

Proportional pressure relief valve, pilot operated, decreasing characteristic curve Type KBVS.1B

RE 18152

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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

• Component size 1

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

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Ordering code (valve without coil) 1)

01	02	03	04	05		06	07	08	09	10	11	12
KBVS		1	В	Α	1	F	С			V		*

01	Proportional pressure relief valve, pilot operated	KBVS
Pres	sure rating	
02	Up to 50 bar	С
	Up to 100 bar	F
	Up to 150 bar	н
	Up to 210 bar	L
	Up to 250 bar	N
	Up to 315 bar	Р
	Up to 350 bar	R
	Up to 420 bar	Т
03	Component size 1	1
04	With a command value = 0, the maximum pressure is set	В
05	Component series	A
06	High Performance and mounting cavity R/UNF-10-01-0-06 (see page 11)	F
Seal	material	
10	FKM seals	v
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	

Valve types (without coil) 1)

12 Further details in the plain text

Туре	Material no.	Туре	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"	"K40"	"C4"			
	03pol (2+PE)	02pol K40	02pol C4/Z30			
Direct voltage DC ³⁾	DIN EN 175301-803	DT 04-2PA, make Deutsch	AMP Junior-Timer			
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

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. $(p_{max} = \text{command value 0}; p_{min} = \text{command value max})$

Notice

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



Type KBVS.1B..

1

1

2

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. Oth- erwise, 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 D	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 g²/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 El	N 60068-2 / IEC 60068-2 (environmenta	l 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 nece	essary. If paint is applied nevertheless, t	he reduced heat dissipation capacity is to be observed.

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hydraulic		
Maximum operating pressure – Main port ① 1)	bar	420
Maximum admissible return – Main port ② flow pressure	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 Δp = 250 bar; closed pilot control valve and HLP46, $\vartheta_{\rm oil}$ = 40 °C)
Hydraulic fluid		See table below
Hydraulic fluid temperature range	°C	-40 to +80
Viscosity range	mm²/s	5 to 400 (preferably 10 to 100)
Maximum permitted degree of contamination of the hydrau- lic 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 100 %		< 2 % of the max. set pressure
command value pressure char- acteristic curve – Command value 0		< 5 % of the max. set pressure
Step response $(T_u + T_g)$	ms	100 (depending on the system)
$0 \rightarrow 100 \text{ \% and/or } 100 \text{ \%} \rightarrow 0$		

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	FKM	VDMA 24568
	– Soluble in water	HEPG	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-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).

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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	– Version "K4"		IP 65 with mating connector mounted and locked			
0470-1	- Version "C4"		IP 66 with mating connector mounted and locked			
(DIN EN 60529) DIN 40050-9			IP 69K with Rexroth mating connector (material no. R901022127)			
Din 40030-3	- Version "K40"		IP 69K with mati	ng connector mo	unted and locked	
Control electronics (separate order)			Plug-in proportio type VT-SSPA1	onal amplifier	Data sheet 30116	
			Analog amplifier	type RA	Data sheet 95230	
			BODAS control u	init 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 $\frac{1}{2}$) has to be connected properly.

Characteristic curves

(measured with HLP46, $\vartheta_{\rm oil}$ = 40^{\pm5} °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



▼ Version "G24..-8"



Limited valve performance

Notice

The characteristic curves have been determined for coils with valve with medium test block size $(80 \times 80 \times 80 \times 80 \text{ mm})$, 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.

Dimensions

▼ KBVS.1B



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



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	R961006735

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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