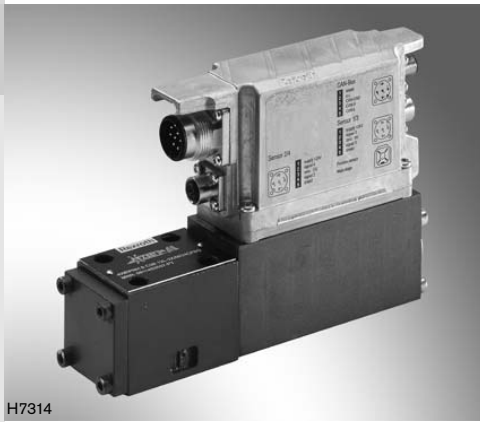
Rexroth
Bosch Group

High-response valve with integrated digital axis controller (IAC-R) and field bus interface

RE 29191/06.05 1/20

Type 4WRPNH

Sizes 6 and 10
Component series 2X
Maximum operating pressure 315 bar
Maximum flow 100 L/min ($\Delta p = 70$ bar)



Type 4WRPNH6

Table of contents

Features

- Direct operated high-response valves of sizes 6 and 10 with control spool and sleeve of servo quality
- Actuated on one side, 4/4 fail-safe position when switched off
- Integrated digital axis control functionality (IAC-R) for:
  - Open-loop flow control
  - Closed-loop position control
  - Closed-loop pressure control
  - p/Q function
  - Alternating closed loop control of position/pressure and position/force
  - NC functionality
- Analogue and digital interfaces for command and actual values
  - 4 x analogue sensors (+/-10V or 4..20mA) or
  - 1 x linear measuring system (1Vss or SSI) and 2 analogue sensors
- Command value feedforward analogue (current or voltage) or via field bus
- Analogue control by means of digital signals
- Field bus interfacing
  - CAN bus with CANopen protocol DS408
  - Profibus-DP V0/V1
- Fast commissioning by means of PC and commissioning software

Ordering code

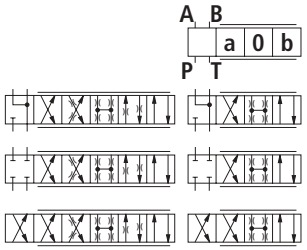
4WRP	N	H			B		−2X/	M/	24				*

With integrated digital axis controller and NC functionality **= N**

Control spool / sleeve **= H**

Size 6 **= 6**
Size 10 **= 10**

Spool symbol
4/4 directional version



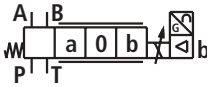
= C3, C5

= C4, C1

= C

With symbols C5 and C1:
P → A: q_v B → T: q_v / 2
P → B: q_v / 2 A → T: q_v

Mounting side of the inductive position transducer



(Standard) **= B**

Nominal flow at 70 bar valve pressure differential (35 bar / control land)

Size 6
2 L/min **= 02**
4 L/min **= 04**
12 L/min **= 12**
15 L/min [1] **= 15**
24 L/min **= 24**
25 L/min [1] **= 25**
40 L/min [2] **= 40**

Size 10
50 L/min. **= 50**
100 L/min. **= 100**

Flow characteristics
Linear **= L**
Inflected characteristic curve [3] **= P**

2X = Component series 20 to 29 (20 to 29: unchanged installation and connection dimensions)

M = NBR seals suitable for mineral oils (HL; HLP) to DIN 51524

Seal material

24 = Supply voltage 24 V

Field bus interface
C = CANopen
P = Profibus DP V0/V1

Command value inputs
A6 = ±10 VDC
F6 = 4 to 20 mA

Sensor interfaces [4]
A = X4, M12-5, ±10V
X7, M12-5, ±10V
B = X4, M12-5, ±10V
X7, M23-12, SSI
C = X4, M12-5, ±10V
X7, M23-12, 1Vss
G = X4, M12-5, 4-20mA
X7, M12-5, 4-20mA

Further details in clear text

[1] Only in conjunction with flow characteristics **"P"**

[2] q_v 2:1 only with nominal flow = 40 L/min

[3] 60% inflection for size 6 at nominal flow **"15"** and **"25"**, otherwise 40% inflection

[4] With sensor interfaces **"A"**, **"B"** or **"C",** only command value input **"A6"** is possible.
With sensor interfaces "**G",** only command value input **"F6"** is possible.

Preferred types

Size 6 with CANopen

Material no.	Type
0811403539	4WRPNH 6 C3B 12L-2X/M/24CA6A
0811403543	4WRPNH 6 C3B 24L-2X/M/24CA6A
0811403542	4WRPNH 6 C3B 40L-2X/M/24CA6A
0811403538	4WRPNH 6 C4B 12L-2X/M/24CA6A
0811403533	4WRPNH 6 C4B 24L-2X/M/24CA6A
0811403548	4WRPNH 6 C4B 40L-2X/M/24CA6A
0811403537	4WRPNH 6 C3B 12L-2X/M/24CF6G
0811403540	4WRPNH 6 C3B 24L-2X/M/24CF6G
0811403571	4WRPNH 6 C3B 40L-2X/M/24CF6G
0811403572	4WRPNH 6 C4B 12L-2X/M/24CF6G
0811403556	4WRPNH 6 C4B 24L-2X/M/24CF6G
0811403546	4WRPNH 6 C4B 40L-2X/M/24CF6G

Size 10 with CANopen

Material no.	Type
0811403360	4WRPNH10 C3B 50L-2X/M/24CA6A
0811403361	4WRPNH10 C3B100L-2X/M/24CA6A
0811403367	4WRPNH10 C4B 50L-2X/M/24CA6A
0811403368	4WRPNH10 C4B100L-2X/M/24CA6A
0811403357	4WRPNH10 C3B 50L-2X/M/24CF6G
0811403369	4WRPNH10 C3B100L-2X/M/24CF6G

Size 6 with Profibus-DP

Material no.	Type
0811403552	4WRPNH 6 C3B 04L-2X/M/24PA6A
0811403549	4WRPNH 6 C3B 12L-2X/M/24PA6A
0811403534	4WRPNH 6 C3B 24L-2X/M/24PA6A
0811403550	4WRPNH 6 C3B 40L-2X/M/24PA6A
0811403575	4WRPNH 6 C3B 40L-2X/M/24PA6B
0811403567	4WRPNH 6 C5B 40L-2X/M/24PA6A
0811403568	4WRPNH 6 C4B 24L-2X/M/24PA6A
0811403545	4WRPNH 6 C4B 40L-2X/M/24PA6A
0811403559	4WRPNH 6 C3B 04L-2X/M/24PF6G
0811403553	4WRPNH 6 C3B 12L-2X/M/24PF6G
0811403557	4WRPNH 6 C3B 24L-2X/M/24PF6G
0811403531	4WRPNH 6 C3B 40L-2X/M/24PF6G
0811403535	4WRPNH 6 C4B 12L-2X/M/24PF6G
0811403532	4WRPNH 6 C4B 24L-2X/M/24PF6G
0811403544	4WRPNH 6 C4B 40L-2X/M/24PF6G
0811403536	4WRPNH 6 C3B 15P-2X/M/24PA6C
0811403573	4WRPNH 6 C3B 25P-2X/M/24PA6B
0811403569	4WRPNH 6 C3B 25P-2X/M/24PA6C
0811403554	4WRPNH 6 C3B 40P-2X/M/24PA6C
0811403570	4WRPNH 6 C5B 40P-2X/M/24PA6C

Size 10 with Profibus-DP

Material no.	Type
0811403363	4WRPNH10 C3B 50L-2X/M/24PA6A
0811403364	4WRPNH10 C3B100L-2X/M/24PA6A
0811403365	4WRPNH10 C5B100L-2X/M/24PA6A
0811403358	4WRPNH10 C3B100L-2X/M/24PF6G
0811403359	4WRPNH10 C4B100L-2X/M/24PF6G
0811403362	4WRPNH10 C B100L-2X/M/24PF6G
0811403370	4WRPNH10 C5B100P-2X/M/24PA6C

Symbols

Size 6

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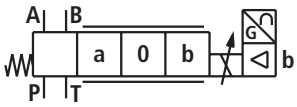
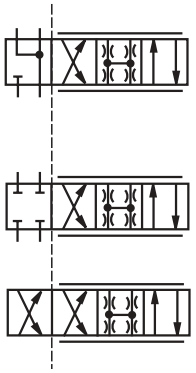
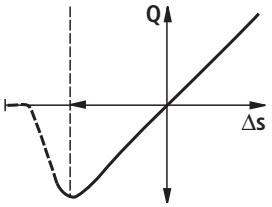
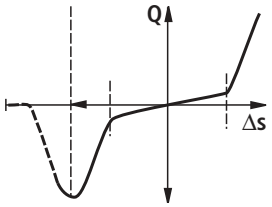
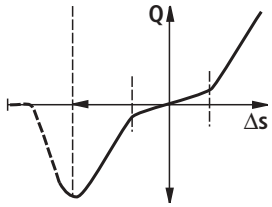
<tr><td> 
</td><td>Linear</td><td>p: 60% inflection
[q_n 15.25 L/min]</td><td>p: 40% inflection
[q_n 40 L/min]</td></tr>
<tr><td> 
</td><td> 
</td><td> 
</td><td> 
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<tr><td></td><td>C3, C5, C4, C1, C</td><td colspan="2">C3, C5, C4, C1</td></tr>
<tr><td></td><td colspan="3">Standard = 1:1, from q_n = 40 L/min also 2:1</td></tr>
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Size 10

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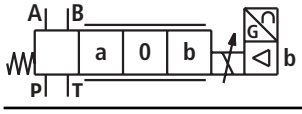
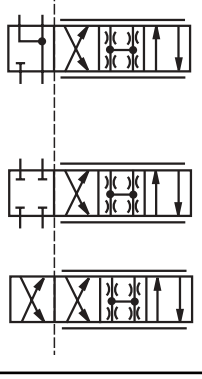
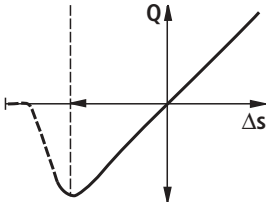
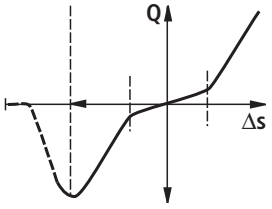
<tr><td> 
</td><td>Linear</td><td>p: 40% inflection</td></tr>
<tr><td> 
</td><td> 
</td><td> 
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</table>

Function, section

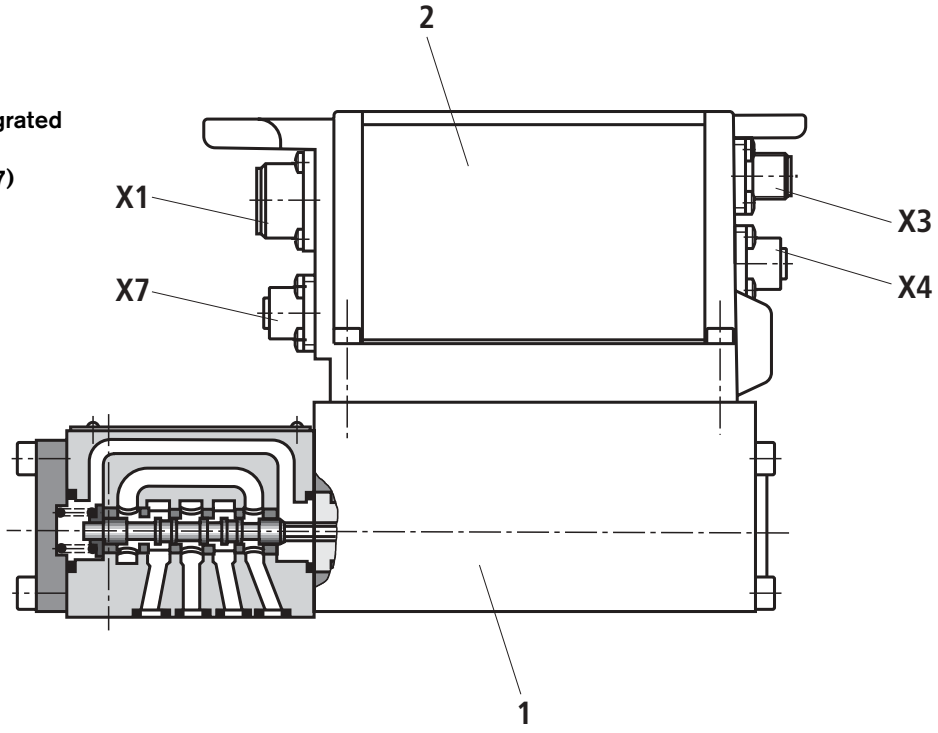
Design

The IAC-R valve basically consists of:

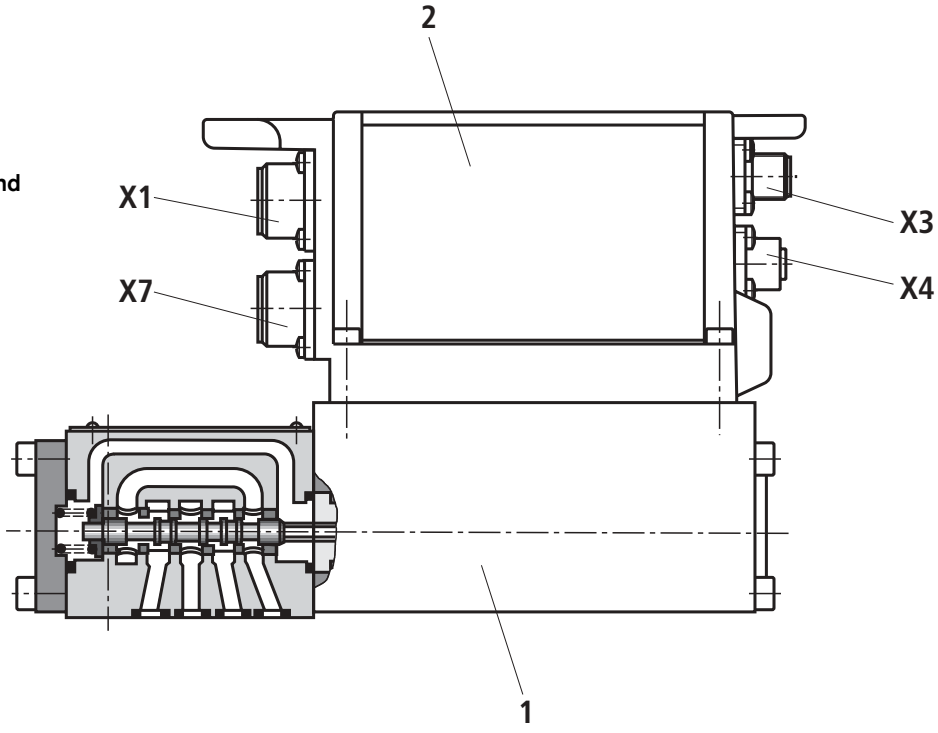
– A direct operated high-response valve (1) with control spool and sleeve of servo quality

– Integrated digital axis controller (2) with analogue and digital sensor interfaces and field bus interfacing (X3)

High-response valve with integrated axis controller with analogue interfaces (X1, X4, X7)



High-response valve with integrated axis controller with analogue interfaces (X1, X4) and digital sensor interface (X7)



Function, section

Functional description

The **IAC-**R valve (**I**ntegrated **A**xis **C**ontroller on the basis of high-response valves) is a digital high-response valve with integrated axis controller with the following functionalities:

- Open-loop flow control
- Closed-loop position control
- Closed-loop pressure control
- p/Q function
- Alternating closed-loop control of position/pressure and position/force
- NC functionality

- The command value can be fed forward either via an analogue interface (X1) or via the field bus interface (X3)
- The actual value signals are made available via an analogue interface I(X1) and can additionally be read out via the field bus (X3).
- The controller parameters are adjusted via the field bus.
- For safety reasons, separate supply voltages for bus/ controller and power part (output stage)

PC program WinHPT

For performing engineering tasks and parameterising the IAC-R valves, the operator can use the commissioning software WinHPT (see accessories).

- Parameterisation
- Programming of the NC functionality
- Diagnosis
- Convenient data management on the PC
- PC operating systems: Windows 2000 or Windows XP

The digital, integrated control electronics allow the recognition of the following faults:

- Cable break of sensors
- Undervoltage
- Temperature of the integrated electronics
- Communication errors
- Watchdog

The following additional functions are available:

- Ramp generator
- Internal command value profile
- Enable function analogue/digital
- Fault output 24 V
- Control output adjustment
  - Dead band compensation
  - Zero point correction
  - Valve characteristic inflection compensation
  - Friction compensation
  - Direction-dependent gain

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

General				Size 6			Size 10		
Design				Spool valve, direct operated, with steel sleeve					
Operation				Proportional solenoid with closed-loop position control, OBE					
Type of connection				Subplate mounting, porting pattern to ISO 4401					
Installation orientation				Optional					
Ambient temperature range			°C	–20 … +50					
Weight			kg	2.7			7.5		
Resistance to vibration				25g, 12h					
Hydraulic (measured with HLP46, $\vartheta_{oil} = 40$ °C ± 5 °C)									
Hydraulic fluid				Hydraulic oil to DIN 51524...535, other media on enquiry					
Viscosity range	Recommended		mm^2/s	20 … 100					
	Max. permissible		mm^2/s	10 … 800					
Hydraulic fluid temperature range			°C	–20 … +60					
Max. permissible degree of contamination of the hydraulic fluid – cleanliness class to ISO 4406 (c)				Class 18/16/13 [1]					
Direction of flow				According to symbol					
Hydraulic, size 6									
Nominal flow at Δp = 35 bar per land [2]			L/min	2	4	12	15	24	40
Max. operating pressure	Ports P, A, B		bar	315					
	Port T		bar	250					
Application limits Δ_p pressure drop across valve q_{Vnom}: > $q_{N\ valves}$	Spool symbols C3, C5		bar	315	315	315	315	315	160
	Spool symbols C1, C4		bar	315	315	315	280	250	100
Leakage at 100 bar	Linear characteristic curve L		cm^3/min	< 150	< 180	< 300	-	< 500	< 900
	Inflected characteristic curve P		cm^3/min	-	-	-	< 180	< 300	< 450
Hydraulic, size 10									
Nominal flow at Δp = 35 bar per land [2]			L/min	50 (1:1)		50 (2:1)	100 (1:1)		100 (2:1)
Max. operating pressure	Ports P, A, B		bar	315					
	Port T		bar	250					
Application limits Δ_p pressure drop across valve q_{Vnom}: > $q_{N\ valves}$	Spool symbols C3, C5			315		315	160		160
	Spool symbols C1, C4			250		250	100		100
Leakage at 100 bar	Linear characteristic curve L		cm^3/min	< 1200		< 1200	< 1500		< 1500
	Inflected characteristic curve P		cm^3/min	< 600		< 500	< 600		< 600
Static / dynamic				Size 6			Size 10		
Hysteresis			%	≤ 0.2					
Manufacturing tolerance			%	< 10					
Actuating time for signal step-change 0 … 100 %			ms	≤ 10			25		
Temperature drift				Zero point drift < 1 % at $\Delta\vartheta = 40$ °C					
Zero balancing				Factory-set ±1 %					
Conformity				CE according to EMC Directives 89/336/EEC, 93/68/EEC, 93/44/EEC					

The footnotes are explained on the folllowing page

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

Electrical			
Relative duty cycle		%	100 (continuous operation)
Type of protection			IP 65 to EN 60529 and IEC 14434/5
Supply voltage	Nominal voltage	VDC	24
	Lower limit value	VDC	21
	Upper limit value	VDC	36
	Max. permissible residual ripple content	Vss	2 (with supply voltages of 23 V … 34 V)
Power consumption	Size 6	W	max. 40
	Size 10	W	max. 60
PE conductor and shield			See plug pin assignment (installation in line with CE requirements)
Adjustment			Factory-calibrated, see valve characteristic curve

1) The cleanliness classes specified for components must be adhered to in hydraulic systems.

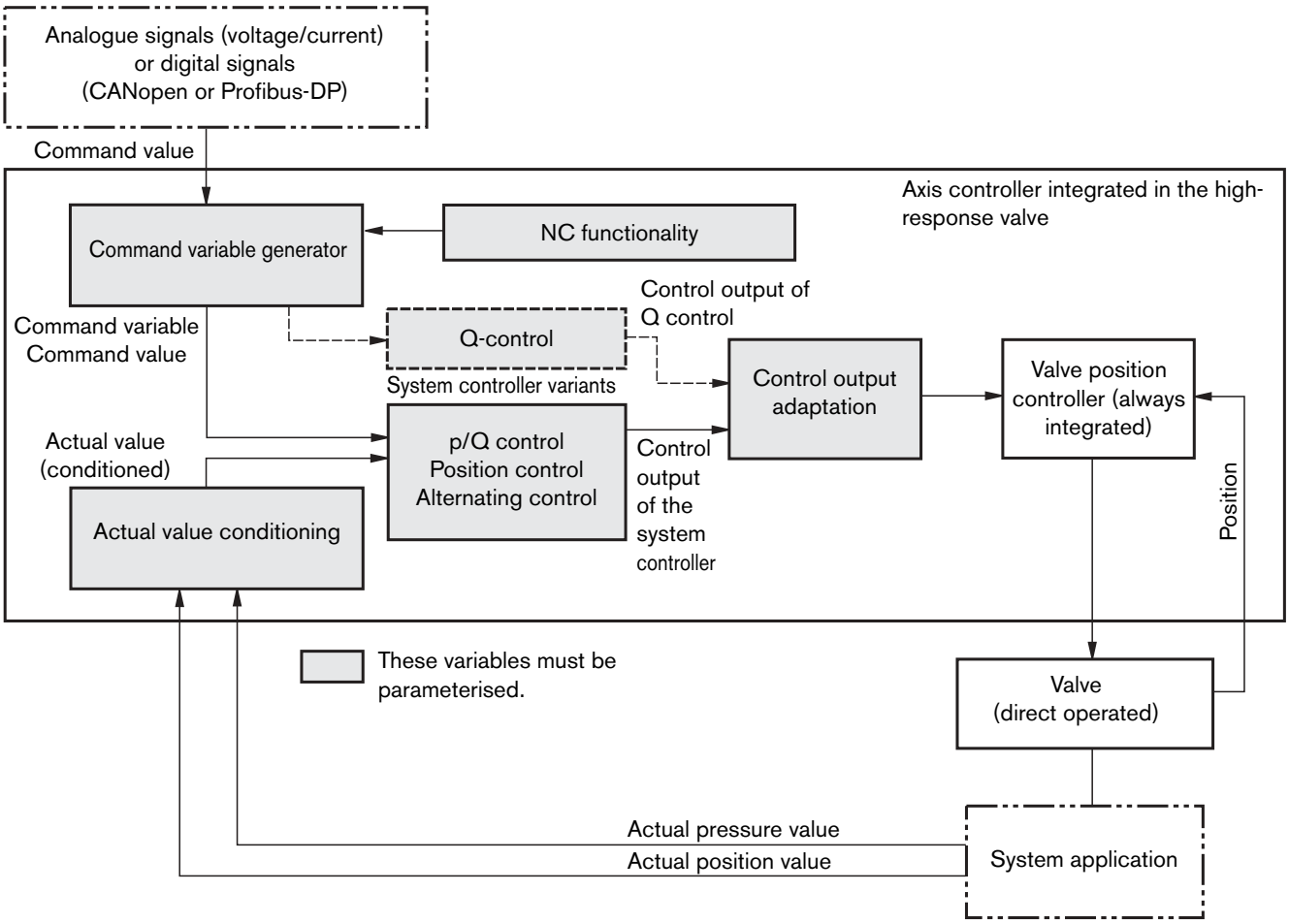
Effective filtration prevents malfunction and, at the same time, increases the service life of components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086 and RE 50088.

2) Flow at other Δp:

$$q_x = q_{nom} \bullet \sqrt{\frac{\Delta p_x}{35}}$$

Block circuit diagram of controller functionality



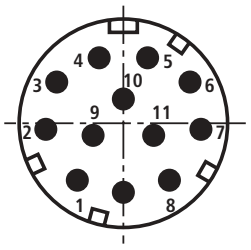
Electrical connection, assignment

Component plug pin assignment X1, 11-pin + PE to DIN EN 175201-804

Pin	No. or colour of litz wire [1]	Assignment of interface A6	Assignment of interface F6
1	1	24 VDC (for output stage)	
2	2	0 V ≙ load zero (for output stage)	
3	White	Enable input 8,5 … 24 VDC = function, R_e ~10 kΩ	
4	Yellow	Command value ± 10 V; R_e ~130 kΩ or digital input (from PLC) [2]	4 … 20 mA command value; R_e = 200 Ω or digital input (from PLC) [2]
5	Green	Reference for command values	
6	Violet	± 10 V actual value or digital output (to PLC) [2]	4 … 20 mA actual value, load impedance ~330 Ω or digital output (to PLC) [2]
7	Pink	Command value ± 10 V; R_e ~130 kΩ or digital input (from PLC) [2]	4 … 20 mA command value; R_e = 200 Ω or digital input (from PLC) [2]
8	Red	± 10 V actual value or digital output (to PLC) [2]	4 … 20 mA actual value, load impedance ~330 Ω or digital output (to PLC) [2]
9	Brown	24 VDC (control voltage for signal part and bus)	
10	Black	0V reference potential for pin 9 (control voltage for signal part and bus)	
11	Blue	Switching output 24 V (error signal or power switching signal) max. 1.8 A max. 0.5 A with cable sets, material no. R900032356 and material no. R900860399	
PE	Green-yellow	PE conductor (connected directly to the metal housing)	

Connect shield to PE on the supply side only!

X1



[1] Litz wire colour of the connecting cable for cable socket with cable set (see Accessories)

[2] Selection by means of commissioning software

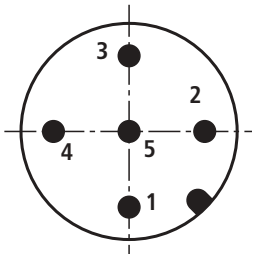
Component plug pin assignment for CAN bus "X3" (coding A), M12 5-pin, male

Pin	Assignment
1	Shield
2	n.c.
3	CAN_GND
4	CAN_H
5	CAN_L

Outer shield at both ends to the metal housing of the plug-in connection.

Inner shields not required.

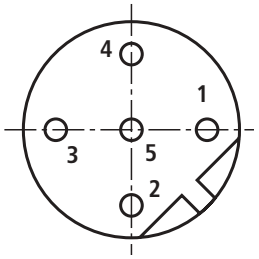
Transfer rate kbit/s	20 to 1000
Bus address	1 to 127



Component plug pin assignment for Profibus DP "X3" (coding B), M12 5-pin, female

Pin	Assignment
1	+5 V_{ISO}
2	Profi A / N
3	Profi GND
4	Profi B /P
5	Shield

Baud rate	to 12 MBaud
Bus address	1 to 126

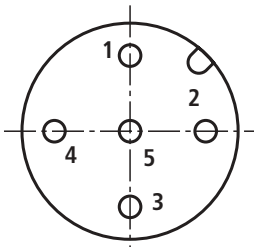


The +5 V_{ISO} of the IAC-R are available for an external terminating resistor

Electrical connections, assignment

Analogue sensor interfaces, connections “X4“ and “X7“ (coding A), M12 5-pin, female

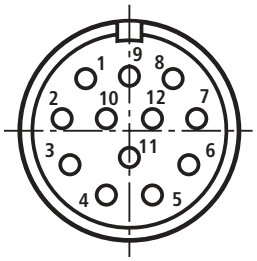
Pin	Assignment Voltage interface	Assignment Current interface
1	Supply 24 VDC	Supply 24 VDC
2	Signal 3 (X4) / 4 (X7), (–10 … +10 V)	Signal 3 (X4) / 4 (X7), (4 … 20mA)
3	Zero 0 V	Zero 0 V
4	Signal 1 (X4) / 2 (X7), (–10 … +10 V)	Signal 1 (X4) / 2 (X7), (4 … 20mA)
5	Shield	Shield



Caution: The analogue sensor interfaces on connections X4 and X7 are keyed alike. Risk of mixing up! The user must ensure correct wiring!

Digital sensor interface 1Vss or SSI measuring system “X7“, M23 12-pin, female

Pin	Assignment 1Vss	Assignment SSI
1	$\overline{B}$	0 V
2	Sense + 5 V	Data
3	R	Clock
4	$\overline{R}$	n.c.
5	A	n.c.
6	$\overline{A}$	n.c.
7	n.c.	n.c.
8	B	n.c.
9	n.c.	24 V
10	0 V	$\overline{Data}$
11	Sense 0 V	$\overline{Clock}$
12	+ 5 V	n.c.

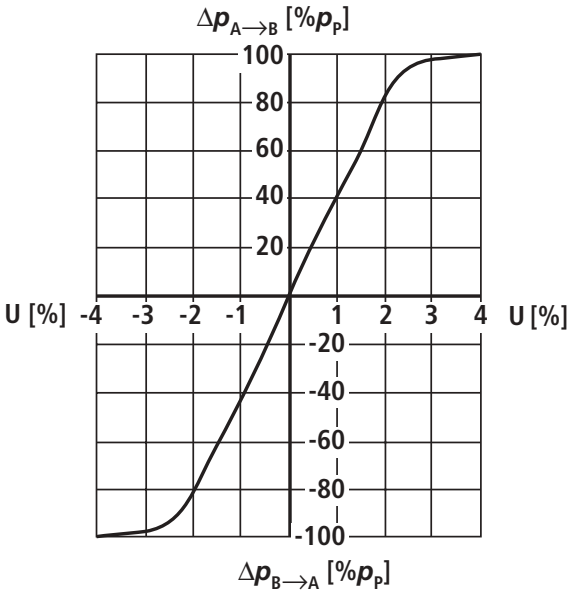


Note:

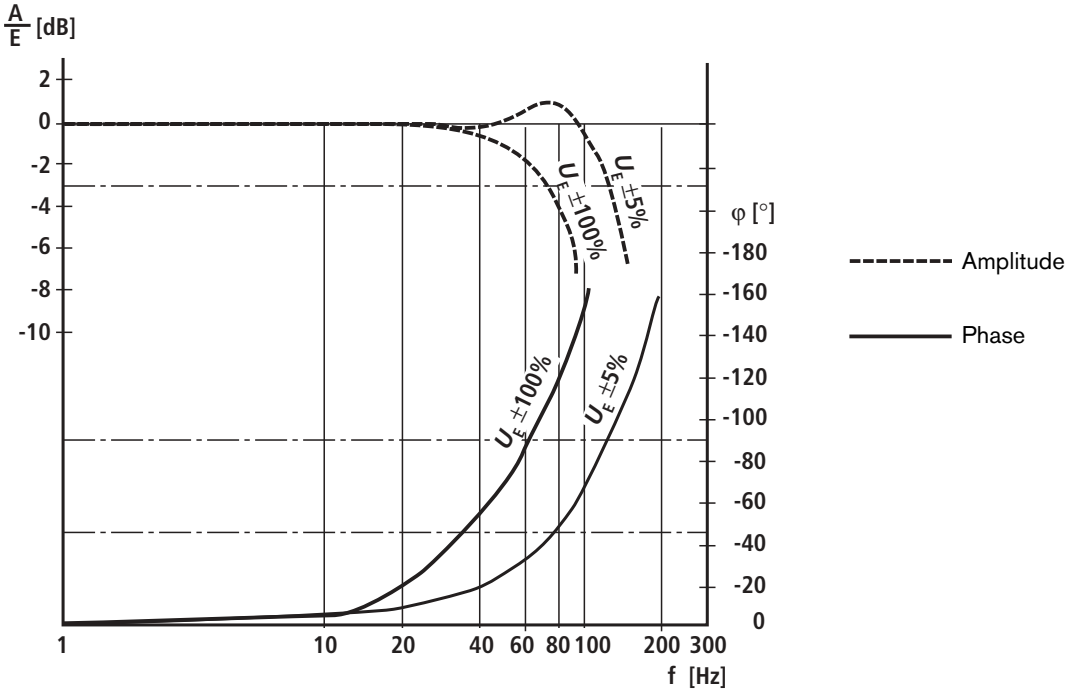
We recommend that the shields be connected at both ends to the metal housing of the plug-in connections.
The use of plug-in pins deteriorates the shield effect!
Inner shields are not required.

Characteristic curves size 6 (measured with HLP46, $\vartheta_{oil} = 40\ °C \pm 5\ °C$)

Pressure gain



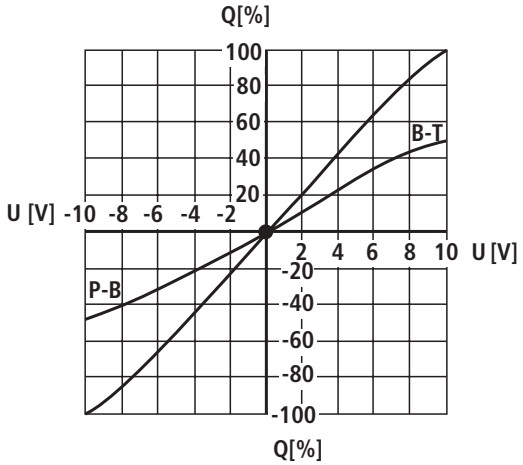
Bode diagram



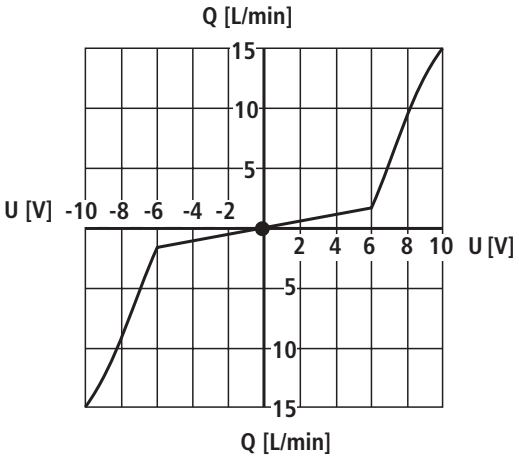
Characteristic curve size 6 (measured with HLP46, $\vartheta_{oil} = 40\ °C \pm 5\ °C$)

Flow/signal function

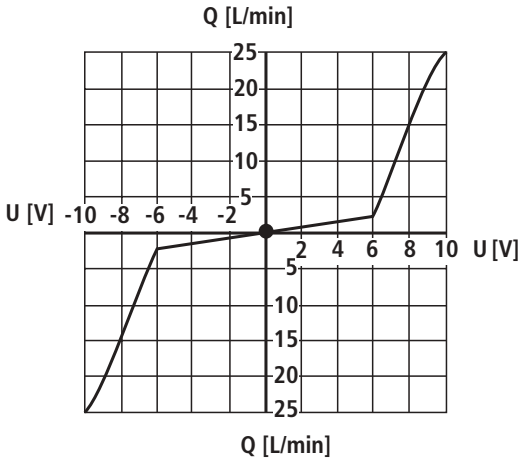
L: Linear



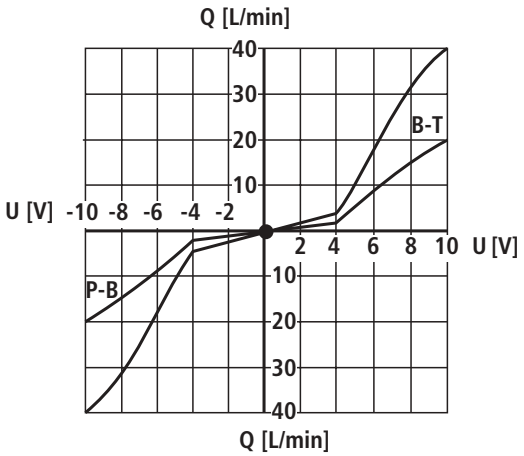
P: 60 % inflection



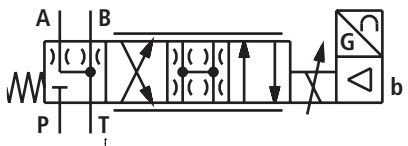
P: 60 % inflection



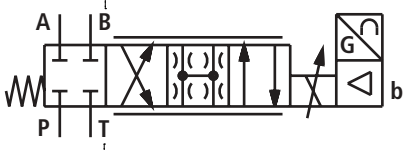
P: 40 % inflection



Fail-safe position



Leakage at	100 bar	P → A	50 cm³/min
		P → B	70 cm³/min
Flow at	$\Delta p = 35$ bar	A → T	10 ... 20 L/min
		B → T	7 ... 20 L/min

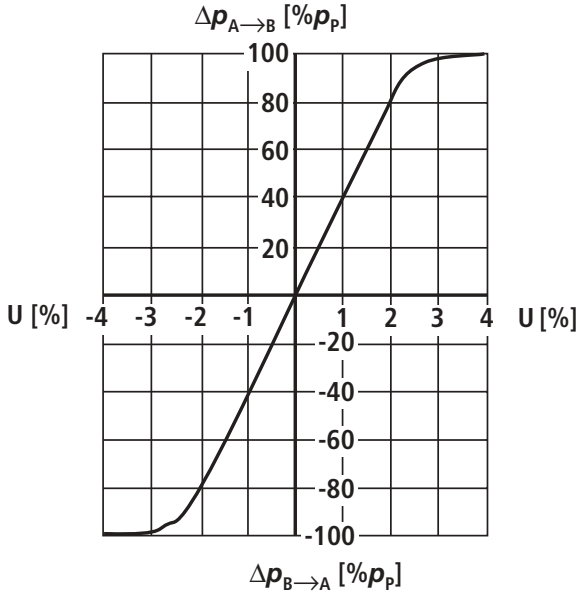


Leakage at	100 bar	P → A	50 cm³/min
		P → B	70 cm³/min
		A → T	70 cm³/min
		B → T	50 cm³/min

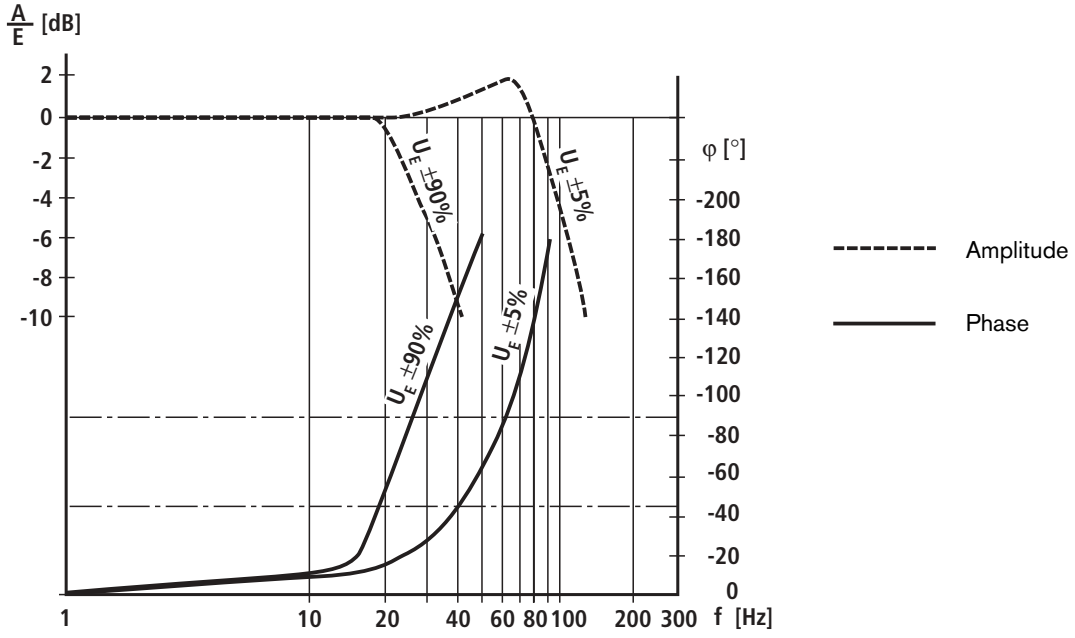
Fail-safe	p = 0 bar => 7 ms	Enable “OFF“ or internal shutdown in the event of an error $U_B \leq 18$ V or $I \leq 2$ mA (for 4…20 mA signal)	
	p = 100 bar => 10 ms		

Characteristic curve size 10 (measured with HLP46, $\vartheta_{oil} = 40\ °C \pm 5\ °C$)

Pressure gain



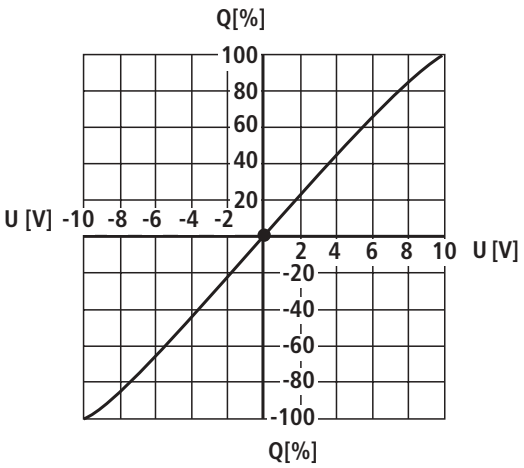
Bode diagramm



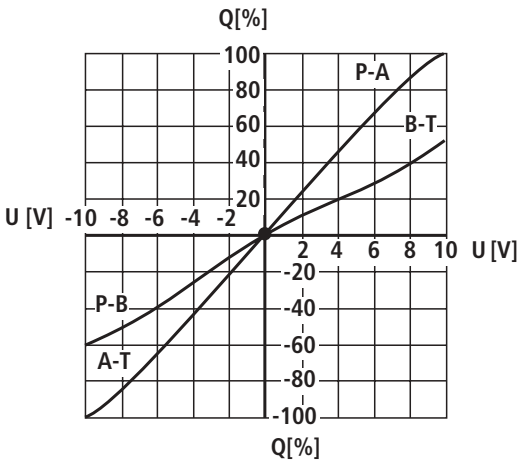
Characteristic curves size 10 (measured with HLP46, $\vartheta_{oil} = 40\ °C \pm 5\ °C$)

Flow/signal function

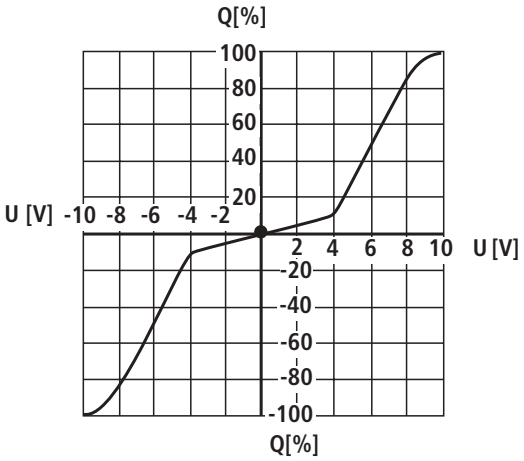
L: Linear 1:1



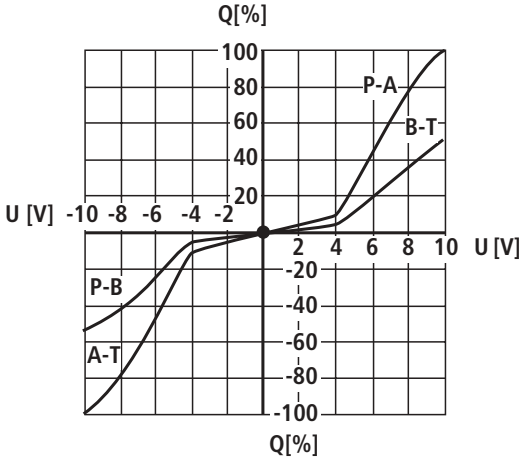
L: Linear 2:1



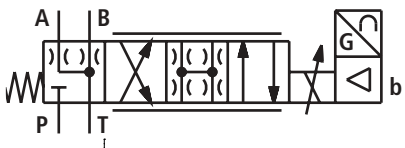
P: 40% inflection 1:1



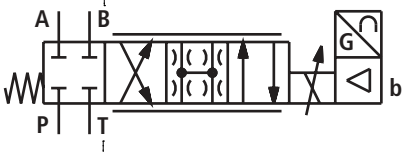
P: 40% inflection 2:1



Fail-safe position



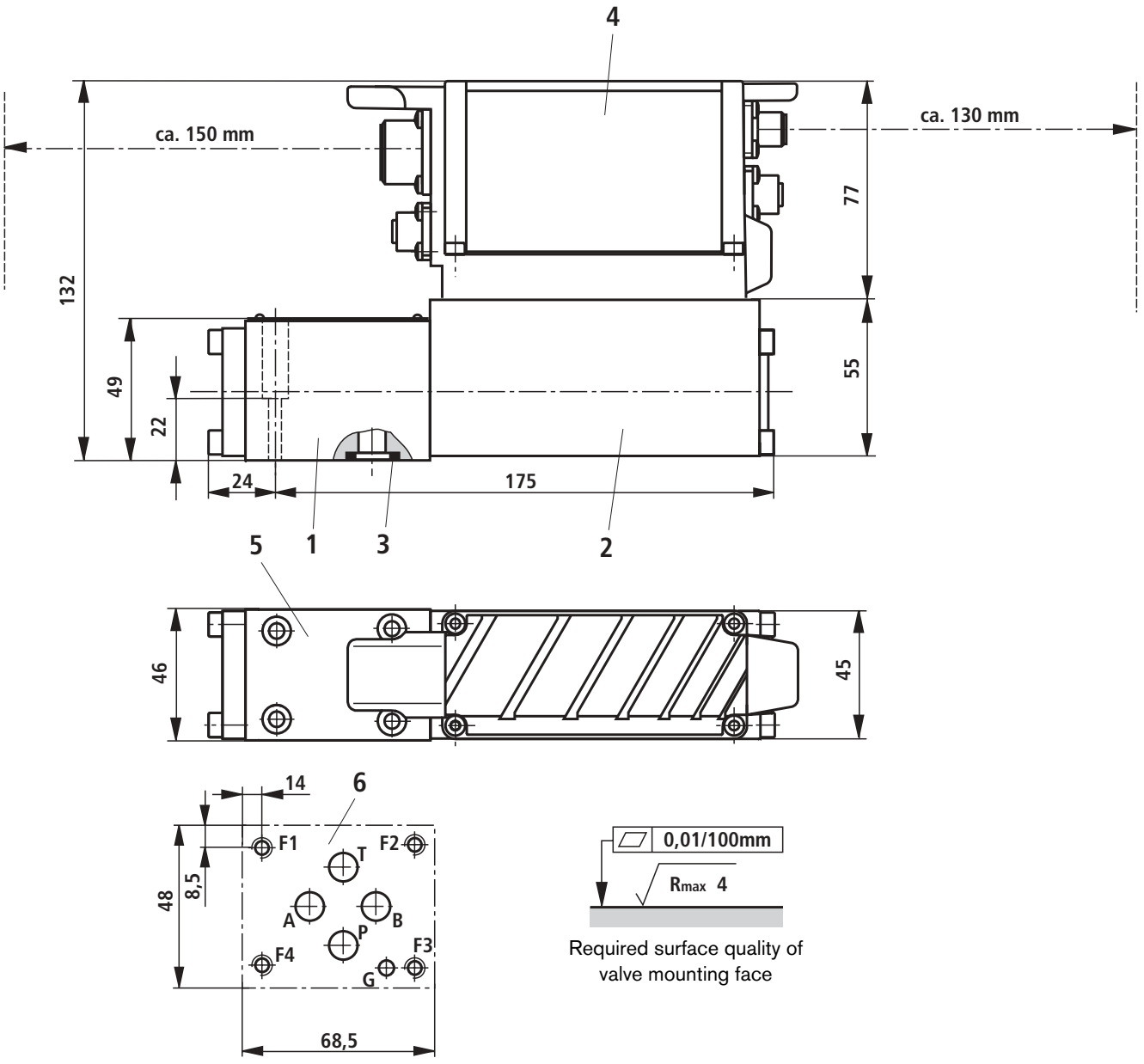
Leakage at	100 bar	P → A	50 cm³/min
		P → B	70 cm³/min
Flow at	$\Delta p = 35$ bar	A → T	10 ... 20 L/min
	$q_n = 50/100$ L/min	B → T	7 ... 20 L/min



Leakage at	100 bar	P → A	50 cm³/min
		P → B	70 cm³/min
		A → T	70 cm³/min
		B → T	50 cm³/min

Fail-safe	p = 0 bar => 12 ms	Enable “OFF“ or internal shutdown in the event of an error
	p = 100 bar => 16 ms	$U_B \leq 18$ V or $I \leq 2$ mA (for 4…20 mA signal)

Unit dimensions size 6 (nominal dimensions in mm)



Required surface quality of valve mounting face

1 Valve housing

2 Control solenoid with position transducer

3 O-ring 9.25 x 1.78 (ports P, A, B, T)

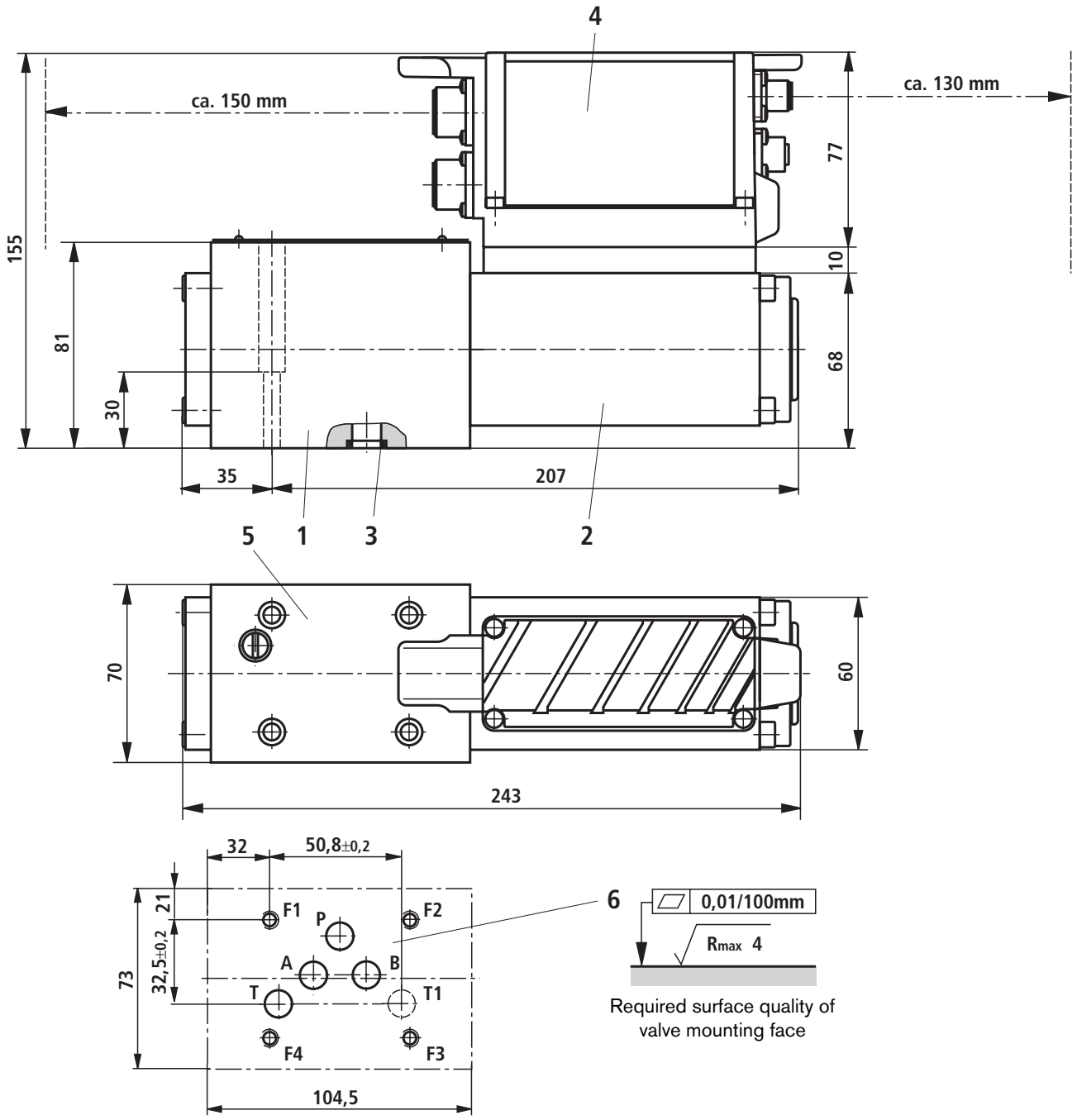
4 Integrated digital closed-loop control electronics

5 Nameplate

6 Machined valve mounting face, position of ports to ISO 4401-03-02-0-94

Valve fixing screws
(not included in the scope of supply)
4 off socket head cap screws to
ISO4762-M5x30-10.9-N67F 821 70
(galvanized in accordance with Bosch standard N67F 821 70)
M_T = 6+2 Nm
Mat. no. **2910151166**

Unit dimensions size 10 (nominal dimensions in mm)



Required surface quality of valve mounting face

1 Valve housing

2 Control solenoid with position transducer

3 O-ring 12.0 x 2.0 (ports P, A, B, T, T1)

4 Integrated digital closed-loop control electronics

5 Nameplate

6 Machined valve mounting face, position of ports to ISO 4401-05-04-0-94

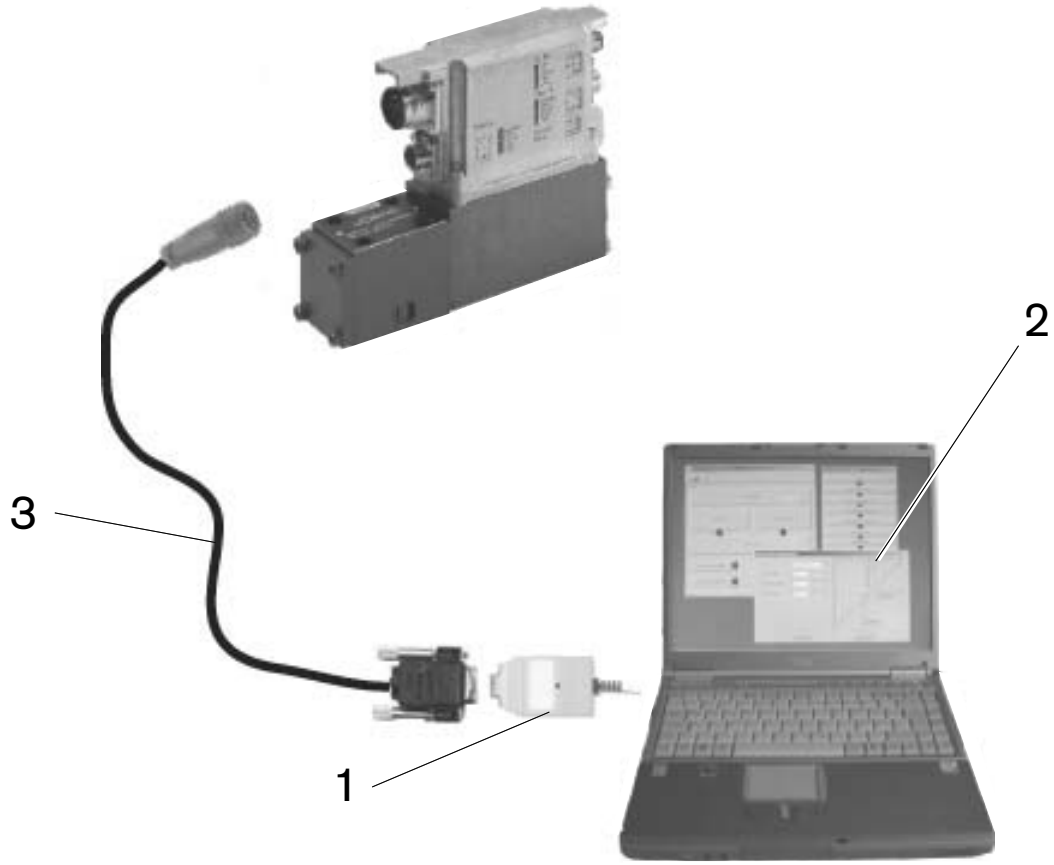
Deviating from standard:
– Port T1 is additionally provided

Valve fixing screws
(not included in the scope of supply)
4 off socket head cap screws to
ISO4762-M6x40-10.9-N67F 821 70
(galvanised in accordance with Bosch standard N67F 821 70)
$M_T = 11+3$ Nm

Mat. no. **2910151209**

Accessories for parameterization (not included in the scope of supply)

The following is required for parameterising by means of a PC:	CANopen (coding A)	Profibus DP (coding B)
1 Interface converter (USB)	VT-ZKO-USB/CA-1-1X/V0/0 Mat. no. R901071963	VT-ZKO-USB/P-1-1X/V0/0 Mat. no. R901071962
2 Commissioning software	WinHPT Download at www.boschrexroth.com/IAC	
3 Connecting cable, 3 m	D-Sub / M12, Mat. no. R900751271	D-Sub / M12, Mat. no. R901078053

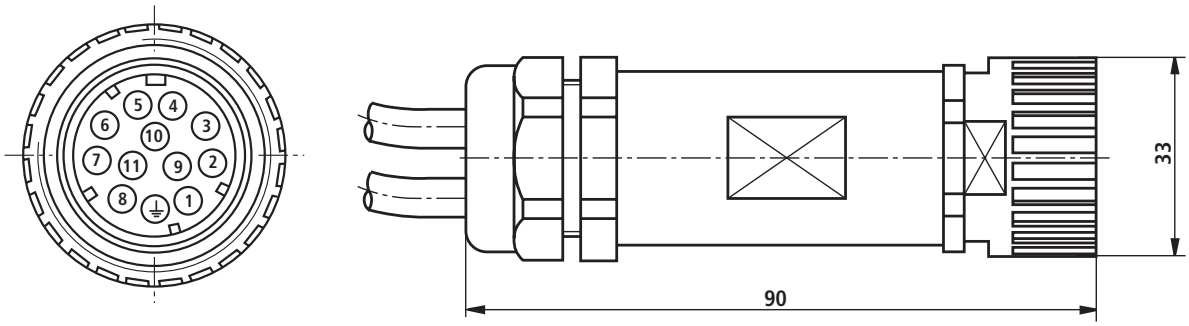


Accessories, connection X1 (not included in the scope of supply)

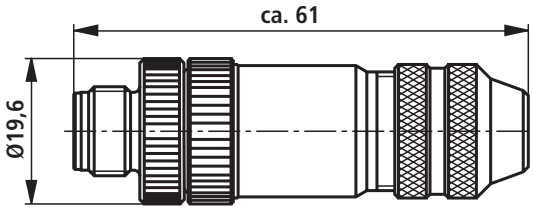
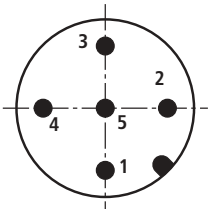
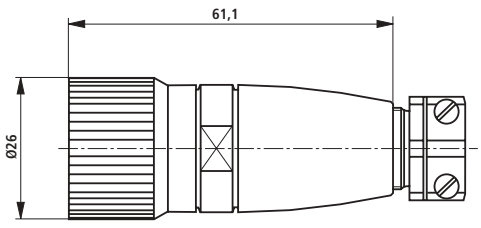
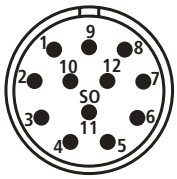
Mating connector for X1

Mating connector to DIN EN 175201-804 (12-pin), female, plastic version

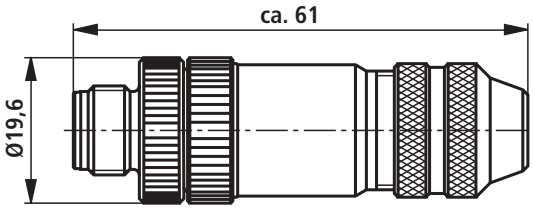
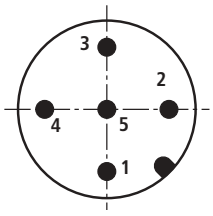
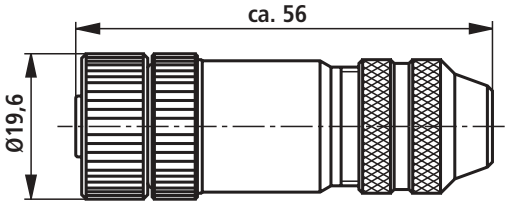
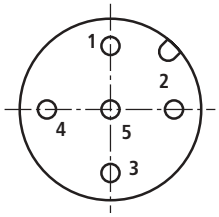
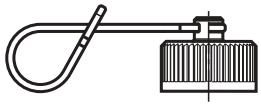
- Mating connector without cable (kit) — Material no. **R900884671**
- Mating connector with cable set 2 x 5 m 12-pin — Material no. **R900032356**
- Mating connector with cable set 2 x 20 m 12-pin — Material no. **R900860399**



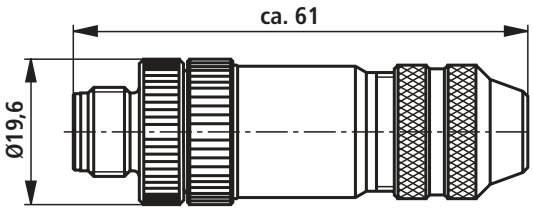
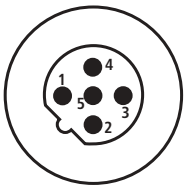
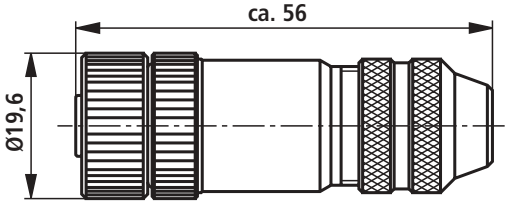
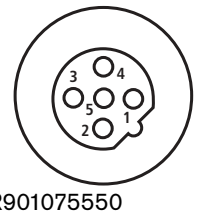
Accessories, sensor connections (not included in the scope of supply)

Description	Detail, dimensions	Pin pattern, order information
X4, X7 (analogue sensors) Plug-in connector, 5-pin, M12 x 1, male, A coding, metal version		 Mat. no.: R901075542 (cable diameter 4 … 6 mm)
X7 (digital sensors, 1 Vss and SSI) Plug-in connector, 12-pin, M23, male, soldered connection, metal version with coupling ring		 Mat. no.: R901076284 (cable diameter to 10,5 mm)

Accessories, CAN bus (A coding) (not included in the scope of supply)

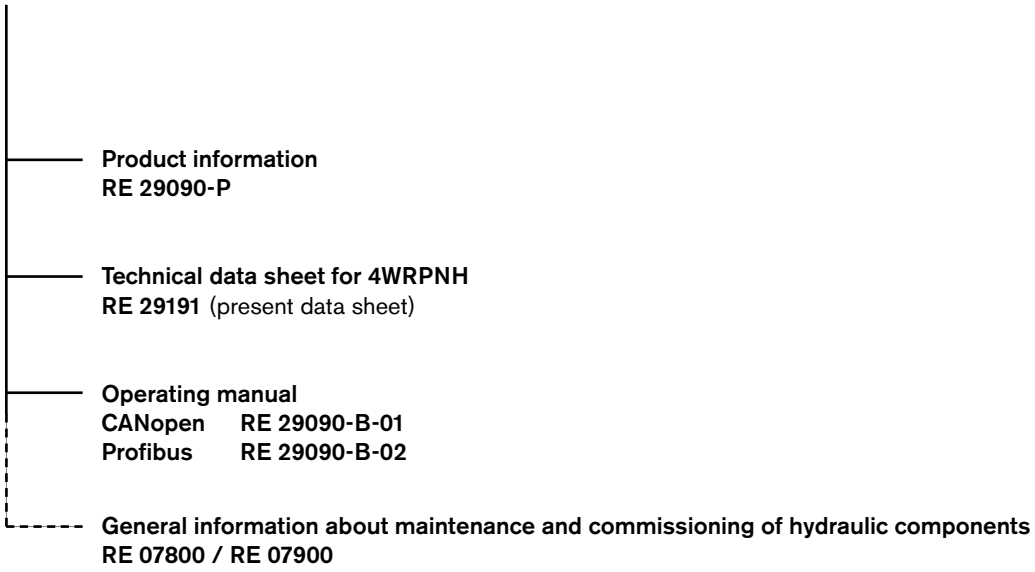
Description	Detail, dimensions	Pin pattern, order information
X3 Round plug-in connector, wired by user, 5-pin, M12 x 1 Straight coupler plug, metal version.		 Mat. no.: R901076906 (cable diameter 6 - 8 mm)
X3 Round plug-in connector, wired by user, 5-pin, M12 x 1 Straight cable socket, metal version.		 Mat. no.: R901076910 (cable diameter 6 - 8 mm)
M12 cab Dust protector (for pins only)		Mat. no.: R901075564

Accessories, Profibus (B coding) (not included in the scope of supply)

Description	Detail, dimensions	Pin pattern, order information
X3 Round plug-in connector, wired by user, 5-pin, M12 x 1 Straight coupler plug, metal version.		 Mat. no.: R901075545 (cable diameter 6 - 8 mm)
X3 Round plug-in connector, wired by user, 5-pin, M12 x 1 Straight coupler socket, metal version.		 Mat. no.: R901075550 (cable diameter 6 - 8 mm)
M12 protective cap (for socket only)		Mat. no.: R901075563

Engineering / maintenance notes / supplementary information

Product documentation for IAC-R



Commissioning software and documentation on the Internet: www.boschrexroth.com/IAC

Maintenance notes:

- The components are tested in the factory and dispatched with default settings.
- Only complete components can be repaired. The repaired components will again be returned with default settings. User settings are not retained or reloaded. The user is responsible for reloading of the relevant user parameters.

Notes:

- Cut the supply voltage for the valve only in when required for the functional sequence of the machine.
- Electrical signals brought out via control electronics (e.g. signal “ready for operation”) must not be used for switching safety-relevant machine functions (see also European standard “safety requirements for fluid power systems and components - hydraulics“, EN 982.)
- If electromagnetic interference is to be expected, take suitable measures to safeguard the function (depending on the application, e.g. shield, filtration!

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