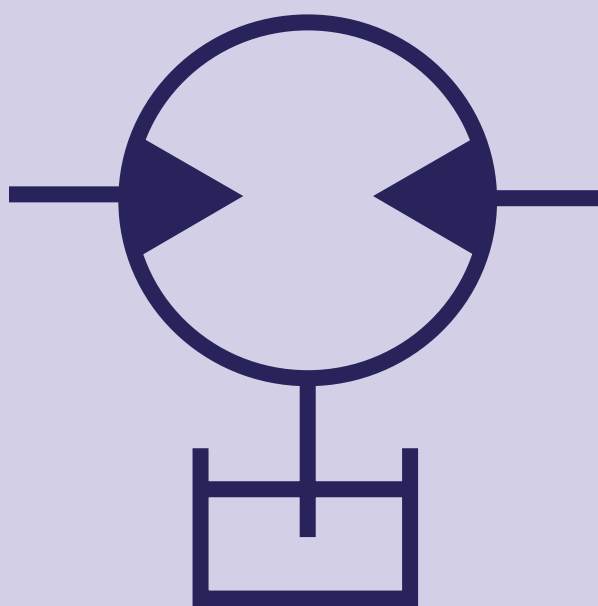
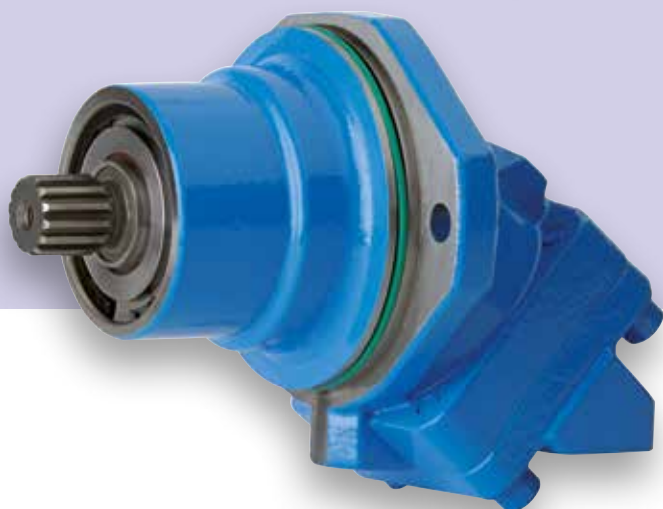
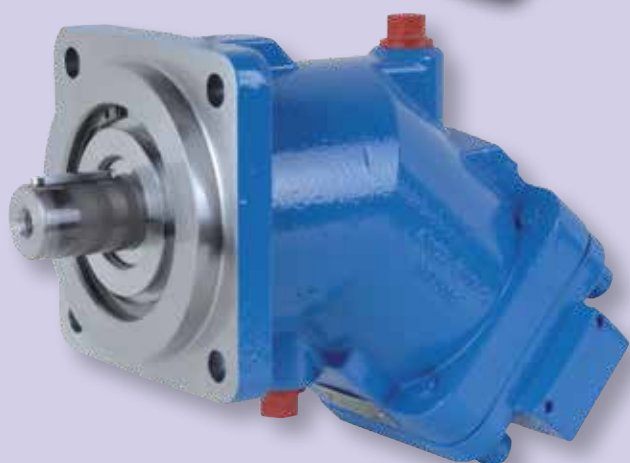
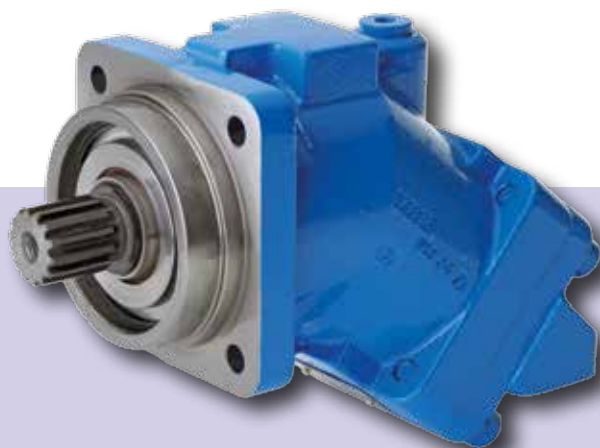


BENT AXIS HYDRAULIC MOTORS

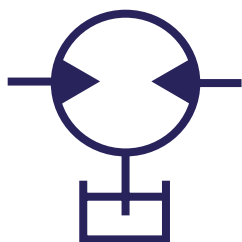
FIXED DISPLACEMENT



make it simple

 **HYDRO
LEDUC**

BENT AXIS

HYDRAULIC MOTORS

Applications and efficiency	4
Definition and advantages	5
Operating conditions	6
Determination / calculating the right motor	8

M series

Range and characteristics of M series motors	10
Order code system of M series motors	11
Dimensions M 5 to M 180	12

MA series

Range and characteristics of MA series motors	26
Order code system of MA series motors	27
Dimensions MA 10 to 180	28

MSI series

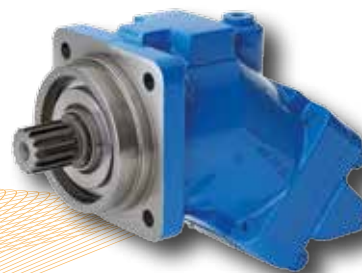
Range and characteristics of MSI series motors	42
Order code system of MSI series motors	43
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M

- Displacement 5 cc/rev - CETOP
- Displacements from 12 to 180 cc/rev - ISO
- For fixed and mobile applications



M series

MA

- SAE
- Displacements from 10 to 180 cc/rev
- For fixed and mobile applications



MA series

MSI

- ISO - semi-integrated
- Displacements from 28 to 125 cc/rev
- For applications mounted on a planetary gearbox



MSI series

Drainless motor

- Single direction of rotation
- Bi-directional rotation



Options
Accessories

► Main applications

Typical applications are those requiring high torque within a small size.

The hydraulic motor is essential for rotations where:

- mechanical solutions are complex or even impossible;
- electrical or pneumatic power sources are not available;
- environments are dangerous (i.e. risk of explosion or extreme temperatures).

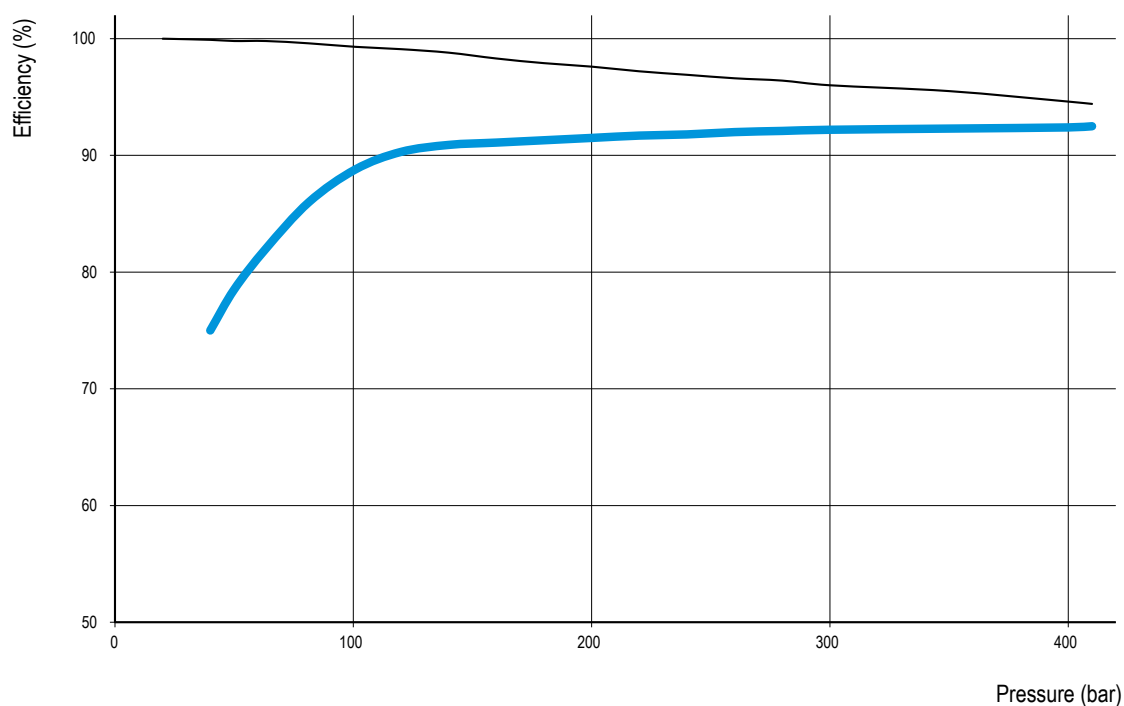
► Examples of use

- Mowers: drive of grass cutting blade, where mechanical solution would be too complicated or impossible;
- Blowers: compressor drive;
- Wheel drive of undercarriages for construction equipment (motor installed on planetary gearbox);
- Industrial of marine winch drive;
- Fan drives.

EFFICIENCY OF M / MA / MSI SERIES MOTORS

N motor = 1000 rpm

ISO46 fluid at 77° F (25°C)



— Global efficiency
— Volumetric efficiency

This graph is given as an indication only.
For further information, please contact our Technical Service.

► Definition of function

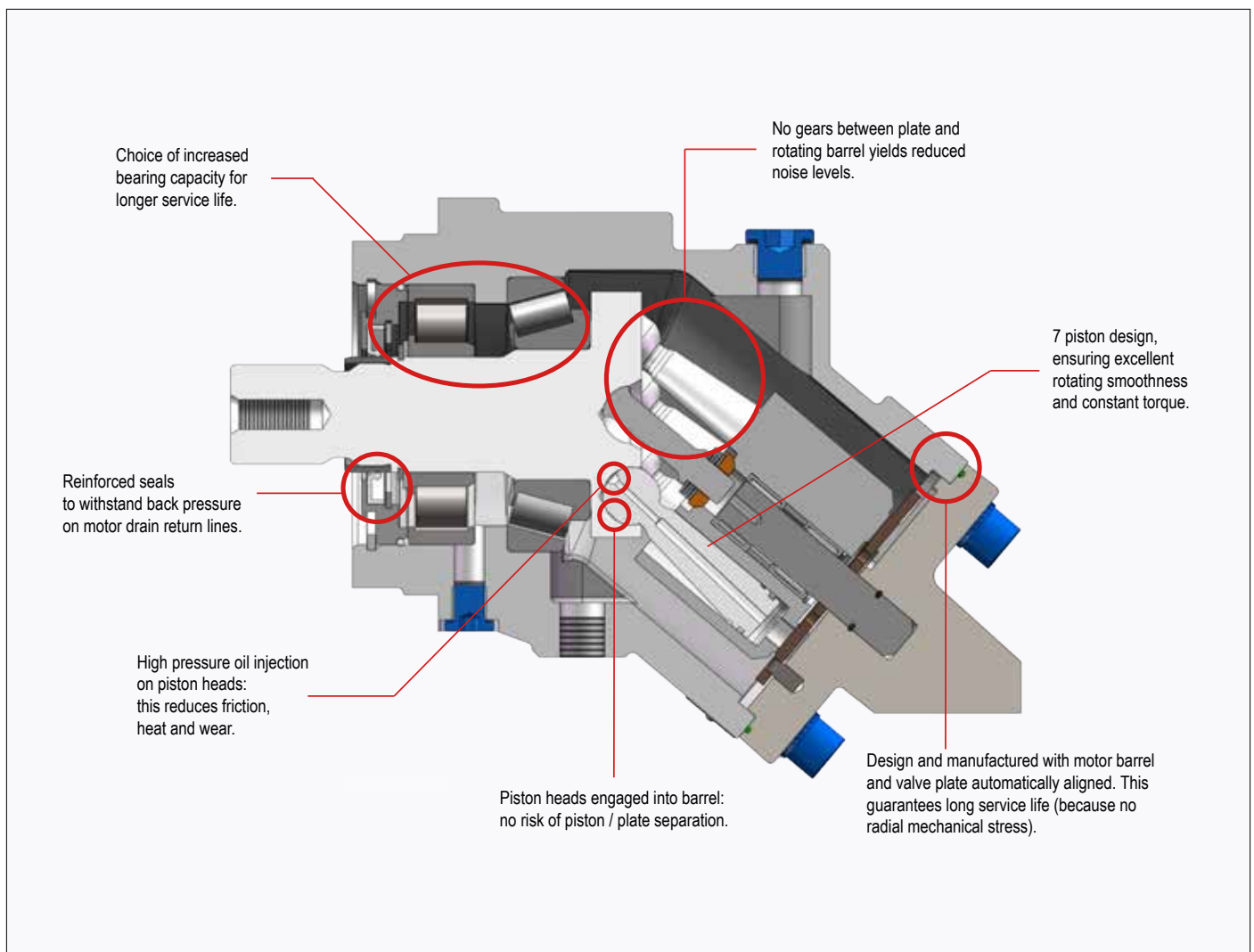
Hydraulic motors transform hydraulic flow into rotating speed and hydraulic pressure into mechanical torque.

Motor rotating speed is proportional to the flow which is supplied to it. Torque produced is proportional to the hydraulic pressure the motor receives.



► Advantages of LEDUC motors

High quality materials and workmanship. The design choices highlighted below ensure the remarkable reliability and long service life of LEDUC motors.



► Preparation of the motor

Before start-up, the motor must be filled with oil.



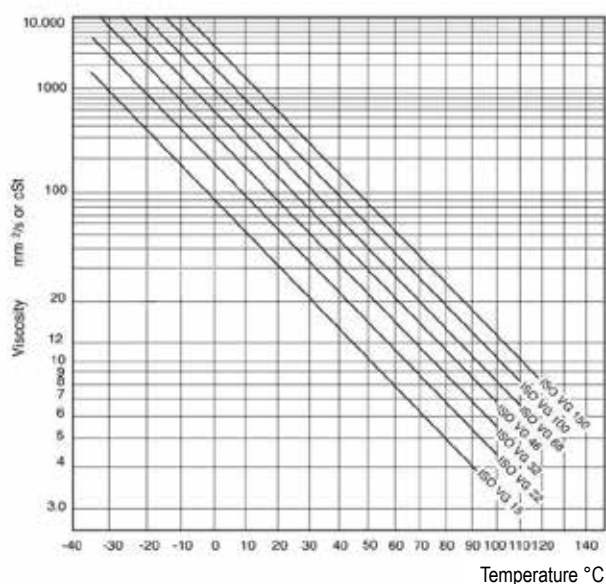
► The fluid

LEDUC motors are designed for use with mineral based hydraulic fluid. Using other fluids is possible but may require a modified motor. Please contact us with details of fluid.

Recommended viscosity:

- Ideally: between 15 and 400 cSt;
- Maximum range: between 5 and 1600 cSt.

Fluid viscosities as a function of temperature



► Filtration of the hydraulic fluid

The service life of the motors depends greatly on the quality and the cleanliness of the hydraulic fluid.

We recommend minimum cleanliness as follows:

- NAS 1638 class 9,
- SAE class 6,
- ISO/DIS 4406 class 20/18/15.

For fluids at very high temperatures 194 to 239 °F (90 to 115 °C), we recommend a minimum cleanliness class of 19/17/14 according to ISO 4406.

► Rotating speeds

Minimum rotating speed to obtain continuous rotation is 200 rpm (however, in certain conditions, the motor can run at speeds as low as 50 rpm). Maximum rotating speed is given for each model of motor.

► Installation positions

LEDUC motors are made to operate in all positions (see details on page 52).

► Operating temperatures

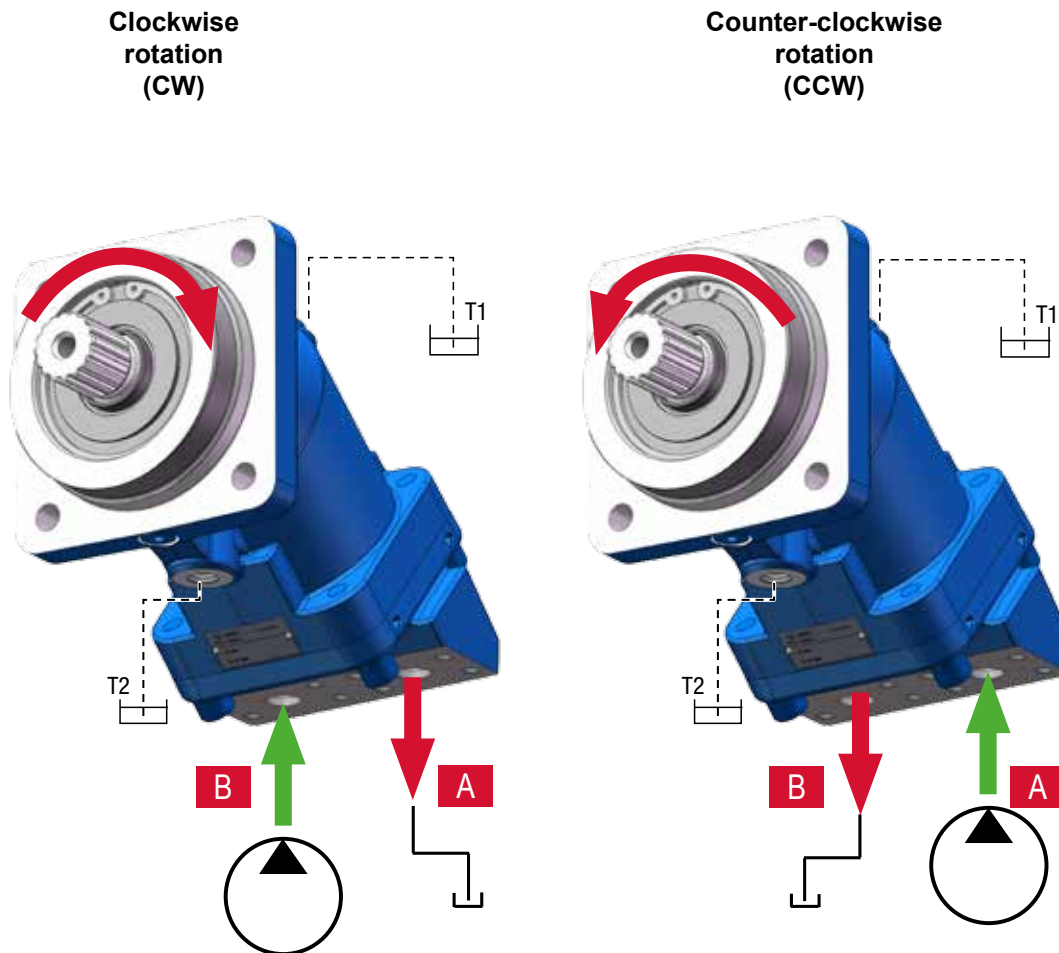
- As standard, LEDUC motors are fitted with FKM seals (Viton ®). Operating temperatures: from -13 to 239 °F (-25 to 115 °C).
- As an option, HYDRO LEDUC proposes NBR seals, for operating temperatures from -40 to 176°F (-40 to 80°C).

IMPORTANT NOTE:

*Before start up, ensure the motor is filled with hydraulic fluid:
See section on installation and start-up, page 52.*

► Direction of rotation

The motors rotate clockwise or counter-clockwise depending on the direction of hydraulic flow entering the motor.

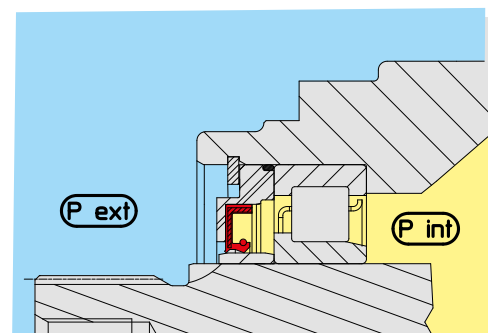


► Drain pressure

It is essential to drain the motor, T1 or T2, to avoid excessive pressures on the shaft seal. Maximum acceptable internal pressure depends on motor rotating speed.

However, following these guidelines will avoid problems during operation:

- Maximum internal pressure (int P) regardless of rotating speed (continuous): 4 bar;
- Maximum internal pressure (int P) regardless of rotating speed (peak): 5.5 bar;
- Minimum pressure in the motor housing: must be greater than ambient (external) pressure (ext P).



► How to determine the correct motor for your application

Calculations using usual mechanical units:

N	= rotating speed (rpm)
C	= Torque (N.m)
ΔP	= Pressure difference between A and B (bar)
Cy	= Displacement cc/rev
Q	= Flow (l/min)
η	= Efficiency (%)

1. Torque supplied by the hydraulic motor

$$\text{Theoretical torque} = \frac{C_y \times \Delta P}{20 \pi} = C_{th}$$

$$\text{Torque } C = C_{th} \times \eta_{motor}$$

For example: a 50 cc/rev motor with a ΔP of 250 bar will supply a theoretical torque of 200 N.m.

Average global efficiency of the motor is 90%, actual torque is thus: 180 N.m).

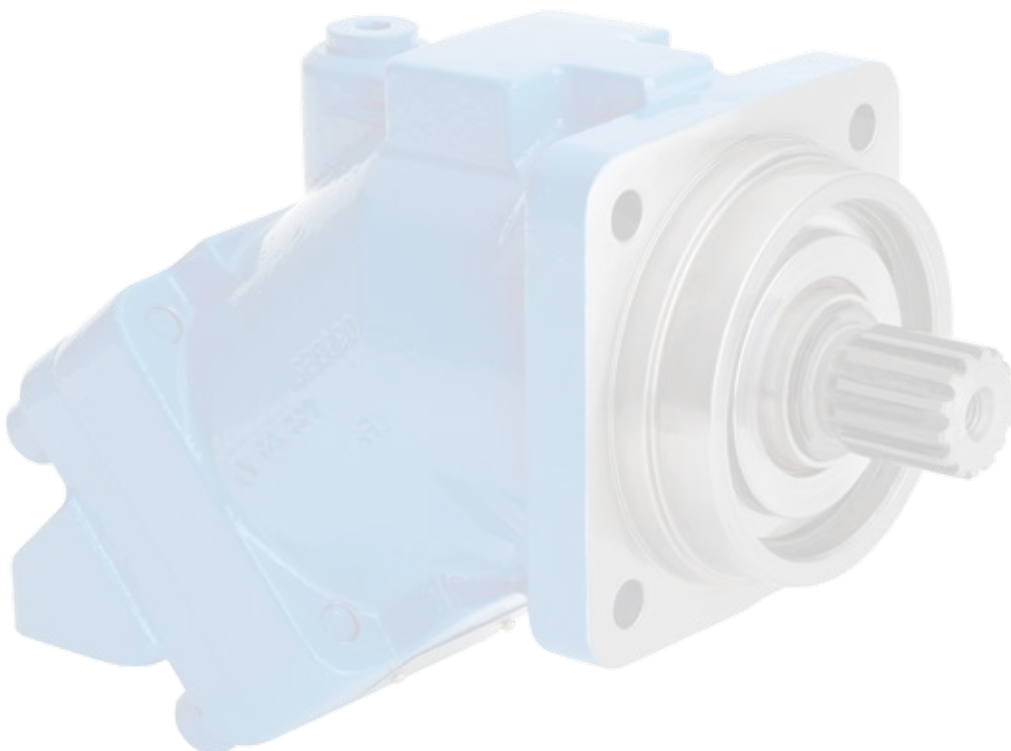
2. Rotating speed of the motor

The rotating speed of the hydraulic motor depends on the flow Q which goes through it, and on the displacement of the motor.

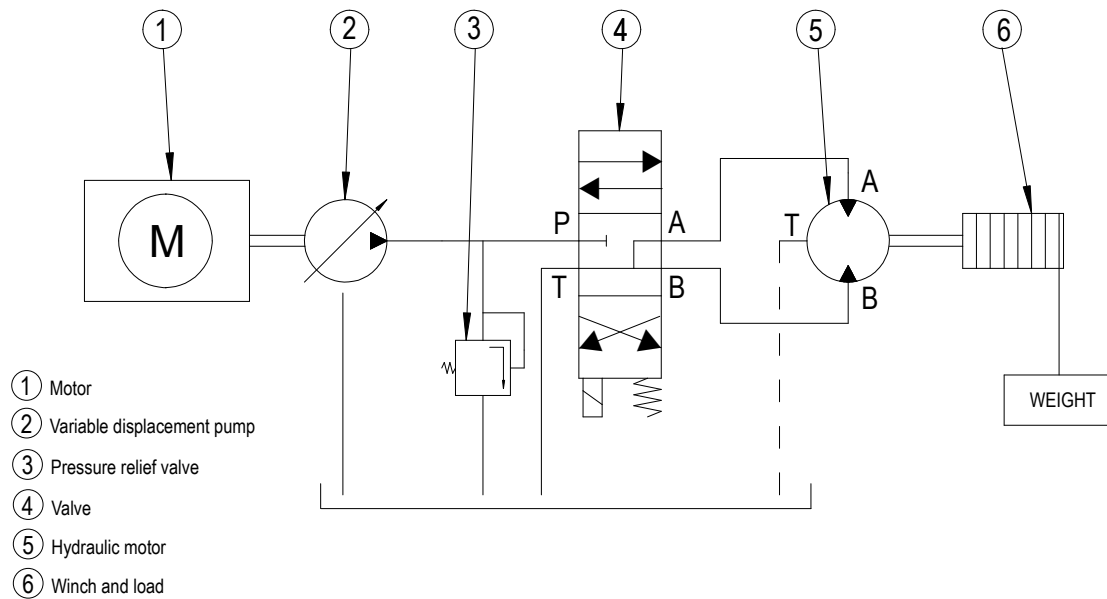
$$N = \frac{Q}{\text{Displ.}} \times 1000$$

► Technical assistance

Our Customer Service would be pleased to assist in determining the right motor for your application.



► Example



The receiving organ (winch) ⑥ needs to rotate at $N = 400$ rpm and supply an actual torque of 200 N.m.
The hydraulic pump ② is capable of operating at pressure P up to 350 bar.

1. Calculating the displacement of the hydraulic motor:

$$C_{th} = \frac{\text{Disp.} \times \Delta P}{20 \pi} \text{ thus Disp.} = 35.9 \text{ cc/rev}$$

In the LEDUC range, choose a motor with a displacement of 32 cc/rev or 41 cc/rev.

2. Calculating the flow Q which the pump needs to supply:

$$Q = \frac{N \times \text{Disp.}}{1000}$$

Corresponding flow:

- For 32 cc/rev motor, $Q = 12.8$ l/min
- For 41 cc/rev motor, $Q = 16.4$ l/min

CHARACTERISTICS OF THE M SERIES MOTORS

Motor model	Displacement (cc/rev)	Continuous max. speed (1) (rpm)	Intermittent max. speed (1) (rpm)	Max. flow absorbed (l/min)	Torque (N.m/bar)	Torque at 350 bar (N.m)	Theoretical maximal power at 400 bar (kW)	Max. allowable pressure continuous / peak (bar)	Weight (kg)
M 5_093840	5	8000	8800	40	0.08	28	26.6	400 / 450	4.4
M 12	12	8000	8800	96	0.19	67	64	400 / 450	5.5
M 18	18.0	8000	8800	144	0.29	100	96	400 / 450	5.5
M 25	24.9	6300	6900	157	0.40	139	104.5	400 / 450	11.5
M 28	27.7	6300	6900	175	0.44	154	116.3	400 / 450	11.5
M 32	32.1	6300	6900	202	0.51	179	134.8	400 / 450	11.5
M 41	41.1	5600	6200	230	0.65	229	153.4	400 / 450	11.5
M 45	45.4	5000	5500	227	0.72	253	151.3	400 / 450	18
M 50	50.3	5000	5500	252	0.80	280	167.6	400 / 450	18
M 63	63	5000	5500	315	1.00	351	210	400 / 450	18
M 80	80.4	4500	5000	362	1.28	448	241.2	400 / 450	23
M 90	90	4500	5000	405	1.43	501	270	400 / 450	23
M 108	108.3	4000	4400	433	1.72	603	288.8	400 / 450	23
M 108 R (2)	108.3	3400	4500	368	1.72	603	245.4	400 / 450	35
M 125	125.4	3400	4500	426	2.00	699	284.2	400 / 450	35
M 160	160	3600	4000	576	2.55	891	384	400 / 450	48.5
M 180	180.6	3600	4000	650	2.87	1006	433.4	400 / 450	48.5

(1) For higher speeds, please contact us.

(2) The M 108 R motor is in the frame size of the M 125.

► Acceptable forces applied to motor shaft

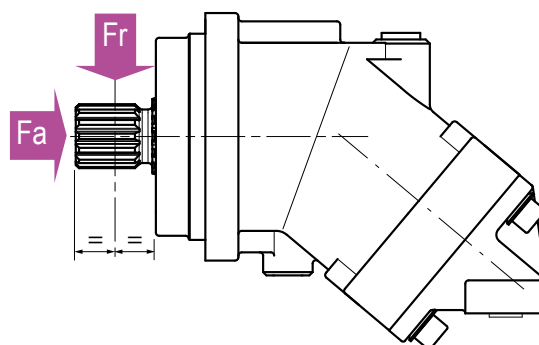
Motor model		5	12	18	25	28	32	41	45	50	63	80	90	108	108 R	125	160	180
Fr	N	710	2800	4000	6000	6200	6500	7000	6500	7500	9000	10500	11000	11500	12500	14500	18000	20000
Fa	N/bar *	10	15	20	27	28	30	40	40	40	50	60	67	80	80	86	85	95

Fr: radial force measured at mid point of length of shaft.

Fa: axial force which tends to push the shaft inwards.

* Differential pressure between A and B.

For other forces, please contact us.



M	...	A	..	..	M2	.	.	..	..
01	02	03	04	05	06	07	08	09	10

To obtain the code for your motor, complete the different parameters 02, 04, 05, 07, 08, 09 and 10 in the table on the left according to the options you require (see table below).

Motor																		
01	Motor																	M

Displacement																		
02		5	12	18	25	28	32	41	45	50	63	80	90	108	108R	125	160	180

Mounting flange																		
03		CETOP 2/bolts	4 bolts ISO 3019-2															A

Shaft																			
04	DIN 5480 splined	–	W25	W25	W25	W30	W30	W30	W30	W30	W30	W40	W40	W40	W45	W45	W50	W50	W1
		–	–	–	W30	W25	W25	–	W35	W35	W35	W35	–	–	W40	W40	–	–	W2
	DIN 6885 keyed	Ø 18	Ø 25	Ø 25	Ø 25	Ø 30	Ø 30	Ø 30	Ø 30	Ø 30	Ø 30	Ø 40	Ø 40	Ø 40	Ø 45	Ø 45	Ø 50	Ø 50	D1
		–	Ø 20	–	Ø 30	Ø 25	Ø 25	–	Ø 35	Ø 35	Ø 35	–	–	–	Ø 40	–	–	–	D2

Inlet ports A and B																				
05	SAE flange ports	Bottom	0	–	–	–	–	●	●	●	●	●	●	●	●	●	●	●	●	L0
		Rear	0	–	–	–	●	●	●	●	●	●	●	●	●	●	●	●	●	M0
		Side	0	–	–	–	●	●	●	●	●	●	●	●	●	●	●	●	●	N0
	Threaded	Side	1	–	–	–	●	●	●	●	●	●	●	●	●	●	●	●	N1	
			0	–	●	●	●	●	●	●	●	●	●	●	●	–	–	–	–	Q0
		1	–	–	–	●	●	●	●	●	●	●	●	●	●	–	–	–	–	Q1
Rear	0	●	●	●	●	●	●	●	●	●	●	●	●	●	●	–	–	–	–	P0

0 = Without suitability for valves
1 = Compatible with flushing valve

Drain ports T1 and T2																		
06		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	M2

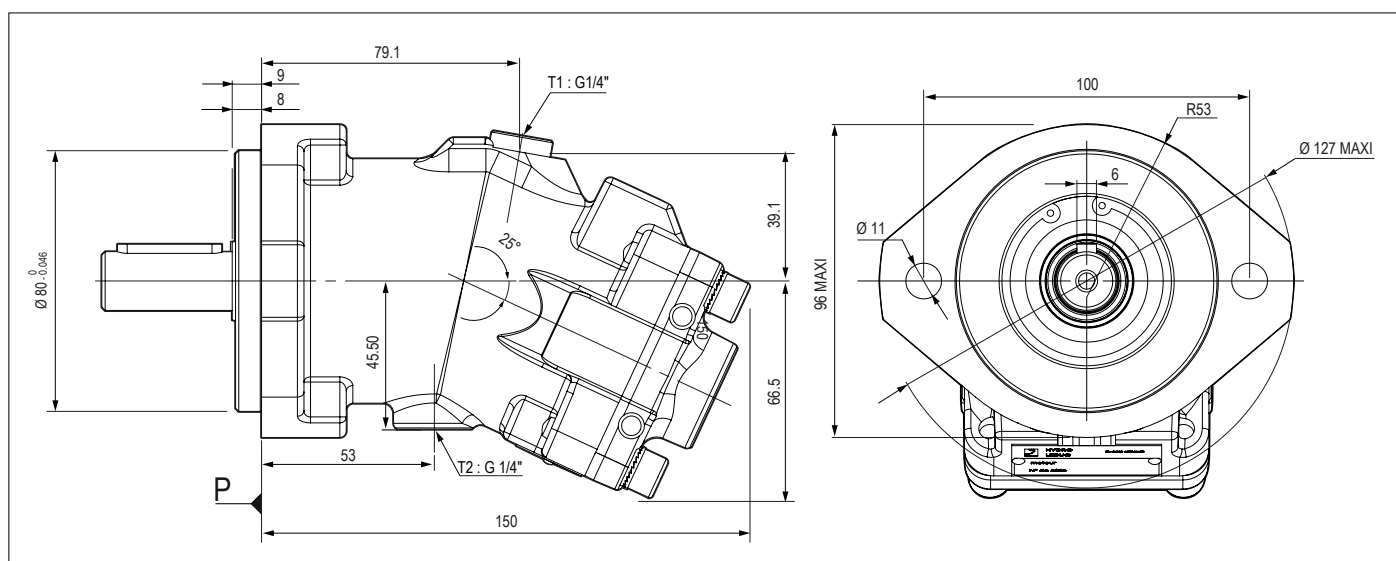
Suitable for use of speed sensor																			
07	Yes	–	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1
	No	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0

Speed sensor																		
08	Yes	–	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1
	No	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0

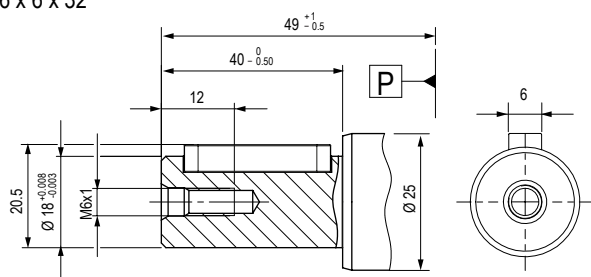
Valves																			
09	Without	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	SV
	with flushing valve	—	—	—	•	•	•	•	•	•	•	•	•	•	•	•	•	•	VB

Low temperature option																			
10	Yes (NBR)	–	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	N
	No (FKM)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	F

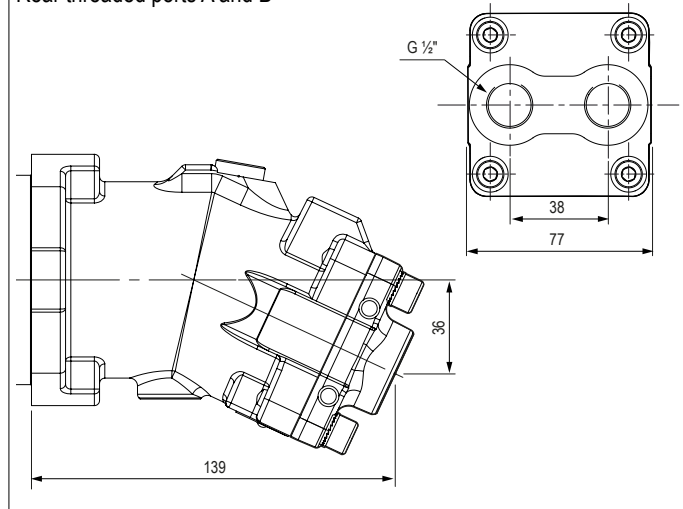
PLEASE NOTE: The M5 motor, reference 093840, only exists in one version (see next page).

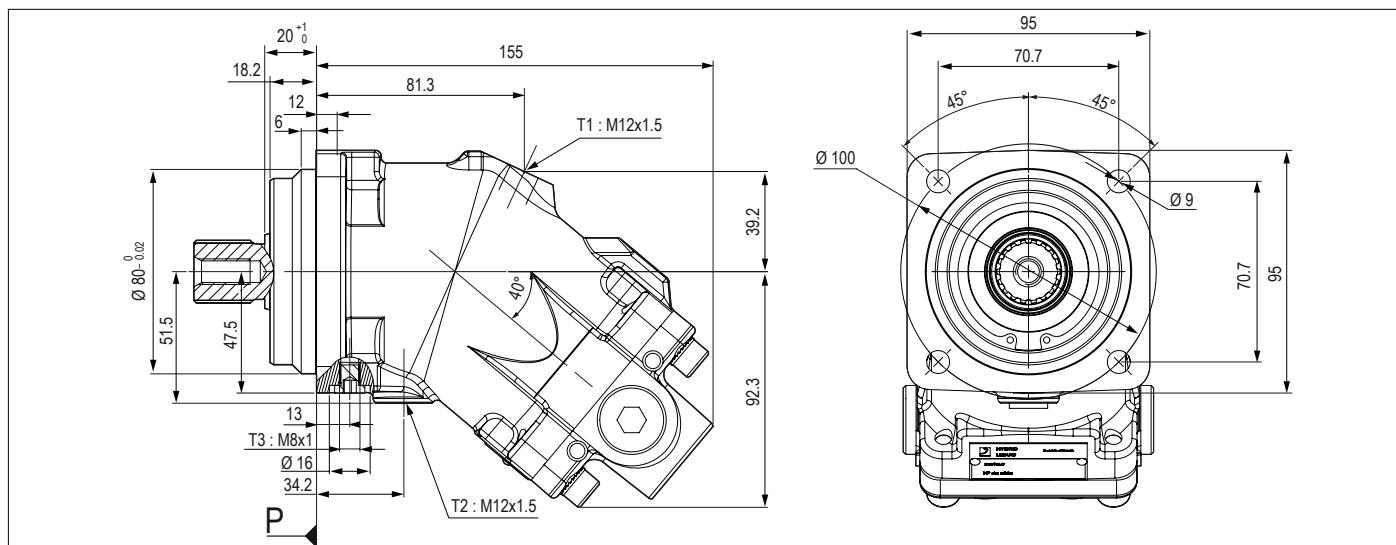
CETOP flange, 2 bolts**► Shaft end**

Cylindrical keyed shaft $\varnothing 18$
AS 6 x 6 x 32

**► Inlet ports**

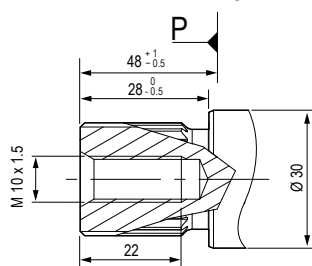
Rear threaded ports A and B



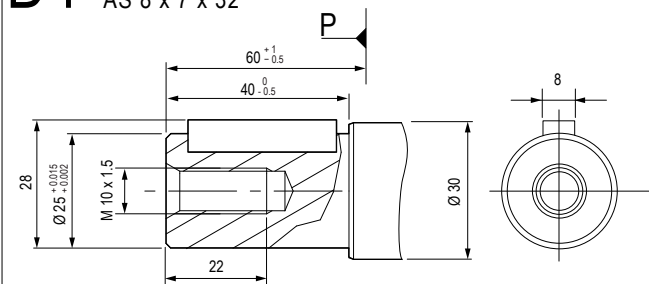


► Shaft

W1 Splined shaft DIN 5480
W 25 x 1.25 x 30 x 18 x 9 g

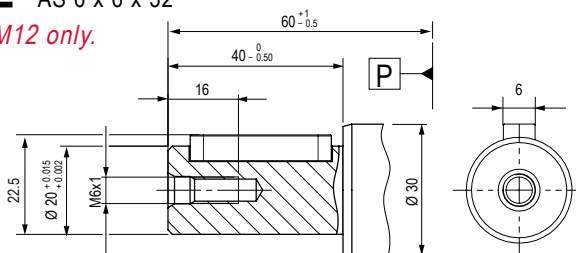


D1 Cylindrical keyed shaft Ø 25 DIN 6885
AS 8 x 7 x 32



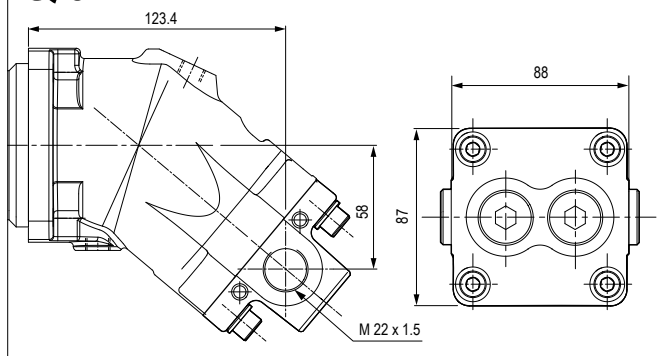
D2 Cylindrical keyed shaft Ø 20 DIN 6885
AS 6 x 6 x 32

For M12 only.

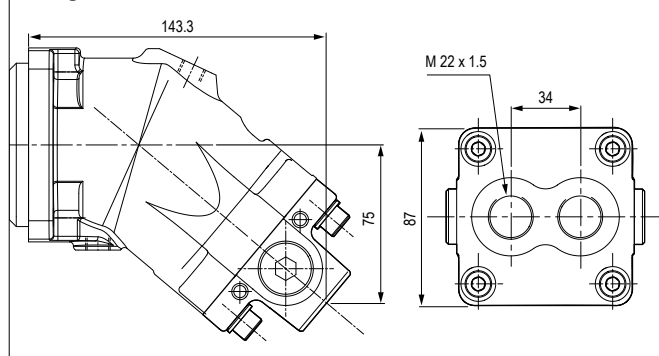


► Inlet ports

Q0 Side threaded ports A and B



P0 Rear threaded ports A and B



Dimensions in mm are given only as an indication.

W1 Splined shaft DIN 5480

W 25 x 1.25 x 30 x 18 x 9 g

Technical drawing of a splined shaft (W1) showing dimensions and a cross-section. The shaft has a diameter of $\varnothing 35$ mm. The total length is 68 mm, with a tolerance of $+1 / -0.5$. The length of the splined section is 43 mm, with a tolerance of $0 / -0.5$. The length of the unthreaded section is 19 mm. The length of the threaded section is 28 mm. The thread is M 8 x 1.25. The cross-section shows a splined shaft with a keyway. The keyway has a width of 19 mm. The shaft is shown in a cross-section view with a keyway. The keyway has a width of 19 mm. The shaft is shown in a cross-section view with a keyway. The keyway has a width of 19 mm.

[illegible]

D1 Cylindrical keyed shaft Ø 25 DIN 6885
AS 8 x 7 x 40

Technical drawing of a cylindrical shaft with a key. The drawing includes a side view and a front view.

Side View Dimensions:

- Shaft diameter: $\varnothing 25^{+0.015}_{-0.002}$
- Key width: $M8 \times 1.25$
- Key length: 19
- Shaft length: $75^{+1}_{-0.5}$
- Key length: $50^{0}_{-0.5}$
- Lock washer (P) and lock nut are shown on the right end.

Front View Dimensions:

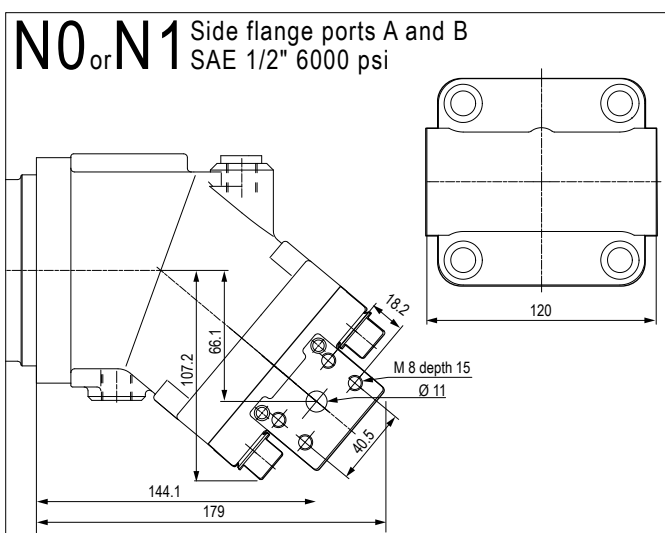
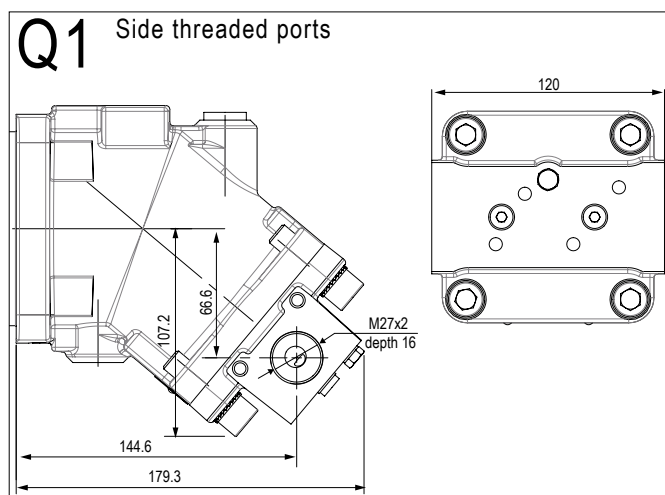
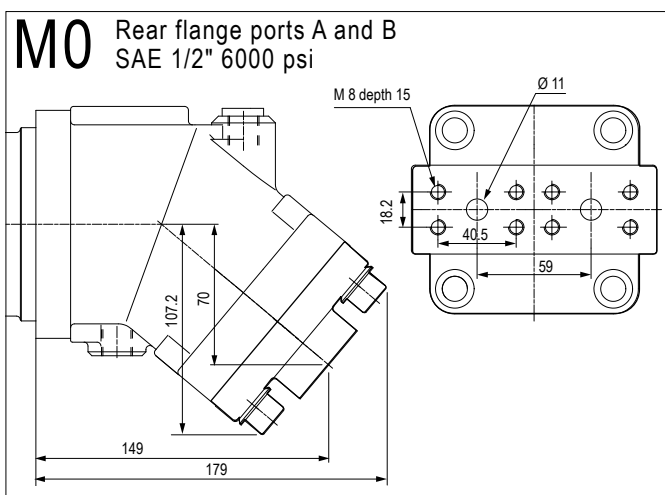
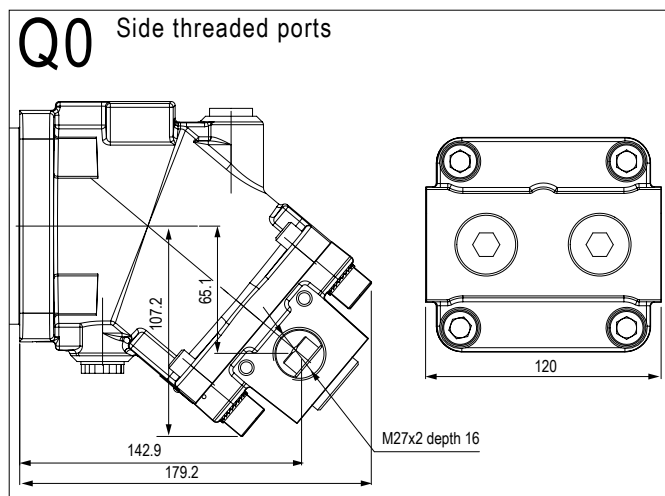
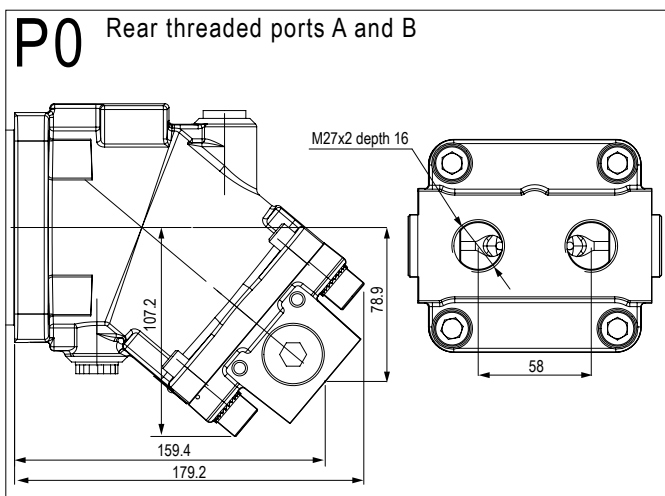
- Shaft diameter: $\varnothing 25$
- Key width: 8

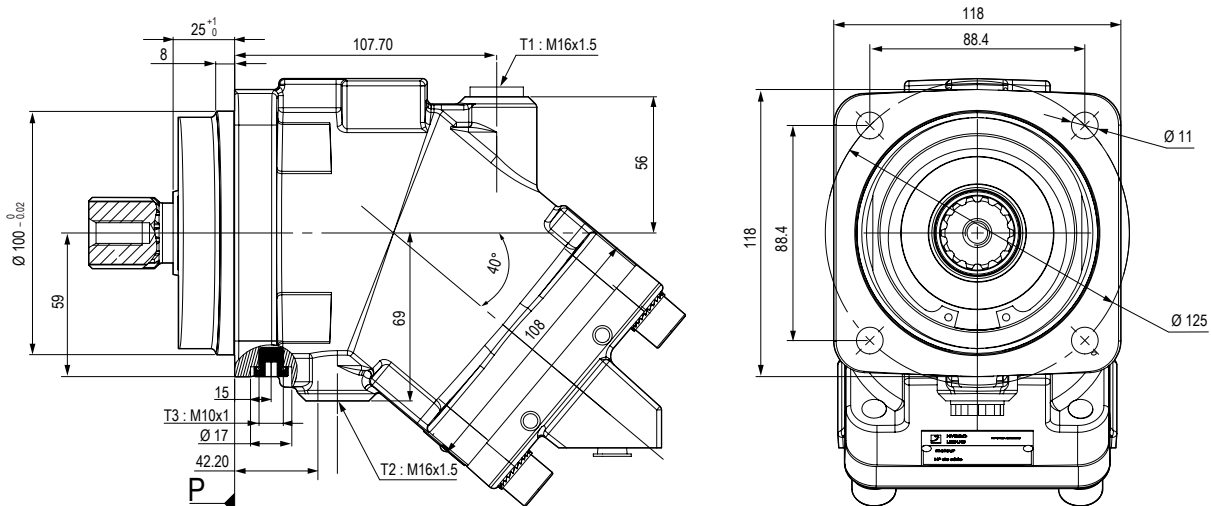
D2 Cylindrical keyed shaft $\varnothing 30$ DIN 6885
AS 8 x 7 x 40

Technical drawing of a cylindrical shaft with a keyway. The shaft has a diameter of 30 mm and a length of 40 mm. A keyway is located 75 mm from the left end, with a key length of 50 mm. The key has a width of 8 mm and a height of 7 mm. The shaft is shown in a cross-section view with a hatched area indicating the keyway. The key is shown in a side view with a hatched area indicating its profile. The shaft is labeled with dimensions: 33, 30, 1.5, 75, 50, 8, 35, 22, and 30. The key is labeled with dimensions: 8, 7, and 50. The shaft is labeled with dimensions: 30, 1.5, 75, 50, 8, 35, 22, and 30. The key is labeled with dimensions: 8, 7, and 50.

Dimensions in mm are given only as an indication.

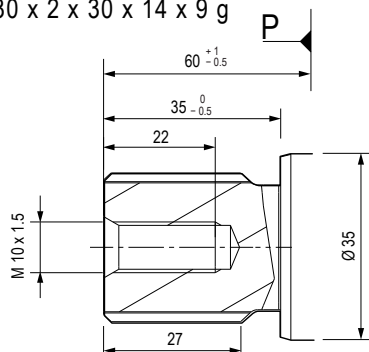
► Inlet ports





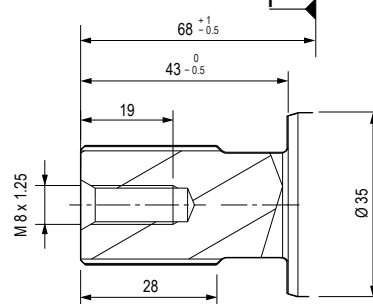
► Shaft end

W1 Splined shaft DIN 5480 W 30 x 2 x 30 x 14 x 9 g

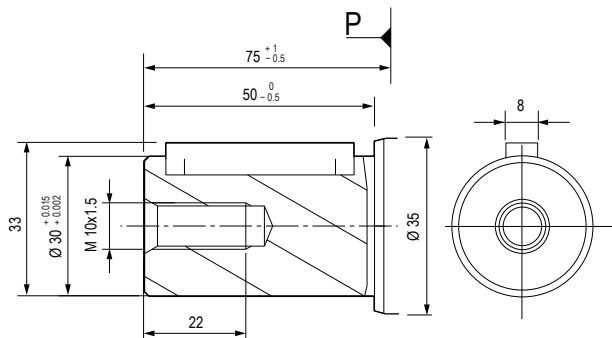


W2 Splined shaft DIN 5480 W 25 x 1.25 x 30 x 18 x 9 g

*Not available
on M 41.*

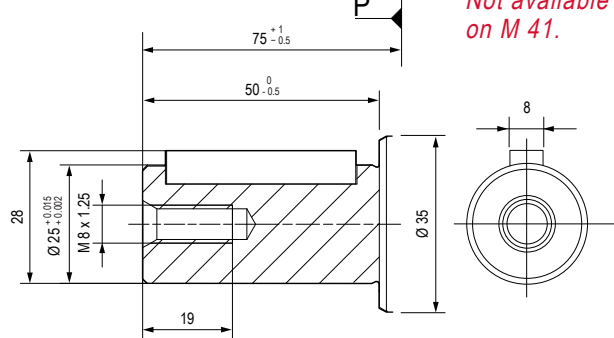


D1 Cylindrical keyed shaft Ø 30 DIN 6885 AS 8 x 7 x 40



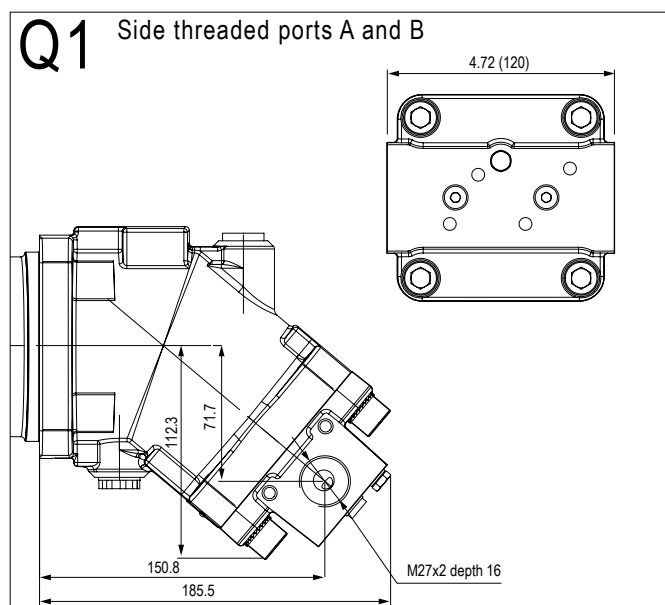
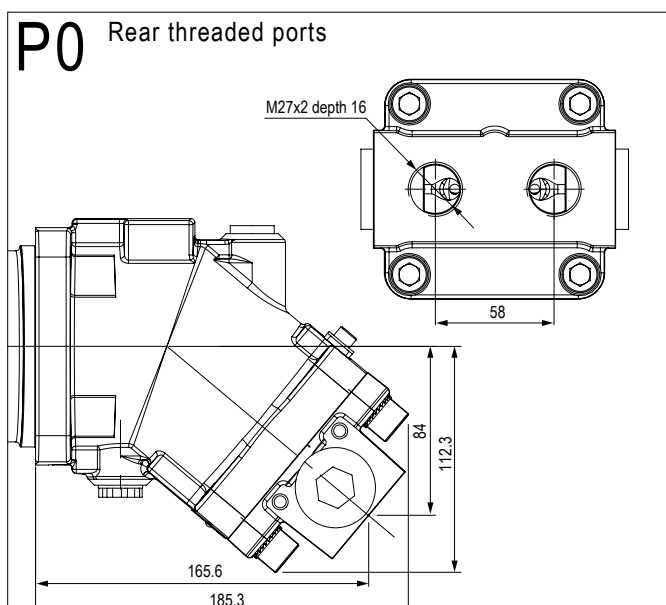
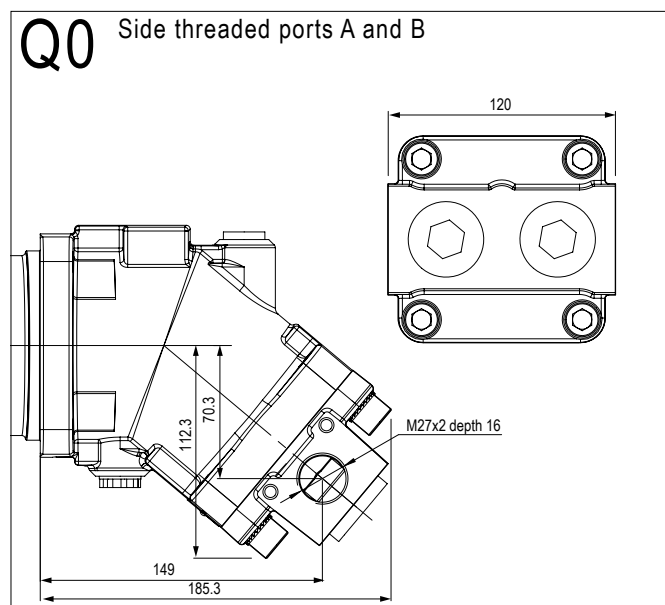
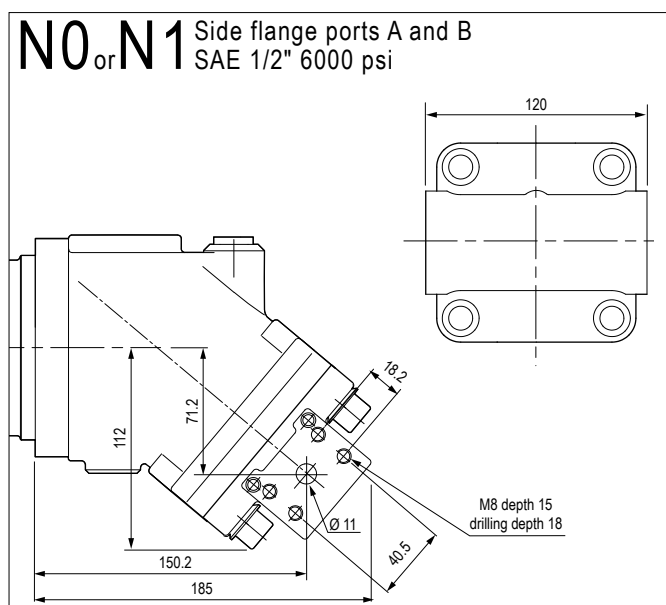
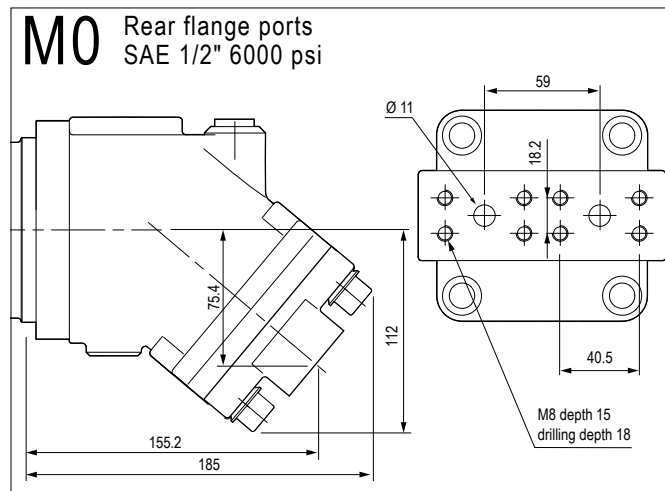
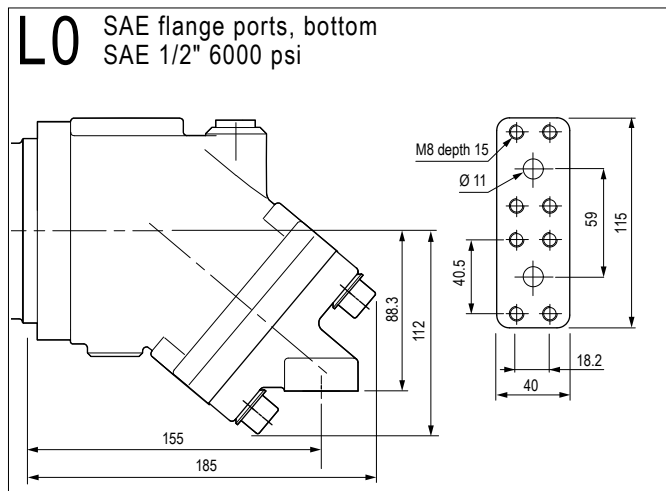
D2 Cylindrical keyed shaft Ø 25 DIN 6885 AS 8 x 7 x 40

*Not available
on M 41.*

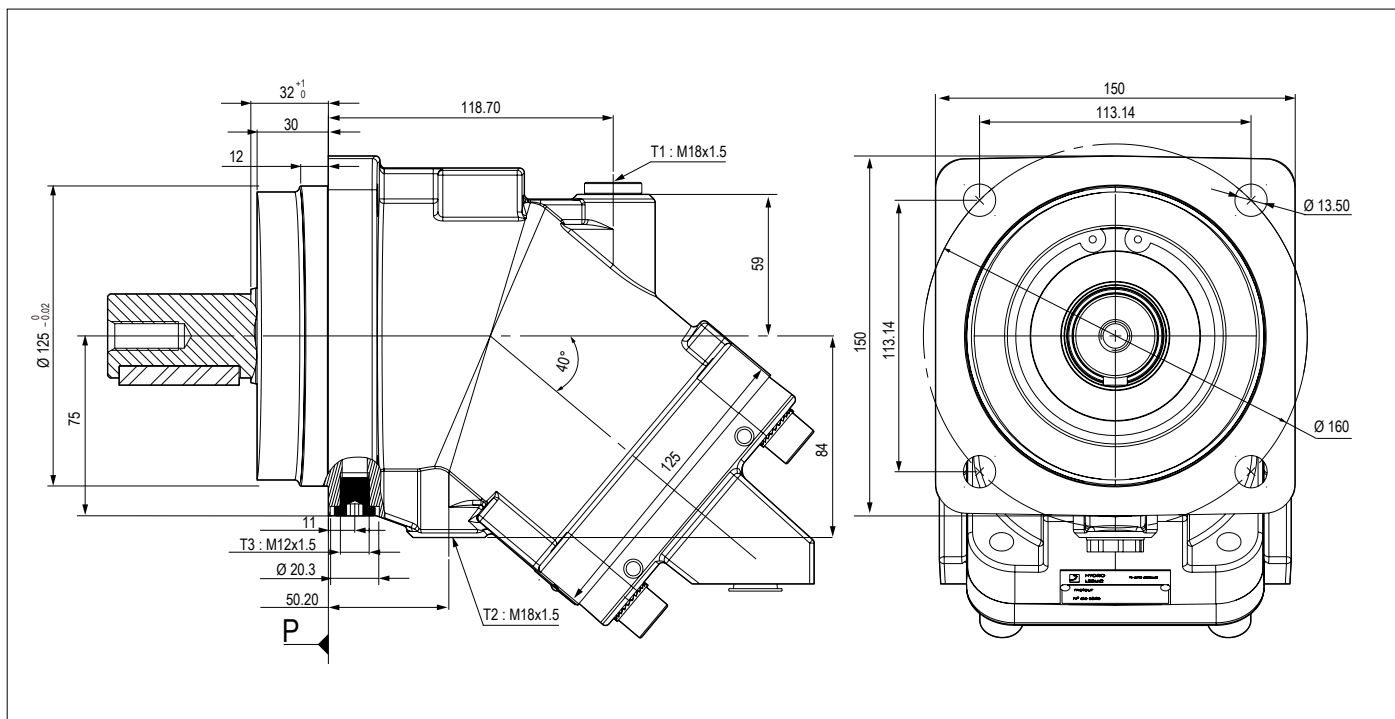


Dimensions in mm are given only as an indication.

► Inlet ports

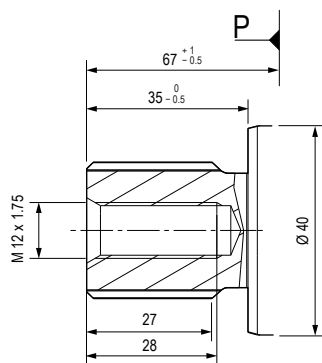


Dimensions in mm are given only as an indication.

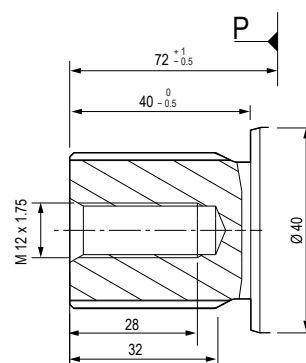


► Shaft end

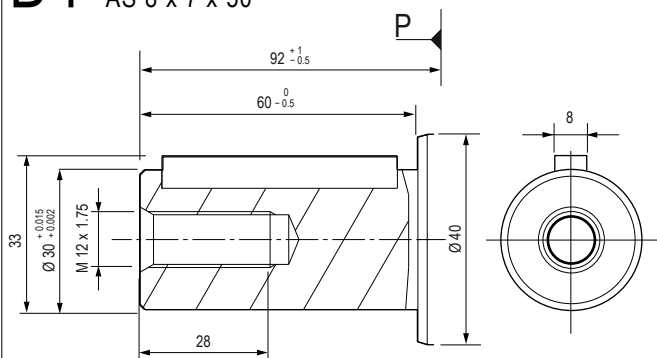
W1 Splined shaft DIN 5480 W 30 x 2 x 30 x 14 x 9 g



W2 Splined shaft DIN 5480 W 35 x 2 x 30 x 16 x 9 g

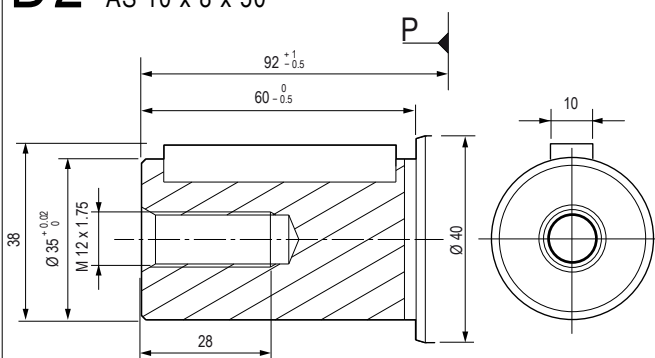


D1 Cylindrical keyed shaft Ø 30 DIN 6885 AS 8 x 7 x 50



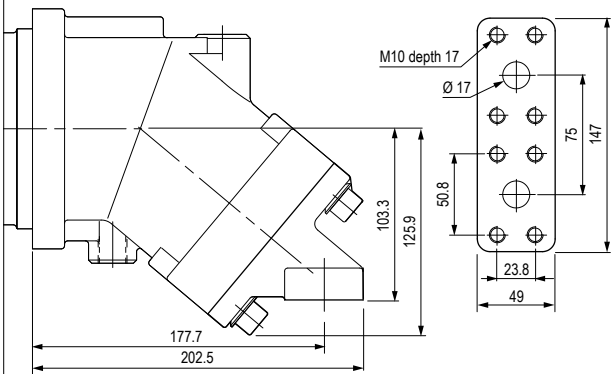
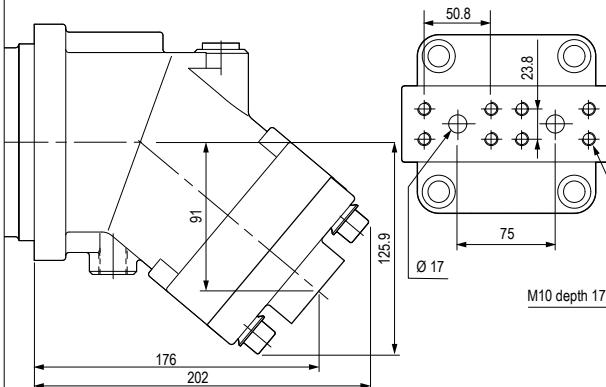
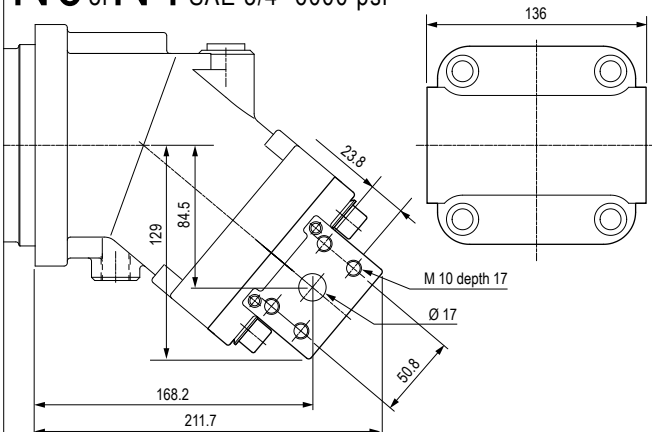
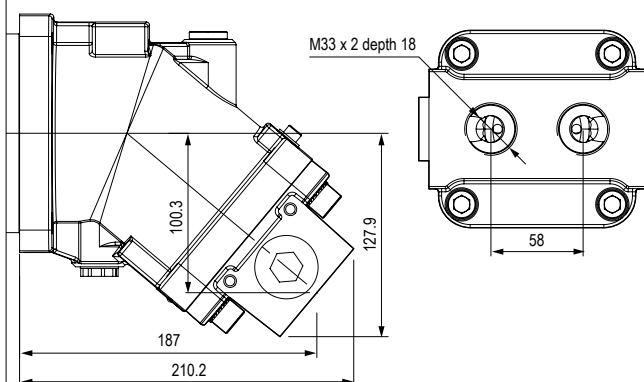
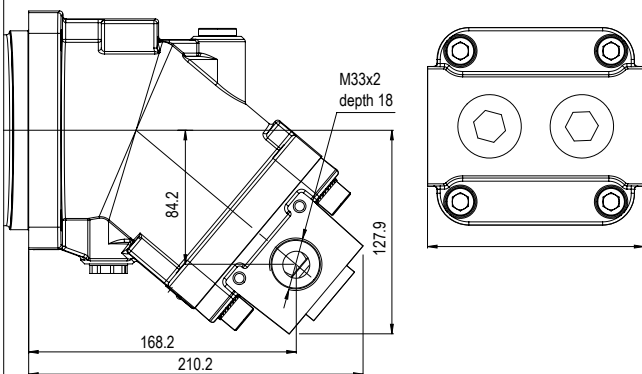
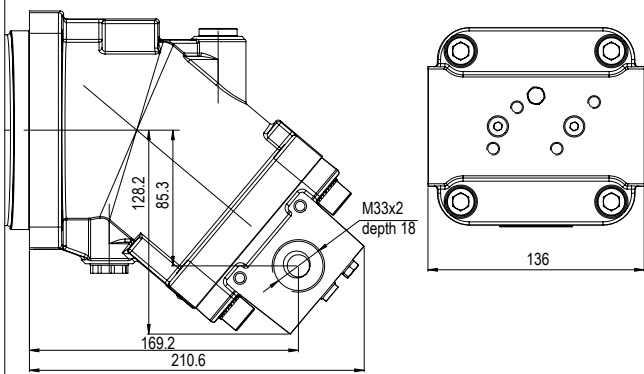
Max. pressure 5076 psi (350 bar) for M50
Max. pressure 4350 psi (300 bar) for M63

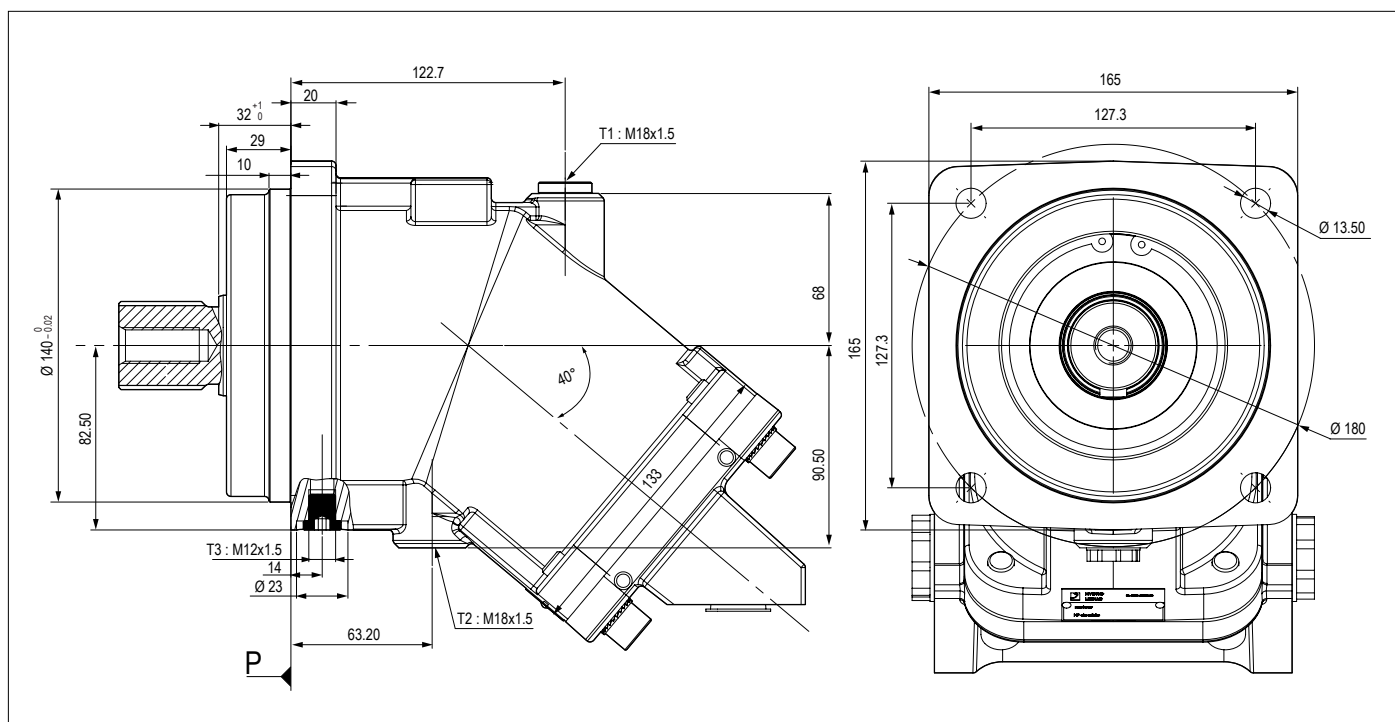
D2 Cylindrical keyed shaft Ø 35 DIN 6885 AS 10 x 8 x 50



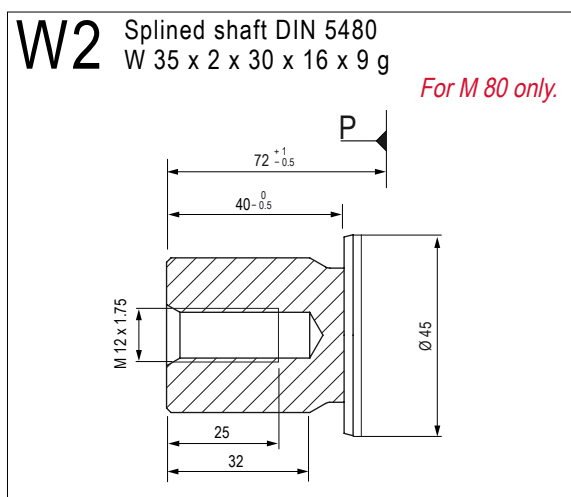
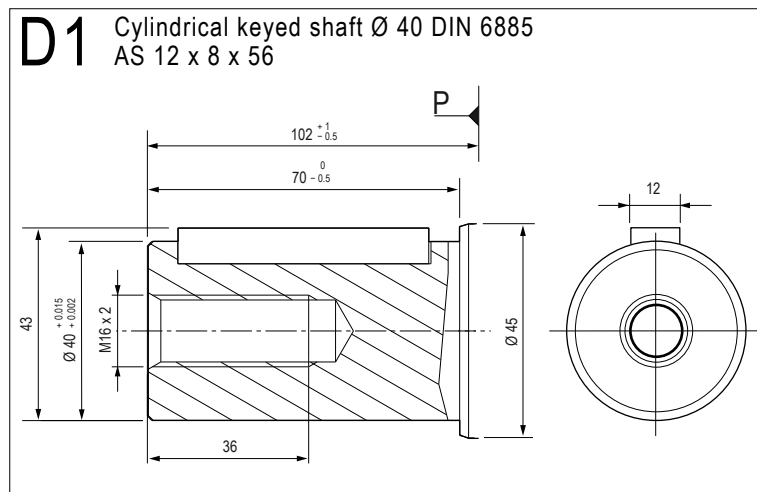
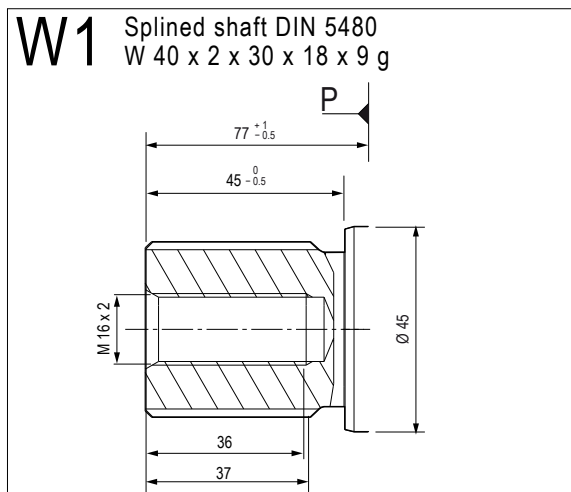
Dimensions in mm are given only as an indication.

► Inlet ports

L0 SAE flange ports, bottom
SAE 3/4" 6000 psi**M0** SAE flange ports, rear
SAE 3/4" 6000 psi**N0 or N1** SAE flange ports, side A and B
SAE 3/4" 6000 psi**P0** Rear threaded ports**Q0** Side threaded ports A and B**Q1** Side threaded ports A and B

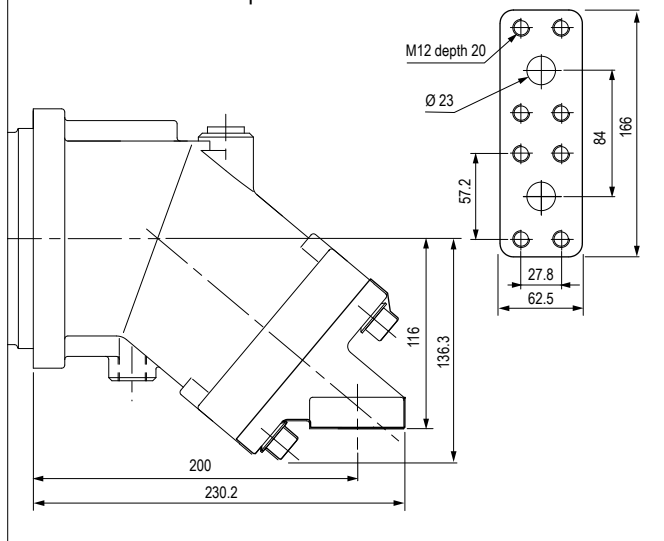
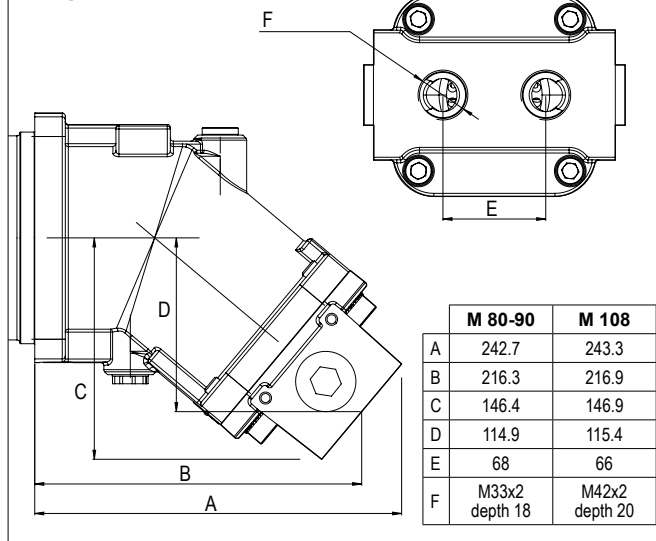
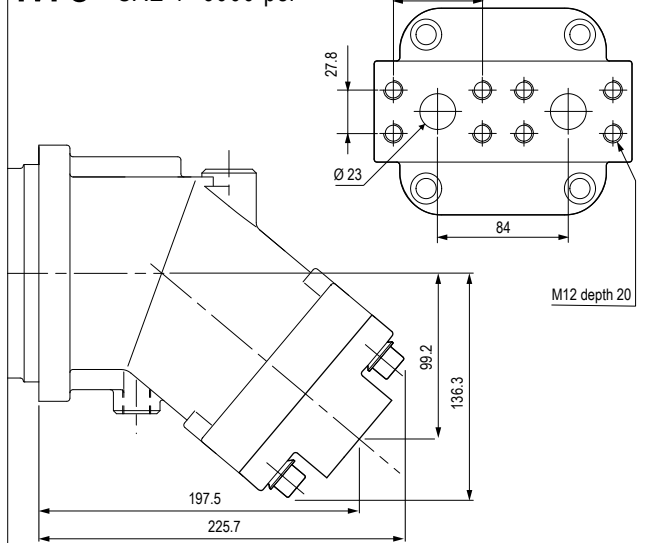
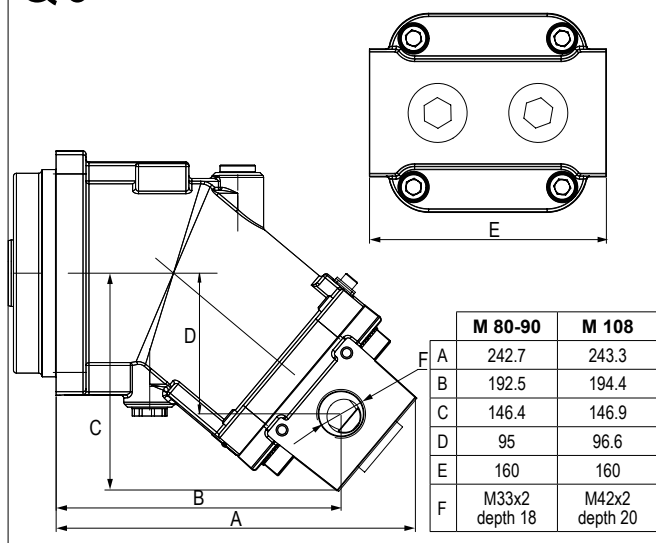
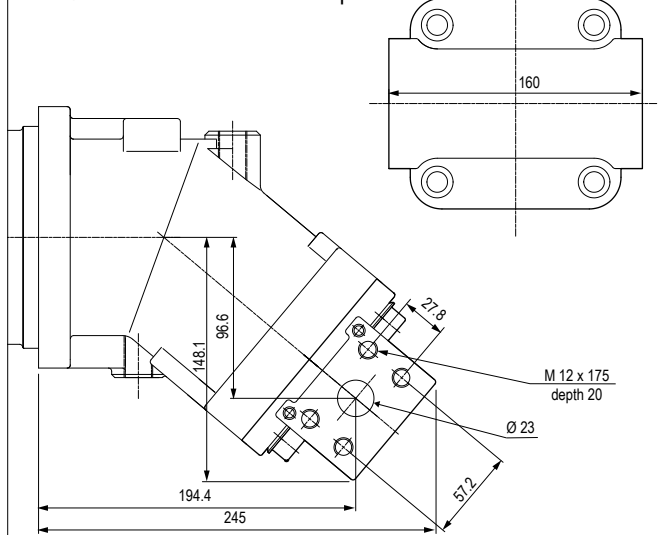
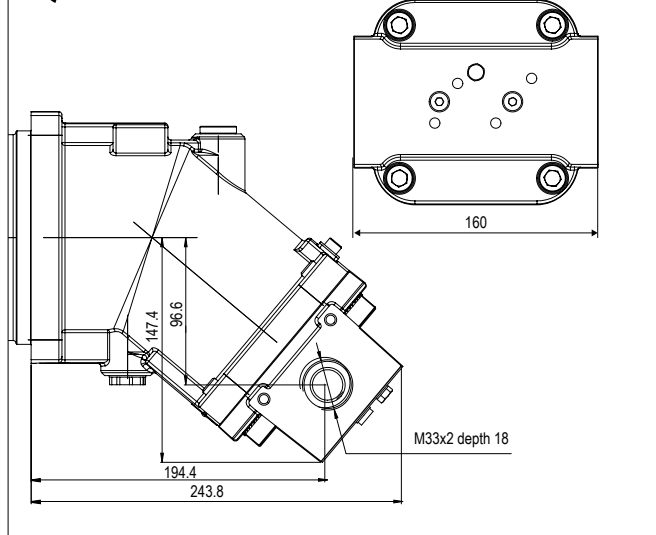


► Shaft end

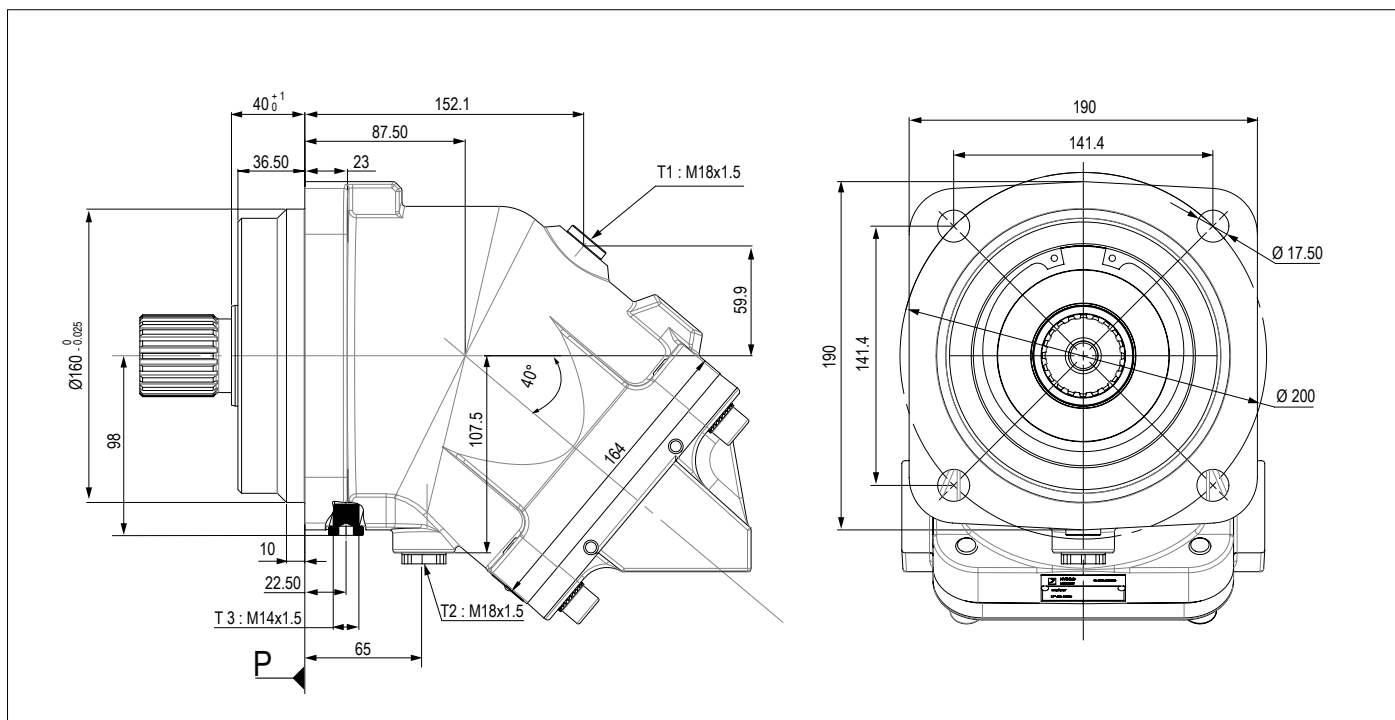


Dimensions in mm are given only as an indication.

► Inlet ports

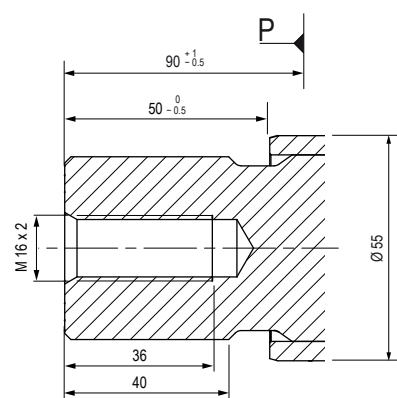
L0 SAE flange ports, bottom
SAE 1" 6000 psi**P0** Rear threaded ports**M0** SAE flange ports, rear
SAE 1" 6000 psi**Q0** Side threaded ports**N0 or N1** SAE flange ports, rear
SAE 1" 6000 psi**Q1** Side threaded ports

Dimensions in mm are given only as an indication.

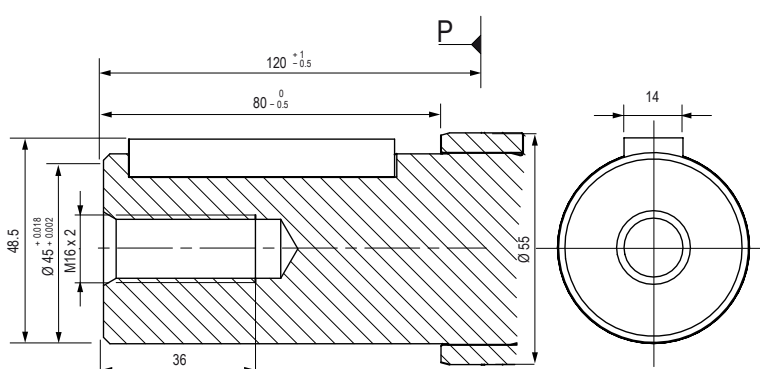


► Shaft end

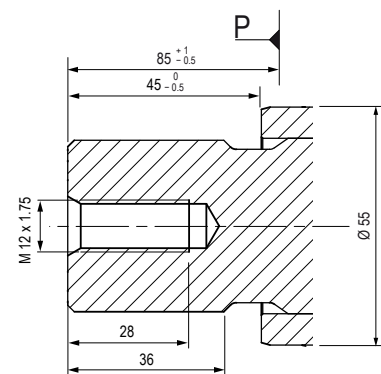
W1 Splined shaft DIN 5480
W 45 x 2 x 30 x 21 x 9 g



D1 Cylindrical keyed shaft $\varnothing 45$ DIN 6885
AS 14 x 9 x 63

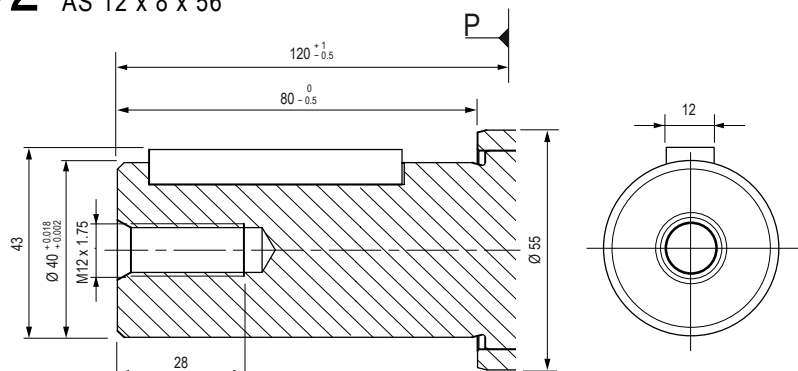


W2 Splined shaft DIN 5480
W 40 x 2 x 30 x 18 x 9 g



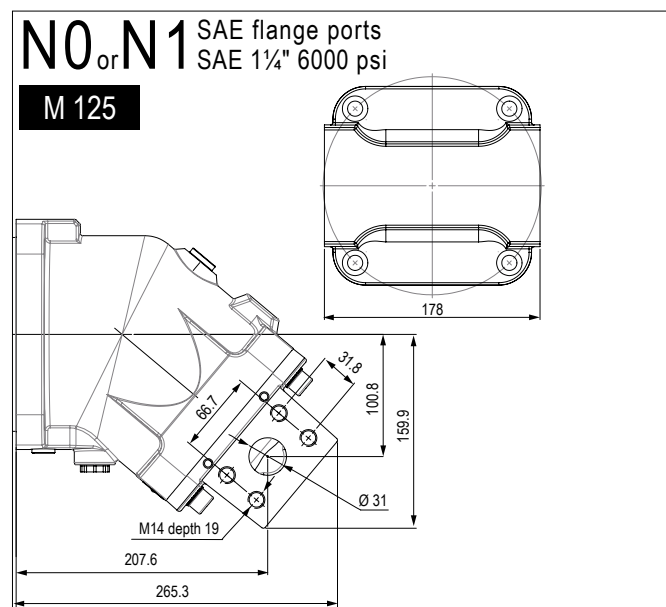
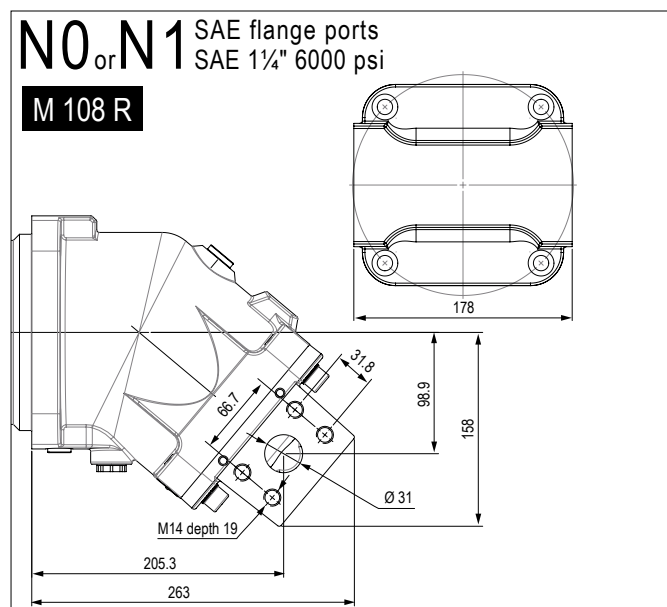
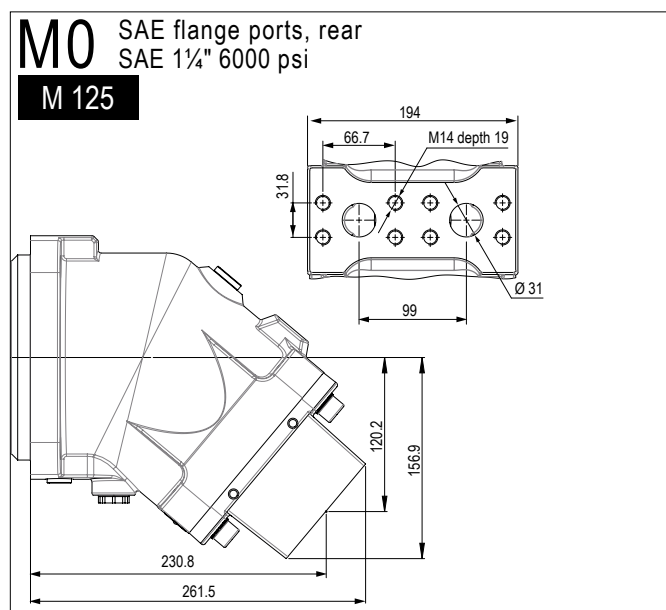
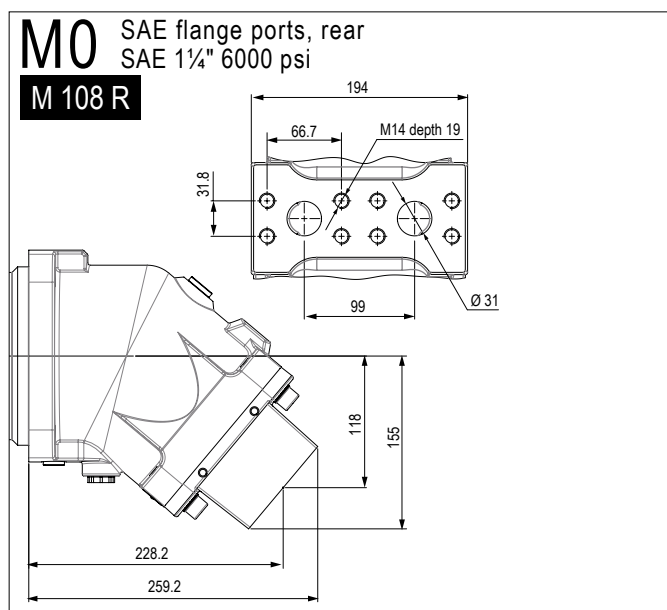
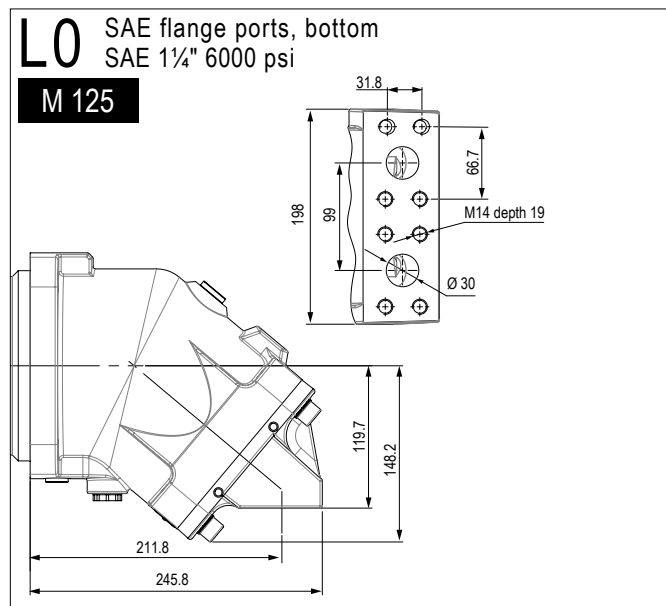
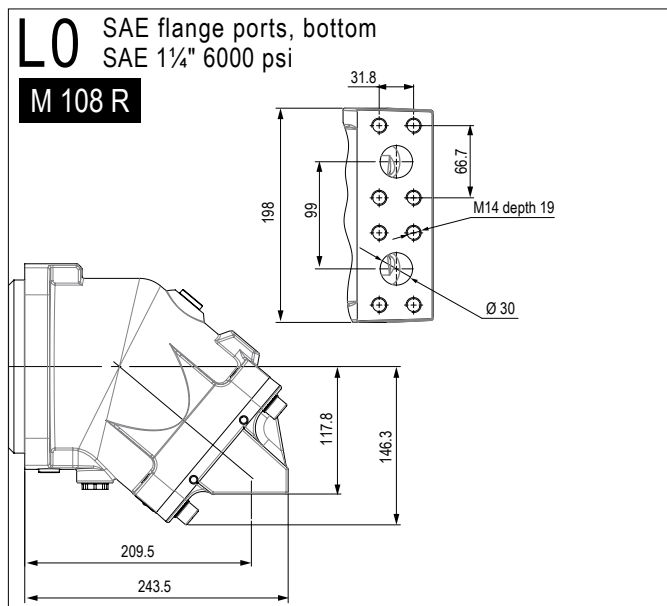
Max. pressure 5076 (350 bar) for M 125.

D2 Cylindrical keyed shaft $\varnothing 40$ DIN 6885
AS 12 x 8 x 56

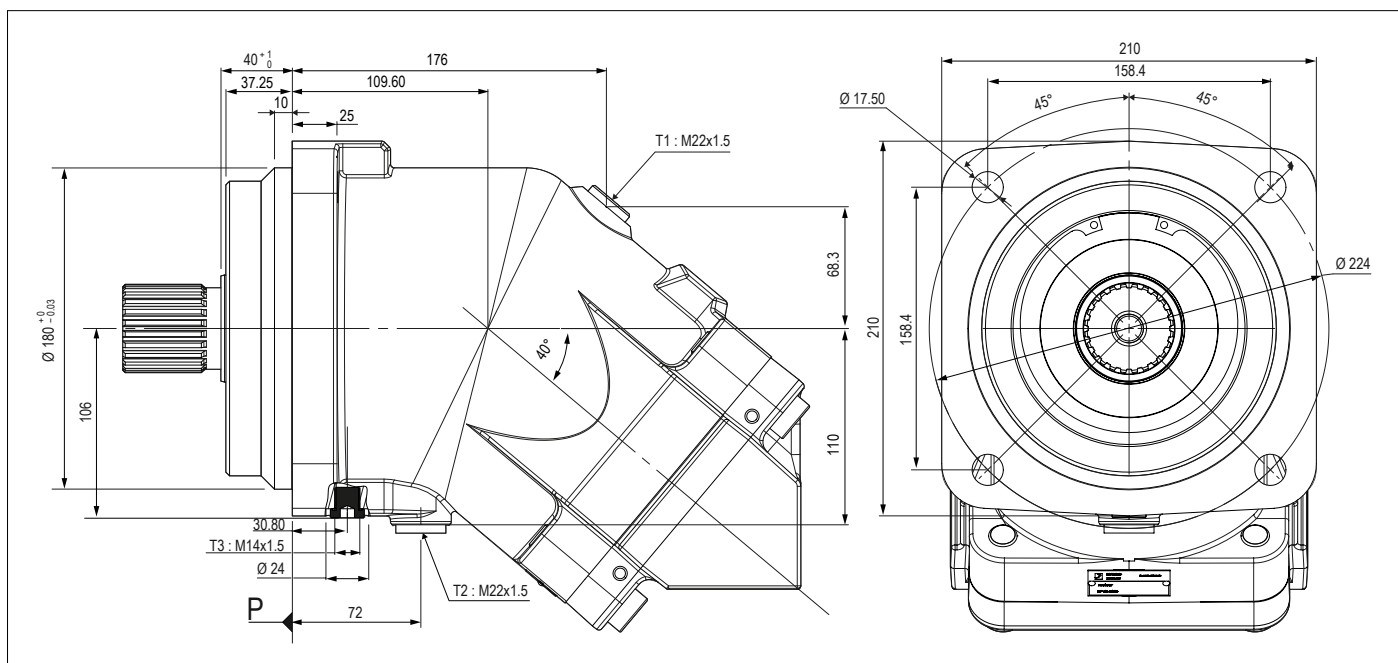


For M 108 R only.

Inlet ports

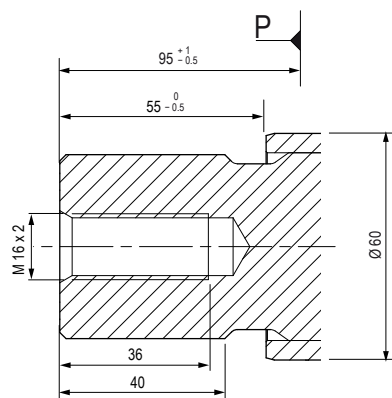


Dimensions in mm are given only as an indication.

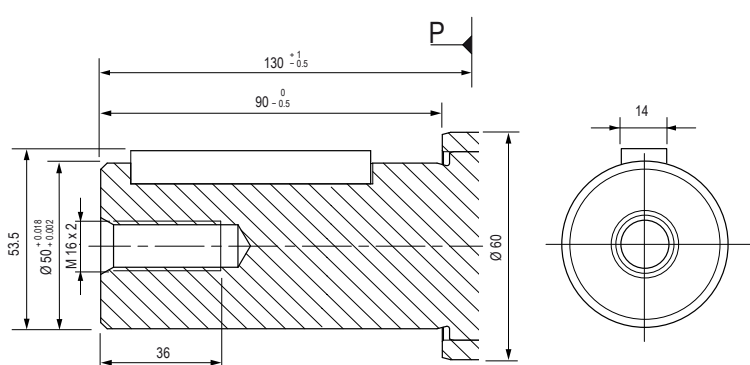


► Shaft end

W1 Splined shaft DIN 5480
W 50 x 2 x 30 x 24 x 9 g

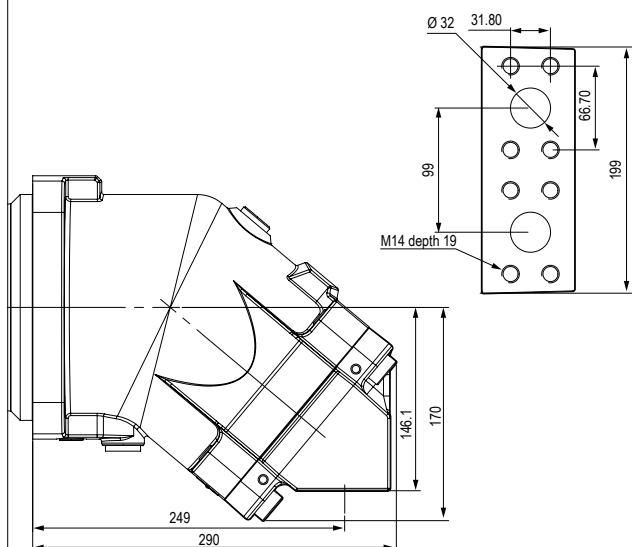


D1 Cylindrical keyed shaft $\varnothing 50$ DIN 6885
AS 14 x 9 x 70

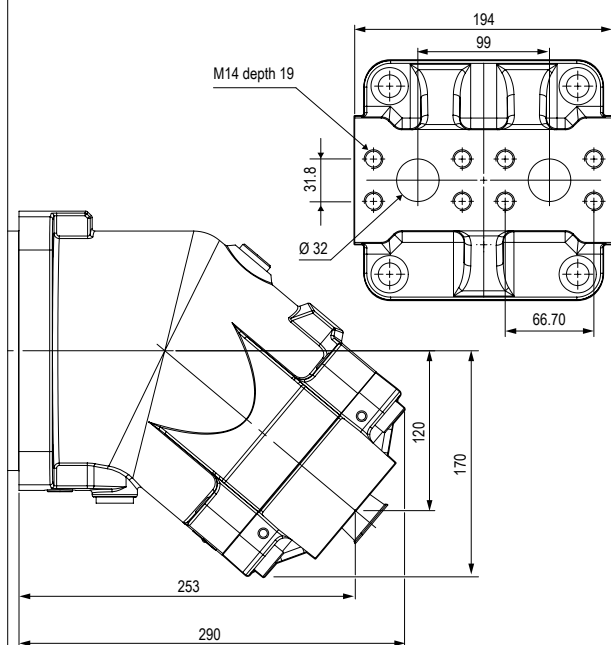


► Inlet ports

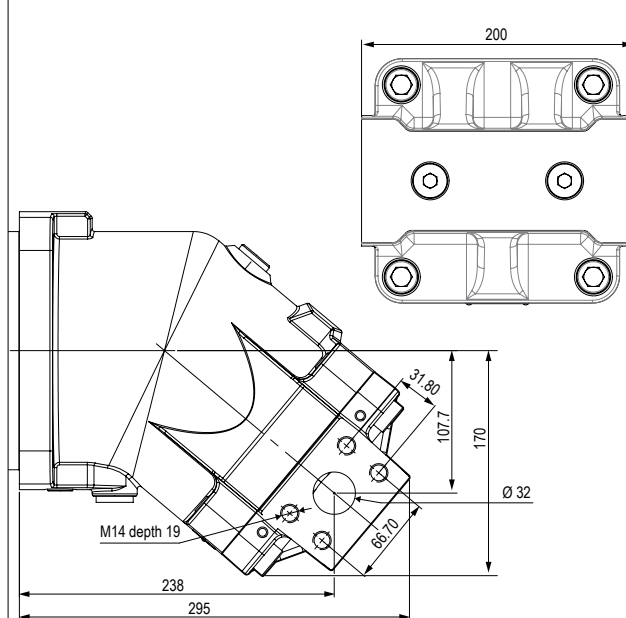
L0 SAE flange ports, bottom
SAE 1 1/4" 6000 psi



M0 SAE flange ports, rear
SAE 1 1/4" 6000 psi



N0 or N1 SAE flange ports
SAE 1 1/4" 6000 psi



CHARACTERISTICS OF THE MA SERIES MOTORS (SAE)

Motor model	Displacement		Continuous max. speed (1)	Intermittent max. speed (1)	Max. flow absorbed		Torque		Torque at 350 bar (5100 psi)		Theoretical maximal power at 5800 psi 400 bar		Max. allowable pressure continuous / peak		Weight (kg)	
	cu.in/rev	cc/rev			gpm	l/mn	lbf.ft/psi	N.m/bar	lbf.ft	N.m	HP	kW	psi	bar	lbs	Kg
MA 10	0.62	10.2	8000	8800	21.6	82	0.0082	0.16	42	57	72.9	54.4	5800 / 6525	400 / 450	14.3	6.5
MA 12	0.73	12.0	8000	8800	25.4	96	0.0097	0.19	49	67	85.7	64	5800 / 6525	400 / 450	14.3	6.5
MA 18	1.10	18.0	8000	8800	38.0	144	0.0145	0.29	74	100	128.7	96	5800 / 6525	400 / 450	14.3	6.5
MA 25	1.52	24.9	6300	6900	41.4	157	0.0201	0.40	102	139	140.1	104.5	5800 / 6525	400 / 450	25	11.5
MA 32	1.96	32.1	6300	6900	53.4	202	0.0259	0.51	132	179	180.7	134.8	5800 / 6525	400 / 450	25	11.5
MA 41	2.51	41.1	5600	6200	60.8	230	0.0331	0.65	169	229	205.6	153.4	5800 / 6525	400 / 450	25	11.5
MA 45	2.77	45.4	5000	5500	60.0	227	0.0366	0.72	187	253	202.8	151.3	5800 / 6525	400 / 450	40	18
MA 50	3.07	50.3	5000	5500	66.4	252	0.0405	0.80	207	280	224.7	167.6	5800 / 6525	400 / 450	40	18
MA 63	3.84	63.0	5000	5500	83.2	315	0.0508	1.00	259	351	281.5	210	5800 / 6525	400 / 450	40	18
MA 80	4.91	80.4	4500	5000	95.6	362	0.0648	1.28	330	448	323.3	241.2	5800 / 6525	400 / 450	51	23
MA 90	5.49	90.0	4500	5000	107.0	405	0.0725	1.43	370	501	361.9	270	5800 / 6525	400 / 450	51	23
MA 108R	6.61	108.3	3400	4500	97.3	368	0.0872	1.72	445	603	329	245.4	5800 / 6525	400 / 450	77	35
MA 125	7.65	125.4	3400	4500	112.6	426	0.1010	2.00	515	699	381	284.2	5800 / 6525	400 / 450	77	35
MA 160	9.76	160.0	3600	4000	152.2	576	0.1289	2.55	657	891	514.7	384	5800 / 6525	400 / 450	107	48.5
MA 180	11.02	180.6	3600	4000	171.8	650	0.1455	2.87	742	1006	581	433.4	5800 / 6525	400 / 450	107	48.5

(1) For higher speeds, please contact us.

► Acceptable forces applied to motor shaft

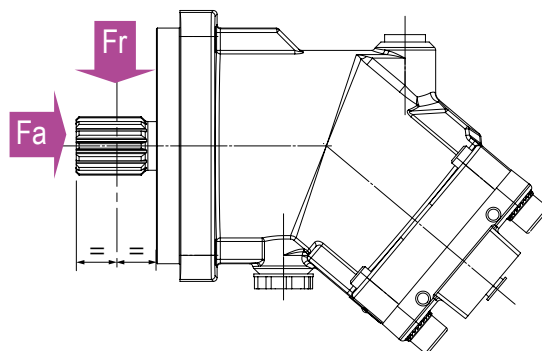
Motor model		10	12	18	25	32	41	45	50	63	80	90	108 R	125	160	180
Fr	lbf	528	630	900	1350	1462.5	1574	1462.5	1686	2023	2360	2473	2812	3262	4050	4500
	N	2350	2800	4000	6000	6500	7000	6500	7500	9000	10500	11000	12500	14500	18000	20000
Fa	lbf/psi	0.19	0.23	0.31	0.42	0.46	0.62	0.62	0.62	0.77	0.93	1.03	1.24	1.33	1.32	1.47
	N/psi (N/bar) *	0.83 (12)	1.03 (15)	1.37 (20)	1.86 (27)	2.06 (30)	2.75 (40)	2.75 (40)	2.75 (40)	3.44 (50)	4.14 (60)	4.62 (67)	5.52 (80)	5.93 (86)	5.86 (85)	6.55 (95)

Fr: radial force measured at mid point of length of shaft.

Fa: axial force which tends to push the shaft inwards.

* Differential pressure between A and B.

For other forces, please contact us.



MA	...	C	..	..	U2	.	.	..	..
01	02	03	04	05	06	07	08	09	10

To obtain the code for your motor, complete the different parameters 02, 04, 05, 07, 08, 09 and 10 in the table on the left according to the options you require (see table below).

Motor																	
01	Motor																MA

Displacement																	
02		10	12	18	25	32	41	45	50	63	80	90	108R	125	160	180	

Mounting flange					
03		SAE B 2 bolts	SAE C 4 bolts	SAE D 4 bolts	C

Shaft																	
04	Splined SAE J498b	13 T 16/32 DP SAE B	13 T 16/32 DP SAE B	13 T 16/32 DP SAE B	14 T 12/24 DP SAE C	14 T 12/24 DP SAE C	14 T 12/24 DP SAE C	14 T 12/24 DP SAE C	14 T 12/24 DP SAE C	14 T 12/24 DP SAE C	14 T 12/24 DP SAE C	14 T 12/24 DP SAE C	13 T 8/16 DP SAE D	13 T 8/16 DP SAE D	13 T 8/16 DP SAE D	13 T 8/16 DP SAE D	S1
			—	—	—	—	—	—	—	—	—	17 T 12/24 DP SAE CC	17 T 12/24 DP SAE CC	—	—	—	S2
		—	—	—	—	—	—	—	—	—	—	21 T 16/32 DP	21 T 16/32 DP	—	—	—	S3
	DIN 6885	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Ø50 mm	D1
	Keyed SAE J744	Ø1"	Ø1"	Ø1"	Ø1 1/4"	Ø1 1/4"	Ø1 1/4"	Ø1 1/4"	Ø1 1/4"	Ø1 1/4"	Ø1 1/2"	Ø1 1/2"	Ø1 3/4"	Ø1 3/4"	—	—	K1
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	K2

Inlet ports A and B																	
05	SAE flange ports	Bottom	0	—	—	—	—	•	•	•	•	•	•	•	•	•	L0
		Rear	0	—	—	—	•	•	•	•	•	•	•	•	•	•	M0
		Side	0	—	—	—	•	•	•	•	•	•	•	•	•	•	N0
			1	—	—	—	•	•	•	•	•	•	•	•	•	•	N1
	Threaded	Side	0	•	•	•	•	•	•	—	—	—	—	—	—	—	Q0
			1	—	—	—	•	•	•	—	—	—	—	—	—	—	Q1
		Rear	0	•	•	•	•	•	•	—	—	—	—	—	—	—	P0

0 = Without suitability for valves
1 = Compatible with flushing valve

Drain ports T1 and T2																	
06		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	U2

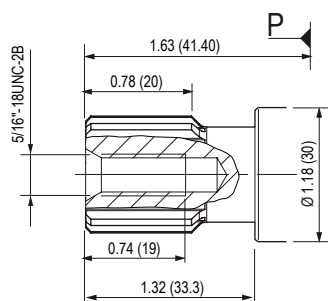
Suitable for use of speed sensor																	
07	Yes	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1
	No	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0

Speed sensor																	
08	Yes	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1
	No	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0

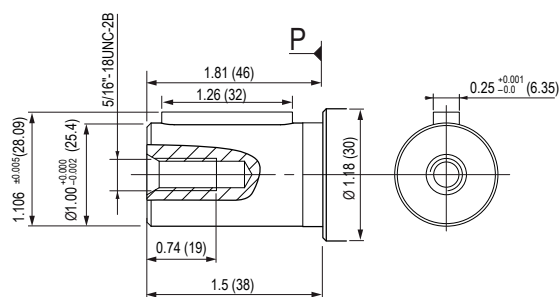
Valves																	
09	Without	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	SV
	With flushing valve	—	—	—	•	•	•	•	•	•	•	•	•	•	•	•	VB

Low temperature option																	
10	Yes (NBR)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	N
	No (FKM)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	F

S1 Splined shaft 13T 16/32DP 7/8"

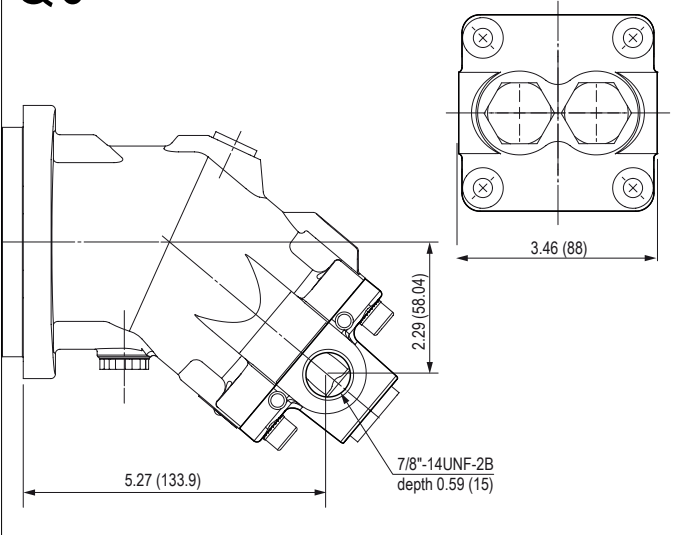


K1 Cylindrical keyed shaft Ø 1"

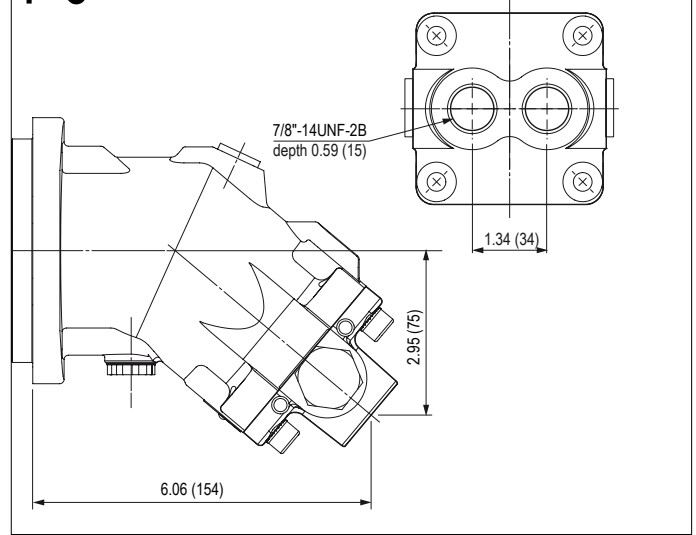


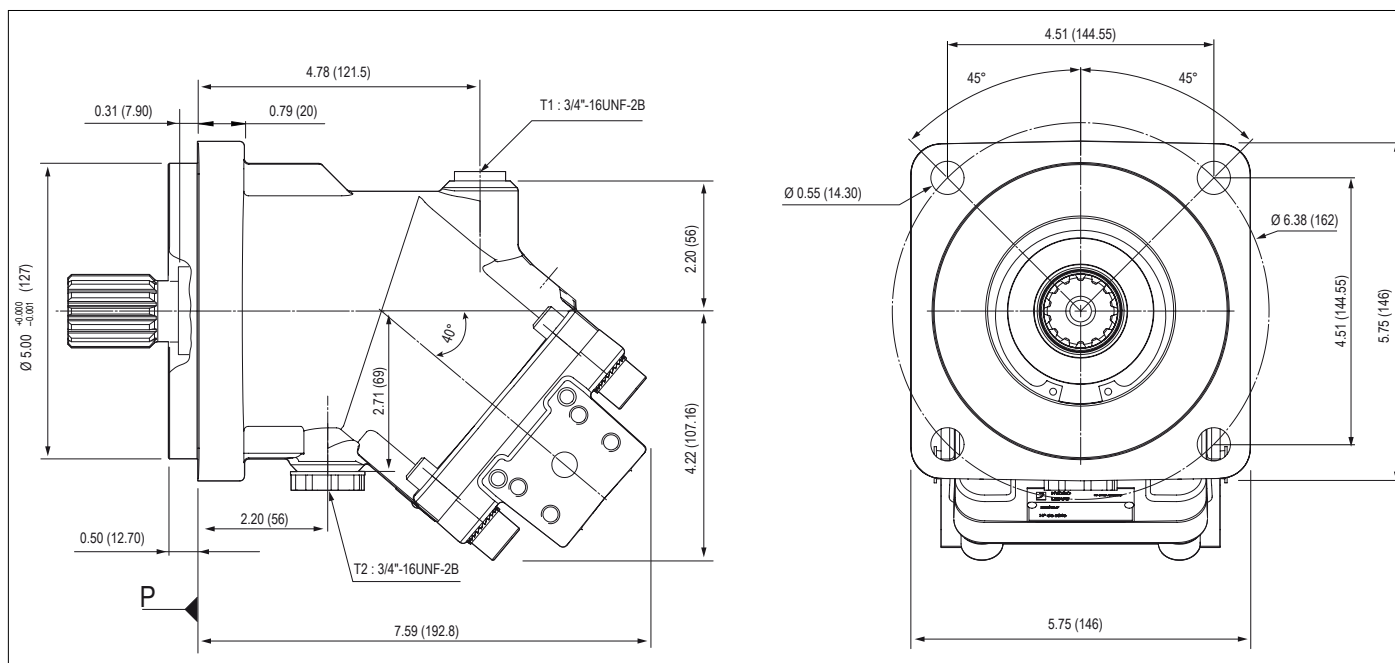
► Inlet ports

Q0 Side threaded ports A and B



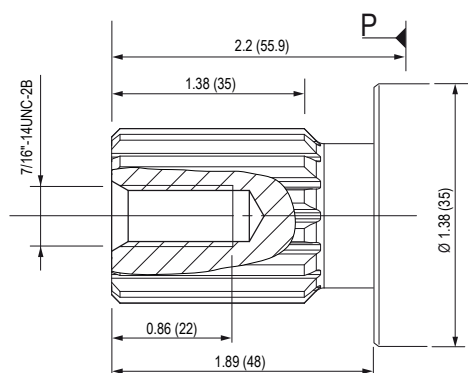
P0 Rear threaded ports A and B



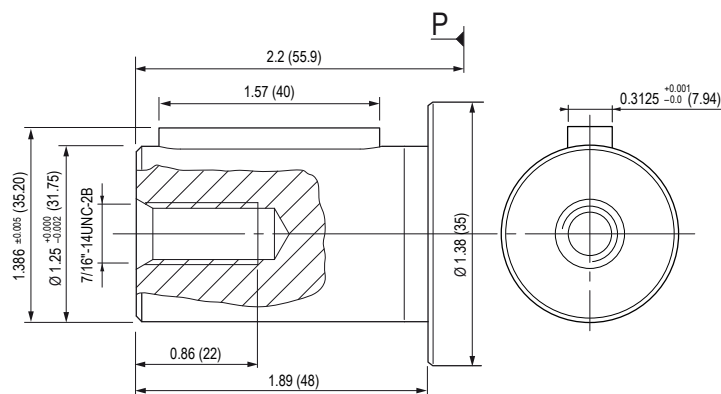


► **Shaft end**

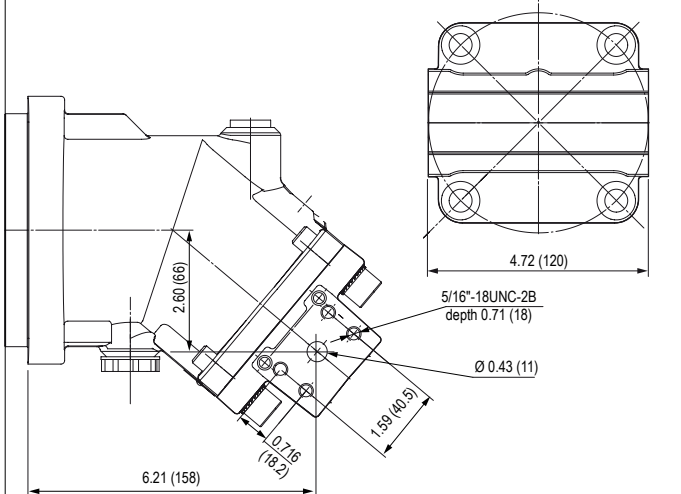
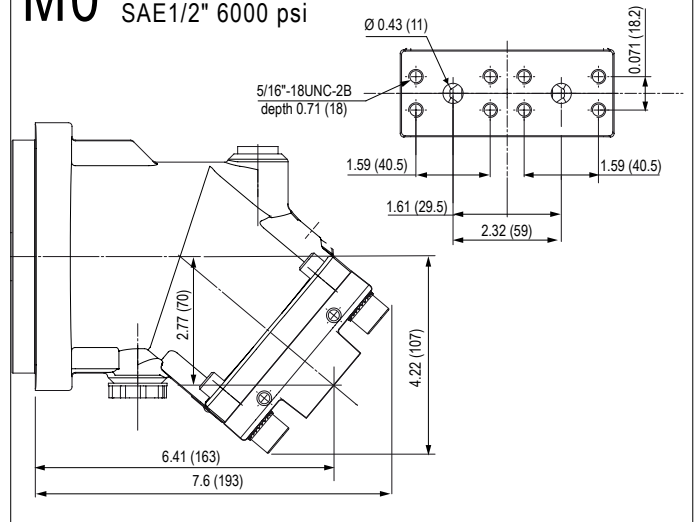
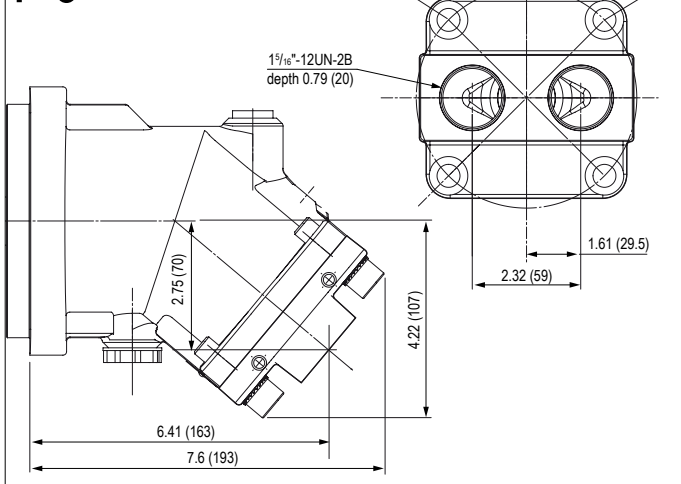
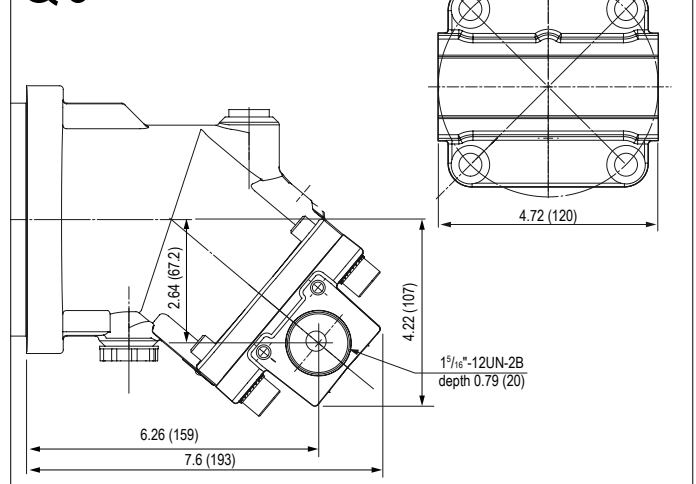
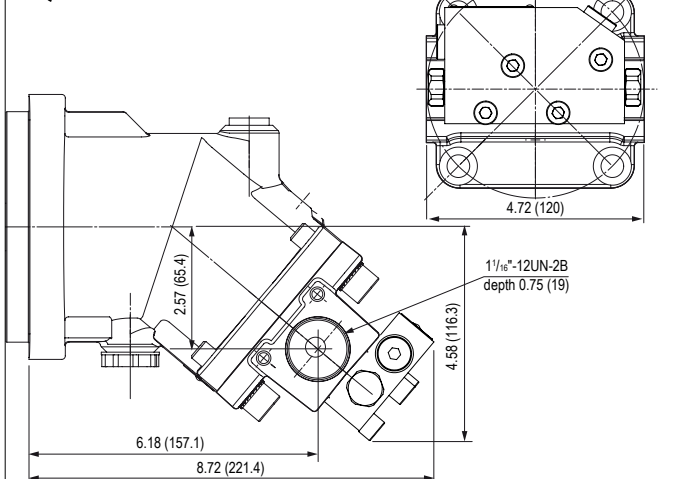
S1 Splined shaft 14T 12/24DP 1¼"



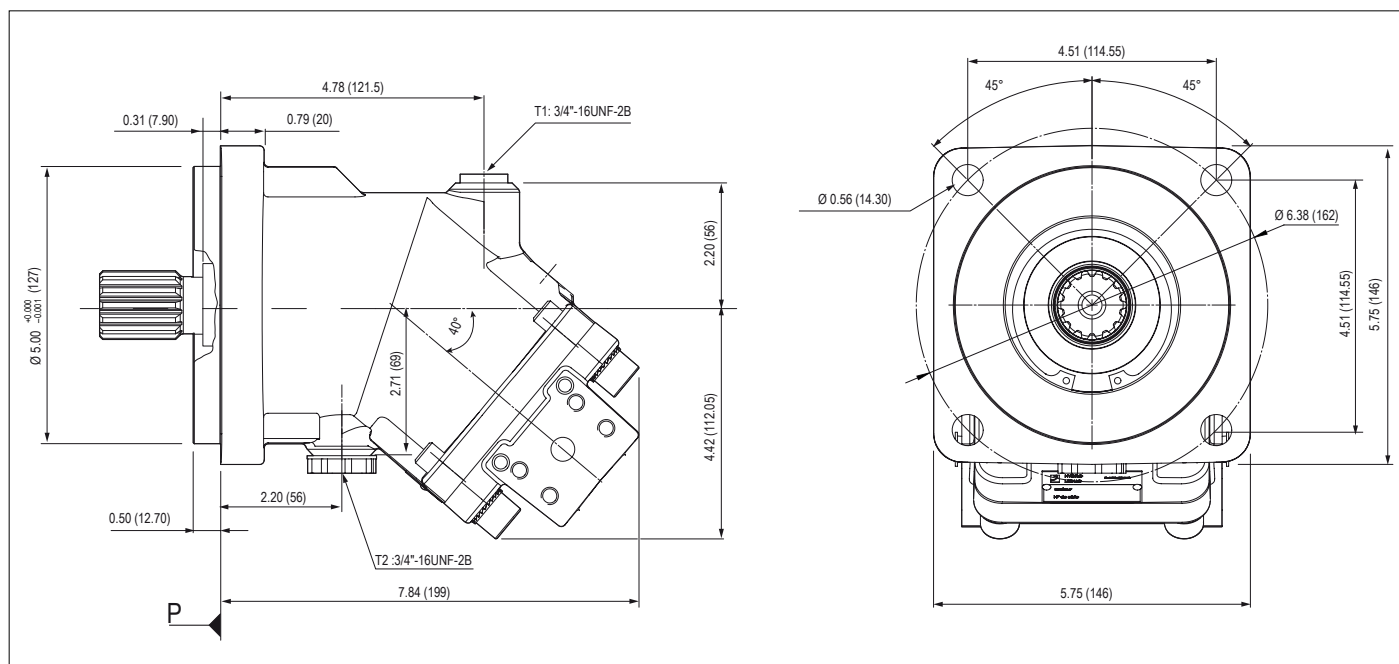
K1 Cylindrical keyed shaft Ø 1 1/4"



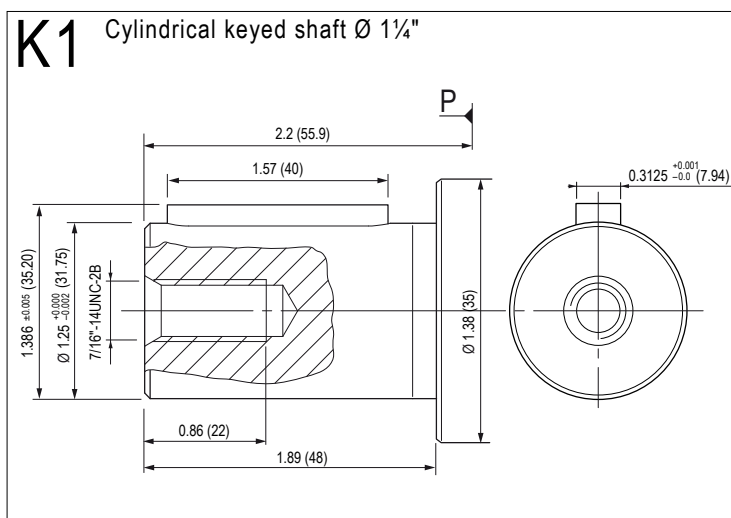
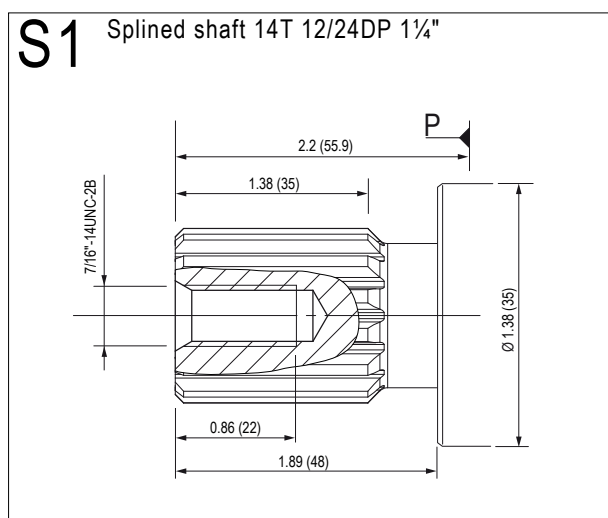
► Shaft end

N0 or N1 Side SAE flange ports A and B
SAE 1/2" 6000 psi

M0 Rear SAE flange ports A and B
SAE 1/2" 6000 psi

P0 Rear threaded ports A and B

Q0 Side threaded ports

Q1 Side threaded ports


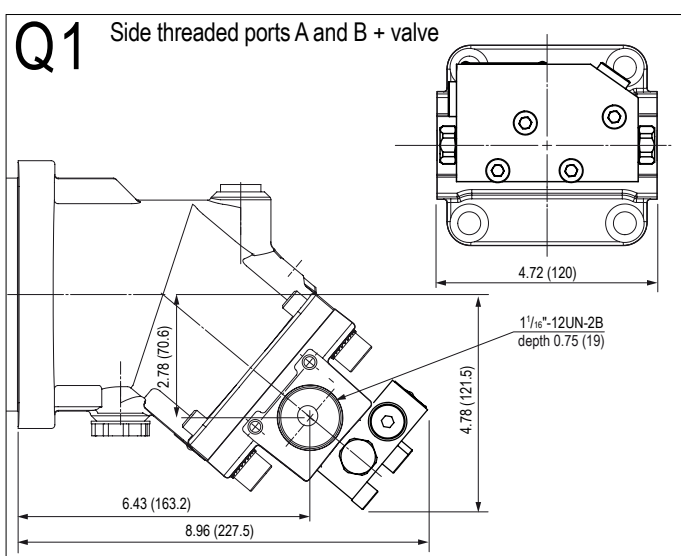
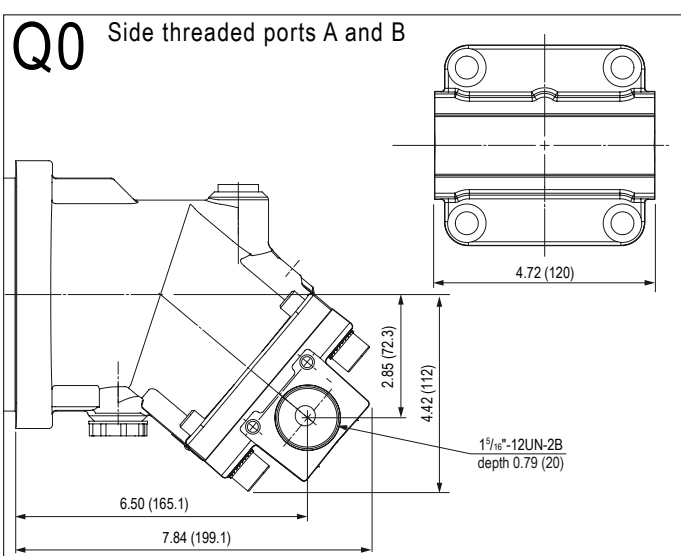
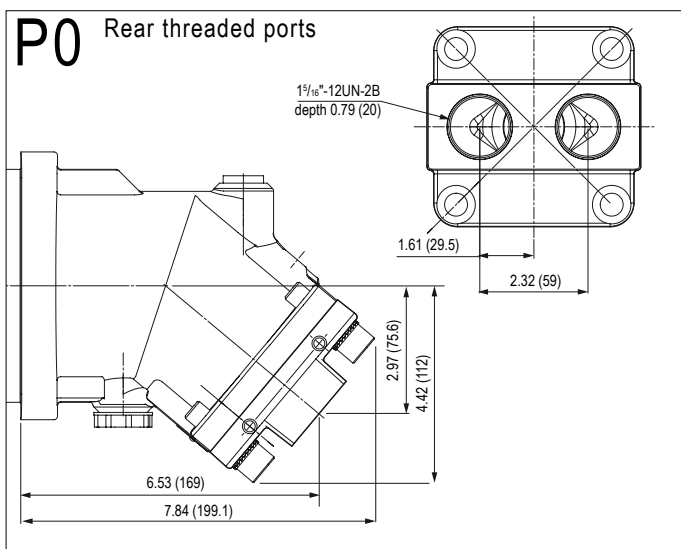
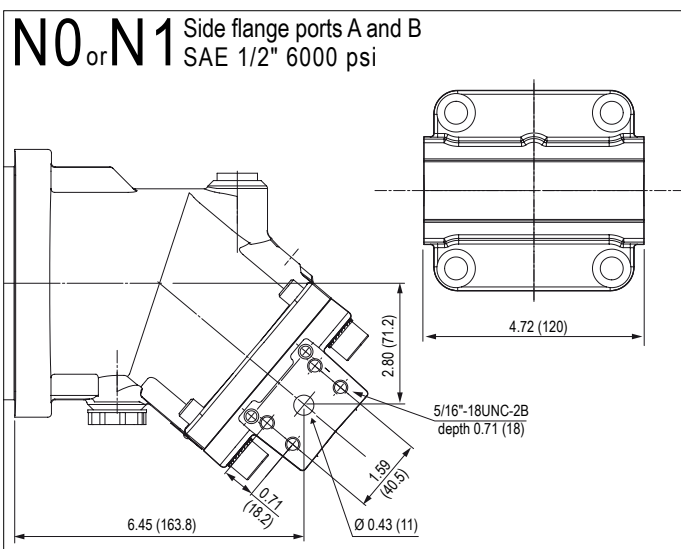
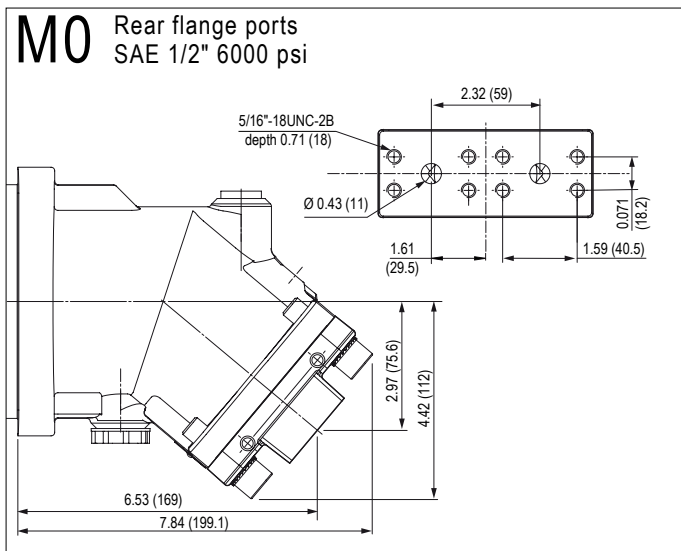
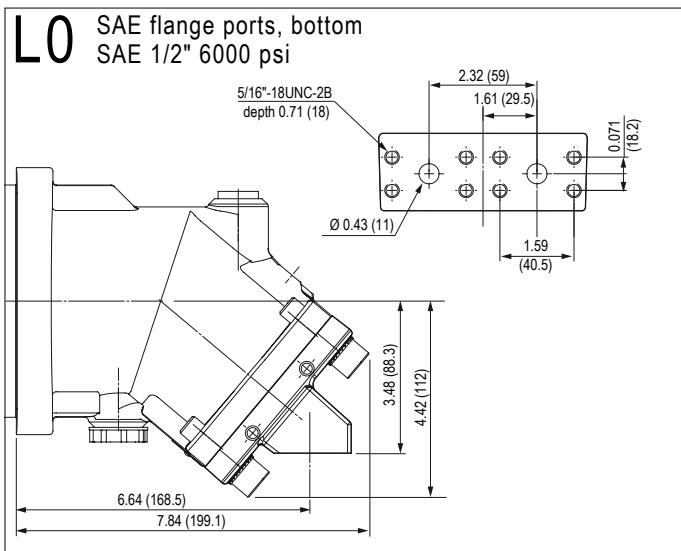
Dimensions in inches (mm) are given only as an indication.

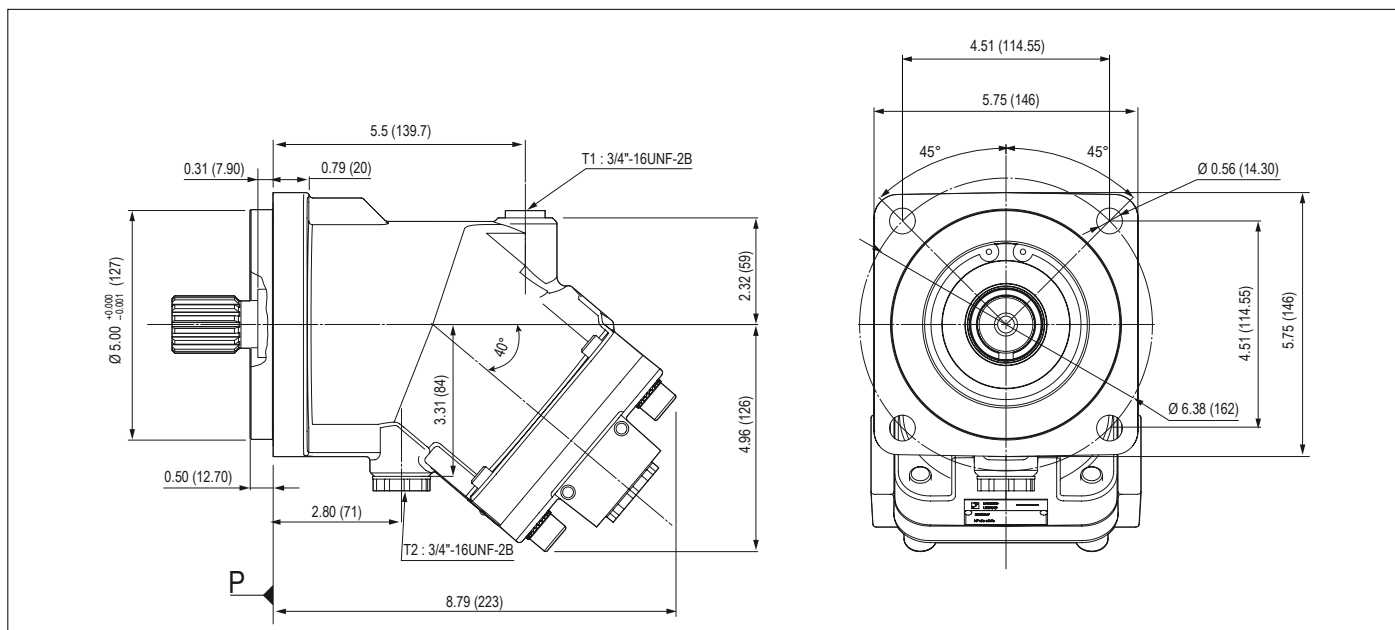


► Shaft end



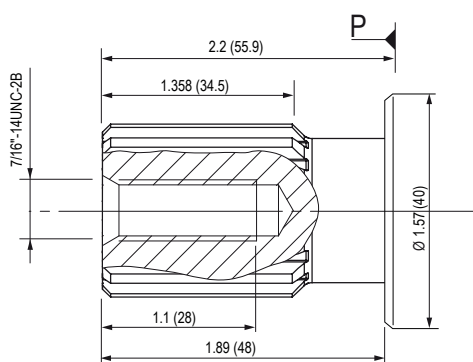
► Inlet ports



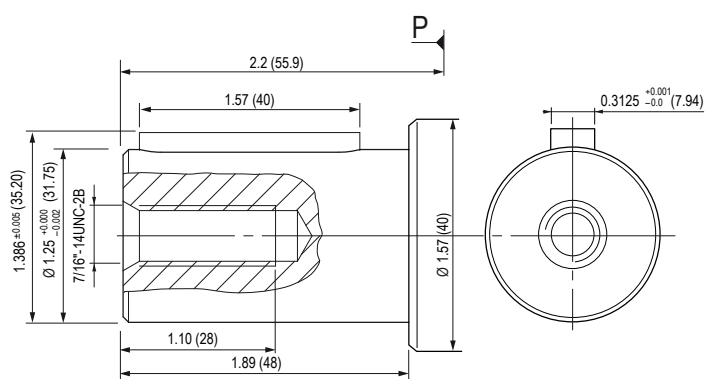


► **Shaft end**

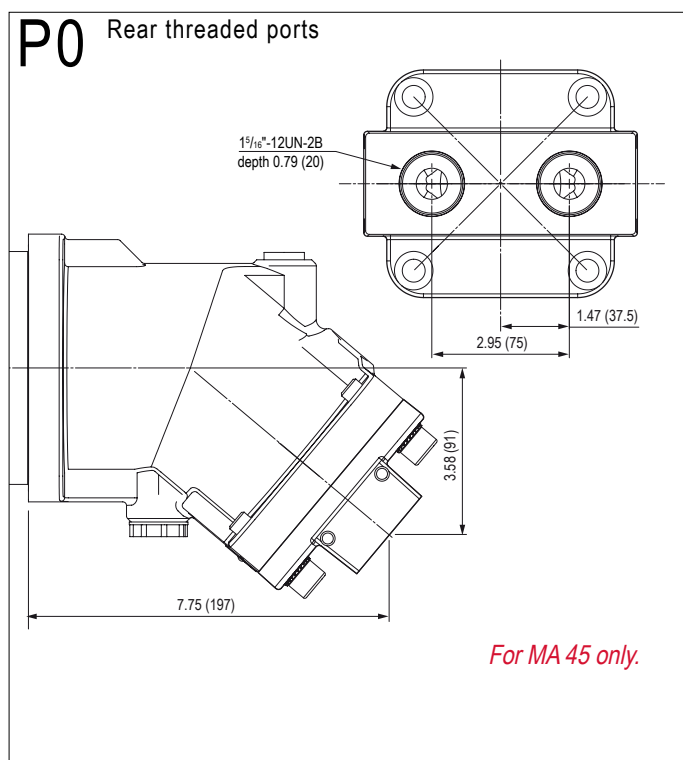
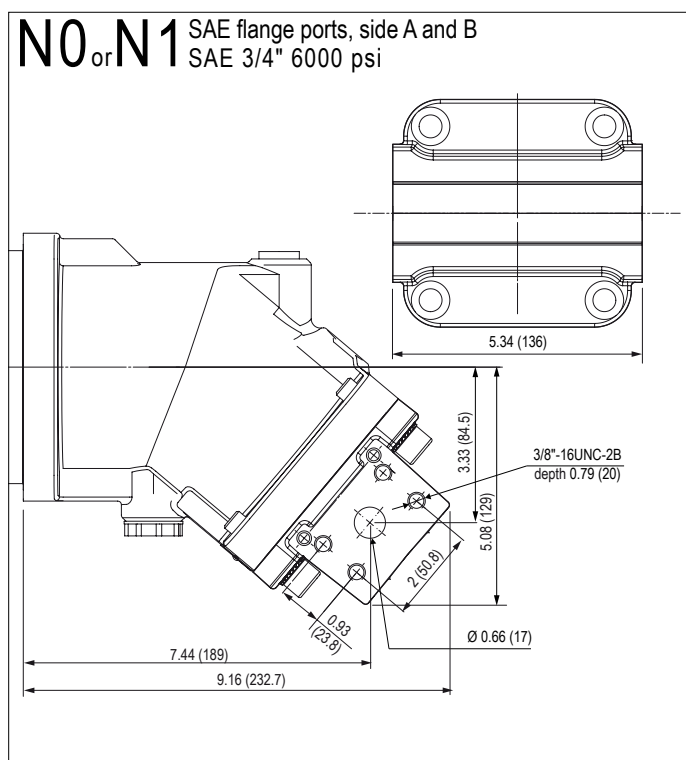
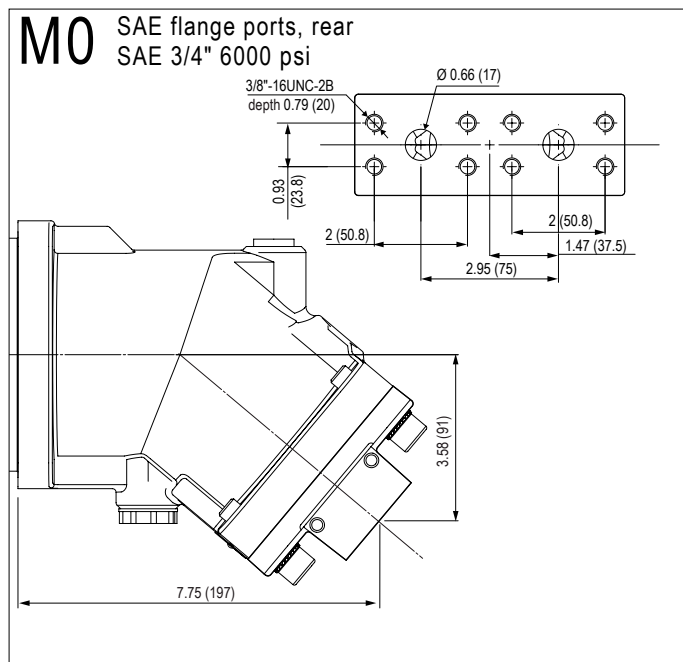
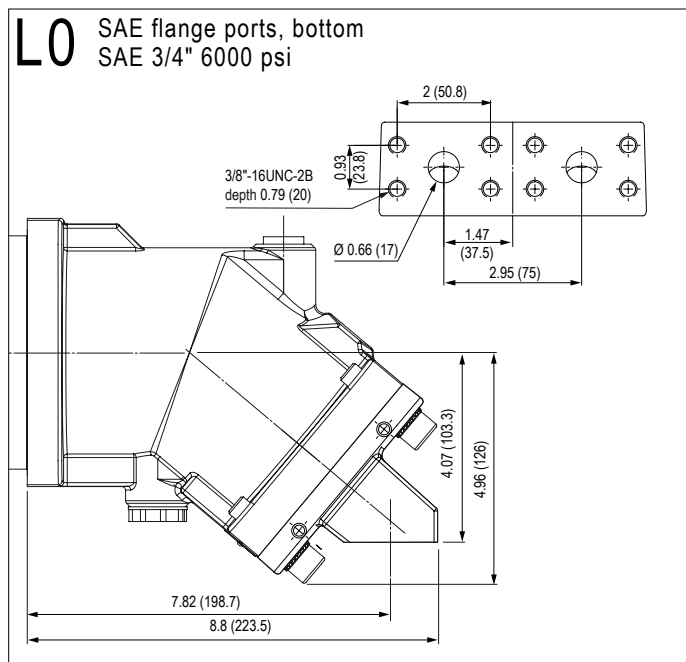
S1 Splined shaft 14T 12/24DP 1¼"

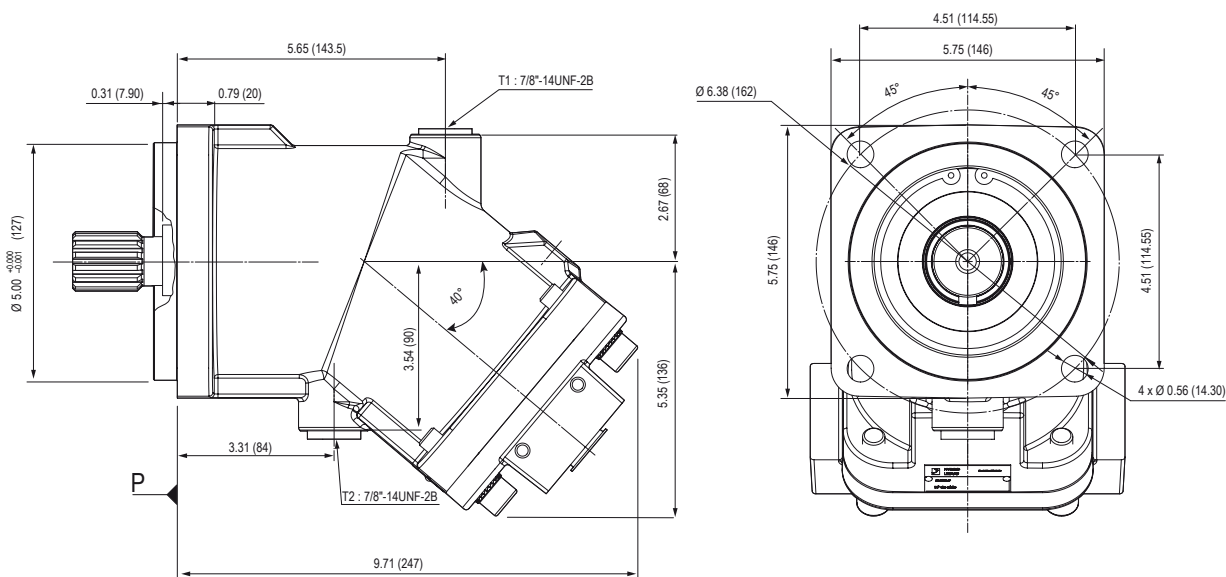


K1	Cylindrical keyed shaft Ø 1¼"
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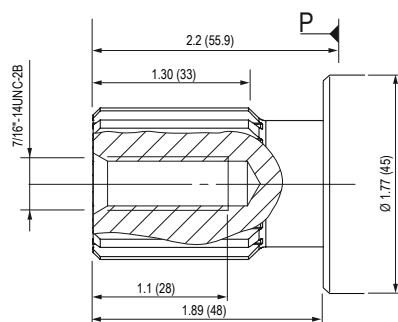
Inlet ports





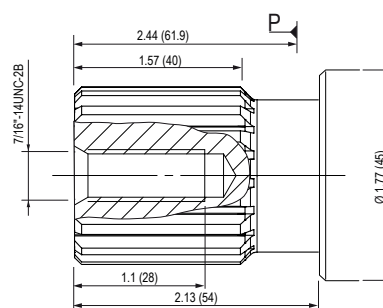
► Shaft end

S1 Splined shaft 14T 12/24DP 1¼"

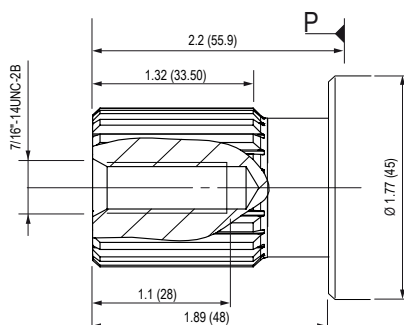


Max. pressure 350 bar (5076 psi) for MA 80.
Max. pressure 320 bar (4495 psi) for MA 90.

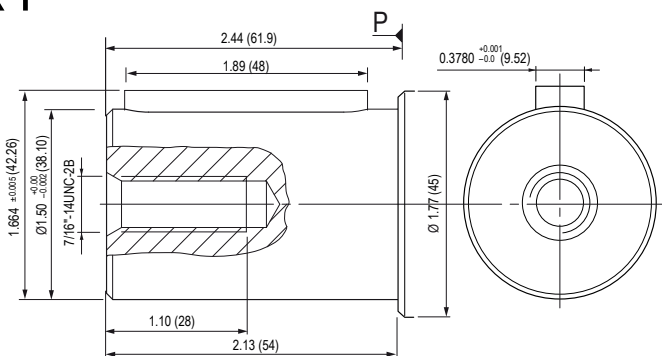
S2 Splined shaft 17T 12/24DP 1½"



S3 Splined shaft 21T 16/32DP 1¾"

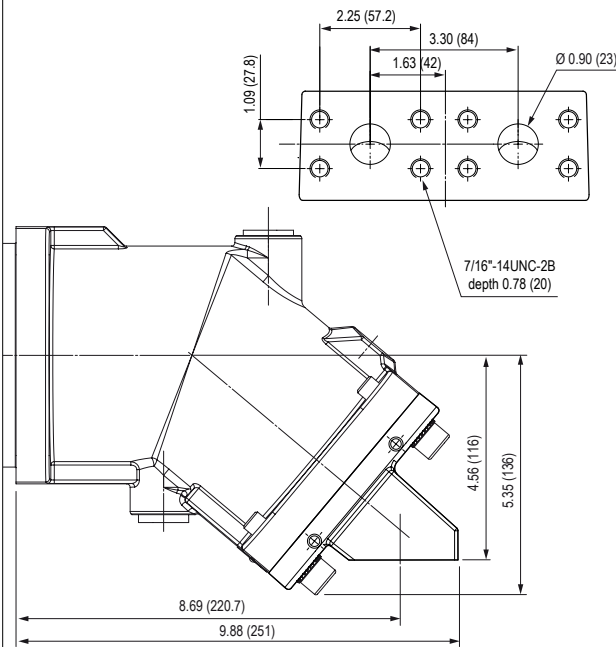


K1 Cylindrical keyed shaft Ø 1½"

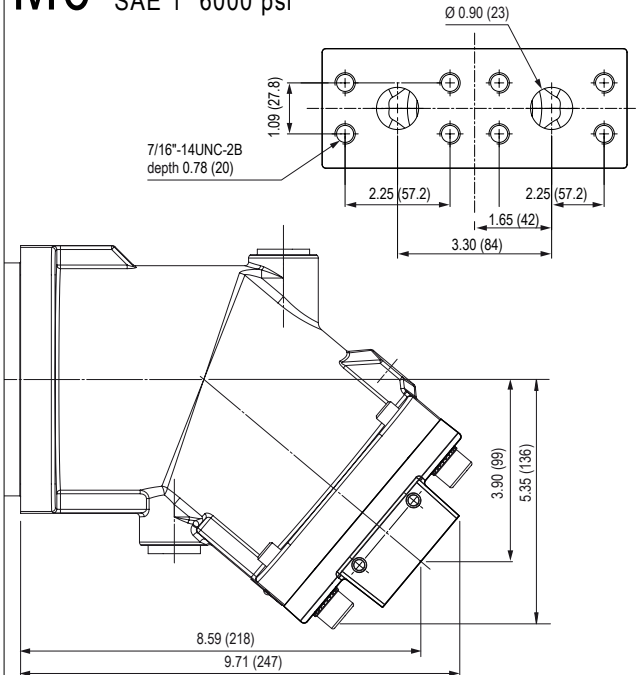


► Inlet ports

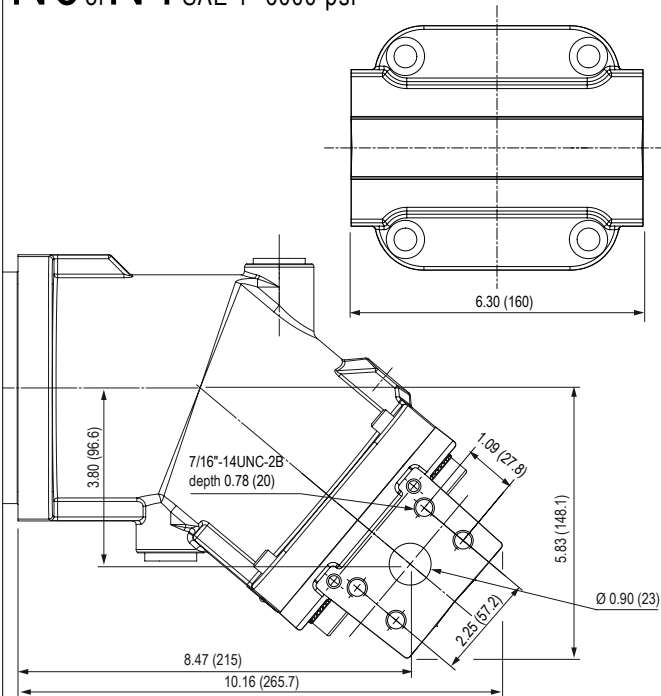
L0 SAE flange ports, bottom SAE 1" 6000 psi

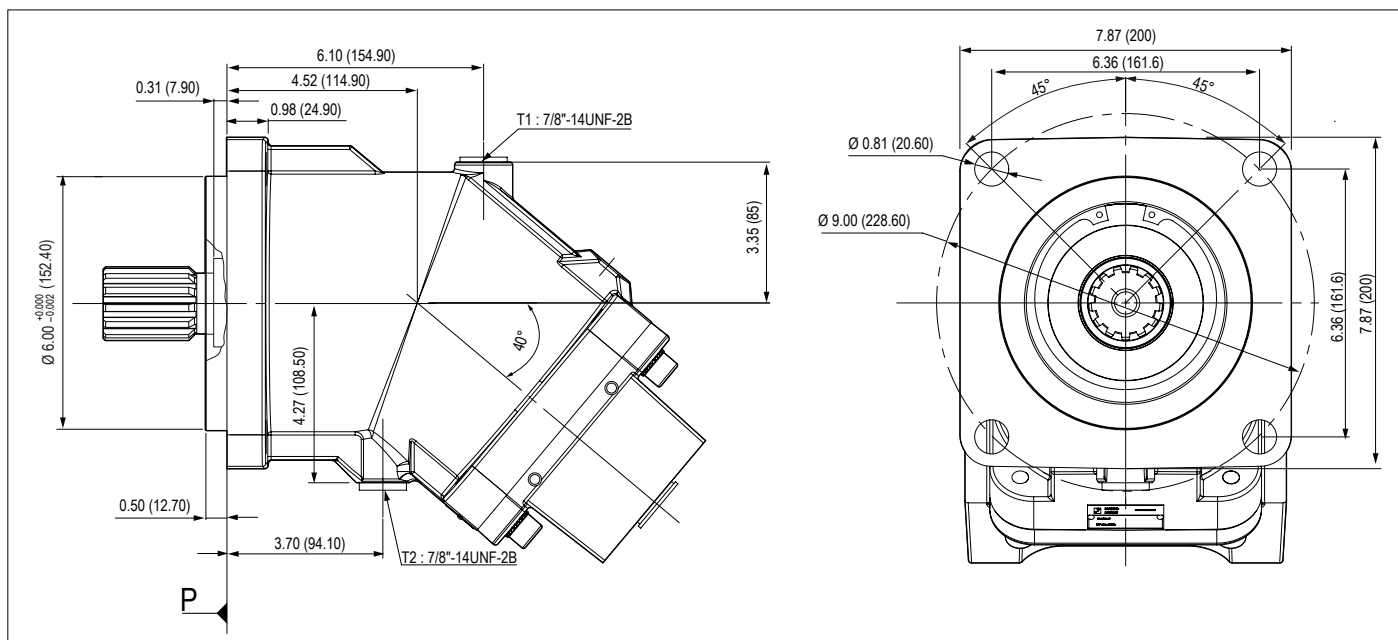


M0 SAE flange ports, rear SAE 1" 6000 psi

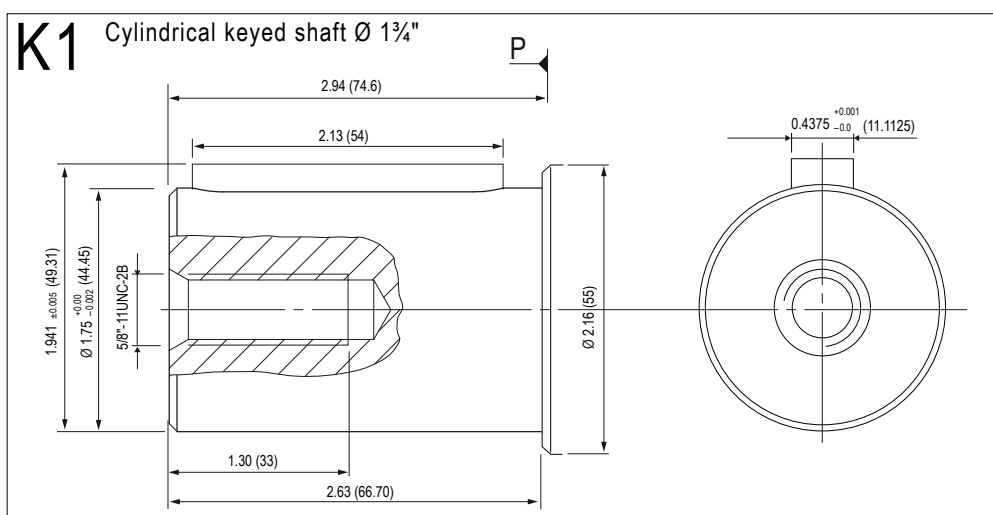
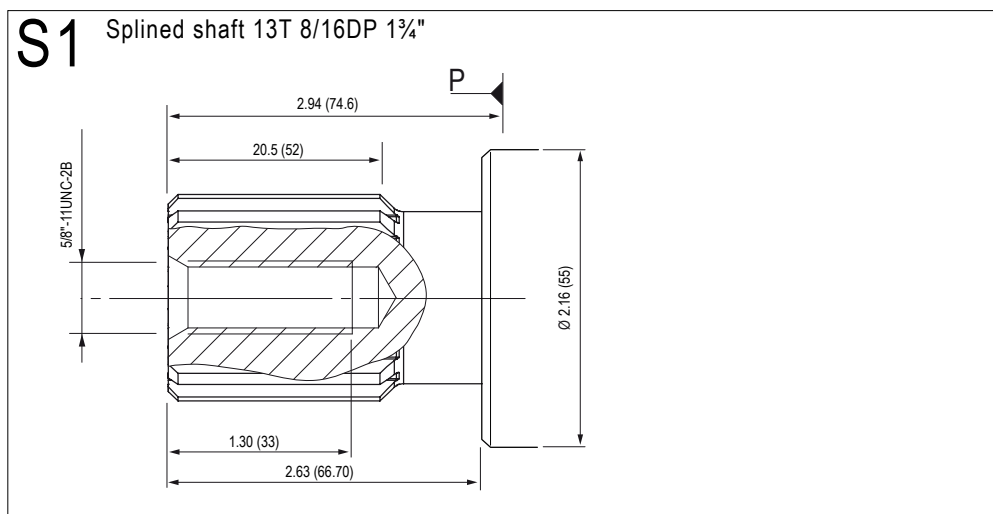


N0 or N1 SAE flange ports, side A and B SAE 1" 6000 psi





► Shaft end

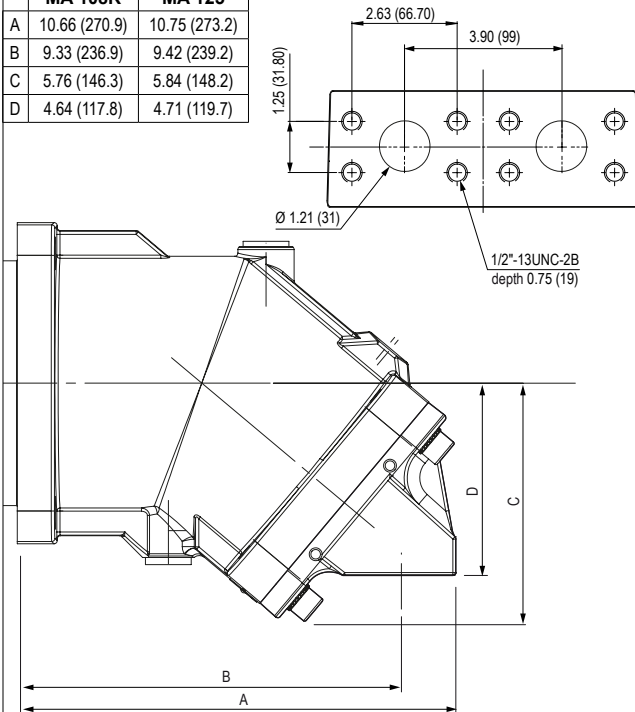


Dimensions in inches (mm) are given only as an indication.

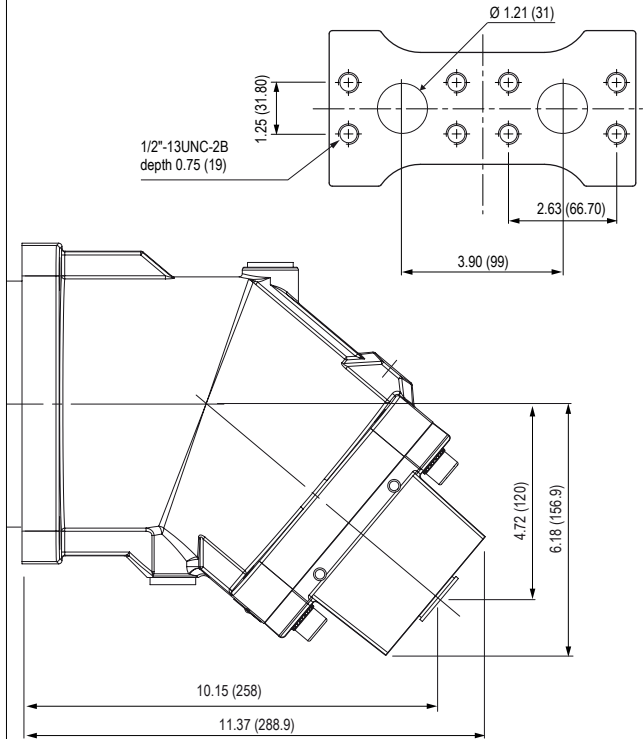
Inlet ports

L0 SAE flange ports, rear SAE 1 1/4" 6000 psi

	MA 108R	MA 125
A	10.66 (270.9)	10.75 (273.2)
B	9.33 (236.9)	9.42 (239.2)
C	5.76 (146.3)	5.84 (148.2)
D	4.64 (117.8)	4.71 (119.7)

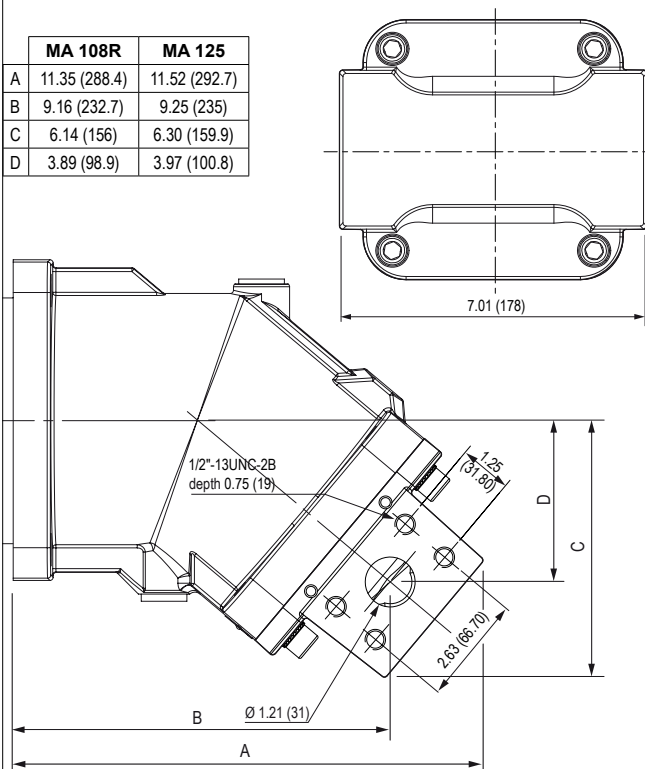


M0 SAE flange ports, bottom SAE 1 1/4" 6000 psi

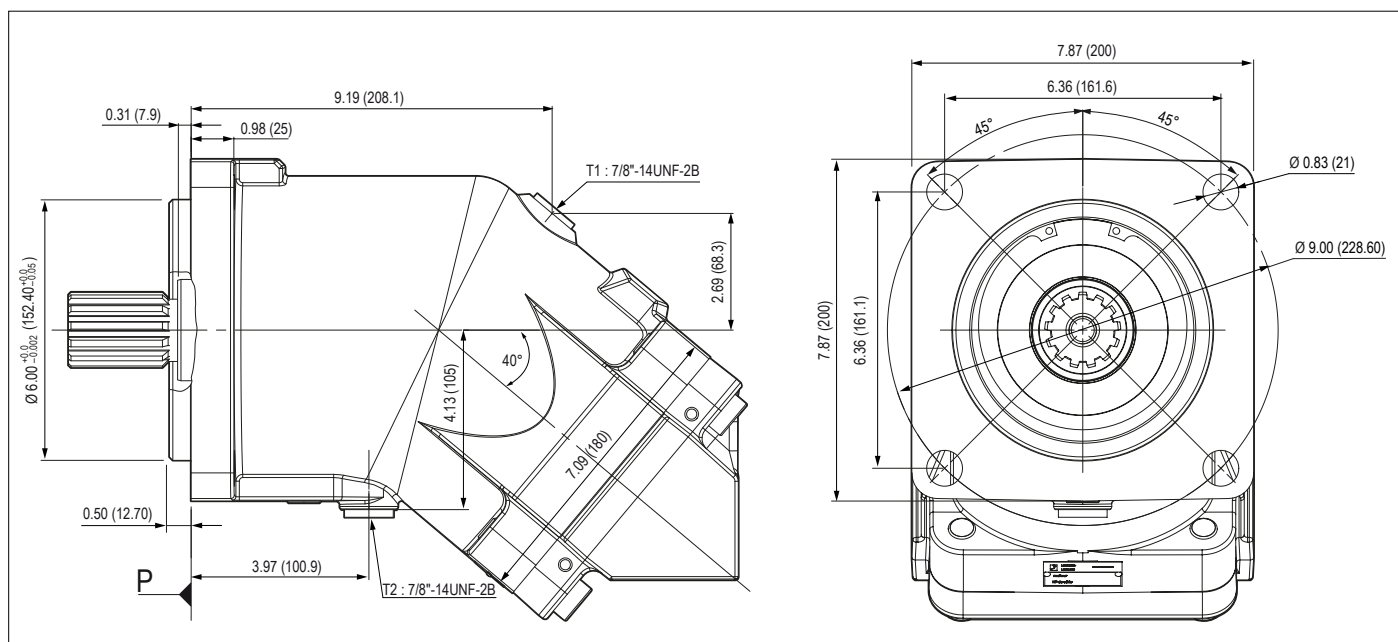


N0 or N1 SAE flange ports, side A and B SAE 1 1/4" 6000 psi

	MA 108R	MA 125
A	11.35 (288.4)	11.52 (292.7)
B	9.16 (232.7)	9.25 (235)
C	6.14 (156)	6.30 (159.9)
D	3.89 (98.9)	3.97 (100.8)

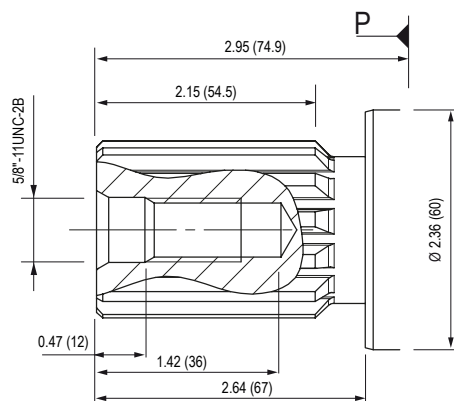


Dimensions in inches (mm) are given only as an indication.

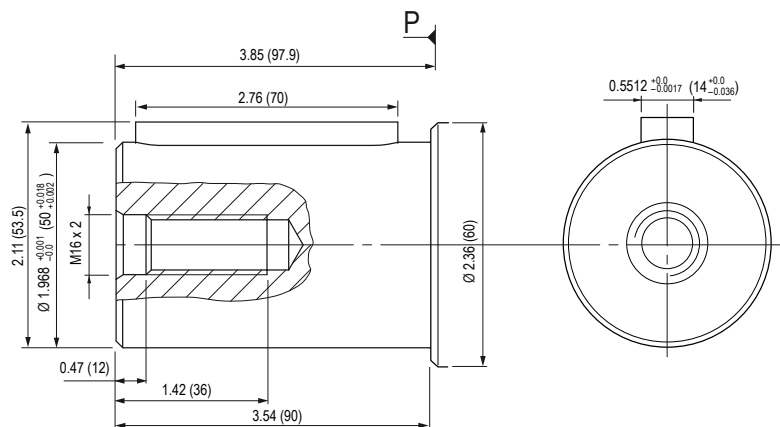


► Shaft end

S1 Splined shaft 13T 8/16DP 1 3/4"

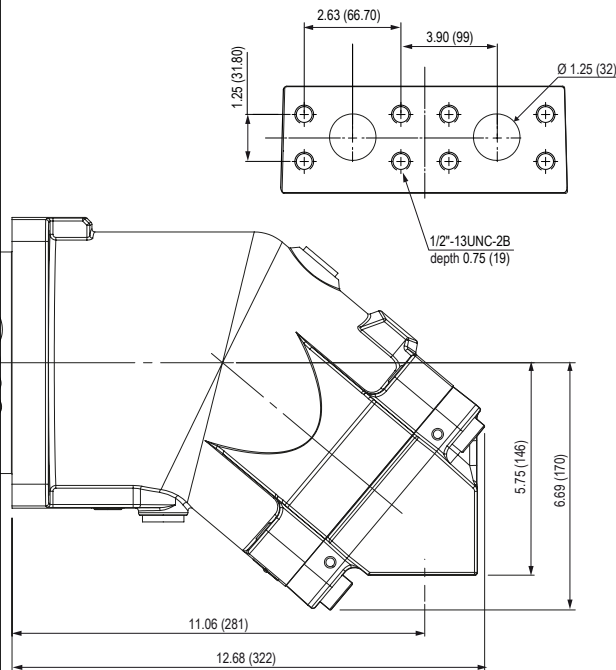


D1 Cylindrical keyed shaft Ø 50 DIN 6885 AS 14 x 9 x 70 mm

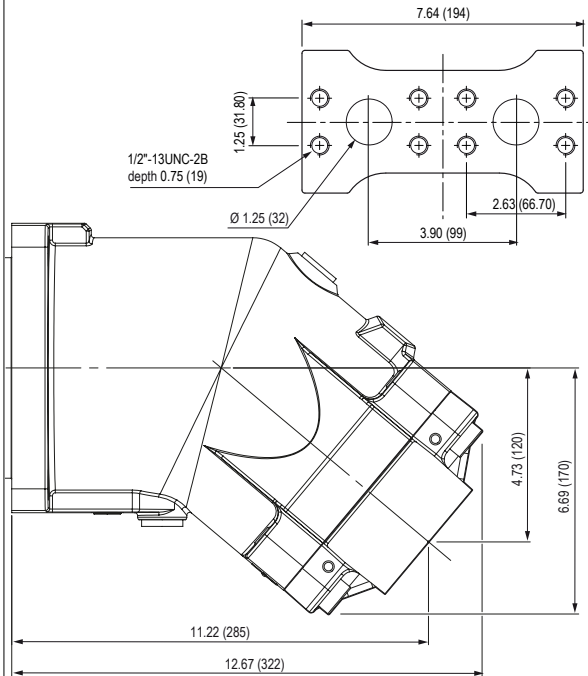


Inlet ports

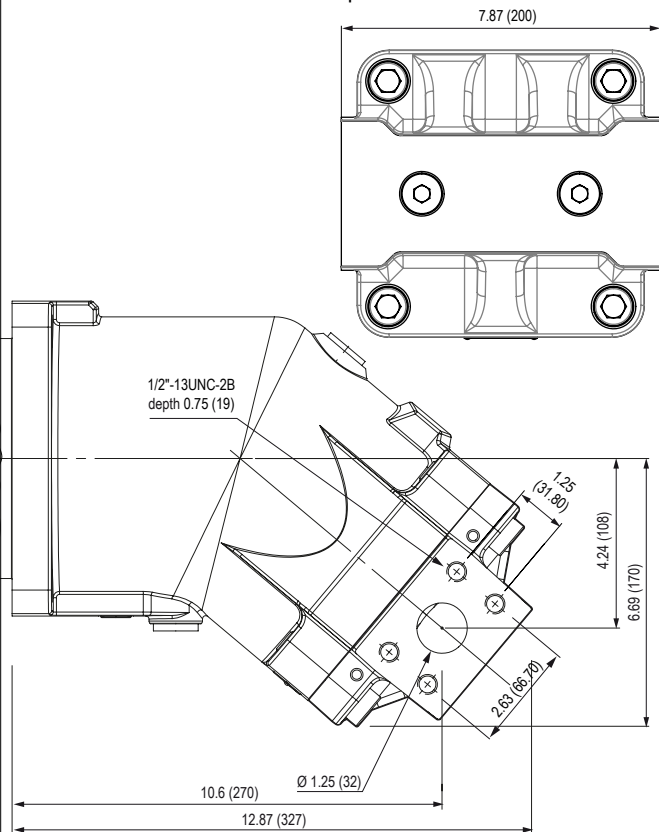
L0 SAE flange ports, bottom
SAE 1 1/4" 6000 psi



M0 SAE flange ports, rear
SAE 1 1/4" 6000 psi



N0 or N1 SAE flange ports, side A and B
SAE 1 1/4" 6000 psi



Dimensions in inches (mm) are given only as an indication.

CHARACTERISTICS OF THE MSI SERIES MOTORS

Motor model	Displacement (cc/rev)	Continuous max. speed (1) (rpm)	Intermittent max. speed (1) (rpm)	Max. flow absorbed (l/mn)	Torque (N.m/bar)	Torque at 350 bar (N.m)	Max. allowable pressure continuous / peak (bar)	Weight (kg)
MSI 28	27.7	6300	6900	175	0.44	154	400 / 450	11.5
MSI 32	32.1	6300	6900	202	0.51	179	400 / 450	11.5
MSI 41	41.1	5600	6200	230	0.65	229	400 / 450	11.5
MSI 50	50.3	5000	5500	252	0.80	280	400 / 450	19
MSI 63	63	5000	5500	315	1.00	351	400 / 450	19
MSI 80	80.4	4500	5000	362	1.28	448	400 / 450	26
MSI 90	90	4500	5000	405	1.43	501	400 / 450	26
MSI 108	108.3	4000	4400	433	1.72	603	400 / 450	26
MSI 108 R (2)	108.3	3400	4500	368	1.72	603	400 / 450	33
MSI 125	125.4	3400	4500	426	2.00	699	400 / 450	33

(1) For higher speeds, please contact us.

(2) The MSI 108 R is in the frame size of the MA 125.

► Acceptable forces applied to motor shaft

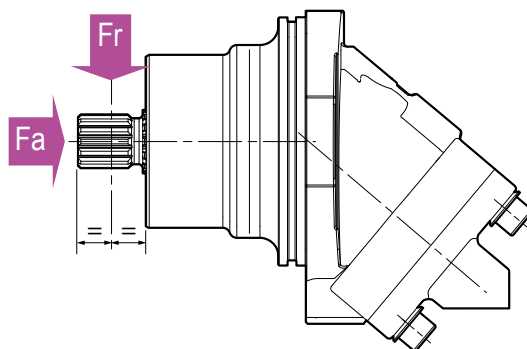
Motor model		28	32	41	50	63	80	90	108	108 R	125
Fr	N	6200	6500	7000	7500	9000	10500	11000	11500	12500	14500
Fa	N/bar *	28	30	40	40	50	60	67	80	80	86

Fr: radial force measured at mid point of length of shaft.

Fa: axial force which tends to push the shaft inwards.

* Differential pressure between A and B.

For other forces, please contact us.



MSI	...	B	...	L0	M1	.	.	SV
01	02	03	04	05	06	07	08	09

To obtain the code for your motor, complete the different parameters 02, 04, 07 and 08, in the table on the left according to the options you require (see table below).

Motor												
01	Semi-integrated motor											MSI

Displacement												
02		28	32	41	50	63	80	90	108	108 R	125	

Mounting flange												
03	2 bolts ISO 3019-2											B

Shaft												
04	DIN 5480 splined	W30	W30	W30	W30	W30	W40	W40	W40	W40	W45	W1
		-	-	-	-	W35	W35	W35	-	-	W40	W2

Inlet ports												
05	SAE flange ports, bottom	•	•	•	•	•	•	•	•	•	•	L0

Drain												
06		1	1	1	1	1	1	1	1	1	1	M1

Suitable for use of speed sensor												
07	Yes	•	•	•	•	•	•	•	•	•	•	1
	No	•	•	•	•	•	•	•	•	•	•	0

Speed sensor												
08	Yes	•	•	•	•	•	•	•	•	•	•	1
	No	•	•	•	•	•	•	•	•	•	•	0

Valves												
09	Without	•	•	•	•	•	•	•	•	•	•	SV

W1 Splined shaft DIN 5480
W 30 x 2 x 30 x 14 x 9 g

Technical drawing of a splined shaft (W1) showing dimensions and a pressure point P. The shaft has a central hole with a diameter of $\varnothing 35$ and a length of 27. The outer diameter is 35. The shaft is splined with a keyway of width 22. The total length of the shaft is 124.1, with a tolerance of $+0.2$ to -0.9 . The drawing also shows a pressure point P at the end of the shaft. The shaft is labeled with the dimensions W 30 x 2 x 30 x 14 x 9 g.

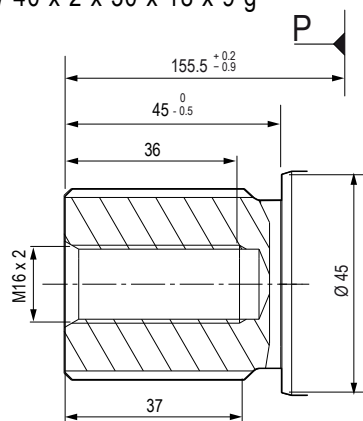
L0 SAE flange ports, bottom 40° A and B
SAE 1/2" 6000 psi

Technical drawing showing the L0 flange assembly with dimensions:

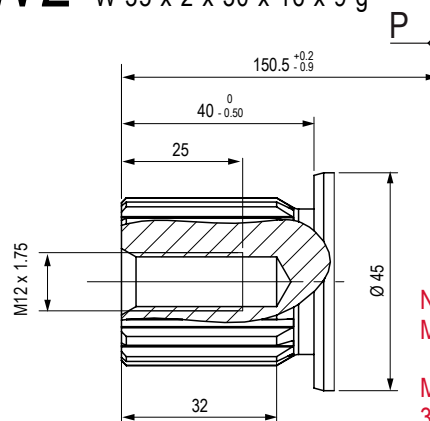
- SAE flange ports, bottom 40° A and B
- SAE 1/2" 6000 psi
- M8 depth 15
- 40.5
- 59
- 115
- Ø 11
- 18.2
- 40
- 88.3
- 91.4
- 111.6

Dimensions in mm are given only as an indication.

W1	Splined shaft DIN 5480 W 40 x 2 x 30 x 18 x 9 g
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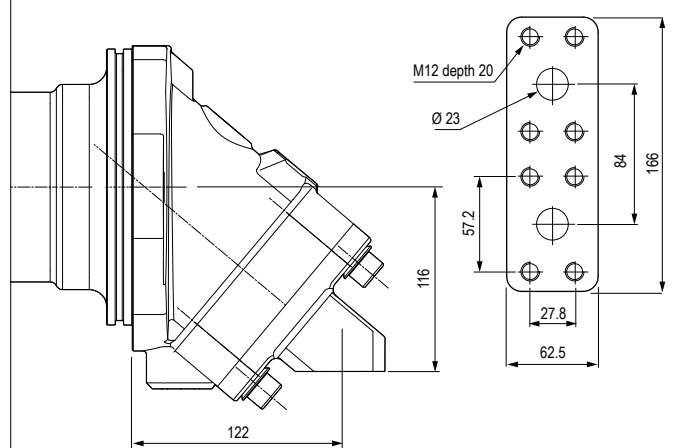


W2	Splined shaft DIN 5480 W 35 x 2 x 30 x 16 x 9 g
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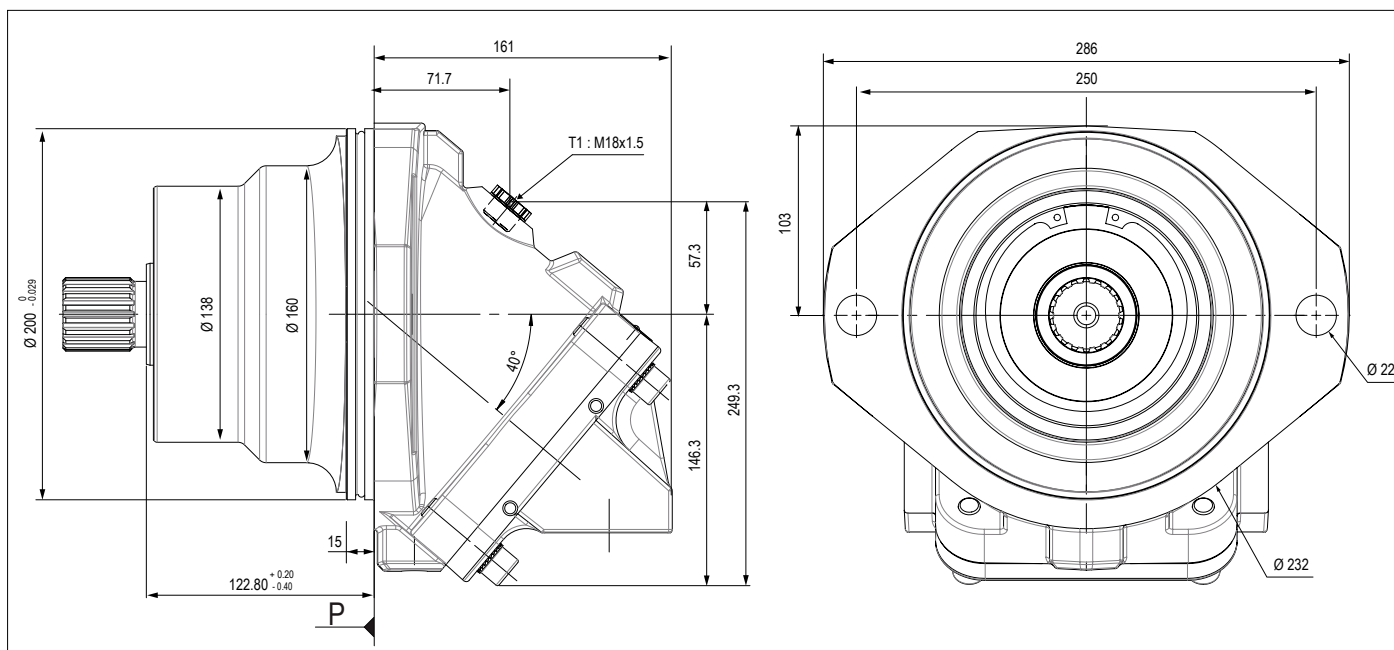


Max. pressure:
350 bar for MSI 90.

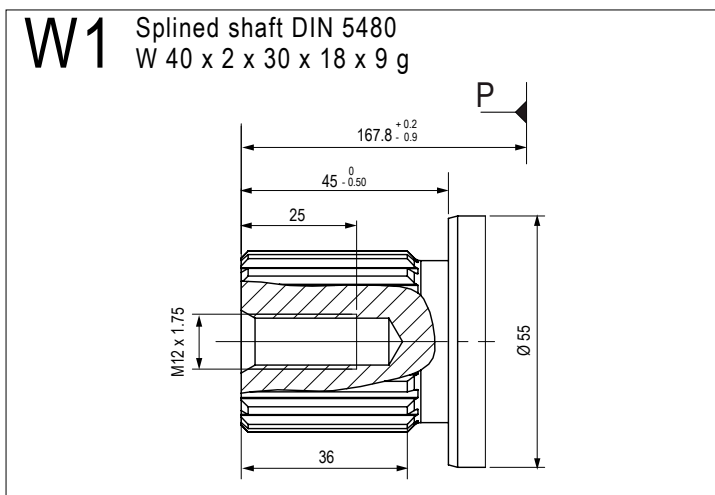
L0	SAE flange ports, bottom 40° A and B SAE 1" 6000 psi
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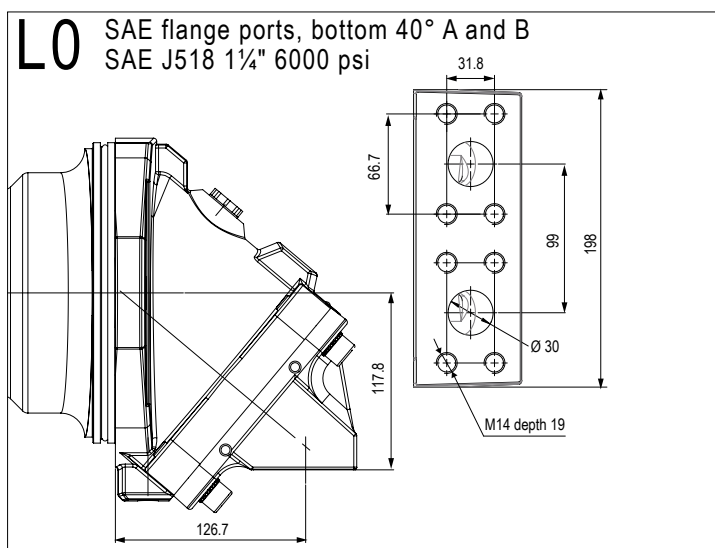
Dimensions in mm are given only as an indication.



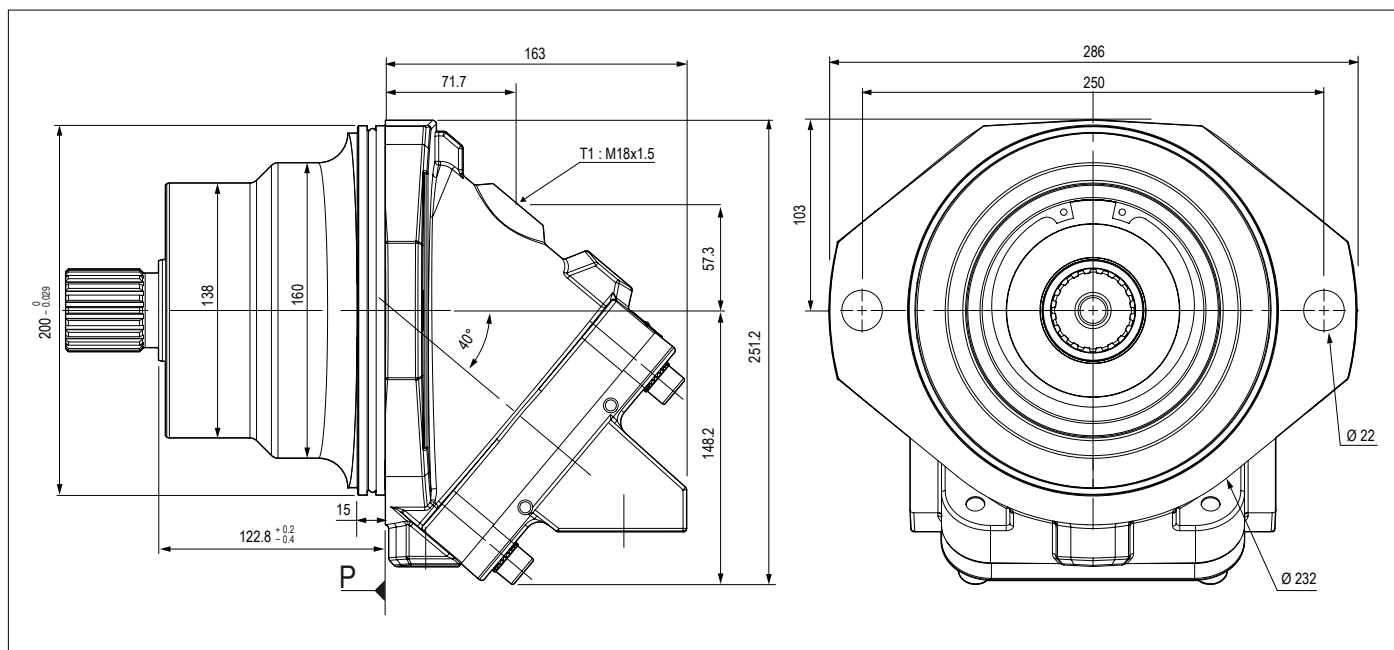
► Shaft end



► Inlet ports

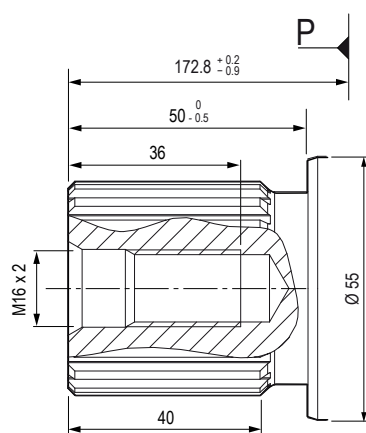


Dimensions in mm are given only as an indication.

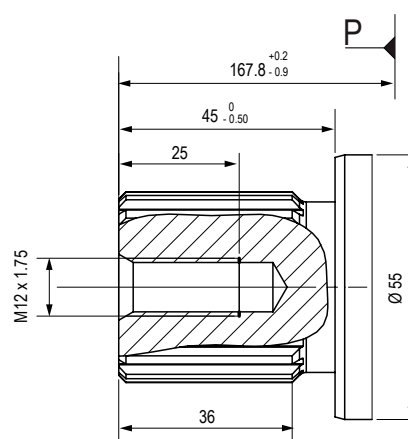


► Shaft end

W1 Splined shaft DIN 5480
W 45 x 2 x 30 x 21 x 9 g

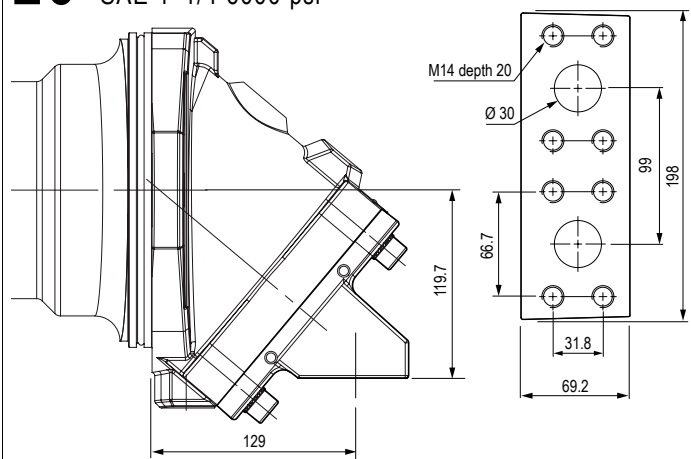


W2 Splined shaft DIN 5480
W 40 X 2 X 30 X 18 X 9 g



► Inlet ports

L0 SAE flange ports, bottom 40° A and B
SAE 1"1/4 6000 psi

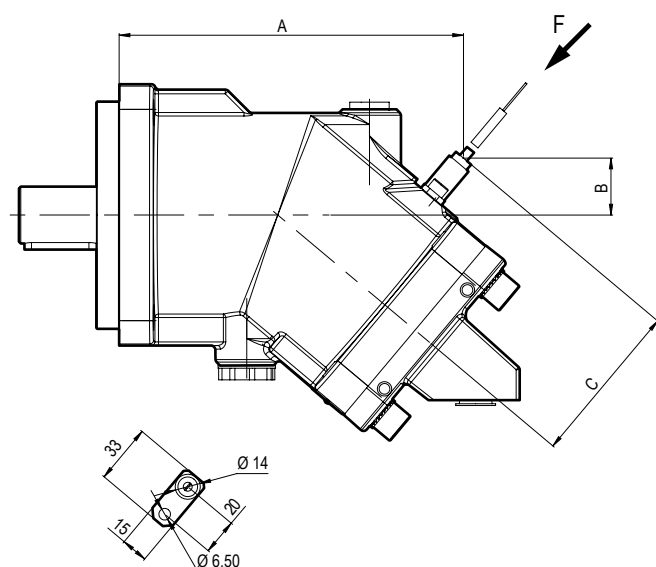


Dimensions in mm are given only as an indication.

SPEED SENSOR & INDICATOR OF DIRECTION OF ROTATION

LEDUC CODE: 093327

M, MA, MSI series motors can be fitted with an induction type speed sensor, to measure rotating speed and also direction of rotation.
This accessory may only be used on motors which are suitably adapted to take it (see the order code system).



► Technical data for the sensor

Supply voltage	5...32 V DC
Current consumption	maximum 6 mA without load
Output frequency	0 Hz...20 kHz
Protection type	IP 69 k
Operating temperature	– 104°F...+ 257°F (– 40°C...+ 125°C)
Weight	around 65 g
Cable length	50 cm

Series	Motor models	A (mm)	B (mm)	C (mm)	Number of teeth *
M	M 12 - 18	152	33	88	30
	M 25	169	32	91	33
	M 28 - 32 - 41	174	28	91	33
	M 45 - 50 - 63	192	24	98	39
	M 80 - 90 - 108	218	18	103	44
	M 108R - 125	225	46	121	64
	M 160 - 180	250	47	126	68
MA	MA 10 - 12 - 18	162	32	87	30
	MA 25	173	41	92	35
	MA 32 - 41	173	41	92	35
	MA 45 - 50 - 63	193	35	96	39
	MA 80 - 90	223	30	101	44
	MA 108R - 125	251	45	122	64
	MA 160 - 180	282	47	126	68
MSI	MSI 28 - 32 - 41	97	43	91	35
	MSI 50 - 63	117	36	96	39
	MSI 80 - 90 - 108	125	31	101	44
	MSI108 R - MSI 125	142	45	122	64

* The motors suitable for use with a speed sensor are fitted with a gear wheel on the barrel.
 When this barrel rotates, it produces a signal proportional to rotating speed, and which is picked up by the sensor.

NOTE: maximum tightening torque = 10 N.m.
 For further information, please contact us.

FLUSHING VALVE | LEDUC CODE: VBS 091180

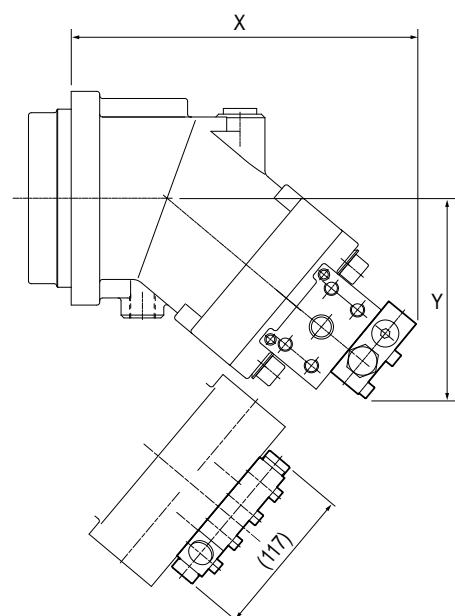
Used to create flow to cool the motor. This valve is essential for all intensive uses of motors and contributes to long service life.

The valve takes some hydraulic fluid from the return connection port (low pressure) and reinjects it into the motor housing. This is then evacuated via the motor drain line.

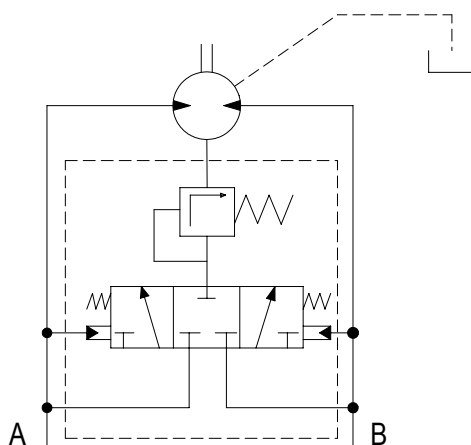
Flushing valves are only available for use with motors with side ports (N1 or Q1).

► Dimensions

Series	Motor models	X (mm)	Y (mm)
M	M 25	207	116
	M 28 - 32 - 41	213	121
	M 45 - 50 - 63	235	137
	M 80 - 90 - 108	265	153
	M 108R	273	153
	M 125	275	155
	M 160 - 180	313	172
MA	MA 25	221	116
	MA 32 - 41	228	122
	MA 45 - 50 - 63	256	137
	MA 80 - 90	286	153
	MA 108 R	305	157
	MA 125	307	159
	MA 160 - 180	345	170

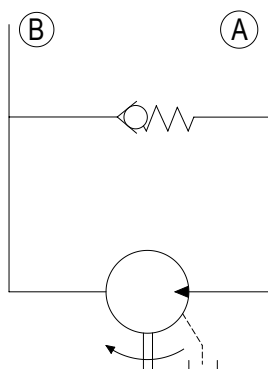


► Schematic drawing of flushing valve

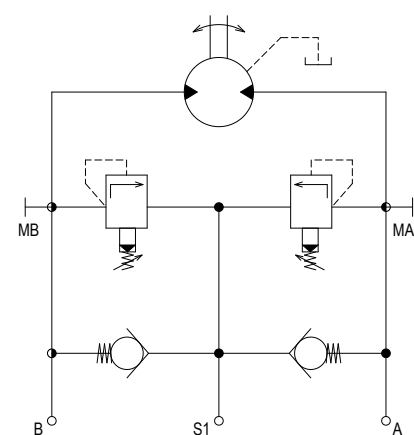


Examples of other valves on request (please consult us):

Anti-cavitation valve



Double pressure relief valve



ATEX CERTIFICATION

► LEDUC motors are certified ATEX

As standard, all LEDUC motors are classed in Group II category 2 D TX.

On request, motors may be supplied for Group II category 2G and Group II category D T4.

As all the motors must be delivered unpainted (risks due to static electricity), it is necessary to pay attention to the risks of corrosion.

► Explanation

Group II category 2 means it is possible to operate in an ATEX 1 zone (probable gas atmosphere) or ATEX 21 zone (probable dusty atmosphere).

G = May operate in a gas zone.

D = May operate in a dusty atmosphere.

TX = Maximum surface temperature.

► Precautions regarding ATEX

It is necessary to check the following recommendations:

- The operating temperatures of the motors must be guaranteed by the end user.
- The machines on which our products are assembled should be ground-connected (static electricity).
- Check all parts connected to the motor for conformity with ATEX.

► Markings on motors

The marking of our product will be: Group II category 2GD c TX (where TX replaces T3 and T4).

Our products are TX registered (based on product surface temperature) and can therefore be certified T4 or T3 according to the following recommendations (hot area).

► Surface temperature

- T4 275°F (135°C) for fluid temperature < 158 °F (70°C).
- T3 392 °F (200°C) for fluid temperature < 230 °F (110°C).

► Example of ATEX marking on motors

CE  II 2 GD c TX HL1

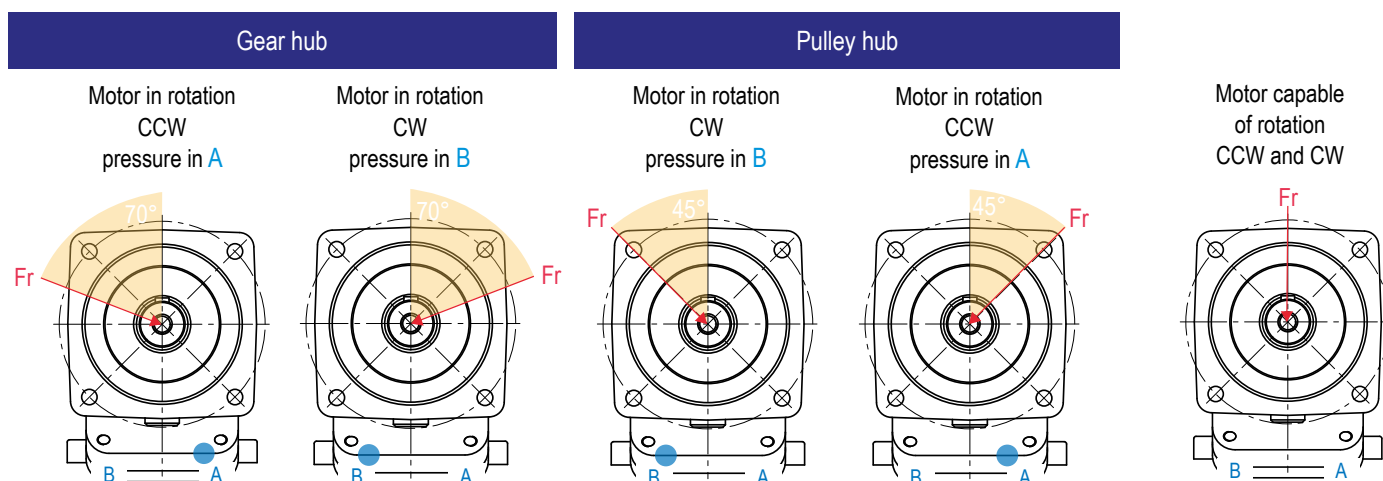
If you have different requirements, please contact us.

IMPORTANT NOTE: ATEX certification does not apply to motors fitted with speed sensor, nor to the “drainless” motors.



► Maximizing service life of bearings

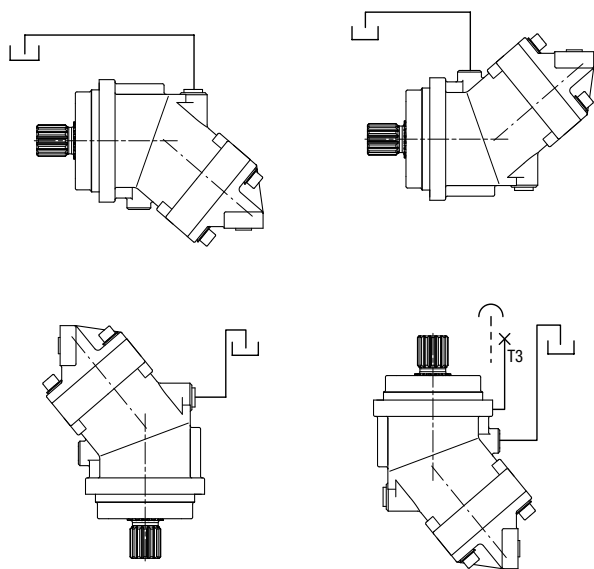
In cases where there is a radial force on motor shaft, keeping the direction of that force within the shaded areas shown below will improve service life of the motor.



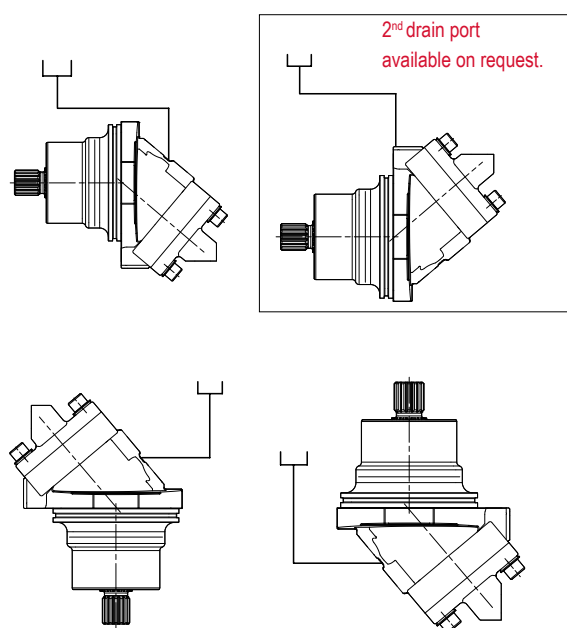
► Mounting position of motors

LEDUC motors can be used in only mounting position. In "shaft upwards" position, make sure that the motor housing is completely filled with fluid (for M motors, bleed the air by the T3 connection). The T3 connection is only available for M series motors.

M | MA

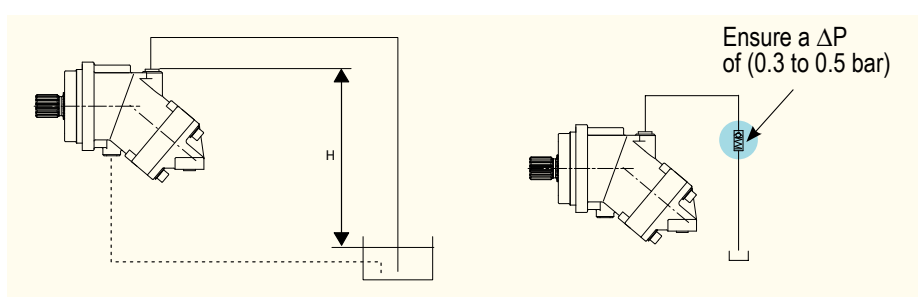


MSI



In installations where the position of the motor (H) is above the tank for the drain return, be sure the drain line is always submerged in fluid.

If this is not the case, it is necessary to add a check valve on the drain line as shown the figure on right.



Drainless motor

bent axis hydraulic motor

HYDRO LEDUC is now able to offer drainless motors for either **single direction of rotation** or **bi-directional use**, under certain conditions and on request (giving details of your application).

ADVANTAGES

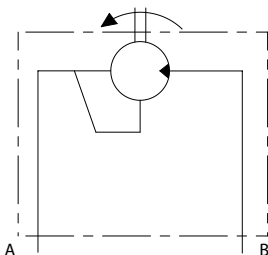
No drainline needed

- ▶ Only two hose lines are required: supply line and output.
 - ▶ The motor is drained through the return line.
- It is fitted with a high pressure lip seal.

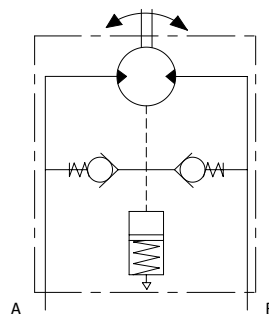
CHARACTERISTICS

- Working speed:
Please consult our Technical Department with details of your applications.
- Max. pressure on the return line: 25 bar.

► Schematic drawing for use in single direction of rotation



► Schematic drawing for bi-directional use



For **bi-directional** applications, the motor is fitted with an accumulator integrated in the back piece, to compensate possible pressure peaks in the housing (for example from rapid change in direction).

Please contact our Customer Service Department with details of your application.

PISTON PUMPS FOR TRUCKS

HYDRO LEDUC offers 3 types of piston pumps perfectly suited to all truck and PTO-mount applications.

- Fixed displac. from 12 to 130 cc/rev
- Variable displac. from 40 to 150 cc/rev



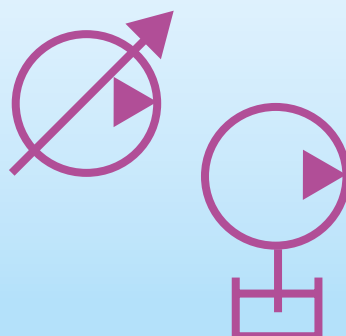
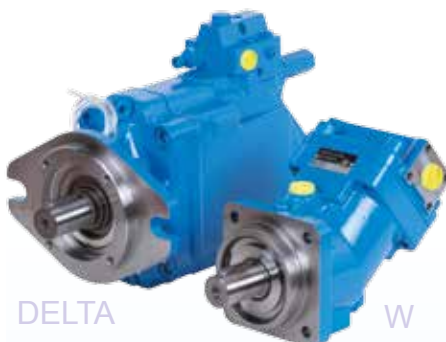
MOBILE & INDUSTRIAL PUMPS

The W range is composed of fixed displacement pumps, and the DELTA range, of variable displacement pumps. These pumps can operate at high pressures within minimal size.

- ▶ W and WA (SAE)* pumps:
 - Fixed displac. from 12 to 125 cc/rev
 - ISO 3019/2 or SAE flanges
 - DIN 5480 or SAE shafts

- ▶ DELTA pumps:
 - Variable displac. from 40 to 92 cc/rev
 - SAE shafts and flanges

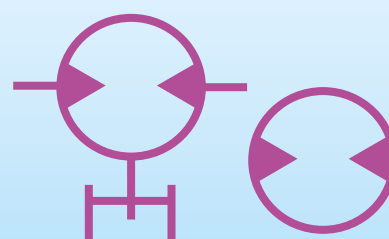
* For SAE version, please ask.



HYDRAULIC MOTORS

Fixed displacement piston motors.

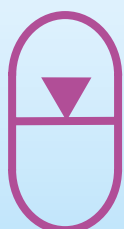
- Models from 5 to 180 cc/rev.
- Available in ISO, SAE and semi-integrated versions.



HYDROPNEUMATIC ACCUMULATORS

Bladder, diaphragm, piston accumulators.
Spherical and cylindrical accumulators.

- Capacity from 0.02 to 50 liters.
- Working pressure up to 500 bar.
- Accessories for use with hydraulic accumulators.



MICRO HYDRAULICS

This is a field of exceptional HYDRO LEDUC know-how:

- Axial and radial piston pumps, of fixed and variable displacement
- Axial piston micro-hydraulic motors
- Micro-hydraulic units incorporating pump electric motors, valving, controls, etc.

HYDRO LEDUC offers complete, original and reliable solutions for even the most difficult environments, and within the smallest size envelopes.



A dedicated R&D team means HYDRO LEDUC is able to adapt or create products to meet specific customer requirements.

Working in close cooperation with the decision-making teams of its customers, HYDRO LEDUC optimizes proposals based on the specifications submitted.

Complete catalogues available at
www.hydroleduc.com



A passion for hydraulics



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