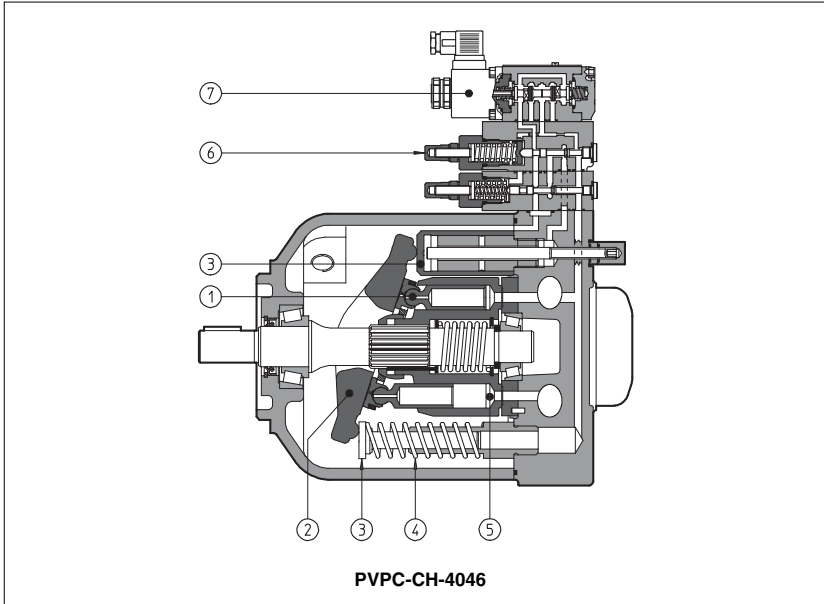


# Axial piston pumps type PVPC

variable displacement, by a full line of mechanical controls



PVPC are variable displacement axial piston pumps for high pressure operation, with low noise level, suitable for hydraulic oils or synthetic fluids having similar lubricating characteristics. The actual displacement is dependent on the length of stroke of the pumping pistons ①. This length of stroke is determined by the position of the swashing plate ② that is achieved by two servo pistons ③ with differential areas, against a spring ④. The rotating barrel ⑤ forces the pistons in a circular path in and out of the barrel and fluid displacement takes place. Typical section on side shows version CH with manual pressure compensator ⑥ and venting solenoid valve ⑦. The available hydraulic controls are shown in sections 7. The wide range of electrohydraulic proportional controls is shown in tab. A170. SAE J744 mounting flange and shaft (see note 1). Max displacement: 29-46-73-88 cm<sup>3</sup>/rev. Max pressure: 280 bar working 350 bar peak.

## 1 MODEL CODE

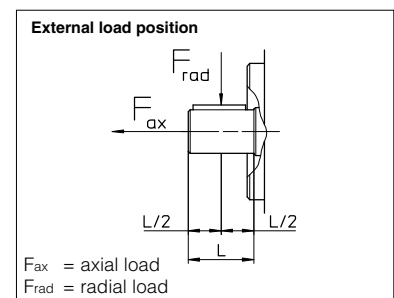
|   |  |   |  |  |   |            |  |  |  |   |               |   |
|---|--|---|--|--|---|------------|--|--|--|---|---------------|---|
| <b>PVPC</b>                             | <b>X2E</b>   | <b>- C</b>  | <b>- 4</b>   | <b>046</b>   | <b>/ 31044</b>                                | <b>/ 1</b> | <b>D</b>   | <b>- I</b>   | <b>X</b>   | <b>24DC</b>   | <b>10</b>     | <b>/*</b>   |
| Variable displacement axial piston pump | Eventual suffix for double pumps<br><b>X2E</b> = with a fixed displacement pump type PFE (see tab. A005) | Type of control (see section 7):<br><b>C</b> = manual pressure compensator<br><b>CH</b> = manual pressure compensator, with venting<br><b>R</b> = remote pressure compensator<br><b>L</b> = load sensing (pressure & flow)<br><b>LW</b> = constant power (combined pressure & flow)<br>For electrohydraulic proportional controls, see table A170 | Size:<br><b>3</b> = for displacement 029<br><b>4</b> = for displacement 046<br><b>5</b> = for displacement 073 and 090 | Max displacement of axial piston pump:<br><b>029</b> = 29 cm <sup>3</sup> /rev<br><b>046</b> = 46 cm <sup>3</sup> /rev<br><b>073</b> = 73 cm <sup>3</sup> /rev<br><b>090</b> = 88 cm <sup>3</sup> /rev | Type of PFE (for double pumps), see tab. A005 |            | Direction of rotation (viewed at the shaft end)<br><b>D</b> = clockwise<br><b>S</b> = counterclockwise | Solenoid of pilot valve:<br><b>-I</b> = solenoid OI (DHI) for AC and DC supply | <b>X</b> = without connector<br>See section 4 for available connectors, to be ordered separately | Supply voltage, see section 5:<br><b>00</b> = solenoid valve without coils (only for OI solenoid) | Series number | Synthetic fluids:<br><b>WG</b> = water-glycol<br><b>PE</b> = phosphate ester<br>See notes under section 2 |

Shaft (SAE Standard):  
**1** = keyed (7/8" for 029 - 1" for 046 - 1 1/4" for 073 and 090)  
**5** = splined (13 teeth for 029 - 15 for 046 - 14 for 073 and 090)

1) pumps with ISO 3019/2 mounting flange and shaft (option /M) are available on request

## 2 OPERATING CHARACTERISTICS

| Pump model   |                        | PVPC*-3029               | PVPC*-4046               | PVPC*-5073               | PVPC*-5090               |
|--|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Displacement   | [cm <sup>3</sup> /rev] | 29                       | 46                       | 73                       | 88                       |
| Theoretical max flow at 1450 rpm                                       | [l/min]                | 42                       | 66,7                     | 105,8                    | 127,6                    |
| Max working pressure / Peak pressure                                   | [bar]                  | 280/350                  | 280/350                  | 280/350                  | 250/315                  |
| Min/Max inlet pressure   | [bar abs.]             | 0,8 / 25                 | 0,8 / 25                 | 0,8 / 25                 | 0,8 / 25                 |
| Max pressure on drain port   | [bar abs.]             | 1,5                      | 1,5                      | 1,5                      | 1,5                      |
| Power consumption at 1450 rpm and at maximum pressure and displacement | [kW]                   | 19,9                     | 31,6                     | 50,1                     | 54,1                     |
| Max torque on the first shaft  | [Nm]                   | Type 1<br>155            | Type 1<br>220            | Type 1<br>400            | Type 1<br>400            |
|  |                        | Type 5<br>190            | Type 5<br>330            | Type 5<br>620            | Type 5<br>620            |
| Max permissible load on drive shaft                                    | [N]                    | F <sub>ax</sub><br>1000  | F <sub>ax</sub><br>1500  | F <sub>ax</sub><br>2000  | F <sub>ax</sub><br>2000  |
|  |                        | F <sub>rad</sub><br>1500 | F <sub>rad</sub><br>1500 | F <sub>rad</sub><br>3000 | F <sub>rad</sub><br>3000 |
| Speed rating   | [rpm]                  | 600 ÷ 3000               | 600 ÷ 2600               | 600 ÷ 2200               | 600 ÷ 1850               |



**Notes:** For speeds over 1800 rpm the inlet port must be under oil level with adequate pipes. Maximum pressure for all models with option /WG is 160 bar, with option /PE is 190 bar. Max speed with options /WG and /PE is 2000/1900/1600/1500 rpm respectively for the four sizes.

### 3 MAIN CHARACTERISTICS OF VARIABLE DISPLACEMENT AXIAL PISTON PUMP TYPE PVPC

|                           |  |
|---------------------------|--|
| Installation position     | Any position. The drain port must be on the top of the pump. Drain line must be separated and unrestricted to the reservoir and extended below the oil level as far from the inlet as possible.<br>Suggested maximum line length is 3 m. |
| Ambient temperature       | from -20°C to +70°C  |
| Fluid                     | Hydraulic oil as per DIN 51524...535; for other fluids see section 11  |
| Recommended viscosity     | 15÷ 100 mm <sup>2</sup> /sec at 40°C (ISO VG 15÷ 100). Maximum start-up viscosity: 1000 mm <sup>2</sup> /sec   |
| Fluid contamination class | ISO 16/13 (filters at 10 µm value with β <sub>10</sub> ≥ 75 recommended)   |
| Fluid temperature         | -20°C +60°C      -20°C +50°C (seals /WG)      -20°C +80°C (seals /PE)  |

#### 3.1 Coils characteristics (for version CH)

|                              |                        |
|------------------------------|------------------------|
| Insulation class             | H                      |
| Connector protection degree  | IP 65                  |
| Relative duty factor         | 100%                   |
| Supply voltage and frequency | See electric feature 5 |
| Supply voltage tolerance     | ± 10%                  |

### 4 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 FOR VERSION CH

The connectors must be ordered separately

| Code of connector | Function   |
|-------------------|--|
| <b>SP-666</b>     | Connector IP-65, suitable for direct connection to electric supply source  |
| <b>SP-667</b>     | As SP-666 connector IP-65 but with built-in signal led, suitable for direct connection to electric supply source |

### 5 ELECTRIC FEATURES FOR VERSION CH

| Type of solenoid  | External supply nominal voltage ±10% (1) |                        | Type of connector      | Power consumption (3)  | Code of spare coil  | Colour of coil label            |
|-------------------|--|------------------------|------------------------|--|---|---------------------------------|
| OI                | DIRECT CURRENT                           | 6 DC                   | SP-666<br>or<br>SP-667 | 33 W   | SP-COU-6DC /80<br>SP-COU-12DC /80<br>SP-COU-24DC /80<br>SP-COU-48DC /80 | brown<br>green<br>red<br>silver |
|                   |  | 12 DC                  |                        |  |   |                                 |
| 24 DC             |  |                        |                        |  |   |                                 |
| 48 DC             |  |                        |                        |  |   |                                 |
| ALTERNATE CURRENT | 110/50 AC (2)                            | SP-666<br>or<br>SP-667 | 60 VA (4)              | SP-COI-110/50/60AC /80<br>SP-COI-120/60AC /80<br>SP-COI-230/50/60AC /80<br>SP-COI-230/60AC /80 | yellow<br>white<br>light blue<br>silver                                 |                                 |
|                   | 120/60 AC                                |                        |                        |  |   |                                 |
| 230/50 AC (2)     |  |                        |                        |  |   |                                 |
| 230/60 AC         |  |                        |                        |  |   |                                 |

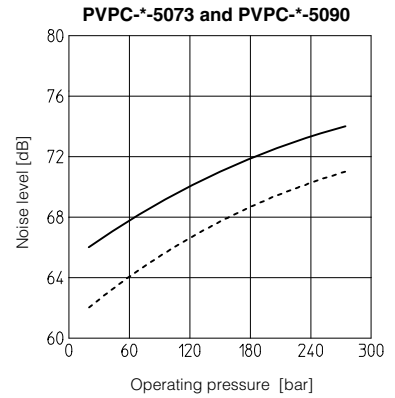
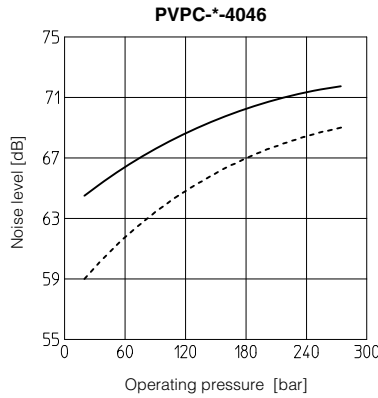
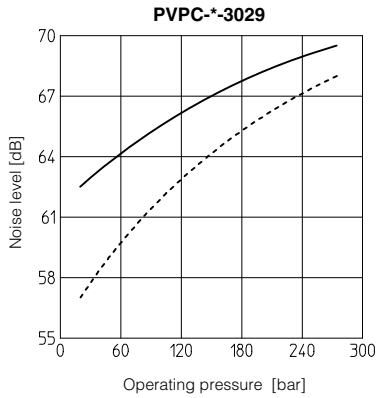
- (1) For other supply voltages available on request see technical table E010.
- (2) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10 ÷ 15% and the power consumption is 55 VA.
- (3) Average values based on tests performed at nominal hydraulic condition and ambient/coil temperature of 20°C.
- (4) When solenoid is energized, the inrush current is approx 3 times the holding current. Inrush current values correspond to a power consumption of about 150 VA.

**6 DIAGRAMS at 1450 rpm (based on mineral oil ISO VG 46 at 50°C)**

**6.1 Noise level curves**

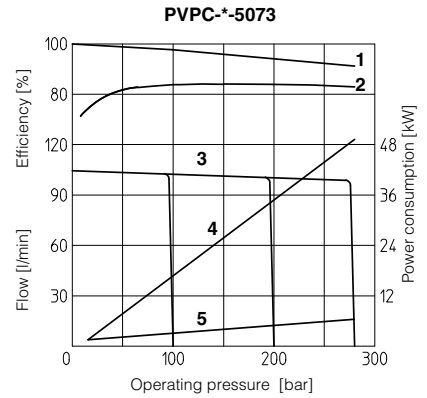
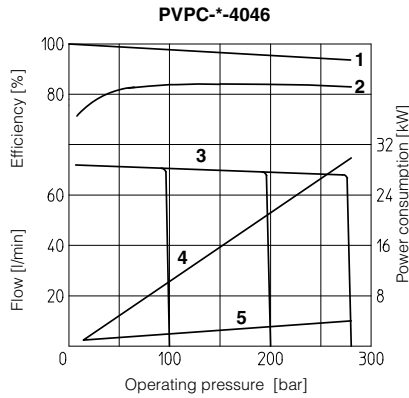
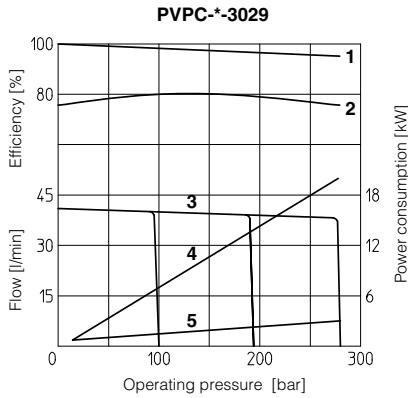
Ambient noise levels measured in compliance with ISO 4412-1 oleohydraulics -Test procedure to define the ambient noise level - Pumps  
Shaft speed: 1450 rpm.

— = Qmax      - - - - - = Qmin



**6.2 Operating limits**

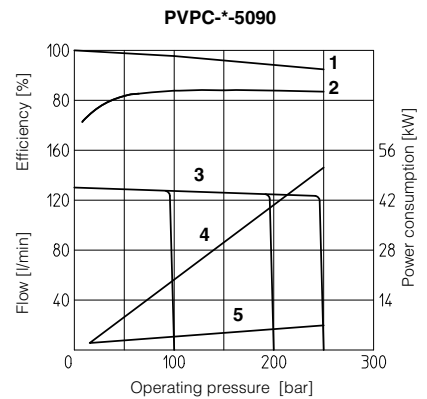
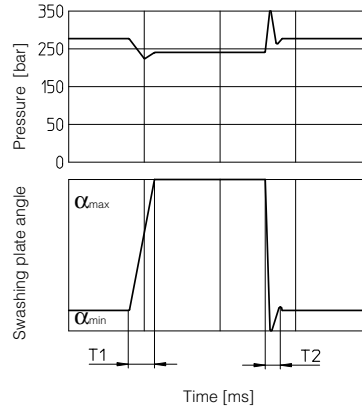
- 1 = Volumetric efficiency
- 2 = Overall efficiency
- 3 = Flow versus pressure curve
- 4 = Power consumption with full flow
- 5 = Power consumption at pressure compensation



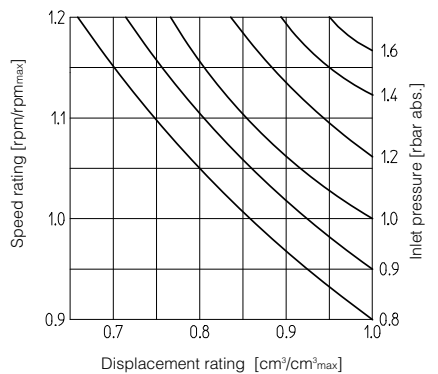
**6.3 Response times**

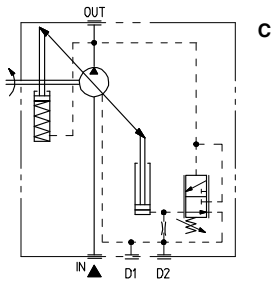
**6.3.1** Response times and pressure peak due to variation 0% → 100% → 0% of the pump displacement, obtained with an instantaneously opening and shut-off of the delivery line.

| Pump type  | T1 (ms) | T2 (ms) |
|------------|---------|---------|
| PVPC*-3029 | 31      | 19      |
| PVPC*-4046 | 44      | 20      |
| PVPC*-5073 | 50      | 25      |
| PVPC*-5090 | 52      | 27      |



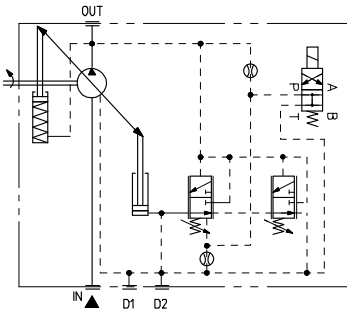
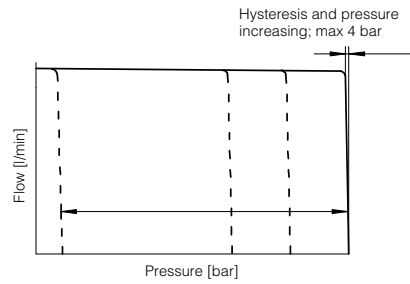
**6.3.2** Variation of inlet pressure and reduction of displacement with increasing speed rating





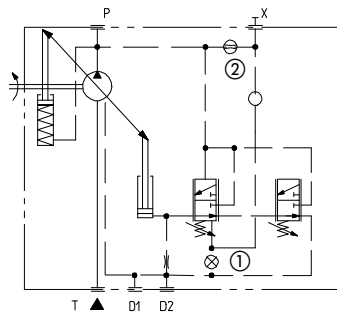
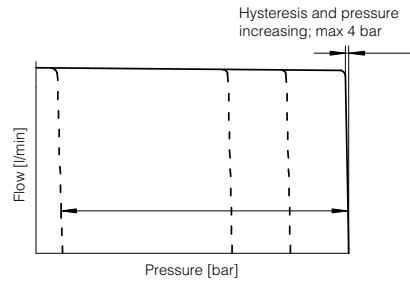
**Manual pressure compensator**

The pump displacement decreases when the line pressure approaches the setting pressure of the compensator. The pump supplies only the fluid required by the system. Pressure may be steplessly adjusted at the pilot valve.  
 Compensator setting range: 20 ÷ 350 bar (315 bar for 090)  
 Compensator standard setting: 280 bar (250 bar for 090)



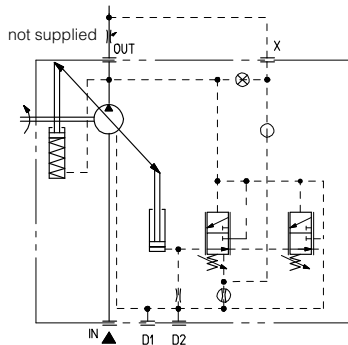
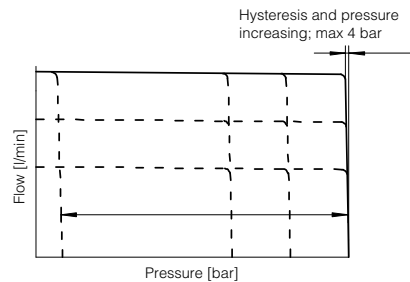
**CH Manual pressure compensator with venting**

As C plus venting function, when a long unloading time is required and heat generation and noise have to be kept at lowest level.  
 Compensator setting range: 20 ÷ 350 bar (315 bar for 090)  
 Compensator standard setting: 280 bar (250 bar for 090)



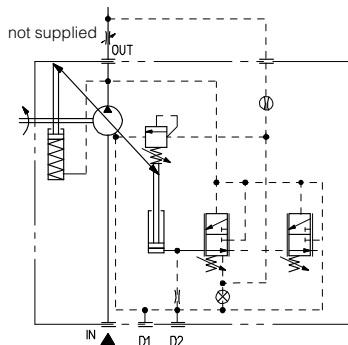
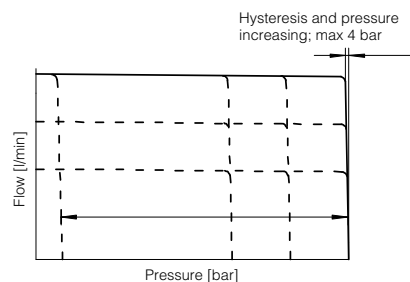
**R Remote pressure compensator**

As C, but with remote setting of the compensator by means of a pressure relief valve on the piloting line X.  
 This version can be obtained from version L using a blind plug UNI 5923 M4x12 in pos. ① and a restrictor M4 drilled ø 0,75 mm in pos. ②.  
 Compensator setting range: 20 ÷ 350 bar (315 bar for 090)  
 Compensator standard setting: 280 bar (250 bar for 090)



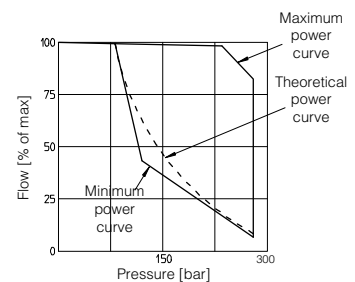
**L Load sensing**

The pump displacement is automatically adjusted to maintain a constant (load independent) pressure drop across an external throttle. Changing the throttle regulation, the pump flow is consequently adjusted.  
 Load sensing control always incorporates an hydraulic compensator to limit the maximum pressure.  
 Compensator setting range: 20 ÷ 350 bar (315 bar for 090)  
 Compensator standard setting: 280 bar (250 bar for 090)  
 Differential pressure setting range: 10 ÷ 40 bar  
 Differential pressure standard setting: 14 bar



**LW Constant power**

In order to achieve a constant drive torque with varying operating pressure. The swashing angle and therefore the outlet flow is varied so that the product of flow and pressure remains constant.  
 For the best regulation, minimum working pressure is 80 bar.  
 While selecting LW control, the required value of power must be communicated with the order (ex. 10 kW at 1450 rpm).



**8 DIMENSIONS OF PVPC-1-3029: BASIC VERSION "C" CONTROL**

**PORTS DIMENSION**

**IN** = Flange SAE 3000 1 1/4"

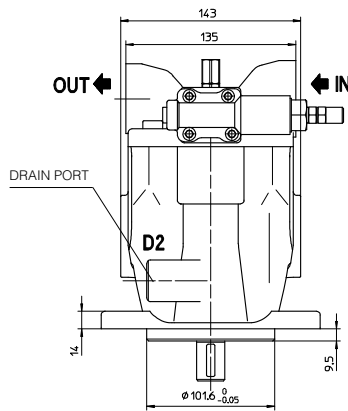
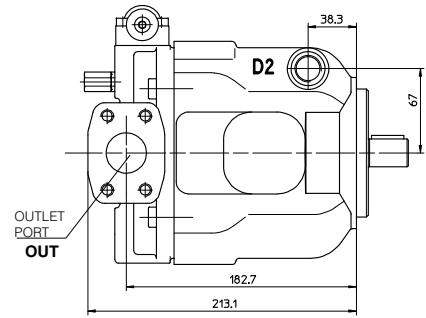
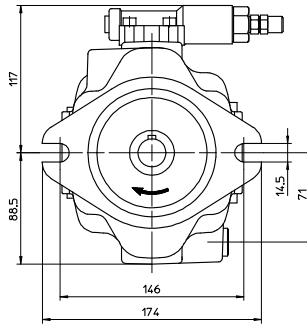
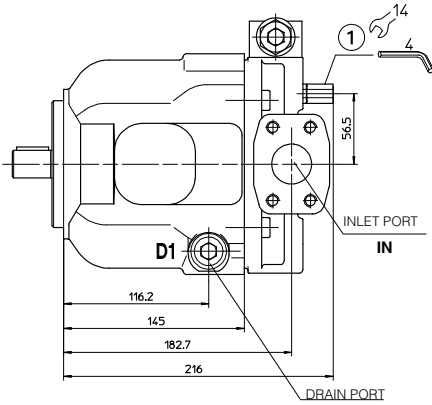
**OUT** = Flange SAE 6000 3/4"

**D1, D2** = 1/2" BSPP

**①** = Regulation screw for max displacement 1,5 cm<sup>3</sup>/rev per turn. Adjustable range 50% to 100% of max displacement.

In case of double pump the regulation screw is not always available, please contact our technical office.

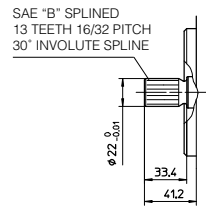
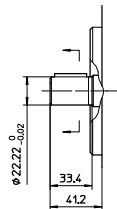
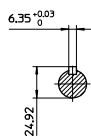
SAE flanges can be supplied with the pump - see www.scoda.it, tab. SK155.



**Mass: 18 kg**

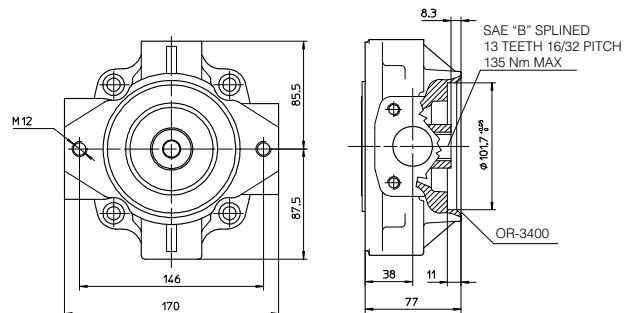
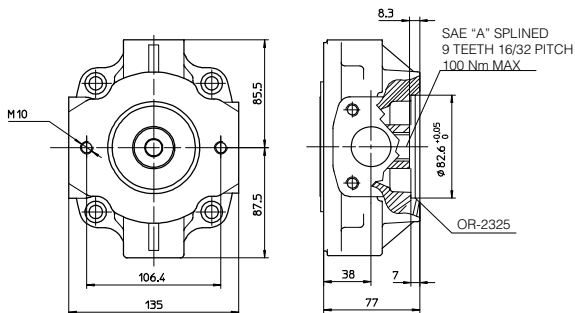
**SHAFT TYPE "1"**

**SHAFT TYPE "5"**



**INTERMEDIATE FLANGE SAE "A" FOR PFE-31**

**INTERMEDIATE FLANGE SAE "B" FOR PFE-41**



Drawing shows pumps with clockwise rotation (option D); pumps with counterclockwise rotation (option S) will have inlet and outlet ports inverted

**9 DIMENSIONS OF PVPC-<sup>s</sup>-4046: BASIC VERSION "C" CONTROL**

**PORTS DIMENSION**

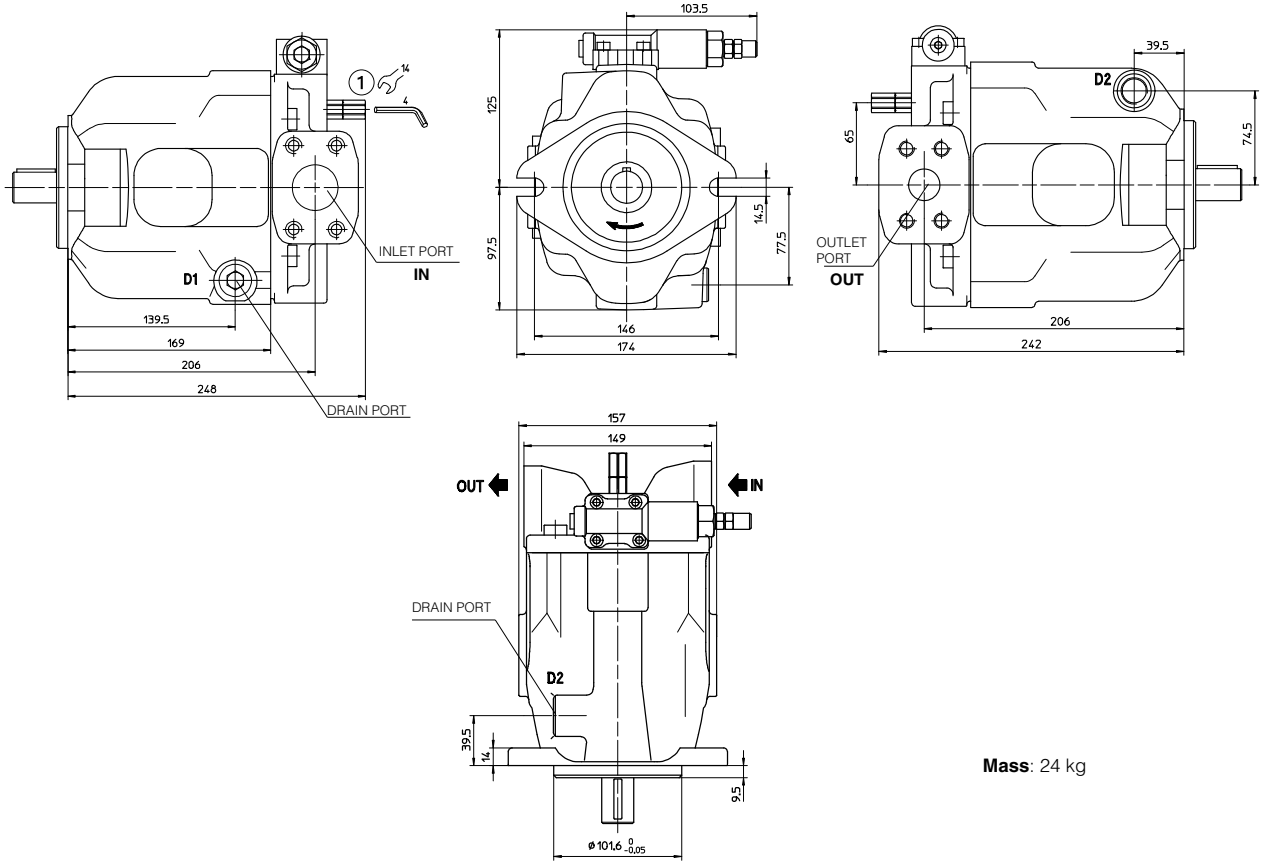
**IN** = Flange SAE 3000 1 1/2"

**OUT** = Flange SAE 6000 1"

**D1, D2** = 1/2" BSPP

**①** = Regulation screw for max displacement 2,2 cm<sup>3</sup>/rev per turn. Adjustable range 50% to 100% of max displacement.  
In case of double pump the regulation screw is not always available, please contact our technical office.

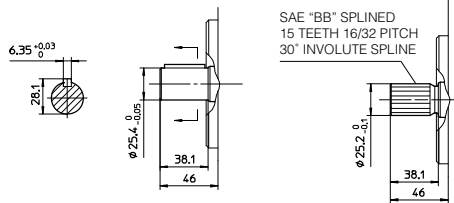
SAE flanges can be supplied with the pump - see [www.scoda.it](http://www.scoda.it), tab. SK155.



**Mass:** 24 kg

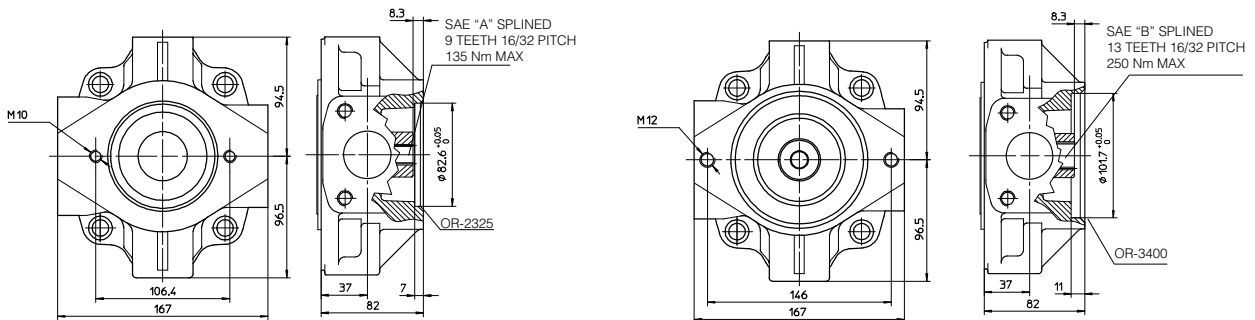
**SHAFT TYPE "1"**

**SHAFT TYPE "5"**



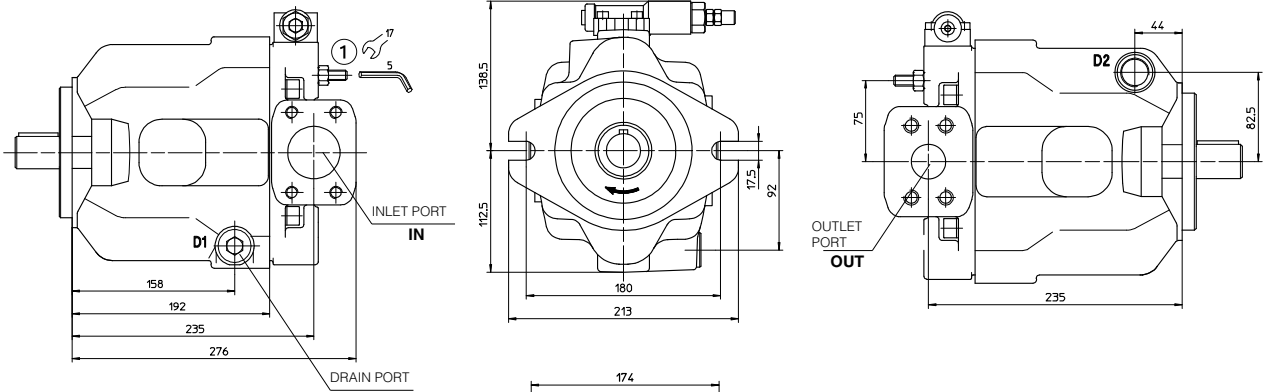
**INTERMEDIATE FLANGE SAE "A" FOR PFE-31**

**INTERMEDIATE FLANGE SAE "B" FOR PFE-41**



Drawing shows pumps with clockwise rotation (option D): pumps with counterclockwise rotation (option S) will have inlet and outlet ports inverted

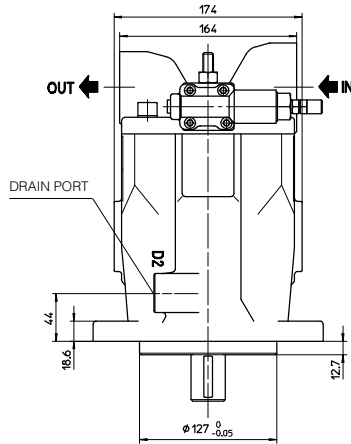
10 DIMENSIONS OF PVPC-\*-5073 and PVPC-\*-5090: BASIC VERSION "C" CONTROL



**PORTS DIMENSION**

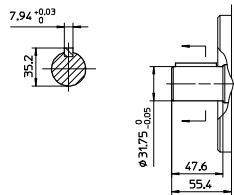
IN = Flange SAE 3000 2"  
 OUT = Flange SAE 6000 1 1/4"  
 D1, D2 = 3/4" BSPP  
 ① = Regulation screw for max displacement  
 3,2 cm<sup>3</sup>/rev per turn.  
 Adjustable range 50% to 100% of max displacement.  
 In case of double pump the regulation screw is not always available, please contact our technical office.

SAE flanges can be supplied with the pump - see [www.scoda.it](http://www.scoda.it), tab. SK155.

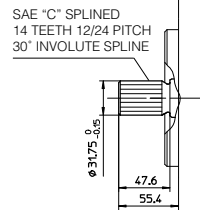


Mass: 33 kg

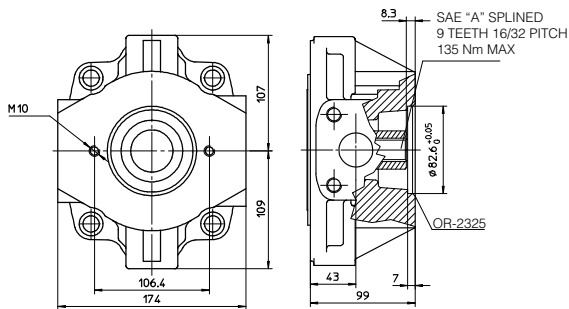
**SHAFT TYPE "1"**



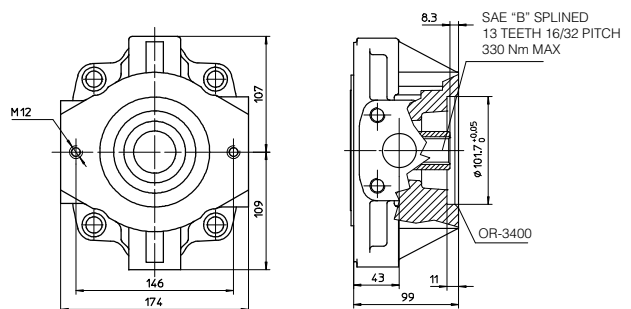
**SHAFT TYPE "5"**



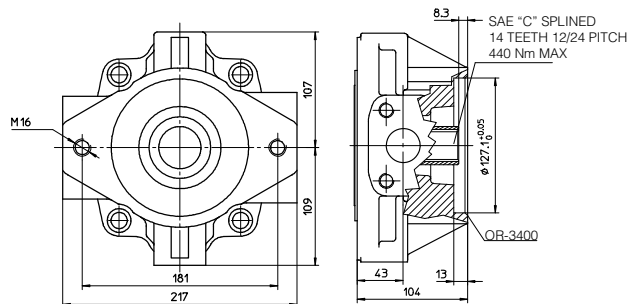
**INTERMEDIATE FLANGE SAE "A" FOR PFE-31**



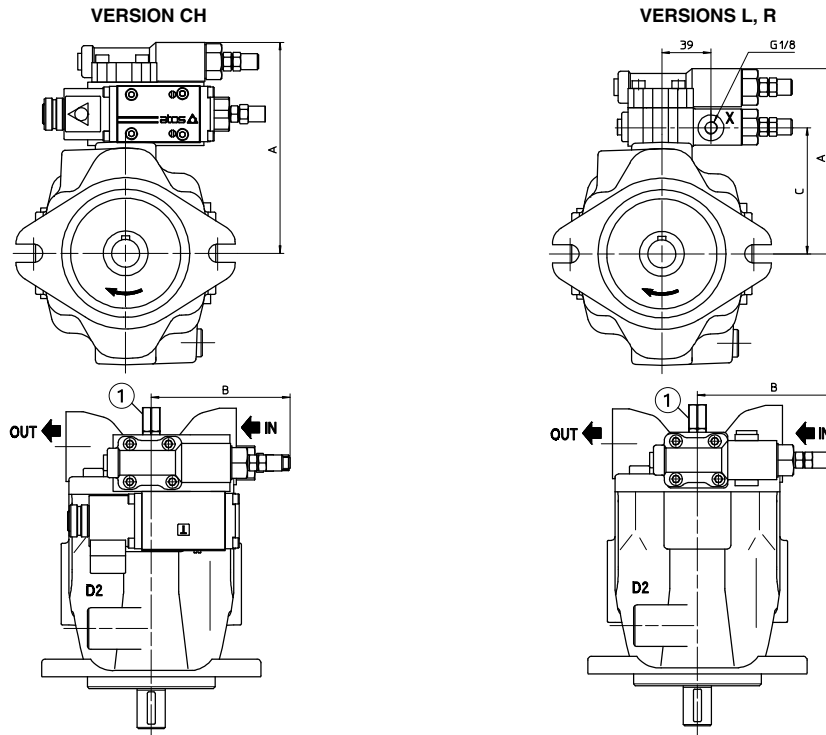
**INTERMEDIATE FLANGE SAE "B" FOR PFE-41**



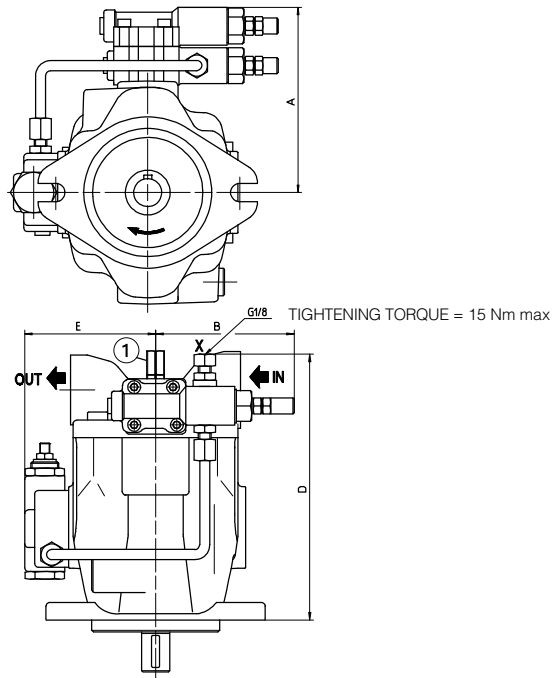
**INTERMEDIATE FLANGE SAE "C" FOR PFE-51**



Drawing show pumps with clockwise rotation (option D); pumps with counterclockwise rotation (option S) will have inlet and outlet ports inverted



VERSION LW



① = Regulation screw for max displacement. Adjustable range 50% to 100% of max displacement.  
 In case of double pump the regulation screw is not always available, please contact our technical office.

Drawing shows pumps with clockwise rotation (option D): pumps with counterclockwise rotation (option S) will have inlet and outlet ports inverted and also the consequently position of the control groups

| Pump type   | Version | A   | B   | C   | D   | E   | Mass (kg) |
|-------------|---------|-----|-----|-----|-----|-----|-----------|
| PVPC-*-3029 | CH      | 168 | 111 | -   | -   | -   | 22        |
|             | L-R     | 144 | 111 | 100 | -   | -   | 19,2      |
|             | LW      | 144 | 111 | -   | 211 | 104 | 20        |
| PVPC-*-4046 | CH      | 177 | 111 | -   | -   | -   | 28        |
|             | L-R     | 153 | 111 | 109 | -   | -   | 25,2      |
|             | LW      | 153 | 111 | -   | 235 | 111 | 26        |
| PVPC-*-5073 | CH      | 190 | 111 | -   | -   | -   | 36,9      |
|             | L-R     | 166 | 111 | 122 | -   | -   | 34,2      |
| PVPC-*-5090 | LW      | 166 | 111 | -   | 258 | 120 | 35        |