

DESCRIPTION

The multiple pumps are available in STANDARD and T.C. (short-tandem) versions.

The versatility of our pumps permits the assembling of a multiple pump using a single pump and making only a simply operation of disassembly/assembly.

- All our standard pumps are already present to engage another pump.
- A very limited quantity of kit "flange connections and accessories" gives a small stock value and mainly a rapid assistance to final users.

- The total of the torque absorbed by each pump shall be not in excess of the max. allowed torque on main shaft (see below scheme)

The max. torque absorbed by the follow pumps shall be not in excess of the torque transmitted by the rear draft gear.

- The power absorbed by the multiple pump is determined from total powers that each pump absorbed and it is calculated as follow:

$$P = \frac{c \times n \times p}{603000}$$

in which:

P = Max. absorbed power (Kw)

c = Pump displacement (cm³/rev)

n = Max. working speed (rpm)

p = Max. working pressure (bar)

TECHNICAL FEATURES

- Performance of units composing multiple pumps are the same as these of the corresponding single pumps.
- Max. rotation speed of multiple pumps is given by slower pump.
- Max. torque absorbed by each simple unit to grant a working limit at max. working pressure is calculated in the following way:

$$M = \frac{c \times p}{64}$$

in which:

M = Max absorbed input torque (ft·lbs)

c = Pump displacement (cm³/rev)

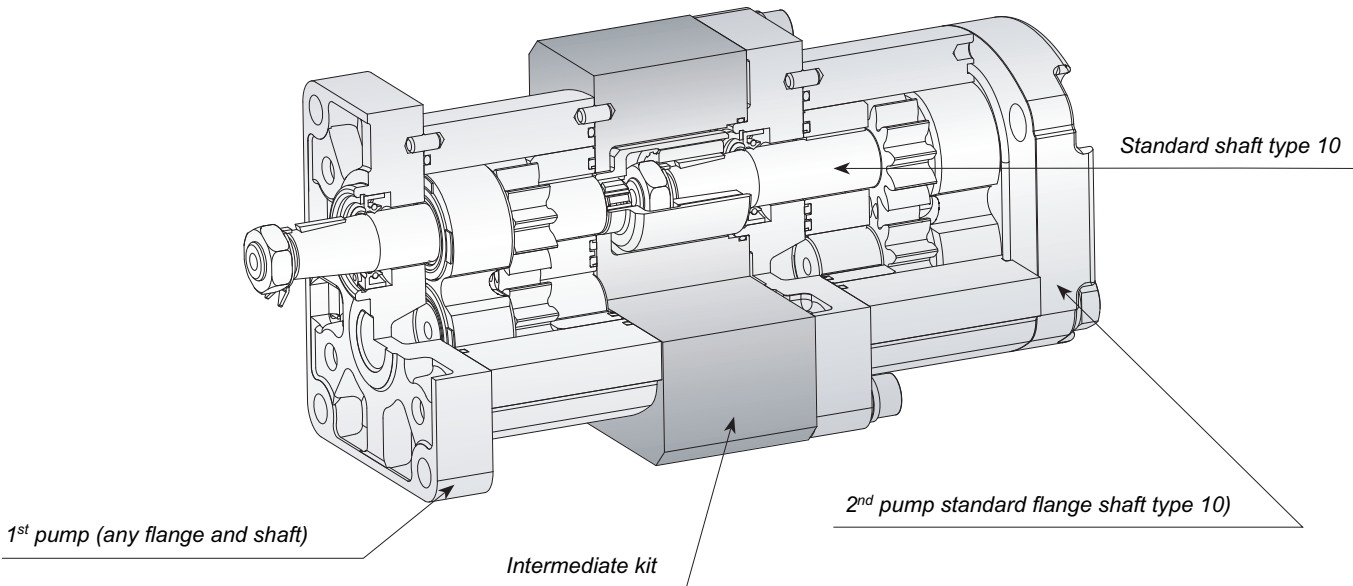
p = Max. working pressure (bar)

	Torque transmitted by the draft pump [Nm] (ft·lbs)								Torque transmitted by rear draft [Nm] (ft·lbs)
	Type 10	Type 11	Type 12	Type 13	Type 14	Type 15	Type 16	Type 17/27	
GR 1	18 (13.3)	18 (13.3)		30 (22.1)	30 (22.1)	30 (22.1)		12 (8.9)	18 (13.3)
GR 2	98 (72.3)	98 (72.3)	98 (72.3)	98 (72.3)	98 (72.3)	98 (72.3)	98 (72.3)	70 (51.6)	75 (55.3)
GR 3	240 (177)			240 (177)	240 (177)				240 (177)
GR 4	750 (553)								750 (553)

ORDERING CODE – TANDEMS

Tandem STANDARD

Are possible different combinations of all the group pumps
(Gr.1 - Gr.2 - Gr.3 and Gr.4).
The suction of each pump is independent.

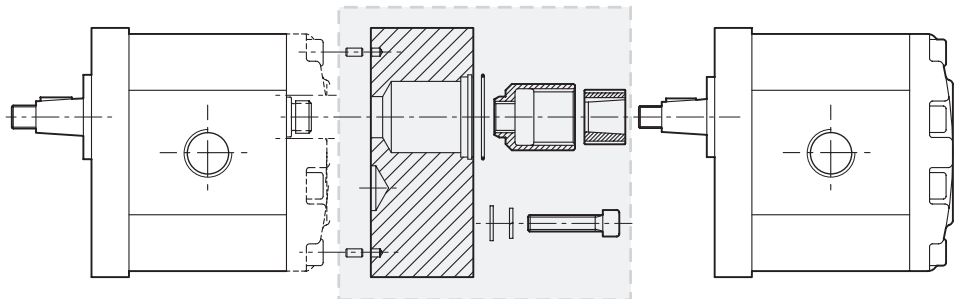


Example of ordering code

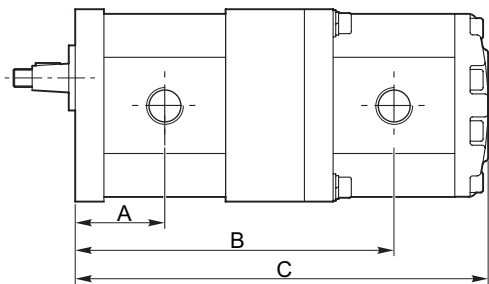
2SP A14	+	1SP A4.2	D	SAE A	-	10	G	(VT)	
2SP A14		First pump type							
1SP A4.2		Second pump type							
D		Clockwise rotation							D = Clockwise rotation S = Anticlockwise rotation
SAE A		Flange and version first pump flange							See corresponding single pump
10		Shaft type first pump							
G		Connections type							
(VT)		Optional							

Example of ordering code

3SP A36	+	2SP A14	+	1SP A3.2	D	SAE B	-	10	G	(VT)	
3SP A36		First pump type									
2SP A14		Second pump type									
1SP A3.2		Third pump type									
D		Clockwise rotation									D = Clockwise rotation S = Anticlockwise rotation
SAE B		Flange and version first pump flange									See corresponding single pump
10		Shaft type first pump									
G		Connections type									
(VT)		Optional									



kit order code 010933000000000



kit order code 010933000000000

mm (inch)

		A	B	C
3SP 62	62	80.4 (3.165)	283.7 (11.169)	367.6 (14.472)
	52	80.4 (3.165)	279.7 (11.012)	359.6 (14.157)
	44	80.4 (3.165)	276.2 (10.874)	352.6 (13.882)
	36	80.4 (3.165)	273.2 (10.756)	346.6 (13.646)
	33	80.4 (3.165)	272.7 (10.736)	343.6 (13.528)
	29	80.4 (3.165)	270.2 (10.638)	340.6 (13.409)
	22	80.4 (3.165)	267.2 (10.520)	334.6 (13.173)
3SP 52	19	80.4 (3.165)	265.7 (10.461)	331.6 (13.055)
	52	76.4 (3.008)	271.7 (10.697)	351.6 (13.843)
	44	76.4 (3.008)	268.2 (10.559)	344.6 (13.567)
	36	76.4 (3.008)	265.2 (10.441)	338.6 (13.331)
	33	76.4 (3.008)	263.7 (10.382)	335.6 (13.213)
	29	76.4 (3.008)	262.2 (10.323)	332.6 (13.094)
	22	76.4 (3.008)	259.2 (10.205)	326.6 (12.858)
3SP 44	19	76.4 (3.008)	257.7 (10.146)	323.6 (12.740)
	44	72.9 (2.870)	261.2 (10.283)	337.6 (13.291)
	36	72.9 (2.870)	258.2 (10.165)	331.6 (13.055)
	33	72.9 (2.870)	256.7 (10.106)	328.6 (12.937)
	29	72.9 (2.870)	255.2 (10.047)	325.6 (12.819)
	22	72.9 (2.870)	252.2 (9.929)	319.6 (12.583)
	19	72.9 (2.870)	250.7 (9.870)	316.6 (12.465)

kit order code 010933000000000

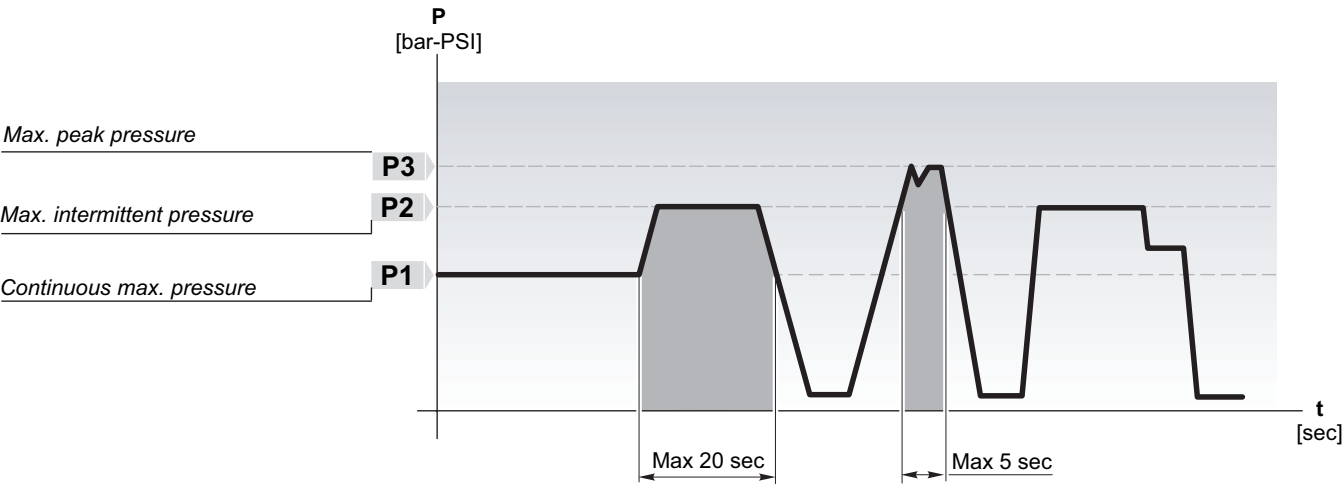
mm (inch)

		A	B	C
3SP 36	36	69.9 (2.752)	252.2 (9.929)	325.6 (12.819)
	33	69.9 (2.752)	250.7 (9.870)	322.6 (12.701)
	29	69.9 (2.752)	249.2 (9.811)	319.6 (12.583)
	22	69.9 (2.752)	246.2 (9.693)	313.6 (12.346)
	19	69.9 (2.752)	244.7 (9.634)	310.6 (12.228)
	33	68.4 (2.693)	247.7 (9.752)	319.6 (12.583)
	29	68.4 (2.693)	246.2 (9.693)	316.6 (12.465)
3SP 33	22	68.4 (2.693)	243.2 (9.575)	310.6 (12.228)
	19	68.4 (2.693)	241.7 (9.516)	307.6 (12.110)
	29	66.9 (2.634)	243.2 (9.575)	313.6 (12.346)
	22	66.9 (2.634)	240.2 (9.457)	307.6 (12.110)
	19	66.9 (2.634)	238.7 (9.398)	304.6 (11.992)
	22	63.9 (2.516)	234.2 (9.220)	301.6 (11.874)
	19	63.9 (2.516)	232.7 (9.161)	298.6 (11.756)
3SP 22	19	62.4 (2.457)	229.7 (9.043)	295.6 (11.655)

SEE PAGE 301 FOR PRICES

Definition of pressures

The pumps can be subjected to the pressures P1, P2 or P3 indicated in the performance tables. The following diagram illustrates the definitions and applicability of these, compared to the rotation speed limits included.



Hydraulic measures

Q Flow	[l/min - Gal/min]
M Torque	[Nm - lbf.in]
P Power	[kW - HP]
V Displacement	[cm ³ /rev - in ³ /rev]
N Speed	[min ⁻¹ - rpm]
Δp Pressure	[bar - PSI]

η_v Volumetric efficiency

η_m Mechanical efficiency

Useful formulas

$$Q = V \text{ [cm}^3\text{/rev]} \times \eta_v \times n \times 10^{-3} \text{ l/min}$$
$$M = \frac{\Delta p \text{ [bar]} \times V \text{ [cm}^3\text{rev]}}{62.83 \times \eta_m} \text{ Nm}$$
$$P = \frac{\Delta p \text{ [bar]} \times V \text{ [cm}^3\text{rev]} \times n}{600 \times 1000 \times \eta_t} \text{ kW}$$

Conversion factors

1 l/min = 0.2641 US Gal/min
1 Nm = 8.851 in·lbs
1 Nm = 0.7375 ft·lbs
1 N = 0.2248 lbs
1kW = 1.34 HP
1cm ³ /giro = 0.061 in ³ /rev
1 bar = 14.5 PSI
1 mm = 0.0394 in
1 kg = 2.205 lbs

Hydraulic fluids

It is advisable to use hydraulic oils of mineral origin with anti-foaming, anti-oxidant and anti-corrosion characteristics and a high viscosity index;

- Recommended viscosity $15 \div 92 \text{ mm}^2/\text{s}$ (cSt)
- Start-up viscosity limit $3000 \text{ mm}^2/\text{s}$ (cSt)

During normal operation, the temperature of the oil must be between 20°C and 65°C and limit values between -15°C and 80°C .

Suction pressure

The allowed working pressure supplied must be in the range $0.7 - 3 \text{ bar}$ (absolute).

For higher values (up to 30 bar), versions with a K seal must be used.

Suction and delivery pipes

Particular attention must be given to the sizing of pipes (rigid or flexible), avoiding disproportionate lengths, sudden variations in cross section or small curvature radius, in any case selecting pipe cross-sections that guarantee an oil speed between 0.6 and 12 m/s .

Filtration

In order to eliminate any impurities present in the oil and to guarantee a longer duration of the pump, the system must be equipped with effective filtration which must be periodically checked to ensure that it is operating correctly.

The following are the recommended filtration levels:

- $26/23 \text{ ISO DIS 4406}$ up to 150 bar
- $23/20 \text{ ISO DIS 4406}$ for higher pressures.

Installation notes

- Make sure that the coupling used for pulling compensates for any axial misalignments that could compromise the integrity of the pump.
- If there are radial and/or axial/ loads on the pump shaft (as is the case, for example, when pulling is carried out using pulleys and belts) the versions available with a support must be chosen.
- The connection coupling between spline shafts must be appropriately lubricated, free to move axially and of an adequate length to cover the entire extension of the two shafts (motor and pump).
- If the pump is painted, protect the shaft seal and also make sure that the contact zone between the shaft seal and the shaft is free of dust or abrasive sediments.

Rotation direction

The rotation direction is defined as S (left/anticlockwise) or D (right/clockwise) by observing the shaft from the front.

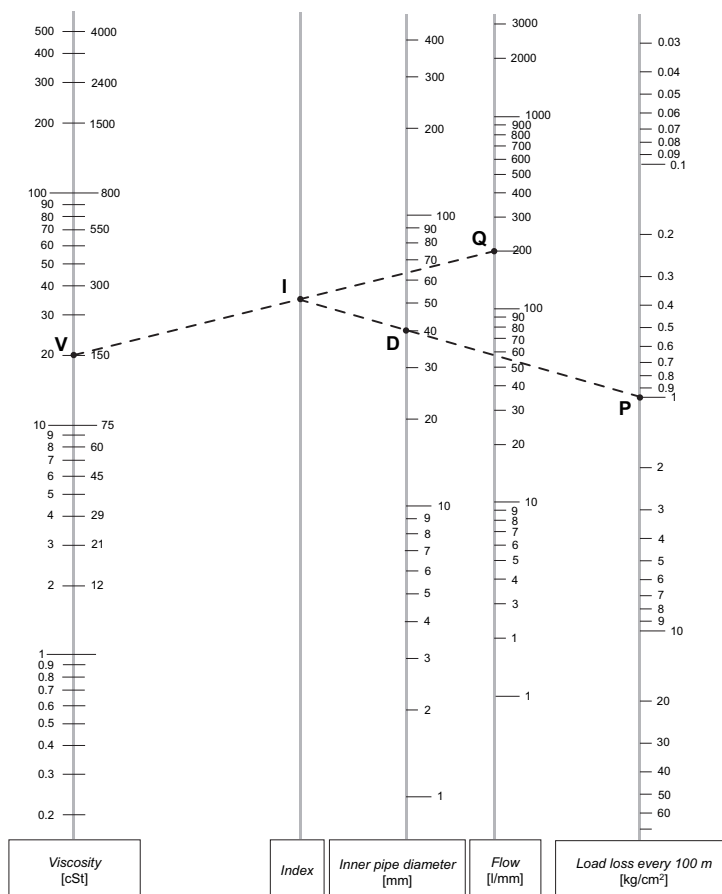
The pumps are monodirectional and therefore when ordering the required rotation direction must be specified; alternatively it is possible to modify the internal set-up as illustrated below (inversion of the rotation direction).

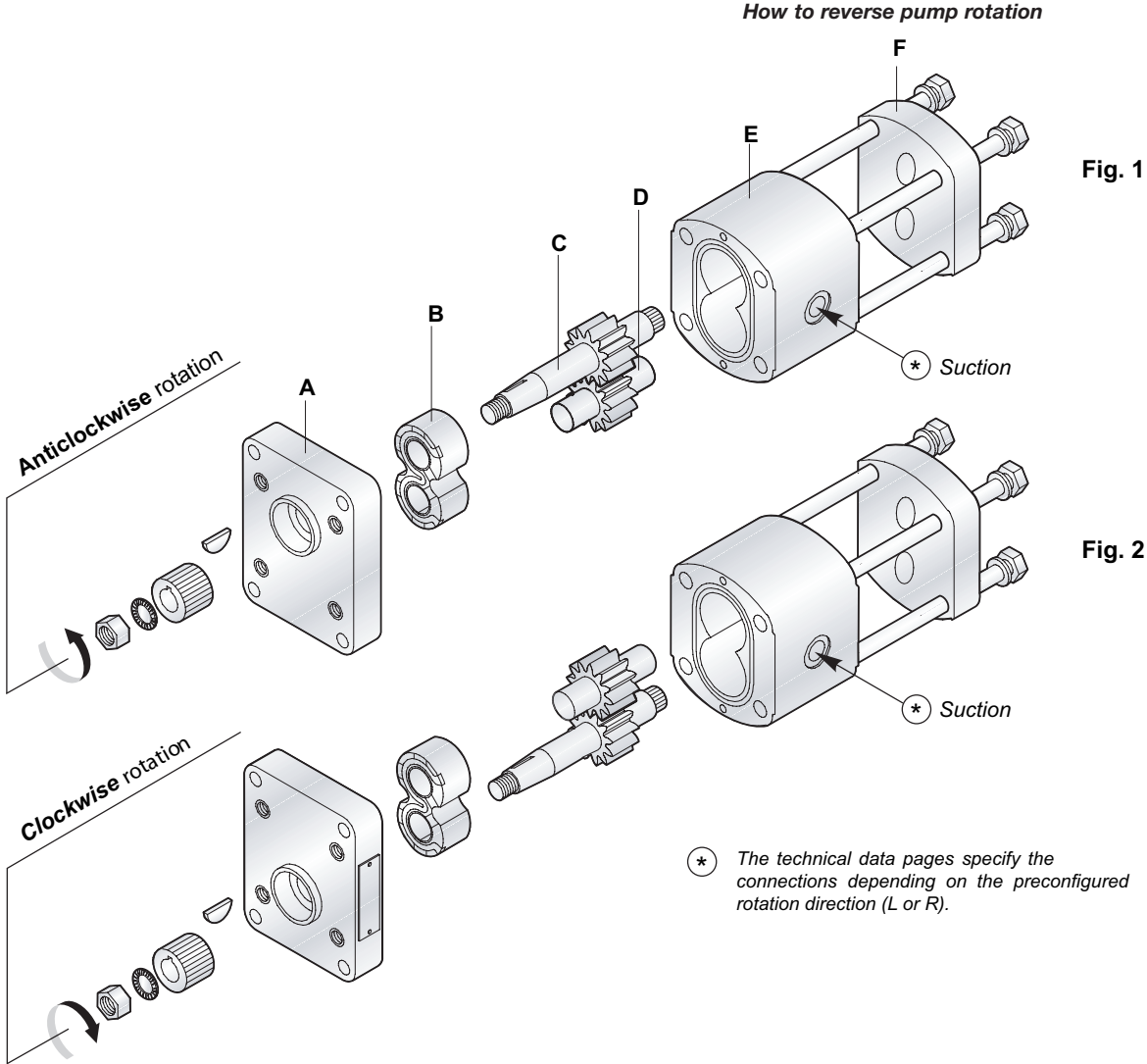
The pages regarding the pump characteristics highlight the directions of the delivery and suction flows for each version and rotation direction.

Pressure drops

The following nomogram allows you to calculate the pressure drops for each 100 m of piping when the viscosity of the oil, the delivery capacity of the pump and the diameter of the piping are known.

The viscosity (V), flow capacity (Q) and diameter (D) values are fixed on the respective scales; a line is drawn joining the points V and Q; the point where this intersects the index line is defined as point I. If the line joining point I to point D is extended, the load pressure drops value can then be read at the intersection with the last scale.





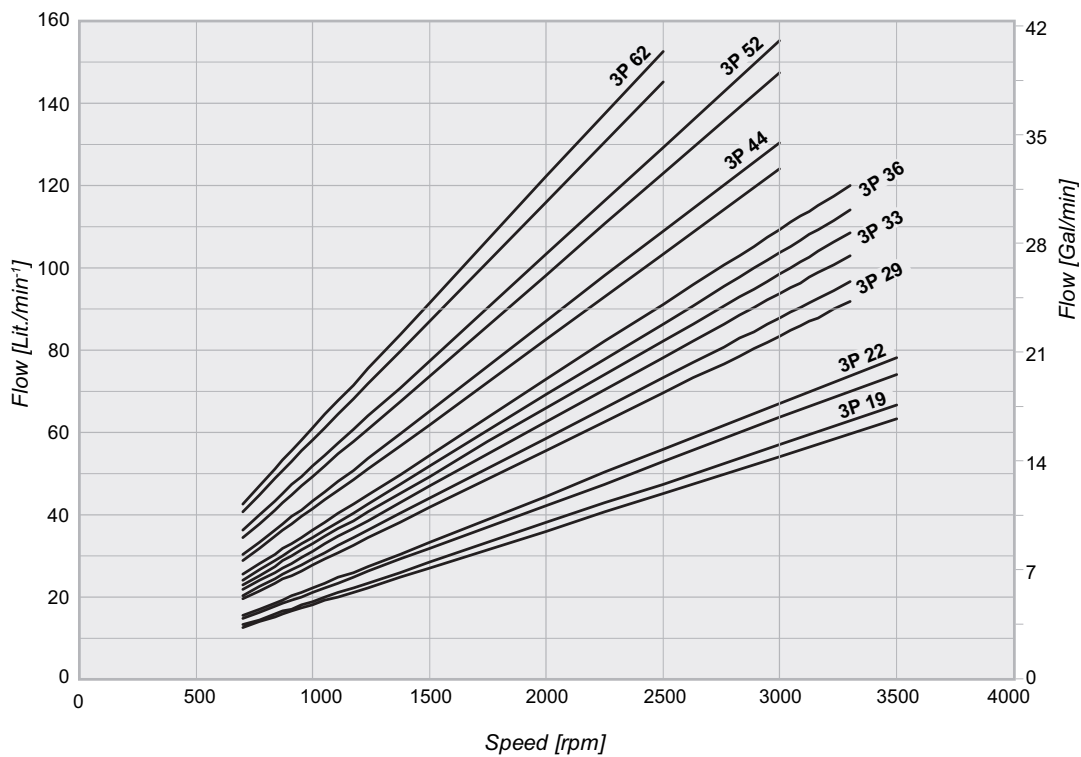
The gear pumps direction of rotation is indicated by an arrow on the label.

How to reverse the pumps rotation:

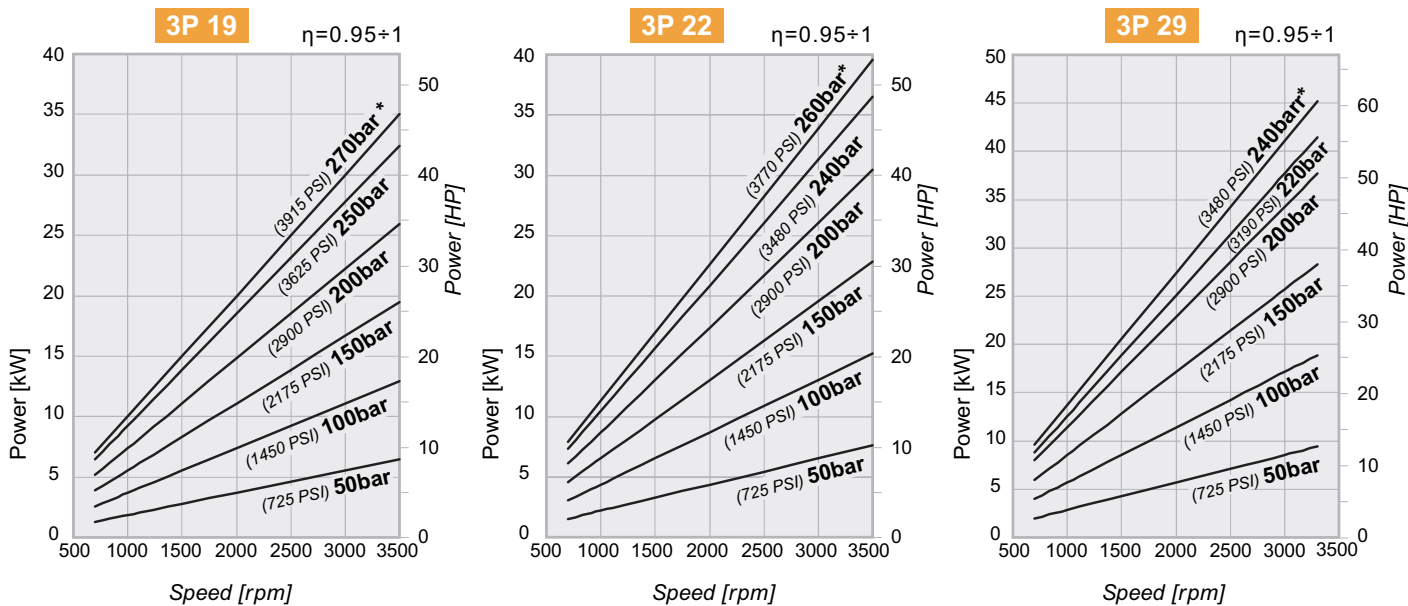
- Disassemble pump as shown in figure 1.
- Pull off gears C - D and reassemble according to figure 2.
- Reassemble bushing B as before.
- Reverse the flange A and reassemble the pump tightening the screws by using a torque wrench.
- For the pumps GR3 - GR4, disassemble only front flange.

Type of pump	GR1	GR2	GR3	GR4
Numbers of screws	4	4	16	16
Type of threads	M8	M10	M10	M14
Tightening torque of screws	30 Nm (266 in-lbs)	50 Nm (443 in-lbs)	60 Nm (531 in-lbs)	140 Nm (1239 in-lbs)
Type of coupling	1IS 12M	2IS 14M 2IS 15M	3IS 18M	4IS 23M
Tightening torque at nut coupling	9 ÷ 10 Nm (80 ÷ 89 in-lbs)	22 ÷ 25 Nm (195 ÷ 221 in-lbs) 32 ÷ 35 Nm (283 ÷ 310 in-lbs)	50 ÷ 55 Nm (443 ÷ 487 in-lbs)	100 ÷ 120 Nm (885 ÷ 1062 in-lbs)

Flow - Speed chart

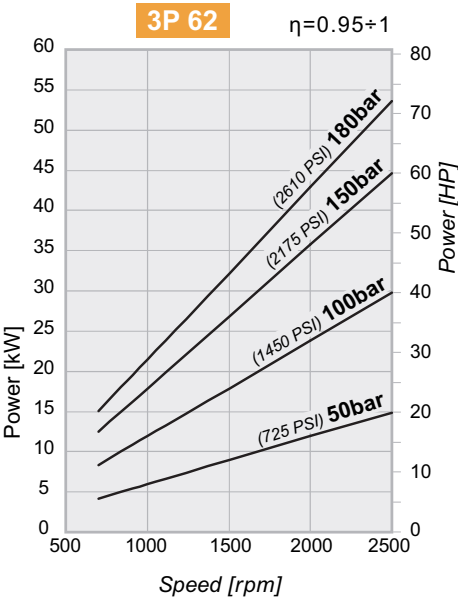
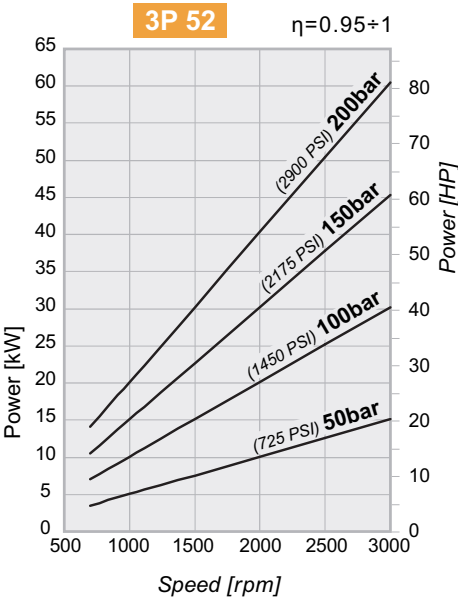
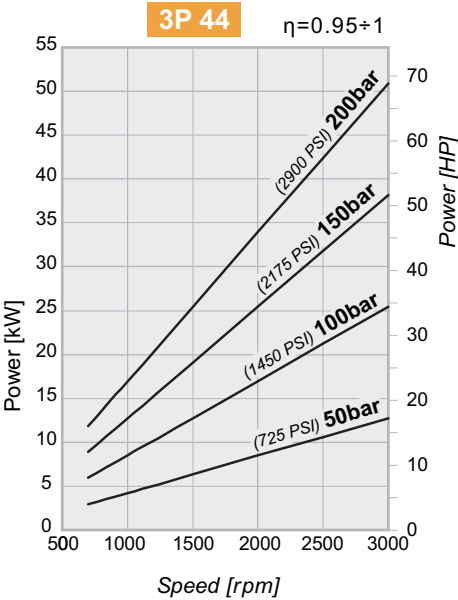
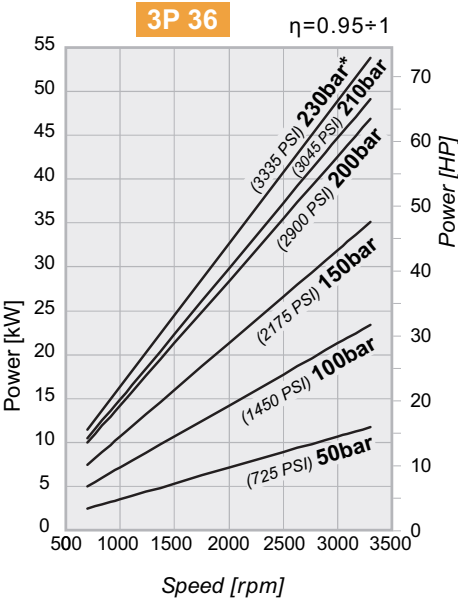
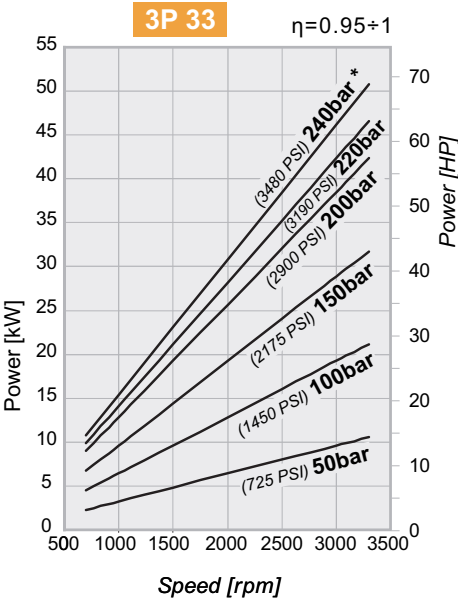


Pumps Group 3 Power and Speed Diagrams



* Only for cast iron pumps

Pumps Group 3 Power and Speed Diagrams



Flange and cover in Aluminium

Technical data

Size	Displacement [cm ³ /rev] (in ³ /rev)	Max. working pressure			Max. speed [g/min] (rpm)	Max. flow [lt/min] (Gal/min)	Min. speed [g/min] (rpm)	Min. flow [lt/min] (Gal/min)	Dimensions		Mass [Kg] (lbs)	Min. volumetric efficiency %
		P1 [bar] (PSI)	P2 [bar] (PSI)	P3 [bar] (PSI)					A [mm] (inch)	B [mm] (inch)		
3SP A19	19 (1.16)	250 (3625)	270 (3915)	300 (4350)	3500	66.5 (17.57)	700	12.64 (3.34)	62.4 (2.457)	128.3 (5.051)	5.23 (11.53)	95*
3SP A22	22.3 (1.36)	240 (3480)	260 (3770)	290 (4205)	3500	78 (20.61)	700	14.83 (3.92)	63.9 (2.516)	131.3 (5.169)	5.36 (11.82)	
3SP A29	29.3 (1.79)	220 (3190)	240 (3480)	260 (3770)	3300	96.7 (25.55)	700	19.48 (5.15)	66.9 (2.634)	137.3 (5.406)	5.64 (12.44)	
3SP A33	32.9 (2.01)	220 (3190)	230 (3335)	260 (3770)	3300	108.6 (28.69)	700	21.88 (5.78)	68.4 (2.693)	140.3 (5.524)	5.78 (12.75)	
3SP A36	36.4 (2.22)	210 (3045)	230 (3335)	250 (3625)	3300	120.1 (31.73)	700	24.21 (6.40)	69.9 (2.752)	143.3 (5.642)	5.91 (13.03)	
3SP A44	43.5 (2.65)	200 (2900)	220 (3190)	240 (3480)	3000	130.5 (34.48)	700	28.93 (7.64)	72.9 (2.870)	149.3 (5.878)	6.19 (13.65)	
3SP A52	51.7 (3.15)	200 (2900)	210 (3045)	240 (3480)	3000	155.1 (40.98)	700	34.38 (9.08)	76.4 (3.008)	156.3 (6.154)	6.50 (14.33)	
3SP A62	61.1 (3.73)	180 (2610)	190 (2755)	200 (2900)	2500	152.7 (40.34)	700	40.63 (10.73)	80.4 (3.165)	164.3 (6.469)	6.87 (15.15)	

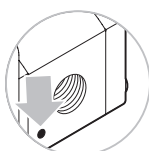
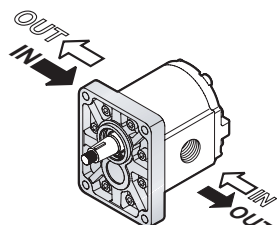
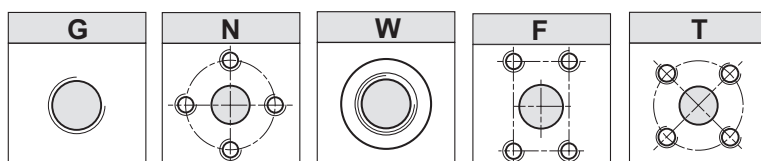
* Value collected during the testing at 1500 rpm

Example of ordering code

3SP | A | 22 | D | (H) | - | 10 | G | (VT)

3SP	Pump type	see table
A	Flange and cover	A = Aluminium
22	Displacement	see table
D	Clockwise rotation	D = Clockwise rotation S = Anticlockwise rotation
(H)	Stiffening seal for low suction pressure	(optional)
—		
10	Shaft type	10 - 13 - 14
G	Connections type	G - N - W - F - T
(VT)	Optional	(VT) Viton seals (optional) VLP-I (N) Pressure relief valve (page A-63)

Conn Port Connections

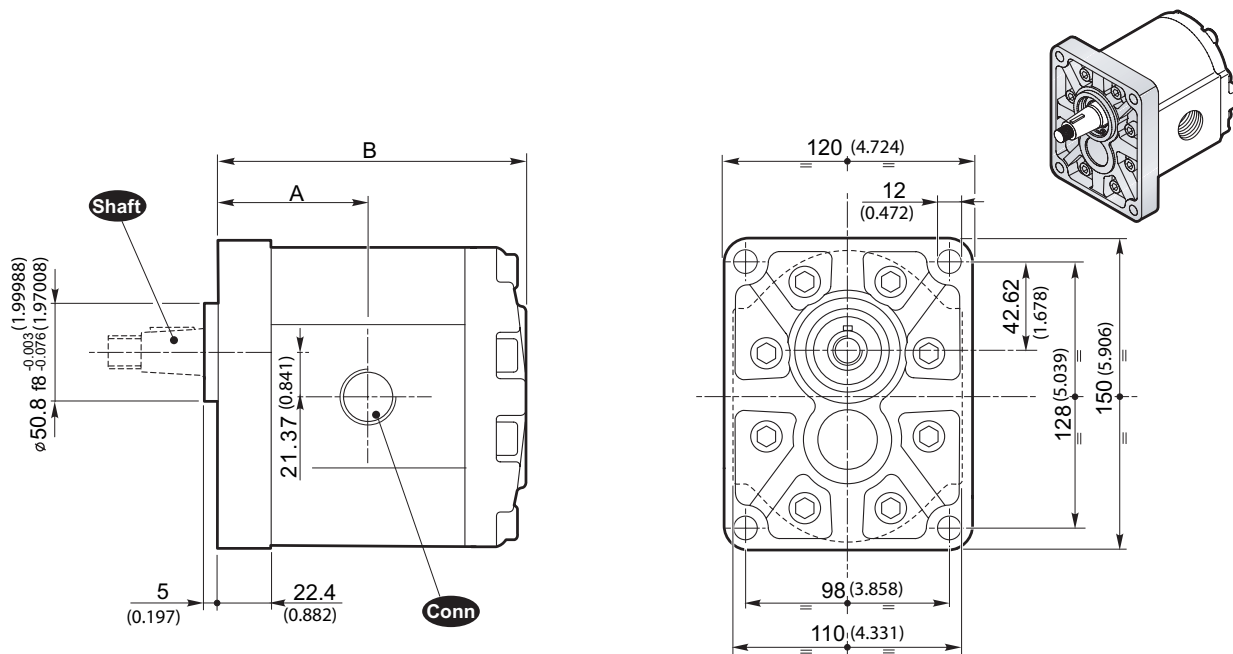


The sign on the body identifies the **suction side** for the pumps.

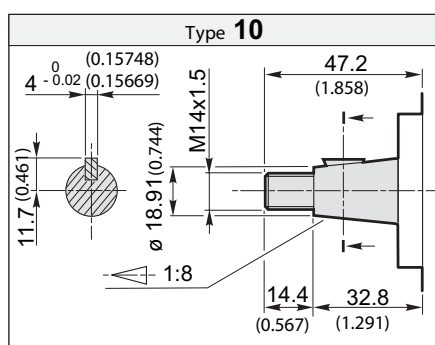
Rotation	
D	S
	

SEE PAGE 285 FOR PRICES

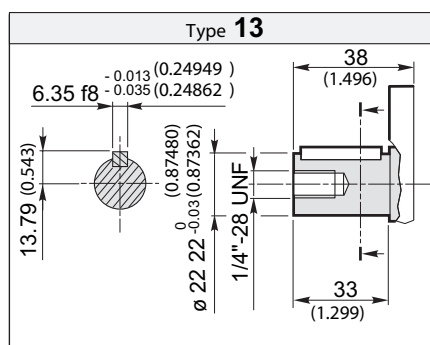
Flange and cover in Aluminium



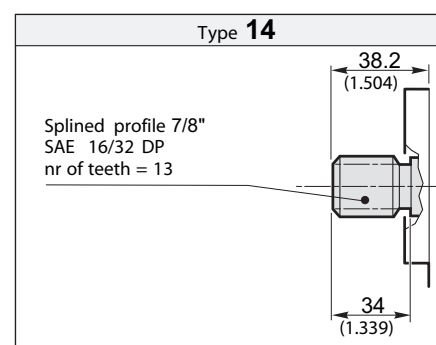
Shaft Available shafts



Torque 240 Nm / 177 ft-lbs



Torque 240 Nm / 177 ft-lbs



Torque 240 Nm / 177 ft-lbs

SEE PAGE 283 FOR PORT SIZES AVAILABLE

Flange and cover in Cast iron

Technical data

Size	Displacement [cm ³ /rev] (in ³ /rev)	Max. working pressure			Max. speed [g/min] (rpm)	Max. flow [lt/min] (Gal/min)	Min. speed [g/min] (rpm)	Min. flow [lt/min] (Gal/min)	Dimensions		Mass [Kg] (lbs)	Min. volumetric efficiency %
		P1 [bar] (PSI)	P2 [bar] (PSI)	P3 [bar] (PSI)					A [mm] (inch)	B [mm] (inch)		
3SP G19	19 (1.16)	270 (3915)	290 (4205)	320 (4640)	3500	66.5 (17.57)	700	12.64 (3.34)	62.4 (2.457)	128.3 (5.051)	7.53 (16.60)	95*
3SP G22	22.3 (1.36)	260 (3770)	280 (4060)	300 (4350)	3500	78 (20.61)	700	14.83 (3.92)	63.9 (2.516)	131.3 (5.169)	7.66 (16.89)	
3SP G29	29.3 (1.79)	240 (3480)	260 (3770)	280 (4060)	3300	96.7 (25.55)	700	19.48 (5.15)	66.9 (2.634)	137.3 (5.406)	7.94 (17.51)	
3SP G33	32.9 (2.01)	240 (3480)	260 (3770)	280 (4060)	3300	108.6 (28.69)	700	21.88 (5.78)	68.4 (2.693)	140.3 (5.524)	8.08 (17.82)	
3SP G36	36.4 (2.22)	230 (3335)	250 (3625)	270 (3915)	3300	120.1 (31.73)	700	24.21 (6.40)	69.9 (2.752)	143.3 (5.642)	8.21 (18.10)	
3SP G44	43.5 (2.65)	200 (2900)	220 (3190)	240 (3480)	3000	130.5 (34.48)	700	28.93 (7.64)	72.9 (2.870)	149.3 (5.878)	8.49 (18.72)	
3SP G52	51.7 (3.15)	200 (2900)	220 (3190)	240 (3480)	3000	155.1 (40.98)	700	34.38 (9.08)	76.4 (3.008)	156.3 (6.154)	8.80 (19.40)	
3SP G62	61.1 (3.73)	180 (2610)	190 (2755)	200 (2900)	2500	152.7 (40.34)	700	40.63 (10.73)	80.4 (3.165)	164.3 (6.469)	9.17 (20.22)	

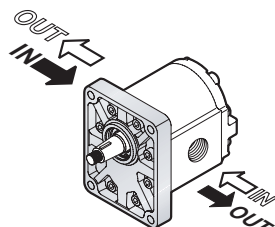
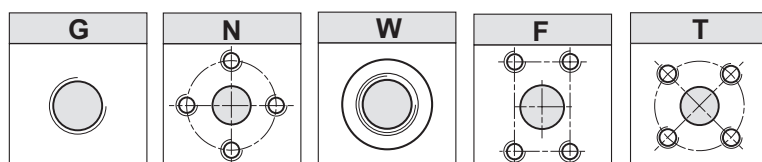
* Value collected during the testing at 1500 rpm)

Example of ordering code

3SP | G | 22 | D | (H) | - | 10 | G | (VT)

3SP	Pump type	see table
G	Flange and cover	G = Ghisa / Cast iron
22	Displacement	see table
D	Clockwise rotation	D = Clockwise rotation S = Anticlockwise rotation
(H)	Stiffening seal for low suction pressure	(optional)
—		
10	Shaft type	10 - 13 - 14
G	Connections type	G - N - W - F - T
(VT)	Optional	(VT) Viton seals (optional) VLP-I (N) Pressure relief valve (page A-63)

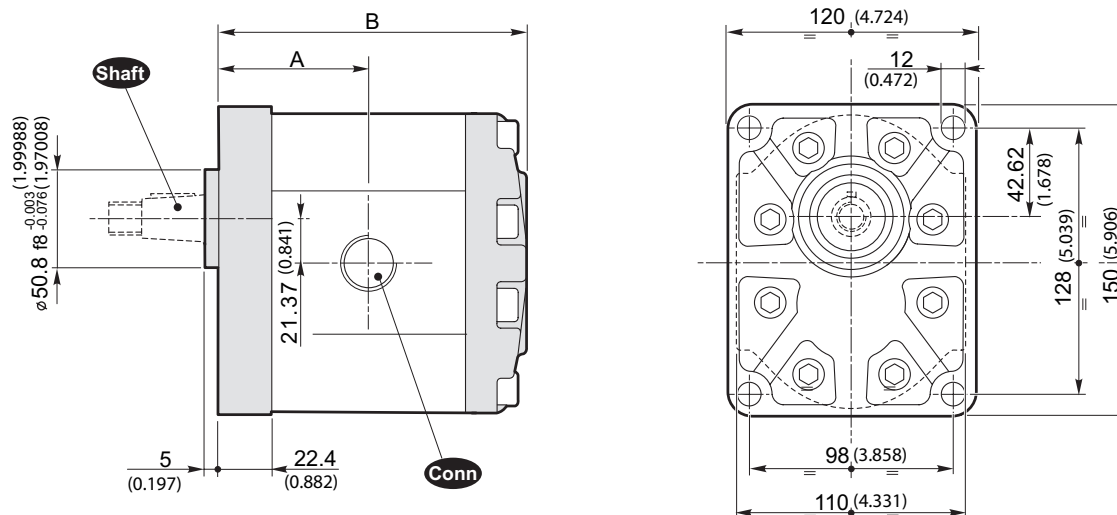
Conn Port Connections



The sign on the body identifies the **suction side** for the pumps.

Rotation	
D	S
	

SEE PAGE 285 FOR PRICES



Technical drawing of a nozzle, labeled **Type 10**. The drawing shows a side view of the nozzle with various dimensions. Key dimensions include:

- Top flange diameter: 4 (0.15748)
- Top flange thickness: 0 (0.15669)
- Central bore diameter: 11.7 (0.461)
- Main body diameter: 18.91 (0.744)
- Main body length: 47.2 (1.858)
- Threaded section diameter: 14.4 (0.567)
- Threaded section length: 32.8 (1.291)
- Tapered section taper: 1:8

Type 13

Technical drawing of a Type 13 ball valve assembly. The drawing includes a front view (left) and a side view (right). The front view shows a ball with a diameter of $\varnothing 22$ (0.87480) and a tolerance of -0.03 (0.87362). The ball is seated in a housing with a diameter of 6.35 (0.24949) and a tolerance of -0.013 (0.24862). The side view shows the housing with a length of 38 (1.496) and a diameter of 33 (1.299). The ball is shown in a partially open position, with a $1/4"$ -28 UNF thread visible. The drawing also includes a dimension of 13.79 (0.543) for the distance from the center of the ball to the top of the housing.

Type 14

Splined profile 7/8"
SAE 16/32 DP
nr of teeth = 13

38.2
(1.504)

34
(1.339)

Torque **240 Nm / 177 ft·lbs**

SEE PAGE 283 FOR PORT SIZES AVAILABLE

50% OFF ALL PRICES

Flange and cover in Aluminium

Technical data

Size	Displacement [cm ³ /rev] (in ³ /rev)	Max. working pressure			Max. speed [g/min] (rpm)	Max. flow [lt/min] (Gal/min)	Min. speed [g/min] (rpm)	Min. flow [lt/min] (Gal/min)	Dimensions		Mass [Kg] (lbs)	Min. volumetric efficiency %
		P1 [bar] (PSI)	P2 [bar] (PSI)	P3 [bar] (PSI)					A [mm] (inch)	B [mm] (inch)		
3SP A19	19 (1.16)	250 (3625)	270 (3915)	300 (4350)	3500	66.5 (17.57)	700	12.64 (3.34)	59.4 (2.339)	125.3 (4.933)	5.23 (11.53)	95*
3SP A22	22.3 (1.36)	240 (3480)	260 (3770)	290 (4205)	3500	78 (20.61)	700	14.83 (3.92)	60.9 (2.398)	128.3 (5.051)	5.36 (11.82)	
3SP A29	29.3 (1.79)	220 (3190)	240 (3480)	260 (3770)	3300	96.7 (25.55)	700	19.48 (5.15)	63.9 (2.516)	134.3 (5.287)	5.64 (12.44)	
3SP A33	32.9 (2.01)	220 (3190)	230 (3335)	260 (3770)	3300	108.6 (28.69)	700	21.88 (5.78)	65.4 (2.575)	137.3 (5.406)	5.78 (12.75)	
3SP A36	36.4 (2.22)	210 (3045)	230 (3335)	250 (3625)	3300	120.1 (31.73)	700	24.21 (6.40)	66.9 (2.634)	140.3 (5.124)	5.91 (13.03)	
3SP A44	43.5 (2.65)	200 (2900)	220 (3190)	240 (3480)	3000	130.5 (34.48)	700	28.93 (7.64)	69.9 (2.752)	146.3 (5.760)	6.19 (13.65)	
3SP A52	51.7 (3.15)	200 (2900)	210 (3045)	240 (3480)	3000	155.1 (40.98)	700	34.38 (9.08)	73.4 (2.890)	153.3 (6.035)	6.50 (14.33)	
3SP A62	61.1 (3.73)	180 (2610)	190 (2755)	200 (2900)	2500	152.7 (40.34)	700	40.63 (10.73)	77.4 (3.047)	161.3 (6.350)	6.87 (15.15)	

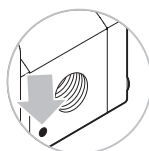
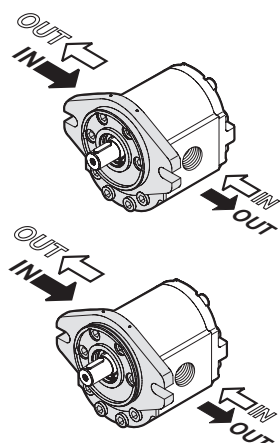
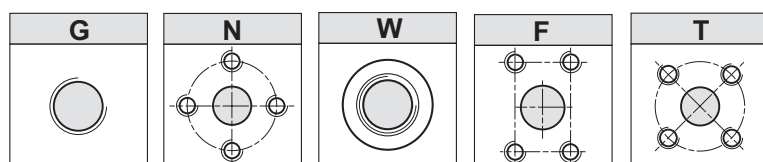
* Value collected during the testing at 1500 rpm)

Example of ordering code

3SP | A | 22 | D | (H) | SAEB | - | 14 | G | (VT)

3SP	Pump type	see table
A	Flange and cover	A = Aluminium
22	Displacement	see table
D	Clockwise rotation	D = Clockwise rotation S = Anticlockwise rotation
(H)	Stiffening seal for low suction pressure	(optional)
SAEB	Flange type	SAE B - SAE B - OR
—		
14	Shaft type	10 - 13 - 14
G	Connections type	G - N - W - F - T
(VT)	Optional	(VT) Viton seals (optional) VLP-I (N) Pressure relief valve (page A-63)

Conn Port Connections



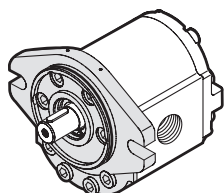
The sign on the body identifies the suction side for the pumps.

Rotation	
D	S
	

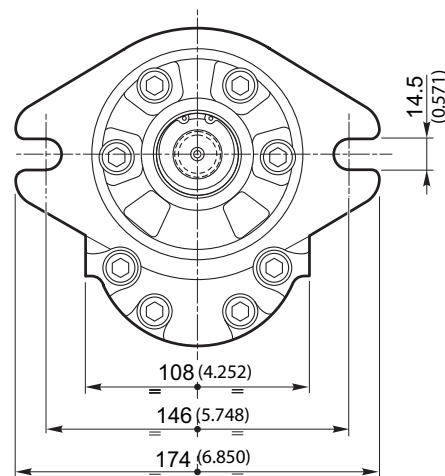
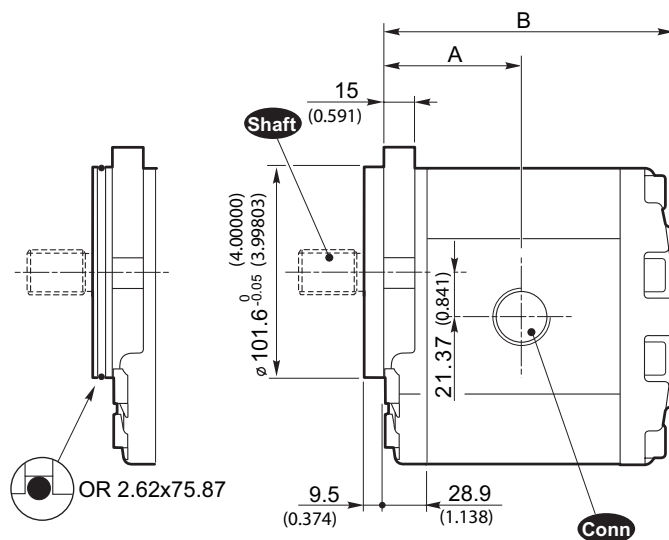
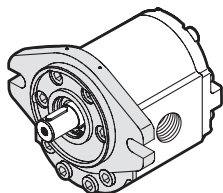
SEE PAGE 285 FOR PRICES

Flange and cover in Aluminium

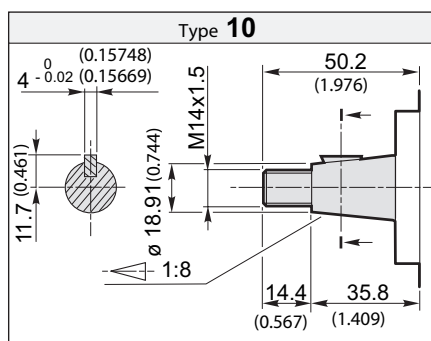
SAE B-OR



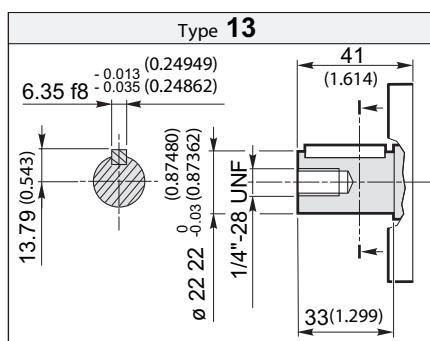
SAE B



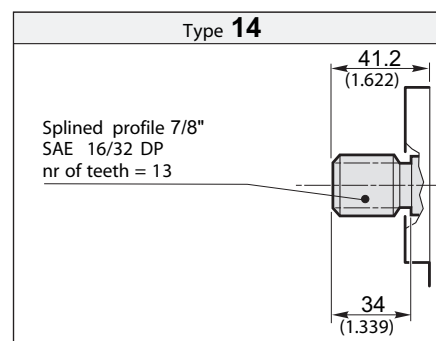
Shaft Available shafts



Torque 240 Nm / 177 ft-lbs



Torque 240 Nm / 177 ft-lbs



Torque 240 Nm / 177 ft-lbs

SEE PAGE 283 FOR PORT SIZES AVAILABLE

Flange and cover in Cast iron

Technical data

Size	Displacement [cm³/rev] (in³/rev)	Max. working pressure			Max. speed [g/min] (rpm)	Max. flow [l/min] (Gal/min)	Min. speed [g/min] (rpm)	Min. flow [l/min] (Gal/min)	Dimensions		Mass [Kg] (lbs)	Min. volumetric efficiency %
		P1 [bar] (PSI)	P2 [bar] (PSI)	P3 [bar] (PSI)					A [mm] (inch)	B [mm] (inch)		
3SP G19	19 (1.16)	270 (3915)	290 (4205)	320 (4640)	3500	66.5 (17.57)	700	12.64 (3.34)	59.4 (2.339)	125.3 (4.933)	7.59 (16.74)	95*
3SP G22	22.3 (1.36)	260 (3770)	280 (4060)	300 (4350)	3500	78 (20.61)	700	14.83 (3.92)	60.9 (2.398)	128.3 (5.051)	7.72 (17.02)	
3SP G29	29.3 (1.79)	240 (3480)	260 (3770)	280 (4060)	3300	96.7 (25.55)	700	19.48 (5.15)	63.9 (2.516)	134.3 (5.287)	8.00 (17.64)	
3SP G33	32.9 (2.01)	240 (3480)	260 (3770)	280 (4060)	3300	108.6 (28.69)	700	21.88 (5.78)	65.4 (2.575)	137.3 (5.406)	8.14 (17.95)	
3SP G36	36.4 (2.22)	230 (3335)	250 (3625)	270 (3915)	3300	120.1 (31.73)	700	24.21 (6.40)	66.9 (2.634)	140.3 (5.524)	8.27 (18.24)	
3SP G44	43.5 (2.65)	200 (2900)	220 (3190)	240 (3480)	3000	130.5 (34.48)	700	28.93 (7.64)	69.9 (2.752)	146.3 (5.760)	8.55 (18.85)	
3SP G52	51.7 (3.15)	200 (2900)	220 (3190)	240 (3480)	3000	155.1 (40.98)	700	34.38 (9.08)	73.4 (2.890)	153.3 (6.035)	8.86 (19.54)	
3SP G62	61.1 (3.73)	180 (2610)	190 (2755)	200 (2900)	2500	152.7 (40.34)	700	40.63 (10.73)	77.4 (3.047)	161.3 (6.350)	9.23 (20.35)	

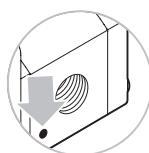
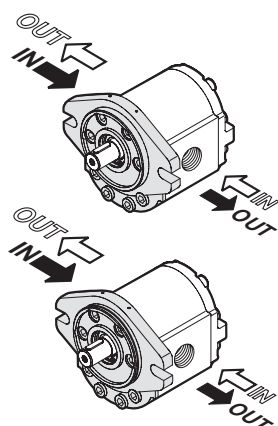
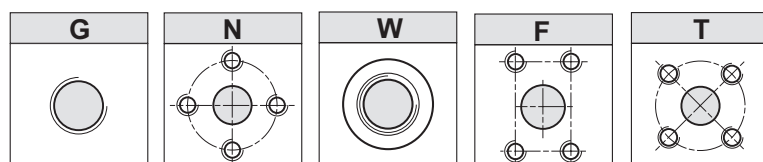
* Value collected during the testing at 1500 rpm)

Example of ordering code

3SP	G	22	D	(H)	SAEB	-	14	G	(VT)
-----	---	----	---	-----	------	---	----	---	------

3SP	Pump type	see table
G	Flange and cover	G = Cast iron
22	Displacement	see table
D	Clockwise rotation	D = Clockwise rotation S = Anticlockwise rotation
(H)	Stiffening seal for low suction pressure	(optional)
SAEB	Flange type	SAE B - SAE B - OR
—		
14	Shaft type	10 - 13 - 14
G	Connections type	G - N - W - F - T
(VT)	Optional	(VT) Viton seals (optional) VLP-I (N) Pressure relief valve (page A-63)

Conn Port Connections



The sign on the body identifies the **suction side** for the pumps.

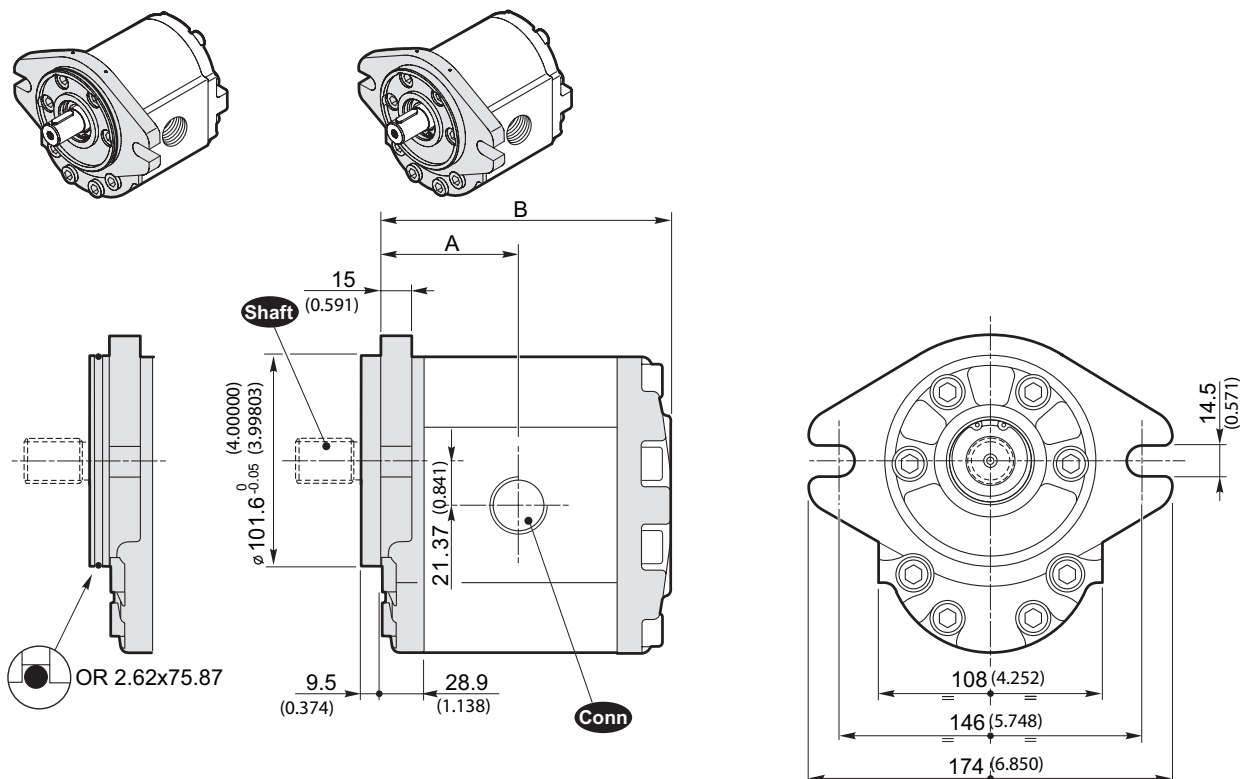
Rotation	
D	S
	

SEE PAGE 285 FOR PRICES

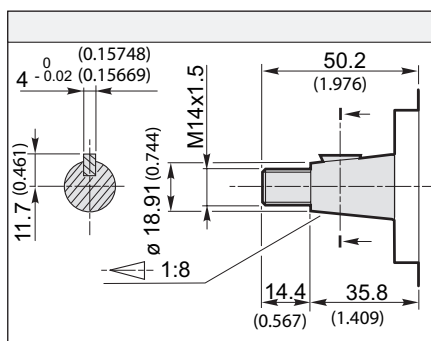
Flange and cover in Cast iron

SAE B-OR

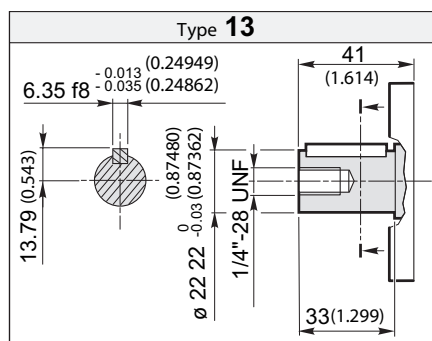
SAE B



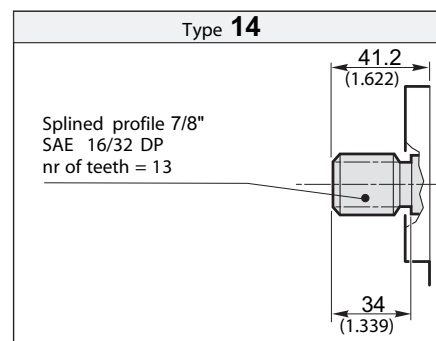
Shaft Available shafts



Torque 240 Nm / 177 ft-lbs



Torque 240 Nm / 177 ft-lbs



Torque 240 Nm / 177 ft-lbs

SEE PAGE 283 FOR PORT SIZES AVAILABLE

Technical data

Size	Displacement [cm³/rev] (in³/rev)	Max. working pressure			Max. speed [g/min] (rpm)	Max. flow [lt/min] (Gal/min)	Min. speed [g/min] (rpm)	Min. flow [lt/min] (Gal/min)	Dimensions		Mass [Kg] (lbs)	Min. volumetric efficiency %
		P1 [bar] (PSI)	P2 [bar] (PSI)	P3 [bar] (PSI)					A [mm] (inch)	B [mm] (inch)		
3SP G19	19 (1.16)	270 (3915)	290 (4205)	320 (4640)	3500	66.5 (17.57)	700	12.64 (3.34)	110.5 (4.350)	176.4 (6.945)	7.58 (16.71)	95*
3SP G22	22.3 (1.36)	260 (3770)	280 (4060)	300 (4350)	3500	78 (20.61)	700	14.83 (3.92)	112.0 (4.409)	179.4 (7.063)	7.72 (17.02)	
3SP G29	29.3 (1.79)	240 (3480)	260 (3770)	280 (4060)	3300	96.7 (25.55)	700	19.48 (5.15)	115.0 (4.528)	185.4 (7.299)	8.0 (17.64)	
3SP G33	32.9 (2.01)	240 (3480)	260 (3770)	280 (4060)	3300	108.6 (28.69)	700	21.88 (5.78)	116.5 (4.587)	188.4 (7.417)	8.14 (17.95)	
3SP G36	36.4 (2.22)	230 (3335)	250 (3625)	270 (3915)	3300	120.1 (31.73)	700	24.21 (6.40)	118.0 (4.646)	191.4 (7.535)	8.28 (18.26)	
3SP G44	43.5 (2.65)	200 (2900)	220 (3190)	240 (3480)	3000	130.5 (34.48)	700	28.93 (7.64)	121.0 (4.764)	197.4 (7.772)	8.55 (18.85)	
3SP G52	51.7 (3.15)	200 (2900)	220 (3190)	240 (3480)	3000	155.1 (40.98)	700	34.38 (9.08)	124.5 (4.902)	204.4 (8.047)	8.88 (19.58)	
3SP G62	61.1 (3.73)	180 (2610)	190 (2755)	200 (2900)	2500	152.7 (40.34)	700	40.63 (10.73)	128.5 (5.059)	212.4 (8.362)	9.25 (20.40)	

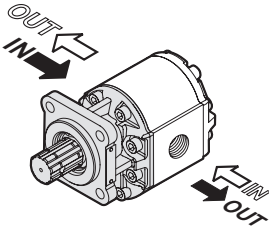
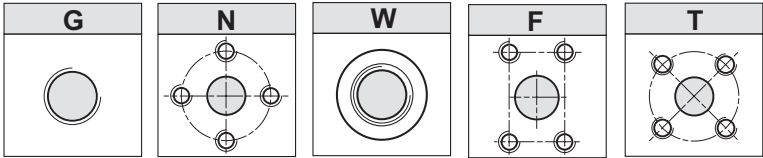
* Value collected during the testing at 1500 rpm)

Example of ordering code

3SP	G	22	D	ZFC	-	24	G	(VT)
-----	---	----	---	-----	---	----	---	------

3SP	Pump type	see table
G	Flange and cover	G = Cast iron
22	Displacement	see table
D	Clockwise rotation	D = Clockwise rotation S = Anticlockwise rotation
ZFC	Flange type	SAE B - SAE B - OR
—		
14	Shaft type	10 - 13 - 14
G	Connections type	G - N - W - F - T
(VT)	Optional	(VT) Viton seals (optional)

Conn Port Connections

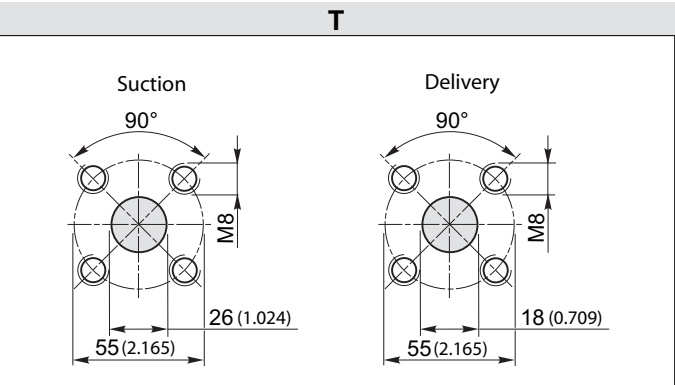
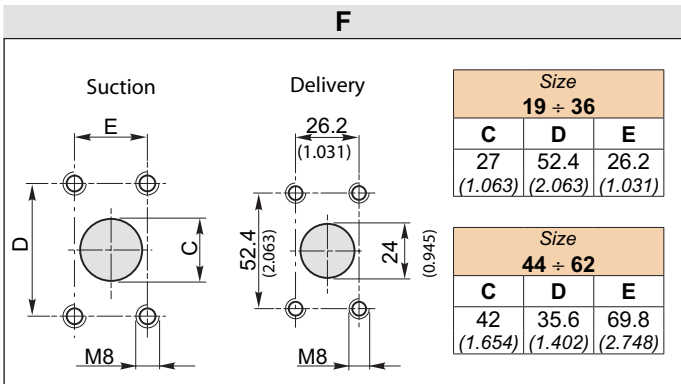
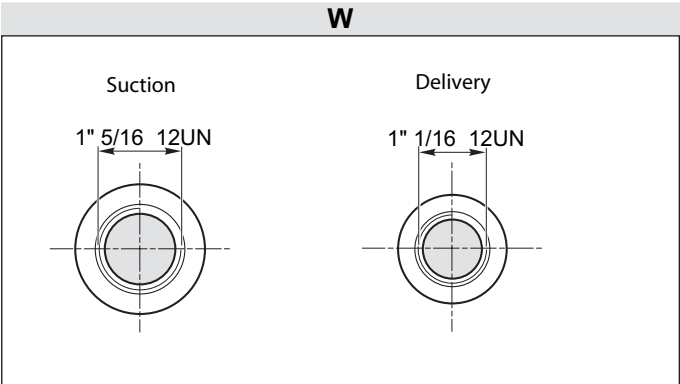
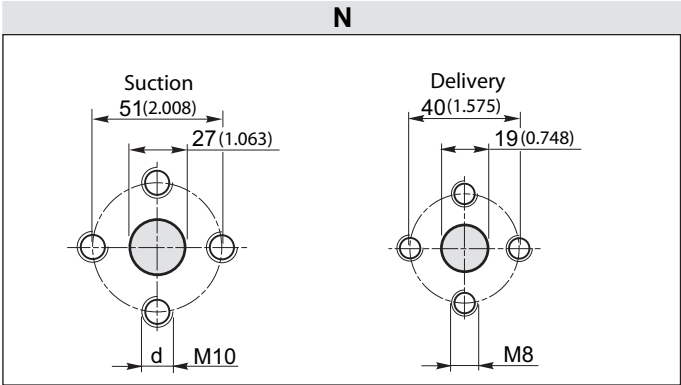
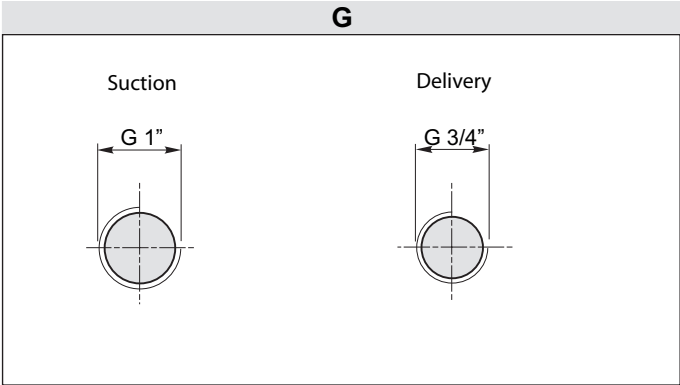


The sign on the body identifies the **suction side** for the pumps.

Rotation	
D	S

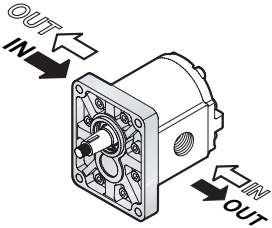
SEE PAGE 285 FOR PRICES





The sign on the body identifies the **suction side** for the pumps.

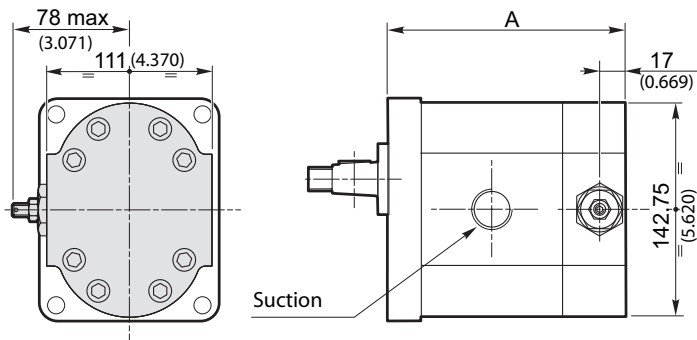
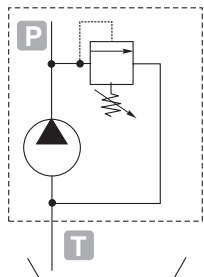
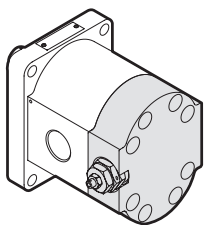
Port Connection positions



Rotation	
D	S
	

VLP- I (N)

Pressure relief valve with internal exhaust



	A		
	Standard	SAE AA	E32 BX E32 CX
3SP A19	127.3 (5.012)	129.3 (5.091)	124.6 (4.906)
3SP A22	130.3 (5.130)	132.3 (5.209)	127.6 (5.024)
3SP A29	136.3 (5.366)	138.3 (5.445)	133.6 (5.260)
3SP A33	139.3 (5.484)	141.3 (5.563)	136.6 (5.378)
3SP A36	142.3 (5.602)	144.3 (5.681)	139.6 (5.496)
3SP A44	148.3 (5.839)	150.3 (5.917)	145.6 (5.732)
3SP A52	155.3 (6.114)	157.3 (6.193)	152.6 (6.008)
3SP A62	163.3 (6.429)	165.3 (6.508)	160.6 (6.323)

Warning.
The pressure relief valve can be applied by substituting the rear cover.
It is supplied only with aluminium flange and cover.
The showed pump is anticlockwise rotation.

The opening of the pressure relief valve should be carry out for times not over 7" each minute to avoid the overheating of the pump.

Example of ordering code

3SP	A	22	D	SAE B	-	10	G	(VT)	VLP-I	(N)
VLP-I	Cover with VLP							VPL-I (at internal exhaust)		
(N)	Spring type							B - N - R (See table)		

		Spring type		
		B	N	R
		white spring	black spring	red spring
Calibration fields*	[bar] (psi)	10 ÷ 100 (145 ÷ 1450)	30 ÷ 280 (435 ÷ 4060)	80 ÷ 380 (1160 ÷ 5510)

* Without setting request, it will be considered standard (black spring: 2175 psi).

SEE PAGE 283 FOR PORT SIZES AVAILABLE