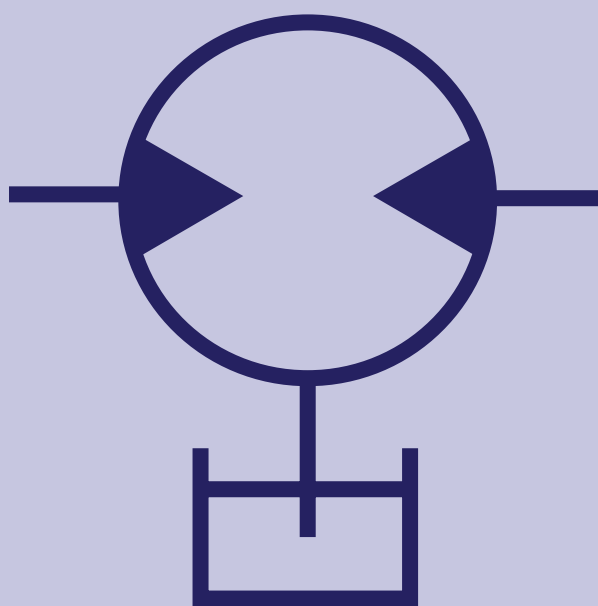
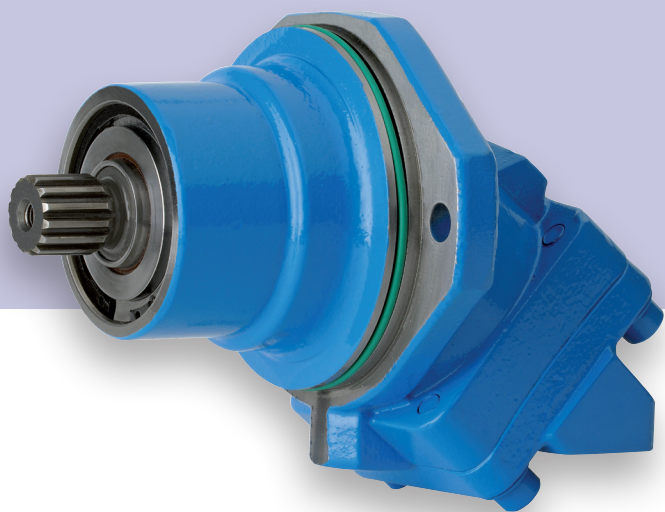
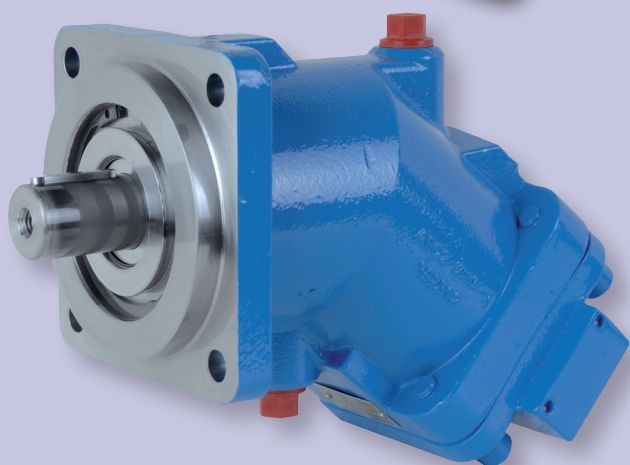
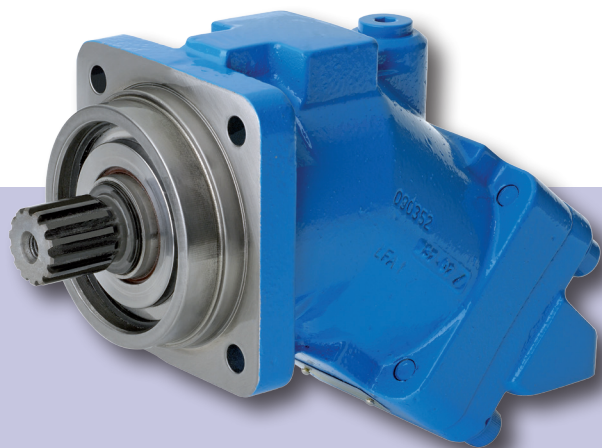


# BENT AXIS HYDRAULIC MOTORS

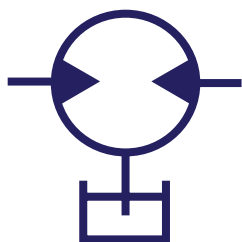
**FIXED** DISPLACEMENT



*make it simple*

 **HYDRO  
LEDUC**

BENT AXIS

**HYDRAULIC MOTORS**

|                                                          |   |
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**MA series**

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**Série MSI**

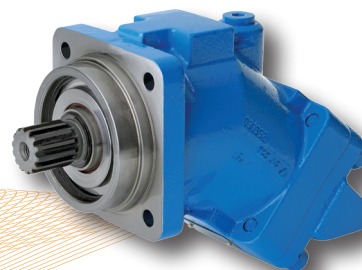
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## M

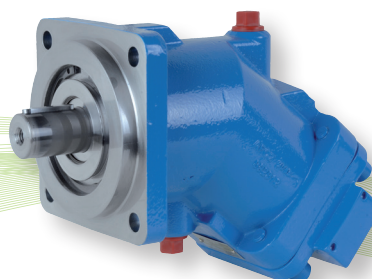
- Displacement 5 cc/rev - CETOP
- Displacements from 12 to 180 cc/rev - ISO
- For fixed and mobile applications



M series

## MA

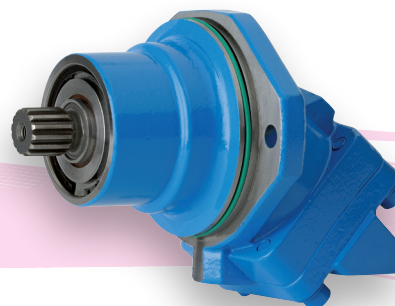
- SAE
- Displacements from 10 to 180 cc/rev
- For fixed and mobile applications



MA series

## MSI

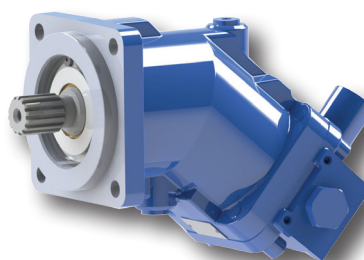
- ISO - semi-integrated
- Displacements from 28 to 125 cc/rev
- for applications mounted on a planetary gearbox



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).

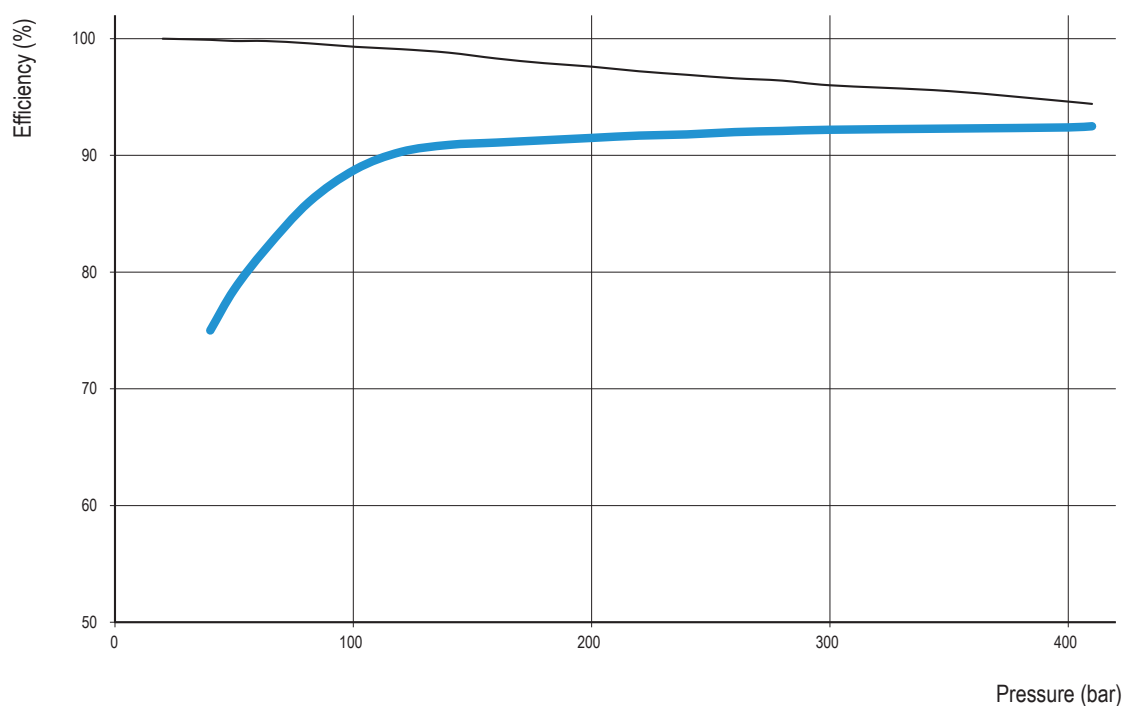
### ► Example of use

- 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

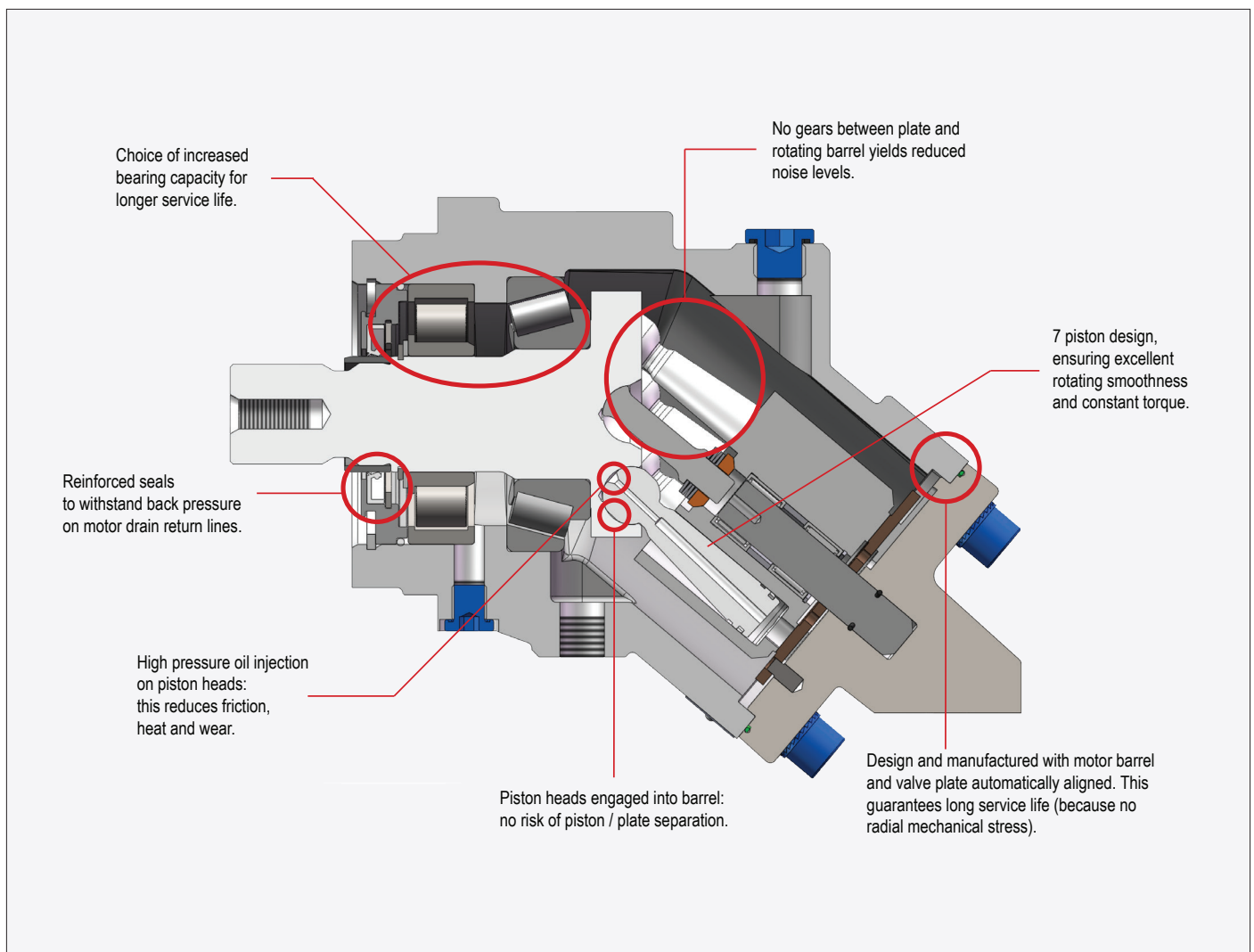
Hydraulic motors transform hydraulic flow into rotating speed and hydraulic pressure into mechanical torque.

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



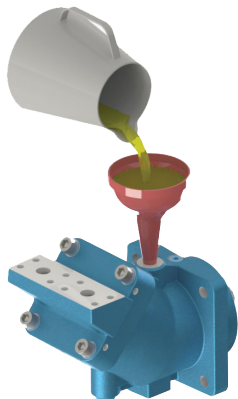
## ► Advantages of LEDUC motors

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.



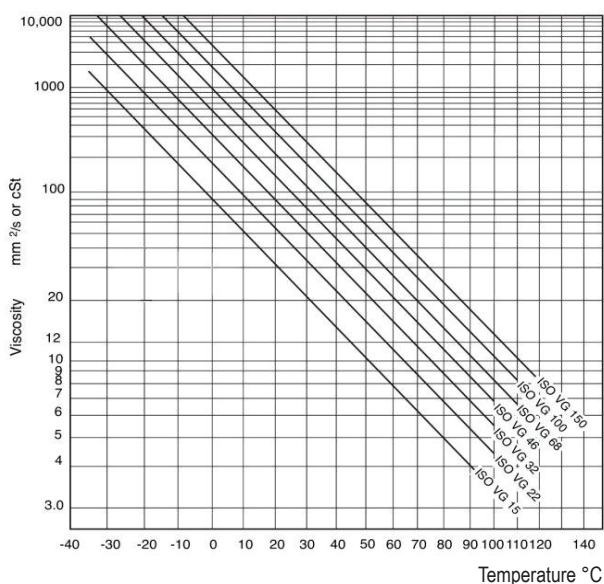
## ► The fluid

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

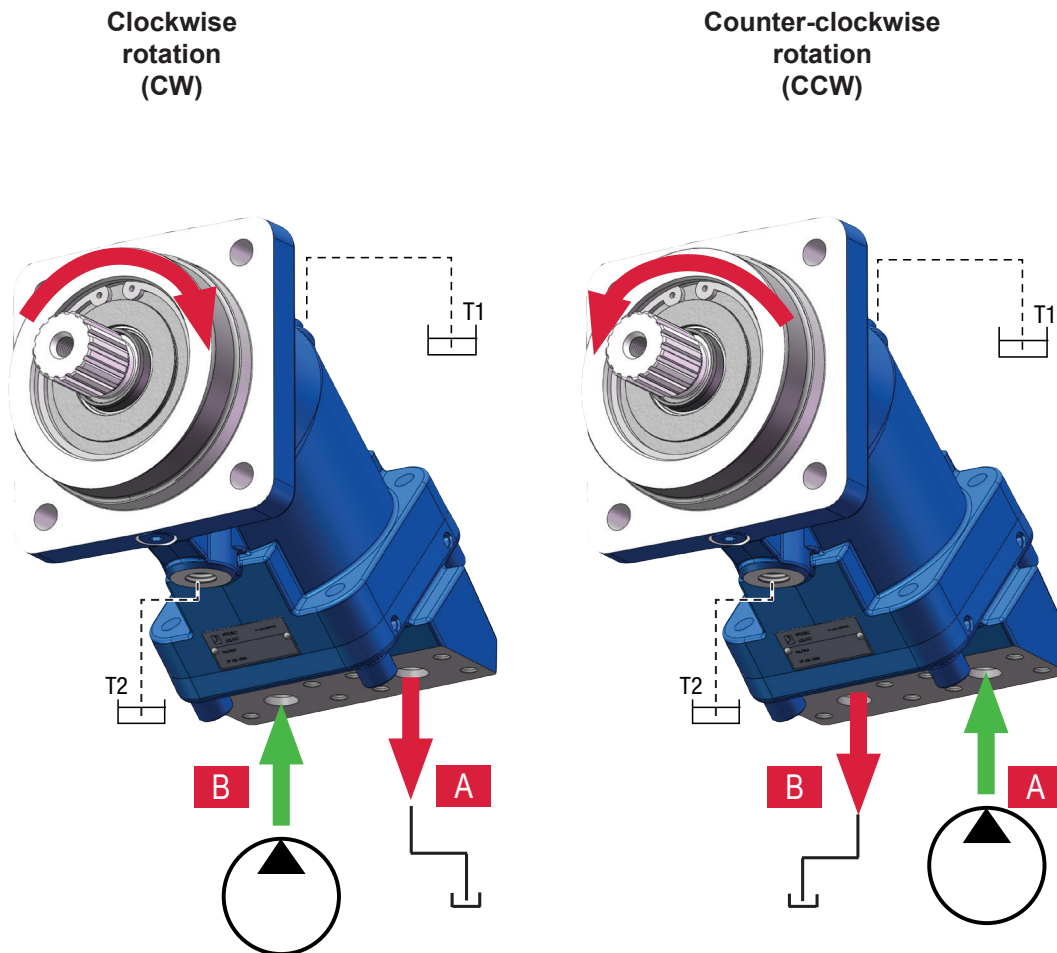
- As standard, LEDUC motors are fitted with FKM seals (Viton ®). Operating temperatures: from -13 to 239 °F (-25 to 115 °C).
- As an option, HYDRO LEDUC proposes NBR seals, for operating temperatures from -40 to 176°F (-40 to 80°C).

### IMPORTANT NOTE:

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

## ► Direction of rotation

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

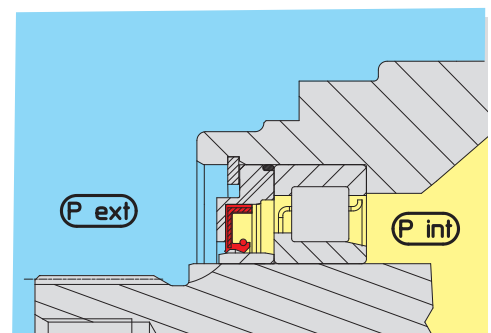


## ► Drain pressure

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)                              |
| $\Delta P$ | = Pressure difference between A and B (bar) |
| Cy         | = Displacement cc/rev                       |
| Q          | = Flow (l/min)                              |
| $\eta$     | = Efficiency (%)                            |

### 1. Torque supplied by the hydraulic motor

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

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

For example: a 50 cc/rev motor with a  $\Delta P$  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).

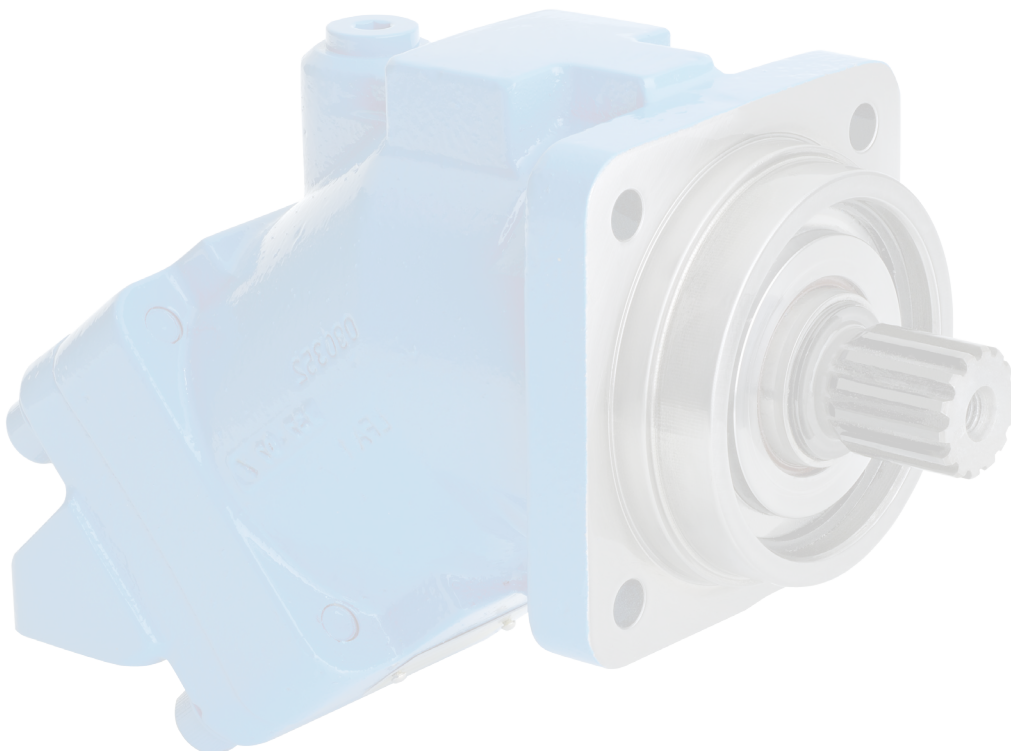
### 2. Rotating speed of the motor

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

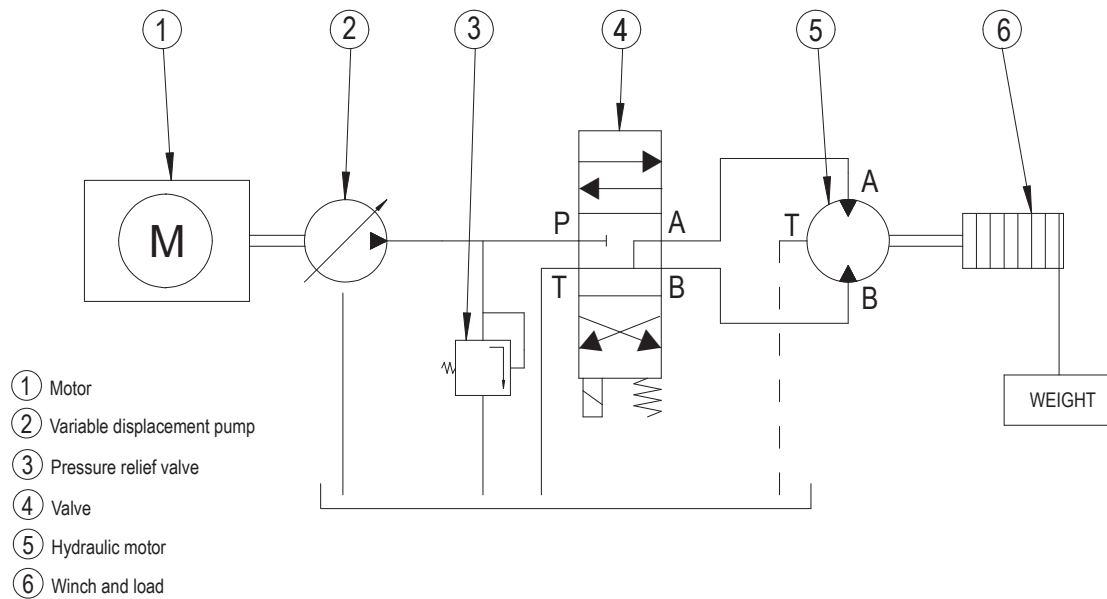
$$N = \frac{Q}{\text{Displ.}} \times 1000$$

## ► 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/mn) | Torque (N.m/bar) | Torque at 350 bar (N.m) | Max. allowable pressure continuous / peak (bar) | Weight (kg) |
|-------------|-----------------------|---------------------------------|-----------------------------------|---------------------------|------------------|-------------------------|-------------------------------------------------|-------------|
| M 5_093840  | 5                     | 8000                            | 8800                              | 40                        | 0.08             | 28                      | 400 / 450                                       | 4.4         |
| M 12        | 12                    | 8000                            | 8800                              | 96                        | 0.19             | 67                      | 400 / 450                                       | 5.5         |
| M 18        | 18.0                  | 8000                            | 8800                              | 144                       | 0.29             | 100                     | 400 / 450                                       | 5.5         |
| M 25        | 24.9                  | 6300                            | 6900                              | 157                       | 0.40             | 139                     | 400 / 450                                       | 11.5        |
| M 28        | 27.7                  | 6300                            | 6900                              | 175                       | 0.44             | 154                     | 400 / 450                                       | 11.5        |
| M 32        | 32.1                  | 6300                            | 6900                              | 202                       | 0.51             | 179                     | 400 / 450                                       | 11.5        |
| M 41        | 41.1                  | 5600                            | 6200                              | 230                       | 0.65             | 229                     | 400 / 450                                       | 11.5        |
| M 45        | 45.4                  | 5000                            | 5500                              | 227                       | 0.72             | 253                     | 400 / 450                                       | 18          |
| M 50        | 50.3                  | 5000                            | 5500                              | 252                       | 0.80             | 280                     | 400 / 450                                       | 18          |
| M 63        | 63                    | 5000                            | 5500                              | 315                       | 1.00             | 351                     | 400 / 450                                       | 18          |
| M 80        | 80.4                  | 4500                            | 5000                              | 362                       | 1.28             | 448                     | 400 / 450                                       | 23          |
| M 90        | 90                    | 4500                            | 5000                              | 405                       | 1.43             | 502                     | 400 / 450                                       | 23          |
| M 108       | 108.3                 | 4000                            | 4400                              | 435                       | 1.72             | 603                     | 400 / 450                                       | 23          |
| M 108 R (2) | 108.3                 | 3400                            | 4500                              | 368                       | 1.72             | 603                     | 400 / 450                                       | 35          |
| M 125       | 125.4                 | 3400                            | 4500                              | 426                       | 2.00             | 699                     | 400 / 450                                       | 35          |
| M 160       | 160                   | 3600                            | 4000                              | 576                       | 2.55             | 891                     | 400 / 450                                       | 48.5        |
| M 180       | 180.6                 | 3600                            | 4000                              | 650                       | 2.87             | 1006                    | 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

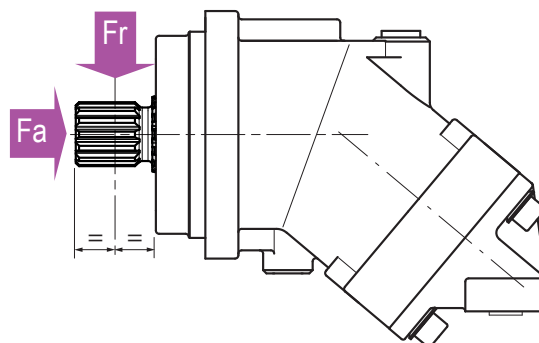
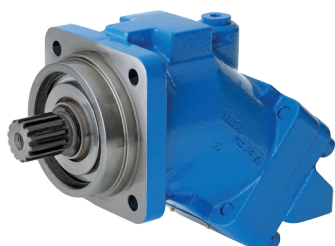
| Motor model |         | 5   | 12   | 18   | 25   | 28   | 32   | 41   | 45   | 50   | 63   | 80    | 90    | 108   | 108 R | 125   | 160   | 180   |
|-------------|---------|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| 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.



# Order code system of M series motors

11

M series

| 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<br>2tbolts | 4 bolts ISO 3019-2 |  |  |  |  |  | A |

| Shaft |                     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |    |
|-------|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----|
| 04    | DIN 5480<br>splined | –    | W25  | W25  | W25  | W30  | 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<br>keyed   | Ø 18 | Ø 25 | Ø 25 | Ø 25 | Ø 30 | 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 |    |    |
|                     |                  |        | 1 | – | – | – | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | N1 |    |    |
|                     | Threaded         | Side   | 0 | – | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | – | – | – | –  | Q0 |    |
|                     |                  |        | 1 | – | – | – | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | – | – | – | –  | Q1 |    |
|                     |                  | Rear   | 0 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | – | – | –  | –  | P0 |
|                     |                  |        | 1 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | –  | P1 |    |

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 | 2 | M2 |

| Suitable for use of speed sensor |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|----------------------------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07                               | Yes | – | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 1 |
|                                  | No  | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 0 |

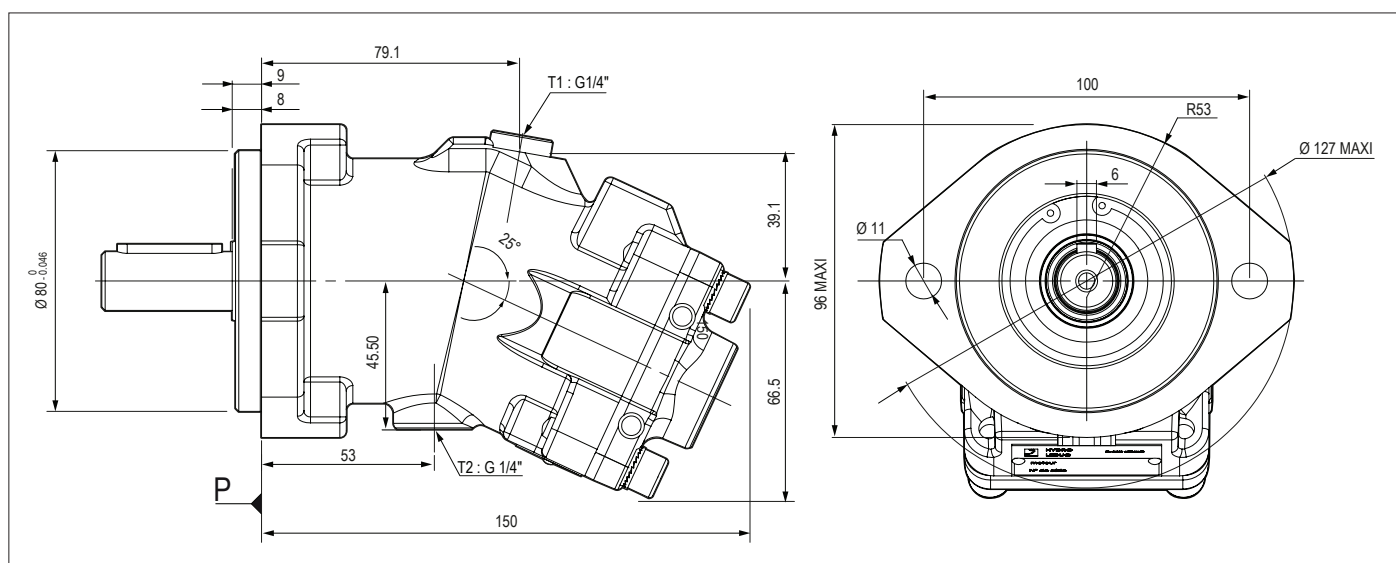
| Speed sensor |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 08           | Yes | – | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 1 |
|              | No  | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 0 |

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

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

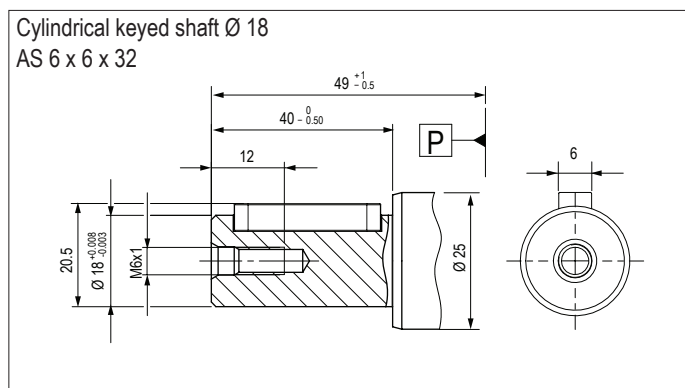
**PLEASE NOTE:** the M5 motor, reference 093840, only exists in one version (see next page).

**CETOP** flange, 2 bolts



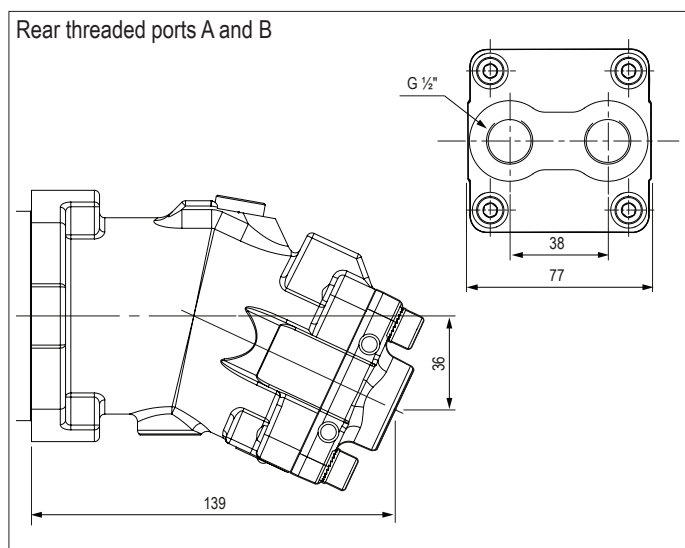
► **Shaft end**

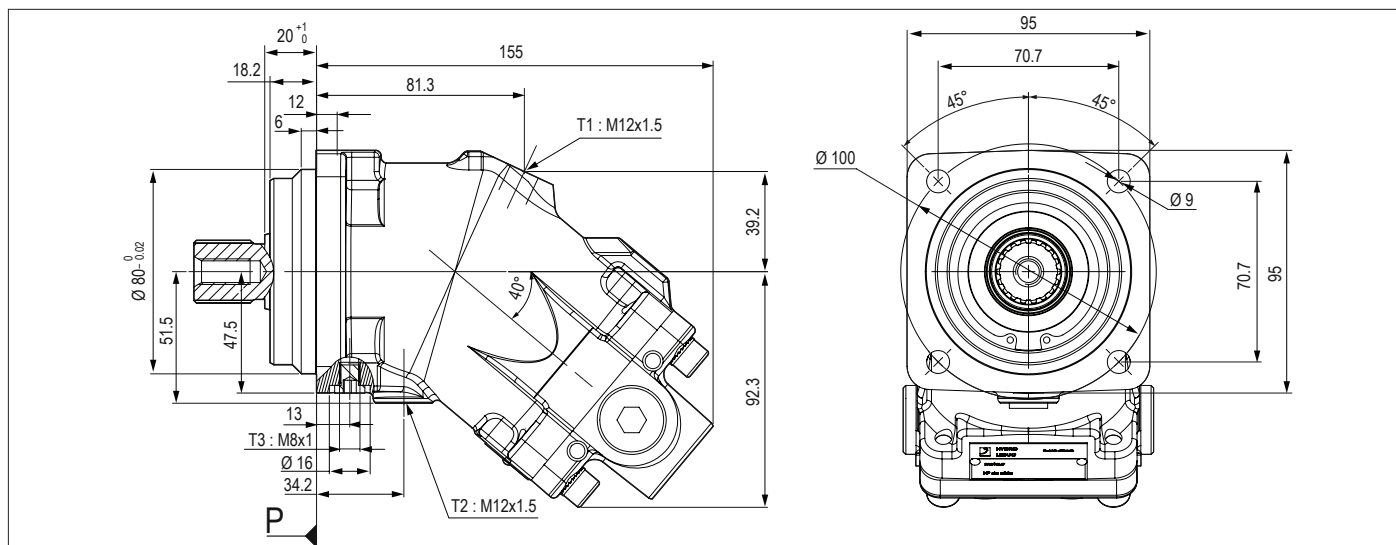
Cylindrical keyed shaft Ø 18  
AS 6 x 6 x 32



► Inlet ports

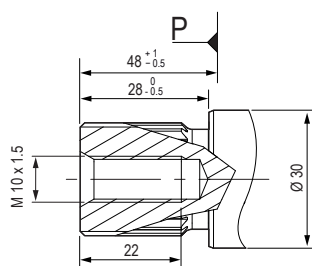
Rear threaded ports A and B



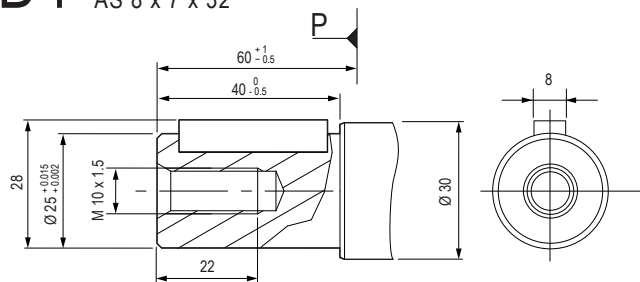


## ► Shaft

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

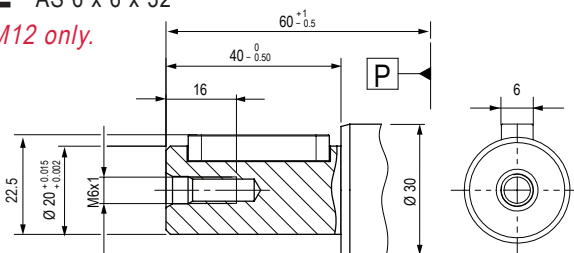


**D1** Cylindrical keyed shaft Ø 25 DIN 6885  
AS 8 x 7 x 32



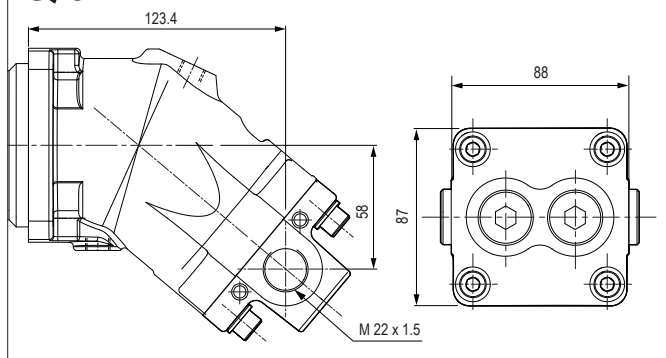
**D2** Cylindrical keyed shaft Ø 20 DIN 6885  
AS 6 x 6 x 32

*For M12 only.*

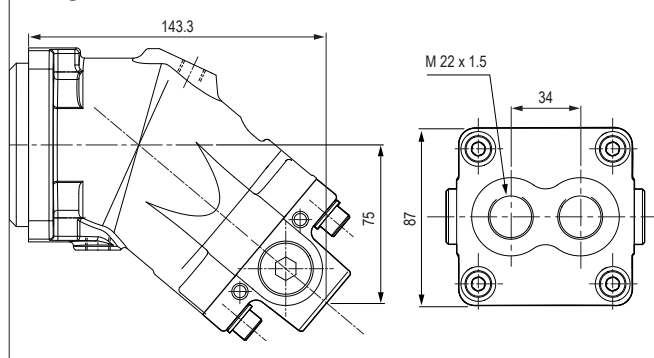


## ► Inlet ports

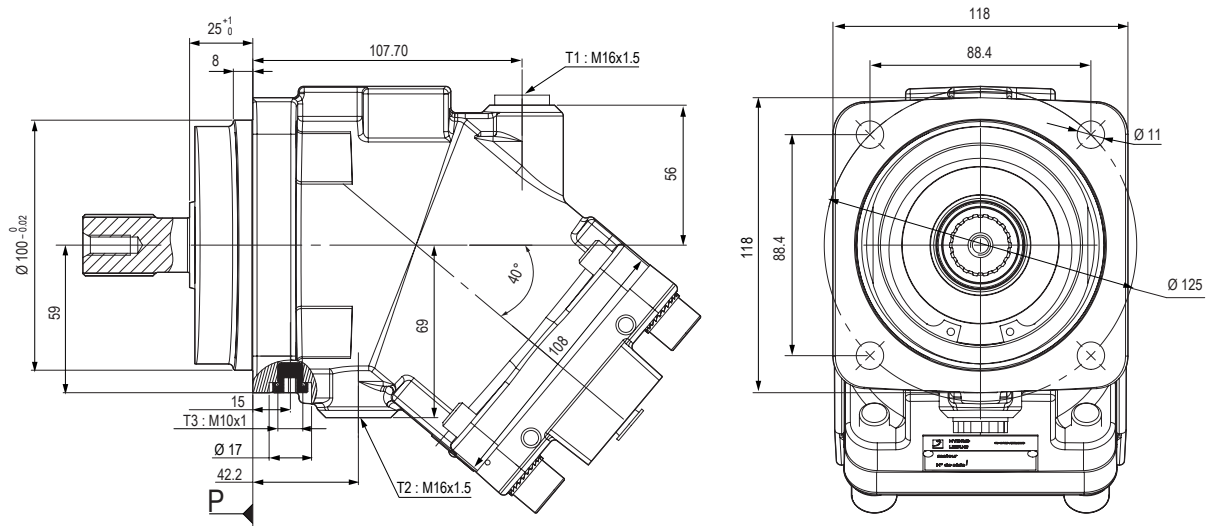
**Q0** Side threaded ports A and B



**P0** Rear threaded ports A and B

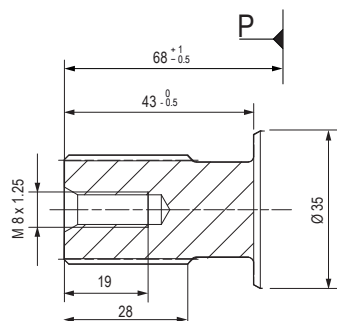


Dimensions in mm are given only as an indication.

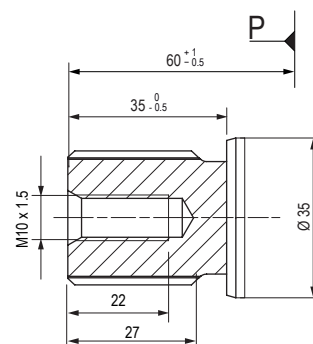


## ► Shaft end

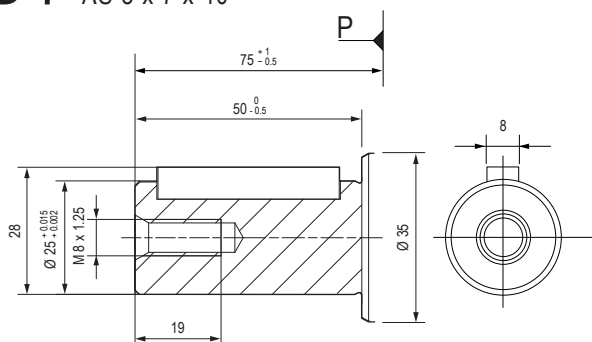
**W1** Splined shaft DIN 5480  
W 25 x 1.25 x 30 x 18 x 9 g



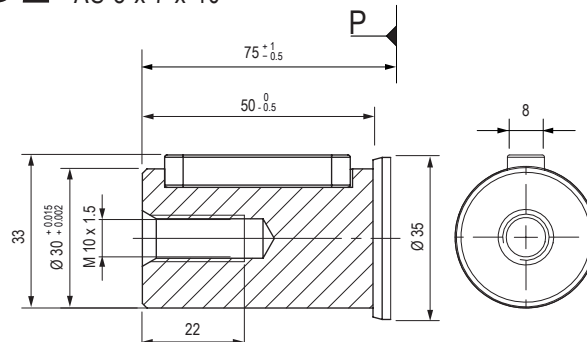
**W2** Splined shaft DIN 5480  
W 30 x 2 x 30 x 14 x 9 g



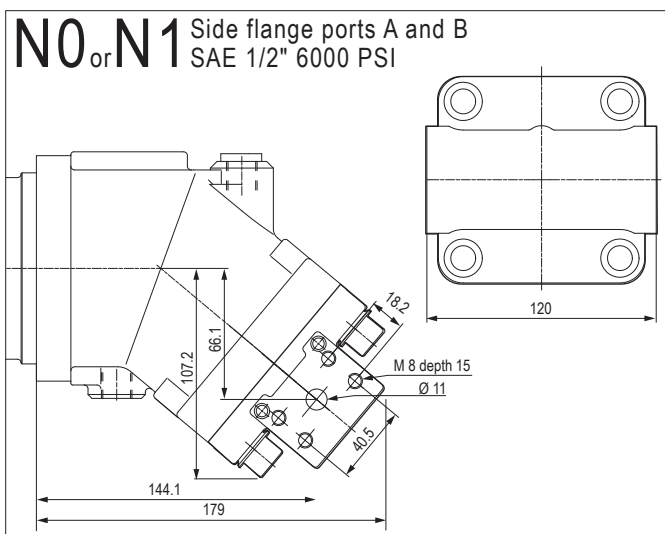
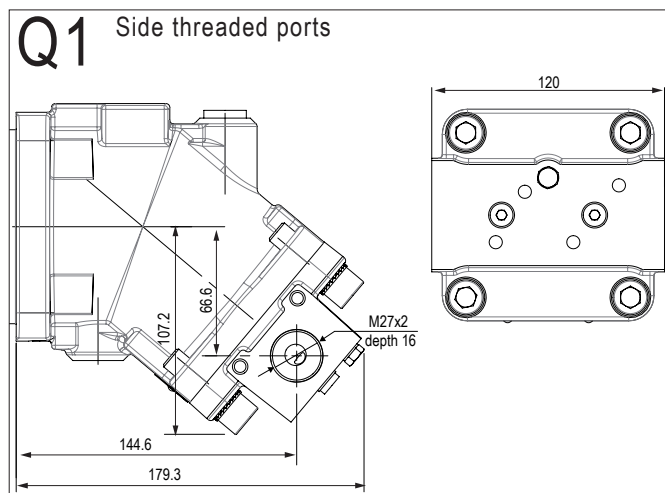
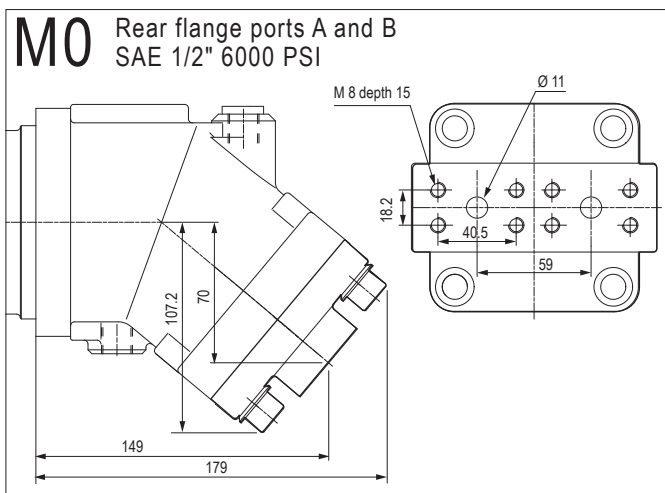
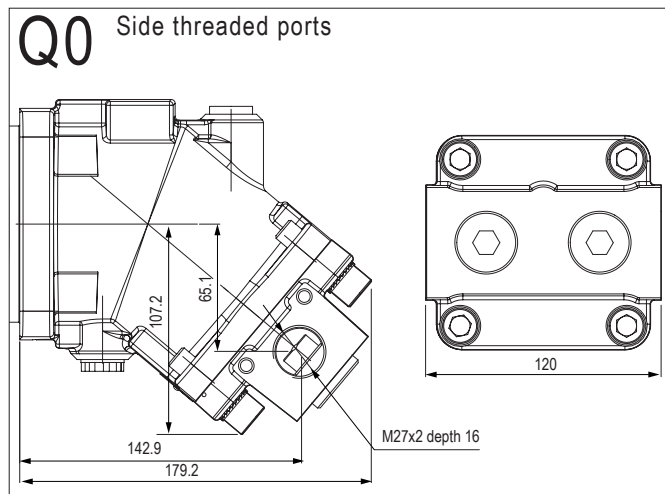
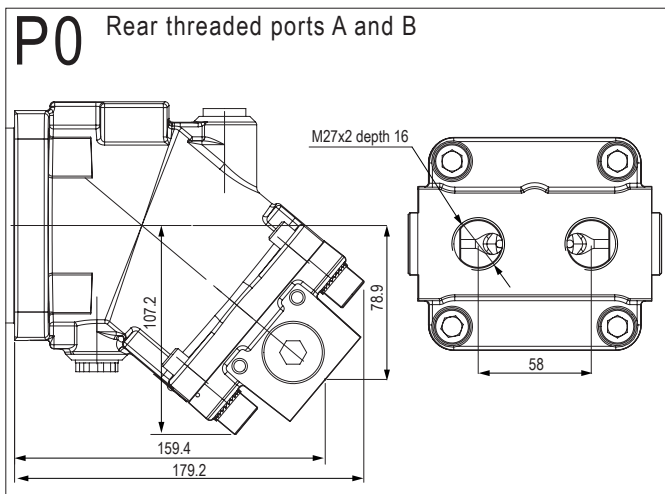
**D1** Cylindrical keyed shaft Ø 25 DIN 6885  
AS 8 x 7 x 40

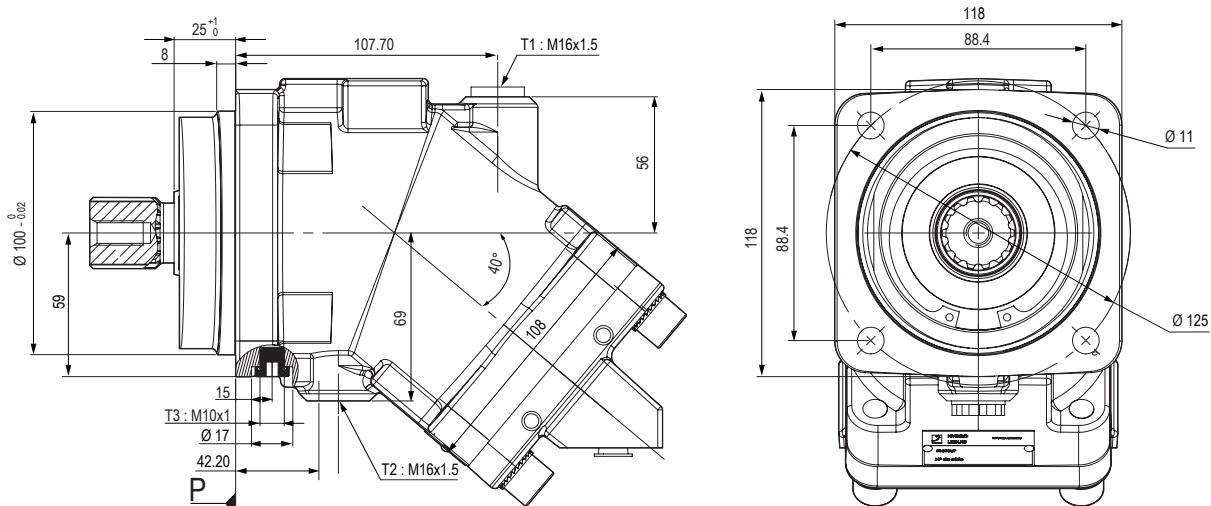


**D2** Cylindrical keyed shaft Ø 30 DIN 6885  
AS 8 x 7 x 40

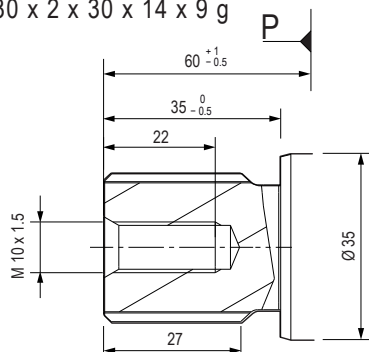
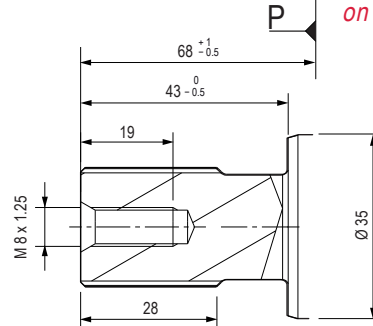
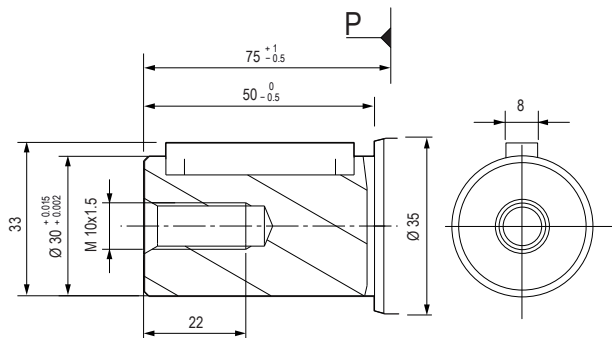
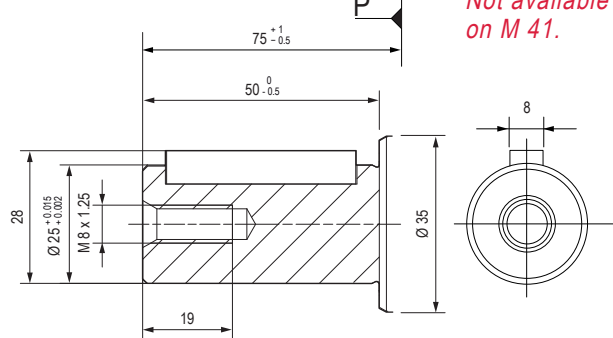


## ► Inlet ports



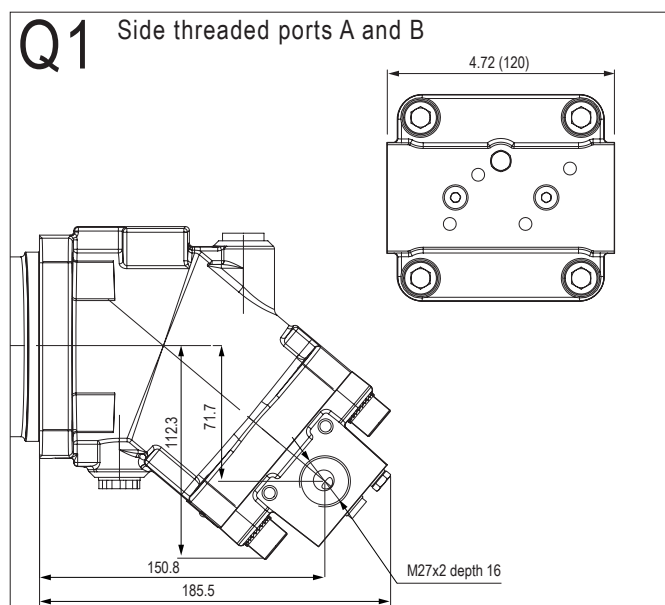
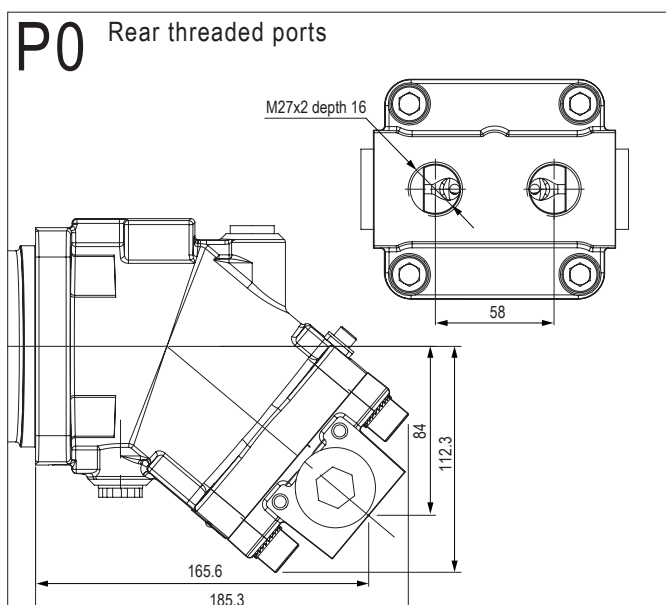
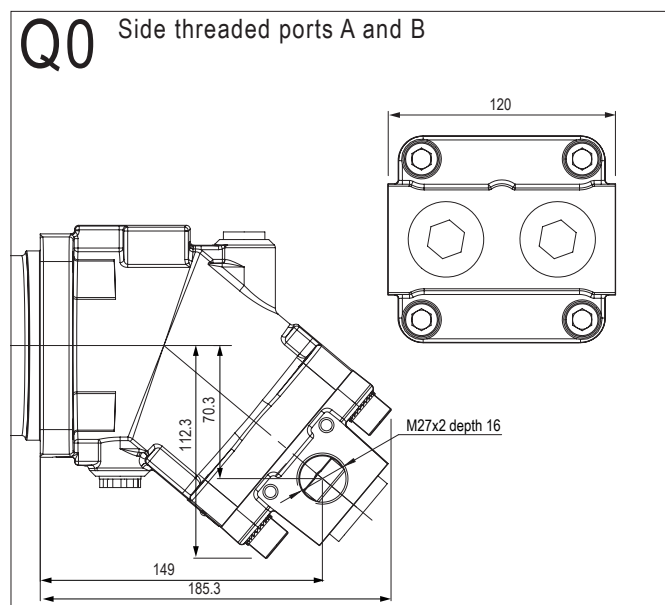
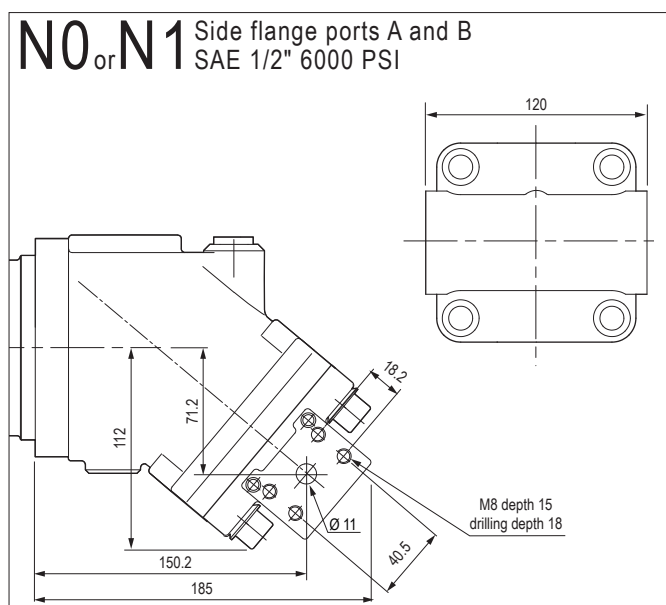
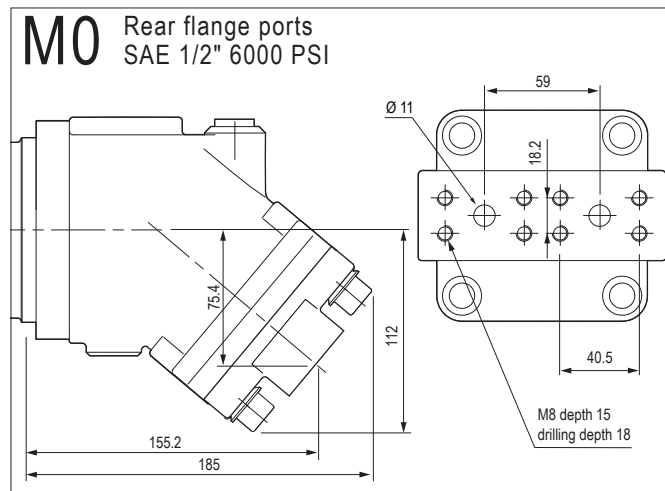
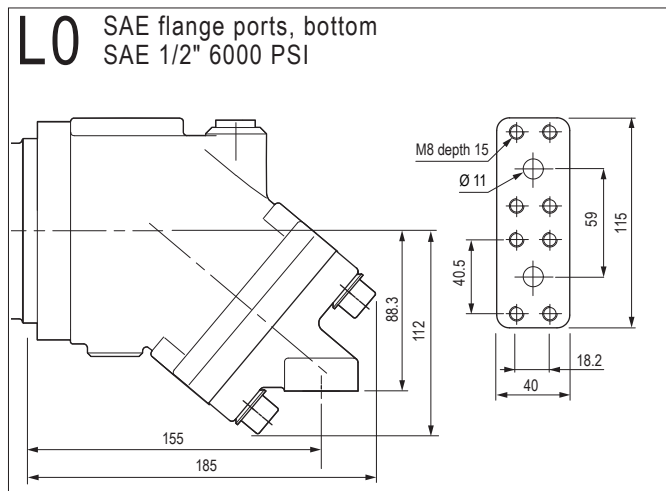


## ► Shaft end

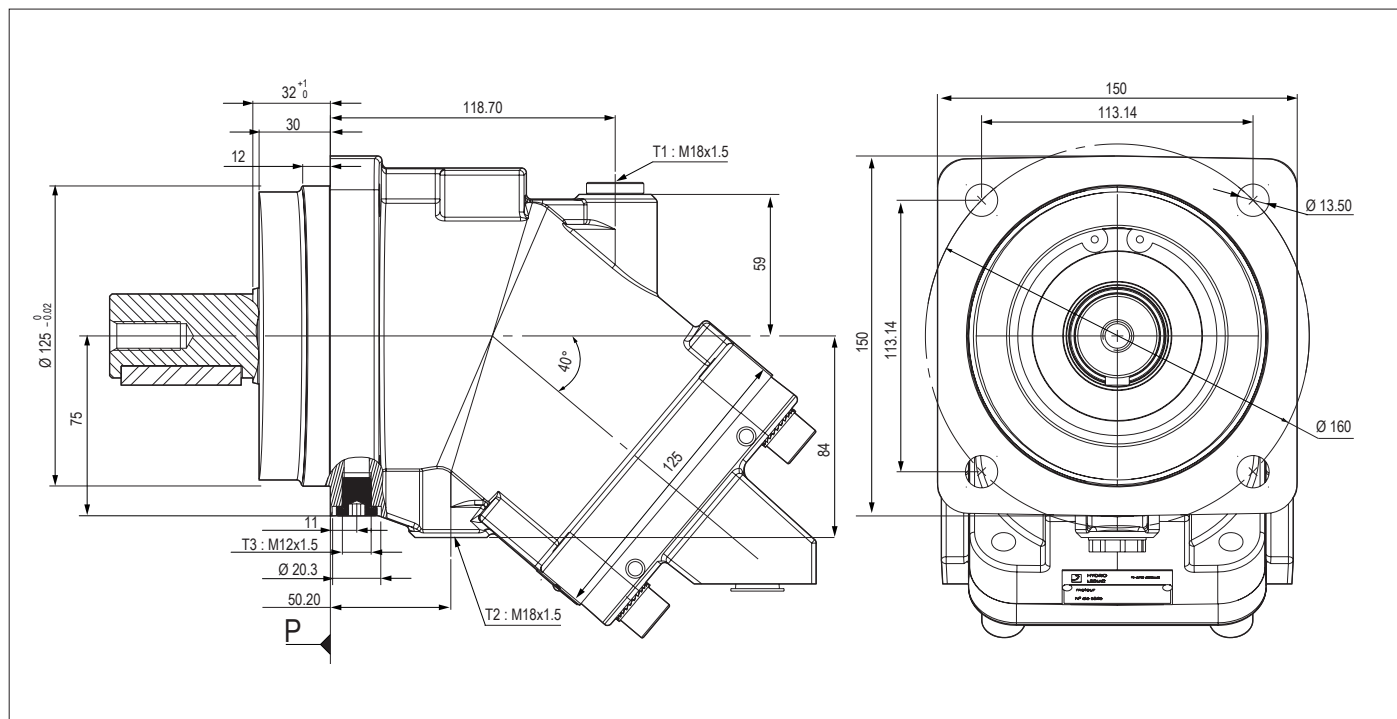
**W1** Splined shaft DIN 5480  
W 30 x 2 x 30 x 14 x 9 g**W2** Splined shaft DIN 5480  
W 25 x 1.25 x 30 x 18 x 9 g*Not available  
on M 41.***D1** Cylindrical keyed shaft Ø 30 DIN 6685  
AS 8 x 7 x 40**D2** Cylindrical keyed shaft Ø 25 DIN 6685  
AS 8 x 7 x 40*Not available  
on M 41.*

Dimensions in mm are given only as an indication.

# Inlet ports

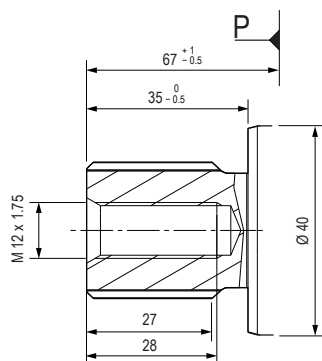


Dimensions in mm are given only as an indication.

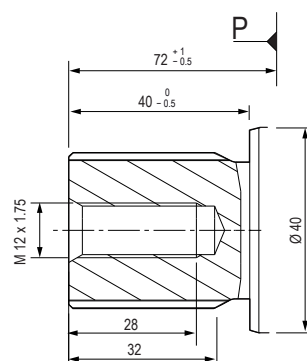


► Shaft end

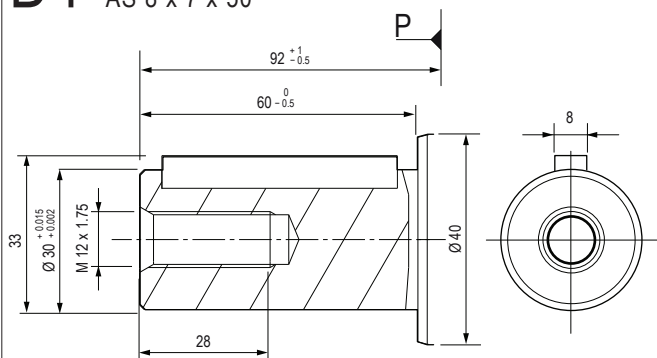
|           |                                                    |
|-----------|----------------------------------------------------|
| <b>W1</b> | Splined shaft DIN 5480<br>W 30 x 2 x 30 x 14 x 9 g |
|-----------|----------------------------------------------------|



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

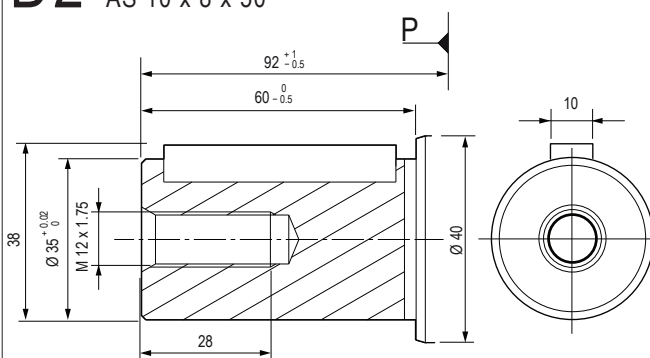


**D1** Cylindrical keyed shaft Ø 30 DIN 6885  
AS 8 x 7 x 50



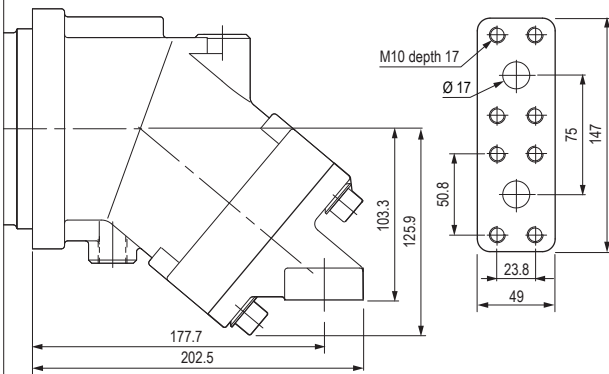
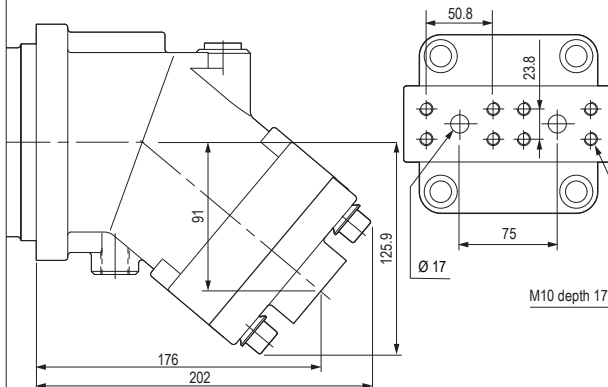
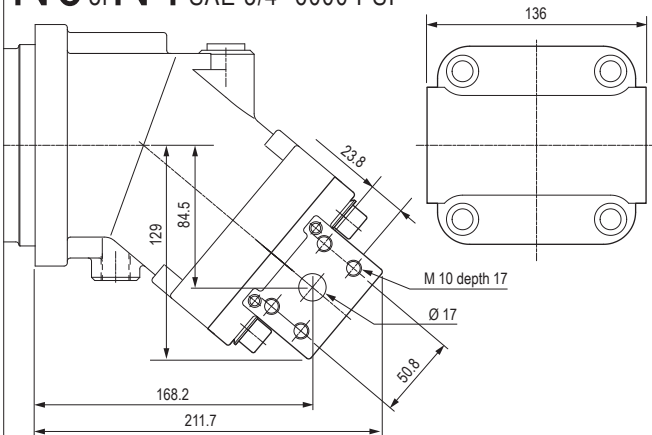
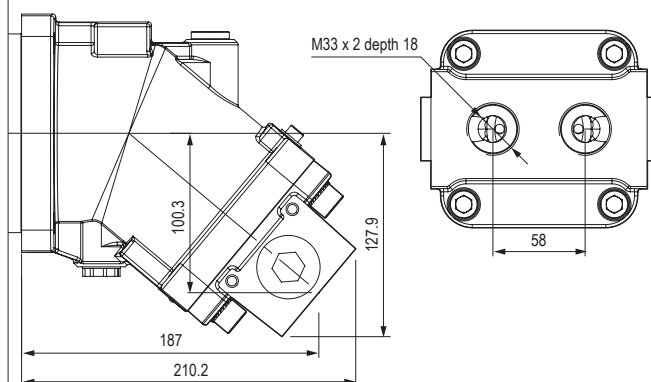
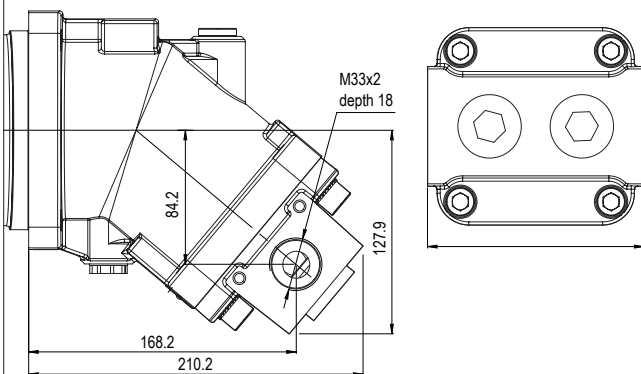
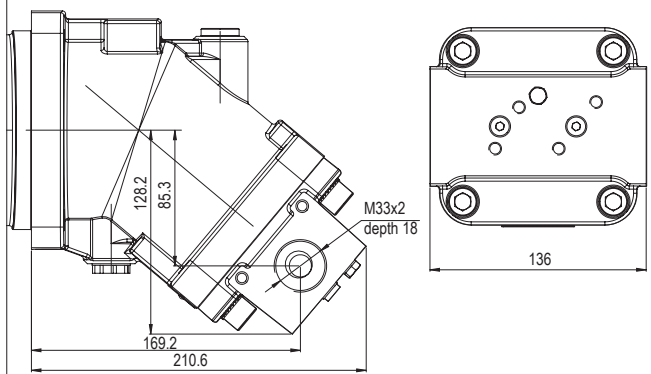
Max. pressure 5076 PSI (350 bar) for M50  
Max. pressure 4350 PSI (300 bar) for M63

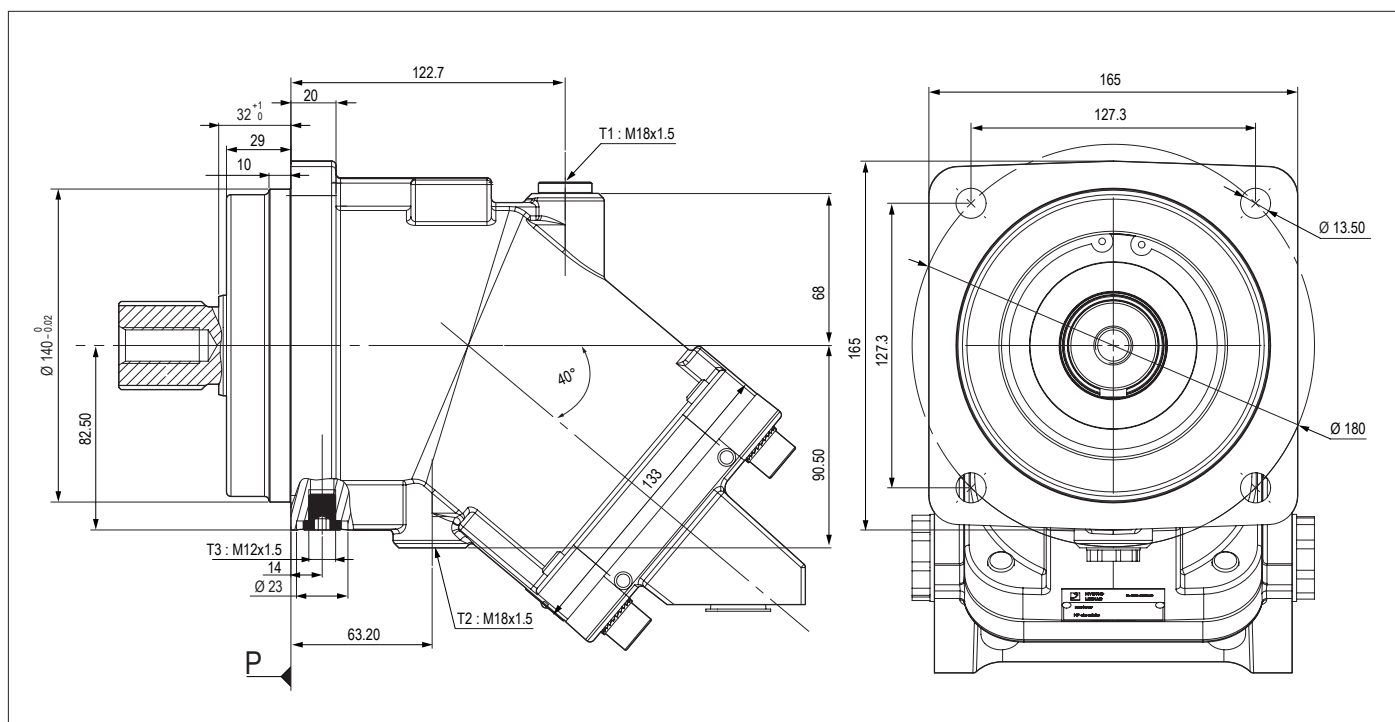
**D2** Cylindrical keyed shaft Ø 35 DIN 6885  
AS 10 x 8 x 50



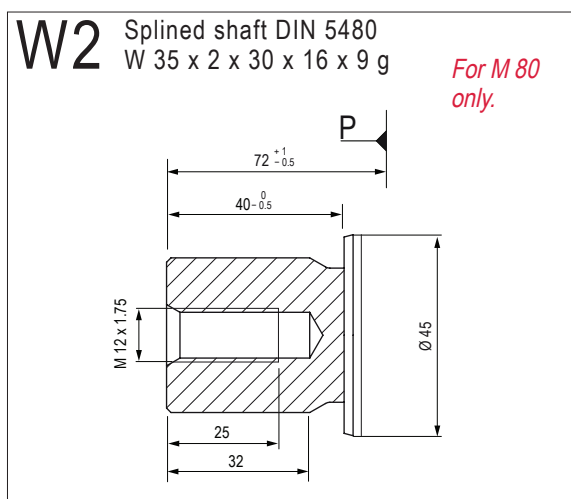
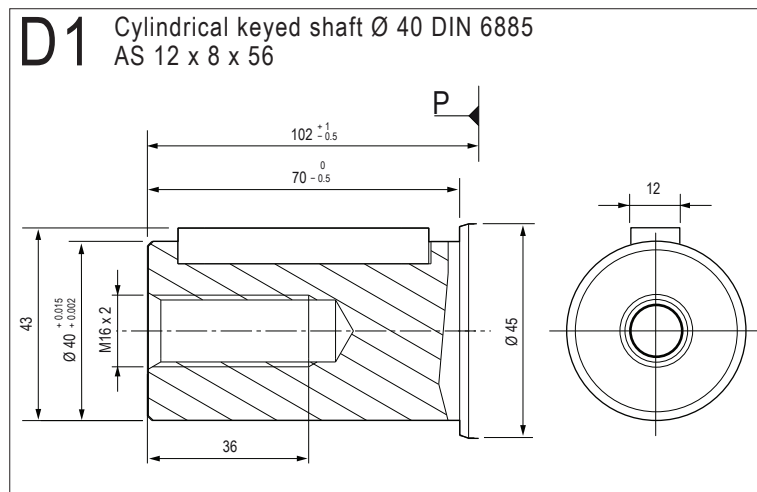
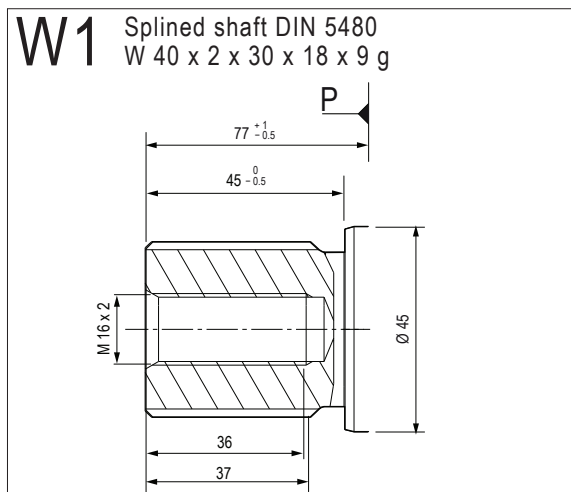
Dimensions in mm are given only as an indication.

## ► 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

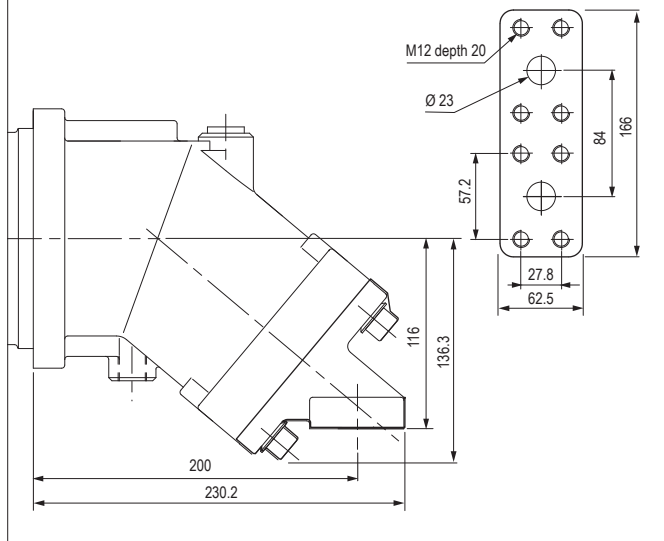
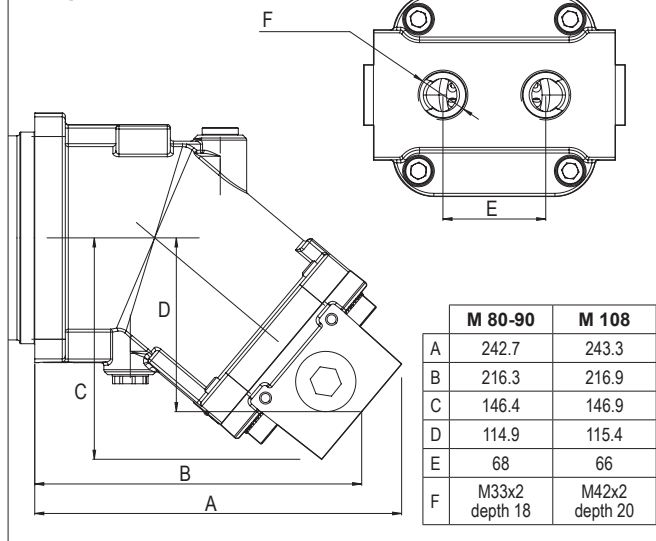
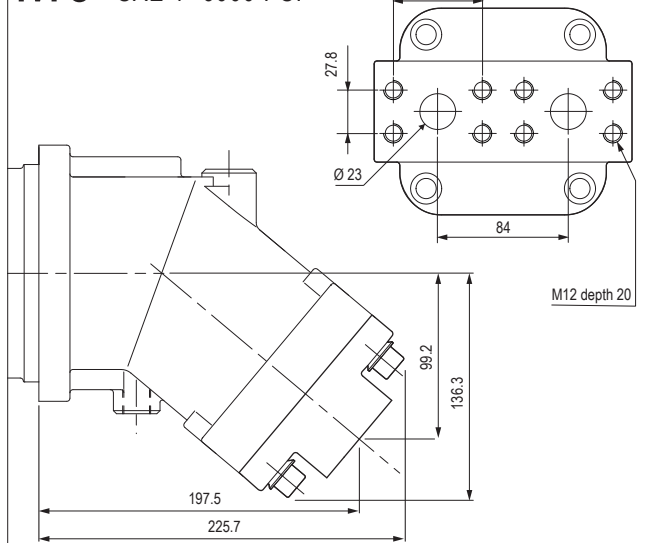
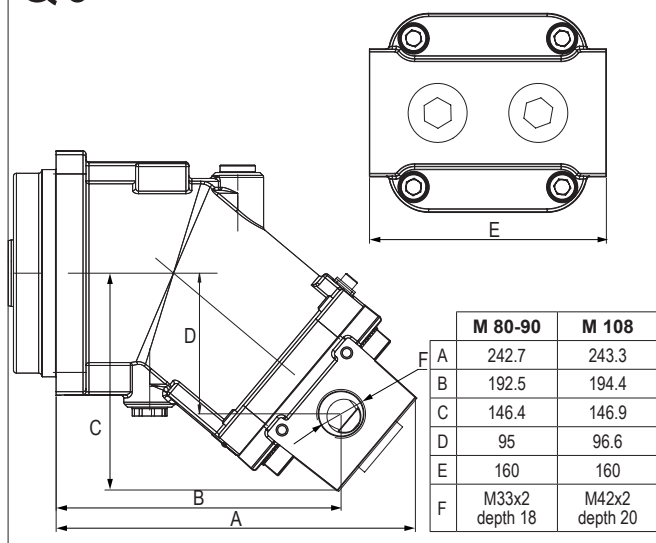
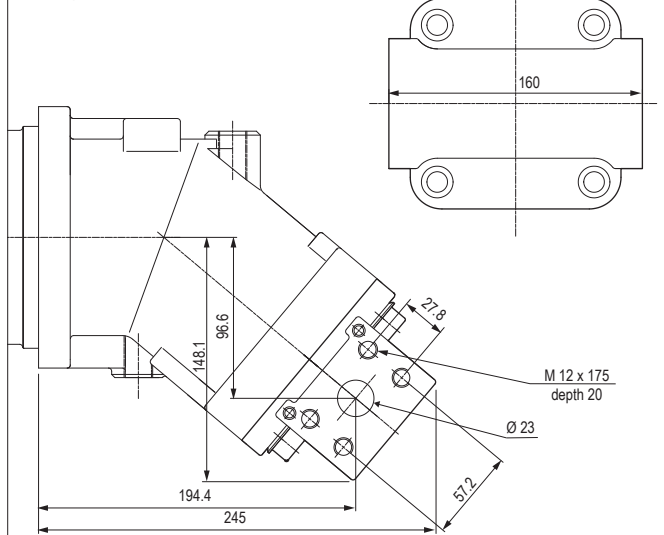
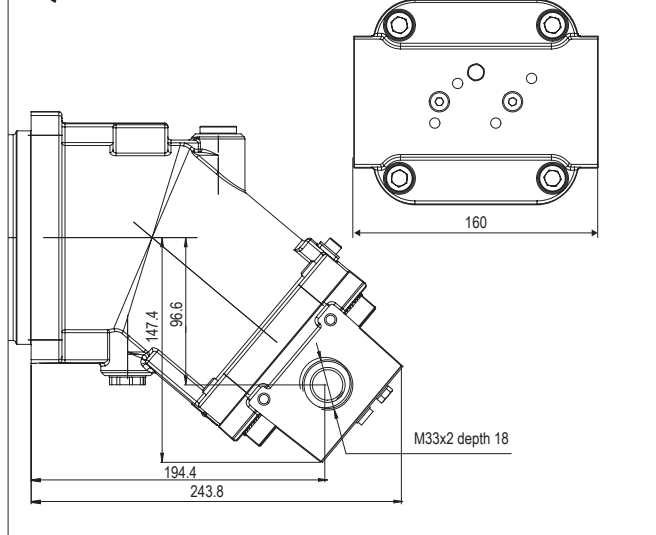


► **Shaft end**

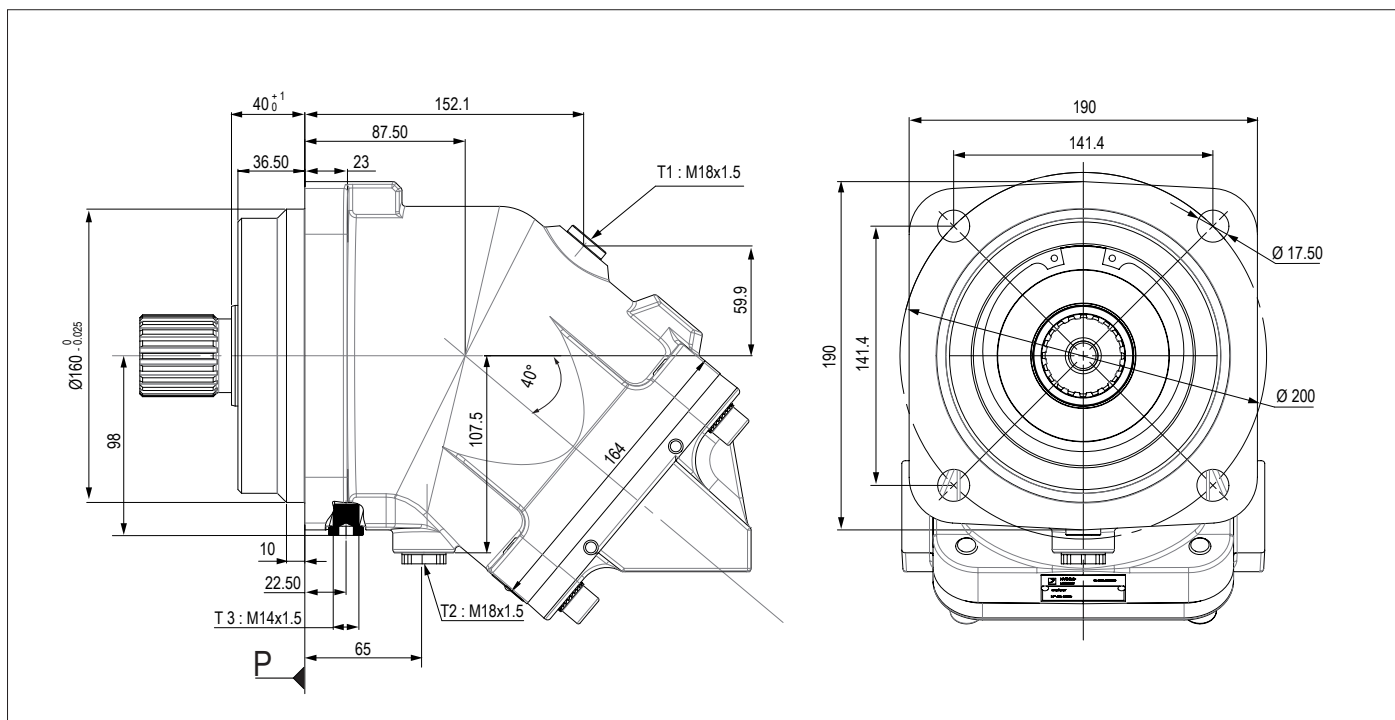


Dimensions in mm are given only as an indication.

## ► Inlet ports

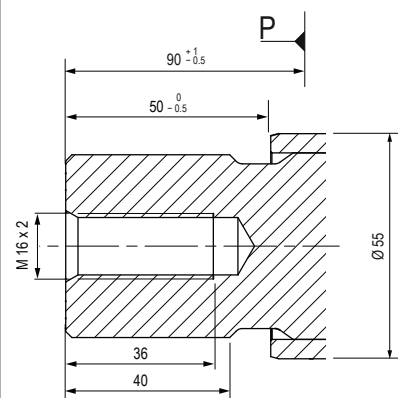
**L0** SAE flange ports, bottom  
SAE 1" 6000 PSI**P0** Rear threaded ports**M0** SAE flange ports, rear  
SAE 1" 6000 PSI**Q0** Side threaded ports**N0 or N1** SAE flange ports, rear  
SAE 1" 6000 PSI**Q1** Side threaded ports

Dimensions in mm are given only as an indication.

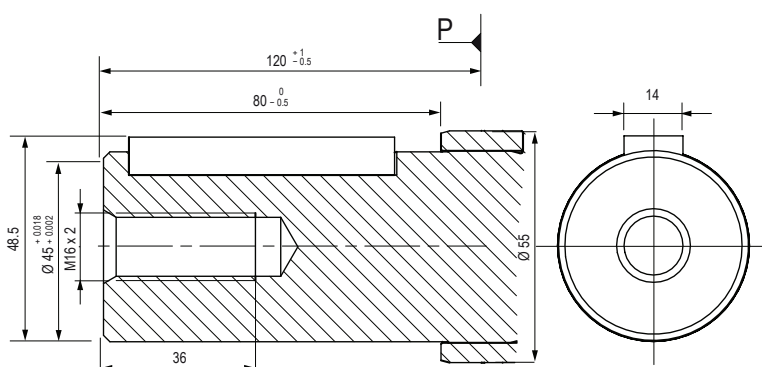


## ► Shaft end

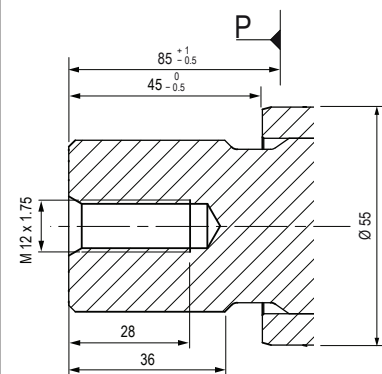
**W1** Splined shaft DIN 5480  
W 45 x 2 x 30 x 21 x 9 g



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

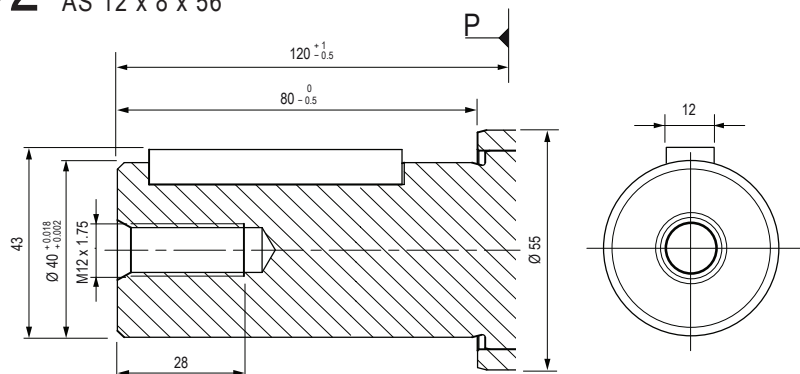


**W2** Splined shaft DIN 5480  
W 40 x 2 x 30 x 18 x 9 g



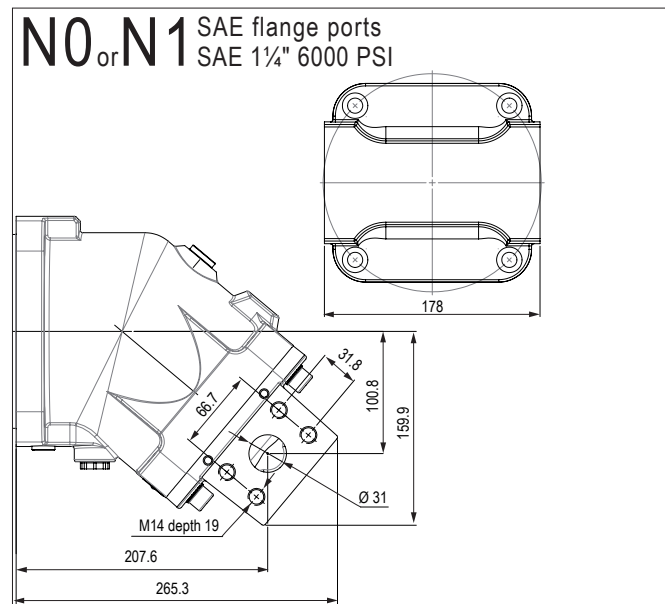
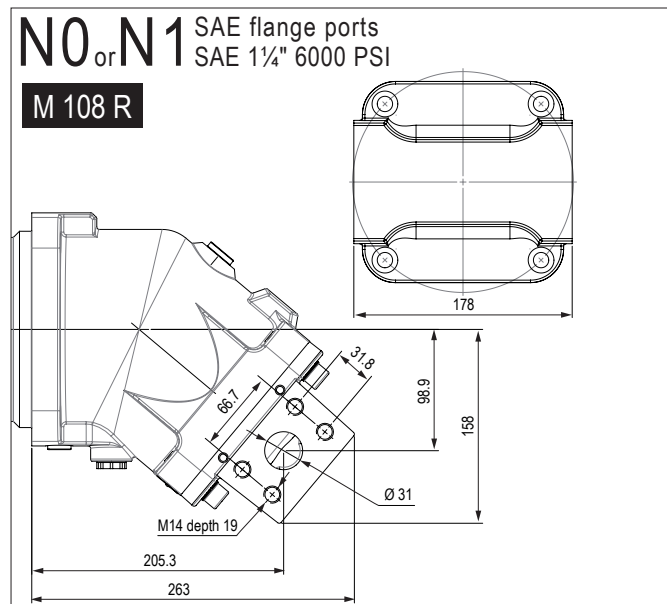
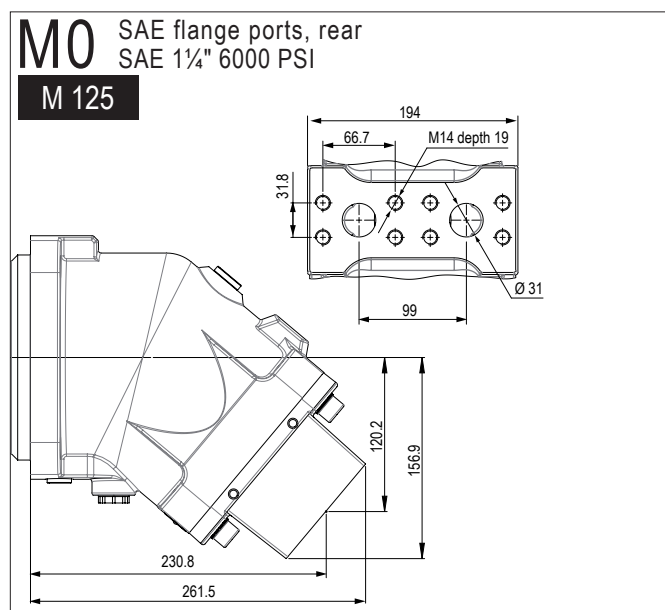
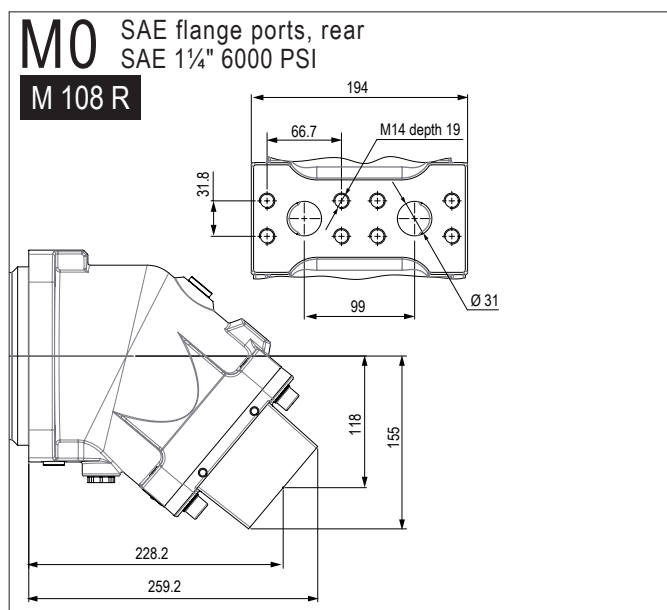
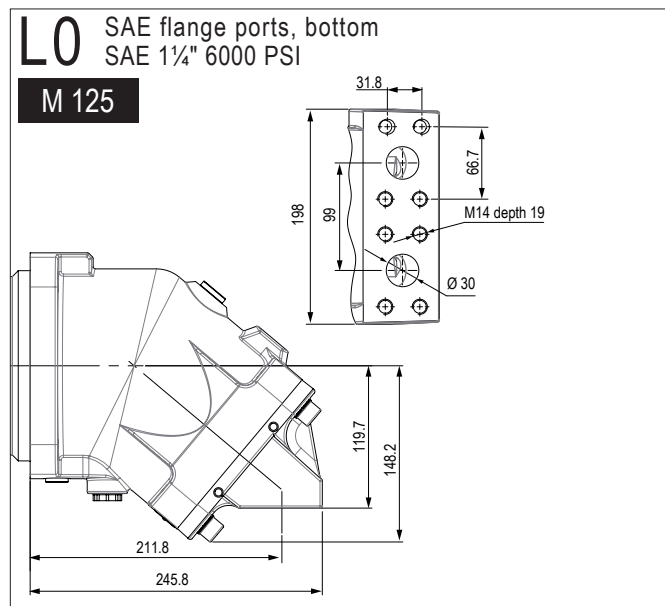
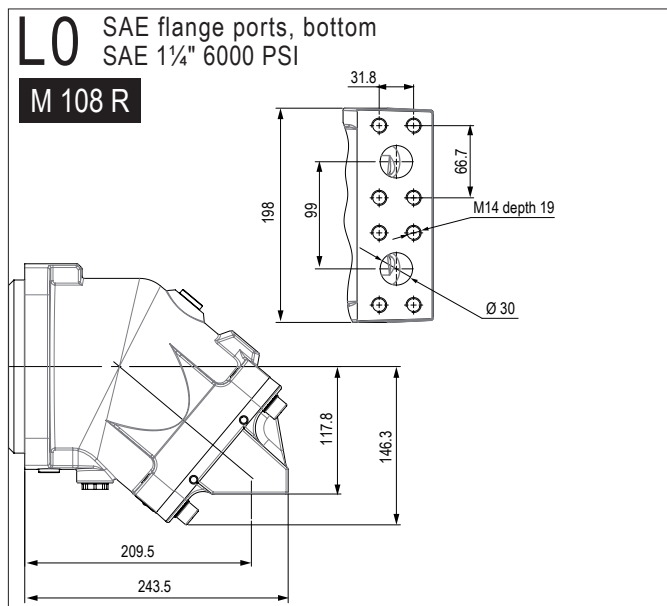
Max. pressure 5076 (350 bar) for M 125.

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

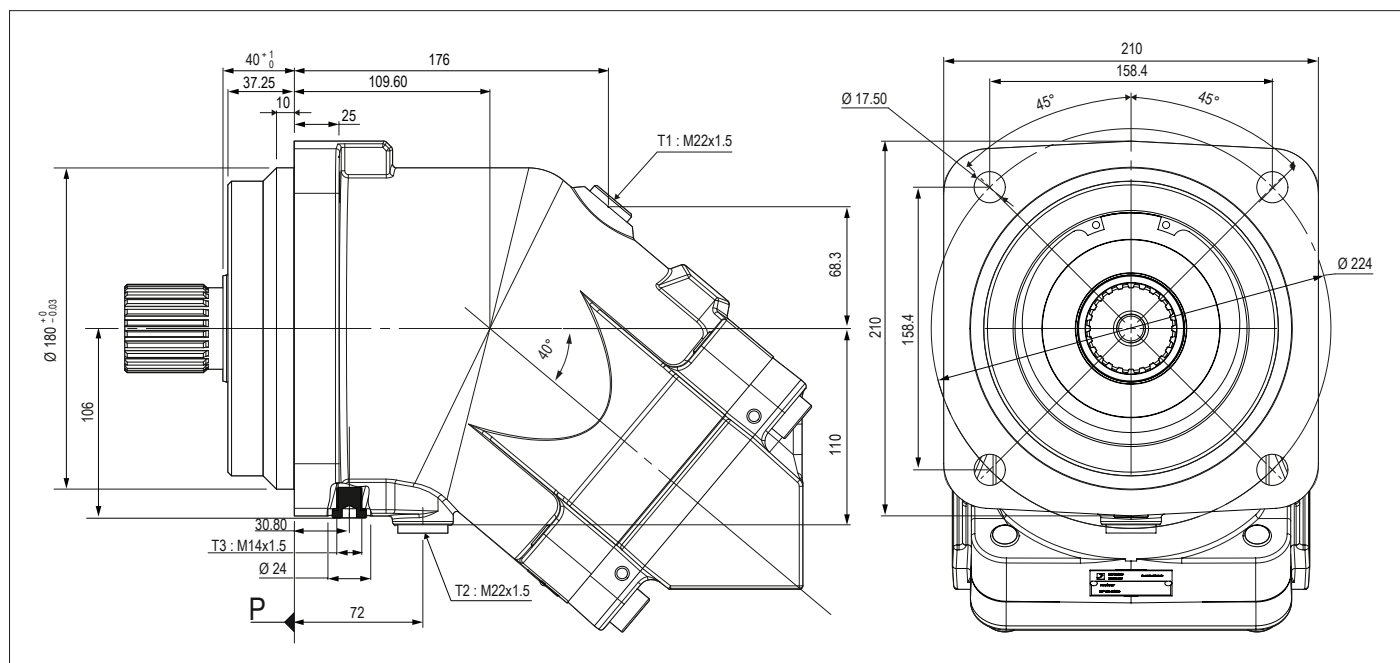


For M 108 R only.

## ► Inlet ports

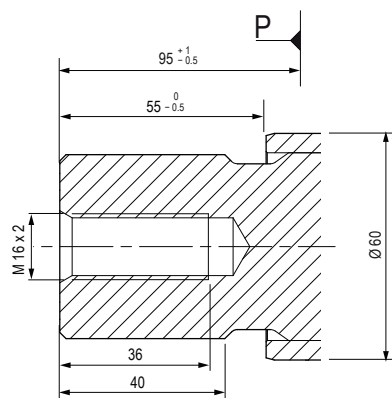


Dimensions in mm are given only as an indication.

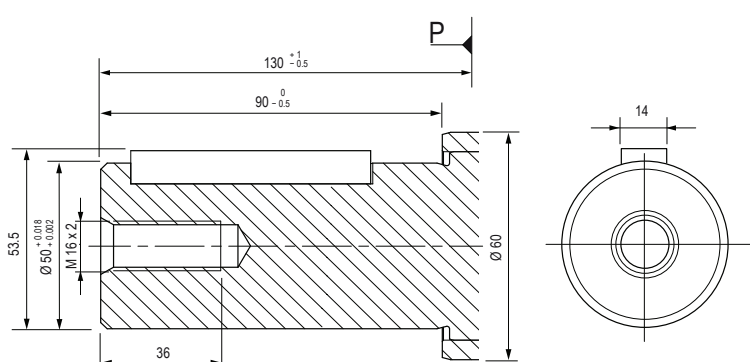


### ► Shaft end

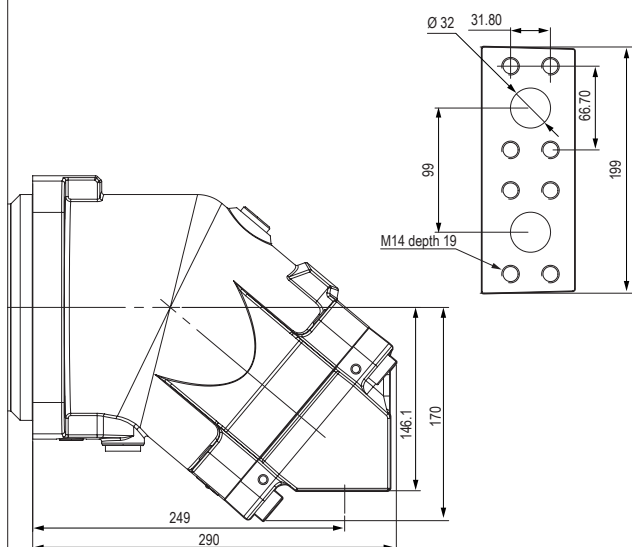
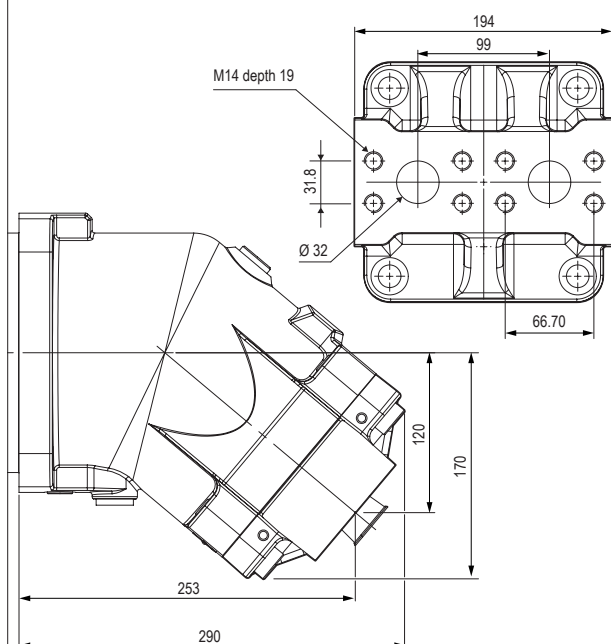
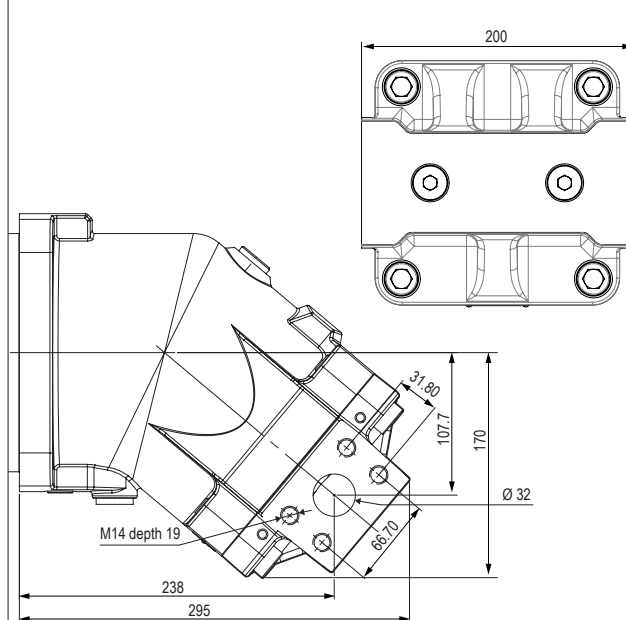
**W1** Splined shaft DIN 5480  
W 50 x 2 x 30 x 24 x 9 g



**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<br>(1) | Intermittent max. speed<br>(1) | Max. flow absorbed |      | Torque     |         | Torque at 350 bar<br>(5100 PSI) |      | Max. allowable pressure<br>continuous / peak |           | Weight (kg) |      |
|-------------|--------------|-------|------------------------------|--------------------------------|--------------------|------|------------|---------|---------------------------------|------|----------------------------------------------|-----------|-------------|------|
|             | cu.in/rev    | cc/tr |                              |                                | gpm                | l/mn | lbf.ft/psi | N.m/bar | lbf ft                          | Nm   | psi                                          | bar       | lbs         | Kg   |
| MA 10       | 0.62         | 10.2  | 8000                         | 8800                           | 21.5               | 81   | 0.0081     | 0.16    | 42                              | 57   | 5800 / 6525                                  | 400 / 450 | 14.3        | 6.5  |
| MA 12       | 0.74         | 12.1  | 8000                         | 8800                           | 25.5               | 96   | 0.0097     | 0.19    | 50                              | 67   | 5800 / 6525                                  | 400 / 450 | 14.3        | 6.5  |
| MA 18       | 1.09         | 18.0  | 8000                         | 8800                           | 37.9               | 144  | 0.0147     | 0.29    | 74                              | 100  | 5800 / 6525                                  | 400 / 450 | 14.3        | 6.5  |
| MA 25       | 1.52         | 24.9  | 6300                         | 6900                           | 41.5               | 157  | 0.0203     | 0.40    | 103                             | 139  | 5800 / 6525                                  | 400 / 450 | 25          | 11.5 |
| MA 32       | 1.96         | 32.1  | 6300                         | 6900                           | 53.4               | 202  | 0.0259     | 0.51    | 132                             | 179  | 5800 / 6525                                  | 400 / 450 | 25          | 11.5 |
| MA 41       | 2.51         | 41.1  | 5600                         | 6200                           | 60.8               | 230  | 0.0331     | 0.65    | 169                             | 229  | 5800 / 6525                                  | 400 / 450 | 25          | 11.5 |
| MA 45       | 2.77         | 45.4  | 5000                         | 5500                           | 59.9               | 227  | 0.0366     | 0.72    | 187                             | 253  | 5800 / 6525                                  | 400 / 450 | 40          | 18   |
| MA 50       | 3.07         | 50.3  | 5000                         | 5500                           | 66.4               | 252  | 0.0407     | 0.80    | 207                             | 280  | 5800 / 6525                                  | 400 / 450 | 40          | 18   |
| MA 63       | 3.85         | 63.0  | 5000                         | 5500                           | 83.2               | 315  | 0.0509     | 1.00    | 259                             | 351  | 5800 / 6525                                  | 400 / 450 | 40          | 18   |
| MA 80       | 4.91         | 80.4  | 4500                         | 5000                           | 95.6               | 362  | 0.0651     | 1.28    | 331                             | 448  | 5800 / 6525                                  | 400 / 450 | 51          | 23   |
| MA 90       | 5.49         | 90.0  | 4500                         | 5000                           | 107.0              | 405  | 0.0727     | 1.43    | 371                             | 502  | 5800 / 6525                                  | 400 / 450 | 51          | 23   |
| MA 108R     | 6.61         | 108.3 | 3400                         | 4500                           | 97.3               | 368  | 0.0875     | 1.72    | 446                             | 603  | 5800 / 6525                                  | 400 / 450 | 77          | 35   |
| MA 125      | 7.65         | 125.4 | 3400                         | 4500                           | 112.6              | 426  | 0.1017     | 2.00    | 516                             | 699  | 5800 / 6525                                  | 400 / 450 | 77          | 35   |
| MA 160      | 9.76         | 160.0 | 3600                         | 4000                           | 152.2              | 576  | 0.1297     | 2.55    | 659                             | 891  | 5800 / 6525                                  | 400 / 450 | 107         | 48.5 |
| MA 180      | 11.02        | 180.6 | 3600                         | 4000                           | 171.8              | 650  | 0.1459     | 2.87    | 744                             | 1006 | 5800 / 6525                                  | 400 / 450 | 107         | 48.5 |

(1) For higher speeds, please contact us.

## ► Acceptable forces applied to motor shaft

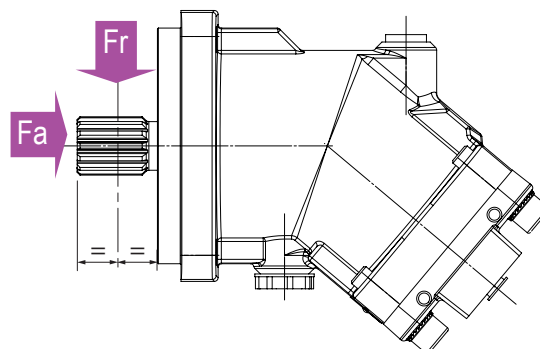
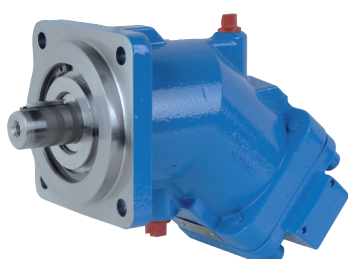
| Motor model |                    | 10           | 12           | 18           | 25           | 32           | 41           | 45           | 50           | 63           | 80           | 90           | 108 R        | 125          | 160          | 180          |
|-------------|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Fr          | lbf                | 528          | 630          | 630          | 1350         | 1462.5       | 1574         | 1462.5       | 1686         | 1686         | 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<br>(N/bar) * | 0.83<br>(12) | 1.03<br>(15) | 1.37<br>(20) | 1.86<br>(27) | 2.06<br>(30) | 2.75<br>(40) | 2.75<br>(40) | 2.75<br>(40) | 3.44<br>(50) | 4.14<br>(60) | 4.62<br>(67) | 5.52<br>(80) | 5.93<br>(86) | 5.86<br>(85) | 6.55<br>(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<br>16/32 DP<br>SAE B | 13 T<br>16/32 DP<br>SAE B | 13 T<br>16/32 DP<br>SAE B | 14 T<br>12/24 DP<br>SAE C | 14 T<br>12/24 DP<br>SAE C | 14 T<br>12/24 DP<br>SAE C | 14 T<br>12/24 DP<br>SAE C | 14 T<br>12/24 DP<br>SAE C | 14 T<br>12/24 DP<br>SAE C | 14 T<br>12/24 DP<br>SAE C | 14 T<br>12/24 DP<br>SAE C  | 13 T<br>8/16 DP<br>SAE D   | 13 T<br>8/16 DP<br>SAE D | 13 T<br>8/16 DP<br>SAE D | 13 T<br>8/16 DP<br>SAE D | S1              |    |
|       |                   |                           | —                         | —                         | —                         | —                         | —                         | —                         | —                         | —                         | —                         | 17 T<br>12/24 DP<br>SAE CC | 17 T<br>12/24 DP<br>SAE CC | —                        | —                        | —                        | 15 T<br>8/16 DP | S2 |
|       |                   | —                         | —                         | —                         | —                         | —                         | —                         | —                         | —                         | —                         | —                         | 21 T<br>16/32 DP           | 21 T<br>16/32 DP           | —                        | —                        | —                        | —               | S3 |
|       | DIN 6885          | —                         | —                         | —                         | —                         | —                         | —                         | —                         | —                         | —                         | —                         | —                          | —                          | —                        | Ø50 mm                   | Ø50 mm                   | D1              |    |
|       | Keyed SAE J744    | Ø1"                       | Ø1"                       | Ø1"                       | Ø1¼"                      | Ø1¼"                      | Ø1¼"                      | Ø1¼"                      | Ø1¼"                      | Ø1¼"                      | Ø1¼"                      | Ø1½"                       | Ø1½"                       | Ø1¾"                     | Ø1¾"                     | —                        | —               | 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

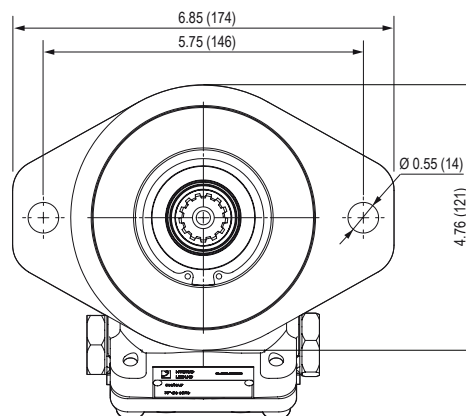
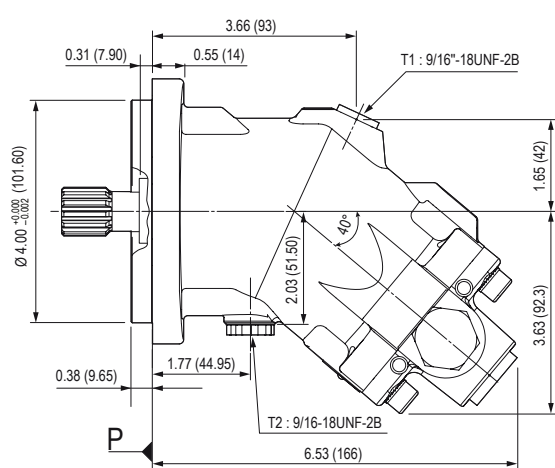
| Drain ports T1 and T2 |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |
|-----------------------|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| 06                    |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | U2 |

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

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

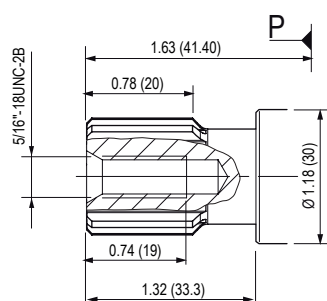
| Valves |                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |
|--------|---------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| 09     | Without             | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | SV |
|     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

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

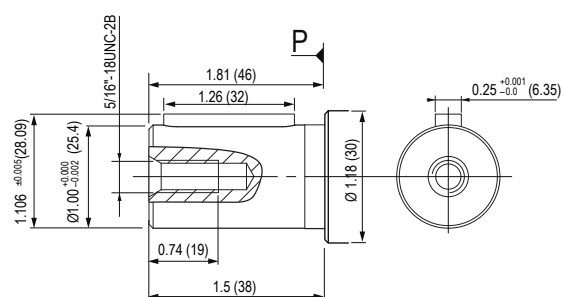


### ► Shaft end

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

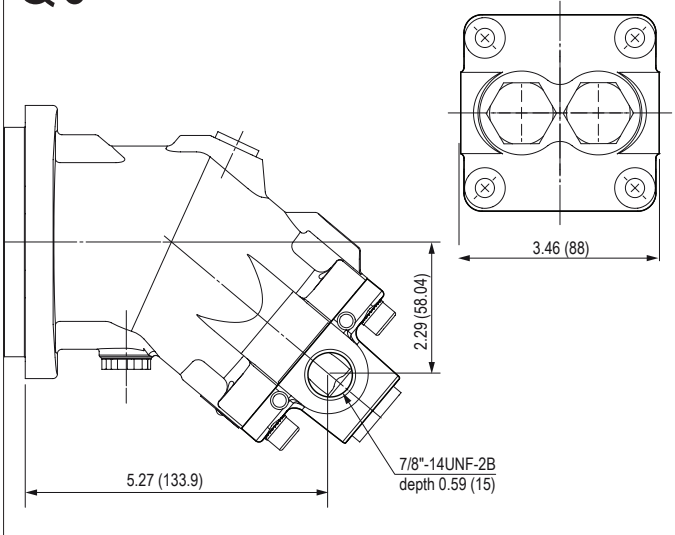


#### K1 Cylindrical keyed shaft $\varnothing 1"$

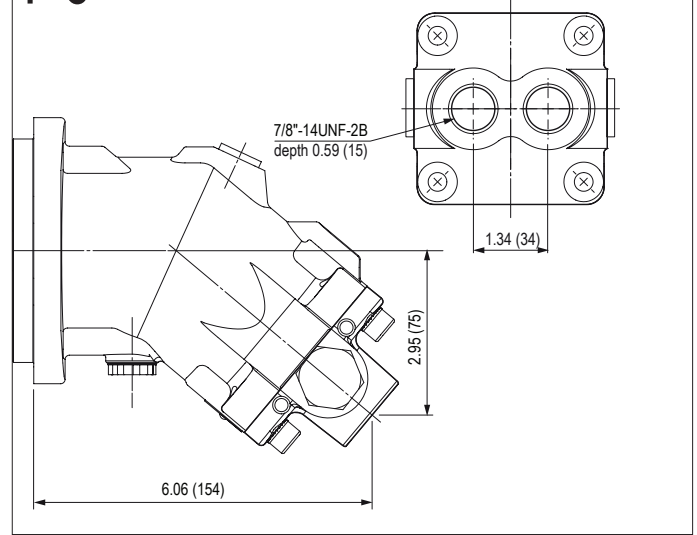


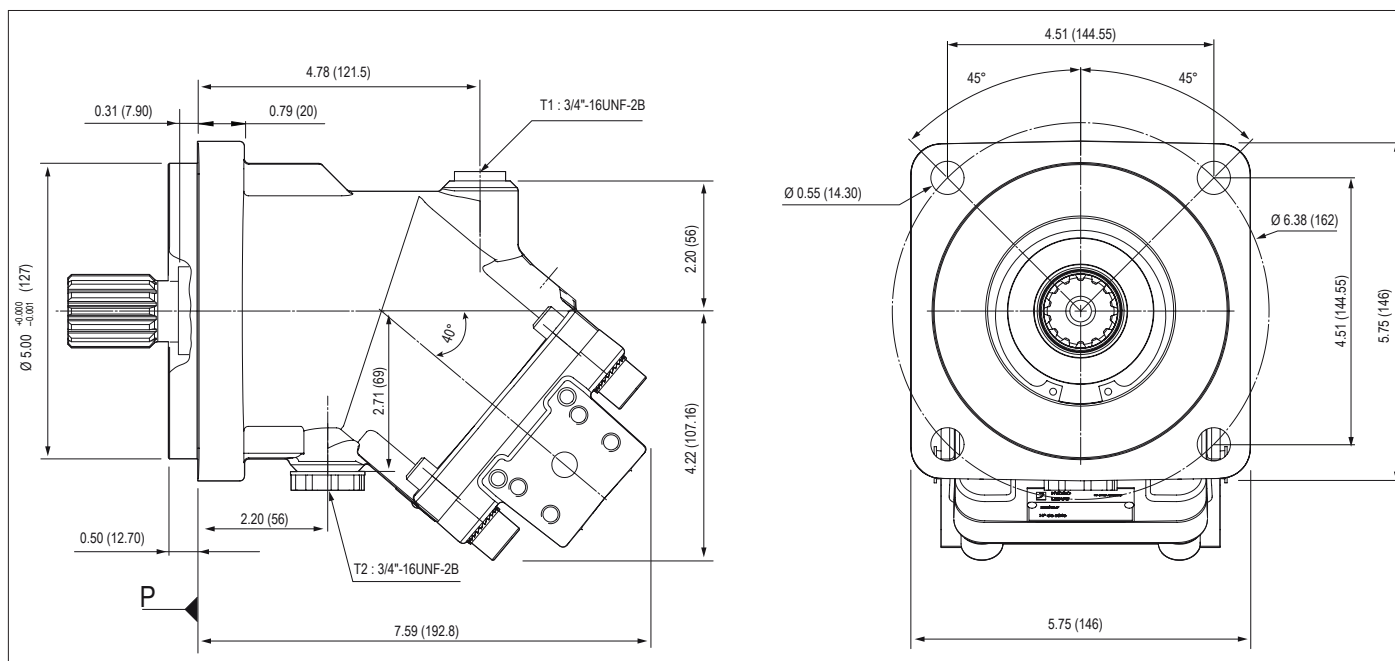
# Inlet ports

## Q0 Side threaded ports A and B



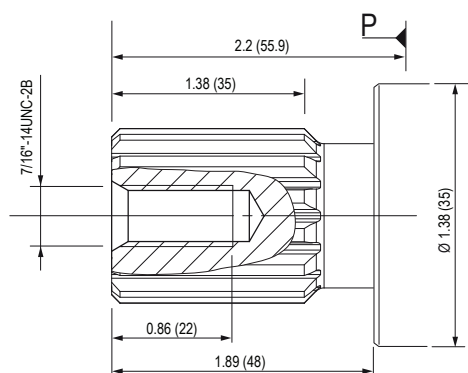
## P0 Rear threaded ports A and B



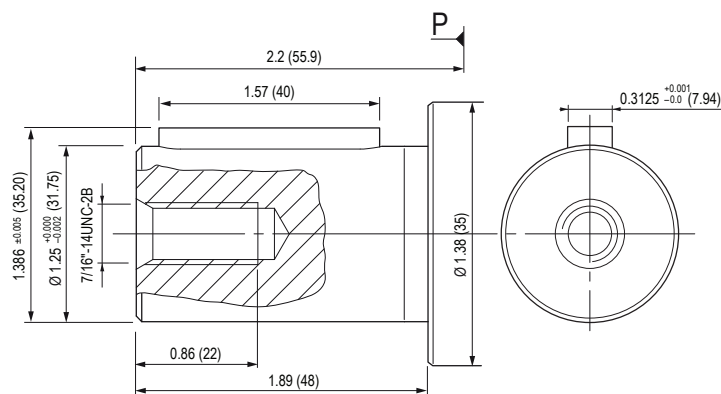


### ► Shaft end

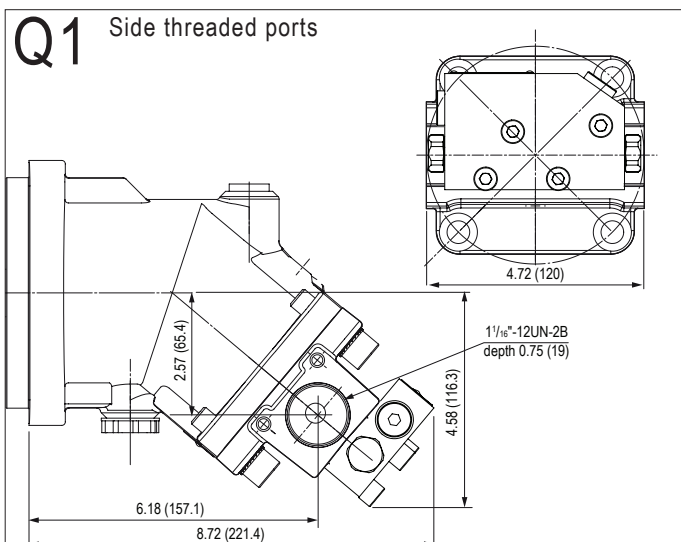
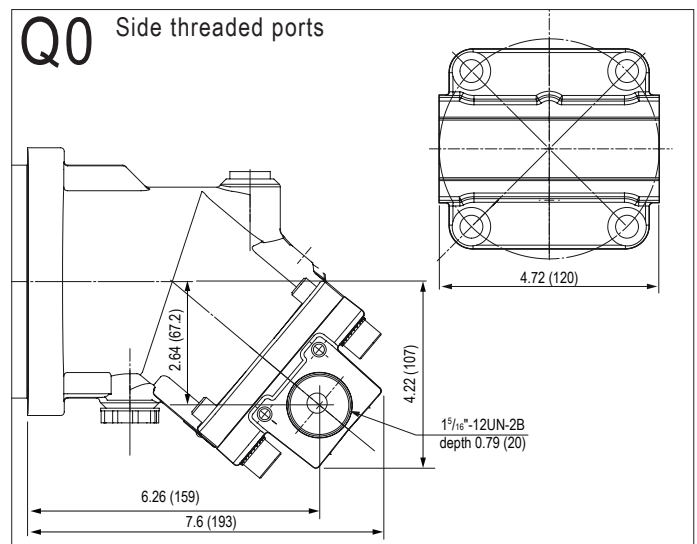
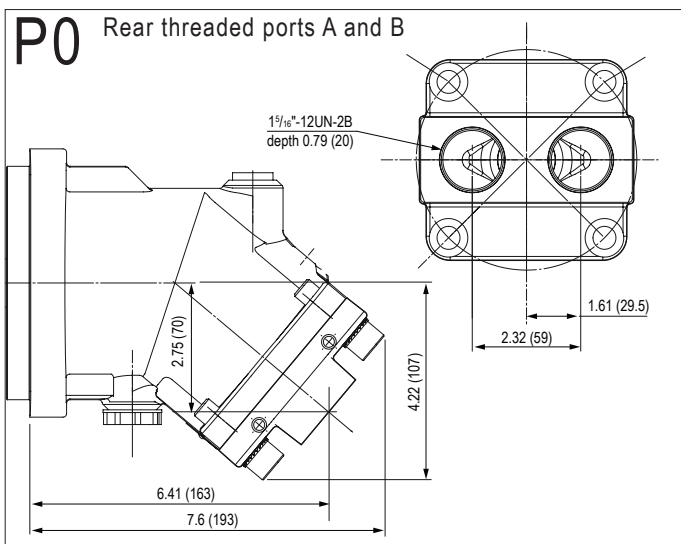
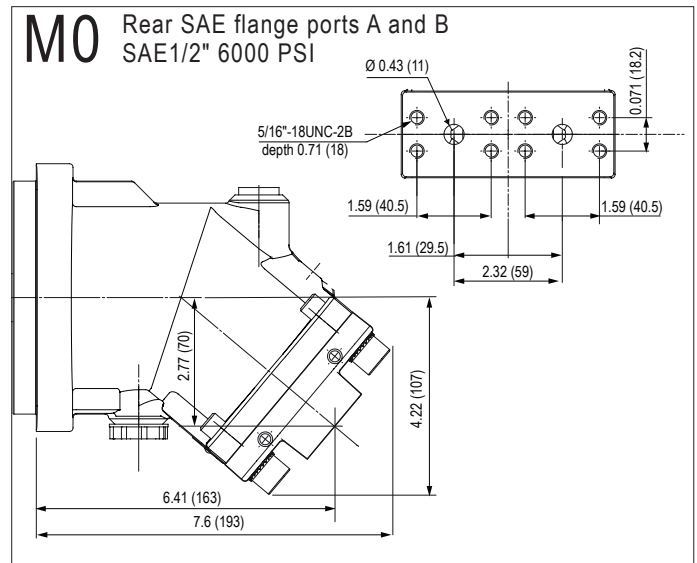
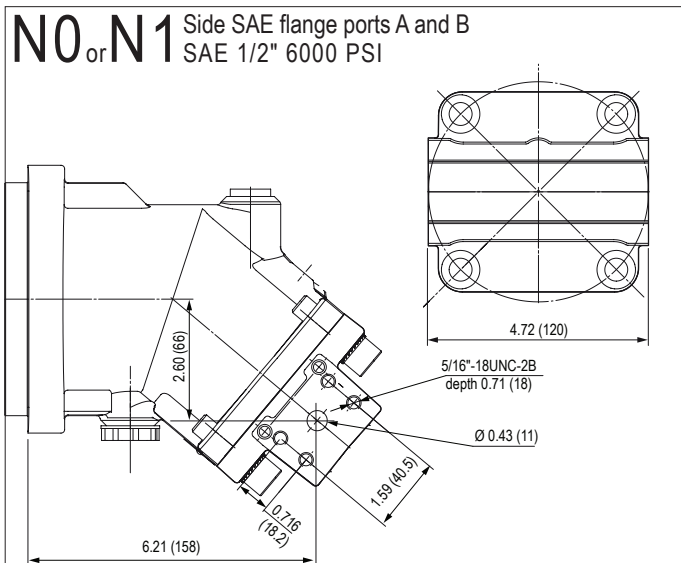
#### S1 Splined shaft 14T 12/24DP 1 1/4"



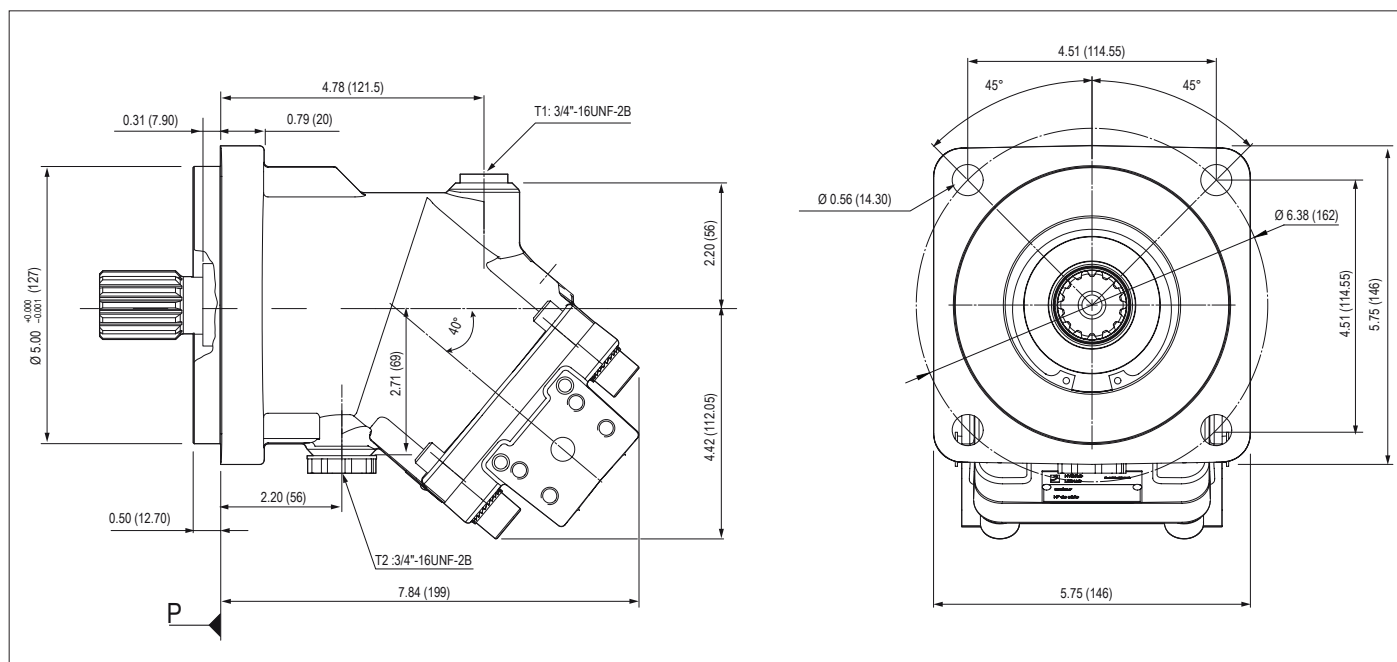
#### K1 Cylindrical keyed shaft $\varnothing 1 1/4"$



## ► Shaft end

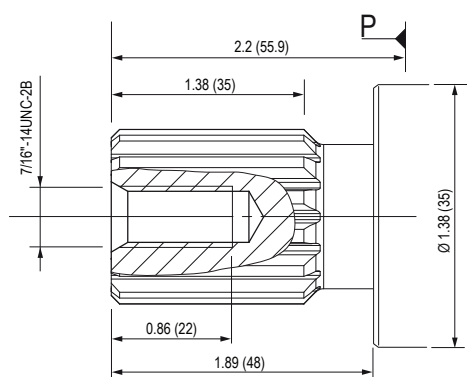


Dimensions in inches (mm) are given only as an indication.

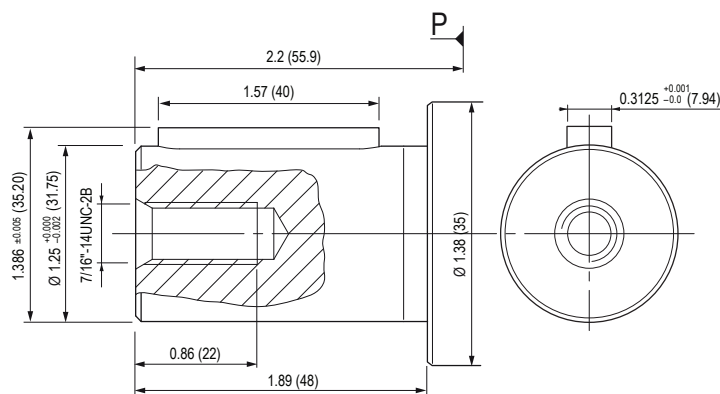


► Shaft end

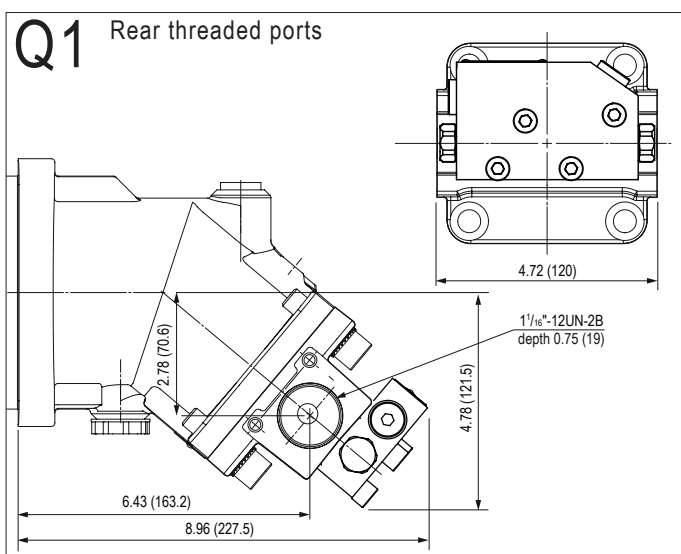
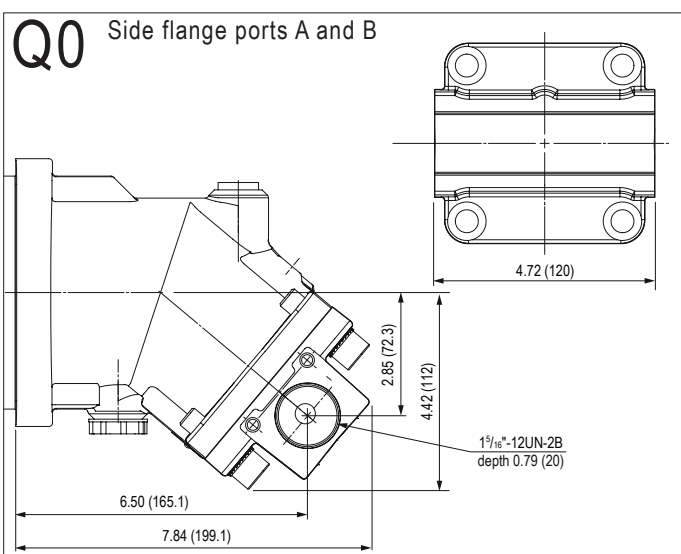
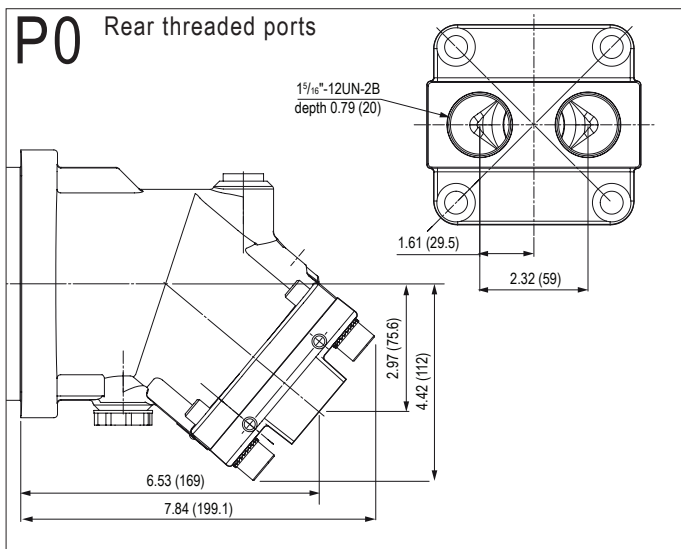
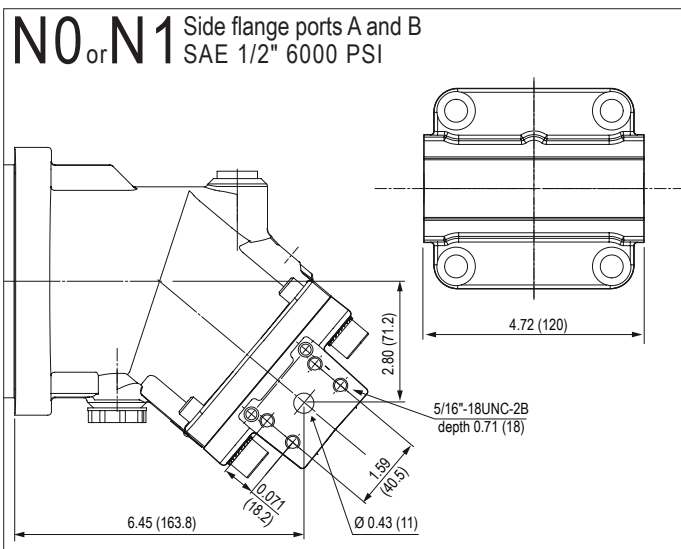
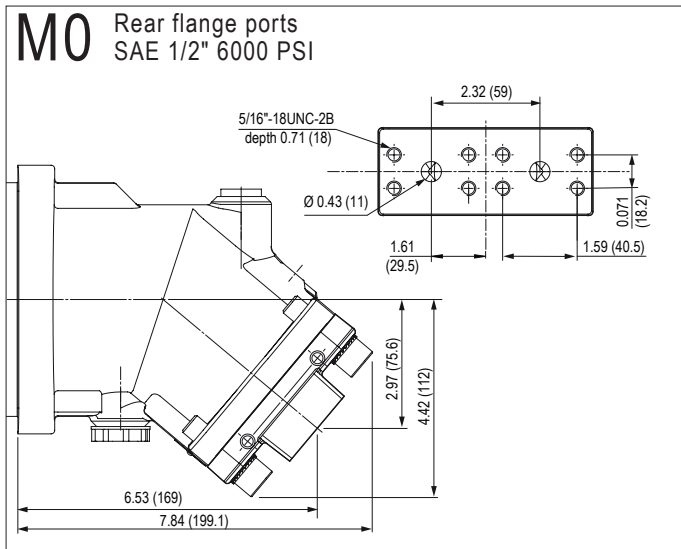
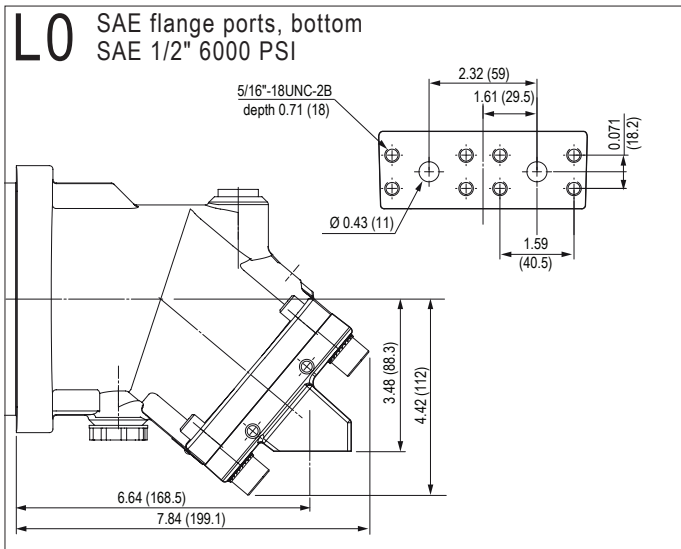
**S1** Splined shaft 14T 12/24DP 1¼"



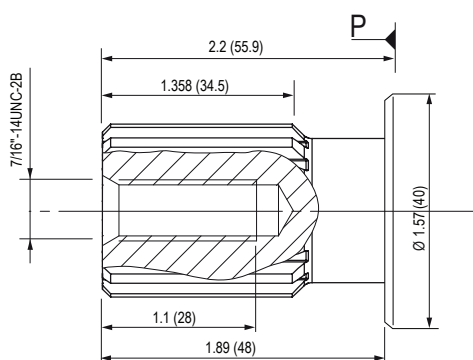
**K1** Cylindrical keyed shaft Ø 1 1/4"



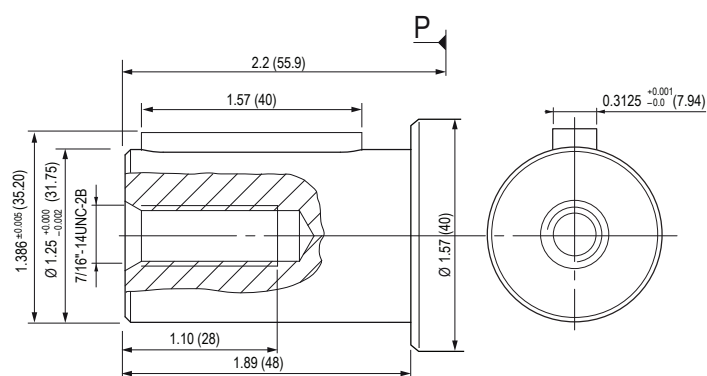
# ► Inlet ports



**S1** Splined shaft 14T 12/24DP 1¼"

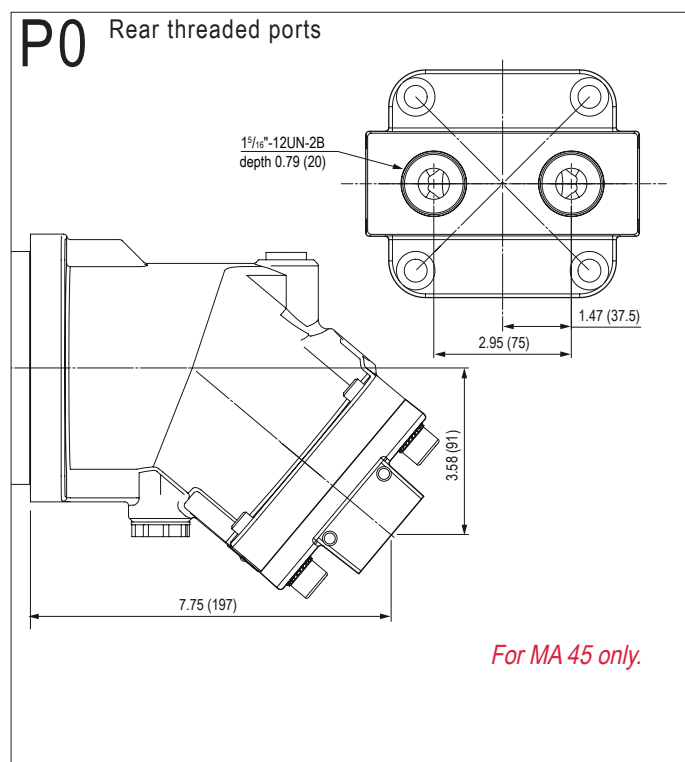
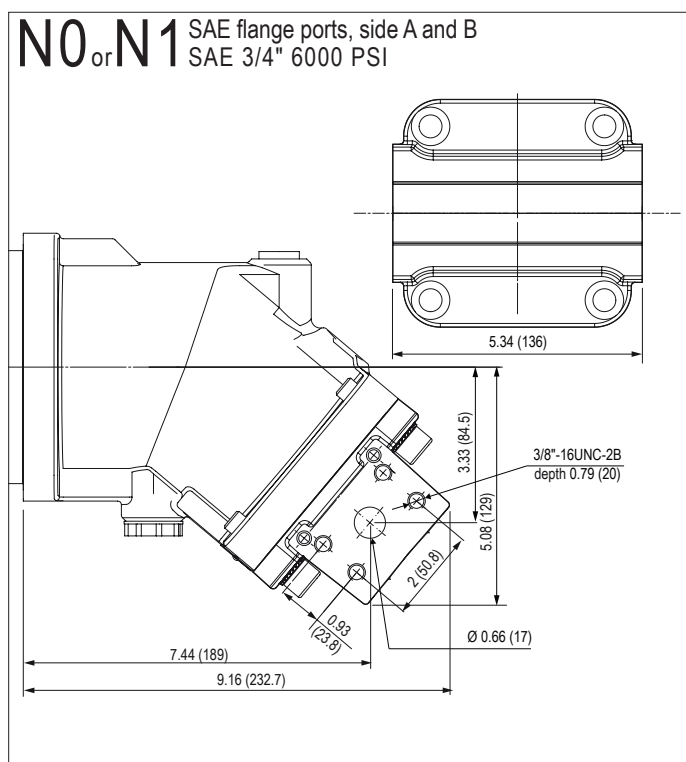
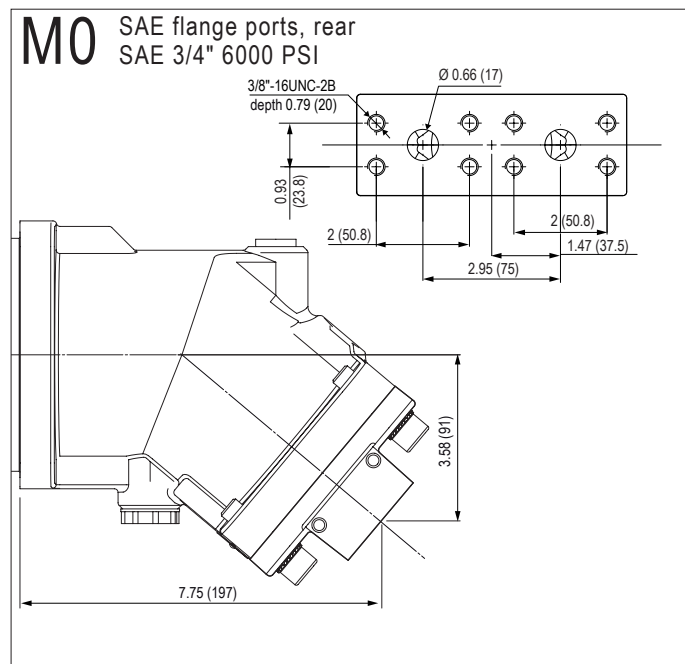
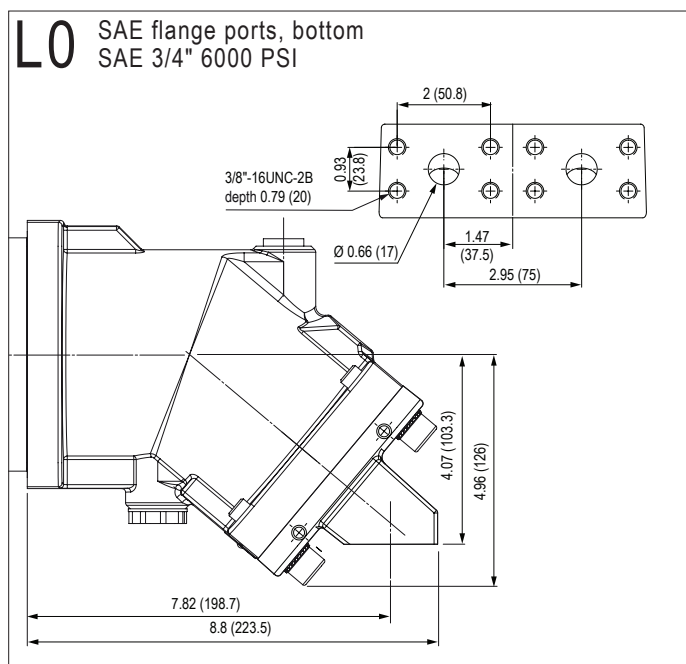


**K1** Cylindrical keyed shaft Ø 1 ¼"

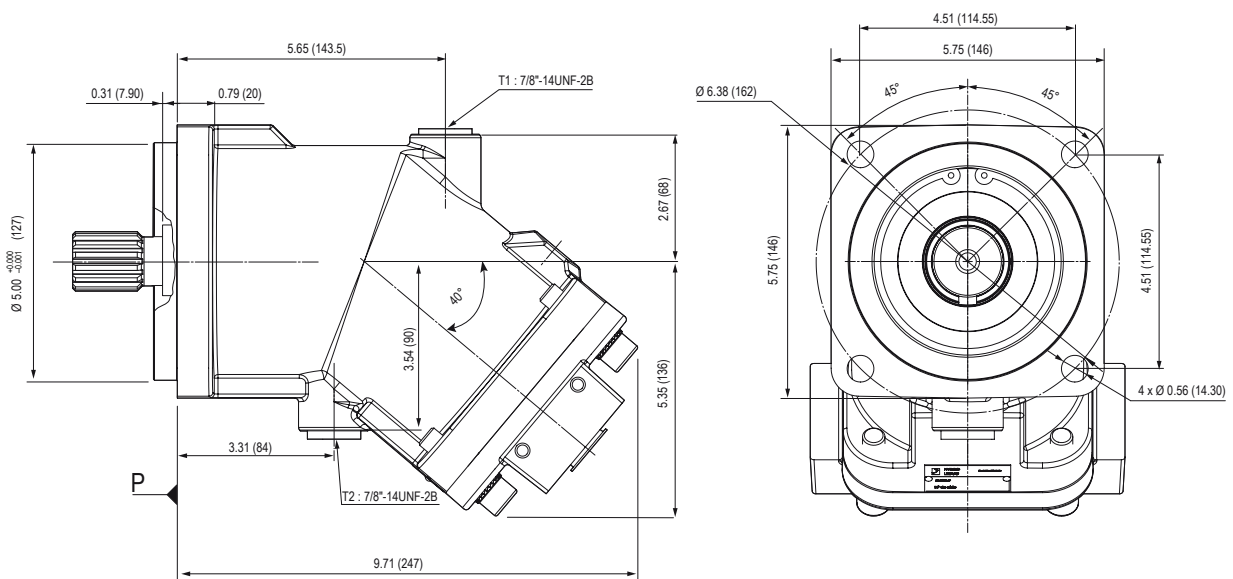


Dimensions in inches (mm) are given only as an indication.

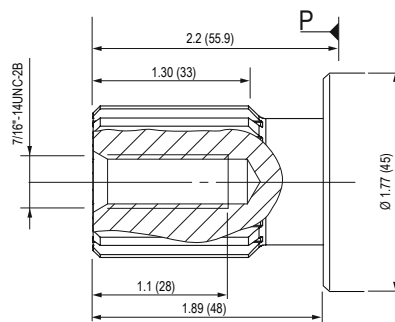
# Inlet ports



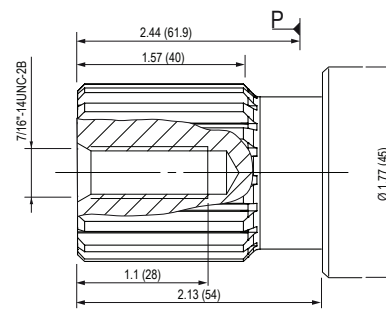
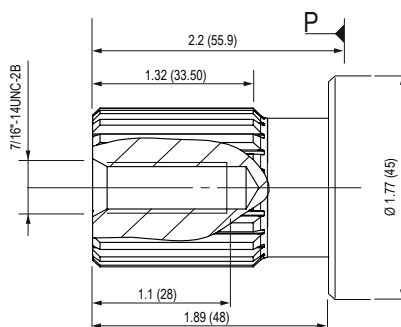
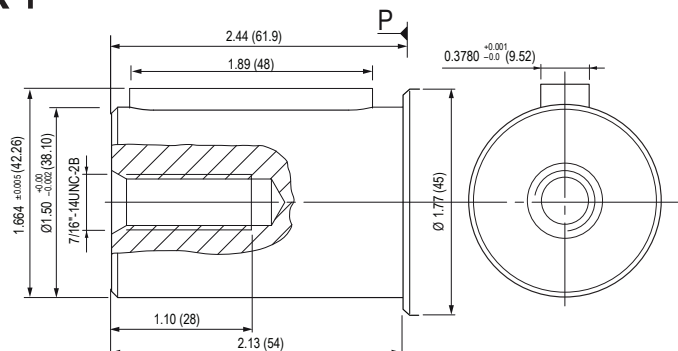
For MA 45 only.



## ► Shaft end

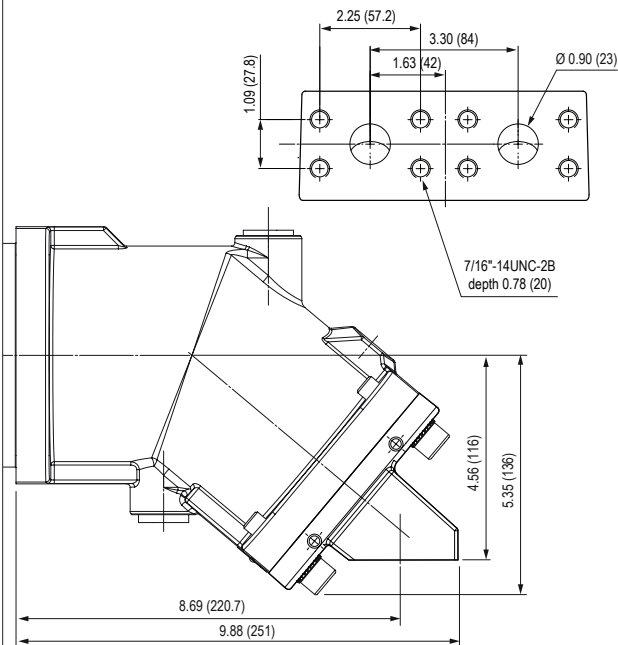
**S1** Splined shaft 14T 12/24DP 1¼"

Max. pressure 350 bar (5075 PSI) for MA 80  
 Max. pressure 320 bar (4495 PSI) for MA 90

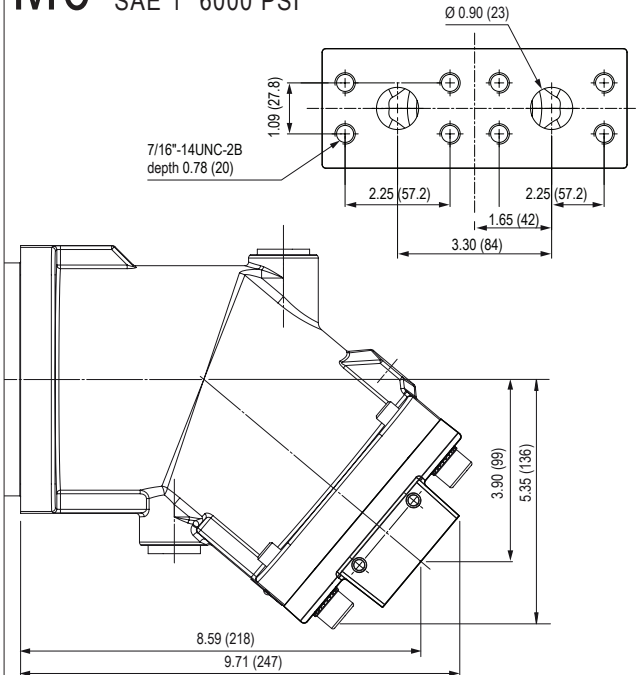
**S2** Splined shaft 17T 12/24DP 1½"**S3** Splined shaft 21T 16/32DP 1¾"**K1** Cylindrical keyed shaft Ø 1½"

# Inlet ports

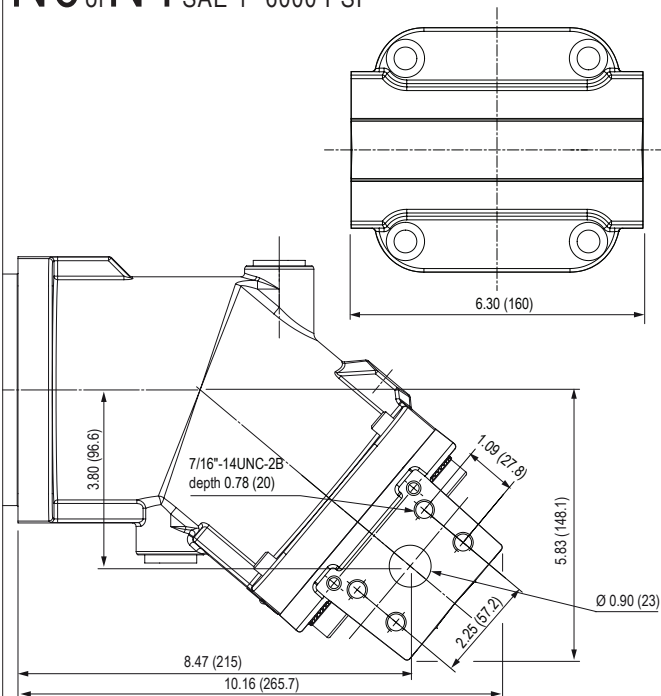
## L0 SAE flange ports, bottom SAE 1" 6000 PSI

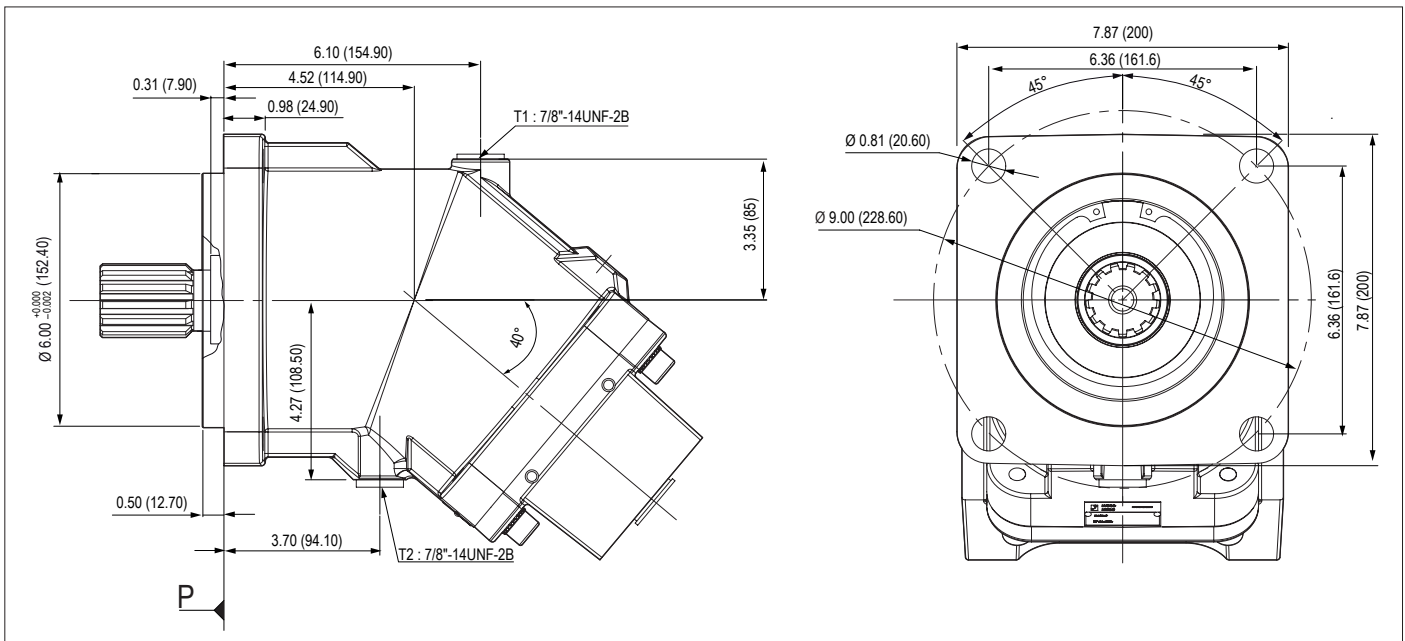


## M0 SAE flange ports, rear SAE 1" 6000 PSI



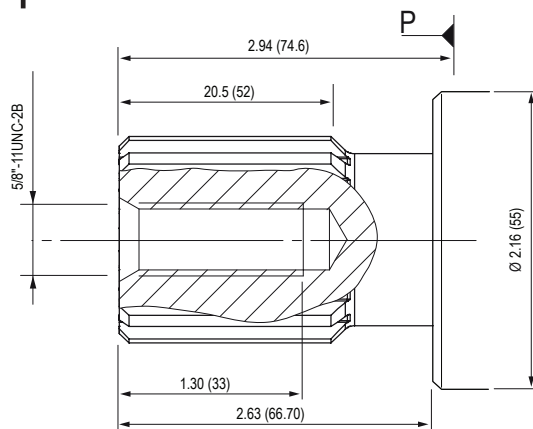
## N0 or N1 SAE flange ports, side A and B SAE 1" 6000 PSI



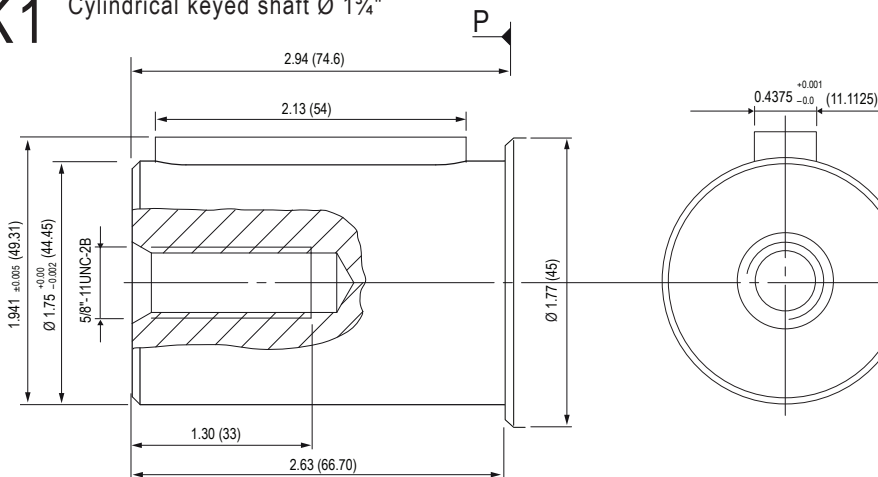


### ► Shaft end

#### S1 Splined shaft 13T 8/16DP 1 $\frac{3}{4}$ "



#### K1 Cylindrical keyed shaft $\varnothing$ 1 $\frac{3}{4}$ "

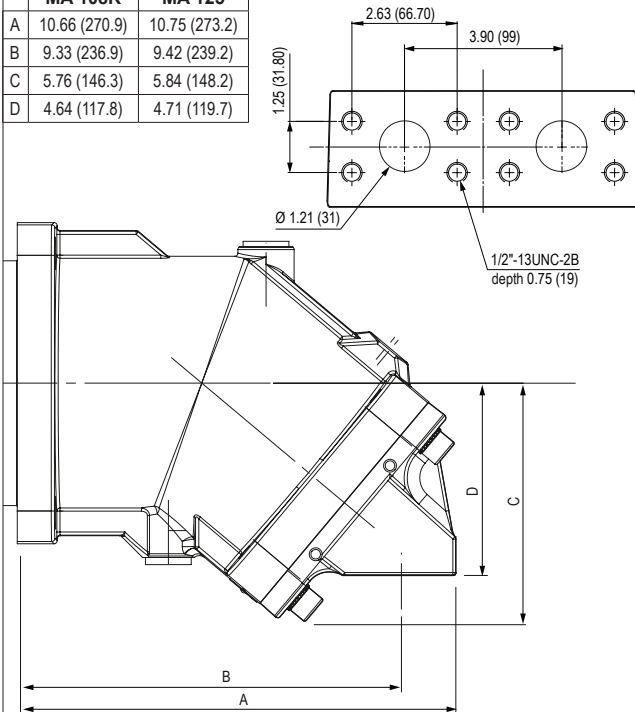


Dimensions in inches (mm) are given only as an indication.

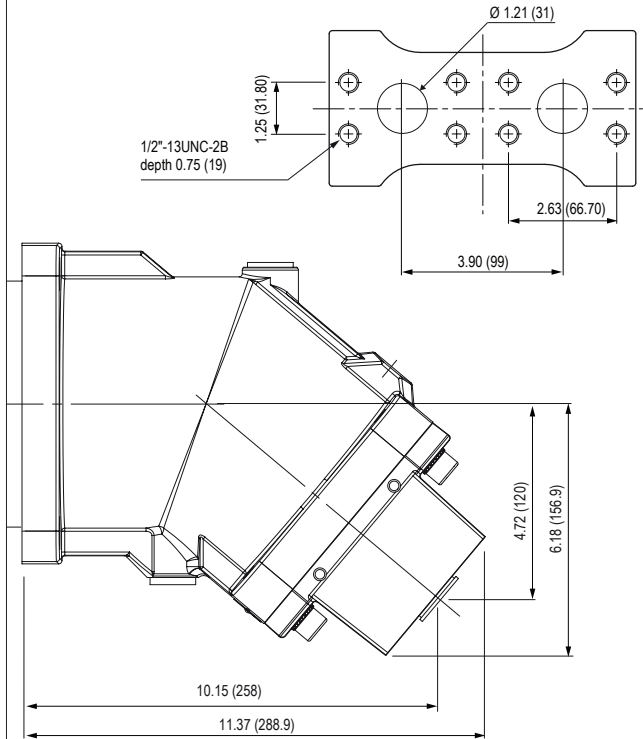
# Inlet ports

## 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)  |

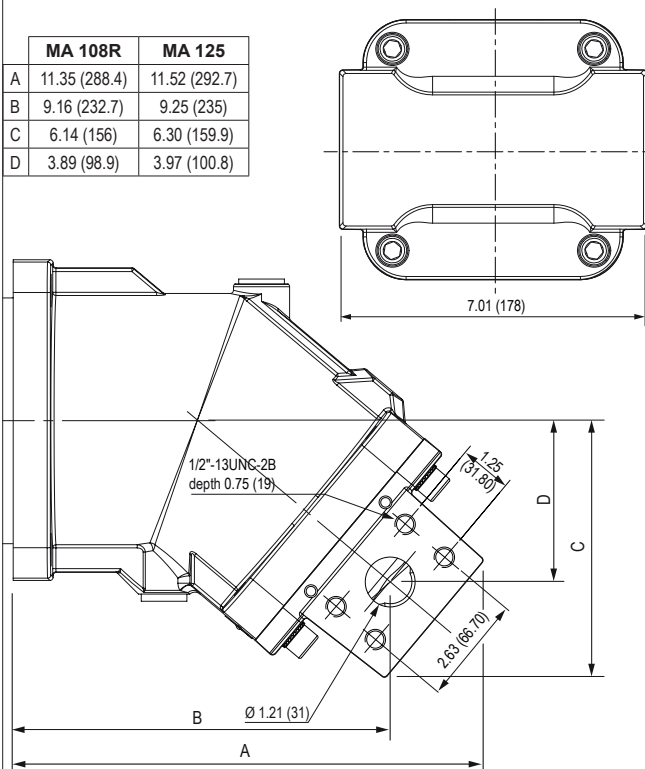


## M0 SAE flange ports, bottom SAE 1 1/4" 6000 PSI

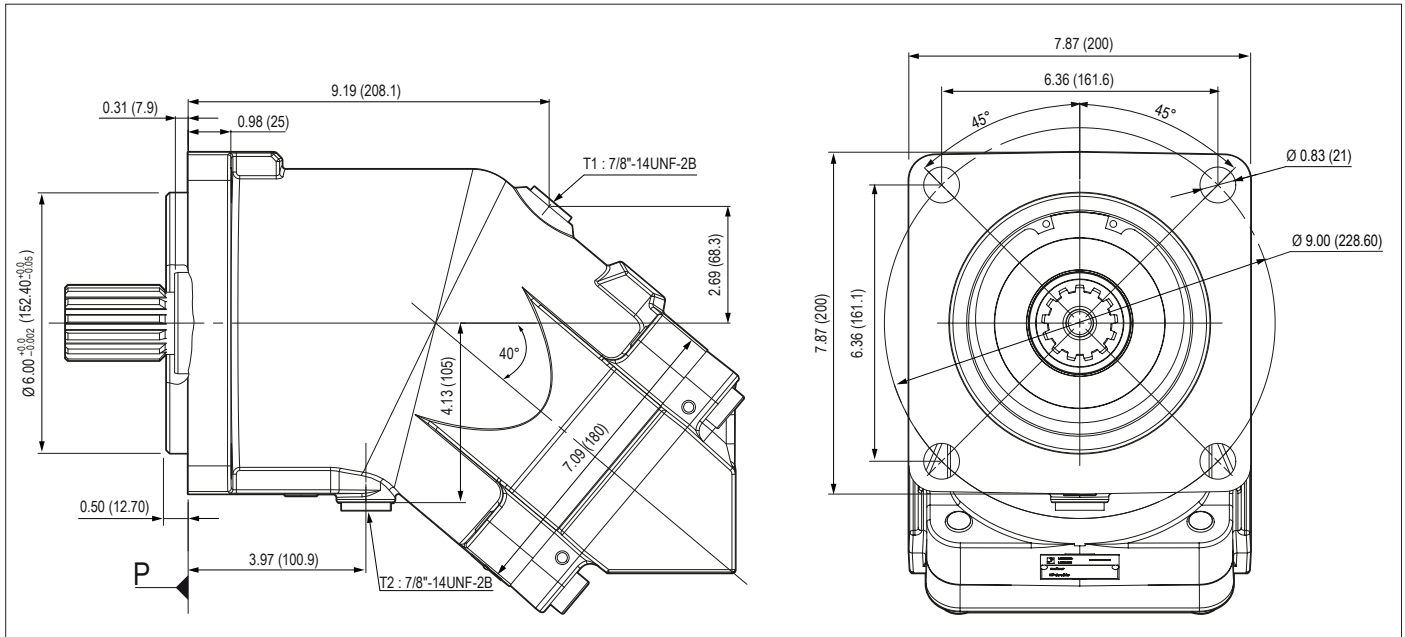


## N0 or N1 SAE flange ports, side A and B SAE 1 1/4" 6000 PSI

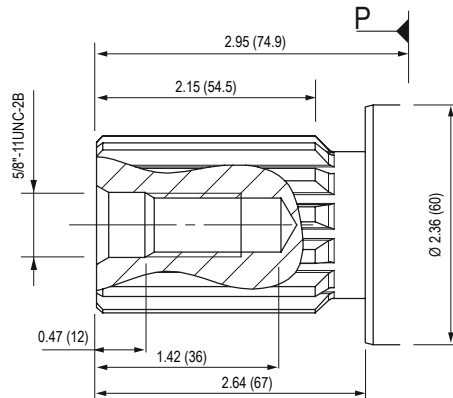
|   | MA 108R       | MA 125        |
|---|---------------|---------------|
| A | 11.35 (288.4) | 11.52 (292.7) |
| B | 9.16 (232.7)  | 9.25 (235)    |
| C | 6.14 (156)    | 6.30 (159.9)  |
| D | 3.89 (98.9)   | 3.97 (100.8)  |



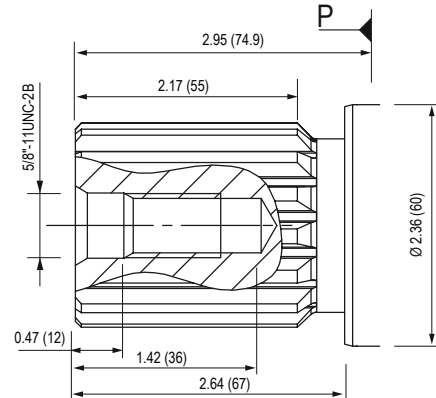
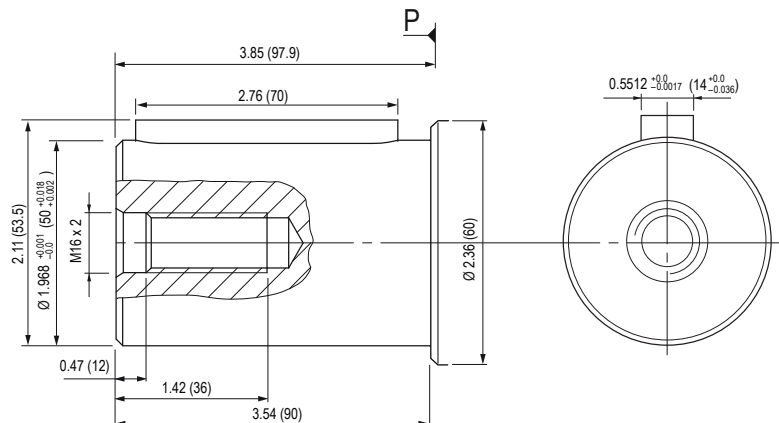
Dimensions in inches (mm) are given only as an indication.



## ► Shaft end

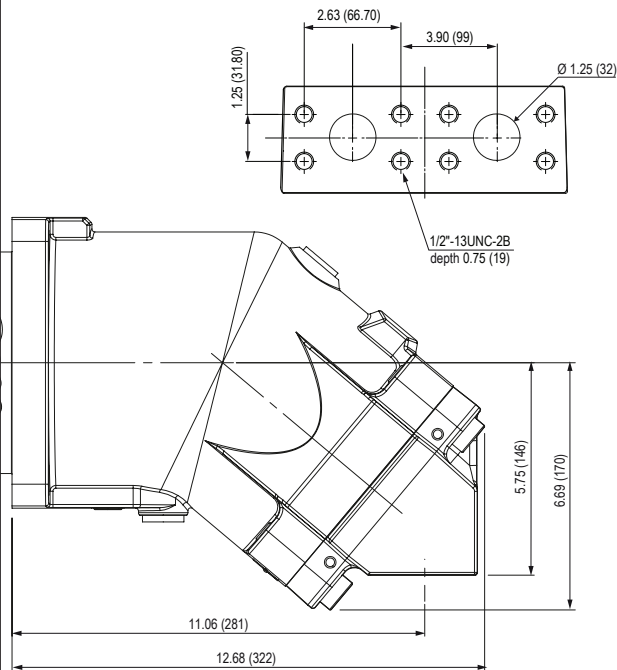
**S1** Splined shaft 13T 8/16DP 1¼"**S2** Splined shaft 15T 8/16DP 2"

MA 180

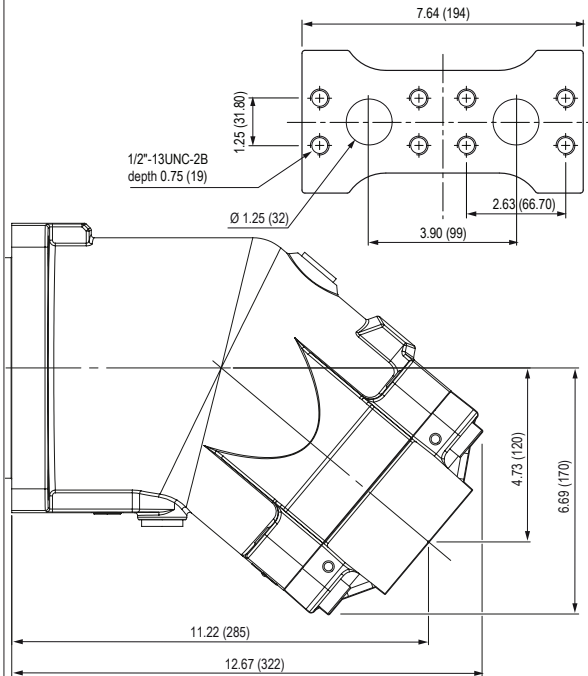
**D1** Cylindrical keyed shaft Ø 50 DIN 6885  
AS 14 x 9 x 70 mm

# Inlet ports

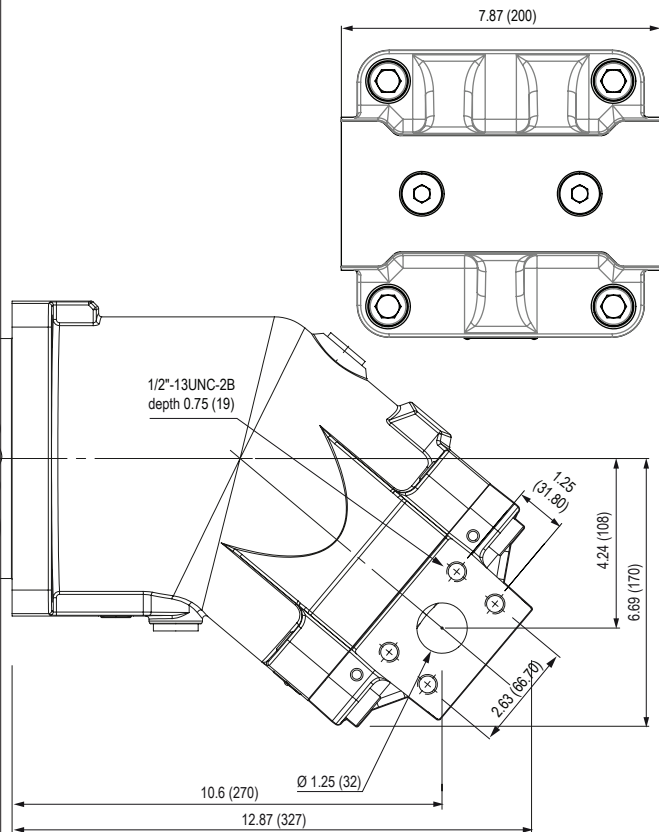
**L0** SAE flange ports, bottom  
SAE 1 1/4" 6000 PSI



**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        | 28                    | 6300                            | 6900                              | 202                       | 0.5              | 175                     | 400 / 450                                       | 11.5        |
| MSI 32        | 32                    | 6300                            | 6900                              | 202                       | 0.5              | 175                     | 400 / 450                                       | 11.5        |
| MSI 41        | 41.1                  | 5600                            | 6200                              | 230                       | 0.65             | 227                     | 400 / 450                                       | 11.5        |
| MSI 50        | 50.3                  | 5000                            | 5500                              | 252                       | 0.8              | 280                     | 400 / 450                                       | 19          |
| MSI 63        | 63                    | 5000                            | 5500                              | 315                       | 1                | 350                     | 400 / 450                                       | 19          |
| MSI 80        | 80.4                  | 4500                            | 5000                              | 362                       | 1.27             | 445                     | 400 / 450                                       | 26          |
| MSI 90        | 90                    | 4500                            | 5000                              | 405                       | 1.42             | 499                     | 400 / 450                                       | 26          |
| MSI 108       | 108.3                 | 4000                            | 4400                              | 435                       | 1.7              | 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                       | 1.99             | 695                     | 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

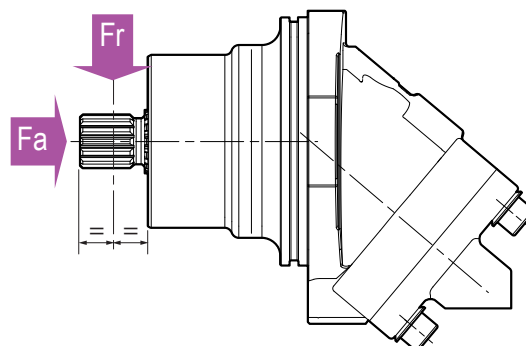
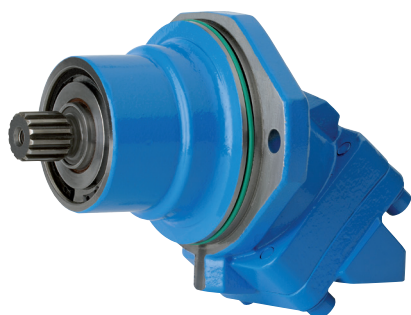
| Motor model |        | 28   | 32   | 41   | 50   | 63   | 80    | 90    | 108   | 108 R | 125   |
|-------------|--------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Fr          | N      | 6200 | 6500 | 7000 | 7500 | 9000 | 10500 | 11000 | 11500 | 12500 | 14500 |
| 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 |

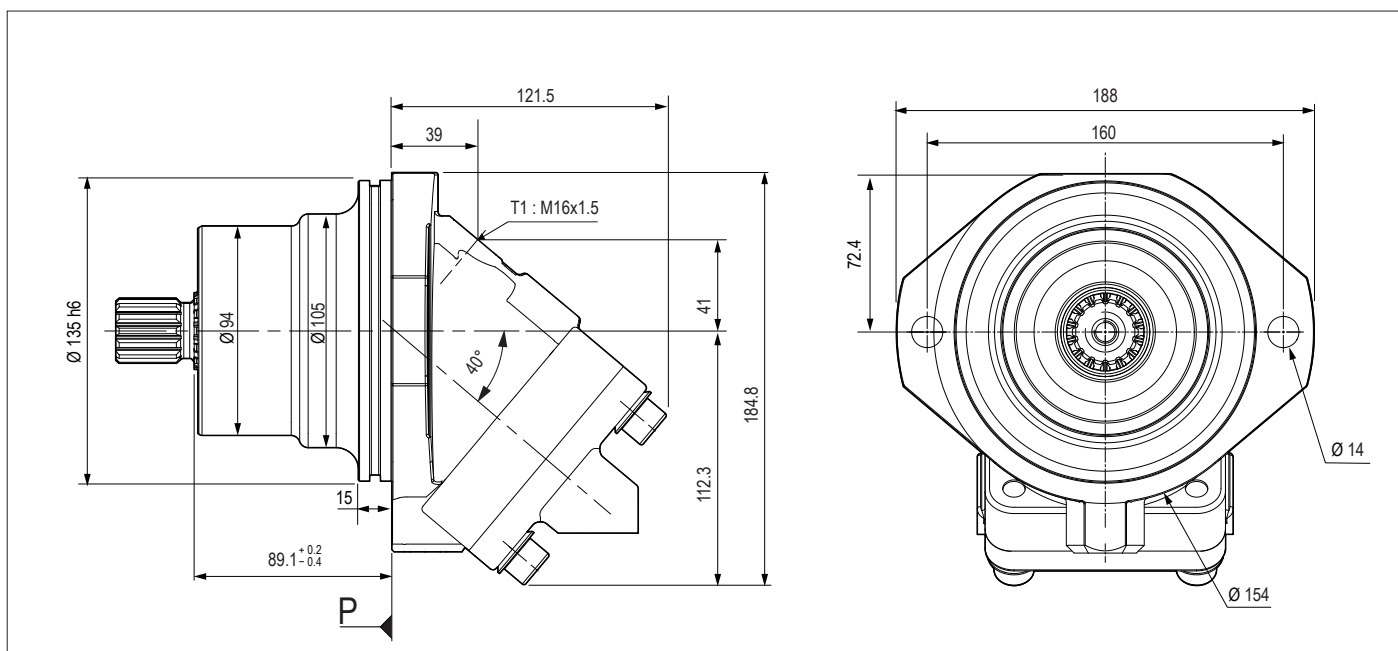
| Inlet ports |                          |   |   |   |   |   |   |   |   |   |   |    |
|-------------|--------------------------|---|---|---|---|---|---|---|---|---|---|----|
| 05          | SAE flange ports, bottom | • | • | • | • | • | • | • | • | • | • | L0 |

| Drain |  |   |   |   |   |   |   |   |   |   |   |    |
|-------|--|---|---|---|---|---|---|---|---|---|---|----|
| 06    |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | M1 |

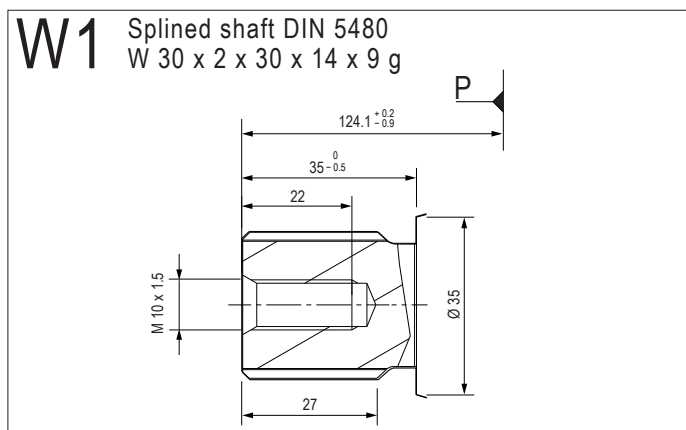
| Suitable for use of speed sensor |     |   |   |   |   |   |   |   |   |   |   |   |
|----------------------------------|-----|---|---|---|---|---|---|---|---|---|---|---|
| 07                               | Yes | • | • | • | • | • | • | • | • | • | • | 1 |
|                                  | No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

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

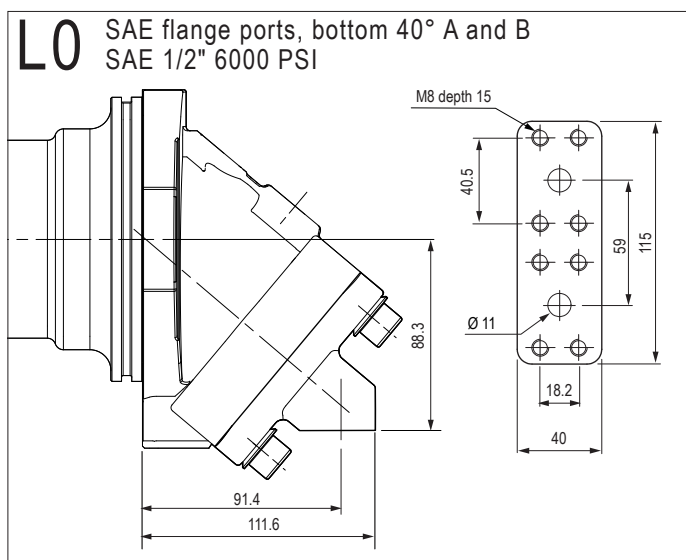
| Valves |         |   |   |   |   |   |   |   |   |   |   |    |
|--------|---------|---|---|---|---|---|---|---|---|---|---|----|
| 09     | Without | • | • | • | • | • | • | • | • | • | • | SV |



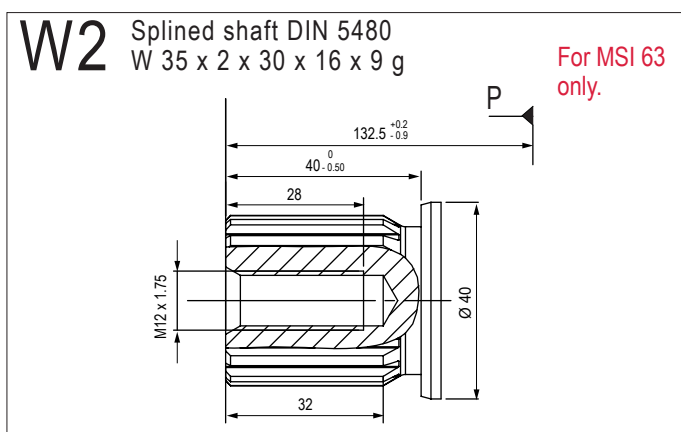
#### ► Shaft end



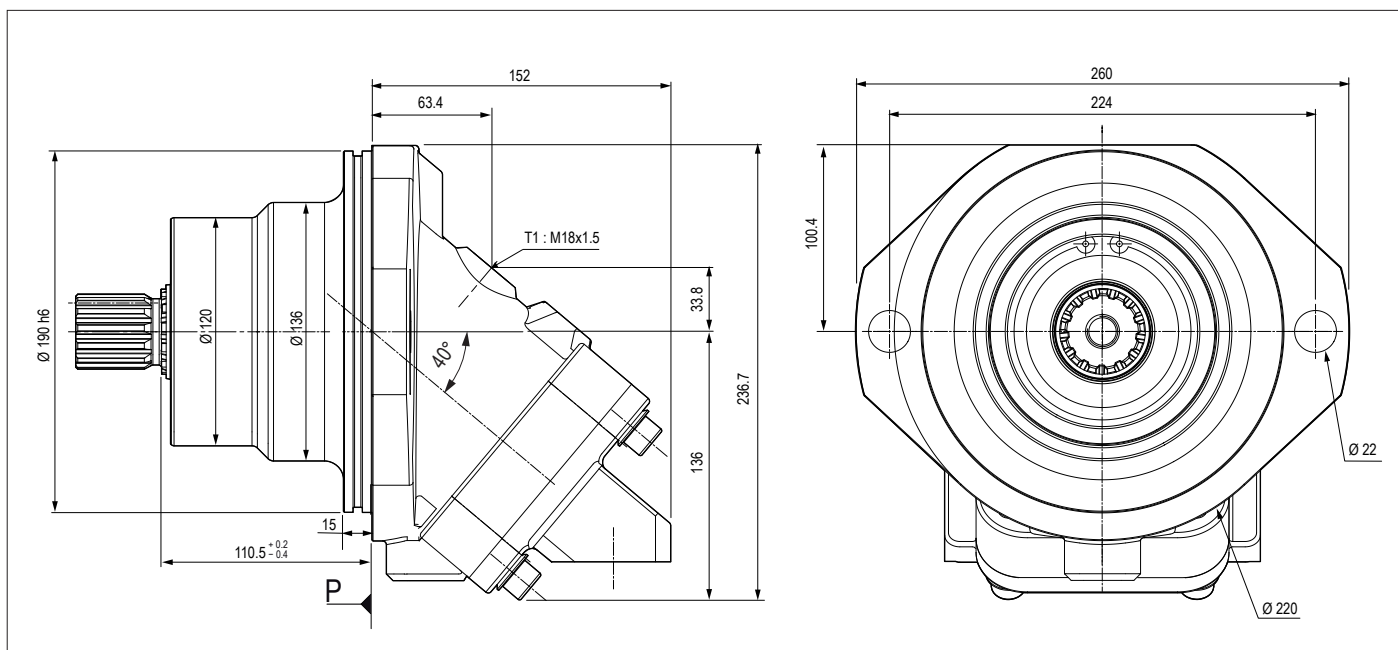
#### ► Inlet ports



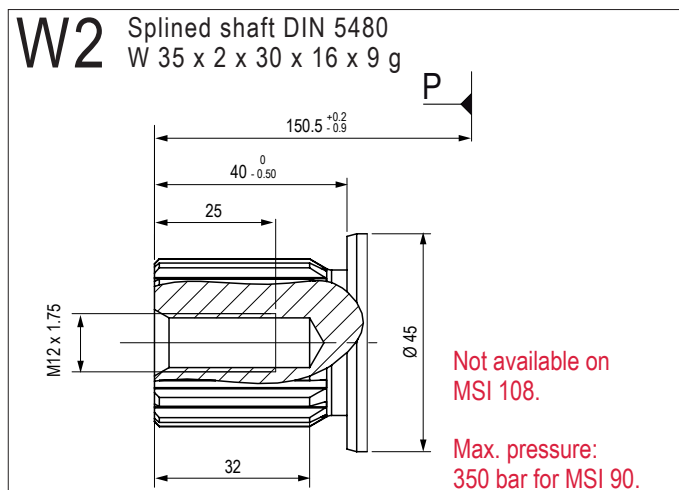
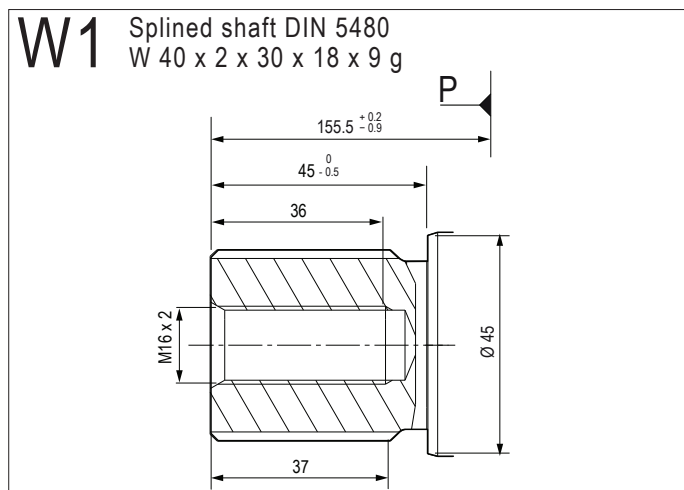
Dimensions in mm are given only as an indication.



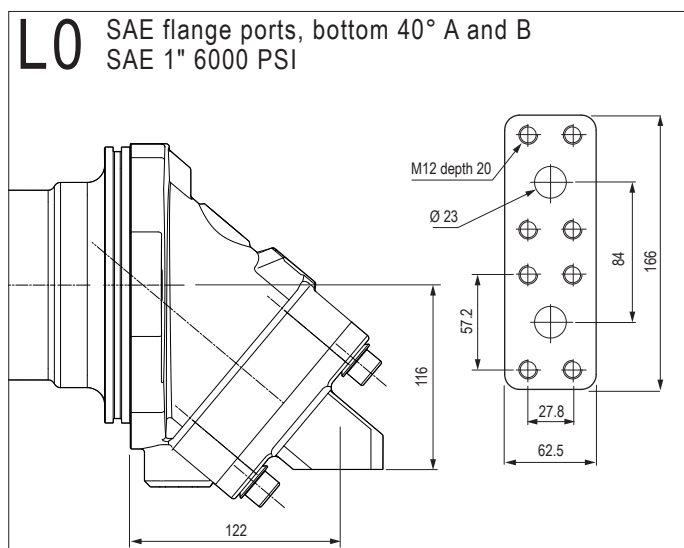
Dimensions in mm are given only as an indication.



► **Shaft end**



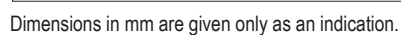
► Inlet ports

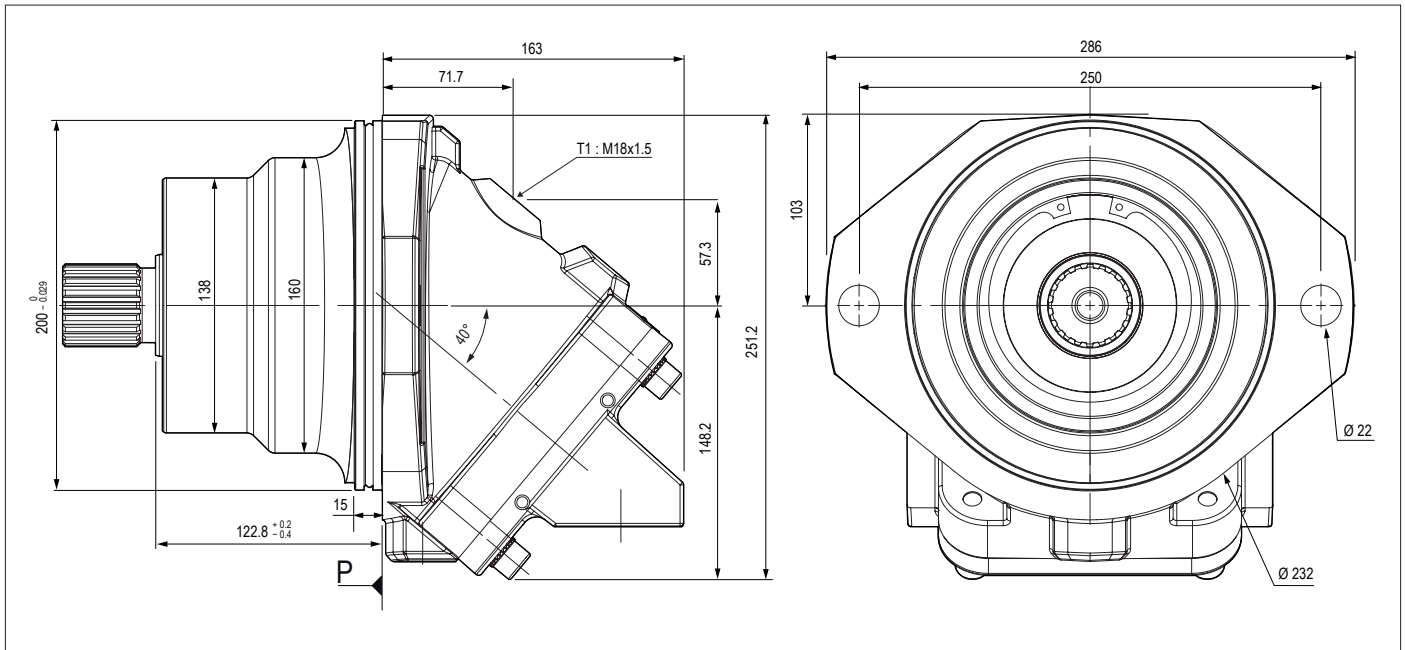


Dimensions in mm are given only as an indication.



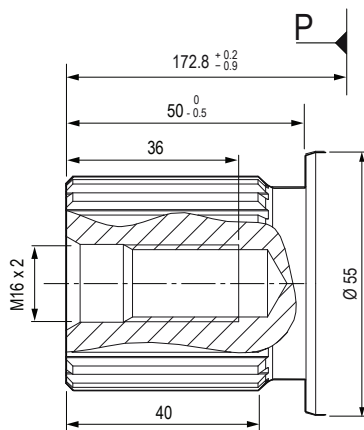
**W1** Splined shaft DIN 5480  
W 40 x 2 x 30 x 18 x 9g



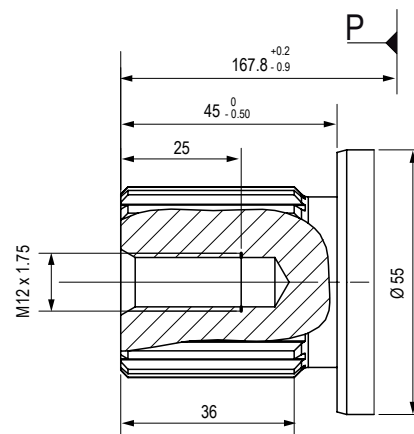


### ► Shaft end

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

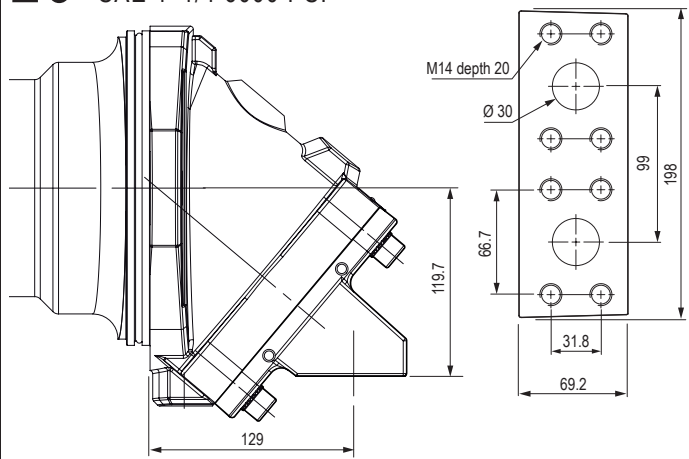


**W2** Splined shaft DIN 5480  
W 40 X 2 X 30 X 18 X 9g



### ► Inlet ports

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

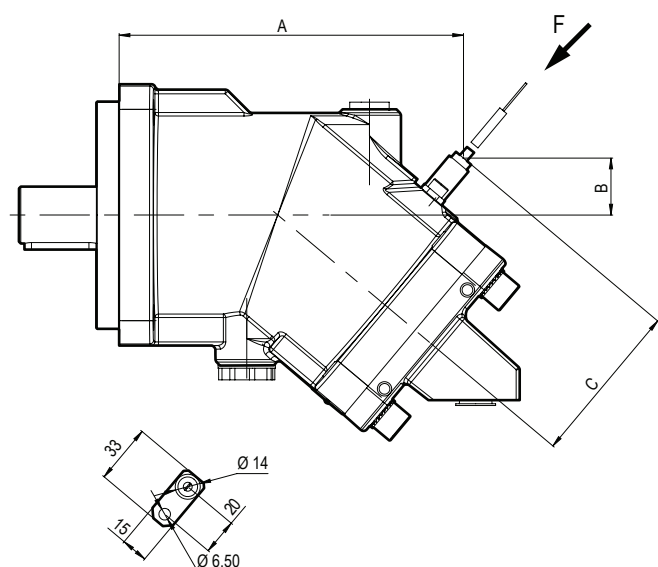


Dimensions in mm are given only as an indication.

## 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

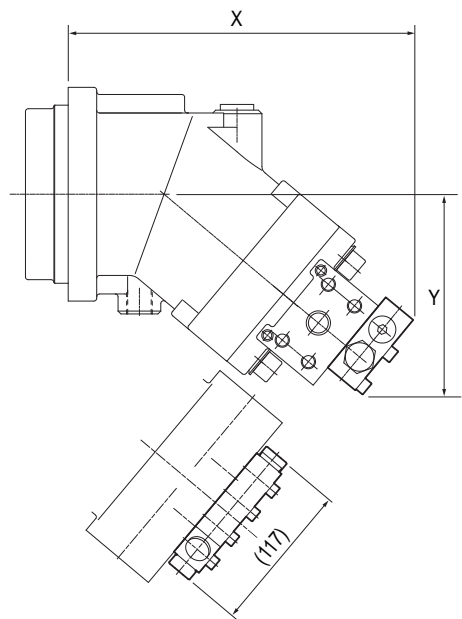
Used to create flow to cool the motor. This valve is essential for all intensive uses of motors and contributes to long service life.

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.

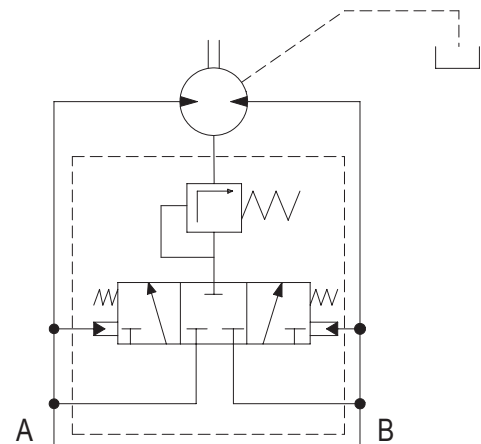
Flushing valves are only available for use with motors with side ports (N1 or Q1).

► Dimensions

| Series | Motor models    | X<br>(mm) | Y<br>(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       |

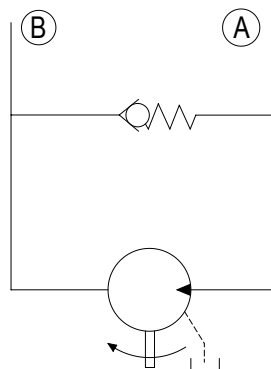


► Schematic drawing of flushing valve

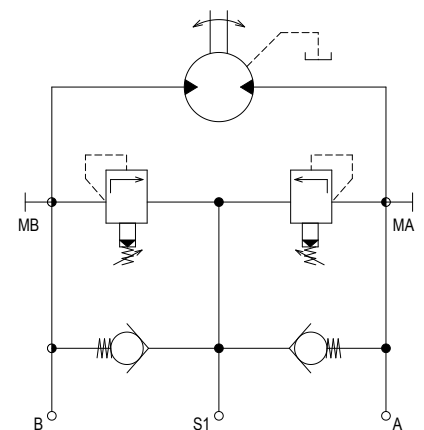


Examples of other valves on request (please consult us):

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

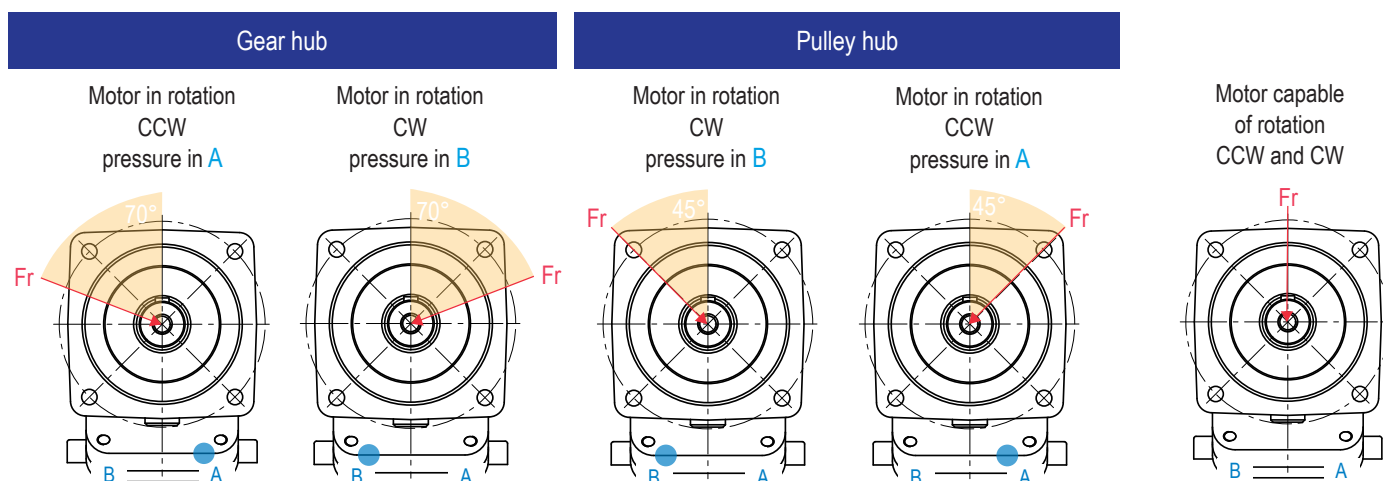
If you have different requirements, please contact us.

**Important note:** ATEX certification does not apply to motors fitted with speed sensor, nor to the “drainless” motors.



### ► Maximizing service life of bearings

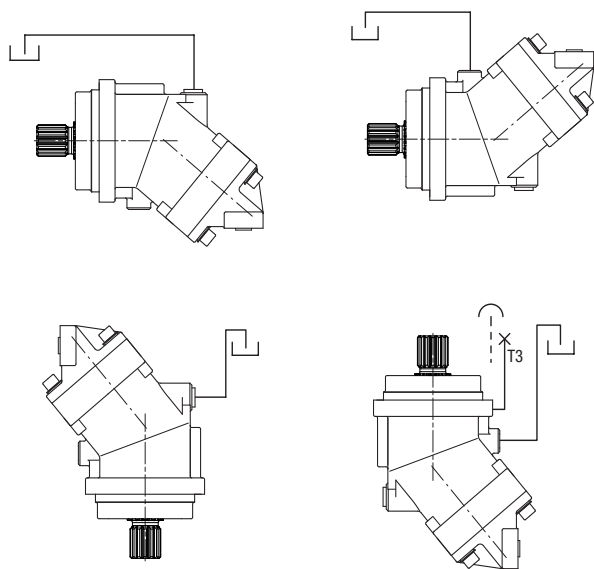
In cases where there is a radial force on motor shaft, keeping the direction of that force within the shaded areas shown below will improve service life of the motor.



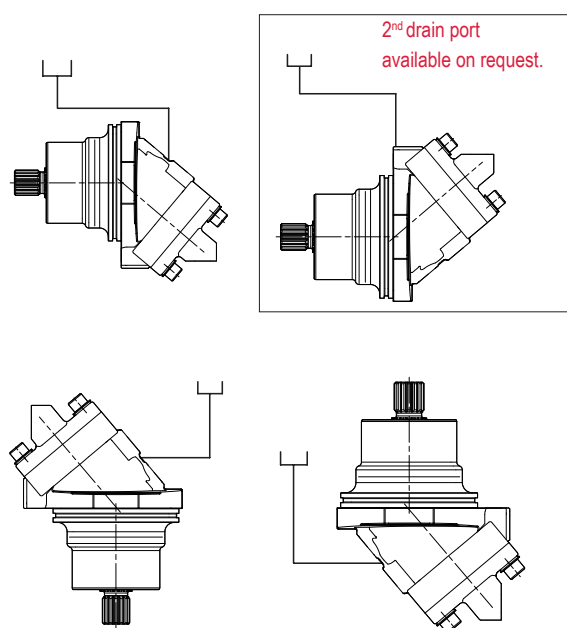
### ► Mounting position of motors

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

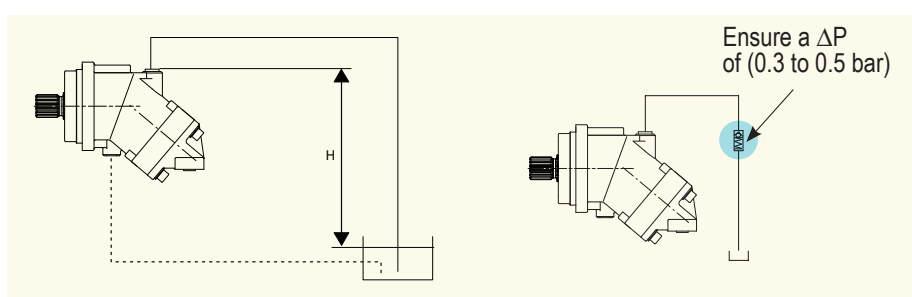


MSI



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

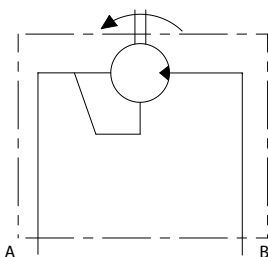
#### No drainline needed

- ▶ 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.

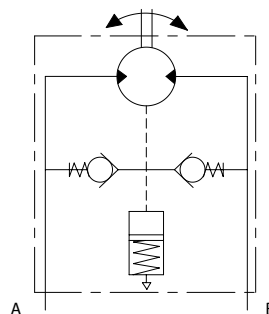
### CHARACTERISTICS

- 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



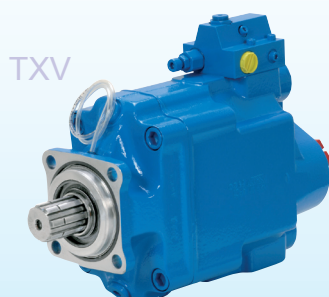
For **bi-directional** applications, the motor is fitted with an accumulator integrated in the back piece, to compensate possible pressure peaks in the housing (for example from rapid change in direction).

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



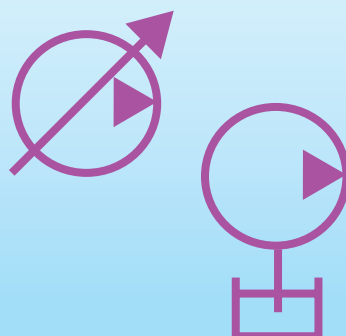
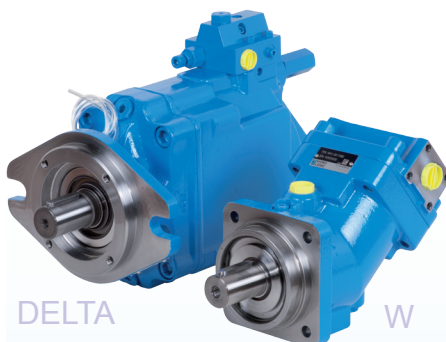
## MOBILE & INDUSTRIAL PUMPS

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

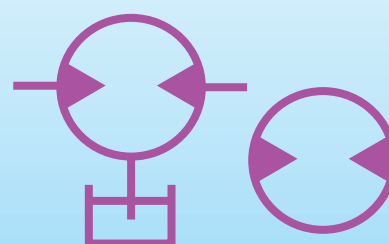
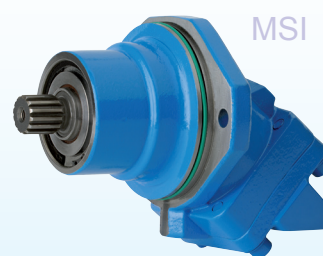
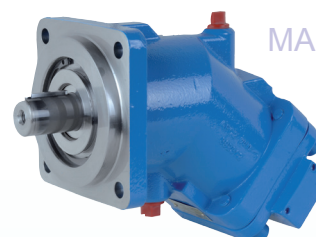
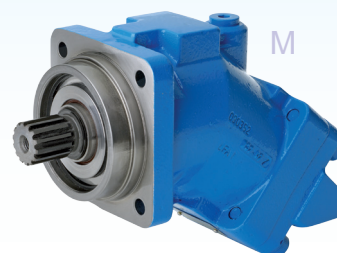
\* For SAE version, please ask.



## HYDRAULIC MOTORS

Fixed displacement piston motors.

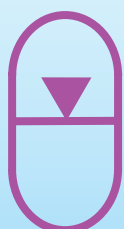
- Models from 5 to 180 cc/rev.
- Available in ISO, SAE and semi-integrated versions.



## 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](http://www.hydroleduc.com)



A passion for hydraulics



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