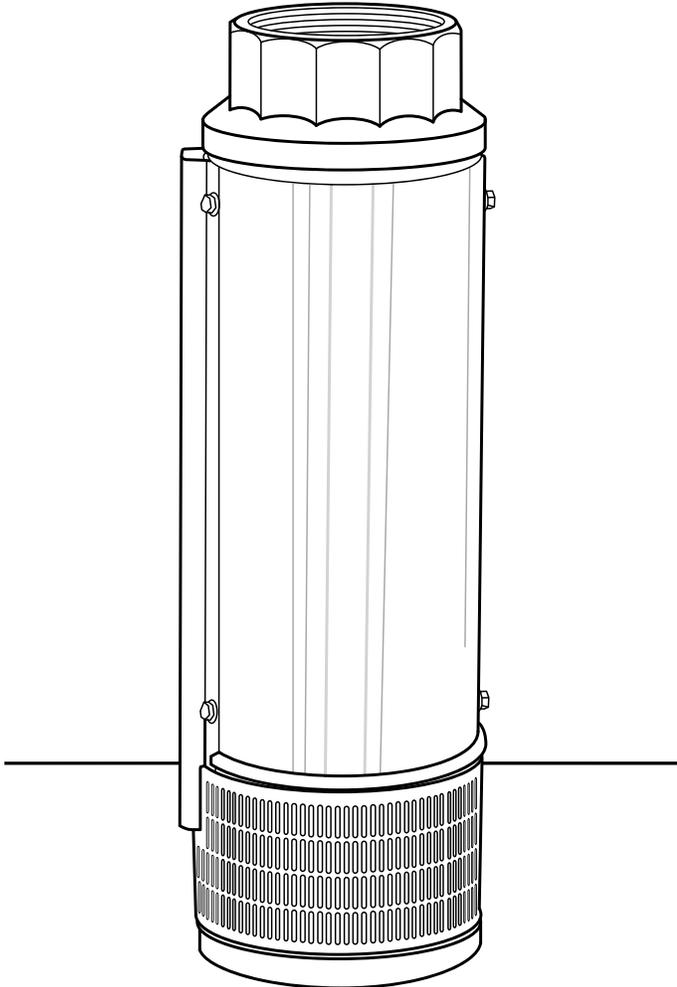




Franklin Electric

# 6" and 8" 50 Hz SUBMERSIBLE PUMPS OWNER'S MANUAL



**BEFORE INSTALLING PUMP, BE SURE TO READ THIS OWNER'S MANUAL CAREFULLY.**

## **INSPECT THE SHIPMENT**

Examine the pump when it is received to be sure there has been no damage in shipping. Should any be evident, report it immediately to the transportation company and ask to have it inspected. Check the pump and motor nameplate to ensure you have received the correct pump unit.

## **READ AND FOLLOW SAFETY INSTRUCTIONS**

 This is the safety alert symbol. When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury:

 **DANGER** warns about hazards that will cause serious personal injury, death or major property damage if ignored.

 **WARNING** warns about hazards that **can** cause serious personal injury, death or major property damage if ignored.

 **CAUTION** warns about hazards that **will** or **can** cause minor personal injury or major property damage if ignored.

The label **NOTICE** indicates special instructions, which are important but not related to hazards.

### **WARNING**



**Hazardous voltage. Can shock, burn, or cause death.**

Ground pump before connecting to power supply. Disconnect power before working on pump, motor or tank.

**Carefully read and follow all safety instructions in this manual and on pump.**

Keep safety labels in good condition.

Replace missing or damaged safety labels.

 **Wire motor for correct voltage. See "Electrical" section of this manual and motor nameplate.**

 **Ground motor before connecting to power supply.**

 **Meet with National, Local and/or Industry standard Electrical Code.**

 Follow wiring instructions in this manual when connecting motor to power lines.

## **CONTENTS**

Inspection-Receipt of Equipment.....	Sec. A
Equipment and Installation Record.....	Sec. B
General Information.....	Sec. C
Suitability of the Well .....	Sec. D
Installation-Site & Support Equipment.....	Sec. E
Electrical Installation.....	Sec. F
Pump Installation.....	Sec. G
Accessories with Installation.....	Sec. H
Operational Checkup.....	Sec. I
Troubleshooting.....	Sec. J

**A. INSPECTION-RECEIPT OF EQUIPMENT**

Examine equipment at the time of receipt. Check that the power cable is not cut or damaged, and that all equipment is correct for the installation. Handle the pump, cable and motor carefully. This is very important because of the precise alignment of the assembly and the vulnerability of the cable. Report any **damages** or **shortages** immediately to the freight carrier agent and make notes on the freight bill of lading. This will facilitate a satisfactory and prompt processing of a claim adjustment.

**B. EQUIPMENT INSTALLATION RECORD**

\*Record the following details at the time of the installation and retain for future references: RMA No. \_\_\_\_\_

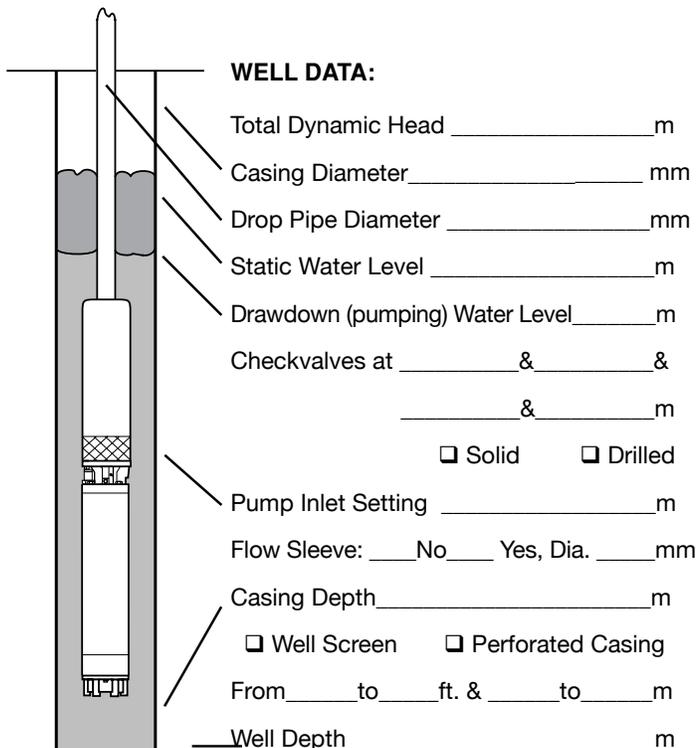
INSTALLER'S NAME \_\_\_\_\_ OWNER'S NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_ ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
 PHONE (\_\_\_\_) \_\_\_\_\_ FAX (\_\_\_\_) \_\_\_\_\_ PHONE (\_\_\_\_) \_\_\_\_\_ FAX (\_\_\_\_) \_\_\_\_\_  
 CONTACT NAME \_\_\_\_\_ CONTACT NAME \_\_\_\_\_  
 WELL NAME/ID \_\_\_\_\_ DATE INSTALLED \_\_\_\_\_ DATE FAILED \_\_\_\_\_  
 WATER TEMPERATURE \_\_\_\_\_ °C

**Motor:**

Motor No. \_\_\_\_\_ Date Code \_\_\_\_\_ KW \_\_\_\_\_ Voltage \_\_\_\_\_ Phase \_\_\_\_\_

**Pump:**

Manufacturer \_\_\_\_\_ Model No. \_\_\_\_\_ Curve No. \_\_\_\_\_ Rating: \_\_\_\_\_ l/m@ \_\_\_\_\_ m TDH  
 NPSH Required \_\_\_\_\_ m NPSH Available \_\_\_\_\_ m Actual Pump Delivery \_\_\_\_\_ l/m@ \_\_\_\_\_ PSI  
 Operating Cycle \_\_\_\_\_ ON (Min./Hr.) \_\_\_\_\_ OFF (Min./Hr.) (Circle Min. or Hr. as appropriate)  
 YOUR NAME \_\_\_\_\_ DATE \_\_\_\_/\_\_\_\_/\_\_\_\_

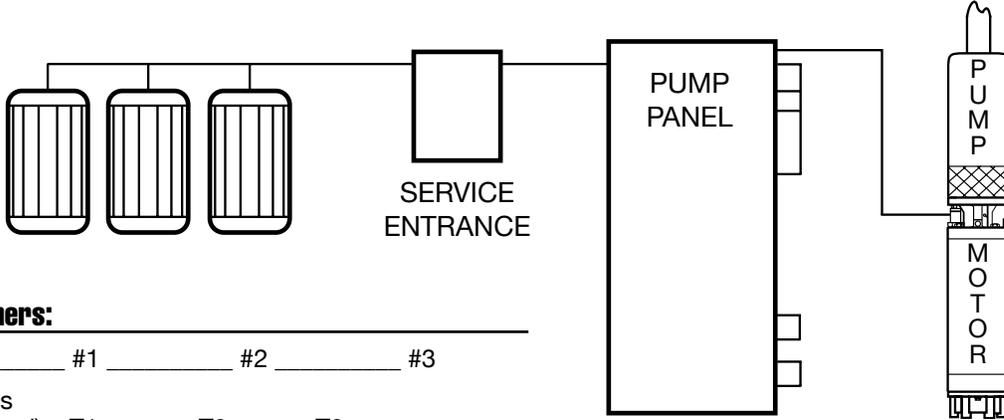


**TOP PLUMBING:**  
 Please sketch the plumbing after the well head (check valves, throttling valves, pressure tank, etc.) and indicate the setting of each device.

**Power Supply:**

Cable: Service Entrance to Control \_\_\_\_\_ m \_\_\_\_\_ mm<sup>2</sup>/MCM     Copper     Aluminum  
 Jacketed     Individual Conductors

Cable: Control to Motor \_\_\_\_\_ m \_\_\_\_\_ mm<sup>2</sup>/MCM     Copper     Aluminum  
 Jacketed     Individual Conductors



**Transformers:**

KVA \_\_\_\_\_ #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3

Initial Megs (motor & lead) T1 \_\_\_\_\_ T2 \_\_\_\_\_ T3 \_\_\_\_\_

Final Megs (motor, lead & cable) T1 \_\_\_\_\_ T2 \_\_\_\_\_ T3 \_\_\_\_\_

**Incoming Voltage:**

No Load L1-L2 \_\_\_\_\_ L2-L3 \_\_\_\_\_ L1-L3 \_\_\_\_\_  
 Full Load L1-L2 \_\_\_\_\_ L2-L3 \_\_\_\_\_ L1-L3 \_\_\_\_\_

**Running Amps:**

HOOKUP 1:  
 Full Load L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_  
 %Unbalance \_\_\_\_\_

HOOKUP 2:  
 Full Load L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_  
 %Unbalance \_\_\_\_\_

HOOKUP 3:  
 Full Load L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_  
 %Unbalance \_\_\_\_\_

Ground Wire Size \_\_\_\_\_ mm<sup>2</sup>/MCM  
 Motor Surge Protection  Yes  No

**CONTROL PANEL:**

Panel Manufacturer \_\_\_\_\_  
 Short Circuit Device  
 Circuit Breaker Rating \_\_\_\_\_ Setting \_\_\_\_\_  
 Fuses Rating \_\_\_\_\_ Type \_\_\_\_\_  
 Standard  Delay

Starter Manufacturer \_\_\_\_\_  
 Starter Size \_\_\_\_\_  
 \_\_\_Type of Starter  Full Voltage  Autotransformer  
 Other: \_\_\_\_\_ Full Voltage in \_\_\_\_\_ sec.

Heater Manufacturer \_\_\_\_\_  
 Number \_\_\_\_\_ Adjustable Set at \_\_\_\_\_ amps.

Subtrol-Plus  No  Yes Registration No. \_\_\_\_\_

If yes, Overload Set?  No  Yes Set at \_\_\_\_\_ amps.  
 Underload Set?  No  Yes Set at \_\_\_\_\_ amps.

Controls are Grounded to:  
 Well Head  Motor  Rod  Power Supply

**Variable Frequency Drives:**

Manufacturer \_\_\_\_\_ Model \_\_\_\_\_ Output Frequency: \_\_\_\_\_ Hz Min \_\_\_\_\_ Hz Max  
 Cooling Flow at Min. Freq. \_\_\_\_\_ Cooling Flow at Max. Freq. \_\_\_\_\_  
 Approved Overload:  Built-in \_\_\_\_\_  External Model: (per above)  Cables: (per above) Set Amps \_\_\_\_\_  
 Start Time \_\_\_\_\_ sec. Stop Mode  Coast \_\_\_\_\_ sec.  Ramp \_\_\_\_\_ sec.  
 Output filter \_\_\_\_\_  Reactor \_\_\_\_\_ % Make \_\_\_\_\_ Model \_\_\_\_\_  None

**Maximum Load Amps:**

Drive Meter Input Amps Line 1 \_\_\_\_\_ Line 2 \_\_\_\_\_ Line 3 \_\_\_\_\_  
 Drive Meter Output Amps Line 1 \_\_\_\_\_ Line 2 \_\_\_\_\_ Line 3 \_\_\_\_\_  
 Test Ammeter Output Amps Line 1 \_\_\_\_\_ Line 2 \_\_\_\_\_ Line 3 \_\_\_\_\_  
 Test Ammeter Make \_\_\_\_\_ Model \_\_\_\_\_

## **C. GENERAL INFORMATION**

The submersible pump unit comprises a submersible pump assembly directly-coupled to a submersible electric motor. The connecting bracket accommodates the coupling between the pump and motor shafts and also serves as the water intake passage.

The pump unit is suspended in the well by the riser pipe, and the electric power is taken down from the well head to the motor by the submersible cable which is secured at intervals to the riser pipe.

Please read the manufacturer's separate instruction manual for the motor, and keep it for future reference.

## **D. SUITABILITY OF THE WELL**

Submersible pumps as well as all water pumps, are designed to handle clean, cool, clear water. Water from an undeveloped well often contains excessive amounts of sand, dirt and other abrasives which can cause damage to the pump.

Install the pump in a well which has already been properly developed with a test pump.

The test pump also provides a means to match the capacity and setting of the pump to the yield of the well. If the pump removes water at a higher rate than the well produces, the drawdown will be excessive and this will cause the pump to cavitate, and result in damage to the pump or motor.

The well must be deep enough so that the pump suction is at least 3.01 m below the expected drawdown level.

The inside diameter of the well casing must be large enough to allow lowering the unit into the well without damage to the power cable and the splice between the power cable and the motor leads. Check that the well is large enough to allow installation of the pump at the required depth. Keep the pump at least 1.52 m from the bottom, particularly where there is a history of sand in the well. Do not install the pump below the lowest perforations in the well casing unless the well size permits the installation of a shroud over unit to ensure an adequate flow of water over the motor for cooling purposes.

The motor must always be immersed in flowing water.

**⚠ CAUTION** Do not install the unit with the motor resting on the bottom, or closer than five feet from the bottom of the well.

## **E. INSTALLATION**

### **SITE & SUPPORT EQUIPMENT**

Equipment & Material Required: The material and equipment necessary for the installation of the pump will vary with the pump size and type of installation. The following list of tools and supplies are offered as a guide.

Materials: Anti-galling lubricant, thread compound, lubricating oil, grease.

Tools & Instruments: Tripod with chain blocks, or rig with power hoist, pipe clamps, megger, pipe wrenches, and

mechanical tools.

Be sure that the equipment is strong enough to lift the total weight of the pump, riser pipe and water in the riser pipes.

### **FOUNDATION**

Construct a solid foundation which must be RIGID, LEVEL and of adequate STRENGTH to support the complete weight of the pump, motor, column, plus the weight of the water pumping through it without exceeding the permissible bearing pressure for the subsoil.

Support the riser pipe at the well head with a well seal, surface plate, or other adapter which seals the well in accordance with local regulations. Make provision for a conduit to carry the power cable into the well.

### **RISER PIPE**

Make up the riser pipe from random lengths of threaded and coupled pipe, and make arrangements to secure it at the well by a well seal, surface plate, or other adapter. Use riser pipe material that meets with national, local and/or industry standards.

Take great care to keep pipes clean and free from pebbles, scale, and thread chips. Tighten each joint securely. Make sound, airtight connections at all fittings.

### **CHECK VALVES**

Many pumps have a built-in or externally supplied check valve. For a pump without one, install a check valve immediately above the pump. Install an additional check valve above the ground. If the pump is more than 100 feet (30m) below the wellhead, install another check valve in the drop pipe 100 feet (30m) above it. For pump settings deeper than 200 feet (60m), install additional check valves at intervals of 100 feet (30m).

**⚠ CAUTION** Take care to prevent damage to the cable during installation.

## **F. ELECTRICAL INSTALLATION**

When the cable is supplied on a reel, support the reel on a piece of pipe laid across a pair of sturdy saw horses. Locate the reel about 1.83 m from the well so that the cable unwinds from the top.

Prevent the cable from scraping on the well casing and avoid pinching the cable either in the pipe clamps or between the riser pipe and well casing.

### **SPlicing POWER CABLE TO MOTOR LEADS**

A waterproof splice must be made to connect the power cable to the motor leads. An improperly made splice will become a service problem. There are different materials and methods that are used to make water tight cable splices. (see method #2 for note)

Method #1- Taped Splice

1. Remove 254 mm from the outer jackets of the jacketed cable, taking care not to damage the insulation of the individual conductors.
2. Trim the motor leads, so that the first wire is 76.70 mm shorter and the 2nd wire is 76.20 mm longer than the 3rd wire.

3. Trim the wires of the cable so that the 1st wire is 76 mm longer and the 2nd wire is 76 mm shorter than the 3rd one.
4. Strip 13 mm of insulation from the end of each wire and scrape the metal clean and thoroughly clean the surface with solvent to insure a watertight splice.
5. Join like-colored wires with connectors and secure connectors with staking pliers. Pull on wires to make sure the wires are firmly crimped.

Fill each connector with solder to insure sound mechanical and electrical joints.

6. Bind each connection with approved self-bonding rubber tape, with the first layer extending at least 50.8 mm over the insulation, and the second layer extending at least 50.8 mm beyond the first. Apply two layers of plastic insulating tape, each extending 50.8 mm beyond the previous one. Bind the three connectors together with one layer of approved self-bonding rubber tape, and two layers of approved electrical tape, all extending over the outer sheath if a jacketed cable is used.

#### Method #2- Resin Cast Splice

Consult national, local and/or industry standards for preferred splicing methods

1. To prepare the 3-conductor power cable for splicing, insert a sharp knife blade between the cable jacket and lead insulation and strip the jacket back 66 mm from the end. Strip the cambric wrapping (if any) from the conductors and strip back rubber insulation 15.2 mm from the end. Assemble the cable connectors and crimp them in place using a crimping tool.
2. Cut off motor leads to equal length. Clean the ends of the leads for about 308 mm, using denatured alcohol. Clean the end of the power cable also. Insert the three motor leads into corresponding holes in the bottom of the rubber casing and push them several inches out the top. Crimp the motor leads into corresponding connectors, crimping the center one first. Bend the cables into line with the holes in the casing up until the connectors are inside the holes about 6.35 mm from the top.
3. Mix the resin as directed. Cut off a corner of the bag and squeeze all of the resin into the casing. With the roll of tape on hand, fold the bag, and tape the top of the bag snugly to the power cable until the resin runs out over the top. This will assure maximum coverage of the resin and minimize the size of the finished splice. When the resin is firm to the touch, the splice may be immersed for testing.

#### REPAIR

Although cuts and abrasions may not puncture the cable insulation, repair them in the following manner.

Use denatured alcohol to clean the cable in the area of damage. Roughen the surface of the insulation with sandpaper and apply a coating of rubber cement to the prepared surface and let dry for 1/2 hour. Cut off a length of 19 mm wide vinyl plastic electrical tape 50.8 mm longer than the cut or abrasion, and lay it smoothly over the damage. Start binding the cable with the same tape 50.8 mm in front of the damage lapping

each wrap halfway over the previous one, until the binding extends 50.8 mm beyond the damage.

Wind the tape smoothly without wrinkles and avoid stretching it unduly. Add three more layers in a similar manner, each extending 50.8 mm beyond that beneath. Apply a coating of rubber cement over the repair as an additional bond and to improve the resistance to oil and solvents.

**⚠ WARNING** Ground the unit when testing, failure to ground properly can result in serious or fatal shock.

#### ELECTRICAL INSTALLATION & TESTS

Employ a competent electrician to do the wiring in accordance with local electrical codes. Conventional overhead or underground installation is satisfactory for the electrical power transmission to the well head.

Check that the power supply corresponds with that shown on the name plates of the motor and control box. **Note: every installation requires a fused disconnect switch or circuit breaker.**

A SINGLE-PHASE unit includes a control box incorporating overload relays, but requires a magnetic starter for automatic operation.

A THREE-PHASE unit requires a magnetic starter with three-leg protection having QUICK-TRIP Ambient compensated overload relays.

**Note: Warranty is void if incorrect overload relays are used.**

Mount the control equipment vertically on a post or wall, and protect it from direct sunlight and extremes of temperature. Make the connections to the control equipment in accordance with the wiring diagram to avoid damage to the motor.

#### PRELIMINARY ELECTRICAL TEST PUMP ABOVEGROUND

After splicing the motor leads to the power cable, use a 500-volt megohm meter (megger) to test the insulation. Connect the ground lead of the megger to the motor frame, and the line leads to the ends of the cable conductors. Check that the meter shows a value of at least 200 megaohms for a new motor and 10 megaohms for a used motor. Remove the megger and wet down the motor leads and power cable with a hose or bucket. Reconnect the megger and check the resistance again. Should the value be appreciably less than before, it indicates damaged insulation. Locate the damage either by visual inspection or by checking the resistance as each successive section of cable are immersed in water. If the cable is new, it is probably unnecessary to check it thoroughly from above the splice down to the motor.

#### G. PUMP INSTALLATION-PERFORMANCE

Should the cable get damaged, either cut out the defective length and splice the ends, or repair the damage, as described in the section on cable Repair(F).

#### INSTALLATION

Thread the first length of riser pipe into the pump

discharge and raise the pump and pipe into a vertical position over the well. Be careful not to drag the pump along the ground, or let it strike other objects getting it into place over the well.

Lower the pump about 3.01 m into the well and fasten the cable to the riser pipe to prevent tangling and damage. Use electrical tape for light cable and stainless steel bands for heavy cable.

Continue to add lengths in the same manner until the required pump setting is reached. Secure the cable to the riser pipe at regular intervals with tape or bands.

**⚠ CAUTION** Take great care to prevent damage to the cable during installation.

Use an Ohmmeter or megger to make continuity and insulation checks on the cable at intervals of 3.01 to 6.1 m as the pump is lowered. This will locate any fault in the cable.

Where a bleeder type air charging kit is used with a hydro pneumatic tank, install the tee and bleeder valve before adding the last length of riser pipe. This will place the bleeder valve about 6.1 m below the well head.

Place the sanitary well seal, surface plate, or other adapter on the last length of riser pipe and pass the submersible cable through the opening provided. Then attach the discharge tee or elbow to the riser pipe. Lower the riser pipe to its final position and tighten the well seal or other device to support the installation in the well.

As soon as the splice joint is submerged in the water, take a resistance reading between the power cable conductors and ground to assure that the insulation and the cable or the splice was not damaged during installation process.

#### INITIAL START-UP & PERFORMANCE CHECK

Make final continuity and insulation (0.5 megohms or higher) checks before connecting the cable to the control equipment. Check that the supply voltage is within 10% of the motor rating. Check all phases of a three-phase supply.

Check the pump and well performance before making the final connection to the discharge system.

1. Install a pressure gauge and gate valve on the end of the pipe. Close the valve.
2. Start the pump, check the pressure developed against the closed valve. If the pressure is substantially less than expected (don't forget to allow for the depth to the water level), the pump may be running backward. To change the rotation of a three phase motor, interchange any two leads.
3. Open the gate valve to give a low flow until you are certain that the well will not yield sand. Open the gate valve gradually to give full flow.
4. Use a hook-on ammeter to read the current, which should approximate the full-load current given on the motor nameplate, but must not exceed the service factor rating of the motor. The service factor varies with the make and the horsepower of the motor. Consult the factory if insufficient information is given about Service Factor performance. 50 Hz Submersible motors have a 1.0 service factor.

Check that the currents in the individual phases of a 3-phase system are approximately equal. Where there is considerable difference between them, change all 3 connections at the starter as shown below (so that rotation remains the same) to obtain the most consistent readings.

To determine current unbalance, subtract the average of the readings from the highest, and subtract the lowest of the readings from the average. The largest difference, expressed as a percent of the average must not exceed 10% at rated load or 5% at service factor load. Note that the highest reading must not exceed the maximum permissible for the motor.

#### EXAMPLE:

Phase 1	54.0 amp
Phase 2	55.0 amp
Phase 3	60.0 amp
Average:	56.3 amp
% Unbalance	$= (60 - 56.3 \times 100) / 56.3$ $= 3.7 \times 100 / 56.3 = 6.6\%$

**⚠ WARNING** Failure to ground the unit properly can result in serious or fatal shock. Refer to electrical code requirements.

Should the unbalance be excessive, ask the power company to improve the voltage balance between the incoming lines.

5. Use a voltmeter to check the voltage at the starter while the pump is running. The average must be within 10% of the motor rating, and the maximum variation of any phase of a 3-phase system from the average should not exceed 1%.

6. Continue to run the pump until the drawdown of the water in the well becomes stable. Should the water level drop to the pump intake to admit air, use one or more of the following methods to protect installation.

- (a) Install additional riser pipe to place pump lower in the well if possible.
- (b) Use a cock valve in the discharge line to throttle the pump output to suit the yield of the well.
- (c) Install FLOATLESS LIQUID LEVEL CONTROL.
- (d) Use a pressure switch with a low water protection or a separate low-water cutout switch. Neither of these devices give as reliable protection as a floatless liquid level control and both require careful application.
- (e) Replace the pump with smaller unit to avoid over pumping the well.

**⚠ CAUTION** Never run the pump unless it is completely submerged in water.

Damage can occur to both pump and motor. In addition, air drawn into the pump can cause air-lock.

## H. ACCESSORIES WITH INSTALLATION

### LIGHTNING ARRESTERS

Install lightning arresters to protect the motor from the effects of electrical storms. Although they will not give protection against direct strikes they will ground the surges caused in transmission lines by surrounding storms.

Install arrester in accordance with the manufacturers separate instructions, either in the control box on some single-phase systems, or in the supply line immediately ahead of the control equipment. Pay particular attention to the ground connection. **DO NOT USE GROUND ROD.** Use the best ground on the premises, which is usually the metal riser pipe from the pump or other metal water pipe.

### RELIEF VALVE

Always install a relief valve if the pump is capable of developing pressures in the discharge system greater than the pressure ratings of individual components. The relief valve must be large enough to handle the pump output at the relief pressure.

### FLOATLESS LIQUID LEVEL CONTROL

The sensing elements of a floatless liquid level control consists of 2 electrodes suspended in the well by insulated wires. These wires connect to a relay which serves as a pilot switch to the starting equipment. The lower electrode is set just above the pump, and the upper at some distance below the static water level. The device cuts off power to the pump automatically when the water level drops below the lower electrode, and does not restore power until the water level recovers to reach the upper electrode. The Liquid Level Control can also be used as a pilot switch in connection with elevated tanks.

## I. OPERATIONAL CHECKUP

The most reliable indication of the condition of a submersible pump are:

- Current drawn by the motor.
- Insulation resistance of the installation below ground.

As the pump wears, the motor current increases, until eventually the overloads trip to protect the motor. While this automatic protection looks after an emergency situation, proper care of a submersible installation should include periodic check-ups to avoid interruptions in the water supply. Use a megger to check the insulation resistance every six months.

Record the insulation resistance and the running current for future reference. When the insulation resistance falls below 10 megohms, check it frequently for further deterioration and pull the pump when the resistance falls to 1/2 megohm.

When pulling the pump, either coil the cable on a reel or raise it from the ground to dry. Check the insulation again when the cable and splices are dry. If the insulation value between the line and motor casing increases to 50 megohms or more, isolate the fault in the cable or the splice and make the necessary repairs. However, if the

insulation reading remains low, disconnect the motor from the cable and check the motor separately. Should the motor be defective, check the pump end for wear and obtain a replacement for either the motor alone, or the pump unit, as necessary.

**⚠ WARNING Hazardous voltage, can shock, burn or kill you.**

## J. TROUBLESHOOTING

- Disconnect power unless required for testing.
- Have electrical testing done by a qualified electrician.
- Most problems occur above ground. Remove pump only as a last resort.

When troubleshooting or servicing the pump, use all precautions for the voltages involved.

Problem	Possible Cause	Remedy
Unit fails to start	1. Electrical trouble 2. Pump sandlocked	1. Check power source, start and reset. Check resistance, cable and motor. Call dealer or electrician. 2. Pull pump and clean. Call dealer.
Pump fails to deliver water	1. Insufficient well yield, water level has dropped. 2. Clogged intake screen. 3. Air lock in pump. 4. Leak in discharge.	1. Reset pump lower into well. Restrict flow to yield. 2. Pull pump. 3. Start and stop pump several times, allowing 1 min. between starts. 4. Raise pipe until leak is found.
Reduced pump output	1. Screen or pump partly plugged. 2. Insufficient well yield. 3. Worn pump due to abrasives. 4. Low voltage. 5. Three-phase unit running backward.	1. Pull pump and clean. 2. Check water level, lower pump is permissible. 3. Replace worn parts. 4. Call electrician. 5. Reverse rotation.
Overload trips	1. Worn pump or pump bound by sand. 2. Electrical troubles.	1. Pull pump and clean or replace worn parts. 2. Call dealer or electrician.
Unit cycles too frequently	1. Pressure switch out of adjustment. 2. Leaks in service line. 3. Check valve leaking. 4. Water logged tank.	1. Readjust to correct setting or replace. 2. Locate and correct. 3. Replace. 4. Check tank for leaks. Be sure fittings are functioning properly.

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