PIC Series 2500 Pipe Mounted In-Line Centrifugal Pump

Installation, Operation & Service Instructions

INSTALLER: PLEASE LEAVE THIS MANUAL FOR THE OWNER’S USE.

DESCRIPTION
The PIC Series 2500 Centrifugal Pump is a close coupled pump which features - high efficiency, rugged construction, and in-line mounting. These features make installation, operation and service easy to perform.

PUMP APPLICATION
The standard PIC Series 2500 centrifugal pump's bronze fitted construction make it ideal for service with the following liquids: unheated domestic and fresh water, boiler feed water, condensate, hydronic cooling or heating, pressure boosting, general pumping and benign liquids.

For other applications contact your local G&L Representative.

OPERATIONAL LIMITS
Unless special provisions have been made for your pump by G&L, the operational limits for PIC Series 2500 Pumps are as follows:

MAXIMUM WORKING PRESSURE
Listed on pump nameplate.

SEAL OPERATING LIMITS
STANDARD SEALS
BUNA-PH Limitations 7-9; Temperature Range -40 to +225°F
EPT-PH Limitations 7-11; Temperature Range -40 to +250°F

For use on closed or open systems which are relatively free of dirt and/or other abrasive particles.

FLUSHED SINGLE SEALS
PH Limitations 7-9; Temperature Range 0 to +250°F*

For use on closed or open low pressure systems which may contain a high concentration of abrasives. An external flush is required.

FLUSHED DOUBLE SEALS
PH Limitations 7-9; Temperature Range 0 to +250°F*

For use on closed or open low pressure systems which may contain a high concentration of abrasives. An external flush is required.

For use on closed or open low pressure systems which require a large amount of makeup water, as well as systems which are subjected to widely varying chemical conditions and solids buildup.

*For operating temperatures above 225°F a cooled flush is required and is recommended for temperatures above 225°F for optimum seal life. On closed systems cooling is accomplished by inserting a small heat exchanger in the flush line to cool the seal flushing fluid.

Flush-line Filters and Sediment Separators are available on special request.
SAFETY INSTRUCTIONS

This safety alert symbol will be used in this manual and on safety instruction decals to draw attention to safety related instructions. When used, the safety alert symbol means ATTENTION: BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.

Your PIC Series 2500 Pump should have the following safety instruction decals located approximately as shown. If the decals are missing or are illegible contact your local G&L representative for a replacement.

WARNING
eyebolts or lifting lugs if provided are for lifting only the components to which they are attached.
failure to follow instructions could result in injury or death.

CAUTION
do not run pump dry. seal damage may occur.
inspect pump seal regularly for leaks, replace as required.
for lubrication requirements, consult service instructions.
failure to follow instructions could result in injury or property damage.

WARNING
rotating components disconnect and lock out power before servicing.
do not operate without all guards in place.
consult installation and service instruction sheet before operating or servicing.
failure to follow instructions could result in injury or death.

ADDITIONAL SAFETY REQUIREMENTS

ELECTRICAL SAFETY:

WARNING: ELECTRICAL SHOCK HAZARD
Electrical connections to be made by a qualified electrician in accordance with all applicable codes, ordinances and good practices. Failure to follow these instructions could result in serious personal injury or death, and property damage.

WARNING: ELECTRICAL OVERLOAD HAZARD
Three phase motors must have properly sized heaters to provide overload and under voltage protection. Single phase motors have built-in overload protections. Failure to follow these instructions could result in serious personal injury or death, and property damage.

THERMAL SAFETY:

WARNING: EXTREME TEMPERATURE HAZARD
If pump, motor, or piping are operating at extremely high or low temperature, guarding or insulation is required. Failure to follow these instructions could result in serious personal injury or death, and property damage.

MECHANICAL SAFETY:

WARNING: UNEXPECTED STARTUP HAZARD
Disconnect and lockout power before servicing. Failure to follow these instructions could result in serious personal injury or death, and property damage.

WARNING: EXCESSIVE SYSTEM PRESSURE HAZARD
The maximum working pressure of the pump is listed on the nameplate, do not exceed this pressure. Failure to follow these instructions could result in serious personal injury or death, and property damage.

WARNING: EXCESSIVE PRESSURE HAZARD VOLUMETRIC EXPANSION
The heating of water and other fluids causes volumetric expansion. The associated forces may cause failure of system components and release of high temperature fluids. This will be prevented by installing properly sized and located compression tanks and pressure relief valves. Failure to follow these instructions could result in serious personal injury or death, and property damage.
PUMP LOCATION

Locate the pump so there is sufficient room for inspection, maintenance and service. If the use of a hoist or tackle is needed, allow ample head room.

⚠️ WARNING: FALLING OBJECT HAZARD
Eyebolts or lifting lugs if provided are for lifting only the components to which they are attached. Failure to follow these instructions could result in serious personal injury or death, and property damage.

If lifting of the entire pump is required, do so with slings placed around the pump assembly as shown.

Special precautions to avoid sound and vibration transmission should be taken if the pump is to be located near a noise sensitive area, a sound specialist should be consulted.

If the pump is not on a closed system, it should be placed as near as possible to the source of the liquid supply, and located to permit installation with the fewest number of bends or elbows in the suction pipe.

The installation must be evaluated to determine that the Net Positive Suction Head Available (NPSHA) meets or exceeds the Net Positive Suction Head Required (NPSHR), as stated by the pump performance curve.

IMPORTANT: Do not install and operate PIC Pumps in closed systems unless the system is constructed with properly sized safety devices and control devices. Such devices include the use of properly sized and located pressure relief valves, compression tanks, pressure controls, temperature controls, and flow controls as appropriate. If the system does not include these devices, consult the responsible engineer or architect before making pumps operational.
PIPING

Always install a section of straight pipe between the suction side of the pump and first elbow or install a suction diffuser. This reduces turbulence of the suction by straightening out the flow of liquid before it enters the pump. The length should be equal to five times the diameter of the pipe.

Be sure to eliminate any pipe-strain on the pump. Support the suction and discharge pipes independently by use of pipe hangers or ground supports close to the pump. A support can be bolted to the underside of the pump body but it must be so constructed as to allow freedom of movement with the normal expansion of the piping.

If the pump is to be mounted in vertical piping with the motor in the horizontal position provide adequate support to prevent strain on pump parts and piping. It is not recommended that pump be mounted with the motor vertically downward. Do not use motor lift ring as a means of suspending the pump.

Line up the piping so that the bolt-holes in the pump flanges match the bolt-holes in the pipe flanges. DO NOT ATTEMPT TO SPRING THE SUCTION OR DISCHARGE LINES INTO POSITION. Bearing wear will result if suction or discharge lines are forced into position. The code for Pressure Piping (A.S.A.B.31.1) lists many types of supports available for various applications.

As a rule, ordinary wire or band hangers are not adequate to maintain alignment. It is very important to provide a strong, rigid support for the suction and discharge lines.

Where considerable temperature changes are anticipated, fittings for absorbing expansion should be installed in the system in such a way as to avoid strain on the pump.

On an open system with a suction-lift, use a foot-valve of equal or greater area than the pump suction piping. Prevent clogging by using a strainer at the suction inlet next to the foot-valve. The strainer should have an area three times that of the suction pipe with a mesh hole diameter of no less than 1/4".

A Triple Duty Valve installed in the discharge line will serve as a check valve to protect the pump from water hammer, as an isolation valve for servicing and for throttling.

NOTES:

1. The pipeline should have isolation valves around the pump and have a drain valve in the suction pipe.

ROTATION

Pump rotation is clockwise when viewed from back of the motor. An arrow is provided to show direction of rotation.

GENERAL INSTRUCTIONS

1. Keep the motor properly lubricated.

2. When there is a danger of freezing, drain the pump.

3. Inspect pump regularly for leaky seals or gaskets and loose or damaged components. Replace or repair as required.

LUBRICATION

Your PIC Series 2500 pump has been lubricated at the factory, future lubrication should be accordance with the motor manufacturers instructions.
PRIMING AND STARTING

**CAUTION: SEAL DAMAGE HAZARD**

Do not run pump dry, seal damage may occur. Failure to follow these instructions could result in property damage and/or moderate personal injury.

Before starting the pump, the pump body must be full of liquid. Manual priming may be required if the system does not automatically fill the pump body with liquid. Vent plugs are provided on the pump body to vent the air. While venting the air from the pump body, the pump shaft should be rotated a few times by hand.

The pump should be started with the discharge valve closed and the suction valve fully open. After the pump is up to operating speed the discharge valve should be opened slowly.

**IMPORTANT:** The pump should never be operated with the suction valve closed or throttled. This could result in cavitation.
SERVICE INSTRUCTIONS

**WARNING: UNEXPECTED STARTUP HAZARD**
Disconnect and lockout power before servicing. Failure to follow these instructions could result in serious personal injury or death, and property damage.

1. Close valves on suction and discharge sides of pump. (If no valves have been installed, it will be necessary to drain the system).

**CAUTION: EXTREME TEMPERATURE HAZARD**
Allow pump temperature to reach acceptable level before proceeding. Open drain valve, do not proceed until liquid stops coming out of drain valve. If liquid does not stop flowing from drain valve isolation valves are not sealing and should be repaired before proceeding. After liquid stops flowing from drain valve, leave drain valve open and continue. Remove the drain plug located at the bottom of the pump volute. Do not reinstall plug or close drain valve until reassembly is completed. Failure to follow these instructions could result in serious moderate personal injury or property damage.

2. Loosen volute capscrews, do not remove them. Using capscrews in the jack screw holes start to remove the pump assembly from the volute.

**WARNING: EXCESSIVE SYSTEM HAZARD**
Make certain the internal pressure is relieved before continuing. Failure to follow these instructions could result in serious personal injury or death, and property damage.

3. Remove seal flushing tube, if used.
   Remove the volute capscrews and remove the pump assembly from the volute.

4. Remove the impeller capscrew, lock washer and washer. Remove the impeller.

5. Install impeller, impeller washer, lock washer and cap-screw, then tighten capscrew (per torque chart).

6. Install new volute gasket then install pump assembly into volute. Tighten volute capscrews (per torque chart). Install seal flushing tube, if used. Install drain plug, close drain valve.

7. Open isolation valves, inspect pump for leaks. If not leaking return pump to service.

2500-S Stuffing Box
With Special Single Mechanical Seal – Figures 8 and 9

5. Remove hex nut from seal cap bolts and remove coverplate capscrews. Remove coverplate from bracket.

6. Remove seal assembly. Thoroughly clean and inspect seal sleeve and seal cap, replace if required.

7. Lubricate shaft sleeve and seal cap with soap water (Do not used petroleum lubricant). Insert stationary seal with O-ring into the seal cap and slide onto the shaft. Replace the seal cap gasket. Slide rotating portion of the seal assembly on to the shaft sleeve and lock in place. For 1 1/4" seals, the collar should be 1 13/32" from the impeller end of the shaft sleeve. For 1 5/8" seals, the distance should be 1 1/4" (see Figure 9).

8. Assemble coverplate to bracket, tighten capscrews (per torque chart). Assemble seal cap to coverplate, tighten hex nuts on seal cap bolts (per torque chart).

Go to Step 10 of 2500 instructions.

2500-D Stuffing Box
With Special Double Mechanical Seal – Figures 8 and 10

5. Remove hex nut from seal cap bolts and remove coverplate capscrews. Remove coverplate from bracket.

6. Remove seal assembly. Thoroughly clean and inspect shaft sleeve, seal cap, and coverplate seal cavity, replace if required.

7. Lubricate shaft sleeve, seal cap, and coverplate with soap water (Do not used petroleum lubricant). Insert one stationary seal and O-ring into seal cap and the other into the coverplate. Slide the seal cap onto the shaft. Replace the seal cap gasket. Slide rotating portion of the seal assembly on to the shaft sleeve.

8. Assemble coverplate to bracket, tighten capscrews (per torque chart). Assemble seal cap to coverplate, tighten hex nuts on seal cap bolts (per torque chart).

Go to Step 10 of 2500 instructions.

*For 1 1/4" seal both parts will be housed in the coverplate as shown in Fig. 10. Seal cap gasket is not used.*
5. Remove hex nuts from packing gland and remove coverplate capscrews. Remove coverplate from bracket.

6. Remove packing rings from the stuffing box.

7. Check condition of shaft sleeve and replace if scored or otherwise damaged.

8. Insert two packing rings into the stuffing box followed by the lantern ring and then the remaining two pieces of packing. Make certain that the packing joints are staggered 90 degrees.

9. Install, but do not tighten the packing gland.

10. Install coverplate over the pump shaft, tighten capscrews (per torque chart).

11. Tighten packing gland to compress packing.

12. Install impeller, impeller washer, lock washer and cap-screw, then tighten (per torque chart).

13. Install new volute gasket then install pump assembly into volute. Tighten volute capscrews (per torque chart). Install seal flushing tube. Install drain plug, close drain valve.

14. Open isolation valves, inspect pump for leaks, if not leaking return pump to service. (See note for packing adjustment.)

**NOTE:**

Before starting pump, back off packing gland nuts or screws until glands are loose, re-tighten with fingers until glands are just snug against the first packing ring. After pump is running at first start, water may run freely from packaging. This is normal and should be allowed to continue for a period of time before further tightening of the glands. Take up gland bolts uniformly, one flat at a time.

An adequate leakage rate is not one single value for all pumps and installations, but is the amount required to provide adequate cooling and lubrication. The required leakage will be largely influenced by operating pressure, fluid temperature, shaft speed, etc.

For fluid temperatures in the range of 32° to 190°F, average leakage rates of 60 to 80 drops per minute are recommended. However, each individual pump and installation will have unique operating conditions that will result in broadly variable leakage rate requirements.

At fluid operating temperatures near the upper limit of 190°F, the maximum temperature rise of the leakage is particularly important. A packed pump should never operate with steam forming at the gland. This necessarily limits the temperature rise to a maximum of about 20°F. If the formation of steam persists at higher leakage rates, cooling water must be provided by means of an external supply, or a heat exchanger used to cool the by-pass flush.

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**DEALER SERVICING**

If trouble occurs that cannot be rectified contact your local G&L representative. He will need the following information in order to give you assistance.

1. Complete nameplate data of pump and motor.
2. Suction and discharge pipe pressure gauge readings.
3. Ampere draw of the motor.
4. A sketch of the pump hook-up and piping.