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Serie di macchine / Série de machines / Σειρά μηχανημάτων / Maschinen-Baureihen / Series machines / Machinery series /
Série de máquinas / Série samostatných strojů / Serijenaprav / Série de máquinas / Pumpserier:

EEM, ENM, ENT, ALM, ALT

Serie di quasi-macchine / Série de quasi-machines / Σειρά μερικώς ολοκληρωμένων μηχανημάτων / Baureihen der unvollständigen Maschinen / Series niet voltooid machines / Partly completed machinery series / Série de cuasi máquinas / Série strojů k vestavbě / Serije delno dokončanih naprav / Série de quase-máquinas / Inbyggnadspumpserier:

EEMQ, ENMQ, ENTQ, ECC, ALMQ, ALTQ, ALCC

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Fig. 1

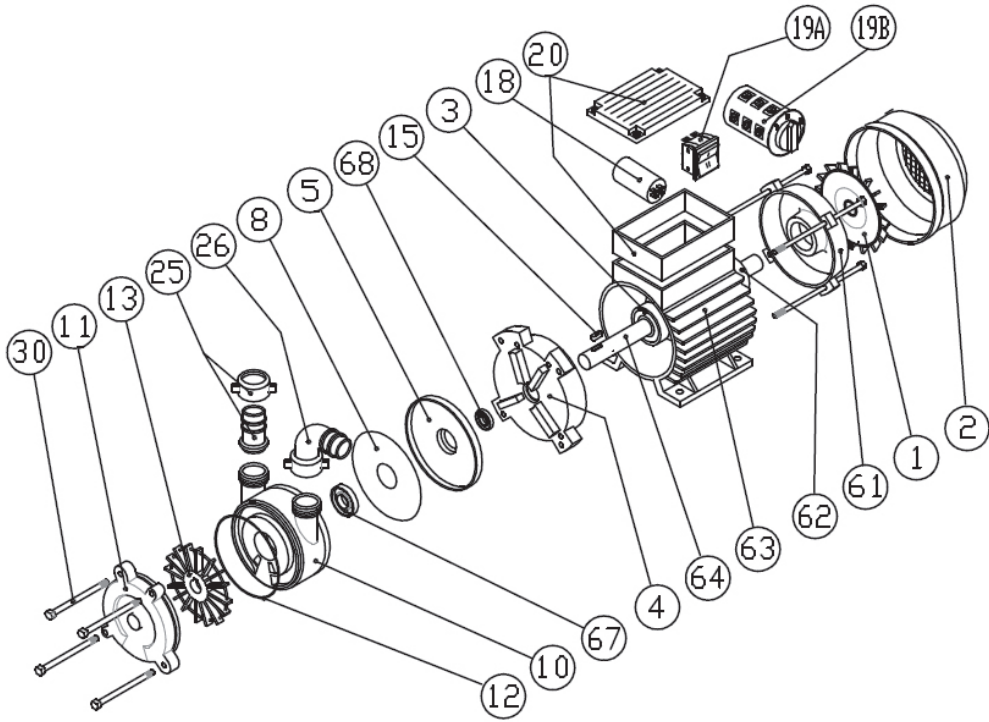


Fig. 2

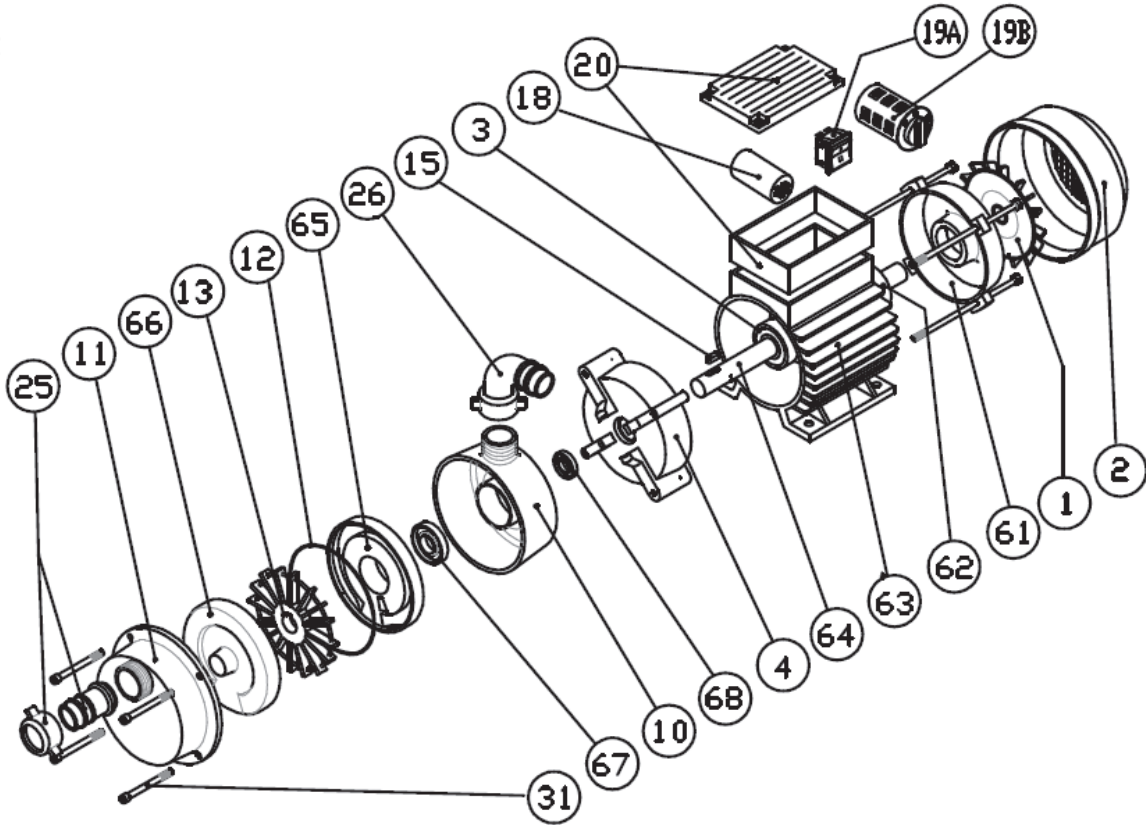


Fig. 3A

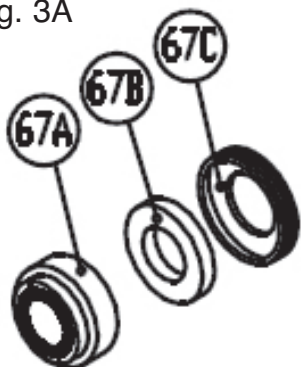


Fig. 3B

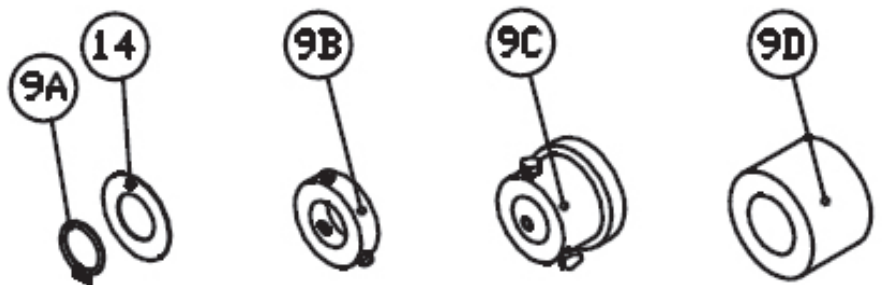


Fig. 4

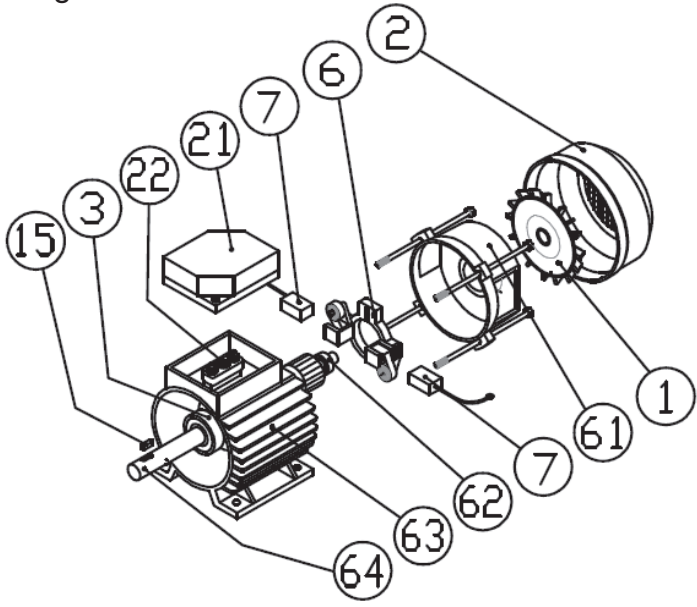


Fig. 6

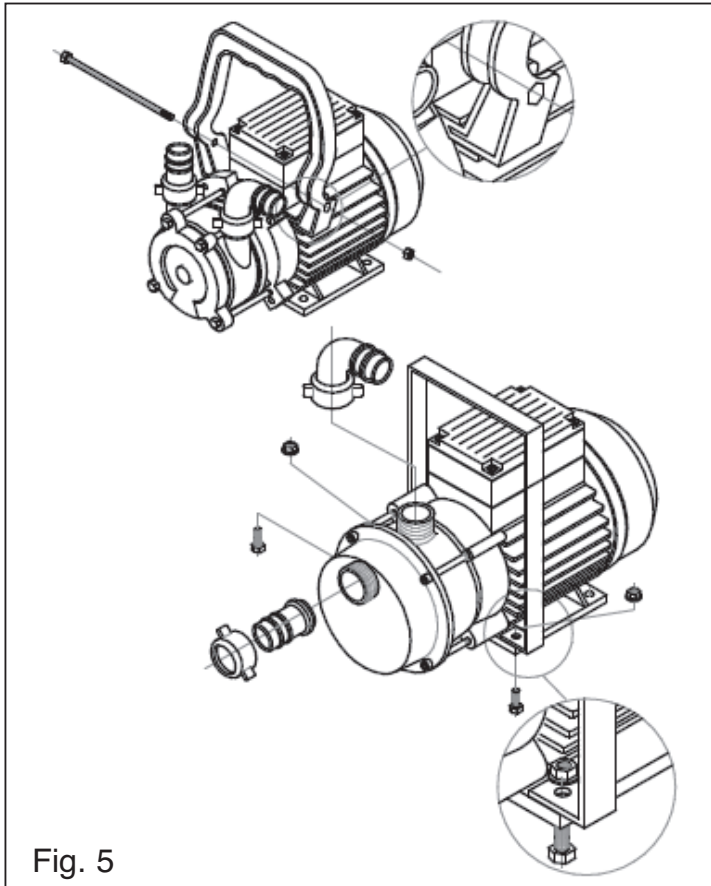
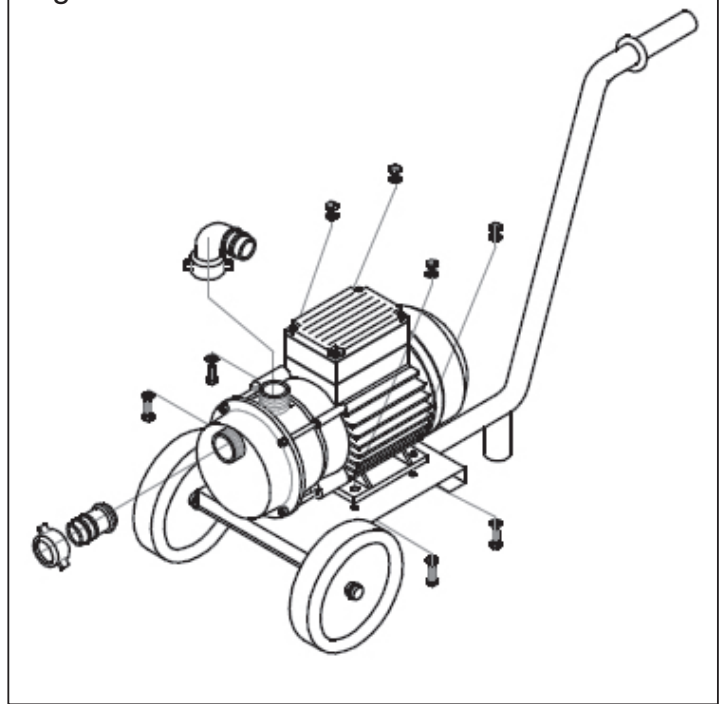
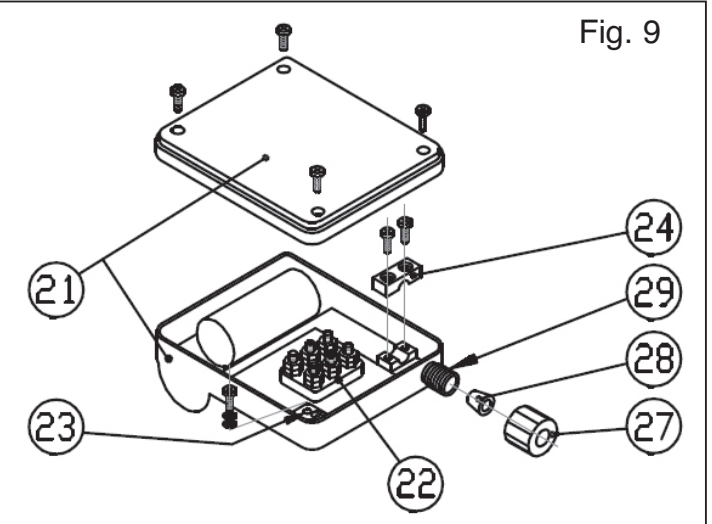
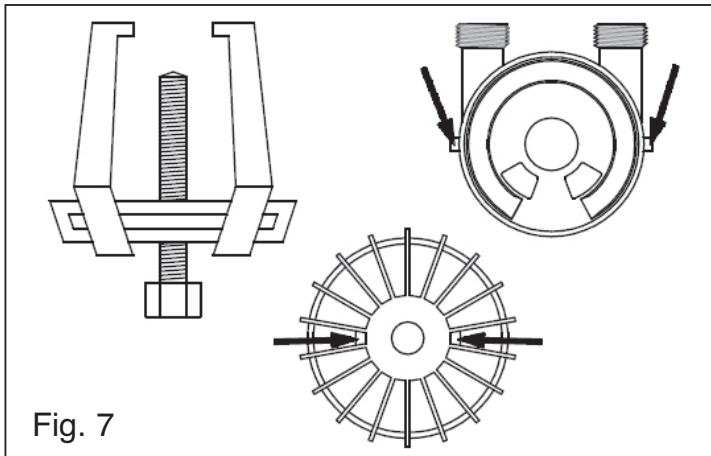
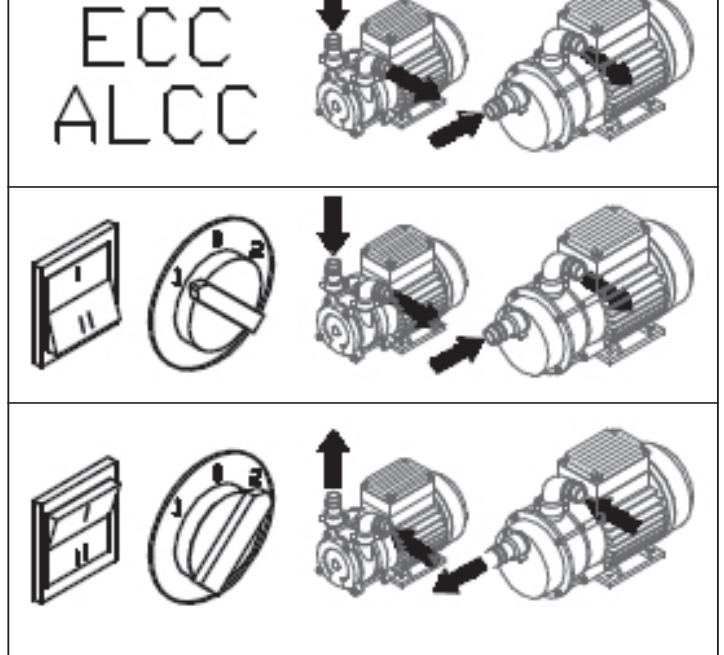
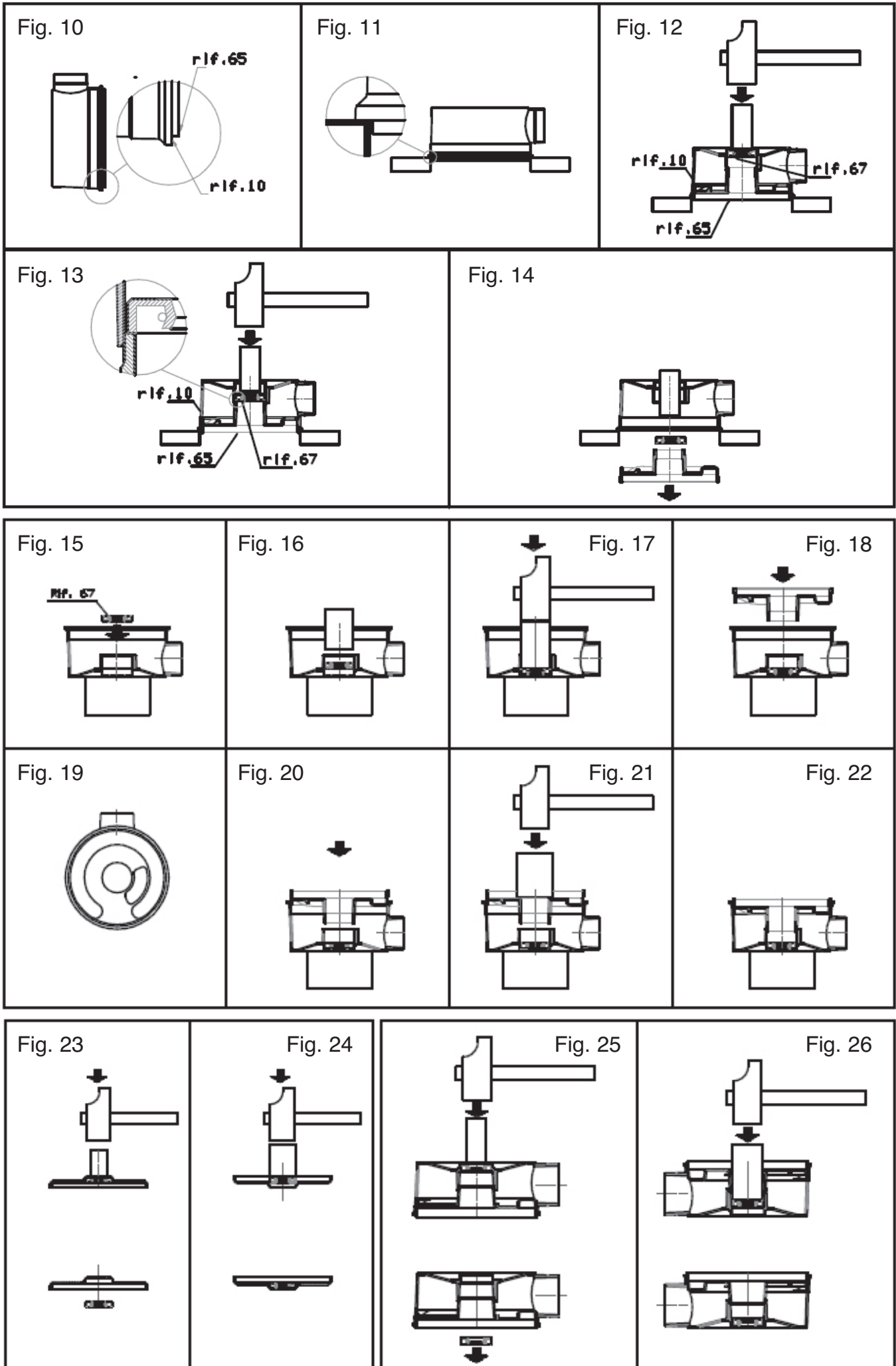


Fig. 8





Translation of the original instructions

Reproduction, for any purpose, of parts of the text or of the drawings is prohibited without prior written consent from the manufacturer.

WARNING concerning machinery

Consult carefully before installing the machinery.

WARNING concerning partly completed machinery

Consult carefully before incorporating the partly completed machinery. When reading, omit information relative to parts that are not present. Comply with all applicable general safety criteria, to guarantee safe use of the machinery in which the partly completed machinery is incorporated.

IMPORTANT

the machinery and partly completed machinery described herein must only be used by persons with appropriate knowledge of their use. They must not be left in a place accessible to children or to persons that might use them in an inappropriate and, consequently, potentially dangerous manner. They must be used exclusively in compliance with the intended use declared by the manufacturer and in compliance with the safety specifications indicated in this manual. They must always be supervised during use.

Chapter 9 and relative subchapters, printed in italics, contain information for maintenance exclusively for use by qualified technicians and must be performed using appropriate personal protective equipment.

This manual describes the use of the pump in compliance with the design specifications and illustrates the technical specifications, methods of installation, use and maintenance and information concerning residual risks related to use. The manual must be considered part of the pump and be kept for future consultation for the entire useful life of the pump.

The manufacturer shall not be held responsible in cases of improper use of the pump, use contrary to specific national regulations, installation not in conformity with the declared specifications, faults in the power supply, unauthorized modifications and operations, use of non-original spare parts or parts not relative to the specific model, total or partial failure to comply with the instructions indicated herein.

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1 – DESCRIPTION OF SYMBOLS USED - GLOSSARY



Safety hazard



Danger of electric shock

WARNING

Danger of damaging the pump

- Bronze: in this document, this term is used to describe Delta C type copper alloy, which is common practice in the self-priming pump sector.
- The series of products EEMQ, ENMQ, ALMQ, ENTQ and ALTQ are partly completed machinery identical, respectively, to the machinery of series EEM, ENM, ALM, ENT and ALT, except for the fact that they are supplied without the switch and cable for connection to the power supply but provided with an electrical terminal block. In the rest of the manual, reference will only be made to the series without the suffix -Q. When switch and cable are mentioned this refers to the completed machinery, while when terminal block is mentioned this refers to the corresponding partly completed machinery.
- The term “series ALCC” refers to the pumps AL 12/20, AL 24/20, AL 12/25, AL 24/25, AL 24/40.
- The type of power supply is indicated in the box identified by the word “Motore” in the pump ratings plate. 1~ means “single-phase alternating current”, 3~ means “three-phase alternating current” and means “direct current”.

2 – USE OF THE MACHINERY/PARTLY COMPLETED MACHINERY

The machinery or partly completed machinery is a self-priming pump of “side channel” type. It has been designed and manufactured specifically for transferring and handling liquids, thanks to some important features:

- very rapid self-priming capacity, i.e. suction of air contained in the suction hose to start pumping;
- no damage to the pump if the liquid in the suction tank finishes;
- possibility of reversing the flow of liquid (for models supplied with alternating current).

Although it has been designed for professional use, it can also be used in a domestic environment, providing the user has become acquainted with its use, by carefully reading the instructions contained in this manual.

2.1 – PROPERTIES OF PUMPED LIQUID



WARNING

the liquid to be pumped:

-**must have no hard suspended particles** (sand, gravel, etc.) which can cause rapid wear of internal parts. If the liquid to be pumped has this risk factor, install a suitable filter in the suction hose.

- **must not be aggressive towards the materials with which it comes into contact, i.e.:**

- 1) the material forming the pumping body (bronze for series EEM, ENM, ENT, ECC - AISI 316 stainless steel for series AL);
- 2) the material of which the shaft is manufactured (AISI 316 stainless steel);
- 3) the materials of which the gasket and the sealing device are manufactured (see Chapter 3.5).
- 4) (only for models with by-pass) acetalic resin.

-**must have suitable viscosity:** these pumps are not suitable for very viscous liquids (such as honey). For series ENM, ENT, ALM, ALT pumps, consider as an indication of maximum viscosity a mineral oil type SAE 30 at a temperature of 40° C; all other series are suitable for liquids with viscosity similar to water.

- **must have a maximum fluid density of:** for series ENM, ENT, ALM, ALT pumps: 1.1 g/cm³; for other series: density similar to water.

- **must have a minimum temperature of:** -15° C, in any case above the freezing temperature of the liquid to be pumped.


- **must have a maximum temperature of: models without by-pass**: depending on the rubber used to manufacture the gaskets: 90° C (NBR rubber, which is standard unless otherwise indicated on the pump), 110° C (EPDM rubber), 130° C Viton rubber; **models with by-pass**: 90° C.

Examples of use of the series with bronze pump body (series EEM, ENM, ENT, ECC)

Water, sea water, gas oil, oil, soaps; in the European Union pumps with bronze pumping body are generally not considered suitable for use with food products, such as milk or olive oil (ref. standard UNI EN 13951). Application in the food sector is subordinate to checking suitability of the pumps with the provisions of the specific HACCP plan drawn up by the user.

Examples of use of series with AISI 316 stainless steel pump body, material suitable for foods and with excellent resistance to corrosion and abrasion (series AL)

- liquid foods, such as wine, vinegar, olive oil, milk; for these uses appropriate methods of washing and disinfecting the pump must be adopted, according to type of liquid (see Chapter 4.3);
- compatible corrosive liquids (such as fungicides or liquid fertilizers)
- the same liquids permitted for bronze pumps, in this case ensuring a much longer useful life.



Use of the pump in environments in which there is danger of explosion or fire (as defined by the law) is prohibited; in particular, do not use with petrol, acetone, solvents, etc.

2.2 – ENVIRONMENT OF USE

- Ventilated, clean and dry closed environment.
- Normal or marine atmosphere, ambient temperature between -15 °C and 40 °C and maximum relative humidity 80%.
- Maximum installation altitude: 1000 meters above sea level.

3 – TECHNICAL DESCRIPTION

3.1 - SPECIFICATIONS

The pump can perform suction of liquid from one port (suction port), sending it to the other port (discharge port); the essential parameter characterizing a pump is

capacity Q (quantity of liquid transferred in a given time); the speed of the pumping operation depends on this.

The capacity of a pump is not fixed, but depends on the **total manometric head H** required by the installation, which is the sum of two contributions:

- 1) difference in height (measured vertically) between the level of liquid in the tank of destination and that of the tank or origin;
- 2) energy losses caused by liquid flow in pipes, valves, fittings, and other elements inserted along its path.

Tab. A indicates the capacity (in litres per minute) as a function of total manometric head (in metres) for the various pump types. The same table also indicates the value of the maximum head Hmax developed by the pump (expressed in bar, unit of pressure measurement), which is reached when the discharge port is closed, and the maximum equivalent A-weighted sound pressure level (LeqA) obtained at 1 metre from the surface of the pump operating with water at 20° C.

3.2 - LIST OF COMPONENTS

Tab. B contains the list of all components, and refers to Figs. 1, 2, 3A, 3B, 4, 9.

- **fig. 1**: exploded drawing of single-phase electric pumps type ENM 20, ENM 20 L, ALM 20, ALM 20 L, EEM 20, EEM 20 L and three-phase electric pumps type ENT 20, ENT 20 L, ALT 20 e ALT 20 L.

- **fig. 2**: exploded drawing of single-phase electric pumps type ENM 25, ENM 25S, ENM 30, ENM 35, ENM 40, ENM 50, ALM 25, ALM 30, ALM 40, ALM 50, EEM 25, EEM 30, EEM 35, EEM 40 and three-phase electric pumps type ENT 25, ENT 25S, ENT 30, ENT 35, ENT 40, ENT 50, ALT 25, ALT 30, ALT 40, ALT 50;

- **fig. 3A**: mechanical seal; **Fig. 3B**: the various systems adopted for fixing the rotating part of the seal;

- **fig. 4**: components of the motor part of direct current pumps; the pumps ECC 12/20, ECC 24/20, AL 12/20, AL 24/20 have the motor part as shown in Fig. 3 and the pump part as shown in Fig. 1; the pumps ECC 12/25, ECC 24/25, ECC 24/40, AL 12/25, AL 24/25, AL 24/40 have the motor part as shown in Fig. 3 and the pump part as shown in Fig. 2.

- **fig. 9** replaces the parts ref. 18, 19, 20 of Figs. 1 and 2 in the partly completed machinery of series EEMQ, ENMQ, ALMQ, ENTQ and ALTQ.

TYPE	1 m	5 m	10 m	Hmax (bar)	LeqA (dB)	Weight kg	TYPE	1 m	5 m	10 m	Hmax (bar)	LeqA (dB)	Weight kg
EEM 20 L, ENM 20 L, ENT 20 L	14	4		0.7	<70	5.2	ECC 24/25	67	50	26	1.9	75	7.1
EEM 20, ENM 20, ENT 20	32	27	21	2.7	77	5.2	ECC 24/40	166	125	70	2.0	80	14.1
EEM 25, ENM 25, ENT 25	53	38	16	1.3	71	7.9	ALM 20 L, ALT 20 L	11	2		0.6	<70	5.2
ENM 25S, ENT 25S	97	92	85	4.8	83	13.4	ALM 20, ALT 20	32	27	21	2.7	77	5.2
EEM 30, EEM 35	89	68	38	1.5	74	10.6	ALM 25, ALT 25	43	28	8	1.2	71	7.8
ENM 30, ENT 30	89	71	43	1.6	74	12.1	ALM 30, ALT 30	89	80	70	4.2	83	13.3
ENM 35, ENT 35	89	71	43	1.6	74	12.2	ALM 40, ALT 40	137	112	76	1.6	77	14
EEM 40	149	115	66	1.6	77	11.3	ALM 50	205	176	140	2.9	82	21.3
ENM 40, ENT 40	149	119	78	1.7	77	14.1	ALT 50	205	176	140	2.9	82	19.4
ENM 50	250	215	167	2.6	84	22.7	AL 12/20	23	16	5	1.4	75	4.1
ENT 50	262	227	180	2.7	84	20.8	AL 24/20	26	20	9	1.6	76	4.1
ECC 12/20	23	16	5	1.4	75	4.1	AL 12/25	49	36	17	1.3	74	7
ECC 24/20	26	20	9	1.6	76	4.1	AL 24/25	54	42	23	1.5	75	7
ECC 12/25	62	44	14	1.4	74	7.1	AL 24/40	146	112	65	1.5	80	14

Data obtained with water at 20° C – Tolerances: standard ISO 2548 for Class C mass produced pumps

Tab. A

1	Motor fan	14	Seal washer	28	Conical gasket
2	Fan cover	15	Tab	29	Threaded sleeve
3	Front bearing	18	Capacitor (single-phase pumps only)	30	Hex head screw
4	Pump flange			31	Hex head hollow screw
5	Counterflange	19A	Toggle switch (series EEM only)	61	Rear guard
6	Brush holder			62	Rear bearing
7	Brush	19B	Rotary switch (other single-phase and three-phase series)	63	Casing with stator
8	Counterflange gasket			64	Shaft with rotor
9A	Stainless steel Seeger ring	20	Inverter box	65	Rear internal part
9B	Stainless steel seal ring	21	Terminal box	66	Front internal part
9C	Brass seal ring	22	Terminal block	67	Seal
9D	Seal spacer	23	Stud	67A	Mech. seal rotating part
10	Pump body	24	Cable clamping bracket	67B	Mech. seal fixed part - counterface
11	Pump cover	25	Straight fitting		
12	O-ring	26	Curved fitting	67C	Mech. seal fixed part - shroud
13	Impeller	27	Ring nut	68	Motor seal

Tab. B

3.3 – MAXIMUM PRIMING HEIGHT

The maximum priming height is the maximum difference in level between the pump and the level of the liquid to be pumped with which it can perform suction of air from the suction hose and start pumping.

With water at 20° C this value can reach 6 metres, but it depends on the quantity of liquid present inside the pump during priming; this quantity depends on the installation methods of the pump and on the configuration of the hoses. To achieve maximum priming performances, comply with the following installation measures:

- 1) **Discharge hose:** during priming the liquid contained in the pump is pushed outwards through the discharge port; therefore, the quantity of liquid decreases, causing reduced priming; avoid this by positioning the discharge hose so that liquid that has flowed out returns inside the pump, for example, by pointing the initial part upwards with a difference in level of 50 cm.
- 2) **Suction hose:** the initial part pointing upwards with a difference in level of 20 cm increases the quantity of liquid that remains inside the pump after it is stopped.

3.4 – PUMPING DIRECTION

Pumps with alternating current motor are two-way: by reversing the direction of rotation of the motor the direction of liquid flow is reversed. For this purpose, machines are equipped with a 3-way switch: 0 = off, 1 = on, 2 = on with liquid flowing in the opposite direction to position 1. The typical pumping directions in single-phase machinery are described in Fig. 8, lines 2 and 3. In three-phase machinery the direction depends on the connection to the power supply.

In direct current partly completed machinery, the pumping direction is fixed and is unrelated to connection of the power supply cables to the terminal block. The typical pumping direction is described in Fig. 8, line 1. The typical pumping directions are not binding, and in some examples could be inverted.

3.5 - SHAFT SEALING DEVICES

The impeller, i.e. the rotating mechanical part that allows the pump to operate is activated through a shaft by the external motor; the pump body has an opening for the shaft to pass through. The "shaft seal" is the device that prevents liquid from leaking through the space between the shaft and the opening in the pump body. Two types of seal are adopted:

- **ring seal** (oil seal) with stainless steel spring; the standard seal used in bronze versions is the NBR rubber oil seal, unless otherwise specified by a label affixed to the pump;
- **mechanical seal** (Fig. 3A); the standard type of seal used in the stainless steel series AL is the ceramic/graphite/ AISI 316/ NBR rubber version, unless otherwise specified by a label affixed to the pump; it greatly increases the number of hours for which the pump can operate before requiring maintenance operations and does not cause wear on the shaft.

Various types of seals are available on request (Viton oil seal, silicon carbide mechanical seals and/or parts in EPDM rubber, Viton, Teflon) to adapt to the majority of requirements linked to temperature, corrosion and abrasion. Should you require

assistance, please contact our technical department.

3.6 - OPTIONAL ACCESSORIES AVAILABLE

- **Handle and truck** for easy transport.
- **Manual by-pass** to adjust capacity and head; the relative instructions for use are included in this manual.
- **Discharge plug or cock**, to drain part of the pump body without removing the hoses.
- **Filters**, to prevent foreign bodies from entering.
- **Hose kit**.
- **Hose fittings** in nylon or stainless steel (for series AL pumps).

4 - INSTRUCTIONS FOR INSTALLATION AND USE

4.1 – HANDLING

Check the weight of the pump indicated on the ratings plate and adopt methods in accordance with national safety regulations relative to manual handling of loads. If necessary use lifting systems, lift trucks, personal protection equipment for manual handling of loads and to prevent the danger of crushed limbs. If the pump is to be moved frequently, accessories (handle and truck) are available to facilitate handling.



Do not lift or transport the pump using the power cable, the hoses or projecting parts (i.e. the inverter or terminal box). Lift the pump by firmly holding the metal part.

4.2 - INSTALLATION AND USE



To install machinery supplied completed, strictly follow the procedures indicated below. To incorporate partly completed machinery, consider the following instructions within the limits of their applicability. Use them to draw up instructions for use of the final machinery. All mechanical and electrical installations to be performed on unprotected parts must be carried out exclusively by qualified technical personnel adopting personal protective equipment to protect hands and limbs against crushing, to protect from sprays and splashes of liquid and to protect against electrical shock. These must be selected in relation to specific risk assessment for the installation to be carried out.

Do not start the pump before having completed the installation.

4.2.1 – PRELIMINARY OPERATIONS

- Remove the pump from the packaging and check that all parts are intact: any breakages that occur during transport can cause dangers of mechanical or electrical nature.

- Assemble the handle (Fig. 5) or the truck (Fig. 6), if provided. During transport, the pump must be disconnected from the power supply. After transport, the truck must be positioned on a completely horizontal surface. Check that accidental movements of the truck cannot cause danger.

- Position the pump in a dry place (the pump is not submersible) on a horizontal surface; leave an empty space of at least 10 cm in front of the motor cooling fan; secure the feet with bolts to prevent movement or falling caused by vibrations during operation, to prevent people from tripping over hoses or the power cable. Make the connections without damaging the pump.



Never hang or fix the pump using the power cable.

- Fill the pump body with liquid to be pumped through one of the ports, preventing the liquid from leaking out either through this port or the other port; as the pump is self-priming, this operation is only necessary the first time, or if the pump has been emptied; in fact, when it stops sufficient liquid remains inside for subsequent priming. Traces of lubricant (cutting fluids, greases) may be present on the inner walls of the pumping body. If these substances can pollute the liquid to be pumped (i.e. food substances), initial pumping must be performed following the cleansing procedure described in Chapter 4.3.

WARNING

Do not operate the pump dry.

4.2.2 – ASSEMBLING THE HOSES

- As shown in Fig. 5 or Fig. 6, screw the hose fittings to the ports; these are provided standard with bronze pumps, on request (in nylon or stainless steel) for series AL pumps, after checking that the gaskets are present in the fittings; the assembly shown is only indicative, the two fittings, straight and curved, can be inverted.

- Provide a pair of hoses of suitable length and with the same internal diameter as the external diameter of the fittings. The hose must be flexible spiral, made of a material suitable for the type and temperature of the liquid to be pumped, resistant to the internal vacuum and with a higher operating pressure than the pressure generated by the pump (equal to H_{max} in Table A).

Insert the ends of the hoses into the hose fittings; **secure the connection using a hose clamp**. It is not necessary to install a check valve; if the liquid can contain hard suspended particles install a suitable filter in the suction hose to retain them; the hose must not exert excessive forces on the pump. Avoid excessive bending of the hoses to avoid kinks.

Insert the free end of the suction hose into the receptacle from which liquid is to be drawn, at a depth at least twice the diameter of the hose and at the same minimum distance from the bottom. Insert the free end of the discharge hose into the receptacle to receive the liquid.



The discharge hose must be fixed, without compressing it, to prevent extraction from the collection receptacle during start-up or operation, which would wet and contaminate the surrounding environment.

In the event of use with dangerous liquids, wear personal protective equipment selected according to the specifications of the liquid, to prevent danger of contamination or contact with exposed body parts.

4.2.3 – ELECTRICAL CONNECTION – GENERAL INSTRUCTIONS



The inverter box (ref. 20) and the terminal box (ref. 21) contain electrical parts; they must be disassembled exclusively by a qualified technician, in compliance with safety regulations.

Before making the electrical connections, check cables, plugs and sockets for damage. Electrical connections must be protected against dampness and sprays of liquid. Only use cables and components in conformity with the safety provisions of Directive 2006/95/EC and suitable for the current absorbed by the motor.

Pumps with three-phase and direct current motors are not provided with overload protection; pumps with single-phase motors are provided with an internal overload protection device and automatic reset only if the words “Protetta da sovraccarico - Overload protected” appear on the yellow label affixed to the pump.

4.2.3.1 – CONNECTION OF SINGLE-PHASE AND THREE-PHASE PUMPS

Required specifications of the power supply network



WARNING

- voltage and frequency coinciding with those indicated on the pump ratings plate (tolerances: 10% on voltage and 2% on frequency);

- provided with an efficient earthing system and equipped with a high sensitivity differential switch (30 mA) installed in line;
- protected against overcurrents;
- (if the pump is not already equipped with this) equipped with overload protection system calibrated to the current (A) indicated on the pump ratings plate;
- (for models with cable without plug and models with terminal block) equipped with a power isolation device.

Models with switch, cable and plug

- select a power socket compatible with the plug, equipped with earthing device, away from possible sprays of liquid and in an accessible position.
- Make sure the switch is positioned to off (0).
- Arrange the cable so that it cannot be knocked or tripped over.
- Insert the plug into the power socket.
- If an extension cable is required, it must be selected according to the current regulations and the data indicated on the pump ratings plate; the electrical connection must be protected against possible sprays of liquid.

Models with switch and cable, without plug



Connection to the power supply network must be performed exclusively by qualified technicians, in compliance with the regulations regarding electrical installations and with all the safety rules applicable to the type of operation.

The power supply must be disconnected before making the connection. First connect the earth conductor, followed by the line conductors.

Models with terminal block



Connection to the power supply network must be performed exclusively by qualified technicians, in compliance with the regulations regarding electrical installations and with all the safety rules applicable to the type of operation. The power supply must be disconnected before making the connection. The power cable must be provided with earth conductor.

Connection of the cable to the partly completed machinery is described below with reference to Fig. 9.

- Remove the cover of the terminal box (ref. 21) after having unscrewed the fixing screws.
- Insert the power cable through the ring nut (ref. 27), the conical gasket (ref. 28), the threaded sleeve (ref. 29) of the terminal box and clamp the ring nut.
- Connect the earth conductor to the motor casing at the stud ref. 23 identified by the symbol \oplus , using the bolts provided.
- Connect the power conductors to the terminal block (ref. 22) following the instructions indicated in the label inside the cover of the terminal box.
- Use the cable clamping bracket ref. 24 to fix the power cable, the right way up or overturned depending on the diameter of the cable; check that it is secured effectively against pulling and twisting of the cable.
- Replace the cover of the terminal box and fasten it using the screws removed previously.

4.2.3.2 – CONNECTION OF DIRECT CURRENT PUMPS

Required specifications of the power supply network

- voltage coinciding with that indicated on the ratings plate of the partly completed machinery (tolerances +10% - 10%);
- protected against overcurrents;
- equipped with overload protection system;
- equipped with a power isolation device.



the partly completed machinery is designed to be supplied by a battery; if another type of generator is used, assess the risk of dangerous voltages being present on accessible metal parts of the partly completed machinery; in particular, bear in mind that the negative pole of the terminal block supplying the partly completed machinery is connected to the casing of its motor.

Connection instructions

- Remove the terminal box (ref. 21), after having unscrewed its fixing screws.
- Insert the power cable through the cable grommet.
- Connect it to the terminal block complying with the polarity (+, -) indicated.
- If it is necessary to secure the cable against pulling or twisting, take the necessary measures.
- Replace the terminal box and fasten it using the screws removed previously.

4.2.4 – STARTING AND STOPPING



- Do not start the pump before having completed installation.
- Do not start the pump with wet hands or while standing on wet surfaces.
- Under no circumstances insert fingers or other body parts or objects through the ports: the pump contains moving parts.

Check that the hoses are positioned correctly. If the pump was supplied with a switch, start it by switching this to the on position corresponding to the direction of pumping required. If the pump was supplied with the terminal block, start it by connecting it to the power supply.



In this phase, take great care that there are no leaks or sprays of liquid from the installation. If these are present, stop the pump immediately and take action to eliminate them.

The pump must not run with the hoses completely closed for more than one minute.

After a short period required for priming, the pump will start to transfer liquid. If pumping is not obtained and the suction hose bubbles air into the liquid to be sucked up this means that the pump is pumping in the opposite direction: in this case stop the pump and reverse the pumping direction or stop the pump and invert connection of the hoses to the ports.



WARNING

Operation must always be supervised; check that the following do not occur: overheating of the motor surface, reduction in speed or stopping, abnormal noises or other events that indicate malfunctioning. In this case, stop the pump immediately, remove the plug (where present) from the socket and consult Chapter 6.

The noise produced by bronze pumps type 20, 25, 30, 35, 40 if they are run when dry (to be avoided at all costs) does not indicate a fault, but is caused by the fact that in these models the impeller slides on the shaft to facilitate maintenance.

To stop the pump, position the switch to stop (0) or disconnect the power supply.

WARNING

After it is switched off, the pump remains filled with liquid, which is essential for priming; if there is any chance of the ambient temperature dropping to below the freezing point of the liquid, empty the pump body to avoid breakage.

4.3 – WASHING AND STORAGE



Before removing the hoses discharge any pressure present inside the pump. If accessible surfaces are hot (see Chapter 5.2) wait for the pump to cool before handling it or use appropriate gloves.

If the pump is used for dangerous substances, the user is responsible for defining the procedures for handling, washing, storing and disposal of waste fluids in compliance with the safety regulations in force for the specific substances treated.

If the pumped liquid has no particular problems, (i.e. water, sea water or soap), in the event of an extended period of disuse, wash the inner walls of the pump by pumping clean water, empty completely, dry the outer surfaces with a soft cloth, coil the electric cable and hoses and store in a dry and protected area.

Cleansing procedure

This allows deeper cleaning than the procedure described previously and can be used in many cases. In uses with foods it is performed during installation and as part of the wash cycle.

- Prepare a detergent solution in a receptacle (i.e. common dishwashing liquid diluted with clean hot water at 40-50° C).
- Insert the suction and discharge hoses of the pump into the receptacle and recirculate the liquid for 5 minutes.
- Pump clean water until complete rinsing is obtained.

Use with slightly perishable food substances (vegetable oil, wine, vinegar)

Before and after use:

- Carry out the cleansing procedure;
- use the pump to recirculate a suitable sanitizing and disinfecting solution (i.e. based on peracetic acid) for an adequate time;
- rinse the inside of the pump body by pumping clean water until the sanitizing and disinfecting solution has been completely eliminated.

Before use, perform the start-up procedure, discarding a first fraction of liquid. Dispose with the fluid used for washing and the discarded liquid from start-up in compliance with the current provisions of law.

In the specific case of use with vegetable oils, if the pump is to remain in disuse for a short period of time and subsequently used again for the same type of oil, it can simply be emptied and the ports capped.

Use with highly perishable food substances (such as milk)

Wash before use, at each time interval established by the HACCP protocol applied and after use, disassembling the pump, cleansing and disinfecting its parts with methods depending on the type of liquid. This operation must be carried out by qualified personnel experienced in performing the pump disassembly and reassembly procedures.

4.4 - USE OF THE BY-PASS (optional device)

The by-pass is a device to adjust capacity and head of the pump and is located on the outside in the form of a knob; it can be rotated counter-clockwise to reduce the maximum capacity to around half and the maximum head by around a quarter. During the priming stage close the by-pass by rotating the knob completely clockwise, as priming capacity is greatly reduced with the by-pass open.

4.5 - DEMOLITION

At the end of its useful life the pump must be demolished, in strict compliance with the standards in force in the country of use. Do not neglect any residue of liquid present inside the pump body.

Only EU countries



The pump belongs to the category of electric and electronic equipment (EEE). The symbol shown here means that it cannot be disposed of as domestic waste. At the end of its useful life the owner must deliver the pump to a WEEE collection point, where it will be subjected to recycling.

For more information, contact the relevant local authority department or the store from which the pump was purchased.

5 – INFORMATION ON RESIDUAL RISKS

5.1 – CONTACT WITH MOVING PARTS

Do not insert objects through the holes in the fan cover (ref. 2), which covers the motor cooling fan.

5.2 - TEMPERATURE OF ACCESSIBLE SURFACES



In typical conditions of use, the outer surfaces of the motor part can reach temperatures in excess of around 40° C higher than the surrounding ambient temperature. The outer surfaces of the pumping body reach the temperature of the pumped liquid, and can therefore be very hot or very cold. In the event of these temperatures representing a danger, the user must adopt suitable protective measures (enclose the pump with barriers, handle using suitable gloves).

5.3 - RISKS CAUSED BY SPATTERING AND LEAKAGE OF FLUIDS

Undesirable leakage or spraying of liquid may occur, for example, in the following cases:



- installation procedure carried out incorrectly;
- wear and tear of hoses;
- wear and tear of sealing device (resulting in spattering of liquid from the space between the flange and the pump body) or of other gaskets (O-ring or counterflange gasket);
- corrosion of the pump body;
- incorrect reassembly after maintenance;
- pumping of cold liquids, with water vapour condensation forming on the outer surface of the pumping body and consequent dripping.

These events cause a wet environment (with danger of electric shock, danger of slipping, etc.) and the risk of persons, animals or objects being struck by jets of liquid. In particular, maximum caution must be taken when pumping liquids that are flammable, corrosive, at high temperature or in any way dangerous for living things or for the environment. The user must assess these risks and if necessary provide appropriate protection from jets of liquid (i.e. screens) and collection vessels in a suitable position. Liquid from leakages must be removed and disposed of correctly and safely.

5.4 - RESIDUAL RISKS CAUSED BY FAULTY OPERATION

The pump is not provided with audible or visual alarms to indicate breakages or malfunctioning. Therefore, the user must take suitable measures to avoid damages

(i.e. flooding) caused by failure or faulty operation of the pump (i.e. installation of alarms, back-up pumps, etc.).

6 - TROUBLESHOOTING

Problem	Possible cause	Remedy
Motor not turning and no humming sound	No electricity	Check the power supply
	System overcurrent or overload protection triggered	Reset the protective device; if the problem persists contact a qualified technician
	Plug not inserted	Insert the plug
	Power connections interrupted or incorrect electric connection	Contact a qualified technician
	Switch positioned to "off"	Switch to the correct "on" position
	Internal overload protection triggered (only for pumps provided with this)	The protection is reactivated automatically; if the protection is triggered again this means the application is too heavy for the pump
	Electrical fault	Contact a qualified technician
Motor making humming sound but not turning	Impeller blocked	Contact a qualified technician
	Electrical fault	Contact a qualified technician
Motor turning at low speed and pump has reduced capacity	Incorrect supply voltage	Supply the pump with the voltage indicated on the ratings plate
	Overload	Application too heavy for the pump
Motor turning but reduced or no liquid capacity	Suction hose end incorrectly positioned	See Chapter 4.2.2
	Infiltration of air or leakage of liquid	Check hoses, tightness of hose clamp, fitting gaskets
	Hoses or filters (if provided) clogged	Clean hoses and filter
	Pump clogged	Contact a qualified technician
	Pump worn	Contact a qualified technician
	Operating head too high	Check the head
Pump not priming	Excessive suction height	Check the suction height
	Pump not filled with liquid	Fill the pump with liquid
	Suction hose end incorrectly positioned	See Chapter 4.2.2
	Pump incorrectly positioned	See Chapter 4.2.1
	Infiltrations of air	Check hoses, tightness of hose clamp, fitting gaskets
	Wear and tear on gaskets or seal	Contact a qualified technician
	Pump worn	Contact a qualified technician
Pump bubbling air in the suction tank	Incorrect pumping direction	Reverse pumping direction
Motor overheating	Overload	Application too heavy for the pump
	Excessive liquid temperature	Application too heavy for the pump
	Electrical fault	Contact a qualified technician
Abnormal noise during pumping	Foreign bodies have entered the pump	Contact a qualified technician
	Impeller broken	Contact a qualified technician
	Impeller seized	Contact a qualified technician
	Bearing worn	Contact a qualified technician
Pump leaking	Wear and tear on gaskets or seal	Contact a qualified technician

7 – DECLARATIONS

The certification below is based on the declarations drawn up by the manufacturer in accordance with Directive 2006/42/EC of reference for the machinery and partly completed machinery described in this manual. A copy of this declaration is available from the manufacturer and is supplied on request or always in the event of supplying complex installations. The certification below summarises the principles of conformity indicating the essential elements established by this Directive.

The company TELLARINI POMPE s.n.c di G. Tellarini & C. with headquarters in via Majorana, 4 - Lugo (RA) – Italy, declares under its sole responsibility that:

(Declaration of Conformity) the side channel self-priming pumps series EEM, series ENM, series ENT, series ALM, series ALT to which this certification refers comply with the essential safety requirements established by:

- Machinery Directive 2006/42/EC and national implementation provisions
- Electromagnetic Compatibility Directive 2004/108/EC and national implementation provisions
- Low Voltage Directive 2006/95/EC and national implementation provisions

(Declaration of Incorporation) the partly completed machinery relating to side channel self-priming pumps series EEMQ, series ENMQ, series ENTQ, series ECC, series ALMQ, series ALTQ, series ALCC, to which this certification refers, complies with the essential safety requirements established by:

- Machinery Directive 2006/42/EC and national implementation provisions
- Electromagnetic Compatibility Directive 2004/108/EC and national implementation provisions
- (with reference to the partly completed machinery included in the field of application) Low Voltage Directive 2006/95/EC and national implementation provisions, excluding the requirements associated with connections to be made to connect the terminal block to the power supply source.

It declares that commissioning of the partly completed machinery must not take place until the final machinery in which it is to be incorporated has been declared to be in conformity (if necessary) with the provisions of Directive 2006/42/EC.

LUGO, 29/12/2009

The legal representative
and technical file holder
Giovanni Tellarini



8 – WARRANTY

The pump is covered by warranty for a period of two years from the date of purchase by the final user. In the absence of documentation proving the date, the warranty period starts from July 1st of the year of manufacture, indicated on the ratings plate. The warranty expires in any case after 3 years from July 1st of the year of manufacture. The warranty covers all manufacturing and material defects confirmed by the manufacturer and consists in the repair or free replacement of the pump by the manufacturer. Any repairs performed under warranty do not modify the expiry date of this warranty.

The warranty does not cover damages caused by improper use, by faulty electrical supply, by use that is not in conformity with the instructions contained in the "user and maintenance manual". Moreover, it does not cover any damages caused or tampering performed by the user, maintenance operations performed incorrectly (also with the use of non-original spare parts) and wear related to normal use (in particular, seals, bearings, capacitors, brushes).

9 – NOTES FOR THE SERVICE TECHNICIAN

Chapter 9 and the relative subchapters contain information for maintenance to be used exclusively by qualified technicians.

9.1 - DISASSEMBLING THE HYDRAULIC PART



Before disassembly and assembly operations, disconnect the equipment from the power supply to prevent accidental starting with moving parts exposed.

Internal parts can have sharp edges; therefore, they should be handled with care wearing appropriate personal protective equipment.

Before disassembly discharge any pressure present inside the pump, wait for it to cool, empty it and dispose of the liquid contained appropriately; if the pump is used for dangerous substances comply with the safety regulations in force for handling of these substances.

The references below can be found in Figs. 1, 2, 3A, 3B, 4 and 9 according to the indications provided in paragraph 3.2.

- Unscrew the screws (ref. 30 or ref. 31) of the cover (ref. 11).
- Remove the cover.
- Remove the O-ring (ref. 12).

- Extract the impeller (ref. 13) as follows:

bronze models type 20-25-30-35-40: the impeller slides on the shaft (ref. 64), it can be extracted simply using your fingers;

bronze models type 50 and all stainless steel models: the impeller is forced onto the shaft; to remove it use an extractor with appropriately shaped claws (fig. 7); the hub of the impeller is provided with two projections for this purpose (fig. 7); for stainless steel models type 20 use the two projections present on the side of the pump body (fig. 7) for extraction.

- Remove the tab (ref. 15).
- Extract the pump body (ref. 10) from the shaft.
- (Only for bronze models type 20) extract the counterflange (ref. 5) from the pump body and remove the gasket (ref. 8).

9.2 -ASSEMBLING THE HYDRAULIC PART

(For bronze models type 20, first insert the counterflange ref. 5 and position the gasket ref. 8);

- Insert the tab (ref. 15) in its seat
- Insert the pump body (ref. 10) along the shaft (ref. 64)
- Position the O-ring (ref. 12) in its seat on the pump body

Models with sliding impeller

- Insert the impeller (ref. 13) over the shaft using your fingers.
- Fit the cover (ref. 11) and insert the screws (ref. 30 or ref. 31), gradually and alternately tightening opposite screws.

Models with forced impeller

The impeller is inserted using a hollow bar with internal diameter slightly larger than that of the shaft.

- To prevent damaging the bearings, first remove the fan cover (ref. 2) and place the back of the shaft (the end on which the motor fan ref. 1 is mounted) on a soft metal surface.
- Striking the impeller (ref. 13) in a central position using the hollow bar and a hammer, move it towards the wearing surface, leaving 0.1 mm clearance.
- Fit the cover (ref. 11) and insert the screws (ref. 30 or ref. 31), gradually and alternately tightening opposite screws.
- Strike the back of the shaft with a punch and hammer.
- Check that the impeller rotates freely rotating the motor fan (ref. 1) and fit the fan cover (ref. 2).

9.2.1 – REPLACING THE OIL SEAL (bronze models type 20 and 50)

- Remove the worn oil seal (ref. 67) from its seat (located in the counterflange ref. 5 for models type 20 and in the pump body for models type 50) striking it using a solid drift of suitable dimensions as shown in Fig. 23. (type 20) or Fig. 25 (type 50).
- Take an identical new oil seal and place it against the mouth of its seat as shown in Fig. 24 (type 20) or Fig. 26 (type 50) facing in the correct direction (the spring must be facing the inside of the pump).
- Insert the oil seal in its seat striking it using a solid drift with a slightly smaller diameter to that of the outer diameter of the oil seal until it has been completely inserted.

9.2.2 - REPLACING THE OIL SEAL (bronze models type 25-30-35-40)

The pump body is produced in two pieces: pump body (ref. 10) and rear internal part (ref. 65), which is inserted into the pump body (Fig. 2 shows the two parts disassembled, Fig. 10 after assembly). To replace the oil seal (ref. 67) the rear internal part must be extracted from the pump body.

- Place the edge of the pump body on two surfaces made of soft material (i.e. wood or aluminium) or any other material, provided that two pieces of paper are placed between surface and body (Fig. 11).
- Take a solid drift (with diameter 28-29 mm and length greater than 60 mm) and strike the oil seal until it is extracted from its seat (Fig. 12).
- Place the oil seal against the edge of the rear internal part as shown in Fig. 13 and strike it again with the solid drift and hammer; the internal part will be removed together with the oil seal (Fig. 14).
- Place the pump body on a surface (Fig. 15); take an identical new oil seal and place it against the mouth of its seat, facing in the correct direction (the spring must be facing the inside of the pump).
- Insert the oil seal in its seat by striking it using a solid drift with a slightly smaller diameter to that of the outer diameter of the oil seal until it has been completely inserted (Figs. 16 and 17).
- Place the rear internal part against the body (Figs. 18 and 20) facing in the correct direction (Fig. 19).
- Insert the internal part into the body using a solid drift of appropriate dimensions (Figs. 21 and 22).

9.2.3 - REPLACING THE MECHANICAL SEAL

- Carry out the disassembly procedure without extracting the pump body; for models type 20 also remove the body (ref. 10), extracting it from the counterflange (ref. 5)
- Remove the fixing system of the rotating part of the mechanical seal (this can belong to one of the types in Fig. 3B).
- Extract the rotating part of the seal (ref. 67A), the counterface (ref. 67B) and the shroud (ref. 67C).
- Take an identical seal, separate shroud and counterface, clean the lapped races of the rotating part and of the counterface with a soft cloth; degrease the housing in the pump body and in the shaft, lubricate rubber parts with soap and water.
- Insert the shroud into the seat in the pump body, followed by the counterface.
- Insert the rotating part of the seal taking care that its rubber parts are not damaged when passing over sharp parts.
- Remount the fixing system of the rotating part of the seal; for systems provided with screws, clamp these so that the length of the rotating part is between 13 and 14 mm.

9.3 - REPLACING THE BRUSHES

The two brushes (ref. 7) provided in direct current pumps are sliding contacts subject to wear and must be replaced periodically; a brush is completely worn when the brush spring is bottomed out; when the brushes are worn operation first become irregular and then the pump stops; to replace:

- remove the fan cover (ref. 2)
- unscrew the 2 screws on the brush holder (ref. 6) that connect the wires of the 2 brushes to the motor winding;
- lift the springs that hold the brushes in place, extract them, replace them and connect the wires using the 2 screws;
- remount the fan cover.