Directional control valve, direct operated, with integrated fieldbus (IFB Multi-Ethernet)

Type 4WRPFH

RE 29395
Edition: 2019-07

H8148+8149+8150

- Size 6
- Component series 3X
- Maximum operating pressure 350 bar
- Rated flow 40 l/min (***Δp*** = 70 bar)

CE

Features

- Open
  - Integrated fieldbus (IFB Multi-Ethernet)
  - Bus connection/service interface (Sercos, EtherCAT, EtherNet/IP, PROFINET RT, POWERLINK, VARAN)
- Scalable
  - 2 configurable analog pressure sensor inputs
- Safe
  - Internal safety function (can be used up to category 4/PL e according to EN 13849-1)
  - CE conformity according to EMC Directive 2014/30/EU
- Precise
  - Integrated pressure/force control, optional
  - High response sensitivity and low hysteresis

Contents

Ordering code

01	02	03	04	05	06	07	08	09	10		11	12	13		14	15	16	17	18
4	**WRP**	**F**	**H**	**6**		**B**			**–**	**3X**	**/**				**/**	**24**		**D9**		

01	4 main ports	**4**
02	Directional control valve	**WRP**
03	With integrated fieldbus	**F**
04	Control spool/sleeve	**H**
05	Size 6	**6**
06	Symbols e.g. C, C1 etc.; for possible version, see page 3	
07	Installation side of the inductive position transducer	**B**

Rated flow at 70 bar pressure differential (35 bar/control edge)

08		Flow characteristic			
		"L"	**"P"** (inflection 40 %)	**"P"** (inflection 60 %)	
	2 l/min	✓	–	–	**02**
	4 l/min	✓	✓	–	**04**
	12 l/min	✓	–	–	**12**
	15 l/min	–	–	✓	**15**
	24 l/min	✓	–	–	**24**
	25 l/min	–	–	✓	**25**
	40 l/min	✓	✓	–	**40**

Flow characteristic

09	Linear	**L**
	Inflected characteristic curve (inflection 60 % for size 6 with rated flows **"15"** and **"25"**, otherwise inflection 40 %)	**P**
10	Component series 30 ... 39 (30 ... 39: unchanged installation and connection dimensions)	**3X**

Seal material (observe compatibility of seals with hydraulic fluid used, see page 8)

11	NBR seals	**M**
	FKM seals	**V**

Pressure sensor (pressure rating)

12	Without pressure rating	**0**
	Pressure rating 280 bar	**G**

Internal pressure sensor (position)

13	Without internal pressure sensors	**0**
	In port A	**A**
	In port B	**B**
	In ports A and B	**C**
14	Supply voltage 24 V	**24**

Ethernet interface

15	EtherNET/IP	**E**
	PROFINET RT	**N**
	Sercos	**S**
	EtherCAT (CANopen profile)	**T**
	POWERLINK (CANopen profile)	**W**
	VARAN	**V**

Ordering code

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4	**WRP**	**F**	**H**	**6**		**B**			**–**	**3X**	**/**				**/**	**24**		**D9**		

Connector

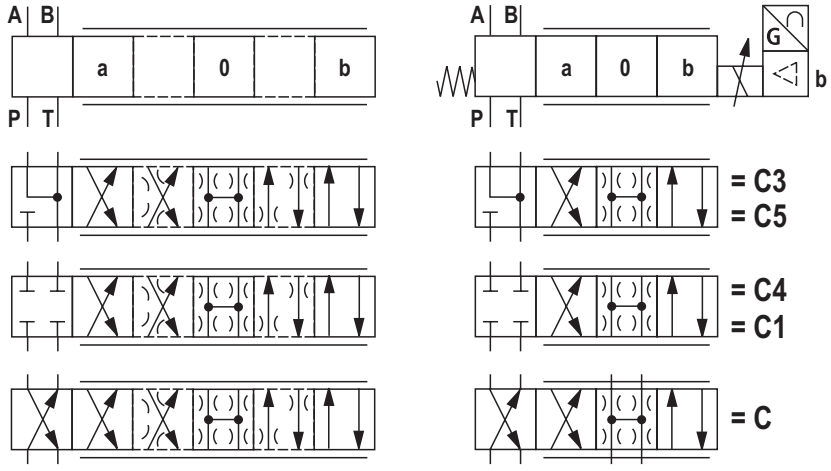
16	Voltage supply, enable acknowledgment	**D9**

Pressure sensor interface

17	Without interface	**0**
	Analog, a maximum of 3 external pressure sensors (0 ... 10 VDC)	**5** [1]
18	For further details, see the plain text	*

[1] Only with version "0" at positions 12 and 13
("4WRPFH 6 .B..-3X/.**00**/24.D95")

Symbols



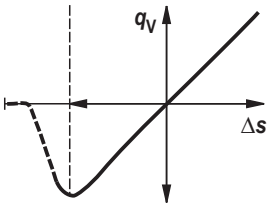
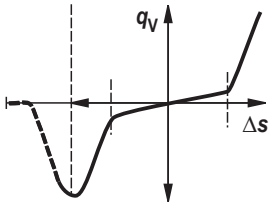
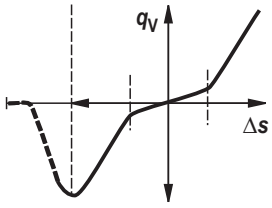
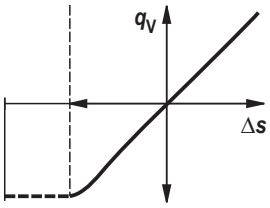
With symbols C5 and C1: [1]
P → A: $q_{V\,nom}$ B → T: $q_{V\,nom}/2$
P → B: $q_{V\,nom}/2$ A → T: $q_{V\,nom}$

[1] Standard = 1:1, $q_{V\,nom}$ 2:1 from rated flow = 40 l/min (version "40")

Notice:
Representation according to DIN ISO 1219-1.
Hydraulic interim positions are shown by dashes.

Symbols

Flow characteristic

Symbol	**Linear characteristic curve** (version "L")	**Inflected characteristic curve** (version "P")	
		Inflection 60 % ($q_{V\,nom}$ = 15, 25 l/min)	Inflection 40 % ($q_{V\,nom}$ = 4, 40 l/min – size 6) ($q_{V\,nom}$ = 50, 100 l/min – size 10)
C3, C5 **C4, C1**			
C		–	–

Function

General information

The **IFB Multi-Ethernet** valve (**I**ntegrated **F**ield**b**us) is a digital directional control valve with integrated fieldbus.

The following operating modes are possible:

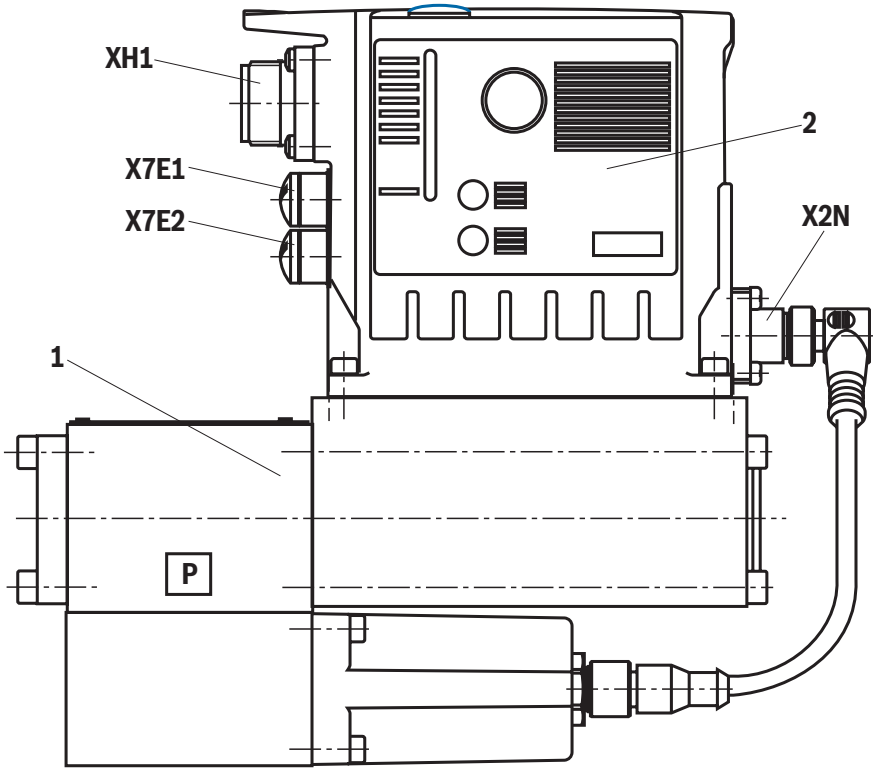
- Standard:
  - Valve direct control
  - Flow control
- Version "5" or with internal pressure sensors:
  - Pressure/force control
  - Active damping
  - Substitutional control (flow – pressure/force); pQ function (flow-controlled)

- Command value presetting is done purely digitally via the Ethernet interface (X7E1 or X7E2)
- The feedback information of the actual value signals to the superior control system is provided via the Ethernet interface (X7E1 or X7E2)
- The controller parameters are set via the Ethernet interface (X7E1 or X7E2)

Set-up

The directional control valve with IFB Multi-Ethernet electronics mainly consists of:

- Direct operated directional control valve (1) with control spool and sleeve in servo quality
- Integrated fieldbus (3) with:
  - connector, voltage supply, safety shut-down (XH1)
  - Ethernet interfaces (X7E1, X7E2)
  - Analog sensor interfaces (X2N, optional)



Type 4WRPFH 6 ...G..D90

Function

Function
When the control solenoid of the valve is switched off (enable pin D, low signal), the spring-operated control spool is in the fail-safe position.
When the control solenoid is activated (enable pin D, high signal), the digital electronics (OBE) compares the specified command value to the position actual value.
In case of control deviations, the control of the solenoid is changed so as to be compensated. Due to the change in magnetic force, the control spool is adjusted against the spring. Stroke/control spool cross-section is regulated proportionally to the command value. In case of a command value presetting of 0, the electronics adjusts the control spool against the spring to central position. In deactivated condition, the spring is untensioned to a maximum and the valve is in fail-safe position.

Notice for safe shut-off according to EN 13849-1
(enable acknowledgment)
The enable acknowledgment is not set (pin C). If the supply voltage fails or in case of cable break, the integrated electronics (OBE) will de-energize the control solenoid and the control spool will move to the fail-safe position.
The enable acknowledgment is also not set if the control spool is not in a hydraulically safe position (insufficient safety overlap of the control spool).

Safety function
The integrated control electronics of the valve enables the additional shut-off of a channel according to EN 13849-1 in the direction P to A (depending on the application, the fail-safe position must be adhered to).
For this purpose, a suitable control system must be provided to perform the plausibility check between the direction-dependent valve signals "enable input" and "enable acknowledgment" (signal fed back by the valve).
It is not possible to switch off direction P→B in a safety-relevant manner according to EN 13849-1 (depending on valve type).

Monitoring
The digital control electronics enable comprehensive monitoring functions/error detection including:
- Undervoltage
- Communication error
- Cable break for analog sensor inputs
- Monitoring of the microcontroller (watchdog)
- Temperature of the integrated electronics

IndraWorks DS PC program
To implement the project planning task and to parameterize the valve, the user may use the IndraWorks DS engineering tool (see accessories):
- Project planning
- Parameterization
- Commissioning
- Diagnosis
- Comfortable administration of all data on a PC
- PC operating systems: Windows 7-10

☞ **Notice:**
4/3 directional control valves are only functional in the active control loop and do not have a leakage-free basic position when deactivated. Consequently, "external isolator valves" are required in many applications and must be taken into account regarding the switch-on/switch-off order.
While the electrical supply voltage is being switched off, the drive may be accelerated for a short time in functional direction P→B.

Technical data
(For applications outside these values, please consult us!)

General			
Installation position			Any
Ambient temperature range		°C	–20 ... +60
Storage temperature range		°C	+5 ... +40
Maximum storage time		years	1 (if the storage conditions are observed; refer to the operating instructions 07600-B)
Vibration resistance	▶ Sine test according to DIN EN 60068-2-6		10 ... 2000 Hz/maximum of 10 g/10 cycles/3 axes
	▶ Noise test according to DIN EN 60068-2-64		20 ... 200 0Hz/10 g_{RMS}/30 g peak/30 min./3 axes
	▶ Transport shock according to DIN EN 60068-2-27		15 g/11 ms/3 axes
Weight	▶ Versions "00..D90" and "00..D95"	kg	3.5
	▶ Versions "GA..D90", "GB..D90" and "GC..D90"	kg	4.8
Maximum relative humidity (no condensation)		%	95
Maximum surface temperature		°C	150
$MTTF_d$ value according to EN ISO 13849		years	150 (for further details, see operating instructions 29391-B)

Hydraulic								
Maximum operating pressure	▶ Ports A, B, P	bar	350					
	▶ Port T	bar	250					
Rated flow (***Δp*** = 35 bar per edge [1])		l/min	2	4	12	15	24/25	40
Limitation of use (transition to fail-safe position)	▶ Symbols C3, C5	bar	350	350	350	350	350	160
	▶ Symbols C4, C1	bar	350	350	350	280	250	100
Leakage flow (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 fluid			See table page 8					
Viscosity range	▶ Recommended	mm^2/s	20 ... 100					
	▶ Maximum admissible	mm^2/s	10 ... 800					
Hydraulic fluid temperature range (flown-through)		°C	–20 ... +60					
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)			Class 18/16/13 [2]					

[1] Flow for deviating ***Δp:***

$$q_x = q_{Vnom} \times \sqrt{\frac{\Delta p_x}{35}}$$

[2] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.
For the selection of filters, see www.boschrexroth.com/filter.

Technical data
(For applications outside these values, please consult us!)

Hydraulic fluid		Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils		HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ Insoluble in water	HETG	FKM	ISO 15380	90221
		HEES	FKM		
	▶ Soluble in water	HEPG	FKM	ISO 15380	
Flame-resistant	▶ Water-free	HFDU (glycol base)	FKM	ISO 12922	90222
		HFDU (ester base)	FKM		
		HFDR	FKM		
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	NBR	ISO 12922	90223

☞ **Important information on hydraulic fluids:**

- For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.
- **Bio-degradable and flame-resistant – containing water:**
  If components with galvanic zinc coating (e.g. version "J3" or "J5") or parts containing zinc are used, small amounts of dissolved zinc may get into the hydraulic system and cause accelerated aging of the hydraulic fluid. Zinc soap may form as a chemical reaction product, which may clog filters, nozzles and solenoid valves - particularly in connection with local heat input.
- **Flame-resistant – containing water:**
  - Due to increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30 % as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended – if possible specific to the installation – to back up the return flow pressure in ports T to approx. 20 % of the pressure differential at the component.
  - Dependent on the hydraulic fluid used, the maximum ambient and hydraulic fluid temperature must not exceed 50 °C. In order to reduce the heat input into the component, the command value profile is to be adjusted for proportional and high-response valves.

Static/dynamic		
Hysteresis	%	≤ 0.2
Manufacturing tolerance q_{Vmax}	%	≤ 10
Temperature drift	%/10 K	Zero shift < 0.25
Pressure drift	%/100 bar	Zero shift < 0.15
Zero compensation		Ex plant ±1 %

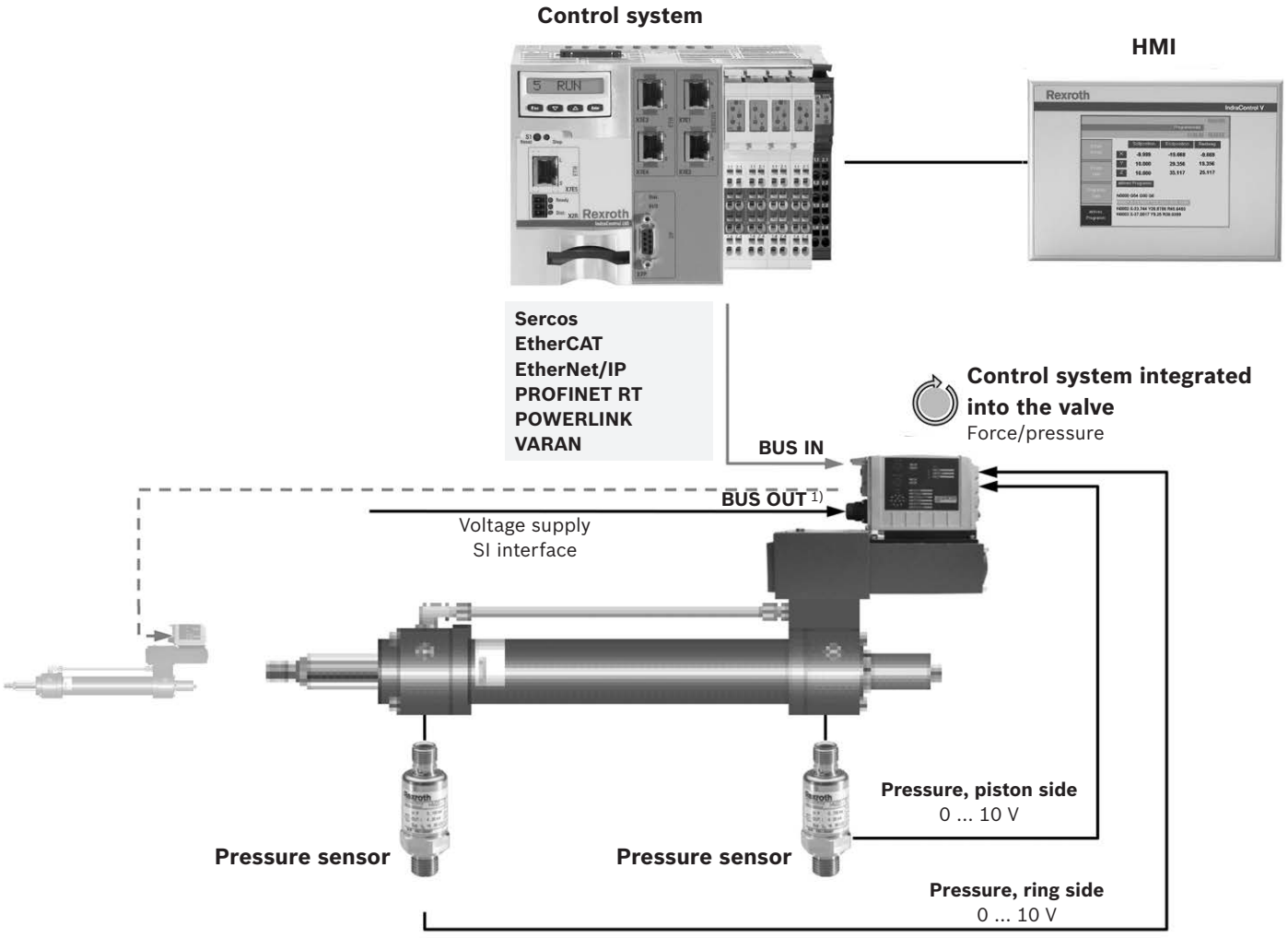
Technical data
(For applications outside these values, please consult us!)

Electrical, integrated electronics (OBE)			
Relative duty cycle		%	100 (continuous operation)
Protection class according to EN 60529			IP65 (If suitable and correctly mounted mating connectors are used)
Supply voltage [3]	▶ Nominal voltage	VDC	24
	▶ Lower limit value	VDC	18
	▶ Upper limit value	VDC	36
	▶ Maximum admissible residual ripple	Vpp	2.5 (comply with absolute supply voltage limit values)
Current consumption	▶ Maximum [4]	A	2.5
	▶ Impulse current	A	4
Maximum power consumption		W	40
AD/DA resolution	▶ Analog inputs		12 bit
Protective grounding conductor and screening			See connector pin assignment (CE-compliant installation) page 12
Required fuse protection, external		A	4, time-lag
Adjustment			Calibrated in the plant, see characteristic curves page 14 ... 15
Conformity			CE according to EMC Directive 2014/30/EU tested according to EN 61000-6-2 and EN 61000-6-3
Parameterization interface			Ethernet
Scan time pressure and force controller (minimum)		ms	0.5
Booting time		s	< 15
Switching input Enable XH1	▶ Quantity		1
	▶ Low level	V	–3 ... 5
	▶ High level	V	15 ... U_B
	▶ Current consumption at high level	mA	< 1
	▶ Reference potential		Pin 5
Switching output Enable acknowledgment XH1	▶ Quantity		1
	▶ Low level	V	0 ... 3
	▶ High level	V	15 ... U_B
	▶ Current carrying capacity	mA	50 (short-circuit-proof)
	▶ Signal delay time	ms	see operating instructions 29391-B
	▶ Reference potential		GND
Analog sensors X2N	▶ Quantity of voltage inputs		3 (version "5")
	▶ Supply voltage	V	24
	▶ Maximum supply current	mA	50
	▶ AD resolution	bit	12
	▶ Voltage inputs		
	– Measurement range	V	0 ... 10
	– Input resistance	kΩ	100 +10 %
	– Temperature drift		< 15 mV/10 K

[3] Voltage limit values must be observed directly at the connector of the valve (observe line length and cable cross-section!)

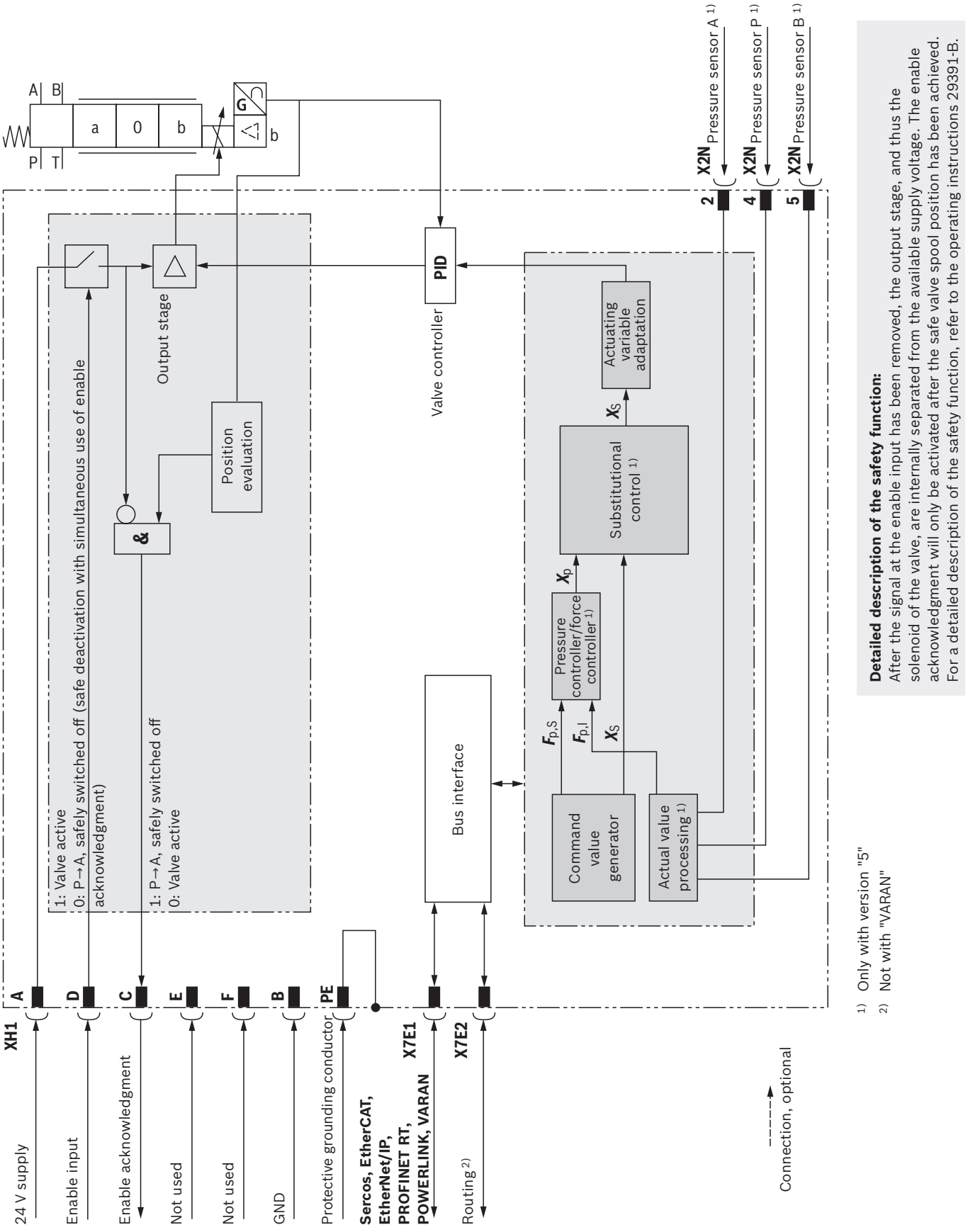
[4] When using the sensor inputs or the switching output, the maximum current consumption will increase according to the external load

Representation of the IFB valve in the system network (version "5")



1) Not with "VARAN"

Block diagram/controller function block



Detailed description of the safety function:
After the signal at the enable input has been removed, the output stage, and thus the solenoid of the valve, are internally separated from the available supply voltage. The enable acknowledgment will only be activated after the safe valve spool position has been achieved. For a detailed description of the safety function, refer to the operating instructions 29391-B.

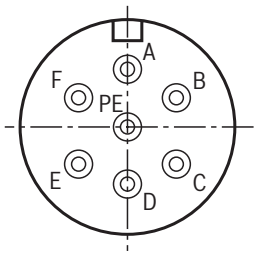
1) Only with version "5"
2) Not with "VARAN"

Electrical connections, assignment

Connector pin assignment XH1, 6-pole + PE according to DIN 43563

Pin	Assignment of interface D9
A	24 VDC supply voltage [1]
B	GND
C	Enable acknowledgment 24 VDC (I_{max} 50 mA) [2] (high ≥ 15 V; low < 2 V)
D	Enable input 24 VDC (high ≥ 15 V; low < 2 V)
E	Not used
F	Not used
PE	Functional ground (connected directly to metal housing)

XH1



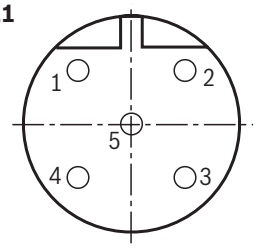
1) A load increases the current consumption on pin A

2) Enable acknowledgment is issued only if the valve has safely switched off according to EN 13849-1, see operating instructions 29391-B.

Connector pin assignment for Ethernet interfaces "X7E1" and "X7E2" (coding D), M12, 4-pole, socket

Pin	Assignment
1	TxD +
2	RxD +
3	TxD –
4	RxD –
5	Not used

X7E1

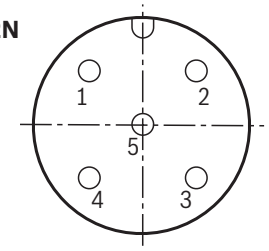


Analog configurable sensor interface, port "X2N" (coding A), M12, 5-pole, socket

Pin	Assignment
1	+24 V voltage output
2	Analog sensor input 2 (0 ... 10 V)
3	GND
4	Analog sensor input 4 (0 ... 10 V)
5	Analog sensor input 3 (0 ... 10 V)

Only with version "5"

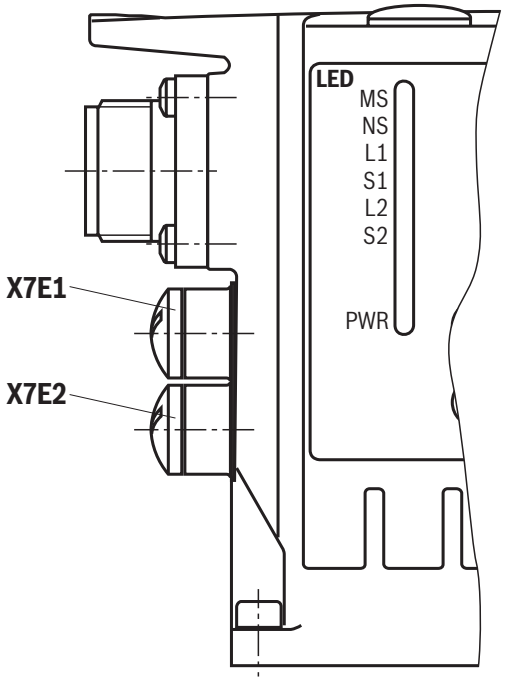
X2N



Notice:
- Reference potential for all signals: GND
- We recommend connecting the shields on both sides via the metal housings of the plug-in connectors.

LED displays

LED	Interface	Sercos	EtherNET/IP	EtherCAT	PROFINET RT	POWERLINK	VARAN
MS	**Electronics module**	Module status	Module status	Module status	Module status	Module status	Module status
NS		S	Network status and others	Network status and others	Network status and others	Status/error	Network status and others
L1	**X7E1**	Link and others	Link and others	Link/activity	Link and others	Link/data activity	Link and others
S1		Activity and others	Activity and others	Not used	Activity and others	Not used	Active and others
L2	**X7E2**	Link and others	Link and others	Link/activity	Link and others	Link/data activity	Not used
S2		Activity and others	Activity and others	Not used	Activity and others	Not used	Not used
PWR	**XH1**	Power	Power	Power	Power	Power	Power



Displays of the status LEDs

Power LED (LED PWR)	Display status
Off	No voltage supply
Green	Operation

Module status LED (LED MS)	Display status
Off	No voltage supply
Green-red, flashing	Initialization
Green, flashing	Drive ready for operation
Green	Drive active
Orange, flashing	Warning
Red, flashing	Error
Green, rapidly flashing	Firmware must be loaded

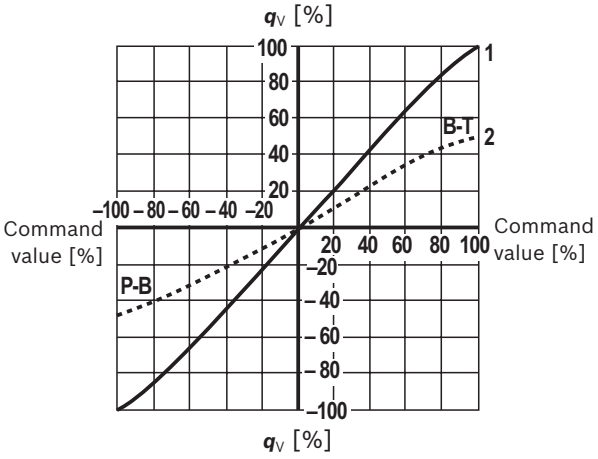
☞ **Notice:**

- For the connection to the M12 sockets, we recommend using self-locking mating connectors
- Module status LED MS relates to the electronics module
- The network status LED NS indicates the status of the control communication, see application description 30338-FK
- LEDs L1, S1, L2 and S2 relate to interfaces "X7E1" and "X7E2"
  - Link: Cable plugged in, connection established (permanently lit)
  - Activity: Data sent/received (flashing)
- For a detailed description of the diagnosis LEDs, please refer to the functional description Rexroth HydraulicDrive HDx.

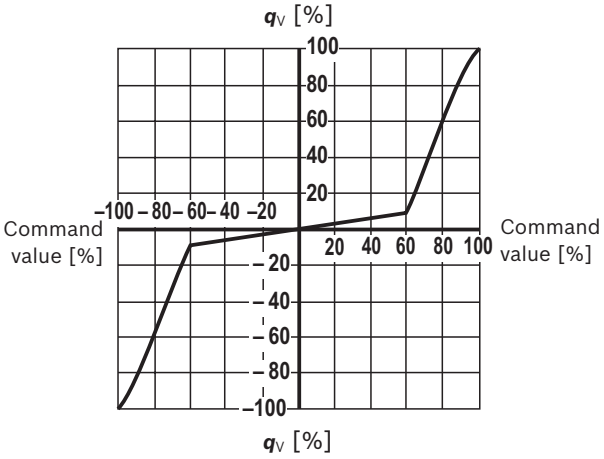
Characteristic curves: Flow characteristic (measured with HLP46, ϑ_{oil} = 40 ±5 °C)

Flow/signal function

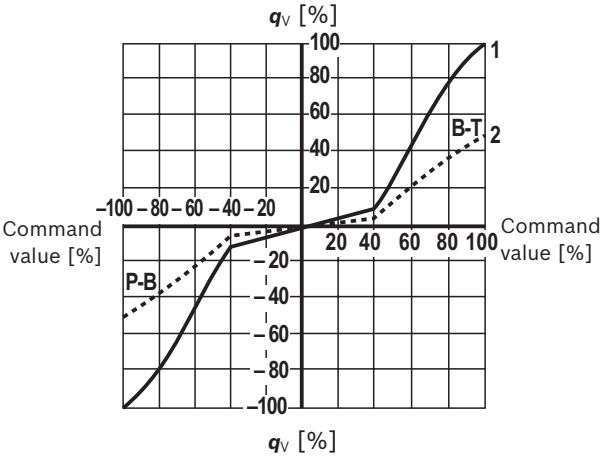
Linear characteristic curve "L"



Inflected characteristic curve "P", inflection at **60 %**



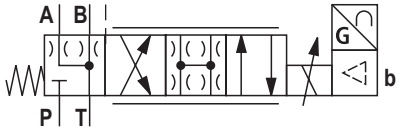
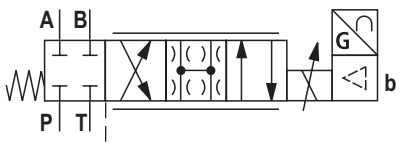
Inflected characteristic curve "P", inflection at **40 %**



1 $q_{vA} : q_{vB}$ = 1:1

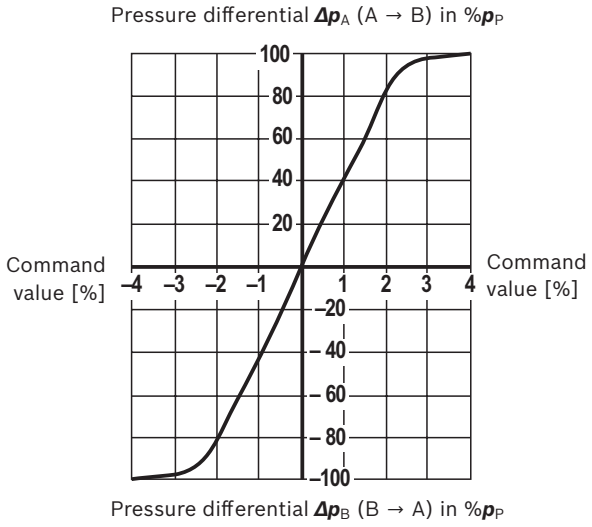
2 $q_{vA} : q_{vB}$ = 2:1

Fail-safe position

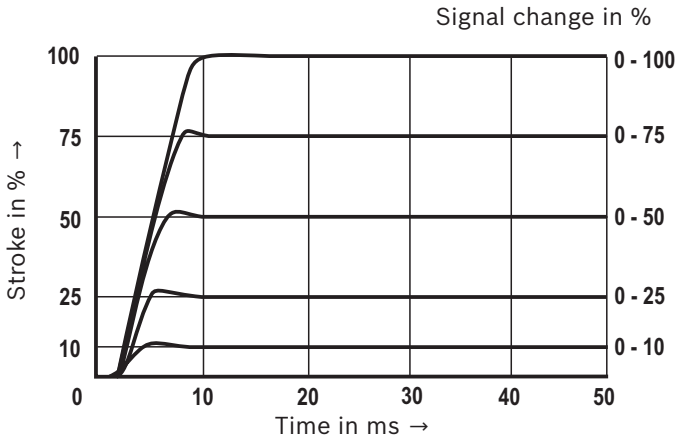
	Leakage flow at 100 bar	P→A P→B	50 cm³/min 70 cm³/min
	Flow at Δp = 35 bar	A→T B→T	10 ... 20 l/min 7 ... 20 l/min
	Leakage flow at 100 bar	P→A P→B	50 cm³/min 70 cm³/min
		A→T B→T	70 cm³/min 50 cm³/min
Fail-safe ←	p = 0 bar → 7 ms p = 100 bar → 10 ms	Enable "off" or internal shut-off if an error has occurred U_B ≤ 18 V or I ≤ 2 mA (with 4 ... 20 mA signal, cable break detection: current threshold configurable)	

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

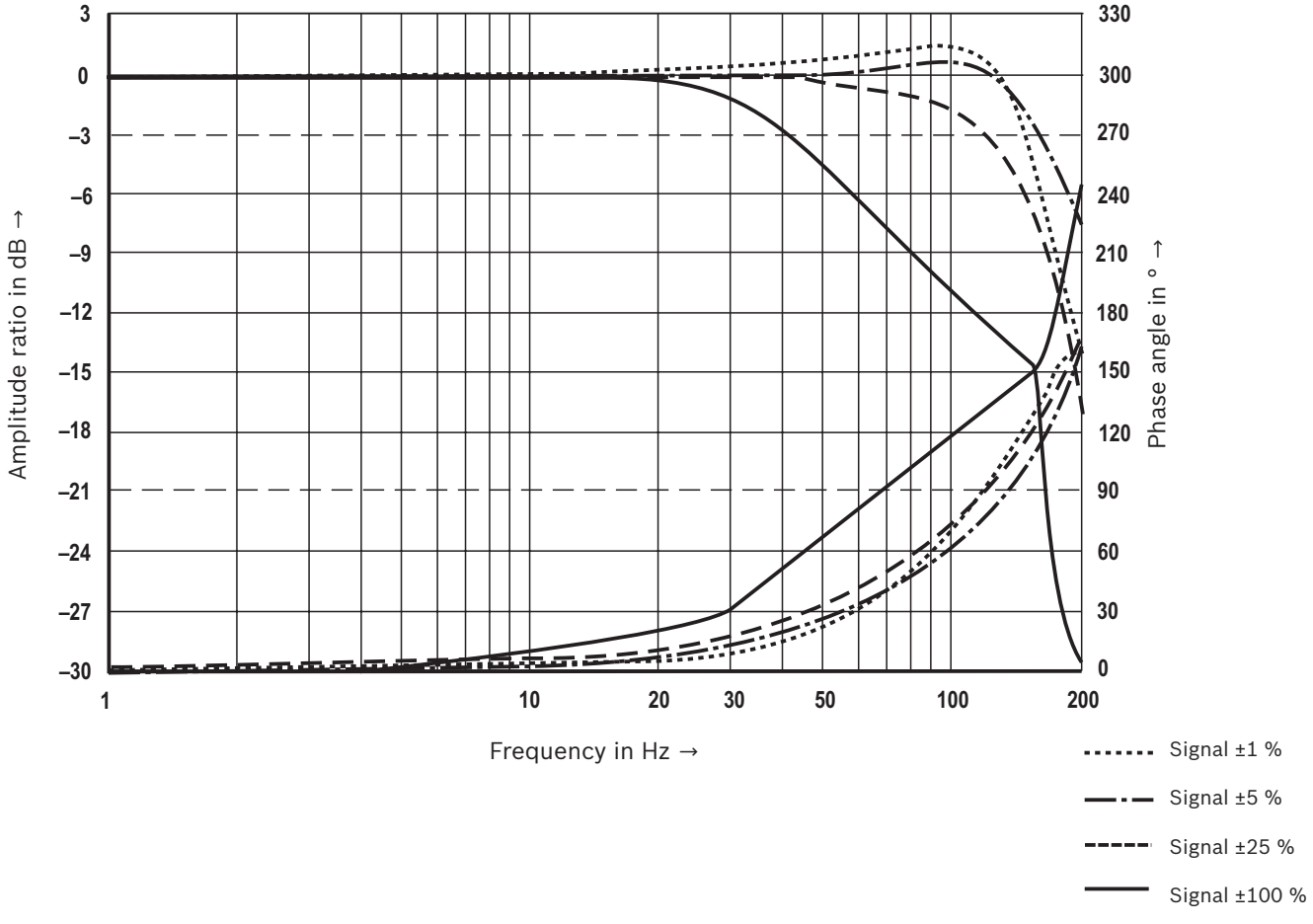
Pressure/signal characteristic curve



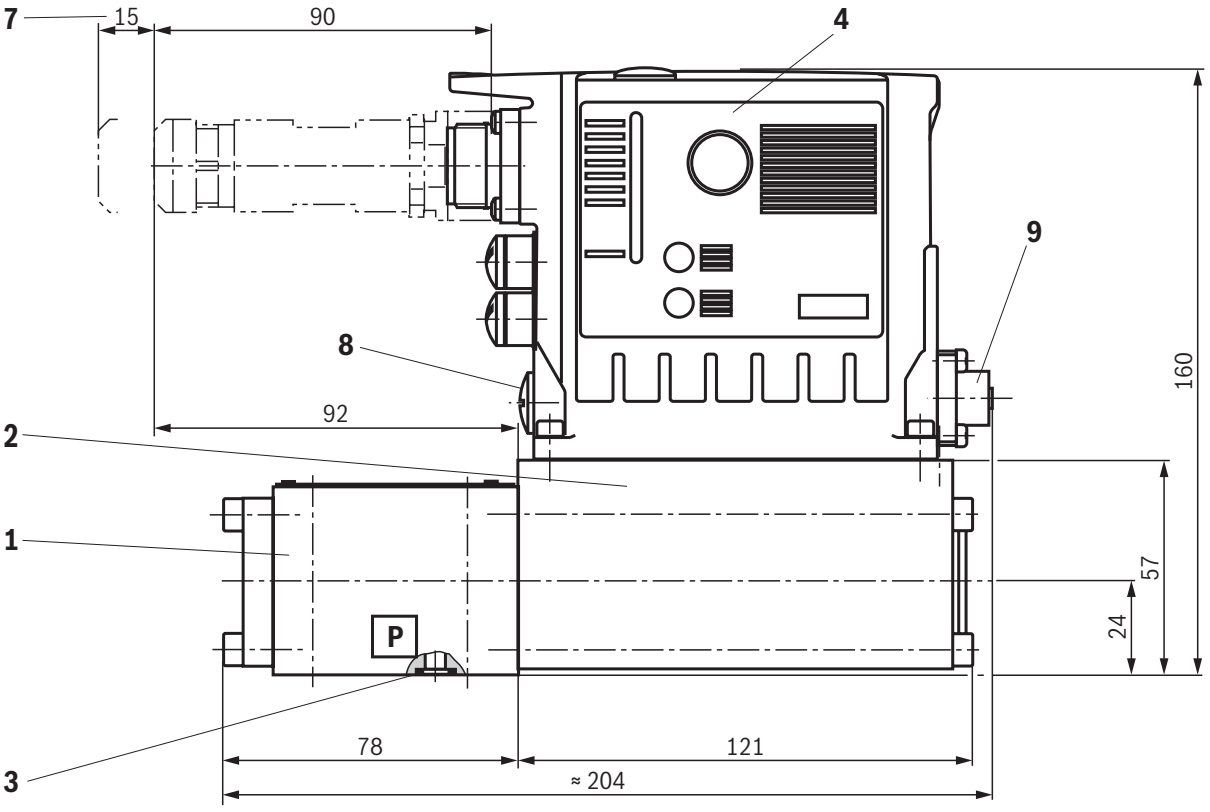
Transition function with stepped electric input signals

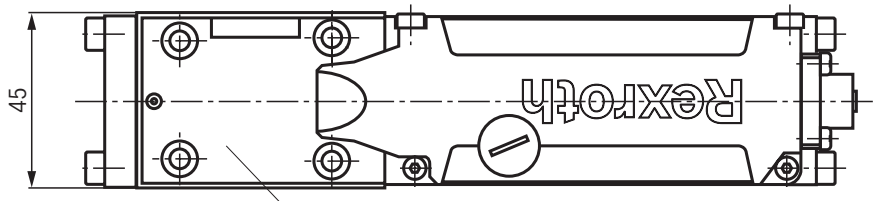


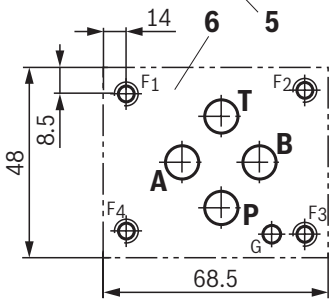
Frequency response characteristic curves

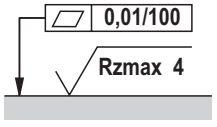


Dimensions: Versions "00..D90" and "00..D95"
(dimensions in mm)









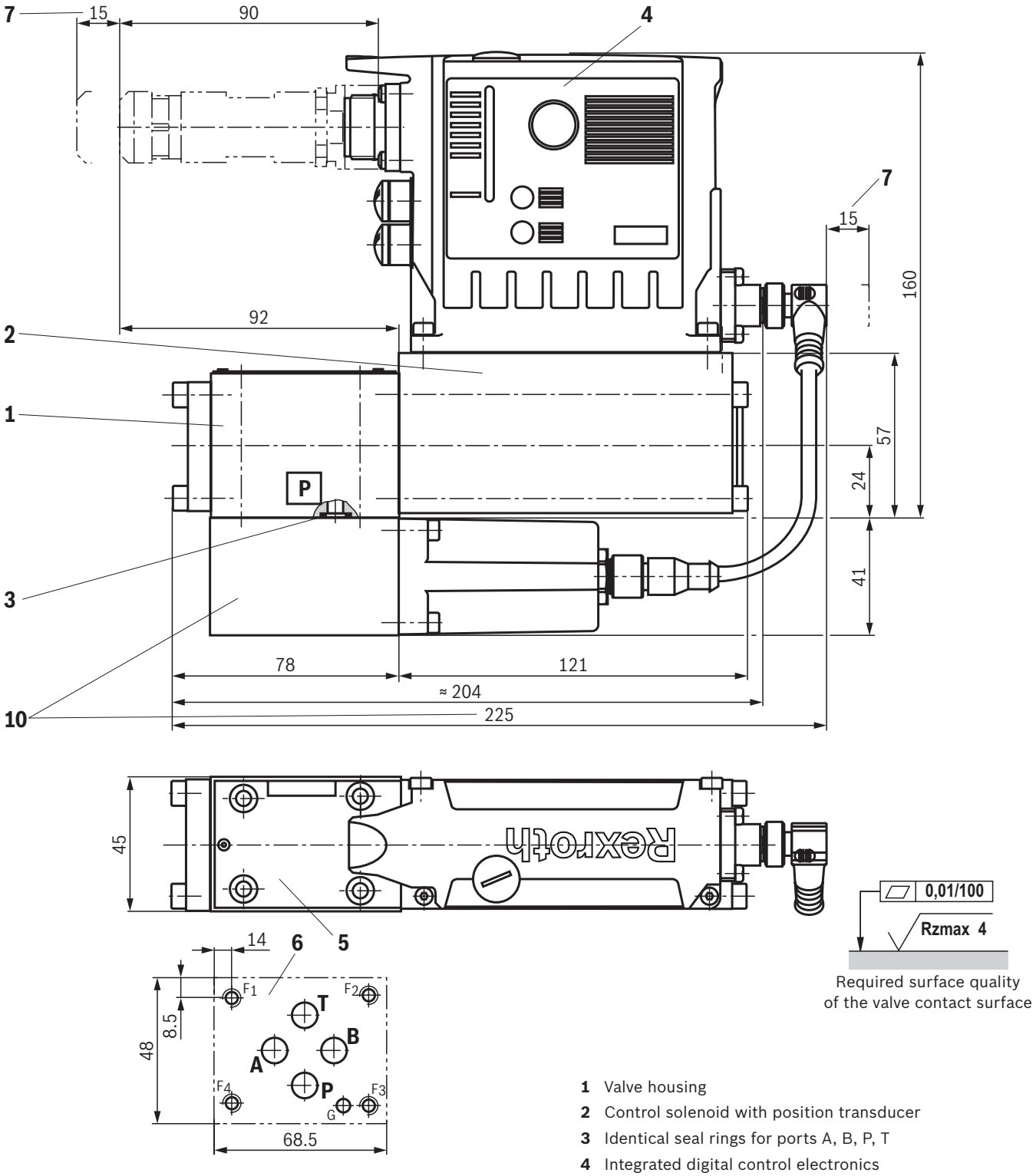
Required surface quality
of the valve contact surface

Valve mounting screws see page 18.

☞ **Notice:**
The dimensions are nominal dimensions which are subject to tolerances.

1 Valve housing
2 Control solenoid with position transducer
3 Identical seal rings for ports A, B, P, T
4 Integrated digital control electronics
5 Name plate
6 Machined valve contact surface, porting pattern according to ISO 4401-03-02-0-05
7 Space required to remove the mating connectors
8 Plug screw PG, version "00..D90" only
9 Version "00..D95" only

Dimensions: Versions "GA..D90", "GB..D90" and "GC..D90"
(dimensions in mm)



Required surface quality
of the valve contact surface

Valve mounting screws see page 18.

Notice:
The dimensions are nominal dimensions which are subject to tolerances.

1 Valve housing
2 Control solenoid with position transducer
3 Identical seal rings for ports A, B, P, T
4 Integrated digital control electronics
5 Name plate
6 Machined valve contact surface, porting pattern according to ISO 4401-03-02-0-05
7 Space required to remove the mating connectors
10 Integrated pressure sensor

Dimensions

Valve mounting screws (separate order)

Version	Hexagon socket head cap screws	Material number
"00..D90", "00..D95"	**4 hexagon socket head cap screws ISO 4762 - M5 x 30 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B** Friction coefficient μ_{total} = 0.09 ... 0.14; tightening torque $M_A = 6^{+2}$ Nm	**R913048086**
"GA..D90", "GB..D90", "GC..D90"	**4 hexagon socket head cap screws ISO 4762 - M5 x 70 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B** Friction coefficient μ_{total} = 0.09 ... 0.14; tightening torque M_A = 8.9 Nm ±10 %	**R913043762**

☞ **Notice:**
The tightening torque of the hexagon socket head cap screws refers to the maximum operating pressure.

Accessories (separate order)

Mating connectors and cable sets

Port	Designation	Version	Short designation	Material number	Data sheet
XH1	Mating connector; for valves with round connector, 6-pole + PE	Straight, metal	7PZ31...M	**R900223890**	08006
		Straight, plastic	7PZ31...K	**R900021267**	
		Angled, plastic	–	**R900217845**	–
	Cable sets; for valves with round connector, 6-pole + PE	Plastic, 3.0 m	7P Z31 BF6	**R901420483**	08006
		Plastic, 5.0 m		**R901420491**	
		Plastic, 10.0 m		**R901420496**	
		Plastic, 20.0 m	–	**R901448068**	–
X7E1, X7E2	Cable set; shielded, 4-pole, D coding	Straight connector M12, on straight connector M12, line cross-section 0.25 mm², CAT 5e, length freely selectable (= xx.x)	–	**R911172111** [1]	–
	Cable set; shielded, 4-pole	Straight connector M12, on straight connector RJ45, line cross-section 0.25 mm², CAT 5e, length freely selectable (= xx.x)	–	**R911172135** [2]	–
X2N [3]	Cable set; shielded, 5-pole, for connecting Rexroth pressure sensors, type HM20, A coding	PUR/PVC, straight connector M12, on straight socket M12, line cross-section 0.34 mm², 0.6 m	–	**R901111709**	–
		PUR/PVC, straight connector M12, on straight socket M12, line cross-section 0.34 mm², 1.0 m	–	**R901111712**	–
		PUR/PVC, straight connector M12, on straight socket M12, line cross-section 0.34 mm², 2.0 m	–	**R901111713**	–
	Cable set; shielded, 5-pole, A coding	Straight connector M12, on free line end, line cross-section 0.34 mm², 1.5 m	–	**R901111752**	–
		Straight connector M12, on free line end, line cross-section 0.34 mm², 3.0 m	–	**R901111754**	–
		Straight connector M12, on free line end, line cross-section 0.34 mm², 5.0 m	–	**R901111756**	–
		Straight connector M12, on free line end, line cross-section 0.34 mm², 10.0 m	–	**R913005147**	–

[1] Additionally indication of type designation RKB0040/xx.x
[2] Additionally indication of type designation RKB0044/xx.x
[3] Only with connection of an external sensor, type HM20

Accessories (separate order)

Protective cap

Protective cap M12	Version	Material number
		**R901075563**

Parameterization

The following is required for the parameterization with a PC		Material number/download
1 Commissioning software	IndraWorks, Indraworks D, Indraworks DS	www.boschrexroth.com/IFB
2 Connection cable, 3 m	Shielded, M12 on RJ45, length can be freely selected (= xx.x)	**R911172135** (additionally indication of type designation RKB0044/xx.x)

Project planning and maintenance instructions

- The supply voltage must be permanently connected; otherwise, bus communication is not possible.
- If electro-magnetic interference is to be expected, take appropriate measures to ensure the function (depending on the application, e.g. shielding, filtration).
- The devices have been tested in the plant and are supplied with default settings.
- Only complete devices can be repaired. Repaired devices are returned with default settings. User-specific settings will not be applied. The machine end-user will have to retransfer the corresponding user parameters.

Further information

▶ Directional control valves, direct operated, with electrical position feedback and integrated electronics (OBE)	Data sheet 29035
▶ Directional control valve with integrated digital axis controller (IAC-R) and field bus interface	Data sheet 29191
▶ Directional control valve with integrated digital axis controller (IAC-R) and clock-synchronized PROFIBUS DP/V2 (PROFIdrive profile)	Data sheet 29291
▶ High-response/proportional valve with Multi-Ethernet interface	Operating instructions 29391-B
▶ CE Declaration of Conformity	Upon request
▶ Subplates	Data sheet 45100
▶ Hydraulic fluids on mineral oil basis	Data sheet 90220
▶ Environmentally compatible hydraulic fluids	Data sheet 90221
▶ Flame-resistant, water-free hydraulic fluids	Data sheet 90222
▶ Hexagon socket head cap screws, metric/UNC	Data sheet 08936
▶ Hydraulic valves for industrial applications	Operating instructions 07600-B
▶ General product information on hydraulic products	Data sheet 07008
▶ Installation, commissioning and maintenance of servo valves and high-response valves	Data sheet 07700
▶ Assembly, commissioning and maintenance of hydraulic systems	Data sheet 07900
▶ Operation fieldbus electronics (xx = software version):	
– Functional description Rexroth HydraulicDrive HDx-20	– 30338-FK
– Parameter description Rexroth HydraulicDrive HDS-16, HDx-17 ...HDx-20	– 30330-PA
– Description of diagnosis Rexroth HydraulicDrive HDS-16, HDx-17 ...HDx-20	– 30330-WA
▶ Commissioning software and documentation on the Internet	www.boschrexroth.com/IFB
▶ Selection of the filters	www.boschrexroth.com/filter
▶ Information on available spare parts	www.boschrexroth.com/spc

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