L.Nemitsas Ltd - Head Office
P.O.Box 54436
3724 Limassol, Cyprus
Tel: +357 25569225 & 25569226
Fax: +357 25 396955

L.Nemitsas Ltd - Nicosia Branch
F.Tsigaridi 19 Str.
2235, Latsia - Nicosia
Tel: +357-22467366
Fax: +357-22467372

E-mail: info@nemitsas.eu
URL: www.nemitsas.eu

SUBMERSIBLE ELECTROPUMPS
50 HZ

NEMITSAS LTD
Development, Manufacture, Sales of Pumping Equipment & Mechanical systems.
Agents and distributors of Machinery and Engineering products.
Since 1913

4'', 6'' & 8''
SUBMERSIBLE PUMPS

Installation and Operating Instructions

ISO 9001
Cert. No. QS.1.09.018

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E-mail: info@nemitsas.eu • Url: www.nemitsas.eu

Before beginning installation, the following checks should be made. They are all critical for the proper installation of this submersible pump.

A. Condition of the well.

If the pump is to be installed in a new well, the well should be fully developed and bailed or blown free of cuttings and sand. The stainless steel construction of the submersible makes it resistant to abrasion; however, no pump, made of any material, can forever withstand the destructive wear that occurs when constantly pumping sandy water.

If this pump is used to replace an oil-filled submersible or oil-lubricated line-shaft turbine in an existing well, **the well must be blown or bailed clear of oil.**

Determine the maximum depth of the well, and the draw-down level at the pump's maximum capacity. Pump selection and setting depth should be based on this data.

The inside diameter of the well casing should be checked to ensure that it is not smaller than the size of the pump and motor.

B. Condition of the water.

Submersible pumps are designed for pumping clear and cold water that is free of air and gases. Decreased pump performance and life expectancy can occur if the water is not cold and clear or contains air and gasses.

Maximum water temperature should not exceed 102°F. Special consideration must be given to the pump and motor if it is to be used to pump water above 102°F.

The stainless steel submersible is highly resistant to the normal corrosive environment found in some water wells. If water well tests determine the water has an excessive or unusual corrosive quality, or exceeds 102°F, contact your Nemitsas representative for information concerning specially designed pumps for these applications.

C. Installation Depth.

A check should be made to ensure that the installation depth of the pump will always be at least (5) five to (10) ten feet below the maximum draw-down level of the well. For flow rates exceeding 100 gpm, refer to performance curves for recommended minimum submergence.
The bottom of the motor should never be installed lower than the top of the well screen or within five feet of the well bottom.
If the pump is to be installed in a lake, pond, tank or large diameter well, the water velocity passing over the motor must be sufficient to ensure proper motor cooling.

D. Electrical Supply .

The motor voltage, phase and frequency indicated on the motor nameplate should be checked against the actual electrical supply.

The wire cable used between the pump and control box or panel should be approved for submersible pump applications. The conductor may be solid or stranded. The cable may consist of individually insulated conductors twisted together, insulated conductors molded side by side in one flat cable or insulated conductors with a round overall jacket.

The conductor insulation should be type RW, RUW, TW, TWU or equivalent and must be suitable for use with submersible pumps. An equivalent Canadian Standards Association certified wire may also be used. See Table D for recommended sizes of cable lengths.

A good cable splice is critical to proper operation of the submersible pump and must be done with extreme care.

If the splice is carefully made, it will work as well as any other portion of the cable, and will be completely watertight. Grundfos recommends using a heat shrink splice kit. The splice should be made in accordance with the kit manufacture's instructions. Typically a heat shrink splice can be made as follows:

1. Examine the motor cable and the drop cable carefully for damage.
2. Cut the motor leads off in a staggered manner. Cut the ends of the drop cable so that the ends match up with the motor leads (See Figure 4-A). On single-phase motors, be sure to match the colors.
3. Strip back and trim off 1/2 inch of insulation from each lead, making sure to scrape the wire bare to obtain a good connection. Be careful not to damage the copper conductor when stripping off the insulation.
4. Slide the heat shrink tubing on to each lead. Insert a properly sized "Sta-kon" type connector on each lead, making sure that lead colors are matched. Using a "Sta-kon" crimping pliers, indent the lugs (Figure 4-B). Be sure to squeeze hard on the pliers, particularly when using large cable.
5. Center the heat shrink tubing over the connector. Using a propane torch, lighter, or electric heat gun, uniformly heat the tubing starting first in the center working towards the ends (Figure 4-C).
6. Continue to apply the heat to the tubing using care not to let the flame directly contact the tubing. When the tubing shrinks and the sealant flows from the ends of the tubing, the splice is complete (Figure 4-D).

FIGURE 4-A

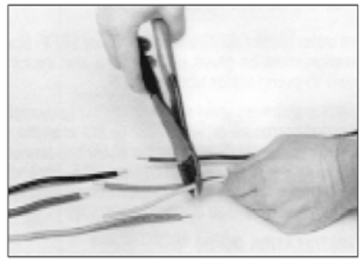


FIGURE 4-B

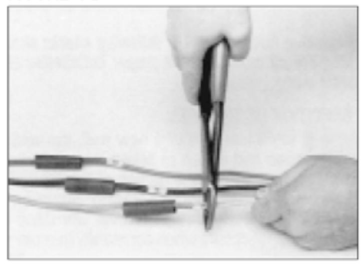


FIGURE 4-C

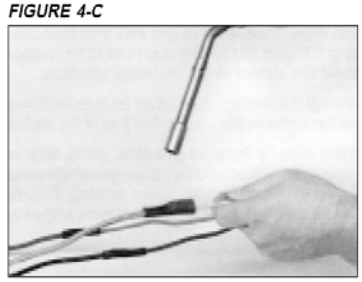
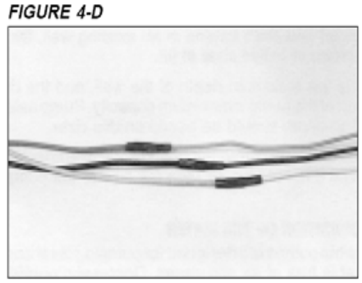


FIGURE 4-D



Installation.

Do not connect the first plastic or flexible riser section directly to the pump. Always attached a metallic nipple or adapter into the discharge chamber of the pump. When tightened, the threaded end of the nipple or adapter must not come in contact with the check valve retainer in the discharge chamber of the pump. The drop cable should be secured to the riser pipe at frequent intervals to prevent sagging, looping and possible cable damage. Nylon cable clips or waterproof tape may be used. The cable splice should be protected by securing it with clips or tape just above each joint.

IMPORTANT – Plastic and flexible pipe tend to stretch under load. This stretching must be taken into account when securing the cable to the riser pipe. Leave 3 to 4 inches of slack between clips or taped points to allow for this stretching. This tendency for plastic and flexible pipe to stretch will also affect the calculation of the pump setting depth. As a general rule, you can estimate that plastic pipe will stretch to approximately 2% of its length. For example, if you installed 200 feet of plastic riser pipe, the pump may actually be down 204 feet. If the depth setting is critical, check with the manufacturer of the pipe to determine who to compensate for pipe stretch.

When plastic riser pipe is used, it is recommended that a safety cable be attached to the pump to lower and raise it.

Check valves:

A check valve should always be installed at the surface of the well. In addition, for installations deeper than 200 feet, check valves should be installed at no more than 200 foot intervals.

Protect the well from contamination:

To protect against surface water entering the well and contaminating the water source, the well should be finished off above grade, and a locally approved well seal or pitless adapter unit utilized.

Electrical.

WARNING: To reduce the risk of electrical shock during operation of this pump requires the provision of acceptable grounding. If the means of connection to the supply connected box is other than grounded metal conduit, ground the pump back to the service by connecting a copper conductor, at least the size of the circuit supplying the pump, to the grounding screw provided within the wiring compartment.

All electrical work should be performed by a qualified electrician in accordance with the latest edition of the National Electrical Code, local codes and regulations.
Verification of the electrical supply should be made to ensure the voltage, phase and frequency match that of the motor. Motor voltage, phase, frequency and full-load current information can be found on the nameplate attached to the motor.

If voltage variations are larger than ± 10%, do not operate the pump.

Direct on-line starting is used due to the extremely fast run-up time of the motor (0.1 second maximum), and the low moment of inertia of the pump and motor. Direct on-line starting current (locked rotor amp) is between 4 and 6.5 times the full-load current. If direct on-line starting is not acceptable and reduced starting current is required, an autotransformer or resistant starters should be used for 5 to 30 HP motors (depending on cable length). For motors over 30 HP, use auto-transformer starters.

Engine-Driven Generators

If the submersible pump is going to be operated using an engine driven generator, we suggest the manufacturer of the generator be contracted to ensure the proper generator is selected and used. See Table B for generator sizing guide.

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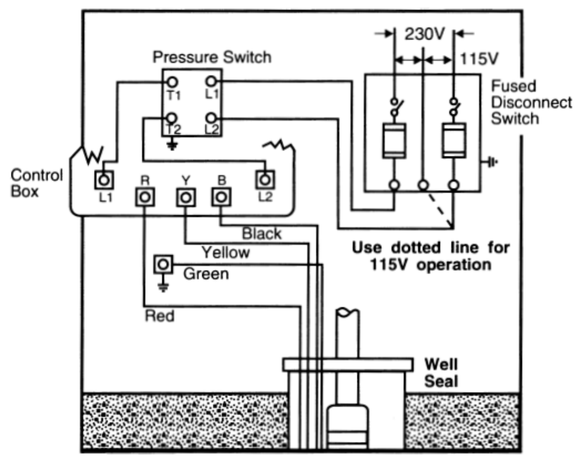
Control Box/Panel Wiring

1. Single-Phase Motors:

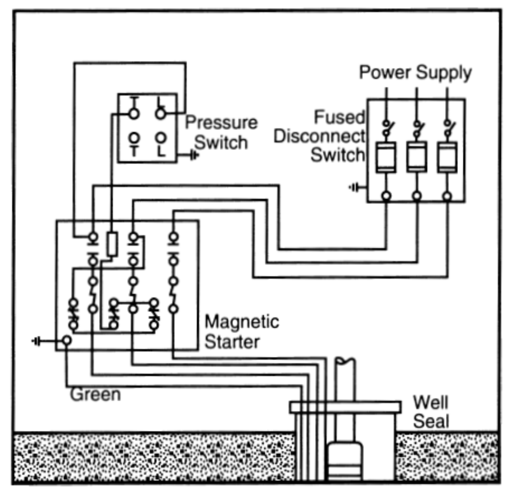
Single-phase motors must be connected as indicated in the motor control box. A typical single-phase wiring diagram using a control box is shown



Single-Phase Wiring Diagram

2. Three-Phase Motors:

Three-phase motors must be used with the proper size and type of motor starter to ensure the motor is protected against damage from low voltage, phase failure, current unbalance and overload current. A properly sized starter with ambient-compensated extra quick-trip overloads must be used to give the best possible motor winding protection. **Each of the three motor legs must be protected with overloads.** The thermal overloads must trip in less than 10 seconds at locked rotor (starting) current. A three-phase motor wiring diagram is illustrated below



Three-Phase Wiring Diagram

Pumps should NEVER be started to check rotation unless the pump is totally submerged. Severe damage may be caused to the pump and motor if they are run dry.

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Control Box/Panel Grounding

The control box or panel shall be permanently grounded in accordance with the National Electrical Code and local codes or regulations. The ground wire should be a bare copper conductor at least the same size as the drop cable wire size. The ground wire should be run as short a distance as possible and be securely fastened to a true grounding point.
True grounding points are considered to be: a grounding rod driven into the water strata, steel well casing submerged into the water lower than the pump setting level, and steel discharge pipes without insulating couplings. If plastic discharge pipe and well casing are used or if a grounding wire is required by local codes, a properly sized bare copper wire should be connected to a stud on the motor and run to the control panel. Do not ground to a gas supply line. Connect the grounding wire to the ground point first and then to the terminal in the control box or panel.

Start-Up

After the pump has been set into the well and the wiring connections have been made, the following procedures should be performed:
A. Attach a temporary horizontal length of pipe with installed gate valve to the riser pipe.
B. Adjust the gate valve one-third of the way open.
C. On three-phase units, check direction of rotation and current unbalance according to the instructions below. For single-phase units proceed directly to "Developing the Well."
D. Under no circumstances should the pump be operated for any prolonged period of time with the discharge valve closed. This can result in motor and pump damage due to overheating. A properly sized relief valve should be installed at the well head to prevent the pump from running against a closed valve.

Three-Phase Motors

1. Check the direction of rotation

Three-phase motors can run in either direction depending on how they are connected to the power supply. When the three cable leads are first connected to the power supply, there is a 50% chance that the motor will run in the proper direction. To make sure the motor is running in the proper direction, carefully follow the procedures below:

A. Start the pump and check the water quantity and pressure developed.
B. Stop the pump and interchange any two leads.
C. Start the pump and again check the water quantity and pressure.
D. Compare the results observed. The wire connection which gave the highest pressure and largest water quantity is the correct connection.

2. Check for current unbalance

Current unbalance causes the motor to have reduced starting torque, overload tripping, excessive vibration and poor performance which can result in early motor failure. It is very important that current unbalance be checked in all three-phase systems. **Current unbalance between the legs should not exceed 5% under normal operating conditions.**

The supply power service should be verified to see if it is a two or three transformer system. If two transformers are present, the system is an “open” delta or wye. If three transformers are present, the system is true three-phase.

Make sure the transformer rating in kilovolt amps (KVA) is sufficient for the motor load.

The percentage of current unbalance can be calculated by using the following formulas and procedures:

$$\text{Average current} = \frac{\text{Total of current values measured on each leg}}{3}$$

$$\text{\% Current unbalance} = \frac{\text{Greatest amp difference from the average}}{\text{average current}} \times 100$$

To determine the percentage of current unbalance:

A. Measure and record current readings in amps for each leg (hookup 1). Disconnect power.

B. Shift or roll the motor leads from left to right so the drop cable lead that was on terminal 1 is now on 2, lead on 2 is now on 3, and lead on 3 is now on 1 (hookup 2). Rolling the motor leads in this manner will not reverse the motor rotation. Start the pump, measure and record current reading on each leg. Disconnect power.

C. Again shift drop cable leads from left to right so the lead on terminal 1 goes to 2, 2 to 3 and 3 to 1 (hookup 3). Start pump, measure and record current reading on each leg. Disconnect power.

D. Add the values for each hookup.

E. Divide the total by 3 to obtain the average.

F. Compare each single leg reading from the average to obtain the greatest amp difference from the average.

G. Divide this difference by the average to obtain the percentage of unbalance. Use the wiring hookup which provides the lowest percentage of unbalance.

Developing the Well

After proper rotation and current unbalance have been checked, start the pump and let it operate until the water runs clear of sand, silt and other impurities. Slowly open the valve in small increments as the water clears until the desired flow rate is reached. Do not operate the pump beyond its maximum flow rating. **The pump should not be stopped until the water runs clear.**

If the water is clean and clear when the pump is first started, the valve should still be **slowly opened until the desired flow rate is reached.** As the valve is being opened, the drawdown should be checked to ensure the pump is always submerged. **The dynamic water level should always be more than 3 feet above the inlet strainer of the pump.**

Disconnect the temporary piping arrangements and complete the final piping connections.

Under no circumstances should the pump be operated for any prolonged period of time with the discharge valve closed. This can result in motor and pump damage due to overheating. A properly sized relief valve should be installed at the well head to prevent the pump from running against a closed valve.

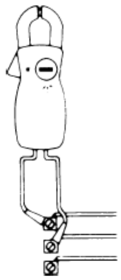
Start the pump and test the system. Check and record the voltage and current draw on each motor lead.

Operation

1. The pump and system should be periodically checked for water quantity, pressure, drawdown, periods of cycling and operation of controls.

Preliminary Tests

SUPPLY VOLTAGE



How to Measure

By means of a voltmeter, which has been set to the proper scale, measure the voltage at the control box or starter.

On single-phase units, measure between line and neutral.

On three-phase units, measure between the legs (phases).

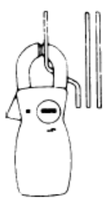
What it Means

When the motor is under load, the voltage should be within ± 10% of the nameplate voltage. Larger voltage variation may cause winding damage.

Large variations in the voltage indicate a poor electrical supply and the pump should not be operated until these variations have been corrected.

If the voltage constantly remains high or low, the motor should be changed to the correct supply voltage.

CURRENT MEASUREMENT



How to Measure

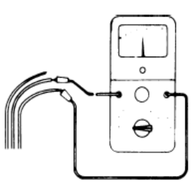
By use of an ammeter, set on the proper scale, measure the current on each power lead at the control box or starter. Current should be measured when the pump is operating at a constant discharge pressure with the motor fully loaded.

What it Means

If the amp draw exceeds the listed service factor amps (SFA) or if the current unbalance is greater than 5% between each leg on three-phase units, check for the following:

1. Burnt contacts on motor starter.
2. Loose terminals in starter or control box or possible cable defect. Check winding and insulation resistances.
3. Supply voltage too high or low.
4. Motor windings are shorted.
5. Pump is damaged, causing a motor overload.

WINDING RESISTANCE



How to Measure

Turn off power and disconnect the drop cable leads in the control box or starter. Using an ohmmeter, set the scale selectors to Rx1 for values under 10 ohms and Rx10 for values over 10 ohms.

Zero-adjust the meter and measure the resistance between leads. Record the values.

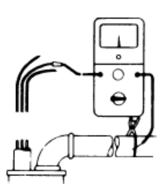
What it Means

If all the ohm values are normal, and the cable colors correct, the windings are not damaged.

If any one ohm value is less than normal, the motor may be shorted.

If any one ohm value is greater than normal, there is a poor cable connection or joint. The windings or cable may also be open.

INSULATION RESISTANCE



How to Measure

Turn off power and disconnect the drop cable leads in the control box or starter. Using an ohm or mega ohmmeter, set the scale selector to Rx 100K and zero-adjust the meter.

Measure the resistance between the lead and ground (discharge pipe or well casing, if steel).

What it Means

For ohm values, refer to table below. Motors of all HP, voltage, phase and cycle duties have the same value of insulation resistance.

OHM VALUE	MEGAOHM VALUE	CONDITION OF MOTOR AND LEADS
		Motor not yet installed:
2,000,000 (or more)	2.0	New Motor.
1,000,000 (or more)	1.0	Used motor which can be reinstalled in the well.
		Motor in well (Ohm readings are for drop cable plus motor):
500,000 - 1,000,000	0.5 - 1.0	A motor in reasonably good condition.
20,000 - 500,000	0.02 - 0.5	A motor which may have been damaged by lightning or with damaged leads. Do not pull the pump for this reason.
10,000 - 20,000	0.01 - 0.02	A motor which definitely has been damaged or with damaged cable. The pump should be pulled and repairs made to the cable or the motor replaced. The motor will still operate, but probably not for long.
less than 10,000	0 - 0.01	A motor which has failed or with completely destroyed cable insulation. The pump must be pulled and the cable repaired or the motor replaced. The motor will not run in this condition.

Total Resistance of Drop Cable (OHMS)

The values shown in this table are for copper conductors. Values are for the total resistance of drop cable from the control box to the motor and back.
To determine the resistance:
1. Disconnect the drop cable leads from the control box or panel.
2. Record the size and length of drop cable.
3. Determine the cable resistance from the table.
4. Add drop cable resistance to motor resistance.
5. Measure the resistance between each drop cable lead using an ohmmeter.
Meter should be set on Rx1 and zero-balanced for this measurement.
6. The measured values should be approximately equal to the calculated values.

Troubleshooting Tips - Submersible Pumps

Fuse overload or circuit breaker trips when motor is started

CAUSE OF TROUBLE	HOW TO CHECK	HOW TO CORRECT
1. Incorrect line voltage	Check the line voltage terminals in the control box (or connection box) with a voltmeter. Make sure the voltage is within the min/max range prescribed by the manufacturer.	If the voltage is incorrect, contact the power company to have it corrected.
2. Defective control box:		
a. Defective wiring	Check all motor and power-line wiring in the control box, following the wiring diagram inside the box. See that all connections are tight and no short circuits exist due to worn insulation, crossed wires, etc.	Rewire any incorrect circuits. Tighten loose connections. Replace worn wires.
b. Incorrect components	Check all control box components to see that they are the type and size specified for the pump in the manufacturer's literature. In previous service work the wrong components may have been installed.	Replace any incorrect component with the size and type recommended by the manufacturer.
c. Defective starting capacitor (skip for 2-wire models)	Using an ohmmeter, X1000 scale, determine the resistance across the disconnected starting capacitor. When contact is made, the ohmmeter needle should jump toward 0, and then drift back slowly towards infinity. No movement indicates an open capacitor, low resistance means the capacitor is shorted.	Replace defective starting capacitor
d. Defective relay (skip for 2-wire models)	Using an ohmmeter, check the relay coil and contacts. Their resistance should be as shown in the manufacturer's literature.	If coil resistance is incorrect or the contacts are defective, replace the relay.
3. Incorrectly wired pressure switch	Check the wiring at the pressure switch	Make sure all line, load and ground connections in the switch match the diagram.
4. Defective motor winding or cable:		
a. Shortened or open motor winding	Check the resistance of the motor winding by using an ohmmeter on the proper terminals in the control box (see manufacturer's wiring diagram). The resistance should match the ohms specified in the data sheet. If it's too low the motor winding may be shorted. If the ohmmeter needle doesn't move, indicating high or infinite resistance, there is an open	If the motor winding is defective - shorted or open, the pump must be pulled and the motor should be repaired.

	circuit in the motor winding or cable.	
b. Grounded cable or winding	Ground one lead of the ohmmeter onto the drop pipe or well casing, then touch the other lead to each motor wire terminal. If the ohmmeter moves appreciably when this is done, there is a ground in either the cable or the motor winding.	Pull the pump and inspect the cable for damage. Replace damaged cable. If cable checks OK, the motor winding is grounded.
5. Pump locked	Check the line amps before the trip. If amps are twice normal, or higher, the pump is probably locked.	Pull pump, disassemble from motor and check which one is locked. Replace one or both if defective.

Pump operates but delivers too little or no water

CAUSE OF TROUBLE	HOW TO CHECK	HOW TO CORRECT
1. Pump may be air locked	Stop and start the pump several times, waiting about one minute between cycles. If the pump resumes it's normal delivery, air lock was the trouble.	If this test fails to correct the trouble proceed as below.
2. Water level in the well is too low	Well production may be too low for the pump capacity. Restrict the low of pump output, then wait for the well to recover, and start pump.	If partial restriction corrects trouble, leave valve or cock at the restricted setting. Otherwise lower pump in well if depth is sufficient. Do not lower if sand clogging might occur.
3. Discharge line check valve installed backwards.	Examine check valve on the discharge line to make sure that the arrow indicating direction of flow points in the right direction.	Reverse the valve if necessary.
4. Leak in drop pipe	Raise the pipe and examine for leaks.	Replace the damaged section of drop pipe.
5. Pump check valve jammed by drop pipe	When pump is pulled after completing Step 4 above, examine connection of drop pipe to pump outlet. If the threaded section of drop pipe has been screwed in too far, it may be jamming the pump's check valve in the closed position.	Unscrew the drop pipe and cut off the portion of threads.
6. Pump intake screen blocked	The intake screen on the pump may be blocked by sand or mud. Examine the screen.	Clean the screen and when reinstalling the pump, make sure it is located several feet above the well bottom - preferably 10 feet or more.
7. Pump parts are worn	Abrasives in the water may result in excessive wear on the impeller, casing and other close-clearance parts. Before pulling the pump, reduce setting on the pressure switch to see if the pump shuts off. If it does, worn parts are probably at fault.	Pull the pump and replace the worn components.
8. Motor shaft uncoupled	Coupling between motor and pump shaft may have worn out or worked loose. Inspect for this after pulling the pump and looking for worn components, as in Step 7 above.	Tighten all connections, setscrews, etc. Replace parts if worn out.

Pump starts too frequently

CAUSE OF TROUBLE	HOW TO CHECK	HOW TO CORRECT
1. Pressure switch defective or out of adjustment	Check the setting on the pressure switch and examine for defects.	Adjust the pressure setting or replace switch.
2. Leak in pressure tank above water level	For discharge or bladder captive air tanks, drain the tank and check the pre-charge pressure. It should be equal to or 2 psig below pump cut-in pressure. If lower, check welds, braze joints, mechanical joints and valve core with a soap solution. DO NOT ATTEMPT TO REPAIR BY WELDING.	Replace tank
3. Leak in plumbing system	Examine the service line to the house and distribution branches for leaks.	Repair leaks
4. Discharge line check valve leaking	Remove and examine.	Replace if defective
5. Air volume control plugged	Remove and inspect the air volume control.	Clean or replace
6. Snifter valve plugged	Remove and inspect the snifter valve.	Clean or replace
7. Captive air tank has lost charge	Check tank.	Recharge or replace tank

Fuse, overload or circuit breaker trips when pump motor is running

CAUSE OF TROUBLE	HOW TO CHECK	HOW TO CORRECT
1. Incorrect voltage	Check the line voltage terminals in the control box or connection box in the case of 2 wire models, with a voltmeter. Make sure the voltage is within the min-max range prescribed by the manufacturer.	If the voltage is incorrect, contact the power company for service.
2. Overheated control or starter	If sunlight or other sources of heat makes the box too hot, overload may trip and fuses may blow. If the box is hot to the touch, this may be the problem.	Ventilate or shade the box, or remove it from the source of heat.
3. Defective control box components (skip this for 2 wire models)	Using an ohmmeter, X1000 scale, determine the resistance across the disconnected running capacitor. When contact is made the ohmmeter needle should jump toward 0, and then drift back towards infinity. No movement indicates an open capacitor; low resistance means the capacitor is shortened. Using an ohmmeter, check the relay coil, its resistance should be shown in the manufacturer's literature. Check amps in red motor lead with the motor running. If amps are much higher than the manufacturer specifies, the start relay contacts are failing to open. If amps are lower, the run capacitor is defective or the motor is overloaded.	Replace defective components

4. Defective motor winding or cable	Check resistance of the motor winding by using an ohmmeter on the proper terminals in the control box. See the manufacturer's wiring diagram. The resistance should match the ohms specified in the manufacturer's data sheet. If too low the motor winding may be shorted. If the ohmmeter needle doesn't move, indicating high or infinite resistance, there is an open circuit in the motor winding. Ground one lead of the ohmmeter onto the drop line or well casing, then touch the other lead to each motor wire terminal. If the ohmmeter needle moves appreciably when this is done, there is a ground in either the cable or the motor winding.	If neither cable or winding is defective, shorted, grounded or open, the well pump must be pulled and serviced.
5. Pump is overloading	If the fuses blow or overloads trip while the well pump is operating, check line amps. If more than 5% above the manufacturer's nameplate value, the pump is overloading, which indicates a defective well pump and / or motor.	Pull pump, disassemble from motor and replace one or both if defective.

Pump won't shut off

CAUSE OF TROUBLE	HOW TO CHECK	HOW TO CORRECT
1. Defective pressure switch	Check the pressure switch to insure contacts are open at the correct pressure.	Adjust or replace switch
2. Water level in the well is too low	Well production in the well may be too low for the pump capacity. Restrict the flow of pump output, wait for the well to recover and then try starting the pump again.	If partial restriction corrects the trouble leave the cock or valve at the restricted setting. Otherwise lower the pump into the well if depth is sufficient. Do not lower if sand clogging might occur.
3. Leak in drop line	Raise the pipe and examine it for leaks.	Replace the damaged section of the drop pipe.
4. Submersible pump parts are worn	The presence of abrasives in the water may result in excessive wear on the impeller, casing and other close-clearance parts. Before pulling the pump, reduce setting on the pressure switch to see if the pump shuts off. If it does, worn parts are probably at fault.	Pull the submersible pump and replace worn components.

Motor does not start, but fuses don't blow

CAUSE OF TROUBLE	HOW TO CHECK	HOW TO CORRECT
1. Overload protection is tripped	Check overloads and circuit breaker to see if they are operable.	Reset overloads or circuit breaker
2. No power	Check power supply to the control box (or overload protection box), by placing a voltmeter across the incoming power lines. Voltage should approximate nominal line voltage.	If no power is reaching the box, contact the power company for service.
3. Defective pressure switch	Check whether contacts are closed and the same voltage is present between load terminals as line terminals.	If the line voltage is not on the line terminals, replace the switch.
4. Defective control box	Examine the winding in the control box to make sure all the contacts are tight. With a voltmeter check voltage at the line and motor terminals. If no voltage is shown at terminals, wiring is defective from pressure switch or in the control box. With a voltmeter, check voltage across the pressure switch while the switch is closed. If the voltage drop is equal to the line voltage, the switch is not making contact.	Correct faulty wiring or tighten loose contacts. You may also try cleaning the contacts or replace the switch.