

# **SUBMERSIBLE SEWAGE PUMPS**

**INSTRUCTION MANUAL**

**FLOWMORE**

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IF THE EQUIPMENT IS NOT TO BE INSTALLED AND OPERATED SOON AFTER ARRIVAL STORE IT IN A CLEAN, DRY, WELL-VENTILATED PLACE, FREE FROM VIBRATION, MOISTURE, AND RAPID OR WIDE VARIATIONS IN TEMPERATURE. ROTATE THE SHAFT SEVERAL REVOLUTIONS BY HAND EVERY FORTNIGHT (TWO WEEKS) TO :

1. COAT THE BEARINGS WITH LUBRICANT.
2. RETARD OXIDATION OR CORROSION AND,
3. PREVENT POSSIBLE FALSE BRINELLING.

FOR OIL LUBE BEARINGS FILL THE RESERVOIR WITH OIL FOR STORAGE. DRAIN OIL TO THE PROPER LEVEL FOR START UP. ROTATE THE SHAFT PERIODICALLY, ALSO NOT TO EXCEED EVERY TWO WEEKS.

CONSIDER A UNIT IN STORAGE WHEN :

1. IT HAS BEEN DELIVERED TO THE JOB SITE AND IS AWAITING INSTALLATION.
2. IT HAS BEEN INSTALLED BUT OPERATION IS DELAYED PENDING COMPLETION OF PLANT CONSTRUCTION.
3. THERE ARE LONG (30 DAYS OR MORE) PERIODS BETWEEN OPERATION CYCLES.
4. THE PLANT (OR DEPARTMENT) IS SHUT DOWN.

NOTE : STORAGE REQUIREMENTS VARY DEPENDING ON THE LENGTH OF STORAGE, THE CLIMATE ENVIRONMENT AND THE EQUIPMENT. FOR STORAGE PERIODS OF THREE MONTHS OR LONGER, CONTACT THE MANUFACTURER FOR SPECIFIC INSTRUCTIONS. IMPROPER STORAGE COULD RESULT IN NON-WARRANTY COVERED RESTORATION REQUIREMENTS OR NON-WARRANTY COVERED PRODUCT FAILURES.

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## Flowmore Submersible Motor Sewage Pumps

### BRIEF DESCRIPTION :

Flowmore Submersible Motor Sewage pumps are manufactured to the highest standards. The rugged, Heavy-duty design and construction is integral part of the complete Submersible pump system.

The motor portion consists of a heavy-duty cast-iron/ cast-steel or M.S. fabricated frame hermetically sealed, heavy-duty long-life electric submersible squirrel-cage induction type motor with Class 'F' insulation and adequate service-factor for the duty with high efficiency, trouble-free construction.

The attached Cross-sectional view diagrammatically shows the various important components and general construction of the whole pump. The Electric Power and Control-cable assemblies are epoxy-sealed at the motor entry point to prevent wicking and to prevent moisture from entering the motor-housing.

The motor horse power exceeds the brake HP requirement of the head and capacity conditions. Special construction eliminates local heating of the motor. The robust one-piece shaft supporting the motor-rotor and the pump impeller rotates in three heavy-duty greased-for-life ball bearings, which take the radial and thrust loads. All the rotating components are dynamically balanced and the shaft additionally runs in a well proportioned and oil-lubricated Stabiliser-bush bearing to eliminate any vibration, which may result due to any imbalance caused by solids in the fluid being pumped. The motor has been designed for continuous duty rating.

### PUMP :

**Flowmore** Submersible Sewage pump has a two-vane non-clog type impeller. The construction is such that the mechanical seal is well protected against damage by sand or floating particles.

The ball bearings have been greased for life for about 40,000 hours and need no attention.

The pump is supplied with 10-meters of Power-cable and/or 10-meters of Auxiliary Control-cable, as standard. However, longer cable lengths can be furnished, which must be specified at the time of order. **The green wire is for ground. Be sure the**

**green wire is connected to a solid ground connection. The Auxiliary Control-cable is also number-coded.**

### POWER AND CONTROL CABLES :

Both the Power and Control-cable leads are double sealed as they enter the motor top plus epoxy-potting totally prevents any moisture leakage.

### MECHANICAL SEALS :

The pump is provided with two separate Heavy-duty tandem-mounted mechanical seals. The rotating surfaces of **both the seals run in oil** and a Patented **Seal-protector** uniquely protects any trash from reaching the sealing surfaces. **These special features ensure extra long-life for the seals.**

### ELECTRICAL CONTROL PANEL :

The **Flowmore Control Panel** is highly sophisticated and would give very reliable service for a long period ensuring extreme protection to the motor. **(Failure to properly connect the Panel or tampering with same would negate all Warrantees by Flowmore).**

### IMPORTANT :

**If Flowmore Electrical Controls are not used and the motor fails because of improper components or if various sensors/probes are not properly connected, the motor Guarantee becomes void.**

### GUIDE RAILS :

Flowmore Submersible Sewage pump is supplied with a **stool alternatively with Guide-rails for lowering the pump in the sump for automatic coupling to the discharge pipe.**

**FOR UTMOST PROTECTION OF THE ELECTRIC MOTOR, VARIOUS PROTECTION DEVICES PROVIDED ON FLOWMORE CONTROL PANELS FOR SUBMERSIBLE PUMPS.**

- Single phasing
- Seal leakage.

- Reverse rotation due to change in supply phase (Dual system).

This protection has been electronically provided in the Control Panel as well as Electro-mechanically within the motor, the lead from the same is included in the Control-cable, which is connected to the Control-Panel - The pump would never run in wrong direction.

- Under-voltage.
- Over-voltage.
- Over-current - for over-load protection.
- Bearings over-heat.
- Motor-windings over-heat.
- Dry-run of the pump - to trip the motor if the water level in the sump falls below the impeller submergence.
- Emergency **STOP** Button.
- LED light indicators have been provided on the Panel for each of the above protections to light-up in case of any fault which immediately identifies the location of fault, at the same time the motor trips, so that no damage is caused.
- Alarm Annunciation may also be provided if so desired.
- The Panel also has various indicating instruments for voltage, current etc., or as may be desired.
- **ALL PROTECTIONS PROVIDED ABOVE WILL REQUIRE MANUAL RE-SETTING ON THE PANEL, FOR RESTARTING THE MOTOR (AFTER REMOVING THE FAULT).**

## GENERAL INFORMATION AND INSTRUCTIONS

- **PACKING :**

When unpacking the unit, it should be checked for any damage and factory should be informed immediately and not later than one-week of receipt. At the same time, claim to be lodged with the Insurance Company, which has insured the equipment during transit.

- **PUMP IN STORAGE OR NOT OPERATING :**

Pumps with mechanical rotary seals must have the impeller manually rotated (6 revolutions)

every fortnight if the pump is not to operate for more than three-months. Preferably, if the pump is rotated manually more frequently, it would extend the life of the seals.

## INSTALLATION INSTRUCTIONS :

### INSTALLING PUMP IN SUMP

Before installing pump in sump lay it on side and turn impeller manually, which may be slightly stuck due to factory test water so it must be broken loose with small bar or screw driver in edge of vanes. The impeller should turn freely.

A Gate or Sluice valve in pump discharge-line is recommended.

### MAKING ELECTRICAL CONNECTIONS :

- Wiring diagrams are provided with Panel for making connections.
- The wire size to use from Panel to Sump depends on motor size and distance.
- Be sure each wire is checked out so that wrong connection to the Panel will not be made.

### POWER CABLE :

- All electrical wiring must be in accordance with local code, and only competent electrician should make the installation. All wires should be checked for Earth with an Ohmmeter or Megger after the connections are made. Insulation Resistance to ground (Earth) should not be less than 500,000 Ohms for each wire. This is important, as one grounded wire can cause considerable trouble.

- Connections are provided on the Terminal-strip.

### CONTROL CABLE :

Should be properly wired to the Panel as per Diagram. **Do not connect power to these lines at any time.**

### IMPORTANT :

**If equipment is not properly wired and protected as recommended, the motor guarantee is void.**

## OPERATION

### STARTING SYSTEM :

1. Turn Main-switch to off-position, then turn ON Main Circuit-breaker.
2. Check voltage in each phase to be proper.
3. Open all discharge valves and allow water to rise in pump.
4. Push **'START BUTTON** on **Starter-Panel**. IF THE starter **'TRIPS'**, the Rotation is **wrong**. If **pump is noisy and vibrates, rotation is wrong**. **Wrong direction of pump would also be indicated in the Control Panel and Starter would trip**. To change rotation, interchange any two line leads to motor on 3Ø. **DO NOT INTERCHANGE MAIN INCOMING LINES**.
5. **Check voltage when pumps are operating and check the current**. Check amps on each wire as sometimes a high lag will exist. **One leg can be somewhat higher 5 to 10% without causing trouble**. For excessive amp. drawn by one lead, stop pump.

## MAINTENANCE

- No attention is necessary as long as the pump shows satisfactory operation.
- The pump should be lifted once **every two years** and **the oil be drained** from the seal chamber to check for water.
- If the pump is used on a GUIDE-RAIL system it should be lifted **once every six months** and checked for corrosion and wear.
- **Generally these pumps give very reliable service and can be expected to operate for years on normal sewage pumping without failure**.

### SERVICING INSTRUCTIONS :

**IMPORTANT : Read all instructions before replacing any parts.**

**WARNING : Before handling these pumps and controls, always disconnect the power first.**

**Do not smoke or use sparkable electrical devices or flames in a septic (gaseous) or possible septic sump.**

### FIELD SERVICE ON MOTOR :

- Submersible Motors can be serviced (out of warranty) in the field by a **Factory-trained Service Technician**. **Any pump (in warranty) must be returned to the factory for service**. **Charges will not be allowed if (in warranty) pump is taken to a motor repair shop that is not an authorised Flowmore Service Center**.

When field service is performed on a pump these instructions should be carefully followed.

### TROUBLE CHECK LIST :

**WARNING : Before handling these pumps and controls, always disconnect the power first.**

**Do not smoke or use sparkable electrical devices or flames in a septic (gaseous) or possible septic sump.**

**Below is a list of common problems and the probable causes :**

### SEAL FAILURE :

A probe is installed in the Seal-chamber, so if any water enters the chamber through the first seal the probe will be energised and a signal will be transmitted to the sensing unit at ground surface causing the pump to trip. The seal should be checked immediately after the fault is indicated. **(failure to follow the instructions or to let the Control Panel be bye-passed or tampered with would negate all Warrantees by Flowmore**.

**Pump will not start and overload heaters trip.**

1. Turn off power and check motor leads with Megger or Ohmmeter for possible ground.

2. Check resistance of motor windings. All 3 phases should show the same reading.

3. If no ground exist and the motor windings check OK remove pump from sump and check for clogged or blocked impeller.

- **Pump does not deliver proper capacity**

1. Discharge Gate-valve may be partially closed or partially clogged.

2. Check-valve may be partially clogged.

3. Pump may be running in wrong direction. Low speed pumps can operate in reverse direction without much noise or vibration. It indicates fault in Control-Panel.

4. Discharge-head may be too high. **Check total head with gauge** when pump is operating. Gauge should be installed on pump side of all valves.

5. If pump has been in service for some time and capacity falls off, remove pump and check for wear or clogged impeller.

- **Motor stops and then restarts after short period but overload heaters in starter do not trip**

1. This indicates heat sensors in the motor-winding are tripping due to excessive heat. Impeller may be partially clogged giving a sustained overload but not high enough to trip overload heater switch.

2. Motor may be operating out of liquid due to a failed level control. All Flowmore Submersible motors can operate for extended periods out of water without burning up the winding but the heat sensors give motor prolonged life by controlling winding temperature.

3. Pump may be operating on a short cycle due to Sump being too small or from water returning to Sump due to a leaking Check-valve.

## **OTHER CAUSES FOR PUMP TRIPPING :**

Due to any of the conditions / faults that may show on Control - Panel by lighting up of LED Lamp, the pump would trip. After the fault is removed, RESET button is to be pressed, 'OUTPUT RELAY ENERGISED' should light up and the pump can be RESTARTED.

## **IMPORTANT**

- Thank you for purchasing your **FLOWMORE** pump. To help ensure years of trouble-free service, please read the manual carefully.

- *It is urged that for a fully successful **Installation** or for **Maintenance Service**, factory-trained Technicians be commissioned. **The cost of same would be worthwhile.***

- Your Flowmore Submersible Motor Sewage Pump has been manufactured to the highest standards however, it needs proper care.

- Do not try to run the pump if the voltage is not correct and not equal in all the 3-phases.

- In case of voltage imbalance or low voltage, the windings will get over-heated and Control Panel would stop the pump.

- Oil of proper quality has been filled in the Oil-Chamber. However, before commissioning the oil-level must be checked.

- See that no bolts or nuts have gone loose during transit.

- Control Panel of **Flowmore pump** is highly reliable and should not be tampered with.

- In case the system is tripping, the fault can be identified from the LED light on the Control Panel. The pump would not start again unless the fault has been removed and the Manual Relay has been **reset**.

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