RE 29016/06.10

Replaces: 09.09

3/3 proportional directional valves direct operated, with electrical position feedback as pilot valves for control systems SY(H)DFE.

Type VT-DFP.

Component series 2X Maximum operating pressure 350 bar



Type VT-DFP-.-2X/... with mating connector (separate order)

Type VT-DFPE-.-2X/... with integrated electronics

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Features

- Pilot valve for the pressure and flow control system SY(H)DFE.
- Actuation by means of a proportional solenoid with electrical feedback
- Control electronics:
 - VT-DFP (for SY(H)DFE1) \rightarrow 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

1/12

11 Further details in the plain text e.g. SO variant

= Available

- = Not available

VT-DFPE	Ord	ering cod	de																
VT-DFPE		VT-DFP		Α	Τ-	2X	1	G24	K0	/	0				1	1	V	_	*
VT-DFPC							1			1		Δ	0	C	1			_	*
VT-DFPN				+	_		1			-		_				_			*
Pilot valve for external electronics				+	+-		/			1					- 1			-	*
Series Pilot valve for external electronics VT-DFP Pilot valve with integrated analog electronics VT-DFP Pilot valve with integrated digital electronics VT-DFPP Pilot valve with integrated digital electronics VT-DFPP Pilot valve with integrated digital electronics, variable-speed VT-DFPP VT-D	'			+	+-		/		1	/		_		+	/	_	•	-	
Pilot valve for external electronics Pilot valve with integrated analog electronics		ı				3		4) 5		ь	/	8	9			10		11
Pilot valve with integrated analog electronics VT-DFPE Pilot valve with integrated digital electronics VT-DFPD Spool design VT-DFPD Spool design Standard (not for HFC fluids) A 2-groove spool (not or HFC fluids) B 4-groove spool (not for new applications) B 4-groove spool (e.g. for HFC fluids) C C C STANDARD SPOOL (e.g. for HFC fluids) C C C STANDARD SPOOL (e.g. for HFC fluids) C C C STANDARD SPOOL (e.g. for HFC fluids) C C STANDARD SPOOL (e.g. for HFC fluids) C C STANDARD SPOOL (e.g. for HFC fluids) C C C STANDARD SPOOL (e.g. for HFC fluids) SPOOL (e.g. f																			
Pilot valve with integrated digital electronics VT-DFPC Pilot valve with integrated digital electronics, variable-speed VT-DFPn Standard (not for HFC fluids) A A B C D C C C C C C C C																			
Pilot valve with integrated digital electronics, variable-speed Standard (not for HFC fluids) A	1		<u> </u>																
Spool design Standard (not for HFC fluids) A 2-groove spool (not for new applications) B 4-groove spool (e.g. for HFC fluids) C C																			
Standard (not for HFC fluids) B 2 g-groove spool (not for new applications) B 4-groove spool (e.g. for HFC fluids) C 3 Component series 2x 4 DC voltage 24V G24 5 Connector (without mating connector) Installation orientation plug-in connector (VT-DFP) and/or integrated electronics (also see page 3) Radially to the pump axis 0 Folded 90° in the direction of the subplate with counterclockwise direction of totation of the pump 1 Folded 90° in the direction of the subplate with clockwise direction of rotation of the pump 2		Pilot valve	WILLI ILL	egrated	aigii	ai eiecir	onic	s, variab	ie-spee	u								V	I-DFPN
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8 VT-DFPE Standard electronics with leakage oil compensation Standard electronics without leakage oil compensation Standard electronics without leakage oil compensation Standard Stand			400011	ю.у, ор														(v	vithout)
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VT-DFPC VT-DFPn Voltage input 010 V (standard) X1 V Voltage input 110 V X1 E Voltage input 0.55 V (standard) 2) X2 F	_						de	1/											
V1-DFPII Voltage input 0.55 V (standard) ²⁾ X2 F	9	VT_DEDC	voltage input u to v (standard)																
		VT_DEPn					-da	A) 2)											
10 FKM seals suitable for mineral oils (HL, HLP) according to DIN 51524 and HFC fluids 3) V	voltage input 0.55 v (standard)								Г										
	10	FKM seals	suitable	e for mi	neral	oils (HL	, HL	P) accor	ding to	DIN :	51524 a	and HFC	fluids 3)						٧

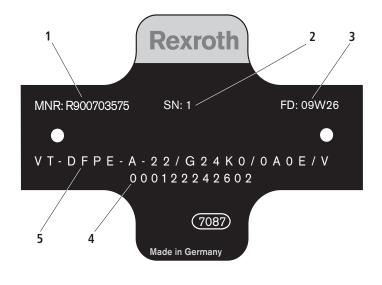
Standard program

Ordering code

Note on feature 6: Installation orientation of the valve electronics								
Direction of rotation clockwise, installation orientation 0	Direction of rotation clockwise, installation orientation 2	Direction of rotation counter- clockwise, installation orienta- tion 0	Direction of rotation counter- clockwise, installation orien- tation 1					

- 1) Connector dependent on the valve type (see technical data and electronic connection)
- ²⁾ With the SYDFEn control system with analog interfaces, the plug-in connector X2 cannot be used as actual pressure value input. Thus, a separate pressure transducer has to be used and connected to plug-in connector X1 in this case.
- 3) Only in connection with SYHDFE and spool design C (feature 2)

Example of nameplate



- 1 Material number
- 2 Serial number
- 3 Date of manufacture
- 4 Fabrication order number
- 5 Type designation

Ordering code: Accessories

Version 4/2009, enquire availability

Accessories for VT-DFP	Material number	Data sheet
Mating connector for solenoid plug	R901017011	
Mating connector for position transducer of valve	R900023126	
Compact power supply unit VT-NE32-1X	R900080049	RE 29929

Accessories for VT-DFPE, VT-DFPC and VT-DFPn	Material number	Data sheet
Mating connector 12-pin for central connection X1 without cable (construction kit)	R900884671	
Mating connector 12-pin for central connection X1 with cable set 2 x 5 m	R900032356	
Mating connector 12-pin for central connection X1 with cable set 2 x 20 m	R900860399	
Test device VT-PDFE-1-1X/V0/0 for SY(H)DFEE and SY(H)DFEC	R900757051	RE 29689-B
Compact power supply unit VT-NE32-1X	R900080049	RE 29929

Accessories only for VT-DFPC and VT-DFPn (serial access)	Material number	Data sheet
Converter USB serial for laptops without serial interface VT-ZKO-USB/S-1-1X/V0/0	R901066684	
Cable for connecting 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 input at plug-in connector X2	R901117164	

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

general							
Туре			VT-DFP	VT-DFPE	VT-DFPC	VT-DFPn	
Storage temperature range	ge	°C	− 20 +70	0 70	0 70	0 70	
Ambient temperature ran	ge	°C	<i>−</i> 20 +60	0 60	0 50	0 50	
Weight		kg	1.96	2.25	2.25	2.25	
hydraulic Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524; HFC fluid only in connection with SYHDFE control system and C spool design				
Hydraulic fluid temperature	range	°C		-20 .	+70		
Viscosity range		mm²/s	20 380				
Maximum admissible degree of contamination of the hydraulic fluid according to ISO 4406			Class	18/16/13 (for pa	rticle size ≤ 4/6/	14 μm)	
Operating pressure	Port A, P	bar		3!	50		
	Port T	bar		1(00		

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

electric	al					
Туре			VT-DFP	VT-DFPE	VT-DFPC	VT-DFPn
Control			External control electronics VT 5041-3X	Integrated, analog	Integrated, digital	Integrated, digital
Operating	yvoltage	U_{B}		24 VDC +40 % -5 %	24 VDC +40 % -5 %	24 VDC +40 % -5 %
Operating	g range (short-time operation)				I.	I
	Upper limit value Lower limit value	$U_{\rm B}(t)_{\rm max}$ $U_{\rm B}(t)_{\rm min}$			35 V 21 V	
Current c	onsumption (in static control operation)	B\\\^\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				
	Rated current Maximum current	I _{Nominal}			0.6 A 1.25 A	
	Actual pressure value input X1; pin 10 and 11	U or I	See data sheet RE 30242	Determi- nation by means of type code	020 mA; 01 05 V; 0.59	erizable: 420 mA; 0 V; 5 V; 0.110 V;
Inputs	Analog current inputs, load	$R_{\rm B}$		100 Ω	100 Ω	100 Ω
	Analog voltage inputs	$R_{\rm E}$		≥ 50 kΩ	≥ 100 kΩ	≥ 100 kΩ
	Digital inputs	Logic 0 Logic 1		≤ 0.6 V ≥ 21 V	≤ 8 V ≥ 14 V	≤ 8 V ≥ 14 V
	P _{actual} / U _{OUT} 1 ¹⁾	$U_{\rm A}$		010 V 1.5 mA	±10 V 2 mA	±10 V 2 mA
Outputs	$\alpha_{\rm actual}$ / $U_{\rm OUT}$ 2 ²⁾	$U_{\rm A}$		±10 V 1.5 mA	±10 V 2 mA	±10 V 2 mA
	Digital outputs	Logic 0 Logic 1		$U_{\rm a} \ge U_{\rm B} - 5$	$U_{\rm a}$ < 1 V V; 10 mA (short	-circuit-proof)
Solenoid	coil resistance	Ω	2.1 3.2			
Coil resis	tance position transducer at 20 °C					
Between port 1 and 2 Ω		Approx. 113				
	Between port 3 and 4	Ω	Approx. 101			
Electrical	connection		See page 6	See page 7	See page 8	See page 9
Protection	class according to EN 60529		IP 65 with mounted and locked plug-in connectors			

Note:

Information on environment simulation testing for the areas EMC (electro-magnetic compatibility), climate and mechanical load, see RE 30030-U (declaration on environmental compatibility).

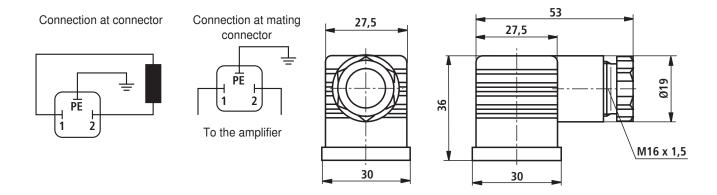
^{1, 2)} With VT-DFPC and VT-DFPn, the outputs are parameterizable, condition as supplied see pages 8/9

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

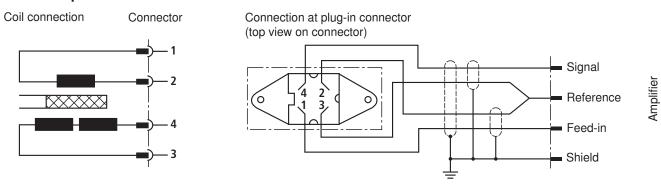
Details on the electrical connection to the VT 5041-3X amplifier are described in data sheet RE 30242.

Solenoid

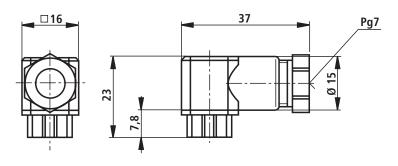
Mating connector 3-pole Z4 M SW according to DIN EN 175301-803 (separate order see page 4)



Inductive position transducer



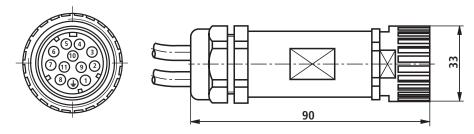
Mating connector 4-pole Pg7-G4W1F/Pg7 SW (separate order see page 4)



Electrical connection: VT-DFPE... (with integrated analog electronics)

X1: Central connection

Mating connector according to EN 175201-804 (12-pin), ordering code see section Accessories on page 4



Device of connector allocation or mating connector and cable set

Pin	Signal	Description	Signal direction	Type of signal	Allocation set (access	in the cable sories)
1	$+U_{\rm B}$	Voltage supply	IN	24 V DC	1	Completing
2	0 V = L0	Reference potential for the voltage supply	-		2	Supply line 3 x 1.0 mm ²
PE	Earth	Earthing connection for the electronics	-		Green/yellow	3 X 1.0 IIIIII
3	Failure	Signals failures, e.g. cable break command / actual values, controller monitoring (logic 0 = error)	OUT	Logic 24 V	White	
4	M0	Reference potential for analog signals	-		Yellow	
5	α _{Command}	Swivel angle command value	IN	Analog ±10 V	Green	
6	α _{Actual}	Actual swivel angle value normalized	OUT	Analog ±10 V	Violet	Supply line
7	P _{Command}	Pressure command value	IN	Analog 010 V	Pink	10 x 0.14 mm²
8	p_{Actual}	Actual pressure value normalized	OUT	Analog 010 V $^{1)}$	Red	shielded (one end of the
9		Function depends on electronics type and additional function, see below			Brown	shield must be connected to
10	Actual pressure value H	Actual pressure value input: Signal level depends on feature 14 in the type code.	IN	Analog	Black	the control!)
11	Actual pressure value L	With type "F" (0.55 V) reserved	-	Analog	Blue	
n.c.					Gray	

Functions at pin 9

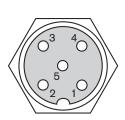
Pin	Additional function	Function in dependence on feature 7 of the ordering code (see page 2)	Signal direction	Type of signal
	A	Switching to different oil volume adjustment (Switch T_D)	IN	Logic 24 V
9	B	Power limitation active	OUT	Logic 24 V
9	C	Command value of power limitation	IN	Analog 010 V
	D	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 16 (mating connector M12)

Pin	Signal HM 16	Pin	
1	OUT, $+U_{\rm B}$	2	n.c.
3	Reference L0		
4	IN, analog, 0.5 to 5 V DC	5	n.c.

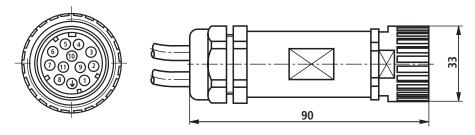
Top view mating connector



Electrical connection: VT-DFPC... (with integrated digital electronics)

X1: Central connection

Mating connector according to EN 175201-804 (12-pin), ordering code see section Accessories on page 4

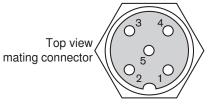


Device of connector allocation or mating connector and cable set

Pin	Signal	Description	Signal direction	Type of signal	Allocation set (access	in the cable sories)
1	$+U_{\rm B}$	Voltage supply	IN	24 V DC	1	Cupply line
2	0 V = L0	Reference potential for the voltage supply	-		2	Supply line 3 x 1.0 mm ²
PE	Earth	Earthing connection for the electronics	-		Green/yellow	3 x 1.0 111111
3	Failure	Signals failures, e.g. cable break command / actual values, controller monitoring (logic 0 = error)	OUT	Logic 24 V	White	
4	M0	Reference potential for analog signals	-		Yellow	
5	Al2	Analog input AI2 Standard: Swivel angle command value	IN	Analog ±10 V	Green	
6	U _{OUT2}	Analog output Standard: Actual swivel angle value normalized	OUT	Analog ±10 V	Violet	Supply line
7	Al1	Analog input AI1 Standard: Pressure command value	IN	Analog 010 V	Pink	shielded (one end of the
8	U _{OUT1}	Analog output Standard: Actual pressure value normalized	OUT	Analog ±10 V	Red	shield must be connected to
9	DI1	Digital input DI1	IN	Logic 24 V	Brown	the control!)
10	Actual pressure value H	Actual pressure value input: Signal level depends	IN	Analog	Black	
11	Actual pressure value L	on feature 14 in the type code.	-	Analog	Blue	
n.c.					Gray	

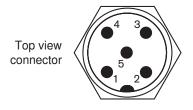
X2: Connection of pressure transducer HM 16 and serial interface RS232 (mating connector M12)

Pin	Signal HM 16	Pin	Signal RS232
1	OUT, $+U_{\rm B}$	2	RxD
3	Reference L0		
4	IN, analog, 0.5 to 5 V DC	5	TxD



X3: Connection CAN bus and digital input 2 (DI2) (connector M12)

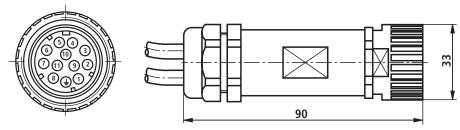
Pin	Signal input	Pin	Signal CAN
1	n.c.	3	CAN GND
2	IN, digital IN2 (DI2)	4	CAN-HIGH
		5	CAN-LOW



Electrical connection: VT-DFPn... (with integrated digital electronics, variable-speed)

X1: Central connection

Mating connector according to EN 175201-804 (12-pin), ordering code see section Accessories on page 4

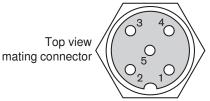


Device of connector allocation or mating connector and cable set

Pin	Signal	Description	Signal direction	Type of signal	Allocation set (access	in the cable sories)
1	$+U_{\rm B}$	Voltage supply	IN	24 V DC	1	Cupply line
2	0 V = L0	Reference potential for the voltage supply	-		2	Supply line 3 x 1.0 mm ²
PE	Earth	Earthing connection for the electronics	-		Green/yellow	3 x 1.0 111111
3	Failure	Signals failures, e.g. cable break command / actual values, controller monitoring (logic 0 = error)	OUT	Logic 24 V	White	
4	M0	Reference potential for analog signals	-		Yellow	
5	Al2	Analog input AI2 Standard: Swivel angle command value	IN	Analog ±10 V	Green	
6	U _{OUT2}	Analog output Standard: Actual swivel angle value normalized	OUT	Analog ±10 V	Violet	Supply line
7	Al1	Analog input AI1 Standard: Pressure command value	IN	Analog 010 V	Pink	10 x 0.14 mm ² shielded (one
8	U _{OUT1}	Analog output Standard: Speed command value	OUT	Analog ±10 V	Red	end of the shield must be connected to
9	DI1	Digital input DI1 Standard: Synchronization bit DI1	IN	Logic 24 V	Brown	the control!)
10	Actual pressure value H	Actual pressure value input: Signal level depends	IN	Analog	Black	
11	Actual pressure value L	on feature 14 in the type code.	-	Analog	Blue	
n.c.					Gray	

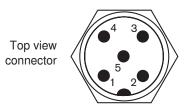
X2: Serial interface RS232 and a selectable digital input S1/pressure transducer input for HM 16 (mating connector M12)

Pin	Signal input	Pin	Signal RS232
1	OUT, $+U_{\rm B}$	2	RxD
3	Reference L0		
4	Analog input 0.55 V for HM 16 Digital input 0 V low, 10 V high (max. 12 V) Standard: Variable-speed operation ON, S1	5	TxD



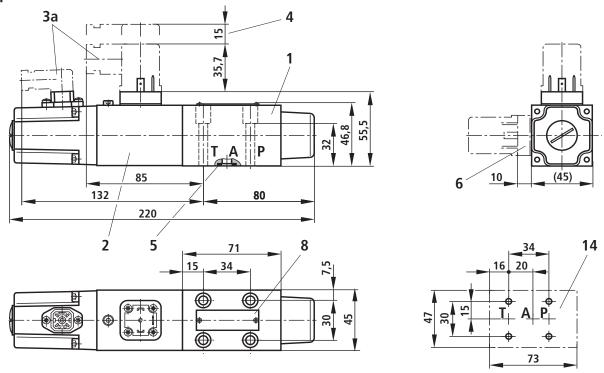
X3: Connection CAN bus and digital input 2 (DI2) (connector M12)

Pin	Signal input	Pin	Signal CAN
1	n.c.	3	CAN GND
2	IN, digital IN2 (DI2) Standard: Start Teach-In, S2	4	CAN-HIGH
		5	CAN-LOW

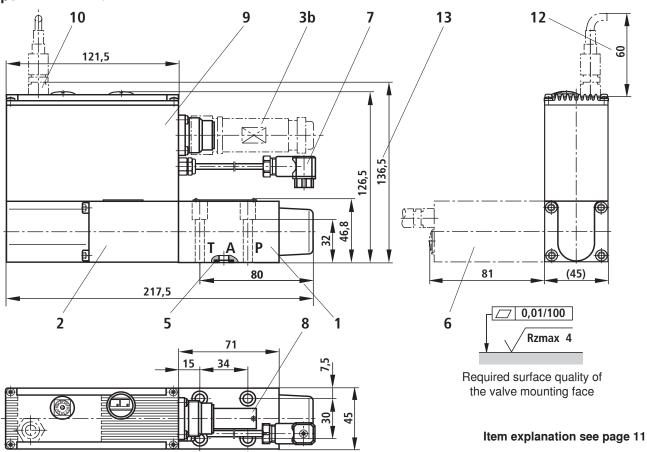


Unit dimensions (dimensions in mm)

Type VT-DFP...2X/...

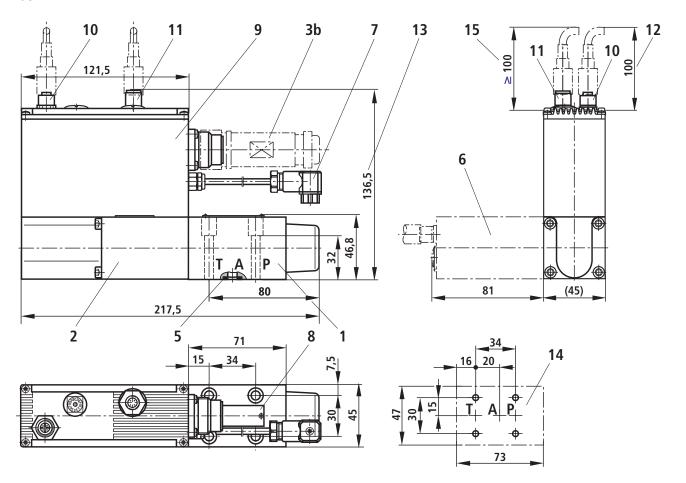


Type VT-DFP...2X/...



Unit dimensions (dimensions in mm)

Type VT-DFPC...2X/... and VT-DFPn...2X/...



- Valve housing
- 2 Proportional solenoid with position transducer
- **3a** Mating connector for solenoid and position transducer (separate order see page 4)
- **3b** Mating connector for connector X1 (separate order see page 4)
- 4 Space required for removing the mating connector
- 5 Identical seal rings for ports P, A, and T
- 6 Solenoid rotated by 90° (attachment direction "2")
- 7 Connection swivel angle position sensor (rotary angle sensor VT-SWA-1-1X)
- 8 Nameplate
- 9 Integrated electronics
- Mating connector X2 for connecting a pressure transducer HM 16 (only with VT-DFPE./...F, VT-DFPC... and VT-DFPn)
- Mating connector X3 for connecting the CAN bus (only with VT-DFPC... and VT-DFPn)
- 12 Space required for plug-in connection (HM 16)

- 13 Dimension for version VT-DFPE...F, VT-DFPC and VT-DFPn (connection for HM 16 or CAN bus)
- 14 Machined valve contact surface
- 15 Space required for CAN connection (plug-in connection on customer side)

Valve mounting screws for all types:

4 hexagon socket head cap screw ISO4762-M6X40-10.9-flZn-240h-L, friction coefficient $\mu_{Total} = 0.09$ to 0.14 according to VDA 235-101, tightening torque $M_{\rm A} = 7$ Nm, material number: **R913000058**

Project planning information

Supplementary notes on the SY(H)DFE control systems can be found in the operating instructions (See section "Further information about this control system" on this page.).

More information on control systems SY(H)DFE

Operating instructions for SY(H)DFE1	RE 30011-B
Operating instructions for SY(H)DFEE	RE 30012-B
Operating instructions for SY(H)DFEC	RE 30027-B
Operating instructions for SY(H)DFEn (in preparation)	RE 30014-B
Data sheet for SYDFE2X	RE 30030
Data sheet for SYDFE3X	RE 30630
Data sheet for SYHDFE1X	RE 30035
Data sheet for external control electronics VT 5041-3X for SYDFE1	RE 30242
Data sheet for swivel angle sensor VT-SWA-1-1X	RE 30268
Data sheet for pressure transducer HM 12-1X and HM 13-1X	RE 29933
Data sheet for pressure transducer HM 16-1X	RE 30266
Data sheet for pressure transducer HM 17-1X	RE 30269
Operating instructions for test device VT-PDFE	RE 29689-B
Current information is also available on the Internet under the address http://www.http://www.boschrexroth.de/sydfe (German).	w.boschrexroth.com/sydfe (English) or

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