





Operating
and maintenance
manual for sliding
vanes vacuum pumps



Index

1. General advises

- 1.1 Introduction pag. 2
- 1.2 Request of spare parts pag. 2

2. Technical specifications

- 2.1 Technical data/Overall dimensions mod. PN...D pag. 3
- 2.2 Technical data/Overall dimensions mod. PN...M pag. 4
- 2.3 Technical data/Overall dimensions mod. PN...FL pag. 5

3. Safe-operating prescriptions

- 3.1 General suggestions pag. 6
- 3.2 Normal running of the pump pag. 6

4. Installation

- 4.1 Checking at arrival of goods pag. 7
- 4.2 Pump mounting / Drive connection pag. 7
- 4.3 Layout of vacuum line pag. 8

5. Starting-up instructions

- 5.1 Oil level checking pag. 9
- 5.2 Lubrication checking pag. 9
- 5.3 Vacuum / Pressure changeover valve pag. 9

6. Maintenance

- 6.1 Ordinary maintenance pag.10
- 6.2 Extraordinary maintenance pag.10
- 6.3 Trouble-shooting pag.11

1. General advises

1.1 Introduction

This booklet contains the necessary instructions for a correct installation, running test, normal use and maintenance of the pump as well as practical suggestions for safe operating.

The knowledge of the following will give trouble free operation for a long time.

It is recommended to:

- read and apply closely the instructions before running the pump.
- keep the booklet at hand and have it known to all operators.

1.2 Request of spare parts

To avoid mistakes when ordering the spare parts make sure you indicate:

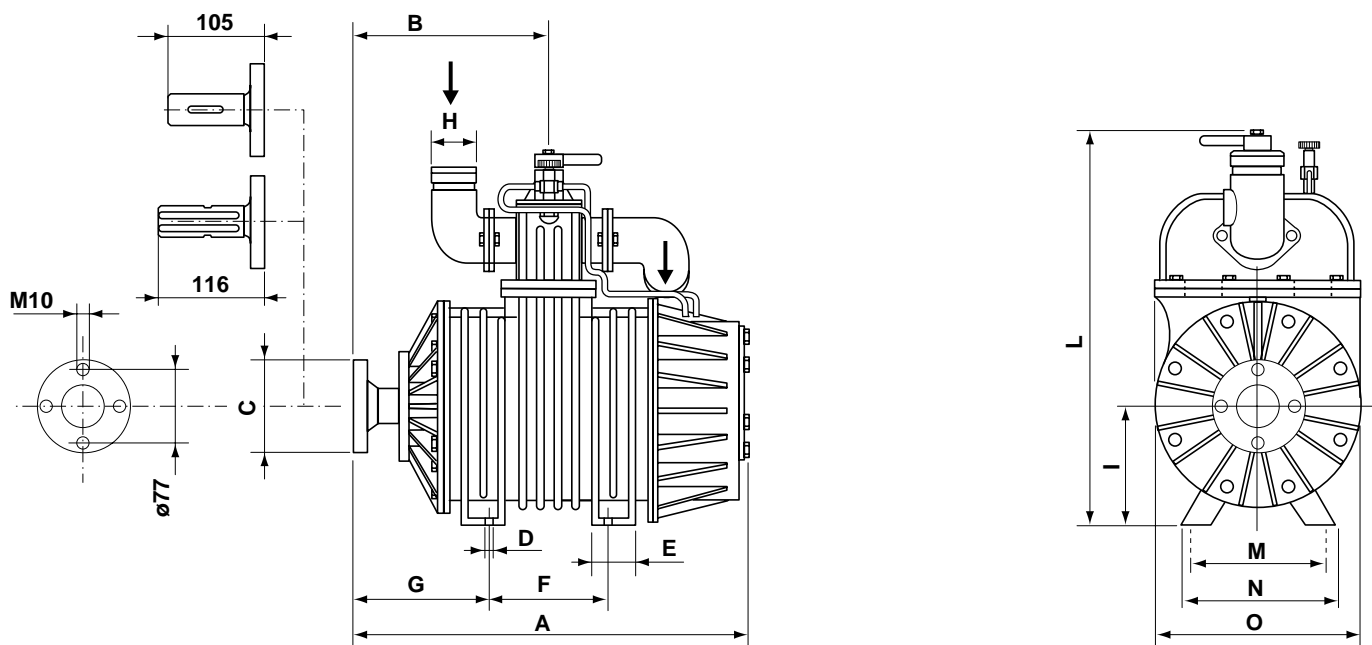
- | | | |
|----------------------------------|---|----------------------|
| a) the model of the pump | } | See pump label |
| b) the serial number of the pump | | |
| c) the denomination of the part | } | See spare parts list |
| d) the number of the pieces | | |
| e) the code of the part | | |

Example:

- a) PN 106 M
- b) X50012
- c) Rotor vane
- d) N° 4 pieces
- e) 16016.010.00

2. Technical specifications

2.1 Technical data / Overall dimensions mod. PN...D



AIR COOLED VACUUM PUMPS-PN SERIES

Performances at 1300 R.P.M.-max. speed

Model		PN 23D	PN 33D	PN 45D	PN 58D	PN 84D	PN106D	PN 125D
Air flow - l./min.	Free air	2600	3600	5300	6500	9000	11000	13200
	60% vacuum	2100	2900	4500	5800	8100	10000	12000
Max vacuum - %		90	90	92	92	92	92	92
Max operating rel. pressure (abs.) - bar		0,5 (1,5)	0,5 (1,5)	0,5 (1,5)	0,5 (1,5)	0,5 (1,5)	0,5 (1,5)	0,5 (1,5)
Power required at 0,5 bar rel. (1,5 abs.) - kW		3,3	4,5	5,8	6,6	11,2	13,6	18,8
Weight - Kg.		53	63	90	102	115	143	190
Oil consumption g/h-drops/min total		65/40	80/45	90/50	90/50	115/65	135/80	150/95
Oil tank capacity - l.		1,2	1,2	2,3	2,3	2,3	2,3	4
Sound level at 60% vac. 7 m. dist. - dB (A) - with silencer		77	74	76	77	81	84	84

Dimensions in mm.

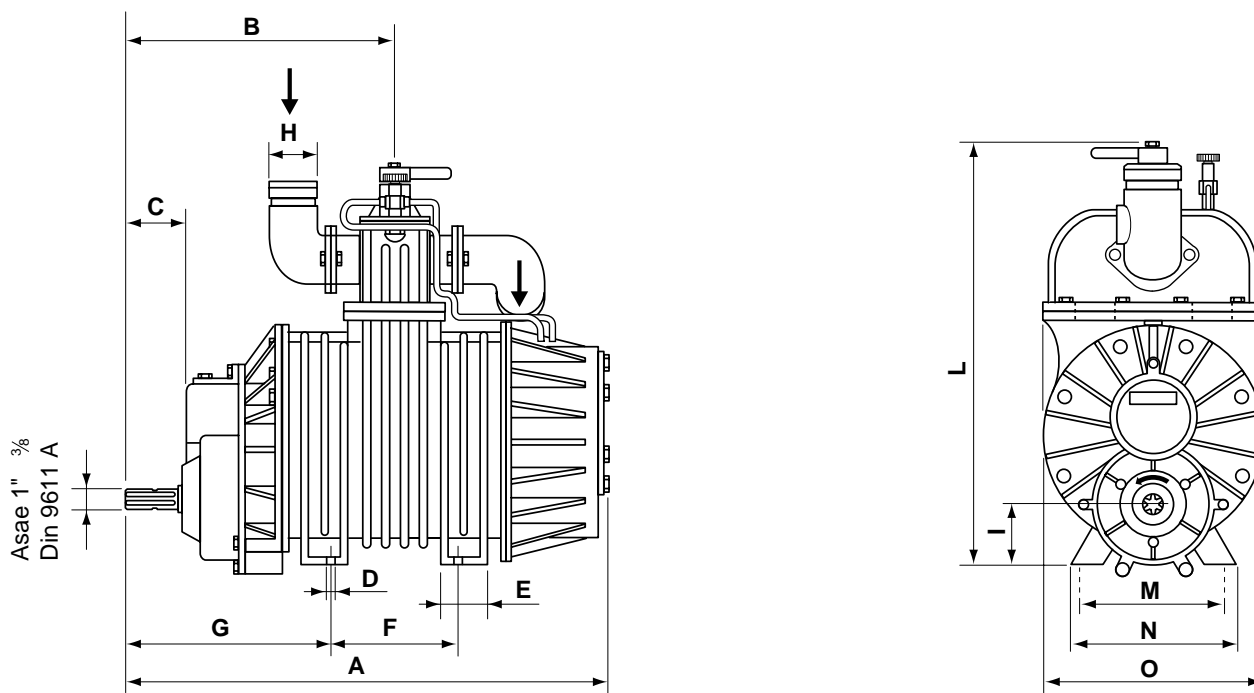
Model	A	B	C	D	E	F	G	H	I	L	M	N	O
PN 23D	466	276	98	16	60	92	226	60	135	408	170	195	215
PN 33D	546	306	98	16	60	160	226	60	135	415	170	195	215
PN 45D	426	206	98	16	50	140	131	60/76/80	150	508	240	270	275
PN 58D	486	226	98	16	80	190	136	60/76/80	175	538	240	270	275
PN 84D	586	276	98	16	80	190	186	60/76/80	150	518	240	270	275
PN 106D	676	321	98	16	70	290	181	60/76/80	175	538	250	285	290
PN 125D	766	426	98	16	95	300	271	100	110	590	275	320	320

LIST OF RECOMMENDED OILS

Pump housing lubrication

Brand/Type	Environment temperature 5°±30° C ISO 46	Environment temperature > 40° C ISO 150
AGIP	Radula 46	Radula 150
ESSO	Nuray 46	Nuray 150
SHELL	Vitrea 46	Vitrea 150
ELF	Movixa 46	Movixa 150
MOBIL	Rubrex 300	Rubrex 900
BP	Energol CS 46	Energol CS 150

2.2 Technical data / Overall dimensions mod. PN...M



AIR COOLED VACUUM PUMPS-PN SERIES

Performances at 540 R.P.M.-max. speed

Model		PN 23M	PN 33M	PN 45M	PN 58M	PN 84M	PN106M	PN 125M
Air flow - l./min.	Free air	2600	3600	5300	6500	9000	11000	13200
	60% vacuum	2100	2900	4500	5800	8100	10000	12000
Max vacuum - %		90	90	92	92	92	92	92
Max operating rel. pressure (abs.) - bar		0,5 (1,5)	0,5 (1,5)	0,5 (1,5)	0,5 (1,5)	0,5 (1,5)	0,5 (1,5)	0,5 (1,5)
Power required at 0,5 bar rel. (1,5 abs.) - kW		3,3	4,5	5,8	6,6	11,2	13,6	18,8
Weight - Kg.		55	65	90	102	115	143	190
Oil consumption g/h-drops/min total		65/40	80/45	90/50	90/50	115/65	135/80	150/95
Oil tank capacity - l.		1,2	1,2	2,3	2,3	2,3	2,3	4
Sound level at 60% vac. 7 m. dist. - dB (A) - with silencer		77	74	76	77	81	84	84

Dimensions in mm.

Model	A	B	C	D	E	F	G	H	I	L	M	N	O
PN 23M	475	280	87	16	60	92	235	60	58	408	170	195	215
PN 33M	555	320	87	16	60	160	235	60	58	415	170	195	215
PN 45M	535	310	87	16	50	140	240	60/76/80	50	508	240	270	275
PN 58M	595	340	87	16	80	190	245	60/76/80	72	538	240	270	275
PN 84M	695	390	87	16	80	190	295	60/76/80	50	518	240	270	275
PN 106M	785	435	87	16	70	290	290	60/76/80	72	538	250	285	290
PN 125M	760	420	87	16	95	300	265	100	110	590	275	320	320

LIST OF RECOMMENDED OILS

Pump housing lubrication

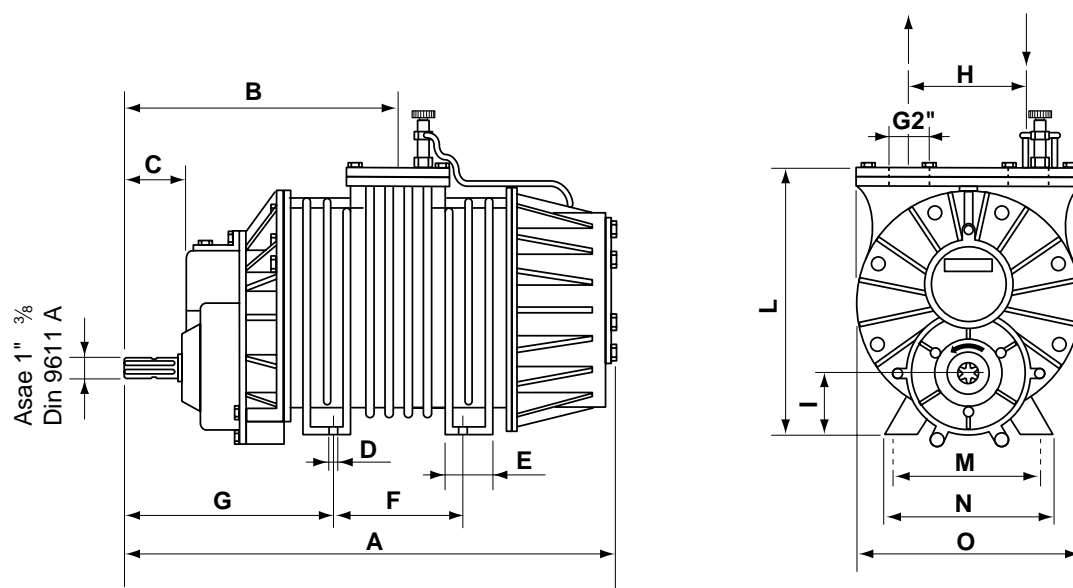
Brand/Type	Environment temperature 5°±30° C ISO 46	Environment temperature > 40° C ISO 150
AGIP	Radula 46	Radula 150
ESSO	Nuray 46	Nuray 150
SHELL	Vitrea 46	Vitrea 150
ELF	Movixa 46	Movixa 150
MOBIL	Rubrex 300	Rubrex 900
BP	Energol CS 46	Energol CS 150

LIST OF RECOMMENDED OILS

Lubrication of gear box

Brand/Type	ISO 220
AGIP	Blasia 220
ESSO	Spartan EP 220
SHELL	Omala oil 220
ELF	Reductelf SP 220
MOBIL	Mobilgear 630
BP	Energol GR XP 220

2.3 Technical data / Overall dimensions mod. PN...FL



AIR COOLED VACUUM PUMPS-PN SERIES

Performances at 540 R.P.M.-max. speed

Mod.		PN 45FL	PN 58FL	PN 84FL	PN 106FL
Air flow - l./min.	Free air	5300	6500	9000	11000
	60% vacuum	4500	5800	8100	10000
Max vacuum - %		92	92	92	92
Max operating rel. pressure (abs.) - bar		3 (4)	3 (4)	3 (4)	3 (4)
Max operating rel. pressure for 5 min. (abs) - bar		1,5 (2,5)	1,5 (2,5)	1,5 (2,5)	1,5 (2,5)
Power at 0,5 bar rel. (1,5 abs.) - kW		5,8	6,6	11,2	13,6
Weight - Kg.		84	95	108	136
Oil consumption g/h-drops/min total		90/50	90/50	115/65	135/80
Oil tank capacity - l.		2,3	2,3	2,3	2,3
Sound level at 60% vac. 7 m. dist. - dB (A) - with silencer		76	77	81	84

Dimensions in mm.

Mod.	A	B	C	D	E	F	G	H	I	L	M	N	O
PN 45FL	535	310	87	16	50	140	240	145	50	315	240	270	275
PN 58FL	595	340	87	16	80	190	245	145	72	345	240	270	275
PN 84FL	695	390	87	16	80	190	295	145	50	325	240	270	275
PN 106FL	785	435	87	16	70	290	290	145	72	345	250	285	290

LIST OF RECOMMENDED OILS

Pump housing lubrication

Brand/Type	Environment temperature 5°±30° C ISO 46	Environment temperature > 40° C ISO 150
AGIP	Radula 46	Radula 150
ESSO	Nuray 46	Nuray 150
SHELL	Vitrea 46	Vitrea 150
ELF	Movixa 46	Movixa 150
MOBIL	Rubrex 300	Rubrex 900
BP	Engelol CS 46	Engelol CS 150

LIST OF RECOMMENDED OILS

Lubrication of gear box

Brand/Type	ISO 220
AGIP	Blasia 220
ESSO	Spartan EP 220
SHELL	Omala oil 220
ELF	Reductelf SP 220
MOBIL	Mobilgear 630
BP	Engelol GR XP 220

3. Safe operating and accident prevention

3.1 General suggestions

- Ordinary and extraordinary maintenance has to be done while the unit is stopped and the drive disconnected.
- Interventions on pneumatic plants have to be done after disconnecting pressure/vacuum from the same.
- Never start the pump if adequate/foreseen safety devices are not installed.
Damaged protections must be immediately replaced.
- Be aware that during operation the pump's body can reach temperature of over 60° centigrade.
Possibility of burnings if this warning is missacted.



Maximum speed shown in the technical specifications tables must not be exceeded.

3.2 Normal use

- Vacuum pumps of the PN-series used for the suction of liquids are foreseen for a max pressure of + 1,5 bar (2,5 for "FL" model) and a max vacuum rate of 92 %.
As cooling is given by atmospheric air, pumps are foreseen for non-continuous duty; suggested uninterrupted working-time: about 15 minutes (free air).
Overheating of the pump will cause serious damages of the same and/or blocking of the rotor.

4. Installation

4.1 Checking at arrival

- upon receipt check that the pump and related accessories are not damaged.
- Check that the rotor/shaft is not blocked.

4.2 Pump mounting / Drive connection

- The pump must be installed so that it is easily accessible for inspection and maintenance.
- The vacuum pump must be installed on a rigid base or stand. The drive can be by cardan shaft, belts and pulley or by hydraulic motor.
- The cardan shaft must be mounted so that it does not create any axial thrust; the inclination of the shaft must not exceed 15° (see fig. 1).
- When using the belts and pulley, the pulley can be mounted directly on the rotor shaft except for PN 125 . For model PN 125 pumps the pulley must be mounted with the suitable support, supplied by JUROP. The alignment between the pulley of the pump and the driving pulley must be thoroughly checked. The V-belts tension must be normal, that means the belts must flex for about 2 cm. under the thumb pressure.
- With the hydraulic transmission the motor must be connected by means of a support and a flexible joint.

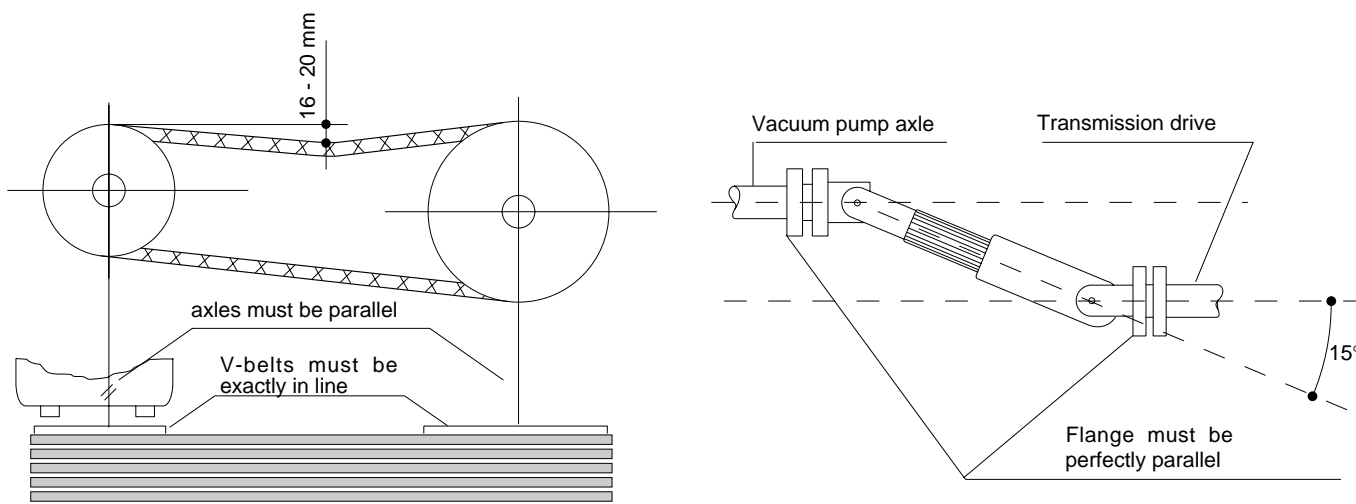


The transmission must be protected according to current safety standards (for Europe 89/392 CEE standards).



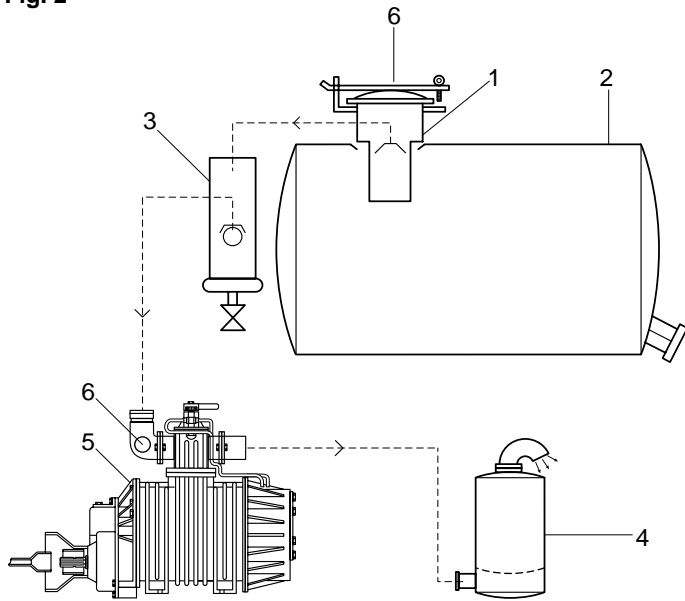
Check that the actual shaft rotation direction matches that of the arrow on the label fixed on the front of the pump.

Fig. 1



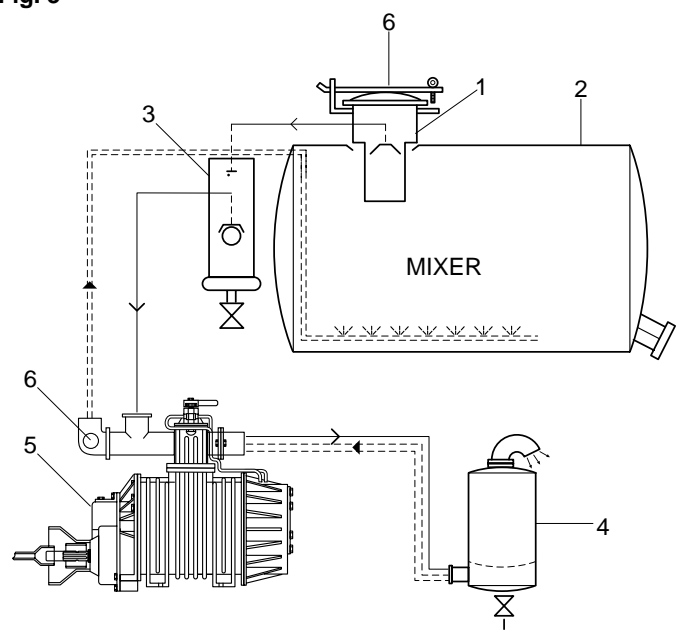
4.3 Layout of vacuum line

Fig. 2



PN PUMP WITH STANDARD MANIFOLD

Fig. 3



PN PUMP WITH MIXER MANIFOLD

Legend

- | | |
|---|---------------------|
| 1 | Primary shutoff |
| 2 | Tank |
| 3 | Secondary shutoff |
| 4 | Silencer + oil trap |
| 5 | Vacuum pump "PN" |
| 6 | Safety relief valve |

- The mounting of a secondary shutoff (pos. 3) is suggested, in-between the pump and the tank, for protecting the vacuum pump.
- A silencer (pos. 4) is suggested in order to reduce sound level.



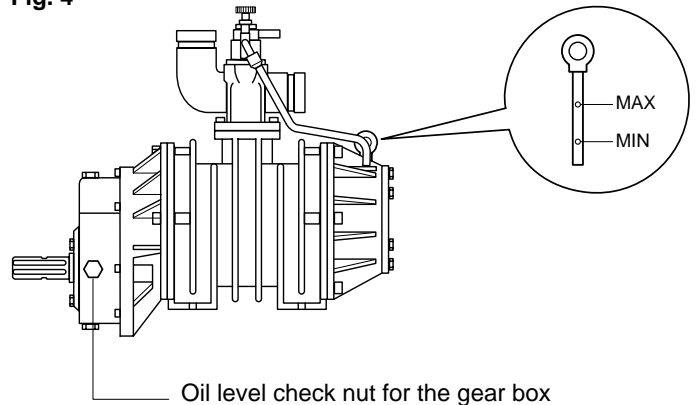
The application of a safety relief valve and a vacuum relief valve on the tank or along the suction line must be foreseen.

5. Starting-up instructions

5.1 Oil level checking

- Before starting-up the pump, check by the oil dip-stick the level of the oil (fig. 4). If refill is needed only the recommended oils must be used (see par. 2). Also the oil level in the gear box must be checked and it must reach the oil level check-nut.

Fig. 4



5.2 Lubrication checking

- When the pump is running, check the correct flow of the oil through the sight glasses of the drip oilers (oil drops must flow regulary). In case of adjustment of oil, the drops must be at least in number

of 30 a minute in each drip oiler (oil flow will increase by turning the adjusting pin on the drip oiler counterclockwise and will decrease by turning it clockwise). For oil consumption see paragraph 2.

5.3 Vacuum / Pressure changeover valve

- Rotating the handle of the 4 way valve (pos. 1÷2 - See following figure) the pump changes over from vacuum to pressure (or viceversa).



As the pump can be connected to the vacuum tank with both the front (drive side) connection or the rear (oil tank side) connection in order to avoid mistakes see the following table "Vacuum-Pressure"

Manifold	Drive	Handle pos.	Pump function	Connection to the tank
Standard	Direct drive Left	1	Pressure	
	Gear box Right	2	Vacuum	
	Direct drive Right	1	Vacuum	
	Gear box Left	2	Pressure	
Mixer	Direct drive Left	1	Vacuum	
	Gear box Right	2	Pressure	
	Direct drive Right	1	Pressure	
	Gear box Left	2	Vacuum	

- JUROP pumps are normally assembled to be connected to the tank by the front connection (see fig. 2-3 page 8).

- **Left** hand drive means counterclockwise rotation and **Right** hand drive means clockwise rotation, looking at the pump from the shaft side.



In case the pump is connected to the tank with the rear connection (oil tank side) the functions "Vacuum - Pressure" will be reversed.



Be aware not to place the handle in neutral position (half way between the two end positions) otherwise the pump will be by-passed (actually runs idle)

6. Maintenance

6.1 Ordinary maintenance

- a) Re-fill periodically the lubrication oil tank.
- b) Change at least once a year the oil in the reduction-box and/or gear-box (see chart at point 2).
- c) Clean the sight-glasses of the drip-oilers.
- d) Check that the drive protections are properly fixed.
- e) On direct-drive models grease the front ball-bearing (see pos. 1 fig. 6-7-8).

6.2 Extraordinary maintenance

Changing of the sliding-vanes:

- a. Remove the front flange as shown in fig. 6-7 and 8.
- b. Lubricate the new vanes and insert them after removal of the old ones.

- c. Replace all the gaskets and seals (ask for the suitable "Gasket Kit").

DISASSEMBLY OF PUMPS

Fig. 6-PN 45÷106

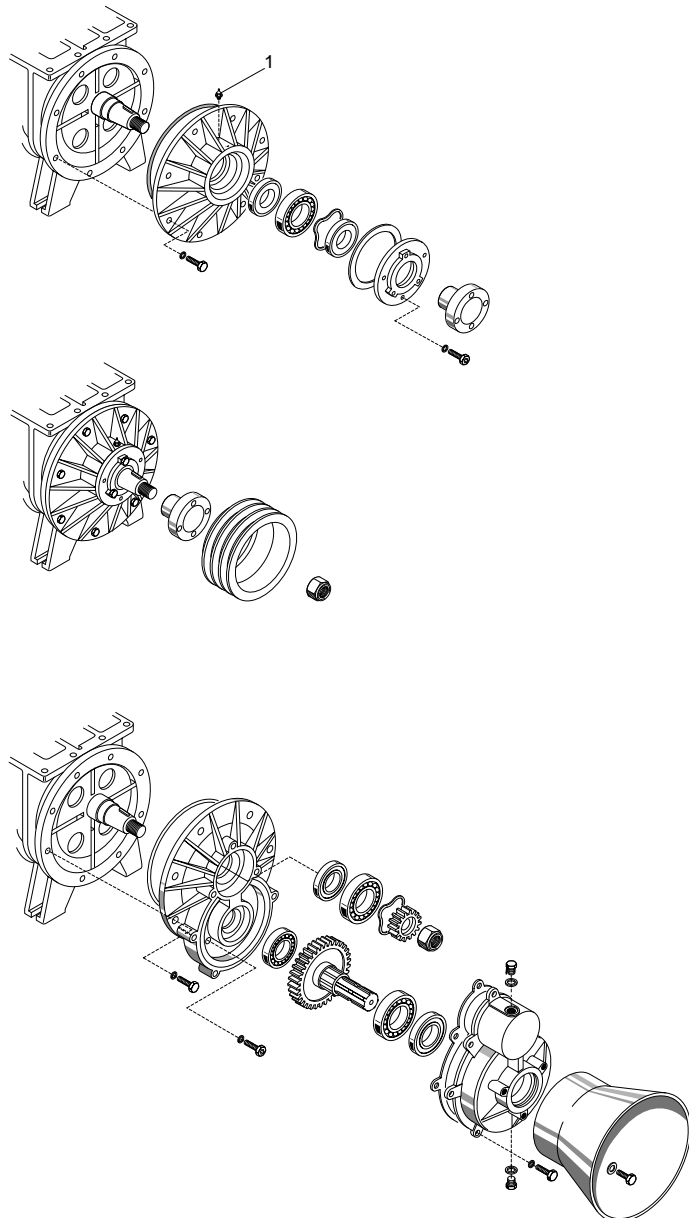


Fig. 7-PN 23÷33

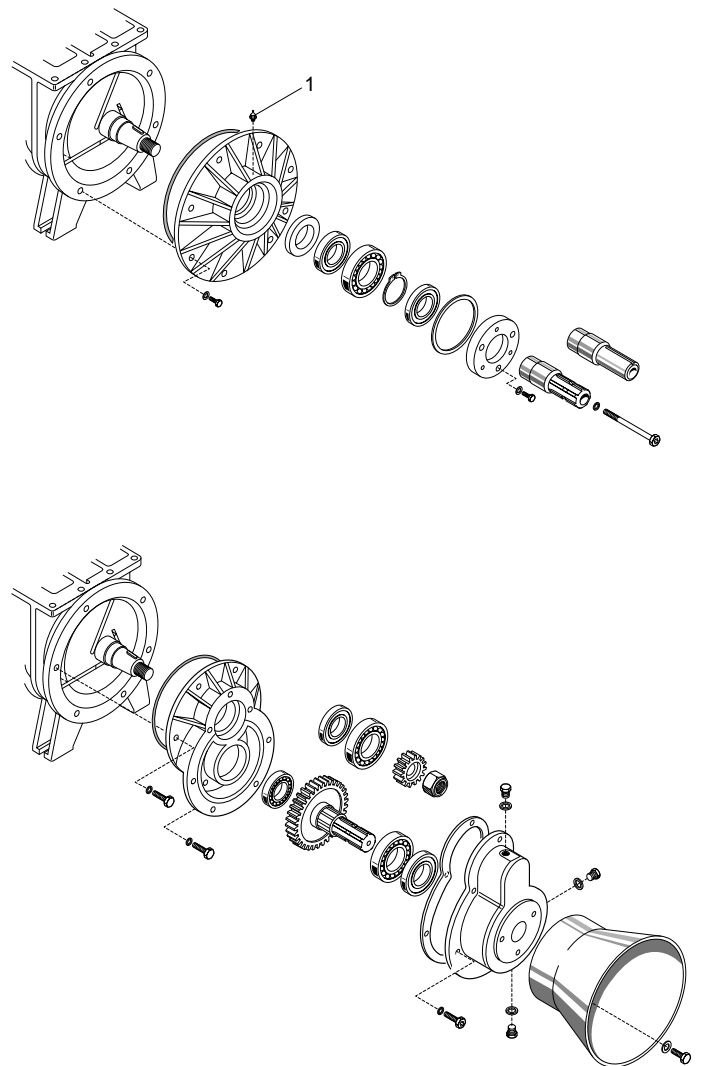
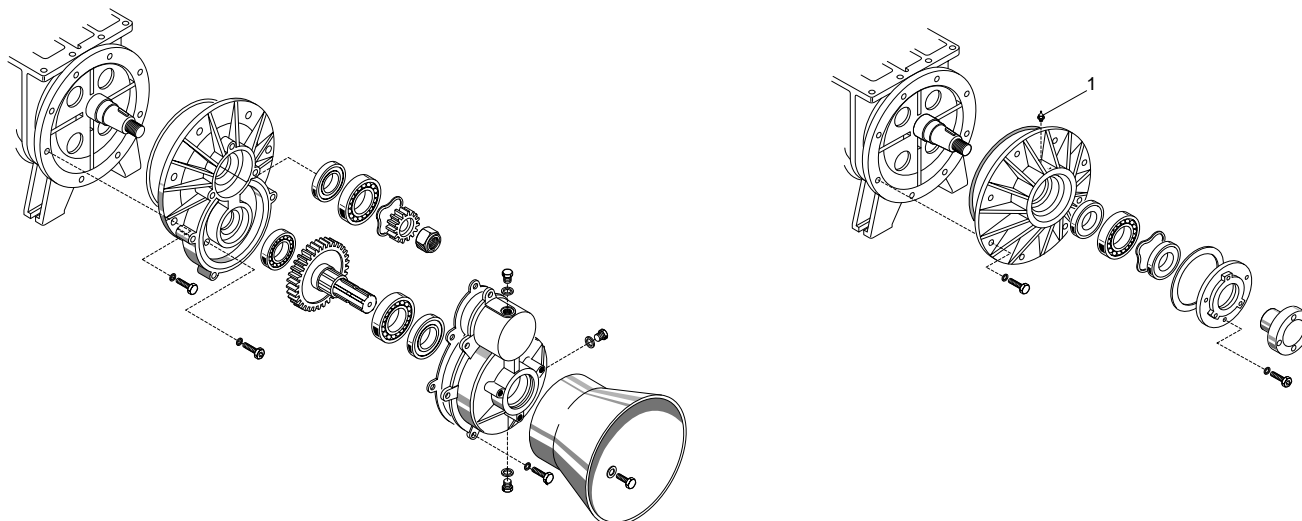


Fig. 8-PN 125



6.3 Trouble-shooting

Troubles

A - Overheating of the pump	
CAUSE	CORRECTION
- Faulty lubrication	- Check the lubrication
- Oil missing	- Re-fill the tank
- Revs. to high	- Reduce revs.
- Operation-time to long	- Stop the pump for a while and let it cool down or operate at lower vacuum rate

B - Pump consumes too much oil	
CAUSE	CORRECTION
- Drip-oiler/s badly adjusted	- Adjustment as described
- Oiler's pin not sealing	- Clean the related seat

C - The pump is blocked	
CAUSE	CORRECTION
- Broken vanes due to suction of foreign objects or bad lubrication	- Dismount the pump and replace damaged parts. Check primary shut-off and lubrication system.
- Frozen pump	- Unfreeze the vacuum pump
- Damaged drive system	- Check and replace damaged parts
- Flange bolts to tight	- Loosen the bolts

D - Little or no vacuum or pressure in the tank

CAUSE	CORRECTION
- Change-over lever in neutral position	- Place lever in right position as shown at point 5-3.
- Worn sliding-vanes	- Replace the vanes
- Loose check-valve	- Replace the valve
- Worn sealing rings	- Replace the rings
- Blocked vacuum pump	- See previous instructions
- Leaking of the gate-valves on the tank	- Tighten the valves
- Leaking of the seals	- Repair or replace the seals
- Primary shut-off blocked	- Dismount and clean the parts
- Clogged connecting pipeline	- Clean the steel pipelines or replace the rubber ones



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