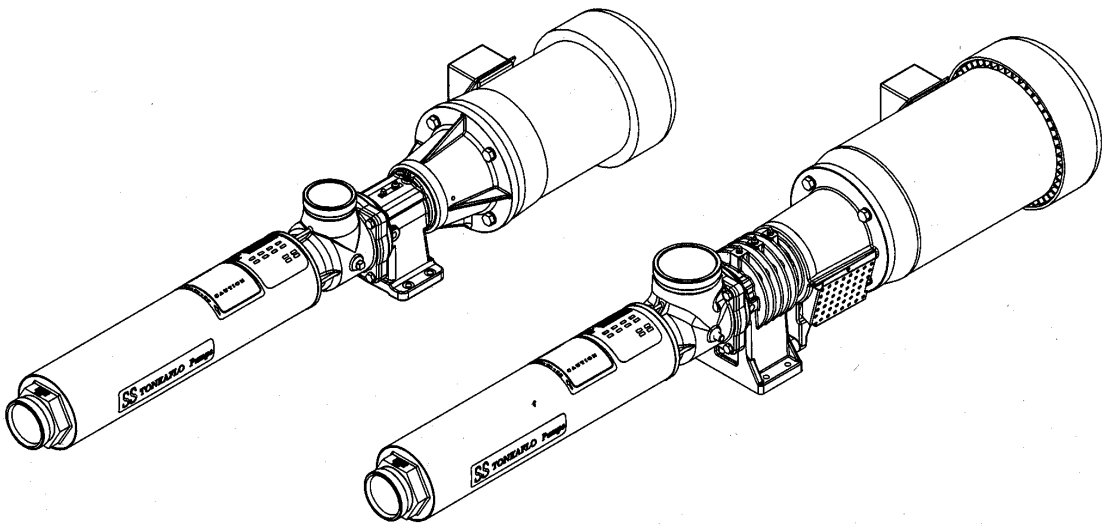
OSMONICS
TONKAFLO® PUMPS
SS SERIES

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL



For SS5500, SS8500, SS12500, and SS24000 Series Medium Pressure Tonkaflo Pumps with G- and D-Bearing Frames

GE Infrastructure
Water & Process Technologies

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

FOR SS5500, SS8500, SS12500, AND SS24000 MEDIUM PRESSURE PUMPS [UP TO 225 psig (15.5 barg)] WITH G- AND D-BEARING FRAMES

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

This manual contains information important to the installation, operation, and maintenance of your Osmonics Tonkaflo® multi-stage centrifugal pump. The Tonkaflo pump has been designed for reliable service in many types of pumping applications. Proper installation and normal maintenance will help ensure extended pump life and prevent costly downtime.

Before installing and operating your Tonkaflo pump, read these instructions carefully and keep the manual handy for future reference. This manual is intended for general maintenance only.

Further information may be obtained by contacting your local Tonkaflo distributor or GE. Contact GE at:

GE Infrastructure
Water & Process Technologies
5951 Clearwater Drive
Minnetonka, MN 55343-8995
USA

Phone: 952 - 933 - 2277
Fax: 952 - 933 - 0141
Toll Free: (800) 848-1750

This manual is not intended for repair or overhaul of the Tonkaflo pump liquid ends.

Only the factory or those who have successfully completed the Factory Service School and have been certified are authorized to repair, service, or overhaul Tonkaflo pump liquid ends.

Your new Tonkaflo multi-stage centrifugal pump is designed for quiet, smooth running, and highly efficient operation. The materials of construction make Tonkaflo suitable for many chemical and pure water applications.

Tonkaflo pumps unique modular design allows the user to choose the number of stages which most closely match the desired performance and, thereby, achieve the highest pumping efficiency. Unlike many other pump manufacturers, Tonkaflo will produce pumps to fit your particular applications should a standard model pump not suit your requirements.

NOTE: This manual, along with all other manuals, is available at www.gewater.com.

2.0 TONKAFLO SPECIFICATIONS

The Tonkaflo pumps covered in this instruction manual are the medium pressure capacity SS5500, SS8500, SS12500, and SS24000 Series pumps. These pumps cover a flow range of 20 - 300 gpm (4.5 - 68 m^3/h) with single unit pressure up to 225 psig (15.5 barg). The capacity and discharge pressure can be increased by operating pumps in parallel or series, respectively. There is no maximum limit on capacity when operating Tonkaflo pumps in parallel. When operating pumps in series, a maximum discharge pressure of 1000 psig (69 barg) may be achieved with optional high-pressure construction on the downstream pump. With inlet pressures greater than 400 psig (27.6 barg), optional high-pressure mechanical seals should be used.

2.1 Capacities

Table 2.1
Capacities

Series	2900 rpm 50 Hertz Minimum - Maximum	3500 rpm 60 Hertz Minimum - Maximum	Maximum Efficiency
SS5500	15 - 65 gpm (3.4 - 14.8 m^3/h)	20 - 75 gpm (4.5 - 17 m^3/h)	60%
SS8500	20 - 90 gpm (4.5 - 20.4 m^3/h)	30 - 110 gpm (6.8 - 25.0 m^3/h)	64%
SS12500	35 - 160 gpm (7.9 - 36.3 m^3/h)	40 - 190 gpm (9.1 - 43.1 m^3/h)	62%
SS24000	65 - 250 gpm (14.8 - 56.8 m^3/h)	80 - 300 gpm (18.2 - 68.1 m^3/h)	61%

NOTE: There must be adequate flow at all times through the pump to prevent excessive heat build-up.

2.2 Maximum Developed Boost Pressure

Table 2.2
Maximum Developed
Boost Pressure

	Maximum Developed Pressure psig (barg)		Number of Centrifugal Stages	
Series	60 Hertz	50 Hertz	60 Hertz	50 Hertz
SS5500	225 (15.5)	235 (16.2)	8	12
SS8500	200 (13.8)	210 (14.9)	8	12
SS12500	115 (7.9)	120 (8.3)	4	6
SS24000	100 (6.9)	95 (6.6)	4	4

2.3 Maximum Recommended Operating Temperature

The maximum recommended operating temperature range is 125°F (52°C). The maximum operating temperature is dependent upon the operating pressure. For high temperature applications, consult the factory for available materials of construction.

The maximum recommended temperature is stated on the pump case. The temperature stated is for the design flow and pressure.

2.4 Standard Materials of Construction:

SS: Wetted castings and pump shaft are 316 stainless steel (SS). The pump casing is 316SS. Impellers and diffusers are Noryl except SS24000 Series diffusers which are 316SS. The mechanical seal has a carbon rotating face and a ceramic stationary face. The secondary sealing element of the mechanical seal is Buna-N. The O-rings and diffuser bearings are Buna-N.

2.5 Special Materials of Construction

Optional ethylene propylene (EPDM), Viton*, and Teflon* elastomers are available. Contact the factory.

* Viton and Teflon are trademarks of E.I. DuPont de Nemours and Company, Inc.

2.6 Pump Nomenclature

Model SS5504G			Model SS24004D-50		
SS	=	Materials of Construction	SS	=	Materials of Construction
55	=	Series 5500	240	=	Series 24000
04	=	Number of Stages	04	=	Number of Stages
G	=	Bearing Frame	D	=	Bearing Frame
			50	=	50 Hertz Operation

2.7 Special Liquids

For liquids other than water, aqueous solutions at elevated temperatures or corrosive solutes consult the factory for compatibility.

3.0 PUMP INSTALLATION

3.1 Check Upon Arrival

Your pump was inspected at the factory prior to shipment to assure meeting the requirements of your order. It is suggested the pump be checked upon receipt for possible damage due to shipping. Any damage should be reported immediately to the carrier.

3.2 Location

Install the pump as close as possible to the source of the liquid to be pumped. It is ideal for the pump to be fed from a reservoir above the pump or from a supply line under positive pressure.

3.3 Pump Mounting

The foundation for the motor and pump must be rigid and substantial to prevent any significant vibration of the pump. The pump should be rigidly mounted at the bearing frame base to a steel skid or concrete pad.

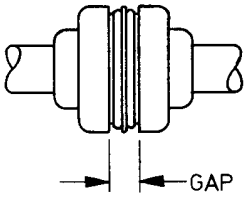
The bracket at the discharge end of the pump should be adjusted so the pump case is supported in a strain-free manner.

3.4 Flexible Coupling Installation

If the pump has been supplied with the motor installed, the coupling is properly installed.

If the pump has not been supplied as an assembled unit, install the coupling flange on the motor shaft. Do not tighten the set screws on the motor-shaft coupling flange until after the pump and motor are assembled.

Install the flexible coupling sleeve into the pump coupling flange and assemble the pump and motor. Adjust the gap between the coupling flanges to the values shown in Figure 3.1 (Gap Between Flanges) within +1/16 - 0-inch (+1.5 - 0 mm).



Coupling Size	inch	(mm)
6	7/8	(22.2)
7	1	(25.4)

Figure 3.1
Gap Between Flanges

3.5 Coupling Guard

Coupling guards are available for all Tonkaflo Pumps (Section 10.3, Pump Accessories). GE Ge recommends a coupling guard. Check your plant's safety requirements.

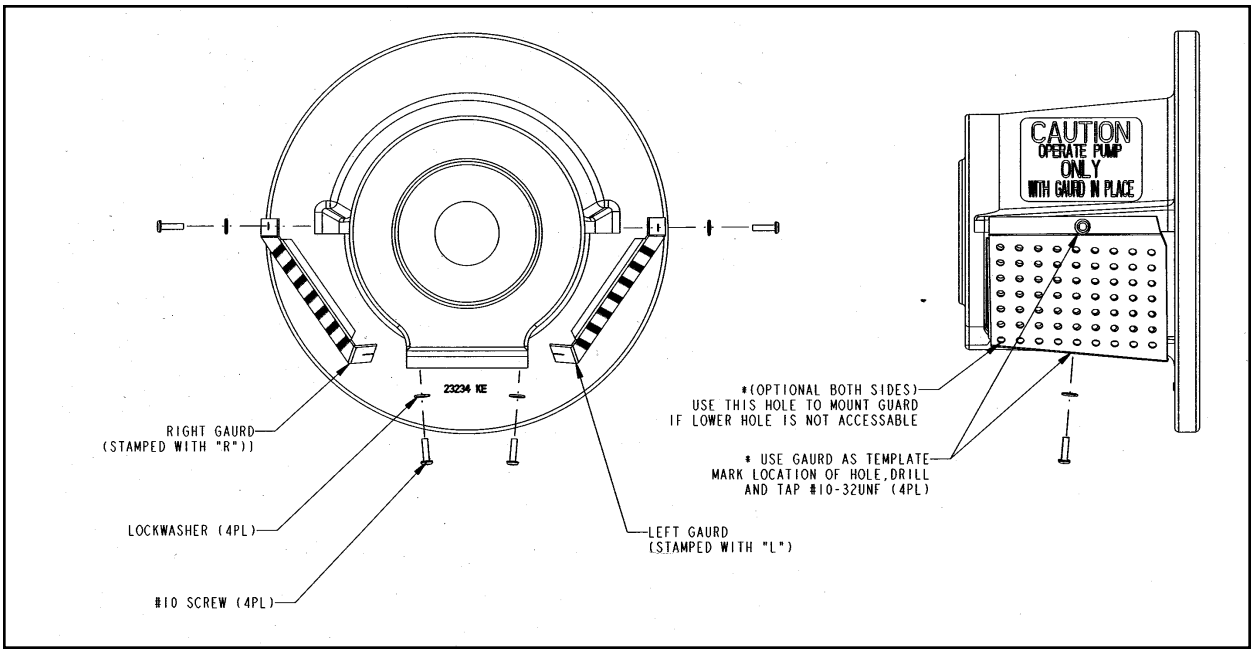


Figure 3.2
Coupling Guard Installation

3.6 Piping

The pump inlet housing has been designed for either upright or left or horizontal positioning. Use of the left or right position helps eliminate air pockets in the inlet piping as discussed later. For left or right position, remove the four (4) bolts holding the suction (inlet) housing to the liquid end adapter. Rotate the suction housing 90º and replace the 4 bolts. For left or right position, a pipe plug can be removed to vent off any air in the top of the pump inlet housing should "venting" be required for pump priming and start-up at installation.

Suction (pump inlet) piping should be of ample size, installed in direct runs, and have a minimum of bends to minimize pressure loss and to help ensure sufficient suction pressure. When possible, keep the suction pipe short.

The suction (inlet) pipe size, immediately ahead of the pump inlet, should be sufficiently sized so that the pressure available at the pump suction (inlet) exceeds the Net Positive Suction Head ($NPSH_R$) required by the pump. Generally, the suction (inlet) piping should be 4-inches (10.2 cm) for flows greater than 170 gpm (38.6 m^3/h), 3-inches (7.6 cm) for 100 - 170 gpm (22.7 - 38.6 m^3/h), 2-1/2-inches for 60 - 100 gpm (13.6 - 22.7 m^3/h), and 2-inches (51 cm) or greater for 60 gpm (13.6 m^3/h) or less (see frictional loss and pressure loss, discussed below).

For most pump applications, it is recommended the pipe size selected result in frictional line loss of 3 psi/100-feet (0.7 bar/100 meter) or less for suction lines and 10 psi/100-feet (2.3 bar/100 meter) or less for discharge lines. A larger pipe size will reduce the frictional line loss.

The pump inlet piping should be designed to avoid areas where air may be trapped and accumulate. Keep the inlet pipe free of high points, which could trap air and disrupt pump priming and start-up. Do not run the inlet piping up, over and down into the pump as an air pocket is created which will cause the pump to vibrate. Pump inlet piping size changes just ahead of the pump should be tapered. Reducers should be eccentric to avoid air pockets.

The discharge piping should be sized and constructed to properly handle the maximum flow and pressure developed by the pump.

When the pump operates with a suction lift, the suction pipe should slope upward to the pump from the source of supply (Figure 3.3, Suction Lift Piping). Provisions must be made for priming the pump. to maintain pump prime, a foot valve can be used with an opening at least as large as the inlet piping. An alternate method would be to use a shut-off valve on the discharge line and a vacuum pump to draw air out of the pump and suction line.

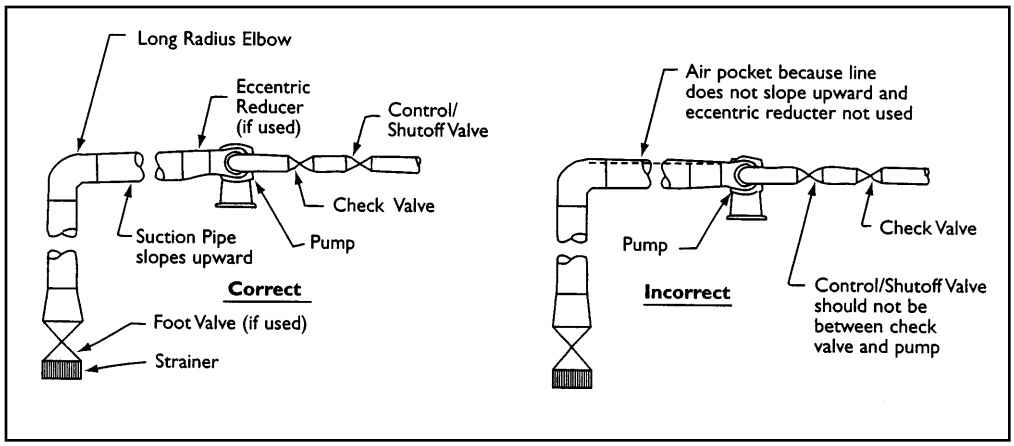


Figure 3.3
Suction Lift
Piping

When pumping liquid from a tank, the suction line must be submerged enough so air is not drawn into the suction line to form a vortex. Increasing the size of the inlet pipe to reduce the velocity will help to prevent the vortex from forming. If necessary, consult the pump curve to reverence the $NPSH_R$.

Hot liquids within the temperature range of the pump must have sufficient positive head to prevent vaporization at the impeller inlet. Consult the factory for $NPSH_A$ requirements of the pump for your application.

The pump must never be throttled on the suction side.

After installation, test the suction line with water and at least 30 psig (2.0 barg) pressure to detect leaks.

3.7 Bypass Piping for Multi-Stage Pumps

Sufficient flow must be maintained through a multi-stage pump so the pump does not overheat. Low flow rates result in excessive energy accumulation and heat build-up in the pump. Minimum recommended flows are shown in Section 2.0 (Tonkaflo Specifications).

A bypass pump is a pipe from the discharge piping back to the source of liquid supply or suction line and may be needed for your installation to ensure that the pump operation is within the specified flow range. It is recommended that the connection of a bypass pipe to the suction line be at least 24-inches (61 cm) away from the pump inlet.

3.8 Suction Screen (Strainer)

This is a precision multi-stage centrifugal pump with close tolerances to provide maximum efficiency.

It is good practice to install a 30 mesh or finer screen, available as an accessory, (Section 10.3, Pump Accessories) or a cartridge filter in the suction line to collect any foreign objects or large particles.

The pump must not be operated with restricted suction line (inlet) flow.

Positive gauge pressure must be maintained at the pump inlet (downstream from the filter or screen). A clogged screen or filter will result in a greater pressure drop. A low pressure alarm or shutoff switch located between the screen or filter and the pump should always be used in conjunction with a suction line screen or filter.

3.9 Discharge Screen (Strainer)

A 30 mesh screen (Section 10.3, Pump Accessories) located in the discharge piping will protect your process fluid should the pump be damaged due to improper operation or other causes. The installation of the discharge screen is shown in Figure 3.4 (Installation of Discharge Screen).

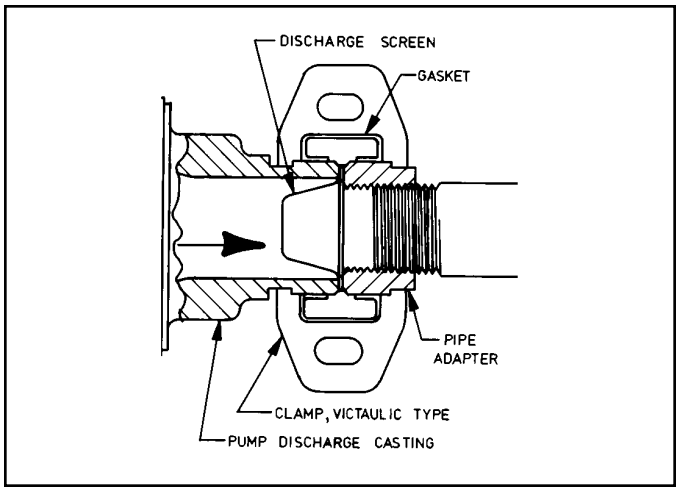


Figure 3.4
Installation of
Discharge Screen

3.10 Pump Piping Connections

The standard model Tonkaflo SS5500, SS8500, SS12500, and SS24000 Series Pumps have grooved ends as shown in Figure 3.4 (Installation of Discharge Screen) to accept Victaulic-type couplings. The couplings with 1000 psig (69 barg) working pressure rating are available as an accessory and include a Buna-N gasket (standard). Other gasket materials such as Viton or EPDM are available. Consult the factory.

The coupling gasket should be thoroughly lubricated before installation. Silicone grease is recommended. Petroleum grease is suitable for most gasket materials, but is not compatible with EPDM.

4.0 TONKAFLO PUMP START-UP

4.1 Pump Priming

THE INLET PIPING AND PUMP MUST BE FILLED WITH LIQUID (i.e., PRIMED) BEFORE START-UP. If the pump is below the liquid source or connected to a positive pressure source, the pump may be primed from that source.

If the pump is above the liquid source, fill the pump and supply line with liquid from an external source.

The pump should be shutoff immediately if prime is lost to avoid overheating and possible damage to the internals of the liquid end.

The pump should not run with a closed discharge for more than one (1) minute as the liquid can heat up very quickly and exceed the maximum operating temperatures causing irreversible damage to the wetted internal parts of the liquid end.

WARNING: NEVER RUN PUMP DRY.

In order to adequately protect the Tonkaflo pump from running dry, it is suggested that controls to protect the pump be used. These controls include: pressure switches, flow switches, and temperature switches.

4.2 Pump Wiring

When initially connecting to the power source, be certain that the motor wiring and available line voltage are the same. Connect the wires as shown on the motor wiring diagram located on the inside of the motor junction box cover or on the nameplate label.

BEFORE STARTING THREE-PHASE MOTOR

STEPS

1. Prime pump (fill pump and inlet piping with liquid) before applying power to avoid damage to pump.

2. Apply power for ONE SECOND to check direction of motor shaft rotation. The motor shaft should turn in a clockwise direction as viewed from the motor end. The direction of rotation for three-phase motors may be reversed by interchanging any two leads.

   CAUTION: If a three-phase motor is wired incorrectly, it will cause the pump shaft to rotate in the wrong direction. This will result in low pressure (about 1/4 to 1/2 of normal) and flow (about 1/2 of normal).

   NOTE: A motor starter is required for all three-phase motors.

5.0 GENERAL TROUBLESHOOTING AT START-UP

5.1 Troubleshooting Chart

LOW FLOW	MOTOR RUNS HOT OR STOPS
1. Restrictions in inlet or discharge 2. Foot valve operating improperly 3. Air leak in inlet piping 4. Air leak in mechanical seal 5. Wrong installation of belt drive 6. Inlet suction lift to high 7. Reverse rotation of pump shaft 8. Pump not primed adequately 9. Specific gravity or viscosity of liquid closed (pump deadheaded)	1. Motor wired improperly 2. Bad connection 3. Motor exceeded rated amp draw 4. Low voltage 5. Excessive ambient temperature 6. Heater size to small in motor heater 7. Binding rotation in the pump shaft 8. Bearings not adequately lubricated 9. Inlet strainer/filter plugged higher than design conditions 10. Pump throttling valve on discharge
MOTOR DOES NOT RUN	**LOW PRESSURE**
1. Blown fuse or tripped circuit breaker or overload heater 2. Motor to hot - allow to cool 3. Motor voltage connection and line voltage different 4. Bad connection 5. Motor wired improperly	1. Pump not adequately primed 2. Air leak in inlet piping 3. Excessive flow 4. Clogged suction line filter or screen 5. Reverse rotation of pump shaft 6. Foot valve operating improperly 7. Wrong ratio for belt drive
PUMP VIBRATION	**PUMP LEAKING**
1. Misalignment of flexible coupling 2. Bent pump shaft 3. Improper mounting 4. Starved suction (cavitation) 5. Worn bearings 6. Rotor out of balance 7. Operating beyond specified capacity range of the pump	1. Mechanical seal needs replacing 2. O-rings in pump casing damaged 3. Oil seals need replacing 4. Piping not sealed properly 5. Drain or vent plus in the inlet casting not tightened

5.2 Bearing Frame Temperature

The operating temperature of the greased lubricated bearing frame utilized on Tonkaflo pumps will vary depending on the boost pressure of the pump. As a general rule, G-Bearing frame will operate within a temperature range of 150° - 200°F (66° - 93°C). The D-Bearing frame will operate within a temperature range of 160° - 220°F (71° - 104°C). During operation, the bearing frame will feel hot to the touch.

6.0 TONKAFLO FIELD MAINTENANCE

6.1 Mechanical Seal Leakage

If liquid is leaking from the hole on the bottom or the holes on either side of the bearing frame near the inlet, the mechanical seal may need to be replaced. With new pumps, pumps with new mechanical seals, or pumps which have been dormant for long periods, the seal faces may not be completely seated and a slight leakage will occur. If this leakage continues for more than sixty (60) seconds, remove discharge piping and tap pump shaft using a wooden dowel to seat the seal. Be careful not to damage the pump shaft.

WARNING: POWER MUST BE DISCONNECTED BEFORE MAINTENANCE.

6.2 Removal and Installation of Liquid End Assembly

6.2.1 Removal of Liquid End Assembly

Removal of the liquid end assembly is required for replacement of the mechanical seal or for maintenance work on the pump bearing frame as described in Section 6.6 (Lubrication Intervals). The liquid end may be removed from the bearing frame without removing the bearing frame from the bedplate or other mounting.

NOTE: Care must be taken to support the discharge end of the liquid end assembly while it is being removed to ensure the pump shaft is not bent.

STEPS

1. Insert a 3/16-inch Allen (hex) wrench in one of the access holes on either side of the bearing frame toward the liquid end (Figure 6.5, Separation of Liquid End Assembly From Bearing Frame). Rotate the pump shaft until the Allen wrench slips into the set screw. Remove the set screw.

2. Remove the four (4) 3/8-inch bolts and lock washers connecting the liquid end assembly to the liquid end adapter (Figure 6.5). Support the liquid end assembly when the bolts are loosened to prevent bending of the pump shaft.

3. When provided, loosen the clamp on the discharge end of the pump case to free the liquid end assembly from its discharge end support. Shorter, medium pressure pumps do not have a discharge support.

4. Remove the liquid end assembly (i.e., liquid end of the pump shaft) by pulling the liquid end away from the bearing frame. Be sure the discharge end of the liquid end assembly is supported so the pump shaft is not bent upon removal.

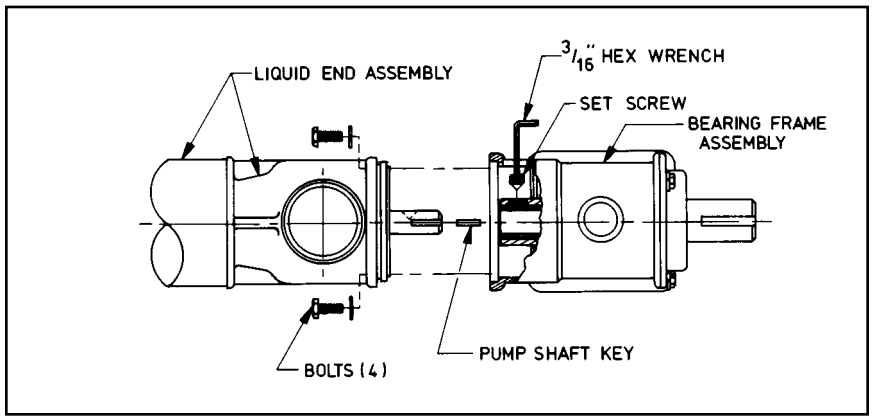


Figure 6.5
Separation of Liquid End
Assembly from Bearing Frame

6.2.2 Installation of Liquid End Assembly

STEPS

1. Place the shaft key in the pump shaft key way and be sure it is fully seated.

2. Check to see that anti-seize compound is on the exposed pump shaft where it engages with the bearing frame shaft and on the 5-1/6-inch diameter bore in the liquid end adapter.. If not, coat the pump shaft with a small amount of an anti-seize compound (i.e., Never-Seez or Anti-Seize). The anti-seize compound is used to prevent corrosion, galvanic pitting, rust, and seizure. These compounds are available from the factory or local industrial supply house.

3. Align the keyed pump shaft with the bore of the bearing frame shaft and insert the pump shaft such that the key on the pump shaft fits into the key way on the bearing frame shaft. Then push until castings come together.

4. Fasten together the inlet casting, mechanical seal holder, and bearing frame assembly with the four (4) 3/8-inch bolts and lock washers. Reference Figure 6.5 (Separation of Liquid End Assembly from Bearing Frame) and Figure 6.6 (Removal of Mechanical Seal) for correct placement of parts.

5. After fastening the inlet casting to the bearing frame assembly, line up the set screw hole in the bearing frame shaft with the access hole in the bearing frame by rotating the flexible coupling. Place the set screw in the bearing frame shaft.

6. Through the opening in the discharge casting, push on the end of the pump shaft with a wooden dowel to seat the shaft in the bearing frame and then tighten the set screw.

6.3 Removal and Installation of Motor Adapter and Motor for G- and D-Bearing Frames

6.3.1 Removal of Motor and Motor Adapter from Bearing Frame

Unfasten the four (4) bolts and lock washers that secure the motor adapter to the motor and remove the motor. Remove the four (4) 5-16-inch bolts from the motor adapter and separate the motor adapter from the bearing frame.

NOTE: For D-Bearing frames, there will be six (6) 3/8-inch bolts to remove.

6.3.2 Assembly of Motor and Motor Adapter to G- and D-Bearing Frames

STEPS

1. Attach the motor adapter to the bearing frame using four (4) 5/16-inch bolts and lock washers for the G-Bearing frames and six (6) 3/8-inch bolts and lock washers for the D-Bearing frame.

2. Position the flexible coupling flange so it is flush with the end of the bearing frame shaft and tighten the set screws.

   NOTE: For D-Bearing Frame Pumps with shorter shaft (182TC or 184TC frame motors) the coupling flange should extend beyond the end of the bearing frame shaft by 1/8 - 3/16-inch (3 - 4 mm).

3. Slip the rubber coupling into place and engage it with the flange.

4. Place the second flexible coupling flange on the motor shaft.

   Check to make sure it slides freely along the end of the shaft and the motor shaft key is in place. Be sure the set screws are positioned so they may be tightened through the opening in the adapter when the motor is installed. Do not tighten the set screws at this stage.

5. Install and bolt the motor to the adapter with four (4) 1/2-inch bolts and lock washers.

6.4 Mechanical Seal Replacement

STEPS

1. Remove the liquid end assembly (Section 6.2.1).

2. Remove the pump shaft key and slide the mechanical seal holder off the pump shaft (Figure 6.6, Removal of Mechanical Seal).

3. Remove the rotary portion (spring, washer, and face assembly) of the seal assembly from the pump shaft by rotating and pulling the rotary portion until it slides off the pump shaft. If prying is required, do not damage the pump shaft or inlet housing where the seal holder seals (Figure 6.6).

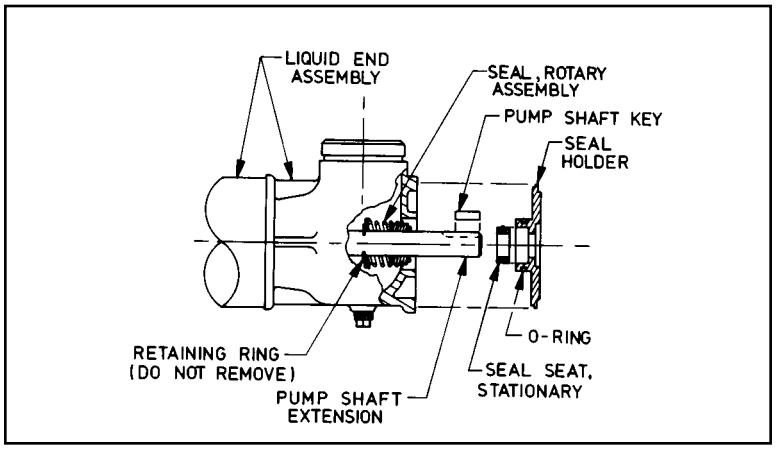


Figure 6.6
Removal of
Mechanical Seal

4. IMPORTANT: When installing new mechanical seal, do not damage (i.e., cut) the rubber bellows which seal on the shaft when sliding the seal over the shaft key way. One method is to wrap thin plastic tape over the shaft key way to protect the rubber bellows from damage. Wrap 1-1/4 turns to cover the end of the key way opposite the shaft end. With some overlap, continue to wrap the tape until the end way is covered to the end of the pump shaft.

5. Lubricate the round surface of the pump shaft with oil, petroleum grease or silicone grease.

   NOTE: Silicone grease is recommended. Petroleum grease is suitable for most gasket materials except with ethylene propylene (EPDM) rubber.

6. After lubrication, install the rotary portion of the new seal by placing it onto the pump shaft and carefully rotating and pushing the rotary portion down the pump shaft until it is lightly seated against the spring. Remove the tape.

7. Remove the stationary portion of the mechanical seal from the cavity in the seal holder (Figure 6.6, Removal of Mechanical Seal).

8. Lubricate the O-ring on the outside of the new stationary seat. Lubricate with petroleum or silicone grease. Do not use petroleum grease on EPDM rubber parts. Install the stationary portion into the seal holder cavity. Make sure the stationary portion is fully seated. Lightly lubricate the seal surface of the stationary seat with grease or oil.

9. Examine the O-ring on the mechanical seal holder and, if the O-ring is damaged, replace it with a new one. A new O-ring is included with the factory-supplied Mechanical Seal Kit (Section 10.2, Standard Model Parts List). Be sure to lubricate with grease before installing.

10. Place the mechanical seal holder containing the new stationary seat onto the pump shaft and slide it down the shaft until fully engaged with the inlet casing.

    CAUTION: Do not damage the new stationary seat when sliding the assembly over the pump shaft.

11. Install the liquid end assembly onto the bearing frame assembly (Section 6.2.2, Installation of Liquid End Assembly).

6.5 Bearing Frame Maintenance on G- and D-Bearing Frame Pumps

6.5.1 Disassembly of G-Bearing Frame Pumps

STEPS

1. Remove the liquid end assembly (Section 6.2.1, Removal of Liquid End Assembly).

2. Remove the motor and motor adapter from the bearing frame (Section 6.3.1, Removal of Motor and Motor Adapter from Bearing Frame).

3. Remove the four (4) 5/16-inch bolts connecting the liquid end adapter to the bearing frame. Remove the liquid end adapter.

6.5.2 G-Bearing Frame Overhaul

STEPS

1. Remove the grease seal holder from the liquid end side of the bearing frame (Figure 6.7, G-Bearing Frame Overhaul). To do this: insert two (2) 6-32 bolts into the threaded holes, then gripping the bolts with a pair of pliers, work the seal holder out.

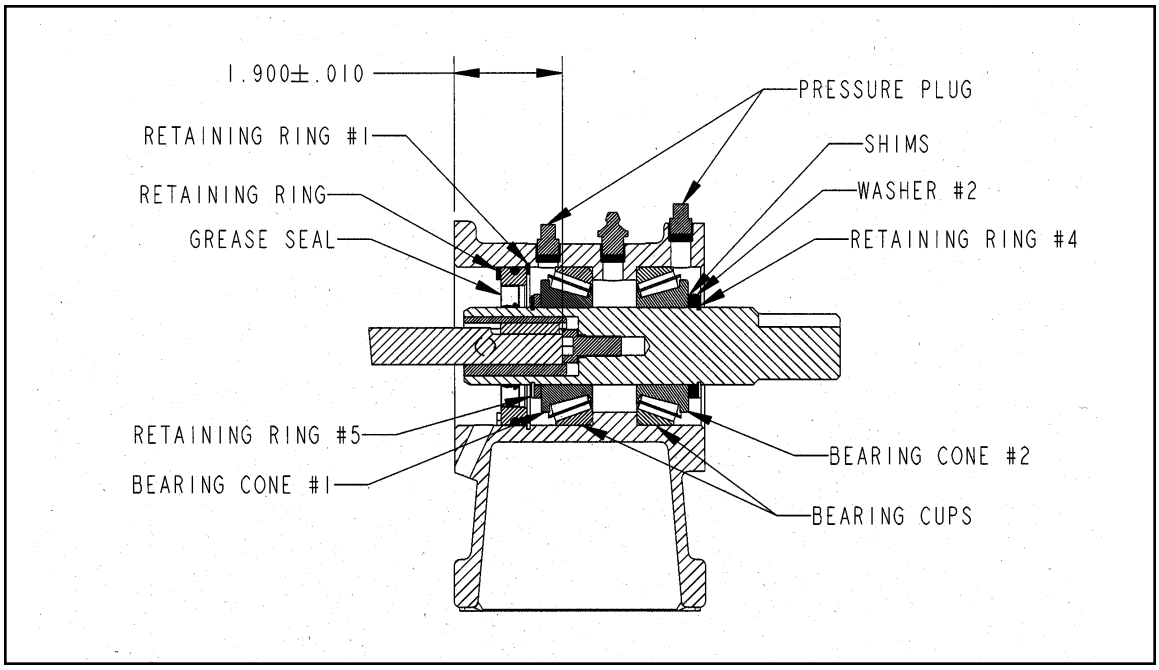


Figure 6.7
G-Bearing Frame Overhaul

NOTE: If the grease holder cannot be removed easily at this time,it can be removed later, when the bearing shaft is removed (Step 3).

2. Remove retaining ring #4, the shims, and the back-up washer (Figure 6.7, G-Bearing Frame Overhaul).

3. Place the bearing frame in a press. Press on the motor end of the shaft to remove the shaft assembly from the bearing frame. Bearing cone #2 is removed from the shaft when the shaft is pressed out of the bearing frame. Bearing cone #1 will remain on the shaft. Removal of the back-up retaining ring #1 behind the grease seal holder is not necessary to remove shaft assembly.

4. Bearing cone #1 can be cleaned and repacked with grease while still on the shaft. Removal of bearing cone #1 should not occur unless replacement is necessary. Removal is accomplished by use of a press to press the bearings off the shaft.

5. Inspect the bearing cups and cones for any rough surface conditions and replace both cup and cone when necessary. Pitted and galled rollers and/or bearing cups indicate replacement is necessary. Very light marks around each roller may occur during “break-in period” from the bearing cage. This is not a problem and bearing replacement is not necessary.

6. If the bearing cup(s) are to be removed, retaining ring #1 must first be removed.

7. To remove the bearing cup(s) from the bearing frame, use a brass or soft steel rod and hammer to knock them out.

   CAUTION: Do not damage the bearing frame.

8. Inspect both grease seals (i.e., motor adapter and bearing frame grease seals) and replace if the seals are no longer pliable or if they are leaking.

6.5.3 Assembly of Pumps with G-Bearing Frames

6.5.3.1 G-Bearing Frame Assembly

STEPS

1. If removed, press new bearing cup(s) into the bearing frame, making sure they are fully seated. When using a new bearing cone, replace both cup and cone as a set.

2. Pack grease into both bearings using EMB #2 lithium grease (Section 6.6, Lubrication Intervals).

3. If removed, press bearing cone #1 onto the shaft, holding the bearing square while starting. Make sure that washer #1 behind retaining ring #2 is in place. The correct check set-up may be checked by placing the shaft into the frame and measuring the 0.16-inch (4.1 mm) recess for G-Bearing frame pumps (Figure 6.7, G-Bearing Frame Overhaul).

4. With the shaft placed in the bearing frame, press on the second bearing cone, holding it square with the shaft while starting. Press until the bearing cone is fully seated against the bearing cup and there is not end play.

5. Install back-up washer #2, the shim pack, and the retaining ring, making sure the flat side of the retaining ring is away from the shims. Press the shaft to force bearing #2 back against the shim pack to seat the shim pack.

6. Check the end play of the shaft.

   STEPS

   A. Grasp the shaft on the motor side of the bearing frame while turning the shaft as far as it will go.

      This ensures that the bearing cone is completely seated in the bearing frame.

B. Hold the shaft in place to prevent axial movement.

C. Zero (0) out and place the dial indicator on the motor.

D. Push the shaft back toward the motor side of the bearing frame and observe the movement on the dial indicator. The end play should read 0.003 - 0.006-inch (0.08 - 0.015 mm) on the dial indicator.

E. Repeat Step D two to three times to verify end play accuracy.

NOTE: End play of 0.006-inch (0.15 mm) or less is difficult to read by hand. GE recommends using a dial indicator to measure end play.

NOTE: Readily noticeable end play means additional shimming is required. Re-shim as necessary, making sure that bearing cone #2 is pressed back against the shim pack before taking the measurement.

7. Examine the O-ring on the outside of the grease seal holder and, if damaged, replace it with a new one. Ensure the O-ring is well lubricated with grease.

8. Lubricate the lip of the grease seal with grease. Press the grease seal into the grease seal holder.

9. Reinstall the grease seal back-up retaining ring #1, if it was removed.

10. Press the grease seal assembly into the bearing frame until seated on the retaining ring.

CAUTION: Be sure the face of the grease seal holder with threaded holes is exposed and is not facing the bearings.

11. Check the 1.90 ± 0.01-inch (48.26 ± 0.25 mm) depth dimension using a suitable depth measure tool. A depth gauge or use of parallel bars and dial caliper is recommended. Remove the bolt using a 3/16-inch (Hex) wrench (supplied with the pump), and add or remove shims as needed. Retighten the bolt.

6.5.3.2 Assembly of Motor and Motor Adapter to Bearing Frame (Section 6.3)

6.5.3.3 Add Grease to Bearing Frame (Section 6.6, Lubrication Intervals)

NOTE: If removed, attach the liquid end adapter to the bearing frame using four (4) 5/19-inch bolts.

6.5.3.4 Reinstall the Liquid End (Section 6.2.2, Installation of Liquid End Assembly)

6.5.3.5 Reinstall Pump (Section 3.0, Pump Installation)

6.5.4 Disassembly of Pumps with D-Bearing Frames

STEPS

1. Remove the liquid end assembly (Section 6.2.1, Removal of Liquid End Assembly).

2. Remove the motor and motor adapter from the bearing frame (Section 6.3.1, Removal of Motor and Motor Adapter from Bearing Frame).

STEPS

A. Remove the nut and lock washer from the bearing frame shaft (Figure 6.8, D-Bearing Frame Overhaul).

NOTE: Removal of the nut can be facilitated by placing a 3/16-inch bolt into the set screw hole in the shaft to hold the shaft while unthreading the bolt.

B. Place the bearing frame in a press. Simultaneously press out the grease seal and remove bearing cone #2 by pressing on the motor end of the bearing frame shaft.

NOTE: The back-up retaining ring behind the grease seal does not have to be removed.

After the grease seal is removed, continue pressing to remove the shaft assembly from the bearing frame. Bearing cone #1 will remain on the shaft (Figure 6.8, D-Bearing Frame Overhaul).

C. Go to Steps 4 - 7 (Section 6.5.2, G-Bearing Frame Overhaul).

6.5.5 Assembly of Pumps with D-Bearing Frames

6.5.5.1 D-Bearing Frame Assembly

STEPS

1. Refer Section 6.5.3.1, Steps 1 and 2.

2. If removed, press bearing cone #1 onto the shaft, holding bearing square while starting. Make sure washer #1, behind the bearing square, has been replaced. The correct set-up may be checked by placing the shaft into the frame and measuring the 0.050-inch (1.3 mm) recess. Refer to Figure 6.8 (D-Bearing Frame Overhaul).

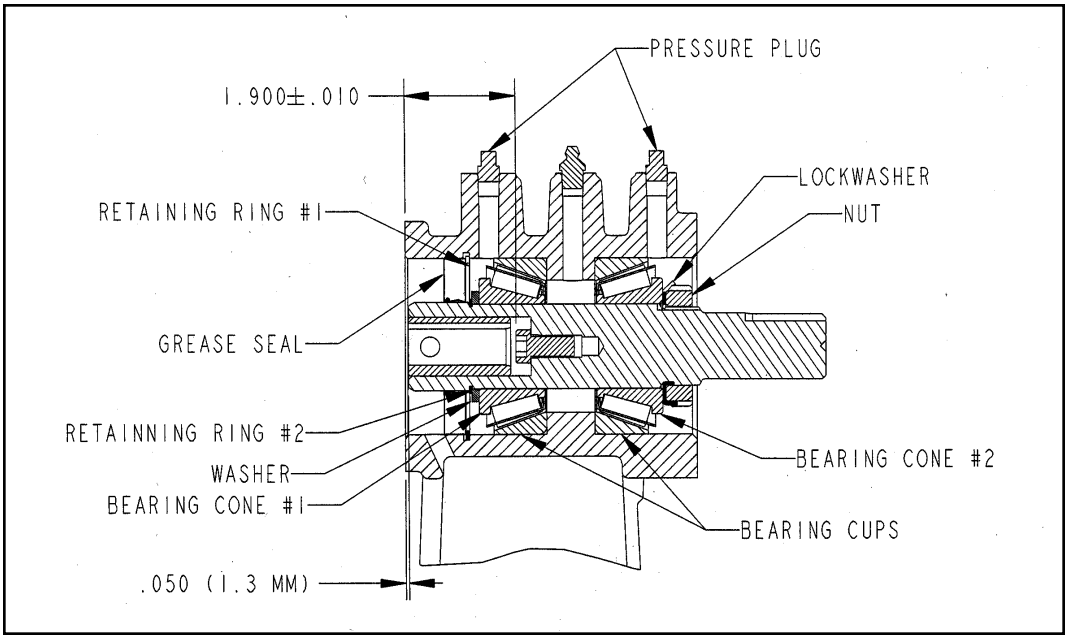


Figure 6.8
D-Bearing Frame
Overhaul

3. With the shaft placed in the bearing frame, press the second bearing cone, holding it square with the shaft while starting. Press until the bearing cone is fully seated against the bearing cup and there is no end play.

4. Reinstall the lock washer and lock nut. Hand tighten the lock nut and lightly set a tank on the lock washer into the slot on the lock nut. If desired, a 3/8-16 UNC x 3-inch bolt may be inserted through a side port in the bearing frame and into the set screw hole in the end of the bearing frame shaft (Figure 6.8) when tightening the lock nut.

5. Using a press, force bearing cone #2 back against the tanged lock washer by pressing on the end of the shaft. This sets the bearing so the shaft end play may be checked.

6. Check the end play of the shaft.

   STEPS

   A. Grasp the shaft on the motor side of the bearing frame while turning the shaft as far as it will go

      This ensures that the bearing cone is completely seated in the bearing frame.

   B. Hold the shaft in place to prevent axial movement.

   C. Zero (0) out and place the dial indicator on the motor.

   D. Push the shaft back toward the motor side of the bearing frame and observe the movement on the dial indicator. The end play should read 0.003 - 0.006-inch (0.08 - 0.015 mm) on the dial indicator.

   E. Repeat Step 4 two to three times to verify end play accuracy.

      NOTE: End play of 0.006-inch (0.15 mm) or less is difficult to read by hand. GE recommends using a dial indicator to measure end play.

   F. If further adjustment is necessary, press on the motor end of the bearing frame shaft to seat bearing cone #2 against the bearing cup. Tighten and loosen the lock nut as required.

   G. Repeat Steps 5 and 6.

   H. When the end play setting is correct, set one tang of the lock washer into a slot in the lock nut.

   I. Reinstall the grease seal making sure it is lubricated with grease or oil.

J. Check the 1.90 ± 0.01-inch (48.26 ± 0.25 mm) depth dimension using a suitable depth measure tool. A depth gauge or use of parallel bars and dial caliper is recommended. Remove the bolt using a 3/16-inch (Hex) wrench supplied with the pump and add or remove shims as needed. Retighten the bolt.

6.5.5.2. Assemble Motor Adapter and Motor Bearing Frame (Section 6.3.2, Assembly of Motor and Motor Adapter to Bearing Frame).

6.5.5.3 Add grease to bearing Frame (Section 6.6, Lubrication Intervals).

NOTE: If removed, attach the liquid end adapter to the bearing frame using four (4) 5/16-inch bolts.

6.5.5.4 Reinstall the Liquid End (Section 6.2.2, Installation of Liquid End Assembly).

6.5.5.5 Reinstall the pump (Section 3.0, Pump Installation).

6.6 Lubrication Intervals

The operating temperature of the grease lubricated bearing frame utilized on Tonkaflo pumps will vary depending on the boost pressure of the pump. As a general rule, the G-Bearing frame will operate within a temperature range of 150º - 200ºF (66º - 93ºC). The D-Bearing frame will operate within a temperature range of 160º - 220ºF (71º - 104ºC). During operation, the bearing frame will feel hot to the touch.

6.6.1 Relubrication Intervals for Pumps Equipped with G- and D-Bearing Frames

NOTE: The bearing frames were lubricated at the factory.

Do not add grease when first putting your new pump into service. The bearing frame should be regreased every lubrication interval or six (6) months (maximum 1000 hours), whichever occurs first.

Table 6.3
Recommended Relubrication
Intervals for Continuous Operation
of 50 and 60 Hertz Motor Pumps

Pump Model Range	60 Hertz Relubrication Interval (HR)	50 Hertz Relubrication Interval (HR)
5502G - 5506G 5507D - 5510D	1000 500	1000 500
8502G - 8505G 8506D - 8510D	1000 500	1000 500
12502G 12503D - 12506	1000 500	1000 1000
24002D - 24004D	500	1000

6.6.2 Grease Type

Use Lubriplate EMB grease in G-and D-Bearing frames. Lubriplate EMB (NLGI Grade 2) has a lithium/polymer base with anti-wear and extreme pressure additives that effectively reduce the operating temperature of the bearing frame during continuous operation.

6.6.3 Greasing Procedure

There are two (2) pressure plugs (zerk position 1 & 3) and one (1) grease fitting (zerk position 2) on the bearing frame. When using the pump in a horizontal motor position, remove the pressure plugs and add grease only through the center grease fitting (zerk position 2).

When using the pump in a vertical motor position, remove the pressure plug and add grease through the grease fitting at zerk position 2 and zerk position 3 for Vertical Motor Up (VMU) or zerk position 2 and zerk position 1 for Vertical Motor Down (VMD).

Add: Typically, this is 15 shots from a hand-operated cartridge grease gun.

6.6.4 Quantity of Grease for Relubrication Interval

Horizontally Mounted Pumps

Remove pressure plugs and add approximately 20 grams (3/4 ounce) through the center grease fitting (zerk position 2). Approximately 15 shots from a hand operated cartridge grease gun.

Vertically Mounted Pumps

Remove pressure plugs and add 20 grams (3/4 ounce) through the center grease fitting (zerk position 2) and 8 grams (1/4 ounce) through the upper grease fitting (zerk position 3) for VMU or (zerk position 1) for VMD.

CAUTION: DO NOT OVER GREASE. Should the bearing frame become so full of grease that it exits from the vent holes WHILE ADDING grease, disassemble and clean bearing frame. Over greasing may cause bearing frame to fail.

7.0 TONKAFLO SERVICE POLICY - PUMP LIQUID END

Section 6.0 (Tonkaflo Field Maintenance) in the Tonkaflo Installation, Operation, and Maintenance Manual was written to assist our customers in performing minor maintenance in the field on Tonkaflo pumps. Proper maintenance will ensure longer pump life and minimize down time. Tonkaflo pumps are manufactured to make field repairs on the mechanical seal a quick and easy process. Bearing frame overhauls may be done by the customer, a local maintenance shop, or the factory. If repair at the factory is desired, call the factory for a Return Goods Authorization (RGA) number and send the complete pump, with or without motor, to the factory. For motor problems, such as worn out motor bearings, it is recommended that maintenance be done at a local motor repair shop.

For Motor Service: Motors must be sent to the nearest authorized motor service center for repair, replacement, and warranty disposition.

Field service of the pump liquid end, with the exception of mechanical seal replacement, is not recommended. If a pump liquid end is damaged by running the pump dry, inadequate flow, excessive deadheading, cavitation, or other reasons, contact a Tonkaflo distributor certified for service or return the pump with or without motor to the factory for repair.

The pump has a grease lubricated bearing frame between the pump liquid end and the motor. They are typically characterized by a “G” or “D” in the model number (e.g., SS5504G).

To return a grease lubricated bearing frame pump to the factory, GE requires the whole unit (pump liquid end, bearing frame, and motor adapter) less the motor and flexible coupling pieces. If the motor adapter is not returned, GE will connect a new one to the repaired pump liquid end/bearing frame and you will be billed for it.

The original bearing frame is essential for the rebuilding of the pump liquid end on 5500, 8500, 12500, and 24000 Series pumps based on the pump design (shimmed impellers). The pump liquid end and bearing frame form a “matched set.” Also, a bearing frame is required to test the pump. If we attach a new bearing frame to your pump liquid end in order to test, it will be shipped with the repaired liquid end of the pump and you will also be billed for it.

8.0 TONKAFLO PUMP RETURN GOODS AUTHORIZATION (RGA) PROCEDURE

If you wish to return goods for repair, warranty evaluation and/or credit, please have your original sales order or invoice available when you call GE. Call (800) 848-1750 and ask to speak with Customer Service. A GE Customer Service representative will provide instructions and a Return Goods Authorization (RGA) number which needs to be clearly written on the outside of the box used to ship your materials. All equipment must be shipped to GE with the freight prepaid by the customer. Call our Customer Service Center with any questions or issues concerning freight claims and a representative will discuss your situation.

All materials to be returned must be rendered into a non-hazardous condition prior to shipping.

There are two ways to handle a return: (1) send in the pump for repair and return or (2) purchase a new pump and when desired, send the defective pump to the factory for repair and return.

8.1 Motor Warranty

Motors must be sent to the nearest authorized motor service center for repair, replacement, and warranty disposition.

8.2 In-Warranty Pump Failure

8.2.1 Return the defective pump to the factory for repair on an RGA within 15 days from RGA issue date. GE absorbs the cost of repair. The repaired pump will be returned and is under warranty for the remainder of the original warranty period or three months, whichever is longer.

8.2.2 GE will not restock or issue return credit against a new, custom-built, pump purchase regardless of the warranty status of the failed pump. The warranty (Section 11.0) is 12 months from installation or 15 months from receipt, whichever occurs first.

8.3 Out-of-Warranty Pump Failure

8.3.1 Return the pump on an RGA for repair. The pump will be repaired and repair charges invoiced to the customer. The warranty on repairs is three months.

8.4 Shipping Charges

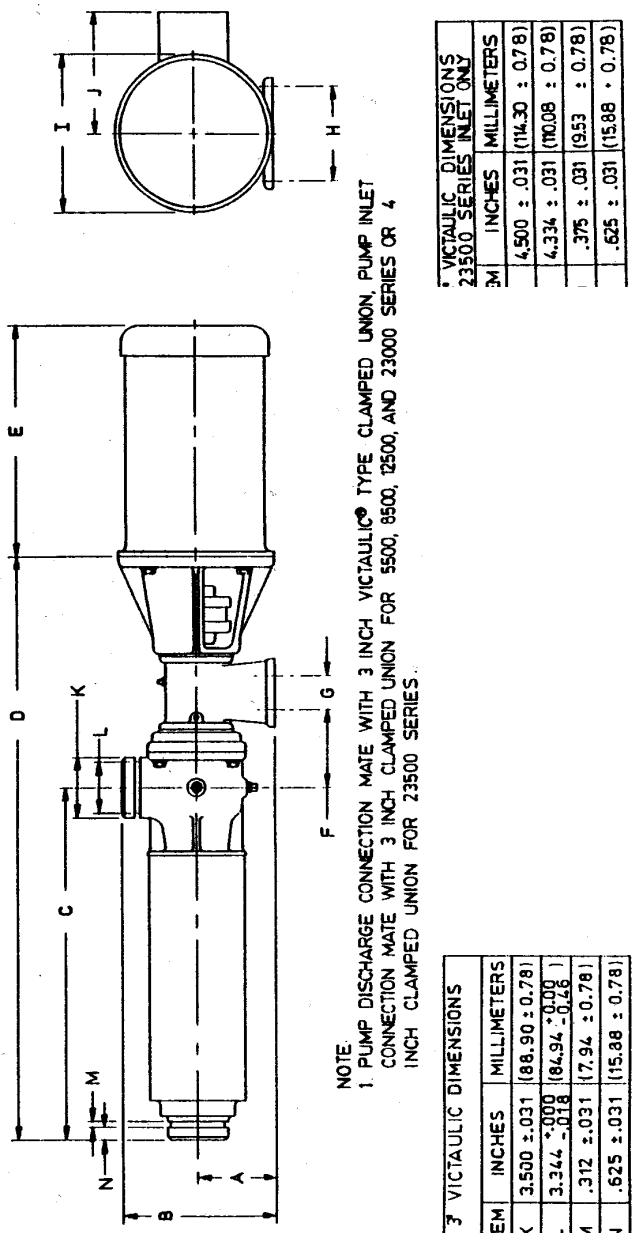
8.4.1 In-Warranty

Customer pays for shipment to GE. GE pays one way surface freight return to customer.

8.4.2 Out-of-Warranty When New Pump is Purchased

Customer pays all shipping charges.

9.0 DIMENSIONAL DRAWING



3" VICTAULIC DIMENSIONS		
ITEM	INCHES	MILLIMETERS
K	3.500 ±.031	(88.90 ± 0.78)
L	3.344 +.000 -.018	(84.94 +0.00 -0.46)
M	.312 ±.031	(7.94 ± 0.78)
N	.625 ±.031	(15.88 ± 0.78)

VICTAULIC DIMENSIONS 23500 SERIES INLET ONLY	
INCHES	MILLIMETERS
4.500 ± .031	(114.30 ± 0.78)
4.334 ± .031	(110.08 ± 0.78)
.375 ± .031	(9.53 ± 0.78)
.625 ± .031	(15.88 ± 0.78)

Figure 9.9
Outline Dimensional Drawing:
Standard Pumps with G- and D-Bearing Frames

Pump Model	Bearing Frame	Motor Size Frame	A	B	C	D	E[b]	F	G	H[b]	I[b]	J[b]	Casing Length/ Size	Approx. Total Length
5503			4.50	8.75	14.50	27.60	13.90	4.50	2.00	5.50	9.90	7.80	2.0	41.5
5504	G	184TC	4.50	8.75	16.50	29.60	13.90	4.50	2.00	5.50	9.90	7.80	2.0	43.5
5506	G	184TC	4.50	8.75	20.40	33.50	15.40	4.50	2.00	5.50	9.90	7.80	2.0	48.9
5508	G	184TC	6.25	10.50	24.40	39.10	15.60	4.50	2.00	5.50	11.50	9.30	2.0	54.7
5512[a]	D	215TC	6.25	10.50	32.20	46.80	15.60	4.50	2.00	5.50	11.50	9.30	2.0	62.5
	D	215TC												
8503			4.50	8.75	14.50	27.60	13.90	4.50	2.00	5.50	9.90	7.80	2.0	41.5
8504	G	184TC	4.50	8.75	16.50	29.60	15.40	4.50	2.00	5.50	9.90	7.80	2.0	45.0
8506	G	184TC	6.25	10.50	20.40	33.50	15.60	4.50	2.00	5.50	11.50	9.30	2.0	50.7
8508	D	215TC	6.25	10.50	24.40	39.10	18.30	4.50	2.00	5.50	12.80	10.40	2.0	57.4
8512[a]	D	254TC	6.25	10.50	32.20	46.90	20.0	4.50	2.00	5.50	12.80	10.40	2.0	66.9
	D	254TC												
12502			4.50	8.75	14.70	27.80	15.40	4.50	2.00	5.50	9.90	7.80	3.0	43.2
12503	G	184TC	6.25	10.50	17.70	32.40	15.60	4.50	2.00	5.50	11.50	9.80	3.0	48.0
12504	D	215TC	6.25	10.50	20.80	35.50	18.30	4.50	2.00	5.50	12.80	10.40	3.0	53.8
12506[a]	D	254TC	6.25	10.50	26.90	41.60	20.0	4.50	2.00	5.50	12.80	10.40	3.0	61.6
	D	254TC												
24002			6.25	10.75	16.10	30.80	18.30	4.50	2.00	5.50	12.80	10.40	4.3	49.1
24003	D	254TC	6.25	10.75	20.40	35.10	23.80	4.50	2.00	5.50	12.80	10.40	4.3	58.9
24004	D	256TC	6.25	10.75	24.70	39.40	19.40	4.50	2.00	5.50	12.80	10.40	4.3	58.8
	D	256TC												

a 50 Hertz - 2900 rpm only

b Motor dimensions are approximate; motor dimensions for totally enclosed fan-cooled design (TEFC) except Model 24004 which is open drip-proof electric motor (ODP)

NOTE: All dimensions are in inches: 1-inch = 2.54 cm

10.0 REPLACEMENT PARTS

10.1 Cutaway Drawings

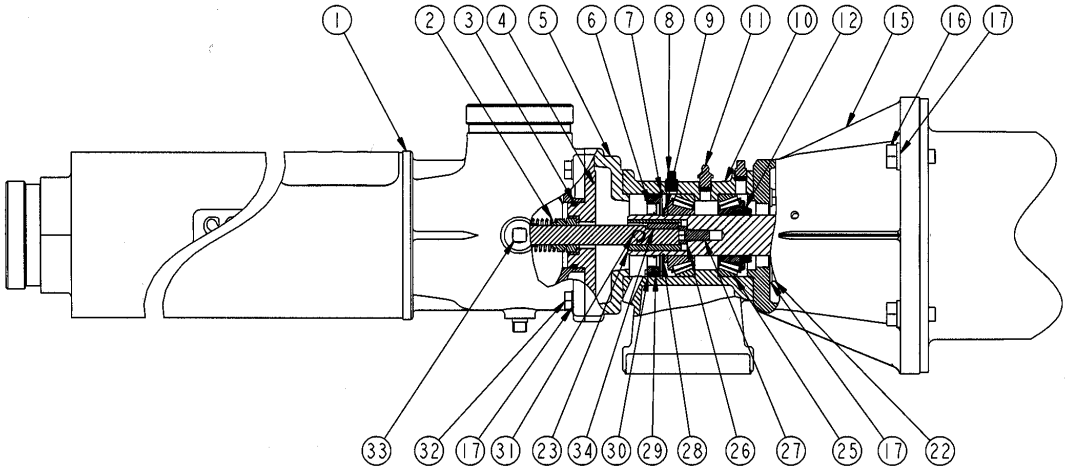


Figure 10.10
G-Bearing Frame Pumps

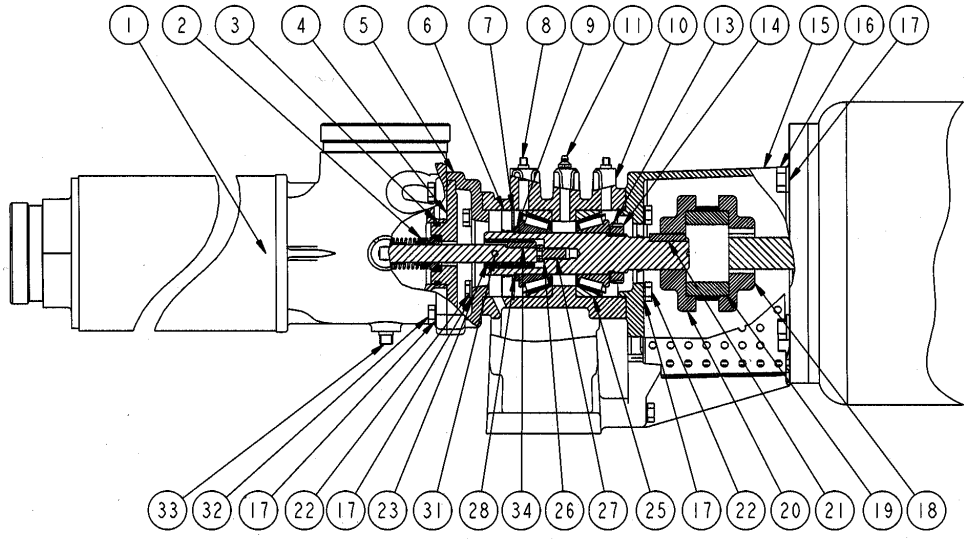


Figure 10.11
D-Bearing Frame Pumps

10.2 Standard Model Parts List

Item Number	Part Description	D* SERIES	G** SERIES
1	Liquid End Assembly	-	-
2	Mechanical Seal, 5/8-inch Diameter		
	Standard, 200 psig (13.8 barg)	1113515	1113515
	High-Pressure, 300 psig (20.7 barg)	1113497	1113497
	High-Pressure, 400 psig (27.6 barg)	1113516	1113516
3	O-ring, Mechanical Seal Holder	1114284	1114284
4	Mechanical Seal Holder	1120703	1120703
5	Liquid End Adapter	1120574	1120573
6	Grease Seals		
	Motor Adapter	1120047	1120047
	Bearing Frame	1120255	1120255
7	Retaining Ring, Bearing Frame, Housing	1114309	1120753
8	Pressure Relief Plug	1120578	1120578
9	Washer	1120252	1120057
10	Bearing Frame	1120358	1120800
11	Grease Fitting	1120060	1120060
12	Shims		
	0.005-inch (0.13 mm)	-	1120058
	0.007-inch (0.18 mm)	-	1120059
13	Lock Washer, Tanged	1120263	-
14	Lock Nut, Left Hand Thread	1117029	-
15	Motor Adapter	1120359	1120026
16	Machine Bolt, Hex, Adapter to Motor		
	1/2-inch-13UNC x 1-1/4-inch long	1113973	1113973
	5/16-inch-18UNC x 1-inch long	-	1110985
17	Lock Washer		
	5/16-inch	1112256	1112256
	3/8-inch	1110012	1110012
	1/2-inch	1113104	1113104

* D All D-Bearing Frame Pumps (5500D-, 8500D-, 12500D-, and 24000D-Series)
** G All G-Bearing Frame Pumps (5500G-, 8500G-, 12500G-Series)

Item Number	Part Description	D* SERIES	G** SERIES
18	Flexible Coupling Flange, Motor Shaft		
	1-1/8-inch Bore, Size 6J	1120094[1]	1120094
	1-3/8-inch Bore, Size 6J	1120095[2]	-
	1-5/8-inch Bore, Size 6J	1114333[3]	-
	1-5/8-inch Bore, Size 7S	1114334[4]	-
19	Flexible Coupling Sleeve		
	Size 6JE	1120306	1120306
	Size 7JE	1121702[4]	-
20	Flexible Coupling Flange, Bearing Frame Shaft, 1-1/8-inch Bore		
	Size 6J	1120094	1120094
	Size 7S	1121705[4]	-
21	Coupling Key for Bearing Frame	1120063	1120063
22	Machine Bolt, Hex, Liquid End & Motor Adapters to Bearing Frame		
	5/16-inch - 28UNC x 1-inch long	1110985[3]	-
	5/16-inch - 28UNC x 1-1/4-inch long	-	1113102
	3/8-inch - 16UNC x 1-1/2-inch long	1112250[4]	-
23	Bearing Frame Shaft Assembly	1120325	1120688
24	O-ring, Bearing Frame	1114471	-
25	Bearing, Cup & Cone	1120491	1120093
26	Shims	1120321	1120321
27	Cap Screw, 3/8-inch 16NC Low Profile	1113676	1113676
28	Retaining Ring, Bearing Frame Shaft	1120259	1120055
29	O-ring, Grease Seal Holder	-	1120051
30	Grease Seal Holder	-	1120046
31	Set Screw	1113769	1113769
32	Machine Bolt, Hex, Inlet to Adapter, 3/8-inch - 16NC x 1-1/4-inch	1110984	1110984
33	Plug Inlet	1115055	1115055
34	Pump Shaft Key	1120062	1120062

* D All D-Bearing Frame Pumps (5500D-, 8500D-, 12500D-, and 24000D-Series)
** G All G-Bearing Frame Pumps (5500G-, 8500G-, 12500G-Series)

1 For use with 182TC or 184TC frame motors.
2 For use with 213TC or 215TC frame motors.
3 For use with 254TC or 256TC frame motors.
4 For use with 25 Hp 256TC frame motor model 24004D-60-Hz only.

10.3 Pump Accessories

PUMP ACCESSORIES		
Part Description	D* SERIES	G* SERIES
Never-Seez	1120110	1120110
Bearing Frame Assembly	1120327	1120740
Mechanical Seal Kit		
Standard, <200 psig (13.8 barg)	1121215	1121215
High-Pressure, < 300 psig (20.7 barg)	1120312	1120312
High-Pressure, < 400 psig (27.6 barg)	1120477	1120477
Allen Wrench, 3/16-inch	1113770	1113770
Victaulic Adapters		
3-inch x 3-inch MNPT, 316SS	1120590	1120590
3-inch x 2-inch FNPT, 316SS	1120587	1120587
3-inch x 1-1/2-inch FNPT, 316SS	1120588	1120588
4-inch x 4-inch MNPT, 316SS (24000-Series Inlet only)	1122067	-
Victaulic Coupling Clamp, 3-inch	1114373	1114373
Victaulic Coupling Clamp, 4-inch (24000-Series Inlet only)	1115161	-
Pump Discharge Screen	1120501	1120501
Retaining Ring Pliers for Mechanical Seal Replacement	1120108	1120108
Bearing Frame Cap for Belt Drive	1120547	1120546
Coupling Guard Kit	1239454	-

* D All D-Bearing Frame Pumps (5500D-, 8500D-, 12500D-, and 24000D-Series)
** G All G-Bearing Frame Pumps (5500G-, 8500G-, 12500G-Series)

10.4 Recommended Spare Parts List

10.4.1 Recommended Spare Parts for G-Bearing Frames

SPARE PARTS FOR TONKAFLO G-BEARING FRAMES		
PART NUMBER	DESCRIPTION	QUANTITY
1121215	5/8-inch standard Type 21, BF501C1 mechanical seal kit, Inlet pressure*. Includes O-ring for standard seal holder.	1
1120047	Bearing frame grease seals	2
1120051	O-ring for bearing frame grease holder	1
1120046	Grease seal holder	1
1120093	Bearing cup and cone	2
1121060**	Bearing frame shaft shims	2
1120055	Bearing frame shaft - retaining ring	1
1121576	Bearing frame grease, Lubriplate EMB (14-1/2-ounce tube)	1
1116531	5500, 8500, 12500, and 24000 Series Medium Pressure Pump Instruction Manual with G- or D-Bearing Frame	1
1120578	Pressure Relief Plug	2
1120057	Bearing frame washer behind retaining ring #5 (0.120-inch)	1
1120753	Bearing frame retaining ring	1
1113769	Bearing frame shaft set screw	1

* Inlet pressure < 200 psi (13.8 bar)

** Two shims at 0.005-inch; 4 shims at 0.007-inch, and 1 shim at 0.120-inch.

SPARE PARTS FOR TONKAFLO G-BEARING FRAMES		
PART NUMBER	DESCRIPTION	QUANTITY
1120062	Pump shaft key	1
1120063	Coupling key	1
1120094	Coupling flange	2
1120306	Coupling sleeve	1
1120546	Holder, grease seal assembly GD (for Belt Driven pumps)	1
1120060	Bearing frame grease fitting	2
1120321	Bearing frame shaft bolt shims	2
1113676	Bearing frame shaft bolt	1

10.4.2 Recommended Spare Parts for D-Bearing Frames

SPARE PARTS FOR TONKAFLO D-BEARING FRAMES		
PART NUMBER	DESCRIPTION	QUANTITY
1121215	5/8-inch standard Type 21, BF501C1 mechanical seal kit, inlet pressure*. Includes O-ring for standard seal holder.	1
1120255	Bearing frame grease seals	1
1120256	Bearing frame motor adapter grease seal	1
1114471	O-ring for bearing frames	1
1120491	Bearing cup and cone	2
1114309	Bearing frame housing retaining ring	1
1120259	Bearing frame shaft retaining ring	1
1121576	Bearing frame grease, Lubriplate EMB (14-1/2-ounces)	1
1120321	Bearing frame shaft bolt shims	2
1120263	Lock washer, multi-tanged	1
1116531	5500, 8500, 12500, and 24000 Series Medium Pressure Pump Instruction Manual with G- or D-Bearing frame	1
1120062	Pump shaft key	1
1120252	Bearing frame washer behind retaining ring #2	1

* Inlet pressure < 200 psig (< 13.8 barg).

SPARE PARTS FOR TONKAFLO D-BEARING FRAMES		
PART NUMBER	DESCRIPTION	QUANTITY
1120578	Pressure relief plug	1
1113769	Bearing frame shaft set screw	1
1120095	Coupling flange motor, 1-3/8-inch bore	1
1120063	Coupling key	1
1120094	Coupling flange	2
1120306	Coupling sleeves	1
1120547	Holder, grease seal assembly DD (for Belt Driven pumps)	1
1120060	Bearing frame grease fitting	2
1117029	Lock nut, left-hand thread	1
1113676	Bearing frame shaft bolt	1
1114334*	Coupling flange motor, 1-5/8-inch bore	1
1121702*	Coupling sleeve	1
1121705*	Coupling flange pump, 1-1/8-inch bore	1

* For use with 25 Horsepower, 256TC frame motor model 24004D-60 Hz only.

10.5 Bearing Frame Overhaul Tools

1. Two (2) 5/32 bolts for removal of grease seal holder (G-Bearing frame pumps).

2. One (1) 3/8-inch bolt for D-Bearing frame pumps to hold bearing frame shaft when removing lock nut.

3. One (1) 3/16-inch Allen (hex) wrench for removal of bearing frame shaft set screw.

4. Bearing press (arbor press).

5. Dial indicator for setting bearing frame shaft end play.

6. Lubriplate EMB Lithium grease (NLGI Grade 2).

7. Hand-held cartridge grease gun.

8. Retaining ring pliers for removal of retaining ring from G-Bearing frame shaft (Truarc L1520 or equivalent).

10.6 Mechanical Seal Change-Out Tools

1. One (1) 3/16-inch Allen (hex) wrench for removal of bearing frame shaft set screw.

2. One (1) 3/8-inch wrench.

10.7 Ordering Parts

Order parts through your local distributor or directly from:

GE Infrastructure
Water & Process Technologies
5951 Clearwater Drive
Minnetonka, MN 55343-8995 USA
Telephone: (952) 933-2277
Fax: (952) 933-0141
Toll Free: (800) 848-1750

To order parts, the following information is necessary:

1. Pump model number (see pump label)

2. Pump serial number (see pump label)

3. Other nameplate information such as operating temperature, materials of construction, or material code and type of mechanical seal

4. Motor horsepower, motor frame size, and enclosure specification

5. Part name

6. Part number

7. Quantity desired

8. Specific materials of construction, if any.

11.0 WARRANTY

TONKAFLO PUMP WARRANTY

GE, warrants its pumps to be free from defects in design, material or workmanship for a period of 15 months from receipt or 12 months from installation of the product, whichever occurs first, when said products are operated in accordance with written instructions and are installed properly. If Tonkaflo pumps are altered or repaired without prior approval of GE, all warranties are void. If any defects or malperformance occur during the warranty period, GEs' sole obligation shall be limited to alteration, repair, or replacement at GEs' expense, F.O.B. factory, of parts or equipment, which upon return to GE and upon GEs' examination prove to be defective. Equipment and accessories not manufactured by GE are warranted only to the extent of and by the original manufacturer's warranty. GE shall not be liable for damage or wear to equipment caused by abnormal conditions, excessive temperature, vibration, failure to properly prime or to operate equipment without flow, or caused by corrosive, abrasive or foreign objects. The foregoing warranty is exclusive and in lieu of all other warranties, whether expressed or implied, including any warranty of merchantability or fitness for any particular purpose. In no event shall GE be liable for consequential or incidental damages.

PUMP MODEL NUMBER: _____

PUMP SERIAL NUMBER: _____

For more information call 952-933-2277 or 800-848-1750 in the U.S., or visit www.gewater.com.

GE Infrastructure
Water & Process Technologies

North American Sales
5951 Clearwater Drive
Minnetonka, MN
55343-8995
USA
(952) 933-2277 Phone
(952) 933-0141 Fax

Euro/Africa Sales
230 rue Robert Schurman
ZA des Uselles
77350 Le MØe sur Seine
FRANCE
+33 1 64 10 2000 Phone
+ 33 1 64 10 3747 Fax

Asia/Pacific Sales
1044/8 SOI 44/2
Sukhumvit Road Parkanog
Bangkok 10110
THAILAND
+ 66 2 38 14213 Phone
+ 66 2 39 18183 Fax

P/N 1115631 Rev.L