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GORMAN-RUPP PUMPS

60 SERIES PUMPS

MANUAL PART 3 of 3

MAINTENANCE AND REPAIR WITH TROUBLESHOOTING

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA Printed in U.S.A.

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Register your new
Gorman-Rupp pump online at
www.grpumps.com

Valid serial number and e-mail address required.

RECORD YOUR PUMP MODEL AND SERIAL NUMBER

Please record your pump model and serial number in the spaces provided below. Your Gorman-Rupp distributor needs this information when you require parts or service.

Pump Model: _____

Serial Number: _____

INTRODUCTION

Thank You for purchasing a Gorman-Rupp 60 Series Pump. **Read this manual** carefully to learn how to safely maintain and service your pump. Failure to do so could result in personal injury or damage to the pump.

A set of three manuals accompanies your pump. The Installation/Operation Manual contains essential information on installing and operating the pump, and on making electrical connections. The Parts List Manual provides performance curve(s), a pump model cross-section drawing, and parts list for your pump.

This Maintenance and Repair Manual provides troubleshooting and maintenance instructions required to properly diagnose operational problems, and to service the pump hydraulic components. Contact the factory for the authorized repair facility closest to you.

This pump is a 60 Series centrifugal pump, with straight-in suction without a suction check valve. The pump is designed to handle **petroleum products** and other clear liquids that **do not** contain solids. For specific service, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

The basic pump is not furnished with a mounting base and power source; however, these items are available from the factory as optional equipment. The pump is designed to be driven by an explosion-proof motor.

As described on the following page, this manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly anticipate and provide detailed precautions for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner/maintenance personnel to ensure that **only** safe, established maintenance procedures are used, and that any procedures not addressed in this manual are performed **only** after establishing that neither personal safety nor pump integrity are compromised by such practices.

If there are any questions regarding the pump which are not covered in this manual or in other literature accompanying the unit, please contact your Gorman-Rupp distributor or the Gorman-Rupp Company:

The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901—1217
or
Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7

CONTENTS

RECORDING MODEL AND SERIAL NUMBERS

Please record the pump model and serial number in the spaces provided in the separate Installation/ Operation Manual and Parts List Manual accompanying your pump. Your Gorman-Rupp distributor needs this information when you require parts or service.

WARRANTY INFORMATION

The warranty provided with your pump is part of Gorman-Rupp's support program for customers who operate and maintain their equipment as described in this and the other accompanying literature. Please note that should the equipment be abused or modified to change its performance beyond the original factory specifications, the warranty will become void and any claim will be denied.

The following are used to alert personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

DANGER!

Immediate hazards which WILL result in severe personal injury or death. These instructions describe the procedure required and the injury which will result from failure to follow the procedure.

WARNING!

Hazards or unsafe practices which COULD result in severe personal injury or death. These instructions describe the procedure required and the injury which could result from failure to follow the procedure.

CAUTION

Hazards or unsafe practices which COULD result in minor personal injury or product or property damage. These instructions describe the requirements and the possible damage which could result from failure to follow the procedure.

NOTE

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

SAFETY – SECTION A

The following information applies throughout this manual to Gorman-Rupp 60 Series basic pumps.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for each specific application. Therefore, it is the owner/installer's responsibility to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor pump integrity are compromised by the installation.

WARNING!

Before attempting to install, operate, or service this pump, familiarize yourself with this manual, and with all other literature shipped with the pump. Unfamiliarity with all aspects of pump operation covered in this manual could lead to destruction of equipment, injury, or death to personnel.

WARNING!

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Shut off the incoming power to the motor and lock it out or take other action to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**

WARNING!

This pump is designed to handle petroleum products and other clear liquids that do not contain solids. Do not attempt to pump water, corrosive materials, or any liquids which may damage the pump or endanger personnel as a result of pump failure.

WARNING!

If this pump is used with volatile and/or flammable liquids, be certain proper safety practices are followed before operating or servicing the pump. Provide adequate ventilation, prohibit smoking, wear static-resistant clothing and shoes. Clean up all fuel spills immediately after occurrence.

WARNING!

Do not operate the pump against a closed discharge valve for long periods of time. If operated against a closed discharge valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

WARNING!

If this pump is used with volatile and/or flammable liquids, overheating may produce dangerous fumes. Take precautions to ensure the area surrounding

the pump is adequately ventilated. Allow the pump to completely cool and use extreme caution when venting the pump, or when removing covers, plates, plugs, or fittings.

Overheated pumps can cause severe burns and injuries, and produce explosive fumes. If overheating of the pump occurs:

1. **Stop the pump immediately.**
2. **Ventilate the area.**
3. **Allow the pump to completely cool.**
4. **Check the temperature before opening any covers, plates, gauges, or plugs.**
5. **Vent the pump slowly and cautiously.**
6. **Refer to instructions in this manual before restarting the pump.**

After the pump has been installed, make certain that the pump and all piping connections are tight, properly supported and secure before operation.

Do not install and operate a non-explosion proof motor in an explosive atmosphere. Install, connect, and operate the motor in accordance with The National Electric Code and all local codes. If there is a conflict between the instructions in the manual accompanying the unit and The National Electric Code or the applicable local code, The National or local code shall take precedence. All electrical equipment supplied with this pump conformed to applicable federal regulations and national codes in effect on the date of manufacture.

TROUBLESHOOTING — SECTION B

Review all SAFETY information in Section A.

WARNING!

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Shut off the incoming power to the motor and lock it out or take other action to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Air leak in suction line.	Correct leak.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Suction lift too high.	Measure lift with vacuum gauge. Reduce lift and/or friction losses in suction line.
	Product vapor pressure too high.	Cool pump and product suction line.
	Pump speed too slow.	Check driver output; check belts or couplings for slippage.
	Pump running backwards.	Check direction of rotation and correct by interchanging any two motor leads at control box. (See **Pump Rotation**, Section C, Installation And Operation Manual).
	Auxiliary priming device faulty or improperly installed.	Repair priming device or check installation.
	Strainer clogged.	Check strainer and clean if necessary.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Strainer clogged.	Check strainer and clean if necessary.
	Suction intake not submerged at proper level or sump too small.	Check installation and correct sub -mergence as needed.
	Pump speed too slow.	Check driver output; check belts or couplings for slippage.
	Suction lift or discharge head to high.	Check piping installation and reduce suction lift and/or discharge head.
	Low or incorrect voltage.	Measure control box voltage, both when pump is running and when shut-
		off.
PUMP REQUIRES TOO MUCH POWER	Pump speed too high.	Check driver output; check that sheaves or couplings are correctly sized.
	Discharge head too low.	Adjust discharge valve.
	Impeller or other wearing parts worn or damaged.	Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.
	Bearing(s) frozen.	Disassemble pump and check bearing(s).
EXCESSIVE NOISE	Cavitation in pump.	Reduce discharge pressure and/or pump speed.
	Pumping entrained air.	Locate and eliminate source of air bubble.
	Pump or drive not securely mounted.	Secure mounting hardware.
	Impeller or other wearing parts worn or damaged.	Replace worn or damaged parts. Check that impeller is properly
PUMP CLOGS FREQUENTLY		centered and rotates freely.
	Solids or debris jamming impeller or priming pump.	Check suction line and storage tank for foreign matter. Install or clean strainer screen.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits.	Check bearing temperature regularly to monitor any increase.
	Suction and discharge lines not properly supported.	Check piping installation for proper support.
	Low or incorrect lubricant.	Check for proper type and level of lubricant.
	Drive misaligned; piping improperly installed.	Realign drive and piping at operating temperature. Add expansion joints if required.

PUMP MAINTENANCE AND REPAIR – SECTION C

Review all SAFETY information in Section A.

Follow the instructions on all tags, label and decals attached to the pump.

WARNING!

Do not attempt to service the pump assembly unless all power to the power source has been shut off and locked out or other action taken to ensure that the pump will remain inoperative; otherwise, injury or death could result.

Use a lifting device with sufficient capacity. If slings or chains are used to move the pump or components, make sure that the load is balanced; otherwise serious personal injury or death could result.

The maintenance and repair instructions in this manual are keyed to the sectional view and the corresponding parts identification list. Refer to the separate Parts List Manual for replacement parts.

Select a suitable location, preferably indoors, to perform required maintenance. All work must be performed by qualified personnel.

This Maintenance and Repair Manual provides troubleshooting and maintenance instructions required to properly diagnose operational problems, and to service the pump hydraulic components.

Check **TROUBLESHOOTING**, Section B to determine causes and remedies of pump problems. Disassemble the pump only as far as required.

Lifting

Use lifting equipment with a capacity of **at least five times the weight of the pump**, including the weight of any options or customer-installed accessories. Suction and discharge hoses or piping **must** be removed before attempting to lift the pump.

For the approximate weight of your pump, refer to the pump specification data sheet or contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

SECTION DRAWING

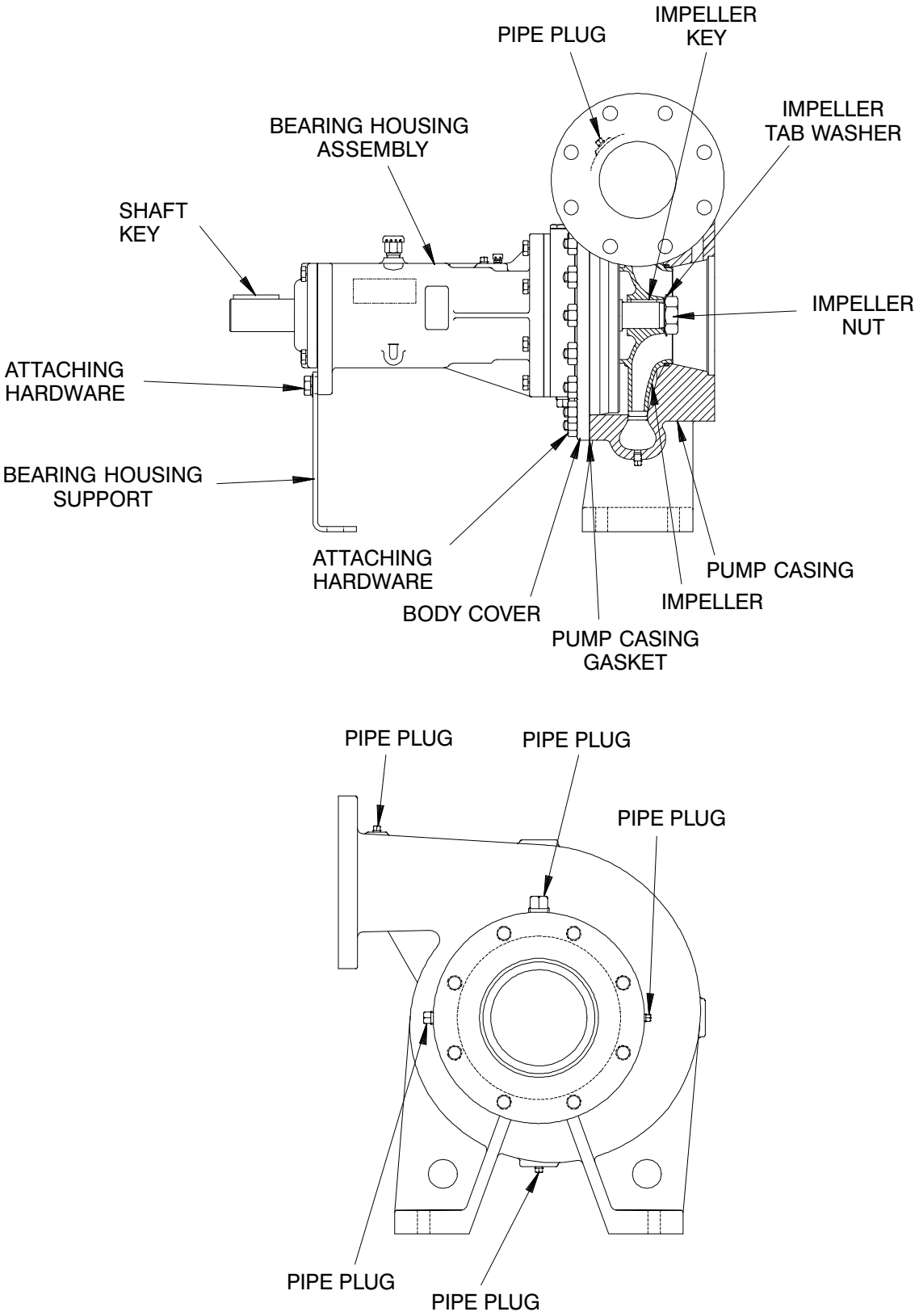

Figure C—1. Typical 60 Series Pump Model Assembly

SECTION DRAWING

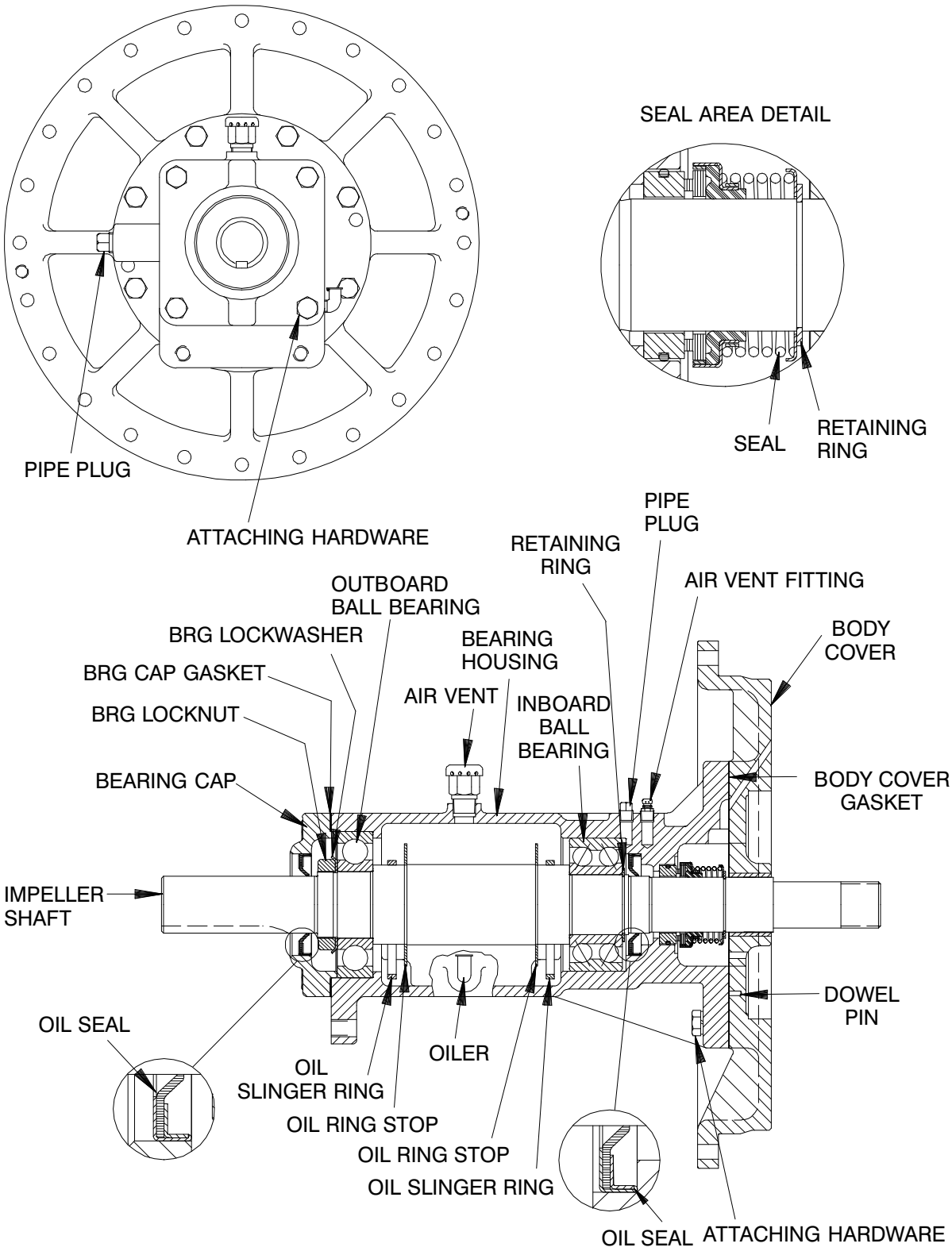

Figure C—2. Typical 60 Series Bearing Housing Assembly

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

Review all SAFETY information in Section A.

Follow the instructions on all tags, label and decals attached to the pump.

This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions which are keyed to the sectional views (see Figures C–1, 2, 3, 4 and 5). Maintenance and repair instructions for the Air Release Valve Assembly are covered separately in the specific literature shipped with the unit.

For part numbers and quantities for your specific pump, refer to the separate Parts List manual accompanying the pump.

All parts of this pump except the pump casing may be serviced without removing mounting hardware or suction and discharge lines. However, the following instructions assume complete disassembly is required.

Before attempting to service the pump, shut off the incoming power to the motor and lock it out, or take other action to ensure that it will remain inoperative. Close all valves in the suction and discharge lines and drain the pump casing and group grind by removing the drain plugs. Clean and reinstall the drain plugs.

WARNING!

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Shut off the incoming power to the motor and lock it out or take other action to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**

WARNING!

This pump is designed to be used with volatile and/or flammable liquids, be certain proper safety practices are followed before operating or servicing the pump. Provide adequate ventilation, prohibit smoking, wear static-resistant clothing and shoes. Clean up all fuel spills immediately after occurrence.

Power Source Removal

(Figure C–1)

Remove the coupling guard and loosen the coupling on the pump drive shaft. Separate the power source and drive components from the pump, and remove the drive shaft key.

Pump Disassembly

(Figure C–1)

Disconnect the suction and discharge lines from the pump casing.

Use a suitable hoist and sling to support the bearing housing. Remove the nuts and install two jacking screws (not supplied) in the tapped holes in the body cover (Figure C–2). Tighten the screws evenly to prevent binding, and pull the bearing housing, body cover and assembled parts straight out of the pump casing.

Remove the pump casing gasket.

Impeller Removal

(Figure C–1)

Immobilize the impeller by inserting a brass rod between the impeller vanes. **Be careful** not to dam-

age the impeller vanes. Straighten the tabs on the impeller tabwasher, and remove the impeller nut and tabwasher.

Remove the brass rod. Install two 1/2–13 UNC capscrews (not supplied) in the tapped holes in the impeller, and use a suitable puller to remove the impeller from the shaft. Retain the impeller key.

NOTE

An alternate method of removing the impeller is to carefully pry on the back side of the impeller (directly against two opposing vanes) with equal pressure until the impeller comes off the shaft.

Body Cover Removal

(Figure C–2)

Remove the attaching hardware and use a soft-faced mallet to tap around the outside diameter of the body cover until it separates from the bearing housing. Remove the body cover gasket, and use solvent to clean the mating surfaces. **Be careful** not to scratch or mar the surfaces.

WARNING!

Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

If body cover replacement is necessary, tap out the dowel pins.

Seal Removal

(Figures C–2 and C–3)

Remove the seal retaining ring with caution; tension on the seal spring will be released. Remove the spring centering washer. Lubricate the shaft and work oil up under the rubber bellows. Slide the rotating portion of the seal off the shaft, and use a stiff wire with a hooked end to remove the stationary seat and O-ring. **Be careful** not to damage the seal faces.

If no further disassembly is required, see **Seal Installation**.

Shaft and Bearing Removal and Disassembly

(Figure C–2)

When the pump is properly operated and maintained, the bearing housing should not require disassembly. Disassemble the shaft and bearings **only** when there is evidence of wear or damage.

CAUTION

Shaft and bearing disassembly in the field is not recommended. These operations should be performed only in a properly equipped shop by qualified personnel.

If your pump is equipped with grease lubricated bearings, there are no provisions for draining or flushing the bearing housing lubricant. Place a drip pan under the bearing housing before removing the shaft and bearings.

NOTE

If your pump is equipped with oil-lubricated bearings, remove the oil cup and drain the bearing cavity before removing the shaft and bearings.

Disengage the attaching hardware and remove the bearing cap, oil seal and gasket. Use an arbor (or hydraulic) press to remove the oil seal from the bearing cap.

Place a block of wood against the impeller end of the shaft, and tap the shaft and assembled bearings from the bearing housing.

If your pump is equipped with an oil seal in the bearing housing between the bearing and seal cavity, use a screwdriver or other suitable tool to remove the oil seal from the bearing housing.

After removing the shaft and bearings, clean and inspect the bearings **in place** as follows.

CAUTION

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place**. It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

Clean the bearing housing, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage and replace as necessary.

WARNING!

Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Clean the bearings thoroughly in **fresh** cleaning solvent. Dry the bearings with filtered compressed air and coat with light oil.

CAUTION

Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. **Do not** spin dry bearings. This may scratch the balls or races and cause premature bearing failure.

Rotate the bearings by hand to check for roughness or binding and inspect the bearing balls. If rotation is rough or the bearing balls are discolored, replace the bearings.

The bearing tolerances provide a tight press fit onto the shaft and a snug slip fit into the bearing housing. Replace the bearings, shaft, or bearing housing if the proper bearing fit is not achieved.

If bearing replacement is required, remove the retaining ring from the impeller shaft, and use a bearing puller to remove the inboard bearing from the shaft.

Straighten the tabs on the bearing washer and remove the bearing lock nut and washer. Use a bearing puller to remove the outboard bearing from the shaft.

Shaft and Bearing Reassembly and Installation

(Figure C—2)

Inspect the shaft for distortion, nicks or scratches, or for thread damage on the impeller end. Dress small nicks and burrs with a fine file or emery cloth. Replace the shaft if defective.

CAUTION

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place**. It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

The bearings may be heated to ease installation. An induction heater, hot oil bath, electric oven, or hot plate may be used to heat the bearings. Bearings should **never** be heated with a direct flame or directly on a hot plate.

NOTE

*If a hot oil bath is used to heat the bearings, both the oil and the container must be **absolutely** clean. If the oil has been previously used, it must be **thoroughly** filtered.*

WARNING!

Use caution when handling hot bearings to prevent burns.

Heat the bearings to a uniform temperature **no higher than** 250°F (120°C), and slide the bearings onto the shaft, one at a time, until they are fully

seated. This should be done quickly, in one continuous motion, to prevent the bearings from cooling and sticking on the shaft.

NOTE

Oil-lubricated bearing housings are equipped with a double-row inboard ball bearing and oil slinger rings with stops (see Figure C–2). Position the stops and slingers on the shaft before installing bearings. Position the inboard double-row bearing on the shaft as indicated in Figure C–3.

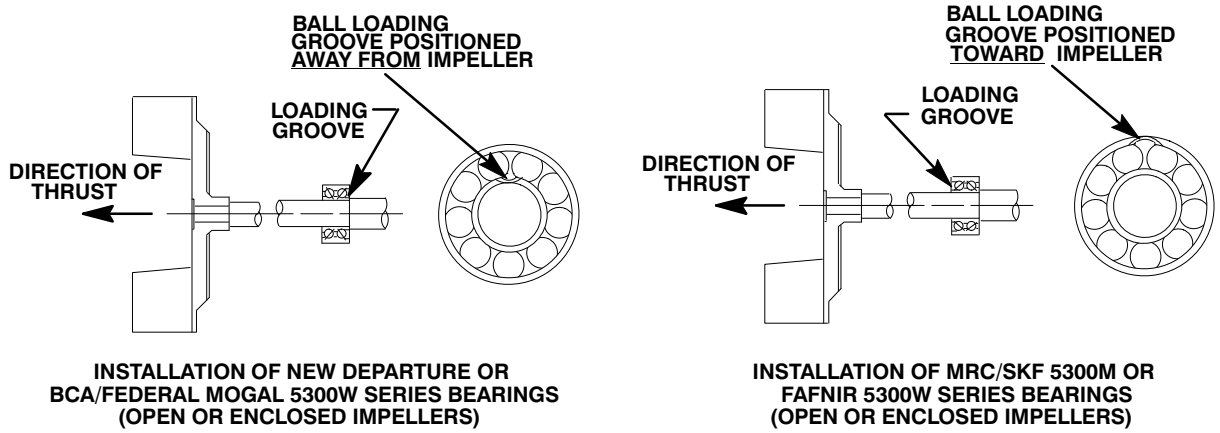

Figure C–3. Bearing Installation

After the bearings have been installed and allowed to cool, check to ensure that they have not moved away from the shaft shoulders in shrinking. If movement has occurred, use a suitable sized sleeve and a press to reposition the bearings against the shaft shoulders.

If heating the bearings is not practical, lubricate the bearings with light oil, and use a suitable sized sleeve, and an arbor (or hydraulic) press to install the bearings on the shaft.

CAUTION

When installing the bearings onto the shaft, **never** press or hit against the outer race, balls, or ball cage. Press **only** on the inner race.

Secure the inboard bearing on the shaft with the bearing retaining ring. Secure the outboard bearing with the tab washer and lock nut.

If your pump is equipped with an inboard oil seal, lubricate the seal with light oil, and position it in the bearing housing with the lip positioned as shown in Figure C– 2. Press the oil seal into the bearing housing until fully seated.

CAUTION

When installing the shaft and bearings into the bearing bore, push against the outer race. **Never** hit the balls or ball cage.

Slide the shaft and assembled bearings into the bearing housing until the outboard bearing seats against the bearing housing shoulder. **Be careful** not to cut or roll the lip of the oil seal.

Press the oil seal into the bearing cap with the lip positioned as shown in Figure C– 2. Replace the bearing cap gasket, and secure the bearing cap with the attaching hardware. **Be careful** not to cut the oil seal lip on the shaft keyway, or roll the lip during installation.

NOTE

*Impeller shaft endplay should be between .002 and .010 inch (.051 to .254 mm). Tighten the bearing cap hardware tight enough to prevent leakage and obtain the correct endplay. **Do not** over-tighten.*

Lubricate the bearing housing as indicated in **LUBRICATION**.

Seal Reassembly And Installation

(Figures C—2 and C—3)

Clean the seal cavity and shaft with a cloth soaked in fresh cleaning solvent.

WARNING!

Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

The seal is not normally reused because wear patterns on the finished faces cannot be realigned during reassembly. This could result in premature failure. If necessary to reuse an old seal in an emergency, **carefully** wash all metallic parts in **fresh** cleaning solvent and allow to dry thoroughly.

Handle the seal parts with extreme care to prevent damage. Be careful not to contaminate precision finished faces; even fingerprints on the faces can shorten seal life. If necessary, clean the faces with a non-oil based solvent and a clean, lint-free tissue. Wipe **lightly** in a concentric pattern to avoid scratching the faces.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. If any components are worn, replace the complete seal; **never mix old and new seal parts**.

If a replacement seal is being used, remove it from the container and inspect the precision finished faces to ensure that they are free of any foreign matter.

To ease installation of the seal, lubricate the shaft, bellows and stationary seat O-ring with water or a very **small** amount of oil, and apply a drop of light lubricating oil on the finished faces. Assemble the seal as follows, (see Figure C—4).

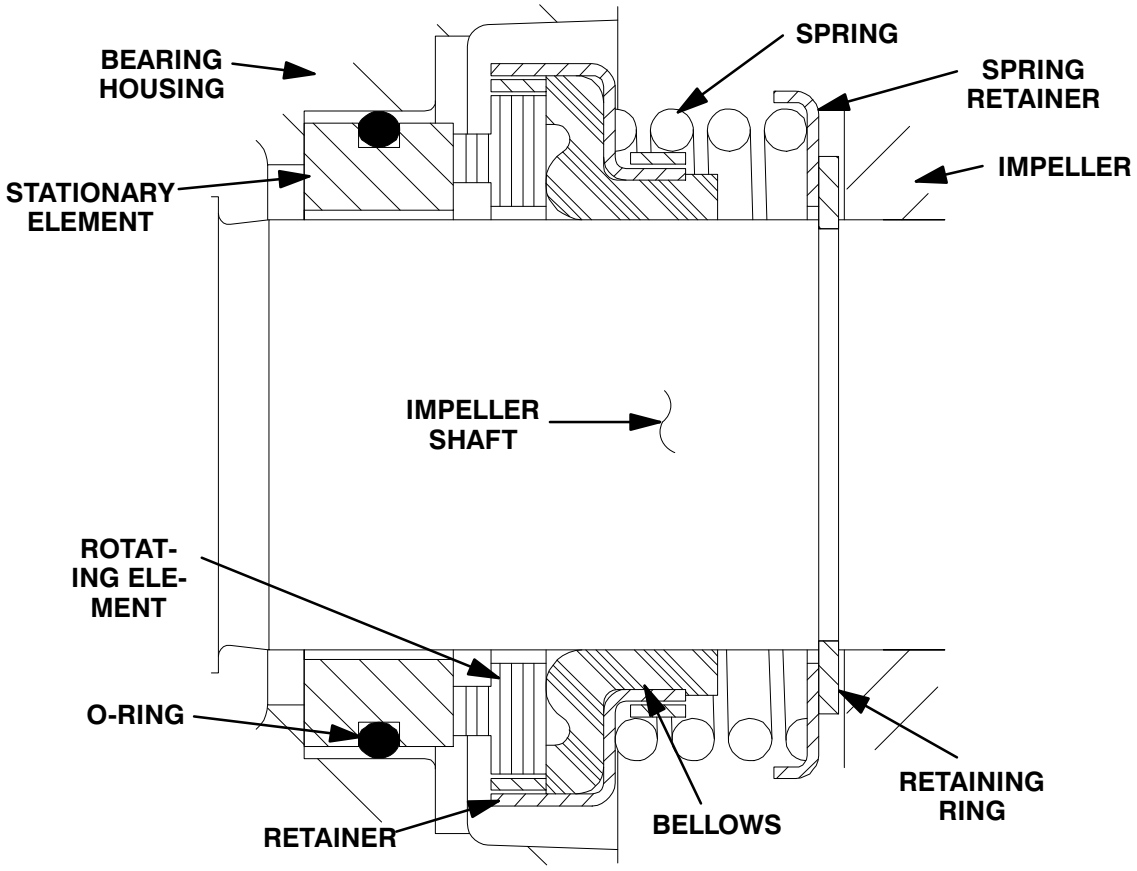

Figure C—4. Seal Assembly

CAUTION

This seal is not designed for operation at temperatures above 160° F (71° C). Do not use at higher operating temperatures.

Inspect the impeller shaft for distortion, nicks, scratches, or damage to the shaft threads. Dress small nicks and burrs with a fine file or emery cloth. If the shaft is defective, refer to **Shaft And Bearing Disassembly** and replace the shaft.

Lubricate the O-ring with a light coat of oil and install it in the stationary seat. Press the seat and O-ring into the bearing housing until fully seated. A push tube cut from a length of plastic pipe would aid this installation. The I.D. of the tube should be slightly larger than the O.D. of the shaft. Be careful not to damage the seal face. After installation, wipe the seal face in a concentric pattern with a clean, lint-free cloth.

NOTE

It is recommended that a tapered sleeve (see Figure C—5) be installed over the shaft keyway to ease installation of the rotating portion of the seal. This tool can be made from steel tubing or black pipe.

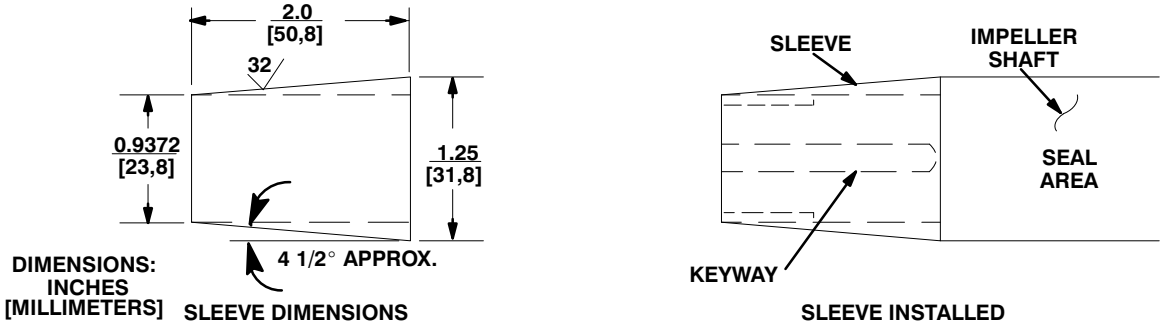

Figure C—5. Seal Installation Sleeve

Lubricate the tapered sleeve and position it on the shaft. Position the rotating portion of the seal (consisting of the retainer, bellows and rotating element) on the sleeve, and apply even pressure against the shoulder of the seal retainer until the rotating subassembly slides onto the shaft and the seal faces contact. A push tube cut from a piece of plastic tubing would aid this installation. The I.D. of the tube should be approximately the same diameter as the I.D. of the seal spring.

Remove the tapered sleeve and install the seal spring and spring centering washer. Secure the seal with the retaining ring.

Body Cover Installation

NOTE

If the body cover requires replacement, refer to the special instructions in ***Body Cover Replacement*** *at this time.*

(Figure C—2)

Install a new body cover gasket and use a soft-faced mallet to tap the body cover into place on the dowel pins. Secure the body cover with the attaching hardware. Be sure the dowel pins are full seated into the body cover.

Impeller Installation

(Figure C—1)

Inspect the impeller and replace it if cracked or badly worn. Earlier design impellers included wear rings and groove pins to secure them to the impeller. The wear rings were an integral part of the impeller, and are not available as replacement items. The current impeller design does not include wear rings. If your impeller is equipped with wear rings and they require replacement, the entire impeller must be replaced with the new design (consult the factory for the new impeller part number).

Install the impeller key, and slide the impeller onto the shaft. Immobilize the impeller, and secure it with the tab washer and impeller nut. Bend the tabs on the washer over the impeller nut.

Body Cover Replacement

(Figure C—4 or C—5)

CAUTION

If the body cover requires replacement, it is **strongly** recommended that the pump be returned to the factory. Fitting procedures involve extremely close tolerances which are critical to efficient operation. These procedures are difficult to accomplish outside the factory.

If the body cover **must** be replaced in the field, dowel holes in the body cover must be drilled and reamed after the bearing housing, body cover and impeller have been fully reassembled.

Install a new body cover gasket.

Position the body cover on the shaft and secure with the attaching hardware, but **do not** fully tighten the capscrews until after the impeller has been installed.

Install the impeller as described in **Impeller Installation**. **Do not** bend the tabs over on the impeller washer (Figure C—1) until the shaft is rotated to check for rubbing of the inboard impeller wear ring against the body cover. If the wear ring rubs, tap the body cover with a mallet until the impeller rotates freely. Now tighten the hardware securing the body cover.

After fully securing the body cover, bend the tabs of the impeller washer over the impeller nut.

Measure the length of the dowel pins. Use the existing dowel pin holes in the bearing housing as guides to drill and ream two new dowel pin holes (.312 inch or 7,9 mm finished diameter) into the body cover. The holes should be just deep enough so the pins will be **flush** with the bearing housing when installed. **Do not** drill through the body cover. Be careful not to damage the holes in the bearing housing or body cover with the drill bit or reamer. Instal the dowel pins in the new holes.

Final Pump Assembly

(Figure C—1)

Install the pump casing gasket. Install the bearing housing assembly and body cover in the pump casing, and secure it with the nuts.

For part numbers and quantities for your specific pump, refer to the separate Parts List manual accompanying the pump.

Install the drive shaft key, and connect the coupling and power source. Install the coupling guards.

LUBRICATION

Seal Assembly

The seal assembly is lubricated by the medium being pumped. No additional lubrication is required.

Grease Lubricated Bearings

Bearings used in grease-lubricated bearing housings are permanently sealed and lubricated by the manufacturer, and no additional lubrication is required. However, to minimize the danger of moisture contamination due to temperature changes, the bearing housing is also partially filled with grease.

When overhauling the bearing housing, remove the air vent fitting, install a lubrication fitting, and fill the cavity approximately one-third full (approximately 5 ounces or 15 ounces (142 g or 425 g) of grease depending on the pump model).

Oil Lubricated Bearings

The bearing housing was fully lubricated when shipped from the factory. Check the oil level regularly at the oil cup and maintain it at the top of the cup. When lubrication is required, remove the air vent and add SAE No. 30 non-detergent oil through the hole. **Do not** over-lubricate. Over-lubrication can cause the bearings to over-heat, resulting in premature bearing failure.

Under normal conditions, drain the bearing housing once each year and refill with clean oil. Change the oil more frequently if the pump is operated continuously or installed in an environment with rapid temperature change.

Monitor the condition of the gearbox lubricant regularly for evidence of rust or moisture condensation. This is especially important in areas where variable hot and cold temperatures are common.

For cold weather operation, consult the factory or a lubricant supplier for the recommended grade of oil.

For U.S. and International Warranty Information,
Please Visit www.grpumps.com/warranty
or call:
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