The Drive & Control Company

Rexroth Bosch Group

4/3 proportional directional spool valve, direct operated, with solenoid actuation

Type VEPS..43

RE 18162
Edition: 2013-01
Replaces: 05.12


H7900

- Frame size 10
- Component series 0
- Maximum operating pressure 350 bar
- Maximum flow 25 l/min

Features

- Mounting cavity R/UNF10-04-0-06
- Direct operated proportional directional spool valve with solenoid actuation for controlling the flow size
- Wet-pin DC solenoids
- Rotatable solenoid coil
- Manual override, optional

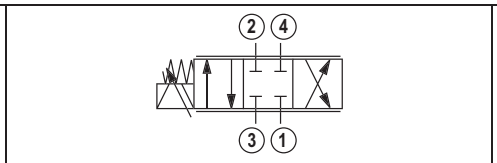
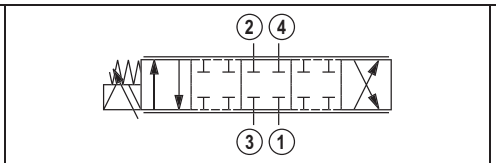
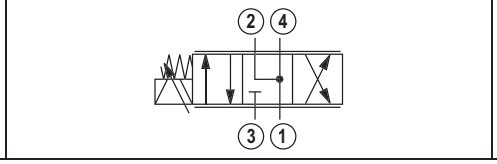
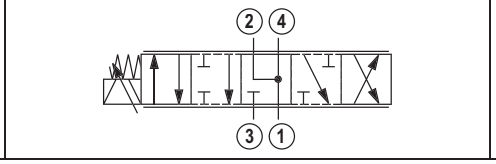
Contents

Ordering code (valve without coil) [1)]

01	02		03	04	05		06	07	08	09	10	11	12
VEPS	–	10A	–	43			OD14		78	KP2		0	0

01	Proportional directional spool valve, direct operated, electrically operated	**VEPS**
02	Frame size 10	**10A**
03	4/3 directional design	**43**

Symbols

04			**10**
			**20**

05	**Without** manual override	**0**
	With pull/push manual override	**-M1**
06	4/3 proportional directional spool valves, direct operated, with solenoid actuation	**OD14**

Symbols

07	See item 04	**10**
		20
08	Frame size 10: R/UNF 10-04-0-06, see page 15	**78**
09	Proportional valve with 2 coils	**KP2**
10	**Without** manual override	**0**
	With pull/push manual override	**1**
11	Standard version	**0**
12	Revision status	**0**

Valve types (without coil) [1)]

Symbol	**Without** manual override **"0"**			**With** pull/push manual override **"-M1", "1"**		
	Type		**Material no.**	**Type**		**Material no.**
10	VEPS-10A-4310	OD141078KP2000	R901271834	VEPS-10A-4310-M1	OD141078KP2100	R901300077
20	VEPS-10A-4320	OD142078KP2000	R901271837	VEPS-10A-4320-M1	OD142078KP2100	R901300083

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Available coils (separate order) [1)]

	Material no. for coil with connector [2)]		
Direct voltage DC [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	R901002932	R901003055	R901003044
24 V / 1200 mA	R901002319	R901003053	R901003026
24 V / 800 mA	R901049962	R901050010	R901049963

1) Complete valves with mounted coil on request.
2) Mating connectors, separate order, see data sheet 08006.
3) Other voltages upon request.

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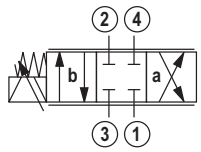
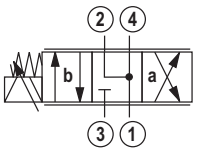
Function, section, symbols

General

The 4/3 proportional directional spool valves are direct operated, pressure-compensated cartridge valves. They regulate the flow proportionally to the input signal in a continuous form from the main port ③ to ② or ③ to ④.
The valve basically consists of:
Pole tube (1), socket (2), a control spool (5) as well as a return spring (4).

Function

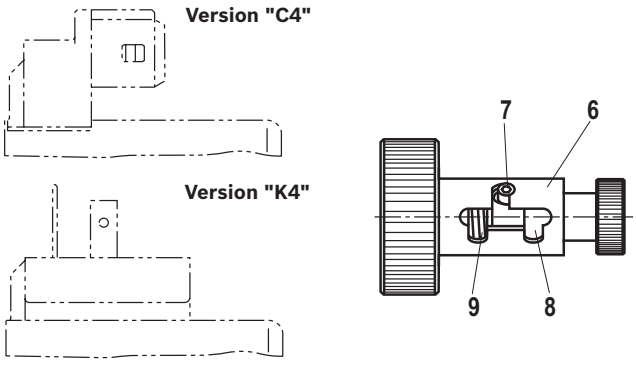
In the de-energized condition, the control spool (5) is held in the initial position by the return spring (4). By energizing the solenoid (3), the control spool (5) is adjusted directly - proportional to the electrical input signal - and connects the main ports ③ with ② or ③ with ④. The symbols are realized by different spools ("10" and "20"). In case of de-excitation of the solenoid (3), the return spring (4) returns the control spool (5) into its initial position. Main ports ②, ③ and ④ can be permanently pressurized with an operating pressure of 350 bar. The ports have a fixed pin assignment (see symbols). At port ① there must be a maximum pressure of 250 bar.
The manual override (6) allows for the switching of the valve without solenoid energization.

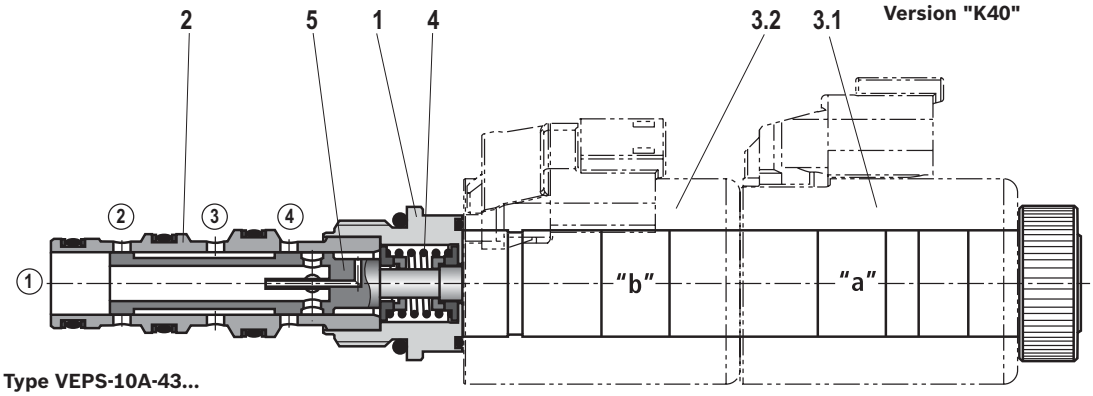
Symbol "10"	Symbol "20"
	

⚠ Attention!
If the valve is not installed or installed in a system that is not completely bled, the valve must not be energized as otherwise, the entering air has a very negative effect on the valve‘s dynamic behavior.

① = Main port 1 (T)
② = Main port 2 (A)
③ = Main port 3 (P)
④ = Main port 4 (B)

7 Initial position
8 Spool position "a"
9 Spool position "b"





Type VEPS-10A-43...

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Technical data

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

general			
Weight	– Valve	kg	0.35
	– Coil	kg	0.25 each
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	–40 to +120 (see page 12 and 13)
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	– Connection ②, ③, ④	bar	350
	– Connection ①	bar	250
Maximum flow		l/min	25
Step response	0 to 100 %; 100 to 0 %	ms	< 180 (with p_s = 10 bar)
Leakage		ml/min	< 60 per control edge (with Δp = 100 bar; HLP46, ϑ_{oil} = 40 °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–40 to +100 (preferably +40 to +50)
Viscosity range		mm²/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]
Hysteresis [2]			≤ 5
Range of inversion [2]			≤ 2
Response sensitivity [2]			≤ 1
Load cycles			2 million [3]

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 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; see data sheet 95230

[3] Rexroth standard test condition (HLP46; ϑ_{oil} = 40 °C ±5 °C)

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Technical data

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

electric					
Voltage type			Direct voltage		
Supply voltages [4]		V	12 DC	24 DC	24 DC
Maximum solenoid current		A	1760 mA	1200 mA	800 mA
Coil resistance	– Cold value at 20 °C	Ω	2.3	4.8	11.5
	– Max. hot value	Ω	3.8	7.9	18.5
Duty cycle		%	see characteristic curve page 12 and 13 [5]		
Maximum coil temperature [6]		°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		
			Plug-in proportional amplifier type VT-SSPA1...		Data sheet 30116
			Analog amplifier type RA...		Data sheet 95230
Recommended dither frequency (PMW)		Hz	120		
Design according to VDE 0580					

[4] Other voltages upon request.

[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 ⏚) has to be connected properly.

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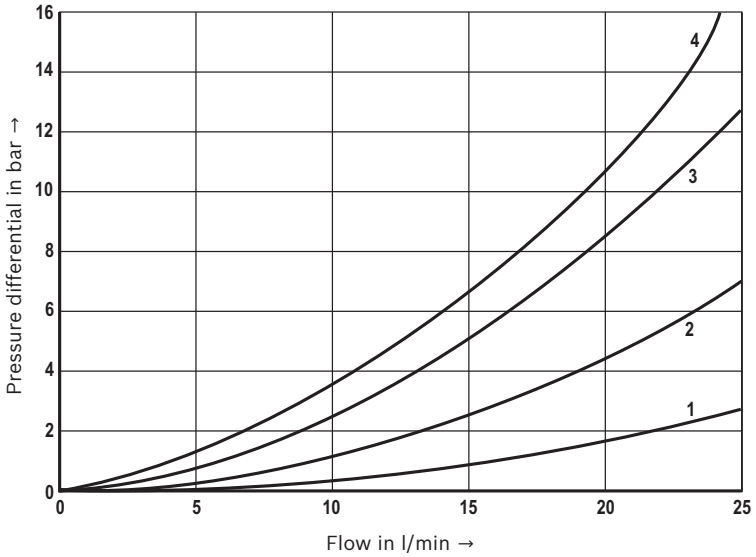
Characteristic curves

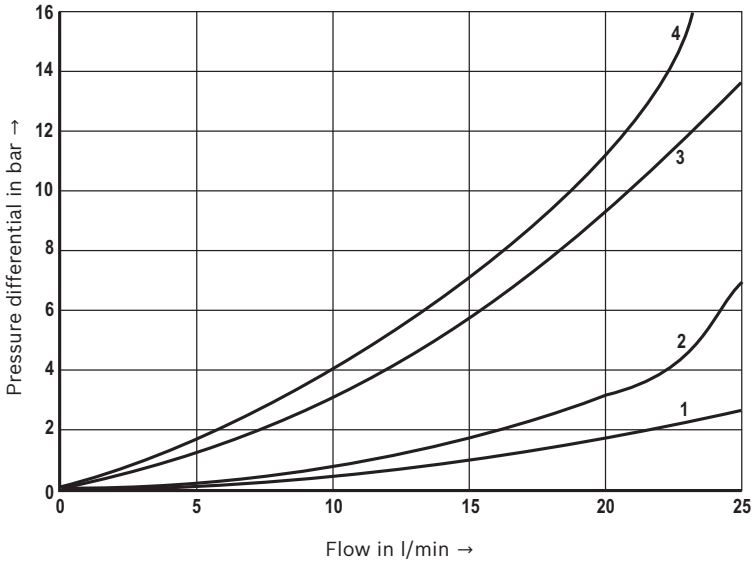
(measured with HLP46, ϑ_{oil} = 40 ±5 °C and 24 V coil)

Δp-q_V characteristic curves – Symbol "10"



1 ② → ①
2 ④ → ①
3 ③ → ④
4 ③ → ②

Δp-q_V characteristic curves – Symbol "20"



1 ② → ①
2 ④ → ①
3 ③ → ④
4 ③ → ②

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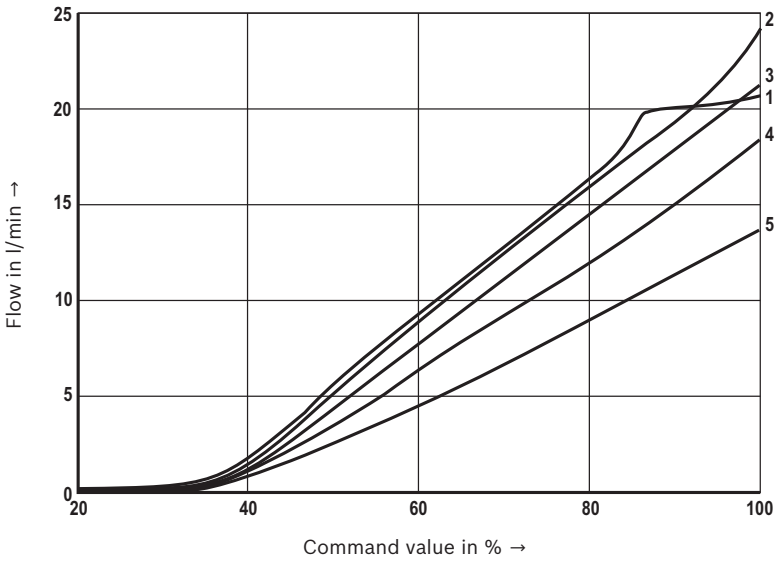
Characteristic curves

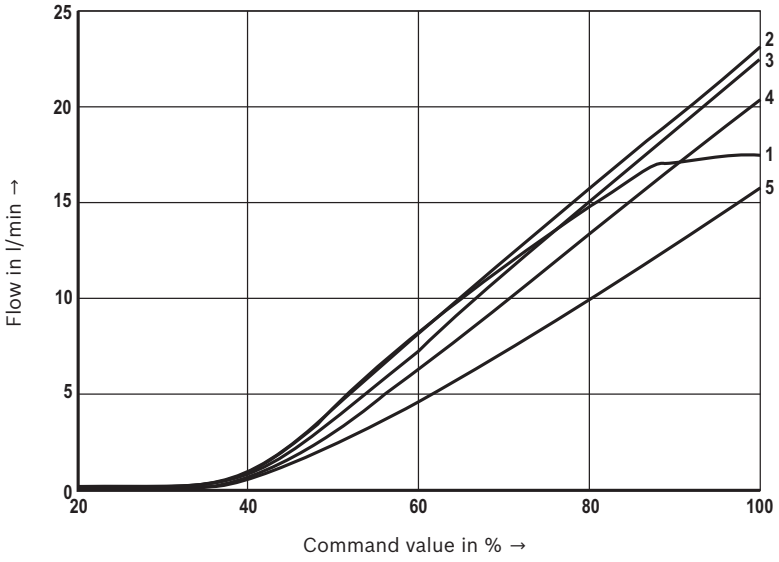
(measured with HLP46, ϑ_{oil} = 40 ±5 °C and 24 V coil)

Direction of flow ③ → ②
Symbol "10"



1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

Direction of flow ③ → ④
Symbol "10"



1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

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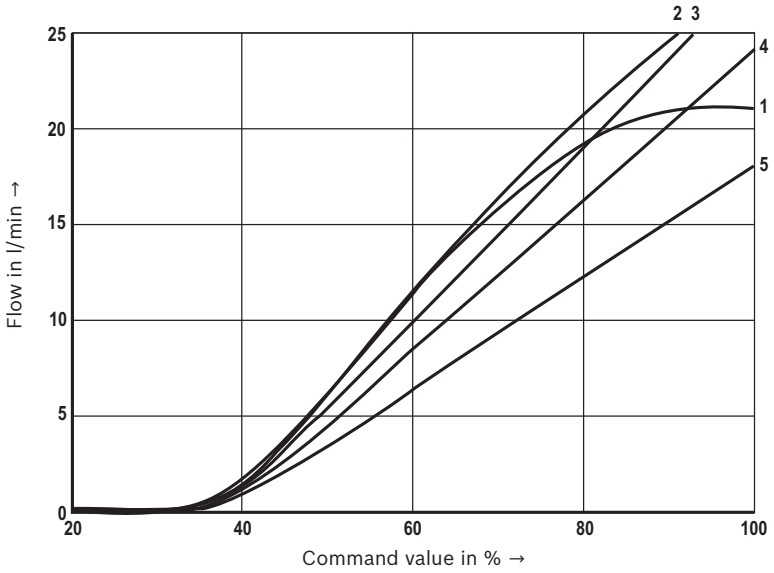
Characteristic curves

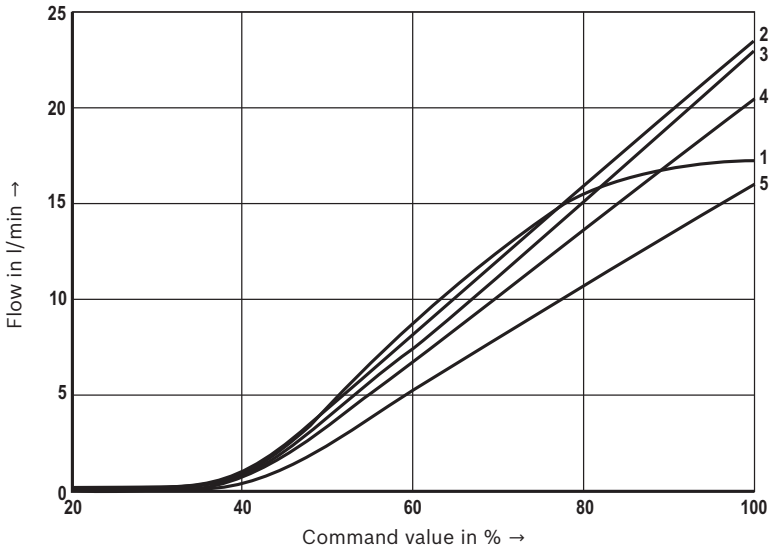
(measured with HLP46, ϑ_{oil} = 40 ±5 °C and 24 V coil)

Direction of flow ③ → ②
Symbol "20"



1 ***Δp*** = 10 bar constant
2 ***Δp*** = 20 bar constant
3 ***Δp*** = 30 bar constant
4 ***Δp*** = 50 bar constant
5 ***Δp*** = 100 bar constant

Direction of flow ③ → ④
Symbol "20"



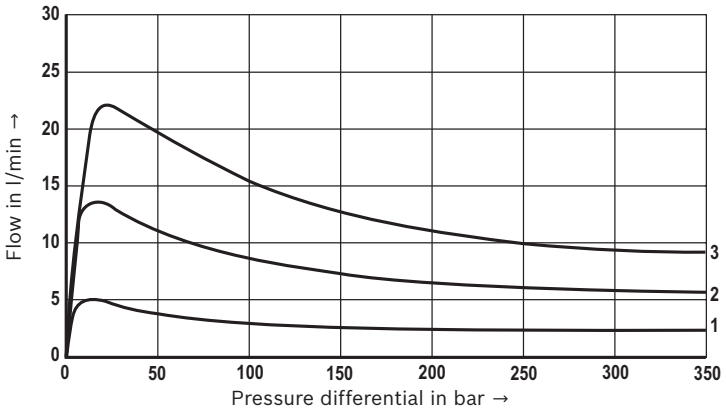
1 ***Δp*** = 10 bar constant
2 ***Δp*** = 20 bar constant
3 ***Δp*** = 30 bar constant
4 ***Δp*** = 50 bar constant
5 ***Δp*** = 100 bar constant

RE 18162, edition: 2013-01, **Bosch Rexroth AG**

Limits of performance

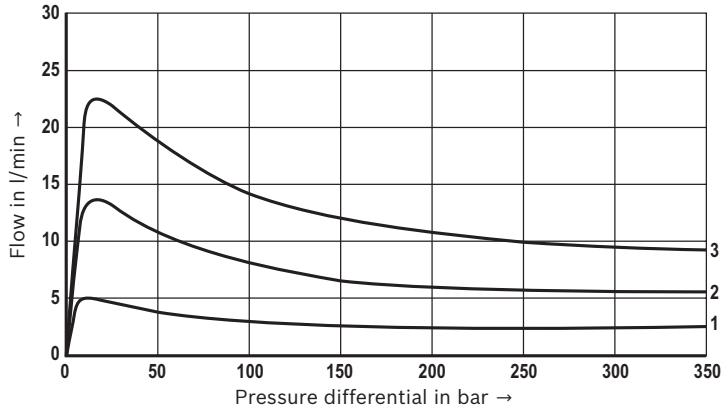
(measured with HLP46, ϑ_{oil} = 40 ±5 °C)

Direction of flow ③ → ② / ④ → ①
Symbol "10"



1 Command value = 50 %
2 Command value = 75 %
3 Command value = 100 %

Direction of flow ③ → ④ / ② → ①
Symbol "10"



1 Command value = 50 %
2 Command value = 75 %
3 Command value = 100 %

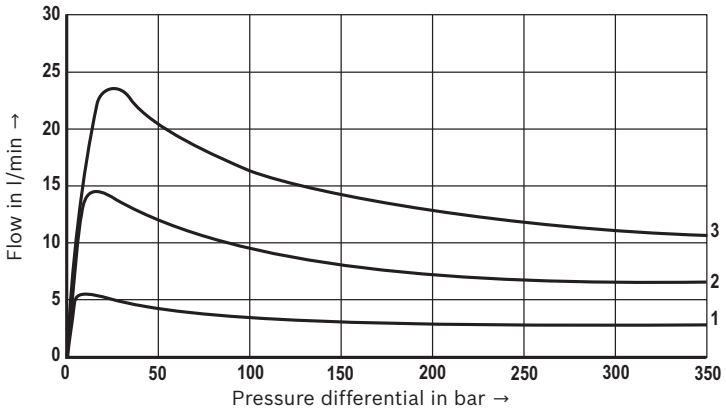
⚠ Attention!
The specified performance limits are valid for operation with two directions of flow (e.g. from ③ to ② and simultaneous return flow from ④ to ①).
Due to the current forces acting within the valves, the permissible performance limit may be considerably lower with only one direction of flow (e.g. from ③ to ② and blocked port ④)!
In such applications, please consult us!
The performance limit was determined without tank preloading.

Bosch Rexroth AG, RE 18162, edition: 2013-01

Limits of performance

(measured with HLP46, ϑ_{oil} = 40 ±5 °C)

Direction of flow ③ → ② / ④ → ①
Symbol "20"



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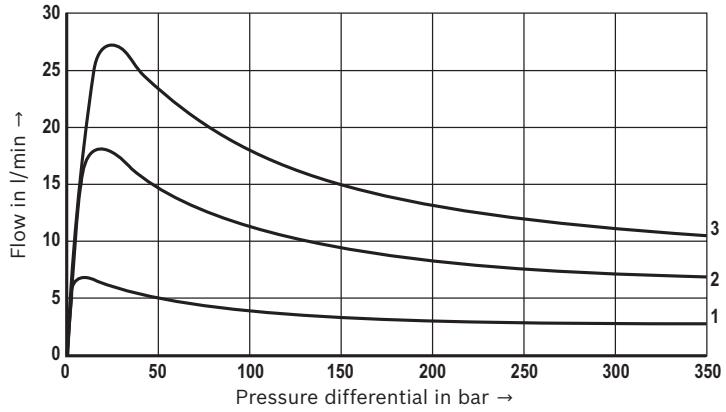
3 Command value = 100 %

Direction of flow ③ → ④ / ② → ①
Symbol "20"



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3 Command value = 100 %

⚠ Attention!
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In such applications, please consult us!
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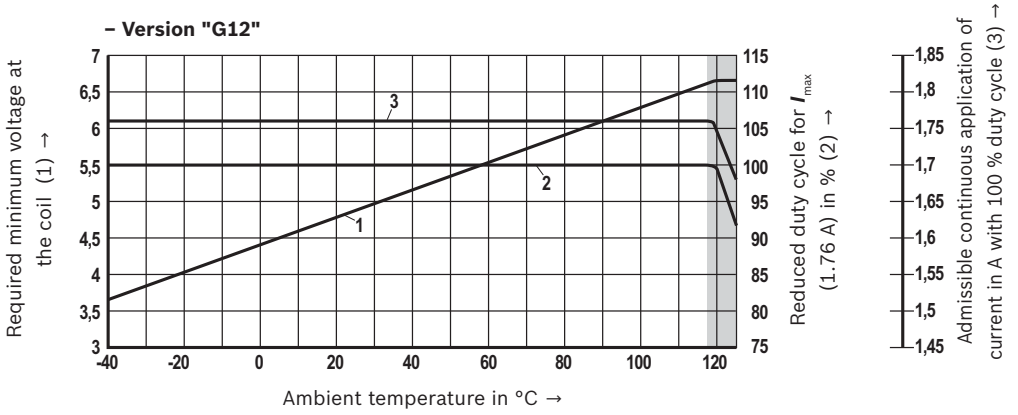
RE 18162, edition: 2013-01, **Bosch Rexroth AG**

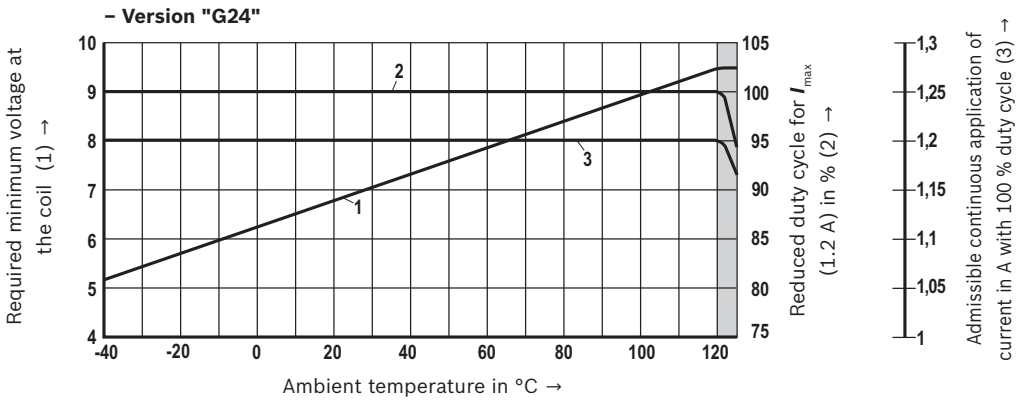
Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature

– Version "G12"



– Version "G24"



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.

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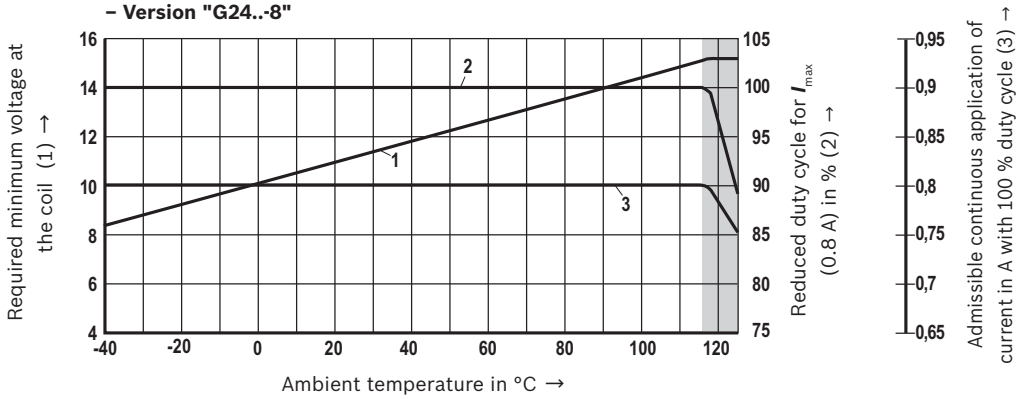
Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature

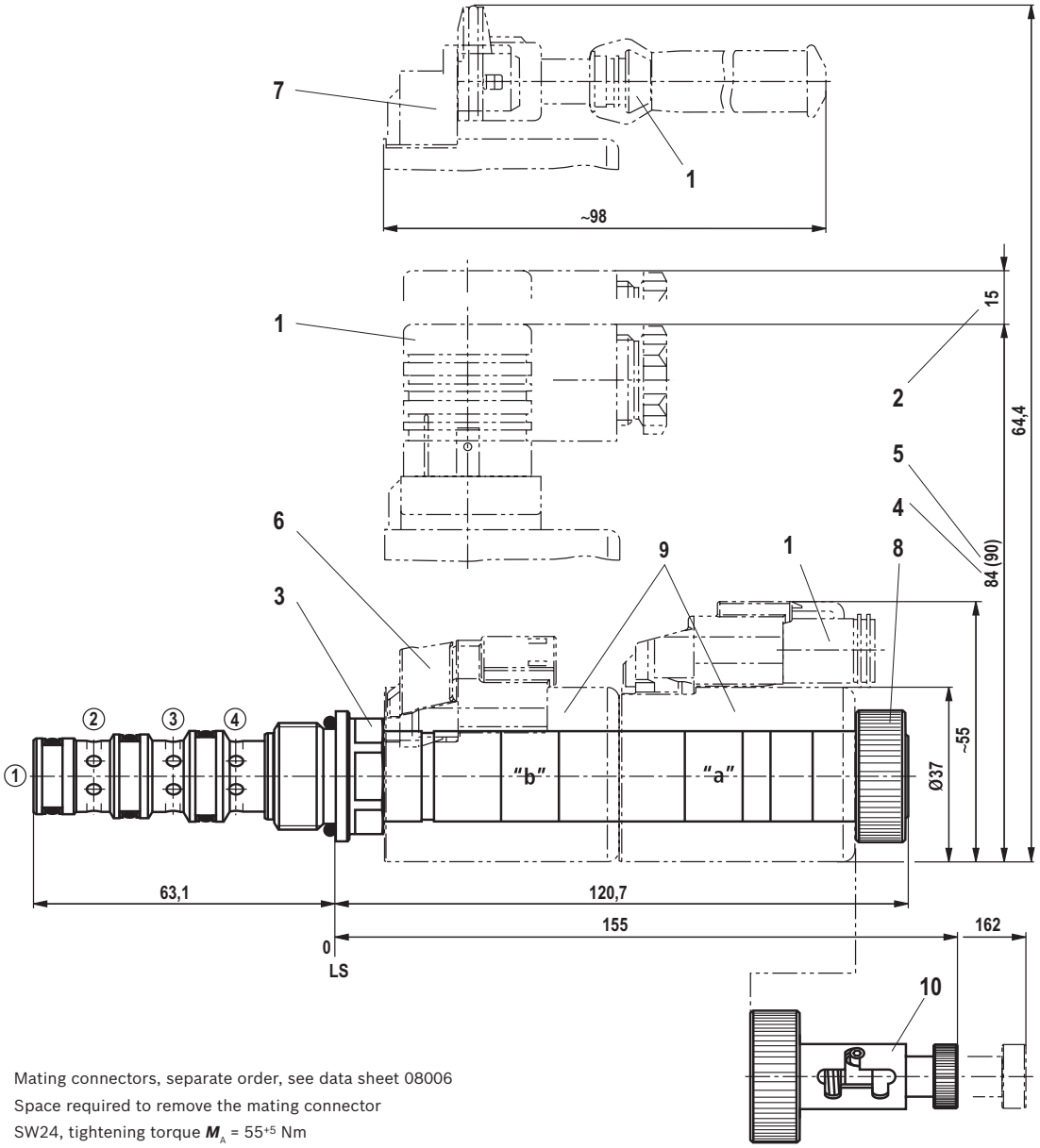
– Version "G24..-8"



Limited valve performance

☞ **Notice!**
The characteristic curves have been determined for coils with valve with medium test block size (80 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 Mating connectors, separate order, see data sheet 08006
2 Space required to remove the mating connector
3 SW24, tightening torque M_A = 55^{+5} Nm
4 Dimension for "K4" mating connector, without circuitry
5 Dimension () for "K4" mating connector, with circuitry
6 Version "K40"
7 Version "C4"
8 Nut, tightening torque M_A = 5^{+1} Nm
9 Coil (separate order, see page 3)
10 Pull/push manual override "1"

① = Main port 1 (T)
② = Main port 2 (A)
③ = Main port 3 (P)
④ = Main port 4 (B)

LS = Location Shoulder

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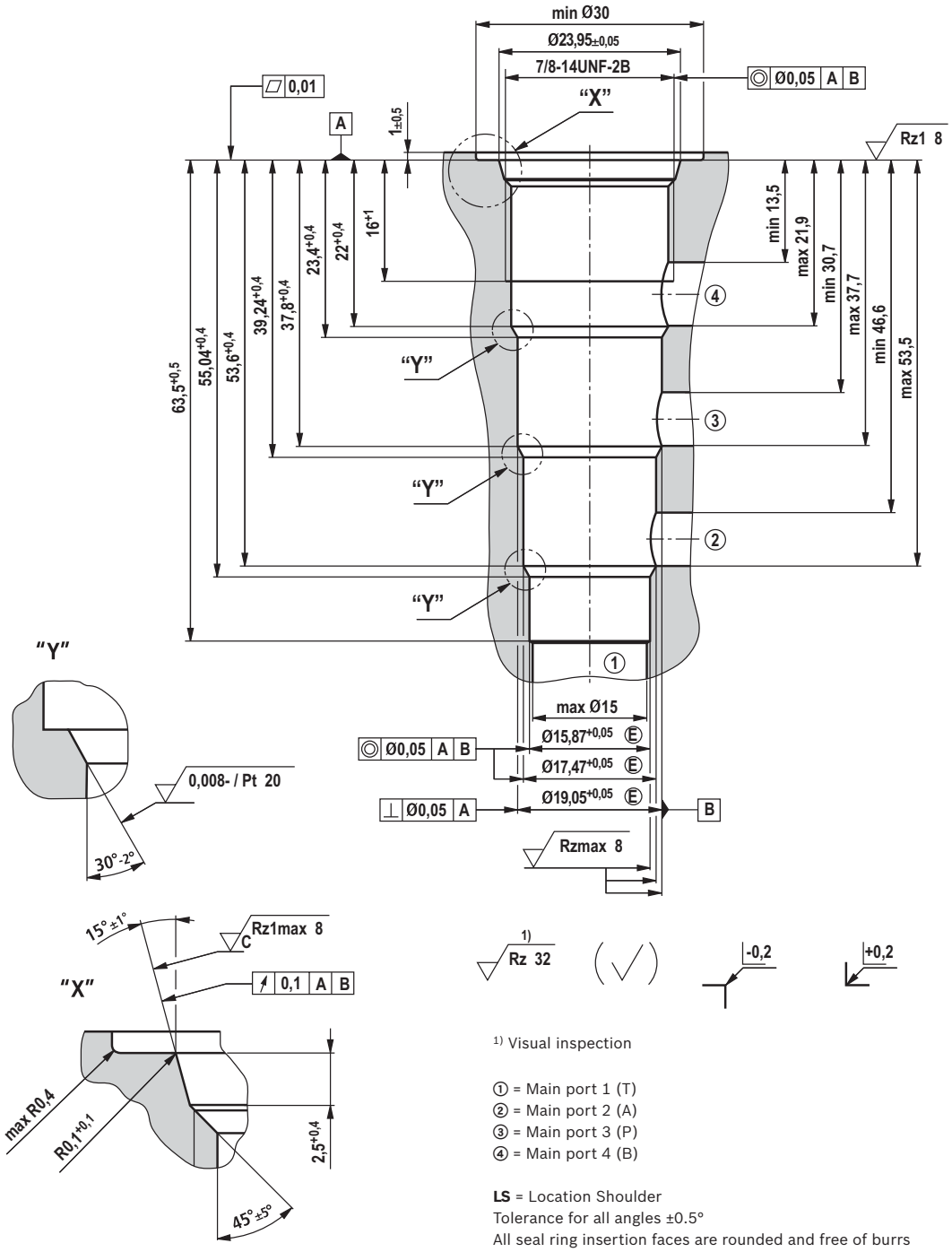
Mounting cavity R/UNF-10-04-0-06; 4 main ports; thread 7/8-14UNF-2B
(dimensions in mm)



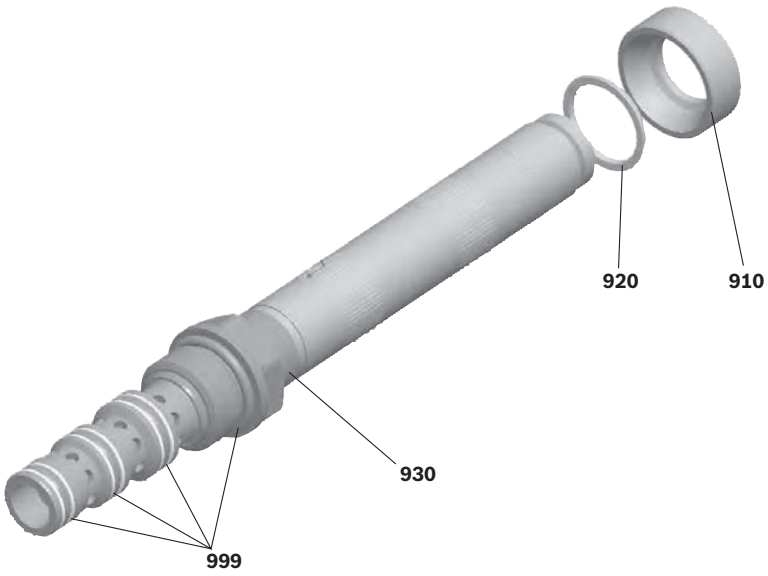
[1] Visual inspection

① = Main port 1 (T)
② = Main port 2 (A)
③ = Main port 3 (P)
④ = Main port 4 (B)

LS = Location Shoulder
Tolerance for all angles ±0.5°
All seal ring insertion faces are rounded and free of burrs

RE 18162, edition: 2013-01, **Bosch Rexroth AG**

Available individual components



Item	Denomination	Material no.
910	Nut	R901241052
920	O-ring for pole tube	R900007769
930	O-ring for pole tube	R913014944
999	Seal kit of the valve	R961005190

Coils, separate order, see page 3

More information

- Control electronics:
  - Plug-in proportional amplifier type VT-SSPA1... Data sheet 30116
  - Analog amplifier type RA... Data sheet 95230
- Selection of the filters www.boschrexroth.com/filter

Bosch Rexroth AG, RE 18162, edition: 2013-01