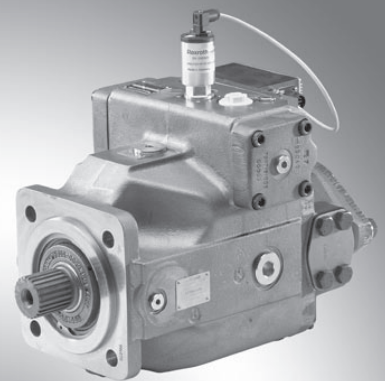


Pressure and flow control system

RE 30035/10.09
Replaces: 12.03

1/28

Type SYHDFEE, SYHDFEC, SYHDFEnSize 125 to 355
Component series 1X
Maximum operating pressure 350 bar

H7126/06

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Features

An SYHDFE.-1X control system serves the electro-hydraulic control of swivel angle, pressure and power (partially optional, see pages 3 and 4) of an axial piston unit.

The control system consists of the following components:

- A4VSO axial piston pump optimized for the operation in the control system
- VT-DFP.-2X proportional valve as pilot valve with integrated electronics including inductive position transducer for valve position sensing.
- Position transducer for sensing the swivel angle
- Pressure transducer with suitable signal level and dynamics (separate order)

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code: Pump of the SYHDFE.-1X control system

SYHDFE.-1X/	125	R	-	V	Z	B	25	U99	-	0000	-	...
1	2	3		4	5	6	7	8		9		See following pages

Series

1	Control system with integrated analog electronics	SYHDFEE-1X
	Control system with integrated digital electronics	SYHDFEC-1X
	Control system with integr. dig. electronics, variable-speed (in preparation)	SYHDFEn-1X

Size type code

		125	180	250	355
2	Displacement cm ³	125	180	250	355

Direction of rotation looking at the drive shaft

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

Hydraulic fluid

4	Mineral oil according to DIN 51 524 (HL/HLP)	●	●	●	●	V
	HFC	●	●	●	●	F

Drive shaft variant

5	Cylindrical with key DIN 6885	●	●	●	●	P
	Splined shaft profile DIN 5480	●	●	●	●	Z

Connection flange

6	ISO 4-hole	●	●	●	●	B
---	------------	---	---	---	---	---

Connection for actuator lines

7	Port B and S: SAE, laterally displaced by 90 °, metric mounting thread, 2nd pressure port B1 vis-à-vis B – upon delivery closed by means of flange plate	●	●	●	●	25
---	----------------------------------------------------------------------------------------------------------------------------------------------------------	---	---	---	---	----

Through-drive (see table page 20)

8	Universal through-drive, convertible, without hub, without intermediate flange closed by means of cover	●	●	●	●	U99
---	---------------------------------------------------------------------------------------------------------	---	---	---	---	-----

Base pump variant

9	Standard (internal pilot oil)	●	●	●	●	0000
	External supply	●	●	●	●	0576

● = Available

- = Not available

--

 Standard program

Ordering code: Pilot valve of the SYHDFEE control system

SYHDFEE-1X/	125	R	-	V	Z	B	25	U99	-	0000	-	A	0	A	0	V	-	*
1	2	3		4	5	6	7	8		9		10	11	12	13	14		15

Spool design

10	Standard	A
	4-groove spool e.g. for HFC	C

Valve, installation orientation

11	Integrated electronics parallel to the pump axis direction subplate	0
----	---------------------------------------------------------------------	---

Additional functions: Closed-loop control

		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

		A	B	C	D	
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 13)

		Plug-in connector	
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

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

Ordering code: Pilot valve of the SYHDFEC/SYHDFEn control system

SYHDFEC-1X/	125	R	-	V	Z	B	25	U99	-	0000	-	A	0	A	0	V	-	*
1	2	3		4	5	6	7	8		9		10	11	12	13	14		15

Spool design

10	Standard	A
	4-groove spool e.g. for HFC	C

Valve installation orientation

11	Integrated electronics parallel to the pump axis direction subplate	0
----	---------------------------------------------------------------------	---

Additional functions

12	Standard	A
----	----------	---

Electronics assembly, options

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

Actual pressure value input

Parameter setting ex factory

(description of the plug-in connectors on pages 14 and 15)

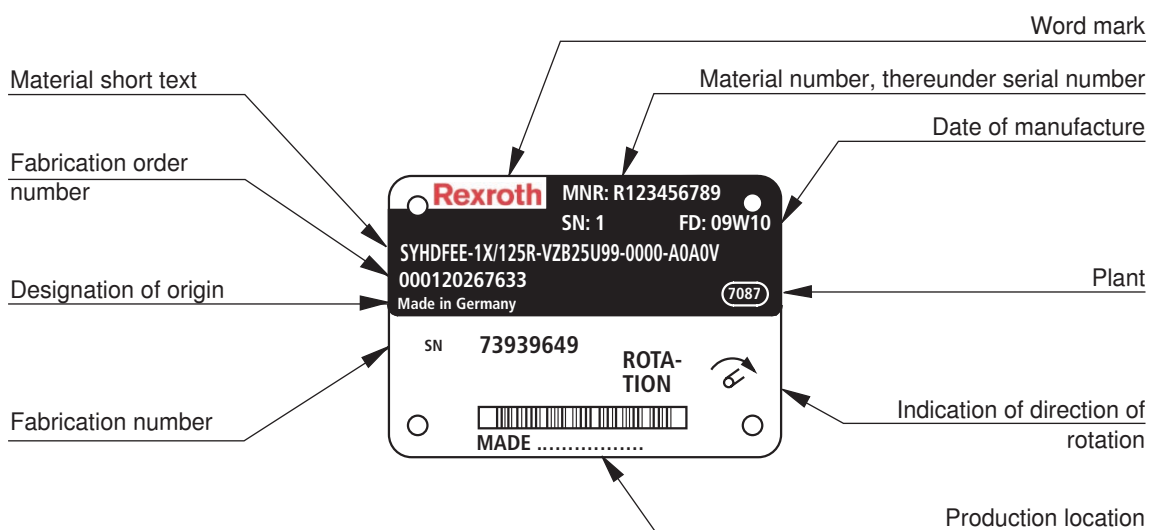
Plug-in connector

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 ¹⁾	X2	F

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

¹⁾ When using the SYHDFEn 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.

Example of a nameplate



Note:

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

Ordering code: Accessories

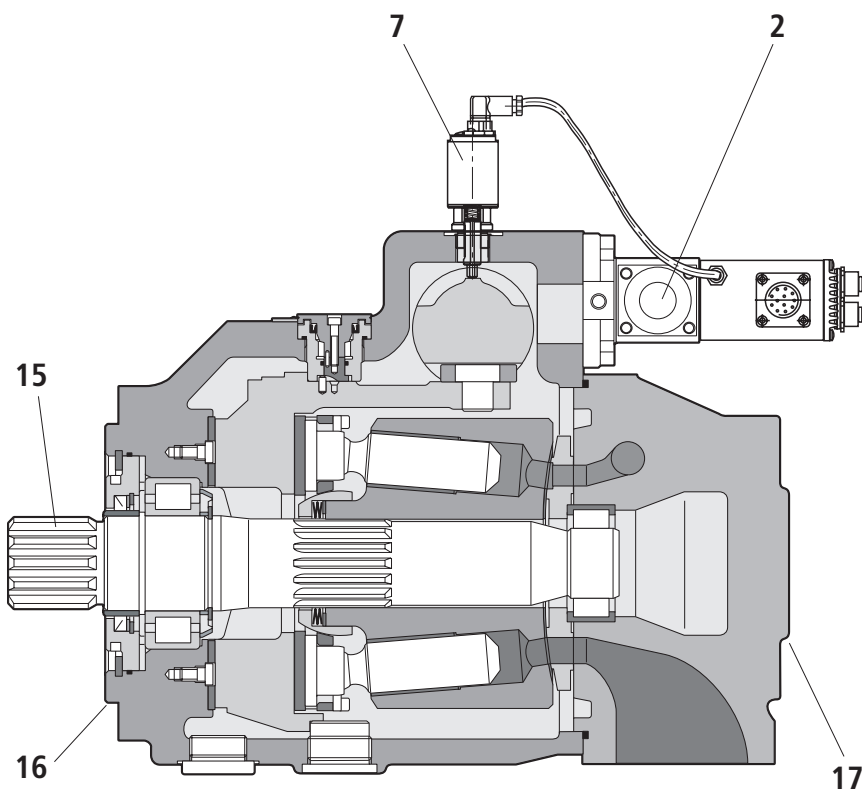
Version 4/2009, enquire availability

Accessory for SYHDFEE, SYHDFEC and SYHDFEn	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	
Pressure transducer HM 12-1X measurement range 315 bar (4...20 mA)	R900199871	RE 29933
Pressure transducer HM 13-1X measurement range 315 bar (0...10 V)	R900174374	RE 29933
Pressure transducer HM 17-1X measurement range 315 bar (4...20 mA)	R900773065	RE 30269
Pressure transducer HM 17-1X measurement range 315 bar (0.1...10 V)	R900773124	RE 30269
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

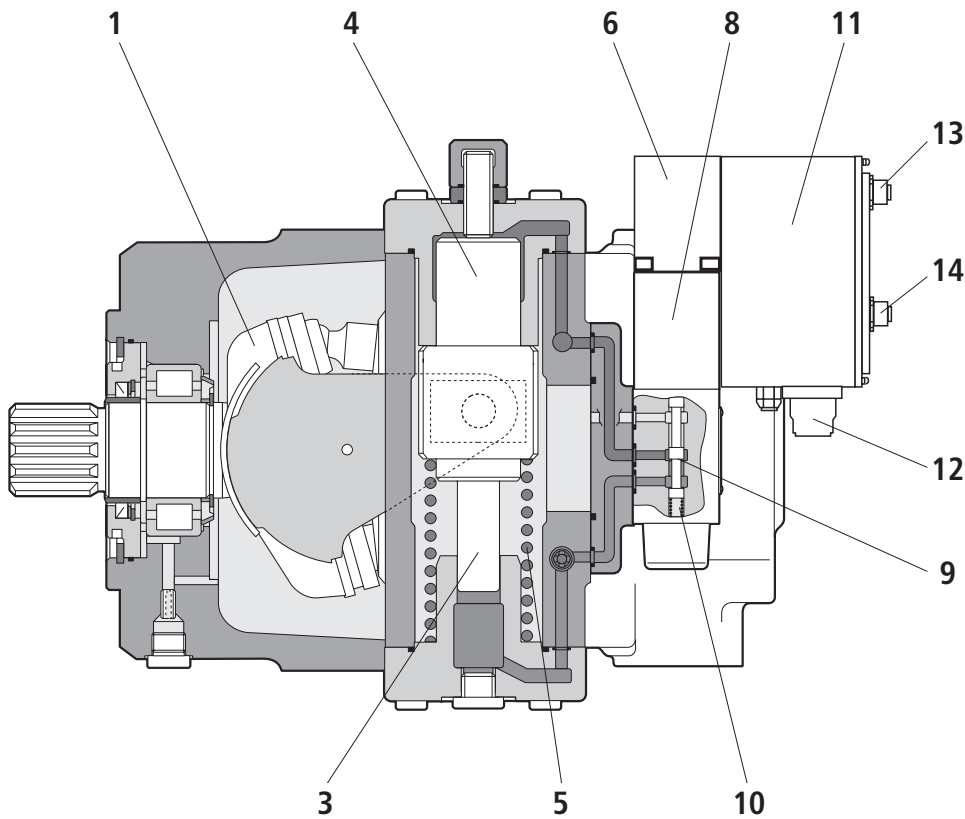
Accessories only for SYHDFEC and SYHDFE (serial access)	Material number	Data sheet
Converter USB/serial for laptops without serial interface VT-ZKO-USB/S-1-1X/V0/0	R901066684	
Cable for connecting a WIN-PED PC (RS232) to the X2 interface Length 3 m	R901156928	
T connector for the simultaneous connection of a WIN-PED PC (RS232) and a pressure transducer at plug-in connector X2 (only necessary with actual pressure value input 0.5...5 V (feature 14 = F)	R901117164	

More accessories	Page
Hubs for through-drives	20
Hubs for the coupling to a standard electric motor	27

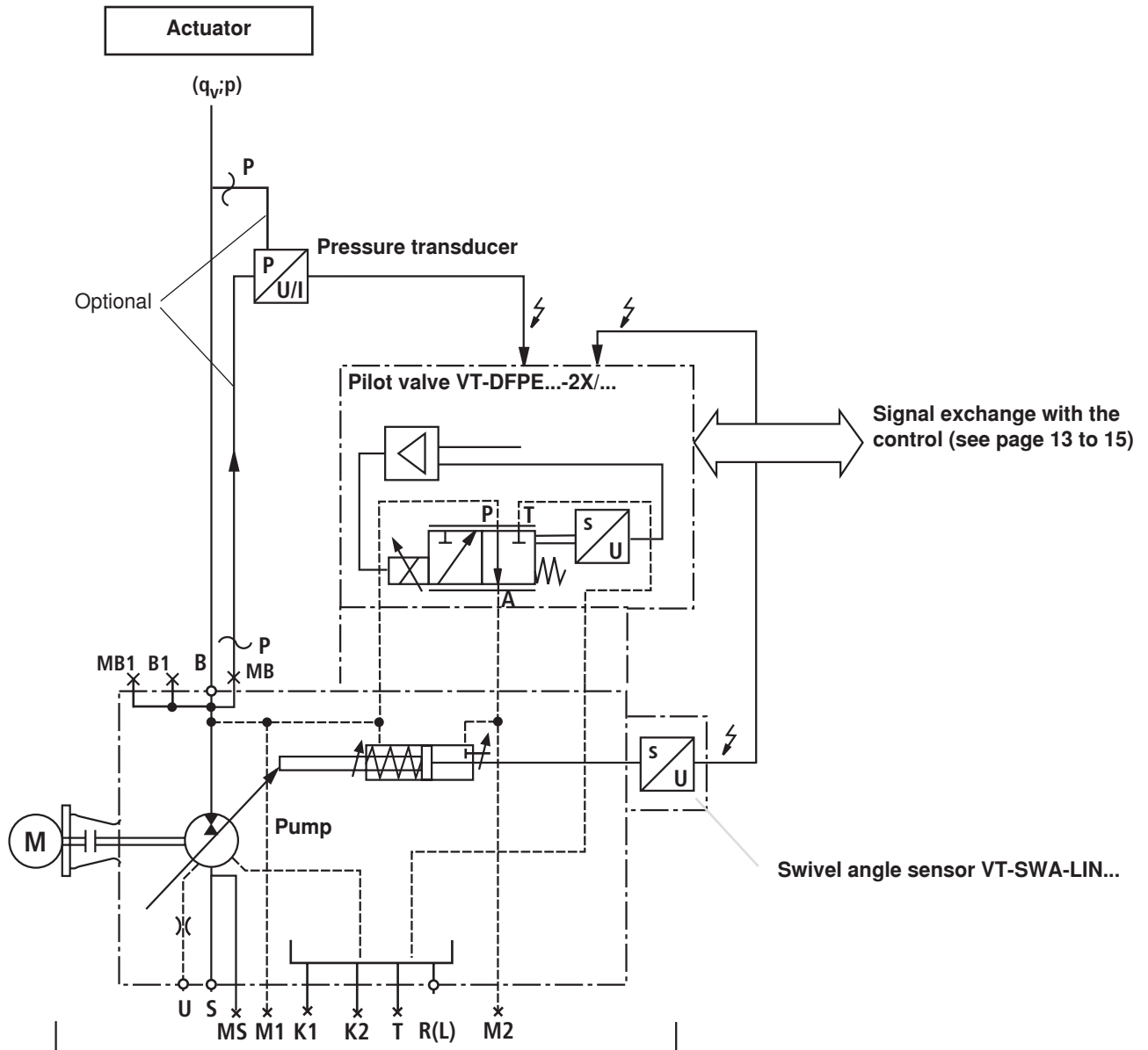
Section



- 1 Swash plate
- 2 Pilot valve
- 3 Counter spool
- 4 Actuating piston
- 5 Spring
- 6 Inductive position transducer
- 7 Swivel angle position sensor with integrated electronics VT-SWA-LIN
- 8 Proportional solenoid
- 9 Valve spool
- 10 Spring
- 11 Integrated electronics
- 12 Connector X1
- 13 Connector X2 (for SYHDFEE only with actual pressure value input F, for SYHDFEC and SYHDFEn always available)
- 14 Mating connector X3 for connecting the CAN bus (only available with SYHDFEC and SYHDFEn)
- 15 Drive shaft
- 16 Connection flange
- 17 Subplate with through-drive U99, without hub, without intermediate flange



Schematic diagram: SYHDFE.-1X, actuating system supplied internally



S	Suction port
K1, K2	Flushing port
T	Fluid drain
MB	Measuring port operating pressure
MS	Measuring port suction pressure
M1, M2	Measuring port control chamber pressure
R(L)	Fluid filling + bleeding (leakage port)
U	Flushing port
B	Pressure port
B1	2. Pressure port/additional port
MB1	Measuring port operating pressure Size 250/355: G1/4 Size 125/180: Blind flange 1 1/4" with pressure measuring port G1/4 attached to B1

When using the HM16-1X/...C13 pressure transducer:

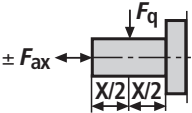
- Installation in MB (pump) in connection with electronic version "actual pressure value input F"
- For attaching an HM16-1X/...C13, an adapter from M14x1.5 to G1/4 (mat. no. R900695665) is necessary.
- Due to the installation position, the HM16 cannot be used for all sizes without restrictions (replacement: HM17-1X/...-F... with extension cable).

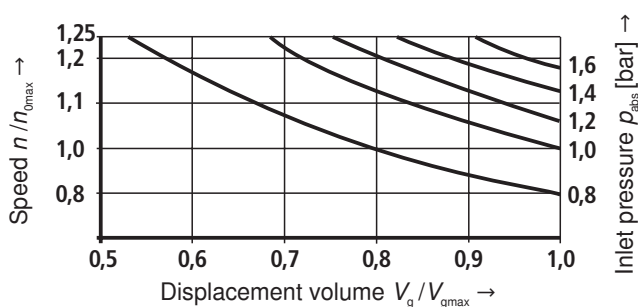
When using an external pressure transducer:

Installation in the B line (preferably close to the actuator) and electrical connection via the central connector X1

Explanation in the operating instructions (see page 27)

Technical data (For applications outside these parameters, please consult us!)**mechanical and hydraulic**

Size / displacement	$V_{g\ max}$ [cm ³]	125	180	250	355
Maximum speed ¹⁾	$n_{0\ max}$ [min ⁻¹]	1800	1800	1800	1500
Minimum speed	n_{min}	50 min ⁻¹			
Max. flow (displacement)					
at max. speed	$q_{v0\ max}$ [l/min]	225	324	450	533
at $n_E = 1500\ min^{-1}$	[l/min]	186	270	375	533
Max. power ($\Delta p = 350\ bar$)					
at max. speed	$P_{0\ max}$ [kW]	131	189	263	311
at $n_E = 1500\ min^{-1}$	[kW]	109	158	219	311
Max. torque ($\Delta p = 350\ bar$)	T_{max} [Nm]	696	1002	1391	1976
Max. admissible drive torque					
Key	T_{Total} [Nm]	1392	1400	2300	3557
Splined shaft Z overall torque	T_{Total} [Nm]	1392	2004	2782	3952
Max. admissible through-drive torque	T_D [Nm]	696	1002	1391	1976
 Drive shaft load $\pm F_{ax}$ – max. adm. axial force $X/2$ $X/2$ – max. admissible radial force ²⁾	$F_{ax\ max}$ [N] F_q [N]	1000 1600	1400 2000	1800 2000	2000 2200
Weight without filling quantity	m [kg]	88	102	184	207
Moment of inertia around drive axis	[kgm ²]	0.03	0.055	0.0959	0.19
Filling quantity, housing	[l]	5	4	10	8
Maximum admissible operating pressure ³⁾	p_{max}	350 bar			
Minimum operating pressure	p_{min}	$\geq 20\ bar$			
Admissible inlet pressure	p	0.8...30 bar			
Hydraulic fluid		Mineral oil (HL, HLP) according to DIN 51524 HFC optional (see ordering key)			
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 $\leq 4/6/14\ \mu m$)			



- ¹⁾ The values are applicable at an absolute pressure of 1 bar in suction port S. With a reduction of the displacement volume 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⁾ When using HFC fluids, also see RE 92053.

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

electrical					
Type			SYHDFEE...1X	SYHDFEC...1X	SYHDFEn...1X
Operating voltage	U_B		24 VDC +40 % -5 %	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_{Nominal}	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 type 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	100 Ω
	Analog voltage inputs	R_E	≥ 50 k Ω	≥ 100 k Ω	≥ 100 k Ω
	Digital inputs	Logic 0	≤ 0.6 V	≤ 8 V	≤ 8 V
		Logic 1	≥ 21 V	≥ 14 V	≥ 14 V
Outputs	$p_{\text{actual}} / U_{\text{OUT}}^{1)}$	U_A I_{\max}	0...10 V 1.5 mA	± 10 V 2 mA	± 10 V 2 mA
	$\alpha_{\text{actual}} / U_{\text{OUT}}^{2)}$	U_A I_{\max}	± 10 V 1.5 mA	± 10 V 2 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	0...50 °C
Storage temperature range (pump+electronics)		ϑ	0...70 °C	0...70 °C	0...70 °C
Electronic design			Integrated in the pilot valve (OBE)		
Electrical connection			See page 13 to 15		
Protection class according to EN 60529		Pump incl. pilot valve	IP 65 with mounted and locked plug-in connectors		
Power limitation			Optional	Yes	Yes

Note:

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

^{1, 2)} With SYHDFEC and SYHDFEn, the outputs are parameterizable, condition as supplied see pages 14/15

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

Bearing flushing

With the following operating conditions, flushing of the bearing is necessary for safe continuous operation:

- Applications with special fluids (not mineral fluids) due to limited lubricity and tight operating temperature range
- Operation with boundary conditions of temperature and viscosity with mineral oil operation

With vertical installation (drive shaft upwards), flushing of the bearing is recommended for lubricating the front bearing and the shaft seal ring.

The bearing is flushed via port "U" in the area of the front flange of the variable displacement pump. The flushing fluid flows through the front bearing and exits with the pump leakage at the leakage port.

For the individual sizes, the following flushing quantities are recommended:

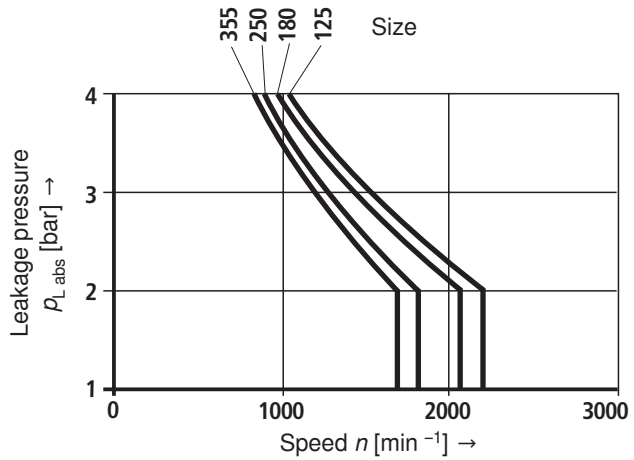
Size	125	180	250	355
Recommended flushing quantity q_{F1} [l/min]	5	7	10	15

The specified flushing quantities result in a pressure differential between port "U" (including fitting) and the leakage chamber of approx. 2 bar (series 1) and approx. 3 bar (series 3).

When using the external bearing flushing, the throttle screw in port U has to be screwed-in to the stop.

Leakage pressure

The admissible leakage pressure (housing pressure) depends on the speed (see diagram).



Max. leakage pressure (housing pressure)

$p_{L abs max} = 4 \text{ bar absolute}$

These specifications are reference values; under special operating conditions, a limitation may become necessary.

Flow direction

S → B

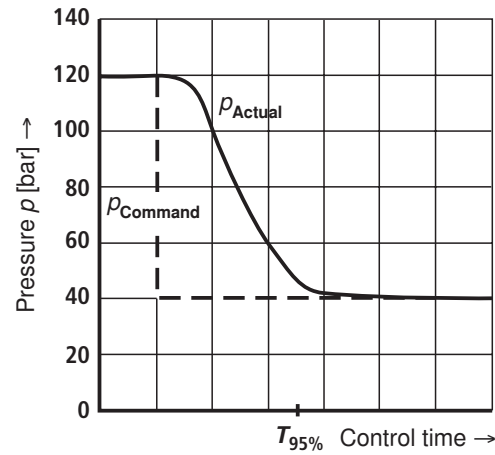
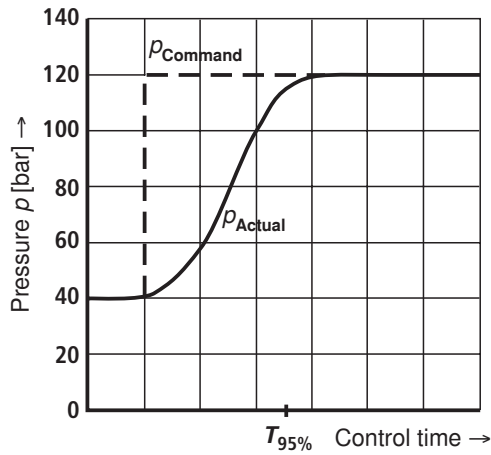
Closed control loop quality SYHDFEE (Specified values are only valid when using the system-related components according to the type code)

	Closed-loop swivel angle control	Closed-loop pressure control ¹⁾
Linearity tolerance	≤ 1.0 %	≤ 1.5 %
Temperature error	≤ 0.5 % / 10 K	≤ 0.5 % / 10 K
Hysteresis	Typically 0.3 %	≤ 0.2 %
Repeatability	≤ 0.2 %	≤ 0.2 %

¹⁾ without considering pump pulsation

Transition function with pressure command value step-change, SYHDFE. with 360° spool (design "A")

The specified curve shapes and control times are only reached with an optimization of the pressure controller.



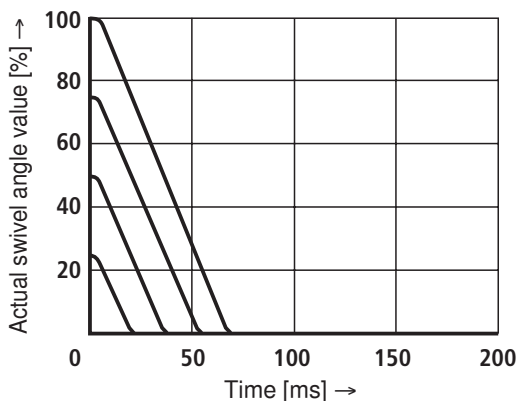
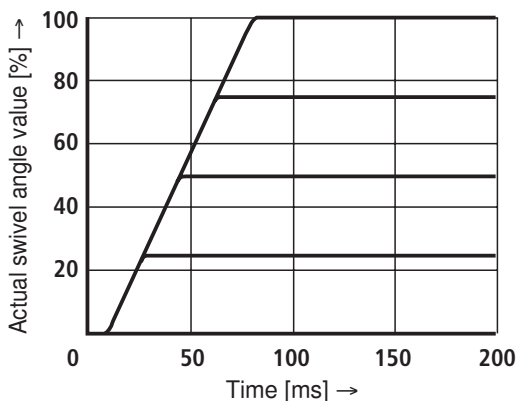
$T_{95\%}$ in ms with a connected hydraulic fluid volume (lines and actuators)

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

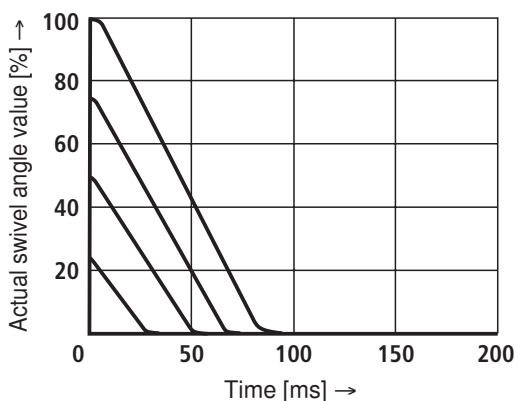
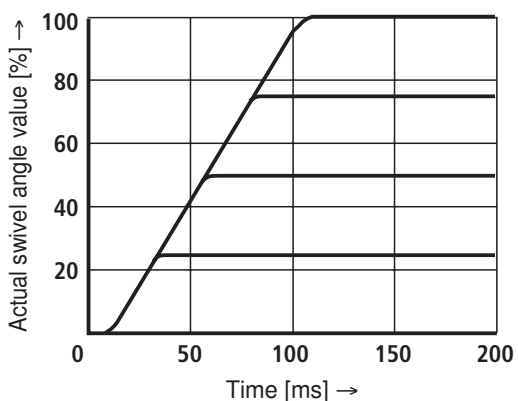
For pressures up to 40 bar, the values of the response times are larger.

Transition function with swivel angle command value step change with 360° spool (design “A”)

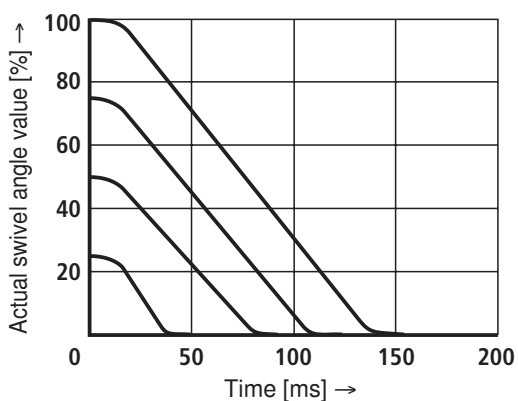
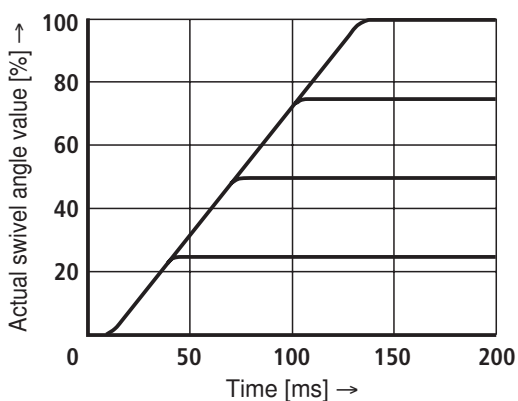
Size 125 $p = 100$ bar



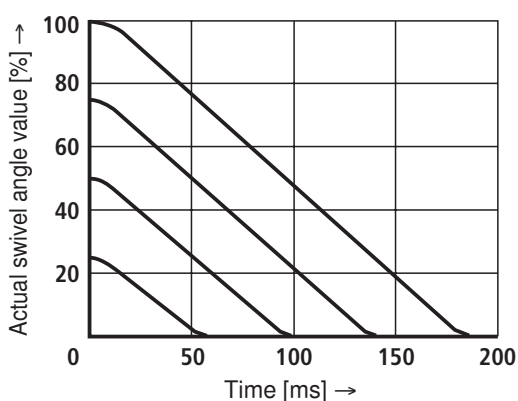
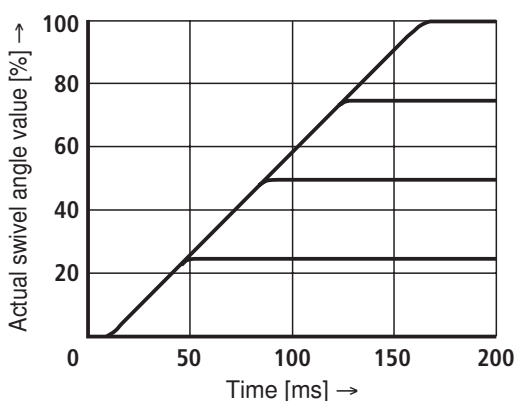
Size 180 $p = 100$ bar



Size 250 $p = 100$ bar



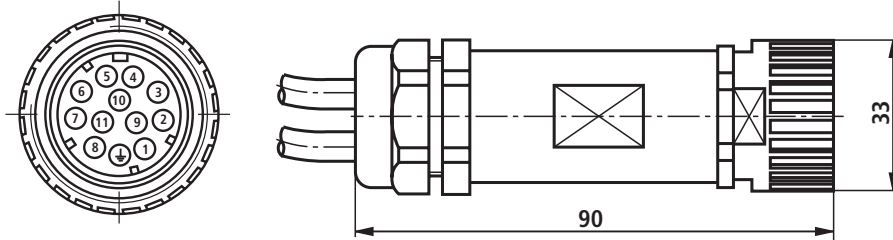
Size 355 $p = 100$ bar



Electrical connection: SYHDFEE...1X

X1: Central connection

Mating connector according to EN 175201-804 (12-pin), ordering code see section Accessories on page 5



Device of connector allocation 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
2	0 V = L0	Reference potential for the voltage supply	-		2
PE	Earth	Earthing connection for the electronics	-		Green/yellow
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
7	p_{Command}	Pressure command value	IN	Analog 0...10 V	Pink
8	p_{Actual}	Actual pressure value normalized	OUT	Analog 0...10 V	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 in the type code. With type "F" (0.5...5 V) reserved	IN	Analog	Black
11	Actual pressure value L		-	Analog	Blue
n.c.					Gray

Supply line 3 x 1.0 mm²

Supply line 10 x 0.14 mm² shielded (one end of the shield must be connected to the control!)

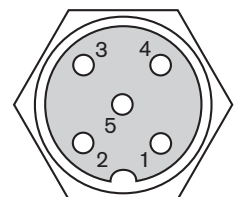
Functions at pin 9

Pin	Additional function	Function in dependence on feature 12 of the ordering code (see page 4)	Signal direction	Type of signal
9	...A...	Switching to different oil volume adjustment (switch TD)	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

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.

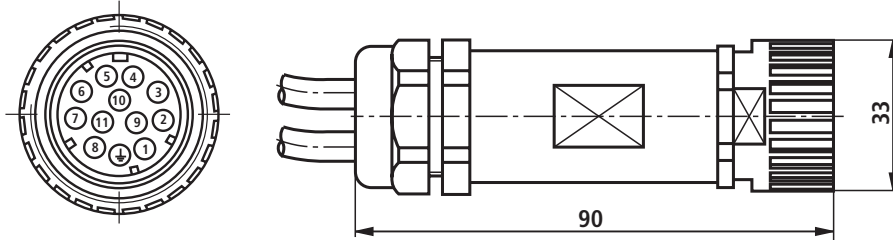
Top view
mating connector



Electrical connection: SYHDFEC...1X

X1: Central connection

Mating connector according to EN 175201-804 (12-pin), ordering code see section Accessories on page 5

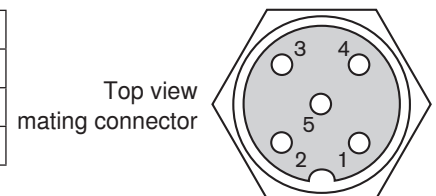


Device of connector allocation or mating connector and cable set

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 mm ²
2	0 V = L0	Reference potential for the voltage supply	-		2	
PE	Earth	Earthing connection for the electronics	-		Green/yellow	
3	Failure	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	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 in the type code. With type "F" (0.5...5 V) reserved	IN	Analog	Black	
11	Actual pressure value L		-	Analog	Blue	
n.c.					Gray	

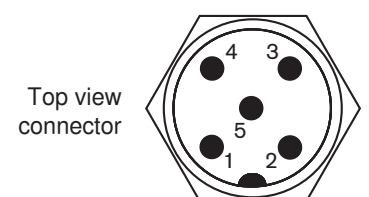
X2: Connection of pressure transducer HM 16 and serial interface RS232 (mating connector M12)

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)

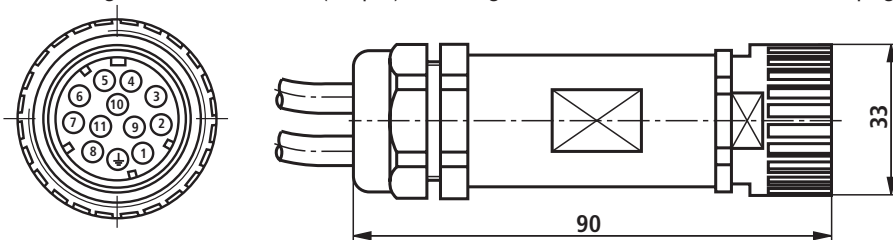
Pin	Signal input	Pin	Signal CAN
1	n.c.	3	CAN GND
2	IN, digital IN2 (DI2)	4	CAN-HIGH
		5	CAN-LOW



Electrical connection: SYHDFEn...1X

X1: Central connection

Mating connector according to EN 175201-804 (12-pin), ordering code see section Accessories on page 5

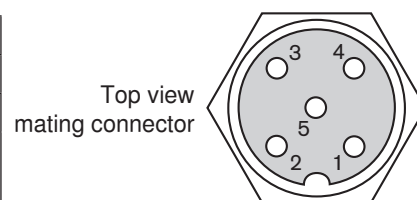


Device of connector allocation or mating connector and cable set

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 mm ²
2	0 V = L0	Reference potential for the voltage supply	-		2	
PE	Earth	Earthing connection for the electronics	-		Green/yellow	
3	Failure	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	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 Standard: Synchronization bit DI1	IN	Logic 24 V	Brown	
10	Actual pressure value H	Actual pressure value input: Signal level depends on feature 14 in the type code. With type "F" (0.5...5 V) reserved	IN	Analog	Black	
11	Actual pressure value L		-	Analog	Blue	
n.c.					Gray	

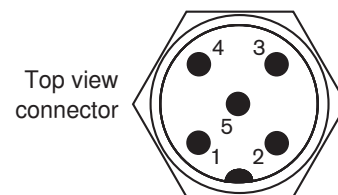
X2: Serial interface RS232 and a selectable digital input S1/pressure transducer input for HM 16 (mating connector M12)

Pin	Signal input	Pin	Signal RS232
1	OUT, $+U_B$	2	RxD
3	Reference L0		
4	Analog input 0.5...5 V for HM 16 Digital input 0 V low, 10 V high (max. 12 V) Standard: Variable-speed operation ON, S1	5	TxD



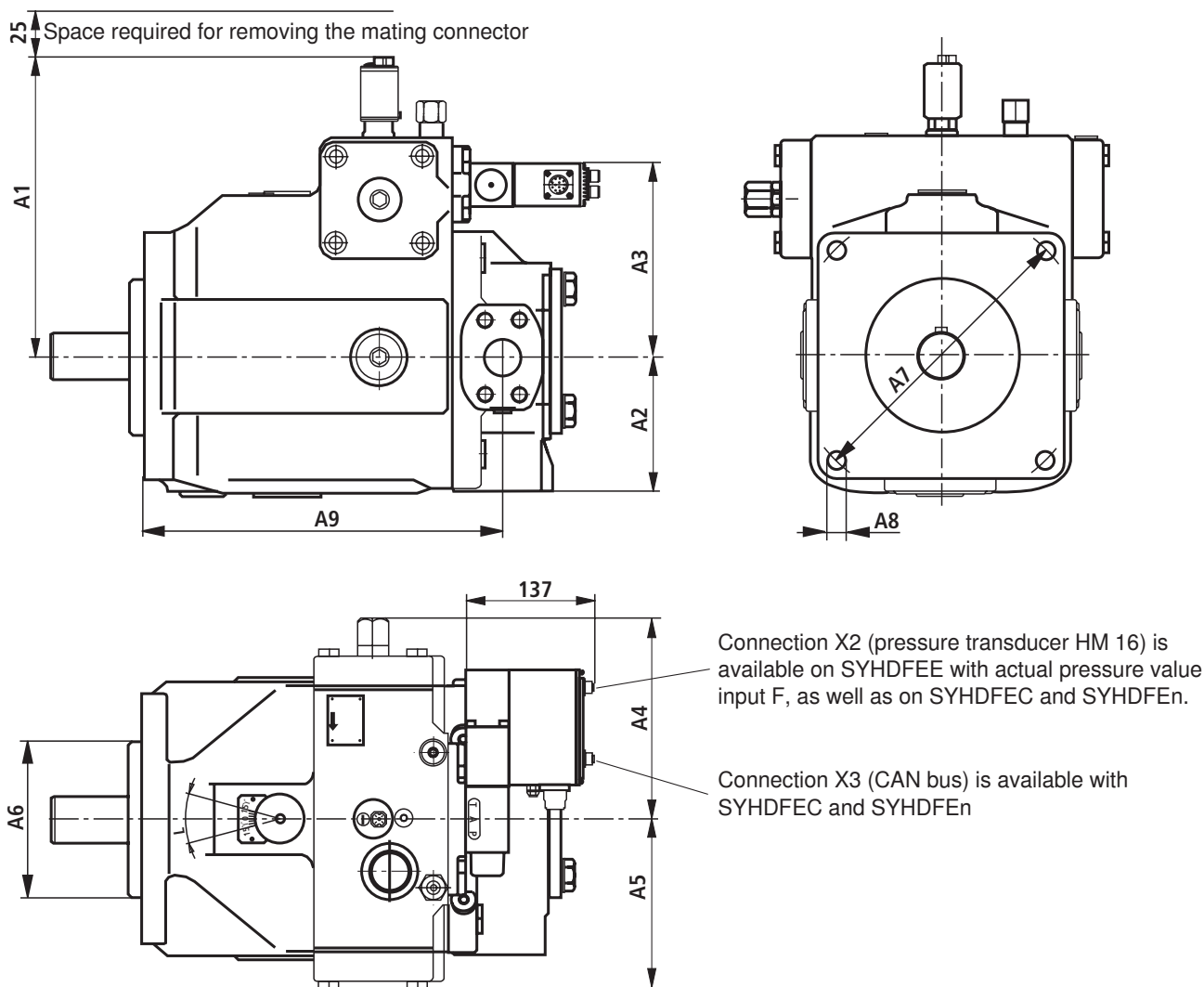
X3: CAN bus and digital input 2 (connector M12)

Pin	Signal input	Pin	Signal CAN
1	n.c.	4	CAN-HIGH
2	IN, digital IN2 Standard: Start Teach-in, S2	5	CAN-LOW
3	Reserved		



Unit dimensions: SYHDFE. (dimensions in mm)

The unit dimensions of the base pump are contained in data sheet RE 92050



Size	A1	A2	A3	A4	A5	A6	A7	A8	A9
125	276	112.5	159	177	137	160	200	20	310
180	276	116	159	177	137	160	200	20	318
250	323	144	206	212	172	224	280	24	380
355	323	144	206	212	172	224	280	24	393

Shaft ends:

Size	Shaft Ø	= P ¹⁾	= Z ²⁾
125	50	AS 14x9x80	W 50x2x30x24x9g
180	50	AS 14x9x80	W 50x2x30x24x9g
250	60	AS 18x11x100	W 60x2x30x28x9g
355	70	AS 20x12x100	W 70x3x30x22x9g

¹⁾ Cylindrical with key DIN 6885

²⁾ Splined shaft profile DIN 5480

Through-drives: Torques

The control systems are supplied with universal through-drives U99.

Their advantage is that the through-drive can be converted subsequently.

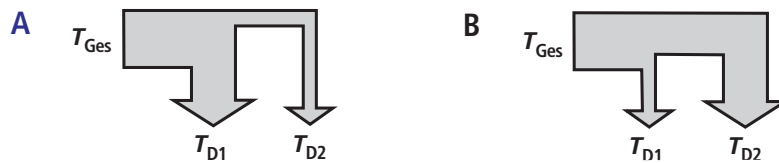
By simply exchanging the intermediate flange and the hub, the through-drive can be adjusted to the on-site requirements.

The assemblies as exchange kits can be ordered separately, see "Accessories for through-drives" on p. 19 as well as RE 95581.

Admissible drive and through-drive torques

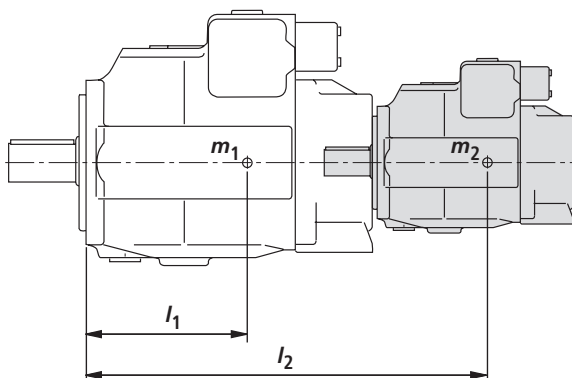
Size		125	180	250	355
Splined shaft					
Maximally admissible total drive torque at the shaft of the pump 1 (Pump 1 + Pump 2)					
	$T_{Total\ max}$ [Nm]	1392	2004	2782	3952
A Admissible through-drive torque	$T_{D1\ max}$ [Nm]	696	1002	1391	1976
	$T_{D2\ max}$ [Nm]	696	1002	1391	1976
B Admissible through-drive torque	$T_{D1\ max}$ [Nm]	696	1002	1391	1976
	$T_{D2\ max}$ [Nm]	696	1002	1391	1976

Distribution of the torques



Admissible inertial torque

Related to connection flange of the main pump



m_1, m_2 [kg] Weight of the pump

l_1, l_2 [mm] Distance of the center of gravity

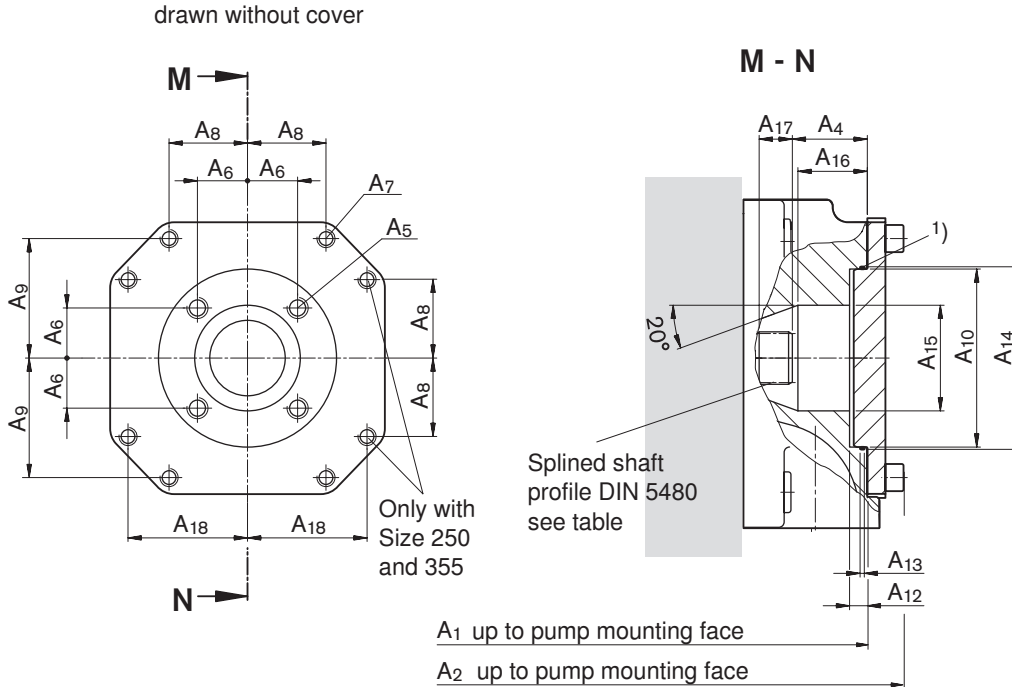
$$T_m = m_1 \cdot l_1 \cdot \frac{1}{102} + m_2 \cdot l_2 \cdot \frac{1}{102} \text{ [Nm]}$$

Size		125	180	250	355
Admissible inertial torque	$T_{m\ adm.}$ [Nm]	4200	4200	9300	9300
Admissible inertial torque with dynamic mass acceleration of $10\ g = 98.1\ m/sec^2$	$T_{m\ adm.}$ [Nm]	420	420	930	930
Weight (SYHDFE or A4VSO...DR)	m [kg]	88	102	184	207
Distance of the center of gravity	l_1 [mm]	170	180	210	220

Unit dimensions: Through-drive U99 (dimensions in mm)

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

U99 **Size 125 to 355**
 with through-drive shaft, without hub, without intermediate flange, closed by means of a pressure-tight cover in a fluid-tight way



Size Main pump	A ₁	A ₂	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₂	A ₁₃
125	347	368	49.7±1	M14; 15 deep	33.2 ^{+0.15}	M12; 18 deep	-	79.2 ^{+0.15}	∅118 ^{H7}	9	2.8 ^{+0.2}
180	371	392	49.7±1	M14; 15 deep	33.2 ^{+0.15}	M12; 18 deep	-	79.2 ^{+0.15}	∅118 ^{H7}	9	2.8 ^{+0.2}
250	431	455	61.4±1	M20; 22 deep	44.5 ^{+0.15}	M10; 15 deep	58.15 ^{+0.15}	86.2 ^{+0.15}	∅160 ^{H7}	9	2.8 ^{+0.2}
355	460	487	61.4±1	M20; 22 deep	44.5 ^{+0.15}	M10; 15 deep	58.15 ^{+0.15}	86.2 ^{+0.15}	∅160 ^{H7}	9	2.8 ^{+0.2}

Size Main pump	A ₁₄	A ₁₅	A ₁₆	A ₁₇	A ₁₈	Splined shaft profile DIN 5480	¹⁾ O-ring for subsequent attachment (included in the delivery)
125	∅121 ^{+0.1}	∅70	46	22	-	W35x1.25x26x9g	118 x 2
180	∅121 ^{+0.1}	∅70	46	25	-	W35x1.25x26x9g	118 x 2
250	∅163 ^{+0.1}	∅87	64	30.5	86.2 ^{+0.15}	W42x1.25x32x9g	160 x 2
355	∅163 ^{+0.1}	∅87	64	34	86.2 ^{+0.15}	W42x1.25x32x9g	160 x 2

Accessories for through-drives

Mounting kits for axial piston variable displacement pumps and SYHDFE control systems

The order numbers for the combination of pumps are contained in the subsequently shown table and in data sheet RE 95581.

Components universal through-drive	Main pump SYHDFE.-1X		Attachment pump			
	Size 125 Size 180	Size 250 Size 350	Size and type		Through-drive Centering Hub	Flange designation
Mounting kit	R902447035	R902447037	Size 18	SYDFE.-2X	U52	SAE J744 82-1 (A-B)
Flange kit	R902446836	R902446850			82.55 mm	
Hub	R902446823	R902446843			3/4 "	
Mounting kit	R902446996	R902446998	Size 28	A10VSO / BR31 Shaft S or R	UB3	ISO 3019-2 100B2HW
Flange kit	R902446808	R902446809			100 mm	
Hub	R902446824	R902446844			7/8 "	
Mounting kit	R902447001	R902447003	Size 45		UB4	ISO 3019-2 100B2HW
Flange kit	R902446808	R902446809			100 mm	
Hub	R902446825	R902446845			1 "	
Mounting kit	R902447014	R902447016	Size 71	SYDFE.-3X	UB8	ISO 3019-2 160B4HW
Flange kit	R902446816	R902446817			160 mm	
Hub	R902446826	R902443227			1 ¼ "	
Mounting kit	R902447021	R902447022	Size 100	A10VSO / BR32 Shaft S or R	UB9	ISO 3019-2 180B4HW
Flange kit	R902446818	R902446820			180 mm	
Hub	R910943555	R910921237			1 ½ "	
Mounting kit	R902447025	R902447026	Size 140		UB7	ISO 3019-2 180B4HW
Flange kit	R902446818	R902446820			180 mm	
Hub	R910904588	R902446849			1 ¾ "	
Mounting kit	R902447019	R902447020	Size 125 Size 180	SYHDFE-1X	U34	ISO 3019-2 160B4HW
Flange kit	R902446816	R902446817			160 mm	
Hub	R902446848	R902446830			W 50x2x24x9g	
Mounting kit		R902447028	Size 250	A4VSO / B Shaft Z	U35	
Flange kit		R902446822			224 mm	
Hub		R910902972			W 60x2x28x9g	
Mounting kit		R902447029	Size 355		U77	
Flange kit		R902446822			224 mm	
Hub		R910941327			W 70x3x22x9g	

Accessories for through-drives

Mounting kits for gear pumps

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

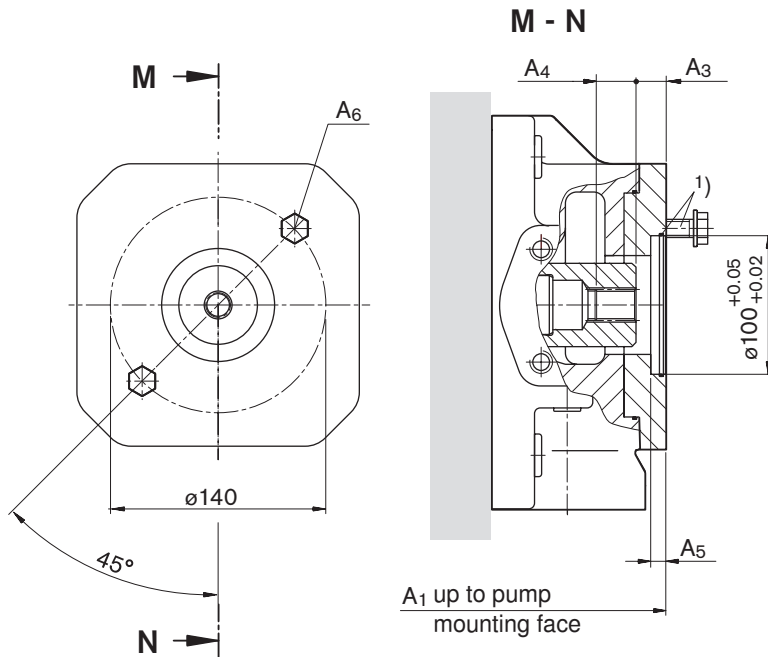
- PGH with shaft R, flange U2, see RE 10223
- PGF3 with shaft J, flange U2, see RE 10213
- AZPF with shaft R, front cover R, see RE 10089

Also verify that the flange and the through-drive (see type code page 2) have the same size. Check in the current data sheet of the gear pump whether the shaft ends have the specified dimensions.

Components universal through-drive	Main pump SYHDFE.-1X		Attachment pump		
	Size 125 Size 180	Size 250 Size 350	Size and type	Through-drive Centering Hub	Flange designation
Mounting kit	R902447030	R902447032	PGF2, PGH2, PGH3, AZPF	U01	SAE J744 82-2(A-B)
Flange kit	R902446836	R902446850		82.55	
Hub	R902446831			5/8 "	
Mounting kit	R902447040	R902447042	PGF 3	U 68	SAE J744 101-2(B)
Flange kit	R902446837	R902446851		101.6 mm	
Hub	R902446824	R902446844		7/8 "	
Mounting kit	R902447045	R902447047	PGH 4	U04	SAE J744 101-2(B)
Flange kit	R902446837	R902446851		101.6 mm	
Hub	R902446825	R902446845		1 "	
Mounting kit	R902447052	R902447053	PGH 5	U24	SAE J744 127-2(B)
Flange kit	R902446838	R902446852		127 mm	
Hub	R910943555	R910921237		1 1/2 "	

Unit dimensions: Through-drives (dimensions in mm)

UB3 Flange ISO 3019-2 100, 2-hole
 Hub for splined shaft, 22-4 SAE B, 7/8", 16/32 DP; 13T³⁾
 For attaching an A10VSO 28/31 splined shaft S (see RE 92711)

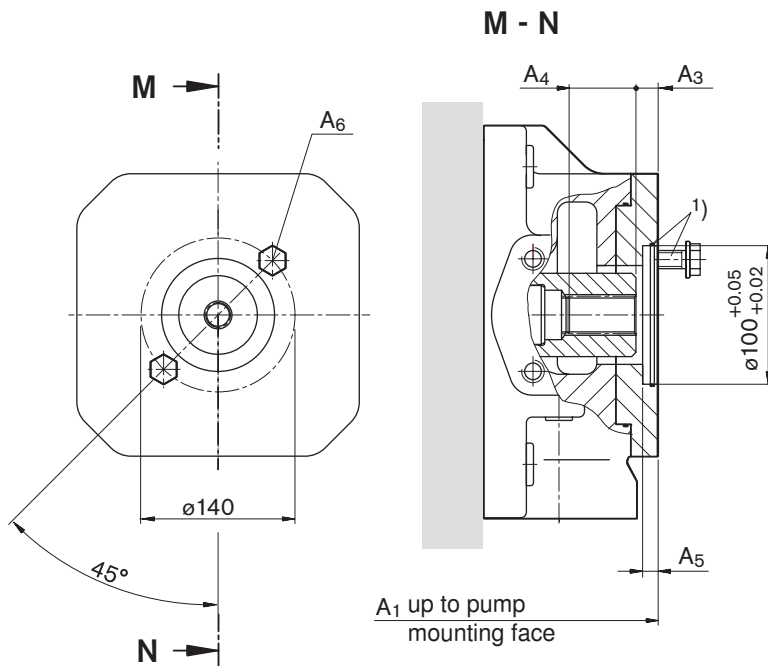


Size	A1	A3	A4	A5	A6 ²⁾
125	369	20.5	24.9	10	M12
180	393	20.5	24.9	10	M12
250	In preparation				
355	In preparation				

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

- 1) 2 fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the general information on page 27 is to be observed
- 3) According to ANSI B92.1a-1976, 30° meshing angle, flat base, side fit, tolerance class 5

UB4 Flange ISO 3019-2 100, 2-hole
 Hub for splined shaft, 25-4 SAE B-B, 1", 16/32 DP; 15T³⁾
 For attaching an A10VSO 45/31 splined shaft S - see RE 92711



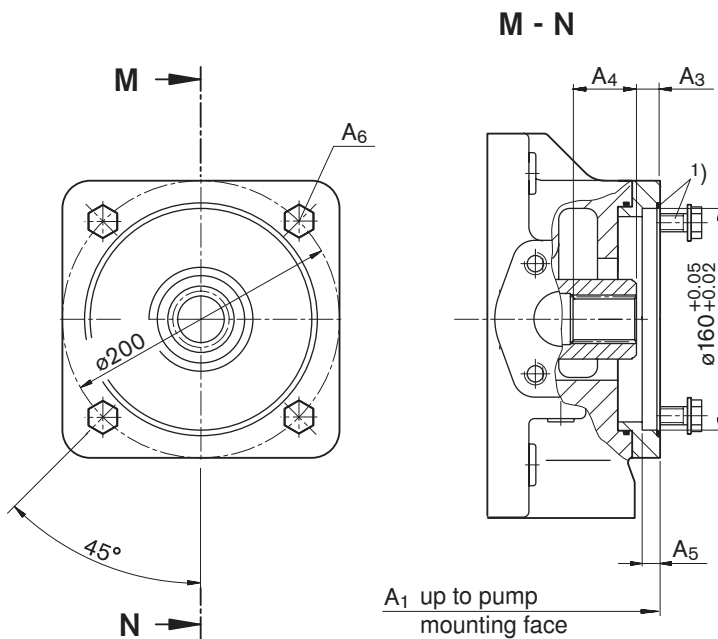
Size	A1	A3	A4	A5	A6 ²⁾
125	369	18.9	29.5	10	M12
180	393	18.9	29.5	10	M12
250	453	20.9	29.5	10	M12
355	482	20.9	29.5	10	M12

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

- 1) 2 fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the general information on page 27 is to be observed
- 3) According to ANSI B92.1a-1976, 30° meshing angle, flat base, side fit, tolerance class 5

Unit dimensions: Through-drives (dimensions in mm)

UB8 Flange ISO 3019-2 160, 4-hole
 Hub for splined shaft, 32-4 SAE C, 1 1/4", 12/24 DP; 14T³⁾
 For attaching an A10VSO 71/32 splined shaft S (see RE 92714)

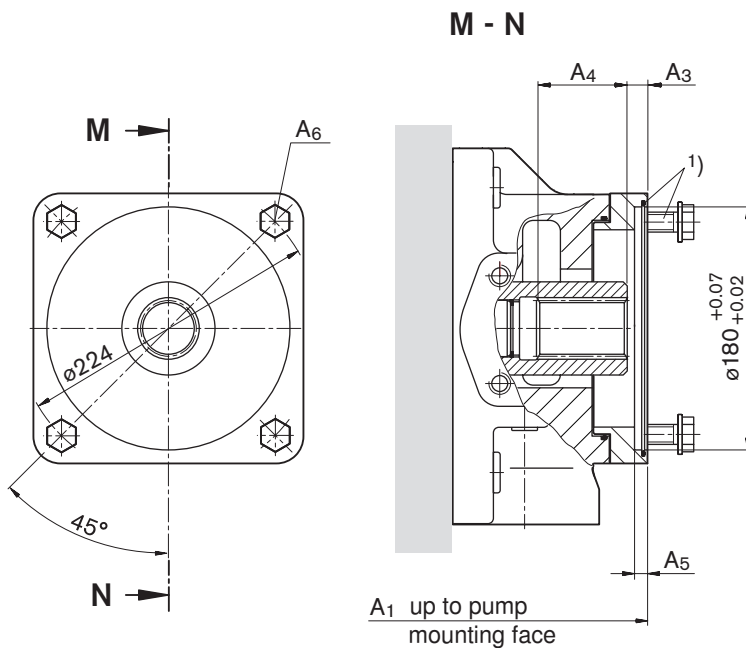


Size	A1	A3	A4	A5	A6 ²⁾
125	In preparation				
180	In preparation				
250	453	20.9	38	9	M16
355	In preparation				

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

- 1) Fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the assembly information on page 27 is to be observed
- 3) According to ANSI B92.1a-1976, 30° meshing angle, flat base, side fit, tolerance class 5

UB7 Flange ISO 3019-2 180, 4-hole
 Hub for splined shaft, 44-4 SAE D, 1 3/4", 8/16 DP; 13T³⁾
 For attaching an A10VSO 140/31(32) splined shaft S - see RE 92711 (RE 92714)



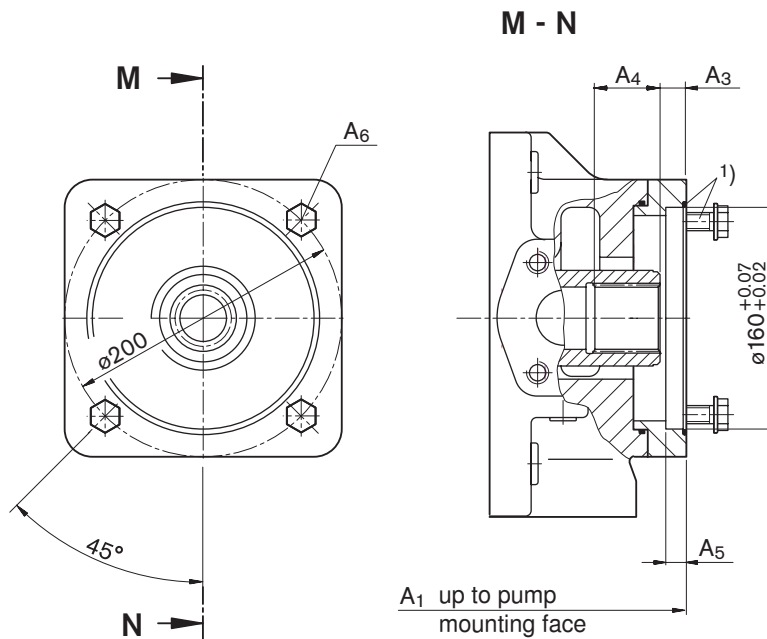
Size	A1	A3	A4	A5	A6 ²⁾
180	406	10.6	62	9	M16
250	453	10.6	64	9	M16
355	482	10.6	64	9	M16

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

- 1) Fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the assembly information on page 27 is to be observed
- 3) According to ANSI B92.1a-1976, 30° meshing angle, flat base, side fit, tolerance class 5

Unit dimensions: Through-drives (dimensions in mm)

U34 Flange ISO 3019-2 160, 4-hole
 Hub according to DIN 5480 N50x2x24x8H
 For attaching an A4VSO /G 125 or 180 splined shaft

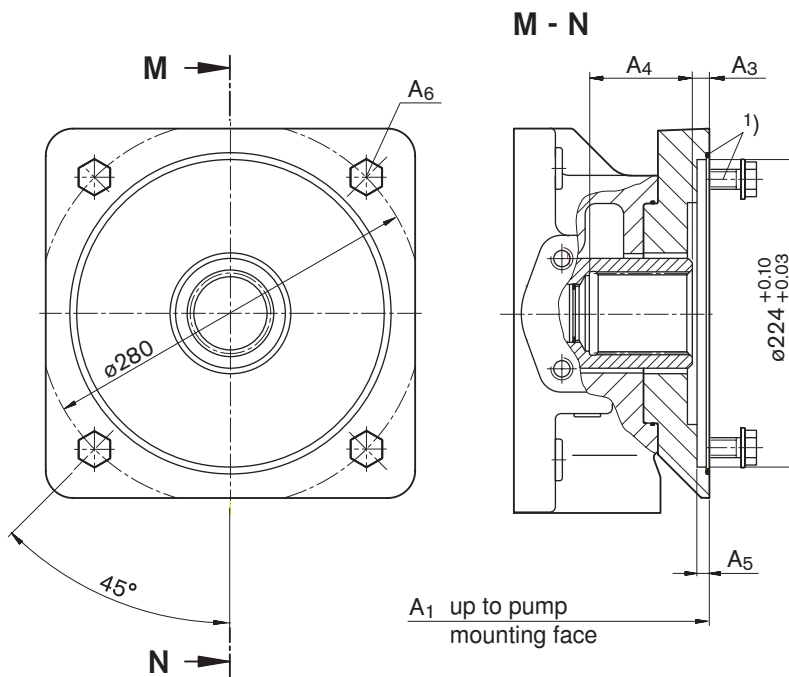


Size	A1	A3	A4	A5	A6 ²⁾
125	369	12.5	51.6	9	M16
180	393	12.5	51.6	9	M16
250	453	12.5	54	9	M16
355	482	12.5	54	9	M16

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

- 1) Fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the assembly information on page 27 is to be observed

U35 Flange ISO 3019-2 224, 4-hole
 Hub according to DIN 5480 N60x2x28x8H
 For attaching an A4VSO/G or A4CSG 250 splined shaft



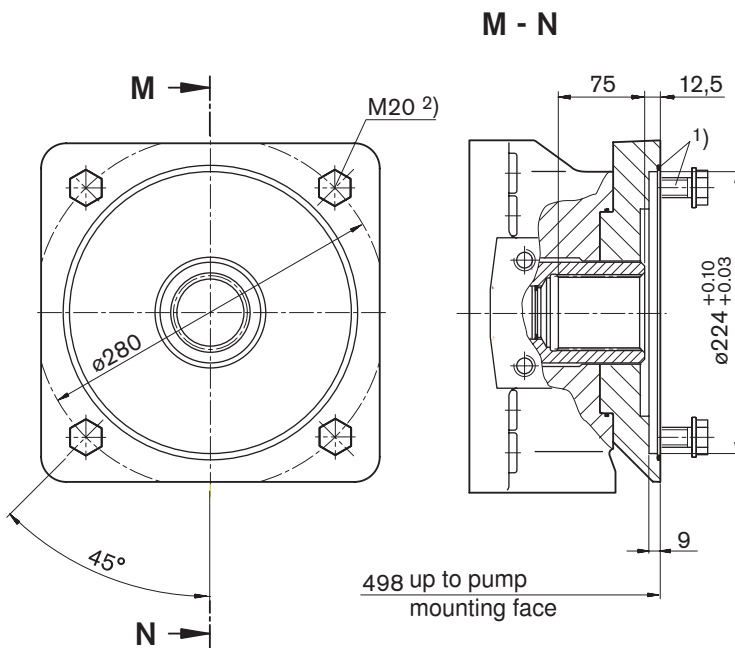
Size	A1	A3	A4	A5	A6 ²⁾
250	469	12.5	75	9	M20
355	498	12.5	75	9	M20

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

- 1) Fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the assembly information on page 27 is to be observed

Unit dimensions: Through-drives (dimensions in mm)

U77 Flange ISO 3019-2 224, 4-hole
 Hub according to DIN 5480 N70x3x22x8H
 For attaching an A4VSO/G or A4CSG 355 splined shaft

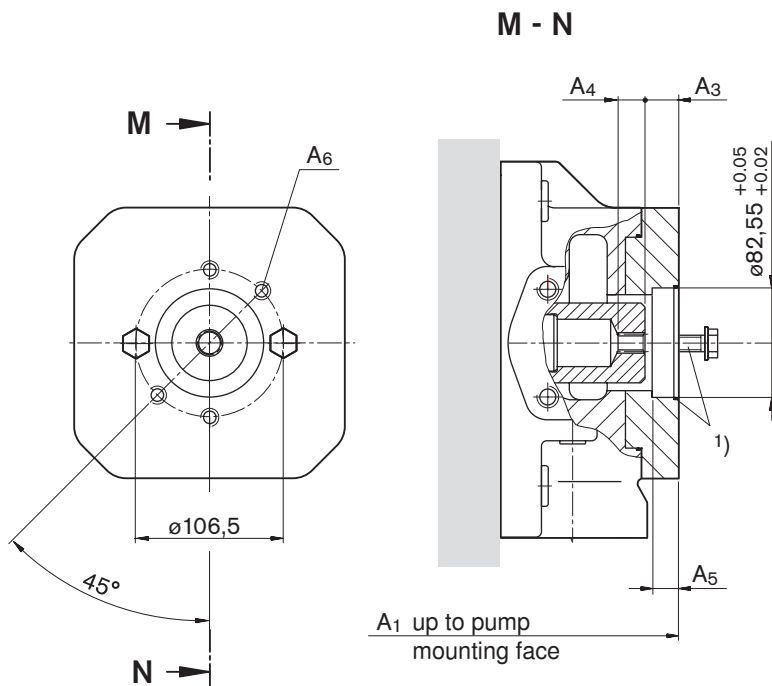


Size 355

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

- 1) Fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the assembly information on page 27 is to be observed

U01 Flange ISO 3019-1 82-2 (SAE A)
 Hub for splined shaft, 16-4 SAE A, 5/8", 16/32 DP; 9T 3)
 For attaching an external gear pump AZ-PF-1X-004 .. 022 (see RE 10089)
 Rexroth recommends a special version of the gear pumps, please contact us



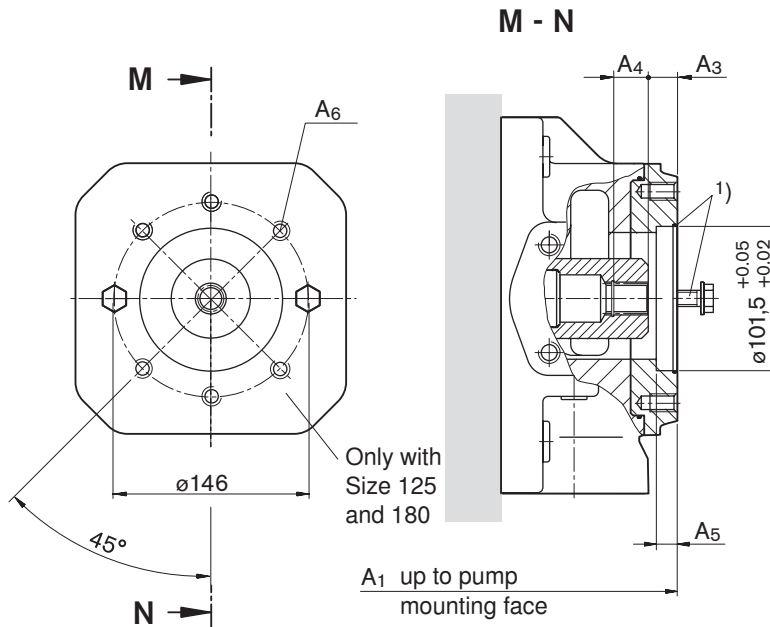
Size	A1	A3	A4	A5	A6 2)
125	369	16	19.4	13	M10
180	393	16	19.4	13	M10
250	453	16	19.4	13	M10
355	482	16	19.4	13	M10

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

- 1) 2 fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the assembly information on page 27 is to be observed
- 3) According to ANSI B92.1a-1976, 30° meshing angle, flat base, side fit, tolerance class 5

Unit dimensions: Through-drives (dimensions in mm)

U68 **Flange** ISO 3019-1 101-2 (SAE B), **Hub** for splined shaft, 22-4 SAE B, 7/8", 16/32 DP; 13T 3)
 For attaching an external gear pump AZ-PN-1X020...032 (see RE 10091 or an A10VO 28/31 and 52(53) splined shaft S (see RE 92701 and 92703)
 Rexroth recommends special versions of the gear pumps, please contact us

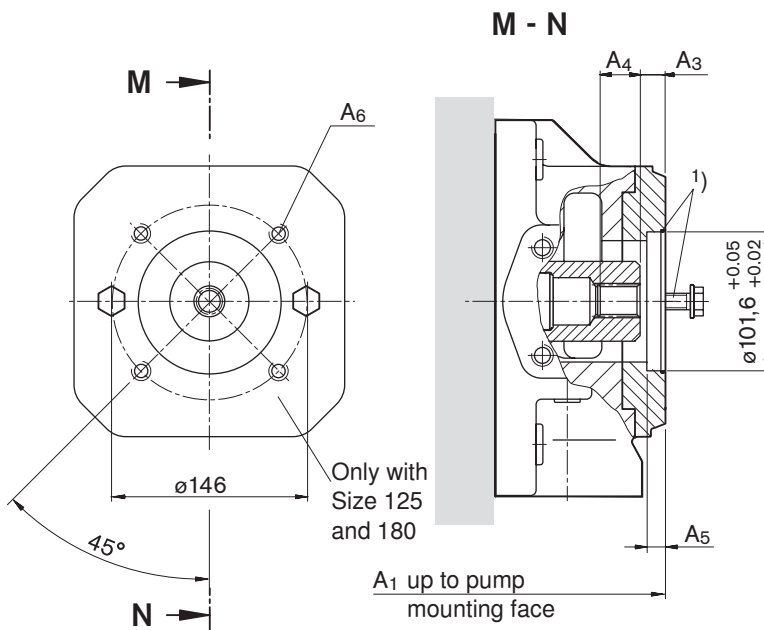


Size	A1	A3	A4	A5	A6 ²⁾
125	369	28	25	13	M12
180	393	28	25	13	M12
250	453	19.5	23.1	13	M12
355	482	19.5	23.1	13	M12

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

- 1) 2 fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the assembly information on page 27 is to be observed
- 3) According to ANSI B92.1a-1976, 30° meshing angle, flat base, side fit, tolerance class 5

U04 **Flange** ISO 3019-1 101-2 (SAE B), **Hub** for splined shaft, 25-4 SAE B-B, 1", 16/32 DP; 15T 3) for attaching an A10VSO 45/31 and 52 (53) splined shaft S (see RE 92701 and 92703) or an internal gear pump PGH4 (see RE 10223)



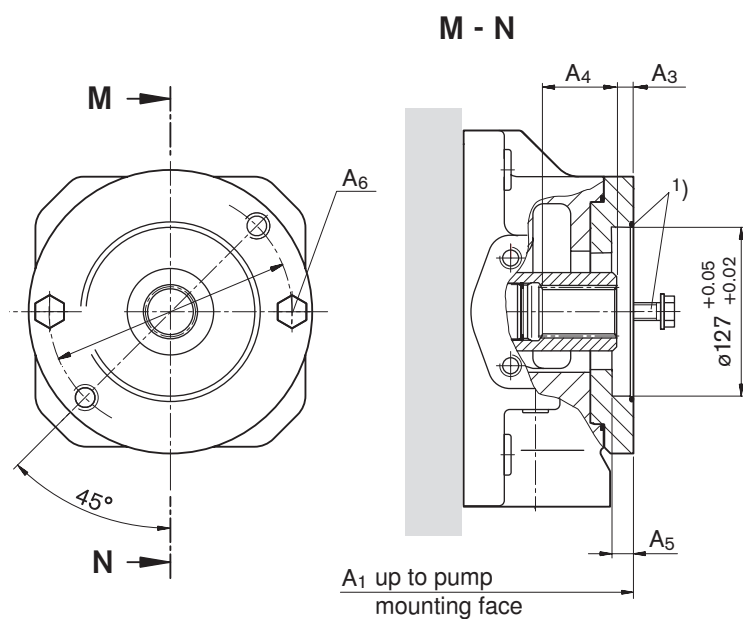
Size	A1	A3	A4	A5	A6 ²⁾
125	369	18.9	29.4	13	M12
180	393	18.9	29.4	13	M12
250	453	18.9	29.4	13	M12
355	482	18.9	29.4	13	M12

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

- 1) 2 fastening screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the assembly information on page 27 is to be observed
- 3) According to ANSI B92.1a-1976, 30° meshing angle, flat base, side fit, tolerance class 5

Unit dimensions: Through-drives (dimensions in mm)

- U24** **Flange** ISO 3019-1 127-2 (SAE C)
Hub for splined shaft, 38-4 SAE C-C, 1 1/2", 12/24 DP; 17T 3)
 For attaching an A10VO 100/31 splined shaft S (see RE 92701) or an A10VO 85/52(53) splined shaft S (see RE 92703) or an internal gear pump PGH5 (see RE 10223)



Size	A1	A3	A4	A5	A6 ²⁾
125	369	10.4	50	13	M16
180	393	10.4	50	13	M16
250	453	12.4	55	13	M16
355	482	12.4	55	13	M16

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

- ¹⁾ 2 fastening screws and O-ring seal are included in the scope of delivery
²⁾ Thread according to DIN 13, for the max. tightening torques, the assembly information on page 27 is to be observed
³⁾ According to ANSI B92.1a-1976, 30° meshing angle, flat base, side fit, tolerance class 5

Hubs for the coupling to a standard electric motor

Motor		SYHDFE.-1X		
Frame size/ characteristic value	Shaft diameter	Size 125/180 Shaft 50 mm	Size 100 Shaft 60 mm	Size 140 Shaft 70 mm
225/0	60	R900026055		
250/0	65	R900026059		
280/0	75	R900026063	R900714636	
315/0	80	R901076760	R900088584 ¹⁾	R900210961 ¹⁾
315/1	80	R900026068	R900783295	R900210960

¹⁾ up to 40 °C

Project planning information

- Command values may only be switched via relays with gold contacts (low voltage, low currents)
- 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 notes on the SYHDFE control system can be found in the operating instructions (See section “Further information about this control system” on this page).

Assembly information

- Tightening torques:
 - The tightening torques specified in this data sheet are maximum values and must not be exceeded (Maximum values for screw-in thread).
The manufacturer's specifications regarding the max. admissible tightening torques of the fittings used are to be observed!
 - For fastening screws according to DIN 13, we recommend checking the tightening torque in the single case according to VDI 2230 version 2003.

Further information about this control system

Operating instructions for SY(H)DFEE	RE 30012-B
Operating instructions for SY(H)DFEC (in preparation)	RE 30013-B
Operating instructions for SY(H)DFEn (in preparation)	RE 30014-B
Data sheet for universal through-drive for connecting two pumps into one combination	RE 95581
Data sheet for axial piston variable displacement pump A4VSO	RE 92050
Data sheet for axial piston variable displacement pump A4VSO for HFC	RE 92053
Data sheet for pilot valve VT-DFP.-2X	RE 29016
Data sheet for swivel angle sensor VT-SWA-LIN-1X	RE 30263
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.boschrexroth.com/sydfc (English) or http://www.boschrexroth.de/sydfc (German).	

Notes

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52 / 18-0
Fax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de

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