

Proportional pressure relief valve, pilot operated, falling characteristic curve

RE 18375/04.12
Replaces: 08.11

1/12

Type KBVS (High Performance)

Size 2
Component series A
Maximum operating pressure 420 bar
Maximum flow 250 l/min



H7683

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Features

- Cartridge valve
- Mounting cavity R/FD
- Pilot operated proportional valve for the limitation of a system pressure
- Suitable for mobile and industrial applications
- Operation by means of proportional solenoid with central thread and detachable coil
- Rotatable solenoid coil
- Fine balancing of the command value/pressure characteristic curves possible externally on the control electronics
- Valves are adjusted to maximum pressure by means of an adjustment screw
- In the event of a power failure, maximum set pressure becomes effective
- Control electronics: Data sheet
 - Plug-in proportional amplifier Type VT-SSPA1... 30116
 - Analog amplifier Type RA... 95230
 - BODAS control unit Type RC... 95200

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

KBVS		2	B	A / DD	C			Y	V		*
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Proportional pressure relief valve, pilot operated

Pressure rating

up to 315 bar

= P

up to 420 bar

= T

Other pressure stages upon request

Size 2

= 2

Maximum pressure at command value = 0

= B

Component series

= A

High-performance and mounting cavity R/FD

= DD

(see page 10)

Proportional solenoid, wet-pin

= C

Supply voltage

Control electronics 12 V DC

= G12

Control electronics 24 V DC

= G24

Further details in the plain text

No code =

Standard

-8 =

Coil 800 mA
(see page 5)

Seal material

V =

FKM seals

Attention!

Observe compatibility of seals with hydraulic fluid used!

Y =

Pilot oil supply internal,
pilot oil return external

Electrical connection ¹⁾

K4 = without mating connector, with connector according to DIN EN 175301-803

K40 = without mating connector, with connector DT 04-2PA (Deutsch plug)

C4 = without mating connector, with connector AMP Junior-Timer

¹⁾ Mating connectors, separate order, see data sheet 08006.

Preferred types

Type	Material number
KBVSP 2 BA/DDCG24K4YV	R901138473
KBVST 2 BA/DDCG24K40YV-8	R901233649

Function, symbol

General

Type KBVS valves are pilot operated proportional pressure relief valves of poppet design and are used for limiting the pressure in hydraulic systems. They basically 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 in dependence upon the command value. At command value 0 or in the event of a power failure, the maximum pressure is set (fail-safe characteristics).

Basic principle

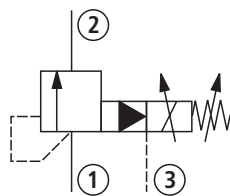
The mechanics of the valve are factory-set to the maximum pressure. A command value for the proportional reduction of the system pressure is selected on the control electronics. The electronics control the solenoid coil with electric current in dependence upon the command value, which causes the actual pressure adjustment in main port ① via the pilot control valve (1) and the main valve (2).

(p_{\max} = command value 0; p_{\min} = command value max.)
The pilot oil return is effected externally via main port ③.

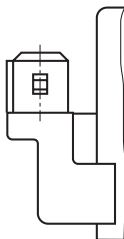
Notice!

Any occurring tank pressure (main port ②) is added up to the set values in main port ①.

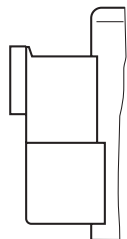
Symbol



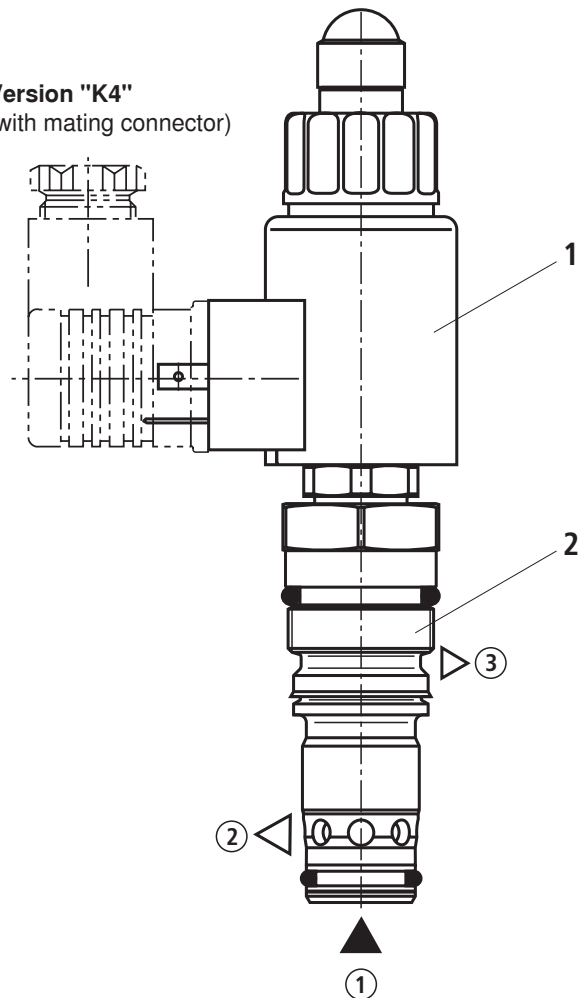
Version "C4"



Version "K40"



Version "K4"
(with mating connector)



- ① = main port 1 (P)
- ② = main port 2 (T)
- ③ = main port 3 (Y)

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

general

Weight	kg	0.66
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, a suspended installation is recommended.
Ambient temperature range	°C	-20 to +120
Storage temperature range	°C	-20 to +80

Environmental audits:

Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 3 axes (X/Y/Z)		
DIN EN 60068-2-6: 05/96	Vibrations, sinusoidal	10 cycles, 5 to 2000 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 broadband 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	Shock test	Half sine 15 g / 11 ms, 3 x in positive, 3 x in negative direction (a total of 6 individual 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 individual shocks)

Details per axis:

Climatic test according to DIN EN 60068-2 / IEC 60068-2 (environmental test):		
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, 24 h each

Salt spray test: 720 h according to DIN 50021

→ Finish painting generally not required. Should you nevertheless wish to apply a finish coat, observe the reduced heat dissipation capacity.

hydraulic

Maximum operating pressure ¹⁾ (main port ①)	bar	420
Maximum permissible return flow pressure (main port ② and ③)	bar	30
Maximum set pressure ²⁾		See command value/pressure characteristic curves on page 6
Minimum set pressure at max. command value		See characteristic curves on page 6
Maximum flow	l/min	250
Hydraulic fluid		See page 5
Hydraulic fluid temperature range	°C	-20 to +80
Viscosity range	mm ² /s	15 to 380
Max. permissible degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 ³⁾

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

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

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 selecting the filters, see www.boschrexroth.com/filter.

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

hydraulic

Hysteresis ⁴⁾	< 4 % of the maximum set pressure	
Range of inversion ⁴⁾	< 0.5 % of the maximum set pressure	
Response sensitivity ⁴⁾	< 0.5 % of the maximum set pressure	
Manufacturing tolerance of the command value/pressure characteristic curve	– Command value 100 %	< 2 % of the maximum set pressure
	– Command value 0	< 5 % of the maximum 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 and related hydrocarbons	HL, HLP, HLPD, HVLP, HVLDP	FKM	DIN 51524
Environmentally compatible	– Insoluble in water	HEES	FKM
		HEPR	FKM
	– Soluble in water	HEPG	FKM
Flame-resistant	– Water-free	HFDU, HFDR	FKM
	– Water-containing	HFAS	FKM



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 process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.

- **Flame-resistant – water-containing:** Maximum pressure differential per control edge 175 bar; otherwise, increased cavitation erosion!
Tank pre-loading < 1 bar or > 20 % of the pressure differential. The pressure peaks should not exceed the maximum operating pressures!
- **Environmentally compatible:** When using environmentally compatible hydraulic fluids that are simultaneously zinc-soluble, zinc may accumulate in the medium (700 mg zinc per pole tube).

electric

Supply voltage	V	12 DC	24 DC	"-8" / 24 DC	
Maximum control 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
Duty cycle	%	100 ⁵⁾			
Maximum coil temperature ⁶⁾	°C	150			
Protection class according to DIN EN 60529	– Version "K4"	IP 65 with mating connector mounted and locked			
	– Version "K40"	IP 69K with mating connector mounted and locked			
	– Version "C4"	IP 66 with mating connector mounted and locked			
Control electronics (separate order)		IP 69K with Rexroth mating connector (Material no. R901022127)			
		– Plug-in proportional amplifier Type VT-SSPA1..., see data sheet 30116 – Analog amplifier Type RA..., see data sheet 95230 – BODAS control unit Type RC..., see data sheet 95200			
Design according to VDE 0580					

⁴⁾ Measured with analog amplifier type RA2-1/10, see data sheet 95230

⁵⁾ In the case of use at heights > 2000 m above MSL, please consult us.

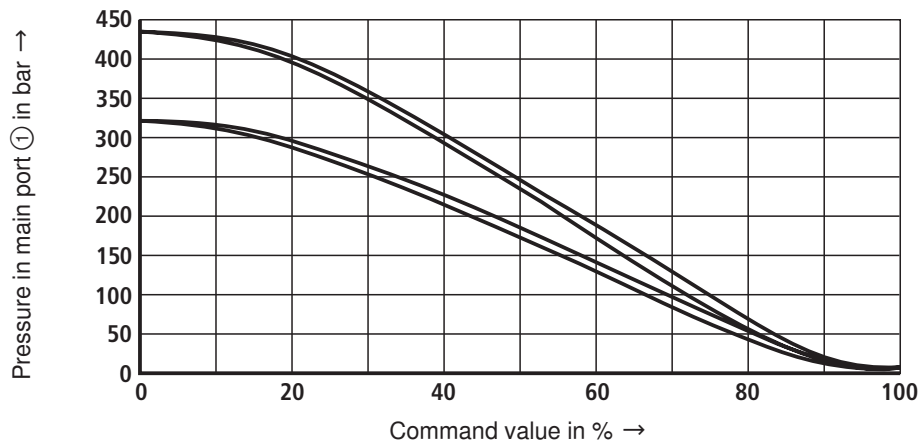
⁶⁾ Due to the temperatures occurring at the surfaces of the

solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

In the electrical connection, the protective earthing conductor (PE $\frac{1}{2}$) is to be connected properly.

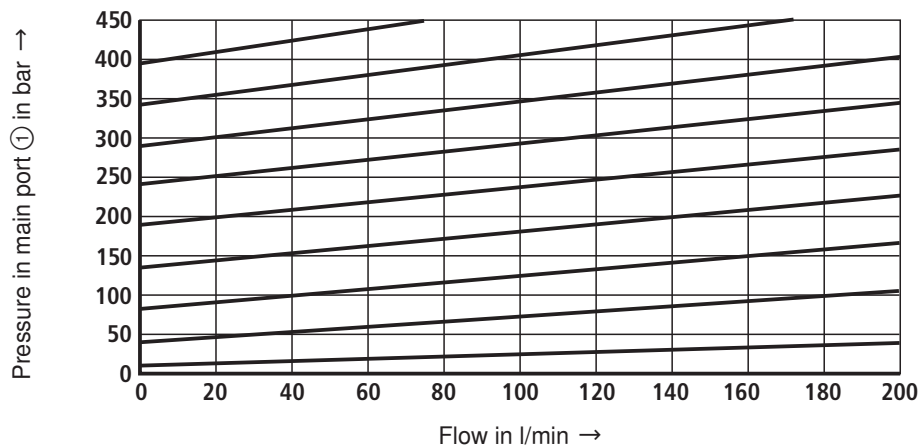
Characteristic curves (measured with HLP46, $\dot{v}_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$ and 24 V coil)

Pressure in main port ① in dependence on command value; flow = 20 l/min



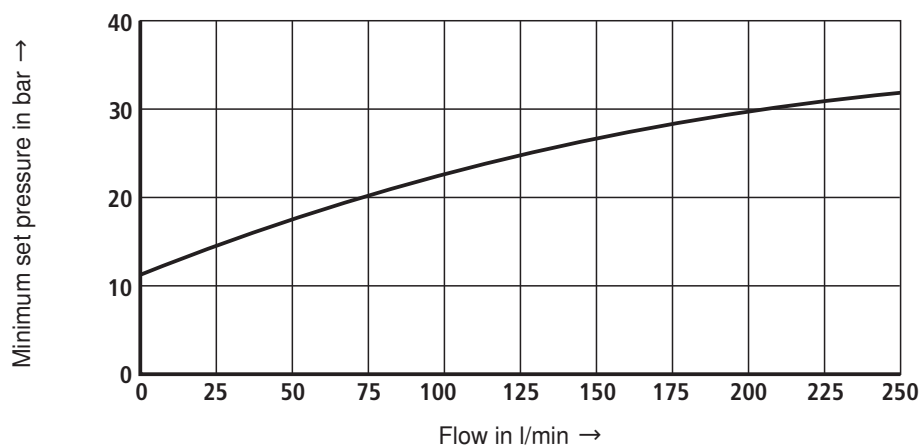
Pressure in main port ① in dependence on flow.

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



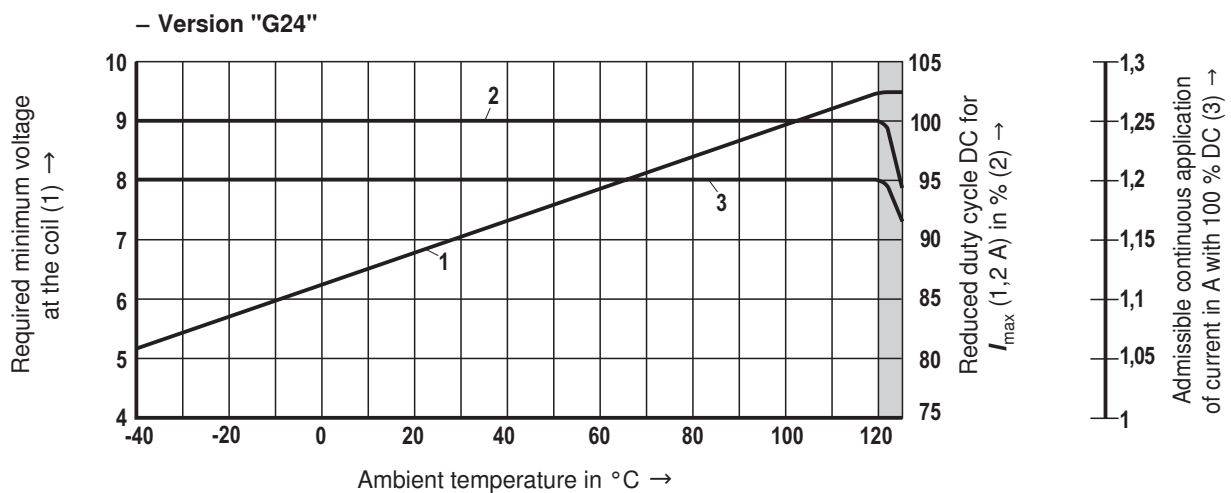
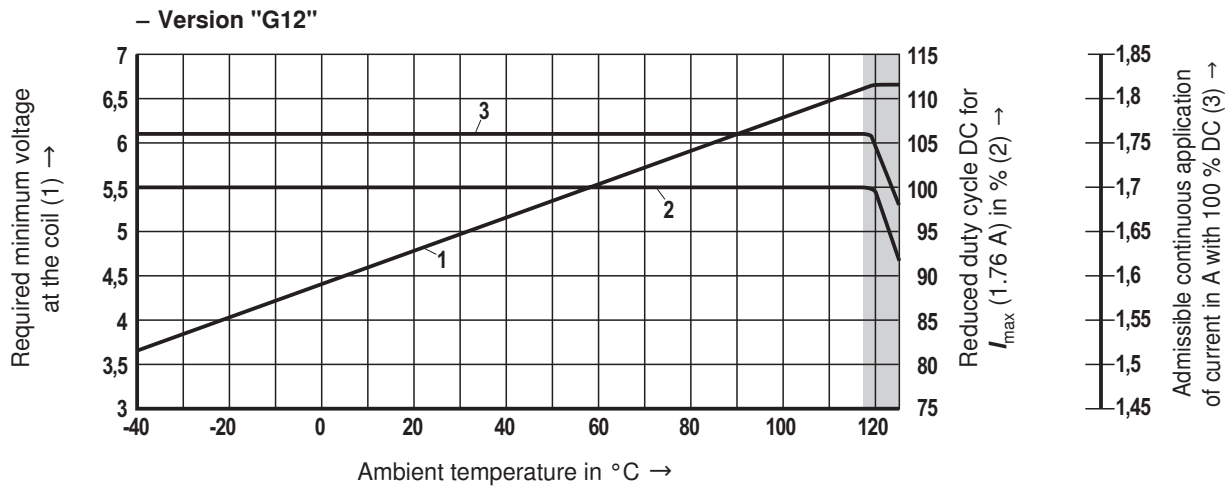
Minimum set pressure in main port ① in dependence on flow.

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



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



 Limited valve performance

Notice!

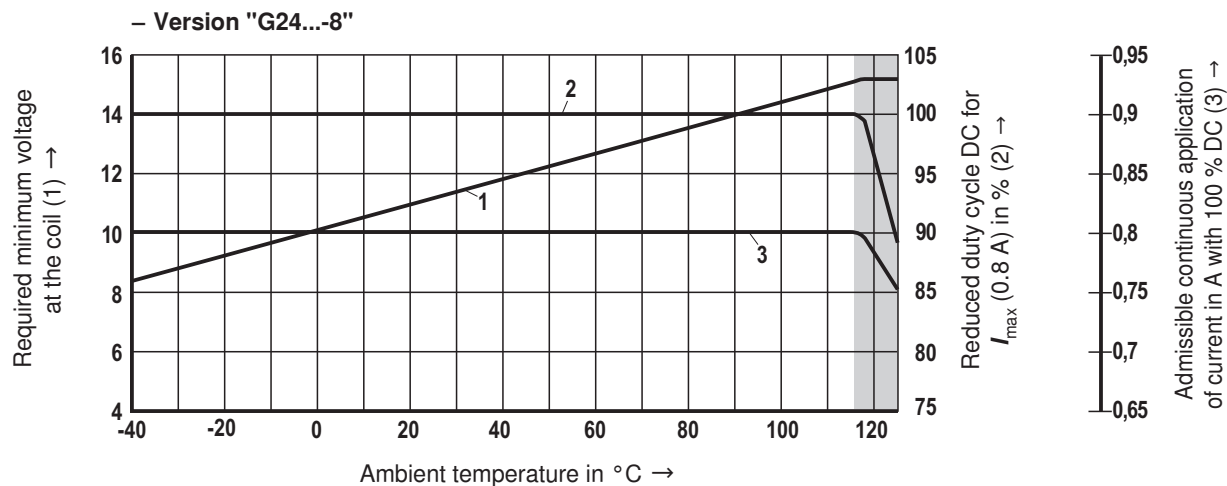
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the range of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the range of application.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



Limited valve performance

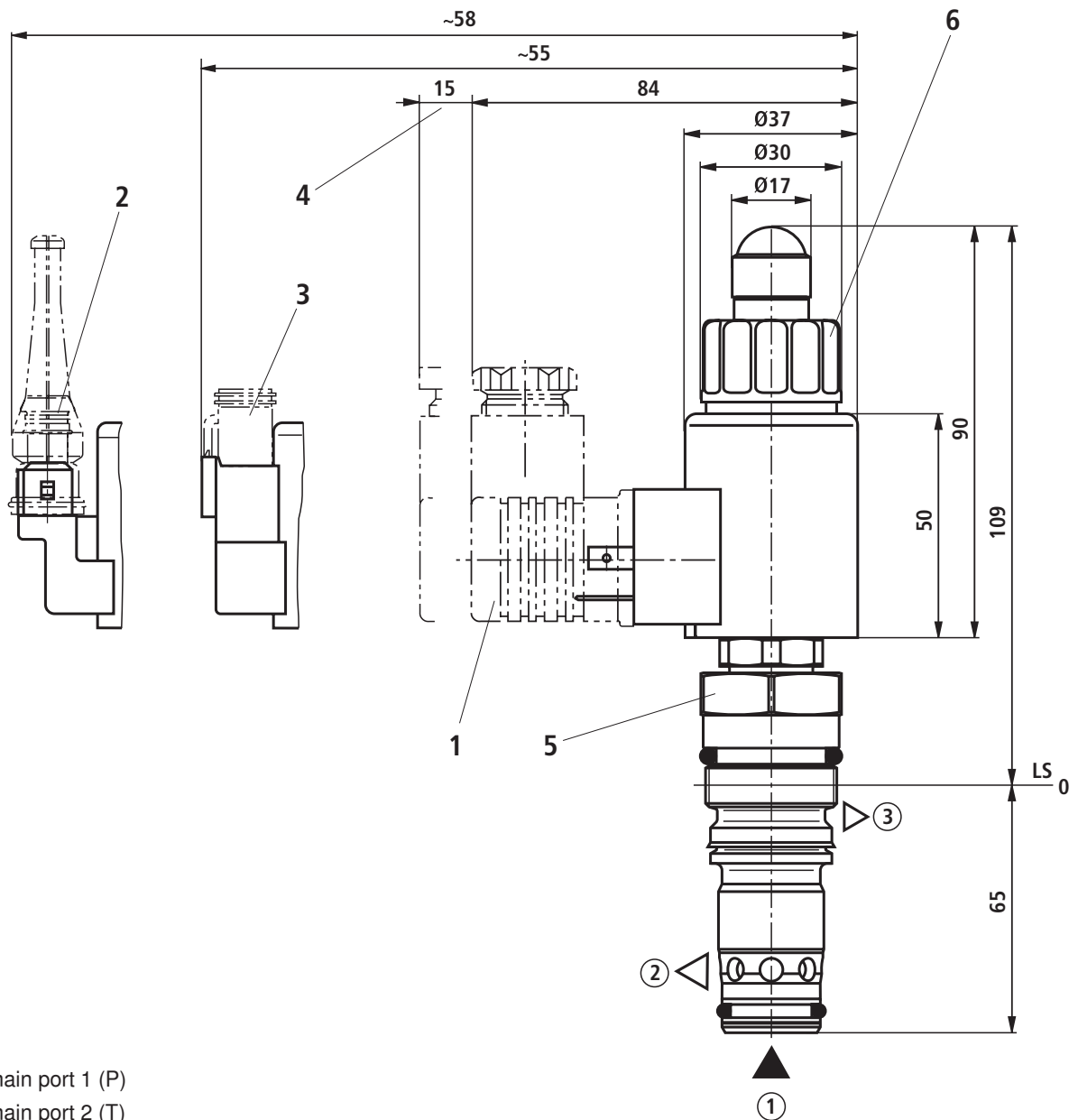
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Unit dimensions (dimensions in mm)



① = main port 1 (P)

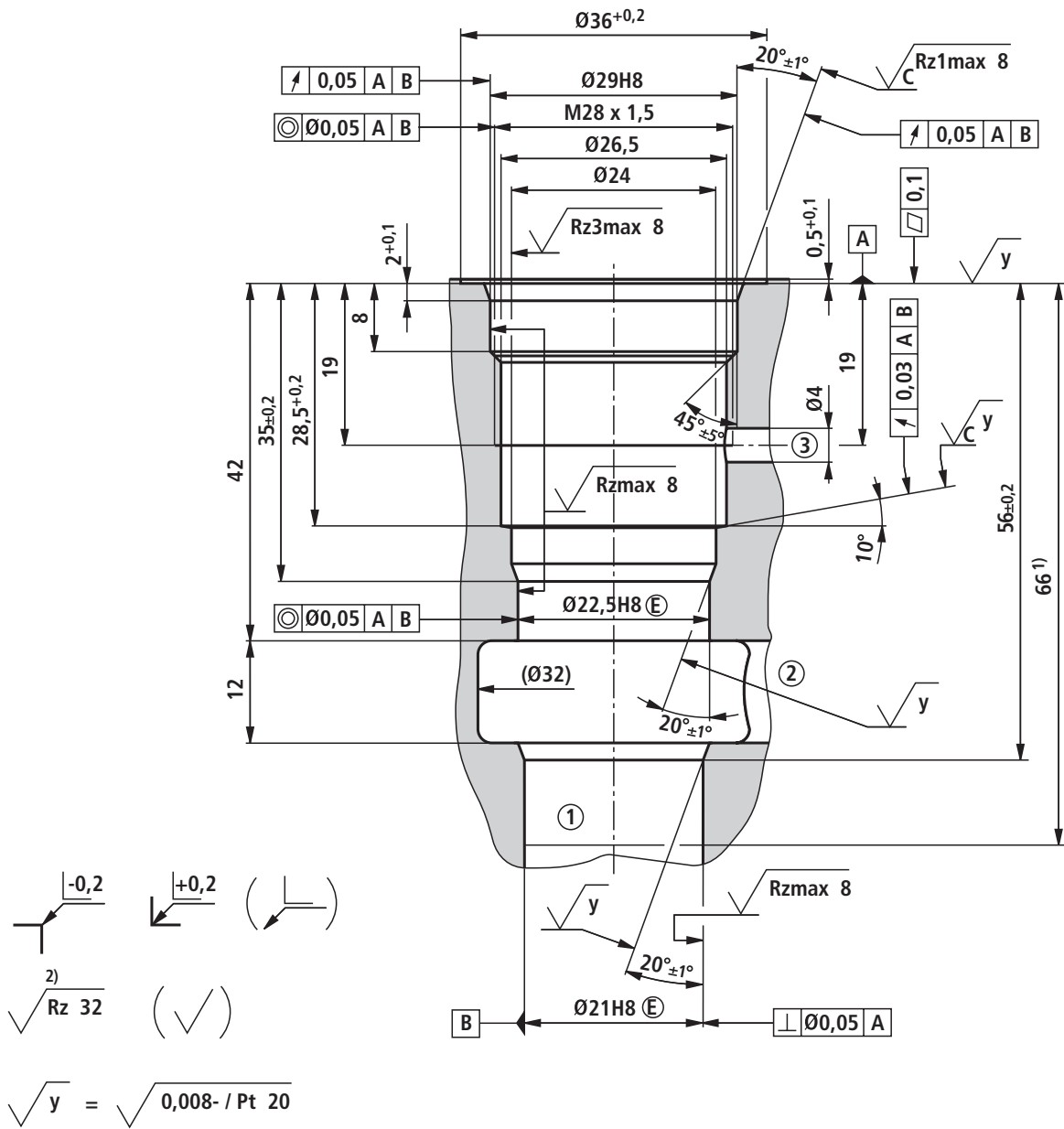
② = main port 2 (T)

③ = main port 3 (Y)

LS = Location Shoulder

- 1 Mating connector for connector "K4" (separate order, see data sheet 08006)
- 2 Mating connector for connector "C4" (separate order, see data sheet 08006)
- 3 Mating connector for connector "K40" (separate order, see data sheet 08006)
- 4 Space required to remove cable socket
- 5 Hexagon SW30; tightening torque $M_A = 92^{+10}$ Nm
- 6 Solenoid nut, tightening torque $M_A = 5^{+1}$ Nm

Mounting cavity R/FD; 3 main ports; thread M28 x 1.5 (dimensions in mm)



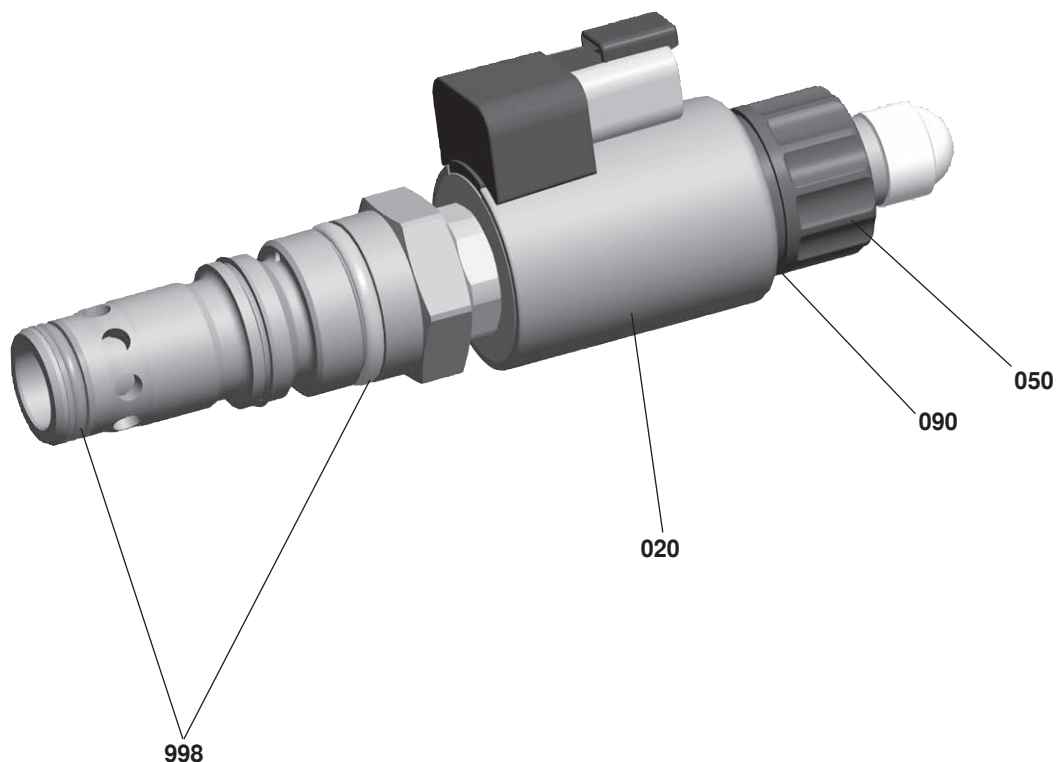
- ① = main port 1 (P)
- ② = main port 2 (T)
- ③ = main port 3 (Y)
- LS = Location Shoulder

Standards:

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

1) Depth of fit
 2) Visual inspection

Available individual components



Item	Denomination		Direct voltage	Material no.
020	Coil for individual connection ¹⁾	Version "K4"	12 V	R901002932
			24 V	R901002319
			24 V / 800 mA	R901049962
		Version "K40"	12 V	R901003055
			24 V	R901003053
			24 V / 800 mA	R901050010
		Version "C4"	12 V	R901003044
			24 V	R901003026
			24 V / 800 mA	R901049963
050	Nut		R900992146	
090	Seal ring for pressure tube		R900007769	
998	Pilot control valve seal kit		R901138335	

¹⁾ **Notice!**

After the solenoid coil has been replaced, the factory-set pressure may change by $\pm 5\%$.

Suitable housing for threaded connection, see data sheet 25818.

Notes
