Axial piston pumps

variable displacement, mechanical controls

① Pistons
② Swash plate
③ Servo piston
④ Spring
⑤ Rotating barrel
⑥ Max pressure compensator
⑦ Load sensing compensator
⑧ Remote pressure transducer

PVPC-L-4046
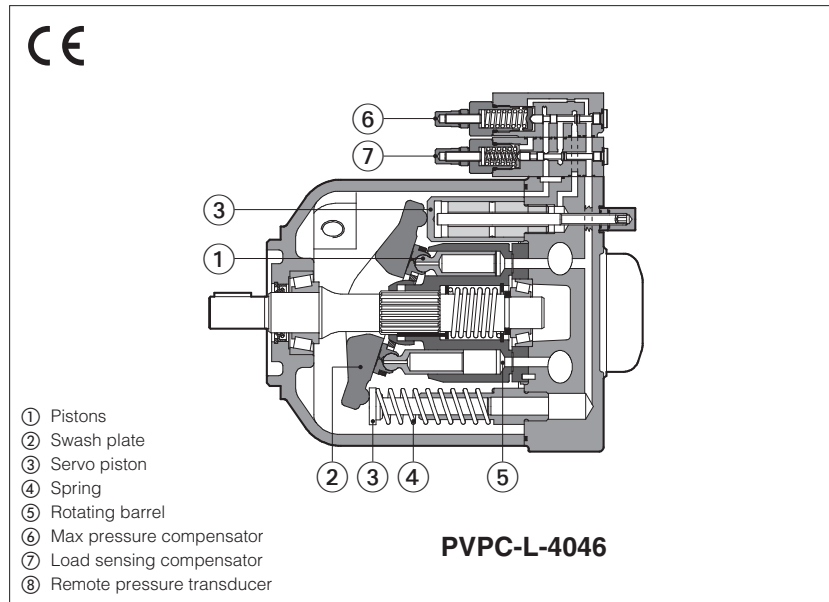
PVPC

Variable displacement axial piston pumps with swash plate design suited for high pressure open circuits.

They are characterized by low noise emission, short response time and flexible operation thanks to the wilde range of mechanical controls, see section ⑫ and ⑬ .

For PVPC pumps with electrohydraulic proportional controls, see tech table AS170.

SAE J744 mounting flange and shaft.

Max displacement	Max pressure working	Max pressure peak
(cm³/rev)	(bar)	(bar)
29, 46, 73	280	350
88	250	315
140	350	420
160	315	390

---

1 MODEL CODE

PVPC	XA	- C	- 4046	/ 1	D	- X	24DC	*	/	*

Variable displacement axial piston pump

Option for pumps with through shaft (1):
XA = intermediate flange SAE A
XB = intermediate flange SAE B
XC = intermediate flange SAE C
  (only for size 5073 and 5090)

Type of control, see sections ⑫ and ⑬ :
C = manual pressure compensator **(2)**
CH = manual pressure compensator, with venting
R = remote pressure compensator **(1)**
L = load sensing (pressure & flow)
LW = constant power (combined pressure & flow) **(3)**

For electrohydraulic proportional controls, see tech table AS170

Size and max displacement (4):
3029 = size 3 - displacement 029 cm³/rev
4046 = size 4 - displacement 046 cm³/rev
5073 = size 5 - displacement 073 cm³/rev
5090 = size 5 - displacement 088 cm³/rev
6140 = size 6 - displacement 140 cm³/rev
6160 = size 6 - displacement 160 cm³/rev

Seals material,
see section ⑤ :
- = NBR
PE = FKM

Series number

Coil voltage, see section ④
(only for CH version)

X = without connector (only for CH version)

See section ④ for available connectors, to be ordered separately

Direction of rotation, viewed at the shaft end:
D = clockwise
S = counterclockwise

Shaft, SAE Standard **(5)**:
1 = keyed
5 = splined

(1) Not available for PVPC size 6, see section ⑬
(2) For PVPC size 6 the compensator type C can be also used for remote pressure control, see section ⑬
(3) For PVPC-LW the requested value of torque setting or power and speed must be specified in the pump order, e.g. 70 Nm or 10 kW at 1450 RPM
(4) Optional intermediate displacements 35 and 53 cm³/rev are available on request
(5) Pumps with ISO 3019/2 mounting flange and shaft (option /M) are available on request

2 GENERAL CHARACTERISTICS

Assembly position - see section 7	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. Suggested maximum line length is 3 m.
Ambient temperature range	**Standard** = -25°C ÷ +80°C **/PE** option -15°C ÷ +80°C
Storage temperature	**Standard** = -40°C ÷ +70°C **/PE** option -20°C ÷ +70°C
Surface protection (pump body)	Black painting RAL9005
Compliance	RoHS Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

3 HYDRAULIC CHARACTERISTICS - based on mineral oil ISO VG 46 at 50 °C

PVPC size		3029		4046		5073		5090		6140		6160	
Max displacement	(cm^3/rev)	29		46		73		88		140		160	
Theoretical max flow at 1450 rpm	(l/min)	42		66,7		105,8		127,6		203		232	
Max pressure working / peak	(bar)	280 / 350		280 / 350		280 / 350		250 / 315		350 / 420		315 / 390	
Min/Max inlet pressure	(bar abs.)	0,8 / 25		0,8 / 25		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		1,5		1,5	
Power consumption at 1450 rpm and at max pressure and displacement	(kW)	20		32		52		55		120		122	
Max torque on the shaft	(shaft type)	Type 1	Type 5	Type 1	Type 5	Type 1	Type 5	Type 1	Type 5	Type 1	Type 5	Type 1	Type 5
	(Nm)	210	270	350	440	670	810	670	810	1300	1660	1300	1660
Max torque at max working pressure	(Nm)	128		203		328		350		780		803	
Speed rating	(rpm)	500 ÷ 3000		500 ÷ 2600		500 ÷ 2600		500 ÷ 2200		500 ÷ 2200		500 ÷ 2000	
Moment of inertia	(Kg/m^2)	0,0020		0,0050		0,0030		0,0030		0,0025		0,0025	
Body volume	(l)	0,7		0,9		1,5		1,5		2,8		2,8	

4 ELECTRICAL CHARACTERISTICS - for PVPC-CH

Insulation class	H
Connector protection degree	IP 65
Relative duty factor	100%
Supply voltage tolerance	± 10%

4.1 COIL VOLTAGE - only for CH version

Average values based ambient/coil temperature of 20°C.

External supply nominal voltage ±10%		**Voltage code**	Power consumption	Nominal current	Coil characteristics
DIRECT CURRENT	12 DC 24 DC	**12DC** **24DC**	19,2 W	1,61 A 0,80 A	Insulation Class: **H** Protection degree: **IP65**

4.2 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 - to be ordered separately

Code of connector	Description
SP-666	Connector IP-65
SP-667	Connector IP-65 but with built-in signal led

5 | SEALS AND HYDRAULIC FLUIDS - for other fluids not included in below table, consult our technical office

Seals, recommended fluid temperature	NBR seals (standard) = -25°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	15÷35 mm²/s - max allowed range: min 10 cSt (at 80°C) - max 1500 cSt at cold startup (-25°C)		
Max fluid contamination level normal operation	ISO4406 class 20/18/13 NAS1638 class 9	see also filter section at	
Max fluid contamination level longer life	ISO4406 class 18/16/11 NAS1638 class 7	www.atos.com or KTF catalog	
Hydraulic fluid	**Suitable seals type**	**Classification**	**Ref. Standard**
Mineral oils	NBR, FKM	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR **(1)**	ISO 12922
Flame resistant with water	NBR	HFC **(1)**	ISO 12922

(1) See section 6

6 | PERFORMANCE RESTRICTIONS WITH FLAME RESISTANT FLUIDS

6.1 HFDU and HFDR - Phosphate ester

PVPC size		**3029**	**4046**	**5073**	**5090**	**6140 / 6160**
Max pressure working / peak	(bar)	200 / 240				**(2)**
Max speed	**(1)** (rpm @ Vmax)	2050	1850	1700	1550	
Ambient temperature range	(°C)	-10 ÷ +80				
Bearing life (% of bearing life with mineral oil)	(%)	90				

(1) With an inlet pressure of 1 bar abs
(2) For information about size 6140, contact Atos technical office
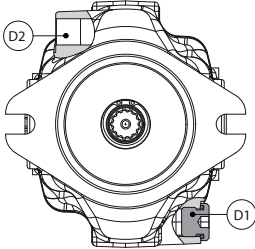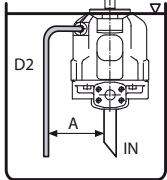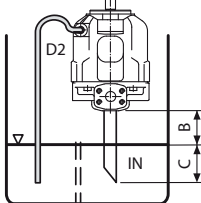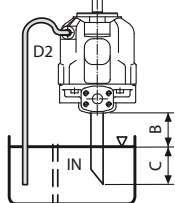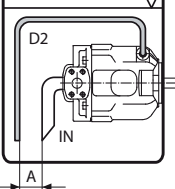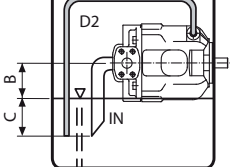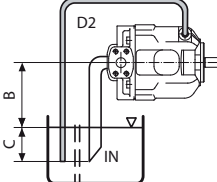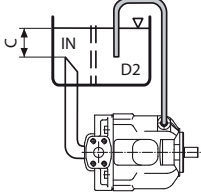
6.2 HFC - Water-glycol (35 ÷ 55 % of water)

PVPC size		**3029**	**4046**	**5073**	**5090**	**6140 / 6160**
Max pressure working / peak	(bar)	180 / 210				**(2)**
Max speed	**(1)** (rpm @ Vmax)	2050	1850	1700	1550	
Ambient temperature range	(°C)	-10 ÷ +60				
Bearing life (% of bearing life with mineral oil)	(%)	40				

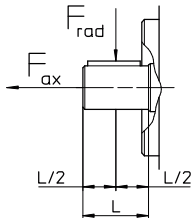**(1)** With an inlet pressure of 1 bar abs
(2) For information about size 6140 and 6160, contact Atos technical office

7 | INSTALLATION POSITION

The pump is supplied with drain D2 open, and D1 plugged. Before installation fill the pump with hydraulic oil for at least 3/4 of its volume, keeping it in horizontal position. With exception of pump mounted below the oil level, we recommend to interpose a baffle plate between inlet and drain line.

VERTICAL INSTALLATION

INSIDE THE TANK
Minimum oil level equal or above the pump mounting surface.
A ≥ 200mm

INSIDE THE TANK
Minimum oil level below the pump mounting surface.
Minimum inlet pressure = 0,8 bar absolute
B ≤ 800mm, C= 200mm

OUTSIDE THE TANK, above oil level
Minimum inlet pressure = 0,8 bar absolute
B ≤ 800mm, C= 200mm

HORIZONTAL INSTALLATION

INSIDE THE TANK
Minimum oil level equal or above the pump mounting surface.
A ≥ 200mm

INSIDE THE TANK
Minimum oil level below the pump mounting surface.
Minimum inlet pressure = 0,8 bar (absolute)
B ≤ 800mm, C= 200mm

OUTSIDE THE TANK, above oil level
Minimum inlet pressure = 0,8 bar (absolute)
B ≤ 800mm, C= 200mm

OUTSIDE THE TANK, below oil level
C= 200mm

IN: inlet line - **D2:** drain line - **A:** minimum distance between inlet and drain line - **B+C:** permissible suction height - **C:** inlet line immersion dept

8 | MAX PERMISSIBLE LOAD ON DRIVE SHAFT

PVPC size			**3029**	**4046**	**5073**	**5090**	**6140**	**6160**
F_{ax} = axial load		N	1000	1500	2000	2000	2000	2000
F_{rad} = radial load		N	1500	1500	3000	3000	3000	3000

9 | VARIATION OF MAX SPEED VS INLET PRESSURE

Inlet pressure	Displacement %					
bar abs.	65	70	80	90	100	
0,8	120	115	105	97	90	**% variation of the max. speed**
0,9	120	120	110	103	95	
1,0	120	120	115	107	100	
1,2	120	120	120	113	106	
1,4	120	120	120	120	112	
1,6	120	120	120	120	117	
2,0	120	120	120	120	120	

Example
Displacement: 80% - Inlet pressure: 1,0 bar - Speed: 115%

10 | MAX DISPLACEMENT SETTING

① Locking displacement limiter screw

② Displacement setting

PVPC size		**3029**	**4046**	**5073**	**5090**	**6140**	**6160**
Max displacement setting range	from ÷ to	20,1 ÷ 28,7	31,8 ÷ 45,4	36,8 ÷ 73,6	44,0 ÷ 87,9	70 ÷ 140	80 ÷ 160
One turn of screw changes pump displacement by approximately	cm³/rev	1,5	2,2	3,2	3,2	6,0	6,0
For locking displacement limiter screw	mm	14	14	17	17	19	19
For displacement setting	mm	4	4	5	5	6	6
Tightening torque	Nm	15 ± 1	15 ± 1	15 ± 1	15 ± 1	20 ± 1	20 ± 1

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

11.1 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

PVPC-*-3029

PVPC-*-4046

—— = Qmax
- - - - = Qmin

PVPC-*-5073 and PVPC-*-5090

PVPC-*-6140, PVPC-*-6160
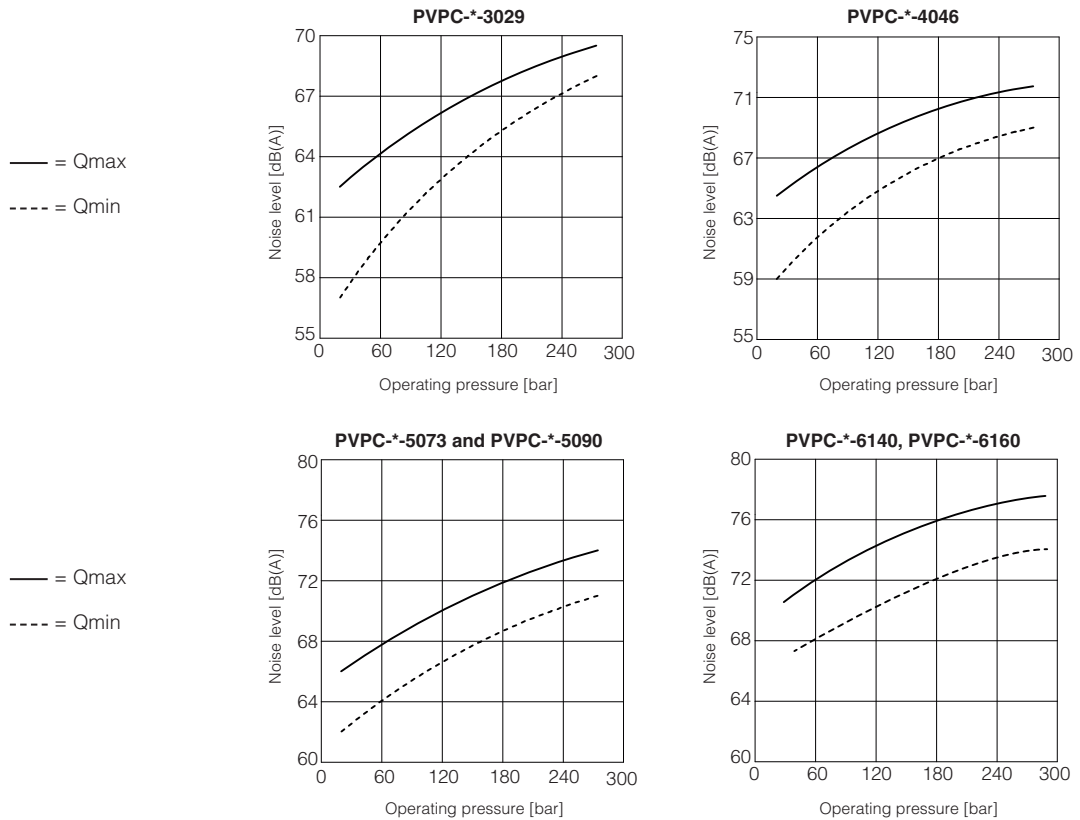
11.2 Operating limits

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

PVPC-*-3029

PVPC-*-4046

PVPC-*-5073

PVPC-*-5090

PVPC-*-6140

PVPC-*-6160

A160
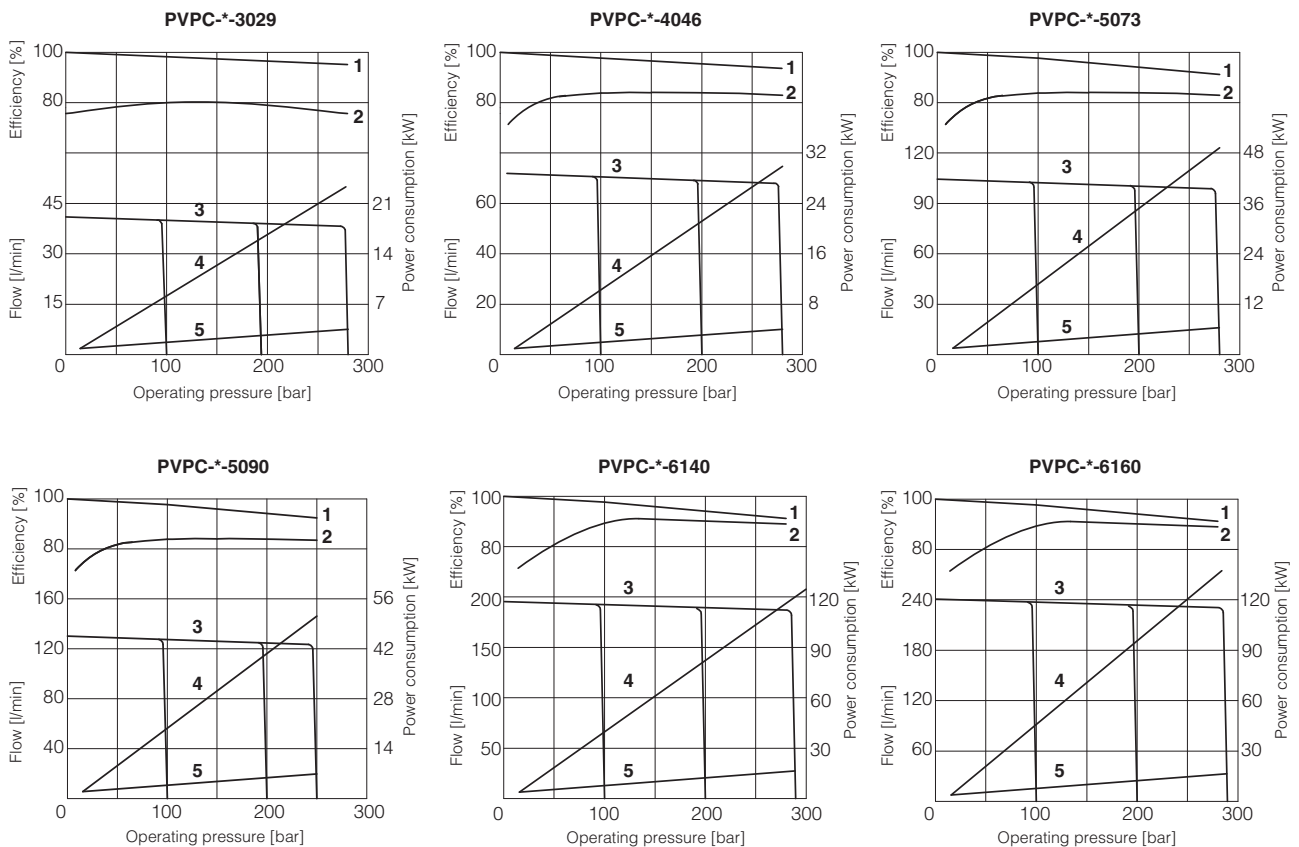
11.3 Response times

Response times and pressure peak due to variation 0% to 100% and 100% to 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	140	36
PVPC-*-4046	140	42
PVPC-*-5073	160	44
PVPC-*-5090	160	44
PVPC-*-6140	170	100
PVPC-*-6160	180	110
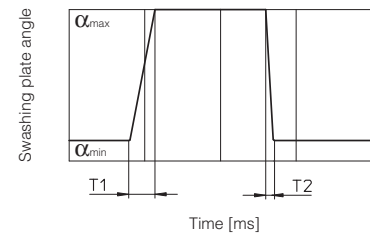
11.4 Minimum power/torque setting for PVPC-LW (constant power regulator)

For the pump correct operation, the power / torque factory setting hast to be higher than the values reported in the below table
In case of lower power/torque setting values, the regulator limits the maximum working pressure to a value lower than the standard setting.

Note: please specify the requested value of torque setting or power and speed in the PVPC-LW pump order, e.g. 70 Nm or 10 kW at 1450 RPM

Pump type	Minimum torque (Nm)	Minimum power (Kw)
PVPC-LW-3029	43	6,7
PVPC-LW-4046	68	10,7
PVPC-LW-5073	113	17,8
PVPC-LW-5090	132	20,7
PVPC-LW-6140	197	30
PVPC-LW-6160	220	34

Type of control: **C**
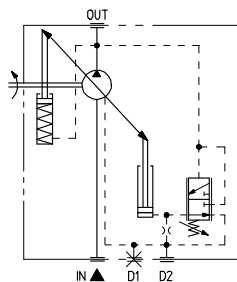
OUT

IN ▲ D1 D2

Manual pressure compensator

The pump displacement is zeroed when the line pressure approaches the setting pressure of the compensator.

Compensator setting range:
20 ÷ 280 bar for 3029, 4046, 5073
20 ÷ 250 bar for 5090

Compensator standard setting:
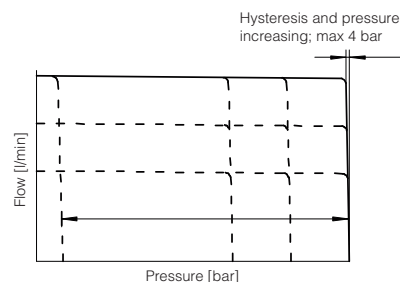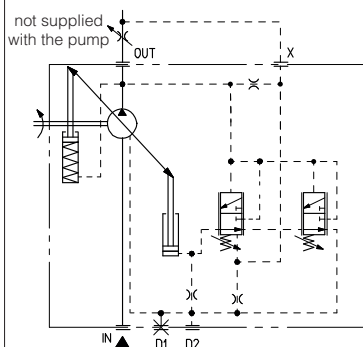280 bar for 3029, 4046, 5073
250 bar for 5090

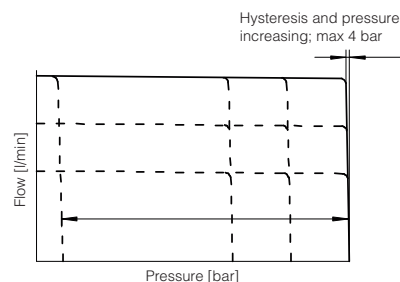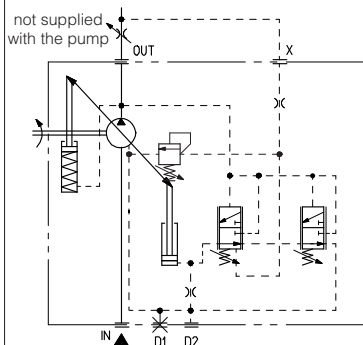Hysteresis and pressure increasing; max 4 bar

Flow [l/min]

Pressure [bar]

Type of control: **CH**

OUT

IN ▲ D1 D2
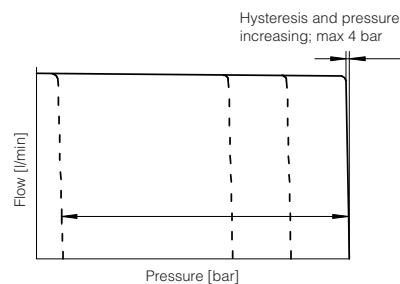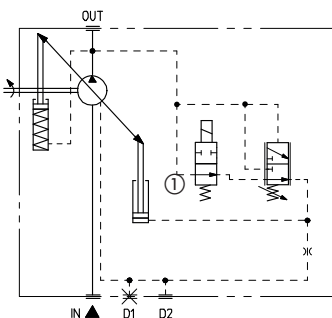
① solenoid venting valve

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.

Venting valve solenoid voltage, see section **4**
Venting valve OFF = null displacement
Venting valve ON = max displacement

Compensator setting range:
20 ÷ 280 bar for 3029, 4046, 5073
20 ÷ 250 bar for 5090

Compensator standard setting:
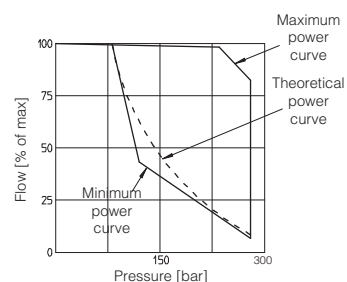280 bar for 3029, 4046, 5073
250 bar for 5090

Hysteresis and pressure increasing; max 4 bar

Flow [l/min]

Pressure [bar]

Type of control: **R**

(1) not supplied with the pump

OUT X

IN ▲ D1 D2
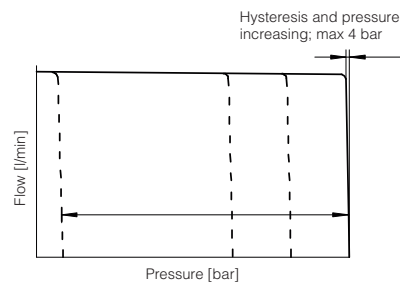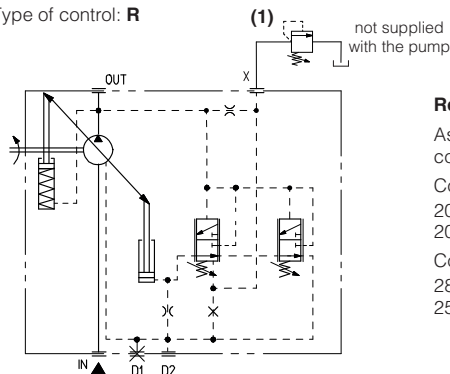
Remote pressure compensator

As C, but predisposed with X piloting port for connection of a remote pilot relief valve **(1)**.

Compensator setting range:
20 ÷ 280 bar for 3029, 4046, 5073
20 ÷ 250 bar for 5090

Compensator standard setting:
280 bar for 3029, 4046, 5073
250 bar for 5090

Hysteresis and pressure increasing; max 4 bar

Flow [l/min]

Pressure [bar]

Type of control: **L**

not supplied with the pump

OUT X

IN ▲ D1 D2

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 ÷ 280 bar for 3029, 4046, 5073
20 ÷ 250 bar for 5090

Compensator standard setting:
280 bar for 3029, 4046, 5073
250 bar for 5090

Differential pressure setting range: 10 ÷ 40 bar
Differential pressure standard setting: 14 bar

Hysteresis and pressure increasing; max 4 bar

Flow [l/min]

Pressure [bar]

Type of control: **LW**

not supplied with the pump
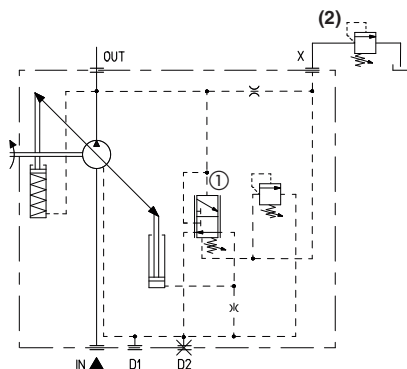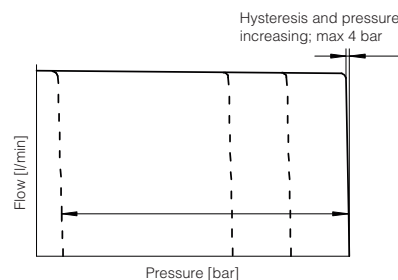
OUT X

IN ▲ D1 D2

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.
See section 11.4 for min power/torque setting

Maximum power curve

Theoretical power curve

Minimum power curve

Flow [% of max]

100
75
50
25
0

150   300

Pressure [bar]

Type of control: **C**

Manual pressure compensator

The pump displacement is zeroed when the line pressure approaches the setting pressure of the compensator.

Compensator setting range:
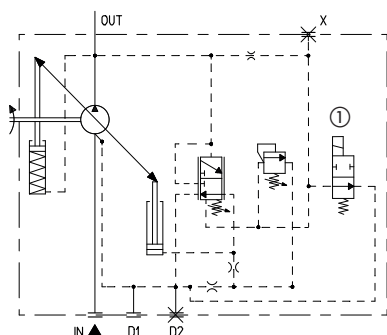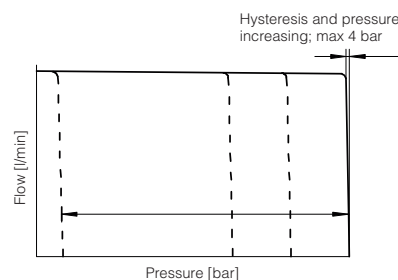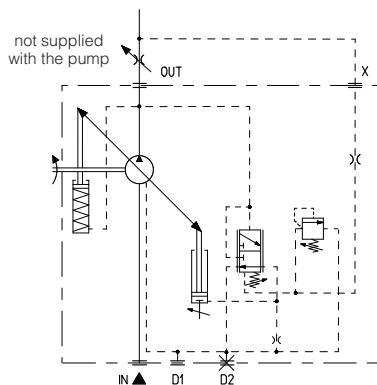20 ÷ 350 bar for PVPC-C-6140
20 ÷ 315 bar for PVPC-C-6160

Compensator standard setting:
350 bar for PVPC-C-6140
315 bar for PVPC-C-6160

Note: do not modify the setting of differential pressure compensator ①

(2): The pump max pressure can be remotely controlled as **-R** control type, connecting the X port to a pilot relief valve. The valve is not supplied with the pump, it needs to be ordered separately

---

Type of control: **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.

Venting valve solenoid voltage, see section $\boxed{4}$
Venting valve OFF = null displacement
Venting valve ON = max displacement

Compensator setting range:
20 ÷ 350 bar for PVPC-C-6140
20 ÷ 315 bar for PVPC-C-6160

Compensator standard setting:
350 bar for PVPC-C-6140
315 bar for PVPC-C-6160

① solenoid venting valve

Type of control: **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 for PVPC-C-6140
20 ÷ 315 bar for PVPC-C-6160

Compensator standard setting:
350 bar for PVPC-C-6140
315 bar for PVPC-C-6160

Differential pressure setting range: 10 ÷ 40 bar
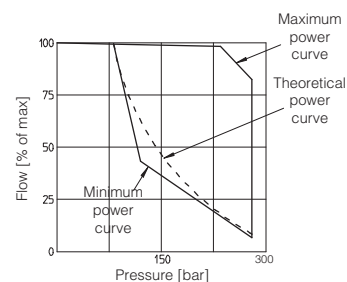Differential pressure standard setting: 14 bar
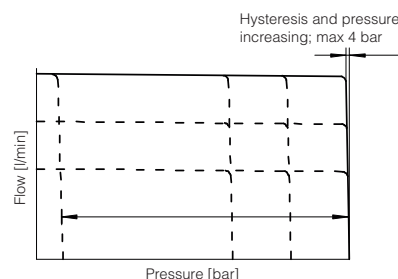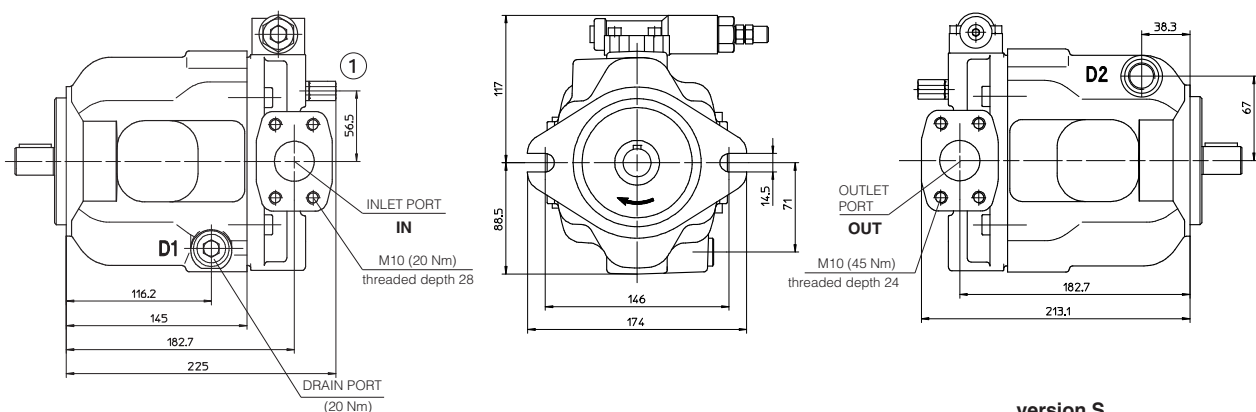

Type of control: **LW**
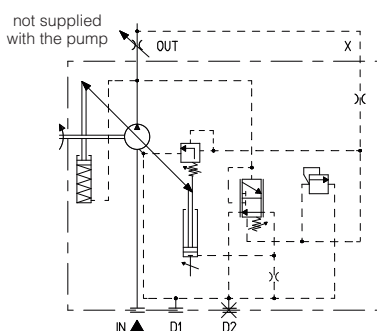
Constant power

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.
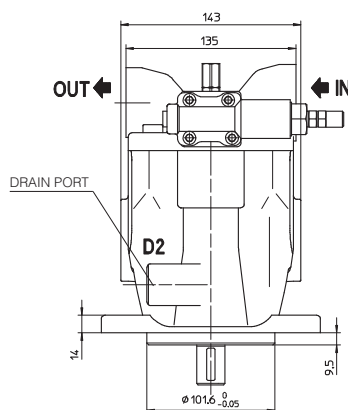**See section 11.4 for min power/torque setting**

INLET PORT
IN

M10 (20 Nm)
threaded depth 28

D1

DRAIN PORT
(20 Nm)

OUTLET PORT
OUT

M10 (45 Nm)
threaded depth 24

D2

version S
counterclockwise rotation
viewed at the shaft end

IN

OUT

Pumps with counterclockwise rotation
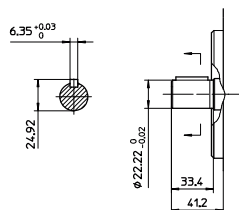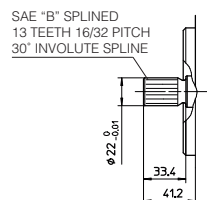(**S**) have the IN and OUT inverted and
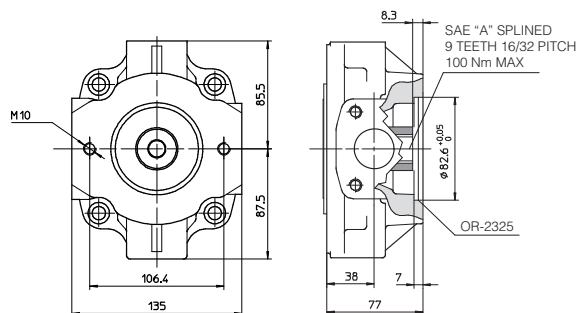consequently the position of the
compensators

PORTS DIMENSION

IN   = Flange SAE 3000 1 1/4"
OUT   = Flange SAE 6000 3/4"
D1, D2 = 1/2" BSPP
① = Screw for max displacement limiter
Not available for version PVPCXB

DRAIN PORT

D2

Mass [kg]	
PVPC-*-3029	18
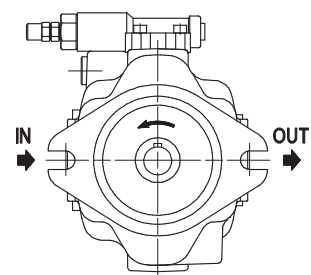
SHAFT TYPE "1"

SHAFT TYPE "5"

SAE "B" SPLINED
13 TEETH 16/32 PITCH
30° INVOLUTE SPLINE

CODE XA - INTERMEDIATE FLANGE SAE "A"
FOR PFE-31

M10

SAE "A" SPLINED
9 TEETH 16/32 PITCH
100 Nm MAX

OR-2325

CODE XB - INTERMEDIATE FLANGE SAE "B"
FOR PFE-41 or PVPC-3029
screw for max displacement setting not available

M12

SAE "B" SPLINED
13 TEETH 16/32 PITCH
135 Nm MAX

OR-3400

PORTS DIMENSION

IN	= Flange SAE 3000 1 1/2"
OUT	= Flange SAE 6000 1"
D1, D2	= 1/2" BSPP
①	= Screw for max displacement limiter

Mass [kg]	
PVPC-*-4046	24

version S
counterclockwise rotation
viewed at the shaft end

Pumps with counterclockwise rotation (**S**) have the IN and OUT inverted and consequently the position of the compensators
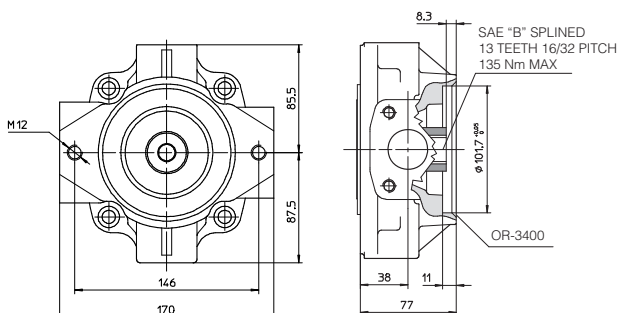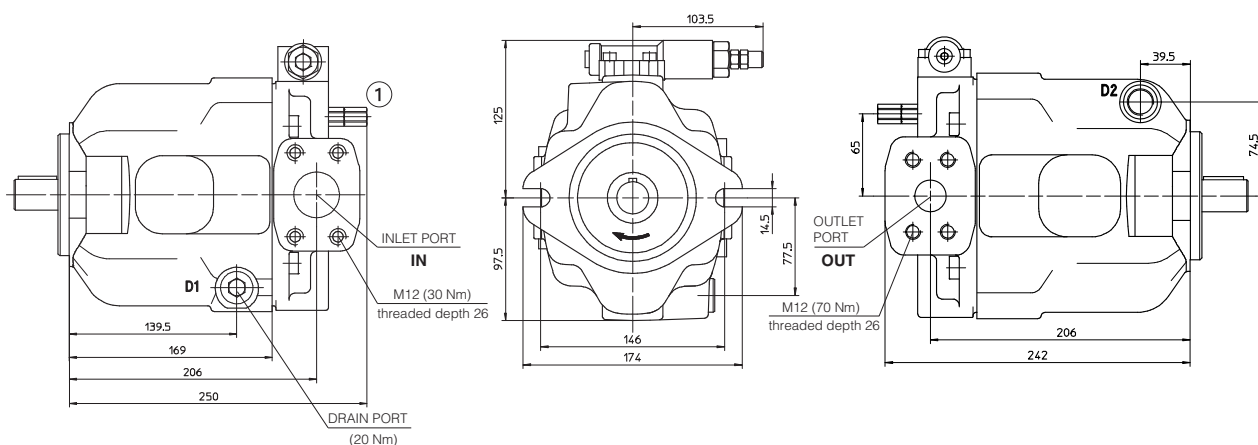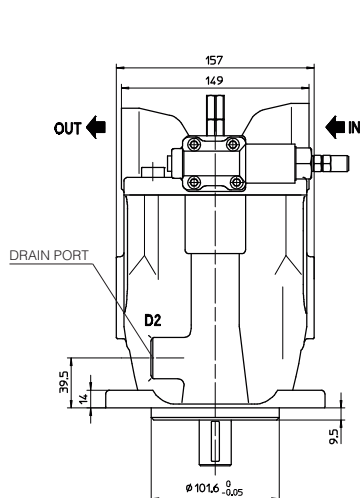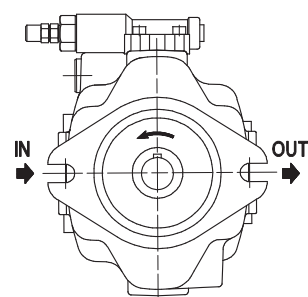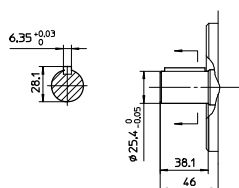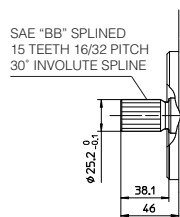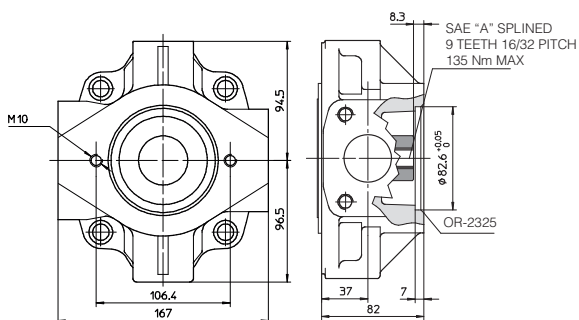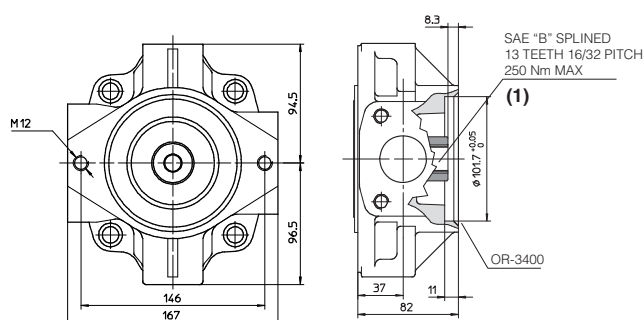
SHAFT TYPE "1"

SHAFT TYPE "5"

SAE "BB" SPLINED
15 TEETH 16/32 PITCH
30° INVOLUTE SPLINE

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

SAE "A" SPLINED
9 TEETH 16/32 PITCH
135 Nm MAX

OR-2325

**CODE XB - INTERMEDIATE FLANGE SAE "B"
FOR PFE-41, PVPC-3029 or PVPC-4046** (see note **1**)

SAE "B" SPLINED
13 TEETH 16/32 PITCH
250 Nm MAX

(1)

OR-3400

(1) For coupling with PVPC-4046 rear pump, the coupling code G-PVPC-40/46 (SAE BB splined, 15 teeth) must be ordered separately
Drawing shows pumps with clockwise rotation (option D): pumps with counterclockwise rotation (option S) will have inlet and outlet ports inverted
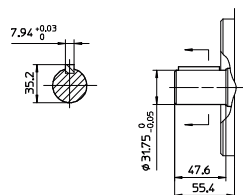
INLET PORT
IN

M12 (30 Nm)
threaded depth 25

DRAIN PORT
(30 Nm)

OUTLET PORT
OUT

M14 (60 Nm)
threaded depth 23

D2

PORTS DIMENSION

IN = Flange SAE 3000 2"
OUT = Flange SAE 6000 1 1/4"
D1, D2 = 3/4" BSPP
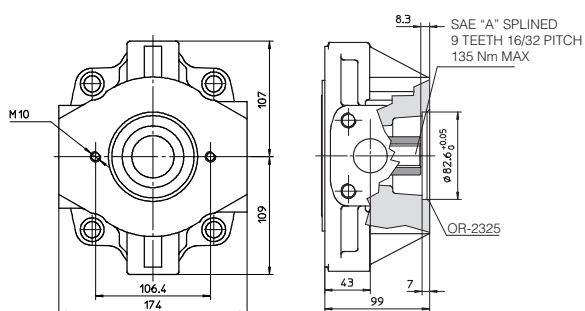① = Screw for max displacement limiter
Not available for PVPCXC

DRAIN PORT

D2

version S
counterclockwise rotation
viewed at the shaft end

IN   OUT

Pumps with counterclockwise rotation
(**S**) have the IN and OUT inverted and
consequently the position of the
compensators

Mass [kg]	
PVPC-*-5073	33
PVPC-*-5090	

SHAFT TYPE "1"

7.94 +0.03/0

35.2

∅ 31.75 0/-0.05

47.6
55.4

SHAFT TYPE "5"

SAE "C" SPLINED
14 TEETH 12/24 PITCH
30° INVOLUTE SPLINE
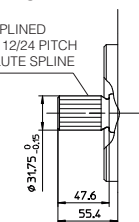
∅ 31.75 0/-0.05

47.6
55.4

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

M10

107
109

106.4
174

SAE "A" SPLINED
9 TEETH 16/32 PITCH
135 Nm MAX

8.3

∅ 82.6 +0.05/0

OR-2325

43
7
99

**CODE XB - INTERMEDIATE FLANGE SAE "B"
FOR PFE-41, PVPC-3029 or PVPC-4046** (see note **1**)

M12

107
109

146
174

SAE "B" SPLINED
13 TEETH 16/32 PITCH
330 Nm MAX

8.3

(1)

∅ 101.7 +0.05/0

OR-3400

43
11
99
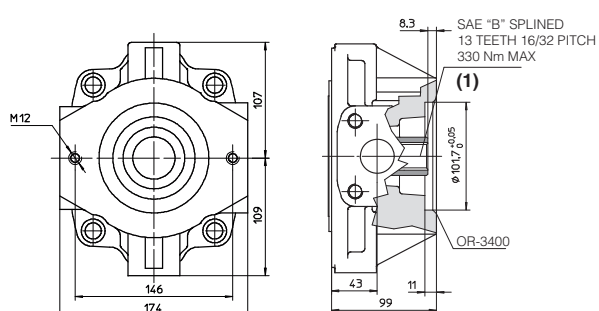
CODE XC - INTERMEDIATE FLANGE SAE "C" FOR PFE-51, PVPC-5073 or PVPC-5090
screw for max displacement setting not available

M16

107
109

181
217

SAE "C" SPLINED
14 TEETH 12/24 PITCH
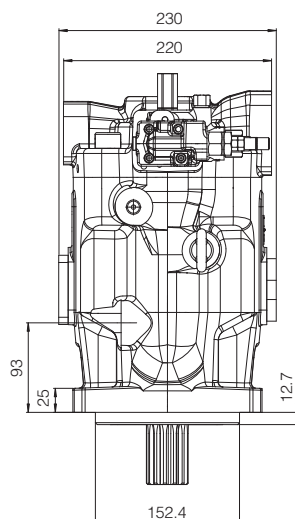440 Nm MAX

8.3

∅ 127.1 +0.05/0

OR-3400

43
13
104
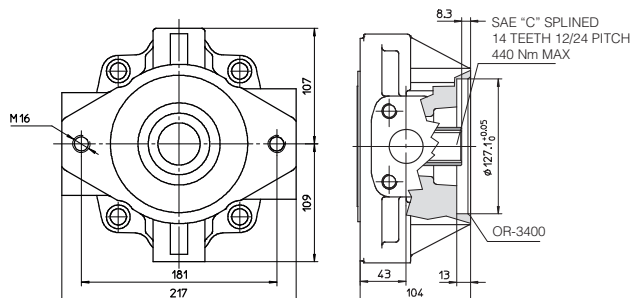
(1) For coupling with PVPC-4046 rear pump, the coupling code G-PVPC-73/46 (SAE BB splined, 15 teeth) must be ordered separately
Drawing show pumps with clockwise rotation (option D): pumps with counterclockwise rotation (option S) will have inlet and outlet ports inverted
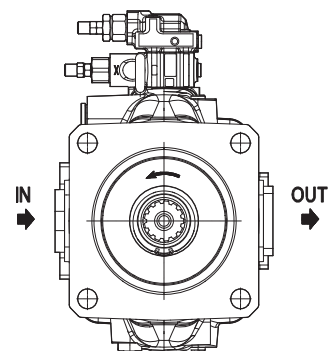
INLET PORT
IN

110

Ø20.6

OUTLET PORT
OUT

220

138.5

80.8

161.6

80.8

D2

91.5

105

①

D1

185.4

244.4

290.4

352.4

115 115

230

290.4

334.4

M12 (30 Nm)
threaded depth 25

M14 (60 Nm)
threaded depth 23
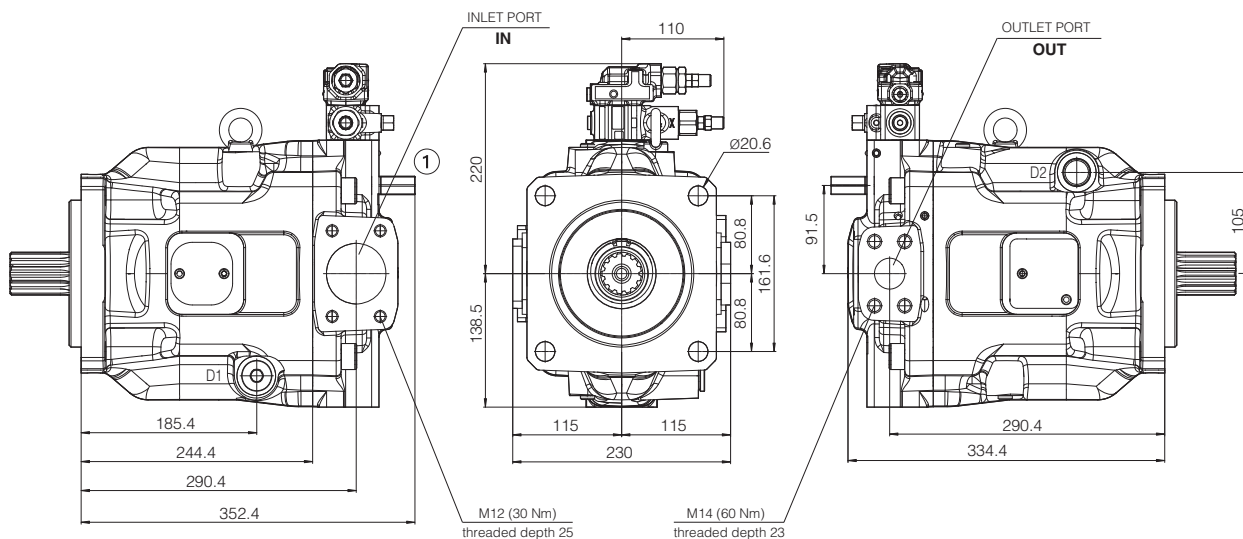
PORTS DIMENSION

IN = Flange SAE 3000 2 1/2"
OUT = Flange SAE 6000 1 1/4"
D1, D2 = 1 1/16"-12UNF
① = Screw for max displacement limiter

230
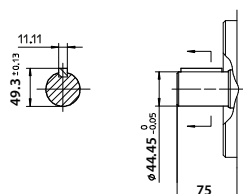
220

93

25

12.7

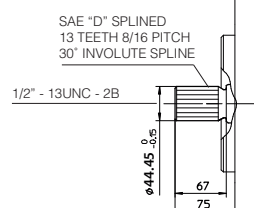152.4

version S
counterclockwise rotation
viewed at the shaft end

IN

OUT

Pumps with counterclockwise rotation
(**S**) have the IN and OUT inverted and
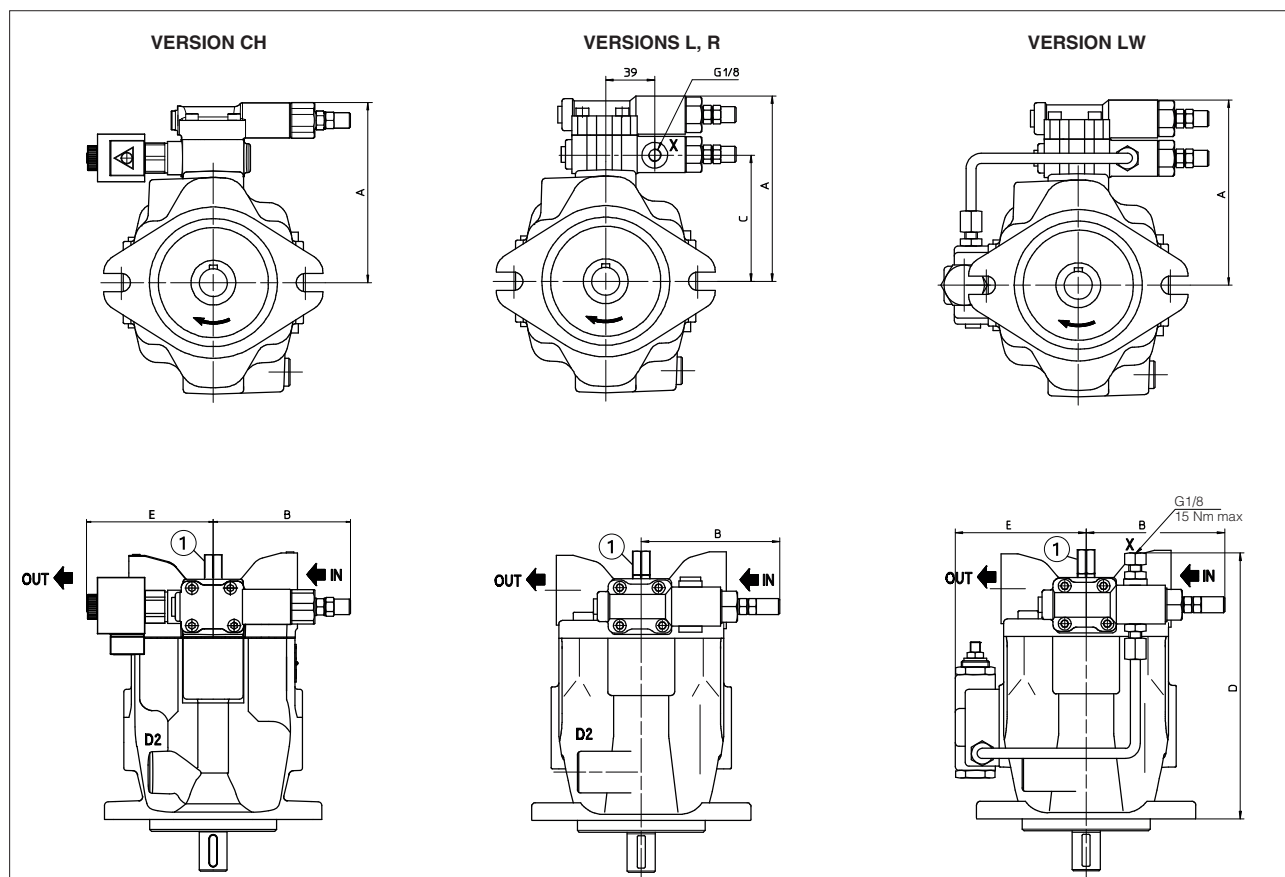consequently the position of the
compensators

Mass [kg]	
PVPC-*-6140	69
PVPC-*-6160	

SHAFT TYPE "1"

11.11

49.3 ±0.13

Ø44.45 0 -0.05

75

SHAFT TYPE "5"

SAE "D" SPLINED
13 TEETH 8/16 PITCH
30° INVOLUTE SPLINE

1/2" - 13UNC - 2B

Ø44.45 0 -0.05

67

75

18.1 PVPC size 3, 4 and 5

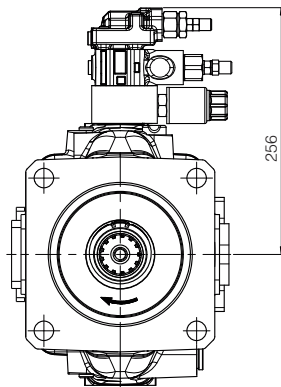| VERSION CH	VERSIONS L, R	VERSION LW

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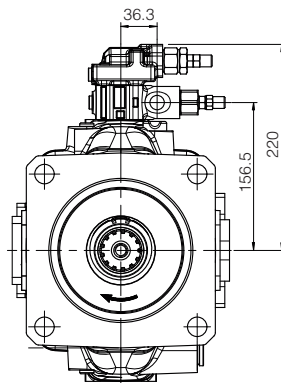
Drawing shows pumps with clockwise rotation (option D): pumps with counterclockwise rotation (option S) will have inlet and outlet ports inverted and also the consequently position of the control groups

Pump type	Version	A	B	C	D	E	Mass (kg)
PVPC-*-3029	CH	144	111	-	-	102	22
	L -R	144	111	100	-	-	19,2
	LW	144	111	-	211	104	20
PVPC-*-4046	CH	153	111	-	-	102	28
	L -R	153	111	109	-	-	25,2
	LW	153	111	-	235	111	26
PVPC-*-5073 PVPC-*-5090	CH	166	111	-	-	102	36,9
	L -R	166	111	122	-	-	34,2
	LW	166	111	-	258	120	35

18.2 PVPC size 6

VERSION CH	VERSION L	VERSION LW
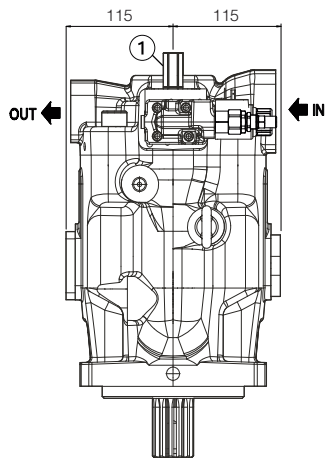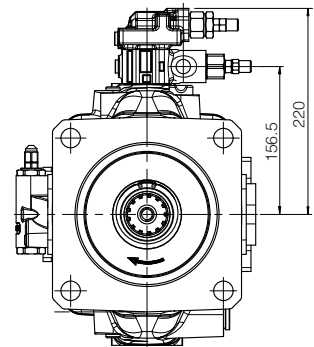
Mass [kg]	
PVPC-*-6140	74
PVPC-*-6160	
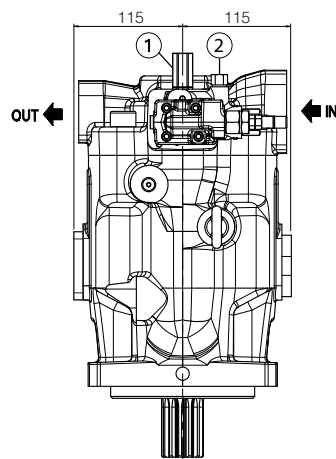
Mass [kg]	
PVPC-*-6140	70.2
PVPC-*-6160	
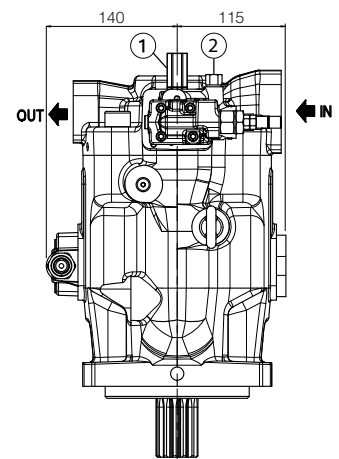
Mass [kg]	
PVPC-*-6140	71
PVPC-*-6160	

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.

② = Loadsensing port G1/8" (tightening torqe 15 Nm).

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

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19 RELATED DOCUMENTATION

A900	Operating and maintenance information for pumps
K800	Electric and electronic connectors