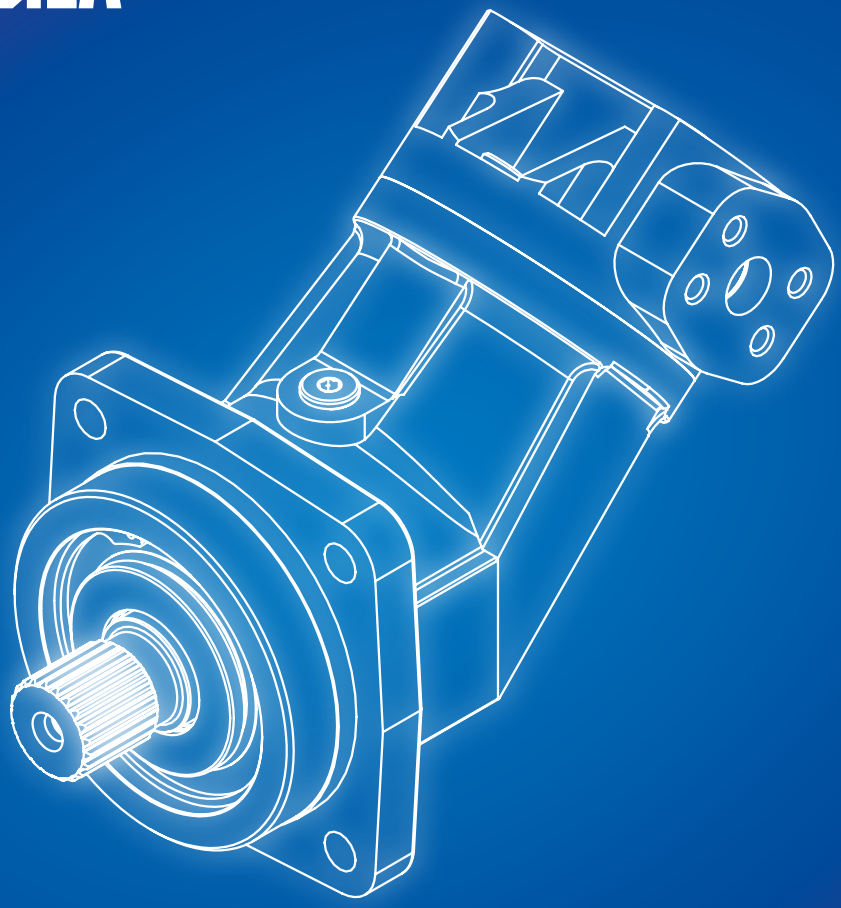
HYDROSILA



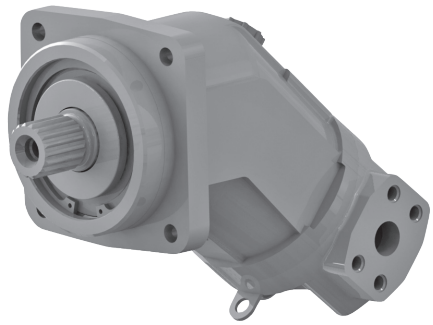
Axial piston bent-axis pumps and motors

series BF20

HS-AB-01/012026

PBF20

PBF20 - series of axial piston fixed displacement pumps in bent-axis design. They have an cast iron body and designed for hydraulic systems of mobile machines operating in severe conditions.
The **PBF20** model range includes pumps with displacement 56, 80 and 107 cm^3.



DESIGN FEATURES

- Open circuit.
- The angle of inclination the block cylinder 40 degrees.
- High hydromechanical efficiency.
- Tapered roller bearings, allow the pump shaft to withstand high radial and axial loads.
- Bimetallic block cylinder of unit has a high wear resistance.
- Conical plungers with compression rings.
- High cast iron body.
- Maximum pressure 450 bar.

PBF20

FIXED DISPLACEMENT AXIAL PISTON PUMPS | Order code

PBF20	.	107	/	R	-	B	A	B	05	N			

FIXED DISPLACEMENT BENT-AXIS AXIAL PISTON PUMP	PBF20

DISPLACEMENT, CM³		CODE
56,1	●	56
80,4	●	80
106,7	●	107

ROTATION	CODE
Clockwise	R
Counterclockwise	L

SEAL	56	80	107	CODE
NBR	●	●	●	B
FKM	○	○	○	F

SHAFT OPTIONS		56	80	107	CODE
Splined shaft DIN 5480	[2]	●	●	●	A
	[3]	●	●	●	Z
Splined shaft ГОСТ 6033	-	●	-	●	0
Keyed shaft DIN 6885	-	●	●	●	B
		●	●	●	P
Splined shaft SAE J744	-	-	●	●	C
		●	-	-	BB

SPECIAL FEATURES*	CODE

CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

WORKING PORTS OPTION	56	80	107	CODE
Two flanged ports, one on the side, one on the rear	●	●	●	05

MOUNTING FLANGES	56	80	107	CODE
ISO 3019/2 4-holes	●	●	●	B

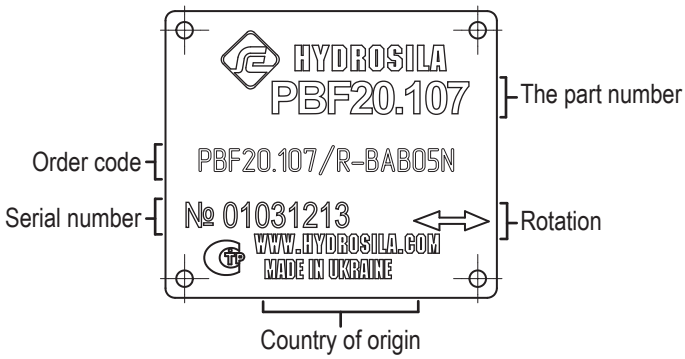
[2] side balanced
[3] side balanced, reduced diameter
* Special option code - assigned if necessary after agreement of special conditions with the customer

Notes: ● Standart; ○ Optional; - Not available

ORDERING EXAMPLE

PBF20.107/R-BAB05N

PBF20 - fixed displacement bent-axis axial piston pump,
107 - displacement 106,7 cm³,
R - clockwise rotation,
B - with seal material NBR,
A - shaft option:splind, acc. to DIN 5480,
B - mounting flange ISO 4 holes,
05 - two flanged ports, one on the side, one on the rear,
N - climate version: temperate.



TECHNICAL SPECIFICATIONS

SIZE		PBF20.56	PBF20.80	PBF20.107
Displacement, Vg	cm^3	56,1	80,4	106,7
Speed				
minimum		400		
rated, at inlet pressure P_{abs}=0,8 bar	min^{-1}	2000	1800	1600
maximum, at inlet pressure P_{abs}=1,0 bar		3000	2680	2400
maximum, at inlet pressure P_{abs}=2,0 bar		3750	3350	3000
Pressure, P				
rated	bar	400		
maximum, t≤6 sec		450		
Maximum drain pressure	bar	2,5		
Inlet pressure, P				
minimum	bar	0,8		
rated		1		
maximum		2		
Flow*, Q				
minimum	l/min	22	32	43
rated		112	145	171
maximum		168	215	256
limit		209	269	320
Input power*, N				
rated	кW	75	96	114
maximum		126	162	192
Efficiency				
hydromechanical		0,96		
volumetric		0,95		
Weight (without fluid), no more	kg	18	23	32

* Without efficiency

FORMULAS

Flow $$Q = \frac{V_g \cdot n \cdot \eta_v}{1000} \text{ [l/min]}$$

Input torque $$T = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}} = \frac{1.59 \cdot V_g \cdot \Delta p}{100 \cdot \eta_{mh}} \text{ [N·m]}$$

Input power $$P = \frac{2 \cdot \pi \cdot T \cdot n}{60000} = \frac{Q \cdot \Delta p}{600 \cdot \eta_t} \text{ [kW]}$$

V_g – displacement (cm^3)

Δp – pressure drop (bar)

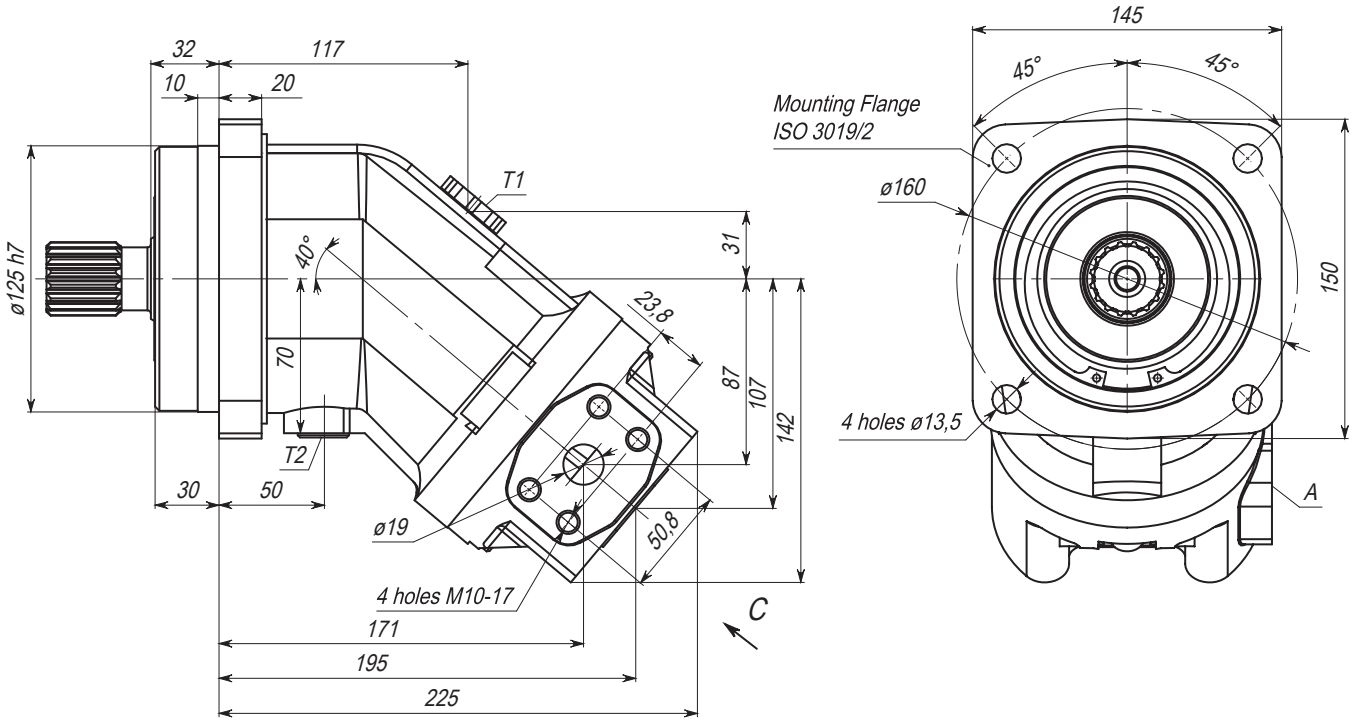
n – speed (min^{-1})

η_v – volumetric efficiency

η_{mh} – hydromechanical efficiency

η_t – overall efficiency

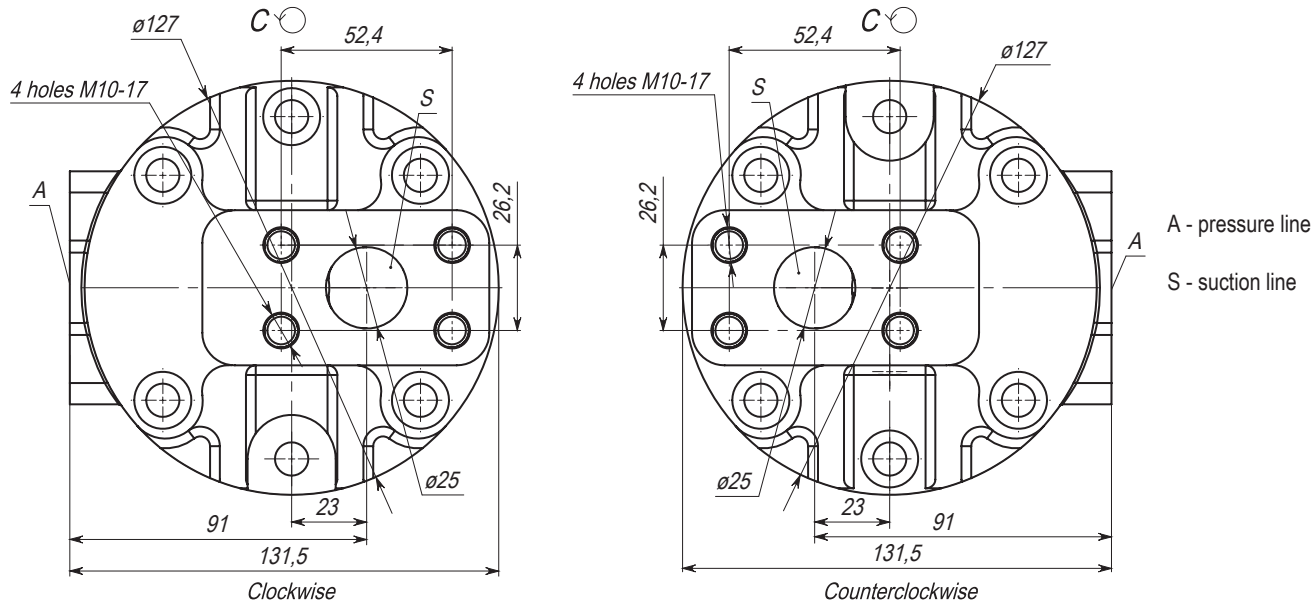
PBF20 PUMPS DIMENSIONS, SIZE 56 CM³



T1, T2 - drain line M18x1,5-12 DIN 3852

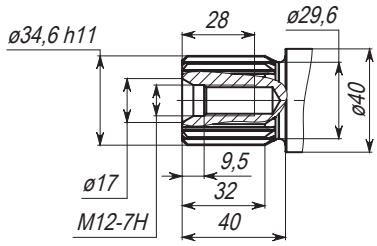
WORKING PORTS OPTION

05 | two flanged ports, one on the side, one on the rear

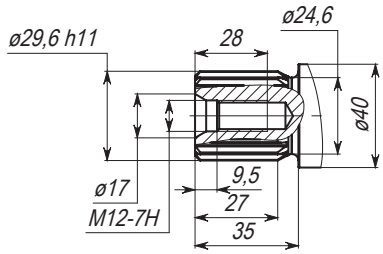


DRIVE SHAFTS

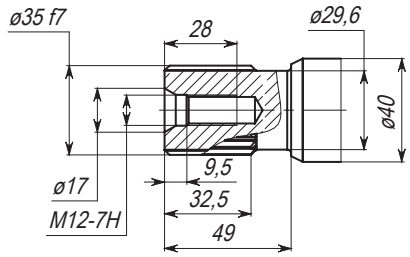
A | Splined shaft W35x2x30x16x9g
DIN 5480, z16



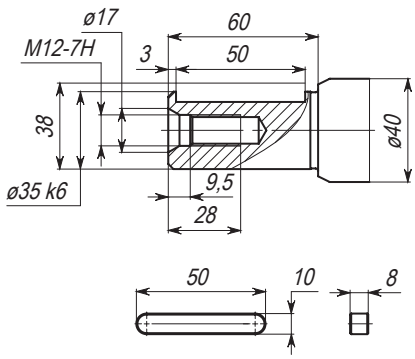
Z | Splined shaft W30x2x30x14x9g
DIN 5480, z14



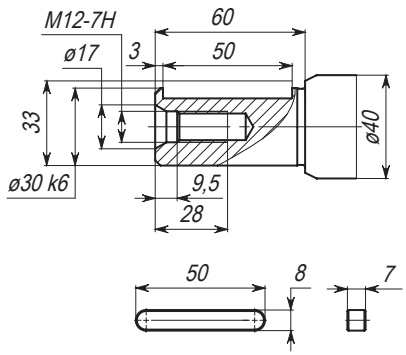
O | Splined shaft 35xf7x2x9g
GOST 6033-80, z16



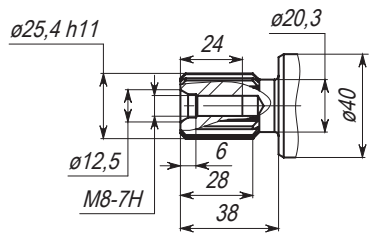
B | Keyed shaft 10x8x50
DIN 6885



P | Keyed shaft 8x7x50
DIN 6885

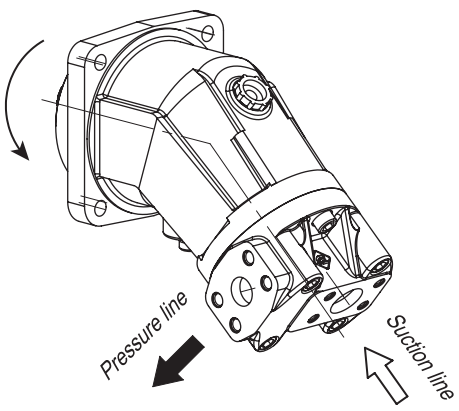


BB | Splined shaft 1 in 15T 16/32 DP
SAE J744-25-4(B-B), z14

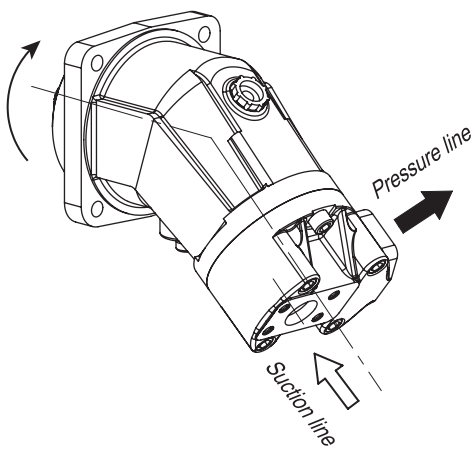


ROTATION

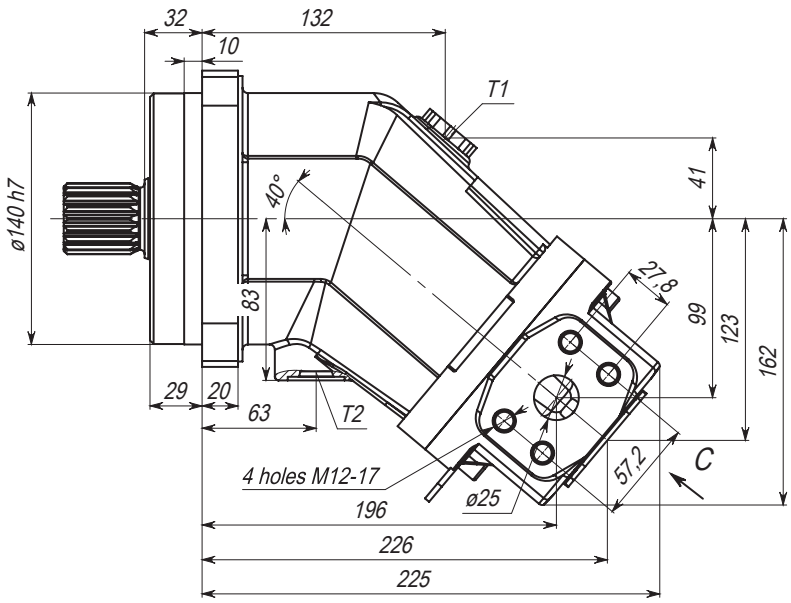
Clockwise

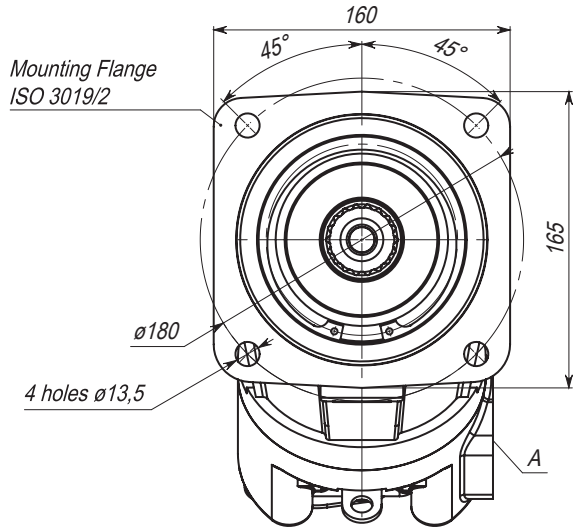


Counterclockwise



PBF20 PUMPS DIMENSIONS, SIZE 80 CM³

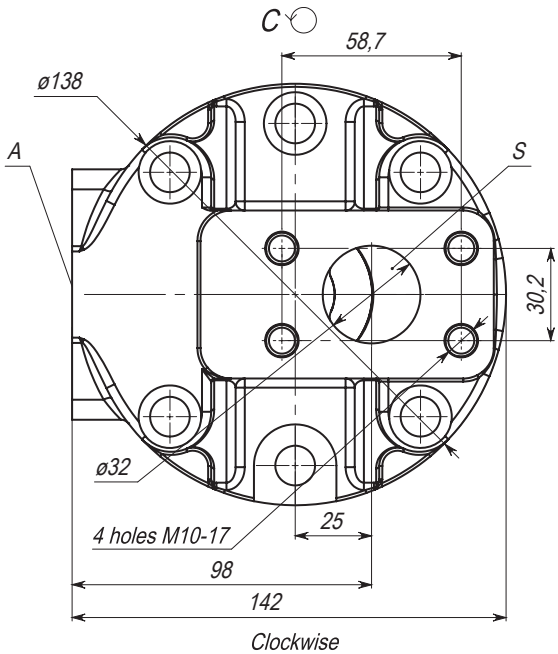




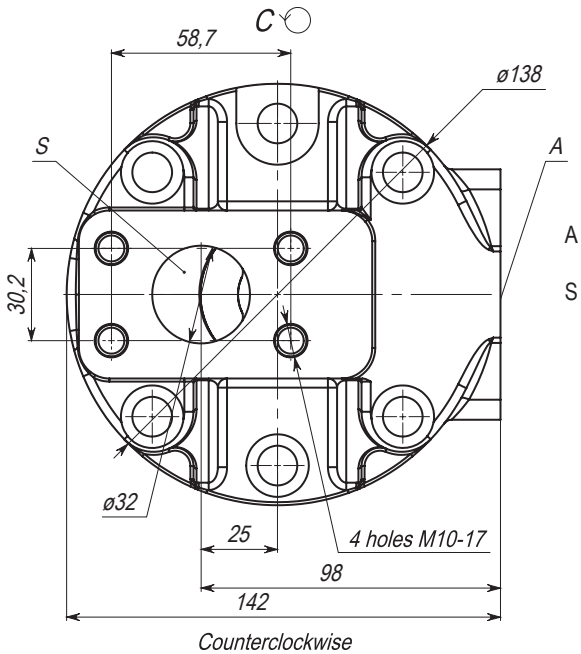
T1, T2 - drain line M18x1,5-12 DIN 3852

WORKING PORTS OPTION

05 | two flanged ports, one on the side, one on the rear



Clockwise



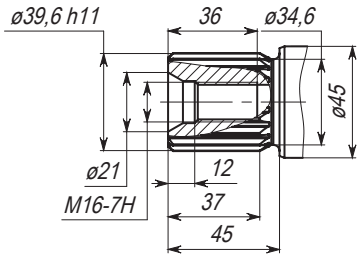
Counterclockwise

A - pressure line

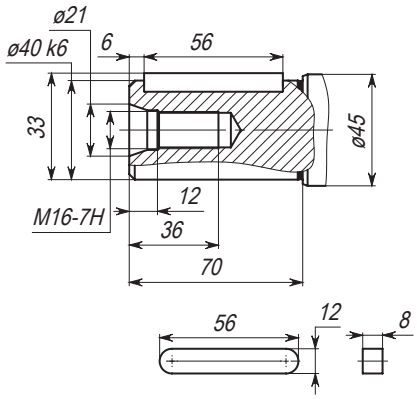
S - suction line

DRIVE SHAFTS

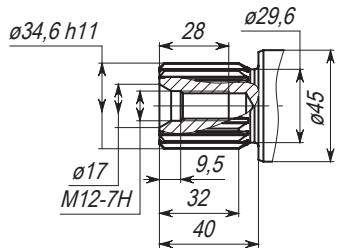
A | Splined shaft W40x2x30x18x9g
DIN 5480, z18



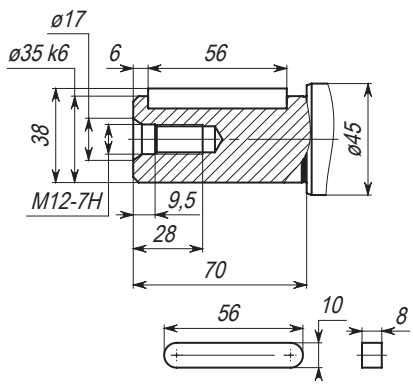
B | Keyed shaft 12x8x56
DIN 6885



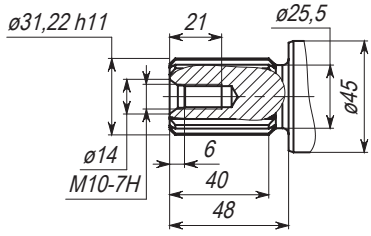
Z | Splined shaft W35x2x30x16x9g
DIN 5480, z16



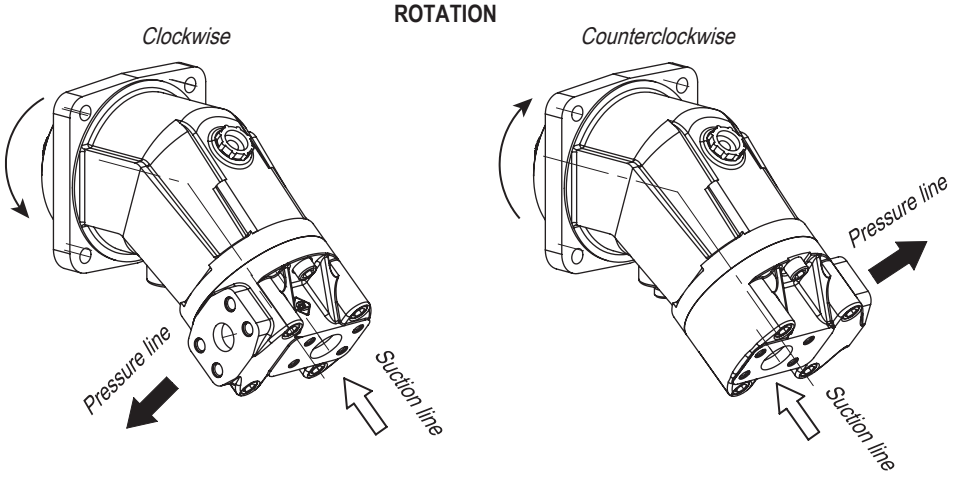
P | Keyed shaft 10x8x56
DIN 6885



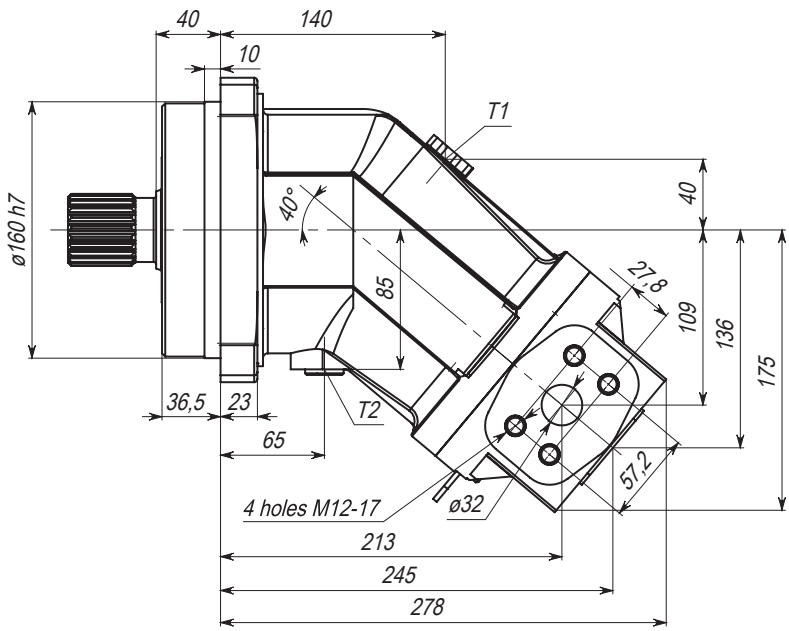
C | Splined shaft 1 1/4 in 14T 12/24 DP
SAE J744-25-4(C), z14

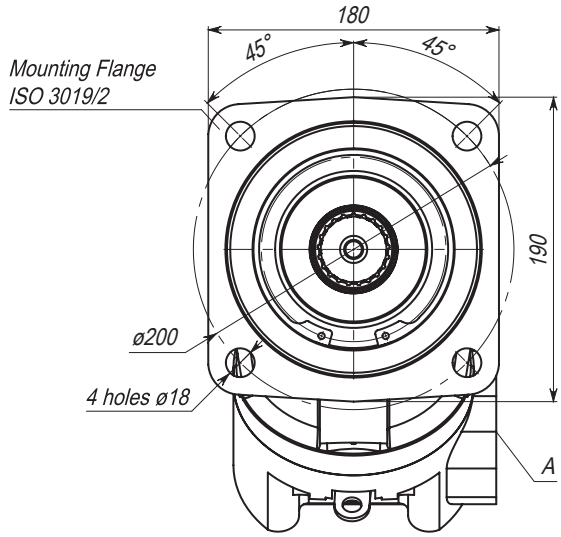


ROTATION



PBF20 PUMPS DIMENSIONS, SIZE 107 CM³

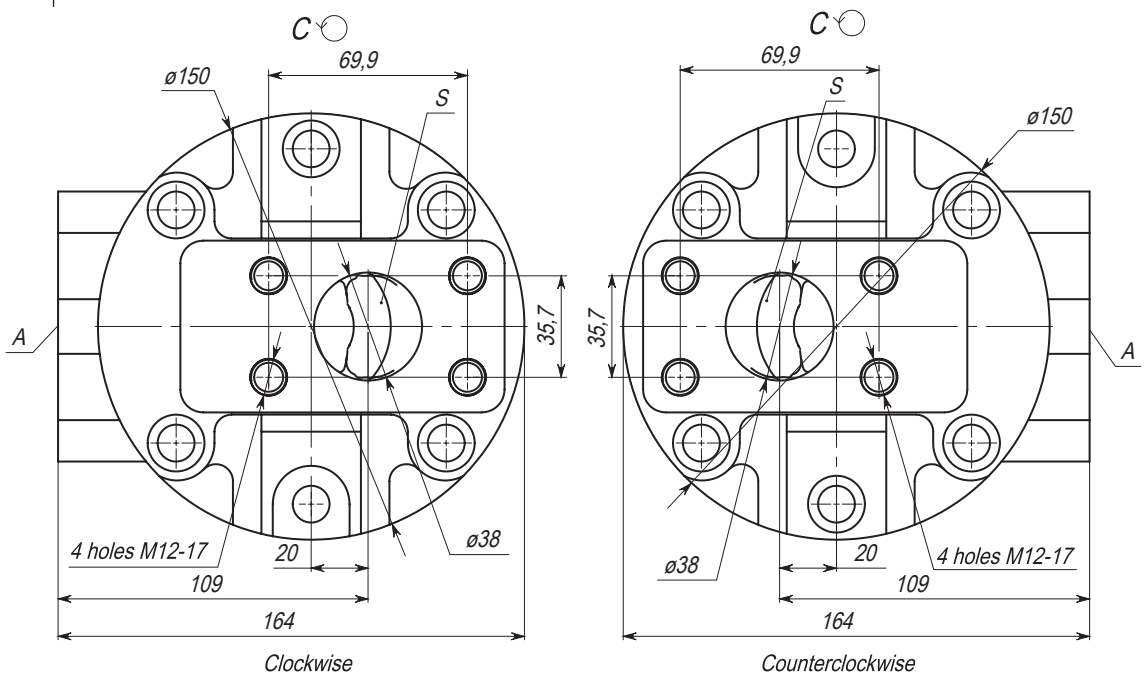




T1, T2 - drain line M18x1,5-12 DIN 3852

WORKING PORTS OPTION

05 | two flanged ports, one on the side, one on the rear

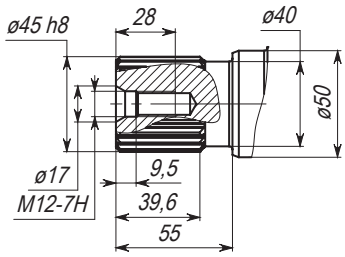


A - pressure line

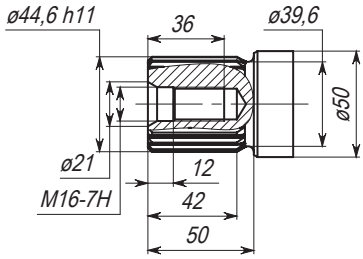
S - suction line

DRIVE SHAFTS

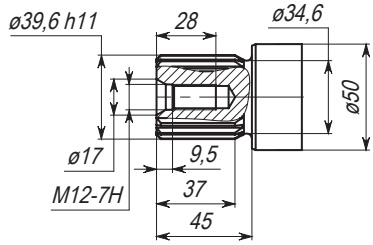
O | Splined shaft W45xh8x2x9g
GOST 6033-80, z21



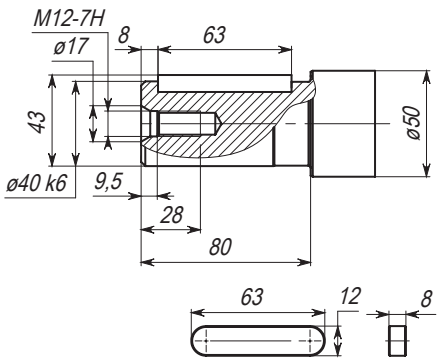
A | Splined shaft W45x2x30x21x9g
DIN 5480, z21



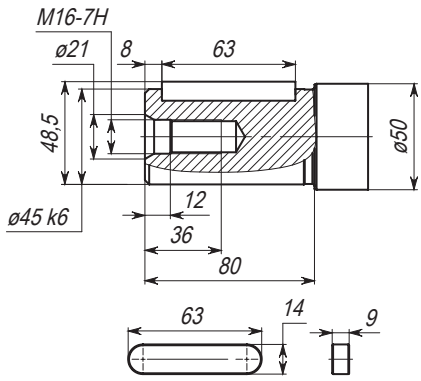
Z | Splined shaft W40x2x30x18x9g
DIN 5480, z18



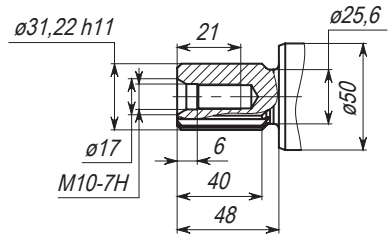
P | Keyed shaft 12x8x63
DIN 6885



B | Keyed shaft 14x9x63
DIN 6885

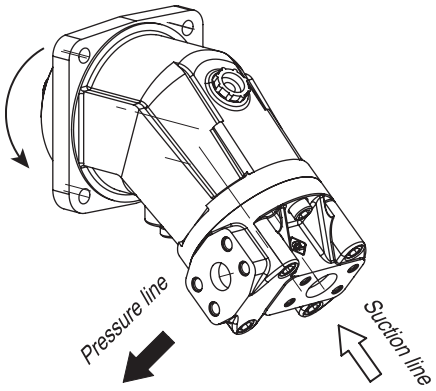


C | Splined shaft 1 1/4 in 14T 12/24 DP
SAE J744-25-4(C), z14

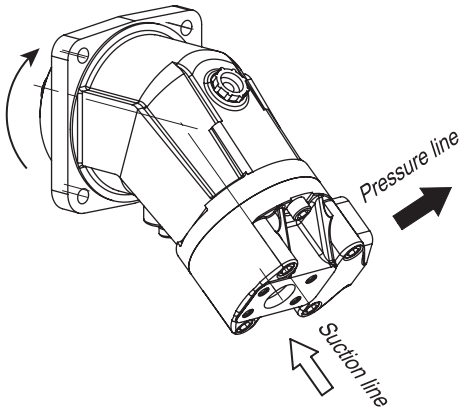


ROTATION

Clockwise

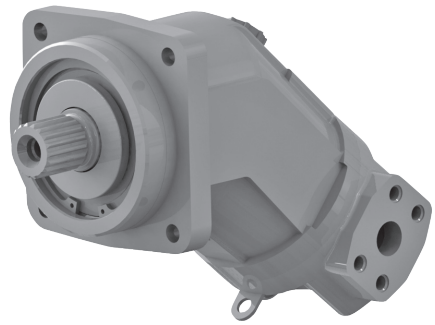


Counterclockwise



MBF20

MBF20 - series of axial piston fixed displacement motors in bent-axis design. They have an cast iron body and designed for hydraulic systems of mobile machines operating in severe conditions.
The **MBF20** model range includes motors with displacement 56, 80 and 107 cm^3.



DESIGN FEATURES

- Open and closed circuits.
- The angle of inclination the block cylinder 40 degrees.
- High hydromechanical efficiency.
- Tapered roller bearings, allow the motor shaft to withstand high radial and axial loads.
- Bimetallic block cylinder of unit has a high wear resistance.
- Conical plungers with compression rings.
- High cast iron body.
- Hydraulic equipment optional.
- Maximum pressure 450 bar.

MBF20

FIXED DISPLACEMENT AXIAL PISTON MOTORS

Order code system

MBF20	.	107	/	W	-	B	A	B	020	N			

FIXED DISPLACEMENT BENT-AXIS AXIAL PISTON MOTOR	MBF20

DISPLACEMENT, CM³		CODE
56,1	●	56
80,4	●	80
106,7	●	107

ROTATION	CODE
Reversible	W

SEAL	56	80	107	CODE
NBR	●	●	●	B
FKM	○	○	○	F

SHAFT OPTIONS		56	80	107	CODE
Splined shaft DIN 5480	2)	●	●	●	A
	3)	●	●	●	Z
Splined shaft GOST 6033	-	●	●	●	O
Splined shaft DIN 6885	-	●	●	●	B
		●	●	●	P
Splined shaft SAE J744	-	-	●	●	C
		●	-	-	BB

MOUNTING FLANGES	56	80	107	CODE
ISO 3019/2, 4 holes	●	●	●	B

SPECIAL FEATURES*	CODE
Speed sensor (with build-in hydraulic equipment)	7

CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

WORKING PORTS OPTION	56	80	107	CODE
Two flanged ports on the rear	●	●	●	010
Two flanged ports on the sides	●	●	●	020
Two flanged ports on the sides (only with flushing valve)	●	●	●	027
Four threaded ports, two on the sides, two on the rear	●	-	-	040
Two flanged ports on the rear (at 90° to the shaft axis)	●	●	●	100
Two flanged ports on the rear (with manifold block)	●	-	-	191

* Special option code - assigned if necessary after agreement of special conditions with the customer

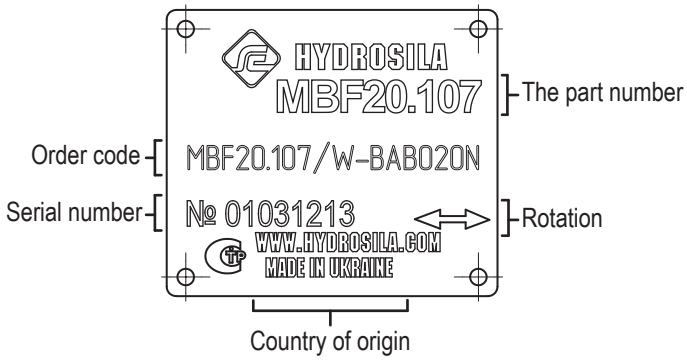
Notes:

● Standart; ○ Optional; - Not available

ORDERING EXAMPLE

MBF20.107/W-BAB020N

MBF20 - fixed displacement bent-axis axial piston motor,
107 - displacement 106,7 cmm,
W - reversible,
B - with seal material NBR,
A - splined shaft, acc. to DIN 5480,
B - mounting flange acc. to ISO 3019/2, 4 holes,
020 - two flanged ports,
N - climate version: temperate.



TECHNICAL SPECIFICATIONS

SIZE		MBF20.56	MBF20.80	MBF20.107
Displacement, Vg	cm^3	56,1	80,4	106,7
Speed:	min^{-1}			
minimum		50		
rated		2000	1800	1600
maximum		5000	4500	4000
Inlet pressure, P	bar			
rated		400		
maximum		450		
Outlet pressure, P	bar			
maximum		250		
rated		200		
Maximum drain pressure	bar	2,5		
Inlet flow*, Q	l/min			
minimum		3	4	5
rated		112	145	171
maximum		281	362	427
Torque*, T	Hm			
rated		357	512	680
maximum		402	576	765
Output power*, N	кW			
rated		75	96	114
maximum		210	271	320
Efficiency				
hydromechanical		0,94		
total efficiency		0,95		
Weight (without fluid)	kg	18	23	32

* Without efficiency

FORMULAS

Inlet flow $$Q = \frac{V_g \cdot n}{1000 \cdot \eta_v} \ [l/min]$$

Torque $$T = \frac{1.59 \cdot V_p \cdot \Delta p \cdot \eta_{mh}}{10} = \frac{V_g \cdot \Delta p \cdot \eta_{mh}}{20 \cdot \pi} \ [N \cdot m]$$

Power $$P = \frac{T \cdot n}{9549} = \frac{2 \cdot \pi \cdot T \cdot n}{60000} = \frac{Q \cdot \Delta p \cdot n_t}{600} \ [kW]$$

V_g – displacement [cm^3]

Δp – pressure drop [bar]

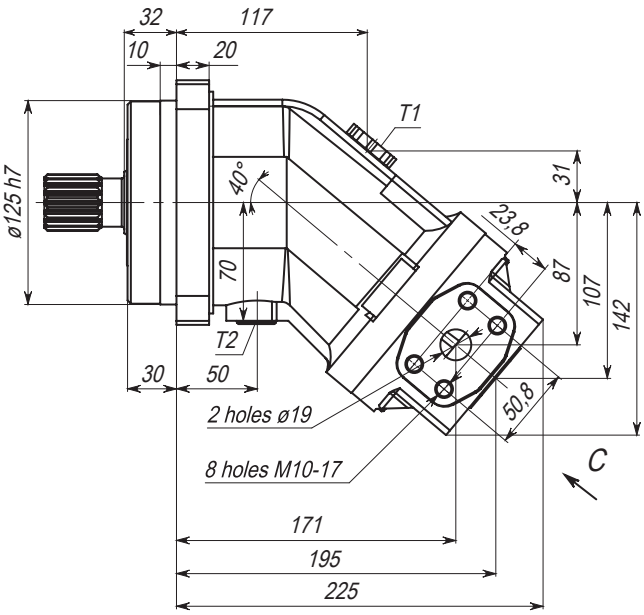
n – speed [min^{-1}]

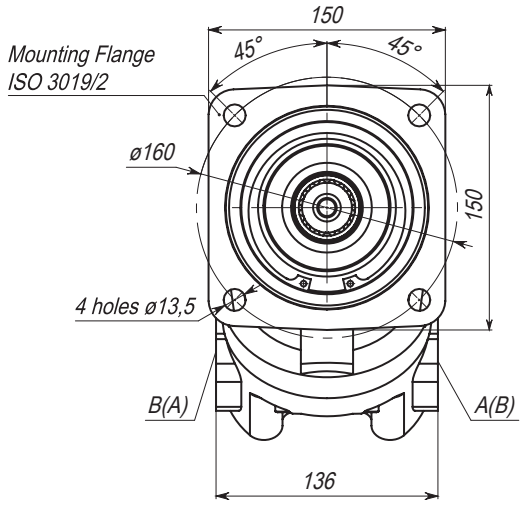
η_v – volumetric efficiency

η_{hm} – hydromechanical efficiency

η_t – overall efficiency

MBF20 MOTORS DIMENSIONS, SIZE 56 CM³

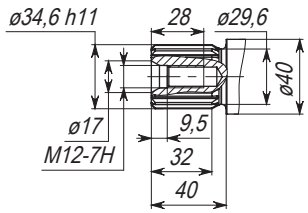




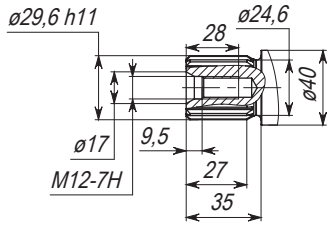
T1, T2 - drain line M18x1,5-12 DIN 3852

DRIVE SHAFTS

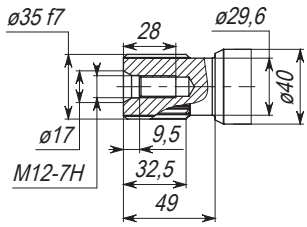
A | Splined shaft W35x2x30x16x9g
DIN 5480, z16



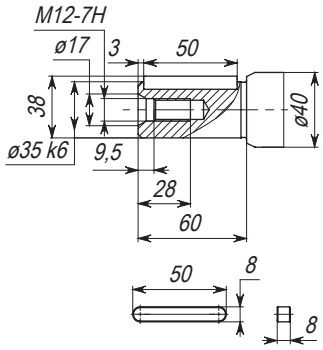
Z | Splined shaft W30x2x30x14x9g
DIN 5480, z14



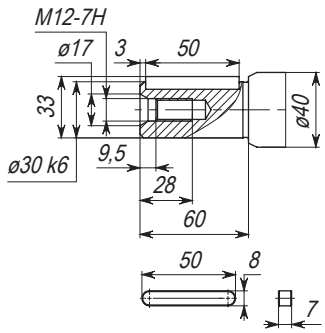
O | Splined shaft 35xf7x2x9g
GOST 6033-80, z16



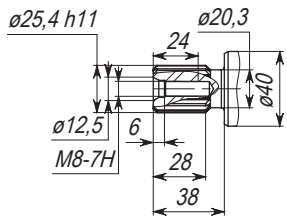
B | Keyed shaft 10x8x50
DIN 6885



P | Keyed shaft 8x7x50
DIN 6885

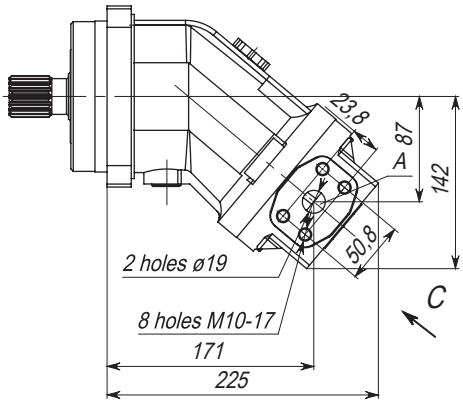


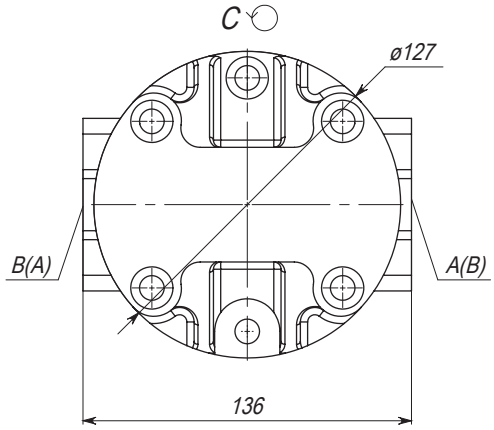
BB | Splined shaft 1 in 15T 16/32 DP
SAE J744-25-4(B-B), z15



WORKING PORTS OPTION

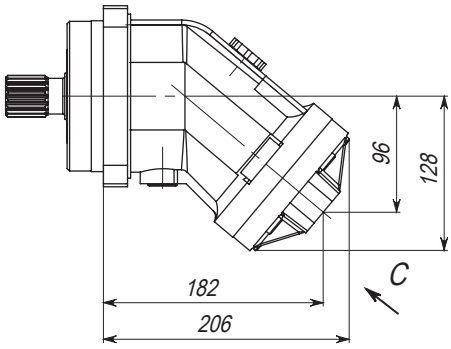
020 two flanged ports on the sides

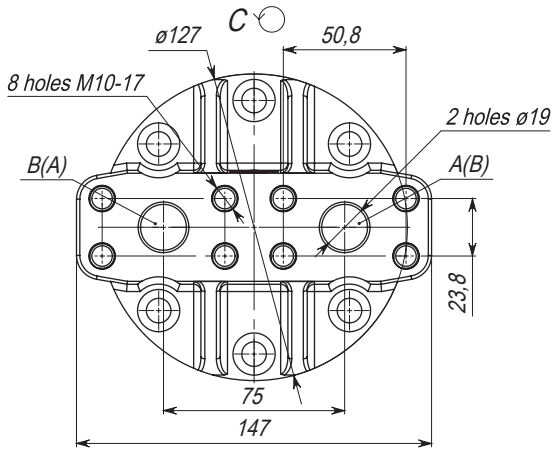




A; B - working lines

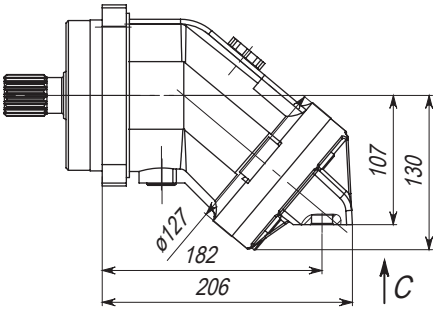
010 two flanged ports on the rear

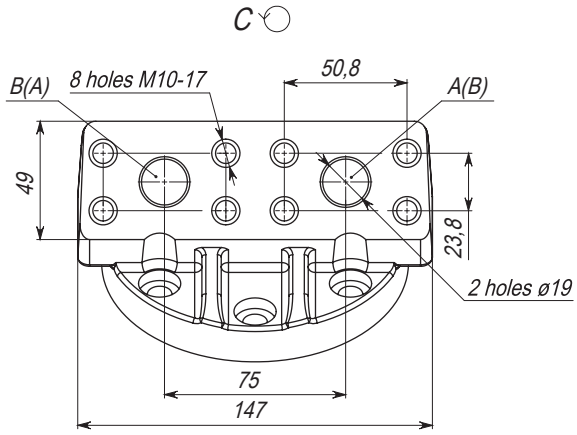




A; B - working lines

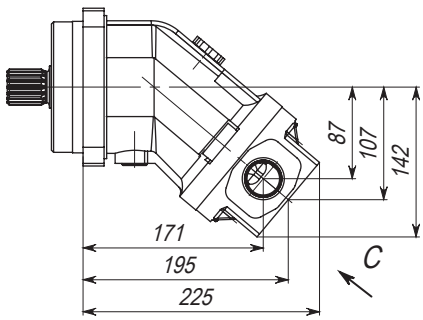
100 two flanged ports on the rear (at 90° to the shaft axis)

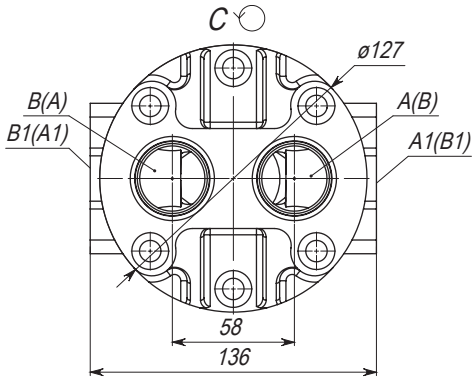




A; B - working lines

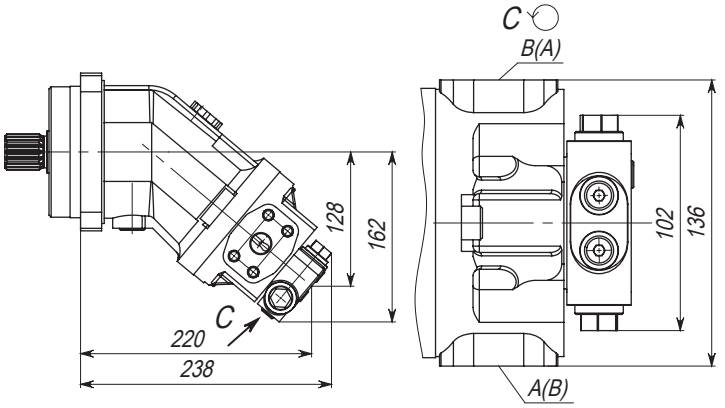
040 four threaded ports, two on the sides, two on the rear



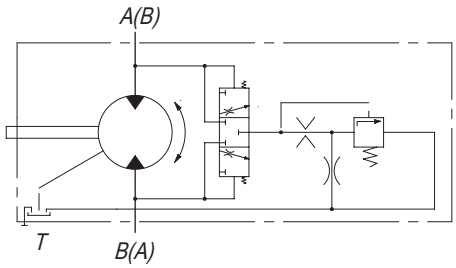


A; A1; B; B1 - working lines
M33x2-18 DIN 3852

027 two flanged ports on the sides (only with flushing valve)

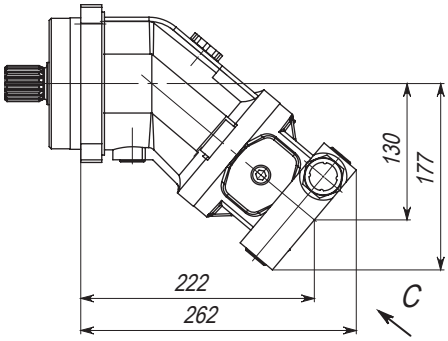


Hydraulic circuit

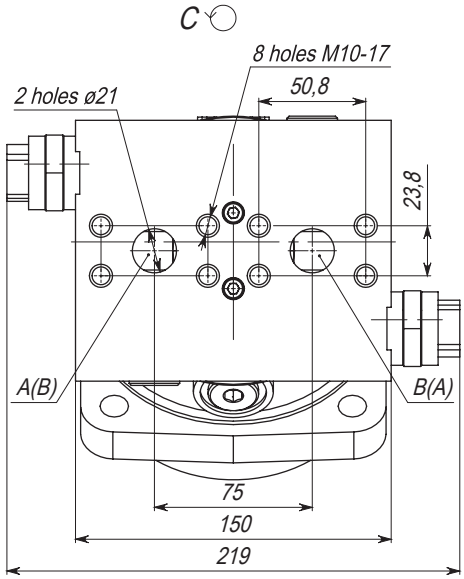


A; B - working lines

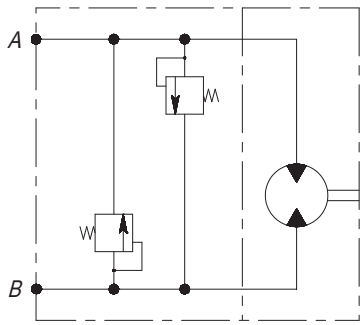
191 two flanged ports on the rear (with manifold block)



A; B - working lines

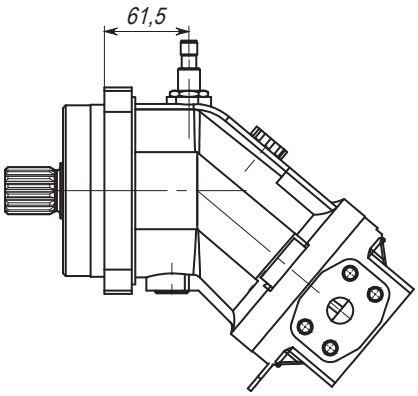


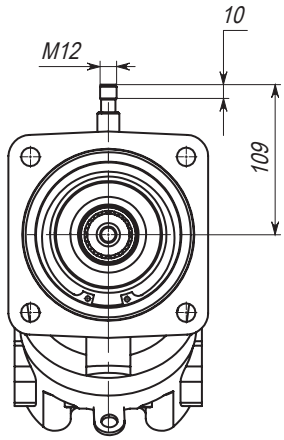
Hydraulic circuit



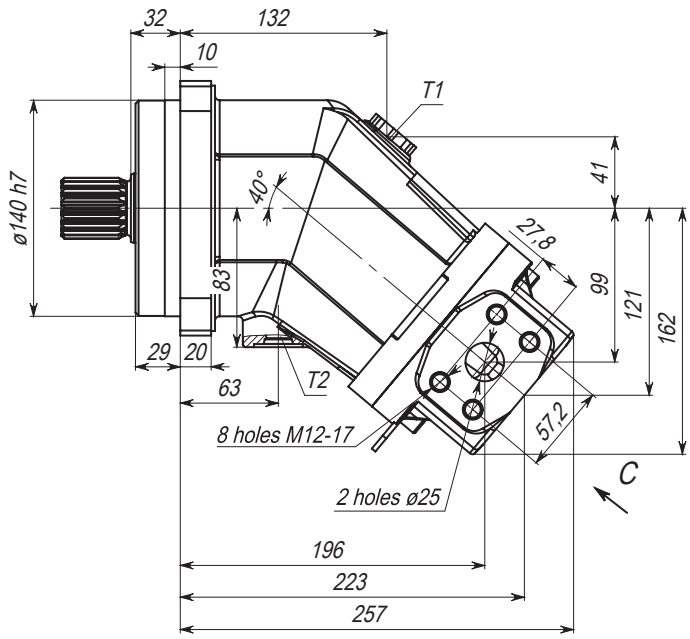
Pressure relief valves standart setting - 350 bar

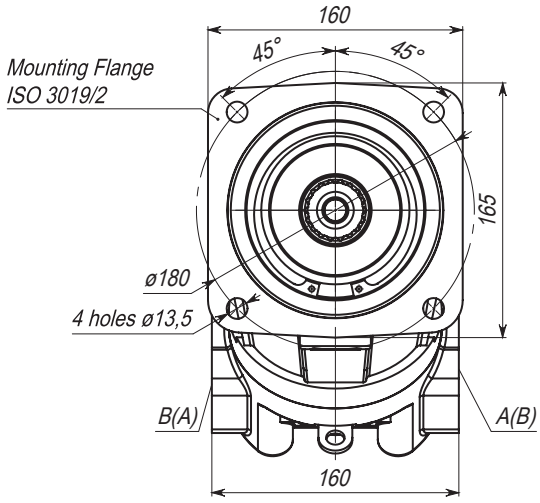
SPEED SENSOR LOCATION





MBF20 MOTORS DIMENSIONS, SIZE 80 CM³

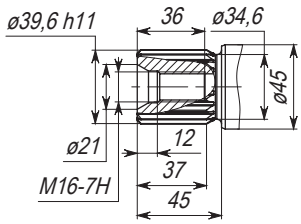




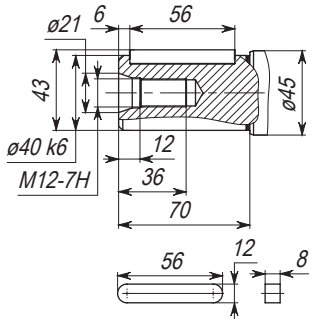
T1, T2 - drain line M18x1,5-12 DIN 3852

DRIVE SHAFTS

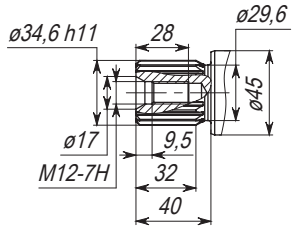
A | Splined shaft W40x2x30x18x9g
DIN 5480, z18



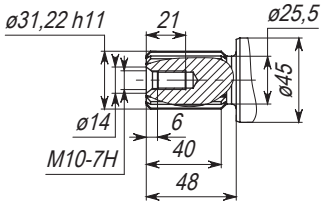
B | Keyed shaft 10x8x50
DIN 6885



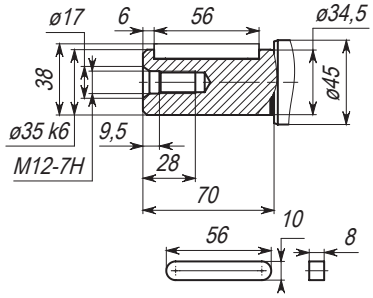
Z | Splined shaft W35x2x30x16x9g
DIN 5480, z16



C | Splined shaft 1 1/4 in 14T 12/24 DP
SAE J744-25-4(C), z14

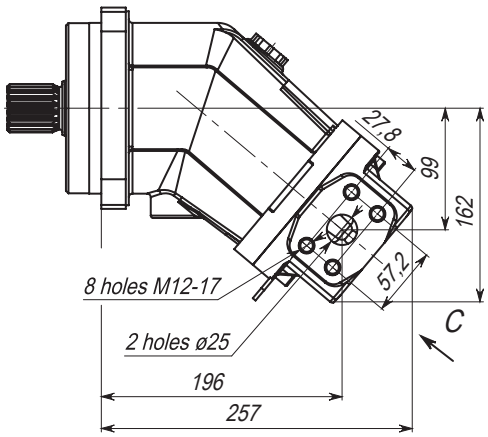


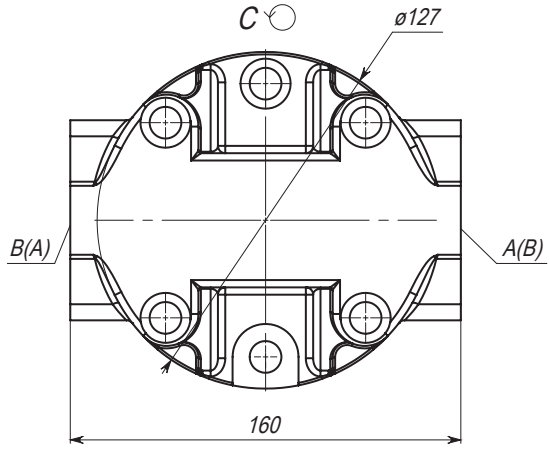
P | Keyed shaft 10x8x56
DIN 6885



WORKING PORTS OPTION

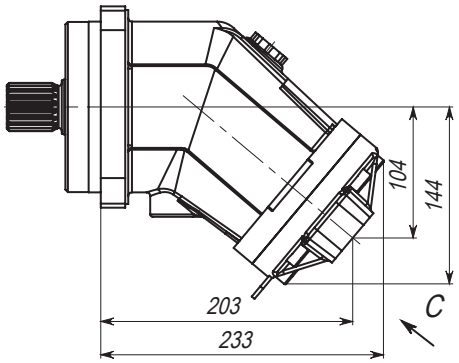
020 two flanged ports on the sides

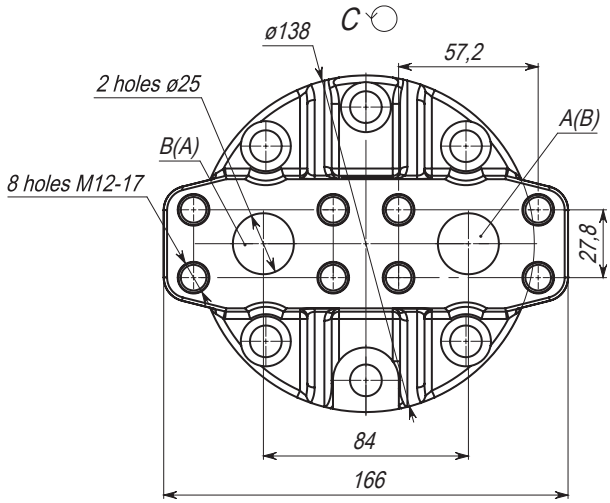




A; B - working lines

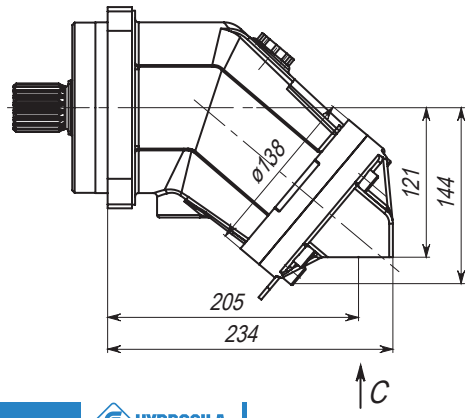
010 two flanged ports on the rear

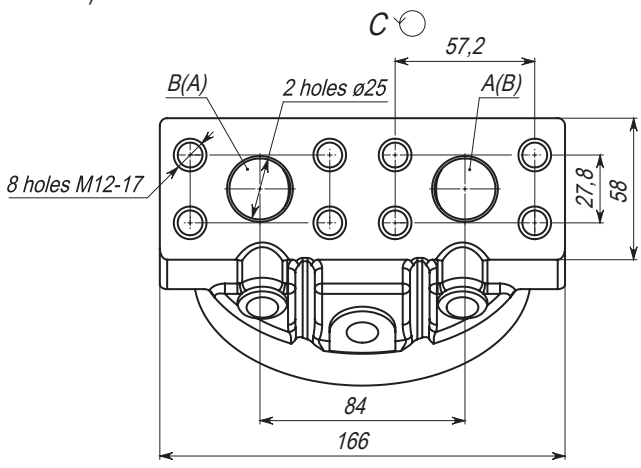




A; B - working lines

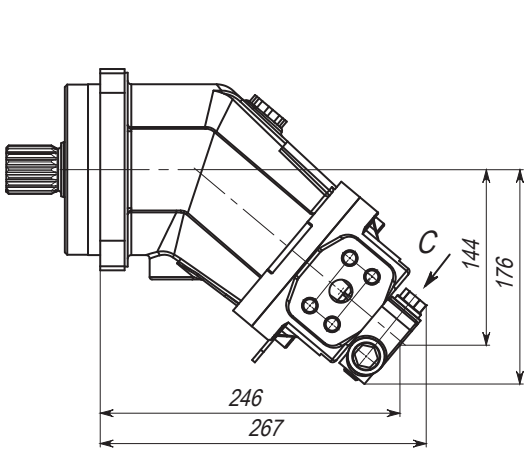
100 two flanged ports on the rear (at 90° to the shaft axis)

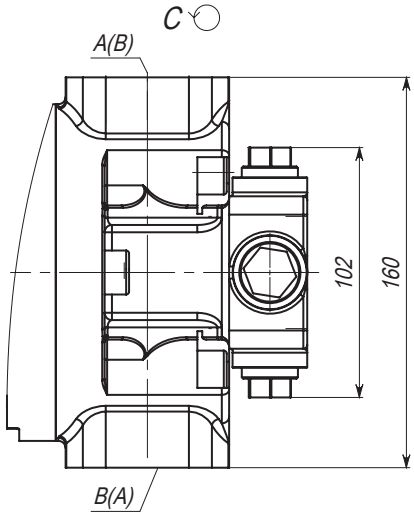




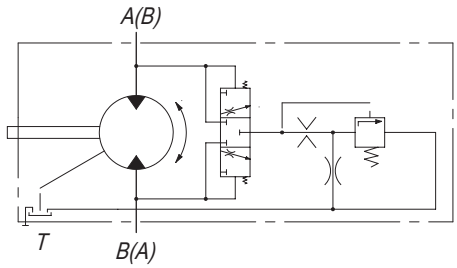
A; B - working lines

027 two flanged ports on the sides (only with flushing valve)



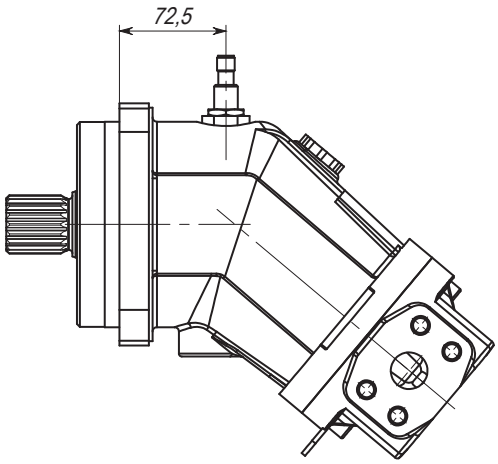


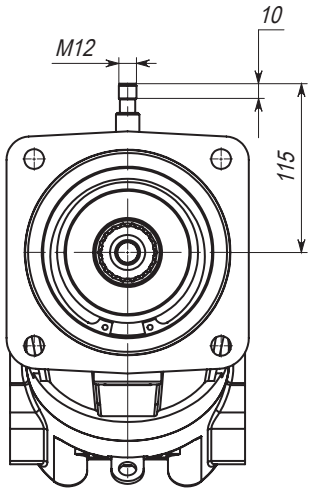
Hydraulic circuit



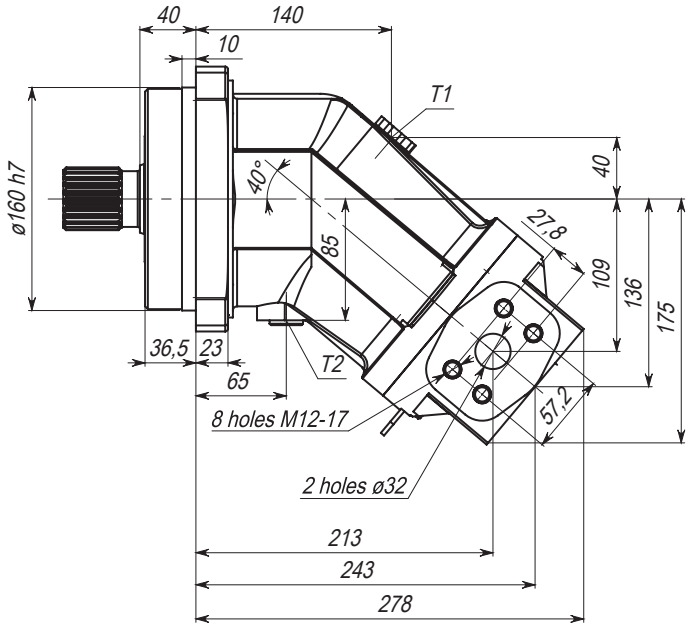
A; B - working lines

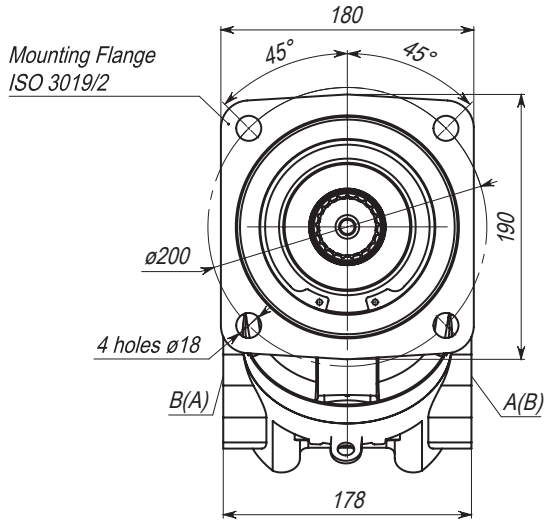
SPEED SENSOR LOCATION





MBF20 MOTORS DIMENSIONS, SIZE 107 CM³

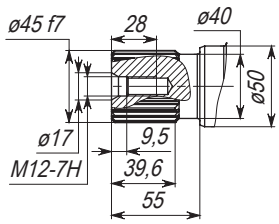




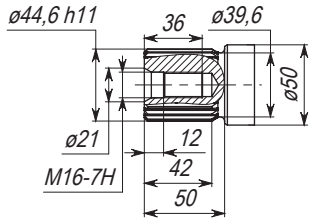
T1, T2 - drain line M18x1,5-12 DIN 3852

DRIVE SHAFTS

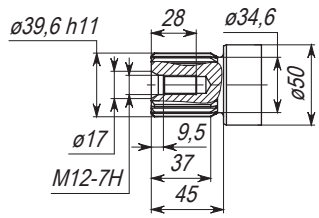
O | Splined shaft W45xh8x2x9g
GOST 6033-80, z21



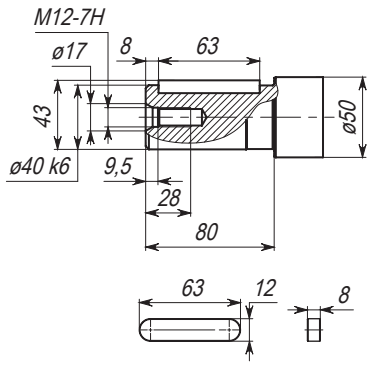
A | Splined shaft W45x2x30x21x9g
DIN 5480, z21



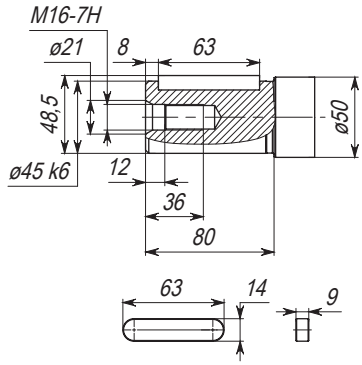
Z | Splined shaft W40x2x30x18x9g
DIN 5480, z18



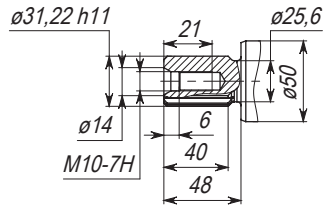
P | Keyed shaft 12x8x63
DIN 6885



B | Keyed shaft 14x9x63
DIN 6885

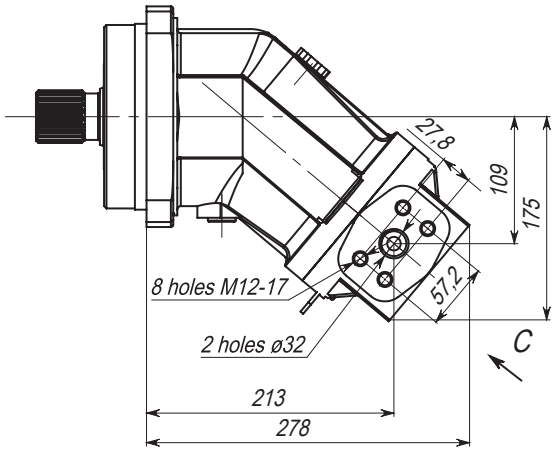


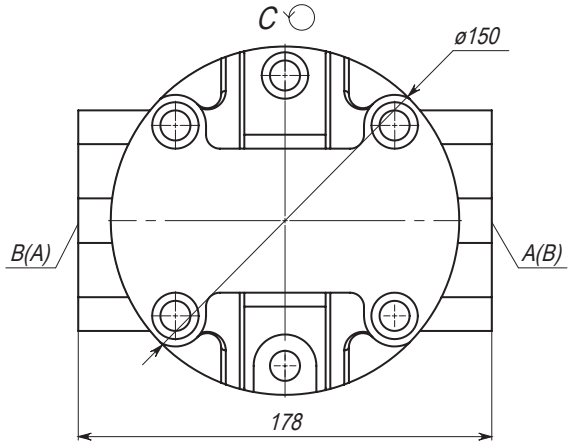
C | Splined shaft 1 1/4 in 14T 12/24 DP
SAE J744-25-4(C), z14



WORKING PORTS OPTION

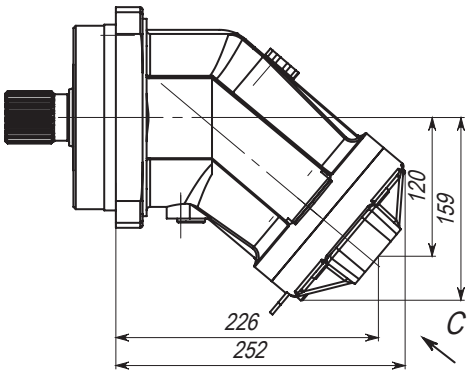
020 two flanged ports on the sides

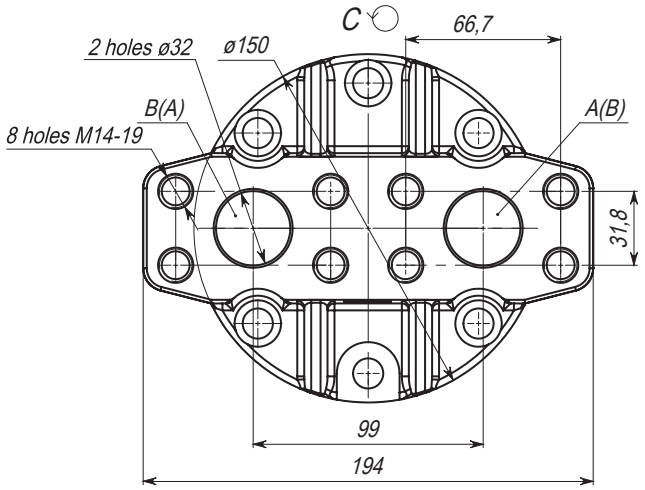




A; B - working lines

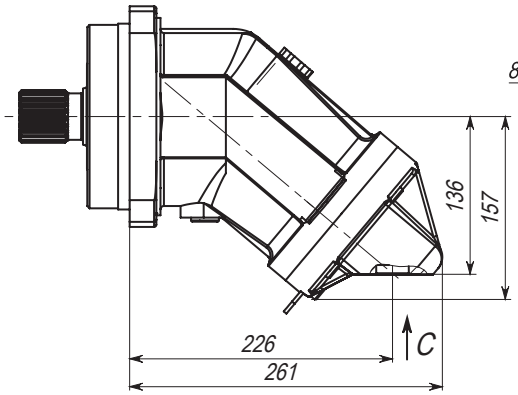
010 two flanged ports on the rear

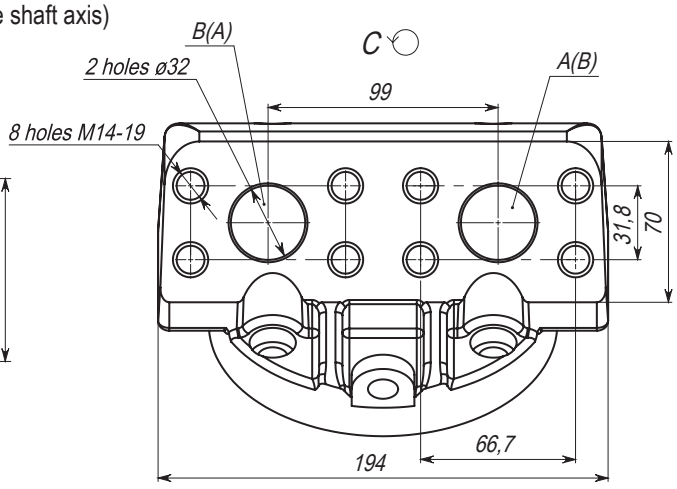




A; B - working lines

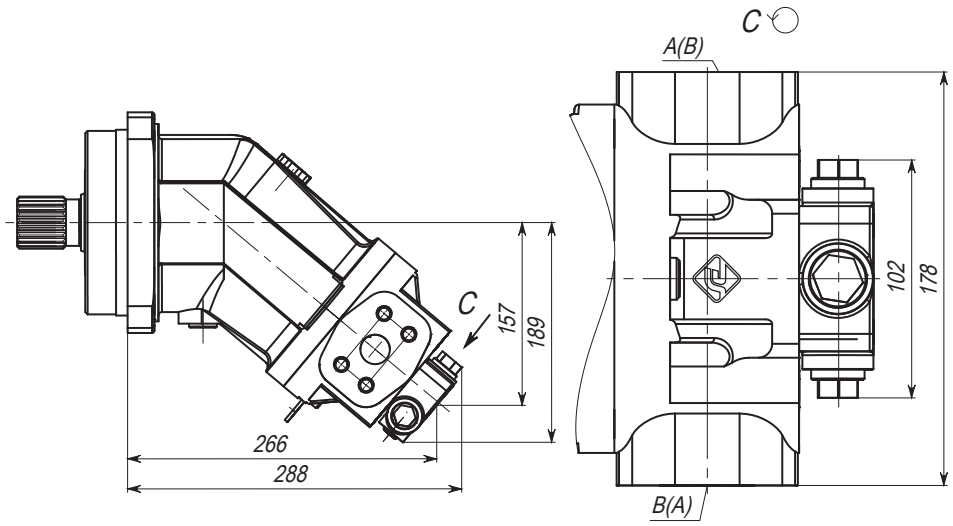
100 two flanged ports on the rear (at 90° to the shaft axis)



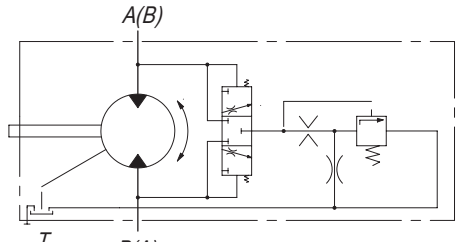


A; B - working lines

027 two flanged ports on the sides (only with flushing valve)

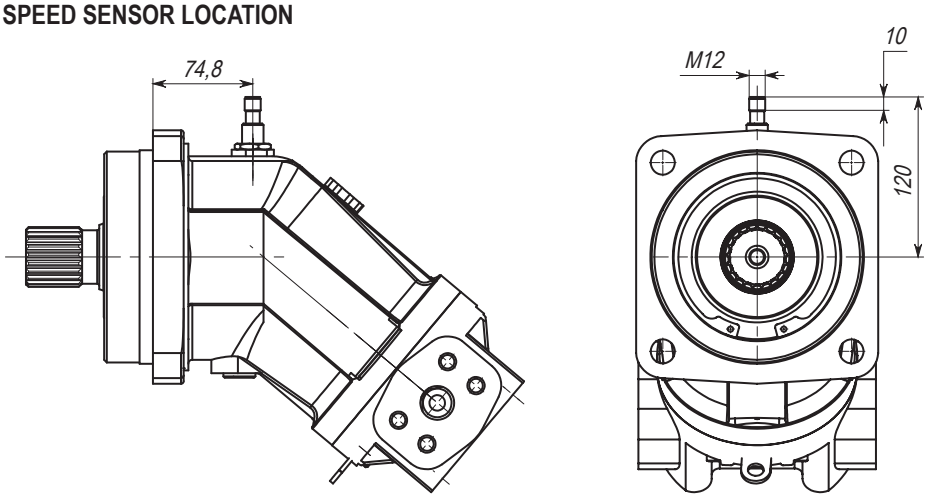


Hydraulic circuit

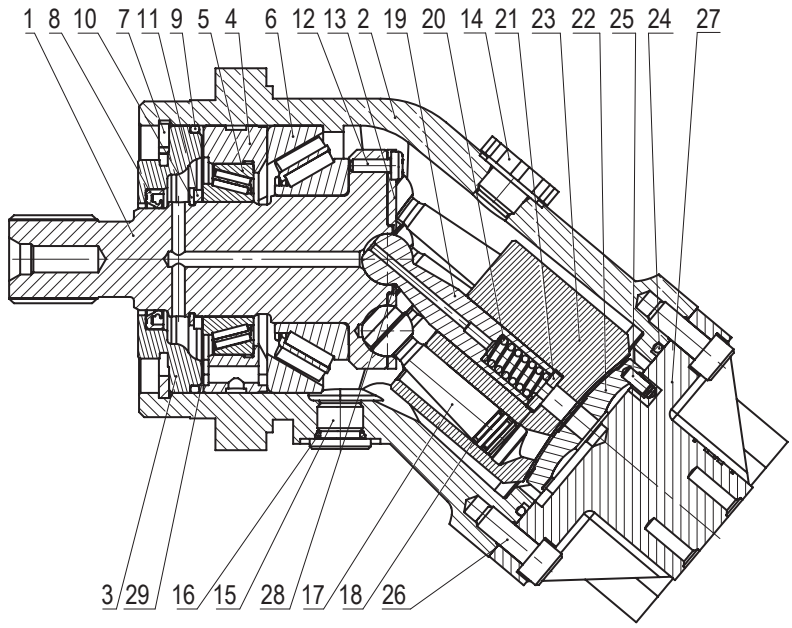


A; B - working lines

SPEED SENSOR LOCATION

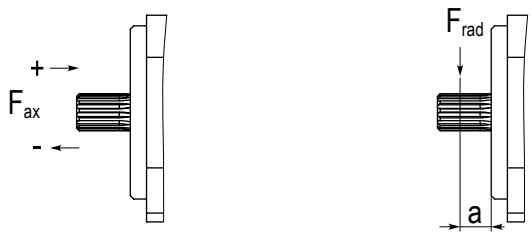


PBF20 PUMPS AND MBF20 MOTORS LAYOUT, SIZE 56, 80, 107 CM³



BF20 (56, 80, 107 cm³)			
POSITION	**NAME**	**POSITION**	**NAME**
1	Shaft	**15**	Plug
2	Body	**17**	Piston
3	Radial seal housing	**18**	Compression ring
4	Bearing cup	**19**	Pin
5, 6	Bearing	**20**	Spring
7, 10	Lock ring	**21**	Support washer
8	Cuff	**22**	Spreader
9, 16, 24	O-ring	**23**	Cylinder block
11	Washer	**25**	Pin
12, 26	Screw	**27**	Cover
13	Separator	**28, 29**	Adjusting washer
14	Transport plug		

LOAD AND DURABILITY (FOR BF20 SERIES PUMPS AND MOTORS)



PERMISSIBLE AXIAL AND RADIAL FORCES ON THE DRIVE SHAFT			
Pumps / motors series	BF20		
Displacement, cm^3	56	80	107
A distance to force F from the shaft collar, a, mm	18	20	20
Maximum radial force F_{rad}, N	9200	11500	13600
Maximum axial force (during standby, no pressure in hydraulic system), $-F_{ax}$, N	0		
Maximum axial force (during standby, no pressure in hydraulic system), $+F_{ax}$, N	800	1000	1250
Permissible axial force (per bar operating pressure), $\pm F_{ax}$, N/bar	8,7	10,6	12,9

NOTE
The direction of the maximum permissible axial force must be consider:
at $-F_{ax}$ - bearing durability is reduced;
at $+F_{ax}$ - bearing durability is increased.

The choice of the optimal direction of the radial force Frad allows to reduce the load on the bearings and achieve an optimal lifetime. Optimal installation angle φ_{opt} for gear (fig. 1) and V-belt (fig. 2) transmission should match to the values in the table.

SERIES	V-BELT	GEAR
BF10	70°	45°
BF20	45°	70°

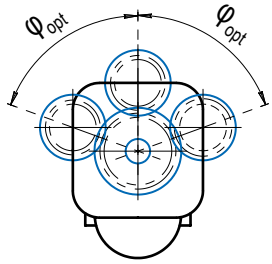


Fig. 1

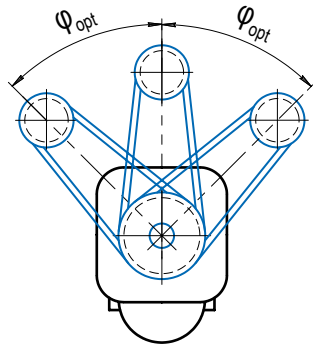


Fig. 2

HYDRAULIC FLUID

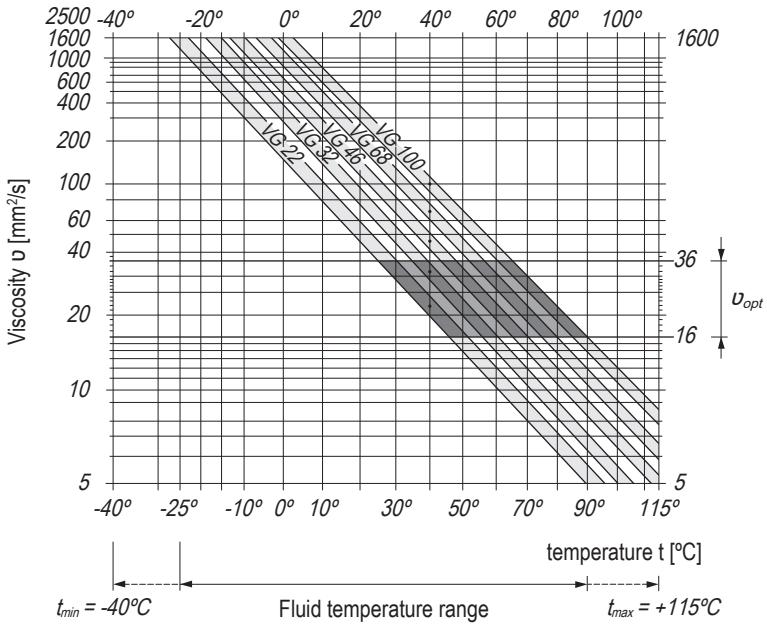
All parameters and characteristics of hydraulic units suggest that hydraulic system uses high quality hydraulic fluids and additives. They should have a number of properties: anticorrosive, antioxidant, anti-foam, and others. These fluids are high-quality turbine oils, API CD SAE J183 engine oil, automatic transmission fluids (ATF) and some specialty fluids.
Never mix different fluids.

HYDRAULIC FLUID CHOICE

For the correct choice you need to know the working temperature of the fluid in the hydraulic tank (depending on the ambient temperature) and the viscosity of the fluid. The fluid must be selected so that the viscosity be within the allowable range (V_{opt}) at any temperature (t_{min}-t_{max}), (see diagram). It is recommended to select a higher temperature class of the working fluid.

EXAMPLE.
At an ambient temperature of X°C, an operating temperature of 60°C is set. In the optimum working range of (V_{opt}) viscosity, this corresponds to classes VG 46 and VG 68. The right choise is VG 68. The temperature of fluid in the drain channel is always higher than the temperature in the tank. At any point in the hydraulic system fluid temperature should not exceed 90°C.
If it is not possible to comply with temperature conditions, consult for advice.

SELECTION DIAGRAM



HYDRAULIC FLUID FILTRATION

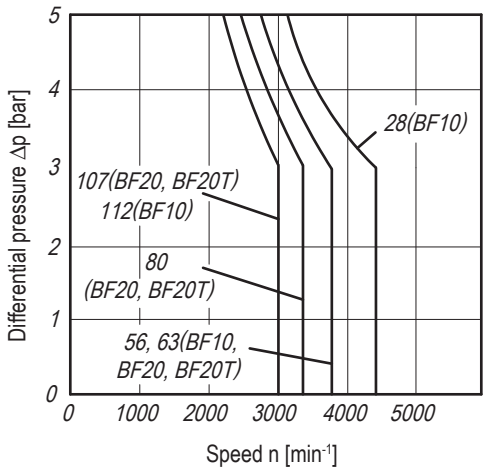
The better filtration provides the higher purity class of the working fluid, which in turn increases the axial piston unit lifetime. To ensure reliable operation of the axial piston unit, it is necessary to determine the working fluid purity according to ISO 4406. At very high temperatures of the working fluid (from 90°C to a maximum of 115°C), a purity class at least 19/17/14 according to ISO 4406 is required. If it is impossible to comply with the purity class, please consult.

VISCOSITY AND TEMPERATURE OF WORKING FLUID

CONDITIONS	VISCOSITY	TEMPERATURE	NOTES
Storage and transportation		$T_{min} \geq -40°C$ $T_{opt} = +5°C…+20°C$	Storage at the factory: Standard - up to 12 months; Long-term - up to 24 months
Cold start	$\upsilon_{max} \leq 1600$ mm²/s	$T \geq -40°C$	$t \leq 3$ min, $n \leq 1000$ min^{-1}, no load $P \leq 50$ bar
Permissible temperature drop		$T \leq 25°C$	The temperature difference between the axial piston pump and the working fluid in the system
Warm-up period	$\upsilon = 1600...400$ mm²/s	$T = -40°C…-25°C$	at $P \leq 0.7 \cdot P_{nom}$, $n \leq 0.5 \cdot n_{nom}$ $t \leq 15$ min
Continuous operating mode	$\upsilon = 400...10$ mm²/s		In case of VG 46 corresponds to a temperature range of + 5°C to + 85°C
		$\Delta T = 12°C$ $T = -25°C…+103°C$	The temperature difference between the cuff, bearing and drainage Temperature in drain line
	$\upsilon_{opt} = 36...16$ mm²/s		Optimal viscosity range in operating mode
Short-term operating	$\upsilon_{min} \geq 7$ mm²/s	$T = +103°C$	$t < 3$ min, $p < 0.3 \cdot P_{nom}$

SHAFT SEAL

The shaft seal service life depends on the shaft speed and drain pressure. The diagram shows the dependence of the shaft speed on the case pressure that acts on the seal from the pump cavity. When the hydraulic unit is operating at the maximum allowable drain pressure, the shaft seal life is reduced. Short-term pressure (t <0,1 sec) up to 10 bar is allowed, but with the increasing the pressure pulsation frequency the shaft seal service life is reduced. The case pressure must be equal to or higher than the ambient pressure.



Maximum case pressure:

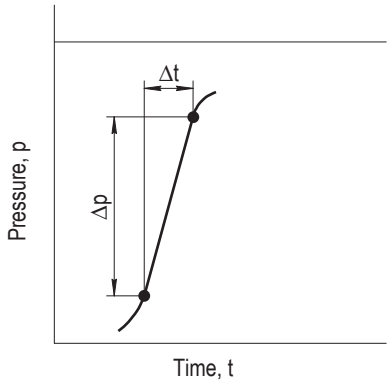
1 bar - for 28 cm^3 series BF10

2,5 bar - 56 cm^3 and 112 cm^3 series BF10, BV10

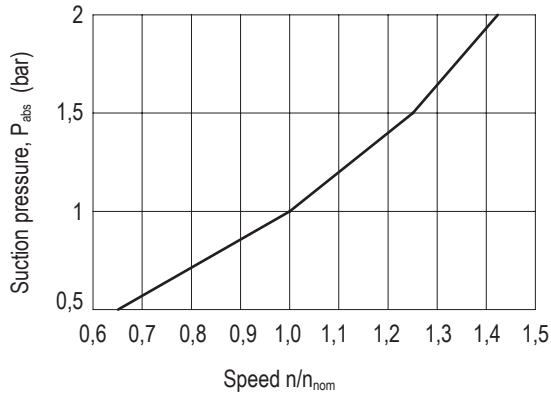
to 3 bar - 56 cm^3, 63 cm^3, 80 cm^3, 107 cm^3 series BF20, BF20T

SUCTION PRESSURE AT INCREASED SPEED

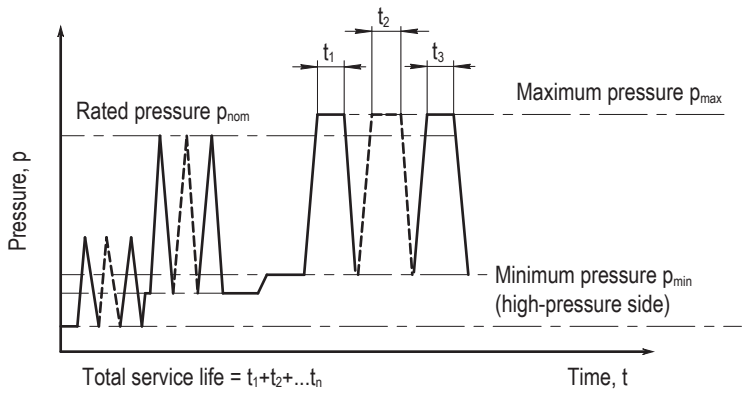
PRESSURE CHANGE RATE



SHAFT ROTATION SPEED TO SUCTION PRESSURE RATE



OPERATING PERIODS OF THE PUMP THROUGHOUT THE ENTIRE SERVICE LIFE



t_1, t_2, t_3, t_n - single operating period

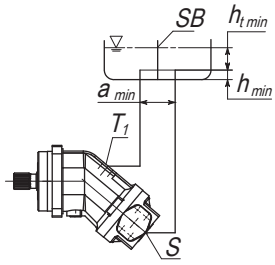
INSTALLATION INSTRUCTIONS

During commissioning and operation, the axial piston unit must be filled with hydraulic fluid and air bled. This must also be observed following a relatively long standstill as the axial piston unit may drain back to the reservoir via the hydraulic lines.
In case of "above reservoir" installation filling and air bleeding must be carried out completely as there is, for example, a danger of dry running.
The drain line to tank (T1, T2) should be located at the highest available level (for the PBF10, PBF20 series).
To achieve lower noise levels, connect all hydraulic lines using flexible hoses and avoid "above reservoir" installation.
In all operating conditions, the drain line must flow into the reservoir below the minimum fluid level. Maximum permissible suction height is 800 mm. The minimum pressure in the suction channel S must also not fall below 0.8 bar to absolute pressure (pabs) during the operation and cold start.

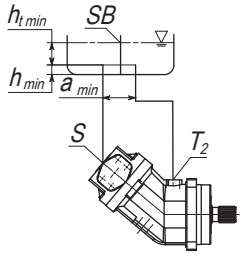
INSTALLATION POSITION FOR PUMPS PBF20

Below-reservoir installation

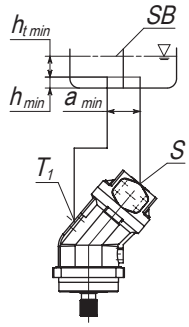
Below-reservoir installation means that the axial piston unit is installed outside of the reservoir below the minimum fluid level. **Installation in positions 1 and 2 is recommended.**



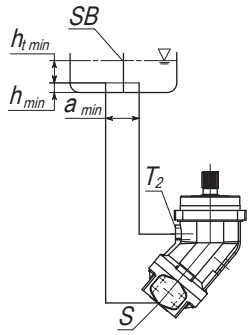
Pos. 1



Pos. 2



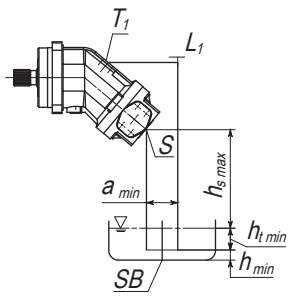
Pos. 3



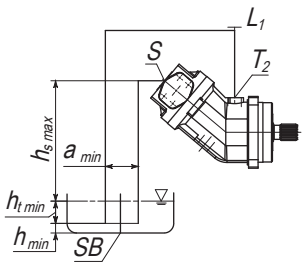
Pos. 4

Above-reservoir installation

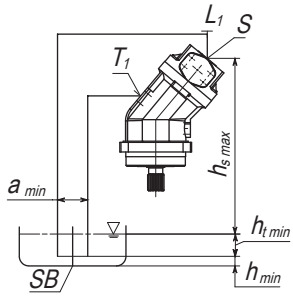
Above-reservoir installation means, that the axial piston unit isinstalled above the minimum fluid level.
Recommendation for installation position 8 (drive shaft upward): a check valve in the drain line (cracking pressure 0.5 bar) can prevent draining of the pump housing.



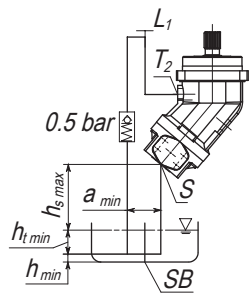
Pos. 5



Pos. 6



Pos. 7



Pos. 8

S Suction line
T_1, T_2 Drain line
SB Damping wall (panel)
$h_{t\,min}$ Minimum required loading depth 200 mm
h_{min} The minimum required distance to the bottom of the tank 100 mm

L_1 Filling / air bleed
$h_{S\,max}$ Maximum permissible suction height (800 mm)
a_{min} When selecting a tank, it is necessary to ensure a sufficient distance between the suction line and the drain line. This will prevent the absorption of heated fluid back into the suction line.

HYDRAULIC TANKS REQUIREMENTS

1. Design of the tank should facilitate cooling of the working fluid, prevent access of air to the working fluid and foaming it, eliminates theingress of contaminants from the environment and sucking sediment from the bottom of the tank to the hydraulic system.
2. The tank must be equipped with a level indicator, and if necessary, equipped with an automatic device that regulates the level of working fluid or signal when the predetermined level.
3. The tank must have a filler neck with a filter and a sealed cap with restraint. The design and installation of the filter should prevent damage during operation. The capacity of the filler neck with a filter must ensure filling the tank within the time stipulated by the technical documentation for specific types of hydraulic tanks.
4. It is desirable that the design of the hydraulic tank provide for a closed filling, in which the working fluid enters the tank through a pipeline hermetically connected to the tank from the filling station.
5. There shoulb be an air bleeder at the top of the tank (for tanks design for operation in ambient pressure) with an air filter with a filter fineness corresponding to the required purity of the working fluid in the system.
The bandwidth of the bleeder should ensure the pressure drop in the tank at the maximum rate of change of the working fluid level does not exceed the value set in the documentation for specific hydraulic tanks. The leakage of the working fluid through the bleeder should be excluded during operation.
6. The design of the tank should ensure its convenient cleaning. Drains must be located in such places that the working fluid can be drained from the tank.
7. The surface of the tank must be protected against corrosion, resistant to the working fluid, causing no pollution.

Hydrosila
25006, Ukraine, Kropyvnytskyi
Tel . : +38 (0522) 39-16-33
Fax: +38 (0522) 39-16-46
e-mail: dir.export@hydrosila.com
www.hydrosila.com

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