

Axial Piston Fixed Displacement Motor A2FM

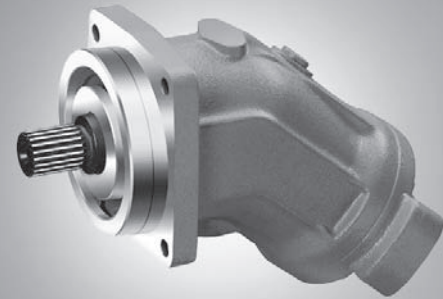
RE 91 001/07.05 1/36
Replaces: 11.04

Technical data sheet

Series 6

Sizes	Nominal pressure/Peak pressure
5	315/350 bar
10...200	400/450 bar
250...1000	350/400 bar

open and closed circuits



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Features

- Fixed displacement motor A2FM of axial piston, bent axis design, suitable for hydrostatic drives in open and closed circuits
- Use in mobile and industrial applications
- The output speed depends on the flow capacity of the pump and the displacement of the motor
- The torque increases with the pressure differential between the high and low pressure side and with increasing displacement
- Careful selection of the displacements offered, permit sizes to be matched to practically every application
- High power density
- Compact design
- High overall efficiency
- Excellent starting torque efficiency
- Economical conception
- One piece pistons with piston rings

Ordering Code / Standard Program (ordering code size 5 see page 8)

	A2F		M		/	6		W	-	V					
01	02	03	04	05		06	07	08		09	10	11	12	13	14

		Service line ports ¹⁾																						
		10	12	16	23	28	32	45	56	63	80	90	107	125	160	180	200	250	355	500	710	1000		
12	SAE flange ports A and B, rear	01	0	-	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	010
		7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	●	●	○	○	017
	SAE flange ports A and B, at side, opposite	02	0	-	-	-	●	●	●	●	●	●	●	●	●	●	●	-	●	-	-	-	-	020
		7	-	-	-	-	-	-	●	●	●	●	●	●	●	●	●	-	●	-	-	-	-	027
	Threaded ports A and B, at side, opposite	03	0	●	●	●	●	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	030
		04	0	●	●	●	●	●	●	●	-	-	-	-	-	-	-	-	●	-	-	-	-	040
	SAE flange ports A and B, bottom (same side)	10	0	-	-	-	-	●	●	●	●	●	●	●	●	●	●	-	-	●	-	-	-	100
		18	1	-	-	-	-	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	181
Port plate with integrated pressure relief valves	19	1	-	-	-	-	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	191	
	2	-	-	-	-	-	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	192	

Valves

Without valve	0
With pressure relief valves (without pressure sequence range)	1
With pressure relief valves (with pressure sequence range)	2
With flushing and boost pressure valve	7

Speed measurement

		10...16	23...180	200	250	355...1000	
13	Without speed measurement (no code)	●	●	●	●	●	
	Prepared for speed measurement with ID sensor ³⁾	-	●	-	-	-	D
	Prepared for speed measurement with HDD sensor ³⁾	-	●	●	●	○	F

Special design

14	Standard version (no code)	
	Specific version for slew drive applications (standard for port plate 19)	J

¹⁾ fastening threads resp. threaded ports are metric

²⁾ at side (sizes 10...63) or rear (size 250) threaded ports plugged with locking screw

³⁾ complete order recommended (A2FM inc. speed sensor)

● = available ○ = in preparation - = not available

■ = preferred program

Technical Data

Hydraulic fluid

Before starting project planning, please refer to our data sheets RE 90220 (mineral oil), RE 90221 (environmentally acceptable pressure fluids) and RE 90223 (HF pressure fluids) for detailed information regarding the choice of pressure fluids and conditions of use.

The A2FM fixed displacement motor is not suitable for use with HFA. If HFB, HFC and HFD or environmentally acceptable pressure fluids are being used, the limitations regarding technical data and seals mentioned in RE 90221 and RE 90223 must be observed. When ordering please indicate the used hydraulic fluid.

Viscosity range

We recommend that a viscosity (at operating temperature) for optimum efficiency and service life purposes of

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

be chosen, taken the circulation temperature (closed circuit) and tank temperature (open circuit) into account.

Limits of viscosity range

The following values apply in extreme cases:

Sizes 5...200:

$$v_{\text{min}} = 5 \text{ mm}^2/\text{s}$$

short term ($t < 3$ min) at max. permitted temperature

$$t_{\text{max}} = +115^\circ\text{C}$$

$$v_{\text{max}} = 1600 \text{ mm}^2/\text{s},$$

short term ($t < 3$ min) with cold start ($p < 30$ bar, $n \leq 1000$ rpm)

$$t_{\text{min}} = -40^\circ\text{C}$$

Sizes 250...1000:

$$v_{\text{min}} = 10 \text{ mm}^2/\text{s},$$

short term ($t < 3$ min) at max. permitted temperature

$$t_{\text{max}} = +90^\circ\text{C}$$

$$v_{\text{max}} = 1000 \text{ mm}^2/\text{s},$$

short term ($t < 3$ min) with cold start ($p \leq 30$ bar, $n \leq 1000$ rpm)

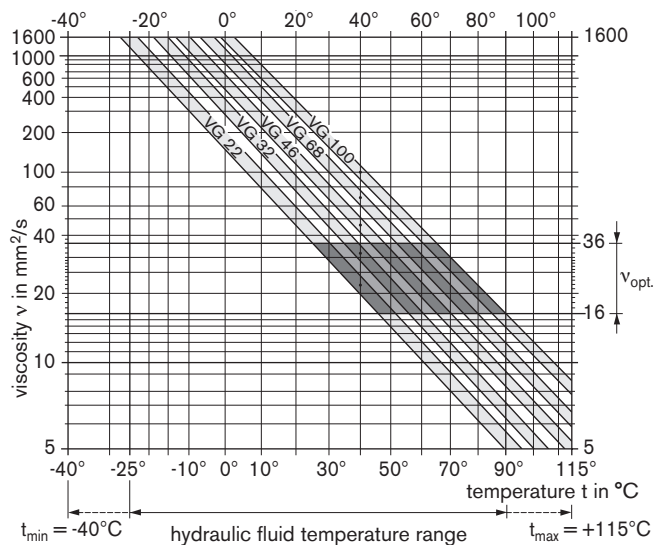
$$t_{\text{min}} = -25^\circ\text{C}$$

Note that the maximum hydraulic fluid temperature must not be exceeded locally either (e.g. bearing area). The temperature in the bearing area is - depending on pressure and speed - up to 12 K higher than the average case drain temperature.

Special measures are necessary at temperatures between -40°C and -25°C . Please contact us.

See RE 90300-03-B for detailed information about use at low temperatures.

Selection diagram



Details regarding the choice of hydraulic fluid

The correct choice of pressure fluid requires knowledge of the operating temperature in relation to the ambient temperature: in a closed circuit the circulation temperature, in an open circuit the tank 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 $X^\circ\text{C}$ an operating temperature of 60°C is set in the circuit. In the optimum operating viscosity range (v_{opt} ; shaded area) this corresponds to the viscosity classes VG 46 or VG 68; to be selected: VG 68.

Please note: The leakage fluid temperature, which is affected by pressure and rotational speed, is always higher than the circulation temperature or tank temperature. At no point in the system may the temperature be higher than 115°C (sizes 5 to 200) or 90°C (sizes 250 to 1000).

If this cannot be achieved due to unusual operating parameters or high ambient temperatures, we recommend to apply bearing flushing at port U (sizes 250 ... 1000) or the use of a flushing and boost pressure valve (see page 28).

Filtration

The finer the filtration, the cleaner the fluid and the longer the service life of the axial piston unit.

To ensure proper function of the axial piston unit, the Hydraulic fluid must have a cleanliness level of at least

20/18/15 according to ISO 4406.

At very high hydraulic fluid temperatures (90°C to max. 115°C , not permitted for sizes 250 to 1000), a cleanliness level of at least

19/17/14 according to ISO 4406 is required.

Please contact us if these cleanliness levels cannot be achieved.

Technical Data

Operational pressure range

Maximum pressure on port A or B
(pressure data according 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
Summation pressure (A + B)	630 bar	630 bar

Sizes 10...200	Shaft end A, Z	Shaft end B, P
Nominal pressure p_N	400 bar	350 bar
Peak pressure p_{max}	450 bar	400 bar
Summation pressure (A + B)	700 bar	700 bar

Sizes 250...1000

Nominal pressure p_N	350 bar
Peak pressure p_{max}	400 bar
Summation pressure (A + B)	700 bar

Please note:

Sizes 10 to 200: at the shaft end Z and P, a nominal pressure of $p_N = 315$ bar ($p_{max} = 350$ bar) is permitted for the driven shaft end that is subjected to transverse bending (pinions, V-belts)!

Sizes 250 to 1000: Please contact us.

Size 56 with shaft end Z: $p_N = 350$ bar, $p_{max} = 400$ bar

In cases of pulsating loading above 315 bar, we recommend the version with splined shaft A (sizes 10 to 200) or splined shaft Z (sizes 45, 250 to 1000).

Minimum inlet pressure, see page 7

Direction of flow

Direction of rotation, viewed on shaft end	clockwise	counter-clockwise
A to B		B to A

Speed range

No limit to minimum speed n_{min} . If uniform motion is required, n_{min} must not be less than 50 rpm. See table on page 6 for maximum speed.

Long-life bearing (sizes 250...1000)

For long service life and use with HF pressure fluids. Same external dimensions as motor with standard bearing. A long-life bearing can be retrofitted. Flushing of bearing and case via port U recommended.

Flow (recommended)

Size	250	355	500	710	1000
$q_{V\ flow}$ (L/min)	10	16	16	16	16

Shaft seal ring

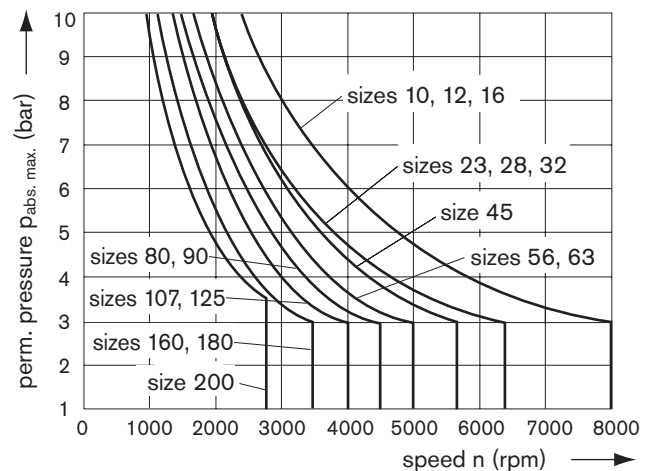
Permissible pressure load

The service life of the shaft seal ring is affected by the speed of the motor and the case drain pressure. The permitted loading with intermittent case drain pressure depends on the rotational speed (see chart). Short-term ($t < 5$ min) pressure spikes of up to 10 bar absolute are permitted.

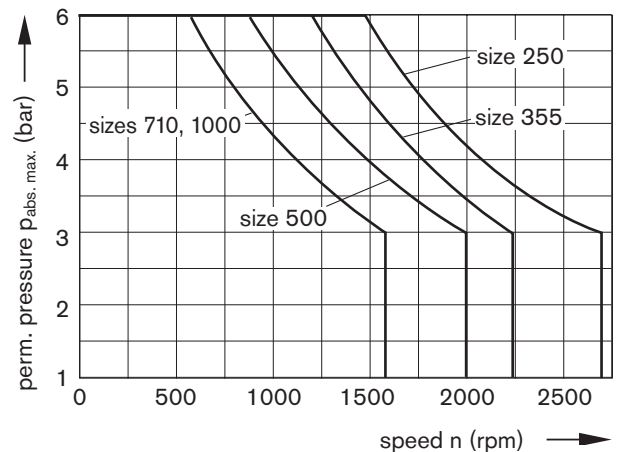
The average permanent case drain pressure must not exceed 3 bar absolute.

The pressure in the case must be equal to or greater than the external pressure on the shaft seal.

Sizes 10...200



Sizes 250...1000



Temperature range

The FKM shaft seal is admissible for a housing temperature range from

-25°C to +115°C at sizes 5...200 and
-25°C to +90°C at sizes 250...1000

Note:

For applications below -25 °C a NBR shaft seal is necessary (admissible temperature range -40 °C to +90 °C). Please contact us.

Technical Data

Table of values (theoretical values, ignoring η_{mh} and η_v ; values rounded)

Size			5	10	12	16	23	28	32	45	56	63	80
Displacement	V_g	cm ³	4,93	10,3	12	16	22,9	28,1	32	45,6	56,1	63	80,4
Speed max.	n_{max}	rpm	10000	8000	8000	8000	6300	6300	6300	5600	5000	5000	4500
	$n_{max \text{ limit}}^{1)}$	rpm	11000	8800	8800	8800	6900	6900	6900	6200	5500	5500	5000
Flow max.	$q_{V \text{ max}}$	L/min	49	82	96	128	144	176	201	255	280	315	360
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
Torque at	$\Delta p = 350 \text{ bar T}$	Nm	24,7 ²⁾	57	67	88	126	156	178	254	312	350	445
	$\Delta p = 400 \text{ bar T}$	Nm	–	65	76	100	144	178	204	290	356	400	508
Mass moment of inertia around output shaft	J	kgm ²	0,00008	0,0004	0,0004	0,0004	0,0012	0,0012	0,0012	0,0024	0,0042	0,0042	0,0072
Filling capacity		L		0,17	0,17	0,17	0,20	0,20	0,20	0,33	0,45	0,45	0,55
Mass (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 ³	90	106,7	125	160,4	180	200	250	355	500	710	1000
Speed max.	n_{max}	rpm	4500	4000	4000	3600	3600	2750	2700	2240	2000	1600	1600
	$n_{max \text{ limit}}^{1)}$	rpm	5000	4400	4400	4000	4000	3000	–	–	–	–	–
Flow max.	$q_{V \text{ max}}$	L/min	405	427	500	577	648	550	675	795	1000	1136	1600
Torque constants	T_K	Nm/bar	1,43	1,70	1,99	2,54	2,86	3,18	3,98	5,65	7,96	11,3	15,9
Torque at	$\Delta p = 350 \text{ bar T}$	Nm	501	595	697	889	1001	1114	1393	1978	2785	3955	5570
	$\Delta p = 400 \text{ bar T}$	Nm	572	680	796	1016	1144	1272	–	–	–	–	–
Mass moment of inertia around output shaft	J	kgm ²	0,0072	0,0116	0,0116	0,0220	0,0220	0,0378	0,061	0,102	0,178	0,55	0,55
Filling capacity		L	0,55	0,8	0,8	1,1	1,1	2,7	2,5	3,5	4,2	8	8
Mass (approx.)	m	kg	23	32	32	45	45	66	73	110	155	325	336

¹⁾ intermittent maximum speed: overspeed at discharge and over-running travel operations, $t < 5 \text{ sec.}$ and $\Delta p < 150 \text{ bar}$

²⁾ $\Delta p = 315 \text{ bar}$



Determining the size



Flow	$q_v = \frac{V_g \cdot n}{1000 \cdot \eta_v}$	L/min	$V_g = \text{Displacement per revolution in cm}^3$ $\Delta p = \text{Differential pressure in bar}$ $n = \text{Speed in rpm}$ $\eta_v = \text{Volumetric efficiency}$ $\eta_{mh} = \text{Mechanical-hydraulic efficiency}$ $\eta_t = \text{Overall efficiency}$
Speed	$n = \frac{q_v \cdot 1000 \cdot \eta_v}{V_g}$	rpm	
Torque	$T = \frac{V_g \cdot \Delta p \cdot \eta_{mh}}{20 \cdot \pi}$	Nm	
Power	$P = \frac{2 \pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p \cdot \eta_t}{600} \text{ kW}$		

Technical Data

Permissible radial and axial loading on the 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	
Radial force, max. ¹⁾ at distance a (from shaft collar)		$F_{q \max}$	N	710	2350	2750	3700	4300	5400	6100	8150 ²⁾	9200 ²⁾	10300	11500 ²⁾
	a	mm		12	16	16	16	16	16	16	18	18	18	20
Axial force, max. ³⁾		$+F_{ax \max}$	N	180	320	320	320	500	500	500	630	800	800	1000
		$-F_{ax \max}$	N	180	320	320	320	500	500	500	630	800	800	1000
Permissible axial force/bar operating pressure		$\pm F_{ax \text{ per.}}/\text{bar}$	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	
Radial force, max. ¹⁾ at distance a (from shaft collar)		$F_{q \max}$	N	12900	13600	15900	18400	20600	22900	1200 ⁴⁾	1500 ⁴⁾	1900 ⁴⁾	3000 ⁴⁾	2600 ⁴⁾
	a	mm		20	20	20	25	25	25	41	52,5	52,5	67,5	67,5
Axial force, max. ³⁾		$+F_{ax \max}$	N	1000	1250	1250	1600	1600	1600	2000	2500	3000	4400	4400
		$-F_{ax \max}$	N	1000	1250	1250	1600	1600	1600	2000	2500	3000	4400	4400
Permissible axial force/bar operating pressure		$\pm F_{ax \text{ per.}}/\text{bar}$	N/bar	10,6	12,9	12,9	16,7	16,7	16,7	⁵⁾	⁵⁾	⁵⁾	⁵⁾	⁵⁾

¹⁾ during intermittent operation (sizes 5...200)

²⁾ permissible max. radial force with shaft end Z: $F_{q \max} = 6500 \text{ N}$

³⁾ max. permissible axial force when stopped or when axial piston unit working in pressureless conditions

⁴⁾ when stopped or when axial piston unit working in pressureless conditions. Higher forces are permitted when under pressure.

Please contact us.

⁵⁾ please contact us

When considering the permissible axial force, the force-transfer direction must be taken into account:

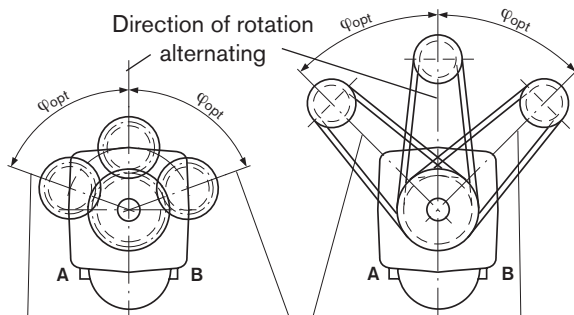
$-F_{ax \max}$ = increase in service life of bearings

$+F_{ax \max}$ = reduction in service life of bearings (avoid if at all possible)

Effect of radial force F_q on the service life of the bearings

By selecting a suitable force-transfer direction of F_q , the stress on the bearing caused by the internal transmission forces can be reduced, thus achieving the optimum service life for the bearing. Recommended position of mating gear depending on direction of rotation. Examples:

	Gear drive	V-belt drive
Size	$\varphi_{opt.}$	$\varphi_{opt.}$
10-180	$\pm 70^\circ$	$\pm 45^\circ$
200-1000	$\pm 45^\circ$	$\pm 70^\circ$



Counter-clockwise
direction of rotation

Pressure on port B

Clockwise
direction of rotation

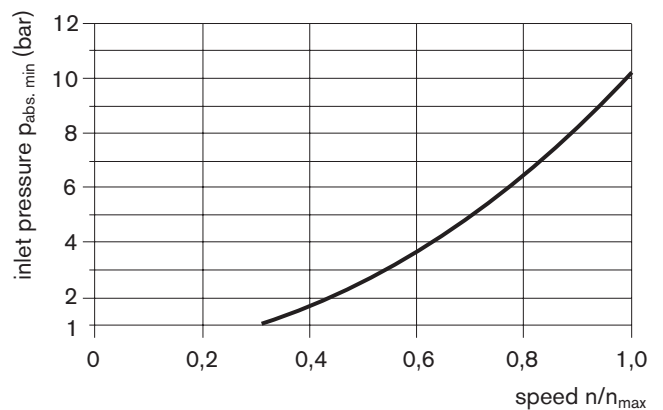
Pressure on port A

Counter-clockwise
direction of rotation

Pressure on port B

Minimum inlet pressure on service line port A (B)

In order to avoid damage of the motor a minimum inlet pressure at the inlet zone must be assured. The minimum inlet pressure is related to the rotational speed of the fixed motor.



Please contact us if these conditions cannot be satisfied.

Ordering Code / Standard Program – Size 5

A2F	5	/	60	W	-		3
01	02		03	04		05	06

Axial piston unit

01	Bent axis design, fixed displacement	A2F
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Size

02	≈ Displacement V_g (cm ³)	5
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Series

03		60
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Direction of rotation

04	Viewed on shaft end	alternating	W
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Shaft end

05	Parallel keyed shaft DIN 6885	B
	Tapered shaft with spigot and spring washer DIN 6888	C

Service line ports

06	Threaded ports A und B at side, metric	3
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Additional instructions in text form

Seals

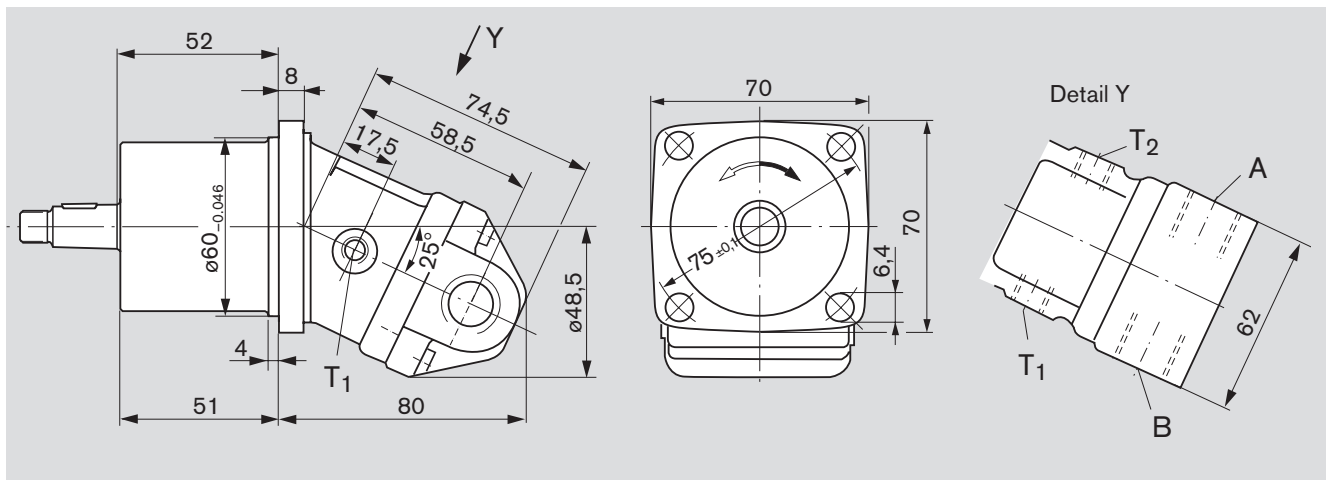
The fixed motor A2F5 is equipped with NBR- (nitril-caoutchouc) seals in standard design.

In case of need FKM- (fluor-caoutchouc) seals please indicate when ordering in clear text:

"with FKM-seals"

Unit Dimensions, Size 5

Before finalizing your design, please request approved installation drawing. Dimensions in mm.



Shaft ends

B Parallel keyed shaft, DIN 6885, A4x4x20
 $p_N = 210$ bar

C Tapered shaft with spigot and spring washer 3x5
 DIN 6888, $p_N = 315$ bar (taper 1:10)

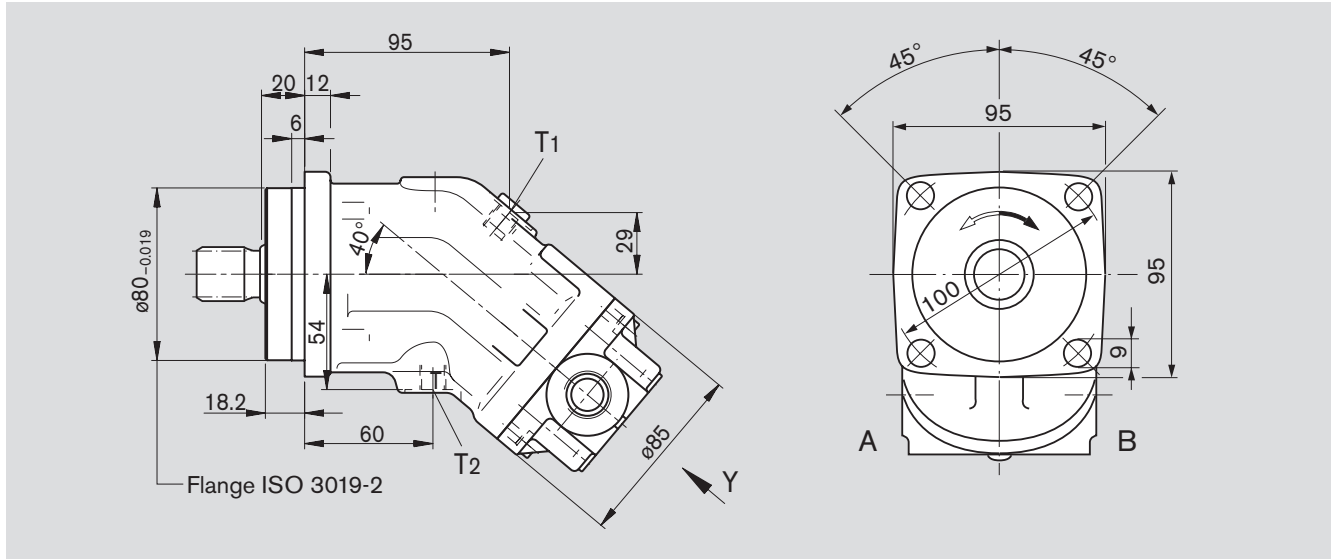
Ports

A, B	Service line ports	M18x1,5; 12 deep	140 Nm ³⁾
		DIN 3852	
T ₁ , T ₂	Case drain ports	M10x1; 8 deep	30 Nm ³⁾
		DIN 3852	

- 1) centering bore according to DIN 332 (thread according to DIN 13)
- 2) thread according to DIN 3852, max. tightening torque: 30 Nm
- 3) please observe the general notes for the max. tightening torques on page 36

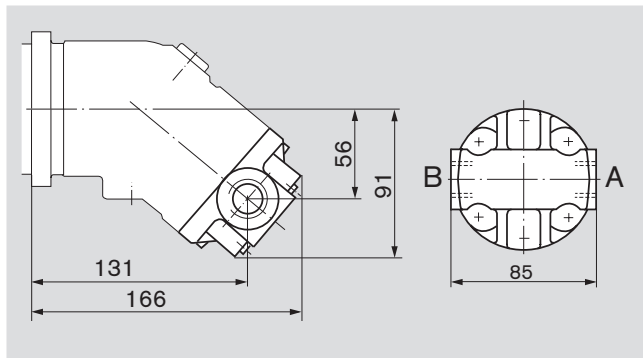
Unit Dimensions, Sizes 10, 12, 16

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

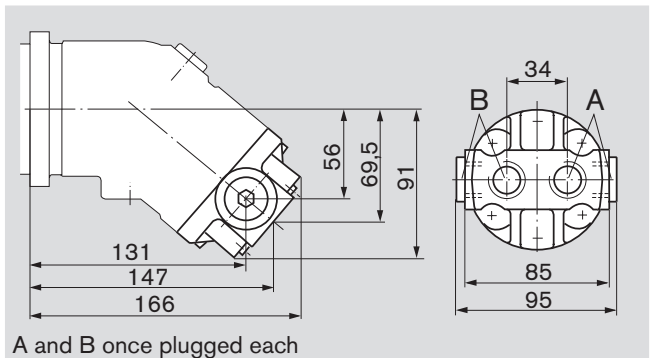


Port plates

03 Threaded ports, at side



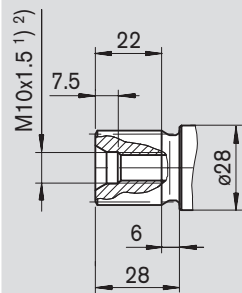
04 Threaded ports, at side and rear



Shaft ends

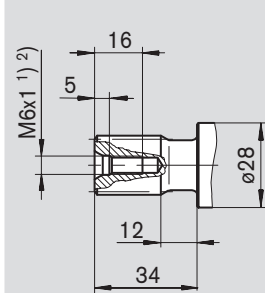
Sizes 10, 12, 16

A Splined shaft DIN 5480
W25x1,25x30x18x9g
 $p_N = 400$ bar



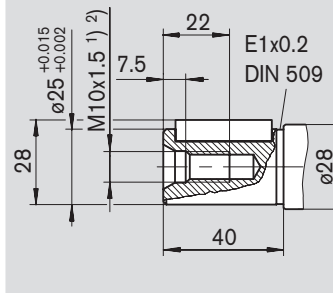
Sizes 10, 12

Z Splined shaft DIN 5480
W20x1,25x30x14x9g
 $p_N = 400$ bar



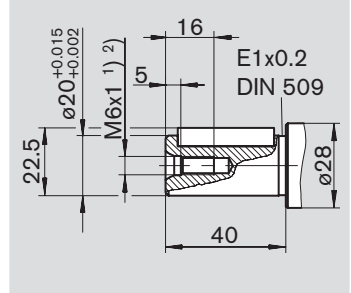
Sizes 10, 12, 16

B Parallel keyed shaft,
DIN 6885, AS8x7x32
 $p_N = 350$ bar



Sizes 10, 12

P Parallel keyed shaft,
DIN 6885, A6x6x32
 $p_N = 350$ bar



Ports

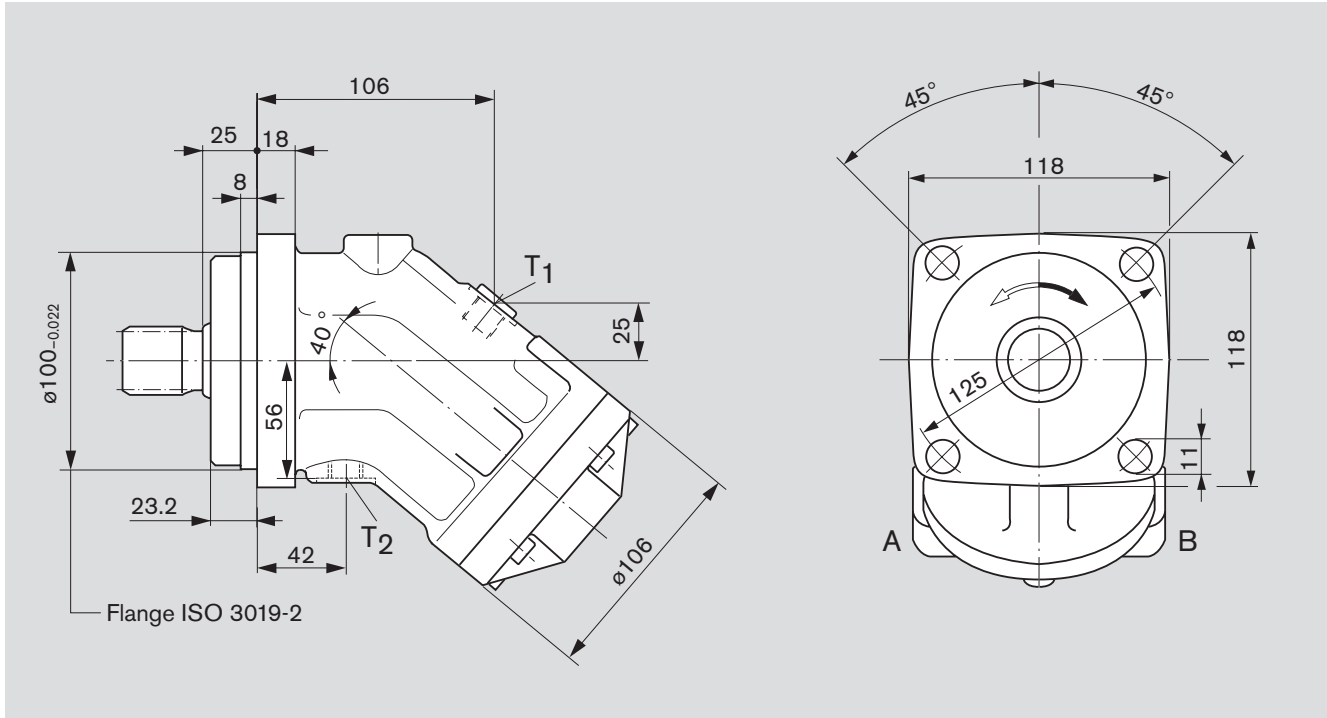
A, B	Service line ports	DIN 3852	M22x1,5; 14 deep	210 Nm ²⁾
T ₁ , T ₂	Case drain ports (T ₁ plugged)	DIN 3852	M12x1,5; 12 deep	50 Nm ²⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Sizes 23, 28, 32

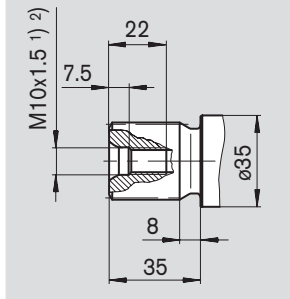
Before finalizing your design, please request approved installation drawing. Dimensions in mm.



Shaft ends

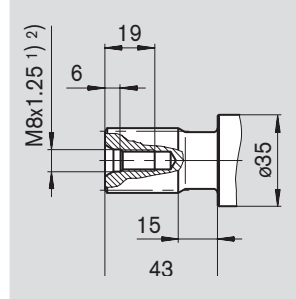
Sizes 23, 28, 32

A Splined shaft DIN 5480
W30x2x30x14x9g
 $p_N = 400$ bar



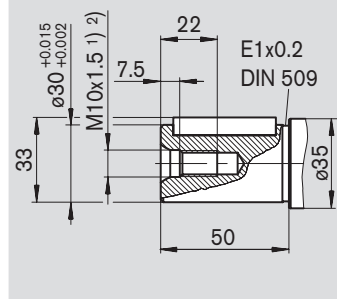
Sizes 23, 28

Z Splined shaft DIN 5480
W25x1,25x30x18x9g
 $p_N = 400$ bar



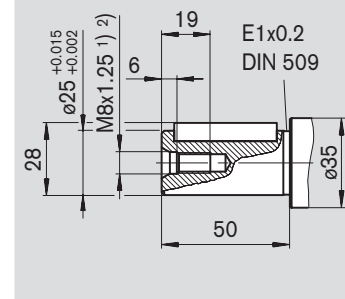
Sizes 23, 28, 32

B Parallel keyed shaft,
DIN 6885, AS8x7x40
 $p_N = 350$ bar



Sizes 23, 28

P Parallel keyed shaft,
DIN 6885, AS8x7x40
 $p_N = 350$ bar



Ports

A, B Service line ports (see port plates)

T₁, T₂ Case drain ports (T₁ plugged)

DIN 3852

M16x1,5; 12 deep

100 Nm ²⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

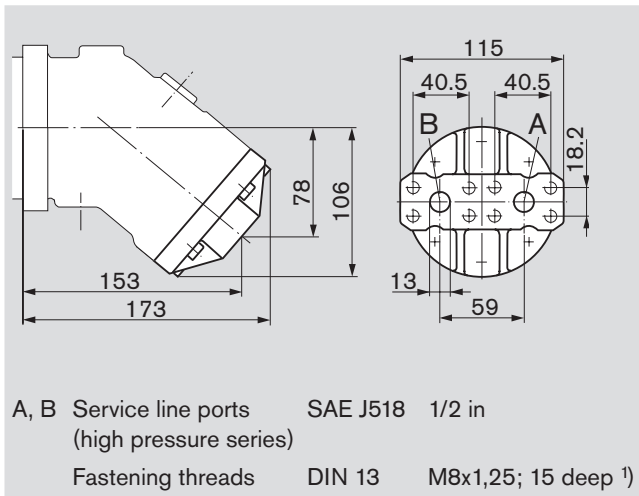
²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Sizes 23, 28, 32

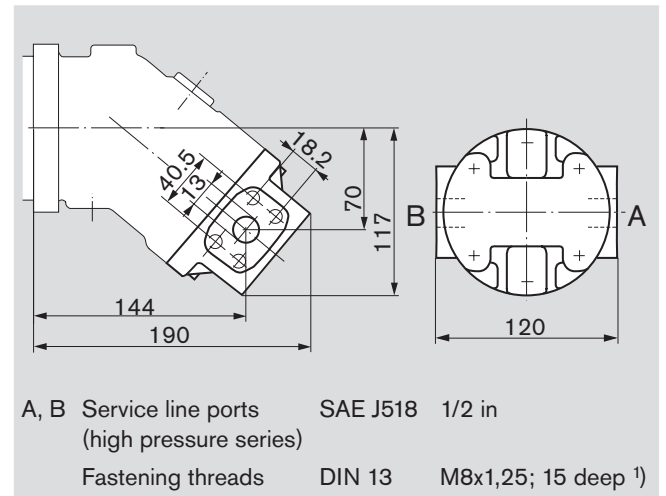
Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Port plates

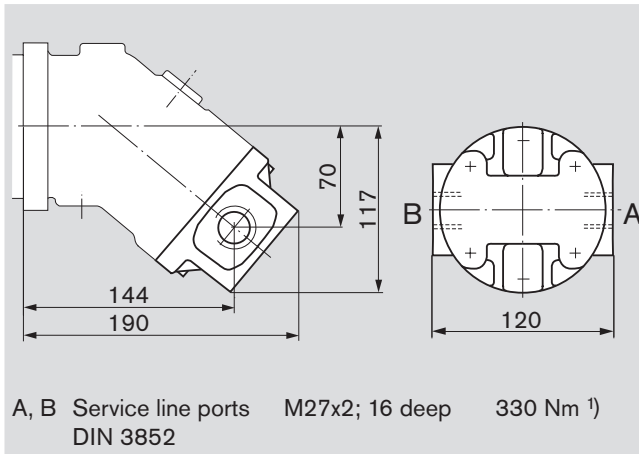
01 SAE flange ports, rear



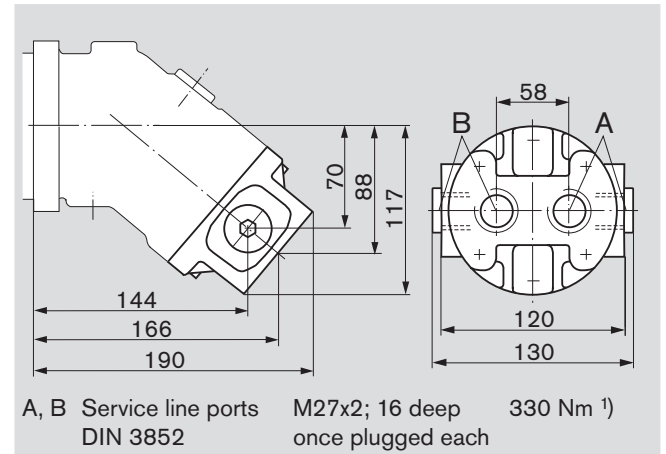
02 SAE flange ports, at side



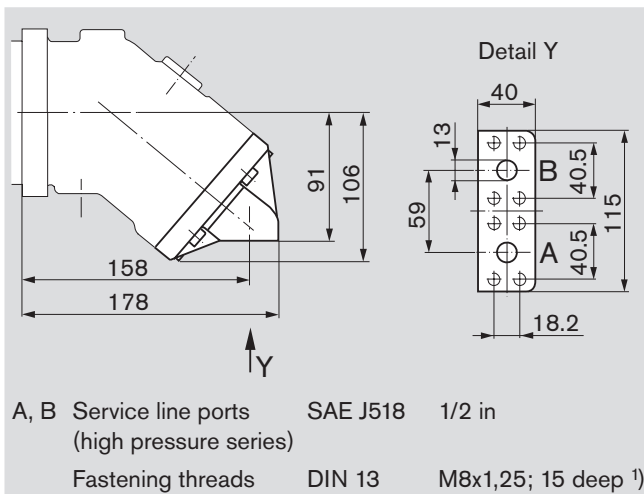
03 Threaded ports, at side



04 Threaded ports, at side and rear



10 SAE flange ports, bottom ²⁾



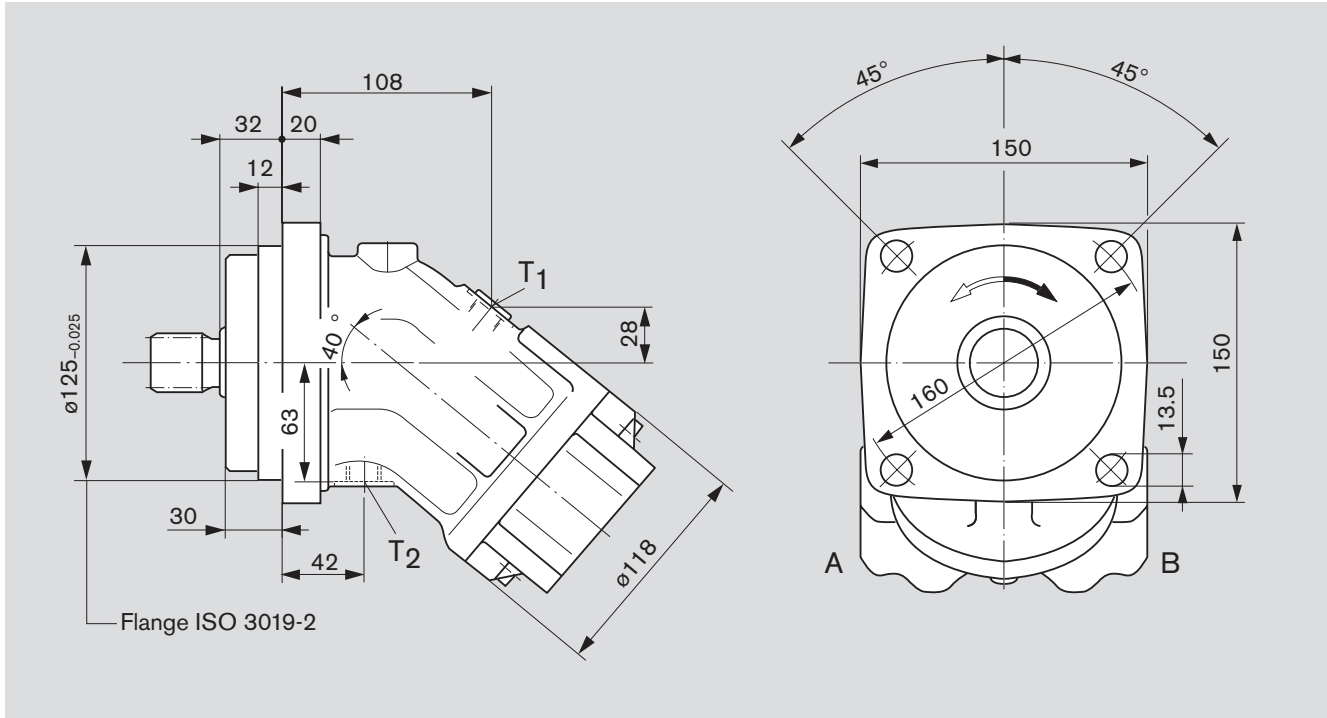
Note: Port plates 18 and 19 see pages 29, 30

¹⁾ please observe the general notes for the max. tightening torques on page 36

²⁾ only sizes 28 and 32

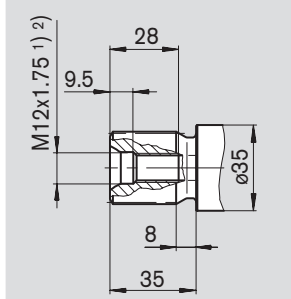
Unit Dimensions, Size 45

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

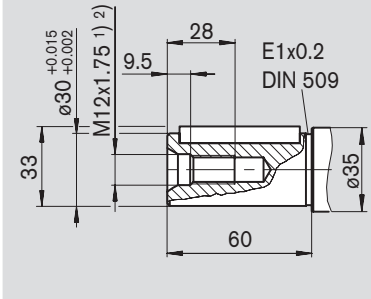


Shaft ends

Z Splined shaft DIN 5480
W30x2x30x14x9g
 $p_N = 400$ bar



P Parallel keyed shaft,
DIN 6885, AS8x7x50
 $p_N = 350$ bar



Ports

A, B Service line ports (see port plates)

T₁, T₂ Case drain ports (T₁ plugged)

DIN 3852

M18x1,5; 12 deep 140 Nm²⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

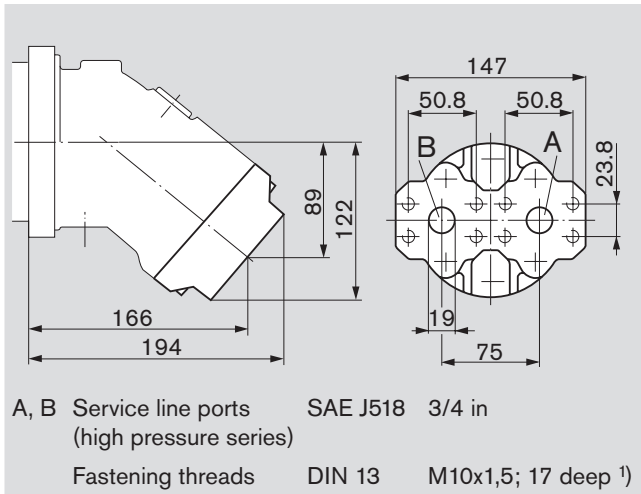
²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Size 45

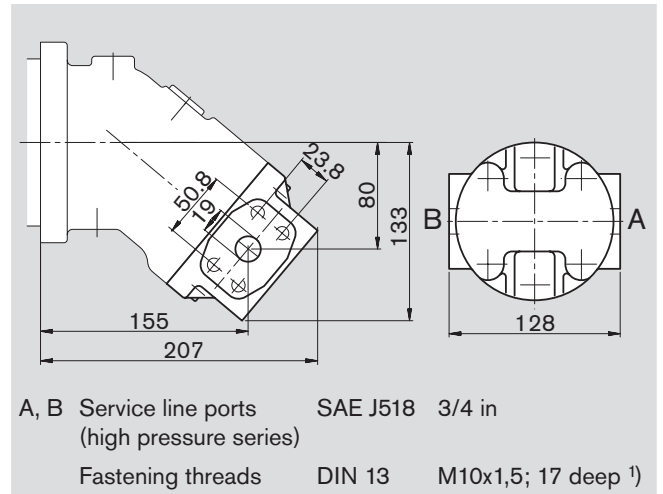
Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Port plates

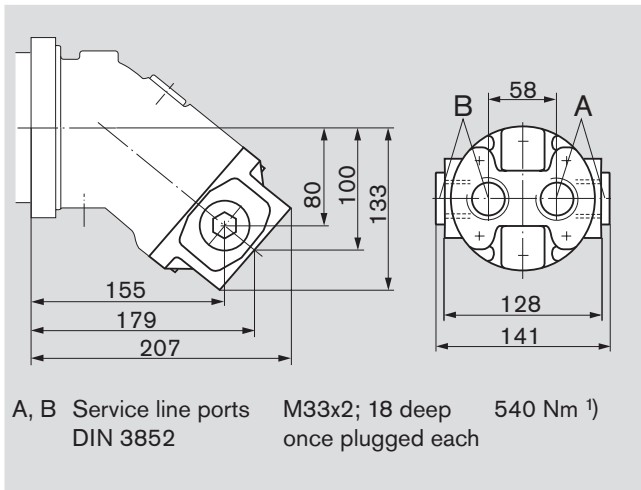
01 SAE flange ports, rear



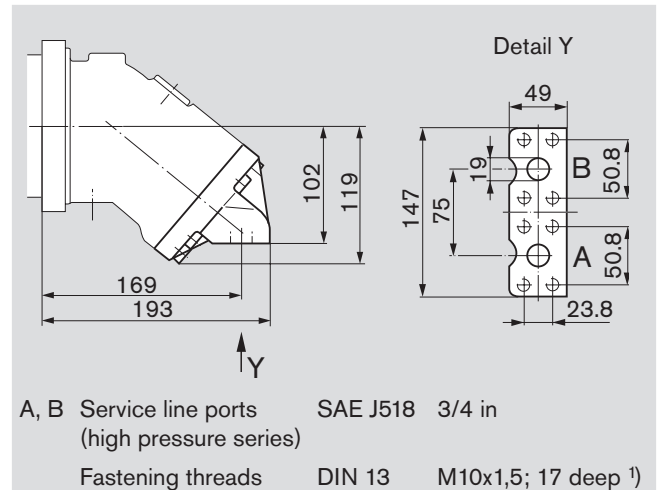
02 SAE flange ports, at side



04 Threaded ports, at side and rear



10 SAE flange ports, bottom

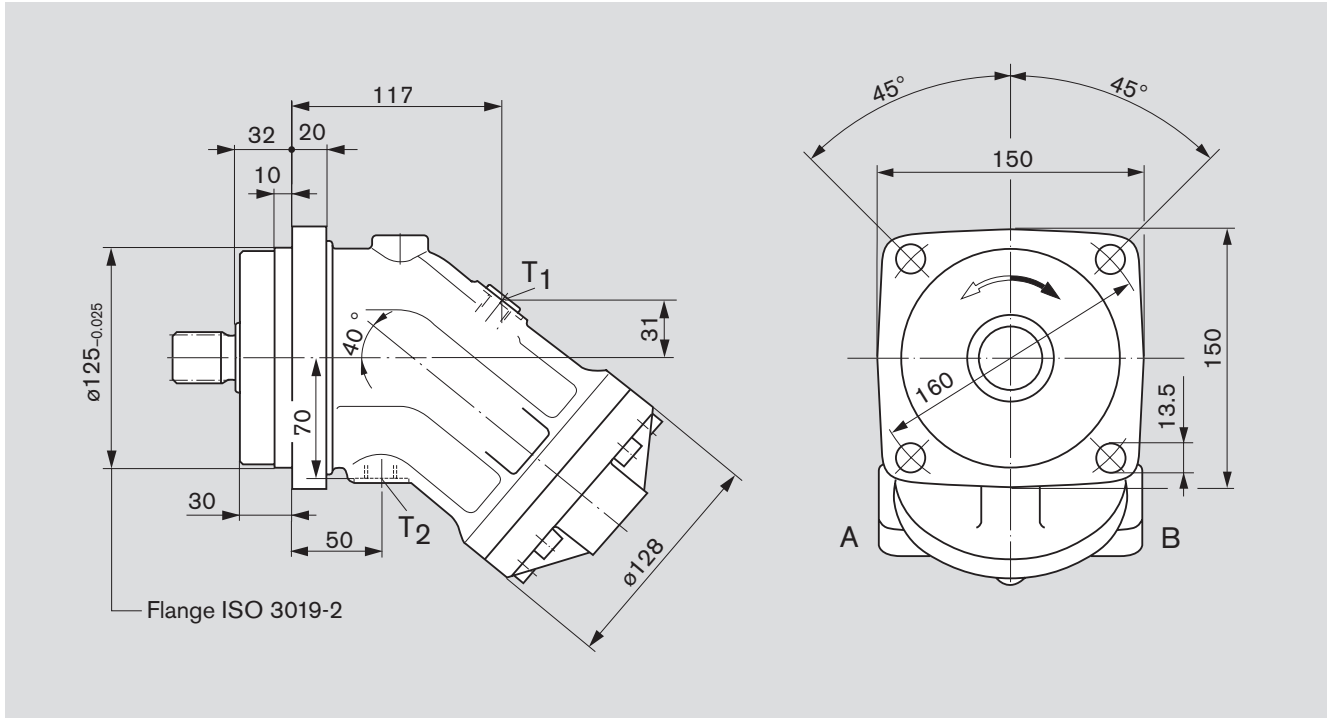


¹⁾ please observe the general notes for the max. tightening torques on page 36

Note: Port plates 18 and 19 see pages 29, 30

Unit Dimensions, Sizes 56, 63

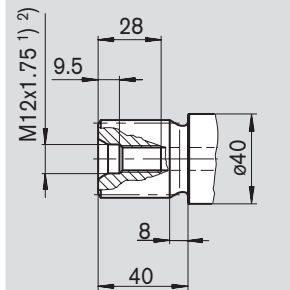
Before finalizing your design, please request approved installation drawing. Dimensions in mm.



Shaft ends

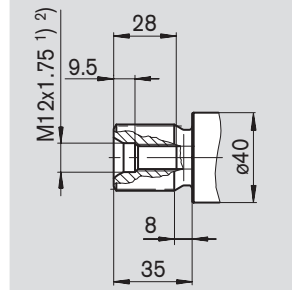
Sizes 56, 63

A Splined shaft DIN 5480
W35x2x30x16x9g
 $p_N = 400$ bar



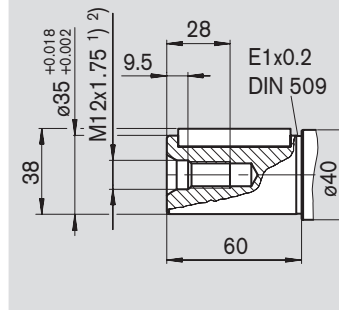
Size 56

Z Splined shaft DIN 5480
W30x2x30x14x9g
 $p_N = 350$ bar



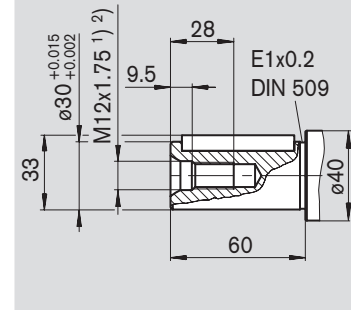
Sizes 56, 63

B Parallel keyed shaft,
DIN 6885, AS10x8x50
 $p_N = 350$ bar



Size 56

P Parallel keyed shaft,
DIN 6885, AS8x7x50
 $p_N = 350$ bar



Ports

A, B Service line ports (see port plates)

T₁, T₂ Case drain ports (T₁ plugged)

DIN 3852

M18x1,5; 12 deep

140 Nm²⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

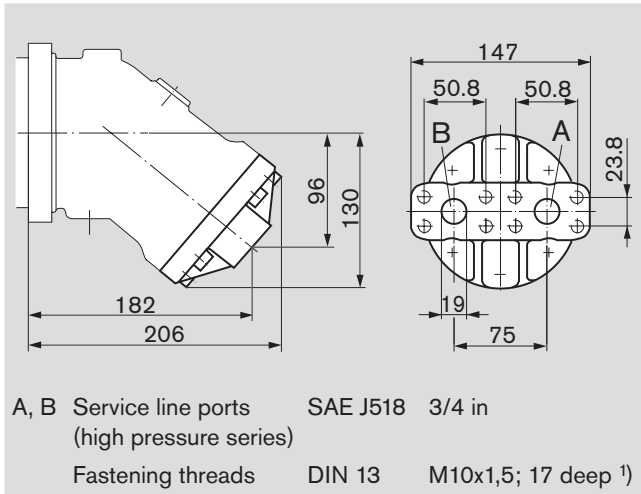
²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Sizes 56, 63

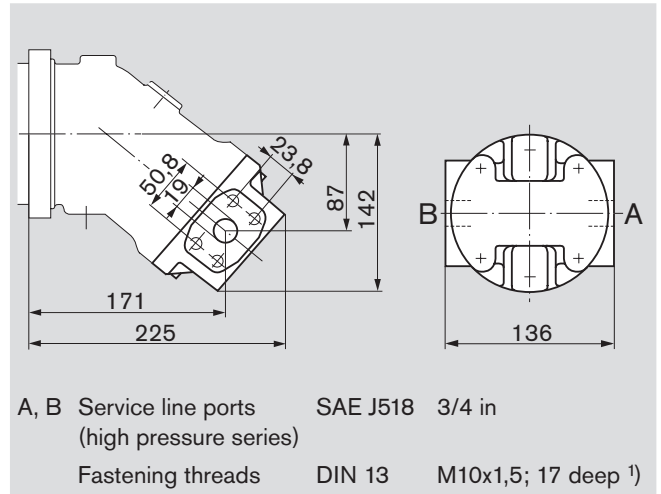
Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Port plates

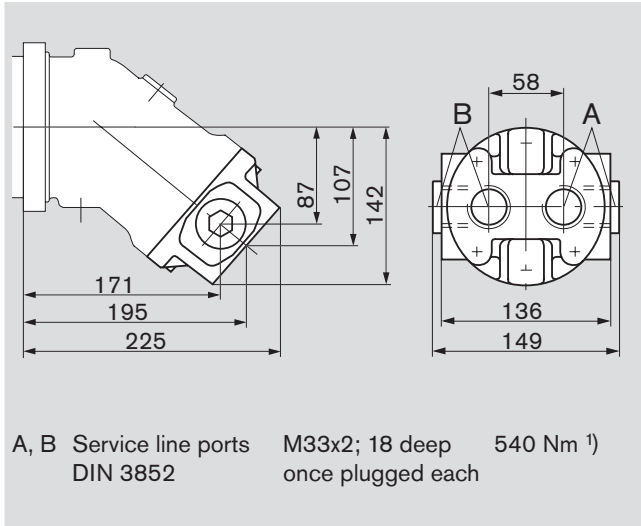
01 SAE flange ports, rear



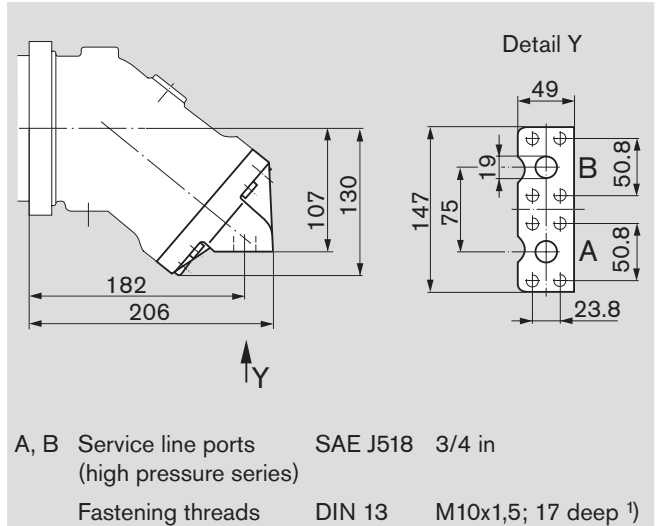
02 SAE flange ports, at side



04 Threaded ports, at side and rear



10 SAE flange ports, bottom

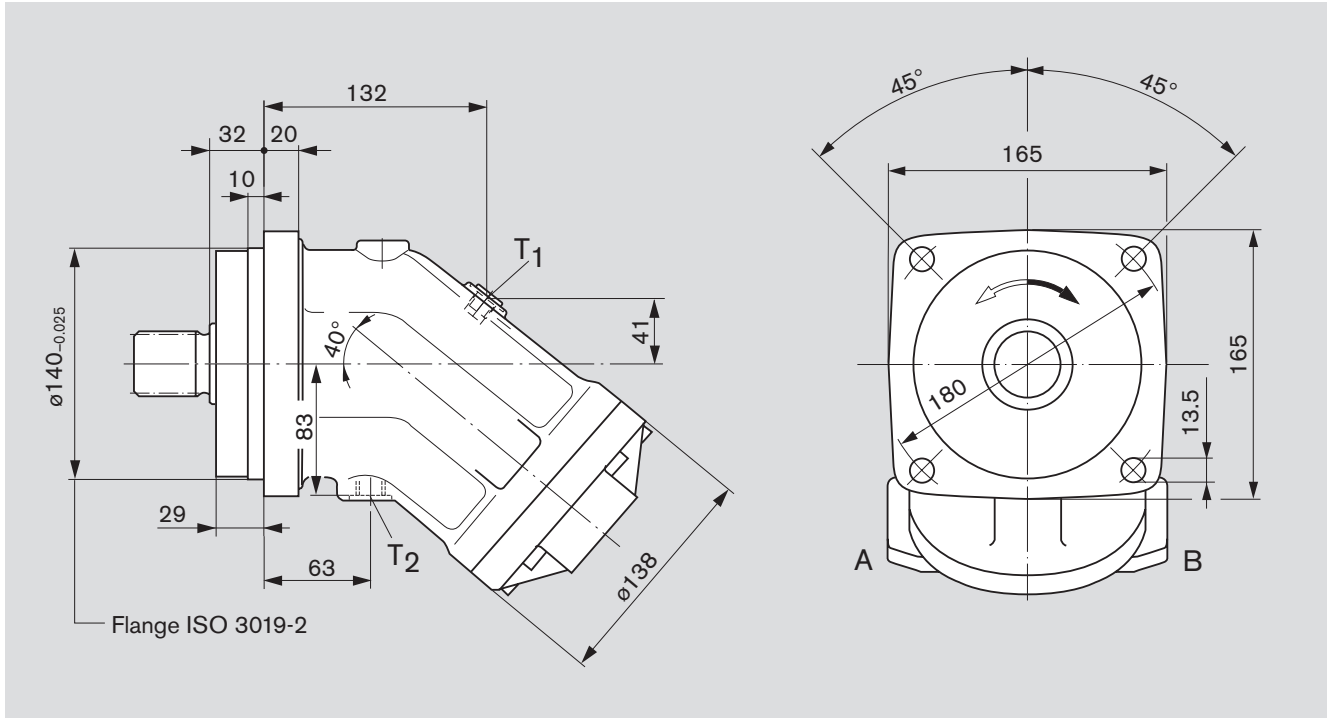


¹⁾ please observe the general notes for the max. tightening torques on page 36

Note: Port plates 18 and 19 see pages 29, 30

Unit Dimensions, Sizes 80, 90

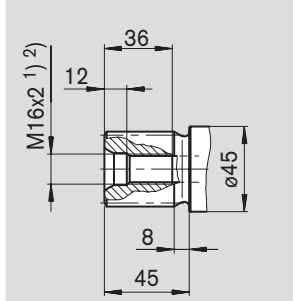
Before finalizing your design, please request approved installation drawing. Dimensions in mm.



Shaft ends

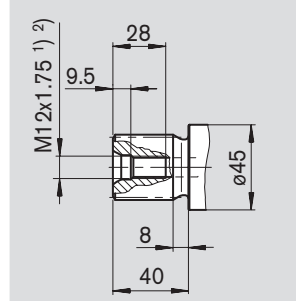
Sizes 80, 90

A Splined shaft DIN 5480
W40x2x30x18x9g
 $p_N = 400$ bar



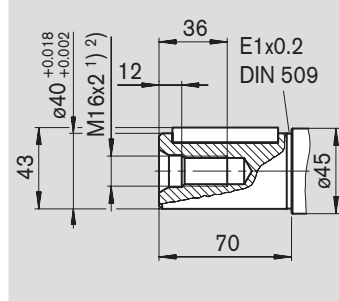
Size 80

Z Splined shaft DIN 5480
W35x2x30x16x9g
 $p_N = 400$ bar



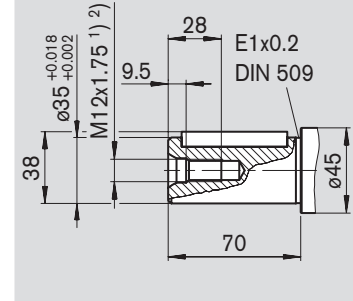
Sizes 80, 90

B Parallel keyed shaft,
DIN 6885, AS12x8x56
 $p_N = 350$ bar



Size 80

P Parallel keyed shaft,
DIN 6885, AS10x8x56
 $p_N = 350$ bar



Ports

A, B Service line ports (see port plates)

T₁, T₂ Case drain ports (T₁ plugged)

DIN 3852

M18x1,5; 12 deep

140 Nm²⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

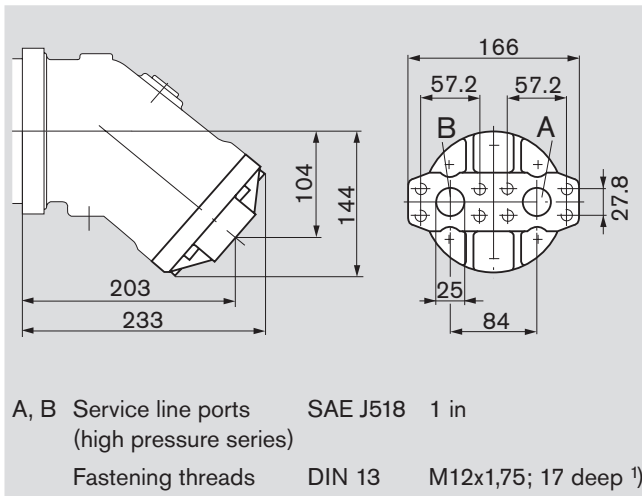
²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Sizes 80, 90

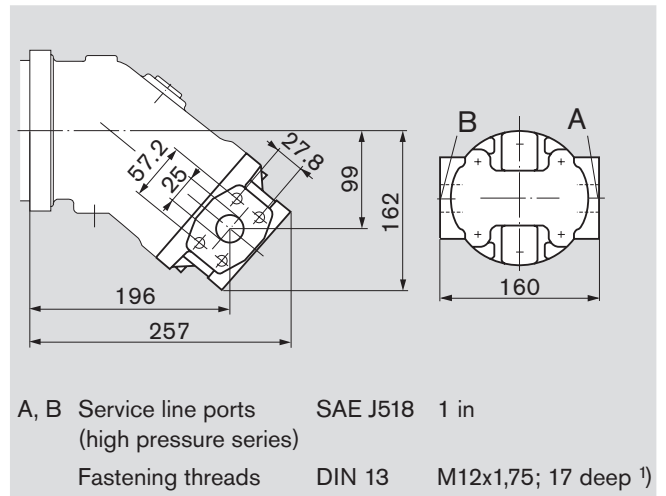
Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Port plates

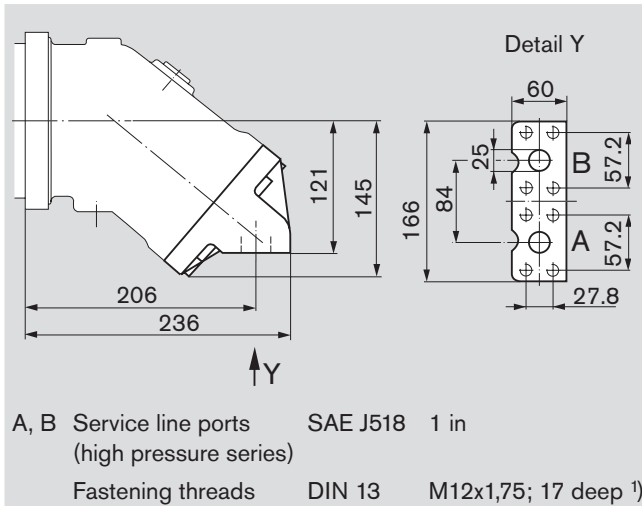
01 SAE flange ports, rear



02 SAE flange ports, at side



10 SAE flange ports, bottom

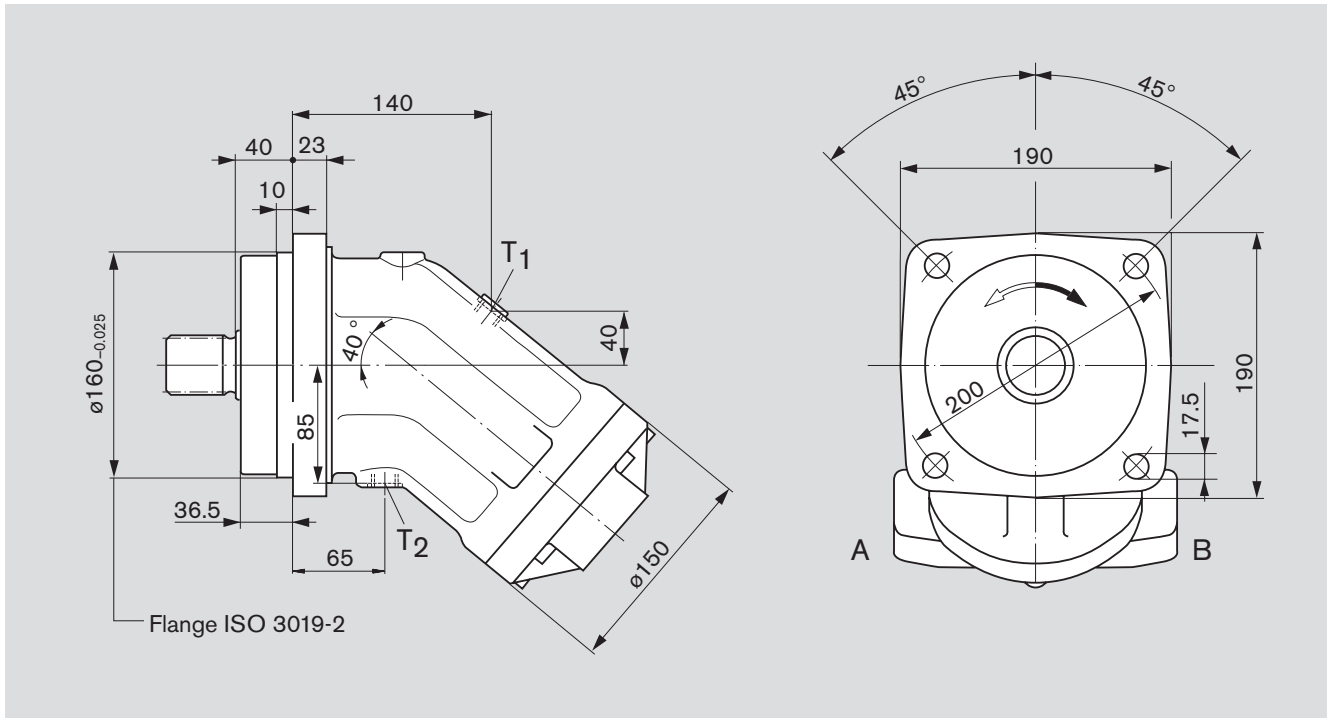


¹⁾ please observe the general notes for the max. tightening torques on page 36

Note: Port plates 18 and 19 see pages 29, 30

Unit Dimensions, Sizes 107, 125

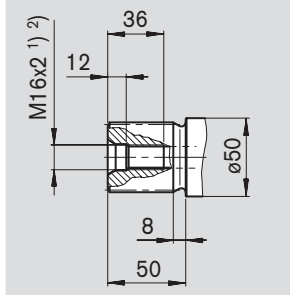
Before finalizing your design, please request approved installation drawing. Dimensions in mm.



Shaft ends

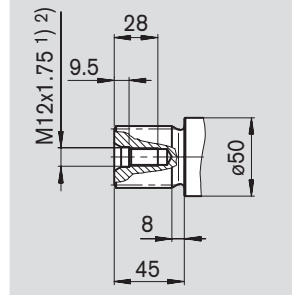
Sizes 107, 125

A Splined shaft DIN 5480
W45x2x30x21x9g
 $p_N = 400$ bar



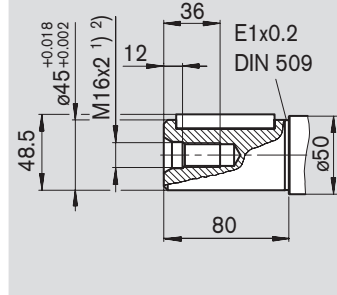
Size 107

Z Splined shaft DIN 5480
W40x2x30x18x9g
 $p_N = 400$ bar



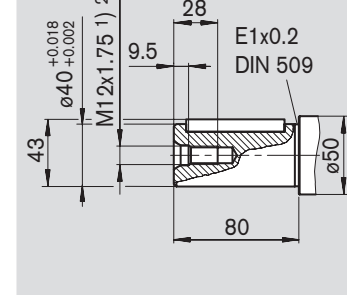
Sizes 107, 125

B Parallel keyed shaft,
DIN 6885, AS14x9x63
 $p_N = 350$ bar



Size 107

P Parallel keyed shaft,
DIN 6885, AS12x8x63
 $p_N = 350$ bar



Ports

A, B Service line ports (see port plates)

T₁, T₂ Case drain ports (T₁ plugged)

DIN 3852

M18x1,5; 12 deep

140 Nm²⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

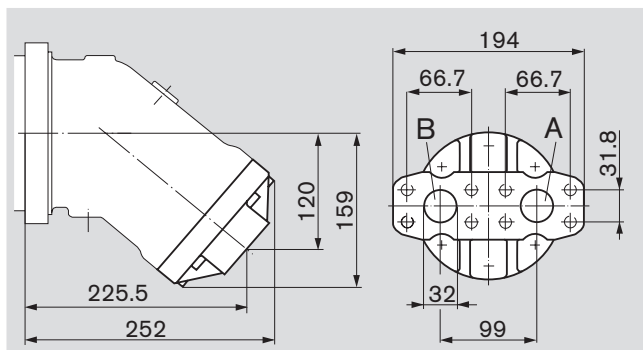
²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Sizes 107, 125

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

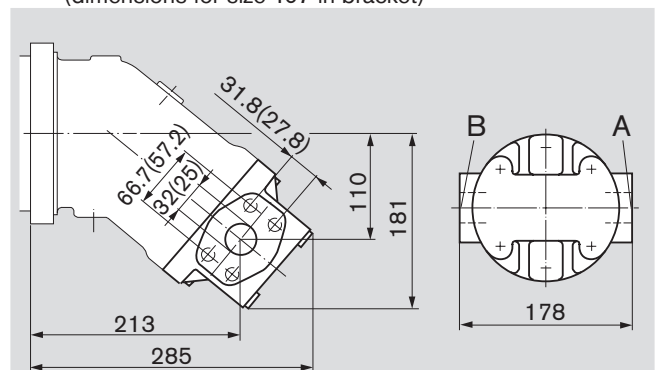
Port plates

01 SAE flange ports, rear



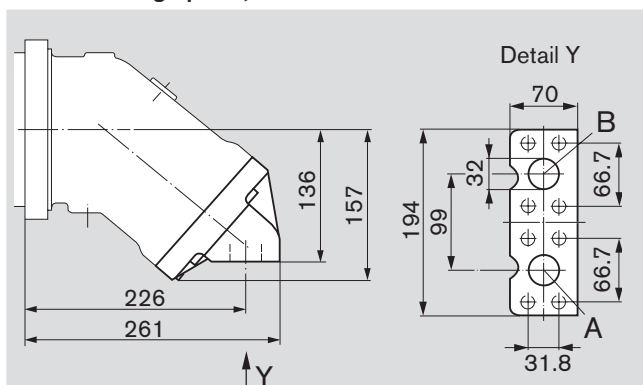
A, B Service line ports	SAE J518	1 1/4 in
(high pressure series)		
Fastening threads	DIN 13	M14x2; 19 deep ¹⁾

02 SAE flange ports, at side (dimensions for size 107 in bracket)



A, B Service line ports	SAE J518	1 in (size 107)
(high pressure series)		1 1/4 in (size 125)
Fastening threads	DIN 13	M12x1,75; 17 deep ¹⁾
		(size 107)
		M14x2; 19 deep ¹⁾
		(size 125)

10 SAE flange ports, bottom



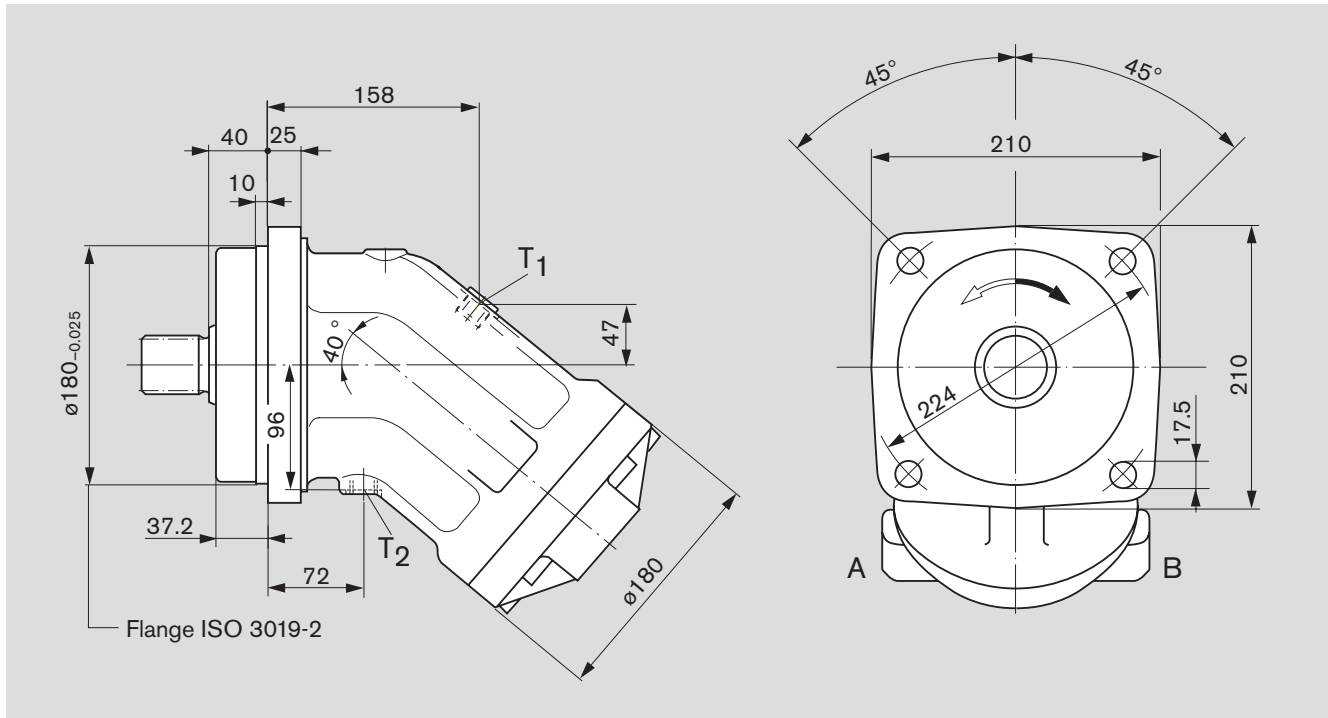
A, B Service line ports	SAE J518	1 1/4 in
(high pressure series)		
Fastening threads	DIN 13	M14x2; 19 deep ¹⁾

¹⁾ please observe the general notes for the max. tightening torques on page 36

Note: Port plates 18 and 19 see pages 29, 30

Unit Dimensions, Sizes 160, 180

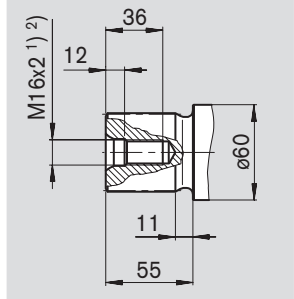
Before finalizing your design, please request approved installation drawing. Dimensions in mm.



Shaft ends

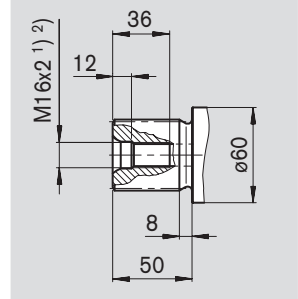
Sizes 160, 180

A Splined shaft DIN 5480
W50x2x30x24x9g
 $p_N = 400$ bar



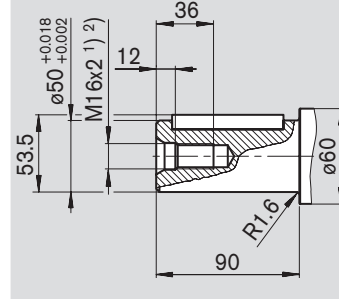
Size 160

Z Splined shaft DIN 5480
W45x2x30x21x9g
 $p_N = 400$ bar



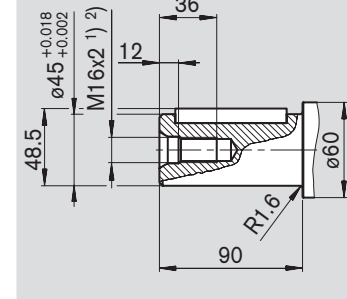
Sizes 160, 180

B Parallel keyed shaft,
DIN 6885, AS14x9x70
 $p_N = 350$ bar



Size 160

P Parallel keyed shaft,
DIN 6885, AS14x9x70
 $p_N = 350$ bar



Ports

A, B Service line ports (see port plates)

T₁, T₂ Case drain ports (T₁ plugged)

DIN 3852

M22x1,5; 14 deep

210 Nm²⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

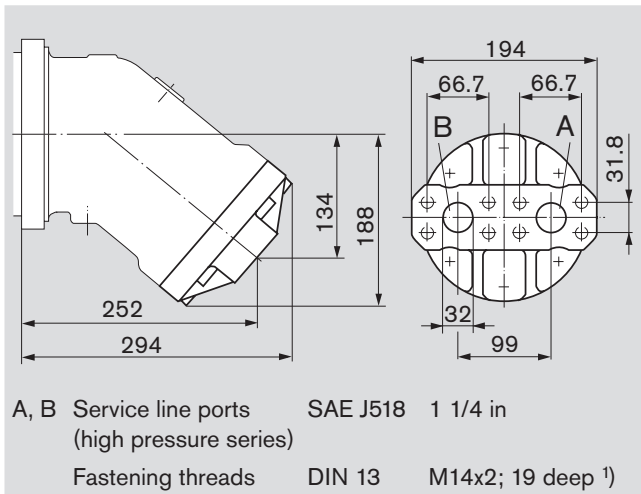
²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Sizes 160, 180

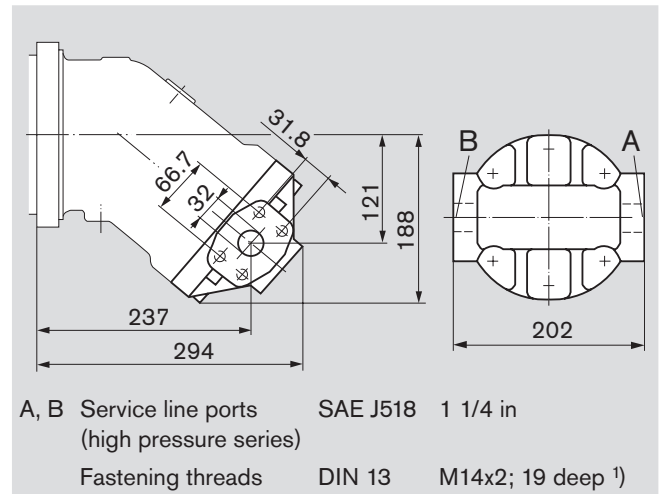
Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Port plates

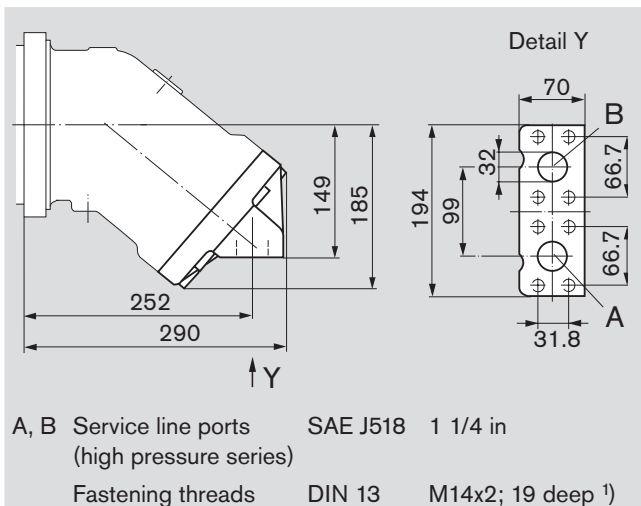
01 SAE flange ports, rear



02 SAE flange ports, at side



10 SAE flange ports, bottom



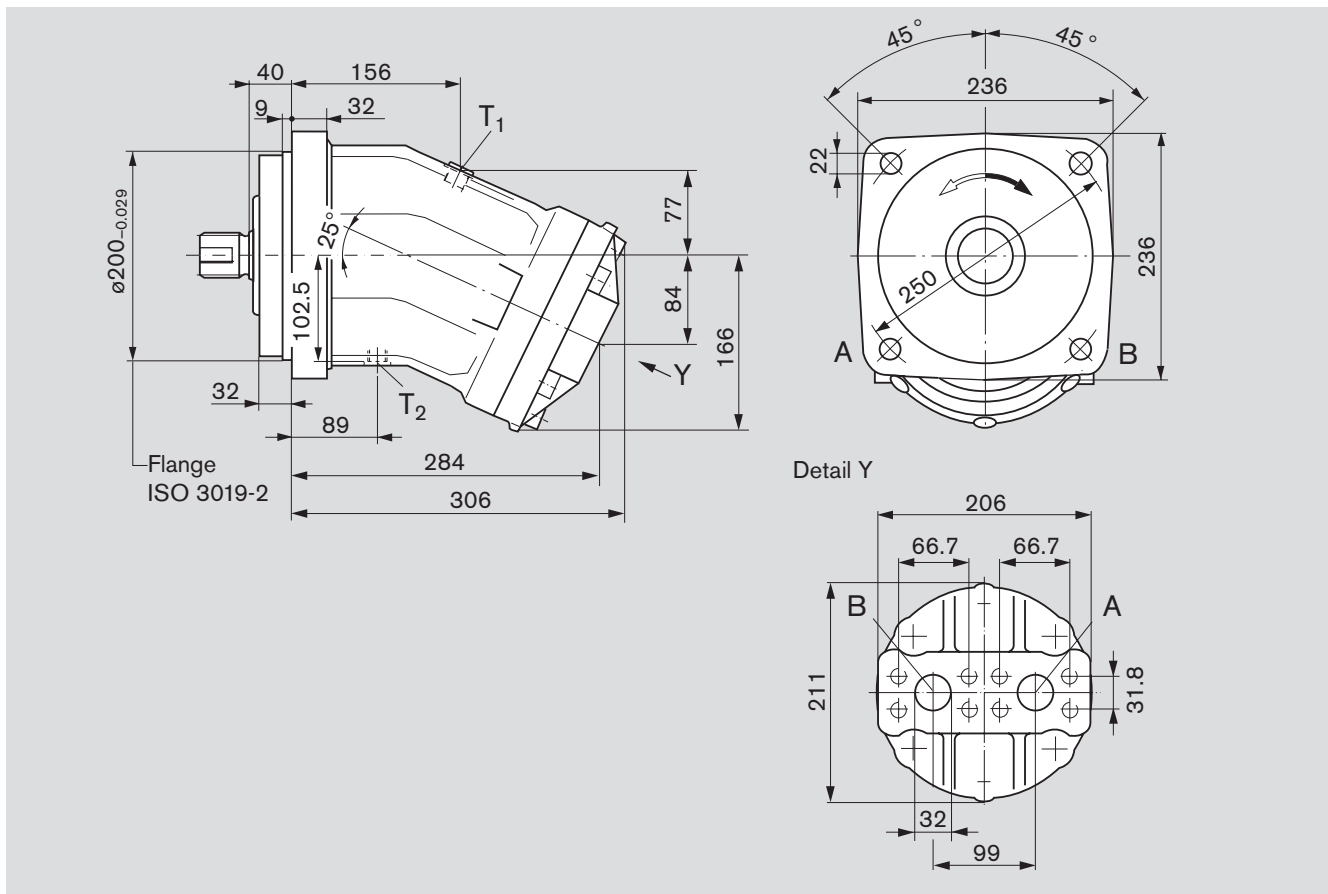
¹⁾ please observe the general notes for the max. tightening torques on page 36

Note: Port plates 18 and 19 see pages 29, 30

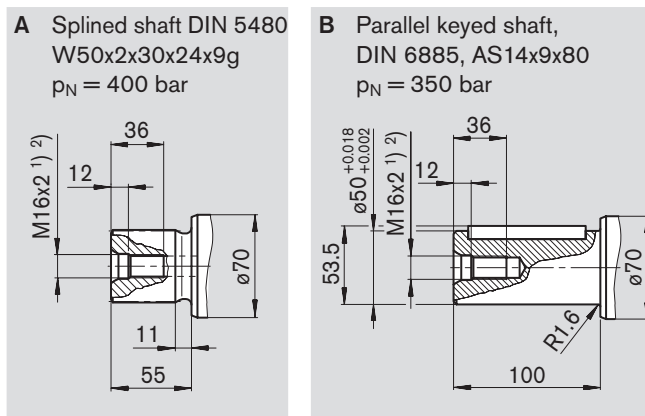
Unit Dimensions, Size 200

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Port plate 01: SAE flange ports, rear



Shaft ends



Ports

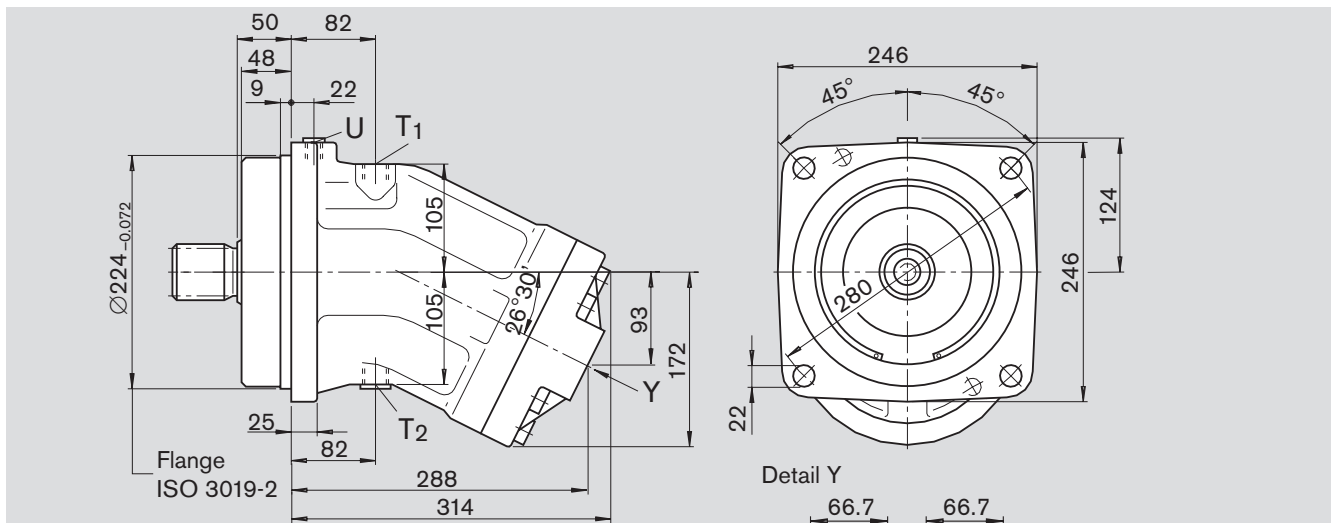
A, B	Service line ports (high pressure series) Fastening threads	SAE J518 DIN 13	1 1/4 in M14x2; 19 deep ²⁾
T ₁ , T ₂	Case drain ports (T ₁ plugged)	DIN 3852	M22x1,5; 14 deep 210 Nm ²⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)
²⁾ please observe the general notes for the max. tightening torques on page 36

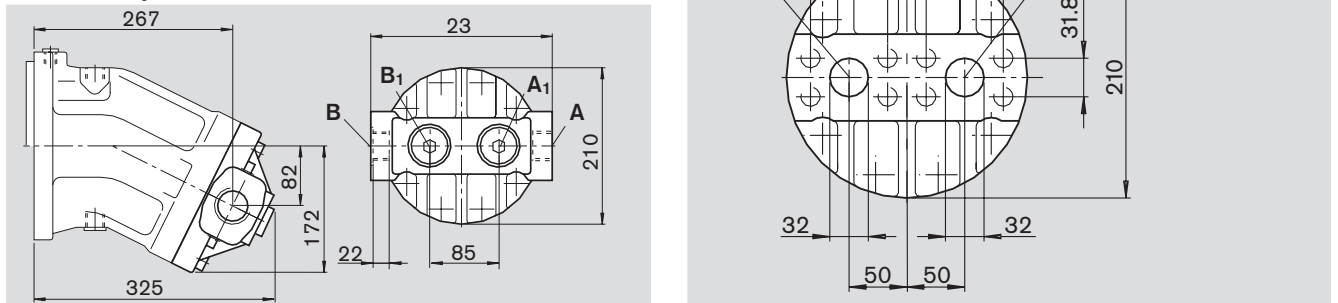
Unit Dimensions, Size 250

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

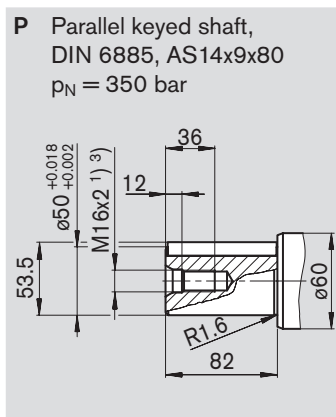
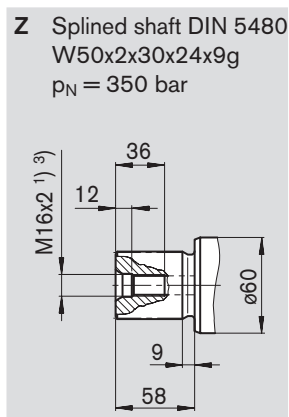
Port plate 01: SAE flange ports, rear



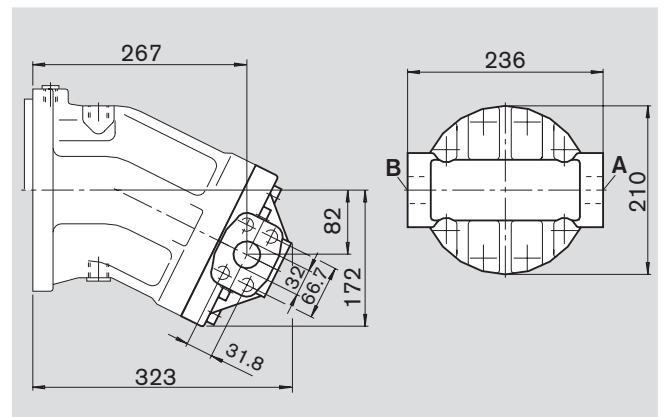
Port plate 04: Threaded ports, at side and rear



Shaft ends



Port plate 02: SAE flange ports, at side



Ports

	Port plate 01/02:	Port plate 04:
A, B Service line ports (high pressure series) Fastening threads	SAE J518 1 1/4 in DIN 13 M14x2; 19 deep ³⁾	DIN 3852 M48x2 ²⁾ 960 Nm ³⁾
T ₁ , T ₂ Case drain ports (T ₂ plugged)	DIN 3852 M22x1,5; 14 deep	210 Nm ³⁾
U Port for bearing flushing (plugged)	DIN 3852 M14x1,5; 12 deep	80 Nm ³⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

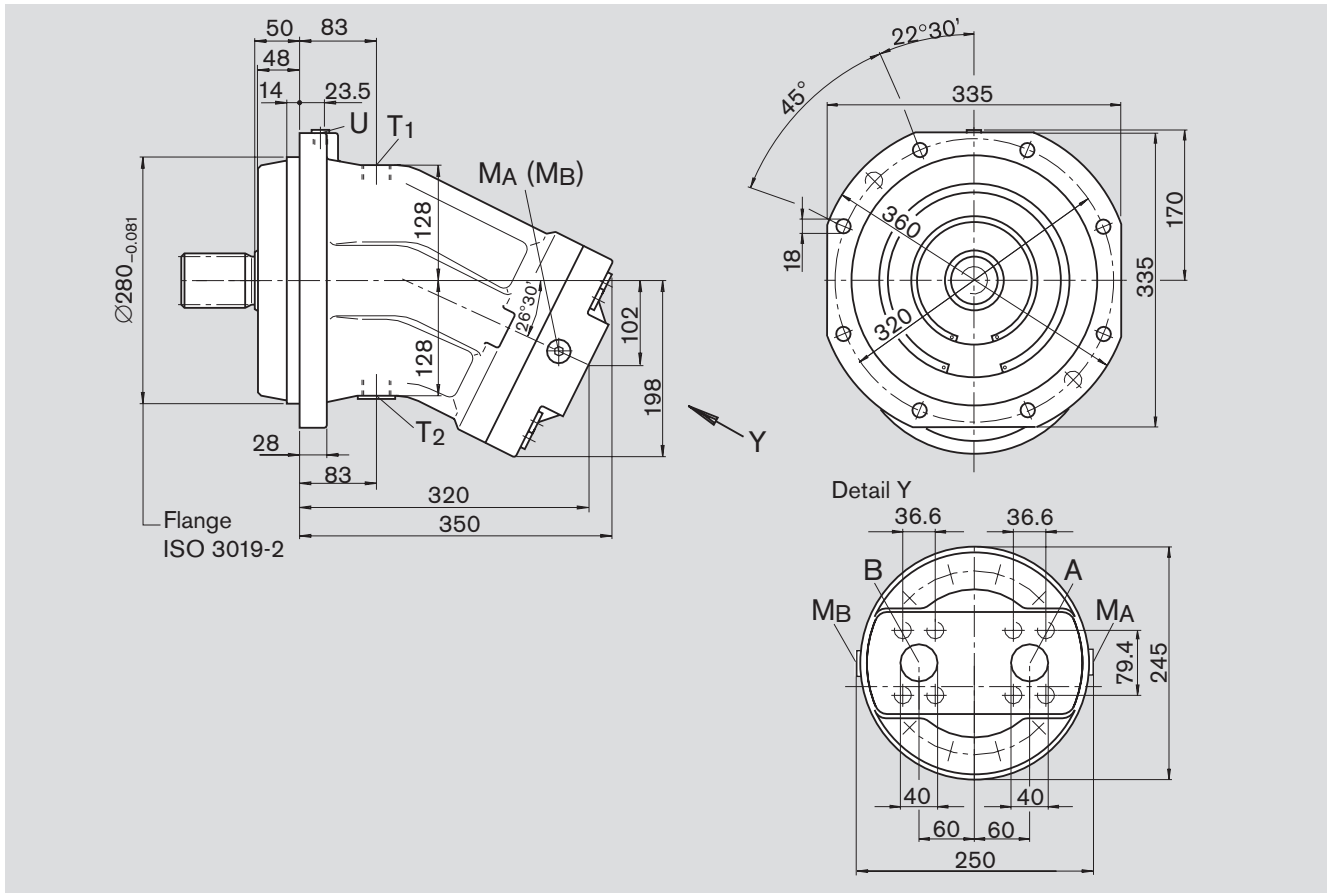
²⁾ service line ports A₁ and A₂ with locking screw plugged

³⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Size 355

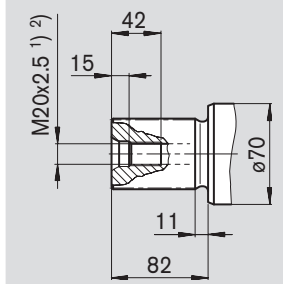
Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Port plate 01: SAE flange ports, rear

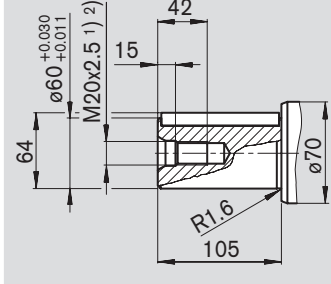


Shaft ends

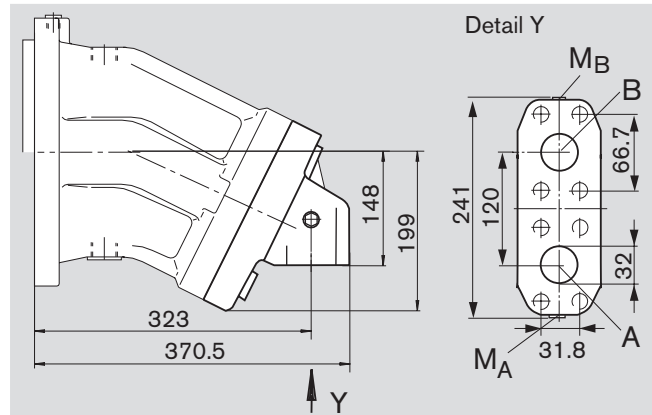
Z Splined shaft DIN 5480
W60x2x30x28x9g
 $p_N = 350$ bar



P Parallel keyed shaft,
DIN 6885, AS18x11x100
 $p_N = 350$ bar



Port plate 10: SAE flange ports, bottom



Ports

	Port plate 01:	Port plate 10:
A, B Service line ports (high pressure series) Fastening threads	SAE J518 DIN 13 1 1/2 in M16x2; 21 deep ²⁾	1 1/4 in M14x2; 22 deep ²⁾
T ₁ , T ₂ Case drain ports (T ₂ plugged)	DIN 3852 M33x2; 18 deep	540 Nm ²⁾
U Port for bearing flushing (plugged)	DIN 3852 M14x1,5; 12 deep	80 Nm ²⁾
M _A , M _B Measuring ports operating pressure (plugged)	DIN 3852 M14x1,5; 12 deep	80 Nm ²⁾

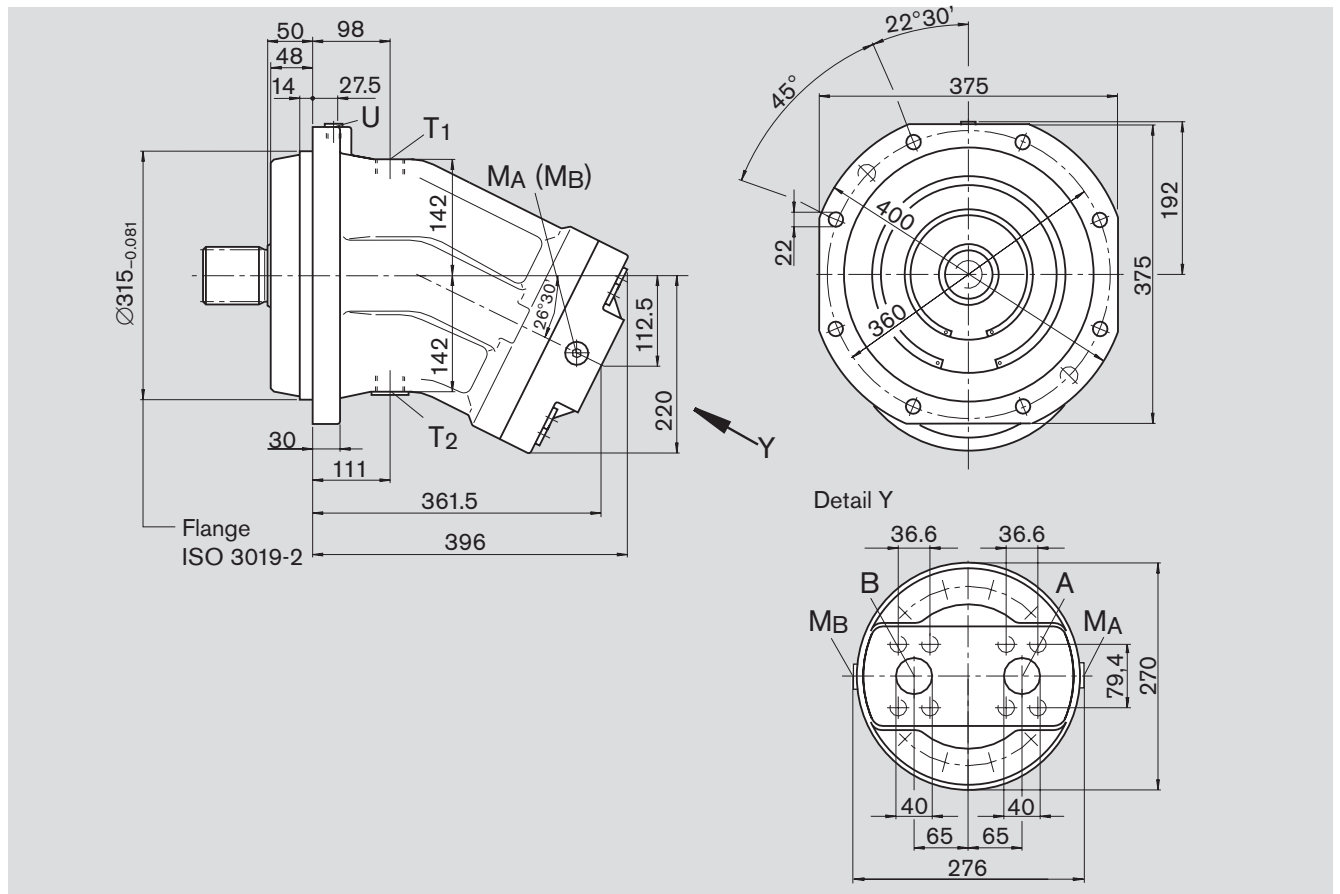
¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Size 500

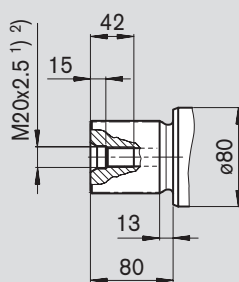
Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Port plate 01: SAE flange ports, rear

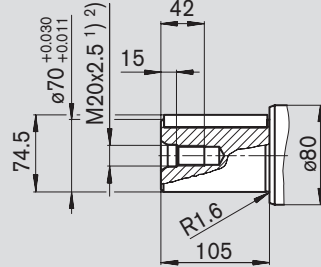


Shaft ends

Z Splined shaft DIN 5480
W70x3x30x22x9g
 $p_N = 350$ bar



P Parallel keyed shaft,
DIN 6885, AS20x12x100
 $p_N = 350$ bar



Ports

A, B	Service line ports (high pressure series) Fastening threads	SAE J518 DIN 13	1 1/2 in M16x2; 21 deep ²⁾	
T ₁ , T ₂	Case drain ports (T ₂ plugged)	DIN 3852	M33x2; 18 deep	540 Nm ²⁾
U	Port for bearing flushing (plugged)	DIN 3852	M18x1,5; 12 deep	140 Nm ²⁾
M _A , M _B	Measuring ports operating pressure (plugged)	DIN 3852	M14x1,5; 12 deep	80 Nm ²⁾

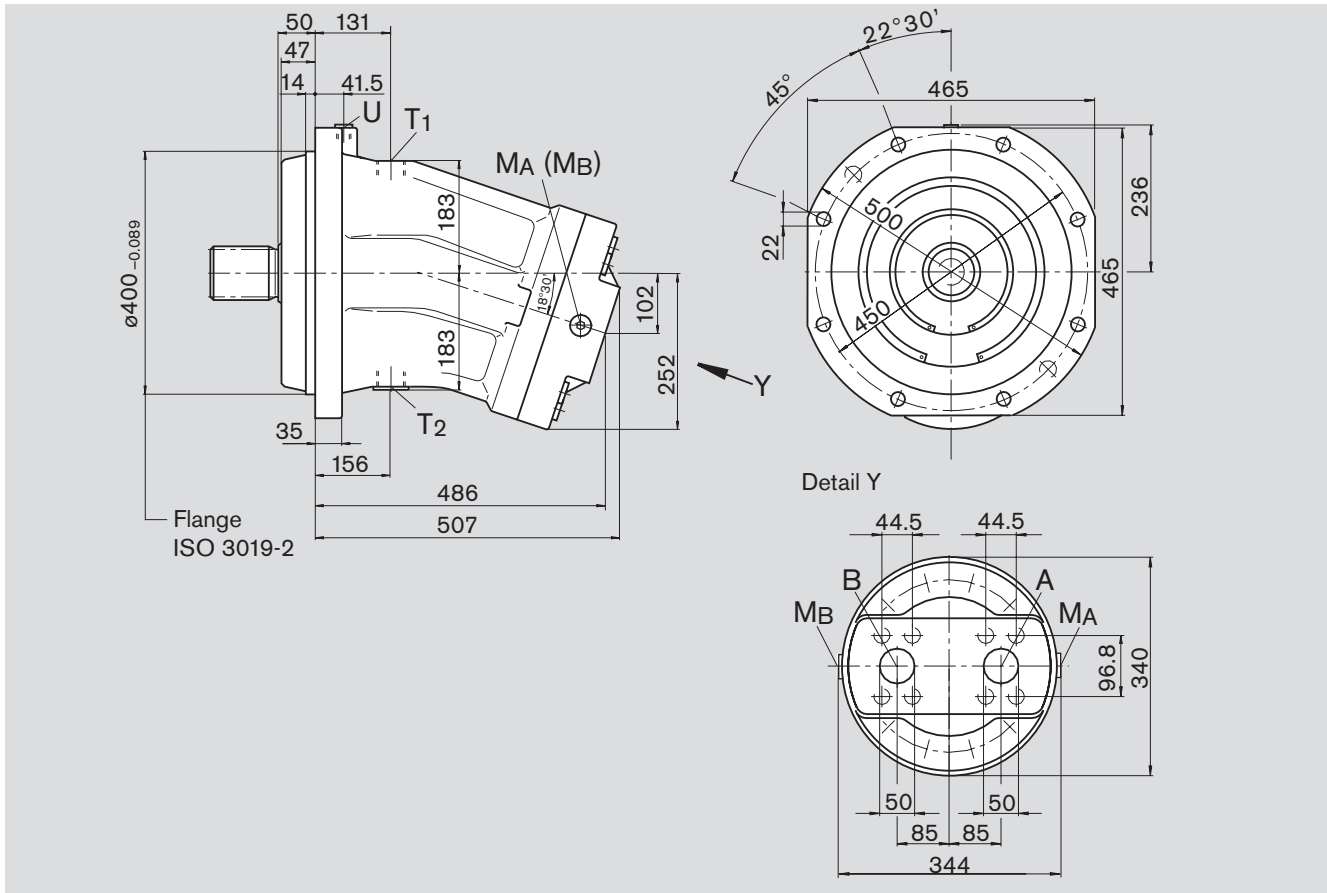
¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Size 710

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

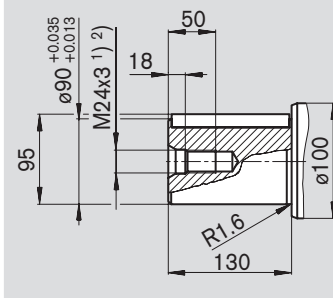
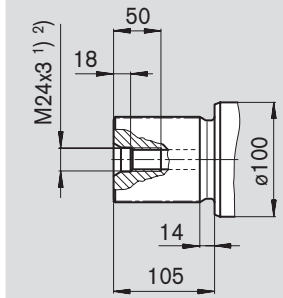
Port plate 01: SAE flange ports, rear



Shaft ends

Z Splined shaft DIN 5480
W90x3x30x28x9g
 $p_N = 350$ bar

P Parallel keyed shaft,
DIN 6885, AS25x14x125
 $p_N = 350$ bar



Ports

A, B	Service line ports (high pressure series) Fastening threads	SAE J518 DIN 13	2 in M20x2,5; 30 deep ²⁾	
T ₁ , T ₂	Case drain ports (T ₂ plugged)	DIN 3852	M42x2; 20 deep	720 Nm ²⁾
U	Port for bearing flushing (plugged)	DIN 3852	M18x1,5; 12 deep	140 Nm ²⁾
M _A , M _B	Measuring ports operating pressure (plugged)	DIN 3852	M14x1,5; 12 deep	80 Nm ²⁾

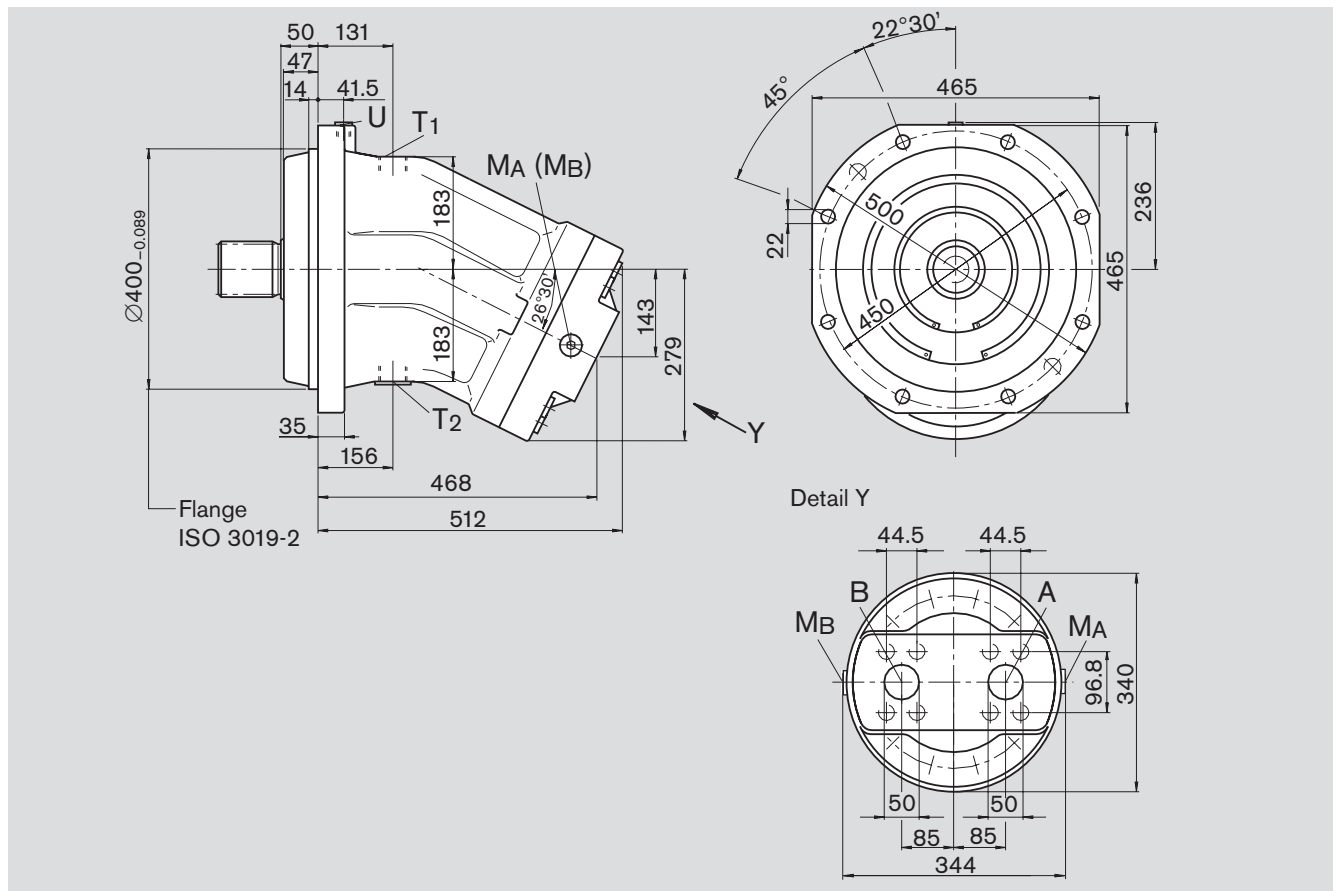
¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

²⁾ please observe the general notes for the max. tightening torques on page 36

Unit Dimensions, Size 1000

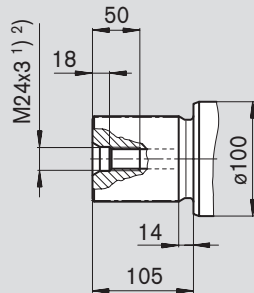
Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Port plate 01: SAE flange ports, rear

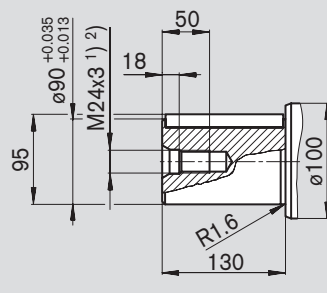


Shaft ends

Z Splined shaft DIN 5480
W90x3x30x28x9g
 $p_N = 350$ bar



P Parallel keyed shaft,
DIN 6885, AS25x14x125
 $p_N = 350$ bar



Ports

A, B	Service line ports (high pressure series) Fastening threads	SAE J518 DIN 13	2 in M20x2,5; 30 deep ²⁾	
T ₁ , T ₂	Case drain ports (T ₂ plugged)	DIN 3852	M42x2; 20 deep	720 Nm ²⁾
U	Port for bearing flushing (plugged)	DIN 3852	M18x1,5; 12 deep	140 Nm ²⁾
M _A , M _B	Measuring ports operating pressure (plugged)	DIN 3852	M14x1,5; 12 deep	80 Nm ²⁾

¹⁾ centering bore according to DIN 332 (thread according to DIN 13)

²⁾ please observe the general notes for the max. tightening torques on page 36

Flushing and Boost Pressure Valve

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

The flushing and boost pressure valve is used to remove heat. In the closed circuit additionally to the case flushing also the minimum boost pressure is assured.

Hydraulic fluid is drained from the relevant low-pressure side into the motor housing. Along with the leakage fluid, it is then discharged into the tank. The hydraulic fluid removed from the circuit must be replaced in the closed circuit with hydraulic fluid by the charge pump.

Opening pressure of charge pressure valve 16 bar (fixed setting). Must be taken into account when setting the charge pressure on the pump in the closed circuit.

On port plate 027, the valve is fitted directly onto the fixed displacement motor (size 45-180, 250), while on port plate 017 (size 355 and 500), it is fitted on a plate.

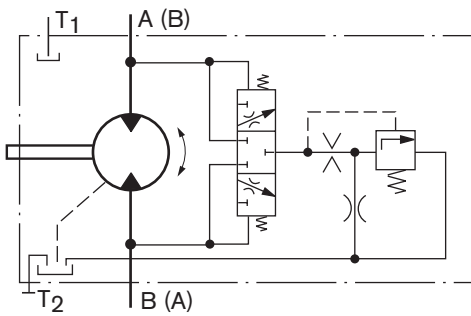
Orifice can be used to adjust the flow as required.

Standard flow (at low pressure $\Delta p = 25$ bar)

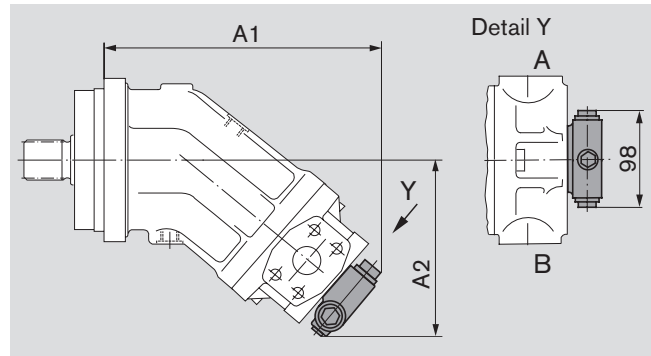
Size	Flushing flow	Orifice-No.
45, 56, 63	3,5 L/min	R909651766
80, 90	5 L/min	R909419695
107, 125	8 L/min	R9094196 96
160, 180	10 L/min	R909419697
250	10 L/min	on request
355, 500	16 L/min	on request

For sizes 45...180, restrictors for flows of 3,5 - 10 L/min can be supplied. In the case of non-standard flows, please specify the restrictor you require when placing your order. The flushing flow without orifice is approx. 12 to 14 l at low pressure $\Delta p_{ND} = 25$ bar.

Circuit diagram

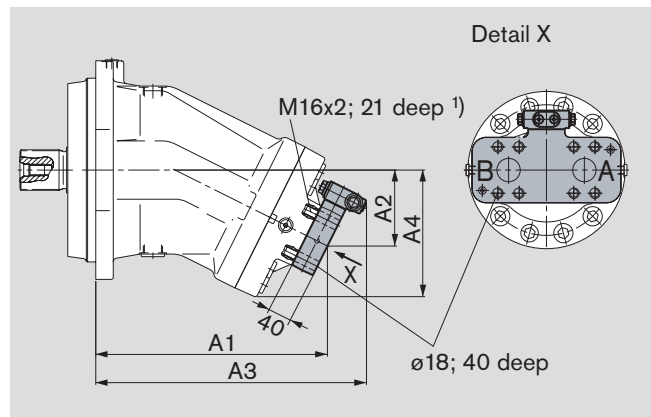


Port plate 027: SAE flange ports, at side



Size	A1	A2
45	223	151
56, 63	239	159
80, 90	268	173,5
107, 125	294	192
160, 180	315	201
250	344	154

Port plate 017: SAE flange ports, rear



Size	A1	A2	A3	A4
355	356	120	421	198
500	397	130	464	220

Additional dimensions see page 24 (size 355) and page 25 (size 500).

1) DIN 13, tightening torque see general notes on page 36

Pressure Relief Valves

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

The pressure relief valves MHDB (as to RE 64642) protect the motor from excess pressure. When the set opening pressure is reached the hydraulic fluid flows from the high pressure side to the low pressure side.

The pressure relief valves can only be supplied in conjunction with the port plates 181, 191 or 192 (counterbalance valve for fitting on port plate 181, see next page).

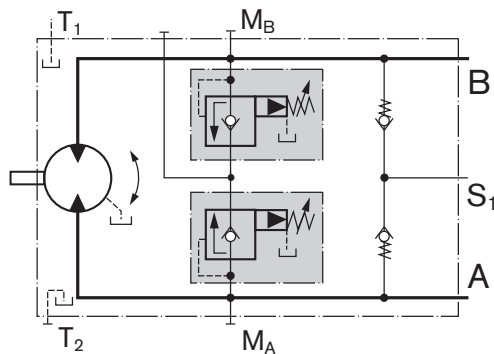
Setting range opening pressure _____ 50 – 420 bar

At design "with pressure sequence range" (192) a higher pressure setting can be realized by applying an external pilot pressure of 25 - 30 bar at port p_{St} .

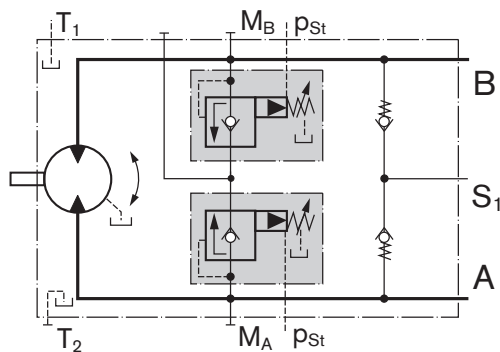
Please indicate in clear text when ordering:

- opening pressure of the pressure relief valve
- opening pressure at pilot pressure applied at p_{St} (for design 192 only)

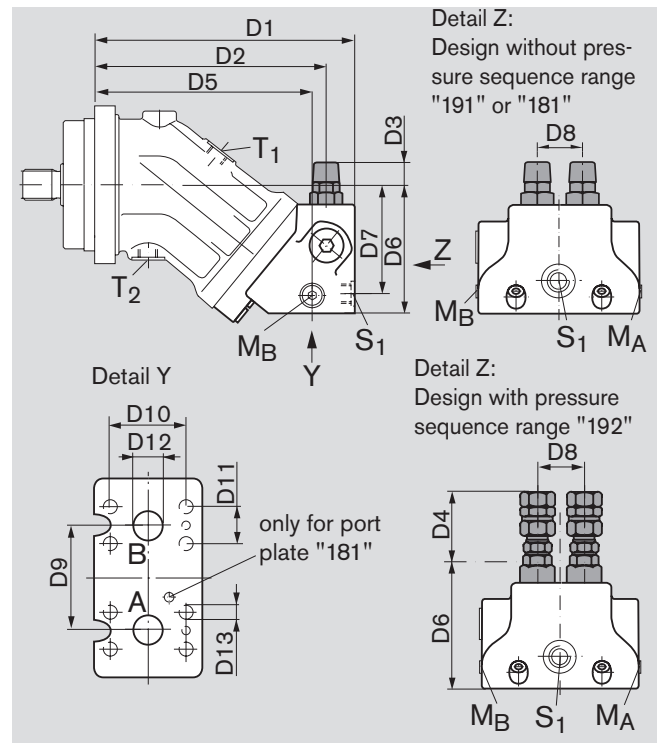
Design without pressure sequence range "191"



Design with pressure sequence range "192"



Unit dimensions



Ports

- A, B Service line ports SAE J518
- S₁ Boosting (only for port plate 191/192)
- M_A, M_B Measuring ports (plugged)
- p_{St} Pilot pressure port (only for port plate 192)

Size	A, B ¹⁾	S ₁ ²⁾	M _A , M _B	p_{St} ³⁾
28, 32	SAE 3/4 in	M22x1,5; 14 deep	M20x1,5; 14 deep ²⁾	G 1/4
45	SAE 3/4 in	M22x1,5; 14 deep	M20x1,5; 14 deep ²⁾	G 1/4
56, 63	SAE 3/4 in	M26x1,5; 16 deep	M26x1,5; 16 deep ²⁾	G 1/4
80, 90	SAE 1 in	M26x1,5; 16 deep	M26x1,5; 16 deep ²⁾	G 1/4
107, 125	SAE 1 1/4 in	M26x1,5; 16 deep	M26x1,5; 16 deep ²⁾	G 1/4
160, 180	SAE 1 1/4 in	M26x1,5; 16 deep	M30x1,5; 16 deep	G 1/4

¹⁾ SAE J518 ²⁾ DIN 3852 ³⁾ DIN ISO 228

Size		D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13 ⁴⁾
28, 32	MHDB.16	209	186	25	63	174	102	87	36	66	50,8	23,8	ø19	M10; 17 deep
45	MHDB.16	222	198	22	60	187	113	98	36	66	50,8	23,8	ø19	M10; 17 deep
56, 63	MHDB.22	250	222	19	57	208	124	105	42	75	50,8	23,8	ø19	M10; 13 deep
80, 90	MHDB.22	271	243,5	17,5	55	229	134	114	42	75	57,2	27,8	ø25	M12; 18 deep
107, 125	MHDB.32	298	267	10	48	251	149,5	130	53	84	66,7	31,8	ø32	M14; 19 deep
160, 180	MHDB.32	332	301	5	43	285	170	149	53	84	66,7	31,8	ø32	M14; 19 deep

⁴⁾ DIN 13, tightening torque see general notes on page 36

Assembly instructions for port plate with pressure sequence range "192":
When fitting the hydraulic line on the p_{St} port, the lock nut must be held in place!

Counterbalance Valve BVD

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Function

Driving/winch counterbalance valves prevent the motor from over-speeding (i.e. -out of control) during overrunning load conditions, which causes motor cavitation in open circuit systems. This overrunning load-induced cavitation occurs in axial piston motors when the motor speed exceeds the speed that would be reached with the available oil flow.

Please note

- BVD counterbalance valve must be specified explicitly in the order. We recommend ordering the counterbalance valve and the motor as a set.
Ordering example: A2FM80/61W-VAB181 + BVD20F27S/41B-V03K16D0400S12
- The counterbalance valve does not replace the mechanical service brake and parking brake.
- Note the detailed information about the BVD counterbalance valve contained in RE 95522!

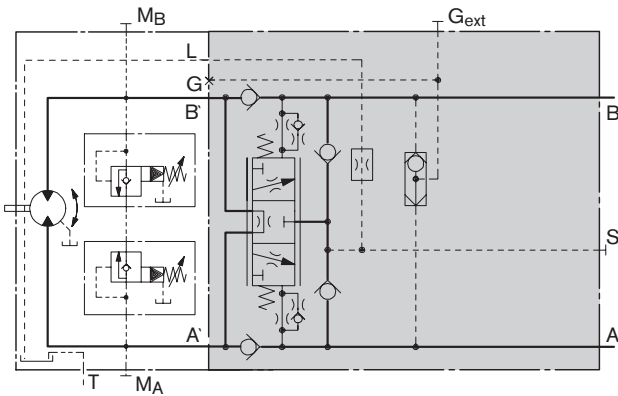
Application example for driving counterbalance valve BVD..F

- Travel drive of wheeled excavators

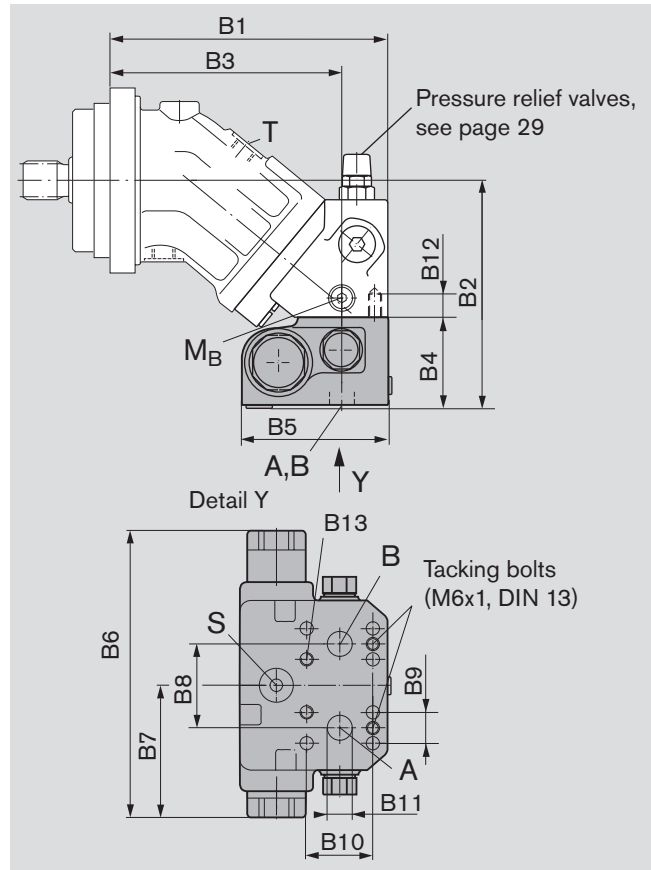
Application example for winch counterbalance valve BVD..W

- Winch drives in cranes
- Track drives in crawler excavator

Circuit diagram driving counterbalance valve BVD..F



Unit dimensions



Ports

- A, B Service line ports SAE J518
- S Boosting (plugged)
- M_A, M_B Measuring ports (plugged)

A2FM Size	Motion control valve Type	A, B ¹⁾	S ²⁾	M _A , M _B ²⁾
28, 32	BVD20..16	SAE 3/4 in	M 22x1,5	M12x1,5
45	BVD20..16	SAE 3/4 in	M 22x1,5	M12x1,5
56, 63	BVD20..17	SAE 3/4 in	M 22x1,5	M12x1,5
80, 90	BVD20..27	SAE 1 in	M 22x1,5	M12x1,5
107, 125	BVD25..38	SAE 1 1/4 in	M 27x2	M12x1,5
160, 180	BVD25..38	SAE 1 1/4 in	M 27x2	M12x1,5
250	on request			

Size		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12 ³⁾	B13 ³⁾
28, 32	BVD20..16	209	180	174	83 ⁴⁾	137	239	98	66	23,8	50,8	∅19	M10; 17 deep	M10; 14 deep
45	BVD20..16	229	191	187	83 ⁴⁾	137	239	98	66	23,8	50,8	∅19	M10; 17 deep	M10; 14 deep
56, 63	BVD20..17	250	192	208	73	137	239	98	75	23,8	50,8	∅19	M10; 17 deep	M10; 14 deep
80, 90	BVD20..27	271	202	229	73	137	239	98	75	27,8	57,2	∅25	M12; 18 deep	M12; 16 deep
107, 125	BVD25..38	298	238	251	90	151,5	292	120,5	84	31,8	66,7	∅32	M14; 19 deep	M14; 19 deep
160, 180	BVD25..38	332	255	285	90	151,5	292	120,5	84	31,8	66,7	∅32	M14; 19 deep	M14; 19 deep

¹⁾ SAE J518 ²⁾ DIN 3852 ³⁾ DIN 13, tightening torque see general notes on page 36 ⁴⁾ with adapting plate

Counterbalance Valve BVD

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

Fastening the counterbalance valve

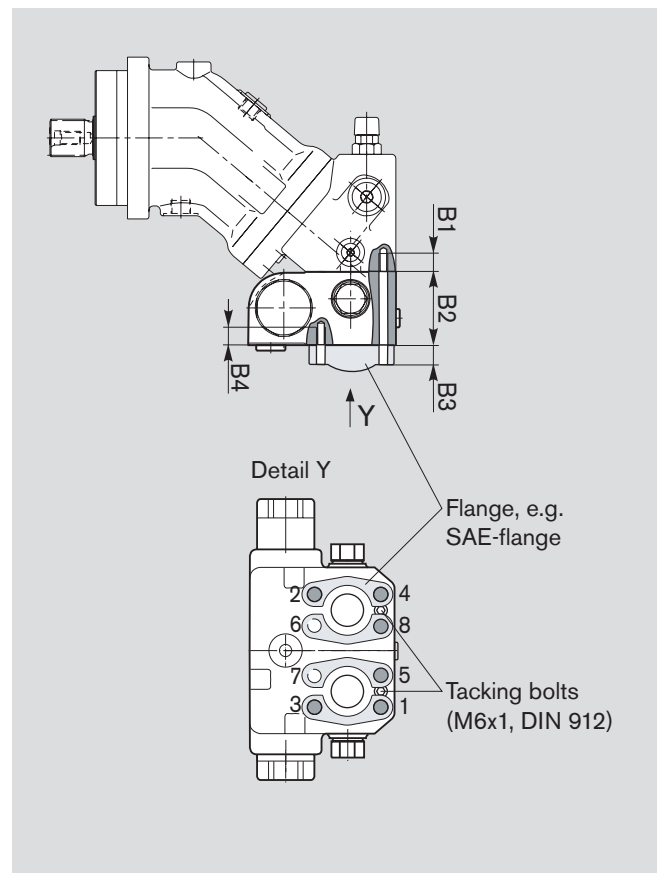
When delivered, the counterbalance valve is fastened to the motor by 2 tacking bolts. Do not remove the tacking bolts when attaching the working lines. If the counterbalance valve and motor are delivered separately, the counterbalance valve must first be fastened to the motor port plate using the tacking bolts provided. In both cases, the final fastening of the counterbalance valve to the motor is done using the threaded connection of the working lines, e.g. using SAE flanges. A total of 6 bolts with thread lengths $B1+B2+B3$ and 2 bolts with thread lengths $B3+B4$ will be required.

When tightening the bolts, it is vital that the sequence (1 to 8) as shown in the diagram is adhered to and carried out in two phases.

In the first phase the bolts should be tightened to 50% of their tightening torque before being tightened to maximum tightening torque in a second phase (see table below).

Thread ¹⁾	Property class	Tightening torque
M10x1,5	10.9	75 Nm
M12x1,75	10.9	130 Nm
M14x2	10.9	205 Nm

¹⁾ fastening screws according to DIN 912



Size	28, 32, 45	56, 63	80, 90	107, 125, 160, 180
Dim. B1 ¹⁾	M10x1,5 17 deep	M10x1,5 17 deep	M12x1,75 18 deep	M14x2 19 deep
Dim. B2	78 ²⁾	68	68	85
Dim. B3	customer-specific (dependent on flange)			
Dim. B4	M10x1,5 15 deep	M10x1,5 15 deep	M12x1,75 16 deep	M14x2 19 deep

Fastening threads according to DIN 13, tightening torque see general notes on page 36

¹⁾ minimum reach required 1 x

²⁾ with adapting plate

Speed Measurement

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

The A2FM...D and A2FM...F ("prepared for speed measurement") versions have teeth on the drive shaft. A sensor installed in the motor counts the teeth on the rotating shaft, and generates a signal in proportion to the speed.

The sensor is fitted to the special port D provided for this purpose. The following versions are available:

Version „D“ (sizes 23-180)

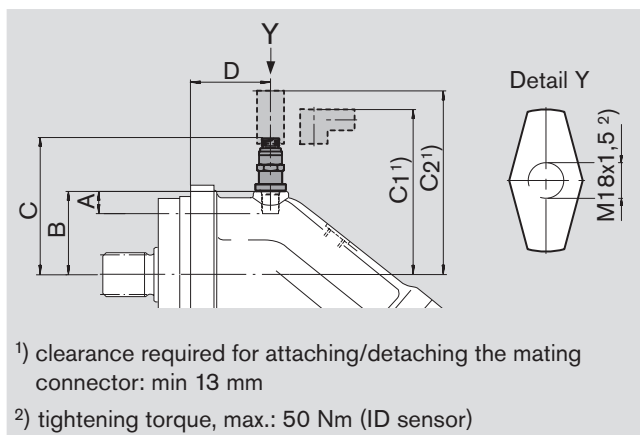
Suitable for fitting of ID inductive speed sensor (see RE 95130). The ID sensor is screwed into port D. The adapter required for the ID inductive speed sensor is supplied with the sensor.

Version „F“ (sizes 23-250)

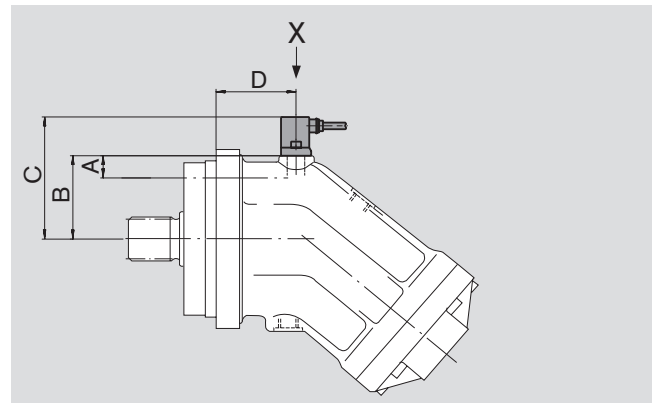
Suitable for fitting of HDD Hall effect speed sensor (see RE 95135). The HDD sensor is flange mounted with two fastening screws. The standard connection is plugged with a compression-proof flange cover.

We recommend ordering the A2FM fixed displacement motor with fitted sensor. The ordering code for the sensor must be specified separately.

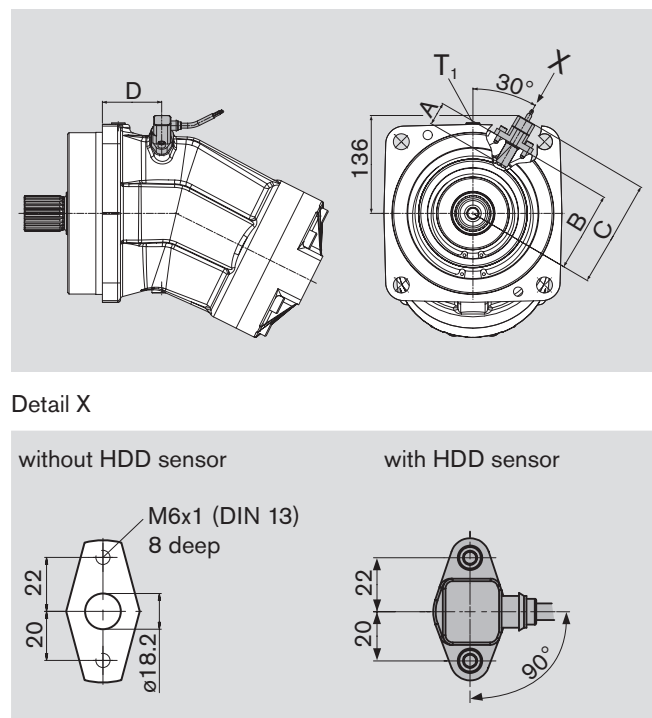
Version „D“ (sizes 23-180): with ID sensor



Version „F“ (sizes 23-200): with HDD sensor



Version „F“ (size 250): with HDD sensor



Size		23,28,32	45	56,63	80, 90	107, 125	160, 180	200	250
Number of teeth		38	45	47	53	59	67	80	78
HDD ³⁾	A Insertion depth (tolerance ± 0,1)	16	16	16	16	16	16	16	32
	B Contact surface	55,5	62,5	67,5	72,5	77,5	85	98,8	110,5
	C	93,8	100,8	105,8	110,8	115,8	123,3	137	149
	D	54,7	54,3	61,5	72,5	76,8	86,8	97,5	82
ID ³⁾	A Insertion depth (tolerance ± 0,1)	9,5	8,5	8,5	8,5	8,5	11	-	-
	B Contact surface	49	55	60	65	70	80	-	-
	C without mating connector	117,2	124,2	129,2	134,2	139,2	146,7	-	-
	C1 with 90° mating connector	150,7	157,7	162,7	167,5	172,5	180,2	-	-
	C2 with 180° mating connector	173,2	179,2	184,2	189,2	194,2	201,7	-	-
D	54,7	54,3	61,5	72,5	76,8	86,8	-	-	

³⁾ suitable speed sensor: sizes 23-200: HDD.L16../20 (see RE 95135) resp. IDR18/20-L250 (see RE 95130) size 250: HDD.L32../20 (see RE 95135)

Installation and Commissioning Notes

General

The motor case must be completely filled up with hydraulic fluid during startup and during operation (filling the case chamber). The motor must be started up at low speed and no load until the system has been bled completely.

If stopped for an extended period, fluid may drain out of the case through the service lines. When restarting, make sure that the case contains sufficient fluid.

The leakage fluid inside the case chamber must be drained off to the tank through the highest case drain port.

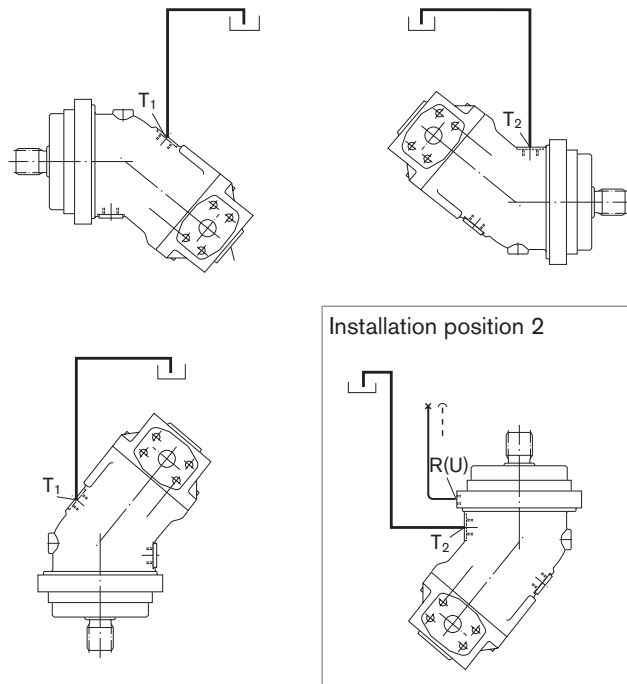
Installation position

Optional. At size 10 ... 200 with installation position "shaft to the top" use motor with bleeding port R (indicate in clear when ordering; the port U in the bearing section for bleeding is included in production with sizes 250 ... 1000).

Installation below the tank

Motor below min. fluid level in the tank (standard)

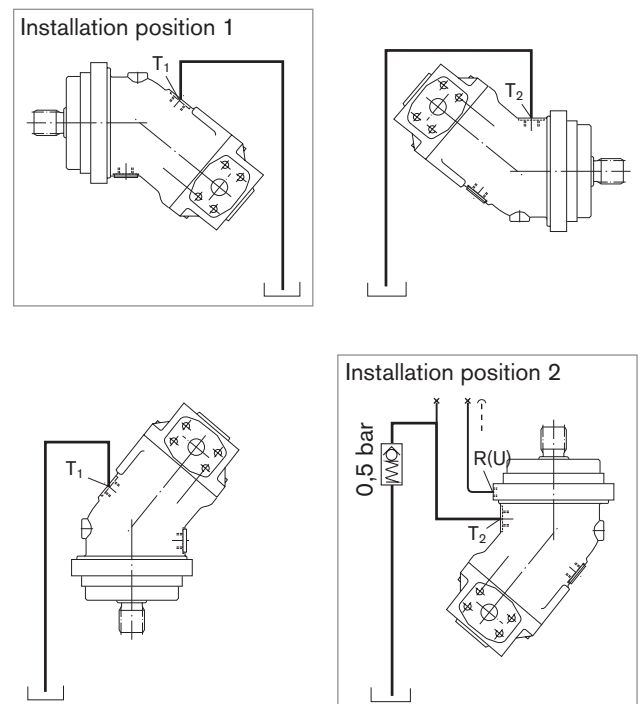
- Fill axial piston motor before startup via the highest case drain port
- Run the motor at low speed until the system is bled completely (bleed through service line port A, B if tubing is long)
- Minimum immersion depth of leakage line in tank: 200 mm (relative to the min. fluid level in the tank).
- Additional measures required for installation position 2 (shaft facing up): with installation position 2, make sure that the motor case is completely full before starting up. Bleed at port R (sizes 10...200) resp. U (sizes 250...1000). Order port R in clear text. An air pocket in the bearing area is leading to damage of the axial piston motor.



Installation above the tank

Motor above min. fluid level in tank

- Proceed in same way as below the tank installation
- Additional measures for installation positions 1 and 2:
If stopped for an extended period, fluid may drain out of the case chamber through the service lines (air enters through the shaft seal). The bearings will therefore not be properly lubricated when the motor is started up again. Fill the axial piston motor before restarting via the highest case drain port. Installation position 2: bleed at port R (sizes 10...200) resp. U (sizes 250...1000). Order port R in clear text.
- Additional measures required for installation position 2 (shaft facing up):
In this installation position the bearings will not be properly lubricated, even if there is still some fluid in the case chamber. Putting a non-return valve (opening pressure 0,5 bar) in the leakage line can prevent the system emptying through the line.



Notes

Notes

General Notes

- The A2FM motor is designed to be used in open and closed circuits.
- Project planning, assembly, and startup of the motor require the involvement of trained personnel.
- The working and functional ports are only designed to accommodate hydraulic piping.
- Tightening torques:
 - The tightening torques specified in this data sheet are maximum values and may not be exceeded (maximum value for screw thread). Manufacturer specifications for the max. permissible tightening torques of the used fittings must be observed!
 - For DIN 13 fastening screws we recommend checking the tightening torque individually according to VDI 2230 Edition 2003.
- The housing temperature rises during and shortly after operation. Take suitable safety precautions (e.g. wear protective clothing).
- The data and information contained herein must be adhered to.

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