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GENERAL INFORMATIONS

EXECUTION

The pumps of these 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 high 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 by means of 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 and are built in insulation class F.

CASING

The casing is equipped with a volute. The suction and discharge nozzles are on the axis.

This is corresponding to the normal requirements of this type of plant.

The pump nozzles type can be flanges UNI 2237 or ANSI 150.

In the area under the body has been reserved a space for an eventual draining hole for the complete flowing out of the liquid from the pump.

IMPELLER

In series is installed an semi-open impeller and on request or if needed can be mounted a closed impeller. 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 this machines, the rotor is connected with the electric motor by means of an elastic coupling and is held up by a cast iron support with two ball bearings (CGD series). CDM pumps mount the shaft directly fixed at the motor-shaft.

REAR BLOCK

The rear block is deep and may also be adapted to the insertion of single or double mechanical seals and edge seals.

INTERMEDIATE ADAPTOR AND SUPPORT

The intermediate adaptor and the bearing support, they have a very sturdy construction, they are made in a single piece that separate motor from pump .

SEALS

The applied seals can be of different types and different trade marks.

The choice is made with the order and according to the operating conditions of the machine.

BASEPLATE

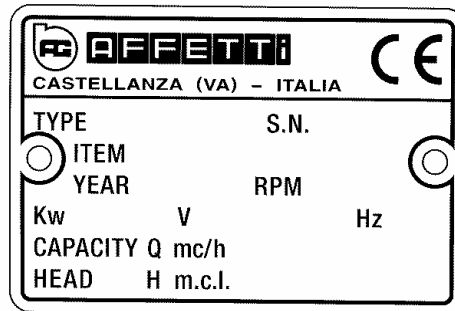
As far as the range of CGD machines is concerned, the baseplate is entirely constructed of electro-welded carbon steel and is equipped with a butt strap of the same material.

For CDM series it's mounted a base in stainless steel AISI 304.

MARKING

Each machine is equipped with a label on which you find all the data requested by the Machine Decree **98/37EC** and which facilitate 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 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 in the best possible position to assure:

- An easy installation of the suction and delivery tubes. The machine should be positioned in immediate neighbourhood of the suction column or tank. Elbows and contractions should be excluded as far as possible.
- An easy access for inspection during normal duty or for maintenance operations.



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 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 body or overflows of highly corrosive liquid during operation under pressure.

Before the installation of the machine you should make sure that the interruptor is in the "zero" position (OFF) and disconnect the appliance from the supply to avoid the accidental actuation of the moving parts.

These operations should be performed only by specialized and trained staff.

SUPPORT BASE AND FOUNDATIONS

These parts have to be realized with suitable materials and guarantee the stability of the support and its surrounding area.

Foundations in reinforced concrete layer on solid ground are highly recommendable. The base has to be placed in a horizontal position. It should be checked by a water level and is fixed by anchoring holes applied on the base itself or on the feet of the motor with screws of stainless steel according to AIS1316. In case of misalignment between the pump and the tubes we recommend the use of metal shims (AISI 316) to equal the differences, which occurred during the connection.

CONNECTION WITH THE TUBES

The suction and the delivery tubes, which are connected with the mouthpieces of the machine, should not produce any excessive charges or disproportions.

Elevated forces and excessive movements transmitted to the tubes may cause damages on the pump. For this reason we recommend to use brackets and rigid fixations for the delivery and suction collectors. 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 flanges of the tubes and of the electric pump. A faulty positioning of these tubes could cause forced unnatural alignments of the various connected collectors and subsequently this could cause leaks on the gaskets or even cracks on some tracts of the tube.

The suction tube has to be controlled and flushed before the connection to guarantee that there are no solid or foreign bodies inside, which could damage the delicate parts of the machine.

FLUSHING PIPE CONNECTION TO THE PUMP

In case of a double flushed mechanical seal the flushing line connection (1/2" GAS), must be with the pipe where is written **INLET** for the entrance of the flushing liquid .

The exit of the flushing liquid instead is identified with **OUTLET** .

CONNECTION UNDER HEAD (Fig. 1)

The installation of the centrifugal pump under head is the most frequent and suitable one. It follows a very simple rule: the water mark of the liquid level always has to be higher than the axe of the suction orifice of the machine and this is an essential condition for avoiding serious damages on the sealing organs and on other parts.

The tract of the suction tube has to be prepared in the way that a tortuous course, constrictions and various obstacles, which may cause difficulties in the free flow of the liquid through the passage of the tube, are avoided.

We recommend to keep the pump in the immediate neighbourhood of the vat or the tank from which the liquid is taken. If this is impossible, you should increase the section of the passage in relation to the diameter of the suction orifice to avoid the formation of air pockets.

On the rear side of the vat you should immediately mount an exclusion valve and successively, if the liquid is dirty, it is recommendable to install a filter (3 to 5 times the tube diameter) on the suction collector to exclude the introduction of foreign bodies into the pump body.

If the tracts results too long or the pumped liquid is too hot, you should introduce a dilatation joint at a distance from the machine, which corresponds to 5 times the diameter of the suction tube. For the complete emptying of the collector and the machine has to be introduced between the joint and the filter a small discharge valve (3/8") during the disassembly of the plant.

On the delivery has to be applied at first a regulation valve at a distance, which corresponds to 5 times the diameter of the tube passage. In immediate sequence has to be mounted a check valve and herewith the installation is completed.

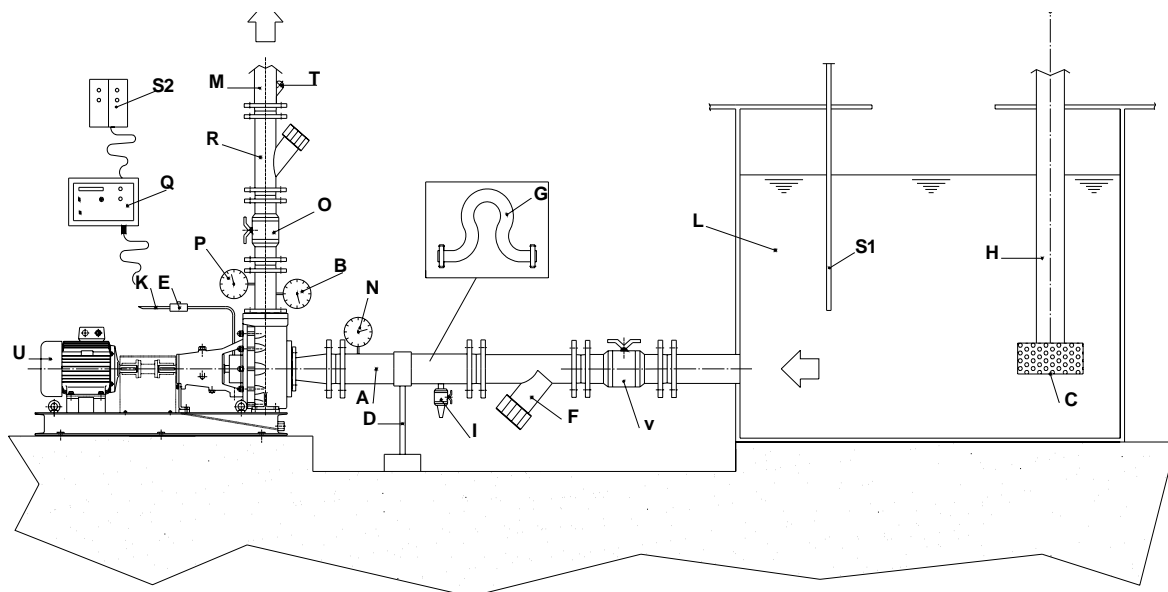


FIG.1

- | | | |
|----------------------|-------------------------|----------------------------|
| (A) Suction tube | (I) Discharge valve | (Q) Electric control board |
| (B) Manometer | (J) Filling tap | (R) Check valve |
| (C) Filter | (K) External flow line | (S1) Level Probe |
| (D) Bracket | (L) Supply vat | (S2) Dry run switch |
| (E) Electric-valve | (M) Delivery tube | (T) Thermometer |
| (F) Filter | (N) Manual vacuum gauge | (U) Pump |
| (G) Dilatation joint | (O) Delivery valve | (V) Suction valve |
| (H) Charge tube | (P) Pressure gauge | (W) Foot valve |

CONNECTION OVER HEAD (Fig. 2)

This method cannot be considered the most suitable one for the installation of a centrifugal pump, which due to its design is not really fit for a use of this kind. In fact we feel obliged to illustrate the problems, which could arise from a similar application, which above all refer to the gradual emptying of the suction tube and probably to a light leakage at the foot valve.

This problem may be caused by an insufficient sealing of the gaskets of the valve or by a movement of the tightening piston. For the above-mentioned motive we do not recommend this type of installation, if the pumped product is encrusting, sticky or so hot that it is almost unsupportable for the construction material of the pump.

On the other hand there should not be any particular problems with unencrusting liquids, which have room temperature. The connection of the suction tube always requires an extremely short tract and a maximum difference of 3 m between the over head connection of the pump and the free water mark.

If the liquid contains impurities, on the end of the suction collector should be applied a foot valve, which guarantees the flow into the column. A wide-radius bend takes the tube from a vertical into a horizontal position and reaches up to the dilatation joint (applied only in case of a long course 'of the tube or of hot liquid).

As for the installation under head also in this case should be mounted a valve (3/8") for the emptying of the suction tube and the pump body. The installation of the delivery has to be performed according to the same principles as described in the "CONNECTION UNDER HEAD" (see the relative paragraph).

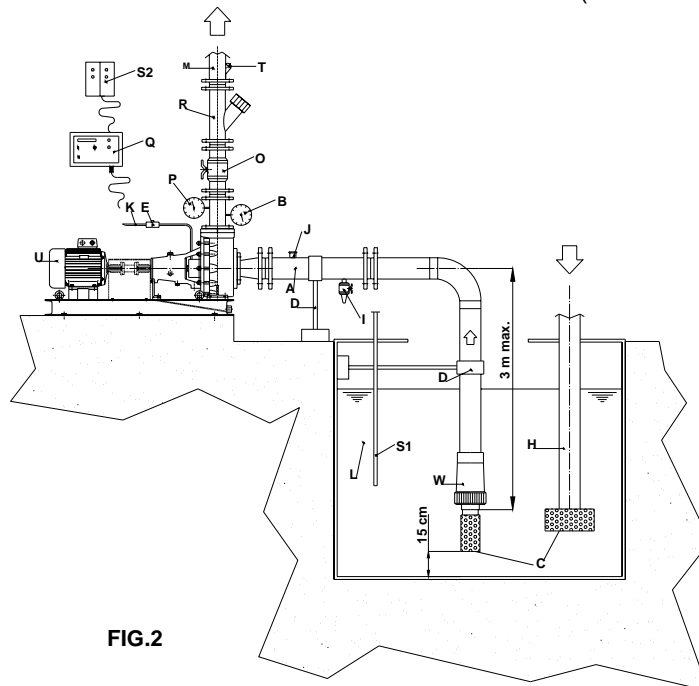


FIG.2

CONNECTION OF THE ELECTRIC MOTOR

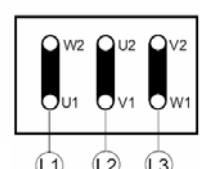
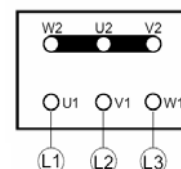
We advise to follow outlin electrical under position.



U1 V1 W1



U1 W1 V1





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 workers.

ALIGNMENT OF THE GROUP (Only for CGD series)

Normally the alignment of the pumping group and the motor is performed in our workshop.

After the installation will be necessary another control, which can be performed by means of a gauge or a rule with shims, fig. A -B.

The control with rule and shims is performed in the following way, fig. A:

- a) Please check with a caliper, a rule or a calibrated gauge that the distance between the two semi-joints is equal at the four points measured on the circumference with a maximum tolerance of 0,5 mm.
- b) Apply a rule on the two parts out the joint and check if the distance between the parts and the shaft is equal at every point.

The gauge control is performed according to fig. B.

- c) Manually make the two semi-joints turn together and keep the instrument stable in the same point (on the rim of the joint).
- d) Repeat the operation turning the joint by 90°.

If in one or the other case you should note differences in level between the two semi-joints, you have to insert laminated shims to align the unaligned parts of the motor or the support.

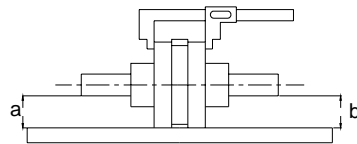


FIG. a

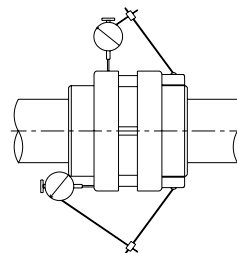


FIG. b

CONTROL INSTRUMENTS

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

A manual vacuum gauge installed on the rectilinear tract of. the suction tube in the immediate neighbourhood of the pump allows to check and to calculate the N.P.S.H. value.

A manometer installed near 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", page 10).

A pressure gauge or an automatic safety device, which blocks the pump in case of functioning without liquid or a minimum level probe, which is applied to the supply vat or tank.

In any case you should carefully follow the instructions for 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 and the suction tubes are correctly connected and that all the bolts are well tightened.
- b) The sluice valve of the suction section has to be completely opened for the filling of the pump and the tube. Please eliminate eventual air or gas pockets and then close the discharge valve.

If the machine is functioning under head, you should flood the suction tube and the pump and make sure that the foot valve is correctly functioning and that above all the sealing of the gaskets is perfect.

- c) Close the exclusion valve on the delivery tube.
- 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 check 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 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	=	0° C +85° C	PEHD	=	-15° C +80° C	PVC	=	0° C +60° C
PVDF	=	-20° C +100° C	PTFE	=	-50° C +150° C			

CAPACITY RANGE

The choice of the type of pump, impeller and motor takes place at the moment of ordering by taking into 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 installation site to which the machine is 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 functionality of the pump depends on the number of working hours, the service conditions, the used construction materials 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 damages.

- 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, sealing and support bearings and if necessary replace them.
- Vibrations and abnormal noise might be the lacking alignment of the pumping group and the motor or simply the rupture of the rubber of plastic parts of the elastic joint. In this case please find a remedy by observing the instructions given in the paragraph "ALIGNMENT OF THE GROUP" on page 9.
- Once a week please control the oil level by means of the inspection plug on a side of the bearing housing. In case the level would be below the center line of the inspection plug add the right quantity of oil. The lubricant has to be replaced after 2000 hours of operation.

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 indications on temperature given in the present manual in the paragraph on "TEMPERATURES", page 10, while for the other parameters we advise to contact your 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 be caused by 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 gets the right signals.
- Please check the support base and make sure that the gaskets of the machine do not lose a small quantity of liquid. In any case we recommend to intervene before any symptom of this kind occurs and to replace the O-rings or the sealing organ, which may be the cause of a similar problem.

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

LUBRICATION GRADE OF OIL (Only for CGD series)

Oil used for lubricating ball or roller bearings should be a high quality, well refined mineral oil. Vegetable or animal oils should not be used as they tend to become rancid and will eventually corrode the bearing surfaces. The following suppliers grades are suitable:

Agip	OTE 46
BP Oil Ltd	Energol THB 46 or CS 46
Castrol	Perfecto T46
Chevron	DC Turbine Oil 46
Esso	Teresso 46 or Nuto H46
Gulf	Harmony 46
Mobil	DTE light
Shell	Turbo T46
Texaco	Regal Oil R & O 46

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 for information on the minimum value at which the liquid starts the crystallization process.

CHANGE OF THE PUMPED LIQUID

If you want to change pumped liquid, you have to take the following measures:

- Close the delivery and the suction taps.
- The tube and the machine have to be completely emptied by opening the discharge valve on the suction duct or in case of a mobile installation under the body of the pump.
- 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 obtained from 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 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 for a machine of this type you must avoid in every possible way that it functions without liquid in order to exclude damages on the sealing. There are many situations, in which this drawback might occur and some of them are listed below. Very frequently this occurs during the charge and discharge operations of the tank trucks. In this case you should equip the machine with suitable instruments, which block operation in case of a lacking flow of pumped liquid (see paragraph entitled "CONTROL INSTRUMENTS": on page 9). Other causes are:

- 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 or inefficient maintenance of the filter or the foot valve;
- The missed opening of the suction valve;
- The total or partial absence of liquid in the vat or the tank;
- The formation of air pockets and cavitation due to a wrong dimensioning and an inadequate structure of the suction collector.

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 a filter on the suction tube. 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 sealing organs, the impeller, the body and the internal parts of the machine.

TROUBLES AND EVENTUAL CAUSES

THE PUMP DOES NOT EROGATE ANY LIQUID

- 1) The pump and the suction tube are not completely filled with liquid. There are air pockets, which have to be purged.
- 2) The foot valve is clogged due to solid residues contained in the liquid.
- 3) The non-return valve on the suction tube is blocked and totally closed.
- 4) The foot valve is faulty and causes the partial or total emptying of the suction duct.
- 5) The impeller is blocked by rubbish or incrustations present in the liquid.
- 6) The foot valve is not sufficiently immersed in the liquid.
- 7) The total head required by the plant is superior to the projected head of the pump.

THE PUMP DOES NOT GIVE SUFFICIENT PERFORMANCES

- 8) Air is penetrating into the suction tube through the sealing.
- 9) The passages of the impeller are partially or totally obstructed by foreign bodies.
- 10) The rotation speed of the motor is too low.
- 11) The impeller is worn out or damaged and the distance to the pump body is too big.
- 12) The sense of rotation is wrong.
- 13) The course of the suction duct is not exact.
- 14) The filter on the suction portion is obstructed.
- 15) The suction tube has got an underdimensioned passage section or an excessively tortuous course.
- 16) The liquid level is too low.
- 17) The foot valve is underdimensioned.

THE PUMP WORKS UNDER AN INSUFFICIENT PRESSURE

- 18) The viscosity of the liquid is higher than foreseen. See also points 7-9-10-11-12.

THE PUMP IS DISCONNECTED AND STOPS EROGATION

- 19) The transported liquid contains an excessive quantity of air or gas. See also points 4-8-14-16.
- 20) Temperature rise of the pumped liquid.
- 21) The capacity increased by more than the fixed value.

THE PUMP ABSORBS AN EXCESSIVE POWER

- 22) The specific weight or the viscosity of the pumped solution is higher than the projected values.
- 23) The pump performances are higher than foreseen.
- 24) The rotation speed is too high.
- 25) Defects or mechanical damages on the machine: non-linear shaft, scrubbing of the rotating parts, locked bearings of the motor or the support, etc.
- 26) Excessive compression of the elastic element on the mechanical sealing (if mounted).

THE PUMP CAUSES VIBRATION AND NOISE

- 27) Operation at a capacity I which is too low for the application.
- 28) The tubes or the foundations are not sufficiently rigid.
- 29) The bearings of the motor or the support are worn out or damaged. See also points 9-25.
- 30) The pump is subject to cavitation. Please check the reasons for this abnormal functioning by taking into consideration points 1-9-12-14-15-16.
- 31) Lacking alignment between the pump and the motor.

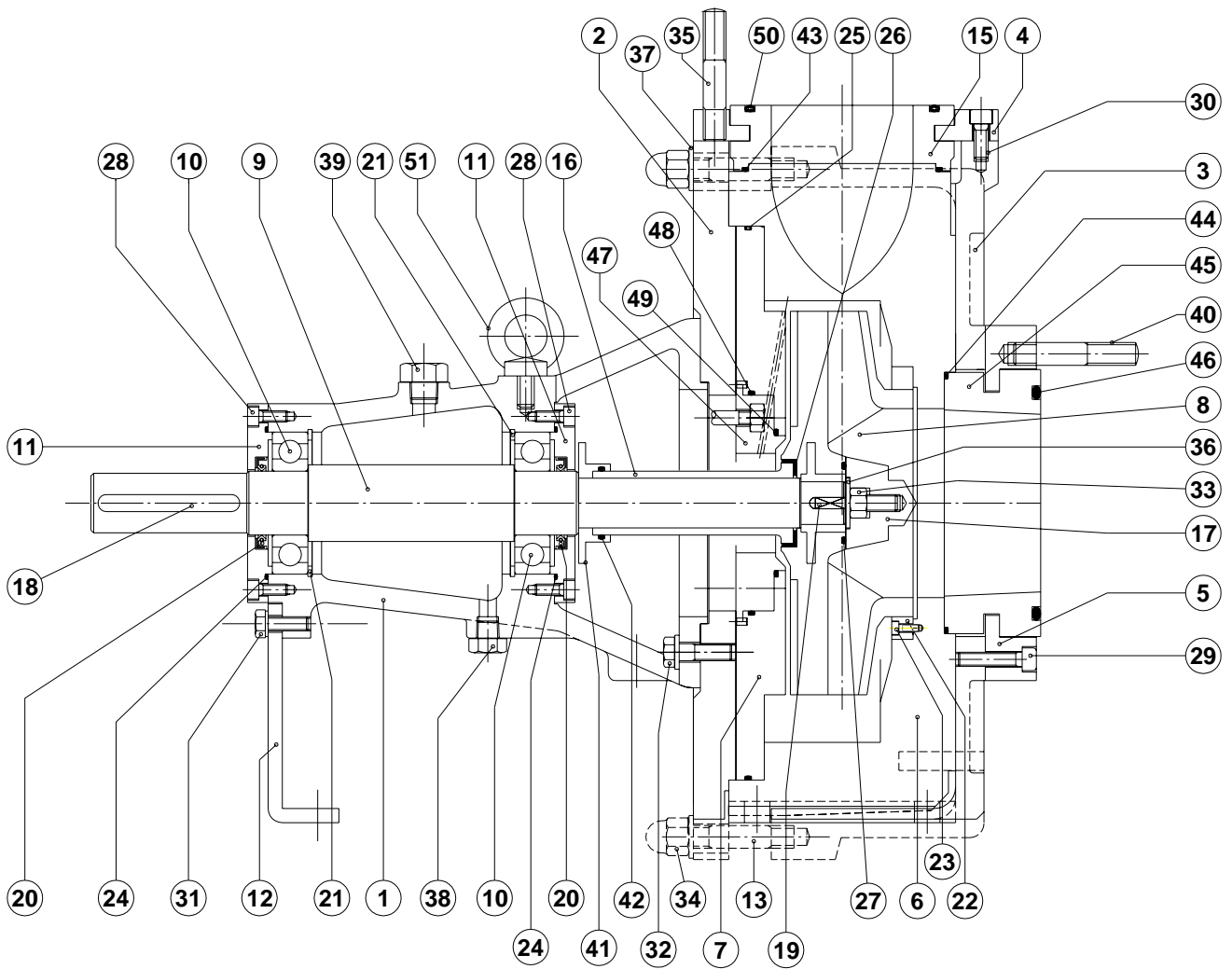
THE SEALING DEVICE IS SUBJECT TO RAPID WEAR

- 32) The flowing liquid or the pumped liquid contains foreign bodies or abrasive substances.
- 33) The gaskets or other employed materials are not suitable for the characteristics of the pumped liquid.
- 34) The pumped liquid causes the formation of air or gas.
- 35) At the machine arrives only a small quantity of liquid or no liquid at all.

THE BEARINGS OF THE MOTOR OR OF THE SUPPORT ARE SUBJECT TO RAPID WEAR

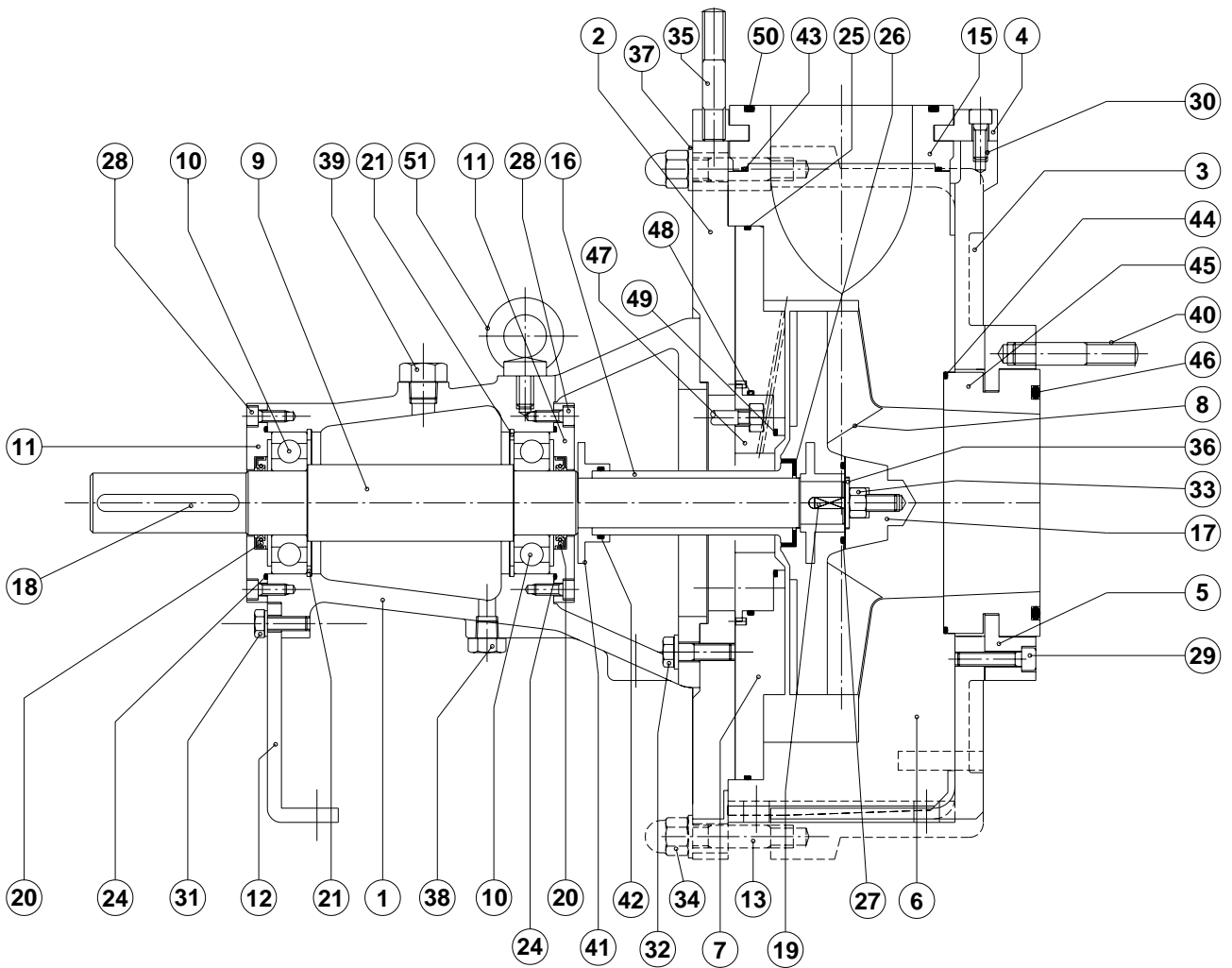
- 36) Lacking lubricant in the support.
- 37) Presence of foreign bodies in the lubricant.
- 38) Presence of water or condensate in the support or in the motor.
- 39) Excessive thrust on the bearings caused mechanical defects. See also point 25.

SERIES CGD CROSS SECTION



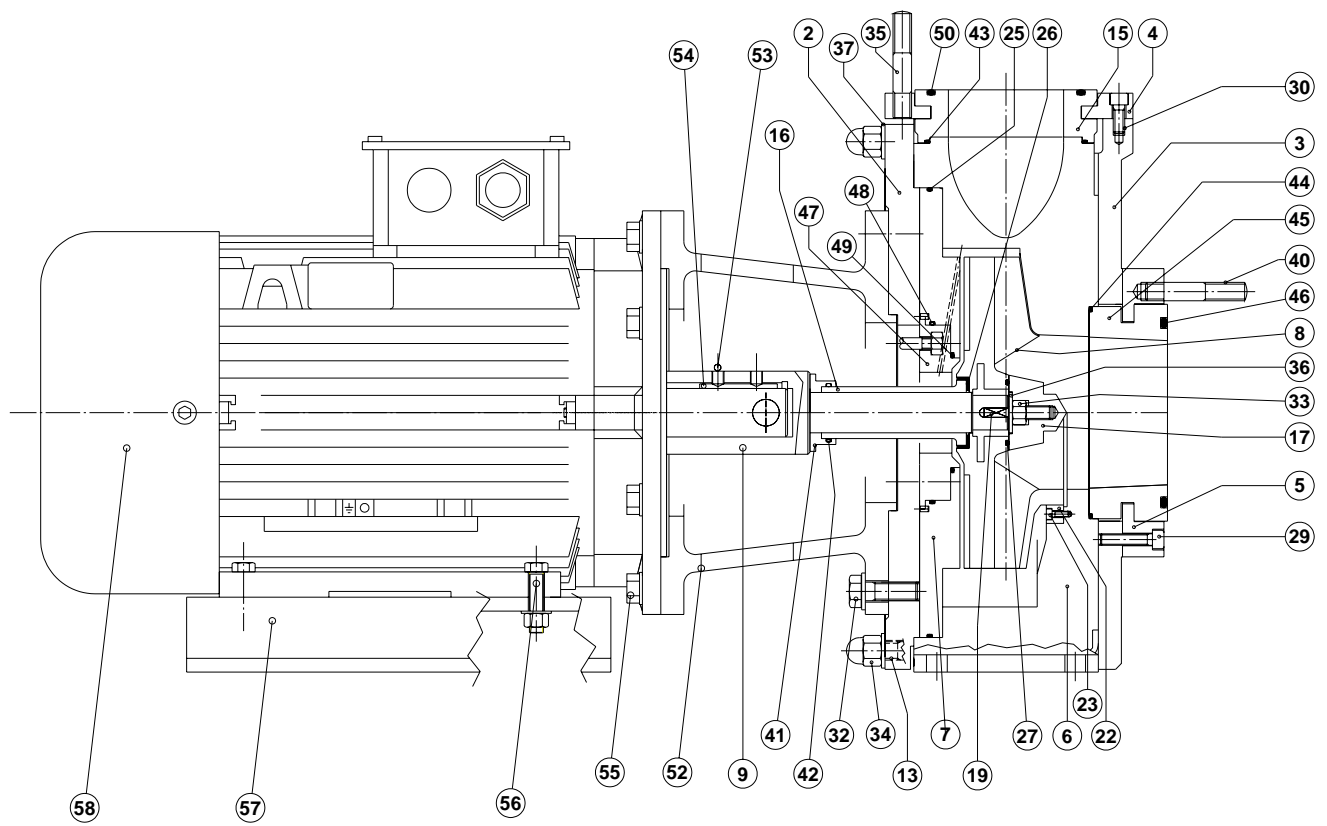
Closed impeller section

SERIES CGD CROSS SECTION



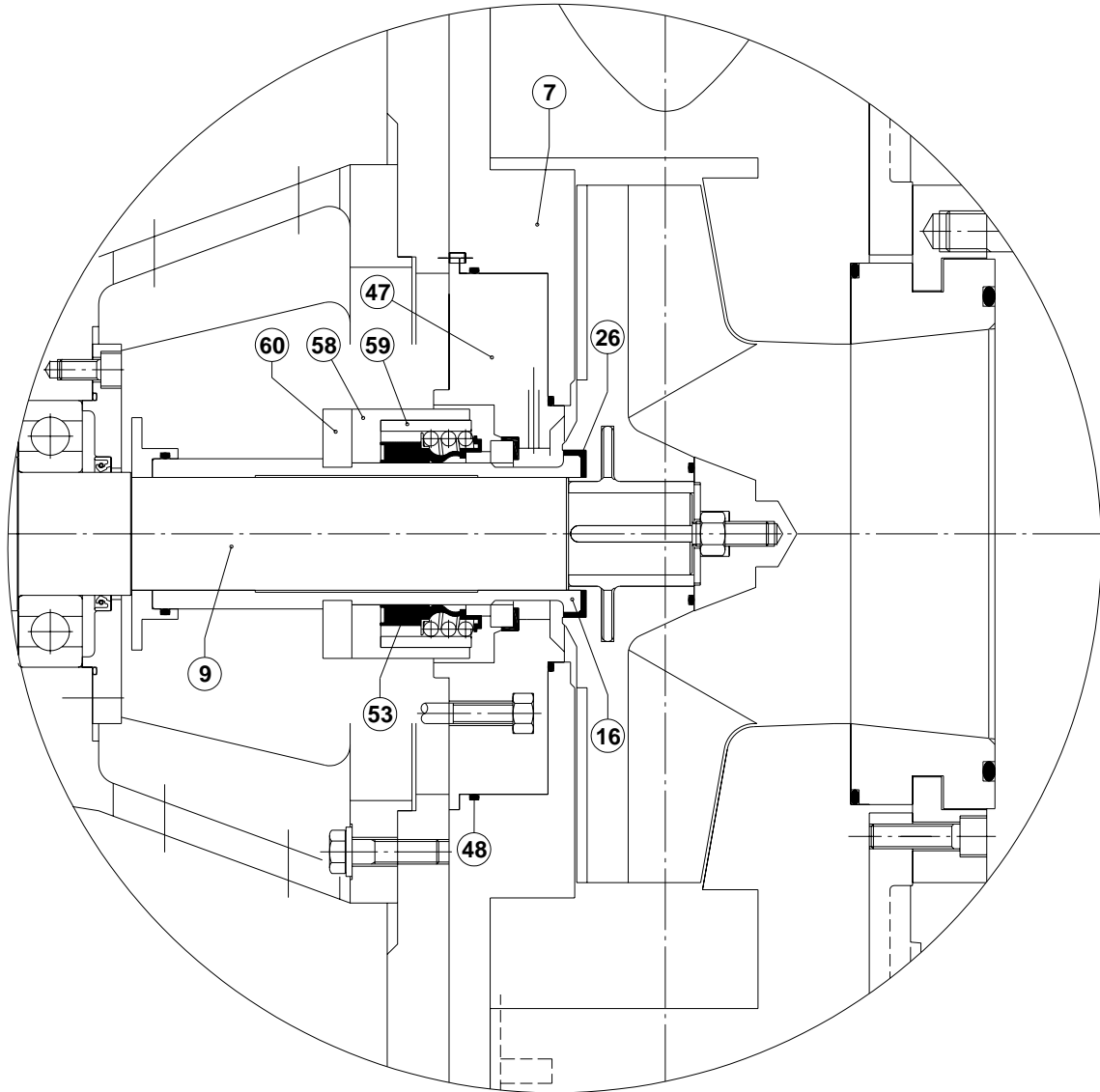
Semi-open impeller section

SERIES CDM CROSS SECTION

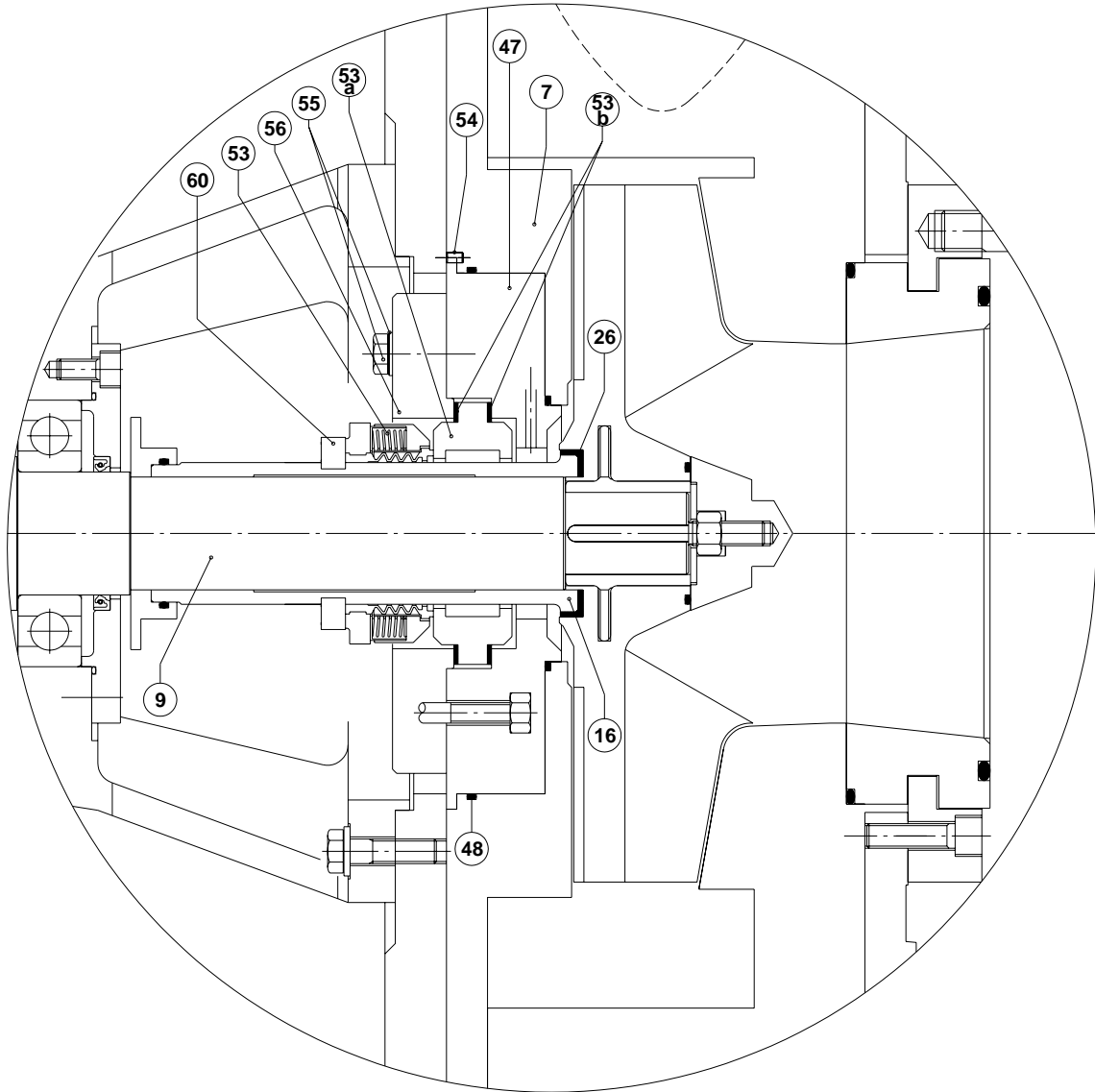


Pump with closed /semi-open impeller

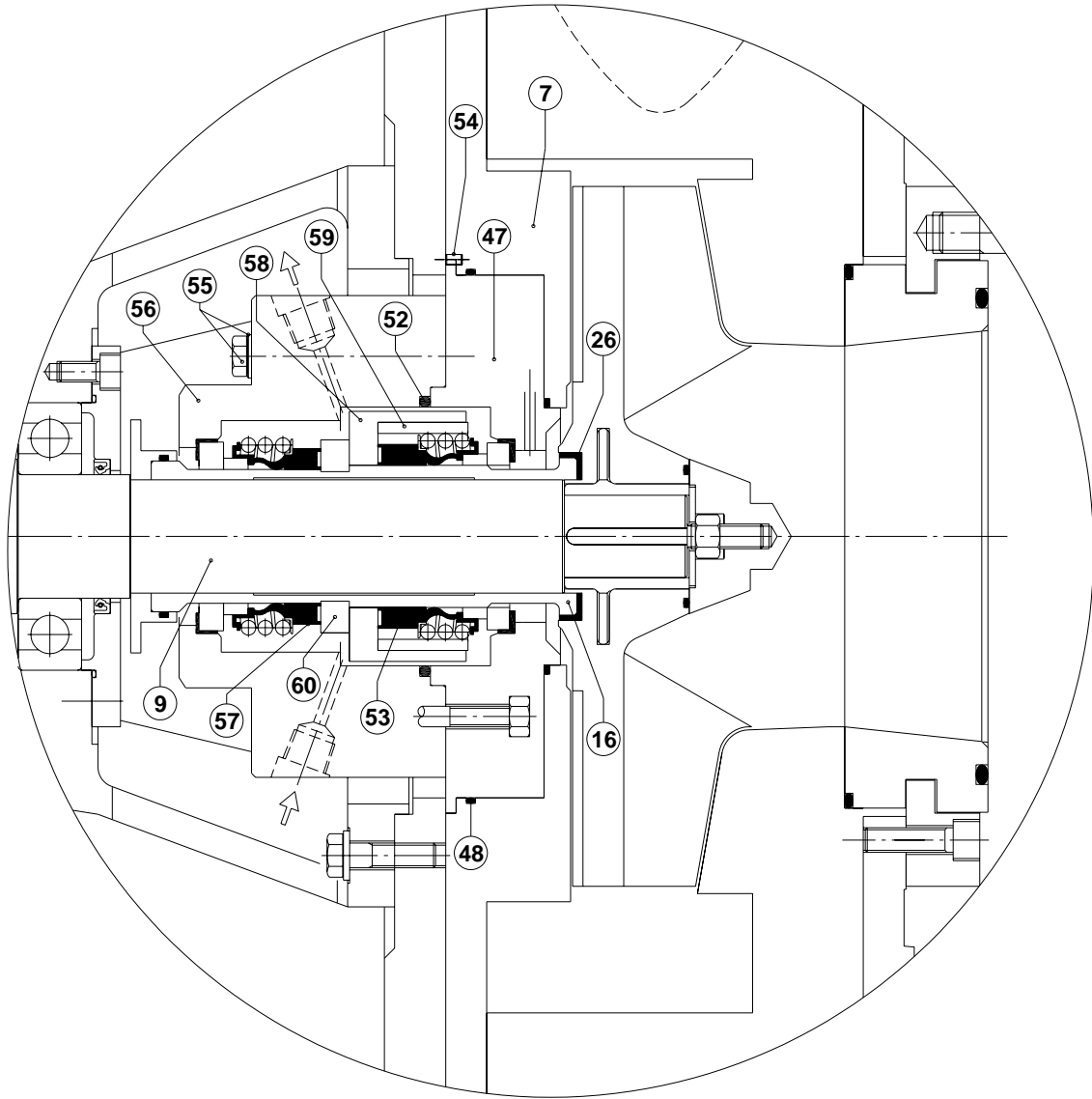
MECHANICAL SEALS



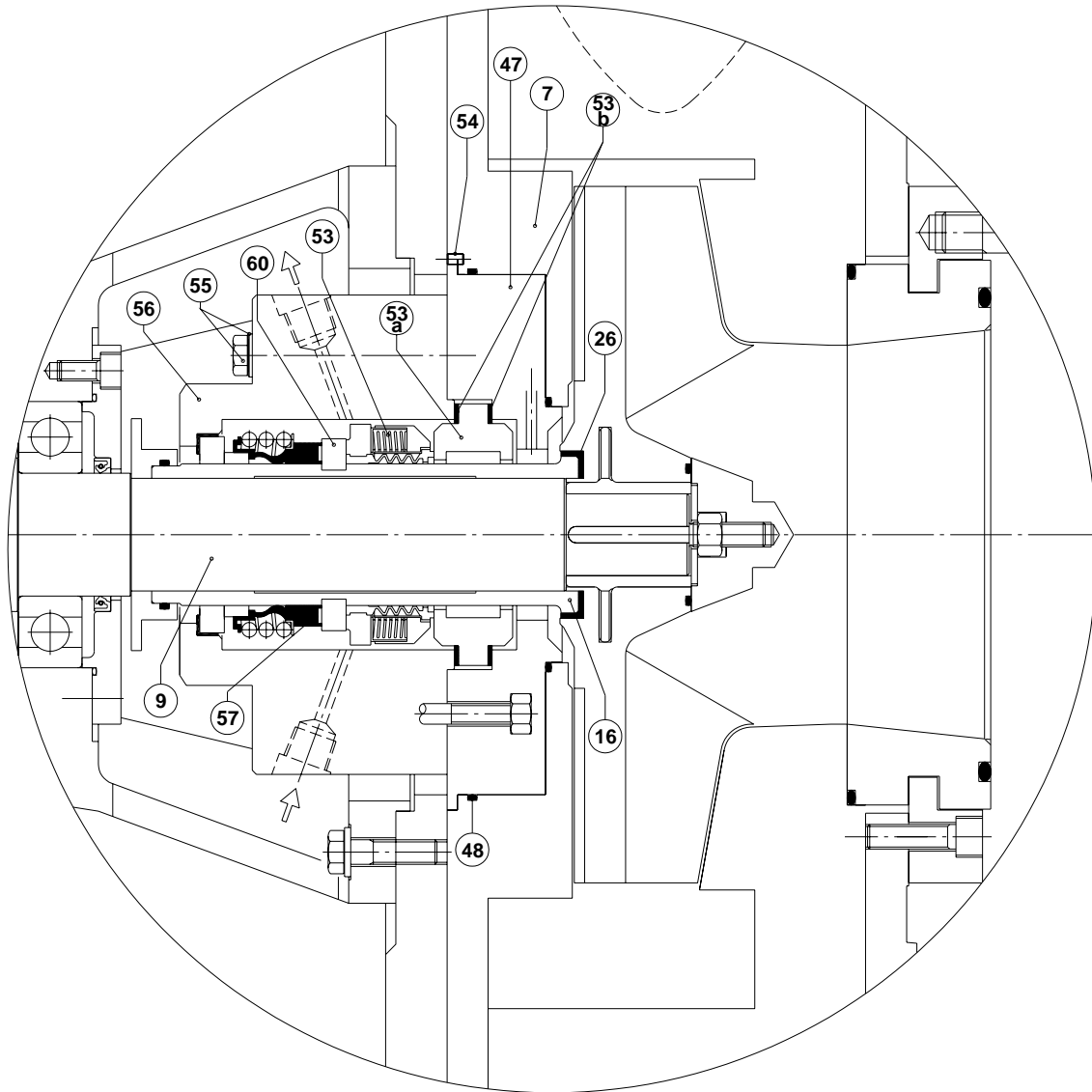
Single external mechanical seal
B6E – B6EFL



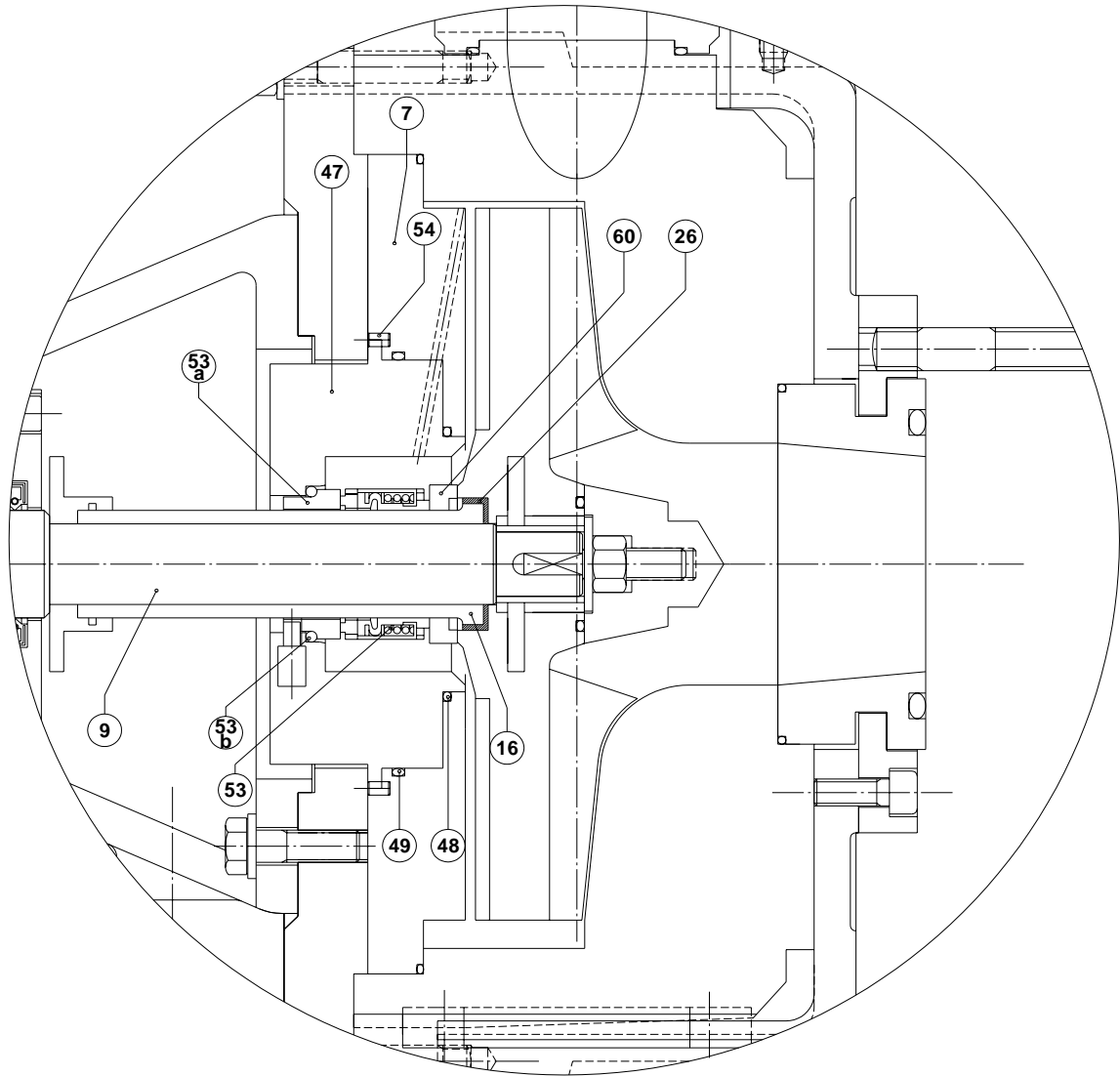
Single external mechanical seal
JTP



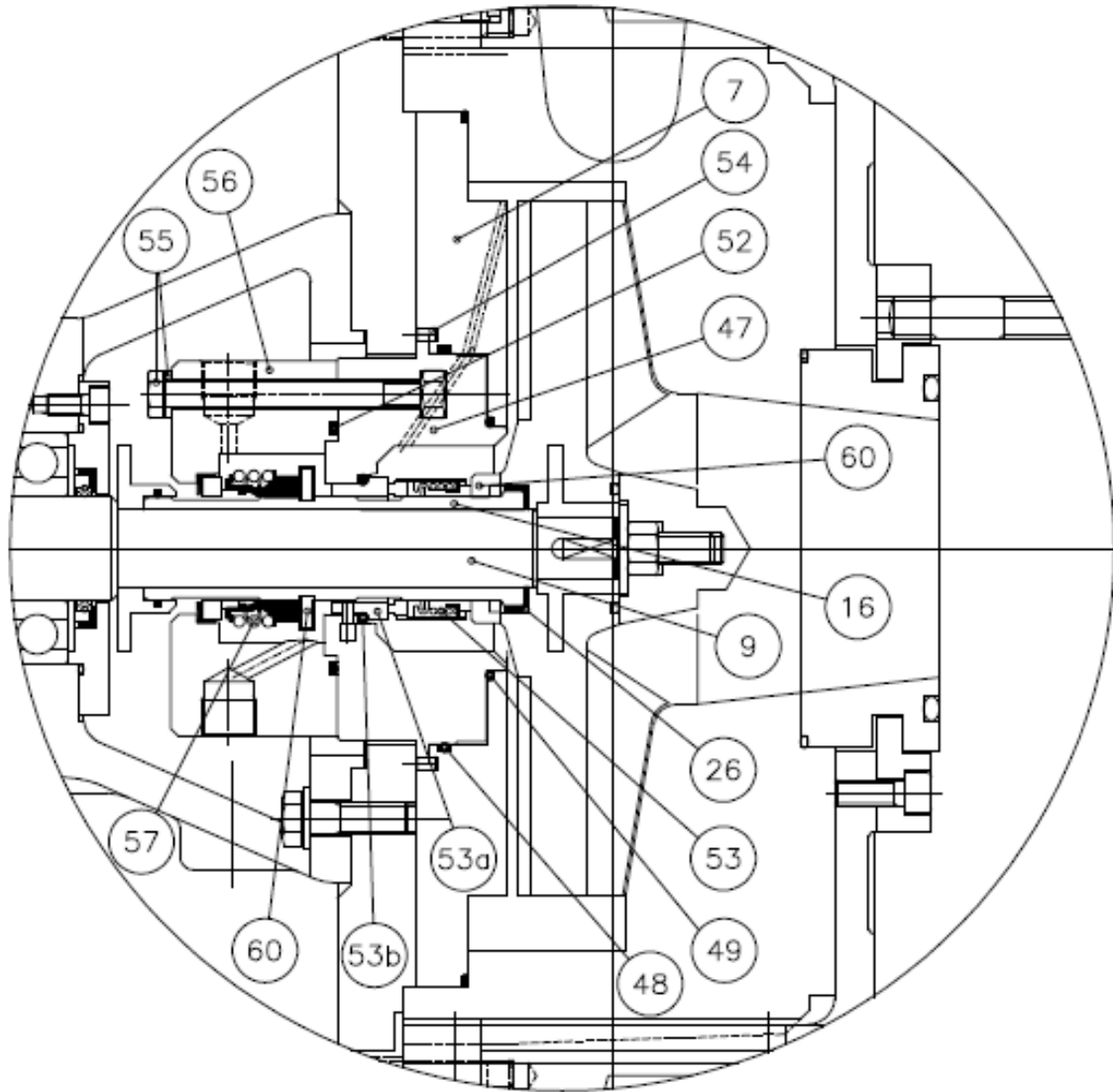
Double external mechanical seal with fluxing
B6EDF



Double external mechanical seal with fluxing
JT2P



Single mechanical internal
J5H – J5G



Double internal mechanical seal with fluxing
J52G - J52S

PART LIST

POS.	DESCRIPTION	POS.	DESCRIPTION
1	Bearing support	40	Stud
2	Rear cover	41	Shield
3	Pump casing	42	O-ring
4	Discharge flange	43	O-ring
5	Suction flange	44	O-ring
6	Pump volute	45	Suction nozzle
7	Stuffing box	46	O-ring
8	Impeller	47	Stuffing box adapter
9	Shaft	48	O-ring
10	Balls bearing	49	O-ring
11	Bearing cover	50	O-ring
12	Support foot	51	Eyebolt
13	Stud	52	O-ring
14	Screw	53	Mechanical seal
15	Discharge nozzle	53a	Mechanical seal static ring
16	Seal sleeve	53b	Gasket
17	Impeller nose	54	Pin
18	Coupling key	55	Screw
19	Impeller key	56	Cover stuffing box
20	Seal ring	57	Mechanical seal
21	Seeger	58	External reinforced seal
22	Wear ring	59	Internal reinforced seal
23	Screw	60	Spacer
24	O-ring	61	Key
25	O-ring	62	Intermediate adaptor
26	Cap	63	Screw
27	O-ring	64	Base
28	Cover screw	65	Motor
29	Screw		
30	Screw		
31	Screw		
32	Screw		
33	Impeller lock nut		
34	Nut		
35	Stud		
36	Impeller washer		
37	Washer		
38	Oil drain plug		
39	Oil filling plug		

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 under power.
- 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 suction and the delivery valves and gradually open the discharge valve so that the liquid, which remained in the tube and in the pump, can flow out.

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

Before disassembly you have to clean the entire body with water or an appropriate liquid. Please try to avoid chemical reactions, which might cause unreparable damages to the machine and the operator.

Please do not discharge the solution obtained from 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 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 DISMANTLE 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 or 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.

- 1) Unscrew (right-hand thread) the body tightening nuts (pos. 34). (**CDM-CGD series**).
- 2) Remove the two screws which fix the pump to the base (**only CGD series**).
- 3) Take the lap plate off the base thus totally uncovering the flexible coupling (**only CGD series**).
- 4) Disassemble the screws joining the parts of the flexible coupling (**only CGD series**).
- 5) Loosen the socket head screws which fix the hub to the motor; slide the piece towards the motor itself so as to be able to extract the spacer **fig. 3 (only CGD series)**.
- 6) In order to replace the mechanic seal, the support ball bearings, the impeller and the O-rings, it is necessary to disassemble the whole group without necessarily removing the whole pump and the motor from the base **fig. 4. (only CGD series)**. Having lifted the whole group formed by the above parts, rest it on a work bench and begin the disassembly operation.
- 7) Unscrew (right-hand thread) the plastic ogive (pos. 17) and afterwards the metal nut (pos. 33). In order to proceed correctly, it is recommended to block the impeller (pos. 8) holding it at the disc with a strip wrench, thus avoiding direct contact with the blades which, if over-stressed, could break.
- 8) Extract the impeller from the shaft (pos. 9) with the help of a special extractor **fig. 5**.
- 9) Remove the lid from the body (pos. 7) prizing the rear armature (pos. 2) **fig. 6**. Remove the plastic liner from the shaft (pos. 16), and also the mechanic seal and the splash guard (pos. 41).

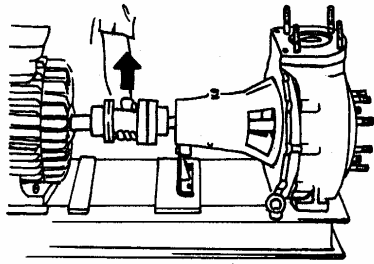


Fig. 3

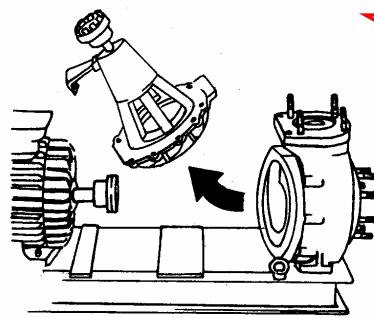


Fig. 4

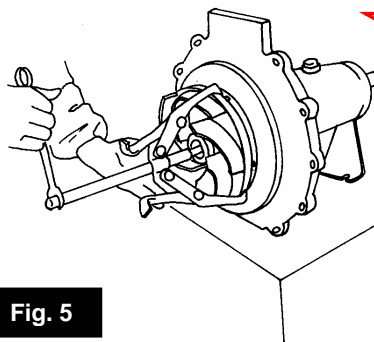


Fig. 5

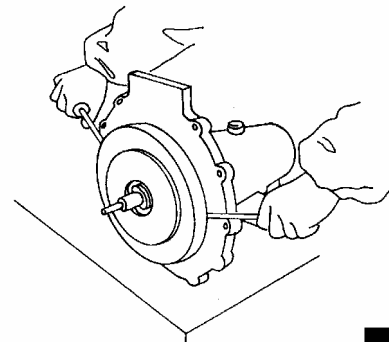


Fig. 6

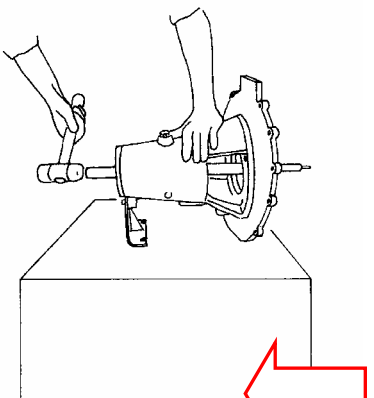


Fig. 7

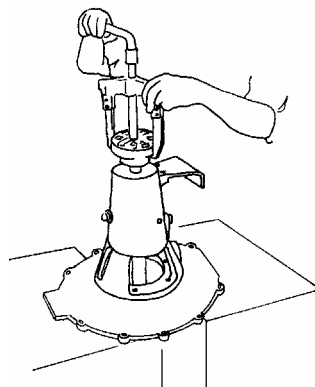


Fig. 8

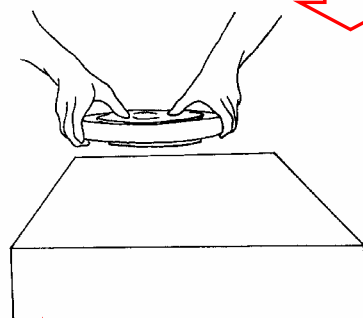


Fig. 9

- 10) Extract the seal-flange (pos. 47) from the body lid (pos. 7) by pressing with your fingers or by using a rubber hammer and tapping delicately **fig. 7**.
- 11) Extraction of the semi-coupling must be carried out by putting the shaft support (pos. 1) and the rear armature (pos.2) in a vertical position on two level surfaces distanced one between the other thus creating a space in which to insert the protruding part of the shaft. Remove the hub with the help of an extractor **fig. 8 (only CGD series)**.
- 12) Extract the impeller from the support, not before having disassembled the little lids of the bearings (pos. 11) **(only series CGD)**.
- 13) With a press (if one is not available a rubber hammer) extract the shaft completely from the support (pos. 9) and from the rear bearing (pos. 10) **fig. 9**. Attention! Before carrying out this operation, remove the tongue housed on the shaft (pos. 18)**(only series CGD)**.

- 14) In order to remove both front and rear ball bearings (pos. 10), use an extractor (**only series CGD**). For the **CDM pumps series**, the removal of the shaft must be executed in completely various way. Unscrew the screws (pos.14) that fix the shaft-pump (pos.9) at the shaft-motor. Successively, with an extractor, or more simply with two levers, unthread the shaft- pump from the shaft-motor **fig.10**.

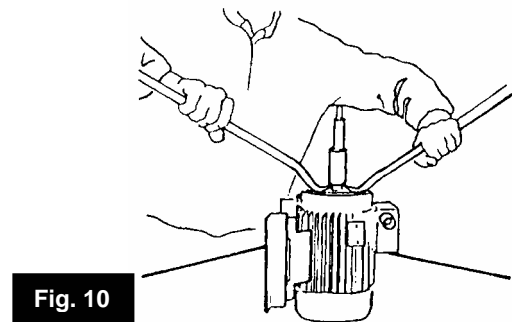


Fig. 10

PUMP ASSEMBLY PROCEDURE

Having disassembled the pump and decided which parts are to be replaced, clean all the parts still in a good condition thoroughly with water or a suitable solvent. It is essential to use original spare parts for the replacements.

As for the disassembly phase, also the assembly phase requires great precision and care in the various operations to be carried out.

- 15) Insert the front bearing (pos. 10) onto the pump shaft (pos. 9). (**Only CGD series**).
- 16) Insert the rotor into the support (pos. 1) **fig. 11. (Only CGD series)**
- 17) Position the support with the rear armature resting on the two surfaces distant one from the other and house the rear bearing (pos. 10) by pressing it into its seat. It is recommended to use a press for this operation but, if one is not available, use a plug made of plastic material and a rubber hammer and insert the piece into the support with caution **fig. 12**. Before fixing the little lids (pos. 11), check the state of the rubber sealing rings (pos. 20) and, if they are not in a good condition, replace them (with every change of bearings it is recommended to replace the sealing rings and o-rings as well (pos. 24).). (**Only CGD series**).
- 18) After had threaded the shaft-pump (pos.9) on the shaft-motor and fix with the screw (pos.14), turn the rotor manually, and with one rubber or plastic hummer, after have measured the state of the balancing of the piece with the comparator, strike delicately until finding a value of balance not advanced to 0.03 millimeter **fig.13. (Only CDM series)**.
- 19) Mount the mechanical seal on the shaft covering (pos.16).

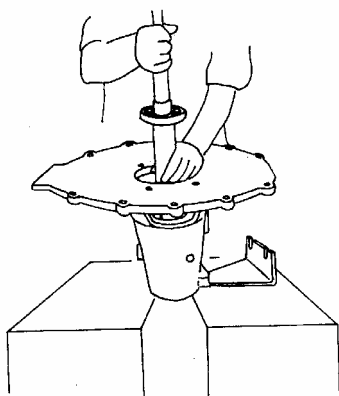


Fig. 11

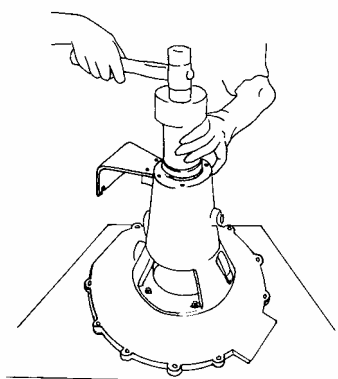


Fig. 12

- 20) Position the support horizontally the rotor, insert the splash guard on the shaft (pos. 41) with the o-ring (pos. 42) and afterwards the covering liner (pos. 16) with the mechanical seal.
- 21) House the seal-flange (pos. 47) in the body lid (pos. 7) and assemble the two pieces coupling them with the rear armature (pos. 2).
- 22) Press the impeller (pos. 8) into the shaft (pos. 9) fixing it with the metal nut (pos. 33) and with the ogive (pos. 17).

23) Assemble the pump-body (pos. 6) with the metal armature (pos. 3); joint the group to the support by clamping the parts with the steel nuts (pos. 34). If the pump-body has not been removed during the disassembly operation and is still fixed to the base, house the support by making a movement contrary to the one shown in figure 4.

24) Press the impeller (pos. 8) onto the shaft (pos. 9) fixing it with the metal nut (pos. 33) and with the ogive (pos. 17).

25) Assemble the pump-body (pos. 6) with the metal armature (pos. 3); joint the group to the support by clamping the parts with the steel nuts (pos. 34). If the pump-body has not been removed during the disassembly operation and is still fixed to the base, house the support by making a movement contrary to the one shown in figure 4. **(Only CGD series).**

26) Place the pumping group and the motor (if it was previously removed) onto the base. Assemble the flexible coupling and align the two parts (see the paragraph "Alignment of the group"). Having carried out the alignment, fit the lap plate. **(Only CGD series).**

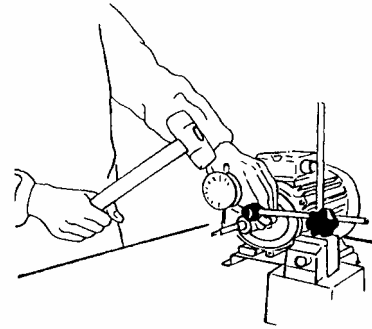


Fig. 13



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, you should 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. 8) with its locking nut (pos. 17).
- b) One mechanical seal (pos.53 - if it's double pos.57), complete with protection (pos. 16).
- c) A complete series of gaskets (pos. 20-24-25-26-27-42-43-44-46-48-49-50-52).
- d) One shaft (pos. 9).
- e) One stuffing box adapter (pos. 47); if it's double mechanical seal (pos.56).
- f) A couple of bearings (pos. 10).

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 attached to the present manual.
- Quantity of requested pieces.

DISPOSAL

The replaced spare 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 and authorized companies with the disposal.