caprari

CENTRIFUGAL VERTICAL LINESHAFT PUMPS

P SERIES

INSTALLATION - OPERATION - MAINTENANCE
INSTRUCTION MANUAL

N.0029169

You are strongly advised to carefully read this instruction manual which is supplied with each pump along with the adjustment tables and to comply with the instructions it contains before proceeding to install the pump.

TABLE OF CONTENTS

1. INTRODUCTION

The **P** series vertical lineshaft pumps comprise the following basic components:

- Control
- Discharge head

(Control unit)

- Lineshaft
- Pump casing

and any accessory components

- Suction pipe
- Foot valve
- Strainer head

If the installation depth exceeds 10 m, make sure that the line bearings are correctly lubricated by installing

• either foot valves, to prevent the riser from emptying

• or the lineshaft pre-lubrication device

If the installation includes a suction pipe, it is advisable to equip it with a foot valve.
To ensure that the pump functions in a regular way, it is essential to prevent the dynamic level from dropping below the minimum suspension depth level of the pump's NPSH.

The control unit can be supplied in four versions:

• With a vertical pulley, with races for standardized V-belt drive or flat for flat belts (**VG** -**VP** series).

• With right-angled transmission for direct drive, drive by means of universal coupling to the motor (**R** - **RR** series) or with overdrive for operation via a universal coupling connected to the tractor's PTO (**M**- **MR** series)

• With support for standardized vertical electric motors (**E** series)

2. WARRANTY

The normal warranty conditions established in the “General Terms of Sale” of CAPRARI S.p.A. become void if the pump:

• Raises fluids other than fresh drinking water free from foreign substances, at a temperature of up to 30°C

• Fails to operate at the speed envisaged by the manufacturer

• Is installed in a well that is unable to house it as the diameter is too small, the perpendicularity incorrect or the lining defective

• Sustains damage owing to corrosion, erosion, abrasion, electrolysis, cavitation and overpressure owing to unsteady flow

• Is installed without complying with the instructions in this manual.

3. WHEN THE PUMP ARRIVES

When the pump arrives, the purchaser must check to make sure that everything conforms to the order and delivery note as to quality and quantity.

Any complaints must be immediately notified in writing to both CAPRARI S.p.A. and the haulage contractor.

Take the greatest care when unpacking the pump to make sure that none of the mechanical partsisdamaged, particularly the shafts and lineshaft sections which must not have been twisted in any way.

The coupling components and connections must be kept scrupulously clean during all the assembly phases.

4. HOW TO PREPARE THE FOUNDATION BED

It is essential to prepare a sufficiently rigid foundation bed at the mouth of the well.

This bed can be made of channel section metal or concrete.

In both cases, the foundation bed must be sized to suit the load-bearing capacity of the ground and the load formed by the installation full of water.

If the bed is made of concrete, it is advisable to allow for bolt housings in the foundation so as to firmly anchor the vertical installation.

Moreover, the foundation bed must be perfectly horizontal and insulated (with a layer of cardboard or other) from the well casing so that any vibrations produced during the transitory phases are unable to damage the actual well itself.

5. WELL INSPECTION

Before proceeding with the installation, check the minimum diameter of the well, its maximum depth and make sure that it is straight and perpendicular.

A well is considered straight if a cylinder 6 m in length with the same diameter as the body of the pump can be freely lowered down to the depth at which the machine is to be installed.

It is essential to know the well’s maximum suction flow rate and the relative static and dynamic levels.

6. WELL CLEARING

It is advisable to have this operation done by the actual well driller, who should also test the flow rate produced (see TECHNICAL ANNEX of this manual).

Proceed as described below if the well has not been cleared: if a considerable amount of sand appears along with the water when the machine is started, throttle the delivery sluice valve or lower the speed of the thermal engine in order to reduce the flow rate.

Gradually open the sluice valve or slightly increase the speed of the engine when the water starts flowing either clean or with only slight traces of sand.

Do not stop the pump for any reason whatsoever when the well is being cleared as the impellers could be sanded up.

If the pump is operated by an electric motor, it must be stopped after the delivery sluice valve has been closed.
If it is driven by a thermal engine, it must be stopped after the speed has been lowered.

7. TOOLS AND EQUIPMENT REQUIRED FOR ASSEMBLY

The range of lift at the hook of the lifting means used must be at least 4 m and the carrying capacity of the lifting equipment must exceed the weight of the pump full of water.

It is very convenient to have an auxiliary hook for assembling the lineshaft.

Besides the normal tools (wrenches, hammer, etc.), the following equipment is also required:

• 2 pairs of brackets of an adequate size

• metal brush for cleaning the threads

• steel ropes and cords

• graphitized grease

8. HOW TO PREPARE THE MATERIALS FOR ASSEMBLY

Lay out the parts on a clean surface near the well in their assembly order, so that they can be coupled to the hoist.

fig. 1 - Preparing the parts for assembly

Thoroughly degrease the transmission shafts using a solvent (denaturated alcohol) and thoroughly clean them with a dry cloth.

NOTE. When using the solvent, take great care to prevent it from coming into contact with the rubber bearings on both the pump casing and lineshaft supports.
Besides warping the rubber, these solvents modify its properties and impair the functions of the bearings.

9. INSTALLATION

9.1. Foot valve and suction pipe

Assemble these parts on the ground. Check to make sure that the valve functions correctly and remember to fit the rubber seal between the jointing flanges.

Assemble one pair of brackets near the upper flange of the suction pipe then lower this latter into the well until the bracket rests on the base.

fig. 2 - Lowering the foot valve and suction pipe into the well

9.2. Pump casing

Thoroughly clean the threaded end of the shaft projection and apply a light film of antiscuff grease to it. Fully screw in the threaded sleeve and take care to remove any excess grease.

Harness the pump and fit it on to the flange of the suction pipe. Place the rubber seal in between and lock the parts together with the relative bolts.

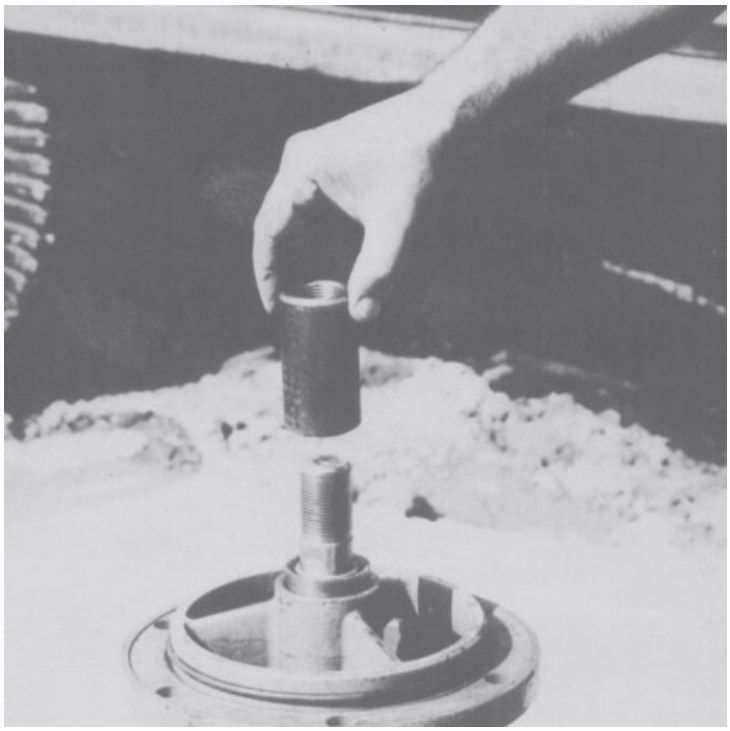

fig. 3 - Fully screw in the threaded sleeve

9.3. Lineshaft

Thoroughly clean the pipe coupling flange.

Assemble the pair of brackets on the pipe, harness this latter and lift it on to the pump casing shaft.

Slant the pipe so that the driving shaft section can be inserted (fig. 4) and position the threaded end on the threaded sleeve. Fully tighten by hand (fig. 5) so as to prevent the thread from being damaged, then torque with the wrenches. (fig. 6)

Connect the pipe to the pump casing with the relative bolts and lower the assembly into the well so that the brackets rest on the bearing frame (fig. 7)

Thoroughly clean the rod support and fit it into the pipe housing (fig. 8). Insert the O-ring seal into the outer seat. (fig.9).

Tighten one of the threaded sleeves (fig.10), then repeat the operations described above for all the lineshaft sections. (fig.11-12-13)

Take the greatest care when the vertical assembly is set in position, so as to prevent the flanges of the riser from being damaged.

When the risers and lineshafts are assembled, make sure that dimension “A” of the shaft projection is within the given tolerance range that ensures regular operation and achieves perfect axial rotor adjustment (see Table). This dimension varies, depending on the number of sections assembled.

The resulting measurement must comply with the table below. If it is less, fit a shimming washer between the driving shafts.

Dimension “A” in mm resulting from assembly of the given number of sections

shaft Ø in mm	Dimension **A** on pump casing	10	15	20	25	30	33	35	40
20 - 24	from 98	96	95,5	94,5	94	93	92,5	92	91,5
	to 99	98	96,5	95,5	95	94	93,5	93	92,5
27 - 30	from 110	107	106,5	105,5	105	104	103,5	103	102,5
	to 111	109	108,5	107,5	107	106	105,5	105	104,5
35 - 40	from 122	120	119,5	118,5	118	117	116,5	116	115,5
	to 124	122	121,5	120,5	120	119	118,5	118	117,5
45 - 55	from 137	135	134,5	133,5	133	132	131,5	131	130,5
	to 139	137	136,5	135,5	135	134	133,5	133	132,5

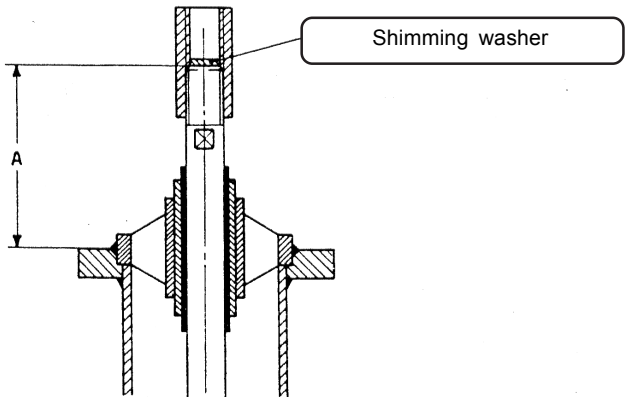

fig. 4 - Slant the pipe so as to insert the driving shaft section

fig. 5 - Fully tighten by hand to prevent the thread from being damaged

Cipriano R.	Ferri M.	11/01/07	0	Prima emissione	
Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce

fig. 6 - Fully torque with wrenches

fig. 7 - Lower the assembly so that the brackets rest on the bearing frame

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Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce

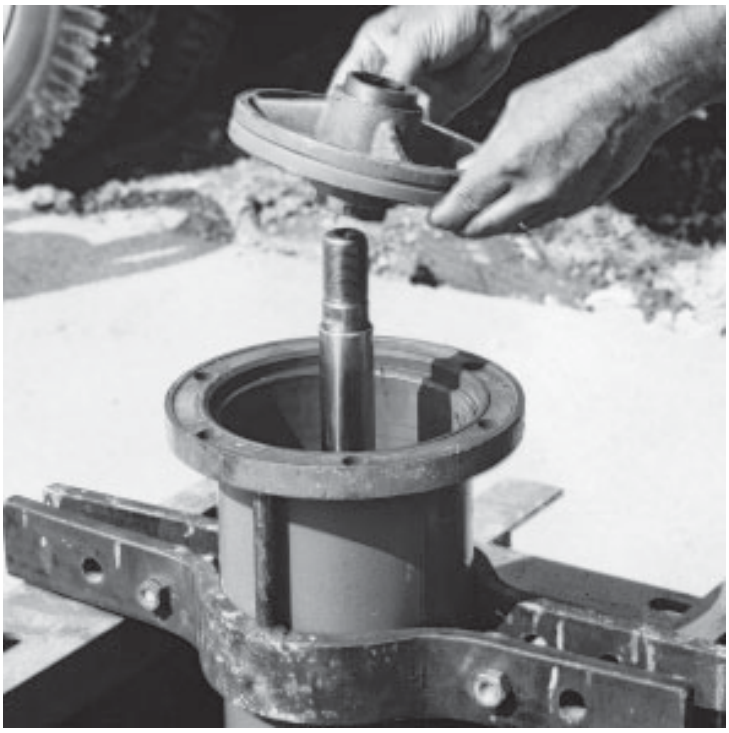

fig. 8 - Fit the rod support into the pipe housing

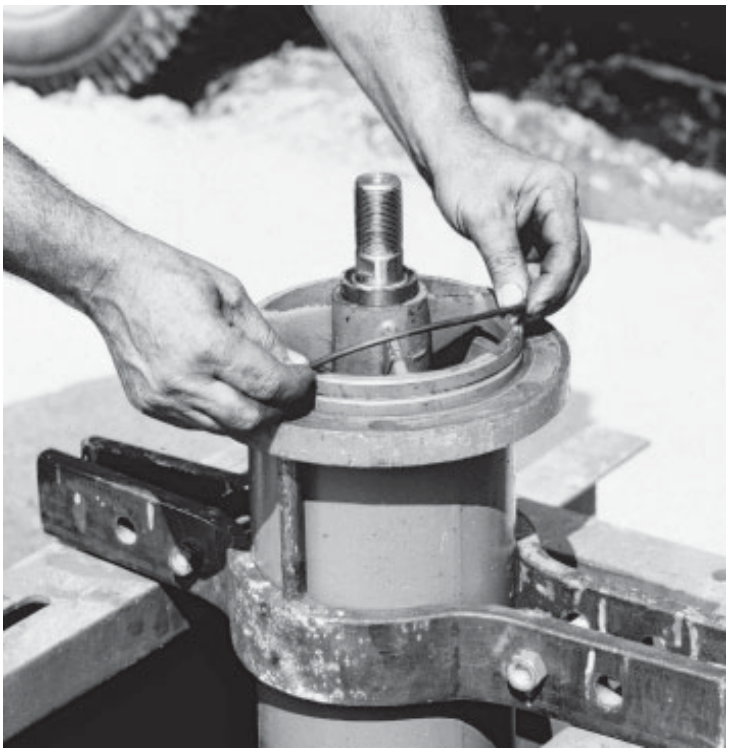

fig. 9 - Seat the O-ring seal

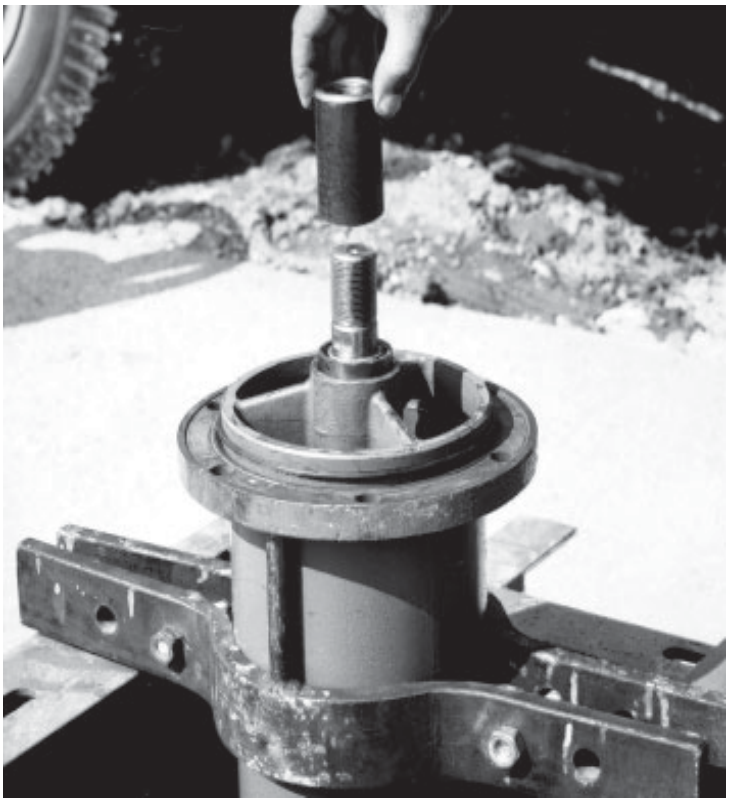

fig. 10 - Tighten a threaded sleeve

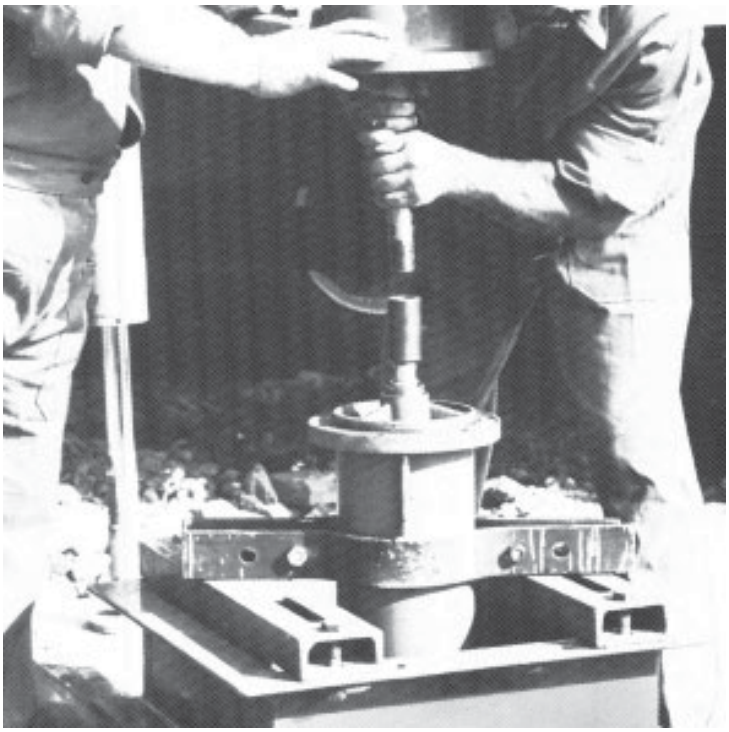

fig. 11 - Insert the threaded sleeve and tighten by hand

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Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce

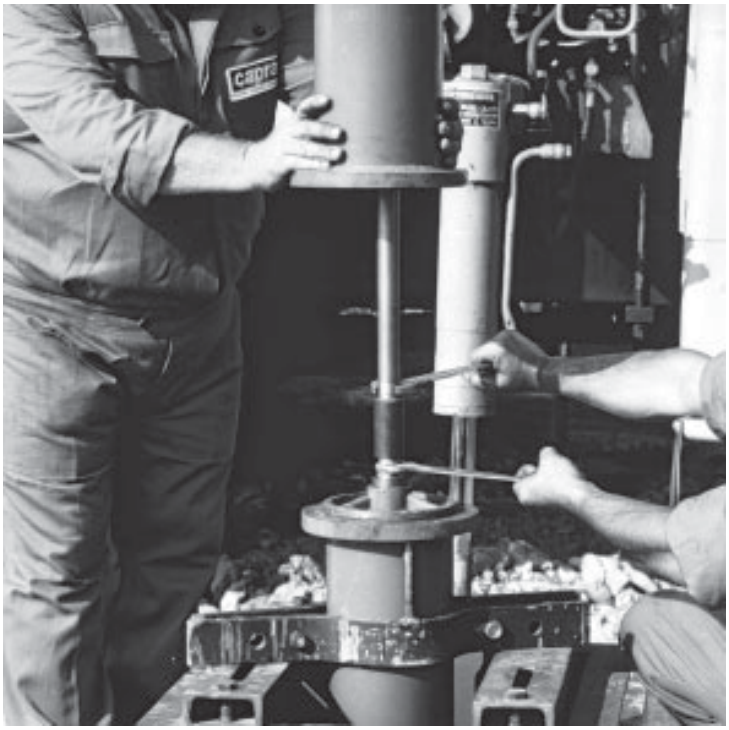

fig. 12 - Fully torque with wrenches

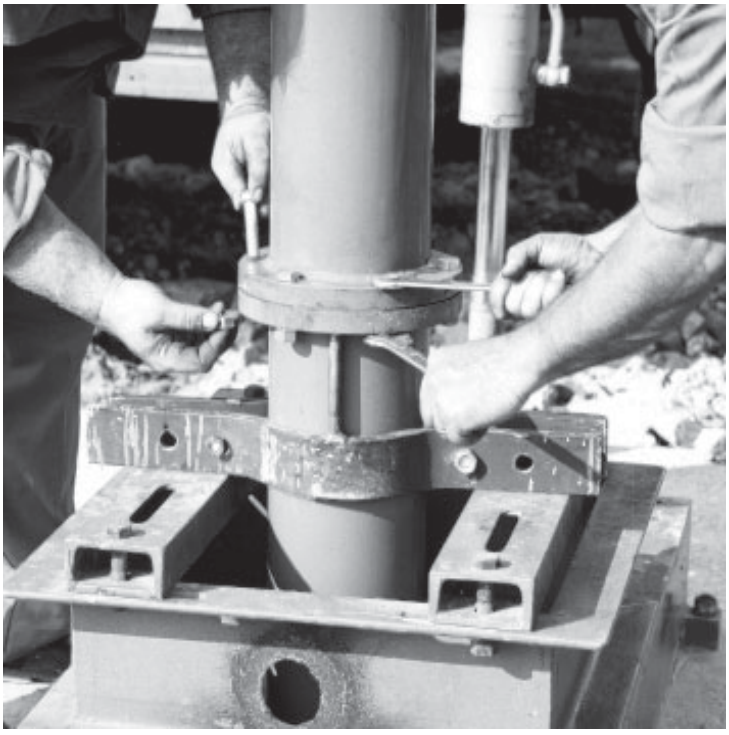

fig. 13 - Install the lineshaft pipes with the relative bolts

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Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce

9.4. Control unit

The control unit is shipped with all three of its sub-assemblies assembled.

• discharge head

• control device

• connection shaft

Make sure that the stuffing box has been slackened off.

Disassemble the head cover, the locking screw and the adjuster for right-angled transmissions of the R or M type.

Remove the pulley cover, the locking screw and the adjuster for vertical pulley transmissions of the VG or VP type.

Remove the locking screw and the adjuster for control units type E with electric motors.

Remove the shaft of the control unit and set aside the feather key.

Carefully screw the connection shaft on to the last section of the lineshaft and lock it in place with the threaded sleeve. (fig. 14)

Harness the control unit so that it is perfectly aligned then lower it. Make sure that the connection shaft is inserted and that it is not damaged in any way. (fig. 15)

Lastly, lock the lineshaft section to the discharge head, raise the whole assembly, disassemble the pair of brackets from the pipe and then lower the assembly on to the bearing frame.

If the control unit is the type with an electric motor, do not connect it to the head before having adjusted the rotor in the axial direction.

fig. 14 – Screw in the connection shaft and lock the threaded sleeve

fig. 15 - Lower the control unit after having made sure that it is perfectly aligned

10. HOW TO FIX THE LINESHAFT PUMP TO THE FOUNDATION BED

If the pump rests on a metal foundation framework, first rest it on the frame but only fix it in place with the relative bolts after having checked to make sure that the lineshaft is centered in relation to the well axis. If this is not the case, correct the position by lifting the entire assembly or by means of a lever.

Weighted down by the machine, the foundation frame will naturally adapt to the bedding surface. This position should be complied with as it provides the pump-foundation frame assembly with a correct bearing surface which can be adjusted if required, using aligning wedges or by filling with a cement mortar mixture.

If the pump is positioned on a concrete base, assemble foundation bolts in the discharge head and spread the lower surface with a light film of grease to prevent it from sticking to the base itself.

Now lower the discharge head on to the foundation bed. Make sure that the grub screws fit into the previously prepared seats in the foundation and keep the lineshaft centered in relation to the well axis.

Position two metal bars in the directly opposite direction to the well axis and use these as a bearing surface, attempting to find the right balance for the entire pump assembly.

Inject a cement mixture between the discharge head and the base so as to form a firm, complete bearing surface.

Tighten the foundation grub screws once the mixture has set.

11. AXIAL ADJUSTMENT OF THE ROTOR

Connect the control unit to the discharge base and fully tighten the relative screws.

If the pump has a foot valve, fill the riser with water and make sure that the rotor rests on the impeller housing rings of the pump casing (rotor blocked).

Position the feather key and tighten the adjuster nut (fig. 16) until the entire rotor is raised to a sufficient extent to detach the impeller pack from its seats.

Now center the rotor in the axial direction by tightening the adjuster nut and then raise the entire lineshaft and the rotor of the pump casing to the extent indicated in the relative ADJUSTMENT TABLES in the Technical Annex of this Manual.

Lock the adjuster nut with the relative screw. (fig. 17)

Make sure that the rotor is free to turn by hand. (fig. 18)

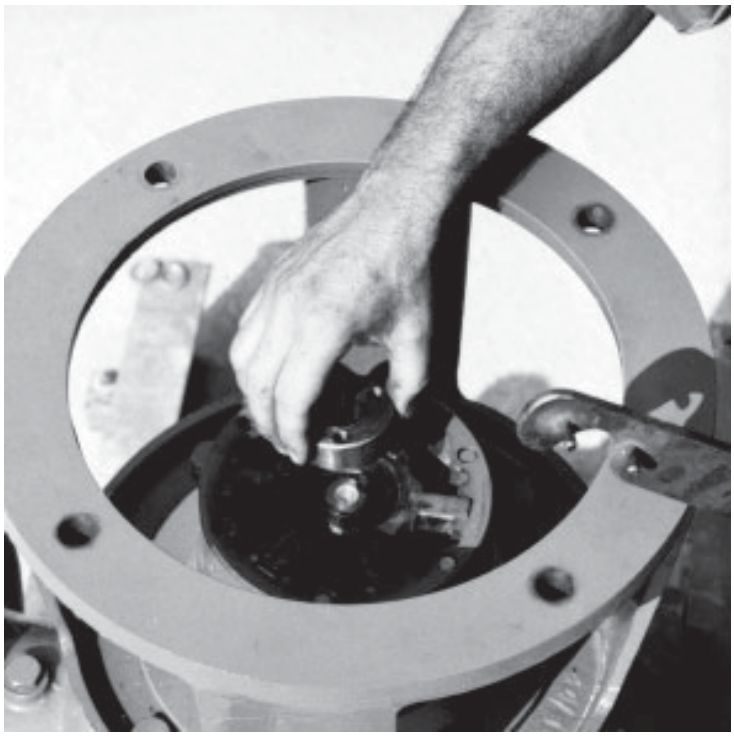

fig. 16 - Set the feather key in position and tighten the adjuster screw

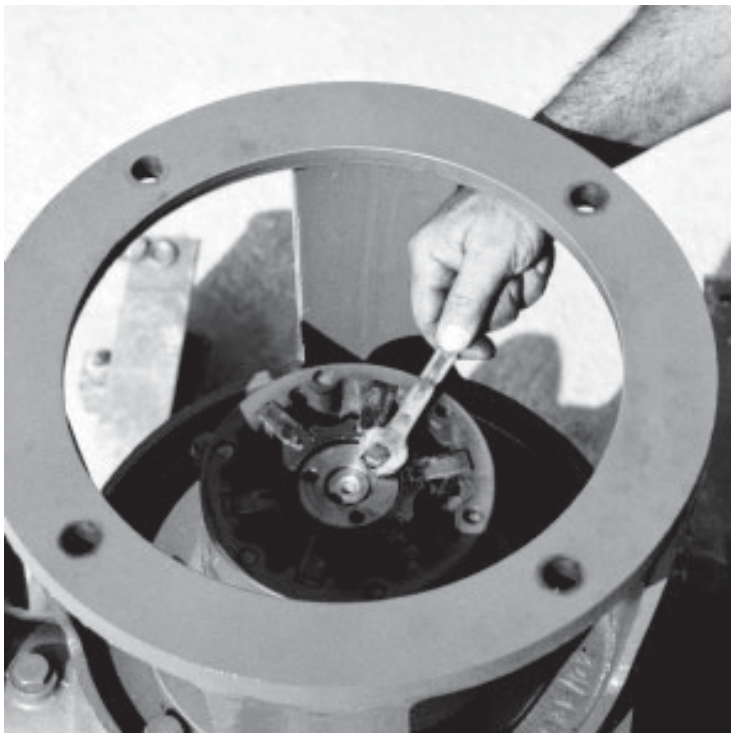

fig. 17 - Lock the adjuster screw with the relative bolt

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Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce

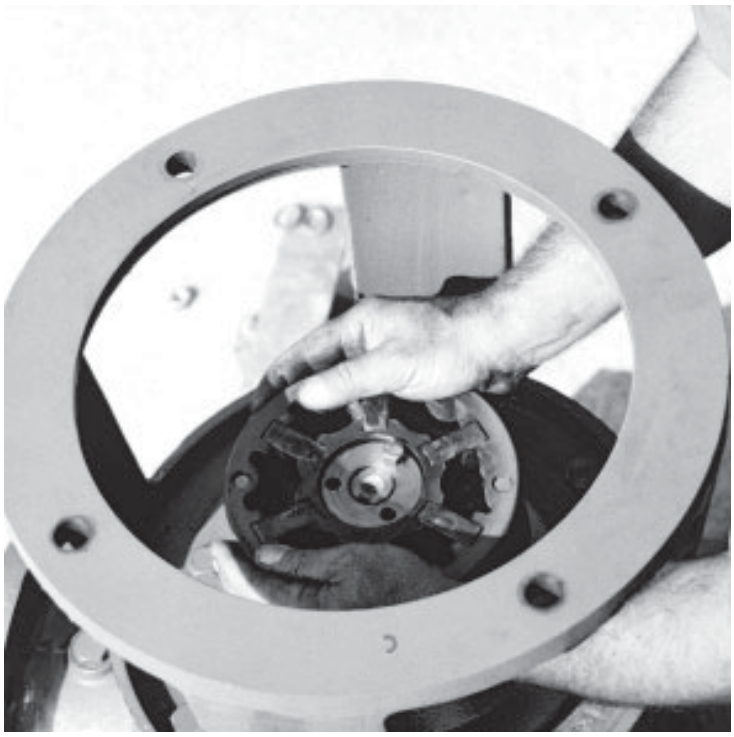


fig. 18 - Make sure that the rotor is free to turn by hand

12. COUPLING TO THE MOTOR

All P series pumps run in the anti-clockwise direction, viewed from above.

It is absolutely essential for the pump to turn in the prescribed direction, to prevent the lineshaft's jointing sleeves from loosening.

Strictly comply with the indications concerning the direction of rotation given on all the pump control units.

Electric motors should be subjected to a preliminary test start-up with the motor disconnected from the pump. If the motor runs in the wrong direction, two of the powering phases must be inverted.

To allow the belts to bend in couplings with flat semi-crossed belts, lower the center of the band on the driven pulley by dimension **B**, which depends on the width of band **L** and of the center distance between pulleys **A**, as shown in the table. (fig. 19 and 19A)

To couple with semi-crossed V-belts, center distance **A** must be:

$$\mathbf{A} \geq \mathbf{5.5} \times (\mathbf{D} + \mathbf{C})$$

Since **D** and **C** can be clearly deduced from (fig. 21).

To align the transmission, the axis of the driving pulley must exceed the center-line of the driven pulley by a dimension **X** depending on center distance **A**, as shown in the table (fig. 21A).

In all types of coupling, it is essential to ensure that no vibrations or external stress are transmitted to the pump.

ELECTRIC MOTOR

Motor coupling assembly: heat the half-coupling on the motor side before splining it on to the motor's shaft projection.

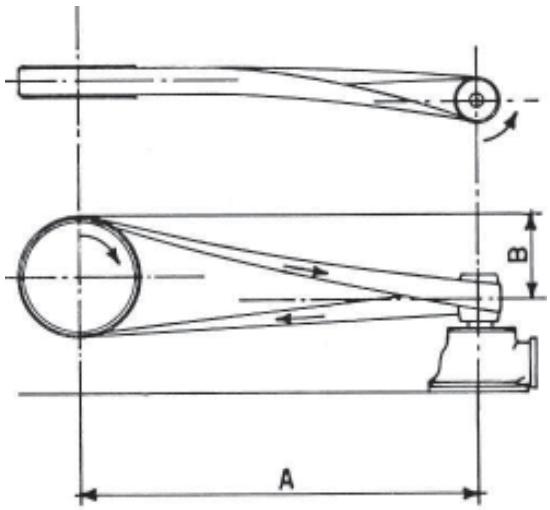
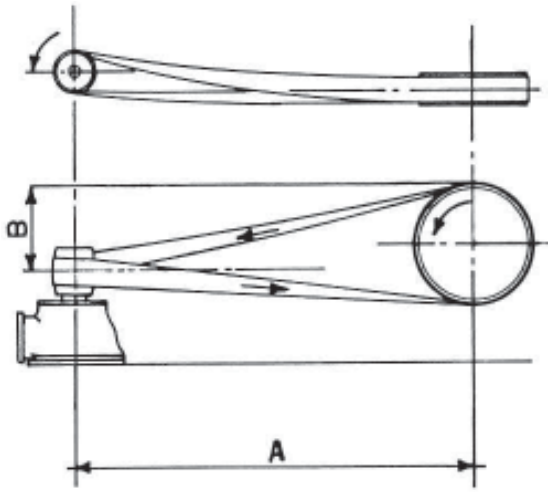
LH PUMP ROTATION	
RH MOTOR ROTATION	LH MOTOR ROTATION
	

fig. 19

FLAT BELTS IN LEATHER AND WITH RUBBER-COATED SURFACES		
BELT WIDTH mm	**A** mm	**B** mm
100	**2300**	**155**
125	**2650**	**175**
150	**3200**	**214**
200	**3700**	**247**
250	**4100**	**274**
300	**4600**	**306**
400	**5500**	**367**

fig. 19A

Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce
Cipriano R.	Ferri M.	11/01/07	0	Prima emissione	

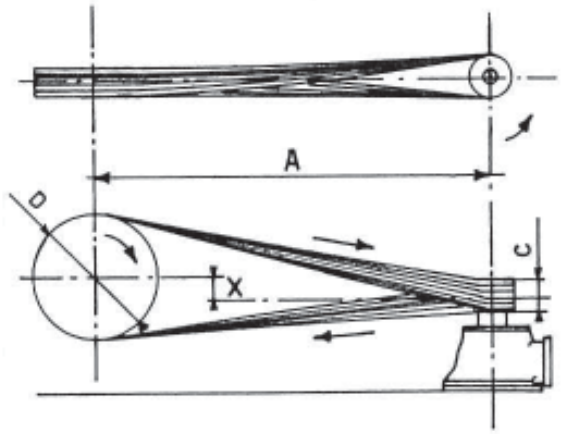
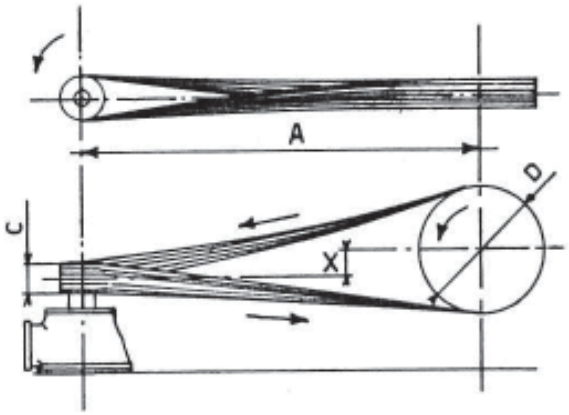
LH PUMP ROTATION	
RH MOTOR ROTATION	LH MOTOR ROTATION
	

fig.. 21

TABLE FOR DETERMINING THE "X" DIMENSION					
A mm	**X** mm	**A** mm	**X** mm	**A** mm	**X** mm
1500	**63,5**	**3000**	**100**	**4500**	**200**
2000	**70**	**3500**	**135**	**5000**	**230**
2500	**75**	**4000**	**165**	**5500**	**270**

fig. 21A

Cipriano R.	Ferri M.	11/01/07	0	Prima emissione	
Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce

13. STARTING

If the support of the control unit is lubricated with oil, it must be filled up to the indicated level (dipstick): controls lubricated with grease are supplied already filled with the correct quantity of lubricant.

Assemble a sluice valve on the pump delivery and, if the installation is equipped with a foot valve, make sure that the riser is full of water.

If the pump is without a foot valve, the rubber bearings of the lineshaft must be pre-lubricated to prevent them from being damaged if the pump runs dry for a brief instant.

Make sure that the pump rotor is free to turn by hand.

If everything is in order, keep the sluice valve slightly open and start the motor as indicated by the relative manufacturer.

If the installation has a thermal engine equipped with clutch it must be started up gradually.

In control units with right-angled transmissions type R or M, make sure that water flows through the discharge pipe of the cooling circuit in a regular way.

If the installation is equipped with an electric motor, check the current input with an amperometer. When the machine is fully running, it should always be less than the ampere rating on the data plate.

Gradually open the delivery sluice valve. Make sure that there are no impurities in the pumped liquid: proceed as described in the “WELL CLEARING” chapter if impurities are noted.

Adjust the stuffing box so that the amount of water essential for normal operation drips from it.

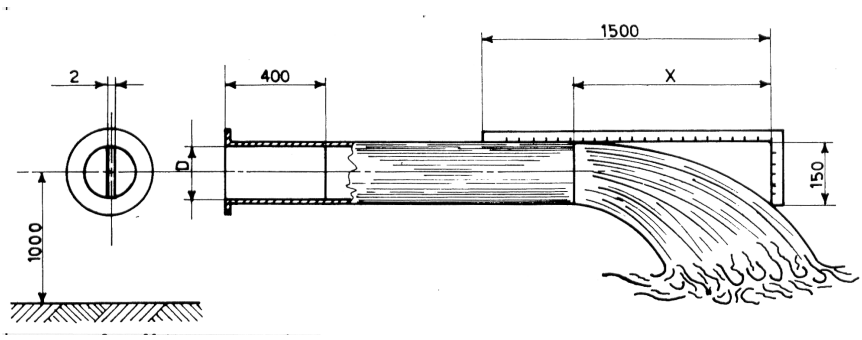
Do not operate the pump at rates that are unable to guarantee a normal flow of water.

Also make sure that the characteristics correspond to the required values during normal operating conditions.

After operating the pump for about 1-2 hours, check to make sure that everything functions regularly after which it is advisable to adjust the pump casing in the axial direction again (see chap. 11).

Determination of a pump by measuring the jet in the free discharge pipes

The simple, accurate method described below can be used to evaluate the flow rate of a pump in the correct way when adequate laboratory instruments are not available.



Three items are required:
• A pipe of the established diameter, which should be inserted into the outlet port of the flow to be measured
This pipe should be no shorter than one meter (we recommend 1.5 m). On the coupling side, there must also be a vertical lever the same as the inner diameter of the pipe, 2 mm thick and 400 mm in length, tangent to the coupling flange.
The pipe must be perfectly horizontal and about 1 meter from ground level.

• An L-shaped rod, graduated on the longer side and not less than 1 meter in length (it is better for the shorter part to be 150 mm in length) (see figure)
• A table, like the one given below, which, after laboratory tests, shows that a determined internal pipe diameter at a relative distance X from the graduated rod, from the surface of the water (see figure), corresponds to a determined flow rate in liters/minute.

Distance	Inner pipe diameter						
X	69	82	106	124	150	175	200
(mm)	FLOW RATE L/minute						
170	240	320	550	800	1180	1480	1930
200	275	375	680	1000	1500	1740	2280
250	330	480	870	1250	1880	2180	2850
300	380	580	965	1480	2225	2610	3410
350	440	650	1110	1700	2500	3050	3980
400	500	750	1250	1910	2780	3490	4550
450	550	850	1380	2110	3040	3920	5120
500	610	920	1520	2300	3300	4360	5690
550	670	1000	1650	2480	3540	4790	6260
600	730	1070	1780	2670	3780	5230	6830
650	810	1180	1900	2850	4030	5660	7400
700	885	1280	2040	3040	4250	6100	7970
750	950	1340	2150	3200	4500	6530	8540

14. OPERATION AND MAINTENANCE

Our control units have two lubrication systems:

• With grease

• With oil

Grease-lubricated controls are supplied already filled with the ideal quantity of lubricant, while oil-lubricated ones are supplied without lubricant. The support of these latter must be filled with lubricant to the prescribed levels before starting.

The lubricants we recommend for the respective types of control unit are indicated in the table (fig. 22).
However, it is always advisable to use lithium soap based lubricants only.

Before starting the pump, make sure that:

• The lineshaft is full of water (if the pump is equipped with a foot valve)
• That the thrust bearing of the control unit is always sufficiently equipped with lubricant
• That the sluice valve is slightly open
• That the rotor is free to turn by hand

After an initial period of about 30-40 hours service, it is advisable to completely change the lubricant used for the running-in phase. Following this, the lubricant should be changed after every 600-700 hours service and after a long idle period.

Greasing should be carried out after every 200-300 hours service or after a long idle period and should always take place when the machine is running.

Note that the temperature of the bearing support rises by 15-20°C immediately after the grease has been injected. This momentary temperature increase is due to the excessive amount of lubricant in the support. Do not fill the supports completely with grease.

The control units are equipped with a bleed valve that will eliminate any excess grease within 15-20 hours service, after which the temperature will return to normal values.

Periodically check the condition of the stuffing box. If adjustments are required, it is advisable to never add more than one ring of packing, after which the stuffing box rings should be completely replaced.

CONTROL UNIT TYPE	TYPE OF LUBRICANT	QUANTITY OF LUBRICANT l	kg
V8G1-V8G-V8P	**S A E 10W oil (Ambient temperatures of up to 35°C-95°F)**	**0.7**	**0.6**
V16G-V16P-V46G-V46G1-V46P-V63G	**S A E 20 oil (Ambient temperatures of over 35°C-95°F)**	**0.8**	**0.7**
R16 - RD16	**BLASIA 68 oil – Agip**	**1.2**	**1.05**
R26 - RD26	**MOBILGEAR 626 – Mobil**	**1.7**	**1.55**
R42 - RD42	**OMALA OIL 68 - Shell**	**2.2**	**1.95**
R75 - RR75	**ENERGOL GR – XP 68 - BP**	**6.1**	**5.5**
R100 - RR100	**GOIA 68 – Q8**	**12.8**	**11.5**
R125	**SPARTAN EP 68 – Esso**	**15.5**	**14**
R160 - R200 - R250	**(Ambient temperatures of up to 35°C-95°F)**	**33.3**	**30**
	BLASIA 100 oil – Agip		
	MOBILGEAR 629 – Mobil		
	OMALA OIL 100 - Shell		
	ENERGOL GR – XP 100 - BP		
	GOIA 100 – Q8		
	SPARTAN EP 150 – Esso		
M16 - RM16	**(Ambient temperatures of over 35°C-95°F)**	**1.4**	**1.3**
M26 - RM26		**2.1**	**1.9**
R42 - RM42		**2.8**	**2.5**
M75 - MR75		**6.6**	**6**
E11 - E13 - EP16 - E18 - EP18 - E20 - EP20 - E22 - EP25 - E28	**LI-MU2 grease - Agip** **MOBILUX N°2 - Mobil** **ALVANIA GR.R2 - Shell** **HT2 - BP** **GUELFCROWN2 - ulf** **BEACON2 - Esso**		**0.10 ÷ 0.20**
E31 - ES31	**S A E 10W oil (Ambient temperatures of up to 35°C-95°F)**	**8.4**	**7.6**
E35 - EP35 - EPS35	**S A E 20 oil (Ambient temperatures of over 35°C-95°F)**		

If the lubricants indicated in the table are unavailable, use equivalent lubricants of current production

Cipriano R.	Ferri M.	11/01/07	0	Prima emissione	
Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce

fig. 23 - Electric motor assembly - Control unit installation

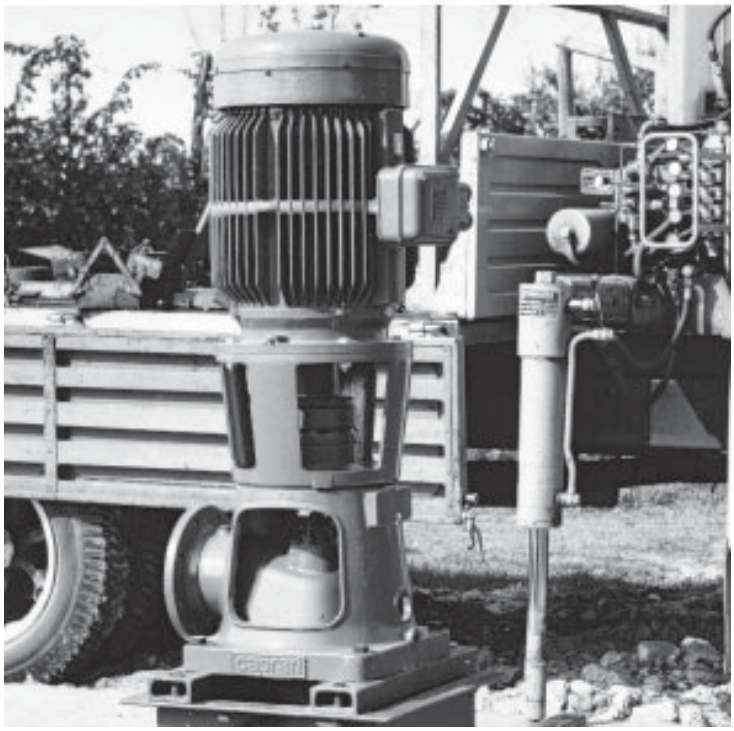
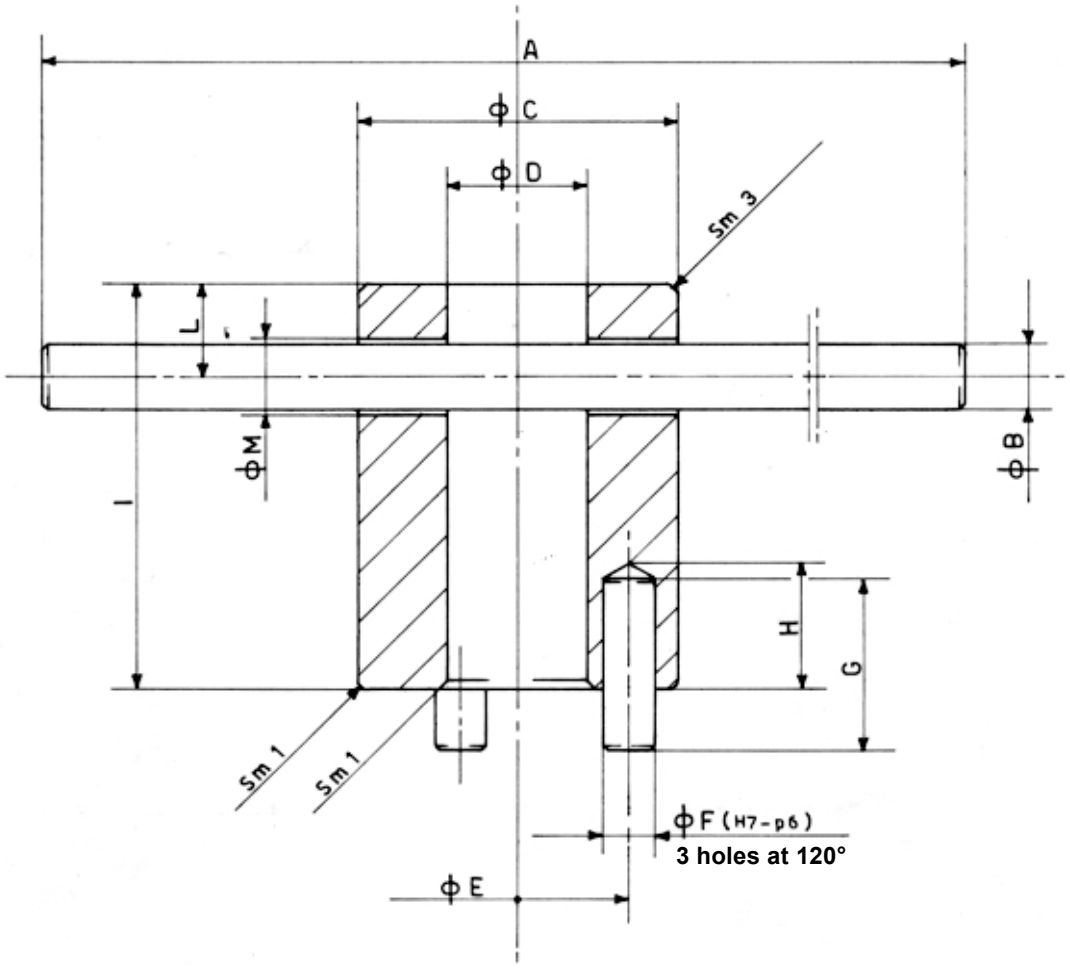


fig. 24 - Assembled control unit

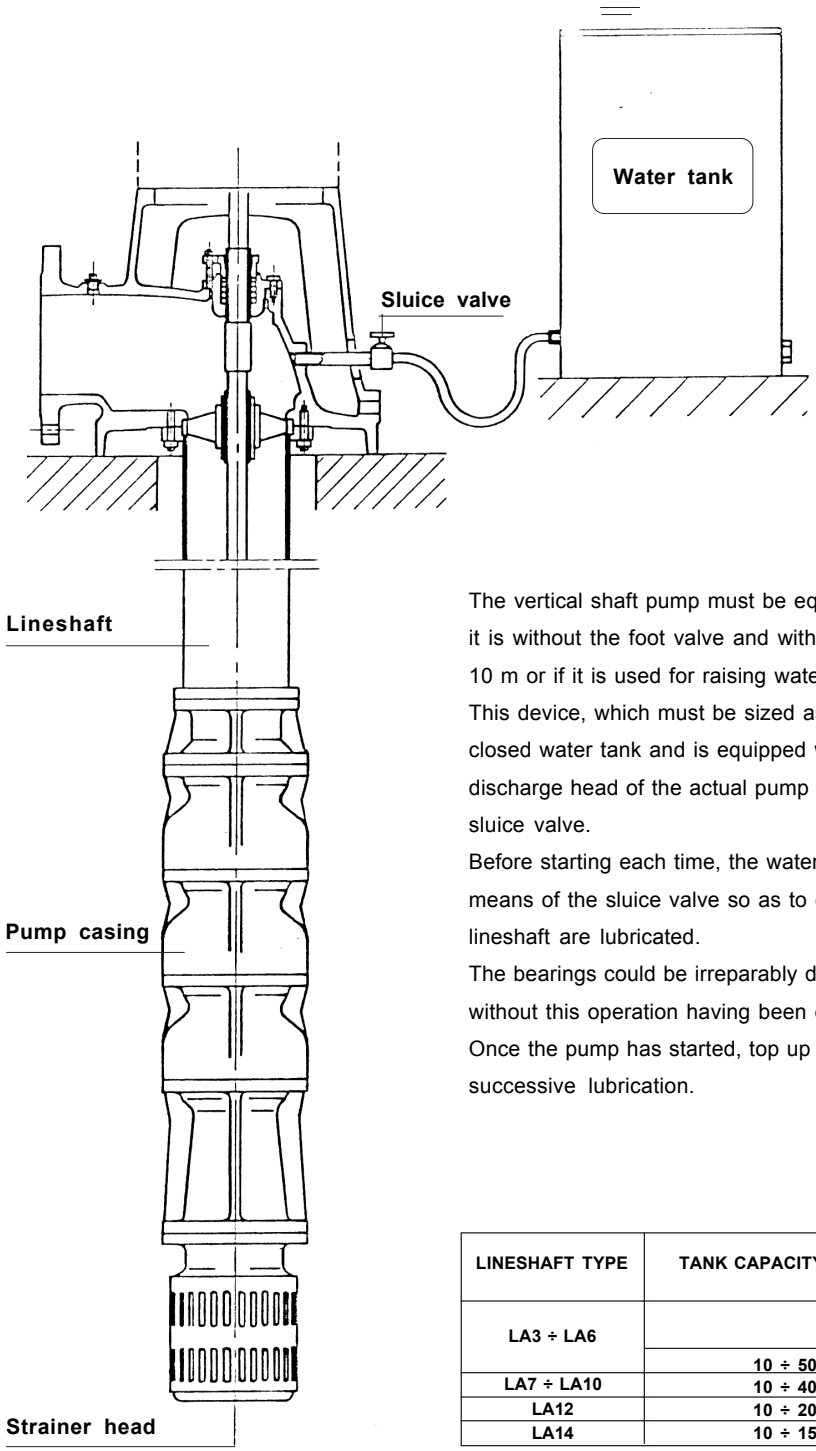
Cipriano R.	Ferri M.	11/01/07	0	Prima emissione	
Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce

CAUSES OF IRREGULAR OPERATION	
FAULTS	PROBABLE CAUSES
The pump fails to deliver	1. Clogged foot valve 2. Excessive suction height 3. Rotation speed too low 4. Wrong rotation direction 5. The head required by the installation exceeds that of the project 6. Foreign bodies in the impeller channels
The pump fails to provide the required flow rate	As described in points 1-3-4-5-6 onwards 7. Worn impellers 8. Incorrect axial adjustment of the vertical assembly
The pump's power input is too high	As described in points 6-8 and9. Rotation speed too high 10. The pump operates with different values from those of the data plate 11. The specific weight of the fluid is higher than the envisaged value 12. Incorrect alignment of the assembly 13. Stuffing box clamped too tightly 14. Stuffing box insufficiently lubricated 15. Bearing rubber unable to withstand the pumped liquid 16. Excessive amount of impurities in the pumped liquid
The pump fails to deliver the correct head	As described in points 3-4-6-8
The stuffing box drips too much	As described in points 12 and 17. The seals installed fail to suit the operating conditions 18. Vibrations in the rotating part 19. The shaft is misaligned owing to worn bearings 20. The shaft and bush are worn on a level with the stuffing box
The pump vibrates and is noisy	As described in points 2-6-8-12-15-19 and 21. Operation at a flow rate that is either too low or too high 22. The control unit and the lineshaft are badly fixed
The bearings wear out too fast	As described in point 12 onwards 23. Insufficient lubricant 24. Foreign bodies in the bearings



Wrench type	A	B	C	D	E	F	G	H	I	L	M	Weight in kg
CH 20	300	10	50	22	36	8	24	16	75	15	12	1,1
CH 24/27			59	29	45				150			2,5
CH 30/35			67	37	50				75			1,6
CH 40/45			89	50	70	10	28	20				2,7
CH 55			94	58	75							2,9

Cipriano R.	Ferri M.	11/01/07	0	Prima emissione	
Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce



The vertical shaft pump must be equipped with the pre-lubrication device if it is without the foot valve and with static differences in level exceeding 10 m or if it is used for raising water containing sand.
This device, which must be sized as indicated in the table, consists of a closed water tank and is equipped with a vent plug connected to the discharge head of the actual pump by means of a pipe complete with sluice valve.
Before starting each time, the water must be drained from the tank by means of the sluice valve so as to ensure that the rubber bearings of the lineshaft are lubricated.
The bearings could be irreparably damaged if the machine is started without this operation having been done.
Once the pump has started, top up the level in the water tank for a successive lubrication.

LINESHAFT TYPE	TANK CAPACITY 200 (L)	TANK CAPACITY 400 (L)
LA3 ÷ LA6	STATIC LEVEL (▮)	
	10 ÷ 50	50 ÷ 100
LA7 ÷ LA10	10 ÷ 40	40 ÷ 80
LA12	10 ÷ 20	20 ÷ 50
LA14	10 ÷ 15	15 ÷ 40

Eseguito	Controllato	Data	Modifica	Descrizione modifica	Sostituisce
Cipriano R.	Ferri M.	11/01/07	0	Prima emissione	