



The Original Engine Cooling Pump Since 1921

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## 29000 Pump Series Technical Guide

### Identification



G2904-01, G2904X

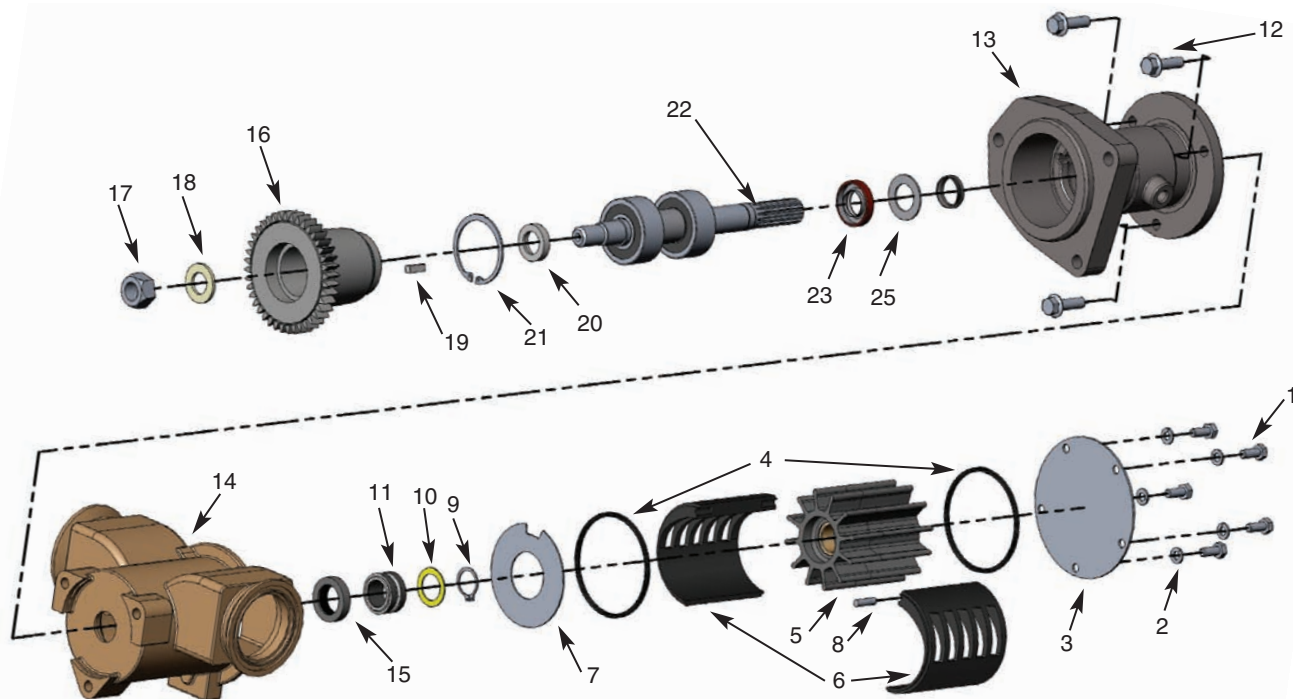


G2902-01, G2902X



G2903-01, G2903-02, G2903X

# Assembly / Disassembly Instructions



The following assembly/disassembly procedures apply to all 29000 Series pumps. Deviations from pump to pump are primarily a result of different methods of drive and mounting. 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, quad rings (4), impeller (5), cam liner halves (6), and wearplate (7). Note the direction of the impeller blades to ensure proper replacement of the impeller during the assembly procedure. Caution: the pin (8) might fall out from its place between the cam liner halves.
- C. Using external snap ring pliers, remove the retaining ring (9) from the shaft.
- D. Slide the washer (10) and mechanical seal (11) off of the shaft.
- E. Remove the bolts (12) holding the body (13) to the housing (14).
- F. Slide the housing off of the shaft and body assembly.
- G. Press the seal seat (15) out of the housing.
- H. When applicable remove the drive gear assembly: while supporting the drive gear (16), remove the nut (17), nut washer (18), and key (19) from the shaft. Slide the gear off of the shaft and remove the thrust washer (20) behind the gear.
- I. Using internal snap ring pliers, remove the retaining ring (21) from the body. Remove the bearing shield (24) from the body.
- J. Press the bearing and shaft assembly (22) out of the body.
- K. Remove the lip seal (23) and washer (25) from the body.
- L. 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 (22) listed on page 4.

**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 below. Due to extremely tight tolerances, special assembly procedures for this assembly must be followed to prevent galling of the shaft in the lip seal area.

## Assembly:

- A. Replace the washer (25) then press the lip seal (23) into the pump body (13) with the metal backing ring of the lip seal toward the housing (14) and away from the engine. Care should be taken to insure 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 (22) into the pump body.
- C. Slide the bearing shield (24) into the pump body and against the inner bearing.
- D. Using internal snap ring pliers, install the retaining ring (21) into the body.

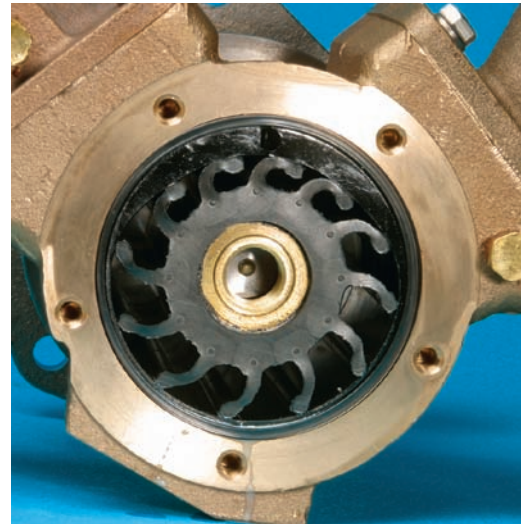
## Assembly / Disassembly Instructions (continued)

- E. Press the mechanical seal seat (15) into the housing 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. Apply Loctite #262 or equivalent to the bolt threads. Fasten the three bolts (12) and torque them to 25 ft-lbs.
- G. When applicable, replace the drive gear assembly. Slide the thrust washer (20) onto the outer bearing. Place the key (19) in the shaft, then slide the gear (16) on the shaft. Apply Loctite #262 or equivalent to the shaft threads. Replace the washer (18), then tighten the nut (17) onto the shaft for the G2902-01 and G2902X. While supporting the drive gear, torque the nut to 270 ft-lbs
- H. Lubricate the inter rubber portion of the mechanical seal (11) 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. Place the washer (10) onto the shaft and against the mechanical seal and then using external snap ring pliers, install the retaining ring (9) into the groove in the shaft to compress the mechanical seal.
- J. Install the wearplate (7) with the hole in the plate lined up with the slot in the housing. Install the quad ring (4) into the housing and on top of the wearplate.
- K. Create the cam assembly by connecting the cam halves (6) together and installing the pin (8) into the cam liner. A dab of grease can be used to hold the pin in place during installation. Place the cam assembly into the housing, ensuring that the pin aligns with the slot in the housing.
- L. 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 (dependent on the pump model – see illustration below for details). 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).



Vanes flipped to the left  
(viewed from cover).

**Models:** G2902-01, G2902X, G2903-01,  
G2903-02, G2903X



Vanes flipped to the right  
(viewed from cover).

**Models:** G2904-01, G2904X

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

# Assembly / Disassembly Instructions (continued)

Sherwood #			G2902-01	G2902X	G2903-01	G2903-02	G2903X	G2904-01	G2904X
Item		QTY							
1	Cap Screw	5	19626-SHW	19626-SHW	19626-SHW	19626-SHW	19626-SHW	19626-SHW	19626-SHW
2	Lockwasher	5	15944-SHW	15944-SHW	15944-SHW	15944-SHW	15944-SHW	15944-SHW	15944-SHW
3	Cover Plate	1	19837-SHW	19837-SHW	19837-SHW	19837-SHW	19837-SHW	19837-SHW	19837-SHW
4	Quad Ring	2	21561-SHW	21561-SHW	21561-SHW	21561-SHW	21561-SHW	21561-SHW	21561-SHW
5	Impeller	1	29000-SHW	29000-SHW	29000-SHW	29000-SHW	29000-SHW	29000-SHW	29000-SHW
6	Cam Liner Halves	2	21533-SHW	21533-SHW	21106-SHW	21106-SHW	21106-SHW	21106-SHW	21106-SHW
7	Wear Plate	1	19836-SHW	19836-SHW	19836-SHW	19836-SHW	19836-SHW	19836-SHW	19836-SHW
8	Pin	1	21566-SHW	21566-SHW	21566-SHW	21566-SHW	21566-SHW	21566-SHW	21566-SHW
9	Retaining Ring	2	19762-SHW	19762-SHW	19762-SHW	19762-SHW	19762-SHW	19762-SHW	19762-SHW
10	Washer	1	19866-SHW	19866-SHW	19866-SHW	19866-SHW	19866-SHW	19866-SHW	19866-SHW
11/15	Mechanical Seal Assy.	1	23837-SHW	23837-SHW	24511-SHW	24511-SHW	24511-SHW	23837-SHW	23837-SHW
12	Bolt	3	21172-SHW	21172-SHW	21172-SHW	21172-SHW	21172-SHW	21172-SHW	21172-SHW
13	Body	1	23916-SHW	23916-SHW	23396-SHW	23396-SHW	23396-SHW	21827-SHW	21827-SHW
14	Housing	1	24623-SHW	24623-SHW	23523-SHW	23523-SHW	23523-SHW	21829-SHW	21829-SHW
16	Gear	1	22789-SHW	22789-SHW					
17	Nut	1	22790-SHW	22790-SHW					
18	Washer	1	22788-SHW	22788-SHW					
19	Keyr	1	22791-SHW	22791-SHW					
20	Gear Spacer	1	23926-SHW	23926-SHW					
21	Retianing Ring	1	19867-SHW	19867-SHW	19867-SHW	19867-SHW	19867-SHW	19867-SHW	19867-SHW
22	Bearing and Shaft Assy.	1	25145-SHW	25145-SHW	25103-SHW	25103-SHW	25103-SHW	25112-SHW	25112-SHW
23	Lip Seal	1	23045-SHW	23045-SHW	23045-SHW	23045-SHW	23045-SHW	19869-SHW	19869-SHW
24	Bearing Shield	1	23425-SHW	23425-SHW	23425-SHW	23425-SHW	23425-SHW		
	Minor Repair Kit		25146-SHW	25146-SHW	25044-SHW	25044-SHW	25044-SHW	25146-SHW	25146-SHW
	Major Repair Kit		25147-SHW	25147-SHW	25045-SHW	25045-SHW	25045-SHW	25148-SHW	25148-SHW

# Impeller Removal

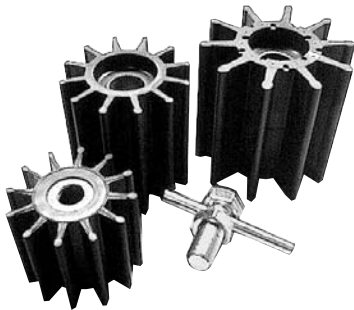
## 29000 Impeller & Impeller Puller

The patented 18000 impeller with threaded insert makes replacement easy when using the inexpensive Sherwood Impeller Puller (Model #23631).



### Removal

- Remove the cover.
- Insert the Sherwood puller into the threaded insert.
- Screw the puller against the shaft lifting the impeller until loose.
- Twist and pull the impeller out of the pump.



### Installation

- Apply a non-petroleum based lubricant to impeller (i.e. silicon or soapy water).
- Install the impeller with a twisting motion onto the shaft.
- Option: Use puller tool to push impeller into pump by loosening and lowering nut until tightening against impeller insert occurs, then turning for installation.
- Then use a small amount of non-petroleum based lubricant to help hold the o-ring in place while replacing the cover.

*Use the same puller (#23631 or 25105) for the 17000, 18000, 22000, 26000, 30000 impeller as well.*

# Preventative Maintenance

Maintenance Schedule	Pleasure Boating (Low Hours)		Commercial/Fishing Use (High Hours)	
	Light Duty	Severe Duty <small>(High RPM, Silt or Sand)</small>	Heavy Duty	Severe Duty <small>(High RPM, Silt or Sand)</small>
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

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

	Impeller Kit 29000K	Minor Kit 25146	Minor Kit 25044	Major Kit 25147	Major Kit 25045	Major Kit 25148
	29000-SHW Impeller	29000-SHW Impeller	29000-SHW Impeller	29000-SHW Impeller	29000-SHW Impeller	29000-SHW Impeller
	21561-SHW Quad Ring	21561-SHW Quad Ring	21561-SHW Quad Ring	21561-SHW (2) Quad Ring	21561-SHW (2) Quad Ring	21561-SHW Quad Ring
	21566-SHW Pin	21566-SHW Pin	21566-SHW Pin	21566-SHW Pin	21566-SHW Pin	1-21566-SHW Pin
		19762-SHW Snap Ring	19762-SHW Snap Ring	19762-SHW Snap Ring	19762-SHW Snap Ring	19762-SHW Snap Ring
		19866-SHW Washer	19866-SHW Washer	19866-SHW Washer	19866-SHW Washer	19866-SHW Washer
		223837-SHW Seal Assy.	24511-SHW Seal Assy.	23837-SHW Seal Assy.	24511-SHW Seal Assy.	23837-SHW Seal Assy.
			1720-0212-SHW O-ring	19836-SHW Wear Plate	1720-0212-SHW O-ring	19835-SHW Washer
			1720-0213-SHW O-ring	19837-SHW Cover	1720-0213-SHW O-ring	19836-SHW Wear Plate
			19836-SHW Wear Plate	21533-SHW (2) Cam Halves	19836-SHW Wear Plate	19837-SHW Cover
			19837-SHW Cover	19867-SHW Snap Ring	19837-SHW Cover	21106-SHW (2) Cam Halves
			21106-SHW (2) Cam Halves	19868-SHW Slinger	21106-SHW (2) Cam Halves	19867-SHW Snap Ring
				22788-SHW Washer	19867-SHW Snap Ring	19868-SHW Slinger
				22790-SHW Nut	19868-SHW Slinger	19869-SHW Lip Seal
				22791-SHW Key	23045-SHW Lip Seal	
				23045-SHW Lip Seal	23425-SHW Sheild	
				23425-SHW Sheild	25103-SHW Shaft/Bearing Assy	
				23926-SHW Gear Spacer		
G2902-01	X	X		X		
G2902X	X	X		X		
G2903-01	X		X		X	
G2903-02	X		X		X	
G2903X	X		X		X	
G2904-01	X	X				X
G2904X	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.  
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 minor or major pump rebuild or if pitting/wear is evident.

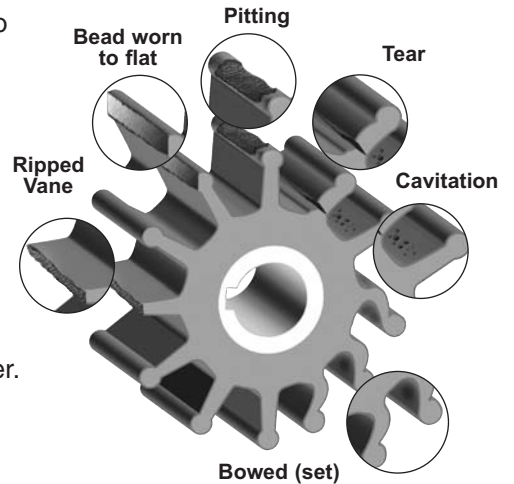
Cover . . . . . Replace at major pump rebuild or if wear exists to maintain pump flow and suction performance.

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 replacement.

Bearing . . . . . Inspect for loss of grease, corrosion or rough rotation.  
Replace at major pump rebuild as the entire shaft and bearing assembly (see page 4 for proper assembly number).



## 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 6



1/11 Rev. A  
Form L-3062



**Pentair**

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