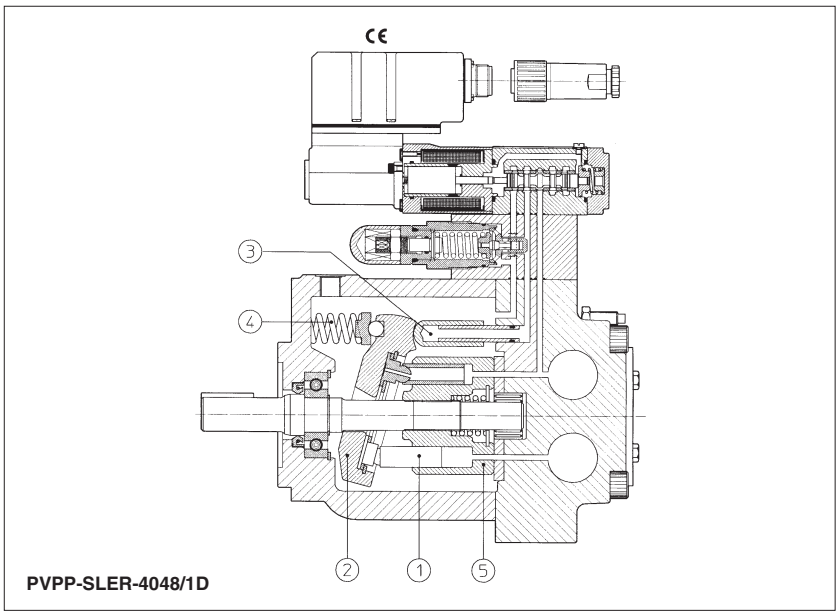
Axial piston pumps type PVPP, variable displacement, high pressure operation

Hydraulic and electrohydraulic control

obsolete components - availability on request



PVPP-SLER-4048/1D

PVPP are variable displacement axial piston pumps for high pressure operation and long service life, with low noise level, suitable for hydraulic oils or synthetic fluid having similar lubricating characteristics.
The actual fluid displacement is dependent upon 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 a servo piston ③ acting on one end of the swashing plate working against the combined effect of the off-setting forces of the pistons and centering spring ④ on the other end.
The rotating barrel ⑤, forces the pistons in a circular path in and out of the barrel and fluid displacement takes place.
See section 5 for a line of hydraulic and electrohydraulic controls for unlimited options of applications. The figure illustrates the advanced control of pressure and flow according to electronic signals.
Displacement: from 23 up to 76 cm³/rev.
Pressure up to 250 bar.

1 MODEL CODE

PVPP	X2E	–	C	–	4	048	/31044	/	1	D	10	/*

PVPP — Variable displacement axial piston pump

X2E — Eventual suffix for double pumps = with a fixed displacement pump type PFE (see tab. A005)

Type of control: (see section 5)
- **C** = manual pressure compensator
- **R** = remote pressure compensator
- **L** = load sensing (pressure & flow)
- **SL** = proportional control
- **SLE** = proportional control with integral electronics
- **SLR** = as SL option plus sequence module
- **SLER** = as SLE option plus sequence module

Size:
- **3** = for displacement 23 and 33 cm³
- **4** = for displacement 48 cm³/rev
- **5** = for displacement 60 and 76 cm³/rev

Displacement of axial piston pump:
- **023** = 23 cm³/rev
- **033** = 33 cm³/rev
- **048** = 48 cm³/rev
- **060** = 60 cm³/rev
- **076** = 76 cm³/rev

On request are available also displacement 16 cm³/rev, 41 cm³/rev and 100 cm³/rev

Type of PFE (for double pumps), see tab. A005

Shaft:
- **1** = keyed (1" for 023, 033, 048 - 1 1/4" for 060, 076)
- **2** = splined (15 teeth for 023, 033, 048) - not available for 060 and 076

Direction of rotation (as viewed at the shaft end):
- **D** = clockwise
- **S** = counterclokwise

Design number

Synthetic fluids
- **/WG** = water-glycol
- **/PE** = phosphate ester

See NOTE below

NOTE: Maximum pressure for PVPP 3023, 3033 and 5076 with option /WG is 70 bar, for PVPP 4048 is 180 bar, for PVPP 5060 is 100 bar. Max speed for all sizes with option /WG is 1500 rpm.

2 OPERATING CHARACTERISTICS

Pump model		PVPP-*-3023		PVPP-*-3033		PVPP-*-4048		PVPP-*-5060	PVPP-*-5076
Displacement	[cm³/rev]	23		33		48		60	76
Max flow at 1500 rpm and 7 bar	[l/min]	34		48		70		87	110
Max pressure / Peak pressure	[bar]	250/350				250/350		250/310	
Max inlet pressure	[bar]	2				0,69		0,69	
Max pressure on drain port	[bar]	3				3		3	
Approx. power consumption at 1500 rpm and at maximum pressure and displacement	[kW]	14,8		20,6		30		38	49
		Type 1	Type 2	Type 1	Type 2	Type 1	Type 2	Type 1	Type 1
Max torque on the first shaft	[Nm]	330	330	330	330	330	330	630	630
Speed ratings	[rpm]	600÷3000				600÷2400		600÷2200	

3 MAIN CHARACTERISTICS OF VARIABLE DISPLACEMENT AXIAL PISTON PUMP TYPE PVPP

Installation position	Any position. The drain port must be on top of the pump. Drain line must be separated and unrestricted to the reservoir and extend below the oil level as far from the inlet line as possible. Suggested maximum line lenght is 3 m.
Loads on the shaft	Axial and radial loads are not allowed on the shaft. The coupling should be sized to absorb the peak horsepower developed.
Ambient temperature	from -20°C to +70°C
Fluid	Hydraulic oil as per DIN 51524... 535; for other fluids see section 1
Recommended viscosity	15-100 mm²/s at 40°C (ISO VG 15 - 100). Maximum start-up viscosity: 1000 mm²/s
Fluid contamination class	ISO 16/13 (filters at 10µm value with $\beta_{10} \geq 75$ recommended)
Fluid temperature	T < 70°C, if T > 60 select /PE seals
ONLY FOR PUMPS WITH PROPORTIONAL ELECTROHYDRAULIC CONTROLS type SL and SLE	
Coil resistance R at 20°C [Ω]	3 ÷ 3,3
Relative duty factor	Continuous rating (ED = 100%)
Max solenoid current [A]	2,6
Max power [Watt]	35

4 ELECTRONIC DRIVERS FOR PUMPS WITH PROPORTIONAL ELECTROHYDRAULIC CONTROLS

The operation of pumps with proportional electrohydraulic controls is optimized in association with Atos electronic drivers, which have factory preset electronic calibration.

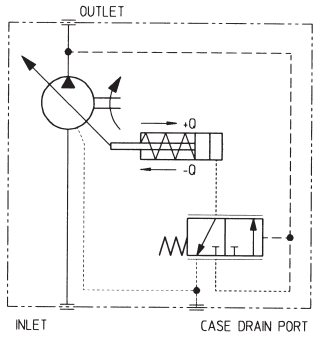
Driver model	Type of pump control	Execution (1)	Max power consumption (2)	Reference signal (3)	Ramps (4)	Special functions (5)
E-ME-L-01H	SL SLR	E	50W	C, (A)	YES	ENABLE
E-RI-LE-01H	SLE SLER	X	50W	C, (A)	NO	MONITOR or FAULT

NOTES

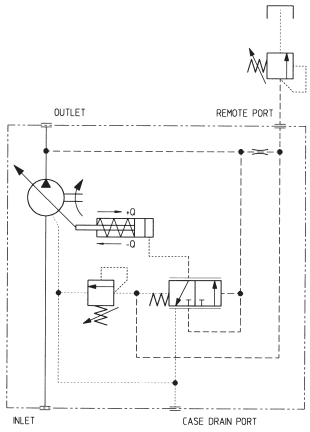
(1) Execution, Format/Connection
E = Eurocard 100x160 mm (plug in unit DIN 41494)
X = sealed box on the valve: IP65 - 40050
(2) Power supply at 24 VDC ± 10%
(3) Reference signals:
C = 0 ÷ 5V or 0 ÷10 VDC
A = 4 ÷ 20 mA (on request)
(4) Ramp options, i.e. control of rapidity on rise and fall of supply current and consequently of hydraulic parameters.
(5) Enable: to allow driver operation only with an electric enabling signal.
Monitor (/M option): position of the swashing plate of the pump (0 VDC - 10 VDC).
Fault: to signal anomalous operating conditions of the driver.

5 HYDRAULIC SCHEMES

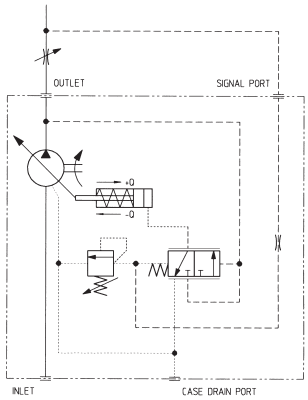
CONTROL "C"
MANUAL PRESSURE COMPENSATOR



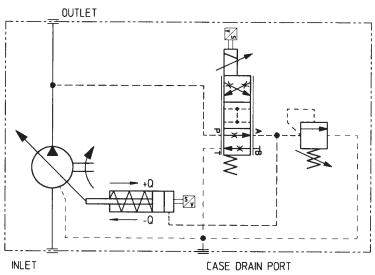
CONTROL "R"
REMOTE PRESSURE COMPENSATOR



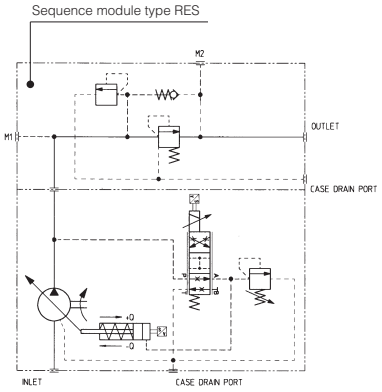
CONTROL "L"
LOAD SENSING



CONTROL "SL", "SLE"
FLOW PROPORTIONAL CONTROL

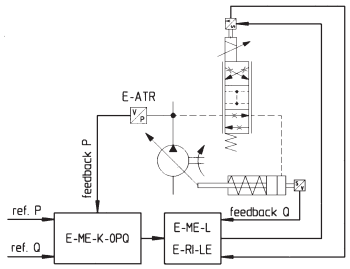


CONTROL "SLR", "SLER"
FLOW PROPORTIONAL CONTROL PLUS SEQUENCE MODULE
see note 6) and 7) on side



(6) The pressure control unit RES (sequence module) is mounted on the outlet port of the pump to grant a minimum piloting pressure for the proportional valve (which controls the pump displacement) also when the line pressure falls under 18 bar. The RES unit also limits the pressure peaks on outlet line.

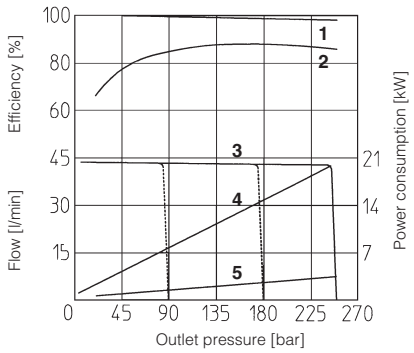
(7) SLR and SLER versions can be used also for **COMBINED PRESSURE & FLOW CONTROL** coupled with the electronic card E-ME-K0PQ in Eurocard format which operates with P.I.D. logic on the pump reference signal according to the following block diagram. In this case a pressure transducer E-ATR (to be ordered separately) must be fitted in the system to feedback the actual pressure value of the line to the E-ME-K-0PQ making possible the pressure closed loop control.

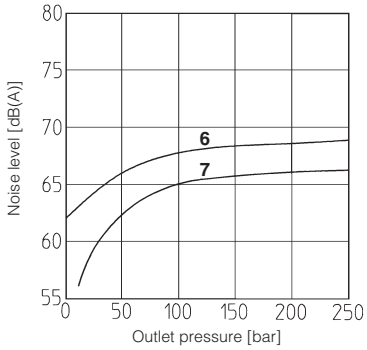


6 DIAGRAMS OF PVPP-*-3023

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

6 = Noise level with full flow
7 = Noise level with flow null

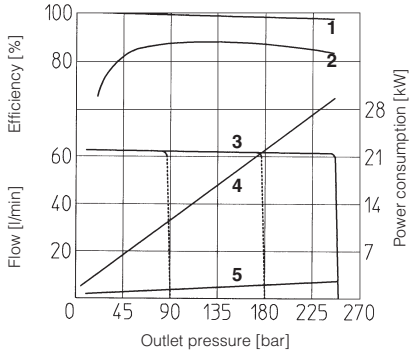


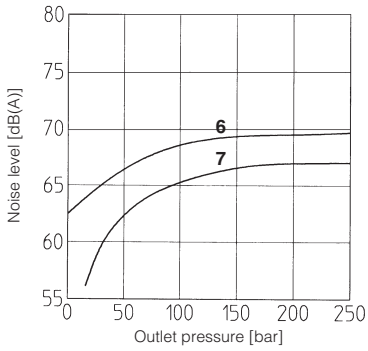


7 DIAGRAMS OF PVPP-*-3033

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

6 = Noise level with full flow
7 = Noise level with flow null

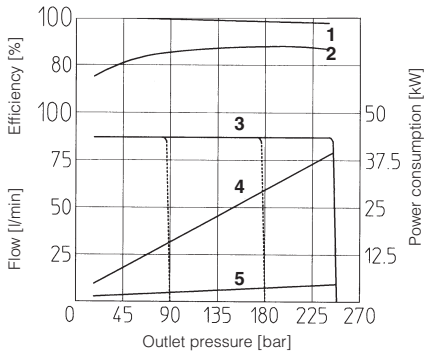


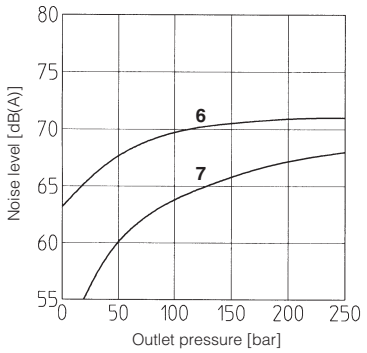


8 DIAGRAMS OF PVPP-*-4048

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

6 = Noise level with full flow
7 = Noise level with flow null

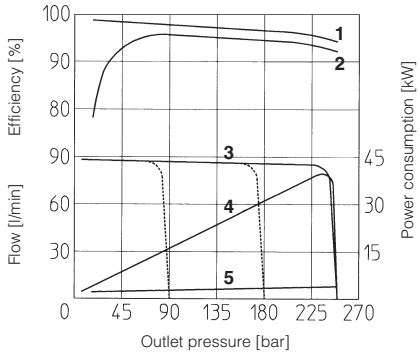


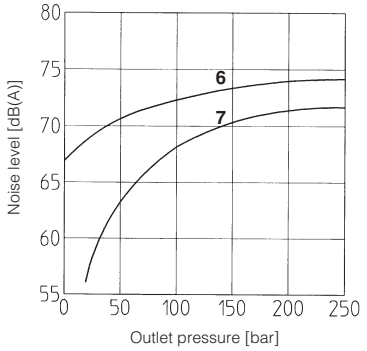


9 DIAGRAMS OF PVPP-*-5060

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

6 = Noise level with full flow
7 = Noise level with flow null

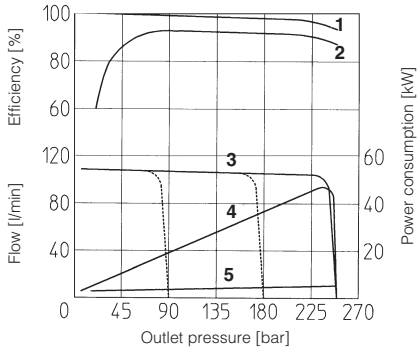


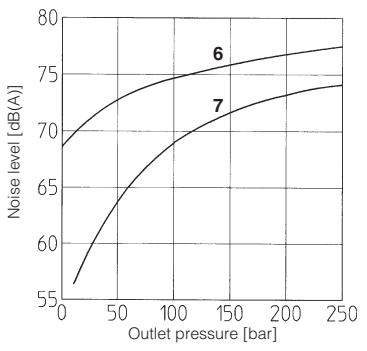


10 DIAGRAMS OF PVPP-*-5076

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

6 = Noise level with full flow
7 = Noise level with flow null

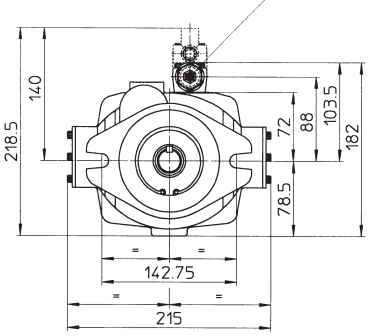




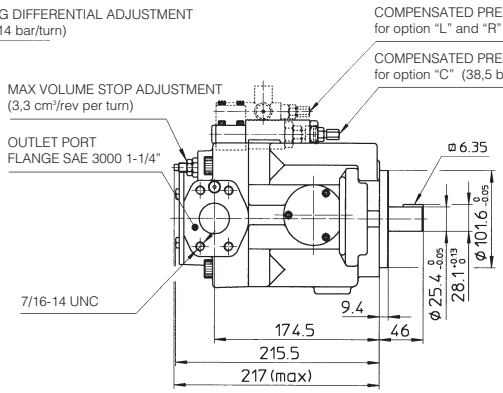
11 DIMENSIONS OF PVPP-*-3023 AND PVPP-*-3033

Version with manual pressure compensator (option “C”)
Dotted line for version with remote pressure compensator (option “R”) and with load sensing (option “L”)

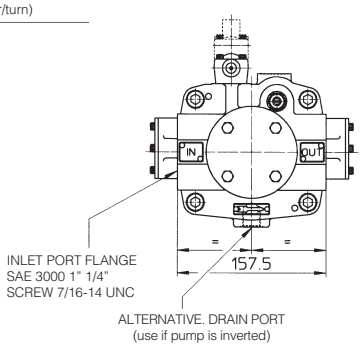
FRONT VIEW



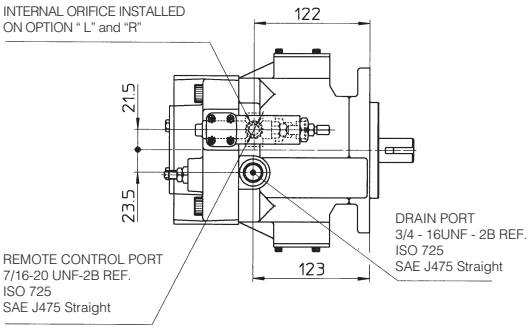
SIDE VIEW

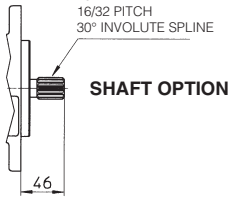


REAR VIEW



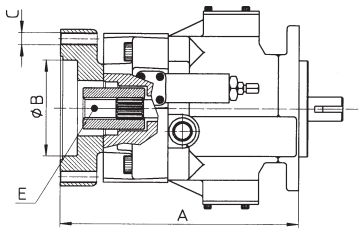
TOP VIEW



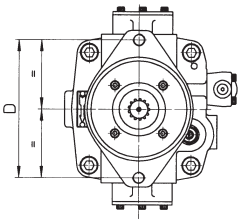


SHAFT OPTION “2”

TOP VIEW WITH THROUGH SHAFT



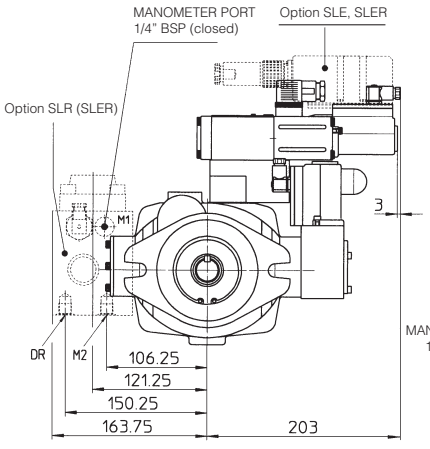
REAR VIEW WITH THROUGH SHAFT



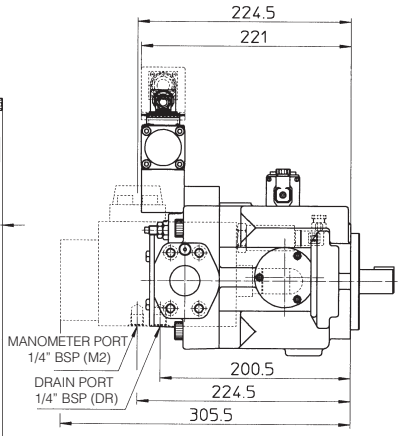
	for PFE-31	for PFE-41
A	238,5	252,5
B	82,5	101,6
C	3/8-16UNC-2B	1/2-13UNC-2B
D	106,4	146
E	SAE 16/32-9T	SAE 16/32-13T

Version with electrohydraulic proportional control type SL
Dotted line for versions with sequence module (option “SLR”) and with integral electronics (option “SLE” and “SLER”)

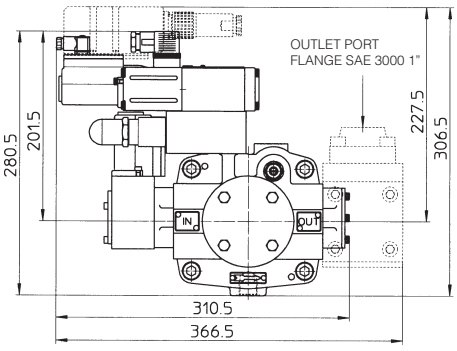
FRONT VIEW



SIDE VIEW



REAR VIEW

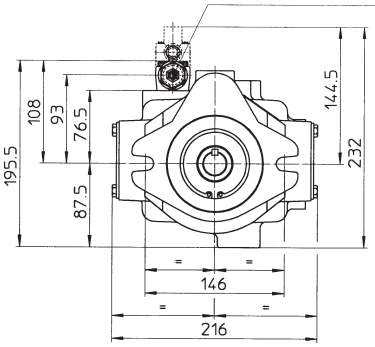


Drawings show pumps with clockwise rotation (option D): pumps with counterclockwise rotation will have inlet and outlet ports reversed.

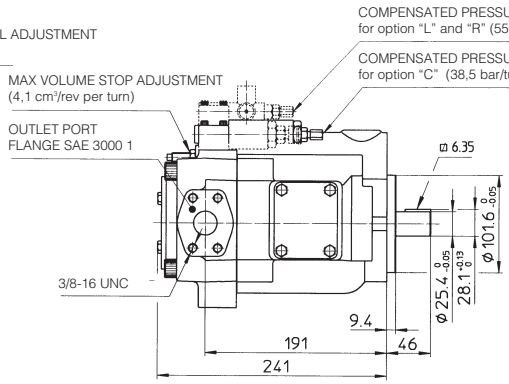
12 DIMENSIONS OF PVPP-*-4048

Version with manual pressure compensator (option "C")
Dotted line for version with remote pressure compensator (option "R") and with load sensing (option "L")

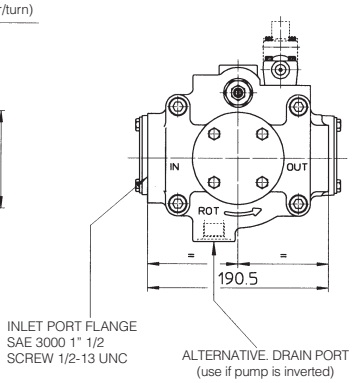
FRONT VIEW



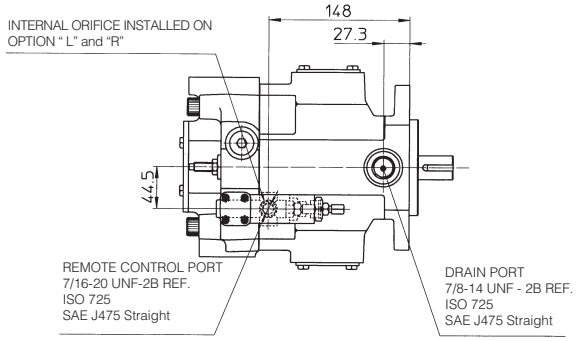
SIDE VIEW

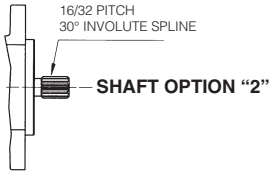


REAR VIEW

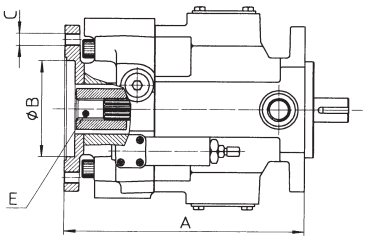


TOP VIEW

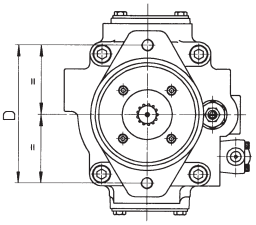




TOP VIEW WITH THROUGH SHAFT



REAR VIEW WITH THROUGH SHAFT



	for PFE-31	for PFE-41
A	238,5	252,5
B	82,5	101,6
C	3/8-16UNC-2B	1/2-13UNC-2B
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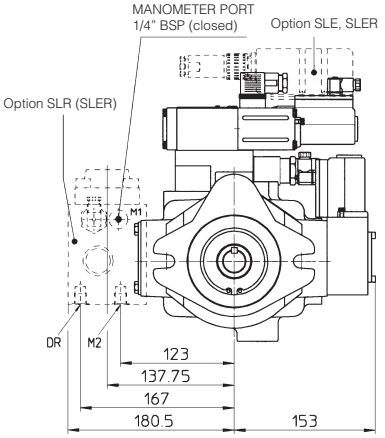
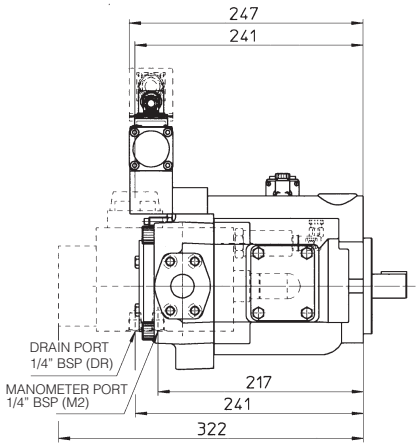
E	SAE 16/32-9T	SAE 16/32-13T

Version with electrohydraulic proportional control type SL
Dotted line for versions with sequence module (option "SLR") and with integral electronics (option "SLE" and "SLER")

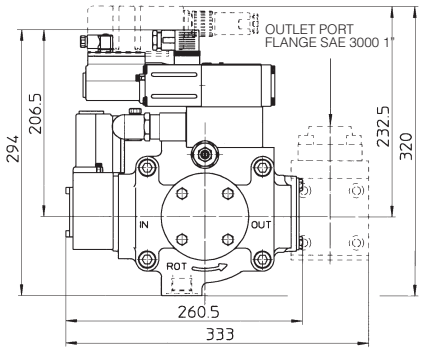
FRONT VIEW



SIDE VIEW



REAR VIEW

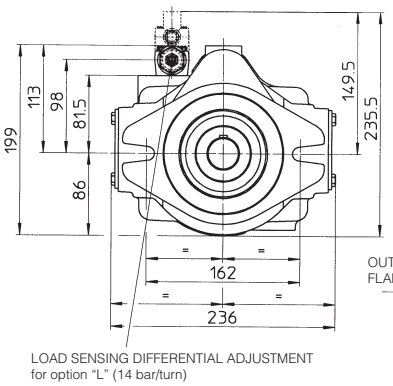


Drawings show pumps with clockwise rotation (option D): pumps with counterclockwise rotation will have inlet and outlet ports reversed.

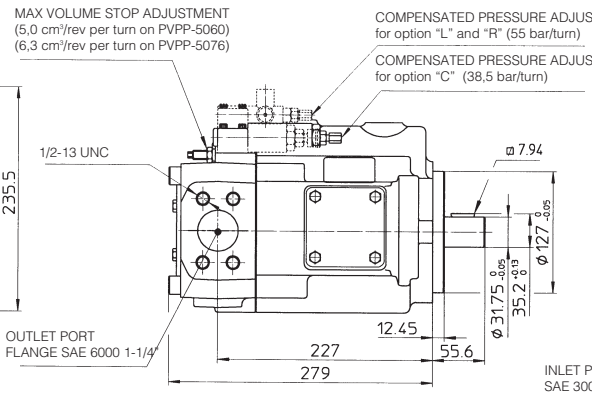
13 DIMENSIONS OF PVPP-*-5060 and PVPP-*-5076

Version with manual pressure compensator (option "C")
Dotted line for version with remote pressure compensator (option "R") and with load sensing (option "L")

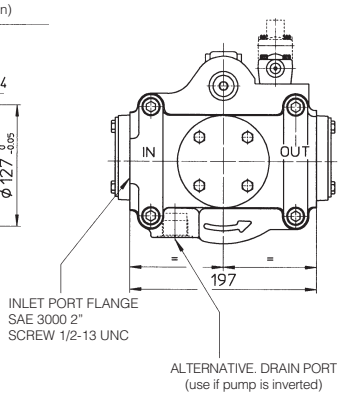
FRONT VIEW



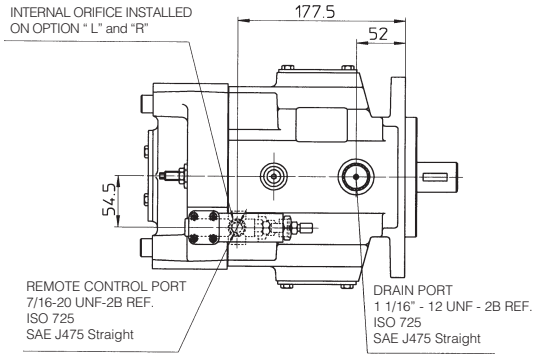
SIDE VIEW



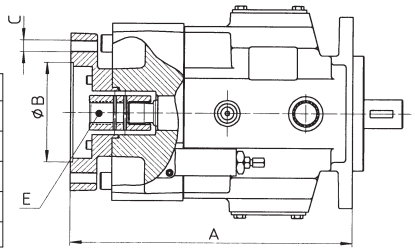
REAR VIEW



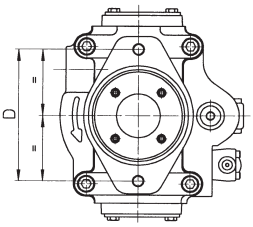
TOP VIEW



TOP VIEW WITH THROUGH SHAFT



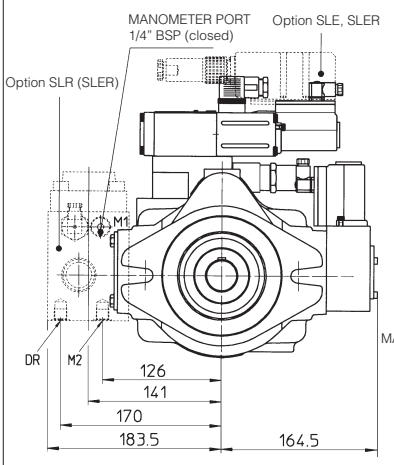
REAR VIEW WITH THROUGH SHAFT



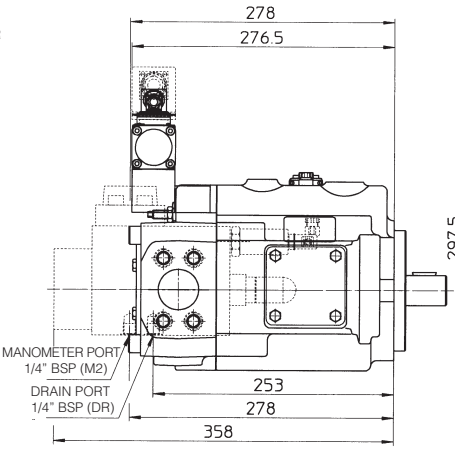
	for PFE-31	for PFE-41	for PFE-51
A	297,5	311,5	321,5
B	82,5	101,6	127
C	3/8-16UNC-2B	1/2-13UNC-2B	5/8-11UNC-2B
D	106,4	146	181
E	SAE 16/32-9T	SAE 16/32-13T	SAE 12/24-14T

Version with electrohydraulic proportional control type SL
Dotted line for versions with sequence module (option "SLR") and with integral electronics (option "SLE" and "SLER")

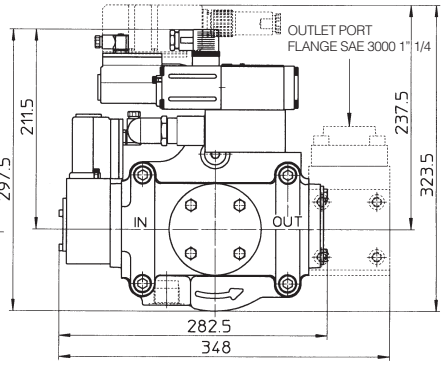
FRONT VIEW



SIDE VIEW



REAR VIEW



Drawing show pumps with clockwise rotation (option D): pumps with counterclockwise rotation will have inlet and outlet ports on the opposite side.