

SEARS

OWNER'S MANUAL

MODEL NO.
390.253251

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

Save This Manual For
Future Reference.



CRAFTSMAN® MULTI-STAGE JET PUMP

- Safety Instructions
- Installation
- Electrical
- Operation
- Maintenance
- Repair Parts

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

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INTRODUCTION

Please read our instructions before installing and using your Deep Well Jet Pump. This will help you obtain the full benefits of the quality and convenience built into this equipment. It will also help you avoid any needless service expense resulting from causes beyond our control which are not covered by our warranty.

FULL ONE YEAR WARRANTY ON CRAFTSMAN® WELL PUMP

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

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, DIRECTLY OR INDIRECTLY FROM THE USE OF THIS PRODUCT.

Some states do not allow the extension 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, Van 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 **will** or **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.

1. To avoid risk of serious bodily injury and property damage, read safety instructions carefully before installing pump.
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 debris from falling into well, contaminating well and possibly damaging pump.

4. Protect pump and piping system from freezing. Allowing pump or water system to freeze could severely damage pump and voids warranty.

⚠ WARNING To avoid serious injury and equipment damage, limit system pressure to 100 pounds per square inch (PSI) or below at all times. Over-pressure can cause tank blowup; install relief valve capable of passing full pump volume at 100 PSI.

5. With a new well, test well for purity before use. Consult local Health Department for procedure.

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

6. Disconnect electrical power source before installing or working on pump.
7. Ground pump with a ground wire run from grounding lug on motor to a grounded lead in the service panel.
8. Line voltage and frequency of electrical power supply must agree with motor nameplate.
9. Use of fuses or wire smaller than size recommended in owner's manual can cause overheating, possible fires, and will void warranty.
10. This pump is a deep well jet pump. It is not designed or intended for shallow well use. Use in a deep well (more than 25' depth to water).

MAJOR COMPONENTS AND WHAT THEY DO

Tank and Air Volume Control

The tank serves two functions:

1. It provides a reservoir of water. Some of this water is drawn off whenever a house fixture is opened (so that the pump doesn't need to start every time you open a tap).
2. It maintains a cushion of air under pressure.

A standard tank requires an Air Volume Control (AVC) to add air to the tank when needed. See the instructions included with the AVC for details of installation and operation.

A Captive Air® tank maintains a constant precharge of air in the tank and does not require an AVC. An annual check on the tank pre-charge pressure is recommended.

Impeller

The pump's impeller rotates with the motor shaft, causing the water to fly out from its rim by centrifugal force. The rotation of the impeller, along with the motion of the water, creates a vacuum at the center of the impeller (the "eye" of the impeller) which pulls in more water.

The Vertical Multi-Stage (VMS) pump has two impellers; the water feeds through them one after the other, with each impeller adding to the pressure. This allows the VMS jet pump to pull water from greater depths and at a higher pressure than a conventional single stage jet pumps.

Jet

The jet is a nozzle/venturi arrangement installed in the well which drives water up to the pump from the well, boosting the water pressure going into the impellers. The jet allows water to be lifted from a greater depth than would be possible with only the impeller eye's vacuum. In order to drive the jet, part of the discharge stream from the pump is diverted back "down the hole" to the jet to help lift water from the well into the pump suction.

Pressure Regulator

The pressure regulator is adjusted at installation to divert the correct amount of water back to the jet for the most efficient operation. Under certain conditions, the pressure regulator may require adjustment during the pump's life (see Page 10) to restore or maintain the pump's efficiency.

Pressure Switch

The pressure switch automatically starts the pump when the pressure in the tank drops to 40 pounds per square inch (PSI) and stops the pump when the tank pressure reaches 60 PSI.

Adapter Flange

The VMS pump is equipped with an adapter flange. This adapter facilitates installation and removal of the pump without disturbing piping. See Pages 6 and 7 for more information.

Pressure Relief Valve

Under certain conditions, VMS pumps can generate very high pressure. The pressure relief valve is installed to make sure that the pressure in the system does not exceed the pressure which the system can carry safely. The pressure relief valve must be able to pass all the water the pump can produce at the system's rated pressure. Install a relief valve (Sears Stock No. 27229) set to open at 75 PSI. between the pump and the tank. There should be no shutoff valves between the pump and the relief valve. See Figures 11 and 12, Page 8, for more information.

Pump Mounting

The pump base has three equally spaced 3/4" NPT threaded sockets. These will take threaded pipe for legs, to allow enough room to make piping connections under the pump.

In the case of a single pipe installation (see below), the pump can be placed directly over the well, using the offset nipple furnished with the casing adapter to connect the pump to the well head.

Piping

When installed on a 'double pipe' jet, one pipe is the pressure or drive pipe; this pipe sends water down into the well to the jet. The other pipe is the suction pipe; this pipe carries water up to the pump suction from the jet. Because of the pressure requirements and depth of multi-stage jet pump installations, use the chart below for pipe selection.

When installed on a single pipe jet, the well casing serves as the drive pipe, carrying water to the jet. The drop pipe inside the well is the suction pipe, carrying water up to the pump from the jet.

Use a 'single pipe' system for a 2" or 3" well; use a 'double pipe' system for a 4" or larger well. See Pages 6 and 7 for details. Follow instructions packed with jet package to get proper nozzle and venturi combination for your pumping depth.

Use 1-1/4" pipe for both suction and drive pipes. A 1" nipple, a 1-1/4"x1" facing bushing, and a 1-1/4" coupling are included in the jet package. These must be used with the jet. (See Figure 8, Page 6, for installation details.)

PUMP PERFORMANCE

Multi-Stage Pump

Pump Performance (in gallons per minute)

Pump Stock No.	Jet Pkg. No.	Discharge Pressure P.S.I.	Pumping Depth In Feet											
			40	60	70	80	90	100	110	120	140	160	180	210
390.253251 1 HP	29670*	40	11.3	10.0	8.8	7.6	6.5	5.0	5.0	5.0	4.2	3.5	2.0	
		60	10.6	8.6	7.5	6.5	5.5	4.8	4.8	4.7	3.9	2.7	1.5	
	29902**†	40	11.7	11.1	10.2	9.2	7.8	6.4	5.1	5.0	4.5	4.0	3.2	2.1
		60	11.0	9.5	8.6	7.8	6.6	5.4	4.7	4.6	4.2	3.4	2.6	1.7
	29660***	40	11.7	11.1	10.2	9.2	7.8	6.4	5.1	5.0	4.5	4.0	3.2	2.1
		60	11.0	9.5	8.6	7.8	6.6	5.4	4.7	4.6	4.2	3.4	2.6	1.7

Use 160 PSI Min. Rating Plastic Pipe.

* Jet Package No. 29670 – 2" Single Pipe (use 1-1/4" galvanized pipe).

** Jet Package No. 29902 – 3" Single Pipe (use 1-1/4" galvanized pipe).

*** Jet Package No. 29660 – 4" Double Pipe.

† Must be ordered through Sears Product Service, 1-800-366-7278.

INSTALLATION

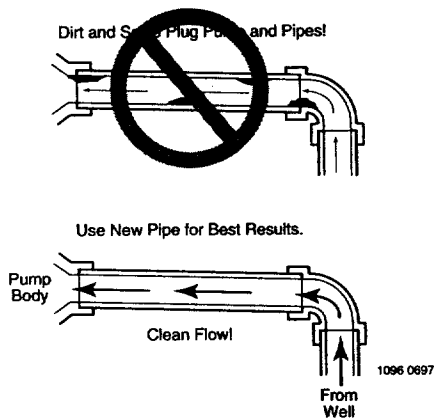


Figure 1 – No Dirt or Scale in Suction Pipe

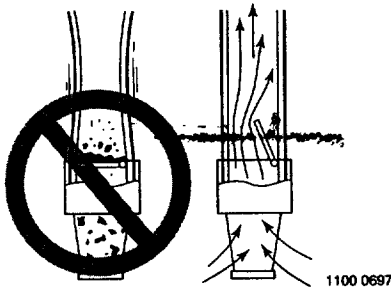


Figure 2 – Foot Valve Must Work Freely

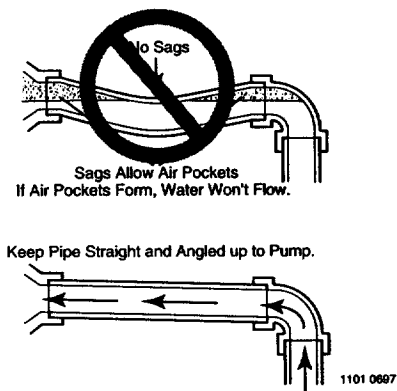


Figure 3 – No Air Pockets in Suction Pipe

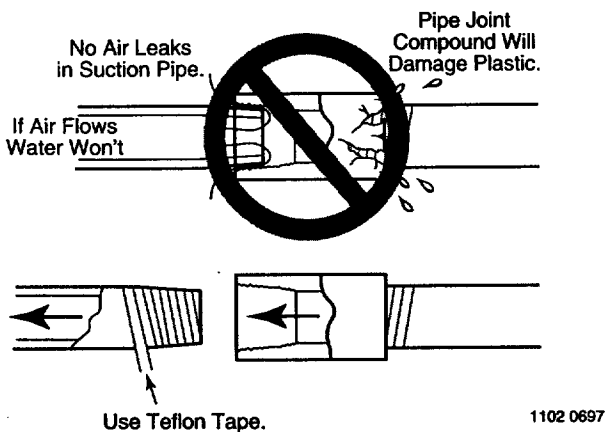


Figure 4 – Suction Pipe Must Not Leak

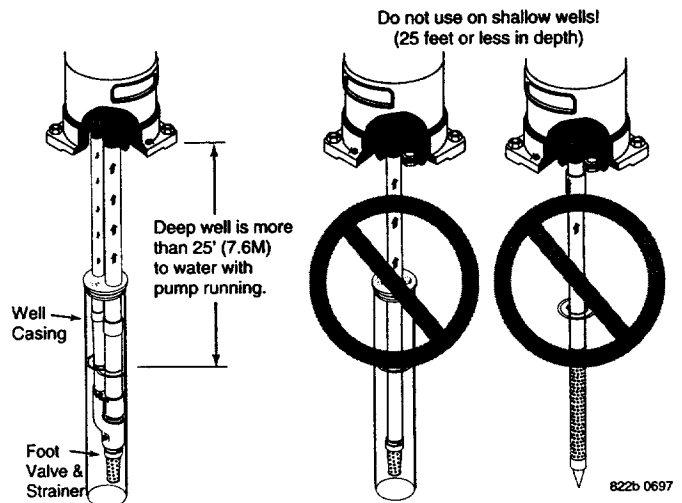


Figure 5 – Use Pump On Deep Well Only

NOTICE: For proper performance, pump **MUST** be matched to ejector and to well depth. Use this pump on wells 25' to 210' deep.

1. Long runs and many fittings increase friction and reduce flow. Locate pump as close to well as possible: use as few elbows and fittings as possible.
2. Be sure well is clear of sand. Sand will plug the pump and void the warranty.
3. Protect pump and all piping from freezing. Freezing will split pipe, damage pump and void the warranty. Check locally for frost protection requirements (usually pipe must be 12" below frost line and pump must be insulated).
4. Be sure all pipes and foot valve are clean and in good shape.
5. No air pockets in suction pipe.
6. No leaks in suction pipe. Use Teflon tape or Plasto-Joint Stik to seal pipe joints.
7. Match pump to well.
IMPORTANT: Flow into well must at least equal flow out through pump!
8. Unions installed near pump and well will aid in servicing. Leave room to use wrenches.

CAUTION Motor normally operates at high temperature and will be too hot to touch. It is protected from heat damage during operation by an automatic internal cutoff switch. Before handling pump or motor, stop motor and allow it to cool for 20 minutes.

DEEP WELL INSTALLATION FOR DOUBLE PIPE

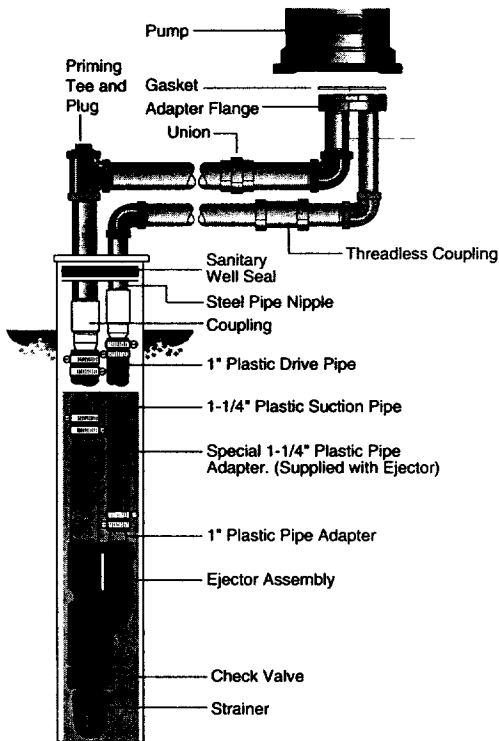


Figure 6 – Offset Installation Plastic Pipe Shown

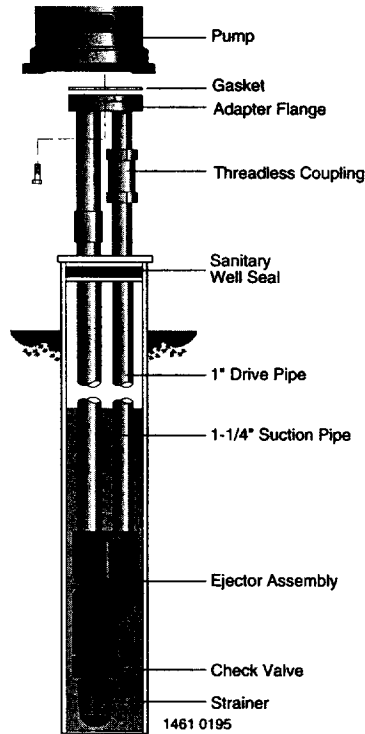
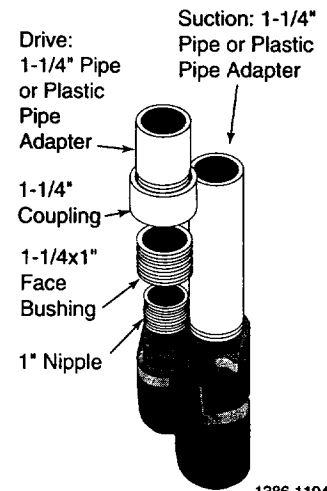


Figure 7 – Over the Well Installation Steel Pipe Shown



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Figure 8 – Jet Assembly With 1" and 1-1/4" Drive Pipes

Piping In The Deep Well

See Figures 6, 7, and 8.

NOTICE: Deep well installations are either single pipe (2" wells) or double pipe (4" and larger wells). In a double pipe installation, the larger pipe is the suction pipe and the smaller pipe is the drive pipe (very deep wells may use suction and drive pipes of the same diameter). Plastic pipe is ideal for double pipe installations. Due to its light weight, it is easy to handle and does not usually require a block and tackle for installation and removal.

Double Pipe Installation – Plastic Pipe

NOTICE: Use Teflon tape on all male threads on plastic pipe and fittings to prevent air leaks in suction piping.

1. Inspect ejector to make sure that nozzle and venturi openings are clean and clear.
 2. Inspect pipe for any foreign matter or obstructions.
- NOTICE:** Make sure that no foreign matter enters pipe openings while installing pump.
3. Make sure foot valve operates freely: attach to ejector with a close nipple. Use Teflon tape on male threads.
 4. Install nozzle and venturi in deep well ejector.
 5. Using Teflon tape on male threads, install special plastic pipe adapter (supplied with ejector) by screwing adapter into 1-1/4" tapped hole in ejector body (see Figures 6 and 8, above).
 6. Thread a 1" plastic pipe adapter or a 1" nipple into

the 1" tapped hole in ejector body (see Figure 8).

7. Install sufficient plastic pipe in well casing to place ejector at the proper depth. (Your well driller should supply this information.)

NOTICE: As a guide, the ejector should be set at least 10 to 20 feet below the lowest water level with pump running, if possible, but always at least five feet from the bottom of the well.

8. Tighten all hose clamps securely on plastic pipe. Use two clamps per joint to prevent air leaks into suction pipe. Clamp screws should be on opposite sides of the pipe. Fill pipes with water to make sure that foot valve and connections do not leak.
 9. Install sanitary well seal on top of well casing; use steel nipple through well seal as shown in Figure 6.
- NOTICE:** Align locating lugs on adapter flange and pump base so that pump discharge will be aligned with piping.
10. Install 1" nipple in one side of adapter flange. Slide threadless coupling down over drive pipe from well. Thread adapter flange onto suction pipe from well and align nipple and drive pipe.
 11. Slide threadless coupling up and secure nipple to drive pipe.
 12. Remove paper backing from adhesive gasket. Apply gasket to adapter flange, making sure that holes line up.
 13. Align locating lugs on pump base with locating lugs on adapter flange; attach pump to flange with cap screws provided.

DEEP WELL INSTALLATION FOR SINGLE PIPE

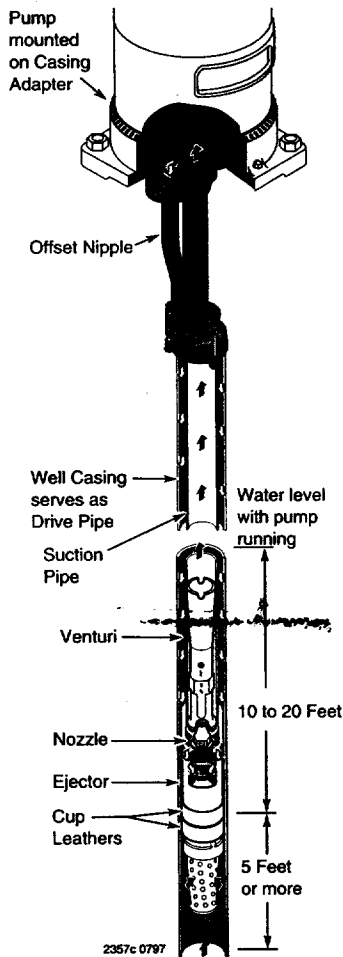


Figure 9

14. See "Discharge Pipe Sizes" for information regarding correct discharge pipe size.

Steel Piping

The special adapter nipple is not used with steel piping.

To more safely lower steel piping into the well, build a tripod out of 2x4 lumber. A couple of pipe clamps can also be made of 2x4s secured with 1/2" bolts (see Figure 10B). Always install the coupling at the top end of the pipe joint and install the pipe clamp below the coupling. This will prevent accidentally dropping the pipe into the well if the clamp slips. With steel pipe, be sure all joints are clean and the ends reamed before installing; use teflon tape or pipe joint compound at each joint to prevent leakage.

Use a lever hoist (a "come-along") to lower pipe into well (see Figure 10A). As each section of piping is lowered into the well, fill it with water. This will help prime the system and also serves as a check on leaks which may occur in the piping and foot valve as the piping is assembled.

Single Pipe Ejector Installation

Single pipe installations require (see Figure 9):

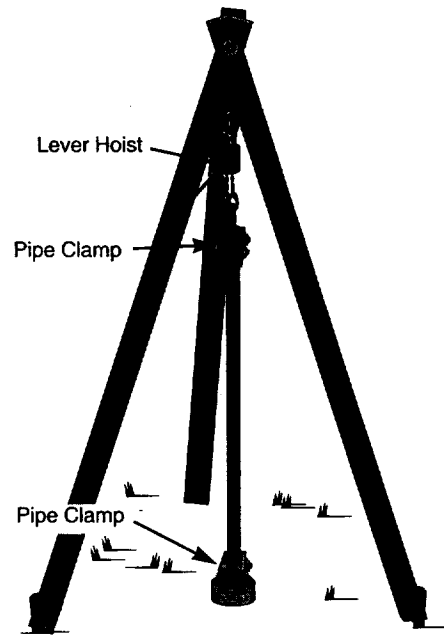


Figure 10A – Use tripod and lever hoist to lower pipe into the well

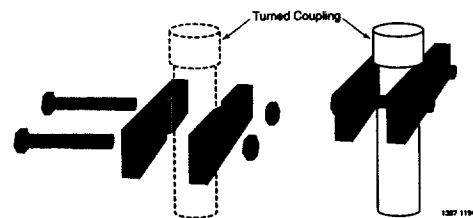


Figure 10B – Pipe clamp detail

- Galvanized steel suction pipe.
 - Leather packer-type ejector with built-in foot valve.
 - Turned couplings (supplied with packer-type ejector).
 - Well casing adapter (supplied with packer-type ejector).
- Connect ejector to first length of pipe. Use pipe joint compound sparingly on male threads.
 - Lower pipe into casing. Use special turned couplings (included with single pipe ejector package) to increase water flow. Use pipe joint compound sparingly on male couplings threads.

Horizontal Offset Pipe Sizes

When the pump is set more than 25' to one side of the well, increase the horizontal pipe size to reduce friction. Never use pipe smaller than the pump port size.

Pump Model	Up to 25'		25' to 100'		100' to 300'	
	Suct.	Drive	Suct.	Drive	Suct.	Drive
390.253251	1-1/4"	1-1/4"	1-1/2"	1-1/4"	2"	2"

NOTICE: Fill pipe with water as each length is added to be sure foot valve and connections do not leak.

PRESSURE TANK CONNECTION

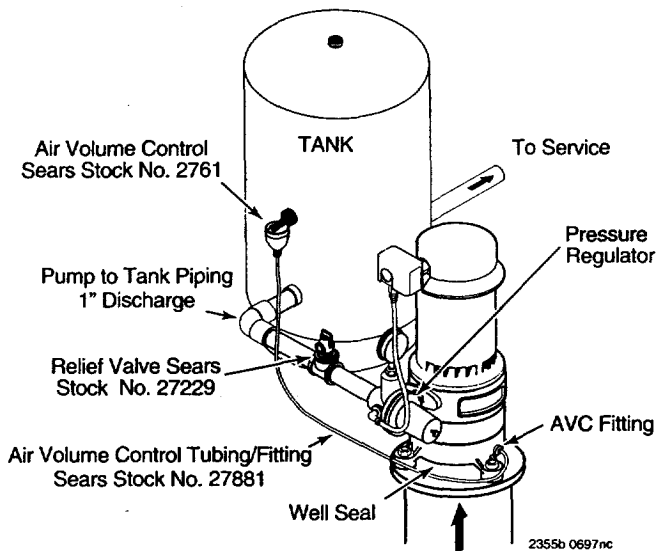


Figure 11 – Pump With Standard Tank

3. Add lengths of pipe until the ejector reaches the proper depth. (Your well driller should supply this information.)

NOTICE: As a guide, the ejector should be set at least 10 to 20 feet below the lowest water level with pump running, if possible, but always at least 5 feet above the bottom of the well (see Figure 9, Page 7).

4. To properly seat the cup seals, after the ejector is correctly positioned move the assembly up and down slightly. Water pressure in the casing will then soak the cup seals (see Figure 9). They should seal in 2-3 hours after installation.
5. With ejector set, install well casing adapter. Remove pipe holder. Align locating lugs and tighten adapter to form seal with well casing.

Discharge Pipe Sizes

1. If increasing discharge pipe size, install reducer in pump discharge port. Do not increase pipe size by stages.
2. When the pump is set away from the points of water use, the discharge pipe size should be increased to reduce pressure losses caused by friction.
 - Up to 100 ft run: 1"
 - 100 ft. to 300 ft run: 1-1/4"
 - 300 ft. to 600 ft run: 1-1/2"

Pressure Tank Installation - Deep Well

The Pressure Tank provides a reservoir of water under pressure and maintains cushion of air pressure to prevent pipe hammering and possible damage to plumbing components. When water is drawn off through house fixtures, the pressure in the tank is lowered and the pressure switch starts the pump.

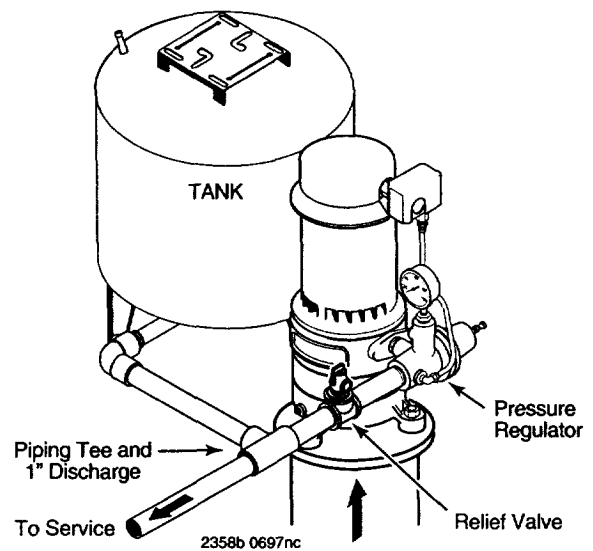


Figure 12 – Pump With Captive-Air® Tank

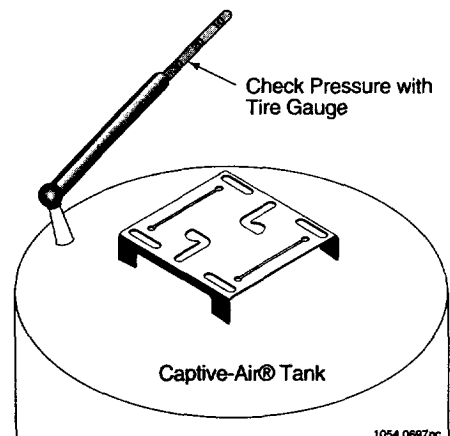


Figure 13 – Checking Tank Pre-charge

Standard Tank Connection

When a standard tank is used, an air volume control (AVC) adds air to the tank when it is needed. See Figure 11 for typical standard tank installation. To connect AVC to pump, thread a 1/8" compression fitting into tapped hole on the front of the pump. Cut tubing to length to reach AVC; assemble to fitting on pump and to AVC on tank. See installation instructions provided with tank and AVC for details.

Precharged Tank Connection

When a precharged tank is used, no AVC is necessary. See Figure 12 for typical precharged tank installation. A precharged tank contains a factory provided air charge.

NOTICE: Your pump pressure switch is set for a 40-60 PSI range and requires a tank pre-charge of 40 PSI for proper operation (see Figure 13). See tank owner's air charge. An annual check on tank charge is recommended.

ELECTRICAL

⚠ Disconnect power before working on pump, motor, pressure switch, or wiring.

Your Motor Terminal Board (under the motor end cover) and Pressure Switch look like one of those shown below. Convert to 115 Volts as shown. Do not change motor wiring

if line voltage is 230 Volts or if you have a single voltage motor. Connect power supply as shown for your type of switch and your supply voltage.

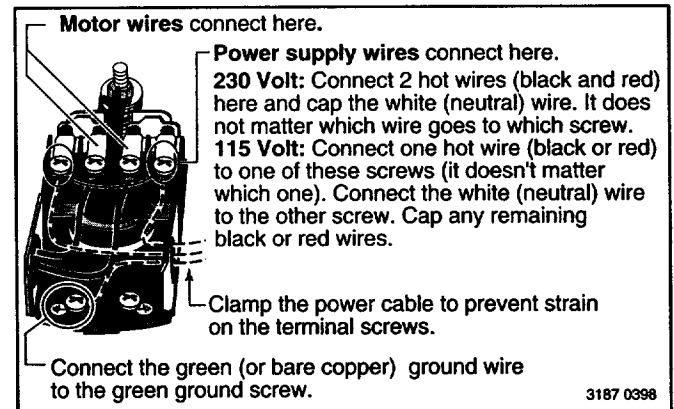
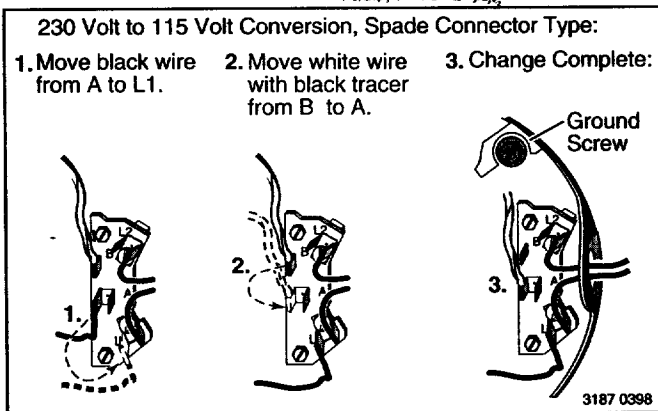
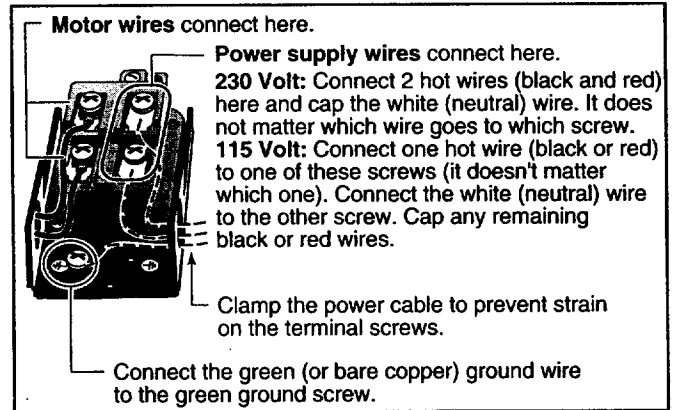
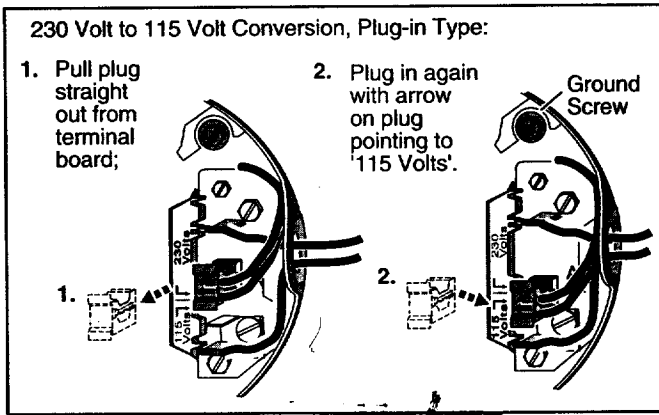


Figure 14 – Motor wiring connections through Pressure Switch. Match motor voltage to line voltage.

⚠ WARNING Hazardous voltage. Can shock, burn, or kill. Connect ground wire before connecting power supply wires. Use the wire size (including the ground wire) specified in the wiring chart. If possible, connect the pump to a separate branch circuit with no other appliances on it.

⚠ WARNING Explosion hazard. Do not ground to a gas supply line.

Wiring Connections

⚠ WARNING Fire hazard. Incorrect voltage can cause a fire or seriously damage the motor and voids the warranty. The supply voltage must be within $\pm 10\%$ of the motor nameplate voltage.

NOTICE: Dual-voltage motors are factory wired for 230 volts. If necessary, reconnect the motor for 115 volts, as shown. Do not alter the wiring in single voltage motors.

Install, ground, wire, and maintain your pump in compliance with the National Electrical Code (NEC) or the Canadian Electrical Code (CEC), as applicable, and

with all local codes and ordinances that apply. Consult your local building inspector for code information.

Connection Procedure

1. Connect the ground wire first as shown in Figure 14. The ground wire must be a solid copper wire at least as large as the power supply wires.
2. There must be a solid metal connection between the pressure switch and the motor for motor grounding protection. If the pressure switch is not connected to the motor, connect the green ground screw in the switch to the green ground screw under the motor end cover. Use a solid copper wire at least as large as the power supply wires.
3. Connect the ground wire to a grounded lead in a service panel, to a metal underground water pipe, to a metal well casing at least ten feet (3M) long, or to a ground electrode provided by the power company or the hydro authority.
4. Connect the power supply wires to the pressure switch as shown in Figure 14.

ELECTRICAL / OPERATION

WIRING CHART – Recommended Wire and Fuse Sizes

MOTOR HP	VOLTS	MAX. LOAD AMPS	BRANCH FUSE* RATING (AMPS)	DISTANCE IN FEET FROM MOTOR TO METER			
				0 to 50	51 to 100	101 to 200	201 to 300
1	115/230	19.2/9.6	25/15	10/14	10/12	8/10	6/10

(*Time delay fuse or circuit breakers are recommended in any motor circuit.

Priming The Pump

⚠ WARNING Burn hazard. NEVER run pump dry. Running pump without water may cause pump to overheat, damaging seal and possibly causing burns to persons handling pump. Fill pump with water before starting.

⚠ WARNING Risk of explosion and steam burns. NEVER run pump with discharge shut off, which can boil water inside pump body. Steam in pump may cause it to explode and scald anyone near. NOTICE: Open water system faucets before priming pump for the first time.

1. Remove pressure gauge.
 - a. Close regulator valve (turn clockwise - see Figure 15A).
 - b. Fill pump and suction pipe with water (Figure 15B).
 - c. Replace pressure gauge, using Teflon tape on thread; tighten gauge.

NOTICE: If a priming tee and plug have been installed for a long horizontal run, be sure to fill suction pipe through this tee and replace plug. (Don't forget to teflon tape the plug.)

2. Start Pump:

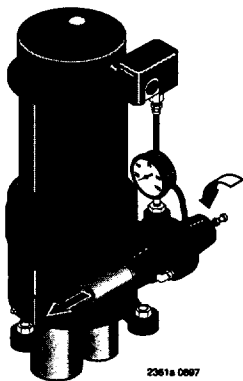
Pressure should increase rapidly to 50 pounds per square inch or more as ejector and pump prime. If so, go to step 4, below.

If pressure does not build to 50 PSI, repeat steps a, b, and c under Step No.1 two or three times to remove entrapped air from the suction pipes.

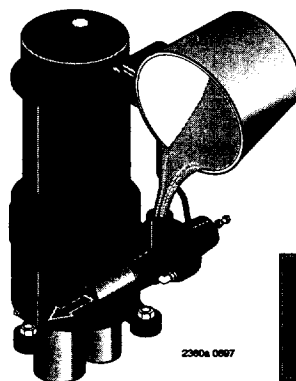
3. If pressure does not build up after priming pump several times, check the following:
 - a. Suction pipe in the water.
 - b. Suction pipe has no leaks.

NOTICE: Air can leak in even where water won't leak out. Make sure all joints are tight.

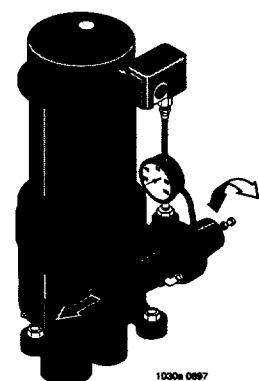
 - c. Control valve, check valve, or foot valve installed and operating correctly.
 - d. Pump trying to lift water more than rated lift for deep well ejector used (including compensation for horizontal offset).
 - e. Be sure pump is not airlocked. In offset installations, pump suction port should be highest point in suction pipe; there should be no sags in suction pipe (run it straight and at a slight angle upward from well head to pump).
4. Once unit has primed and pressure stabilized, slowly open (turn counterclockwise - Figure 16A, regulator valve until pressure falters (pressure gauge needle flutters; pump may become noisy - see Figure 16B). At this point, close (turn clockwise) regulator valve slightly until pressure stabilizes. This setting provides maximum flow (Figure 16C).
5. Pump may draw well down far enough at this point to lose its prime. If so, close regulator valve until pressure is stable throughout pumping cycle. Close faucets and allow pump to pressurize tank and shut off.
6. Check system by alternately opening and closing faucets in the system. With faucets open, pressure will drop until pump starts; with faucets closed, pressure will build up until pump shuts off.



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A – Close Regulator ➡ B – Fill Pump With Water ➡ C – Start Pump ➡ D – Adjust Regulator

Figure 15 – Priming Pump

OPERATION / MAINTENANCE

7. There are conditions of deep well operation when the regulator valve may be completely open without any faltering of pressure. In this case, operate pump with regulator valve open.

HELPFUL HINTS / MAINTENANCE

How To Handle A Gaseous Well

In some areas well water contains gases which must be allowed to escape before the water is used. To deliver gas-free water suspend a pipe, closed at the bottom and open at the top, so that it surrounds the suction pipe inlet. (See Figure 17). Since the gases rise in the well casing, the water sucked down through the pipe and into the suction pump is free of gas. This type of well must be vented to the outside of any enclosure.

Air Control In Flowing Wells

Flowing wells or wells with little or no drawdown, could create a special problem in air control in the operation of your standard tank system. In such cases, a pre-charged tank (which needs no air control) is recommended.

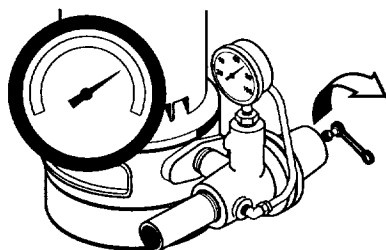


Figure 16A – Open Regulator Valve

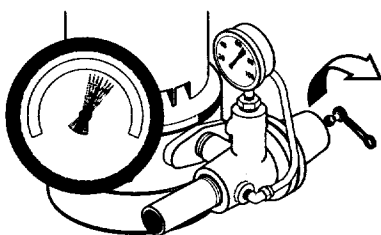


Figure 16B – Watch for Pressure Gauge to Flutter

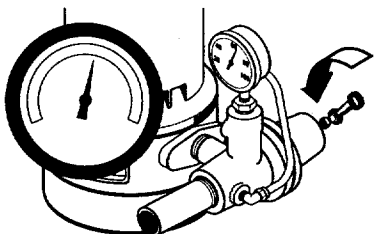


Figure 16C – Close Regulator Valve until Pressure Stabilizes

Using the Compound Gauge

If the pump or system seems to be operating inefficiently, the compound gauge can sometimes help determine the problem.

A compound gauge is a combination vacuum and pressure gauge which will indicate (1) receding water level in the well, (2) leakage in the suction line or in the pump, or (3) clogged impeller.

To use, install the gauge in the air volume control (AVC) port in the base of the pump. Open all shutoff valves between pump and household piping. Tighten regulator screw as far as possible. After running pump a few minutes to eliminate all air from pipes, loosen regulator screw until compound gauge shows 15" of vacuum. This setting indicates that the pressure regulator is set for delivery of the highest volume of water possible. Let the pump run a few minutes; if the water level in the well is falling, the vacuum will increase. If necessary, reduce the regulator setting to bring the vacuum reading back to 15". If the pump does not develop 15" of vacuum according to the gauge, you may have air leaks in the suction line or a clogged impeller.

Cleaning the Deep Well Jet

1. Disconnect power.
2. Disconnect piping and well seal or casing adapter.
3. Withdraw jet assembly from the well.
4. Unscrew and remove the venturi. Remove the nozzle with a socket wrench and clean.
5. Replace all parts, reprime, and turn on power.

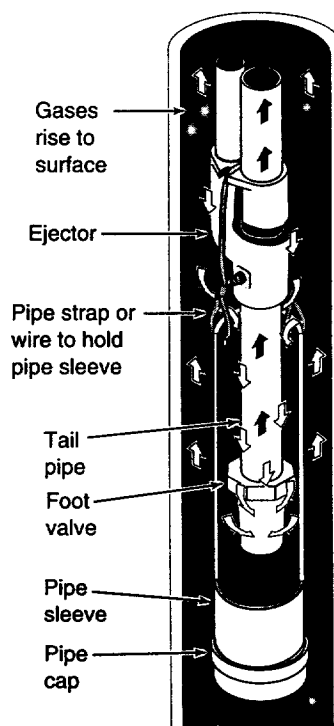


Figure 17 – Gas/Air Control in Well

MAINTENANCE

Pump Disassembly

1. Pull disconnect switch. Disconnect power lines from pressure switch.
2. Remove the two cap screws holding the pump to the flange adapter. Don't disturb the piping in the well.
3. Remove the flange adapter gasket and scrape the surfaces clean.
4. Leaving the tubing in place, unscrew and remove the straight barbed fitting at the pressure switch.
5. Draw a line down the side of the pump with a marker to help alignment during reassembly. Mark the pump from the motor to the base volute (see Figure 18).

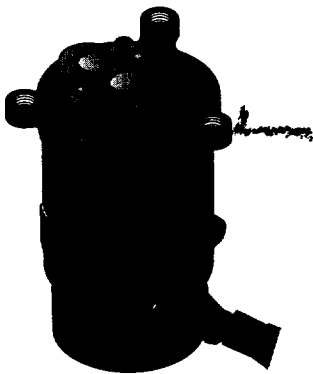


Figure 18

6. Turn the pump upside down on the bench and block it. Remove the four cap screws from the base. With a mallet, tap upward on the base to loosen it. Lift the base off of the intermediate volute (see Figure 19).

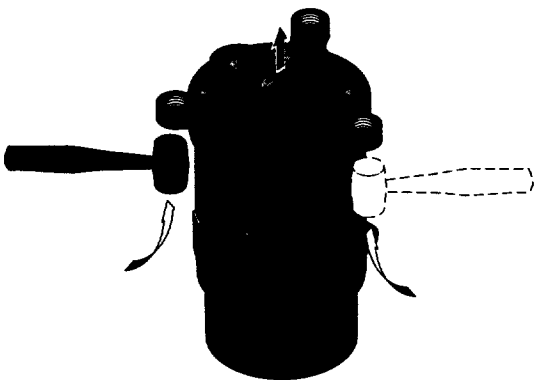


Figure 19

7. To reduce the chance of dropping the pump onto your foot, lay it down on the bench; block it so it won't roll.

8. Hold the motor shaft with pliers or vice grips through the opening in the pump adapter. Unscrew the impeller nut off the end of the shaft (see Figure 20).

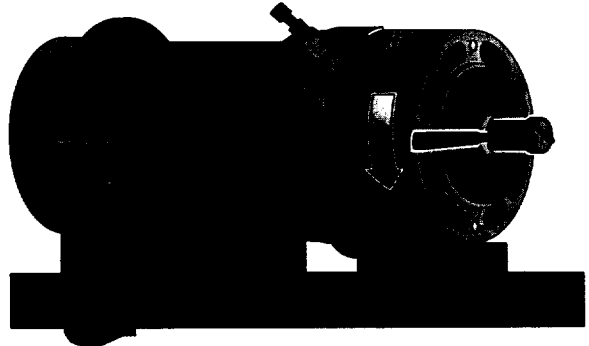


Figure 20

9. The impellers are keyed to the shaft and do not unscrew. Insert two screw drivers on opposite sides under the exposed impeller and pry the impeller off (Figure 21) to remove it.

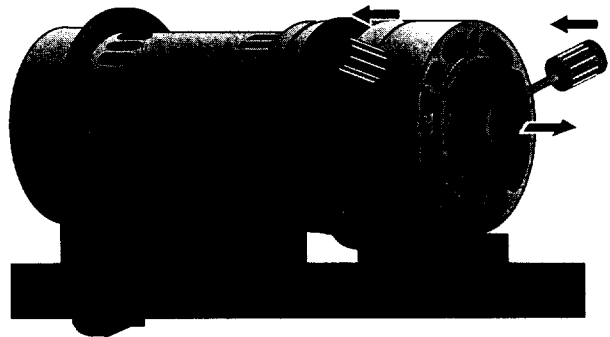


Figure 21

10. Carefully tap a small screwdriver or thin bladed chisel in between the intermediate volute and the pump adapter in two or three places around the pump to separate the castings (Figure 22). *Do not mar the sealing surfaces; do not break pieces out of the adapter or volute - the castings are easily damaged.*

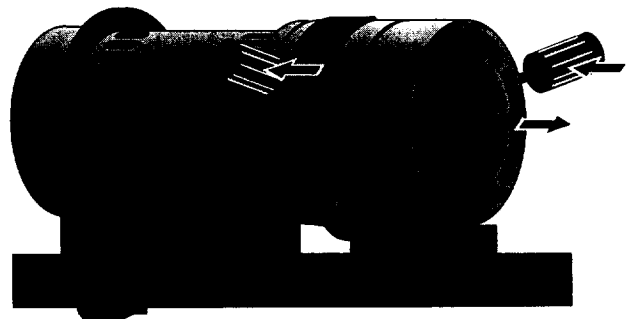


Figure 22

MAINTENANCE

11. Remove the intermediate volute and slide the impeller spacer off of the shaft.
12. Remove the impeller. Don't disturb the shaft keys if you are only replacing the seal.
13. Rotate the seal spring retainer cup so that the slot lines up with the shaft keys; remove the cup and spring.
14. Remove the two cap screws holding the adapter bracket to the motor.
15. With two screwdrivers on opposite sides of the pump, carefully pry the pump adapter away from the motor. This will pull the seal off of the motor shaft. *Use caution to make sure that the ceramic seal does not dig into the shaft and scratch the shaft's sealing surface.*

Installation Of New Seal

1. Clean all gasket surfaces thoroughly before re-assembly. Clean the seal bore cavity in the pump adapter.
2. Wet the rubber seat ring with soapy water and push the stationary part of the seal into the seal bore cavity. Use a piece of 1" pipe pressing on a cardboard washer (to prevent damaging seal surface) as a press. *Make sure that the seal half is fully seated in the seal bore cavity.* Remove the cardboard once the seal is in place.
3. Make sure that the shaft keys are in place on the shaft. If they are not, squeeze them in place now with slip joint pliers. *Do not tap them or hit them with a hammer; you could bend the shaft* (see Figure 23). When the keys are correctly installed, the adapter will pass over the keys without interference.

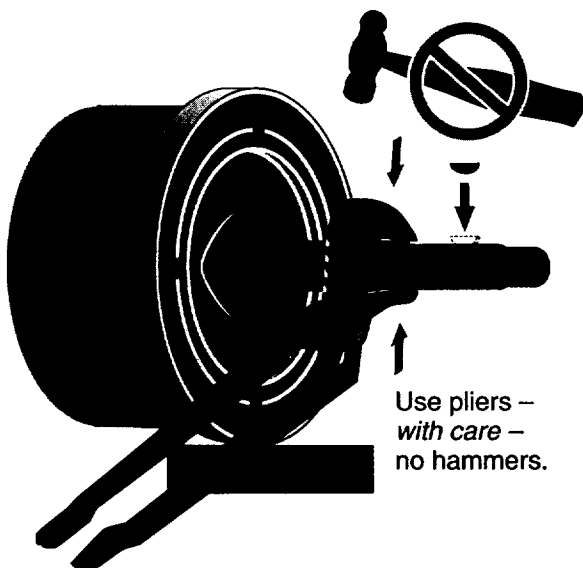


Figure 23

4. *Carefully* slide the adapter over the shaft (see Figure 24). Do not damage the shaft sealing surface; it is highly polished and any slight scratches or nicks will ruin it.

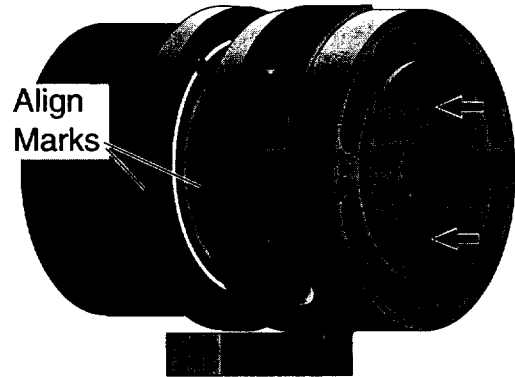


Figure 24

5. Using the alignment marks made before disassembly, line up the adapter with the motor and bolt the adapter in place. Tighten the cap screws evenly.
6. Push the shaft seal and seal spring onto the shaft, after making sure that the seal faces and shaft are clean. *Take care that the shaft shoulder does not damage the carbon seal face.* Follow the seal spring with the spring holder; compress the spring and give the spring holder a quarter turn to lock it under the first shaft key (see Figure 25).

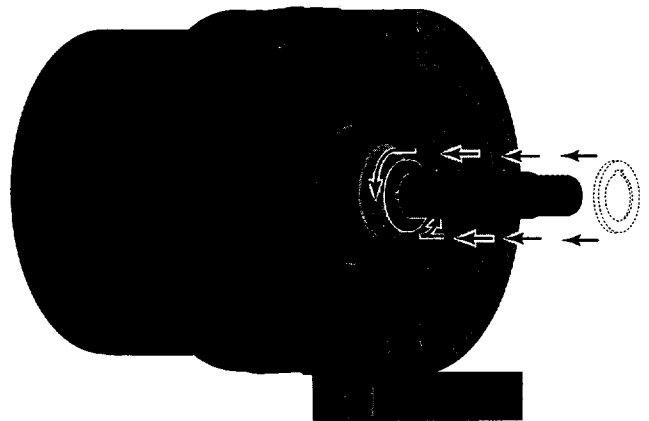


Figure 25

7. Slide the first impeller onto the shaft; follow it with the impeller spacer. Twist the impeller on the shaft to make sure that the shaft key is still in place and the impeller is locked to the shaft (the shaft should turn with the impeller).
8. Install a new volute gasket, lining up the bolt holes with the bolt holes in the adapter. *Make sure the gasket is right side up so that the water passage holes line up with the water passages in the volutes.*

MAINTENANCE

9. Install the intermediate volute, aligning it with the mark made before disassembly. Use the long cap screws to check this alignment. *It cannot be stressed too strongly that all bolt holes and water passages of all gaskets and volutes MUST line up with each other, or the pump will not be assembled correctly.*
10. Make sure the second shaft key is in place and install the second impeller. Twist the impeller to make sure that the shaft key is still in place. Hold the motor shaft with slip-joint pliers or vice-grips and install and tighten the impeller locknut. Tightening the lock nut automatically spaces the impeller correctly. *Do not overtighten.*
11. Install the base volute gasket. *Make sure the gasket is right side up so that the water passage holes line up with the water passages in the volutes.* Install the base volute, using the alignment marks made before disassembly. Make sure that the pump discharge will correctly meet the piping when the pump is reinstalled.
12. Insert the four base capscrews and tighten evenly (see Figure 26). These should be easy to install if everything is correctly aligned. *If not, don't force them; go back over your work and find and correct the misalignment.*

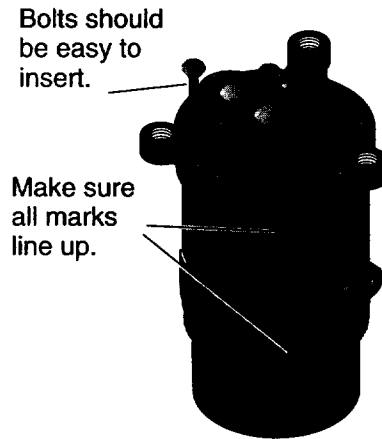


Figure 26

13. Reinstall the pressure switch barb fitting and pressure tube.
14. Reinstall the pump on the adapter flange (use a new gasket) and reconnect the wiring and grounding. Pump is now ready for operation.

TROUBLESHOOTING CHART

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Motor will not run	<ol style="list-style-type: none"> 1. Disconnect switch is off 2. Fuse is blown 3. Starting switch is defective 4. Wires at motor are loose, disconnected, or wired incorrectly 5. Pressure switch contacts are dirty 6. Wrong voltage 	<ol style="list-style-type: none"> 1. Be sure switch is on 2. Replace fuse 3. Replace starting switch 4. Refer to instructions on wiring. Check and tighten all wiring. 5. Clean by sliding piece of plain paper between contacts 6. Make sure motor voltage exactly matches power supply voltage.
Motor runs hot and overload kicks off	<ol style="list-style-type: none"> 1. Motor is wired incorrectly 2. Voltage is too low 3. Pump cycles too frequently 	<ol style="list-style-type: none"> 1. Refer to instructions on wiring 2. Check with power company. Install heavier wiring if wire size is too small. See wiring instructions. 3. See section below on too frequent cycling
Motor runs but no water is delivered *(Note: Check prime before looking for other causes. Unscrew pressure gauge and see if there is water in priming hole)	<ol style="list-style-type: none"> *1. Pump in a new installation did not pick up prime through: <ol style="list-style-type: none"> a. Improper priming b. Air leaks c. Leaking foot valve *2. Pump has lost its prime through: <ol style="list-style-type: none"> a. Air leaks b. Water level below suction of pump 3. Ejector or impeller is plugged 4. Check valve or foot valve is stuck in closed position 5. Pipes are frozen 6. Foot valve and/or strainer are buried in sand or mud 	<ol style="list-style-type: none"> 1. In new installation <ol style="list-style-type: none"> a. Re-prime according to instructions b. Check all connections on suction line, air volume control, and ejector c. Replace foot valve 2. In installation already in use: <ol style="list-style-type: none"> a. Check all connections on suction line, air volume control, ejector and shaft seal b. Lower suction line into water and re-prime. If receding water level in a shallow well operation exceeds suction lift, a deep well pump is needed. 3. Clean ejector or impeller; see Maintenance 4. Replace check valve or foot valve 5. Thaw pipes. Bury pipes below frost line. Heat pit or pump house. 6. Raise foot valve and/or strainer above well bottom
Pump does not deliver water to full capacity (Also check point 3 immediately above)	<ol style="list-style-type: none"> 1. Water level in well is lower than estimated 2. Steel piping (if used) is corroded or limed, causing excess friction 3. Offset piping is too small in size 	<ol style="list-style-type: none"> 1. Lower ejector in well 2. Replace with plastic pipe where possible, otherwise with new steel pipe 3. Use larger offset piping
Pump pumps water but does not shut off	<ol style="list-style-type: none"> 1. Pressure switch is out of adjustment or contacts are "frozen" 2. Faucets have been left open 3. Ejector or impeller is clogged 4. Water level in well is lower than estimated 5. Wrong voltage 	<ol style="list-style-type: none"> 1. Adjust or replace pressure switch 2. Close faucets 3. Clean ejector or impeller 4. Check possibility of using a deep well jet pump 5. Make sure motor voltage exactly matches power supply voltage.
Pump cycles too frequently	<ol style="list-style-type: none"> 1. Standard pressure tank is water-logged and has no air cushion 2. Pipes leak 3. Faucets or valves are open 4. Foot valve leaks 5. Pressure switch is out of adjustment 6. Air charge too low in Captive Air® tank 	<ol style="list-style-type: none"> 1. Drain tank to air volume control tapping. Check air volume control for defects. Check for air leaks at any connection. 2. Check connections 3. Close faucets or valves 4. Replace foot valve 5. Adjust or replace pressure switch 6. Disconnect electrical power and open faucets until all pressure is relieved. Using automobile tire pressure gauge, check air pressure in tank at the valve stem located at top of tank. If less than the pressure switch cut-in setting, pump air into tank from outside source until the air pressure is the same as cut-in setting of switch. Check air valve for leaks, using soapy solution, and replace core if necessary.
Air spurts from faucets	<ol style="list-style-type: none"> 1. Pump is picking up prime 2. Leak in suction side of pump 3. Well is gaseous 4. Intermittent overpumping of well 	<ol style="list-style-type: none"> 1. As soon as pump picks up prime, all air will be ejected 2. Check suction piping 3. Change installation, see Maintenance 4. Lower foot valve if possible, otherwise restrict discharge side of pump

REPAIR PARTS

Repair Parts List - Multi-Stage Jet

Key No.	Part Number	Part Description
1**	J218-600C	Motor
2	L43-5C	Connector
3	U36-112ZP	Locknut - 1/2"
4	U217-1228	Pressure Switch
5	U37-672P	Switch Tube - 14-1/2"
6	J212-24A	Pressure Regulator Assembly
7	L2-16	Adapter
8	U30-75ZP	Capscrew - 3/8"-16x1-1/4" Lg. (2 Req.)
9	U65-15SS	Shaft Key (2 Req.)
10	U109-99	Seal - Shaft
11	J24-11	Spring Holder
12	J105-76P	Impeller (2 Req.)
13	J43-23	Spacer - Impeller
14	J101-26	Intermediate Volute w/Wear Rings
14A	J20-11	Gasket (2 Req.)
14B	J23-10	Wear Ring (2 Req.)
14C	J23-11	Wear Ring
15	U36-175D	Impeller Nut
16	J101-33	Base Volute w/Wear Ring
17	U78-57CT	Pipe Plug - 1/4" NPT
18*	U30-82ZP	Capscrew - 3/8"-16x4-1/4" Lg. (4 Req.)

Repair Parts List - Pressure Regulator

Key No.	Part Number	Part Description
1	J112-14	Pressure Regulator Body w/Seat
1A	U111-212T	Barbed Fitting - Elbow
1B	J66-16	Valve Seat
2	J220-16B	Diaphragm Assembly
2A	J42-5	Regulator Guide
2B	J62-9	Stem
2C	J20-16	Diaphragm
2D	J43-31	Spring Follower
2E	U43-23ZP	Lock Washer
2F	U36-36ZP	Nut 1/4-20
3	U78-107DT	Reducer Bushing 1/2x1/8 NPT
4	U239-3	Pressure Gauge 0-100#
5	J24-13	Spring
6	J61-5	Spring Guide
7	J52-9	Bonnet
8	U30-60ZP	Capscrew 5/16-18x3/4" Lg. (4 Req.)
9	U30-69FTZP	Adjusting Screw 5/16-18x2"
10	U36-37ZP	Locknut 5/16-18

* Standard hardware item; may be purchased locally.

** Not mailable; specify freight or express.

For repair or service to motors, always give the Motor Model number and any other data found on the motor model plate.

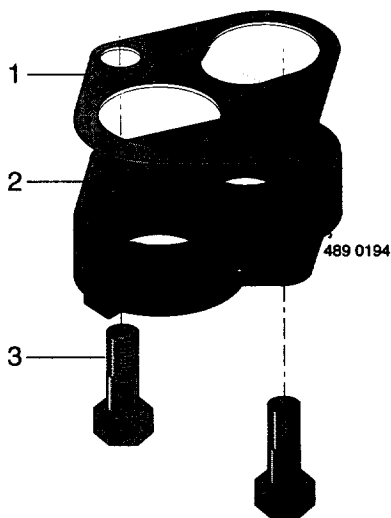
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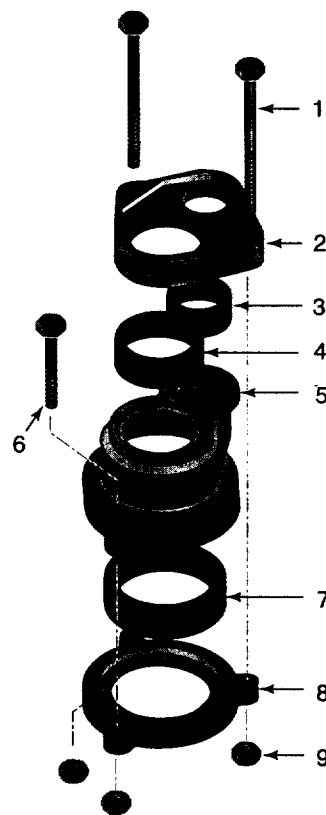
REPAIR PARTS

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Vertical Casing Adapters and Adapter Flanges for Multi-Stage Jet Pump



Adapter Flange



Casing Adapter

Repair Parts List - Adapter Flange

Key No.	Part Number	Part Description
1	J20-12	Adapter Gasket
2	J2-17B	Adapter – 1-1/4"x1-1/4" NPT
3*	U30-86PS	1/2-13 x1-1/4" Long Capscrew (2 Req.)

* Standard Hardware Item, may be purchased locally.

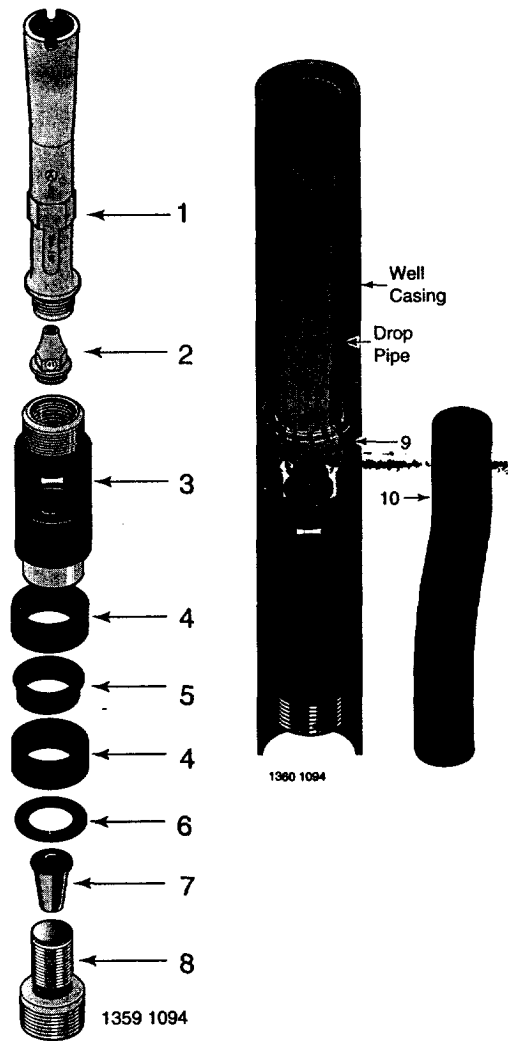
Repair Parts List - Casing Adapters

Key No.	J216-13 2"	J216-14 3"	Part Description
1	U30-282ZP	U30-282ZP	3/8-16x5" Long Machine Bolt (2 Req.)
2	J16-19ZZP	J16-23ZZ	Upper Flange
3	J21-19	J21-19	Seal Ring – Drive Pipe
4	J21-18	J21-18	Seal Ring – Suction Pipe
5	J51-1ZZP	J51-3ZZ	Casing Adapter Body
6	U30-277ZP	U30-277ZP	3/8-16x2-1/2" Hex Hd. Bolt (3 Req.)
7	J21-17	J21-21	Seal Ring – Lower
8	J16-20ZZP	J16-24ZZP	Lower Flange
9	U36-38ZP	U36-38ZP	3/8" Hex Nut (3 Req.)

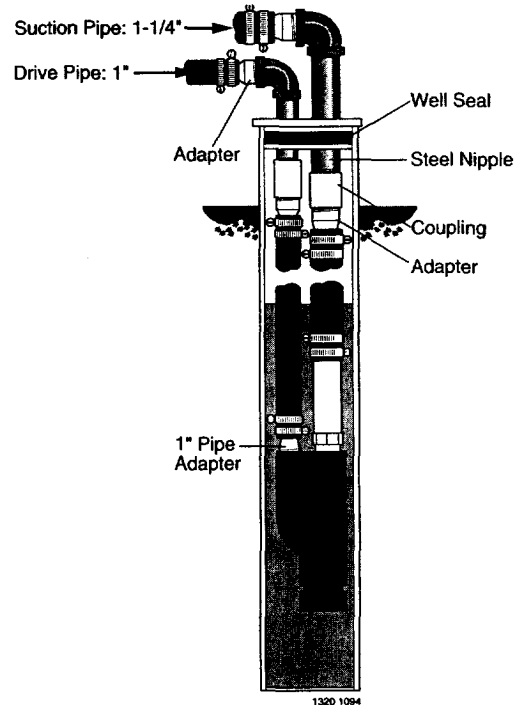
REPAIR PARTS

Jet Packages

2" and 3" Single Pipe Jets



4" Double Pipe Jets



Repair Parts List – Jet Packages

Key No.	29670 2" Single Pipe Jets	29902 3" Single Pipe Jets	29660 4" Double Pipe Jets	Part Description
1	J32P-24	J32P-24	J32P-24	Venturi
1	J32P-18	J32P-18	J32P-18	Venturi
2	J34P-42	J34P-42	J34P-42	Nozzle
3	J40-24	J40-25	N40-92	Jet Body
4	J57-1	J57-3	—	Packer Leathers (2 Req)
5	J43-14P	J43-16	—	Spacer
6	—	J43-20C	—	Washer
7	P122-10B	J161-3	N212-12P	Check Valve
8	J66-13	J66-14	—	Valve Seat
9	U11-1	—	—	Turned Coupling (11 included)
10	J37-4	J37-4	—	1" NPT Offset Nipple
11	—	—	L8-1P	Strainer
12	—	—	U11-104P	Plastic Pipe Adapter
•	J216-13	J216-14	—	Casing Adapter
•	U37-116GP	U37-116GP	—	1" x 6" T.O.E. Nipple

• Not illustrated.

Venturi Selection Chart

Pump Model	HP	Venturi Installed	Max. Depth with Jet Package No.		
			29670 2" Single Pipe	29902 3" Single Pipe	29660 4" Double Pipe
390.253251	1	J32P-24	90'	100'	100'
		J32P-18	180'	210'	210'

OWNER'S MANUAL

Model No.
390.253251

The model number of your Multi-Stage Jet Pump will be found on the pump body.

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

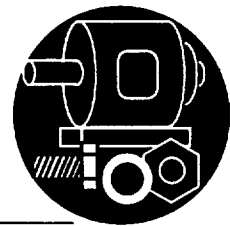
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- Model Number
- Part Number
- Part Description

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