

Electric Drives
and Controls

Hydraulics

Linear Motion and
Assembly Technologies

Pneumatics

Service

Rexroth
Bosch Group

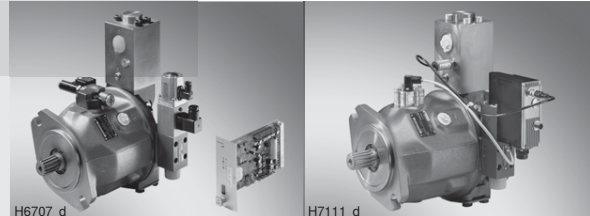
Pressure and flow control system

RE 30030/12.11
Replaces: 07.10

1/30

Type SYDFE1-2X, SYDFEE-2X, SYDFEC-2X ¹⁾

With axial piston variable
displacement pump A10VSO.../31
Size 18 to 140
Component series 2X
Maximum operating pressure 280 bar



SYDFE1-2X..., VT 5041

SYDFEC-2X...

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Features

1	An SYDFE.-2X 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.
2	
8	
9	The control system consists of the following components:
12	- Axial piston variable displacement pump A10VSO.../31
14	- VT-DFP.-2X proportional valve as pilot valve including inductive position transducer for valve position sensing. With versions SYDFEE and SYDFEC, the pilot valve includes electronics for control of the system
16	
16	- For SYDFE1: External control electronics VT 5041-3X for realizing all electric functions necessary for the SYDFE1-2X (separate order)
18	
18	- Position transducer for sensing the swivel angle
20	
20	- Pressure transducer with suitable signal level and dynamics (optionally HM 16, otherwise separate order)
21	
21	- Preload valve with integrated pressure relief function SYDZ (optional)
22	
29	
30	
30	

¹⁾ Type SYDFEn-2X is described in data sheet 62240.

Ordering code: Pump of the SYDFE control system

SYDFE.-2X/	071	R	-	P	R	A	12	N00	-	0000	-	...
1	2	3		4	5	6	7	8		9		See following pages

Series

1	Control system for external analog electronics (separate order)	SYDFE1-2X
	Control system with internal analog electronics	SYDFEE-2X
	Control system with internal digital electronics	SYDFEC-2X
	Variable-speed control system Sytronix DFE n 5000 see data sheet 62240	SYDFEn-2X
	Pump combinations (see order example page 6)	SY2DFE.-2X, SY3DFE.-2X

Size

2	Displacement cm ³	018	028	045	071	100	140	
		18	28	45	71	100	140	

Direction of rotation looking at the drive shaft

3	Clockwise	●	●	●	●	●	●	R
	Counterclockwise	●	●	●	●	●	●	L

Hydraulic fluid

4	Mineral oil according to DIN 51524 (HL/HLP)	●	●	●	●	●	●	P
---	---	---	---	---	---	---	---	----------

Drive shaft variant

5	Cylindrical with key DIN 6885 (not in connection with through-drive)	Ø18	Ø22	Ø25	Ø32	Ø40	Ø45	P
	Splined shaft profile SAE J 744 ¹⁾	3/4"	-	-	-	1½"	1¾"	S
	Splined shaft profile SAE J 744 (higher torque)	-	7/8"	1"	1¼"	-	-	R

Connection flange

Diameter centering in mm

6	ISO 2-hole	80	100	100	125	125	-	A
	ISO 4-hole	-	-	-	-	-	180	B
	SAE 2-hole	82.55	101.6	101.6	127	127	-	C
	SAE 4-hole	-	-	-	-	-	152.4	D

Port for working lines pressure port B and suction port S

7	SAE, laterally opposite, mounting thread metric	●	●	●	●	●	●	12
---	---	---	---	---	---	---	---	-----------

Through-drive (All through-drives with individual pumps come without a hub and are operationally safe, provided with an end cover)

8	Without through-drive	●	●	●	●	●	●	N00	
	Centering	Attachment pump ²⁾ (examples)							
	ISO Ø100 mm	A10VSO..31 size 28/45	-	●	●	●	●	KD3	
	ISO Ø125 mm	A10VSO..31 size 71/100	-	-	-	●	●	KD5	
	ISO Ø180 mm	A10VSO..31 size 140	-	-	-	-	●	KD7	
	SAE Ø82.55 mm	A10VSO..31 size 18, PGF2, PGH2, PGH3, AZPF	●	●	●	●	●	KC1	
	SAE Ø101.6 mm	PGH4, 1PF2G3, PGF3	-	●	●	●	●	KC3	
	SAE Ø127 mm	PGH5	-	-	-	●	●	KC5	
SAE Ø152.4 mm	A10VO140	-	-	-	-	●	KC6		

Base pump variant

9	Standard (internal pilot oil)	●	●	●	●	●	●	0000
	External supply	●	●	●	●	●	-	0479
	External supply + regenerative operation	-	-	-	●	●	●	0487

● = available - = not available Preferred program

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

²⁾ Also observe the conditions for the attachment pumps on page 21.

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

SYDFE1-2X/	071	R	-	P	R	A	12	N00	-	0000	-	A	0	X0XX	2	-	*
1	2	3		4	5	6	7	8		9		10	11	12	13		14

Spool design

10	Standard (size 28... size 140)	A
	2-groove spool (size 18 ... size 140, only for replacement requirement)	B
	4-groove spool (size 18)	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 200 bar	1
	Pressure limitation 250 bar	2
	Pressure limitation 300 bar	3
	without preload valve	X

14	Further details in the plain text e.g. SO variant	
----	---	--

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

SYDFEE-2X/	071	R	-	P	R	A	12	N00	-	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 (size 28...size 140)	A
	4-groove spool (size 18)	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

Electronic assembly, option

13	Standard electronics with leakage oil compensation	●	-	-	●	0
	Standard electronics without leakage oil compensation	●	●	●	●	1

Actual pressure value input

(description of the plug-in connectors on page 14)

		Plug-in 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	-	-	-	●	L
	without pressure transducer	●	●	●	●	X

Preload valve with integrated pressure limitation

16	Pressure limitation 200 bar	1
	Pressure limitation 250 bar	2
	Pressure limitation 300 bar	3
	without preload valve	X

17	Further details in the plain text e.g. SO variant	
----	---	--

Comment on feature 11: Valve, installation orientation of integrated electronics			
Clockwise direction of rotation, installation orientation 0	Clockwise direction of rotation, installation orientation 2	Counterclockwise direction of rotation, installation orientation 0	Counterclockwise direction of rotation, installation orientation 2

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

SYDFEC-2X/	071	R	-	P	R	A	12	N00	-	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 (size 28...size 140)	A
	4-groove spool (size 18)	C

Valve, mounting 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
----	----------	---

Electronic assembly, options

13	Standard	0
----	----------	---

Actual pressure value input Parameter setting ex factory (description of the plug-in connectors on page 15)

		Plug-in 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					●	L
	without pressure transducer		●	●	●	●	X

Preload valve with integrated pressure limitation

16	Pressure limitation 200 bar	1
	Pressure limitation 250 bar	2
	Pressure limitation 300 bar	3
	without preload valve	X

17	Further details in the plain text e.g. SO variant	
----	---	--

Comment on feature 11: Valve, installation orientation of integrated electronics			
Clockwise direction of rotation, installation orientation 0	Clockwise direction of rotation, installation orientation 2	Counterclockwise direction of rotation, installation orientation 0	Counterclockwise direction of rotation, installation orientation 2

Ordering code: Order examples

Order example for single pump:

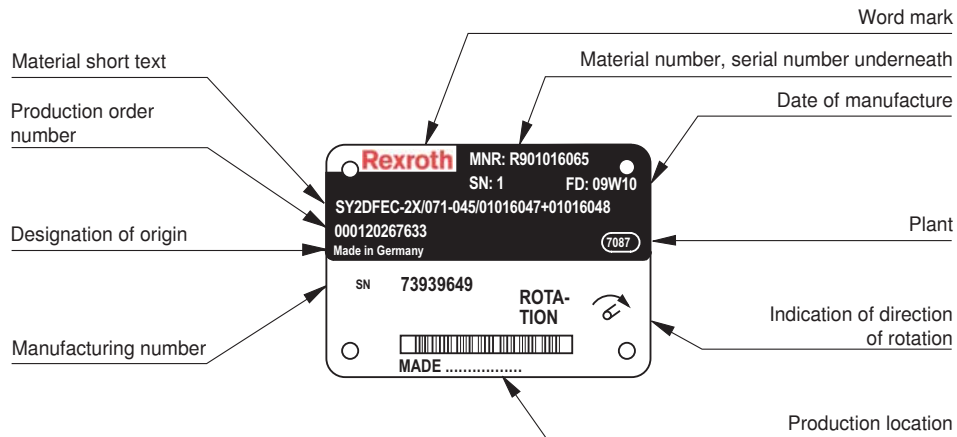
SYDFEE-2X/100R-PSA12N00-0479-A0A0VXX

Order example for pump combination:

Both material numbers and/or type designations are to be connected by means of "+".

	Main pump (1st pump)	+	Attachment pump (2nd pump)
	SY2DFEE-2X/100-100/		00709780
	SY2DFEE-2X/100-100/SYDFEE-2X/100R-PSA12KD5-0000-A0A0CXX	+	SYDFEE-2X/100R-PSA12KD5-0000-A0A0CXX
Double pump	<div style="border: 1px solid black; padding: 5px;"> <p>Size of the main pump</p> <p>Size of the attachment pump</p> <p>Material number without "R9" for the main pump or type designation if material number is not known</p> <p>Pump combination, mounted with accessories</p> <p>Material number without "R9" for the attachment pump or type designation if material number is not known</p> </div>		
Size of the main pump			
Size of the attachment pump			
Material number without "R9" for the main pump or type designation if material number is not known			
Material number without "R9" for the attachment pump or type designation if material number is not known			

Example of name plate of an SY2DFEC pump combination



Notice:

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

Ordering code: Accessories

Version 10/2011, enquire availability

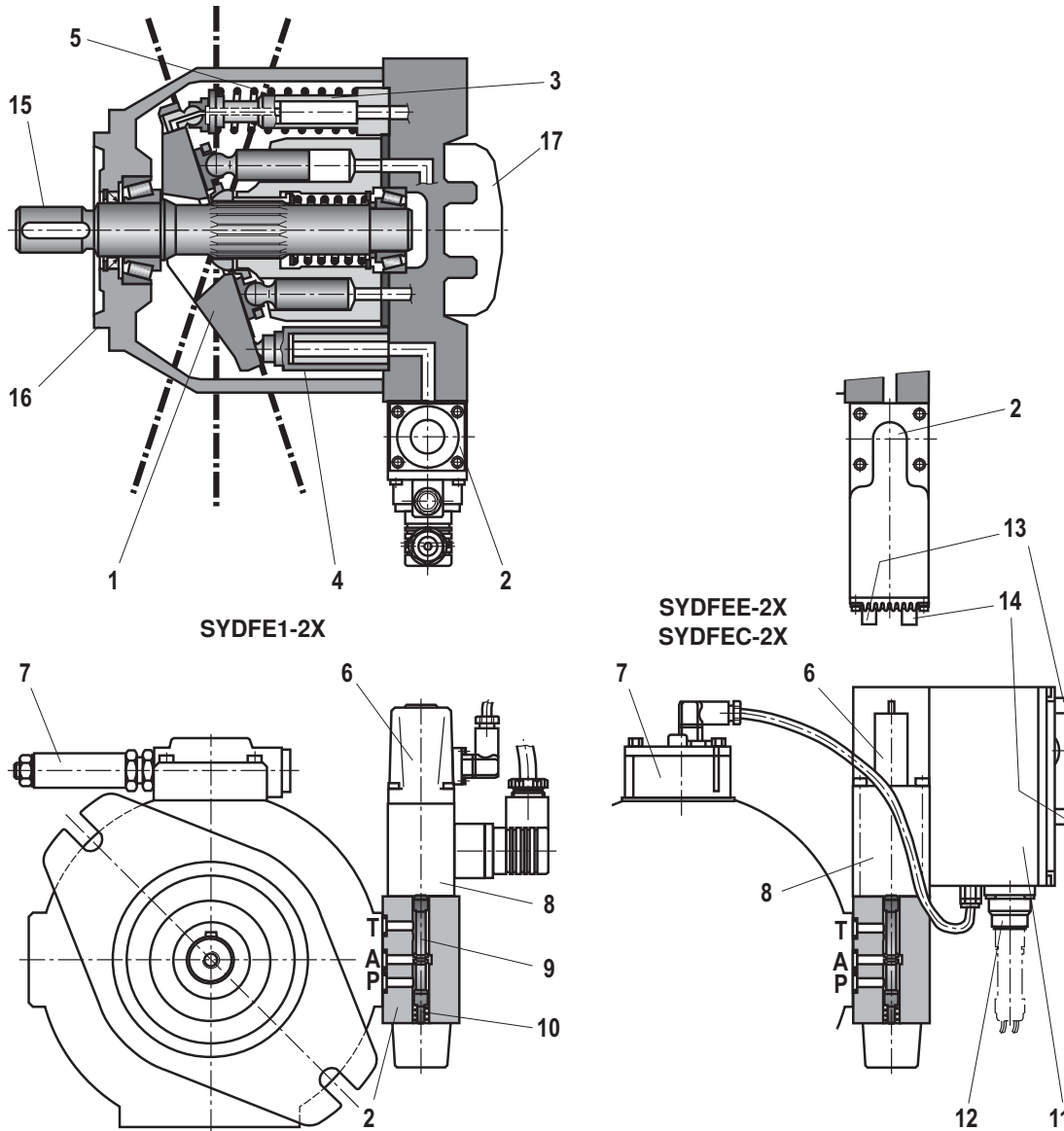
Accessories for SYDFE1	Material number	Data sheet
External control electronics VT 5041-3X/1 without power limitation, without swivel angle display	R901236404	30242
External control electronics VT 5041-3X/2 without power limitation, with swivel angle display	R901263598	30242
External control electronics 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 12-1X measurement range 315 bar (4...20 mA)	R900199871	29933
Pressure transducer HM 13-1X measurement range 315 bar (0...10 V)	R900174374	29933
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 12-1X measurement range 315 bar (4...20 mA)	R900199871	29933
Pressure transducer HM 13-1X measurement range 315 bar (0...10 V)	R900174374	29933
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-pin, shielded, A-coded, cable diameter 6...8 mm	R901076910	

More accessories	Page	
Hubs for through-drives	21	
Torsionally flexible couplings for attachment to a standard electric motor	29	

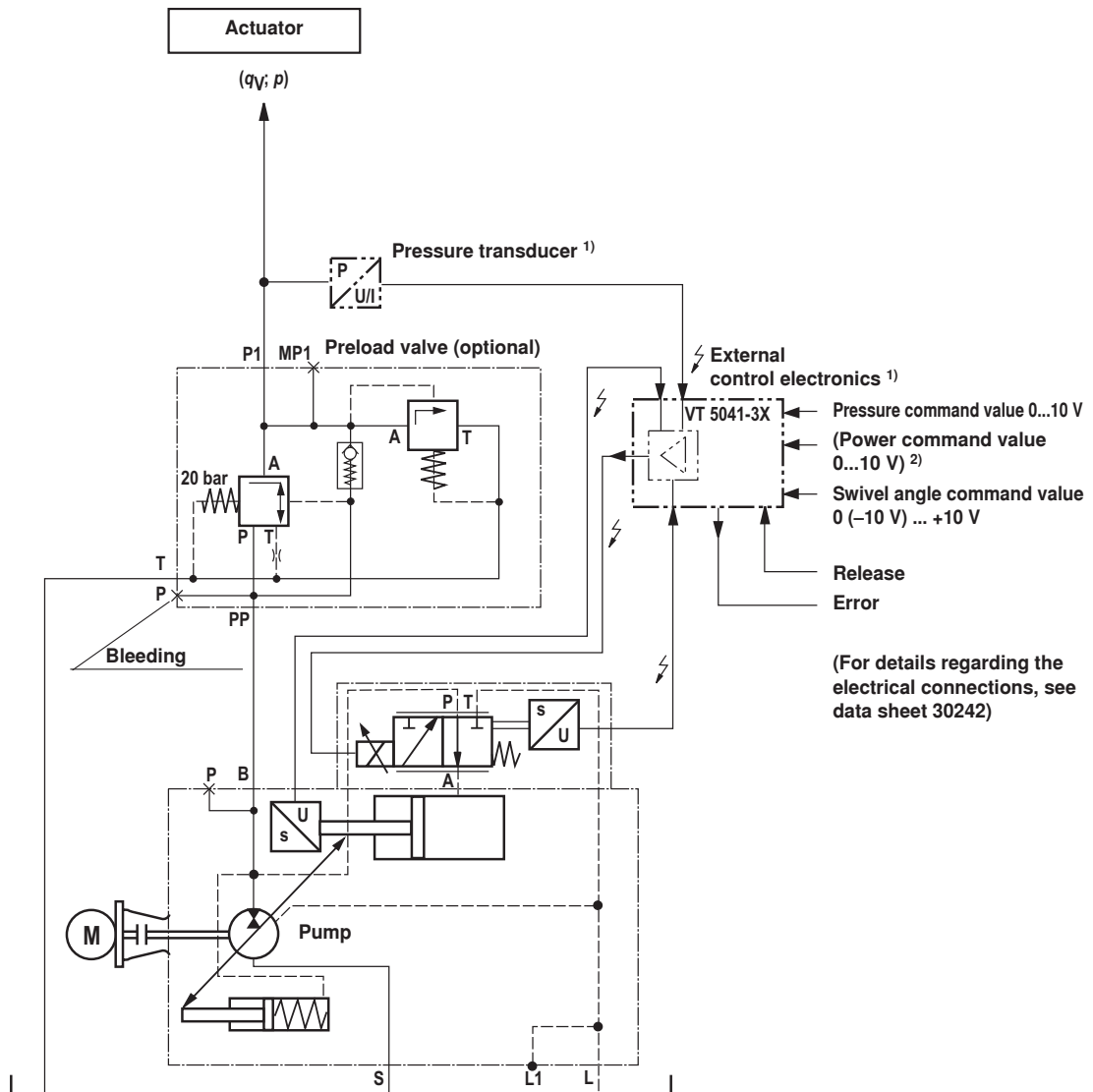
Cross section



- 1 Swash plate
- 2 Pilot valve
- 3 Counter spool
- 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 Integrated electronics
- 12 Connector X1
- 13 Connector X2 for connecting pressure transducer HM 16 (for SYDFEE only with actual pressure value input F, for SYDFEC always available)
- 14 Mating connector X3 for connecting the CAN bus (only available with SYDFEC)
- 15 Drive shaft
- 16 Connection flange
- 17 Subplate, optionally with through-drive

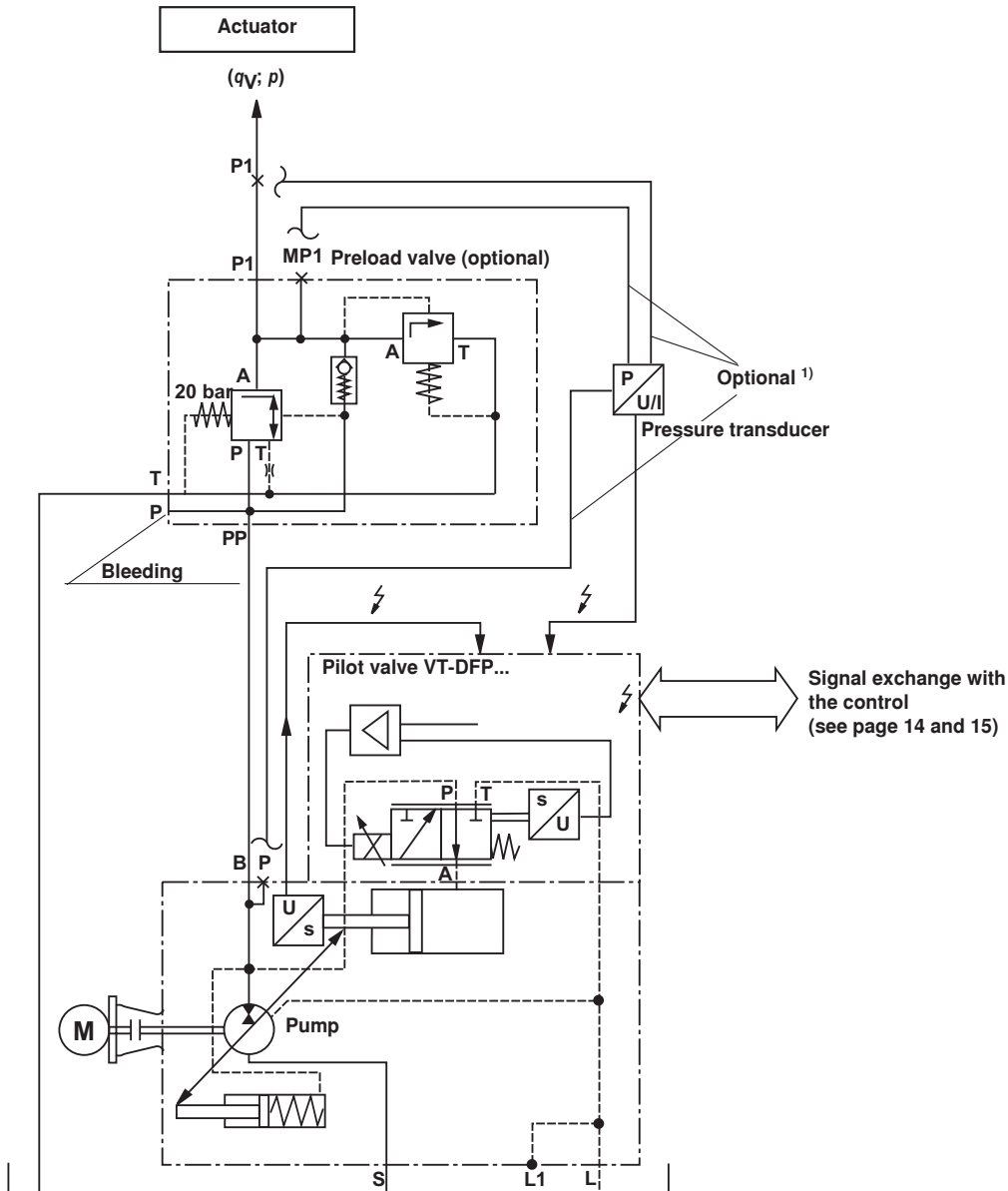
Schematic diagram: SYDFE1-2X, actuating system supplied internally



¹⁾ Separate order

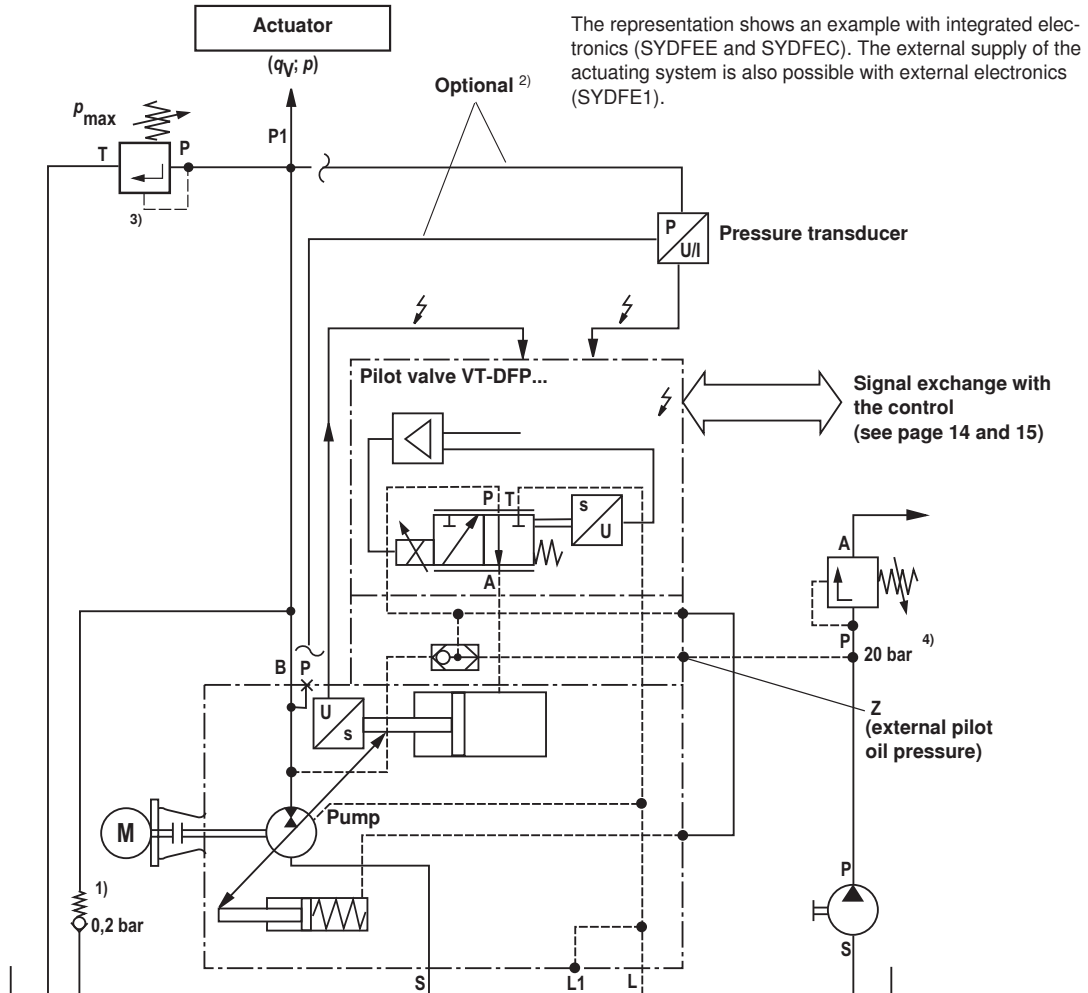
²⁾ Optional

Schematic diagram: SYDFEE-2X, SYDFEC-2X, actuating system supplied internally



- ¹⁾ When using the HM 16 pressure transducer:
Installation in P (pump) or MP1 (preload valve) in connection with electronic 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 the central connector.
When using a preload valve, the pressure transducer is to be connected to P1 or MP1.

Schematic diagram: SYDFE...-2X, actuating system supplied externally



1) The use of a pressure relief and 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!

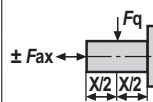
4) Observe upper limit for external pilot oil pressure! (see operating instructions), recommendation: 20 bar absolute.

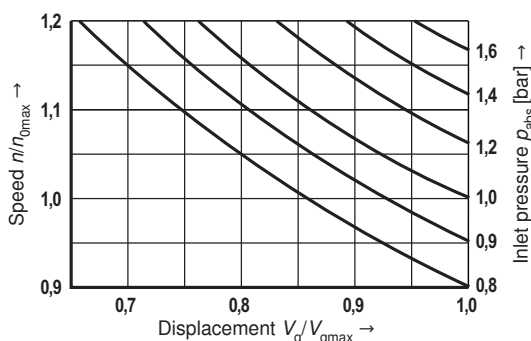
Pressure transducer	Mounting options	Comment
HM 16	P	Only in connection with actual pressure value input "F"
HM 12 / HM 13 / HM 17	P1	Preferably close to the actuator

Important notices on the external supply:

- In the case of an actuating system with external supply, the pump will - in case of voltage failure - not swivel 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).
- Command values for pressure and flow must always be greater than zero ($p_{\text{Command}} \geq 3 \text{ bar}$, $\alpha_{\text{Command}} \geq 5 \%$), as due to drift or tolerances, there is no exact "zero" pressure or "zero" swivel angle. In the unfavorable case, smaller command value provisions may 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	$V_{g\ max}$ [cm ³]	18	28	45	71	100	140
Maximum speed ¹⁾	$n_{0\ max}$ [min ⁻¹]	3300	3000	2600	2200	2000	1800
Minimum speed	n_{min}	50 min ⁻¹					
Max. flow (displacement) at max. speed with $n_E = 1500\ min^{-1}$	$q_{v0\ max}$ [l/min]	59.4	84	117	156	200	252
		27	42	68	107	150	210
Max. power ($\Delta p = 280\ bar$) at max. speed with $n_E = 1500\ min^{-1}$	$P_{0\ max}$ [kW]	27.7	39	55	73	93	118
		12.6	20	32	50	70	98
Max. torque ($\Delta p = 280\ bar, n_{0\ max}$)	T_{max} [Nm]	80.1	125	200	316	445	623
Max. admissible drive torque							
Key	T_{Total} [Nm]	88	137	200	439	857	1206
Splined shaft S total torque	T_{Total} [Nm]	124				1104	1620
Max. admissible through-drive torque	T_D [Nm]	108				778	1266
Splined shaft R total torque	T_{Total} [Nm]		225	400	644		
Max. admissible through-drive torque	T_D [Nm]		176	365	548		
 Drive shaft load – Max. admissible axial force – Max. admissible radial force ²⁾	$F_{ax\ max}$ [N] F_q [N]	700 350	1000 1200	1500 1500	2400 1900	4000 2300	4800 2800
Weight:							
Pump without through-drive incl. pilot valve	m [kg]	14	17	23	35	47	62
In addition, preload valve	m [kg]	3.3	3.3	3.3	6.3	6.3	6.3
In addition, in case of external supply	m [kg]	2	2	2	2	2	2
Moment of inertia around drive axis	[kgm ²]	0.0009	0.0017	0.0033	0.0083	0.0167	0.0242
Filling quantity of the housing	[l]	0.4	0.7	1.0	1.6	2.2	3.0
Maximum admissible operating pressure ³⁾	p_{max}	280 bar					
Minimum operating pressure:							
with 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	0.8...5.0 bar					
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 1 bar in suction port S. With a reduction of the displacement or an increase in the inlet pressure, the speed can be increased according to the following characteristic curve. With a reduced inlet pressure, the speed is to be reduced.

²⁾ In case of higher radial forces, please consult us

³⁾ In case of higher pressures, please consult us

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	$U_B(t)_{max}$	35 V		
Lower limit	$U_B(t)_{min}$	21 V		
Current consumption (in static control operation)				
Rated current	I_{Rated}	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 k Ω	≥ 100 k Ω
	Digital inputs	Logic 0	≤ 0.6 V	≤ 8 V
		Logic 1	≥ 21 V	≥ 14 V
Outputs	$p_{actual} / U_{OUT}^{1)}$	U_A	0...10 V	± 10 V
		I_{max}	1.5 mA	2 mA
	$\alpha_{actual} / U_{OUT}^{2)}$	U_A	± 10 V	± 10 V
		I_{max}	1.5 mA	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.

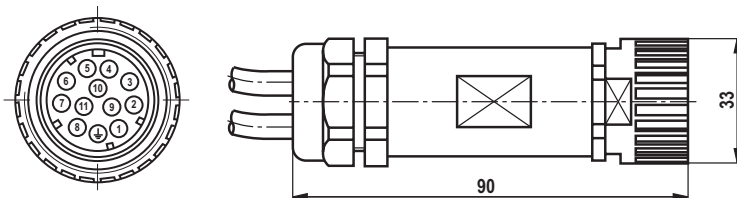
^{1, 2)} With SYDFEC, the outputs are parameterizable, condition as supplied see page 15

Electrical connection: SYDFEE...2X

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-pin), ordering code see section Accessories on page 7



Assignment of connector or mating connector and cable set

Pin	Signal	Description	Signal direction	Type of signal	Assignment in the cable set (accessories)	
1	$+U_B$	Voltage supply	IN	24 V DC	1	Supply line 3 x 1.0 mm ²
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 mm ² shielded (one end of the shield must be connected to the control!!)
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	
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: Signal level depends on feature 14 of the ordering code With type "F" (0.5...5 V) reserved	IN	Analog	Black	
11	Actual pressure value L		-	Analog	Blue	
n.c.					Gray	

Functions at pin 9

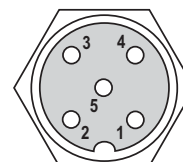
Pin	Additional function	Function dependent on feature 12 of the ordering code (see page 4)	Signal direction	Type of signal
9	...A...	Switching to different oil volume adjustment (switch T_D)	IN	Logic 24 V
	...B...	Power limitation active	OUT	Logic 24 V
	...C...	Command value of power limitation	IN	Analog 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 case 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.

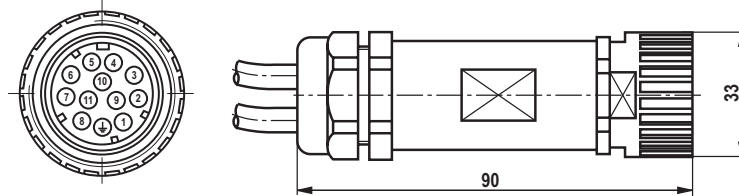
Top view
Mating
connector



Electrical connection: SYDFEC...2X

X1: Central connection

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

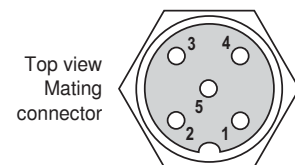


Assignment of connector or mating connector and cable set

Pin	Signal	Description	Signal direction	Type of signal	Assignment in the cable set (accessories)
1	$+U_B$	Voltage supply	IN	24 V DC	1
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
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

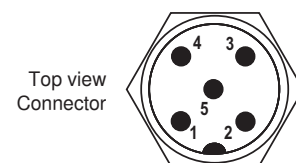
X2: Connection of pressure transducer HM 16 and serial interface RS232 (mating connector M12)

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



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



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.

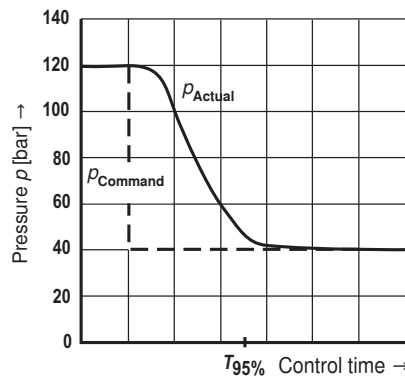
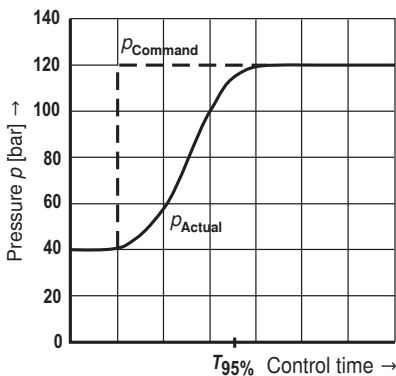
	Swivel angle control	Pressure control ¹⁾
Linearity tolerance	≤ 1.0 %	≤ 1.5 % (≤ 1.0 % ²⁾)
Temperature error	≤ 0.5 % / 10 K	≤ 0.5 % / 10 K
Hysteresis	≤ 0.2 %	≤ 0.2 %
Repeatability	≤ 0.2 %	≤ 0.2 %

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 rpm and are only reached with an optimization of the pressure controller.



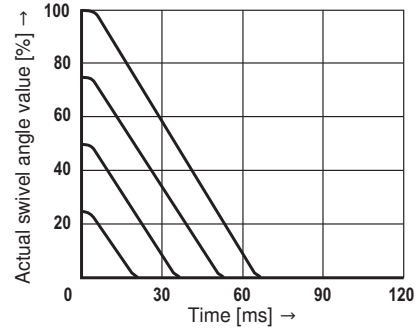
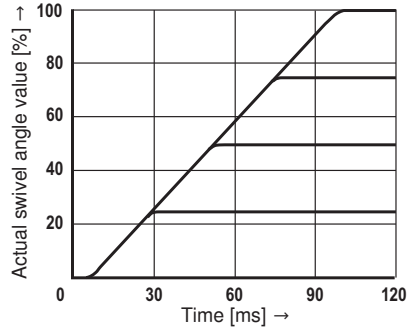
$T_{95\%}$ in ms with a connected hydraulic fluid volume (lines and actuators)

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

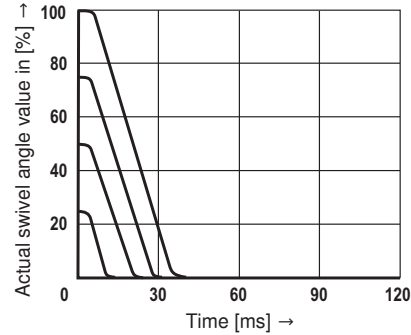
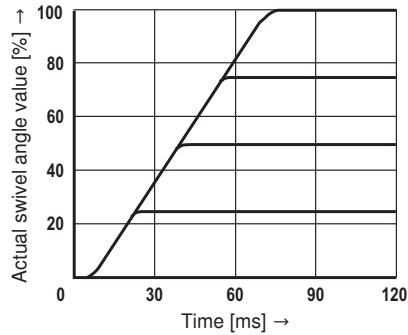
For pressures up to 40 bar, the values of the response times are larger.

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

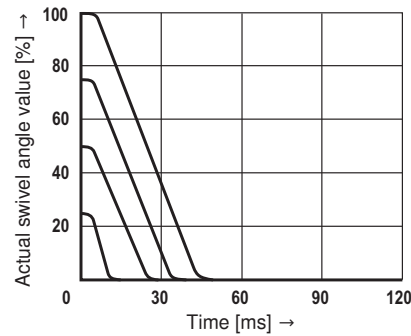
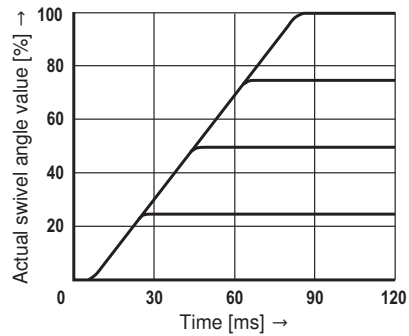
Size 18, 28, 45, 71 $p = 20$ bar



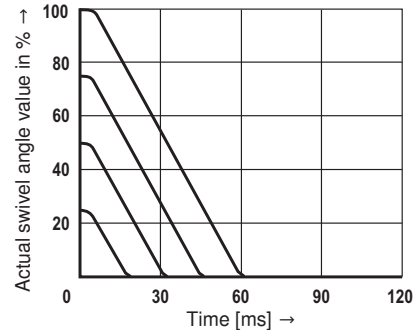
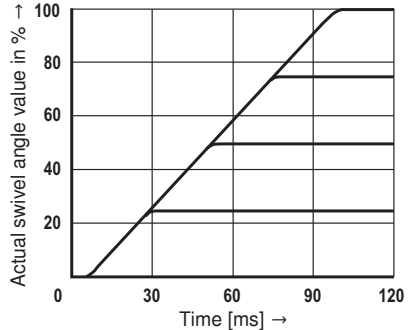
Size 18, 28, 45, 71 $p = 50$ bar



Size 100 $p = 50$ bar



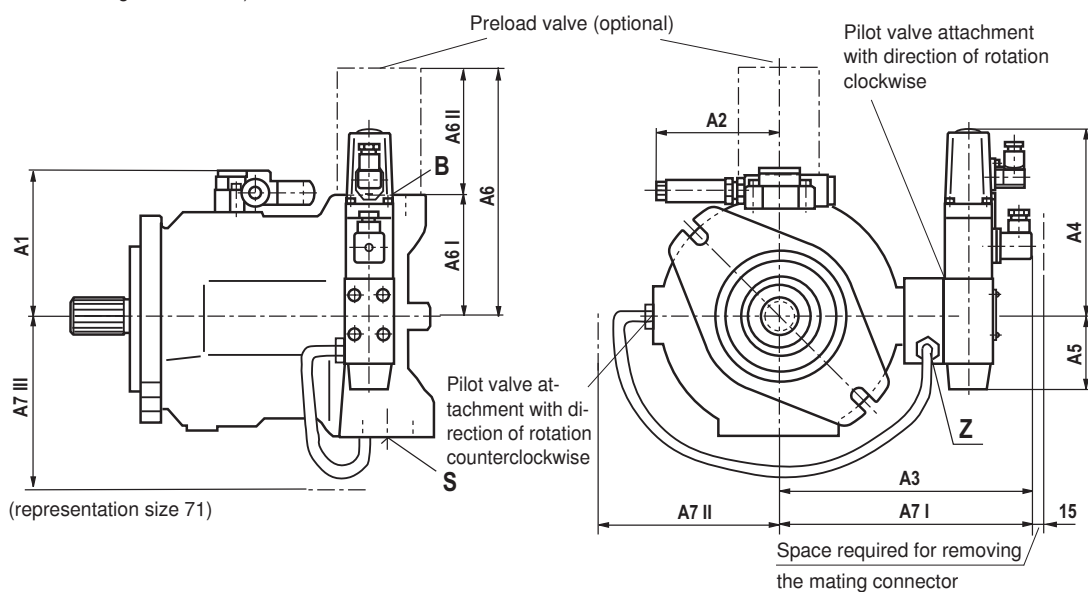
Size 140 $p = 50$ bar



Unit dimensions: SYDFE1 (dimensions in mm)

The unit dimensions of the base pump (axial piston variable displacement pump A10VSO.../31) are contained in data sheet 92711.

Size 18 to 140
(Shaft design "S";
without through-drive "N00")



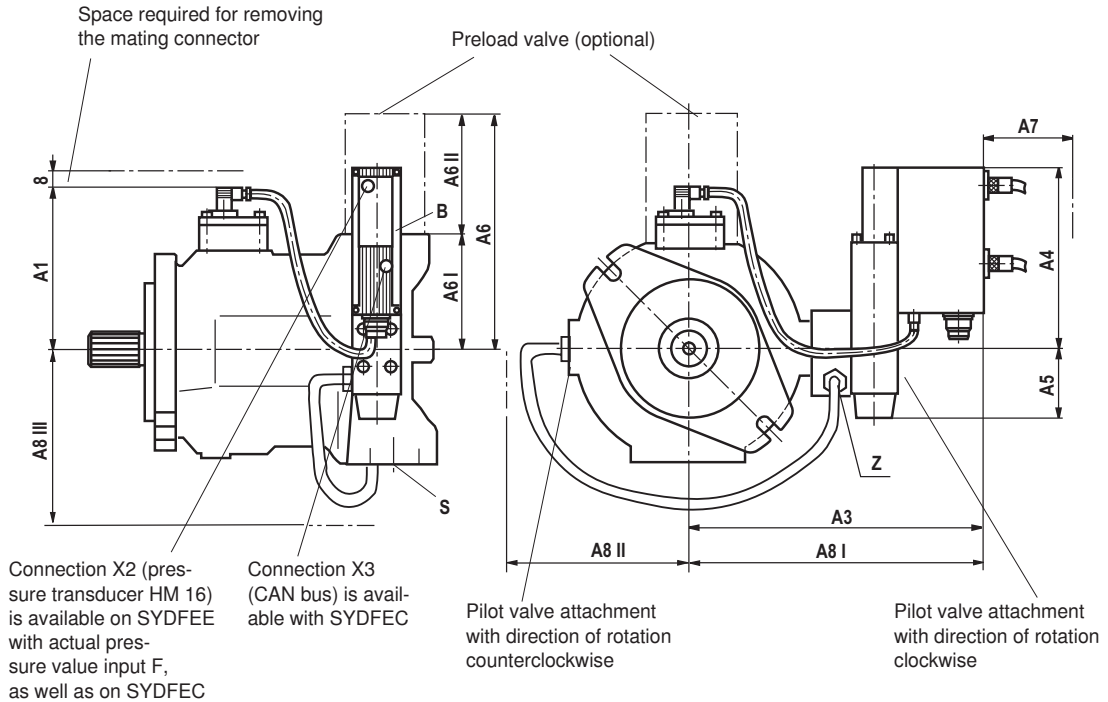
Size	A1	A2	A3	A4	A5	A6	A6 I	A6 II	Pilot oil port "Z"		
									A7 I	A7 II	A7 III
18	98	107	161	158	63	178	63	115	196	125	100
28	106	107	171	158	63	195	80	115	206	135	115
45	112	107	181	158	63	205	90	115	216	145	125
71	124	107	195	158	63	254	104	150	230	159	150
100	129	107	200	158	63	247	100	147	235	164	150
140	140	107	213	143	78	257	110	147	248	182	150

Unit dimensions: SYDFEE and SYDFEC (dimensions in mm)

The unit dimensions of the base pump (axial piston variable displacement pump A10VSO.../31) are contained in data sheet 92711.

Size 18 to 140

(Valve mounting direction "0"; shaft design "S"; without through-drive "N00")

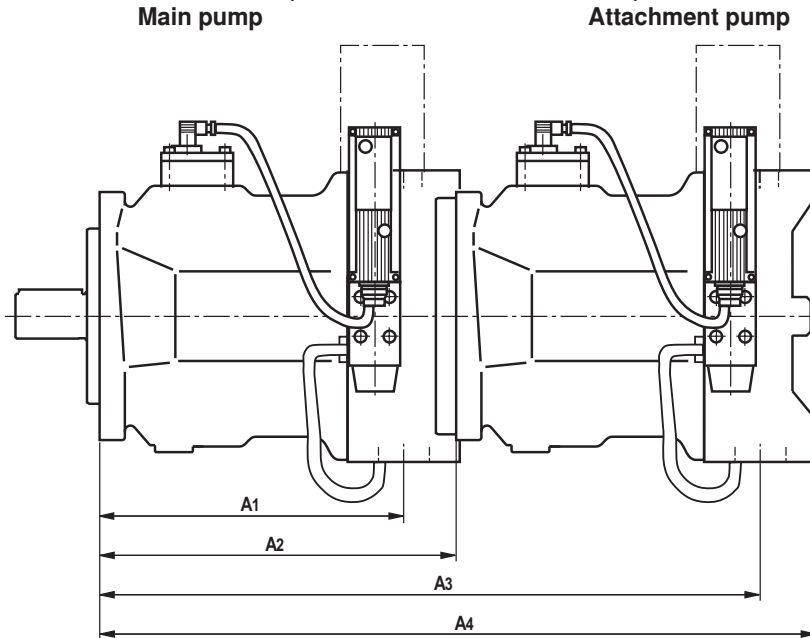


Size	A1	A3	A4	A5	A6	A6 I	A6 II	A7	Pilot oil port "Z"		
									A8 I	A8 II	A8 III
18	120	198	158	63	178	63	115	60	233	125	100
28	128	208	158	63	195	80	115	60	243	135	115
45	134	218	158	63	205	90	115	60	253	145	125
71	146	232	158	63	254	104	150	60	267	159	150
100	151	237	158	63	247	100	147	60	272	164	150
140	162	250	143	78	257	110	147	60	285	182	150

Dimension A7 → installation space required for connecting the optional pressure transducer HM 16

Unit dimensions: Combination pumps (dimensions in mm)

**A10VSO.../31 + A10VSO.../31
(SYDFE.-2X/... + SYDFE.-2X/...)**



Main pump \ Attachment pump	A10VSO 18				A10VSO 28				A10VSO 45				A10VSO 71				A10VSO 100				A10VSO 140			
	A1	A2	A3	A4	A1	A2	A3	A4	A1	A2	A3	A4	A1	A2	A3	A4	A1	A2	A3	A4	A1	A2	A3	A4
A10VSO 18	164	204	349	399	164	204	349	399	184	229	374	424	217	267	412	462	275	338	483	533	275	350	495	554
A10VSO 28					164	204	368.5	410	184	229	393.5	435	217	267	431.5	473	275	338	502.5	544	275	350	514	556
A10VSO 45									184	229	413	453	217	267	451	491	275	338	522	562	275	350	534	574
A10VSO 71													217	267	484	524	275	338	555	595	275	350	567	609
A10VSO 100																	275	338	613	664	275	350	625	679
A10VSO 140																					275	350	625	688

Hubs for through-drives

Hubs for the combination of single pumps or the combination of SYDFE with other pumps. Observe that the attachment pump has a splined shaft SAE J744 with the specified diameter.

To the attachment pumps listed in the table, the following conditions apply:

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

Also observe that the through-drive of the main pump and the flange of the attachment pump (see ordering code page 2) are identical. Check in the current data sheet of the gear pump whether the shaft ends have the specified dimensions.

Main pump SYDFE or A10VSO...						Attachment pump	
Size 18	Size 28	Size 45	Size 71	Size 100	Size 140	ø shaft	Pump type (examples)
R902436099	R902436199	R902436100	R902436200	R902436201	R902436202	3/4 " 19-4 (SAE A-B)	SYDFE-2X, A10VSO..31 Size 018 shaft S
	R902436098	R902436084	R902436083	R902436101	R902436102	7/8 " 22-4 (SAE B)	SYDFE-2X, A10VSO..31 Size 028 shaft R PGF3
		R902436103	R910968921	R902436105	R902436204	1 " 25-4 (SAE B-B)	SYDFE-2X, A10VSO..31 Size 045 shaft R PGH4
			R902436085	R902436086	R902436106	1 1/4 " 32-4 (SAE C)	SYDFE-2X, A10VSO..31 Size 071 shaft R
				R910943565	R910943555	1 1/2 " 38-4 (SAE C-C)	SYDFE-2X, A10VSO..31 Size 100 shaft S PGH5
					R910932172	1 3/4 " 44-4 (SAE D)	SYDFE-2X, A10VSO..31 Size 140 shaft S
R910943528	R910986299	R910943529	R910943545	R910943560	R910943551	5/8 " 16-4 (SAE A)	1PF2G2, PGF2, PGH2, PGH3, AZPF

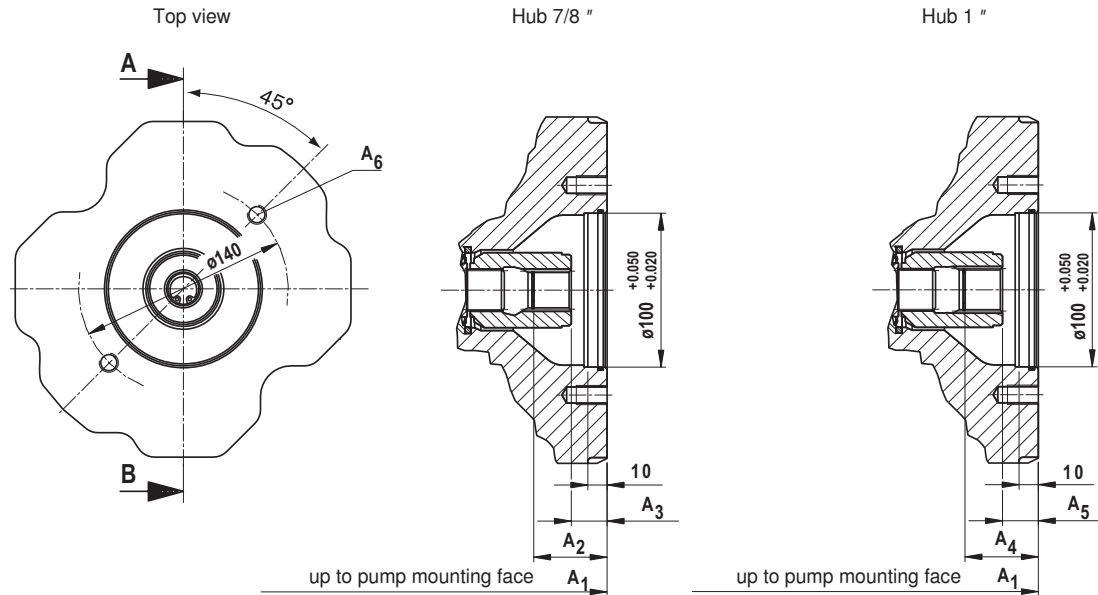
Unit dimensions: Through-drives (dimensions in mm)

KD3

Flange ISO 100, 2-hole for the attachment of

- SYDFE.-2X (size 28 and size 45, flange A)
- A10VSO..31 (size 28 and size 45, flange A, see data sheet 92711)

Sectional presentation with examples for hubs
(order number for hubs see page 21)



Size	A1	A2	A3	A4	A5	A6
28	204	41.7	17.8	-	-	M12; 15 right through
45	229	41.7	17.9	46.7	18.4	M12; 14 right through
71	267	44.1	20.3	49.1	20.8	M12; 20 deep
100	338	41	17.6	45.9	18.2	M12; 20 deep
140	350	41.1	18	45.9	18.3	M12; 20 deep

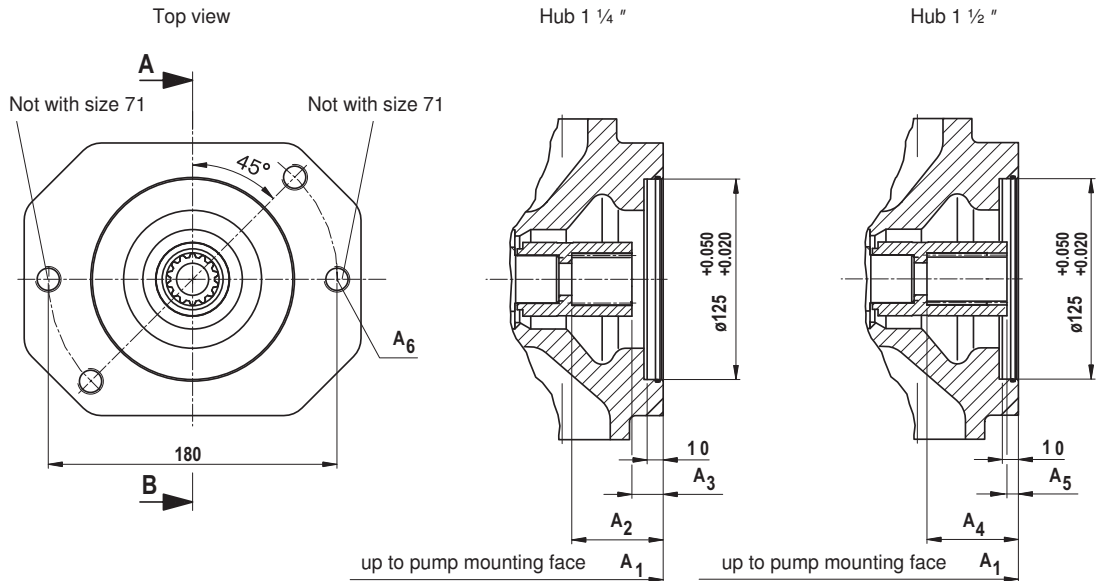
Unit dimensions: Through-drives (dimensions in mm)

KD5

Flange ISO 125, 2-hole for the attachment of

- SYDFE.-2X (size 71 and size 100, flange A)
- A10VSO..31 (size 71 and size 100, flange A, see data sheet 92711)

Sectional presentation with examples for hubs
(order number for hubs see page 21)

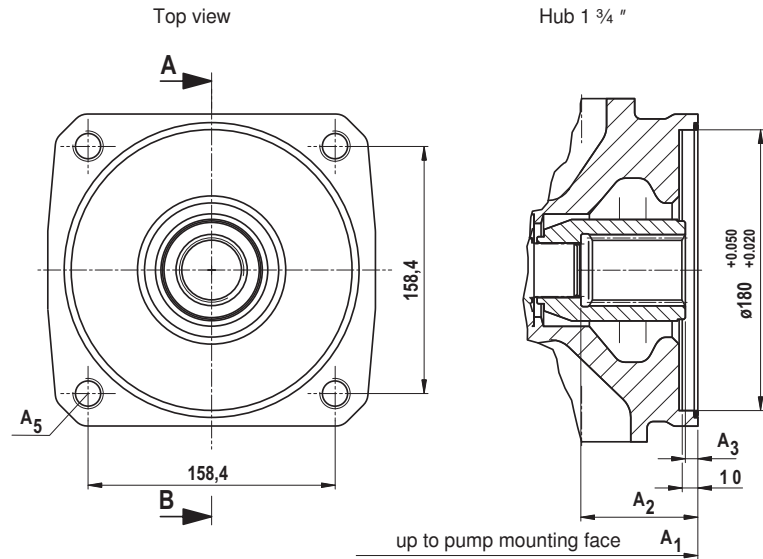


Size	A1	A2	A3	A4	A5	A6
71	267	58.6	21.8	-	-	M16; 20 right through
100	338	56.4	19.5	63.9	7.9	M16; 20 deep
140	350	55.4	17.4	73.3	7.9	M16; 24 deep

Unit dimensions: Through-drives (dimensions in mm)

- KD7** Flange ISO 180, 4-hole for the attachment of
- SYDFE.-2X (size 140, flange B)
 - A10VSO..31 (size 140, flange B, see data sheet 92711)

Sectional presentation with examples for hubs
(order number for hubs see page 21)



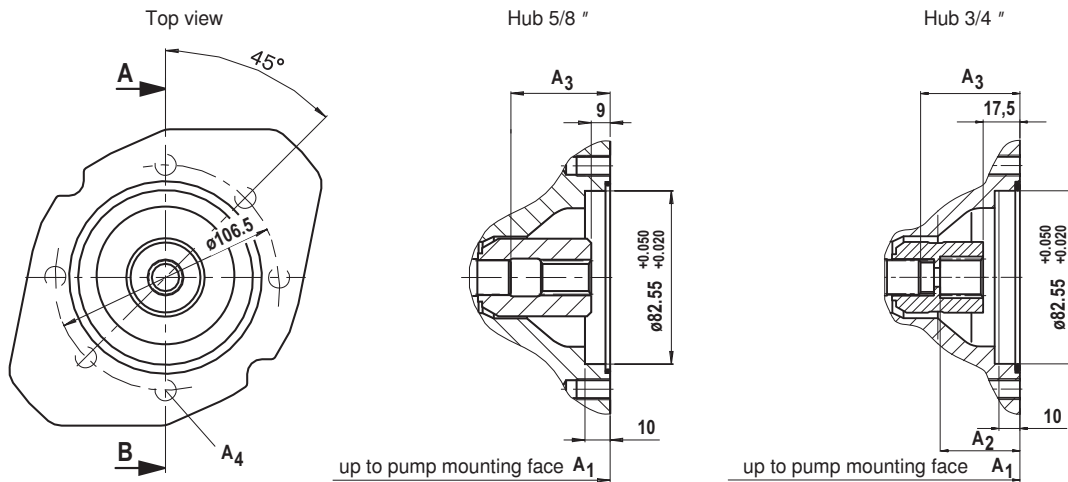
Size	A1	A2	A3	A5
140	350	75	8	M16; 22 right through

Unit dimensions: Through-drives (dimensions in mm)

KC1

- Flange SAE 82-2 (SAE A, 2-hole) for the attachment of
- SYDFE.-2X (size 18, flange C)
 - A10VSO..31 (size 18, flange C, see data sheet 92711)
 - PGF2 (shaft J, flange U2, see data sheet 10213)
 - PGH2 and PGH3 (shaft R, flange U2, see data sheet 10223)
 - AZPF (shaft R, front cover R, see data sheet 10089)

Sectional presentation with examples for hubs
(order number for hubs see page 21)



Size	A1	A2	A3	A4
18	182	40	43	M10; 14.5 deep
28	204	39	47	M10; 16 deep
45	229	40.5	53	M10; 16 deep
71	267	40	61	M10; 20 deep
100	338	40	65	M10; 20 deep
140	350	41	77	M10; 17 deep

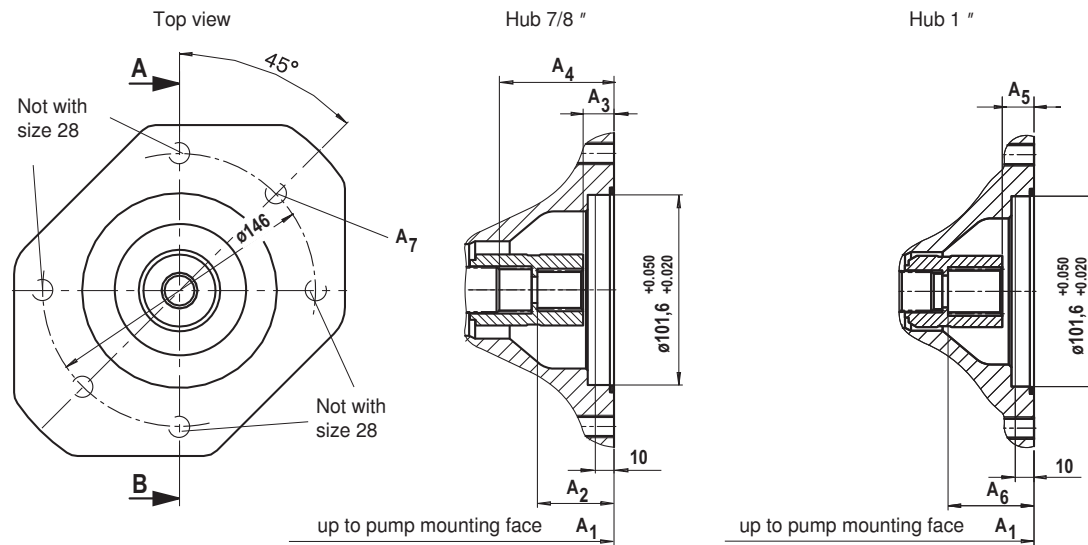
Unit dimensions: Through-drives (dimensions in mm)

KC3

Flange SAE 101-2 (SAE B, 2-hole) for the attachment of

- SYDFE.-2X (size 28 and size 45, flange C)
- A10VO..31 (size 28 and size 45, flange C, see data sheet 92701)
- PGF3 (shaft J, flange U2, see data sheet 10213)
- PGH4 (shaft R, flange U2, see data sheet 10223)

Sectional presentation with examples for hubs
(order number for hubs see page 21)



Size	A1	A2	A3	A4	A5	A6	A7
28	204	43	16.5	47	-		M12; 15 deep
45	229	42	16.5	53	18.4	46.7	M12; 18 deep
71	267	43	16.5	61	20.8	49.1	M12; 20 deep
100	338	41	16.5	65	10.5	65	M12; 20 deep
140	350	44	16.5	77	18.3	45.9	M12; 20 deep

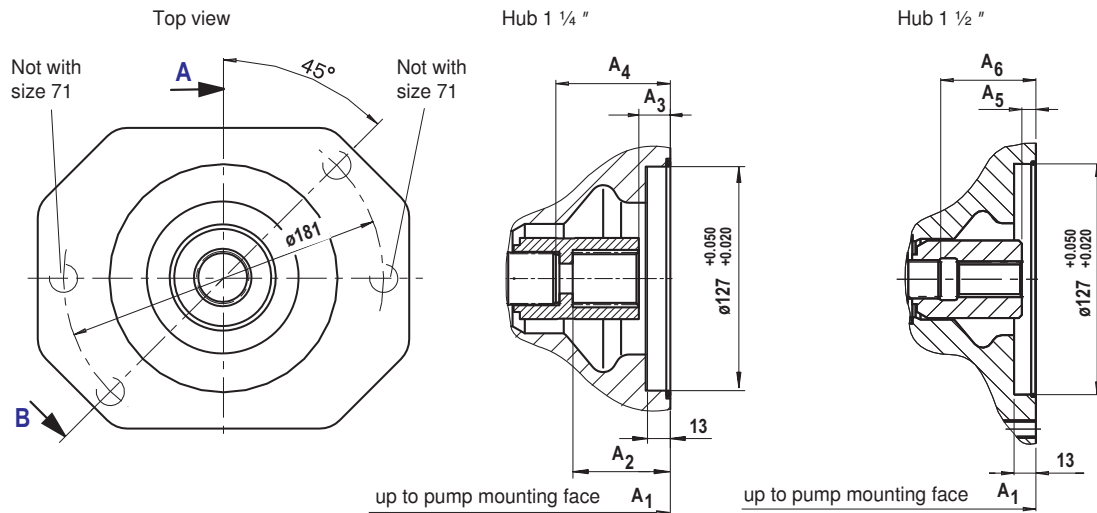
Unit dimensions: Through-drives (dimensions in mm)

KC5

Flange SAE 127-2 (SAE C, 2-hole) for the attachment of

- SYDFE.-2X (size 71 and size 100, flange C)
- A10VO..31 (size 71 and size 100, flange C, see data sheet 92701)
- PGH5 (shaft R, flange U2, see data sheet 10223)

Sectional presentation with examples for hubs
(order number for hubs see page 21)



Size	A1	A2	A3	A4	A5	A6	A7
71	267	55.5	17.9	61	-	-	M16; 18 deep
100	338	57	17.9	65	8	65	M16; 25 deep
140	350	60	17.9	77	9	77.3	M16; 32 deep

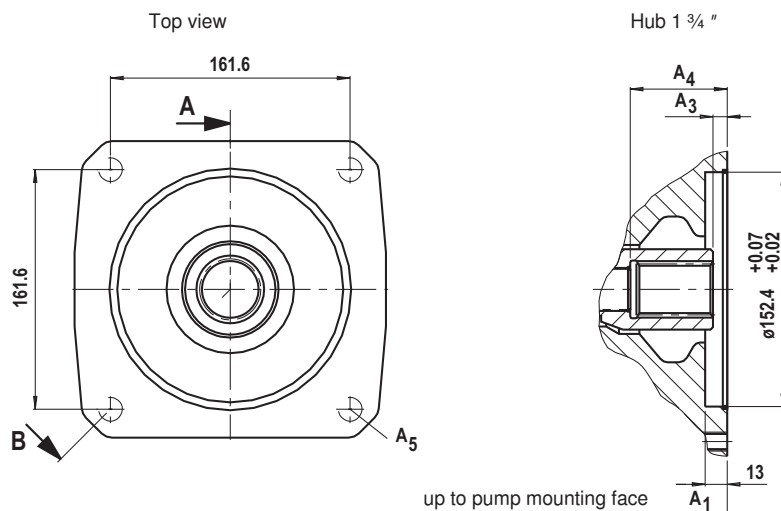
Unit dimensions: Through-drives (dimensions in mm)

KC6

Flange SAE 152-4 (SAE D, 4-hole) for the attachment of

- SYDFE.-2X (size 140, flange D)
- A10VO..31 (size 140, flange D, see data sheet 92701)

Sectional presentation with examples for hubs
(order number for hubs see page 21)



Size	A1	A3	A4	A5
140	350	10.5	77	M16; 24 deep

Torsionally flexible couplings for attachment to a standard electric motor

Motor		SYDFE.-2X		
Frame size/ characteristic	Shaft diameter	Size 18 Shaft S, 3/4 "	Size 28 Shaft S or R, 7/8 "	Size 45 Shaft S or R, 1 "
100/0 112/0	28		R901038012	R901038017
132/0	38	R900704699	R901012344	R900772898
160/0	42	R900726977	R900991864	R900994283
180/0	48		R900032918	R900062159
200/0	55		R901038026	R901038025
225/0	60		R900750847	R901066409
250/0	65			R900988348

Motor		SYDFE.-2X		
Frame size/ characteristic	Shaft diameter	Size 71 Shaft S or R, 1 ¼ "	Size 100 Shaft S, 1½ "	Size 140 Shaft S, 1 ¾ "
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.
- Supplementary notices on the SYDFE control system can be found in 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 DFE n 5000	62240
Data sheet for axial piston variable displacement pump A10VSO.../31	92711
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 12-1X and HM 13-1X	29933
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 the address http://www.boschrexroth.com/sydfc (English) or http://www.boschrexroth.de/sydfc (German).	

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