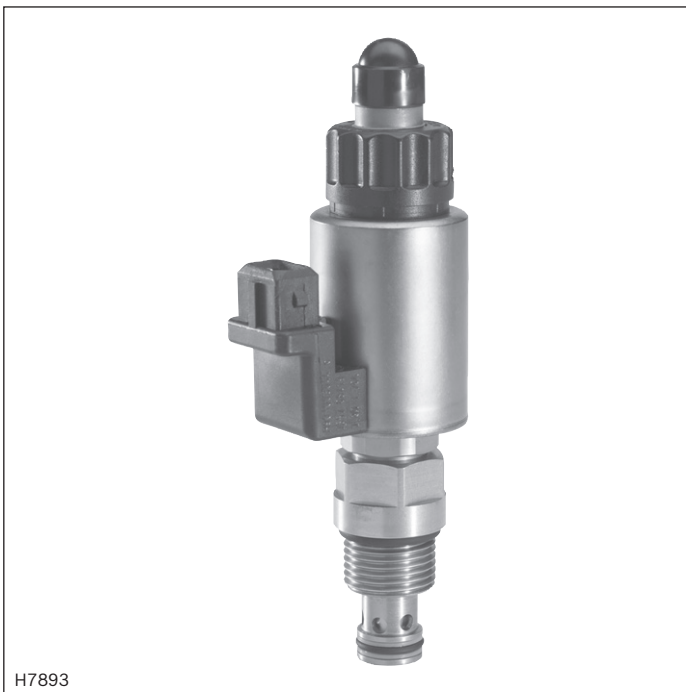


Proportional pressure relief valve, pilot operated, increasing characteristic curve

RE 18160

Edition: 2012-05

Type KBVS.1A



H7893

- ▶ 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 minimum pressure is set
- ▶ Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics

Contents

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Ordering code

01	02	03	04	05	06	07	08	09	10	11	12
KBVS		1	A	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 minimum pressure is set	A
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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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07	Proportional solenoid, wet-pin	C
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Supply voltage

08	Control electronics 12 V DC	G12
	Control electronics 24 V DC	G24

Electrical connection

09	Without mating connector, with connector according to DIN EN 175301-803	K4
	Without mating connector, with connector DT 04-2PA (Deutsch connector)	K40
	Without mating connector, with connector AMP Junior-Timer	C4

Seal material

10	FKM seals	V
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	

11	Standard version	no code
	Coil 800 mA (see page 6)	-8

12	Further details in the plain text	*
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¹⁾ Mating connectors, separate order, see data sheet 08006.

Valve types

Type	Material no.	Type	Material no.
KBVSC1AA/FCG24K40V	R901290550	KBVSN1AA/FCG24K40V	R901290569
KBVSF1AA/FCG24K40V	R901290561	KBVSP1AA/FCG24K40V	R901290570
KBVSH1AA/FCG24K40V	R901290562	KBVSR1AA/FCG24K40V	R901290580
KBVSL1AA/FCG24K40V	R901290567	KBVST1AA/FCG24K40V	R901290585

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 minimum pressure is set.

Function

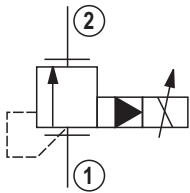
For the proportional increase in the system pressure, a command value is specified at the control electronics. The electronics control the solenoid coil with electric current depending on the command value, which via the pilot control valve (1) and the main valve (2) causes the actual pressure adjustment in main port ①.

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

Notice!

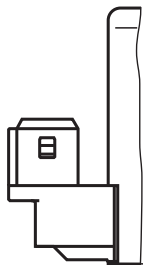
Occurring tank pressures (main port ②) are added up to the set values in main port ①.

Symbol

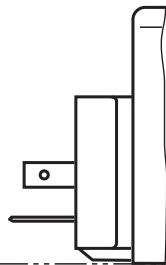


- ① = Main port 1
- ② = Main port 2

Version "C4"

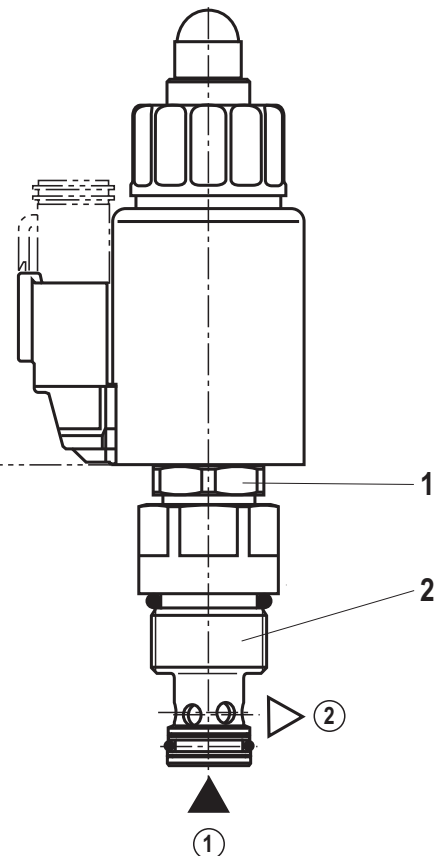


Version "K4"



Version "K40"

(with mating connector)



Type KBVS.1A..

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 %	< 5 % of the max. set pressure
	– Command value 0	< 2 % 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	HEES	VDMA 24568
	– Soluble in water	HEPG	
 Important information on hydraulic fluids! ► 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.		► Bio-degradable: When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.	

- 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!)

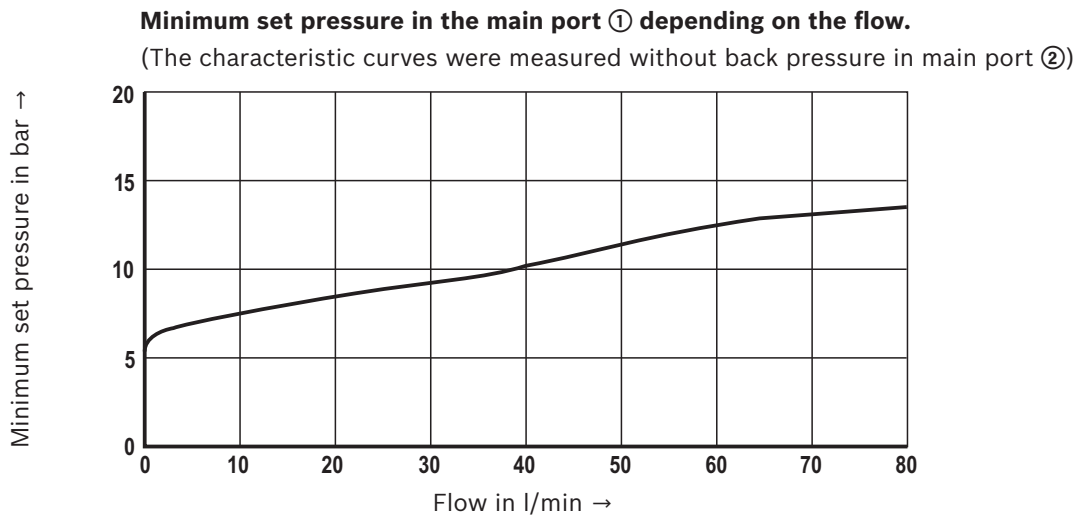
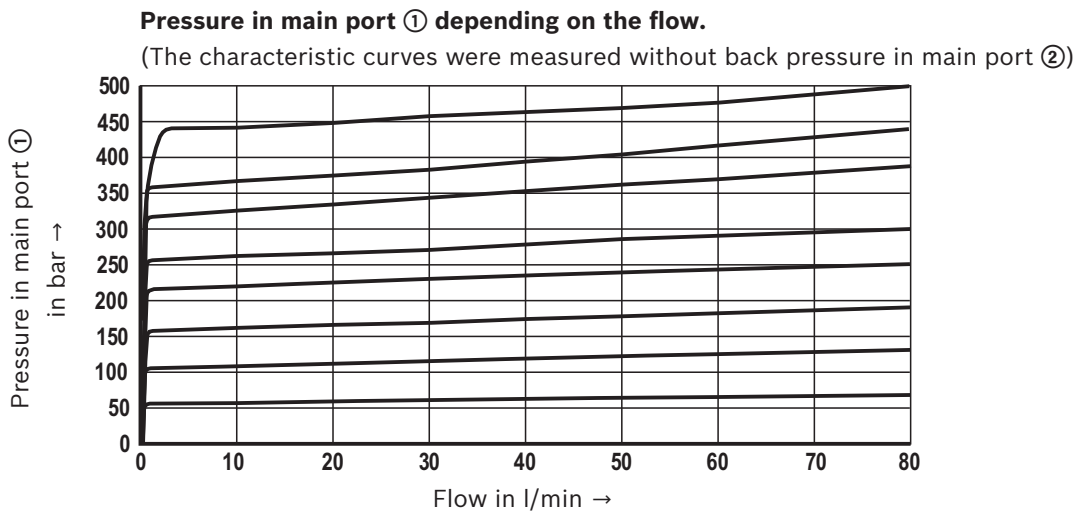
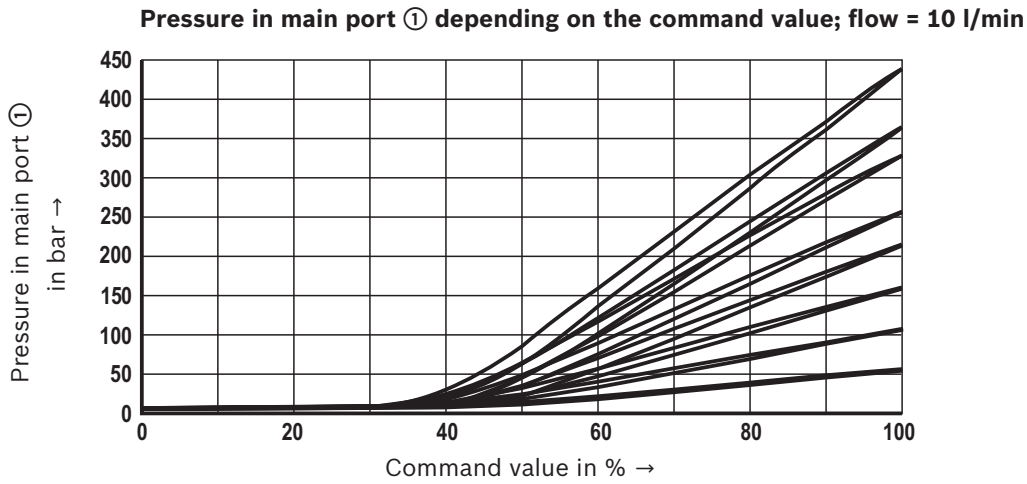
electric					
Voltage type		Direct voltage			
Supply voltages	V	12 DC	24 DC	"-8" / 24 DC	
Maximum solenoid current	mA	1760	1200	800	
Coil resistance	- Cold value at 20 °C	Ω	2.3	4.8	11.5
	- Max. hot value	Ω	3.8	7.9	18.9
Duty cycle	%	See characteristic curve page 8 and 9 ⁵⁾			
Maximum coil temperature 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!

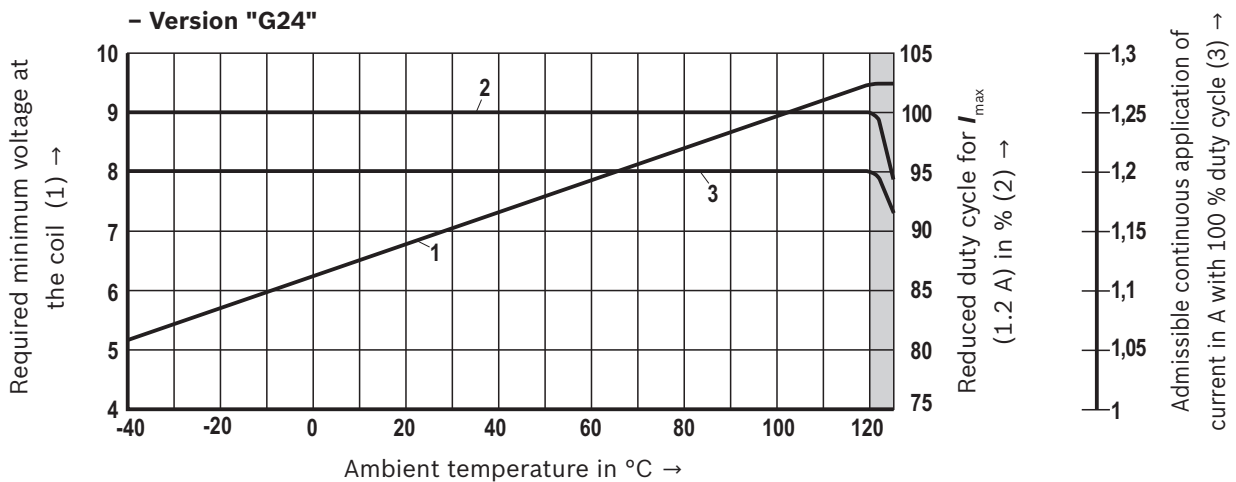
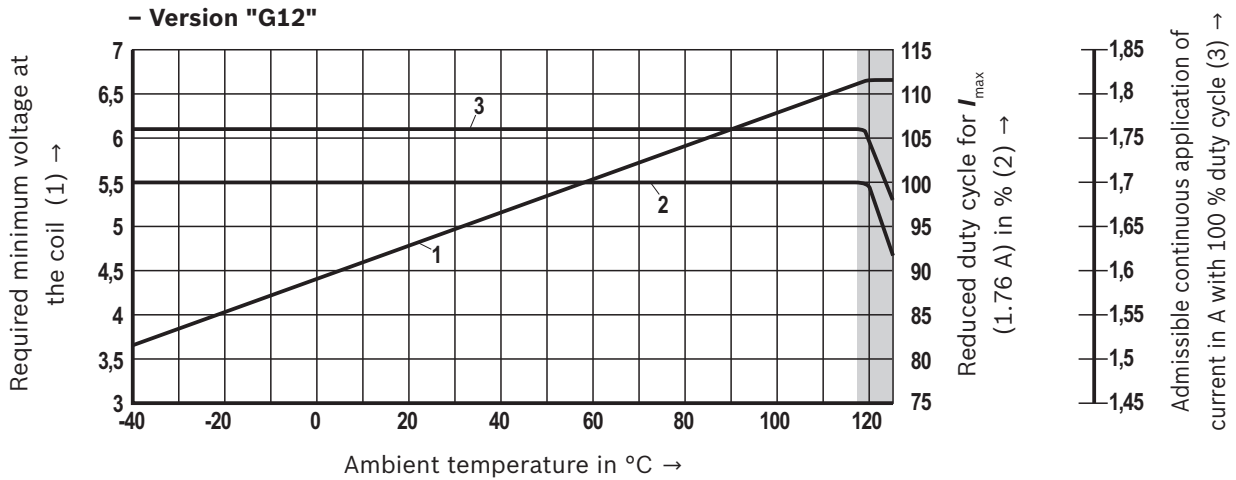
When establishing the electrical connection, the protective earthing conductor (PE \perp) has to be connected properly.

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



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range depending on the ambient temperature



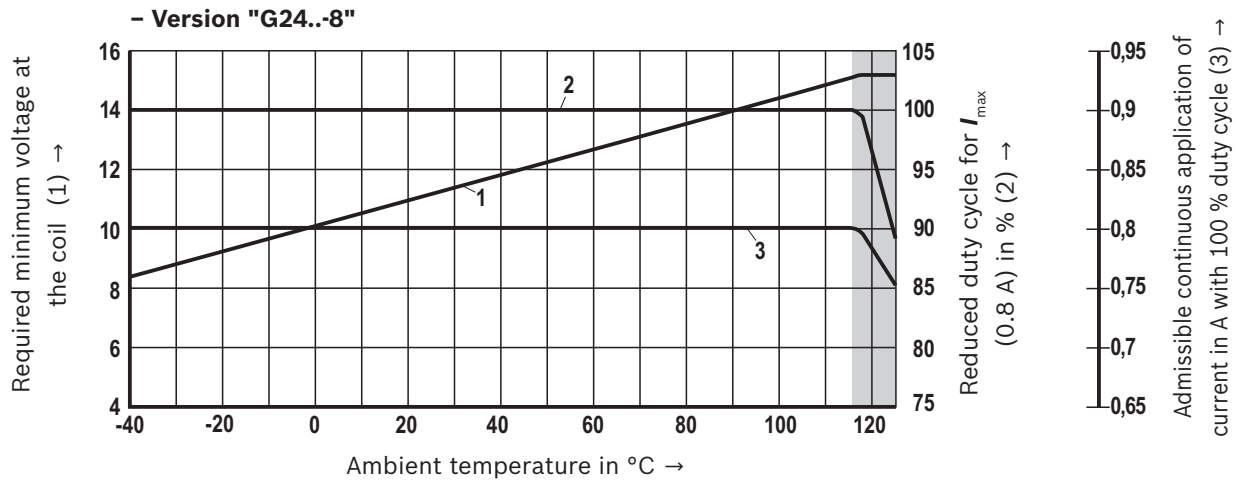
Limited valve performance

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

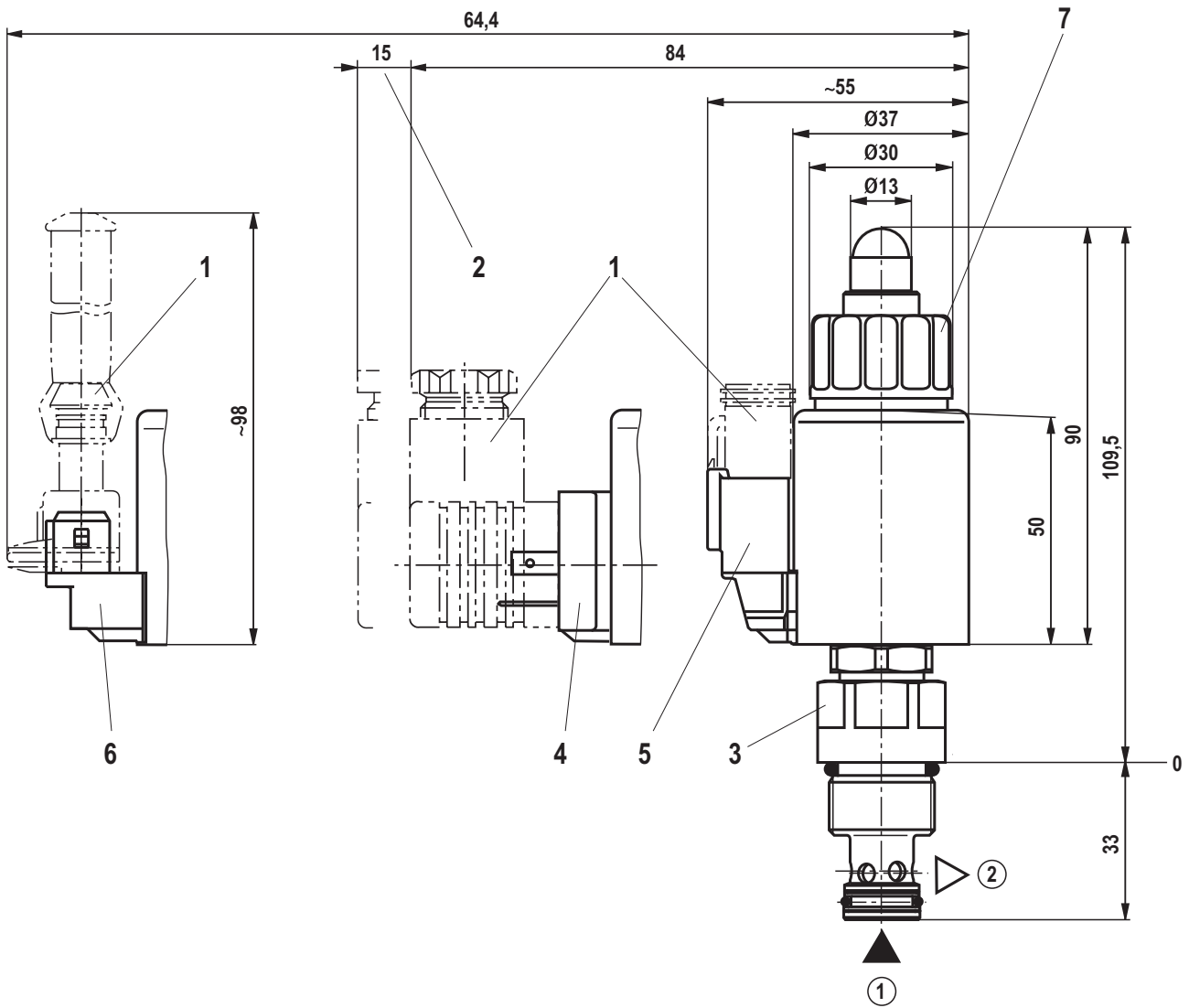
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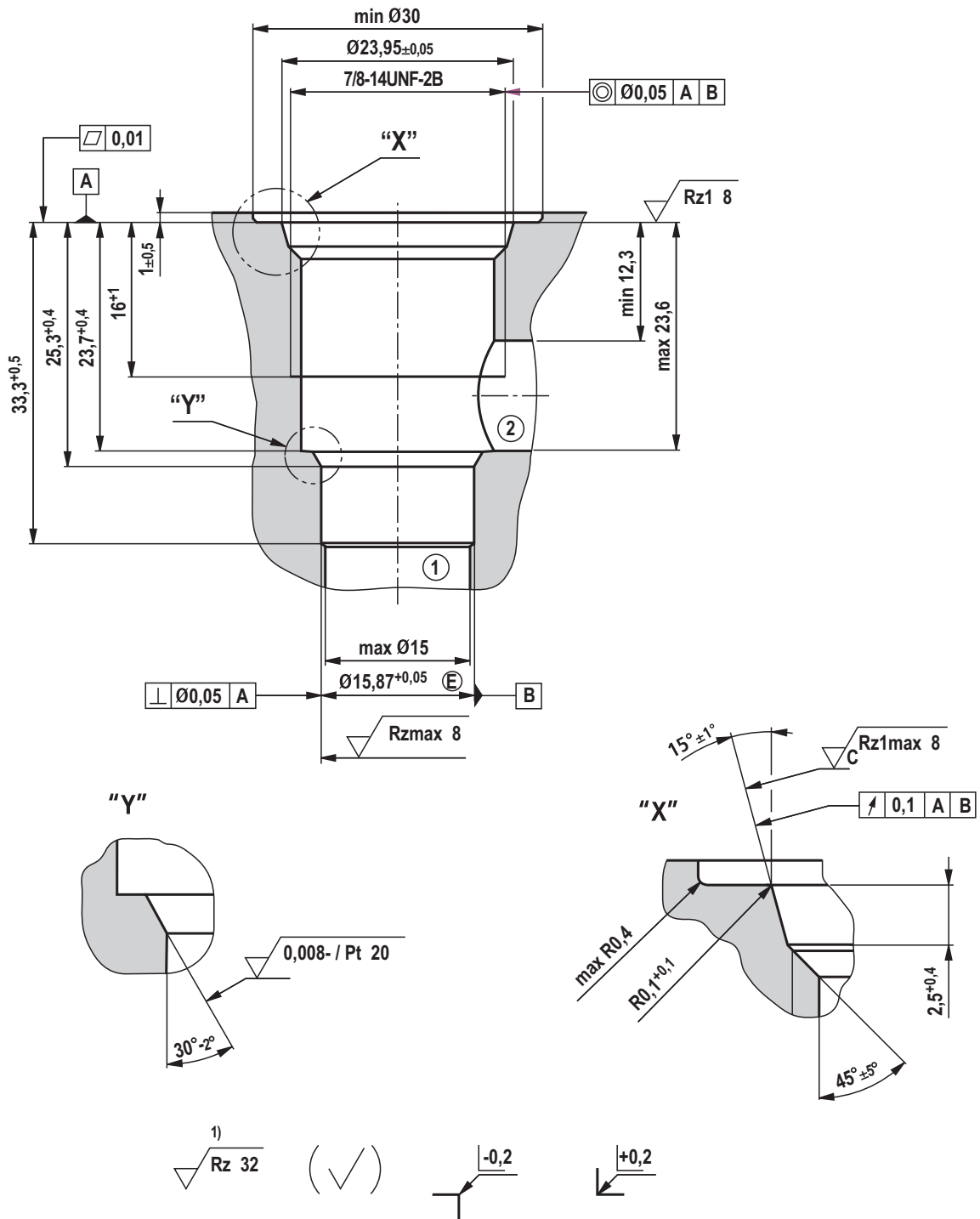
Unit dimensions (dimensions in mm)



- 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

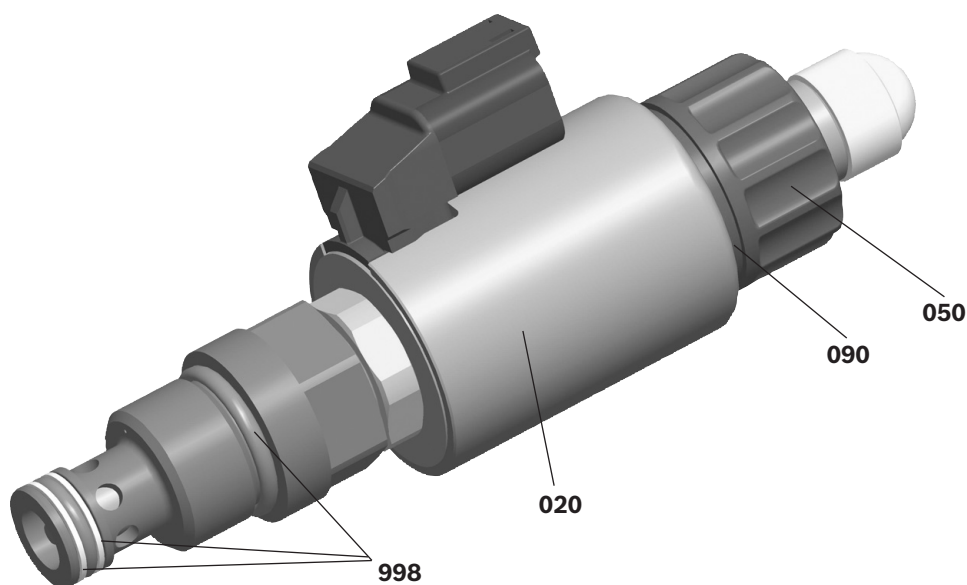
- ① = Main port 1
- ② = Main port 2

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		Direct voltage	Material no.
020	Coil for individual connection ¹⁾	K4	12 V 24 V / 1200 mA 24 V / 800 mA	R901002932 R901002319 R901049962
		K40	12 V 24 V / 1200 mA 24 V / 800 mA	R901003055 R901003053 R901050010
		C4	12 V 24 V / 1200 mA 24 V / 800 mA	R901003044 R901003026 R901049963
050	Nut			R900992146
090	Seal ring for pole tube			R900007769
998	Seal kit of the valve			R901006735

¹⁾ After exchange of the solenoid coil, the pressure set in the factory may change by $\pm 5\%$.

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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