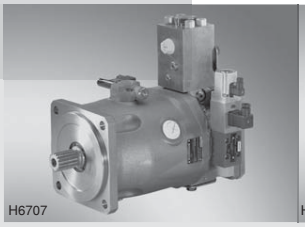
Pressure and flow control system

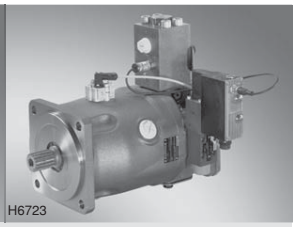
RE 30630/04.13 1/28
Replaces: 12.11

Type SYDFE1-3X, SYDFEE-3X, SYDFEC-3X [1)]

With axial piston variable displacement pump A10VSO.../32
Size 71 to 180
Component series 3X
Maximum operating pressure 280 bar



SYDFE1-3X...



SYDFEE-3X...

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Features

An SYDFE.-3X control system is used for the electro-hydraulic control of swivel angle, pressure and power (partially optional, see pages 4 and 7) of an axial piston variable displacement pump.

The control system consists of the following components:

- Axial piston variable displacement pump A10VSO.../32
- VT-DFP.-2X proportional valve as pilot valve including inductive position transducer for valve position detecting. With versions SYDFEE and SYDFEC, the pilot valve contains electronics for system control.
- For SYDFE1: External control electronics VT 5041-3X for performing all electric functions necessary for the SYDFE1-3X (separate order)
- Position transducer for detecting the swivel angle
- Pressure transducer with suitable signal level and dynamics (optionally HM 16, otherwise separate order)
- Preload valve with integrated pressure relief function SYDZ (optional)

[1)] Type SYDFEn-3X is described in data sheet 62241.

Ordering code: Pump of the SYDFE control system

SYDFE.-3X/	071	R	-	V	R	B	22	U99	-	0000	-	...
1	2	3		4	5	6	7	8		9		See following pages

Series

1	Control system for external analog electronics (separate order)	**SYDFE1-3X**
	Control system with internal analog electronics	**SYDFEE-3X**
	Control system with internal digital electronics	**SYDFEC-3X**
	Variable-speed control system Sytronix DFEn 5000, see data sheet 62241	**SYDFEn-3X**

	Size	071	100	140	180	
2	Displacement cm^3	71	100	140	180	
	Direction of rotation looking at the drive shaft					
3	Clockwise	●	●	●	●	**R**
	Hydraulic fluid					
4	Mineral oil according to DIN 51524 (HL/HLP)	●	●	●	●	**V**
	Drive shaft variant					
5	Splined shaft profile SAE J 744 [1]	-	1½"	1¾"	1¾"	**S**
	Splined shaft profile SAE J 744 (higher through-drive torque)	1¼"	-	-	-	**R**
	Connection flange according to ISO 30319-2 (4-hole)					
6	ISO 4-hole	●	●	●	●	**B**
	Subplate design					
7	Without shock and vibration absorption (pre-compression volume, PCV)	●	●	●	-	**22**
	With shock and vibration absorption (pre-compression volume, PCV; not with base pump variant 0487 or 0541)	●	●	●	●	**32**
	Through-drive					
8	Universal through-drive U99 closed operationally safe with end cover in the factory; for components for the adaptation of more pump stages, see the table on page 21	●	●	●	●	**U99**
	Base pump variant					
9	Standard (internal pilot oil)	●	●	●	●	**0000**
	External supply	●	●	- [2]	●	**0479**
	External supply + regenerative operation	●	●	●	-	**0487**
	Regenerative operation without external supply	●	●	- [2]	-	**0541**

● = Available - = Not available Preferred program

[1] ANSI B92.1a-1976, 30° pressure angle, flat root, side fit, tolerance class 5

[2] Size 140 with subplate 22 (without PCV) is always suitable for regenerative operation; thus, the option is omitted.

Ordering code: Pilot and preload valve of the SYDFE1 control system

SYDFE1-3X/	071	R	-	V	R	B	22	U99	-	0000	-	A	0	X0XX	2	-	*
1	2	3		4	5	6	7	8		9		10	11	12	13		14

Spool design

10	Standard	**A**
	2-groove spool (only for replacement requirement)	**B**
	4-groove spool	**C**

Installation orientation, solenoid

11	Mating connector is orientated radially to the pump axis	**0**

12	Features currently not used	**X0XX**

Preload valve with integrated pressure limitation

13	Pressure limitation to 200 bar (tolerance ±8 bar) [1]	**1**
	Pressure limitation to 250 bar (tolerance ±10 bar) [1]	**2**
	Pressure limitation to 300 bar (tolerance ±12 bar) [1]	**3**
	Without preload valve	**X**

14	Further details in the plain text e.g. SO variant	
	High-speed version	**019**

[1] The pressure relief function of the preload valve is designed for a maximum speed of 1800 1/min for size 140 and for a maximum speed of 1500 1/min for size 180. Higher speeds are available on request.

Ordering code: Pilot and preload valve of the SYDFEE control system

SYDFEE-3X/	071	R	-	V	R	B	22	U99	-	0000	-	A	0	A	0	F	L	2	-	*
1	2	3		4	5	6	7	8		9		10	11	12	13	14	15	16		17

Spool design

10	Standard	**A**
	4-groove spool	**C**

Integrated electronics, installation orientation (see below)

11	Radially to the pump axis	**0**
	Folded 90° in the direction of the subplate	**2**

	Control, additional function	A	B	C	D	
12	Selectable 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**

	Electronics assembly, option					
13	Standard electronics with leakage oil compensation	●	-	-	●	**0**
	Standard electronics without leakage oil compensation	●	●	●	●	**1**

	Actual pressure value input (description of the connectors on page 14)	Connector	4...20 mA	0...10 V	1...10 V	0.5...5 V	
14	Current input 4...20 mA	X1	●				**C**
	Voltage input 0...10 V	X1		●			**V**
	Voltage input 1...10 V	X1			●		**E**
	Voltage input 0.5...5 V	X2				●	**F**

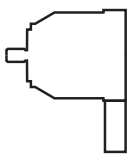
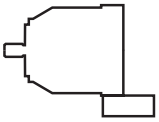
	Pressure transducer					
15	HM 16, measurement range 315 bar (0.5...5 V) with connection cable 0.5 m for direct connection to X2 (only in connection with actual pressure value input F)	-	-	-	●	**L**
	Without pressure transducer	●	●	●	●	**X**

Preload valve with integrated pressure limitation

16	Pressure limitation to 200 bar (tolerance ±8 bar) [1]	**1**
	Pressure limitation to 250 bar (tolerance ±10 bar) [1]	**2**
	Pressure limitation to 300 bar (tolerance ±12 bar) [1]	**3**
	Without preload valve	**X**

17	Further details in the plain text e.g. SO variant	
	High-speed version	019

Note on feature 11: Valve, installation orientation of the integrated electronics

Clockwise direction of rotation, installation orientation 0	Clockwise direction of rotation, installation orientation 2
	

[1] The pressure relief function of the preload valve is designed for a maximum speed of 1800 1/min for size 140 and for a maximum speed of 1500 1/min for size 180. Higher speeds are available on request.

Ordering code: Pilot and preload valve of the SYDFEC control system

SYDFEC-3X/	071	R	-	V	R	B	22	U99	-	0000	-	A	0	A	0	F	L	2	-	*
1	2	3		4	5	6	7	8		9		10	11	12	13	14	15	16		17

Spool design

10	Standard	A
	4-groove spool	C

Valve, installation orientation of integrated electronics (see below)

11	Radially to the pump axis	0
	Folded 90° in the direction of the subplate	2

Additional functions

12	Standard	A

Electronics assembly, options

13	Standard	0

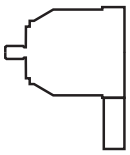
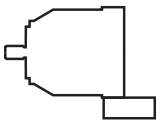
	Actual pressure value input Parameter settings ex factory (description of the connectors on page 15)	Connector	4...20 mA	0...10 V	1...10 V	0.5...5 V	
14	Current input 4...20 mA	X1	●				C
	Voltage input 0...10 V	X1		●			V
	Voltage input 1...10 V	X1			●		E
	Voltage input 0.5...5 V	X2				●	F
	Pressure transducer						
15	HM 16, measurement range 315 bar (0.5...5 V) with connection cable 0.5 m for direct connection to X2 (only in connection with actual pressure value input F)					●	L
	Without pressure transducer		●	●	●	●	X

Preload valve with integrated pressure limitation

16	Pressure limitation to 200 bar (tolerance ±8 bar) [1]	1
	Pressure limitation to 250 bar (tolerance ±10 bar) [1]	2
	Pressure limitation to 300 bar (tolerance ±12 bar) [1]	3
	Without preload valve	X

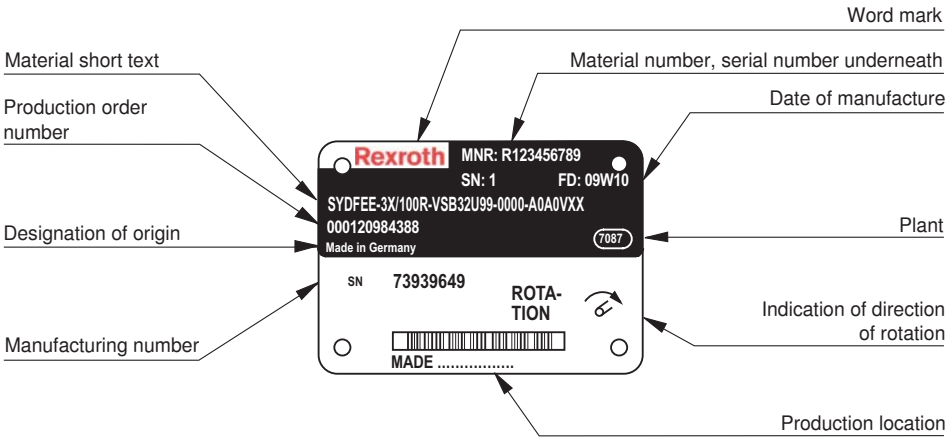
17	Further details in the plain text e.g. SO variant	
	High-speed version	019

Note on feature 11: Valve, installation orientation of the integrated electronics

Clockwise direction of rotation, installation orientation 0	Clockwise direction of rotation, installation orientation 2
	

[1] The pressure relief function of the preload valve is designed for a maximum speed of 1800 1/min for size 140 and for a maximum speed of 1500 1/min for size 180. Higher speeds are available on request.

Example of name plate



Notice:

For enquiries regarding the control system, material number, fabrication order number, serial number, and date of manufacture are necessary.

Ordering code: Accessories

Version 04/2013, enquire availability

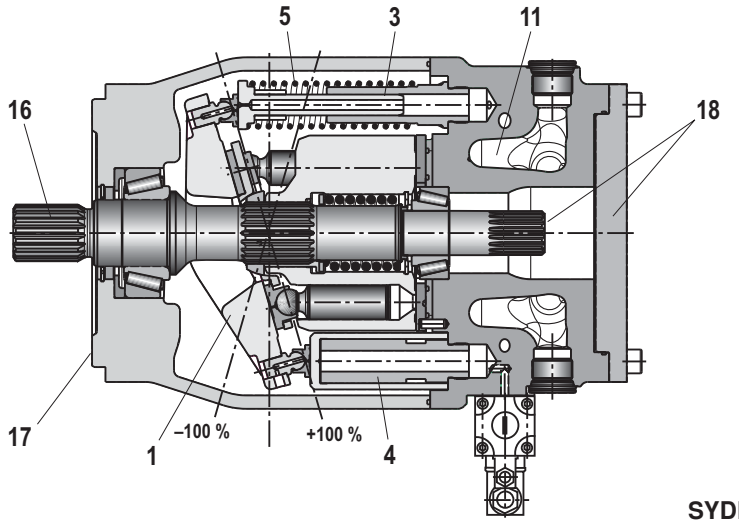
Accessories for SYDFE1	Material number	Data sheet
External control electronics VT 5041-3X/1 without power limitation, without swivel angle display	R901236404	30242
External control electronics VT 5041-3X/2 without power limitation, with swivel angle display	R901263598	30242
External control electronics 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 20-1X, measurement range 400 bar (4...20 mA)	R901295669	30270
Pressure transducer HM 20-1X, measurement range 400 bar (0.1...10 V)	R901295670	30270
Pressure transducer HM 17-1X, measurement range 315 bar (4...20 mA)	R900773065	30269
Pressure transducer HM 17-1X, measurement range 315 bar (0.1...10 V)	R900773124	30269
Card holder VT 3002-1-2X/32D	R900020153	29928
Compact power supply unit VT-NE32-1X	R900080049	29929

Accessories for SYDFEE, SYDFEC	Material number	Data sheet
Mating connector 12-pin for central connection X1 without cable (assembly kit)	R900884671	08006
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	
Pressure transducer HM 20-1X, measurement range 400 bar (4...20 mA)	R901295669	30270
Pressure transducer HM 20-1X, measurement range 400 bar (0.1...10 V)	R901295670	30270
Pressure transducer HM 17-1X, measurement range 315 bar (4...20 mA)	R900773065	30269
Pressure transducer HM 17-1X, measurement range 315 bar (0.1...10 V)	R900773124	30269
Test device VT-PDFE-1-1X/V0/0	R900757051	29689-B
Compact power supply unit VT-NE32-1X	R900080049	29929

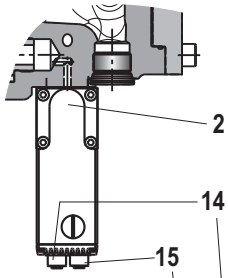
Accessories for SYDFEC only	Material number	Data sheet
Converter USB/serial for laptops without serial interface, VT-ZKO-USB/S-1-1X/V0/0	R901066684	
Cable for connecting a Win-PED PC (RS232) to the X2 interface, length 3 m	R901156928	
T connector for the simultaneous connection of a WIN-PED PC (RS232) and use of the pressure transducer at connector X2	R901117164	
Mating connector for interface X3, M12, straight, can be connected independently, 5 pins, shielded, A coded, cable diameter 6...8 mm	R901076910	

More accessories	Page	
Accessories for through-drives	21	
Torsionally flexible couplings for attachment to a standard electric motor	26	

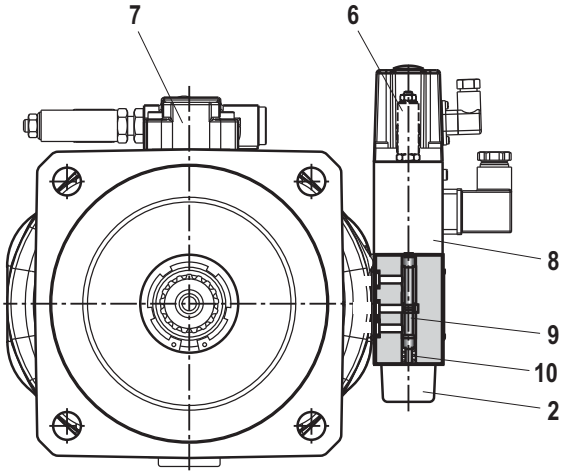
Section

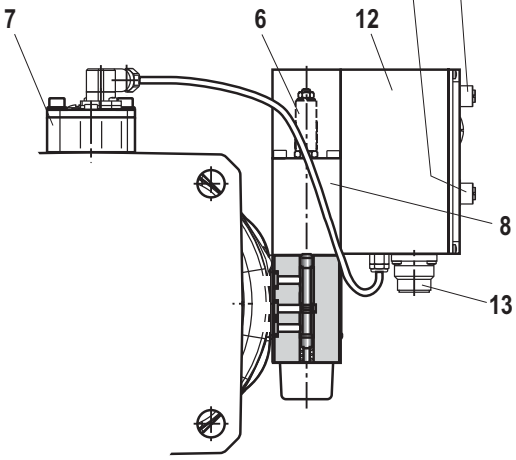


SYDFE1-3X



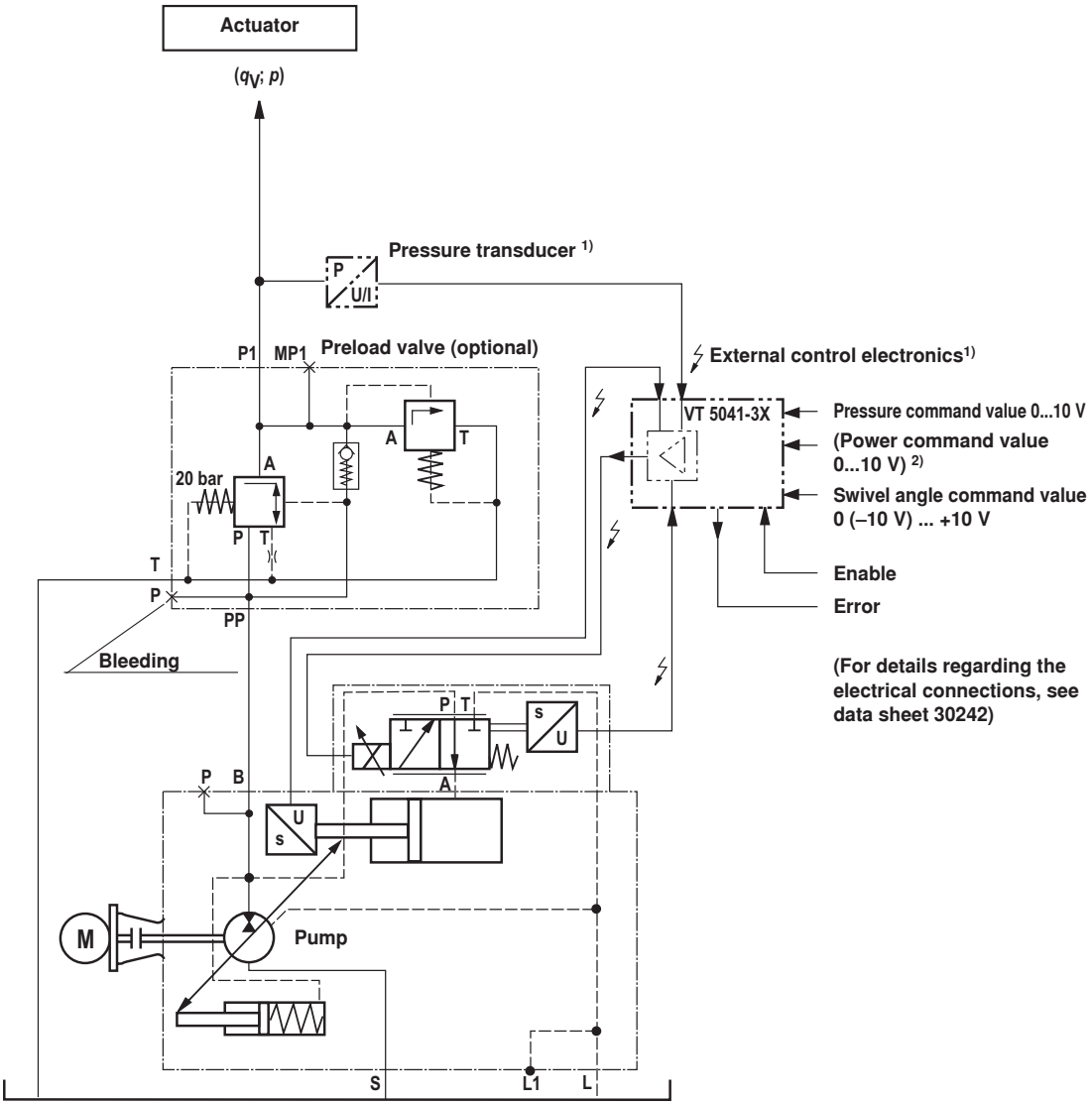
SYDFEE-3X
SYDFEC-3X





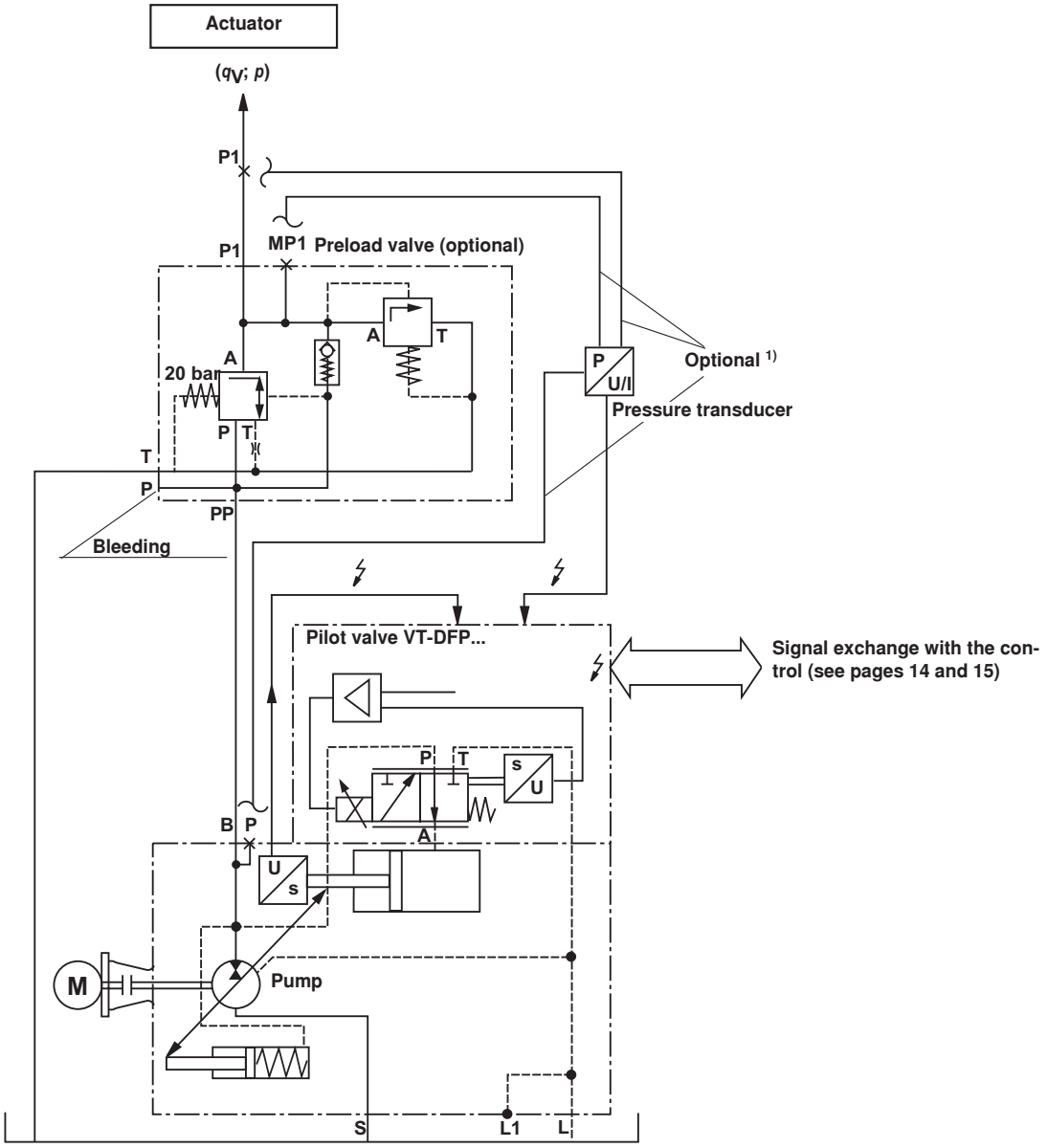
1 Swash plate
2 Pilot valve
3 Counter piston
4 Actuating piston
5 Spring
6 Inductive position transducer for valve position
7 Swivel angle/position sensor
8 Proportional solenoid
9 Valve spool
10 Spring
11 Pre-compression volume PCV
12 Integrated electronics
13 Connector X1
14 Connector X2 for connecting pressure transducer HM 16 (for SYDFEE only with actual pressure value input F, for SYDFEC always available)
15 Mating connector X3 for connecting the CAN bus (only available with SYDFEC)
16 Drive shaft
17 Connection flange
18 Through-drive U99 closed with cover

Schematic diagram: SYDFE1-3X, actuating system supplied internally



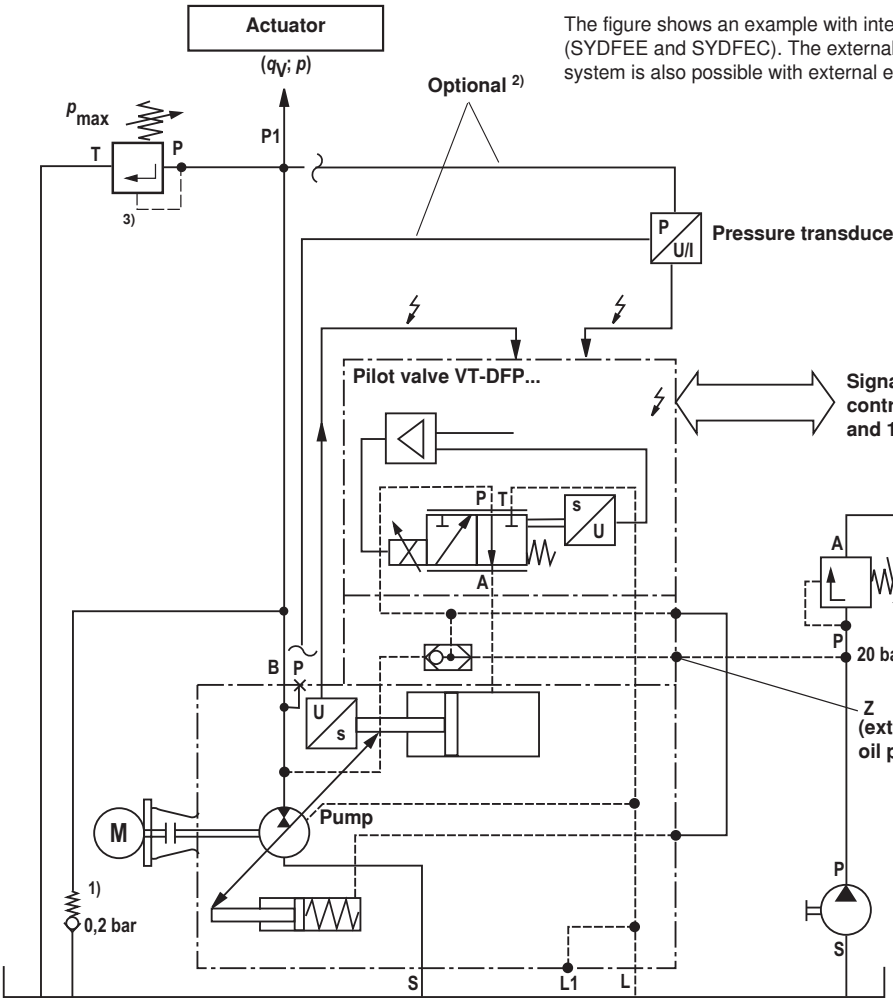
1) Separate order
2) Optional

Schematic diagram: SYDFEE-3X, SYDFEC-3X, actuating system supplied internally



1) When using the pressure transducer HM 16:
Installation in P (pump) or MP1 (preload valve) in connection with electronics version "actual pressure value input F".
When using an external pressure transducer:
Installation in the P1 line (preferably close to the actuator) and electrical connection via central connector.
When using a preload valve, the pressure transducer is to be connected to P1 or MP1.

Schematic diagram: SYDFE...-3X, actuating system supplied externally



The figure shows an example with integrated electronics (SYDFEE and SYDFEC). The external supply of the actuating system is also possible with external electronics (SYDFE1).

1) The use of an anti-cavitation valve (check valve with 0.2 bar spring) is essential in order to prevent dry-running in case of an error.

3) Maximum pressure limitation must be provided by the customer!

4) Observe the upper limit for the external pilot oil pressure (see operating instructions). Recommendation: 20 bar absolute.

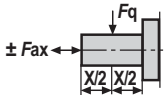
2)

Pressure transducer	Mounting options	Comment
HM 16	P	Only in connection with actual pressure value input "F"
HM 20 / HM 17	P1	preferably close to the actuator

Important notes on external supply:

- In the case of an actuating system with external supply, the pump will - in case of voltage failure - not switch to zero stroke but to the negative stop (displacement of 100 % flow from the system to the tank).
- With an active fault message, it is imperative that the machine control reacts (e.g. switching off the drive motor of the pump, interrupting the external supply of the actuating system).
- The command values for pressure and flow must always be greater than zero ($p_{command} \geq 3$ bar, $\alpha_{command} \geq 5$ %) as due to drift or tolerances, there is no exact "zero" pressure or "zero" swivel angle. Under unfavorable conditions, smaller command value provisions can lead to cavitation.
- The actual pressure value must not be less than 10 bar for more than 10 minutes (lubrication).

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

mechanical and hydraulic					
Size / displacement	$V_{g\,max}$ [cm³]	71 / 71.1	100 / 100	140 / 140	180/180
Max. speed (standard version)	$n_{0\,max}$ [min⁻¹]	1800 [1]	1800 [1]	1800 [2]	1800 [2]
Max. speed (high-speed version)		2550 [2]	2300 [2]	2200 [2]	-
Minimum speed	n_{min}	50 min⁻¹			
Max. flow (displacement)					
with max. speed (standard version)	$q_{v0\,max}$ [l/min]	128	180	252	324
with max. speed (high-speed version)		181	230	308	-
with n_E = 1500 min⁻¹	[l/min]	106.7	150	210	270
Max. power (Δ p = 280 bar)					
with max. speed (standard version)	$P_{0\,max}$ [kW]	59.7	84	118	151
with max. speed (high-speed version)		84	107	144	-
with n_E = 1500 min⁻¹	[kW]	50	70	98	125
Max. torque (Δp = 280 bar, $n_{0\,max}$)	T_{max} [Nm]	317	446	624	802
Max. admissible drive torque					
Splined shaft S total torque	T_{Total} [Nm]		1104	1620	1620
Max. adm. through-drive torque	T_D [Nm]		778	1266	1266
Splined shaft R total torque	T_{Total} [Nm]	644			
Max. adm. through-drive torque	T_D [Nm	548			
 Drive shaft load					
– Max. adm. axial force	$F_{ax\,max}$ [N]	2400	4000	4800	800
– Max. admissible radial force [3]	F_q [N]	1900	2300	2800	2300
Weight:					
Pump without through-drive incl. pilot valve	m [kg]	49	71	75	80
In addition, preload valve	m [kg]	6.3	6.3	6.3	6.3
In addition, in case of external supply	m [kg]	2	2	2	2
Moment of inertia around drive axis	J_{TW} [kgm²]	0.0087	0.0185	0.0276	0.033
Filling quantity of the housing	V [l]	1.6	2.2	3.0	2.7
Nominal pressure	p_{nom}	280 bar			
Maximum admissible operating pressure	p_{max}	350 bar [4]			
Minimum operating pressure:					
Wth preload valve	p_{min}	≥ 1 bar			
Without preload valve	p_{min}	≥ 20 bar			
In case of external supply (20 bar)	p_{min}	> 10 bar in continuous operation; in case of operation below 10 bar, observe notices on page 11			
Admissible inlet pressure	p [bar]	0.8…5.0	0.8…5.0	1.0...10	1.0...10
Hydraulic fluid		Mineral oil (HL, HLP) according to DIN 51524			
Hydraulic fluid temperature range	ϑ	–20... +70 °C			
Maximum admissible degree of contamination of the hydraulic fluid according to ISO 4406		Class 18/16/13 (for particle size ≤ 4/6/14 µm)			

[1] The values are applicable at an absolute pressure of 0.8 bar in suction port S.

[2] The value is applicable at an absolute pressure of 1.0 bar in suction port S.

[3] In case of higher radial forces, please consult us.

[4] See also data sheet 92714.

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

electric

The electrical properties of SYDFE1 are described in data sheet 30242.

Type			SYDFEE...2X	SYDFEC...2X
Operating voltage		U_B	24 VDC +40 % –5 %	24 VDC +40 % –5 %
Operating range (short-time operation)				
	Upper limit value	$U_B(t)_{max}$	35 V	
	Lower limit value	$U_B(t)_{min}$	21 V	
Current consumption (in static control operation)				
	Rated current	I_{nom}	0.6 A	
	Maximum current	I_{max}	1.25 A	
Inputs	Actual pressure value input X1; pin 10 and 11	U or I	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 inputs, load	R_B	100 Ω	100 Ω
	Analog voltage inputs	R_E	≥ 50 kΩ	≥ 100 kΩ
	Digital inputs	Logic 0	≤ 0.6 V	≤ 8 V
		Logic 1	≥ 21 V	≥ 14 V
Outputs	p_{actual} / $U_{OUT}1$ [1)]	U_A I_{max}	0…10 V 1.5 mA	±10 V 2 mA
	α_{actual} / $U_{OUT}2$ [2)]	U_A I_{max}	±10 V 1.5 mA	±10 V 2 mA
	Digital outputs	Logic 0	U_a < 1 V	
		Logic 1	$U_a \geq U_B$ – 5 V; 10 mA (short circuit proof)	
Ambient temperature range at the pump		ϑ	0…60 °C	0…50 °C
Storage temperature range (pump+electronics)		ϑ	0…70 °C	0…70 °C
Electronics design			Integrated in the pilot valve (OBE)	
Electrical connection			See page 14	See page 15
Protection class according to EN 60529	Pump incl. pilot valve		IP 65 with mounted and locked plug-in connectors	

Notice:

For information on the environment simulation testing for the areas of EMC (electromagnetic compatibility), climate and mechanical load, see data sheet 30030-U.

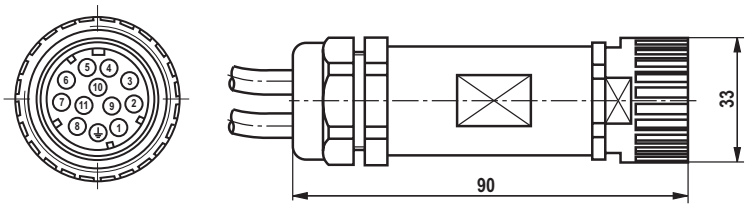
[1, 2)] With SYDFEC, the outputs are parameterizable, for the condition at delivery, see page 15.

Electrical connection: SYDFEE...3X

The electrical connection of the SYDFE1 control system is described in data sheet 30242.

X1: Central connection

Mating connector according to EN 175201-804 (12 pins), for the ordering code, see section Accessories on page 7



Allocation of connector or mating connector and cable set

Pin	Signal	Description	Signal direction	Type of signal	Allocation in the cable set (accessories)	
1	+ U_B	Voltage supply	IN	24 V DC	1	Supply line 3 x 1.0 mm²
2	0 V = L0	Reference potential for the voltage supply	-		2	
PE	Earth	Earthing connection for the electronics	-		Green/ yellow	
3	Fault	Signals failures, e.g. cable break command / actual values, controller monitoring (logic 0 = error)	OUT	Logic 24 V	White	Supply line 10 x 0.14 mm² shielded (one end of the shield must be connected to the control!)
4	M0	Reference potential for analog signals	-		Yellow	
5	$\alpha_{Command}$	Swivel angle command value	IN	Analog ± 10 V	Green	
6	α_{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 electronics type and additional function, see below			Brown	
10	Actual pressure value H	Actual pressure value input: The signal level depends on feature 14 of the ordering codes Reserved with type "F" (0.5...5 V)	IN	Analog	Black	
11	Actual pressure value L		-	Analog	Blue	
n.c.					Gray	

Functions at pin 9

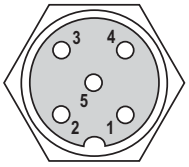
Pin	Additional function	Function depends on feature 12 of the ordering codes (see page 4)	Signal direction	Type of signal
9	-..A…	Switching to different oil volume adjustment (switch T_D)	IN	Logic 24 V
	-..B…	Power limitation active	OUT	Logic 24 V
	-..C…	Command value of power limitation	IN	Analog 0...10 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 the event of a cable break.

X2: Connection of pressure transducer HM 16 (mating connector M12)

Pin	Signal HM 16	Pin	
1	OUT, +U_B	2	n.c.
3	Reference L0		
4	IN, analog, 0.5 to 5 V DC	5	n.c.

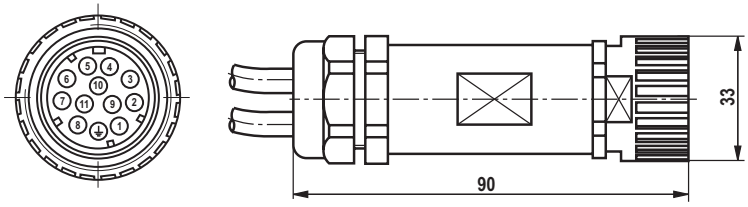
Top view mating connector



Electrical connection: SYDFEC...3X

X1: Central connection

Mating connector according to EN 175201-804 (12 pins), for the ordering code, see section Accessories on page 7.



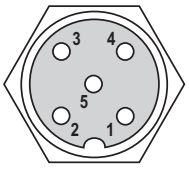
Allocation of connector or mating connector and cable set

Pin	Signal	Description	Signal direction	Type of signal	Allocation in the cable set (accessories)	
1	+ U_B	Voltage supply	IN	24 V DC	1	Supply line 3 x 1.0 mm²
2	0 V = L0	Reference potential for the voltage supply	-		2	
PE	Earth	Earthing connection for the electronics	-		Green/ yellow	
3	Fault	Signals failures, e.g. cable break command / actual values, controller monitoring (logic 0 = error)	OUT	Logic 24 V	White	Supply line 10 x 0.14 mm² 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 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	
7	AI1	Analog input AI1 standard: Pressure command value	IN	Analog 0...10 V	Pink	
8	U_{OUT1}	Analog output Standard: 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 depends on feature 14 of the ordering code	IN	Analog	Black	
11	Actual pressure value L		-	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_B	2	RxD
3	Reference L0		
4	IN, analog, 0.5 to 5 V DC	5	TxD

Top view mating connector



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

Top view mating connector

Closed-loop control quality

Notices:

– The specified values are only valid when using the system-related components specified in this data sheet.

– At pressures < 20 bar, higher tolerances have to be anticipated due to lower actuating forces.

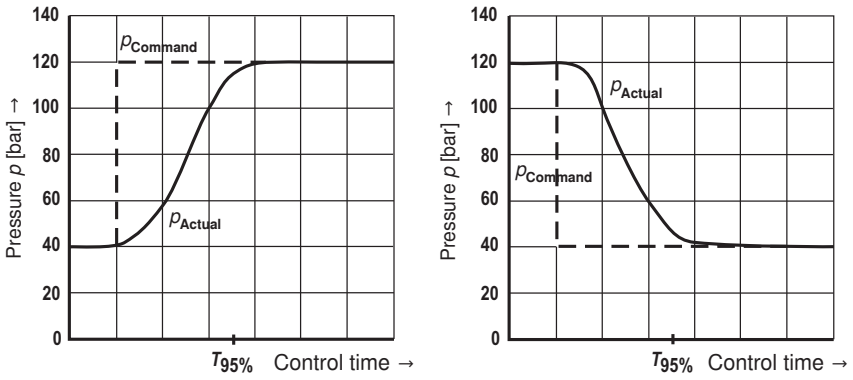
	Swivel angle control	Closed-loop pressure control [1]
Linearity tolerance	≤ 1.0 %	≤ 1.5 % (≤ 1.0 % [2])
Temperature error	≤ 0.5 % / 10 K	≤ 0.5 % / 10 K
Hysteresis	≤ 0.2 %	≤ 0.2 %
Repeatability	≤ 0.2 %	≤ 0.2 %

[1] Without considering the pump pulsation

[2] With SYDFEC using the integrated calibration function

Transition function with pressure command value step with spool design "A"

The specified curve shapes and control times refer to a drive speed of 1500 1/min and are only reached with an optimization of the pressure controller.



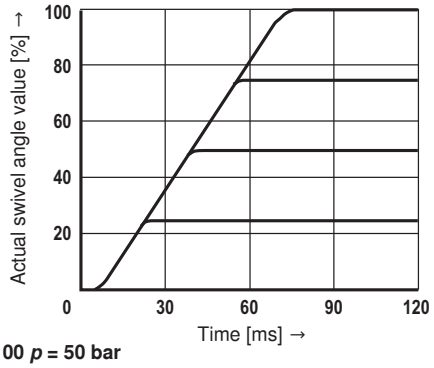
$T_{95\,\%}$ in ms with a connected hydraulic fluid volume (lines and actuators)

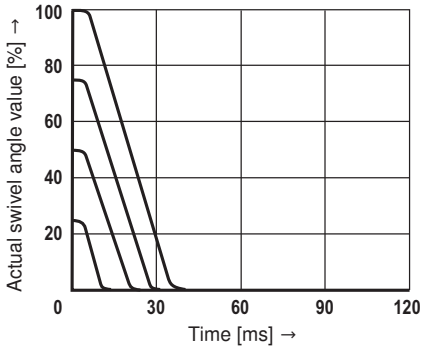
Hydraulic fluid volume	$T_{95\,\%}$
< 5 l	150 ms
5 – 10 l	200 ms
15 – 25 l	250 ms

For pressures up to 40 bar, the values of the response times are larger.

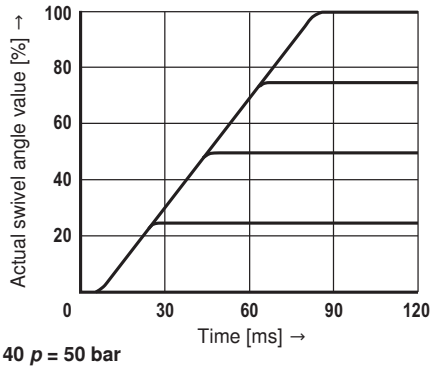
Transition function with swivel angle command value step with spool design "A"

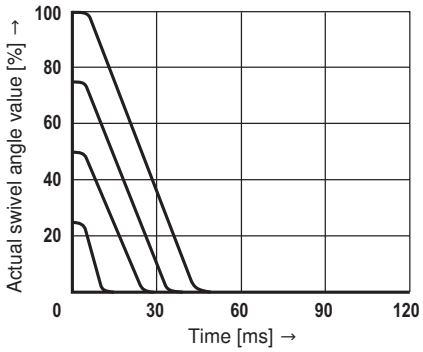
Size 71 p = 50 bar



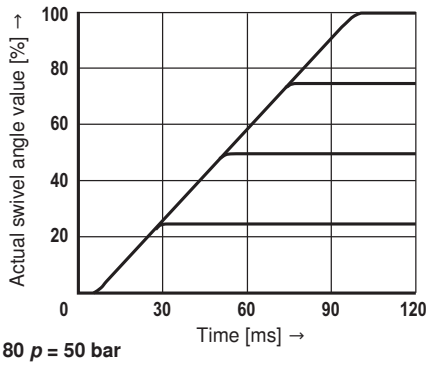


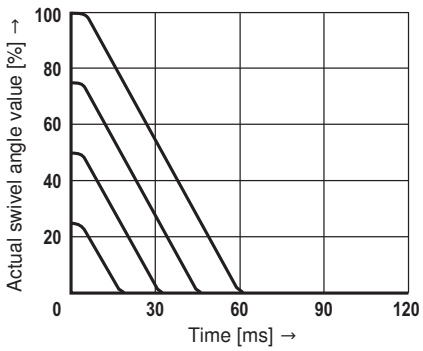
Size 100 p = 50 bar



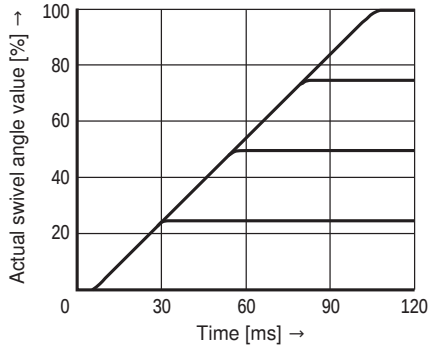


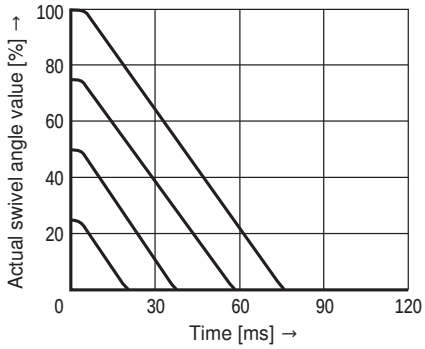
Size 140 p = 50 bar





Size 180 p = 50 bar

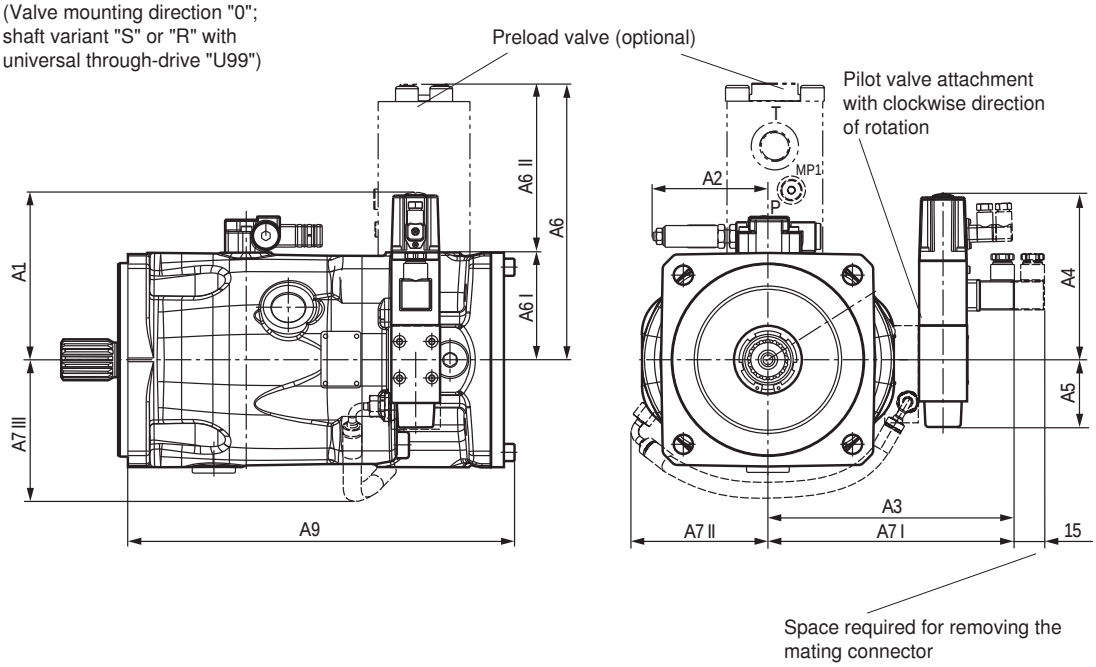




Dimensions: SYDFE1 (dimensions in mm)

The dimensions of the base pump (axial piston variable displacement pump A10VSO.../32) are contained in data sheet 92714.

Size 71 to 180
(Valve mounting direction "0";
shaft variant "S" or "R" with
universal through-drive "U99")



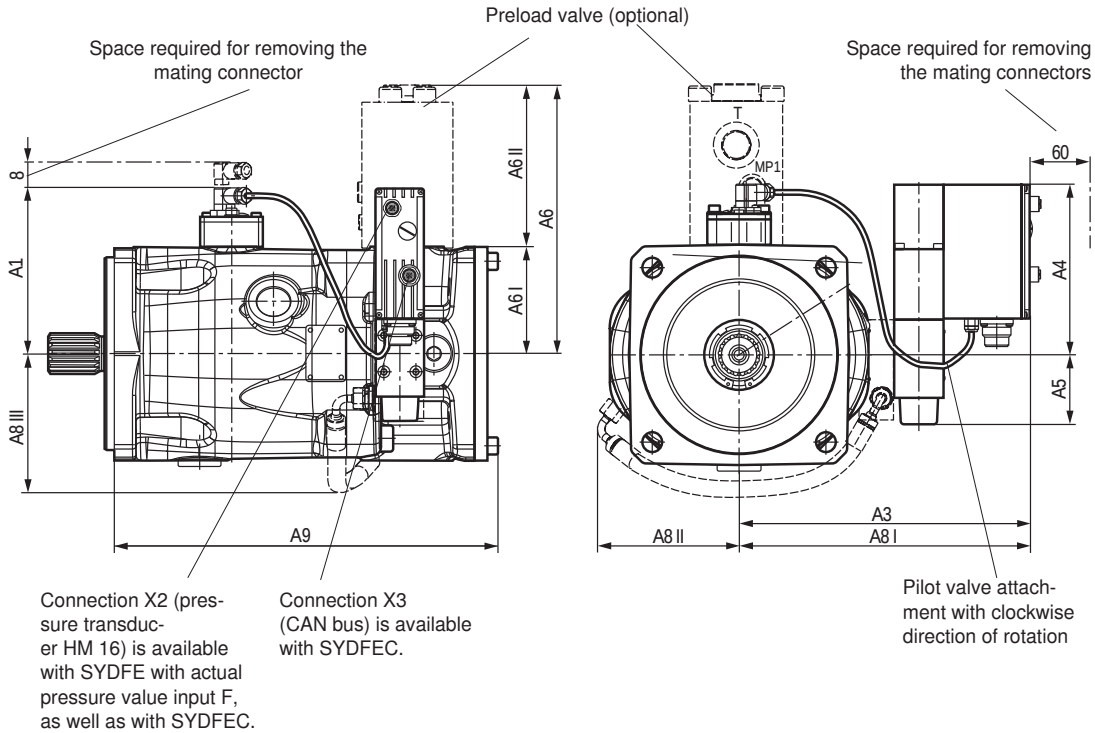
Size	A1	A2	A3 [1]	A4	A5	A6	A6 I	A6 II	Dimensions with base pump variant "0479" or "0487" A7 I	A7 II	A7 III	A9
71	124	107	189	158	63	254	104	150	224	159	150	301
100	129	107	200	158	63	247	100	147	235	164	150	360
140	140	107	213	143	78	257	110	147	248	182	150	377
180	140	107	213	143	78	257	110	147	248	182	150	387

[1] Dimension with base pump variant 0000 or 0541

Dimensions: SYDFEE and SYDFEC, integrated electronics with installation orientation 0
(dimensions in mm)

The dimensions of the base pump (axial piston variable displacement pump A10VSO.../32) are contained in data sheet 92714.

Size 71 to 180
(Valve mounting direction "0";
shaft variant "S" or "R" with
universal through-drive "U99")



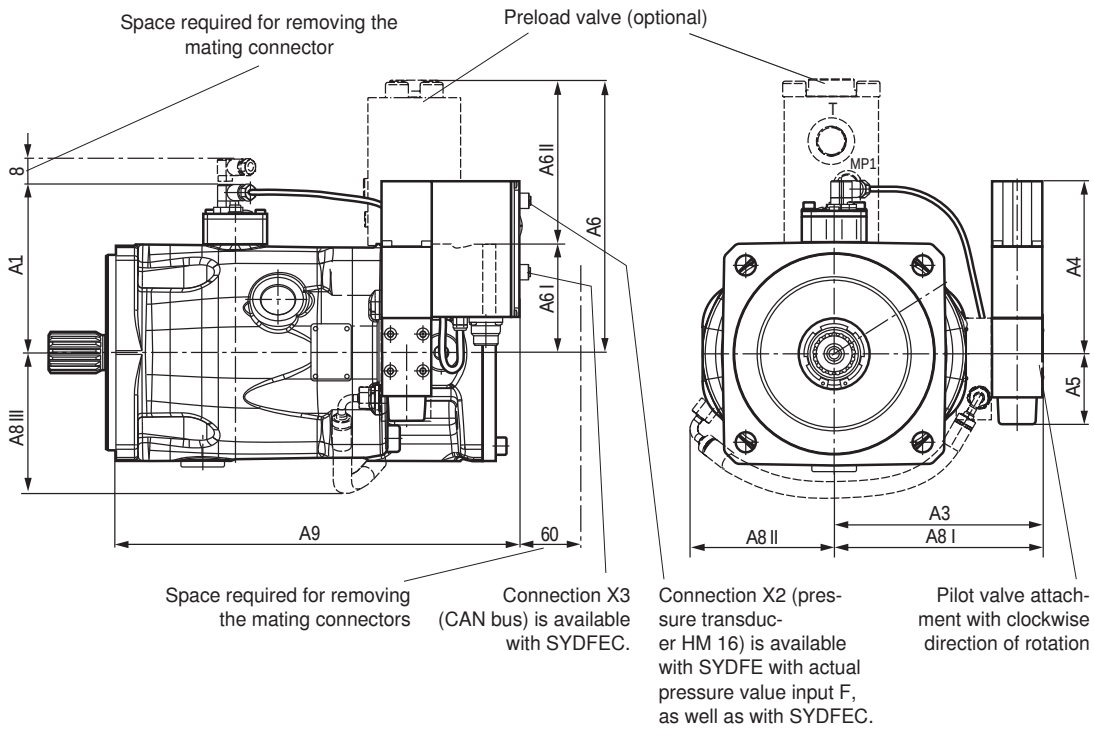
Size	A1	A3 [1]	A4	A5	A6	A6 I	A6 II	Dimensions with base pump variant "0479" or "0487" A8 I	A8 II	A8 III	A9
71	146	226	158	63	254	104	150	261	159	150	301
100	151	237	158	63	247	100	147	272	164	150	360
140	162	250	158	63	257	110	147	285	182	150	377
180	162	250	158	63	257	110	147	285	182	150	387

[1] Dimension with base pump variant 0000 or 0541

Dimensions: SYDFEE and SYDFEC, integrated electronics with installation orientation 2
(dimensions in mm)

The dimensions of the base pump (axial piston variable displacement pump A10VSO.../32) are contained in data sheet 92714.

Size 71 to 180
(Valve mounting direction "0";
shaft variant "S" or "R" with
universal through-drive "U99")



Size	A1	A3 [1]	A4	A5	A6	A6 I	A6 II	Dimensions with base pump variant "0479" or "0487" A8 I	A8 II	A8 III	A9
71	146	146	158	63	254	104	150	181	159	150	316
100	151	157	158	63	247	100	147	192	164	150	372
140	162	170	158	63	257	110	147	205	182	150	382
180	162	170	158	63	257	110	147	205	182	150	392

[1] Dimension with base pump variant 0000 or 0541

Accessories for through-drives

With the introduction of A10VSO, series 32, a so-called universal through-drive for combining several pump stages is used. The required components can be seen from the following table and are to be ordered separately.

The following conditions apply to the attachment pumps listed in the table:

- SYDFE and A10VSO with shaft S or R
- PGH with shaft R, flange U2, see data sheet 10223
- PGF3 with shaft J, flange U2, see data sheet 10213
- AZPF with shaft R, front cover R, see data sheet 10089

Note also that the flange and the through-drive (see ordering code on page 2) match. Check in the current data sheet of the gear pump whether the shaft ends have the specified dimensions.

Components Universal through-drive	Main pump SYDFE..-3X/..U99			Attachment pump			
	Size 71	Size 100	Size 140/180	Size and type		Through-drive Centering Hub	Flange designation
Mounting kit	R902447036	R902447038	R902447039	Size 18	SYDFE..-2X/ A10 VSO / BR31	U52 82.55 mm 3/4 ″	ISO 3019-1-82-2
Flange kit	R902446836	R902446850	R902446850				
Hub	R902436200	R902436201	R902436202				
Mounting kit	R902446997	R902446999	R902447000	Size 28		UB3 100 mm 7/8 ″	ISO 3019-2 100B2HW
Flange kit	R902446808	R902446809	R902446809				
Hub	R910967813	R902436101	R902436102				
Mounting kit	R902447002	R902447004	R902447005	Size 45		UB4 100 mm 1 ″	ISO 3019-2 100B2HW
Flange kit	R902446808	R902446809	R902446809				
Hub	R910968921	R902436105	R902436204				
Mounting kit	R902447015	R902447017	R902447018	Size 71	SYDFE..-3X/..U99 A10 VSO / BR32	UB8 160 mm 1 ¼ ″	ISO 3019-2 160B4HW
Flange kit	R902446816	R902446817	R902446817				
Hub	R910962431	R902436086	R910963436				
Mounting kit		R902447023	R902447024	Size 100		UB9 180 mm 1 ½ ″	ISO 3019-2 180B4HW
Flange kit		R902446820	R902446820				
Hub		R910943565	R910943555				
Mounting kit			R902447027	Size 140/180		UB7 180 mm 1 ¾ ″	ISO 3019-2 180B4HW
Flange kit			R902446820				
Hub			R910932172				
Mounting kit	R902447031	R902447033	R902447034	PGF2, PGH2, PGH3, AZPF		U01 82.55 mm 5/8 ″	ISO 3019-1-82-2
Flange kit	R902446836	R902446850	R902446850				
Hub	R910943545	R910943560	R910943551				
Mounting kit	R902447041	R902447043	R902447044	PGF3		U68 101.6 mm 7/8 ″	ISO 3019-1-101-2
Flange kit	R902446837	R902446851	R902446851				
Hub	R902436083	R902436101	R902436102				
Mounting kit	R902447046	R902447048	R902447049	PGH4		U04 101.6 mm 1 "	ISO 3019-1-101-2
Flange kit	R902446837	R902446851	R902446851				
Hub	R910943548	R902436105	R902436204				
Mounting kit		R902479709	R902463283	PGH5		U24 127 mm 1 ½ "	ISO 3019-1-127-2
Flange kit		R902446852	R902446852				
Hub		R902436369	R910943555				

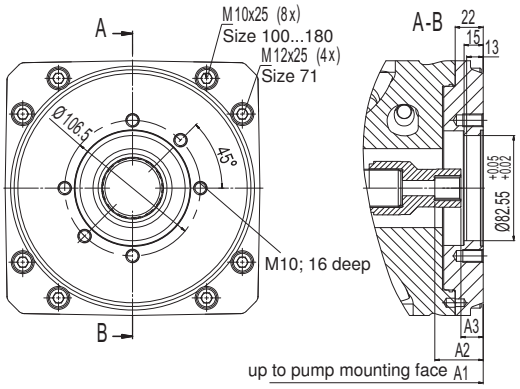
Combinations are only possible with shaft ends according to SAE J744 [1)]

[1)] ANSI B92.1a-1976, 30° pressure angle, flat root, side fit, tolerance class 5. A mounting kit comprises the flange kit and hub; a flange kit comprises the flange, seals and mounting materials.

Dimensions: Through-drives (dimensions in mm)

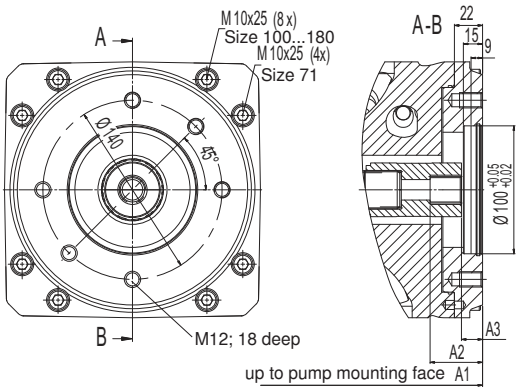
Before determining your construction, please request a binding installation drawing.

U52 **Flange** ISO 3019-1-82-2
Hub for splined shaft according to ANSI B92.1a-1996 3/4 ″ 11T 16/32DP [1] (SAE J744 - 19-4 (A-B))



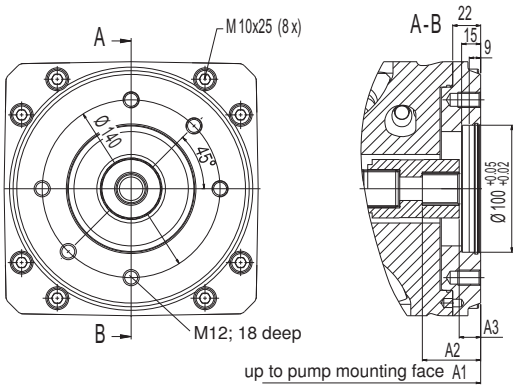
Size	A1	A2	A3
71	299	38	17.5
100	360	38	17.5
140	377	38	17.5
180	387	38	17.5

UB3 **Flange** ISO 3019-2 - 100B2HW
Hub for splined shaft according to ANSI B92.1a-1996 7/8 ″ 11T 16/32DP [1] (SAE J744 - 22-4 (B))



Size	A1	A2	A3
71	299	41	16.5
100	360	41	16.5
140	377	41	16.5
180	387	41	16.5

UB4 **Flange** ISO 3019-2 - 100B2HW
Hub for splined shaft according to ANSI B92.1a-1996 1 ″ 15T 16/32DP [1] (SAE J744 - 25-4 (B-B))



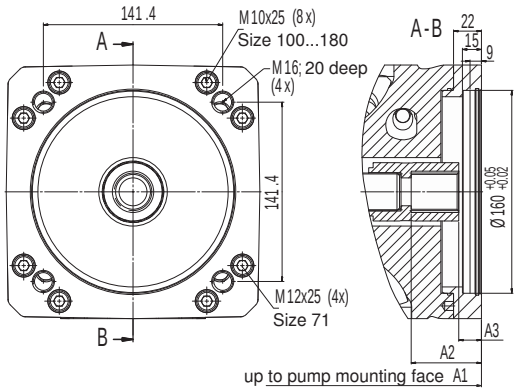
Size	A1	A2	A3
71	299	45.9	16.9
100	360	45.9	16.9
140	377	45.9	16.9
180	387	45.9	16.9

[1] 30° pressure angle, flat root, side fit, tolerance class 5

Dimensions: Through-drives (dimensions in mm)

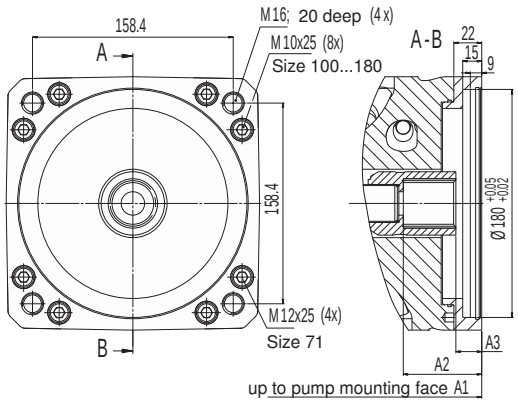
Before determining your construction, please request a binding installation drawing.

UB8 **Flange** ISO 3019-2 - 160B4HW
Hub for splined shaft according to ANSI B92.1a-1996 1 ¼ ″ 14T 12/24DP [1] (SAE J744 - 32-4 (C))



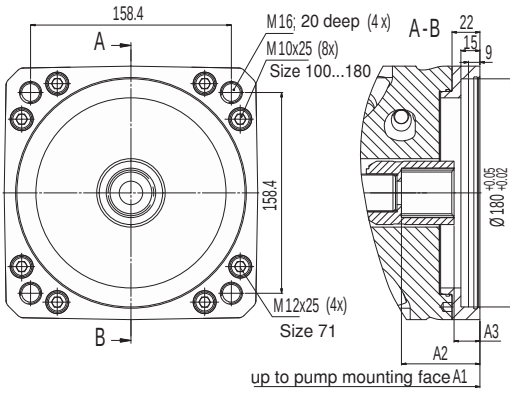
Size	A1	A2	A3
71	299	55.4	17.9
100	360	55.4	17.9
140	377	55.4	17.9
180	387	55.4	17.9

UB9 **Flange** ISO 3019-2 - 180B4HW
Hub for splined shaft according to ANSI B92.1a-1996 1 ½ ″ 17T 12/24DP [1] (SAE J744 - 38-4 (C-C))



Size	A1	A2	A3
100	360	61.9	20.4
140	377	61.9	20.4
180	387	61.9	20.4

UB7 **Flange** ISO 3019-2 - 180B4HW
Hub for splined shaft according to ANSI B92.1a-1996 1 ¾ ″ 13T 8/16DP [1] (SAE J744 - 44-4 (D))



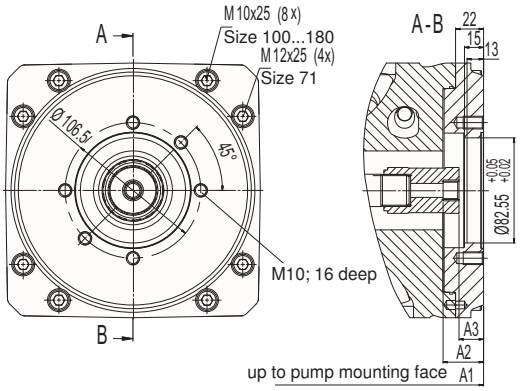
Size	A1	A2	A3
140	377	75	Request
180	387	75	Request

[1] 30° pressure angle, flat root, side fit, tolerance class 5

Dimensions: Through-drives (dimensions in mm)

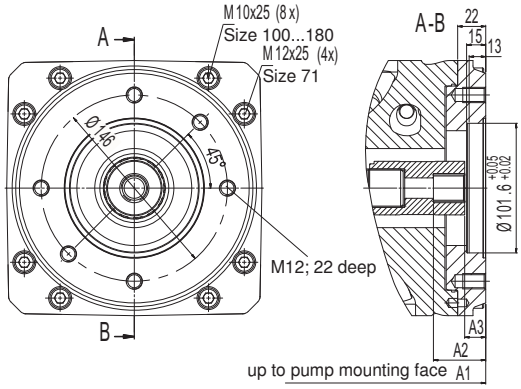
Before determining your construction, please request a binding installation drawing.

U01 **Flange** ISO 3019-1-82-2
Hub for splined shaft according to ANSI B92.1a-1996 5/8 ″ 9T 16/32DP [1] (SAE J744 - 16-4 (A))



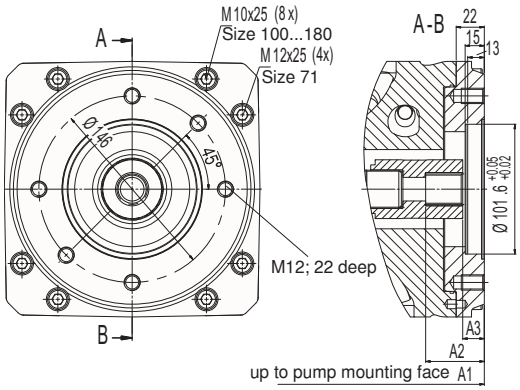
Size	A1	A2	A3
71	299	31.8	19.3
100	360	31.8	Request
140	377	31.8	Request
180	387	31.8	Request

U68 **Flange** ISO 3019-1-101-2
Hub for splined shaft according to ANSI B92.1a-1996 7/8 ″ 13T 16/32DP [1] (SAE J744 - 22-4 (B))



Size	A1	A2	A3
71	299	41	16.5
100	360	41	16.5
140	377	41	16.5
180	387	41	16.5

U04 **Flange** ISO 3019-1-101-2
Hub for splined shaft according to ANSI B92.1a-1996 1 ″ 15T 16/32DP [1] (SAE J744 - 25-4 (B-B))



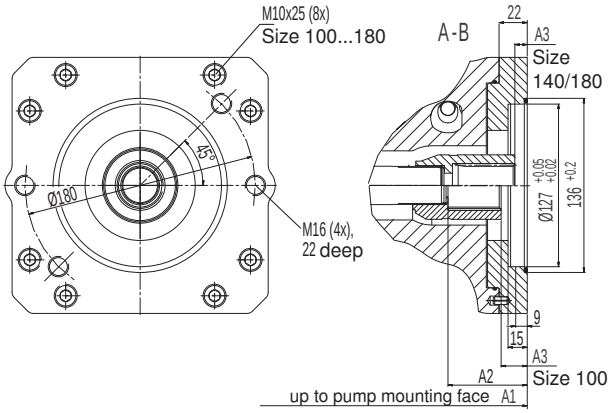
Size	A1	A2	A3
71	299	45.9	16.9
100	360	45.9	16.9
140	377	45.9	16.9
180	387	45.9	16.9

[1] 30° pressure angle, flat root, side fit, tolerance class 5

Dimensions: Through-drives (dimensions in mm)

Before determining your construction, please request a binding installation drawing.

U24 **Flange** ISO 3019-1-127-2
Hub for splined shaft according to ANSI B92.1a-1976 1 ½ " 17T 12/24DP [1] (SAE J744 - 38-4 (C-C))



Size	A1	A2	A3
100	360	61.9	20.4
140	377	70.5	10.5
180	387	70.5	10.5

[1] 30° pressure angle, flat root, side fit, tolerance class 5

Torsionally flexible couplings for attachment to a standard electric motor

Motor		SYDFE.-3X		
Frame size/ characteristic value	Shaft diameter	Size 71 Shaft S or R, 1¼ ″	Size 100 Shaft S, 1½ ″	Size 140/180 Shaft S, 1¾ ″
160/0	42	R900228413		
180/0	48	R900240468	R900242567	
200/0	55	R901038021	R901104689	R901038048
225/0	60	R900228375	R901050508	R900988121
250/0	65	R900986404	R901046864	R900708084
280/0	75	R900218487	R901055216	R901052451
315/0	80		R901046894 [1)]	R901041730 [1)]
315/1	80			R901046885

[1)] Up to 40 °C

Project planning information

- Always shield command and actual value lines.
- The distance to aerial lines or radios must be at least 1 m.
- Do not lay signal lines close to power cables.
- For supplementary notices on the SYDFE control system, see the operating instructions (see section "More information about this control system" on this page).

More information about this control system

Operating instructions for SY(H)DFE1	30011-B
Operating instructions for SY(H)DFEE	30012-B
Operating instructions for SY(H)DFEC	30027-B
Data sheet for variable-speed control system Sytronix DFEn 5000	62241
Universal through-drive U99 for connecting two pumps into one combination	95581
Data sheet for axial piston variable displacement pump A10VSO../32	92714
Data sheet for external control electronics VT 5041-3X for SYDFE1	30242
Data sheet for pilot valve VT-DFP.-2X	29016
Data sheet for pump preload valve SYDZ 0001-1X	29255
Data sheet for swivel angle sensor VT-SWA-1-1X	30268
Data sheet for pressure transducer HM 20-1X	30270
Data sheet for pressure transducer HM 16-1X	30266
Data sheet for pressure transducer HM 17-1X	30269
Operating instructions for test device VT-PDFE	29689-B
Current information is also available on the Internet at http://www.boschrexroth.com/sydfe (English) or http://www.boschrexroth.de/sydfe (German).	

Notes