

# A3FO (ISO2) Bent Axis Pumps

## ISO2 Mounting Flange High Pressure Bent Axis Pump

High Pressure Hydraulic Bent Axis Piston Pumps, High Pressure, 400/450 BAR Working Pressure. High Rotational Speed, High Efficiency, Slim Design, Cast Iron Pump Body, Re-Designed.

### Designation;

5cc, 10cc, 12cc, 18cc, 25cc, 32cc, 41cc, 50cc,  
56cc, 63cc,

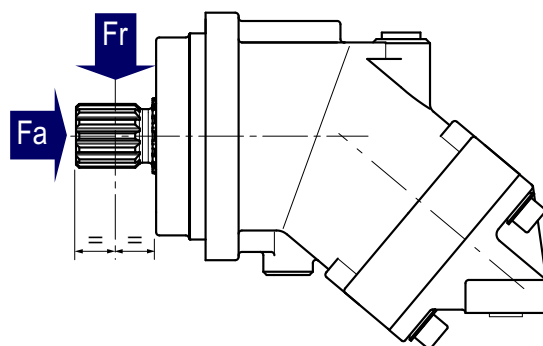


Hidrapac **Store**

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## Characteristics of the A3FO - ISO2 Flange Bent Axis Pumps

| Pump MODEL | DISPL. (cc) | CONTINUOUS MAX. SPEED (rpm) | INTERMITTENT MAX. SPEED (rpm) | MAX. FLOW ABSORBED (l/mn) | TORQUE BAR (m.N/bar) | TORQUE AT 350 BAR (m.N) | THEORETCL MAX. POWER AT 400 BAR (HP / kW) | MAX. ALLOW PRESSURE CONTN./PEAK (bar) | WEIGHT (kg) |
|------------|-------------|-----------------------------|-------------------------------|---------------------------|----------------------|-------------------------|-------------------------------------------|---------------------------------------|-------------|
| 5 cc       | 5.1         | 8800                        | 9600                          | 45                        | 0.09                 | 46                      | 64.1 / 48.2                               | 400 / 450                             | 5.2         |
| 10 cc      | 10.2        | 8600                        | 9400                          | 88                        | 0.14                 | 58                      | 72.9 / 54.4                               | 400 / 450                             | 5.5         |
| 12 cc      | 12.0        | 8000                        | 8800                          | 96                        | 0.19                 | 67                      | 85.5 / 64.4                               | 400 / 450                             | 5.5         |
| 18 cc      | 18.0        | 8000                        | 8800                          | 144                       | 0.28                 | 99                      | 128.5 / 95.9                              | 400 / 450                             | 5.5         |
| 25 cc      | 25.0        | 6300                        | 6900                          | 158                       | 0.40                 | 139                     | 140.0 / 104.4                             | 400 / 450                             | 11.4        |
| 32 cc      | 32.0        | 6300                        | 6900                          | 202                       | 0.50                 | 178                     | 180.5 / 134.4                             | 400 / 450                             | 11.5        |
| 41 cc      | 41.0        | 5600                        | 6200                          | 230                       | 0.65                 | 228                     | 205.2 / 153.1                             | 400 / 450                             | 11.6        |
| 45 cc      | 45.0        | 5600                        | 6200                          | 252                       | 0.72                 | 253                     | 202.4 / 151.8                             | 400 / 450                             | 17.9        |
| 50 cc      | 50,3        | 5000                        | 5500                          | 252                       | 0.80                 | 280                     | 224.1 / 167.5                             | 400 / 450                             | 18.1        |
| 56 cc      | 56,0        | 5000                        | 5500                          | 280                       | 0.90                 | 320                     | 244.5 / 187.1                             | 400 / 450                             | 18.1        |
| 63 cc      | 63.0        | 5000                        | 5500                          | 315                       | 1.00                 | 351                     | 281.6 / 209.1                             | 400 / 450                             | 18.2        |



| Pump model  | 5, 10, 12 | 18 cc | 25 cc | 32 cc  | 41. 45 | 50 cc | 56, 63cc |
|-------------|-----------|-------|-------|--------|--------|-------|----------|
| Fr ( lbf )  | 630       | 900   | 1350  | 1462.5 | 1462.5 | 1686  | 2023     |
| Fr ( N/bar) | 2800      | 4000  | 6000  | 6500   | 6500   | 7500  | 9000     |
| Fa ( lbf )  | 0.23      | 0.31  | 0.42  | 0.46   | 0.62   | 0.62  | 0.77     |
| Fa ( N/bar) | (15)      | (20)  | (27)  | (30)   | (40)   | (40)  | (50)     |

Ordering Code; A3FO - ISO2 Flange Bent Axis Pumps

Model Code

A3FO

Bent Axis Hydraulic Piston Pump  
(ISO2) Mounting Flange

Displacement

63

5 10 12 18 25 32 41 45 50 56 63

Flange Type  
4 bolts ISO2 3019-2

4B

4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B

Shaft Type  
Keyed or Splined

S14

S18 S18 S18 S18 S18 S18 S18 S16 S16 S16 S16  
K25 K25 K25 K25 S14 S14 S14 S14 S14 S14 S14  
K20 K20 K20 K20 K25 K25 K25 K30 K30 K30 K30  
K30 K30 K30 K35 K35 K35 K35

Rear Cover  
Type

RD1

RS1 RS1 RS1 RS1 RD1 RD1 RD1 RD1 RD1 RD1 RD1  
RS2 RS2 RS2 RS2 RD2 RD2 RD2 RD2 RD2 RD2 RD2  
SD2 SD2 SD2 SD2 SD2 SD2 SD2

Direction of Rotation

W

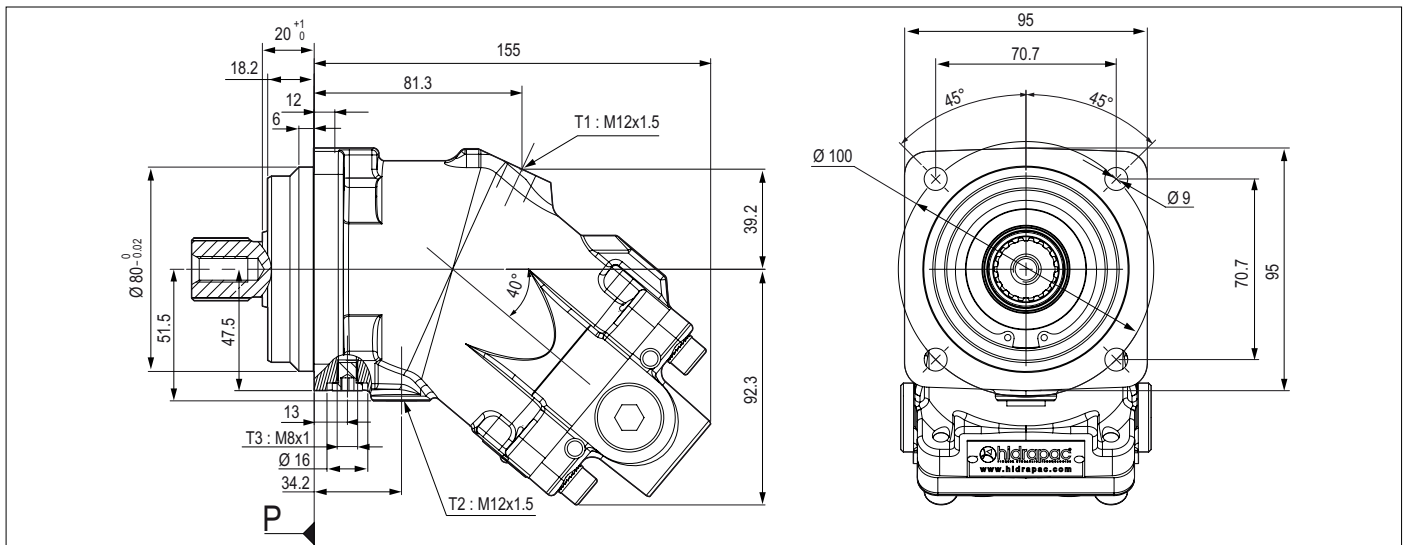
W Bi-Directional Rotation - New Design

Seal Options

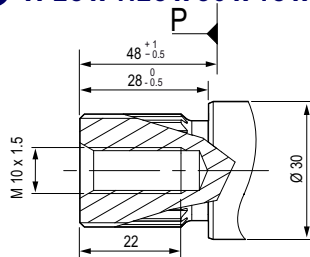
V

V Viton Seals N Nitrile Seals H High Pressure Seals

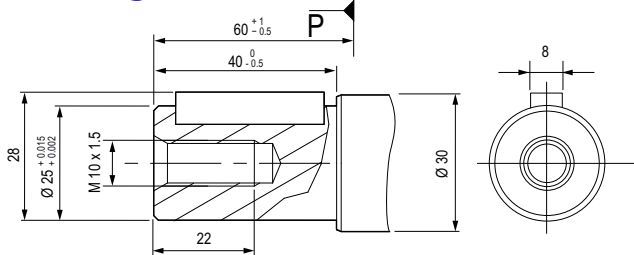
# A3FO - 5 cc (ISO2) Bent Axis Pump



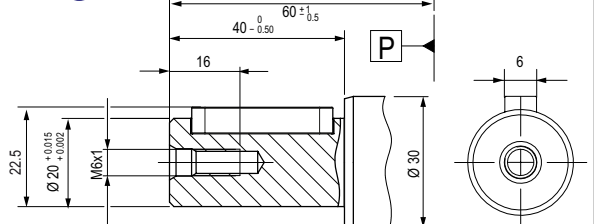
## S18 Splined shaft DIN 5480 W 25 x 1.25 x 30 x 18 x 9 g



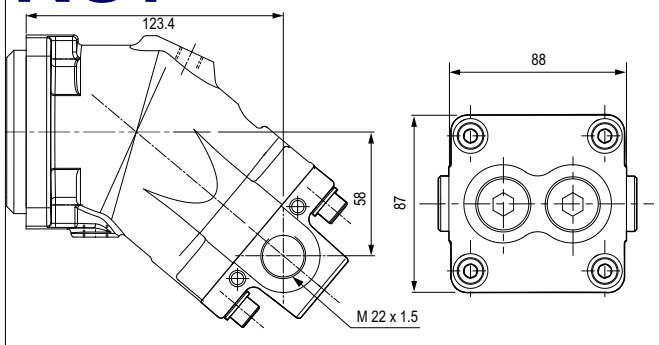
## K25 Cylindrical keyed shaft Ø 25 DIN 6885 AS 8 x 7 x 32



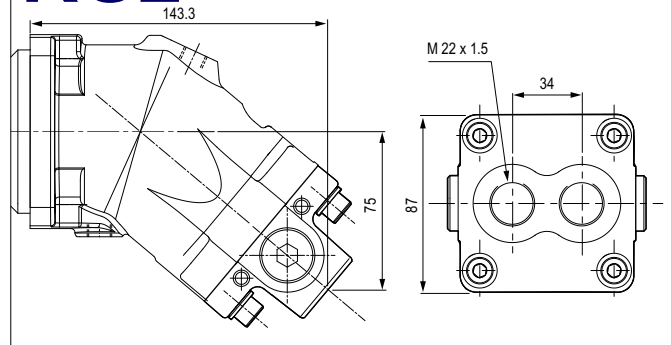
## K20 Cylindrical keyed shaft Ø 20 DIN 6885 AS 6 x 6 x 32



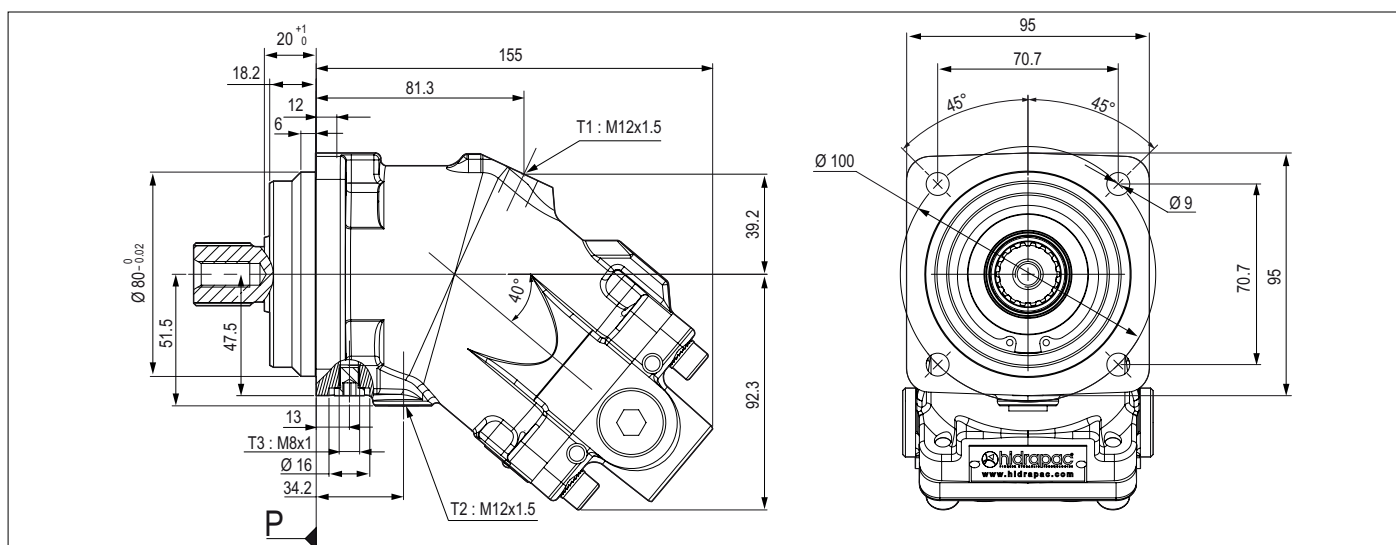
## RS1 Side threaded ports A and B



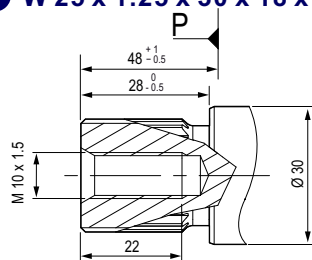
## RS2 Rear threaded ports A and B



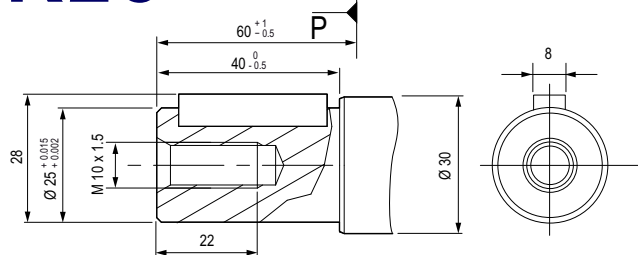
# A3FO - 10 cc (ISO2) Bent Axis Pump



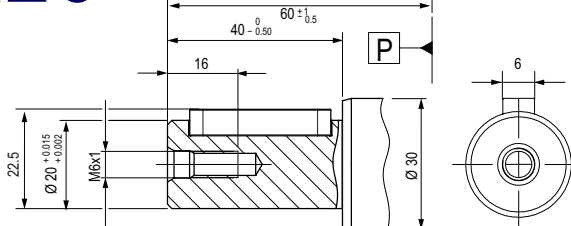
## S18 Splined shaft DIN 5480 W 25 x 1.25 x 30 x 18 x 9 g



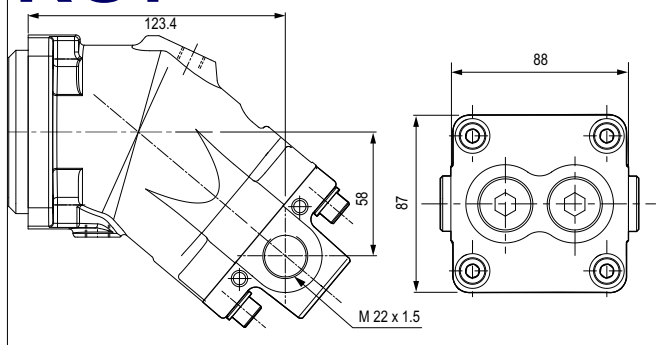
## K25 Cylindrical keyed shaft Ø 25 DIN 6885 AS 8 x 7 x 32



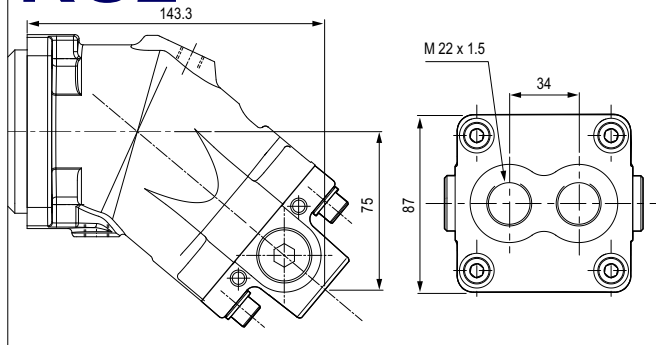
## K20 Cylindrical keyed shaft Ø 20 DIN 6885 AS 6 x 6 x 32



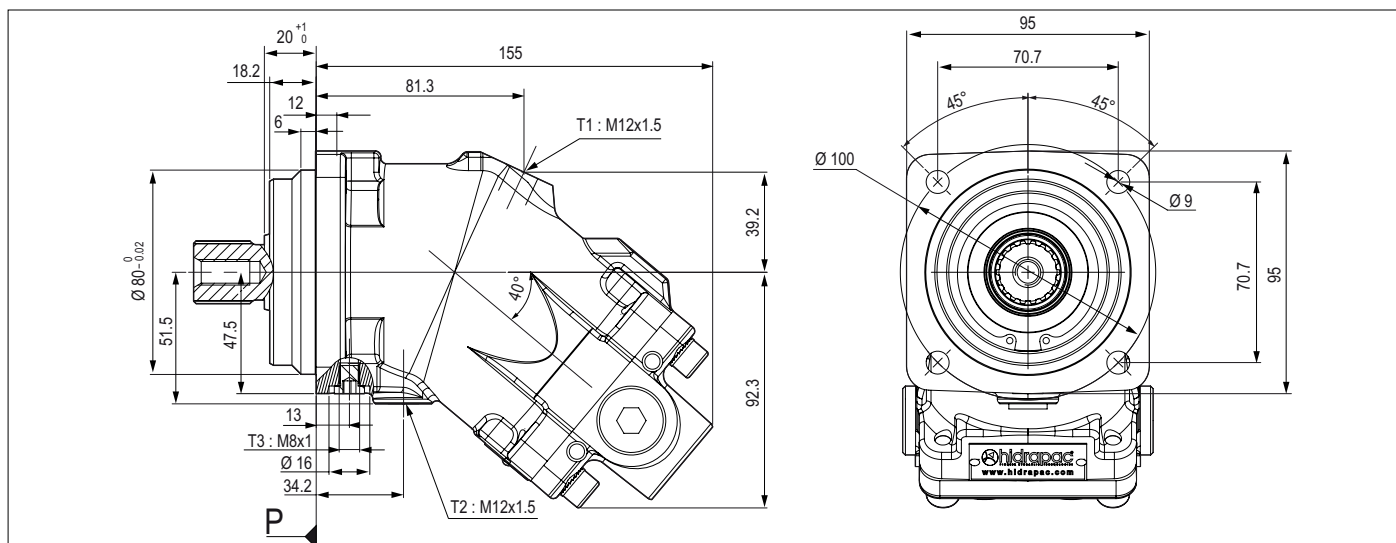
## RS1 Side threaded ports A and B



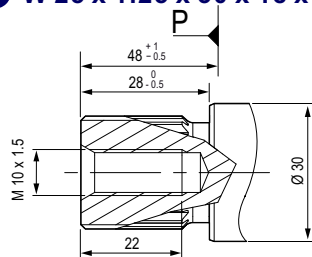
## RS2 Rear threaded ports A and B



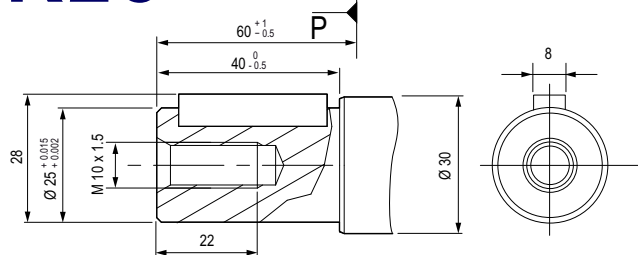
# A3FO - 12 cc (ISO2) Bent Axis Pump



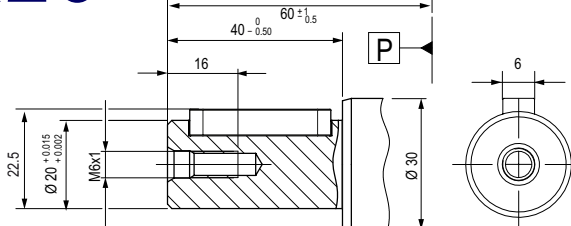
## S18 Splined shaft DIN 5480 W 25 x 1.25 x 30 x 18 x 9 g



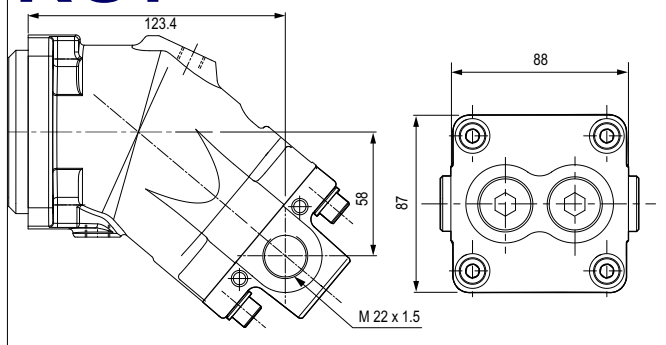
## K25 Cylindrical keyed shaft Ø 25 DIN 6885 AS 8 x 7 x 32



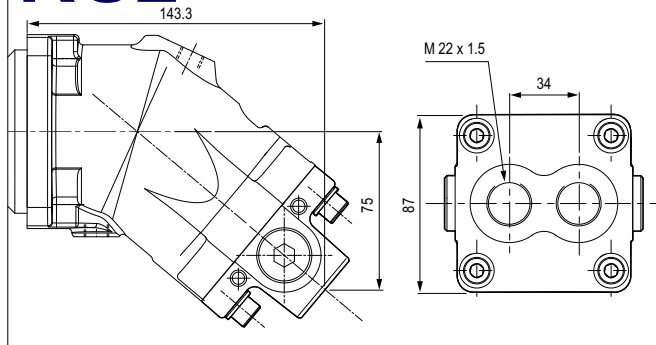
## K20 Cylindrical keyed shaft Ø 20 DIN 6885 AS 6 x 6 x 32



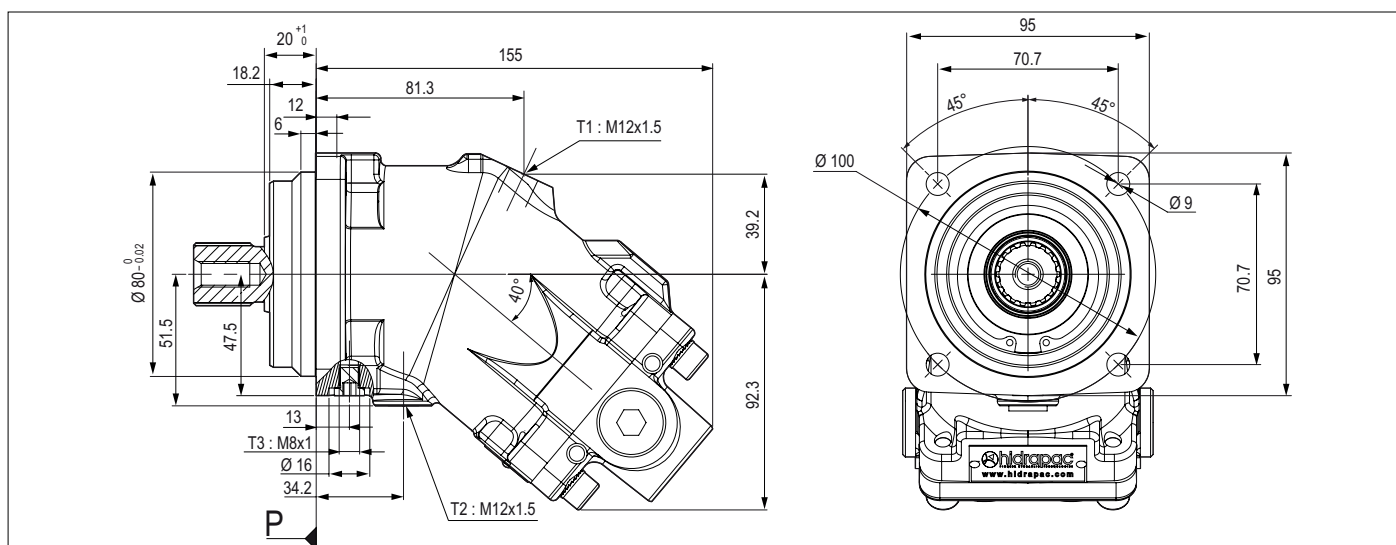
## RS1 Side threaded ports A and B



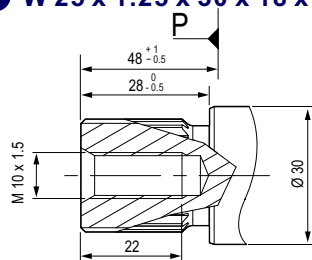
## RS2 Rear threaded ports A and B



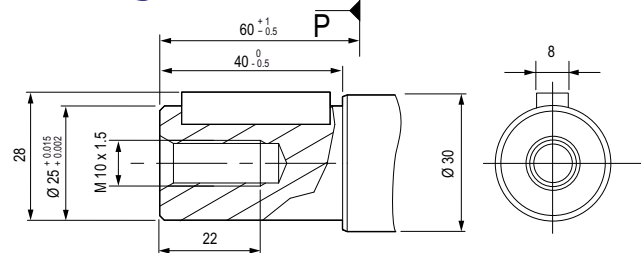
# A3FO - 18 cc (ISO2) Bent Axis Pump



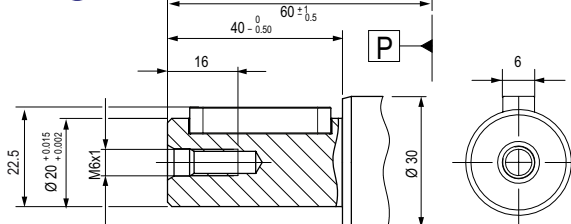
## S18 Splined shaft DIN 5480 W 25 x 1.25 x 30 x 18 x 9 g



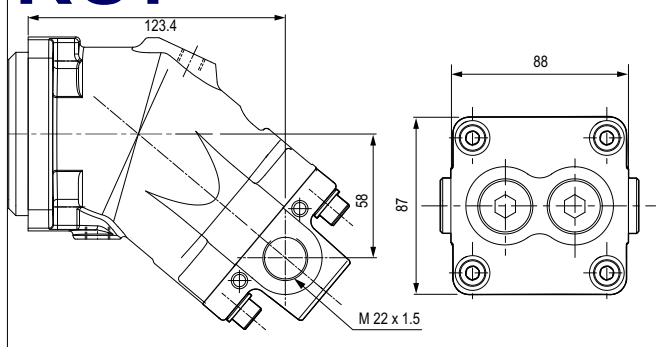
## K25 Cylindrical keyed shaft Ø 25 DIN 6885 AS 8 x 7 x 32



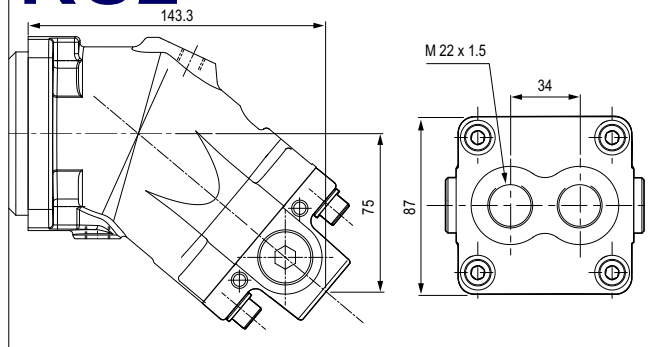
## K20 Cylindrical keyed shaft Ø 20 DIN 6885 AS 6 x 6 x 32



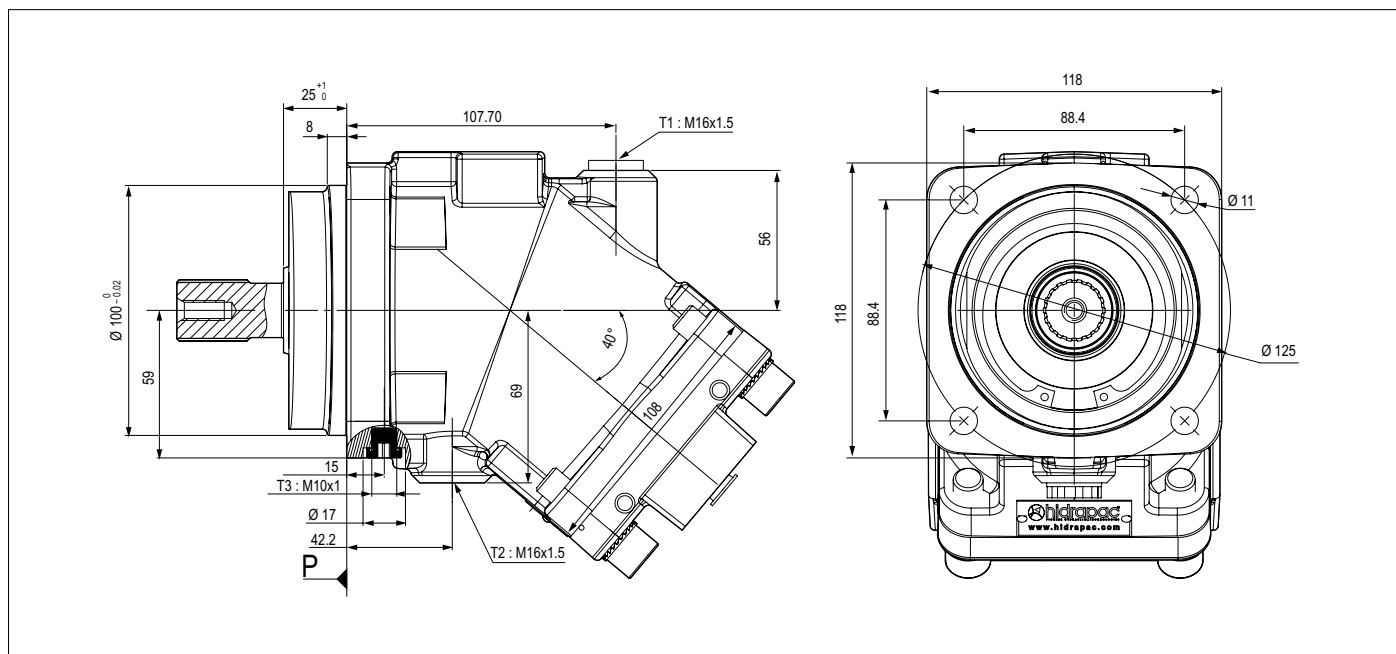
## RS1 Side threaded ports A and B



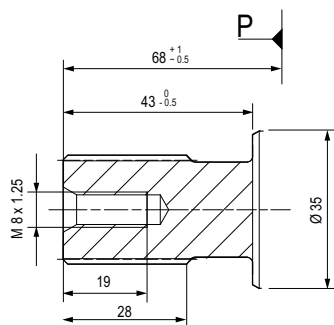
## RS2 Rear threaded ports A and B



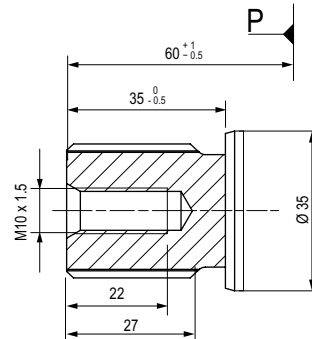
# A3FO - 25 cc (ISO2) Bent Axis Pump



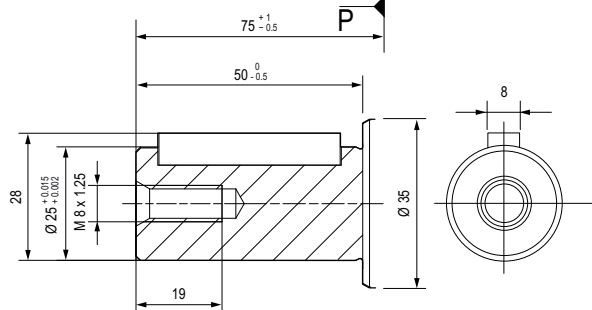
## S18 Splined shaft DIN 5480 W 25 x 1.25 x 30 x 18 x 9 g



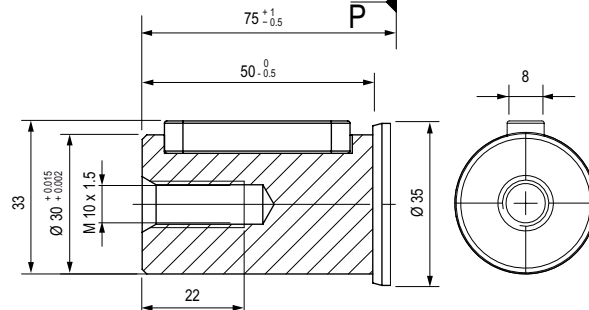
## S14 Splined shaft DIN 5480 W 30 x 2 x 30 x 14 x 9 g



## K25 Cylindrical keyed shaft Ø 25 DIN 6885 AS 8 x 7 x 40



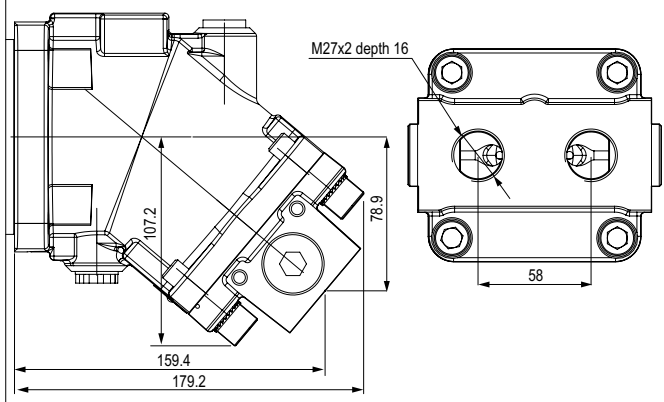
## K30 Cylindrical keyed shaft Ø 30 DIN 6885 AS 8 x 7 x 40



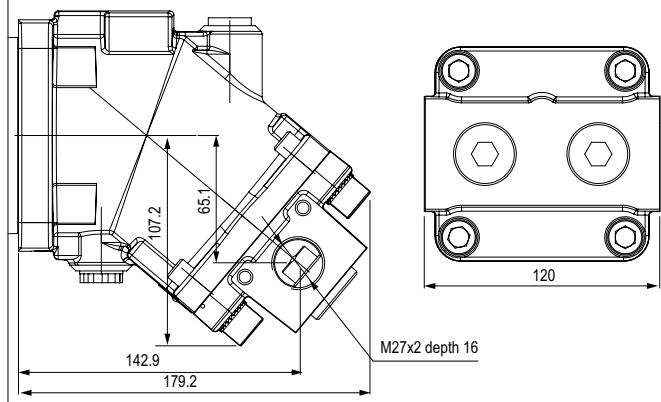
# A3FO - 25 cc (ISO2) Bent Axis Pump



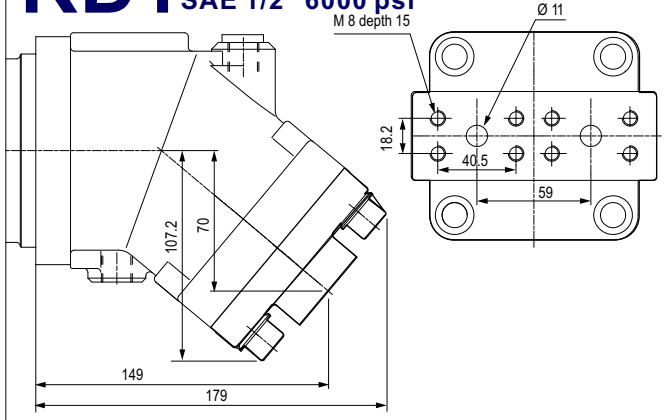
## RD2 Rear threaded ports A and B



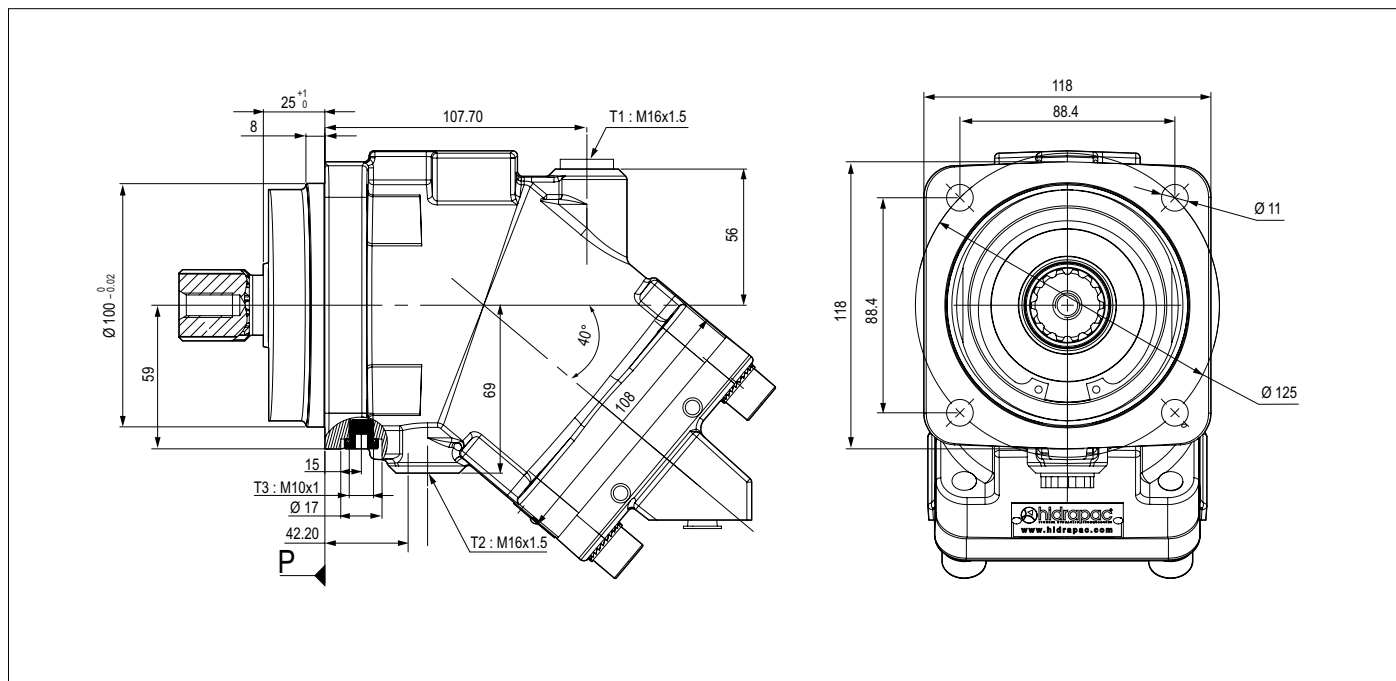
## SD2 Side threaded ports A and B



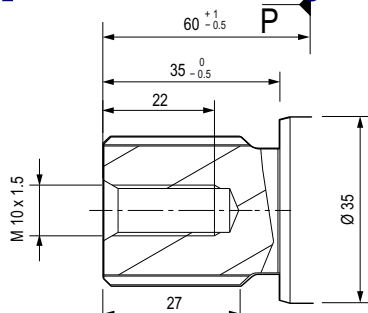
## RD1 Rear flange ports A and B SAE 1/2" 6000 psi



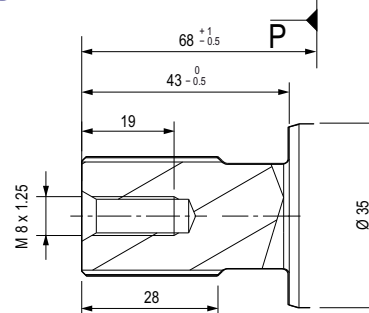
# A3FO - 32 cc (ISO2) Bent Axis Pump



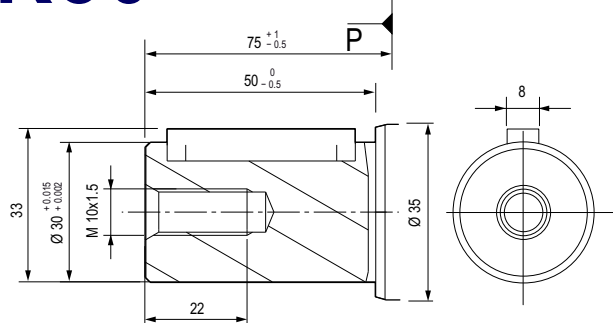
## S14 Splined shaft DIN 5480 W 30 x 2 x 30 x 14 x 9 g



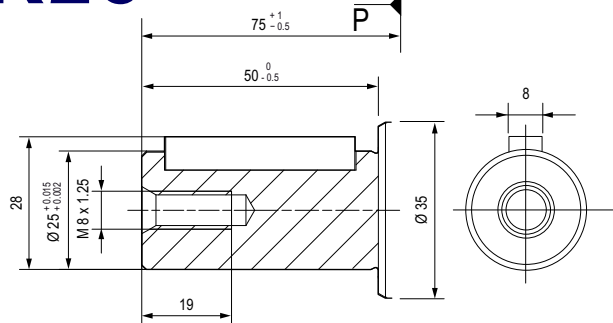
## S18 Splined shaft DIN 5480 W 25 x 1.25 x 30 x 18 x 9 g

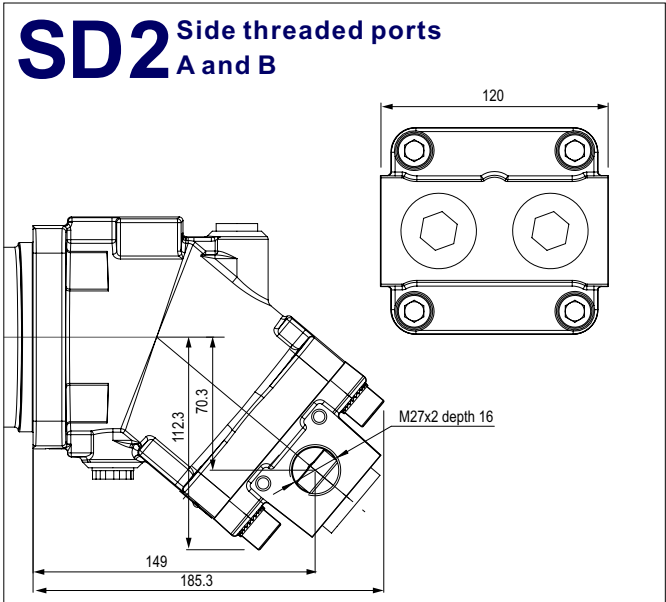
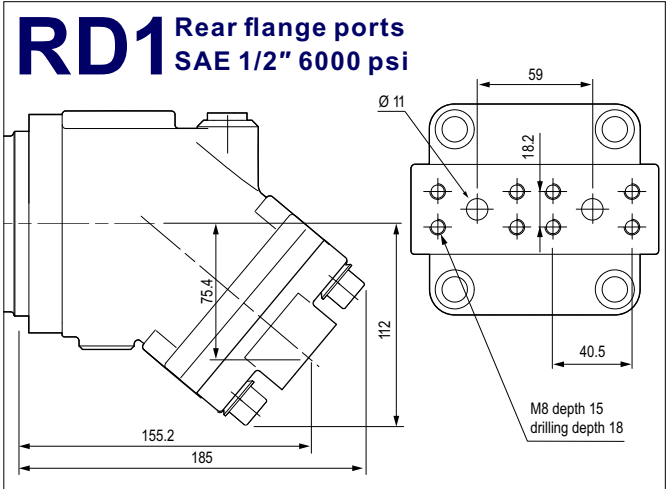
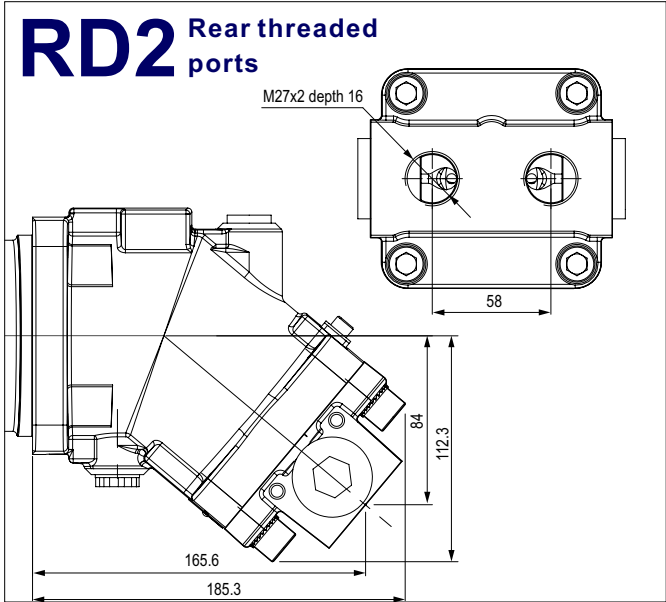


## K30 Cylindrical keyed shaft Ø 30 DIN 6885 AS 8 x 7 x 40

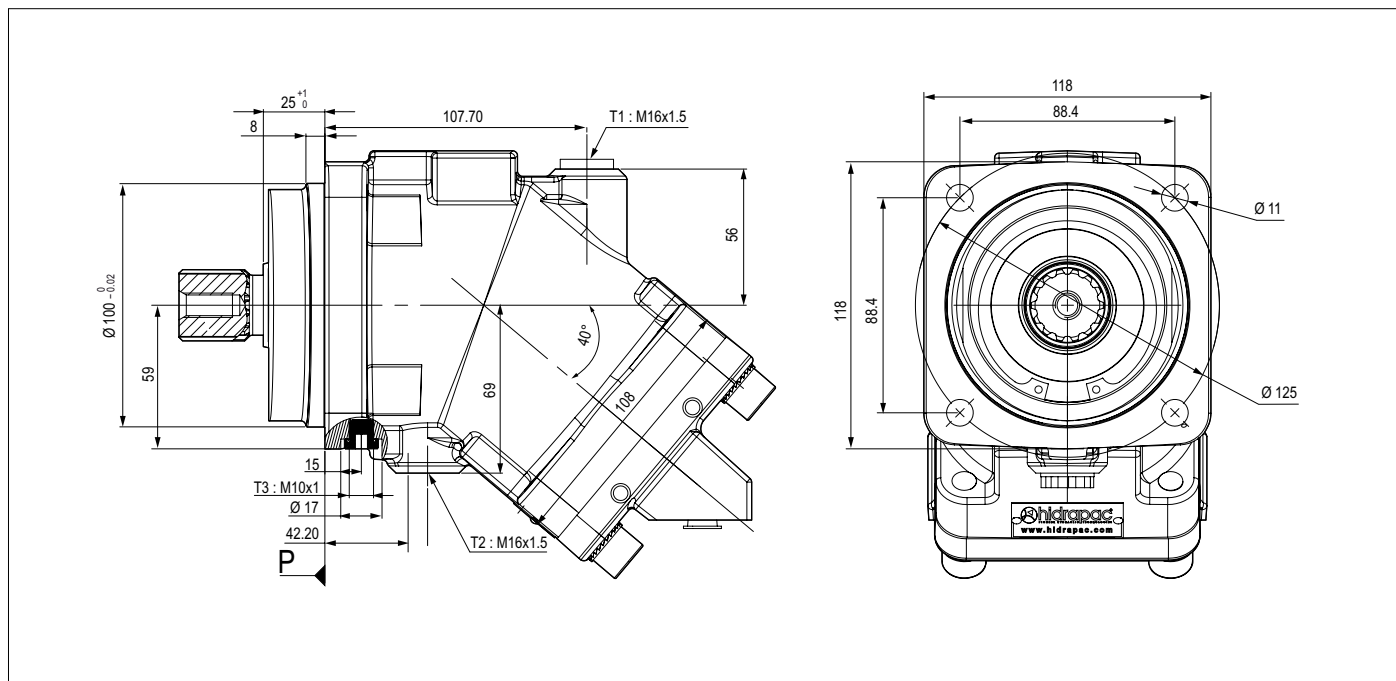


## K25 Cylindrical keyed shaft Ø 25 DIN 6885 AS 8 x 7 x 40

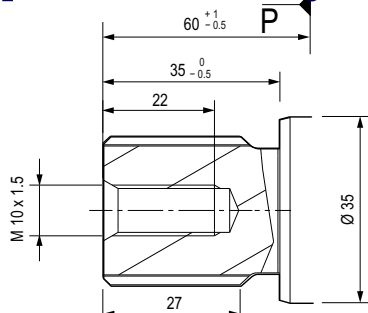




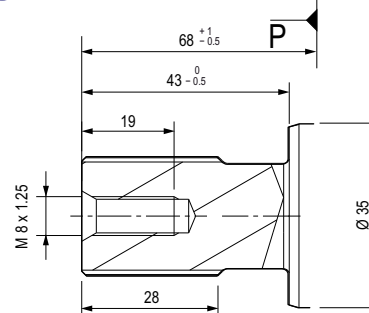
# A3FO - 41 cc (ISO2) Bent Axis Pump



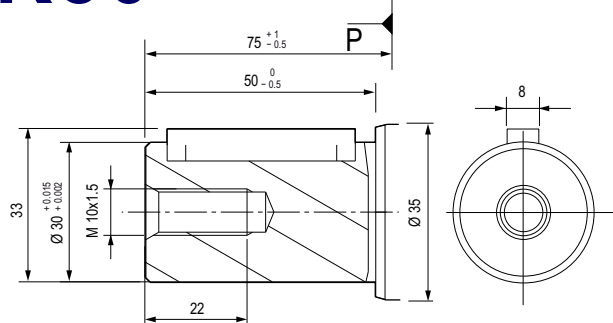
## S14 Splined shaft DIN 5480 W 30 x 2 x 30 x 14 x 9 g



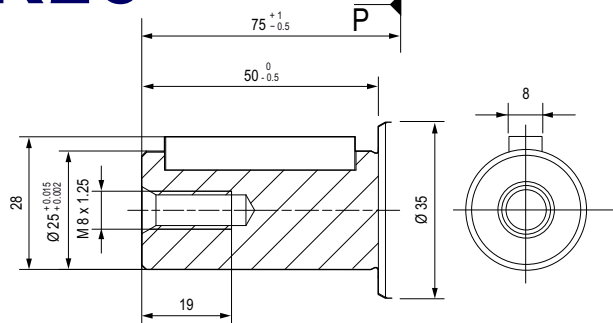
## S18 Splined shaft DIN 5480 W 25 x 1.25 x 30 x 18 x 9 g



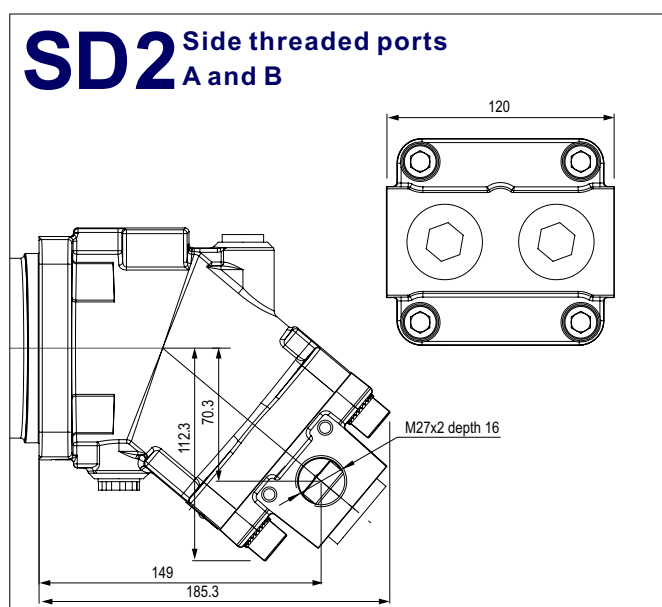
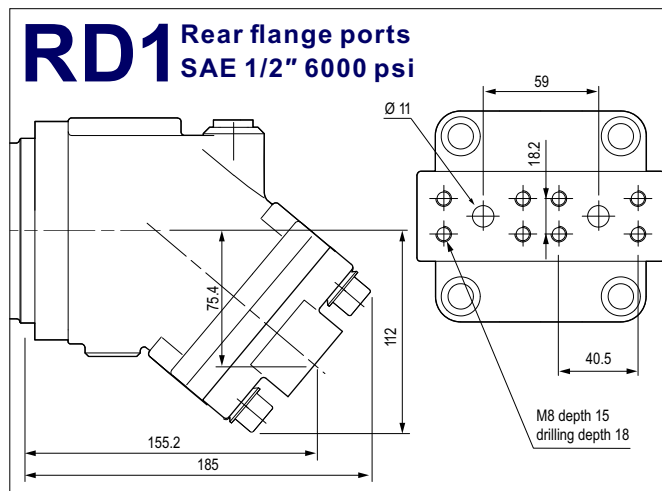
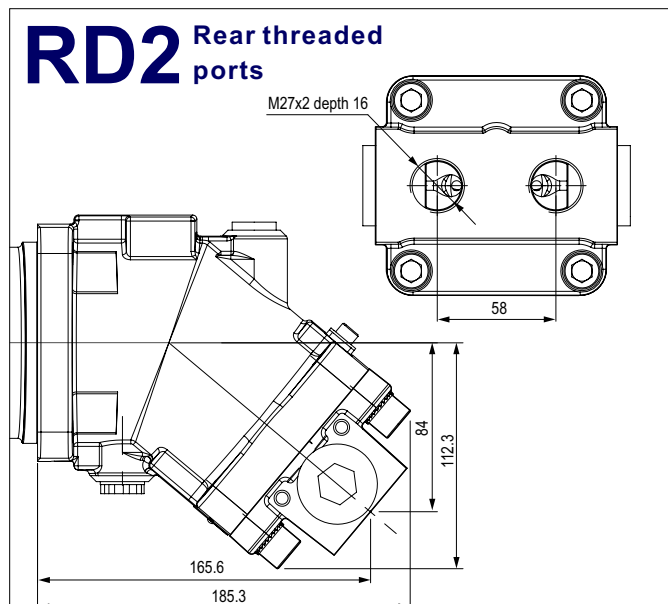
## K30 Cylindrical keyed shaft Ø 30 DIN 6885 AS 8 x 7 x 40



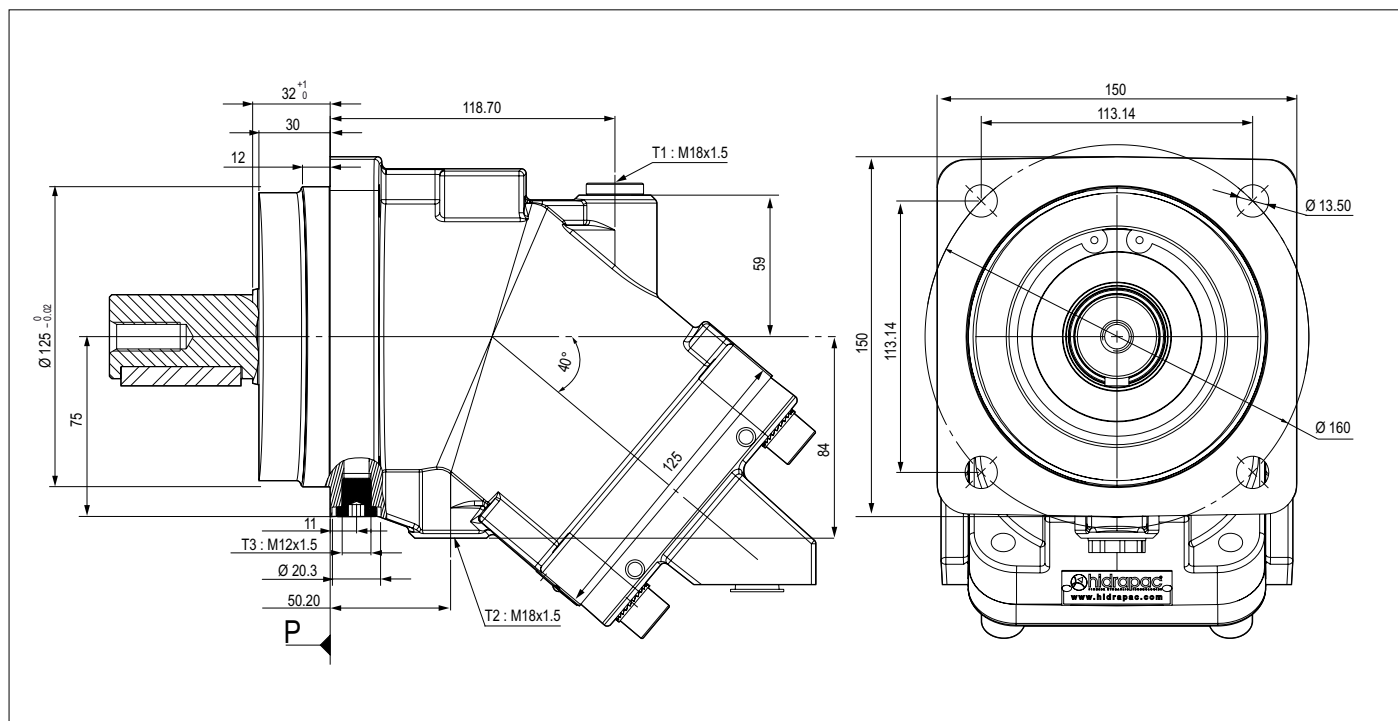
## K25 Cylindrical keyed shaft Ø 25 DIN 6885 AS 8 x 7 x 40



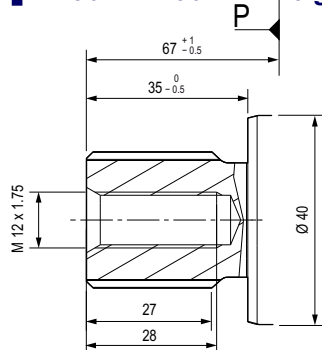
# A3FO - 41 cc (ISO2) Bent Axis Pump



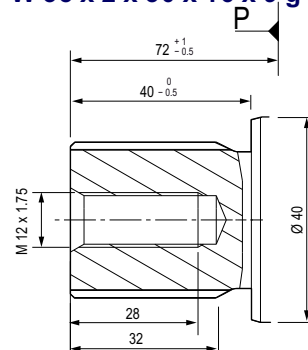
# A3FO - 45 cc (ISO2) Bent Axis Pump



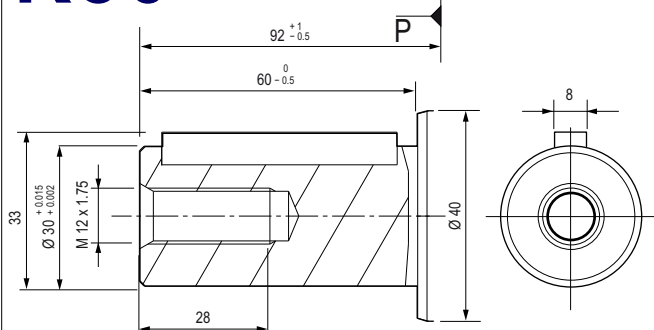
## S14 Splined shaft DIN 5480 W 30 x 2 x 30 x 14 x 9 g



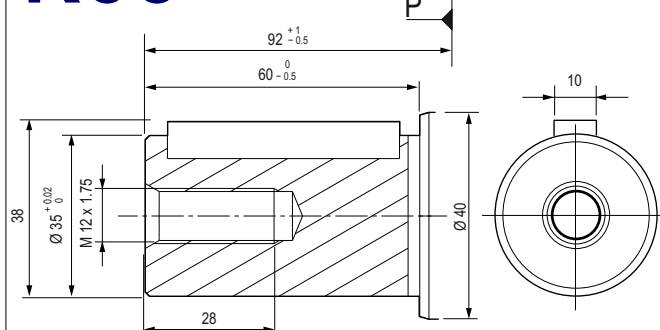
## S16 Splined shaft DIN 5480 W 35 x 2 x 30 x 16 x 9 g



## K30 Cylindrical keyed shaft $\varnothing 30$ DIN 6885 AS 8 x 7 x 40



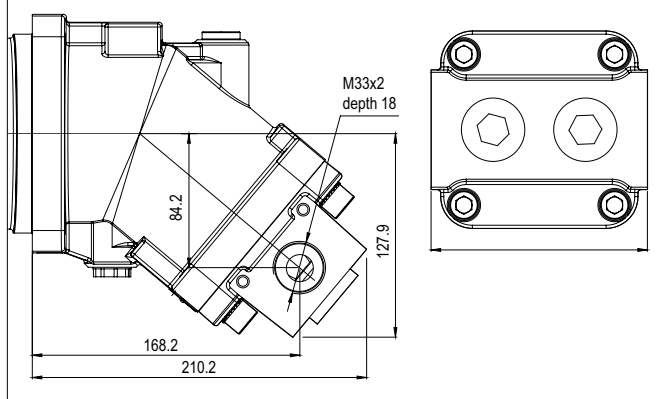
## K35 Cylindrical keyed shaft $\varnothing 35$ DIN 6885 AS 10 x 8 x 50



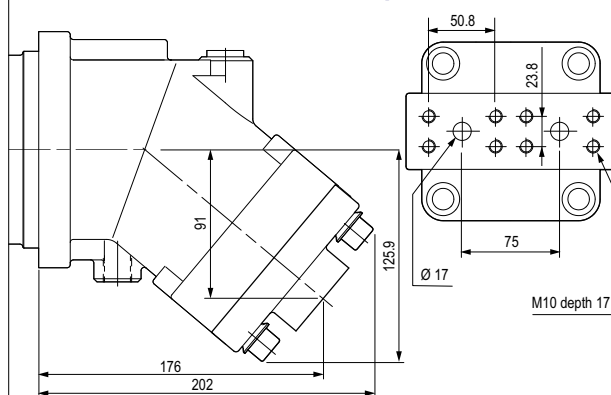
# A3FO - 45 cc (ISO2) Bent Axis Pump



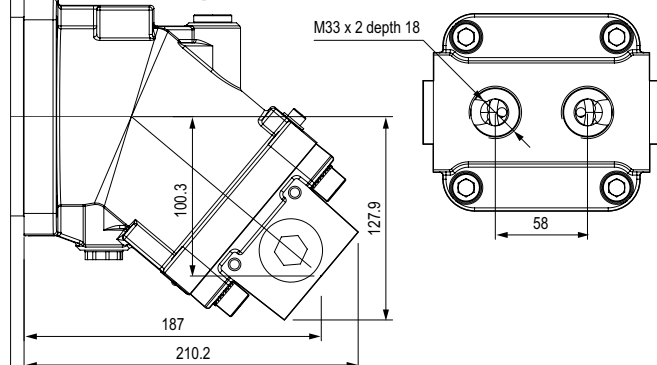
## SD2 Side threaded ports A and B



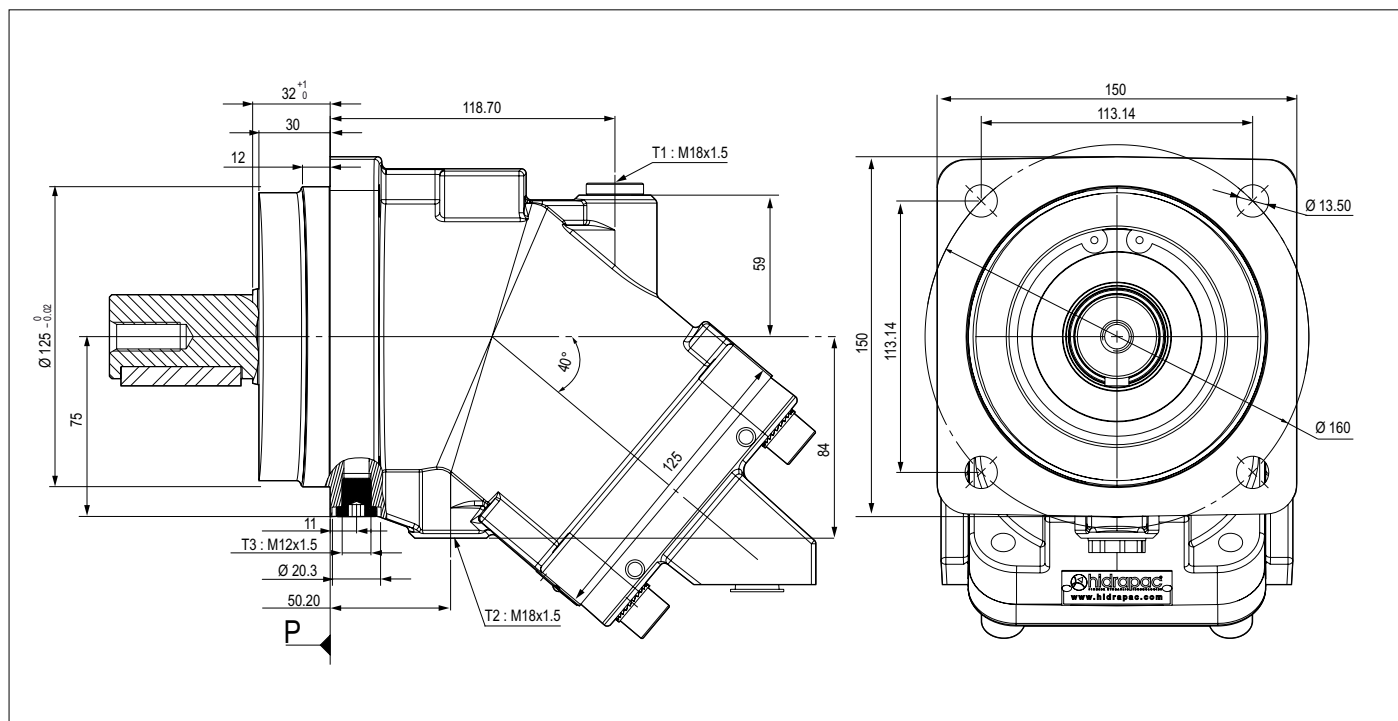
## RD1 SAE flange ports, rear SAE 3/4" 6000 psi



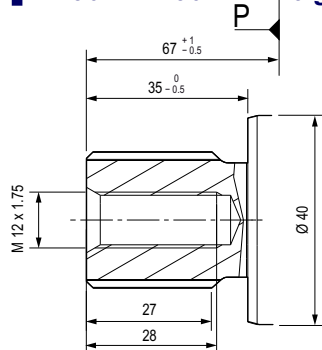
## RD2 Rear threaded ports



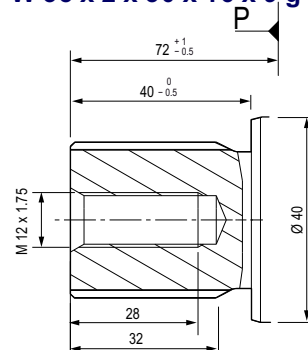
# A3FO - 50 cc (ISO2) Bent Axis Pump



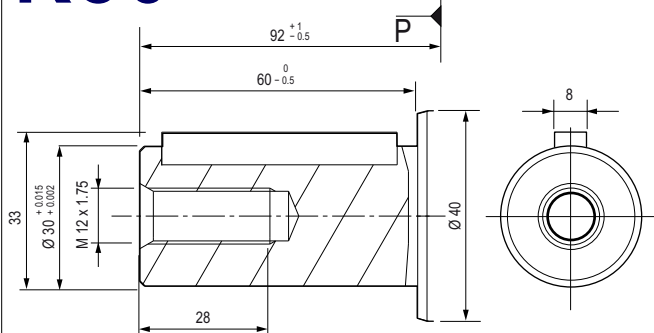
## S14 Splined shaft DIN 5480 W 30 x 2 x 30 x 14 x 9 g



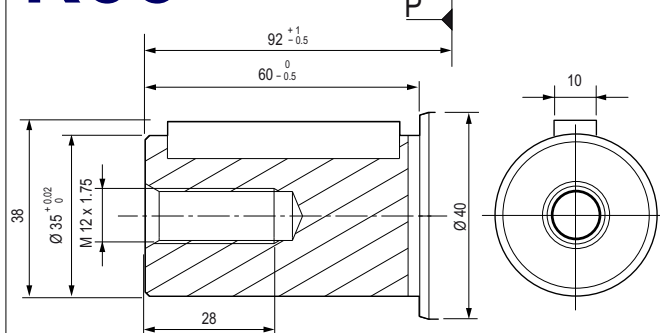
## S16 Splined shaft DIN 5480 W 35 x 2 x 30 x 16 x 9 g

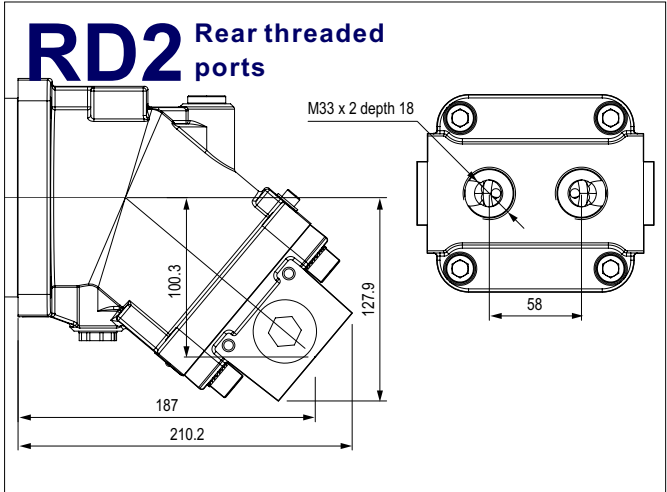
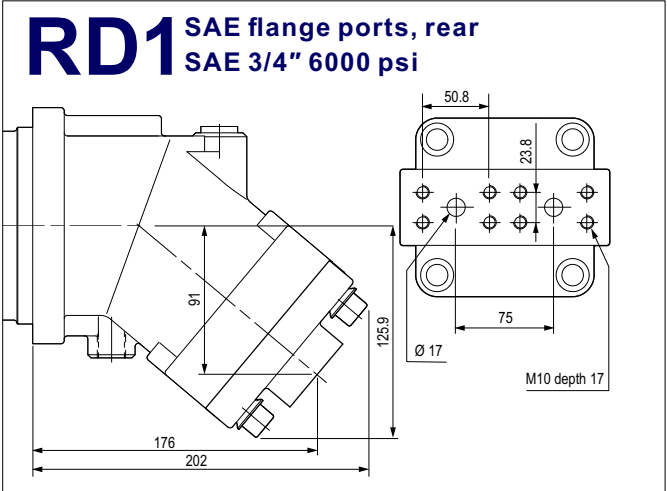
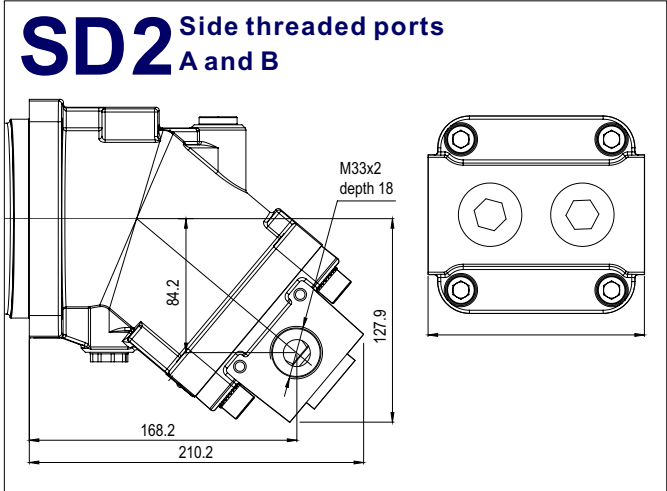


## K30 Cylindrical keyed shaft $\varnothing 30$ DIN 6885 AS 8 x 7 x 40

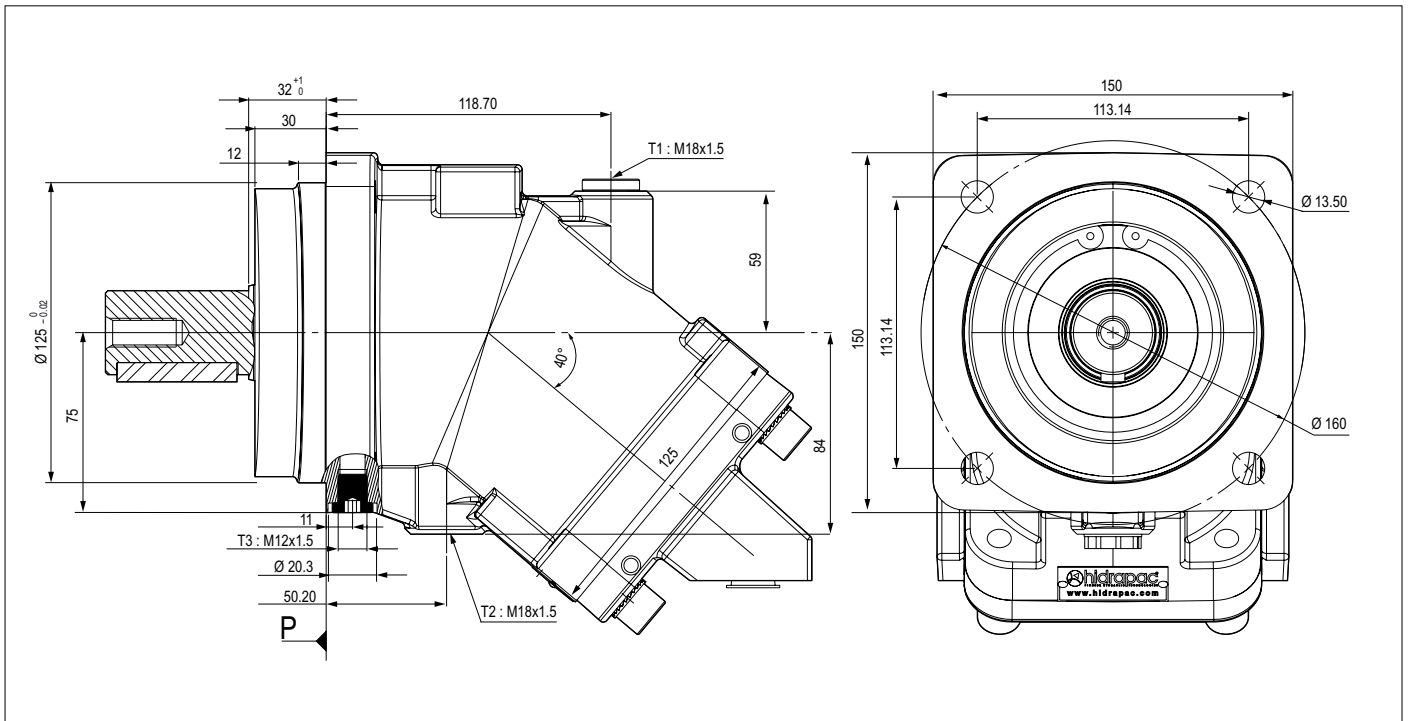


## K35 Cylindrical keyed shaft $\varnothing 35$ DIN 6885 AS 10 x 8 x 50

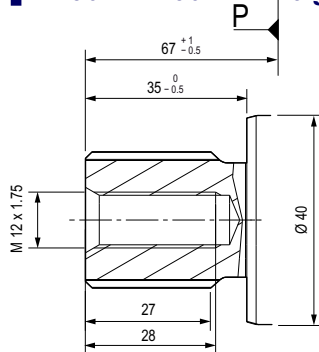




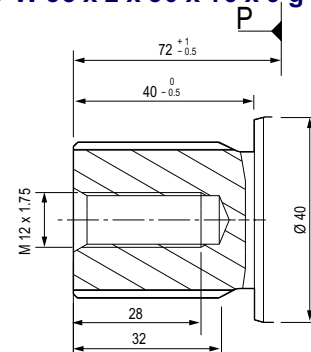
# A3FO - 56 cc (ISO2) Bent Axis Pump



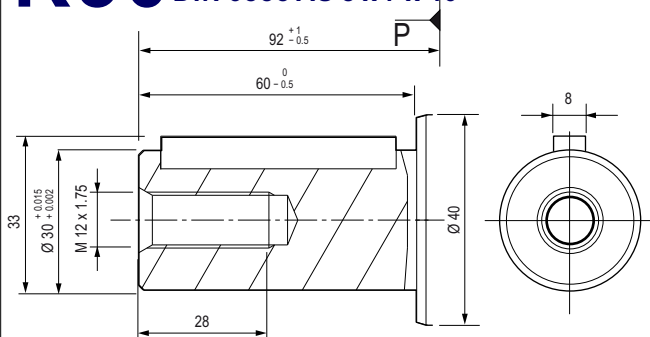
## S14 Splined shaft DIN 5480 W 30 x 2 x 30 x 14 x 9 g



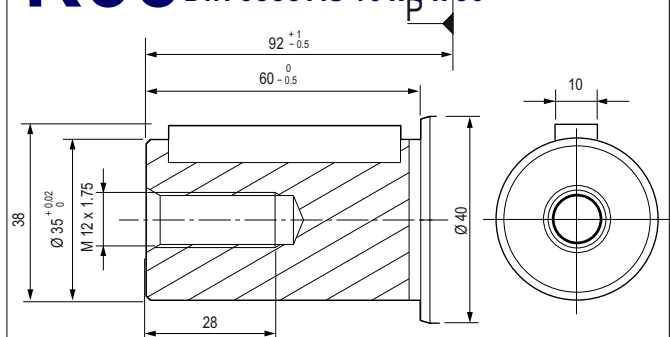
## S16 Splined shaft DIN 5480 W 35 x 2 x 30 x 16 x 9 g



## K30 Cylindrical keyed shaft $\varnothing 30$ DIN 6885 AS 8 x 7 x 40



## K35 Cylindrical keyed shaft $\varnothing 35$ DIN 6885 AS 10 x 8 x 50

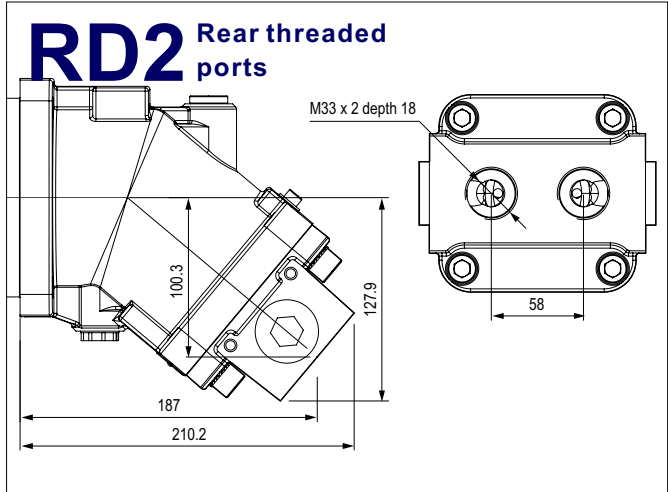
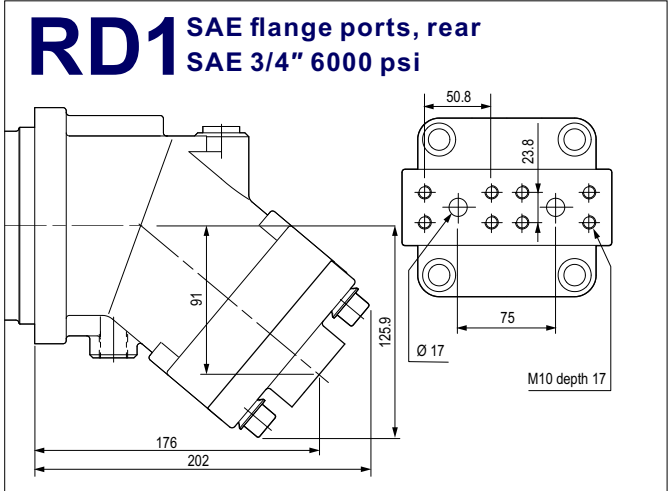
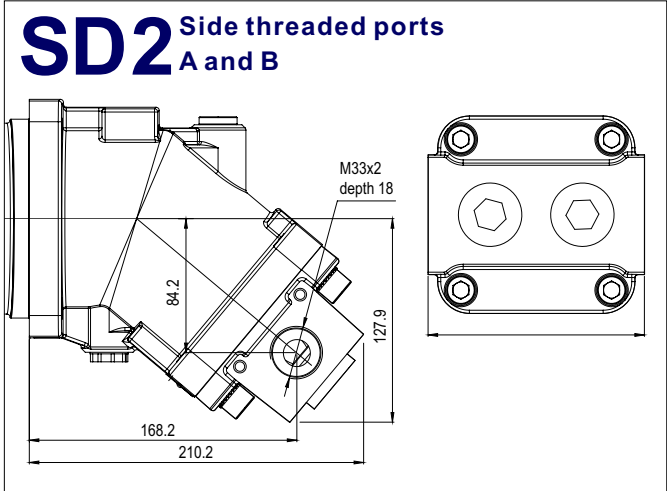


A3FO - 56 cc (ISO2) Bent Axis Pump

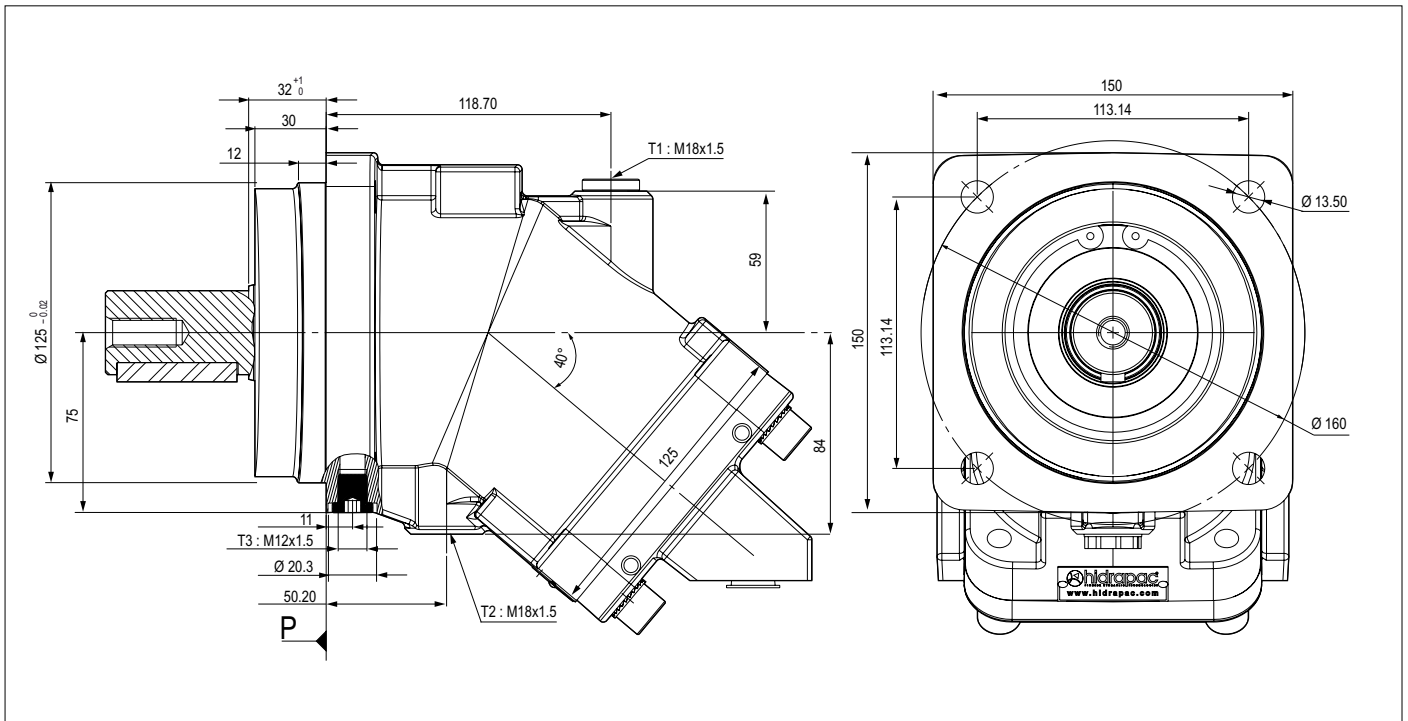


hidrapac

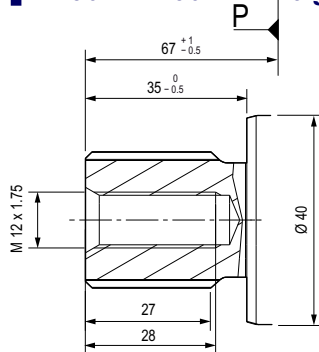
PIONEER HYDRAULIC TECHNOLOGIES



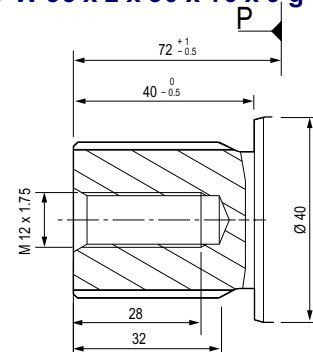
# A3FO - 63 cc (ISO2) Bent Axis Pump



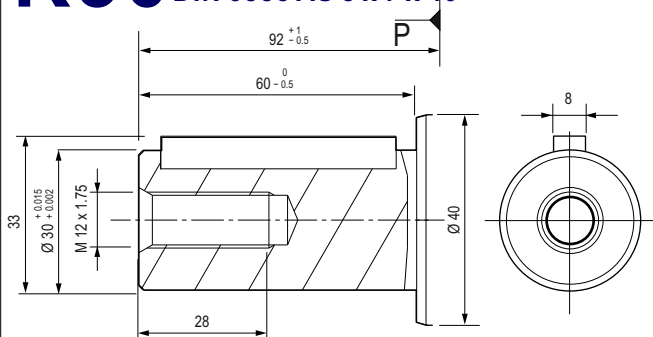
## S14 Splined shaft DIN 5480 W 30 x 2 x 30 x 14 x 9 g



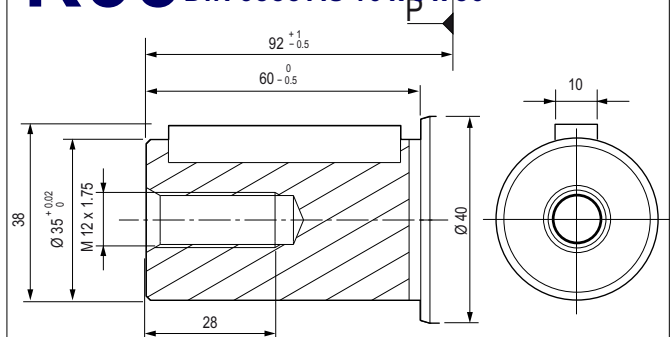
## S16 Splined shaft DIN 5480 W 35 x 2 x 30 x 16 x 9 g



## K30 Cylindrical keyed shaft $\varnothing 30$ DIN 6885 AS 8 x 7 x 40



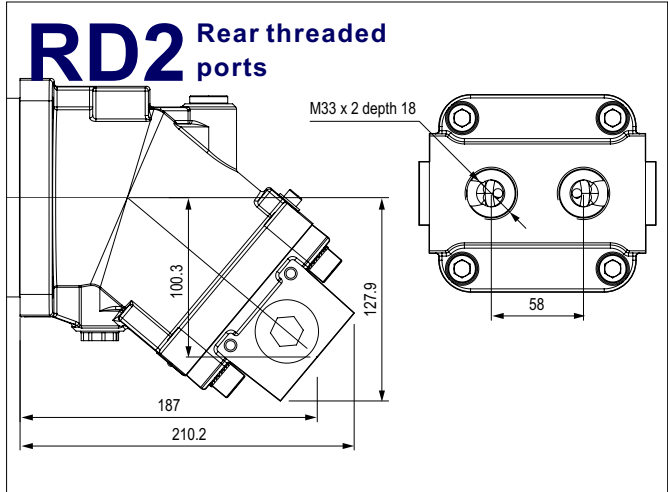
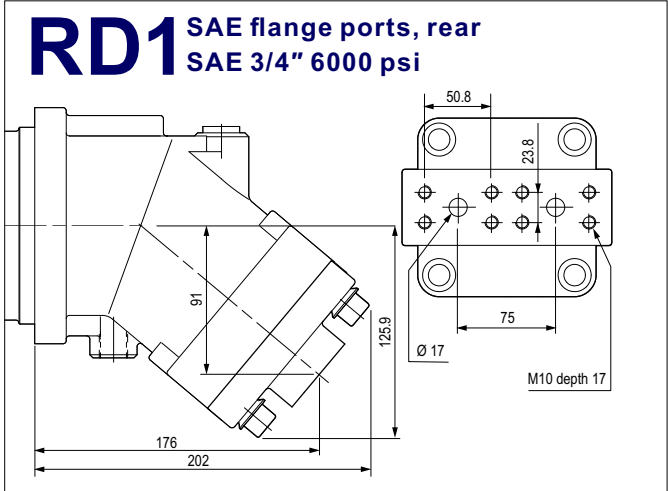
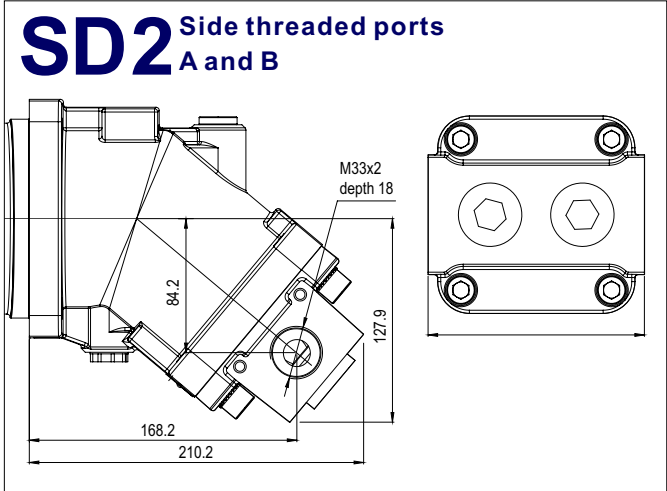
## K35 Cylindrical keyed shaft $\varnothing 35$ DIN 6885 AS 10 x 8 x 50



A3FO - 63 cc (ISO2) Bent Axis Pump



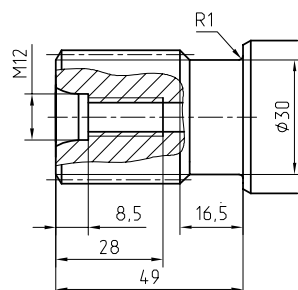
hidrapac®  
PIONEER HYDRAULIC TECHNOLOGIES



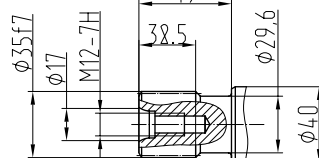
## Special Shaft Drive Options for A3FO Pumps

For the Special applications, we produce Special Shaft Drive for the A3FO Pumps.  
Details are listed in below.

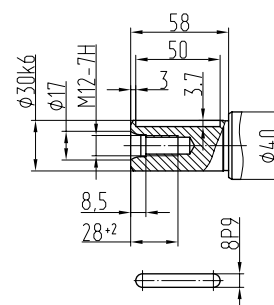
Splined shaft  
35xf7x2x9g GOST 6033-80



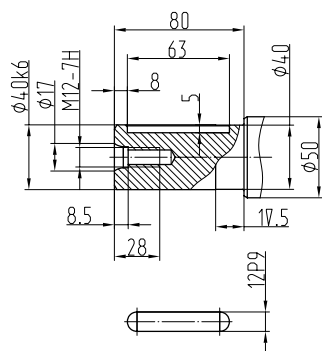
35xf7x2x9g ГОСТ6033



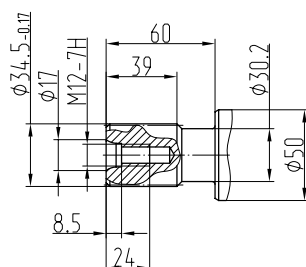
Parallel keyed shafts



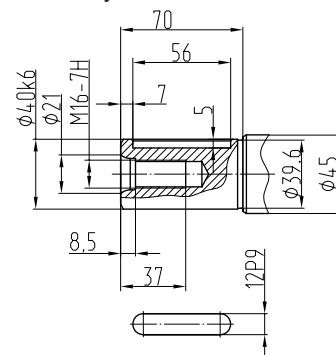
Parallel keyed shafts



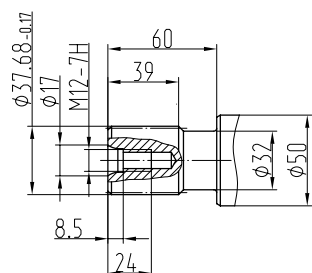
1 3/8' 21T 16/32DP ANSI B92



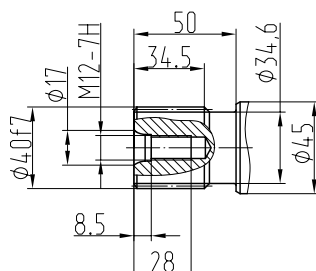
Parallel keyed shafts



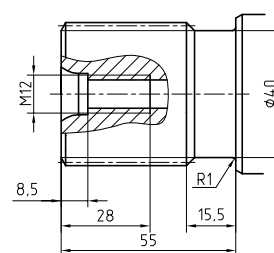
1 1/2' 23T 16/32DP ANSI B92



40xf7x2x9g GOST6033

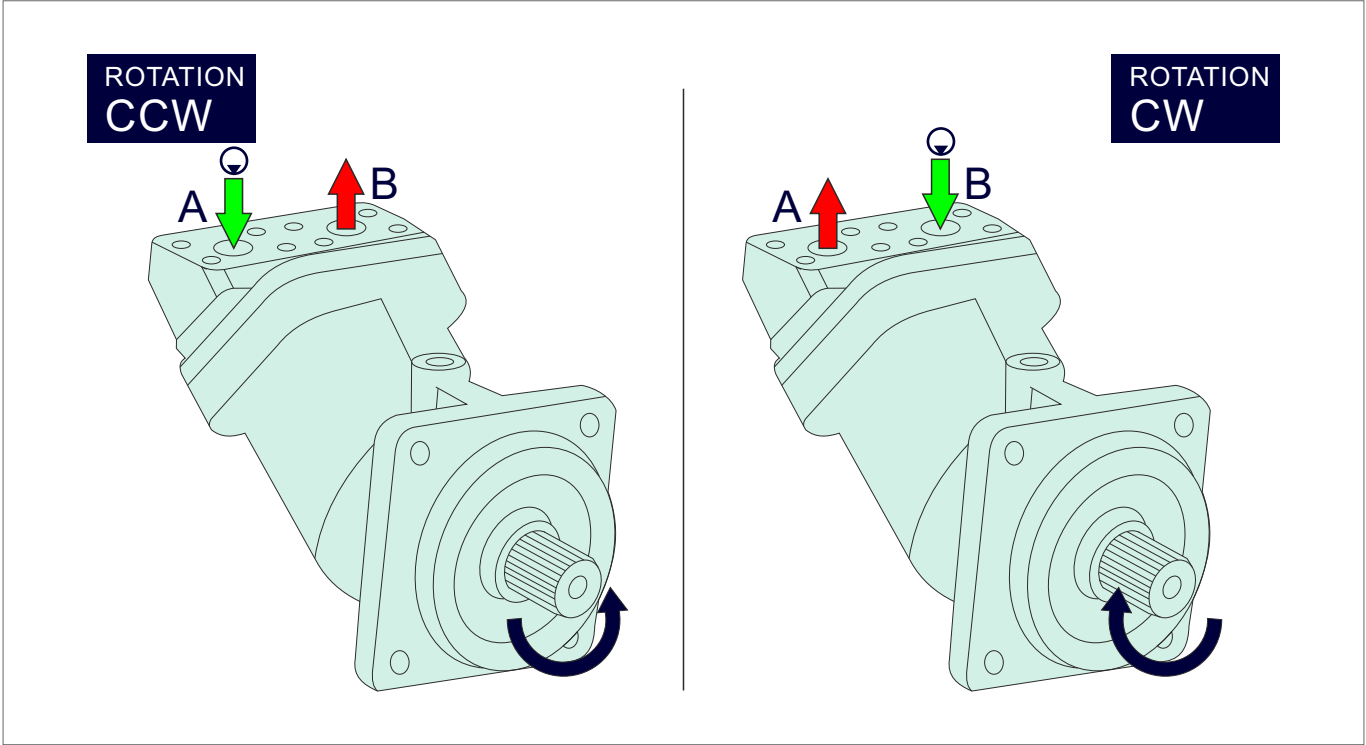


45xh8x2x9g GOST 6033-80



Direction of Rotation; Reversible

The Pumps rotate clockwise or counter-clockwise depending on the direction of hydraulic flow entering the Pump.



| Formulas                   |      |                                                                                                         |                                               |
|----------------------------|------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Pump Output Flow           | GPM  | $GPM = (Speed\ (rpm) \times disp.\ (cu.\ in.)) / 231$                                                   | $GPM = (n \times d) / 231$                    |
| Pump Input Horsepower      | HP   | $HP = GPM \times Pressure\ (psi) / 1714 \times Efficiency$                                              | $HP = (Q \times P) / 1714 \times E$           |
| Pump Efficiency            | E    | Overall Efficiency = Output HP / Input HP                                                               | $E_{overall} = HP_{out} / HP_{in} \times 100$ |
|                            |      | Overall Efficiency = Volumetric Eff. $\times$ Mechanical Eff.                                           | $E_{overall} = EffVol. \times EffMech.$       |
| Pump Volumetric Efficiency | E    | Volumetric Efficiency = Actual Flow Rate Output (GPM) / Theoretical Flow Rate Output (GPM) $\times$ 100 | $EffVol. = Q_{act.} / Q_{theo.} \times 100$   |
| Pump Mechanical Efficiency | E    | Mechanical Efficiency = Theoretical Torque to Drive / Actual Torque to Drive $\times$ 100               | $EffMech = T_{theo.} / T_{act.} \times 100$   |
| Pump Displacement          | CIPR | $Displmnt\ (In.^3\ / rev.) = Flow\ Rate\ (GPM) \times 231 / Pump\ RPM$                                  | $CIPR = GPM \times 231 / RPM$                 |
| Pump Torque                | T    | Torque = Horsepower $\times$ 63025 / RPM                                                                | $T = 63025 \times HP / RPM$                   |
|                            |      | Torque = Pressure (PSIG) $\times$ Pump Displacement (CIPR) / 2 $\pi$                                    | $T = P \times CIPR / 6.28$                    |

- Horsepower for driving a pump

: For every 1 hp of drive, the equivalent of 1 gpm @ 1500 psi can be produced.
- Horsepower for idling a pump

: To idle a pump when it is unloaded will require about 5% of it's full rated power
- Wattage for heating hydraulic oil

: Each watt will raise the temperature of 1 gallon of oil by 1° F. per hour.
- Flow velocity in hydraulic lines

: Pump suction lines 2 to 4 feet per second, pressure lines up to 500 psi - 10 to 15 ft./sec., pressure lines 500 to 3000 psi - 15 / 20 ft./sec.; all oil lines in air-over-oil systems; 4 ft./sec.

## Installation & Assemble Informations for Bent Axis Pumps

### POSITION

ISO2 Flange Bent Axis Pumps can be operate any position.

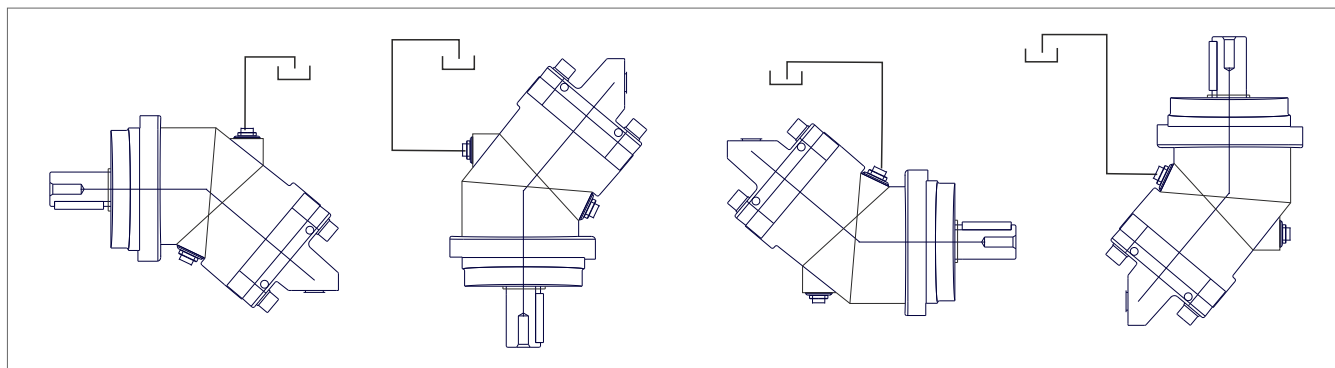
### DIRECTION OF ROTATION

ISO2 Flange Bent Axis Pumps can be operate in both directions of rotation.

Before of Installation operation, the Pump must be filled with hydraulic fluid and air bled.

### INSTALLATION POSITION

See following examples.

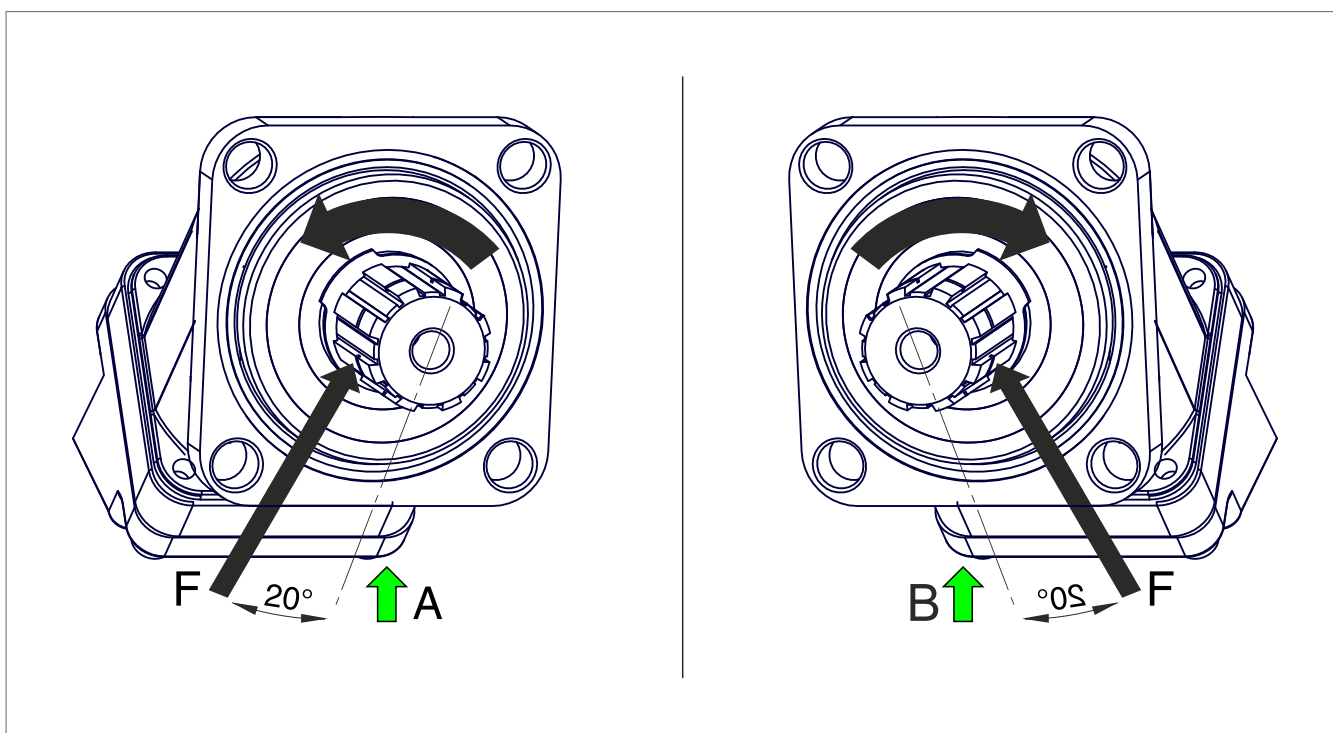


### HYDRAULIC FLUID

Recommended ;

Generally : between 15 and 200 cSt.

Maximum : between 5 and 1600 cSt.



### FOR USE;

Available via e-mail on request or each Pump is supplied via Starting datasheet.

## Formulas, Calculations, Installation Guide

### Quick Calculation

Flow rate

$$Q = \frac{V_s \cdot n}{1000 \eta_v} \text{ (lpm)}$$

Torque

$$M = \frac{V_s \cdot \Delta p \cdot \eta_{mh}}{63} \text{ (Nm)}$$

Power

$$P = \frac{2\pi \cdot M \cdot n}{60000} = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p \cdot \eta_t}{600} \text{ (kw)}$$

Speed

$$n = \frac{1000 \cdot Q \cdot \eta_v}{V_s} \text{ (lpm)}$$

- $V_s$  = Displacement (ccm/rev.)  
 $\Delta p$  = Diff. pressure (bar)  
 $n$  = Speed (rpm)  
 $Q$  = Flow (lpm)  
 $\eta_v$  = Volumetric efficiency  
 $\eta_{mh}$  = Mechanical-hydraulic efficiency  
 $\eta_t$  = Total efficiency ( $\eta_t = \eta_v \times \eta_{mh}$ )

New frame sizes to meet market requirements.

Optional by-pass valve.

For use in mobile & industrial and stationary applications areas.

The pump drive shaft bearings are designed to give the service life expected in these areas of operation. Interchangeable with other bent axis pumps & Pumps

40° bent axis design giving high power, small overall dimensions, optimum efficiency and economic design. Flange and shaft designed for direct mounting on truck gearbox PTO's. The fixed displacement bent axis pumps generates a hydraulic fluid flow. It is designed for use in trucks, commercial vehicles and all stationary hydraulic applications. The pump is a fixed pump with rotary group in bent-axis design open circuits. Flow is proportional to drive speed and displacement.

For axial piston units with bent-axis design, the Pistons are arranged diagonally with respect to the drive shaft. The pump motor covers the whole displacement range 5 to 130 cm<sup>3</sup>/rev. The pump has been developed with modern styling and design to satisfy market demand as to designed new generation plate and pistons with give high flow performance, high pressures with high efficiency and very small dimensions.

The pump is available both to DIN and SAE world standards and can be mounted either directly at the gear box or via a drive shaft. If necessary it can also be augmented with a by-pass valve.

Other brand bent axis pumps compatible and interchangeable with bent axis pumps motors. Refer to the data sheet and order confirmation for the technical data, operating conditions and operating limits of the bent axis piston pumps.

# Hydraulic Pumps



## K2FA (DIN)

BENT AXIS PISTON PUMPS



## K2FL (DIN)

ALUMINUM BODY  
BENT AXIS PISTON PUMPS



## A2FD (DIN)

DUAL FLOW  
BENT AXIS PISTON PUMPS



## A2FO (ISO)

BENT AXIS PISTON PUMPS



## A2FS (SAE)

BENT AXIS PISTON PUMPS



## AXVP Series

VARIABLE DISPLACEMENT  
PISTON PUMPS



## A3PP Series

AXIAL PISTON PUMPS



## A3PH Series

HIGH PRESSURE  
PISTON PUMPS



## ByPass Valve

FOR  
BENT AXIS PISTON PUMPS



## LS Adapters

FOR  
VARIABLE PISTON PUMPS

# Hydraulic Motors



## K2FM (DIN)

BENT AXIS PISTON MOTORS



## A2FM (ISO)

BENT AXIS PISTON MOTORS



## A2MS (SAE)

BENT AXIS PISTON MOTORS



## A2FE (FixedPlug)

BENT AXIS PISTON MOTORS



## Anti Cavitation

VALVE  
BENT AXIS PISTON MOTORS

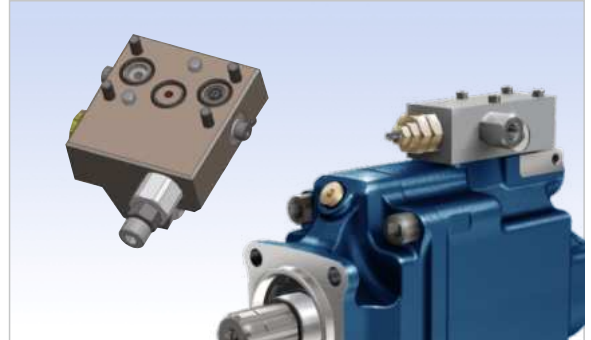
### ByPass Valve

for Bent Axis Piston Pumps



### LS Adapter

for Variable Displacement Piston Pump



### Suction Fittings

for Bent Axis Piston Pumps



### Flushing Valve

for Bent Axis Piston Motors



### Adapter

for Bent Axis Piston Pumps



### Flange, Couplar

for Bent Axis Piston Pumps



# Hydraulic Pumps, Hydraulic Motors

Bent Axis Hydraulic Piston Pumps, Bent Axis Piston Motors,  
Dual Flow Hydraulic Piston Pumps, Variable Displacement Piston Pumps,  
High Pressure Piston Pumps, Straight Axial Piston Pumps..



Address;

## **HIDRAPAC HYDRAULIC PUMP & MOTORS**

### **Address; (PRODUCTION)**

Fevzicakmak Mah. Sila Cad. Kobisan 3 San. Sit.  
No: 73 / C Karatay – Konya, PO Code; 42050, Turkiye

### **Address; (ASSEMBLE, SHIPMENT)**

Fevzicakmak Mah. Sila Cad. Kobisan 3 San. Sit.  
No: 71 / AD Karatay – Konya, PO Code; 42050, Turkiye

**Phone; +90 551 111 77 44**