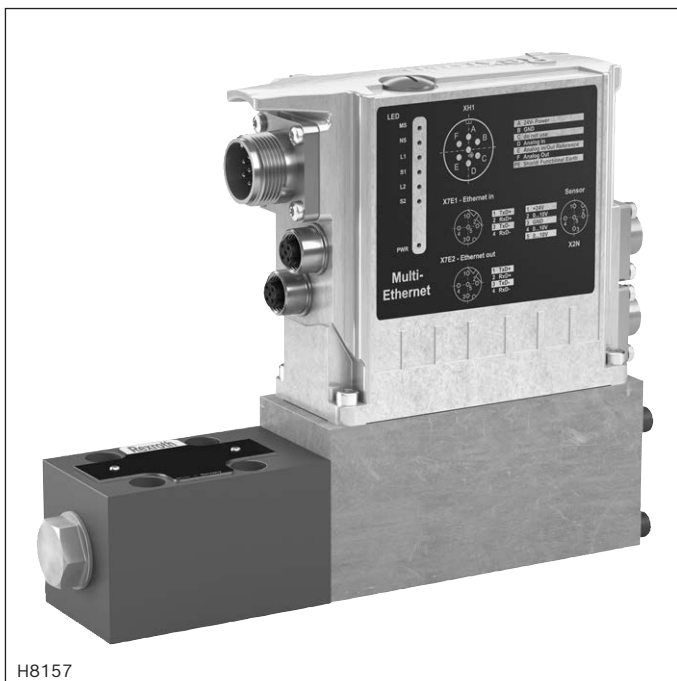


Proportional directional valves, direct operated, with electrical position feedback as pilot control valve for control systems SY(H)DFE.

Type VT-DFP.



► Component series 1X; 2X

Features

- Actuation by means of a proportional solenoid with electrical feedback

Control electronics:

- VT-DFP for SY(H)DFE1
 - External control electronics VT 5041-3X
- VT-DFPE for SY(H)DFEE
 - Integrated, analog
- VT-DFPC for SY(H)DFEC
 - Integrated, digital with CAN bus interface
- VT-DFPn for SY(H)DFEn
 - Integrated, digital with CAN bus interface, for variable-speed operation
- VT-DFPD for SY(H)DFED
 - Integrated, digital with Ethernet bus interface, for variable-speed operation
- VT-DFPF for SY(H)DFEF
 - Integrated, digital with Ethernet bus interface

Contents

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Ordering code	2, 3
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Environmental compatibility	20, 21
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Ordering code

01	02	03	04	05	06	07	08	09	10	11		
	-	-	/	G24	K0	/			/	V	-	*

Series

01	Pilot control valve for external electronics	VT-DFP
	Pilot control valve with integrated analog electronics	VT-DFPE
	Pilot control valve with integrated digital electronics (CANopen fieldbus)	VT-DFPC ¹⁾
	Pilot control valve with integrated digital electronics, variable-speed	VT-DFPn ¹⁾
	Pilot control valve with integrated digital electronics (ethernet-based bus systems)	VT-DFPD
	Pilot control valve with integrated digital electronics (ethernet-based bus systems)	VT-DFPF

Control spool version

02	Standard	A
	2-groove (only for replacement requirement)	B
	4-groove (e.g. for HFC fluids)	C
03	Component series 10 ... 19 (10 ... 19: unchanged installation and connection dimensions); only type VT-DFPD and VT-DFPF	1X
	Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions)	2X
04	Direct voltage 24 V	G24
05	Connector (without mating connector) ²⁾	K0

Installation orientation connector (VT-DFP) / integrated electronics (see below and "Dimensions")

06	Radially to the pump axis	0
	Folded 90° in the direction of the subplate with counterclockwise direction of rotation	1
	Folded 90° in the direction of the subplate with clockwise direction of rotation	2

Additional functions: Closed-loop control

07	- VT-DFP	no code
	- VT-DFPE	
	Switchable pressure controller (high signal)	A
	Power limitation adjustable at the OBE valve	B
	Power limitation adjustable via analog input	C
	Pressure controller that can be switched off (high signal)	D
	- VT-DFPC	
	Standard	A
	- VT-DFPn	
	Teach-in version for cyclic operation	A
	Real-time version (speed calculation without teach-in)	R
	- VT-DFPD	
	Standard	A
	For variable-speed operation	N
	- VT-DFPF	
	Standard	A

Installation orientation of the valve electronics

A10VSO				A4VSO	
Clockwise direction of rotation		Counterclockwise direction of rotation		Clockwise direction of rotation	
Installation orientation "0"	Installation orientation "2"	Installation orientation "0"	Installation orientation "1"	Installation orientation "0"	Installation orientation "1"

Ordering code

01	02	03	04	05	06	07	08	09	10	11		
	-	-	/	G24	K0	/			/	V	-	*

Electronics assembly, option

08	- VT-DFP	no code
	- VT-DFPE	
	Standard electronics with leakage oil compensation	0
	Standard electronics without leakage oil compensation	1
	- VT-DFPC	
	Standard	0
	- VT-DFPn	
	Standard	0
	- VT-DFPD, VT-DFPF	
	Bus system Sercos III	S
	Bus system CANopen over EtherCAT	T
	Bus system servo drive over EtherCAT	D
	Bus system servo drive over Varan	V
	Bus system Ethernet/IP	E
	Bus system PROFINET RT	N
	Bus system Powerlink	W ³⁾

Actual pressure value input (see "Electrical connections")

09	– VT-DFP		no code
	– VT-DFPE, VT-DFPC, VT-DFPn		
	Current input 4 ... 20 mA	Port X1	C
	Voltage input 0 ... 10 V (standard)	Port X1	V
	Voltage input 1 ... 10 V	Port X1	E
	Voltage input 0.5 ... 5 V (standard)	Port X2	F
	– VT-DFPD		
	Voltage input 0 ... 10 V (freely configurable, parameter setting on delivery)	Port XH4	V
	Voltage input 0.5 ... 5 V (freely configurable, parameter setting on delivery)	Port X2M1	F
	– VT-DFPF		
	Voltage input 0 ... 10 V (freely configurable, parameter setting on delivery)	Port XH1	V
	Voltage input 0.5 ... 5 V (freely configurable, parameter setting on delivery)	Port X2N	F


Seal material (observe compatibility of seals with hydraulic fluid used, see page 5)

10	FKM seals	V
11	Further details in the plain text	

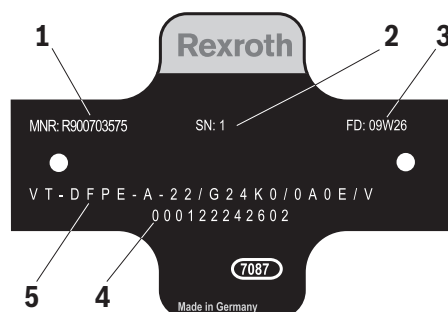
1) Not recommended for new applications.

2) Connector dependent on the valve type (see "Technical data" and "Electrical connection").

3) On request

 **Notice:** Preferred types and standard units are contained in the EPS (standard price list).

Example of name plate



- 1 Material number
- 2 Serial number
- 3 Date of production
- 4 Production order number
- 5 Type designation

Technical data

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

General							
Type		VT-DFP	VT-DFPE	VT-DFPC	VT-DFPn	VT-DFPD	VT-DFPF
Mass	kg	1.96	2.25			3.25	3.15
Ambient temperature range	°C	-20 ... +60	0 ... +60	0 ... +50		-20 ... +60	
Storage temperature range	°C	-20 ... +70	0 ... +70			+5 ... +40	
Transport temperature (duration 16±1 h)	°C	-25 ... +85					-40 ... +80
Maximum relative humidity (no condensation)	%	95					

Hydraulic			
Maximum operating pressure	▶ Port A, P	bar	400
	▶ Port T	bar	100
Hydraulic fluid			see table below
Hydraulic fluid temperature range (at the valve working ports)		°C	−20 ... +70
Viscosity range		mm²/s	20 ... 380
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)			Class 18/16/13 ¹⁾

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	ISO 15380	90221
		HEES		
	► Soluble in water	HEPG	ISO 15380	
Flame-resistant	► Water-free	HFDU (glycol base)	ISO 12922	90222
		HFDU (ester base)		
		HFDR		
	► Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	ISO 12922	90223

**Important notices 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 the 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 – backing 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 environment 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.

¹⁾ 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.

Technical data

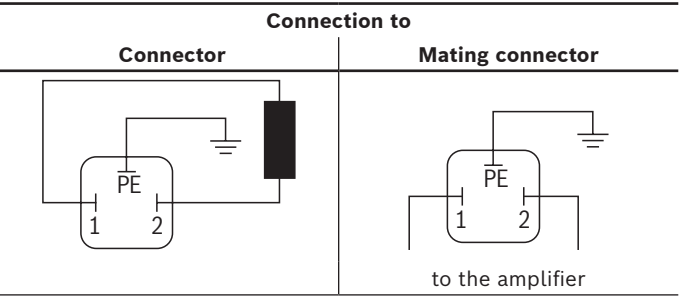
(For applications outside these values, please consult us!)

Electric									
Type		VT-DFP	VT-DFPE	VT-DFPC	VT-DFPn	VT-DFPD	VT-DFPF		
Control		external control electronics VT5041-3X	integrated, analog	integrated, digital					
Operating voltage		VDC	24 ^{+40%} _{-10%}	24 ^{+40%} _{-5%}		24			
Operating range (short-time operation)	► Upper limit value	V	–	35		36			
	► Lower limit value	V	–	21		18			
Current consumption (in static control operation)	► Rated current	A	–	0.6					
	► Maximum current	A	–	1.25		2.3	2.5		
Inputs ³⁾	► Analog		–	Determination by means of ordering code	Parameterizable: 0 ... 20 mA; 4 ... 20 mA; 0 ... 10 V; 0 ... 5 V; 0.5 ... 5 V; 0.1 ... 10 V; 1 ... 10 V				
	► Analog, current, load	Ω	–	100		200			
	► Analog, voltage	kΩ	–	≥ 50	≥ 100		150 ^{+10%}		
	► Digital	Logic 0	V	–	≤ 0.6	≤ 8	IEC-61131, Type 1	–	
		Logic 1	V	–	≥ 21	≥ 14		–	
	Outputs ³⁾	► <i>p</i> _{is} / <i>U</i> _{OUT1}	V	–	0 ... 10	±10			
mA			–	1.5	2	1			
► <i>a</i> _{is} / <i>U</i> _{OUT2}		V	–	±10				–	
		mA	–	1.5	2	1	–		
► Digital		Logic 0	V	–	<i>U</i> _a < 1 V				–
		Logic 1	V	–	<i>U</i> _a ≥ <i>U</i> _B – 5 V; 10 mA (short-circuit-proof)				–
Solenoid coil resistance		Ω	2.1 ... 3.2	–					
Coil resistance position transducer at 20 °C									
	► Between port 1 and 2	Ω	approx. 113	–					
	► Between port 3 and 4	Ω	approx. 101	–					
Protection class according to EN 60529				IP65 (with correctly installed electrical connection)					
	► Pump incl. pilot control valve								

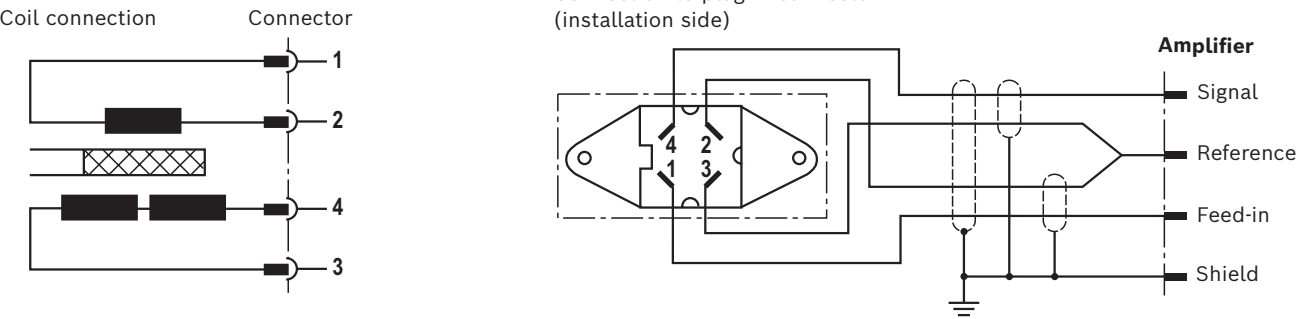
³⁾ For the condition as supplied and parameterization options, see "Electrical connection", page 6 ... 11

Electrical connection: Type VT-DFP... (for external analog electronics)

► Solenoid



► Inductive position transducer



📌 **Notices:**

- Details on the electrical connection to the type VT 5041-3X amplifier are described in data sheet 30242.
- Mating connectors, separate order, see page 19.

Electrical connection: VT-DFPE... (with integrated analog electronics)► **X1, central connection****Assignment of connector or mating connector and cable set**

Pin	Signal	Description	Signal direction	Type of signal	Assignment in cable set (accessories)	
1	+ U_B	Voltage supply	IN	24 VDC	1	Supply line 3 x 1.0 mm ²
2	0 V = L0	Reference potential for the voltage supply	–	–	2	
PE	Ground	Grounding connection for the electronics	–	–	green/yellow	
3	Fault	Signals faults, e.g. cable break command / actual values, controller monitoring (logic 0 = error)	OUT	logic 24 V	white	Supply line 10 x 0.14 mm ² shielded (one end of the shield must be connected to the control)
4	M0	Reference potential for analog signals	–	–	yellow	
5	a_{Command}	Swivel angle command value	IN	analog ± 10 V	green	
6	a_{Actual}	Actual swivel angle value, normalized	OUT	analog ± 10 V	violet	
7	p_{Command}	Pressure command value	IN	analog 0...10 V	pink	
8	p_{Actual}	Actual pressure value, normalized	OUT	analog 0...10 V ¹⁾	red	
9		Function depends on electronic type and additional function, see below	–	–	brown	
10	Actual pressure value H	Actual pressure value input: Signal level depends on pos. 9 in the ordering code. With version "F" (0.5 ... 5 V) reserved	IN	analog	black	
11	Actual pressure value L		–	analog	blue	
n.c.					gray	

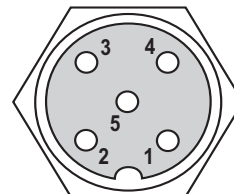
Functions at pin 9

Pin	Additional function	Function dependent on pos. 7 of the ordering code (order, see ordering code)	Signal direction	Type of signal
9	"A"	Selecting a different oil volume adjustment (switch T_D)	IN	logic 24 V
	"B"	Power limitation active	OUT	logic 24 V
	"C"	Command value of power limitation	IN	analog 0 ... 10 V
	"D"	Switch off pressure controller	IN	logic 24 V

¹⁾ When using a pressure transducer with raised zero point (e.g. 4 ... 20 mA), a voltage of –1 ... –2.5 V will be output in case of a cable break.

► **X2, connection of pressure transducer HM 20**

Pin	Signal HM 20	Pin	
1	OUT, + U_B	2	n.c.
3	Reference L0		
4	IN, analog, 0.5 ... 5 VDC	5	n.c.

**Notice:**

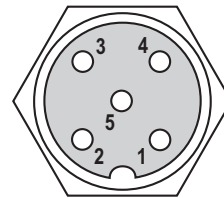
Mating connectors, separate order, see page 19.

Electrical connection: VT-DFPC... (with integrated digital electronics)► **X1, central connection****Assignment of connector or mating connector and cable set**

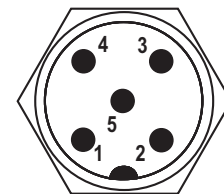
Pin	Signal	Description	Signal direction	Type of signal	Assignment in cable set (accessories)	
1	+ U_B	Voltage supply	IN	24 VDC	1	Supply line 3 x 1.0 mm ²
2	0 V = L0	Reference potential for the voltage supply	–	–	2	
PE	Ground	Grounding connection for the electronics	–	–	green/yellow	
3	Fault	Signals faults, e.g. cable break command / actual values, controller monitoring (logic 0 = error)	OUT	logic 24 V	white	Supply line 10 x 0.14 mm ² shielded (one end of the shield must be connected to the control)
4	M0	Reference potential for analog signals	–	–	yellow	
5	AI2	Analog input AI2 Factory setting: Swivel angle command value	IN	analog ± 10 V	green	
6	U_{OUT2}	Analog output Factory setting: Actual swivel angle value, normalized	OUT	analog ± 10 V	violet	
7	AI1	Analog input AI1 Factory setting: Pressure command value	IN	analog 0...10 V	pink	
8	U_{OUT1}	Analog output Factory setting: Actual pressure value, normalized	OUT	analog ± 10 V	red	
9	DI1	Digital input DI1	IN	logic 24 V	brown	
10	Actual pressure value H	Actual pressure value input: Signal level depending on pos. 9 of the ordering code	IN	analog	black	
11	Actual pressure value L		–	analog	blue	
n.c.					gray	

► **X2, connection of pressure transducer HM 20 and serial interface RS232 (mating connector M12)**

Pin	Signal HM 20	Pin	Signal RS232
1	OUT, + U_B	2	RxD
3	Reference L0		
4	IN, analog, 0.5 to 5 V DC	5	TxD

► **X3, connection of CAN bus and digital input 2 (DI2) (connector M12)**

Pin	Signal input	Pin	Signal CAN
1	n.c.	3	CAN GND
2	IN, digital IN2 (DI2)	4	CAN-HIGH
		5	CAN-LOW

**Notice:**

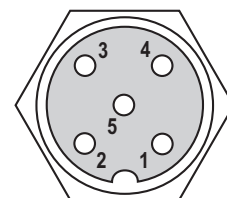
Mating connectors, separate order, see page 19.

Electrical connection: VT-DFPn... (with integrated digital electronics)► **X1, central connection****Assignment of connector or mating connector and cable set**

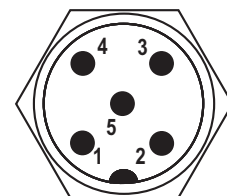
Pin	Signal	Description	Signal direction	Type of signal	Assignment in cable set (accessories)	
1	+ U_B	Voltage supply	IN	24 VDC	1	Supply line 3 x 1.0 mm ²
2	0 V = L0	Reference potential for the voltage supply	–	–	2	
PE	Ground	Grounding connection for the electronics	–	–	green/yellow	
3	Fault	Signals faults, e.g. cable break command / actual values, controller monitoring (logic 0 = error)	OUT	logic 24 V	white	Supply line 10 x 0.14 mm ² shielded (one end of the shield must be connected to the control)
4	M0	Reference potential for analog signals	–	–	yellow	
5	AI2	Analog input AI2 Factory setting: Swivel angle command value	IN	analog ± 10 V	green	
6	U_{OUT2}	Analog output Factory setting: Actual swivel angle value, normalized	OUT	analog ± 10 V	violet	
7	AI1	Analog input AI1 Factory setting: Pressure command value	IN	analog 0...10 V	pink	
8	U_{OUT1}	Analog output Factory setting: Speed command value	OUT	analog ± 10 V	red	
9	DI1	Digital input DI1 Dependent on additional function (pos. 7 of the ordering code): – Teach-In version: Synchronization bit DI1 – Real-time version: Activate real-time operation	IN	logic 24 V	brown	
10	Actual pressure value H	Actual pressure value input: Signal level depends on pos. 9 in the ordering code.	IN	analog	black	
11	Actual pressure value L		–	analog	blue	
n.c.					gray	

► **X2, serial interface RS232 and a switchable digital input S1/pressure transducer input for HM 20**

Pin	Signal input	Pin	Signal RS232
1	OUT, + U_B	2	RxD
3	Reference L0		
4	Analog input 0.5...5 V for HM 20 or digital input 0 V low, 10 V high ¹⁾ Dependent on additional function (pos. 7 of the ordering code): ► Teach-In version: Digital input "Variable-speed operation on, S1" ► Real-time version: Input as analog input for pressure transducer HM20	5	TxD

► **X3, connection of CAN bus and digital input 2 (DI2) (connector M12)**

Pin	Signal input	Pin	Signal CAN
1	n.c.	3	CAN GND
2	IN, digital IN2 (DI2) Depending on additional function (pos. 7 of the ordering code), factory setting: ► Teach-In version: Start Teach-In, S2 ► Real-time version: Manual speed presetting active, speed is applied according to the real-time operation status and the setting of the R parameters.	4	CAN-HIGH
		5	CAN-LOW



¹⁾ For valves with date of manufacture including 2013 max. 12 V.
For valves after date of production 2014 max. $U(B)$.

**Notice:**

Mating connectors, separate order, see page 19.

Electrical connection: VT-DFFD... (with integrated digital electronics)► **XH4, central connection****Assignment of connector or mating connector and cable set**

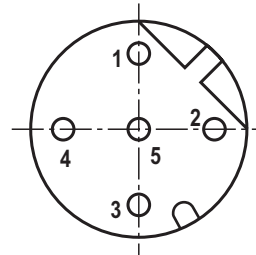
Pin	Signal	Description	Signal direction	Type of signal	Assignment in cable set (accessories)	
1	+ U_B	Voltage supply	IN	24 VDC	1	Supply line 3 x 1.0 mm ²
2	0 V = L0	Reference potential for the voltage supply	–	–	2	
PE	Ground	Grounding connection for the electronics	–	–	green/yellow	
3	DO	Switching output 24 V max. 1.5 A Factory setting: Error signal	OUT	logic 24 V	white	Supply line 10 x 0.14 mm ² shielded (one end of the shield must be connected to the control)
4	M0	Reference potential for analog signals	–	–	yellow	
5	AI2	Analog input 2 (or digital input, configuration via software)	IN	analog ± 10 V (digital 24 V)	green	
6	AO2	Analog output 2 Factory setting: Actual swivel angle value, normalized	OUT	analog ± 10 V or 0 ... 20 mA ¹⁾	violet	
7	AI1	Analog input 1 (or digital input, configuration via software)	IN	analog ± 10 V (digital 24 V)	pink	
8	AO1	Analog output 1 Factory setting: Actual pressure value, normalized	OUT	analog ± 10 V or 0 ... 20 mA ¹⁾	red	
9	DI	Digital input (use freely configurable)	IN	logic 24 V	brown	
10	Actual pressure value H	Actual pressure value input (analog input 8): Signal level depends on parameter setting. Factory setting dependent on pos. 9 of the ordering code: 0 ... 10 V (V) or deactivated (F)	IN	analog 0 ... 10 V (freely configurable)	black	
11	Actual pressure value L		–	analog	blue	
n.c.					gray	

¹⁾ If the analog inputs AI1 and AI2 are not used, the analog outputs AO1 and AO2 may be parameterized as current outputs

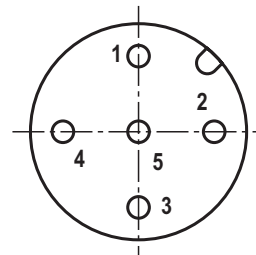
(e.g. if the command value presetting is realized via the field bus).

► **X7E1 and X7E2, connector pin assignment for Ethernet interface (coding D), M12, 4-pole, socket**

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

► **X2M1 and X2M2, analog configurable sensor interface (coding A), M12, 5-pole, socket**

Pin	Assignment
1	+ 24 V voltage output (sensor supply) ²⁾
2	Sensor signal input current (4 ... 20 mA) ³⁾
3	GND
4	Sensor signal input voltage (0 ... 10 V) ³⁾
5	Negative differential amplifier input to pin 4 (optional)



²⁾ Maximum load capacity 50 mA, voltage output same as voltage supply connected to input XH4.

³⁾ Only one signal input per interface configurable

Notices:

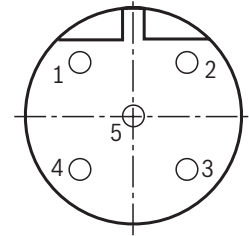
- X2N, reserved (not used)
- X8A, actual swivel angle value input (coding A), M12, 5-pole, socket M12
- Mating connectors, separate order, see page 19.

Electrical connection: VT-DFPF... (with integrated digital electronics)► **XH1, central connection****Assignment of connector or mating connector and cable set**

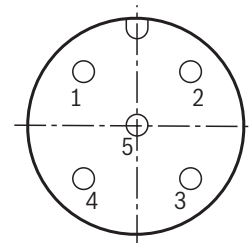
Pin	Signal	Description	Signal direction	Type of signal	Assignment in cable set (accessories)	
A	+ U_B	Voltage supply	IN	24 VDC	brown	Supply line 3 x 1.0 mm ²
B	0 V = L0	Reference potential for the voltage supply	–	–	yellow	
PE	Ground	Grounding connection for the electronics	–	–	green/yellow	
C	–	Do not use	–	–	green	Supply line 10 x 0.14 mm ² shielded (one end of the shield must be connected to the control)
D	AI1	Analog input 1 (freely-configurable)	IN	analog ± 10 V or 0 ... 20 mA	blue	
E	M0	Reference potential for analog signals	–	–	gray	
F	AO1	Analog output 1 (freely-configurable)	OUT	analog ± 10 V or 0 ... 20 mA	white	

► **X7E1 and X7E2, connector pin assignment for Ethernet interface (coding D), M12, 4-pole, socket**

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

► **X2N, analog configurable sensor interface (coding A), M12, 5-pole, socket**

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



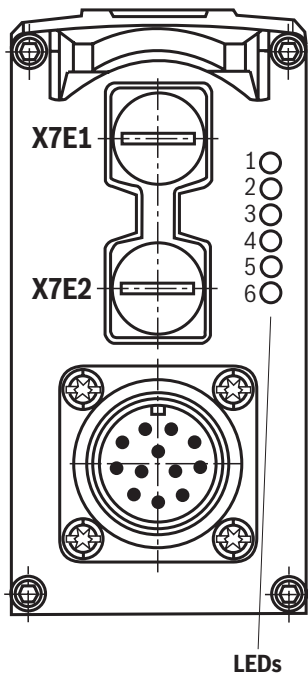
¹⁾ Maximum load capacity 3 x 25 mA, voltage output same as voltage supply connected to input XH1.

**Notices:**

- X8A1, actual swivel angle value input (coding A), M12, 5-pole, socket M12
- Mating connectors, separate order, see page 19.

LED displays: VT-DFPD

LED	Interface	Sercos	EtherNET/IP	EtherCAT	PROFINET RT	POWERLINK	VARAN
1	X7E1	Activity	Activity	Not used	Activity	Not used	Active
2		Link	Link	Link/activity	Link	Link/data activity	Link
3	Electronics module	S	Network status	Network status	Network status	Status/error	Network status
4		Module status	Module status	Module status	Module status	Module status	Module status
5	X7E2	Activity	Activity	Not used	Activity	Not used	Not used
6		Link	Link	Link/activity	Link	Link/data activity	Not used



Displays of the status LEDs

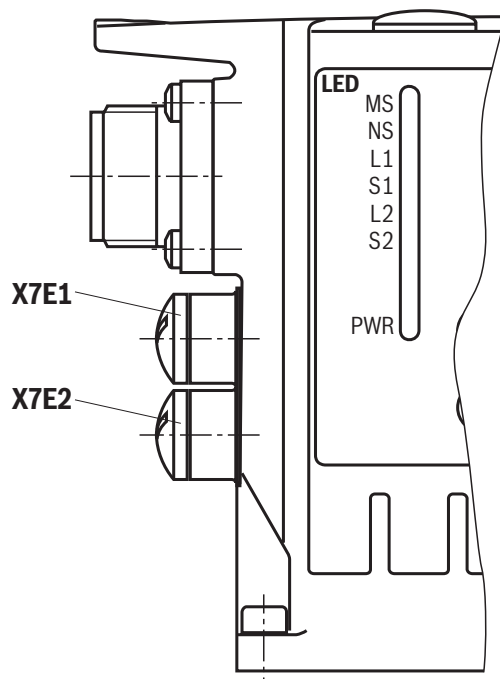
Network status LED (LED 3)	Display status
See application description 30338-FK	

Module status LED (LED 4)	Display status
Off	No voltage supply
Green-red, flashing	Self-test
Green, flashing	Drive ready for operation
Green	In control
Orange, flashing	Warning
Red, flashing	Error

- Notices:**
- For the connection to the M12 sockets, we recommend using self-locking mating connectors
 - LEDs 1, 2, 5 and 6 relate to interfaces "X7E1" and "X7E2"
 - Link: Cable plugged in, connection established (permanently lit)
 - Activity: Data sent/received (flashing)
 - The network status LED 3 (NS) indicates the status of the control communication, see application description 30338-FK.
 - Module status LED 4 relates to the electronics module
 - For a detailed description of the diagnosis LEDs, please refer to the functional description Rexroth HydraulicDrive HDx.

LED displays: VT-DFPF

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

**Displays of the status LEDs**

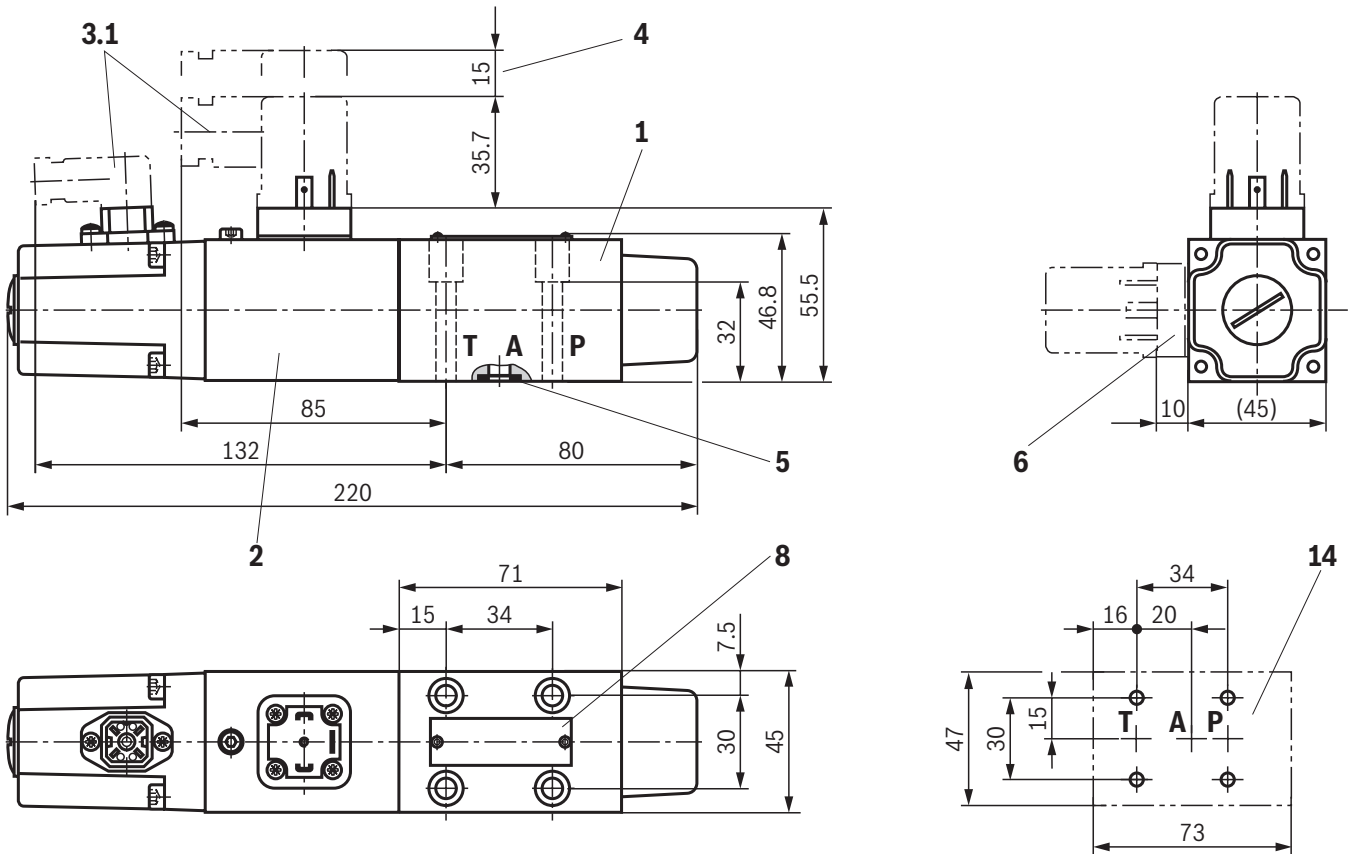
Power LED (LED PWR)	Display status
Off	No voltage supply
Green	Operation

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

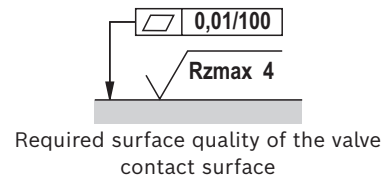
**Notices:**

- 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.

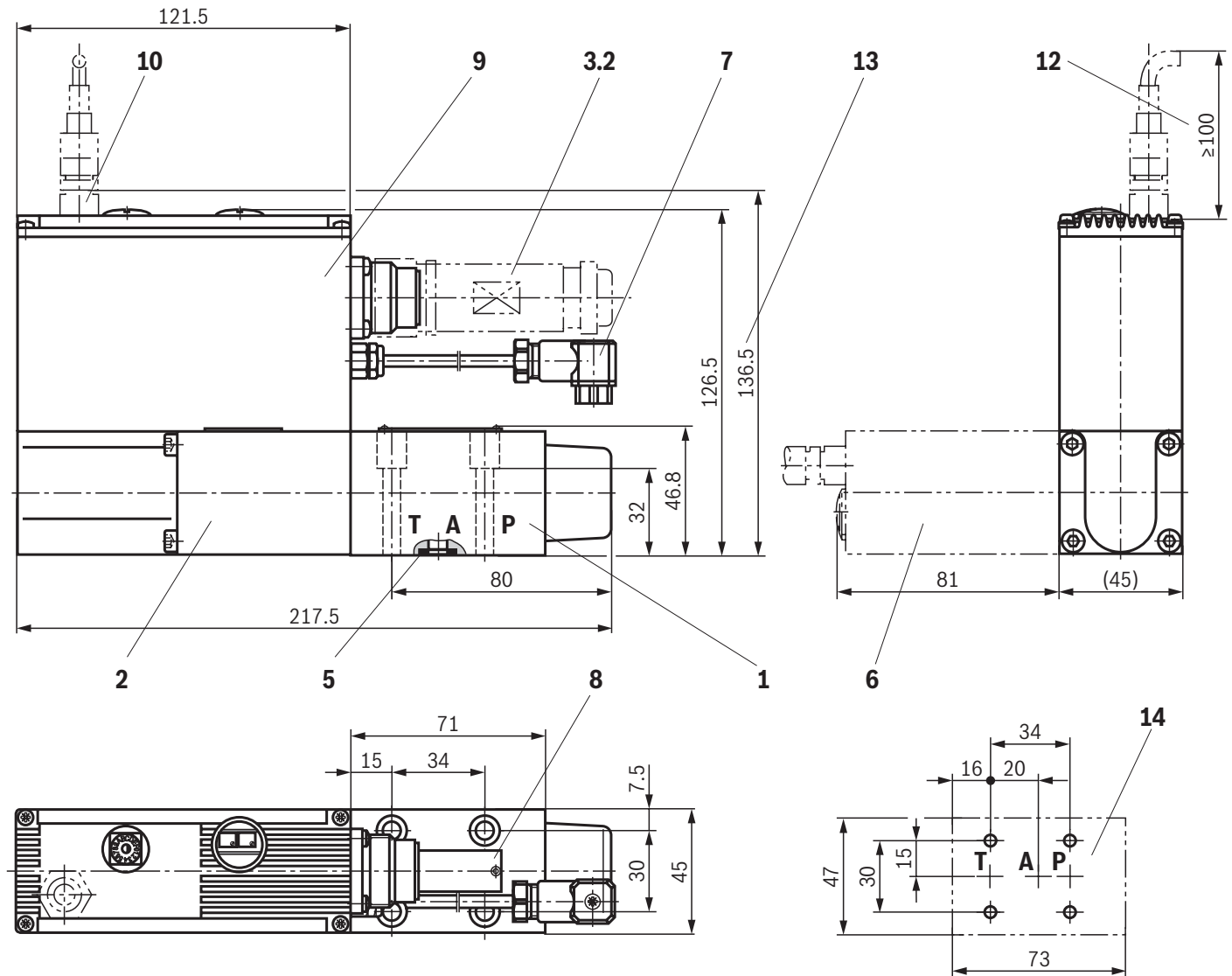
Dimensions: Type VT-DFP
(dimensions in mm)



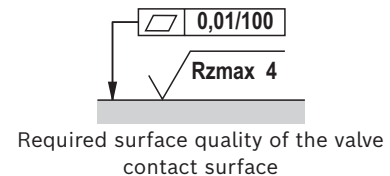
- 1 Valve housing
- 2 Proportional solenoid with position transducer
- 3.1 Mating connectors for solenoid and position transducer (separate order see page 19)
- 4 Space required for removing the mating connector
- 5 Identical seal rings for ports P, A, and T
- 6 Solenoid rotated by 90° (installation orientation "2")
- 8 Name plate
- 14 Machined valve contact surface



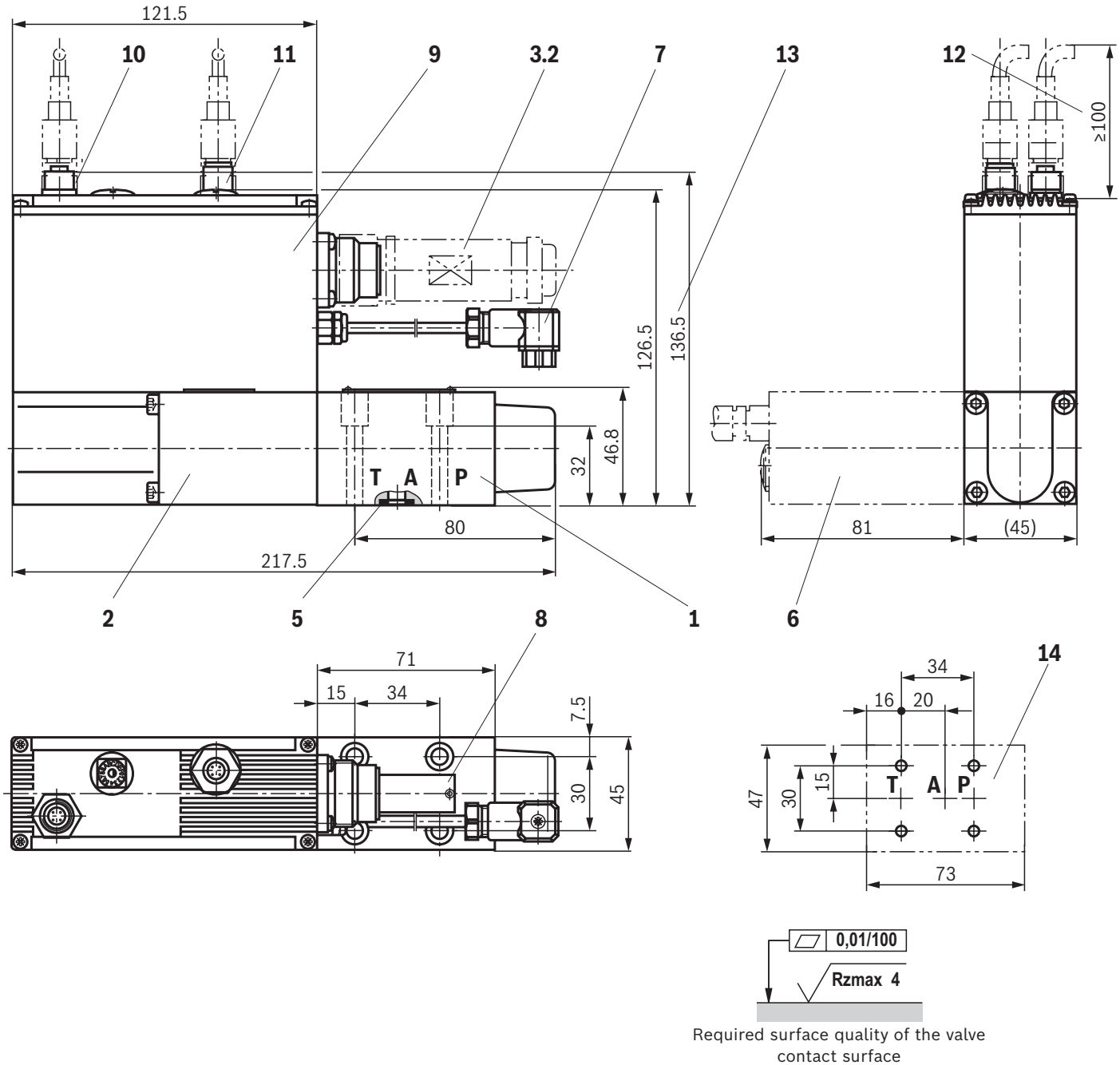
Dimensions: Type VT-DFPE
(dimensions in mm)



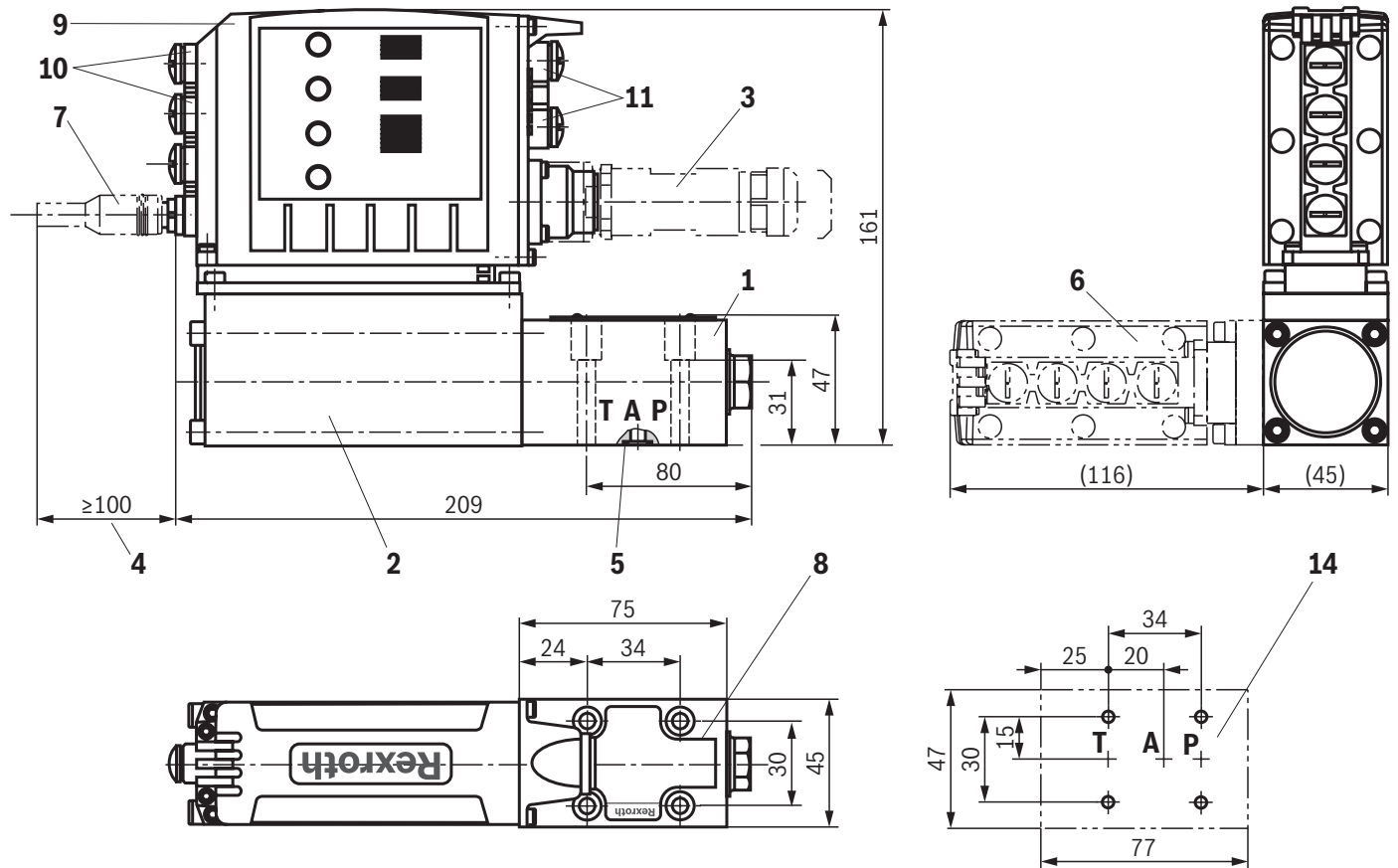
- 1 Valve housing
- 2 Proportional solenoid with position transducer
- 3.2 Mating connector for connector X1 (separate order see page 19)
- 5 Identical seal rings for ports P, A, and T
- 6 Solenoid rotated by 90° (installation orientation "2")
- 7 Connection swivel angle position sensor (rotary angle sensor VT-SWA-1-1X)
- 8 Name plate
- 9 Integrated electronics
- 10 Mating connector X2 for connection of a pressure transducer HM 20-2X/315-F-C13-0,5
- 12 Space required for plug-in connection (HM 20)
- 13 Dimension for version VT-DFPE...F, VT-DFPC and VT-DFPn (connection for HM 20 or CAN bus)
- 14 Machined valve contact surface



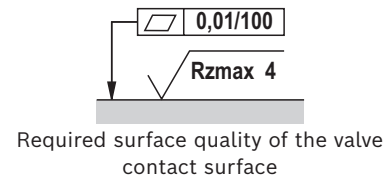
Dimensions: Type VT-DFPC and VT-DFPn
(dimensions in mm)



- | | |
|--|--|
| <ul style="list-style-type: none"> 1 Valve housing 2 Proportional solenoid with position transducer 3.2 Mating connector for connector X1 (separate order see page 19) 5 Identical seal rings for ports P, A, and T 6 Solenoid rotated by 90° (installation orientation "2") 7 Connection swivel angle position sensor (rotary angle sensor VT-SWA-1-1X) 8 Name plate 9 Integrated electronics | <ul style="list-style-type: none"> 10 Mating connector X2 for connection of a pressure transducer HM 20-2X/315-F-C13-0,5 11 Mating connector X3 for the connection to the CAN bus (only with VT-DFPC... and VT-DFPn) 12 Space required for plug-in connection (HM 20) 13 Dimension for version VT-DFPE...F, VT-DFPC and VT-DFPn (connection for HM 20 or CAN bus) 14 Machined valve contact surface 15 Space required for CAN-port (plug-in connection on the customer side) |
|--|--|

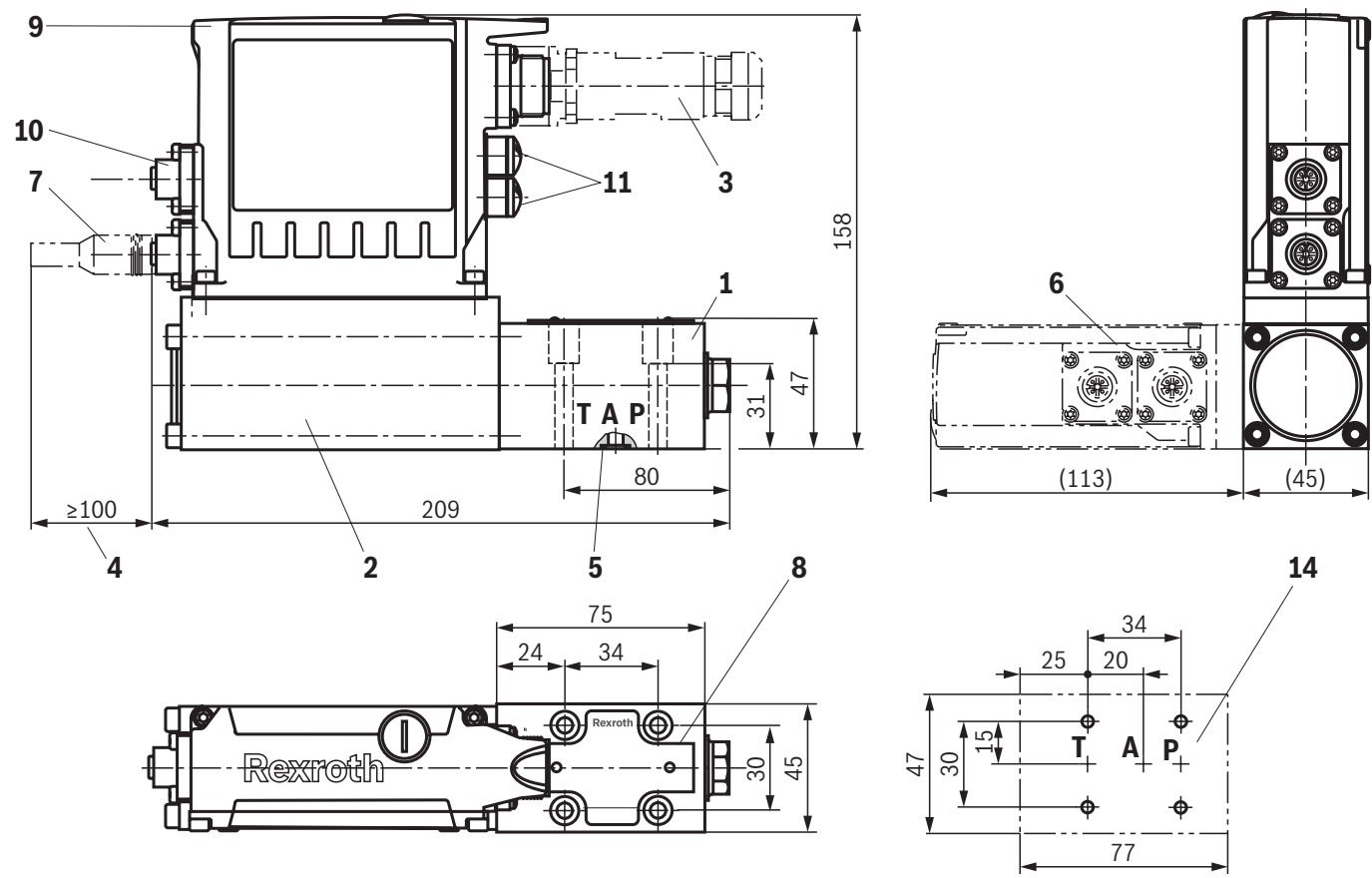
Dimensions: Type VT-DFPD
(dimensions in mm)


- 1 Valve housing
- 2 Proportional solenoid with position transducer
- 3 Mating connector for connector XH4 (separate order see page 19)
- 4 Space required to remove the line connector
- 5 Identical seal rings for ports P, A, and T
- 6 Solenoid rotated by 90° (installation orientation "2")
- 7 Port swivel angle position sensor (rotary angle sensor VT-SWA-1-1X/...-G15...)
- 8 Name plate
- 9 Integrated electronics
- 10 Mating connector X2M1 and X2M2 for the connection to a pressure transducer HM 20
- 11 Connector X7E1 and X7E2 for the connection to the Ethernet interface
- 14 Machined valve contact surface

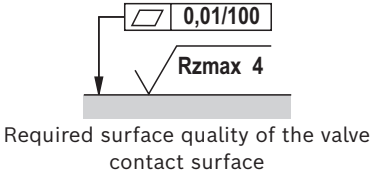

Valve mounting screws (separate order)

	Quantity	Hexagon socket head cap screws	Material number
Without sandwich plate	4	ISO 4762 - M6 x 40 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$; tightening torque $M_A = 9 \text{ Nm} \pm 10\%$	R913051533
With sandwich plate (height 35 mm)	4	ISO 4762 - M6 x 75 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$; tightening torque $M_A = 9 \text{ Nm} \pm 10\%$	R913043778

Dimensions: Type VT-DFPF
(dimensions in mm)



- 1 Valve housing
- 2 Proportional solenoid with position transducer
- 3 Mating connector for connector XH1 (separate order see page 19)
- 4 Space required to remove the line connector
- 5 Identical seal rings for ports P, A, and T
- 6 Solenoid rotated by 90° (installation orientation "2")
- 7 Port swivel angle position sensor (rotary angle sensor VT-SWA-1-1X/...-G15...)
- 8 Name plate
- 9 Integrated electronics
- 10 Mating connector X2N for connection of a pressure transducer HM 20 (only version "0.5-5 V" and "0.1-10 V")
- 11 Connector X7E1 and X7E2 for the connection to the Ethernet interface
- 14 Machined valve contact surface



Valve mounting screws (separate order)

	Quantity	Hexagon socket head cap screws	Material number
Without sandwich plate	4	ISO 4762 - M6 x 40 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B Friction coefficient $\mu_{total} = 0.09 \dots 0.14$; tightening torque $M_A = 9 \text{ Nm} \pm 10\%$	R913051533
With sandwich plate (height 35 mm)	4	ISO 4762 - M6 x 75 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B Friction coefficient $\mu_{total} = 0.09 \dots 0.14$; tightening torque $M_A = 9 \text{ Nm} \pm 10\%$	R913043778

Accessories (separate order)

SYDFE1	Material number	Data sheet
External control electronics VT 5041-3X/1 without power limitation, without swivel angle display	R901236404	30242
External control electronics VT 5041-3X/2 without power limitation, with swivel angle display	R901263598	30242
External control electronics VT 5041-3X/3 with power limitation, with swivel angle display	R901196678	30242
Mating connector for solenoid plug	R901017011	08006
Mating connector for position transducer of valve	R900023126	08006
Mating connector for position transducer of pump	R900013674	–
Pressure transducer HM 20-2X, measurement range 315 bar (4 ... 20 mA)	R901342029	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.1 ... 10 V)	R901342030	30272
Card holder VT 3002-1-2X/32D	R900020153	29928
Compact power supply unit VT-NE32-1X	R900080049	29929
SYDFEE, SYDFEC, SYDFEn	Material number	Data sheet
Mating connector 12-pole for central connection X1 without cable (assembly kit)	R900884671	08006
Mating connector 12-pole for central connection X1 with cable set 2 x 5 m	R900032356	–
Mating connector 12-pole for central connection X1 with cable set 2 x 20 m	R900860399	–
Pressure transducer HM 20-2X, measurement range 315 bar (4 ... 20 mA)	R901342029	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.1 ... 10 V)	R901342030	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.5 ... 5 V) with 0.5 m cable	R901342038	30272
Test device VT-PDFE-1-1X/V0/0	R900757051	29689-B
Compact power supply unit VT-NE32-1X	R900080049	29929
SYDFEC and SYDFEn	Material number	Data sheet
Converter USB serial for laptops without serial interface VT-ZKO-USB/S-1-1X/V0/0	R901066684	–
Cable for the connection of a Win-PED PC (RS232) to the X2 interface, length 3 m	R901156928	–
T connector for the simultaneous connection of a WIN-PED PC (RS232) and use of the pressure transducer at connector X2	R901117164	–
Mating connector for interface X3, M12, straight, can be connected independently, 5-pole, shielded, A-coded, cable diameter 6 ... 8 mm	R901076910	–
Converter USB/CAN bus for the connection of a computer to a CAN bus system	R901071963	–
Cable for the connection of CAN bus / X3 to CAN bus converter (D-Sub)	R901152127	–
SYDFED	Material number	Data sheet
Mating connector 12-pole for central connection XH4 without cable (assembly kit)	R900884671	08006
Mating connector 12-pole for central connection XH4 with cable set 2 x 5 m	R900032356	–
Mating connector 12-pole for central connection XH4 with cable set 2 x 20 m	R900860399	–
Pressure transducer HM 20-2X, measurement range 315 bar (4 ... 20 mA)	R901342029	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.1 ... 10 V)	R901342030	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.5 ... 5 V) with 0.5 m cable	R901342038	30272
Test device VT-PDFE-1-1X/V0/0	R900757051	29689-B
Ethernet connection cable M12 to RJ45 (connection X7E1 & X7E2), additional information type designation RKB0044/003,0	R911343806	
SYDFEF	Material number	Data sheet
Mating connector 6-pole for central connection XH1 without cable (assembly kit)	R900021267	08006
Mating connector 6-pole for central connection XH1 with cable set 3 m	R901420483	08006
Mating connector 6-pole for central connection XH1 with cable set 5 m	R901420491	08006
Mating connector 6-pole for central connection XH1 with cable set 10 m	R901420496	08006
Pressure transducer HM 20-2X, measurement range 315 bar (4 ... 20 mA)	R901342029	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.1 ... 10 V)	R901342030	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.5 ... 5 V) with 0.5 m cable	R901342038	30272
Ethernet connection cable M12 to RJ45 (connection X7E1 & X7E2), additional information type designation RKB0044/003,0	R911343806	–

Project planning information

- ▶ Always shield command and actual value cables.
- ▶ The distance to aerial lines or radios must be at least 1 m.
- ▶ Do not lay signal lines close to power lines.
- ▶ For amending notices on the SY(H)DFE control system, see the operating instructions (see "Further information").

Environmental compatibility for the areas EMC, climate and mechanical load

Type SY(H)DFEE with VT-DFPE

Mechanical load	
DIN EN 60068-2-6: 1994, vibrations, sine-shaped	10 cycles / 5 ... 2000 ... 5 Hz / $\Delta f = 1$ oct./min. / max. 10 g
IEC 68-2-36: 1973, vibrations, random (broadband noise)	20 ... 2000 Hz / 10 g _{RMS} / 0.05 g ² /Hz / 30 min per axis
DIN EN 60068-2-27: 1993 transport shock	Half-sine 15 g / 11 ms, 3 x each in positive and in negative direction per axis
Electro-magnetic compatibility (EMC)	Testing according to EN 61000-6-2:2001, VDE 0839 Part 6-2
ESD – EN 61000-4-2:1995, +A1:1998 +A2:2000, IEC 1000-4-2	Air discharge SG 4, BWK A Contact discharge SG 4, BWK A
Burst - prEN 61000-4-4:2004, IEC 1000-4-4	Repetition rate: 5 KHz / 100 KHz Ub: SG 3 , BWK A Data line: SG 4 , BWK A
Surge – EN 61000-4-5:1995, +A1:2001, IEC 1000-4-5	Ub: SG 1/ BWK A
HF fields – EN 61000-4-6:1996 + A1:2001, IEC 1000-4-6 (conducted)	Ub: SG 3/ BWK A

Type SY(H)DFEC / SY(H)DFEn with VT-DFPC/n

Mechanical load	Test according to EN 60068-2 / IEC 68-2 / DIN 40046
prEN 60068-2-6:1994, vibrations, sine-sine-shaped	10 cycles / 5 ... 2000 ... 5 Hz / $\Delta f = 1$ oct./min. / max. 10 g
IEC 68-2-36: 1973 / DIN 40046-24: 1977, vibrations, random (broadband noise)	20 ... 2000 Hz / 10 g _{RMS} / 0.05 g ² /Hz / 30 min per axis
EN 60068-2-27:1993, shocking	Half-sine 15 g / 11 ms, 3 x each in positive and in negative direction per axis
Extended testing according to MIL-STD-820 D: Vibrations, random	10 ... 89 Hz, 0.04 g ² /Hz 89 ... 300 Hz, +4 dB / octave 300 ... 1000 Hz, 0.2 g ² /Hz 1000 ... 2000 Hz, -6 dB / octave 60 min testing time per axis
Extended testing according to MIL-STD-820 D: Shocking	Half-sine 60 g / 6 ms, 1 x each in positive and in negative direction per axis
Electro-magnetic compatibility (EMC)	
Interference resistance	Testing according to EN 61000-6-2:2001, VDE 0839 Part 6-2
ESD – EN 61000-4-2:1995, +A1:1998 +A2:2000, IEC 1000-4-2	Air discharge SG 4, BWK A Contact discharge SG 4 / BWK A
Burst - EN 61000-4-4:1995, +A1:2001 +A2:2001, IEC 1000-4-4	Ub: SG 3 / BWK B Data line: SG 4 / BWK B
Surge – EN 61000-4-5:1995, +A1:2001, IEC 1000-4-5	Ub: SG 1 / BWK A
HF fields – EN 61000-4-6:1996 , +A1:2001, IEC 1000-4-6 (conducted)	Ub: SG 3 / BWK A
Interference emission	Testing according to EN 61000-6-3:2001, VDE 0839 Part 6-3
EN 55022:1998, emission, radio interference suppression voltage	Class B / 0.15 ... 30 MHz when using the Rexroth VT-NE32 power supply unit

Environmental compatibility for the areas EMC, climate and mechanical load

Type SY(H)DFED with VT-DFPD

Mechanical load	Test according to EN 60068-2 / IEC 68-2 / DIN 40046
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 ... 2000 Hz / 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
Electro-magnetic compatibility (EMC)	
Interference resistance	Testing according to EN 61000-6-2: 2005 and EN 61000-6-3: 2007 + A1/2011
ESD – EN 61000-4-2: 2009	Air discharge SG 3 / BWK B Contact discharge SG 2 / BWK B
Burst – EN 61000-4-4: 2004, + A1: 2010	Repetition rate: 5 kHz / 100 kHz Ub: SG 3 / BWK B Data line: SG 4 / BWK B
Surge – EN 61000-4-5: 2006	Ub: SG 1 / BWK B
HF fields – EN 61000-4-6: 2009 (conducted)	with BWK A / SG 3
Interference emission	Test according to basic technical standard EN 61000-6-3: 2007 + A1:2011 and EN 61000-6-4: 2007 + A1:2011
Radio interference voltage – EN 55016-2-1: 2009, + A1: 2011	0.15 ... 30 MHz, class A, EN 55011
Protection class according to EN 60529 (pump including pilot control valve)	IP65 (if suitable and correctly mounted mating connectors are used)

Type SY(H)DFED with VT-DFPF

Mechanical load	
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 ... 2000 Hz / 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
Electro-magnetic compatibility (EMC)	
Interference resistance	Testing according to EN 61000-6-2: 2005 and EN 61000-6-3: 2007 + A1/2011
ESD – EN 61000-4-2: 2009	Air discharge SG 3 / BWK B Contact discharge SG 2 / BWK B
HF fields – EN 61000-4-3: 2006 +A1:2008, +A2:2010 (freely beamed)	80 ... 1000 MHz: SG 3 / BWK A 1.4 GHz ... 2.0 GHz: SG 2 / BWK A 2 GHz ... 2.7 GHz: SG 1 / BWK A
Burst – EN 61000-4-4:2012	Repetition rate: 5 kHz / 100 kHz Ub: SG 3 / BWK B Data line: SG 3 / BWK B
Surge – EN 61000-4-5:2014	Ub: SG 1 / BWK A Data line: SG 2 / BWK B
HF fields - EN 61000-4-6:2014 (conducted)	SG 3 / BWK A
Magnetic fields - EN 61000-4-8:2010"	SG 4 / BWK A
Interference emission	Testing according to EN 61000-6-3:2007, + A1: 2011
EN 55016: 2009, emission, radio interference suppression voltage	Class A / 0.15 ... 30 MHz
Protection class according to EN 60529 (pump including pilot control valve)	IP65 (if suitable and correctly mounted mating connectors are used)

SG = severity level; BWK = evaluation criterion