Bronze Rotary Gear Pumps
Installation, Operation, and Maintenance Instruction

INTRODUCTION

Congratulations for choosing an Oberdorfer pump, the Industry Standard for quality since 1890.

Construction

Bronze Rotary Gear pump standard pump housings and helical gears are made of top quality bronze. Shafts are stainless steel. Pumps are available with bronze bearings and grease fittings or with carbon bearings which require no lubrication. Dynamic seal arrangements include packing, lip, or mechanical seals for a variety of application requirements. Static cover o-ring seals eliminate gasket problems.

Application Range

Bronze Rotary Gear pumps are of the external gear positive displacement type, displacing a finite volume of fluid with each shaft revolution. As such, capacity varies in direct proportion to pump speed. They are suited to handle clear lubricating and non-lubricating fluids, with PH ranging from 4 to 11, and temperatures to 400°F. These pumps handle viscous fluids to 100,000 cps (462000 SUS) at reduced shaft speeds, with flow rates to 175 GPM (662 LPM), differential pressures to 150 psig (10.3 BAR), and suction lift capability to 20 feet (6.1 meters) for new pumps.

Motor Runs Hot or Overloads

1) Discharge pressure too high
2) Shaft speed too fast
3) Fluid viscosity higher than expected
4) Incorrectly wired motor
5) Motors normally feel hot

Remedy
1) Reduce discharge pressure. Check relief valve setting. Be sure discharge pressure gages function correctly.
2) Reduce speed
3) Change to larger horsepower or higher service factor motor. Thin fluid.
4) Check wiring diagram
5) Verify if actual motor ampereage draw is within range

Seal Leaks

1) Dry running
2) Solid impurities in fluid
3) Damaged or damaged pump
4) Seal material incompatible with fluid

Remedy
1) Open valves. Prime pump
2) Install suction strainer. Clean suction strainer.
3) Inspect and repair as required
4) Verify original application conditions. Consult factory.

Troubleshooting Matrix
Flow By-Pass
When a flow by-pass system is used to control out-
put from the pump, the bypassed fluid should be directed back
from the pump inlet. Provisions for cooling should be made in the event of recircu-
lation heat build-up.

Pump Driver Mounting
Adapter kits (including bracket, coupling compo-
ents, and hardware) are available for Bronze Close Coupled Gear pumps allowing connectivity to NEMA and IEC motor frames. Assembly instructions are included with each kit. Adapterless motors, carbonator mounts, and electric clutches are available for some models. Base mount kits (including baseplate, coupling components, coupling guard, and hard-
ware) are available for Bronze Pedestal Gear pumps. Contact your Oberdorfer representative for additional information.

MAINTENANCE
Frequency
Since each installation differs, the frequency and extent of pump maintenance is best established based upon past performance. Keeping detailed maintenance records of past performance aids in determining future preventative maintenance intervals. During routine operating inspections, pay particular attention to seal and bearing areas of the pump. Consult the motor manufacturer for motor maintenance instructions.

Pressure Relief
Discharge lines should be fitted with properly sized line pressure relief valves to protect both the pump and the system. Pumps equipped with integral internal bypass relief valves are intended to provide continuous service against intermittent overpressurization. They are not designed for continuous use and can lead to over-
heating. In these instances, a line pressure relief valve is required. The relief outlet should be piped back to the suction vessel.

MAINTENANCE
Recommended Spares
Pumps equipped with mechanical seals are of the stan-
dard pusher bellows type or wedge style. They can be expected to provide long and troublefree service provided:

1) Seal materials are compatible with pumped fluid and properly applied to the service.
2) Adequate cooling and lubrication is provided.
3) Dry running is avoided.
4) Abrasives are kept away from seal area.
5) Pump and driver are properly aligned.

If the problem persists, the pump should be inspected for wear or damage. Oberdorfer Bronze Gear Pump internal parts may be readily inspected in the field usually without removal from the drive or system plumbing. Simply remove the cover to pull the bearing and the pump should be removed from the drive and the flange bolted. To avoid excessive leakage. Eventually all the packing in the pump will become deteriorated and will have to be replaced. Contact your local authorized distributor or the Oberdorfer factory.

OPERATION
Pre-Startup
Prior to start-up, recheck installation as described above. Verify desired rotation by jogging the motor and make corrections if necessary. Before initial startup, pre-wet the gears and make sure the pump is adequately primed. Failure to do so could cause immediate damage to pump components. Make sure that discharge valves are open.

Changing Applications
Verify that all wetted parts of the pump are compat-
ible with the new fluid to be handled and that the motor is ade-
quately sized. Check with your Oberdorfer distributor if in doubt.

Inspect for Wear
If your Bronze Gear Pump exhibits reduced flow, an inability to maintain pressure, is noisy or performs otherwise abnormally, first refer to the Troubleshooting Matrix on back.
suction from a tank or vessel, position the inlet above the maximum expected level of solids. Use full-bore ball valves or gate valves to minimize restriction. Suction strainers should be properly sized to minimize pressure drop and positioned for easy cleaning access. If start-up screens are used, be sure they are removed prior to placing the system into regular operation. Orient lines so as to prevent formation of air pockets. Be sure all joints are tight. Flush out all suction lines prior to installing the pump.

General Piping

For further ease of maintenance, use union fittings to connect the pump to the system. Install a discharge priming tee for convenience. Do not spring the piping to connect the pump. Use piping supports or hangers as required. When necessary, provide for thermal expansion and contraction to avoid placing strain on the pump.

Alignment

Proper alignment is key to seal and bearing performance. Improper alignment can lead to premature pump failure. Check the alignment carefully between the pump and the drive. (See Figure #1 on Pg.4 for more information regarding Proper Alignment)

Belt Drive

Though alignment is not as critical as direct connected, ensure that the pump and motor shafts are parallel and in line. For units suitable for belt drive, be sure that the belt tension is adequate (per the belt manufacturer’s recommendation) but do not overtighten. For heavy pulley loads, models are equipped with external ball bearing supports. A single 1/2” (A or 4L section) V-belt is satisfactory for drive speeds up to 1 HP 3450 RPM. For larger drive sizes, double-V belts are recommended. Install guards around all moving parts in accordance with OSHA to prevent personal injury.

Fasteners

Unless the pump has been shipped directly from the factory, it is recommended to check all bolts and nuts for tightness to eliminate possible leakage problems or destructive vibration.

Pressure Relief

Discharge lines should be fitted with properly sized line pressure relief valves to protect both the pump and the system. Pumps equipped with integral internal bypass relief valves are intended to serve as a means of protection against intermittent overpressurization. They are not designed for continuous use and can lead to overheating. In these instances, a line pressure relief valve is required. The relief outlet should be piped back to the suction vessel.

Flow By-Pass

When a flow-by-pass system is used to control output from the pump, the bypassed fluid should be directed back to the suction vessel to avoid recirculation heat build-up. In cases where this is not possible, connect to the suction at least 10 pipe diameters length away from the pump inlet. Provisions for cooling should be made in the event of recirculation heat build-up.

Pump Driver Mounting

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Unless the pump has been shipped directly from the factory, it is recommended to check all bolts and nuts for tightness to eliminate possible leakage problems or destructive vibration.

CAUTION

Prior to start-up, recheck installation as described above. Verify desired rotation by jogging the motor and make corrections if necessary. Before initial startup, pre-wet the gears and make sure the pump is adequately primed. Failure to do so could cause immediate damage to pump components. Make sure that discharge valves are open.

Start-up

Start pump and check for proper operation. Adjust packing (if applicable) as necessary, allowing adequate time to run in. Do not overtighten the packing edge damage to the packing and the shaft can occur. A properly packed and adjusted packing nut will leak at about 10 drops every 3 to 5 minutes. Tighten packing nut only while shaft is rotating. Lip and mechanical seals require periodic adjustment. If the pump’s bearing areas or seal area runs hot, shut the pump down and determine the cause. For units equipped with integral pressure relief valve, the factory setting is usually 50 psi. It is recommended that the setting should be 5 psi above the operating pressure in the discharge line. To increase the set point, turn the by-pass valve adjusting screw clockwise. If start-up screens were used, be sure they are removed prior to placing the system into regular operation. Depending on suction conditions, it may be necessary to reprime the pump for subsequent restarts.

Changing Applications

Verify that all wetted parts of the pump are compatible with the new fluid to be handled and that the motor is adequately sized. Check with your Oberdorfer distributor if in doubt.

Inspect for Wear

If your Bronze Gear Pump exhibits reduced flow, an inability to maintain pressure, is noisy or performs otherwise abnormally, first refer to the Troubleshooting Matrix on back.
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**Flow Direction**

Gear pumps will perform equally well in either direction however care must be taken for pumps equipped with integral pressure relief valves. To change flow direction effectively reversing the suction and discharge ports, simply switch driver rotation by following motor wiring diagram instructions and change the location of the relief valve as shown below. Most pump motor units are factory supplied with counterclockwise shaft rotation (when viewing the pump from the shaft end).

**Motor Runs Hot or Overloads**

1. **Discharge pressure too high**
   - Reduce downstream pressure. Check relief valve setting. Be sure discharge pressure setting is function correctly.
2. **Shaft speed too fast**
   - Reduce speed
3. **Fluid viscosity higher than expected**
   - Change to larger horsepower or higher service factor motor. Thin fluid.
4. **Incorrectly wired motor**
   - Check wiring diagram
5. **Binding internal pump parts**
   - Inspect and correct condition
6. **Motors normally feel hot**
   - Verify if actual motor amperage draw is within range

**Seal Leaks**

1. **Dry running**
   - Open valves. Prime pump
2. **Solid particles in fluids**
   - Install suction strainer. Clean suction strainer.
3. **Air leak at suction**
   - Locate and repair leak
4. **Worn or damaged pump**
   - Inspect and repair as required
5. **Seal material incompatible with fluid**
   - Verify original application conditions. Consult factory.

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**Troubleshooting Matrix**

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Probable Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Liquid Delivery</td>
<td>1) Closed valve</td>
<td>1) Open valves</td>
</tr>
<tr>
<td></td>
<td>2) Plugged suction</td>
<td>2) Eliminate restriction</td>
</tr>
<tr>
<td></td>
<td>3) Air leak at suction</td>
<td>3) Locate and repair leak</td>
</tr>
<tr>
<td></td>
<td>4) Suction lift too high</td>
<td>4) Do not exceed vapor pressure of liquid</td>
</tr>
<tr>
<td></td>
<td>5) Motor wired incorrectly</td>
<td>5) Check wiring diagram</td>
</tr>
<tr>
<td></td>
<td>6) Worn or damaged pump</td>
<td>6) Inspect and repair as required</td>
</tr>
<tr>
<td></td>
<td>7) Low viscosity</td>
<td>7) Verify original application conditions</td>
</tr>
<tr>
<td>Low Liquid Delivery</td>
<td>1) Pump shaft speed incorrect</td>
<td>1) Check driver speed, motor wiring, pulley tension</td>
</tr>
<tr>
<td></td>
<td>2) Discharge pressure too high</td>
<td>2) Reduce downstream pressure</td>
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<td>5) Low viscosity</td>
<td>5) Verify original application conditions</td>
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<tr>
<td>Gradually Loses Prime</td>
<td>1) Suction lift too high</td>
<td>1) Improve suction pressure</td>
</tr>
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<td></td>
<td>2) Air or gas in fluid</td>
<td>2) Eliminate air or gas from fluid</td>
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<td>5) Low viscosity</td>
<td>5) Verify original application conditions</td>
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<tr>
<td>Noisy</td>
<td>1) Cavitation</td>
<td>1) Improve system suction pressure, provide adequate NPSH</td>
</tr>
<tr>
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<td>2) Solid particles in fluid</td>
<td>2) Install suction strainer. Clean suction strainer.</td>
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</table>

**Suction Plumbing**

Suction side plumbing considerations are key to desirable pump performance. Minimize head loss by assuring sufficient pipe size (especially important for highly viscous services). Generally the same size pipe as the pump ports is sufficient. Suction plumbing and connections should be designed to avoid temperature variations. Contact the motor manufacturer for specific motor storage information.

**Site Preparation**

Choose a site that allows easy access to the pump for maintenance. Consider protection from the elements. Guard against drips and spray from nearby equipment. Choose a solid foundation for mounting. If noise is a concern, consider a rubber pad under the pump base to dampen.

**Maintenance**

- New Pump Receipt Inspection
- Records
- Troubleshooting Matrix

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OBERDORFER PUMPS

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