

Diagnosing specific problems

Problem	Possible cause	Remedy
The pump does not run	<ol style="list-style-type: none"> 1. No power at motor. 2. Fuses are blown or circuit breakers are tripped. 3. Motor starter overloads are burned or have tripped out. 4. Starter does not energize. 5. Defective controls. 6. Motor is defective. 7. Defective capacitor. (Single-phase motors) 8. Pump is bound. 	<p>Check for voltage at motor terminal box. If no voltage at motor, check feeder panel for tripped circuits and reset circuit.</p> <p>Turn off power and remove fuses. Check for continuity with ohmmeter. Replace blown fuses or reset circuit breaker. If new fuses blow or circuit breaker trips, the electrical installation, motor and wires must be checked.</p> <p>Check for voltage on line and load side of starter. Replace burned heaters or reset. Inspect starter for other damage. If heater trips again, check the supply voltage and starter holding coil.</p> <p>Energize control circuit and check for voltage at the holding coil. If no voltage, check control circuit fuses. If voltage, check holding coil for shorts. Replace bad coil.</p> <p>Check all safety and pressure switches for operation. Inspect contacts in control devices. Replace worn or defective parts or controls.</p> <p>Turn off power and disconnect wiring. Measure the lead to lead resistances with ohmmeter (RX-1). Measure lead to ground values with ohmmeter (RX-100K). Record measured values. If an open or grounded winding is found, remove motor and repair or replace.</p> <p>Turn off power and discharge capacitor. Check with ohmmeter (RX-100K). When the meter is connected to the capacitor, the needle should jump towards 0 ohms and slowly drift back to infinity (∞). Replace if defective.</p> <p>Turn off power and manually rotate pump shaft. If shaft does not rotate easily, check coupling setting and adjust as necessary. If shaft rotation is still tight, remove pump and inspect. Disassemble and repair.</p>
The pump runs but at reduced capacity or does not deliver water	<ol style="list-style-type: none"> 1. Wrong rotation 2. Pump is not primed or is airbound. 3. Strainers, check or foot valves are clogged. 4. Suction lift too large. 5. Suction and/or discharge piping leaks. 6. Pump worn. 7. Pump impeller or guide vane is clogged. 	<p>Check wiring for proper connections. Correct wiring.</p> <p>Turn pump off, close isolation valve(s), remove priming plug. Check fluid level. Refill the pump, replace plug and start the pump. Long suction lines must be filled before starting the pump.</p> <p>Remove strainer, screen or valve and inspect. Clean and replace. Reprime pump.</p> <p>Install compound pressure gauge at the suction side of the pump. Start pump and compare reading to performance data. Reduce suction lift by lowering pump, increase suction line size or removing high friction loss devices.</p> <p>Pump runs backwards when turned off. Air in suction pipe. Suction pipe, valves and fittings must be airtight. Repair any leaks and retighten all loose fittings.</p> <p>Install pressure gauge, start pump, gradually close the discharge valve and read pressure at shutoff. Convert measured pressure (in PSI) to head (in feet): (Measured PSI x 2.31 ft./PSI = _____ ft.). Refer to the specific pump curve for shutoff head for that pump model. If head is close to curve, pump is probably OK. If not, remove pump and inspect.</p> <p>Disassemble and inspect pump passageways. Remove any foreign materials found.</p>

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The pump runs but at reduced capacity or does not deliver water (continued)	8. Incorrect drain plug installed. 9. Improper coupling setting.	If the proper drain plug is replaced with a standard plug, water will recirculate internally. Replace with proper plug. Check/reset the coupling, see page 10.
Pump cycles too much	1. Pressure switch is not properly adjusted or is defective. 2. Level control is not properly set or is defective. 3. Insufficient air charging or leaking tank or piping. 4. Tank is too small. 5. Pump is oversized.	Check pressure setting on switch and operation. Check voltage across closed contacts. Readjust switch or replace if defective. Check setting and operation. Readjust setting (refer to level control manufacturer's data). Replace if defective. Pump air into tank or diaphragm chamber. Check diaphragm for leak. Check tank and piping for leaks with soap and water solution. Check air to water volume. Repair as necessary. Check tank size and air volume in tank. Tank volume should be approximately 10 gallons for each gpm of pump capacity. The normal air volume is 2/3 of the total tank volume at the pump cut-in pressure. Replace tank with one of correct size. Install pressure gauges on or near pump suction and discharge ports. Start and run pump under normal conditions, record gauge readings. Convert PSI to feet (Measured PSI x 2.31 ft./PSI = _____ ft.) Refer to the specific pump curve for that model, ensure that total head is sufficient to limit pump delivery within its design flow range. Throttle pump discharge flow if necessary.
Fuses blow or circuit breakers or overload relays trip	1. Low voltage. 2. Motor overloads are set too low. 3. Three-phase current is imbalanced. 4. Motor is shorted or grounded. 5. Wiring or connections are faulty. 6. Pump is bound. 7. Defective capacitor (single-phase motors). 8. Motor overloads at higher ambient temperature than motor.	Check voltage at starter panel and motor. If voltage varies more than ±10%, contact power company. Check wire sizing. Cycle pump and measure amperage. Increase heater size or adjust trip setting to a maximum of motor nameplate (full load) current. Check current draw on each lead to the motor. Must be within ±5%. If not, check motor and wiring. Rotating all leads may eliminate this problem. Turn off power and disconnect wiring. Measure the lead-to-lead resistance with an ohmmeter (RX-1). Measure lead-to-ground values with an ohmmeter (RX-100K) or a megaohm meter. Record values. If an open or grounded winding is found, remove the motor, repair and/or replace. Check proper wiring and loose terminals. Tighten loose terminals. Replace damaged wire. Turn off power and manually rotate pump shaft. If shaft does not rotate easily, check coupling setting and adjust as necessary. If shaft rotation is still tight, remove pump and inspect. Disassemble and repair. Turn off power and discharge capacitor. Check with ohmmeter (RX-100K). When the meter is connected to the capacitor, the needle should jump towards 0 ohms and slowly drift back to infinity (∞). Replace if defective. Use a thermometer to check the ambient temperature near the overloads and motor. Record these values. If ambient temperature at motor is lower than at overloads, especially where temperature at overloads is above +104°F (+40°C), ambient-compensated heaters should replace standard heaters.