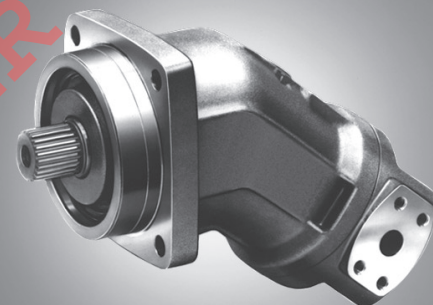


# Fixed Displacement Pump A2FO

**RE 91 401/09.00**  
replaces: 01.97

for open circuits

Sizes 5...1000  
Series 6  
Nominal pressure up to 400 bar  
Peak pressure up to 450 bar



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## Features

- 1 – Fixed displacement pump A2FO of axial piston, bent axis design is made suitable for hydrostatic drives in open circuits.
- 2
- 3...6 – Suitable for use in mobile or industrial applications.
- 7 – Output flow is proportional to drive speed and displacement.
- 7 – The drive shaft bearings are designed to give the service life expected in these areas of operation.
- 8
- 9 – Careful selection of the displacements offered, permit sizes to be matched to practically every application.
- 10
- 11 – Favourable power / weight ratio
- 12 – Compact and economical design
- 13 – Optimum efficiency
- 14 – One piece pistons with piston rings
- 15
- 15
- 16
- 16
- 17
- 17
- 18
- 19

### Ordering Code / Standard Program

(Ordering code size 5 see page 7)

										<b>A2F</b>		<b>0</b>		<b>/ 6</b>		<b>-</b>																											
<b>Hydraulic fluid</b>																																											
Mineral oil (no code)																																											
HFB-, HFC-, HFD- fluids										sizes 10...200 (no code) sizes 250...1000 <sup>1)</sup>																																	
										<b>E-</b>																																	
<b>Axial piston unit</b>																																											
Bent axis design, fixed displacement										<b>A2F</b>																																	
<b>Drive shaft bearings</b>																																											
										10...200		250..500		710..1000																													
Mechanical bearings (no code)										●		●		-																													
Long-Life bearings										-		●		●		<b>L</b>																											
<b>Mode of operation</b>																																											
Pump, open circuit										<b>0</b>																																	
<b>Size</b>																																											
≥ Displacement V <sub>d</sub> (cm <sup>3</sup> )																																											
5 10 12 16 23 28 32 45 56 63 80 90 107 125 160 180 200 250 355 500 710 1000																																											
Sizes 5...200: production Elchingen plant; sizes 250...1000: production Horb plant																																											
<b>Series</b>																																											
										<b>6</b>																																	
<b>Index</b>																																											
										sizes 10...180					<b>1</b>																												
										size 200					<b>3</b>																												
										sizes 250...1000					<b>0</b>																												
<b>Direction of rotation</b>																																											
Viewed on shaft end										clockwise					<b>R</b>																												
										anti-clockwise					<b>L</b>																												
<b>Seals</b>																																											
										10...200		250...1000																															
NBR (nitril-caoutchouc)										●		-		<b>P</b>																													
NBR (nitril-caoutchouc), shaft seal in FKM (fluor-caoutchouc)										●		-		<b>N</b>																													
FKM (fluor-caoutchouc)										●		●		<b>V</b>																													
<b>Shaft end</b>																																											
		10		12		16		23		28		32		45		56		63		80		90		107		125		160		180		200		250		355		500		710		1000	
Splined shaft		●		●		●		●		●		●		●		●		●		●		●		●		●		-		-		-		-		-		-		<b>A</b>			
DIN 5480		●		●		-		●		●		-		●		-		●		-		●		-		-		●		●		●		●		●		<b>Z</b>					
Parallel shaft with		●		●		●		●		●		-		●		●		●		●		●		●		●		-		-		-		-		-		<b>B</b>					
key, DIN 6885		●		●		-		●		●		-		●		-		●		-		●		-		-		●		●		●		●		●		<b>P</b>					
<b>Mounting flange</b>																																											
		10		12		16		23		28		32		45		56		63		80		90		107		125		160		180		200		250		355		500		710		1000	
ISO 4-hole		●		●		●		●		●		●		●		●		●		●		●		●		●		●		-		-		-		-		-		<b>B</b>			
ISO 8-hole		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		<b>H</b>			
<b>Service line connections <sup>2)</sup></b>																																											
A(B) SAE, at side		-		-		-		●		●		●		●		●		●		●		●		●		●		-		-		-		-		-		<b>05</b>					
S SAE, at rear		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		<b>06</b>					
A(B) threads at side		●		●		●		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		<b>11</b>					
S threads, at rear		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		<b>11</b>					
A(B) SAE, at rear		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		<b>11</b>					
S SAE, at rear		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		<b>11</b>					

  = preferred program (preferred types see page 18)

● = available  
- = not available

<sup>1)</sup> only in connection with drive shaft bearings "L"  
<sup>2)</sup> threads of fixing screws are metric

## Technical Data

### Fluid

To review the application of A2FO pumps with the selected hydraulic fluid, detailed fluid compatibility and application data can be found in data sheets RE 90220 (mineral oil), RE 90221 (environmentally acceptable hydraulic fluids) and RE 90223 (fire resistant fluids, HF).

The fixed pump A2FO is not suitable for operation with HFA. When using HFB-, HFC-, HFD- or environmentally acceptable hydraulic fluids possible limitations for the technical data have to be taken into consideration. If necessary please consult our technical department (please indicate type of the hydraulic fluid used for your application on the order sheet).

### Operating viscosity range

In order to obtain optimum efficiency and service life, we recommend that the operating viscosity (at operating temperature) be selected from within the range:

$$v_{opt} = \text{operating viscosity } 16 \dots 36 \text{ mm}^2/\text{s}$$

referred to the tank temperature (open circuit).

### Viscosity limits

The limiting values for viscosity are as follows:

Sizes 5...200

$v_{min} = 5 \text{ mm}^2/\text{s}$ ,  
short term at a max. permissible temperature of  $t_{max} = 115^\circ\text{C}$

$v_{max} = 1600 \text{ mm}^2/\text{s}$ ,  
short term on cold start ( $t_{min} = -40^\circ\text{C}$ )

Sizes 250...1000

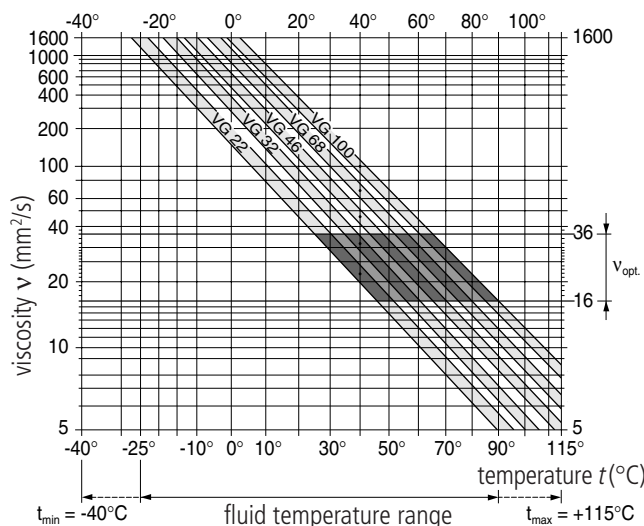
$v_{min} = 10 \text{ mm}^2/\text{s}$ ,  
short term at a max. permissible leakage oil temp. of  $t_{max} = 90^\circ\text{C}$

$v_{max} = 1000 \text{ mm}^2/\text{s}$ ,  
short term on cold start ( $t_{min} = -25^\circ\text{C}$ )

Please note that the max. fluid temperature is also not exceeded in certain areas (for instance bearing area).

At temperatures of  $-25^\circ\text{C}$  up to  $-40^\circ\text{C}$  special measures may be required for certain installation positions. Please contact us for further information.

### Selection diagram



### Notes on the selection of the hydraulic fluid

In order to select the correct fluid, it is necessary to know the operating temperature in the tank (open circuit) in relation to the ambient temperature.

The hydraulic fluid should be selected so that within the operating temperature range, the operating viscosity lies within the optimum range ( $v_{opt}$ ) (see shaded section of the selection diagram). We recommend that the highest possible viscosity range should be chosen in each case.

Example: At an ambient temperature of  $X^\circ\text{C}$  the operating temperature is  $60^\circ\text{C}$ . Within the operating viscosity range ( $v_{opt}$ ; shaded area), this corresponds to viscosity ranges VG 46 or VG 68. VG 68 should be selected.

Important: The leakage oil (case drain oil) temperature is influenced by pressure and pump speed and is always higher than the tank temperature. However, at no point in the circuit may the temperature exceed  $115^\circ\text{C}$  for sizes 5...200 or  $90^\circ\text{C}$  for sizes 250...1000.

If it is not possible to comply with the above conditions because of extreme operating parameters or high ambient temperatures please consult us.

### Filtration

The finer the filtration the better the achieved cleanliness level of the pressure fluid and the longer the life of the axial piston unit.

To ensure the functioning of the axial piston unit a minimum cleanliness level of

9 to NAS 1638

18/15 to ISO/DIS 4406 is necessary.

At very high temperatures of the hydraulic fluid ( $90^\circ\text{C}$  to max.  $115^\circ\text{C}$ , not permissible for sizes 250...1000!) at least cleanliness level

8 to NAS 1638

17/14 to ISO/DIS 4406 is necessary.

If above mentioned grades cannot be maintained please consult supplier.

### Direction of flow

clockwise rotation

anti-clockwise rotation

S to B

S to A

### Symbol

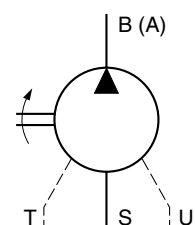
#### Connections

A, B Service line ports

S Suction port

T Drain port

U Port for bearing flushing (sizes 250...1000)



## Technical Data

### Case drain pressure

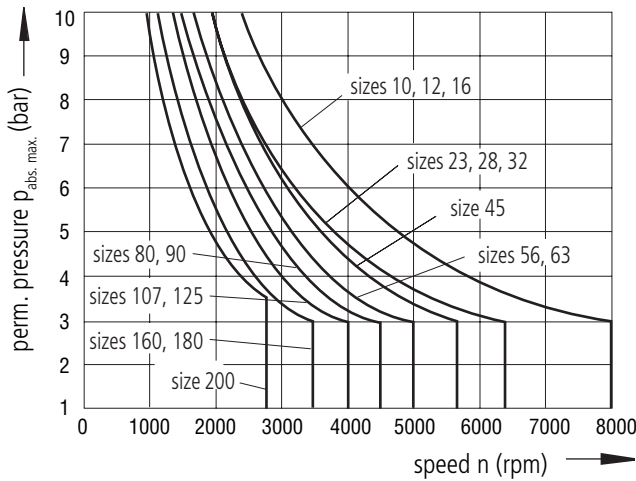
Shaft seal ring **FKM** (fluor-caoutchouc)

The lower the speed and the case drain pressure the higher the life expectancy of the shaft seal ring. The values shown in the diagram are permissible loads of the seal ring and shall not be exceeded.

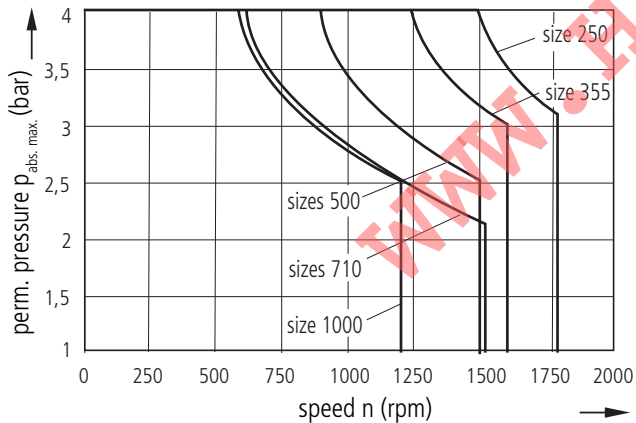
With constant case pressure in the range of the max. permissible case pressure a reduction of the life expectancy of the seal ring will result.

For a short period ( $t < 5$  min.) for the sizes 5...200 pressure loads up to 5 bar independent from rotational speeds are permissible.

#### Sizes 10...200



#### Sizes 250...1000



Shaft seal ring **NBR** (nitril-caoutchouc) sizes 5...200

For seal rings of NBR 33% reduced values for the max. permissible housing pressure  $p_{abs,max}$  are to be considered compared with seals of FKM.

Special operation conditions may require limitations of these values.

Note:

- maximum permissible pump speeds are given in the table on page 5
- max. perm. casing pressure  $p_{abs,max}$  \_\_\_\_\_ 10 bar (sizes 5...200)  
\_\_\_\_\_ 4 bar (sizes 250...1000)
- the pressure in the housing must be the same as or greater than the external pressure on the shaft seal

### Working pressure range inlet

Minimum pressure at port S

$p_{abs,min}$  \_\_\_\_\_ 0,8 bar

### Working pressure range outlet

Maximum pressure at port A or B

(Pressure data to DIN 24312)

Size 5	Shaft end B	Shaft end C
Nominal pressure $p_N$	210 bar	315 bar
Peak pressure $p_{max}$	250 bar	350 bar

Sizes 10...200 <sup>1)</sup>	Shaft end A, Z <sup>2)</sup>	Shaft end B, P
Nominal pressure $p_N$	400 bar	350 bar
Peak pressure $p_{max}$	450 bar	400 bar

<sup>1)</sup> Attention: shaft end Z and P with drives of radial force loads at the drive shaft (pinion V-belt drives) necessitate reduction of the nominal pressure to  $p_N = 315$  bar.

<sup>2)</sup> shaft end Z for size 56:  $p_N = 350$  bar,  $p_{max} = 400$  bar

#### Sizes 250...1000

Nominal pressure $p_N$	350 bar
Peak pressure $p_{max}$	400 bar

With pulsating loads above 315 bar we recommend using the model with splined shaft, standard version A (sizes 10...200) or with splined shaft Z (sizes 250...1000).

### Long-Life bearings (L) (sizes 250...1000)

(for high life expectancy and use of HF-fluids)

The outer dimensions of the axial piston pumps are identical to standard design (without long life bearings). The change from standard design to long life bearing system is possible. We recommend to apply bearing flushing at port U.

### Temperature range of the shaft seal ring

The FKM shaft seal is admissible for a temperature range from -25°C to +115°C. For applications below -25°C a NBR shaft seal is necessary (admissible temperature range -40°C to +90°C) (special design for sizes 250...1000).

### Bearing flushing

For sizes 250...1000 bearing and housing flushing is possible through port U.

Flushing flow (recommendation)

Size	250	355	500	710	1000
$q_{flush}$ (L/min)	10	16	20	25	25

## Technical Data

**Table of values** (theoretical values, without considering  $\eta_{mh}$  and  $\eta_v$ ; values rounded)

Size			5	10	12	16	23	28	32	45	56	63	80
Displacement	$V_g$	cm <sup>3</sup>	4,93	10,3	12,0	16,0	22,9	28,1	32	45,6	56,1	63	80,4
Max. speed <sup>1)</sup>	$n_{max}$	rpm	5600	3150	3150	3150	2500	2500	2500	2240	2000	2000	1800
Max. perm. speed with increased input pressure $p_{abs}$	$n_{max perm.}$	rpm	8000	6000	6000	6000	4750	4750	4750	4250	3750	3750	3350
Max. perm. output flow, at $n_{max}^{2)}$	$q_{V max}$	L/min	27	32	37	49	56	68	78	99	109	122	140
Max. power at $q_{V max}$	$\Delta p = 350$ bar	$P_{max}$	14,5 <sup>3)</sup>	19	22	29	33	41	47	60	65	74	84
	$\Delta p = 400$ bar	$P_{max}$	–	22	25	34	38	47	53	68	75	84	96
Torque constants	$T_K$	Nm/bar	0,076	0,164	0,19	0,25	0,36	0,445	0,509	0,725	0,89	1,0	1,27
Perm. torque	$\Delta p = 350$ bar	$T$	24,7 <sup>3)</sup>	57	67	88	126	156	178	254	312	350	445
	$\Delta p = 400$ bar	$T$	–	65	76	100	144	178	204	290	356	400	508
Case volume		L		0,17	0,17	0,17	0,20	0,20	0,20	0,33	0,45	0,45	0,55
Moment of inertia about drive axis	$J$	kgm <sup>2</sup>	0,00008	0,0004	0,0004	0,0004	0,0012	0,0012	0,0012	0,0024	0,0042	0,0042	0,0072
Weight (approx.)	$m$	kg	2,5	5,4	5,4	5,4	9,5	9,5	9,5	13,5	18	18	23

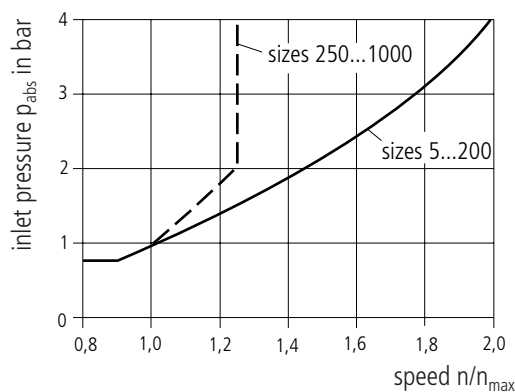
Size			90	107	125	160	180	200	250	355	500	710	1000
Displacement	$V_g$	cm <sup>3</sup>	90	106,7	125	160,4	180	200	250	355	500	710	1000
Max. speed <sup>1)</sup>	$n_{max}$	rpm	1800	1600	1600	1450	1450	1550	1500	1320	1200	1200	950
Max. perm. speed with increased input pressure $p_{abs}$	$n_{max perm.}$	rpm	3350	3000	3000	2650	2650	2750	1800	1600	1500	1500	1200
Max. perm. output flow, at $n_{max}^{2)}$	$q_{V max}$	L/min	158	167	196	228	255	304	364	455	582	826	922
Max. power at $q_{V max}$	$\Delta p = 350$ bar	$P_{max}$	95	100	117	135	152	181	219	273	350	497	554
	$\Delta p = 400$ bar	$P_{max}$	108	114	133	155	174	207	–	–	–	–	–
Torque constants	$T_K$	Nm/bar	1,43	1,70	1,99	2,55	2,86	3,18	3,99	5,65	7,96	11,3	15,9
Perm. torque	$\Delta p = 350$ bar	$T$	501	595	697	889	1001	1114	1393	1978	2785	3955	5570
	$\Delta p = 400$ bar	$T$	572	680	796	1016	1144	1272	–	–	–	–	–
Case volume		L	0,55	0,8	0,8	1,1	1,1		2,5	3,5			7,8
Moment of inertia about drive axis	$J$	kgm <sup>2</sup>	0,0072	0,0116	0,0116	0,0220	0,0220	0,0378	0,061	0,102	0,178	0,55	0,55
Weight (approx.)	$m$	kg	23	32	32	45	45	66	73	110	155	322	336

<sup>1)</sup> The values shown are valid for an absolute pressure ( $p_{abs}$ ) of 1 bar at the suction inlet S and when operated on mineral oil.

By increase of the input pressure ( $p_{abs} > 1$  bar) the rotational speeds can be increased to the max. admissible speeds (speed limits) (see diagram).

<sup>2)</sup> 3 % volumetric loss included <sup>3)</sup>  $\Delta p = 315$  bar

### Maximum permissible speed with increased inlet pressure $p_{abs}$ at suction port S



Note:

- max. perm. speed  $n_{max perm.}$  (speed limit)
- min. perm. pressure at port S
- admissible values for the drive shaft seal

### Calculation of size

$$\text{Flow } q_v = \frac{V_g \cdot n \cdot \eta_v}{1000} \quad \text{in L/min}$$

$$\text{Torque } T = \frac{V_g \cdot \Delta p}{20 \pi \cdot \eta_{mh}} = \frac{1,59 \cdot V_g \cdot \Delta p}{100 \cdot \eta_{mh}} \quad \text{in Nm}$$

$$\text{Power } P = \frac{2 \pi \cdot T \cdot n}{60 \cdot 1000} = \frac{T \cdot n}{9549} = \frac{q_v \cdot \Delta p}{600 \cdot \eta_t} \quad \text{in kW}$$

$V_g$  = geometric displacement per rev. in cm<sup>3</sup>

$T$  = torque in Nm

$\Delta p$  = pressure differential in bar

$n$  = speed in rpm

$\eta_v$  = volumetric efficiency

$\eta_{mh}$  = mech. -hyd. efficiency

$\eta_t$  = overall efficiency

## Technical Data

### Output drive

Permissible axial and radial loads on drive shaft

The values given are maximum values and do not apply to continuous operation

Size		5	10	12	16	23	28	32	45	56	63	80
a	mm	12	16	16	16	16	16	16	18	18	18	20
$F_{q \max}$	N	710	2350	2750	3700	4300	5400	6100	8150	9200	10300	11500
$\pm F_{ax \max}$	N	180	320	320	320	500	500	500	630	800	800	1000
$\pm F_{ax \text{ perm.}} / \text{bar}$	N/bar	1,5	3,0	3,0	3,0	5,2	5,2	5,2	7,0	8,7	8,7	10,6

Size		90	107	125	160	180	200	250	355	500	710	1000
a	mm	20	20	20	25	25	25	41	52,5	52,5	67,5	67,5
$F_{q \max}$	N	12900	13600	15900	18400	20600	22900	1200 <sup>1)</sup>	1500 <sup>1)</sup>	1900 <sup>1)</sup>	3000 <sup>1)</sup>	2600 <sup>1)</sup>
$\pm F_{ax \max}$	N + $F_{ax \max}$	1000	1250	1250	1600	1600	1600	4000	5000	6250	10000	10000
	N - $F_{ax \max}$	1000	1250	1250	1600	1600	1600	1200	1500	1900	3000	2600
$\pm F_{ax \text{ perm.}} / \text{bar}$	N/bar	10,6	12,9	12,9	16,7	16,7	16,7	<sup>2)</sup>	<sup>2)</sup>	<sup>2)</sup>	<sup>2)</sup>	<sup>2)</sup>

<sup>1)</sup> Axial piston unit in stationary or in bypass operation, please contact us when appearing higher forces!

<sup>2)</sup> Please contact us!

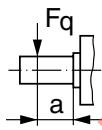
### Code explanation

a = distance of  $F_q$  from shaft shoulder

$F_{q \max}$  = max. perm. radial force at distance a (at intermittent operation)

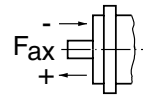
$\pm F_{ax \max}$  = max. perm. axial force when stationary or when axial piston unit is running at zero pressure

$\pm F_{ax \text{ perm.}} / \text{bar}$  = perm. axial force/bar working pressure



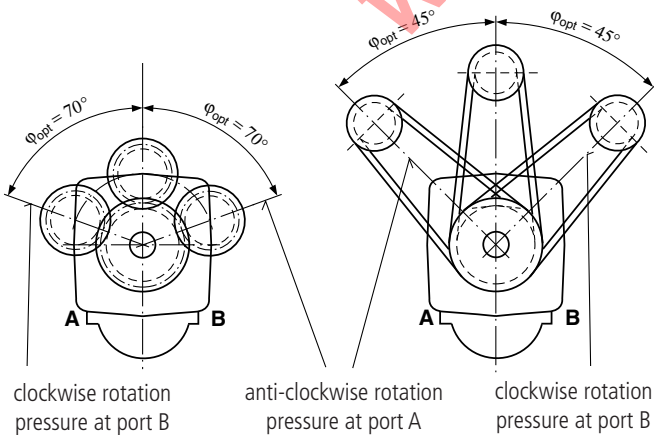
The direction of the max. perm. axial force must be noted by sizes 5...200:

-  $F_{ax}$  = increases bearing life  
 +  $F_{ax}$  = reduces bearing life (avoid if possible)



### Optimal force direction of $F_q$ (valid for sizes 10...180)

By means of appropriate force directions of  $F_q$  the bearing load caused by inside rotary group forces can be reduced. An optimal life expectation of the bearing can be reached.



### Ordering Code / Standard Program - Size 5

		<b>A2F</b>	<b>5</b>	<b>6.0</b>	<b>7</b>
<b>Axial piston unit</b>					
Bent axis design, fixed displacement		<b>A2F</b>			
<b>Size</b>					
Displacement $V_g$ (cm <sup>3</sup> )		<b>5</b>			
<b>Direction of rotation</b>					
Viewed on shaft end		clockwise		<b>R</b>	
		anti-clockwise		<b>L</b>	
<b>Series</b>					
		<b>6.0</b>			
<b>Shaft end</b>					
Parallel shaft with key DIN 6885		<b>B</b>			
Tapered shaft with spigot and spring washer DIN 6888		<b>C</b>			
<b>Service line connections</b>					
Threads at side, metric		<b>7</b>			

Additional instructions in text form

**Seals**

The fixed pump A2F 5 is equipped with NBR- (nitril-caoutchouc) seals in standard design. In case of need FKM- (fluor-caoutchouc) seals please indicate when ordering in clear text: "with FKM-seals"

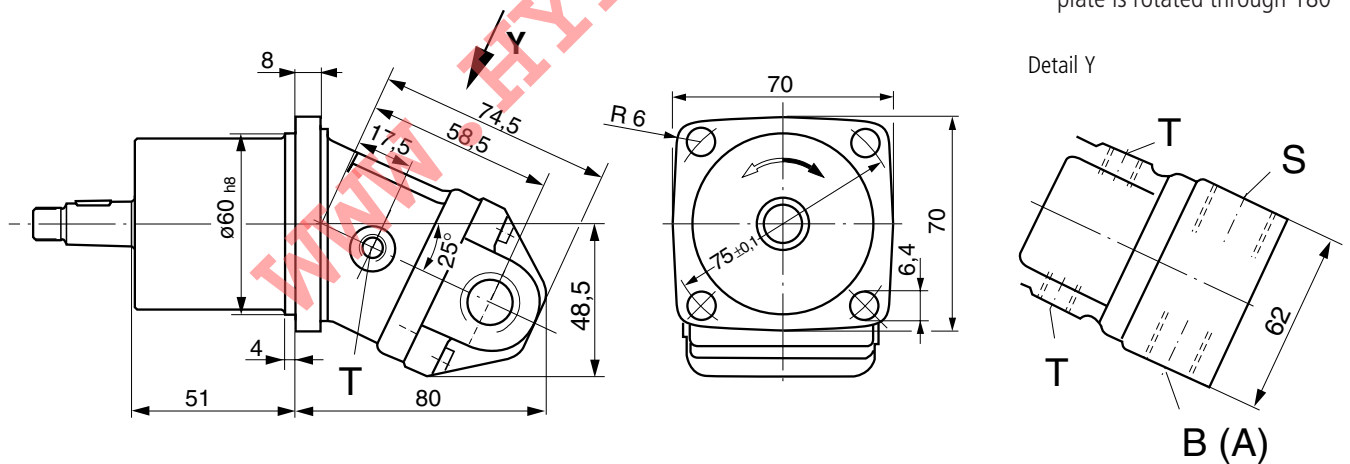
 = preferred program (preferred types see page 18)

### Unit Dimensions, Size 5

Before finalising your design, please request a certified drawing.

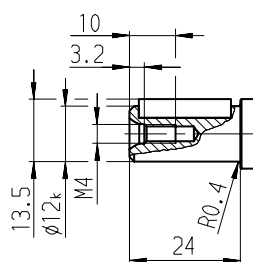
**Note:**

For anti-clockwise rotation port plate is rotated through 180°



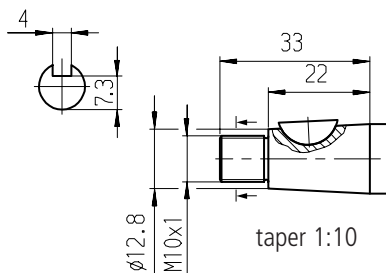
**Shaft ends**

**B** Parallel shaft with key A4x4x20 DIN 6885



$p_N = 210$  bar

**C** Tapered shaft with spigot and spring washer 3x5 DIN 6888



$p_N = 315$  bar

**Connections**

- B, (A) Service line ports M18x1,5
- S Suction port M22x1,5
- T Drain port M10x1, both sides

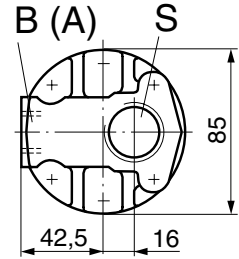
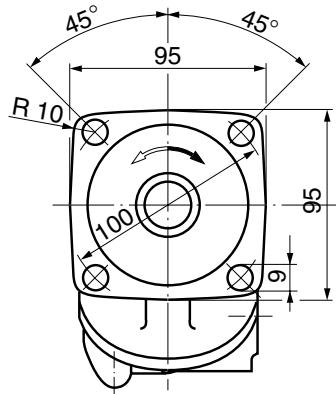
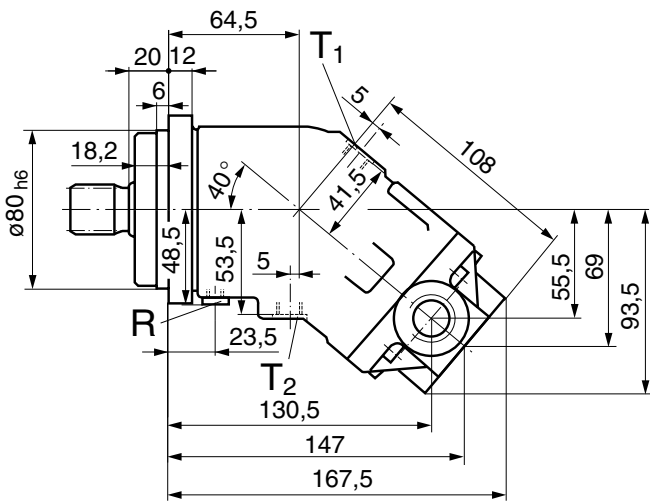


### Unit Dimensions, Sizes 10, 12, 16

Before finalising your design, please request a certified drawing.

**Note:**

For *anti-clockwise* rotation port plate is rotated through 180°



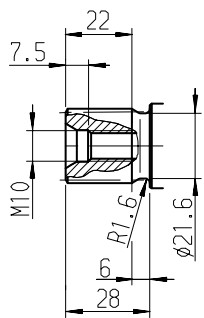
**Connections**

B(A)	Service line ports	M22x1,5
S	Suction port	M33x2
T <sub>1</sub> , T <sub>2</sub>	Drain port (1 port plugged)	M12x1,5
R	Air bleed (plugged)	M8x1

**Shaft ends**

**Sizes 10, 12, 16**

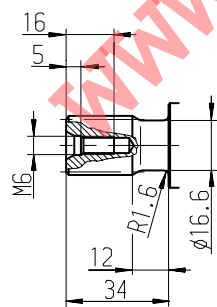
**A** Splined shaft, DIN 5480  
W 25x1,25x30x18x9g



p<sub>N</sub> = 400 bar

**Sizes 10, 12**

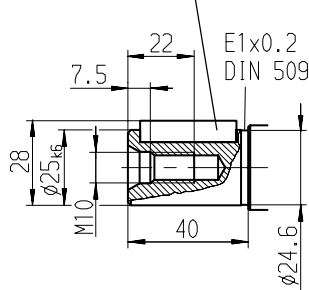
**Z** Splined shaft, DIN 5480  
W 20x1,25x30x14x9g



p<sub>N</sub> = 400 bar

**Sizes 10, 12, 16**

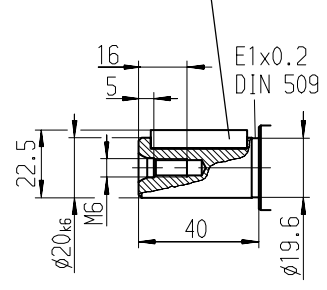
**B** Parallel shaft with key,  
AS 8x7x32, DIN 6885



p<sub>N</sub> = 350 bar

**Sizes 10, 12**

**P** Parallel shaft with key,  
AS 6x6x32, DIN 6885



p<sub>N</sub> = 350 bar

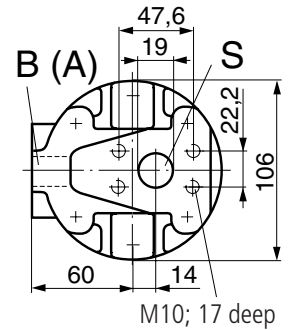
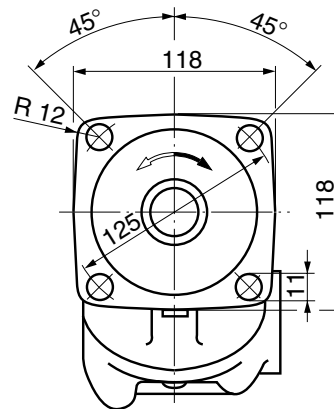
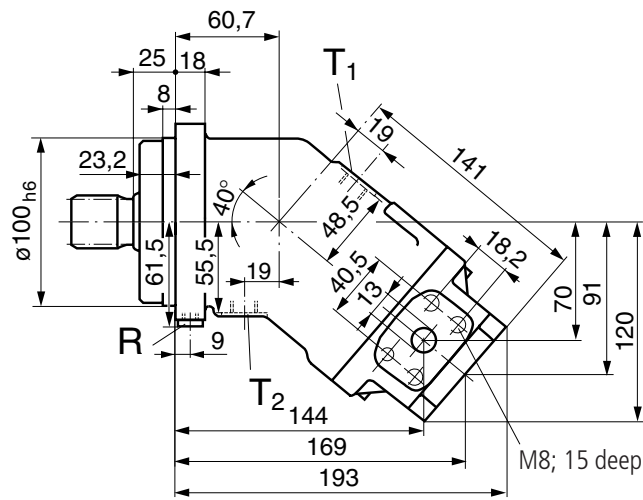


## Unit Dimensions, Sizes 23, 28, 32

Before finalising your design, please request a certified drawing.

**Note:**

For anti-clockwise rotation port plate is rotated through 180°



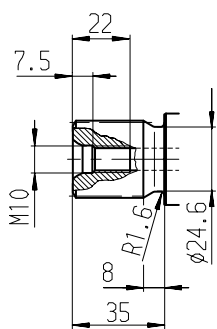
**Connections**

B(A)	Service line ports 420 bar (6000 psi) high pressure series	SAE 1/2"
S	Suction port 350 bar (5000 psi) standard series	SAE 3/4"
T <sub>1</sub> , T <sub>2</sub>	Drain port (1 port plugged)	M16x1,5
R	Air bleed (plugged)	M10x1

**Shaft ends**

**Sizes 23, 28, 32**

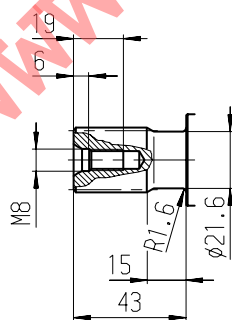
**A** Splined shaft, DIN 5480  
W 30x2x30x14x9g



$p_N = 400$  bar

**Sizes 23, 28**

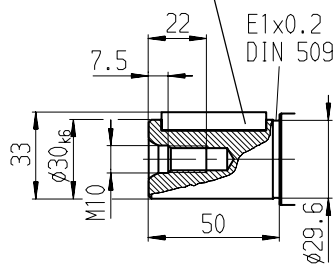
**Z** Splined shaft, DIN 5480  
W 25x1,25x30x18x9g



$p_N = 400$  bar

**Sizes 23, 28, 32**

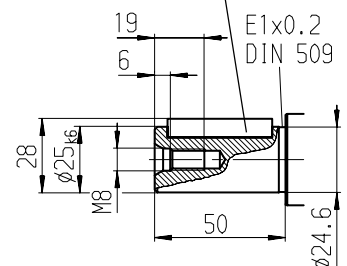
**B** Parallel shaft with key,  
AS 8x7x40, DIN 6885



$p_N = 350$  bar

**Sizes 23, 28**

**P** Parallel shaft with key,  
AS 8x7x40, DIN 6885



$p_N = 350$  bar

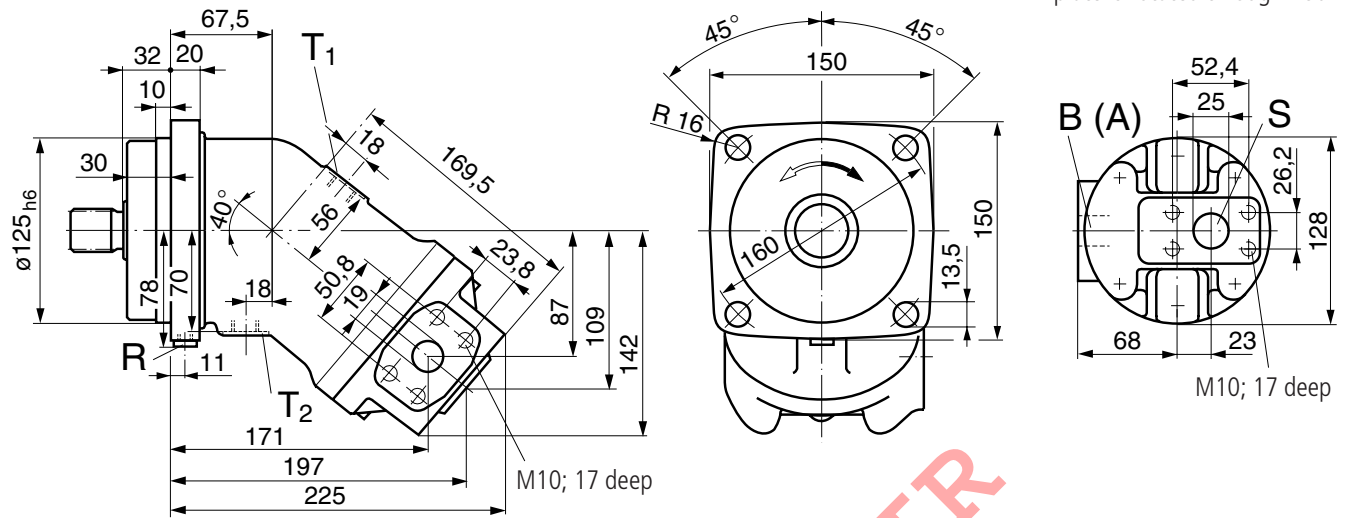


### Unit Dimensions, Sizes 56, 63

Before finalising your design, please request a certified drawing.

**Note:**

For anti-clockwise rotation port plate is rotated through 180°



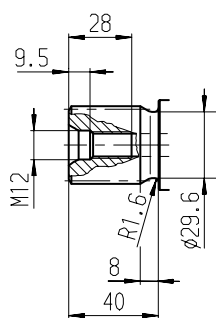
**Connections**

B(A)	Service line ports 420 bar (6000 psi) high pressure series	SAE 3/4"
S	Suction port 350 bar (5000 psi) standard series	SAE 1"
T <sub>1</sub> , T <sub>2</sub>	Drain port (1 port plugged)	M18x1,5
R	Air bleed (plugged)	M12x1,5

**Shaft ends**

**Sizes 56, 63**

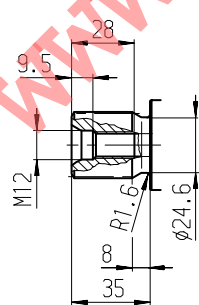
**A** Splined shaft, DIN 5480  
W 35x2x30x16x9g



$p_N = 400$  bar

**Size 56**

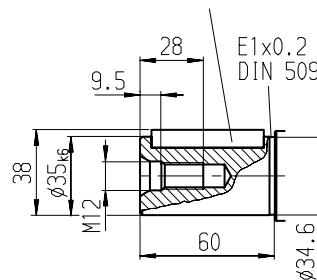
**Z** Splined shaft, DIN 5480  
W 30x2x30x14x9g



$p_N = 350$  bar

**Sizes 56, 63**

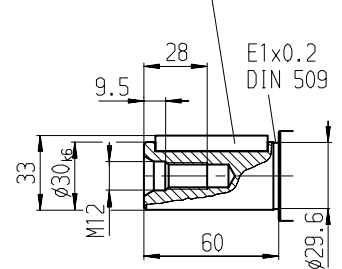
**B** Parallel shaft with key,  
AS 10x8x50, DIN 6885



$p_N = 350$  bar

**Size 56**

**P** Parallel shaft with key,  
AS 8x7x50, DIN 6885



$p_N = 350$  bar



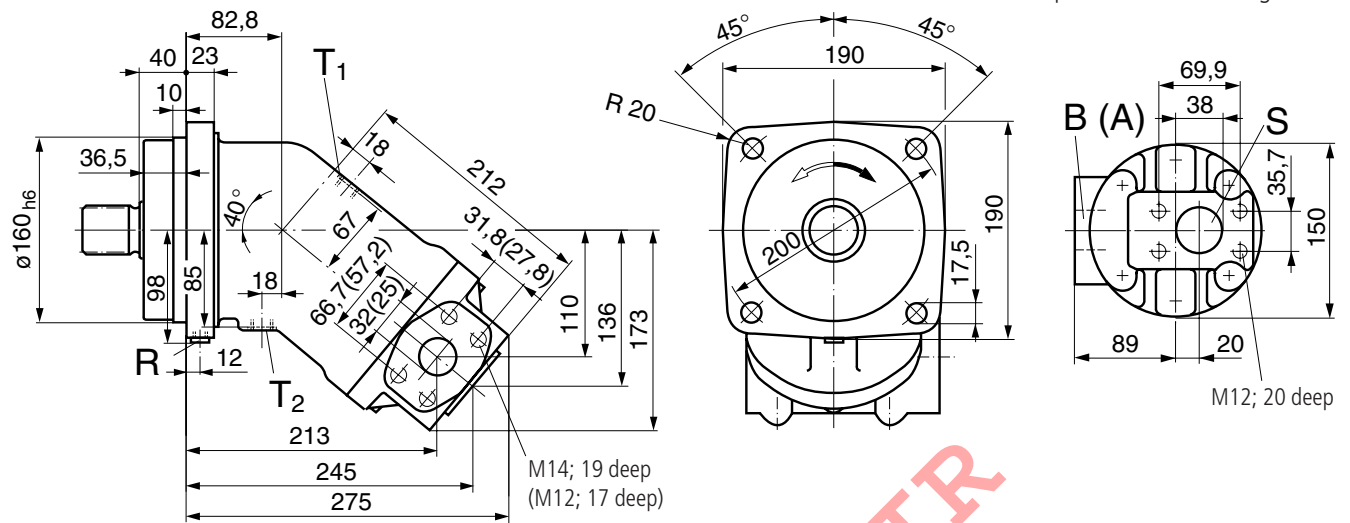
### Unit Dimensions, Sizes 107, 125

Dimensions brackets for size 107

Before finalising your design, please request a certified drawing.

**Note:**

For anti-clockwise rotation port plate is rotated through 180°



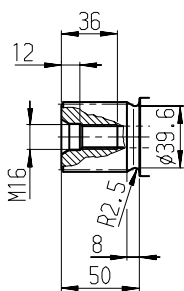
**Connections**

B(A)	Service line ports 420 bar (6000 psi) high pressure series	SAE 1 1/4" (1")
S	Suction port 210 bar (3000 psi) standard series	SAE 1 1/2"
T <sub>1</sub> , T <sub>2</sub>	Drain port (1 port plugged)	M18x1,5
R	Air bleed (plugged)	M14x1,5

**Shaft ends**

**Sizes 107, 125**

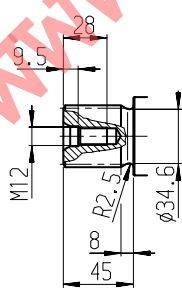
**A** Splined shaft, DIN 5480  
W 45x2x30x21x9g



p<sub>N</sub> = 400 bar

**Size 107**

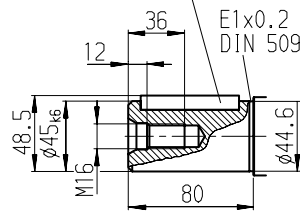
**Z** Splined shaft, DIN 5480  
W 40x2x30x18x9g



p<sub>N</sub> = 400 bar

**Sizes 107, 125**

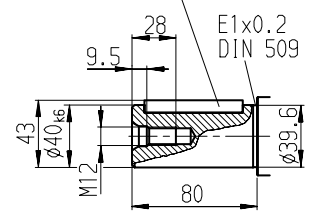
**B** Parallel shaft with key,  
AS 14x9x63, DIN 6885



p<sub>N</sub> = 350 bar

**Size 107**

**P** Parallel shaft with key,  
AS 12x8x63, DIN 6885



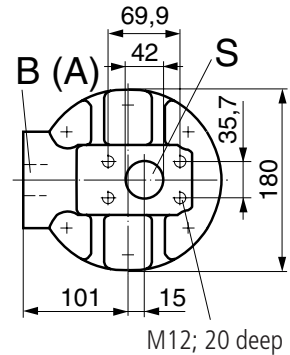
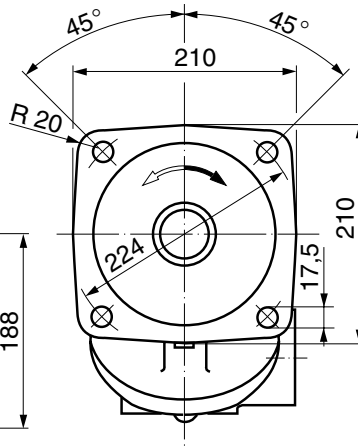
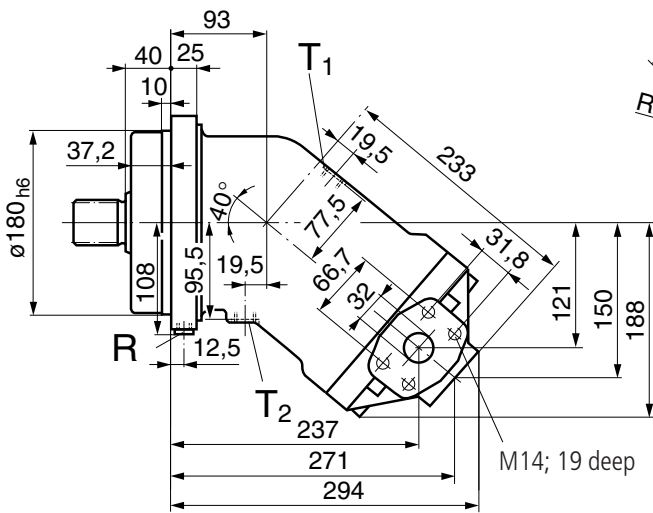
p<sub>N</sub> = 350 bar

### Unit Dimensions, Sizes 160, 180

Before finalising your design, please request a certified drawing.

**Note:**

For anti-clockwise rotation port plate is rotated through 180°



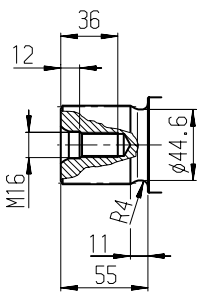
**Connections**

B(A)	Service line ports 420 bar (6000 psi) high pressure series	SAE 1 1/4"
S	Suction port 210 bar (3000 psi) standard series	SAE 1 1/2"
T <sub>1</sub> , T <sub>2</sub>	Drain port (1 port plugged)	M22x1,5
R	Air bleed (plugged)	M14x1,5

**Shaft ends**

**Sizes 160, 180**

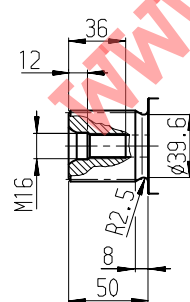
**A** Splined shaft, DIN 5480  
W 50x2x30x24x9g



p<sub>N</sub> = 400 bar

**Size 160**

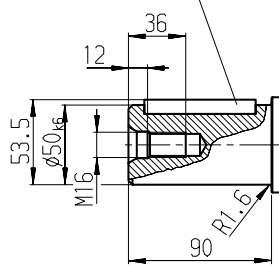
**Z** Splined shaft, DIN 5480  
W 45x2x30x21x9g



p<sub>N</sub> = 400 bar

**Sizes 160, 180**

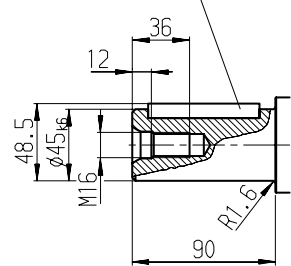
**B** Parallel shaft with key,  
AS 14x9x70, DIN 6885



p<sub>N</sub> = 350 bar

**Size 160**

**P** Parallel shaft with key,  
AS 14x9x70, DIN 6885



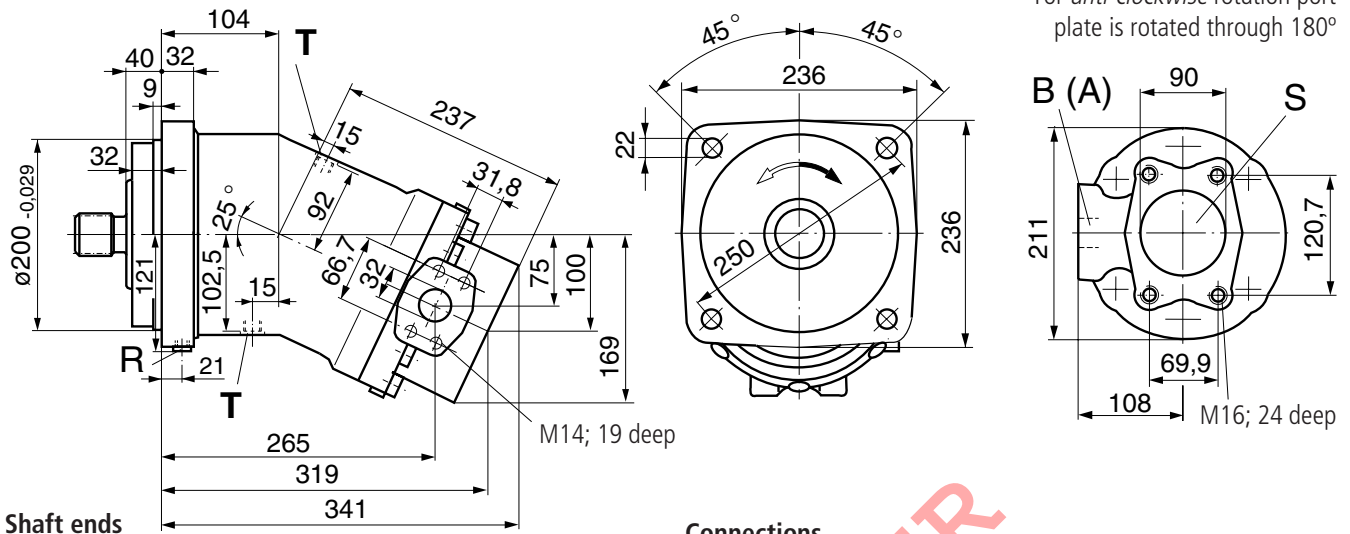
p<sub>N</sub> = 350 bar

### Unit Dimensions, Size 200

Before finalising your design, please request a certified drawing.

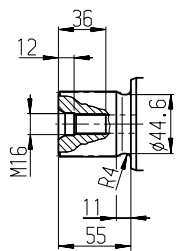
**Note:**

For anti-clockwise rotation port plate is rotated through 180°



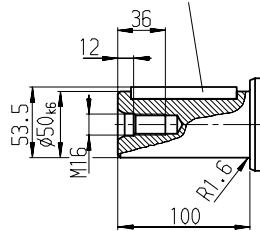
**Shaft ends**

**A** Splined shaft, DIN 5480  
W 50x2x30x24x9g



$p_N = 400$  bar

**B** Parallel shaft with key,  
AS 14x9x70, DIN 6885



$p_N = 350$  bar

**Connections**

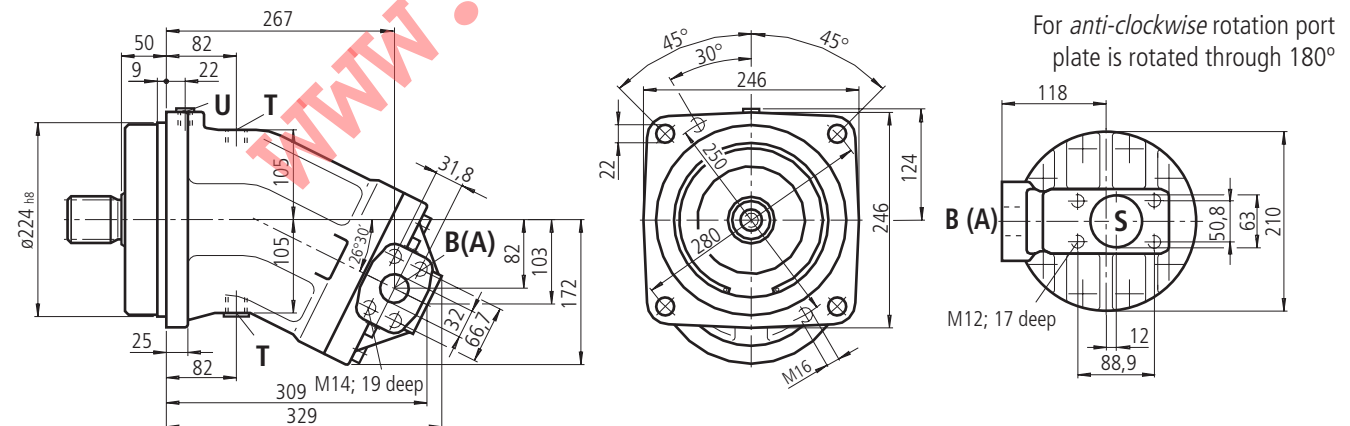
B(A)	Service line ports 420 bar (6000 psi) high pressure series	SAE 1 1/4"
S	Suction port 35 bar (500 psi) standard series	SAE 3 1/2"
T	Drain port (1 port plugged)	M22x1,5
R	Air bleed (plugged)	M14x1,5

### Unit Dimensions, Size 250

Before finalising your design, please request a certified drawing.

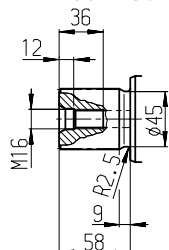
**Note:**

For anti-clockwise rotation port plate is rotated through 180°



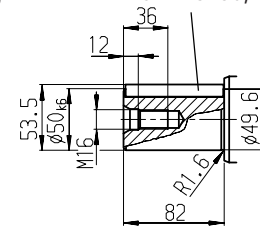
**Shaft ends**

**Z** Splined shaft, DIN 5480  
W 50x2x30x24x9g



$p_N = 350$  bar

**P** Parallel shaft with key,  
AS 14x9x80, DIN 6885



$p_N = 350$  bar

**Connections**

B(A)	Service line ports high pressure series	SAE 1 1/4"
S	Suction port standard series	SAE 2 1/2"
T	Drain port (1 port plugged)	M 22x1,5
U	Port for bearing flushing (plugged)	M 14x1,5

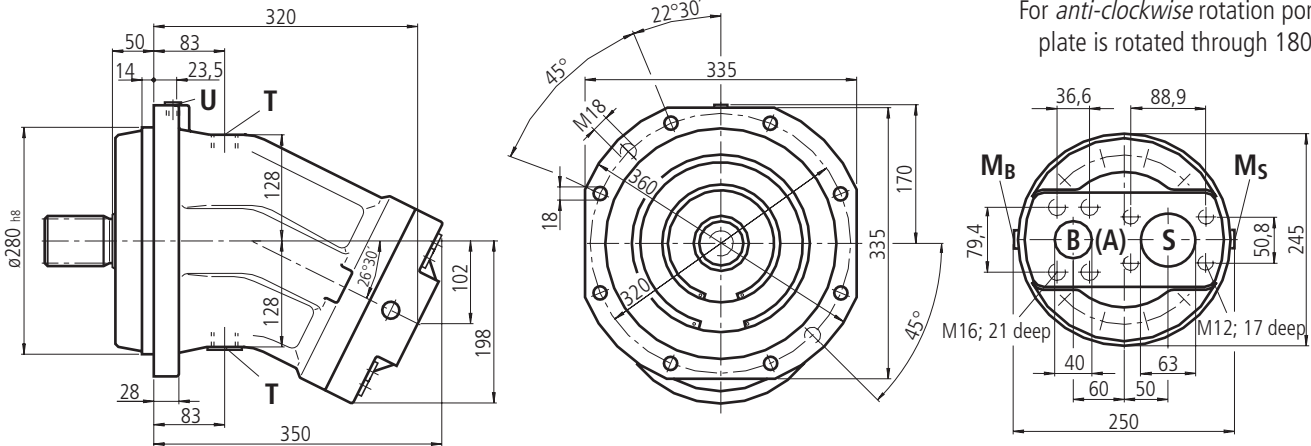


### Unit Dimensions, Size 355

Before finalising your design, please request a certified drawing.

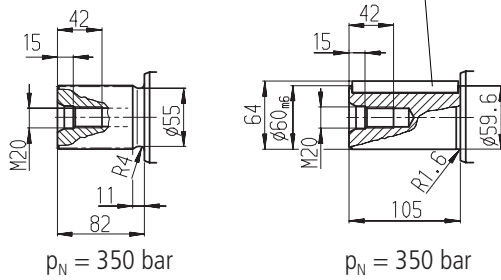
**Note:**

For anti-clockwise rotation port plate is rotated through 180°



**Shaft ends**

- A** Splined shaft, DIN 5480 W 60x2x30x28x9g
- P** Parallel shaft with key, AS 18x11x100, DIN 6885



**Connections**

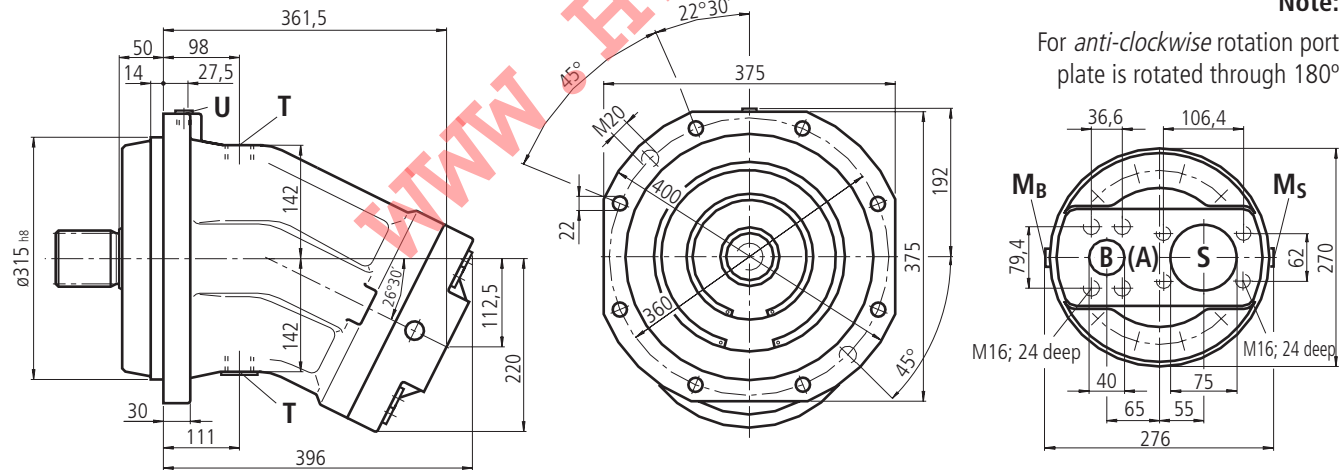
- B(A)** Service line ports high pressure series SAE 1 1/2"
- S** Suction port standard series SAE 2 1/2"
- T** Drain port (1 port plugged) M33x2
- U** Port for bearing flushing (plugged) M14x1,5
- M<sub>A(B)</sub>** Gauge port (working pressure) plugged M14x1,5
- M<sub>S</sub>** Gauge port (suction pressure) plugged M14x1,5

### Unit Dimensions, Size 500

Before finalising your design, please request a certified drawing.

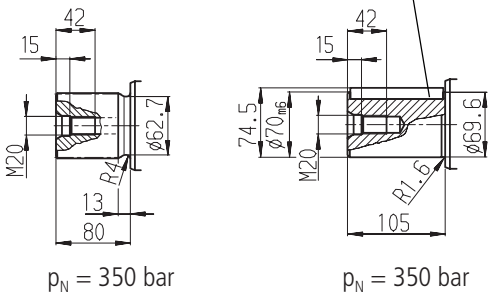
**Note:**

For anti-clockwise rotation port plate is rotated through 180°



**Shaft ends**

- Z** Splined shaft, DIN 5480 W 70x3x30x22x9g
- P** Parallel shaft with key, AS 20x12x100, DIN 6885

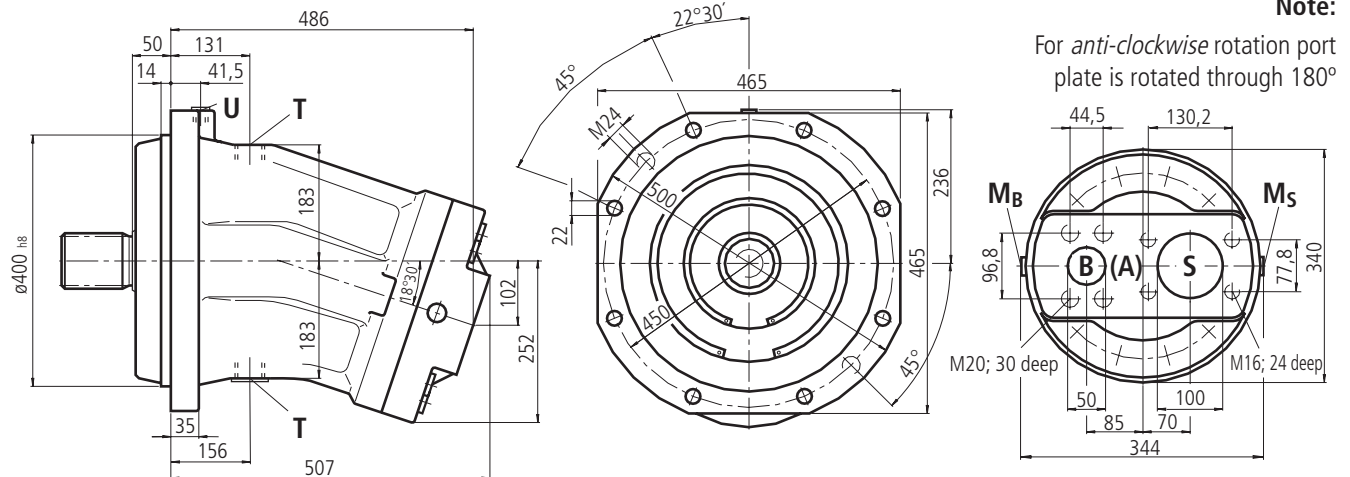


**Connections**

- B(A)** Service line ports high pressure series SAE 1 1/2"
- S** Suction port standard series SAE 3"
- T** Drain port (1 port plugged) M33x2
- U** Port for bearing flushing (plugged) M18x1,5
- M<sub>A(B)</sub>** Gauge port (working pressure) plugged M14x1,5
- M<sub>S</sub>** Gauge port (suction pressure) plugged M14x1,5

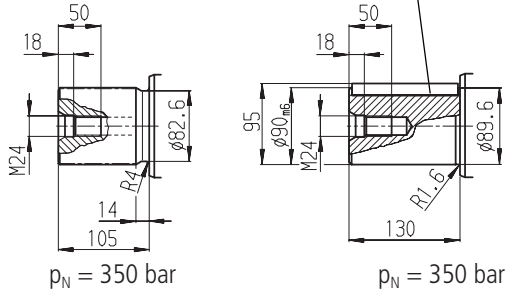
### Unit Dimensions, Size 710

Before finalising your design, please request a certified drawing.



#### Shaft ends

- Z** Splined shaft, DIN 5480 W 90x3x30x28x9g
- P** Parallel shaft with key, AS 25x14x125, DIN 6885

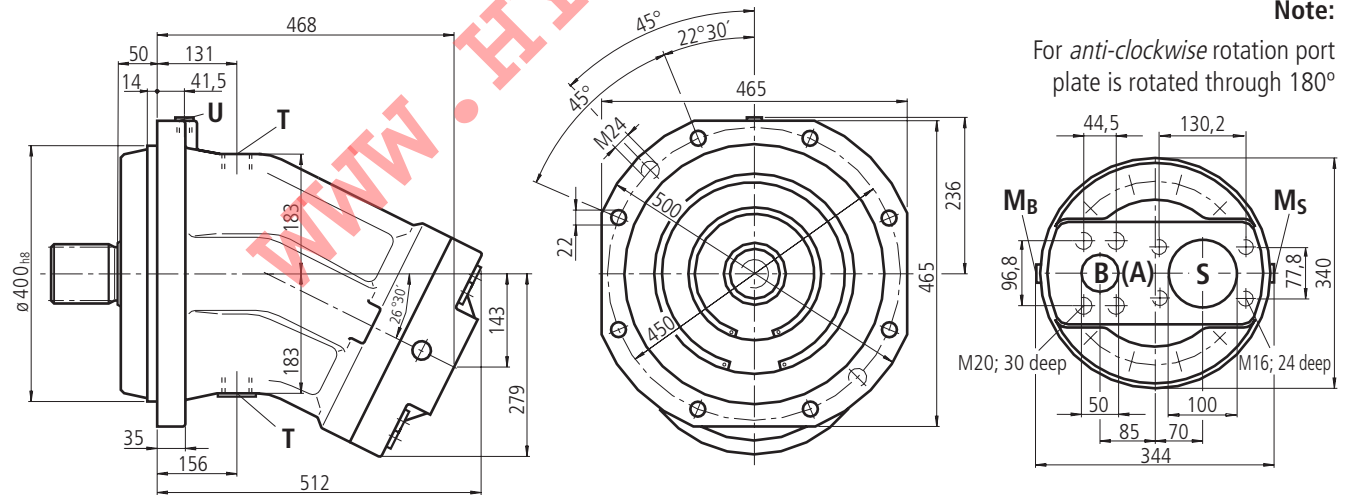


#### Connections

- B(A)** Service line ports high pressure series SAE 2"
- S** Suction port standard series SAE 4"
- T** Drain port (1 port plugged) M42x2
- U** Port for bearing flushing (plugged) M18x1,5
- M<sub>A(B)</sub>** Gauge port (working pressure) plugged M14x1,5
- M<sub>S</sub>** Gauge port (suction pressure) plugged M14x1,5

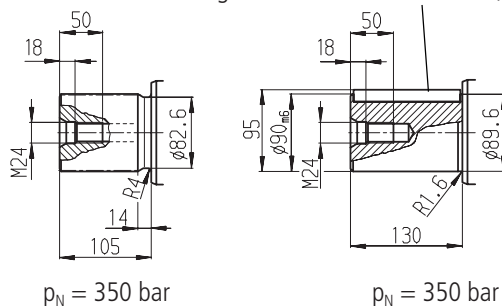
### Unit Dimensions, Size 1000

Before finalising your design, please request a certified drawing.



#### Shaft ends

- Z** Splined shaft, DIN 5480 W 90x3x30x28x9g
- P** Parallel shaft with key, AS 25x14x125, DIN 6885



#### Connections

- B(A)** Service line ports high pressure series SAE 2"
- S** Suction port standard series SAE 4"
- T** Drain port (1 port plugged) M42x2
- U** Port for bearing flushing (plugged) M18x1,5
- M<sub>A(B)</sub>** Gauge port (working pressure) plugged M14x1,5
- M<sub>S</sub>** Gauge port (suction pressure) plugged M14x1,5

## Preferred Types

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Type	Ident-No.	Type	Ident-No.
A2F5.6.0B7	9404452	A2FO90/61R-PAB05	9408467
A2FO10/61R-PAB06	9424894	A2FO90/61R-PBB05	9408472
A2FO10/61R-PBB06	9610682	A2FO107/61R-PAB05	9423259
A2FO12/61R-PAB06	9420472	A2FO107/61R-PBB05	9438282
A2FO12/61R-PBB06	9610683	A2FO125/61R-PAB05	9409641
A2FO16/61R-PAB06	9411113	A2FO125/61R-PBB05	9409642
A2FO16/61R-PBB06	9411121	A2FO160/61R-PAB05	9422192
A2FO23/61R-PAB05	9427223	A2FO160/61R-PBB05	9610688
A2FO23/61R-PBB05	9610684	A2FO180/61R-PAB05	9409371
A2FO28/61R-PAB05	9425164	A2FO180/61R-PBB05	9409358
A2FO28/61R-PBB05	9610685	A2FO200/63R-PAB05	2011993
A2FO32/61R-PAB05	9410193		
A2FO32/61R-PBB05	9410198		
A2FO45/61R-PZB05	9411585		
A2FO56/61R-PAB05	9425190		
A2FO56/61R-PBB05	9610686		
A2FO63/61R-PAB05	9408527		
A2FO63/61R-PBB05	9408552		
A2FO80/61R-PAB05	9424687		
A2FO80/61R -PBB05	9610687		

Sizes 5...200: production Elchingen plant

Sizes 250...1000: production Horb plant

Please state type and ident-no. when ordering!

## Installation and Commissioning Guidelines

### General

At start-up and during operation the pump housing has imperatively to be filled up with hydraulic fluid (filling of the case chamber). Start-up has to be carried out at low speed and without load till the system is completely bled.

At a longer standstill the case may discharge via operating line. At new start-up a sufficient filling of the housing has to be granted.

The leakage oil in the housing has to be discharged to the tank via highest positioned case drain port. The min. suction pressure at port S should not fall below 0,8 bar absolute.

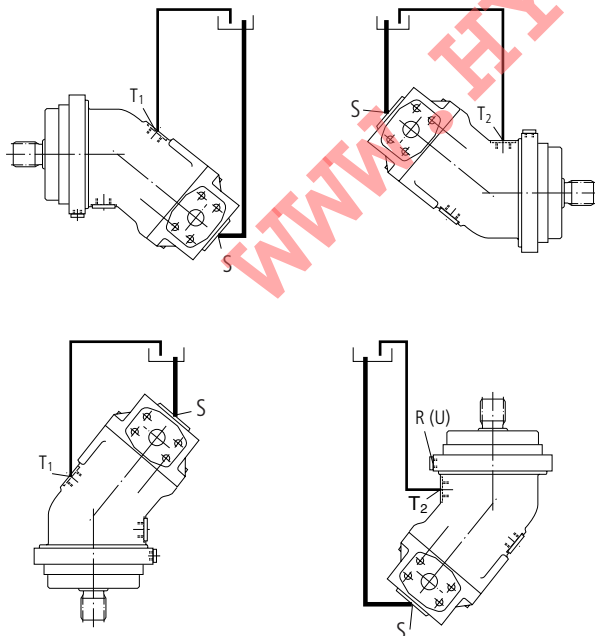
### Installation position

Optional

#### Installation below tank level

Pumps below min. oil level in the tank (standard)

- Fill up axial piston pump before start-up via highest positioned case drain port (note for the "shaft on top" installation position: fill until oil starts escaping from air bleed port R or U).
- Recommendation: Fill up suction lines
- Operate pump at low speed (ignition speed) till pump system is completely filled up
- Minimum immersion depth of the suction line or drain line in the tank:  
200 mm (relative to the min. oil level in the tank).



#### Installation on top of tank level

Pump on top of min. oil level in the tank

→ Actions as installation below tank level

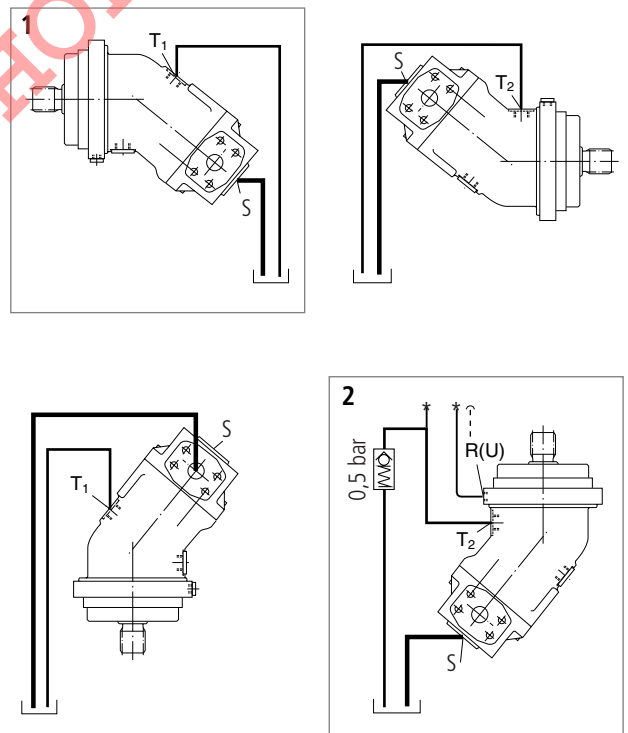
→ Installation position 1 and 2:

If the pump is left at standstill for a long period, the oil in the housing chamber may fully drain out through the operating lines (air entering via the shaft seal). Consequently, on restarting, the bearings will be insufficiently lubricated. You should therefore refill the axial piston unit via the highest positioned drain port before restarting (Installation position 2: air bleed via port R or U).

→ Installation position 2 (shaft on top)

In this installation position, the bearings will be insufficiently lubricated even if the housing chamber is only partially drained. To prevent oil draining via the drain port, insert a check valve in the drain line (opening pressure 0.5 bar).

→ Note: min. admissible pressure at port S (min. suction pressure)



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