

Proportional flow control valve, with integrated pressure compensator

RE 18702

Edition: 2012-05

Replaces: 05.11

Type KUDSR



- ▶ Size 3
- ▶ Component series A
- ▶ Maximum operating pressure 350 bar
- ▶ Maximum flow 120 l/min

Features

- ▶ Mounting cavity R/UNF-16-03-0-06
- ▶ Direct operated proportional valve for controlling the flow size
- ▶ Operation by means of proportional solenoid with central thread and detachable coil
- ▶ Rotatable solenoid coil
- ▶ With concealed manual override
- ▶ Screwable manual override with star handle, optional

Contents

Features	1
Ordering code, valve types	2
Available coils, symbols	3
Function	4
Technical data	5 ... 6
Characteristic curves	7 ... 10
Minimum terminal voltage at the coil and relative duty cycle	11
Unit dimensions	12
Mounting cavity	13
Available individual components	14
More information	14

Ordering code (valve without coil) ¹⁾

01	02	03	04	05	06	07	08	09
KUDS	R	3		A	/	F	N9	V *

01	Proportional flow control valve, with integrated pressure compensator, direct operated	KUDS
02	Maximum operating pressure 350 bar	R
03	Size 3	3

Symbol		
04		Flow in the main port ③
		80 l/min
		60 l/min
		40 l/min
05	Component series	A
06	High Performance and mounting cavity R/UNF-16-03-0-06, see page 13	F
07	With concealed manual override ²⁾	N9
Seal material		
08	FKM seals	V
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	
09	Further details in the plain text	*

¹⁾ Complete valves with mounted coil on request.

²⁾ Screwable manual override with star handle **"N14"** (separate order, material no. **R913009058**, see page 12).

Valve types (without coil) ¹⁾

Type	Material no.
KUDSR3CA/FN9V	R901255657
KUDSR3C1A/FN9V	R901287409
KUDSR3C2A/FN9V	R901265879

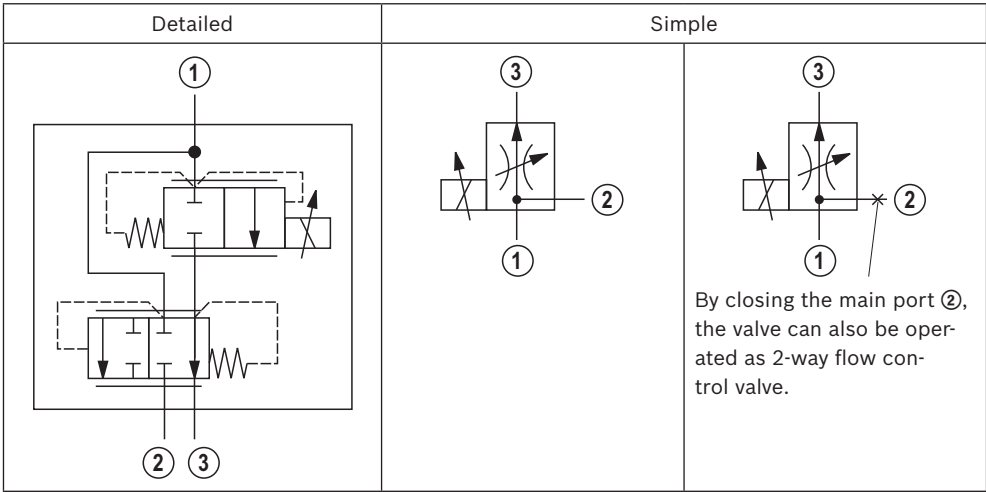
Available coils (separate order) ¹⁾

Direct voltage DC ⁴⁾	Material no. for coil with connector ³⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make Deutsch	"C4" 02pol C4/Z30 AMP Junior-Timer
12 V (1.8 A)	R901022180	R901272648	R901022680
24 V (1.2 A)	R901022174	R901272647	R901022683

³⁾ Mating connectors, separate order, see data sheet 08006.

⁴⁾ Other voltages upon request.

Symbols



- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A)

Function

General

The proportional flow control valve is a direct operated cartridge valve in spool design with integrated pressure compensator. It regulates the flow proportionally to the input signal in a continuous form from the main port ① to ③. Superfluous residual flow is led to the tank or to another actuator via the port ②.

The valve basically comprises of housing, control spool, control spring, pressure compensator piston, orifice bush, pressure compensator spring as well as proportional solenoid (1) with central thread and detachable coil.

Function

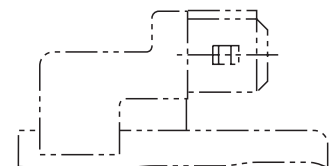
With de-energized proportional solenoid (1), the control spool that is always pressure-compensated to the actuating forces due to its structural design is held in the initial position by the control spring and blocks the flow between main port ① and ③. By energizing the proportional solenoid (1), the control spool is adjusted directly proportional to the electrical input signal and, via orifice-like cross-sections (with progressive flow characteristic), connects the main ports ① and ③. Due to the integrated pressure compensator piston together with the pressure compensator spring, the pressure drop across the valve is kept constant, independent of the pressures at ①, ② and ③. In case of superfluous flow from ① the pressure compensator piston moves to the right and opens the connection ① to ②. In case of de-excitation of the proportional solenoid (1), the control spring returns the control piston into its initial position. The whole flow is now directly led from main port ① to main port ②.

The manual override (2) allows for the adjustment of the valve without solenoid energization.

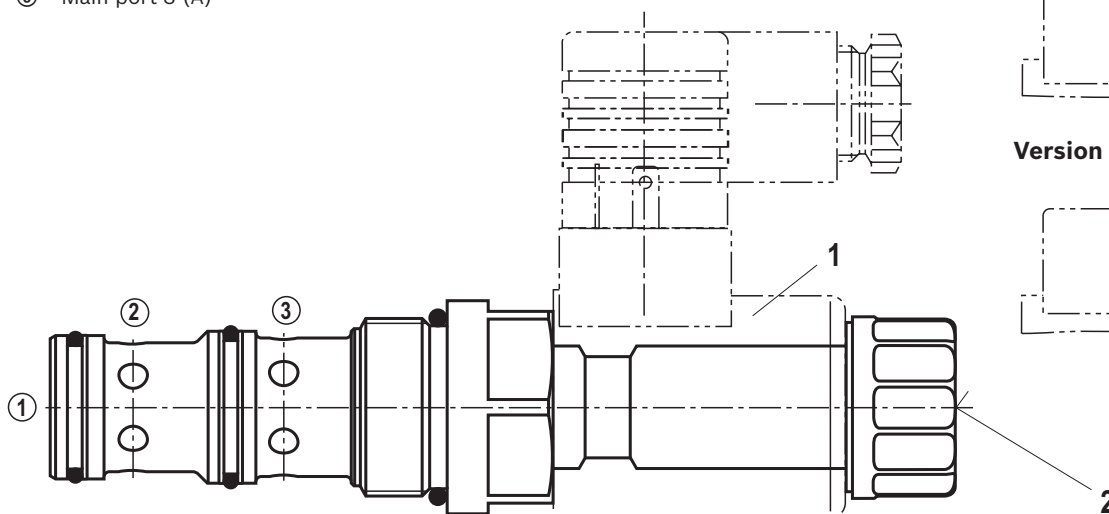
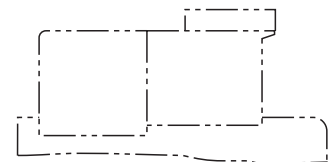
- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A)

Version "K4"
(with mating connector)

Version "C4"



Version "K40"



Type KUDSR3...

Technical data

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

general		
Weight	kg	0.97
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	see page 11
Storage temperature range	°C	-20 to +80

Environmental audits

Salt spray test according to DIN 50021	h	720
Surface protection DC solenoids		Coating according to DIN 50962-Fe//ZnNi with thick film passivation

hydraulic		
Maximum operating pressure	– Main port ①	bar 350
Bypass pressure	– Main port ②	bar 350 with q_{Vmax}
Prio pressure	– Main port ③	bar 330 with q_{Vmax}
Control pressure differential	– ① to ③	bar 12 to 15
Minimum pressure differential	– ① to ③	bar > 10
Maximum flow	– Main port ①	l/min 120
Rated flow	– ① to ③	l/min 80 (regulated)
Leakage		ml/min < 100 (with $\Delta p = 100$ bar in ①; HLP46, $\vartheta_{oil} = 40$ °C)
Hydraulic fluid		See table below
Hydraulic fluid temperature range		°C -40 to +100 (preferably +40 to +50)
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 ¹⁾
Load cycles	Million	10
Hysteresis ²⁾	%	≤ 5
Range of inversion ²⁾	%	≤ 2
Response sensitivity ²⁾	%	≤ 1

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-solvent, zinc may accumulate in the fluid.

¹⁾ 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.

²⁾ Measured with analog amplifier type RA2-1/10 according to data sheet 95230 (PWM = 100 Hz).

Technical data

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

electric			
Voltage type		Direct voltage	
Supply voltages ³⁾	V	12 DC	24 DC
Maximum solenoid current		1.8	1.2
Coil resistance	– Cold value at 20 °C	Ω	3.3
	– Max. hot value	Ω	5.8
			7.2
			13.0
Duty cycle		%	See characteristic curve page 11
Maximum coil temperature ⁴⁾		°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)		Analog amplifier module type VT-MSPA1...	Data sheet 30223
		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
Design according to VDE 0580			

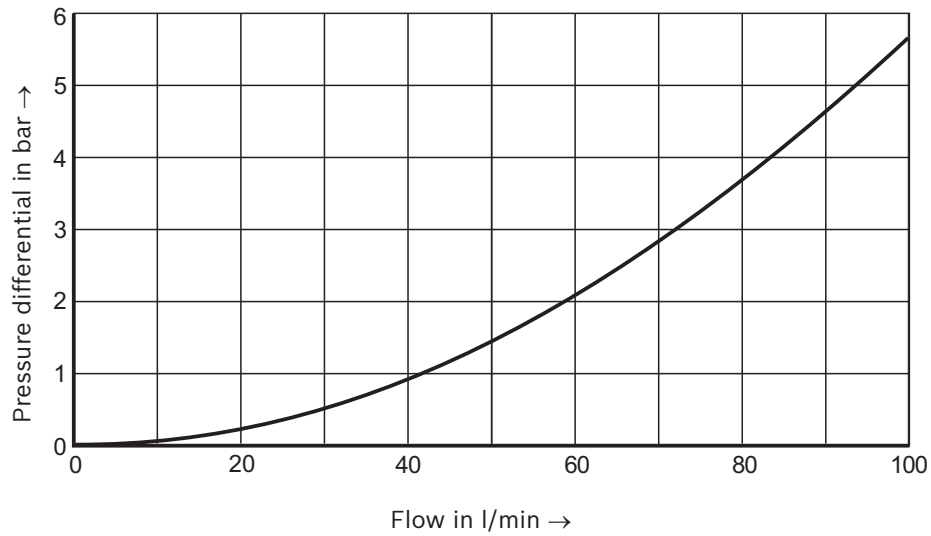
³⁾ Other voltages upon request⁴⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

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

Characteristic curves

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

Δp - q_v characteristic curve – Main port ① to ② (③ open, orifice closed)

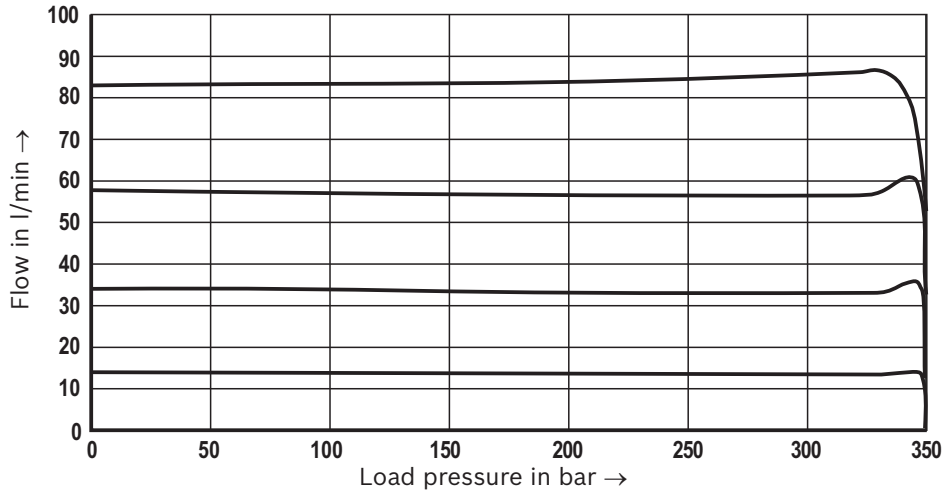


Characteristic curves: Version "C"

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and $q_{v①} = 80 \text{ l/min}$)

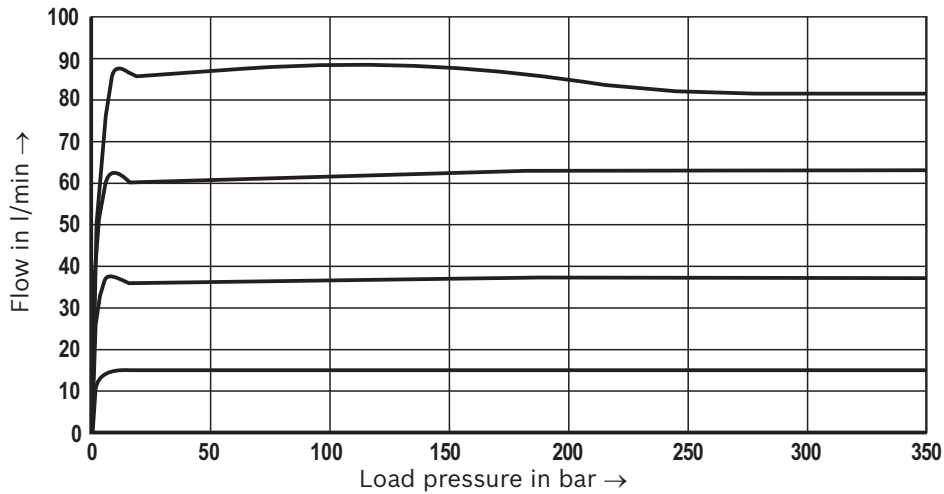
Regulated flow at the main port ③ across load pressure

3-way function (main port ② open to the tank)

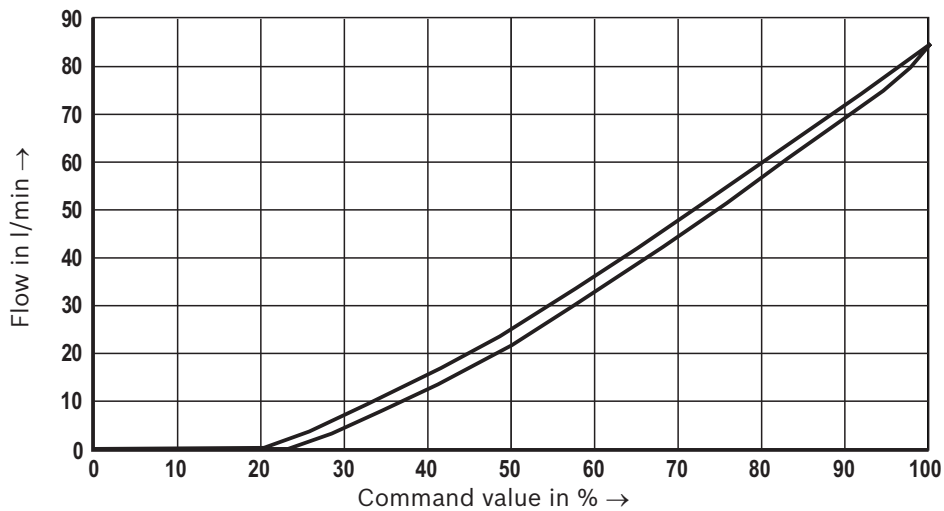


Regulated flow at the main port ③ across load pressure

2-way function (main port ② closed)



Flow at the main port ③ across command value

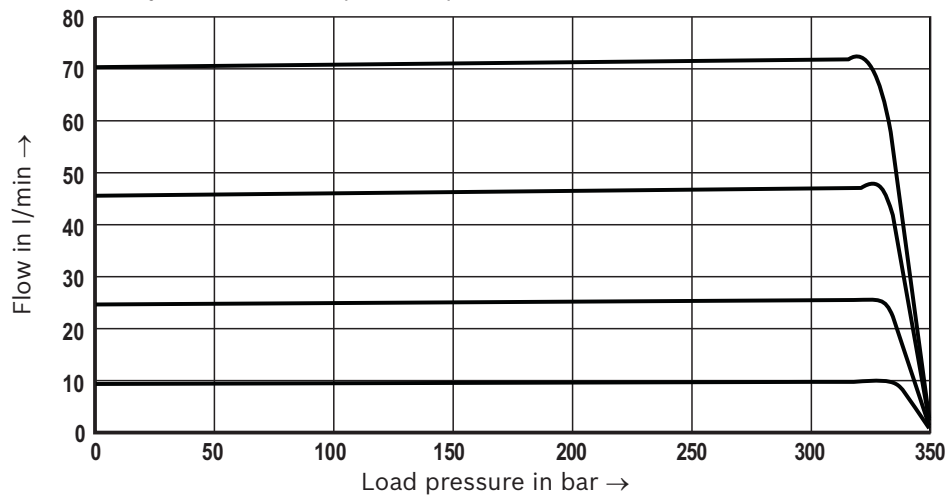


Characteristic curves: Version "C1"

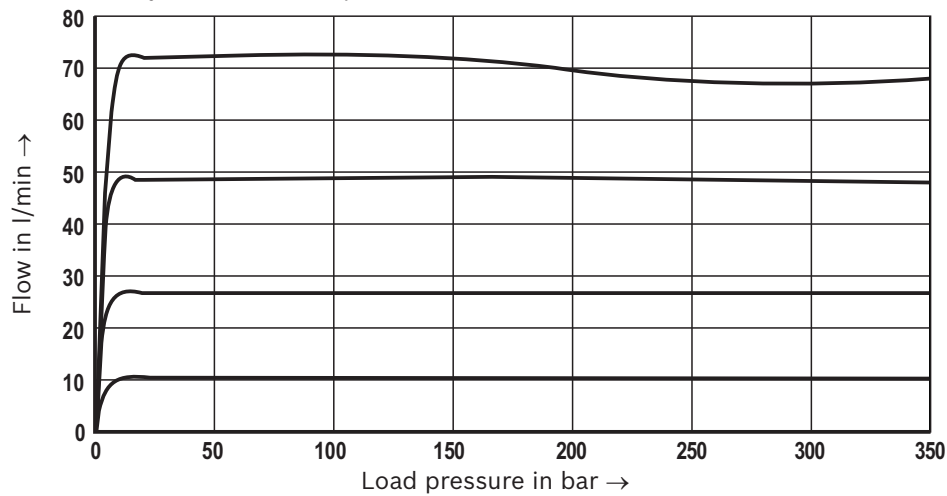
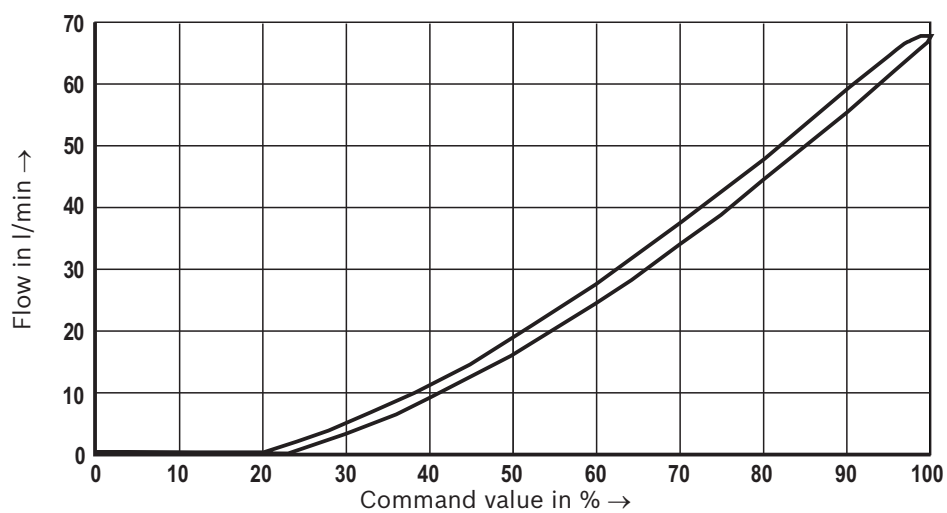
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and $q_{v①} = 60 \text{ l/min}$)

Regulated flow at the main port ③ across load pressure

3-way function (main port ② open to the tank)

**Regulated flow at the main port ③ across load pressure**

2-way function (main port ② closed)

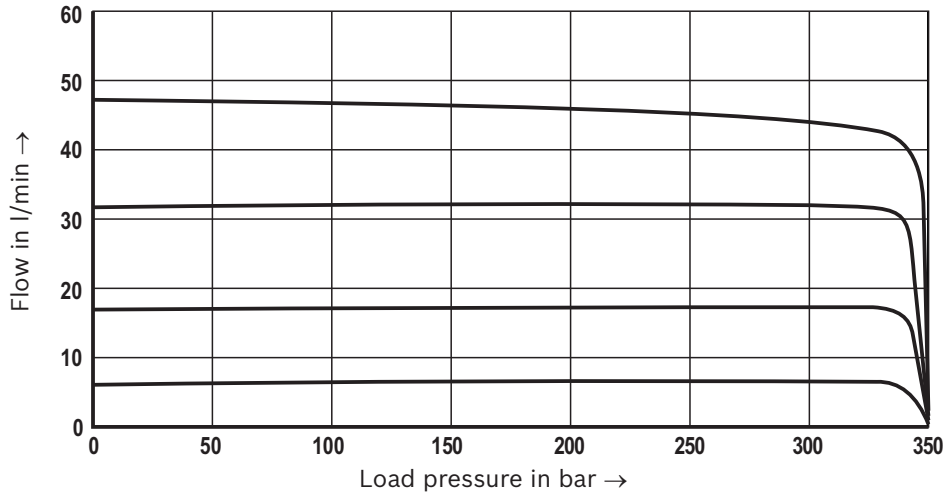
**Flow at the main port ③ across command value**

Characteristic curves: Version "C2"

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and $q_{v①} = 40 \text{ l/min}$)

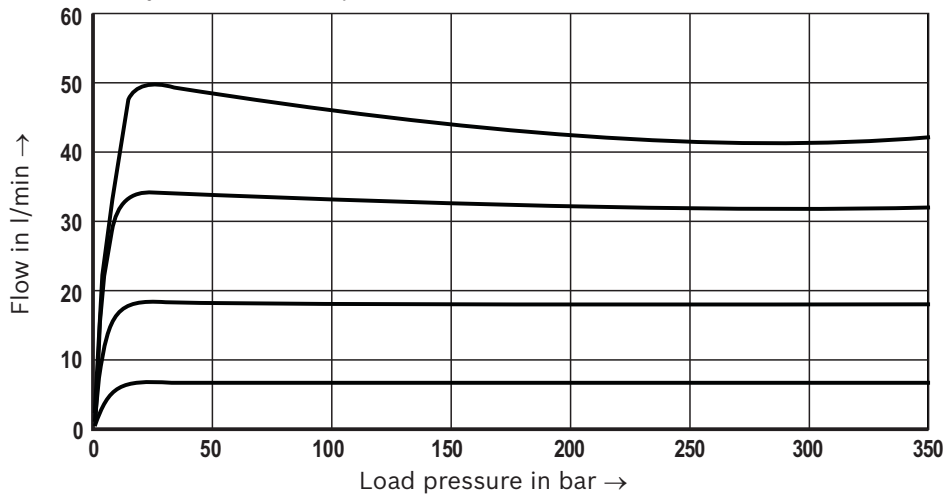
Regulated flow at the main port ③ across load pressure

3-way function (main port ② open to the tank)

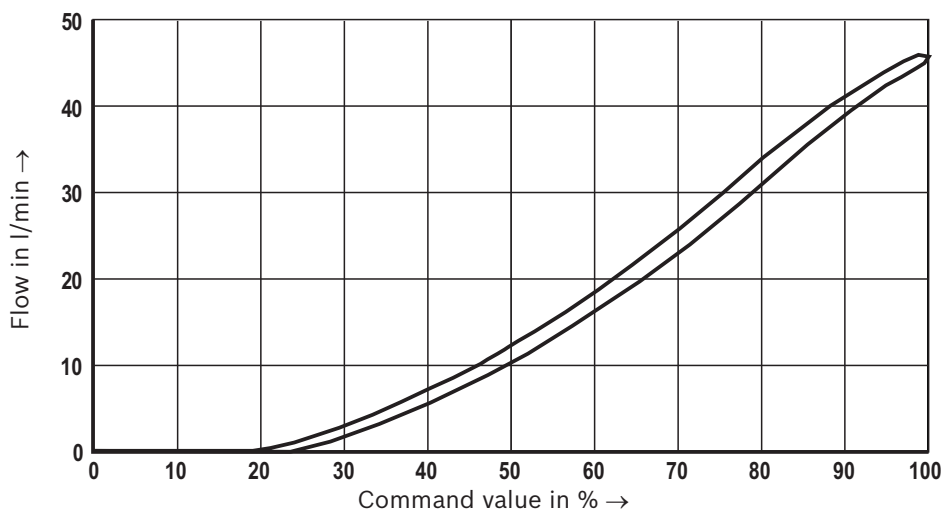


Regulated flow at the main port ③ across load pressure

2-way function (main port ② closed)

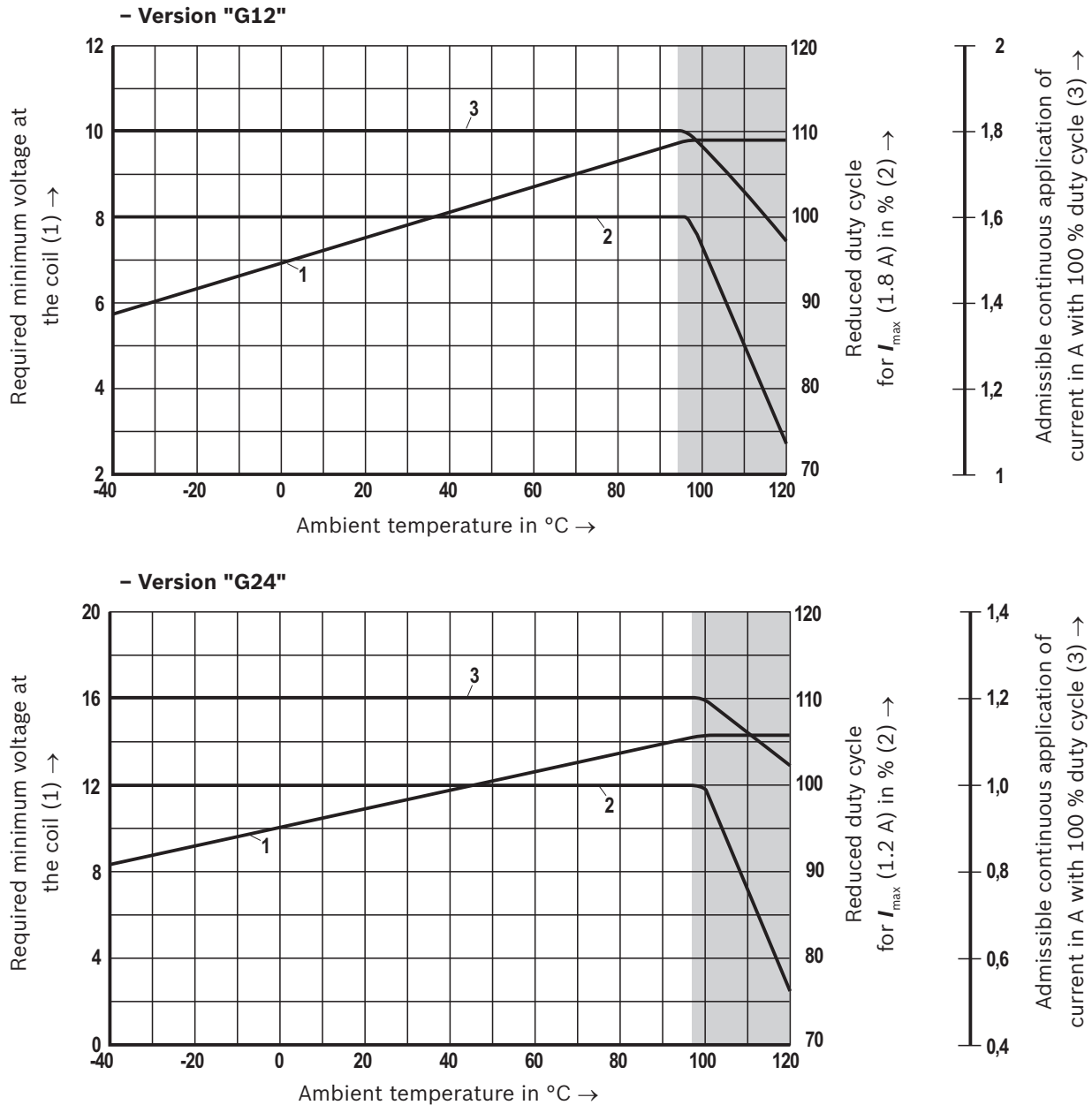


Flow at the main port ③ across command value



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



Limited valve performance

Notices!

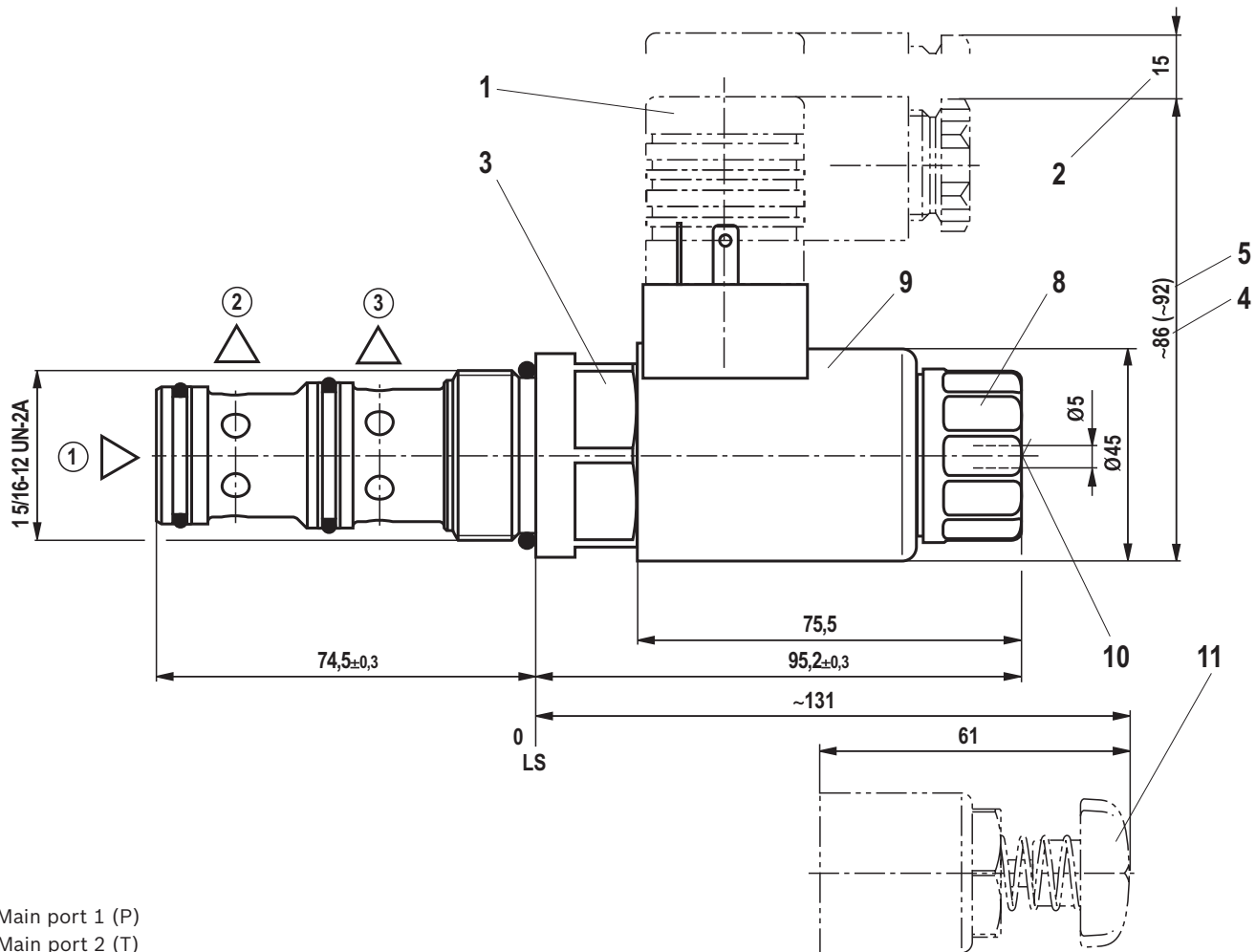
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

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.

Unit dimensions

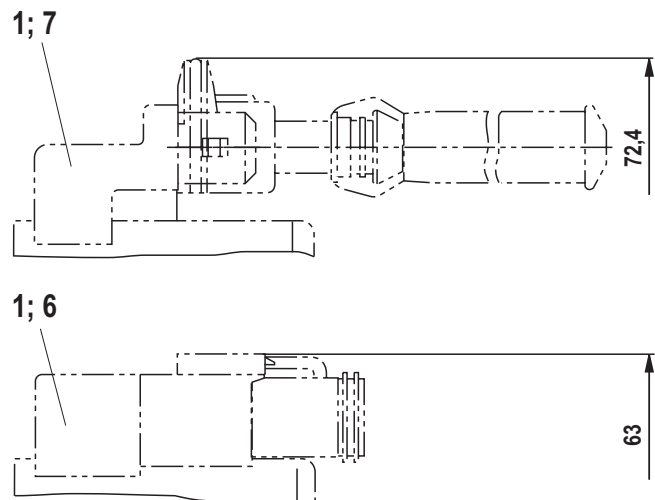
(dimensions in mm)



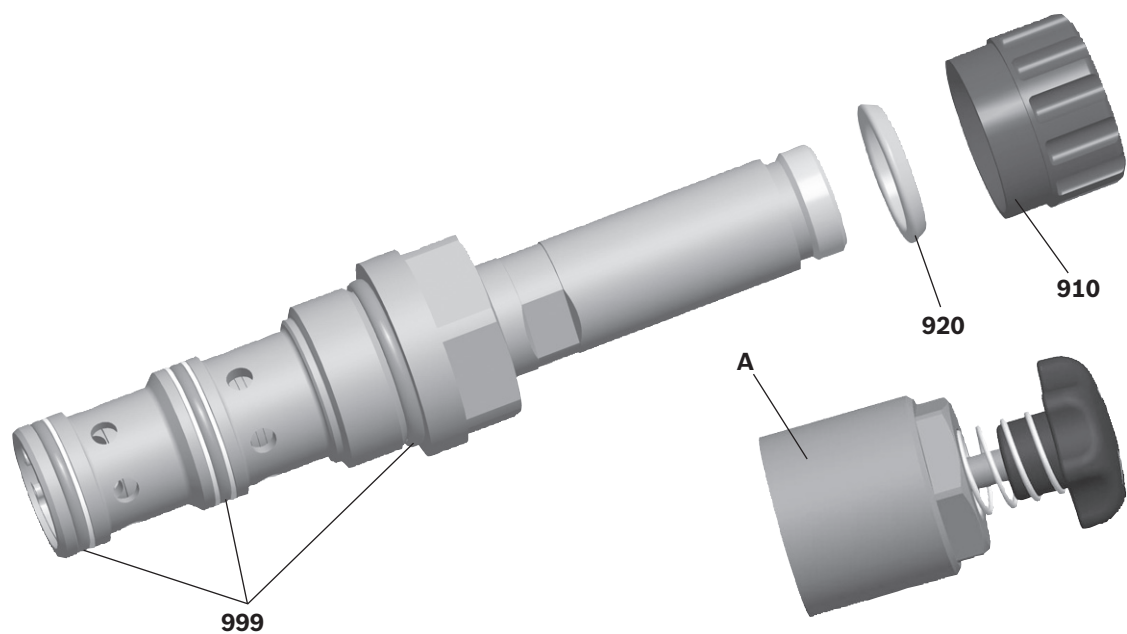
- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A)

LS = Location Shoulder

- 1** Mating connector without circuitry for connector "K4" (separate order, see data sheet 08006)
- 2** Space required to remove the mating connector
- 3** SW36, tightening torque $M_A = 165^{+15}$ Nm
- 4** Dimension for "K4" mating connector, without circuitry
- 5** Dimension () for "K4" mating connector, with circuitry
- 6** Mating connector for connector "K40" (separate order, see data sheet 08006)
- 7** Mating connector for connector "C4" (separate order, see data sheet 08006)
- 8** Nut, tightening torque $M_A = 5^{+2}$ Nm
- 9** Coil (separate order, see page 3)
- 10** Concealed manual override "N9"
- 11** Screwable manual override with star handle "N14" (separate order, see page 3)



Available individual components



Item	Denomination	Material no.
910	Nut	R900029574
920	O-ring for pole tube	R900002507
999	Seal kit of the valve	R961003236
A	Manual override "N14"	R913009058

Coils, separate order, see page 3.

More information

- Control electronics:
 - Analog amplifier module type VT-MSPA1...
 - Plug-in proportional amplifier type VT-SSPA1...
 - Analog amplifier type RA...
 - BODAS control unit type RC...
- Selection of the filters

Data sheet 30223

Data sheet 30116

Data sheet 95230

Data sheet 95200

www.boschrexroth.com/filter

Notes

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Notes

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