

Proportional pressure relief valve, pilot-operated, rising characteristic curve

RE 18139-08/07.12 1/12
Replaces: 09.07

Type KBVS.3A (High-Performance)

Component size 3
Component series A
Maximum operating pressure 350 bar
Maximum flow 200 l/min



H7139

Overview of contents

Contents	Page
Features	1
Ordering code	2
Preferred types	2
Function, symbol	3
Technical data	4, 5
Characteristic curves	6
Minimum terminal voltage at the coil and relative duty cycle	7, 8
Unit dimensions	9
Mounting cavity	10
Available individual components	11

Features

- Mounting cavity R/ISO 7789-33-01-0-98
- Pilot-operated valve for limiting a system pressure
- Suitable for mobile and industrial applications
- Operation by proportional solenoid
- Proportional solenoid with central thread and detachable coil
- Cartridge valve
- Control electronics: plug-in amplifier VT-SSPA1...
- Fine balancing of the command value/pressure characteristic curves possible externally on the control electronics
- In the event of a power failure, the minimum pressure becomes effective

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

Ordering code

KBVS		3	A	A / L	C			V	*
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Pilot-operated proportional pressure relief valve

Pressure stage

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

Component size 3 = 3

At command value = 0 the pressure is set = A

Component series = A

¹⁾ Cable sockets (separate order), see RE 08006

²⁾ See page 10

Further details in clear text

no code = Standard
-8 = Coil 800 mA (see page 5)

Seal material

V = FKM seals
⚠ Caution!
Observe compatibility of seals with the hydraulic fluid used!

Electrical connection ¹⁾

K4 = Component plug 03-pin (2+PE) K4, DIN EN 175301-803

K40 = Component plug 02-pin K40 DT 04-2PA, make: Deutsch

C4 = Cable plug 02-pin C4/Z30 type: Junior-Timer

Supply voltage

G12 = Control electronics 12 V DC

G24 = Control electronics 24 V DC

C = Proportional solenoid, wet pin

L = High-Performance and mounting cavity R/ISO 7789 ²⁾

Preferred types

Type	Material number
KBVSC3AA/LCG24K4V	R901061858
KBVSF3AA/LCG24K4V	R901061859
KBVSH3AA/LCG24K4V	R901061869
KBVSL3AA/LCG24K4V	R901061873
KBVSN3AA/LCG24K4V	R901061874
KBVSP3AA/LCG24K4V	R901061875
KBVSR3AA/LCG24K4V	R901061877

Function, Symbol

General

Valves of the KBVS type are pilot-operated proportional pressure relief valves of poppet design and used for limiting the pressure in hydraulic systems. They basically consist of a screwed-in proportional pilot 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 minimum pressure is set.

Basic principle

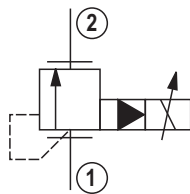
For the proportional increase in the system pressure, a command value is selected on the control electronics. The electronics controls the solenoid coil with electric current in dependence upon the command value, which causes the actual pressure adjustment in main port 1 via pilot valve (1) and main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

(p_{\max} = command value max; p_{\min} = command value 0)
Internal pilot oil supply and drain.

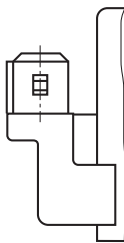
Note!

Any tank pressures (main port 2) add to the set value in main port 1.

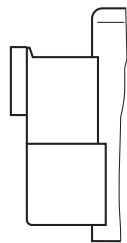
Symbol



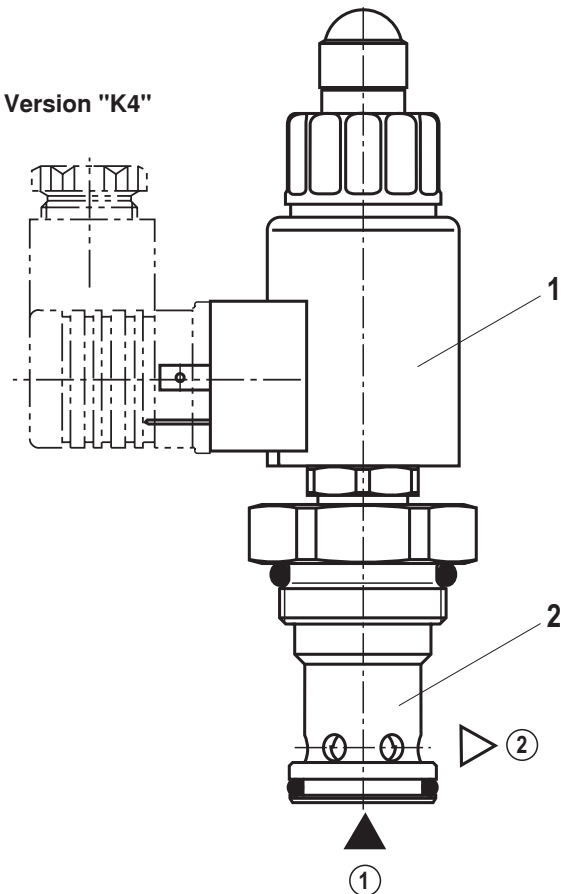
Version "C4"



Version "K40"



Version "K4"



Technical data (for applications outside these parameters, please consult us!)**general**

Weight	kg	0,7
Installation orientation		Optional, if it can be ensured that no air can collect upstream of the valve. Otherwise, we recommend that the valve be mounted in a suspended position.
Ambient temperature range	°C	-20 to +120
Storage temperature range	°C	-20 to +80

Environmental tests:

Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Z)

DIN EN 60068-2-6: 05/96	Vibration, sinusoidal	10 cycles at 5 to 2000 to 5 Hz with a logarithmic frequency change rate of 1 Oct./min, 5 to 57 Hz, amplitude 1.5 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibration (random) and broadband noise	20 to 2000 Hz, amplitude 0.05 g ² /Hz (10 g RMS/30 g peak), testing time 30 min
DIN EN 60068-2-27: 03/95	Shock test	Half sine 15 g / 11 ms; 3 x in pos., 3 x in neg. direction (6 individual shocks in total)
DIN EN 60068-2-29: 03/95	Bump test	Half sine 25 g / 6 ms; 1000 x in pos., 1000 x in neg. direction (2000 individual shocks in total)

Details per axis

Climatic test according to DIN EN 60068-2 / IEC 60068-2 (environmental testing):

DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, dwell time 16 h
DIN EN 60068-2-2: 08/94		+110 °C, dwell time 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles at -25 °C, dwell time 2 h
DIN EN 60068-2-2: 08/94	Dry heat test	2 cycles at +120 °C, dwell time 2 h
IEC 60068-2-30: 1985	Damp heat, cyclical	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

Max. operating pressure ¹⁾ (main port 1)	bar	350
Max. permissible return flow pressure (main port 2)	bar	210
Maximum set pressure ²⁾		See command value/pressure characteristic curves on page 6
Minimum set pressure at command value 0		See characteristic curves on page 6
Maximum flow	l/min	200 (with pressure stage 350 bar max. 100 l/min)
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 acc. to ISO 4406 (c)		Class 20/18/15 ³⁾

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


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

³⁾ The cleanliness class stated for the components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, increases the service life of components.

For the selection of filters, see www.boschrexroth.com/filter

Technical data (for applications outside these parameters, please consult us!)**hydraulic**

Hysteresis		< 6 % of max. set pressure
Range of inversion		< 0,5 % of max. set pressure
Response sensitivity		< 0,5 % of max. set pressure
Tolerance of the command value/pressure characteristic curve	– Command value 100 %	< 5 % of max. set pressure
	– Command value 0	< 2 % of max. set pressure
Step response ($T_u + T_q$) 0 → 100 % or 100 % → 0	ms	100 (depends on 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! ▶ 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-solvent, zinc may accumulate in the fluid.	

electrical

Supply voltage	V	12 DC	24 DC	"-8" / 24 DC	
Maximum control current	mA	max. nominal current 1760 mA	max. nominal current 1200 mA	max. nominal current 800 mA	
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	%	100 ⁴⁾			
Maximum coil temperature ⁵⁾	°C	150			
Type of protection acc. to VDE 0470-1 (DIN EN 60529), DIN 40050-9	– Version "K4"	IP 65 with cable socket mounted and locked			
	– Version "C4"	IP 66 with cable socket mounted and locked			
	– Version "K40"	IP 69K with Rexroth cable socket (material no. R901022127)			
Control electronics ⁶⁾		Plug-in amplifier VT-SSPA1 (300 Hz)			
Rating according to VDE 0580					

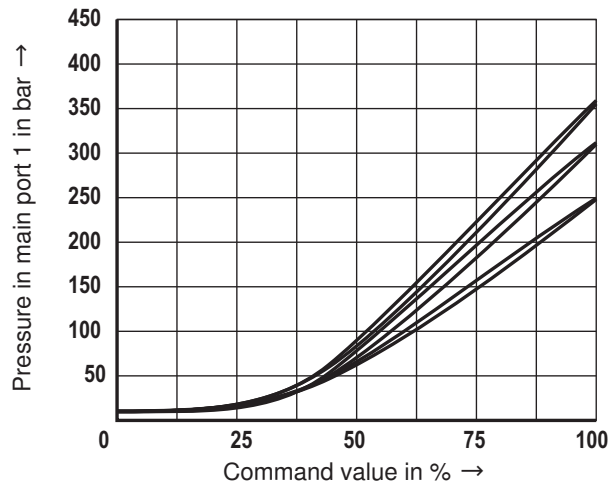
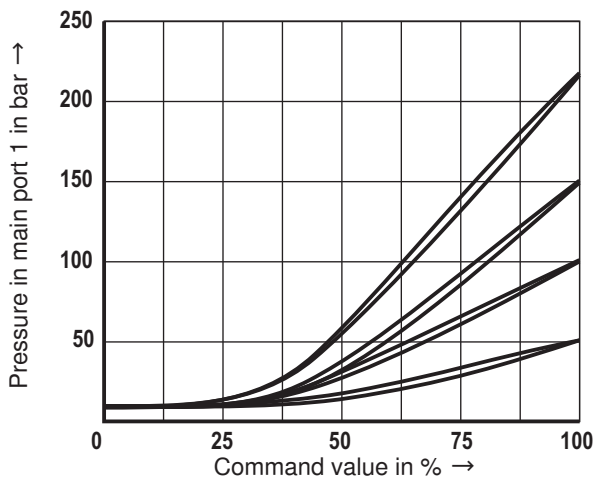
⁴⁾ In the case of use at heights > 2000 m above MSL we recommend that you consult the manufacturer.

⁵⁾ Due to the surface temperatures occurring on solenoid coils, the European standards ISO 13732-1 and EN 982 must be observed!

⁶⁾ Separate order, see RE 30116

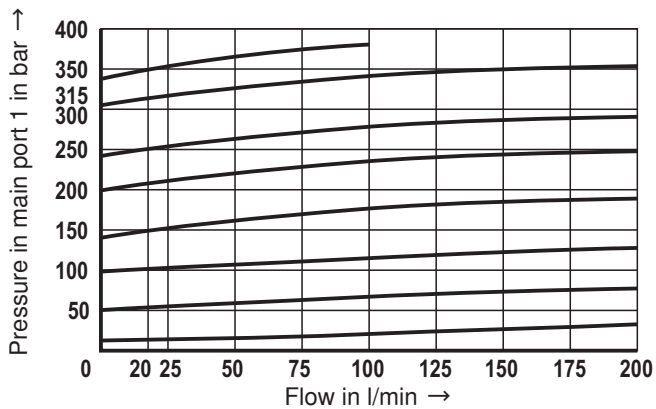
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$ and 24 V coil)

Pressure in main port 1 in dependence on command value. Flow = 20 l/min



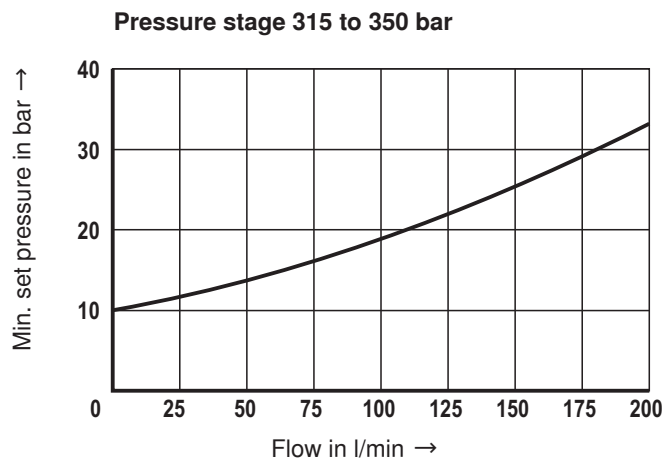
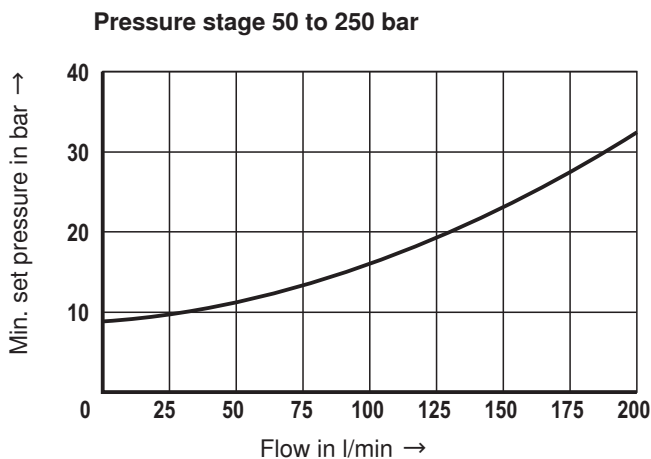
Pressure in main port 1 in dependence on flow.

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



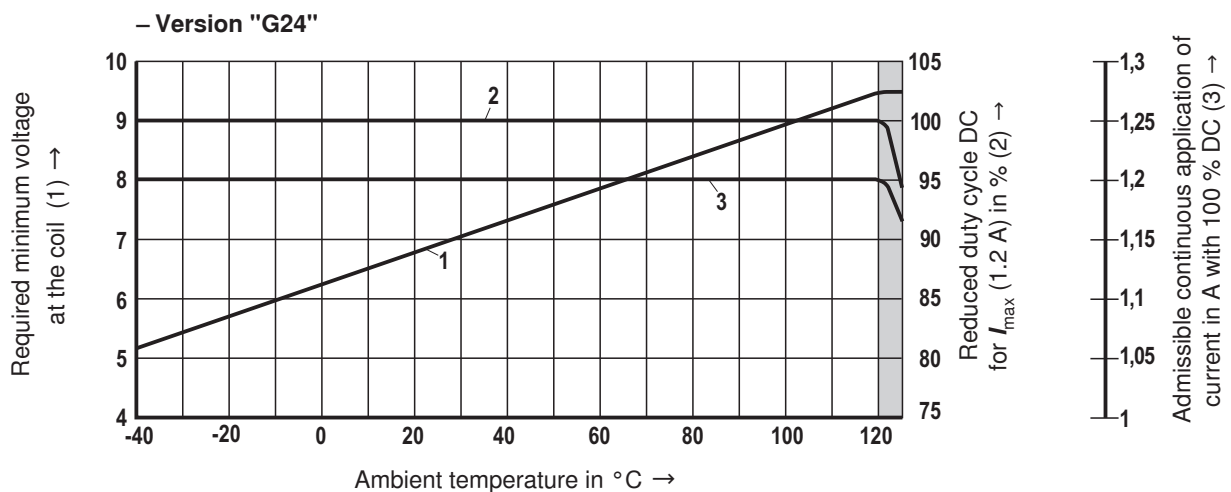
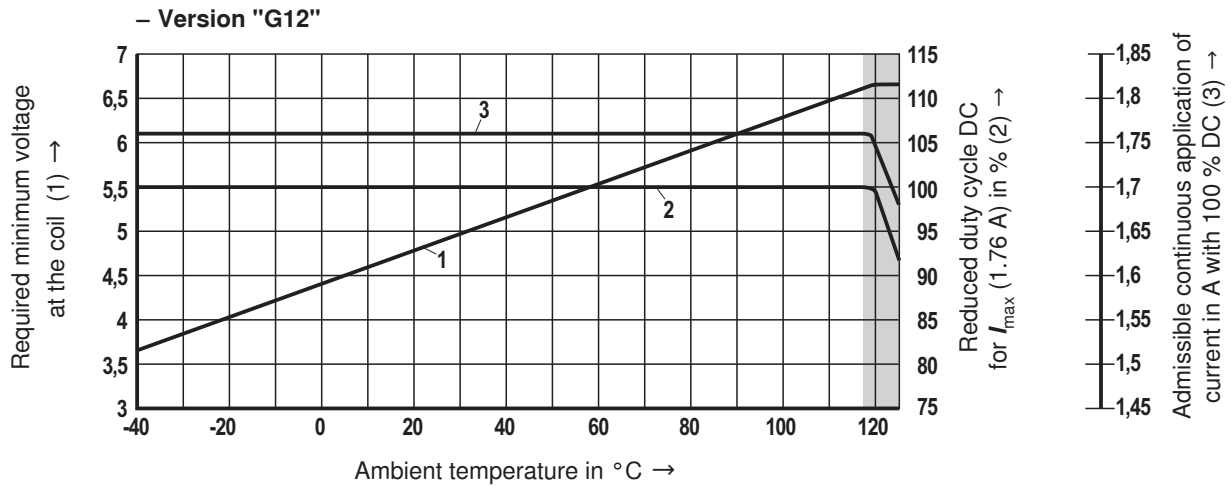
Minimum set pressure in main port 1 at command value 0.

(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!

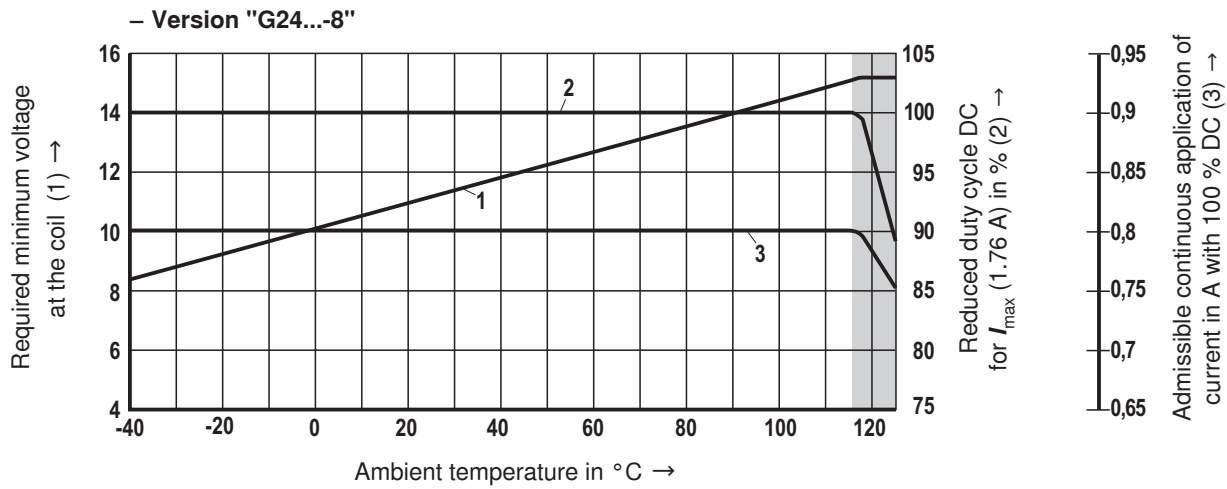
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the 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 against the ambient temperature



Limited valve performance

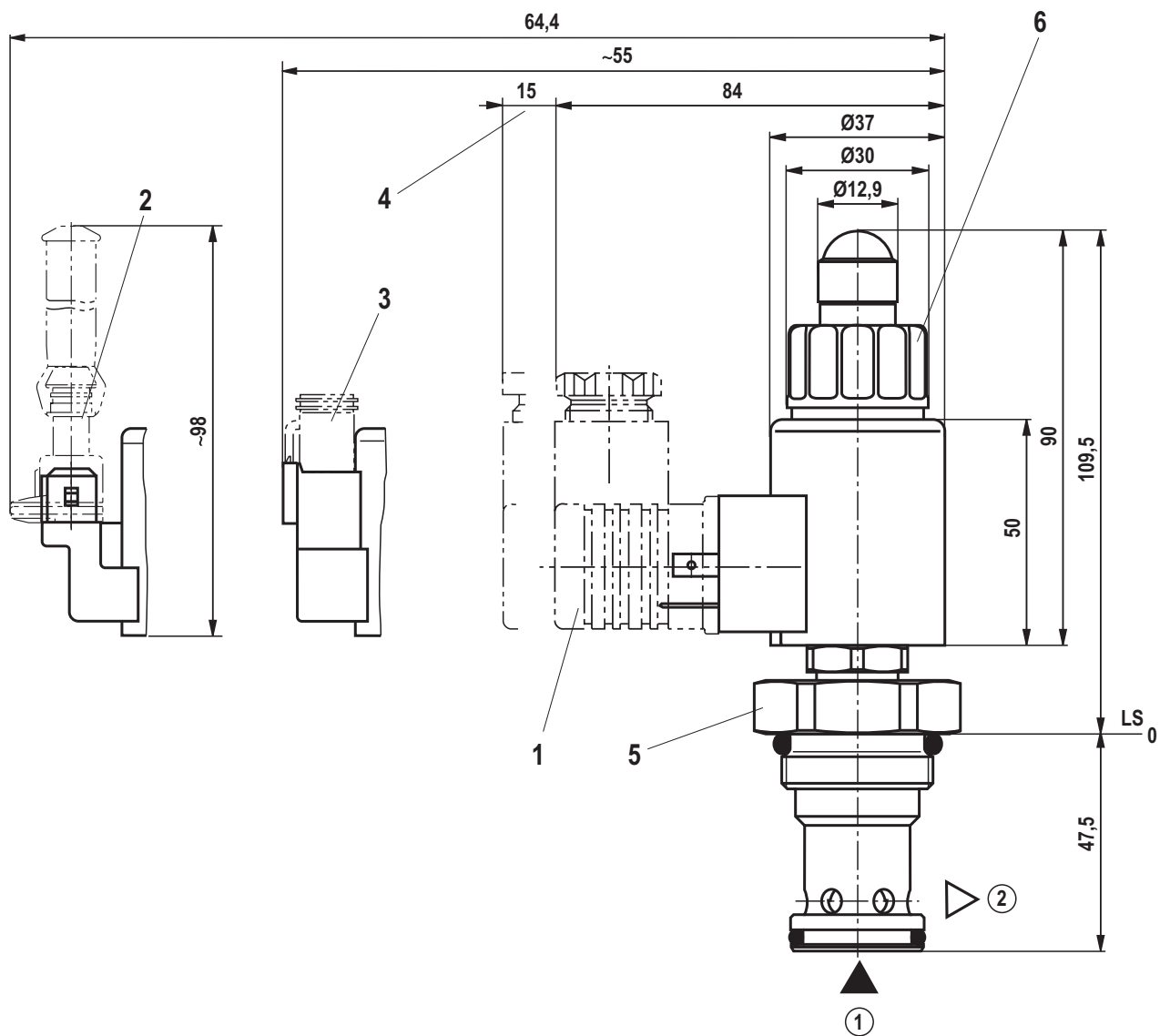
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Unit dimensions (dimensions in mm)



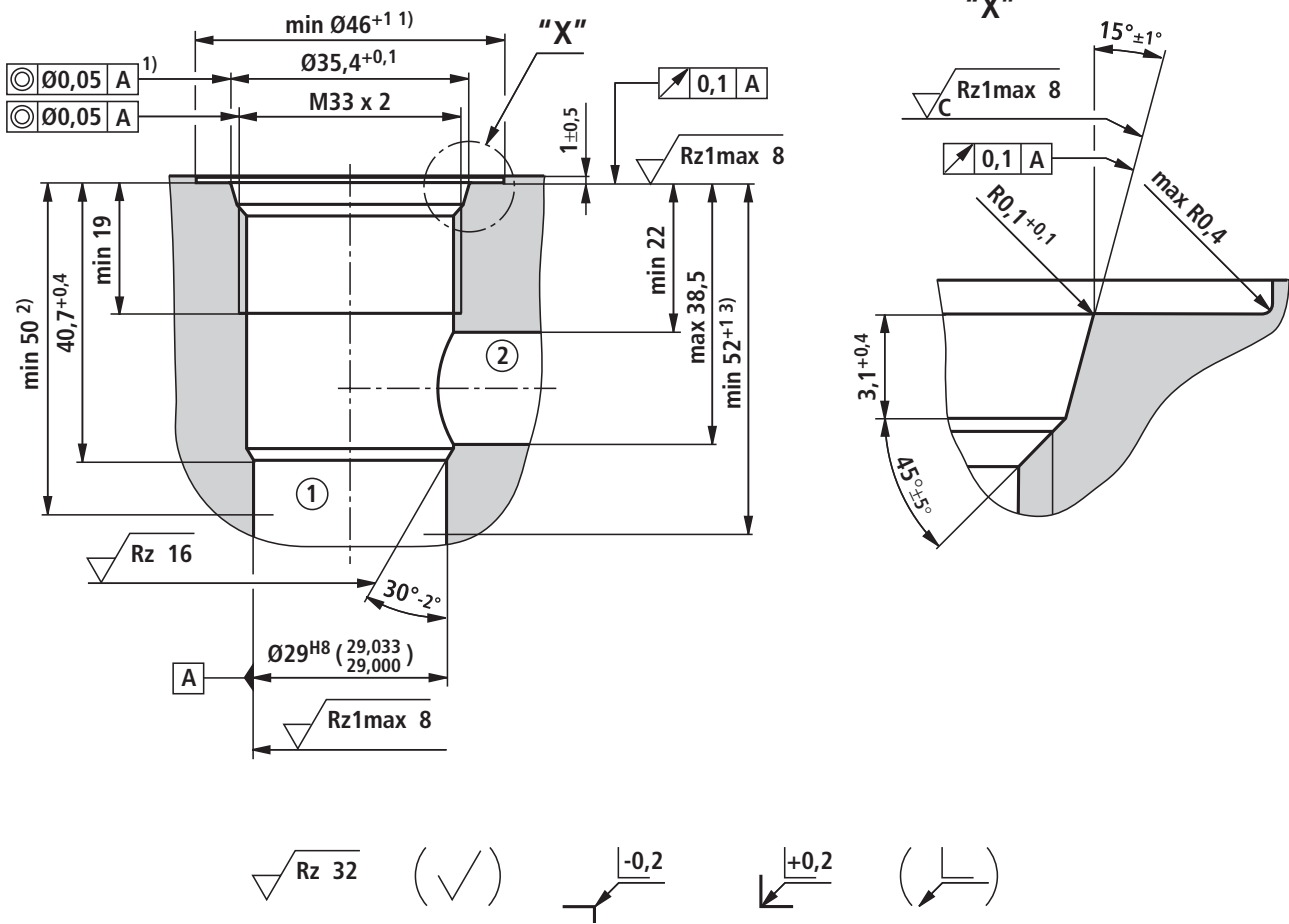
① = Main port 1

② = Main port 2

LS = Location shoulder

- 1 Cable socket for component plug "K4"
(separate order, see RE 08006)
- 2 Cable socket for component plug "C4"
(separate order, see RE 08006)
- 3 Cable socket for component plug "K40"
(separate order, see RE 08006)
- 4 Space required to remove the plug-in connector
- 5 Hexagon SW41;
 - Tightening torque $M_A = 100^{+20}$ Nm (< 250 bar)
 - Tightening torque $M_A = 120^{+20}$ Nm (> 250 bar)
- 6 Solenoid nut, tightening torque $M_A = 5^{+1}$ Nm

Mounting cavity R/ISO 7789-33-01-0-98; 2 main ports; thread M33 x 2
 (dimensions in mm)



¹⁾ Different from ISO 7789-33-01-0-98

²⁾ Depth of fit

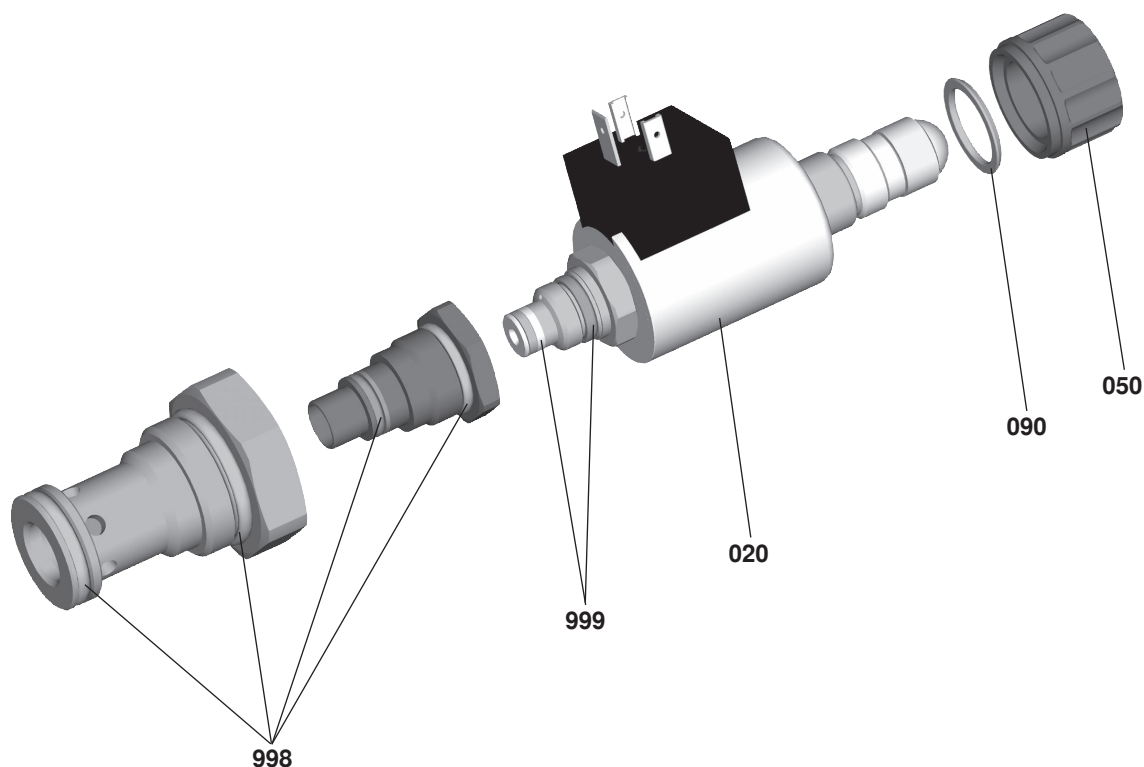
³⁾ Optional

① = Main port 1

② = Main port 2

LS = Location shoulder

Available individual components



Item	Designation		DC	Material no.
020	Coil for individual connection ¹⁾	Version K4	12 V 24 V 24 V / 800 mA	R901002932 R901002319 R901049962
		Version K40	12 V 24 V 24 V / 800 mA	R901003055 R901003053 R901050010
		Version C4	12 V 24 V 24 V / 800 mA	R901003044 R901003026 R901049963
050	Nut			R900992146
090	Seal ring for pressure tube			R900007769
998	Main stage seal kit			R961001025
999	Pilot valve seal kit			R961000376

¹⁾ **Note!**

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

Notes
