



**YOUR
SOLUTIONS**

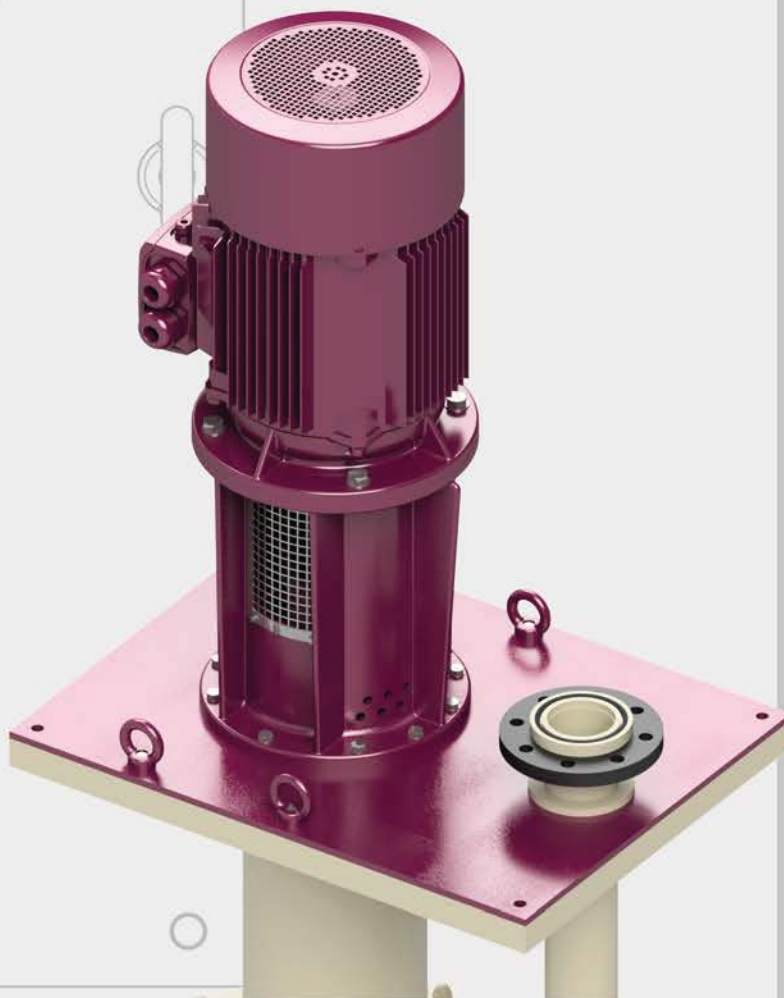
C O R R O S I V E A P P L I C A T I O N S

User manual

Installation

Operation

Maintenance



User manual in the original or in different languages should be requested to the manufacturer.

ISO 9001
Certified company



2006/42/EC
Machinery Directive



Translation of the
original instructions

Centrifugal sump pumps

CGV-N

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GENERAL INFORMATION

EXECUTION

The pumps of this series have been developed for the pumping of corrosive liquids and special attention has been dedicated to a rugged construction, an easy access for maintenance and hydraulic efficiency.

The design of the volute and at the same time of a bladed channel guarantees a maximum output with minimum overall dimensions and excellent performances.

Each machine is combined with a series of motors of different power and satisfies the most diversified needs thanks to an optimum ratio between capacity and head in function of the specific weight of the pumped liquid assuring a low energy consumption.

The installed motors are in compliance with the UNEL-MEC standards, mount a protection according to IP55, are built in insulation class F and are connected with the pump body through a cast iron adaptor.

PUMP BODY

The pump body is equipped with a volute and the suction orifice is located in an axial position whilst the delivery orifice is in a tangential position (from the machine type 65-125 to type 125-250 it is positioned in the centre) and this is corresponding to the normal requirements of this type of plant.

On some machines the connections can be equipped with free flanges (UNI 2223 or a similar product) and on other machines with cylindrical gas threadings.

IMPELLER

The impeller is open and on request or if necessary can be mounted a closed type. The blades on the rear side provide for a reduction of the axial thrust caused by the flux of the liquid during suction.

ROTOR

On the CGV-N series the rotor is driven and held by means of grease-lubricated ball bearings. The connection between the shaft and the motor is established by means of an elastic joint.

The guide of the rotation system is performed by sleeves, which are mounted onto every joint of the column and into the upper part of the pump body.

A plastic coating entirely covers the shaft, which is constructed in one piece and driven by bushes of pure aluminium and freely turns inside sleeves of charged PTFE (this system varies according to the series and the length of the immersion tube).

Their lubrication is guaranteed by the pumped liquid or by an auxiliary one coming from an external source.

REAR BLOCK

The rear block is deep and has been studied to contain the drive sleeves of the shaft, which can be replaced very easily after wear or after rupture.

INTERMEDIATE ADAPTOR

The intermediate adaptor has got a sturdy construction and is entirely composed of cast iron. It has been specially designed to keep the electric motor in a distance from the rest of the pump and to guarantee the integrity of its external structure and above all of its internal parts like bearings and the rotor.

SUPPORT PLATE

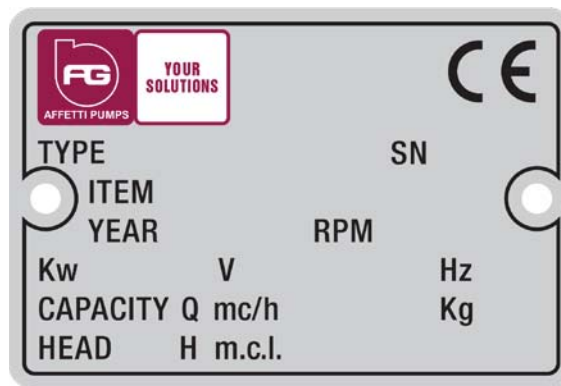
The support plate is entirely manufactured of a technopolymer and assures a perfect stability and a solid anchorage of the pump to the vat or to the tank.

If necessary, on request or in special cases, it can be equipped with a metallic counter-plate to reach a higher compactness.

MARKING

Each machine is equipped with a label on which you find all the data prescribed by the Machine Decree **2006/42/CE** and which facilitates the identification of the machine.

For an eventual spare part request please cite the machine number of the pump.



GUARANTEE AND CERTIFICATION

Automatically and without a special request of the customer our company emits a guarantee and a test certificate.

Moreover we are ready to supply all possible types of certificates according to the requirements of our customers.

PRE - INSTALLATION

PACKING

The structure of the packing and the employed materials are chosen according to shape, dimensions and weight of the machine, which has to be shipped.

We may adopt solutions of the following type:

- cardboard box with filling material for machines of small dimensions ;
- cardboard box and wooden pallet with filling material for bigger pumps ;
- wooden pallets exclusively for machines, which due to their structure do not need any external covering;
- wooden box for long and very heavy pumps.

TRANSPORT

A good transport is very important for the fine functioning of the machine and for this reason this operation merits our full attention.

The charge and the discharge of the delivered items have to be performed in dependence on the shape, the weight and the type of packing.

The lifting should be done without soliciting the fragile parts (body and connections) of the pump. The packed machine should be set down gently and without a blow and has to be fixed and supported so that during transport it does not leave its original position and is not exposed to strong vibrations.

The discharge in the customer's store has to be performed with the same precautions as the charge.

INSPECTION

At the arrival of the machine has to be carried out an accurate inspection to make sure that during transport did not occur any damage. If this should be the case, please contact the responsible agent.

Sometimes -for safety reasons -components and accessories are separately packed inside the main packing.

After the removal of the pump please accurately check the contents of the packing.

Our company is free from any obligation to reply on a request of compensation for damages advanced by the customer or third persons.

STORING

Normally the pump is delivered with the objective of a short-term installation.

If a long storing period is foreseen, please make sure that the storing site is dry and clean in order to avoid damages before installation.

In the cited case we advise that before its installation on the plant the pump should be carefully cleaned by eliminating eventual foreign bodies, which could compromise the correct functioning. At last have to be removed the protection taps from the delivery and suction orifices.

INSTALLATION

POSITIONING OF THE MACHINE

The pump has to be mounted vertically and in the best possible position to assure an easy connection with the delivery tube. The machine should be positioned in immediate neighbourhood of the vat or tank so that a rapid intervention is guaranteed in case of preventive maintenance or damage. It is recommended to position the pump taking into consideration that the distance between the suction orifice, the ground and the nearest wall should not be less than 5 times the diameter of the orifice itself.



Recommended Safety Measures

Above all you have to keep a sufficient safety distance between the machine and an eventual passage for persons. Do not store the pump in spaces together with inflammable or explosive materials. To assure the safety of the operator or any other interested person the positioning of the pump should be performed by taking into consideration eventual ruptures of the delivery tube or overflows of highly corrosive liquid during operation under pressure. Before the installation of the machine please make sure that the switch is in the "zero" position (OFF) and disconnect the appliance from the power supply to avoid the accidental actuation of the moving parts. These operations should be performed only by specialized and trained staff.

SUPPORT AND FIXING OF THE PUMP

They have to be realized with suitable materials to guarantee the stability and the resistance against eventual exhalations of corrosive vapours from the liquid in the vat or the tank. For the above-mentioned reasons we recommend to construct the support on which the machine is positioned of stainless steel according to AISI 316.

At first please carefully prepare the support surface. The pump is introduced into the tank and delicately put into the right position on the support after having applied the filter or the extension tube (if requested).

Compensate the level by introducing metal shims (AISI 316) between the support plane and the plate so that the flatness error is limited to 1 mm.

Finally connect the pump rigidly with the support by using the holes applied on the rectangular flange.

CONNECTION WITH THE TUBES (Fig.1)

The delivery tube, which is connected with the mouthpiece of the machine, should not produce any excessive charges or disproportions.

Elevated forces and excessive movements transmitted to the tube may cause damages on the pump. For this reason we recommend to use brackets and rigid fixations for the pressure collector. This operation is essential and indispensable, if you want to obtain a correct operation of the machine.

Another special requirement, which should be strictly observed, is the parallelism between the flange of the tube and the electric pump. A faulty positioning could cause forced unnatural alignments of the connected collector and subsequently this could result in leaks on the gaskets or even cracks on some tracts of the tube.

As already explained in the previous paragraph the application of filter on the suction side is extremely useful to assure that eventual foreign bodies, which are present in the liquid, do not come into contact with the impeller and the internal pump body.

Moreover we think that it is highly recommendable to mount a filter case onto the filling tube of the tank.

There should also be mounted two probes, one for the maximum and one for the minimum level. They indicate when the water has reached the maximum or minimum height that is necessary to cover the pump body and the eventual intermediate flanges and keep it from overflowing the vat or the tank.

If the machine includes an external flow line with an electro-valve, the cleaning and the lubrication of the guide sleeves of the shaft is guaranteed by the total insulation of its tract. (This operations is recommended, if the pump is installed in environments where the temperature may fall to less than 3 CC).

On the delivery have to be applied at a distance, which corresponds to 5 times the section of the tube passage, a sluice valve and a no-return valve and, if the liquid is hot and the tube too long, a dilatation joint.

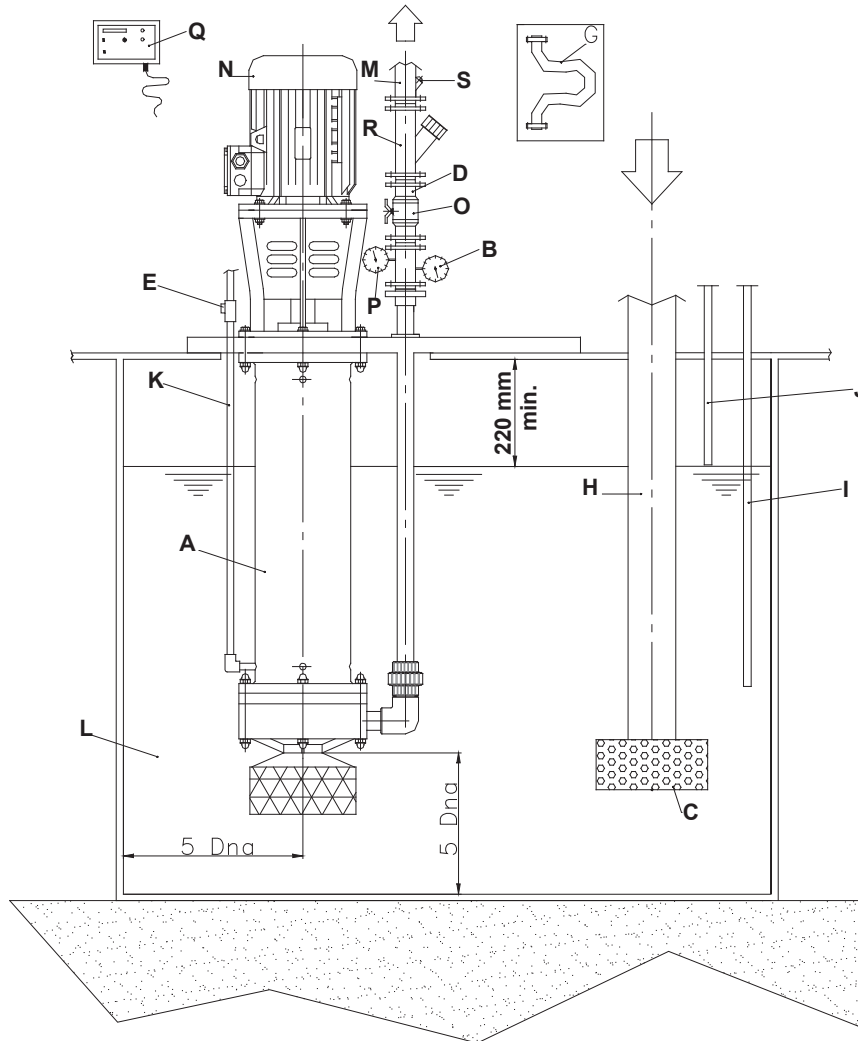


FIG.1

- | | |
|-------------------------|----------------------------|
| (A) Pump | (K) Flow line |
| (B) Manometer | (L) Supply vat |
| (C) Filter | (M) Delivery tube |
| (D) Bracket | (N) Motor |
| (E) Electro-valve | (O) Delivery valve |
| (F) Filter | (P) Pressure gauge |
| (G) Dilatation joint | (Q) Electric control board |
| (H) Charge tube | (R) Check valve |
| (I) Minimum level probe | (S) Thermometer |
| (J) Maximum level probe | |

CONNECTION OF THE ELECTRIC MOTOR

We advise to follow with care the schemes of the motor producer, which you can find in the terminal box or in the instruction manual.



Recommended Safety Measures

It is highly dangerous to start the pump before having completed the installation. The assembly operations have to be performed by specialized and trained staff.

CONTROL INSTRUMENTS

To guarantee a correct functioning the machine should be equipped with instruments, which at every instant control its operation, i. e.

- A manual vacuum gauge installed in the immediate neighbourhood of the exit orifice for the measurement of the operating pressure.
- A wattmeter or an ammeter for the examination of the input power and the comparison of the values indicated on the motor label with the effectively absorbed energy.
- A thermometer for measuring the temperature of the liquid. This parameter is very important and has to be kept under control to avoid the exposure of the machine to excessive temperatures, which could damage the materials of the pump (see paragraph "TEMPERATURES").
- A pressure gauge or an automatic safety device, which blocks the pump in case of operation without liquid, or two probes, one for the minimum and one for the maximum level, which are applied to the supply vat or tank.
- In any case you should carefully follow the instructions of installation put at your disposal by the producer of the appliance.

OPERATION

START OF THE PUMP

Before starting the pump you should take the following steps:

- a) Please make sure that the delivery tube is correctly connected and that the bolts are well tightened.
- b) Please check if in the vat there is the liquid, which has to be pumped, and that its level is at least high enough to cover the whole body of the pump.
- c) Close the exclusion valve on the delivery tube. If the pump is equipped with an external flow line, please open the tap and make sure that before the start of the pump the liquid reaches the guide sleeves of the machine capacity of 5 l/min. for every element that is flowed through and pressure of + 0,5 Bar compared with the operating pressure, if the bush, which has to be flowed through, is situated at the back of the pump body.
- d) After having completed the phases (a), (b) and (c) please make sure that the sense of rotation of the motor is correct (see arrow on the cap) by actuating the switch with a rapid sequence of start and stop. Please do not insist on making the pump turn in the inverse sense, since this operation could cause serious damages on the machine.
To change the sense of rotation you only have to invert two of the three terminal wires of the motor.
- e) Start the motor and slowly open the exclusion valve on the delivery until you reach the required capacity for operating the pump. (Please do not leave the sluice valve of the pressure tube closed for a long time).
- f) Check the input values of the pump by taking into consideration the values marked on the motor label and make sure that these values (input power in kw or intensity in ampere) are not exceeded.

STOP OF THE PUMP

If the delivery tube is equipped with a check valve, the stop of the machine may take place without any particular precaution.

In the negative case the delivery valve has to be slowly closed before stopping the motor so that water hammers in the pressure system are avoided and the liquid can flow out through the pump. Only at this point you may close the eventual auxiliary flowing from an external source, provided that the machine is equipped with such a device. We recommend short periodical operating controls of the pump.



Recommended Safety Measures

In the start as well as in the stop phase of the pump the operator should be adequately equipped for reasons of health preservation.

This means rubber gloves and boots, anti-acid overalls, helmet with protective visor for the face and the indispensable equipment for each operator, which excludes the risk of physical damages.

It is absolutely forbidden to introduce the fingers or other parts of the body into the orifices and the various openings. The pump is equipped with movable parts.

The mentioned operations have to be performed by skilled staff.

TEMPERATURES

For the correct operation of the machine should be observed the following temperature values, which are listed on the data sheet. Moreover we indicate the maximum and minimum operating temperatures, which have to be strictly observed for a continuous working cycle of eight hours.

PP = -10° C + 75° C

PVDF = -40° C + 90° C

The relative material is specified on the data sheet, on the delivery bill and on the invoice.



CAPACITY RANGE

The choice of the type of pump, impeller and motor takes place at the moment of ordering by taking into the consideration the capacity and head data requested by the customer.

The user should carefully observe the operating conditions mentioned on the data sheet and especially the data regarding capacity and head at the operating point to which the machine has been destined.

Please do not force the pump to work in the two extreme positions, i.e. too far on the right hand or too far on the left hand of the characteristic line, since serious problems might arise. For this reason we recommend to work with the intermediate point of the curve.

ACOUSTIC PRESSURE

If the present product is used in an appropriate and a permanent way, the noise exposure, which depends on the relative environment, may reach maximum values of no more than 80 dB (A).

HINTS ON CORRECT OPERATION

PREVENTIVE MAINTENANCE

The performances of the pump depend on the number of working hours, the materials used for its construction and on the care with which the pump is treated during its operative life. A daily check during operation helps to avoid complications and assures an immediate intervention in case of damage.

- The pump has to function without vibrations or abnormal noise. If similar events should occur, please intervene and check the status of the rotating organs like shaft, impeller, guide sleeves of the shaft, bearings of the motor, support and if necessary replace them.
- We recommend to inject once a week a small quantity of grease by means of the greasers positioned on the support.

The lubricant has to be replaced after 2000 operating hours (Please use special grease for bearings).

- Please control the characteristics of the pumped liquid (temperature, specific weight and chemical composition).

If these characteristics change, the operating conditions and the performances of the machine may change too.

- Please accurately check that changes in the pumped solution are compatible with the characteristics of the machine by taking into account the temperature values indicated in the paragraph "TEMPERATURES" of the present manual, while for the other parameters we advise to contact our local reseller or our company.
- Please make sure that capacity and pressure are according to the projected values and that they have not been subject to changes, which may negatively influence the internal parts of the pump.
- The partial rupture of the impeller blades may cause a reduction of the hydraulic performances. In this case you have to replace the faulty part.
- The filter housing has to be checked in periodical intervals and cleaned, if necessary.
- Please make sure that the control instruments are completely efficient and that the machine always receives the right signals.

The replacement of the damaged parts has to take place in a dry and clean environment.

LUBRICATION

CGV pumps are delivered with the bearings filled with grease.

It is recommended to inject a small quantity of grease by means of the greaser every week.

The suggested types of grease is SHELL ALVANIA 3 or ESSO BEACON 3 or equivalent.

CRYSTALLIZATION OF THE PUMPED LIQUID

The crystallization of liquids is a problem, which should not be underestimated. For this reason we invite the user to ask the producer for information on the pumped product and on the minimum value at which the liquid starts the crystallization process.

CHANGE OF THE PUMPED LIQUID

For the replacement of the pumped liquid you have to take the following measures:

- Completely empty the tube and the machine by opening the sluice valve at the delivery.
- Clean the pump internally with water or a suitable liquid by avoiding eventual chemical reactions, which might cause irreparable damages to the machine and the operator.
- Do not discharge the solution left after the cleaning of the internal parts of the pump into the environment.



Recommended Safety Measures

To operate in conditions of extreme safety during the control of the running machine the operator should be adequately equipped.

Rubber gloves and boots, anti-acid overalls and helmet with protective visor for the face are the indispensable equipment for the persons who have to operate without running the risk of physical damages.

The described operations have to be carried out by skilled staff.

EVENTUAL DRY FUNCTIONING OF THE PUMP

The principal rule, which you should observe at any instant, says that with a machine of this type you must avoid in every possible way that it functions without liquid. Only in this way you can exclude damages on the rotating parts.

There are many situations in which this drawback might occur:

- The malfunction of the control instruments due to the encrusting and corrosive action of the pumped liquids, which attacks the most exposed organs.
- A poor and inefficient maintenance of the filter.
- The most frequent one is the absolute or partial lack of liquid in the vat or in the tank. In this case you should equip the machine with suitable instruments, which block the pump, if the flow of pumped liquid is lacking (see paragraph "CONTROL INSTRUMENTS").

IMPURITIES CONTAINED IN THE PUMPED LIQUID

Due to their nature and design the pumps of this series have got low endurance levels in case of liquids, which contain solid, abrasive or filamentary particles.

We recommend to avoid, if possible, the pumping of such fluids or to install filters on the suction orifice and on the filling tube of the vat. In any case you should take into consideration that the maximum allowable concentration of impurities is 3 %. With higher values could be caused serious problems on the guide sleeves, the impeller, the body and the internal parts of the pump.

TROUBLES AND EVENTUAL CAUSES

THE PUMP DOES NOT EROGATE ANY LIQUID

- 1) In the vat there is no liquid.
- 2) The no-return valve on the suction tube is blocked and totally closed.
- 3) The impeller is blocked by rubbish or incrostations contained in the liquid.
- 4) The total head required by the plant is higher than the projected head of the pump.

THE PUMP DOES NOT REACH A SUFFICIENT CAPACITY

- 5) Air enters from the suction tube due to vortexes that are caused by an insufficient immersion.
- 6) The passages of the impeller are partially or totally obstructed by foreign bodies.
- 7) The rotation speed of the motor is too low.
- 8) The impeller is worn out or damaged and the distance to the pump body is too big.
- 9) The sense of rotation is wrong.
- 10) The end-float between the rotating and fixed guide bushes of the shaft or between the wear ring
- 11) in the pump body and the impeller (only for pumps with closed impeller) has become very big.
- 12) The filter on the suction side is obstructed.
- 13) The extension tube on the suction side (if applied) has got an underdimensioned passage section.

THE PUMP WORKS UNDER INSUFFICIENT PRESSURE

- 14) The viscosity of the liquid is higher than foreseen. See also points 4-6-7-8-9-10.

THE PUMP IS DISCONNECTED AND STOPS EROGATING

- 15) The transported liquid contains an excessive quantity of air or gas. See also points 5-11.
- 16) Temperature rise of the pumped liquid.
- 17) The capacity increased by more than the fixed value.

THE PUMP ABSORBS AN EXCESSIVE POWER

- 18) The specific weight or the viscosity of the pumped solution is higher than the projected values.
- 19) The pump performances are higher than foreseen.
- 20) The rotation speed is too high.
- 21) Damages or mechanical defects on the machine: distorted shaft, rubbing of the rotating organs, blocked bearings of the motor and the support, etc
- 22) Wrong alignment of the pump group vs. the motor.

THE PUMP CAUSES VIBRATION AND NOISE

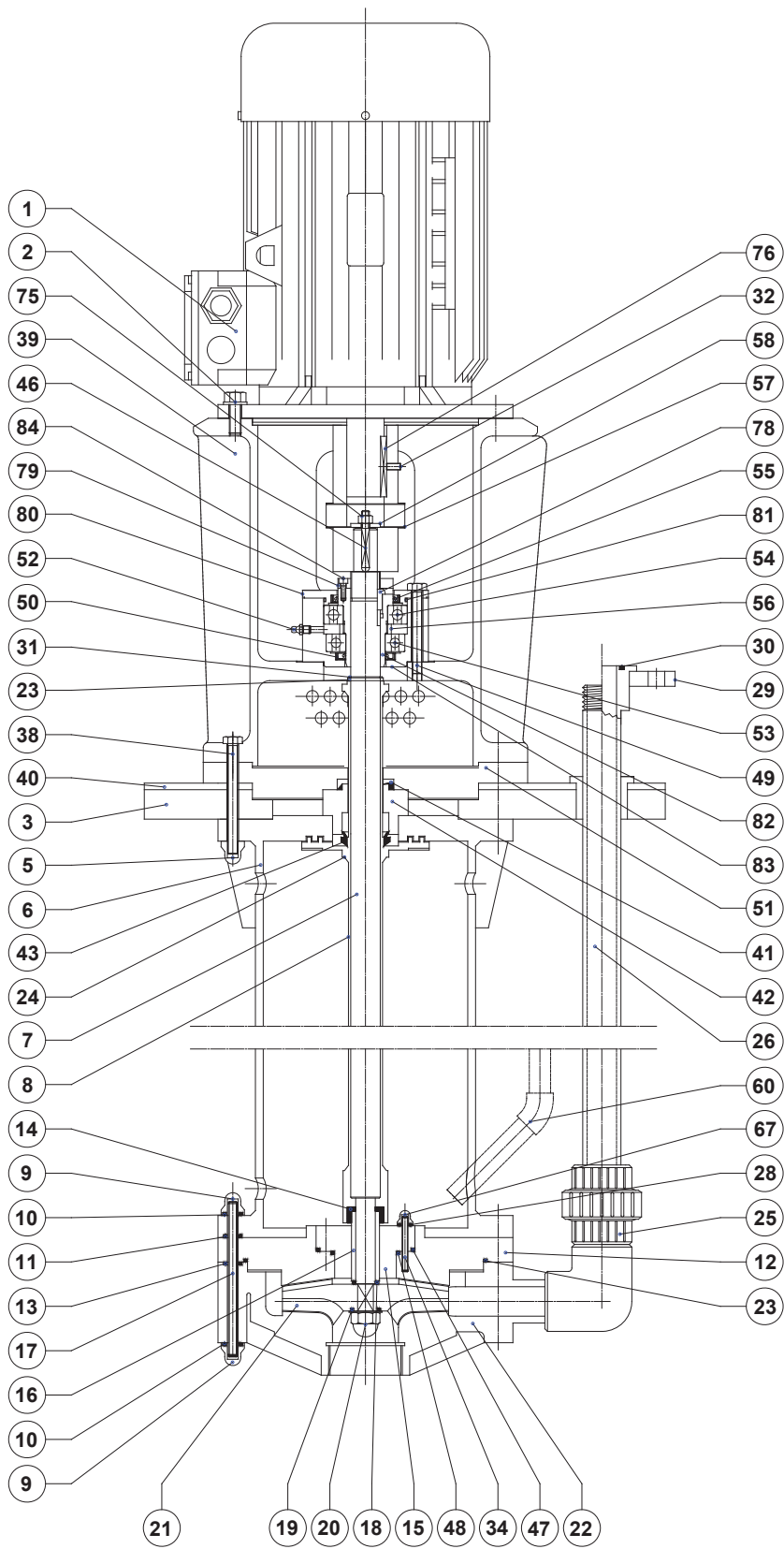
- 23) The flatness of the support plate has not been respected.
- 24) Operation at a capacity, which is too low.
- 25) The tube or the support structure is not rigid enough.
- 26) The bearings of the motor or the support are worn out or damaged. See also points 6 -20.
- 27) The pump is subject to cavitation, since the suction orifice has got an insufficient distance from the ground or the wall of the vat. Please find out the reasons for the abnormal operation by studying points 6-9-11-12.

THE GUIDE BUSHES OF THE SHAFT GET RAPIDLY WORN OUT

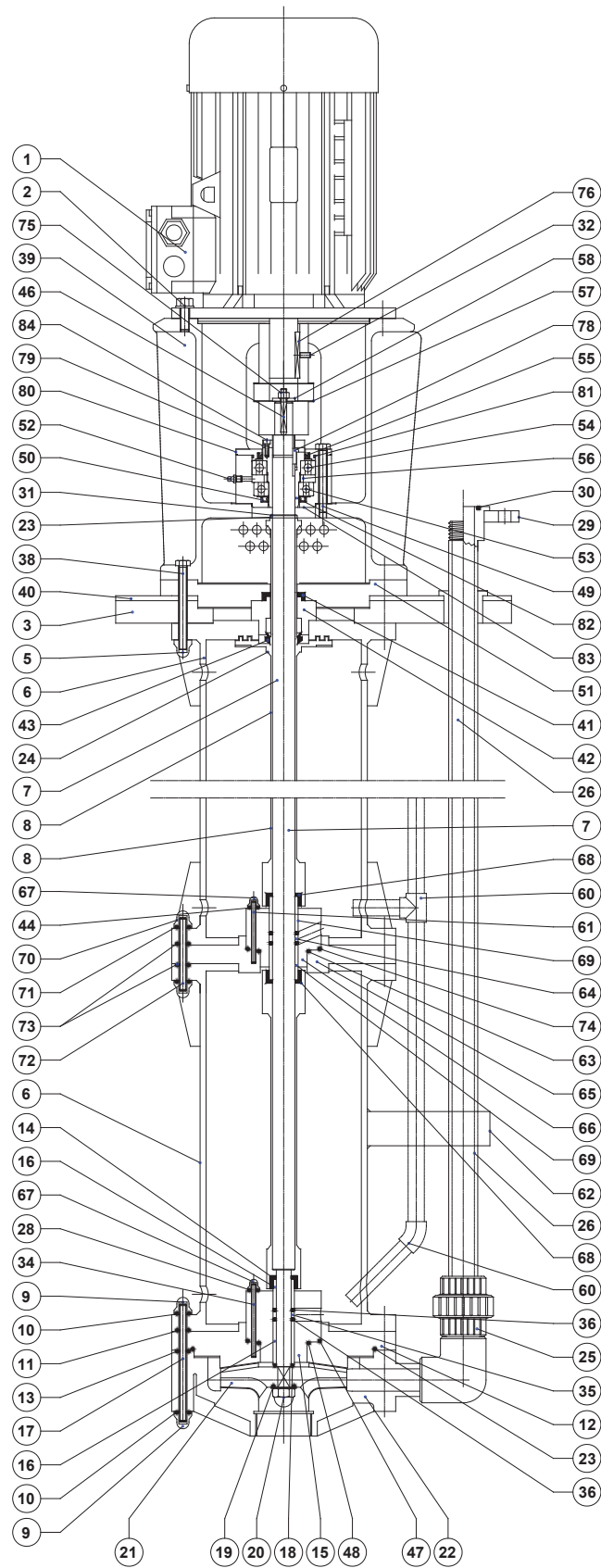
- 28) The flowing liquid or the pumped liquid contains foreign bodies or abrasive substances or the flow duct is obstructed.
- 29) The gaskets or other employed materials are not suitable for the characteristics of the pumped liquid.
- 30) The pumped liquid causes the formation of air or gas.
- 31) At the machine arrives only a small quantity of liquid or no liquid at all.

SHORT LIFE OF THE MOTOR OR SUPPORT BEARINGS

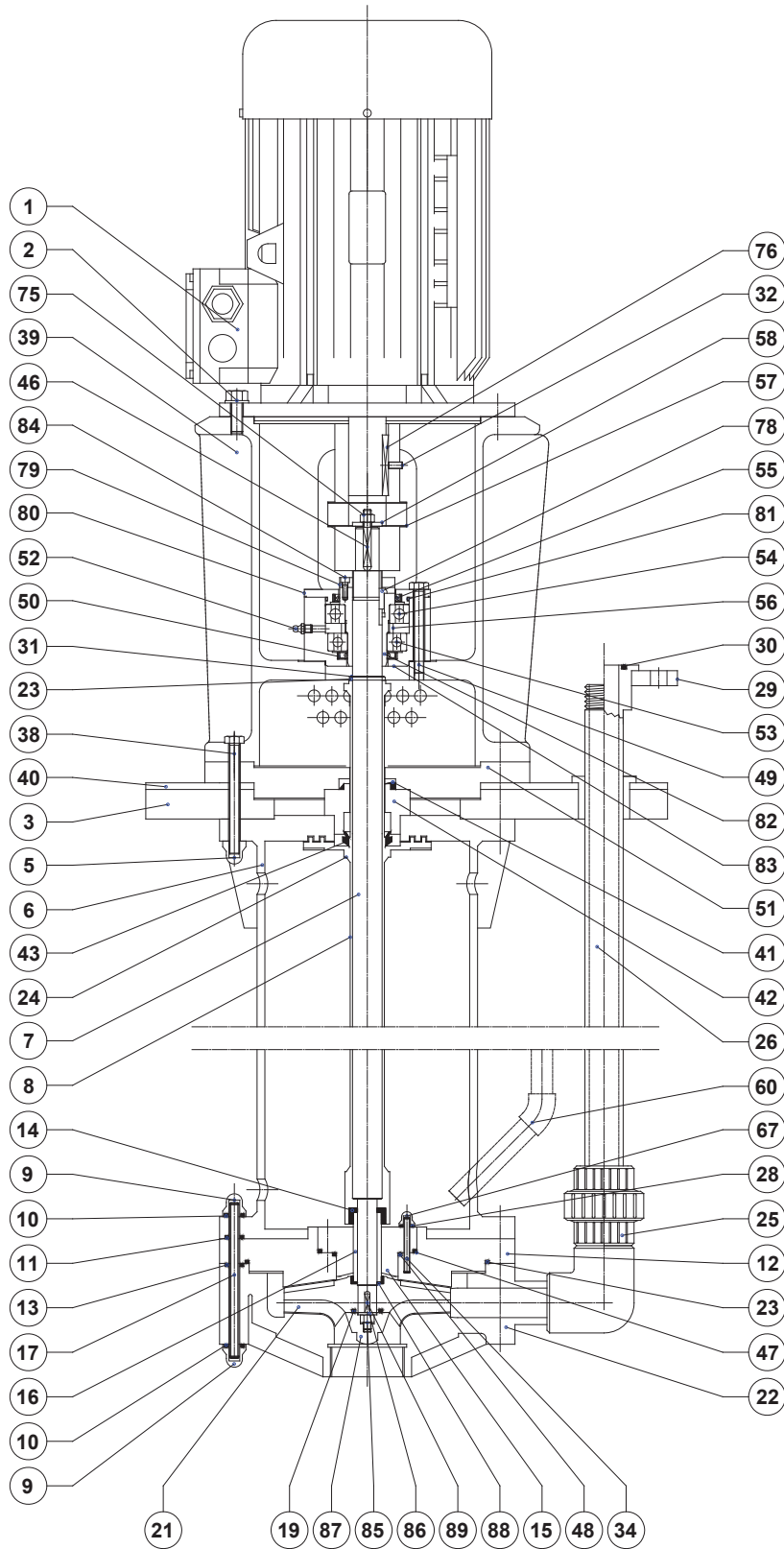
- 32) Lacking lubricant in the support.
- 33) Presence of foreign bodies in the lubricant.
- 34) Presence of water or condensate in the support or the motor.
- 35) Excessive thrust on the bearings caused by mechanical defects. See also point 20.



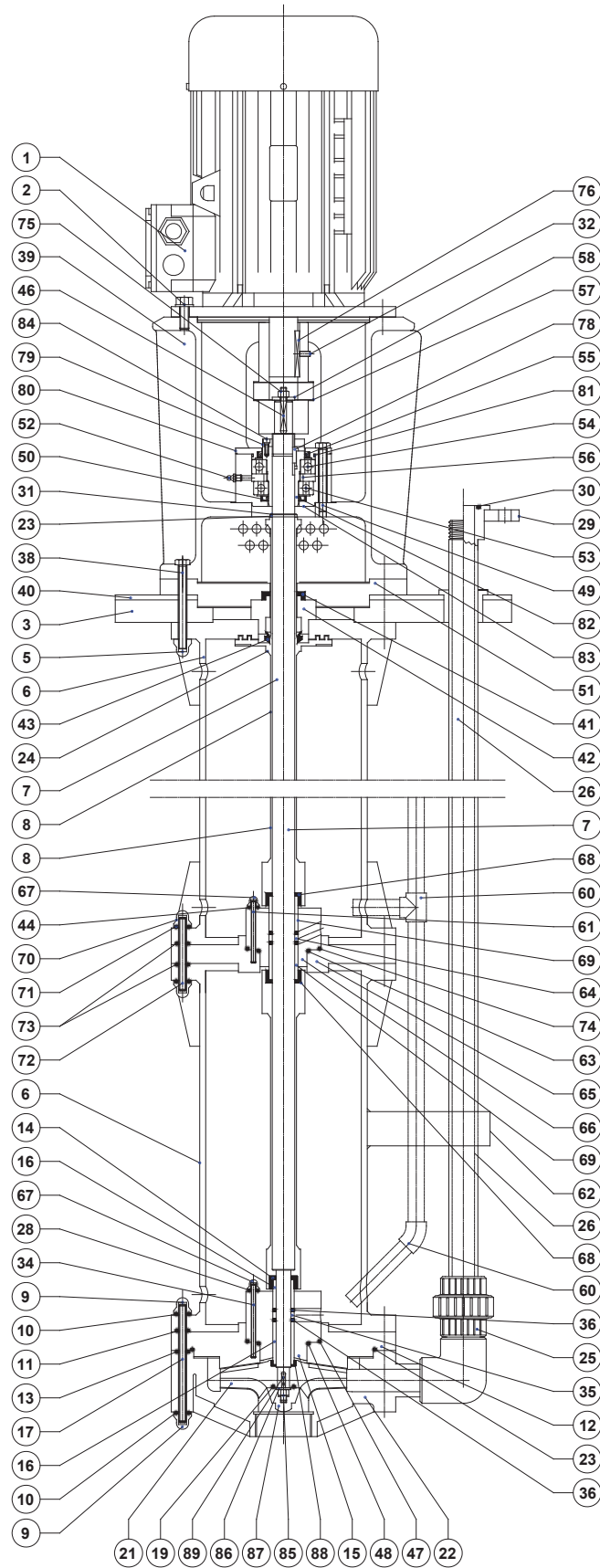
H = 500 - 750 - 1000 - 1250 With open impeller
 for pumps 25-100/25-125/32-125/40-130/40-160/50-160/65-125/65-160



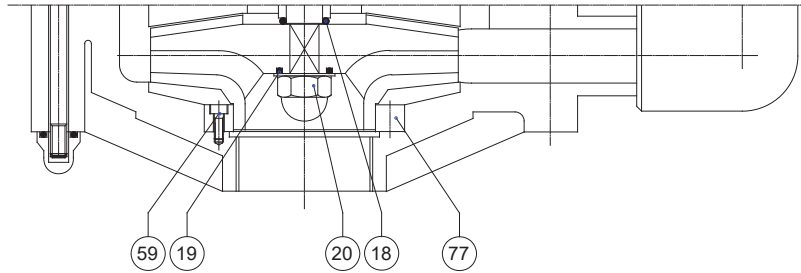
H = 1500 - 1750 - 2000 - 2250 - 2500 - 3000 With open impeller
for pumps 25-100/25-125/32-125/40-130/40-160/50-160/65-125/65-160



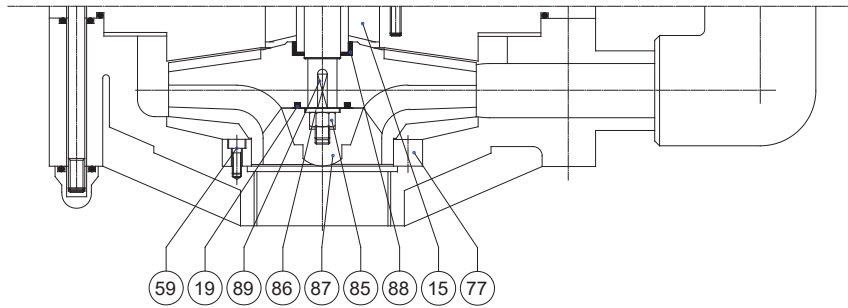
H = 500 - 750 - 1000 - 1250 With open impeller
 For pumps 40-200/40-250/50-200/50-250/50-315/65-250/80-200/80-250
 80-315/80-400/100-250/150-315



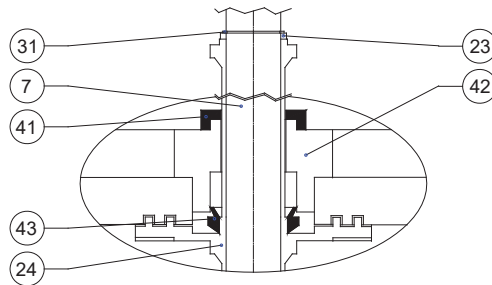
H = 1500 - 1750 - 2000 - 2250 - 2500 - 3000 With open impeller
 for pumps 40-200/40-250/50-200/50-250/50-315/65-250
 80-200/80-250/80-315/80-400/100-250/150-315



With closed impeller for pumps
 25-100/25-125/32-125/40-130/40-160/50-160/65-125/65-160



With closed impeller for pumps
 40-200/40-250/50-200/50-250/50-315/65-250/80-200/80-250/80-315/80-400/100-250/150-315



Vapour-tight device

PART LIST

POS.	DESCRIPTION	POS.	DESCRIPTION
01	Motor	48	O-Ring
02	Screw	49	Screw
03	Plate	50	Seal Ring
05	Covered Nut	51	Support Flange
06	Column	52	Greaser
07	Shaft	53	Ball Bearing
08	Shaft covering	54	Ball Bearing
09	Covered Nut	55	Seal Ring
10	O-Ring	56	Ring Nut
11	O-Ring	57	Coupling
12	Rear Block	58	Washer
13	O-Ring	59	Screw
14	Cap	60	Flushing Tees and Bends
15	Stationary Bushing	61	Tie Rod
16	Rotating Bushing	62	Stirrup
17	Tie Rod	63	O-Ring
18	O-Ring	64	Spacer
19	O-Ring	65	Intermediate Support
20	Impeller Lock Nut	66	Stationary Bushing
21	Impeller	67	Covered Nut
22	Body	68	Cap
23	O-Ring	69	Rotating Bushing
24	Deflector	70	Covered Nut
25	Pipe Union	71	O-Ring
26	Delivery tube	72	Tie Rod
28	O-Ring	73	O-Ring
29	Flange	74	O-Ring
30	O-Ring	75	Self-locking Nut
31	Retaining Ring	76	Key
32	Screw	77	Wear Ring
34	Tie Rod	78	Key
35	Spacer	79	Locking Nut
36	O-Ring	80	Cover
38	Screw	81	O-Ring
39	Head	82	Bushing
40	Reinforced Plate	83	Thrust Bearing Housing
41	Vapour Tight Ring / Cap	84	Screw
42	Stationary Ring	85	Nut
43	V-Ring	86	Washer
44	O-Ring	87	Ogive
46	Key	88	Cap
47	O-Ring	89	Key

MAINTENANCE AND REPAIR OPERATIONS

REMOVAL FROM THE PLANT

Before disconnecting the pump from the plant please take the following steps :

- a) Make sure that the pump is not running.
- b) Detach the plug from the electric switchboard.
- c) Detach the electric cables from the terminal board and carefully isolate the ends.
- d) Tighten the delivery valve.

After these operations you may begin with the removal of the machine from the plant.

Before disassembling the pump for maintenance you have to clean its whole body with water or an appropriate liquid. Please try to avoid chemical reactions, which might cause irreparable damages to the machine and the operator.

Please do not discharge the solution left after the cleaning of the pump into the environment.



Recommended Safety Measures

To operate in conditions of extreme safety during the removal of the pump from the plant the operator should be adequately equipped. Rubber gloves and boots, anti-acid overalls and helmet with protective visor for the face are the indispensable requisites for the persons who have to operate without running the risk of physical damages. The described operations have to be carried out by skilled staff.

HOW TO DISASSEMBLE THE PUMP

Take great care during the disassembly phase in order to avoid damaging any of the inside parts of the machine by an incorrect use of pliers and screwdrivers.

We recommend laying out the various components on a bench in the same order in which they were disassembled and protecting them from jolts and dust.

Having prepared the surface on which to place and disassemble the pump, proceed as follows:

- 1) put the machine in a horizontal position, before removing the motor (pos. 1) measure the exact distance between the two hubs of the flexible coupling (pos. 57). Afterwards position the pump vertically (if the column length allows it) with the body turned upwards placing the lantern on a flat surface.
- 2) Unscrew (right-hand thread) with an 18 or 22 mm elbowed wrench (do not use other types of wrench) the tightening nuts of the body (pos. 9) **fig. 2**.
- 3) Extract the body (pos. 22) after having unscrewed (right-hand thread) the delivery tube (pos. 26). If the presser has a flange (pos. 29), loosen the union (pos. 25). Take great care that any flow connectors are completely disconnected.
- 4) Disassemble the impeller (pos. 21) blocking it first with a strip wrench and unscrewing the ogive or the blocking nut (pos. 20) **fig. 3** and afterwards extract it from the shaft with the help of an extractor **fig. 4**. Carry on by removing the rear block (pos. 12).
- 5) Having completed the above operations, if the pump is fitted with intermediate supports, carry out the



FIG.2

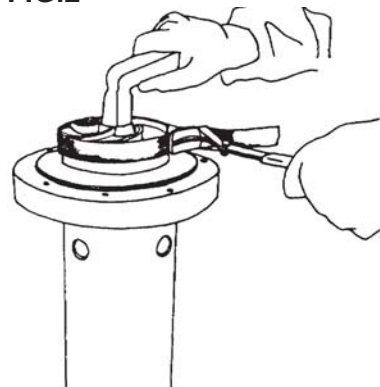


FIG.3

following operations:

- a) disassemble the lower segment of the column by unscrewing the nuts (pos. 70) which join the two parts.
 - b) Extract the protective covering (pos. 8) of the shaft together with the rotating bush (pos. 69).
 - c) Disassemble the intermediate support (pos. 65). In order to remove the static bush (pos. 66), unscrew the covered nuts (pos. 67).
 - d) In order to detach the upper segment of the plate (pos. 3), unscrew the screws (pos. 38). Afterwards extract the remaining segment of the shaft liner.
- 6) Remove the plates (pos. 3 – 40) and the support flange (pos. 51). At this point the machine will resemble **fig. 5**.
 - 7) Reposition the machine horizontally, unscrew the nut (pos. 75) which fixes the hub to the pump-shaft and remove it **fig. 6**. If it is also necessary to disassemble the hub from the motor, unscrew the socket head screw (pos. 32) which fixes it to the shaft. In both cases, if in difficulty, use an extractor.
 - 8) Remove the (pos. 49) screws in order to separate the little lid (pos. 80) from the support (pos. 83) **fig. 7**. Extract the rotor from the support **fig. 8**. In order to replace the ball bearings (pos. 53 – 54), unscrew the screws (pos. 84) and the ring nut (pos. 79) (right-hand thread), extract the tooth tongue (pos. 78), remove from the shaft (pos. 7) the group comprising the metal bush and the bearings themselves. Extract the lower one first (pos. 53), unscrew the ring nut (pos. 56) (right-hand thread) and afterwards remove the upper ball bearing (pos. 54).

Substitution of the static guide bushes (pos. 15 – 66) and rotating ones (pos. 16 – 69), must only take place if:

- a) clearance between the moving and the static parts is over 0.125 mm radial.
- b) One of the two bushes is scratched or even broken.
- c) The contact surfaces no longer have their original characteristics (they are rough or porous).

If the machine is fitted with a closed impeller it is necessary to check the wear ring (pos. 77) situated in the body (pos. 22), which should be replaced if there is an excessive widening of the internal diameter. Maximum radial clearance allowed between the impeller eye and the internal bush diameter is 0.6 mm, beyond which we recommend replacing the part. See to changing the ring if there are deep scratches, lacerations or abrasions of the contact surface, using an extractor for internal diameters, not before having unscrewed the fixing bolts (pos. 59) (operate with great caution: the screws are made of a plastic material).



FIG.4

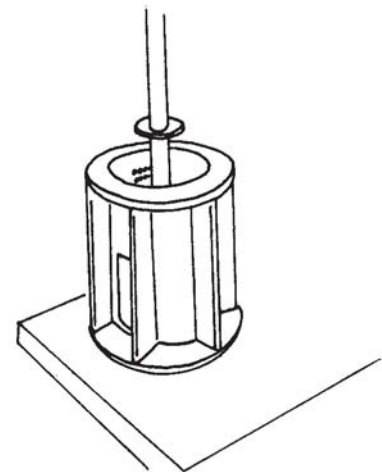


FIG.5

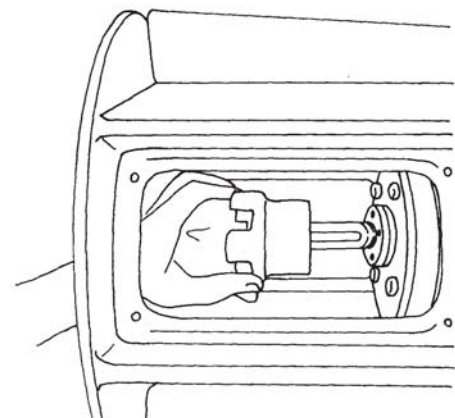


FIG.6

PROCEDURE FOR PUMP ASSEMBLY

Having disassembled the pump and decided which parts need replacing, clean thoroughly all the parts which are still in good condition with water or an appropriate solvent. Original spare parts must be used to replace parts in a bad condition. Just as the disassembly phase, also the assembly phase requires great precision and care in following the various operations.

9) Check very carefully that the pump shaft (pos. 7) is in perfect condition. It is important to see if there any areas where the part is corroded. Neither must its balancing be neglected; by eye it is difficult to see if the part is suitable or not. Checking with a comparator is an important and indispensable operation to carry out in order to guarantee a successful intervention.

How to proceed:

- a) the part must be fixed to the two extremities (for example using the mandrel of a lathe and its tail-stock).
 - b) Position the sensor of the instrument along the whole length of the shaft at approx. every 300 mm.
 - c) Rotate the part and note any unbalancing (in the point of maximum unbalancing do not go over 0.10 mm). If the numbers noted are not within the limits described above we recommend getting in touch with our technical office for an explanation.
- 10) Reassemble the ball bearings (pos. 53 – 54) on the metal bush (pos. 82). Once the rotor has been recomposed insert it into the support (pos. 83) **fig 10** and proceed in the opposite way of point 8.
 - 11) Assemble the hub on the pump-shaft, keeping a distance of 7 mm between the threaded ring nut (pos. 80) and the part underneath the shaft itself. In order to find the exact position, screw or unscrew the ring nut until reaching the required point **fig. 9**; fix the ring nut with the four socket head screws (pos. 84). If you want to make the impeller go forward or backward in respect to its original position, once all the pieces of the pump are assembled, adjust the position of the shaft as described above.
 - 12) Fix the support flange (pos. 51), the rectangular plates (pos. 3 – 40) and the flange of the column onto the metal lantern (pos. 46) with the screws (pos. 38).
 - 13) Insert its covering liner onto the shaft (pos. 8) and the bushes of the rotating guides (pos. 16 – 69). Place the rear block (pos. 12) in its special seat.
 - 14) Assemble the impeller (pos.21).
 - 15) Close the pump-body (pos. 22), by screwing the covered nuts (pos. 9) with an 18 or 22 mm elbowed wrench.
 - 16) Screw the delivery tube (pos. 26) to the body.
 - 17) Apply the electric motor (pos. 1) to the lantern (pos. 39) taking care that the two hubs of the flexible coupling (pos. 57) are exactly the same distance apart as before disassembling the machine. If they should not be, loosen the socket head screw (pos. 32) which fixes the hub to the motor and reposition the part correctly.

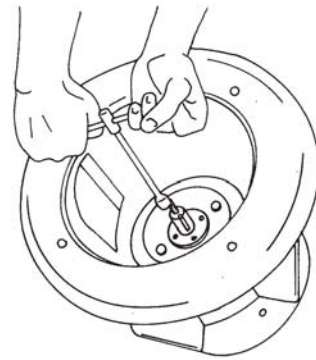


FIG.7

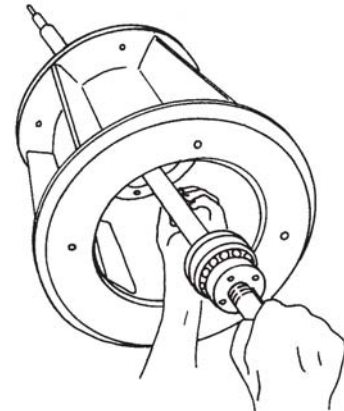


FIG.8

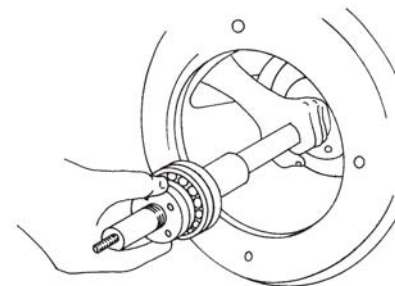


FIG.9

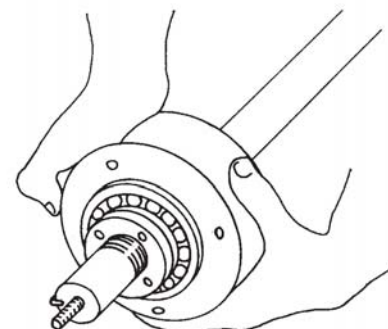


FIG.10



Useful indications

The assembly and disassembly operations of the pump can be performed exclusively by persons who have got basic mechanical knowledge and skills.

For a better understanding of the characteristic features sufficient notions on the materials, which are used for the construction of the machine, are indispensable.

RECOMMENDED SPARE PARTS

To determine the minimum quantity of spare parts, which should be available for eventual replacements, please take into consideration the operating conditions (more or less heavy) and the number of interchangeable units installed on the plant.

For each pump we normally advise to keep the following pieces on store:

- a) One impeller (pos. 21) with its locking nut (pos. 20).
- b) One rotating bush (pos. 16) and one fixed bush (pos. 15). If intermediate stages are foreseen, you should also keep on store two static bushes (pos. 66) and two rotating bushes (pos. 69).
- c) A complete set of gaskets (pos. 10-11-13-14-18-19-23-28-30-36-47-48-68-71-73-81).
- d) A shaft with its coating (pos. 7-8).
- e) A couple of bearings (pos. 53-54) and of sealing rings (pos. 50-55).
- f) If equipped with a vapour seal, have to be kept on store a rubber cap (pos. 41) a stationary PTFE ring (pos. 42) and a V-ring (pos. 43).
- g) If a closed impeller is mounted, it is important to keep available as spare parts a PTFE C-G wear ring (pos. 77) and its locking screws (59).

In your spare part orders please always cite:

- machine number of the pump
- series and type
- number and position of the component on the sectional drawing in the present manual
- quantity of requested pieces.

DISPOSAL

The replaced parts or the pumps, which reached the end of their operative life, have to be submitted to a careful selection in order to separate the various parts according to the materials. They should be stored and if possible recycled. If this is impossible, please charge specialized an authorized companies with the disposal.



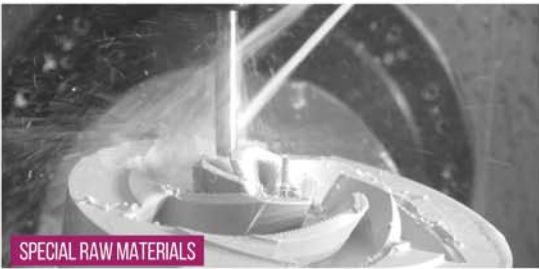
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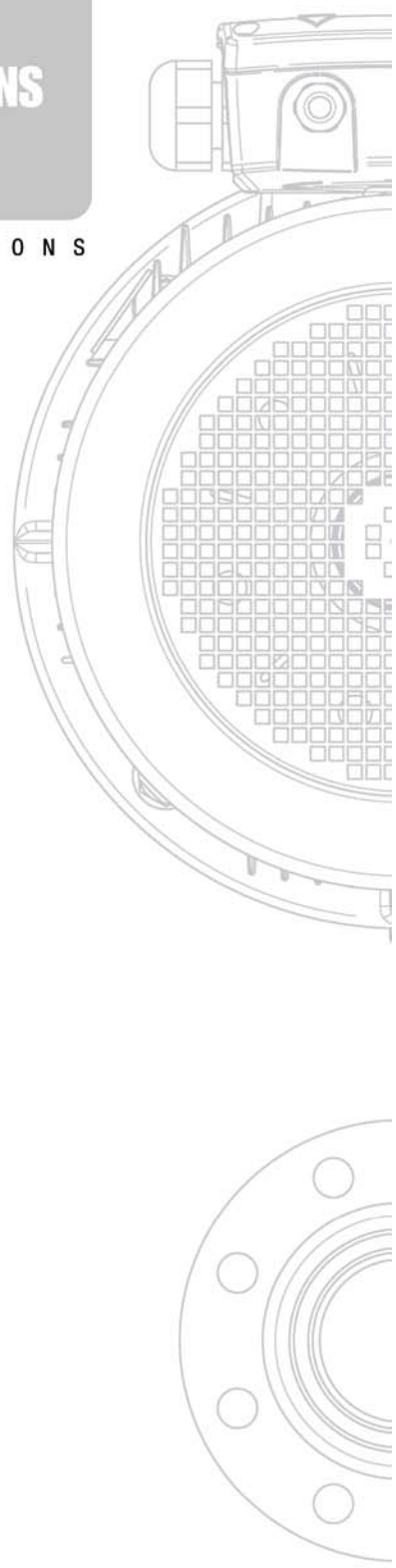
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