

**MANNESMANN  
REXROTH****Fixed Displacement Motor A2FM**Series 6, for use in open and closed circuits  
Axial tapered piston - bent axis design**RE  
91001/01.97**

replaces 11.95

Brueninghaus Hydromatik

Sizes 5...1000

Nom. Pressure up to 400 bar Peak Pressure up to 450 bar



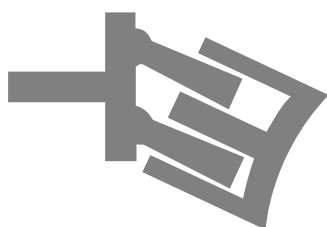
The fixed displacement motor A2FM of axial piston, bent axis design is made suitable for hydrostatic drives in open and closed circuits.

Output speed is proportional to input flow and inversely proportional to displacement. Drive torque increases with the pressure drop across the unit.

The motor is suitable for use in mobile and industrial applications.

Careful selection of the displacements offered, permit sizes to be matched to practically every application.

- Favourable power / weight ratio
- Compact and economic design
- Optimum efficiency
- One piece pistons with piston rings
- Patented cylinder block drive system



## Fixed Displacement Motor A2FM

**Ordering Code / Standard Program**

(Ordering code size 5 see page 8)

**Hydraulic fluid**

Mineral oil (no code)	
HF-fluids	sizes 10...200 (no code)
	sizes 250...1000 (only in connection with drive shaft bearings "L")
	<b>E-</b>

**Axial piston unit**

Bent axis design, fixed displacement	<b>A2F</b>
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**Drive shaft bearings**

	10...200	250...500	710...1000	
Mechanical bearings (no code)	●	●	—	
Long-Life bearings	—	●	●	<b>L</b>

**Mode of operation**

Motor (Plug-in motor A2FE see RE 91008)	<b>M</b>
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**Size**

$\geq$ Displacement $V_g$ (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 plant Elchingen; Sizes 250...1000: production plant Horb

**Series**

	<b>6</b>
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**Index**

	sizes 10...180	<b>1</b>
	size 200	<b>3</b>
	sizes 250...1000	<b>0</b>

**Direction of rotation**

viewed on shaft end	alternating	<b>W</b>
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**Seals**

	10...200	250...1000	
NBR (nitril-caoutchouc)	●	—	<b>P</b>
NBR (nitril-caoutchouc), shaft seal in FPM	●	—	<b>N</b>
FPM (fluor-caoutchouc)	●	●	<b>V</b>

**Shaft end**


	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 key, DIN 6885	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●	●	—	—	—	—	—	<b>B</b>
	●	●	—	●	●	—	●	●	—	●	—	●	—	●	—	—	●	●	●	●	●	<b>P</b>

**Mounting flange**

	10...250	355...1000	
ISO 4-hole	●	—	<b>B</b>
ISO 8-hole	—	●	<b>H</b>

● = available

— = not available

 = preferred program  
 (preferred types see page 22)

Fixed Displacement Motor A2FM

A2F M / 6 W -

Hydraulic fluid

Axial piston unit

Drive shaft bearings

Mode of operation

Size

Series

Index

Direction of rotation

Seals

Shaft end

Mounting flange

Service line connections <sup>1)</sup>

		10	12	16	23	28	32	45	56	63	80	90	107	125	160	180	200	250	355	500	710	1000		
Ports A and B SAE, at rear end	01 0	—	—	—	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	010
	6	—	—	—	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	—	016
Ports A and B SAE at side, opposite side	02 0	—	—	—	●	●	●	●	●	●	●	●	●	●	●	●	—	●	—	—	—	—	—	020
	6	—	—	—	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	—	026
	7	—	—	—	—	—	—	●	●	●	●	●	●	●	●	●	—	●	—	—	—	—	—	027
Ports A and B threads, at side, opposite side	03 0	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	030	
	6	—	—	—	●	●	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	036	
Ports A and B threads, at side and rear end	04 0	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	040	
	6	—	—	—	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	—	—	046	
Ports A and B SAE at side, same side	10 0	—	—	—	—	●	●	●	●	●	●	●	●	●	●	●	—	—	—	—	—	—	100	
	6	—	—	—	—	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	106	
port plate with integrated pressure relief valves	19 1	—	—	—	—	●	●	●	●	●	●	●	●	●	●	●	—	—	—	—	—	—	191	
	2	—	—	—	—	●	●	●	●	●	●	●	●	●	●	●	—	—	—	—	—	—	192	

Valves

without valves (no code)	0
with pressure relief valves ( <i>without</i> pressure sequence range)	1
with pressure relief valves ( <i>with</i> pressure sequence range)	2
with integrated flushing valve	6
with built-on flushing and boost valve	7

Speed sensing control

	10...16	23...180	200...1000	
without speed sensing control (no code)	●	●	●	
prepared for speed sensing control	—	●	—	D

<sup>1)</sup> Threads of fixing screws and service lines are metric

## Technical Data

### Fluid

We request that before starting a project detailed information about the choice of pressure fluids and application conditions are taken from our catalogue sheets RE 90220 (mineral oil), RE 90221 (environmentally acceptable hydraulic fluids) and RE 90223 (fire resistance fluids, HF).

When using HF- 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 loop temperature (closed circuit) or 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  $t_{max} = 115^\circ\text{C}$

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

sizes 250...1000

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

short term at a max. permissible leakage oil temp. of  $t_{max} = 90^\circ\text{C}$

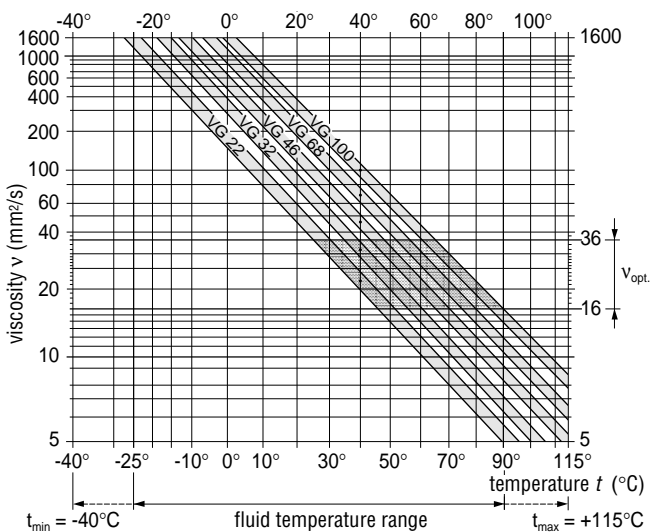
$$v_{max} = 1000 \text{ mm}^2/\text{s},$$

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 loop (closed circuit) or the tank temperature (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 (closed circuit: loop temperature; open circuit: tank 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 motor speed and is always higher than the circuit or 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 purity grade 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 purity grade of:

9 to NAS 1638

6 to SAE

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 class

8 to NAS 1638

5 to SAE

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

A to B

B to A

### Speed range

There is no limitation on minimum speed  $n_{min}$ . If uniformity of rotation is required, however, speed  $n_{min}$  should not be allowed to fall below 50 rpm.

See table on page 6 for max. permissible speeds.

### Installation position

Any installation position possible. The motor housing must be filled with fluid prior the commissioning, and must remain full whenever it is operating.

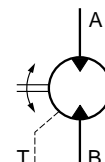
For extensive information on installation position, please consult our data sheet RE 90270 before completing your design work.

### Symbol

#### Connections

A, B Service line ports

T Drain port



## Technical Data

### Case drain pressure

The lower the speed and the case drain pressure the higher the life expectation of the shaft seal ring.

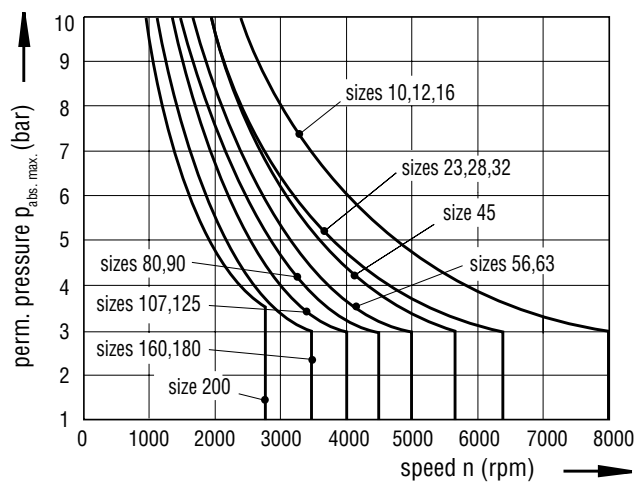
### Shaft seal ring FPM (fluor-caoutchouc)

The values shown in the diagram are permissible loads of the seal ring and shall not be exceeded.

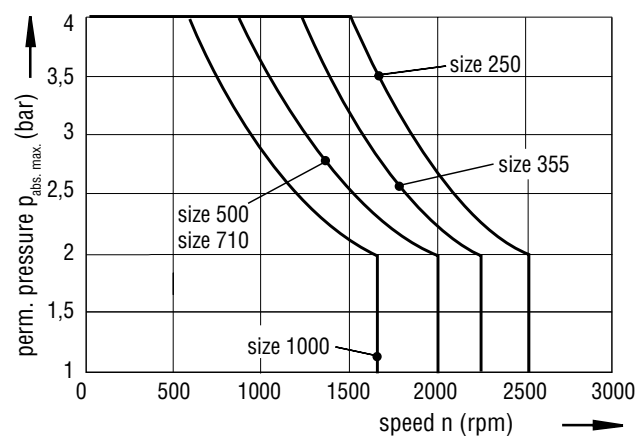
At stationary pressure loads in the range of the max. admissible leakage pressure a reduction of the life experience of the seal ring will result.

For a short period ( $t < 5$  min.) are for the sizes 10...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)

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 FPM.

Special operation conditions may require limitations of these values.

### Note:

- maximum permissible motor speeds are given in the table on page 6
- max. perm. housing 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.

### Flushing valve

In order to prevent excessive heat build-up in closed circuit operation, it is possible to fit a flushing valve (built into the port plate). Two such valves are available:

- an Integrated flushing valve (built into the port plate) (sizes 23...90)
- a built-on flushing and boost pressure relief valve (sizes 45...180, 250)

### Integrated flushing valve (6)

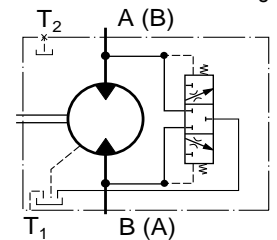
- switching pressure  $\Delta p \geq 8$  bar (this value is lower than the starting pressure of an unloaded motor).

- closed in centre position ( $\Delta p < 8$  bar).

Sizes	23-32	45-63	80-90
Flushing-volume L/min	2,5	3,1	4,1

(values given for low pressure

$\Delta p = 25$  bar)



### Built-on flushing and boost pressure relief valve (7)

This valve is built on to the fixed displacement motor. It must then be noted that only a port plate with ports at side is then available (port plate 02).

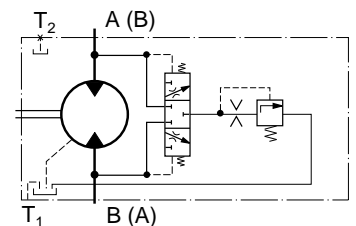
The flushing and boost pressure relief valve has a fixed setting of 16 bar (the setting of the primary boost pressure relief valve must be noted) and is used to safeguard the minimum boost pressure. A fixed flow of fluid is taken via an orifice from the low pressure side of the circuit and fed into the motor housing. This flow is then passed back to tank with the case drain fluid. Fluid thus removed from the closed circuit must be made up by means of the boost pump.

Different orifice sizes may be used to select varying flows of flushing fluid.

### Flows (at low pressure $\Delta p = 25$ bar) \*

Size	Flow	Orifice No.
45, 56, 63	3,5 L/min	651766/503.12.01.01
80, 90	5 L/min	419695/503.12.01.01
107, 125	8 L/min	419696/503.12.01.01
160, 180	10 L/min	419697/503.12.01.01
250	10 L/min	

\* Standard flushing volumes (for sizes 45...180 flushing volumes of 3,5 - 10 L/min can be supplied. If a flushing volume different from the standard flushing volume is required, please indicate the requested orifice in clear text when ordering).



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

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

The outer dimensions of the axial piston motors 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.

### Bearing flushing

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

## Fixed Displacement Motor A2FM

## Technical Data

### Working pressure range

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	Shaft end A	Shaft end Z, B, P
Nominal pressure $p_N$	400 bar	350 bar *)
Peak pressure $p_{max}$	450 bar	400 bar

\*) 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 (please contact us).

### 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).

The sum of the pressures at ports A and B may not exceed 700 bar (630 bar, A2F 5).

### Speed sensor (D) (sizes 23...180)

Version A2FM...D ("suitable for fitting speed sensor") includes gearing on the rotary group and in addition the port M in which a speed sensor is screwed in.

A speed-proportional signal is produced by means of the rotating, splined rotary group which can be picked up by a suitable sensor and fed back for evaluation.

The speed sensor can be screwed into port M (thread M18x1,5).

Sizes	23...32	45	56...63	80...90	107...125	160...180
No. of teeth	38	45	47	53	59	67
length of thread (mm)	12,7	11,2	14,7	14,7	14,7	14,7

The speed sensor is not included in standard supply.

Suitable sensors (order separately):

- Inductive impulse detector ID (see RE 95038)
- Hall effect speed sensor HD (see RE 95042)

**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	16	22,9	28,1	32	45,6	56,1	63	80,4
Max. speed	$n_{max}$	rpm	10 000	8000	8000	8000	6300	6300	6300	5600	5000	5000	4500
	$n_{max\ intermittent}^{1)}$	rpm	11 000	8800	8800	8800	6900	6900	6900	6200	5500	5500	5000
Max. flow	$q_{V\ max}$	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	$\Delta p = 350$ bar	$T$	Nm	24,7 <sup>2)</sup>	57	67	88	126	156	178	254	312	445
	$\Delta p = 400$ bar	$T$	Nm	–	65	76	100	144	178	204	290	356	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	$n_{max}$	rpm	4500	4000	4000	3600	3600	2750	2500	2240	2000	1600	1600
	$n_{max\ intermittent}^{1)}$	rpm	5000	4400	4400	4000	4000	3000	–	–	–	–	–
Max. flow	$q_{V\ max}$	L/min	405	427	500	577	648	550	625	795	1000	1136	1600
Torque constants	$T_K$	Nm/bar	1,43	1,70	1,99	2,54	2,86	3,18	3,98	5,64	7,95	11,3	15,9
Torque at	$\Delta p = 350$ bar	$T$	Nm	501	595	697	889	1001	1114	1391	1979	2785	3955
	$\Delta p = 400$ bar	$T$	Nm	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> Intermittent max. speed: overspeed at discharge and overtaking travel operations,  $t < 5$  sec. and  $\Delta p < 150$  bar

<sup>2)</sup>  $\Delta p = 350$  bar

## Fixed Displacement Motor A2FM

## 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

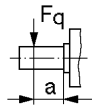
Size		90	107	125	160	180	200	250	355	500	710	1000	
a	mm	20	20	20	25	25	25	41	52,5	52,5	67,5	67,5	
$F_{q \max}$	N	12900	13600	15900	18400	20600	22900	1200 <sup>1)</sup>	1500 <sup>1)</sup>	1900 <sup>1)</sup>	3000 <sup>1)</sup>	2600 <sup>1)</sup>	
$\pm F_{ax \max}$	N	$+F_{ax \max}$	1000	1250	1250	1600	1600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

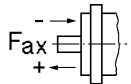
### Code explanation

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 operating 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)



### Calculation of size

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

Output speed  $n = \frac{q_v \cdot 1000 \cdot \eta_v}{V_g}$  in rpm

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

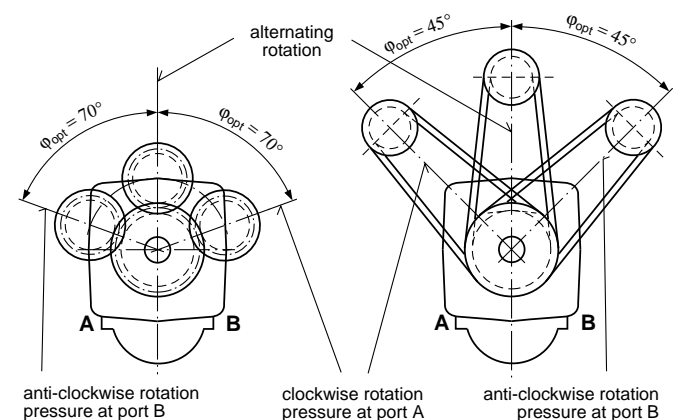
$T = T_K \cdot \Delta p \cdot \eta_{mh}$  in Nm

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

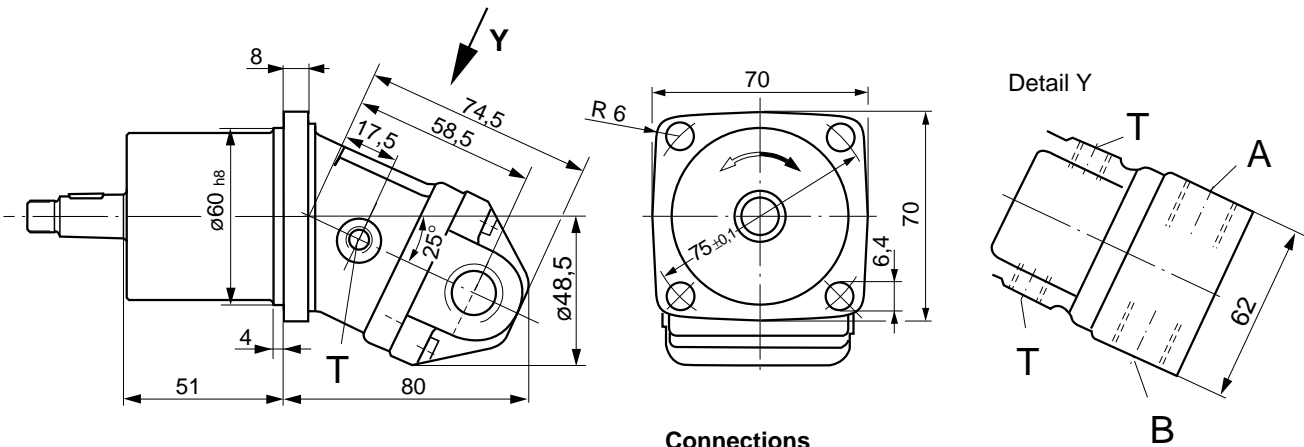
$V_g$  = geometric displacement per rev. in cm<sup>3</sup>  
 $T$  = torque in Nm  
 $\Delta p$  = pressure differential in bar  
 $n$  = speed in rpm  
 $T_K$  = torque constants in Nm/bar  
 $\eta_v$  = volumetric efficiency  
 $\eta_{mh}$  = mech.-hyd. efficiency  
 $\eta_t$  = overall efficiency

### 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.



**Unit Dimensions, Size 5**

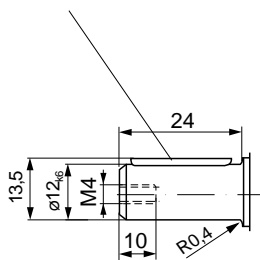


**Connections**

- A, B Service line ports M 18x1,5
- T Drain port M 10x1, both sides

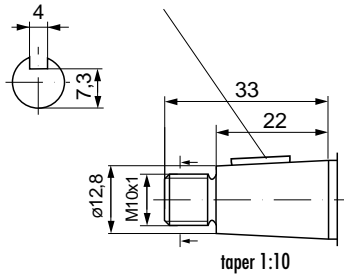
**Shaft ends**

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



Nominal pressure  $p_N = 210$  bar

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



Nominal pressure  $p_N = 315$  bar

**Ordering Code / Standard Program**

Size 5

A2F	5	W	6.0		3
-----	---	---	-----	--	---

Additional instructions in text form

**Axial piston unit**

Bent axis design, fixed displacement **A2F**

**Size**

Displacement  $V_g$  (cm<sup>3</sup>) **5**

**Direction of rotation**

viewed on shaft end alternating **W**

**Series**

**6.0**

**Shaft end**

Parallel shaft with key DIN 6885	<b>B</b>
Tapered shaft with spigot and spring washer DIN 6888	<b>C</b>

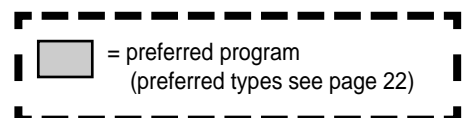
**Service line connections**

Threads at side, metric **3**

**Seals**

The fixed motor A2F5 is equipped with NBR (Nitril-caoutchouc) seals in standard design. In case of need FPM- (fluor-caoutchouc) seals please indicate when ordering in clear text:

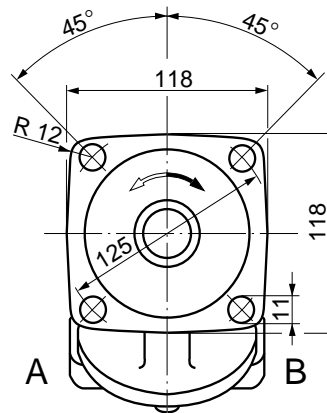
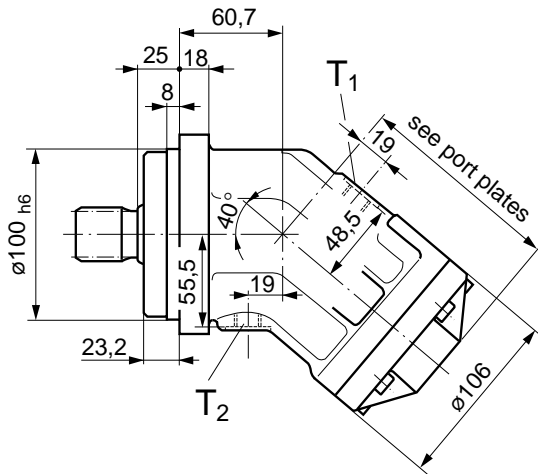
"with FPM-seals"







**Unit Dimensions, Sizes 23, 28, 32**



**Connections**

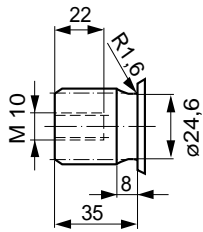
A, B Service line ports (see port plates)  
 T<sub>1</sub>, T<sub>2</sub> Drain ports (1 port plugged)

M 16x1,5

**Shaft ends**

**Sizes 23, 28, 32**

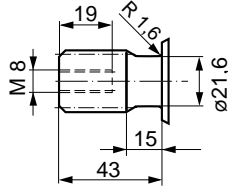
**A** Splined shaft  
 W 30x2x30x14x9g  
 DIN 5480



Nominal pressure  
 $p_N = 400 \text{ bar}$

**Sizes 23, 28**

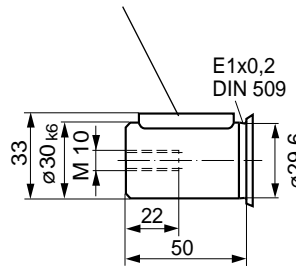
**Z** Splined shaft  
 W 25x1,25x30x18x9g  
 DIN 5480



Nominal pressure  
 $p_N = 350 \text{ bar}$

**Sizes 23, 28, 32**

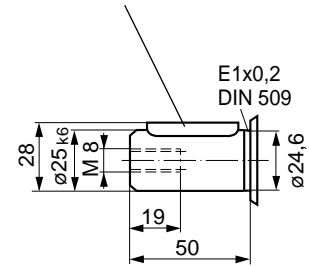
**B** Parallel shaft with  
 key AS 8x7x40  
 DIN 6885



Nominal pressure  
 $p_N = 350 \text{ bar}$

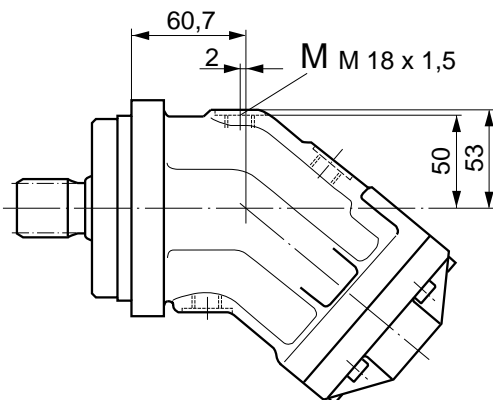
**Sizes 23, 28**

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



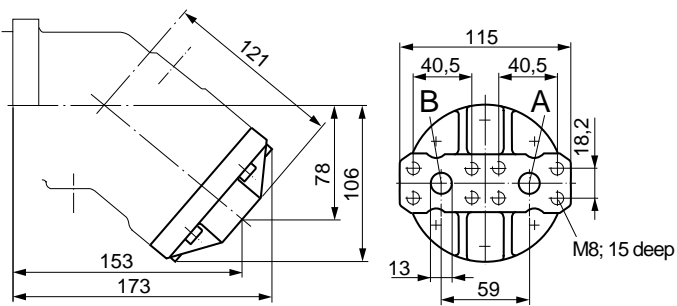
Nominal pressure  
 $p_N = 350 \text{ bar}$

**prepared for speed sensing control (D), with port M**  
 (inductive impulse detector ID see RE 95038  
 hall effect speed sensor HD see RE 95042,  
 to be ordered separately!)



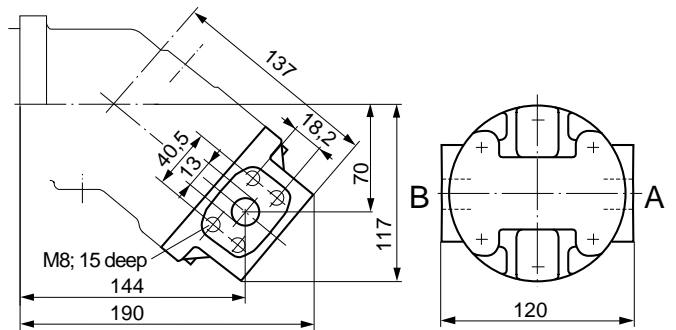
**Sizes 23, 28, 32 Port plates**

**01**



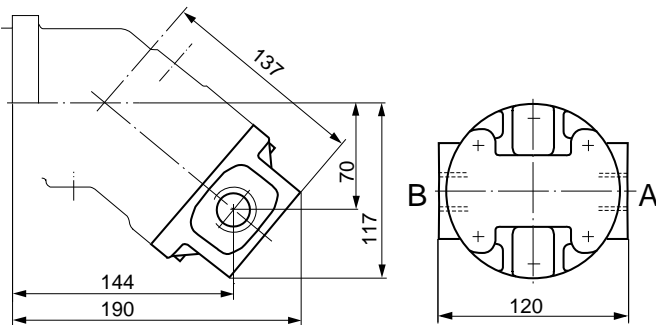
A, B Service line ports SAE 1/2"  
420 bar (6000 psi) high pressure series

**02**



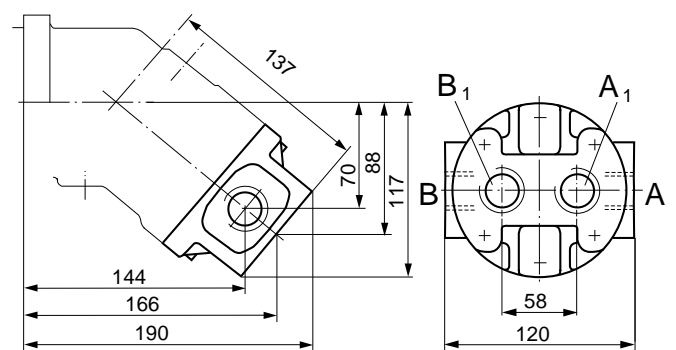
A, B Service line ports SAE 1/2"  
420 bar (6000 psi) high pressure series

**03**



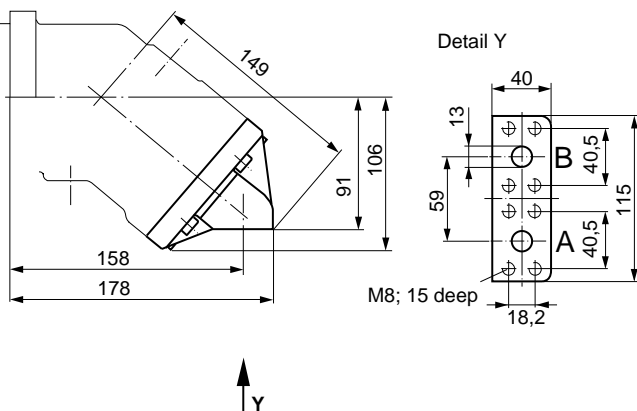
A, B Service line ports M 27x2

**04**



A, B, A<sub>1</sub>, B<sub>1</sub> Service line ports M 27x2

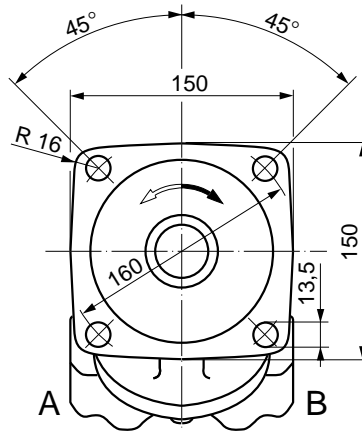
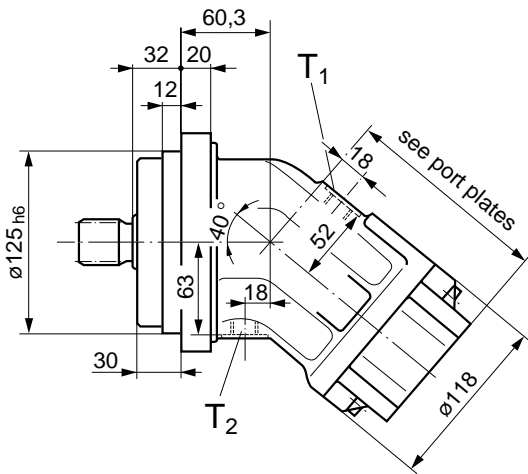
**10**



A, B Service line ports SAE 1/2"  
420 bar (6000 psi) high pressure series

**19 (see page 28)**

**Unit Dimensions, Size 45**



**Connections**

A, B Service line ports (see port plates)  
 T<sub>1</sub>, T<sub>2</sub> Drain ports (1 port plugged)

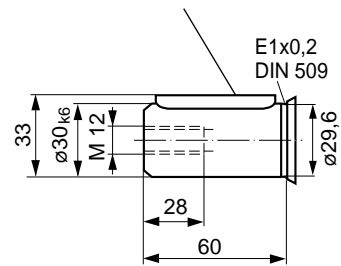
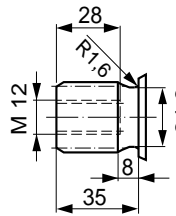
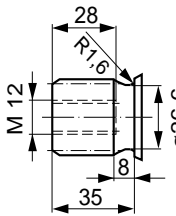
M 18x1,5

**Shaft ends**

**A** Splined shaft  
 W 32x2x30x14x9g  
 DIN 5480

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

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

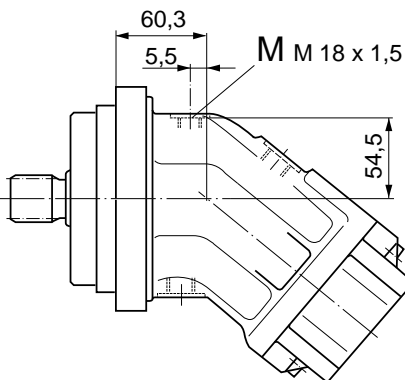


Nominal pressure  
 p<sub>N</sub> = 400 bar

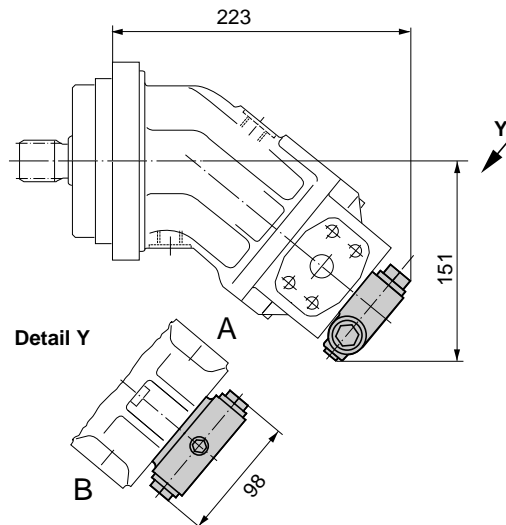
Nominal pressure  
 p<sub>N</sub> = 350 bar

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

**prepared for speed sensing control (D)**, with port M  
 (inductive impulse detector ID see RE 95038  
 hall effect speed sensor HD see RE 95042,  
 to be ordered separately!)

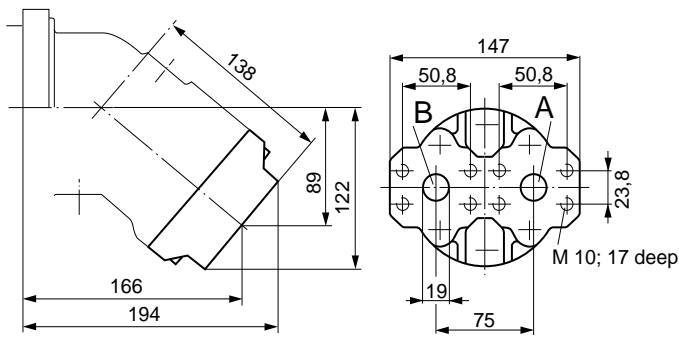


**with built-on flushing and boost valve (7)**



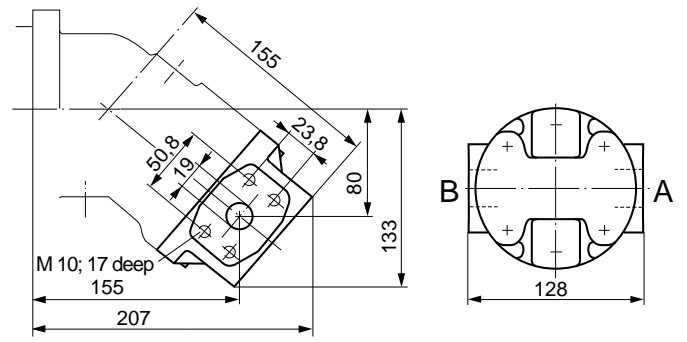
**Size 45 Port plates**

**01**



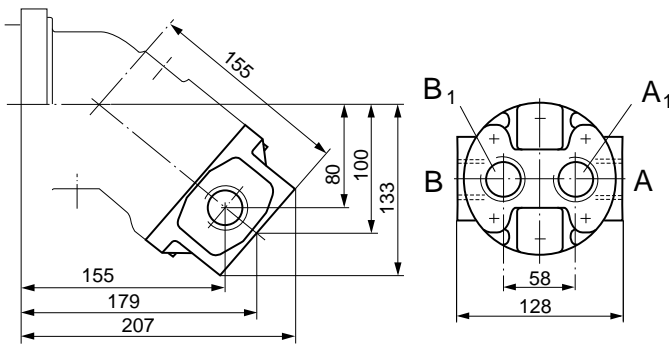
A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 3/4"

**02**



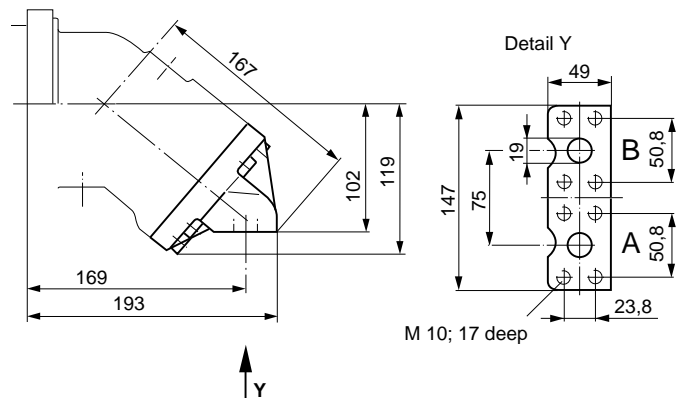
A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 3/4"

**04**



A, B, A<sub>1</sub>, B<sub>1</sub> Service line ports  
M 33x2

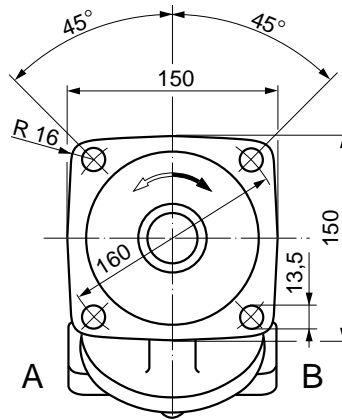
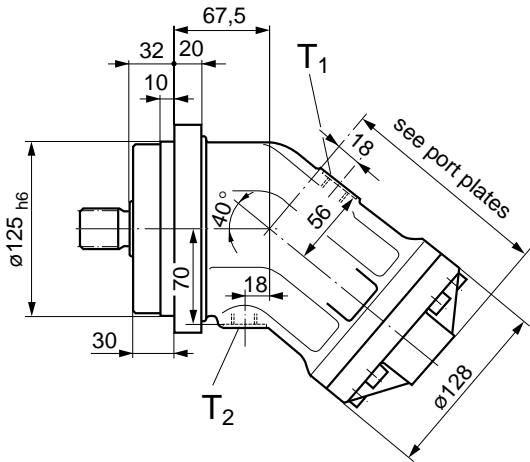
**10**



A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 3/4"

**19** (see page 28)

**Unit Dimensions, Sizes 56, 63**



**Connections**

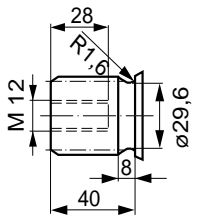
A, B Service line ports (see port plates)  
 T<sub>1</sub>, T<sub>2</sub> Drain ports (1 port plugged)

M 18x1,5

**Shaft ends**

**Sizes 56, 63**

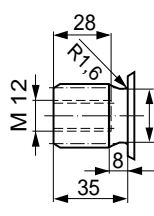
**A** Splined shaft  
 W 35x2x30x16x9g  
 DIN 5480



Nominal pressure  
 $p_N = 400 \text{ bar}$

**Size 56**

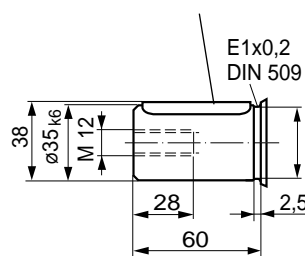
**Z** Splined shaft  
 W 30x2x30x14x9g  
 DIN 5480



Nominal pressure  
 $p_N = 350 \text{ bar}$

**Sizes 56, 63**

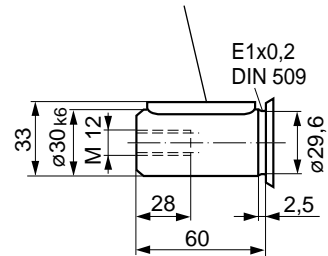
**B** Parallel shaft with  
 key AS 10x8x50  
 DIN 6885



Nominal pressure  
 $p_N = 350 \text{ bar}$

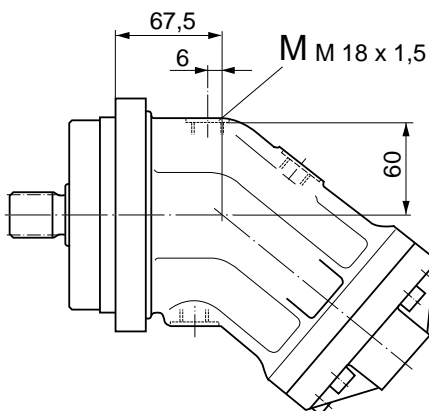
**Size 56**

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

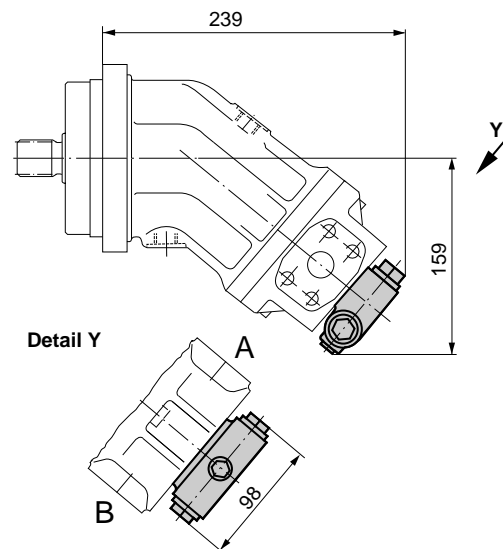


Nominal pressure  
 $p_N = 350 \text{ bar}$

prepared for speed sensing control (D), with port M  
 (inductive impulse detector ID see RE 95038  
 hall effect speed sensor HD see RE 95042,  
 to be ordered separately!)

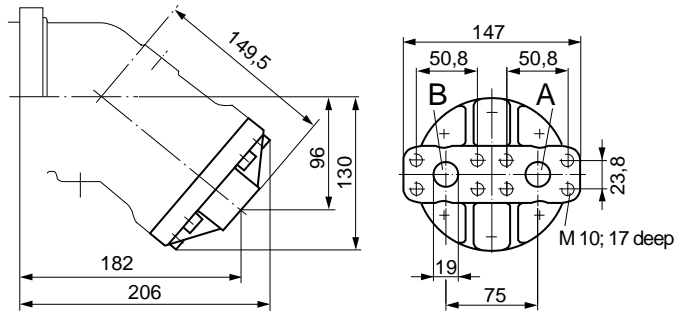


with built-on flushing and boost valve (7)



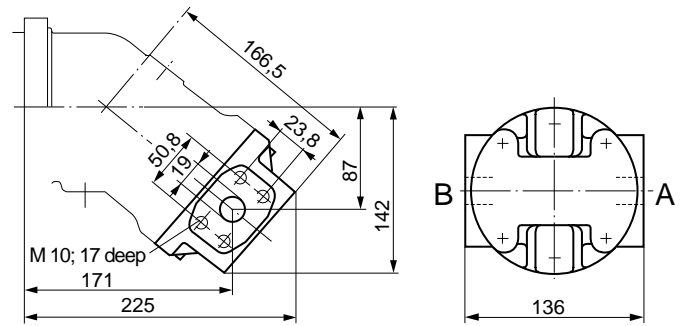
**Sizes 56, 63 Port plates**

**01**



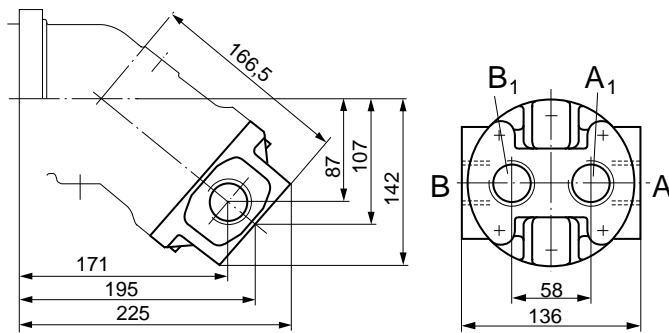
A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 3/4"

**02**



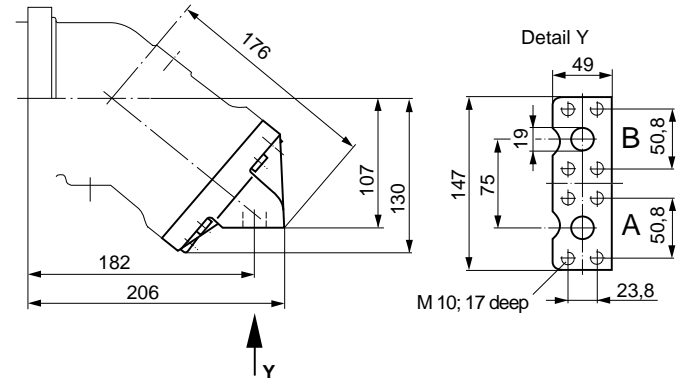
A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 3/4"

**04**



A, B, A<sub>1</sub>, B<sub>1</sub> Service line ports  
M 33x2

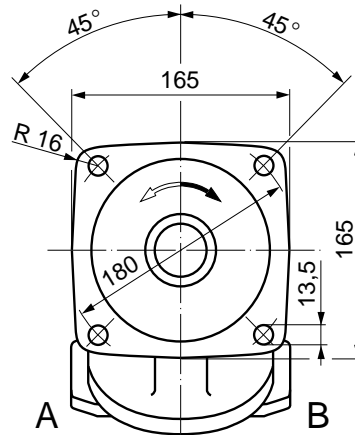
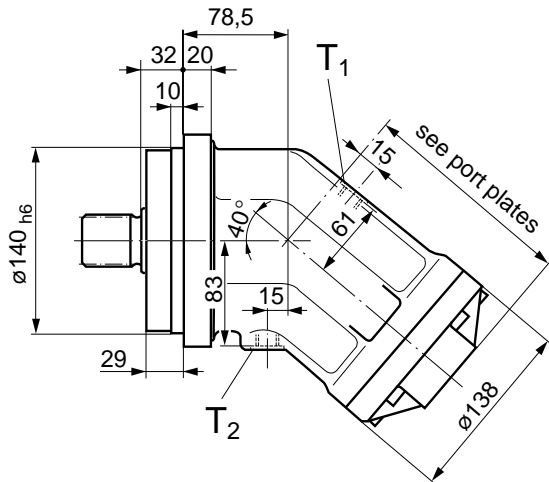
**10**



A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 3/4"

**19** (see page 28)

**Unit Dimensions, Sizes 80, 90**



**Connections**

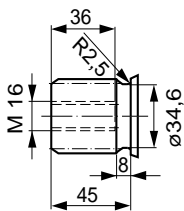
A, B Service line ports (see port plates)  
 T<sub>1</sub>, T<sub>2</sub> Drain ports (1 port plugged)

M 18x1,5

**Shaft ends**

**Sizes 80, 90**

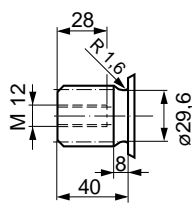
**A** Splined shaft  
 W 40x2x30x18x9g  
 DIN 5480



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

**Size 80**

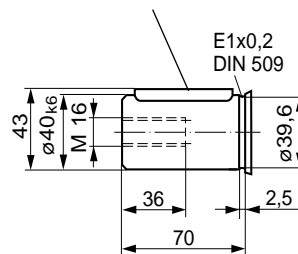
**Z** Splined shaft  
 W 35x2x30x16x9g  
 DIN 5480



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

**Sizes 80, 90**

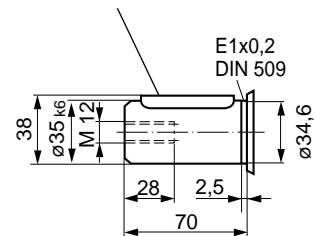
**B** Parallel shaft with  
 key AS 12x8x56  
 DIN 6885



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

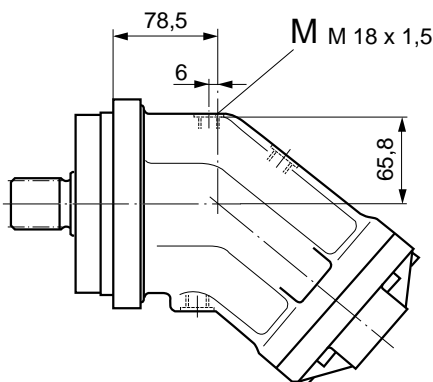
**Size 80**

**P** Parallel shaft with  
 key AS 10x8x56  
 DIN 6885

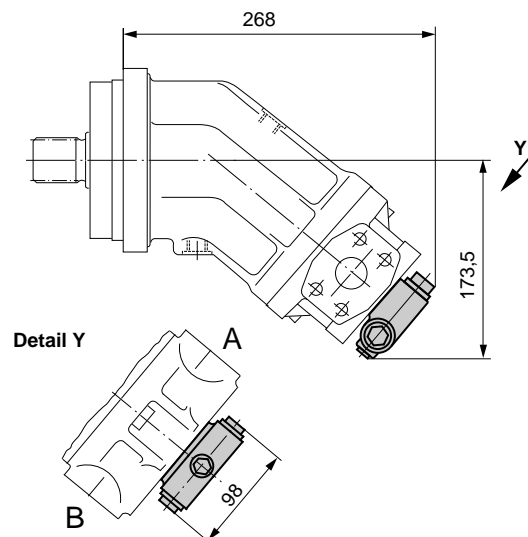


Nominal pressure  
 p<sub>N</sub> = 350 bar

prepared for speed sensing control (D), with port M  
 (inductive impulse detector ID see RE 95038  
 hall effect speed sensor HD see RE 95042,  
 to be ordered separately!)



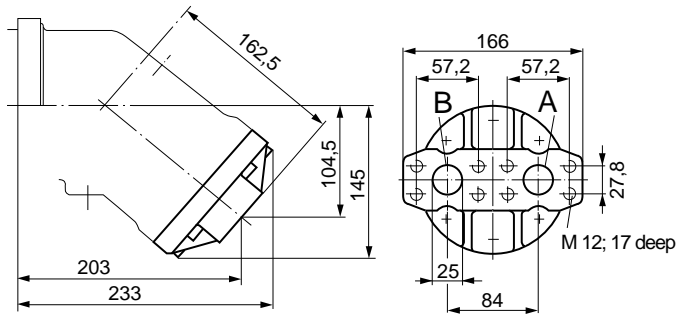
**with built-on flushing and boost valve (7)**





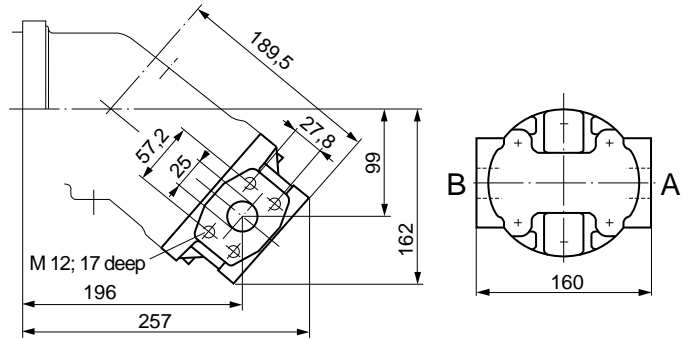
**Sizes 80, 90 Port plates**

**01**



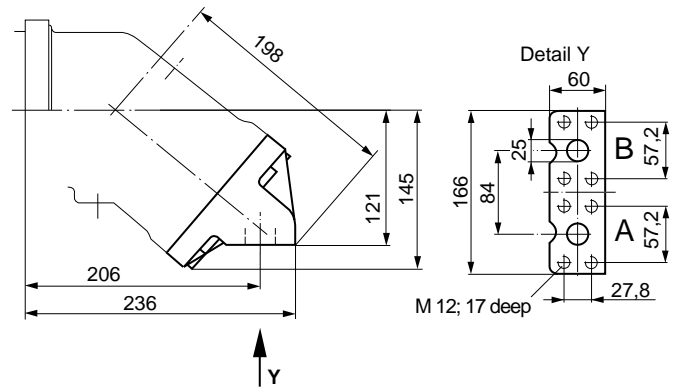
A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 1"

**02**



A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 1"

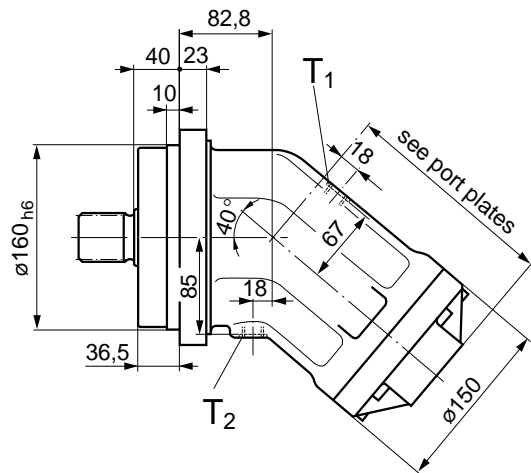
**10**



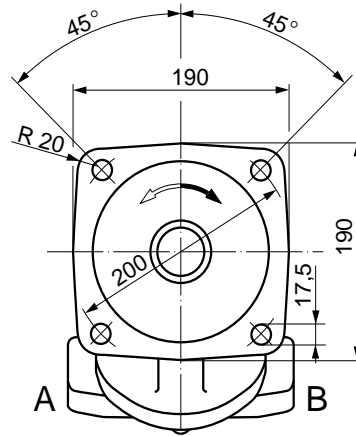
A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 1"

**19** (see page 28)

**Unit Dimensions, Sizes 107, 125**



**Dimensions brackets for size 107**



**Connections**

A, B Service line ports (see port plates)

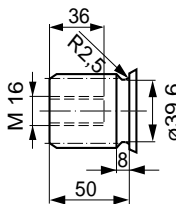
T<sub>1</sub>, T<sub>2</sub> Drain ports (1 port plugged)

M 18x1,5

**Shaft ends**

**Sizes 107, 125**

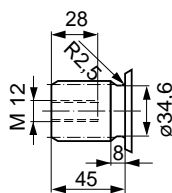
**A** Splined shaft  
W 45x2x30x21x9g  
DIN 5480



Nominal pressure  
 $p_N = 400 \text{ bar}$

**Size 107**

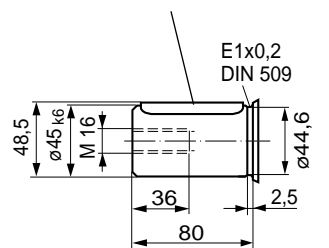
**Z** Splined shaft  
W 40x2x30x18x9g  
DIN 5480



Nominal pressure  
 $p_N = 350 \text{ bar}$

**Sizes 107, 125**

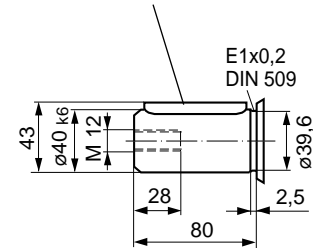
**B** Parallel shaft with  
key AS 14x9x63  
DIN 6885



Nominal pressure  
 $p_N = 350 \text{ bar}$

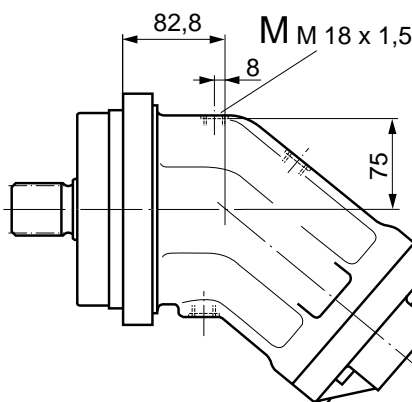
**Size 107**

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

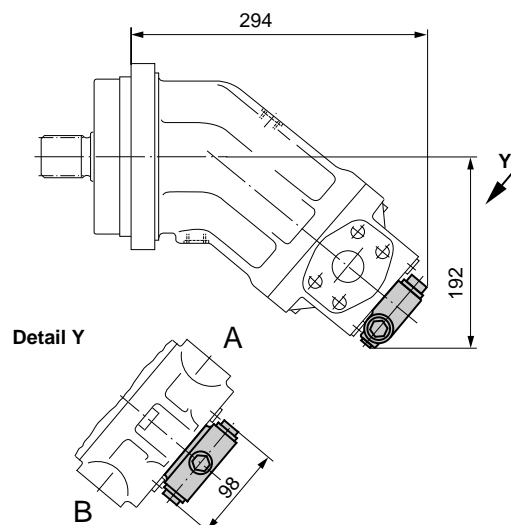


Nominal pressure  
 $p_N = 350 \text{ bar}$

**prepared for speed sensing control (D)**, with port M  
(inductive impulse detector ID see RE 95038  
hall effect speed sensor HD see RE 95042,  
to be ordered separately!)

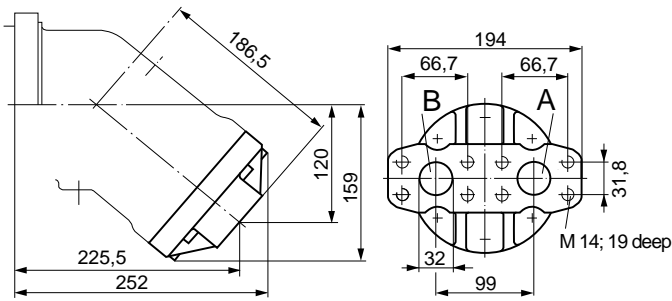


**with built-on flushing and boost valve (7)**



**Sizes 107, 125 Port plates**

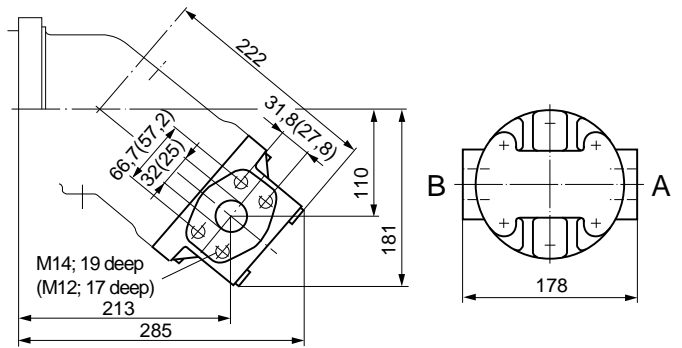
**01**



A, B Service line ports  
420 bar (6000 psi) high pressure series SAE 1 1/4"

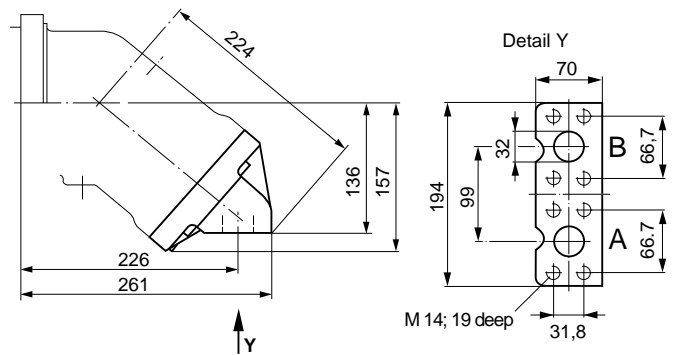
**Dimensions brackets for size 107**

**02**



A, B Service line ports  
420 bar (6000 psi) high pressure series SAE 1 1/4" (SAE 1")

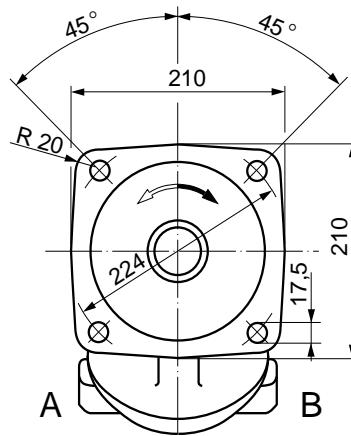
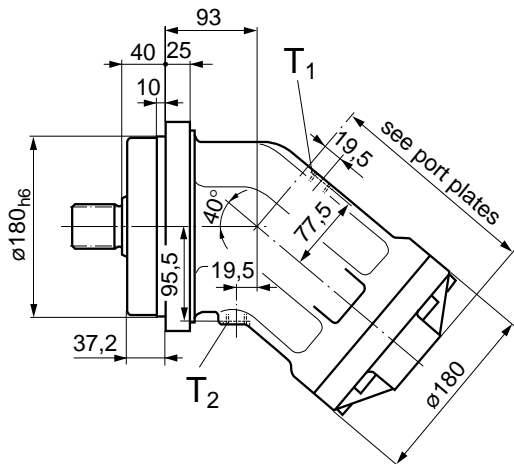
**10**



A, B Service line ports  
420 bar (6000 psi) high pressure series SAE 1 1/4"

**19** (see page 28)

**Unit Dimensions, Sizes 160, 180**



**Connections**

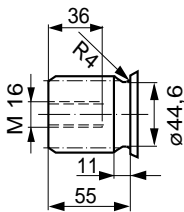
A, B Service line ports (see port plates)  
 T<sub>1</sub>, T<sub>2</sub> Drain ports (1 port plugged)

M 22x1,5

**Shaft ends**

**Sizes 160, 180**

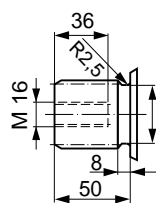
**A** Splined shaft  
 W 50x2x30x24x9g  
 DIN 5480



Nominal pressure  
 $p_N = 400 \text{ bar}$

**Size 160**

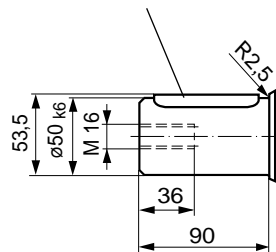
**Z** Splined shaft  
 W 45x2x30x21x9g  
 DIN 5480



Nominal pressure  
 $p_N = 350 \text{ bar}$

**Sizes 160, 180**

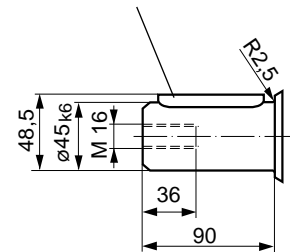
**B** Parallel shaft with  
 key AS 14x9x70  
 DIN 6885



Nominal pressure  
 $p_N = 350 \text{ bar}$

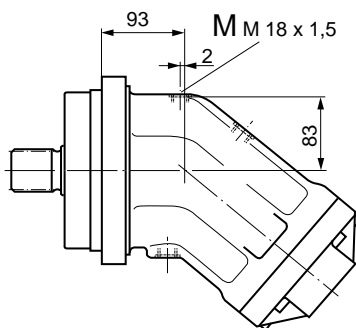
**Size 160**

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

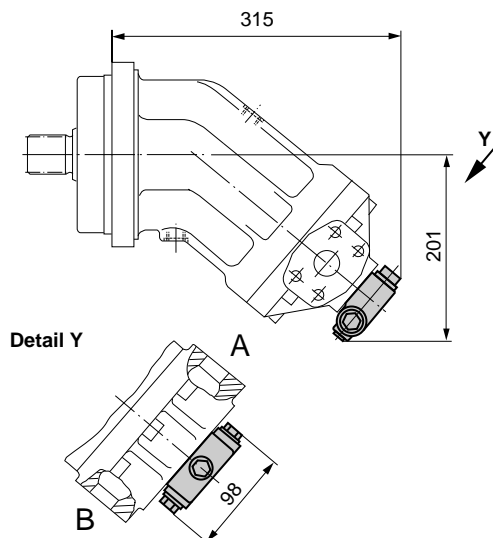


Nominal pressure  
 $p_N = 350 \text{ bar}$

prepared for speed sensing control (D), with port M  
 (inductive impulse detector ID see RE 95038  
 hall effect speed sensor HD see RE 95042,  
 to be ordered separately!)

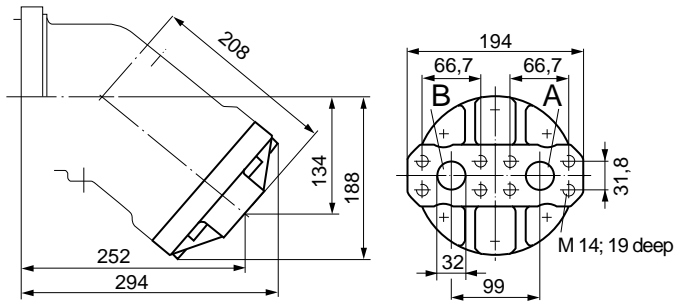


**with built-on flushing and boost valve (7)**



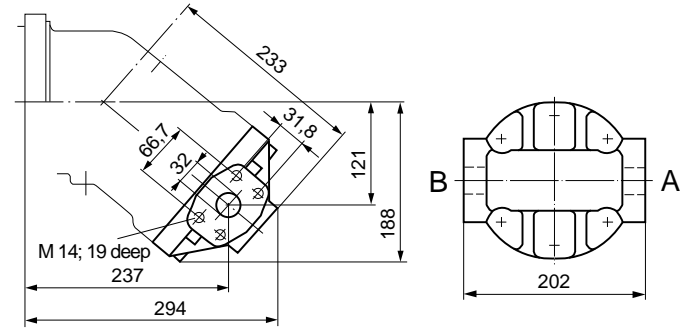
**Sizes 160, 180 Port plates**

**01**



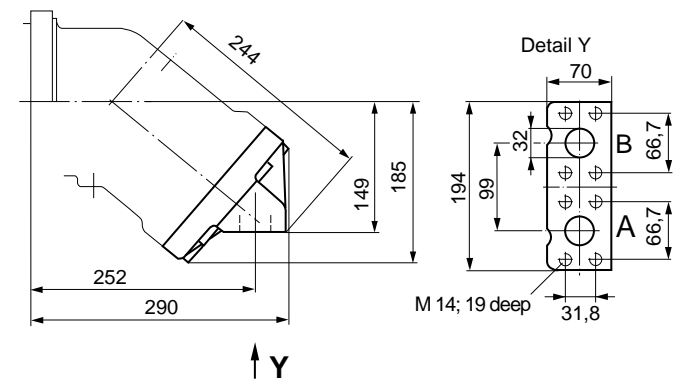
A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 1 1/4"

**02**



A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 1 1/4"

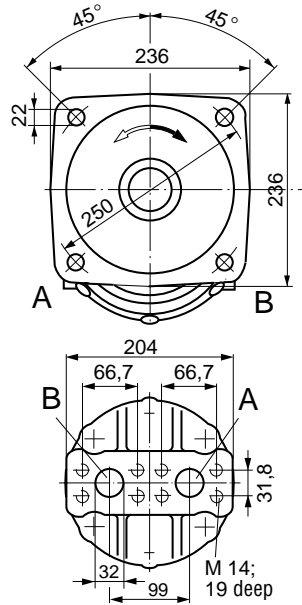
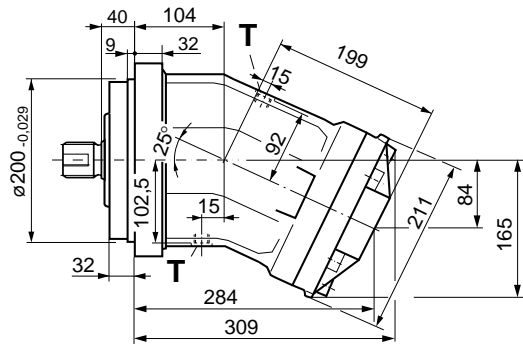
**10**



A, B Service line ports  
420 bar (6000 psi) high pressure series  
SAE 1 1/4"

**19** (see page 28)

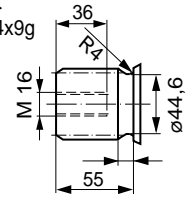
## Unit Dimensions, Size 200



### Shaft ends

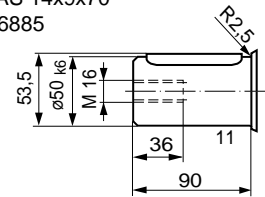
#### A Splined shaft

W 50x2x30x24x9g  
DIN 5480



#### B Parallel shaft with

key AS 14x9x70  
DIN 6885



### Connections

- A, B Service line ports SAE 1 1/4"  
420 bar (6000 psi) high pressure series  
T Drain port (1 port plugged) M 22x1,5

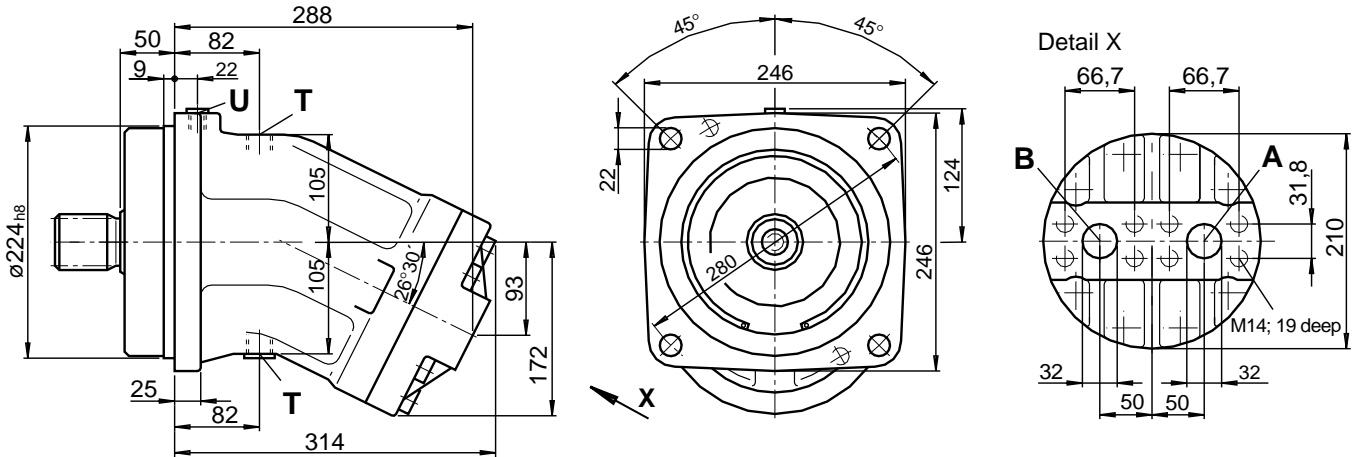
### Preferred types, please state type and ident-no. when ordering

Type	Ident-No.	Type	Ident-No.
A2F5W6.0B3	9404451	A2FM80/61W-PAB010	9422638
A2FM10/61W-PAB030	9423386	A2FM80/61W-PAB020	9422089
A2FM10/61W-PBB030	9610656	A2FM80/61W-PBB010	9610666
A2FM12/61W-PAB030	9424240	A2FM80/61W-PBB020	9610667
A2FM12/61W-PBB030	9610657	A2FM90/61W-PAB010	9408463
A2FM16/61W-PAB030	9411111	A2FM90/61W-PAB020	9408464
A2FM16/61W-PBB030	9411119	A2FM90/61W-PBB010	9408468
A2FM23/61W-PAB010	9427351	A2FM90/61W-PBB020	9408469
A2FM23/61W-PAB020	9422092	A2FM107/61W-PAB010	9424300
A2FM23/61W-PAB040	9428415	A2FM107/61W-PAB020	9424093
A2FM23/61W-PBB010	9610658	A2FM107/61W-PBB010	9610668
A2FM23/61W-PBB020	9610659	A2FM107/61W-PBB020	9610669
A2FM23/61W-PBB040	9610660	A2FM125/61W-PAB010	9409630
A2FM28/61W-PAB010	9424853	A2FM125/61W-PAB020	9409634
A2FM28/61W-PAB020	9422548	A2FM125/61W-PBB010	9409637
A2FM28/61W-PAB040	9421629	A2FM125/61W-PBB020	9409638
A2FM28/61W-PBB010	9610661	A2FM160/61W-PAB010	9425163
A2FM28/61W-PBB020	9610662	A2FM160/61W-PAB020	9424094
A2FM28/61W-PBB040	9610663	A2FM160/61W-PBB010	9610670
A2FM32/61W-PAB010	9410189	A2FM160/61W-PBB020	9610671
A2FM32/61W-PAB020	9410190	A2FM180/61W-PAB010	9409189
A2FM32/61W-PAB040	9410192	A2FM180/61W-PAB020	9409190
A2FM32/61W-PBB010	9410194	A2FM180/61W-PBB010	9409372
A2FM32/61W-PBB020	9410195	A2FM180/61W-PBB020	9409373
A2FM32/61W-PBB040	9410197	A2FM200/63W-PAB010	2011528
A2FM45/61W-PZB010	9411581	A2FM250/60W-VZB010	915383
A2FM45/61W-PZB020	9411582	A2FM250/60W-VPB010	914475
A2FM45/61W-PZB040	9411584	A2FM250/60W-VZB020	910653
A2FM56/61W-PAB010	9424905	A2FM250/60W-VPB020	930970
A2FM56/61W-PAB020	9422129	A2FM355/60W-VZH010	920780
A2FM56/61W-PAB040	9429251	A2FM355/60W-VPH010	929843
A2FM56/61W-PBB010	9610664	A2FM500/60W-VZH010	968982
A2FM56/61W-PBB020	9610665	A2FM500/60W-VPH010	943251
A2FM56/61W-PBB040	9605544	A2FLM710/60W-VZH010	965974
A2FM63/61W-PAB010	9408523	A2FLM710/60W-VPH010	969815
A2FM63/61W-PAB020	9408524	A2FM1000/60W-VZH010	944773
A2FM63/61W-PAB040	9408526	A2FM1000/60W-VPH010	949444
A2FM63/61W-PBB010	9408514		
A2FM63/61W-PBB020	9408549		
A2FM63/61W-PBB040	9408551		

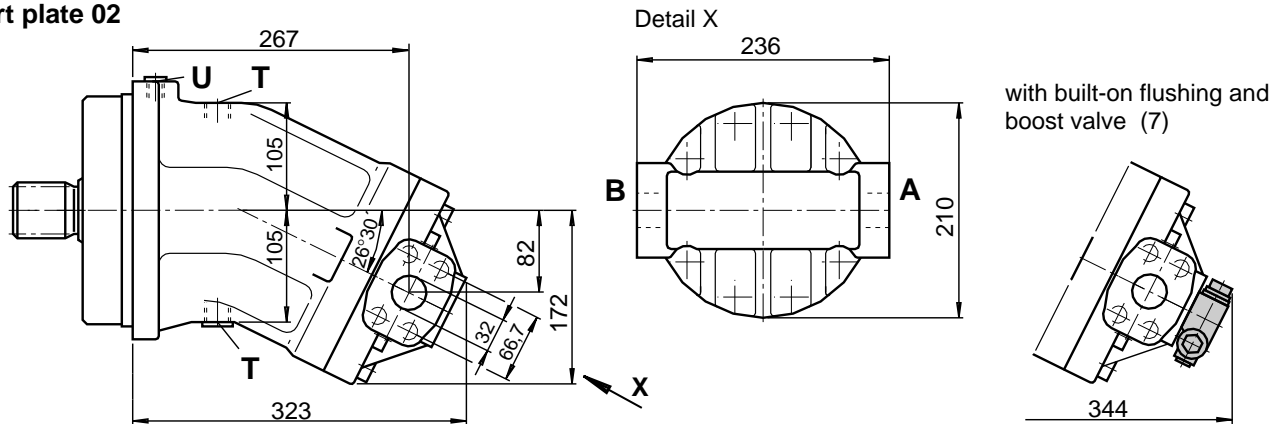
sizes 5...200: production plant Elchingen  
sizes 250...1000: production plant Horb

### Unit Dimensions, Size 250

#### Port plate 01



#### Port plate 02



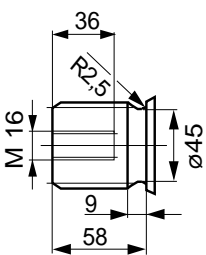
#### Connections

A, B	Service line ports	SAE 1 1/4"
	420 bar (6000 psi) high pressure series	
T	Drain port (1 port plugged)	M 22x1,5
U	Port for bearing flushing (plugged)	M14x1,5

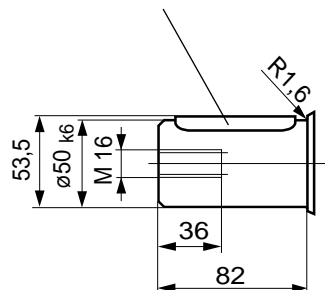
#### Shaft ends

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

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

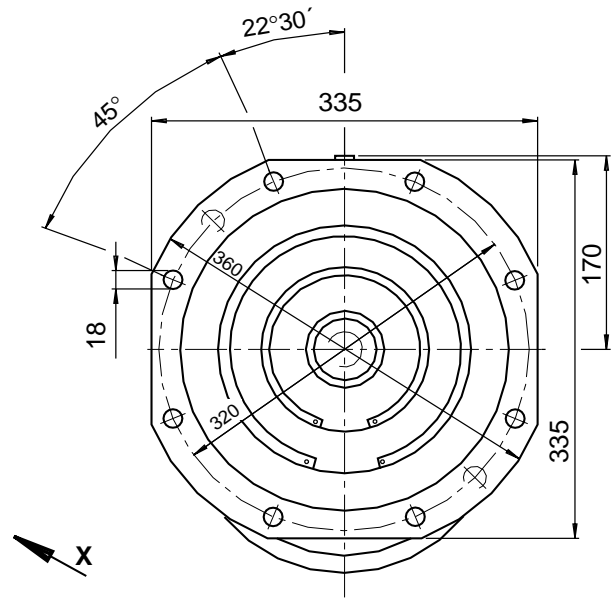
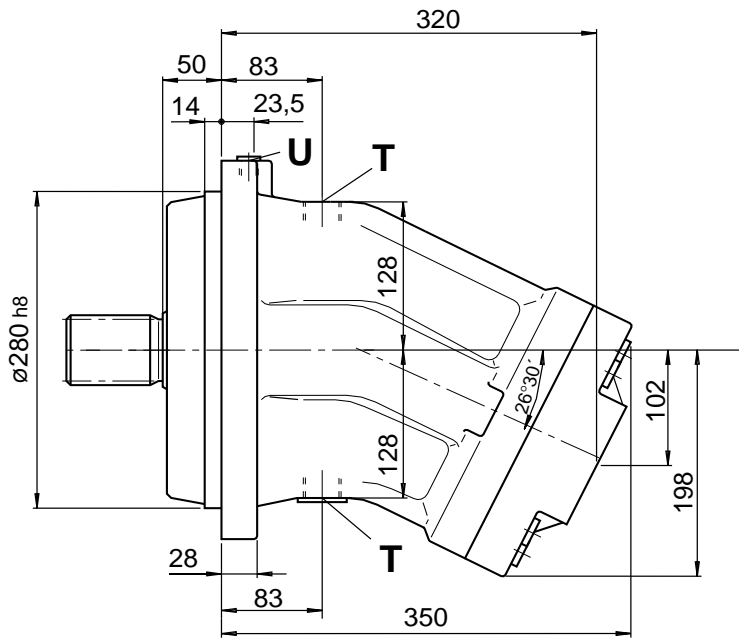


Nominal pressure  
 $p_N = 350$  bar

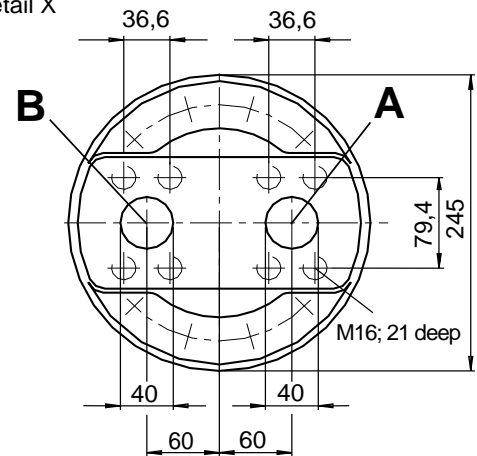


Nominal pressure  
 $p_N = 350$  bar

### Unit Dimensions, Size 355



Detail X



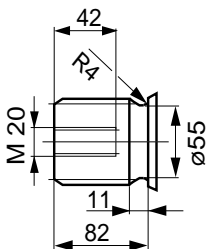
#### Connections

- |   |            |
|---|------------|
| A, B Service line ports                 | SAE 1 1/2" |
| 420 bar (6000 psi) high pressure series |            |
| T Drain port (1 port plugged)           | M 33x2     |
| U Port for bearing flushing (plugged)   | M 14x1,5   |

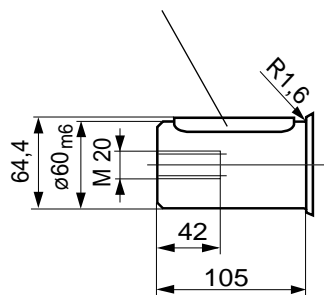
#### Shaft ends

**Z** Splined shaft  
W 60x2x30x28x9g  
DIN 5480

**P** Parallel shaft with  
key AS 18x11x100  
DIN 6885



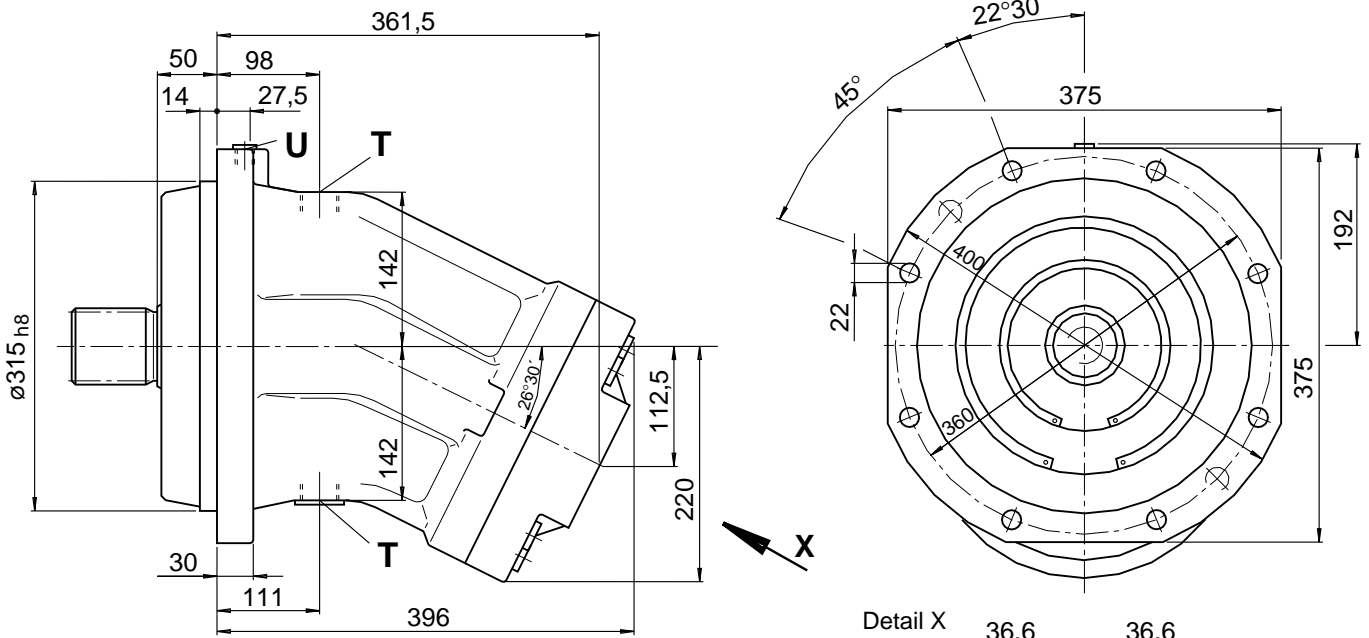
Nominal pressure  
 $p_N = 350$  bar



Nominal pressure  
 $p_N = 350$  bar

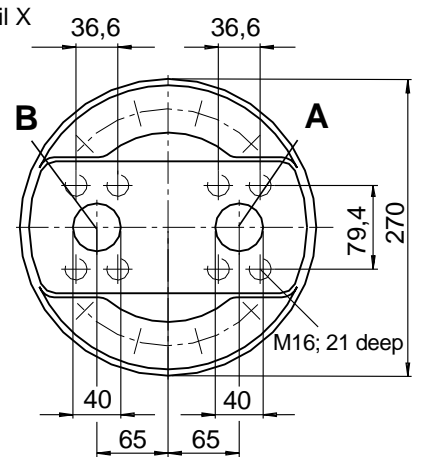


**Unit Dimensions, Size 500**



**Connections**

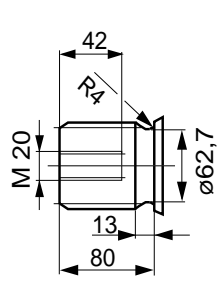
- A, B Service line ports SAE 1 1/2"
- 420 bar (6000 psi) high pressure series
- T Drain port (1 port plugged) M 33x2
- U Port for bearing flushing (plugged) M 18x1,5



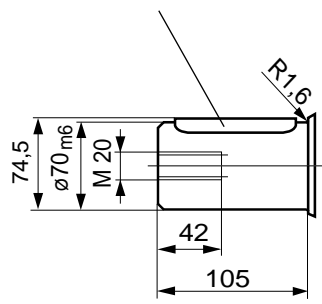
**Shaft ends**

**Z** Splined shaft  
W 70x3x30x22x9g  
DIN 5480

**P** Parallel shaft with  
key AS 20x12x100  
DIN 6885

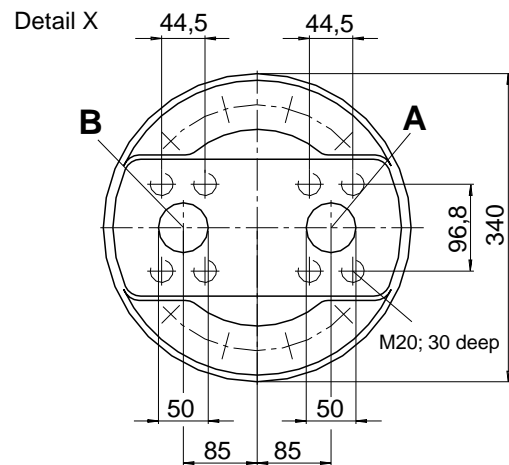
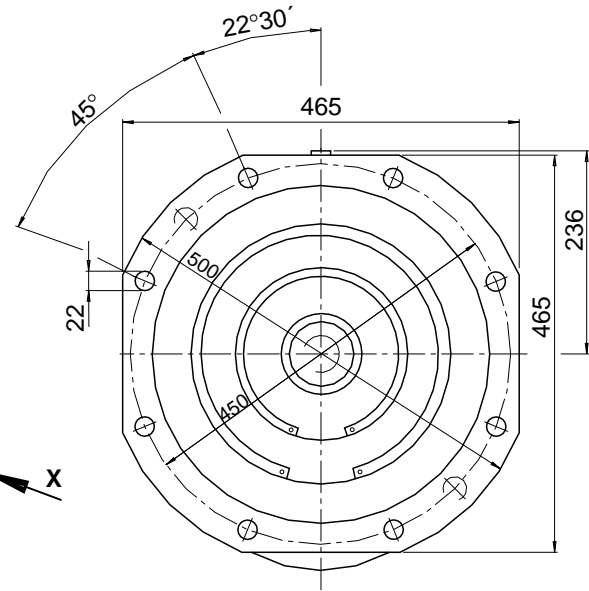
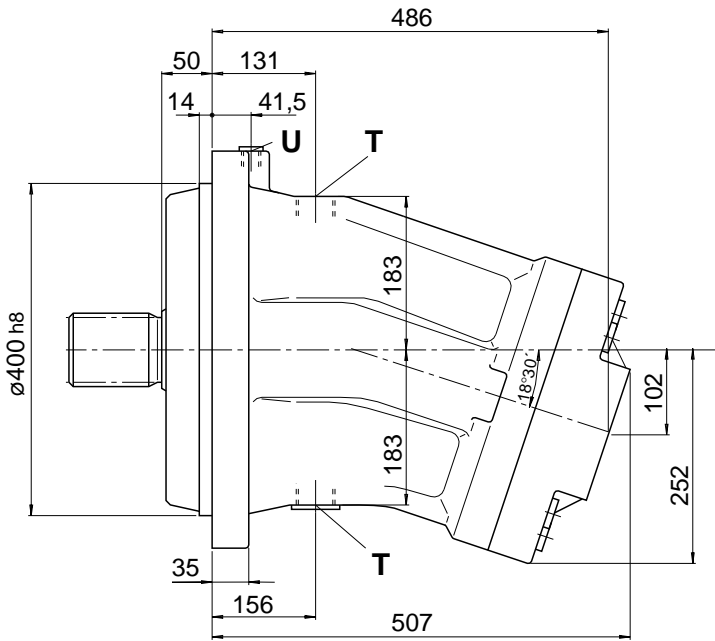


Nominal pressure  
 $p_N = 350$  bar



Nominal pressure  
 $p_N = 350$  bar

**Unit Dimensions, Size 710**



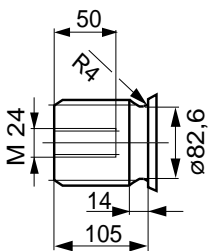
**Connections**

- A, B Service line ports SAE 2"  
420 bar (6000 psi) high pressure series
- T Drain port (1 port plugged) M 42x2
- U Port for bearing flushing (plugged) M18x1,5

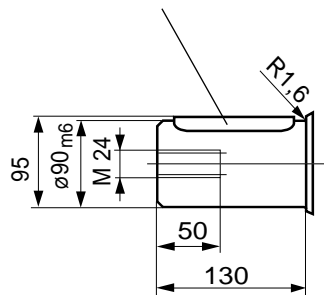
**Shaft ends**

**Z** Splined shaft  
W 90x3x30x28x9g  
DIN 5480

**P** Parallel shaft with  
key AS 25x14x125  
DIN 6885

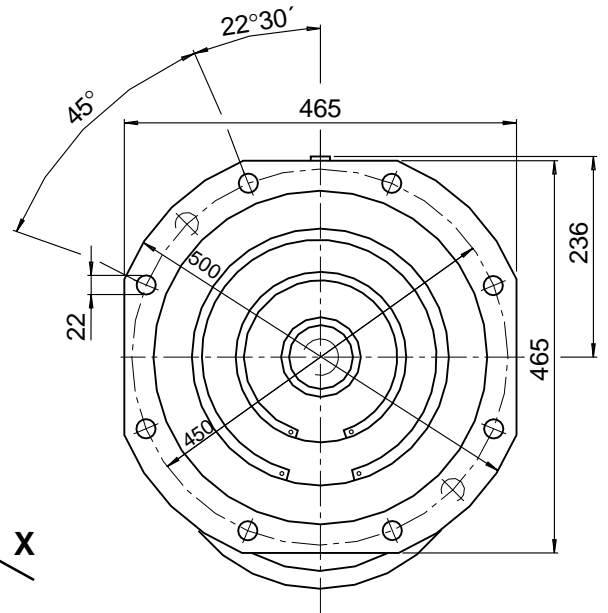
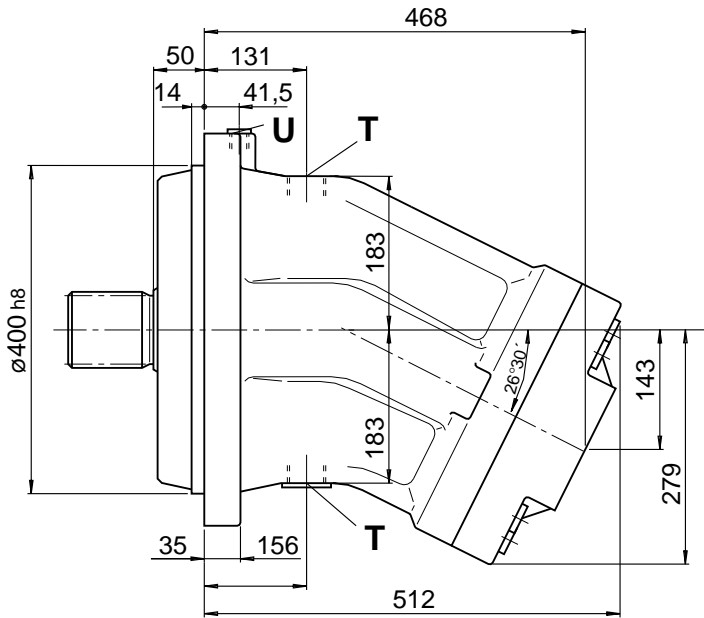


Nominal pressure  
 $p_N = 350\text{ bar}$

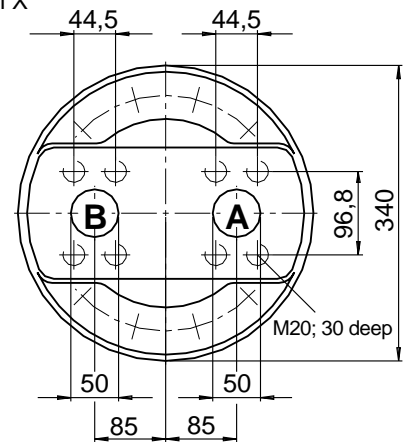


Nominal pressure  
 $p_N = 350\text{ bar}$

**Unit Dimensions, Size 1000**



Detail X



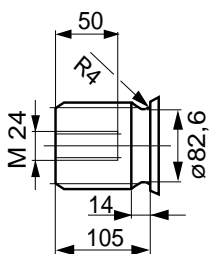
**Connections**

- A, B Service line ports SAE 2"
- 420 bar (6000 psi) high pressure series
- T Drain port (1 port plugged) M 42x2
- U Port for bearing flushing (plugged) M18x1,5

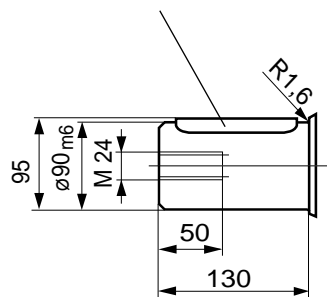
**Shaft ends**

**Z** Splined shaft  
W 90x3x30x28x9g  
DIN 5480

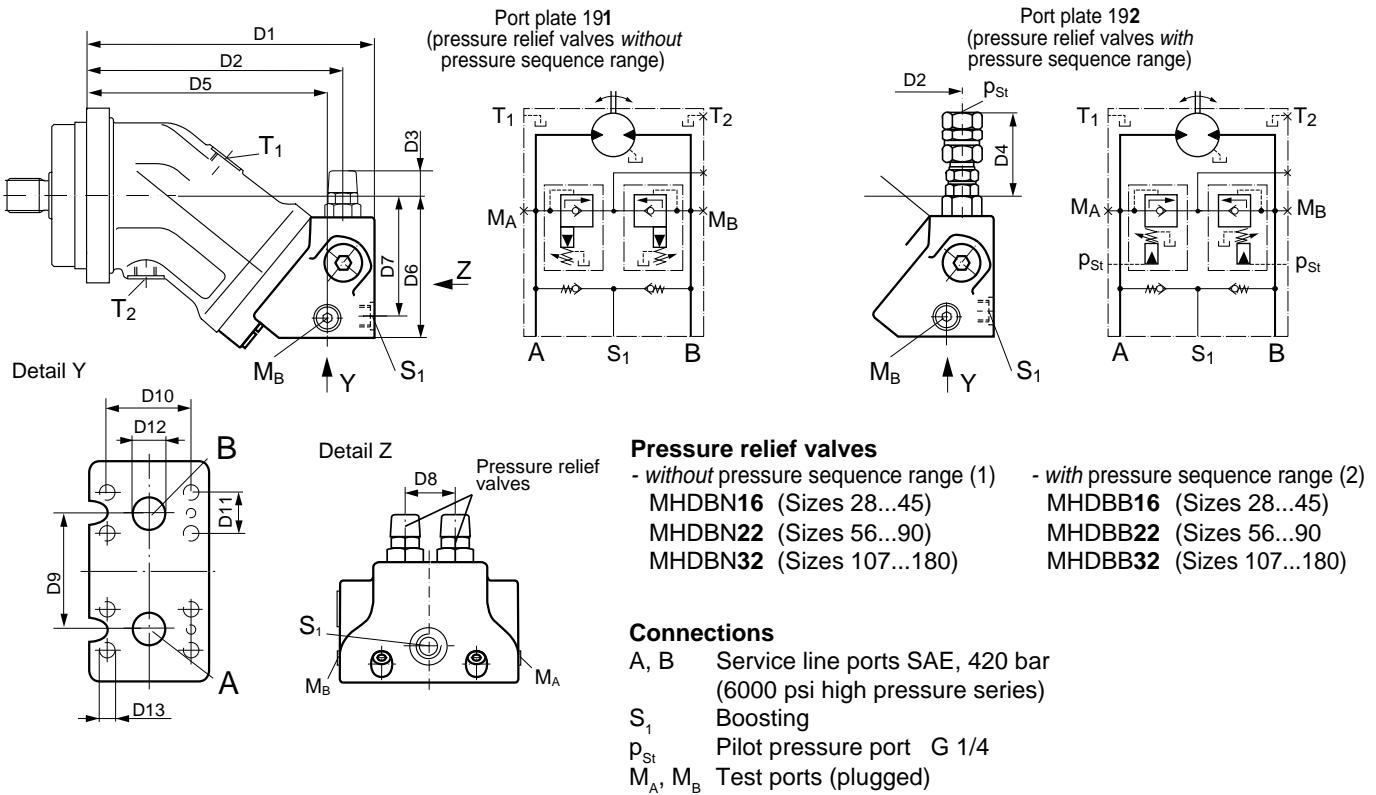
**P** Parallel shaft with  
key AS 25x14x125  
DIN 6885



Nominal pressure  
 $p_N = 350\ \text{bar}$



Nominal pressure  
 $p_N = 350\ \text{bar}$

**Port plate 19, with integrated pressure relief valves**

Size	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	Ports A, B	Port S <sub>1</sub>	Ports M <sub>A</sub> , M <sub>B</sub>
28	209	186	25	63	174	102	87	36	66	50,8	23,8	19	M10; 17 deep	SAE 3/4"	M 22x1,5	M 20x1,5
32	209	186	25	63	174	102	87	36	66	50,8	23,8	19	M10; 17 deep	SAE 3/4"	M 22x1,5	M 20x1,5
45	222	198	22	60	187	113	98	36	66	50,8	23,8	19	M10; 17 deep	SAE 3/4"	M 22x1,5	M 20x1,5
56	250	222	19	57	208	124	105	42	75	50,8	23,8	19	M10; 13 deep	SAE 3/4"	M 26x1,5	M 26x1,5
63	250	222	19	57	208	124	105	42	75	50,8	23,8	19	M10; 13 deep	SAE 3/4"	M 26x1,5	M 26x1,5
80	271	243,5	17,5	55	229	134	114	42	75	57,2	27,8	25	M12; 18 deep	SAE 1"	M 26x1,5	M 26x1,5
90	271	243,5	17,5	55	229	134	114	42	75	57,2	27,8	25	M12; 18 deep	SAE 1"	M 26x1,5	M 26x1,5
107	298	267	10	48	251	149,5	130	53	84	66,7	31,8	32	M14; 19 deep	SAE 1 1/4"	M 26x1,5	M 26x1,5
125	298	267	10	48	251	149,5	130	53	84	66,7	31,8	32	M14; 19 deep	SAE 1 1/4"	M 26x1,5	M 26x1,5
160			5	43		170	149	53	84	66,7	31,8	32	M14; 19 deep	SAE 1 1/4"	M 26x1,5	M 30x1,5
180			5	43		170	149	53	84	66,7	31,8	32	M14; 19 deep	SAE 1 1/4"	M 26x1,5	M 30x1,5