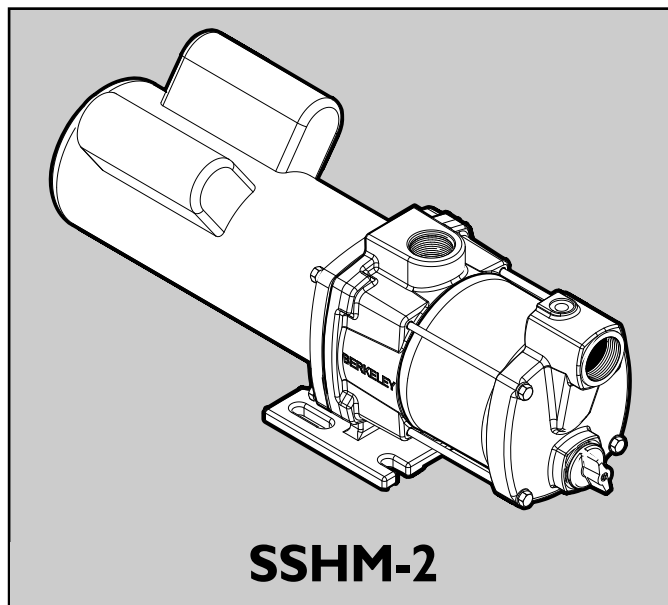




293 Wright St., Delavan WI 53115

OWNER'S MANUAL

Self-Priming Horizontal Multistage Pump



Installation/Operation/Parts

For further operating, installation, or maintenance assistance:

Call 1-888-237-5353

READ AND FOLLOW SAFETY INSTRUCTIONS!

⚠ 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 label **NOTICE** indicates special instructions which are important but not related to hazards.


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

Keep safety labels in good condition.

Replace missing or damaged safety labels.

ELECTRICAL SAFETY

⚠ WARNING



Hazardous voltage. Can shock, burn, or cause death.

Ground pump before connecting to power supply.

⚠ Wire motor for correct voltage. See "Electrical" section of this manual and motor nameplate.

⚠ Ground motor before connecting to power supply.


⚠ Meet National Electrical Code, Canadian Electrical Code, and local codes for all wiring.

⚠ Follow wiring instructions in this manual when connecting motor to power lines.

Make workshops childproof; use padlocks and master switches; remove starter keys.

⚠ CAUTION **Do not touch an operating motor.** Modern motors can operate at high temperatures. To avoid burns when servicing pump, allow it to cool for 20 minutes after shut-down before handling.

GENERAL SAFETY

	⚠ WARNING
	<p>Hazardous pressure! Do not run pump against closed discharge.</p> <p>Release all pressure on system before working on any component.</p>

To avoid heat built-up in pump, over pressure hazard and possible injury, do not use in a pressure tank (domestic water) system. Do not use as a booster pump; pressurized suction may cause pump body to explode.

Do not allow pump or piping system to freeze. Freezing can damage pump and pipe, may lead to injury from equipment failure and will void warranty.

Pump water only with this pump.

Periodically inspect pump and system components.

Wear safety glasses at all times when working on pumps.

Keep work area clean, uncluttered and properly lighted; store properly all unused tools and equipment.

Keep visitors at a safe distance from the work areas.

Maximum inlet pressure20 psi

Maximum operating pressure130 psi

Maximum liquid temperature120° F

Thank you for purchasing a top quality, factory tested pump.

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ATTACH ORIGINAL RECEIPT HERE FOR WARRANTY CONSIDERATION.

LIMITED WARRANTY

Berkeley/WICOR Canada Company (WICOR), warrants to the original consumer of the products listed below, that they will be free from defects in material and workmanship for the Warranty Period from the date of original installation or manufacture as noted.

Product	Warranty Period
Water Systems Products – jet pumps, small centrifugal pumps, submersible pumps and related accessories	<i>whichever occurs first:</i> 1 year from date of original installation, or 2 years from date of manufacture
Hydro-Flow Filters	1 year from date of purchase
Signature 2000® Fibrewound Tanks	5 years from date of original installation
Pro-Source™ Steel Pressure Tanks	5 years from date of original installation
Pro-Source™ Epoxy-Lined Tanks	3 years from date of original installation
Sump/Sewage/Effluent Products	1 year from date of original installation, or 2 years from date of manufacture

Our warranty will not apply to any product that has been subject to negligence, misapplication, improper installation or maintenance. In the event a three phase submersible motor is operated with single phase power through a phase converter, or if three-leg ambient compensated, extra-quick trip overload relays of recommended size are not used, our warranty is void.

Buyer's only remedy and Berkeley's/WICOR's only duty is to repair or replace defective products (at Berkeley's/WICOR's choice). Buyer agrees to pay all labor and shipping charges associated with this warranty and to request warranty service through the installing dealer as soon as a problem is discovered. If warranty service is requested more than 30 days after the Warranty Period has ended, it will not be honored.

Berkeley/WICOR SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, OR CONTINGENT DAMAGES WHATSOEVER. THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE WARRANTY PERIOD PROVIDED HEREIN.

Certain states do not permit the exclusion or limitation of incidental or consequential damages or the placing of limitations on the duration of an implied warranty, therefore, the limitations or exclusions herein may not apply. This warranty sets forth specific legal rights and obligations, however, additional rights may exist, which may vary from state to state.

Supersedes all previous publications.

In the U.S.: Berkeley, 293 Wright St., Delavan, WI 53115

In Canada: WICOR Canada Company, 1800 Courtney Park Drive East, Unit 5-7, Mississauga, Ontario L5T 1W1

Dirt and Scale Plug Pump and Pipes!



Use New Pipe for Best Results.

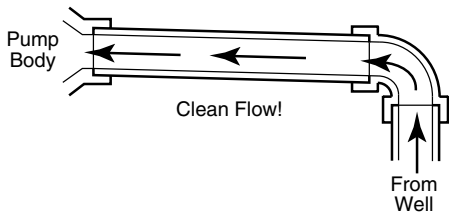


Figure 1 – No Dirt or Scale in Suction Pipe

BEFORE YOU INSTALL YOUR PUMP

NOTICE: Well must not be more than 20' depth to water.

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. Unions installed near pump and well will aid in servicing. Leave room to use wrenches.
8. **⚠ WARNING** Pump body may explode if used as a booster pump. **DO NOT use in a booster application.**

NOTICE: Use the installation method below which matches your well type.

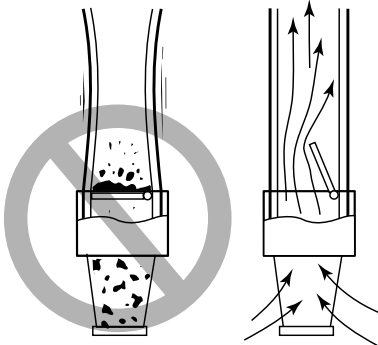


Figure 2 – Foot Valve Must Work Freely

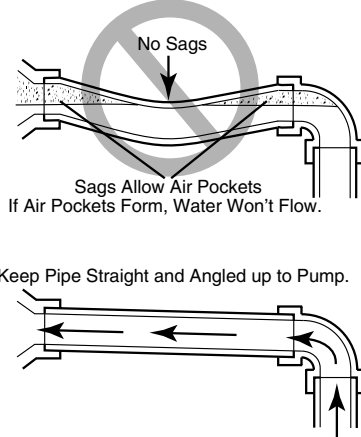


Figure 3 – No Air Pockets in Suction Pipe

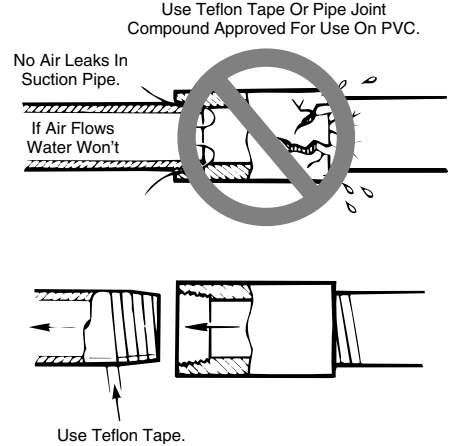


Figure 4 – Suction Pipe Must Not Leak

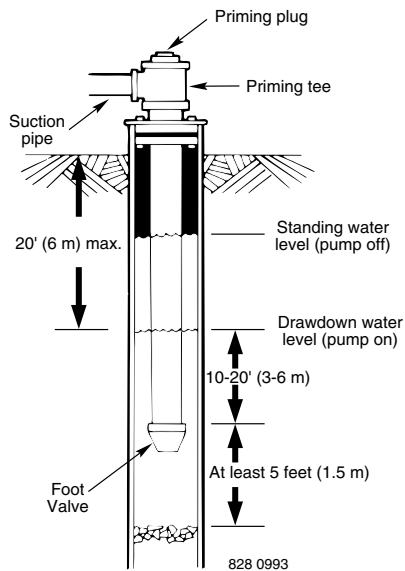


Figure 5 – Cased/Dug Well Installation

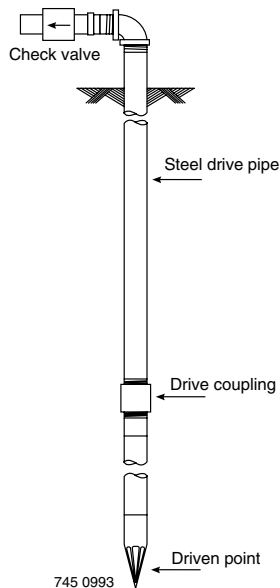


Figure 6 – Driven Point Installation

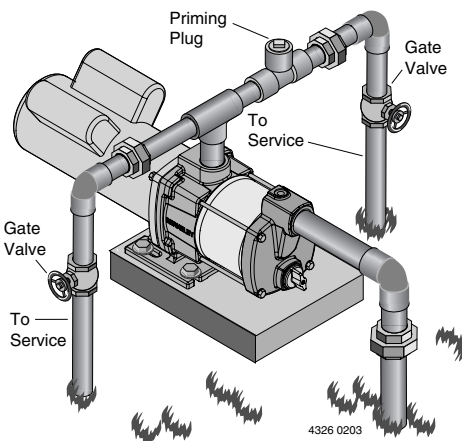


Figure 7 – Multiple Discharge

CASED WELL INSTALLATION

1. Inspect foot valve to be sure it works freely. Inspect strainer to be sure it is clean.
2. Connect foot valve and strainer to the first length of suction pipe and lower pipe into well. Add sections of pipe as needed, using Teflon tape on male threads. Be sure that all suction pipe is leakproof or pump will lose prime and fail to pump. Install foot valve 10 to 20 feet below the lowest level to which water will drop while pump is operating (pumping water level). Your well driller can furnish this information.
3. To prevent sand and sediment from entering the pumping system, the foot valve/strainer should be at least 5 feet above the bottom of the well.
4. When the proper depth is reached, install a sanitary well seal over the pipe and in the well casing. Tighten the bolts to seal the casing.
5. When using a foot valve, a priming tee and plug as shown in Figure 5 are recommended.

DUG WELL INSTALLATION

Same as cased well installation.

DRIVEN POINT INSTALLATION

1. Connect the suction pipe to the drive point as illustrated in Figure 6. Keep horizontal pipe run as short as possible. Use Teflon tape on male pipe threads. Multiple well points may be necessary to provide sufficient water to pump.
2. Install a check valve in horizontal pipe. Flow arrow on check valve must point toward pump.

HORIZONTAL PIPING FROM WELL TO PUMP

1. Never install a suction pipe that is smaller than the suction port of the pump.
2. To aid priming on well point installations, install a line check valve as shown in Figure 6. Be sure check valve flow arrow points toward pump.

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' run: Same size as pump discharge port.
 - 100' to 300' run: Increase one pipe size.
 - 300' to 600' run: Increase two pipe sizes.

SPRINKLING APPLICATION

This pump is designed to deliver plenty of water at full sprinkler pressure. It can pump from a pond, cistern or well points.

Pump discharge can be divided to supply two (2) or more sprinkler systems. A suggested multiple discharge to service is shown in Figure 7.

Do not use in a pressure tank or booster pump application.

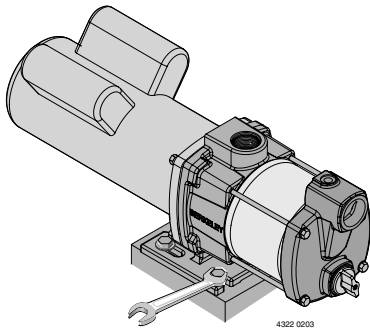


Figure 8 – Bolt Pump Down

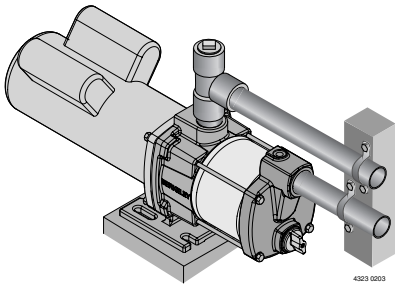


Figure 9 – Independently Support All Piping Attached to Pump

PUMP INSTALLATION

Make sure that all pipe joints in the suction pipe are air tight as well as water tight. *If the suction pipe can suck air, the pump will not be able to pull water from the well.*

1. Bolt pump to solid, level foundation.
2. Support all piping connected to the pump.
3. Wrap 1-1/2 to two layers of Teflon tape clockwise (as you face end of pipe) on all male threads being attached to pump.
4. Tighten joints hand tight plus 1-1/2 turns. **Do not overtighten.**

NOTICE: Install pump as close to well head as possible. Long piping runs and many fittings create friction and reduce flow.

NOTICE: For long horizontal pipe runs, install a priming tee between check valve and well head as shown in Figure 6. For driven point installations, install a check valve as shown in Figure 6. Be sure check valve flow arrow points **toward** pump.

Use schedule 80 or iron pipe. See “Well Pipe Installation” for more information.

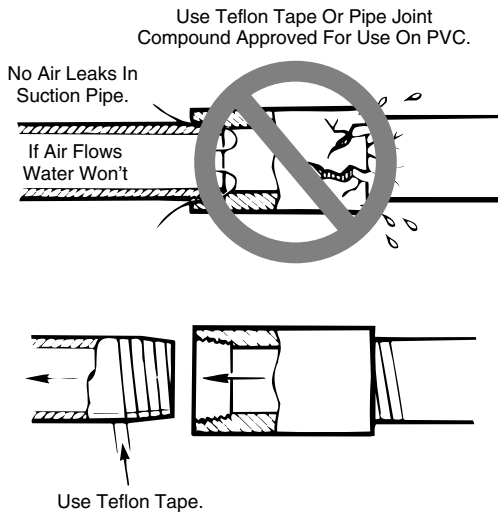


Figure 10 – Use Teflon tape or Plasto-Joint Stik¹ on pipe joints and connections to pump.

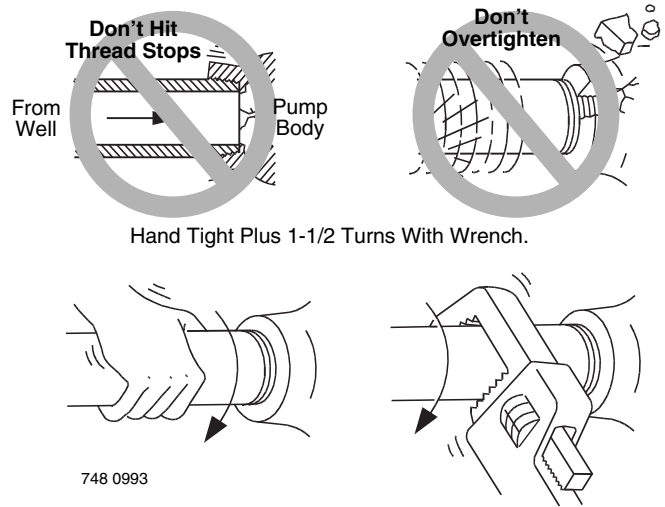


Figure 11 – Don't overtighten.

¹ Lake Chemical Co., Chicago, IL

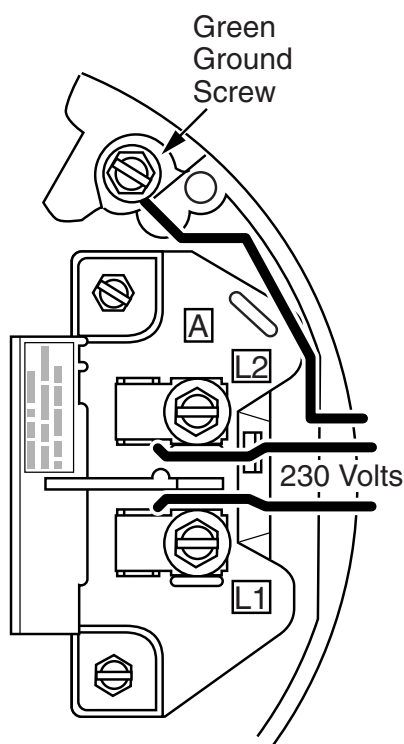


Figure 12 – 230V Single Phase Wiring Diagram

Connection diagram for single-phase motors. Your motor's terminal board (under the motor end cover) should match the diagram in Figure 12.

Connect power supply wires to L1 and L2. For 3-phase motors, or if motor does not match this picture, follow the connection diagram on the motor nameplate.

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

Disconnect power to motor before working on pump or motor. Ground motor before connecting to power supply.

WIRING

⚠ Ground motor before connecting to electrical power supply. Failure to ground motor can cause severe or fatal electrical shock hazard.

⚠ Do not ground to a gas supply line.

⚠ To avoid dangerous or fatal electrical shock, turn OFF power to motor before working on electrical connections.

⚠ Supply voltage must be within $\pm 10\%$ of nameplate voltage. Incorrect voltage can cause fire or damage motor and voids warranty. If in doubt consult a licensed electrician.

⚠ Use wire size specified in Wiring Chart (below). If possible, connect pump to a separate branch circuit with no other appliances on it.

⚠ Wire motor according to diagram on motor nameplate. If nameplate diagram differs from diagram above, follow nameplate diagram.

1. Install, ground, wire and maintain this pump in accordance with electrical code requirements. Consult your local building inspector for information about codes.
2. Provide a correctly fused disconnect switch for protection while working on motor. Consult local or national electrical codes for switch requirements.
3. Disconnect power before servicing motor or pump. If the disconnect switch is out of sight of pump, lock it open and tag it to prevent unexpected power application.
4. Ground the pump permanently using a wire of the same size as that specified in wiring chart (below). Make ground connection to green grounding terminal under motor canopy marked GRD. or \oplus .
5. Connect ground wire to a grounded lead in the service panel or to a metal underground water pipe or well casing at least 10 feet long. Do not connect to plastic pipe or insulated fittings.
6. Protect current carrying and grounding conductors from cuts, grease, heat, oil, and chemicals.

Wiring Chart – Recommended Wire and Fuse Sizes

Model	Motor HP	Volts	Max. Load Amp	Branch Fuse Rating Amp	DISTANCE IN FEET(METERS) FROM MOTOR TO SUPPLY				
					0 - 100 (0 - 30)	101 - 200 (31 - 61)	201 - 300 (62 - 91)	301 - 400 (92 - 122)	401 - 500 (123 - 152)
					AWG WIRE SIZE (mm ²)				
B82456	2	230	15.4	20	12 (3)	12 (3)	10 (5.5)	8 (8.4)	8 (8.4)

7. Connect current carrying conductors to terminals L1 and L2 under motor canopy. When replacing motor, check wiring diagram on motor nameplate against Figure 12. If the motor wiring diagram does not match the diagram in Figure 12, follow the diagram on the motor.
8. Motor has automatic internal thermal overload protection. If motor has stopped for unknown reasons, thermal overload may restart it unexpectedly, which could cause injury or property damage. Disconnect power before servicing motor.
9. If this procedure or the wiring diagram is confusing, consult a licensed electrician.

Operation

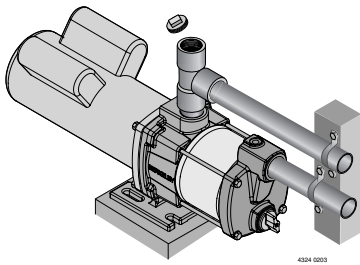


Figure 13 – Remove Priming Plug

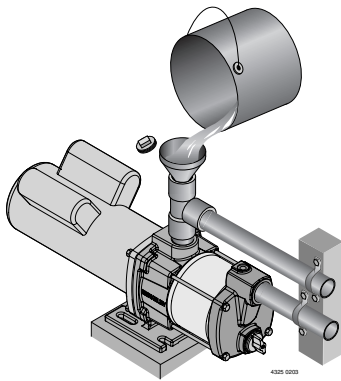


Figure 14 – Fill Pump Before Starting

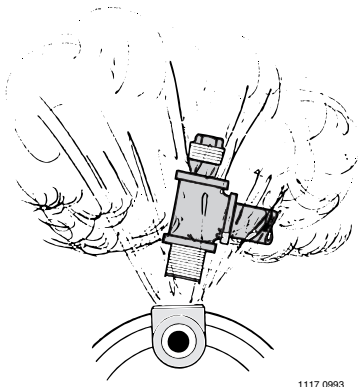


Figure 15 – Do Not Run Pump with Discharge Shut-off.

PRIMING THE PUMP

NOTICE: 'Priming' refers to the pump expelling all air in the system and beginning to move water from its source out into the system. It does not refer only to pouring water into the pump (although pouring water in is usually the first step).

NOTICE: NEVER run pump dry. Running pump without water in it will damage seals and can melt impeller and diffuser. To prevent damage, **fill pump with water before starting.**

1. Remove priming plug (Figure 13).
2. Make sure suction and discharge valves and any hoses on discharge side of pump are open.
3. Fill pump and suction pipe with water.
4. Replace priming plug, using Teflon tape on thread; tighten plug.

NOTICE: If a priming tee and plug have been provided 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.)

5. Start pump: water should be produced in 5 minutes or less, the time depending on depth to water (not more than 20') and length of horizontal run (10' of horizontal suction pipe = 1' of vertical lift due to friction losses in the pipe).

If no water is produced within 5 minutes, stop pump, release all pressure, remove priming plug, refill and try again.

▲ WARNING Hazardous pressure and risk of explosion and scalding. If pump is run continuously at no flow (that is, with discharge shut off or without priming), water may boil in pump and piping system. Under steam pressure, pipes may rupture, blow off of fittings or blow out of pump ports and scald anyone near.

To prevent explosion, do the following:

- A. Be sure discharge (valve, pistol grip hose nozzle, etc.) is open whenever pump is running.
- B. If pump fails to produce water when attempting to prime, release all pressure, drain pump and refill with cold water after every two attempts.
- C. When priming, monitor pump and piping temperature. If pump or piping begin to feel warm to the touch, shut off pump and allow system to cool off. Release all pressure in system and refill pump and piping with cold water.

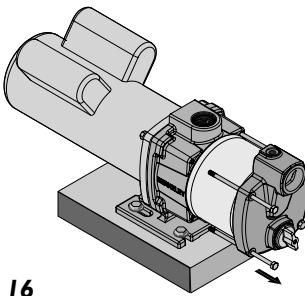


Figure 16

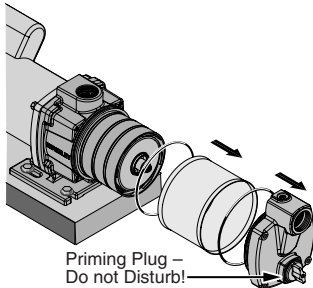


Figure 17

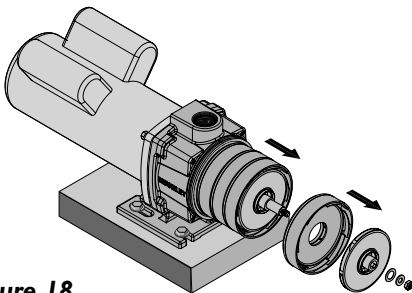


Figure 18

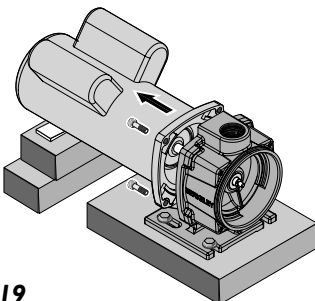


Figure 19

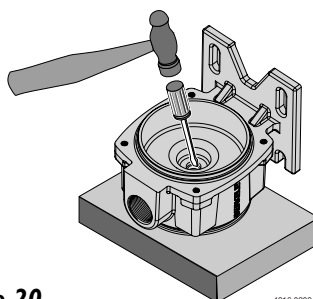


Figure 20

MAINTENANCE

If motor is replaced, replace the shaft seal. Keep a seal on hand for future use.

Be sure to prime pump before starting.

NOTICE: Check motor label for lubrication instructions. The mechanical shaft seal in the pump is water lubricated and self-adjusting.

NOTICE: Drain pump when disconnecting from service or when it might freeze. You can fill the pump with RV anti-freeze (propylene glycol) to prevent it from freezing.

PUMP DISASSEMBLY

NOTICE: Do not disturb the priming valve (see Figure 17). It is NOT a drain plug!

1. Shut off power to the pump before working on it.
2. Close all suction and discharge valves to isolate the pump before proceeding further.
3. Remove the drain plug (Key No. 16) from the suction body and drain the pump.
4. Disconnect the suction line.
5. Remove four capscrews (Key No. 17) from the pump (see Figure 16).
6. Pull the pump suction body forward (see Figure 17). Remove the sleeve (Key No. 8) by pulling it straight forward. Be careful not to damage the O-rings on the bracket and suction body.
7. Remove the motor canopy, hold the motor shaft with a 7/16" open end wrench, and remove the nut and two washers (Key Nos. 13, 12, 11) from the end of the shaft. See Figure 18.
8. Slide the impellers and diffusers (Key Nos. 10, 9) off of the shaft (Figure 18).
9. Slide the spacer (Key No. 6) off of the shaft, then pull the rotating half of the seal (Key No. 5) forward on the shaft and remove it.
10. Block up the motor (so that the shaft will not take the weight of the motor when you loosen the capscrews holding the motor to the bracket), remove four capscrews (Key No. 2), and slide the motor and shaft back out of the bracket (see Figure 19).

NOTICE: To avoid springing the shaft, be sure that the shaft does not take the weight of the motor as you remove it.

SEAL REMOVAL

1. Follow the instructions under "Pump Disassembly", above.
2. Remove the discharge pipe from the bracket (Key No. 4).
3. Remove the hold down bolts from the bracket.
4. Turn the bracket motor side up on the bench and use a screwdriver to carefully tap the stationary seal half out of the bracket (see Figure 20).
5. Clean the seat in the bracket.

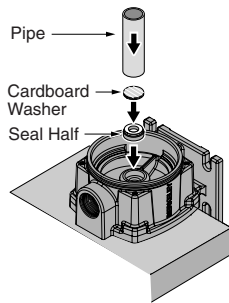


Figure 21

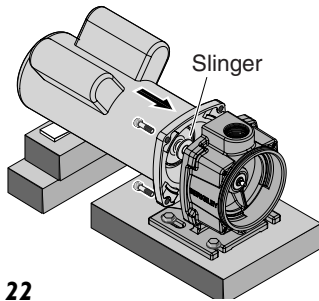


Figure 22

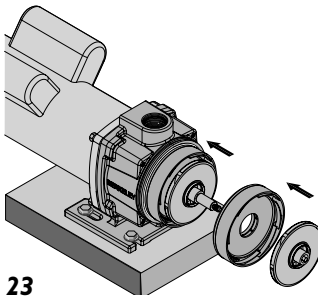


Figure 23

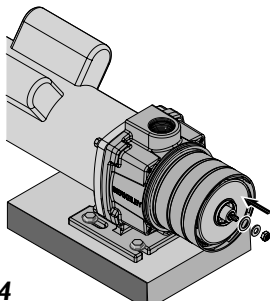


Figure 24

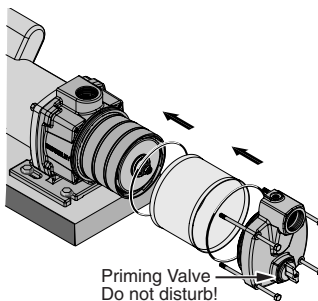


Figure 25

SEAL INSTALLATION

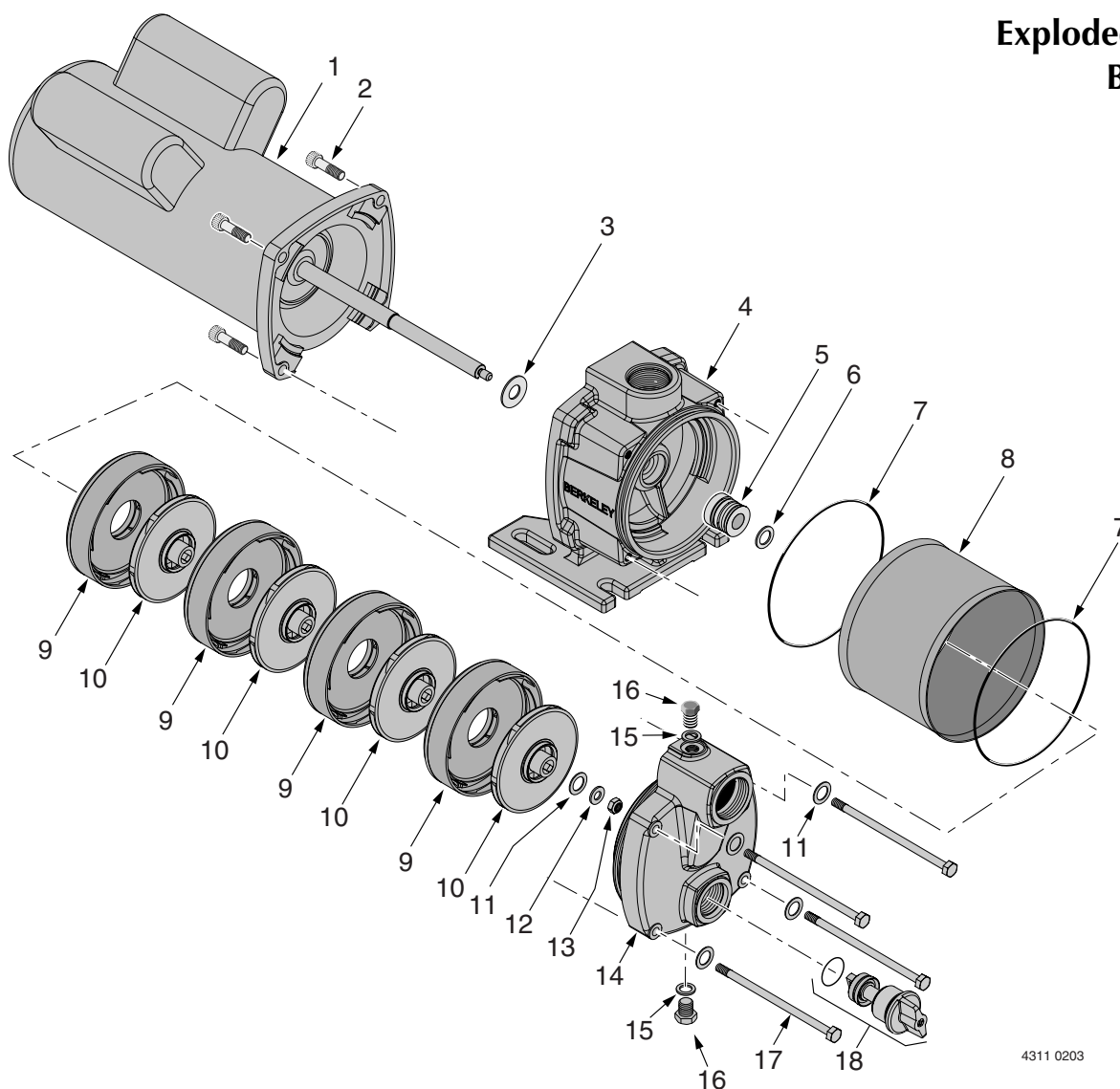
1. Turn the bracket pump side up on the bench. You will need to block it up to do this (See Figure 21).
 2. Clean the seal cavity in the bracket.
 3. Wet the outer edge of the rubber cup on the ceramic seat with liquid soap. Be sparing!
 4. Put a clean cardboard washer on the seal face. With thumb pressure, press the ceramic seal half firmly and squarely into the seal cavity. The polished face of the ceramic seat is up. If the seal will not seat correctly, remove it, placing the seal face up on the bench. Reclean the cavity. The seal should now seat correctly.
 5. If the seal does not seat correctly after recleaning the cavity, place a clean cardboard washer over the polished seal face and carefully press it into place using a piece of standard 3/4" pipe as a press.
- NOTICE:** Be sure you do not scratch the seal face.
6. Dispose of the cardboard washer and recheck the seal face to be sure it is free of dirt, foreign particles, scratches and grease.
 7. Inspect the shaft to be sure it is free of nicks and scratches.

PUMP REASSEMBLY

1. Bolt the bracket down to the foundation (see Figure 21).
2. Slide the motor shaft through the seal and bolt up the motor (see Figure 22). Make sure that the slinger is on the shaft between the bracket and the motor flange. Make sure that you don't chip the seal face with the shaft shoulders and that the shaft does not take the weight of the motor at any time.
2. CAREFULLY slide the rotating seal half onto the shaft, seal face first. Make sure that you don't chip the seal face on the shaft shoulders.
3. Follow the seal half with the spacer (Key No. 6). Slide the washer up against the seal.
4. Slide a diffuser onto the shaft (open face out) until it seats on the bracket (see Figure 23). Follow the diffuser with an impeller. Engage the molded impeller key in the slot in the shaft. Don't force it! Be sure that the impeller eye faces out (forward).
5. Repeat step 4 with the remaining impellers and diffusers.
6. Reinstall the toothed washer, the flat washer, and the impeller nut (in that order – Key Nos. 11,12,13) onto the motor shaft (see Figure 24). Hold the shaft and tighten the impeller nut to 12 ft.-lbs. torque.
7. Check the sleeve O-Rings; if they show any damage or wear, replace them. Reinstall the sleeve O-Rings (Key No. 7) on the bracket and the suction body.
8. Reinstall the sleeve on the bracket and the pump suction body in the sleeve. Be sure that you do not pinch or damage the O-Ring. See Figure 25.
9. Install four capscrews (Key No. 17) through the pump head and into the bracket. Tighten the capscrews to 22 ft.-lbs. torque.
10. Reinstall the drain plug and washer (Key Nos. 16 and 15) in the suction body.
11. Reinstall the suction and discharge piping and open all valves. Check for leaks.
12. Prime the pump according to the instructions on Page 8.

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Motor will not run	Disconnect switch is off Fuse is blown or circuit breaker tripped Starting switch is defective Wires at motor are loose, disconnected, or wired incorrectly	Be sure switch is on. Replace fuse or reset circuit breaker. DISCONNECT POWER; Replace starting switch. Refer to instructions on wiring (Page 7). DISCONNECT POWER; check and tighten all wiring. ⚠ WARNING Capacitor voltage may be hazardous. To discharge capacitor, hold insulated handle screwdriver BY THE HANDLE and short capacitor terminals together. Do not touch metal screwdriver blade or capacitor terminals. If in doubt, consult a qualified electrician.
Motor runs hot and overload kicks off	Motor is wired incorrectly Voltage is too low	Refer to instructions on wiring. Check with power company. Install heavier wiring if wire size is too small (See Electrical / Wiring Chart).
Motor runs but no water is delivered* * (Note: <i>Stop pump</i> ; then check prime before looking for other causes. Unscrew priming plug and see if water is in priming hole).	Pump in new installation did not pick up prime through: 1. Improper priming 2. Air leaks 3. Leaking foot valve or check valve Pump has lost prime through: 1. Air leaks 2. Water level below suction pipe inlet Foot valve or strainer is plugged Impeller is plugged Check valve or foot valve is stuck shut Pipes are frozen Foot valve and/or strainer are buried in sand or mud Water level is too low for shallow well setup to deliver water	In new installation: 1. Re-prime according to instructions. 2. Check all connections on suction line, with soapy water or shaving cream. 3. Replace foot valve or check valve. In installation already in use: 1. Check all connections on suction line and shaft seal. 2. Lower suction line into water and re-prime. If receding water level in well exceeds 20' (6.1M), a deep well pump is needed. Clean foot valve or strainer. Clean impeller. Replace check valve or foot valve. Thaw pipes. Bury pipes below frost line. Heat pit or pump house. Raise foot valve and/or strainer above bottom of water source. Clean foot valve and strainer. Pump will not lift water more than 20' (6.1M).
Pump does not deliver water to full capacity	Water level in well is lower than estimated Steel piping (if used) is corroded or limed, causing excess friction Piping is too small in size Packed well point	A deep well jet will be needed if your well is more than 20' (6.1M) depth to water. Replace with plastic pipe where possible, otherwise with new steel pipe. Use larger piping. Backflush well point or sink new point.

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REPAIR PARTS LIST

Key No.	Part Description	No. Used	Part Number
1	Motor	1	M13783
2	Socket Head Capscrew	4	U30-104ZP
3	Slinger	1	17351-0009
4	Bracket	1	M13784
5	Shaft Seal	1	M13800
6	Spacer	1	121P1710
7	O-Ring	2	111P0830
8	Sleeve	1	251A4310
9	Diffuser	4	101P4790
10	Impeller	4	101P2070
11	Washer, Toothed	5	121P1720
12	Washer, Flat	1	121P1760
13	Impeller Nut	1	U36-204SSW
14	Pump Body (Suction)	1	721S3360
15	Washer	2	121P0810
16	Pipe Plug	2	171P1180
17	Capscrew	4	121P1690
18	Priming Valve Complete (Includes O-Ring)	1	ZBR05820