



Series 1531 Centrifugal Pump

Installation, Operation & Service Instructions

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

DESCRIPTION

The Series 1531 centrifugal pump is a close coupled pump which features — high efficiency, rugged construction, foot mounted motor. These features make installation, operation and service easy to perform.

PUMP APPLICATION

The standard Series 1531 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 B&G Representative.

OPERATIONAL LIMITS

Unless special provisions have been made for your pump by ITT Bell & Gossett, the operational limits for Series 1531 Pumps are as follows:

MAXIMUM WORKING PRESSURE

Listed on pump nameplate.

SEAL OPERATING LIMITS

STANDARD SEALS

BUNA-PH Limitation 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.

PACKING

PH Limitations 7-9; Temperature Range 0 to +200°F

For use on open or closed 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 250°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 INSTRUCTION

This safety alert symbol will be used in this manual and on the pump 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 Series 1531 Pump should have the following safety instruction decals located approximately as shown. If the decals are missing or are illegible contact your local B&G 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.

P70643

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.

P70642

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.

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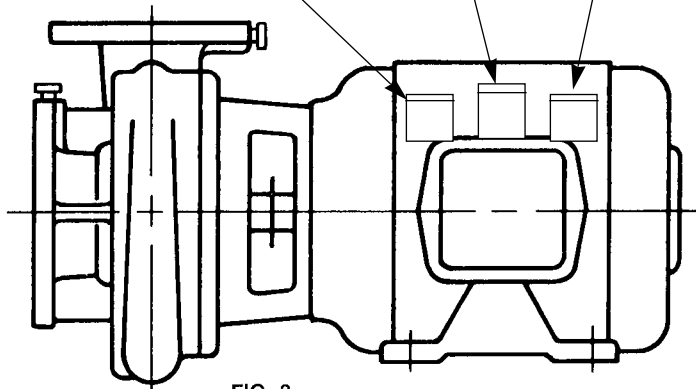


FIG. 3

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 protectors. Failure to follow these instruction 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 under the pump assembly as shown.

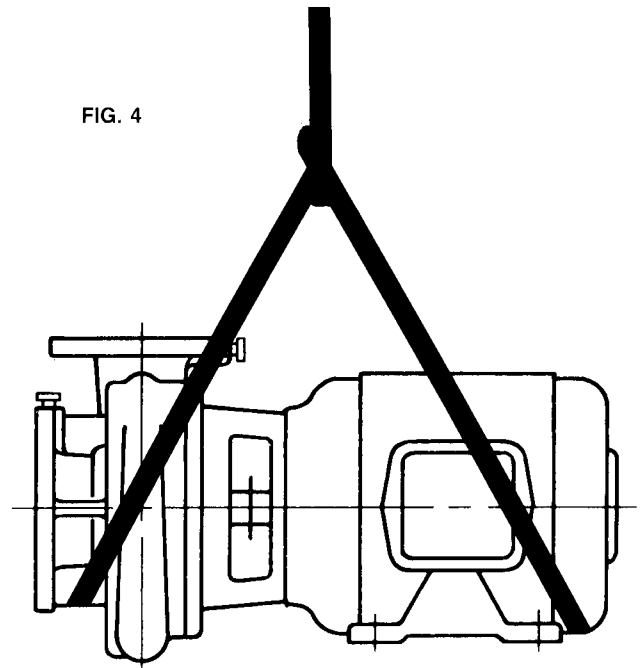
The best pump location for sound and vibration absorption is on a concrete floor with sub soil underneath. If the pump location is overhead, special precautions should be undertaken to reduce possible sound transmission, consult a sound specialist.

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.

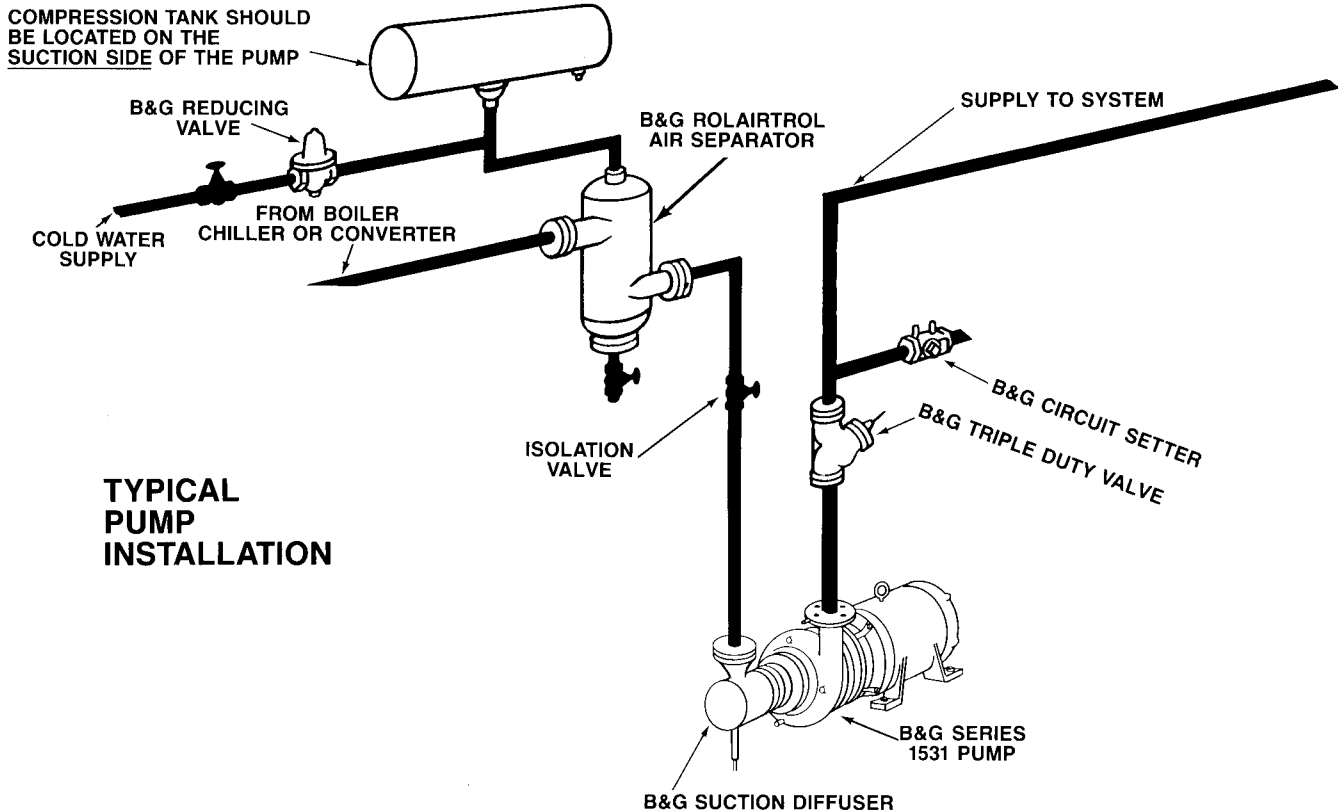
IMPORTANT: Do not install and operate ITT Bell & Gossett Pumps, 3D Valves, Suction Diffusers, etc., in closed systems unless the system is constructed with properly sized safety devices and control devices. Such devices include the use of properly sized and located pressure relief valves, compression

FIG. 4



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.

FIG. 5



**TYPICAL
 PUMP
 INSTALLATION**

INSTALLATION

This pump is built to provide years of service if installed properly and attached to a suitable foundation. A base of concrete weighing 2½ times the weight of the pump is recommended. (Check the shipping ticket for pump weight.)

If possible, tie the concrete pad in with the finished floor.

To facilitate easy servicing, some type of expansion fitting should be utilized. The female portion should be inserted into a suitable hole in the pad so that its top surface is flush with the pad surface. Thus, when the hold-down bolts are removed, the motor can be removed by sliding it back from the pump. (See Figure 6.)

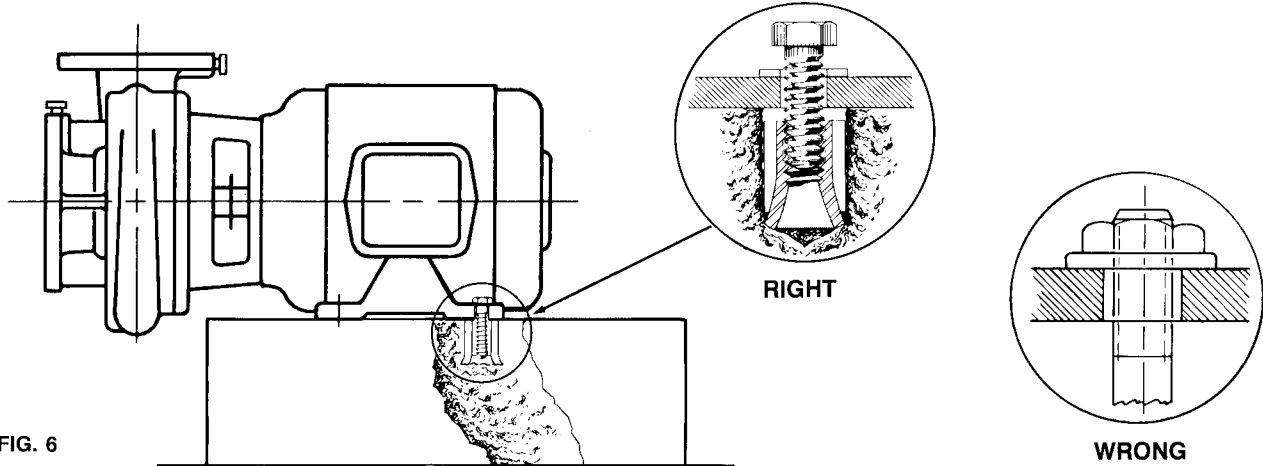


FIG. 6

ROTATION

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

PIPING

Always install a section of straight pipe between the suction side of the pump and first elbow or install a B&G 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 near the pump. Line up the vertical and horizontal 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 ¼".

When using an isolation base, flexible piping should be used on both the suction and discharge sides of the pump.

A Bell & Gossett 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.
2. When installing the suction and discharge connections to a threaded pump housing the use of teflon tape sealer or a high quality thread sealant is recommended.

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 time 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.

LUBRICATION

Your Series 1531 pump has been lubricated at the factory, future lubrication should be in accordance with the motor manufacturers instructions.

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.

FIG. 7

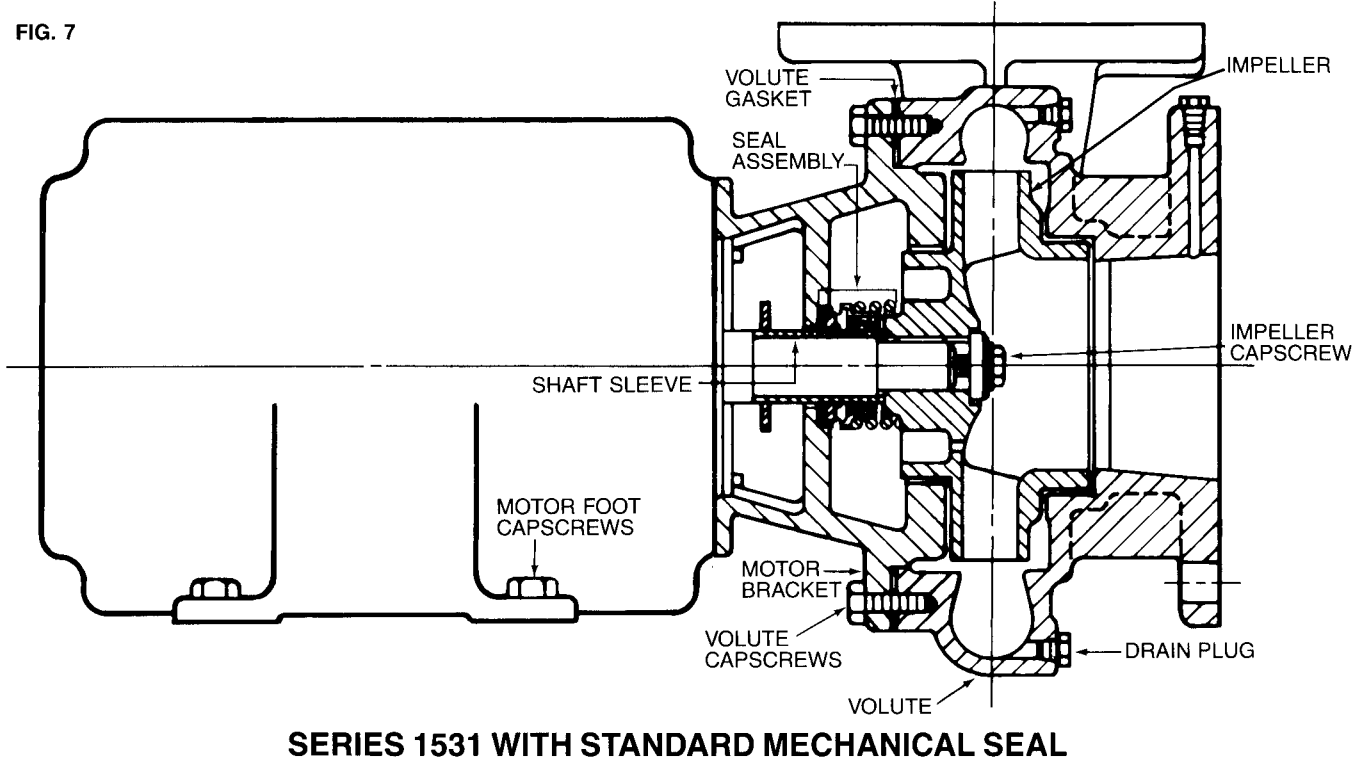


FIG. 8

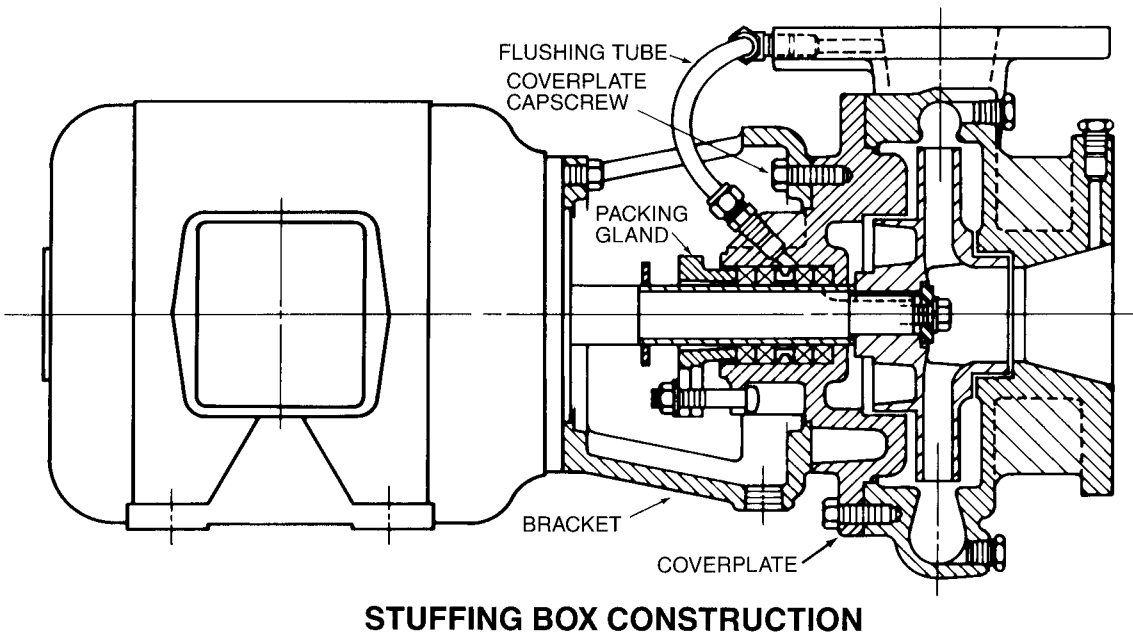


FIG. 9

1531-S

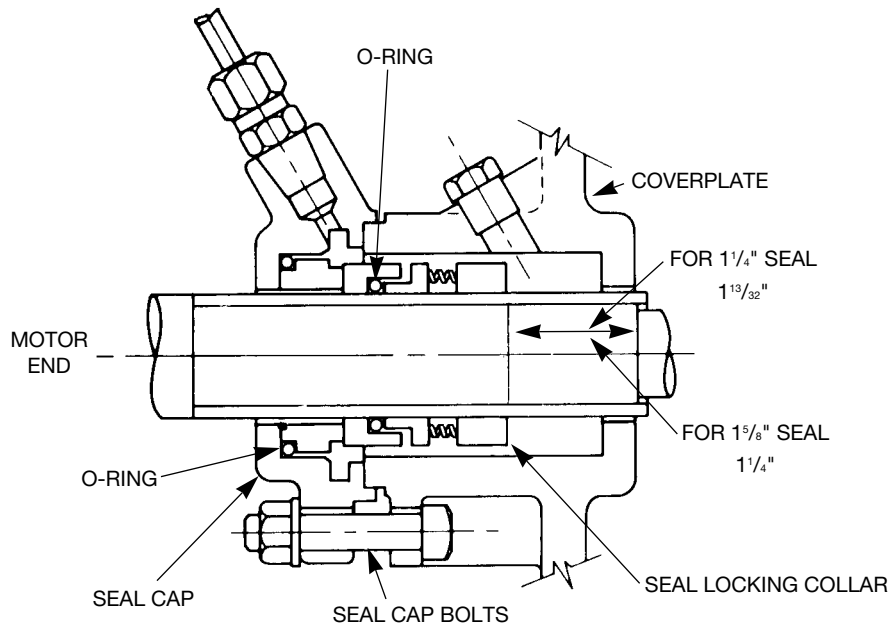
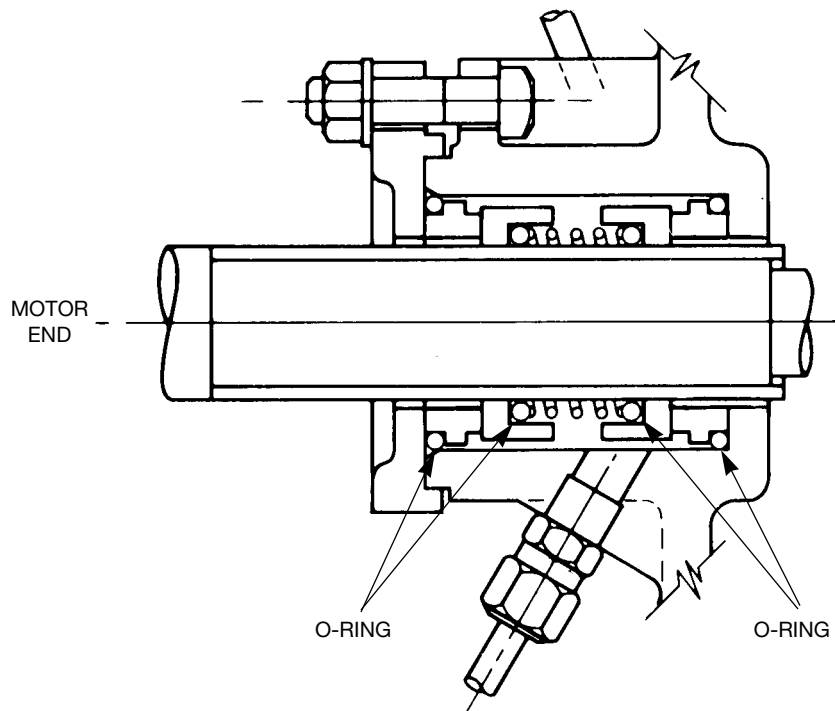


FIG. 10

1531-D



SERVICE INSTRUCTIONS



WARNING: Unexpected Startup Hazard

Disconnect and lock out 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 on the bottom of the pump volute. Do not reinstall plug or close drain valve until reassembly is completed. Failure to follow instructions could result in moderate personal injury or property damage.

2. Remove motor foot capscrews. 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 Pressure 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.

1531 and 1531-F

With Standard Mechanical Seal – Figure 7

5. Remove the rotating portion of the seal, use a screwdriver to loosen the compression ring.
6. Remove the seal insert along with the insert gasket and retainer (if used).
7. Thoroughly clean the shaft sleeve and the coverplate seal cavity. Inspect for surface damage like pitting, corrosion, nicks or scratches. Replace if necessary.
8. Lubricate the shaft sleeve and coverplate seal cavity with soapy water (Do not use petroleum lubricant) install a new cup gasket and a new seal insert with indentation side down into the cup.
9. Slide a new rotating seal assembly onto the shaft sleeve. With a screwdriver push on the top of the compression ring until the seal is tight against the seal insert. Install seal spring.
10. Install impeller, impeller washer, lock washer and capscrew, then tighten capscrew (per torque chart).
11. Install new volute gasket then install pump assembly into volute. Tighten volute capscrews (per torque chart). Install seal flushing tube, if used. Install motor foot capscrews and tighten. Install drain plug, close drain valve.
12. Open isolation valves, inspect pump for leaks. If not leaking return pump to service.

1531-S Stuffing Box

With Special Single Mechanical Seal – Figure 8 and 9

5. Remove hex nuts 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 soapy water (Do not use 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 shaft sleeve and lock in place. For 1¼" seals, the collar should be 1¹³/₃₂" from the impeller end of the shaft sleeve. For 1⁵/₈" seals, the distance should be 1¼" (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 1531 Instructions.

1531-D Stuffing Box

With Special Double Mechanical Seal – Figure 8 and 10

5. Remove hex nuts 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 cavity with soapy water (Do not use 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 seal cap gasket.* Slide rotating portion of seal assembly on to 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 1531 instructions.

**For 1¼" seal both parts will be housed in the coverplate as shown in Fig. 10. Seal cap gasket is not used.*

**1531-PF Stuffing Box
With Packing – Figure 8**

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 in 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 capscrew, 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 motor foot capscrews and tighten. 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 packing. 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.

Capscrew Type	Head Marking	CAPSCREW TORQUE (FOOT-POUND)								
		Capscrew Diameter								
		¼	⅜	½	⅝	¾	⅞	1		
SAE Grade 2		6	13	25	38	60	120	190	210	300
Brass Stainless Steel	 or 	4	10	17	27	42	83	130	200	300
SAE Grade 5		10	20	35	60	90	180	325	525	800

DEALER SERVICING

If trouble occurs that cannot be rectified contact your local B&G 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.

For further information, contact ITT Bell & Gossett, 8200 N. Austin Avenue, Morton Grove, IL 60053, Phone (847) 966-3700 – Facsimile (847) 966-9052.