

The image features three interlocking gears of different sizes, rendered in a light gray, sketchy style. Each gear contains a simple black outline of a triangle. The largest gear is at the top right, the medium one is on the left, and the smallest is at the bottom right. The text 'Petrone Oleodinamica' is centered over the top gear, and 'Group 3' is positioned below the bottom gear.

# Petrone Oleodinamica

Group 3



**TECHNICAL INFORMATION  
SERIES PNP 3**

▪ **Pump Displacement:**

28 – 33 – 38 – 44 – 55 cm<sup>3</sup> / rev.

▪ **Speed range :**

600 – 3000 rpm.

▪ **Efficiency:**

High volumetric efficiency  $\eta_v > 96\%$ ; mechanical efficiency  $\eta_m > 90\%$ ; overall efficiency  $\eta_t > 90\%$

▪ **Suitable to run under severe conditions of:**

Pressure, speed and temperature.

▪ **High pressure capability:**

Up to 230 bar max. continuous operating pressure for displacement up to 44 cm<sup>3</sup> (see performance table for further details).

▪ **High temperature seal kit available:**

T > 85° C

▪ **Main different mounting configurations of drive shaft and mounting flange:**

Drive shaft and mounting flange are fully interchangeable with the main market's Standards, and with all the other type of Petrone Oleodinamica S.r.l. gear pumps.

▪ **Large standardization of components:**

Seal kit, cover, bearing, gears, are common to all the configurations.

▪ **Tandem options available:**

All drive shafts of pumps PNP2 have the predisposition to the joining for the realization of double pumps.

▪ **All PNP 3 pumps may work as unidirectional motors**

(In the opposite sense of rotation compared to the one of a pump), without any change of components.

▪ **Easy to change**

Rotation, drive shaft, front flange, or from single to multiple pump stage



## INSTRUCTIONS FOR USE

To achieve the best in terms of performance and life, it is necessary to meet the catalogue specifications, but it is also necessary to follow some general rules, and we would like to recommend the following :

- Put much care in designing the hydraulic circuit as a the whole, specially the suction line, the choice and the position of the safety relief valves, of the filters, and dimensioning reservoir and heat exchangers.
- Ensure a correct and frequent cleaning and maintenance of circuit and hydraulic fluid.
- Equip the circuit with suitable alarm and safety devices, as well as reliable instrumentations.
- Avoid as much as possible cold starting, under load, specially at low room-temperatures, and after long standstills. Repeated starts under load are not recommended.
- At low speeds, avoid to use the pump at high pressure for long periods, or in excessively intermittent duties. In these cases a multiplier gearbox is recommended.
- A proper oil choice is a major factor, as well as a correct thermal protection.
- Drive the pump whit a suitable power take off (PTO).

### OPERATING REQUIREMENTS

- **Max. inlet vacuum: 0.3 bar**
- **Max inlet pressure: 3 bar**
- **Environmenntal temperature range : - 15° C ÷ 80° C**



## HYDRAULIC FLUID

- We recommend mineral-based hydraulic oils, like HLP HV (DIN 51514)  
Allowed engine oils with additives preventing from oxidation, wear and foaming.

### *Fluid temperature*

Max. operating:	<b>80° C</b>
Recommended:	<b>30° C ÷ 60° C</b>

**Temperature over 80 °C are allowed but using FPM (Viton) seals.**

### *Viscosity*

Recommended range:	<b>20 ÷ 65 cSt</b>
Max. at cold starting:	<b>1000 cSt</b>

### *Fluid cleanliness and filtering*

Recommended grade of filtration:	<b>Inlet: 80 ÷ 100 µm</b> <b>Outlet: up to 170 bar 25 µm over 170 bar 10 µm</b>
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**Use quality filters, with indicators and alarm. Avoid as much as possible to use filter with by-pass valve.**



Petrone Oleodinamica

## HYDRAULIC CIRCUIT AND INSTALLATION

Rules for dimensioning the circuit:

- Avoid sharp restrictions and small radius bends.
- Recommended fluid speed in inlet line:  $0,5 \div 1,6$  m / sec.
- Recommended fluid speed in delivery line:  $2 \div 6$  m / sec.
- Recommended fluid speed in return line:  $1,5 \div 3$  m / sec.

**For further details and information regarding the applications of our pumps, please contacts PETRONE OLEODINAMICA S.r.l.**



## USEFUL FORMULAS

### **Flow:**

The calculate the output flow “Q” delivered by a pump at a certain speed “n”.:  
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$$Q = \frac{V \cdot n}{1000} \cdot \eta_v \text{ [ l / min]}$$

V = Pump capacity [ cm<sup>3</sup> / rev ]

n = Speed [ r.p.m.]

$\eta_v$  = Volumetric Efficiency (assume, for general calculations 0,93-0,97 from 1000 to 3000 r.p.m.)

### **Power-Efficiencies**

Hydraulic Power: the hydraulic power  $W_h$  transferred to an oil flow Q due to a pressure variation  $\Delta p$  is given by the:

$$W_h = \frac{Q \cdot \Delta p}{600} \text{ [kW]}$$

Mechanical Power: the mechanical power  $W_m$  absorbed from a pump shaft is given by the following:

$$W_m = \frac{M_t \cdot n \cdot \pi}{30 \cdot 1000} \text{ [kW]}$$

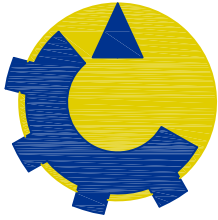
### **Torque**

To calculate the torque  $M_t$  necessary to run a pump under a differential pressure  $\Delta p$  è:

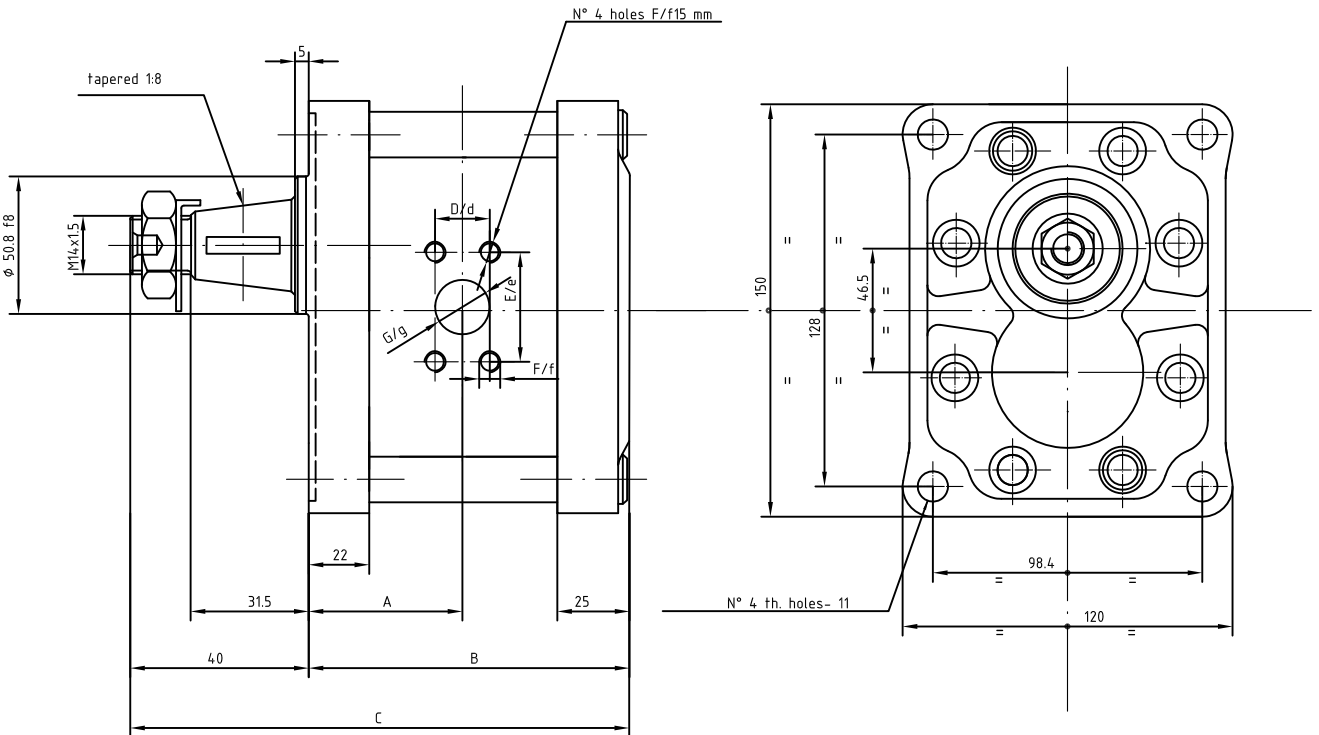
$$M_t = \frac{V \cdot \Delta p}{20 \cdot \pi \cdot \eta_m} \text{ [N \cdot m]}$$

$\Delta p$  = Differential pressure between outlet and inlet [ bar ]

$\eta_m$  = Mechanical efficiency of the pump (assume, for general calculations 0.85 at cold start, 0.9 on steady running).



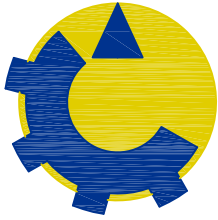
Dimensions



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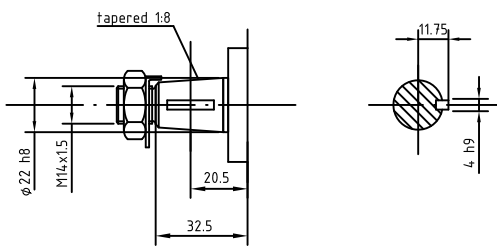
INLET	c - d - e - f
OUTLET	C - D - E - F

Type	Displacement cm <sup>3</sup> /rev	Dimensions mm							NOTES
		Quote A	Quote B	Quote C	Quotes $\frac{d}{D}$	Quotes $\frac{e}{E}$	Quotes $\frac{f}{F}$	Quotes $\frac{g}{G}$	
28	28	67	137	177	22.23 26.19	47.63 52.37	3/8-16UNC-2B	19.10 25.40	
33	33	68,80	140,6	180,6	26.19 30.18	52.37 58.72	3/8-16UNC-2B 7/16-14UNC2B	25.40 31.80	
38	38	70,9	144,8	184,8	26.19 30.18	52.37 58.72	3/8-16UNC-2B 7/16-14UNC2B	25.40 31.80	
44	44	73,2	149,4	189,4	26.19 30.18	52.37 58.72	3/8-16UNC-2B 7/16-14UNC2B	25.40 31.80	
55	55	77,7	158,4	198,4	30.18 35.71	58.72 69.85	7/16-14UNC2B 1/2-13UNC-2B	31.80 38.10	

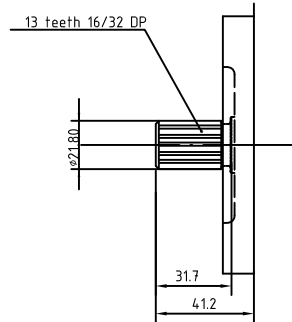


## Drive Shafts

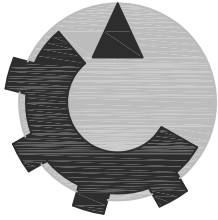
Tapered 1:8				CO 01	
For mounting flanges					
01	02				
Dimensions shown referring to mounting flange no. 01					



SAE "A" 13 T				SC 01	
For mounting flanges					
02	03				
Dimensions shown referring to mounting flange no. 02					



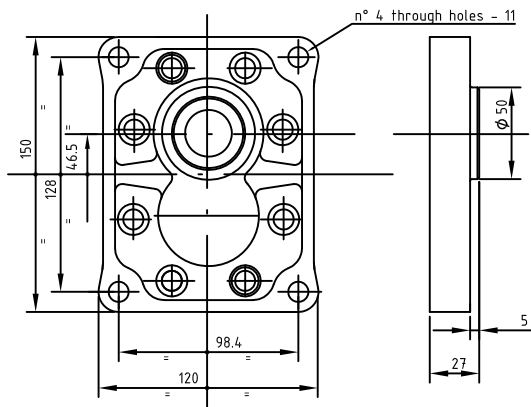




## Mounting flanges

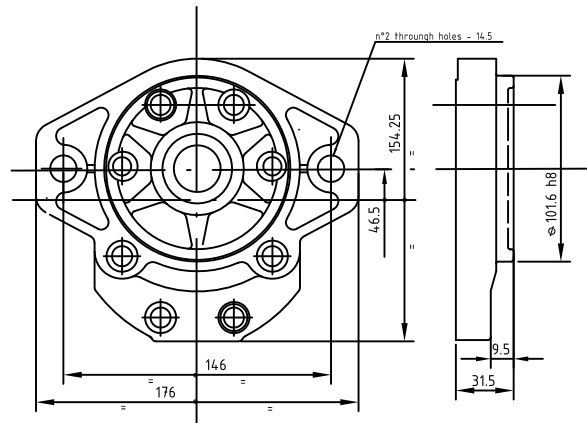
Standard

01



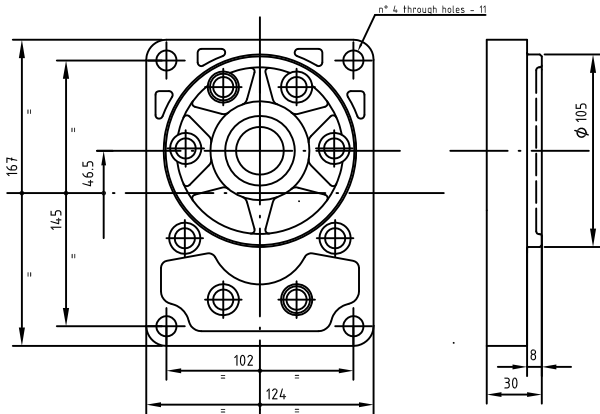
SAE "A"

02



Flange  $\phi$  105

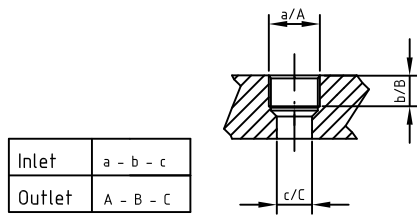
03





## Flanged ports

Type A



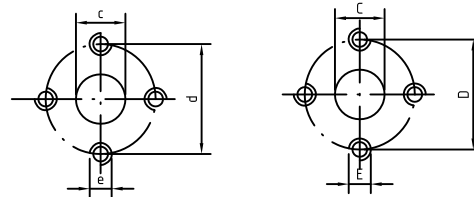
Inlet	a - b - c
Outlet	A - B - C

Type	28- 44	55
a/A	G1"	G1"-1/4
b/B	22	22
c/C	27	33

Type B

Inlet

Outlet

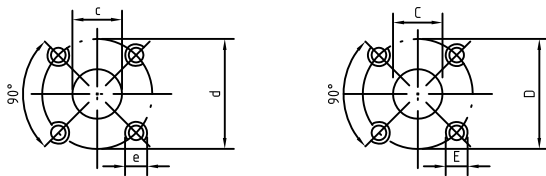


Type	28	33-38	44-55
c/C	20	27 / 20	27
d/D	40	51 / 40	51
e/E	M8	M8/M10	M10

Type C

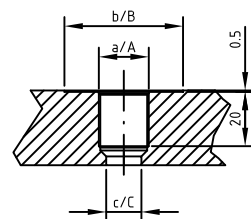
Inlet

Outlet



Tipo	28 - 55
c/C	27 / 18
d/D	55
e/E	M8

Type D



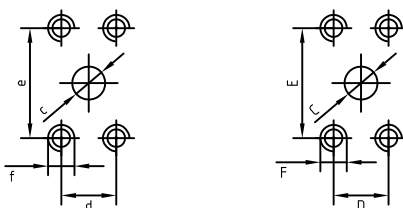
Inlet	a - b - c
Outlet	A - B - C

Type	28 - 33	38 - 44	55
a/A	1-5/16-12 UN-2B 1-1/16-12 UN-2B	1-5/8-12 UN-2B 1-5/16-12 UN-2B	1-7/8-12 UN-2B 1-5/8-12 UN-2B
b/B	49/41	58/49	65/58
c/C	27/19	32/27	32

Type E (SAE)

Inlet

Outlet



Type	28 - 33	38 - 44	55
c/C	25.4/19	30.5/25.4	39.3/30.5
d/D	26.2/22.2	30.2/26.2	35.7/30.2
e/E	52.4/47.6	58.7/52.4	69.8/58.7
f/F	M10	M10	M12/M10



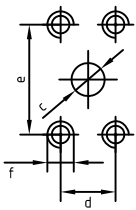

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## Flanged ports

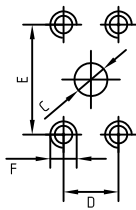
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Type F UNC SAE J518
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Inlet



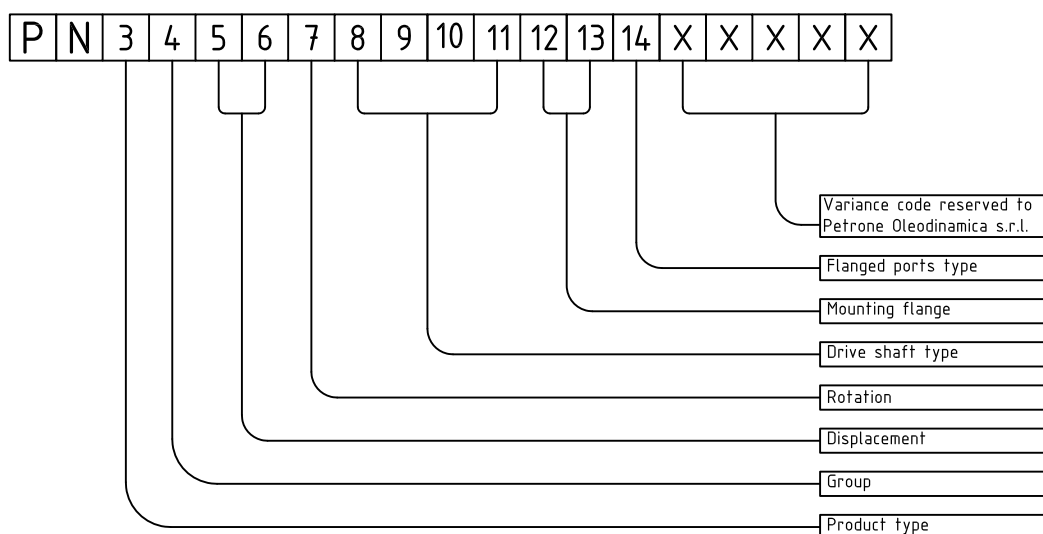
Outlet



Type	28	33-44	55
c/C	25.40/19.10	31.80/25.40	38.10/31.80
d/D	26.19/22.23	30.18/26.19	35.71/30.18
e/E	52.37/47.63	58.72/52.37	69.85/58.72
f/F	3/8-16UNC-2B	7/16-14UNC-2B 3/8-16UNC-2B	1/2-13UNC-2B 7/16-14UNC-2B



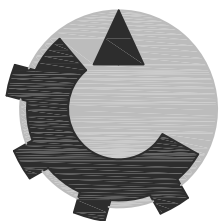
## Single pump order code



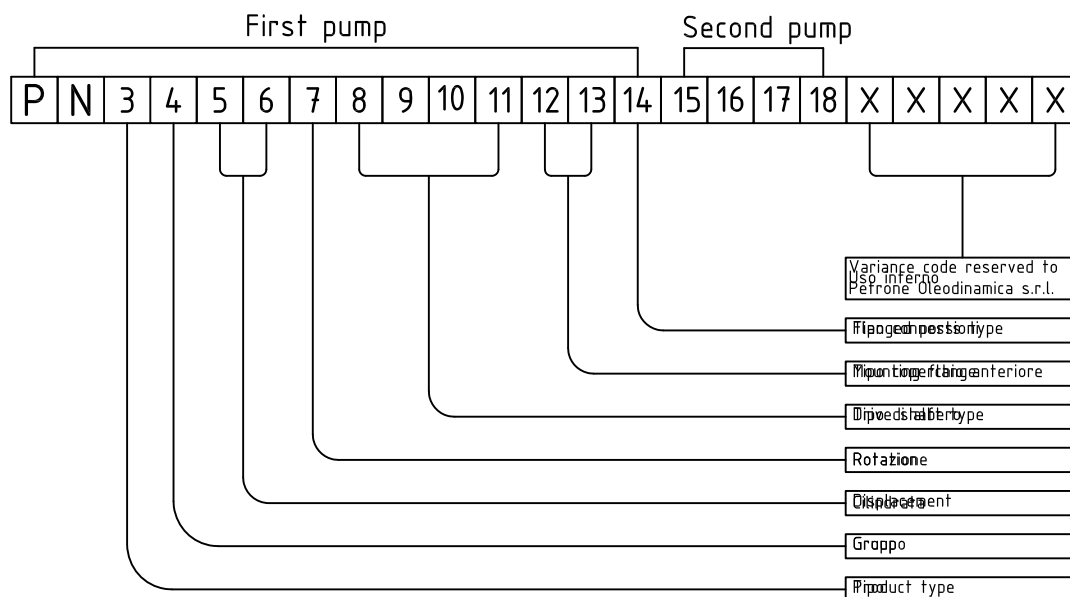
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- (3) Type <Pump> <Motor>
- (4) Group <3>
- (5) (6) Displacement <28> <33> <38> <44> <55>
- (7) Rotation <Dx> <Sx>
- (8) (9) (10) (11) Drive shaft type <CO01><SC01>
- (12) (13) Mounting flange type <01><02><03>
- (14) Flanged ports type <A><B><C><D><E><F>

How to order a single pump: PNP 3/28 D C001 01 B: External gear pump, displacement 28 cm<sup>3</sup>/rev, clockwise rotation, tapered shaft1:8, standard mounting flange, flanged ports type B.

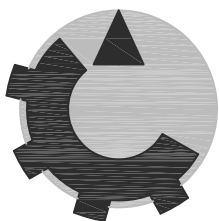


## Double pump order code (GROUP 3- GROUP 2)

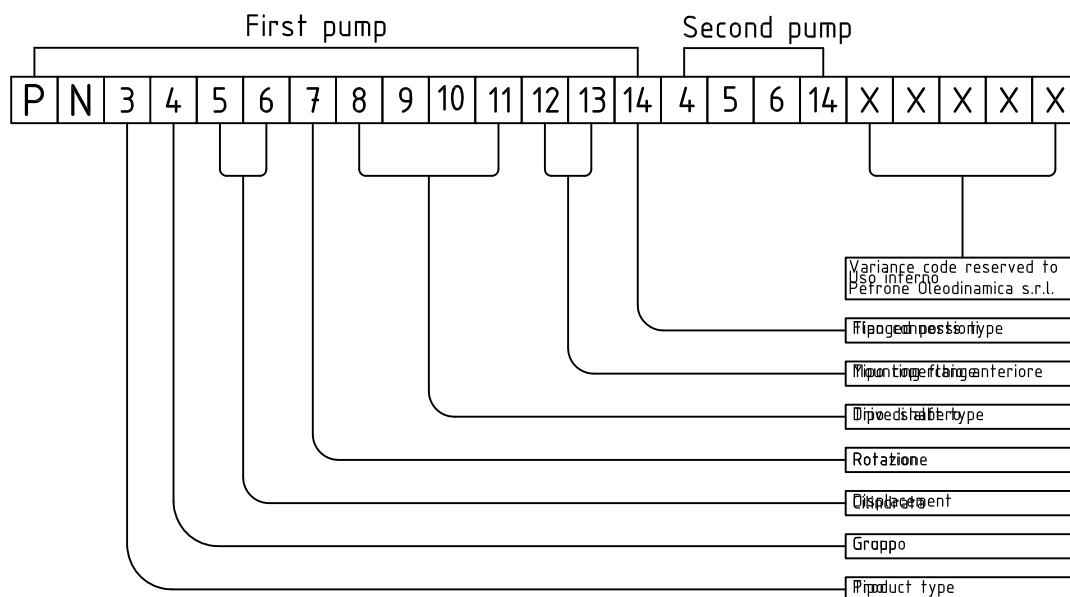


(3)	Type <Pump> <Motor>
(4)	Group <3>
(5) (6)	Displacement <28> <33> <38> <44> <55>
(7)	Rotation <Dx> <Sx>
(8) (9) (10) (11)	Drive shaft type <CO01><SC01>
(12) (13)	Mounting flange type <01><02><03>
(14)	Flanged ports type <A><B><C><D><E><F>
(15)	Group <2>
(16) (17)	Displacement <04> <06> <08> <11> <14> <16> <20> <22> <26>
(18)	Flanged ports type <A><B><C><D><E><F>

How to order a double pump: PNP 3/28 D C001 01 B 2 06 B: External gear pump, displacement 28+6 cm<sup>3</sup>/rev, clockwise rotation, tapered shaft1:8, standard mounting flange, flanged ports type B.



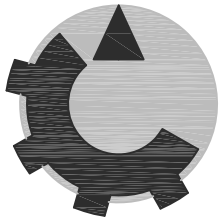
## Double pump order code (GROUP 3 - GROUP 3)



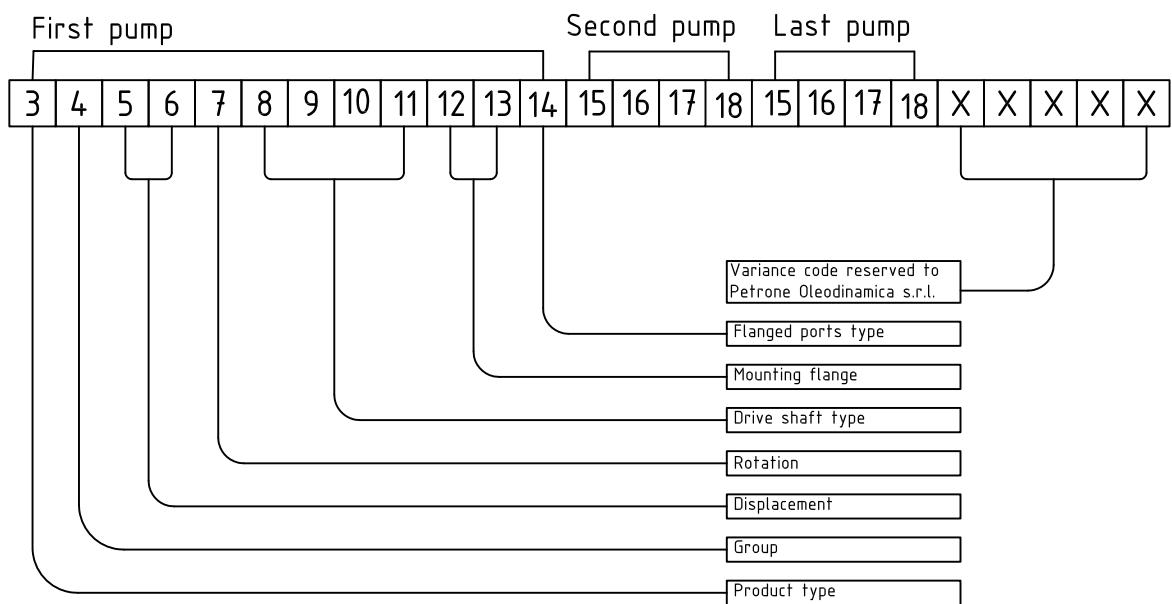
version 2009 April

- (3) Type <Pump> <Motor>
- (4) Group <3>
- (5) (6) Displacement <28> <33> <38> <44> <55>
- (7) Rotation <Dx> <Sx>
- (8) (9) (10) (11) Drive shaft type <C001><SC01>
- (12) (13) Mounting flange type <01><02><03>
- (14) Flanged ports type <A><B><C><D><E><F>

How to order a double pump: PNP 3/28 D C001 01 B 328B: External gear pump, displacement 28+28 cm<sup>3</sup>/rev, clockwise rotation, tapered shaft 1:8, standard mounting flange, flanged ports type B.



## Triple pump order code (GROUP3- GROUP2- GROUP2)



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- (3) Type <Pump> <Motor>
- (4) Group <3>
- (5) (6) Displacement <28> <33> <38> <44> <55>
- (7) Rotation <Dx> <Sx>
- (8) (9) (10) (11) Drive shaft type <CO01><SC01>
- (12) (13) Mounting flange type <01><02><03>
- (14) Flanged ports type <A><B><C><D><E><F>
- (15) Group <2>
- (16) (17) Displacement <04> <06> <08> <11> <14> <16> <20> <22> <26>
- (18) Flanged ports type <A><B><C><D><E><F>

How to order a triple pump: PNP 3/38 D C001 01 B 2 16 B 2 06 B: External gear pump, displacement 38+16+6 cm<sup>3</sup>/rev, clockwise rotation, tapered shaft1:8, standard mounting flange, flanged ports type B.