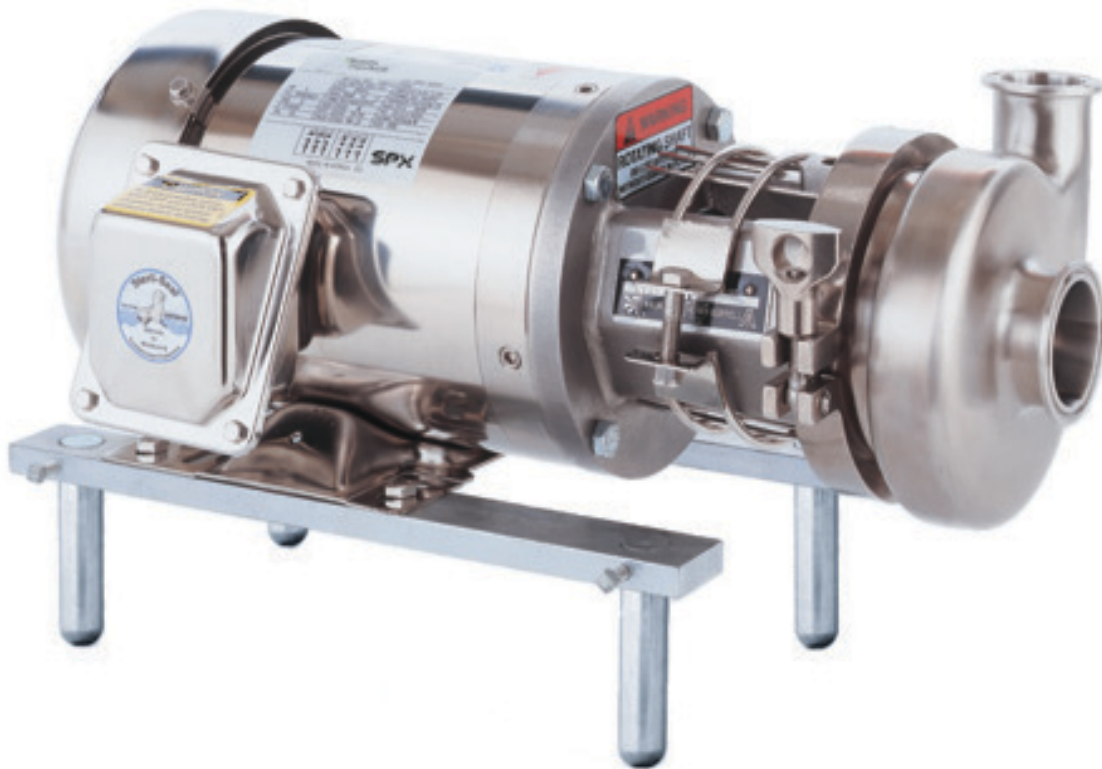


## C-Series

CENTRIFUGAL PUMP - NEMA VERSION

FORM NO.: 95-03008-NEMA REVISION: 05/2025

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.



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## Warranty

**LIMITED WARRANTY:** Unless otherwise mutually agreed to in writing, (a) SPX FLOW US, LLC (SPX FLOW) goods, auxiliaries and parts thereof are warranted to the Buyer against defective workmanship and material for a period of twelve (12) months from date of installation or eighteen (18) months from date of delivery, whichever expires first, and (b) SPX FLOW services are warranted to Buyer to have been performed in a workman-like manner for a period of ninety (90) days from the date of performance. If the goods or services do not conform to the warranty stated above, then as Buyer's sole remedy, SPX FLOW shall, at SPX FLOW's option, either repair or replace the defective goods or re-perform defective services. If Buyer makes a warranty claim to SPX FLOW and no actual defect is subsequently found, Buyer shall reimburse SPX FLOW for all reasonable costs which SPX FLOW incurs in connection with the alleged defect. Third party goods furnished by SPX FLOW will be repaired or replaced as Buyer's sole remedy, but only to the extent provided in and honored by the original manufacturer's warranty. Unless otherwise agreed to in writing, SPX FLOW shall not be liable for breach of warranty or otherwise in any manner whatsoever for: (i) normal wear and tear; (ii) corrosion, abrasion or erosion; (iii) any good or services which, following delivery or performance by SPX FLOW, has been subjected to accident, abuse, misapplication, improper repair, alteration (including modifications or repairs by Buyer, the end customer or third parties other than SPX FLOW), improper installation or maintenance, neglect, or excessive operating conditions; (iv) defects resulting from Buyer's specifications or designs or those of Buyer's contractors or subcontractors other than SPX FLOW; or (v) defects resulting from the manufacture, distribution, promotion or sale of Buyer's products; (vi) damage resulting from the combination, operation or use with equipment, products, hardware, software, firmware, systems or data not provided by SPX FLOW, if such damage or harm would have been avoided in the absence of such combination, operation or use; or (vii) Buyer's use of the goods in any manner inconsistent with SPX FLOW's written materials regarding the use of such product. In addition, the foregoing warranty shall not include any labor, dismantling, re-installation, transportation or access costs, or other expense associated with the repair or replacement of SPX FLOW goods. THE WARRANTIES CONTAINED HEREIN ARE THE SOLE AND EXCLUSIVE WARRANTIES AVAILABLE TO BUYER AND SPX FLOW HEREBY DISCLAIMS ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ANY PERFORMANCE OR PROCESS OUTCOME DESIRED BY THE BUYER AND NOT SPECIFICALLY AGREED TO BY SPX FLOW. THE FOREGOING REPAIR, REPLACEMENT AND REPERFORMANCE OBLIGATIONS STATE SPX FLOW'S ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.

## Shipping Damage or Loss

If equipment is damaged or lost in transit, file a claim at once with the delivering carrier. The carrier has a signed Bill of Lading acknowledging that the shipment has been received from SPX FLOW in good condition. SPX FLOW is not responsible for the collection of claims or replacement of materials due to transit shortage or damages.

## Warranty Claim

Warranty claims must have a **Returned Material Authorization (RMA)** from the Seller or returns will not be accepted. Contact 800-252-5200 or 262-728-1900.

Claims for shortages or other errors must be made in writing to Seller within ten (10) days after delivery. This does not include transit shortage or damages. Failure to give such notice shall constitute acceptance and waiver of all such claims by Buyer.

## Safety

### READ AND UNDERSTAND THIS MANUAL PRIOR TO INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT

SPX FLOW recommends users of our equipment and designs follow the latest Industrial Safety Standards. At a minimum, these should include the industrial safety requirements established by:

1. Occupational Safety and Health Administration (OSHA)
2. National Fire Protection Association (NFPA)
3. National Electrical Code (NEC)
4. American National Standards Institute (ANSI)

#### **⚠ WARNING**

*Severe injury or death can result from electrical shock, burn, or unintended actuation of equipment. Recommended practice is to disconnect and lockout industrial equipment from power sources, and release stored energy, if present. Refer to the National Fire Protection Association Standard No. NFPA70E, Part II and (as applicable) OSHA rules for Control of Hazardous Energy Sources (Lockout-Tagout) and OSHA Electrical Safety Related Work Practices, including procedural requirements for:*

- Lockout-tagout
- Personnel qualifications and training requirements
- When it is not feasible to de-energize and lockout-tagout electrical circuits and equipment before working on or near exposed circuit parts

Before putting SPX FLOW equipment into operation, the operator shall analyze the application for all foreseeable risks, their likelihood to occur and the potential consequences of the identified risks as per ISO 31000 and ISO/IEC 31010 in their actual current version.

**Locking and Interlocking Devices:** These devices should be checked for proper working condition and capability of performing their intended functions. Make replacements only with the original equipment manufacturer's OEM renewal parts or kits. Adjust or repair in accordance with the manufacturer's instructions.

**Periodic Inspection:** Equipment should be inspected periodically. Inspection intervals should be based on environmental and operating conditions and adjusted as indicated by experience. At a minimum, an initial inspection within 3 to 4 months after installation is recommended. Inspection of the electrical control systems should meet the recommendations as specified in the National Electrical Manufacturers Association (NEMA) Standard No. ICS 1.3, Preventative Maintenance of Industrial Control and Systems Equipment, for the general guidelines for setting-up a periodic maintenance program.

**Replacement Equipment:** Use only replacement parts and devices recommended by the manufacturer to maintain the integrity of the equipment. Make sure the parts are properly matched to the equipment series, model, serial number, and revision level of the equipment.

Warnings and cautions are provided in this manual to help avoid serious injury and/or possible damage to equipment:

#### **⚠ DANGER**

*Immediate hazards which WILL result in severe personal injury or death.*

#### **⚠ WARNING**

*Hazards or unsafe practices which COULD result in severe personal injury or death.*

#### **⚠ CAUTION**

*Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.*

## Care of Component Materials

**NOTE:** SPX FLOW recommends the use of an FDA-approved anti-seize compound on all threaded connections.

### WARNING

*Failure to comply with the Care of Component Materials could lead to bodily injury.*

### Stainless Steel Corrosion

Corrosion resistance is greatest when a layer of oxide film is formed on the surface of stainless steel. If film is disturbed or destroyed, stainless steel becomes much less resistant to corrosion and may rust, pit or crack.

Corrosion pitting, rusting and stress cracks may occur due to chemical attack. Use only cleaning chemicals specified by a reputable chemical manufacturer for use with stainless steel. Do not use excessive concentrations, temperatures or exposure times. Avoid contact with highly corrosive acids such as hydrofluoric, hydrochloric or sulfuric. Also avoid prolonged contact with chloride-containing chemicals, especially in presence of acid. If chlorine-based sanitizers are used, such as sodium hypochlorite (bleach), do not exceed concentrations of 150 ppm available chlorine, do not exceed contact time of 20 minutes, and do not exceed temperatures of 104°F (40°C).

Corrosion discoloration, deposits or pitting may occur under product deposits or under gaskets. Keep surfaces clean, including those under gaskets or in grooves or tight corners. Clean immediately after use. Do not allow equipment to set idle, exposed to air with accumulated foreign material on the surface.

Corrosion pitting may occur when stray electrical currents come in contact with moist stainless steel. Ensure all electrical devices connected to the equipment are correctly grounded.

### Elastomer Seal Replacement Following Passivation

Passivation chemicals can damage product contact areas of this equipment. Elastomers (rubber components) are most likely to be affected. Always inspect all elastomer seals after passivation is completed. Replace any seals showing signs of chemical attack. Indications may include swelling, cracks, loss of elasticity or any other noticeable changes when compared with new components.

## Introduction

This manual contains installation, operation, cleaning, repair instructions, and parts lists for the C-Series Centrifugal Pumps. It also provides a troubleshooting chart to help in determining and correcting possible pump problems.

## Operating Parameters

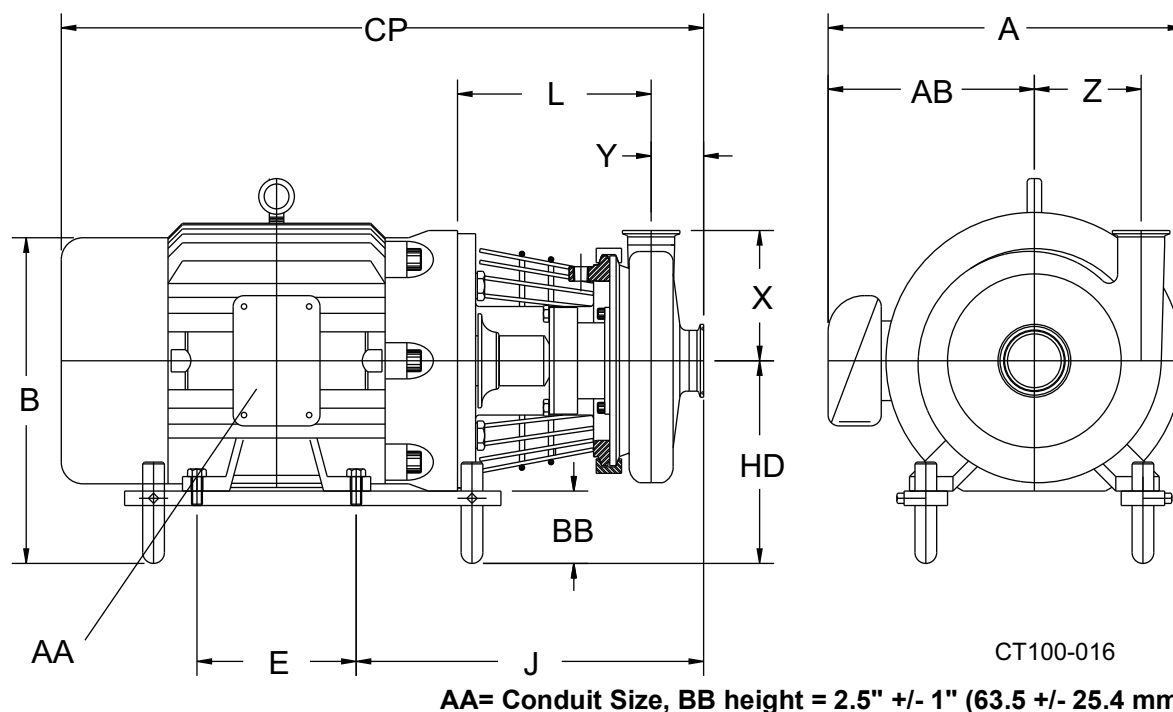
<b>Capacity:</b>	10 to 780 gpm
<b>Viscosity:</b>	1 to 1500 cPs
<b>Maximum operating temperature:</b>	212°F (100°C)
<b>Maximum inlet pressure:</b>	25 psi (1.7 bar)
<b>Operating Speeds:</b>	50Hz: up to 2950 RPM 60Hz: up to 3500 RPM

Casing, backplate, and impeller are 316 stainless steel with polished sanitary finish.

- Port Connection: S-Line clamp fittings are standard.
- Power: Supplied by a standard foot-mounted C-face motor, through 60 Horsepower.
- Seal Type "D": Seal material is carbon rotating on stationary stainless steel backplate.
- Seal Type "DG": Gland ring with replaceable seal seat. See page 70.
- Seal Type "E": Water-cooled balanced double seal (carbon). See page 71.
- Seal Type "F": "D" seal with a water cascade attachment. See item 137 on the parts list pages starting on page 54.
- Sanitary Polish: 32 Ra finish

## Pump Dimensions

**NOTE:** Dimensions are for guidance only. Contact your SPX FLOW Distributor for more detailed measurements if needed. Any dimensions that include the motor may vary depending on the motor selected.



**Figure 1 - Pump Dimensions with NEMA Motor**

**Table 1: Pump Dimensions with NEMA Motor**

Pump Model	NEMA Frame	A	B	CP	J	E	L	HD	AA	AB
<b>C-100</b>	<b>56C</b>	6.5" (165 mm)	9.49" (241 mm)	17.60" (447 mm)	6.85" (174 mm)	2.99" (76 mm)	2.76" (70mm)	5.47" (139 mm)	.47" (12 mm)	3.23" (82 mm)
	<b>143TC</b>	9.69" (246 mm)	9.49" (241 mm)	19.96" (507 mm)	77.68 (195 mm)	3.98" (101 mm)	3.74" (95 mm)	5.98" (152 mm)	.75" (19 mm)	6.93" (176 mm)
<b>C-114</b>	<b>56C</b>	6.5" (165 mm)	9.49" (241 mm)	16.34" (415 mm)	10.67" (263 mm)	2.99" (76 mm)	6.22" (158 mm)	5.47" (139 mm)	.47" (12 mm)	3.23" (82 mm)
	<b>140TC</b>	9.69" (246 mm)	9.49" (241 mm)	19.21" (488 mm)	10.67" (271 mm)	5.00" (127 mm)	6.22" (158 mm)	5.98" (152 mm)	.75" (19 mm)	6.93" (176 mm)
	<b>182TC</b>	11.61" (295 mm)	11.42" (290 mm)	22.24" (565 mm)	13.39" (340 mm)	5.47" (139 mm)	6.77" (172 mm)	6.97" (177 mm)	.75" (19 mm)	7.87" (200 mm)
<b>C-216</b>	<b>56C</b>	6.5" (165 mm)	9.49" (241 mm)	16.34" (415 mm)	10.67" (263 mm)	2.99" (76 mm)	6.06" (154 mm)	5.47" (139 mm)	.47" (12 mm)	3.23" (82 mm)
	<b>140TC</b>	9.69" (246 mm)	9.49" (241 mm)	19.21" (488 mm)	10.83" (275 mm)	5.00" (127 mm)	6.06" (154 mm)	5.98" (152 mm)	.75" (19 mm)	6.93" (176 mm)
	<b>180TC</b>	11.61" (295 mm)	11.42" (290 mm)	22.24" (565 mm)	12.20 (310 mm)	5.47" (139 mm)	6.69" (170 mm)	6.97" (177 mm)	.75" (19 mm)	7.87" (200 mm)
	<b>210TC</b>	13.11" (333 mm)	12.91" (328 mm)	25.79" (655 mm)	13.94" (354 mm)	5.98" (152 mm)	7.8" (198 mm)	7.72" (196 mm)	.75" (19 mm)	8.86" (225 mm)
	<b>250TC</b>	14.50" (368 mm)	15.00" (381 mm)	31.02" (788 mm)	14.50" (368 mm)	10.00" (254 mm)	8.50" (216 mm)	8.74" (222 mm)	0.98" (25 mm)	9.49" (241 mm)



Table 1: Pump Dimensions with NEMA Motor

Pump Model	NEMA Frame	A	B	CP	J	E	L	HD	AA	AB
<b>C-218</b>	<b>140TC</b>	9.69" (246 mm)	9.49" (241 mm)	19.21" (488 mm)	10.98" (279 mm)	5.00" (127 mm)	6.30" (160 mm)	5.98" (152 mm)	.75" (19 mm)	6.93" (176 mm)
<b>C-218 C-328</b>	<b>180TC</b>	11.61" (295 mm)	11.42" (290 mm)	22.24" (565 mm)	12.28" (312 mm)	5.00" (127 mm)	6.93" (176 mm)	6.97" (177 mm)	.75" (19 mm)	7.87" (200 mm)
	<b>210TC</b>	13.11" (333 mm)	12.91" (328 mm)	25.79" (655 mm)	13.27" (337 mm)	5.98" (152 mm)	7.28" (185 mm)	7.72" (196 mm)	.75" (19 mm)	8.86" (225 mm)
	<b>250TC</b>	14.49" (368 mm)	15.00" (381 mm)	31.02" (788 mm)	14.65" (372 mm)	10.00" (254 mm)	8.19" (208 mm)	8.74" (222 mm)	.98" (25 mm)	9.49" (241 mm)
	<b>280TC</b>	20.63" (524 mm)	17.28" (439 mm)	32.24" (819 mm)	15.28" (388 mm)	10.98" (279 mm)	8.82" (224 mm)	9.49" (241 mm)	1.97" (50 mm)	13.11" (333 mm)
	<b>280TSC</b>	18.58" (472 mm)	16.30" (414 mm)	31.93" (811 mm)	15.28" (388 mm)	10.98" (279 mm)	8.82" (224 mm)	9.49" (241 mm)	1.97" (50 mm)	12.20" (310 mm)
<b>C-328</b>	<b>320TC 320TSC</b>	23.11" (587 mm)	20.98" (533 mm)	35.43" (900 mm)	17.13" (435 mm)	11.97" (304 mm)	9.69" (246 mm)	10.47" (266 mm)	1.97" (50 mm)	14.09" (358 mm)

Table 2: Pump Dimensions with NEMA Motor

Pump Model	X	Y	Z	Inlet (Suction)	Outlet (Discharge)	Maximum Impeller Size
<b>C-100</b>	3.46" (88 mm)	1.5" (38 mm)	1.46" (37 mm)	1.5" (38 mm)	1" (25 mm)	3.68" (93 mm)
<b>C-114</b>	3.62 (92 mm)	1.61" (41 mm)	2.60" (66 mm)	1.5" (38 mm) OR 2" (51 mm)	1.5" (38 mm)	4.0" (102 mm)
<b>C-216</b>	5.67" (144 mm)	1.93" (49 mm)	3.66" (93 mm)	2" (51 mm) OR 2.5" (64 mm)	1.5" (38 mm)	6.0" (152 mm)
<b>C-218</b>	5.47" (139 mm)	1.93" (49 mm)	4.72" (120 mm)	2" (51 mm) OR 3" (76 mm)	1.5" (38 mm)	8.0" (203 mm)
<b>C-328</b>	5.47" (139 mm)	2.24" (57 mm)	4.72" (120 mm)	3" (76 mm) OR 4" (102 mm)	2" (51 mm)	8.0" (203 mm)

## Installation

**⚠ DANGER**

*The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out and the pump is de-pressurized.*

Unpack all parts of your equipment and inspect for damages that may have occurred during shipping. Report any damage to the carrier. See “Shipping Damage or Loss” on page 4.

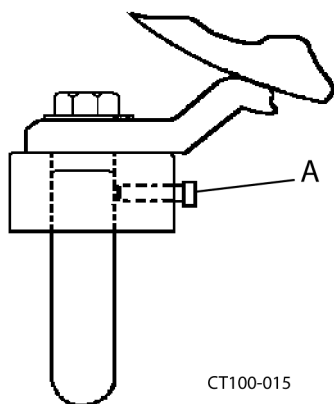
All ports are covered at the factory to keep out foreign objects during transit. If the covers are missing or damaged, remove the pump cover and thoroughly inspect the fluid head. Be sure the pumping head is clean and free of foreign material before rotating the shaft.

## Pump Location

1. Locate the pump as near as practical to the liquid supply.
2. Keep the supply piping short and straight to keep the pump supplied with liquid and prevent damaging cavitation.
3. Locate the pump so that it is accessible for service and inspection during operation.
4. Protect the motor from flooding.

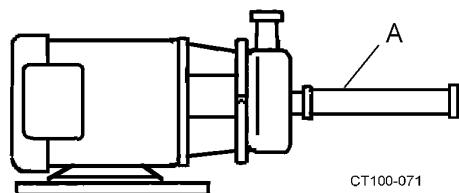
## Pump Leveling

Level the pump by loosening the setscrews (Figure 2, item A) to adjust the length of the legs.

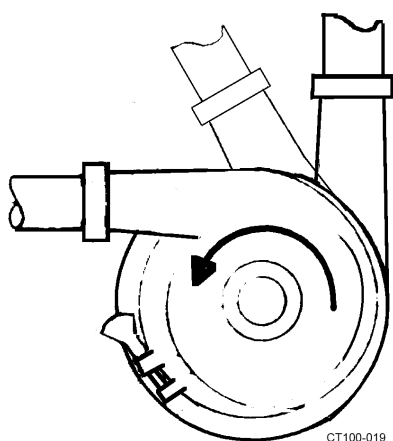


**Figure 2 - Leveling Leg Setscrew Location**

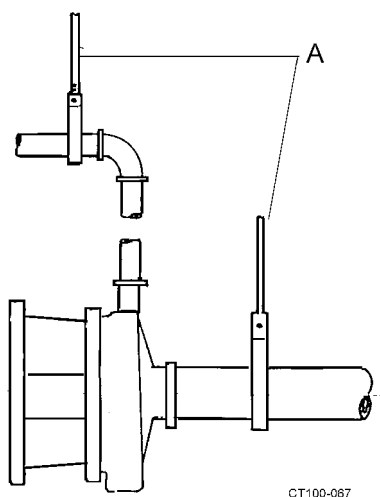
## Supply and Discharge Piping/Valves



**Figure 3 - Straight Pipe Length**



**Figure 4 - Recommended Discharge Positions**



**Figure 5 - Pipe Supports**

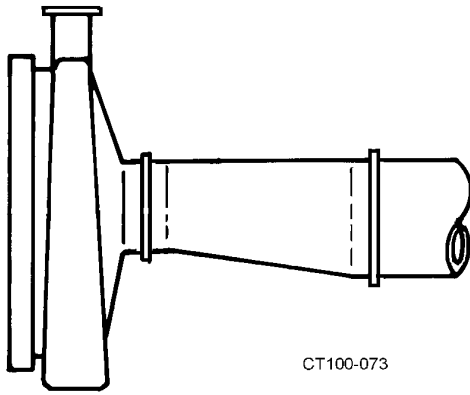
### ⚠ CAUTION

*Install the pump and piping system in accordance with local codes and restrictions. Practices described in this manual are recommended for optimum performance.*

- Use a line size equal to or larger than the connection size on the pump, especially the inlet supply line.
- Keep the supply line as short and as straight as possible by minimizing the use of elbows and valves. Avoid up and down rises that trap air.
- Be certain all joints in the suction line are well-sealed to prevent air leaks.
- Maintain a straight length of pipe (Figure 3, item A) at least 8 pipe diameters long at the pump inlet.
- The pump casing on the C-114 through C-328 may be rotated with the discharge connection pointing in any direction; the best pump performance will be with the outlet up, to the left, or 45 degrees in between. These positions ensure a flooded casing and prevent problems caused by air in the system. See Figure 4.
- Seal all joints in the suction line well to prevent air from being sucked into the system.
- If an expansion joint is used, install a pipe anchor between it and the pump.
- The slope of the line depends on the application requirements; the best pump operation is with the supply line sloped slightly upward toward the pump to prevent trapped air. If the system must drain into the pump casing, keep the downward slope to a minimum or priming problems may occur. See Figure 5.
- Support the supply and discharge piping near the pump so that no strain is put on the pump casing. See Figure 5, item A.
- Install shutoff valves to isolate the pump from the supply and discharge lines to allow the pump to be serviced without draining the system.

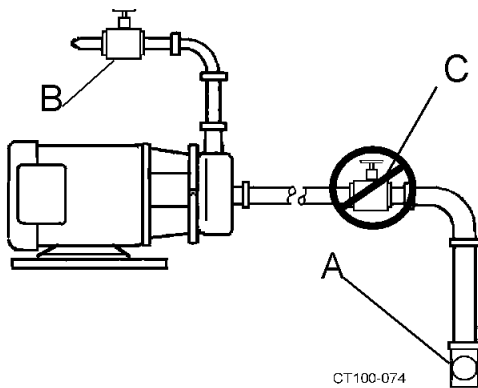
### ⚠ WARNING

*The pump and piping may contain sharp edges. Wear gloves to help avoid injuries from these hazards.*



**Figure 6 - Correct Eccentric Installation**

- If a reducer is connected to the inlet, use an eccentric type to prevent problems due to trapped air. See Figure 6.



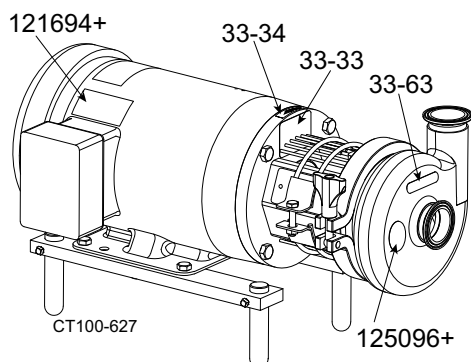
**Figure 7 - Valve Piping Installation**

- This pump is not self-priming. If the pump is installed above the supply liquid level, install a foot valve or other system check valve (Figure 7, item A) to keep the system flooded for priming.
- A throttling valve may be required to control the pump flow rate to prevent motor overload. Always install a throttling valve (Figure 7, item B) in the discharge piping and at least 10 diameters from the pump outlet. **NEVER** install a throttling valve in the supply piping (Figure 7, item C).

## Installations that may cause operation problems

- Any system throttling valves or similar devices to control flow rate must be installed in the **discharge** line. **DO NOT** install any system throttling valves or similar devices to control the flow rate in the **supply** line. (See Figure 7.) Restriction in the supply line may cause cavitation and pump damage.
- “Water hammer” in the system can damage the pump and other system components. Water hammer often occurs when valves in the system are suddenly closed, causing lines to move violently with a loud noise. One way to eliminate water hammer is to slow down the actuation speed of the valve.
- Do not expose the pump to freezing temperatures with liquid in the casing. Frozen liquid in the casing will damage pump. Drain the casing before exposing it to freezing temperatures.

## Electrical Connections



### Label part numbers:

121694+: Warning-Read Manual  
33-34: Direction of Rotation  
33-33: Warning-Rotating Shaft  
33-63: Warning-Keep Fingers Out  
125096+: 3-A Label

**Figure 8 - Replaceable Label Location**

### **⚠ DANGER**

*The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out and the pump is de-pressurized.*

### **⚠ CAUTION**

*The motor must be installed by qualified personnel, e.g., a licensed electrician.*

- Read the motor manufacturer's instructions before making an installation. Follow the manufacturer's lubrication schedules. Check the motor nameplate to be sure that the motor is compatible with the electrical supply and all wiring, switches, and starters. Make sure all overload protections are correctly sized.
- Check the pump rotation following an electrical installation. The correct direction of rotation is counterclockwise when facing the pump inlet connection. See Figure 4 on page 11 and label 33-34 in Figure 8.

## Before First Startup

## Clean Pump and Piping

Disassemble the pump and clean all product contact parts and seal parts prior to first operation. Follow instructions in the "Cleaning Safety Procedures" on page 13 and "Pump Disassembly - Pin Impeller Design" on page 18 or "Pump Disassembly - Sealed Impeller Design" on page 30. Thoroughly clean the pump of any materials that could have accumulated during installation.

## Cleaning Safety Procedures

### **⚠ DANGER**

*To prevent an accidental start-up, lock out the power source using your lock and key.*

## Manual Cleaning

- Do not use toxic and/or flammable solvents.
- Lock out electrical power and shut off all air prior to cleaning the equipment.
- Keep electrical panel covers closed and power off when washing the equipment.
- Clean up spills as soon as possible.
- Never attempt to clean the equipment while it is operating.
- Wear proper protective clothing.

## Cleaning-In-Place (CIP)

1. Make certain that all connections in the cleaning circuit are properly applied and tightened to avoid contact with hot water or cleaning solutions.
2. When the cleaning cycle is controlled from a remote or automated cleaning center, establish safe procedures to avoid automatic start-up while servicing equipment in the circuit.

## Preliminary Test Run

Test the system using a preliminary run with the materials that will be pumped. **DO NOT** run the pump to produce final product at this time. See “Starting the Pump” on page 15.

## Check for Possible Motor Overload Condition

### CAUTION

*The motor must be installed by qualified personnel, e.g., a licensed electrician.*

Certain combinations will overload the motor when operated with open unrestricted discharge, resulting in an unacceptably high flow rate. Additional discharge restriction may be required to lower the flow rate and lower the horsepower requirement. **DO NOT** add any restriction to the supply line. If the pump was incorrectly selected, a smaller impeller or a higher motor horsepower may be required. If you are uncertain about pump selection and application, temporarily install an ammeter in the electrical service.

### **Ammeter Test**

Operate the pump under process conditions and check the motor amp draw versus the nameplate full load rating. If the amp draw exceeds the motor rating, a system change or pump change is required. If the process conditions and/or liquid changes (higher viscosity, higher specific gravity), recheck the motor amp draw. Contact your authorized SPX FLOW distributor for assistance.

## Operation

### Important Safety Information

**⚠ DANGER**

*The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out and the pump is de-pressurized.*

**⚠ WARNING**

*The pump components and piping may contain sharp edges. Handle the impeller carefully because edges may be sharp. Wear gloves while installing and servicing the pump to help avoid injuries from these hazards.*

**⚠ CAUTION**

*These pumps will be severely damaged if operated with closed valves in the discharge or inlet lines. The pump warranty is not valid for damages caused by a hydraulic overload from operation or start-up with a closed valve in the system.*

**⚠ CAUTION**

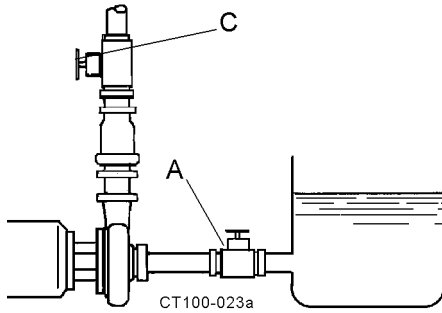
*The motor must be installed by qualified personnel, e.g., a licensed electrician. Motor maintenance, repair and wiring are not covered in this manual. For specific information, contact the motor manufacturer.*

Ensure that the pump is correctly installed as described in “Installation” on page 10.

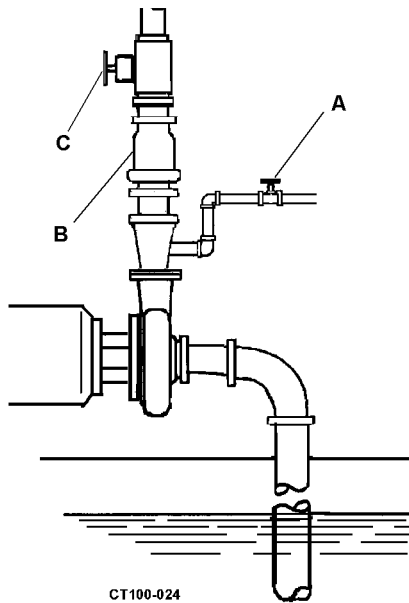
### Starting the Pump

1. If the pump has a flush seal option, start the flow of flush water (recommended rate is approximately 5 US gallons per hour (18.9 liters per hour) before operating the pump.
2. **Before starting the pump**, prime the pump by flooding the pump casing with liquid to avoid damaging the pump parts. Depending on the installation, refer to the priming instructions on page 16.
3. Start the pump motor.
4. Check the pump to ensure that the liquid is flowing and that all piping connections and seals are leak-free.
5. Make sure that the pump is not operating against a closed discharge. Continued operation against a closed discharge will heat the liquid in the casing to boiling and lead to pump damage.
6. Slowly open the discharge valve until the desired flow is obtained. Observe the pressure gauges. If pressure is not attained quickly, stop the pump and prime it again.

## Priming the Pump



**Figure 9 - Pump Below Supply  
(Feed Source Above Pump Level)**



**Figure 10 - Pump Above Supply  
(Feed Source Below Pump Level)**

## Stopping the Pump

### ⚠ CAUTION

The motor must be installed by qualified personnel, e.g., a licensed electrician.

## Priming the Pump with the Feed Source Above Pump Level

1. Fill the supply tank with liquid and open the supply line (suction) valve (see Figure 9, item A).
2. Open the discharge valve to vent any air trapped in the supply line or casing (see Figure 9, item C).
3. Resume the "Starting the Pump" procedure on page 15, at step 3.

## Priming the Pump with the Feed Source Below Pump Level

The pump will not self-prime if the liquid supply is below the pump level. If the liquid supply is below the pump level, provide an outside source for priming.

1. Close the discharge valve (see Figure 10, item C) and open the air vents.
2. Open the valve in the outside supply line (see Figure 10, item A) until liquid flows from the vent valves.
3. Close the vent valves.
4. Close the outside supply line.

**NOTE:** Use a type of check valve system (see Figure 10, item B) to keep the supply line and pump casing flooded with liquid; otherwise the pump must be primed before each operation.

5. Resume the "Starting the Pump" procedure on page 15, at step 3.

### ⚠ DANGER

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out and the pump is de-pressurized.

1. To stop the pump, shut off power to the pump motor.

**NOTE:** Liquid in the system can flow freely through the pump; the pump does not act as a shutoff valve.

2. Shut off the supply and discharge lines.



## Maintenance

### Important Safety Information

**⚠ DANGER**

*The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out and the pump is de-pressurized.*

**⚠ WARNING**

*The pump components and piping may contain sharp edges. Handle the impeller carefully because edges may be sharp. Wear gloves while installing and servicing the pump to help avoid injuries from these hazards.*

**⚠ CAUTION**

*Make sure to keep the work area clear of machine parts, tools, product lines, foreign materials, and power cables to avoid potential hazards.*

**⚠ CAUTION**

*Make sure appropriate lighting is available: at least 1000 lux, independent of daylight and weather conditions.*

**⚠ CAUTION**

*Before carrying out any maintenance and repair work on cold components, ensure that the machine parts in question are sufficiently heated. The contact temperature of accessible machine parts must not be lower than those in the EN ISO 13732-1.*

Before detaching port connections to the pump:

- Close the suction and discharge valves.
- Drain the pump and clean or rinse, if necessary.
- Disconnect or shut off the electrical supply and lock out all power.

### Scheduled Maintenance

A routine maintenance program can extend the life of your pump. Keep maintenance records. These will help pinpoint potential problems and causes.

#### Routine Maintenance

- Check for unusual noise, vibration and bearing temperatures.
- Inspect the pump and piping for leaks.
- Check the mechanical seal area for leakage (no leakage is desired).
- Check the backplate gasket for wear/damage.
- Lubricate the bearings (see motor manufacturer for correct specifications).
- Monitor the seals.
- Perform vibration analysis.
- Check the discharge pressure.
- Monitor the temperature.

## Pump Disassembly - Pin Impeller Design

**NOTE:** SPX FLOW recommends replacing elastomers every time the pump is serviced.

**NOTE:** For the Sealed Impeller design, see "Pump Disassembly - Sealed Impeller Design" on page 30.

Items required to work on a C-Series Pin Impeller Design Pump:

- Mallet
- Allen Wrench (Seal Carrier)
- Allen Wrench (Shaft)
- Wrench (Motor Adapter)
- 0.060 inch shims
- Anti-seize compound

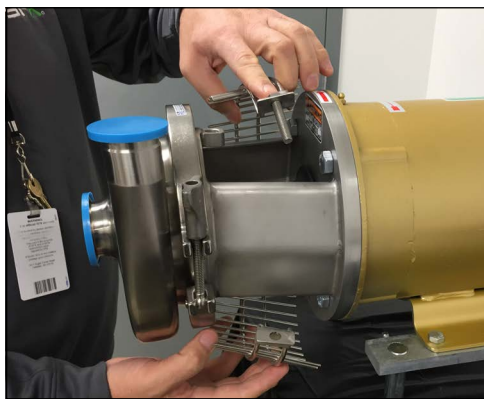


Figure 11 - Guard assembly



Figure 12 - Remove casing clamp

### **⚠ DANGER**

*The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair pump unless all power is off and locked out and the pump is de-pressurized.*

*To avoid serious injury, shut off and drain product from the pump prior to disconnecting the piping.*

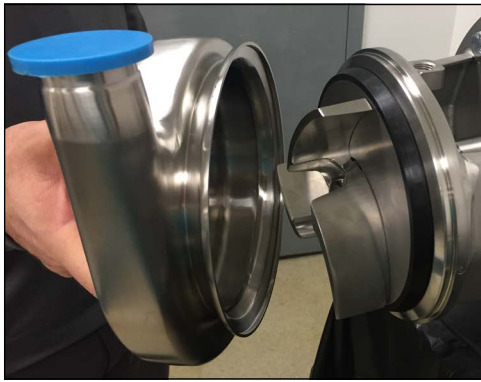
### **⚠ WARNING**

*The pump components and piping may contain sharp edges. Handle the impeller carefully because edges may be sharp. Wear gloves while installing and servicing the pump to help avoid injuries from these hazards.*

1. Shut off the product flow to the pump and relieve any product pressure.
2. Shut off and lock out power to the pump.
3. Disconnect the suction and discharge pipe fittings.
4. Using a wrench, remove the guard assembly.

5. Loosen the casing clamp wing nut. While holding the pump casing, remove the clamp.

**NOTE:** On the C-100, remove the casing wing nuts.



**Figure 13 - Remove casing**



**Figure 14 - Push back on impeller**



**Figure 15 - Remove impeller**



**Figure 16 - Remove impeller pin**

6. Remove the casing and inspect the clamps and the casing for damage or wear. Replace if necessary.

7. Push back on the impeller and position the retaining pin (arrow) in the center of the stub shaft. This will allow the impeller to be pulled off the stub shaft.

**NOTE:** C-214 shown. C-218 and C-328 impellers have 4 blades.

8. Remove the impeller from the stub shaft.

9. Remove impeller retainer pin.



**Figure 17 - Remove backplate**



**Figure 18 - Remove gasket**



**Figure 19 - Remove seal, O-ring, seal cup and spring**



**Figure 20 - Remove O-ring**

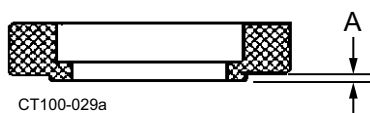
10. Rotate the backplate to disengage the backplate pins from the adapter pins. Remove the backplate with the gasket attached, by pulling it straight off the adapter.

**NOTE:** Take care to protect the sealing face and edges of the backplate from nicks and scratches.

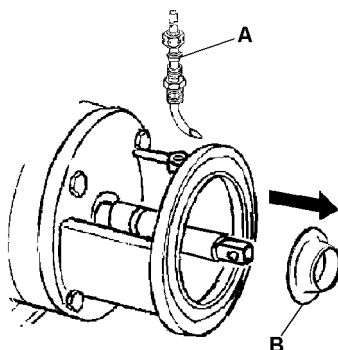
11. Remove the backplate gasket and inspect it for wear and sealing failure. Replace the gasket if necessary.

12. Pull the carbon seal, O-ring, seal cup, and spring straight off the stub shaft to remove them.

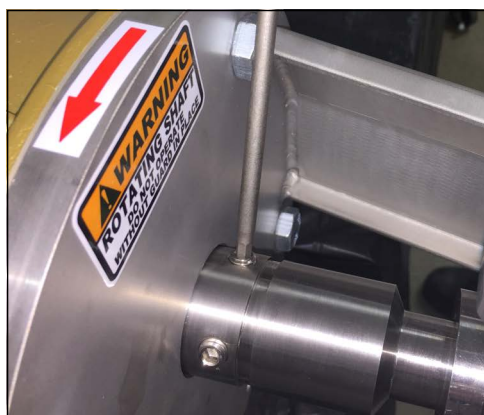
13. Remove the seal O-ring from the seal. Discard and replace the O-ring.



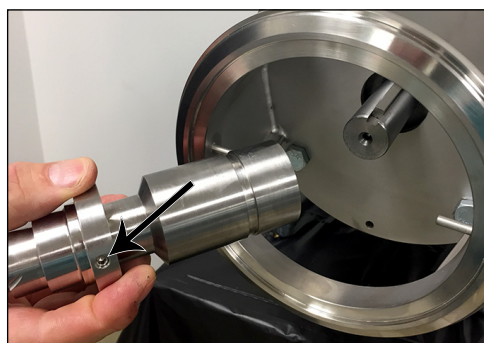
**Figure 21 - Carbon Seal Measurements**



**Figure 22 - Remove water cascade**



**Figure 23 - Pin Impeller: Loosen setscrews**



**Figure 24 - Pin Impeller: Slide stub shaft off motor shaft**

14. Carefully inspect the seal. Replace the seal if it is damaged or worn.

**NOTE:** When the extension end of the carbon seal is less than 1/32" (0.79 mm) (see Figure 21, item A), replace the seal.

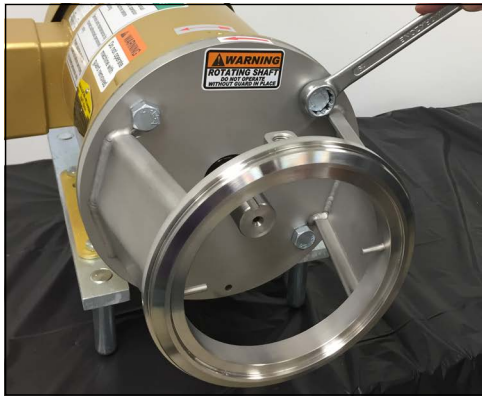
15. Remove the water cascade attachment from the adapter (if included). See Figure 22, item A.
16. Remove the rubber shaft deflector (Figure 22, item B) by pulling it straight off the stub shaft. Examine it for tearing, loose fit, or other defects that would allow liquid to leak into the motor along the shaft.

## Remove Motor Adapter

**NOTE:** The shaft and motor adapter only need to be removed if you are replacing the motor.

1. Loosen the two setscrews securing the stub shaft to the motor shaft.
  2. Carefully remove the stub shaft. The stub shaft is a tight fit, but can be removed by applying pressure with a pry bar.
- NOTE:** Examine the shaft sealing surfaces for nicks or scratches which can cause excessive O-ring wear or leaking. Replace if damaged.
3. Loosen the two setscrews on the drive collar (see arrow in Figure 24), then remove the drive collar from the stub shaft.
- NOTE:** The drive collar only needs to be removed if you are replacing the motor or adjusting the seal.





**Figure 25 - Remove motor adapter bolts**



**Figure 26 - Remove motor adapter**

4. Remove the motor adapter retaining bolts.

5. Remove the motor adapter.

**NOTE:** Motor maintenance, repair and wiring are not covered in this manual. For specific information, contact the motor manufacturer.

## Pump Assembly - Pin Impeller Design

Items required to work on a C-Series Pin Impeller Design Pump:

- Mallet
- Wrench (Motor Adapter)
- Allen Wrench (Seal Carrier)
- 0.060 inch shims
- Allen Wrench (Shaft)
- Anti-seize compound

**NOTE:** If not installing or replacing a motor, skip to step 3.

1. Place the motor adapter onto the motor face. Mount the adapter so that the threaded hole for the water cascade (arrow) faces up.



**Figure 27 - Install motor adapter**

2. Install and tighten the motor adapter retaining bolts.



**Figure 28 - Install motor adapter bolts**

3. Install the key in the motor shaft.

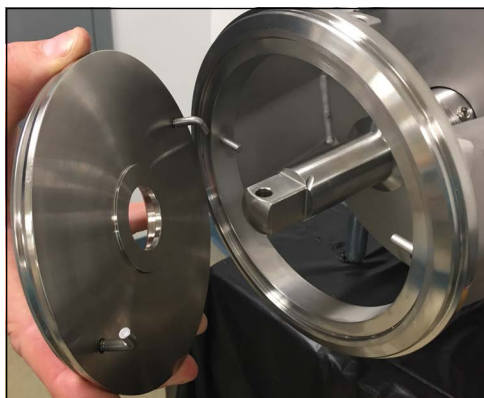


**Figure 29 - Install key in motor shaft**

4. Place the stub shaft assembly onto the motor shaft. **Do not tighten the shaft setscrews.**



**Figure 30 - Stub shaft on motor shaft**



**Figure 31 - Install backplate**



**Figure 32 - Backplate pins engaged with adapter pins**



**Figure 33 - Insert impeller retainer pin**

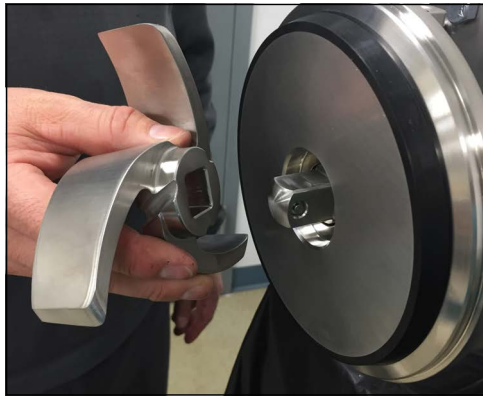


**Figure 34 - Center pin**

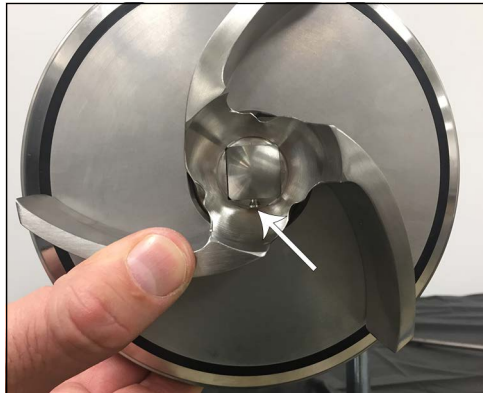
### Set backface clearance

1. Install the backplate on the adapter and rotate it until the backplate pins engage the adapter pins, ensuring solid contact of the backplate to the adapter.
2. Figure 32 shows the backplate pins engaged with the adapter pins.
3. Rotate the stub shaft until the impeller retaining hole is in a horizontal position. Insert the impeller retainer pin, and center it in the stub shaft.
4. Center the impeller retainer pin. Figure 34 shows the impeller retainer pin centered in the stub shaft.





**Figure 35 - Slide impeller on shaft**



**Figure 36 - Impeller pin engaged**



**Figure 37 - Place feeler gauge, tighten setscrews**



**Figure 38 - Slide deflector onto shaft**

5. Slide the impeller onto the shaft.

**NOTE:** C-214 shown. C-218 and C-328 impellers have 4 blades.

6. Hold the impeller tight against the shoulder in the shaft and rotate the shaft one-quarter turn until the impeller pin engages with the impeller.

7. Place a  $0.060" \pm 0.010"$  (1.52 mm  $\pm$  0.25 mm) feeler gauge between the backplate and the impeller.

8. Push the stub shaft/impeller assembly toward the motor until the impeller rests against the feeler gauge.

9. Tighten the two setscrews on the stub shaft.

10. Remove the impeller, impeller retainer pin, and backplate.

11. Slide the deflector (large diameter end first) onto the shaft until it seats in the shaft groove.

**NOTE:** If the deflector can not be forced on with the fingers, use a blunt tool to tap it evenly into place.



Figure 39 - Slide drive collar onto shaft



Figure 40 - Locate drive collar

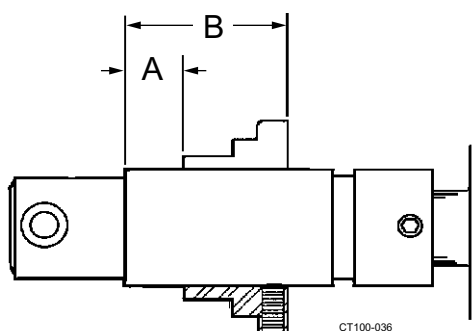


Figure 41 -Drive Collar for "D" Seal Type Adjustment



Figure 42 - Lubricate and install O-ring

## Install the pump seal

**NOTE:** "D" seal shown. For "DG" seal, see "Type "DG" Seal" on page 47 and for "E" seal, see "Type "E" Water-Cooled Balanced Double Seal" on page 50. Type "F" Seal is a "D" seal with a water cascade attachment.

1. Slide the seal drive collar onto the stub shaft.

**NOTE:** Does not apply to the C-100; the C-100 does not require a drive collar. Proceed to step 3.

2. Use the "A" and "B" dimensions in Table 3 to properly locate the drive collar on the stub shaft. See Figure 40 and Figure 41. Tighten the setscrews to secure it in place.

Table 3: Seal Chart

Model	A	B
C-114	9/16" (14.3 mm)	1 7/16" (36.5 mm)
C-216	9/16" (14.3 mm)	1 23/32" (43.6 mm)
C-218	9/16" (14.3 mm)	1 41/64" (41.6 mm)
C-328	9/16" (14.3 mm)	1 41/64" (41.6 mm)

3. Lubricate and install the seal O-ring into the seal.

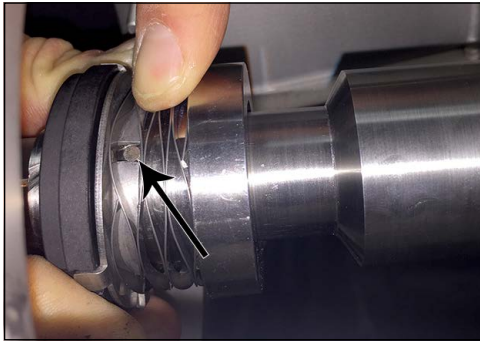
**NOTE:** Do not lubricate the seals with any type of oil or grease. The seal faces will be lubricated by the product being pumped.



**Figure 43 - Seal O-ring installed**



**Figure 44 - Install seal**



**Figure 45 - Slot and pin aligned**



**Figure 46 - Install gasket**

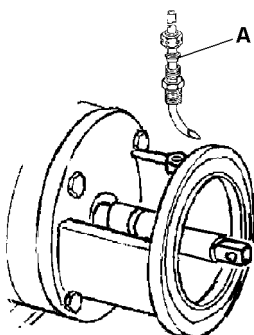
4. Figure 43 shows the seal O-ring installed in the seal.
5. Assemble the spring, seal cup, O-ring, and carbon seal, and install them as a unit, taking care that the slot in the seal cup aligns with the pin on the drive collar  
**NOTE:** On the C-100, the slot will align with the pin on the shaft.  
**NOTE:** If necessary, apply gentle pressure on the O-ring to overcome resistance on the shaft.
6. Figure 45 shows the slot in the seal cup aligned with the pin on the shaft.
7. Lubricate and install the gasket on the backplate.



**Figure 47 - Install backplate**



**Figure 48 - Backplate pins engaged**



**Figure 49 - Water cascade attachment**



**Figure 50 - Install impeller**

8. Install the backplate on the adapter. Check that the seal cup slot is engaged with the pin on the drive collar.

9. Rotate the backplate until the backplate pins engage the adapter pins.

10. If supplied, install a water cascade (part no 60112+). Mount the water cascade (Figure 49, item A) in the adapter above the seal on the assembled backplate to flow water onto the seal face.

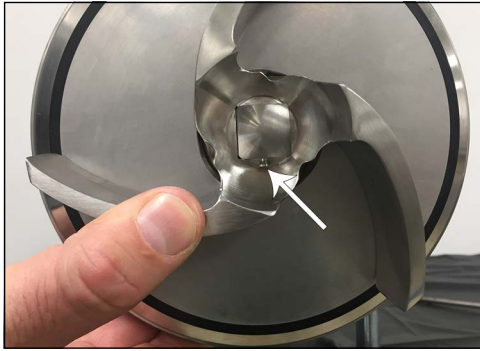
- The connection is 1/4 inch (6.35 mm) O.D. tubing.
- The required flow is approximately 5 U.S. gallons per hour (18.9 liters per hour).
- The recommended water supply is cool and filtered. If the product solidifies at a cool temperature, use warm or hot water.

**NOTE:** Seal Type "F" is a "D" seal with a water cascade attachment.

11. Rotate the shaft until the pin hole in the end is in a horizontal position. Insert the impeller pin, center it in the shaft end, and slide the impeller onto the shaft.

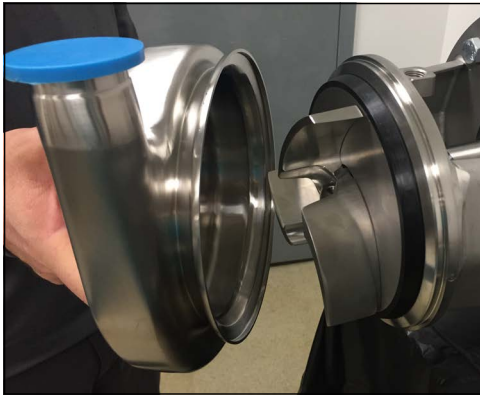
**NOTE:** C-214 shown. C-218 and C-328 impellers have 4 blades.





**Figure 51 - Impeller pin secured**

**NOTE:** Hold the impeller tight against the stub shaft and rotate the shaft one-quarter turn until the impeller pin drops and secures the impeller.

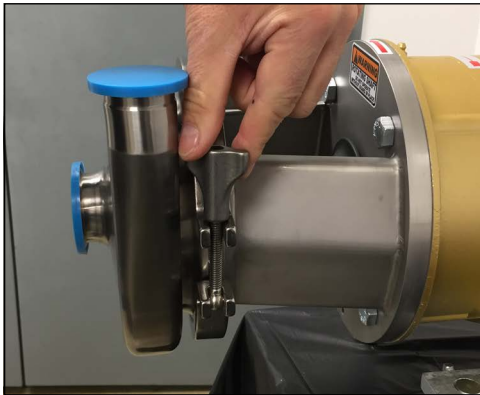


**Figure 52 - Install casing**

### Install the pump casing and guard

1. Place the casing over the impeller/backplate.

**NOTE:** If necessary, use a soft rubber mallet to line up the casing.



**Figure 53 - Install clamp**

2. Close and tighten the clamp.

**NOTE:** Check for strain or misalignment of piping to the casing. Re-adjust the casing ports and/or entire motor, leveling as necessary.

3. Assemble the cascade water fitting (part 60112+, if included).



**Figure 54 - Install guard assembly**

4. Install the guard assembly and tighten it in place. Assemble the suction and discharge lines to the casing.

## Pump Disassembly - Sealed Impeller Design

Items required to work on a C-Series Sealed Impeller Pump:

- Mallet
- Allen Wrench (Seal Carrier)
- Allen Socket (Shaft Collar)
- Socket (Impeller Nut)
- Wrench (Motor Adapter)
- Driver Ratchet
- 0.060 inch shims
- Anti-seize compound



Figure 55 - Guard assembly



Figure 56 - Remove casing clamp



Figure 57 - Remove casing

**NOTE:** For Pin Impeller design, see “Pump Disassembly - Pin Impeller Design” on page 18.

**NOTE:** SPX FLOW recommends replacing elastomers every time the pump is serviced

### **⚠ DANGER**

*The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair pump unless all power is off and locked out and the pump is de-pressurized.*

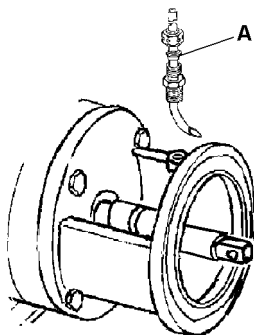
### **⚠ DANGER**

*To avoid serious injury, shut off and drain product from the pump prior to disconnecting the piping.*

1. Shut off the product flow to the pump and relieve any product pressure.
2. Shut off and lock out power to the pump.
3. Disconnect the suction and discharge pipe fittings.
4. Using a wrench, remove the guard assembly.
5. Loosen the casing clamp wing nut. While holding the pump casing, remove the clamp.

**NOTE:** On the C-100, remove the casing wing nuts.

6. Remove the casing and inspect the clamps and the casing for damage or wear. Replace if necessary.



**Figure 58 - Remove water cascade**



**Figure 59 - Remove casing gasket**



**Figure 60 - Loosen impeller nut**



**Figure 61 - Remove impeller nut**

7. Remove the water cascade attachment from the adapter (if included). See Figure 22, item A.

8. Remove the gasket from the pump backplate and inspect it for wear and sealing failure. Replace if necessary.

9. Loosen the impeller nut.

**NOTE:** You can keep the impeller from turning by placing an Allen wrench on the shaft collar screw.

10. Remove the impeller nut from the stub shaft.

**⚠ WARNING**

The pump components and piping may contain sharp edges. Handle the impeller carefully because edges may be sharp. Wear gloves while installing and servicing the pump to help avoid injuries from these hazards.



**Figure 62 - Remove O-ring from impeller nut**

11. Remove the impeller nut O-ring from the impeller nut.



**Figure 63 - Remove impeller**

12. Remove the impeller from the stub shaft.

**NOTE:** C-214 shown. C-218 and C-328 impellers have 4 blades.

**⚠ WARNING**

The pump components and piping may contain sharp edges. Handle the impeller carefully because edges may be sharp. Wear gloves while installing and servicing the pump to help avoid injuries from these hazards.



**Figure 64 - Remove stub shaft O-ring**

13. Remove the stub shaft O-ring.



**Figure 65 - Install backplate**

14. Rotate the backplate to disengage the backplate pins from the adapter pins, then remove it by pulling it straight off the adapter.

**NOTE:** Take care to protect the sealing face and edges of the backplate from nicks and scratches.





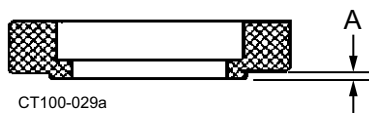
**Figure 66 - Remove seal, cup, and spring**



**Figure 67 - Remove key**



**Figure 68 - Remove O-ring**



**Figure 69 - Carbon Seal Measurements**



**Figure 70 - Loosen setscrews**



**Figure 71 - Remove drive collar**

15. Remove the seal, cup, and spring from the stub shaft.

16. Remove the key.

17. Remove the seal O-ring from the seal. Discard and replace the O-ring.

18. Carefully inspect the seal. Replace the seal if it is damaged or worn.

**NOTE:** When the extension end of the carbon seal is less than 1/32" (0.79 mm) (see Figure 69, item A), replace the seal.

19. Loosen the drive collar setscrews.

**NOTE:** Removing the drive collar is only necessary if you are removing the motor or adjusting the seal.

20. Remove the drive collar from the stub shaft.



Figure 72 - Loosen shaft collar screws



Figure 73 - Slide stub shaft off motor shaft



Figure 74 - Remove motor adapter bolts



Figure 75 - Remove motor adapter

## Remove Motor Adapter

**NOTE:** The shaft and motor adapter only need to be removed if you are replacing the motor.

1. Loosen the shaft collar screws.

2. Carefully remove the stub shaft and shaft collar.

**NOTE:** Examine the shaft sealing surfaces for nicks or scratches which can cause excessive O-ring wear or leaking. Replace if damaged.

3. Remove the motor adapter retaining bolts.

4. Remove the motor adapter.

**NOTE:** Motor maintenance, repair and wiring are not covered in this manual. For specific information, contact the motor manufacturer.

## Pump Assembly - Sealed Impeller Design

For components included in the C-Series Pin Impeller to Sealed Impeller Conversion Kit, see “C-Series Pin Impeller to Sealed Impeller Conversion Kits” on page 75.  
Note: the impeller is not part of the kit.



**Figure 76 - Sealed Impeller Components**  
(Note: only one set of O-rings is required)



**Figure 77 - Install motor adapter**



**Figure 78 - Install motor adapter bolts**

Items required to work on a C-Series Sealed Impeller Pump:

- Mallet
- Allen Wrench (Seal Carrier)
- Allen Socket (Shaft Collar)
- Socket (Impeller Nut)
- Wrench (Motor Adapter)
- Torque Wrench
- 0.060 inch shims
- Anti-seize compound

1. Lay out the sealed impeller components.

**NOTE:** C-214 shown. C-218 and C-328 impellers have 4 blades.

**NOTE:** If not installing or replacing a motor, skip to step 4.

2. Place the motor adapter onto the motor face. Mount the adapter so that the threaded hole for the water cascade (arrow) faces up.

3. Install and tighten the motor adapter retaining bolts.



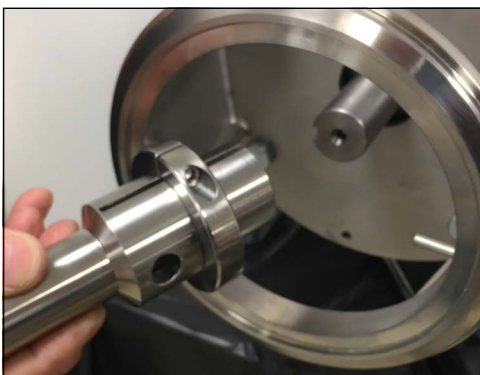
**Figure 79 - Remove shaft collar screws**



**Figure 80 - Apply anti-seize**



**Figure 81 - Slide shaft collar on stub shaft**



**Figure 82 - Slide stub shaft on motor shaft**

4. Remove both shaft collar screws.

5. Apply anti-seize to the threads. Reinstall the screws into the shaft collar, leaving them loose.

6. Slide the shaft collar onto the stub shaft. Line up the slots of the shaft collar with the slots on the stub shaft.

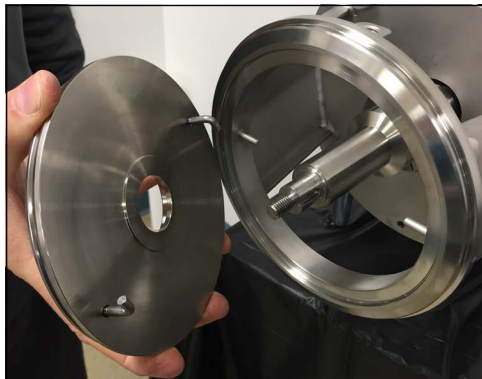
7. Slide the stub shaft onto the motor shaft.





**Figure 83 - Stub shaft on motor shaft**

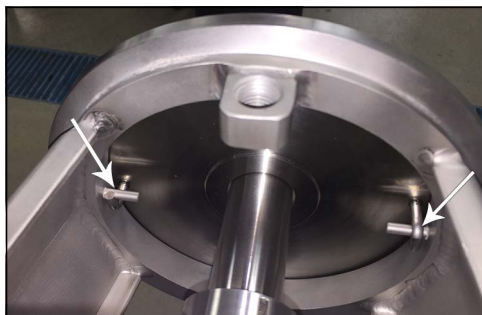
8. Figure 83 shows the stub shaft on the motor shaft. Leave the shaft collar loose.



**Figure 84 - Install backplate**

### Set backface clearance

1. Install the backplate onto the pump.



**Figure 85 - Twist backplate**

2. Twist the backplate so the locking tabs hook over the studs in the motor adapter.

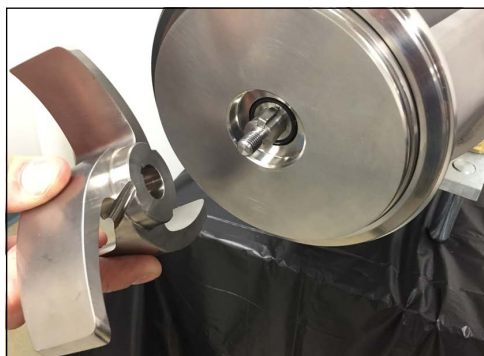


**Figure 86 - Install key**

3. Install the key into the stub shaft keyway.



**Figure 87 - Key installed**



**Figure 88 - Install impeller**



**Figure 89 - Install impeller nut**



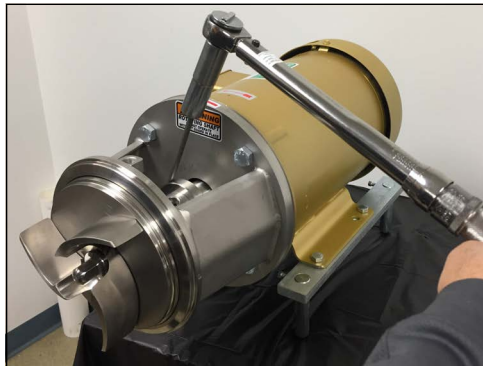
**Figure 90 - Place shim**

4. Figure 87 shows the key installed (arrow). Lightly coat the threads on the stub shaft with anti-seize.
5. Install the impeller onto the stub shaft as shown.  
**NOTE:** C-214 shown. C-218 and C-328 impellers have 4 blades.  
**NOTE:** Do not install any O-rings at this time.
6. Install the impeller nut onto the stub shaft.  
**NOTE:** Do not install any O-rings at this time.
7. Tighten the impeller nut by hand.
8. Place a 0.060 inch shim between the impeller and the back-plate of the pumps.



**Figure 91 - Tighten screws**

9. While pushing the impeller back, keeping the shim tight between the impeller and the backplate, tighten the screws on the shaft collar.



**Figure 92 - Torque shaft collar screws**

Torque the shaft collar screws to the specified torque.

NEMA Motor Frame	Tool Size	Shaft Collar Screw Torque, in-lb (N·m)
56C/140TC/180TC	3/16" Allen	80 (9.0)
210TC/250TC/ 280TC/280TSC	1/4" Allen	121 (13.7)
320TC/320TSC	5/16" Allen	220 (24.9)

## Install the pump seal

**NOTE:** “D” seal shown. For “DG” seal, see “Type “DG” Seal” on page 47 and for “E” seal, see “Type “E” Water-Cooled Balanced Double Seal” on page 50. Type “F” Seal is a “D” seal with a water cascade attachment.

1. Remove the impeller nut, impeller, and backplate from the pump. Place the drive collar onto the stub shaft.

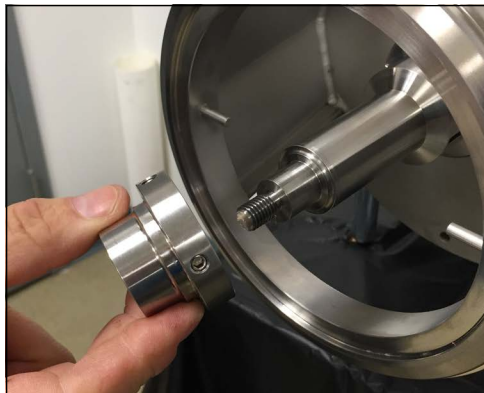


Figure 93 - Place drive collar on stub shaft

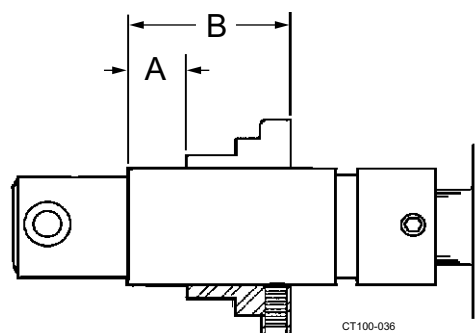


Figure 94 -Drive Collar for “D” Seal Type Adjustment

2. Use the “A” and “B” dimensions in Table 4 to properly locate the drive collar on the stub shaft. See Figure 94 and Figure 95. Tighten the setscrews to secure it in place.

Table 4: Drive Collar Location

Model	A	B
C-114	9/16" (14.3 mm)	1 7/16" (36.5 mm)
C-216	9/16" (14.3 mm)	1 23/32" (43.6 mm)
C-218	9/16" (14.3 mm)	1 41/64" (41.6 mm)
C-328	9/16" (14.3 mm)	1 41/64" (41.6 mm)

3. With the drive collar in place, tighten the drive collar set-screws.

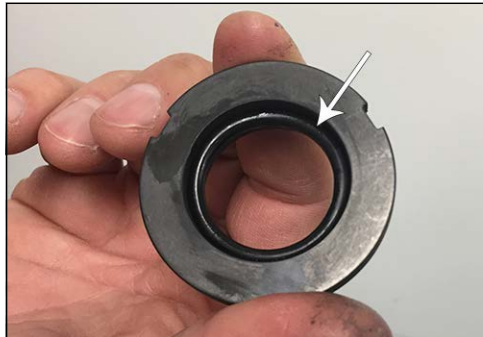


Figure 95 - Tighten setscrews





**Figure 96 - Install O-ring**



**Figure 97 - Seal O-ring installed**

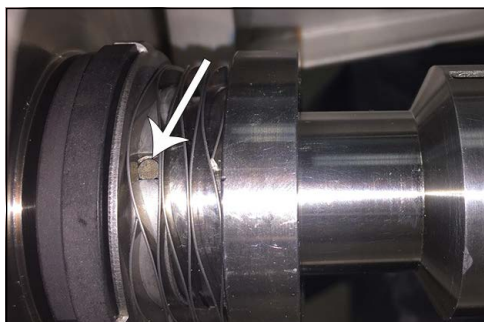


**Figure 98 - Line up groove and pin**



**Figure 99 - Push seal on stub shaft**

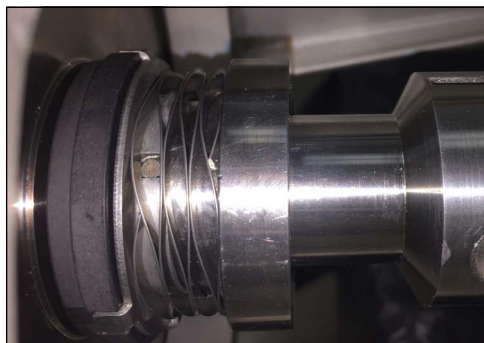
4. Install the lubricated seal O-ring into the seal.
5. Seal O-ring shown installed.
6. Install the seal, cup, and spring onto the stub shaft. Line up the groove on the cup with the pin on the stub shaft.
7. Push the seal onto the stub shaft until the pin on the stub shaft enters the groove on the cup.



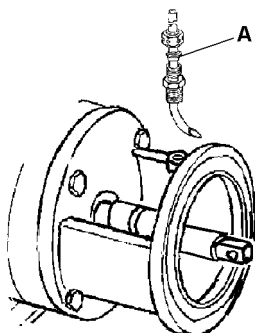
**Figure 100 - Stub shaft pin in groove**



**Figure 101 - Install backplate**



**Figure 102 - Seal with backplate installed**



**Figure 103 - Water cascade attachment**

8. The arrow shows the stub shaft pin in the groove on the cup.
9. Install the backplate on the pump. Twist the backplate to lock it on the retaining studs.
10. Figure 102 shows the seal with the backplate installed.
11. If supplied, install a water cascade (part no 60112+). Mount the water cascade (Figure 103, item A) in the adapter above the seal on the assembled backplate to flow water onto the seal face.
  - The connection is 1/4 inch (6.35 mm) O.D. tubing.
  - The required flow is approximately 5 U.S. gallons per hour (18.9 liters per hour).
  - The recommended water supply is cool and filtered. If the product solidifies at a cool temperature, use warm or hot water.

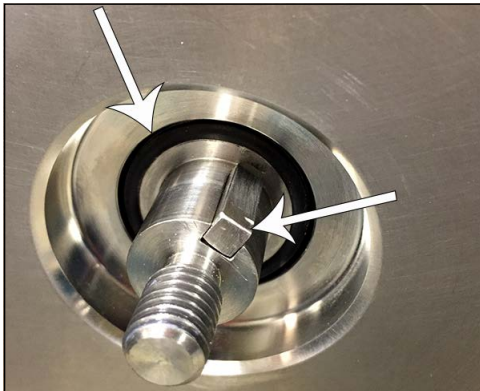
**NOTE:** Seal Type "F" is a "D" seal with a water cascade attachment.



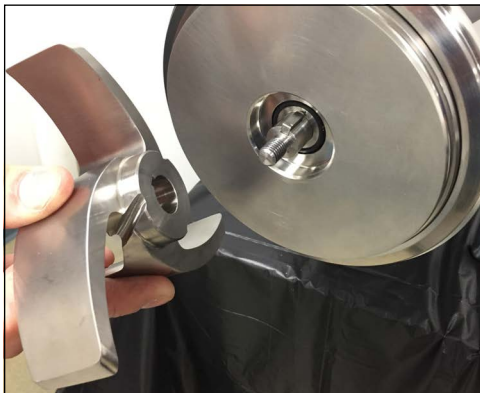
**Figure 104 - Lightly stretch O-ring**



**Figure 105 - Install stub shaft O-ring**



**Figure 106 - Stub shaft O-ring installed**



**Figure 107 - Install impeller on stub shaft**

## Install the impeller onto the pump

1. Lightly stretch the stub shaft O-ring if needed.
2. Install the stub shaft O-ring onto the stub shaft.
3. Figure 106 shows the stub shaft O-ring and key installed. Confirm that the stub shaft key is also installed in the keyway groove.
4. Install the impeller onto the stub shaft as shown.

**NOTE:** C-214 shown. C-218 and C-328 impellers have 4 blades.



Figure 108 - Install O-ring on impeller nut



Figure 109 - Install impeller nut



Figure 110 - Hand-tighten impeller nut



Figure 111 - Torque impeller nut

5. Install the lubricated impeller nut O-ring on the impeller nut.
6. Install the impeller nut onto the stub shaft.
7. Hand-tighten the impeller nut.
8. Torque the impeller nut to the correct specification.

**NOTE:** You can keep the impeller from turning by placing an Allen wrench on the shaft collar screw.

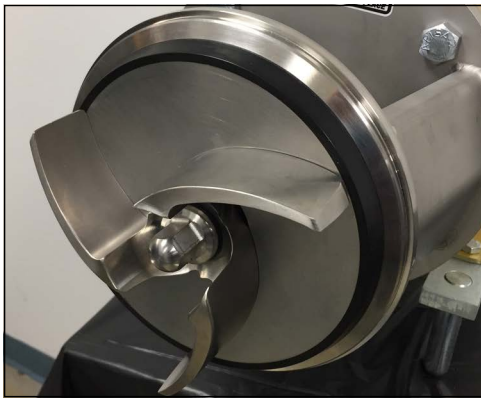
Table 5: Impeller Nut Torque/Tool Size

Pump Size	Torque ft-lb (N·m)	Tool Size (Allen wrench)
C-100	10 (14)	5/8"
C-114	6 (8)	7/16"
C-216	10 (14)	5/8"
C-218 / C-328	12 (16)	3/4"





**Figure 112 - Place casing gasket onto backplate**



**Figure 113 - Casing gasket installed**



**Figure 114 - Install casing**



**Figure 115 - Install casing clamp**

## Install the pump casing and guard

1. Place the lubricated casing gasket onto the pump backplate.

2. Figure 113 shows the casing gasket installed.

3. Install the casing onto the pump.

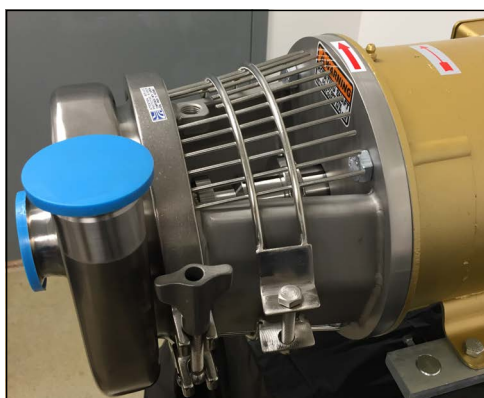
**NOTE:** If necessary, use a soft rubber mallet to line up the casing.

4. While holding the casing in place, install the casing clamp.



**Figure 116 - Hand-tighten casing clamp**

5. Hand-tighten the casing clamp.



**Figure 117 - Install guard assembly**

6. Install the guard assembly onto the pump as shown.

## Type “DG” Seal

The “DG” Seal uses the type “D” rotating seal components and incorporates a replaceable, clamped-in stationary seal seat.

**NOTE:** The C-100 is not available with “DG” or “E” seals.

Items in Figure 118:

11H	Backplate
17J	Gland Ring
17K	Stud
17L	Pin (on backplate, not shown)
17M	Lock washer
17N	Nut
80	Inboard Rotary Seal
80A	Seal Cup
80B	O-ring
80C	Spring
80N	Inboard Stationary Seal
80P	PTFE Gasket - Outboard (thin)
80R	PTFE Gasket - Inboard (thick)

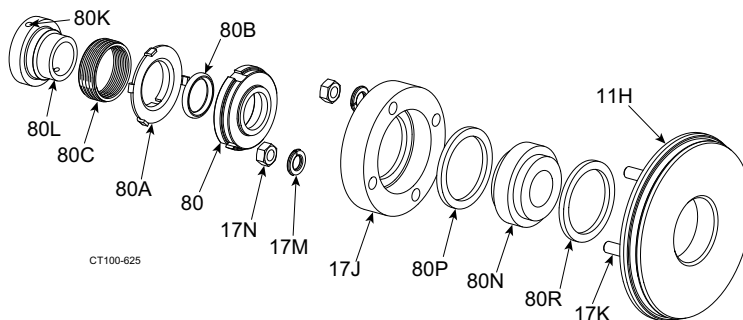
**NOTE:** A larger exploded view of the “DG” Seal with parts list is on page 70.

### **⚠ DANGER**

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair pump unless all power is off and locked out and the pump is de-pressurized.

### **⚠ DANGER**

To avoid serious injury, shut off and drain product from the pump prior to disconnecting the piping.



**Figure 118 - “DG” Seal exploded view**

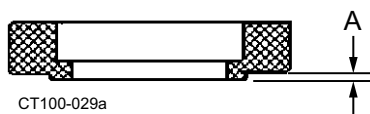
## Disassembly

1. Shut off the product flow to the pump and relieve any product pressure.
2. Shut off and lock out power to the pump.
3. Disconnect the suction and discharge pipe fittings.
4. Using a wrench, remove the guard assembly.
5. Loosen the casing clamp wing nut. While holding the pump casing, remove the clamp.
6. Remove the casing and inspect the clamps and the casing for damage or wear. Replace if necessary.
7. Remove the impeller and the backplate (See page 19 for pin impeller design or page 31 for the sealed impeller design.)

**NOTE:** Take care to protect the sealing face and edges of the backplate from nicks and scratches.

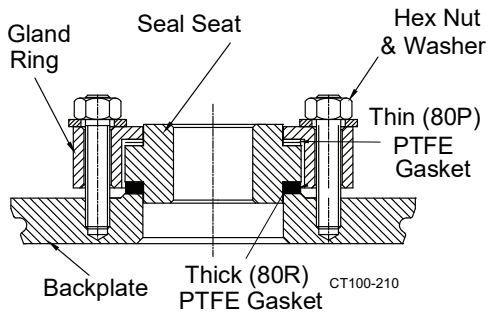
8. Pull the inboard rotary seal (item 80), O-ring (80B), seal cup (80A) and spring (80C) straight off the stub shaft to remove them.
9. Carefully inspect the O-ring and the inboard rotary seal for signs of abrasion, cuts, or other wear that could cause leakage.

**NOTE:** The inboard rotary seal (item 80) is available in TC, SC, and carbon. To measure wear on the carbon inboard rotary seal only: when the extension end of the carbon seal is less than 1/32" (0.79 mm) (see Figure 119, item A), replace the carbon seal.

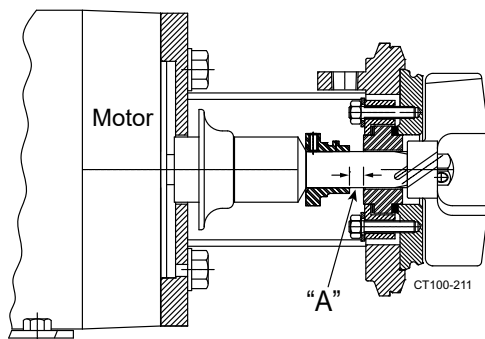


**Figure 119 - Carbon Seal Measurements**

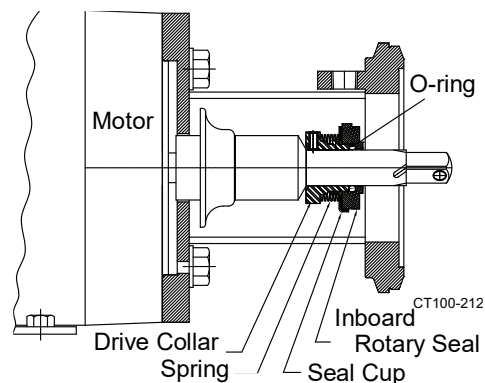
10. Remove four nuts and washers off the backplate to release the gland ring, seal seat and PTFE gaskets (see Figure 120). Examine them for signs of abrasion, cuts or other wear that could cause leakage and replace as required.



**Figure 120 - Stationary Seal Seat**



**Figure 121 - Drive Collar Adjustment for "DG" Seal (Pin Impeller Design shown)**



**Figure 122 - Installing Seal (Pin Impeller Design shown)**

## Reassembly

**NOTE:** The images refer to the pin impeller design, but the instructions apply to the sealed impeller design as well.

DG stationary seal seats are reversible as supplied by the factory. To reverse the DG seal, remove the four nuts and washers that secure the gland ring to the backplate, and lift off the gland ring. The stationary seat can be turned over to bring the unused surface into use.

**NOTE:** If the seal has been replaced or the drive collar loosened, it will need to be repositioned:

1. Assemble the PTFE gaskets, seal seat, gland ring, and washers on the backplate (as shown in Figure 120), and tighten them uniformly with the hex nuts.

**NOTE:** PTFE gaskets with different thicknesses are used. The thicker gasket (80R) must always be installed on the impeller side to prevent contact between the impeller hub and the stationary seat. (See Figure 118 on page 47 and Figure 120 on this page.)

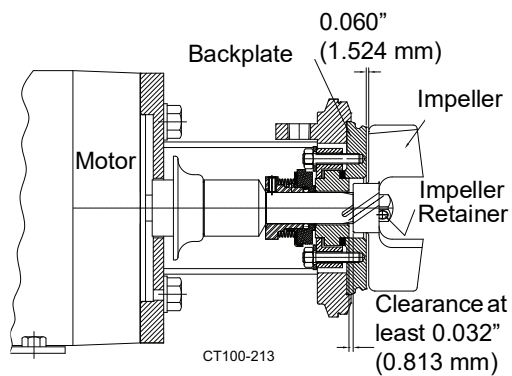
2. Place the drive collar onto the stub shaft.
3. Install the backplate, casing gasket, and casing.
4. Install and tighten the casing clamp.
5. Using an appropriate tool, set the drive collar to the dimension "A" as shown in Figure 121, and tighten the setscrew of the drive collar.

Model	Dimension "A"
C-114 / C-216	0.295" (7.5 mm)
C-218 / C-328	0.312" (7.9 mm)

6. Remove the casing clamp, casing and backplate.
7. Assemble the spring, seal cup, O-ring, and inboard rotary seal onto the drive collar. See Figure 122.

**NOTE:** Make sure that the pin on the drive collar is in line with the slot on the cup. (See Figure 45 on page 27.)





**Figure 123 - Installing backplate and impeller (Pin Impeller Design shown)**

8. Assemble the backplate and install the impeller. (See Figure 123.)
9. Before installing the casing, visually inspect the impeller hub and seal face to ensure that there is clearance between them. If no clearance is visible, disassemble the pump and move the stub shaft forward, to provide at least 0.032" (0.813 mm) clearance between the impeller hub and the seal seat face. (See Figure 123.)
10. Reset the seal drive collar if necessary. When the drive collar is properly positioned and the seal components are properly installed, the pump shaft should rotate freely by hand. If excessive effort is required to rotate the shaft, check to be sure that all components are properly installed.
11. Assemble the casing gasket and casing, and then install the clamp. Use a soft rubber mallet to line up the casing and tighten the clamp, then install the guard assembly.

## Type “E” Water-Cooled Balanced Double Seal

**NOTE:** The C-100 is not available with “DG”, “E” or “F” seals.

The Type “E” seal consists of two carbon seals inside a stuffing box that is attached to the backplate. Its sealing action is the same as the external balanced seal. This seal design is used in applications where a vacuum-tight, cool operating seal is required.

Periodically inspect all parts of the pump to prevent malfunctions caused by worn or broken parts.

Items in Figure 124 and Figure 125:

11B	Backplate
17	Stationary Gland Ring
17A	Screws (4)
17B	O-ring
17C	lock washer
80	Inboard Rotary Seal
80B	O-ring
80G	Cup
80H	Spring
80J	Drive Collar
83C	Stuffing Box
J	Stuffing Box and Backplate

**NOTE:** A larger exploded view of the “E” Seal with parts list is on page 71.

### ⚠ DANGER

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair pump unless all power is off and locked out and the pump is de-pressurized.

### ⚠ DANGER

To avoid serious injury, shut off and drain product from the pump prior to disconnecting the piping.

**NOTE:** Take care to protect the sealing face and edges of the backplate from nicks and scratches.

**NOTE:** Disassembly for repair is the same procedure as for cleaning.

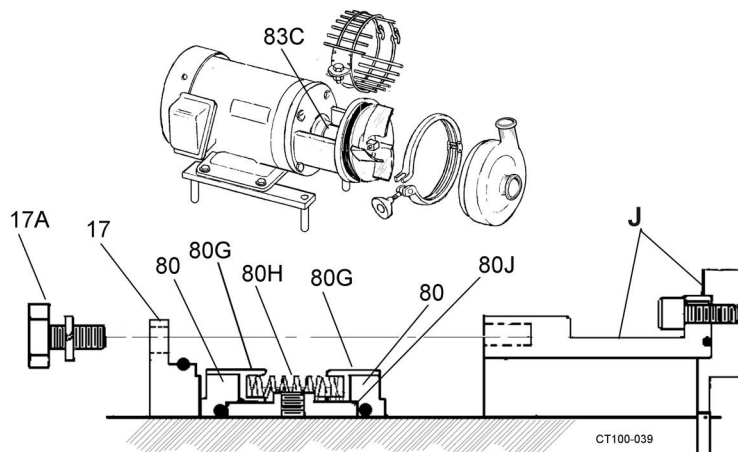


Figure 124 - Parts Stack for Stuffing Box

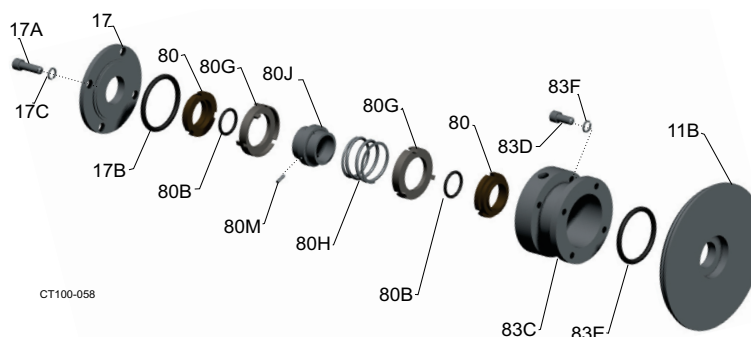
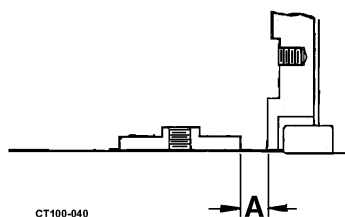


Figure 125 - “E” Seal Exploded View

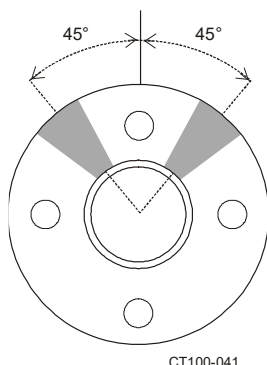
## Seal Servicing

1. Disconnect the water inlet and outlet from the stuffing box.
2. With a wrench of appropriate size, remove the guard assembly.
3. Remove the casing and clamp assembly.
4. Remove the four screws (17A) that retain the stationary gland ring (17) to the stuffing box.
5. Slide the stuffing box and backplate assembly forward off the stub shaft.
6. Remove the inboard rotary seal (80), seal O-ring (80B), cup (80G), and seal spring (80H) from the shaft.
7. Loosen the two setscrews and remove the drive collar (80J).
8. Remove the remaining inboard rotary seal, seal O-ring, cup, and stationary gland ring from the shaft.



**Figure 126 - Drive Collar to Backplate Dimension**

Model	Dimension "A"
C-114	5/16" (7.9 mm)
C-216, C-218, C-328	23/64" (9.12 mm)



**Figure 127 - Water Connection Locations**

## Installing the "E" Seal

1. Install the backplate, gasket, and casing.
2. Install and tighten the casing clamp.
3. Scribe a mark on the shaft at location "A" behind the backplate. See Figure 126.
4. Remove the casing clamp, casing, and backplate.
5. Slide the deflector (Pin Impeller design only), stationary gland ring, one inboard rotary seal, one seal O-ring, one seal cup, and drive collar onto the shaft.
6. Locate the drive collar in relation to the scribe mark and secure it to the shaft with the setscrews. See Figure 126.

**NOTE:** Drive collar location is critical.

7. Install the seal spring, seal cup, seal O-ring, and seal onto the shaft. See Figure 124 and Figure 125 on page 50.
8. Be sure that the spring is seated in each cup and the drive ear on each seat cup is not in alignment with the drive pins on the drive collar.
9. Slide the stuffing box and backplate assembly over the shaft and seal parts.
10. Secure the stationary gland ring to the stuffing box using four screws.
11. Assemble the guard assembly and tighten the nut.
12. Attach the water inlet and outlet to the stuffing box. Two 1/8" NPT (3.175 mm) water connections are provided on the stuffing box. They are spaced at 90° from each other and should be located at 45° to vertical when assembling the pump. Flush water must enter one of these connections and exit through the other.
13. The amount of water used will vary depending on the operating temperature of the pump. In vacuum applications, 10 drops per minute discharge is recommended.

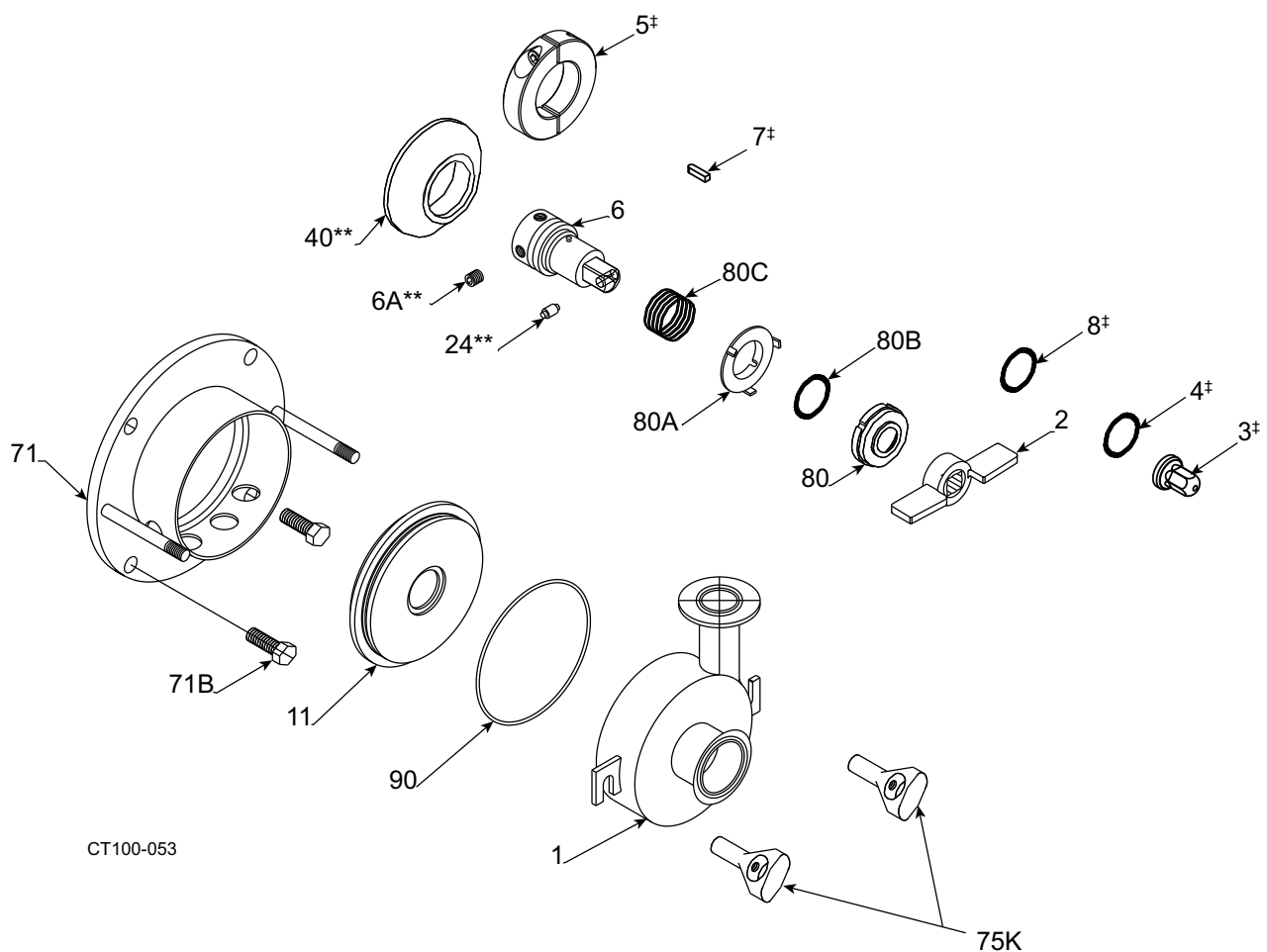
**NOTE:** Water must be piped through the stuffing box to keep the seal cool and vacuum-tight.

**NOTE:** Approximately 3 gallons per hour (11.36 liters per hour) is required to maintain the seal temperature at 100°F (38°C) when the product temperature is 175°F (79°C).

14. Assemble the casing gasket and casing, and then install the clamp. Use a soft rubber mallet to line up the casing and tighten the clamp, then install the guard assembly.

## Parts Lists

### C-100 Pump Parts



Shown with the standard type "D" seal

Item numbers with ‡ are for the Sealed Impeller Design only.

Item numbers with \*\* are for the Pin Impeller Design only.

## C-100 Pump Parts

ITEM	DESCRIPTION	QTY.	PART NO.	NOTES
1	Casing, 1.5" x 1" w/ S-Line Ports	1	60000+	1, 4
2	C100 Impeller - Pin Impeller Design, Full, 3.68" dia., 32 Ra finish	1	60026+	10, 11
	C100 Impeller - Sealed Impeller Design, Full, 3.68" dia., 32 Ra finish		138526+	9, 11
3	Impeller Nut - Sealed Impeller Design	1	138531+	9
* 4	Impeller Nut O-ring - Sealed Impeller Design, BUNA N	1	N70116	9
	Impeller Nut O-ring - Sealed Impeller Design, FKM		V70116	
	Impeller Nut O-ring - Sealed Impeller Design, EPDM		E70116	
5	Shaft Collar - Sealed Impeller Design, 56C Frame	1	138567+	9
	Shaft Collar - Sealed Impeller Design, 140TC Frame		135577+	
6	Stub Shaft, 56C Frame	1	60050+	10
	Stub Shaft, 140TC Frame		60051+	
	Stub Shaft - Sealed Impeller Design, 56C Frame	1	138535+	9
	Stub Shaft - Sealed Impeller Design, 140TC Frame		138536+	
6A	Shaft Set Screw, 56C, 140TC Frame	2	30-22	10
7	Impeller Key - Sealed Impeller Design	1	138584+	9
* 8	Stub Shaft O-ring - Sealed Impeller Design, BUNA N	1	N70116	9
	Stub Shaft O-ring - Sealed Impeller Design, FKM		V70116	
	Stub Shaft O-ring - Sealed Impeller Design, EPDM		E70116	
11	Backplate	1	60597+	4, 5
* 24	Impeller Retainer	1	60039+	10
40	Deflector, 56C, 140TC Frame	1	60042+	10
71	Adapter, 56C Frame	1	60596+	5
	Adapter, 140TC Frame		60600+	
71B	Adapter Mounting Bolt, 56C, 140TC Frames	4	30-30	
75K	Wing Nut	2	60083+	
* 80	Inboard Rotary Seal, Carbon	1	60084+	
80A	Seal Cup	1	60088+	
* 80B	Seal O-Ring, Buna N	1	N70214	
	Seal O-Ring, FKM		V70214	
	Seal O-Ring, EPDM		E70214	
80C	Spring	1	60091+	
* 90	Casing O-Ring, Buna N	1	N70153	
	Casing O-Ring, FKM		V70153	
	Casing O-Ring, EPDM		E70153	

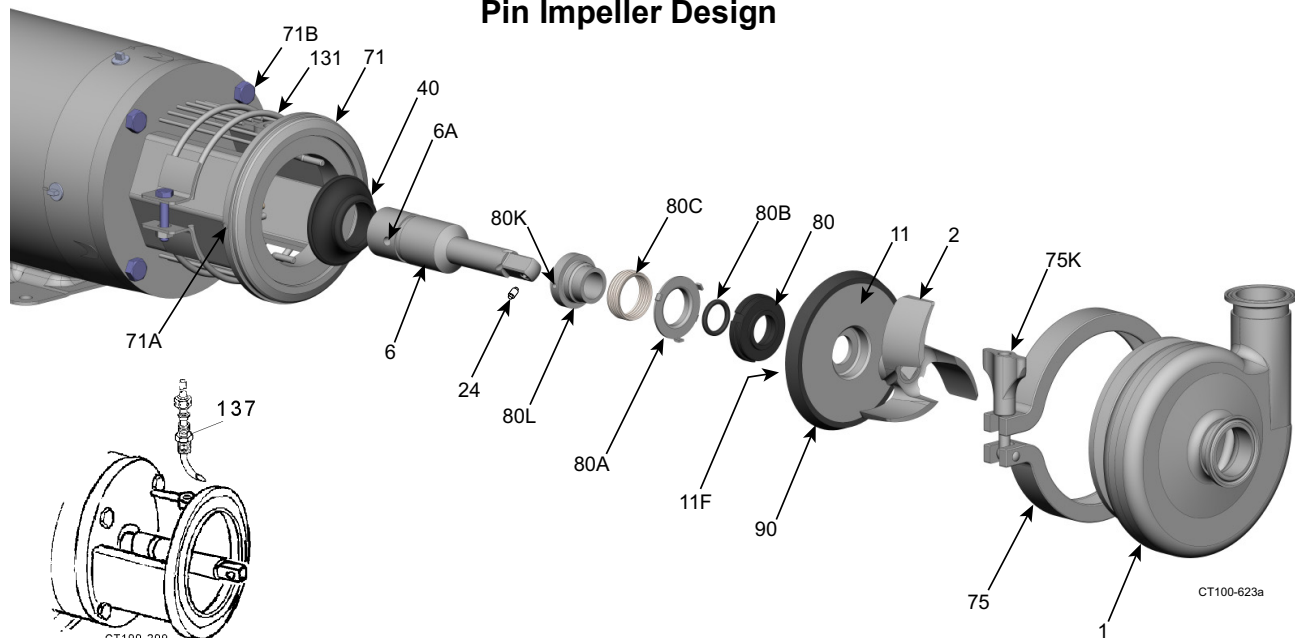
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## Notes:

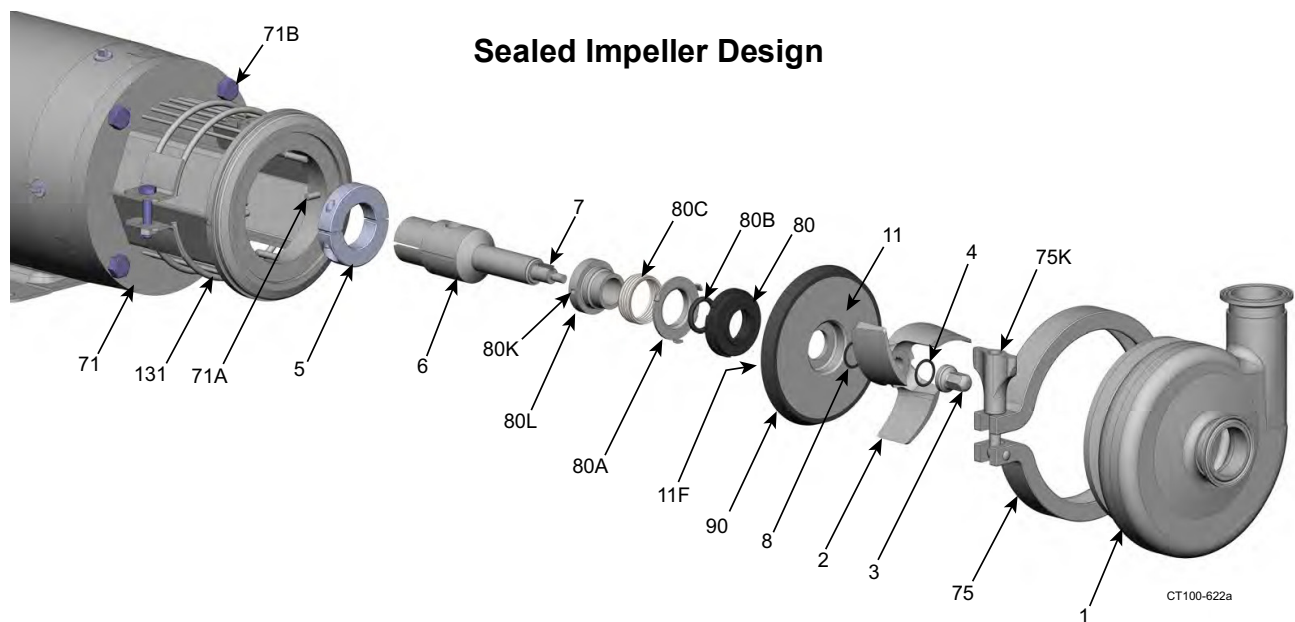
- \* Recommended Spare Parts - also available in kits (see page 72)
- 1. For casings with Bevel threaded, Female I-Line, NPT or Flanged connections, please contact factory.
- 4. Contact factory if casing drain, passivation, or optional finish is required.
- 5. For a pump shipped prior to approx. April 1999: item 11 or item 71 alone will not work; need both the backplate (item 11) and adapter (item 71) as well as a casing O-ring (item 90). Contact factory with serial no.
- 9. Applies **only** to the Sealed Impeller Design.
- 10. Does not apply to the Sealed Impeller Design; applies **only** to the Pin Impeller Design.
- 11. Contact your local distributor for other impeller sizes and finishes.
- 12. C-100 is not available with DG or E seals. Standard "D" type is shown.

## C-114 Pump Parts

### Pin Impeller Design



### Sealed Impeller Design



Shown with standard type "D" Seal

For other optional seals, see "Type E" Water-Cooled Balanced Double Seal Option" on page 71 and "Type DG" Seal Assembly Option" on page 70. Type "F" seal is a type "D" seal with a water cascade attachment.



## C-114 Pump Parts

ITEM	DESCRIPTION	QTY.	PART NO.	NOTES
1	Casing, 1-1/2" x 1-1/2" w/ S-Line Ports	1	60001+	1, 4
	Casing, 2" x 1-1/2" w/ S-Line Ports	1	60002+	1, 4
2	C114 Impeller - Pin Impeller Design, Full, 4.0" dia., 32 Ra finish	1	60027+	10, 11
	C114 Impeller - Sealed Impeller Design, Full, 4.0" dia., 32 Ra finish		138527+	9, 11
3	Impeller Nut - Sealed Impeller Design	1	138532+	9
* 4	<b>Impeller Nut O-ring - Sealed Impeller Design, BUNA N</b>	1	N70015	9
	<b>Impeller Nut O-ring - Sealed Impeller Design, FKM</b>		V70015	
	<b>Impeller Nut O-ring - Sealed Impeller Design, EPDM</b>		E70015	
5	Shaft Collar - Sealed Impeller Design, 56C Frame	1	138567+	9
	Shaft Collar - Sealed Impeller Design, 140TC Frame		135577+	
	Shaft Collar - Sealed Impeller Design, 180TC Frame		135580+	
6	Stub Shaft, 56C Frame	1	60052+	2, 10
	Stub Shaft, 140TC Frame		60053+	
	Stub Shaft, 180TC Frame		60054R2	
	Stub Shaft - Sealed Impeller Design, 56C Frame		138538+	9
	Stub Shaft - Sealed Impeller Design, 140TC Frame		138539+	
	Stub Shaft - Sealed Impeller Design, 180TC Frame		138540+	
6A	Shaft Setscrew, for 56C - 180TC Frame Stub Shafts	2	30-22	2, 10
7	Impeller Key - Sealed Impeller Design	1	138585+	9
* 8	<b>Stub Shaft O-ring - Sealed Impeller Design, BUNA N</b>	1	N70015	9
	<b>Stub Shaft O-ring - Sealed Impeller Design, FKM</b>		V70015	
	<b>Stub Shaft O-ring - Sealed Impeller Design, EPDM</b>		E70015	
11	Backplate	1	60010+	4, 5, 8
11F	Backplate Pin	2	60013+	8
* 24	<b>Impeller Retainer</b>	1	60039+	10
40	Deflector, 56C - 140TC Frame	1	60042+	2, 10
	Deflector, 180TC Frame		60043+	

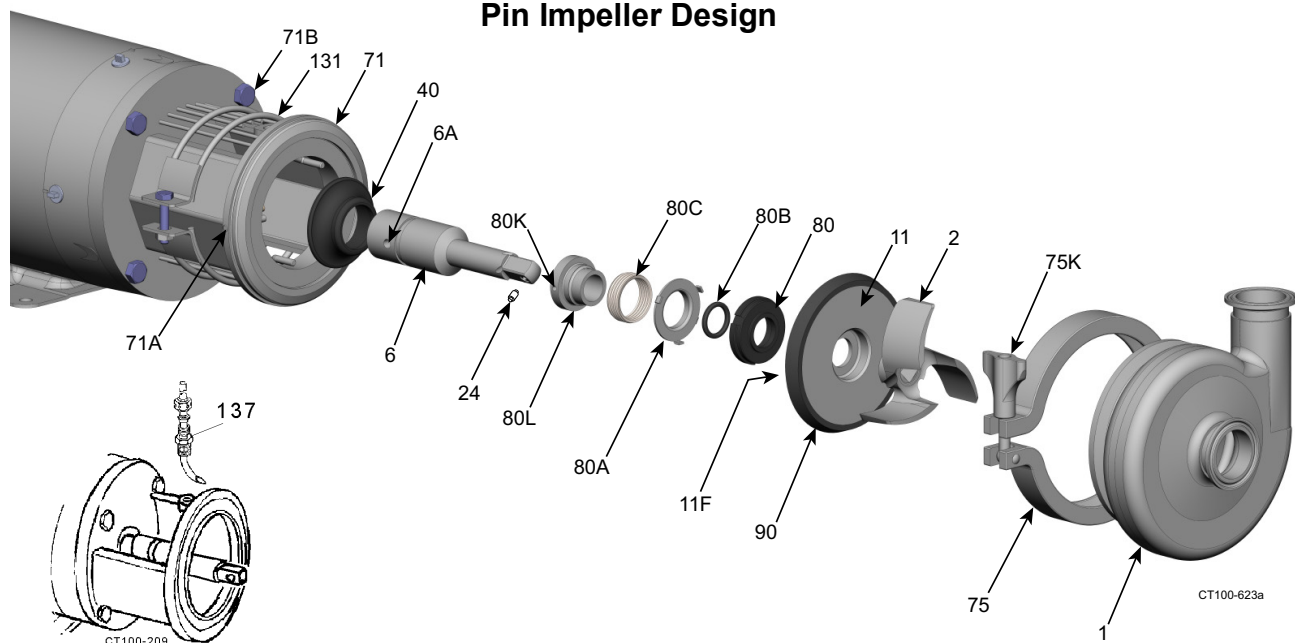
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## Notes:

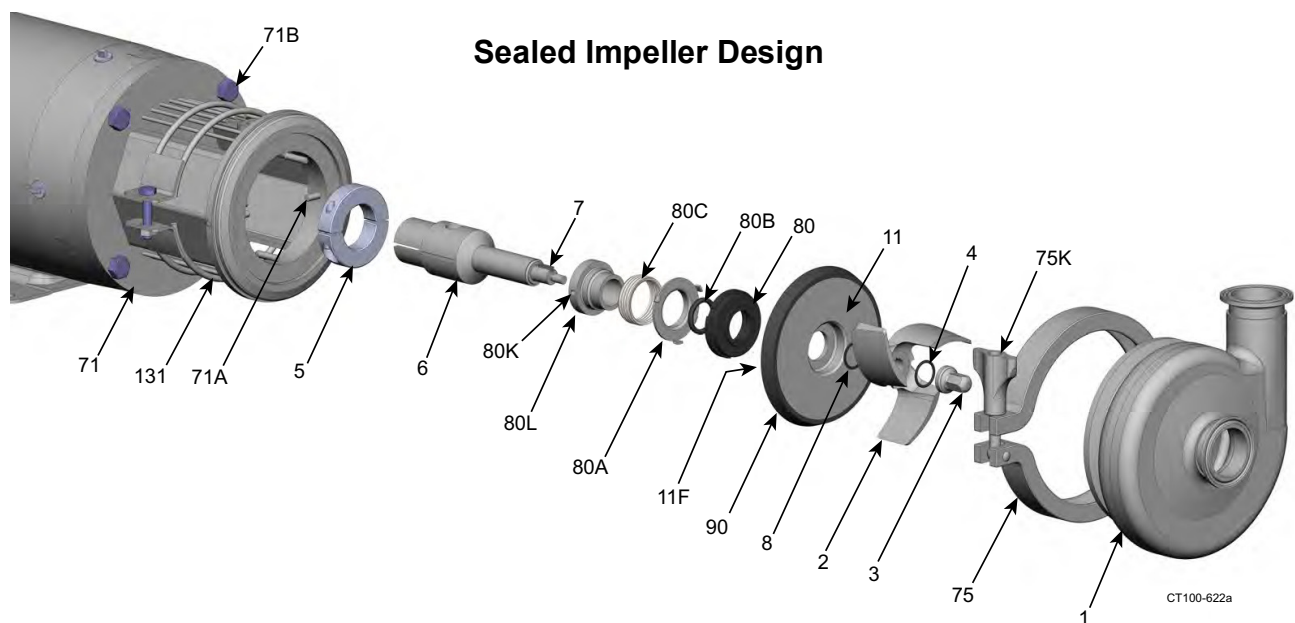
- \* Recommended Spare Parts - also available in kits (see page 72)
- 1. For casings with Bevel threaded, Female I-Line, NPT or Flanged connections, please contact factory.
- 2. These items are needed to change the motor adapter.
- 4. Contact factory if casing drain, passivation, or optional finish is required.
- 5. For a pump shipped prior to approx. April 1999: item 11 or item 71 alone will not work; need both backplate (item 11) and adapter (item 71) as well as the casing O-ring (item 90). Contact factory with serial no.
- 9. Applies **only** to the Sealed Impeller Design.
- 10. Does not apply to the Sealed Impeller Design; applies **only** to the Pin Impeller Design.
- 11. Contact your local distributor for other impeller sizes and finishes.
- 12. Type "F" seal is a type "D" seal with a water cascade attachment.

## C-114 Pump Parts, continued

### Pin Impeller Design



### Sealed Impeller Design



Shown with standard type "D" Seal

For other optional seals, see "Type "E" Water-Cooled Balanced Double Seal Option" on page 71 and "Type "DG" Seal Assembly Option" on page 70. Type "F" seal is a type "D" seal with a water cascade attachment.

## C-114 Pump Parts, continued

ITEM	DESCRIPTION	QTY.	PART NO.	NOTES
71	304 SS Adapter, 56C - 140TC Frame	1	60748+	2
	304 SS Adapter, 180TC Frame		60749+	
71A	Adapter Pin	2	30-434	
71B	Adapter Mounting Bolt, 56C - 140TC Frame	4	30-60	2
	Adapter Mounting Bolt, 180TC Frame		30-36X	
75	Clamp Assembly	1	60080+	
75K	Wing Nut	1	60083+	
* 80	Inboard Rotary Seal, Carbon	1	60085+	7
80A	Seal Cup	1	60088+	
* 80B	Seal O-Ring, Buna N	1	N70210	
	Seal O-Ring, FKM		V70210	
	Seal O-Ring, EPDM		E70210	
80C	Spring	1	60091+	
80K	Setscrew	2	60570+	
80L	Drive Collar	1	60094R1	
* 90	Casing Gasket, Buna N	1	60099+	
	Casing Gasket, FKM		60100+	
	Casing Gasket, EPDM		60626+	
131	Guard Assembly, 56C - 140TC	1	60782+	2
	Guard Assembly, 180TC Frame		60783+	
137	Water Cascade Inlet Assembly, optional	1	60112+	12

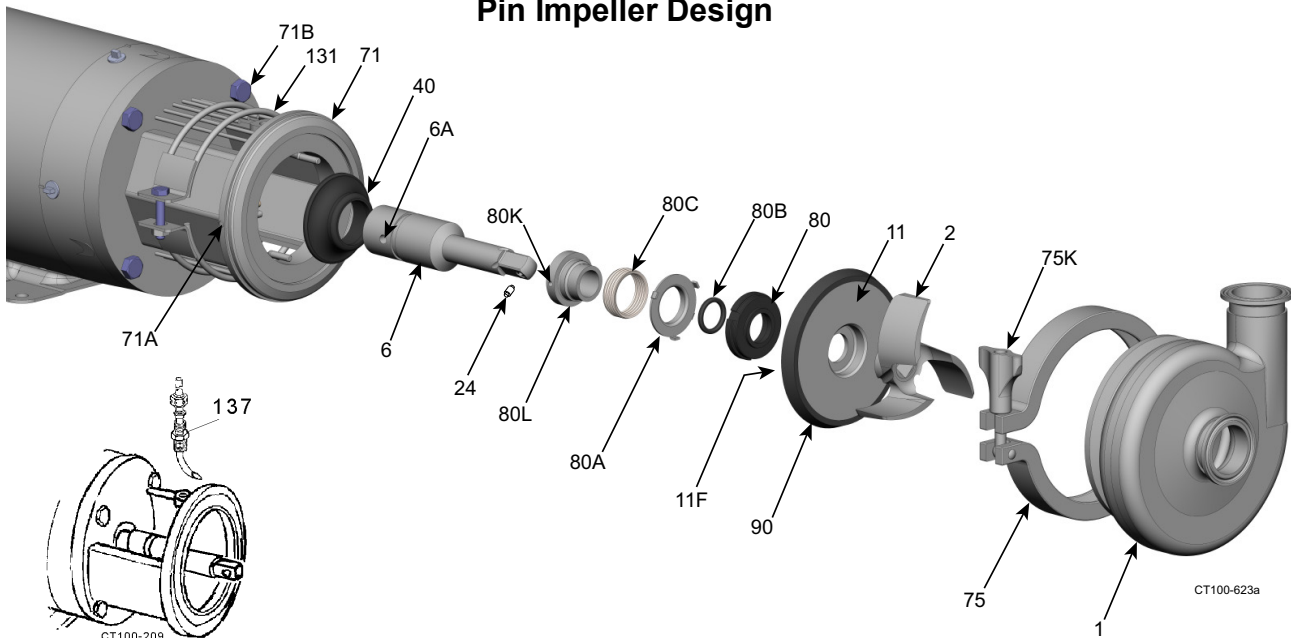
PL5050-CH2b

## Notes:

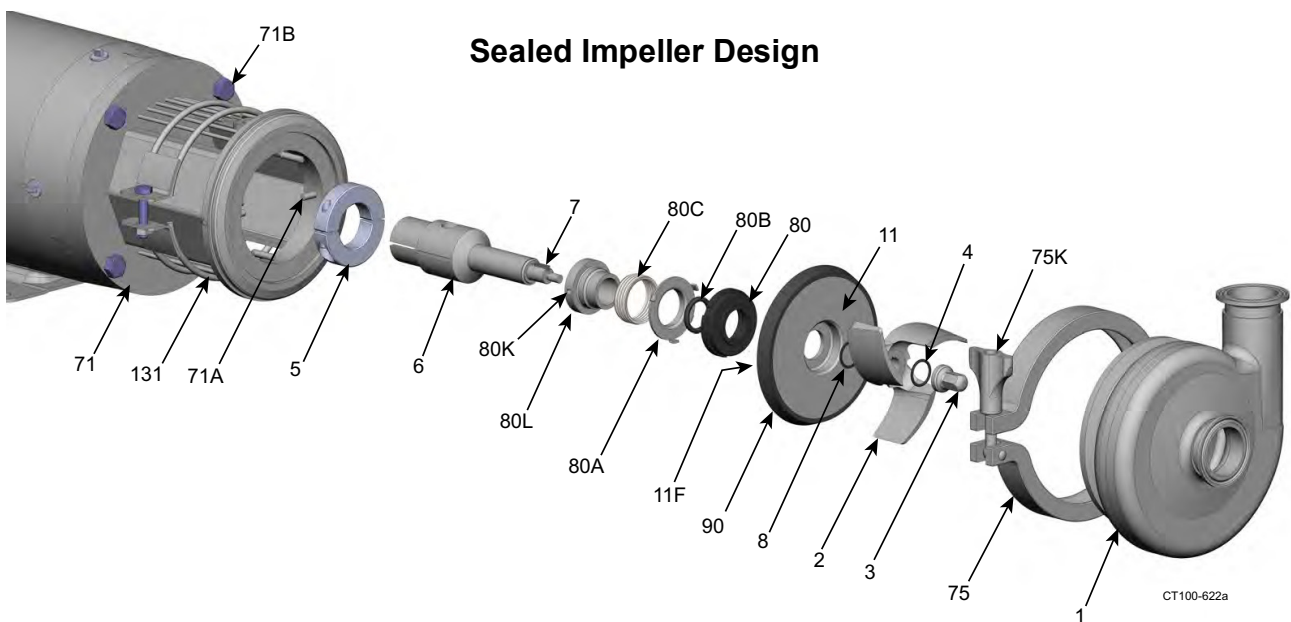
- \* Recommended Spare Parts - also available in kits (see page 72)
- 1. For casings with Bevel threaded, Female I-Line, NPT or Flanged connections, please contact factory.
- 2. These items are needed to change the motor adapter.
- 4. Contact factory if casing drain, passivation, or optional finish is required.
- 5. Used with standard "D" seal only.
- 7. Shown with standard type "D" Seal. For other optional seals, see page 70 and page 71.
- 8. Backplate pins (11F) are included with the backplate if purchased as a spare part.
- 9. Applies **only** to the Sealed Impeller Design.
- 10. Does not apply to the Sealed Impeller Design; applies **only** to the Pin Impeller Design.
- 11. Contact your local distributor for other impeller sizes and finishes.
- 12. Type "F" seal is a type "D" seal with a water cascade attachment.

## C-216 Pump Parts

### Pin Impeller Design



### Sealed Impeller Design



Shown with standard type "D" Seal

For other optional seals, see "Type "E" Water-Cooled Balanced Double Seal Option" on page 71 and "Type "DG" Seal Assembly Option" on page 70. Type "F" seal is a type "D" seal with a water cascade attachment.

## C-216 Pump Parts

ITEM	DESCRIPTION	QTY.	PART NO.	NOTES
1	Casing, 2" x 1-1/2" w/ S-Line Ports	1	60003+	1, 4
	Casing, 2-1/2" x 1-1/2" w/ S-Line Ports		60004+	
2	C216 Impeller - Pin Impeller Design, Full, 6.0" dia., 32 Ra finish	1	60028+	10, 11
	C216 Impeller - Sealed Impeller Design, Full, 6.0" dia., 32 Ra finish		138528+	9, 11
3	Impeller Nut - Sealed Impeller Design	1	138533+	9
* 4	<b>Impeller Nut O-ring - Sealed Impeller Design, BUNA N</b>	1	N70118	9
	<b>Impeller Nut O-ring - Sealed Impeller Design, FKM</b>		V70118	
	<b>Impeller Nut O-ring - Sealed Impeller Design, EPDM</b>		E70118	
5	Shaft Collar - Sealed Impeller Design, 56C Frame	1	138567+	9
	Shaft Collar - Sealed Impeller Design, 140TC Frame		135577+	
	Shaft Collar - Sealed Impeller Design, 180TC Frame		135580+	
	Shaft Collar - Sealed Impeller Design, 210TC Frame		135698+	
	Shaft Collar - Sealed Impeller Design, 250TC Frame		135700+	
6	Stub Shaft, 56C Frame	1	60055+	2, 10
	Stub Shaft, 140TC Frame		60056+	
	Stub Shaft, 180TC Frame		60057+	
	Stub Shaft, 210TC Frame		60058R3	
	Stub Shaft, 250TC Frame		60059R3	
	Stub Shaft - Sealed Impeller Design, 56C Frame		138544+	9
	Stub Shaft - Sealed Impeller Design, 140TC Frame		138545+	
	Stub Shaft - Sealed Impeller Design, 180TC Frame		138546+	
	Stub Shaft - Sealed Impeller Design, 210TC Frame		138547+	
	Stub Shaft - Sealed Impeller Design, 250TC Frame		138548+	
6A	Shaft Setscrew, 56C - 180TC Frame	2	30-38	2, 10
	Shaft Setscrew, 210TC - 250TC Frame	4	30-38	
7	Impeller Key - Sealed Impeller Design	1	138586+	9
* 8	<b>Stub Shaft O-ring - Sealed Impeller Design, BUNA N</b>	1	N70118	9
	<b>Stub Shaft O-ring - Sealed Impeller Design, FKM</b>		V70118	
	<b>Stub Shaft O-ring - Sealed Impeller Design, EPDM</b>		E70118	
11	Backplate	1	60011+	4, 5, 8
11F	Backplate Pin	2	60013+	8

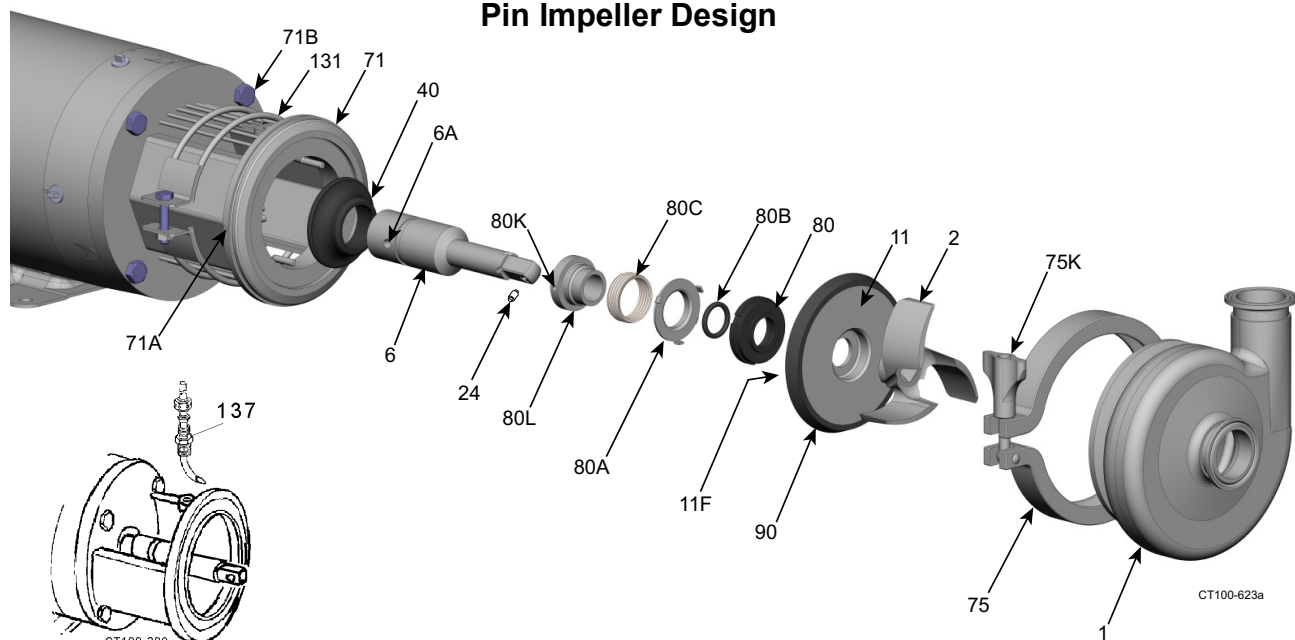
PL5050-CH3

## Notes:

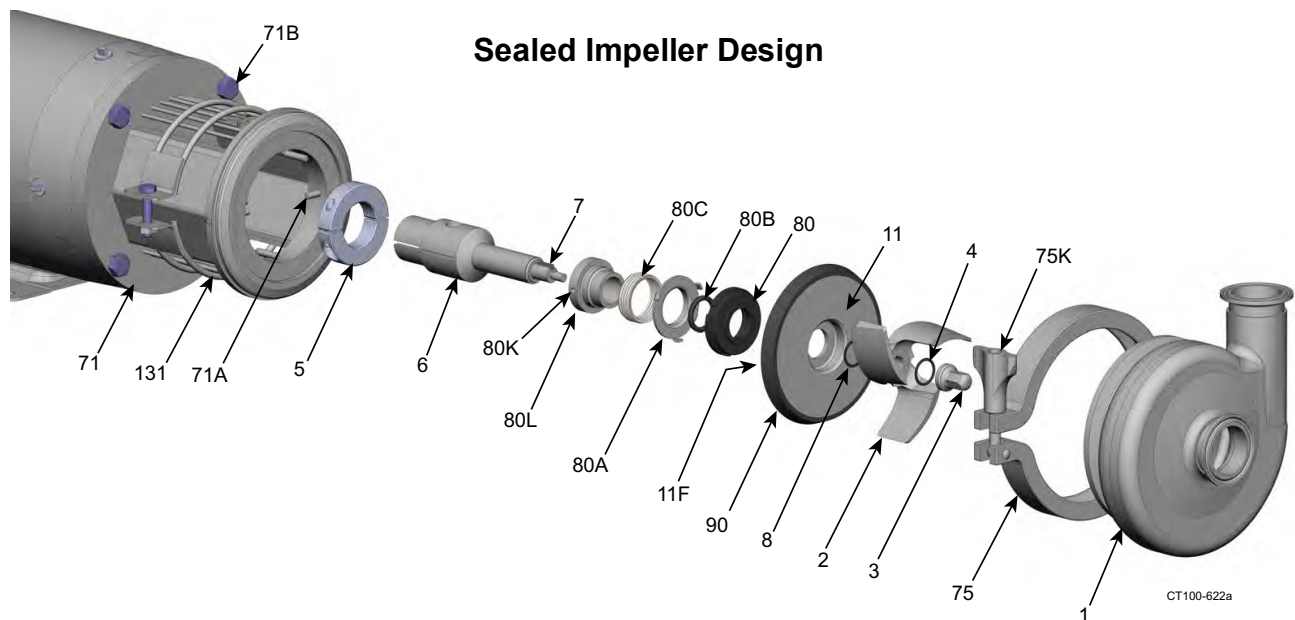
- \* Recommended Spare Parts - also available in kits (see page 72)
- 1. For casings with Bevel threaded, Female I-Line, NPT or Flanged connections, please contact factory.
- 2. These items are needed to change the motor adapter.
- 4. Contact factory if casing drain, passivation, or optional finish is required.
- 5. Used with standard "D" seal only.
- 7. Shown with standard type "D" Seal. For other optional seals, see page 70 and page 71.
- 8. Backplate pins (11F) are included with the backplate if purchased as a spare part.
- 9. Applies **only** to the Sealed Impeller Design.
- 10. Does not apply to the Sealed Impeller Design; applies **only** to the Pin Impeller Design.
- 11. Contact your local distributor for other impeller sizes and finishes.
- 12. Type "F" seal is a type "D" seal with a water cascade attachment.

## C-216 Pump Parts, continued

### Pin Impeller Design



### Sealed Impeller Design



Shown with standard type "D" Seal

For other optional seals, see "Type "E" Water-Cooled Balanced Double Seal Option" on page 71 and "Type "DG" Seal Assembly Option" on page 70. Type "F" seal is a type "D" seal with a water cascade attachment.



**C-216 Pump Parts, continued**

ITEM	DESCRIPTION	QTY.	PART NO.	NOTES
* 24	<b>Impeller Retainer</b>	1	60040+	
40	Deflector, 56C - 184TC Frame	1	60044+	2, 10
	Deflector, 213TC - 215TC		60045+	
	Deflector, 254TC - 256TC Frame		60046+	
71	304 SS Adapter, 56C - 145TC Frame	1	60750+	2
	304 SS Adapter, 182TC - 184TC Frame		60751+	
	304 SS Adapter, 213TC - 215TC Frame		60752+	
	304 SS Adapter, 254TC - 256TC Frame		60753+	
71A	Adapter Pin	2	30-434	
71B	Adapter Mounting Bolt, 56C - 145TC Frame	4	30-60	2
	Adapter Mounting Bolt, 182TC - 256TC Frame		30-36X	
75	Clamp Assembly	1	60081+	
75K	Wing Nut	1	60083+	
* 80	<b>Inboard Rotary Seal, Carbon</b>	1	60086+	7
80A	Seal Cup	1	60089+	
* 80B	<b>Seal O-Ring, Buna N</b>	1	N70216	
	<b>Seal O-Ring, FKM</b>		V70216	
	<b>Seal O-Ring, EPDM</b>		E70216	
80C	Spring	1	60092+	
80K	Set Screw	2	30-178	
80L	Drive Collar	1	60095R1	
* 90	<b>Casing Gasket, Buna N</b>	1	60101+	
	<b>Casing Gasket, FKM</b>		60102+	
	<b>Casing Gasket, EPDM</b>		60627+	
131	Guard Assembly, 56C - 145TC	1	60784+	2
	Guard Assembly, 182TC - 184TC Frame		60785+	
	Guard Assembly, 213TC - 215TC Frame		60786+	
	Guard Assembly, 254TC - 256TC Frame		60787+	
137	Water Cascade Inlet Assembly, optional	1	60112+	12

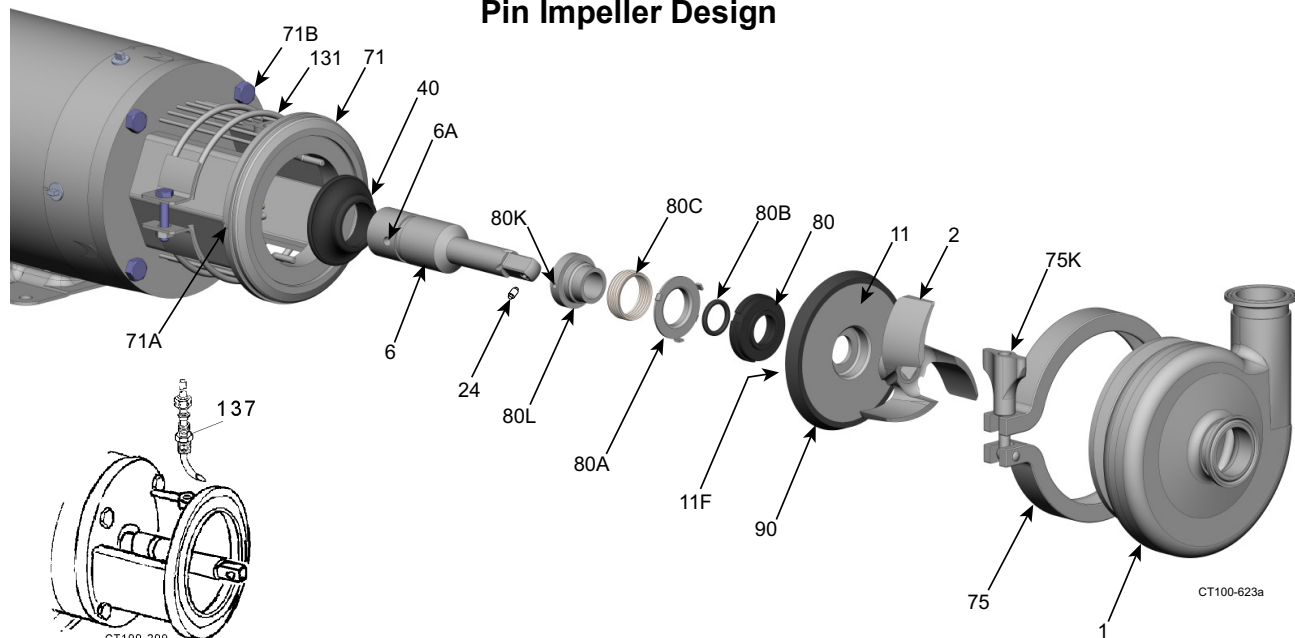
PL5050-CH3b

## Notes:

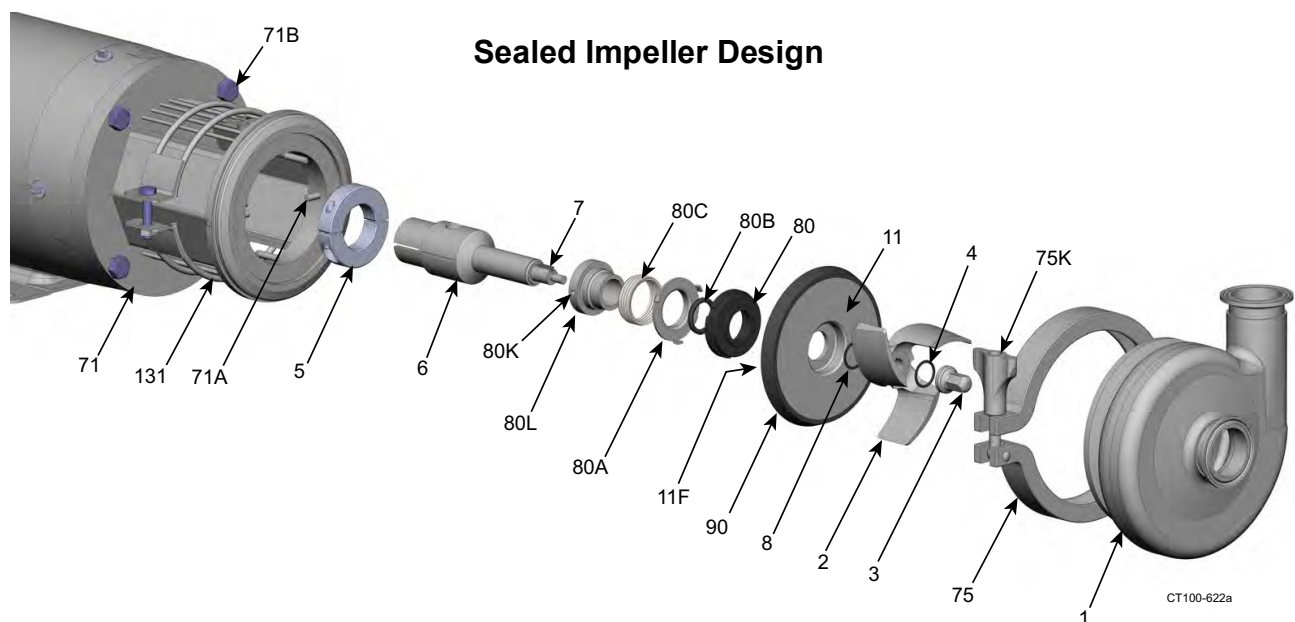
- \* Recommended Spare Parts - also available in kits (see page 72)
- 1. For casings with Bevel threaded, Female I-Line, NPT or Flanged connections, please contact factory.
- 2. These items are needed to change the motor adapter.
- 4. Contact factory if casing drain, passivation, or optional finish is required.
- 5. Used with standard "D" seal only.
- 7. Shown with standard type "D" Seal. For other optional seals, see page 70 and page 71.
- 8. Backplate pins (11F) are included with the backplate if purchased as a spare part.
- 9. Applies **only** to the Sealed Impeller Design.
- 10. Does not apply to the Sealed Impeller Design; applies **only** to the Pin Impeller Design.
- 11. Contact your local distributor for other impeller sizes and finishes.
- 12. Type "F" seal is a type "D" seal with a water cascade attachment.

## C-218 Pump Parts

### Pin Impeller Design



### Sealed Impeller Design



Shown with standard type "D" Seal

For other optional seals, see "Type "E" Water-Cooled Balanced Double Seal Option" on page 71 and "Type "DG" Seal Assembly Option" on page 70. Type "F" seal is a type "D" seal with a water cascade attachment.

Note: C-214 shown. C-218 and C-328 impellers have 4 blades.

## C-218 Pump Parts

ITEM	DESCRIPTION	QTY.	PART NO.	NOTES
1	Casing, 2" x 1-1/2" w/ S-Line Ports	1	60005R2	1, 4
	Casing, 3" x 1-1/2" w/ S-Line Ports		60006+	
2	C218 Impeller - Pin Impeller Design, Full, 7.875" dia., 32 Ra finish	1	60029+	10, 11
	C218 Impeller - Sealed Impeller Design, Full, 7.875" dia., 32 Ra finish		138529+	9, 11
3	Impeller Nut - Sealed Impeller Design	1	138534+	9
* 4	<b>Impeller Nut O-ring - Sealed Impeller Design, BUNA N</b>	1	N70124	9
	<b>Impeller Nut O-ring - Sealed Impeller Design, FKM</b>		V70124	
	<b>Impeller Nut O-ring - Sealed Impeller Design, EPDM</b>		E70124	
5	Shaft Collar - Sealed Impeller Design, 140TC Frame	1	135577+	9
	Shaft Collar - Sealed Impeller Design, 180TC Frame		135580+	
	Shaft Collar - Sealed Impeller Design, 210TC Frame		135698+	
	Shaft Collar - Sealed Impeller Design, 250TC Frame		135700+	
	Shaft Collar - Sealed Impeller Design, 280TC Frame		135698+	
	Shaft Collar - Sealed Impeller Design, 280TSC Frame		135700+	
6	Stub Shaft, 140TC Frame	1	60060+	2, 10
	Stub Shaft, 180TC Frame		60061+	
	Stub Shaft, 210TC Frame		60062+	
	Stub Shaft, 250TC Frame		60063+	
	Stub Shaft, 280TSC		60064+	
	Stub Shaft, 280TC Frame		60533+	
	Stub Shaft, 320TSC Frame		60065+	9
	Stub Shaft, 320TC Frame		60532+	
	Stub Shaft - Sealed Impeller Design, 140TC Frame		138553+	
	Stub Shaft - Sealed Impeller Design, 180TC Frame		138554+	
	Stub Shaft - Sealed Impeller Design, 210TC Frame		138555+	
	Stub Shaft - Sealed Impeller Design, 250TC Frame		138556+	
	Stub Shaft - Sealed Impeller Design, 280TC Frame		138559+	
	Stub Shaft - Sealed Impeller Design, 280TSC Frame		138558+	
6A	Shaft Setscrew, 140TC - 180TC Frame	2	30-38	2, 10
	Shaft Setscrew, 210TC - 280TSC Frame	4	30-38	
7	Impeller Key - Sealed Impeller Design	1	138587+	9

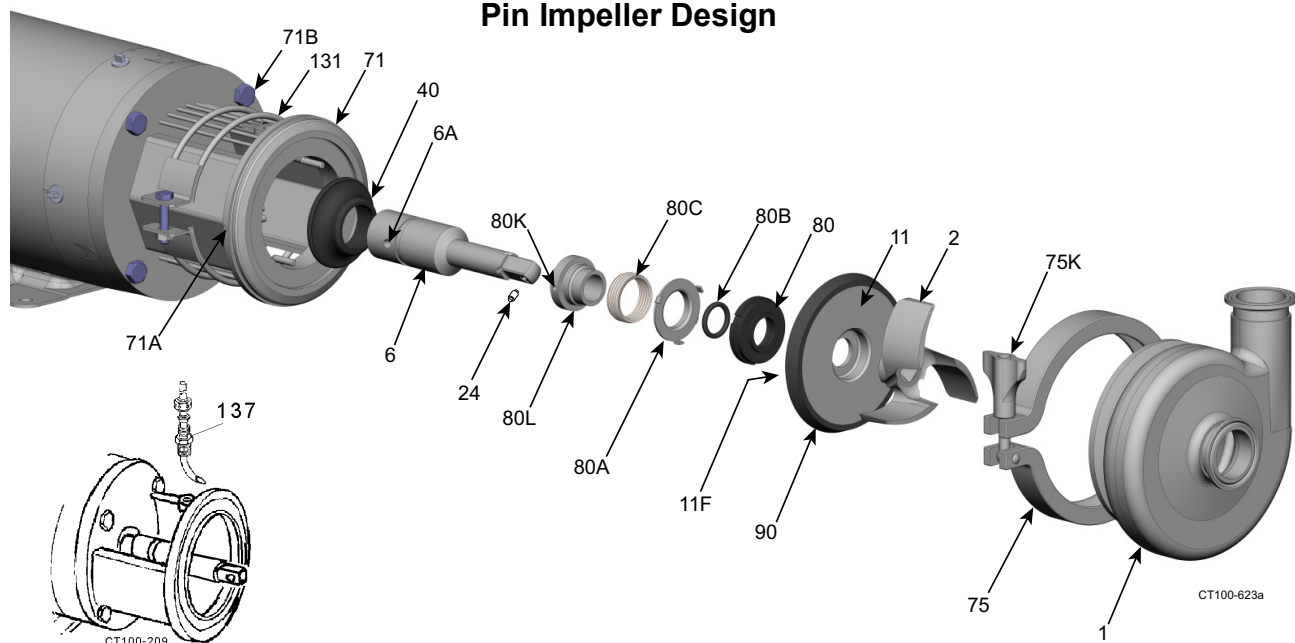
PL5050-CH4

## Notes:

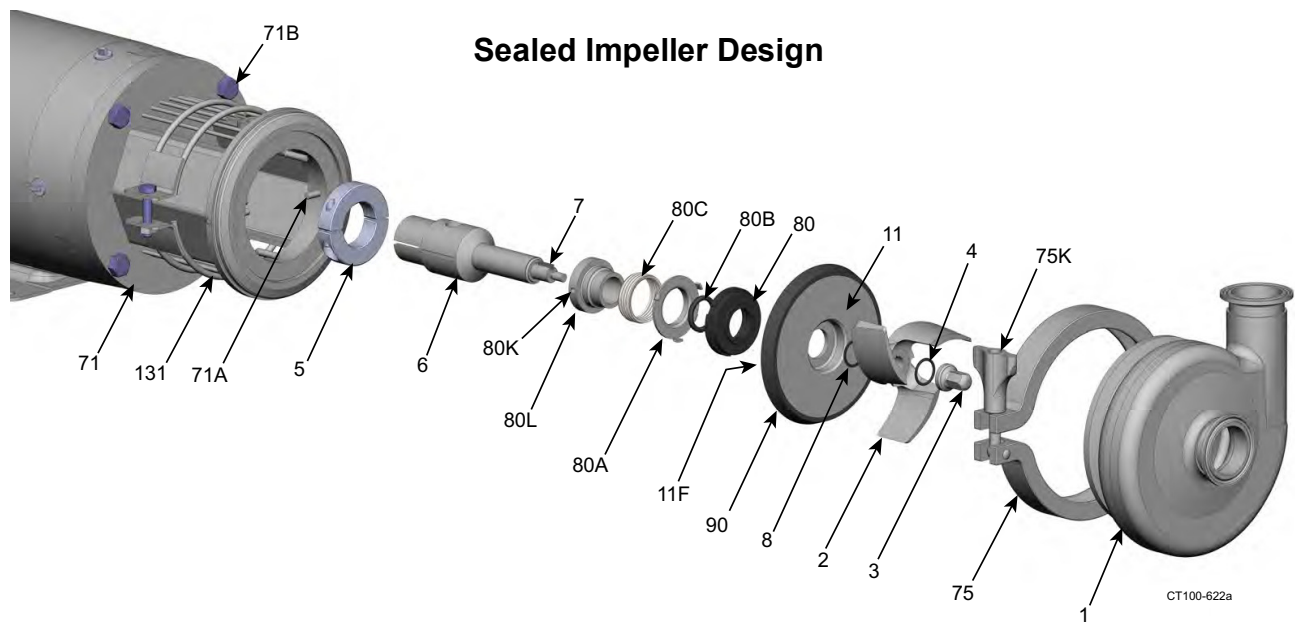
- \* Recommended Spare Parts - also available in kits (see page 72)
- 1. For casings with Bevel threaded, Female I-Line, NPT or Flanged connections, please contact factory.
- 2. These items are needed to change the motor adapter.
- 4. Contact factory if casing drain, passivation, or optional finish is required.
- 5. Used with standard "D" seal only.
- 7. Shown with standard type "D" Seal. For other optional seals, see page 70 and page 71.
- 8. Backplate pins (11F) are included with the backplate if purchased as a spare part.
- 9. Applies **only** to the Sealed Impeller Design.
- 10. Does not apply to the Sealed Impeller Design; applies **only** to the Pin Impeller Design.
- 11. Contact your local distributor for other impeller sizes and finishes.
- 12. Type "F" seal is a type "D" seal with a water cascade attachment.

## C-218 Pump Parts, continued

### Pin Impeller Design



### Sealed Impeller Design



Shown with standard type "D" Seal

For other optional seals, see "Type "E" Water-Cooled Balanced Double Seal Option" on page 71 and "Type "DG" Seal Assembly Option" on page 70. Type "F" seal is a type "D" seal with a water cascade attachment.

Note: C-214 shown. C-218 and C-328 impellers have 4 blades.

## C-218 Pump Parts, continued

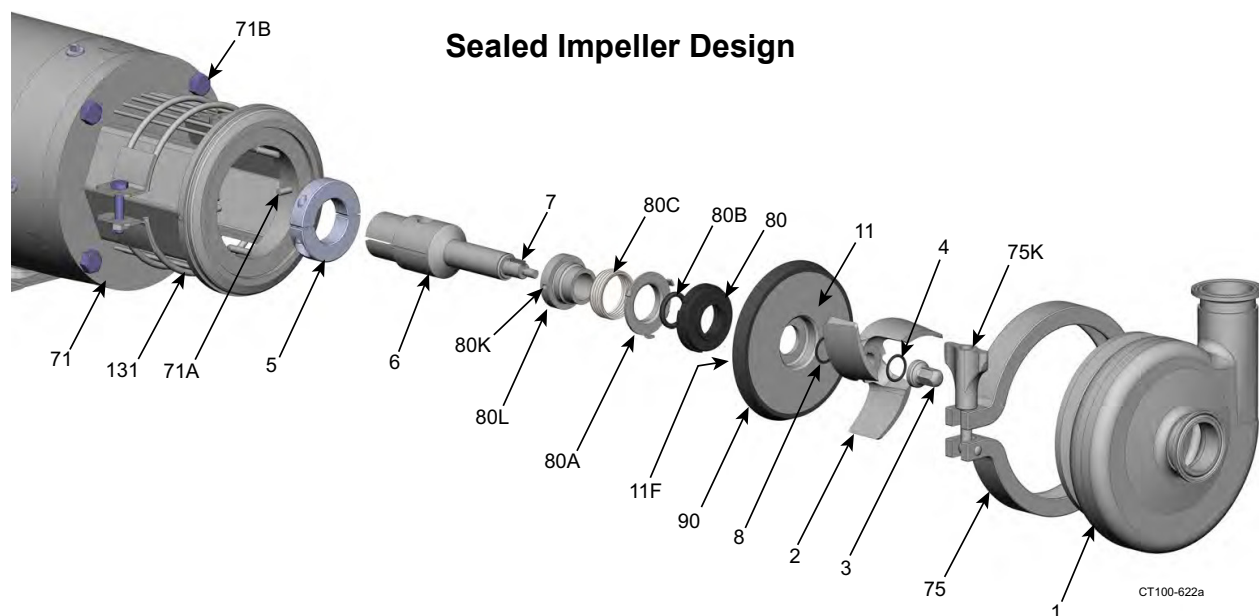
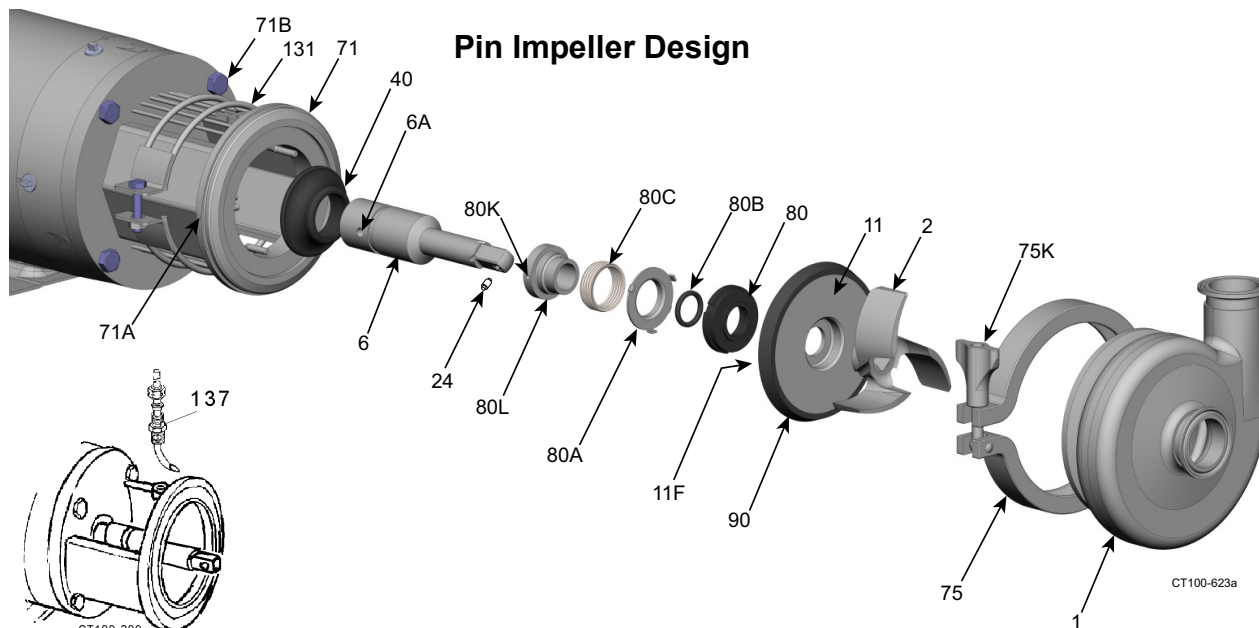
ITEM	DESCRIPTION	QTY.	PART NO.	NOTES
* 8	Stub Shaft O-ring - Sealed Impeller Design, BUNA N	1	N70124	9
	Stub Shaft O-ring - Sealed Impeller Design, FKM		V70124	
	Stub Shaft O-ring - Sealed Impeller Design, EPDM		E70124	
11	Backplate	1	60012+	4, 5, 8
11F	Backplate Pin	2	60013+	8
* 24	Impeller Retainer	1	60041+	
40	Deflector, 143TC - 184TC Frame	1	60047+	2, 10
	Deflector, 213TC - 256TC Frame		60046+	
	Deflector, 284TSC - 286TC Frame		60048+	
71	304 SS Adapter, 143TC - 145TC Frame	1	60754+	2
	304 SS Adapter, 182TC - 184TC Frame		60755+	
	304 SS Adapter, 213TC - 215TC Frame		60756+	
	304 SS Adapter, 254TC - 256TC Frame		60757+	
	304 SS Adapter, 284TSC - 286TC Frame		60758+	
71A	Adapter Pin	2	30-434	
71B	Adapter Mounting Bolt, 143TC - 145TC Frame	4	30-60	2
	Adapter Mounting Bolt, 182TC - 286TC Frame	4	30-36X	
75	Clamp Assembly	1	60082+	
75K	Wing Nut	1	60083+	
* 80	Inboard Rotary Seal, Carbon	1	60087+	7
80A	Seal Cup	1	60090+	
* 80B	Seal O-Ring, Buna N	1	N70222	
	Seal O-Ring, FKM		V70222	
	Seal O-Ring, EPDM		E70222	
80C	Spring	1	60093+	
80K	Set Screw	2	30-178	
80L	Drive Collar	1	60096R1	
* 90	Casing Gasket, Buna N	1	60103+	
	Casing Gasket, FKM		60104+	
	Casing Gasket, EPDM		60628+	
131	Guard Assembly, 143TC - 145TC Frame	1	60788+	2
	Guard Assembly, 182TC - 184TC Frame		60789+	
	Guard Assembly, 213TC - 215TC, 100/112-B5 Frame		60790+	
	Guard Assembly, 254TC - 256TC Frame		60791+	
	Guard Assembly, 284TSC - 286TC Frame		60792+	
137	Water Cascade Inlet Assembly, optional	1	60112+	12

PL5050-CH4b

## Notes:

- \* Recommended Spare Parts - also available in kits (see page 72)
- 1. For casings with Bevel threaded, Female I-Line, NPT or Flanged connections, please contact factory.
- 2. These items are needed to change the motor adapter.
- 4. Contact factory if casing drain, passivation, or optional finish is required.
- 5. Used with standard "D" seal only.
- 7. Shown with standard type "D" Seal. For other optional seals, see page 70 and page 71.
- 8. Backplate pins (11F) are included with the backplate if purchased as a spare part.
- 9. Applies **only** to the Sealed Impeller Design.
- 10. Does not apply to the Sealed Impeller Design; applies **only** to the Pin Impeller Design.
- 11. Contact your local distributor for other impeller sizes and finishes.
- 12. Type "F" seal is a type "D" seal with a water cascade attachment.

## C-328 Pump Parts



Shown with standard type "D" Seal. For other optional seals, see "Type "E" Water-Cooled Balanced Double Seal Option" on page 71 and "Type "DG" Seal Assembly Option" on page 70. Type "F" seal is a type "D" seal with a water cascade attachment.

Note: C-214 shown. C-218 and C-328 impellers have 4 blades.



## C-328 Pump Parts

ITEM	DESCRIPTION	QTY.	PART NO.	NOTES
1	Casing, 3" x 2" w/ S-Line Ports	1	60007+	1, 4
	Casing, 4" x 2" w/ S-Line Ports		60008+	
2	C328 Impeller - Pin Impeller Design, Full, 8.0" dia., 32 Ra finish	1	60030+	10, 11
	C328 Impeller - Sealed Impeller Design, Full, 8.0" dia., 32 Ra finish		138530+	9, 11
3	Impeller Nut - Sealed Impeller Design	1	138534+	9
* 4	Impeller Nut O-ring - Sealed Impeller Design, BUNA N	1	N70124	9
	Impeller Nut O-ring - Sealed Impeller Design, FKM		V70124	
	Impeller Nut O-ring - Sealed Impeller Design, EPDM		E70124	
5	Shaft Collar - Sealed Impeller Design, 180TC Frame	1	135580+	9
	Shaft Collar - Sealed Impeller Design, 210TC Frame		135698+	
	Shaft Collar - Sealed Impeller Design, 250TC Frame		135700+	
	Shaft Collar - Sealed Impeller Design, 280TC Frame		135700+	
	Shaft Collar - Sealed Impeller Design, 280TSC Frame		135700+	
	Shaft Collar - Sealed Impeller Design, 320TC Frame		135974+	
	Shaft Collar - Sealed Impeller Design, 320TSC Frame		135974+	
6	Stub Shaft, 143TC - 145TC Frame	1	60060+	2, 10
	Stub Shaft, 182TC - 184TC Frame		60061+	
	Stub Shaft, 213TC - 215TC Frame		60062+	
	Stub Shaft, 254TC - 256TC Frame		60063+	
	Stub Shaft, 284TSC - 286TSC Frame		60064+	
	Stub Shaft, 284TC - 286TC Frame		60533+	
	Stub Shaft, 324TSC - 326TSC Frame		60065+	
	Stub Shaft, 324TC - 326TC Frame		60532+	
	Stub Shaft - Sealed Impeller Design, 180TC Frame		138554+	9
	Stub Shaft - Sealed Impeller Design, 210TC Frame		138555+	
	Stub Shaft - Sealed Impeller Design, 250TC Frame		138556+	
	Stub Shaft - Sealed Impeller Design, 280TC Frame		138559+	
	Stub Shaft - Sealed Impeller Design, 280TSC Frame		138558+	
	Stub Shaft - Sealed Impeller Design, 320TC Frame		138561+	
	Stub Shaft - Sealed Impeller Design, 320TSC Frame		138560+	
6A	Shaft Setscrew, 140TC - 180TC Frame	2	30-38	2, 10
	Shaft Setscrew, 210TC - 326TSC Frame	4	30-38	

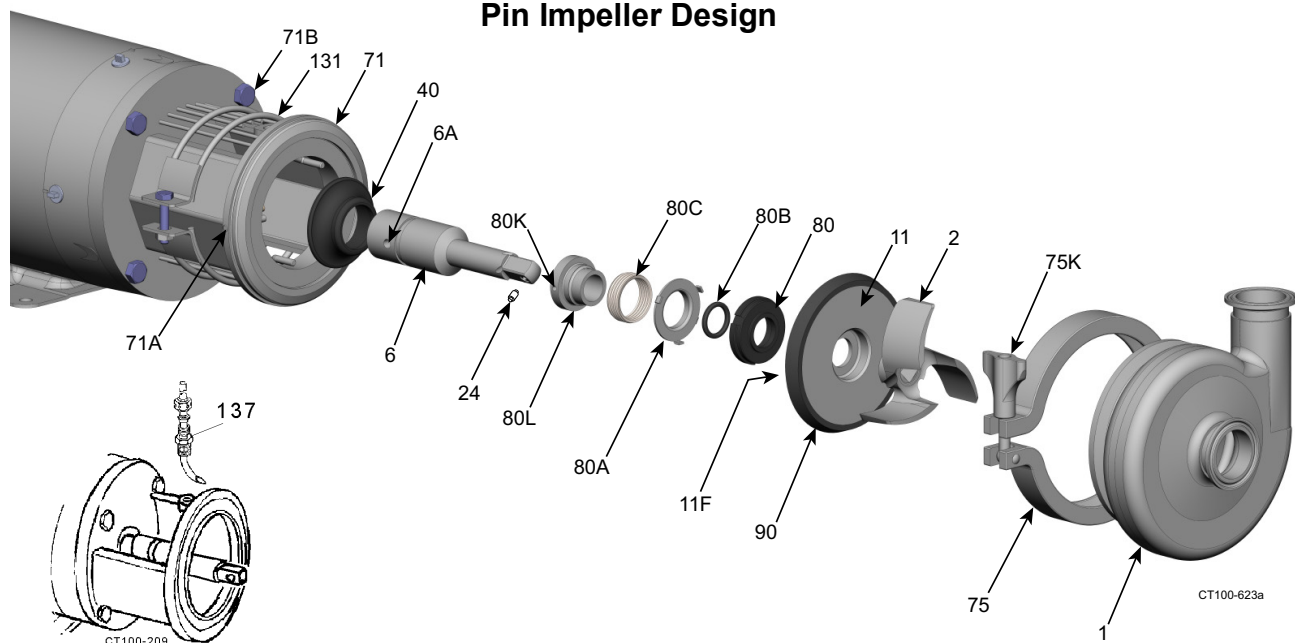
PL5050-CH5

## Notes:

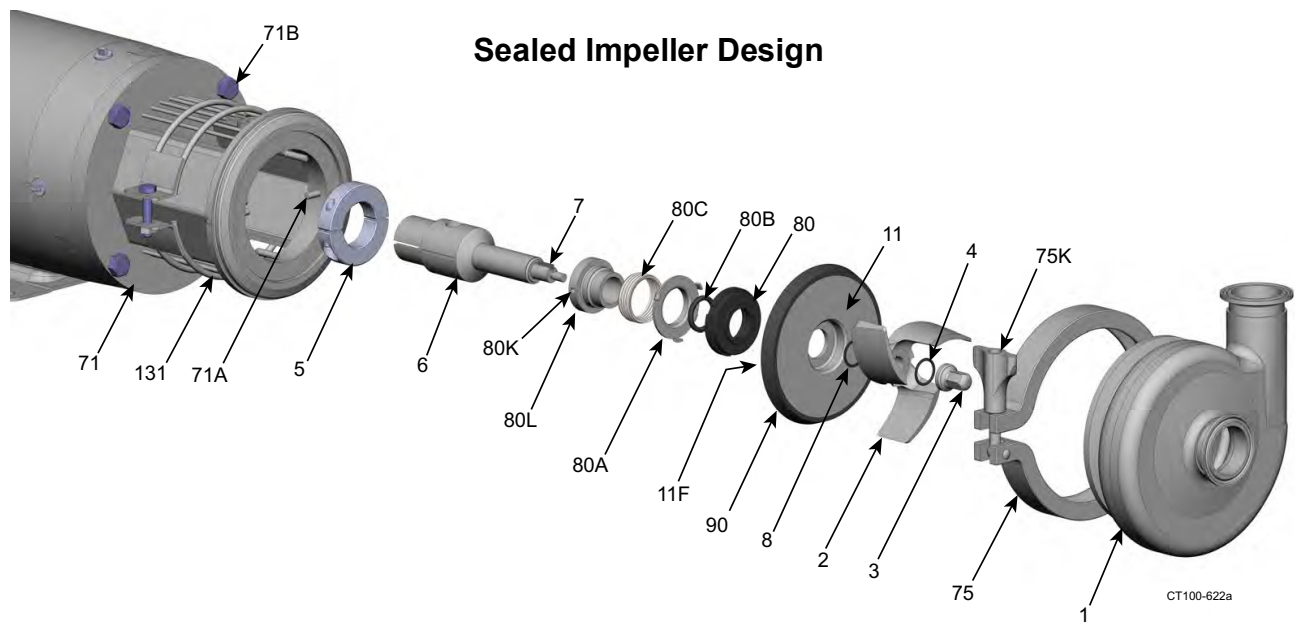
- \* Recommended Spare Parts - also available in kits (see page 72)
- 1. For casings with Bevel threaded, Female I-Line, NPT or Flanged connections, please contact factory.
- 2. These items are needed to change the motor adapter.
- 4. Contact factory if casing drain, passivation, or optional finish is required.
- 5. Used with standard "D" seal only.
- 7. Shown with standard type "D" Seal. For other optional seals, see page 70 and page 71.
- 8. Backplate pins (11F) are included with the backplate if purchased as a spare part.
- 9. Applies **only** to the Sealed Impeller Design.
- 10. Does not apply to the Sealed Impeller Design; applies **only** to the Pin Impeller Design.
- 11. Contact your local distributor for other impeller sizes and finishes.
- 12. Type "F" seal is a type "D" seal with a water cascade attachment.

## C-328 Pump Parts, continued

### Pin Impeller Design



### Sealed Impeller Design



Shown with standard type "D" Seal

For other optional seals, see "Type "E" Water-Cooled Balanced Double Seal Option" on page 71 and "Type "DG" Seal Assembly Option" on page 70. Type "F" seal is a type "D" seal with a water cascade attachment.

Note: C-214 shown. C-218 and C-328 impellers have 4 blades.

## C-328 Pump Parts, continued

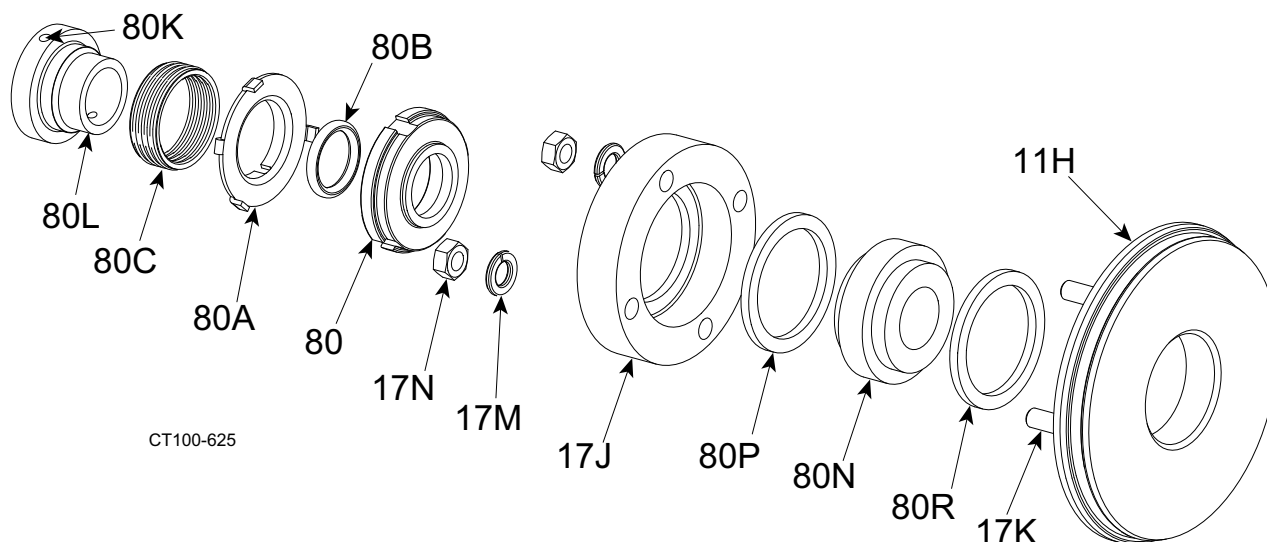
ITEM	DESCRIPTION	QTY.	PART NO.	NOTES
7	Impeller Key - Sealed Impeller Design	1	138587+	9
* 8	Stub Shaft O-ring - Sealed Impeller Design, BUNA N	1	N70124	9
	Stub Shaft O-ring - Sealed Impeller Design, FKM		V70124	
	Stub Shaft O-ring - Sealed Impeller Design, EPDM		E70124	
11	Backplate	1	60012+	4, 5, 8
11F	Backplate Pin	2	60013+	8
* 24	Impeller Retainer	1	60041+	
40	Deflector, 182TC - 184TC Frame	1	60047+	2, 10
	Deflector, 213TC - 256TC Frame		60046+	
	Deflector, 284TSC - 286TC Frame		60048+	
	Deflector, 324TSC - 326TC Frame		60049+	
71	304 SS Adapter, 182TC - 184TC Frame	1	60755+	2
	304 SS Adapter, 213TC - 215TC Frame		60756+	
	304 SS Adapter, 254TC - 256TC Frame		60757+	
	304 SS Adapter, 284TSC - 286TC Frame		60758+	
	304 SS Adapter, 324TSC - 326TC Frame		60759+	
71A	Adapter Pin	2	30-434	
71B	Adapter Mounting Bolt, 182TC - 286TC Frame	4	30-36X	2
	Adapter Mounting Bolt, 324TC - 326TC Frame		30-24	
75	Clamp Assembly	1	60082+	
75K	Wing Nut	1	60083+	
* 80	Inboard Rotary Seal, Carbon	1	60087+	7
80A	Seal Cup	1	60090+	
* 80B	Seal O-Ring, Buna N	1	N70222	
	Seal O-Ring, FKM		V70222	
	Seal O-Ring, EPDM		E70222	
80C	Spring	1	60093+	
80K	Setscrew	2	30-178	
80L	Drive Collar	1	60096R1	
* 90	Casing Gasket, Buna N	1	60103+	
	Casing Gasket, FKM	1	60104+	
	Casing Gasket, EPDM	1	60628+	
131	Guard Assembly, 182TC - 184TC Frame	1	60789+	2
	Guard Assembly, 213TC - 215TC Frame		60790+	
	Guard Assembly, 254TC - 256TC Frame		60791+	
	Guard Assembly, 284TSC - 286TC Frame		60792+	
	Guard Assembly, 324TSC - 326TC Frame		60793+	
137	Water Cascade Inlet Assembly, optional	1	60112+	12

PL5050-CH5b

## Notes:

- \* Recommended Spare Parts - also available in kits (see page 72)
- 1. For casings with Bevel threaded, Female I-Line, NPT or Flanged connections, please contact factory.
- 2. These items are needed to change out the motor frame.
- 4. Contact factory if passivation or optional finish is required.
- 5. Used with standard "D" seal only.
- 7. Shown with standard type "D" Seal. For other optional seals, see page 70 and page 71.
- 8. Backplate pins (11F) are included with the backplate if purchased as a spare part.
- 9. Applies **only** to the Sealed Impeller Design.
- 10. Does not apply to the Sealed Impeller Design; applies **only** to the Pin Impeller Design.
- 11. Contact your local distributor for other impeller sizes and finishes.
- 12. Type "F" seal is a type "D" seal with a water cascade attachment.

## Type “DG” Seal Assembly Option



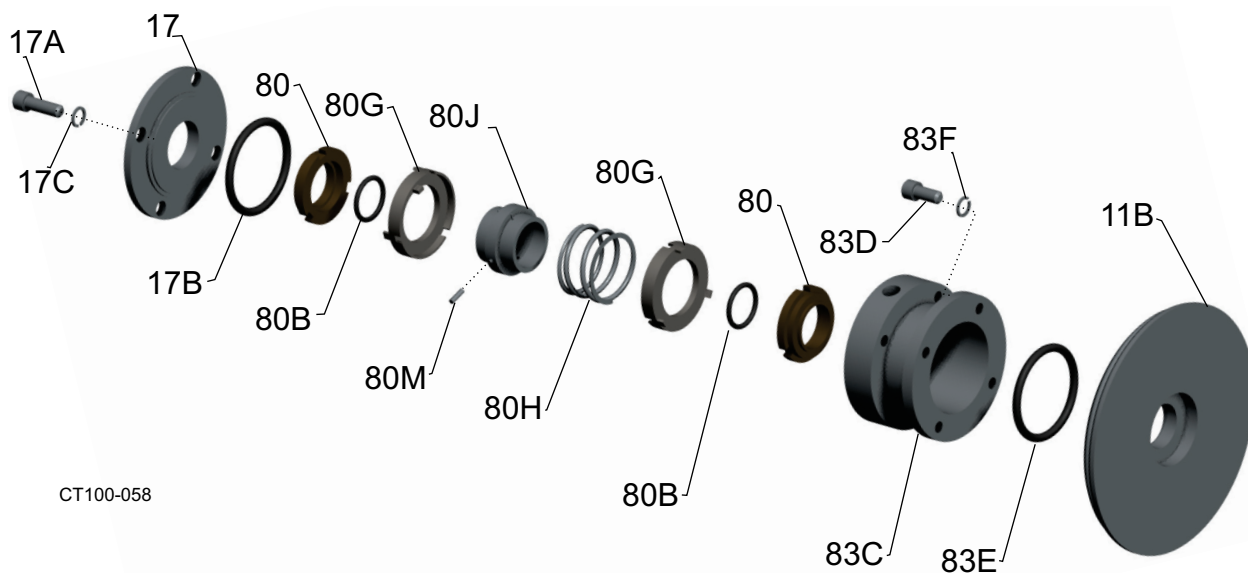
ITEM	DESCRIPTION	QTY.	PART NO.			NOTES
			C-114	C-216	C-218 C-328	
11H	Backplate	1	60481+	60482+	60483+	4, 6, 7
17J	Gland Ring	1	60484+	60485+	60486+	
17K	Stud	4	60890+	60888+	60888+	7
17L	Pin (attaches to backplate, not shown)	2	N/A	60013+	60013+	6, 7
17M	Lock washer	Note 8	43-22	43-15	43-15	8
17N	Nut	4	36-53	36-41	36-41	
*	80 Inboard Rotary Seal, Tungsten Carbide	1	113663+	113665+	113667+	9
	80 Inboard Rotary Seal, Silicon Carbide		113664+	113666+	113668+	
	80 Inboard Rotary Seal, Carbon		60085+	60086+	60087+	
80A	Seal Cup	1	60088+	60089+	60090+	
*	80B O-Ring, Buna N	1	N70210	N70216	N70222	9
	80B O-Ring, FKM		V70210	V70216	V70222	
	80B O-Ring, EPDM		E70210	E70216	E70222	
80C	Spring	1	60091+	60092+	60093+	
80K	Set Screw	2	30-662	30-178	30-178	
80L	Drive Collar	1	60094R1	60095R1	60096R1	
*	80N Inboard Stationary Seal, Silicon Carbide	1	113670+	113673+	113676+	
	80N Inboard Stationary Seal, Ceramic		113671+	113674+	113677+	
	80N Inboard Stationary Seal, Tungsten Carbide		113669+	113672+	113675+	
	80N Inboard Stationary Seal, Siliconized Graphite		60374+	60375+	60376+	
*	80P PTFE Gasket - Outboard; 1/16" (1.587 mm) thick	1	60377+	60378+	60379+	
*	80R PTFE Gasket - Inboard; 1/8" (3.175 mm) thick	1	60760+	60761+	60762+	
	DG Conversion kit	1	60506+	60507+	60508+	9

PL5050-CH6

## Notes:

- \* Recommended Spare Parts
- 1. The C-100 is not available with “DG”, “E”, or “F” seals.
- 4. Contact factory if passivation or optional finish is required.
- 6. There is no pin on the C-114 backplate.
- 7. Studs (17K) and pins (17L) are included with the backplate if purchased as a spare part.
- 8. 17M Lock washer: C-114 needs a qty. of 1; C-216, C-218 & C-328 need a qty. of 4.
- 9. To convert from a D seal to a DG seal, you need: DG Conversion kit x1, item 80 x1 and 80B x1.

## Type “E” Water-Cooled Balanced Double Seal Option



CT100-058

ITEM NO.	DESCRIPTION	QTY. PER PUMP	PART NO.			NOTES
			C-114	C-216	C-218 C-328	
11B	Backplate	1	60487+	60488+	60489+	4
17	Stationary Gland Ring	1	60490+	60491+	60492+	
17A	Screw	4	30-587	30-29	30-29	
* 17B	O-Ring, Buna N	1	N70033	N70034	N70038	
	O-Ring, FKM		V70033	V70034	V70038	
17C	Lock washer	See note 8	43-22	43-15	43-15	8
* 80	Inboard Rotary Seal, Carbon	2	60085+	60086+	60087+	9
* 80B	O-Ring, Buna N	2	N70210	N70216	N70222	9
	O-Ring, FKM		V70210	V70216	V70222	
	O-Ring, EPDM		E70210	E70216	E70222	
80G	Cup	2	60493+	60494+	60495+	
80H	Spring	1	60496+	60497+	60498+	
80J	Drive Collar	1	60499+	60500+	60501+	
80M	Set Screw	2	30-629	30-589	30-589	
83C	Stuffing Box	1	60502+	60503+	60504+	
83D	Screw	4	30-131	30-587	30-590	
* 83E	O-Ring, Buna N	1	N70034	N70037	N70153	
	O-Ring, FKM		V70034	V70037	V70153	
83F	Lock washer	4	43-21	43-22	43-15	
	E Conversion kit	1	60509+	60510+	60511+	9

PL5050-CH7

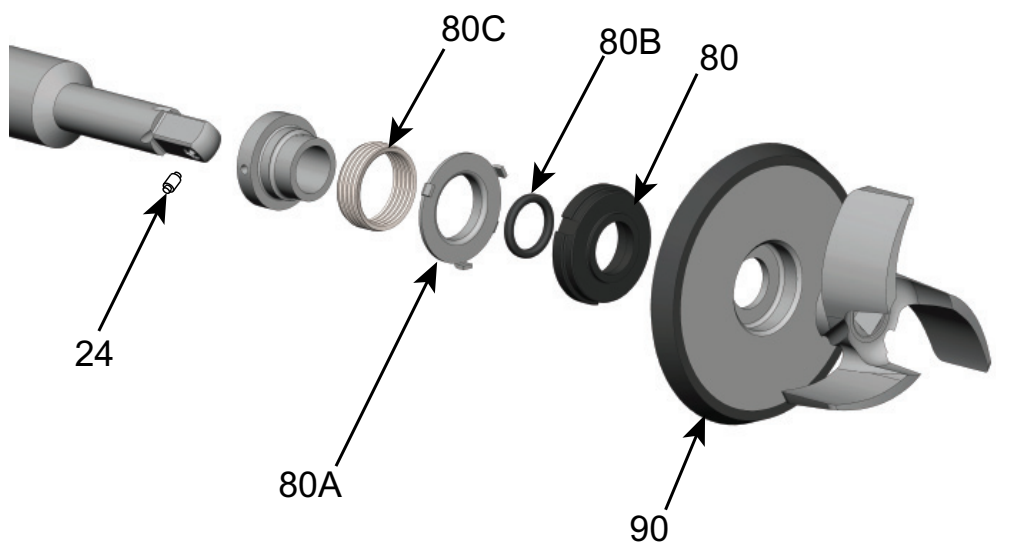
## Notes:

\* Recommended Spare Parts

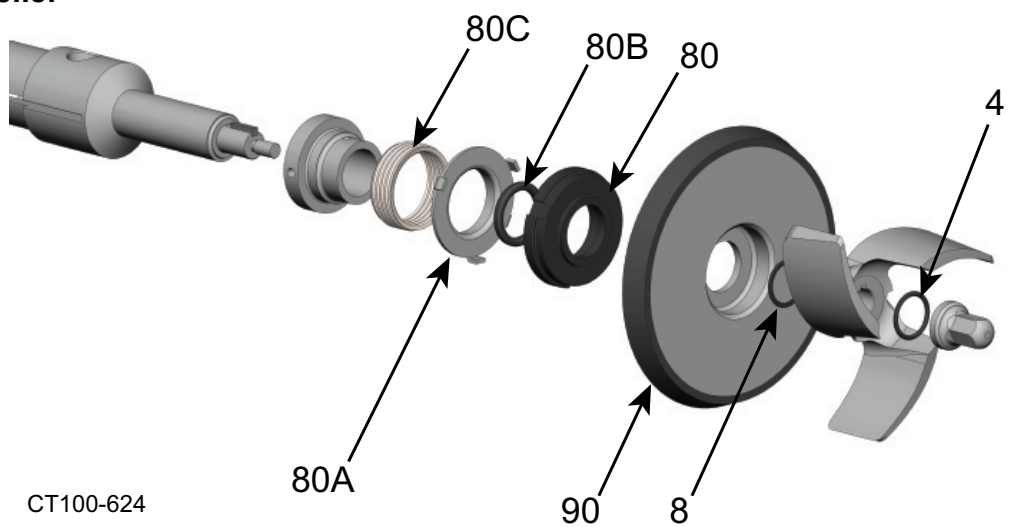
1. The C-100 is not available with “DG”, “E”, or “F” seals.
4. Contact factory if passivation or optional finish is required.
8. Lock washer: C-114 needs a qty. of 1; C-216, C-218 & C-328 need a qty. of 4.
9. To convert from a D seal to an E seal, you need: E Conversion kit x1, item 80 x2, and 80B x2.

## C-Series “D” Seal Kits

### Pin Impeller Design



### Sealed Impeller Design



Note: C-214 shown. C-218 and C-328 impellers have 4 blades.



## C-Series "D" Seal Kits

### C-Series "D" Seal/Elastomer Kit

Item No.	Description	Qty. in kit	C-100	C-114	C-216	C-218 C-328	Notes
4/8	Impeller Nut O-Ring (item 4), Stub Shaft O-Ring (item 8)	2	N70116	N70015	N70118	N70124	1
			V70116	V70015	V70118	V70124	
			E70116	E70015	E70118	E70124	
24	Impeller Retainer	1	60039+	60039+	60040+	60041+	2
80	Seal, Carbon	1	60084+	60085+	60086+	60087+	3
80B	Seal, O-Ring	1	N70214	N70210	N70216	N70222	3
			V70214	V70210	V70216	V70222	
			E70214	E70210	E70216	E70222	
90	Gasket, Casing FKM	1	N70153	60099+	60101+	60103+	3
			V70153	60100+	60102+	60104+	
			E70153	60626+	60627+	60628+	

C-Series "D" Seal/Elastomer Kit, Buna N	140181+	140182+	140183+	140184+
C-Series "D" Seal/Elastomer Kit, FKM	140185+	140186+	140187+	140188+
C-Series "D" Seal/Elastomer Kit, EPDM	140189+	140190+	140191+	140192+

### C-Series Complete "D" Seal Kit

Item No.	Description	Qty. in kit	C-100	C-114	C-216	C-218 C-328	Notes
4/8	Impeller Nut O-Ring (item 4), Stub Shaft O-Ring (item 8)	2	N70116	N70015	N70118	N70124	1
			V70116	V70015	V70118	V70124	
			E70116	E70015	E70118	E70124	
24	Impeller Retainer	1	60039+	60039+	60040+	60041+	2
80	Seal, Carbon	1	60084+	60085+	60086+	60087+	3
80A	Cup	1	60088+	60088+	60089+	60090+	3
80B	Seal, O-Ring	1	N70214	N70210	N70216	N70222	3
			V70214	V70210	V70216	V70222	
			E70214	E70210	E70216	E70222	
80C	Spring	1	60091+	60091+	60092+	60093+	3
90	Gasket, Casing	1	N70153	60099+	60101+	60103+	3
			V70153	60100+	60102+	60104+	
			E70153	60626+	60627+	60628+	

C-Series Complete "D" Seal Kit, Buna N	140193+	140194+	140195+	140196+
C-Series Complete "D" Seal Kit, FKM	140197+	140198+	140199+	140200+
C-Series Complete "D" Seal Kit, EPDM	140201+	140202+	140203+	140204+

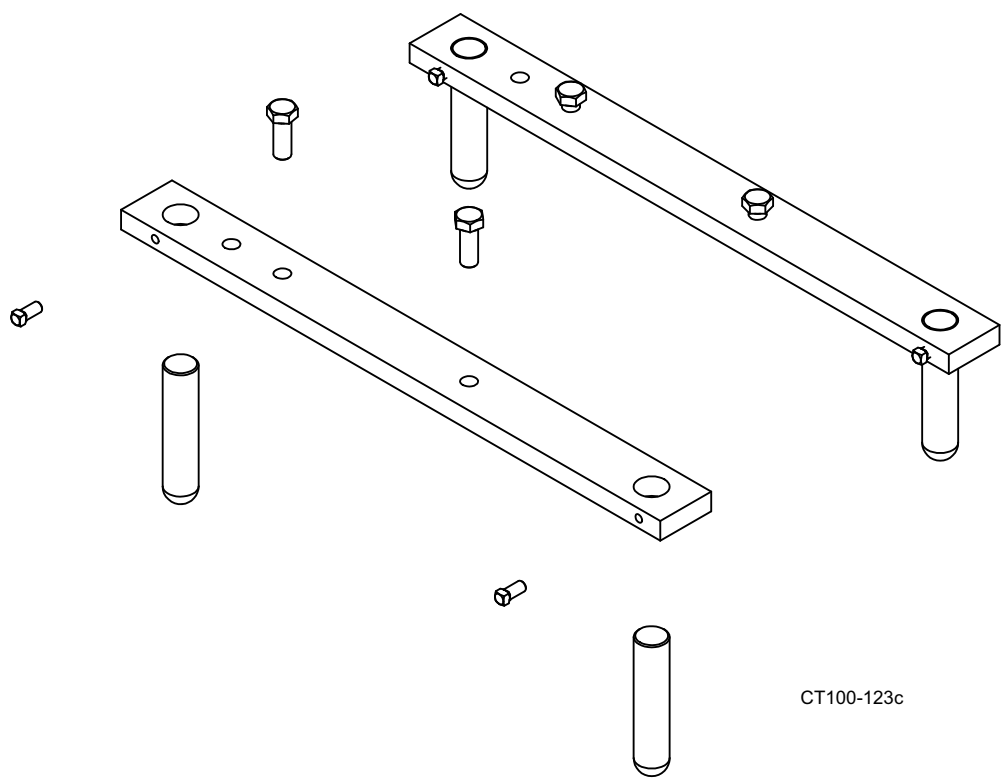
PL5050-CH8

#### Notes:

Items in the kits cover both the pin impeller and sealed impeller design.

1. Applies to the sealed impeller design only.
2. Applies to the pin impeller design only.
3. Applies to both the pin impeller and sealed impeller designs.
4. Buna N color code is yellow, FKM color code is white, EPDM color code is green.
5. For a C-100 manufactured prior to approx. April of 1999, contact SPX FLOW Application Engineering and provide serial number.

Motor Mounts - NEMA Frame Sizes



Description	Part Number
LEG KIT, NEMA 56C	114365+
LEG KIT, NEMA 143/145	110256+
LEG KIT, NEMA 182/184	110255+
LEG KIT, NEMA 213/215	110254+
LEG KIT, NEMA 254/256	110253+
LEG KIT, NEMA 284/286	110252+
LEG KIT, NEMA 324/326	110251+
LEG KIT, NEMA 364	110251A

PL5050-CH14

## C-Series Pin Impeller to Sealed Impeller Conversion Kits

### Conversion Kits

Model	Frame	Kit Part No.
C100	NEMA 56C	138662+
	NEMA 140TC	138663+
C114	NEMA 56C	138665+
	NEMA 140TC	138666+
	NEMA 180TC	138667+
C216	NEMA 56C	138671+
	NEMA 140TC	138672+
	NEMA 180TC	138673+
	NEMA 210TC	138674+
	NEMA 250TC	138675+
C218	NEMA 140TC	138680+
	NEMA 180TC	138681+
	NEMA 210TC	138682+
	NEMA 250TC	138683+
	NEMA 280TC	138684+
	NEMA 280TSC	138685+
C328	NEMA 180TC	138690+
	NEMA 210TC	138691+
	NEMA 250TC	138692+
	NEMA 280TC	138693+
	NEMA 280TSC	138694+
	NEMA 320TC	138695+
	NEMA 320TSC	138696+

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#### Kits include (item numbers from previous parts pages):

Item 3, Impeller nut

Item 5, Shaft collar

Item 6, Stub shaft

Item 7, Impeller key

Item 4/8, 2 FKM and 2 EPDM O-rings. Use either the FKM or EPDM O-rings--the unused O-rings can be discarded.

**Note: Kits do NOT include the impeller. See impeller part numbers below.**

### Full-size impeller part numbers:

Description	Part No.	Note
C100 Impeller - Sealed Impeller Design, Full, 3.68" dia., 32 Ra finish	138526+	1
C114 Impeller - Sealed Impeller Design, Full, 4.0" dia., 32 Ra finish	138527+	1
C216 Impeller - Sealed Impeller Design, Full, 6.0" dia., 32 Ra finish	138528+	1
C218 Impeller - Sealed Impeller Design, Full, 7.875" dia., 32 Ra finish	138529+	1
C328 Impeller - Sealed Impeller Design, Full, 8.0" dia., 32 Ra finish	138530+	1

PL5050-CH19

#### Note:

1. Full impeller size part numbers are listed. Contact your local distributor for other impeller sizes and finishes.

## Troubleshooting

Problem	Possible Cause	Suggested Action
<b>Not Enough Liquid Delivered</b>	Pump not primed.	Prime pump. Install a priming system if possible.
	Suction or discharge plugged or closed.	Open suction. If plugged, <b>shut down the pump</b> and remove blockage.
	Air leak in supply or at seal area.	Check system for air leaks and repair as necessary. Replace seals if required.
	Wrong direction of rotation.	Adjust motor electrical wiring to correct rotation.
	Discharge head too high.	Lower discharge head until pump can move material without causing overload. Modify system to have more back pressure required.
	Suction lift too high.	Lower pump in system until the pump is easily supplied with material.
	Speed too slow (low voltage, wrong frequency, wrong motor).	Adjust voltage and frequency. Change motor if necessary.
	Excessive air in material.	Adjust system to remove excess air from material before it reaches the pump.
	Insufficient NPSH (Net Positive Suction Head) available.	Adjust system to provide correct NPSH.
<b>Not Enough Pressure</b>	Impeller diameter too small for duty.	Contact SPX FLOW Application Engineering for sizing information.
	Air leak in supply or at seal area.	Check system for air leaks and repair as necessary. Replace seals if required.
	Wrong direction of rotation.	Adjust motor electrical wiring to correct rotation.
	Speed too slow (low voltage, wrong frequency, wrong motor).	Adjust voltage and frequency. Change motor if necessary.
	Excessive air in material.	Adjust system to remove excess air from material before it reaches the pump.
	Impeller diameter too small for duty.	Contact SPX FLOW Application Engineering for sizing information.
<b>Motor Overload</b>	Insufficient NPSH (Net Positive Suction Head) available.	Adjust system to provide correct NPSH.
	Faulty electrical connections.	Check wiring and repair/replace as necessary.
	Unrestricted discharge resulting in too high a flow rate.	Add discharge restriction to lower flow rate.

Problem	Possible Cause	Suggested Action
<b>Motor Overload, continued</b>	Impeller interference.	Disassemble pump and inspect for damage. Remove interference if still present. Replace worn/damaged parts.
	Seal binding.	Disassemble pump and inspect for damage. Check for material crystallization on seals.
	Discharge head too low allowing pump to deliver too much liquid.	Raise discharge head until pump achieves proper resistance to flow.
	Liquid heavier or more viscous than rating.	Contact your SPX FLOW Customer Service Representative for sizing information.
	Overload heaters too small for motor.	Inspect and replace as necessary.
	Electrical supply, voltage, frequency, incorrect.	Adjust voltage and frequency. Change motor if necessary.
	Impeller diameter too large for duty.	Contact SPX FLOW Application Engineering for sizing information.
	Defective motor.	Replace motor.
<b>Vibration/Noise</b>	Pump not level.	Make sure all legs are touching the floor. Level pump.
	Piping not supported.	Support all piping as described in the installation section.
	Starved suction/Supply line blocked.	<b>Shut down pump</b> and remove blockage.
	Foreign material in pump.	Disassemble pump, remove all foreign material and inspect for damage. Replace worn/damaged parts.
	Starved suction/Insufficient NPSH (Net Positive Suction Head) available.	Adjust system to provide correct NPSH.
	Impeller hub/impeller shaft worn.	Disassemble pump and inspect for damage. Replace worn parts.
	Impeller shaft loose or bent.	Disassemble pump and inspect for damage.
	Impeller out of balance.	Disassemble pump and inspect for damage. Replace impeller.
	Motor bearings worn.	Disassemble motor and inspect for damage. Replace worn parts.
	Excessive air in material.	Adjust system to remove excess air from material before it reaches the pump.

Problem	Possible Cause	Suggested Action
<b>Rapid Seal Wear</b>	Incorrect impeller shaft location; excessive spring loading.	Adjust pump alignment to motor and piping.
	Water Hammer.	Adjust system to reduce air in system and sudden starts or stops in flow.
	Impeller shaft loose or bent.	Disassemble pump and inspect for damage. Replace worn/damaged parts.
	Abrasive product.	Contact SPX FLOW Application Engineering for alternate seal information.
	Prolonged “dry” running.	Adjust process to insure pump has a continual fresh supply of product during operation.
	Abrasive solids (unfiltered) in flush water supplied to seal.	Use only filtered water in seal flush system.
<b>Seal Leaks</b>	Gasket damaged or worn.	Disassemble pump and inspect for damage.
	Seal not installed correctly.	Disassemble pump and inspect seal for damage (replace if necessary). Install seal correctly and reassemble pump.
	Carbon seal worn or damaged.	Disassemble pump and inspect seal for damage (replace if necessary).
	Inlet/Outlet connection loose or no gasket.	Inspect inlet/outlet connection for gasket and tighten connection.
	Casing clamp loose.	Tighten clamp.





## C-Series

CENTRIFUGAL PUMP - NEMA  
VERSION

The logo for SPX FLOW, Inc. features the word "SPX" in a bold, grey, sans-serif font, followed by a green stylized "X" that is composed of two overlapping shapes. To the right of the "X" is the word "FLOW" in the same grey, bold, sans-serif font. A registered trademark symbol (®) is located at the top right of the "W".

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