Pressure relief valve, pilot operated, with pulling function

Type MHDBN...Y..02

RE 64599
Edition 2015-11


H7975

- With external port Y
- Frame sizes 16, 22, 32
- Component series 3X
- Maximum operating pressure 420 bar
- Maximum flow 400 l/min

Features

- Screw-in cartridge valve
- Seat design
- Pressure rating 420 bar
- Available in 3 sizes (16, 22, 32)

Contents

Ordering codes

01	02	03	04	05		06		07	08	09	10	11	12	13
MH	**DBN**		**K**	**2**	**–**	**3X**	**/**	**420**		**Y**			**02**	*****

01	Mobile hydraulics	**MH**
02	Pressure relief valve, pilot operated, with pulling function [1]	**DBN**
03	Size 16	**16**
	Size 22	**22**
	Size 32	**32**
04	Screw-in cartridge valve	**K**

Adjustment type

05	Grub screw with internal / external hexagon	**2**
06	Component series 30 ... 39 (30 ... 39: unchanged installation and connection dimensions)	**3X**

Pressure rating

07	Set pressure up to 420 bar [2]	**420**

Pressure adjustment

08	**Without** pressure adjustment [3]	**no code**
	With pressure adjustment	**-...** [4]

Pilot oil flow

09	Pilot oil return, external	**Y**

Seal material

10	NBR seals	**M**
	FKM seals	**V**
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	

Mounting cavity

11	M24 x 1	**FB**
	M28 x 1	**FC**
	M30 x 1.5	**LG**
	M33 x 1	**FK**

External port

12	Metric (M14 x 1)	**02**
13	Further details in the plain text	*****

1) Minimum cracking pressure, see characteristic curves pages 5 and 6

2) The values refer to the screw-in cartridge valve. If the valve is installed in a housing, it must be ensured that the set pressure of the screw-in cartridge valve does not exceed the possibly lower value of the housing.

3) Valves whose pressure is not adjusted at the factory are delivered in pressure-relieved state.

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

☞ **Notice:**
In the case of subsequent re-adjustment of valves set at the factory, the warranty will become void!

Valve types

Type	**Material no.**	**Mounting cavity** (see page 8)	**Characteristic curves** (see pages 5 and 6)
MHDBN 16 K2-3X/420YVFB02	R901051669	FB	D1 / E1
MHDBN 22 K2-3X/420YVFC02	R900936872	FC	D3 / E4
MHDBN 22 K2-3X/420YVLG02	R900768445	LG	D3 / E4
MHDBN 32 K2-3X/420YVFK02	R900727414	FK	D4 / E6

Function, section, symbol

General

The pressure valve type MHDBN...Y..02 is a pilot operated pressure relief valve for installation in block designs. It is used for system pressure limitation. The system pressure can be set steplessly via the adjustment type (4).

Pressure relief function

The valve is closed in initial position. The pressure in main port ① acts on the spool (1). At the same time, pressure is applied to the spring-loaded side of the spool (1) via nozzle (2) and to the pilot poppet (6) via nozzle (3). If the pressure in main port ① exceeds the value set at spring (5), the pilot poppet (6) opens. Hydraulic fluid flows from the spring-loaded side of the spool (1) via the nozzle (3) and channel (7) into the external port ③. The resulting pressure drop moves the spool (1) and thus opens the connection from main port ① to ② while maintaining the pressure set at the spring (5). The pilot oil return is effected externally via the channel (7) to the external port ③.

The pressure applied to port ③ is added to the pressure value set at the spring (5) in a ratio of 1:1.

Feed function

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

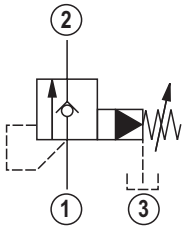
If the pressure at main port ① is lower than that at main port ②, the spool (1) will be lifted out of its seat. Hydraulic fluid flows from main port ② to main port ①. Tank preloading should be ≥ 4 bar.

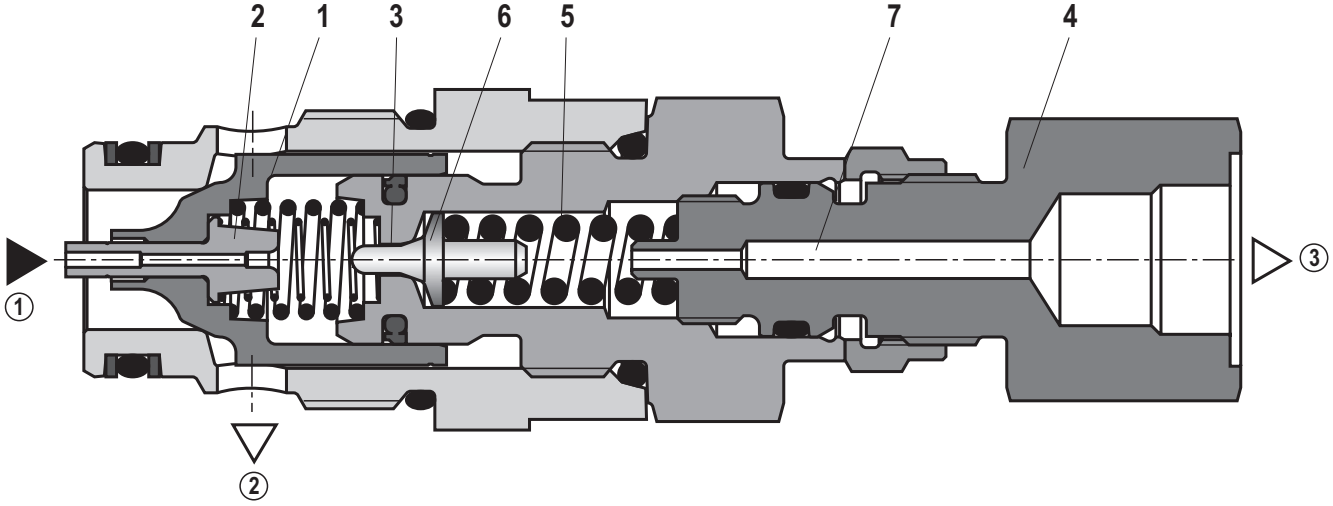
Notice:

- The cracking pressure depends on the counter / return flow pressure at main port ②.
- The pilot operated pressure valves are virtually leakage-free thanks to their design.

Symbol

Pilot oil supply "Y"





Type MHDBN . K2-3X/420.Y..02

① = Main port 1 (P)
② = Main port 2 (T)
③ = Main port 3 (Y)

Technical data
(for applications outside these values, please consult us!)

general		
Weight	kg	See page 7
Installation position		Any
Ambient temperature range	°C	–20 ... +80
Storage temperature range	°C	–20 ... +80
Surface protection		The valves do not feature any surface protection. Surface protection has to be ensured by painting the components or the entire assembly (e.g. valve with housing).

hydraulic			
Maximum operating pressure	▶ Main port ① (P)	bar	420
	▶ Main port ② (T)	bar	50
	▶ External port ③ (Y), (P_{ST})	bar	420 (added to the pressure adjustment at a ratio of 1:1)
Minimum set pressure	▶ Main port ① (P)	bar	≤ 50
Maximum flow	▶ P → T, T → P	l/min	See characteristic curves on page 5 and 6
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–30 ... +80 (NBR seal) –20 ... +80 (FKM seal)
Viscosity range		mm^2/s	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)			Class 20/18/15 [1]
Load cycles			2 million [2]

Hydraulic fluid		Classification	Suitable sealing 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	

☞ **Important information on hydraulic fluids:**
- ▶ For more information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!
- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable and flame-resistant:** When using hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate (700 mg zinc per pole tube).

[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 $ß_{10} \geq 75$.

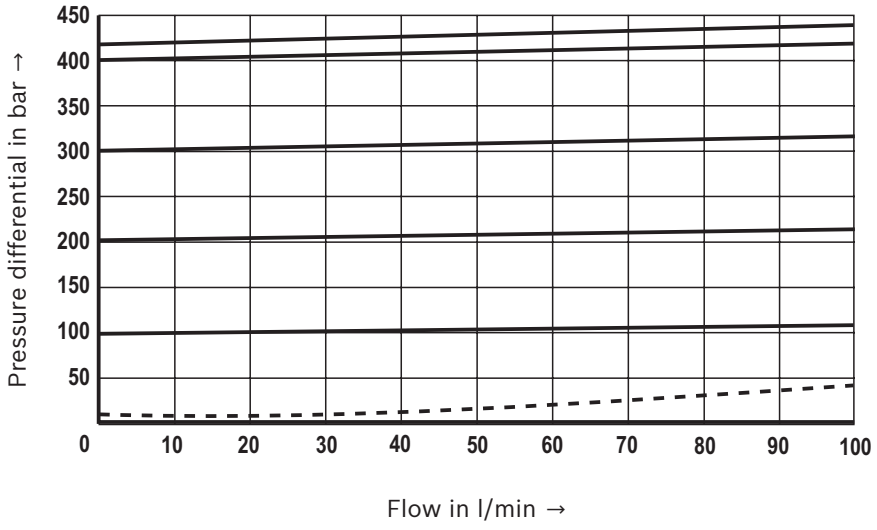
[2] Rexroth standard test condition (HLP46; ϑ_{oil} = 40 °C ± 5 °C)

☞ **Notice:**
- ▶ Under application conditions with an operating 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 operating pressure is the sum of the set pressure and counter pressure!
- ▶ The technical data was determined at a viscosity of $\boldsymbol{v}$ = 41 mm^2/s (HLP46; ϑ_{oil} = 40 °C)
- ▶ The following documentation must be observed: 64020-B1 Hydraulic valves for mobile applications
- ▶ Minimum cracking pressure see characteristic curves on pages 5 and 6
- ▶ When exchanging screw-in cartridge valves, provide for the correct tightening torque!

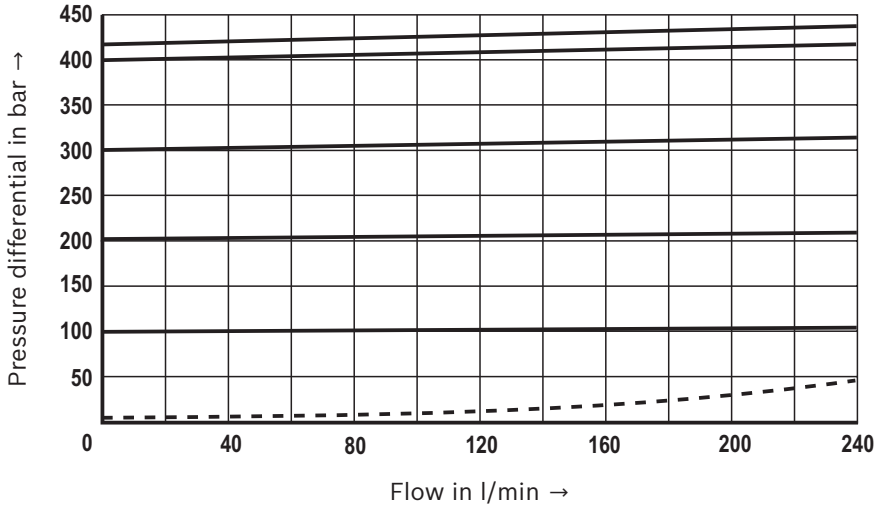
Characteristic curves

(measured with HLP46, ϑ_{Oil} = 40 ± 5 °C)

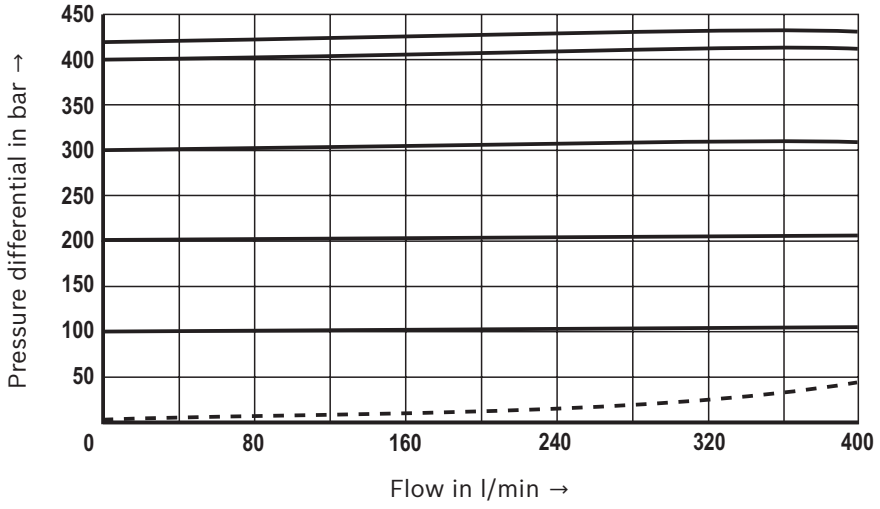
p_E-q_V characteristic curves – "D1"



p_E-q_V characteristic curves – "D3"



p_E-q_V characteristic curves – "D4"



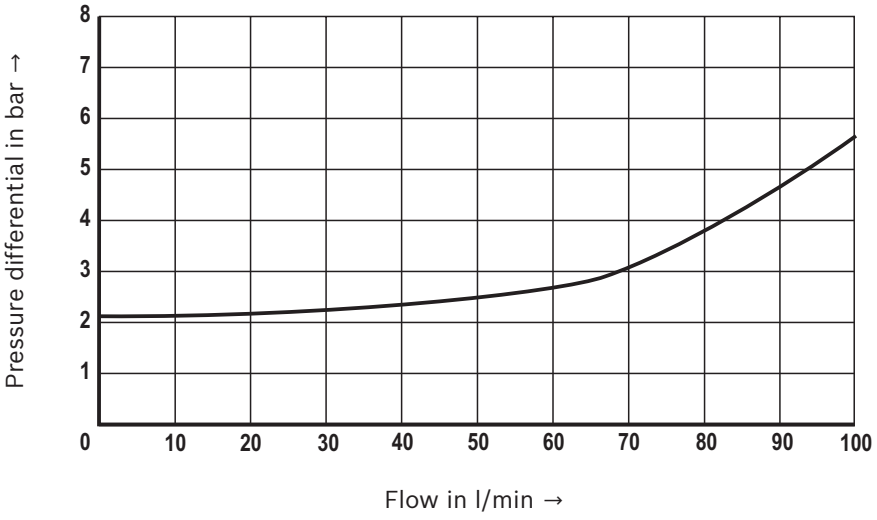
☞**Notice:**
The characteristic curves apply for a sequencing pressure of p_{St} = 0 bar without housing resistance in the entire flow range.

_ _ _ _ _ _ _
Performance limit

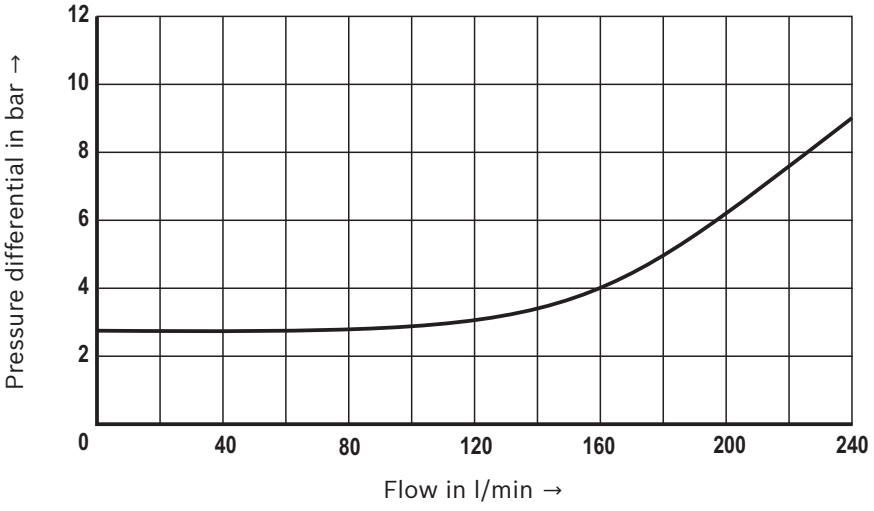
Characteristic curves

(measured with HLP46, ϑ_{oil} = 40 ± 5 °C and 24 V coil)

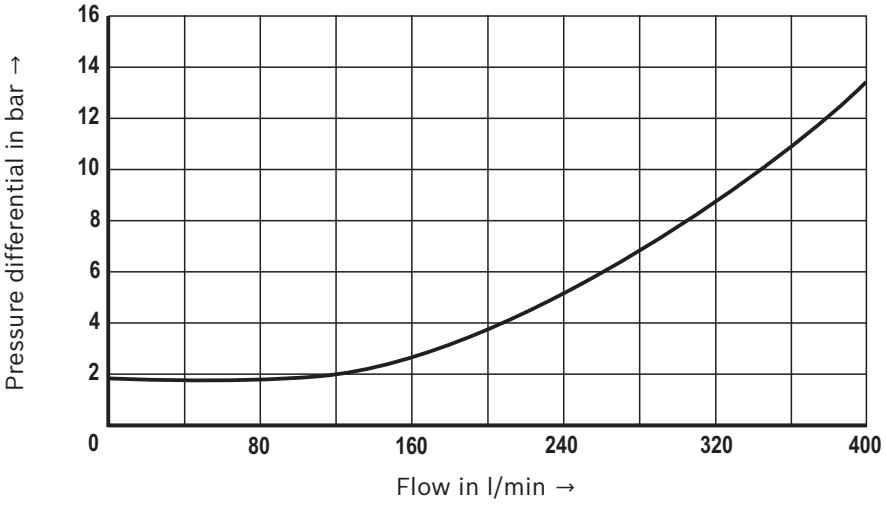
p_E-q_V characteristic curves – "E1"



p_E-q_V characteristic curves – "E4"

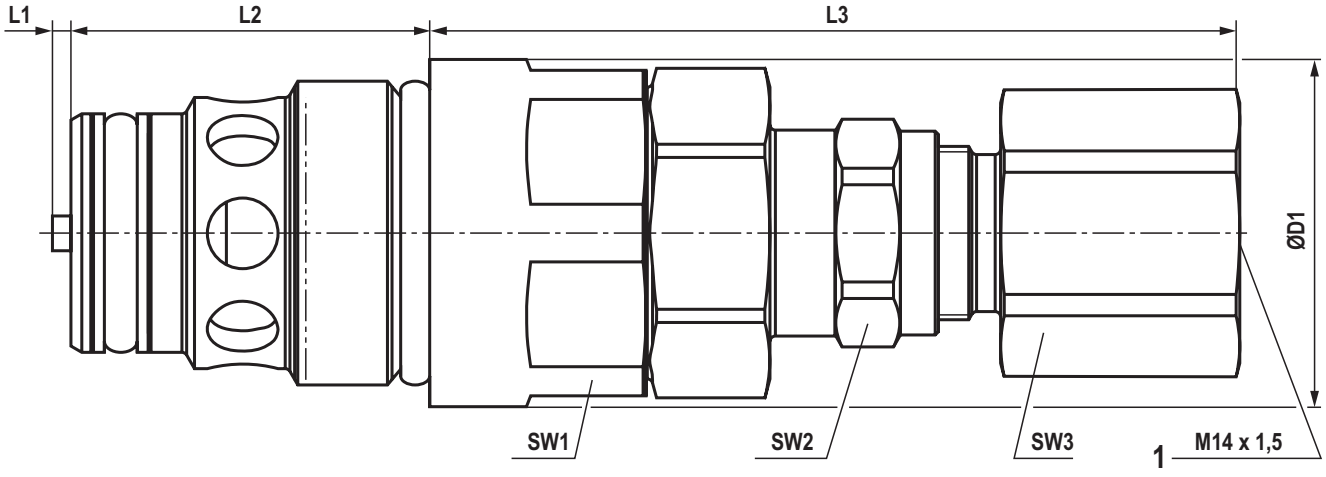


p_E-q_V characteristic curves – "E6"



☞**Notice:**
The characteristic curves apply for a sequencing pressure of p_{St} = 0 bar without housing resistance in the entire flow range.

Dimensions
(dimensions in mm)



Type	ØD1	L1	L2	L3	Wrench size			Tightening torque in Nm[1]		Weight in kg
					SW1	SW2	SW3	SW1	SW2	
MHDBN 16 K2-3X/420YVFB02	27.3	2.8	21.5	78.6	24	19	24	90 ± 10	15	0.20
MHDBN 22 K2-3X/420YVFC02	32	1.7	33	76	30	19	24	100 ± 10	15	0.46
MHDBN 22 K2-3X/420YVLG02	34.5	–	38.5	84.5	30	19	24	120 ± 12	15	0.36
MHDBN 32 K2-3X/420YVFK02	37	3.4	37.5	75.5	34	19	24	150 ± 10	15	0.46

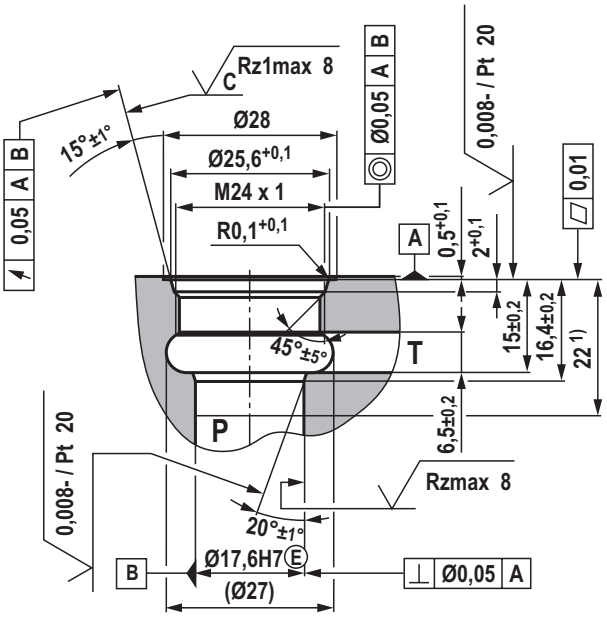
[1] Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by surface microstructure, material pairing etc. Thus, we recommend checking the mounting characteristics with original components and boundary conditions

① = Main port 1 (P)
② = Main port 2 (T)
③ = Main port 3 (Y)

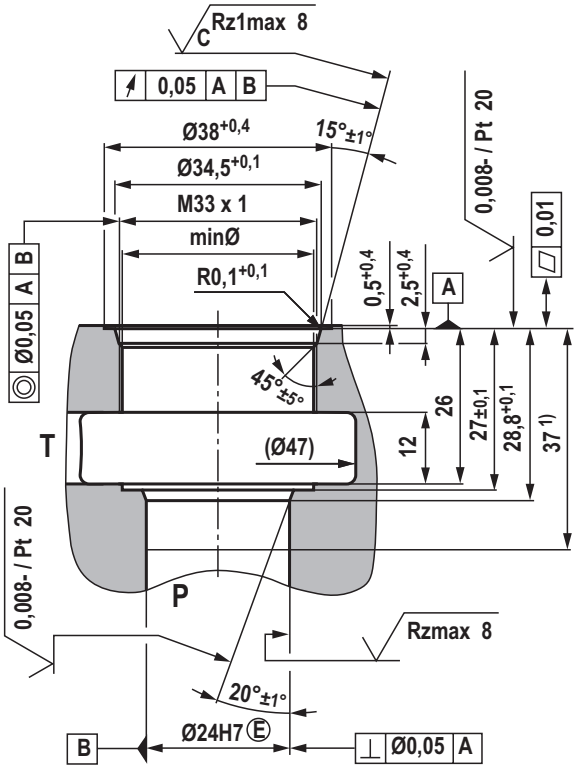
1 Port Y

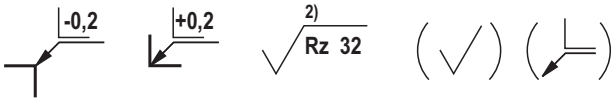
Mounting cavity
(dimensions in mm)

Version "FB" (M24 x 1)
(Drawing no. R901063585)



Version "FK" (M33 x 1)
(Drawing no. R901148145)





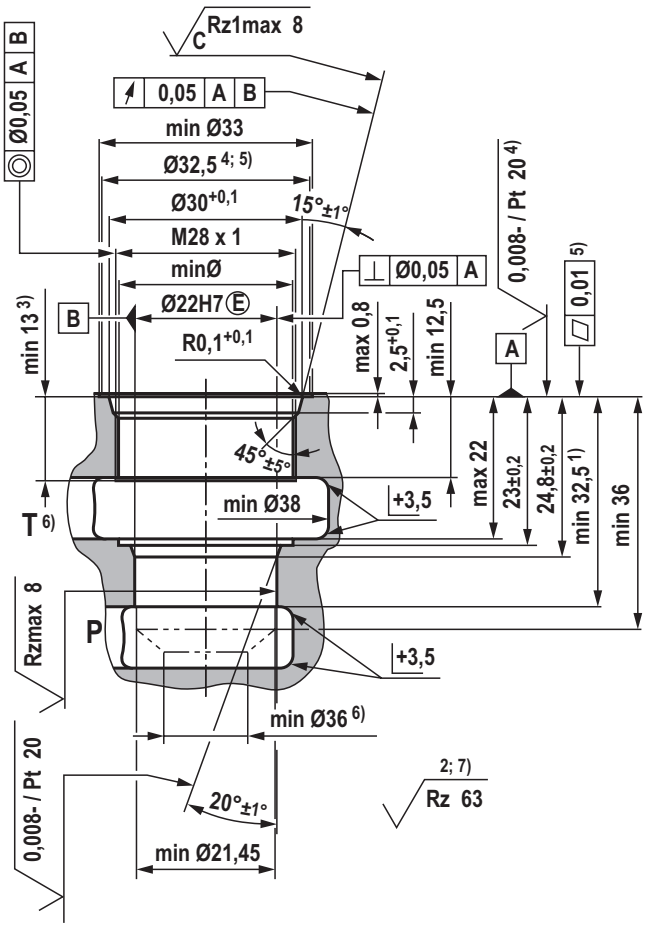
1) Depth of fit
2) Visual inspection
All seal ring insertion faces are rounded and free of burrs

Standards:

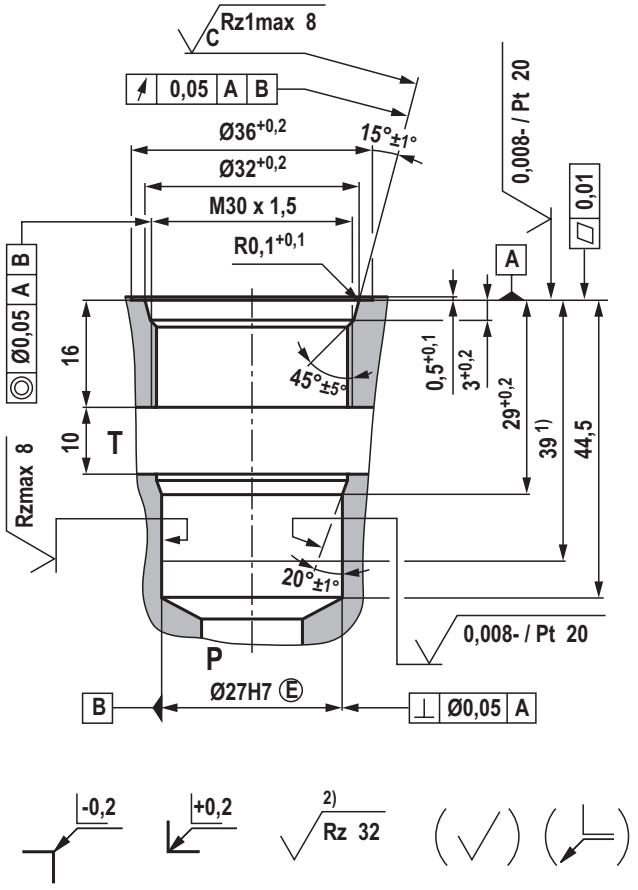
Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

Mounting cavity
(dimensions in mm)

Version "FC" (M28 x 1)
(Drawing no. RA50151421)



Version "LG" (M30 x 1.5)
(Drawing no. R901110408)



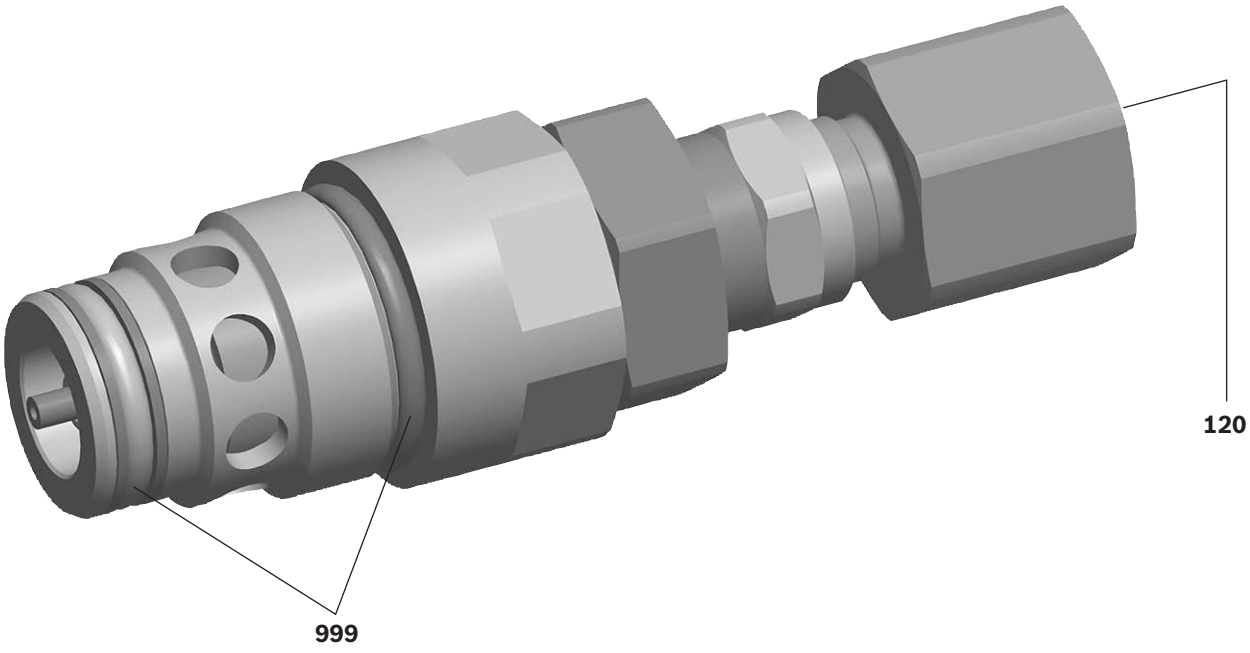
1) Depth of fit
2) Visual inspection
3) Thread depth
4) Roughness up to ø32.5 required
5) Levelness up to ø32.5 required
6) Required opening cross-section for pumps (P) and tank port (T) > 132 mm²
7) For sprues

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

Available individual components



Item	Denomination	Design	Seal material	Material no.
120	Protective plug M14 x 1.5			R900992921
999	Seal kit of the valve for mounting cavity	"FB"	FKM	R961003378
999	Seal kit of the valve for mounting cavity	"FC"	FKM	R961003380
999	Seal kit of the valve for mounting cavity	"FK"	FKM	R961003389
999	Seal kit of the valve for mounting cavity	"LG"	FKM	R961003397

Seal kits with NBR seals upon request.

Additional information

- Hydraulic fluids on mineral oil basis — Data sheet 90220
- Environmentally compatible hydraulic fluids — Data sheet 90221
- Flame-resistant, water-free hydraulic fluids — Data sheet 90222
- Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC) — Data sheet 90223
- Hydraulic valves for mobile applications — Operating instructions 64020-B1
- Selection of filters — www.boschrexroth.com/filter
- Information on available spare parts — www.boschrexroth.com/spc

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52/18-0
documentation@boschrexroth.de
www.boschrexroth.de

Notes

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52 / 18-0
documentation@boschrexroth.de
www.boschrexroth.de

Notes