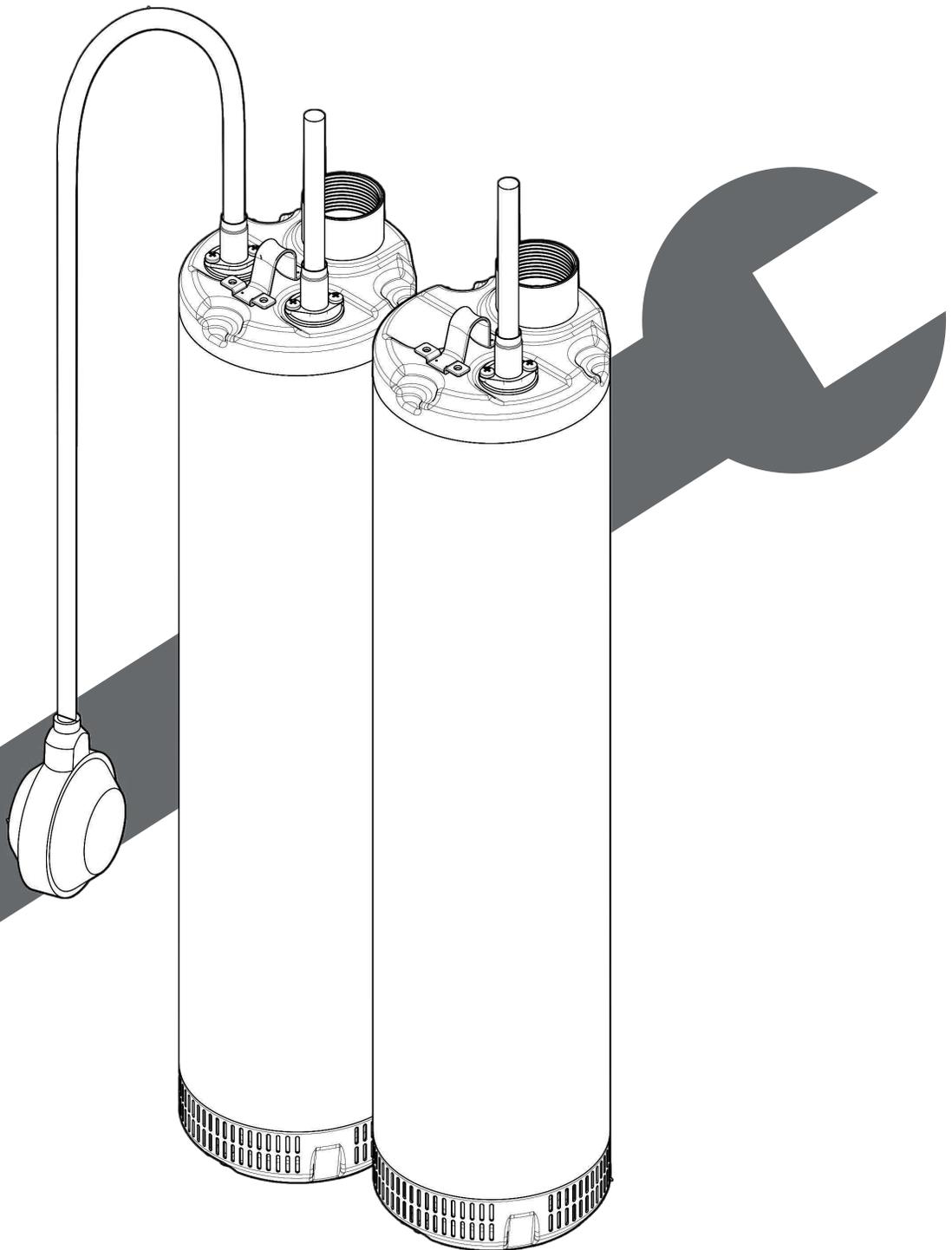


SPM Series

5" Close-coupled Submersible Electric pumps



**INSTALLATION AND
OPERATING INSTRUCTIONS**

1 Introduction and Safety

1-1 Introduction

This manual provides information on how to do Installation and Operation.

Attention :

This manual is an integral part of the unit. Make sure to have read and understood the manual before installing the unit and putting it to use.

The manual must always be made available to the user, stored in the proximity of the unit, and well kept.

1-2 Safety

1-2-1 Danger levels

Before using the unit, the user must read, understand and comply with the danger warnings in order to avoid the following risks:

- Injuries and health hazards
- Damage to the product
- Unit malfunction

Danger Levels	
Hazard Level	Indication
DANGER	It identifies a dangerous situation which, if not avoided, causes serious injury, or even death.
WARNING	It identifies a dangerous situation which, if not avoided, causes serious injury, or even death.
CAUTION	It identifies a dangerous situation which, if not avoided, may cause small or medium level injuries.
NOTICE	It identifies a situation which, if not avoided, may cause damage to property but not to people.

1-2-2 User Safety

Symbol	Description
	<p>WARNING : This unit must be used only by qualified users. Qualified users are people able to recognize the risks and avoid hazards during installation, use and maintenance of the unit. Strictly comply with current health and safety regulations.</p>

1-2-3 Protection Of The Environment

- Disposal of packaging and product
- Comply with the current regulations on sorted waste disposal.
- Leaking of fluid

The unit contains a small quantity of lubricant oil: always put in place the necessary measures to ensure that any spilled lubricant does not disperse in the environment.

Symbol	Description
	<p>WARNING : It is prohibited to dispose lubricating fluids and other hazardous substances in the environment</p>
	<p>WARNING : Ionizing radiation hazard If the unit has been exposed to ionizing radiations, implement the necessary safety measures for the protection of people. If the unit needs to be dispatched, inform the carrier and the recipient accordingly, so that appropriate safety measures can be put in place.</p>

2 Handling and Storage

2-1 Unit Handling

Lift the unit by attaching a rope to the lifting ring.



Description
<p>DANGER : Electrical hazard Holding the unit by the power supply cord or the float is strictly forbidden.</p>
<p>WARNING : Use cranes, ropes, lifting straps, hooks and clasps that comply with current regulations.</p>
<p>NOTICE : Make sure that the harnessing does not hit and/or damage the unit.</p>
<p>WARNING : Lift and handle the unit slowly.</p>
<p>WARNING : During handling, make sure to avoid injury to people and animals, and/or damage to property.</p>

2-2 Storage

The unit must be stored :

- In a covered and dry place.
- Away from heat sources.
- Protected from dirt.
- Protected from vibrations
- At an ambient temperature between -5°C and +60°C (23°F and 140°F), and relative humidity between 5% and 95%.
- Do not place heavy loads on top of the unit.
- Protect the unit from collisions.

3 Intended Use

Applications:

- Water supply from first collection tanks, wells for domestic use, basins and water streams
- Irrigation
- Pressure boosting systems
- Rainwater collection tanks
- Vehicle washing systems
- Craft pressure boosting systems
- Air purification and humidification
- Water filtering and recycling systems.

Pumped liquids

- Clean
- Free of solid particles or fibres
- Chemically and mechanically non aggressive
- Non-flammable.

3-1 Conditions of use

- The maximum pressure at the appliance inlet is determined by the pressure increase created by the pump, so as not to exceed the maximum operating pressure.
- Pumped liquid maximum temperature: +40°C.
- Electrical supply voltage: refer to the rating plate.
- Maximum immersion depth: see the indication of the nameplate (max 20 m).
- Maximum number of consecutive hourly start-ups: 20.

3-2 Non-permitted use

Do not use the electric pump for applications other than those described above and, in any case, not authorised by the manufacturer. Improper use may cause serious damage (including death) to people, animals, objects and the environment.



Do not use the electric pump in swimming pools, basins, ponds and in similar places when people are in the water.

- Do not pump food liquids or human food products.
- Do not pump any liquids that are more viscous and/or denser than water, unless specifically authorised by the manufacturer.
- Do not use the machine in potentially explosive environments or with flammable liquids.
- Do not run the machine without any liquid.
- To avoid overheating, do not run the electric pump continuously at a flow rate of zero or lower than 10% of the rated value. The pump is operated at best within the range specified on the nameplate.

3-3 START-UP AND PROLONGED STOP

Before starting the electric pump, it is necessary to fill it and the suction pipe with water (the whole circuit, if the plant is closed).

If an electric pump with positive suction head is installed, perform the following operations manually.

Otherwise, if a negative suction head system is installed or the suction line is pressurised, it is sufficient to open the valves, vent the air and wait for filling.

In closed circuits, load the system from the highest point and vent air at the same time.

During the first few seconds of operation, the pump will expel further air.

If the circuit is closed, vent it with appropriate valves.



Pay attention to leaks. Use appropriate PPE to protect against mechanical and chemical risks.



Slowly open the valves during venting, avoiding sudden manoeuvres; do not direct the jet towards people, animals or electrical appliances.

After prolonged downtime, check the pump for proper priming before starting it, and vent the pipes, if necessary.

If a long period of inactivity is foreseen and/or the machine needs to be emptied of liquid, disconnect it from the pipes and tilt it to let the liquid out.

4 Installation

4-1 Precautions

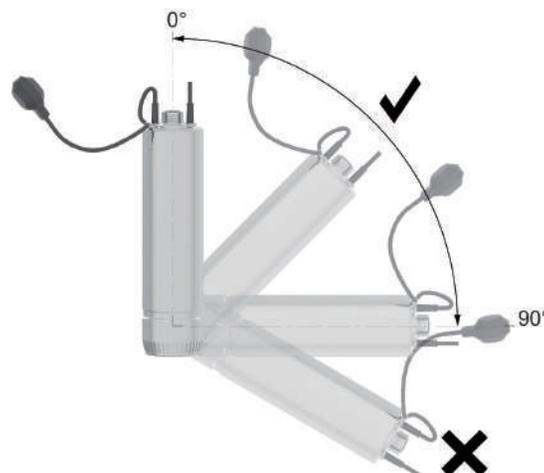
Before starting, make sure that the safety instructions shown in Introduction and Safety on page 4 have been fully read and understood.

Description
<p>DANGER : All the hydraulic and electrical connections must be completed by a qualified person and/or technician.</p>
<p>DANGER : Potentially explosive atmosphere hazard It is prohibited to start the unit in environments with potentially explosive atmospheres or with combustible dusts.</p>
<p>WARNING : Always wear personal protective equipment.</p>
<p>WARNING : Always use suitable working tools.</p>
<p>WARNING : When selecting the place of installation and connecting the unit to the hydraulic and electric power supplies, strictly comply with current regulations.</p>
<p>NOTICE : In case of outdoor installation, ensure protection from frost.</p>

4-2 Installation Area

1. Follow the provisions in Operating environment .
2. Remove any solid sediments found.
3. Check that the well or the tank are of appropriate size for housing the unit, with an even perimeter without obstacles.
4. Check that the sizes of the well/tank do not hinder the free movement of the float, if present.

4-2-1 Permitted Positions

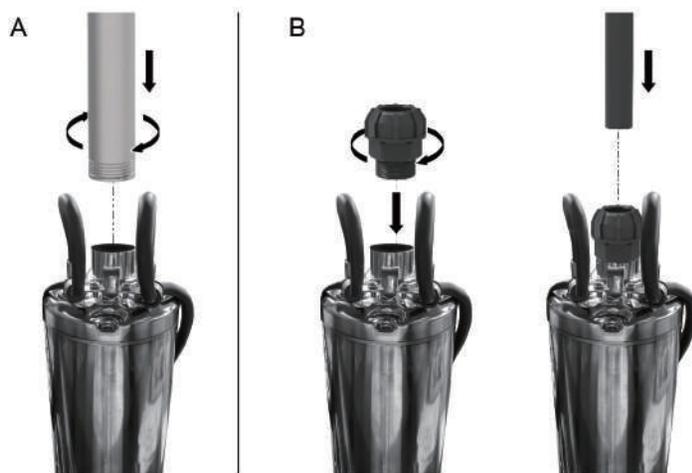


4.3 Hydraulic Connection

Symbol	Description
	DANGER : All the hydraulic and electrical connections must be completed by a qualified person and/or technician.
	DANGER : Electrical hazard Holding the unit by the power supply cord or the float is strictly forbidden.
	WARNING : Piping must be sized to ensure safety at the maximum operating pressure.
	WARNING : Install appropriate seals between the unit couplings and the pipings.

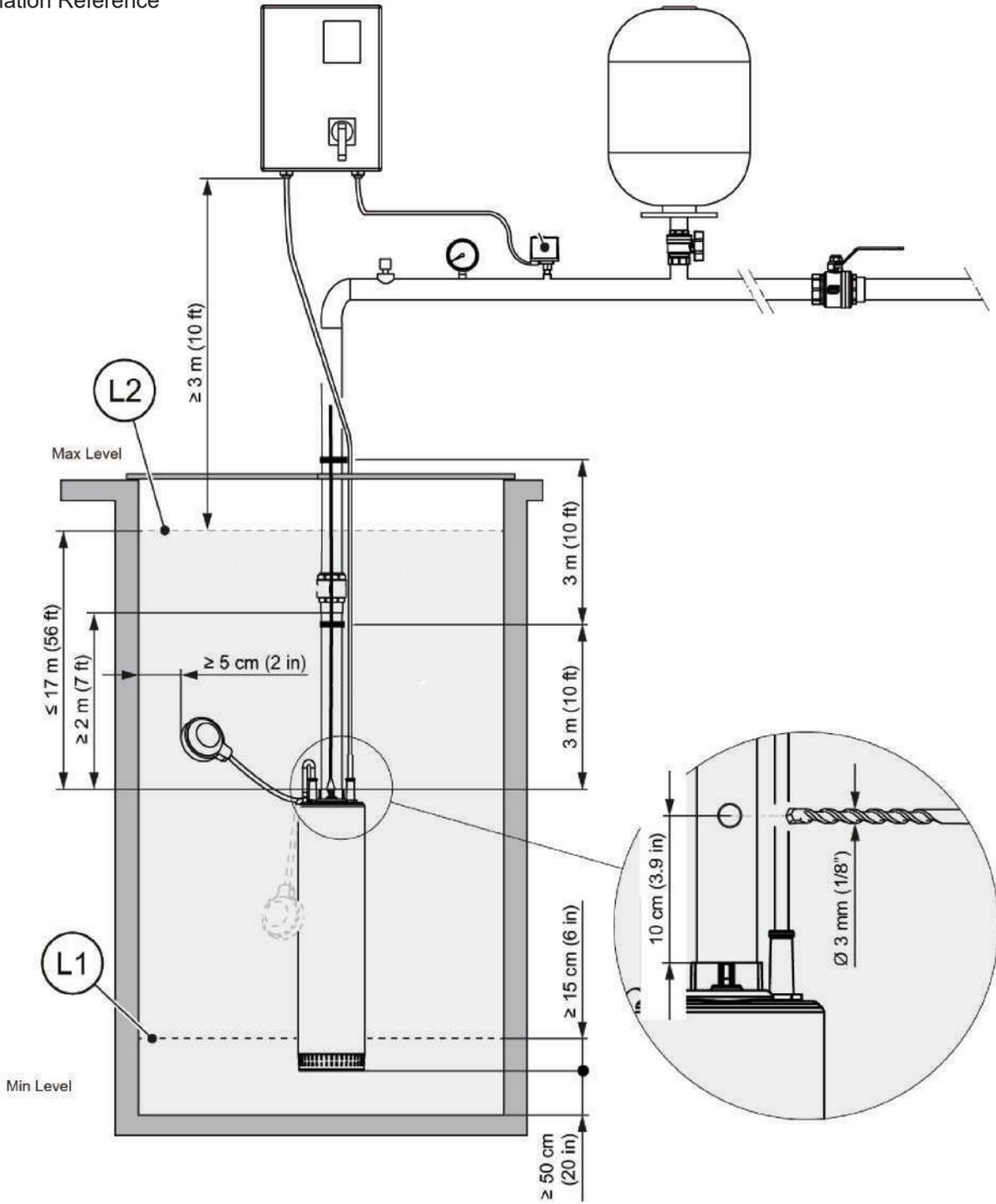
4-3-1 Guidelines For The Hydraulic System

1. Connect the piping to the unit discharge port:
 - a) In case of metal piping, this should be screwed directly to the port.
 - b) In case of plastic piping, use an adapter as recommendation.



2. Install a check valve on the piping, at least 2 m (7 ft) from the unit, and then one every 10 m (33 ft).
3. Make a 3 mm (1/8") relief hole 10 cm (3.9 in) from the discharge port.
4. Secure the power supply cord to the piping with nylon ties at distances of 3m (10ft) from each other, keeping it loose from one tie and the next, to avoid it being pulled in case of piping expansion.
5. Secure a rope made of non-perishable material to the lifting ring.
6. Lower the unit in the well/tank holding it with the rope.
7. Position the unit :
 - At the centre of the well/tank
 - Submerged in the liquid at a depth of at least 15cm (6in)
 - At a maximum depth of 17 m (56 ft) from the maximum level of the liquid
 - At a minimum distance of 50 cm (20 in) from the bottom of the well/tank
 - With at least 3 m (10 ft) of power supply cord out of the liquid
 - With the float, if installed, at least 5 cm (2in) from the wall of the well/tank.

Installation Reference



4-4 Electrical Connection

Symbol	Description
	DANGER : All the hydraulic and electrical connections must be completed by a technician possessing the technical-professional requirements outlined in the current regulations.
	DANGER : Electrical hazard Before starting work, check that the unit is unplugged and that the pump unit, the control panel and the auxiliary control circuit cannot restart, even unintentionally.

4-4-1 Ground

Symbol	Description
	DANGER : Electrical hazard Always connect the external protection conductor (ground) to the ground terminal before attempting to make any other electrical connections.
	DANGER : Electrical hazard Connect the pump unit and any electric accessories to a socket with protection conductor (ground).
	DANGER : Electrical hazard Check that the external protection conductor (ground) is longer than the phase conductors; In case of accidental disconnection of the unit from the phase conductors, the protection conductor must be the last one to detach itself from the terminal.
	DANGER : Electrical hazard Install suitable systems for protection against indirect contact, in order to prevent lethal electric shocks.

4-4-2 Guidelines For Electrical Connection

1. Check that:

- The mains voltage and frequency match the specifications on nameplate.
- The power supply cord is protected from high temperatures, vibrations, collisions, and abrasions.

2. Check that the power supply line is provided with:

- A short circuit protection device of appropriate size.
- A mains disconnection device with contact opening distance ensuring complete disconnection for overvoltage conditions.
- If it is not possible to visually check the level of the liquid, install a system for protection against dry run connected to a pressure switch (or float, probes, or other suitable devices)
- Built in Thermal Protector for single phase unit.
- The control box with built - in capacitor and overload protector and stops automatically in case of over temperature.

5 Use and Operation

5-1 Precautions

Symbol	Description
	DANGER : Electrical hazard Do not use the unit in swimming pools or similar places when people are inside.
	WARNING : Make sure that the drained liquid cannot cause damage or injuries.
	WARNING : Electrical hazard Check that the unit is properly connected to the mains power supply.
	WARNING : Injuries hazard The unit, equipped with a single-phase motor with automatic reset thermal overload protection, could restart automatically after it has cooled down.
	WARNING : It is prohibited to put combustible materials near the unit.
	NOTICE : The unit must be submerged in the liquid at a depth of at least 15 cm (6 in) before startup.
	NOTICE : Dry run is forbidden.
	NOTICE : It is prohibited to operate the unit with the on-off valve closed.
	NOTICE : Make sure that there is no residual air inside the unit after being submerged in the liquid.

5-2 Rotation Direction Check (Three - Phase Motors)

1. Submerge the unit in the liquid at a depth of at least 15cm (6in).
2. Start the unit.
3. Check the discharge pressure gauge :
If pressure is detected, the motor rotation direction is correct
If no pressure or low pressure is detected, the motor rotation direction is wrong.
4. Stop the unit.

5-2-1 Wrong Rotation Direction

1. Disconnect the power supply.
2. Invert two of the three wires of the power supply cord.

5-3 Starting and Stopping

Units with float

1. Connect the plug to the mains and/or turn on the switch: depending on the position of the float, the unit stays idle or starts to operate.
2. With the unit in operation, check that the liquid is actually being pumped and that there is no :
 - Leaking of fluid from the piping
 - Abnormal noise or vibration
 - Vortex nearby the suction port.
3. When the float reaches the low position (minimum liquid level), the pump automatically stops.

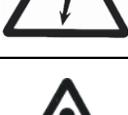
Units without float

1. Connect the plug to the mains and/or turn on the switch: the unit starts.
2. With the unit in operation, check that the liquid is actually being pumped and that there is no :
 - Leaking of fluid from the piping
 - Abnormal noise or vibration
 - Vortex nearby the suction port.
3. Once the unit has taken up liquid to the minimum level, disconnect the plug from the mains and/or turn off the switch to switch it off.

6 Maintenance & Troubleshooting

6-1 Precautions

Before starting, make sure that the instructions shown in Introduction and Safety have been fully read and acknowledged.

Symbol	Description
	WARNING : Maintenance must be done by a qualified person or technician.
	WARNING : Always wear personal protective equipment.
	WARNING : Always use suitable working tools.
	WARNING : In the case of liquids that are excessively hot or cold, pay attention to the risk of injury.
	DANGER : Electrical hazard Before starting work, check that the unit is unplugged and that the pump un it, the control panel and the auxiliary control circuit cannot restart, even unintentionally.
	DANGER : Electrical hazard If the unit is connected to the frequency converter, disconnect the mains power supply and wait at least 10 minutes for the residual current to dissipate.
	WARNING : If a fault cannot be corrected or is not mentioned, contact seller.

6-2 The Unit Does Not Start

Cause	Possible Solution
Power supply cut off	Restore the power supply
Float switch in the low position	<ul style="list-style-type: none"> ■ Check the liquid level in the well/tank and/or ■ Adjust the float switch and/or ■ Check that the float switch can move without impediments
Capacitor faulty (with control box)	Replace the capacitor
Control box faulty	Check and repair or replace the control box
Starter set incorrectly, or faulty	Adjust or replace the starter

6-3 The Unit Starts Up Too Frequently (Automatic Start/Stop)

Cause	Possible Solution
Float switch in the low position	<ul style="list-style-type: none"> ■ Check the liquid level in the well/tank and/or ■ Adjust the float switch and/or ■ Check that the float switch can move without impediments
Check valve blocked	Replace the check valve
Starter set incorrectly, or faulty	Adjust or replace the starter

6-4 There Is Little Or No Flow Rate and/or Pressure

Cause	Possible Solution
Motor turns in the wrong direction	Check the direction of rotation and change it if necessary
Well liquid level too low	<ul style="list-style-type: none"> ■ Increase the installation depth, and/or ■ Reduce the unit performance levels, and/or ■ Replace the unit with another with lower performance levels
Check valve locked in closed or partially closed position	Replace the check valve
Suction filter clogged	Clean the filter
Discharge pipe throttled	Remove the throttling
Piping and/or unit clogged	Remove the throttling
Under voltage	Check the electric power supply
Liquid leaking from the unit due to corrosion or faulty seals	<ul style="list-style-type: none"> ■ Check the installation requirements and the limits of use, and/or ■ Install the sacrificial anode kit and/or ■ Send the unit to an authorized workshop for testing
Air in the unit	<ul style="list-style-type: none"> ■ Draining the unit and/or ■ Make a relief hole, see Guidelines for the hydraulic system

6-5 The Unit Never Stops (Automatic Start/Stop)

Cause	Possible Solution
Float switch in the low position	<ul style="list-style-type: none"> ■ Check the liquid level ■ Adjust the float switch and/or ■ Check that the float switch can move without impediments
The required flow rate is greater than the one expected	Reduce the required flow rate
Discharge pipe leaking	Eliminate the leaks
Pipes, on-off valves or filter clogged with impurities	Remove the impurities
Starter set incorrectly, or faulty	Adjust or replace the starter

6-6 The Thermal Overload Protection Triggers

The motor thermal overload protection triggers occasionally, or after the unit has been running for a few minutes.

Cause	Possible Solution
Liquid temperature too high	Bring the liquid temperature back within the permitted limit
Input voltage outside the rated limits	Make sure the voltage values are correct
Unbalanced input voltage	Make sure the voltage of the three phases is balanced
Wrong duty point, flow rate below or above the permitted limits	Bring the flow rate back within the permitted limits
Presence of solid or fibrous substances in the liquid (unit overload)	Remove the substances

6-7 Excessive Anode Consumption

Cause	Possible Solution
Electric contact with large size metal parts	Remove the electric contact
Defective grounding	Check and reset the grounding
Eddy current	Remove all eddy current
Liquid too aggressive	<ul style="list-style-type: none"> ■ Check the compatibility of the unit with the liquid ■ Check the liquid temperature

6-8 The unit produces excessive noise and/or vibrations

Cause	Possible Solution
Resonance	Check the installation
Foreign bodies in the unit	Remove the foreign bodies
The unit does not turn freely due to a mechanical fault	Send the unit to an authorized workshop for testing
Wrong duty point, flow rate below or above the permitted limits	Bring the flow rate back within the permitted limits

7 Disposal

7.1 Precautions

Symbol	Description
	<p>WARNING : The unit must be disposed of through approved companies specialized in the identification of different types of materials (steel, copper, plastic, etc.)</p>
	<p>WARNING : It is prohibited to dispose of lubricating fluids and other hazardous substances in the environment.</p>

Limited Warranty:

The products of Stairs Industrial Co., Ltd (Stairs) are warranted to the first user only to be free of defects in material and workmanship for a period of 12 month from the date of installation, but no more than 18 month from date of shipment. Stairs liability under this warranty shall be limited to repairing or replacing at our election, without charge, FOB Stair’s manufacture center. Stairs will not be liable for any cost of removal, installation, transportation or any other charges that may arise in connection with warranty claim.

The warranty period commences on the date of original purchase of the equipment. Proof of purchase and installation date, failure date, and supporting installation data must be provided when claiming repairs under warranty.

This warranty is subject to due compliance by the original purchaser with all directions and conditions set out in the installation and operating instructions. Failure to comply with these instructions, damage or breakdown caused by fair wear and tear, negligence, misuse, incorrect installation, inappropriate chemicals or additives in the water, inadequate protection against freezing, rain or other adverse weather conditions, corrosive or abrasive water, lightning or high voltage spikes or through unauthorized persons attempting repairs are not covered under warranty.

Stairs will not be liable for any incidental or consequential damages, losses, or expenses, arising from installation, use, or any other causes. There are no express or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above. Certain countries do not permit the exclusion or limitation of incidental or consequential damages or the placing of limitations on the duration of an implied warranty, therefore, the limitations or exclusions herein may not apply. This warranty sets forth specific legal rights and obligations, however, additional rights may exist, which may vary from countries to countries supersedes all previous publications.

