

# NE 2 / NE 3 / NH 3

Installation, Operation, and Maintenance Manual.

This manual contains the necessary instructions for the installation and commissioning of its wastewater pumps **NE2 / NE3 / NH3**. Carefully read these recommendations before starting your pump. **Always keep it at hand!**

**Note:** Technical specifications are subject to change without prior notice.

## 1- INTRODUCTION

This manual it is a guide for the installation, operation and maintenance of WDM Pumps wastewater pumps of the NE 2 and NE 3 series.

Carefully read the instructions before installing your equipment. Keep it for future consultations. The pumps have been built according to North American pump manufacturers (Contractors Pump Bureau) and tested by means of hydrostatic and performance tests that guarantee their correct operation. Inspect them carefully and make sure that there are not missing pieces and that they have not deteriorated in transport. Make the claim to the transport company as soon as possible in case it is necessary.

The design, materials and processes used in the manufacture of our products ensure proper functioning. However, life and duration will depend on the adequate application, installation, periodic inspection and, in general, on careful preventive maintenance.



### **WARNING!**

**WDM Water Systems** is not responsible for damages or accidents that occur if the instructions given in this manual are not followed. The warranty is only valid when original spare parts are used.

## 2. SAFETY RECOMMENDATIONS

- Use safety shoes when handling heavy parts or tools.
- Do not operate the pumps with closed discharge valves.
- Do not remove caps or drain valves when the equipment is working.
- Never try to attach pipes to the pumps by force. Sizes must be adequate.
- For any maintenance work always disconnect the power.
- Make sure the pump is isolated from a pressurized system before disassembling it.
- Never apply heat to disarm the pump. There may be an explosion risk.
- Do not wear loose clothes that can be taken by the driver or other movable parts.
- Never place your hands on suction or discharge openings.
- Do not manipulate the pump by the cord set.
- Anchor the pump before operating to prevent falling or sliding.
- Operating the pump with the closed discharge valve decreases the life of the bearings and the mechanical seal.
- Wastewater pumps are not recommended to be used in pools or recreational water facilities.
- Control the risk of explosion before using an electric welding equipment.
- Do not ignore health danger and consider hygiene standards.
- Pay attention to the risks derived from electricity breakdowns.
- Ensure that the lifting elements are in good condition.
- Provide an adequate security barrier around the work area.
- Make sure you have a good exit outside the work area.
- Use helmet, safety goggles and footwear suitable for pump handling.

- Never insert the fingers in the pump aspiring inlet because there is a risk of a cut with the turbine. Before manipulating the pump, stop and disconnect the power.

The pump is designed to be used with liquids that can be harmful. To prevent any eye and skin harm, the following standards must be considered:

- Always wear protective goggles and rubber gloves.
- Rinse the pump well with water under pressure before handling it.
- After disassembling the pump, rinse all the components with clean water.
- Place a rag next to the oil chamber screw at the time of loosening it. This will prevent any splash into the eyes or on the skin, since there may be pressure on the pump chamber due to the infiltrations of the fluid pumped.

These pumps have been designed to operate safely when used and maintained in accordance with what is written in this manual.

A pump is a device that contains pieces that are in rotation and, therefore, it can be dangerous. Operators and maintenance personnel must be aware of this and follow security recommendations. Pumps are heavy equipment: handle them carefully.

#### **Precautions prior to installation**

- Be careful not to damage the motor terminals when the unit is being unpackaged.
- Check the identification plate and make sure the data corresponds to the pump that you bought.
- Make sure the voltages are specified for the pump work.
- Keep this manual for future consultations.
- Transport and place this pump always in vertical position.

#### **WARNING!**

Wastewater pumps are NOT recommended for:

- (a) pumping flammable liquids
- (b) being used in areas considered dangerous
- (c) being used in pools or recreational facilities
- (d) pumping liquids with abrasive solids
- (e) operating without the recommended level of submergence.

### **3. INSTALLATION**

#### **Location**

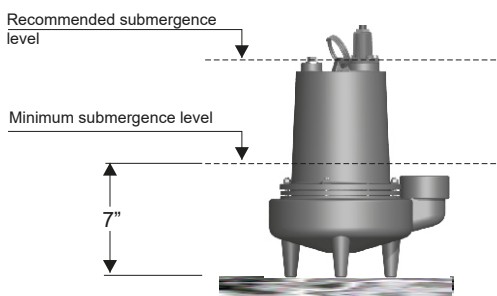
Never install pumps in a ditch with moving soils. The pump can sink, and the suction can be covered.

These pumping units are autonomous and are recommended for use in a sump or pond. The sump must be ventilated, in accordance with local plumbing codes.

This pump is designed to pump wastewater with non-explosive and non-corrosive liquids; they should not be installed in places classified as hazardous or near energy sources.

## Submergence level

The pump volute where the motor is lodged contains oil to cool the motor, lubricate the bearings and mechanical seal. These models can operate for long periods of time without pumping liquids. However, a level of submergence is recommended to achieve better cooling and increase motor life as indicated in the following diagram.



## Discharge connection

- The discharge pipe should be as short as possible and must have a check valve and a shutoff valve. The first protects the pump and the second serves to cut the flow in the system.
- Elbows should be avoided as much as possible (see typical installation diagram)



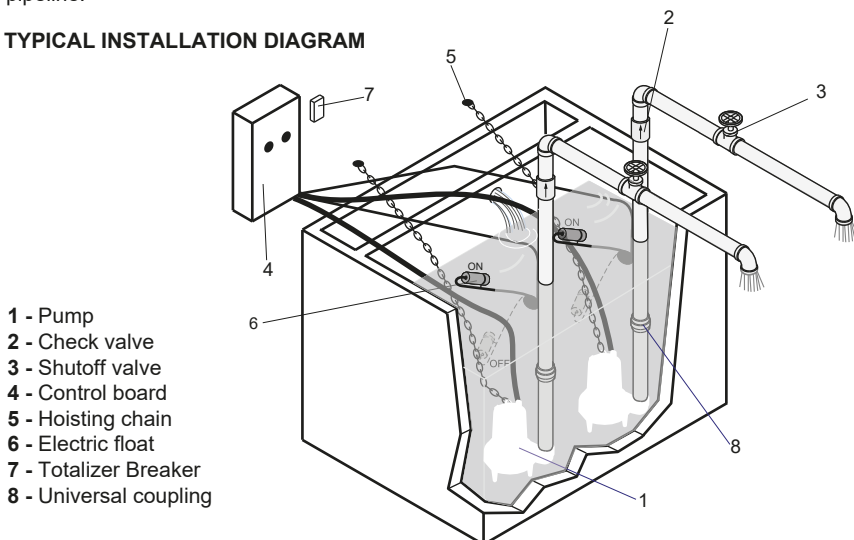
### WARNING!

Pumps must be anchored separately from the pipes and their connections should **NEVER** be forced by stress generated in the pump causing failures in their operation.

## Level controls

The following diagram shows a typical installation using level controls mounted on the pipeline.

### TYPICAL INSTALLATION DIAGRAM



- 1) Never work in the well with the system on.
- 2) The level controls (floats) are sent together with the pumps and must be adjusted on the site, simply adjusting it in the discharge pipe with a strap, or clamp. Make sure the control can range freely. On the other hand, ensure that the pump driver is submerged in the water when the level control is in the off position.
- 3) It is recommended that the float must be placed to ensure that the level of the liquid in the ejector well is never below the upper part of the pump volute, or a minimum level of 7 inches above the bottom of the pump.

## Electric Connections

The cord set should not be modified except to shorten its length.

The control board must be placed outside the well and its connections must be made according to the National Electric Code standards.

- The neoprene cord that connects to the pump should NOT be modified, except for cutting the cord to be connected to the control board.

Avoid water to enter the cord by the ends, since this moisture will reach the motor and cause serious damage.

- Install a temperature protection system to disconnect and warn the user on an inadmissible temperature reached by overload. The causes of this behavior must be examined.



### **WARNING!**

- \* The cord set should not be used to lift or move the pump.
- \* Do not allow the pump to work in an abnormal overload situation.
- \* Poor connections void the warranty.

## Overload protection:

Single phase - The motor has an overload booting and protector capacitor, used as an inherent superheating protector and operates in the combined effect with the one for temperature. This means that the overload protector will shoot and turn off the pump if the coils overheat, or the passage of load current through them becomes too high. Next, it is automatically restored, and the pump starts until after the motor cools at a safe temperature. In the case of an overload, the source of this condition must be determined and rectified immediately. **DO NOT LET THE PUMP WORK UNDER OVERLOAD CONDITIONS!**

- According to the National Electric Code, all models must be installed using 12AWG or higher cord.
- For distances less than 250 feet (76m) from the main breaker to the pump, 12AWG is sufficient. For major distances, consult an electrician expert or the manufacturer directly.
- In the models NE 3 20-3-4P use cord No. 12 AWG for distances that go up to 250pies (76m); for greater distances, consult the manufacturer.
- The size of the control cables (those that lead to the motor) can be number 14 AWG.

- The starters, and fuses must be selected according to the table (no 1).

**Table No 1**

**Electrical specifications for wastewater motors**

Model	Hp	Volt.	Phases	R.P.M	Max Current (A)	Rotor locked MAX Current (A)	Coil Resistance Beginning - Start		Breaker Amp.	Cord size	Capacitor
NE 2 4-1-4-115	0.4	115	1	1.750	12.0	19.0	2.14	30.5	15	14/3	15MFD
NE 3 5-1-4-115	0.5	115	1	1.750	10.5	18.4	1.18	1.18	15	14/3	20MFD
NE 3 7-1-4-230	0.75	230	1	1.750	7.0	17.5	2.24	9.24	20	14/3	20MFD
NE 3 10-1-4-230	1.0	230	1	1.750	8.5	17.5	2.24	9.24	20	14/3	20MFD
NE 3 10-4-230	1.0	230	3	1.750	6.0	16.0	6.0	-	15	12/4	-
NE 3 10-4-460	1.0	460	3	1.750	3.0	8.0	-	-	15	12/4	-
NE 3 20-1-4 230	2.0	230	1	1.750	9.0	28.0	-	-	20	14/3	20MFD
NE 3 20-4-230	2.0	230	3	1.750	14.0	41.2	2.21	2.23	30	12/4	-
NE 3 20-4-460	2.0	460	3	1.750	7.0	20.6	-	-	20	12/4	-
NE 3 30-4-230	3.0	230	3	1.750	19.0	56.0	1.4	-	40	12/4	-
NE 3 30-4-460	3.0	460	3	3.500	9.0	28.0	6.3	-	20	12/4	-
NE 3 10-1-2-230	1.0	230	1	3.500	15.0	42.0	*	-	20	14/3	30MFD
NE 3 20-2-230	2.0	230	3	3.500	14.0	36.0	2.52	3.09	30	12/4	-
NE 3 20-2-460	2.0	460	3	3.500	7.0	18.0	-	-	15	12/4	-
NE 3 30-2-230	3.0	230	3	3.500	16.4	40.0	2.3	-	30	12/4	-
NE 3 30-2-460	3.0	460	3	3.500	8.2	20.0	9.1	-	20	12/4	-
NHE 3 10-1-2-230	1.0	230	1	3.500	15.0	42.0	*	-	30	14/3	30MFD
NHE 3 20-2-230	2.0	230	3	3.500	14.0	36.0	2.52	3.09	30	12/4	-
NHE 3 20-2-460	2.0	460	3	3.500	7.0	18.0	-	-	15	12/4	-
NHE 3 30-2-230	3.0	230	3	3.500	16.4	40.0	2.3	-	30	12/4	-
NHE 3 30-2 460	3.0	460	3	3.500	8.2	20.0	9.1	-	20	12/4	-

## 4. OPERATION

Before operating the pumps, check the following points:

### Check phases and voltage

Voltage and other electrical data contained in the identification plate.

### Rotation of the motor.

It must be the right one to avoid motor and pump damage. Give a soft start and observe the direction of turn. It must match what is indicated on the plate (clockwise, seeing it from the upper part of the volute). For three-phase pumps if the rotation is not the indicated one, exchange two cables in the connection of the control board. Whenever making an electrical change, check the direction of rotation.

Do not make the line changes inside the pump volute; write down the pump serial number for subsequent reference.

### Isolation test.

Before the pump is put into service, make an isolation test with a (megger). Ohms, as well as volts and amps must be recorded and saved.

Once the pump has been properly connected and descended to the well, its operation must be checked during some work cycles. The emptying times of the well or operation per cycle must be recorded.

The volute must contain oil to cool the motor.

## 5. GENERAL MAINTENANCE

### Cleaning

If the pump is used in transportable applications, it is necessary to clean it after each use by pumping clean water, thus avoiding the formation of dirt deposits and inlays.



### WARNING!

**Before starting any maintenance or repair work in the pumps, close the discharge valve and disconnect the power.**

Because the motor is lubricated by oil, no other type of lubrication or maintenance work is needed. These bombs are generally very reliable in their operation and in most cases, they can last working without setbacks for many years.

However, as any mechanical equipment, a preventive maintenance program must be carried out that includes:

**a) Motor volute review to verify its level and oil pollution.**

The pump is supplied by the manufacturer with the motor cooling oil.

To check:

- Place the pump on one side, remove the cap (16) and drain the oil in a clean and dry container.
- See if the oil is dirty or contaminated; if contaminated, then the pump must be carefully inspected for leaks on the shaft seal (6), cord entry (7), the "O" ring of the set of set of cord (25), and the cap (16).
- Before filling with oil, perform a test pressure to locate the fault; once repaired, fill again with dielectric oil Texaco Diala-Oil- Ax or Mobil D.T.E Light according to the recommended amount Table (No 2):

**Table No. 2** Recommended amount of dielectric oil according to model

MODEL	GALONS	LITERS
NE 2 4-1-4-115	0.5	1.7
NE 3 5-1-4-115	1.0	3.8
NE 3 7-1-4-230	0.75	2.8
NE 3 10-1-4-230	0.75	2.8
NE 3 10-4-230	0.75	2.8
NE 3 10-4-460	0.75	2.8
NE 3 20-4-230	1.0	3.8
NE 3 20-4-460	1.0	3.8
NE 3 30-4-230	1.2	4.5
NE 3 30-4-460	1.2	4.5
NE 3 10-1-2-230	1.0	3.8
NE 3 20-2-230	1.0	3.8
NE 3 30-2-230	1.2	4.5
NE 3 30-2-460	1.2	4.5
NHE 3 10-1-2-230	1.0	3.8
NHE 3 20-2-230	1.0	3.8
NHE 3 20-2-460	1.0	3.8
NHE 3 30-2-230	1.2	4.5
NHE 3 30-2-460	1.2	4.5

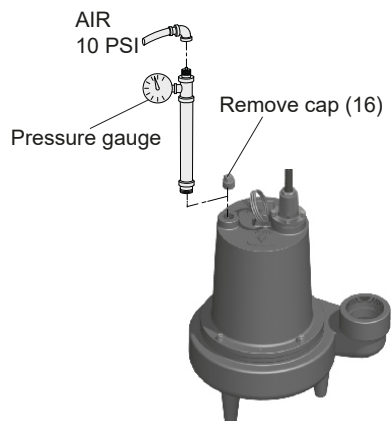


**WARNING!**

**Verify that the oil is below the oil level at the top about 1,6 Inches. If this is not done, excessive hydraulic pressure would be caused that could destroy the pump. Excess oil voids the warranty.**

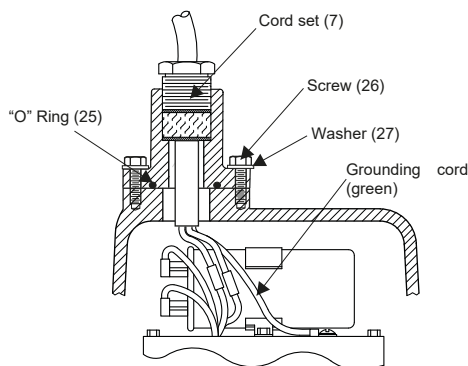
**b) Test pressure.**

Before checking the pump for leaks around the shaft seal, the square ring, and the cord entry, the oil level must be completed as described in the previous section. Apply sealant to a previously assembled tube with a pressure gauge and install it where the cap goes (apply air at 10 PSI). Use a soap and water solution and apply around the sealed areas and check for air bubbles. If after five minutes the pressure remains constant, and "bubbles" are not observed, slowly release the pressure, and remove the tube together with the pressure gauge. Place the cap (16) applying a thread sealant.



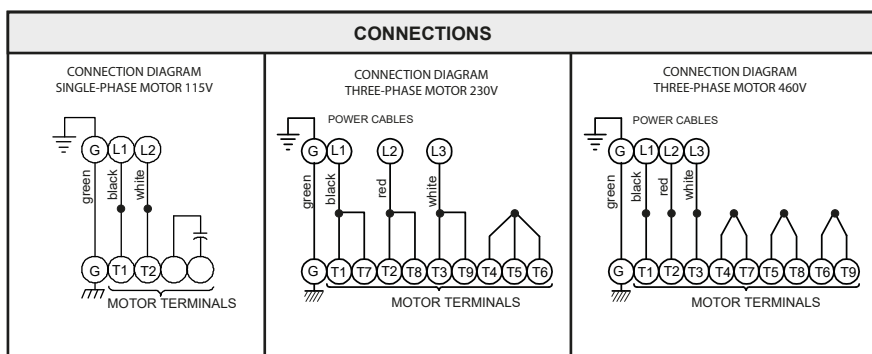
## Electrical connections

Check the cables to ensure that they are not torn or have any other defect. If that is the case, change the entire lid of the cord set (7). Remove motor cables and check the insulation. Change them if needed. Now place the "O" ring (25) on the cord set (7). Reconnect the motor terminals to the power cord as shown in diagram.



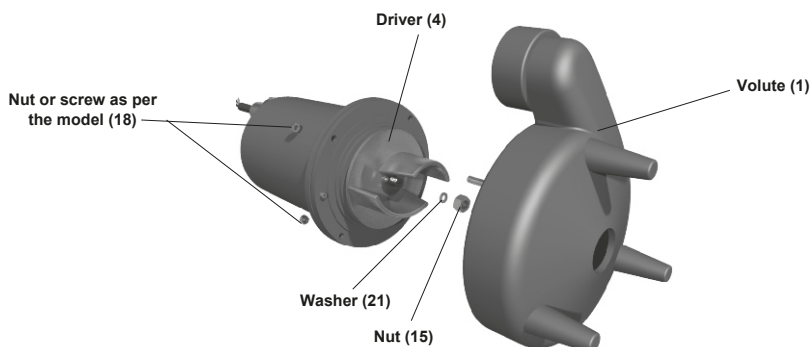
### WARNING!

All submersible pump models must be grounded (green cord).



## Drive replacement.

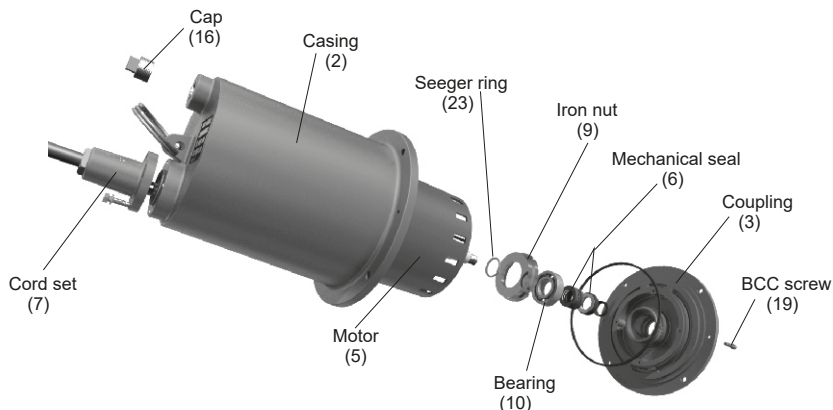
- To clean the volute (1) or replace the driver (4), remove the screw (18) and lift the motor assembly and volute seal (1).
- If the driver (4) needs to be replaced, remove the nut (15) and unscrew it holding the shaft with a screwdriver.
- To assemble the driver (4), screw it on the shaft and tighten it. Clean the shaft and place the nut (15) applying a 35 foot/pound torque. Turn the driver to verify its tightening. Install the assembly on the volute (1) and tighten at 8 feet/pound.
- Verify that there is no friction.





## Motor and mechanical seal service

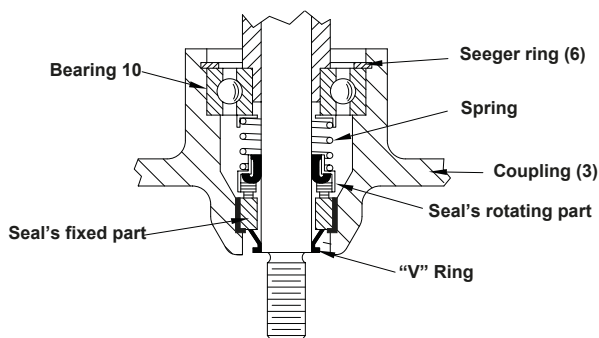
- Remove the volute (1) and the driver (4), as previously noted.
- Remove the oil from the casing (2) by removing the cap (16)
- Remove the screws (19) and separate the motor (5) with the coupling (3) of the casing (2)
- Disconnect the motor (5) from the cord set (7); release the motor screws and remove the coupling (2) together with the stationary part of the seal (6) of the motor (5)
- Check now the motor, bearing and seal components
- Replace the parts that are worn or damaged.
- If one of the seal components requires to be replaced, replace everything.

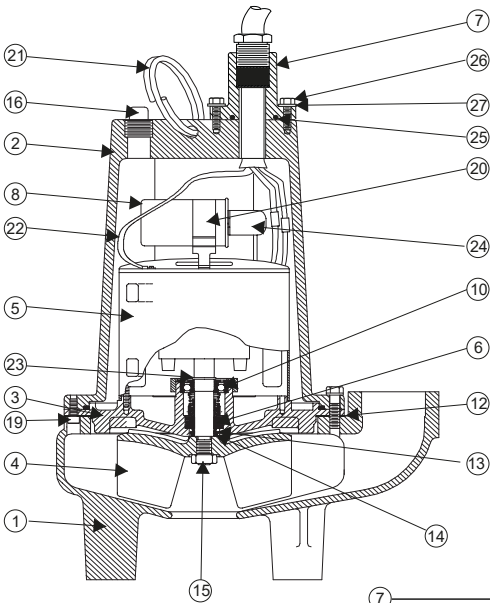


### CAUTION!

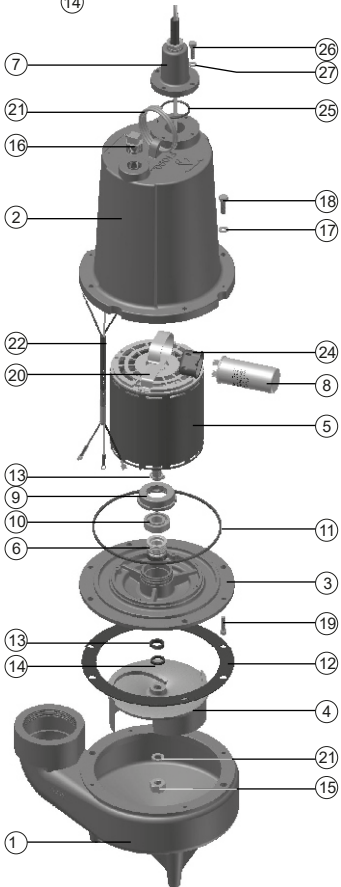
Handle the seal parts carefully.

- Do not scratch or spoil the rectified faces.
- When replacing the seal remove the rotating component and the spring of the motor shaft.
- Also, the fixed part of the coupling. Clean the coupling cavity (3).
- Place the new fixed component in the coupling, the spring in the rotating axis and component. Make sure the spring is properly fixed on the rotating component.
- Carefully assemble the coupling (3) on the motor (5) using the motor screws. Then tighten the cap (9) in the coupling thread (3), check the capacitor (8) and replace if necessary. Add the oil specified above.





No	DESCRIPTION	REF	QTY
1	VOLUTE	61574	1
2	MOTOR HOUSING	F1091	1
3	IRON SEAL PLATE	26204	1
4	IMPELLER	30363	1
5	1.0 HP MOTOR	29729	1
6	5/8" MECHANICAL SEAL	00012	1
7	CORD ASSEMBLY	61277	1
8	20-µF CAPACITOR	24306	1
9	1-1/2" IRON NUT	35602	1
10	6203ZZ BEARING	17414	1
11	SQUARE RING	27269	1
12	GASKET	27344	1
13	"V" RING	56789	1
14	RUBBER SPACER	59648	1
15	1/2" NF NUT	02522	1
16	3/4" CAP	03204	1
17	5/16" STAINLESS STEEL PRESSURE WASHER	02615	4
18	5/16"x1-1/2" NC SCREW	16675	4
19	1/4"x1" NC SOCKET SCREW	16673	2
20	CAPACITOR BRACE	33459	1
21	GALVANIZED HANDLE	27271	1
22	GROUNDING CORD	90139	1
23	A-17 SEEGER RING	17421	1
24	TERMINAL PROTECTOR	34322	1
25	"O" RING	17711	1
26	1/4" x 1" STAINLESS STEEL SCREW	02452	4
27	1/4" STAINLESS STEEL PRESSURE WASHER	22333	4



## 6. FAILURES, CAUSES AND SOLUTIONS

If the system does not work properly, read the instructions carefully and carry out the maintenance recommendations.

If the operating problems are not corrected, the following guide can be helpful in the identification and correction of them:

<b>FAILURE TYPE</b>	<b>PROBABLE CAUSE</b>	<b>SOLUTION</b>
<b>1.</b> The pump does not start.	There is no power in the motor connections.	Check and correct
	Impeller blocked by solids larger than those that the pump can handle.	Clean impeller and inlet of any obstruction.
	Overload protector triggered	If the current in the motor terminals is zero in single-phase motors, disconnect it, let it cool and re-connect. In three-phase motors, allow the protector to cool, press and measure current again. If it is still zero, check the pump's installation connections, starter, or cables in general.  In three-phase motors, after placing the protectors, if the current is within the limits.
<b>2.</b> The pump works manually but not automatically.	Defective floating switch	Check the connections to the switch in the well. Make sure there is enough water to operate the controls.  If there is an available ohmmeter, place the switch terminals, use a 100-ohm scale, operate manually, and observe if it marks zero when it is closed.
<b>3.</b> The pump starts but then the overload relay triggers	Failure in a feeding phase.	Control the balance of the phases.
	Phase imbalance.	Control the adjustment. Substitute the overload relay.
	Bad regulation or defective relay. Blocked rotor.	Send to specialized technical service.
	The feed voltage does not correspond to that of the engine.	Replace the motor or control the feed.
<b>4.</b> The pump works but does not drain the pond.	Pump suction totally or partially obstructed.	Eliminate obstruction.
	Obstructed discharge pipe.	Clean the pipe.
	Closed discharge valve.	Open valve.
	Air trapped in the pump body.	Proceed to lift up and lower the pump or open the valve until all the air comes out.
	Real elevation height far higher than the one planned	Replace model with a different one.

Note: Not all problems and corrections apply to each pump model.

## 7. WARRANTY

WDM Water Systems guarantees its wastewater pumps for 12 months from the delivery date, against any material and manufacturing defect, in accordance with what is indicated in its general sales conditions. Please contact our commercial team for special condition depending on sales country.

Failure to comply with the suggestions and recommendations of this manual, as well as the incorrect use or unauthorized manipulation of the product, completely invalidates the warranty.

The warranty excludes wear by use, incorrect use, repair, or replacement of the defective piece by the user or by unqualified personnel without the express authorization of WDM Water Systems.



### **ATTENTION!**

Any detected anomaly must be immediately reported to WDM Water Systems.

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