

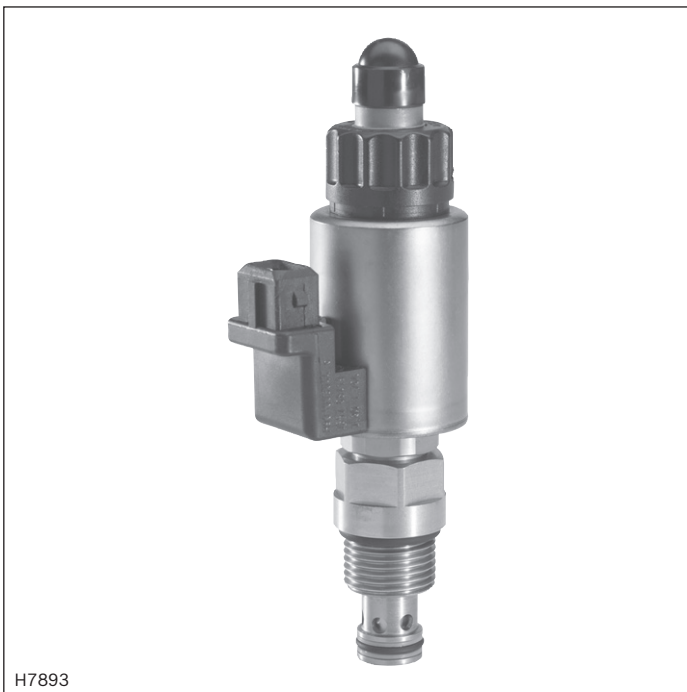
Proportional pressure relief valve, pilot operated, decreasing characteristic curve

RE 18152

Edition: 2012-07

Replaces: 05.12

Type KBVS.1B



- ▶ Component size 1
- ▶ Component series A
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 80 l/min

Features

- ▶ Cartridge valve
- ▶ Mounting cavity R/UNF10-01-0-06
- ▶ Pilot operated proportional valve for system pressure limitation
- ▶ Suitable for mobile and industrial applications
- ▶ Operation by means of proportional solenoid with central thread and detachable coil
- ▶ Rotatable solenoid coil
- ▶ Via an adjustment screw, the valve is set to maximum pressure
- ▶ In case of power failure, the maximum pressure set results
- ▶ Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics

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Ordering code (valve without coil) ¹⁾

01	02	03	04	05	06	07	08	09	10	11	12
KBVS		1	B	A	/	F	C		V		*

01	Proportional pressure relief valve, pilot operated	KBVS
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Pressure rating

02	Up to 50 bar	C
	Up to 100 bar	F
	Up to 150 bar	H
	Up to 210 bar	L
	Up to 250 bar	N
	Up to 315 bar	P
	Up to 350 bar	R
	Up to 420 bar	T

03	Component size 1	1
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04	With a command value = 0, the maximum pressure is set	B
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05	Component series	A
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06	High Performance and mounting cavity R/UNF-10-01-0-06 (see page 11)	F
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Seal material

10	FKM seals	V
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	
12	Further details in the plain text	*

Valve types (without coil) ¹⁾

Type	Material no.	Type	Material no.
KBVSC1BA/FV	R901325098	KBVSN1BA/FV	R901325107
KBVSF1BA/FV	R901325099	KBVSP1BA/FV	R901325109
KBVSH1BA/FV	R901325102	KBVSR1BA/FV	R901325111
KBVSL1BA/FV	R901325105	KBVST1BA/FV	R901325112

Available coils (separate order) ¹⁾

	Material no. for coil with connector ²⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make Deutsch	"C4" 02pol C4/Z30 AMP Junior-Timer
Direct voltage DC ³⁾			
12 V	R901002932	R901003055	R901003044
24 V / 1200 mA	R901002319	R901003053	R901003026
24 V / 800 mA	R901049962	R901050010	R901049963

¹⁾ Complete valves with mounted coil upon request

²⁾ Mating connectors, separate order, see data sheet 08006.

³⁾ Other voltages upon request.

Function, symbol

General

Valves of type KBVS are pilot operated proportional pressure relief valves in spool design and are used to limit the pressure in hydraulic systems. They mainly consist of the screwed-in proportional pilot control valve (1) and the main valve (2).

These valves can be used for infinitely adjusting the pressure to be limited depending on the command value. With command value 0 or in case of power failure, the maximum pressure is set (fail-safe characteristics).

Function

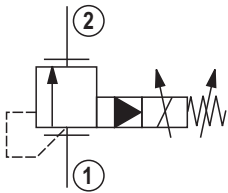
In the factory, the valves are mechanically set to the maximum pressure. For the proportional reduction of the system pressure, a command value is specified at the control electronics. The electronics control the solenoid coil with electric current depending on the command value, which via the pilot control valve (1) and the main valve (2) causes the actual pressure adjustment in main port ①.

(p_{max} = command value 0; p_{min} = command value max)

Notice!

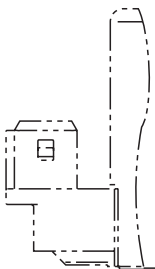
Occurring tank pressures (main port ②) are added up to the set values in main port ①.

Symbol

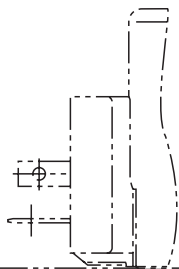


- ① = Main port 1
- ② = Main port 2

Version "C4"

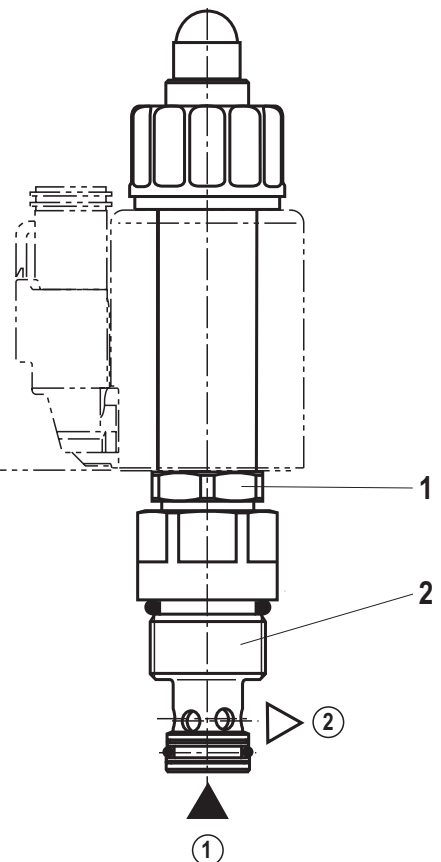


Version "K4"



Version "K40"

(with mating connector)



Type KBVS.1B..

Technical data (For applications outside these parameters, please consult us!)

general		
Weight	kg	0.75
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	-40 to +120 (see page 8 and 9)
Storage temperature	°C	-20 to +80

Environmental audits

Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Y)		
DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz to 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 to 57 Hz, amplitude 1.6 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broad-band noise	20 to 2000 Hz, amplitude 0.1 g ² /Hz (14 g RMS/30 g peak), testing time 24 h
DIN EN 60068-2-27: 03/95	Shocking	Half-sine 15 g / 11 ms; 3 x in positive, 3 x in negative direction (a total of 6 single shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half-sine 15 g / 11 ms; 1000 x in positive, 1000 x in negative direction (a total of 2000 single shocks)


Indication per axis

Climatic test according to EN 60068-2 / IEC 60068-2 (environmental audit)		
DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles -25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles à 24 h
Salt spray test according to DIN 50021		h 720

→ Coating generally not necessary. If paint is applied nevertheless, the reduced heat dissipation capacity is to be observed.

Technical data (For applications outside these parameters, please consult us!)

hydraulic			
Maximum operating pressure ¹⁾	– Main port ①	bar	420
Maximum admissible return flow pressure	– Main port ②	bar	210
Maximum set pressure ²⁾			See command value pressure characteristic curves page 7
Maximum set pressure with command value 0			See characteristic curves page 7
Maximum flow		l/min	80
Pilot oil		l/min	< 0.8
Leakage		ml/min	< 200 (with $\Delta p = 250$ bar; closed pilot control valve and HLP46, $\vartheta_{oil} = 40$ °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm ² /s	5 to 400 (preferably 10 to 100)
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ³⁾
Load cycles			10 million
Hysteresis ⁴⁾			< 4 % of the max. set pressure
Turnover voltage ⁴⁾			< 0.5 % of the max. set pressure
Response sensitivity ⁴⁾			< 0.5 % of the max. set pressure
Manufacturing tolerance of the command value pressure characteristic curve	– Command value 100 %		< 2 % of the max. set pressure
	– Command value 0		< 5 % of the max. set pressure
Step response ($T_u + T_g$) 0 → 100 % and/or 100 % → 0		ms	100 (depending on the system)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	FKM	VDMA 24568
	– Soluble in water	FKM	
 Important information on hydraulic fluids!		► Bio-degradable: When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.	
<ul style="list-style-type: none"> ► For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us! ► There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)! ► The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature. 			

¹⁾ The maximum operating pressure is added up from the set pressure and the return flow pressure!

²⁾ The valves are factory-set. In case of subsequent adjustment, the warranty will become invalid!

³⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components. For the selection of the filters see www.boschrexroth.com/filter.

⁴⁾ Measured with analog amplifier type RA2-1/10, see data sheet 95230 (PWM = 300 Hz).

Technical data (For applications outside these parameters, please consult us!)

electric					
Voltage type		Direct voltage			
Supply voltages	V	12 DC	24 DC	"-8" / 24 DC	
Maximum solenoid current	mA	1760	1200	800	
Coil resistance	- Cold value at 20 °C	Ω	2.3	4.8	11.5
	- Max. hot value	Ω	3.8	7.9	18.9
Duty cycle	%	See characteristic curve page 8 and 9 ⁵⁾			
Maximum coil temperature ⁶⁾	°C	150			
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked			
	- Version "C4"	IP 66 with mating connector mounted and locked			
		IP 69K with Rexroth mating connector (material no. R901022127)			
	- Version "K40"	IP 69K with mating connector mounted and locked			
Control electronics (separate order)		Plug-in proportional amplifier type VT-SSPA1...	Data sheet 30116		
		Analog amplifier type RA...	Data sheet 95230		
		BODAS control unit type RC...	Data sheet 95200		
Recommended dither frequency (PMW)	Hz	300			
Design according to VDE 0580					

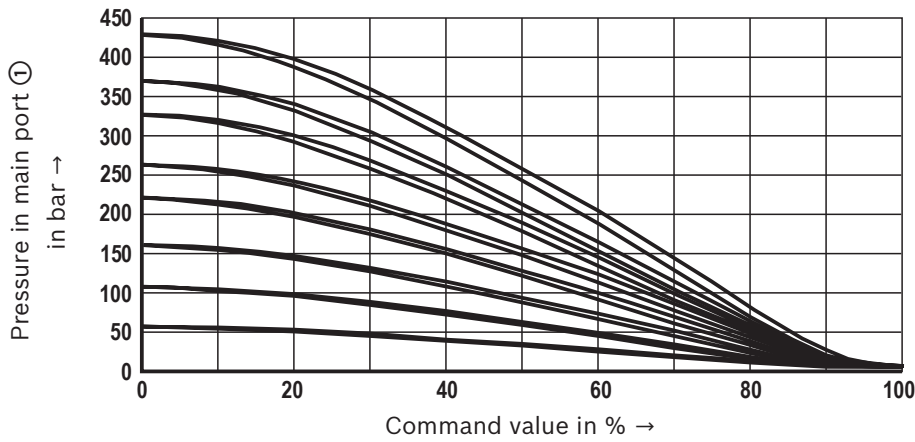
⁵⁾ In case of use in altitudes > 2000 m a.s.l., we recommend consulting the manufacturer.

⁶⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

When establishing the electrical connection, the protective earthing conductor (PE \perp) has to be connected properly.

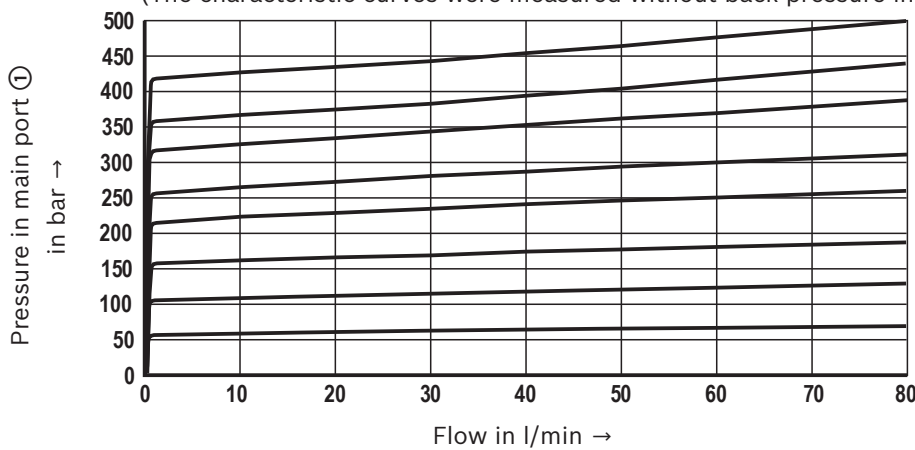
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ and 24 V coil)

Pressure in main port ① depending on the command value; flow = 10 l/min



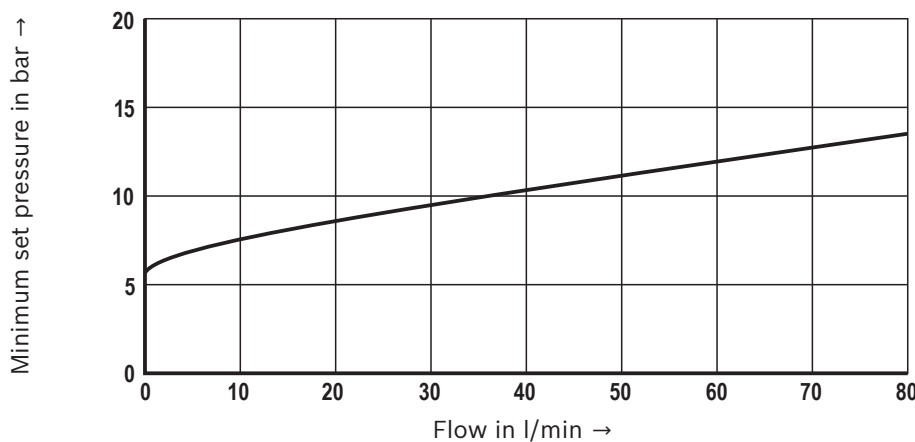
Pressure in main port ① depending on the flow.

(The characteristic curves were measured without back pressure in main port ②)



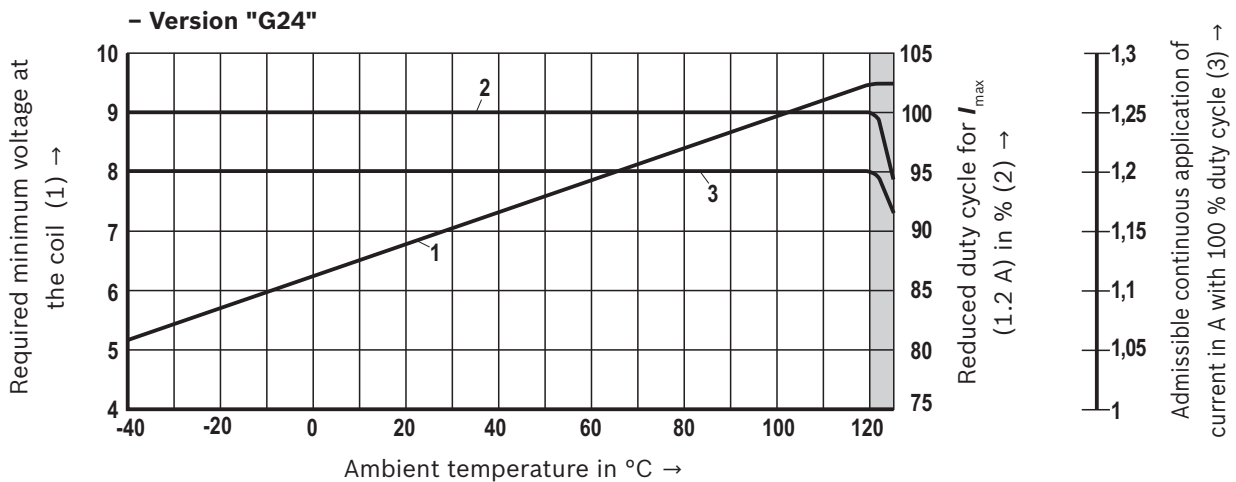
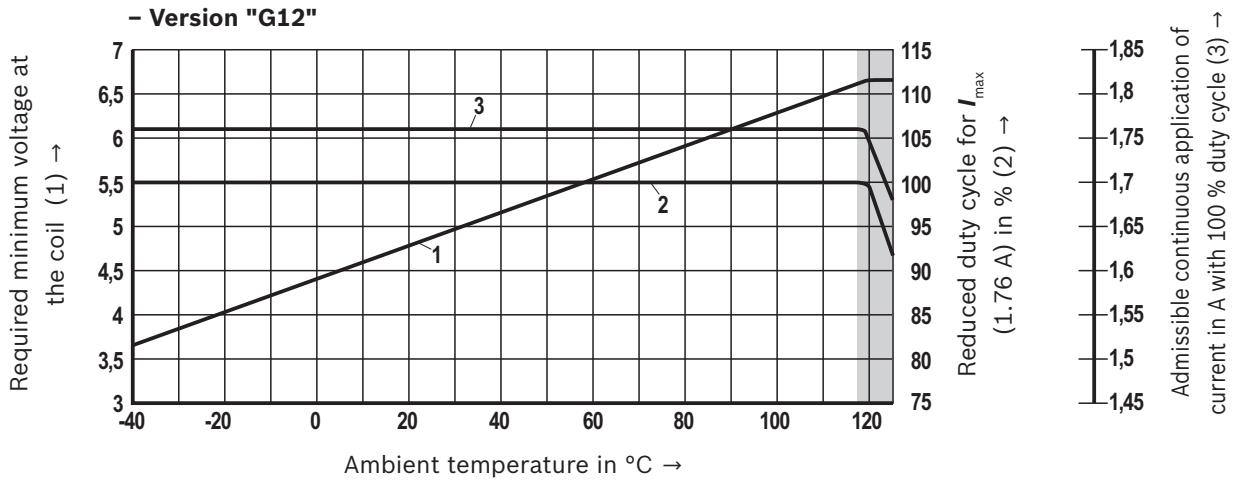
Minimum set pressure in the main port ① depending on the flow.

(The characteristic curves were measured without back pressure in main port ②)



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range depending on the ambient temperature



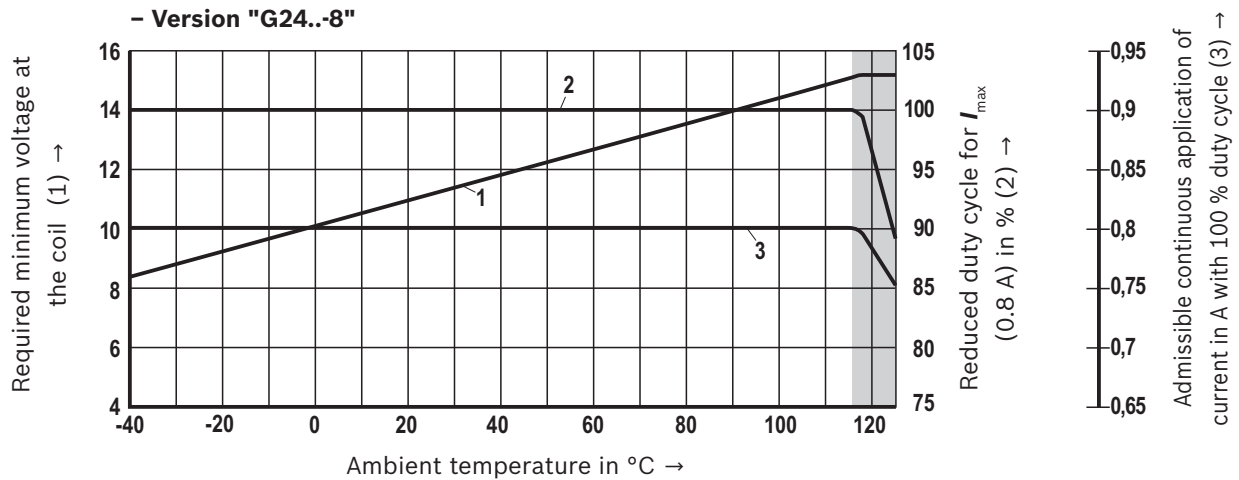
Limited valve performance

Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air. Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened. In single cases, more unfavorable conditions may lead to limitations of the area of application.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range depending on the ambient temperature



Limited valve performance

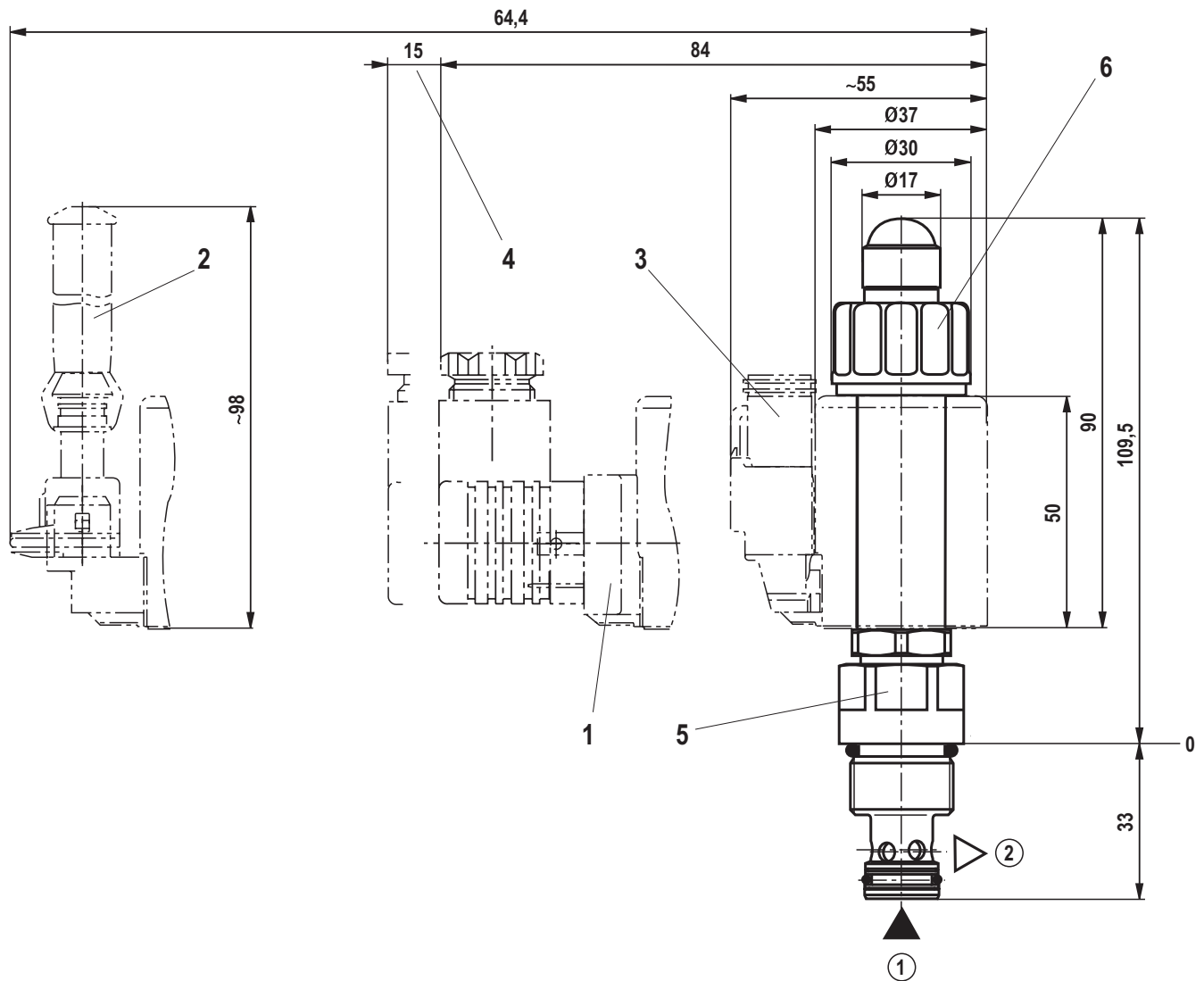
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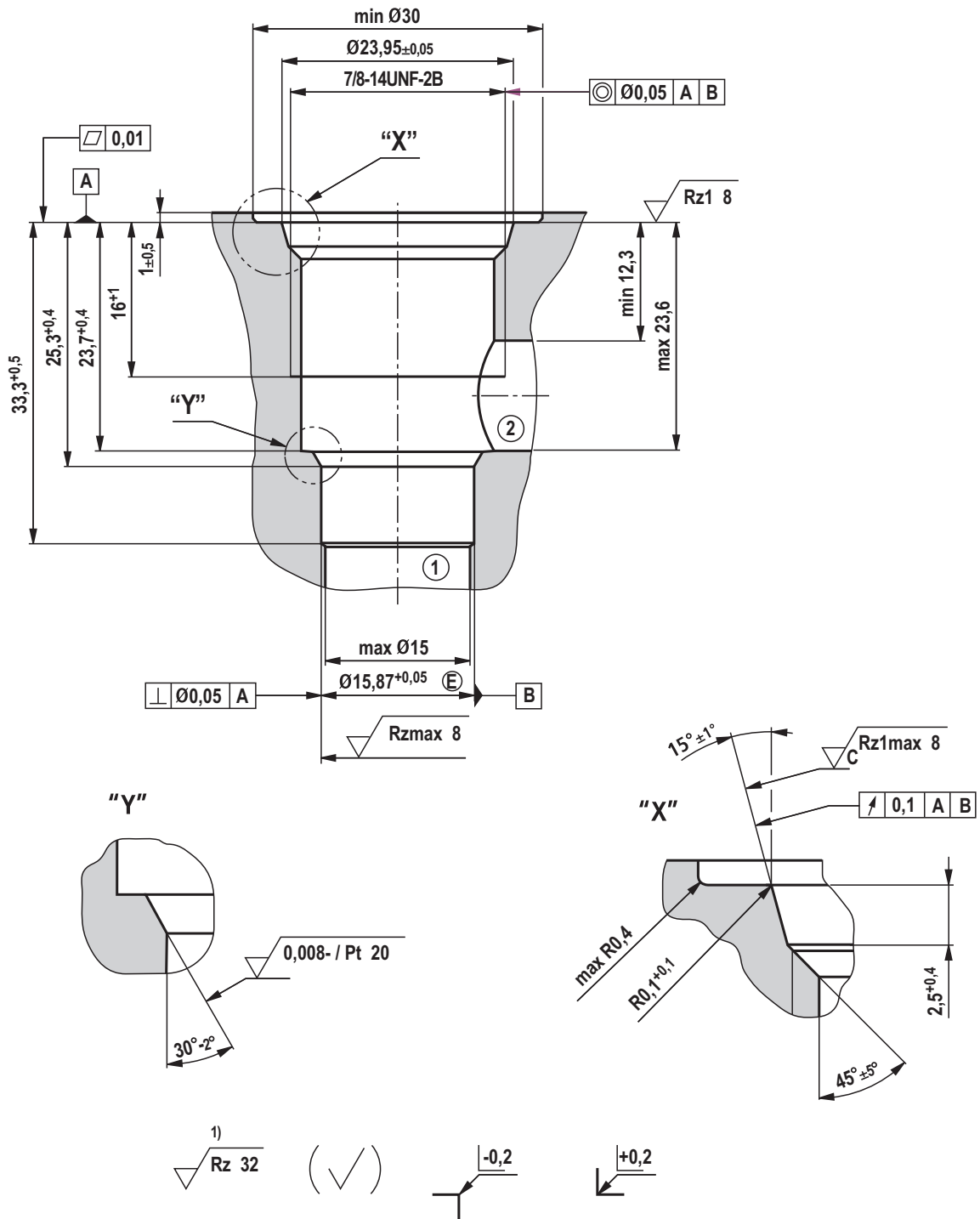
Unit dimensions (dimensions in mm)



- 1 Mating connectors, separate order, see data sheet 08006
- 2 Space required to remove the mating connector
- 3 SW24, tightening torque $M_A = 55^{+5}$ Nm
- 4 Version "K4"
- 5 Version "K40"
- 6 Version "C4"
- 7 Nut, tightening torque $M_A = 5^{+1}$ Nm

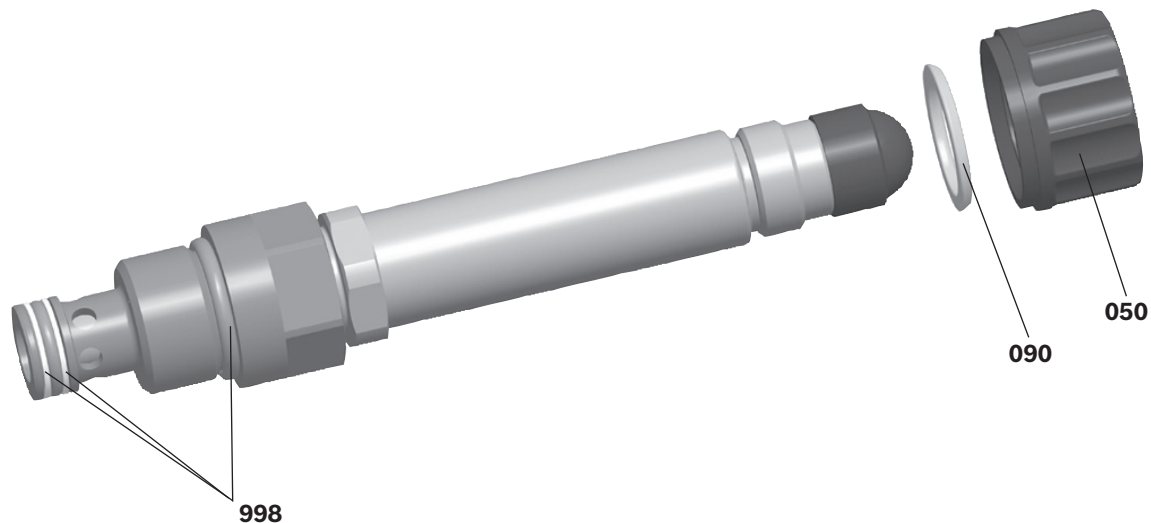
- ① = Main port 1
- ② = Main port 2

Mounting cavity R/UNF-10-01-0-06; 2 main ports; thread 7/8-14UNF-2B (dimensions in mm)



1) Visual inspection

- ① = Main port 1
- ② = Main port 2

Available individual components

Item	Denomination	Material no.
050	Nut	R900992146
090	Seal ring for pole tube	R900007769
998	Seal kit of the valve	R901006735

Coils, separate order, see page 2

More information

- ▶ Control electronics:
 - Plug-in proportional amplifier type VT-SSPA1...
 - Analog amplifier type RA...
 - BODAS control unit type RC...
- ▶ Selection of the filters

Data sheet 30116

Data sheet 95230

Data sheet 95200

www.boschrexroth.com/filter

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