

# **SIDE CHANNEL SELF-PRIMING PUMP Type EN, ENC, AL, ALC, ENM**



**User's manual**

## 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, ALMA, ENTQ and ALTO 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 riskfactor, 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/cm<sup>3</sup>; 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 bv-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 bv-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 H<sub>max</sub> 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.

Tab. A

TYPE	1 m	5m	10 m	Hmax (bar)	LeqA (dB)	Weight kg	TYPE	1 m	5m	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

Tab. A

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

### 3.3 - MAXIMUM PRIMING HEIGHT

The maximum priming height is the maximum difference in level between the pump and the level of 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.

### 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 (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.



#### WARNING

**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.**



#### WARNING

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 Hmax 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 INSTRUCTION



**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 , 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. 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 minutes**

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 deterative solution in a receptacle (i.e. common dishwashing liquid 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.)

## 5 - INFORMATION ON RESIDUAL RISKS

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



Fig. 1

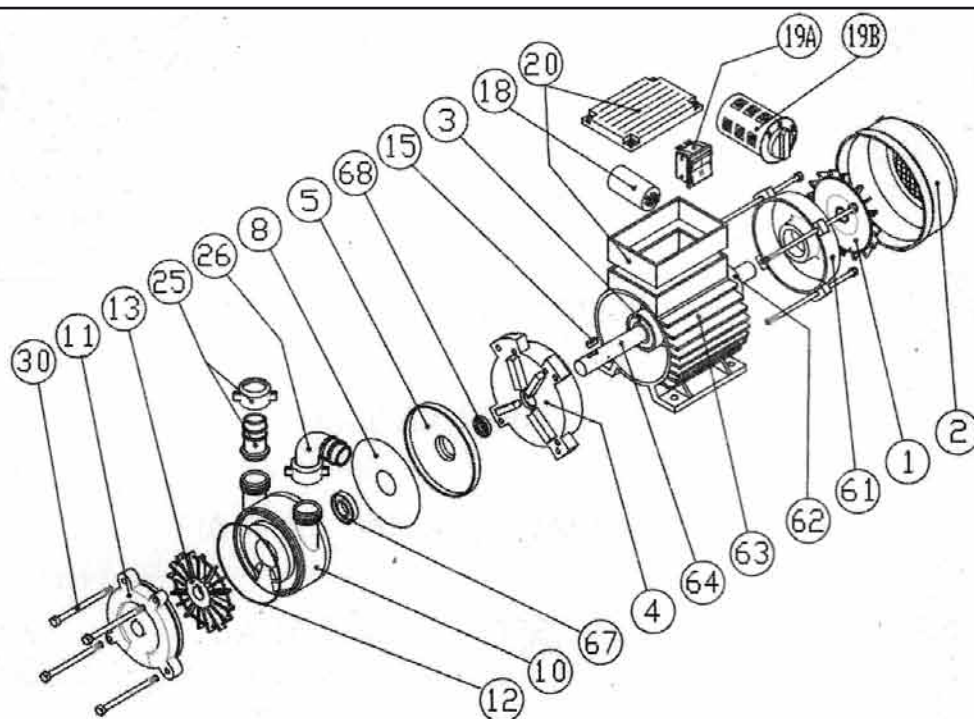


Fig. 2

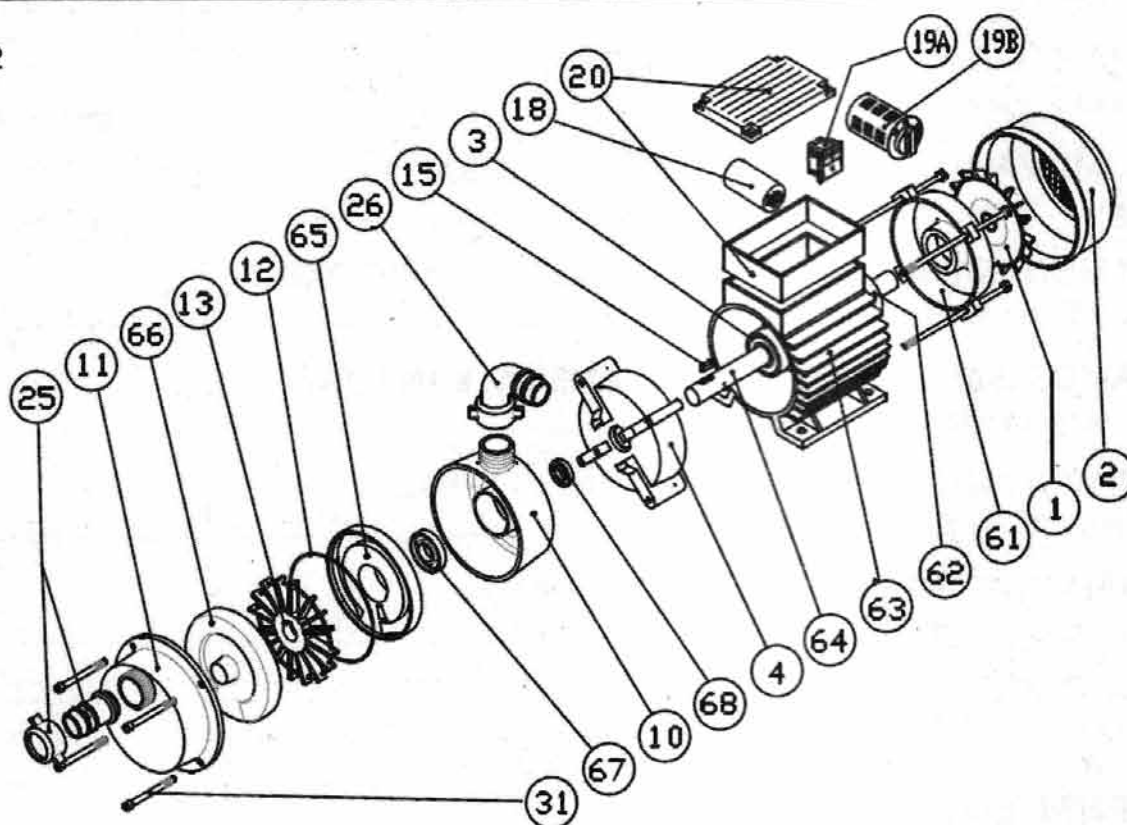


Fig. 3A

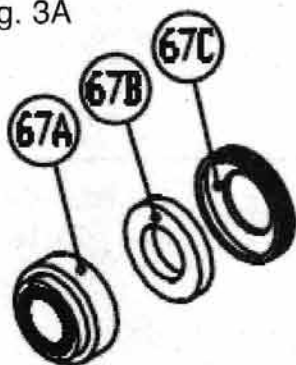


Fig. 3B

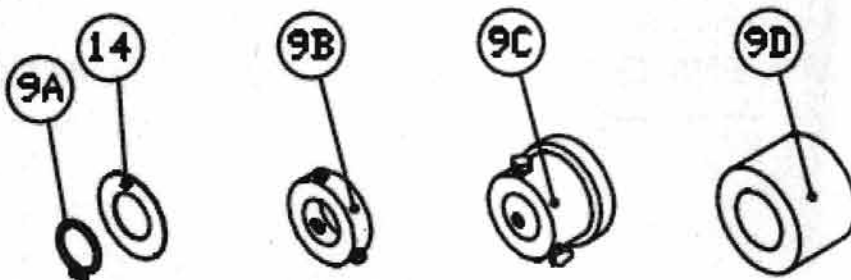


Fig. 4

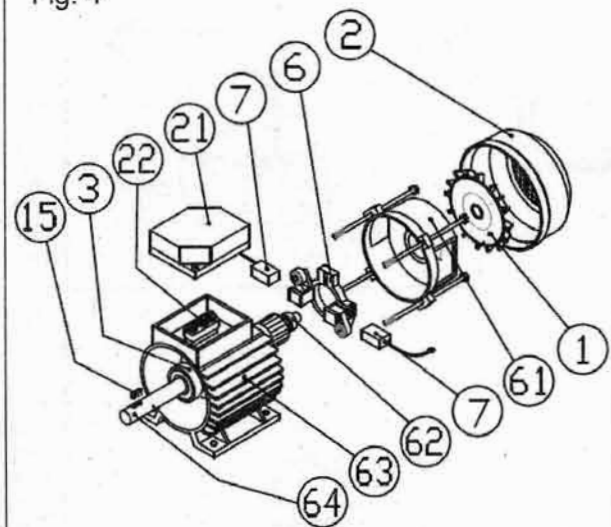


Fig. 6

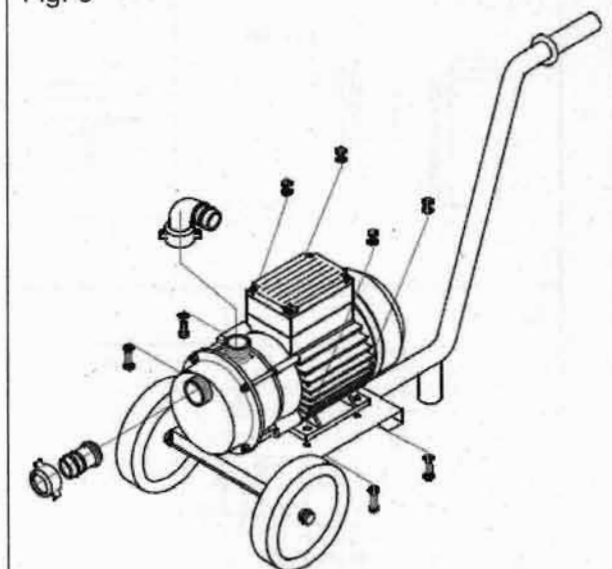


Fig. 5

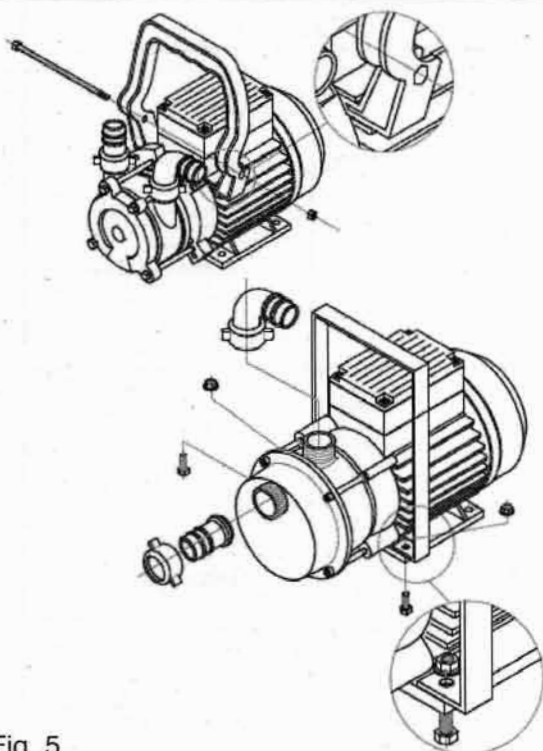


Fig. 8

ECC  
ALCC

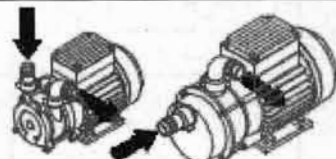


Fig. 9

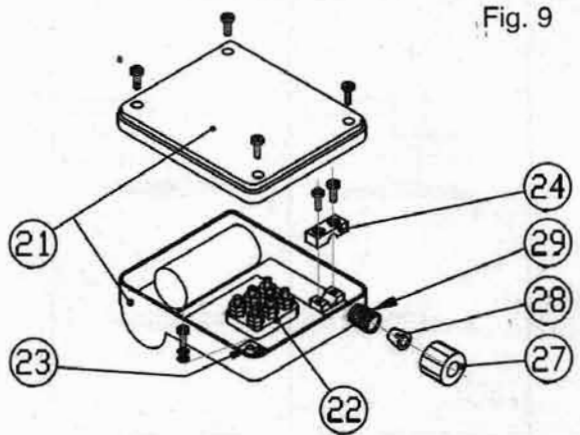
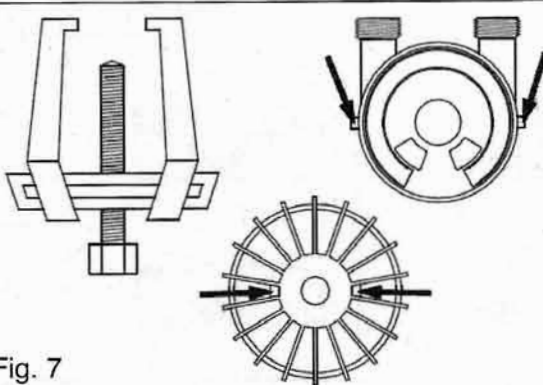
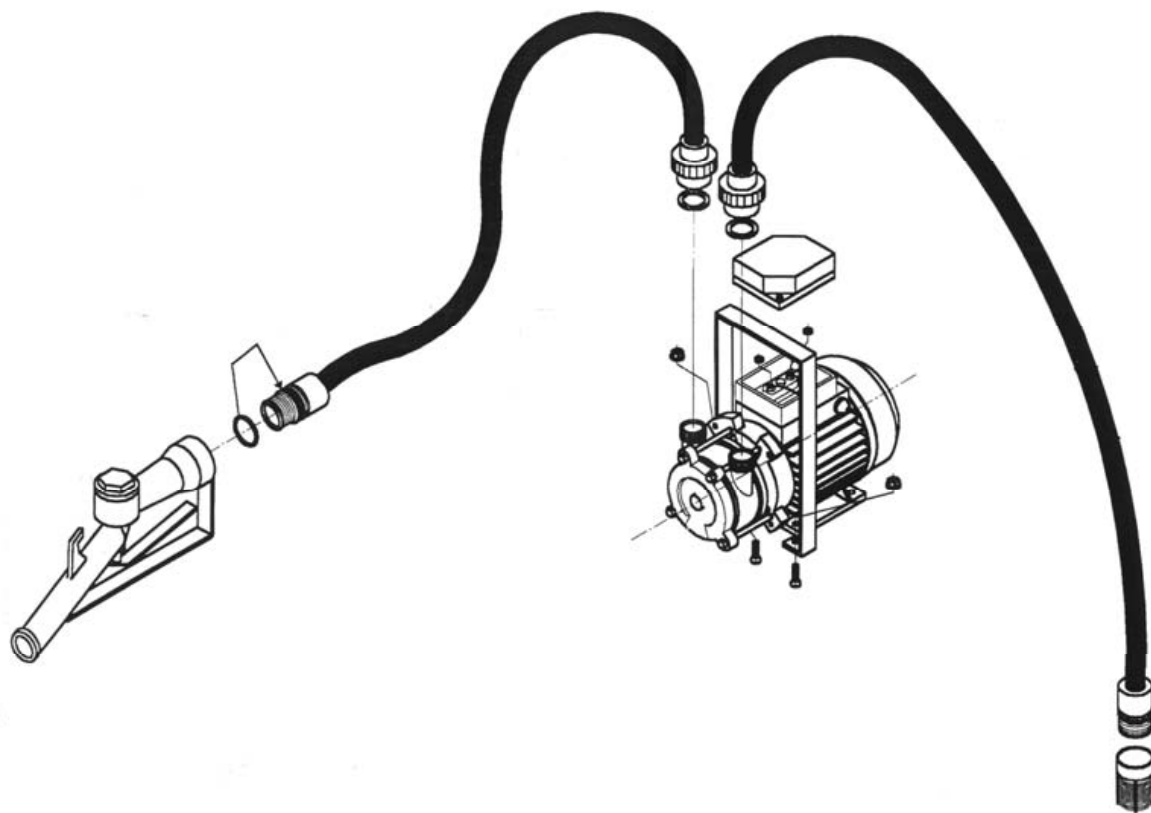


Fig. 7





Kit fuel mounting