RE 18166/2019-12-13
Replaces: 01.2018

rexroth
A Bosch Company

3-way proportional pressure reducing valve, pilot-operated, rising characteristic curve Type KTVS.1A

HAD8071

- Size 1
- Series A
- Maximum operating pressure 350 bar
- Maximum flow 80 l/min

Features

- Screw-in cartridge valve
- Mounting cavity R/UNF10-03-0-06
- Pilot-operated 3-way proportional valve for system pressure reduction
- Suitable for mobile and industrial applications
- Operation by means of proportional solenoid with central thread and detachable coil
- Rotatable solenoid coil
- 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

Type code

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

01	Proportional pressure reducing valve, pilot-operated	**KTVS**

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**

03	Size 1	**1**

04	With a command value = 0, the minimum pressure is set	**A**

05	Series	**A**

06	High-Performance and mounting cavity R/UNF-10-03-0-06 (see page 12)	**F**

07	Proportional solenoid, wet-pin	**C**

Supply voltage

08	Electronic controls 12 V DC	**G12**
	Electronic controls 24 V DC	**G24**

Electrical connection[1)]

09	Device connector according to DIN EN 175301-803	**K4**
	Device connector 2-pin, DT 04-2P (DEUTSCH)	**K40**
	Device connector 2-pin, Junior-Timer (AMP)	**C4**

Sealing material

10	FKM (fluoroelastomer), andere Dichtungen auf Anfrage	**V**

11	Standard version (no code)	
	Preferred version 24 V / 800 mA	**–8**

12	Further details in plain text	*****

Preferred types

12 V, 1760 mA version	
R901391947	KTVSL1AA/FCG12K40V
R901529217	KTVSR1AA/FCG12K40V

24 V, 800 mA version	
R901507949	KTVSL1AA/FCG24K4V-8
R901529216	KTVSR1AA/FCG24K4V-8

24 V, 1200 mA version	
R901427613	KTVSL1AA/FCG24K40V
R901427606	KTVSR1AA/FCG24K40V

1) Plug-in connectors are not included in the scope of delivery and must be ordered separately, see data sheet 08006.

Functional description

General

Valves of type KTVS are pilot-operated 3-way proportional pressure reducing valves in spool design and are used for pressure reduction 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 stepless adjustment of the pressure to be limited dependent on the command value.

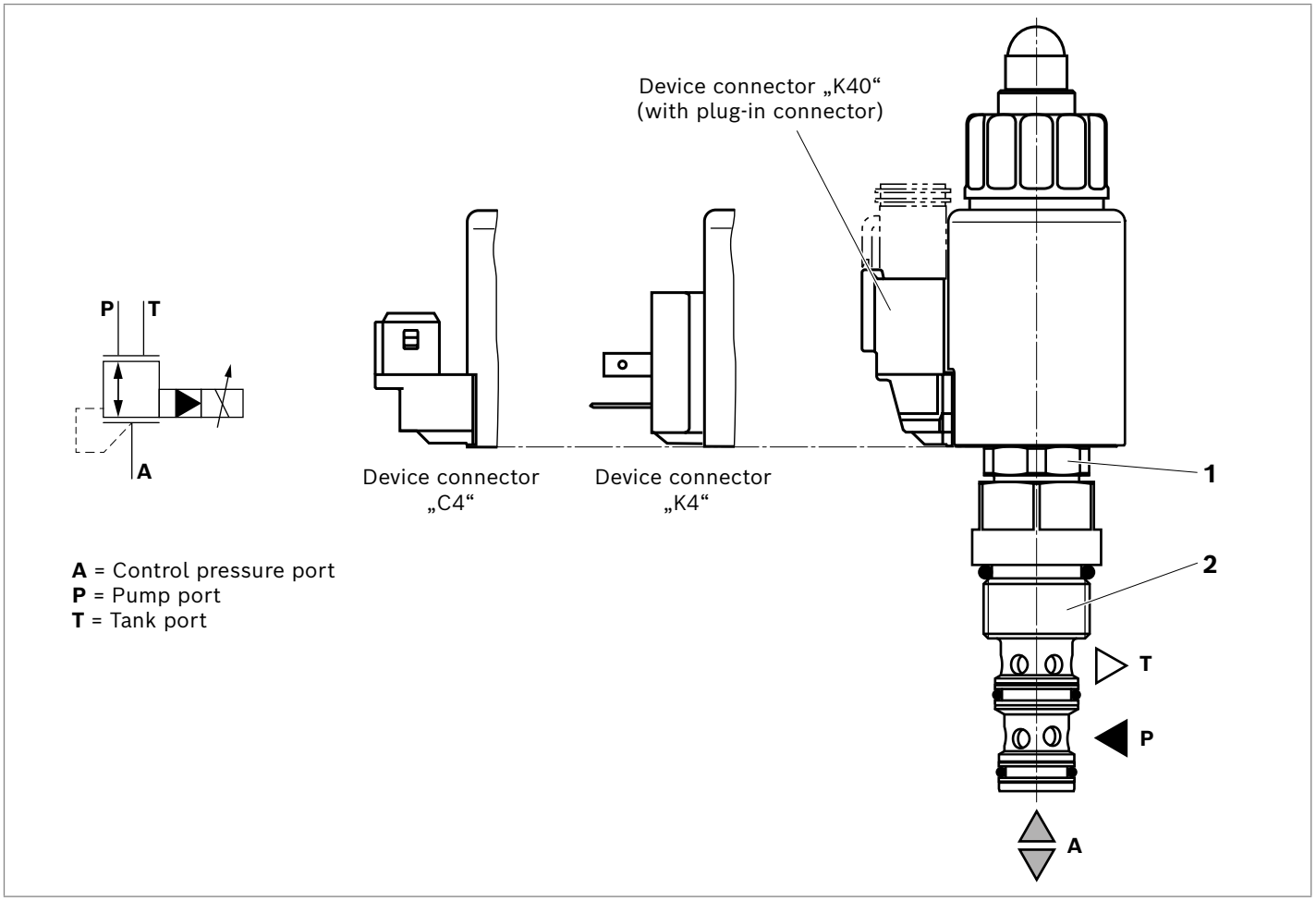
Function

For the proportional increase in the system pressure, a command value is specified at the control electronics. Dependent on the command value, the solenoid coil is electrically controlled by the electronic system for the actual pressure adjustment in the port **A** via pilot control valve (**1**) and main valve (**2**).

Further increasing system pressure (port **P**) does not have any effect on the pressure in the port **A** (pressure holding function). Pressure losses in port **A** (actuator) are compensated by the valve.
If the pressure in port **A** exceeds the set value, the control spool is displaced against the spring and the port **A** is connected to **T**.
(p_{max} = max. command value; p_{min} = command value 0)

Notice
Occurring tank pressures (port **T**) are added to the values set in port **A**.

▼ **Type KTVS.1A..**



Technical data

General		
Weight	kg	0.56
Installation position		Any – if it is ensured that no air can collect upstream of the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	–40 ... +120 (see pages 9 and 10)
Storage temperature	°C	–20 ... +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 ... 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 ... 57 Hz, amplitude 1.6 mm (p-p), 57 ... 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broadband noise	20 ... 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 ... +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 the unit is coated nevertheless, the reduced heat dissipation capacity has to be observed.		

Notice
Please contact us if the unit will be used outside the specified range of values.

Hydraulic			
Maximum operating pressure [1]	Port **A**	bar	350 (maximum pressure differential 210 bar)
	Port **P**	bar	350
Maximum admissible return flow pressure	Port **T**	bar	210
Maximum set pressure [2]			See command value pressure characteristic curves on pages 7 ... 8
Maximum set pressure with command value 0			See characteristic curves on pages 7 ... 8
Maximum flow		l/min	80
Pilot oil		l/min	< 0.8
Leakage		ml/min	< 300 (at Δp = 250 bar; closed pilot control valve and HLP46, ϑ_{oil} = 40 °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–40 ... +80
Viscosity range		mm²/s	5 ... 400 (preferably 10 ... 100)
Maximum admissible 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]			< 6% 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

Hydraulic fluid		**Classification**	**Suitable sealing materials**	**Standards**	**Data sheet**
Mineral oils		HL, HLP	FKM	DIN 51524	90220
Bio-degradable	insoluble in water	HEES	FKM	ISO 15380	90221
	soluble in water	HEPG	FKM	ISO 15380	

Notice

- Further information and details on using other hydraulic fluids are available in the above data sheets or on request.
- Restrictions are possible with the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.).
- The flash point of the hydraulic fluid used must be 40 K above the maximum solenoid surface temperature.
- **Bio-degradable:** When using biodegradable hydraulic fluids that are also 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 set at the factory. In the case of subsequent readjustment, 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 life cycle 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).

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 (ED)		%	See characteristic curves on pages 9 and 10 [5]		
Maximum coil temperature [6]		°C	150		
Protection class according to ISO 20653	Connector version "K4"		IP6K5 [7]		
	Connector version "C4"		IP6K6K [7]		
			IP6K9K [7] (only with Rexroth type R901022127)		
	Connector version "K40"		IP6K7 and IP6K9K [7]		
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	250		
Design according to VDE 0580					

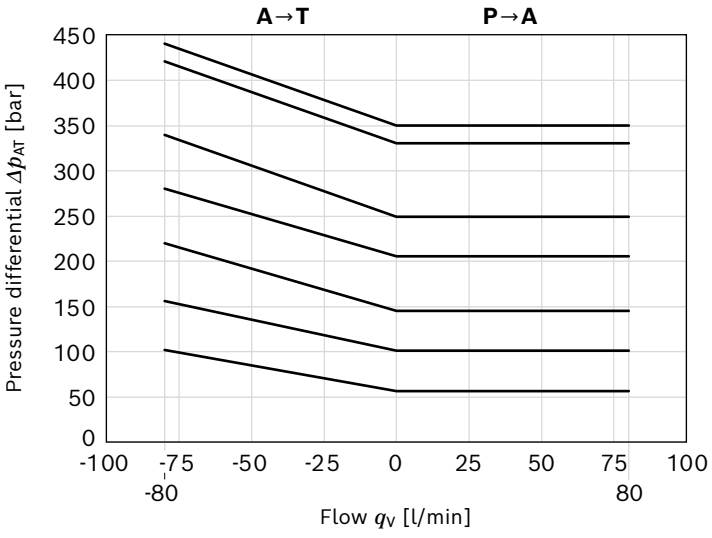
Notice
For the electrical connection, a protective earth (PE ⏚) connection is mandatory based on the specification.

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!
7) With installed and locked plug-in connector. Plug-in connectors are not included in the scope of delivery and must be ordered separately, see data sheet 08006.

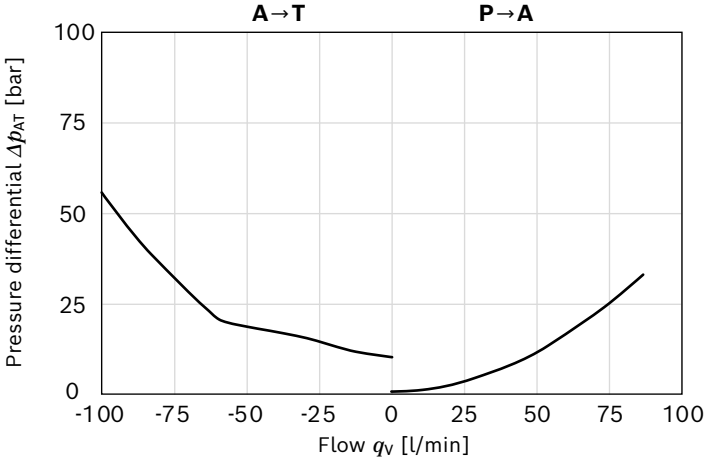
Characteristic curves

Δp-q_V-flow characteristic curve

▼ **Pressure in port A dependent on flow**
(The characteristic curves were measured without counter pressure in port **T**)

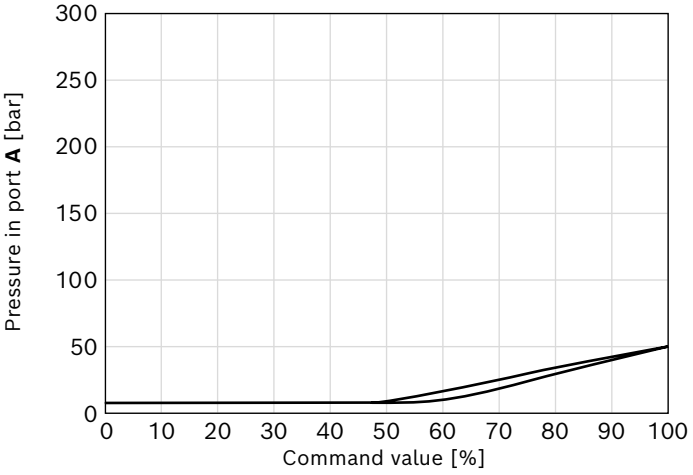


▼ **Minimum set pressure**
(The characteristic curves were measured without counter pressure in port **T**)

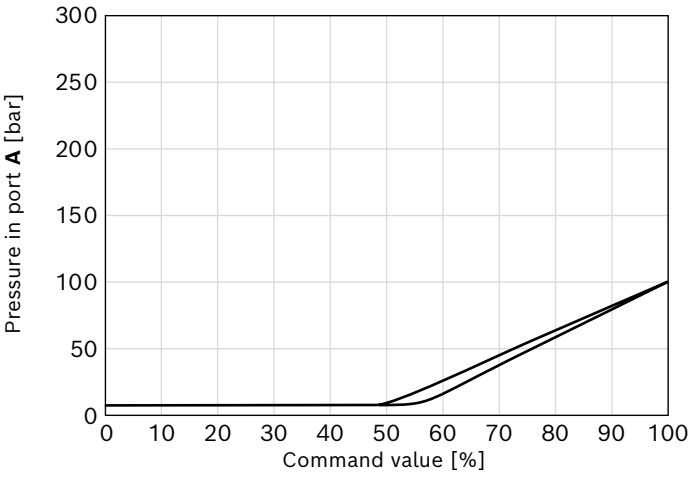


p-I-characteristic curve; flow = 0 l/min

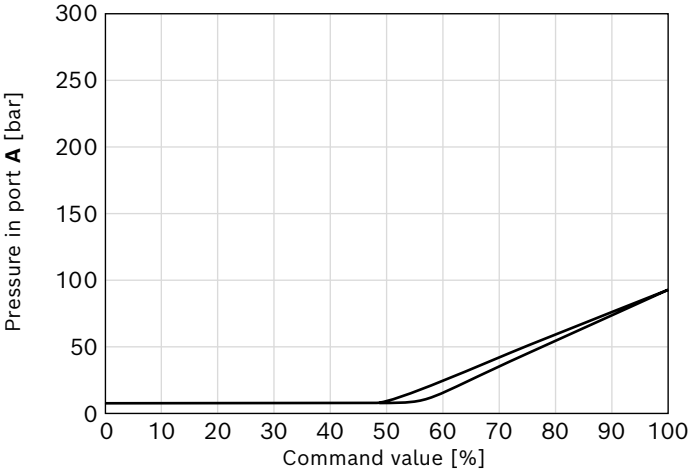
▼ **Pressure stage 50 bar**



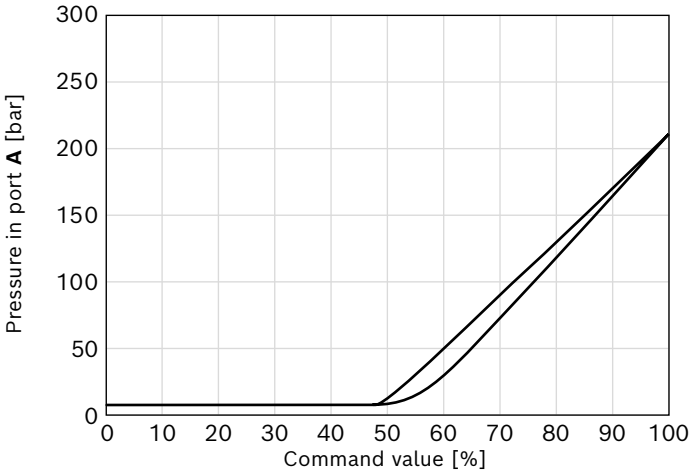
▼ **Pressure stage 100 bar**



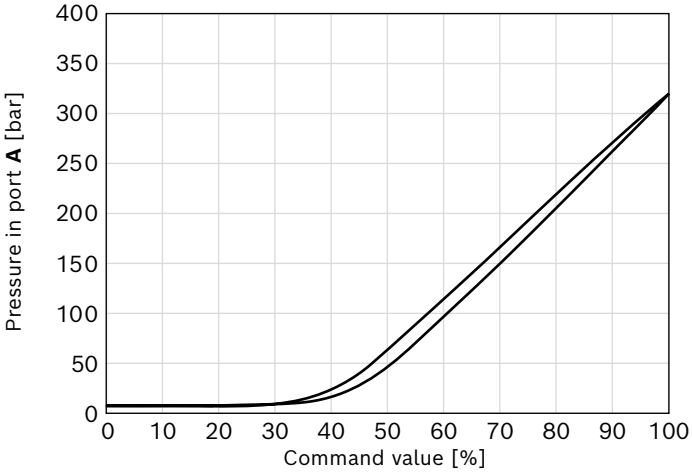
▼ **Pressure stage 150 bar**



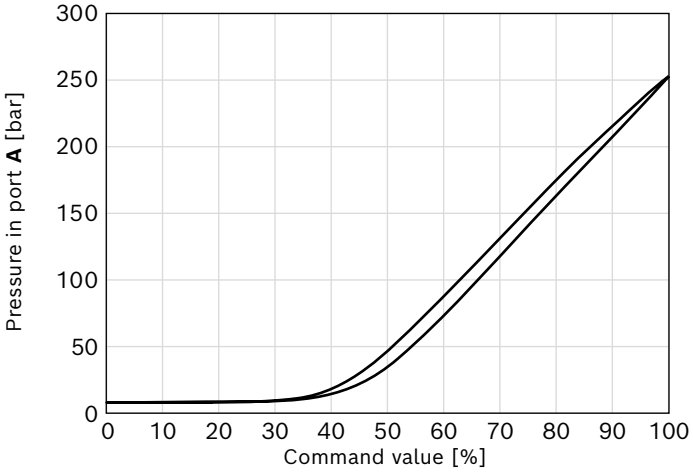
▼ **Pressure stage 210 bar**



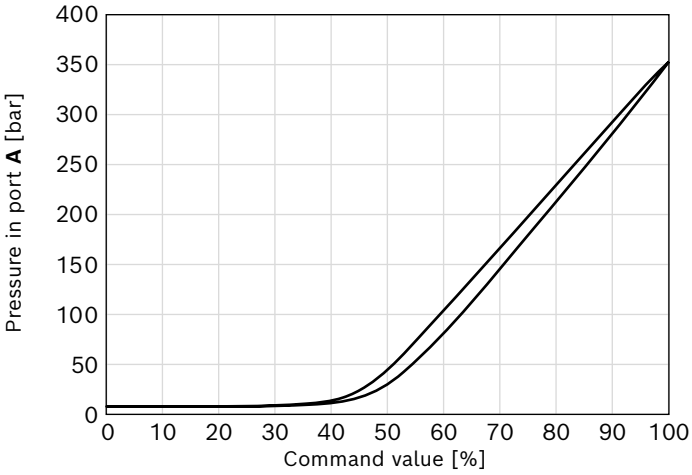
▼ **Pressure stage 315 bar**



▼ **Pressure stage 250 bar**



▼ **Pressure stage 350 bar**

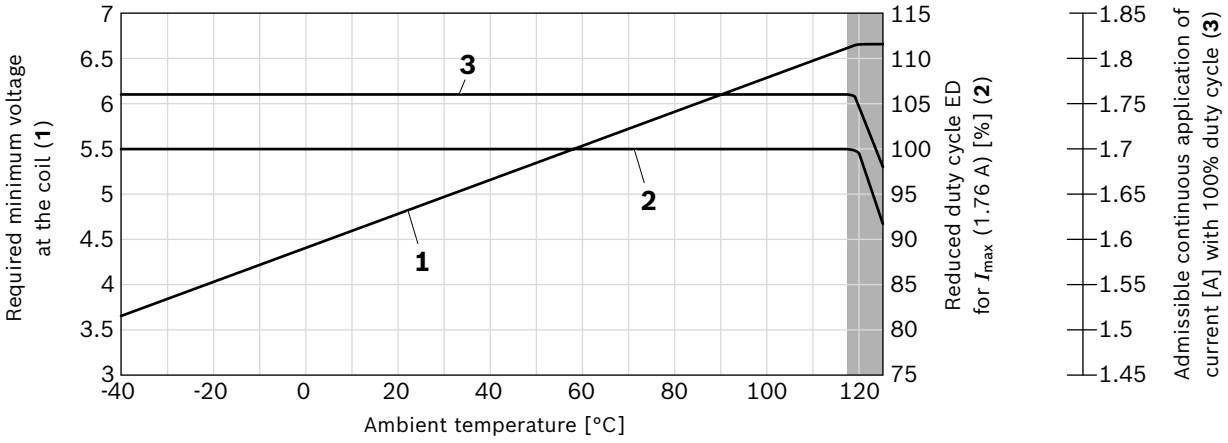


Notice
Characteristic curves measured with HLP46, ϑ_{oil} = 40$^{\pm 5}$ °C and 24 V coil.

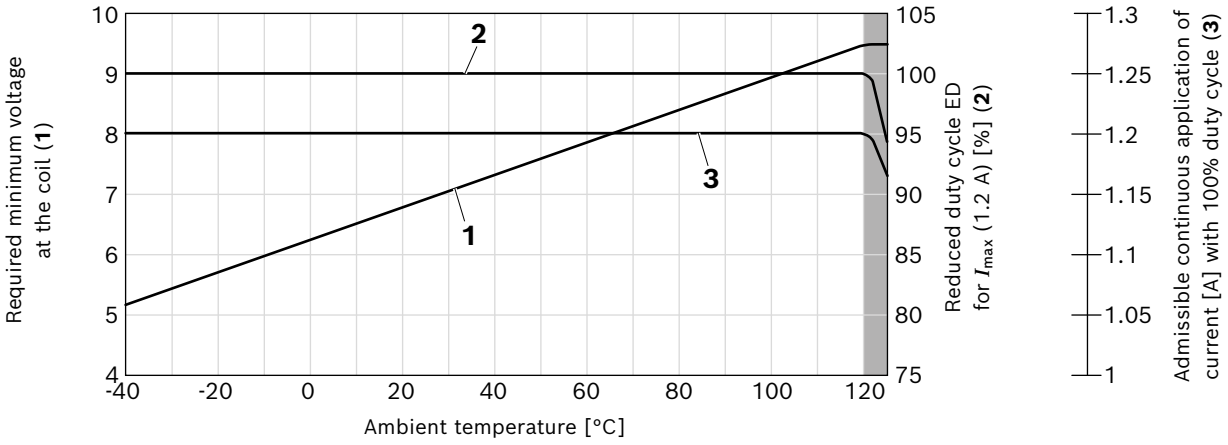
Permissible working range

Minimum terminal voltage on the coil and relative duty cycle depending on the ambient temperature

▼ **Version “G12”**



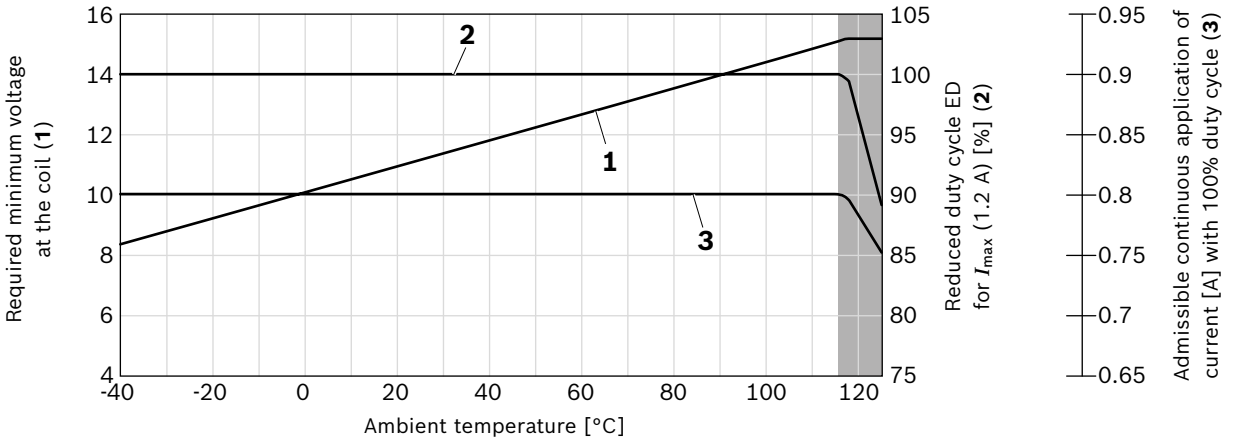
▼ **Version “G24”**



= Limited valve performance

Notice
The characteristic curves have been determined for coils with valve and medium test block size (80 × 80 × 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 individual cases, more unfavorable conditions may lead to limitations of the area of application.

▼ **Version “G24..-8”**



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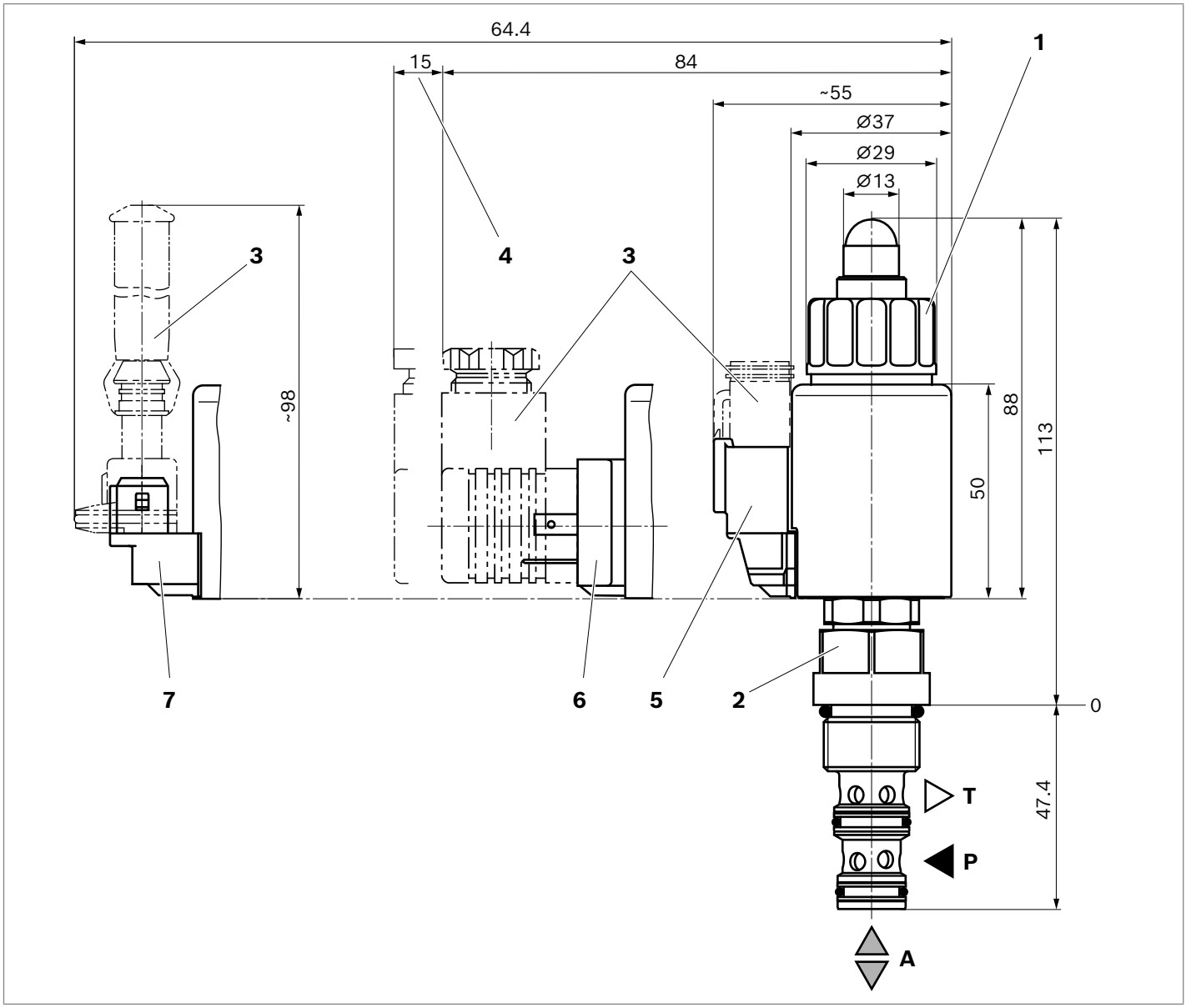
Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened. In individual cases, more unfavorable conditions may lead to limitations of the area of application.

Dimensions

▼ **KTVS.1A..**

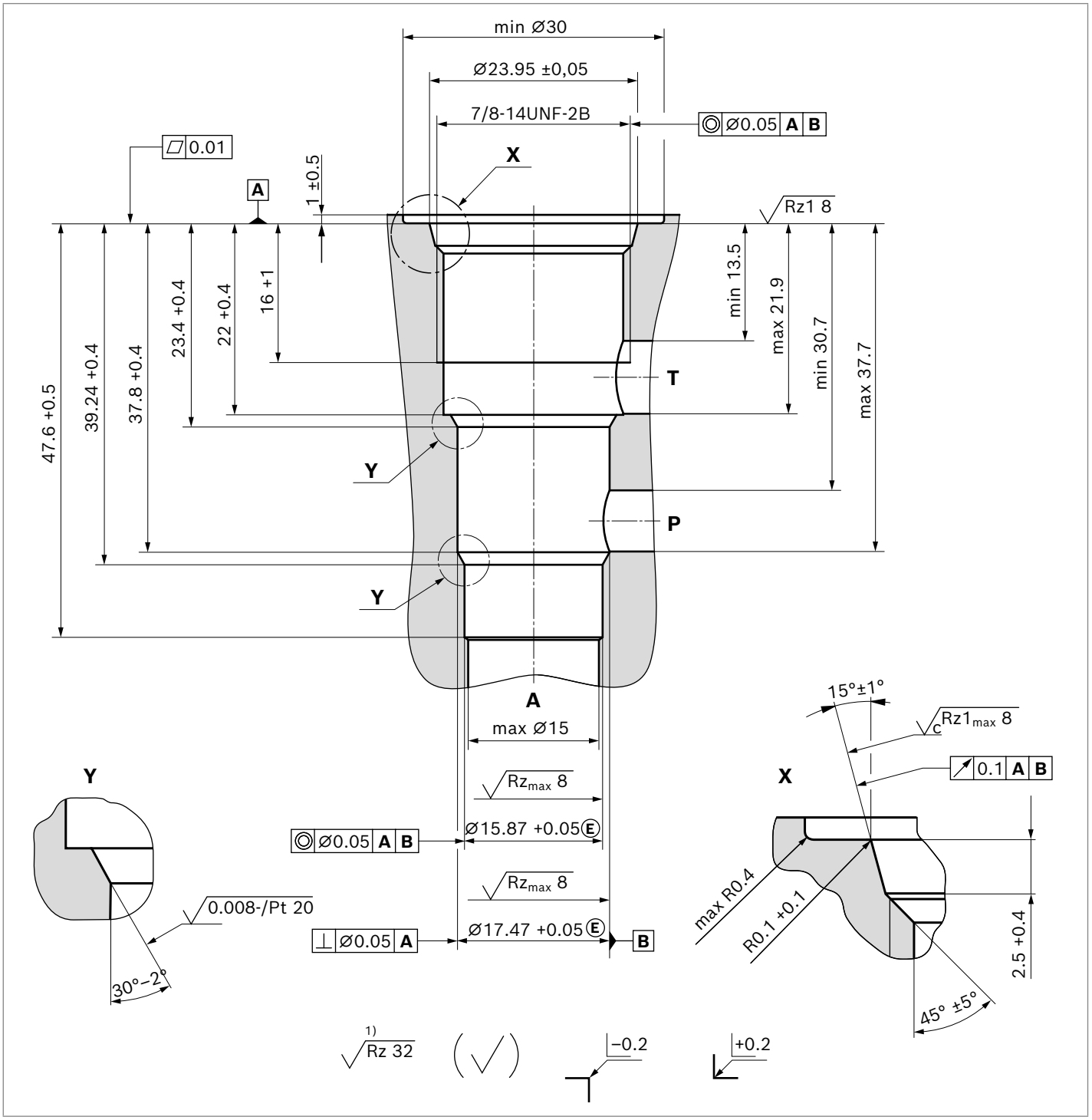


1 Nut, tightening torque M_A = 5^{+1} Nm
2 SW24, tightening torque M_A = 55^{+5} Nm
3 Plug-in connectors, separate order, see data sheet 08006
4 Space required to remove the plug-in connector
5 Device connector “K40”
6 Device connector “K4”
7 Device connector “C4”

A = Control pressure port
P = Pump port
T = Tank port

Mounting cavity

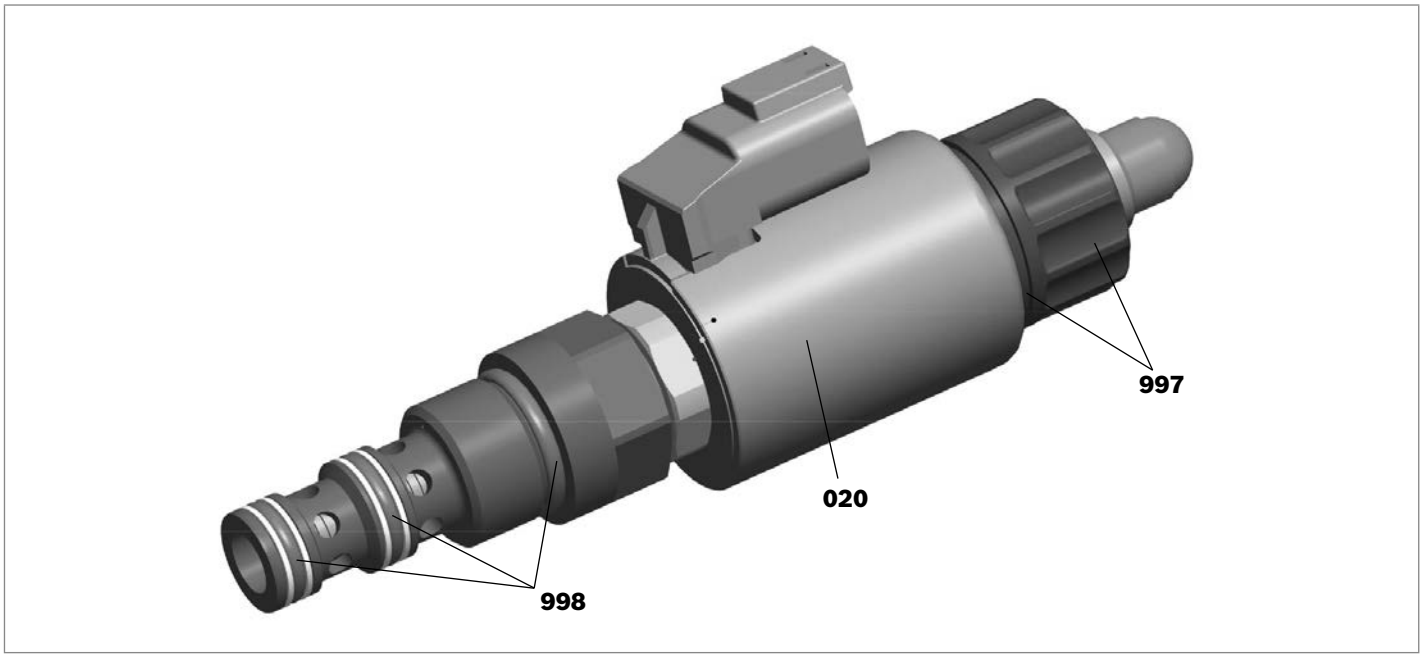
▼ **R/UNF-10-03-0-06; 3 main ports; thread 7/8-14UNF-2B**



A = Control pressure port
P = Pump port
T = Tank port

1) Visual inspection

Available individual components



Item	Denomination		Direct voltage	Material No.
020	Coil for individual connection [1]	K4	12 V	R901002932
			24 V / 1200 mA	R901002319
			24 V / 800 mA	R901049962
		K40	12 V	R901003055
			24 V / 1200 mA	R901003053
			24 V / 800 mA	R901050010
		C4	12 V	R901003044
			24 V / 1200 mA	R901003026
			24 V / 800 mA	R901049963
997	Nut and Seal ring for pole tube			R961010456
998	Seal kit of the valve			R961011282

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

Related documentation

▶ Electronic controls:		
– Plug-in proportional amplifier	Type VT-SSPA1...	Data sheet 30116
– Analog amplifier	Type RA	Data sheet 95230
– BODAS controller	Type RC	Data sheets 95204, 95205, 95206
▶ Mineral oil-based hydraulic fluids		Data sheet 90220
▶ Environmentally acceptable hydraulic fluids		Data sheet 90221
▶ $MTTF_D$ values		Data sheet 90294
▶ Filter selection		www.boschrexroth.com/filter

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