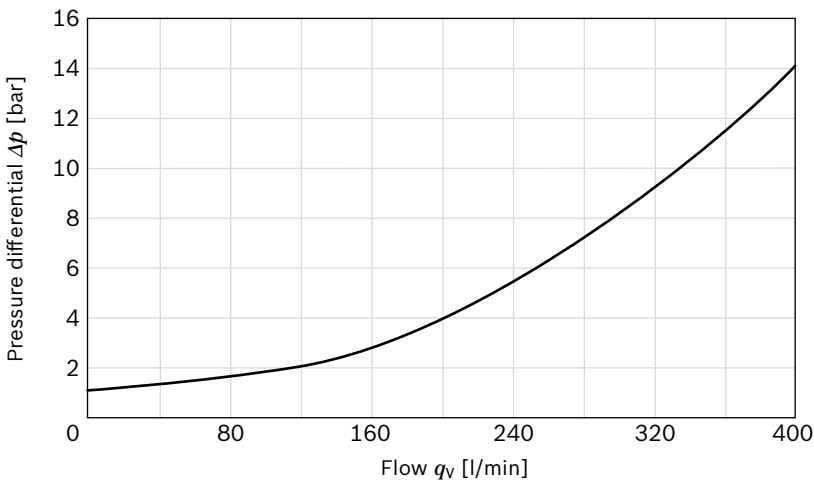
Notice

- ▶ Characteristic curves measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ } ^\circ\text{C}$.
- ▶ The characteristic curves apply to an output pressure $p_T = 0 \text{ bar}$ over the entire flow range and without housing resistance.
- ▶ They refer to the specified nominal value of the pressure stage (100, 420).
- ▶ Below the nominal pressure, the characteristic curves become increasingly steeper.

▼ p_E - q_V characteristic curve - "E6"

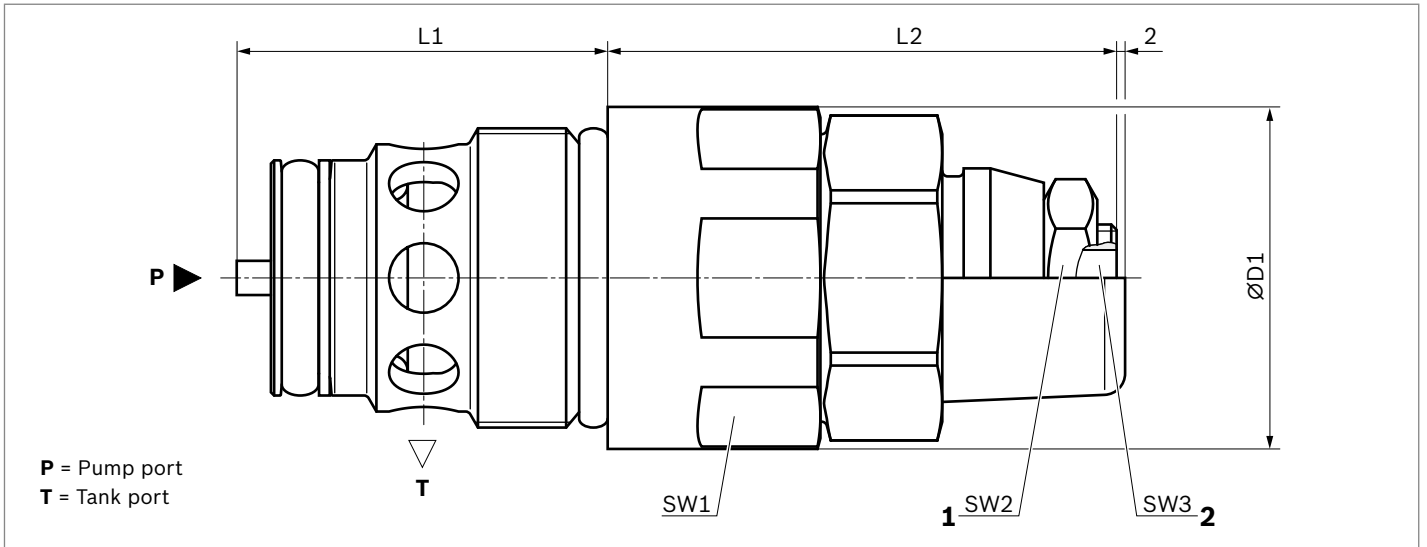


▼ p_E - q_V characteristic curve - "E7"



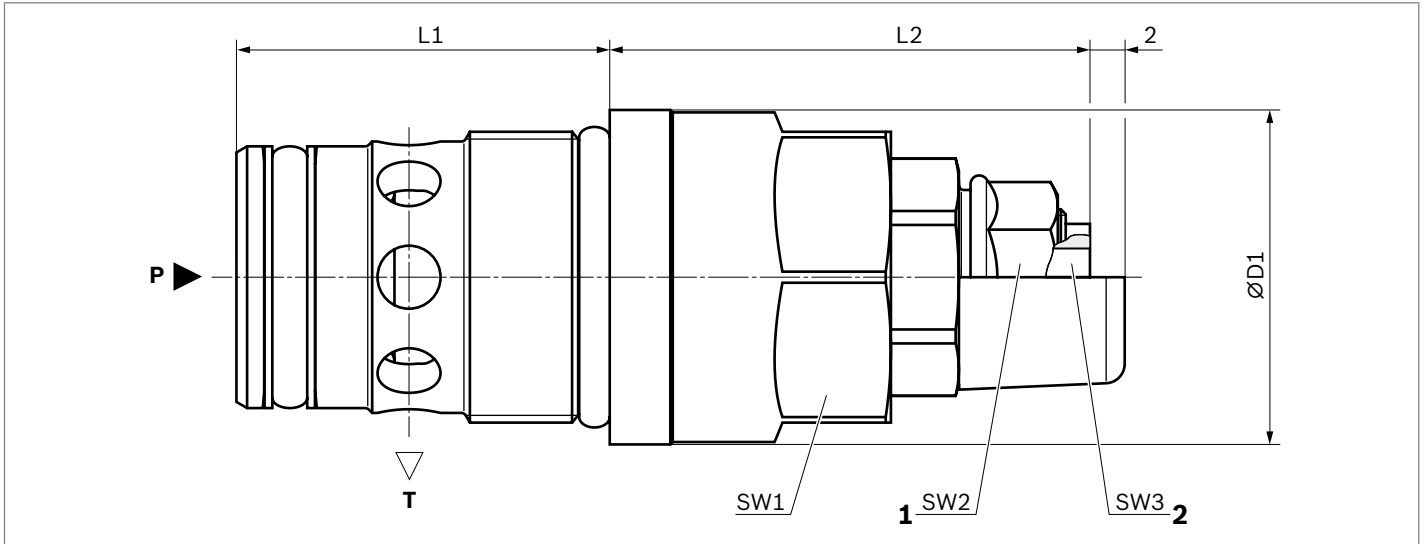
Dimensions

▼ MHDBN...VFK



Type	ØD1	L1	L2	Wrench size			Tightening torque [Nm] ¹⁾		Weight [kg]
				SW1	SW2	SW3	SW1	SW2	
MHDBN 32 K2-3X/...VFK	37.0	40.9	46.1	34	16	5	150	15	0.40

▼ MHDBN...VFH / MHDBN...VLM



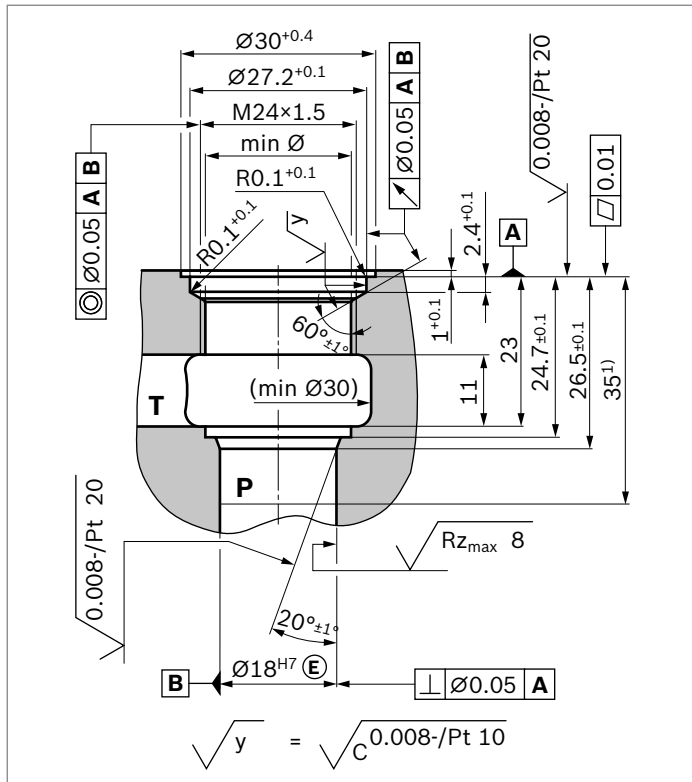
Typ	ØD1	L1	L2	Wrench size			Tightening torque [Nm] ¹⁾		Weight [kg]
				SW1	SW2	SW3	SW1	SW2	
MHDBN 16 K2-3X/...VFH	29.0	35.0	46.8	24	17	5	100	20	0.21
MHDBN 32 K2-3X/...VLM	41.0	47.4	46.0	36	17	5	150	20	0.45

1) Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by the surface microstructure, material pairing, etc.
Thus, we recommend checking the mounting characteristics with original components and under boundary conditions.

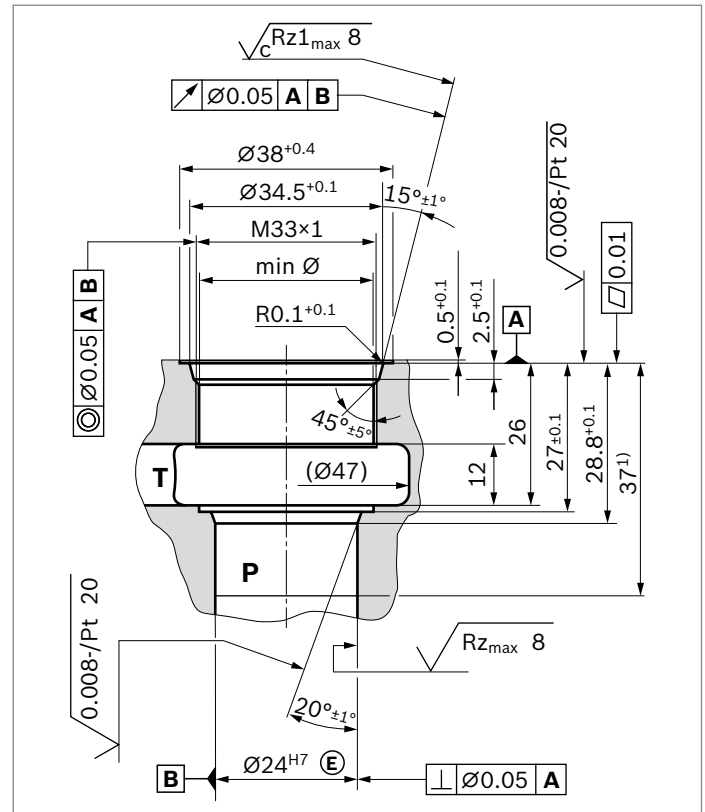
1 Lock nut
2 Internal hexagon

Mounting cavity

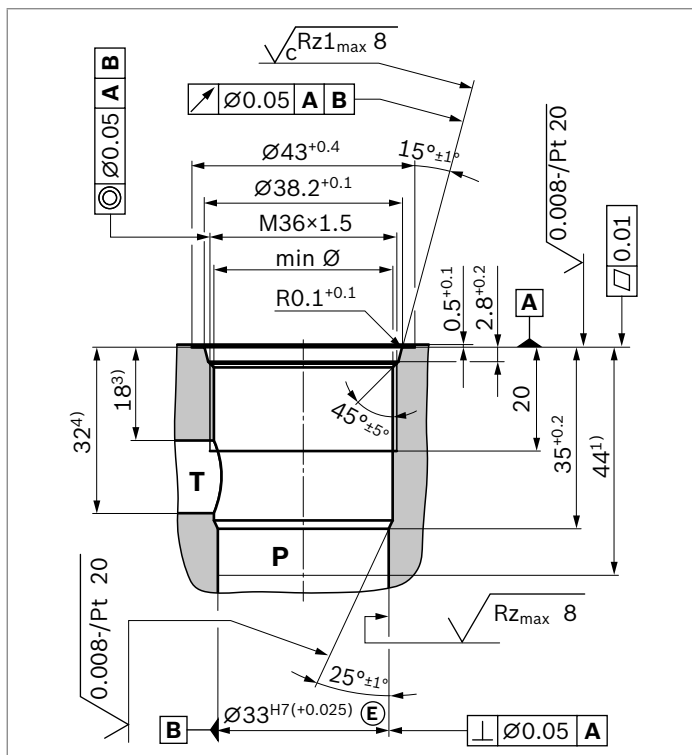
▼ **Version "FH"** (M24 × 1.5)
(Drawing no. R901148102)



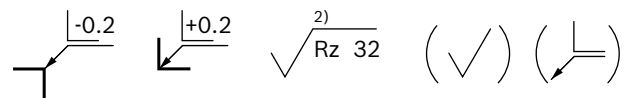
▼ **Version "FK"** (M33 × 1)
(Drawing no. R901148145)



▼ **Version "LM"** (M36 × 1.5)
(Drawing no. R901148162)



P = Pump port
T = Tank port

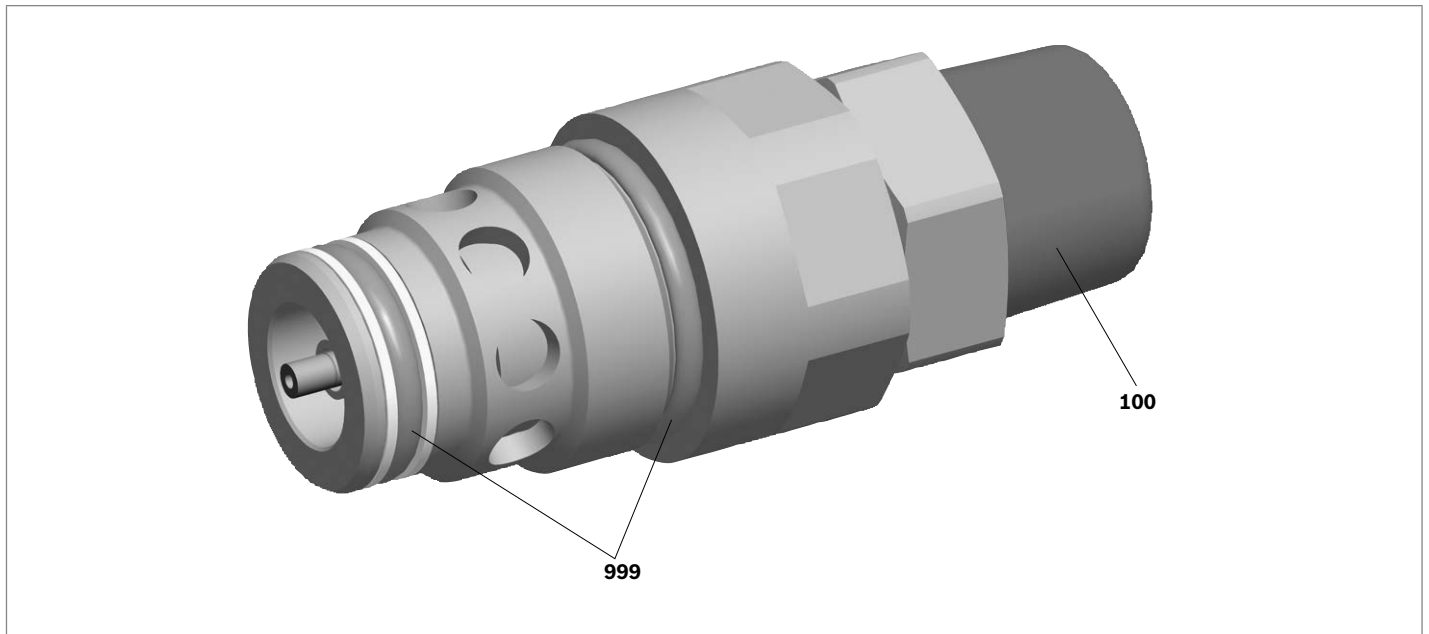


All seal ring insertion faces are rounded and free of burrs.

Standards:

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768-mK
Tolerance	ISO 8015
Surface condition	ISO 1302

- 1) Depth of fit
- 2) Visual inspection
- 3) Thread depth
- 4) Roughness up to $\varnothing 32.5$ required
- 5) Levelness up to $\varnothing 32.5$ required

Available individual components

Item	Designation	Sealing material	Material no.
100	Protective cap	–	R900168151
999	Seal kit of the valve for mounting cavity “FH”	FKM	R961003387
	Seal kit of the valve for mounting cavity “FK”	FKM	R961003389
	Seal kit of the valve for mounting cavity “LM”	FKM	R961003398

Seal kits with other seals upon request.

Related documentation

- ▶ Mineral oil-based hydraulic fluids
- ▶ Environmentally acceptable hydraulic fluids
- ▶ Filter selection

Data sheet 90220
Data sheet 90221
www.boschrexroth.com/filter

Bosch Rexroth AG

Zum Eisengießer 1
97816 Lohr am Main
Germany
Tel. +49 9352 18-0
info.ma@boschrexroth.de
www.boschrexroth.com

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