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17000 Pump Series Technical Guide

Identification



**P1710A, P1710C,
P1710X, P1726X, P1732A,
P1732C, P1732X**



**P1716A, P1716C,
P1716X, P1722A, P1722C,
P1722X, P173**



P1719X

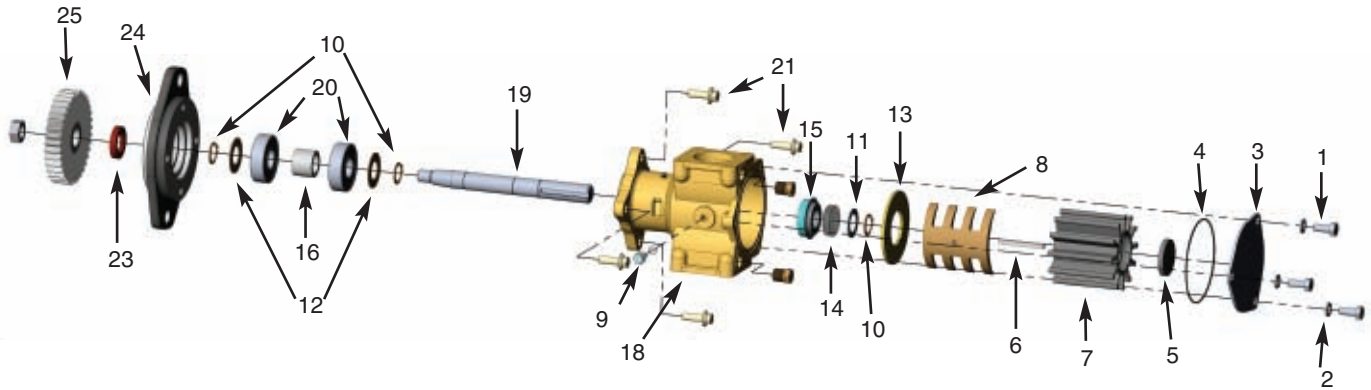


**P1727A, P1727C,
P1727X, P1730A, P1730C,
P1730X, P1731, P1733X**



P176X

Assembly / Disassembly Instructions



The following assembly/disassembly procedures apply to all 17000 Series pumps. Deviations from pump to pump are primarily a result of different methods of drive and mounting. Pump model numbers can be found stamped into the cover plate of the pump.

Disassembly:

- A. Remove the three bolts (1) and lock washers (2) from the pump cover (3). The cover and o-ring (4) are now free. The impeller end cap (5) can be pried off with a screwdriver. Normally, impellers (7) can be removed by using the 23631 or 25105 impeller puller (3/4" – 16 bolt) for the 17000 threaded impeller or by using two pair of pliers to grip two of the impeller's vanes on opposite sides of the impeller. A penetrating lubricant will help loosen a stuck impeller. Also, rotating the shaft by hand may help free the impeller. The 3/16" key (6) will also be removed at this time.
- B. Remove any pulleys or drive gears (25) from the drive shaft. For tapered shaft models (all models except P173 and P1719), it is necessary to remove the shaft nut and pull the gear or pulley with a puller. For models with pressed on gears (P173), two threaded holes are provided in the gear. An appropriate puller may be attached to these two holes to remove the gear from the shaft.
- C. Most models will be equipped with a flange adapter (24). The flange adapter is held to the pump body by two socket head cap screws (21), either 3/8" or 10mm, depending on the model. The screws are removed by using a hex socket wrench. More current models are mounted with four 8mm flange hex head bolts. The adapter is then removed. If the lip seal (23) in the adapter requires replacing, it can be pressed out at this time.
- D. The cam (8) and cam screw (9) are removed. The internal wear plate (13) will drop out. The retaining ring (10), washer (11) and seal seat (14) are then removed. Pump models P1710C, P1716C, P1722C, P1727C, P1730C, P1732C, and P17XX-04 do not utilize this retaining ring and washer. For these pumps, the seal seat can be removed in step F below.
- E. From the ball bearing end, the internal snap ring (17) must be removed on models P171 through P176, P1710 and P1732. All other models have extended bearing assemblies and are held together by means of the flanged adapter.
- F. The shaft/bearing assembly (19) is pressed out of the body from the impeller end of the housing and removed from the engine end of the pump. For pump models P1710C, P1716C, P1722C, P1727C, P1730C, P1732C, and P17XX-04, the seal seat will press off of the shaft when the shaft is forced out of the pump.
- G. On earlier models, the two external snap rings (10) are removed from the shaft (19) along with the bearing washers (12), permitting removal of bearings (20). More recent designs do not utilize the bearing washers, and they have one retaining ring in-between the ball bearings. The mechanical seal (15) may now be removed by pressing it out from the bearing side of the housing (18).

Warning: If a shaft/bearing assembly exists for the particular model that is being repaired, do not try to build the shaft/bearing assembly from the individual parts, but instead purchase the entire assembly. Due to extremely tight tolerances, special assembly procedures for this assembly must be followed to prevent galling and subsequent leakage in the oil seal area of the pump.

Reassembly:

- A. Press mechanical seal (15) into housing (18), using the seal pusher provided in the 25115 seal kit if applicable, with the grey silicon carbide or black carbon seal face toward the impeller.
- B. On all older model pumps with mounting adapters, the lip seal (23) will have to be replaced prior to replacing the flange adapter (24). Care should be taken to ensure proper alignment of the lip seal to the adapter and that the lip seal is uniformly pressed to prevent distortion. The metal backing ring of the lip seal goes toward the pump and away from the engine.
- C. Skip this step if the entire shaft/bearing assembly is available for the particular model that is being repaired. Install external snap ring (10) on shaft (19). Next, place washer (12), bearing (20), bearing spacer (16), second bearing (20) and washer (12) and secure with the second external snap ring (10). The bearings will have to be pressed on from the pulley/gear end. Note that it is extremely important to properly align the bearings to the shaft prior to the press, otherwise the possibility exists of galling the shaft in the area of the lip seal.

Assembly / Disassembly Instructions (continued)

Warning: The new 25119 and 25120 shaft and bearing assemblies can only be used with the 25115 mechanical seal kit which utilizes a pressed on seal seat. This seal is an upgrade over the standard mechanical seal. Attempting to use the 15955 or 23799 mechanical seal with the 25119 or 25120 shaft bearing assembly or in a standard P1700 pump will damage the seal and cause a shaft leak. The 25115 mechanical seal kit CANNOT be used on the standard P1700 shaft due to the design. The 25115 mechanical seal kit can only be used in either a P1710C, P1716C, P1722C, P1727C, P1730C, P1732C, or P17XX-04 pump or with a P1700 series pump that has been upgraded with the 25119 or 25120 shaft and bearing assembly. Attempting to use the 25115 mechanical seal on an older shaft design will damage the shaft and mechanical seal which will cause a seal leak.

Note: The 25119 and 25120 shaft and bearing assemblies can be identified by the indentation machined into the shaft on the impeller end, the slightly undercut shaft in the key area which allows the seal seat to slide down the shaft to within 3/8" of the mechanical seal on the 25120, or the use of a plunged key on the 25119, or the lack of a snap ring groove between the impeller and the bearing closest to the impeller. These features are all absent on older shaft bearing versions of the shaft.

- D. Press the bearing and shaft assembly into the housing (18). In applicable pump models, replace the internal snap ring (17). The use of Loctite #262 or equivalent is recommended on the adapter bolts. The adapter (24) may be reassembled to the pump housing (18) at this time with two or four bolts (21) as applicable. Torque the adapter bolts to 18 ft-lbs.
- E. The seal seat (14) is now installed from the impeller end of the housing. The grey silicon carbide or white ceramic seat should be placed against the grey silicon carbide or black carbon seal face of the mechanical seal (15). **Caution:** Care must be taken to remove all burrs, salt buildup, and other corrosion from the keyway and seal seat area to prevent cutting the rubber cup or galling the 25115 metal seal sleeve.
1. When installing the 25115 seat with the metal sleeve (see the Warning and Note above), use the seal installation tool provided in the mechanical seal, minor and major kits, to press the seal seat (14) to the correct position on the shaft. Place the seal seat in the seal installation tool with the grey silicon carbide face away from the tool and the metal backing cup inside the tool. Slide the seal seat and tool over the shaft from the impeller end of the pump. The seal seat is pressed onto the shaft until the seal installation tool contacts the metal edge of the mechanical seal case. This metal to plastic contact between the seal edge and the plastic seal installation tool ensures the proper seal compression. The press holds the seat in place; no snap ring is used in this design.
 2. When installing the ceramic and rubber boot, a pusher should be used with a diameter only slightly greater than the shaft diameter (.80"). Soapy water or a lubricant from a seal manufacturer may be used in assembly. Oil or grease must not be used as it will prevent the rubber cup from properly gripping the shaft. The seat and cup are pressed just beyond the external/snap ring groove. The seat should be inspected to ensure that the cup did not become partially dislodged during the press procedure. The washer (11) and external snap ring (10) are then installed.
- F. The internal wear plate (13) is dropped in place, anti-rotation pin aligned with the cast slot in the bottom of the housing. The cam (8) is reinstalled and secured with the cam screw (9) and cam screw o-ring. Older model cam screws were sealed by means of a nylon washer requiring Permatex or other sealant to seal the cam screw. The cam screw should be inspected to ensure that it does not protrude below the cam. This condition is possible if the nylon seal is badly deformed or if a substitute screw is used. Should the screw protrude beneath the cam, replace it with a new screw, or grind flush. Failure to do so will result in immediate impeller damage.
- G. At this time, if applicable, press on any gears (25), pulleys, or hubs onto the shaft. While pressing on the drive mechanism, the shaft (19) must be securely supported from the impeller end and in line with the press. Failure to do so will result in either damaged bearings and/or a canted gear with excessive run out. For the base model pumps P1716, P1722, P1727, P1730 and P1731, replace the tapered gear and gear nut on the shaft. Use Loctite #262 on the gear threads and torque the nut to 50 ft-lbs. For all other tapered gear and shaft assemblies, see the applicable engine manufacturers' requirements for thread sealant and torque specifications.
- H. Install the plunged key into the shaft for pumps P1710C, P1732C, and equivalent P17XX-04 designs without the thru-key.
Note: The 1-1/2" key in the 17000K impeller kit is the plunged key.
- I. Install the impeller (7) using a non-petroleum based lubricant such as silicon or soapy water. **Note:** Do not use petroleum-based fluids as they will damage the impeller. The impeller is installed using a twisting motion. Ensure the impeller blades are bent in the same direction as upon removal. Once installed, rotate the shaft to align keyway and slide the key (6) in place (not applicable for the plunged key designs P1710C, P1732C, and equivalent P17XX-04). **Note:** The 2" key found in the 17000K is used in all models other than the designs P1710C, P1732C, and equivalent P17XX-04. Cover the key hole in the impeller insert with the rubber end plug (5). **Caution:** Failure to place the plug in place on the 17000A impeller will cause the key to walk out of the shaft keyway and damage the cover. The 17000 impeller requires that the key be placed on the shaft prior to installation.
- J. Replace the cover o-ring (4), cover (3), lock washers (2), and the cover cap screws (1). Torque the cap screws to 14 ft-lbs.
Note: If the cover is replaced with a new one, record the information on the original cover to help identify the pump for future repairs and maintenance.
- K. After installation, inspect the pump seal, lip seal, body, housing, and cam areas for leaks.

Assembly / Disassembly Instructions (continued)

Sherwood #			P176X	P1710A*	P1710C	P1716A**	P1716C	P1719X	P1722A**	P1722C	P1726X
			P176	P1710	P1710-04	P1716B-01	P1716-04	P1719	P1722B-01	P1722-04	P1726
			P176-02	P1710-02		P1716B-02		P1719-01	P1722B-02		
				P1710X		P1716X		P1719F-01	P1722X		
Item	QTY										
1	Cap Screw	3	16029	19626	19626	19626	19626	19626	19626	19626	19626
2	Lockwasher	3	15944	15944	15944	15944	15944	15944	15944	15944	15944
3	Cover Plate	1	18742	18742	18742	18742	18742	18742	18742	18742	18742
4	O-ring	1	15945	15945	15945	15945	15945	15945	15945	15945	15945
5	Impeller Cap	1	24626	24626	24626	24626	24626	24626	24626	24626	24626
6	Key	1	19667	19667	25152	19667	19667	19667	19667	19667	19667
7	Impeller	1	17000	17000	17000	17000	17000	17000	17000	17000	17000
8	Cam	1	18271	18271	18271	18271	18271	18271	18271	18271	18271
9	Cam Screw	1	10515	19714	19714	19714	19714	19714	19714	19714	19714
10	Retaining Ring (Ext)	1/2/3	15952	15952		15952		15952	15952		15952
11	Washer	1	15959	15959		15959		15959	15959		15959
12	Washer	2	19614					19614			
13	Wear Plate-Pin Assy	1	18441	18441	24162	18441	18441	18441	18441	18441	18441
14/15	Water Seal/Seat Assy	1	15955	15955	25115	15955	25115	15955	15955	25115	15955
16	Spacer	1	15940					19615			
17	Retaining Ring (Int)	1	15942	15942	15942						15942
18	Housing	1	19015	24161	24161	19630	19630	24409	19630	19630	24161
19	Shaft	1	19620					19345			
19	Shaft/Bearing Assy	1		25119	25119	25120	25120		25120	25120	25119
20	Ball Bearing	2	15951					15951			
21	Adaptor Bolts	4		19708	19708	19708	19708	19708	19708	19708	19708
23	Oil Lip Seal	1		21776	21776	19674	24250	19674	19674	24250	21776
24	Adaptor	1		19699	19699	19727	19727	19700	19955	19955	19699
	Gear Assy/Hub	1				22495	22495		22495	22495	
	Cam Screw O-ring	1		19712	19712	19712	19712	19712	19712	19712	19712
	Gear Nut	1				19730	19730		19730	19730	
	Adaptor Gasket	1				21570	21570		21570	21570	
	Flanged Port O-rings	2									
	Flanged Port Bolts	8									
	Slinger	1		24156	24156	24156	24156		24156	24156	24156
	Minor Repair Kit		23973	23973	25123	23972	25124	23972	23972	25124	23973
	Major Repair Kit		23975	25121	25121	25122	25122	23974	25122	25122	25121

Sherwood #			P1727A***	P1727C	P1730A**	P1730C	P1731	P1731-04	P1732A*	P1732C	P1733X
			P1727FB	P1727-04	P1730-01	P1730-04	P1731-01		P1732-01	P1732-04	P1733F-01
			P1727FB-01		P1730-02	P1730F-04	P1731F-02		P1732-02		
			P1727FB-02		P1730F-01				P1732X		
			P1727X		P1730F-02						
					P1730X						
Item	QTY										
1	Cap Screw	3	19626	19626	19626	19626	19626	19626	19626	19626	19626
2	Lockwasher	3	15944	15944	15944	15944	15944	15944	15944	15944	15944
3	Cover Plate	1	18742	18742	18742	18742	18742	18742	18742	18742	18742
4	O-ring	1	15945	15945	15945	15945	15945	15945	15945	15945	15945
5	Impeller Cap	1	24626	24626	24626	24626	24626	24626	24626	24626	24626
6	Key	1	19667	19667	19667	19667	19667	19667	19667	25152	19667
7	Impeller	1	17000	17000	17000	17000	17000	17000	17000	17000	17000
8	Cam	1	18271	18271	18271	18271	18271	18271	21318	21318	18271
9	Cam Screw	1	19714	19714	19714	19714	19714	19714	19714	19714	19714
10	Retaining Ring (Ext)	1/2/3	15952		15952		15952		15952		15952
11	Washer	1	15959		15959		15959		15959		15959
12	Washer	2									19614
13	Wear Plate-Pin Assy	1	18441	24162	18441	24162	18441	24162	18441	24162	18441
14/15	Water Seal/Seat Assy	1	15955	25115	15955	25115	15955	25115	15955	15955	15955
16	Spacer	1									24014
17	Retaining Ring (Int)	1							15942	15942	
18	Housing	1	24176	24176	24176	24176	24176	24176	24161	24161	24409
19	Shaft	1									24015
19	Shaft/Bearing Assy	1	25120	25120	25120	25120	25120	25120	25119	25119	
20	Ball Bearing	2									15951
21	Adaptor Bolts	4	19708	19708	19708	19708	19708	19708	19708	19708	19708
23	Oil Lip Seal	1	19674	24250	19674	24250	19674	19674	21776	21776	24017
24	Adaptor	1	21205	21205	21985	21985	21985	21985	19699	19699	24016
	Gear Assy/Hub	1	22495	22495	22495	22495					
	Cam Screw O-ring	1	19712	19712	19712	19712	19712	19712	19712	19712	19712
	Gear Nut	1	19730	19730	19730	19730	19730	19730			
	Adaptor Gasket	1	21570	21570	21570	21570					
	Flanged Port O-rings	2	21525	21525	21525	21525	21525	21525			21525
	Flanged Port Bolts	8			21484	21484	21484	21484			
	Slinger	1	24156	24156	24156	24156	24156	24156	24156	24156	
	Minor Repair Kit		23972	25124	23972	25124	23972	25124	23973	25123	23972
	Major Repair Kit		25122	25122	25122	25122	25122	25122	25121	25121	25038

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 (Low Hours)		Commercial/Fishing Use (High Hours)	
	Light Duty	Severe Duty (High RPM, Silt or Sand)	Heavy Duty	Severe Duty (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	Minor Kits						Major Kits				
	17000K	23972	23973	24576	24578	25123	25124	23974	23975	25038	25121	25122
P176X	X		X						X			
P176	X		X						X			
P176-02	X		X						X			
P1710A	X			X							X	
P1710	X		X								X	
P1710-02	X		X								X	
P1710X	X		X								X	
P1710C	X					X					X	
P1710-04	X					X					X	
P1716A	X	X										X
P1716B-01	X	X										X
P1716B-02	X	X										X
P1716X	X	X										X
P1716C	X						X					X
P1716-04	X						X					X
P1719X	X	X						X				
P1719	X	X						X				
P1719-01	X	X						X				
P1719F-01	X	X						X				
P1722A	X	X										X
P1722B-01	X	X										X
P1722B-02	X	X										X
P1722X	X	X										X
P1722C	X						X					X
P1722-04	X						X					X
P1726X	X		X								X	
P1726	X		X								X	
P1727A	X				X							X
P1727FB	X	X										X
P1727FB-01	X	X										X
P1727FB-02	X	X										X
P1727X	X	X										X
P1727C	X						X					X
P1727-04	X						X					X
P1730A	X				X							X
P1730-01	X	X										X
P1730-02	X	X										X
P1730F-01	X	X										X
P1730F-02	X	X										X
P1730X	X	X										X
P1730C	X						X					X
P1730-04	X						X					X
P1730F-04	X						X					X
P1731	X	X										X
P1731-01	X	X										X
P1731F-02	X	X										X
P1731-04	X						X					X
P1732A	X			X							X	
P1732-01	X		X								X	
P1732-02	X		X								X	
P1732X	X		X								X	
P1732C	X					X					X	
P1732-04	X					X					X	
P1733X	X	X										
P1733F-01	X									X		

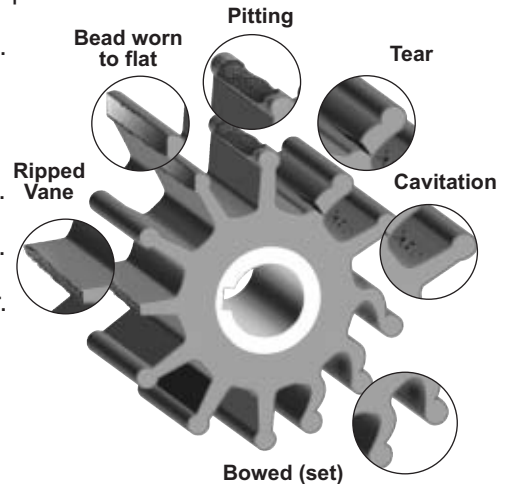
Inspection

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 minor and 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 minor and 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 or if in doubt.



Genuine Sherwood Tech Tips

Sherwood recommends replacing your impeller annually. 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 it 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

Three tips to help you install your new Sherwood 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.
- 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.)

*See Maintenance Schedule



Pentair

SPECIALTY/OEM GROUP

375 Fifth Avenue NW • New Brighton, MN 55112

Phone: +1 651-766-6300 • 800-471-0460 • Fax: +1 651-766-6603

www.sherwoodpumps.com