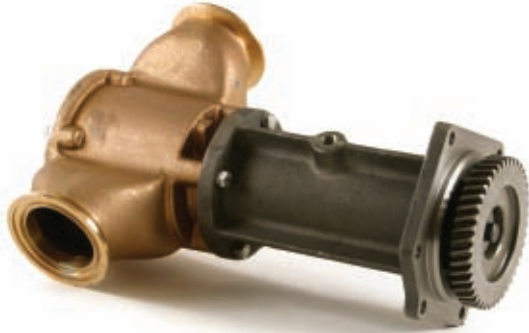




The Original Engine Cooling Pump Since 1921

## 22000 Pump Series Technical Guide

### Identification

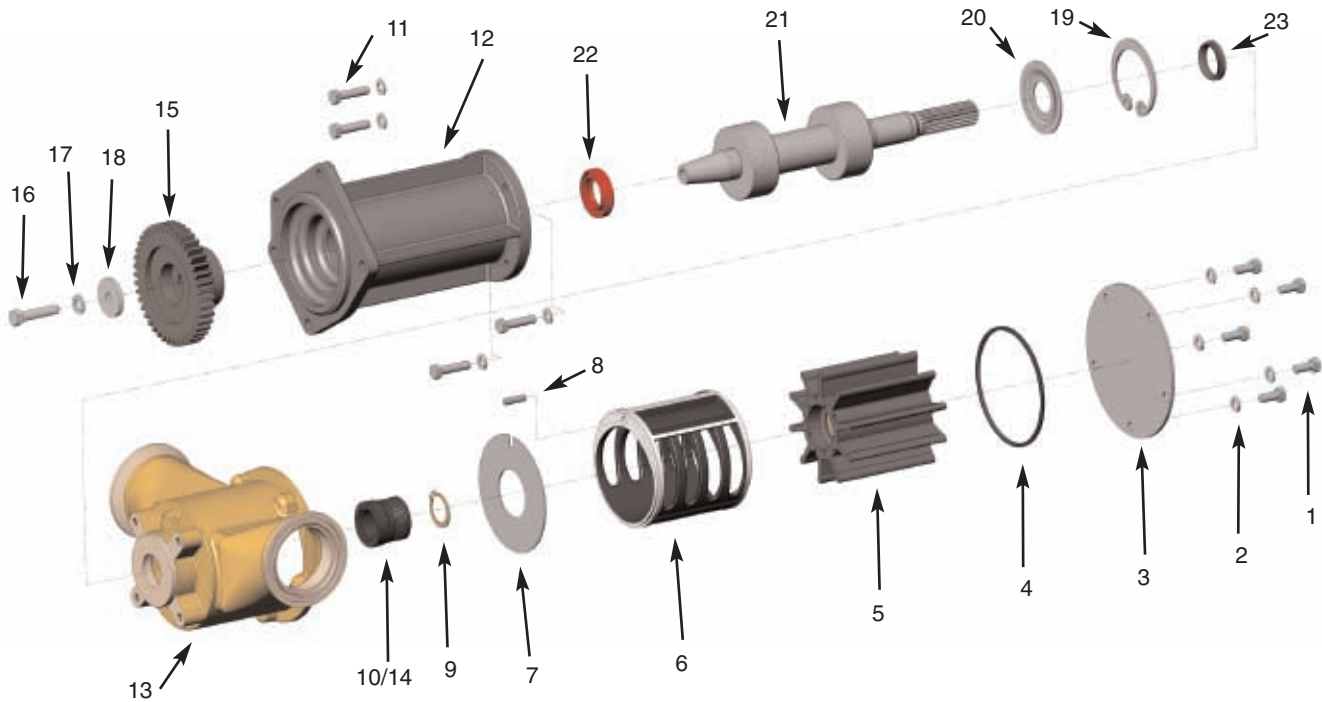


**G2201 and G22011**



**G22012 and G22012X**

# Assembly / Disassembly Instructions



The following assembly/disassembly procedures apply to all G22000 Series pumps. Pump numbers can be found stamped into the cover plate of the pump.

## Disassembly

- A. Remove the bolts (1) and lockwashers (2) from the cover (3).
- B. Remove the cover and quad ring (4). Note the direction of the impeller blades to ensure proper replacement of the impeller during the assembly procedure. The impeller (5) can be removed with impeller puller 23631 or a 3/4"- 16 bolt (by screwing the bolt into the threaded impeller, the impeller is jacked out of the pump).
- Caution:** The pin (8) might fall out from its place when removing the cam.
- C. The cam (6), cam anti-rotation pin, and wearplate (7) can be removed.
- D. Using external snap ring pliers, remove the retaining ring (9) from the shaft.
- E. Slide the mechanical seal (10) off of the shaft.
- F. Remove the bolts (11) and lockwashers holding the body (12) to the housing (13).
- G. Slide the housing off of the shaft and body assembly.
- H. Press the seal seat (14) out of the housing.
- I. When applicable, remove the drive gear assembly: while supporting the drive gear (15), remove the bolt (16), lockwasher (17) and thrust washer (18) from the shaft. Pull the gear off of the tapered shaft using a bearing or wheel puller.
- J. Using internal snap ring pliers, remove the retaining ring (19) from the body. For the G22012-01 and G22012X, remove the bearing shield (20) from the body.
- K. Press the bearing and shaft assembly (21) out of the body.
- L. Remove the lip seal (22) from the body.
- M. Inspect the shaft for grooving of the lip seal area and heavy fretting of the spline portion that drives the impeller. Inspect the bearings for loss of grease, corrosion and rough rotation. If the shaft or bearings exhibit such a wear, replace the entire shaft and bearing assembly (21) listed on page 3.

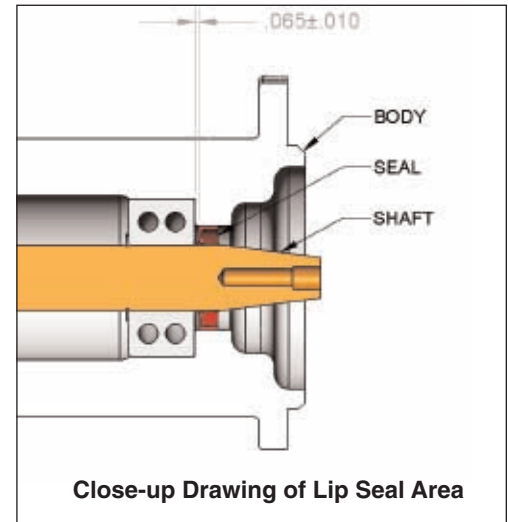
**Warning:** Do not try to build the shaft and bearing assembly from the individual parts, but instead purchase the entire shaft and bearing assembly listed on page 3. Due to tight tolerances, special assembly procedures for this assembly must be followed to prevent galling of the shaft in the lip seal area.

# Assembly / Disassembly Instructions (continued)

## Assembly

- A. The lip seal (22) should be pressed in the body (12) with the metal backing ring of the lip seal toward the housing (13) and away from the engine.

**Caution:** For the G22012-01 and G22012X, when pressing the lip seal in the body from the impeller end, the lip seal should be pressed 0.065" plus/minus 0.010" past the furthest bearing location. See detailed illustration. This position is critical to the performance of the oil seal since it needs to be placed slightly further than the bearing, but not as far as the beginning of the taper. Failure to place the seal at this location will cause the lip seal to contact the tapered portion of the shaft which will cause premature lip seal wear. Care should also be taken to ensure proper alignment of the lip seal to the pump body and that the lip seal is uniformly pressed to prevent distortion.



- B. Press the shaft and bearing assembly (21) into the pump body. For the G22012-01 and G22012X, ensure that the lip seal will not wear on the tapered portion of the shaft (see Caution above). Replace the slinger (23) on the shaft between the mechanical seal position and the bearings.
- C. For the G22012-01 and G22012X, slide the bearing shield (20) into the pump body and against the inner bearing.
- D. Using internal snap ring pliers, install the retaining ring (19) into the body.
- E. Press the mechanical seal seat (14) into the housing (13) with the gray silicon carbide face toward the impeller. Lubricate the outside of the seat boot with a water soluble lubricant or soapy water for easier assembly. Oil or grease must not be used as it will prevent the rubber cup assembly from properly gripping the housing. The seat should be inspected to ensure that the cup did not become partially dislodged during the assembly procedure.
- F. Slide the housing over the shaft and body assembly. Fasten the four bolts (11) and lockwashers, and torque them to 12-16 ft-lbs.
- G. Replace the drive gear assembly. Slide the gear (15) on the shaft. Place the thrust washer (18) on the gear and against the shaft. Place the lockwasher (17) on the bolt (16), and then apply Loctite #262 or equivalent to the bolt. Fasten the bolt to the shaft and torque it to 36 ft-lbs.
- H. Lubricate the internal rubber portion of the mechanical seal (10) with a water soluble lubricant or soapy water and slide the seal onto the shaft with the silicon carbide portion of the mechanical seal toward the seal seat. Oil or grease must not be used as it will prevent the mechanical seal from properly gripping the shaft.
- I. Using external snap ring pliers, replace the retaining ring (9) on the shaft.
- J. Install the pin (8) into the housing.
- K. Install the wear plate (7) with the hole in the plate aligned with the pin in the housing.
- L. Place the cam (6) in the housing. Align the hole in the cam with the pin in the housing and ensure the anti-rotation pin is in place after the cam is fully installed.
- M. Insert the impeller (5) in the housing using a twisting motion. Ensure that the impeller blades are bent in the same direction as upon removal (counterclockwise when viewed from the cover). For ease of installation, apply a silicon lubricant to the impeller.

**Caution:** DO NOT USE A PETROLEUM-BASED LUBRICANT (petroleum product will cause damage to the impeller).

- N. Insert the quad ring (4) into the groove, install the cover (3) on the housing, and then fasten the lockwashers (2) and bolts (1). Torque the cover bolts to 5-8 ft-lbs.
- O. After installation, inspect the seal, body, housing and cover for leaks.

# Assembly / Disassembly Instructions (continued)

| Sherwood # |                         | G2201 | G22011-01 | G22012-01 | G22012X |       |
|------------|-------------------------|-------|-----------|-----------|---------|-------|
| Item       | QTY                     |       |           |           |         |       |
| 1          | Cap Screw               | 5     | 19626     | 19626     | 19626   | 19626 |
| 2          | Lockwasher              | 9     | 15944     | 15944     | 15944   | 15944 |
| 3          | Cover Plate             | 1     | 23113     | 23113     | 23113   | 23113 |
| 4          | Quad Ring               | 1     | 23111     | 23111     | 23111   | 23111 |
| 5          | Impeller                | 1     | 22000     | 22000     | 22000   | 22000 |
| 6          | Cam                     | 1     | 24160     | 24160     | 24160   | 24160 |
| 7          | Wear Plate              | 1     | 23112     | 23112     | 23112   | 23112 |
| 8          | Pin                     | 1     | 21566     | 21566     | 21566   | 21566 |
| 9          | Retaining Ring          | 1     | 23115     | 23115     | 23115   | 23115 |
| 10/14      | Mechanical Seal Assy.   | 1     | 23087     | 23906     | 23906   | 23906 |
| 11         | Bolt                    | 4     | 23211     | 23211     | 23211   | 23211 |
| 12         | Body                    | 1     | 23056     | 23056     | 23919   | 23919 |
| 13         | Housing                 | 1     | 23057     | 24229     | 24159   | 24159 |
| 15         | Gear                    | 1     | 23181     | 23181     | 23181   | 23181 |
| 16         | Bolt                    | 1     | 23194     | 23194     | 23194   | 23194 |
| 17         | Lockwasher              | 1     | 23196     | 23196     | 23196   | 23196 |
| 18         | Thrust Washer           | 1     | 23195     | 23195     | 23195   | 23195 |
| 19         | Retaining Ring          | 1     | 23091     | 23091     | 23091   | 23091 |
| 20         | Bearing Shield          | 1     |           |           | 23922   | 23922 |
| 21         | Bearing and Shaft Assy. | 1     | 24464     | 24464     | 24465   | 24465 |
| 22         | Lip Seal                | 1     | 23088     | 23088     | 23088   | 23088 |
| 23         | Slinger                 | 1     |           |           | 23924   | 23924 |
|            | Minor Repair Kit        |       | 24870     | 24870     | 24870   | 24870 |
|            | Major Repair Kit        |       | 24872     | 24872     | 24872   | 24872 |

# Preventative Maintenance

*The #1 reason for premature engine wear is overheating. To maintain engine performance, insist upon genuine Sherwood impellers and service kits.*

| Maintenance Schedule | Pleasure Boating<br>(Low Hours) |   | Commercial/Fishing Use<br>(High Hours) |   |
|----------------------|---------------------------------|---|--|---|
|                      | Light Duty                      | Severe Duty<br>(High RPM, Silt or Sand) | Heavy Duty                             | Severe Duty<br>(High RPM, Silt or Sand) |
| Impeller Kit         | Every year                      | 6 months                                | 6 months                               | 3 months                                |
| Minor Kit            | 2 years                         | Every year                              | Every year                             | 6 months                                |
| Major Kit            | 4 years                         | 2 years                                 | 2 years                                | Every year                              |

|           | Impeller Kit<br>22000K | Minor Kit<br>24870      | Major Kit<br>24872      |
|-----------|------------------------|-------------------------|-------------------------|
|           | 1-22000 Impeller       | 1-22000 Impeller        | 1-22000 Impeller        |
|           | 1-21566 Pin            | 1-21566 Pin             | 1-21566 Pin             |
|           | 1-23111 Quad Ring      | 1-23111 Quad Ring       | 1-23088 Lip Seal        |
|           |                        | 1-23115 Snap Ring       | 1-23091 Snap Ring       |
|           |                        | 1-23906 Mechanical Seal | 1-23111 Quad Ring       |
|           |                        |                         | 1-23112 Wear Plate      |
|           |                        |                         | 1-23113 Cover Plate     |
|           |                        |                         | 1-23115 Snap Ring       |
|           |                        |                         | 1-23194 Bolt            |
|           |                        |                         | 1-23196 Lockwasher      |
|           |                        |                         | 1-23195 Thrust Washer   |
|           |                        |                         | 1-23906 Mechanical Seal |
|           |                        |                         | 1-23922 Bearing Shield  |
|           |                        |                         | 1-24160 Cam             |
| G2201     | X                      | X                       | X                       |
| G22011-01 | X                      | X                       | X                       |
| G22012-01 | X                      | X                       | X                       |
| G22012X   | X                      | X                       | X                       |

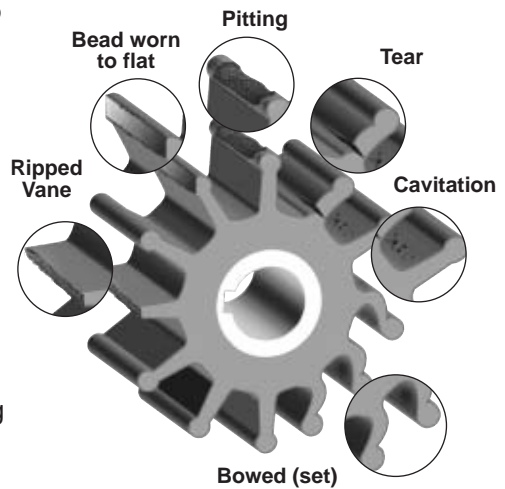
# Inspection

*The #1 reason for premature engine wear is overheating.*

*To maintain engine performance, insist upon genuine Sherwood impellers and service kits.*

## Recommended inspection to be performed at any service interval:

|                 |  |
|-----------------|--|
| Impeller        | Inspect for cracks or tears. Also, inspect for excessive abrasion of vane ends.<br>Replace annually or if any of the conditions exist, as in the picture below.*                 |
| Wear Plate      | Inspect for wear, flatness and pin for fatigue. Replace at major pump rebuild or if wear is evident to maintain pump flow and suction performance.                               |
| Cam             | Replace at major pump rebuild or if pitting/wear is evident.   |
| Cover           | Replace at major pump rebuild or if wear exists to maintain pump flow and suction performance.   |
| Mechanical Seal | Replace at minor and major pump rebuild or if leaking.   |
| Lip Seal        | Replace at major pump rebuild or if leaking.   |
| Shaft           | Inspect for wear in area of lip seal and rubber impeller. Grooving of lip seal area or heavy fretting of the impeller end shaft will require shaft/bearing assembly replacement. |
| Bearing         | Inspect for loss of grease, corrosion or rough rotation. Replace the entire shaft and bearing assembly if these conditions exist or if the bearing integrity is in doubt.        |



## Genuine Sherwood Tech Tips

To maintain best engine performance and to prolong engine life - replace your impeller annually\*. Three tips to help you install your new impeller:

- Use a non-petroleum based lubricant (silicon or soapy water) to help slide the impeller into the housing.
- Install the impeller with a twisting motion onto the shaft. Never force an impeller onto the shaft. The impeller must be able to move freely on the shaft to properly prime and function.
- Use a small amount of non-petroleum based lubricant to help hold the o-ring when replacing the cover.

Proper storage of the impellers during a prolonged lay-up can help maintain the life of the impeller. Remove the impeller from the housing and store in a cool, dark place. This will avoid the following:

- Copper bonding of the impeller to the housing
- Vanes "setting" into position as stored in the housing
- Ultraviolet deterioration

\* See Maintenance Schedule on page 5