

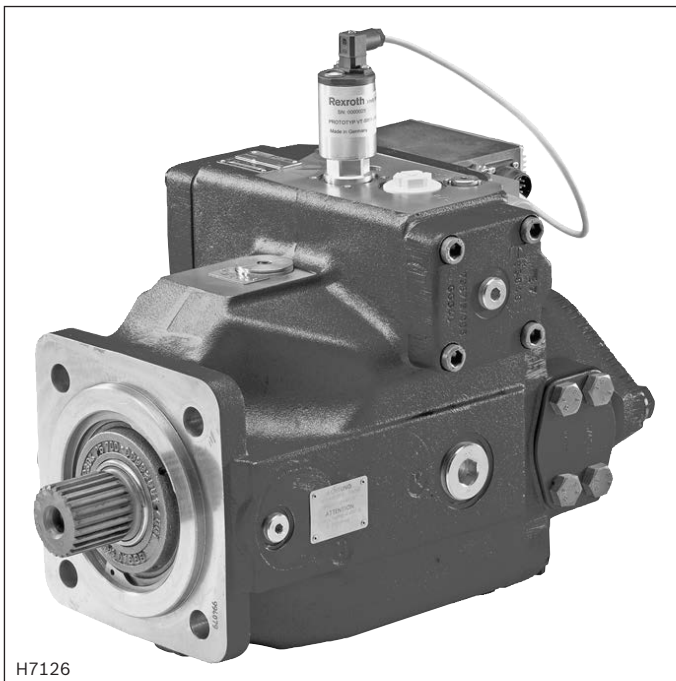
## Pressure and flow control system

Type SYHDFEE-1X, SYHDFEC-1X,  
 SYHDFEn-1X, SYHDFED-1X

**RE 30035**

Edition: 2017-08

Replaces: 12.11



- ▶ Size 40 ... 355
- ▶ Component series 1X
- ▶ Maximum operating pressure 350bar [5076 psi]
- ▶ With axial piston variable displacement pump A4VSO

### Features

An SYHDFE.-1X control system is used for the electro-hydraulic control of swivel angle, pressure and power (partially optional, see page 3) of an axial piston variable displacement pump.

The control system consists of the following components:

- ▶ A4VSO axial piston variable displacement pump optimized for the operation in the control system
- ▶ VT-DFP.-2X or VT-DFPD-1X 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 (optionally HM 20, separate order)

### Contents

Features	1
Ordering code	2 ... 8
Section	9
Schematic diagram	10 ... 11
Technical data	12 ... 15
Electrical connection	16 ... 20
LED displays SYHDFED-1X	21
Control loop quality	22
Transition function	22 ... 24
Dimensions: SYHDFE	25 ... 27
Through-drives: Torques	28
Dimensions: Through-drives	29 ... 30
Accessories for through-drives	31 ... 32
Dimensions: Through-drives	33 ... 38
Hubs for standard electric motor coupling	38
Project planning information	39
Further information about this control system	39

## Ordering code: Pump of the SYHDFE control system

01	02	03	04	05	06	07	08	09	See following pages				
<b>SYHDFE.-1X</b>	<b>/</b>	<b>125</b>	<b>R</b>	<b>-</b>	<b>V</b>	<b>Z</b>	<b>B</b>	<b>25</b>	<b>U99</b>	<b>-</b>	<b>0000</b>	<b>-</b>	...

## Series

01	Control system with internal analog electronics	<b>SYHDFEE-1X</b>
	Control system with internal digital electronics – CAN bus	<b>SYHDFEC-1X</b>
	Variable-speed control system with internal digital electronics	<b>SYHDFEn-1X</b>
	Control system with internal digital electronics – Ethernet-based bus systems	<b>SYHDFED-1X</b>
	Pump combinations (see order example on page 7)	<b>SY2DFE.-1X,</b> <b>SY3DFE.-1X</b>

## Size

		<b>040</b>	<b>071</b>	<b>125</b>	<b>180</b>	<b>250</b>	<b>355</b>	
02	Displacement cm <sup>3</sup>	40	71	125	180	250	355	

## Direction of rotation looking at the drive shaft

03	Clockwise	•	•	•	•	•	•	<b>R</b>
	Counterclockwise	•	•	•	•	•	•	<b>L</b>

## Hydraulic fluid

04	Mineral oil according to DIN 51524 (HL/HLP)	•	•	•	•	•	•	<b>V</b>
	HFC	-	•	•	•	•	•	<b>F</b>

## Drive shaft variant

05	Cylindrical with fitting key DIN 6885 (not in connection with through-drive)	•	•	•	•	•	•	<b>P</b>
	Splined shaft profile DIN 5480	•	•	•	•	•	•	<b>Z</b>

## Connection flange

06	ISO 4-hole	•	•	•	•	•	•	<b>B</b>
----	------------	---	---	---	---	---	---	----------

## Port for working lines pressure port B and suction port S

07	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	•	•	•	•	•	•	<b>25</b>
----	---	---	---	---	---	---	---	-----------

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

08	Universal through-drive U99 closed operationally safe with end cover at the factory; for components for the adaptation of more pump stages, see the table on page 30	-	-	•	•	•	•	<b>U99</b>
	Through-drive K99 closed operationally safe with end cover at the factory; for components for the adaptation of more pump stages, see the table on page 29	•	•	-	-	-	-	<b>K99</b>
	Without through-drive	•	•	-	-	-	-	<b>N00</b>
	<b>Centering</b>	<b>Attachment pump</b> <sup>1)</sup> (examples)						
	ISO Ø100 mm	A10VSO..31 NG28/45	-	•	-	-	-	<b>KD3</b>
	SAE Ø82.55 mm	A10VSO..31 NG18, PGF2, PGH2, PGH3, AZPF	•	•	-	-	-	<b>KC1</b>

## Base pump variant

09	Standard (internal pilot oil)	•	•	•	•	•	•	<b>0000</b>
	External supply	•	•	•	•	•	•	<b>0576</b>

•	= available
---	-------------

-	= not available
---	-----------------

■	= preferred program
---	---------------------

<sup>1)</sup> Also observe the conditions for the attachment pumps on page 31.

## Ordering code: Pilot and preload valve of the SYHDFEE control system

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15					
SYHDFEE-1X	/	125	R	-	V	Z	B	25	U99	-	0000	-	A	0	A	0	V	-	*

## Spool design

10	Standard	A
	4-notch spool (e.g. for HFC fluids)	C

## Integrated electronics, installation orientation

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

## Control, additional function

		A	B	C	D	
12	Switchable pressure controller (high signal)	•				A
	Power limitation adjustable at the OBE valve		•			B
	Power limitation adjustable via analog input			•		C
	Pressure controller that can be switched off (high signal)				•	D

## Electronics assembly, option

13	Standard electronics <b>with</b> leakage oil compensation	•	•	•	•	0
	Standard electronics <b>without</b> leakage oil compensation	•	•	•	•	1

## Actual pressure value input

(description of the connectors on page 16)

		Connector	C 4 ... 20 mA	V 0 ... 10 V	E 1 ... 10 V	F 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

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

**Ordering code: Pilot valve of the SYHDFEC control system**

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15					
SYHDFEC-1X	/	125	R	-	V	Z	B	25	U99	-	0000	-	A	0	A	0	V	-	*

**Spool design**

10	Standard	A
	4-notch spool (e.g. for HFC fluids)	C

**Valve, installation orientation of the integrated electronics**

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

**Additional functions**

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

**Electronics assembly, option**

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

**Actual pressure value input****Parameter setting ex factory**

(description of the connectors on page 17)

		Connector	C 4 ... 20 mA	V 0 ... 10 V	E 1 ... 10 V	F 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
15	Further details in the plain text e.g. SO variant						*

**Ordering code: Pilot valve of the SYHDFEn control system**

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15					
SYHDFEn-1X	/	125	R	-	V	Z	B	25	U99	-	0000	-	A	0	A	0	V	-	*

**Spool design**

10	Standard	A
	4-notch spool (e.g. for HFC fluids)	C

**Valve, installation orientation of the integrated electronics**

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

**Additional functions**

12	Teach-in version for cyclic operation	A
	Real-time version (speed calculation without teach-in)	R

**Electronics assembly, options**

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

**Actual pressure value input****Parameter setting ex factory**

(description of the connectors on page 18 and 19)

		Connector	C 4 ... 20 mA	V 0 ... 10 V	E 1 ... 10 V	F 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 <sup>1)</sup>	X2				•	F

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

<sup>1)</sup> With the SYHDFEn control system with the additional function (feature 12 of the ordering code) "Teach-in version for cyclic operation" and with analog interfaces, the switching input X2 cannot always be used as an actual pressure value input. It depends on the configuration. Please observe the notes in the operating instructions 30014-b.

**Ordering code: Pilot and preload valve of the SYDFED control system**

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15					
SYHDFED-1X	/	125	R	-	V	Z	B	25	U99	-	0000	-	A	0	A	S	F	-	*

**Spool design**

10	Standard	A
	4-notch spool (NG18)	C

**Valve, installation orientation of the integrated electronics**

11	Radially to the pump axis	0
	Integrated electronics, vertical to pump axis <sup>1)</sup>	1

**Additional functions**

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

**Field bus interface**

13	Sercos III	S
	EtherCAT (CANopen profile)	T
	VARAN (servo drive profile)	V
	Ethernet/IP	E
	PROFINET RT	N
	Powerlink	W

**Actual pressure value input** (freely configurable)**Parameter setting ex factory**

(description of the connectors on page 20 et sq.)

		Connector	V 0 ... 10 V	F 0.5 ... 5 V	
14	Voltage input 0 ... 10 V	XH4	•		V
	Voltage input 0.5 ... 5 V	X2M1		•	F
17	Further details in the plain text e.g. SO variant				*

<sup>1)</sup> This installation orientation is required for pump combinations.

### Ordering code: Order examples

#### Order example for single pump:

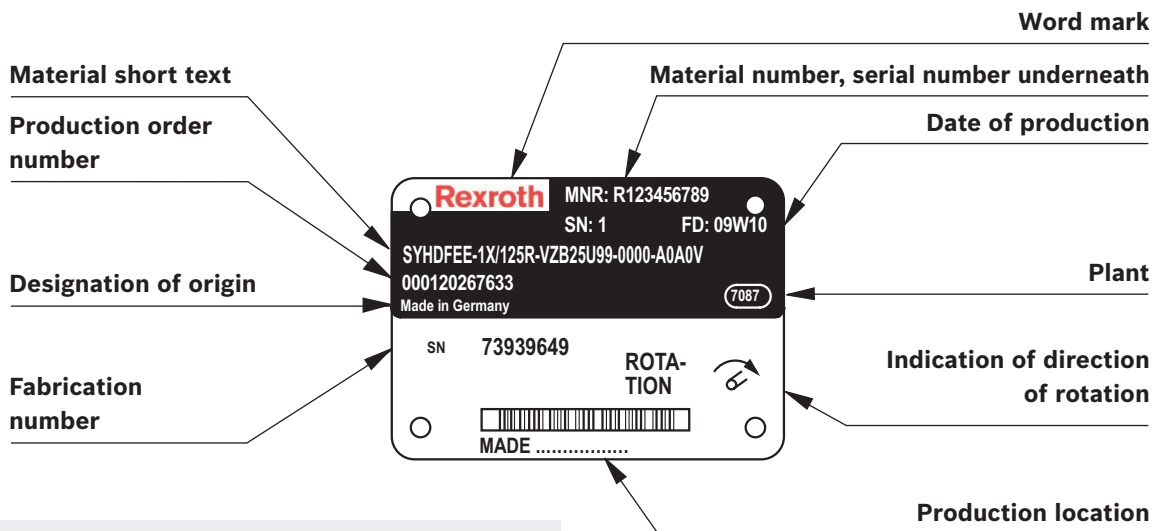
SYHDFEE-1X/250R-VZB25U99-0576-A0A0V

#### 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)
	SY2HDFEE-1X/125-125/01240219	+ 01240219
	SY2HDFEE-1X/125-125/SYHDFEE-1X/125R-VZB25U99-0000-A0B0V	+ SYHDFEE-1X/125R-VZB25U99-0000-A0B0V
Double pump		
Size of the main pump		
Size of the attachment pump or pump abbreviation if the attachment pump is not SYHDFE (e.g. PGF)		
Material number without "R9" for the main pump or type designation if material number is not known		
Pump combination, mounted with accessories		
Material number without "R9" for the attachment pump or type designation if material number is not known		

### Example of name plate of pump combination SYHDFEE



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

**Ordering code: Accessories****Version 12/2014, enquire availability**

<b>Accessories for SYDFE1</b>	<b>Material number</b>	<b>Data sheet</b>
External control electronics VT 5041-3X/1 without power limitation, without swivel angle display	<b>R901236404</b>	30242
External control electronics VT 5041-3X/2 without power limitation, with swivel angle display	<b>R901263598</b>	30242
External control electronics VT 5041-3X/3 with power limitation, with swivel angle display	<b>R901196678</b>	30242
Mating connector for solenoid plug	<b>R901017011</b>	08006
Mating connector for position transducer of valve	<b>R900023126</b>	08006
Mating connector for position transducer of pump	<b>R900013674</b>	
Pressure transducer HM 20-2X, measurement range 315 bar (4 ... 20 mA)	<b>R901342029</b>	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.1 ... 10 V)	<b>R901342030</b>	30272
Card holder VT 3002-1-2X/32D	<b>R900020153</b>	29928
Compact power supply unit VT-NE32-1X	<b>R900080049</b>	29929

<b>Accessories for SYDFEE, SYDFEC, SYDFEn</b>	<b>Material number</b>	<b>Data sheet</b>
Mating connector 12-pole for central connection X1 without cable (assembly kit)	<b>R900884671</b>	08006
Mating connector 12-pole for central connection X1 with cable set 2 x 5 m	<b>R900032356</b>	
Mating connector 12-pole for central connection X1 with cable set 2 x 20 m	<b>R900860399</b>	
Pressure transducer HM 20-2X, measurement range 315 bar (4 ... 20 mA)	<b>R901342029</b>	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.1 ... 10 V)	<b>R901342030</b>	30272
Test device VT-PDFE-1-1X/V0/0	<b>R900757051</b>	29689-B
Compact power supply unit VT-NE32-1X	<b>R900080049</b>	29929

<b>Accessories for SYDFEC and SYDFEn</b>	<b>Material number</b>	<b>Data sheet</b>
Converter USB serial for laptops without serial interface VT-ZKO-USB/S-1-1X/V0/0	<b>R901066684</b>	
Converter USB/CAN bus for the connection of a computer to a CAN bus system	<b>R901071963</b>	
Cable for connecting a Win-PED PC (RS232) to the X2 interface, length 3 m	<b>R901156928</b>	
Cable for the connection of CAN bus/X3 at CAN bus converter (D-Sub)	<b>R901152127</b>	
T connector for the simultaneous connection of a WIN-PED PC (RS232) and use of the pressure transducer at connector X2	<b>R901117164</b>	
Mating connector for interface X3, M12, straight, can be connected independently, 5-pole, shielded, A coded, cable diameter 6 ... 8 mm	<b>R901076910</b>	

<b>Accessories for SYDFED</b>	<b>Material number</b>	<b>Data sheet</b>
Mating connector 12-pole for central connection XH4 without cable (assembly kit)	<b>R900884671</b>	08006
Mating connector 12-pole for central connection XH4 with cable set 2 x 5 m	<b>R900032356</b>	
Mating connector 12-pole for central connection XH4 with cable set 2 x 20 m	<b>R900860399</b>	
Pressure transducer HM 20-2X, measurement range 315 bar (4 ... 20 mA)	<b>R901342029</b>	30272
Pressure transducer HM 20-2X, measurement range 315 bar (0.1 ... 10 V)	<b>R901342030</b>	30272
Test device VT-PDFE-1-1X/V0/0	<b>R900757051</b>	29689-B
Compact power supply unit VT-NE32-1X	<b>R900080049</b>	29929
Ethernet connection cable M12 to RJ45 (connection X7E1 & X7E2), additional information type designation RKB0044/xxx.x (xxx.x: length in meters)	<b>R911172135</b>	

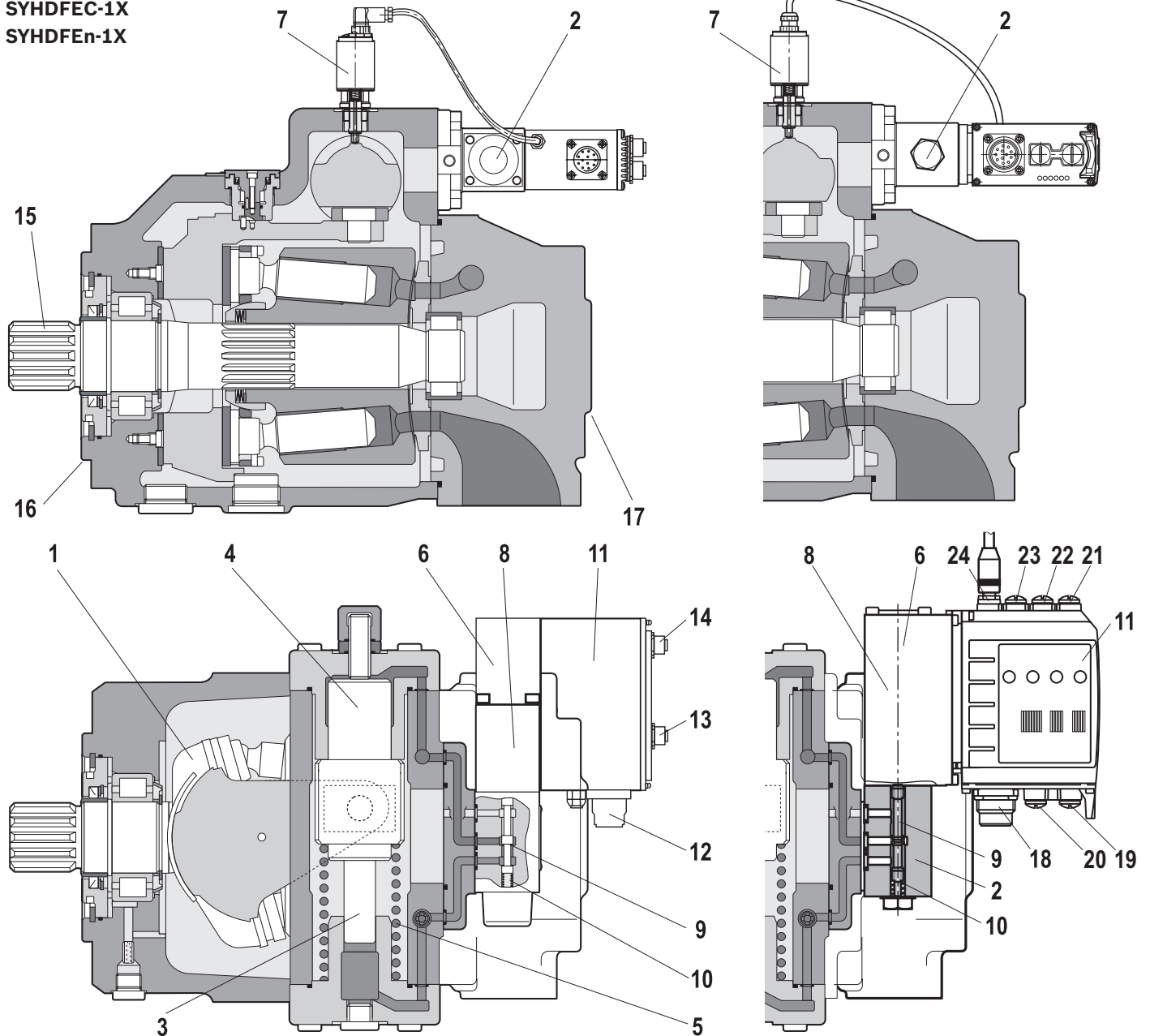
<b>More accessories</b>	<b>Page</b>
Accessories for through-drives	31
Torsionally flexible couplings for attachment to a standard electric motor	39



**Section**

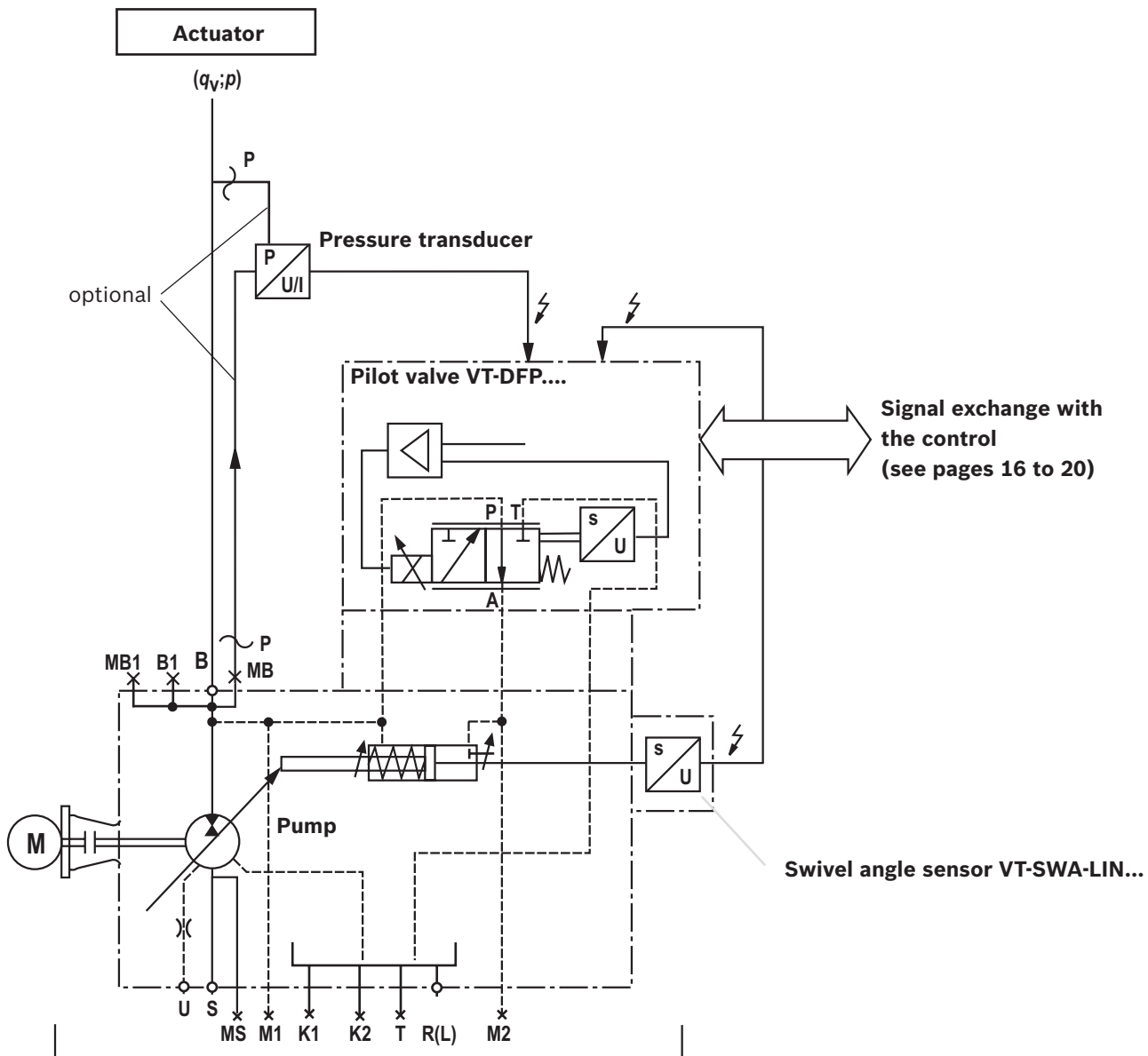
**SYHDFEE-1X  
SYHDFEC-1X  
SYHDFEn-1X**

**SYHDFED-1X**



- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1 Swash plate</li> <li>2 Pilot valve</li> <li>3 Counter piston</li> <li>4 Actuating piston</li> <li>5 Spring</li> <li>6 Inductive position transducer for valve position</li> <li>7 Swivel angle position sensor</li> <li>8 Proportional solenoid</li> <li>9 Valve spool</li> <li>10 Spring</li> <li>11 Integrated electronics</li> <li>12 Connector X1</li> <li>13 Mating connector X3 for connection of the CAN bus (only available with SYHDFEC/SYHDFEn)</li> </ul> | <ul style="list-style-type: none"> <li>14 Connector X2 for connection of the pressure transducer HM 20, cable version (for SYHDFEE only with actual pressure value input F, for SYHDFEC/SYHDFEn always available)</li> <li>15 Drive shaft</li> <li>16 Connection flange</li> <li>17 Subplate, optionally with through-drive</li> <li>18 Connector XH4</li> <li>19 Multi Ethernet interface X7E1</li> <li>20 Multi Ethernet interface X7E2</li> <li>21 Configurable sensor interface X2M1</li> <li>22 Configurable sensor interface X2M2</li> <li>23 Reserved, X2N</li> <li>24 Actual swivel angle value input X8A</li> </ul> |
|---|--|

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



- S** Suction port
- K1, K2** Flushing port
- T** Fluid drain
- MB** Measuring port operating pressure (M14x1.5)
- MS** Measuring port suction pressure
- M1, M2** Measuring port control chamber pressure
- R(L)** Fluid filling + bleeding (leakage connection)
- U** Flushing port
- B** Pressure port
- B1** 2nd pressure port/additional port
- MB1** Measuring port operating pressure  
NG250/355: G1/4  
NG 40/71/125/180: Blind flange attached to B1 with  
pressure measuring port G1/4
- Z** External pilot oil pressure

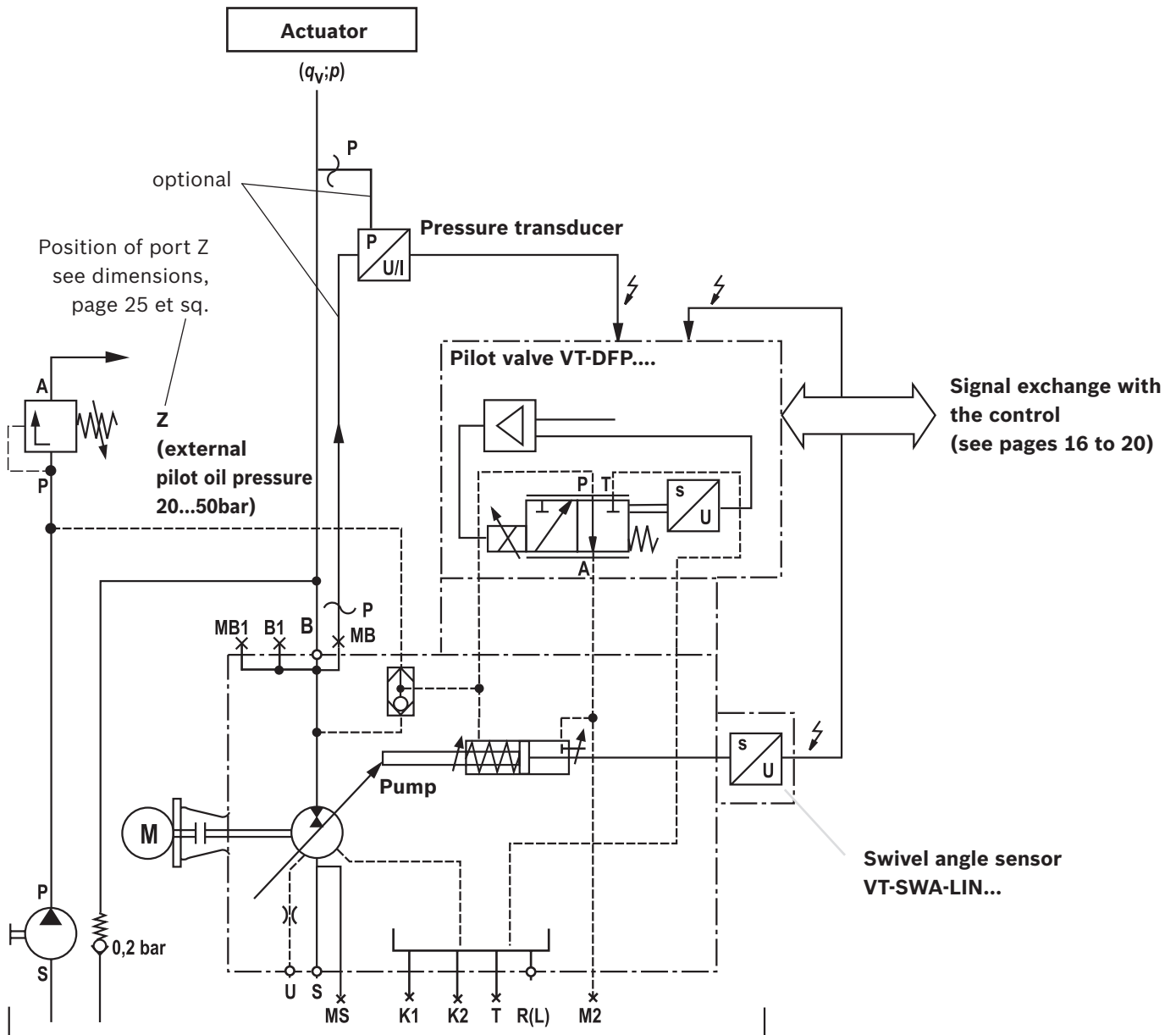
**When using the HM20-2x/...C13 pressure transducer:**

- ▶ Installation in MB or MB1 (pump) in connection with electronic version "actual pressure value input F"
- ▶ For HM20-2X/315-F-C13-0,5 in MB attachment, an adapter from M14x1.5 to G1/4 (mat. no. R900695665) is necessary.
- ▶ Due to the installation position, the HM20 cable version cannot be used for all sizes without restrictions (use with M12 extension cable).

**When using an external pressure transducer:**

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

Explanation in the operating instructions (see page 39)

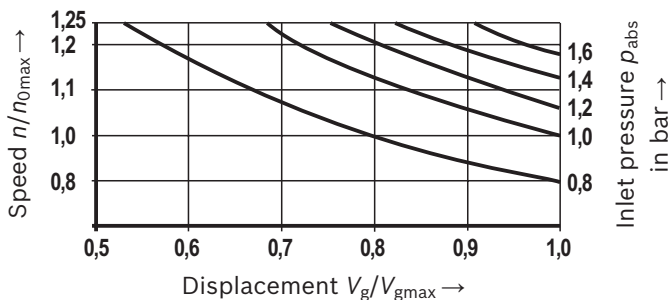
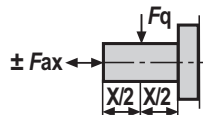
**Schematic diagram: SYHDFE...-1X, actuating system supplied externally**

**Important information on external supply:**

- ▶ In the case of an actuating system with external supply, the pump adjustment 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 ( $p_{\text{Command}} \geq 3 \text{ bar}$ ,  $q_{\text{Command}} \geq 5\%$ ) as due to drift or tolerances, there is no exact "zero" pressure or "zero" swivel angle. Under unfavorable conditions, smaller command value presettings 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 values, please consult us!)

mechanical and hydraulic								
Size / displacement	$V_{g \max}$	cm <sup>3</sup>	<b>40</b>	<b>71</b>	<b>125</b>	<b>180</b>	<b>250</b>	<b>355</b>
Speed <sup>1)</sup>								
▶ maximum at $V_{g \max}$	$n_0$	min <sup>-1</sup>	2600	2200	1800	1800	1900	1700
▶ maximum at $V_{g \max}$ and HFC fluids	$n_0$	min <sup>-1</sup>	-	2200	1800	1800	1500	1500
Minimum speed <sup>2)</sup>	$n_{\min}$	min <sup>-1</sup>	200					
Max. flow (displacement)								
▶ at $n_0$ and $V_{g \max}$	$q_{v0}$	l/min	104	156	225	324	450	533
▶ at $n_E = 1500 \text{ min}^{-1}$ and $V_{g \max}$	$q_{vE \max}$	l/min	60	107	186	270	375	533
Max. power ( $\Delta p = 350 \text{ bar}$ )								
▶ at $n_0$ and $V_{g \max}$	$P_0$	kW	61	91	131	189	263	311
▶ at $n_E = 1500 \text{ min}^{-1}$ and $V_{g \max}$	$P_{E \max}$	kW	35	62	109	158	219	311
Max. torque ( $\Delta p = 350 \text{ bar}$ )	$T_{\max}$	Nm	223	395	696	1002	1391	1976
Max. admissible drive torque								
▶ Fitting key	$T_{\text{total}}$	Nm	380	700	1392	1400	2300	3557
▶ Splined shaft S overall torque	$T_{\text{total}}$	Nm	446	790	1392	2004	2782	3952
▶ Max. admissible through-drive torque	$T_D$	Nm	223	395	696	1002	1391	1976
Drive shaft load								
▶ max. adm. axial force	$F$	N	600	800	1000	1400	1800	2000
▶ max. admissible radial force <sup>3)</sup>	$F_q$	N	1000	1200	1600	2000	2000	2200
Weight without filling quantity	$m$	kg	39	53	88	102	184	207
Moment of inertia around drive axis		kgm <sup>2</sup>	0.0049	0.0121	0.03	0.055	0.0959	0.19
Filling quantity of the housing		l	2	2.5	5	4	10	8
Maximum admissible operating pressure <sup>4)</sup>	$p_{\max}$	bar	350					
Minimum operating pressure	$p_{\min}$	bar	≥ 20					
Admissible inlet pressure	$p$	bar	0.8 ... 30.0					
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524 HFC optional (see ordering code)					
Hydraulic fluid temperature range	$\vartheta$	°C	-20 ... +70					
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 opening 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) Does not apply to HFC fluid, formula for determination of the minimum speed on page 13
- 3) In case of higher radial forces, please consult us. Not applicable for use of HFC fluids
- 4) When using HFC fluids, also see data sheet 92053.

## Technical data

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

### Determination of the minimum speed at HFC hydraulic fluid (see ordering code)

Size			71	125	180	250	355
Speed	$n_0$	min <sup>-1</sup>	750	850	600	550	450
Viscosity	$\nu_0$ [cSt]	mm <sup>2</sup> /s	25				

#### Admissible load:

$$x = \left( \frac{p}{p_{nenn}} \cdot \frac{V_g}{V_{g \max}} \right) = \frac{\nu}{\nu_0} \cdot \frac{n}{n_0}$$

$$n = n_0 \cdot \frac{\nu_0}{\nu} \cdot \left( \frac{p}{p_{nenn}} \cdot \frac{V_g}{V_{g \max}} \right)$$

At SYHDFEN, the minimum speed can be determined by means of the derating function.

#### Example 1:

A4VSO125 may be operated at  
 $\nu = 16\text{cSt}$   
 as of  $n = 1328\text{ min}^{-1}$  with nominal load

#### Example 2:

the admissible load for A4VSO250  
 is  $n = 500\text{ min}^{-1}$  and  $10\text{ cSt}$   
 $x = 10/25 \cdot 500/550 = 0.364$  (=127 bar at  $V_{g \max}$ )

electric				SYHDFEE...1X	SYHDFEC...1X and SYHDFEn...1X	
Type						
Operating voltage	$U_B$	VDC	24 +40% -5%	24 +40% -5%		
Operating range (short-time operation)	▶ Upper limit value	$U_B(t)_{\max}$	V	35		
	▶ Lower limit value	$U_B(t)_{\min}$	V	21		
Current consumption (in static control operation)	▶ Rated current	$I_{\text{rated}}$	A	0.6		
	▶ Maximum current	$I_{\max}$	A	1.25		
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	$R_B$	$\Omega$	100	100	
	▶ Analog voltage inputs	$R_E$	k $\Omega$	$\geq 50$	$\geq 100$	
	▶ Digital inputs	Logic 0	V	$\leq 0.6$	$\leq 8$	
	Logic 1	V	$\geq 21$	$\geq 14$		
Outputs	▶ $p_{\text{actual}} / U_{\text{OUT}1}^{1)}$	$U_A$	V	0 ... 10	$\pm 10$	
		$I_{\max}$	mA	1.5	2	
	▶ $q_{\text{actual}} / U_{\text{OUT}2}^{1)}$	$U_A$	V	$\pm 10$	$\pm 10$	
		$I_{\max}$	mA	1.5	2	
▶ Digital outputs	Logic 0	V	$U_a < 1\text{ V}$			
	Logic 1	V	$U_a \geq U_B - 5\text{ V}; 10\text{ mA}$ (short-circuit-proof)			
Ambient temperature range at the pump	$\vartheta$	$^{\circ}\text{C}$	0 ... 60	0 ... 50		
Storage temperature range (pump + electronics)	$\vartheta$	$^{\circ}\text{C}$	0 ... 70	0 ... 70		
Electronics design	Integrated in the pilot valve (OBE)					
Electrical connection				see page 16	see page 17, 18	
Protection class according to EN 60529	▶ Pump incl. pilot valve	IP 65 with mounted and locked plug-in connectors				
					optional	yes

<sup>1)</sup> With SYHDFEC, SYHDFEn and SYHDFED, the outputs are parameterizable, for the condition as supplied, see page 17 to 20).

**Technical data**

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

Type			Type SYHDFED...1X
Supply voltage <sup>2)</sup>	▶ Nominal voltage	VDC	24
	▶ Lower limit value	VDC	18
	▶ Upper limit value	VDC	36
	▶ Maximum admissible residual ripple	Vpp	2.5
Power consumption	Maximum	W	40
Required fuse protection, external		A	4 , time-lag
AD/DA resolution	▶ analog inputs	Bit	12
	▶ analog outputs <sup>1)</sup>	Bit	10
Actual pressure value input XH4, pin 10 and 11	▶ analog voltage	V	0 ... 10
	▶ analog current	mA	0 ... 20 With configuration on current input: Maximum admissible input current 30 mA
Ambient temperature range at the pump	∅	°C	-20 ... +60
Storage temperature range (pump + electronics)	∅	°C	0 ... +70
Electronics design			Integrated in the pilot valve (OBE)
Electrical connection			see page 19, 20
Protection class according to EN 60529	▶ Pump incl. pilot valve		IP 65 with mounted and locked plug-in connectors

- 1) With SYDFEC, SYDFEn and SYDFED, the outputs are parameterizable, for the condition as supplied, see page 16 to 20).
- 2) With SYDFED, the supply voltage is used directly for sensor connections X2M1, X2M2 and X8M (no internal voltage limitation)

**Notice:**

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

### Technical data

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

#### Bearing flushing

With the following operating conditions, bearing flushing 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), bearing flushing is recommended for lubrication of the front bearing and the shaft seal ring.

The bearing is flushed using 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 connection.

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

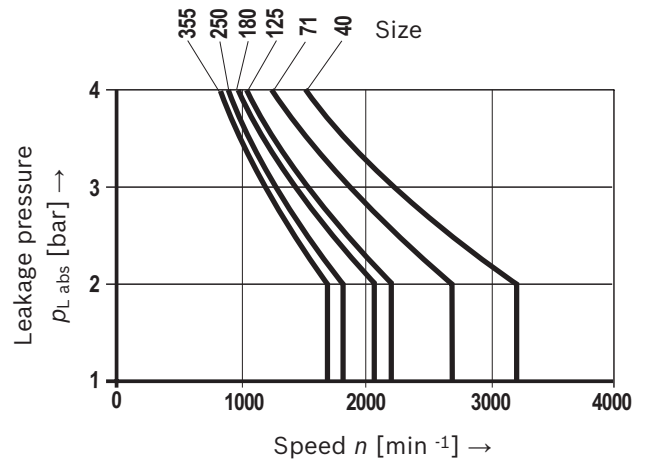
Size	40	71	125	180	250	355
recommended flushing quantity $q_{Sp}$ [l/min]	3	4	5	7	10	15

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)

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

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

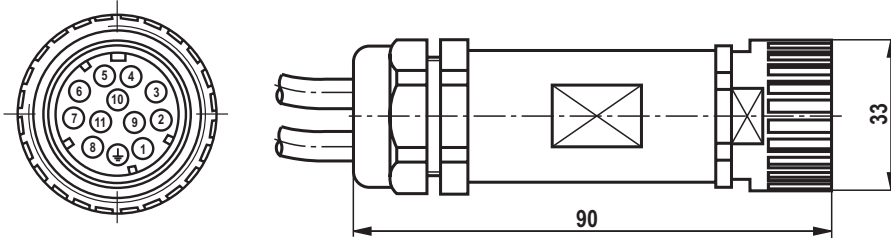
#### Flow direction

S → B

## Electrical connection: SYHDFEE...1X

### X1: Central connection

Mating connector according to EN 175201-804 (12-pole), for the ordering code, see section Accessories on page 8.



### Assignment of connector or mating connector and cable set

Pin	Signal	Description	Signal direction	Type of signal	Assignment in cable set (accessories)
1	+ $U_B$	Voltage supply	IN	24 V DC	1
2	0 V = L0	Reference potential for the voltage supply	–		2
PE	Ground	Grounding connection for electronics	–		green/yellow
3	Fault	Signals faults, 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	$a_{\text{Command}}$	Swivel angle command value	IN	analog $\pm 10$ V	green
6	$a_{\text{Actual}}$	Actual swivel angle value, normalized	OUT	analog $\pm 10$ V	violet
7	$p_{\text{Command}}$	Pressure command value	IN	analog 0 ... 10 V	pink
8	$p_{\text{Actual}}$	Actual pressure value, normalized	OUT	analog 0 ... 10 V <sup>1)</sup>	red
9		Function depends on electronic type and additional function, see below			brown
10	Actual pressure value H	Actual pressure value input: Signal level depends on 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

Supply line 3 x 1.0 mm<sup>2</sup>

Supply line 10 x 0.14 mm<sup>2</sup> shielded (one end of the shield must be connected to the control!)

### Functions at pin 9

Pin	Additional function	Function depends on feature 12 of the ordering code (see page 4)	Signal direction	Type of signal
9	..A...	Selecting a different oil volume adjustment (switch $T_D$ )	IN	logic 24 V
	..B...	Power limitation active	OUT	logic 24 V
	..C...	Command value of power limitation	IN	analog 0 ... 10 V
	..D...	Switch off pressure controller	IN	logic 24 V

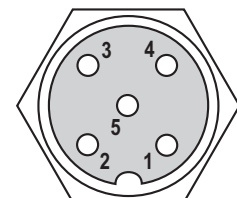
<sup>1)</sup> When using a pressure transducer with raised zero point (e.g. 4 ... 20 mA), a voltage of  $-1 \dots -2.5$  V will be output in case of a cable break.

### X2: Connection of pressure transducer HM 20

#### HM 20-2X/315-F-C13-0,5 (cable version) (mating connector M12)

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

Top view  
Mating connector

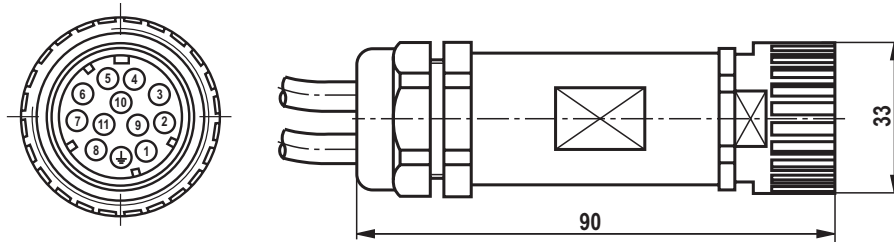




## Electrical connection: SYHDFEC...1X

### X1: Central connection

Mating connector according to EN 175201-804 (12-pole), for the ordering code, see section Accessories on page 8.



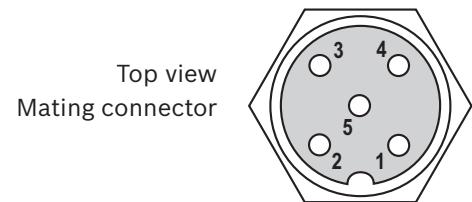
### Assignment of connector or mating connector and cable set

Pin	Signal	Description	Signal direction	Type of signal	Assignment in cable set (accessories)
1	+ $U_B$	Voltage supply	IN	24 V DC	1
2	0 V = L0	Reference potential for the voltage supply	–		2
PE	Ground	Grounding connection for electronics	–		green/yellow
3	Fault	Signals faults, 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 Factory setting: Swivel angle command value	IN	analog $\pm 10$ V	green
6	$U_{OUT2}$	Analog output Factory setting: Actual swivel angle value, normalized	OUT	analog $\pm 10$ V	violet
7	AI1	Analog input AI1 Factory setting: Pressure command value	IN	analog 0 ... 10 V	pink
8	$U_{OUT1}$	Analog output Factory setting: Actual pressure value, normalized	OUT	analog $\pm 10$ 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 20

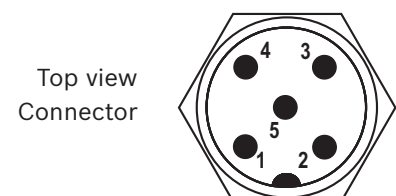
#### HM 20-2X/315-F-C13-0.5 (cable version) and serial interface RS232 (mating connector M12)

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



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

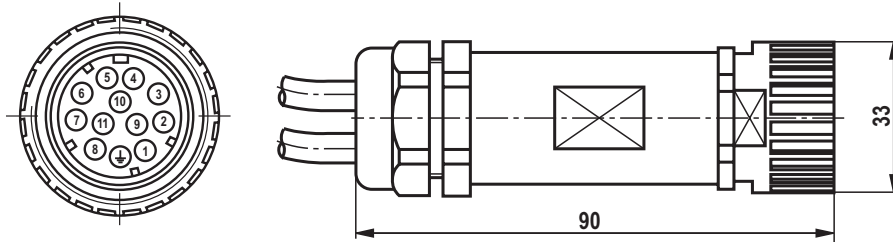
Pin	Signal input	Pin	Signal CAN
1	n.c.	3	CAN GND
2	IN, digital IN2 (DI2)	4	CAN-HIGH
		5	CAN-LOW



## Electrical connection: SYHDFEn...1X

### X1: Central connection

Mating connector according to EN 175201-804 (12-pole), for the ordering code, see section Accessories on 8.



### Assignment of connector or mating connector and cable set

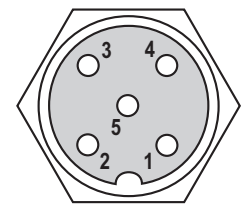
Pin	Signal	Description	Signal direction	Type of signal	Assignment in cable set (accessories)
1	+ U <sub>B</sub>	Voltage supply	IN	24 V DC	1
2	0 V = L0	Reference potential for the voltage supply	–		2
PE	Ground	Grounding connection for electronics	–		green/yellow
3	Fault	Signals faults, e.g. cable break 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 Factory setting: Swivel angle command value	IN	analog ±10 V	green
6	U <sub>OUT2</sub>	Analog output Factory setting: Actual swivel angle value, normalized	OUT	analog ±10 V	violet
7	AI1	Analog input AI1 Factory setting: Pressure command value	IN	analog 0 ... 10 V	pink
8	U <sub>OUT1</sub>	Analog output Factory setting: Speed command value	OUT	analog ± 10 V	red
9	DI1	Digital input DI1 Depending on additional function (Feature 12 of the ordering code): ► Teach-In version: Synchronization bit DI1 ► Real-time version: Activate real-time operation, S1	IN	logic 24 V	brown
10	Actual pressure value H	Actual pressure value input: Signal level depends on feature 14 in the ordering code.	IN	analog	black
11	Actual pressure value L		–	analog	blue
n.c.					gray

Supply line 3 x 1.0 mm<sup>2</sup>

Supply line 10 x 0.14 mm<sup>2</sup> shielded (one end of the shield must be connected to the control!)

### X2: Serial interface RS232 and a switchable digital input/pressure transducer input for HM 20 HM 20-2X/315-F-C13-0,5 (cable version) (mating connector M12)

Pin	Signal input	Pin	Signal RS232
1	OUT, +U <sub>B</sub>	2	RxD
3	Reference L0		
4	Analog input 0.5 ... 5 V for HM 20 or Digital input 0 V low, 10 V high <sup>1)</sup> Depending on additional function (feature 12 of the ordering code), factory setting: ► Teach-In version: Digital input "Variable-speed operation on, S1" ► Real-time version: Input as analog input for pressure transducer HM 20	5	TxD



Top view  
Mating connector

<sup>1)</sup> For valves with date of manufacture including 2013 max. 12 V. For valves after date of production 2014 max. U<sub>B</sub>.

## Electrical connection: SYHDFEn...1X

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

Pin	Signal input	Pin	Signal CAN
1	n.c.	3	CAN GND
2	IN, digital IN2 (DI2) Depending on additional function (feature 12 of the ordering code), factory settings: <ul style="list-style-type: none"> <li>▶ Teach-In version: Start Teach-In, S2</li> <li>▶ Real-time version: Manual speed presetting active, speed is applied according to the real-time operation status and the setting of the R parameters.</li> </ul>	4	CAN-HIGH
		5	CAN-LOW

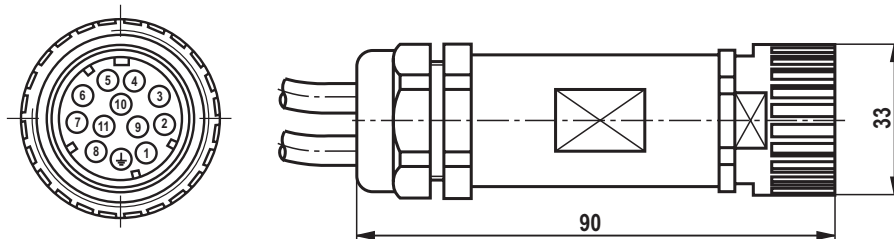


Top view  
Connector

## Electrical connection: SYHDFED...1X

### XH4: Central connection

Mating connector according to EN 175201-804 (12-pole), for the ordering code, see section Accessories on page 8.

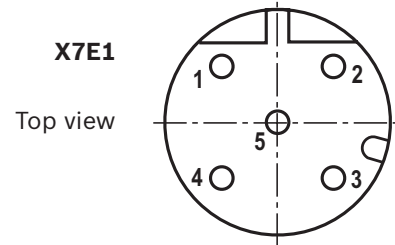


### Assignment of connector or mating connector and cable set

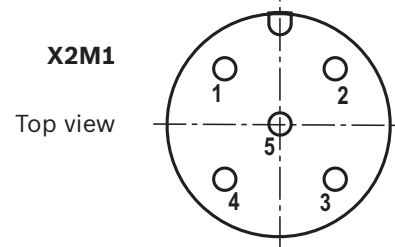
Pin	Signal	Description	Signal direction	Type of signal	Assignment in cable set (accessories)
1	+ $U_B$	Voltage supply	IN	24 V DC	1
2	0 V = L0	Reference potential for the voltage supply	–		2
PE	Ground	Grounding connection for electronics	–		green/yellow
3	DO	Switching output 24 V max. 1.5 A Factory setting: Error signal	OUT	logic 24 V	white
4	M0	Reference potential for analog signals	–		yellow
5	AI2	Analog input 2 (or digital input, configuration via software)	IN	analog $\pm 10$ V or 0 ... 20 mA (digital 24V)	green
6	AO2	Analog output 2 Factory setting: Actual swivel angle value, normalized	OUT	analog $\pm 10$ V or 0 ... 20 mA	violet
7	AI1	Analog input 1 (or digital input, configuration via software)	IN	analog $\pm 10$ V or 0 ... 20 mA (digital 24V)	pink
8	AO1	Analog output 1 Factory setting: Actual pressure value, normalized	OUT	analog $\pm 10$ V or 0 ... 20 mA	red
9	DI	Digital input (use freely configurable)	IN	logic 24 V	brown
10	Actual pressure value H	Actual pressure value input (analog input 8): Signal level depends on parameter setting. Factory setting depends on feature 14 of the ordering code: 0 ... 10 V (V) or deactivated (F)	IN	analog 0 ... 10 V, 0 ... 20 mA (freely configurable)	black
11	Actual pressure value L		–	analog	blue
n.c.					gray

**Electrical connection: SYHDFED....1X****X7E1 and X7E2: Connector pin assignment for Ethernet interface (coding D), M12, 4-pole, socket**

Pin	Assignment
1	TxD +
2	RxD +
3	TxD -
4	RxD -
5	not assigned

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

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



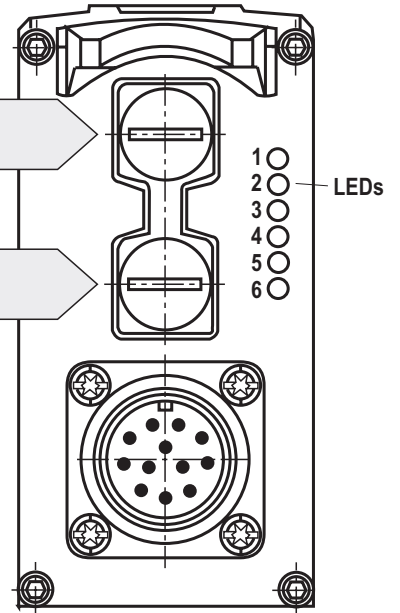
<sup>1)</sup> Maximum load capacity 50 mA, voltage output same as voltage supply connected to input XH4.

<sup>2)</sup> Only one signal input per interface, configurable

**X2N: Reserved****X8A: Actual swivel angle value input (coding A), M12, 5-pole, socket M12**

## LED displays SYHDFED-1X

LED	Interface	Sercos	EtherNET/IP	EtherCAT	PROFINET
1	X7E1	Activity	Activity	Not used	Activity
2		Link	Link	Link/activity	Link
3	Electronics module	S	Network status	Network status	Network status
4		Module status	Module status	Module status	Module status
5	X7E2	Activity	Activity	Not used	Activity
6		Link	Link	Link/activity	Link



### Displays of the status LEDs

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

Network status LED (LED 3)	Display status
Off	No voltage supply
Green	Operation

#### Notes:

- ▶ LEDs 1, 2, 5 and 6 relate to interfaces "X7E1" and "X7E2"
  - Link: Cable plugged in, connection established (permanently lit)
  - Activity: Data sent/received (flashing)
- ▶ Module status LEDs 3 and 4 relate to the electronics module
- ▶ For a detailed description of the diagnosis LEDs, please refer to the functional description Rexroth HydraulicDrive HDB.

## Control loop quality

### Notes:

- ▶ 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.

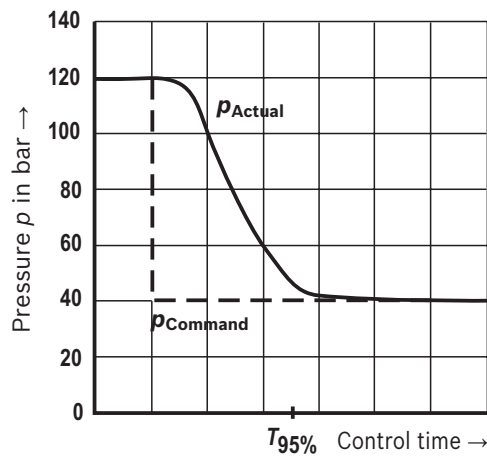
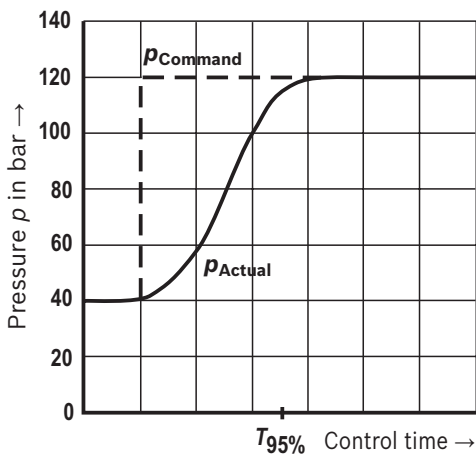
	Swivel angle control	Pressure control <sup>1)</sup>
Linearity tolerance	≤ 1.0%	≤ 1.5% (≤ 1.0% <sup>2)</sup> )
Temperature error	≤ 0.5 % / 10 K	≤ 0.5 % / 10 K
Hysteresis	≤ 0.2%	≤ 0.2%
Repetition accuracy	≤ 0.2%	≤ 0.2%

1) Without considering the pump pulsation

2) With SYHDFEC, SYHDFEn and SYHDFED 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.



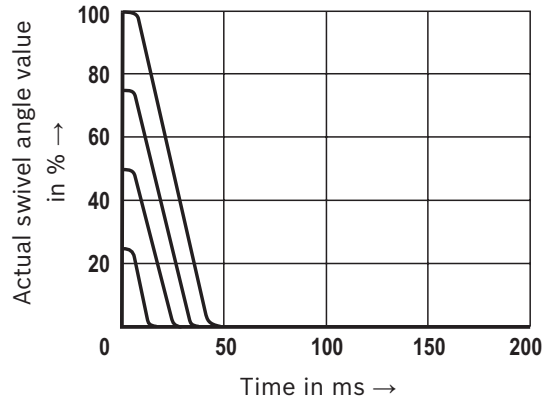
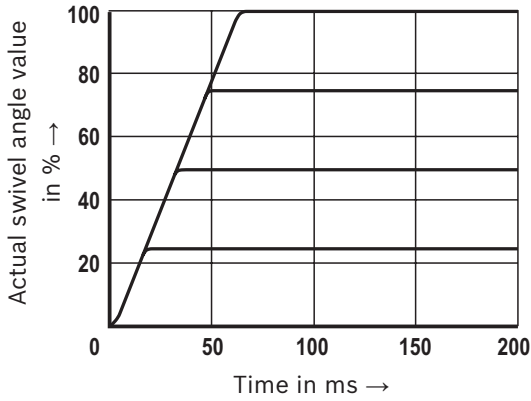
T 95% in ms with a connected hydraulic fluid volume (lines and actuators)

Hydraulic fluid volume in l	T <sub>95%</sub> in ms
5 ... 10	200
15 ... 25	250

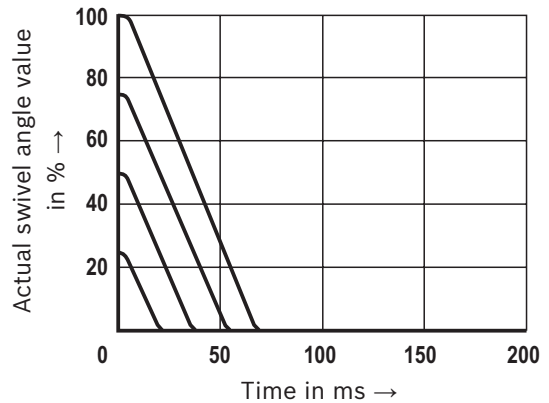
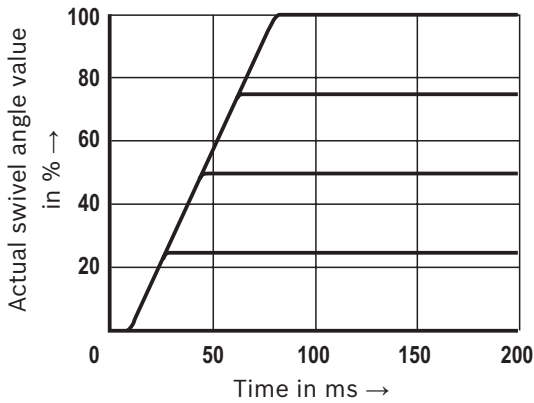
For pressures up to 40 bar, the values of the response times are greater.

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

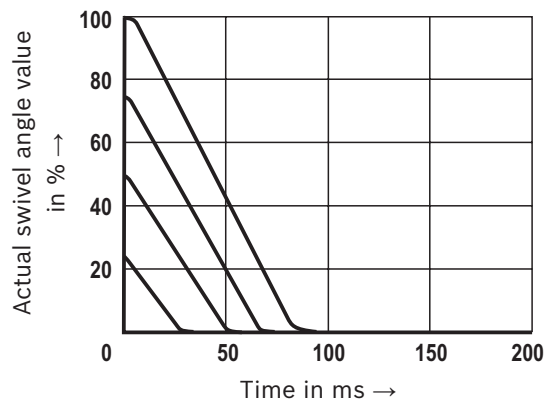
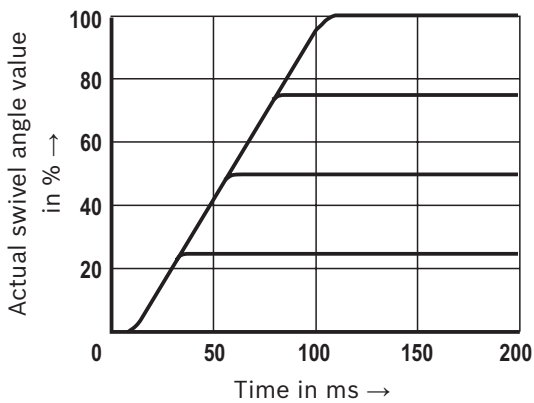
**NG40, 71  $p = 100$  bar**



**NG125  $p = 100$  bar**

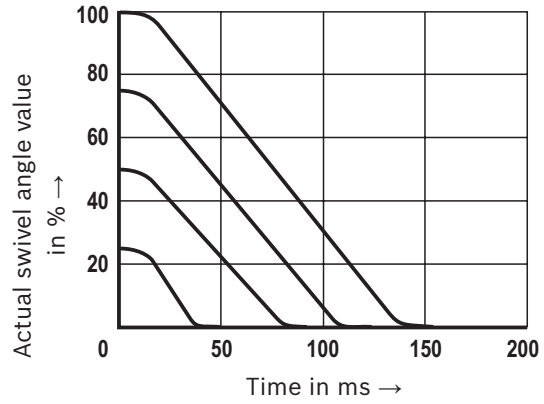
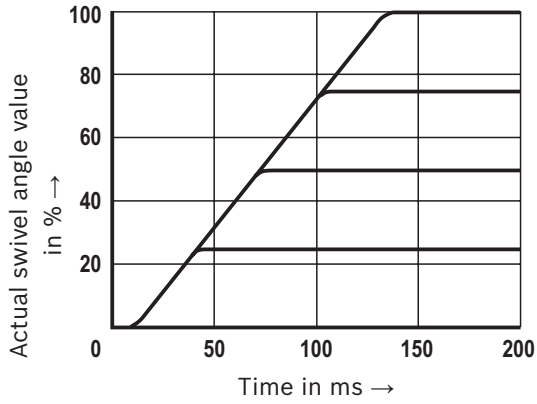


**NG180  $p = 100$  bar**

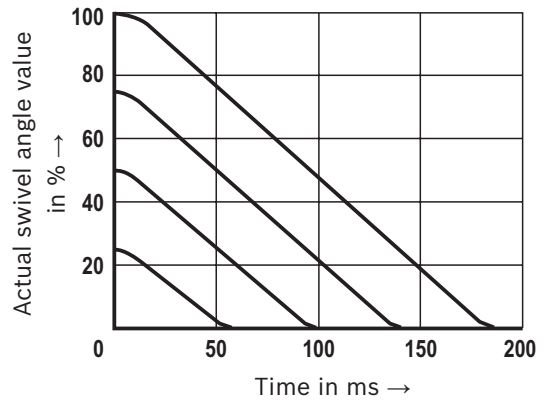
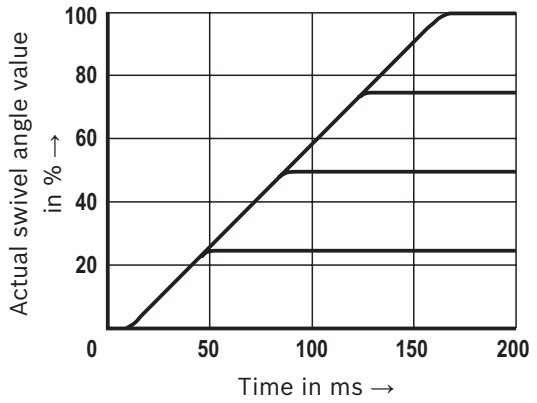


### Transition function with swivel angle command value step with spool design "A"

NG250  $p = 100$  bar



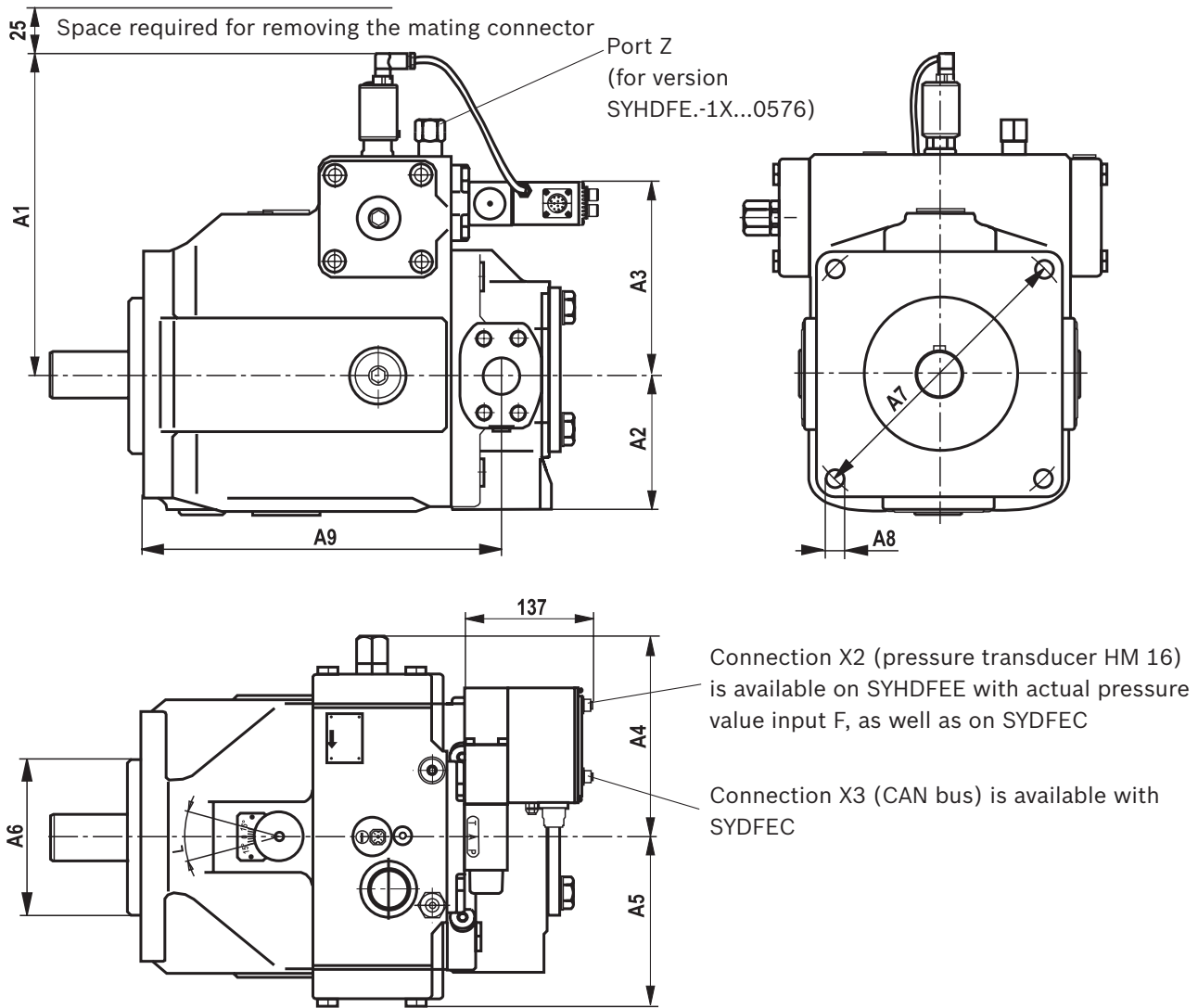
NG355  $p = 100$  bar





**Dimensions: SYHDFEE-1X, SYHDFEC-1X, SYHDFEn-1X, installation orientation 0**  
(dimensions in mm)

The dimensions of the base pump (axial piston variable displacement pump A4VSO) are contained in data sheet 92050.

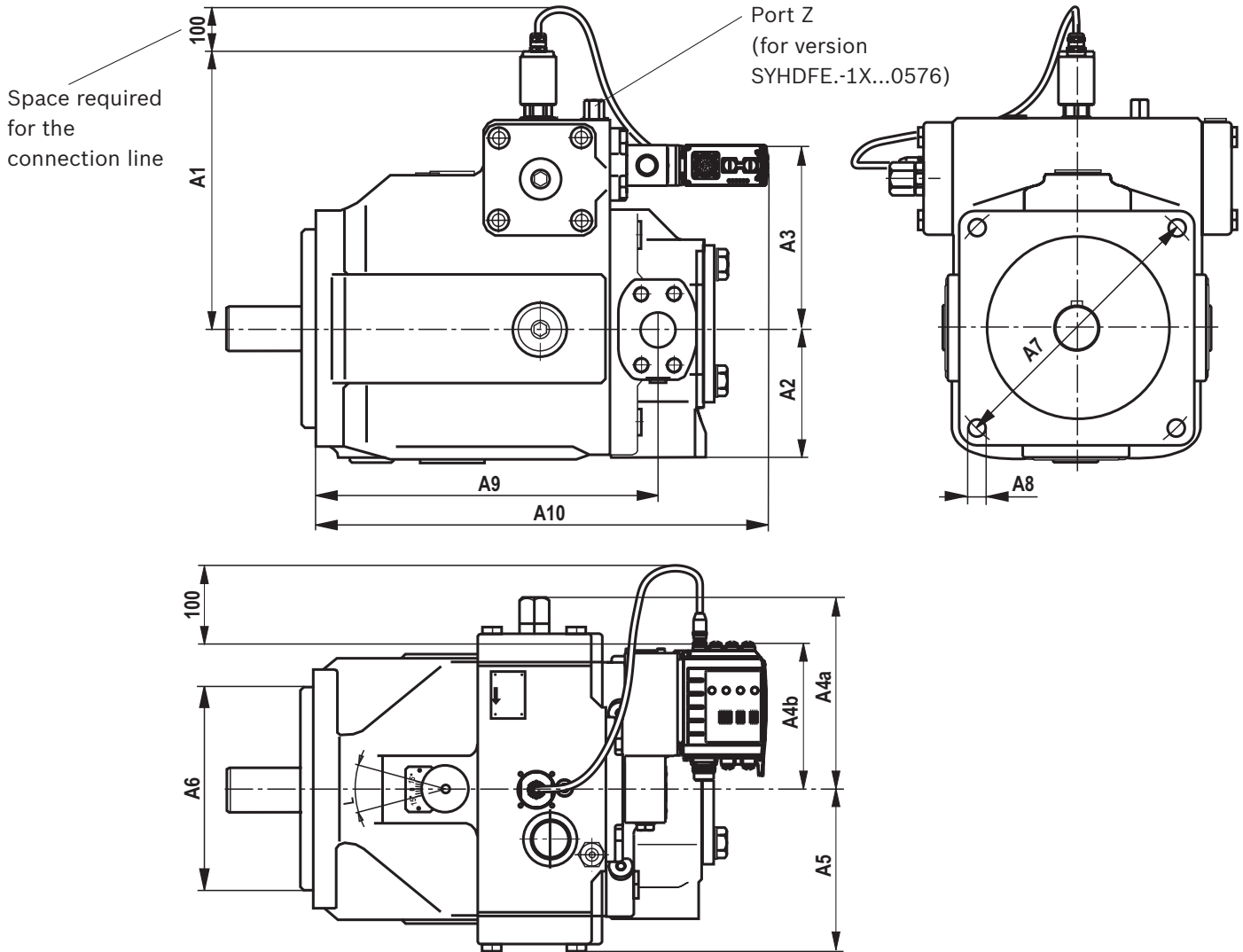


**SYHDFEE-1X, SYHDFEC-1X, SYHDFEn-1X, installation orientation 0:**

NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
40	239	80	127	130	104	125	160	15	227	325
71	256	92.5	141	149	127	140	180	15	254	352
125	291	112.5	171	177	147	160	200	20	310	421
180	291	116	171	177	147	160	200	20	318	421
250	339	144	207	212	179	224	280	24	380	483
355	339	144	207	212	179	224	280	24	393	575

**Dimensions: SYHDFED-1X, installation orientation 0**  
(dimensions in mm)

The dimensions of the base pump (axial piston variable displacement pump A4VSO) are contained in data sheet 92050.

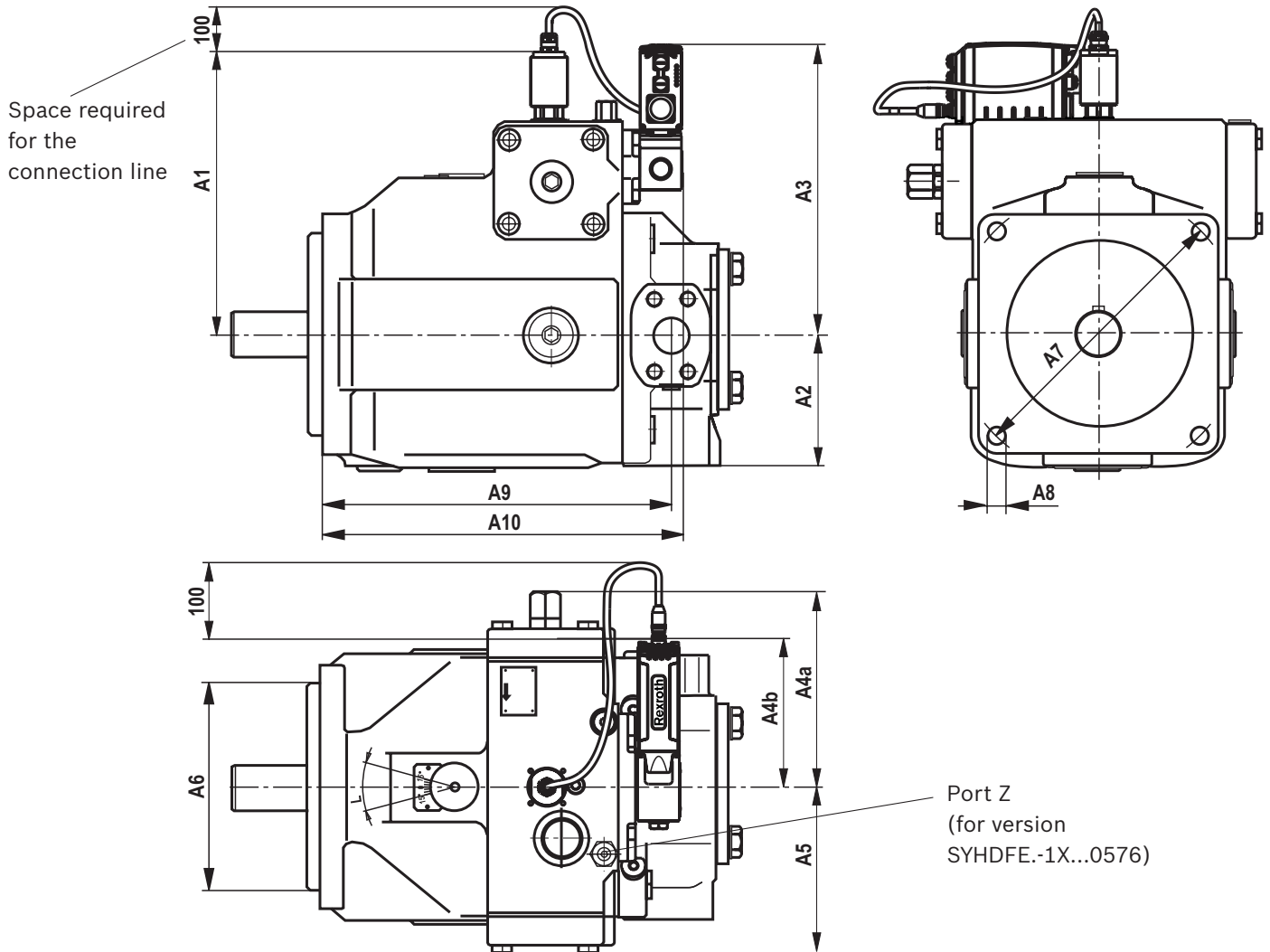


**SYHDFED-1X, installation orientation 0:**

NG	A1	A2	A3	A4a	A4b	A5	A6	A7	A8	A9	A10
40	212	80	127	130	167	104	125	160	15	227	348
71	229	92.5	141	149	167	127	140	180	15	254	375
125	264	112.5	171	177	167	147	160	200	20	310	444
180	264	116	171	177	167	147	160	200	20	318	444
250	312	144	207	212	167	179	224	280	24	380	506
355	312	144	207	212	167	179	224	280	24	380	598

## Dimensions: SYHDFED-1X, installation orientation 1 (dimensions in mm)

The dimensions of the base pump (axial piston variable displacement pump A4VSO) are contained in data sheet 92050.



### SYHDFED-1X, installation orientation 1:

NG	A1	A2	A3	A4a	A4b	A5	A6	A7	A8	A9	A10
40	212	80	241	130	167	104	125	160	15	227	235
71	250	92.5	255	149	167	127	140	180	15	254	262
125	264	112.5	285	177	167	147	160	200	20	310	331
180	264	116	285	177	167	147	160	200	20	318	331
250	312	144	321	212	167	179	224	280	24	380	393
355	312	144	321	212	167	179	224	280	24	393	485

### Shaft ends:

NG	Shaft Ø	= P 1)	= Z 2)
40	32	AS 10x8x56	W 32x2x14x9g
71	40	AS 12x8x68	W 40x2x18x9g
125	50	AS 14x9x80	W 50x2x24x9g
180	50	AS 14x9x80	W 50x2x24x9g
250	60	AS 18x11x100	W 60x2x28x9g
355	70	AS 20x12x100	W 70x3x22x9g

1) Cylindrical with fitting key DIN 6885

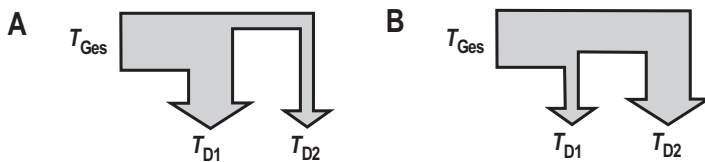
2) Splined shaft profile DIN 5480

## Through-drives: Torques

### Admissible drive and through-drive torques

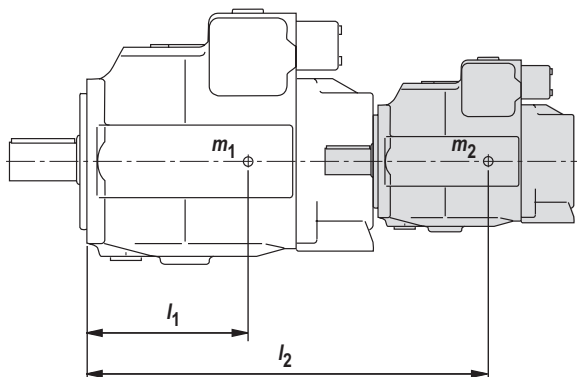
Size		40	71	125	180	250	355
Splined shaft							
Maximally admissible total drive torque at the shaft of pump 1 (Pump 1 + Pump 2)	$T_{Total\ max}$ [Nm]	446	790	1392	2004	2782	3952
A Admissible through-drive torque	$T_{D1\ max}$ [Nm]	223	395	696	1002	1391	1976
	$T_{D2\ max}$ [Nm]	223	395	696	1002	1391	1976
B Admissible through-drive torque	$T_{D1\ max}$ [Nm]	223	395	696	1002	1391	1976
	$T_{D2\ max}$ [Nm]	223	395	696	1002	1391	1976
Fitting key							
Maximally admissible total drive torque at the shaft of pump 1 (Pump 1 + Pump 2)	$T_{Total\ max}$ [Nm]	380	700	1392	1400	2300	3557
A Admissible through-drive torque	$T_{D1\ max}$ [Nm]	223	395	696	1002	1391	1976
	$T_{D2\ max}$ [Nm]	157	305	696	398	909	1581
B Admissible through-drive torque	$T_{D1\ max}$ [Nm]	157	305	696	398	909	1581
	$T_{D2\ max}$ [Nm]	223	395	696	1002	1391	1976

### Distribution of torques



### Admissible mass torque

related to mounting flange of the main pump



$m_1, m_2$  [kg] Pump weight

$l_1, l_2$  [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		40	71	125	180	250	355
Admissible mass torque	$T_{m\ adm.}$ [Nm]	1800	2000	4200	4200	9300	9300
Admissible mass torque with dynamic mass acceleration of 10 g = 98.1 m/sec <sup>2</sup>	$T_{m\ adm.}$ [Nm]	180	200	420	420	930	930
Weight (SYHDFE or A4VSO...DR)	$m$ [kg]	39	53	88	102	184	207
Distance of the center of gravity	$l_1$ [mm]	120	140	170	180	210	220

## Dimensions: Through-drives (dimensions in mm)

The control systems of size 40 to 71 are partly supplied with through-drive K99.

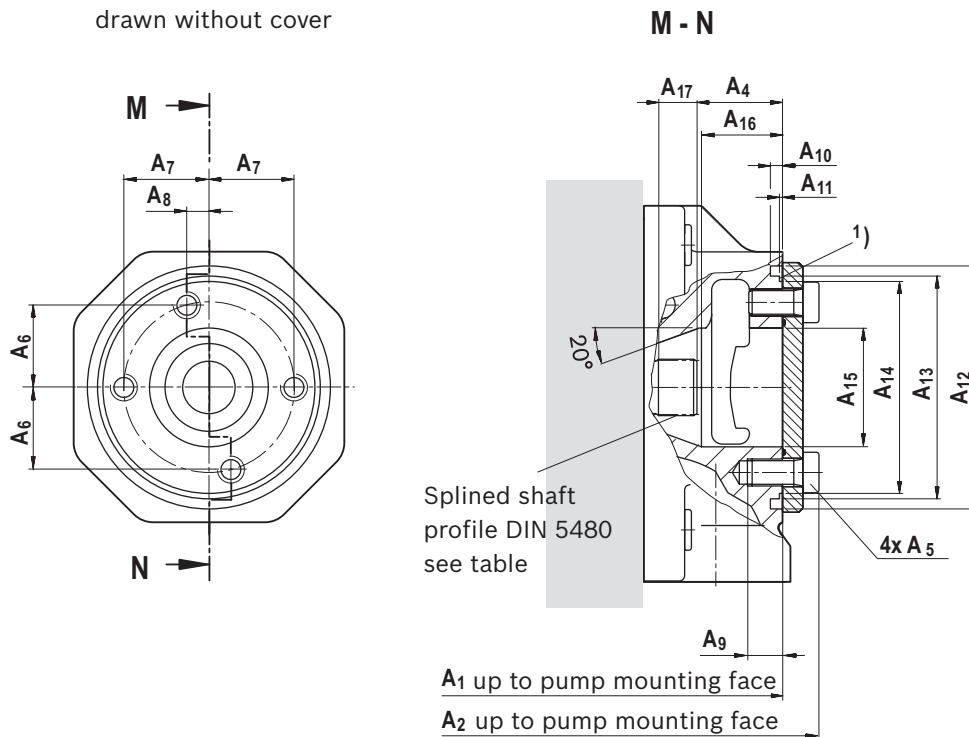
Their advantage is that the through-drive can be subsequently modified.

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 page 31 as well as data sheet 95581.

Small centering diameters are directly worked into the pump subplate. Subsequent modification is not possible. Please note the type key under ordering code and the overview under "Accessories for through-drives". Hubs for through-drives can be ordered separately.

### K99 NG 40 to 71

with through-drive shaft, without hub, without intermediate flange, closed by means of a pressure-resistant cover in a fluid-tight way



NG Main pump	A <sub>1</sub>	A <sub>2</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub>	A <sub>12</sub>	A <sub>13</sub>
40	263	280	51.3 <sup>±1</sup>	M12; 25 deep	37 <sup>+0.2</sup>	37 <sup>+0.2</sup>	0	18	9	2.3 <sup>+0.1</sup>	∅118 <sup>H7</sup>	∅105 <sub>g6</sub>
71	291	310	48 <sup>±1</sup>	M12; 25 deep	42.3 <sup>+0.15</sup>	45 <sup>+0.15</sup>	15.4 <sup>±15</sup>	18	9	2.7 <sup>+0.1</sup>	∅130 <sup>H7</sup>	∅116 <sub>g6</sub>

NG Main pump	A <sub>14</sub>	A <sub>15</sub>	A <sub>16</sub>	A <sub>17</sub>	Splined shaft profile DIN 5480	<sup>1)</sup> O-ring for subsequent attachment (not included in the scope of delivery)
40	∅97.6 <sup>-0.4</sup>	∅52	44	14	W25x1.25x18x9g	99 x 3
71	∅106.4 <sup>-0.4</sup>	∅63	38	16	W30x1.25x22x9g	110.72 x 3.53

**Dimensions: Through-drives**  
(dimensions in mm)

The control systems of size 125 to 355 are supplied with universal through-drives U99.

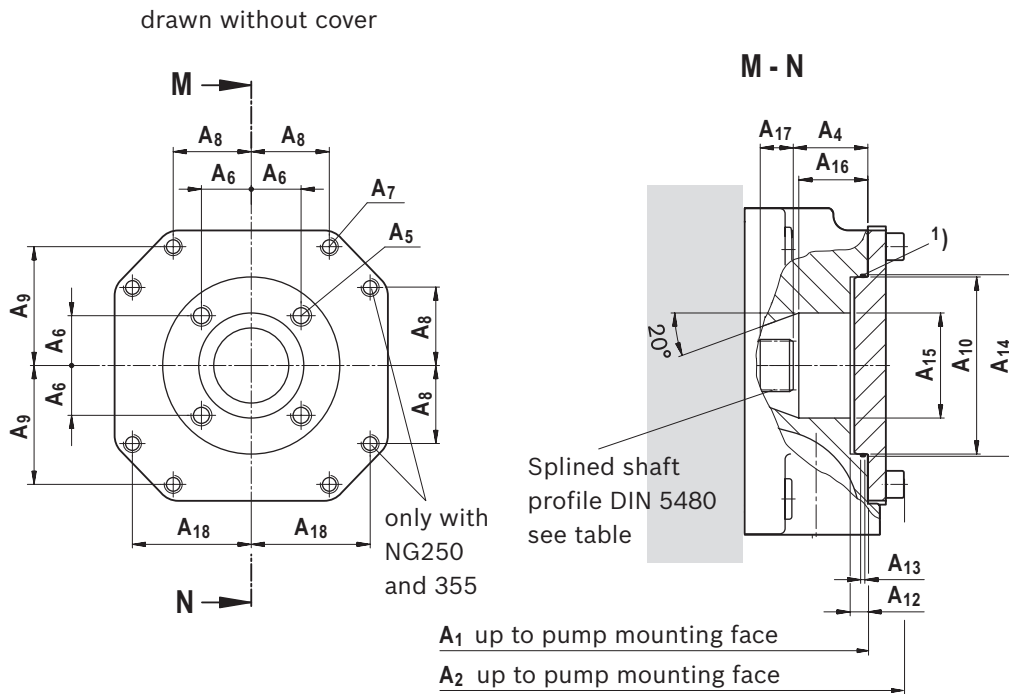
Their advantage is that the through-drive can be subsequently modified.

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 page 31 as well as data sheet 95581.

**U99 NG 125 to 355**

with through-drive shaft, without hub, without intermediate flange, closed by means of a pressure-resistant cover in a fluid-tight way



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

NG Main pump	A <sub>14</sub>	A <sub>15</sub>	A <sub>16</sub>	A <sub>17</sub>	A <sub>18</sub>	Splined shaft profile DIN 5480	<sup>1)</sup> O-ring for subsequent attachment (included in the scope of delivery)
125	∅121 <sup>+0.1</sup>	∅70	46	22	-	W35x1.25x26x9g	118 x 2
180	∅121 <sup>+0.1</sup>	∅70	46	25	-	W35x1.25x26x9g	118 x 2
250	∅163 <sup>+0.1</sup>	∅87	64	30.5	86.2 <sup>+0.15</sup>	W42x1.25x32x9g	160 x 2
355	∅163 <sup>+0.1</sup>	∅87	64	34	86.2 <sup>+0.15</sup>	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 table shown below and in the data sheet 95581 specification.

Components Universal through-drive U99	Main pump SYHDFE.-1X		Attachment pump			
	NG125 NG180	NG250 NG355	Size and type		Through-drive Centering Hub	Flange designation
Mounting kit	R902447035	R902447037	NG18	SYDFE.-2X	U52 82.55 mm 3/4"	SAE J744 82-1 (A-B)
Flange kit	R902446836	R902446850				
Hub	R902446823	R902446843				
Mounting kit	R902446996	R902446998	NG28	A10VSO / BR31	UB3 100 mm 7/8"	ISO 3019-2 100B2HW
Flange kit	R902446808	R902446809				
Hub	R902446824	R902446844				
Mounting kit	R902447001	R902447003	NG45	Shaft S or R	UB4 100 mm 1"	ISO 3019-2 100B2HW
Flange kit	R902446808	R902446809				
Hub	R902446825	R902446845				
Mounting kit	On request	On request	NG40		UE1 125mm 1"	ISO 3019-2 125B4HW
Flange kit	On request	R902446813				
Hub	R902446825	R902446845				
Mounting kit	R902447014	R902447016	NG71	SYDFE.-3X A10VSO / BR32	UB8 160 mm 1 ¼"	ISO 3019-2 160B4HW
Flange kit	R902446816	R902446817				
Hub	R902446826	R902443227				
Mounting kit	R902447021	R902447022	NG100	Shaft S or R	UB9 180 mm 1 ½"	ISO 3019-2 180B4HW
Flange kit	R902446818	R902446820				
Hub	R910943555	R910921237				
Mounting kit	R902447025	R902447026	NG140		UB7 180 mm 1 ¼"	ISO 3019-2 180B4HW
Flange kit	R902446818	R902446820				
Hub	R910904588	R902446849				
Mounting kit	R902447010	R902447011	NG40		U31 125mm W 32x2x14x9g	ISO 3019-2 125B4HW
Flange kit	R902446812	R902446813				
Hub	R902446828	R902446846				
Mounting kit	R902447012	R902447013	NG71	SYHDFE-1X	U33 140mm W 40x2x18x9g	ISO 3019-2 140B4HW
Flange kit	R902446814	R902446815				
Hub	R902491155	R902446847				
Mounting kit	R902447019	R902447020	NG125 NG180	A4VSO / BR30	U34 160 mm W 50x2x24x9g	ISO 3019-2 160B4HW
Flange kit	R902446816	R902446817				
Hub	R902446848	R902446830				
Mounting kit		R902447028	NG250	Shaft Z	U35 224 mm W 60x2x28x9g	ISO 3019-2 224B4HW
Flange kit		R902446822				
Hub		R910902972				
Mounting kit		R902447029	NG355		U77 224 mm W 70x3x22x9g	ISO 3019-2 224B4HW
Flange kit		R902446822				
Hub		R910941327				

Components Universal through-drive K99	Main pump SYHDFE.-1X		Attachment pump			
	NG40	NG71	Size and type		Through-drive Centering Hub	Flange designation
Mounting kit		R902546965	NG18	SYDFE.-2X A10VSO / BR31	K52 82.55 mm 3/4"	ISO 3019-1- 82-2
Hub	R910944344 Tooth hub f. KC1					
Mounting kit	R902488855					
Hub		R910987983 Tooth hub f. KD3	NG28	Shaft S or R	KB3 100mm 7/8"	ISO 3019-2 100B2HW

## Accessories for through-drives

Components Universal through-drive K99	Main pump SYHDFE.-1X		Attachment pump			
	NG40	NG71	Size and type		Through-drive Centering Hub	Flange designation
Mounting kit	On request	On request	NG45	SYDFE.-2X A10VSO / BR31 Shaft S or R	KB4 100mm 1"	ISO 3019-2 100B2HW
Mounting kit		R902543215	NG45	SYDFE.-3X A10VSO / BR32 Shaft S or R	KE1 125mm 1"	ISO 3019-2 125B4HW
Mounting kit		R902543416	NG71		KB8 160 mm 1 1/4"	ISO 3019-2 160B4HW
Mounting kit	R902425118	R910904879	NG40	SYHDFE-1X A4VSO / BR10 Shaft Z	K31 125mm W 32x2x14x9g	ISO 3019-2 125B4HW
Mounting kit		R902403972	NG71		K33 140mm W 40x2x18x9g	ISO 3019-2 140B4HW

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

- ▶ 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

Also observe 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.

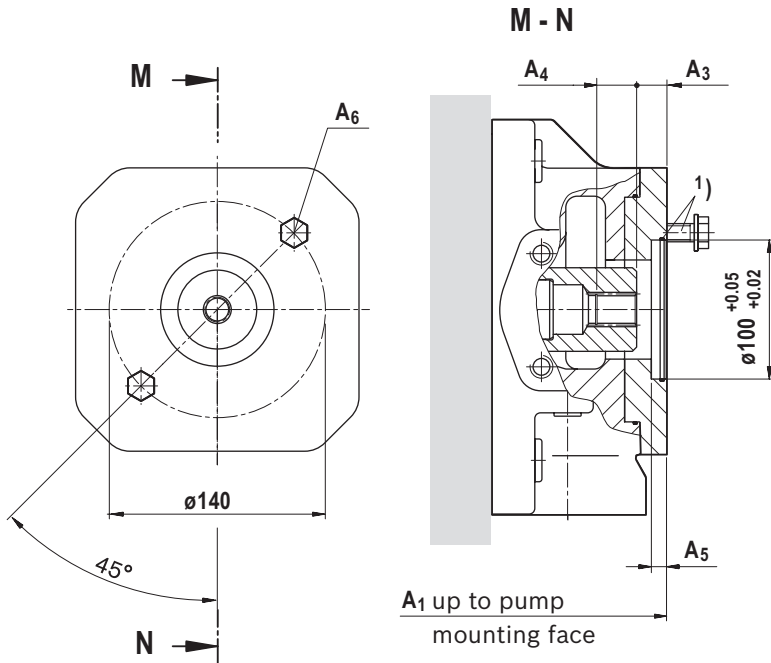
Components Universal through-drive	Main pump SYHDFE.-1X		Attachment pump		
	NG125 NG180	NG250 NG350	Size and type	Through-drive Centering Hub	Flange designation
Mounting kit	R902447030	R902447032	PGF2, PGH2, PGH3, AZPF	U01	SAE J744 82-2(A-B)
Flange kit	R902446836	R902446850		82.55	
Hub	R902446831	R902497505		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"	

Components Universal through-drive	Main pump SYHDFE.-1X		Attachment pump		
	NG40	NG71	Size and type	Through-drive Centering Hub	Flange designation
Hub	R910944342 Tooth hub f. KC1	R910944356 Tooth hub f. KC1	PGF2, PGH2, PGH3, AZPF	K01 82.55 mm 5/8"	ISO 3019-1- 82-2"



**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; 13T 3)  
 for A10VSO 28/31 splined shaft S attachment (see data sheet 92711)

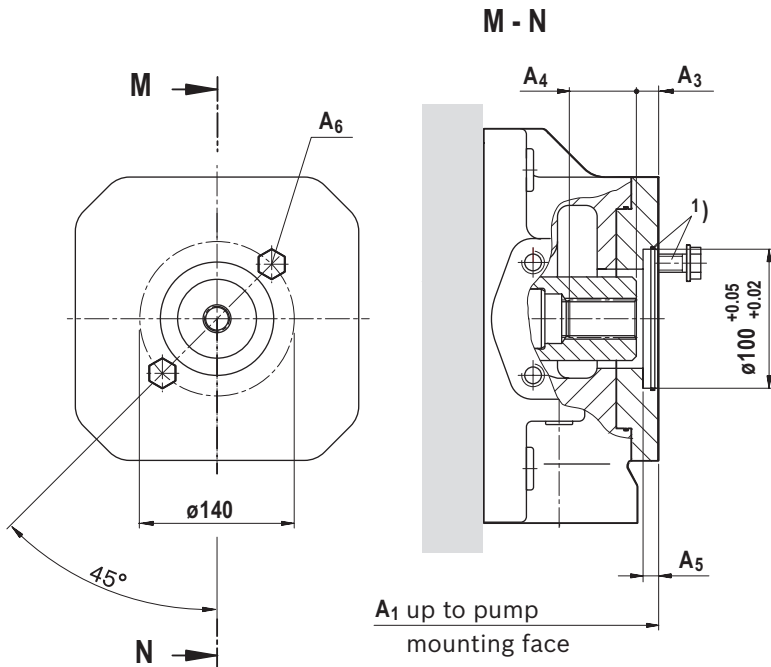


NG	A1	A3	A4	A5	A6 <sup>2)</sup>
125	369	20.5	24.9	10	M12
180	393	20.5	24.9	10	M12
250	in preparation				
355	in preparation				

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

- 1) 2 mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 is to be observed
- 3) According to ANSI B92.1a-1976, 30° pressure angle, flat root, 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; 15T <sup>3)</sup>  
 for A10VSO 45/31 splined shaft S attachment (see data sheet 92711)



NG	A1	A3	A4	A5	A6 <sup>2)</sup>
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

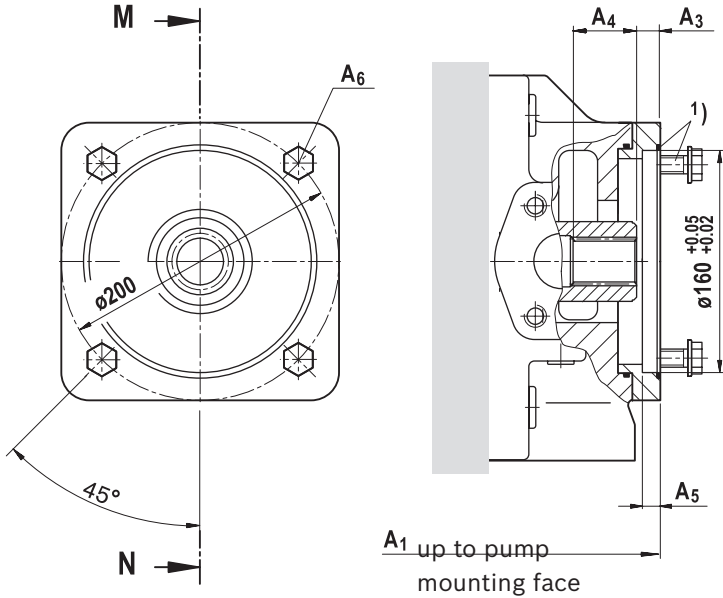
Before determining your design, please request a binding installation drawing.

- 1) 2 mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 is to be observed
- 3) According to ANSI B92.1a-1976, 30° pressure angle, flat root, side fit, tolerance class 5

**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; 14T 3)**  
 for A10VSO 71/32 splined shaft S attachment (see data sheet 92714)

**M - N**



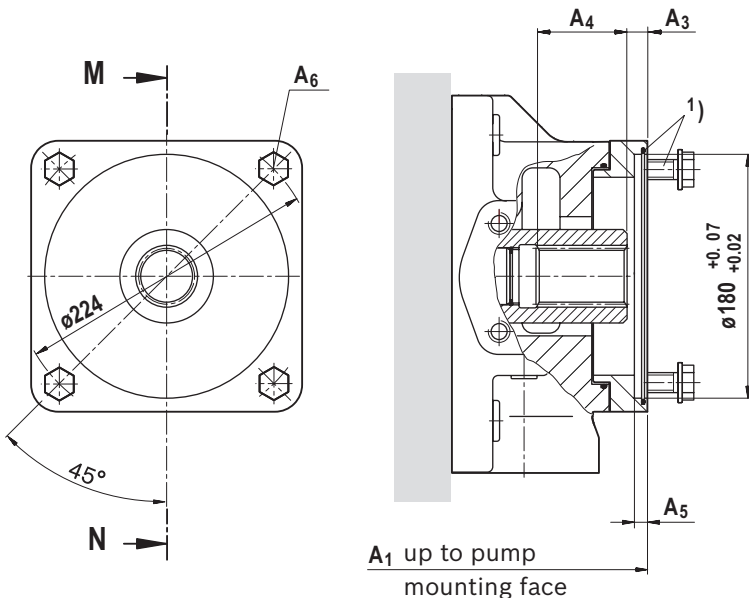
NG	A1	A3	A4	A5	A6 <sup>2)</sup>
125	in preparation				
180	in preparation				
250	453	20.9	38	9	M16
355	in preparation				

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

- 1) Mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 is to be observed
- 3) According to ANSI B92.1a-1976, 30° pressure angle, flat root, 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; 13T 3)**  
 for A10VSO 140/31(32) splined shaft S attachment (see data sheet 92711 (RE 92714))

**M - N**



NG	A1	A3	A4	A5	A6 <sup>2)</sup>
180	406	10.6	62	9	M16
250	453	10.6	64	9	M16
355	482	10.6	64	9	M16

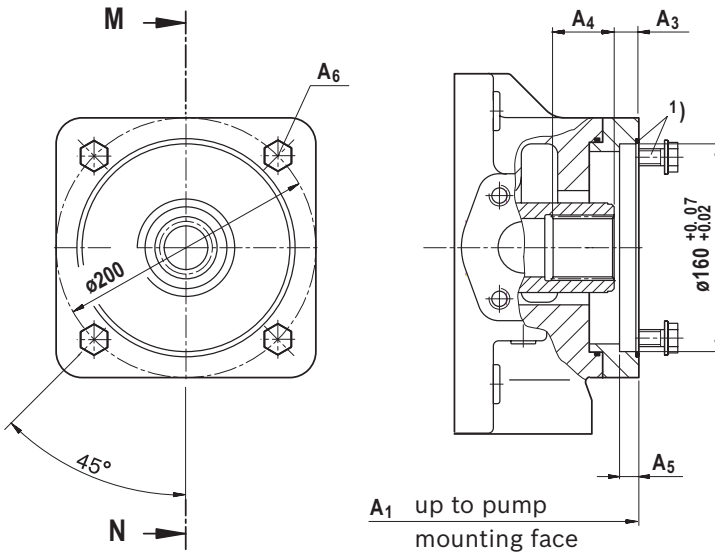
Before determining your design, please request a binding installation drawing.

- 1) Mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 is to be observed
- 3) According to ANSI B92.1a-1976, 30° pressure angle, flat root, side fit, tolerance class 5

**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

**M - N**



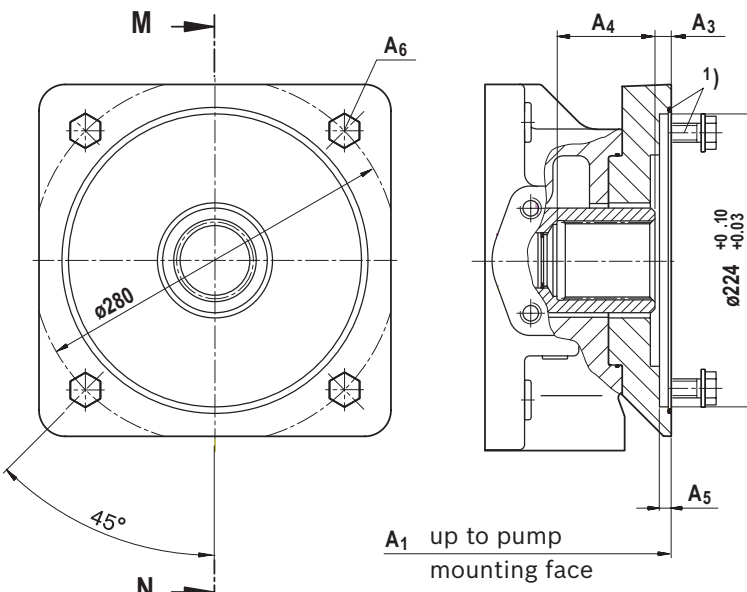
NG	A1	A3	A4	A5	A6 <sup>2)</sup>
125	369	12.5	51.6	9	M16
180	393	12.5	51.6	9	M16
250	453	12.5	54	9	M16
355	482	12.5	54	9	M16

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

- 1) Mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 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

**M - N**



NG	A1	A3	A4	A5	A6 <sup>2)</sup>
250	469	12.5	75	9	M20
355	498	12.5	75	9	M20

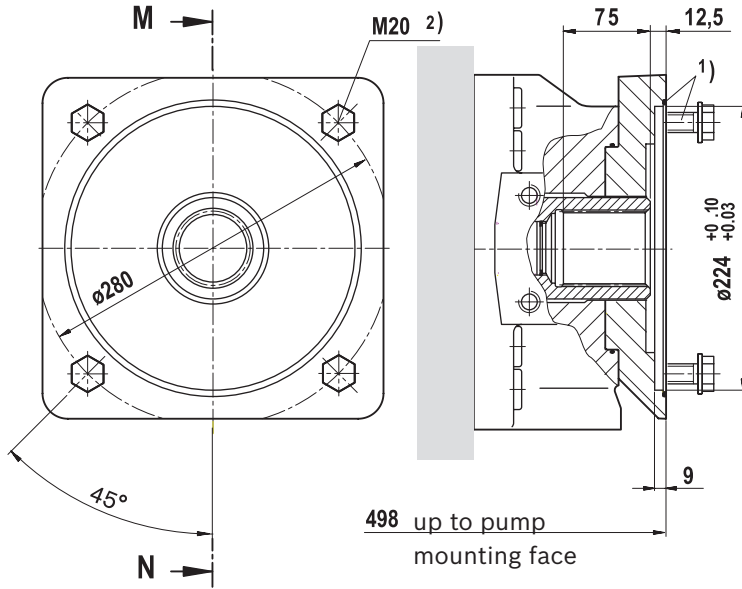
Before determining your design, please request a binding installation drawing.

- 1) Mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 is to be observed

**Dimensions: Through-drives (dimensions in mm)**

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

**M - N**



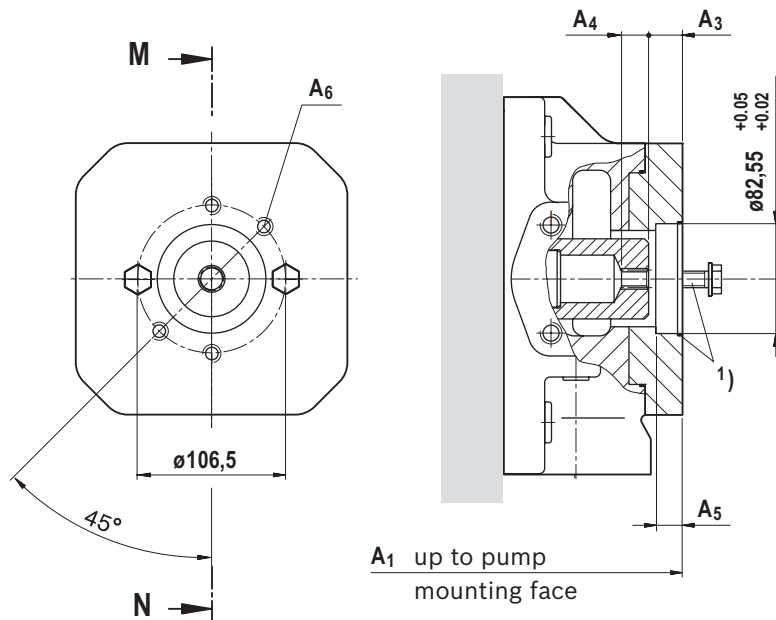
**NG355**

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

- 1) Mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 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<sup>3)</sup>  
 for external gear pump AZ-PF-1X-004 ... attachment 022 (see data sheet 10089)  
 Rexroth recommends a special version of the gear pumps, please contact us

**M - N**



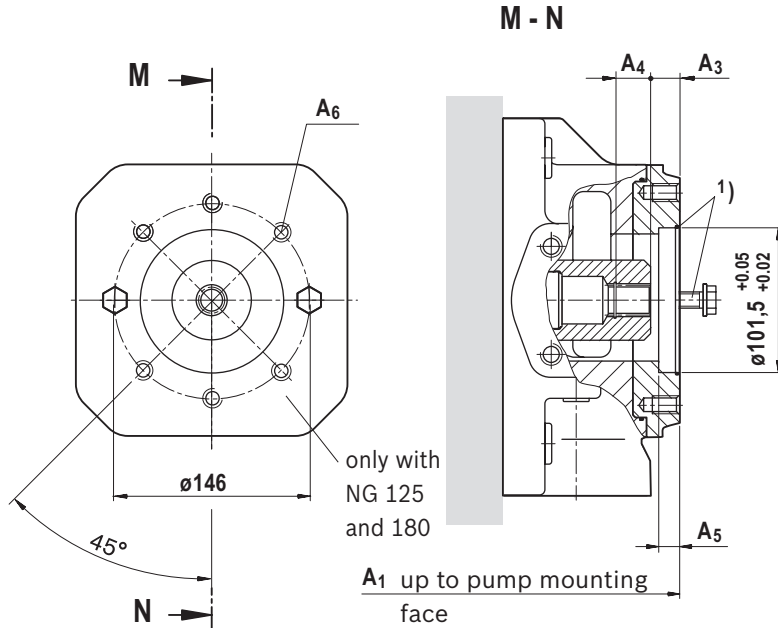
NG	A1	A3	A4	A5	A6 <sup>2)</sup>
125	369	16	19.4	13	M10
180	393	16	19.4	13	M10
250	453	16	19.4	13	M10
355	482	16	19.4	13	M10

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

- 1) Mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 is to be observed
- 3) According to ANSI B92.1a-1976, 30° pressure angle, flat root, side fit, tolerance class 5

## 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 <sup>3)</sup> for external gear pump AZ-PN-1x020...032 attachment (see data sheet 10091 or an A10VO 28/31 and 52(53) splined shaft S (see data sheet 92701 and 92703) Rexroth recommends special versions of the gear pumps, please contact us

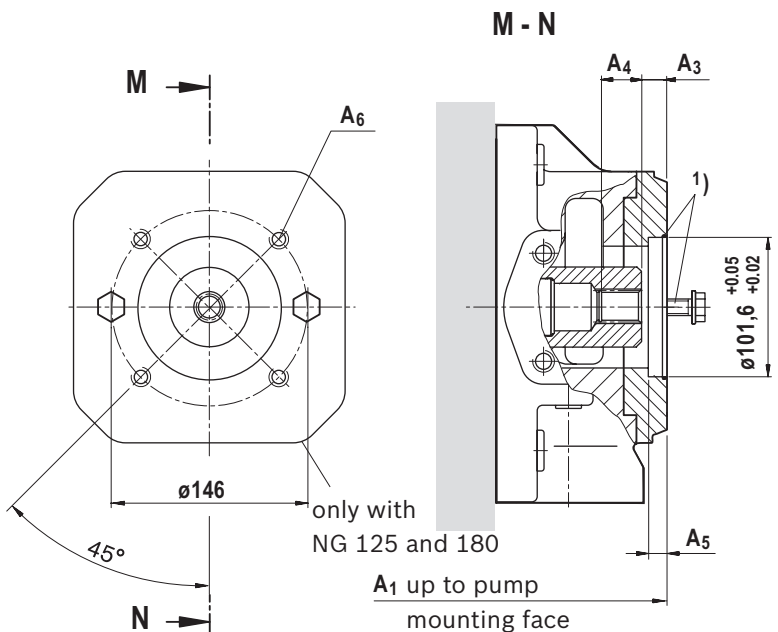


NG	A1	A3	A4	A5	A6 <sup>2)</sup>
125	369	28	25	13	M12
180	393	28	25	13	M12
250	453	19.5	23.1	13	M12
355	482	19.5	23.1	13	M12

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

- 1) 2 mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 is to be observed
- 3) According to ANSI B92.1a-1976, 30° pressure angle, flat root, 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 <sup>3)</sup> for A10VO 45/31 and 52 (53) splined shaft S attachment (see data sheet 92701 and 92703) or an internal gear pump PGH4 (see data sheet 10223)



NG	A1	A3	A4	A5	A6 <sup>2)</sup>
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 design, please request a binding installation drawing.

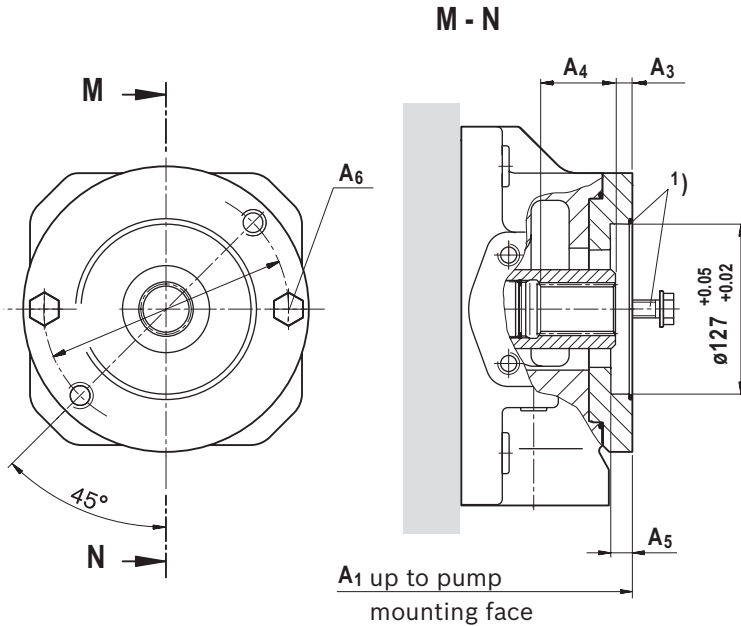
- 1) 2 mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 is to be observed
- 3) According to ANSI B92.1a-1976, 30° pressure angle, flat root, side fit, tolerance class 5

**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 <sup>3)</sup>

for A10VSO 100/31 splined shaft S attachment (see data sheet 92701) or an A10VO 85/52(53) splined shaft S (see data sheet 92703) or an internal gear pump PGH5 (see data sheet 10223)



NG	A1	A3	A4	A5	A6 <sup>2)</sup>
<b>125</b>	369	10.4	50	13	M16
<b>180</b>	393	10.4	50	13	M16
<b>250</b>	453	12.4	55	13	M16
<b>355</b>	482	12.4	55	13	M16

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

- 1) 2 mounting screws and O-ring seal are included in the scope of delivery
- 2) Thread according to DIN 13, for the max. tightening torques, the installation information on page 39 is to be observed
- 3) According to ANSI B92.1a-1976, 30° pressure angle, flat root, side fit, tolerance class 5

**Hubs for standard electric motor coupling**

Coupling with gear rim for ambient temperatures up to 80 °C, e.g. for motor assemblies with IM V1 motor

Motor		SYHDFE.-1X		Shaft Z	
Frame size/ characteristic	Shaft diameter	NG71 Shaft W40x2x18x9g	NG125/180 Shaft W50x2x24x9g	NG250 Shaft W60x2x28x9g	NG355 Shaft W70x3x22x9g
225/0	60	R900026054	R900026055		
250/0	65	R900026058	R900026059		
280/0	75	R900026062	R900026063	R900714636	
315/0	80	R901037250	R901076760	R900088584 <sup>1)</sup>	R900210961 <sup>1)</sup>
315/1	80		R900026068	R900783295	R900210960

1) Up to 40 °C

## Project planning information

- ▶ Command values may only be switched via relays with gold-plated contacts (low voltage, low currents)
- ▶ Always shield command and actual value cables.
- ▶ The distance to aerial lines or radios must be at least 1 m.
- ▶ Do not lay signal lines close to power lines.
- ▶ Supplementary information on the SYHDFE control system can be found in the operating instructions (See section "Further information about this control system" on this page).

## Installation information

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

## Further information about this control system

- |  |           |
|--|-----------|
| ▶ Operating instructions for SY(H)DFEE   | ▶ 30012-B |
| ▶ Operating instructions for SY(H)DFEC   | ▶ 30027-B |
| ▶ Operating instructions for SY(H)DFEn   | ▶ 30014-B |
| ▶ Operating instructions for SY(H)DFED   | ▶ 30017-B |
| ▶ Data sheet for universal through-drive for connecting two pumps into one combination             | ▶ 95581   |
| ▶ Data sheet for axial piston variable displacement pump A4VSO                                     | ▶ 92050   |
| ▶ Data sheet for axial piston variable displacement pump A4VSO for HFC                             | ▶ 92053   |
| ▶ Data sheet for pilot valve VT-DFP.-2X  | ▶ 29016   |
| ▶ Data sheet for swivel angle sensor VT-SWA-LIN-1X   | ▶ 30263   |
| ▶ Data sheet for pressure transducer HM20-2X   | ▶ 30272   |
| ▶ Operating instructions for test device VT-PDFE   | ▶ 29689-B |
| ▶ Technical information: Modification options for variable displacement pump A4VSO for DFE control | ▶ 30637   |

Current information is also available on the Internet at the address <http://www.boschrexroth.com/sydfc> (English) or <http://www.boschrexroth.de/sydfc> (German).

## Notes

Bosch Rexroth AG  
Industrial Hydraulics  
Zum Eisengießer 1  
97816 Lohr am Main, Germany  
Phone +49 (0) 93 52/40 30 20  
my.support@boschrexroth.de  
www.boschrexroth.de

© This document, as well as the data, specifications and other information set forth in it, are the exclusive property of Bosch Rexroth AG. It may not be reproduced or given to third parties without its consent.  
The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.