U.S. SOLID

SHALLOW WELL JET PUMP

Manual No. 14658

Contents

1 SAFETY INSTRUCTIONS

1. Use this pump only for clear water. Never pump flammable or explosive liquids, including oil, gasoline, kerosene or ethanol. Do not operate the pump where flammable vapours may be present. Contact with flammable liquids can cause fire or explosion, property damage, serious injury or death.
2. Disconnect the pump from its power source before servicing it.
3. **Do not touch the motor housing while the pump is running. The motor is designed to become hot during normal operation; do not open or disassemble the motor housing.**
4. Do not handle the pump or motor with wet hands, while standing on a wet or damp surface, or while standing in water.
5. Wear protective safety goggles whenever you work on or around the pump.
6. This pump accepts 115 V or 230 V. To select 230 V, open the terminal cover and move the switch to the correct setting. Wiring should be completed by a qualified electrician.
7. Keep the power cord away from sharp edges, hot surfaces, oil and chemicals. Do not kink the cord or use it if it is worn or damaged.
8. Confirm that the electrical supply is suitable for the pump before connecting power.
9. Operating the unit outside these instructions may void the warranty. Never operate a damaged pump; doing so may cause property damage, serious injury or death.
10. Connect the pump to a grounded circuit protected by a ground-fault circuit interrupter (GFCI).
11. Understand the pump's intended uses, operating limits and possible hazards before installation.
12. Fasten the pump securely to a solid base.
13. Inspect the pump and system components regularly. Disconnect power before beginning an inspection.
14. Observe all applicable local electrical and safety rules, the National Electrical Code (NEC) and OSHA requirements.
15. A thermal protector will shut the motor off if it overheats and will reset after the motor cools to a safe temperature. The pump can restart unexpectedly while still connected to power.

16. The pump uses strong, corrosion-resistant materials and can provide long service when installed and maintained correctly. Insufficient electrical power, dirt or debris can still cause failure. Read the troubleshooting guidance before operating the unit.
17. Keep fingers and foreign objects away from ventilation openings and other openings. Never insert anything into the motor.

CAUTION: The motor may be hot during operation. After switching the pump off, allow at least 20 minutes for it to cool before handling it. Protect the pump and every system component from freezing; freezing will void the warranty. Inspect the system periodically, keep the work area clean and well lit, store unused tools safely, and keep visitors away from the work area.

CAUTION: This unit is not intended for sewage service. Using it for sewage will void the warranty.

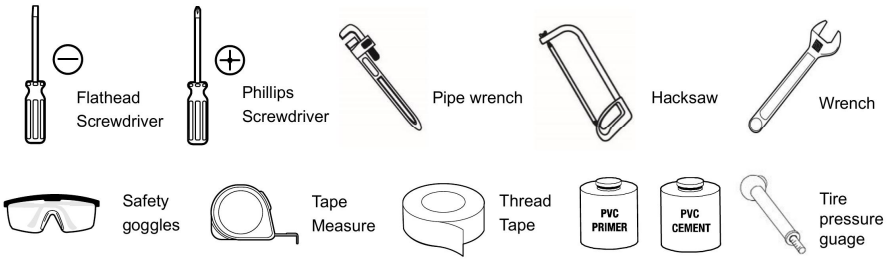
WARNING: Install this pump in a dry, protected location. Do not install it where it is exposed directly to rain, snow, flooding or other weather conditions. If it is installed outside the house, enclose it in a weatherproof pump house or protective enclosure. The enclosure must keep the pump dry, provide adequate ventilation and prevent freezing.

2 PRODUCT OVERVIEW

Attribute	Specification
Pump type	Single-stage shallow-well jet pump
Motor	1 HP
Power supply	115/230 V, single phase, 60 Hz; 30/20 A circuit
Pressure-switch setting	30 psi cut-in / 50 psi cut-out
Flow at 40 psi total discharge pressure	0 ft: 26.0 GPM; 5 ft: 24.5 GPM; 10 ft: 22.5 GPM
Flow at 40 psi total discharge pressure continued	15 ft: 21.0 GPM; 20 ft: 17.0 GPM; 25 ft: 12.7 GPM
Maximum shutoff pressure	74 psi
Liquid temperature range	32°F to 140°F (0°C to 60°C)
Connections	Discharge: 1 in. FNPT; suction: 1-1/4 in. FNPT
Maximum shallow-well water level	25 ft

3 BEFORE INSTALLATION

3.1 Tools Required



3.2 Determine the Depth of Your Well

Attach a small, heavy weight to a string and lower it until it touches the bottom of the well. Mark the string at ground level, then pull it out and measure from the weight to that mark. This measurement is the well depth. Subtract 5 ft. from it; the result must not exceed the pump's rated maximum depth, or the pump may operate poorly or fail to operate.

3.3 Location of the Pump

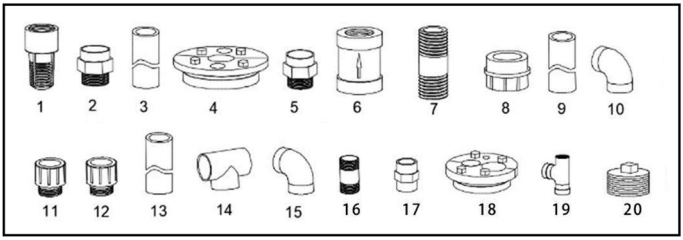
Choose a location that leaves enough room for future service. The pump may be installed in a basement, utility room, at the well, or between the house and the well. If it is located outside the house, place it only in a weatherproof pump house or protective enclosure. Keep the pump dry and protected from flooding, excess moisture and freezing; protect the well for sanitary reasons, and install the pump as close to the well as practical.

3.4 Precharged Pressure Tank

For better pump performance, use an external diaphragm pressure tank, and install it before the pump. Its bladder separates compressed air from the water, reducing air absorption and providing more usable water than a conventional tank.

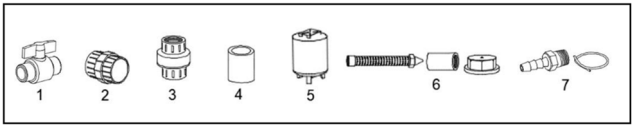
IMPORTANT: Set tank air pressure 2 psi below the pressure switch cut-in setting. Before fitting a new pump, drain the tank completely. With the supplied 30/50 psi switch at its factory settings, the tank should be adjusted to 28 psi before start-up.

3.5 Parts You May Need for Assembly



Item	Description	Item	Description
1	1-1/4 in. foot valve	11	1 in. × 3/4 in. PVC reducing male adapter
2	1-1/4 in. PVC MPT × slip (socket) male adapter	12	3/4 in. PVC MPT × slip (socket) male adapter
3	1-1/4 in. PVC rigid pipe	13	3/4 in. PVC rigid pipe
4	Well seal, single pipe	14	3/4 in. CPVC CTS socket tee fitting
5	1 in. PVC MPT × slip (socket) male adapter	15	3/4 in. PVC 90-degree S × S elbow
6	1-1/4 in. lead-free brass check valve	16	1 in. × 3 in. galvanized steel nipple
7	1-1/4 in. × 3 in. galvanized steel nipple	17	1 in. PVC FPT × slip (socket) female adapter
8	1-1/4 in. PVC FPT × slip (socket) female adapter	18	4 in. well seal, double pipe
9	1 in. PVC rigid pipe	19	1-1/4 in. PVC tee, FPT × FPT × FPT
10	1 in. PVC 90-degree S × S elbow	20	1-1/4 in. galvanized plug

3.6 Optional Parts for Assembly



Item	Description	Item	Description
1	3/4 in. slip × slip ball valve	5	20 gal. or larger tank
2	1-1/4 in. PVC slip × slip union	6	Well point, drive coupling, drive cap
3	3/4 in. PVC FPT × FPT union	7	1/8 in. AVC control kit
4	1-1/4 in. PVC coupling 1 in. PVC coupling 3/4 in. PVC coupling		

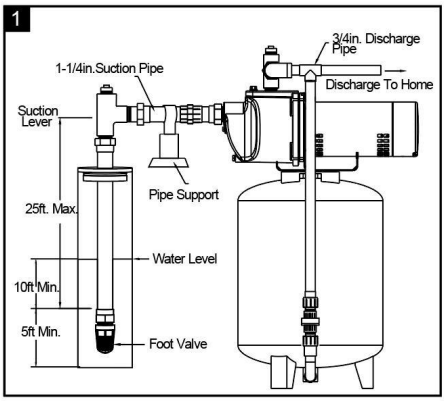
4 INSTALLATION

GENERAL GUIDANCE: Do not use flexible pipe on the suction/inlet side. A union or hose coupling near the pump makes future removal easier. A rubber hose between the water system and house piping can reduce transmitted operating noise.

4.1 Select the Water Source Configuration

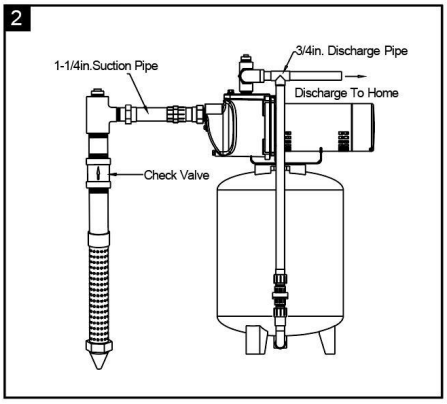
4.1.1 Cased Well Installation, 4 in. or Larger Casing

A cased well is a machine-bored hole in the earth, typically from a few feet to 25 ft. deep. Common domestic well diameters are 4 in., 5 in., 6 in. and 8 in.



4.1.2 Driven Well Point Installation

A driven well point uses pipe with a pointed screen driven into the ground below the water table. The depth is usually less than 25 ft. Available diameters are 1 in. through 2 in.



4.1.3 Surface Water Installation

For a surface-water source, run one pipe to a lake, river, cistern or pond; the suction lift must be less than 25 ft. Install an inlet screen to prevent swimmers, wildlife and debris from being drawn into the inlet.

CAUTION: Possible contamination. Do not use surface water for drinking. The installation shown could be used for sprinkler applications.

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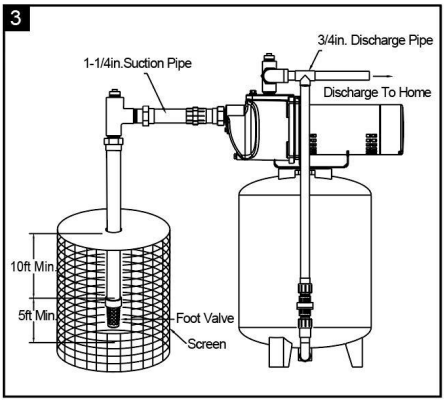
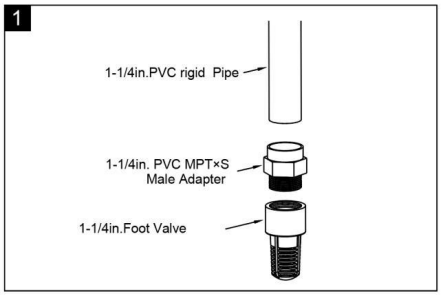


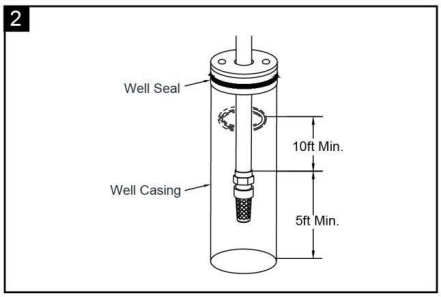
4.2 Installing Piping in Well

CAUTION: Dry-fit the complete assembly before applying glue or tape. Follow the adhesive manufacturer's procedure and, where possible, glue vertically so adhesive cannot run into the pipe or fittings. Apply pipe tape and pipe-paste compound to all male threads. Tighten until snug, then add another 1/4 turn to seal the joint.

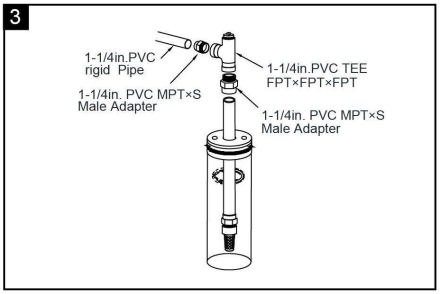
For Cased Well Installation



1. Join the 1-1/4 in. foot valve to the 1-1/4 in. PVC MPT × slip (socket) male adapter, then cement the adapter to the 1-1/4 in. PVC rigid pipe. Every joint must be airtight and watertight for correct pump operation.



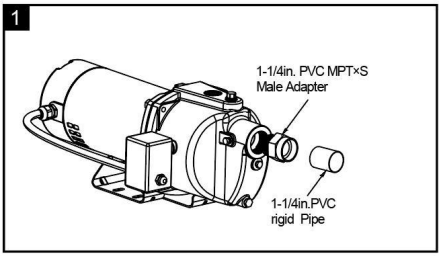
2. Slide the well seal over the 1-1/4 in. PVC rigid pipe and set it into the casing. Keep the foot valve 5 ft. above the well bottom and at least 10 ft. below the water surface.

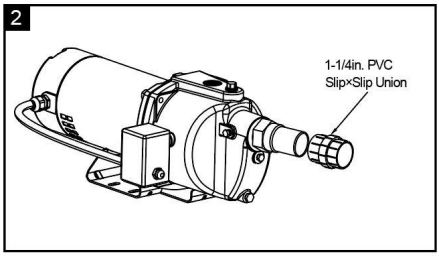


3. Cement the 1-1/4 in. PVC MPT × slip (socket) male adapter into the rigid pipe and fit the 1-1/4 in. PVC FPT × FPT × FPT tee. Use the horizontal port for another male adapter and rigid pipe, adding pipe sections until the optional 1-1/4 in. slip × slip union can be reached.

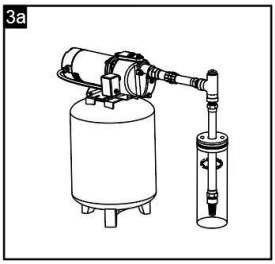
4.3 Well to Pump Connection

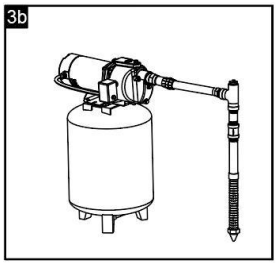
1. Screw the 1-1/4 in. PVC MPT × slip (socket) male adapter into the pump, then cement a short horizontal length of 1-1/4 in. rigid PVC into the adapter.
2. Cement a 1-1/4 in. slip × slip union onto the short horizontal pipe. Slope the complete inlet run gently upward from the well to the pump so air cannot collect in the line.

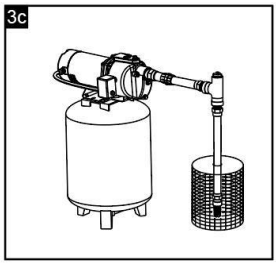




3. Completed installation is shown below.





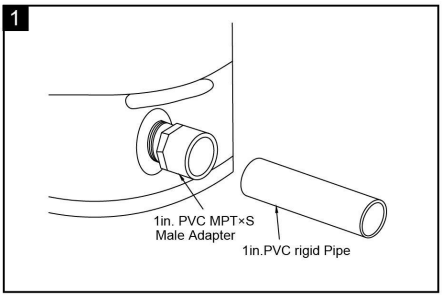


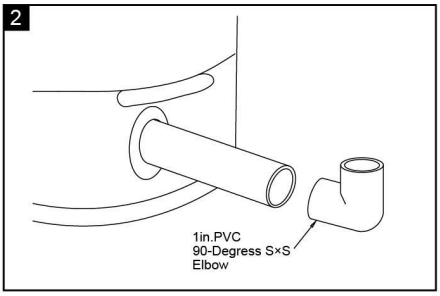
4.4 Pump to Pressure Tank and to House Connection

NOTE: Keep the pump within 4 ft. of the tank to avoid pressure-switch chatter. Check the tank air charge once each year.

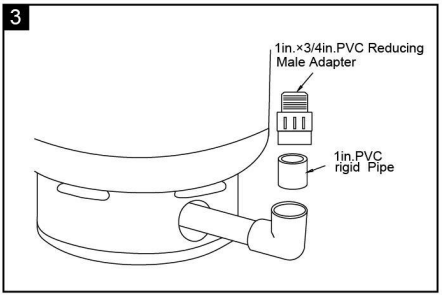
4.4.1 Precharged Pressure Tank Connection

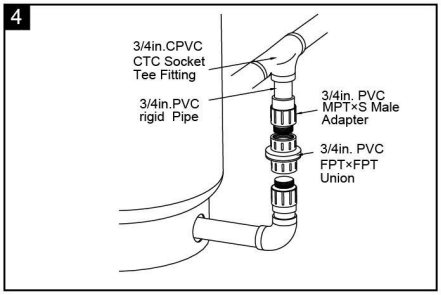
1. Most pressure tanks use a 1 in. inlet elbow at the bottom. Attach a 1 in. PVC MPT × slip (socket) male adapter and a short section of 1 in. rigid PVC to that elbow.
2. Cement the 1 in. PVC 90-degree S × S elbow in place.



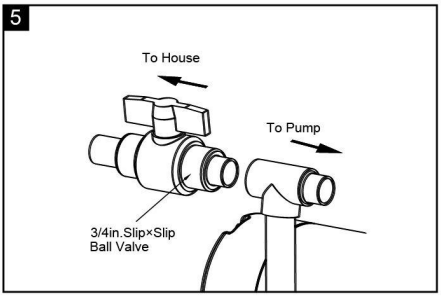


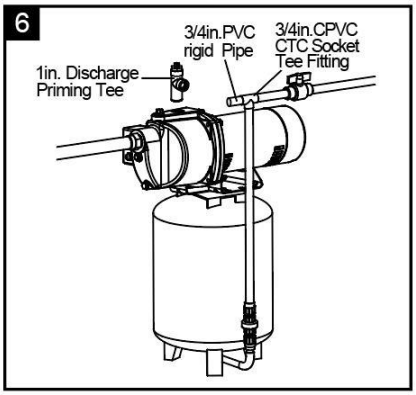
3. Cement 1 in. rigid PVC into the elbow, then add the 1 in. × 3/4 in. PVC reducing male adapter.
4. Cement 3/4 in. rigid PVC into the 3/4 in. CPVC CTS socket tee. Add the 3/4 in. PVC MPT × slip (socket) male adapter to the rigid pipe and connect it to the 3/4 in. PVC FPT × FPT union.



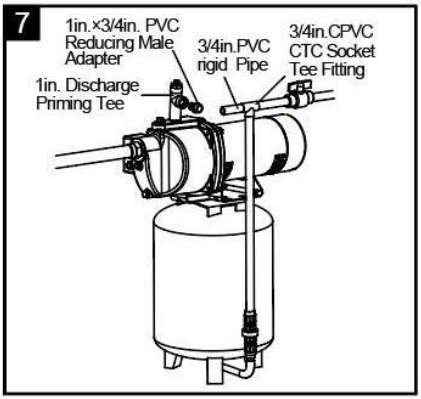


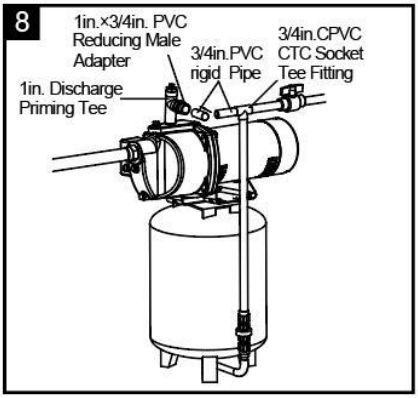
5. Connect the branch to the house plumbing. From the tee, run the pipe and add the optional 3/4 in. slip × slip ball valve.
6. Fit a galvanized tee with one 1 in. male NPT and two 1 in. female NPT ports to the pump outlet.

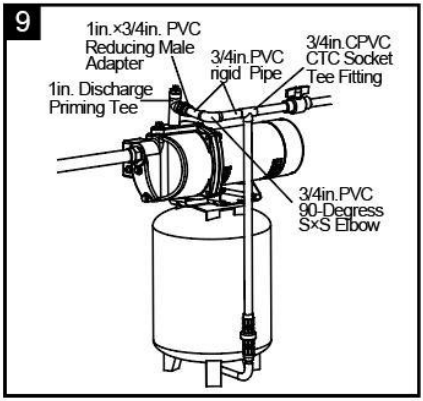




7. Attach the 1 in. × 3/4 in. PVC male adapter to the galvanized tee.
8. Add a short length of 3/4 in. rigid PVC.
9. Use Fig. 9 as the completed piping-and-tank reference.





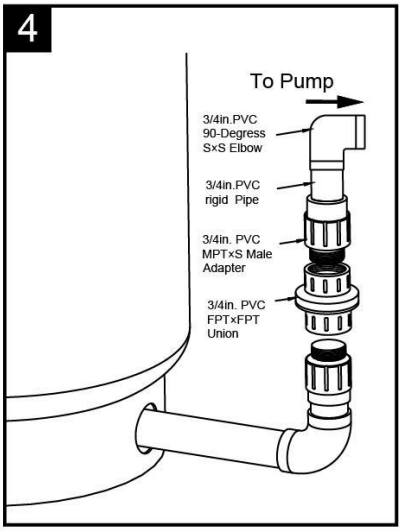


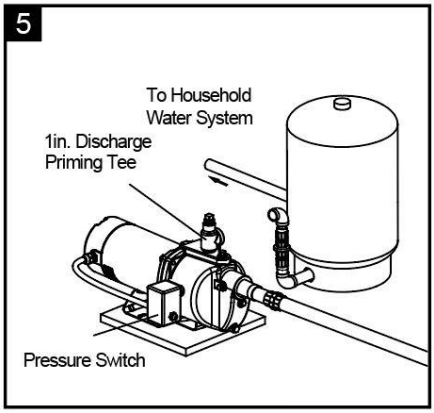
NOTE: A waterlogged precharged tank usually has a leaking or failed bladder. Press the air valve: water coming from the valve confirms a failed bladder. Replace the tank because the bladder cannot be repaired.

4.4.2 Conventional Pressure Tank Connection

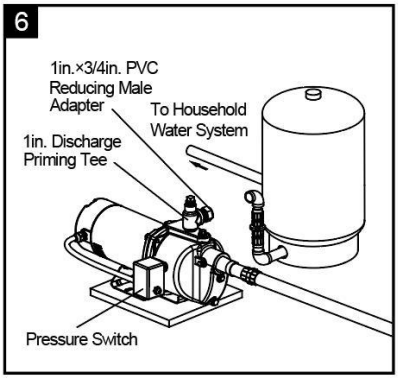
Use the same method described in steps 1 through 3 of the 4.4.1 precharged pressure-tank connection.

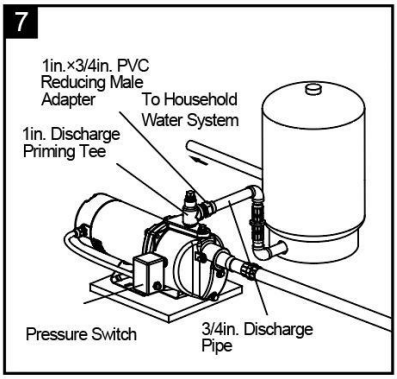
4. Cement 3/4 in. rigid PVC into the 3/4 in. PVC 90-degree S × S elbow. Add the 3/4 in. PVC MPT × slip (socket) male adapter and connect it to the 3/4 in. PVC FPT × FPT union.
5. Fit the galvanized tee with one 1 in. male NPT and two 1 in. female NPT ports to the pump outlet.

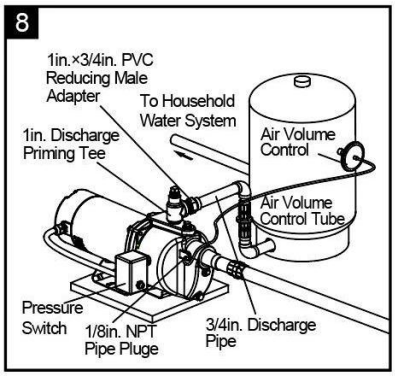




6. Attach the 1 in. × 3/4 in. PVC male adapter to the galvanized tee.
7. Add a short 3/4 in. rigid PVC section. Refer to Fig. 7 for the completed tank and piping arrangement.
8. Remove the 1/8 in. NPT plug from the pump's Air Volume Control (AVC) port. At the upper tapping on the pump face, install a 1/8 in. hose-barb × MIP adapter fitting. Run tubing from the pump AVC port to the connection on the AVC mounted on the tank.







NOTE: As the pump refills the tank with water, the air-volume control supplies the tank with the correct air-to-water ratio. If the air-volume control is functioning properly, the pump should shut off at the pressure-switch cut-out setting.

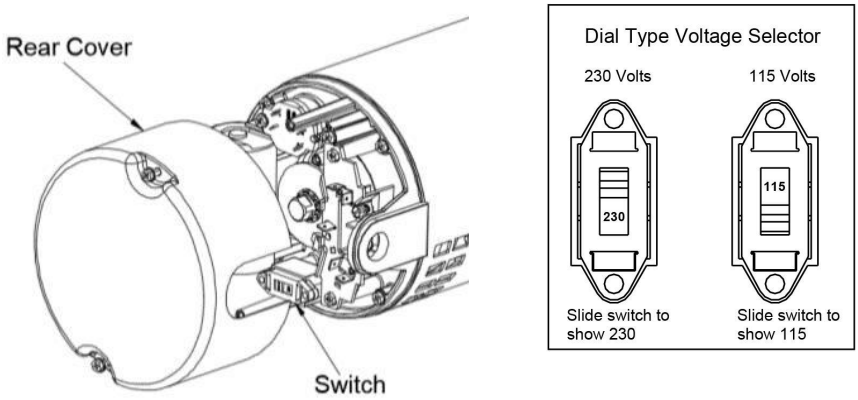
5 ELECTRICAL CONNECTIONS

WARNING: Electric-shock hazard. Electric shock can cause serious injury or death. Disconnect power before working on the pump, motor, pressure switch or wiring.

5.1 Change from 115 V to 230 V

The single-phase motor is factory-wired for 115 V and can be set for 230 V. When using a 230 V supply, remove the motor's rear cover, move the selector so 230 V is displayed, and reinstall the cover.

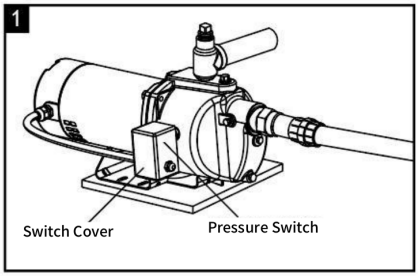
WARNING: Electric-shock hazard. Verify that power is disconnected. Never connect a motor set for 115 V to a 230 V supply.

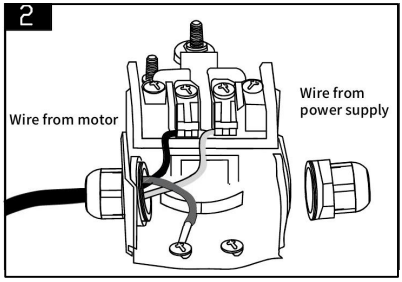


Rear cover and dial type voltage selector

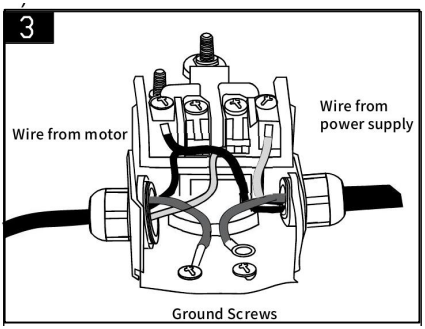
5.2 Wiring the Pressure Switch

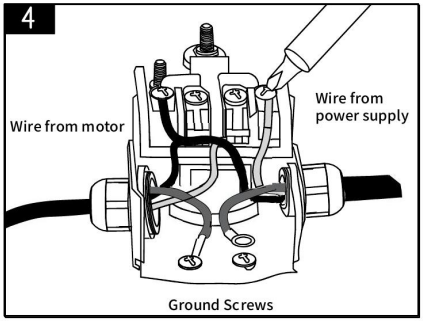
1. Remove the switch cover that is installed on the pressure switch.
2. Insert an electrical wire strain relief into the opening in the opposite side of the pressure switch.



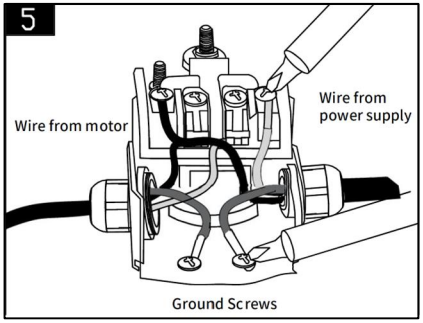


3. Pass the cable from the power supply through the strain relief and tighten the nut on the strain relief. Do not crush the wire.
4. Connect the two wires from the power supply to the two outside terminals on the pressure switch.





5. Connect the green ground wire from the power supply to the green ground screw in the pressure switch.



ELECTRIC-SHOCK HAZARD: Attach the ground wire before connecting the supply wires. Use the wire gauge listed in the wiring chart, including the grounding conductor. A dedicated branch circuit is recommended.

EXPLOSION HAZARD: Never use a gas supply line as the grounding point.

WARNING: Fire hazard. Incorrect voltage can start a fire, damage the motor and void the warranty. Supply voltage must stay within ±10% of the motor nameplate voltage.

NOTE: The motor is set for 115 V at the factory. If needed, change the selector as shown. Install, ground, wire and maintain the pump according to the NEC or CEC, as applicable, plus all local codes and ordinances. Contact the local building inspector for code requirements.

5.3 Wiring Chart

The table below shows recommended wire and fuse sizes.

Motor HP	Volts	Max. Load Amp	Branch Fuse Rating Amp	Distance in feet from motor to supply / AWG wire size (mm²)
1/2	115/230	12.4/6.2	20/15	0-50: 14/14 (2/2) 51-100: 14/14 (2/2) 101-200: 12/14 (3/2) 201-300: 10/12 (5/3) 301-400: 8/12 (8/3) 401-500: 8/10 (8/5)
3/4	115/230	15.8/7.9	20/15	0-50: 14/14 (2/2) 51-100: 14/14 (2/2) 101-200: 10/14 (5/2) 201-300: 8/14 (8/2) 301-400: 8/14 (8/2) 401-500: 6/12 (13/3)
1	115/230	17.6/8.8	30/20	0-50: 14/14 (2/2) 51-100: 12/14 (3/2) 101-200: 8/14 (8/2) 201-300: 8/12 (8/3) 301-400: 6/12 (13/3) 401-500: 6/10 (13/5)

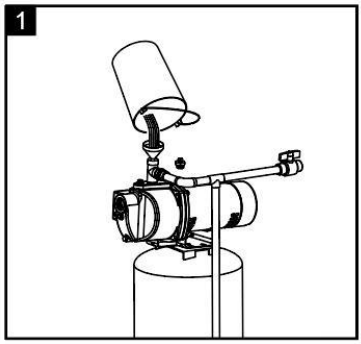
6 OPERATION AND MAINTENANCE

WARNING: Before installation, service, relocation or maintenance, disconnect electrical power and release all pressure from the system.

6.1 Priming and Initial Operation

CAUTION: Burn hazard. Never operate the pump without water. A dry-running pump can overheat, damage the seal and burn anyone handling it. Fill the pump before switching it on.

WARNING: Explosion and scalding hazard. Do not run the pump against a closed discharge. Water may boil inside the pump, creating dangerous pressure and a risk of explosion or scalding.



1. Remove the pump priming plug or tee and fill the pump. Fill the piping between the pump and well, and confirm that the well piping is full. If a priming tee is installed in the suction line, remove its plug and fill that line as well.
2. Refit all fill plugs. Crack open the faucet nearest the pump or tank so air can leave the system.
3. Switch on the power and start the pump.
4. If water is not available after 2 or 3 minutes, stop the pump and remove the fill plugs. Refill the pump and piping. Several repetitions may be necessary to clear trapped air.
5. When the pump starts building pressure, close the faucet and let the pump reach shutoff pressure. Open one or two faucets to lower the pressure until the pump restarts. It should start at 30 PSI and stop at 50 PSI. Run one or two complete cycles to confirm operation and flush dirt or scale loosened during installation.

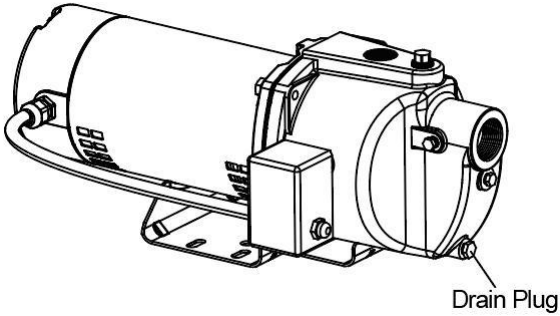
If priming is unsuccessful, see the Troubleshooting section or contact customer service.

6.2 Winterizing

CAUTION: If freezing is possible, drain the complete system. A drain plug at the bottom of the pump housing is provided for this purpose.

Use the drain openings provided on every model:

- □ Unplug the pump from the power-supply outlet.
- □ Remove the drain plug.
- □ Drain all piping to a point below the freeze line. This will drain the pump.



NOTE: While this will drain the pump, it will not necessarily drain all unprotected parts of the piping system. To drain the tank, disconnect the piping at the tank outlet.

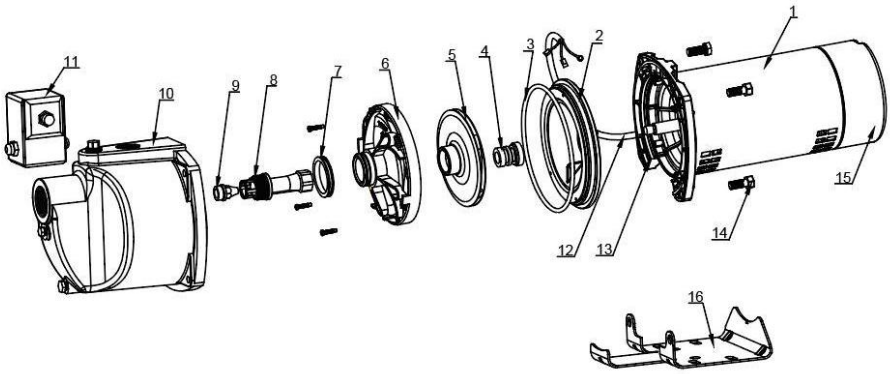
7 SERVICE AND REPLACEMENT PARTS

7.1 Seal Assembly Replacement

CAUTION: Verify that power is disconnected before servicing. Handle the rotary seal assembly carefully; its precision-lapped sealing faces can be damaged easily.

1. Disengage the pump body (Ref. No. 10), including diffuser 6 and venturi 8, from the motor mounting ring (Ref. No. 13).
2. Remove the rear cover (Ref. No. 15). Remove the impeller (Ref. No. 5) using a 9/16 in. open-end wrench to hold the motor shaft.
3. The rotary seal (Ref. No. 4) will come loose at this time. Use a screwdriver or similar instrument to pry the silicon-carbide seal from the recess of the seal plate (Ref. No. 2). Be careful not to damage the motor shaft or recess surface.
4. Clean the recess and motor shaft thoroughly.
5. Install the new seal assembly: (a) insert the silicon-carbide seal and rubber gasket into the recess of the seal plate. To facilitate installation, apply a drop of liquid soap to the outside diameter of the rubber gasket. Keep the polished surface of the mechanical seal and the motor shaft clean and free of dirt and oil. (b) Slip the remaining parts of the rotary seal assembly onto the motor shaft. Apply a drop of liquid soap to the inside diameter of the rubber drive ring.
6. Replace the impeller and diffuser removed in Step 2.
7. Reassemble the pump body to the motor and mounting bracket.

7.2 Parts List



Item	Description	Qty.
1	Motor	1
2	Seal plate / pressure gauge	1
3	O-ring	1
4	Mechanical seal assembled, E-5/8 in.	1
5	Impeller	1
6	Diffuser	1
7	Diffuser ring	1
8	Venturi	1
9	Nozzle	1
10	Pump body	1
11	Pressure switch	1
12	Lead wire	1
13	Mounting ring	1
14	Screws	4
15	Rear cover	1
16	Base	1

8 TROUBLESHOOTING

NOTE: Draining the pump does not necessarily empty every unprotected part of the piping. To drain the tank, disconnect the pipe at the tank outlet.

Problem	Possible Cause	Corrective Action
Pump does not start or run.	1. The switch is off. 2. There is a blown fuse or tripped breaker. 3. The pressure-switch contacts are dirty. 4. The wires at the motor are loose or wired incorrectly.	1. Turn the power switch on. 2. Replace the fuse or reset the circuit breaker. 3. DISCONNECT THE POWER. File or clean the switch contacts. 4. DISCONNECT THE POWER. Follow the wiring instructions to check and tighten the wires.

Problem	Possible Cause	Corrective Action
Pump will not prime.	1. The pump was primed improperly or air is trapped in the pipe. 2. There is an air leak. 3. The water level is below the suction-pipe inlet. 4. The foot valve is plugged or leaks.	1. DISCONNECT THE POWER. Adjust pump height and make the pipe slope down to the well. Remove the discharge tee and re-prime. 2. Check all connections and fix the leakage. 3. Lower the suction pipe. If the water level is more than 25 ft., use deep-well installation. 4. Clean or replace the foot valve.

Problem	Possible Cause	Corrective Action
Pump operates but pumps little or no water.	1. The foot valve is buried in sand or mud. 2. The ejector or impeller is plugged. 3. The foot valve or inlet strainer is clogged. 4. The water level is below the maximum lift specification. 5. The voltage is not correct. 6. The pressure regulator is not set up correctly.	1. Lift the suction pipe. 2. Clean the ejector or impeller. 3. Clean or replace as necessary. 4. Select a convertible jet pump. 5. Check the voltage switch. 6. Readjust the pressure regulator.

Problem	Possible Cause	Corrective Action
Pump starts and stops too often.	1. The tank was precharged incorrectly. 2. There is a ruptured diaphragm/bladder in the precharged tank, or it has no air cushion. 3. The pipes are leaking. 4. The foot valve leaks. 5. The pressure switch is not adjusted correctly. 6. The air charge is too low in the precharged tank.	1. Add or release air as needed. 2. Replace the tank/refill the air. 3. Repair the pipe connections or replace the pipes. 4. Repair or replace the foot valve. 5. Check the pressure gauge; the pump ON/OFF points should be around 30 psi/50 psi. If not, adjust or replace the pressure switch. 6. DISCONNECT POWER and open faucets until all pressure is relieved. Check air pressure in the tank at the valve stem. If less than 30 psi, pump air into the tank until it is 2 psi less than the cut-in setting. Check the air valve for leaks with soapy solution and replace the core if necessary.

Problem	Possible Cause	Corrective Action
Pump does not shut off.	1. Water level is lower than estimated. 2. The pipes leak. 3. The pressure switch is not set correctly.	1. Use a deep-well installation. 2. Locate and repair the leak or reconnect. 3. Reset or replace the pressure switch.

Contact
Feel free to visit our website: www.ussolid.com
You can email us at service@ussolid.com