

EN

PNR/PNE 104-124 - PNR 142SL



ORIGINAL INSTRUCTIONS



**INSTALLATION, USE AND  
MAINTENANCE MANUAL**



Rev. 01  
19-07-2016

COMPANY WITH  
QUALITY SYSTEM  
CERTIFIED BY DNV GL  
= ISO 9001 =

2016 – **Juop** – Azzano Decimo (PN)

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# 1. General warnings

## 1.1. Introduction

- This booklet contains the necessary instructions for a correct installation, running, use and maintenance of the pump, as well as some practical suggestions for a safe operating.
- The knowledge of the following pages will grant a long and trouble-free operation of the pump.
- Following the instructions below contributes to limiting pump repair expenses by extending its duration, as well as preventing hazardous situations, thereby increasing its reliability.
- If the pump is driven by an hydraulic motor please refer to manufacturer's specific manual.
- It is recommended to:
  - Read, understand and apply carefully the instructions before running the pump.
  - Keep the booklet at hand and have it known to all operators.
- Below is a brief description of the symbols used in this manual.



If these safety rules are not respected, operators can be injured and the pump or oilers damaged remarkably.



If these safety rules are not respected, the pump or system can be damaged.



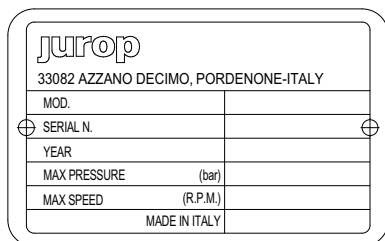
Suggestions for an environment friendly use of the pump.



Useful information for an easy usage and maintenance of the pump.

• The graphic representations and photographs contained in this manual are there to illustrate the product in the parts that make it up and in specific operating phases. Though the model shown in the manual may differ from the one purchased, the operating principle at the base of the illustrated operating phase is the same.

• Every PNR/PNE pump has to be fitted with its own tag reporting the following data: Model, Serial number, Year, Max speed, Max pressure.



Pic. 1.1

## 1.2. Spare part request

- Use only **genuine spare parts** for maintenance and repairs. To order spare parts, provide the following details:

EXAMPLE:

- |   |              |
|---|--------------|
| a) The model of the pump (see pump tag)         | PNR 104      |
| b) The serial number of the pump (see pump tag) | K60001       |
| c) A description of the parts (see parts list)  | VANE         |
| d) The quantity (see parts list)                | n°5 pcs      |
| e) The code number of the part (see parts list) | 16016 059 00 |

## 1.3. Warranty terms and conditions

- Compliance with the installation, use and maintenance instructions provided by this manual **is crucial for the recognition of warranty** against defective parts.

## 2. Technical data

- Sliding vanes vacuum pump injection cooled (PNR) or natural air-cooling (PNE). The PNR version is meant for heavy duty; the PNE version for normal use.
- Forced oil lubrication of both bearings and sealings. Copper oil piping. Rear oil tank (PNE/PNR 104-124). Side oil tank (PNR142).
- Manifold with non-return valve on the pump inlet.
- Built-in vacuum-pressure changeover valve. Pneumatic or hydraulic actuator are available.
- Transmission:
  - Direct with smooth or splined shaft.
  - Gearbox transmission (ASAE 1" 3/8) 540 or 1000 rpm, counter clockwise rotation.
  - Hydraulic motor.

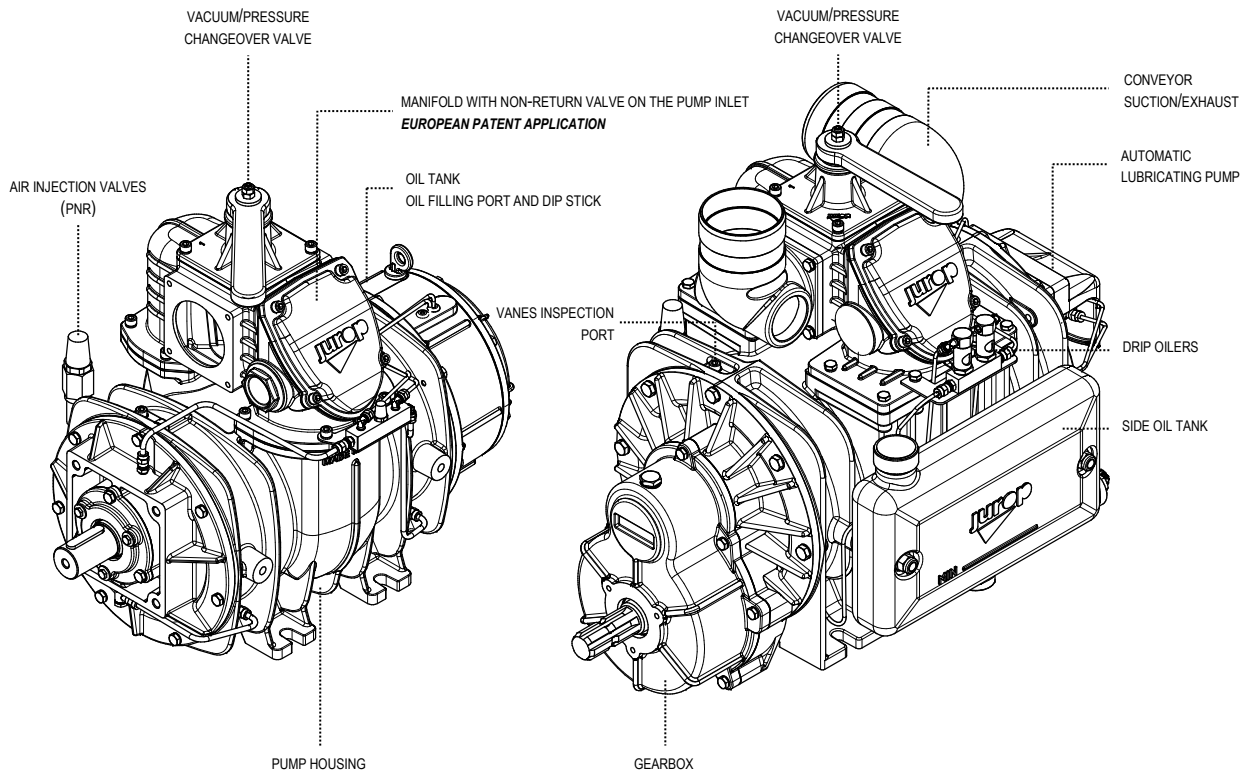
### STANDARD EQUIPMENT

- Sliding-vanes, air cooled **vacuum pump**.
- Asbestos-free **tangential vanes**.
- Automatic lubrication by means of a **volumetric pump** and an **oil tank**.
- Asymmetrical manifold with **check valve** installed on the pump inlet.
- Pivoting suction and exhaust **conveyors** in aluminum alloy.
- **Direct transmission** with smooth or splined shaft (ASAE 1 3/8").
- **Gearbox transmission** with smooth or splined shaft.
- **Counter clockwise rotation**.
- **Injection cooled (PNR) or natural air-cooling (PNE)**.

### AVAILABLE ON REQUEST

- **Clockwise rotation**.
- Transmission with hydraulic motor.
- Drive by means of mechanical drive from **Power Take Off**.
- **Pulley** for the belt drive.
- **Pneumatic actuator** for the vacuum/pressure changeover valve.
- **Hydraulic actuator** for the vacuum/pressure changeover valve.

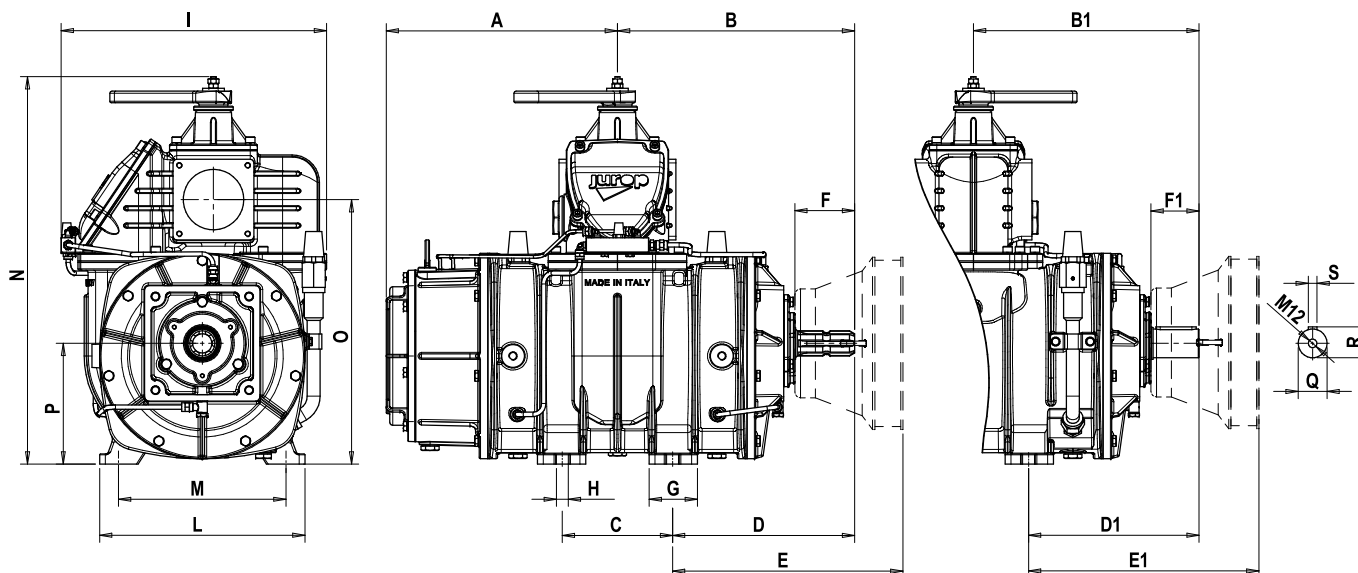
## PNR / PNE



## 2.1 Dimensions and arrangements

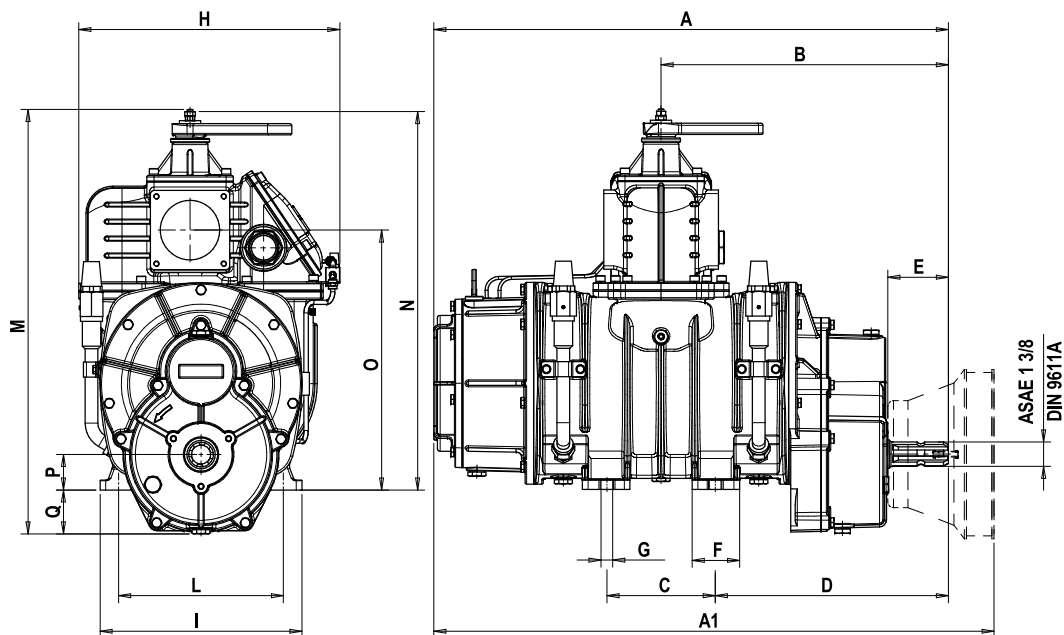
WEIGHT	PNR/PNE 104	PNR/PNE 124	PNR 142 SL
Direct transmission (smooth or splined shaft)	150 Kg	177 Kg	210 Kg
Gearbox transmission (540 rpm)	173 Kg	190 Kg	225 Kg
Gearbox transmission (1000 rpm)	173 Kg	190 Kg	230 Kg
Hydraulic motor	180 Kg	210 Kg	224 Kg

### PNR/PNE 104-124 Direct transmission



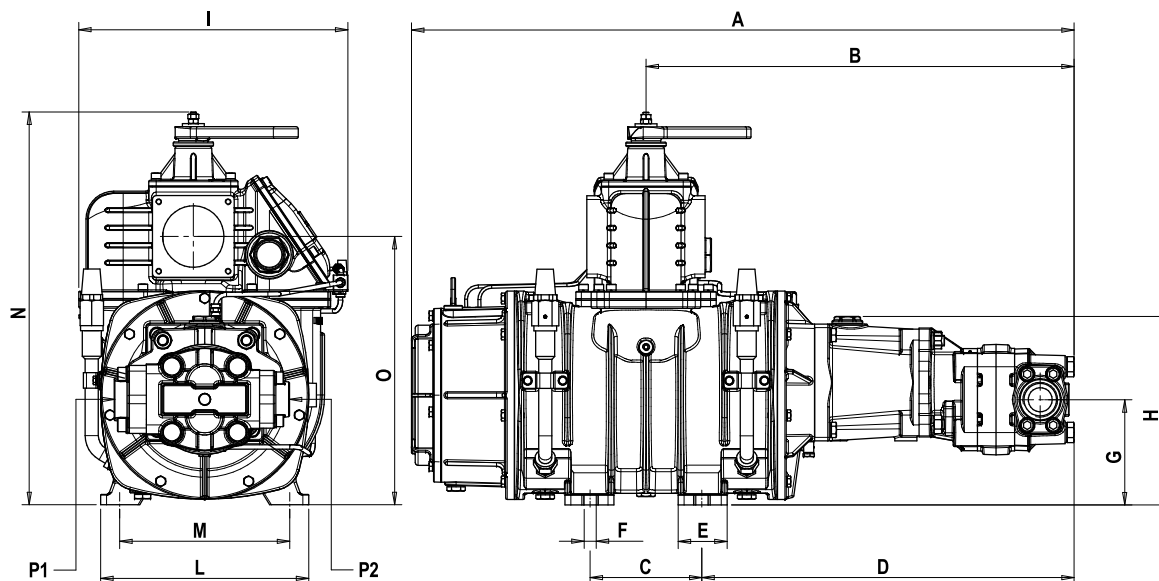
Mod.	A	B	B1	C	D	D1	E	E1	F	F1	G	H	I	L	M	N	O	P	Q	R	S
PNR104	321	329	313	153	253	238	320	320	83	67	67	16,5	368	285	249	534	367	167,5	40	43	12
PNR124	353,5	362	346	153	285	269	352	352	83	67	67	16,5	368	285	249	534	367	167,5	40	43	12

### PNR/PNE 104-124 Gearbox transmission



Mod.	A	A1	B	C	D	E	F	G	H	I	L	M	N	O	P	Q
PNR104	727	791	406	153	329	85,5	67	16,5	368	285	249	600	534	367	50	62
PNR124	792	856	437	153	368	85,5	67	16,5	368	285	249	600	534	367	50	62

**PNR/PNE 104-124 Hydraulic motor**



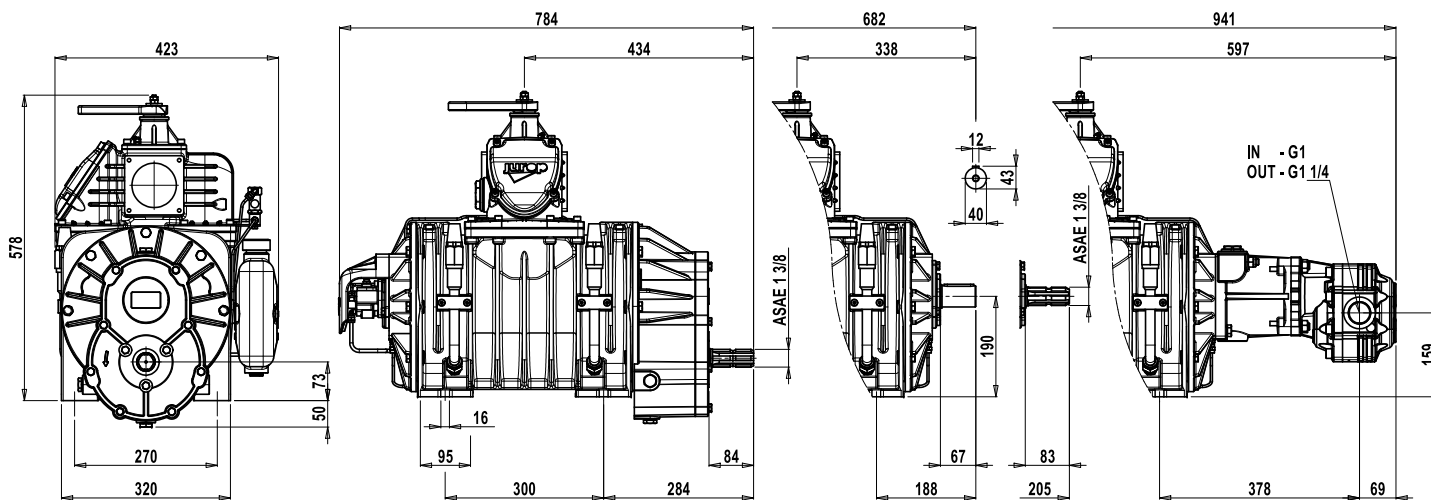
Mod.	A	B	C	D	E	F	G	H	I	L	M	N	O	P1	P2
PNR104	907	586	153	510	67	16,5	136	258	368	285	249	534	367	1" ½	1" ¼
PNR124	955	502	153	525	67	16,5	144	258	368	285	249	534	367	-	-

**PNR 142 Side oil tank**

PNR142 M (540-1000RPM)

PNR142 D

PNR142 HDR



## 2.2 Performances

Performances	PNR/PNE 104 D	PNR/PNE 104 M	PNR/PNE 104 HDR
Maximum speed	1300 rpm	540 - 1000 rpm	1300 rpm
Air flow at free air condition	10400 l/min - 624 m <sup>3</sup> /h	10400 l/min - 624 m <sup>3</sup> /h	10400 l/min - 624 m <sup>3</sup> /h
Air flow at 60% vacuum rate	9400 l/min - 564 m <sup>3</sup> /h	9400 l/min - 564 m <sup>3</sup> /h	9400 l/min - 564 m <sup>3</sup> /h
Maximum vacuum	95 %	95 %	95 %
Maximum vacuum at continuous duty PNR	70 %	70 %	70 %
Maximum vacuum at continuous duty PNE	60 %	60 %	60 %
Power required at 0,5 bar rel (1,5 bar abs)	14 kW	14 kW	14 kW
Max operating rel. pressure (abs.) at continuous duty	1 bar (2 bar abs)	1 bar (2 bar abs)	1 bar (2 bar abs)
Max operating rel. pressure	2,5 bar abs	2,5 bar abs	2,5 bar abs
Oil consumption	130-150 g/h	130-150 g/h	130-150 g/h
Oil tank capacity	3,2 l	3,2 l	3,2 l

Performances	PNR/PNE 124 D	PNR/PNE 124 M	PNR/PNE 124 HDR
Maximum speed	1300 rpm	540 - 1000 rpm	1300 rpm
Air flow at free air condition	12400 l/min - 744 m <sup>3</sup> /h	12400 l/min - 744 m <sup>3</sup> /h	12400 l/min - 744 m <sup>3</sup> /h
Air flow at 60% vacuum rate	11200 l/min - 672 m <sup>3</sup> /h	11200 l/min - 672 m <sup>3</sup> /h	11200 l/min - 672 m <sup>3</sup> /h
Maximum vacuum	95 %	95 %	95 %
Maximum vacuum at continuous duty PNR	70 %	70 %	70 %
Maximum vacuum at continuous duty PNE	60 %	60 %	60 %
Power required at 0,5 bar rel (1,5 bar abs)	16 kW	16 kW	16 kW
Max operating rel. pressure (abs.) at continuous duty	1 bar (2 bar abs)	1 bar (2 bar abs)	1 bar (2 bar abs)
Max operating rel. pressure	2,5 bar abs	2,5 bar abs	2,5 bar abs
Oil consumption	130-150 g/h	130-150 g/h	130-150 g/h
Oil tank capacity	3,2 l	3,2 l	3,2 l

Performances	PNR142 D	PNR142 M (540rpm)	PNR142 M (1000rpm)	PNR142 HDR
Maximum speed	1200 rpm	540 rpm	1000 rpm	1200 rpm
Air flow at free air condition	14200 l/min - 852 m <sup>3</sup> /h	14200 l/min - 852 m <sup>3</sup> /h	14200 l/min - 852 m <sup>3</sup> /h	14200 l/min - 852 m <sup>3</sup> /h
Air flow at 60% vacuum rate	12800 l/min - 768 m <sup>3</sup> /h	12800 l/min - 768 m <sup>3</sup> /h	12800 l/min - 768 m <sup>3</sup> /h	12800 l/min - 768 m <sup>3</sup> /h
Maximum vacuum	95 %	95 %	95 %	95 %
Maximum vacuum at continuous duty	70 %	70 %	70 %	70 %
Power required at 0,5 bar rel (1,5 bar abs)	20,5 kW	20,5 kW	20,5 kW	20,5 kW
Max operating rel. pressure (abs.) at continuous duty	1 bar (2 bar abs)	1 bar (2 bar abs)	1 bar (2 bar abs)	1 bar (2 bar abs)
Max operating rel. pressure	1,5 bar (2,5 bar abs)	1,5 bar (2,5 bar abs)	1,5 bar (2,5 bar abs)	1,5 bar (2,5 bar abs)
Oil consumption	160-170 g/h	160-170 g/h	160-170 g/h	160-170 g/h
Oil tank capacity	4 l	4 l	4 l	4 l

### REFERENCE CONDITIONS

Conveyed gas: air

Ambient reference temperature: 20°C (68°F)

Absolute reference pressure: 1013mbar (14.7psi)

Vacuum condition: atmospheric discharge

Pressure condition: atmospheric suction

Actual performance may vary of ± 5%

## 2.3 Usage limitations

Model	Max. Speed (rpm)			P (bar ABS)	T (°C)		Room Temperature
	Direct - HDR	Mult - 540	Mult - 1000		PNR	PNE	
PNR / PNE 104	850 - 1300	360 - 540	650 - 1000	2,5 bar abs	180 °C	160 °C	-20 / +40°C
PNR / PNE 124	850 - 1300	360 - 540	650 - 1000	2,5 bar abs	180 °C	160 °C	-20 / +40°C
PNR 142	850 - 1300	360 - 540	650 - 1000	2,5 bar abs	180 °C	160 °C	-20 / +40°C

P: absolute pressure during delivery

T: temperature during delivery



## 2.4 Sound pressure level

Sound pressure level		PNR104	PNE104	PNR124	PNE124	PNR142sl
60% vacuum rate, distance of 7 meter	dB (A)	78	75	78	75	78

## 2.5 Lubrication

Recommended oils and greases: *OIL TANK*

Room T	Viscosity	Type	ENI	ESSO	SHELL	TOTAL	MOBIL	BP	TEXACO HAVOLINE
< 10°C	ISO VG 46	Mineral Oil	Acer 46	Nuto 46	Morlina oil 46	Drosera MS 46	Nuto H 46	Bartran HV 46	Rando HD 46
> 10°C	ISO VG 150	Mineral Oil	Acer 150	Nuto 150	Morlina oil 150	Drosera MS 150	Nuto H 150	Bartran HV 150	Rando HD 150

Recommended oils and greases: *GEARBOX*

Viscosity	Type	ENI	ESSO	SHELL	TOTAL	MOBIL	BP	TEXACO HAVOLINE
ISO VG 220	Mineral Oil	Blasia 220	Spartan EP 220	Omala oil 220	Carter EP 220	Mobilgear 630	Energol GR XP 220	Meropa 220

### 3. Safety and accident prevention



**Attention: carefully apply these prescriptions.**

#### 3.1 General recommendations

- Installation and maintenance must be carried out with the unit totally disengaged from its drive system and must be performed by qualified personnel.
- Use adequate clothing (avoid ties, loose sleeves, necklaces and so on) and suitable protection equipment (gloves, protection glasses, boots...).
- To prevent errors and hazardous situations, establish what each operator is responsible for in the different maintenance operations.
- Durante il trasporto del decompressore utilizzare adeguate imbracature. Appoggiare il decompressore su punti stabili.
- When transporting the compressor use proper slinging. Store the compressor in stable places.
- Before each maintenance operation, stop the pump and restore the atmospheric pressure.
- Make sure that all the parts of the unit are idle and cool, before performing any maintenance operation.
- When the pump is running, some parts may reach very high temperatures (above 100°C). Use all necessary precautions to avoid contact.
- Operators working nearby must avoid prolonged exposure to the noise emitted by the aspirator, if not equipped with the proper ear-protection devices.
- Avoid accidental suction of solids: solids may be projected at high speed through the exhaust manifold and cause injuries. A filter must be mounted on the suction line (Mesh 55).

- Do not start the machine if the protection devices provided for transmissions are removed. Replace damaged part.
- Pressure relief valve: point the air flux away from the operators.
- Do not use the aspirator over its designed limits: the machine may be damaged and the operator may be injured.



**Do not exceed the speed and the power supply parameters indicated in the technical tables (see par. 2.2 - 2.3).**

#### 3.2 Intended use

- Vacuum pumps of the PNR/PNE series are commonly used on stationary or mobile equipment for suction and transfer by means of vacuum or so-called pneumatic-transportation of liquid and solid wastes.
- They are air-cooled and consequently foreseen for a non-continuous duty. The mod. PNE and the mod. PNR, the latter supplied with air injection system (fig. 1) and meant for heavy duty works, do not accept operating temperatures over 150 °C (300 °F), checked at not more than 150 mm from the discharge connections.
- Evitare l'aspirazione di materiali tossici e di gas infiammabili o esplosivi poiché i componenti interni possono raggiungere temperature elevate.
- Avoid suction of liquids or solids, they can seriously damage the pump.
- Do not run the pump over its designed operating limits (see par. 2.3): it may break and transmission can be damaged.

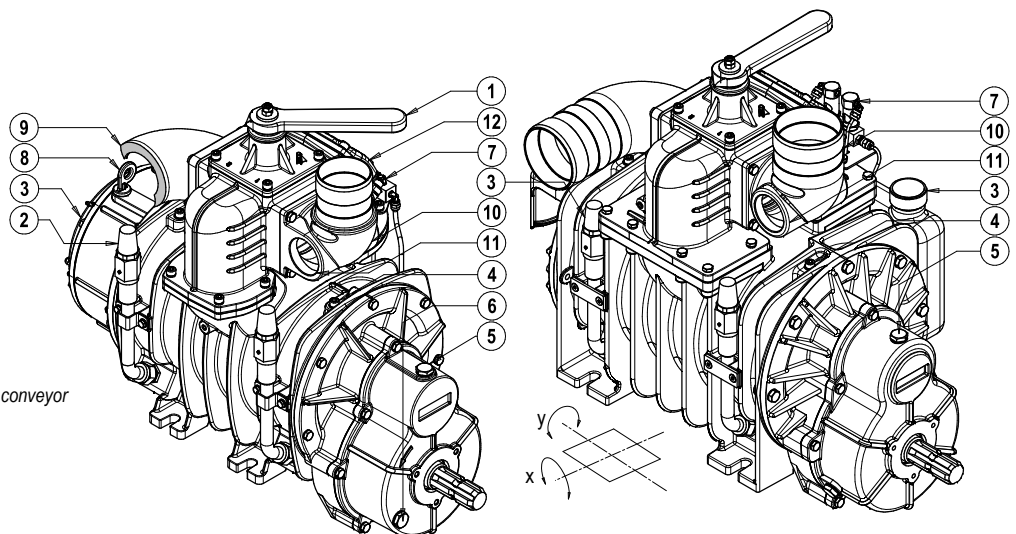
### 4. Installation

#### Main components legend

1. Vacuum/Pressure change-over valve
  2. Air injection valves (PNR)
  3. Oil tank
  4. Vanes inspection port
  5. Gear box oil filling plug
  6. Gear box oil level plug
  7. Drip oilers
  8. Oil filling port and dip stick
  9. Exhaust conveyor
  10. Suction conveyor
  11. Pressure relief valve port.
- Available only if foreseen with additional conveyor  
Code 1627102500.*
12. Non-return valve (Intake manifold)

PNR/PNE 104-124

PNR 142 SL



Pic. 4.1

#### 4.1. Checking upon receipt

- When the goods are delivered, make sure that all parts listed on the delivery note are in perfect condition and have suffered no damage during shipping.
- Make sure the vacuum pump has its identification plate. Pumps without such identification are to be considered anonymous and potentially dangerous: in such an event, they must not be used, otherwise the manufacturer will be deemed free from any liability whatsoever.
- Pump must be kept in a dry storage area. During storage, inlet and outlet ports must be kept closed.

#### 4.2. Storing in the warehouse

- If the compressor will not be installed inside a short time after delivery:
  - Remove the guards from the ports and spray a film of protective oil over the inner surfaces of the body, rotors and sides. Then attach again the guards;
  - Store in a closed and dry place. Renew the preserving oil periodically.
- To temporarily store a used pump, follow the instructions below:
  - Thoroughly clean the pump.
  - Equip the pump with suitable anti-corrosion protection.

#### 4.3. Mounting

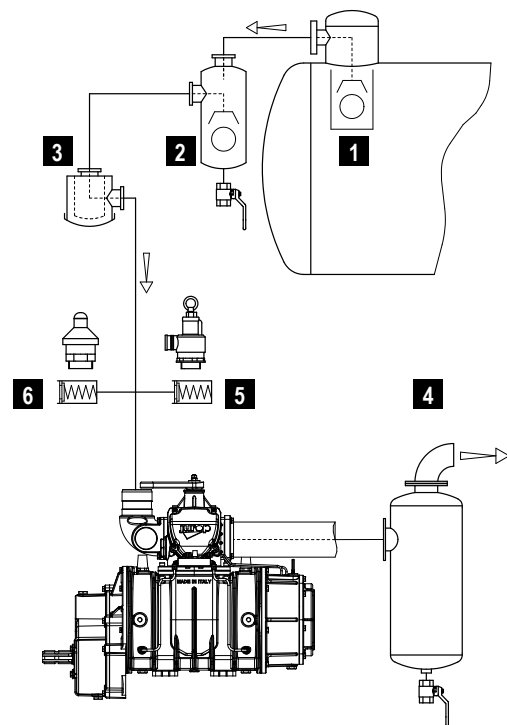
- The pump must be assembled for an easy access for maintenance operations and secured rigidly to a frame or levelled base (max. 3° slant to the horizontal plane. See Fig. 4.1). The base must be such as to avoid vibrations, bending or deformation.
- Leave enough space around the pump to allow the free circulation of air for cooling; avoid exposure to dirt and debris.
- Provide the necessary space to reach all points of lubrication control (oil level), and the oil tank filler cap, the lever of the 4-way switch, vanes inspection ports. See Pic. 4.1.
- For PNR/PNE 104-124 the oil tank is mounted on the rear side of the pump. Instead for PNR142 the oil tank is mounted on the suction side of the housing.
- In case of PNR/PNE with hydraulic motor, provide the necessary space to disassemble the motor itself and proceed with joint lubrication.

#### 4.4. Vacuum / Pressure line

- See picture 4.2.

##### Vacuum / Pressure line components

1	Primary shutoff
2	Secondary shutoff
3	Suction filter
4	Silencer
5	Over-pressure safety relief valve
6	Vacuum control valve



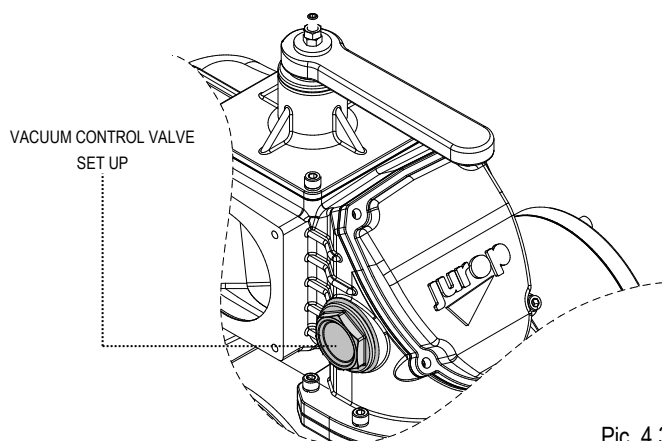
Pic. 4.2

- The hoses connecting the suction and exhaust ports of the vacuum pump must be of adequate diameter (suggested not less than 3") and of oil and corrosion resistant materials and before connecting them, make sure that they are perfectly clean in the inside.
- The weight or dimensions of the pipes must in no way stress the PNR/PNE body. Use high temperature resistant rubber sleeves.
- Remove the port guards when mounting. The pipes and components of the whole line must be clean.
- Avoid constrictions and tight curves where they are not essential.
- Connect the pump to the tank through the suction manifold (Fig. 4.1 - pos. 10) which has a threaded port for fitting the over-pressure valve.
- The exhaust pipes can reach high temperatures. Protect those adequately from the operator reach.
- A clapet valve on suction pipe avoids rotation in the opposite direction when the pump stops.
- To avoid that foreign liquids will enter the vacuum pump it is necessary to mount on the suction line an over-flow valve of "floating-ball" type (Fig. 4.2 - pos. 1). The flow section of this valve must be equivalent to the suction hose's one.
- It is also necessary to have on the line a suitable air filter for preventing solids to be sucked inside the vacuum pump. It is also recommended to mount a "secondary shutoff" of floating-ball type (Fig. 4.2 - pos. 2) between vacuum pump and over-flow (primary shutoff), along with the previously mentioned air filter (Fig. 4.2 - pos. 3).
- Called also 4-way valve, normally is manually operated but it can be at any time transformed in pneumatically or hydraulic operated upon request of the appropriate kit.
- During normal running of the pump the resulting noise should be reduced by means of a suitable silencer (Fig. 4.2 - pos. 4) mounted as close as possible to the pump itself. It has to be dimensioned for the air flow produced by the pump model. The oil used for the pump's inside lubrication has to be separated from the exhausted air by means of an adequate oil-separator, placed directly inside the silencer.

The silencer is fitted also with a draining tap for the collected oil and condensed liquids.

- Over-pressure safety relief valve (Pic. 4.2 - pos. 5). It must be dimensioned to discharge the entire air-flow of the pump. The adjustment of this valve has to be kept inside 10% of tolerance of the pump's working pressure and in any case it has to stay inside the given value of the tank's work pressure.

- Vacuum control valve has to be fitted on the suction piping, if the tank's characteristics or the vacuum line will need this kind of vacuum-limiting device.



Pic. 4.3

- For pumps that reach, during normal operating, discharge air temperature close to 150 °C (300°F) - (checked at not more than 150 mm from the discharge connection) it is necessary to use a device (overheating limiter) that will not allow to exceed such temperature. Contact our Technical Department.

- An adjustable curved pipe is installed on the outlet of the silencer, in order to prevent rain from entering and to enable positioning (during installation) of the output airflow.

- Direct the silencer discharge output away from the silencer suction inlet in order to prevent the input of hot fluids into the injection inlet.



**Attention: direct the silencer discharge output away from the silencer suction inlet.**

#### 4.5 Hydraulic actuator adjustment

- Extraordinary maintenance operations can require the upper cover (and that of the actuator, either manual or pneumatic) to be removed. We recommend ensuring enough space to carry out such operations.

- If the cock blocks or it moves with friction, screw up the clearance regulation nut (A). Screw up ¼ of turn each time. Block the nut rotation with the safety nut.

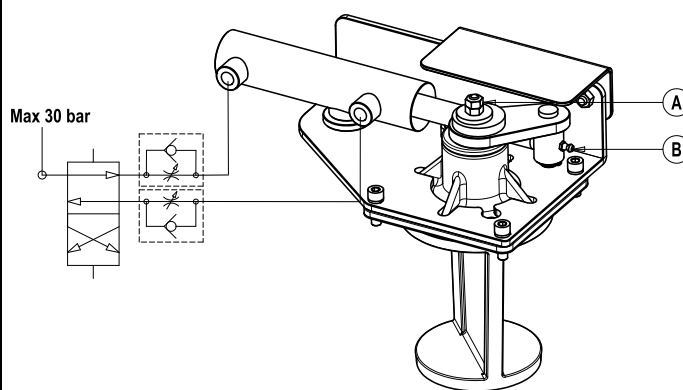
- The lubrication points (B) and the clearance regulation bolt (A) must be accessible. See Fig. 4.5.

- Lubricate with grease every 1000 cycles. Grease type NLGI 2.

- It is suggested to install 2 one-way flow controller between the hydraulic switch and the hydraulic actuator. Set the flow controllers in order to prevent hard hitting through the end of stroke. Minimum commutation time: 1 second.

- Maximum feed pressure: 30 bar.

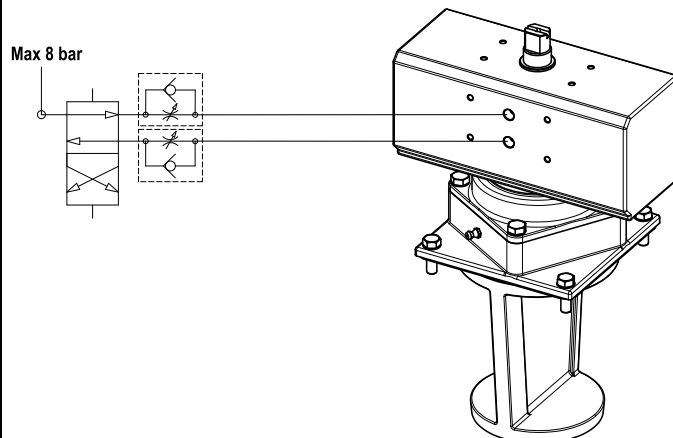
- To order spare parts see spare parts list at the end of this manual.



Pic. 4.4

#### 4.6 Pneumatic actuator adjustment

- In the event of 4-way valves equipped with pneumatic actuator, we recommend installing two one-way flow regulators between the pneumatic "control" and the pneumatic actuator. The following figure shows a schematic view of a possible pneumatic installation.



Pic. 4.5

- We recommend adjusting the two flow regulators in order for rotation to occur without knocks and with a switching time of at least one second.

#### 4.7. Pump mounting - drive connection

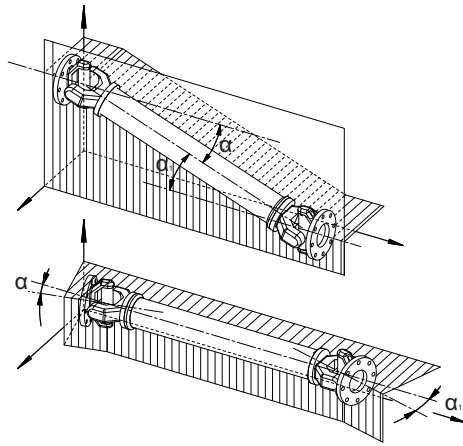
##### A) Cardan shaft drive

- Use telescopic cardan shafts.

- In order to achieve a uniform motion of the driven shaft, the following requirements must be met (see Pic. 4.6):

- Equal working angle  $\alpha$  and  $\alpha_1$  of both couplings;
- The internal fork joints must be coplanar;
- Both driven and driving shafts must be coplanar.

- It is also recommended working with limited articulated joint angles (max 15° at 1000 rpm and max 11° at 1100 rpm) and disengaging the transmission for those operations requiring great angles (steering or lifting).



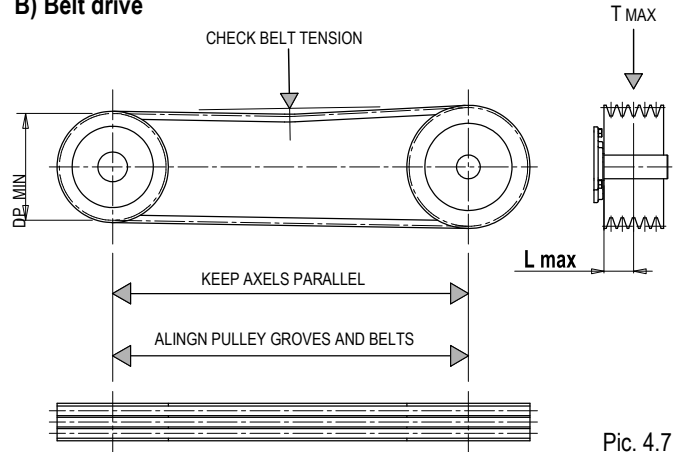
Pic. 4.6

Follow the rotation direction as indicated on the pump front conveyor protection. Follow the instructions of the cardan shaft's manufacture.

- Use the protection that comes with the Julia group shaft.

Use the cardan protection supplied with the pump. The pump installation must fulfill the current EC injury prevention specifications.

**B) Belt drive**



Pic. 4.7

- Install a suitable pulley on the smooth shaft as close as possible to the pump in order to avoid excessive bending stress on the drive shaft.
- Apply an adequate belt tension (see list below).
- Do not use driven or driving pulleys with a pitch diameter inferior to values reported in the box below. Small pulleys require a high belt tension which may cause premature wear to the bearing or transmission damages.

Model	Max. Speed (rpm)	T. max (N)	L. max (mm)	Pitch diameter (mm)	Nr. Grooves	Belts type
PNR/PNE104	1300	3300	35	200	2	XPB
PNR/PNE124	1300	3300	35	200	2	XPB
PNR 142 (1 bar abs)	1300	3300	35	200	3	XPB

Pitch Diameter. min.: Minimum drive of pulley pitch diameter.

**C) Hydraulic drive transmission (PNR/PNE HDR)**

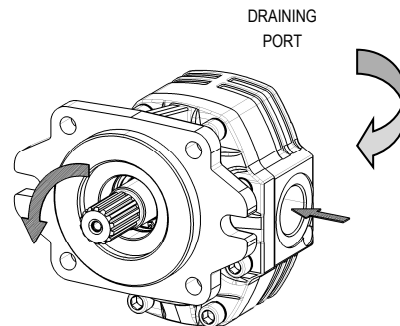
Model	Displacement	Operating pressure (max. vac.)	Operating pressure (1 rel. bar)	Flow	Max pressure draining line	Max. pressure motor exhaust	Max pressure
PNR/PNE104	61 cc/rev	130 bar	170 bar	83 l/min (1300rpm)	5 bar	5 bar	180 bar
PNR/PNE124	72 cc/rev	130 bar	170 bar	98 l/min (1300rpm)	5 bar	5 bar	220 bar
PNR 142	86 cc/rev	150 bar	200 bar	110 l/min (1200rpm)	5 bar	5 bar	220 bar

(\*) : Oil temperature, used in the main circuit.

- **Fluid:** mineral oil for hydraulic systems in compliance with ISO/DIN.

Temperature	Optimum viscosity ale	Max. viscosity allowed
-20 / +80 °C	12 – 100 cSt	750 cSt

- **Filtration:** class 21/19/16 contamination according to ISO 4406 to be obtained with a  $\beta_x = 75$  filter.
- **Check circuit connections:** they must be applied in the same rotation direction as that indicated by the arrow on the pump front flange.
- **Draining:** connect directly to the tank above the maximum oil level. Operating without draining line may damage the motor.

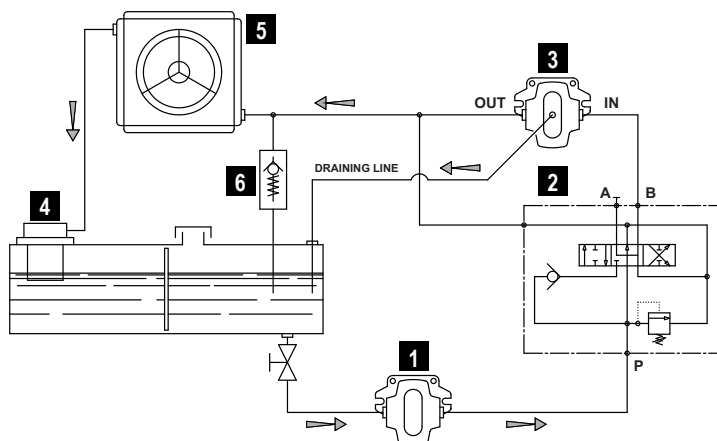


Pic. 4.8

- **Distributor:** open-centre distributor in central idle position (vacuum pump off). It must be equipped with an adjustable overpressure safety valve.

- **Motor pipeline:** outlet pipe must not be of a smaller diameter than that of the inlet port. Inlet pipes always have a diameter smaller than outlet pipes. Choose preferably flexible pipes to avoid vibration transmission.

- **Tank:** with suction pipe and return separated by baffles. If necessary, use a heat exchanger to avoid oil heating above 70-80°C and protect it from extreme pressure with a pressure relief valve. Minimum approximate capacity: as twice as the circulation flow.



Pic. 4.9

1	Hdr pump	4	Oil filter
2	Distributor	5 *	Heat exchanger
3	Hdr motor	6 *	Safety valve

\* optional components

- **Starting-up:** be sure that the system is well cleaned and pour oil into the tank and into the motor housing (necessary to lubricate the internal bearings).

- Vent the circuit and adjust the overpressure safety valve to the lowest possible value.
- Check the oil tank level.
- Increase pressure and rotation speed until operating values are reached.

- The machine/system manufacturer is responsible for dimensioning the lines.

**The machine/system manufacturer is responsible for dimensioning the lines.**

## 5. Start up

### 5.1. Pump starting-up

- Before starting the equipment check the lubricating oil level of the pump.
- Refill the tank with lubrication oil.
- Check the oil level in the gear box (if the pump is provided with it).
- In order to choose the most suitable oil, see paragraph. 2.5.
- Check that all protection and safety devices are correctly installed.
- Check that no obstacles obstruct the vacuum and pressure line or the air injection cooling system.
- Check rotation direction: open all system valves and start running at slow speed.

**Do not rotate in the wrong direction: pump may be damaged.**

- Check which position of the 4-way integrated valve lever allows vacuum or pressure functioning.
- If the pump has been in storage for a long time: inlet. liter of oil in the pump for an easy cleaning of internal parts.
- Close the valve and increase vacuum rate (or operating pressure).
- Check loading and operating speed for vibrations or unusual noises.

**This vacuum pump is designed to work at maximum speed. For longer operating we recommend the pump be run at working speed.**


- Prepare adequately transmission.

### 5.2. Operating precautions

- Run the vacuum pump at a room temperature of -20°C e +40°C.
- Do not make the vacuum pump overheat. Maximum air temperature on exhaust (or delivery) side: 150°C.
- Do not operate the pump without lubrication: it may cause quick wear and possible breakdown of vanes.
- Do not start running the pump under load: that causes stress to the drive system and the hydraulic motor.
- Check rotation speed. The vacuum pump must never exceed the maximum speed or run below the minimum speed.
- Do not accidentally operate the pump in the wrong direction: it may break the vanes.
- Do not convey the exceeding delivery outlet towards the suction port, otherwise it will sack warm gas.
- Control the air flow by adjusting the rotation speed: do not use the pressure relief valve to discharge the exceeding flow.
- Once that the wanted vacuum rated has been attained it is recommendable to decrease the speed. (see par. 2.3): This useful procedure, that will not increase the time requested to fill up the tank,

will however result in a lesser wear of the vanes. It is suggested to reduce the speed also when operating with pressure.


- When, exhaust temperature is reduced, vane durability is increased and both oil consumption and power absorption are reduced.



**Once the needed vacuum rate has been reached, we recommend reducing the vacuum pump speed to its working speed.**

- Internal wash-up is necessary after prolonged inactivity, after working in dusty environments or in case of accidental suction of liquids. Such operation must be carried out only on cooled pumps.

1. Disconnect the exhaust silencer, if possible;
2. Start running the pump at low speed;
3. Suck some water (about 1-2 litres) through the inlet port;
4. Then suck oil (about 1 litre) to complete the wash-up and lubricate internal components.



**In case the exhaust line cannot be disconnected, drain the liquids accumulated in the separator of the exhaust silencer.**

- With temperature below 5 °C (40 °F) and long periods of inactivity, introduce some quantity of oil through the suction connection before starting off the pump.

- The air injection cooling system grants the use of the vacuum pump at high vacuum rates. Anyway it has to be remembered that the pump has been designed for non-continuous work. This cooling system allows to dissipate part of the accumulated heat still at satisfactory lubrication conditions. Continuous, heavy-duty work, or prolonged work periods will cause an over-heating of the pump, consequently reducing performances and durability.

- With the PNR models it is quite normal that the vacuum rate in the tank will fall down at about 50%, if and when the pump is stopped for sufficient time. This because atmospheric air will flow back in the tank through the injection valves, which are adjusted at approximately 0,5 bar. Vent the tank and take it to atmospheric pressure when stopping the pump in order to avoid back rotation of the pump.

## 6. Maintenance

### 6.1. Ordinary maintenance

- Installation and maintenance must be operated only by qualified personnel wearing the proper clothes and the necessary tools as well as protection devices.

- Use suitable protection equipment (gloves, protection glasses, boots...)

- In the following table summarizes the main controls to be performed and the frequency of intervention.

Operating Condition	Maintenance Area	Check	8H	50H	500H	1000H
OPERATING	Vacuum line	Check safety valve (non-return valve)				
		Operating pressure				
	Transmission / Pump	Lubrication: dripping into oilers (PNR 142)				
		Rotation speed				
		Sound pressure level (also HDR motor)				
STANDSTILL	Vacuum line	Suctions filters				
		4-way changeover valve: check and lubricate				
	Pump	Clean oilers glasses (PNR 142)				
		Check oil level				
		Check vanes wear				
		Change oil (*)				
		Pump's inner washing (**)				
	Overall	Greasing				
		Check cardan shaft drive				
Check transmission pulley						

(\*)The first oil change must be done inside 500 hours operation. Following changes every 5000 hours or 12 months. In order to choose the most suitable oil, see paragraph 2.5.

(\*\*) After operation in dusty environments, after accidental sucking of liquids inside the pump or before a long inoperativity period it is recommended to wash the pump inside according to the procedure described at paragraph 5.2.

#### Checking lubrication (PNR 142 only)

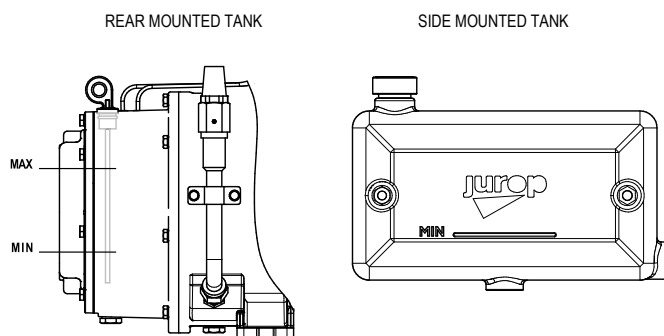
- Check dripping into the oilers.
- Be sure it is regular (about 60 drops/min at max. speed, with free ports) to grant a correct lubrication of the pump. At lower speeds, the number of drops must be directly proportional.



If the pump is running without lubrication, the internal components may quickly be damaged due to overheating. Stop the vacuum pump and check the oil level and the lubricating pump.

### Checking the oil tank level

- Check the oil tank level.
- Do not run the pump with oil level under the minimum level: that may lead to dry functioning and cause serious damages. (Fig. 6.1).
- Check the oil level in the gear box (if the pump is provided with it).

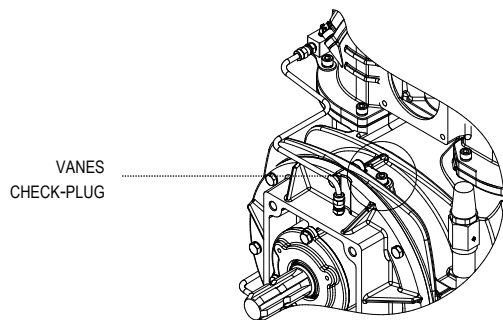


Pic. 6.1

- Rear mounted tank capacity: 3,2 l.
- Side mounted tank capacity: 4 l.
- Use pure and fresh oil. In order to choose the most suitable oil, see paragraph 2.5.

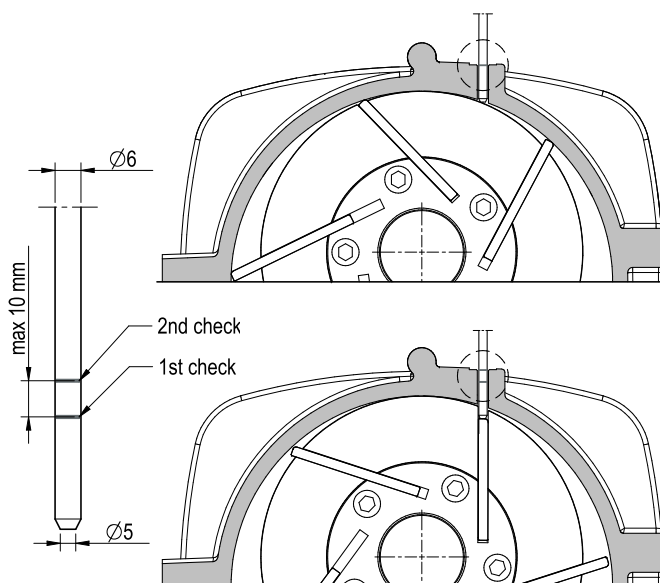
### Checking the vanes wear

- Unscrew the vanes wear check-plug on the front flange. See Pic. 6.2.



Pic. 6.2

- Turn the shaft by hand until vanes appearance.
- Vanes usually slip on seat bottom due to gravity. Check their right entry in the seat.
- Insert a  $\varnothing 6$  mm stick until it touches the rotor and then mark like in Pic. 6.3.
- Turn the rotor slowly until the stick touches the vane in idle position in its seat. The vanes slide to the bottom of the seat due to gravity: check they really do and mark again on the stick.
- Repeat the same procedure for all the vanes. If wear exceeds 10 mm: replace the vanes as soon as possible.



Pic. 6.3

- Replace all the pump vanes at the same time.



Replace the vanes when their wear exceeds 10 mm (L – L min): they may break. Replace all vanes at the same time.

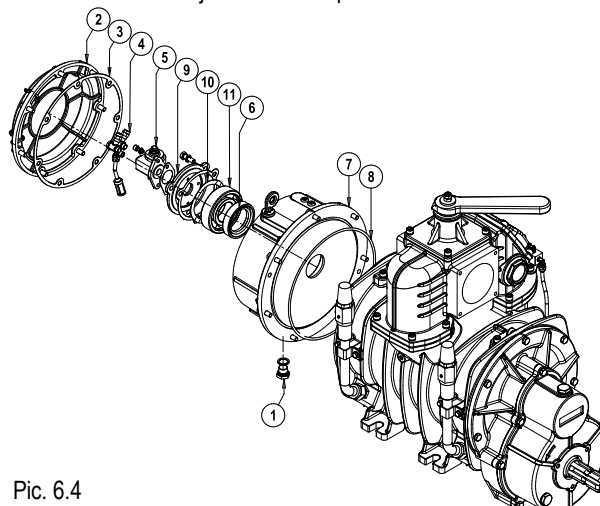
- Replace the cap after the measurement.

## 6.2. Extraordinary maintenance

- Before starting any extraordinary maintenance operation, be sure the pump stands still and follow the safety prescriptions as described in Cap. "Safety and accident prevention".

### Replacing the vanes (PNR/PNE 104-124)

- Remove the vacuum pump from its bearing frame and wash it before disassembling.
- It is suggested to remove the oil tank on the rear part because generally the pump's drive components are fitted on the front flange. Use always the specific kit of gaskets for the pump model at hand (see also spare parts list).
- Material that is subject to wear: replace.



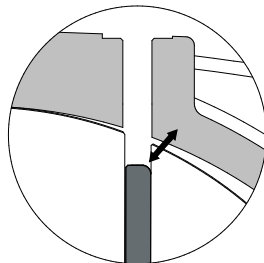
Pic. 6.4



Pos.	Code	Description
1	1684000000	PLUG 3/8
2	1640101200	TANK'S CAP
3	1680707700	CAP'S GASKET
4	4026706101	PIPE'S FITTING
5	4024251000	OIL PUMP (RIGHT)
	4024251500	OIL PUMP (LEFT)
6	4022200111	SEAL 72X48X15
7	16125006E0	OIL TANK
8	4022200309	OR
9	1610508500	PUMP'S FLANGE
10	4026300020	COMPENSATION RING
11	4023100140	BEARING

**Disassemble operation**

- Drain the oil tank through the proper port (pos. 1).
- Remove the tank's cap (pos. 2) and change the gasket (pos. 3); unscrew the lubrication pipe's fittings (pos. 4) connecting the oil pump to the oilers.
- Remove the oil pump (pos. 5).
- Remove the screws fixing the oil tank (pos. 7) and carefully remove it, eventually using two screws partially winded inside the threads. Avoid that the rotor falls down inside the housing, supporting it if necessary with adequate tools.
- Change the OR (pos. 8).
- Remove the oil pump's flange (pos. 9), the compensation ring (pos. 10) and the bearing (pos. 11) this will make the reassembly of the oil tank much easier (pos. 7).
- Lubricate the new vanes before inserting them in the rotor's slots.
- The new vanes have to be inserted with the rounded corner facing towards the housing (See Pic. 6.5).



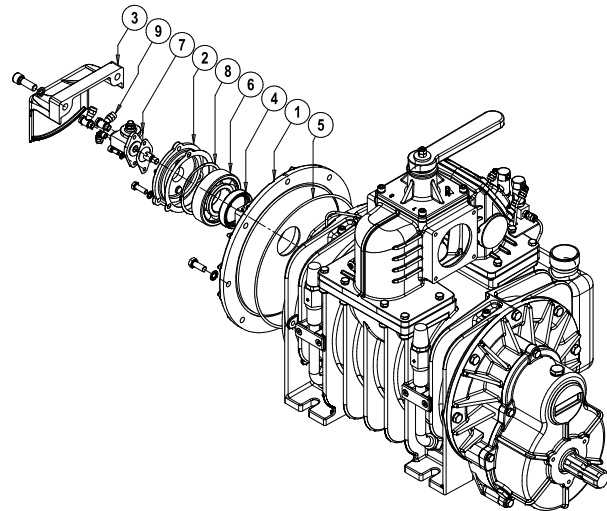
Pic. 6.5

**Assemble operation**

- Reassemble everything again in the right sequence, absolutely avoiding to leave foreign parts inside the pump. Always change all the gaskets and the OR after having them properly lubricated and also the seal (pos. 6) if necessary. Put some grease in the space between the bearing (pos. 11) and the flange (pos. 9).
- Reassemble the oil tank (pos. 7) and the OR (pos. 8) carefully inserting the drive shaft without damaging the seal.
- Insert the bearing (pos. 11), the compensation ring (pos. 10), and the oil pump's flange (pos. 9).
- Insert correctly the lubrication pump in the driving slot and refit the flange.
- Reassemble the lubrication pipes and fittings.
- Reassemble the tank's cap (pos. 2) and the gasket (pos. 3).
- Replace the plug on the tank (pos. 1) and refill it with lubrication oil.

**Replacing the vanes (PNR 142)**

- Remove the vacuum pump from its bearing frame and wash it before disassembling.
- It is suggested to remove the oil tank on the rear part because generally the pump's drive components are fitted on the front flange. Use always the specific kit of gaskets for the pump model at hand (see also spare parts list)
- Material that is subject to wear: replace.



Pic. 6.6

Pos.	Code	Description
1	1610508100	FLANGE
2	1610512900	PUM'S FLANGE
3	1642100200	REAR PROTECTION
4	4022200113	SEAL 70X55X15
5	4022200311	OR
6	4023100150	BEARING
7	4024251000	OIL PUMP (RIGHT)
	4024251500	OIL PUMP (LEFT)
8	4026300025	COMPENSATION RING
9	4026706101	PIPE'S FITTING

**Disassemble operation**

- Remove the rear protection (pos. 3).
- Unscrew the lubrication pipe's fittings connecting the oil pump (pos. 9) to the oilers.
- Remove the oil pump (pos. 7).
- Remove the screws fixing the flange (pos. 1) and carefully remove it, eventually using two screws partially winded inside the threads. Avoid that the rotor falls down inside the housing, supporting it if necessary with adequate tools.
- Change the OR (pos. 5).
- Remove the oil pump's flange (pos. 2), the compensation ring (pos. 8) and the bearing (pos. 6) this will make the reassembly of the oil tank much easier.
- Lubricate the new vanes before inserting them in the rotor's slots.
- The new vanes have to be inserted with the rounded corner facing towards the housing (See Pic. 6.5).

### Assemble operation

- Reassemble everything again in the right sequence, absolutely avoiding to leave foreign parts inside the pump. Always change all the gaskets and the OR (pos. 5) after having them properly lubricated and also the seal (pos. 4) if necessary. Put some grease in the space between the bearing (pos. 6) and the flange (pos. 1).

- Reassemble the flange (pos. 1), and the OR (pos. 5) carefully inserting the drive shaft without damaging the seal (pos. 4).

- Insert the bearing (pos. 6), the compensation ring (pos. 8) and the oil pump's flange (pos. 2).

- Insert correctly the lubrication pump (pos. 7) in the driving slot and refit the flange.

- Reassemble the lubrication pipes and fittings.

- Reassemble the rear protection (pos. 3).

### General warnings

- On direct drive models normally it is not necessary to remove the front small flange. However, if this has to be done do not forget to grease the underneath bearing.

- The front bearing has been greased during pump's assembling. Lubrication of said bearing is necessary after long working periods only (for example, normal duration of a set of vanes). It is consequently suggested to pump carefully new grease through the lubrication nipple in order to avoid damages to the seals.

- When changing the vanes do not forget to carefully clean all the components that you have dismantled. Clean the oil filter and the oil tank from the solid sediments. The models PNR142, are provided with a side oil tank; be careful to the maximum tight torque of the oil filter plug. Maximum torque: 10Nm.

### Mounting the hydraulic drive

- We recommend the drive coupling be oiled when vanes are being replaced.

- However lubricate the drive coupling every 1500 hours.



**We recommend the drive coupling be oiled every 1500 hours.**

- Apply coupling hub to vacuum pump axis respecting the position marked during disassembly: the grain must go back into the seat on the rim.

- Mount the coupling and lubricate internally with NLGI 2 Lithium grease. Provide an adequate quantity of fat, in order to have a medium filling.

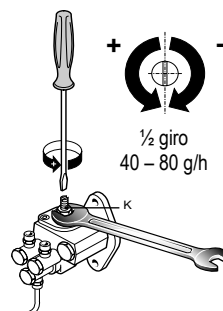
- Reassembly the motor without forcing onto the seals.

### Adjusting the self-lubricating pump

- The automatic lubricating pump is adjusted by the manufacturer before the shipping.

- If consumption noticeably differs from the indicated value, adjust it as follows:

- Remove the upper protection cover;
- Using a screwdriver and a 10 mm wrench, adjust the adjusting screw (K). Close the nut and remount the upper protection cover;
- It is advisable to turn the screw of  $\frac{1}{4}$  of turn and verify the actual consumption.



Pic. 6.7



**Do not reduce oil consumption below the value indicated in par. 2.2 (for functioning at speeds different from the maximum, flow is proportionate to rotating speed).**

- $\frac{1}{2}$  turn of the adjusting screw causes a variation in the flow of approximately **40 - 80 g/h**, depending on using conditions.

### Cleaning of the inside exhaust port of the pump housing and the 4-way manifolds

- Frequency: at every changing of the vanes.
- How to proceed: dismantle the manifold and remove possible oilscales or other foreign parts.
- The clogging-up of this manifold and the exhaust port depends mainly from heavy duty use of the pump and causes an increase of temperature and a non perfect closing of the check valve. A careful cleaning of all components, including the insides of the housing and the non-return check valve and it's seat, is therefore strongly recommended.

## 7. Malfunctions: troubleshooting

### PROBLEMS

#### Overheating

Cause	Solution
• Faulty lubrication	• Check the oil pump
• Missing oil	• Fill up the oil tank
• Revolutions too high	• Reduce the speed
• Operating time too long at too high vacuum rate	• Decrease the vacuum rate
• Clogged filters on the air injection system	• Clean the filters
• Insufficient diameter of vacuum and discharge line	• Check the correct dimensions of the line (minimum suggested 3")

#### The pump is blocked

Cause	Solution
• Broken vanes:	• Dismantle the pump and change the vanes
- due to foreign parts	• Check/clean the filters and elements on the vacuum line
- due to faulty lubrication	• Check the lubrication pump
• Damaged drive system	• Change the damaged parts
• Frozen up pump	• Warm-up the pump

#### Reduced performances

Cause	Solution
• 4-way valve handle in neutral position	• Move the handle against the resting pin
• Worn vanes	• Change the vanes
• Leaking check valve	• Clean the check valve
• Worn O-rings	• Change the seals
• Leaking gaskets and/or valves on the vacuum tank	• Change that damaged parts
• Clogged connecting pipeline	• Change the damaged hoses - pipes
• Floating ball or air filter obstructed	• Dismantle and clean
• Crusted up exhaust manifold	• Dismantle and clean
• Vacuum line components under-dimensioned	• Check the dimensioning for the pump model at hand
• Rubber connection obstructed or damaged	• Change the connections

#### Abnormal oil consumption

Cause	Solution
• Insufficient lubrication	• Adjust the oil pump flow
• Excessive oil consumption	• Loss of adjustment of the oil pump • Probable wear or breakage of the seal rings of the vacuum pump shaft. Replace them • Check the fittings built on the automatic oil pump and screw tight

## 8. Scrapping

• Before scrapping the machine, the following materials need to be separated and suitably disposed of:

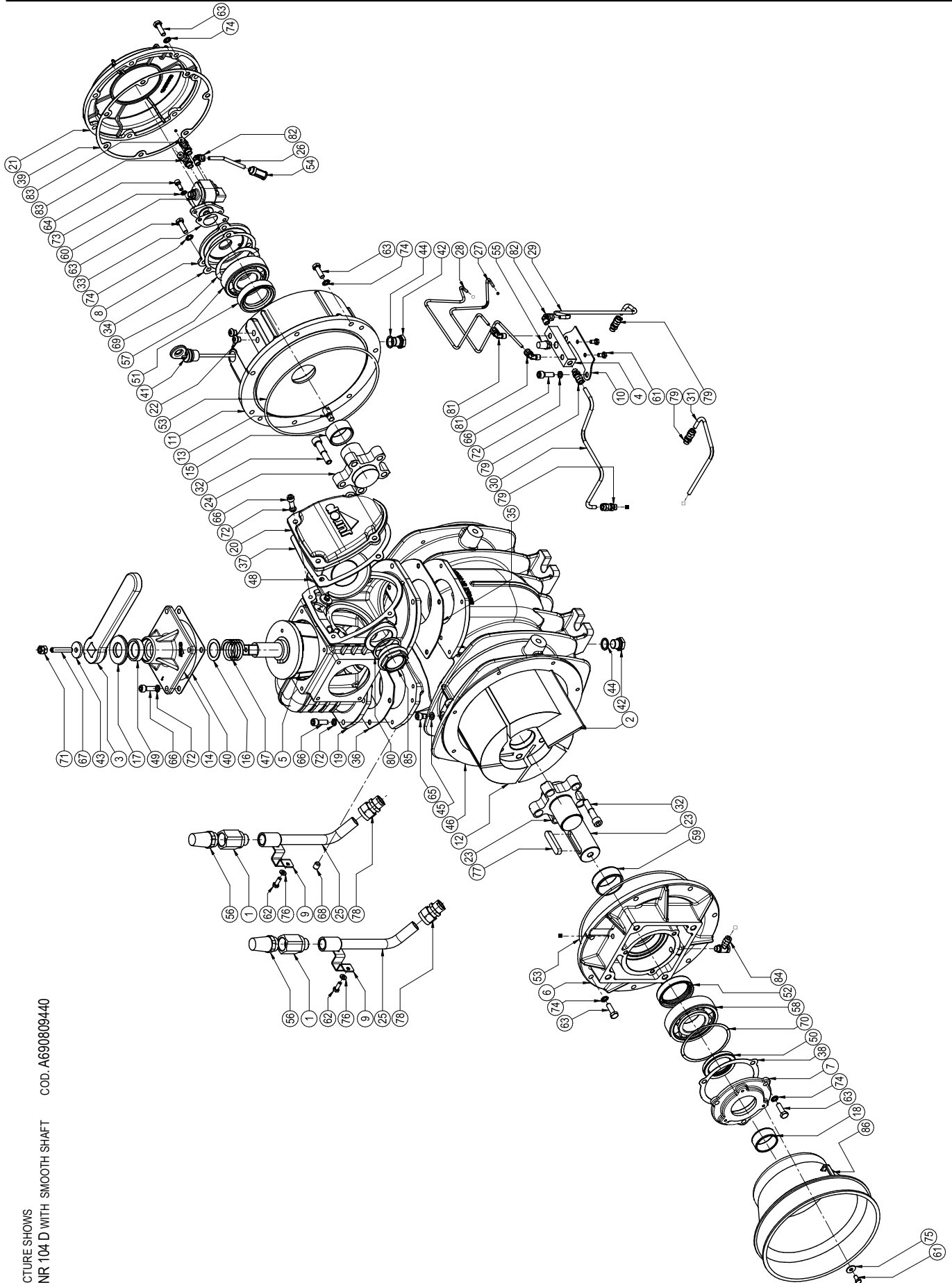
- Hydraulic oil.
- Rubber and plastic parts, such as hoses.
- Steel and aluminium parts.

• Recycling materials allow reducing the environmental impact and respecting the environment.



**Do not dispose of in the environment. Dispose of in compliance with the standards in force.**

**PNR/PNE 104-124 D**

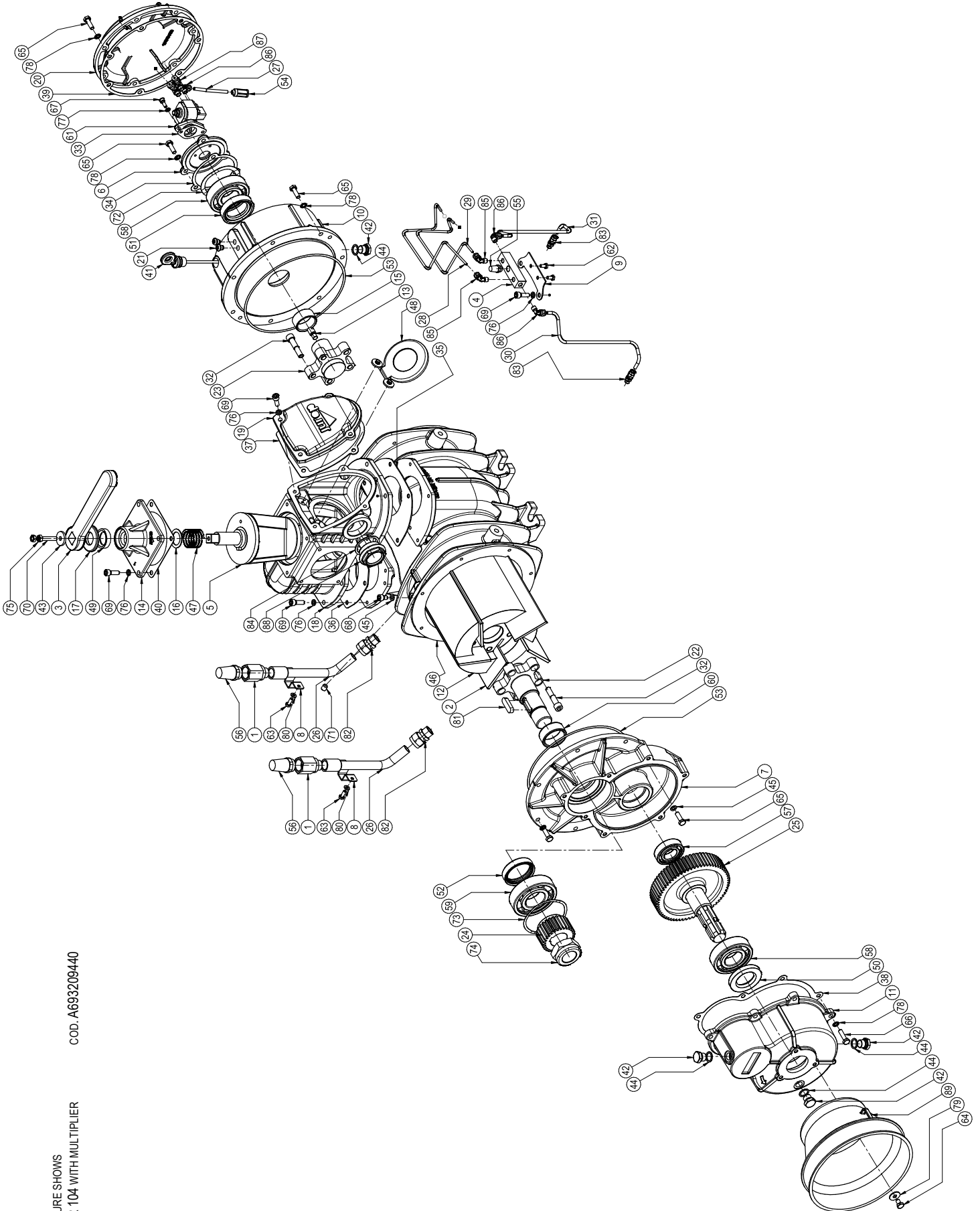


PICTURE SHOWS  
PNR 104 D WITH SMOOTH SHAFT  
COD. A690809440

**PNR/PNE 104-124 D**

Pos.	Codice	Descrizione	Q.tà	Pos.	Codice	Descrizione	Q.tà
1	1493300200	AIR INJECTION VALVE 1/2"	2	35	16807009E0	GASKET	1
2	1601605900	VANE PNR 104	5	36	16807010E0	GASKET	1
	1601606000	VANE PNR 124	5	37	16807011E0	GASKET	1
	1601605500	VANE PNE 104	5	38	1680707300	GASKET	1
	1601605600	VANE PNE 124	5	39	1680707700	GASKET	1
3	1605500100	HANDLE	1	40	1680707800	GASKET	1
4	16081001E0	DISTRIBUTOR	1	41	1683600300	OIL STICK	1
5	1608502500	CONVEYOR	1	42	1684000000	PLUG 3/8	4
6	16105005E0	FLANGE	1	43	1685002800	WASHER 30X8,5 SP.4 GALV.	1
7	1610508200	FLANGE	1	44	1685100200	WASHER 17X22X1,5	4
8	1610508500	OIL PUMP FLANGE	1	45	1685100800	WASHER 8X14X1,5	2
9	16120820E0	PLATE	2	46	16875020E0	HOUSING PNR-PNE 104	1
10	16120854E0	PLATE	1		16875019E0	HOUSINGPNR-PNE 124	1
11	16125006E0	OIL TANK	1	47	1691000000	CONVEYOR SPRING	1
12	1621503500	ROTOR PNR/PNE 104	1	48	18930008E0	CLAPET-VALVE	1
	1621503600	ROTOR PNR/PNE 124	1	49	4022200030	SEAL 41X27X10	1
13	1622002600	SHAFT M10	1	50	4022200044	SEAL 65X45X8	1
14	1623100500	CAPPELLOTTO	1	51	4022200111	SEAL 72X48X15	1
15	1624007500	BUSHING 40X48X22	1	52	4022200113	SEAL 70X55X15	1
16	162409YKBO	SPACER	1	53	4022200309	OR 4875 VITON	2
17	1624202300	SPACER	1	54	4022300001	FILTER	1
18	1626001100	BUSHING	1	55	4022301001	OIL BLOCK FILTER ¼	1
19	16275006E0	MANIFOLD	1	56	4022301004	OIL BLOCK FILTER ¾	2
20	16401008E0	CLAPET CAP	1	57	4023100140	BEARING 6308	1
21	1640101200	OIL TANK CAP	1	58	4023100150	BEARING 6309	1
22	1642600000	PROTECTION	2	59	4023130035	BUSHING 55X45X22	1
23	1650014700	FRONT SMOOTH SHAFT	1	60	4024251000	OIL PUMP (RIGHT)	1
	1650014600	FRONT SPLINED SHAFT	1		4024251500	OIL PUMP (LEFT)	1
24	1650014800	REAR SHAFT	1	61	4026102702	SCREW TE M 6X12 GALV.	5
25	1663014000	PIPE	2	62	4026102704	SCREW TE M 6 X 16 GALV.	4
26	1663041100	PIPE	1	63	4026102807	SCREW TE M 8 X 25 GALV.	27
27	16631022E0	PIPELINE 1 PNR-PNE 104 P.LUBR DX	1	64	4026121305	SCREW TCEI M 6 X 16 GALV.	2
	16631028E0	PIPELINE 1 PNR-PNE 104 P.LUBR SX	1	65	4026121401	SCREW TCEI M 8 X 12 GALV.	2
	16631018E0	PIPELINE 1 PNR-PNE 124 P.LUBR DX	1	66	4026121407	SCREW TCEI M 8 X 25 GALV.	16
	16631026E0	PIPELINE 1 PNR-PNE 124 P.LUBR SX	1	67	4026135414	SCREW S.TESTA M 8X45 GALV.	1
28	16631023E0	PIPELINE 2 PNR-PNE 104 P.LUBR DX	1	68	4026135504	SCREW S.TESTA M 10 X 10 GALV.	1
	16631029E0	PIPELINE 2 PNR-PNE 104 P.LUBR SX	1	69	4026300020	COMPENSATION RING	1
	16631019E0	PIPELINE 2 PNR-PNE 124 P.LUBR DX	1	70	4026300025	COMPENSATION RING	1
	16631027E0	PIPELINE 2 PNR-PNE 124 P.LUBR SX	1	71	4026308005	NUT M 8 ESAG. GALV.	2
29	16631025E0	PIPELINE PNR-PNE 104 DIST-CORPO DX	1	72	4026350505	WASHER GROWER 8 GALV.	16
	16631024E0	PIPELINE PNR-PNE 104 DIST-CORPO SX	1	73	4026351504	WASHER M 6 GALV.	2
	16631021E0	PIPELINE PNR-PNE 124 DIST-CORPO DX	1	74	4026351505	WASHER M 8 GALV.	27
	16631020E0	PIPELINE PNR-PNE 124 DIST-CORPO SX	1	75	4026356001	WASHER 6X18 GALV.	3
30	16631032E0	PIPELINE PNR-PNE 104 DIST-FLANG DX	1	76	4026357003	WASHER M6 GALV.	4
	16631031E0	PIPELINE PNR-PNE 104 DIST-FLANG SX	1	77	4026501006	TAB 12X8X56	1
	16631034E0	PIPELINE PNR-PNE 124 DIST-FLANG DX	1	78	4026701301	FITTING	2
	16631036E0	PIPELINE PNR-PNE 124 DIST-FLANG SX	1	79	4026702004	FITTING	4
31	16631033E0	PIPELINE PNR-PNE 104 FLANG-CORPO DX	1	80	4026702708	WASHER 1"½	1
	16631030E0	PIPELINE PNR-PNE 104 FLANG-CORPO SX	1	81	4026706000	FITTING 90°4X1/8	2
	16631035E0	PIPELINE PNR-PNE 124 FLANG-CORPO DX	1	82	4026706003	FITTING 90° 6X1/8	2
	16631037E0	PIPELINE PNR-PNE 124 FLANG-CORPO SX	1	83	4026706101	FITTING	2
32	1672001600	SCREW TCEI M10X1,5	10	84	4026706104	FITTING	1
33	1680609700	GASKET	1	85	4026904005	PLUG 1"½	1
34	1680609800	GASKET	1	86	4029602806	PROTECTION	1

**PNR/PNE 104-124 CON MOLTIPLICATORE**

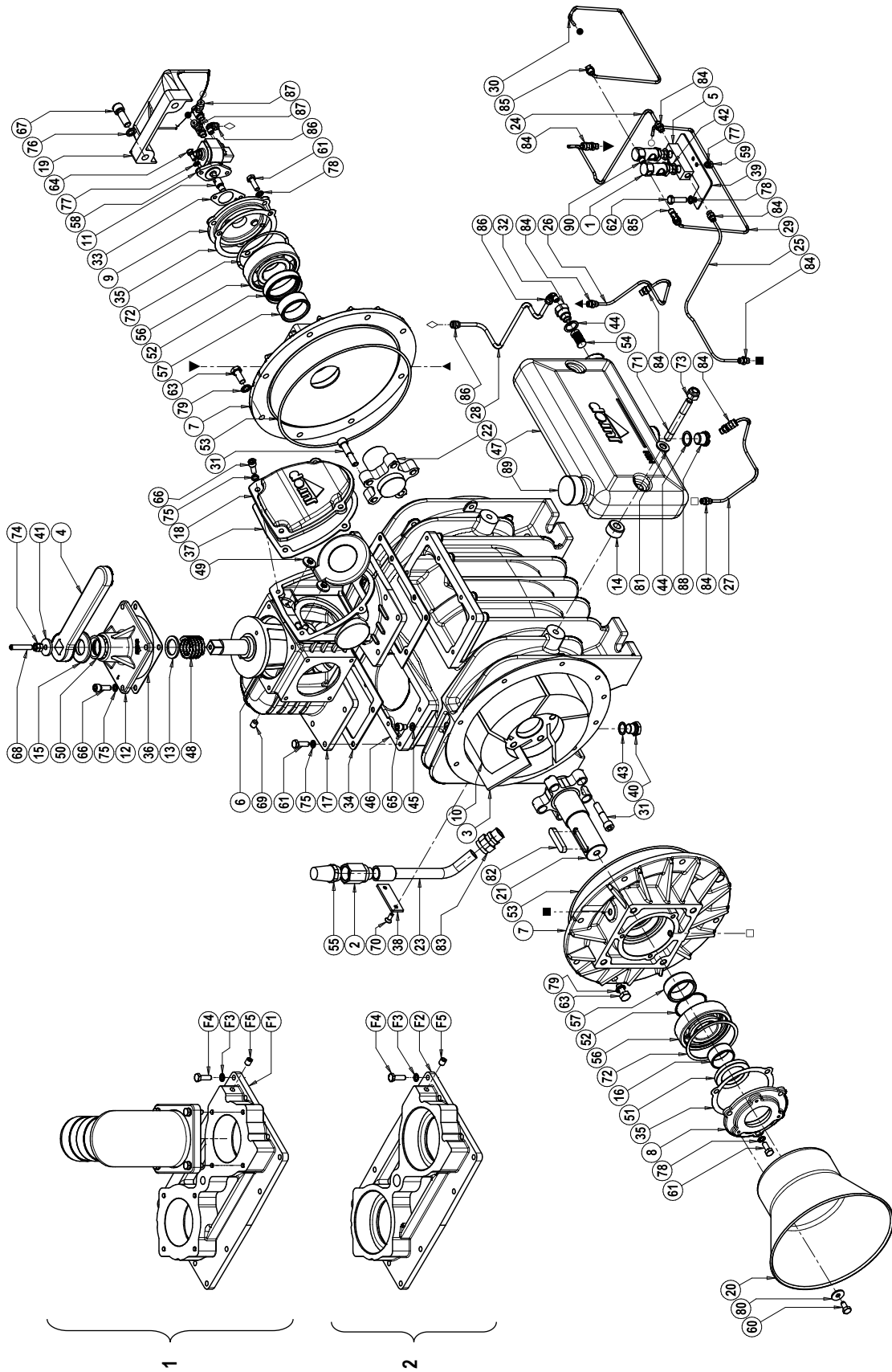


COD. A693209440  
 PICTURE SHOWS  
 PNR 104 WITH MULTIPLIER

**PNR/PNE 104-124 with multiplier**

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	1493300200	AIR INJECTION VALVE 1/2"	2	39	1680707700	GASKET	1
2	1601605900	VANE PNR 104	5	40	1680707800	GASKET	1
	1601606000	VANE PNR 124	5	41	1683600300	OIL STICK	1
	1601605500	VANE PNE 104	5	42	1684000000	PLUG 3/8	4
	1601605600	VANE PNE 124	5	43	1685002800	WASHER 30X8,5 SP.4 GALV.	1
3	1605500100	HANDLE	1	44	1685100200	WASHER 17X22X1,5	4
4	16081001E0	DISTRIBUTOR	1	45	1685100800	WASHER RA 8X14X1,5	2
5	1608502500	CONVEYOR	1	46	16875020E0	HOUSING PNR-PNE 104	1
6	1610508500	FLANGE	1		16875019E0	HOUSING PNR-PNE 124	1
7	1610508700	FLANGE	1	47	1691000000	CONVEYOR SPRING	1
8	16120820E0	PLATE	2	48	18930008E0	CLAPET	1
9	16120854E0	PLATE	1	49	4022200030	SEAL 41X27X10	1
10	16125006E0	OILT TANK	1	50	4022200040	SEAL 72X40X10	1
11	1612503500	GEARBOX	1	51	4022200111	SEAL 72X48X15	1
12	1621503500	ROTOR PNR/PNE 104	1	52	4022200113	SEAL 70X55X15	1
	1621503600	ROTOR PNR/PNE 124	1	53	4022200309	OR 4875 VITON	2
13	1622002600	SHAFT M10	1	54	4022300001	FILTER	1
14	1623100500	CONVEYOR CAP	1	55	4022301001	OIL BLOCK FILTER ¼	1
15	1624007500	BUSHING 40X48X22	1	56	4022301004	OIL BLOCK FILTER ¾	2
16	162409YKBO	SPACER	1	57	4023100110	BEARING 6206	1
17	1624202300	SPACER	1	58	4023100140	BEARING 6308	2
18	16275006E0	MANIFOLD	1	59	4023100150	BEARING 6309	1
19	16401008E0	CLAPET CAP	1	60	4023130035	BUSHING 55X45X22	1
20	1640101200	REAR COVER	1	61	4024251000	OIL PUMP (RIGHT)	1
21	1642600000	PIPELINE PROTECTION	2		4024251500	OIL PUMP (LEFT)	1
22	1650014500	FRONT SHAFT	1	62	4026102702	SCREW TE M 6X12 GALV.	5
23	1650014800	REAR SHAFT	1	63	4026102704	SCREW TE M 6 X 16 GALV.	4
24	1651005500	PINION	1	64	4026102802	SCREW TE M 8X12 GALV.	3
25	1651005700	GEAR	1	65	4026102807	SCREW TE M 8 X 25 GALV.	24
26	1663014000	PIPELINE	2	66	4026102808	SCREW TE M 8 X 30 GALV.	7
27	1663041100	PIPELINE	1	67	4026121305	SCREW TCEI M 6 X 16 GALV.	2
28	16631022E0	PIPELINE 1 PNR-PNE 104 P.LUBR. DX	1	68	4026121401	SCREW TCEI M 8 X 12 GALV.	2
	16631028E0	PIPELINE 1 PNR-PNE 104 P.LUBR SX	1	69	4026121407	SCREW TCEI M 8 X 25 GALV.	16
	16631018E0	PIPELINE 1 PNR-PNE 124 P.LUBR DX	1	70	4026135414	SCREW M 8X45 GALV.	1
	16631026E0	PIPELINE 1 PNR-PNE 124 P.LUBR SX	1	71	4026135504	SCREW M 10 X 10 GALV.	1
29	16631023E0	PIPELINE 2 PNR-PNE 104 P.LUBR DX	1	72	4026300020	COMPENSATION RING	1
	16631029E0	PIPELINE 2 PNR-PNE 104 P.LUBR SX	1	73	4026300025	COMPENSATION RING	1
	16631019E0	PIPELINE 2 PNR-PNE 124 P.LUBR DX	1	74	4026306115	NUT M 36X3 ESAG. AUTOBL.	1
	16631027E0	PIPELINE 2 PNR-PNE 124 P.LUBR SX	1	75	4026308005	NUT M 8 ESAG. GALV.	2
30	16631024E0	PIPELINE PNR-PNE 104 DIST.-CORPO SX	1	76	4026350505	WASHER GROWER 8 GALV.	16
	16631025E0	PIPELINE PNR-PNE 104 DIST.-CORPO DX	1	77	4026351504	WASHER DENT.INT.M 6 GALV.	2
	16631020E0	PIPELINE PNR-PNE 124 DIST.-CORPO SX	1	78	4026351505	WASHER DENT.INT.M 8 GALV.	29
	16631021E0	PIPELINE PNR-PNE 124 DIST.-CORPO DX	1	79	4026356002	WASHER 8X24 GALV.	3
31	16631025E0	PIPELINE PNR-PNE 104 DIST.-CORPO DX	1	80	4026357003	WASHER M6 GALV.	4
	16631024E0	PIPELINE PNR-PNE 104 DIST.-CORPO SX	1	81	4026501003	TAB 12X8X40	1
	16631021E0	PIPELINE PNR-PNE 124 DIST.-CORPO DX	1	82	4026701301	FITTING	2
	16631020E0	PIPELINE PNR-PNE 124 DIST.-CORPO SX	1	83	4026702004	FITTING	2
32	1672001600	SCEW TCEI M10X1,5	10	84	4026702708	WASHER 1"½	1
33	1680609700	GASKET	1	85	4026706000	FITTING 90°4X1/8	2
34	1680609800	GASKET	1	86	4026706003	FITTING 90° 6X1/8	3
35	16807009E0	GASKET	1	87	4026706101	FITTING	2
36	16807010E0	GASKET	1	88	4026904005	PLUG 1"½	1
37	16807011E0	GASKET	1	89	4029602806	PROTECTION SHAFT	1
38	1680707600	GASKET	1				

**PNR 142 D**



PICTURE SHOWS  
PNR 142 D (SIDE MOUNTED TANK)

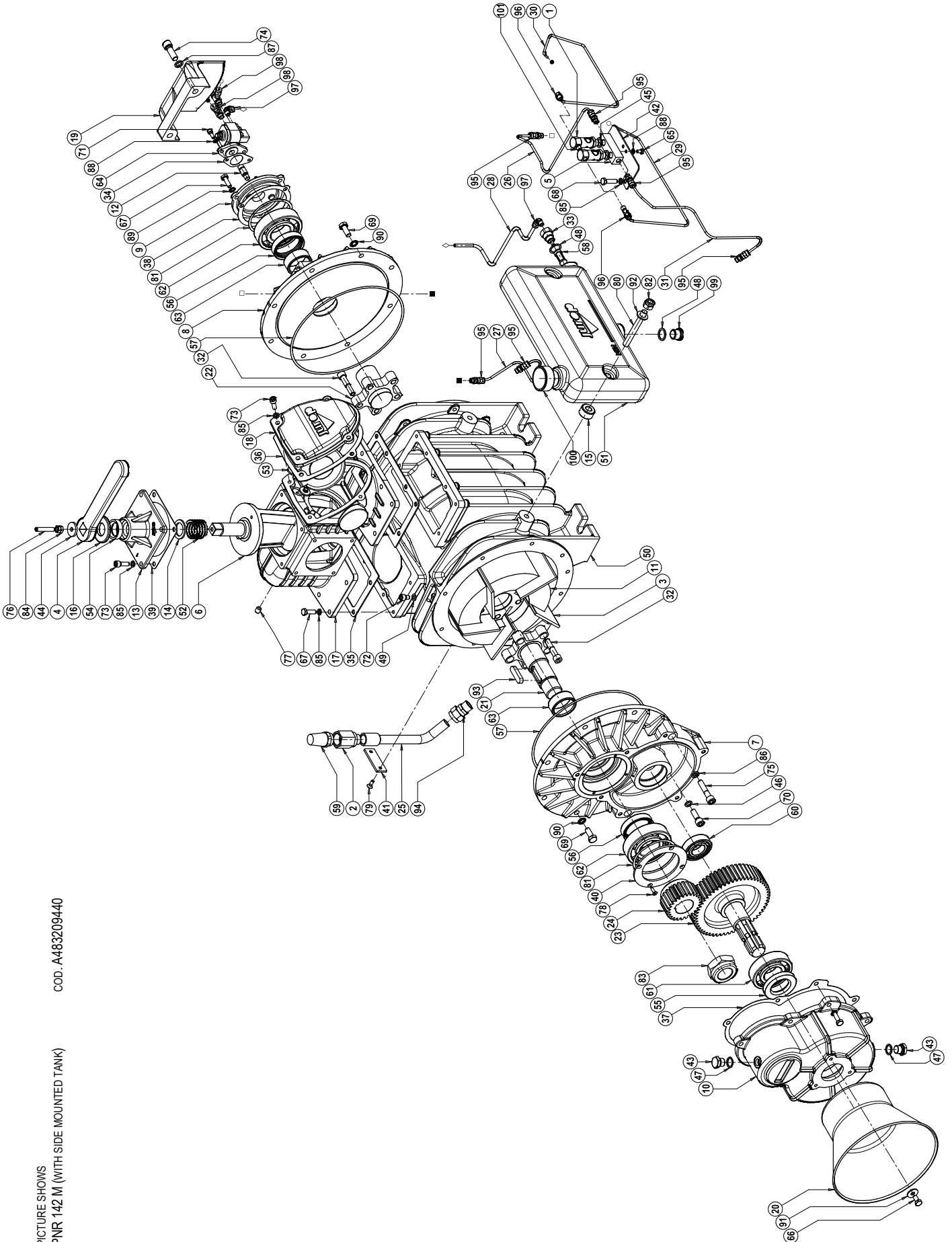


**PNR 142 D**

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	1401200700	OIL DRIPPER	2	46	1687509500	HOUSING PNR 142 SL	1
2	1493300200	AIR INJECTION VALVE 1/2"	2	47	1687600000	OIL TANK	1
3	1601605200	VANE	5	48	1691000000	CONVEYOR SPRING	1
4	1605500100	HANDLE	1	49	18930008E0	CLAPET	1
5	1608100000	DISTRIBUTOR	1	50	4022200030	SEAL	1
6	1608502500	CONVEYOR	1	51	4022200044	SEAL 65X45X8	1
7	1610508100	FLANGE	2	52	4022200113	SEAL 70X55X15	2
8	1610508200	FLANGE	1	53	4022200311	OR 4975	2
9	1610512900	FLANGE	1	54	4022300001	FILTER	1
10	1621503200	ROTOR	1	55	4022301004	FILTER	2
11	1622002600	SHAFT M10	1	56	4023100150	BEARING 6309	2
12	1623100500	CONVEYOR CAP	1	57	4023130035	BUSHING 55X45X22	2
13	162409YKBO	SPACER	1	58	4024251000	OIL PUMP (RIGHT)	1
14	1624042800	SPACER	2		4024251500	OIL PUMP (LEFT)	1
15	1624202300	SPACER	1	59	4026101301	SCREW TE M6X10 GALV.	2
16	1626001100	BUSHING	1	60	4026102804	SCREW TE M8X16 GALV.	3
17	16275007E0	MANIFOLD	1	61	4026102807	SCREW TE M8X25 GALV.	16
18	16401008E0	CLAPET CAP	1	62	4026102808	SCREW TE M8X30 GALV.	2
19	1642100200	REAR PROTECTION	1	63	4026102907	SCREW TE M10X25 GALV.	16
20	1642600100	CARDAN PROTECTION	1	64	4026121305	SCREW TCEI M6X16 GALV.	2
21	1650013100	FRONT SHAFT (SMOOTH)	1	65	4026121401	SCREW TCEI M8X12 GALV.	2
	1650012900	FRONT SHAFT (SPLINED)	1	66	4026121407	SCREW TCEI M8X25 GALV.	8
22	1650022900	REAR SHAFT	1	67	4026121710	SCREW TCEI M12X35 GALV.	2
23	1663014000	PIPELINE	2	68	4026135414	SCREW M8X45 GALV.	1
24	1663065800	PIPELINE	1	69	4026135504	SCREW M10X10 GALV.	1
25	1663065900	PIPELINE	1	70	4026155605	SCREW TSPEI M6X16 GALV.	4
26	1663066000	PIPELINE	1	71	4026171211	SCREW M12X80 GALV.	2
27	1663066100	PIPELINE	1	72	4026300025	COMPENSATION RING	2
28	1663066300	PIPELINE	1	73	4026305508	NUT M12 ESAG. AUTOBLOCC.	2
29	1663066400	PIPELINE	1	74	4026308005	NUT M 8 ESAG. GALV.	2
30	1663066500	PIPELINE	1	75	4026350505	WASHER GROWER 8 GALV.	20
31	1672001600	SCREW TCEI M10X1,5	10	76	4026350508	WASHER GROWER 12 GALV.	2
32	1673001000	FITTING	1	77	4026351504	WASHER 6 GALV.	4
33	1680609700	GASKET	1	78	4026351505	WASHER 8 GALV.	8
34	1680610200	GASKET	2	79	4026351506	WASHER 10 GALV.	16
35	1680707300	GASKET	2	80	4026356002	WASHER PIANA 8X24 GALV.	3
36	1680707800	GASKET	1	81	4026357007	WASHER M12 GALV.	2
37	16807011E0	GASKET	1	82	4026501006	TAB 12X8X56	1
38	1681006600	PLATE	2	83	4026701301	FITTING 1/2X18	2
39	1681100200	PLATE	1	84	4026702000	FITTING 4X1/8	8
40	1684000000	PLUG 3/8	2	85	4026706000	FITTING UNIV.90° 4X1/8	2
41	1685002800	WASHER 30X8,5 ZINC.	1	86	4026706003	FITTING UNIV.90° 6X1/8	2
42	1685100000	WASHER	2	87	4026706101	FITTING 4-1/8	2
43	1685100200	WASHER	2	88	4026904503	PLUG	1
44	1685100300	WASHER	2	89	4026910103	PLUG	1
45	1685100800	WASHER	2	90	4026910601	PLUG 1/8'	2

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
<b>1</b>		<b>Flanged Manifold</b>		<b>2</b>		<b>Threaded Manifold</b>	
F1	1627504800	FLANGED MANIFOLD	1	F2	1627504900	THREADED MANIFOLD	1
F3	4026351505	WASHER M8	12	F3	4026351505	WASHER M8	12
F4	4026102807	SCREW M8X25	12	F4	4026102807	SCREW M8X25	12
F5	4026135504	SCREW M10X10	1	F5	4026135504	SCREW M10X10	1

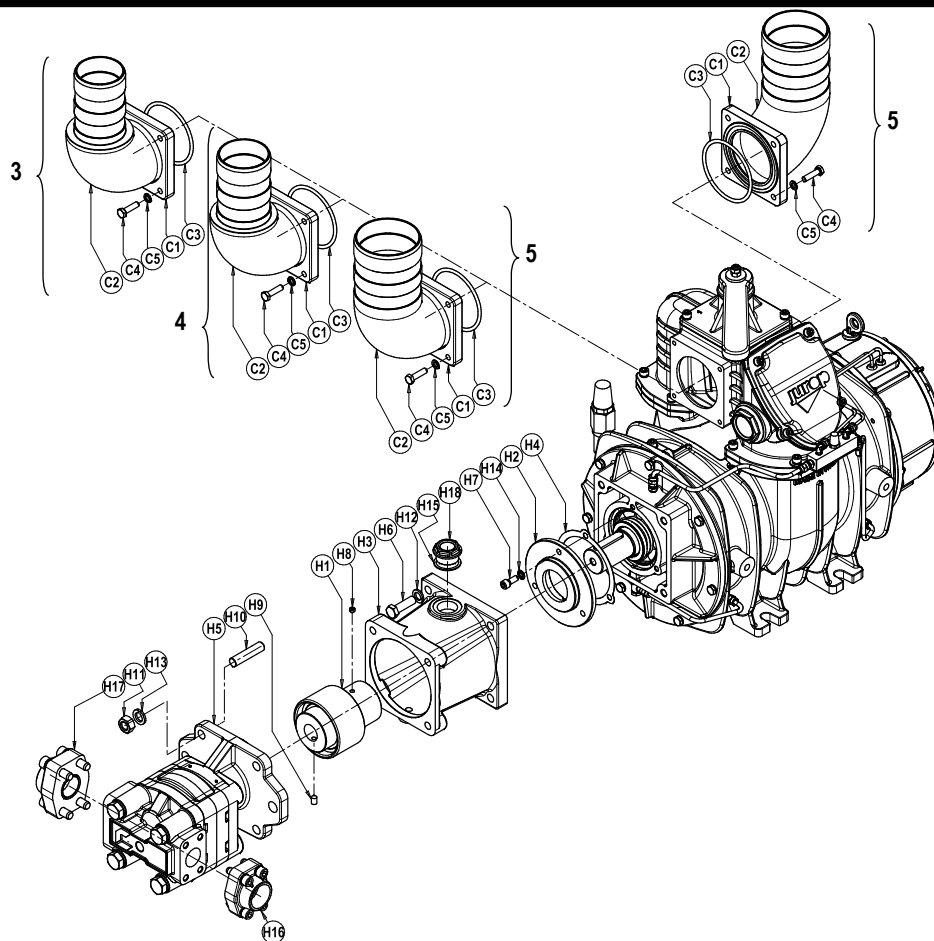
**PNR 142 WITH MULTIPLIER**



PICTURE SHOWS  
PNR 142 M (WITH SIDE MOUNTED TANK)  
COD. A483209440

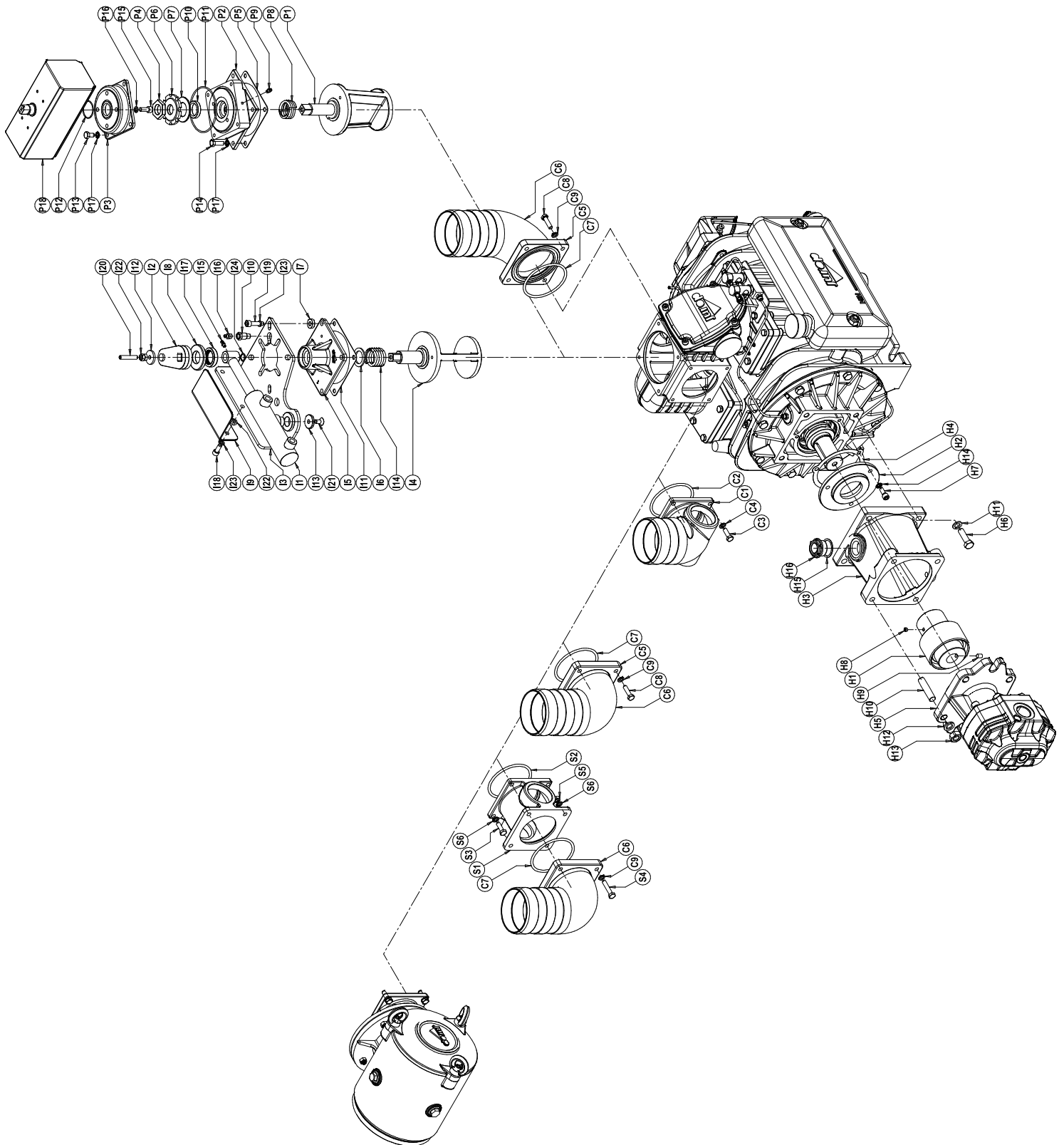
**PNR 142 with multiplier**

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	1401200700	OIL DRIPPER	2	52	1691000000	CONVEYOR SPRING	1
2	1493300200	AIR INJECTION VALVE 1/2"	2	53	18930008E0	CLAPET	1
3	1601605200	VANE	5	54	4022200030	SEAL	1
4	1605500100	HANDLE	1	55	4022200040	SEAL 72X40X10	1
5	1608100000	DISTRIBUTOR	1	56	4022200113	SEAL 70X55X15	2
6	1608502500	CONVEYOR	1	57	4022200311	OR 4975	2
7	1610507900	FLANGE	1	58	4022300001	FILTER	2
8	1610508100	FLANGE	1	59	4022301004	FILTER	2
9	1610512900	FLANGE	1	60	4023100018	BEARING 6206	1
10	1612503000	GEARBOX	1	61	4023100040	BEARING 6308	1
11	1621503200	ROTOR	1	62	4023100150	BEARING 6309	2
12	1622002600	SHAFT M10	1	63	4023130035	BUSHING 55X45X22	2
13	1623100500	CONVEYOR CAP	1	64	4024251000	OIL PUMP (RIGHT)	1
14	162409YKBO	SPACER	1		4024251500	OIL PUMP (LEFT)	1
15	1624042800	SPACER	2	65	4026101301	SCREW TE M6X10 ZINC.	2
16	1624202300	SPACER	1	66	4026102804	SCREW TE M8X16 ZINC.	3
17	16275007E0	MANIFOLD	1	67	4026102807	SCREW TE M8X25 ZINC.	13
18	16401008E0	CLAPET CAP	1	68	4026102808	SCREW TE M8X30 ZINC.	9
19	1642100200	REAR COVER	1	69	4026102907	SCREW TE M10X25 ZINC.	13
20	1642600100	SHAFT PROTECTION	1	70	4026120506	SCREW TCEI M10X30 ZINC.	1
21	1650012800	FRONT SHAFT	1	71	4026121305	SCREW TCEI M6X16 ZINC.	2
22	1650022900	REAR SHAFT	1	72	4026121401	SCREW TCEI M8X12 ZINC.	2
23	1651005200	GEAR	1	73	4026121407	SCREW TCEI M8X25 ZINC.	8
24	1651005300	PINION Z 25	1	74	4026121710	SCREW TCEI M12X35 ZINC.	2
25	1663014000	PIPELINE	1	75	4026121813	SCREW TCEI M10X50 ZINC.	2
26	1663065800	PIPELINE	1	76	4026135414	SCREW M8X45 ZINC.	1
27	1663066000	PIPELINE	1	77	4026135504	SCREW M10X10 ZINC.	1
28	1663066300	PIPELINE	1	78	4026155505	SCREW TSPEI M5X16 ZINC.	4
29	1663066400	PIPELINE	1	79	4026155605	SCREW TSPEI M6X16 ZINC.	4
30	1663066500	PIPELINE	1	80	4026171211	SCREW M12X80 ZINC.	2
31	1663066700	PIPELINE	1	81	4026300025	COMPENSATION RING	2
32	1672001600	SCREW TCEI M10X1,5	10	82	4026305508	NUT M12	2
33	1673001000	FITTING	2	83	4026306115	NUT M36X3	1
34	1680609700	GASKET	1	84	4026308005	NUT M 8	2
35	1680610200	GASKET	2	85	4026350505	WASHER GROWER 8 GALV.	20
36	16807011E0	GASKET	1	86	4026350506	WASHER GROWER 10 GALV.	2
37	1680707200	GASKET	1	87	4026350508	WASHER GROWER 12 GALV.	2
38	1680707300	GASKET	1	88	4026351504	WASHER 6 GALV.	4
39	1680707800	GASKET	1	89	4026351505	WASHER 8 GALV.	10
40	1681006500	PLATE	1	90	4026351506	WASHER 10 GALV.	13
41	1681006600	PLATE	2	91	4026356002	WASHER 8X24 GALV.	3
42	1681100200	PLATE	1	92	4026357007	WASHER M12 GALV.	2
43	1684000000	PLUG 3/8	5	93	4026501004	TAB 12X8X45	1
44	1685002800	WASHER 30X8,5 ZINC.	1	94	4026701301	FITTING 1/2X18	2
45	1685100000	WASHER	2	95	4026702000	FITTING 4X1/8	6
46	1685100100	WASHER	1	96	4026706000	FITTING UNIV.90° 4X1/8	2
47	1685100200	WASHER	5	97	4026706003	FITTING UNIV.90° 6X1/8	2
48	1685100300	WASHER	2	98	4026706101	FITTING 4-1/8	2
49	1685100800	WASHER	2	99	4026904503	PLUG	1
50	1687509500	HOUSING PNR 142 SL	1	100	4026910103	PLUG	1
51	1687600000	OIL TANK	1	101	4026910601	PLUG 1/8"	2

**PNR/PNE 104-124 HDR AND ACCESSORIES**

**PNR/PNE 104-124 HDR and accessories**

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
H1	1470102300	COUPLING	1	3	1852103800	TURNING CONVEYOR Ø76	
H2	1610021600	HDR FLANGE	1	C1	1610101100	CONVEYOR FLANGE	1
H3	1612501000	BRACKET HDR	1	C2	1627102800	CONVEYOR	1
H4	1680707300	GASKET	1	C3	4022200310	OR	1
H5	4024107009	HDR MOTOR PNR104	1	C4	4026102808	SCREW TE M8X30 GALV.	4
	4024107001	HDR MOTOR PNR124	1	C5	4026350706	WASHER GROWER M8 GALV.	4
H6	4026103004	SCREW M12X40 GALV.	4	4	1852103900	TURNING CONVEYOR Ø80	
H7	4026121405	SCREW M8X20 GALV.	3	C1	1610101100	CONVEYOR FLANGE	1
H8	4026136003	SCREW M8X8	1	C2	1627102700	CONVEYOR	1
H9	4026136006	SCREW M8X14	1	C3	4022200310	OR	1
H10	4026171304	SCREW M14X40	4	C4	4026102808	SCREW TE M8X30 GALV.	4
H11	4026308008	NUT M14 ESAG. GALV.	4	C5	4026350706	WASHER GROWER M8 GALV.	4
H12	4026350709	WASHER GROWER 12 GALV.	4	5	1852104000	TURNING CONVEYOR Ø100	
H13	4026350710	WASHER GROWER 14 GALV.	4	C1	1610101100	CONVEYOR FLANGE	1
H14	4026350909	WASHER M8	3	C2	1627102400	CONVEYOR	1
H15	4026359001	WASHER D.E.40X33,5X1,5	1	C3	4022200310	OR	1
H16	4026711003	FLANGE ASF 104G 1"1/4	1	C4	4026102808	SCREW TE M8X30 GALV.	4
H17	4026711004	FLANGE AFS 106G 1"1/2	1	C5	4026350706	WASHER GROWER M8 GALV.	4
H18	4026904003	PLUG 1" GALV.	1				

**PNR 142 HDR AND ACCESSORIES**



**PNR 142 HDR and accessories**

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
H1	1470103200	COUPLING	1	P11	4022200330	OR 3375	1
H2	1610021600	HDR FLANGE	1	P12	4022200331	OR 2137	1
H3	1612501000	BRACKET HDR	1	P13	4026102804	SCREW M8X16	4
H4	1680707300	GASKET	1	P14	4026102807	SCREW M8X25	4
H5	4024107004	HDR MOTOR	1	P15	4026121405	SCREW M8X20	4
H6	4026103004	SCREW M12X40	4	P16	4026350505	WASHER GROWER M8	4
H7	4026121405	SCREW M8X20	3	P17	4026351505	WASHER M8	8
H8	4026136003	SCREW M8X8	1	P18	4027100405	PNEUMATIC ACTUATOR	1
H9	4026136006	SCREW M8X14	1	P19	4027421206	FITTING	2
H10	4026141304	SCREW M14X40	4				
H11	4026350709	WASHER GROWER M12	4	<b>8</b>	<b>1852103400</b>	<b>FIXED CONVEYOR Ø80</b>	
H12	4026350710	WASHER GROWER M14	4	C1	1627101300	CONVEYOR Ø80	1
H13	4026308008	NUT M14	4	C2	4022200310	OR 6362	1
H14	4026350505	WASHER GROWER M8	3	C3	4026102807	SCREW M8X25	4
H15	4026359001	WASHER	1	C4	4026350706	WASHER GROWER M8	4
H16	4026904003	PLUG 1"	1				
<b>6</b>	<b>143029KRB0</b>	<b>KIT HYDRAULIC ACTUATOR</b>		<b>9</b>	<b>1852103500</b>	<b>FIXED CONVEYOR Ø100</b>	
I1	143027T6B0	HYSRAULIC ACTUATOR	1	C1	1627101200	CONVEYOR Ø100	1
I2	15020A10B0	ACTUATOR LEVER	1	C2	4022200310	OR 6362	1
I3	151307TJB0	ACTUATOR SUPPORT	1	C3	4026102807	SCREW M8X25	4
I4	1608502500	CONVEYOR	1	C4	4026350706	WASHER GROWER M8	4
I5	1623100500	FLANGE	1	<b>4</b>	<b>1852103900</b>	<b>TURNING CONVEYOR Ø80</b>	
I6	162409YKB0	SPACER	1	C1	1610101100	CONVEYOR FLANGE	1
I7	1624043400	SPACER	1	C2	1627102700	CONVEYOR	1
I8	1624202300	SPACER	1	C3	4022200310	OR	1
I9	164206XYB0	PROTECTION	1	C4	4026102808	SCREW TE M8X30 GALV.	4
I10	1673009700	GREASING NIPPLE	1	C5	4026350706	WASHER GROWER M8 GALV.	4
I11	1680707800	GASKET	1				
I12	1685002800	WASHER 30X8.5X4	1	<b>5</b>	<b>1852104000</b>	<b>TURNING CONVEYOR Ø100</b>	
I13	168509U0B0	WASHER	1	C1	1610101100	CONVEYOR FLANGE	1
I14	1691000000	SPRING	1	C2	1627102400	CONVEYOR	1
I15	4022100100	GREASER M6X1	1	C3	4022200310	OR	1
I16	4022100107	GREASER	1	C4	4026102808	SCREW TE M8X30 GALV.	4
I17	4022200030	SEAL	1	C5	4026350706	WASHER GROWER M8 GALV.	4
I18	4026121405	SCREW M8X20	2				
I19	4026121408	SCREW M8X35	4	<b>10</b>	<b>185212L4B0</b>	<b>KIT SUCTION FILTER</b>	
I20	4026135414	SCREW M8X45	1				
I21	4026155705	SCREW M8X16	1				
I22	4026308005	NUT M8	4				
I23	4026350505	WASHER GROWER M8	6				
I24	4026510012	SEEGER	1				
<b>7</b>	<b>143028G1B0</b>	<b>KIT PNEUMATIC ACTUATOR</b>					
P1	160858KBB0	CONVEYOR	1				
P2	161258H0B0	ACTUATOR SUPPORT	1				
P3	1640580QB0	ACTUATOR COVER	1				
P4	167007ZAB0	CONVEYOR NUT	1				
P5	1680707800	GASKET	1				
P6	168409PQB0	RING NUT	1				
P7	168529TFB0	SPACER	1				
P8	1691000200	CONVEYOR SPRING	1				
P9	4022100100	IGREASING NIPPLE M6X1	1				
P10	4022200005	Y-SEAL 37X27X7	1				



<b>Model</b>	<b>Issue date</b>	<b>Revision No.</b>	<b>Revision date</b>	<b>Filled out by</b>	<b>Viewed by</b>
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Juop SpA reserves the right to modify the products described in this manual without prior notice.