2.5PB

Aluminium gear pumps

Technical Catalogue

E0.138.0219.02.00IM05

salami®

GEAR PUMPS

SALAMI gear pumps are available with displacements from 1.4 cm^3/rev to 99 cm^3/rev *(from 0.09 cu.in/rev to 6.03 cu.in/rev)*.
Multiple pumps can always be relized combining stages taken from different or same series.
Several options of shafts, flanges and ports as for European, German and American standards are available for all the pumps.

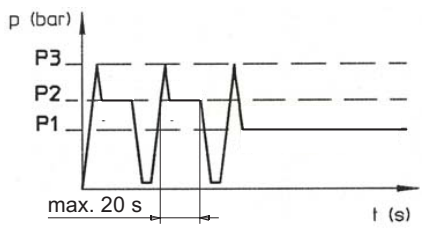
SALAMI gear pumps offer:
•High volumetric efficiency thanks to an innovative design and an accurate control of machining tolerances.
•Axial compensation achieved by the use of floating bushes that allow high volumetric efficiency throughout the working pressure range.
•DU bearings to ensure high pressure capability.
•12 teeth integral gear and shaft.
•Aluminium body.
•Cast iron flange and cover.
•Double shaft seals.
•Nitrile seals as standard and Viton seals in high temperature applications.
•All pumps are hydraulically tested after assembly to ensure the highest standard performance.
•Gear pumps are ideal for mobile equipment including: snow plows, light duty equipment, farm vehicles, town trucks, cherry pickers, lift gates, utility vehicles, aerial devices, hoists, spreaders, fan drive.
•Also available Bidirectional rotation.

TECHNICAL DATA

- Pump inlet pressure (absolute pressure)	0.8 to 1.5 bar *(11.6 to 21.7 psi)*
- Minimum operating fluid viscosity	12 mm^2 / sec
- Max starting viscosity	800 mm^2 / sec
- Suggested fluid viscosity range	17 - 65 mm^2 / sec
- Fluid operating temperature range	-20 to 80 °C
- Fluid operating temperature range with FPM seals (Viton)	-15 to 110°C
- Fluid operating temperature range with HNBR seals*	-30 to 110°C
- Hydraulic fluid	mineral oil

*Available on request.

DEFINITION OF PRESSURES

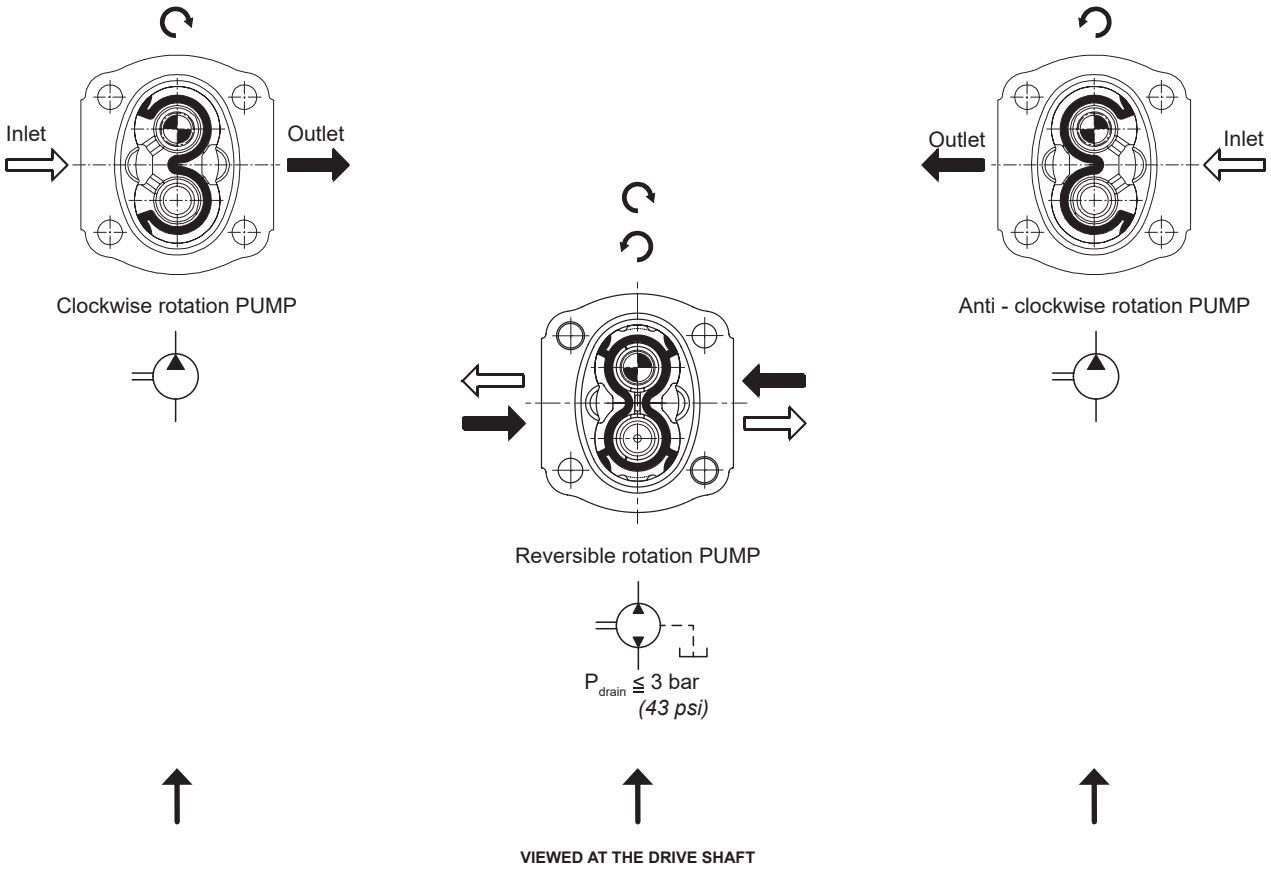


P3 = Peak pressure
P2 = Intermittent operating pressure (1/3 of working time)
P1 = Continuous operating pressure

DRIVE SHAFTS

Radial and axial loads on the shafts must be avoided since they reduce the life of the unit.
In order to avoid misalignment during the assembly with the primary engine, a connection with “Oldham” coupling (or coupling having convex toothed hub) is recommended.

ROTATION



HYDRAULIC PIPE LINE

To ensure favorable suction conditions it is important to keep pressure drop in suction pipe line to a minimum value (see TECHNICAL DATA).
To calculate hydraulic pipe line size, the designer can use; as an approximate guide, the following fluid speed figures:

From 1 to 2 m/sec on suction pipe line From 6 to 10 m/sec on pressure pipe line	From *3.28* to *6.36 ft/sec* on suction pipe line From *19.7* to *32.8 ft/sec* on pressure pipe line

The lowest fluid speed values in pipe lines is recommended when the operating temperature range is high and/or for continuos duty.
The highest value is recommended when the temperature difference is low and/or for intermittent duty.
When tandem pumps are supplied by 2 different reservoirs with 2 different fluids it is necessary to specify “AS” version.

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FILTRATION INDEX RECOMMENDED

Working pressure	>200 bar/2900 psi	<200 bar/2900 psi
Contamination class NAS 1638	9	10
Contamination class ISO 4406	19/18/15	20/19/16
Achieved with filter β_x=75	15 µm	25 µm

FIRE RESISTENT FLUID

Type	Description	Max pressure	Max speed (rpm)	Temperature
HFB	Oil emulsion with 40% water	130 bar/*1880 psi*	2500	3°C+65°C
HFC	Water glycol	180 bar/*2600 psi*	1500	-20°C+65°C
HFD	Phosphate esters		1750	-10°C+80°C

COMMON FORMULAS FOR PUMPS

C = Input torque $= \frac{q \cdot \Delta p}{62.8 \cdot \eta_m}$ (Nm)

P = Input power $= \frac{q \cdot n \cdot \Delta p \, 10^{-3}}{600 \, \eta_m}$ (kW)

Q = Outlet flow $= \frac{q \cdot n \cdot \eta_v}{1000}$ (l/min)

LEGENDA

Δp = Working pressure (bar)

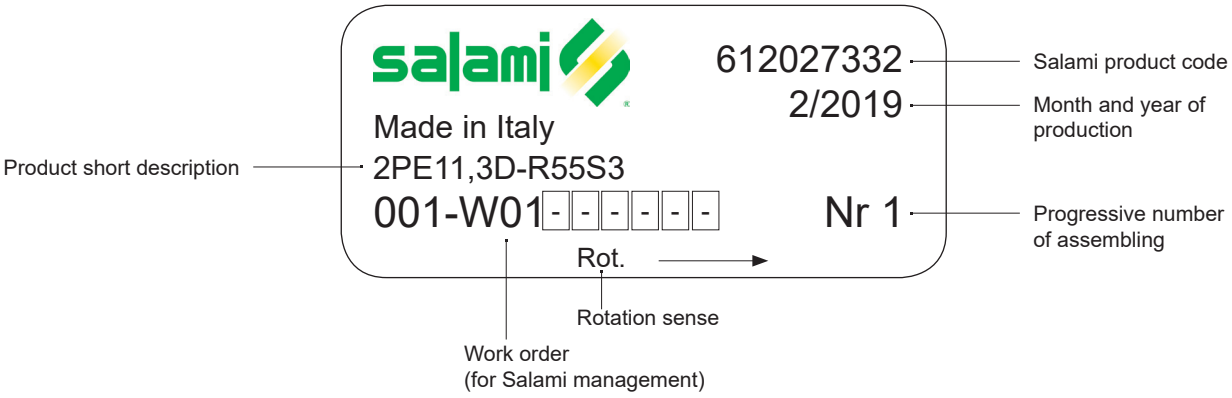
q = Displacement (cm^3/rev)

n = Speed (min^{-1})

η_m = Mechanical eff. (0.92)

η_v = Volumetric eff. (0.95)

IDENTIFICATION LABEL



WORKING CONDITIONS

	Displacement		Continuous pressure P1**		Intermittent pressure P2		Peak pressure P3		Max. speed	Min. speed
GROUP 1.5 - E SERIES	cm^3/rev	*cu.in/rev*	bar	*psi*	bar	*psi*	bar	*psi*	min^{-1}	
1.5PE - 1.4	1.4	*0.09*	250	*3625*	270	*3915*	290	*4205*	5000	700
1.5PE - 2.1	2.1	*0.13*	250	*3625*	270	*3915*	290	*4205*	5000	700
1.5PE - 2.8	2.8	*0.17*	250	*3625*	270	*3915*	290	*4205*	4500	700
1.5PE - 3.5	3.5	*0.21*	250	*3625*	270	*3915*	290	*4205*	4500	700
1.5PE - 4.1	4.1	*0.25*	250	*3625*	270	*3915*	290	*4205*	4000	700
1.5PE - 5.2	5.2	*0.32*	230	*3335*	250	*3625*	270	*3915*	4000	700
1.5PE - 6.2	6.2	*0.38*	230	*3335*	250	*3625*	270	*3915*	3600	600
1.5PE - 7.6	7.6	*0.46*	200	*2900*	220	*3190*	250	*3625*	3300	600
1.5PE - 9.3	9.3	*0.57*	180	*2610*	200	*2900*	240	*3480*	3000	600
1.5PE - 11	11	*0.67*	170	*2465*	190	*2755*	220	*3190*	3000	600

GROUP 2 - E SERIES	cm^3/rev	*cu.in/rev*	bar	*psi*	bar	*psi*	bar	*psi*	min^{-1}	
2PE - 3.2*	3.2	*0.19*	250	*3625*	280	*4060*	300	*4350*	4000	600
2PE - 3.9*	3.9	*0.24*	250	*3625*	280	*4060*	300	*4350*	4000	600
2PE - 4.5	4.6	*0.27*	250	*3625*	280	*4060*	300	*4350*	4000	600
2PE - 6.5	6.5	*0.4*	250	*3625*	280	*4060*	300	*4350*	4000	600
2PE - 8.3	8.2	*0.5*	250	*3625*	280	*4060*	300	*4350*	3500	500
2PE - 10.5	10.6	*0.65*	250	*3625*	280	*4060*	300	*4350*	3500	500
2PE - 11.3	11.5	*0.68*	250	*3625*	280	*4060*	300	*4350*	3500	500
2PE - 12.5	12.7	*0.77*	250	*3625*	280	*4060*	300	*4350*	3500	500
2PE - 13.8	13.8	*0.84*	250	*3625*	280	*4060*	300	*4350*	3500	500
2PE - 16	16.6	*1.01*	250	*3625*	280	*4060*	300	*4350*	3000	400
2PE - 19	19.4	*1.15*	220	*3190*	240	*3480*	260	*3750*	3000	400
2PE - 22.5	22.9	*1.37*	200	*2900*	220	*3190*	240	*3480*	2750	400
2PE - 26	25.8	*1.58*	180	*2610*	200	*2900*	220	*3190*	2500	400

*Available only as rear pump

GROUP 2.5 - B SERIES	cm^3/rev	*cu.in/rev*	bar	*psi*	bar	*psi*	bar	*psi*	min^{-1}	
2.5PB - 5.5*	5.97	*0.36*	250	*3625*	280	*4060*	300	*4350*	3000	600
2.5PB - 8.3*	8.29	*0.50*	250	*3625*	280	*4060*	300	*4350*	3000	600
2.5PB - 11.5*	11.76	*0.72*	250	*3625*	280	*4060*	300	*4350*	3000	600
2.5PB - 13.8*	14.07	*0.86*	250	*3625*	280	*4060*	300	*4350*	3000	600
2.5PB - 16	16	*0.97*	250	*3625*	280	*4060*	300	*4350*	3000	600
2.5PB - 19	19.3	*1.17*	250	*3625*	280	*4060*	300	*4350*	3000	600
2.5PB - 22	22.2	*1.35*	250	*3625*	280	*4060*	300	*4350*	3000	500
2.5PB - 25	25.2	*1.53*	250	*3625*	280	*4060*	300	*4350*	3000	500
2.5PB - 28	27.6	*1.68*	250	*3625*	280	*4060*	300	*4350*	3000	500
2.5PB - 32	32.4	*1.97*	230	*3335*	250	*3625*	260	*3750*	3000	500
2.5PB - 38	38.1	*2.32*	200	*2900*	220	*3190*	240	*3480*	2750	400
2.5PB - 44	44.2	*2.69*	170	*2465*	190	*2755*	210	*3040*	2500	400

*Available only as rear pump. Displacements **11.5-13.8** are available as single pump only with drive shaft “55”.

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WORKING CONDITIONS

	Displacement		Continuous pressure P1**		Intermittent pressure P2		Peak pressure P3		Max. speed	Min. speed
GROUP 3 - E SERIES	cm^3/rev	*cu.in/rev*	bar	*psi*	bar	*psi*	bar	*psi*	min^{-1}	
3PE - 21	20.6	*1.26*	250	*3625*	280	*4060*	300	*4350*	3000	600
3PE - 27	27	*1.65*	250	*3625*	280	*4060*	300	*4350*	3000	600
3PE - 33	33.5	*2.04*	250	*3625*	280	*4060*	300	*4350*	3000	600
3PE - 38	38.7	*2.36*	250	*3625*	280	*4060*	300	*4350*	2750	500
3PE - 46	46.9	*2.86*	250	*3625*	270	*3915*	280	*4060*	2750	500
3PE - 55	54.1	*3.3*	220	*3190*	240	*3480*	250	*3625*	2500	400
3PE - 65	63.1	*3.85*	200	*2900*	220	*3190*	240	*3480*	2500	400
3PE - 75	73.4	*4.48*	180	*2610*	200	*2900*	220	*3190*	2500	400

GROUP 3.5 - C SERIES	cm^3/rev	*cu.in/rev*	bar	*psi*	bar	*psi*	bar	*psi*	min^{-1}	
3.5PC - 55	54.8	*3.34*	250	*3625*	280	*4060*	300	*4350*	2750	400
3.5PC - 64	63.2	*3.85*	250	*3625*	280	*4060*	300	*4350*	2750	350
3.5PC - 75	74.7	*4.55*	230	*3335*	250	*3625*	280	*4060*	2500	300
3.5PC - 87	88	*5.36*	210	*3040*	230	*3330*	260	*3750*	2250	300
3.5PC - 98*	99	*6.03*	200	*2900*	220	*3190*	250	*3625*	2000	300

*Displacement 98 are special release, please contact sales department.

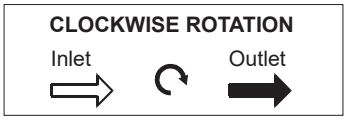
**For working conditions, using exclusively pressure P1, the value of max. speed must be reduced of 10%.

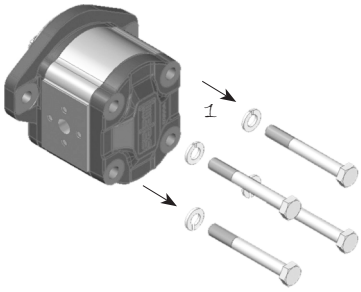
For bidirectional pump the max pressure has to be reduced of 10%.

The max pressure is refered to pumps with flanged ports, using the threaded ports the pump life could be reduced.

ROTATION CHANGING INSTRUCTIONS FOR UNITS

Before starting, be sure that the pump is cleaned externally as well as the working area to avoid that particles dangerous for pump working can find their way into the pump. Pump represented is a clockwise rotation pump. To obtain an anti_clockwise rotation read carefully the following instructions.

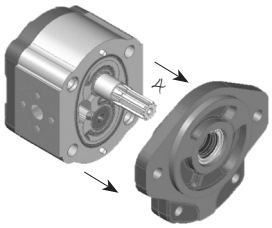




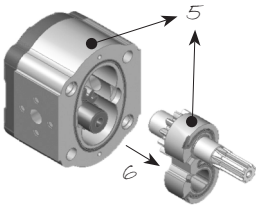
1 - Loosen and fully unscrew the screws.

2 - Lay the pump on the working area in order to have the mounting flange turned upside.

3 - Coat the shaft extension with grease to avoid damaging the shaft seal.

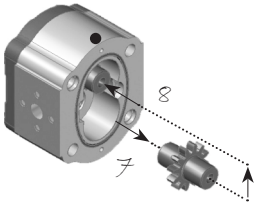


4 - Remove the flange and lay it on the working area; verify that the seal is correctly located in the body seat.



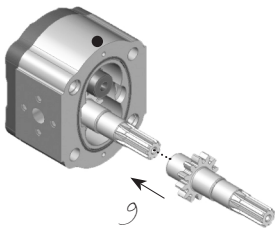
5 - Mark the position of the bushing and eventually the thrust plate, relative to the body.

6 - Remove the bushing, thrust plate and the driving gear taking care to avoid driven gear axial shifts.

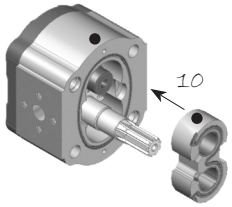


7 - Draw out the driven gear from its housing, taking care to avoid rear cover axial shifts.

8 - Re-locate the driven gear in the position previously occupied by the driving gear.



9 - Re-locate the driving gear in the position previously occupied by the driven gear.



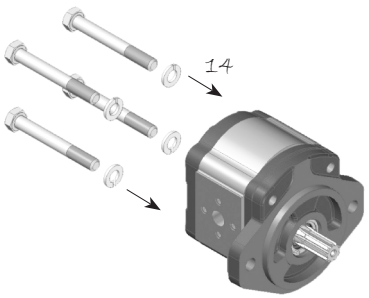
10 - Replace the bushing and thrust plate taking care that:
- marks are located as on the picture
- surface containing the seal is visible
- seal and its protection are correctly located.

11 - Clean body and mounting flange refaced surfaces.

12 - Verify that the two plugs are located in the body.

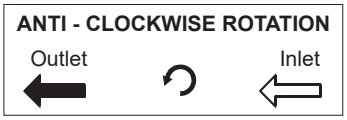
13 - Refit the mounting flange, turned 180° from its original position.

14 - Replace the clamp bolts and tighten crosswise evenly to an appropriate torque.



15 - Check that the shaft rotates freely.

16 - Mark on the flange the new direction of rotation.



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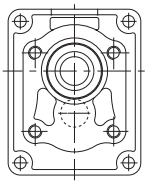
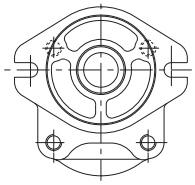
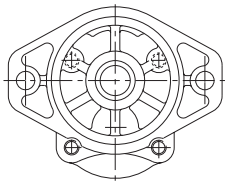
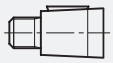
Final revised edition - February 2019

SHAFTS AND FLANGES COMBINATION

2.5PB	 CODE **P2** European standard	 CODE **S2** SAE A 2 Bolts	 CODE **S3** SAE B 2 Bolts
 CODE **38** - Tapered 1:8	38P2		
 CODE **53** - SAE A splined 10T		53S2	
 CODE **54** - SAE A splined 11T		54S2	
 CODE **55** - SAE B splined 13T		55S2	55S3
 CODE **87** - SAE B parallel		87S2	87S3

Note: other versions available, see shafts and flanges information.

Displacements up to 2.69 cu.in./rev
Pressure up to 4350 psi

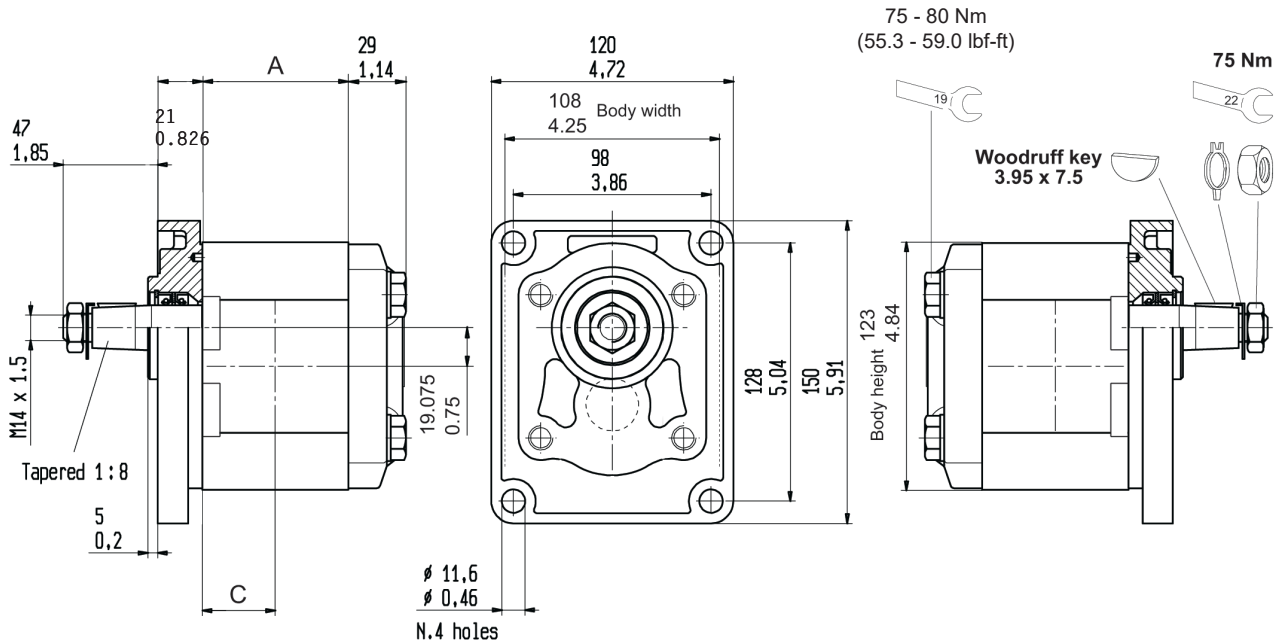
GEAR PUMPS

Displacements up to 44.2 cm³/rev
Pressure up to 300 bar

ASSEMBLING DIMENSIONS AND WORKING CONDITIONS

Type			5.5*	8.3*	11.5*	13.8*	16	19	22	25	28	32	38	44
Displacement	cm³/rev *cu.in./rev*		5.97 *0.36*	8.29 *0.50*	11.76 *0.72*	14.07 *0.86*	16 *0.97*	19.3 *1.17*	22.2 *1.35*	25.2 *1.53*	27.6 *1.68*	32.4 *1.97*	38.1 *2.32*	44.2 *2.69*
Dimension A	mm *in*		52.2 *2.05*	54.6 *2.15*	58.2 *2.29*	60.6 *2.38*	63 *2.45*	66.5 *2.59*	70 *2.73*	72.5 *2.82*	85 *3.31*	90.5 *3.52*	96.5 *3.76*	103 *4.06*
Dimension C	mm *in*		26.1 *1.02*	27.3 *1.07*	29.1 *1.14*	30.3 *1.19*	31.5 *1.20*	33.25 *1.29*	35 *1.36*	36.25 *1.41*	42.5 *1.65*	45.25 *1.76*	48.25 *1.88*	51.5 *2.03*
Continuous pressure	P¹	bar *psi*	250 *3625*	250 *3625*	250 *3625*	250 *3625*	250 *3625*	250 *3625*	250 *3625*	250 *3625*	250 *3625*	230 *3335*	200 *2900*	170 *2465*
Intermittent pressure	P²	bar *psi*	280 *4060*	280 *4060*	280 *4060*	280 *4060*	280 *4060*	280 *4060*	280 *4060*	280 *4060*	280 *4060*	250 *3625*	220 *3190*	190 *2755*
Peak pressure	P³	bar *psi*	300 *4350*	300 *4350*	300 *4350*	300 *4350*	300 *4350*	300 *4350*	300 *4350*	300 *4350*	300 *4350*	260 *3750*	240 *3480*	210 *3040*
Max speed		rpm	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	2750	2500
Min speed		rpm	600	600	600	600	600	600	500	500	500	500	400	400
Weight		kg *lbs*	3.40 *7.48*	3.60 *7.92*	3.80 *8.36*	4.10 *9.02*	3.40 *7.48*	3.60 *7.92*	3.80 *8.36*	4.10 *9.02*	4.50 *9.92*	4.75 *10.47*	5.00 *11.00*	5.30 *11.66*

*Available only as rear pump, displacements **11.5-13.8** are available as single pump only with drive shaft "55".



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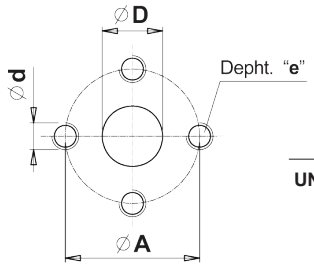
FLANGED AND THREADED PORTS

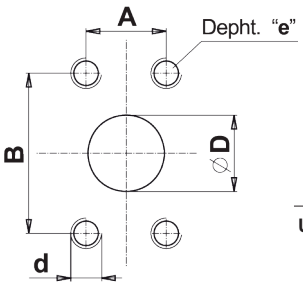


code P

Flanged ports
european standard

UNI-DIRECTIONAL PUMPS	TYPE	INLET				OUTLET			
		Ø D	Ø A	d	e	Ø D	Ø A	d	e
	From 5.5 to 8.3	13 *(0.51")*	30 *(1.18")*	M6	13 *(0.51")*	13 *(0.51")*	30 *(1.18")*	M6	13 *(0.51")*
	From 11.5 to 19	20 *(0.79")*	40 *(1.57")*	M8					
	From 22 to 44	25 *(0.97")*	51 *(2.01")*	M10	16 *(0.62")*	18 *(0.70")*	40 *(1.56")*	M8	18 *(0.70")*

BI-DIRECTIONAL PUMPS Special version available on request.

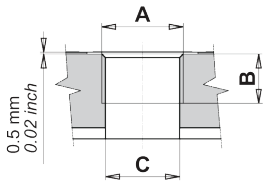


code S

Flanged ports
SAE J518
AMERICAN STANDARD
THREAD

UNI-DIRECTIONAL PUMPS	TYPE	INLET					OUTLET				
		Ø D	B	A	d	e	Ø D	B	A	d	e
	From 16 to 44	25 *(0.97")*	52.4 *(2.06")*	26.2 *(1.02")*	3/8 16 unc	16 *(0.62")*	18 *(0.70")*	47.6 *(1.87")*	22.2 *(0.86")*	3/8 16 unc	16 *(0.62")*

BI-DIRECTIONAL PUMPS Special version available on request.

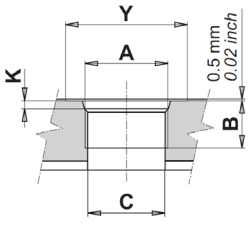


code G

Threaded ports
GAS (BSPP)

UNI-DIRECTIONAL PUMPS	TYPE	INLET			OUTLET		
		A	B	ØC	A	B	ØC
	From 5.5 to 22	G3/4	16 *(0.62")*	20 *(0.78")*	G1/2	15 *(0.59")*	
	From 25 to 44	G1	19 *(0.74")*	23 *(0.91")*	G3/4	16 *(0.62")*	20 *(0.78")*

BI-DIRECTIONAL PUMPS Special version available on request.



code R

Threaded ports
SAE (ODT)

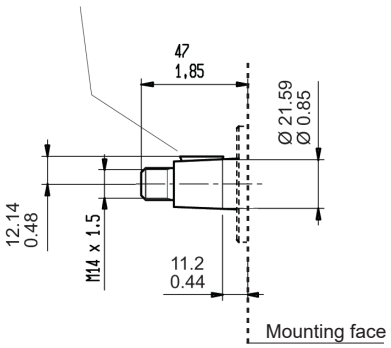
UNI-DIRECTIONAL PUMPS	TYPE	INLET					OUTLET				
		A	B	ØC	Y	K	A	B	ØC	Y	K
	From 5.5 to 22	1-1/16-12 UN (SAE 12)	19 *(0.74")*	20 *(0.78")*	41 *(1.61")*	3.3 *(0.12")*	7/8-14 UNF (SAE 10)	14 *(0.54")*	15 *(0.59")*	34 *(1.32")*	2.5 *(0.10")*
	From 25 to 44	1-5/16-12 UN (SAE 16)		23 *(0.91")*	49 *(1.93")*		1-1/16-12 UN (SAE 12)	19 *(0.74")*	20 *(0.78")*	41 *(1.61")*	3.3 *(0.12")*

BI-DIRECTIONAL PUMPS Special version available on request.

E0.138.0219.02.00IM05

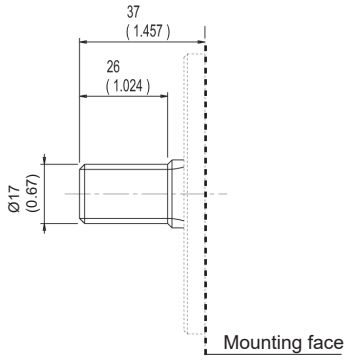
DRIVE SHAFTS

Woodruff Key (3.95x7.5)



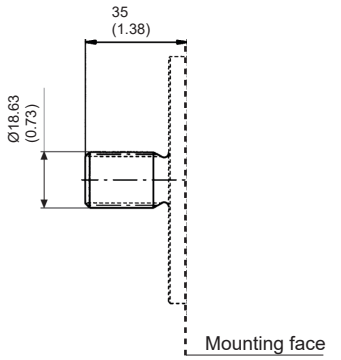
code 38 Max torque 250 Nm (2213 lbf in)

Tapered 1:8



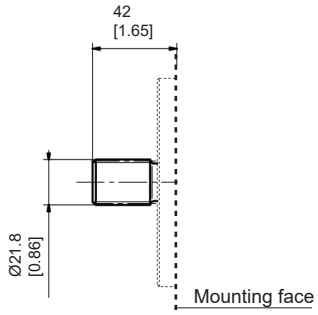
code 53 Max torque 125 Nm (1106 lbf in)

SAE A Splined 10T-16/32DP Ansi B92 1a 1976



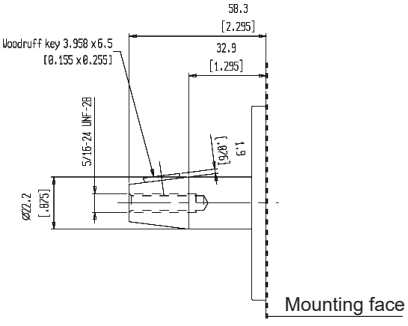
code 54 Max torque 150 Nm (1327 lbf in)

SAE A Splined 11T-16/32DP Ansi B92 1a 1976



code 55 Max torque 320 Nm (2832 lbf in)

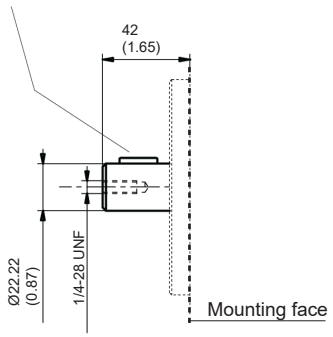
SAE B Splined 13T-16/32DP Ansi B92 1a 1976



code 37 Max torque 200 Nm (1770 lbf in)

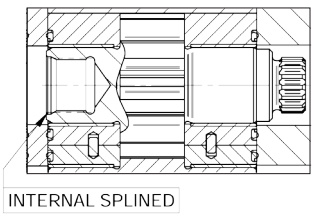
Tapered 1:4

Woodruff Key (6.35x6.35x17.7)



code 87 Max torque 220 Nm (1950 lbf in)

SAE B Parallel

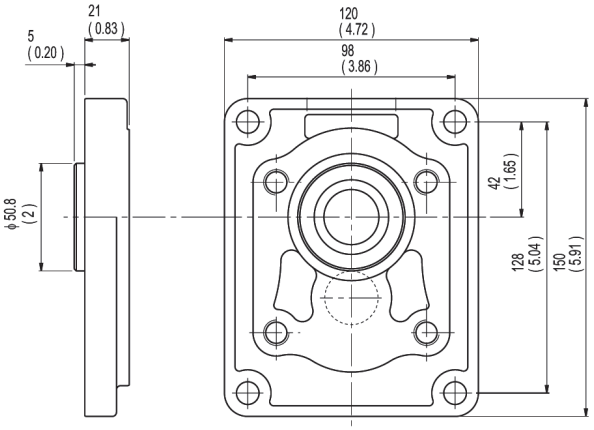


code 64 Max torque 115 Nm (1017.8 lbt in)

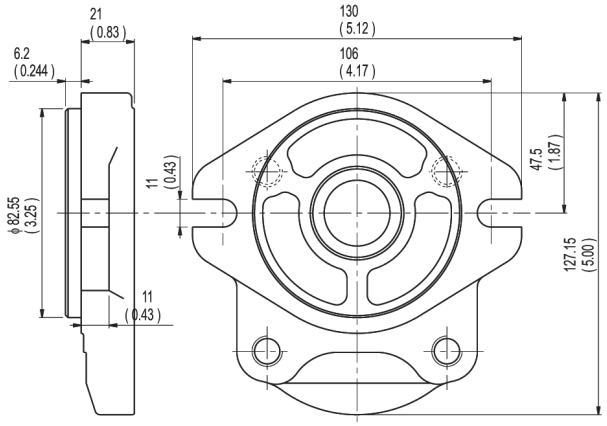
DIN 5480 internal splined (only for rear pumps)

E0.138.0219.02.00IM05

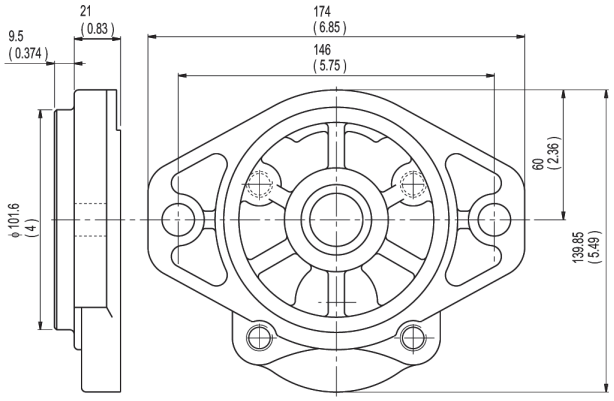
MOUNTING FLANGES



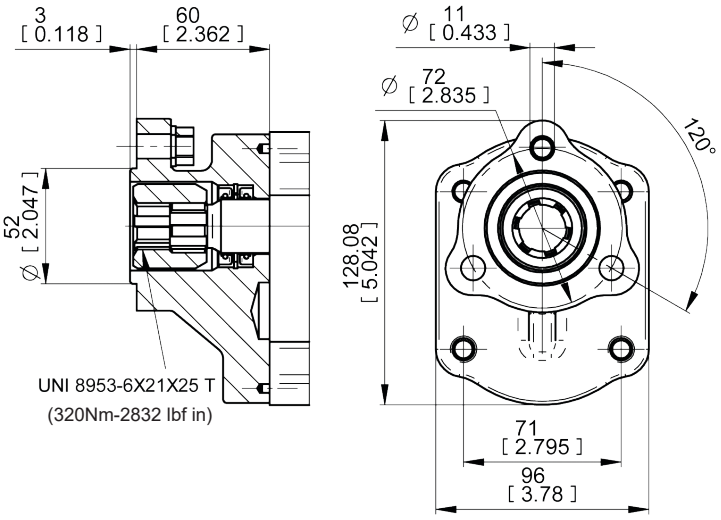
P2	European standard
With shaft code 38	



S2	SAE A 2 bolts
With shaft code 53-54-55-87	



S3	SAE B 2 bolts
With shaft code 55-87	



T1	3 BOLT UNI 8953
With shaft code 73	

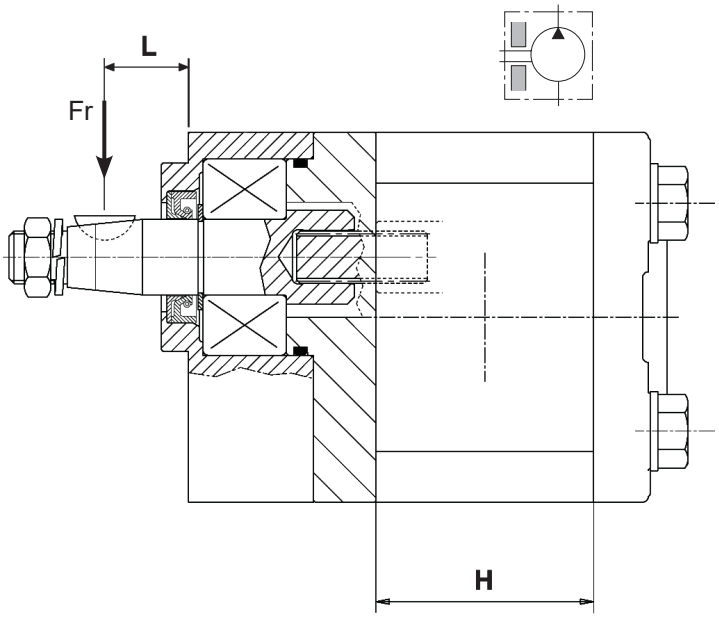
E0.138.0219.02.00IM05

OUTRIGGER BEARING

The following diagrams show radial load capability of the bearing.
Calculation according to ISO 281 at 10 cSt.

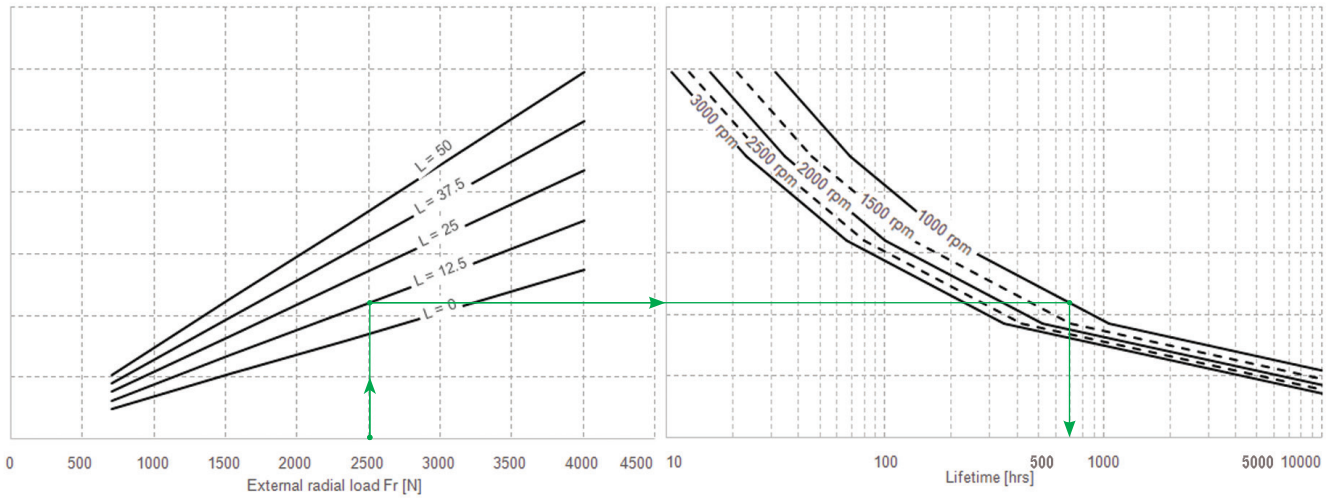
TYPE	H
16	63 (2.45")
19	66.5 (2.59")
22	70 (2.73")
25	72.5 (2.82")
28	85 (3.31")
32	90.5 (3.52")
38	96.5 (3.76")
44	103 (4.06")

L=Distance between mounting flange and radial force point of application.

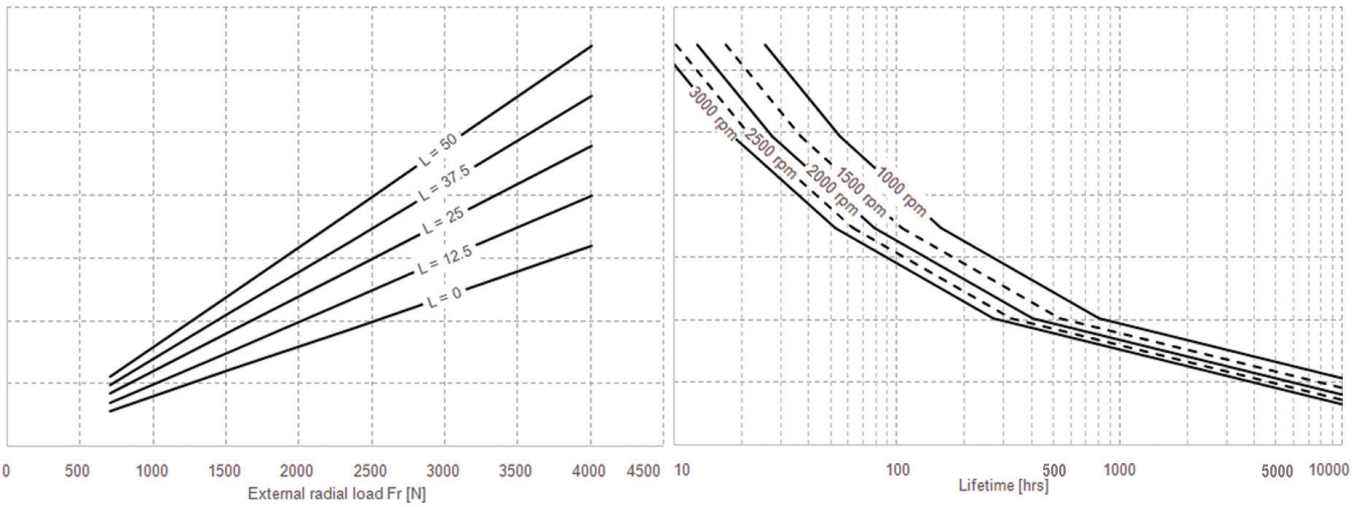


Example:
Fr = 2500 N
L = 12.5
Speed = 1000 rpm
→ Expected life: 700 hrs

For Code CP

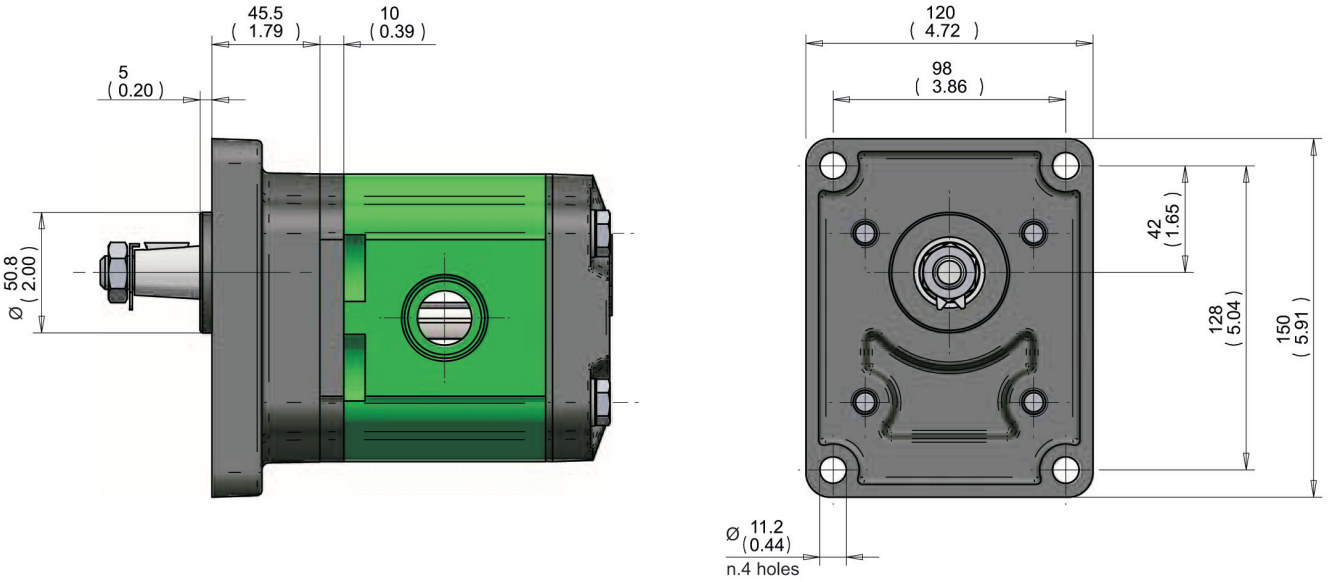


For Code Z1

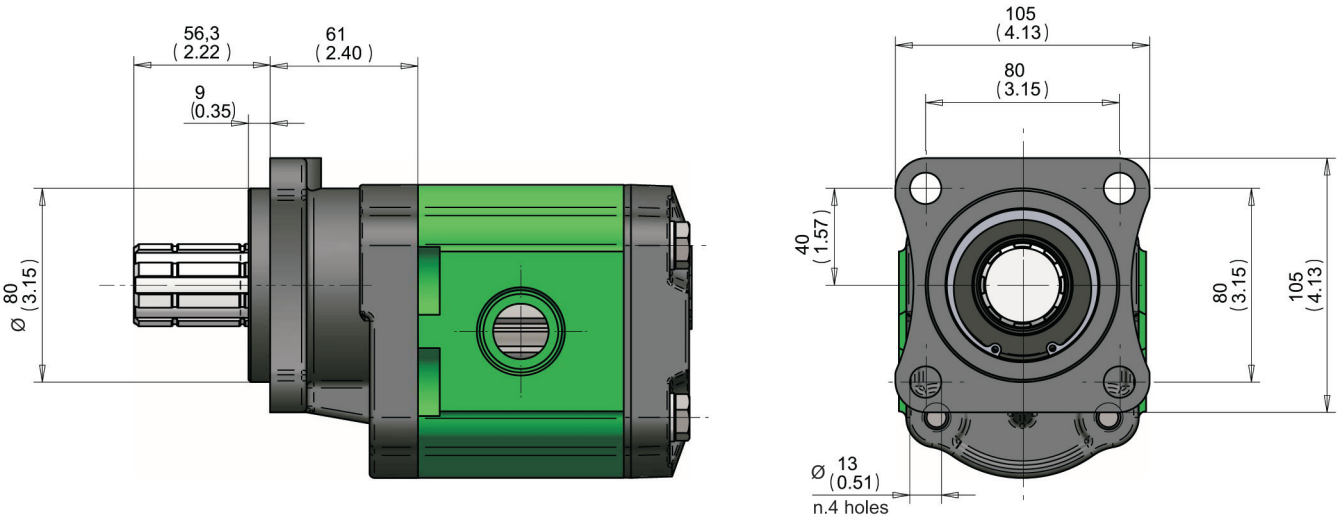


E0.138.0219.02.00IM05

MOUNTING FLANGES WITH BEARING



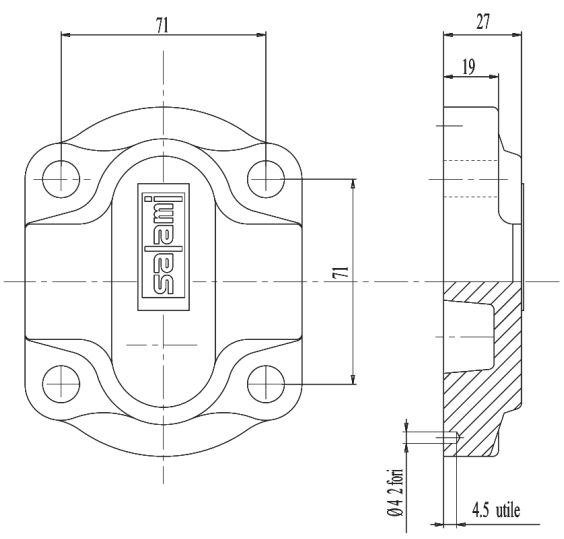
CP	European standard mounting flange
With shaft code 38 (see page 70)	



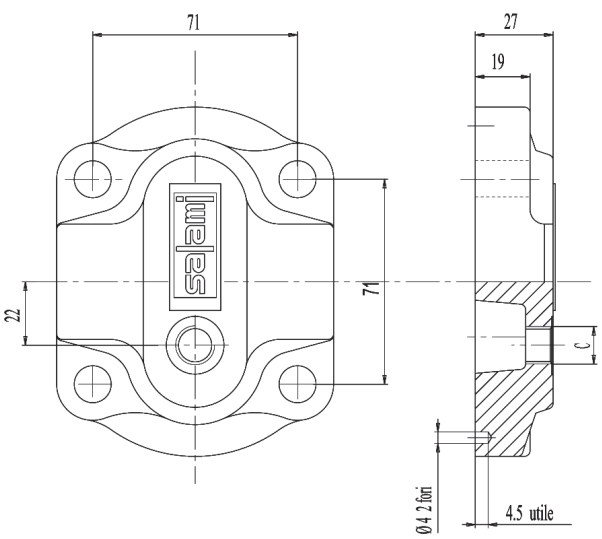
Z1	4 Bolts (ZF gear box) ISO 7653
With shaft code 66	

E0.138.0219.02.00IM05

REAR COVERS

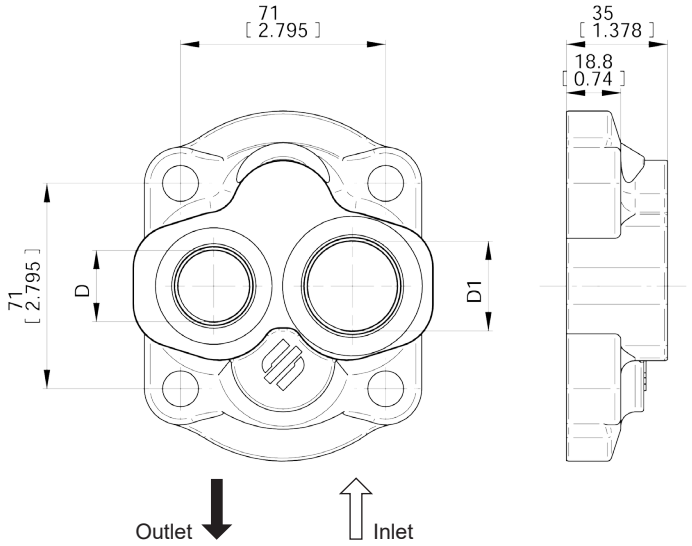


Standard rear cover
for unidirectional pumps



Standard rear cover
for reversible pumps, with external drain C.

C
9/16-18 UNF-2B (SAE6)
G3/8



UNIDIRECTIONAL PUMPS

code 1

D	D1
1-1/16-12 UN-2B (SAE12)	1-5/16-12 UN-2B (SAE16)
G3/4	G1

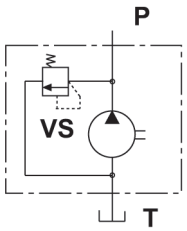
On request outlet port only.

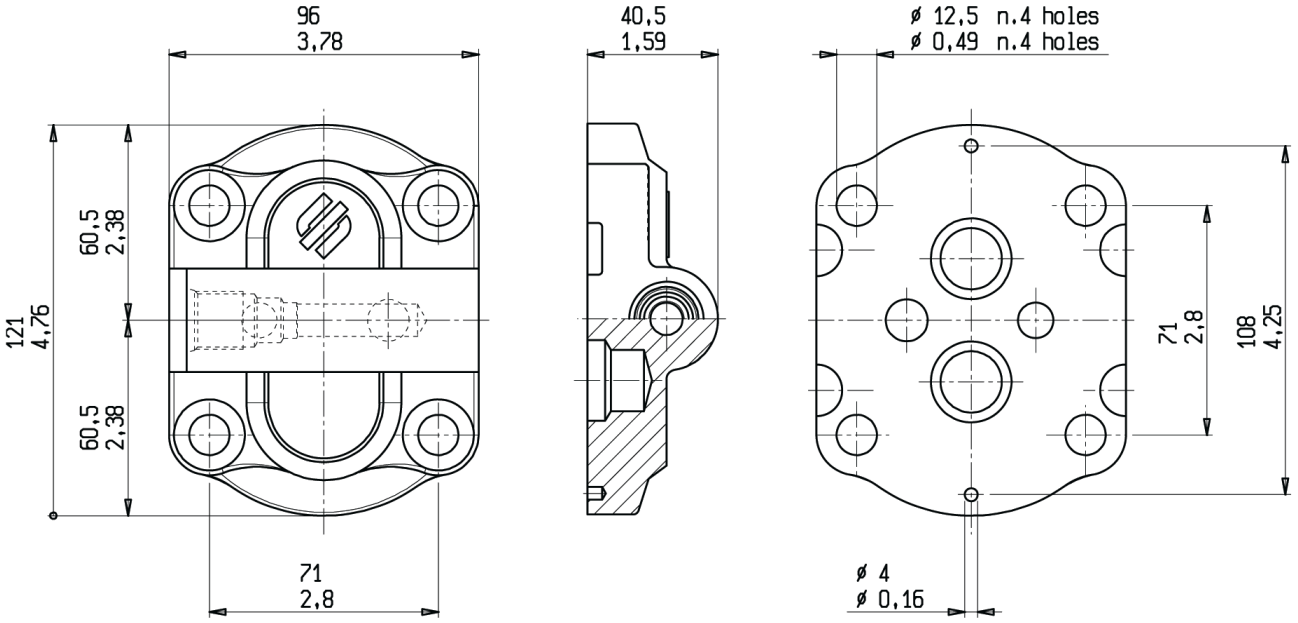
E0.138.0219.02.00IM05

REAR COVERS WITH RELIEF VALVE

code VS

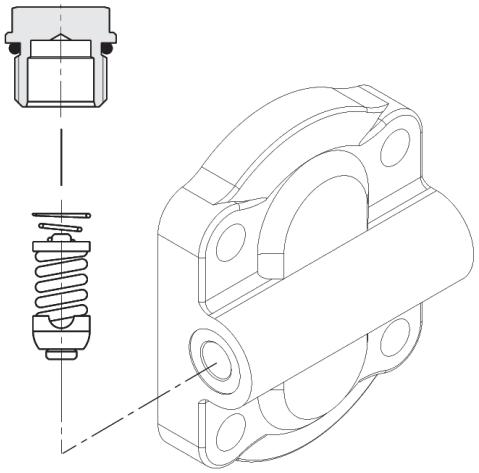
With main relief valve
with internal unloading line.
Rear cover with fixed setting main relief valve.



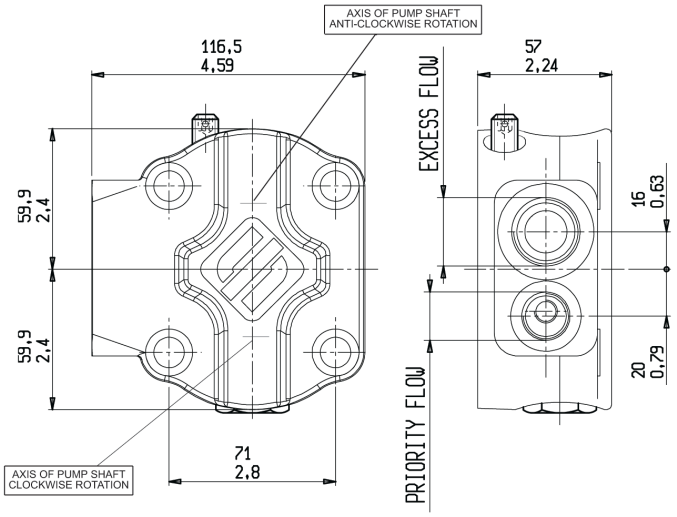


Available values of fixed setting

bar	*psi*	bar	*psi*
25	*362*	160	*2320*
32	*464*	175	*2538*
40	*580*	190	*2756*
50	*725*	210	*3046*
63	*914*	230	*3336*
80	*1160*	250	*3626*
100	*1450*	280	*4061*
125	*1813*	315	*4569*
140	*2030*	350	*5076*

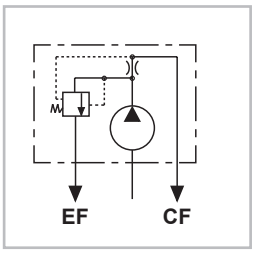


PRESSURE COMPENSATED CONTROL AND PRIORITY FLOW VALVE



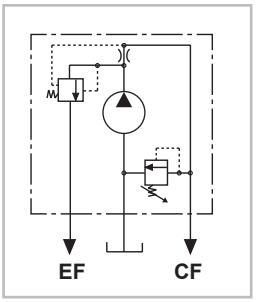
VP1 - VPS1
SIDE PORTS

Priority flow ports	Excess flow ports
G 3/8	G 3/4
(SAE8) 3/4 - 16 UNF - 2B	(SAE12) 1-1/16 - 12 UNF - 2B



code VP1

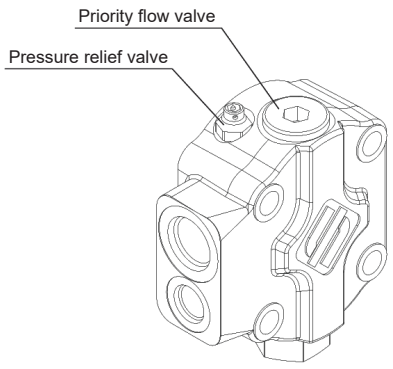
Priority flow valve, excess flow to second actuator.



code VPS1

Priority flow valve, excess flow to second actuator with pressure relief valve on priority flow line.

CALIBRATED ORIFICE Φ d (mm/*inch*)	FLOW RATE (l/min - gpm) ± 10%
1.5 /*(0.06")*	*2.5 - (0.66)*
2 /*(0.08")*	4 - *(1.06)*
2.4 /*(0.09")*	6 - *(1.59)*
2.8 /*(0.11")*	8 - *(2.11)*
3.1 /*(0.12")*	10 - *(2.64)*
3.5 /*(0.14")*	12.5 - *(3.30)*
4 /*(0.16")*	16 - *(4.23)*
4.4 /*(0.17")*	20 - *(5.28)*
4.9 /*(0.19")*	25 - *(6.61)*



PRIORITY FLOW VALVE (VP - VPS)

3 Ways flow control priority valve. It ensures a constant flow to CF port, given by the screwed control orifice (see table) and regardless of the pump speed; the excess flow is available for other functions at the EF port.
The two lines CF and EF can be loaded simultaneously and the max pressure of the priority line can be limited by a relief valve connected to the suction port.

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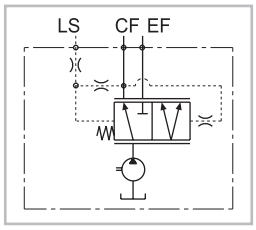
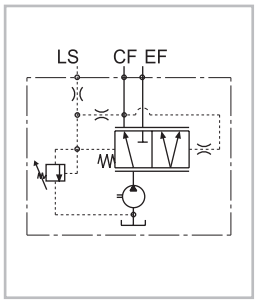
LOAD SENSING PRIORITY VALVE



code VPD1

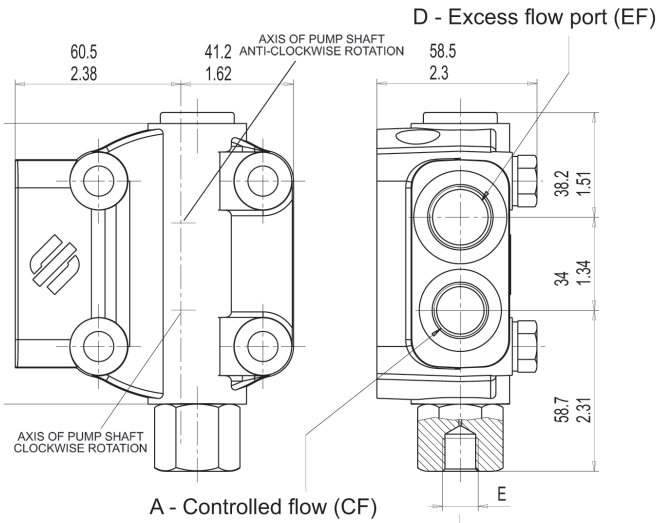
Load sensing priority valve with dynamic signal without main relief valve.

CF = Priority flow port
EF = Excess flow port
LS = Load sensing signal port

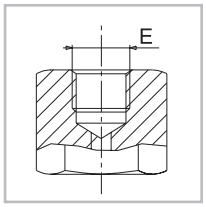


code VPDS1

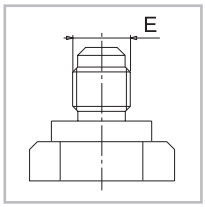
Load sensing priority valve with dinamic signal with main relief valve.



VPD1 - VPDS1
SIDE PORTS



Female fitting



Male fitting

Minimum load sensing signal (LS) = 4 bar (28 psi)

A	D	E
G 3/8	G 3/4	G 1/4
(SAE8) 3/4 - 16 UNF - 2B	(SAE12) 1-1/16 - 12 UN - 2B	(SAE4) 7/16 - 20 UNF - 2B

LOAD SENSING PRIORITY VALVES (VDP1-VDPS1)

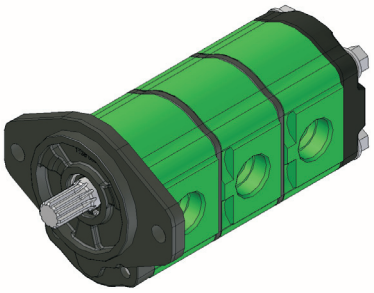
The load sensing priority valve is a control valve able to divide the flow generated by the pump, coming from the port P, in two different flows named Qcf and Qef.
The Qcf flow follows the user request, the flow Qefchanges according to the equation:

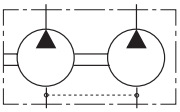
Qin = Qcf + Qef

This valve is used in hydraulic steering systems, theCF port is connected to the inlet of power steering unit while the other functions (lifter etc…) are connected to the EF port. The load sensing LS signal of the valve is connected to the LS of powersteering unit.
The regulated flow Qcf depends on the steering speed, the remaining flow Qef is available for the other funcions and complies with the equation

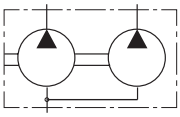
Qef = Qin – Qcf

MULTIPLE GEAR PUMPS ASSEMBLING DIMENSIONS



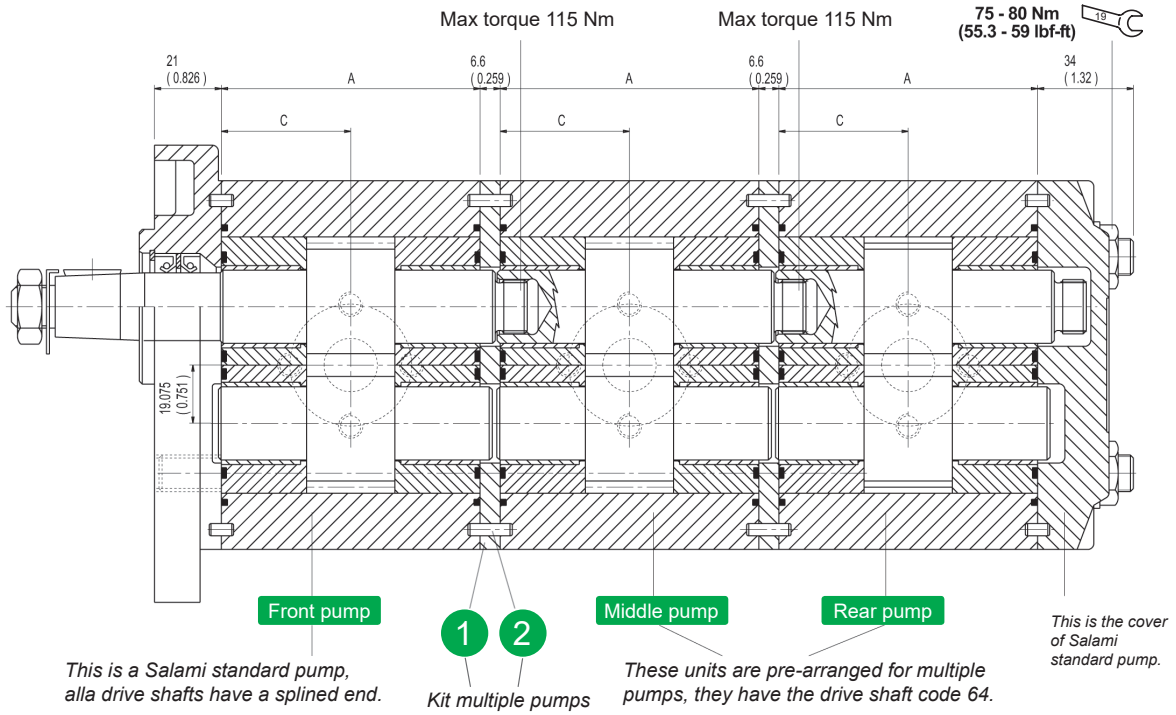


MULTIPLE GEAR PUMPS with inlet port on each body



MULTIPLE GEAR PUMPS with common inlet port*

*In case of common inlet port, to avoid too high value of oil speed, 40 l/min is the max. sucked flow for the downstream pump. Commercial code **UA**.



The 2.5PB pumps can be easily transformed into front pump in the multiple units. All drive shafts are pre-arranged and have a splined end according DIN 5482. The first unit must always be the same size or bigger than following units. The features and performances are the same of the corresponding single units: only in the case of simultaneous operating you have to verify that the inlet torque is lower than the max. transmissible by the drive shaft. Finally to assembly the multiple pump you need to order bolts of the right length.

Type		5.5	8.3	11.5	13.8	16	19	22	25	28	32	38	44
Dimension A	mm	52.2	54.6	58.2	60.6	63	66.5	70	72.5	85	90.5	96.5	103
	in	*2.05*	*2.15*	*2.29*	*2.38*	*2.48*	*2.62*	*2.76*	*2.85*	*3.35*	*3.56*	*3.80*	*4.06*
Dimension C	mm	26.1	27.3	29.1	30.3	31.5	33.25	35	36.25	42.5	45.25	48.25	51.5
	in	*1.03*	*1.07*	*1.14*	*1.19*	*1.22*	*1.29*	*1.36*	*1.41*	*1.65*	*1.76*	*1.88*	*2.03*

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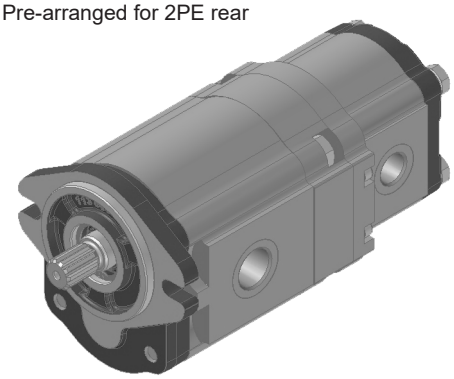
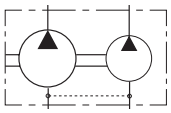
2.5PB COMBINATION WITH PUMP 2PE

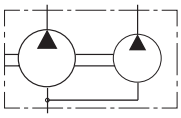
PD2

Kit multiple pumps
Pre-arranged for 2PE rear



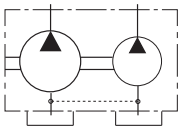


MULTIPLE GEAR PUMPS with inlet port on each body



MULTIPLE GEAR PUMPS with common inlet port*

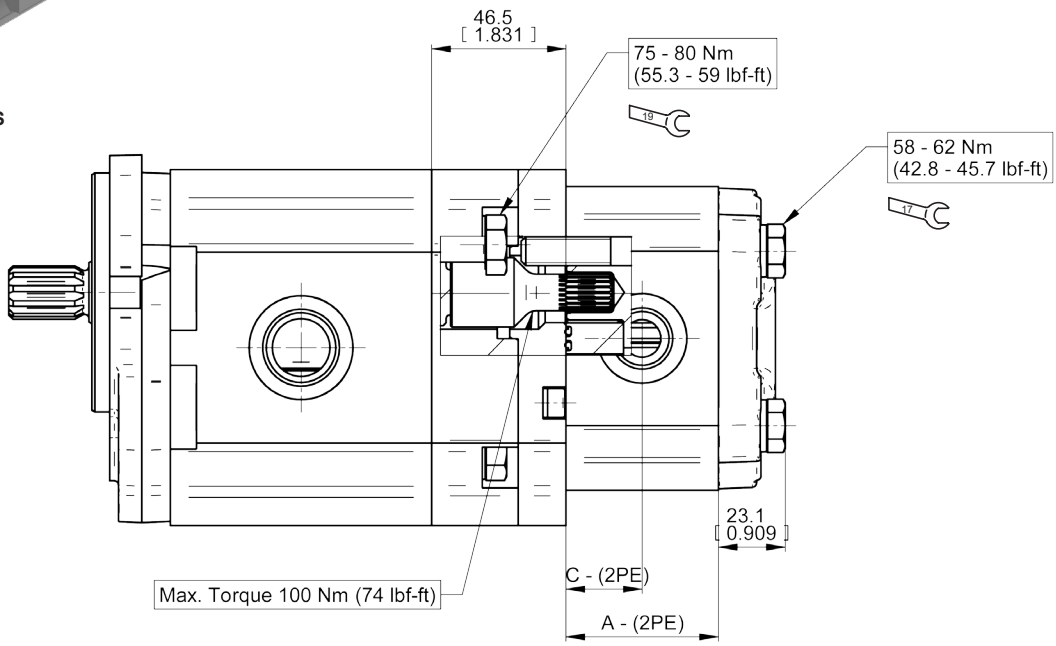
*In case of common inlet port, to avoid too high value of oil speed, 30 l/min is the max. sucked flow for the downstream pump. Commercial code **UA**.



MULTIPLE GEAR PUMPS with separated stages

code AS

ALL THE PUMPS CAN BE ALSO MULTIPLE

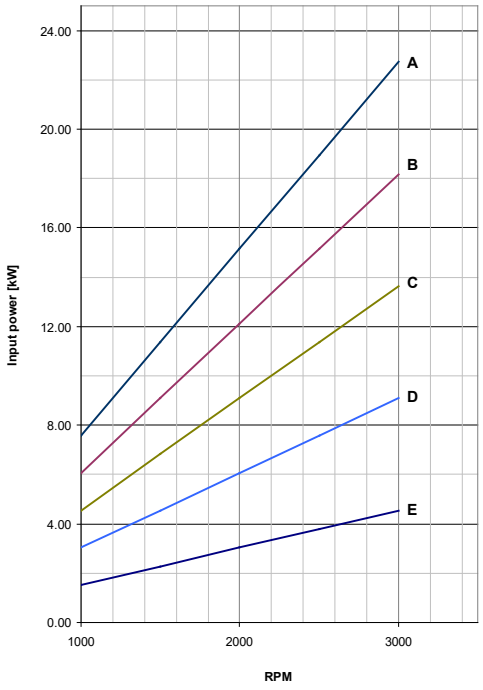


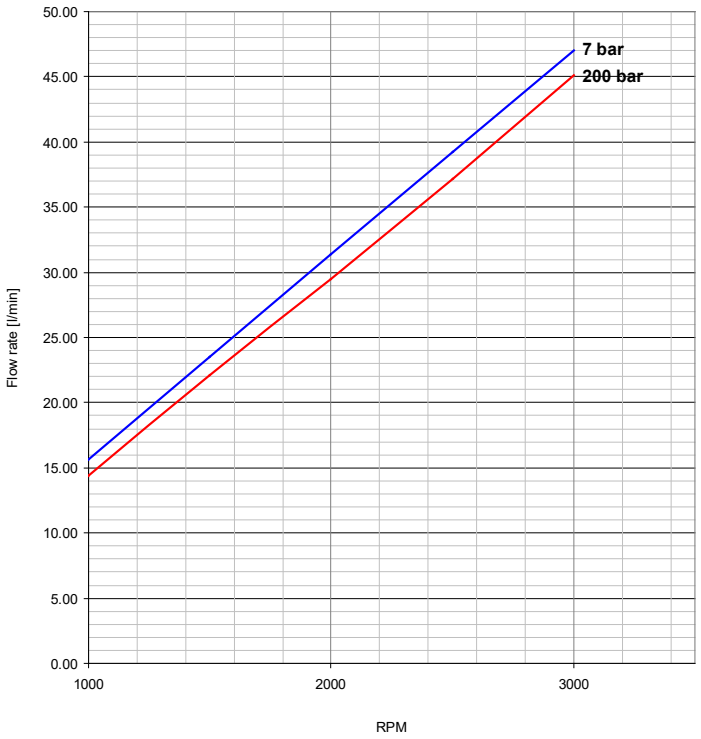
2PE-Type		3.2*	3.9*	4.5	6.5	8.3	10.5	11.3	12.5	13.8	16	19	22.5	26
Dimension A - 2PE	mm *in*	47.1 *1.83*			49.95 *1.97*	52.8 *2.07*	56.3 *2.22*	59.7 *2.35*		63.5 *2.5*	67.5 *2.65*	75.6 *2.97*	81 *3.19*	86.8 *3.42*
Dimension C - 2PE	mm *in*	23.55 *0.93*			25 0.98	26.4 *1.04*	28.15 *1.11*	29.75 *1.17*		31.75 *1.25*	33.75 *1.33*	37.80 *1.49*	40.5 *1.59*	43.4 *1.71*

*Available only as rear pump

PERFORMANCE CURVES

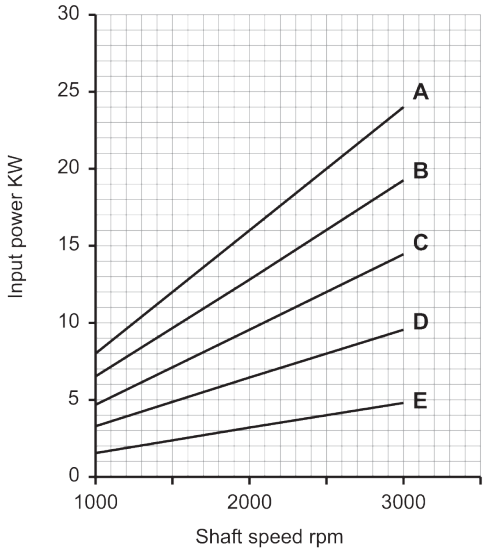
Performance curves carried out with oil viscosity at 21 cSt and oil temperature at 50°C

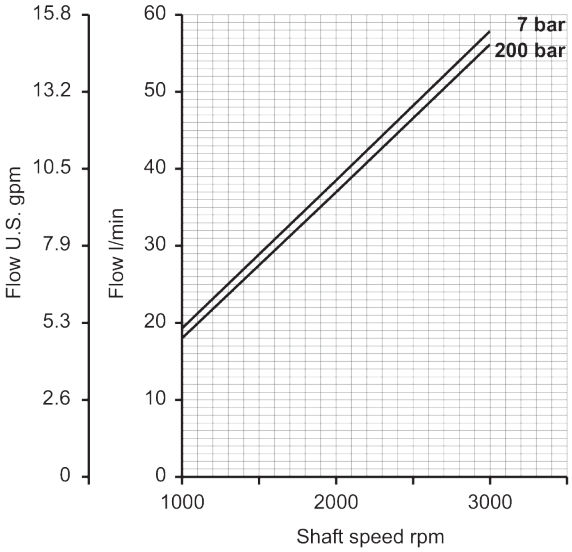




2.5PB - 16

A=250bar - *(3625 psi)*
B=200bar - *(2900 psi)*
C=150bar - *(2175 psi)*
D=100bar - *(1450 psi)*
E=50bar - *(725 psi)*





2.5PB - 19

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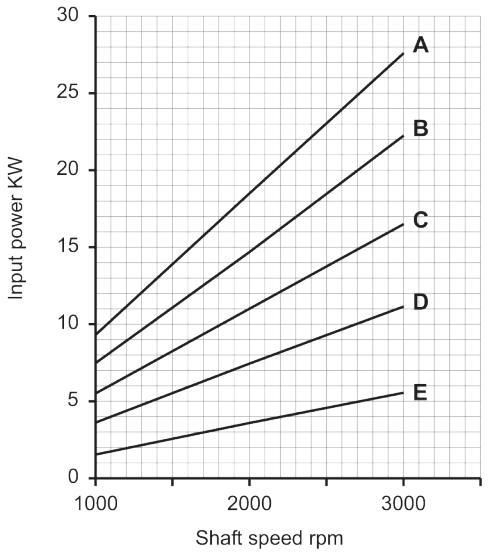
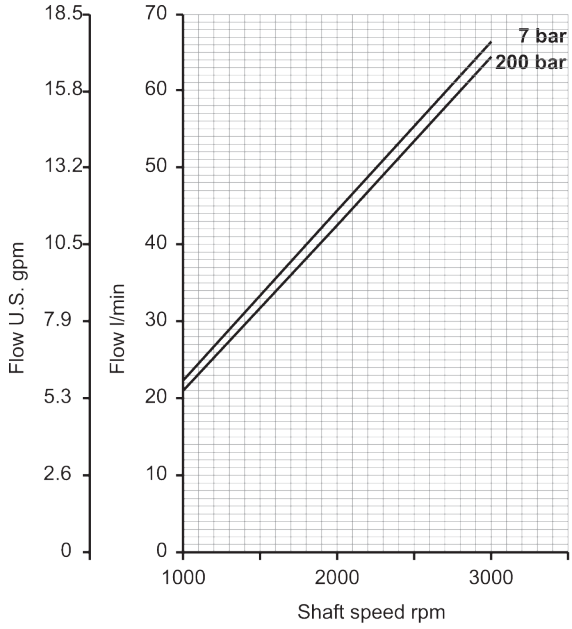
PERFORMANCE CURVES

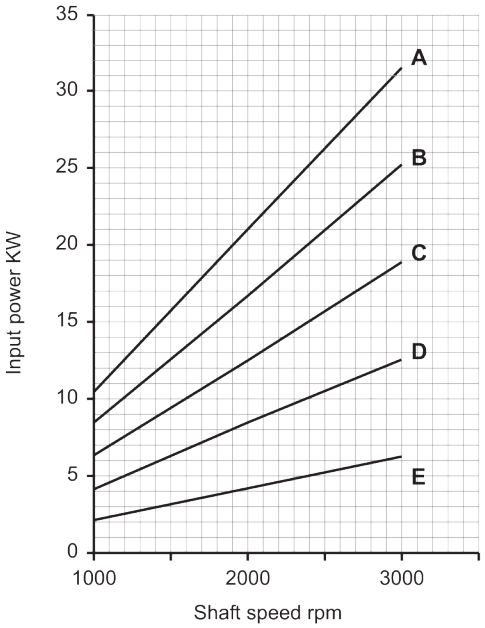
Performance curves carried out with oil viscosity at 21 cSt and oil temperature at 50°C

A=250bar - *(3625 psi)*
B=200bar - *(2900 psi)*
C=150bar - *(2175 psi)*
D=100bar - *(1450 psi)*
E=50bar - *(725 psi)*

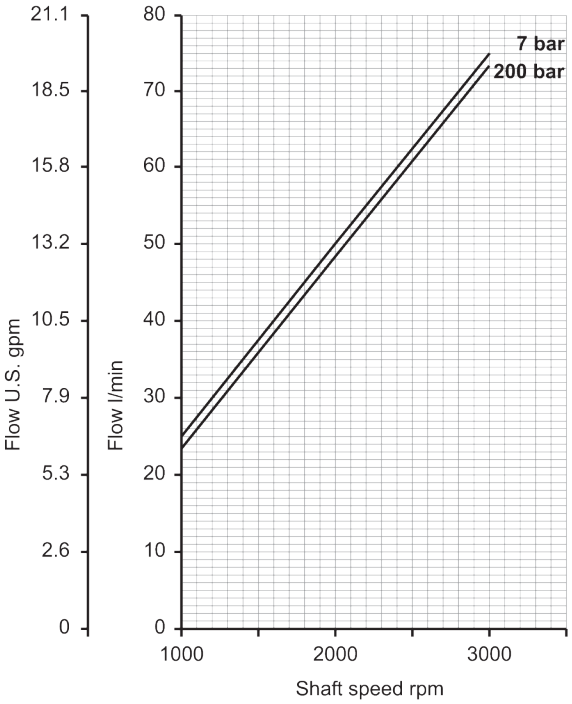




2.5PB - 22



A=250bar - *(3625 psi)*
B=200bar - *(2900 psi)*
C=150bar - *(2175 psi)*
D=100bar - *(1450 psi)*
E=50bar - *(725 psi)*

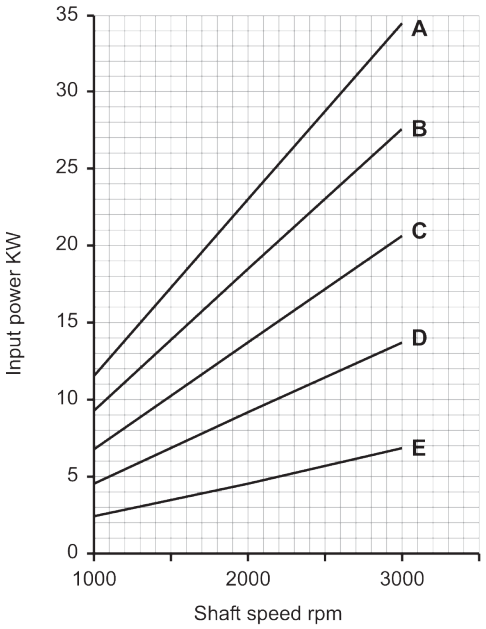


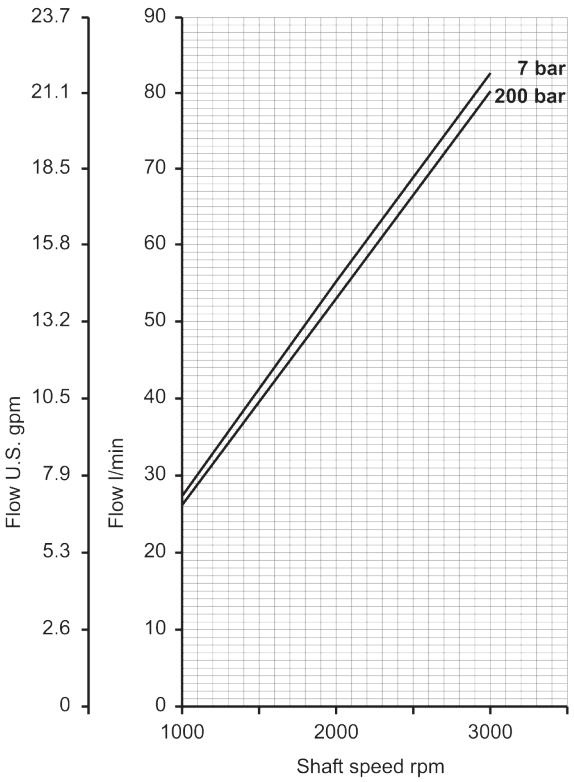
2.5PB - 25

PERFORMANCE CURVES

Performance curves carried out with oil viscosity at 21 cSt and oil temperature at 50°C

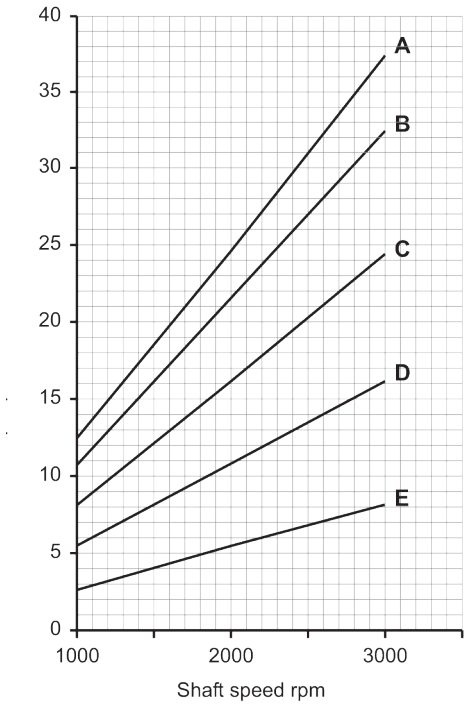
A=250bar - *(3625 psi)*
B=200bar - *(2900 psi)*
C=150bar - *(2175 psi)*
D=100bar - *(1450 psi)*
E=50bar - *(725 psi)*

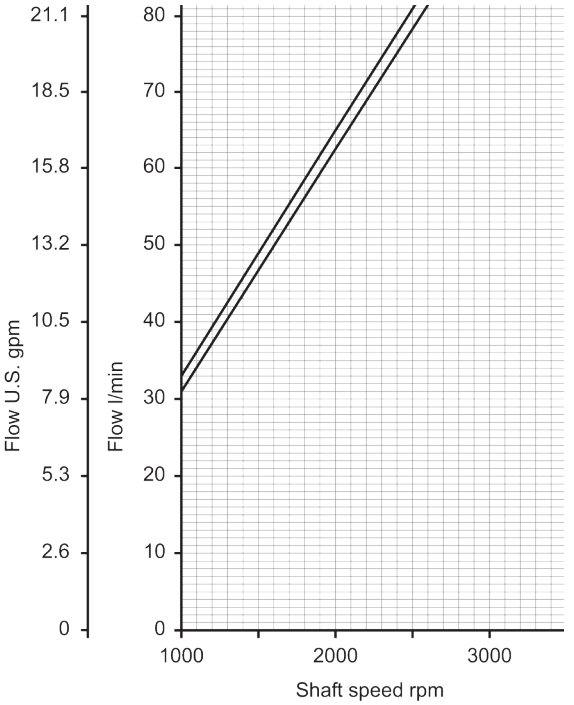




2.5PB - 28

A=230bar - *(3625 psi)*
B=200bar - *(2900 psi)*
C=150bar - *(2175 psi)*
D=100bar - *(1450 psi)*
E=50bar - *(725 psi)*





2.5PB - 32

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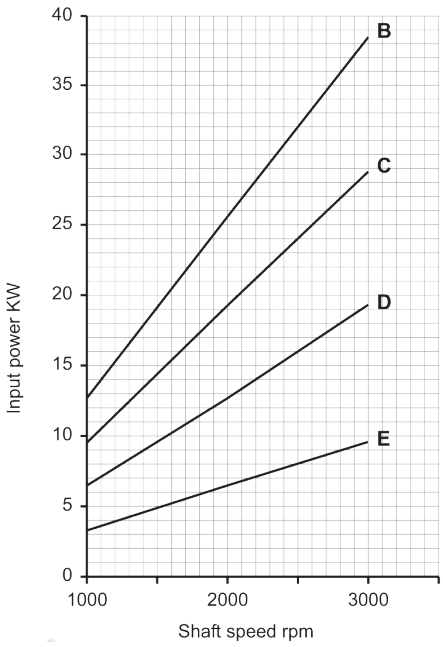
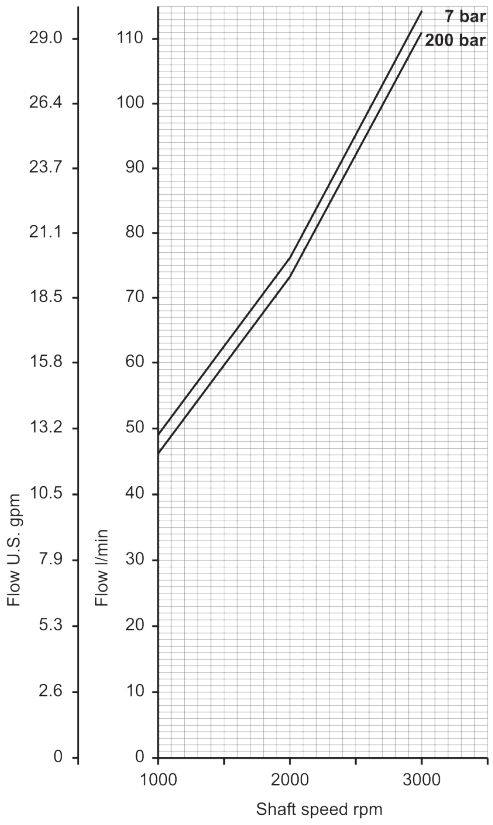
PERFORMANCE CURVES

Performance curves carried out with oil viscosity at 21 cSt and oil temperature at 50°C

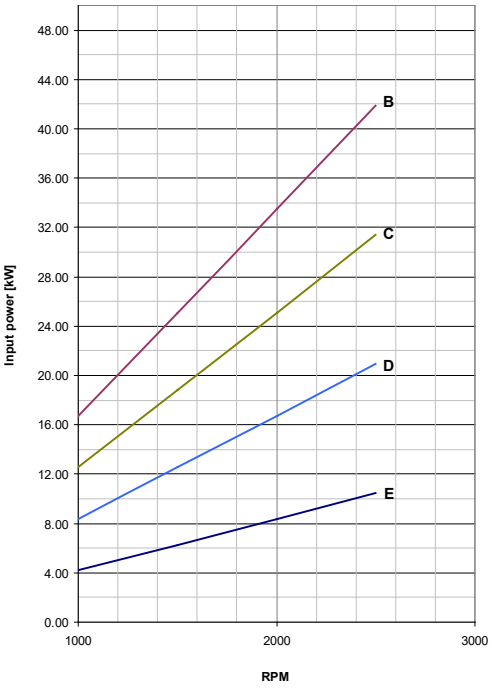
B=200bar - *(2900 psi)*
C=150bar - *(2175 psi)*
D=100bar - *(1450 psi)*
E=50bar - *(725 psi)*

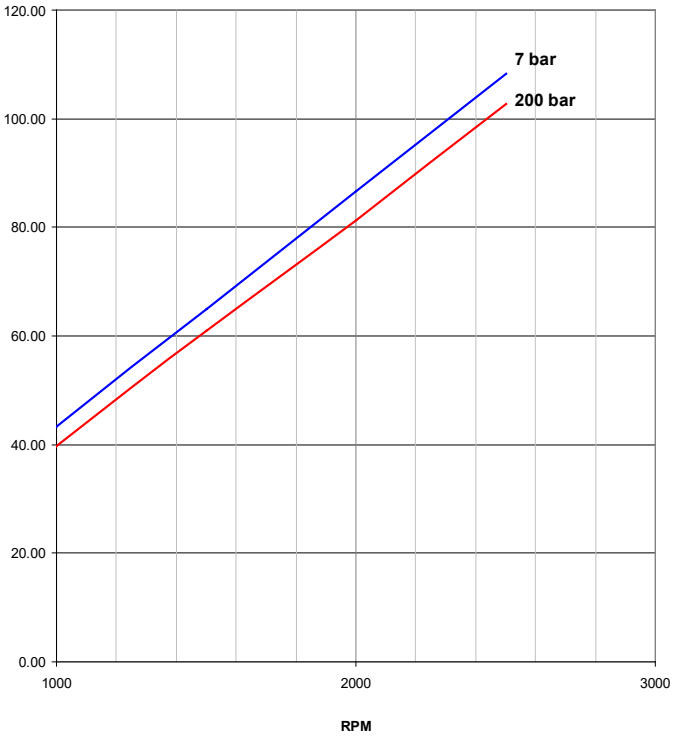




2.5PB - 38

B=200bar - *(2900 psi)*
C=150bar - *(2175 psi)*
D=100bar - *(1450 psi)*
E=50bar - *(725 psi)*





2.5PB - 44

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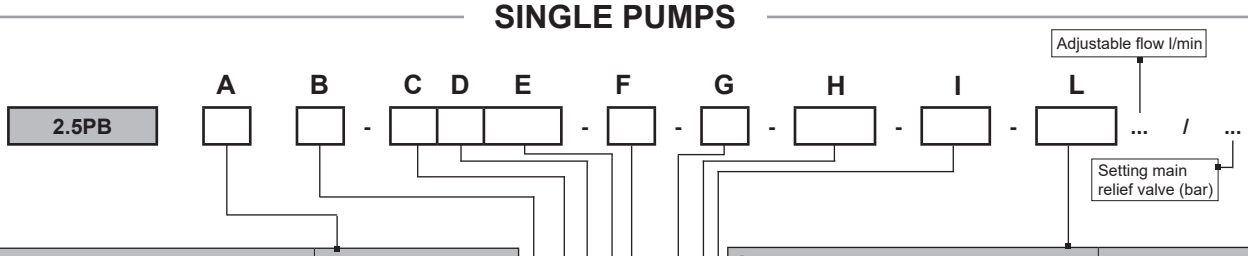
How to order-2.5PB

SINGLE PUMPS



DISPLACEMENTS		A CODES
11.76 cm³/rev.	*0.72 cu.in/rev.*	11.5
14.07 cm³/rev.	*0.86 cu.in/rev.*	13.8
16 cm³/rev.	*0.97 cu.in/rev.*	16
19.3 cm³/rev.	*1.17 cu.in/rev.*	19
22.2 cm³/rev.	*1.35 cu.in/rev.*	22
25.2 cm³/rev.	*1.53 cu.in/rev.*	25
27.6 cm³/rev.	*1.68 cu.in/rev.*	28
32.4 cm³/rev.	*1.97 cu.in/rev.*	32
38.1 cm³/rev.	*2.32 cu.in/rev.*	38
44.2 cm³/rev.	*2.69 cu.in/rev.*	44

ROTATION (page 6)	CODES B
Clockwise	D
Anti-clockwise	S
Reversible	R

PORTS (page 69)	CODES C
Flanged ports european standard	P
Flanged ports SAE (UNC)	S
Threaded ports GAS (BSPP)	G
Threaded ports SAE (ODT)	R

DRIVE SHAFT (page 70)	CODES D
Tapered 1:8	38
SAE A splined 10T	53
SAE A splined 11T	54
SAE B splined 13T	55
DIN 5480 internal splined **(only for rear pumps- see page 78)**	64
Tapered 1:4	37
7/8" SAE B parallel shaft Ø22.22	87

L VALVES IN THE COVER (page 75)	CODES
Fixed main relief valve	VS
Priority flow divider with excess flow to 2nd actuator	VP1
Priority flow divider with excess flow to 2nd actuator with main relief valve	VPS1
Priority flow divider with Load sensing with dinamic signal	VPD1
Load sensing priority valve with dinamic signal with main relief valve	VPDS1

I REAR COVER (page 79)	CODE
Pre-arranged for 2PE rear	PD2

H OUTRIGGER BEARING (page 73)	CODES
European standard	CP
4 Bolts for ZF gear box Ø80	Z1

G PORTS POSITION	CODE
Lateral ports standard	
Rear ports (page)	1

F SEAL	CODE
Buna standard	
Viton	V

E MOUNTING FLANGES (page 71)	CODES
European standard	P2
SAE A 2 bolts	S2
SAE B 2 bolts	S3
3 BOLT UNI 8953	T1

Order example: 2.5PB 19D, ports European standard (P), drive shaft (38), mounting flange (P2) with valve in the cover (VS 190 bar).
2.5PB19D-P38P2-VS190

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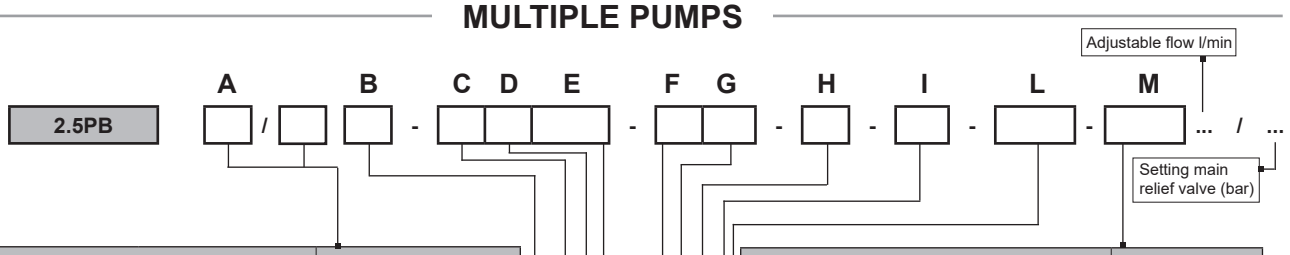
2.5PB-How to order

MULTIPLE PUMPS



DISPLACEMENTS		A CODES
5.97 cm³/rev.	***0.36 cu.in/rev.***	***5.5***
8.29 cm³/rev.	***0.50 cu.in/rev.***	***8.3***
11.76 cm³/rev.	*0.72 cu.in/rev.*	11.5
14.07 cm³/rev.	*0.86 cu.in/rev.*	13.8
16 cm³/rev.	*0.97 cu.in/rev.*	16
19.3 cm³/rev.	*1.17 cu.in/rev.*	19
22.2 cm³/rev.	*1.35 cu.in/rev.*	22
25.2 cm³/rev.	*1.53 cu.in/rev.*	25
27.6 cm³/rev.	*1.68 cu.in/rev.*	28
32.4 cm³/rev.	*1.97 cu.in/rev.*	32
38.1 cm³/rev.	*2.32 cu.in/rev.*	38
44.2 cm³/rev.	*2.69 cu.in/rev.*	44

ROTATION (page 6)	CODES B
Clockwise	D
Anti-clockwise	S

PORTS (page 69)	CODES C
Flanged ports european standard	P
Flanged ports SAE (UNC)	S
Threaded ports GAS (BSPP)	G
Threaded ports SAE (ODT)	R

DRIVE SHAFT (page 70)	CODES D
Tapered 1:8	38
SAE A splined 10T	53
SAE A splined 11T	54
SAE B splined 13T	55
Tapered 1:4	37
7/8" SAE B parallel shaft Ø22.22	87

Order example: 2.5PB 32/28D, ports SAE (R), drive shaft (55), mounting flange (S3).
2.5PB32/28D-R55S3

M VALVES IN THE COVER (page 75)	CODES
Fixed main relief valve	VS
Priority flow divider with excess flow to 2nd actuator	VP1
Priority flow divider with excess flow to 2nd actuator with main relief valve	VPS1
Priority flow divider with Load sensing with dinamic signal	VPD1
Load sensing priority valve with dinamic signal with main relief valve	VPDS1

L REAR COVER (page 79)	CODE
Pre-arranged for 2PE rear	PD2

I OUTRIGGER BEARING (page 73)	CODES
European standard	CP
4 Bolts for ZF gear box Ø80	Z1

H PORTS POSITION	CODE
Lateral ports standard	
Rear ports (page)	1

G SUCTION PORTS	CODES
Common suction	UA*
Separeted stages	AS

F SEAL	CODE
Buna standard	
Viton	V

E MOUNTING FLANGES (page 71)	CODES
European standard	P2
SAE A 2 bolts	S2
SAE B 2 bolts	S3
3 BOLT UNI 8953	T1

*UA: this type of multiple pump is a Salami standard multiple pump which has only one inlet port opened, all the other inlet port are closed.
In case of common suction, the code 1 - 2 or 3, correspond to the body where inlet is located.

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