



TEXAS PROCESS TECHNOLOGIES

Customer Name:
System Code:

Pump Serial No.:

Notes:

Motor Serial No.:

*Texas Process
Technologies*

Advanced Technology for Superior Performance



INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

CENTRIFUGAL SANITARY “C” - CSC

PLEASE READ BEFORE UNPACKING

Your pump has been verified prior to shipment. Careful handling prior to and during installation will ensure continued service at specified operating conditions.

READ THIS ENTIRE BOOK before attempting to install, operate or repair this pump. Properly installed, your pump will give you satisfactory, dependable service. We urge that you carefully read these step-by-step instructions, to eliminate any problems of installation, operation or repair.

Failure to read and comply with installation and operating instructions will void the responsibility of the manufacturer and may also result in bodily injury as well as property damage.

This book is intended to be a permanent part of your pump installation and should be preserved in a convenient location for ready reference. If these instructions should become soiled, obtain a new copy from Texas Process Technologies. Please include pump model and/or serial number with your request.

Safety Information

 **DANGER** - This symbol signifies that failure to follow the precautions listed may result in serious injury to operating personnel.


 **Warning** - This symbol signifies that these safety instructions are required for safe operation of the pump unit.

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SECTION 1 GENERAL

INTRODUCTION

This instruction manual is intended to assist those involved with the installation, operation and maintenance of Texas Process Technologies, Sanitary Centrifugal Pumps, CSC Series. It is recommended that this manual be thoroughly reviewed prior to installing or performing any work on the pump or motor.

1-A Importance of Instructions

The design, material and workmanship incorporated in the construction of Texas Process Technologies, pumps make them capable of giving long, trouble-free service. The life and satisfactory service of any mechanical unit, however, is enhanced and extended by periodic inspection and careful maintenance. This instruction manual was prepared to assist operators in understanding the construction and correct methods of installing, operating, and maintaining these pumps. Thoroughly study Sections 2, 3, 4 and carefully follow the instructions for installation. Appendix Sections have answers to trouble and maintenance questions. Keep this instruction manual handy for reference. Further information can be obtained by contacting the local authorized distributor or the factory.

1-B Special Warnings

Texas Process Technologies will not be liable for any damages or delay caused by failure to comply with the provisions of this instruction manual. This pump is not to be operated at speeds, working pressures, discharge pressures, or temperatures higher than, nor used with liquids other than, stated in the original order acknowledgment without written permission of Texas Process Technologies.

1-C Receiving Inspection-Shortages

Care should be taken when unloading pumps. If shipment is not delivered in good order and in accordance with the Bill-of-Lading, note the damage or shortage on both receipt and freight bill. MAKE ANY CLAIMS TO THE TRANSPORTATION COMPANY PROMPTLY. Instruction sheets on various components as well as the Instruction Book for the pump are included in the shipment. DO NOT DISCARD!

1-D Preservation and Storage

Texas Process Technologies' normal domestic shipping and storage preparation is suitable for protecting the pump during shipment in covered trucks. It also provides protection during covered storage at the job site, and for a short period between installation and start-up. If the pump is to be idle and/or exposed to the elements for an extended period, either before or after installation, special precautions are required. One approach is to provide special preservatives and wrapping before shipment. However, after installation the protective wrappings will have been removed. Therefore, application of preservatives after installation is considered a good practice. Information about various long-term preservation and storage options available can be obtained for the driver, coupling, mechanical seal, or other equipment supplied on your order. Please contact the factory for further details.

SECTION 2 INSTALLATION

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

2-A Pump Location

Locate the pump as near as practical to the liquid supply. Keep supply piping short and straight to keep pump supplied with liquid and prevent damaging cavitation. Pump should be accessible for service and inspection during operation. Motor must be protected from flooding.

2-B Pump Leveling

Level the pump by loosening the set screws (see Figure 1, item A), to adjust the length of the legs.

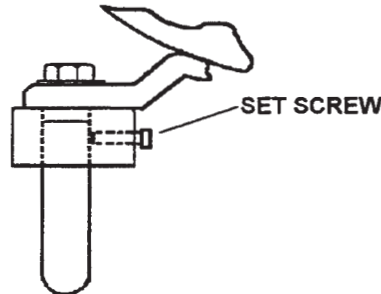


Figure 1

2-C Supply and Discharge Piping/Valves

- 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 straight as possible by minimizing the use of elbows and valves. Avoid up and down rises that could trap air.
- Be certain that all joints in the suction line are well sealed to prevent air leaks.
- Maintain a straight length of pipe at least 8 diameters long at the pump inlet.
- The pump casing 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 positions in between. These positions ensure a flooded casing and prevent problems caused by air in the system (see Figure 2).

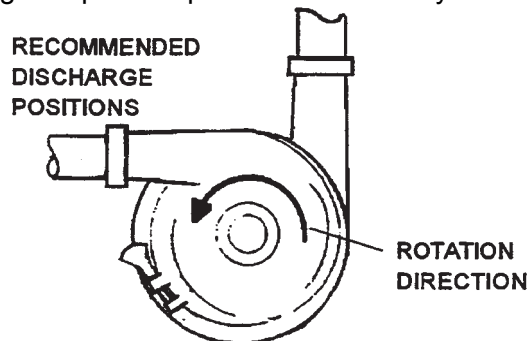


Figure 2

- All joint in the suction line must be well sealed to prevent air from being sucked into the system.
- Support supply and discharge piping near the pump so that no strain is put onto pump casing. If an expansion joint is used, install a pipe anchor between it and the pump.

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

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

- Line slope will depend on application requirements; best pump operation is with supply line sloped slightly upward toward pump to prevent trapped air. If system must drain into pump casing, keep downward slope to a minimum or priming problems may occur.
- Install shutoff valves to isolate pump from supply and discharge lines to allow pump service without draining system.
- This pump is not self-priming. If pump is installed above supply liquid level, install foot valve or other system check valve to keep system flooded for priming.
- A throttling valve may be required to control pump flow rate to prevent motor overload. Always install a throttling valve in the discharge piping and at least 10 diameters from the pump outlet.

2-D Installations that May Cause Operation Problems

Any system throttling valves or similar devices to control flow rate, must be installed in the discharge line. NEVER install a throttling valve in the suction piping line. 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 and with a loud noise. When this condition is present, find and eliminate the source of the water hammer. And do not expose pump to freezing temperatures with liquid in casing. Frozen liquid in casing will damage the pump. Drain casing before exposing it to freezing temperatures.

2-E Electrical Connections

⚠ DANGER - To avoid electrocution, ALL electrical installation should be done by a registered Electrician, following the corresponding Industry Safety Standards. All power must be OFF and LOCKED OUT during installation.

Read motor manufacturer’s instructions before making installation. Follow manufacturer’s lubrication schedules. Check motor nameplate to be sure motor is compatible with electrical supply and wiring, switches and starters. Make sure all overload protections are correctly sized. Check the pump rotation following electrical installation. Correct direction of rotation is counterclockwise when facing the pump inlet connections.

2-F Flush Seal Options

When this option is ordered, a fitting assembly (see Figure 3) is supplied for directing a flow of compatible liquid onto the back-plate/seal area.

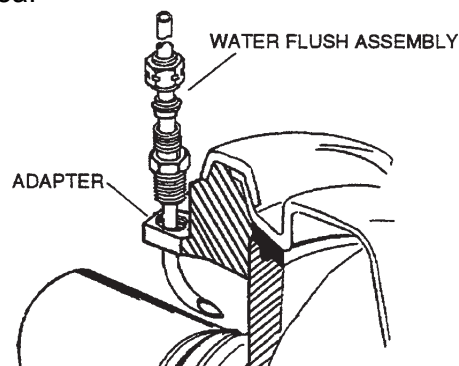


Figure 3

The water cascade block must be above the seal on the assembled back-plate to flow a compatible liquid onto the seal face. The connection is ¼" O.D. tubing. The required flow is approximately 5 GPH (0.25-0.35 LPM). The recommended liquid supply is cool and filtered. If product solidifies at cool temperature, warm or hot liquid may be used.

2-G Before First Startup

Disassemble the pump and clean all product contact parts and seal parts, prior to first operation. Follow these Cleaning Safety Procedures:

Manual Cleaning

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

Cleaning-In-Place (CIP)

- Make certain that all connections in the cleaning circuit are properly applied, and tightened to avoid contact with hot water or cleaning solutions.
- 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.

2-H Preliminary Test Run

The system should be tested using a preliminary run with the materials that will be pumped. DO NOT run the pump at this time to produce final product.

2-J Check for Possible Motor Overload Condition

Certain combinations will overload 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.

2-K 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 had changed (higher viscosity, higher specific gravity), recheck the motor amp draw. Please contact your authorized Texas Process Technologies distributor for assistance.

SECTION 3 OPERATION

3-A Starting the Pump

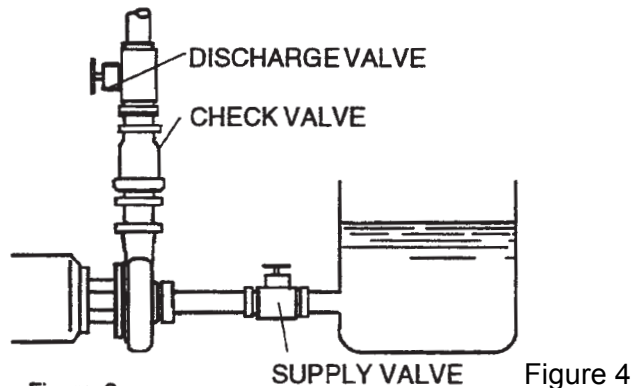
Follow the following procedure:

- 1) If the pump has a flush seal option, start the flow of flush of compatible liquid (approximately 5 GPM (15-30 LPH) recommended rate), before operating the pump.
- 2) Prime the pump by flooding the pump casing with liquid BEFORE starting the pump, to avoid damage to any pump parts.
- 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 in this condition will heat the liquid in the casing to boiling point, and lead to pump damage.
- 6) Slowly, open the discharge valve until the desire flow is obtained. Observe the pressure gauges. If pressure is not attained quickly, stop the pump and prime it again.

3-B Priming the Pump

Priming the Pump with the Feed Source ABOVE Pump Level (see Figure 4):

- Fill the supply tank with liquid and open the supply line valve (suction side).
- Open the discharge valve to vent any air trapped in the supply line and/or casing.
- Resume the "Starting the Pump" procedure described before in this page, at step 3.



Priming the Pump with the Feed Source BELOW Pump Level (see Figure 5):

The pump will not self-prime if the liquid supply is below the pump level. An outside source for priming should be provided.

- Close the discharge valve and open the air vents.
- Open the valve in the outside supply line, until liquid flows from the vent valves.
- Close the vent valves.
- Close the outside supply lines.

(Use a type of check valve system to keep the supply line and pump casing flooded with liquid; otherwise the pump must be primed before each operation).

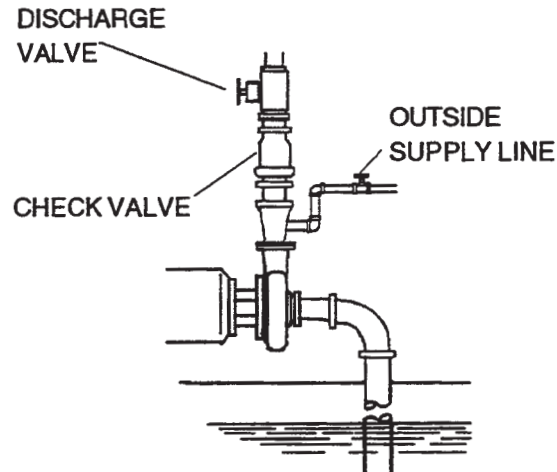


Figure 5

- Resume the “Starting the Pump” procedure from previous page, at step 3.

3-C Stopping the Pump

- To stop the pump, shut off power to the pump motor.
- Shut off the suction and discharge lines.

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

SECTION 4 MAINTENANCE

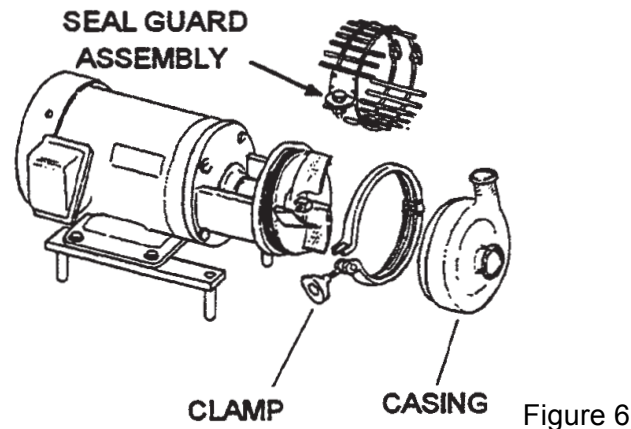
4-A Scheduled Maintenance

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

- 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 back-plate gasket for wear or damage.
- Lubricate the bearings (see motor manufacturer for correct specifications).
- Monitor the seal.
- Perform vibration analysis.
- Check the discharge pressure.
- Monitor the temperature.

4-B Pump Disassembly

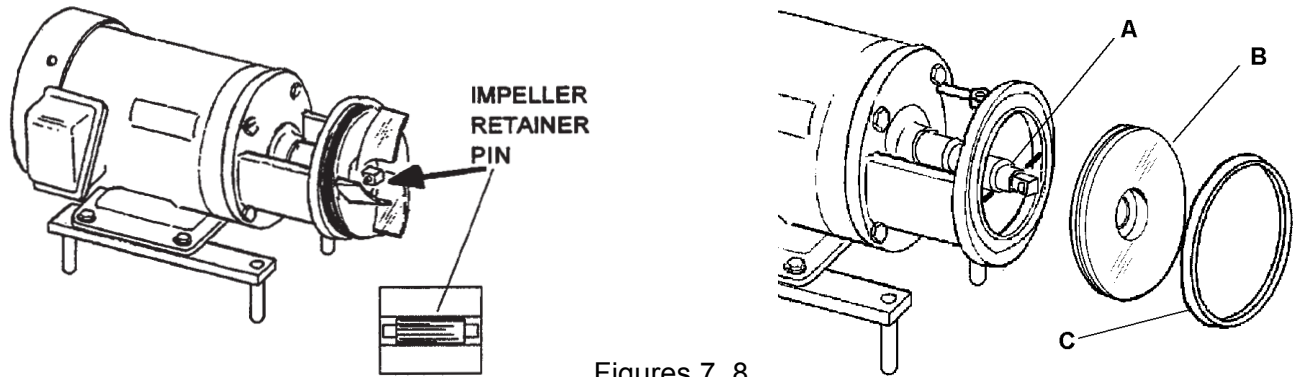
- Shut off the product flow to the pump and relieve any product pressure.
- Shut off and lock out power to the pump.
- Disconnect the suction and discharge pipe fittings.
- Using a wrench, remove the seal guard assembly (see Figure 6).



- Loosen the clamp wing nut and swing the clamp open (on the C100 model, remove the casing wing nuts).
- Remove the casing and inspect the clamp saddles and the casing for damage or wear. Replace if necessary.
- Push back on the impeller and position the retaining pin in the center of the stub shaft. This will allow the impeller to be pulled off the stub shaft (see Figure 7).
- Rotate the back-plate to disengage the back-plate pins from the adapter pins. Remove the back-plate with the gasket attached by pulling (see Figure 8, items B and C), it straight off the adapter (see Figure 8, item A).
- Remove the back-plate gasket and inspect it for wear and sealing failure.

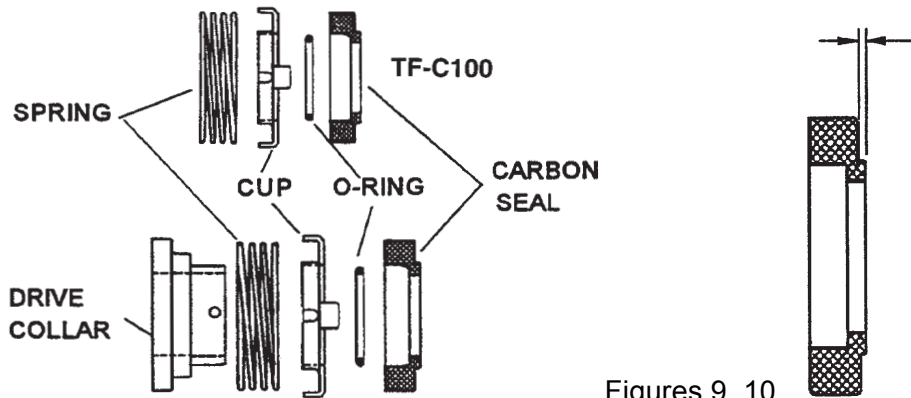
WARNING!

Take care to protect the sealing face and edges of the back-plate from nicks and scratches.



Figures 7, 8

- Pull the carbon seal, O-ring, seal cup, and spring straight off the stub shaft to remove them (see Figure 9).
- Carefully inspect the O-ring and the carbon seal for signs of abrasions, cuts, or other wear that could cause leakage. When the extension end of the carbon seal is less than 1/32", replace the seal. (see Figure 10).



Figures 9, 10

- After cleaning, inspect the seal, O-ring, and gasket again. Replace if necessary.
- Remove the water cascade attachment from the adapter (if included (see Figure 11, item A)). Remove the rubber shaft deflector (see Figure 11, 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.

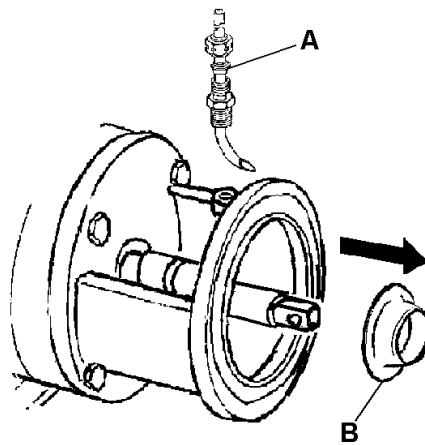


Figure 11

4-C Replacing the Motor

- To replace or service the motor, disassemble the pump as outlined in “Pump Disassembly” procedure on page 10.
- Remove the bolts securing the adapter to the motor frame and remove the adapter.
- Loosen the two setscrews securing the stub-shaft to the motor shaft (see Figure 12). Carefully remove the stub-shaft. The stub-shaft is a tight fit, but can be removed by applying pressure around the periphery of the shaft with a pry bar.

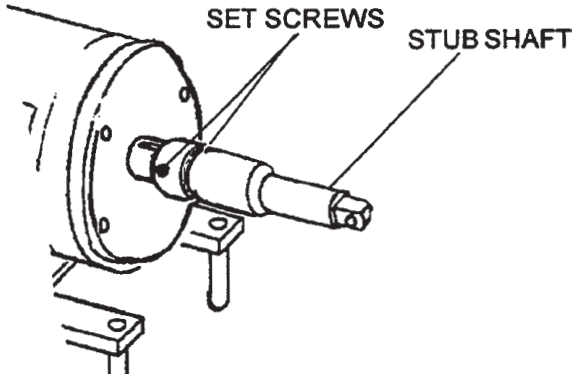


Figure 12

WARNING! Examine the shaft sealing surfaces for nicks or scratches, which can cause excessive O-ring wear or leaking.

- Remove the bolts securing the motor to the mounting brackets. Bolt the new motor to the mounting brackets.

WARNING! Motor maintenance, repair and wiring are not covered in this Manual. For specific information, please contact the motor manufacturer.

- If required, level the motor by adjusting the legs individually and securing them in place with the setscrews. Please see “Pump Leveling” on page 5.

4-D Installing the Adapter

- Install the adapter to the motor, with the drain cavity at the bottom. Insert the four bolts to secure the adapter to the motor. Tighten the bolts (see Figure 13).

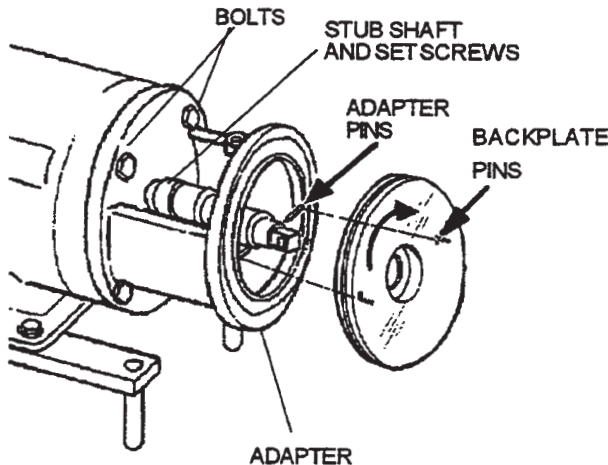


Figure 13

- Install the key in the motor shaft.
- Place the stub-shaft assembly onto the motor shaft (see Figure 13). DO NOT tighten the shaft setscrews.
- Install the back-plate on the adapter and rotate it until the back-plate pins engage the adapter pins (see Figure 13), ensuring solid contact of the back-plate to the adapter.
- Rotate the stub shaft until the impeller's retaining hole is in a horizontal position. Insert the impeller retainer pin, and center it in the stub-shaft.
- Slide the impeller onto the shaft. 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 (see Figure 14).

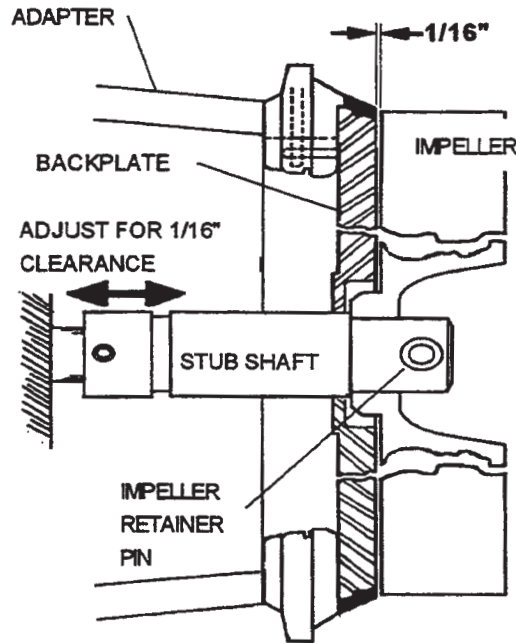


Figure 14

- Place a $0.060'' \pm 0.010''$ (1.52 mm \pm 0.25 mm) feeler gauge between the front face of the back-plate and the impeller.
- Push the sub-shaft/impeller assembly toward the motor until the impeller rests against the feeler gauge.
- Tighten the two setscrews on the stub-shaft.
- With a feeler gauge, check that the clearance between the rear face of the impeller and the front (inside) face of the back-plate is $0.060'' \pm 0.010''$ (1.52 mm \pm 0.25 mm).
- Remove the impeller retainer pin, impeller, and back-plate.
- Slide the deflector (large diameter end first) onto the shaft until it seats in the shaft groove. If the deflector cannot be forced on with the fingers, use a blunt tool to tap it evenly into place.

4-E Stub Shaft Adjustment (Models C-114 through C-328)

Slide the seal drive collar onto the stub shaft as shown on Figure 15.

- Use the “A” and “B” dimensions in the following Seal Chart, to properly locate the drive collar on the stub shaft. Tighten the setscrews to secure in place.

Model	A(mm)	B(mm)
C114	14.2	36.5
C216	14.2	43.6
C218	14.2	41.6
C328	14.2	41.6

Note: C-100 Pump Model does not require drive collar.

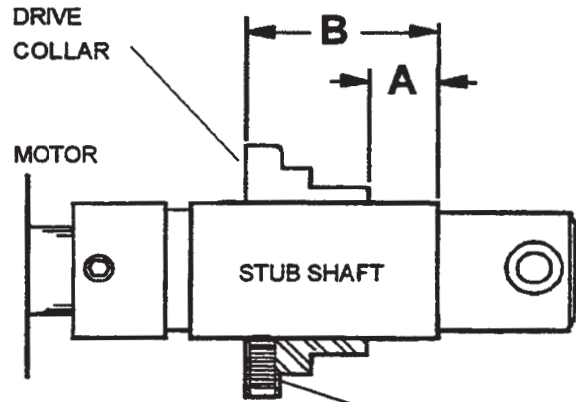


Figure 24 SET SCREW (2) Figure 15

- Assemble the spring, seal cup, O-ring and carbon seal, and install as a unit, taking care that slot in seal cup aligns with the pin on shaft (see Figure 16). Gentle pressure on the O-ring will overcome resistance on the shaft.

WARNING! DO NOT lubricate seals with any type of oil or grease. The seal faces will be lubricated by the product being pumped.

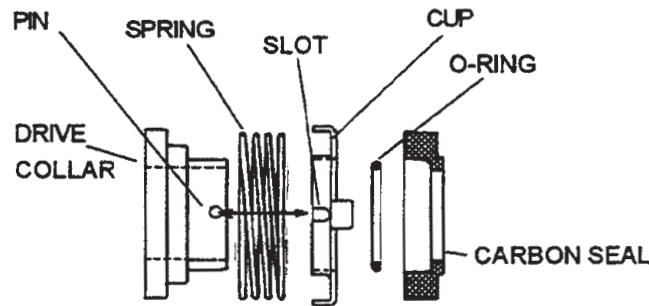


Figure 16

- Assemble the gasket to the back-plate. Install the back-plate on the adapter. Check that the seal cup slot is engaged with the pin on the drive collar.
- Rotate the back-plate until the back-plate pins engage the adapter pins (see Figure 17).

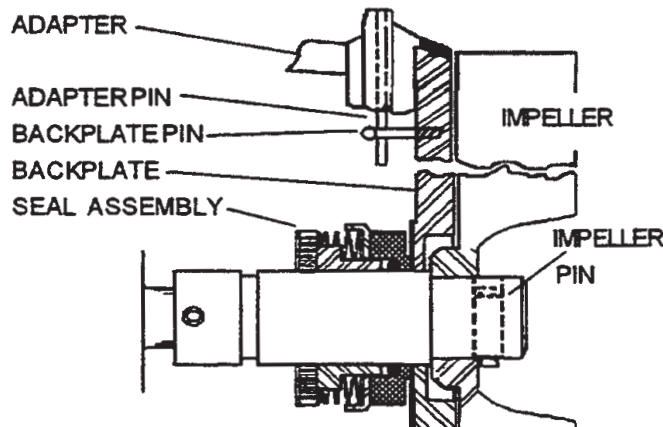


Figure 17

- Rotate the shaft until the pin's hole in the end is in a horizontal position. Insert the impeller pin, center it in the shaft end and slide the impeller on the shaft. Hold the impeller tight against the stub shaft and rotate the shaft one-fourth turn until the impeller pin drops and secures the impeller (see Figure 17).
- Place the casing over the impeller/back-plate, close and tighten the clamp.
- Assemble the cascade water fitting if included. Install seal guard and tighten in place. Assemble the suction and the discharge lines to the casing. Check for strain or misalignment of piping to the casing. Re-adjust the casing ports and/or entire motor leveling as necessary.

APPENDIX TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Not Enough Liquid Delivered	Pump not primed.	Prime pump. Install a priming system if possible.
	Suction or discharge plugged or closed.	Open suction. If plugged, shut down pump 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 turning too freely causing overload.
	Suction lift too high.	Lower pump is 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 available.	Adjust system to provide correct NPSH.
Impeller diameter too small for duty.	Contact your Texas Process Technologies Customer Service Representative for sizing information.	

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Not Enough Pressure	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 your Texas Process Technologies Customer Service Representative for sizing information.

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Motor Overload	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.
	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 Texas Process Technologies 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 your Texas Process Technologies Customer Service Representative for sizing information.
	Defective motor.	Replace motor.

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Vibration / Noise	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 of this Manual.
	Starved suction / Supply line blocked.	Shut down the pump 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 available.	Adjust system to provide correct NPSH.
	Impeller hub / impeller shaft worn / Impeller shaft loose or bent / Impeller out of balance.	Disassemble pump and inspect for damage.
	Motor bearing worn.	Disassemble motor and inspect for damage.
	Starved suction / Supply line too long / Supply line too small.	Install shorter or larger system supply line respectively.
	Excessive air in material.	Adjust system to remove excess air from material before it reaches the pump.

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Rapid Seal Wear	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 your Texas Process Technologies Customer Service Representative 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.

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Seal Leaks	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 assemble pump.
	Carbon seal worn or damaged.	Disassemble pump and inspect for damage. Replace if needed.
	Inlet/Outlet connection loose or no gasket.	Inspect inlet/outlet connection for gasket and tighten connection.
	Casing clamp loose.	Tighten clamp.