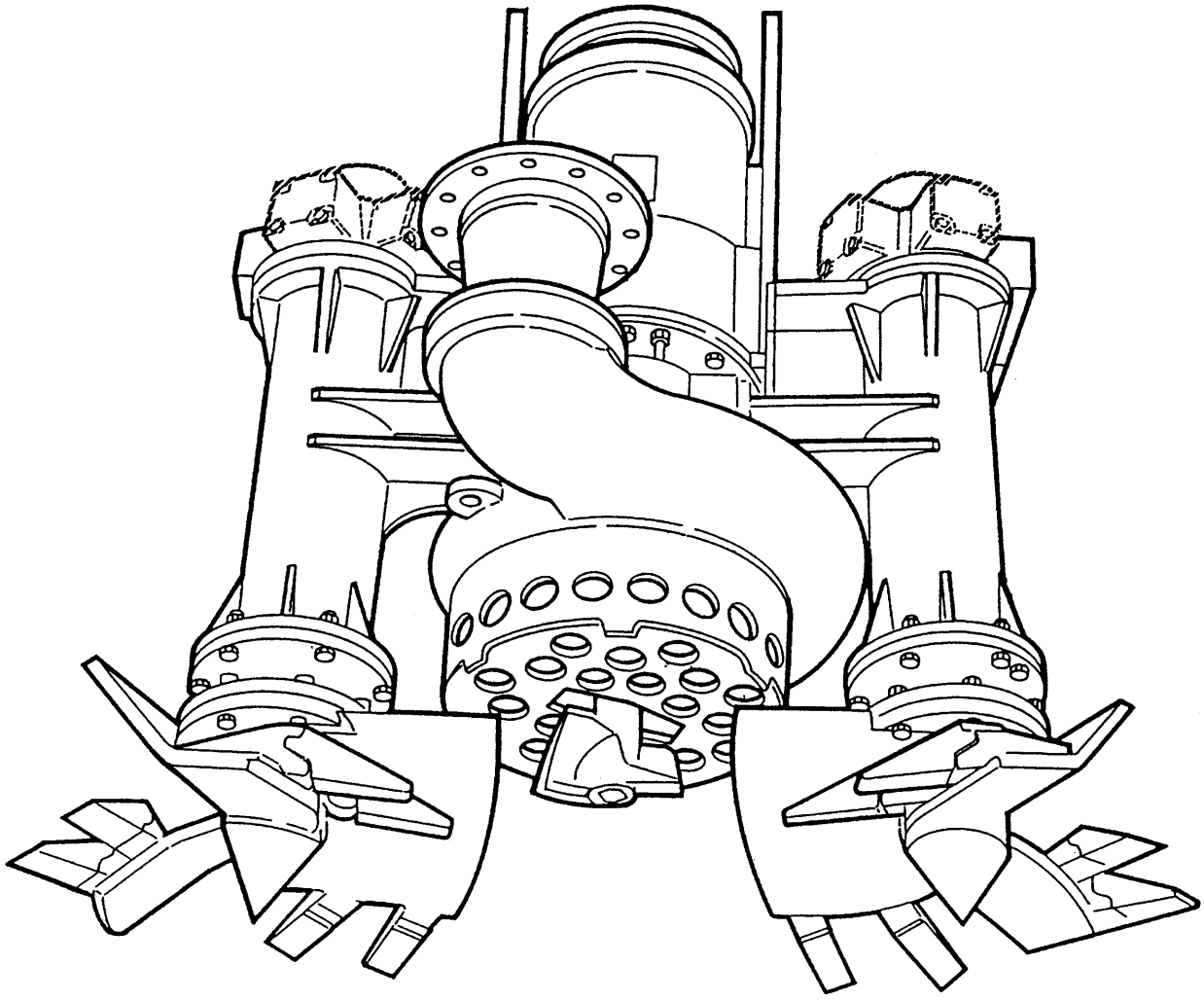
DREDGING PUMPS
HD-300H

GB

Instructions handbook / Spare parts

CE



varisco®

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INDEX

PRESENTATION

This instruction manual has been conceived and structured for rapid and easy consultation, thanks to the index ordered by subjects, and explanatory figures and tables.

GENERAL WARNINGS

This instruction manual must be studied by the owner of the machine, the technical personnel within the factory, the operators, that is, all those that will be using the machine, the maintenance technician.
The manual is an integral part of the machine and contains information on its use, technical characteristics, as well as instructions for handling, installation, assembling, regulation and maintenance.
It also contains a section for trouble-shooting, if necessary, and for the ordering of spares.
The varisco® technicians are always available, on the telephone and fax, to supply all the explanations that may be needed.

This manual:
- must be considered as an integral part of the machine until it is taken to the breakdown yard;
- must be kept in an easily accessible place and suitable for its preservation;
- must be consulted each time that there are problems or doubts on the operation of the machine;
- must be carefully followed for whatever regards the necessary maintenance operations set out in it.

In case it is lost, apply for a copy directly from varisco® .

varisco® reserves the right to carry out all modifications to update the machine or instruction manual according to the technological progress and the state of the art.
This constitutes no obligation to carry out modifications to the machines that have already been sold. If the machine is ceded to a third party, it is recommended that of the instruction manual follow it.

varisco® RETAINS ITSELF FREE FROM LIABILITY OF ANY KIND, AND ESPECIALLY FOR:
- improper use of the machine
- use of the machine by personnel not trained to used it
- power supply defects
- maintenance defects
- unauthorised and unforeseen modifications
- use of spares that are not original or not specific for the model
- non observance of the instructions

The use of the machine for different purposes are to be considered dangerous for the operator and for the machine. Likewise, modalities of installation and utilisation different from that indicated in the present manual could cause damage to persons and/or to the machine itself.

WARRANTY REGULATIONS

varisco® guarantees the original user that the machine will be reasonably free from factory and material defects.
This warranty lasts for 6 (six) months from the date of shipment and refers to the correction of any defect that will be recognised by varisco® as being subject to warranty (after presentation of adequate proof of claim), in one of the following ways and at the discretion of varisco® :

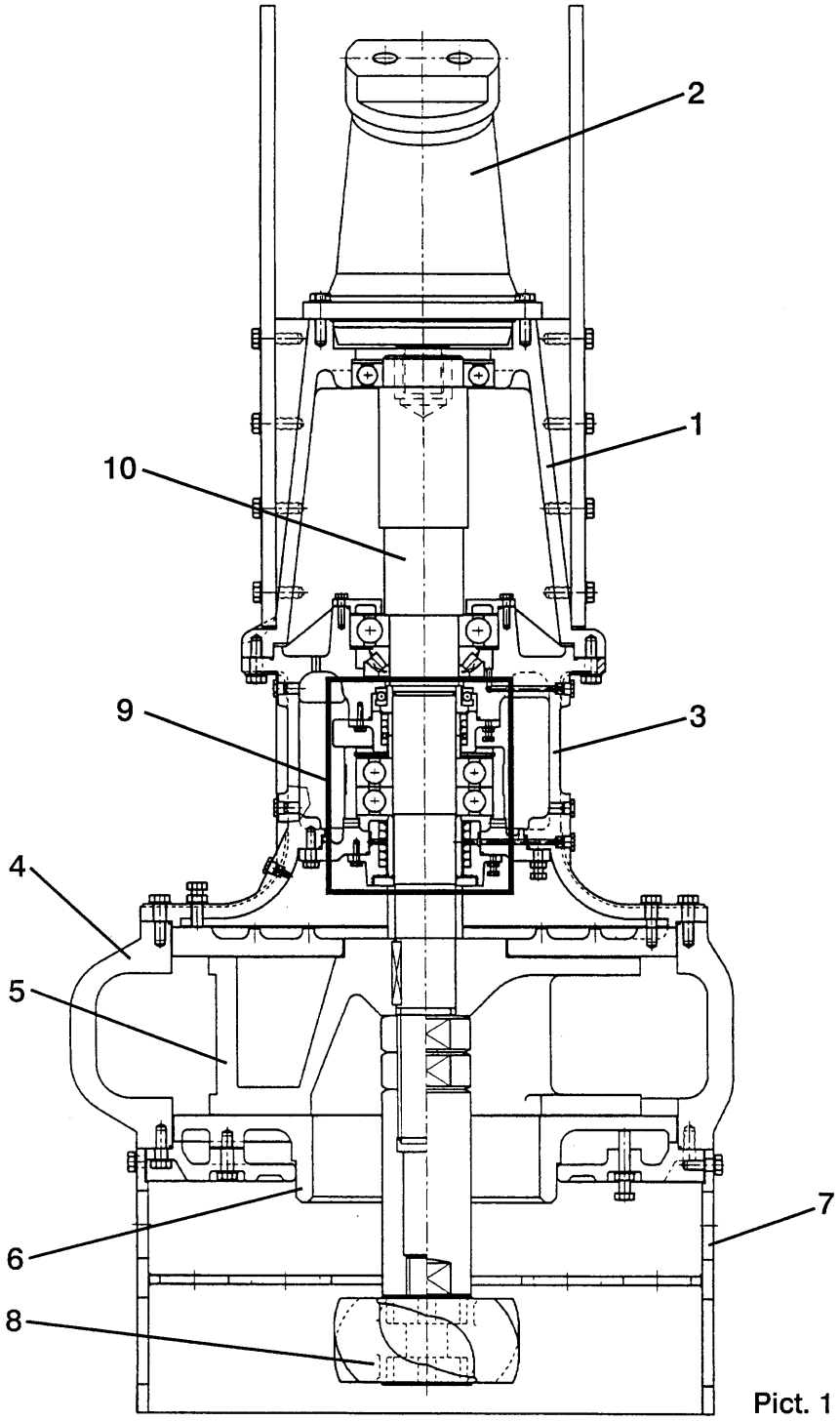
- replacement of the defective part with a new one, made available in the offices of the Purchaser at the lowest transport rate;
- repair of the defective part, after this has been returned to varisco® with transport expenses pre-paid.

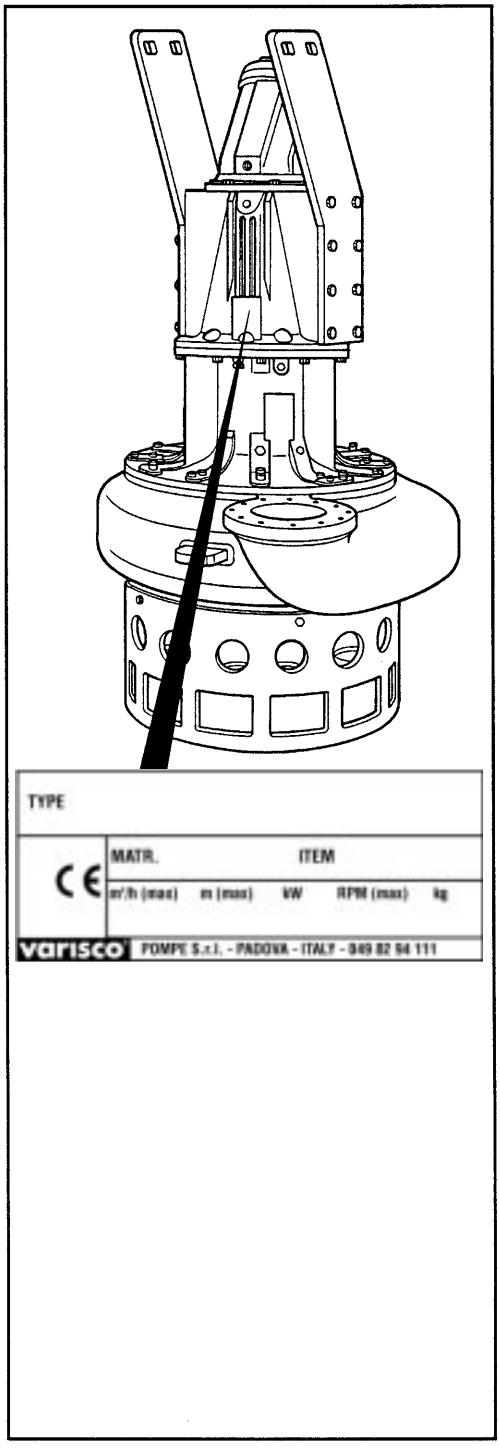
As soon as the spare is ready, The Client will make the defective part available to varisco®
The warranty does not apply to those parts that result defective because of incorrect use, handling or bad observance of the use and maintenance instructions supplied by varisco®
The consumable parts or those parts subject to normal wear (like seals and seals, impellers, stirrer wear-plates, volutes and electrical components, etc.)are not included in this warranty.
If the purchaser tries, either to repair any fault that is under guarantee, or obtain direct supply of the spare part without previous written consent of varisco® , the latter will not be responsible for the results of the repair and will not be held to reimburse the expenses sustained by the Purchaser.
varisco® declines all responsibility for expenses due to "down time", business costs and losses deriving therefrom.
All justifiable claims of breakdown will be transmitted in writing by the Purchaser to varisco® before expiry of the warranty. There are no other guarantees, explicit or implicit, that can be treated or adapted for any particular purpose.

1.0 DESCRIPTION

STRUCTURAL DESCRIPTION OF THE MACHINE (Pict. 1)

The **varisco**® hydraulic pumps are made of high quality materials and undergo severe controls before leaving the factory. They are essentially composed of covers **1**, on which the hydraulic motor **2** is fitted. Inside the oil housing **3** is housed the group of seals **9** that prevents the water from passing to the motor. On the main shaft **10**, inside the casing **4**, there is a keyed impeller **5**, made with high chrome content anti-wear materials. A wear plate adjustable **6**, of the same material, partially closes the impeller inlet. Inside the strainer protection **7** houses a cutter **8** that rotates and stirs the mixture of solids in the water to be pumped.

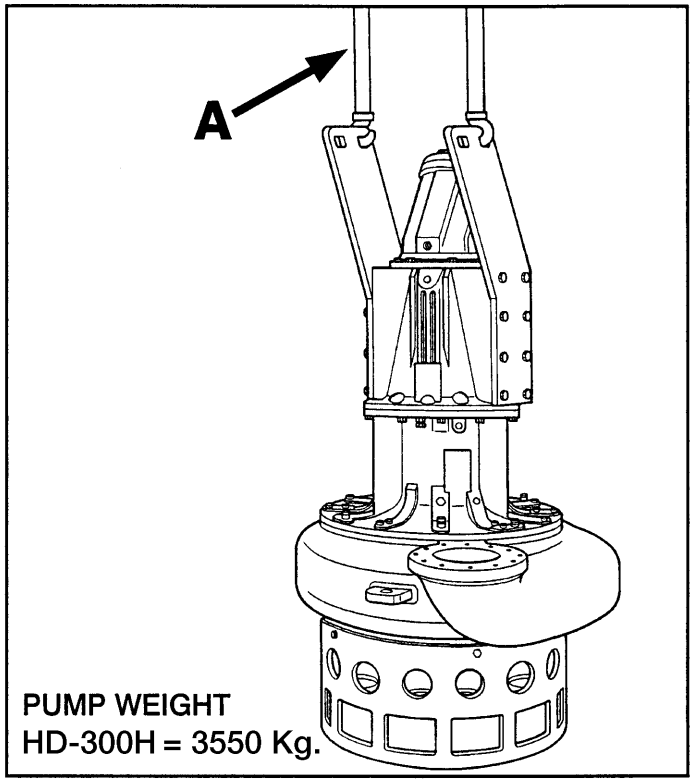




Pict. 1

2.0 TRANSPORT, ASSEMBLY AND DEMOLITION

Remove the packaging from the goods and subsequently lift the pump using the special brackets **A** indicated in **Pict. 2**.

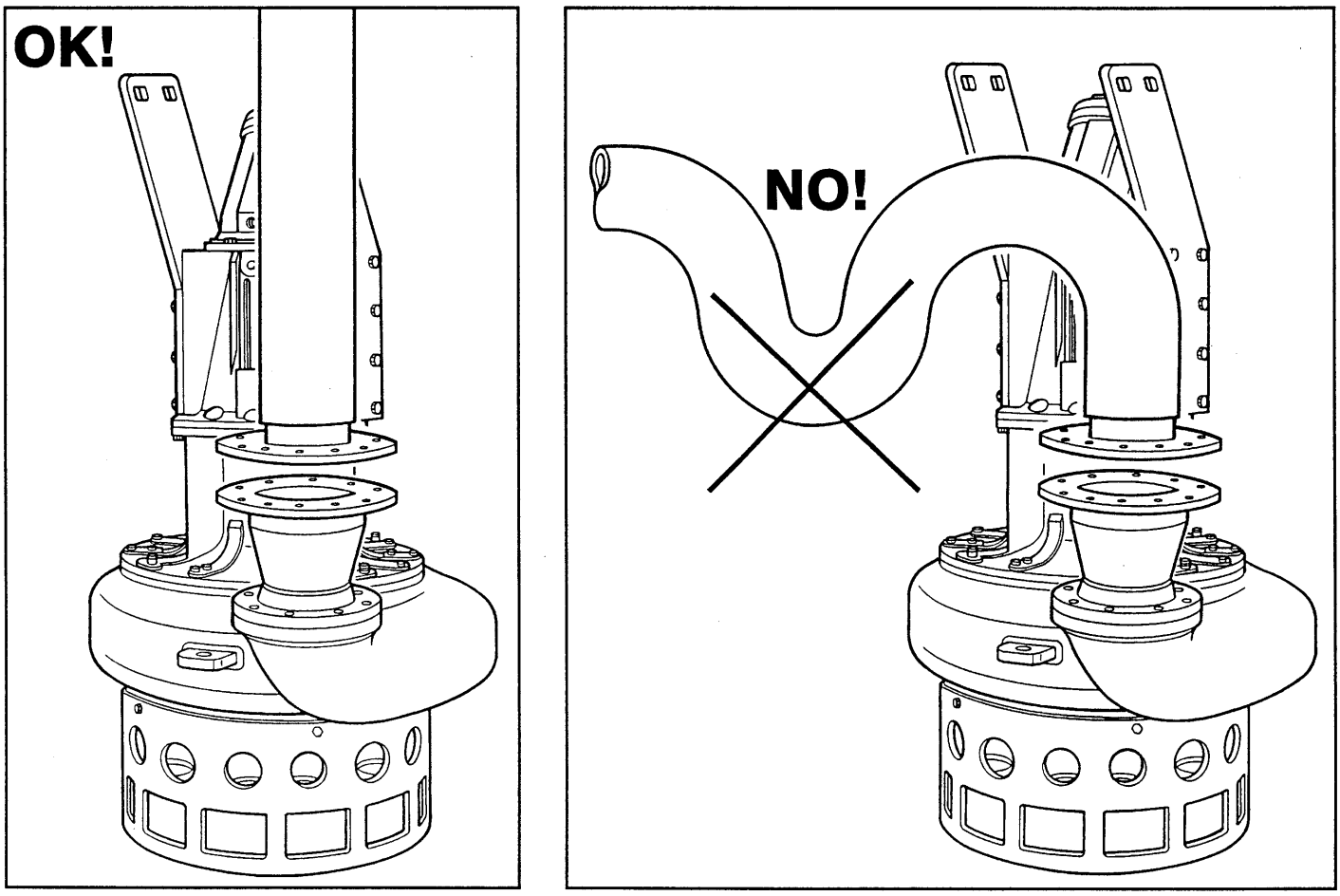


Pict. 2

INSTALLATION

Connect the delivery pipe.

- The delivery pipes must never form siphons **(Pict. 3)**, to avoid problems due to the formation of air pockets or deposits of material.
- Before connecting then pump to the hydraulic supply source, make sure that all the data on the rating plate correspond (max. pressure, etc.).



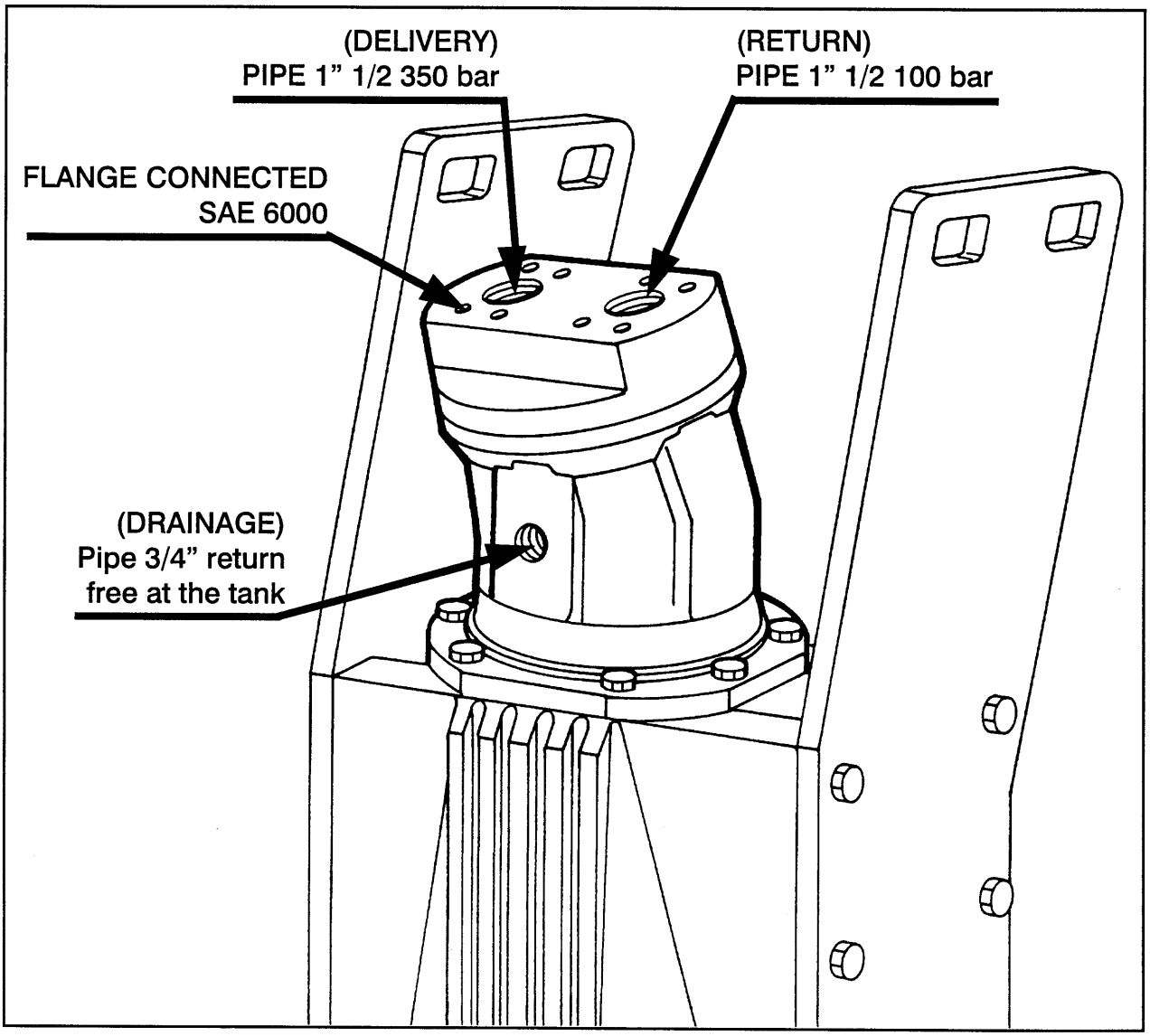
Pict. 3

Connect the oil supply pipes, to the pump as indicated in **Pict. 4**.

DISMANTLING

Before doing anything on the pump, be sure to disconnect the hydraulic supply and the delivery pipes.

Warning: the machine that is considered completely useless must be removed from the department and collected by the manufacturer or any other firm specialised in demolition. Remember that dismantling the machine in your establishment will "produce" different materials (metals, plastics, oil, etc.) whose disposal will be done in compliance with the legislative regulations in force in the state where the machine is found.



Pict. 4

The drainage oil must be collected in non-pressurized tanks. "Free return" means that there must be nothing that impedes the drainage (narrowing, valves, filters, etc.)

3.0 STARTING AND OPERATION

STARTING

The pump has been created to pump suspended matter, even with solid parts, as long as water is always present. It can be used for civil and industrial purposes, as long as conditions described in this manual are observed.
Check the direction of rotation: by passing very short impulses and check that the direction of rotation is that indicated on the rating plate.

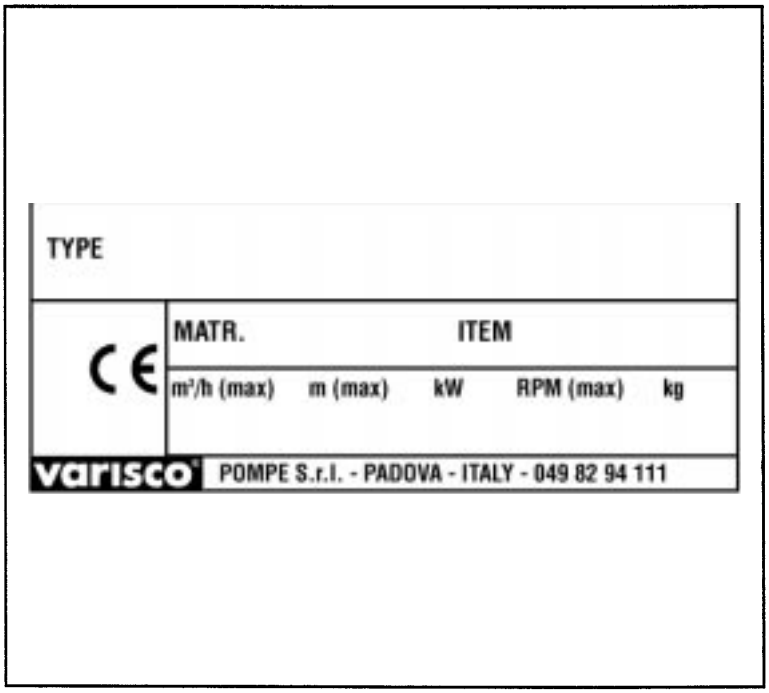
1) Immerse the pump in clear water.
2) If any priming problems should come up, stop and wait for about 30 seconds, leaving it immersed, until all the air has been eliminated.
3) Check that: when pumping only water H_2O, the operating pressure always stays at least 20÷30% below the set maximum pressure.
4) Slowly lower the pump until it comes into contact with the material
5) Check the percentage of solid to avoid exceeding the maximum pressure threshold.
6) When clean water is not available, but only mud and other mixtures, check that the pump does not go over the maximum pressure indicated on the rating plate **(Pict. 5)**; however, if this does happen, create a further load loss, by doing what is set out below:
   - by adding pipes
   - by creating bottlenecks
   - raising the discharge height
7) Before stopping the pump, it is always a good rule to pump water with very little solid in it, so that the pipes are washed.

EMERGENCY SITUATIONS

The correct use of the machine excludes the possibility of emergencies happening during operation or during cleaning and maintenance, unless the latter have not been done in compliance with this instruction manual.

If there is any imminent mechanical danger, stop, or have the pump stopped by disconnecting it from the hydraulic supply. An accurate search for the fault, or anomaly that caused the danger, must be carried out soon afterwards, and once detected, see to resetting the operation of the machine and of the protection set-up.

If necessary, have varisco® Service or competent personnel from another firm carry out any repairs or work.

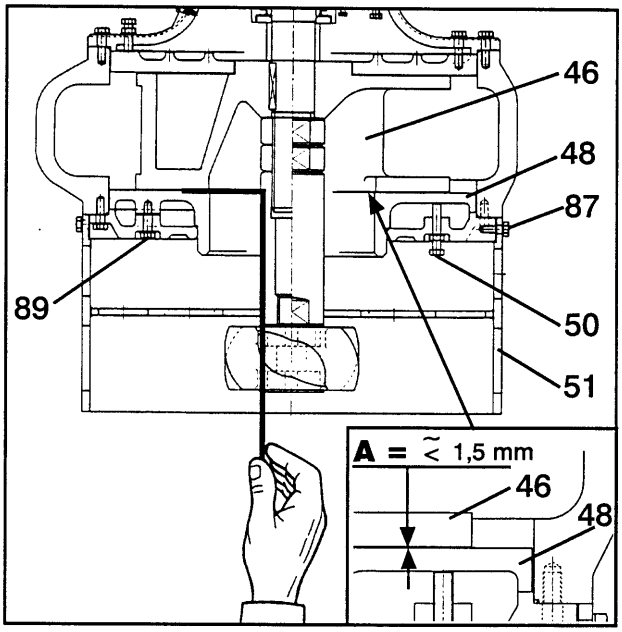


Pict. 5

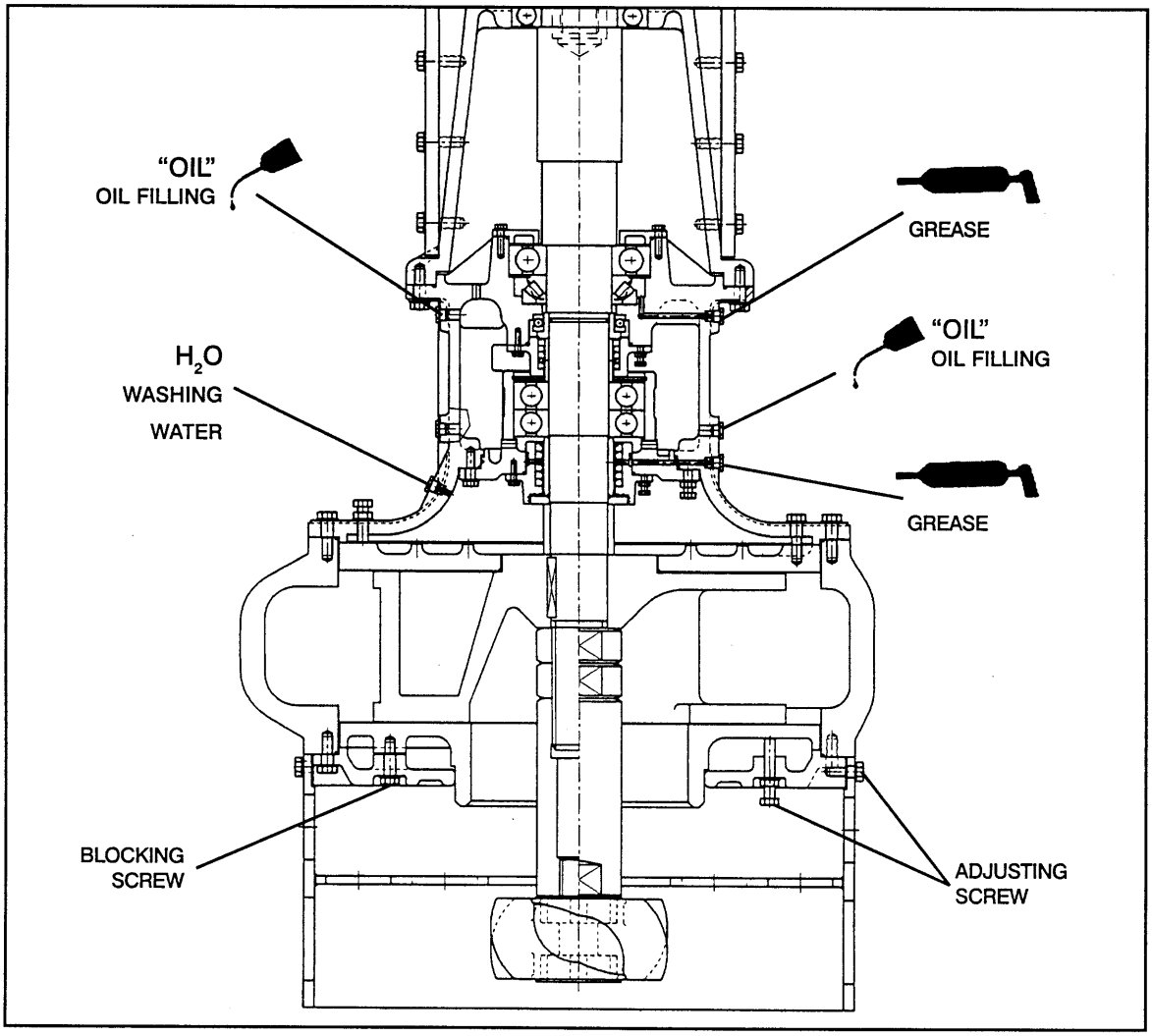
4.0 MAINTENANCE AND CLEANING

Warning: maintenance and cleaning of the nachine must be done after having stopped the machine.

1) Check the tightness of the fastening screws after the first 50 hours of pump operation.
2) Remove the two plugs marked by the labels GREASE, **Pict. 7** every 50 hours of work and top up the grease with a hand grease gun.
3) Every 600 hours check the clearance between the impeller **46** and the lower wear plate **48** is as follows **(see Pict. 6)**.
   - Keep the pump in a vertical position;
   - Dismantle the side strainer **51** by removing the screws in position **87**;
   - Check that the clearance is not more than 1,5 mm, if it is wider proceed as follows:
   - slacken of the fastening screws **89**;
   - take the wear plate **48** at a distance of about 1,5 mm from the impeller **46**, by turning the adjustment screws **50**.
   - check that it rotates freely;
   - fasten the adjustment screws **50** and the fastening screws **89** (tighten to about +/- 40N).



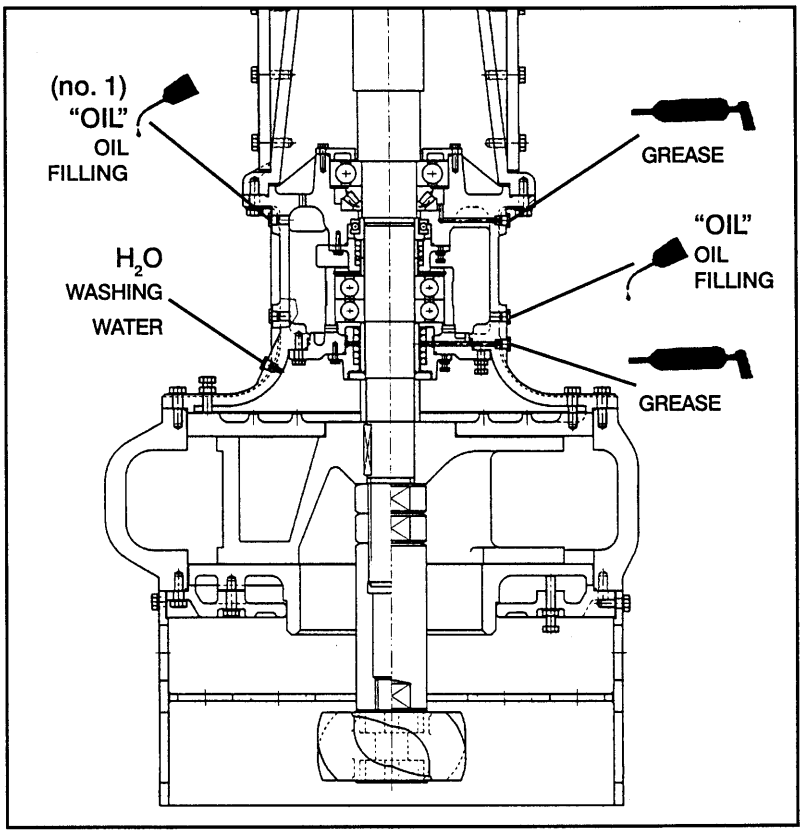
Pict. 6



Pict. 7

4) For customers that work with particularly abrasive materials having a very fine particle size, we advise passing a jet of water under pressure, connecting it to the prepared threaded connector indicated with H_2O **(Pict. 8)**. The pressure must be greater than that exerted by the pump to have continuous cleaning of the area of the seals and so less wear. It is good practice to grease the area of the seals at the end of each shift (use grease such as POLIMER 400 with LIQUILON).

5) Check the level and deterioration of the oil every 200 hours of operation by removing the plug labelled "OIL" (no. 1) **Pict. 8**. For a total oil change or topping up, the following steps have to be taken:



Pict. 8

a) It is good practice to empty the pump completely of the remaining oil. The exhausted lubricant must be disposed of in conformity with the laws in force in the country where the machine is used, since its dispersal in the ground will pollute the water beds.

This is not necessary if the oil is simply topped up.

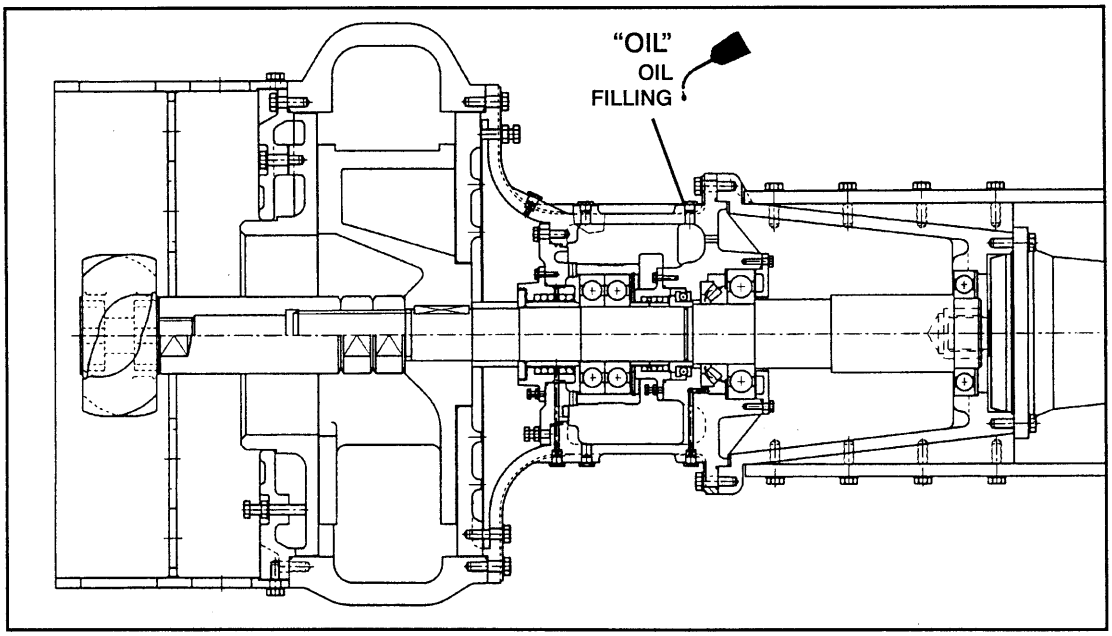
b) The pump must be placed in a horizontal position, keeping the plug marked "OIL" pointing up **(Pict. 9)**.

c) Remove the plug marked "OIL".

d) Top up until completely full or completely change the oil with about 20 kg of oil having the characteristics as in the table following.

Oil type	ISO	Density a 15/4 °C	Cst 40° C	Viscosity Cst 100 °C	E50°C	I.V.	Flash point V.A. °C	Pour point °C
EP320	320	0,900	330	25,8	24	95	240	- 17

e) Before closing the plug change the copper washer to prevent leaks and water seeping in. If the oil is "milky" the seals must be replaced.

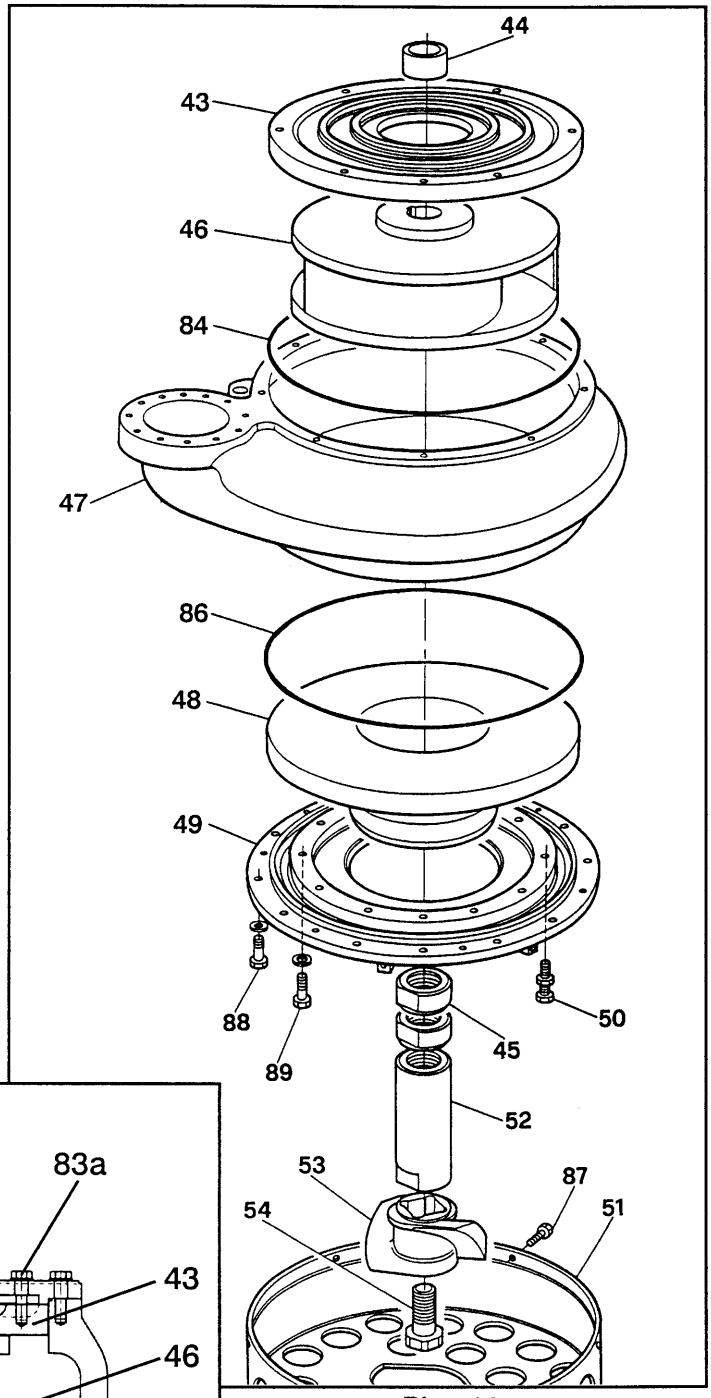


Pict. 9

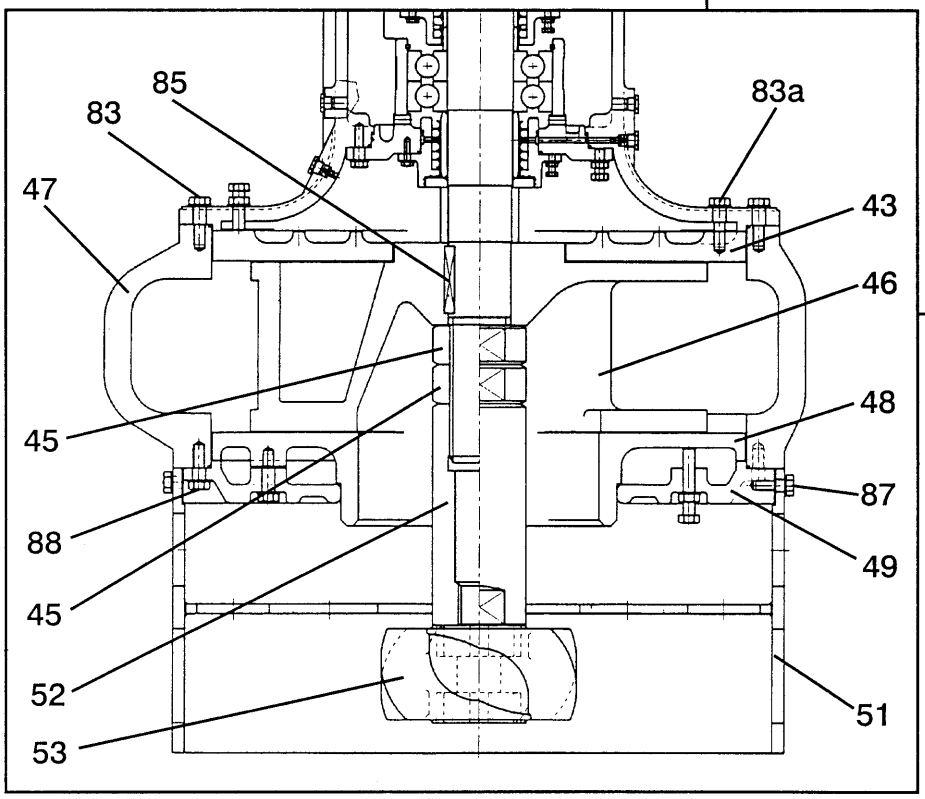
REPLACING THE SEALS

- Completely empty the oil from the oil housing.
- Remove the strainer **51 (Pict. 10)** by unscrewing the screws **87**.
- Unscrew the agitator **53** by hitting it smartly in an anti-clockwise direction as shown in **Pict. 11**; make sure the impeller **46 (Pict. 10)** is blocked with an iron rod.
- Remove the connection **52 (Pict. 10)** and then the nuts **45.**
- Extract the delivery cover **49 (Pict. 11)** after having removed the screws **88**. With the flange pos. **49** the lower wear plate **48** also will come down.
- Remove the casing **47 (Pict. 10)** after having removed the screws **83**.
- Extract the impeller **46**.
  If it sticks use an extractor, taking care not to damage the threaded part of the motor shaft.
- Remove the key **85**. To remove the upper wear plate **43** unscrew the screws **83a**.

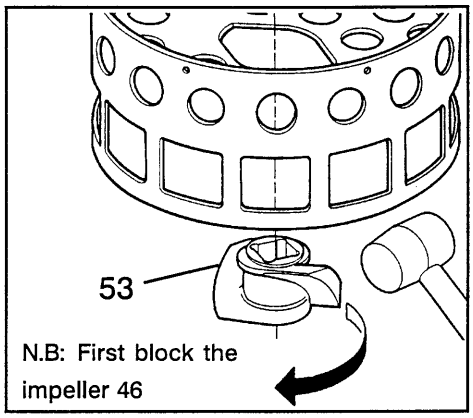
At this point upon arrival at the seals zone it is possible to proceed in two directions:
1) Replacing the seals, zone "A". } see **Pict. 12**,
2) Replacing the seals, zone "A+B". } pag. 11



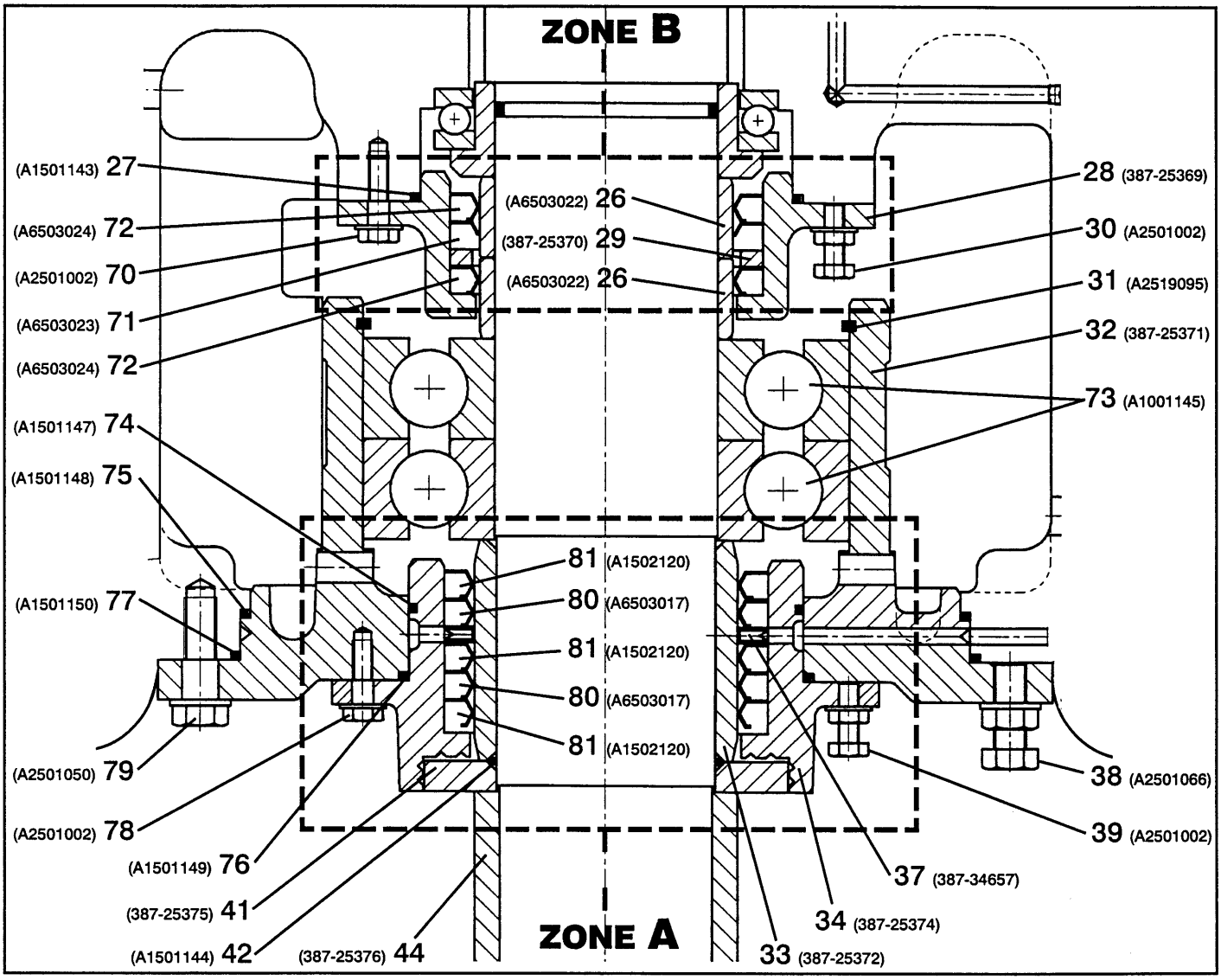
Pict. 10a



Pict. 10



Pict. 11



Pict. 12

1) Replacing the seals zone "A" (Pict. 12).

- Remove the spacer **44-41** and the O-ring **42**.
- Loosen the screws **78** and lower the lower seal flange **34**, with the aid of the release screws **39**.
- Remove the shaft sleeve **33**.
- Change the shaft sleeve **33**, the seals **80** (no.2), **81** (no. 3) and the three O-rings **42, 76, 74**.
- To reassemble follow the instructions in the reverse order.

2) Replacing the seals zone "A+B" (Pict. 12).

- Loosen the screws **79** and lower the bearing support **32** with the aid of the release screws **38**.
- Together with the support **32** the seal zone **"A"** will also be lowered.
- To change the zone **"A"** seals use the same procedure indicated in point 1.
- Loosen the screws **70** and lower the upper seal flange **28** with the aid of the release screws **30**.
- Remove the two shaft sleeves **26**.
- Change the shaft sleeves **26**, the seals **71** (no. 1) and **72** (no. 2) and the O-ring **27**.
- To reassemble follow the instructions in the reverse order.
- Check the state of wear of the bearings **73** and replace if necessary.
- After changing the zone **"A"** seals, change the two O-rings **77** and **75** before refitting the flange **32**.

Remember to adjust the lower wear plate **48 (see Pict. 6 page 8)** as indicated in paragraph **3)**, before closing the pump definitely.
Top up with new oil, according to the instructions of paragraph **5)**, page 9.
Periodically, check the state of the hydraulic system .
When parts of the hydraulic equipment are replaced, **components with hydraulic characteristics as similar as possible to the originals must be used.**

PUTTING THE MACHINE OUT OF SERVICE

If for any reason whatsoever the machine should be temporarily placed out of service, it is important to disconnect the hydraulic supply, clean it and cover it to protect it from dust. To put it back into service again follow the instructions for starting up.

5.0 NOISE

The machine was designed and manufactured while at the same time keeping in due consideration air noise hazards. The construction techniques used allow to limit the noise level within tolerable limits in compliance with the Machine Directives 89/392. point 1.7.4.f:
- the pondered equivalent continuous acoustic pressure level is 62 dBA.
- the maximum pondered instantaneous acoustic pressure "C" is never above 63 Pa (130 dB compared to 20 mPa).

Air noise detection was effected by placing the probe two metres from the machine, along the whole perimeter and at a metre from the floor. The noise was measured under vacuum. This because the machine itself does not require any specific operation position fixed by the operator since it is normally immersed in water and therefore the values are non-influencing.
The observations were done with a model HD9020K1 DELTA OHM PRECISION INTEGRATOR NOISE METER in conformity with the: IEC 651 class 1 standards
IEC 804 class 1
IEC 225 filters 1/3 octave
The instrument was calibrated with a DELTA OHM HH9101 calibrator conforming to the IEC 942-1988 class1.

HYDRAULIC CONNECTIONS

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- The **varisco**® pumps are only supplied with piston hydraulic motors, suitable for circuits where the continuous operating pressure may reach 350 bar. These pressures can only be reached in the worst conditions. Make sure that in the hydraulic power unit, the safety valve is set from 250 up to 350 bar according to the **varisco**® pump model.
  The drainage pipe from the motor must be connected directly to the tank without filters or any other restriction in between.

- Start the pump out of the liquid to be pumped and check the direction of rotation and the speed with a revolution counter. The speed must be adapted to the working conditions (between 1000 ÷ 1200 rpm, the length of the pipes, vertical height above the water, etc.), since good operation and the best duration of the pump are obtained by working in the flow rate/head range corresponding to the model concerned (see the the pump curve at pag. 22).

6.0 SAFETY

Introduction

varisco® has designed and built the machine keeping in mind the results of a preventive and accurate analysis of the risks connected to the use of the machine.
The protections and devices applied, therefore, represent the profuse commitment by the varisco® technicians to achieve the aim of safety sanctioned by the specific directives issued by the EEC. The protections and devices are illustrated below with drawings.
Other instructions and information on the safety of the machine are contained in the paragraphs which deal with the use, maintenance and repair.

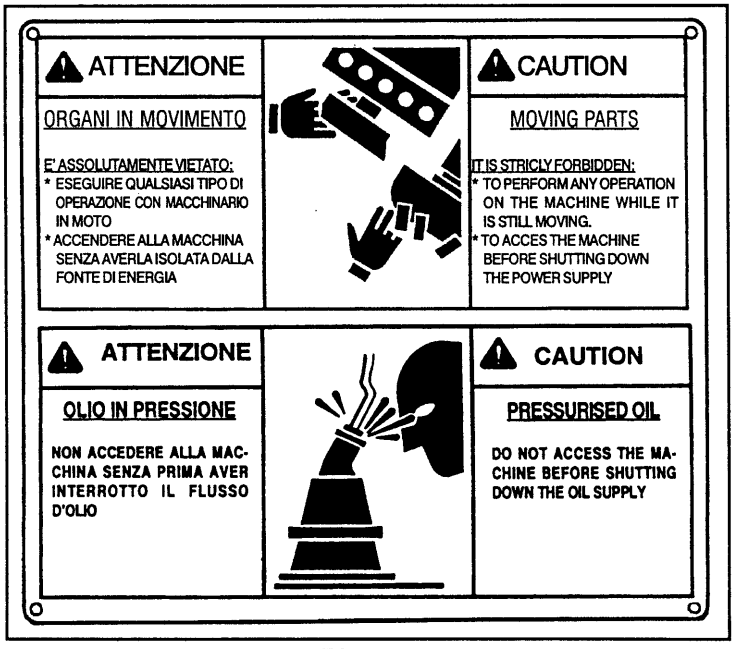
All the organs in movement are segregated inside the pump structure.
The only rotating mechanical part is the AGITATOR **53 (Pict. 14)**, that for functional reasons cannot be protected in any way.
In fact its specific function is that of cleaning the strainer **51** and stirring the solid bodies present in order to set them in suspension in the liquid to be pumped **(Pict. 14)**.
On the pump there is a warning plate **(Pict. 13)** to remind us of this danger.

When about to operate the pump, keep clear of this rotating part in order to avoid accidents.

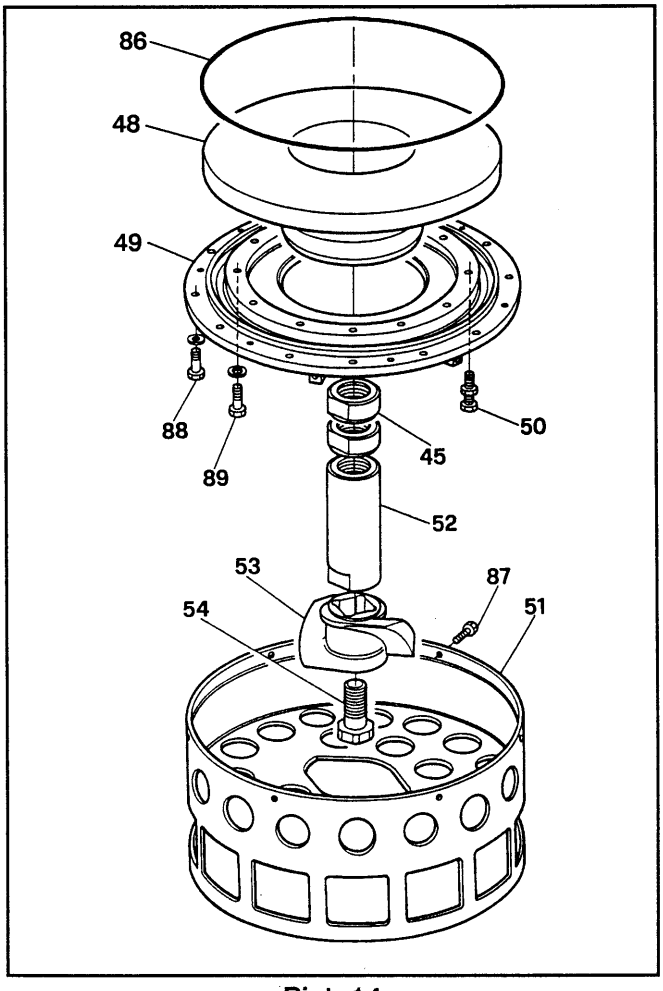
The strainer **51 (Pict. 14)** is made according to the suction capacity of the pump, and does not allow the passage of particles of over **120** mm diameters for HD-300H.
It is a good rule not to come close to the pump when it is immersed in water to avoid dangerous situations.

Do not open without having first releasing the hydraulic pressure.

On the pump there is a warning plate to remind us of this danger **(Pict. 13)**. The driving hydraulic motor is fed oil under pressure, therefore keep to the safety rules in the table.



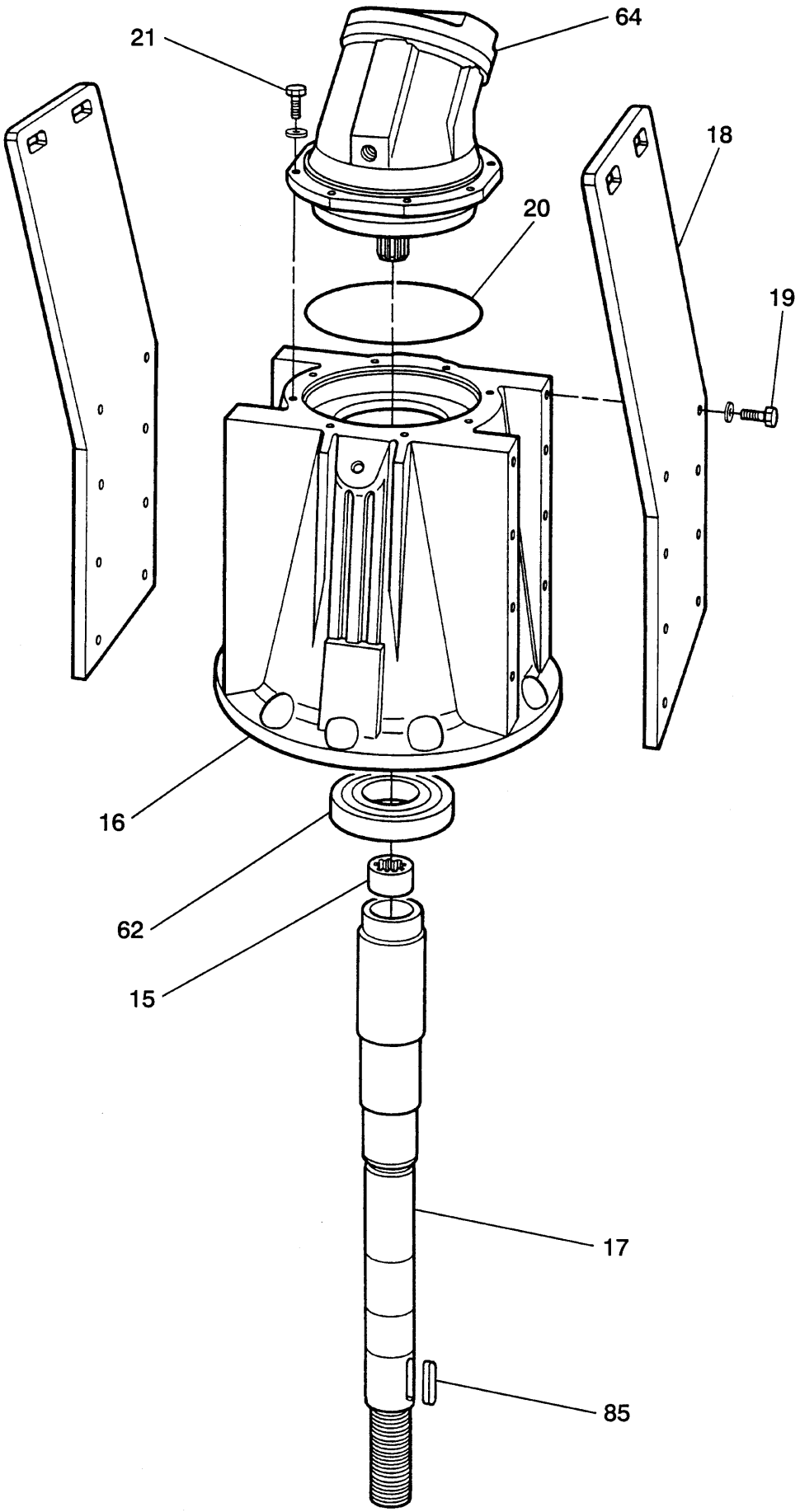
Pict. 13



Pict. 14

SPARE PARTS

varisco®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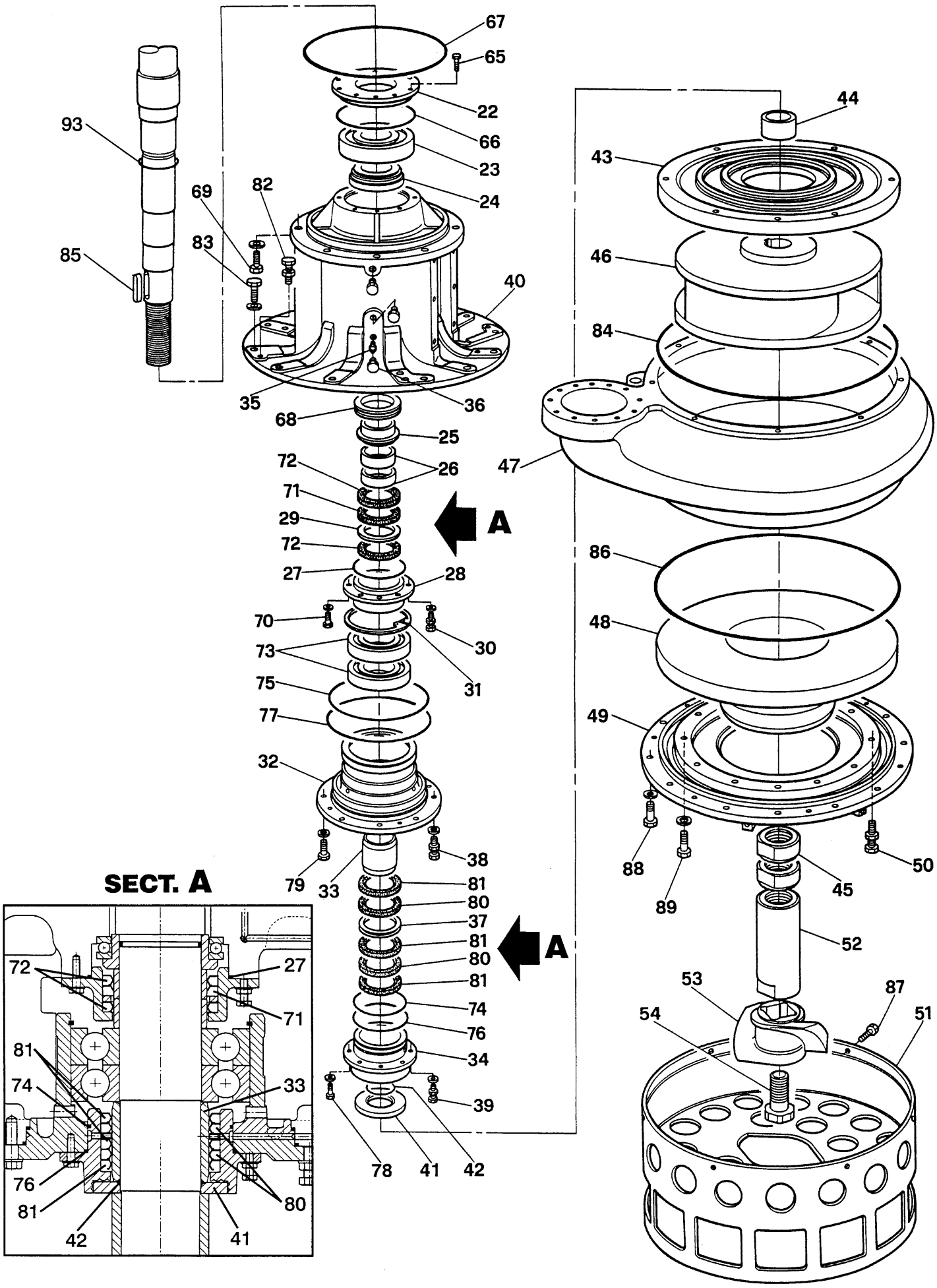
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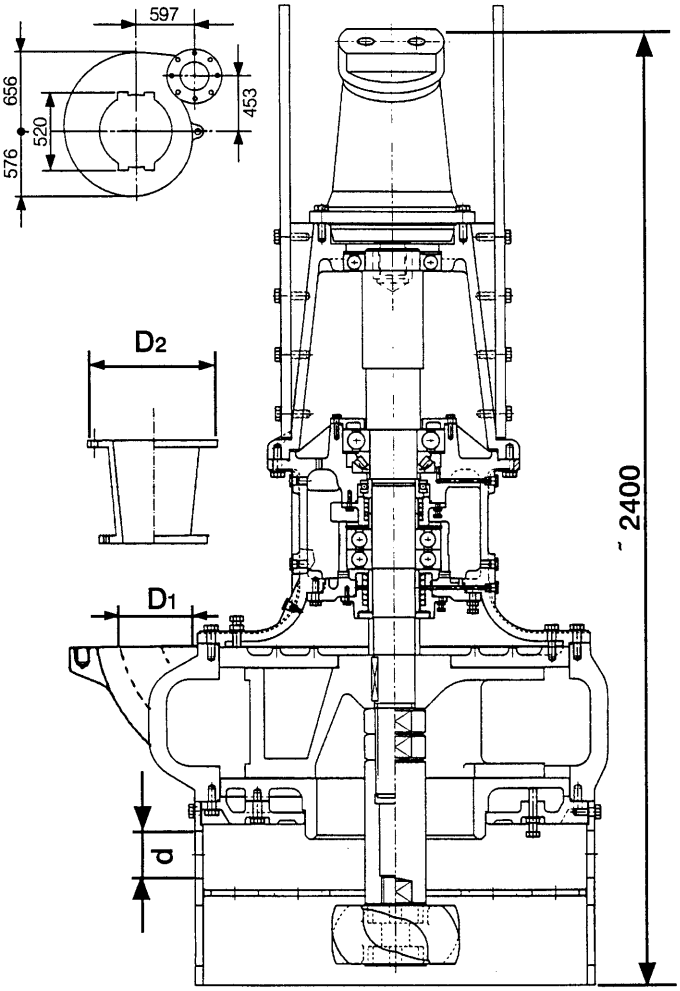
POS.	COD.	Q.TY	DESCRIPTION
15	F27771	1	SPLINED BUSH
16	387-25389	1	COVER
17	387-25388	1	MAIN SHAFT
18	388-26735	2	PLATE
19	A2501103	16	SCREW
20	A1501153	1	O-RING
21	A2501103	8	SCREW
22	387-25366	1	BEARINGS COVER
23	A1001143	1	BEARINGS
24	A1002067	1	BEARINGS
25	387-25368	1	BUSHING
26	A6503022	2	RINGS (SHAFT SLEEVE)
27	A1501143	1	O-RING
28	387-25369	1	UPPER SEAL FLANGE
29	387-25370	1	THICKNESS
30	A2501002	2	SCREW
31	A2519095	1	SEEGER
32	387-25371	1	BEARINGS SUPPORT
33	387-25372	1	SHAFT SLEEVE
34	387-25374	1	LOWER SEAL FLANGE
35	A6502018	3	GREASE NIPPLE
36	A6504064	6	NUT
37	387-34657	1	GREASE SPACER
38	A2501066	4	SCREW
39	A2501002	2	SCREW
40	387-25367	1	OIL HOUSING
41	387-25375	1	SPACER
42	A1501144	1	O-RING
43	387-25378	1	UPPER WEAR PLATE
44	387-25376	1	SPACER
45	387-25382	2	NUT
46	387-25379	1	IMPELLER
47	387-25377	1	CASING
48	387-25380	1	LOWER WEAR PLATE
49	387-25381	1	DELIVERY COVER
50	-	6	SCREW
51	387-25386	1	FILTER
52	387-25383	1	CONNECTIVE

POS.	COD.	Q.TY	DESCRIPTION
53	387-25384	1	AGITATOR
54	387-25385	1	SCREW
62	A1001146	1	BEARINGS
64	A4517007	1	HYDRAULIC MOTOR
65	A2501014	10	SCREW
66	A1501145	1	O-RING
67	387-32883	1	O-RING
68	A1003020	1	BEARING
69	A2501103	8	SCREW
70	A2501002	8	SCREW
71	A6503023	1	SEAL
72	A6503024	2	SEAL
73	A1001145	2	BEARINGS
74	A1501147	1	O-RING
75	A1501148	1	O-RING
76	A1501149	1	O-RING
77	A1501150	1	O-RING
78	A2501002	6	SCREW
79	A2501050	8	SCREW
80	A6503017	2	SEAL
81	A1502120	3	SEAL
82	A2501103	8	SCREW
83	A2501103	18	SCREW
84	387-32884	1	O-RING
85	A2518117	1	KEY
86	387-32884	1	O-RING
87	-	6	SCREW
88	A2501024	18	SCREW
89	A2501103	6	SCREW
93	A1501127	1	O-RING

TECHNICAL DATA

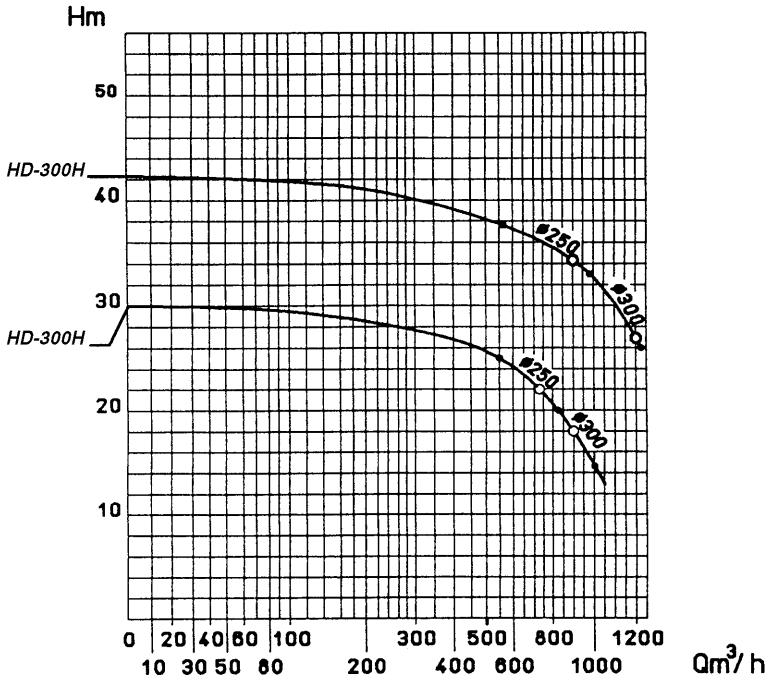
	MODEL "A" 600-750 R.P.M.	MODEL "B" 600-750 R.P.M.
Capacity:	720-900 m³/h	900-1200 m³/h
Head:	22-34 m.	18-28 m.
Bore:	250 mm. (D1)	300 mm. (D2)
Cross section:	120 mm. (d)	120 mm. (d)
Output:	150-300 HP	150-300 HP
Need of oil:	300-375 l/min.	300-375 l/min.
Oil pressure:	230-350 bar.	230-350 bar.
Weight:	3500 Kg.	3550 Kg.



MATERIALS

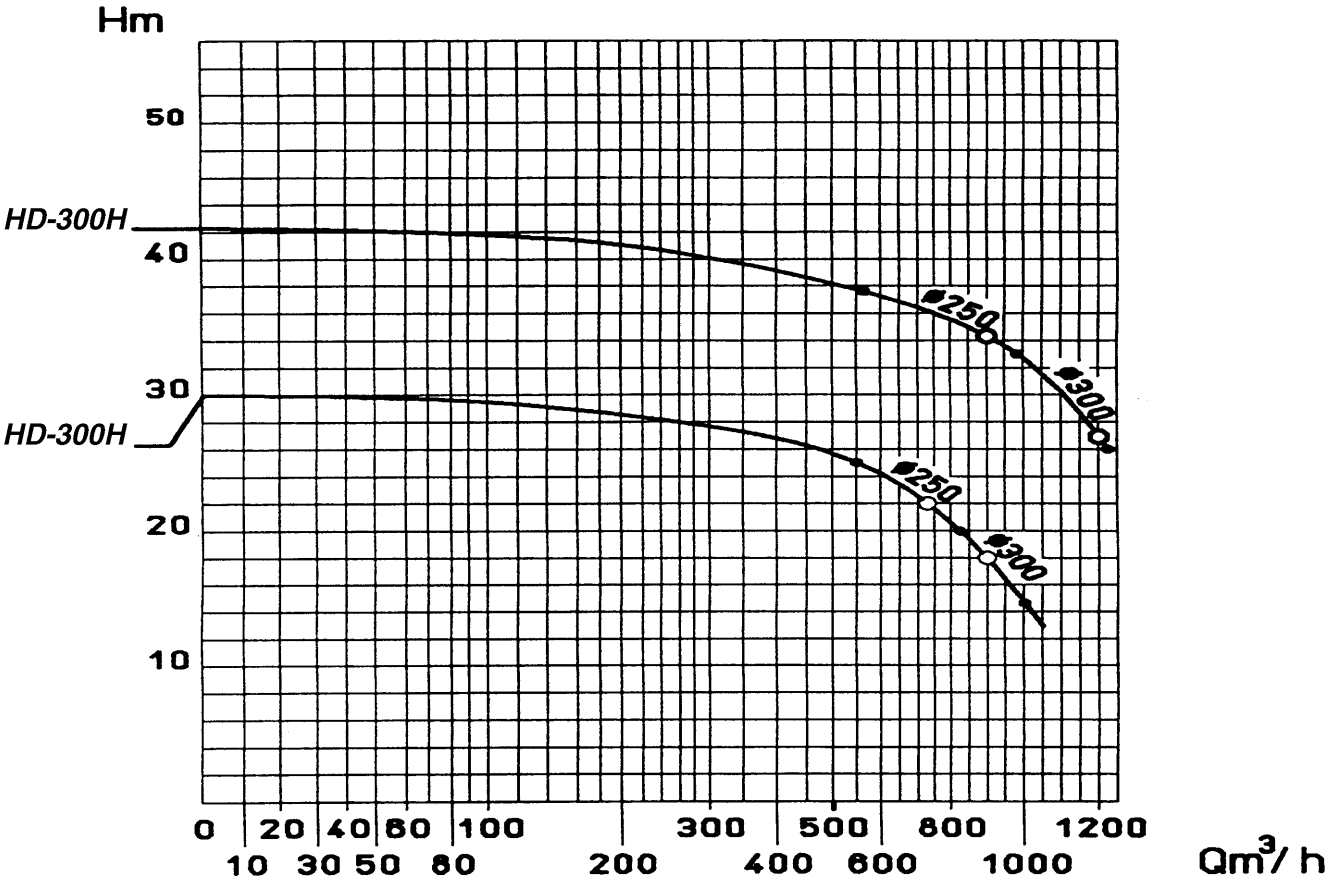
Main body:	cast iron G25
Shaft:	austempering NiCrM04 steel
Wearing parts:	chrom hard
Casing:	spheroidal cst iron GS500
Impeller:	two vanes (closed)
Seals motor zone:	n° 1 rubber lip seal, plus n° 1 PTFE teflon lip seal.
Seals impeller zone:	(alternate) n° 3 rubber lip seals plus n° 2 PTFE lip seals with stainless steel spring plus n° 1 grease labyrinth.

PERFORMANCE CURVES



PUMP MODEL:	HD-300H-A	HD-300H-B
Bore:	250 mm (D1)	300 mm (D2)
Capacity:	720-900 m³/h	900-1200 m³/h
Head:	22-34 mm.	18-28 mm.
Impeller diameter:	760 mm.	760 mm.
Speed:	600-750 R.P.M.	600-750 R.P.M.
Motor output:	110-220 Kw	110-220 Kw
Motor displacement:	500 c.c.	500 c.c.
Need of oil:	300-375 l/min	300-375 l/min
Oil pressure:	230-350 bar.	230-350 bar.

PERFORMANCE CURVES



PUMP SPECIFICATIONS

MODEL	Discharge	Capacity m^3/h	Head m H_2O	Motor displacement	Motor output
HD-300H-A	250 mm	720-900 m^3/h	22-34 m	500 C.C.	110-220 Kw
HD-300H-B	300 mm	900-1200 m^3/h	18-28 m	500 C.C.	110-220 Kw

MODEL	Speed R.P.M.	Cross section	Need of oil	Oil pressure	Weight Kg
HD-300H-A	600-750	120 mm	300-375 l/m	230-350 bar	3500
HD-300H-B	600-750	120 mm	300-375 l/m	230-350 bar	3550