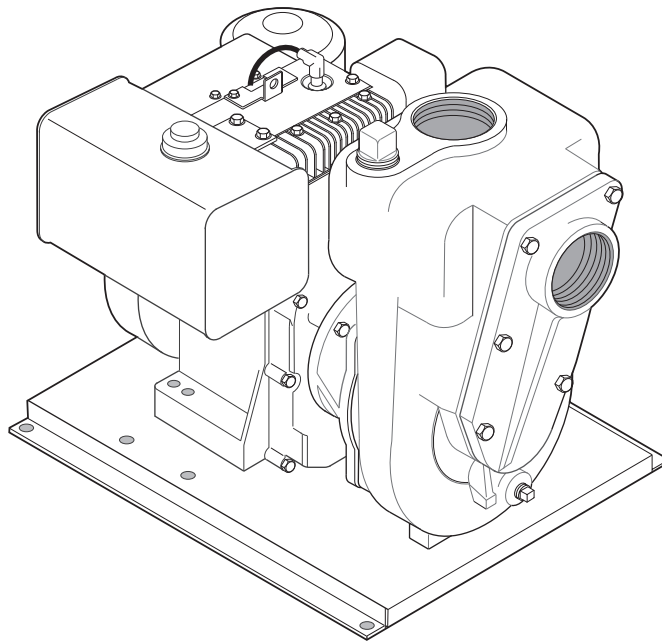


**BERKELEY®****B2X, B3T, B4T, B4Z****Important**

For best possible performance and continuous, satisfactory operation, read these instructions before installing your new pump.

Should service be required, this manual can be a valuable guide. It should be kept near the installation for ready reference.

## Important Safety Instructions

**SAVE THESE INSTRUCTIONS** - This manual contains important instructions that should be followed during installation, operation, and maintenance of the product. Save this manual for future reference.

**⚠** 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** indicates a hazard which, if not avoided, *will* result in death or serious injury.

**⚠ WARNING** indicates a hazard which, if not avoided, *could* result in death or serious injury.

**⚠ CAUTION** indicates a hazard which, if not avoided, *could* result in minor or moderate injury.

**NOTICE** addresses practices not related to personal injury.

The manufacturer cannot anticipate every possible circumstance that might involve a hazard. The warnings in this manual, and the tags and decals affixed to the unit are, therefore, not all-inclusive. If you use a procedure or operating technique that the manufacturer does not specifically recommend, you must satisfy yourself that it is safe for you and others. You must also make sure that the procedure or operating technique that you choose does not render the system unsafe.

To avoid risk of serious bodily injury and property damage, read and follow all safety instructions in this manual and on equipment carefully before installing this pump. Keep safety labels in good condition; replace if missing or damaged.

**⚠ WARNING Risk of hazardous gas.** Running engine gives off carbon monoxide, an odorless, colorless, poison gas. Breathing carbon monoxide can cause headache, fatigue, dizziness, vomiting, confusion, seizures, nausea, fainting or death.

- Operate pump ONLY outdoors.
- Keep exhaust gas from entering a confined area through windows, doors, ventilation intakes, or other openings.

**⚠ WARNING Risk of entanglement.** Starter and other rotating parts can entangle hands, hair, clothing, or accessories.

- NEVER operate engine powered pump without protective housings, covers, or guards in place.
- DO NOT wear loose clothing, jewelry or anything that may be caught in the starter or other rotating parts.
- Tie up long hair and remove jewelry.

**⚠ WARNING Risk of hazardous gas.** The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

**⚠ WARNING Risk of fire and burns.** Contact with muffler or engine area can result in serious burns. Exhaust heat/gases can ignite combustibles or structures causing a fire.

- DO NOT touch hot parts and AVOID hot exhaust gases.
- Allow equipment to cool before touching.
- DO NOT install the pump closer than 5 feet (1.5m) from any combustibles or structures with combustible walls having a fire resistance rating of less than 1 hour.
- It is a violation of California Public Resource Code, Section 4442, to use or operate the engine on any forest-covered, brush-covered, or grass-covered land unless the exhaust system is equipped with a spark arrester, as defined in Section 4442, maintained in effective working order. Other states or federal jurisdictions may have similar laws.  
Contact the original equipment manufacturer, retailer, or dealer to obtain a spark arrester designed for the exhaust system installed on this engine.
- Replacement parts must be the same and installed in the same position as the original parts.

**⚠ WARNING Risk of explosion.** The pump body may explode if used to boost pressure above 100 psi (689 kPa). Do not use this pump with inlet pressure greater than 70 psi (483 kPa). If not already in the piping system, install a pressure relief valve in the pump discharge line capable of passing the full pump flow at 100 psi (689 kPa). If local code requires installation of a pressure relief valve capable of handling the full pump flow at a pressure less than 100 psi (689 kPa), follow the code requirements.

**⚠ WARNING Risk of fire or explosion.** To avoid risk of fire and explosion, Pump Water Only with this pump. Do not pump salt water, flammable liquids or chemicals. Do not use the pump near gas pilot lights or where chemical or gas fumes are present. Use of this pump with liquids other than water or in an atmosphere containing chemical or gas fumes may ignite those liquids or gases and cause injury or death due to an explosion and/or fire.

**⚠ WARNING Burn hazard.** If water is trapped in the pump during operation it may turn to steam. Trapped steam can lead to an explosion and burns. Never run the pump with the outlet closed or obstructed.

### California Proposition 65 Warning

**⚠ WARNING** This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

## Limited Warranty

BERKELEY warrants to the original consumer purchaser ("Purchaser" or "You") of the products listed below, that they will be free from defects in material and workmanship for the Warranty Period shown below.

| Product                                                                                                                                       | Warranty Period                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Water Systems:</b>                                                                                                                         |                                                                                                                          |
| Water Systems Products — jet pumps, small centrifugal pumps, submersible pumps and related accessories                                        | <i>whichever occurs first:</i><br>12 months from date of original installation, or<br>18 months from date of manufacture |
| Pro-Source™ Composite 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                                                                                                                 | 12 months from date of original installation, or<br>18 months from date of manufacture                                   |
| <b>Agricultural/Commercial:</b>                                                                                                               |                                                                                                                          |
| Centrifugals – close-coupled motor drive, frame mount, SAE mount, engine drive, VMS, SSCX, SSHM, solids handling, submersible solids handling | 12 months from date of original installation, or<br>24 months from date of manufacture                                   |
| Submersible Turbines, 6" diameter and larger                                                                                                  | 12 months from date of original installation, or<br>24 months from date of manufacture                                   |

Our limited warranty will not apply to any product that, in our sole judgement, has been subject to negligence, misapplication, improper installation, or improper maintenance. Without limiting the foregoing, operating a three phase motor with single phase power through a phase converter will void the warranty. Note also that three phase motors must be protected by three-leg, ambient compensated, extra-quick trip overload relays of the recommended size or the warranty is void.

Your only remedy, and BERKELEY's only duty, is that BERKELEY repair or replace defective products (at BERKELEY's choice). You must pay all labor and shipping charges associated with this warranty and must request warranty service through the installing dealer as soon as a problem is discovered. No request for service will be accepted if received after the Warranty Period has expired. This warranty is not transferable.

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

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on the duration of an implied warranty, so the above limitations or exclusions may not apply to You. This warranty gives You specific legal rights and You may also have other rights which vary from state to state.

This Limited Warranty is effective June 1, 2011 and replaces all undated warranties and warranties dated before June 1, 2011.

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

**In Canada: 269 Trillium Dr., Kitchener, Ontario N2G 4W5**

## Location

Place unit as close to water source as possible to minimize suction lift, obtain the best pumping performance, and aid in priming. A typical portable installation is shown in Figure 1.

For permanent installation, mount unit on a foundation that will support the weight of pump and engine and also provide stability while the pump is running. For most permanent installations, it is advisable to bolt unit directly to foundation.

**NOTICE** Settling and/or shifting during operation can cause piping to place excessive strain on the pump and may damage pump case.

## Suction Connection

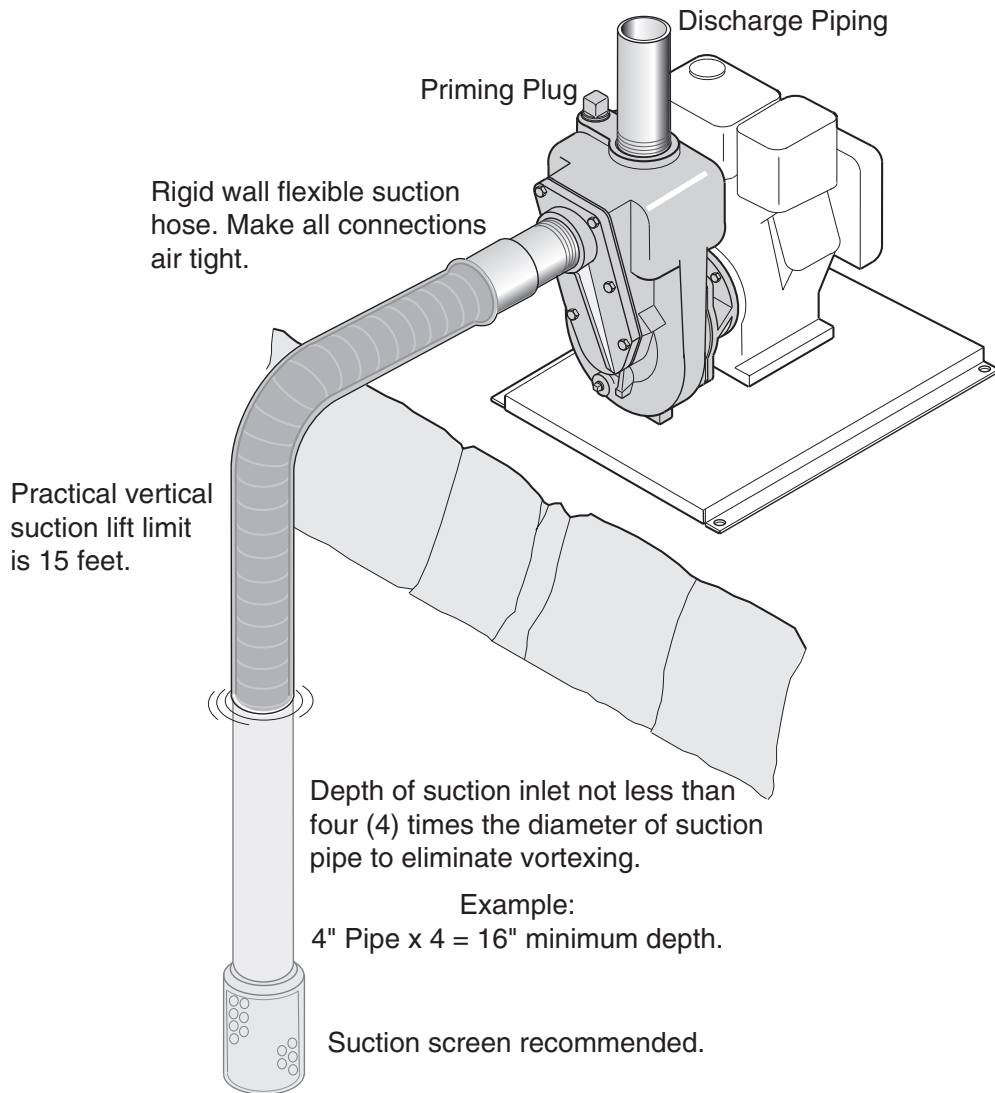
Connect either rigid pipe or flexible suction hose to pump suction as shown in Figure 1. If hose is selected, hose must be rated to hold the suction pressure and prevent collapse while the pump is running.

Make the suction line a continuous rise from the water source to the pump. High spots can trap air and also make priming difficult. Make sure all connections are tight and free of air leaks.

**NOTICE** Suction pipe or hose must be at least as large as the pump suction inlet in order for the pump to operate properly.

Minimum depth for the suction inlet is determined by the diameter of the suction line. See Figure 1.

Use a suction screen to keep debris out of pump.



**Figure 1 - Typical portable installation**

## Operation

**NOTICE** Do not start or run pump dry or damage to the mechanical seal will result.

- Wear safety glasses at all times when working on pumps.
- Do not allow pump or any system component to freeze. To do so will void warranty.
- Periodically inspect pump and system components.

## Priming The Pump

A self priming pump only needs to be manually primed at the first start-up. Once primed, under normal conditions the pump will reprime automatically at each subsequent start-up.

To prime, remove plug from top of pump case and fill case with water. Replace plug and start pump. Unit is equipped with a flapper type check valve which will open at start-up and allow pump to evacuate air from the suction line. After several minutes of operation, pump will be fully primed and pumping water. Priming time will vary depending on length and diameter of suction line.

## Running The Engine

**▲ WARNING Risk of hazardous gas.** The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Refer to engine owner/operator manual supplied with pump for starting and operating instructions.

Pump performance varies depending on engine R.P.M. Refer to engine operator's manual to adjust engine speed.

**NOTICE** Pump has the capability of overloading engine if allowed to run continuously at an RPM or flow rate that is above specified hydraulic performance.

It is important to check the engine load setting when putting the pump into operation, or after any speed change. Do this as follows.

- When operating under load it must be possible to push the throttle to a full open position and hear a noticeable increase in engine RPM (Above 6%).
- Upon release, throttle should return to original position and a decrease in engine speed should be noticed.
- Under this condition, engine has sufficient power reserve to safely operate at continuous duty.

## Maintenance

**▲ WARNING Risk of entanglement.** Starter and other rotating parts can entangle hands, hair, clothing, or accessories.

## Pump Lubrication

Pump liquid end does not require any grease or oil for lubrication. The mechanical seal is lubricated by water when the pump is operating.

## Engine

Refer to the engine manufacturer's operating manual for complete maintenance.

Seal Replacement

- 1. Refer to Figure 2. Remove pump case from seal plate to expose impeller and mechanical seal.

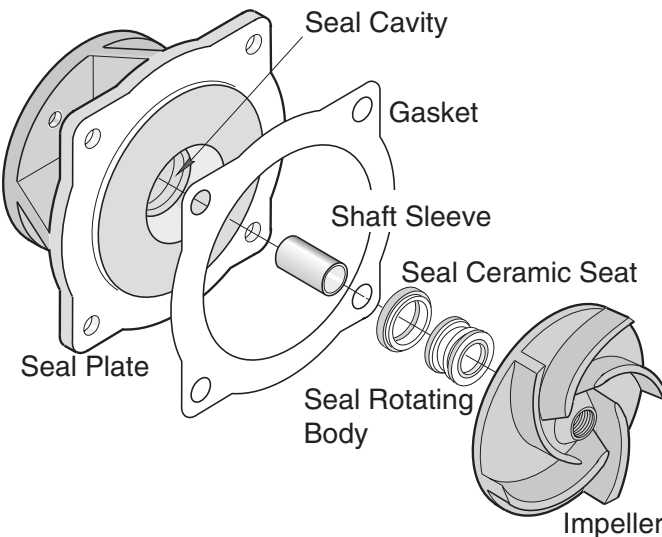


Figure 2 - Seal components and orientation

**NOTICE** Gasket(s) may be damaged during disassembly. Replace with new gasket(s) at this time.

- 2. Hold engine shaft stationary and unscrew impeller. Remove rotating body of mechanical seal.
- 3. Remove seal plate from engine, then tap ceramic seat out of seal plate from the back.
- 4. Clean ceramic seat cavity in seal plate thoroughly before installing new seal.  
**NOTICE** Make sure that seal faces are clean; do not scratch or damage new seal face during seal replacement.
- 5. Lubricate ceramic seat with mineral oil and press into seal plate cavity.
- 6. Lubricate shaft sleeve with mineral oil and slide seal body into place. If an impeller spacer was provided with pump between shaft sleeve and impeller, replace it.
- 7. Screw impeller back on engine shaft and re-install pump case.

Ordering Replacement Parts:

Locate the Berkeley nameplate on pump. This plate is normally on the pump case or bracket. (Seal Plate). A typical nameplate is shown in Figure 3.

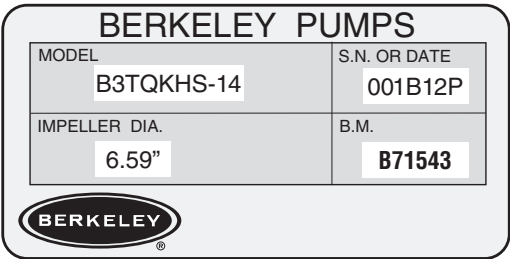


Figure 3 - Example nameplate

To be sure of receiving correct parts, provide all nameplate data when ordering. B.M. (Bill of Material) number is most important.

Write the nameplate information below, as nameplates can become worn or lost.

Model: \_\_\_\_\_

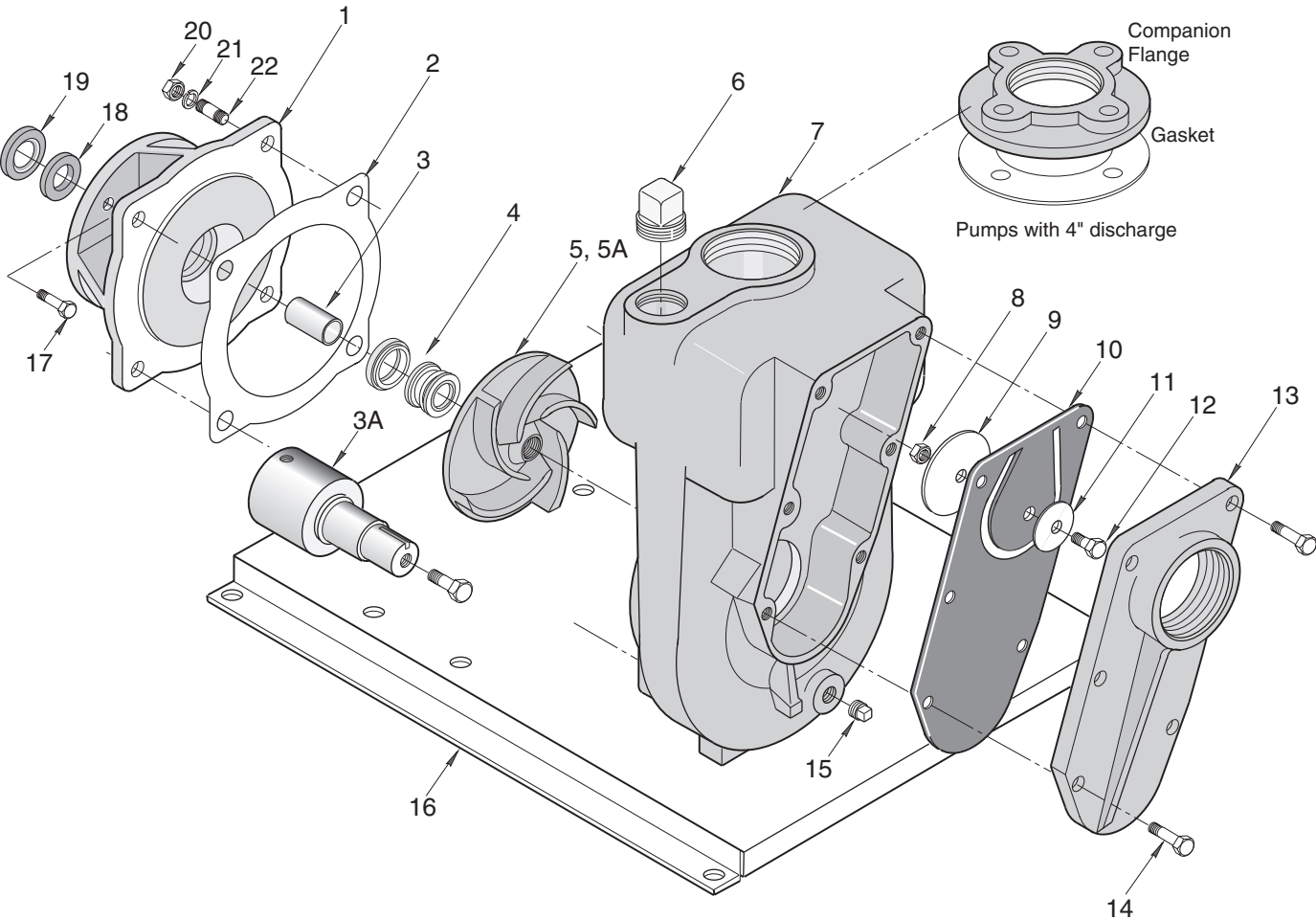
S.N. or Date: \_\_\_\_\_

Impeller Dia.: \_\_\_\_\_

B.M. \_\_\_\_\_

|                                    | Probable Cause |   |   |   |      |   |   |   |   |   |        |   |   |   |   |   |
|------------------------------------|----------------|---|---|---|------|---|---|---|---|---|--------|---|---|---|---|---|
|                                    | Engine         |   |   |   | Pump |   |   |   |   |   | System |   |   |   |   |   |
| Symptom                            | A              | B | C | D | A    | B | C | D | E | F | A      | B | C | D | E | F |
| No water delivered                 |                |   |   |   | X    | X | X |   |   |   | X      | X | X |   |   | X |
| Not enough water delivered         | X              |   |   |   |      |   | X | X |   |   | X      | X | X |   |   | X |
| Not enough pressure                | X              |   |   |   |      |   | X | X |   |   | X      | X | X |   |   |   |
| Engine heats excessively           |                | X | X |   |      |   |   | X | X | X |        | X |   | X |   |   |
| Abnormal noise and/or vibration    |                |   |   | X | X    |   | X |   |   | X |        | X | X | X |   |   |
| Pump works for a while, then stops |                |   |   | X |      |   | X |   |   | X |        |   | X |   | X | X |

| Cause                                                                              | Corrective Action                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1. Engine</b>                                                                   |                                                                                                                                                                                                                       |
| A. Speed too low                                                                   | Refer to engine manufacturer's manual                                                                                                                                                                                 |
| B. Rotating and/or reciprocating parts drag                                        | Refer to engine manufacturer's manual                                                                                                                                                                                 |
| C. Speed too high                                                                  | Maximum engine speed not to exceed engine manufacturer's recommendation.                                                                                                                                              |
| D. Loose or broken parts                                                           | Refer to engine manufacturer's manual                                                                                                                                                                                 |
| <b>2. Pump</b>                                                                     |                                                                                                                                                                                                                       |
| A. Not primed                                                                      | Reprime, inspect suction system for air leaks, and or clack assembly.                                                                                                                                                 |
| B. Pump takes too long to prime                                                    | Check for air leaks or defective check valve.                                                                                                                                                                         |
| C. Flow through pump completely or partially blocked.                              | Locate and remove obstruction. Attach strainer.                                                                                                                                                                       |
| D. Internal leakage                                                                | Check clearances between face of vanes and case. Should not exceed 1/32".                                                                                                                                             |
| E. Rotating parts drag                                                             | Inspect. Repair.                                                                                                                                                                                                      |
| F. Loose or broken parts                                                           | Inspect. Repair.                                                                                                                                                                                                      |
| <b>3. System</b>                                                                   |                                                                                                                                                                                                                       |
| A. Pressure required by system at design flow rate exceeds pressure rating of pump | Compare pump pressure and flow rate against pump performance chart. Reduce system pressure requirement. Increase pressure capability of pump.                                                                         |
| B. Obstruction in suction piping                                                   | Locate and remove obstruction. Attach strainer.                                                                                                                                                                       |
| C. Suction lift too high                                                           | Check with gauge or measure vertical distance between water surface and center line of pump, allowing for friction loss in suction pipe. Reduce rate of flow to obtain desired lift. Refer to pump performance chart. |
| D. Discharge head too low                                                          | Decrease rate of flow                                                                                                                                                                                                 |
| E. Suction inlet not immersed deep enough                                          | Refer to "Installation"                                                                                                                                                                                               |
| F. Leaky suction line or connection admitting air                                  | Repair or replace suction line. Tighten connections.                                                                                                                                                                  |



Series B2X, B3T, B4T, B4Z

| Ref. | Description                      |
|------|----------------------------------|
| 1    | Seal Plate                       |
| 2    | Gasket (pump case to seal plate) |
| 3    | Shaft Sleeve                     |
| 3A   | Shaft Extension (18, 30 HP)      |
| 4    | Mechanical Seal                  |
| 5    | Impeller                         |
| •5A  | Impeller Spacer                  |
| 6    | Pipe Plug                        |
| 7    | Pump Case                        |
| 8    | Hex Nut (clack)                  |
| 9    | Clack Weight                     |
| 10   | Clack Gasket                     |

| Ref. | Description                      |
|------|----------------------------------|
| 11   | Clack Washer                     |
| 12   | Capscrew (clack)                 |
| 13   | Suction Cover                    |
| 14   | Capscrew (suction cover to case) |
| 15   | Pipe Plug                        |
| 16   | Base (small HP shown)            |
| 17*  | Capscrew (seal plate to engine)  |
| 18   | Slinger                          |
| 19   | Oil Seal                         |
| 20   | Hex Nut (seal plate to case)     |
| 21   | Lockwasher                       |
| 22   | Stud (seal plate to case)        |

• Not shown  
\* Some models have stud and hex nut connections.

Refer to [BerkeleyPumps.com](http://BerkeleyPumps.com) for detailed repair parts listings.

Engine

Refer to engine manufacturer’s operating manual for complete maintenance and warranty.