

SEARS

OWNER'S MANUAL

3-WIRE SUBMERSIBLE PUMP MODEL Nos.

390.284021 390.284071
390.284031 390.284081
390.284041 390.284091
390.284051 390.284370
390.284061 390.284380
 390.284390

CONTROL CENTER Nos.

390.284121 390.284251
390.284131 390.284261
390.2841 390.284271

2-WIRE SUBMERSIBLE PUMP MODEL Nos.

390.285511
390.2855
390.2853

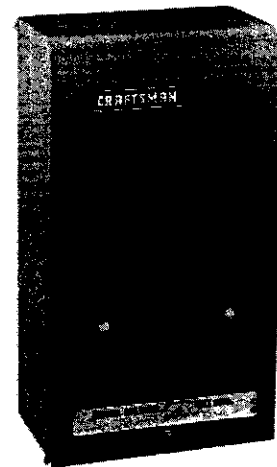
CAUTION:

Read and Follow
All Safety Rules and
Operating Instructions
Before First Use of
This Product.

Save This Manual For
Future Reference.



3 WIRE CONTROL CENTER



CRAFTSMAN® TWO and THREE WIRE SUBMERSIBLE PUMPS

- Safety Instructions
- Installation
- Operation
- Troubleshooting
- Repair Parts

Sears, Roebuck and Co., Hoffman Estates, IL 60179 U.S.A.

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INTRODUCTION

Please take a few minutes to read our instructions before installing your submersible pump. It will help to assure perfect installation and help you avoid needless service expenses.

FULL ONE YEAR WARRANTY ON CRAFTSMAN® HYDROGLASS® SUBMERSIBLE WELL PUMPS

For one year from the date of purchase, Sears will repair or replace this pump, free of charge, if defective in material or workmanship.

LIMITED WARRANTY ON CRAFTSMAN® HYDROGLASS® SUBMERSIBLE WELL PUMPS (not including Controls)

After one year and through three years from the date of purchase, Sears will furnish, free of charge, a replacement part for any defective part. You pay for labor.

This warranty does not cover repairs or replacement parts necessary because of abuse or negligence including failure to install, adjust and operate this pump according to the instructions in the owner's manual.

LIMITATION OF LIABILITY

SEARS WILL NOT BE LIABLE FOR LOSS OR DAMAGE TO PROPERTY OR ANY INCIDENTAL OR CONSEQUENTIAL LOSS OR EXPENSE FROM PROPERTY DAMAGE DUE DIRECTLY OR INDIRECTLY FROM THE USE OF THIS PRODUCT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

WARRANTY SERVICE IS AVAILABLE BY SIMPLY CONTACTING THE NEAREST SEARS SERVICE CENTER/DEPARTMENT IN THE UNITED STATES.

This warranty applies only while the product is in use in the United States.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Sears, Roebuck and Co., Dept. 817 WA, Hoffman Estates, IL 60179

RULES FOR SAFE INSTALLATION AND OPERATION

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

! 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 property damage if ignored.

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

To avoid risk of serious bodily injury and property damage, read safety instructions carefully before installing pump.

1. **WARNING** **Hazardous pressure** Under certain conditions, submersible pumps can develop extremely high pressure. Install a pressure relief valve capable of passing entire pump flow at 75 PSI (517kPa).

! **Do not allow pump, pressure tank, piping, or any other system component containing water to freeze. Freezing may damage system, leading to injury or flooding. Allowing pump or system compo-**

nents to freeze will void warranty.

2. Follow local and/or national plumbing and electrical codes when installing pump.
3. Keep well covered while installing pump to prevent leaves and other foreign material from falling into well, contaminating the well and possibly damaging the pump.
4. Protect pump and piping system from freezing. Allowing pump or water system to freeze could severely damage pump and voids warranty.
5. To protect system against over-pressure, install a pressure relief valve (Stock No. 2729).
6. With a new well, test well water for purity before using. Consult your local Health Department for procedure.

WARNING **Hazardous voltage. Can shock, burn, cause death, or start fires.**

7. Disconnect electrical power source before installing or working on pump.
8. Use pump only in a well application.
9. Correct fusing, wiring and grounding are essential to proper operation. See Page 6 for electrical instructions.
10. Line voltage and frequency listed on motor nameplate must agree with line voltage and frequency of electrical power supply.
11. Use of fuses or wire smaller than size recommended in owner's manual can cause overheating, possible fires, and will void warranty.

GENERAL INFORMATION

NOTICE: Model Number of your pump is located on the pump shell. Record this number and keep in a safe place for future reference in the event service is needed.

The most important things you should know about your well are: (1) its total depth; (2) depth to water; (3) draw down water level.

1. The well **total depth** is the distance from the ground level to the well bottom.
2. **Depth to water** is measured from the ground level to the water level in the well when the pump is not running.
3. **Draw down water level** is the distance from ground level to the water level while water is being pumped. In most wells, the water level drops when water is being pumped.

Usually you can obtain this information from your well driller. Enter it in box at right.

Record the following information at the time of installation and retain it for future reference:	
Pump Model No.	_____
Control Center Model No.	_____
Horsepower	_____
Volts	_____
Phase	_____
Hertz	_____
Full Load Amps	_____
Well Casing Diameter	_____
Well Depth	_____
Depth to Water	_____
Draw Down Water Level	_____

Table I - Pump Performance Chart (In Gallons Per Minute)

Residential Pumps with 1-1/4" Discharge																	
Model Number	H.P.	Voltage	Stages	Discharge Pressure P.S.I.	Pumping Depth in Feet *												
					20	40	60	80	100	125	150	175	200	250	300	350	400
390.285511	1/2	115	6	40	13.6	12.6	11.5	10.1	8.6	-	-	-	-	-	-	-	-
390.2855	1/2	230	6	40	13.6	12.6	11.5	10.1	8.6	-	-	-	-	-	-	-	-
390.284021	1/2	230	6	40	13.6	12.6	11.5	10.1	8.6	-	-	-	-	-	-	-	-
390.2853	3/4	230	8	40	-	-	13.5	12.7	11.9	10.7	9.4	7.9	-	-	-	-	-
390.284031	3/4	230	8	40	-	-	13.5	12.7	11.9	10.7	9.4	7.9	-	-	-	-	-
390.284041	1	230	10	40	-	-	-	-	13.5	12.9	11.9	10.9	9.8	7.4	-	-	-
390.284051	1-1/2	230	14	40	-	-	-	-	-	-	-	13.5	12.9	11.7	10.4	8.9	7.1
High Capacity Pumps with 1-1/4" Discharge																	
390.284061	1	230	7	40	26.4	24.7	22.7	20.7	18.4	-	-	-	-	-	-	-	-
390.284071	1-1/2	230	9	40	-	-	25.8	24.3	22.9	21.0	18.8	15.4	-	-	-	-	-
390.284081	2	230	12	40	-	-	-	-	26.4	25.1	23.7	22.2	20.8	17.2	-	-	-
390.284091	3	230	17	40	-	-	-	-	-	-	-	26.7	25.5	23.8	21.7	19.6	16.8
Extra-High Capacity Pumps with 1-1/4" Discharge																	
390.284370	1-1/2	230	6	40	36.0	33.5	30.8	-	-	-	-	-	-	-	-	-	-
390.284380	2	230	8	40	-	-	36.6	34.8	32.8	29.8	-	-	-	-	-	-	-
390.284390	3	230	12	40	-	-	-	-	38.8	37.3	35.9	34.5	32.6	28.3	-	-	-

*Pumping depth in feet is the maximum distance to water from ground level. This maximum distance (drawdown water level) occurs while pump is operating. In most cases, when pump is not running, the water level will rise to a higher point in the well.

TABLE II - Fusing, Wiring and Cable Selection (Copper Conductors Only)

Model Number	Type	Control Box No.	HP	Volts	Max Load Amps	Circuit Breaker Rating (Amps)	AWG Cable Size			Max. Cable Length in Feet - Disconnect switch to motor
							12	10	8	
390.285511	2-Wire	-	1/2	115	12.0	30	160	250	390	} Max. Cable Length in Feet - Disconnect switch to motor
390.2855	2-Wire	-	1/2	230	6.0	15	650	1020	1610	
390.2853	2-Wire	-	3/4	230	8.0	20	480	760	1200	
390.284021	3-Wire	390.284121	1/2	230	6.0	15	650	1020	1610	} Max. Cable Length in Feet - Disconnect switch to motor
390.284031	3-Wire	390.284131	3/4	230	8.0	20	480	760	1200	
390.284041	3-Wire	390.2841	1	230	9.8	25	400	630	990	
390.284061	3-Wire	390.2841	1	230	9.8	25	400	630	990	
390.284051	3-Wire	390.284251	1-1/2	230	11.5	30	310	480	770	
390.284071	3-Wire	390.284251	1-1/2	230	11.5	30	310	480	770	
390.284370	3-Wire	390.284251	1-1/2	230	11.5	30	310	480	770	
390.284081	3-Wire	390.284261	2	230	13.2	25	250	390	620	
390.284380	3-Wire	390.284261	2	230	13.2	25	250	390	620	
390.284091	3-Wire	390.284271	3	230	17.0	40	190	300	470	
390.284390	3-Wire	390.284271	3	230	17.0	40	190	300	470	



INSTALLATION

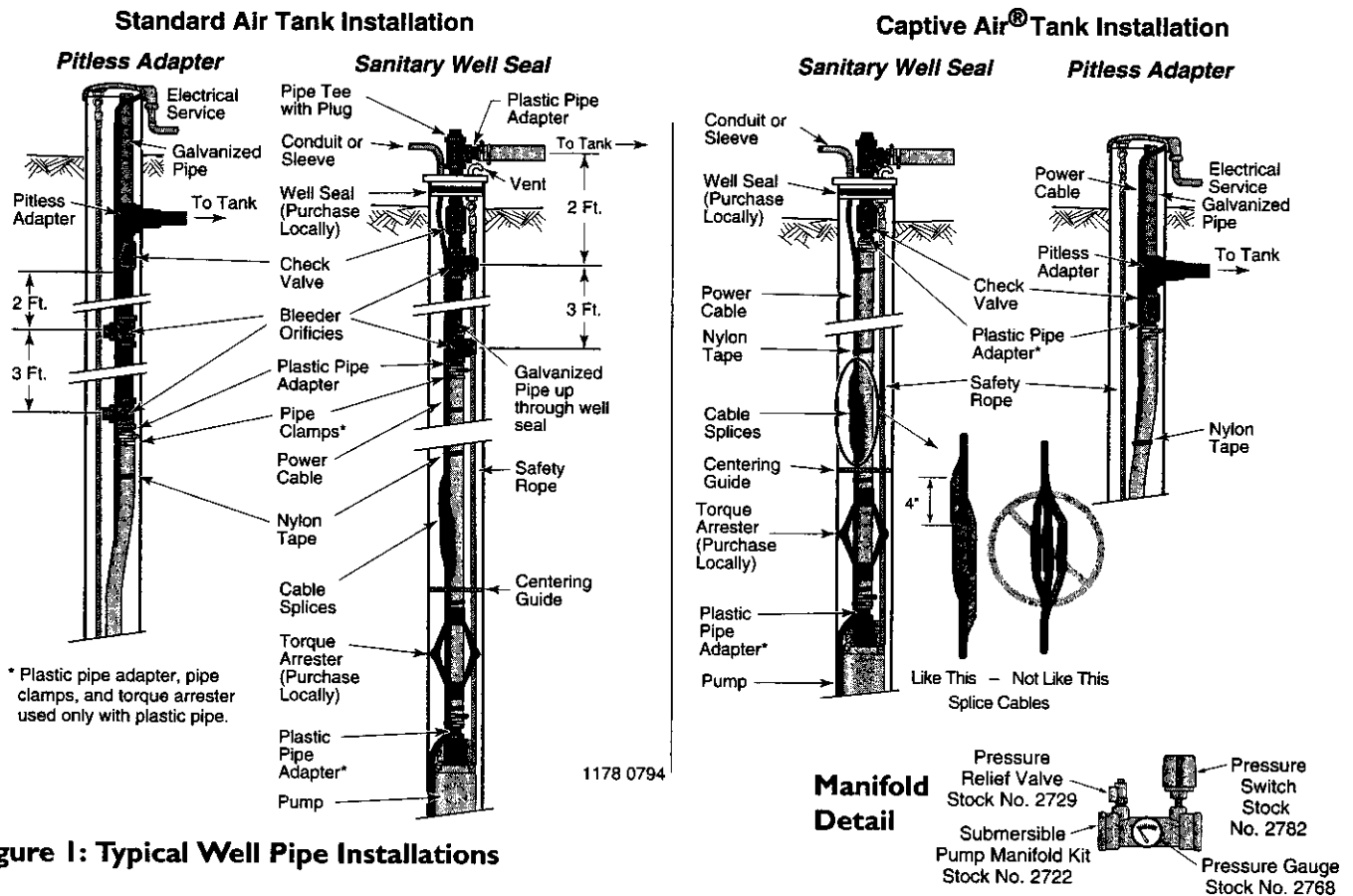


Figure 1: Typical Well Pipe Installations

If depth of well and the distance to the water level in the well are not known, proceed as follows:

1. Tie an object that will float to the end of a ball of string and drop it into the well.
2. When float hits water and string becomes slack, mark the string and pull float from well. Measure distance between mark and float for the water level in the well.
3. Remove float, replace with a heavy object that will sink in water and drop it into the well until string becomes slack. Mark string and pull object from well.
4. Measure distance between mark and object for depth of well.

If drawdown water level is not known, set pump 5 feet from the bottom of the well.

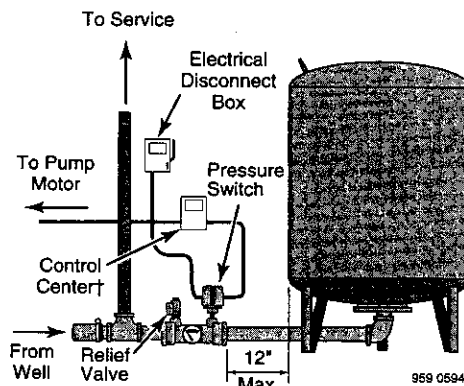


Figure 2: Captive-Air® Pressure Tank Installation

Basic Tools and Materials Needed

Study Figures 1 thru 3. Figure 1 shows the piping and electrical connections of a submersible pump in a well. Figure 2 shows typical installation of a Captive Air® Tank System. Figure 3 shows typical installations of a Standard Air Tank System. These illustrations will help you determine what materials you will need for piping.

Plastic Pipe Installation

Tools: Knife, Wire Cutters, Pliers, Screwdriver, Hammer, Adjustable Wrench, Hacksaw, Pipe Wrenches (2).

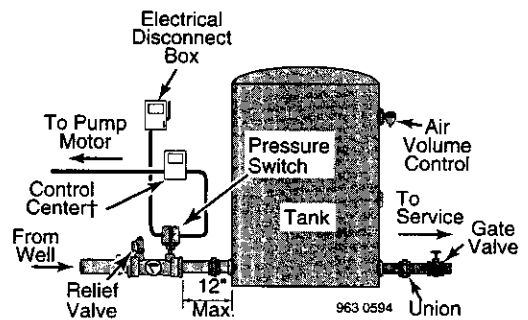


Figure 3: Standard Pressure Tank Installation

† NOTICE: Control Center is used with 3-wire pumps only. For 2-wire pumps, run cable directly from pressure switch to motor.

INSTALLATION

Materials: Plastic Pipe and Fittings (as required to complete job); Teflon Tape (DO NOT use pipe joint compound on plastic fittings); Centering Guides - Stock No. 2724.

Galvanized Steel Pipe Installation

Tools: Knife, Wire Cutters, Pliers, Screwdriver, Hammer, Adjustable Wrench, Hacksaw, Pipe Wrenches (2), Pipe Cutting and Threading Tools.

Materials: Galvanized Pipe and Fittings (as required to complete job); Pipe Joint Compound or Teflon Tape; Centering Guides - Stock No. 2724.

Safety Pressure Relief Valve Stock No. 2729

For your protection, install this pressure relief valve. Purchase from your local Sears Store.

This relief valve is designed to protect home water systems from excessive pressure. It is factory preset to start relieving pressure at 75 PSI (pounds per square inch). Use only on home water systems with pumps listed in this Owners Manual.

1. For maximum protection, locate valve within 2 ft. of the pressure tank.
2. Install valve directly in pipe tee. Do not use any reducers or pipe extensions. Tee must be located in main pump supply line to tank. See diagram Page 4.
3. Protect relief valve from freezing, dirt, and any other possible damage that would cause the valve not to function.
4. Long lengths of pipe or hose connected to the relief valve discharge port can limit the amount of water and pressure that can be relieved. If necessary to pipe away from relief valve, use minimum 1-1/4" plastic pipe.
5. Protect everything in the immediate area of the relief valve from water damage in the event the relief valve operates.

Gauge

A Pressure Gauge, Stock No. 2768, can be installed. It will indicate the pressure at which pump starts and stops and any pressure in between.

The Motor

The motor is water filled type, and is ready to run as received.

Pressure Switch

Install an automatic pressure switch (Stock No. 2782) set to start pump at 40 lbs. pressure and stop pump when the system pressure reaches 60 lbs. See Figures 2 and 3, Page 4.

Tank

The tank serves two functions. It provides a reservoir of water, which can be drawn off through the house fixture. The tank maintains a cushion of air under pressure. When tank pressure falls far enough, pump will start.

Two types of tanks are available: Captive Air® and Standard. The Air Volume Control (AVC) maintains the cushion of air in Standard Tanks. No Air Volume Control is needed with a Captive Air® Tank.

Air Volume Control

A device mounted on a standard tank in order to keep enough air in the tank to prevent waterlogging the tank. Operating a water system with no air cushion in the pressure tank can cause water hammer, rapid pump cycling, and damage to the system.

Engine-Generators For Submersible Pumps

Listed are the minimum Watt ratings for Engine Generators required to power your Submersible Pump motor in the event of an electrical power failure.

Any additional loads, such as lights, must be added to these loads, and the correct size used.

Be sure your generator is the same voltage as your submersible motor. See Table II, Page 3.

Pump Motor HP	Minimum Watt Rating of Generator	
	3-Wire Motors	2-Wire Motors
1/2	2,000	2,400
3/4	3,000	2,900
1	4,000	-
1-1/2	5,000	-
2	7,500	-
3	10,000	-

Overload Protector

This is a safety switch which opens when a momentary short or surge of power occurs or when the pump is stuck or locked with sand. It prevents the motor from burning out. It is built into the pump motor (2-Wire motors and 1/2 through 1 HP 3-Wire motors) or the Control Center (1-1/2 through 3 HP 3-Wire motors). 1/2 through 1 HP motors automatically restart after the motor cools. If the protector continues to open, the trouble should be located before continuing operation. 1-1/2 through 3 HP motors must be manually reset at control center.

Centering Guides

Install centering guides (Stock No. 2724) to keep the pump, pipe, and electrical cable from coming in contact with the well casing wall. Purchase separately.

Control Center (3-Wire Pumps only)

The control center contains the electrical equipment (other than the pressure switch) needed to start and run a 3-Wire motor.

Mark mounting screw locations on the wall and hang control center as close to pressure tank as possible. BE SURE to mount Control Center so that it hangs vertically and is level. It may not function normally otherwise.

NOTICE: References to "2-Wire" or "3-Wire" motors refer to the load-carrying wires running to the motor. All motors have a ground wire in addition to the load conductors, so that you will see *four* wires when looking at a "3-Wire" motor (3 load conductors plus a ground wire), and three wires when looking at a "2-Wire" motor (2 load conductors plus a ground wire). "3-Wire" motors require an electrical disconnect switch plus a Control Center; "2-Wire" motors use only an electrical disconnect switch.

ELECTRICAL

WIRING

⚠ WARNING Hazardous voltage. Can shock burn, or cause death. Install pump with all electrical wiring and grounding in accordance with your local electrical code. Install and use pump only in a well application. Disconnect power before installing pump, pressure switch, and control center.

Make sure power is off before wiring control center. Follow wiring diagram, Figures 4 and 5.

Make sure that the line voltage and frequency stamped on the motor nameplate agree with the voltage and frequency of the electrical power supply. If in doubt, check with your electric power company or a licensed electrician.

Check Fusing and Wiring Chart before connecting wires from pressure switch to electric power. All wiring must comply with your local electrical code.

See Chart, Page 3.

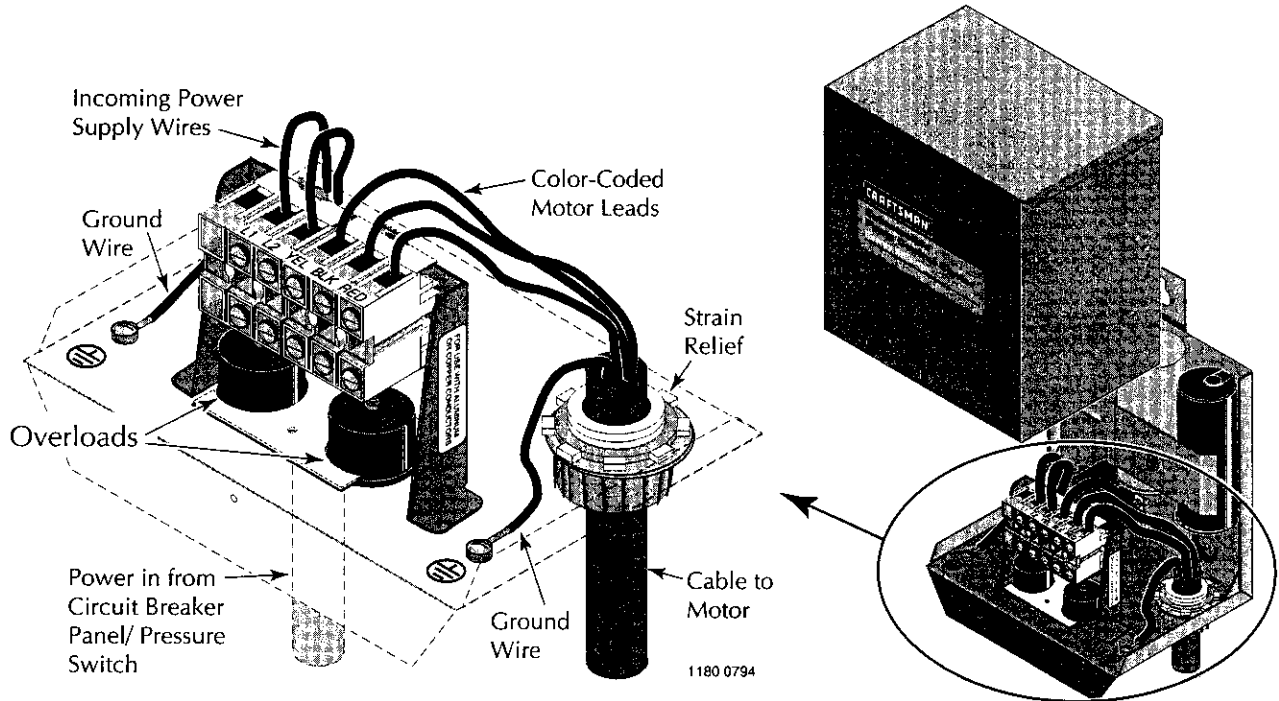


Figure 4: Wiring connections for 1-1/2, 2, and 3 HP Control Centers.

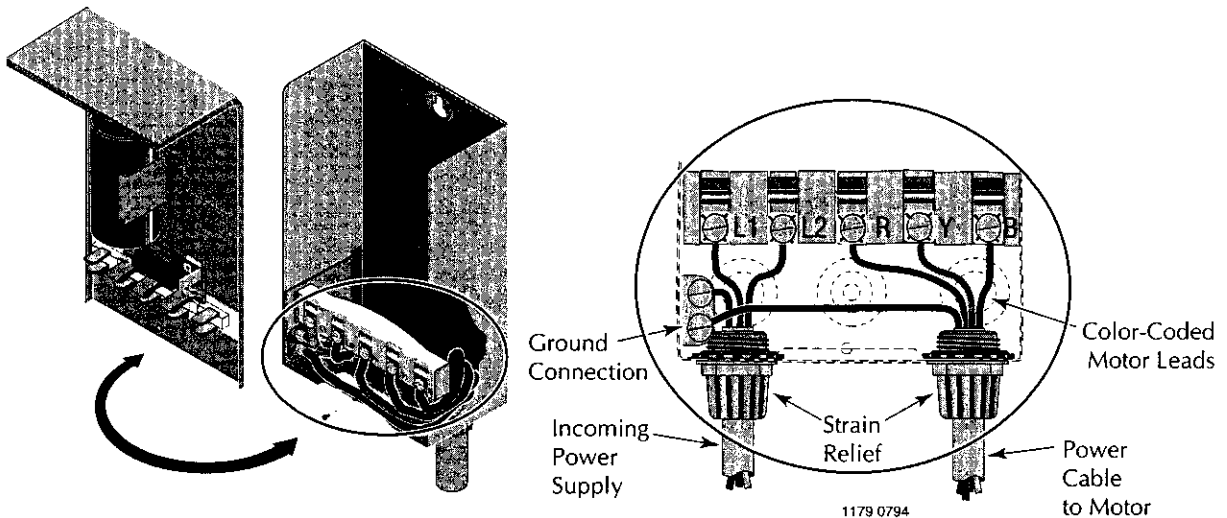


Figure 5: Wiring connections 1/2, 3/4, and 1 HP Control Centers.

ELECTRICAL

Important Electrical Grounding Information

⚠ WARNING Hazardous voltage. Can shock, burn, or kill. To reduce the risk of electrical shock during pump operation, ground and bond the pump and motor as follows:

- To reduce risk of electrical shock from metal parts of the assembly other than the pump, bond together all metal parts accessible at the well head (including metal discharge pipe, metal well casing, and the like). Use a metal bonding conductor at least as large as the power cable conductors running down the well to the pump's motor.
- Clamp or weld (or both if necessary) this bonding conductor to the grounding means provided with the pump, which will be the equipment-grounding terminal, the grounding conductor on the pump housing, or an equipment-grounding lead. The equipment-grounding lead, when provided, will be the conductor having green insulation; it may also have one or more yellow stripes.
- Ground the pump, motor, and any metallic conduit that carries power cable conductors. Ground these back to the service by connecting a copper conductor from the pump, motor, and conduit to the grounding screw provided within the supply-connection box wiring compartment. This conductor must be at least as large as the circuit conductors supplying the pump.

Save these instructions.

Surge Protection

For protection against damage caused by high voltage surges, your motor has built-in surge protectors.

NOTICE: Surge protectors **will not** protect against direct or near direct lightning strikes!

GROUNDING

Permanently ground all electrical components in accordance with the National Electrical Code and applicable local codes and ordinances. Make a permanent ground using a conductor of correct size from a grounded lead in the service panel or a properly driven and grounded ground rod. **DO NOT** ground to a gas supply line. **DO NOT** connect to electric power supply until unit is permanently grounded.

If plastic well casing is used in your installation, ground the metal well cap or well seal, providing electrical leads to the pump motor go through the well cap or well seal.

The grounding conductor need not be larger than the circuit conductors supplying the motor providing circuit conductors conform to the wiring data provided in this manual.

CABLE SPLICING

NOTICE: Match colors of wires in cable to colors of wires coming from motor.

For #14, #12, or #10 Wire Cable Installation

Included in the splice kit are three plastic splice insulators and four butt connectors; use two insulators on "2-Wire" motors and 3 insulators on "3-Wire" motors. The extra connector is for the ground lead. The insulating sleeves can be used on wire cable sizes #14, #12 and #10. No tape is required for this type of joint. To use the insulators stagger the pigtail ends of the motor leads and the cable. Cut each lead about 4" longer than the last one.

Method #1: Soldering (Figure 6).

Stagger the pigtail ends of the motor leads and the cable. Cut each lead about 4" longer than the last one. Trim the insulation back 1/2" on each lead. Unscrew the plastic caps from the insulator. Place parts on each end of the wire to be spliced, as shown.

Unscrew the plastic caps from the insulator. Place parts on each end of the wire to be spliced, as shown in Figure 6. Then proceed to splice the wires. Strip both wire ends about 1-1/2". Be sure the surface is scraped clean. Overlap the two ends so there is about 1/2" space between the insulation ends. Twist the wire about 1-1/2 turns. With pliers, wind the remaining wire on each end closely around the other wire as shown. Use a soldering iron and a resin core solder or pure solder with a non-acid soldering paste to solder the joint.

After splicing, center the body of the insulator over the splice. Slide the neoprene sleeves down into the recesses in the body as far as they will go. Screw the caps on to the insulator, tightening them securely by hand. This makes a strong, waterproof splice.

Method #2: Crimptype Connectors (Figure 6)

Stagger the pigtail ends of the motor leads and the cable. Cut each lead about 4" longer than the last one. Trim the insulation back 1/2" on each lead. Unscrew the plastic caps from the insulator. Place parts on each end of the wire to be spliced, as shown.

Splice the wires with a butt-type connector using a crimping tool. After splicing, center the body of the insulator over the splice. Slide the neoprene sleeves down into the recesses in the body as far as they will go. Screw the caps onto the insulator, tightening them securely by hand. This makes a strong waterproof splice.

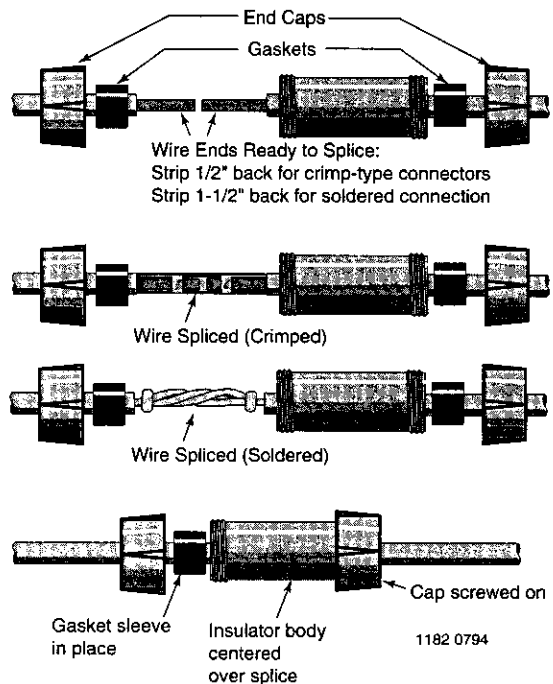


Figure 6: Crimped splice and soldered splice.

ELECTRICAL / PIPING INSTALLATION

Method #3: Cable Splicing for #8 Wire Cable (Splice to #10 or smaller wire ONLY)

1. Remove 3/8" insulation from end of motor pigtail leads and from drop cable leads.
2. Place heat shrink tubing over motor pigtail leads.
3. Insert leads into butt connector and crimp with crimping tool. Pull leads to check connection.
4. Center tubing over butt connector and apply heat with a propane torch (a match or lighter will not supply enough heat).

NOTICE: Keep torch moving; too much concentrated heat in one place will ruin tubing and may damage wires.

5. When tubing begins to shrink, increase concentration of heat at center of tube. As center of tube collapses on wire, work heat out to each end until entire tube is collapsed tight around wire.

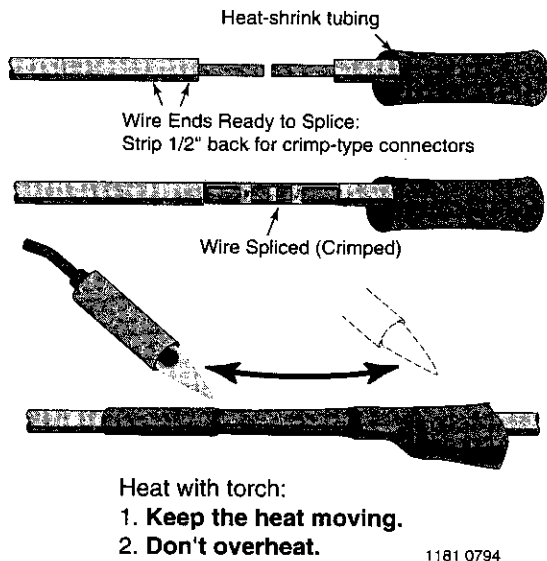


Figure 7: Heat-Shrink Splicing.

"Do It Yourself" Installation with polyethylene plastic pipe

(For Installation of Steel Pipe, See Pages 10 & 11)

This "Proven" Do-It-Yourself Installation section is intended to help anyone installing Sears Submersible pumps. If these simple instructions are followed, you will have a successful and professional installation that will last as long as there is water in the well.

Polyethylene Pipe is recommended in all "Do-It-Yourself" installations. Steel pipe weighs 12 times as much as plastic pipe and special equipment is required. 100 PSI plastic pipe can be used to depths of 100'. 160 PSI plastic pipe can be used to depths of 220'.

The depth and the drawdown level of a new well can be obtained from the well driller. The drawdown water level is the lowest level to which the water in the well will drop while being pumped.

NOTICE: If there is a chance that pump can overpump well, install a Pump Guard (Stock No. 2721) to prevent running pump dry.

If depth of well and the distance to the water level in the well are not known, See page 4. The pump should not be set closer than 5 feet from the bottom of the well and should be submerged 15 to 20 feet below the draw down water level. If the draw down water level is not known, set the pump 5 feet from the bottom of the well.

Install centering guides (purchase from Sears - Stock No. 2724). These are used to keep pump, pipe and electrical cable centered in the well.

NOTICE: Install a torque protector (available locally) to protect pipe from twisting damage due to motor starting.

To prevent dropping anything into the well, keep the top of the casing covered.

Lay pump near the well, discharge end pointing outward. Also lay out the well seal or pitless adapter if used, plastic pipe, safety rope, hose clamps, centering guides, tape, electrical cable and tools. If this is a standard pressure tank installation, also lay out the bleeder orifice piping as shown in Figure 8 (below) and Figure 1 on Page 4.

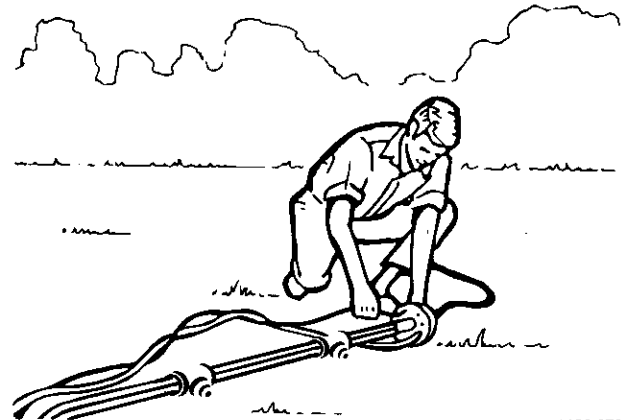


Figure 8

NOTE: The bleeder orifices, check valve and air volume control required for standard tanks are not furnished. A special Air Volume Control Kit containing these parts is available from Sears Product Service, 1-800-366-7278. Not needed with Captive Air® tank.

Assembly of all components that go into the well should be made horizontally on the ground and then lowered into well.

1. Install a nylon adapter in the pump discharge tapping. Use Teflon tape on male threads only.
2. Unroll the plastic pipe in a line away from the pump. Be sure the ground is smooth so as not to damage the pipe or electrical cable.
3. Cut off sealed ends of plastic pipe. Use a sharp knife or hacksaw.



PIPING INSTALLATION

4. Trim centering guides if necessary. Centering guides will fit 6 inch or larger well casings and 1 inch drop pipe. For 4 or 5 inch casings, the outside tabs must be trimmed with a hacksaw or knife. See marks on tabs. For drop pipe sizes 1-1/4 and 1-1/2 inch, inside hole of guide must be trimmed. See marks on guide. **NOTE:** Do not cut hole oversize. A snug fit works best.

5. Slide centering guides on the plastic pipe. First guide should be located about 6 inches above the pump discharge connection. Additional guides should be located at equal intervals on the plastic pipe.

After placing first guide about 6 inches above the discharge connection, place a stainless steel hose clamp above the guide. This will prevent guide from sliding up pipe as pump is lowered in well. On other guides, place clamp above and below it to maintain position.

6. Slide plastic pipe on to the nylon adapter until it is up to the shoulder on the adapter. Clamp pipe to adapter with 2 stainless steel hose clamps. Place the screw mechanisms on clamps opposite each other. Tape down excess length of hose clamp band.

7. Feed motor leads through the first centering guide. Make electric cable splices according to choices on Pages 7 and 8. Stagger the splices by cutting one lead about 4 inches longer than the other one. Tape splices to the plastic pipe. Note that staggering prevents the splices from rubbing on the well casing.

8. Unroll the balance of the electrical cable along side of plastic pipe. Be sure not to damage the insulation or kink the wire. Now go back and feed the cable through the centering guides located along the pipe.

9. If necessary, cut plastic pipe shorter than proper depth setting to allow for bleeder orifice piping assembly or distance down to your pitless adapter.

10. If a standard pressure tank system is being used, make up bleeder orifice assembly as shown in installation drawings (Figure 1, Page 4). Using teflon tape on all male threads. Assemble this unit to the plastic pipe in same manner as outlined in Step 6.

CAUTION Assembly may slip through well seal.

Install an elbow on the pipe above the well seal. This safety measure will prevent dropping the pipe and pump into the well when lowering it.

11. If a Captive Air® pressure tank system is being used, assemble as shown in the typical pump installation with Captive Air® Tank (Figure 1, Page 4). Note that bleeder orifices and check valves are not used.

12. If well seal is used, assemble safety ring in bottom part of the seal.

13. At about every five feet, tape electrical cable to the pipe (Figure 9). Use 1-1/2 to 2 wraps of tape. This will allow some freedom of cable movement to allow for stretch of the plastic pipe. Leave a surplus of electrical cable at the top for splicing purposes. Surplus can be neatly tucked into top of well casing.

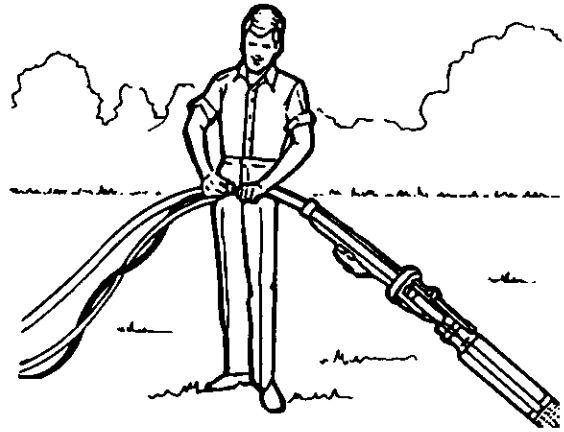


Figure 9

14. Tie safety rope to pump discharge casting in holes provided. Thread the rope through the centering guides. It is not necessary to tape rope to the pipe. Remove as much slack as practical and tie to ring in well seal or well cap in the case of a pitless adapter.

CAUTION Risk of cable damage and electrical shock. Never support the weight of the pump and pipe on the electrical cable. Use the drop pipe for this purpose. Protect the cable from damage when lowering the unit in the well.

15. To lower the pump into the well will require one person at the well doing the actual lowering, and another at the top end of the assembly. Stand as close as possible to well and lower the unit. (Figure 10).

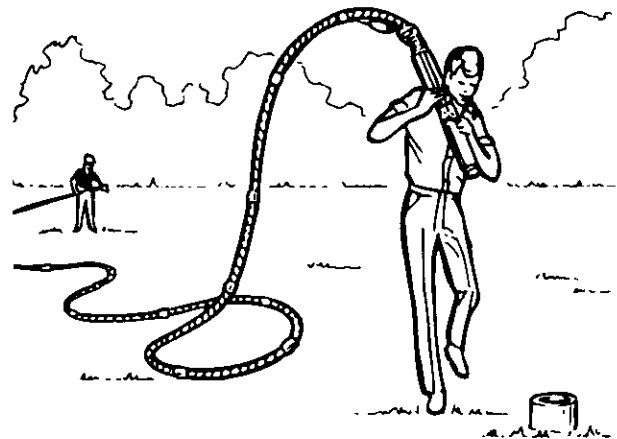


Figure 10

Do not rub the pipe or electrical cable on the top of the casing. The second person will bring the assembly toward the well during the lowering process. Clean off any material picked up from the ground as you lower.

16. If this is a well seal installation, wiring can be completed after well seal is in place. If this is a pitless adapter installation, make final splice at time of well development or when pitless adapter connection has been made.

INSTALLATION

17. Develop the well - See "Well Development and Pump Test".
18. Before piping up a Captive Air® Tank, be certain air pressure in tank is the same as the cut-in pressure of the pressure switch. For additional information, see instructions on tank or in the tank owners manual. Complete piping to pressure tank.

Installation with Steel Pipe

1. Read the "Do It Yourself Installation with Plastic Pipe" section first. Information on the following items will be found there:

Depth to water	Well Depth
Drawdown	Proper Pump Setting
Centering Guides	Electrical Cable Splicing
Testing the Pump	Pressure Tanks

2. Screw a length of galvanized pipe into discharge of pump.
3. With the pump and pipe in vertical position, tape cable to pipe just above and below the splice connections.
4. Lower pump into well and tape cable to pipe every 10' with plastic tape. For easy and safe handling in lowering pump into well, it is advisable to use a tripod with a block and tackle. A pipe holder should always be used to support the assembly on top of the well casing while making up the next length of pipe. See Figure 11 below.

CAUTION Risk of cable damage and electrical shock. Never support the weight of the pump and pipe on the electrical cable. Use the drop pipe for this purpose. Protect the cable from damage when lowering the unit in the well.

5. Add sufficient length of pipe to the pump discharge, using pipe joint compound on male threads, until the pump is at the proper setting.

The pump should not be set closer than 5 feet from the bottom and should be submerged 15 to 20 feet below the

draw down water level. If drawdown level is not known, set the pump 5 feet from the bottom of the well.

6. Develop the well - See "Well Development and Pump Test," below.
7. Refer to **Typical Pump Installation Drawings** for proper method of piping depending on the type of pressure tank used.

Well development and pump test

Proper well development will normally clear out all solid materials in the well water. It will also tell you if the well is capable of supplying the full capacity of the pump. If you are not certain of the draw down water level in your well, this can also be measured after pumping at maximum flow for a period of time.

Well development simply means pumping at very low flow rate to start with and gradually increasing the flow to its maximum. The quality of the water must be visually checked throughout the procedure.

The amount of time spent on well development will vary depending on the condition of the water. Allow yourself at least 2 hours continuous running and do not become alarmed if it takes 4, 5 or more hours to clear up the water.

This well development procedure will assure you of long, no-pump wear, trouble free operation.

Do not start pump with discharge open unless this development procedure has been done and well is clear.

1. Connect temporary piping as shown in Figure 12, below. This includes a gate valve for flow regulation.
2. Connect motor leads and electric power supply. See Figures 4 and 5, Page 6.

Do not start pump yet!

3. Close the gate valve and then carefully open slightly to allow a small amount of water to be pumped.

You can now start your pump!

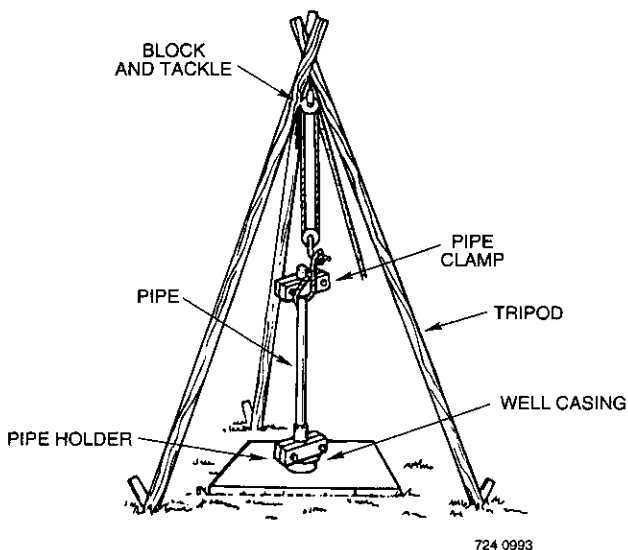


Figure 11

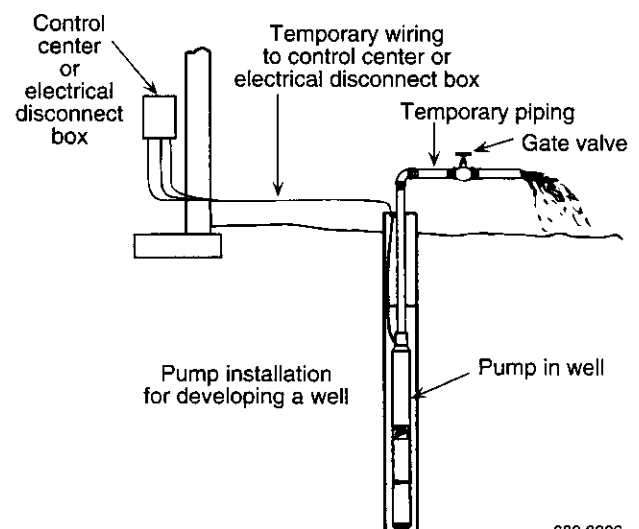


Figure 12

INSTALLATION

Low flow will not harm your pump. With the gate valve set in this position, allow water to be pumped on the ground until it is completely clear of solids such as silt and sand. This can be checked by catching some water in a glass container and waiting a period of time to let the solids in the water settle to the bottom of the container.

When the water completely clears, open the valve several turns to increase the flow rate and repeat the checking procedure for solids.

Continue the flow-checking procedure until the valve is completely open and water is free of solids.

4. Turn off electric power and remove temporary piping and wiring. Proceed with final installation.

Pitless Adapter

Follow instructions included with your pitless adapter for installation.

Well Seal

Tighten the 4 bolts on the well seal, thus compressing the rubber sealing member and sealing the well casing, the drop pipe and the cable conduit. A conduit fitting should be used in order to seal the cable at the top of the well seal. Install an air vent in the third opening in the sanitary well seal as shown in the diagrams, Figure 1, Page 4.

Complete Installation and Check Operation

At this point the necessary piping to complete this installation to the tank should be added.

For suggested methods of piping to the tank, refer to Figures 2 and 3, Page 4, for the pressure tank system being installed.

Where the tank and controls are installed in a basement or at another location away from the well, it is necessary that the pipe leading from the tank back to the well be buried below the frost line to prevent freezing.

When all connections have been made, the pump is ready for operation.

Turn on switch. The pressure switch will stop the pump at 60 PSI, and will allow it to start again when enough water has been drawn to reduce the water system pressure to 40 PSI. This can be checked by opening a faucet and drawing water until the pump starts again.

NOTICE: Be sure there is no excessive sand in the water. Sears, Roebuck and Co. and the manufacturer cannot be responsible for damage to the pump and motor caused by excessive sand. (See **Well Development.**)

NOTICE: If there is a chance the pump can over-pump well, install a Pump Guard (Stock No. 2721) to protect against dry running.

HELPFUL HINTS – TROUBLES, CAUSES & REMEDIES

Trouble	Causes	Remedies
Little or no water delivered.	<p>A. Water level in a low producing well drops too low while pump is operating, causing air lock, loss of prime and possibly seriously damaging pump.</p> <p>B. Intake screen partially plugged.</p> <p>C. Check valve(s) may be stuck.</p> <p>D. Voltage too low; motor will run slowly, causing low discharge pressure (head) and high operating current draw.</p> <p>E. <i>Standard tanks only;</i> check valve above bleeder orifice assembly may be stuck or installed backwards.</p> <p>F. Impellers or diffusers worn due to sand or abrasives in water or running pump while it is air/gas-locked.</p>	<p>A. Lower pump further into well, but make sure it is at least five feet above well bottom. Install a valve in discharge pipe between pump and pressure tank. Use valve to restrict flow until discharge rate does not exceed well recovery rate.</p> <p>⚠ WARNING To prevent possibility of dangerous high pressure, install a relief valve in discharge pipe between pump and flow restriction valve. Relief valve must be capable of passing full pump flow at 75 PSI.</p> <p>B. Lime or other matter in water may build up on screen. Pull pump and clean screen.</p> <p>C. Make sure that built-in check valve in pump and any check valves in discharge line are free to open properly.</p> <p>D. Have a competent electrician verify voltage at electrical disconnect box (2-Wire) or control center (3-Wire) while pump is operating. If voltage is low, power company may need to raise it or installation may require larger wire. Discuss with power company or licensed electrician.</p> <p>E. Examine check valve; if stuck free it. If installed backwards (arrow on valve body will show direction of flow), reverse it. If valve is defective, replace it with a new one.</p> <p>F. Pull pump and return to Sears for service. Before reinstalling pump, sandy or gaseous conditions in well must be corrected.</p>
Air or milky water discharges from faucets.	<p>A. Air volume control not functioning, causing air to build up in tank.</p> <p>B. Well water may be gaseous.</p>	<p>A. Replace air volume control if necessary.</p> <p>B. If your well is naturally gaseous and your system has a standard tank, remove the bleeder orifices and plug the tees. If condition is serious, check with competent well professionals.</p>
Pump starts too frequently.	<p>A. Leak in pressure tank or plumbing.</p> <p>B. Pressure switch defective or out of adjustment.</p> <p>C. Check valve leaking.</p> <p>D. Tank waterlogged.</p> <p>E. Drop pipe leaking.</p> <p>F. Pressure switch is too far from tank.</p>	<p>A. Check all connections with soapsuds for air leaks. Fix any leaks you find. Check plumbing for water leaks. Fix any leaks you find.</p> <p>B. If necessary, replace switch.</p> <p>C. Inspect valves and replace if necessary.</p> <p>D. Captive Air® Tanks: Check tank for leaks; correct if possible. Recharge tanks to 20 PSI with a 20-40 PSI switch, 30 PSI for a 30-50 PSI switch, 40 PSI for a 40-60 PSI switch, etc. Standard Tanks: Check tank for leaks; correct if possible. Check bleeder orifices and clean bleeders; replace if necessary.</p> <p>E. Raise one length of pipe at a time until leak is found. When water stands in pipe, there is no leak below that point.</p> <p>F. Move pressure switch to within one foot of tank.</p>



HELPFUL HINTS – TROUBLES, CAUSES & REMEDIES

Trouble	Causes	Remedies
<p>Fuses blow or overload protector trips when motor starts.</p>	<p>A. Fuses or wires too small. B. Low or high voltage.</p> <p>C. Motor stuck or binding (abrasive material, such as sand, may lock pump).</p> <p>D. Cable splices or motor windings grounded, shortened, or open.</p> <p>E. <i>3-Wire only</i>: Cable leads may be improperly connected in control center.</p> <p>F. <i>3-Wire only</i>: There may be a broken wire in the control center.</p> <p>G. <i>3-Wire only</i>: Starting or running capacitor in control center may be defective or vented (blown out).</p>	<p>A. Replace with correct sizes (see Table II, Page 3).</p> <p>B. While motor is running, voltage should not exceed plus 10% or minus 5% of rated voltage shown on motor nameplate. Call electric power company to adjust line voltage if it is not within these limits.</p> <p>C. Pull pump and clean it. Before reinstalling pump, clean well carefully (see Page 10) for well development procedure). If necessary, clean well carefully with sand pump or by bailing. NOTICE: If well is sandy or dirty and cannot be cleaned or a suitable sand screen installed, do not reinstall pump.</p> <p>D. Consult competent electrician or service technician.</p> <p>E. Check wiring diagram on control center panel (also see Figures 4 and 5, Page 6, in this manual) and color coding of drop cable.</p> <p>F. Have a competent electrician examine all connections and wiring in control panel. If necessary, repair them.</p> <p>G. Inspect capacitors (see Figures 4 and 5, Page 6). Have competent electrician check capacitors. Replace if necessary.</p> <p>⚠ WARNING Hazardous voltage. Can shock, burn, or cause death. Capacitors may still carry voltage charges even after being disconnected from wiring. Have them checked by a competent electrician.</p>
<p>Motor will not start but does not blow fuses.</p> <p>⚠ WARNING Hazardous voltage. Can shock, burn, or cause death. Only competent electricians should work on electrical service.</p>	<p>A. No voltage to motor.</p> <p>B. Cable splices or motor windings may be grounded, shorted, or open-circuited.</p> <p>C. Open circuit in control center (3-wire only); faulty connections; faulty wires.</p> <p>D. Faulty pressure switch.</p> <p>E. <i>3-Wire only</i>: Cable leads improperly connected in control center.</p>	<p>A. With voltmeter check 1) fuse box to make sure full voltage is available; 2) pressure switch terminals, to make sure pressure switch is passing voltage correctly; and 3) terminal strips in control center or disconnect switch box to make sure voltage is available there. 1-1/2 through 3 HP: Push red overload reset button(s) on bottom of control center.</p> <p>B. Consult competent electrician or service technician. <i>Do not attempt to disassemble pump or motor.</i></p> <p>C. Examine all connections and wires; examine terminal strips in control center (3-wire only); repair if necessary.</p> <p>D. Check pressure switch; replace if necessary.</p> <p>E. Check wiring diagram on control center panel (also see Figures 4 and 5, Page 6, in this manual) and color coding of drop cable.</p>
<p>Pressure switch fails to shut off pump.</p>	<p>A. Voltage too low; motor will run slowly, causing low discharge pressure (head) and high operating current draw.</p> <p>B. Faulty pressure switch.</p> <p>C. Impellers or diffusers worn (due to sand or abrasives in water or running pump while it is air- or gas-locked) to the point that pump does not develop sufficient pressure to activate switch.</p> <p>D. Drop pipe leaking.</p> <p>E. Water level in well may become too low when pump is running.</p>	<p>A. Have a competent electrician verify voltage at electrical disconnect box (2-wire) or control center (3-wire) while pump is operating. If voltage is low, power company may need to raise it or installation may require larger wire. Discuss with power company or licensed electrician. Check voltage with a recording meter if trouble reoccurs.</p> <p>B. Replace switch.</p> <p>C. Adjust switch to allow for reduced pressure coming from pump. If adjustment does not solve problem, it may be necessary to replace pump. If well water contains enough sand to cause undue wear on the pump, clean out well or install a suitable sand screen before reinstalling pump. See "Well Development", Page 10.</p> <p>D. Raise one length of pipe at a time until leak is found. When water stands in pipe, there is no leak below that point.</p> <p>E. Lower pump further into well, but make sure it is at least five feet above well bottom. Install a valve in discharge pipe between pump and pressure tank. Use valve to restrict flow until discharge rate does not exceed well recovery rate.</p> <p>⚠ WARNING To prevent possibility of dangerous high pressure, install a relief valve in discharge pipe between pump and flow restriction valve. Relief valve must be capable of passing full pump flow at 75 PSI.</p>
<p>Fuses blow or overload protector trips when motor is running.</p>	<p>A. Low or high voltage.</p> <p>B. <i>3-Wire only</i>: High ambient (atmospheric) temperature.</p> <p>C. <i>3-Wire only</i>: Control Center wrong horsepower or voltage for installation.</p> <p>D. Wire size too small, improperly connected in control center.</p> <p>E. Cable splices or motor windings may be grounded, shorted or open-circuited.</p>	<p>A. While motor is running, voltage should not exceed plus 10% or minus 5% of rated voltage shown on motor nameplate. Call Power company to adjust line voltage if it is not within these limits.</p> <p>B. Make sure control center is installed out of direct sunlight.</p> <p>C. Compare horsepower and voltage rating of motor (from motor nameplate) with those of control center (from control center nameplate). These numbers must match.</p> <p>D. See Table II, Page 3, and make sure wire size matches specifications in table.</p> <p>E. Consult competent electrician or service technician to determine if this is the cause of the problem or not. <i>Do not attempt to disassemble pump or motor.</i></p>

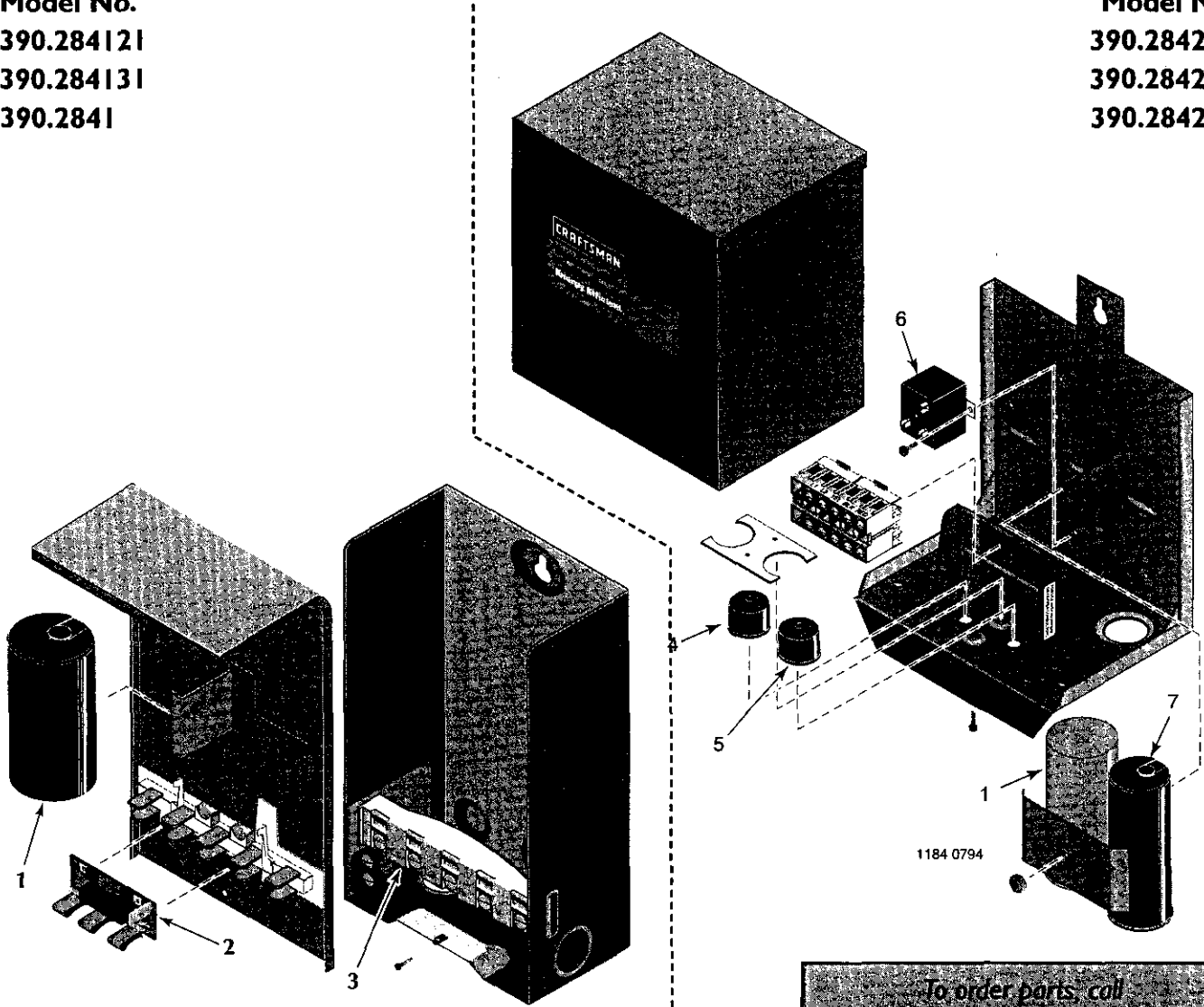
CONTROL CENTER REPAIR PARTS

1/2 HP THROUGH 1 HP

Model No.
390.284121
390.284131
390.2841

1-1/2 HP THROUGH 3 HP

Model No.
390.284251
390.284261
390.284271



*To order parts, call
Sears Product Service
1-800-366-7278*

REPAIR PARTS LIST

230V/60Hz/1Ph							
Key. No.	1/2 HP Model 390.284121	3/4 HP Model 390.284131	1 HP Model 390.2841	1-1/2 HP Model 390.284251	2 HP Model 390.284261	3 HP Model 390.284271	Part Description
1	U17-1172	U17-1173	U17-1174	U17-1174	U17-1174	U17-1175	Start Capacitor
2	U17-1184	U17-1185	U17-1186	-	-	-	Solid State Switch
3	U17-1201	U17-1201	U17-1201	-	-	-	Terminal Strip
4	-	-	-	U17-1190	U17-1191	U17-1192	Start Overload
5	-	-	-	-	U17-1194	U17-1196	Run Overload
6	-	-	-	U17-1187	U17-1187	U17-1187	Voltage Relay
7	-	-	-	U17-1177	U17-1178	U17-1179	Run Capacitor

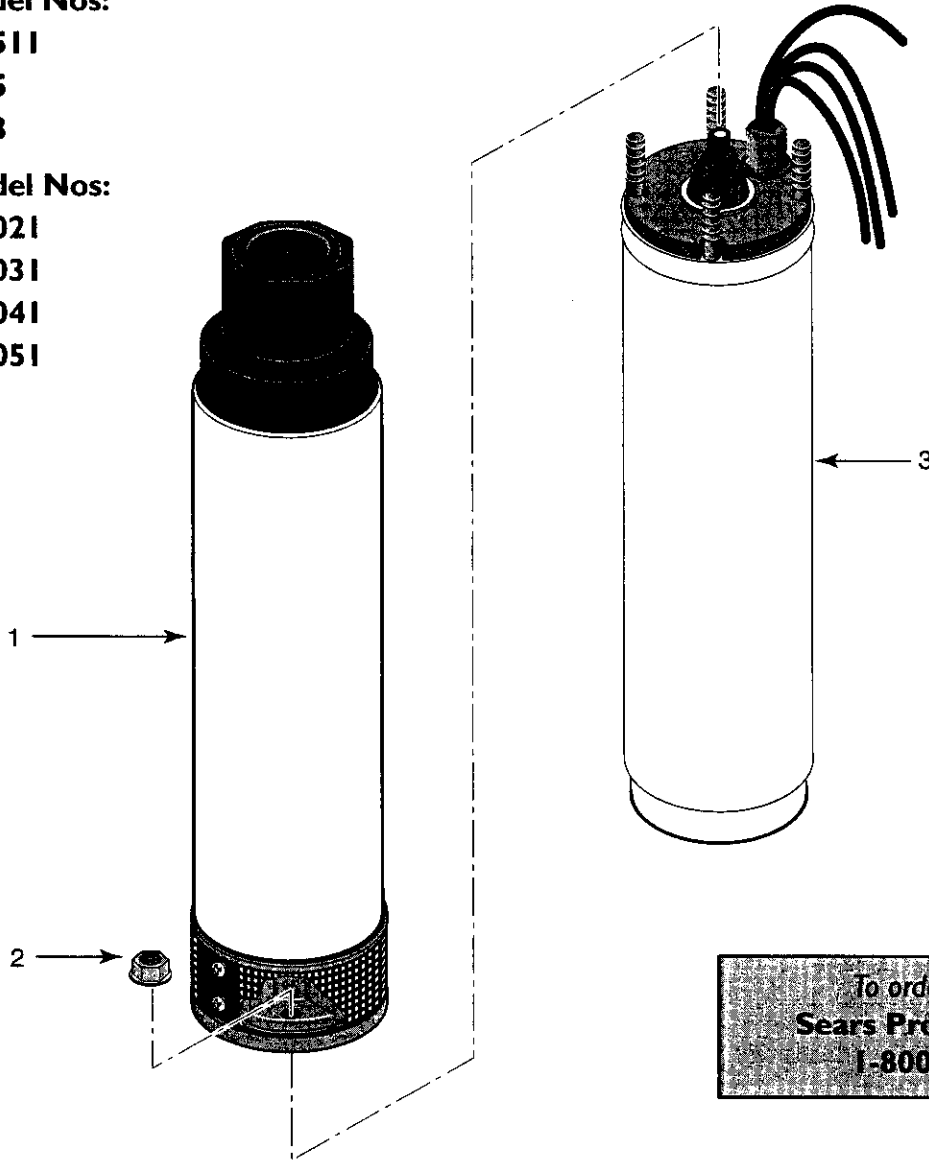
REPAIR PARTS

2-Wire Model Nos:

390.2855 I I
 390.2855
 390.2853

3-Wire Model Nos:

390.28402 I
 390.28403 I
 390.28404 I
 390.28405 I



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REPAIR PARTS LIST

Key. No.	1/2HP/115V Model 390.285511	1/2HP/230V Model 390.2855	1/2HP/230V Model 390.284021	3/4HP/230V Model 390.2853 390.284031	1HP/230V Model 390.284041	1-1/2HP/230V Model 390.284051	Part Description
1	P364-23	P364-23	P364-23	P364-24	P364-25	P364-26	Liquid End Assembly – Complete*
2	33933	33933	33933	33933	33933	33933	Nut - 5/16 Hex (4 Required)
3	P564-31	P564-32	-	P564-33	-	-	Motor (2-Wire)
3	-	-	P564-24	P564-26	P564-27	P564-28	Motor (3-Wire)

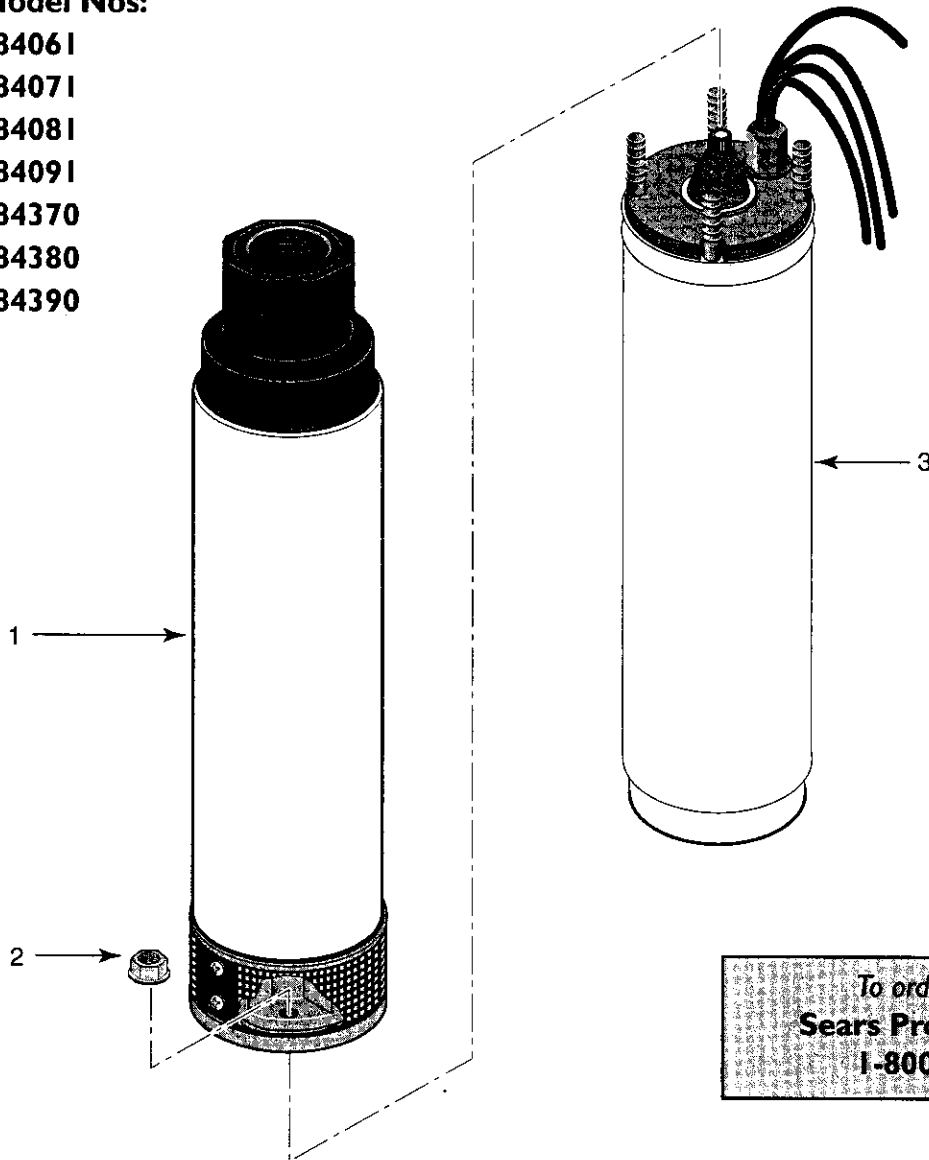
* Includes Lead Guard and Suction Screen



REPAIR PARTS

3-Wire Model Nos:

- 390.284061
- 390.284071
- 390.284081
- 390.284091
- 390.284370
- 390.284380
- 390.284390



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REPAIR PARTS LIST

Key No.	1HP/230V Model 390.284061	1-1/2HP/230V Model 390.284071	1-1/2HP/230V Model 390.284370	2HP/230V Model 390.284081	2HP/230V Model 390.284380	3HP/230V Model 390.284091	3HP/230V Model 390.284390	Part Description
1	P364-27	P364-28	P364-31	P364-29	P364-32	P364-30	P364-33	Liquid End Assembly – Complete*
2	33933	33933	33933	33933	33933	33933	33933	Nut - 5/16 Hex (4 Required)
3	P564-27	P564-28	P564-28	P564-29	P564-29	P564-30	P564-30	Motor

* Includes Lead Guard and Suction Screen

SEARS

OWNER'S MANUAL

3-WIRE SUBMERSIBLE PUMP MODEL Nos.

390.284021 390.284071
390.284031 390.284081
390.284041 390.284091
390.284051 390.284370
390.284061 390.284380
 390.284390

CONTROL CENTER Nos.

390.284121 390.284251
390.284131 390.284261
390.2841 390.284271

2-WIRE SUBMERSIBLE PUMP MODEL Nos.

390.285511
390.2855
390.2853

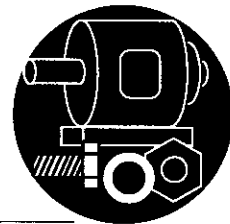
The model number of your Submersible Pump will be found on a plate attached to the pump.

When requesting service or ordering parts, always give the following information:

- Product Type
- Model Number
- Part Number
- Part Description

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(1-800-366-7278)



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(1-800-473-7247)



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Sears Repair Service Center in your area
Call 24 hours a day, 7 days a week
1-800-488-1222



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Maintenance Agreement or to inquire
about an existing Agreement
call 9 am - 5 pm, Monday-Saturday
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