



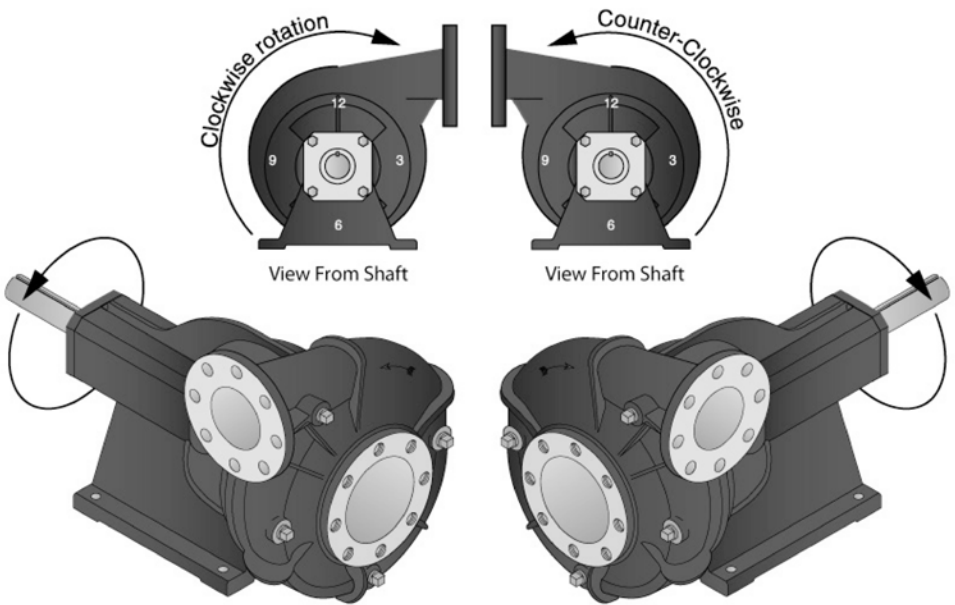
Pump Start Up & Maintenance Guide



All maintenance and repairs should be performed by qualified professionals only. This guide is provided to our customers **for reference only** and should not be used in place of expertise.

Starting a New Pump

Before a pump is put into operation the rotational direction must be verified to assure proper performance (refer to illustration below). Centrifugal pumps will still pump liquid when the rotation is incorrect, however Gallons Per Minute and Head will be a fraction of the published performance.



- **Rope Seal:** Before starting a pump with a **Rope Packing Seal for the first time**, loosen gland nuts and re-tighten finger tight. Once running, allow packing to leak liberally for a few moments to saturate then tighten gland nuts one complete turn each until leakage is reduced to 40 to 60 drops per minute.
- **Mechanical Seal:** Adjustment or maintenance of a Mechanical Seal is normally not required. The seal is enclosed within the pump and is self-adjusting. Seal is cooled and lubricated by the pumped liquid.

Weekly Maintenance

Observe the following to verify the pump unit is operating properly.

- Vibration – All rotating machines can be expected to produce some vibration. However excessive vibration can reduce the life of the unit. If the vibration seems excessive, discontinue operation to determine cause and correct.
- Noise – When the unit is operating under load, listen closely for unusual sounds that might indicate the unit is in distress. Determine the cause and correct.
- Operating Temperature – During operation, heat is dissipated from the pump bearings and the driver. After a short period of time the surface of the pump bracket may reach temperatures as high as 150°F, which is normal. If the surface temperature of the pump bracket or driver is excessive, discontinue operation, determine cause of the temperature rise and correct. Bearings will run hotter for a brief run-in period after packing which is normal. However, worn bearings will cause excessive temperatures and need to be replaced. **The pump unit is cooled by the water flowing through it, and will normally be at the temperature of the pumping liquid.**
- Rope Seal: After a short period of operation, verify that the rope packing box and gland are not hot. If heat is detected, loosen the gland nuts evenly until water is just running out of stuffing box in a DROPLET form. Water must not be streaming or spraying out. Verify cool operation periodically. Adjust gland nuts **EVENLY** as necessary for lubrication and cooling of the packing. If packing has been tightened to the limit of the packing gland travel, additional packing is necessary.
- Mechanical Seal: There should be no leakage from a mechanical seal, if there is it needs to be replaced.
- Inspect suction line and/or screen for flow obstruction.

Quarterly Maintenance

- Pump and Piping Connections – Inspect all system piping connections for leakage or possible misalignment. Misalignment of pipe connections to the pump will put excessive strain on the pump case and can cause damage to internal components of both the pump and motor. If stress on the pump case is suspected, adjust pipe supports to correct.

For flange connections, misalignment can be checked by shutting down the pump and removing the pipe flange bolts on the pump connections. If the mating flanges come apart or shift, there is pressure at the connection(s) and adjustments should be made to the piping supports until flanges mate without force. This procedure can be done throughout the piping system.

- Check pump foundation integrity and ensure all hold-down bolts are secure.
- Complete any lubrication requirements.
- Inspect packing or mechanical seal for possible replacement. Examine shaft sleeve if present for wear and replace it if necessary.
- Inspect pumping plant panel for signs of wear and replace/repair worn parts.
- Check pump bearings for signs of wear. Repack, grease or replace as necessary.

Annual Maintenance

- Inspect pump and entire pumping system for signs of wear.
- Inspect system valves, screens, gaskets, diaphragms etc.
- Check pump impeller eye clearance.
- Inspect impeller, volute case, and seal chamber for signs of excessive wear or corrosion.

Recommended Spares

It is recommended that the following spare parts be kept on-site as a minimum back-up to service pump and reduce down-time. Parts shown do not apply to all models. Check your model/style against parts breakdown drawing(s) when selecting spares.

- Mechanical Shaft Seal.
- Packing and packing gland.
- Shaft Sleeve(s).
- Impeller wear ring.
- All gaskets and O-Rings required for one pump.
- Retaining Rings.

If having a pump non-operational has severe consequences a back-up pump should be considered. Otherwise a back-up impeller, volute case, bearings and shaft would be prudent.

Spare Parts List

Mechanical Seals

116-S32690 (B3Z/B4Z/B6Z)

116-S32693 (B3J/B4J)

Impeller Wear Rings

116-S02894 (B4J)

116-S04176 (B3J)

Rope Packing

116-S14022 (B3Z/B6Z)

116-S08291 (B3Z-HD)

Rope Packing Glands

116-B82468 (B3Z/B6Z)

116-B82470 (B3Z-HD)

Volute O-Rings

116-M14943 (B3Z)

116-S26471 (B3J)

Volute Gaskets

116-S05126 (B3Z/B4Z/B6Z)

116-S06271 (B3J/B4J)

Shaft Kits

111-B80698 (B3Z, CW)

111-B80696 (B3Z, CCW)

111-B85916 (B3Z-HD, CCW)

111-B85585 (B3Z-HD, CW)

111-B78178 (B3ZQ-S, CW)

111-B80703 (B4Z, CW)

111-B82184 (B6Z, CW)

111-B73051 (B3J/B4J, CW)

111-B73052-3

(B3Z/B6Z, CW, SPLINED)

Pump Troubleshooting

Troubleshooting should be performed by qualified personnel only. Buyer assumes all risk and liability arising from installation or repair of the original product.

Little or No Discharge

- Casing not initially filled with water. (Prime the pump)
- Total head too high. (Shorten suction and/or head)
- Suction lift too high, or too long (Lower suction lift, install foot valve and prime, or shorten length of suction line)
- Impeller plugged (Clean impeller)
- Hole or air leak in suction line (Repair or replace. Pipe sealing compound is preferred over thread tape)
- Impeller damaged (Replace impeller)
- Insufficient inlet pressure or suction head (Increase inlet pressure by adding more water to tank or increasing back pressure)
- Casing gasket or "O" ring leaking (Replace)
- Pump flow is greater than well flow capacity (Match pump flow to well capacity)

Loss of Suction

- Air leak in suction line (Repair & replace)
- Suction lift too high (Lower suction lift, install foot valve and prime)
- Insufficient inlet pressure or suction head (Increase inlet pressure by adding more water to tank or increasing back pressure)
- Clogged foot valve, check valve or strainer (Unclog)
- Casing not initially filled with water (Prime the pump)
- Defective foot valve or check valve (Replace)
- Defective priming hose bibb on suction pipe (Replace)

Pump Leaks at Shaft

- Worn mechanical seal (replace mechanical seal). Rope seals are meant to drip 40 to 60 drops per minute.

Pump Vibrates and/or Makes Excessive Noise

- Mounting plate or foundation not rigid enough (Reinforce)
- Foreign material in pump (Dismantle pump and clean)
- Impeller damaged (Replace impeller)
- Worn motor bearings (Replace bearings)
- Suction lift too high (Lower suction lift, install foot valve and prime)

Pump Will Not Deliver Water or Develop Pressure

- No priming water in casing (Fill pump casing)
- Mechanical seal leaking (Replace mechanical seal)
- Leak in suction line (Repair or replace)
- Discharge line is closed and priming air cannot vent (Open)
- Suction line or valve is closed (Open)
- Pump has failed (Repair or replace)
- Foot valve or check valve is leaking (Replace valve)
- Suction screen clogged (Clean or replace)

Winterizing

If a pump is to be out of service for an extended period of time, the following storage procedures should be followed.

- Remove exterior dirt, grime or any substance that may trap moisture. Prime exposed metal and repaint if necessary.
- Flush suction and discharge lines. Check for leaks at this time and replace any worn gaskets.
- Lubricate bearings.
- If possible, keep unit clean and dry during storage period to guard against corrosion.
- Seal all open ports to keep out foreign objects such as insects, rodents, dust and dirt.
- Rotate driver shaft periodically to prevent freeze-up of internal components.
- Shelter pump from the elements when possible.



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