



# VL Series Manual



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## 1 TECHNICAL FEATURES

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 in conformity with the legislation in force.

The most important points are indicated with the following symbols:



**DANGER:** The texts preceded by this symbol provide safety norms whose non-observance may gravely harm persons.



**WATCH OUT!:** The texts preceded by this symbol provide safety norms, failure to comply with which may damage either the pump or the transmission.



**ENVIRONMENT PROTECTION:** The texts preceded by this symbol provide suggestions for an environmentally-friendly use and maintenance of the pump.



**USEFUL SUGGESTIONS:** The texts preceded by this symbol provide useful advice to make the machine's use easier.

### ATEX directive

The ATEX EC/94/9 directive defines the essential requirements for protection apparatuses and systems destined for being used in a potentially explosive atmosphere such as gas, steams, fogs and inflammable dusts. The VL series pumps marked with the Ex symbol are classed for employment in potentially explosive atmospheres defined group II, category 2 and 3 by the ATEX EC/94/9 directive.



**ATEX CONFORMITY:** The texts preceded by this symbol provide compulsory rules regarding installation, employment and maintenance of the ATEX-certified pumps. **Observe the data provided on the little embossed metal plate. Observe peremptorily the directions this maintenance manual provides.**

Non-observance forfeits all the requirements fixed by the directive, and releases the manufacturer from all liability resulting from the employment of the machine in a potentially explosive atmosphere.

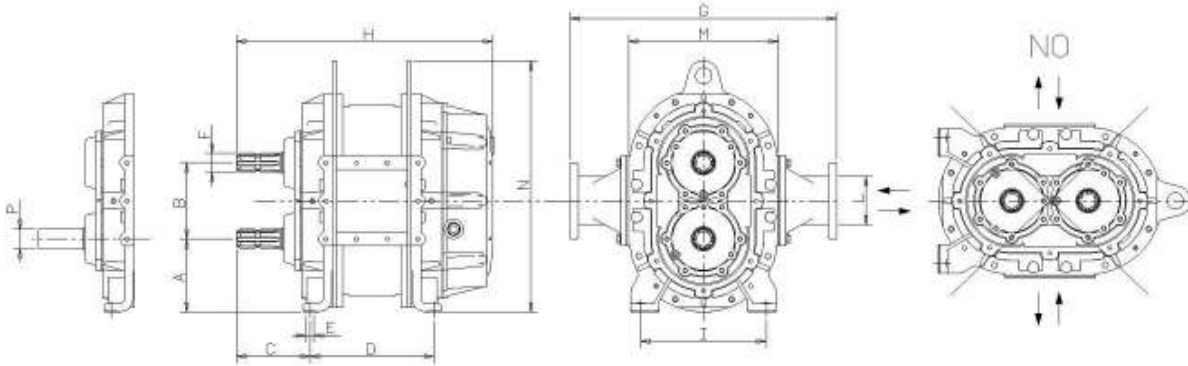
**All operations**, such as transport, storage, assembly, start-up, maintenance and repairing, must be performed outside all **explosive atmospheres**.

**All operations**, such as transport, storage, assembly, start-up, maintenance, repairing and use, must be exclusively carried out **by qualified and specialised staff that are aware of this user's manual's contents**.

## 2 TECHNICAL SPECIFICATION

### 2.1 OVERALL DIMENSIONS AND WEIGHTS

Fig.1



### ROTARY LOBE PUMPS - VL SERIES Ex (Tab.1)

Dimensions mm														
Model	A	B	C	D	E	F	G	H	I	L	M	N	P	Kg
VL 7	135	140	135	158	14	ASA E 1 3/8" DIN 9611A	580	410	230	DN 80	274	463	35g6	97
VL 14	135	140	135	223	14	ASA E 1 3/8" DIN 9611A	510	470	230	DN 100	274	463	35g6	105
VL 20	135	140	135	289	14	ASA E 1 3/8" DIN 9611A	610	534	230	DN 150	274	463	35g6	119
VL 27	135	140	135	366	14	ASA E 1 3/8" DIN 9611A	610	613	230	DN 150	274	463	-	146
VL 40	135	140	135	497	14	ASA E 1 3/8" DIN 9611A	828	747	230	DN 175	274	463	-	170

All running under regimes and /or pressure levels higher than those indicated in the table is forbidden.

### 2.2 PERFORMANCE

Model	velocity [rpm]	maximum flow [l/min]	maximum pressure [bar]	Power [kW]
VL 7	540	700	5	8
VL 14	540	1400	5	17
VL 20	540	2000	5	25
VL 27	540	2700	5	34
VL 40	540	4000	3	42

### SUGGESTED LUBRICANTS (Tab. 2)

Pump lubrication		
Brand	Oil (ISO 320)	Grease (ISO 280)
AGIP	Blasia 320	GR MU EP2
BP	Energol GR-XP 320	Grease LTX2
ESSO	Spartan EP 320	Beacon 2-Esso GR grease
MOBIL	Mobilgear 632	Mobilplex 47
SHELL	Omala oil 320	Alvania grease R2

Fig.2

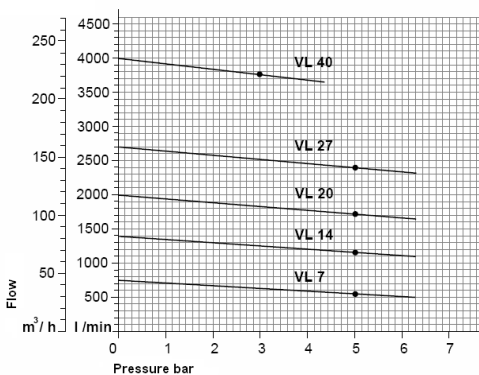
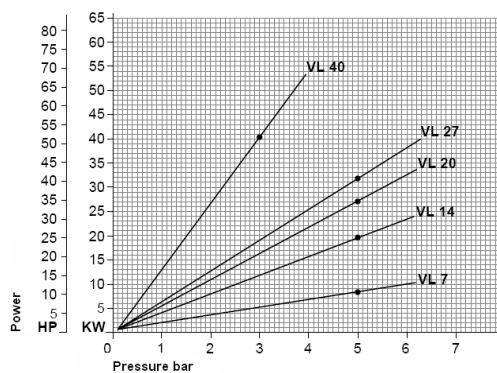


Fig.3



The self-priming, VL pumps, in the start-up stage can 'dry' run but only for short periods. To avoid superficial temperatures outreaching the fixed class, the 10 second-maximum value must never be exceeded. Please refer to the level device application in section 4.3.

## 2.3 CONVEYED FLUID



VL Ex pumps are conceived for conveying viscous, fibrous products, muds and pastes at a maximum 40 °C temperature.

Fluids containing abrasive solid materials in suspension up to a 10 mm diameter may be conveyed provided they have no cutting edges/profiles and cause no anomalous vibrations in the machine.



Peremptorily avoid the entrance of remarkably big solid bodies into the pumps. Such a possibility, in fact, may cause a sudden blocking of the pump with ensuing likely breakage of the transmission gears.



That is why a suction filter must be applied to withhold particles larger than 10 mm MAX and having a passage section able to guarantee a delivery that is at least twice that of the pump. Clean the filter periodically to avoid cavitation ( see sect.6.1 ).

In the case of cardan transmission/drive we suggest to assemble the cardan shaft with a safety pin.

Verify the chemical compatibility of the matter to be conveyed with the lobes' inner lining, according to what is indicated in the following table:

**Tab.3**

Lobes	NBR	EPDM	VITON	POLYURETHAN
Generally resistant to	most hydrocarbons, fats, oils, hydraulic fluids, chemicals.	vegetable and animals fats, oils, ozone, strong and oxidizing chemicals.	aromatic, aliphatic, alogenated hydrocarbons, acids, animal/vegetable oils.	mineral oil, aromatic and aliphatic hydrocarbons, many nitrils.
Generally attacked to	ozone, ketones, esters, aldehydes, nitro and chlorinated hydrocarbons.	mineral oils, solvents, aromatic hydrocarbons.	ketones, low mole weight esters, nitro containing compounds.	acids, phenols, toluene, aldehydes and ketones, chlorinated hydrocarbons.
Resistance	oil	very good	poor	excellent
	fuels	good	poor	excellent
	ketones	fair	excellent	poor
	hydrocarbons	good	poor	excellent

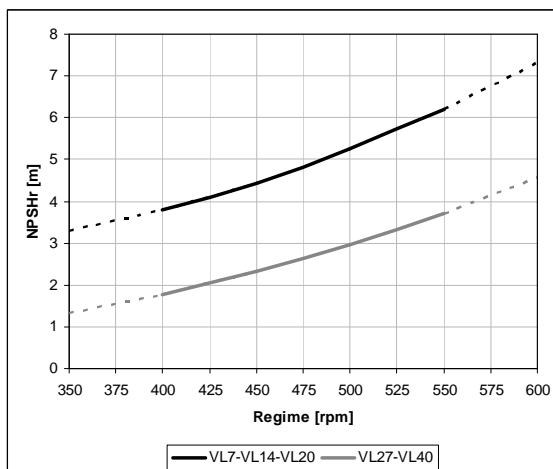
If the matter to be conveyed is not indicated in the table, please contact our customer service office.



If you expect not to employ the pump with Viton lobes for a long time, wet the lobes with a lot of water and in safety conditions before stopping it. In the opposite case the priming of electrostatic discharges between the lobes and the housing is likely at start-up.

### 2.3.1 VISCOSITY OF THE Poured OUT LIQUIDS AND SUCTION PRESSURE

**Fig.4**



The viscosity of a liquid, indicating the resistance that it opposes to its being moved, increases considerably when the temperature decreases.

Because of viscosity, pressure falls shall occur in the suction line and overpressure in the discharge line.

To prevent anomalies in running, above all when inflammable liquids are to be conveyed, keep pressure at the suction flange sufficiently high in order not to prime the cavitation phenomenon.



Before starting to use the equipment, verify that the suction plant's NPSHa is higher than the pump's NPSHr value, which can be deduced from the chart in illn. no. 4. Determine static pressure's minimum value at the suction flange, and verify that during use you do not go under this limit. Also read section 4.3. In case you have any doubt, please contact our customer-service office.

Should you be conveying highly viscous liquids, we suggest you decrease pressure losses along the lines by reducing the rotation regime, employing the suggested diameters, and short suction ducts as well. If possible, install the pump under head.

### 3 SAFETY AND PREVENTION OF ACCIDENTS

If the safety rules are not abided by, operators may suffer injuries due to contact with moving gears. Should anomalous features be noticed while the machine is running (abnormal absorption, increases in temperature, noisiness, vibrations), please inform the staff in charge of maintenance.



#### CARRY OUT THE FOLLOWING PRECEPTS VERY CAREFULLY

- When transporting the pump use suitable slings.
- Installation and maintenance shall be performed only by qualified personnel with the following pre-requisites:
  - Experience and specific technical training;
  - Knowledge of the technical norms and applicable laws;
  - Knowledge of all safety directions: domestic, local, general and of the plant;
  - Ability in recognising and avoiding likely danger;
  - Use of the appropriate clothing, the necessary protections and instruments.
- Before any maintenance operation:
  - Stop the pump and restore the system at the surrounding pressure condition (vent the whole plant);
  - Disengage the power transmission;
  - Works only on cold and stopped pump.
- Operators working at short distances from the running pump should avoid to be exposed for long periods of time to the noise of generated by the machine, unless wearing adequate protections.
- Non The machine must never be started without the safety devices foreseen for the drive elements. Change any damaged guard.
- Do not use the pump above the given performance values that could result in breakdowns and consequent damages of the drive components and to the operators.



Dispose of exhausted oils according to regulations in force.

### 4 INSTALLATION

#### CONTROL AT RECEPTION

- Remove the packaging and eliminate the material that may become dangerous if inhaled.
- At arrival of goods, verify that all components are not damaged.
- Make sure the pump has its identification plate. Pumps without such identification are considered anonymous and potentially dangerous: in such a case they must not be used, otherwise the manufacturer will be free from any liability whatsoever. In such an event, contact the manufacturer or retailer.

## CONSERVATION IN THE WAREHOUSE

If you foresee not to use the pump for a long time:

- introduce a layer of grease inside the housing and, by rotating the pistons manually, lubricate the surfaces subject to oxidation.
- Keep in a closed and dry place. Do not remove the protections on the inlets. For conservation purposes, repeat these operations periodically.



### 4.1 PRECAUTION AT ASSEMBLY

Pump's location must be chosen to let an easy maintenance an check. The pump must be rigidly fixed to a levelled-off frame or bed (max. inclination = 5°). The size of the structure must be such as to avoid any bending or vibrations.

- Avoid exposition to dust, rubble/deposits or projection of materials.
- Predispose the room required to reach:
  - The condensation draining plug on the lower side of the pump's housing.
  - The level of the oil tank
  - The oil filling and draining plugs on the tank
  - The lid of the rear oil tank
  - The front seals groups
- Support the piping connecting the pump to avoid overexertion on inlets.



Carry out assembly operations outside any whatever potentially explosive atmosphere.

Do not tilt the pump more than 5° with respect to the horizontal line.

**Ensure the pump cannot accumulate static electricity by grounding it electrically.** To said end, use the holes at the foot of the machine.

Allow for free passage of air on all sides of the machine.

Neither embed nor cover the pump.

The bed must not convey heat into the machine while it is running.

### 4.2 POWER DRIVE



For running to take place in explosive ambiances, since all transmission components are potential primers, they must comply with the ATEX directive and be marked at least Ex II 2G, with temperature class T4, T5 or T6.

#### 4.2.1 CARDAN DRIVE



We suggest using telescopic type cardan shafts. The cardan must be mounted in a way to avoid axial forces. Upper inclinations angle 15° (fig.4). Rotation must be as regular as possible (homo-kinetic transmission). Follow the directions provided by the cardan shaft's manufacturer.



Employ appropriate cardan protections: the pump's installation must be carried out in compliance with EC accident prevention legislation.

## 4.2.2 TRANSMISSION WITH BELTS



The pulley must be installed on the smooth pump shaft jutting-out as little as possible. Use SPB or SPBX trapezoidal belts.

The smallest pulley employed for transmission must have the following features:

**Tab.4**

Model	Minimum n° of grooves	Minimum pitch diameter [mm]
<b>VL 7</b>	3	160
<b>VL 14</b>	6	160
<b>VL 20</b>	6	180
<b>VL 27</b>	-	-
<b>VL 40</b>	-	-



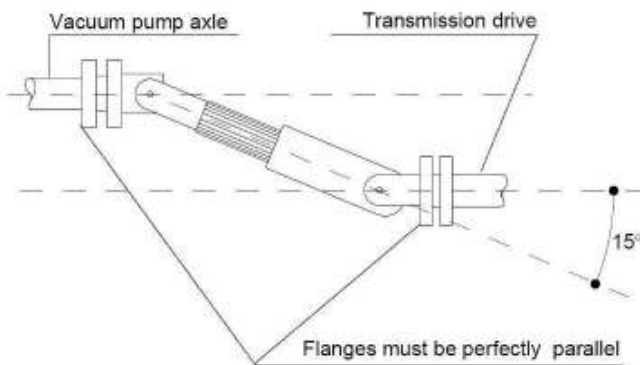
Use the least number of belts.

Use pulleys with a primitive diameter bigger than the minimum one prescribed.

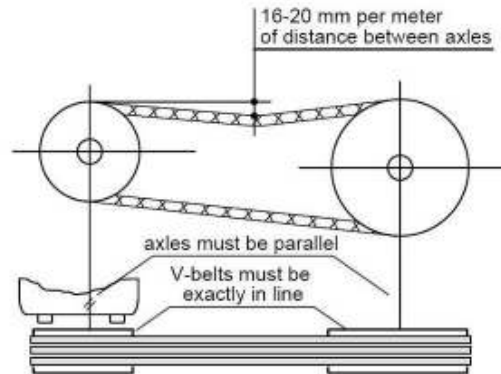
Do not apply an excessive pull on the belts: follow the manufacturer's directions (illn. 6).

Transmission must be protected according to norms in force in Europe (EEC directive no. 89/392 on machines).

**Fig.5**



**Fig. 6**



## 4.2.3 DIRECT TRANSMISSION

Should you install a flexible joint, control its alignment with a comparator in at least four points equally far away on the periphery. Failure to ensure alignment may quickly wear out the joint and the bearings.

## 4.2.4 HYDRAULIC TRANSMISSION/DRIVE

The directions given hereafter refer to the hydraulic transmission adopted by JUROP in non-certified versions.

- **Motor features we suggest**



Model	Displacement	Velocity	Working pressure	Delivery
	cc/rev	rpm	bar	l/min
VL 7	34	2000	95	72
VL 14	43	2000	150	91
VL 20	61	2000	153	129
VL 27	72	2000	149	152
VL 40	72	2000	183	152

Maximum pressure at draining line: 5 bar

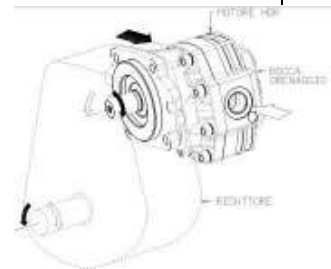
Maximum pressure of motor discharge: 5 bar

Between the suggested motor and the pump there shall have to be an adequate reduction gear with a velocity ratio equal to 1:3.7.

- **Fluid:** mineral oil for hydraulic plants according to ISO/DIN

Temperature °C	Optimal viscosity cSt	Max. consented viscosity cSt
-20 / +80	12 - 100	750

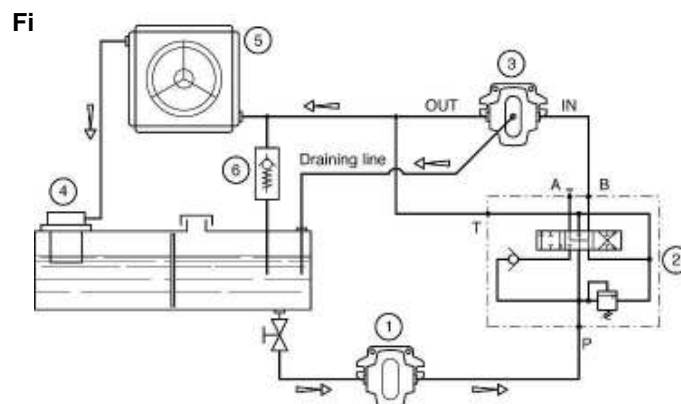
- **Filtering:** contamination class 19/16 according to ISO 4406 to be obtained with a  $\beta_x$  filter = 75
- **Verify the circuit's connections:** they must be coherent with the pump's rotation direction with regard to the protections installed in the plant.



Rotation in the wrong direction shall render the protections ineffective.

- **Draining:** connect directly to the plant's tank above the maximum oil level. Machine running without draining may damage the motor.

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



- **Distributor:** with open ports in the rest position. The distributor must be fitted with an adjustable over-pressure safety relief valve.
- **Motor piping:** with a nominal diameter at least equal to that of the motor ports. The diameter of the motor inlet pipe is always smaller than the discharge. Prefer flexible piping to avoid conveying vibrations.

- **Tank:** with feeding and return pipes spaced and separated by partition. If necessary use a heat exchanger to avoid overheating the oil (max 70°C) with a safety valve to avoid pressure peaks should the circuit be obstructed. The capacity is about twice the quantity of oil circulating (in l/min).
- **Starting:** make sure the system is perfectly clean and put oil in the tank, using a filter.
  - Vent off the circuit. Adjust the pressure limiting valve to the lowest possible value.
  - Check the level of the oil in the tank.
  - Increase pressure and rotation until the working values are reached.



### 4.3 INSTALLATION D'ASPIRATION ET SYSTEMES DE PROTECTION



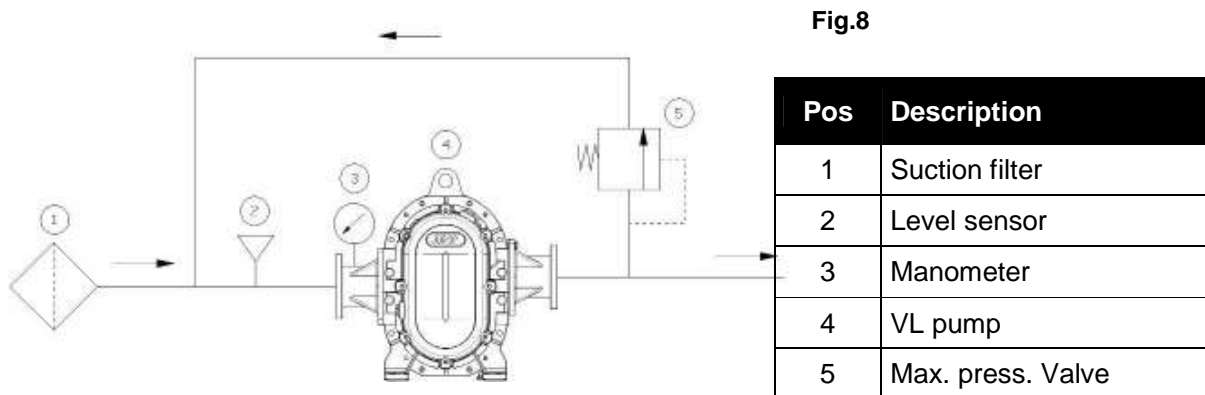
Realise the plant according to the information provided in illn. no. 8.

When overpressure is possible at discharge due to: clogging of the line (unclean fluids with suspended solids), non-voluntary closing of the valves or a change in the fluid's thermodynamic state, protect the pump with an appropriate safety device.

The device may be a maximum pressure valve, in conformity with the requirements set out in the ATEX directive as a control and protection system with Ex II 2G marking and T4, T5 or T6 temperature class. The valve shall have to re-circulate, at suction, a delivery that is sufficient to keep working pressure within the maximum allowed limits (5 bar per VL 7, VL 14, VL 20 and VL 27e of 3 bar per VL 40). Calibrate the valve with precision before you set it to work.

Should the device intervene, the operator shall immediately have to:

- Stop the machine;
- Determine and solve the cause that provoked the overpressure;
- Clean the overpressure valve accurately without changing its calibration;
- Start up the plant again.



The VL pumps have self-priming properties, yet they must be protected from any overheating due to an extended 'dry' running. Said situation may occur:

- At start-up stage;
- When the liquid in the suction tank is exhausted;
- When the suction filter or the valve's closure along the suction line are clogged up.

Foresee a level sensor for the plant (e.g., a vibration level sensor), conforming to the requirements of the ATEX directive as a control and protection system with Ex II 2G marking and T4, T5 or T6 temperature class, able to stop the machine after, and no later than, 10 seconds from the moment liquid is absent. The device shall have FFR equal to 2 ho, conform to the requirements set out in enclosure IV of the EC/98/37 directive on machines, moreover protect it from any contact with solid substances suspended in the liquid by means of a proper filtering system.

Should the pump be installed under head, to avoid cavitation from starting, monitor pressure - while the machine is running - at suction flange with a manometer (3). The operator shall stop the machine, should pressure decrease below the minimum fixed level (see paragraph 2.3.1).



When possible, install the pump under head.  
Avoid any bottlenecks and tight curves, when not indispensable.

Piping diameter must be adequate for the delivery realised with the pump and, in all cases, be no less than that of the inlets. Please refer to the diameters suggested in table 1.

Neither the piping's weight nor its expansion is to stress the pump's housing. Use temperature-resistant, rubber sleeves.

When assembling, be sure piping and all the line's components are clean.



If machine running takes place in potentially explosive ambiances, since all the line's components are a potential priming source, they must comply with the ATEX directive and be marked Ex II 2G, with T4, T5 or T6 temperature class at least. It is the installer's duty to certify the whole plant at ATEX before the machine starts operating in potentially explosive ambiances.

## 5 STARTING THE SYSTEM



Before starting up the system, verify that the oil level in the gearbox reaches half of the side level pilot light ( the amount of oil in about 1 liter).

Verify that all the protections have been correctly installed.

Verify that all interception valves are open and that there is no clogging in the suction and discharge line.

Verify that the suction filter is completely immersed in the liquid.

Pump can work in both sense.

Verify the rotation direction: start up slowly and control discharge pressure at the discharge flange till the nominal regime is attained. If that is not possible, verify beforehand the theoretical losses of the discharge line.

For any technical consultation, contact our customer-service office.

### 5.1 PRECAUTION DURING USE



- Avoid the pump's overheating.
- Avoid start-ups on load : they may stress transmission and the hydraulic motor.
- Control rotation regime: it must never exceed the prescribed operating limit.
- Avoid rotation in the wrong direction: protections no longer respond.
- Should the safety valve intervene, do not keep the valve in a by-pass position too long.
- Adjust delivery by acting on the rotation regime: do not use the safety valve to discharge any excess in delivery.
- After a long period of inactivity, after using highly abrasive and viscous liquids, or ones that generate calcareous deposits, internal washing shall become necessary.
- After every use, discharge deposits by opening up the plug of the pump's housing at pos. 60
- If you foresee long stops, lubricate the lobes internally, and the housing as well. If possible, lubricate before each start-up (this avoids high powers at pickup). Use a lubricant that is

compatible with the materials constituting the pump and that are inert with respect to the conveyed liquid.

- Avoid letting in any liquids whose temperature exceeds 40°C
- Clean the safety valve at every intervention.
- If a suction filter is present, clean it periodically.



Use the pump in potentially explosive ambiances only if the environmental temperature falls within the  $-20 \div +40^{\circ}\text{C}$  range.

## 6 MAINTENANCE

**N.B.:** All disassembly and assembly operations shall be carried out exclusively by qualified and trained personnel. Operate outside a potentially explosive atmosphere.

### 6.1 ORDINARY MAINTENANCE



Observe the safety directions given under para. "Safety and accident prevention" before beginning whatsoever maintenance operation.

Tab.5

STATE OF PUMP	CHECK	FREQUENCY
IN FUNCTION	Discharge pressure	F
	Rotation regime	D
	Suction pressure	F
PUMP AT A STANDSTILL	Oil level in the tank	M
	Inner lubrication	D
	Verification of transmission conditions	M
	Verification of the wear of lobes	W
	Cleaning suction filter	D
	State of safety valve	M
	Front seal slips	W

**Frequency:** **D:** daily **W:** weekly **M:** monthly **F:** frequently while machine is running.



While running the apparatus, watch out if unusual noises and/or anomalous vibrations commence: should there be any, stop the machine.

In case of overheating, unusual noises or alteration of the paint, examine the rotating parts, the support of the front bearing and the seal rings.

Control the machine in such a way as to ensure that there are no losses/leaks before it is started up.

Substitute the seal rings when you first notice an oil leak.

### 6.2 EXTRAORDINARY MAINTENANCE

#### SUBSTITUTION OF THE LOBES

.....

Substitute the lobes opportunely if you notice any wear marks, superficial deformation or if the sizes:



A min: 98 mm  
B min : 180 mm  
C min : 65 mm

are changed (see illn..9).

## SUBSTITUTION OF THE HOUSING AND SIDE WEAR PLATES



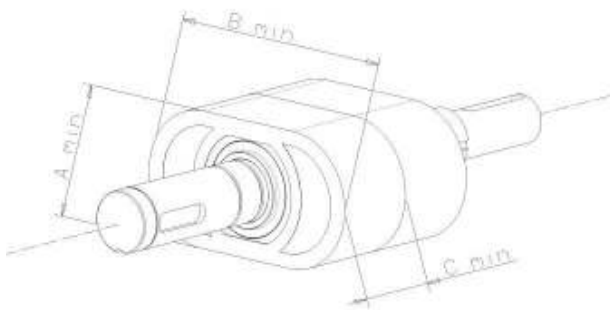
If the housings pos. 29 show evident traces of wear or if the dimensions “D” and “E” are more than (fig.10):

D = 181,8 mm.

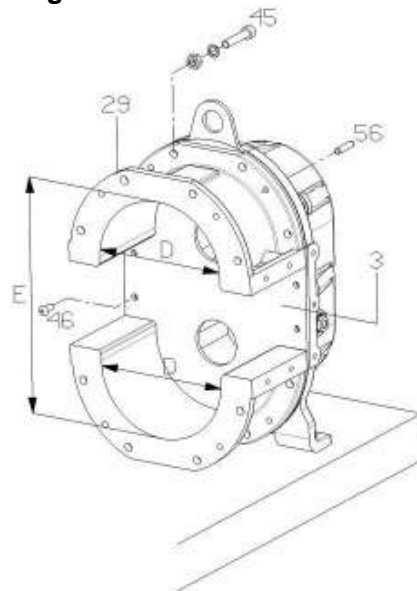
E = 321,8 mm.

If the wearplates of pos. 3 show evidence of wear, replace them removing the n. 4 screws of pos. 45 and the elastic pins of pos. 56.

**Fig.9**



**Fig.10**



## SUBSTITUTION OF THE BEARINGS



Substitute all bearings after 10,000 hours' running, or after using the pump for 5 years. In all cases replace bearings when they first appear to be working in an anomalous manner. Follow directions given in section 6.2.1. and subsequent ones.

## SUBSTITUTION OF SEAL RINGS



The oil seal ring must be regularly checked so that it holds perfectly, otherwise substitute it.

Change the inner seal rings every 500 hours, in all cases when they first appear to be running in an anomalous manner. Follow directions given in section 6.2.1. and subsequent ones.

## SUBSTITUTION OF OIL / GREASE



First time change the oil after the 100 work-hours. Substitute the tank's oil and the lubricating grease for the front bearings at every extraordinary maintenance intervention, and anyhow within 500 hours' running. Substitute the oil and the grease if contaminated by the conveyed fluid. Also substitute the inner seal rings.

Wash the tank accurately before introducing any oil.

The amount of oil to fill is about 1 liter.

### 6.2.1 DISASSEMBLING OF THE PUMP

Previous to the disassembly:

- Take off the suction and discharge connections.
- Wash out the housing.
- Fix the end plate, drive side, to a rigid, plane, surface (for VL 7-14-20); bed side of the axle for VL 27- 40.

**N.B.:** To operate on VL 40 refer to VL 27's operating sequence.

#### 6.2.1.1 Disassembly sequence VL 7 - VL14 - VL20 (Refer to VL 14 spare parts sheet)

- Unscrew the filling plug (vent) of pos. 25.
- Remove the draining plug of pos. 25 and check that all the oil is drained out.
- Unscrew the n. 8 screws of pos. 43 and remove the oil tank
- Unscrew the self-locking ring of pos. 51 by means of the suitable spanner UNI 6752.  
By means of a puller or with two screwdrivers pull off the two gears of pos. 17-18. **Note: the two gears have timing marks; take care to put them in evidence before the disassembly. (pag. 11-fig. 13).**
- Remove the keys from the axle, unscrew the n. 3 screws pos.43.
- Unscrew the rear bearing flanges pos. 5 with a puller.
- Move over to the front of the pump and remove the n. 3 screws of pos. 43.
- Remove the front flange of pos. 6.
- Unscrew the self-locking nut of pos. 51 by means of the suitable spanner.
- Unscrew the n. 6 screws of pos. 43.
- Unscrew the two front bearing flanges pos. 5 with the puller.
- Unscrew the n. 8 screws M10x50 of pos. 45 front side.
- By means of a hammer remove the end plate pos. 19 + 3 Front side.
- Remove the whole axle as shown in fig. 11.

Verify the state of wear of the housings, side wear plates and lobes as indicated in sect. 7.2.

#### 6.2.1.2 VL 27 disassembly sequence

Repeat the same operations described in the previous paragraph until point g.

- Unscrew the n. 8 screws M10x50 pos. 46 rear side.
- By means of a hammer remove pos. 20 + 4 rear side.
- Move over to the front of the pump and Unscrew the n. 3 screws pos. 45.
- Remove the front flange of pos. 7.
- Unscrew the self-locking nut of pos. 52 by means of the suitable spanner.
- Unscrew the n. 6 screws of pos. 44.

- n. Use the puller to extract the axles ( or else beat on the axle with a rubber hammer and pull it out). The axle comes out as described in illustration 11, complete with its rear lobes, bushings pos.42, rear small flange pos.13 and intermediate small flange pos.8.
- o. Pull out the two front flanges pos.5 by using screwdrivers as a lever.
- p. Remove the 8 TCEI M10x50 screws and release the rear housings pos.30, intermediate anti-wear flange pos.3 and gaskets pos.24.
- q. Pull out the couples of front lobes together with the small front flanges pos.13 and the bushings pos.42.

### 6.2.1.3 Lobes disassembly of model VL 7 – VL14 – VL 20

Proceed as by fig.11 striking with a plastic hammer on top of the suitable pipe diam. 82x72 - length 325 mm. Take off the bushings pos. 41 before reassembly.

### 6.2.1.4 Lobes disassembly of model VL 27

Take hold of the rear lobes as in illn.12 and strike it on a protection plate of suitable material, till you extract the lobes, bushing pos 42 and the small flange pos 13. If the operation becomes difficult to perform, pull out the bushing beforehand pos. 41 with the appropriate puller.

Fig.11

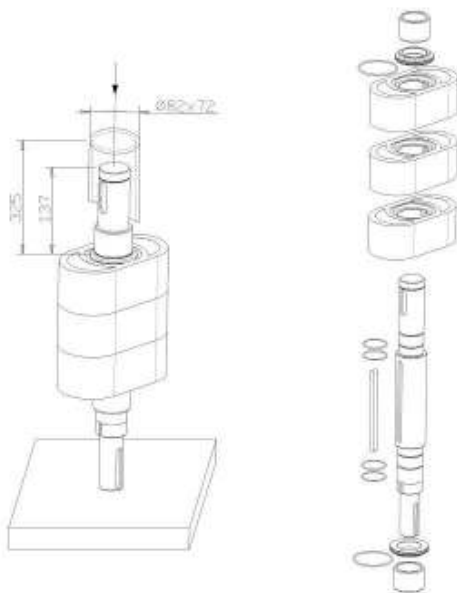
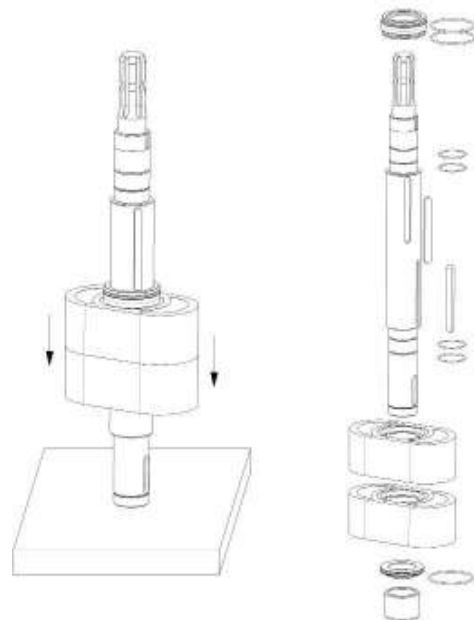


Fig.12



### 6.2.1.5 Disassemble of seals and bearing housing

Group of rear seal rings:

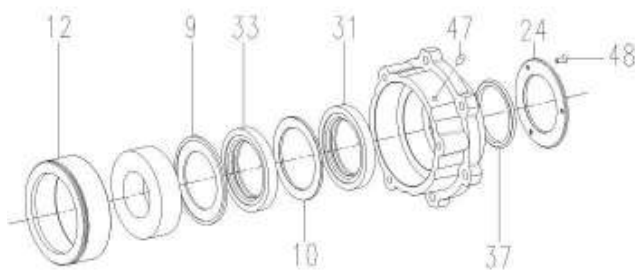
- Loosen the set screw of pos.47.
- Slip off the front and rear bushing of pos. 9 by means of two screwdrivers.
- Pull out the small flange pos.9.

- Unscrew the three TSPEI M4x10 screws and pull out the small wear plate seal gasket pos.24 and Teflon ring pos.37.
- Use a screwdriver to extract the seal rings pos.31 and 33 with the inner placer pos.10.

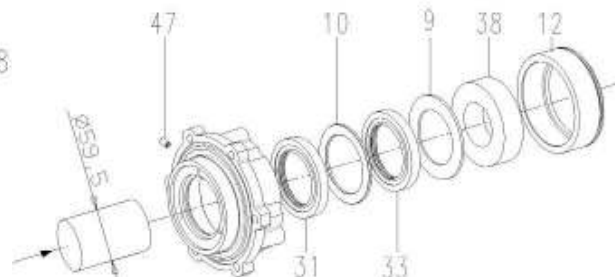
Front seals group:

- Loosen the set screw of pos.47.
- Unscrew the three TSPEI M4x10 screws and pull out the small wear plate seal pos.24 and Teflon ring pos.37.
- Use the plug in illustration.13 to pull out the small seal/bearing housing pos.9, bearing pos.38 and the front and rear bushings pos.12.
- Use a screwdriver to extract the seal rings pos.31 with the inner placer pos. 10.

**Fig.13**



**Fig.14**



**Note: The seal rings of pos. 31 and 33 must always be replaced.**

## 6.2.2 REASSEMBLE

All parts that are wearied off or damaged must be replaced with original spare parts.

All seals and o-rings must always be replaced. Use the kit cod.: 18800-000-00.

Check that lobes and seals are of the same material (NBR-NBR, VITON-VITON).

During the reassemble all the seals and O-rings must be lubricated or greased in order to allow the contact and exact matching to the corresponding surfaces without being damaged..

Single groups reassemble sequence ( refer to VL14).

### 6.2.2.1 End plate- housing and wearplate group

If necessary, substitute the wear plate (see illn.10).

- Substitute the O-rings pos.36 between the end plate and the wear plate, then use the pins pos.56 for centring, and close as a parcel (execute both the end plate- wear plate groups);
- Lock the wear plate to the end plate with the 4 TBEI M8x18 screws pos 45.
- Add new gaskets pos.23 and fix the pump housings pos.29 with the 8 screws pos.45.

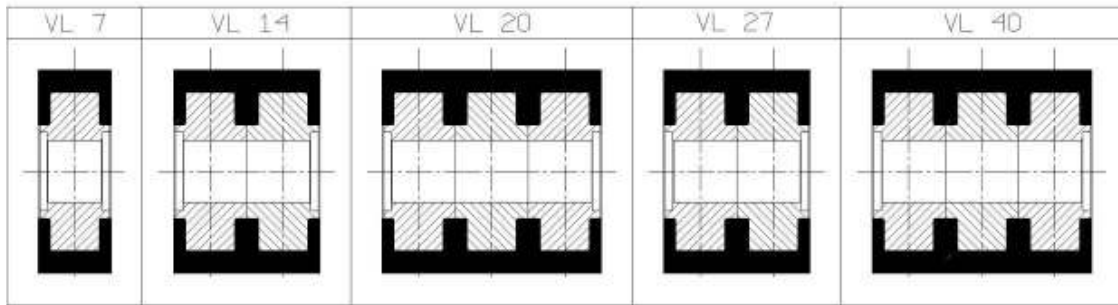
### 6.2.2.2 Axle– lobe group

Reassemble the axle-lobe groups as in illustration 10 or in illn. 11 by following the matching sequence of the lobes as in illustration 14. For VL 27, assemble the sole couple of front lobes (on the side of the broached axle).

Do not insert the wear bushing P.41.

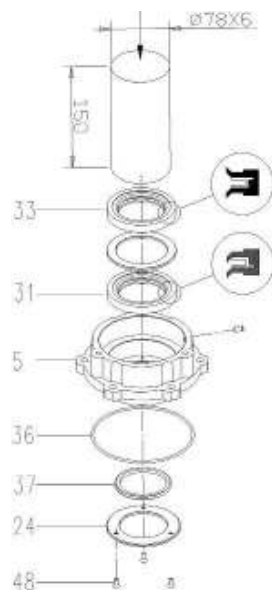
**Fig.14**





### 6.2.2.3 Seal/bearing group

Fig.15



The seal must be filled with the specified grease. **The seal slips must be turned as in illustration 15.**

- Insert the Teflon ring pos.37.
- Set the seal plate pos.24 and fasten it with the three SPEI M4x10 screws.
- Insert the O-ring pos.36 lubricated;
- Insert the seal rings group and the intermediate spacer by using the plug indicated in illustration15. Watch out for the orientation of the seal slips!
- Assemble the bearing flange pos. 5 onto the end plates pos.19 in the original position and fasten the screws pos. 44.

### 6.2.2.4 Assemble of the pump housing – lobes – end plate VL

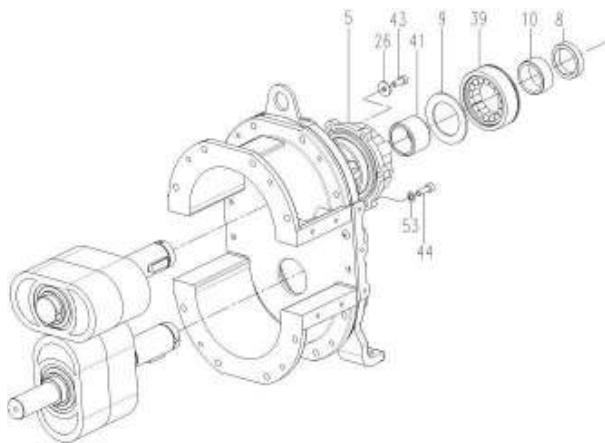
Refer to VL 14.

Check that the O-rings of the axle are in the correct position.

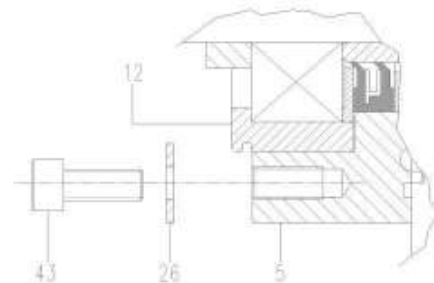
- Fasten the rear end plate-wear plate group to a rigid bench;
  - Insert the two axle-lobes groups as in illn. 16 by placing them in the right position on the wear plate, and by centring them precisely with respect to the holes. Ensure square ness as much as possible!.
  - Insert the bushing of pos. 41 on the axle and place it in the correct position against the bushing pos.11. For the assemble use a pipe of suitable length and of diam. 55x47. Sliding through the seal slips must take place without any stumbling. Be careful: do not turn around the outer seal slip.
  - Insert the spacer of pos. 9, checking that it is correctly centred;
  - Insert the rear bushing group pos.12 and bearing pos.39 on the axle, and with the same tube of point c and take it to the correct position, striking with a hammer;
- NOTE: The outside circular groove on the rear bearing bushing of pos. 12 must match exactly the plane of the outside face of the bearing flange of pos.5.

- f. Insert the inner ring of the bearing pos. 10 illn. 16 till it is placed in the correct position;
- g. Fasten the bushing pos. 12 with the three washers pos. 26 and the screws pos. 43, and be sure the washer adheres perfectly between pos. 12 and pos. 5 (illn.17). Use some LOCTITE 242 on the screws pos. 43.
- h. Screw on the set screw of pos. 47 blocking it slightly (use "LOCTITE 242");
- i. Insert the spacer of pos. 8 ;
- j. Repeat the operations from c a i for the second axle.

**Fig.16**



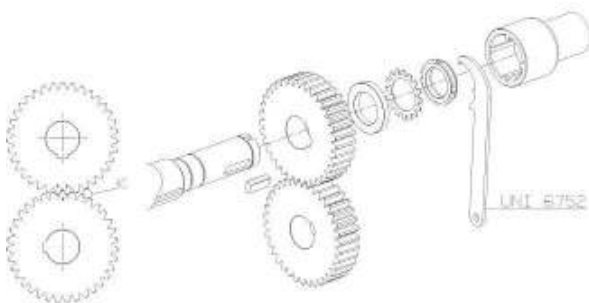
**Fig.17**



### 6.2.2.5 Timing and blocking of gears for VL 7 – VL14 – VL 20 – VL 27

The timing of the gears is very important and the following instructions must be correctly followed.

**Fig.18**



- Insert the key in the axle groove.
- Insert the two gears taking care that the reference marks are matching.
- Insert the spacer and safety ring of pos. 1 and 2.
- For fixing the self-locking ring, insert a pin in between the gears (see fig. 13-point K)
- Screw on the rings M45x1,5 by means of the spanner UNI 6752 and with a blocking torque of 350 N/m (the self-locking ring can be re-used a second time).
- Bend the tab of the safety ring pos. 2 by means of a punch in order to block the self-locking ring.

### 6.2.2.6 Assemble of the front chamber and of the lobe – housing group VL 27

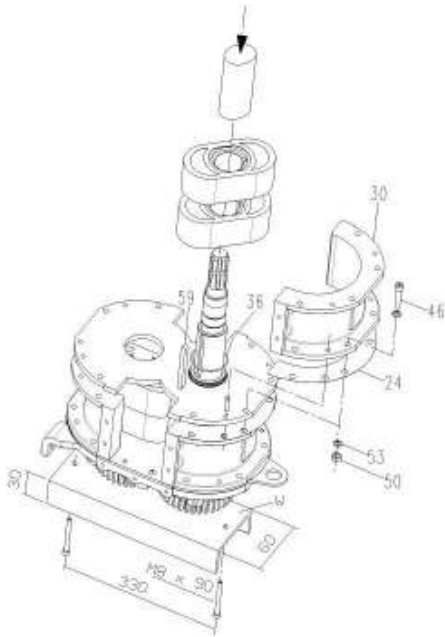


Fig.19

- Place the pump with the axles in a vertical position, after fixing the blocking plane "W".
- Insert the o-ring of pos. 36 and the key of pos. 59.
- Insert the pistons by means of the introduction pipe.
- Insert the housing gasket of pos. 24 in between the housing of pos. 30 and the wearplate.
- Centre the group on the n. 4 pins and screw on the n. 8 screws of pos. 46.

### 6.2.2.7 Assemble of the front end plate – housing of VL 7 – VL14 – VL 20 – VL 27

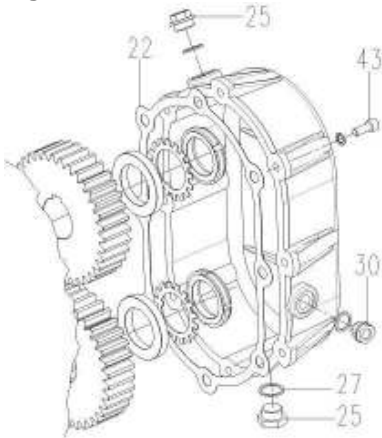
Check that the two O-rings of the seals housing pos 5 and the O-rings of the axle are in the correct position.

- Insert the end plate-front wear plate group – and place it in the correct position. Verify the centring of the axles with regard to the seal/bearing housings.
- Insert the bushing of pos. 41 on the axle and take it to the correct position by means of the introduction pipe diam. 55x47 of a suitable length (lubricate thoroughly the inside and outside of the bushing).
- Insert the spacer of pos. 9, checking that it is correctly centred.
- Insert the bearing of pos. 38 on the axle and by means of the introduction pipe of point "c" and of a hammer bring it to then correct position.
- Centre the bearing bushing of pos.12 to the outside diameter of the bearing and press it to the correct position. **NOTE: The outside circular groove on the bearing bushing of pos. 12 must match exactly the plane of the outside face of the bearing flange of pos. 5. If this does not occur, disassemble and check.**
- Insert the safety ring pos. 50.
- Screw on the ring M45x1,5 by pos 51 means of the spanner UNI 6752 and tighten it with a torque of 350 Nm.
- Bend the tab of the safety ring by means of a punch in order to block the self-locking ring.
- Check the seal of pos. 32 and replace it if it is worn. Fill with grease the flange of pos. 6 and screw on the n. 3 screws of pos. 43.

### 6.2.2.8 Assemble of the oil tank and lubrication of the gears

Refer of VL 14.

Fig.20



- a. Place the gasket of pos. 22 exactly on the oil tank of pos.28.
- b. Mount the oil tank by means of the screws of pos. 43.
- c. Place the drain plug of pos. 25..
- d. Fill with oil till you cover half of the oil level window pos. 30.
- e. Screw up the filling port with the aluminium washer pos. 25 and fasten properly.

Verify that there is no oil blow-by through the gasket, and that the tank is hermetic .

### 6.2.2.9 Checking of the running

Lubricate the lobes with oil and grease.

Turn the axles by hand making sure that the group turns smoothly.

Mount the inlet and outlet connections.

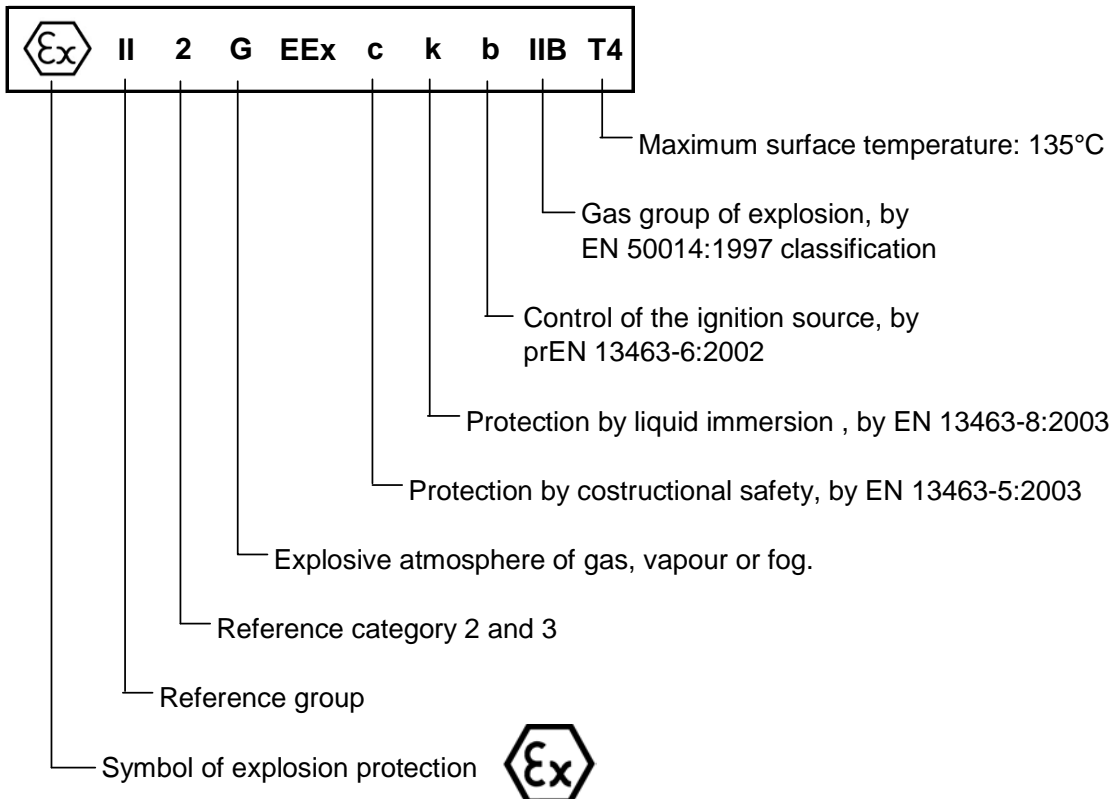
Now the pump can be set at work again.

## 7 MARKING

Name plate (example)

<b>Juropol</b>		AZZANO DECIMO PORDENONE-ITALY			
MOD.	VL 20	YEAR	2004		
SERIAL No.			H345506		
MAX PRESSURE		(bar)	5		
MAX SPEED		(R.P.M.)	540		
	II2G EEx ckb IIB T4		REF.	8000314530	
MADE IN ITALY					

Description of the plate		
Abbreviation	Unit	Description
MOD.	/	Type of pump
YEAR	/	Year of construction
SERIAL No.	/	Serial number of the pump
MAX PRESSURE	bar	Maximum available relative pressure at discharge
MAX SPEED	min <sup>-1</sup>	Maximum speed
FILE REF.	/	Registration code of the technical brochure



## 8 TROUBLE SHOOTING

### OVERHEATING OF THE PUMP

CAUSE	CORRECTION
To high pressure on the outlet side	Reduce the pressure losses by reducing the r.p.m.; verify possible clogging along the discharge line /outlet side and/or the valves while closing.
To high r.p.m. of the pump	Check the r.p.m. and keep them at prescribed values.
Low level in the oil tank (oil consumption)	Proceed with the substitution of the rear seals and restore the level.
Low suction pressure (cavitation)	Reduce pressure losses; reduce delivery by lowering rotation speed. Restore NPSHa to safety values
Grease leaking from the small front flange	Substitute the front seal ring

### THE PUMP DOES NOT DELIVER AND STOP

Intervention of the oil level window:	
<ul style="list-style-type: none"> <li>Pumping level is to high</li> </ul>	Reduce the pumping level; Check NPSHa
<ul style="list-style-type: none"> <li>Wearied-off lobes</li> </ul>	Substitute lobes as indicated under point 6.2.1.
<ul style="list-style-type: none"> <li>Components of the suction line not of the proper size</li> </ul>	Increase piping diameters.
<ul style="list-style-type: none"> <li>Clogged suction filter or Closed valves</li> </ul>	Clean the filter; Verify the opening of the valves in suction line

### UNSTABLE DELIVERY AND VIBRATION OF THE PUMP

Air infiltration in the suction line	Verify the seal of the suction piping and the suction filter's level of immersion.
Clogged suction filter	Clean the filter
To high r.p.m. of the pump	Check the r.p.m. and keep them at prescribed values.
To high pressure on the outlet side	Reduce the pressure losses by reducing the r.p.m.; increase the line diameter.
Viscosity or density of pumped media is to high	Reduce r.p.m.

The pump cavitates	Reduce pressure losses in suction stage. Reduce suction height and length; reduce speed; increase piping diameters, reduce the fluid's temperature.
<b>BY-PASS INTERVENTION</b>	
Exceedingly high discharge pressure	Reduce pressure losses; reduce delivery by lowering rotation speed; verify possible clogging along the discharge line/outlet side line and/or in the valves at closing stage. Accurately clean overpressure valve before starting up again.

## 9 SCRAPPING



Before demolition, break up - and dispose of - the following materials in a proper manner:

lubricating oil  
 rubber and plastic parts  
 parts in cast iron, steel and aluminium.

Do not abandon/disperse in the environment.  
 Do not use dismantled parts as spare parts.

## 10 REQUEST FOR SPARE PARTS

How to order the spare parts::

- a) The model of the pump.( MOD. )
- b) The serial number of the pump ;

See pump label

Esempio:

- a) VL 14 Ex
- b) X50012

- c) The denomination of the part.;
- d) The number of pieces.;
- e) The code of the part.;

See spare parts list

- c) End lobe
- d) n° 4 pieces
- e) 1503601400