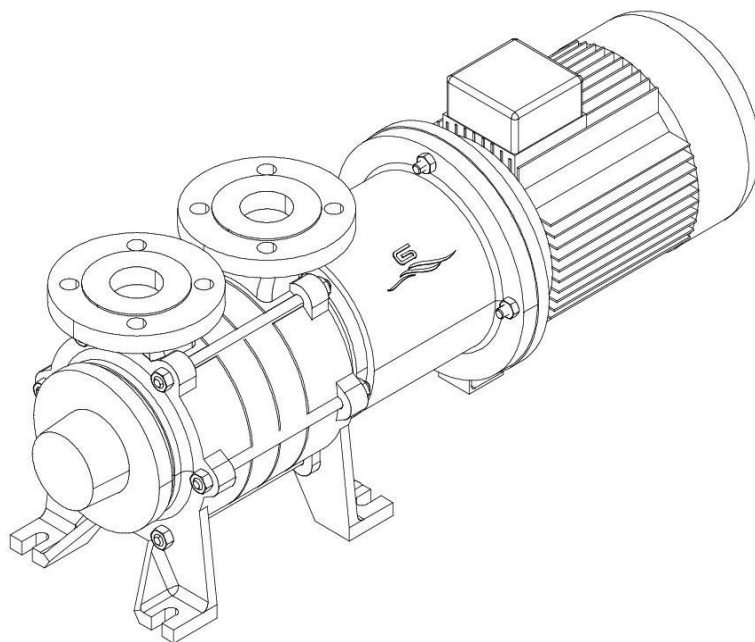


POMPE AUTOADESCANTI  
SELF-PRIMING ELECTRO PUMP



# ACM

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***DISASSEMBLY AND ASSEMBLY INSTRUCTIONS  
FOR MULTISTAGE SELF-PRIMING PUMPS***



**GIANNESCHI**  
pumps and blowers





## WARNING

These instructions are for the maintenance personnel for maintenance and repair of self-priming multistage pumps series ACM.

Disassembly and assembly procedures should be carried out by qualified personnel. Prior to working on the pumps the maintenance person should be fully knowledgeable of the material outlined in this manual. Instructions relating to safety of operation, installation and maintenance will be found in the "OPERATING INSTRUCTION ACM-BT SERIES" which is usually supplied with the pump or it can be requested Gianneschi Pumps and Blowers.

Proper attire is necessary prior to beginning any work on the pumps. Therefore, for your safety, always wear safety hat, eyeglasses, gloves, shoes etc. and be sure to have proper tools necessary for the work to be done.

Do not force or subject pump or any of its components to sudden shocks or violent impact. Do not damage with markings or scratches the mechanical seal surface areas, the engagement surfaces and sealing areas. Do not damage gaskets, and O-Rings. Do not leave in the pump foreign matter such as screws, nuts, bolts, washers, rags, etc.

When requesting spare parts or technical information for the pump, always quote the pump model number and serial number which is printed on the pump nameplate.

Should additional information be required, please do not hesitate to contact Gianneschi Pumps and Blowers or the closest representative.

Gianneschi Pumps and Blowers will not and cannot be responsible for work done on the pump by the customer or non-authorized personnel.

NOTE: Pump parts are identified by item numbers (COD.). Item numbers can be found in the parts list under chapter

10 and cross-referenced with the sectional drawing.

All drawings given in these instructions are only schematics and not certified.

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## 1 - PREPARATION PRIOR TO PUMP DISASSEMBLY

In the event pump repair is necessary, it is important to be familiar with work to be carried out. See also the attached  
“Operating instruction ACM-BT series”.



**FOLLOW THE SAFETY PRECAUTIONS LISTED IN CHAPTER 2 OF ABOVE MANUAL**

Prior to working on the pump it is important to:

- procure and wear safety attire (hat, glasses, gloves, shoes, etc.)
- disconnect electrical power and, if required, disconnect electrical cable from motor terminal box
- close valves at pump suction and discharge side
- allow pump to cool down if it has been handling hot liquids
- follow safety precautions if hazardous fluids have been handled by the pump
- drain pump casing of any handled liquid through the draining connections and, if required, rinse the pump with neutral liquid.

If it is necessary to remove pump and motor from installation, proceed as follows:

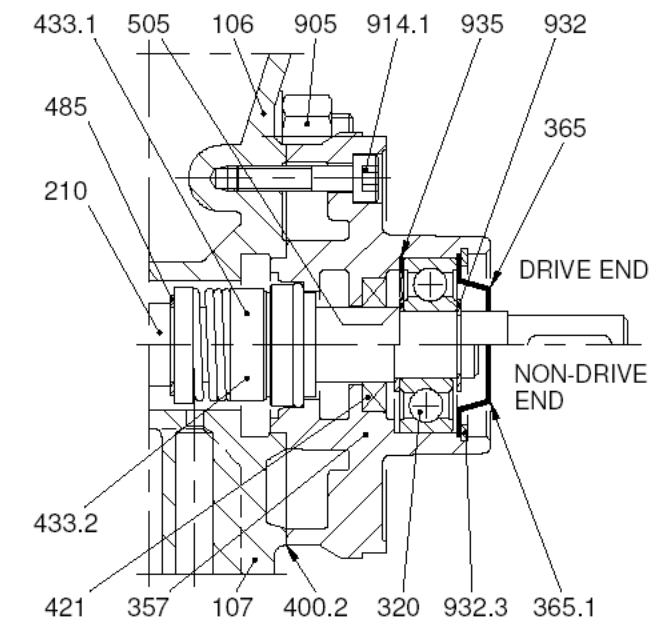
- remove flange bolts from pump suction and discharge connections
- remove the coupling guard
- remove the spacer coupling, if applicable
- if it is required to remove the motor, remove the anchor bolts from the motor feet or (in case of monoblock design) from the motor flange, then remove the motor
- remove the anchor bolts from the pump feet
- remove the pump from the baseplate.

## 2 - DISASSEMBLY FOR BEARINGS AND/OR MECHANICAL SEALS REPLACEMENT

The pumps are designed to allow replacement of ball bearings, sleeve bearings and mechanical seals without total pump disassembly. Therefore it is possible to leave the pump in place without disconnecting the piping or removing the pump from the installation.

Disassembly should follow the steps as outlined for the specific type of pump design.

**NOTE:** Adopt extra care to prevent damaging of mechanical seal faces and seal components during disassembly.



Sectional drawing mechanical seal and bearing housing

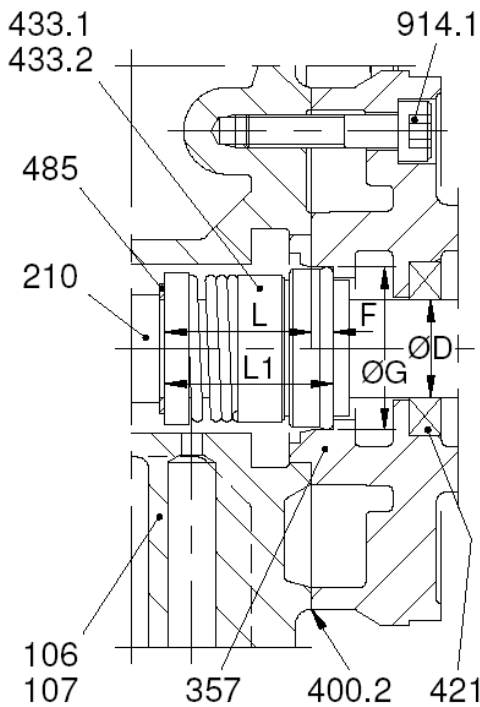
## 2.1 - DISASSEMBLY OF BEARINGS AND MECHANICAL SEALS PUMPS

Remove internal snap ring COD. 932.3, bearing cover COD. 365 or 365.1, shaft snap ring COD. 932, bolts COD. 914.1, bearing housing COD. 357 (with help of gear puller), ball bearing COD. 300, spacer COD. 505, elastic ring COD. 935, remove the radial seal ring COD. 421 and finally the mechanical seal COD. 433.1 or 433.2.

## 3 - MECHANICAL SEALS ASSEMBLY

NOTE: Standard pumps are fitted with mechanical seals unified to DIN 24960/K standard having short working length "L1". For dimensions of non-unified mechanical seals, contact Gianneschi Pumps and Blower or the closest representative.

Disassembled parts should be checked prior to fitting mechanical seals COD. 433.1 and 433.2 : On bearing housing COD. 357 and/or 357.1, verify dimensions "G" and "F". On shaft COD. 210 check diameter "D". From casing COD. 106 and/or 107 to spacer COD. 485 the dimension "L" should also be verified. Dimensions should be as given by fig. 2 and table 1.



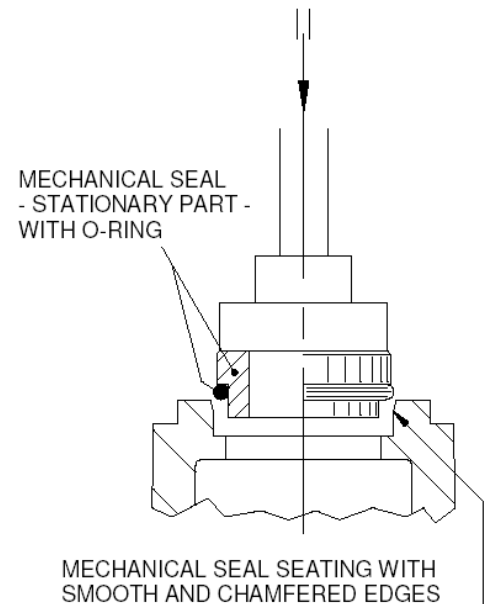
Tab. 1 - MECHANICAL SEAL DIMENSIONS

PUMPS SERIES	Ø D h6	F	Ø G H8	L	L1 ±0,5
ACM 310	22	2	37	35,5	37,5
ACM 400 & 500	28	18	43	24,5	42,4
ACM 650	35	25	50	17,5	

Fig. 2 - Typical mechanical seal with locating dimensions for either pump end (Drive and Non-Drive)

### 3.1 - FITTING SEAL STATIONARY PART IN BEARING HOUSING

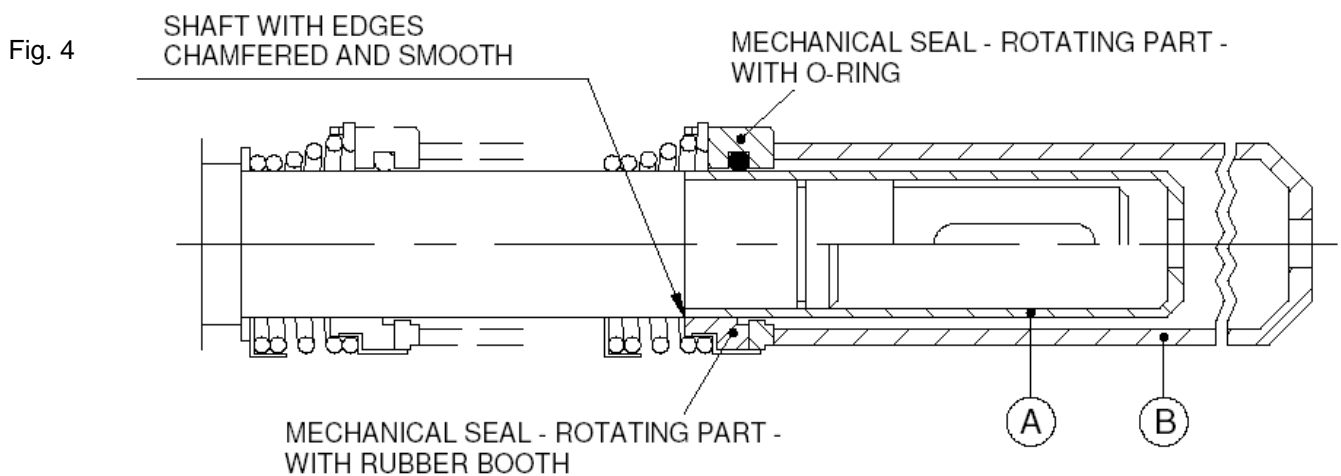
The seating area for the seal stationary part and its edges should be perfectly clean and free of tool or machining markings. Lightly wet the seating area and the O-Ring for the seal stationary part using water, soapy fluid, Vaseline, etc., avoid the use of oils. Press the seal stationary part (with O-Ring in place) in the seal housing seating area with the help of a plug having the face protected with a soft material such as plastic or paperboard. Applied force should be vertical to the axis of the part. A harbour press or the shaft of a drill press can be used for this operation, see fig. 3.



### 3.2 - FITTING SEAL ROTATING PART OVER THE SHAFT

The mechanical seal areas over the pump shaft should be clean, smooth and without sharp edges. Polish such areas with an extra fine emery cloth prior to applying lubricating fluids such as water, soapy fluid or Vaseline (do not use oils). Slide seal retainer COD. 485 over the shaft, slide the total seal rotating part over a conical guiding sleeve "A" or similar tool to help fit the seal over the shaft (see fig. 4), sleeve should also be lubricated with the above mentioned fluids. The seal rotating part can then be pushed over the shaft by hand or using a sleeve "B" till it rests against the retainer COD. 585.

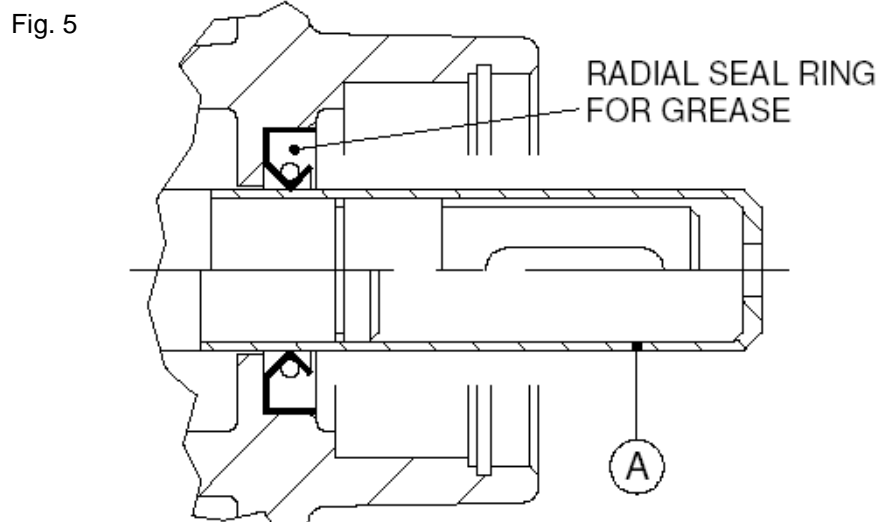
NOTE: Mechanical seals with conical single springs are designed for a single rotational direction, therefore they must be fitted on pump side which has the proper direction or rotation.



Install the bearing having COD. 357 and/or 357.1 complete of radial seal ring COD. 421 (see fig. 5), seal seat COD. 542, seal stationary part COD. 433.1 or 433.2 and gasket COD. 400.2.

NOTE: Bearing housing draining opening should be at bottom (6 o'clock location).

Bolts COD. 914.1 should be tightened to pump casing COD. 106 and/or 107.



## 4 - BEARING ASSEMBLY

Bearings can only be fitted after the mechanical seals are in place and the bearing housings are secured per chapter 3.

### 4.1 - BEARING ASSEMBLY

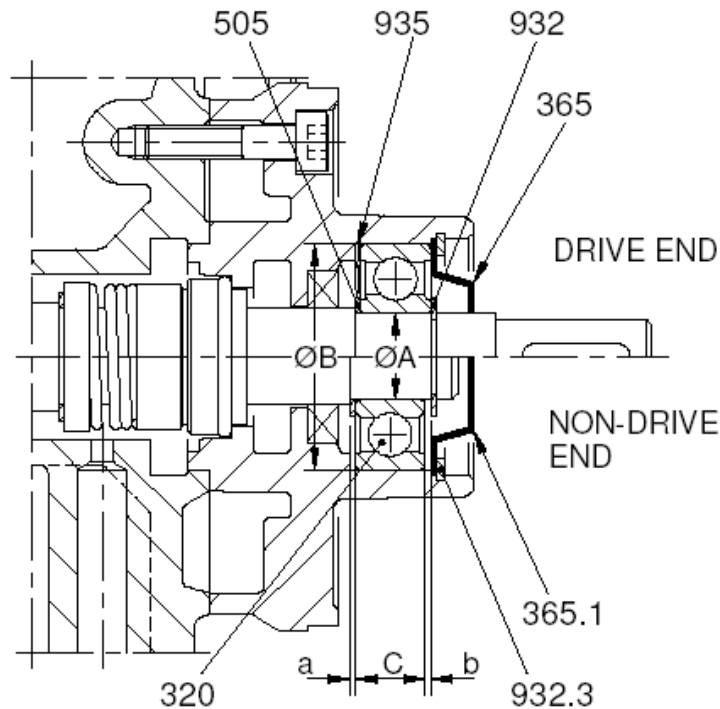
(See fig. 6 for parts identification).

Slide spacer COD. 505 over the motor side shaft, place the elastic ring COD. 935 in the bearing housing.

Slide spacer COD. 505 over the discharge side shaft, place the elastic ring COD. 935 in the bearing housing.

Push bearing COD. 320 over the shaft, place the snap ring COD. 932, the bearing cover COD. 365 and the snap ring COD. 932.3.

Fig. 6



Tab. 2 - BEARING DIMENSIONS

PUMPS SERIES	a	b	BEARING DIMENSIONS			BALL BEARING TYPE
			Ø A	Ø B	C	
ACM 310	1	1	20	52	15	6304 - 2RS
ACM 400 & 500			25	62	17	6305 - 2RS
ACM 650		1,5	30	72	19	6306 - 2RS

## 5 - PUMP DISASSEMBLY

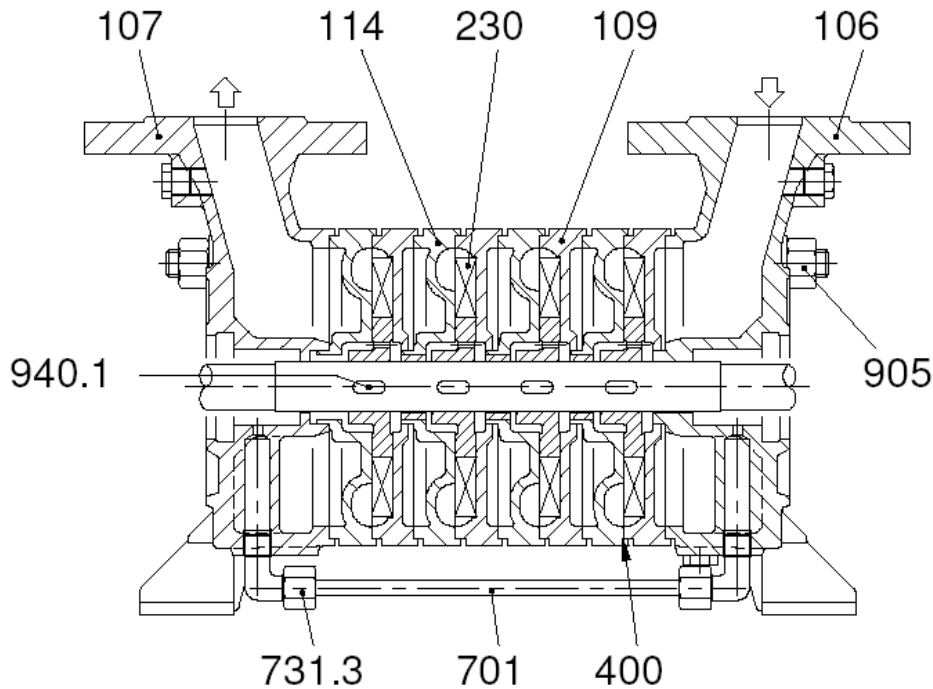
Complete pump disassembly becomes necessary if, for example, there is an excessive wear of impellers which would prevent the pump from performing as expected or if the shaft is excessively damaged in the seal areas causing leakage of the pumped liquid.

Replacing or machining the worn out parts will be a question of economics and/or time available to complete the repair. In this chapter a pump without bearing housing and without mechanical seals will be considered (see fig. 8). Disassembly and assembly of these components have been addressed in chapters 2, 3, & 4.

**NOTE:** Where the mechanic is not familiar with the pump, it is advisable to draw a reference line along the pump.

Mark each part with its location, rotation and assembly sequence; however the main components are already marked at the external upper part with reference logs to provide the proper position (see chapter 8).

Disassembly work should be carried out with proper tools and using suitable disassembly sequence to prevent further damage to the pump parts.



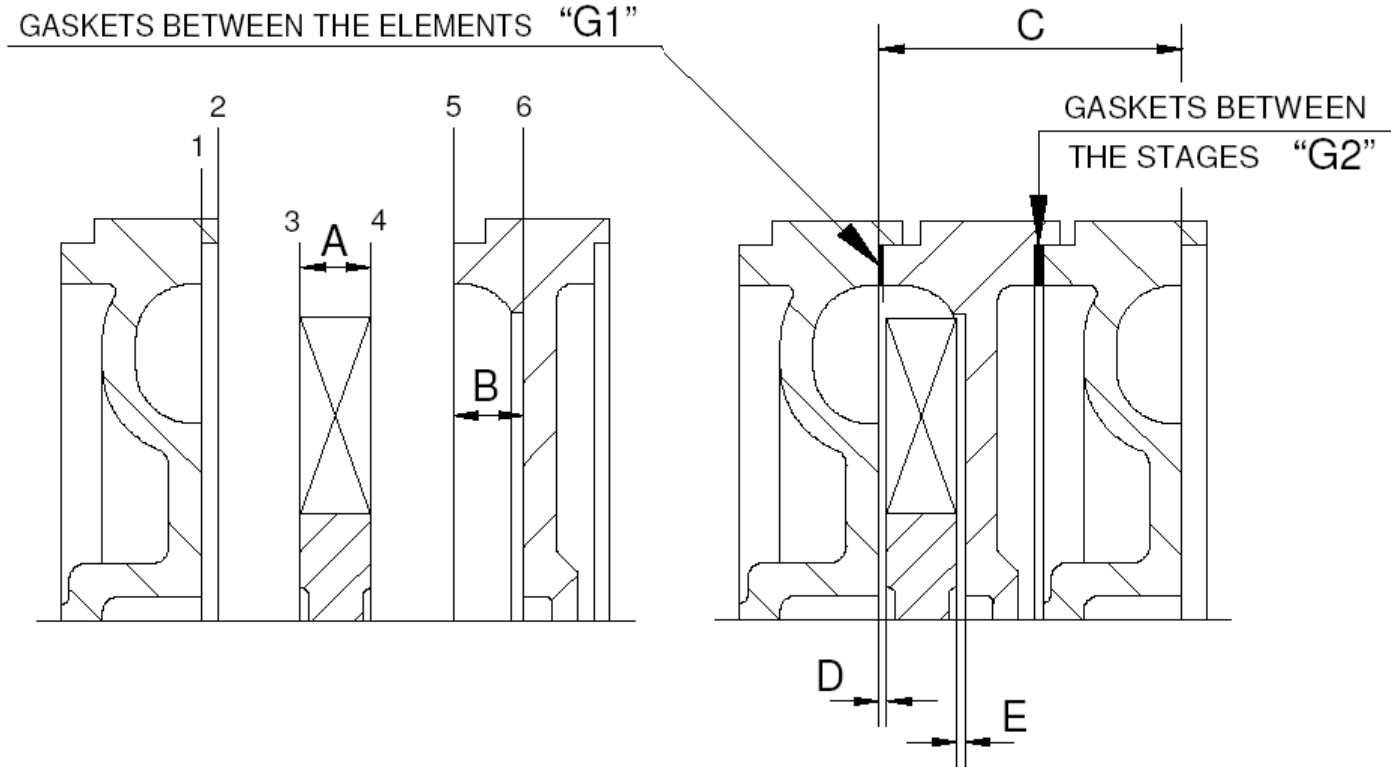
Loosen and remove the tie-bolts COD. 905, the tube fittings COD. 731.3 with tubing COD. 701. Depending upon the pump model, remove suction and discharge casings COD. 106 and 107, the suction and discharge plates COD. 109 and 114. Remove open impellers COD. 230 and gaskets COD. 400.

## 6 - MACHINING AND REVISION OF PUMP PARTS

Machining of internal parts is usually required to remove grooves and/or deformation of working surfaces hence to rebuild the proper internal clearances. Material removal from the surfaces should be minimal and only to reset the proper clearances. Impeller COD. 230 can be machined on both faces 3 and 4 (if required), max. material to be removed each face is approximately 0,3 mm (see tab. 4 for nominal dimension "A" for impellers).

The surfaces 1, 2, 5, & 6 of the intermediate plates COD. 109 and 114 (see fig. 9) can also be machined max. 0,3 mm each.

Fig. 9



Tab. 3

<b>GASKETS "G1"</b>	n° 1 x 0.1 mm				
<b>GASKETS "G2"</b>	n° 1 x 0.1 mm				
<b>TOTAL TOLLERANCE in mm "D+E"</b>	<b>SERIES</b>	<b>310</b>	<b>400</b>	<b>500</b>	<b>650</b>
	<b>Min.</b>	0.05	0.08	0.08	0.08
	<b>Max.</b>	0.10	0.13	0.13	0.13

Tab. 4

<b>Pumps Series</b>	<b>310</b>	<b>400</b>	<b>500</b>	<b>650</b>
<b>"C" in mm</b>	40.2	55.2	75.2	90.2
<b>Nominal "A" in mm</b>	10	10	20	20

See table 1 for the allowed total clearance "D+E" and machine surfaces 1, 5, 6 accordingly. The total clearance "D+E" is given by "B - A + G1".

NOTE: The impeller will self-centre between the two plates by hydraulic forces as soon as the pump is started, therefore the clearances "D" and "E" will become identical

Machining of the pump intermediate plates will decrease the total pump length. If the decrease of the pump length is more than 7mm, re-assembly problems may be encountered. Therefore it is required to maintain dimension "C" (width of each stage) as indicated in tab 4. Dimension "C" can be rebuilt by adding more gaskets or using a thicker gasket "G2" as indicated in Fig. 9.

NOTE: Machining of the pump internal parts will result in decrease of pump performance especially when the impeller dimension "A" has been decreased.



## 7 - PUMP ASSEMBLY

Inspect every pump component making certain that they are in good condition. If the parts are in acceptable condition, proceed with cleaning procedure using suitable cleaning products. Those parts that are reusable but require machining should be reworked as discussed in chapter 6.

When mixing new original parts with used and re-machined parts, make sure that the dimensions of the later are compatible with those from the original parts. For recommended spare parts see chapter 9.

For mechanical seals assembly see chapter 3. See sections in chapter 11 for identification of the item numbers.

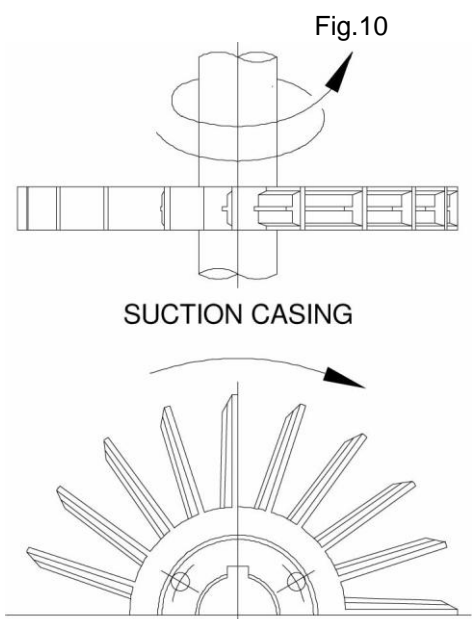
NOTE: Assembly sequence given below assumes that the pump is completely disassembled.

1. Place the pump shaft COD. 210 in a bench vice vertically and with the drive side upward. Insert on the shaft the seal retaining ring COD. 485. Lubricating shaft and seal rotating part then rotating part of mechanical seal COD. 433.2. If mechanical seals are with conical springs designed for one specific rotation, the seal to be mounted here is the one for C.W. or right hand shaft rotation.. Lubricate (with suitable fluid) the O-Ring of the mechanical seal and press fit the stationary part into the bearing housing.
2. Clean the 2 mechanical seal faces. Insert over the shaft the bearing housing and keep compressed the mechanical seal spring.
3. Insert spacer COD. 505 over the shaft, the elastic ring COD. 935 in the bearing housing. Fit the bearing COD. 320 on the shaft till it bottoms to the shaft shoulder, block the bearing with snap ring COD. 932. With a bearing puller, compress the bearing and elastic ring in the bearing housing (this operation helps fitting the bearing cover and relative snap ring). Place the bearing cover COD. 365 on the bearing housing, fit the snap ring COD. 932.3 in the bearing housing then remove the bearing housing. Insert the coupling key COD. 940 in the shaft and remove the shaft from the vice.
4. Place gasket COD. 400.2 on the bearing housing then slide shaft and bearing housing assembly in the suction casing COD. 106, then bolt the assembly to the casing with COD. 914.1. Make sure the draining opening of the bearing housing is located at the bottom.
5. Place the assembly in the vertical position with the shaft drive end locked in a vice and the pump casing flange toward you.  
Place the gasket "G2" COD. 400 on the suction plate keeping it in place with a few drops of compatible oil (see tab. 3 and 4 for gasket thickness and clearances).  
Place the suction plate COD. 109 on the suction casing as indicated in the assembly schematic based on the pumps number of stages (see chapter 8).

NOTE: The schematic is based on the rotation of the sets of plates (suction/discharge) in function of the number of stages, bearing in mind that every stage set, made by one suction and discharge plate plus the impeller, must be assembled with the matching reference grooves of the plates lined up with each other.

Fit on the shaft the key COD. 940.1 for the first impeller COD. 230. Slide the impeller on the shaft with the flat part of the blades on the left of the shaft from the observing point, the impeller blades must "bite" into the liquid when rotating, see fig. 13.

NOTE: The key COD. 940.1 must fit perfectly in the impeller keyway but the impeller must be allowed to freely slide over the shaft.

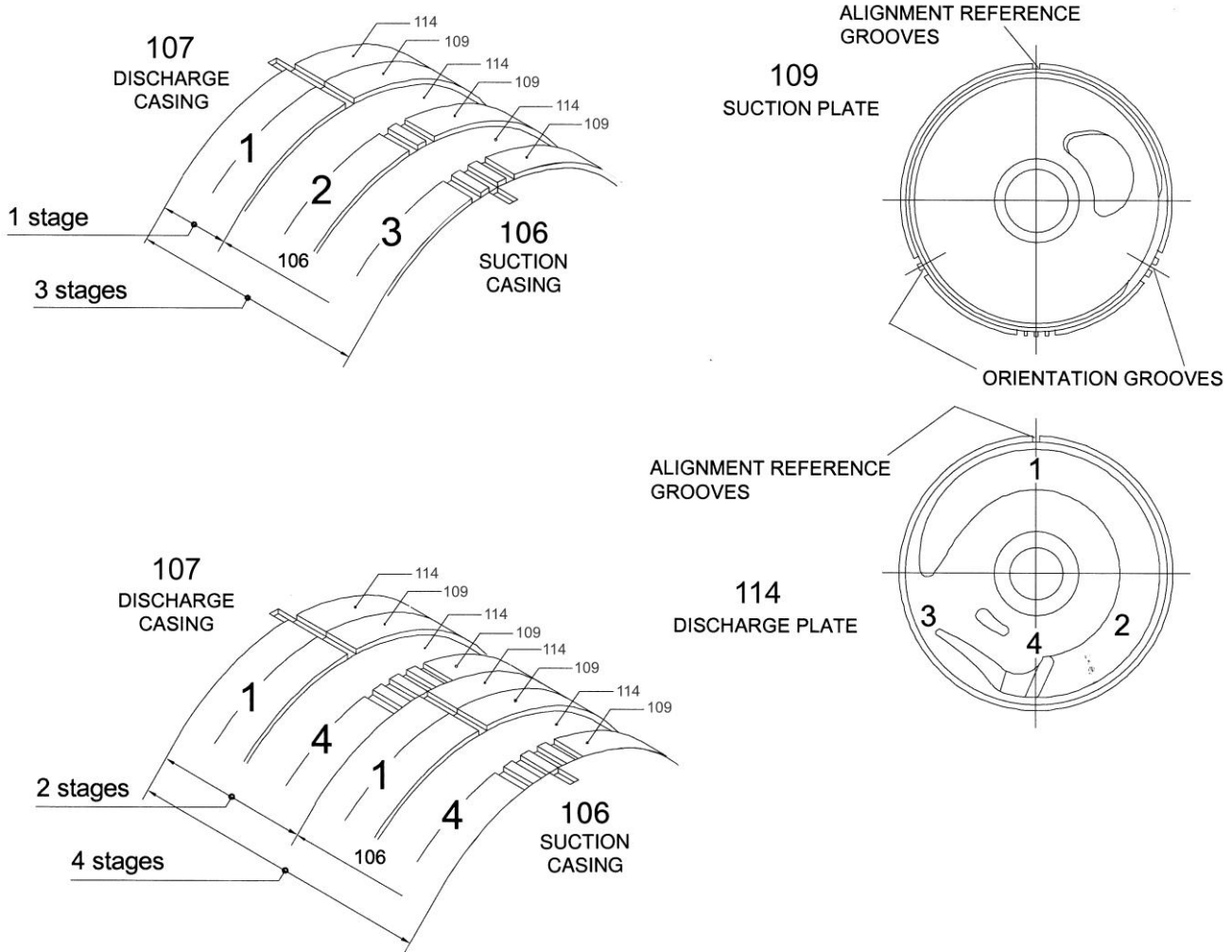




Place gasket "G1" COD. 400 on the female side of discharge plate COD. 114 and fit this on the suction plate with the 2 reference grooves lined up.

6. At this point the steps from point 5 will be repeated as many times as the number of stages to be built. Carefully place the orientation of the suction and discharge plates as illustrated in the schematics or chapter 8.
7. Place gasket "G2" COD. 400 on the discharge casing COD. 107 and fit the casing on the pump with flange oriented similar to the other flange. Install the tie bolts COD. 905 and tighten the nuts finger-tight. Place the pump horizontally on its feet on a flat base for alignment. Torque the tie bolts with a torque wrench.
8. Fit seal locating ring COD. 485 over the shaft, verify that the distance from the shaft shoulder holding the seal and the external face of the discharge casing COD. 107 is given on tab. 1. If the mechanical seal is not of the type suitable for either direction of rotation, the seal should be suitable for C.C.W. (left) rotation. Properly lubricate the seal rotating part COD. 433.1 and slide it over the shaft against the locating ring. Lubricate the O-Ring of the seal stationary part and press-fit it in the bearing housing. Clean both seal faces. Install the bearing housing on the discharge casing COD. 107 with gasket COD. 400.2 in between and tighten the bolts COD. 914.1.
9. Insert the spacer COD. 505 on the shaft so that the bearing inner ring resting against the spacer will be about 1 mm out in relation to the landing face on the bearing housing for the bearing outer ring. Fit the bearing on the shaft and against the spacer. Fit the snap ring COD. 932 on the shaft. Place the bearing cover COD. 365.1 on the bearing and secure it with snap ring COD. 932.3.
10. Be sure that the pump rotor rotates freely by hand. Turn the pump upside down, connect tubing COD. 701 to the fitting elbows COD. 731.3 on the 2 casings. Hydrotest the pump to 1,2 times the maximum working pressure for the pump series (NOTE: not the operating pressure) and make sure that there are no leaks.  
**In order to avoid possible malfunction we suggest to replace the connect tubing - mechanical seal flushing pipe (COD. 701 - COD. 731.3)**

## 8 - ASSEMBLY SCHEMATICS



## 9 - SPARE PARTS

When ordering the pump it is good practice to also order the recommended spare parts, especially when there are no stand-by units in the installation. This will minimise unnecessary down times in the event of pump failure.

Therefore, depending upon the type of pump and the number of pumps installed, the quantity of spare parts to be kept on hand should be determined.

Following are the minimum recommended spare parts:

- |                   |  |
|-------------------|--|
| 1 Impeller        | 1 Set packing, where applicable          |
| 1 Suction Plate   | 1 Set mechanical seals, where applicable |
| 1 Discharge Plate | 2 Sets gaskets                           |
| 1 Shaft assembly  | 1 Set of spacers                         |
| 1 Bearing set     |  |

When ordering spare parts always provide the information printed on the pump nameplate: Pump model, serial number and year of manufacture.

Provide also the part item number, description and quantity required which is found on sectional drawings (chapter 11) and parts list (chapter 10).

We recommend the use of original spares: in case this is not respected, you lose the right of guarantee and Gianneschi Pumps and Blowers declines any responsibility.



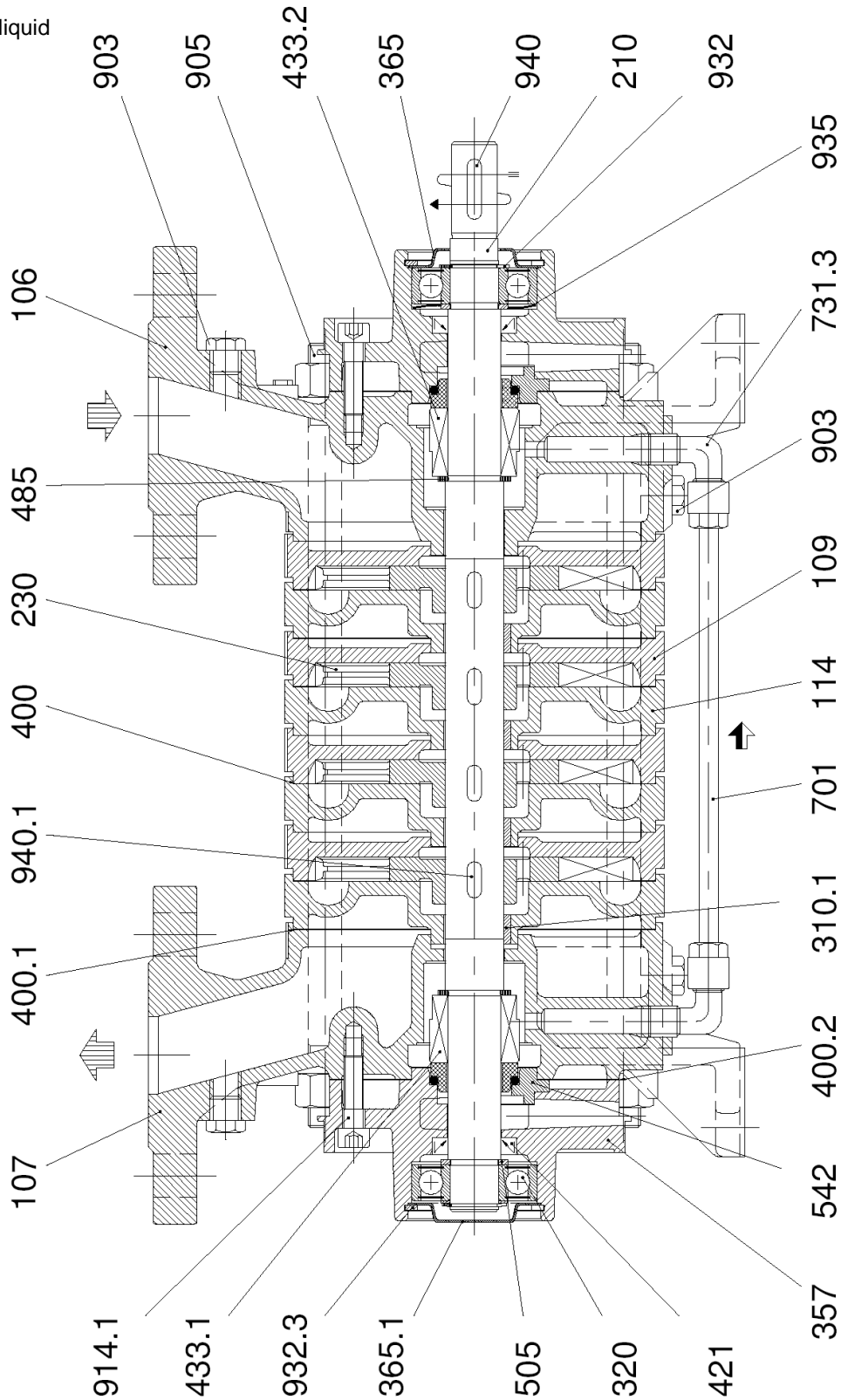
## 10 - PARTS LIST

<b>COD. No.</b>	<b>DESCRIPTION</b>
106	Suction casing
107	Discharge casing
109	Suction plate
114	Discharge plate
210	Shaft
230	Open impeller
320	Ball bearing
357	Mechanical seal and bearing housing
365	Bearing cover
400	Gasket
421	Radial seal ring
433	Mechanical seal
433.1	Mechanical seal, c. c. w.
433.2	Mechanical seal, c. w.
485	Retainer ring, mechanical seal
505	Spacer ring, bearing
701	Tubing
731.3	Elbow fitting
903	Plug
905	Tie-bolt with washers and nuts
914.1	Screw
932	Snap ring for shaft
932.3	Snap ring for bore
935	Elastic ring
940	Key, drive end
940.1	Key, impeller

## 11 - SECTIONAL DRAWING AND AUXILIARY DRAWINGS

SYMBOL LEGEND:

- Cooling liquid from external source
- Mechanical seal lubrication from internal source
- Handled liquid





**NOTE:**

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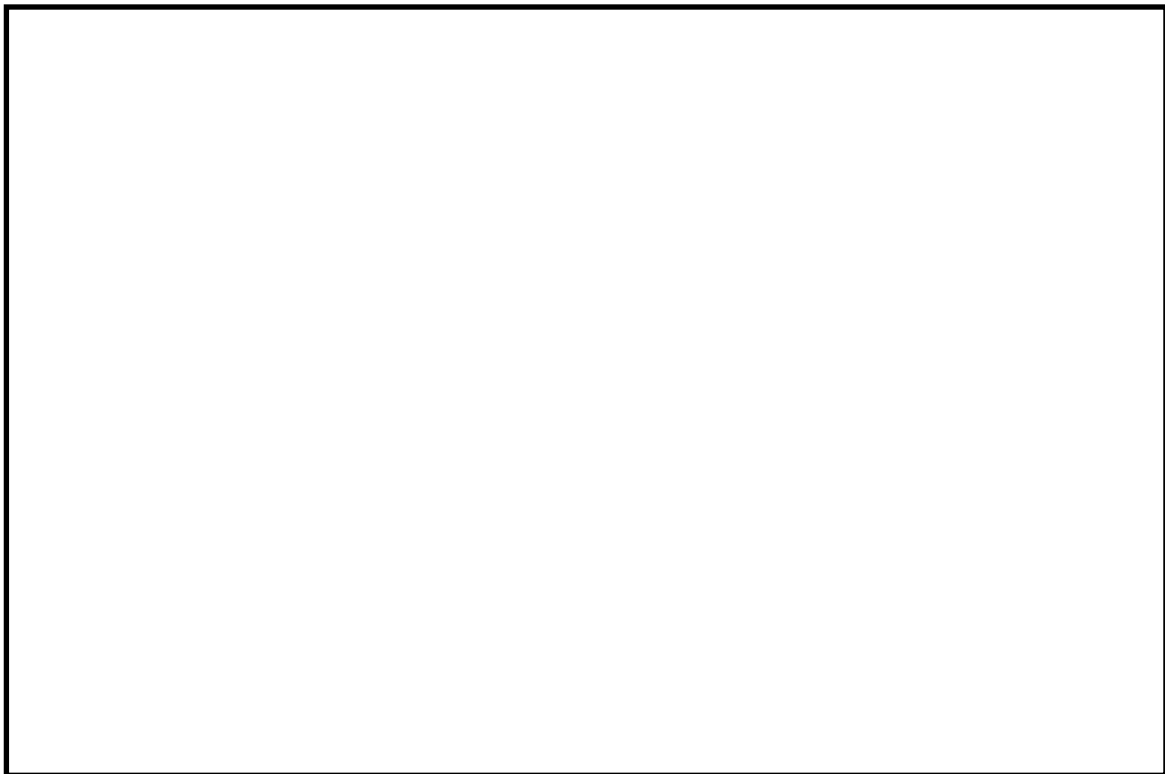
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**Blower Plate**



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