



TOP-FLO[®] Centrifugal Pump Model "TF-C" Series



Operation
Maintenance
& Parts List

Please read and understand this manual prior to installing, operating or maintaining this pump.

Haleson 
Sanitary / Biopharma / Industrial

www.toplineonline.com



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SAFETY

TOP-FLO® “TF-C” Series centrifugal pumps have been designed to be safe and reliable when properly used and maintained.

Operators and maintenance personnel must follow safety measures. Failure to observe the instructions in this manual could result in personal injury or machine damage.

- **Do Not operate pump beyond the rated conditions for which the pump was sold.**
- **Do Not use heat to remove impeller or disassemble pump due to risk of explosion of trapped liquid.**

Warnings, cautions and notes are contained in this manual. To avoid serious injury and/or possible damage to equipment, pay attention to these messages.

WARNING Hazards or unsafe practices which COULD result in severe personal injury or death and how to avoid it.

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

NOTE Important information pertaining directly to the subject. (Information to be aware of when completing the task.)

WARNING

Do not operate pump without CASING/VOLUTE clamped securely in place.

WARNING

ROTATING SHAFT
DO NOT OPERATE WITHOUT
GUARD IN PLACE

WARNING

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

WARNING

TO AVOID POSSIBLE SERIOUS INJURY, SHUT OFF AND DRAIN PRODUCT FROM PUMP PRIOR TO DISCONNECTING PIPING.

CAUTION

Wear gloves to avoid cutting injuries from sharp pump parts.

WARNING

TO AVOID SERIOUS INJURY, DO NOT INSTALL OR SERVICE PUMP UNLESS ALL POWER IS OUT AND LOCKED OUT.

Read and understand this manual prior to installing, operating or maintaining this pump.

WARRANTY

TOP LINE PUMP WARRANTY

Seller warrants its products to be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. This warranty shall not apply to products which require repair or replacement due to normal wear and tear or to products which are subjected to accident, misuse or improper maintenance. This warranty extends only to the original Buyer. Products manufactured by others but furnished by Seller are exempted from this warranty and are limited to the original manufacturer's warranty.

Seller's sole obligation under this warranty shall be to repair or replace any products that Seller determines, in its discretion, to be defective. Seller reserves the right either to inspect the products in the field or to request their prepaid return to Seller. Seller shall not be responsible for any transportation charges, duty, taxes, freight, labor or other costs. The cost of removing and/or installing products which have been repaired or replaced shall be at Buyer's expense. Seller expressly disclaims all other warranties, express or implied, including without limitation any warranty of merchantability of fitness for a particular purpose. The foregoing sets forth Seller's entire and exclusive liability, and Buyer's exclusive and sole remedy, for any claim of damages in connection with the sale of products. In no event shall Seller be liable for any special consequential incidental or indirect damages (including without limitation attorney's fees and expenses), nor shall Seller be liable for any loss of profit or material arising out of or relating to the sale or operation of the products based on contract, tort (including negligence), strict liability or otherwise.

GENERAL INFORMATION

SHIPPING DAMAGE

Inspect your shipment immediately. If shipping damage is found, note it on the drivers copy (packing slip) and request the driver to ask the Inspector to call. You are responsible for initiating shipping damage claims.

HIDDEN DAMAGE

If during installation, you discover hidden damage caused in shipping, contact the Shipper immediately and ask for an Inspector to call. Notify your Top Line Distributor of the problem.

WARRANTY CLAIM

Please read the Warranty statement to correctly determine if you have a claim. In warranty claims you must have a "Returned Goods Authorized" (RGA) from Top Line before any returns will be accepted. Your Top Line Distributor will help you with a warranty problem.

ORDERING/RETURNING PARTS

See page 24 for complete information on ordering parts. Complete the Distributor/Product information immediately and keep for later reference.

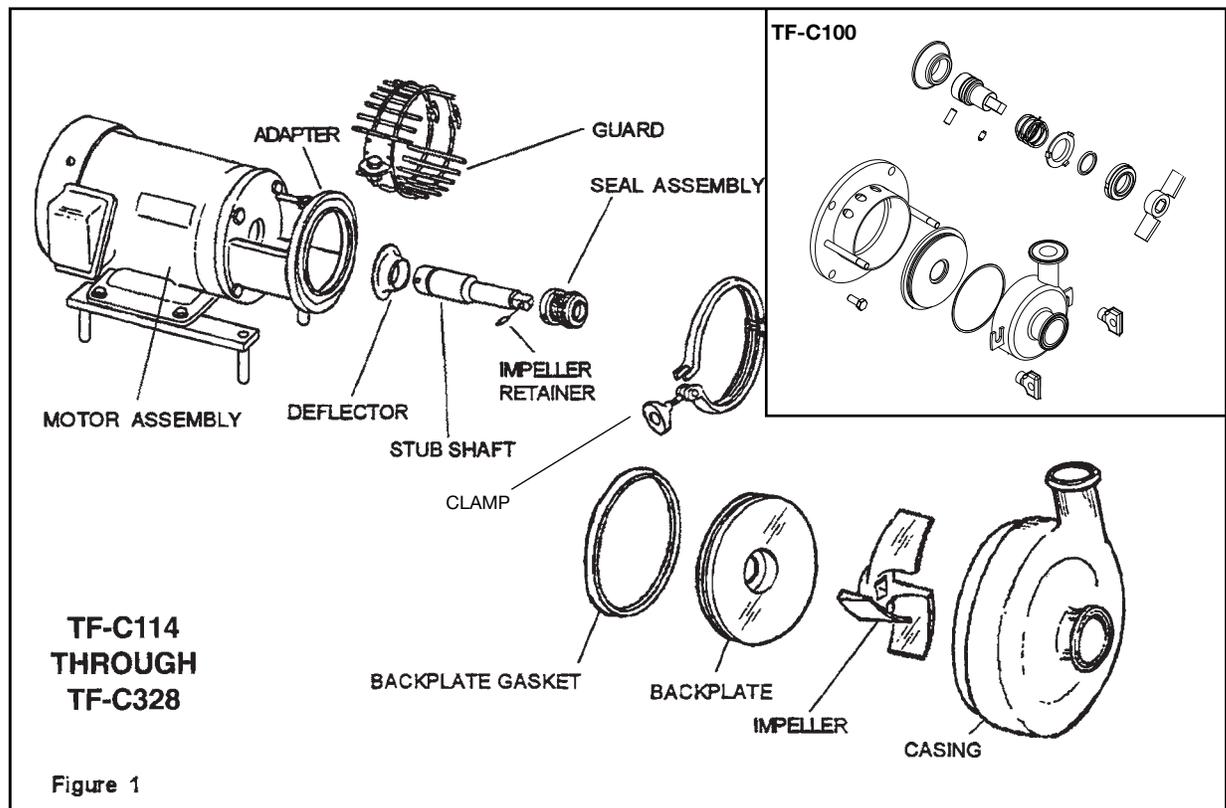
INTRODUCTION

DESCRIPTION

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

The “TF-C” Series Centrifugal Pumps consist of two sections, the motor assembly, and the pump components. (Figure 1) The pump is mounted on the drive motor with an adapter, and is coupled to the motor with a stainless steel stub shaft. The pump impeller mounts on the stub shaft and is secured with a floating impeller retainer pin.

The casing is joined to the adapter by a clamp, greatly simplifying removal and also permitting the casing outlet to be rotated to various positions. (The TF-C 100 is secured with two wing nuts and may only be mounted with the outlet facing straight up.) The mechanical external balanced seal assures a long wear life. The drive motor is mounted on a frame with adjustable legs in accordance with sanitary design requirements providing simple installation and easy leveling of the pump.



INTRODUCTION

PERFORMANCE CHARACTERISTICS:

Nominal Capacity: To 780 GPM **Viscosity:** To 200 CPS **Temperatures:** To 212°F (100°C)

Nominal Speeds: To 2900 RPM - 50HZ; To 3500 RPM - 60HZ

STANDARD CONSTRUCTION:

- Casting, backplate, and impeller are 316L stainless steel with a 32Ra grit polished sanitary finish.
- Port Connection: Clamp fittings are standard.
- Power: Supplied by a standard foot-mounted C-face motors through 60 horsepower.
- Seal: "Type D" Seal material is carbon rotating on stationary stainless steel backplate. Water cascading attachment is available option ("F" Seal.) Dual seal is available option ("E" Seal.)
- Elastomers: Buna, FKM and EPDM.

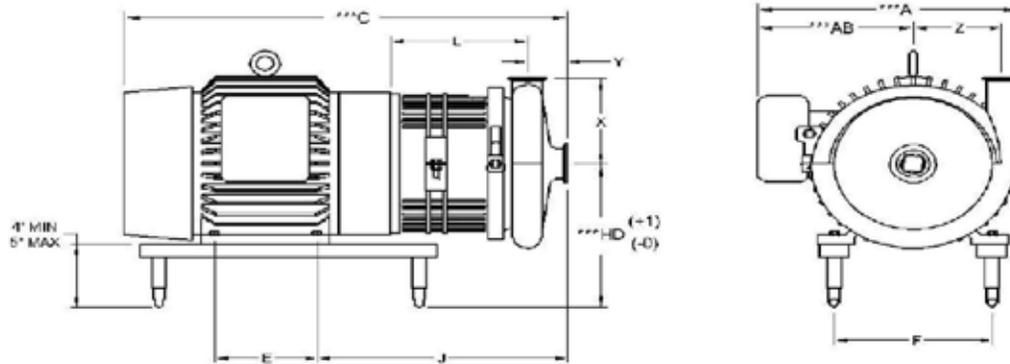
MECHANICAL SPECIFICATIONS

| MODEL | PORT SIZE Inches | | IMPELLER DIA. Inches (mm) | |
|---------|---------------------|----------------|------------------------------|--------------|
| | Inlet | Discharge | Minimum | Maximum |
| TF-C100 | 1-1/2 - | 1 - | 3.0 (76) | 3.68 (93) |
| TF-C114 | 1-1/2 2 | 1-1/2 1-1/2 | 2.5 (63) | 4.0 (101) |
| TF-C216 | 2 2-1/2 | 1-1/2 1-1/2 | 4.0 (101) | 6.0 (152) |
| TF-C218 | 2 3 | 1-1/2 1-1/2 | 6.0 (152) | 8.0 (203) |
| TF-C328 | 3 4 | 2 2 | 5.5 (139) | 8.0 (203) |

AVAILABLE MOTOR FRAME SIZES FOR PUMP MODELS

| | | | |
|---------|---|---------|---|
| TF-C100 | 56C 143TC-145TC | TF-C218 | 143TC-145TC 182TC-184TC 213TC-215TC |
| TF-C114 | 56C 143TC-145TC 182TC-184TC | | 254TC-256TC 284TC-286TC |
| TF-C216 | 56C 143TC-145TC 182TC-184TC 213TC-215TC 254TC-256TC | TF-C328 | 182TC-184TC 213TC-215TC 254TC-256TC 284TC-286TC 324TC-326TC |

INSTALLATION TOP-FLO® CENTRIFUGAL PUMP DIMENSIONS



PUMP DIMENSIONS

| PUMP MODEL | SUCTION | DISCHARGE | *X | *Y | **X | **Y | Z |
|------------|---------|-----------|-------|-------|-------|-------|-------|
| C100 | 1.500 | 1.000 | 3.500 | 1.554 | | | 1.453 |
| C114 | 1.500 | 1.500 | 3.625 | 1.594 | 3.875 | 1.844 | 2.625 |
| C216 | 2.000 | 1.500 | 4.500 | 1.906 | 4.750 | 2.156 | 3.688 |
| C218 | 2.000 | 1.500 | 5.500 | 1.719 | 5.750 | 1.969 | 4.750 |
| C328 | 3.000 | 2.000 | 5.500 | 2.219 | 5.750 | 2.719 | 4.750 |

PUMP AND MOTOR DIMENSIONS WITH "WASHDOWN" TOTALLY ENCLOSED BALDOR MOTORS

| PUMP MODEL | FRAME | A | *C | **C | HD | AB | *J | E | F | L |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| C100 | 56C | 8.313 | 13.312 | | 7.500 | 5.000 | 6.875 | 3.000 | 4.875 | 2.750 |
| | | | | | | | | | | |
| C114 | 56C | 8.313 | 16.821 | 17.071 | 7.500 | 5.000 | 10.375 | 3.000 | 4.875 | 6.219 |
| | 143 TC | 8.563 | 17.813 | 18.063 | 7.500 | 5.250 | 10.844 | 4.000 | 5.500 | 6.219 |
| | 145 TC | 8.563 | 19.848 | 18.063 | 7.500 | 5.250 | 10.888 | 5.000 | 5.500 | 6.219 |
| | 182 TC | 9.813 | 20.938 | 21.180 | 8.500 | 5.875 | 12.219 | 4.500 | 7.500 | 6.781 |
| | 184 TC | 9.813 | 23.790 | 24.915 | 8.500 | 5.875 | 12.000 | 5.500 | 7.500 | 6.781 |
| C216 | 56C | 8.313 | 16.976 | 17.226 | 7.500 | 5.000 | 10.531 | 3.000 | 4.875 | 6.062 |
| | 143 TC | 8.563 | 17.968 | 18.223 | 7.500 | 5.250 | 10.844 | 4.000 | 5.500 | 6.062 |
| | 145 TC | 8.563 | 20.003 | 20.253 | 7.500 | 5.250 | 10.844 | 5.000 | 5.500 | 6.062 |
| | 182 TC | 9.813 | 21.157 | 21.399 | 8.500 | 5.875 | 12.219 | 4.500 | 7.500 | 6.688 |
| | 184 TC | 9.813 | 24.009 | 24.259 | 8.500 | 5.875 | 12.219 | 5.500 | 7.500 | 6.688 |
| | 213 TC | 12.156 | 26.487 | 26.624 | 9.250 | 7.375 | 13.969 | 5.500 | 8.500 | 7.813 |
| | 215 TC | 12.156 | 27.864 | 28.114 | 9.250 | 7.375 | 13.969 | 7.000 | 8.500 | 7.813 |
| | 254 TC | 16.094 | 28.533 | 28.783 | 10.250 | 9.625 | 14.594 | 8.250 | 10.000 | 8.437 |
| | 256 TC | 16.094 | 30.163 | 30.413 | 10.250 | 9.625 | 14.594 | 10.000 | 10.000 | 8.437 |
| C218 | 143 TC | 8.563 | 18.036 | 18.281 | 7.500 | 5.250 | 10.281 | 4.000 | 5.500 | 6.312 |
| | 145 TC | 8.563 | 20.066 | 18.286 | 7.500 | 5.250 | 10.281 | 5.000 | 5.500 | 6.312 |
| | 182 TC | 9.813 | 21.211 | 20.941 | 8.500 | 5.875 | 12.281 | 4.500 | 7.500 | 6.938 |
| | 184 TC | 9.813 | 24.071 | 24.321 | 8.500 | 5.875 | 12.281 | 5.500 | 7.500 | 6.938 |
| | 213 TC | 12.156 | 25.686 | 25.936 | 9.250 | 7.375 | 13.281 | 5.500 | 8.500 | 7.312 |
| | 215 TC | 12.156 | 27.176 | 27.426 | 9.250 | 7.375 | 13.281 | 7.000 | 8.500 | 7.312 |
| | 254 TC | 16.094 | 28.096 | 28.346 | 10.250 | 9.625 | 14.157 | 8.250 | 10.000 | 8.188 |
| | 256 TC | 16.094 | 29.726 | 29.977 | 10.250 | 9.625 | 14.157 | 10.000 | 10.000 | 8.188 |
| | 284 TC | 20.438 | 33.916 | 34.166 | 11.000 | 13.125 | 15.281 | 9.500 | 11.000 | 8.812 |
| 286 TC | 20.438 | 33.916 | 34.166 | 11.000 | 13.125 | 15.281 | 11.000 | 11.000 | 8.812 | |
| C328 | 182 TC | 9.813 | 22.024 | 22.524 | 8.500 | 5.875 | 13.094 | 4.500 | 7.500 | 7.250 |
| | 184 TC | 9.813 | 24.884 | 25.384 | 8.500 | 5.875 | 13.094 | 5.500 | 7.500 | 7.250 |
| | 213 TC | 12.156 | 26.499 | 26.999 | 9.250 | 7.375 | 14.094 | 5.500 | 8.500 | 7.625 |
| | 215 TC | 12.156 | 29.664 | 28.489 | 9.250 | 7.375 | 14.094 | 7.000 | 8.500 | 7.625 |
| | 254 TC | 16.094 | 28.909 | 29.409 | 10.250 | 9.625 | 15.000 | 8.250 | 10.000 | 8.500 |
| | 256 TC | 16.094 | 30.539 | 31.039 | 10.250 | 9.625 | 15.000 | 10.000 | 10.000 | 8.500 |
| | 284 TC | 20.438 | 34.729 | 35.229 | 11.000 | 13.125 | 16.094 | 9.500 | 11.000 | 9.125 |
| | 286 TC | 20.438 | 34.729 | 35.229 | 11.000 | 13.125 | 16.094 | 11.000 | 11.000 | 9.125 |
| | 324 TC | 22.375 | 37.311 | 37.811 | 12.000 | 14.125 | 17.156 | 10.500 | 12.500 | 9.812 |
| 326 TC | 22.375 | 37.311 | 37.811 | 12.000 | 14.125 | 17.156 | 12.000 | 12.500 | 9.812 | |

* WITH CLAMP CONNECTIONS (STANDARD)
 ** WITH THREADED BEVEL SEAT CONNECTIONS
 *** DIMENSIONS ARE FOR BALDOR WASHDOWN MOTORS
 OTHER MOTOR MANUFACTURERS DIMENSIONS MAY VARY
 FLANGE MOTORS

NOTES:
 ALL DIMENSIONS IN INCHES.
 DIMENSIONS ARE APPROXIMATE AND FOR GUIDANCE ONLY.
 THESE DIMENSIONS ARE FOR PUMPS USING NEMA STANDARD "C"

INSTALLATION

UNPACKING EQUIPMENT

Check all parts received and inspect for damages that may have occurred during shipping. Report any damage to the carrier.

PUMP LOCATION

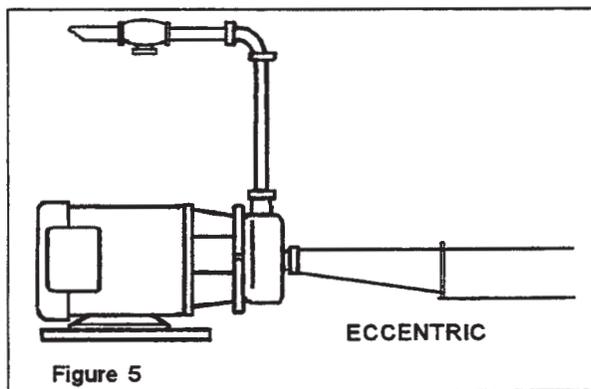
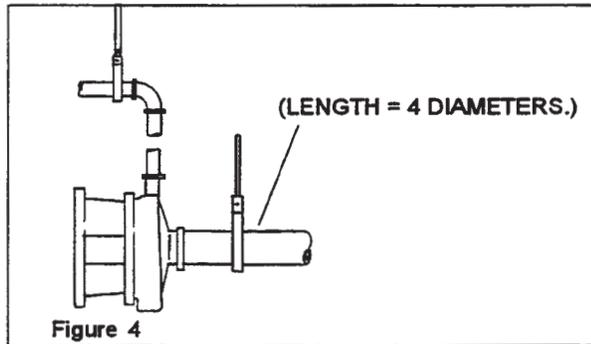
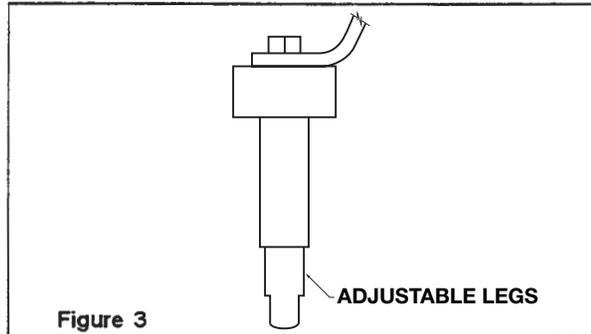
- Place as close as practical to the liquid supply. Keep supply piping short and straight. Keeping the pump supplied with liquid will prevent damaging from cavitation.
- The pump must be accessible for service and inspection during operation.
- The motor must be protected from flooding.

PUMP LEVELING

- Level the pump by rotating the adjustable legs. (Figure 3)

SUPPLY AND DISCHARGE PIPING/VALVES

- Use line size equal to, or larger than connection sizes on pump, especially the inlet supply line.
- Keep the supply line short and straight. Use as few elbows, valves, or other types of restrictions as possible. Avoid up and down rises which will trap air.
- Be certain all joints in the suction lines are well sealed to prevent air leaks.
- Maintain a straight length of pipe at least 4 diameters long at the pump inlet. (Figure 4)
- 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 insure the casing is flooded and prevents problems due to air in the system. (Figure 6)
- Support the supply and discharge piping near the pump so no strain is put on the pump casing.
- If an expansion joint is used, install a pipe anchor between it and the pump.
- If a reducer is connected to the inlet, use an eccentric type (Figure 5) to prevent problems due to trapped air.

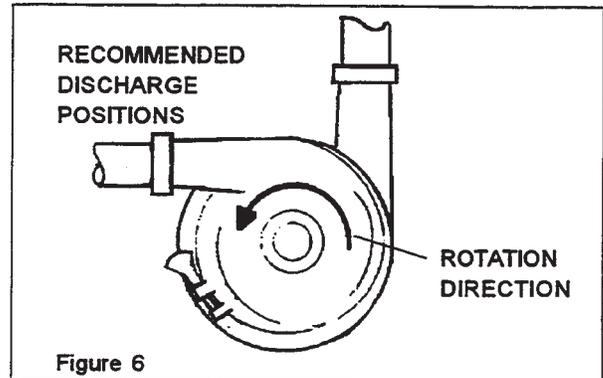


CAUTION
Wear gloves to avoid cutting injuries from sharp pump and piping parts.

- Line slope will depend on application requirements. The best pump operation is with supply line sloped slightly upward toward pump to prevent trapped air. If the system must drain into the 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 the system.

INSTALLATION

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

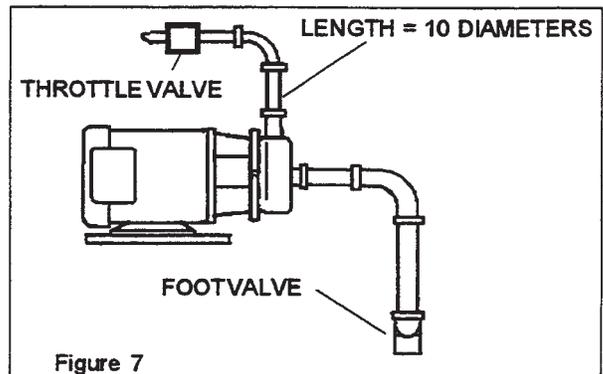


ELECTRICAL CONNECTIONS

WARNING

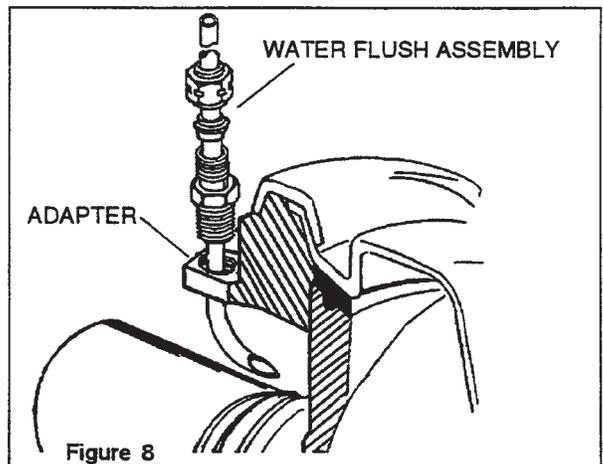
To avoid electrocution, ALL electrical installation should be done by a registered electrician, following Industry Safety Standards. All power must be OFF and LOCKED OUT during installation.

- Read the manufacturer's motor instructions before making installation. Follow the manufacturer's lubrication schedules.
- Check the motor nameplate to be sure the motor is compatible with the electrical supply and all wiring, switches, starters, and overload protection are correctly sized.
- Check pump rotation following electrical installation. Correct rotation is counter clockwise when facing pump inlet connection. (Figure 5)



FLUSH SEAL OPTION

When this option is ordered, a fitting assembly is supplied for directing a flow of water onto the backplate/seal area. The water supply should be cool and filtered. If the product solidifies at cool temperatures, use warm or hot water. The connection size is 1/4 inch O.D. tubing and the required flow is approximately 5 U.S. gallons per hour. (Figure 8)



CLEANING PUMP PRIOR TO FIRST OPERATION

CLEAN PUMP AND PIPING

Disassemble pump and clean all product contact parts and seals prior to first operation. Follow instructions in the "Cleaning Safety Procedures" and "Disassembly for Cleaning and Repair" section (pages 9 and 12). The pump should be thoroughly cleaned of any materials which may have accumulated during installation.

WARNING

TO AVOID SERIOUS INJURY, DO NOT INSTALL OR SERVICE PUMP UNLESS ALL POWER IS OFF AND LOCKED OUT.

OPERATION

CLEANING SAFETY AND TEST RUN

CLEANING SAFETY PROCEDURES

Manual Cleaning:

1. Do not use toxic and/or flammable solvents.
2. Lock out electrical power and shut off all air prior to cleaning equipment.
3. Keep electrical panel covers closed and power off when washing equipment.

WARNING

To prevent an accidental start-up the power source should be locked out using your lock and key.

4. Clean up spills as soon as possible.
5. Never attempt to clean the equipment while it is operating.
6. Wear proper protective apparel.

Cleaning-In-Place

1. Make certain that all connections in the cleaning circuit are properly applied and tight to avoid contact with hot water or cleaning solutions.
2. When the cleaning cycle is controlled from a remote or automated cleaning center, follow all established safety procedures for servicing the system.

PRELIMINARY TEST RUN

See **OPERATION** on page 10 to set pump up for a test run.

CHECK FOR POSSIBLE MOTOR OVERLOAD CONDITION

Certain combinations will overload the motor when operated with open, unrestricted discharge, which results in a high flow rate. Additional discharge restriction may be required to lower the flow rate and lower the horsepower requirements. DO NOT add restrictions to the supply line. If the pump was incorrectly sized, a smaller impeller or a higher horsepower motor may be required.

If uncertain about pump selection and application, temporarily install an ammeter in the electrical service to check the amp draw.

AMMETER TEST

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

WARNING

TO AVOID ELECTROCUTION, ONLY A QUALIFIED ELECTRICIAN SHOULD INSTALL THE AMMETER.

OPERATION

- Any system throttling valves, or similar devices used to control flow rate must be installed in the discharge line, not the supply 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. 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 the pump. Drain casing before exposing to freezing temperatures.

DISASSEMBLY, CLEANING/REPAIR

It is not necessary to disassemble the pump for cleaning if used in a CIP Installation (Clean-In-Place). However, periodically take pump apart, thoroughly inspect, clean and reassemble.
(See MAINTENANCE - DISASSEMBLY)

OPERATION

WARNING

Skin and eye protection are required when handling hazardous or toxic fluids.

CAUTION

If pump is being drained, take necessary precautions to avoid personal injury.

NOTE: Disposal of drainage must be in conformance with environmental regulation.

Pumps must have been correctly installed as described in the "INSTALLATION" section.

SEAL FLUSH

1. If the pump has the flush seal option, start the flow of flush water (approximately 5 US gallons per hour recommended rate).

PRIME PUMP

2. Flood the pump casing with liquid BEFORE starting pump to avoid damage to the pump parts. Fill the supply tank with liquid and open supply line valve (suction). Any air trapped in the supply line or casing should be vented. (Figure 9)

PRIMING WITH OUTSIDE SOURCE

The pump will not self prime if the liquid supply is below the pump level. (Figure 10)

3. Close the discharge valve and open the air vents.
4. Open the valve in the outside supply line until the liquid flows from the vent valves.
5. Close the vent valves and the supply line. 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. (See Figure 7)
6. Start the pump motor.

PUMP CHECK

7. Check to see that liquid is flowing and all piping connections and seals are leak free.

The pump must be operated against a closed discharge for a short time. However, continued operation will heat liquid in casing to boiling and lead to pump damage.

PUMP BELOW SUPPLY

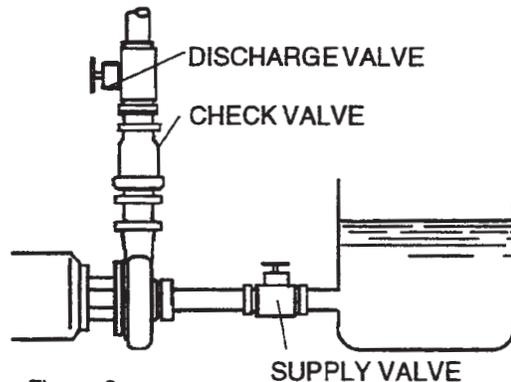


Figure 9

PUMP ABOVE SUPPLY

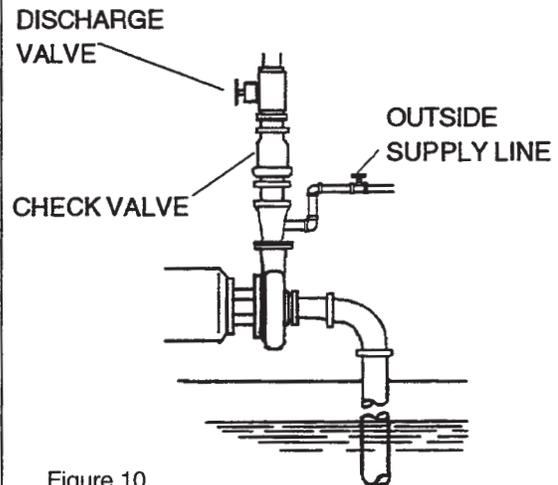


Figure 10

8. Slowly open the discharge valve until desired flow is obtained. Observe pressure gauges and if pressure is not attained quickly, stop pump and prime again.

STOP PUMP

9. To stop the pump, shut off the power to the pump motor. Liquid in the system can flow freely through the pump. The pump does not act as a shut off valve. Shut off supply and discharge lines.

STUB SHAFT SEAL

The shaft design utilizes a drive collar as shown in Figure 11 to assure proper location of the seal assembly. The TF-C100 does not require a drive collar. The drive collar is incorporated in the design of the stub shaft.

The drive collar must be properly located on the shaft, following procedures outlined on page 15.

This type of seal should be replaced when the face is worn away, or when leakage is noted (Figure 12)

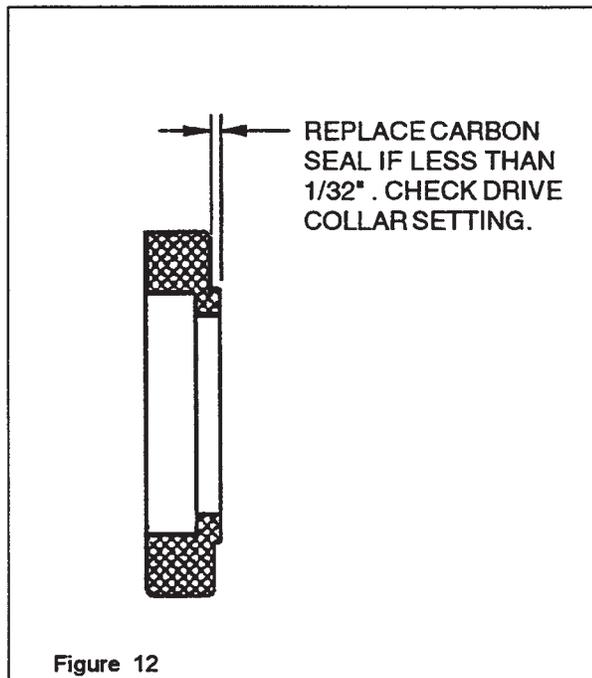
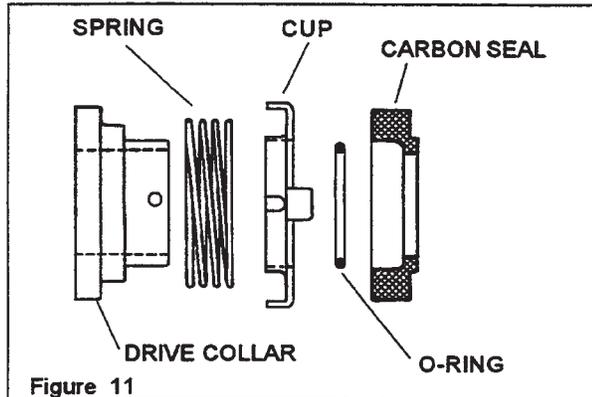
To remove the seal, disconnect the suction and discharge piping. Then, remove the casing, impeller, and backplate. Protect the sealing face of the backplate from nicks and scratches.

NOTE: When the carbon seal is replaced, the position of the drive collar should be checked and reset if necessary, per the dimensions given on page 15.

Inspection during cleaning will determine if the carbon seal needs replaced. No additional drive collar adjustment is necessary unless the seal is replaced. (Figure 12)

SERVICE/REPAIR

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



CAUTION

Wear gloves to avoid cutting injuries from sharp pump parts.

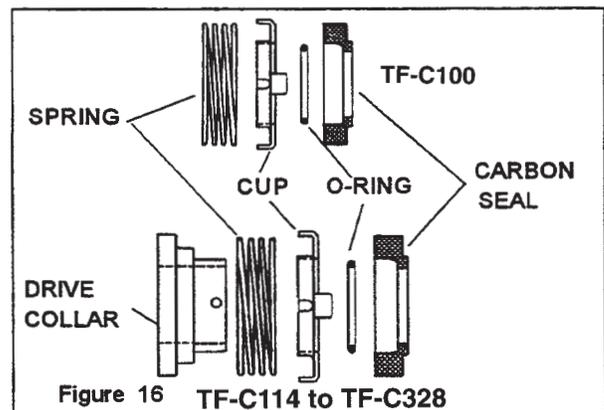
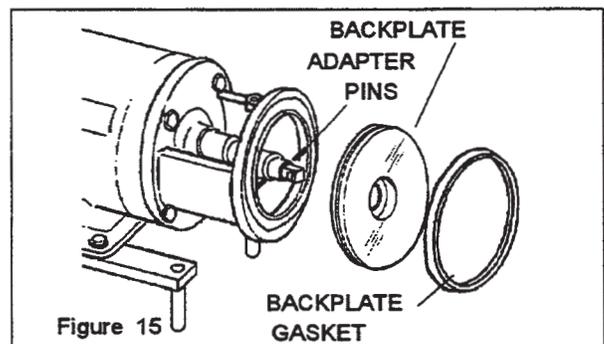
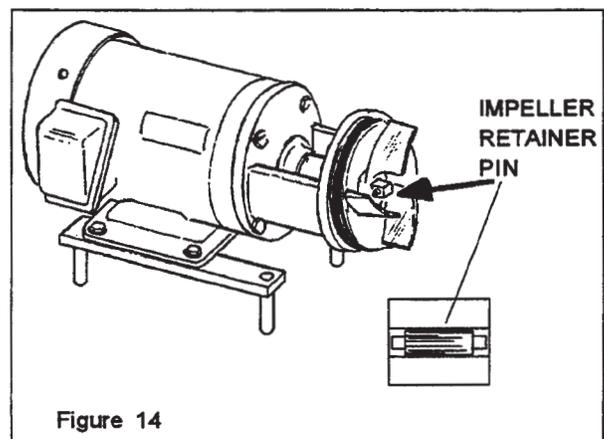
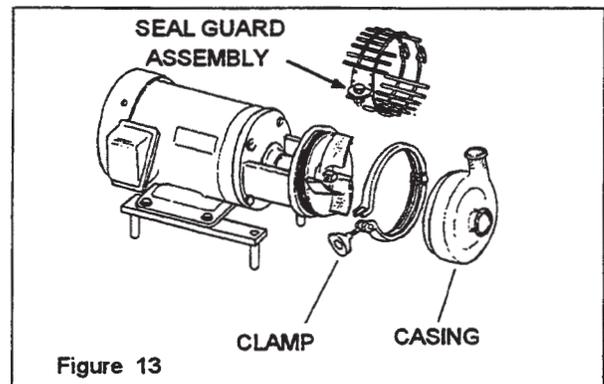
1. **Shut off** product flow to the pump and relieve any product pressure.
2. **Shut off and lock out** power to the pump.
3. Disconnect the suction and discharge pipe fittings.
4. Remove the seal guard assembly with a wrench. (Figure 13)
5. Loosen clamp wing nut and swing clamp open. On the TF-C100, remove casing wing nuts.
6. Inspect clamp saddles and the casing for damage or wear and replace if necessary. (Figure 13)
7. Push back on the impeller and position the retaining pin in the center of the stub shaft. This will allow the impeller to pull off the stub shaft. (Figure 14)
8. Rotate the backplate to disengage the backplate pins from the adapter pins. Remove the backplate with gasket attached, by pulling straight off the adapter. (Figure 15)
9. Remove the backplate gasket and inspect it for wear and sealing failure.

NOTE: Care must be taken to protect the sealing face and edges of the backplate from nicks and scratches.

10. Remove the carbon seal, o-ring, seal cup, and spring from the stub shaft by pulling them straight off the shaft. (Figure 16)
11. Carefully inspect the o-ring and the carbon seal for signs of abrasions, cuts, or other wear that could cause leakage. (Figure 16)

NOTE: Replace the carbon seal when the extension end of the seal is less than 1/32". (Figure 12)

12. After cleaning, inspect the seal, o-ring, and gasket and replace if necessary.



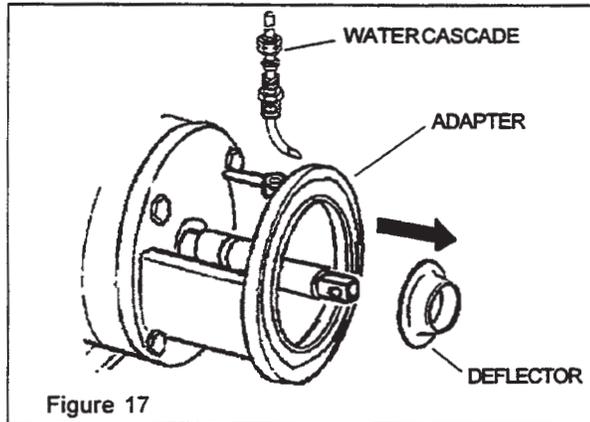
MAINTENANCE

WATER CASCADE - REPLACING MOTORS

13. Remove the water cascade attachment from the adapter, if included. Remove the rubber shaft deflector by pulling it straight off the stub shaft. Examine it for tearing, loose fit, or other defects that would allow liquid leakage into the motor along the shaft. (Figure 17)

WARNING

TO AVOID SERIOUS INJURY, DO NOT INSTALL OR SERVICE PUMP UNLESS ALL POWER IS OFF AND LOCKED OUT.



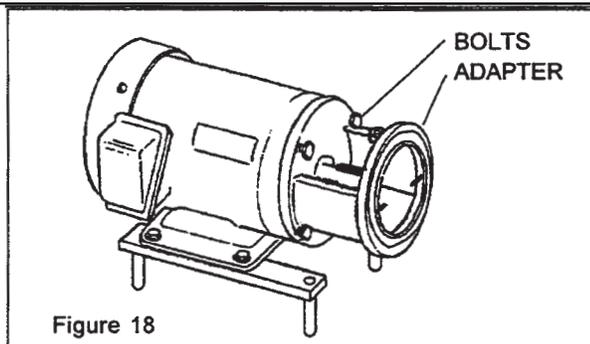
REPLACING MOTOR

To replace or service the motor, disassemble the pump as outlined in DISASSEMBLY steps 1 through 11.

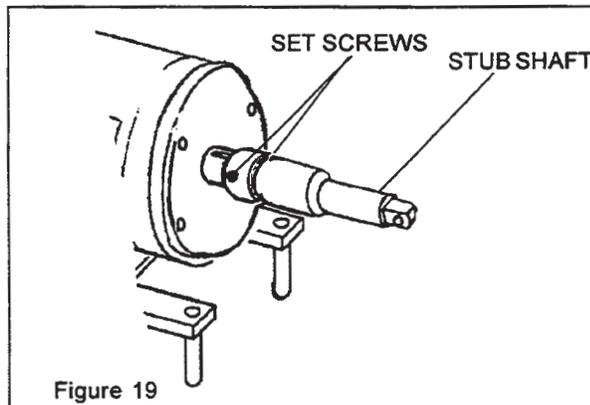
1. Remove the bolts that secure the adapter to the motor frame and remove the adapter. (Figure 18)

CAUTION

The stub shaft has four sharp diagonal grooves in the end. Wear gloves to prevent injuries to hands.



2. Loosen the two (2) set screws securing the stub-shaft to the motor shaft. 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 19)

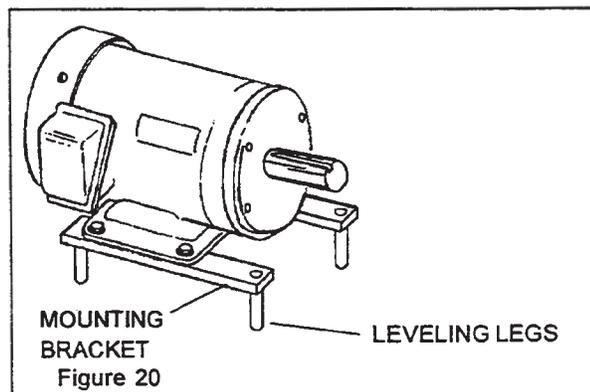


NOTE: Examine the shaft sealing surfaces for nicks or scratches which can cause excessive o-ring wear or leaking.

3. Remove the bolts securing the motor to the mounting brackets. Bolt the new motor to the mounting brackets. (Figure 20)

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

If required, level the motor by rotating the adjustable legs individually. (Figure 3 & 20)



MAINTENANCE

INSTALL ADAPTER-STUB SHAFT ADJUSTMENT

1. Mount the adapter to the motor with the drain cavity at the bottom. Insert the four bolts to secure the adapter to the motor. (Figure 21)
2. Install half key in the motor shaft.
3. Place the stub-shaft assembly onto the motor shaft. Do not tighten the shaft set screws.
4. Install the backplate on the adapter and rotate until the backplate pins engage the adapter pins, assuring solid contact of the backplate to the adapter. (Figure 21)
5. 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. Slide the impeller on 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. (Figure 22)

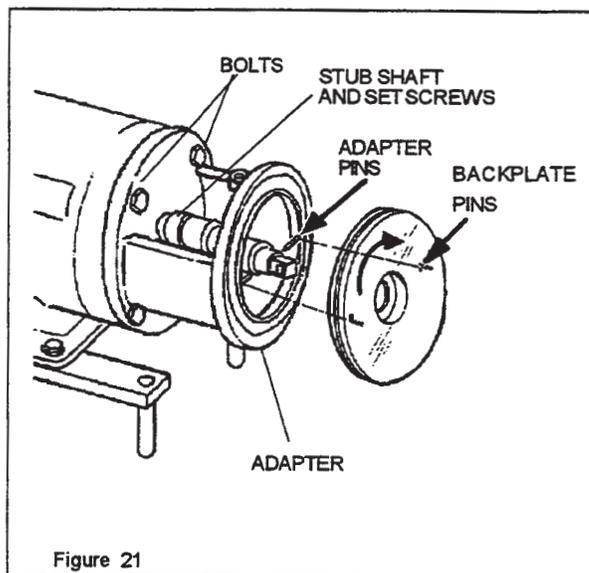


Figure 21

STUB SHAFT ADJUSTMENT

1. Push the stub-shaft/impeller assembly toward the motor until the impeller strikes the front face of the backplate.
2. Move the stub-shaft away from the motor shaft to allow 1/16-inch maximum clearance between the rear face of the impeller and the front (inside) face of the backplate. (See Figure 22)
3. Tighten the two set screws on the stub-shaft.
4. Remove the impeller retainer pin, impeller, and the backplate.
5. Slide the deflector (large diameter end first) onto the shaft until it seats in the shaft groove. (Figure 23)

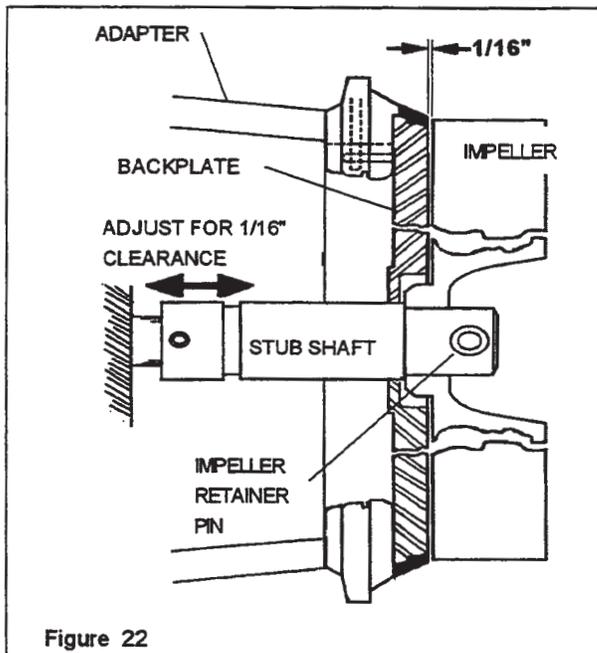


Figure 22

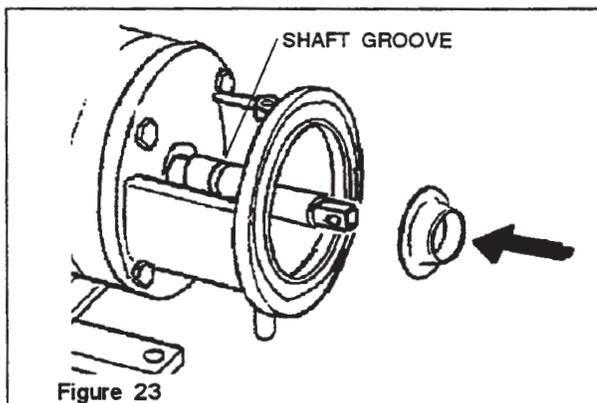


Figure 23

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

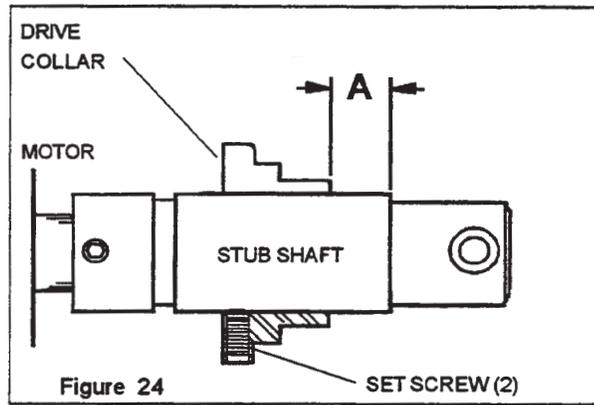
MAINTENANCE

DRIVE COLLAR ADJUSTMENT

(Models TF-C114 through TF-C328)

- Slide the seal drive collar onto the stub shaft as shown in Figure 24.
Use the "A" dimension in the SEAL CHART to properly locate the drive collar on the stub shaft. Tighten the set screws to secure in place.

NOTE: TF-C100 pump does not require drive collar.

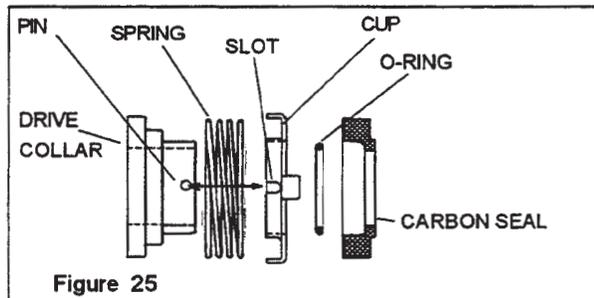


SEAL CHART for figure 24

| MODEL | A |
|---------|-------|
| TF-C114 | 9/16" |
| TF-C216 | 9/16" |
| TF-C218 | 9/16" |
| TF-C328 | 9/16" |

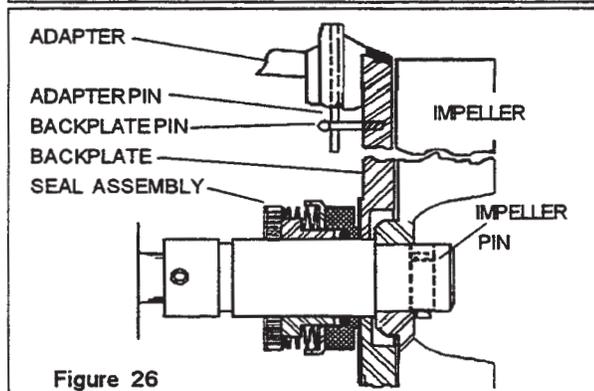
- Assemble the spring, seal cup, o-ring, and carbon seal, and install as a unit. Make sure the slot in the seal cup aligns with the pin on the shaft. (Figure 25) Gentle pressure on the o-ring will overcome resistance on the shaft.

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



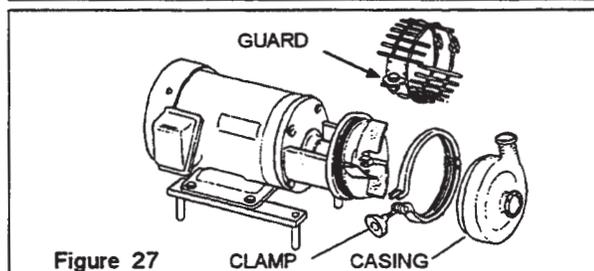
- Assemble the gasket to the backplate. Install the backplate on the adapter. Make sure the seal cup slot is engaged with the pin on the drive collar. (Figure 25)
- Rotate the backplate until the backplate pins engage the adapter pins. (Figure 25)
- Rotate the shaft until the pin hole in the end is in a horizontal position. Insert the impeller pin, center it in the shaft end, and slide the impeller 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. (Figure 26)



- Place the casing over the impeller/backplate, close and tighten the clamp. (Figure 27)
- Assemble the cascade water fitting, if included. Install the seal guard and tighten in place. Assemble the suction line and the discharge line to the casing.

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



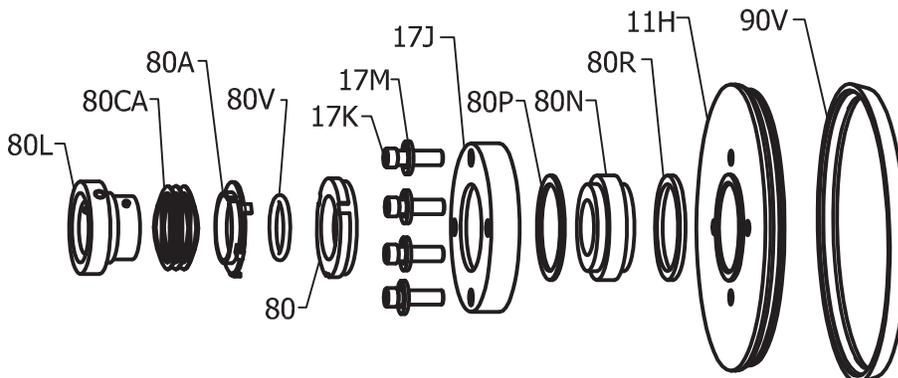


FIGURE 28

DG-SEAL

| KEY | C114 | C216 | C218/C328 | QTY. | DESCRIPTION | MATERIAL |
|-------|------------|-------------|-------------|------|-----------------------|------------------|
| 11H | 564911H | 566911H | 568911H | 1 | BACKPLATE | 316L SS |
| *80R | 564980R | 566980R | 568980R | 1 | INBOARD GASKET | 1/8" PTFE |
| *80N | 564980N-SC | 566980N-SC | 588980N-SC | 1 | STATIONARY SEAT | SILICONE CARBIDE |
| *80P | 564980P | 566980P | 568980P | 1 | OUTBOARD GASKET | 1/16" PTFE |
| 17J | 564917J | 566917J | 568917J | 1 | GLAND RING | 304 SS |
| 17K | 564917K | 566917K | 568917K | 4 | BOLT/SCREW | SS |
| *80 | 564980 | 566980 | 568980 | 1 | ROTATING CARBON SEAL | CARBON |
| *80V | 564980V | 566980V | 568980V | 1 | O-RING SEAL | FKM |
| 80A | 564980A | 566980A | 568980A | 1 | CUP | 304 SS |
| *80CA | 564980CA | 566980CA | 568980CA | 1 | SPRING | SS |
| 80L | 564980L | 566980L | 568980L | 1 | DRIVE COLLAR | 304 SS |
| 17M | WASHER 1/4 | WASHER 5/16 | WASHER 5/16 | 4 | LOCK WASHER | SS |
| *90V | 564990V | 566990V | 568990V | 1 | CASING GASKET | FKM |
| *24 | 564924 | 566924 | 568924 | 1 | IMPELLER RETAINER PIN | 316L SS |

* RECOMMENDED SPARE PARTS

Disassembly

At each step in the disassembly, process parts should be inspected for nicks, cuts, abrasions, and other wear. Replace parts if necessary. Care should be taken to protect all sealing surfaces from being damaged during disassembly.

- Disconnect suction and discharge piping from pump casing.
- Remove seal guard and casing.
- Remove the impeller.
- Remove the backplate.
- Remove casing gasket from the backplate.
- Remove the carbon seal, seal cup, and spring from the stub shaft.
- Remove the gland ring, seal seat, and PTFE gaskets by removing the four cap screws.

Reassembly

Setting the Drive Collar - Measuring Method

1. Assemble the PTFE gaskets, seal seat, gland ring, and secure to the back plate by uniformly tightening the capscrews.

Note: The PTFE inboard (80R) and outboard (80P) gaskets are different thicknesses. The thicker gasket (80R) must always be installed on the impeller side to prevent contact between the impeller hub and the stationary seal.

2. Slide the drive collar onto the stub shaft.
3. Install the backplate and the casing gasket.
4. Install the casing and tighten the casing clamp.
5. Scribe a mark on the stub shaft behind the backplate.
6. Set the drive collar to "A" dimension in the seal chart and tighten the drive collar setscrew. (Figure 30)
7. Remove the casing and backplate.
8. Assemble the spring, seal cup, o-ring, and carbon seal onto the drive collar. *The pin on the drive collar must align with the slot in the cup.*
9. Slide the backplate onto the stub shaft. Position the impeller retaining pin in the center of the stub shaft hole and install the impeller. Push the impeller against the stub shaft and rotate the stub shaft until the impeller retaining pin falls and secure the impeller.
10. Check the impeller hub and seal face to ensure there is a clearance between them before installing the casing.
11. Reset the seal drive collar if required. When the drive collar is positioned correctly and the seal components are properly installed, the shaft should rotate freely by hand.
12. Assemble the casing gasket, casing, and casing clamp. Use a soft rubber mallet to line up the casing. Tighten the casing clamp and install the seal guard.

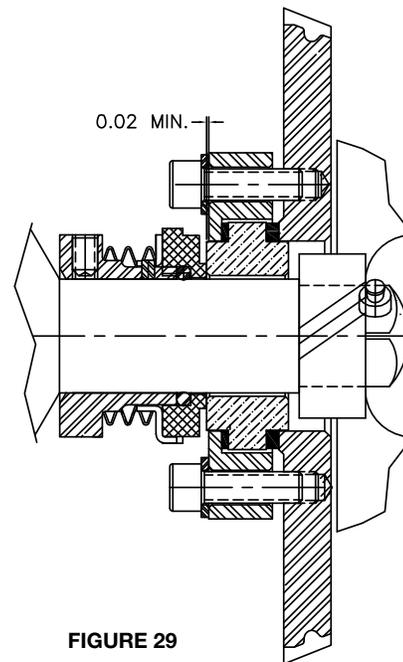


FIGURE 29

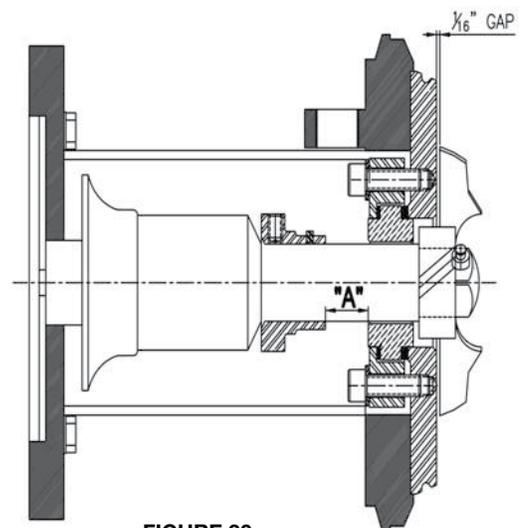


FIGURE 30

SEAL CHART

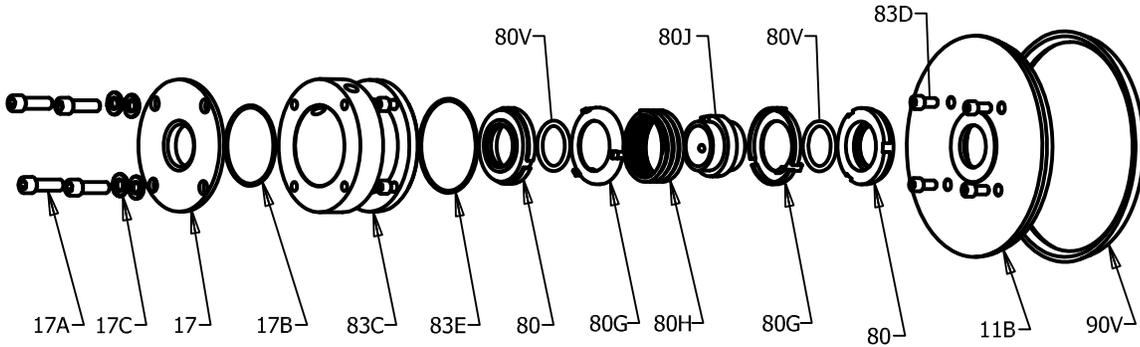
| MODEL | A |
|---------|-------|
| TF-C114 | 5/16" |
| TF-C216 | 5/16" |
| TF-C218 | 5/16" |
| TF-C328 | 5/16" |

Setting the Drive Collar – By Position for both “D” Seal & “DG” Seal

1. Assemble the spring, seal cup, o-ring seal, and carbon seal onto the drive collar. Care must be taken so that the spring does not rest on the tab that is bent back. A portion of the spring is offset to provide clearance for this tab. Care must be taken to ensure the pin on drive drive collar is in line with slot on cup.
2. Install as a unit on the shaft.
3. Install the backplate and casing.
4. Install and tighten the casing clamp.
5. Slide the drive collar and seal assembly toward the backplate until the nose of the drive collar pushes the o-ring and carbon seal tight against the backplate.
6. Slide the drive collar away from the backplate 1/32” (.79mm) and secure the drive collar in this location with the set screws.
7. 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 and the drive collar is properly positioned.

Note: Extra care should be taken when assembling “TF-C” series pumps with type “DG” or “F” seals. Incorrect stub shaft settings will allow the impeller hub to contact the inboard face of the stationary seal seat. Interference of impeller hub and seal seat face will cause wear of impeller hub and damage the inboard or secondary seal face of the clamped-in-seat. Visual inspection is recommended after installation of the impeller and before installation of casing to ensure clearance between the impeller hub and seal face. If no clearance is visible, the pump should be disassembled and stub shaft moved forward to provide at least 1/32” (.79mm) clearance between the impeller hub and seal seat face. Reset seal drive collar if necessary.

“E” water-cooled balanced double seal consists of two carbon seals inside a stuffing box attached to the backplate. It is designed for applications where a vacuum-tight, cool operating seal is required.



E-SEAL

FIGURE 31

| KEY | C114 | C216 | C216/C328 | QTY. | DESCRIPTION | MATERIAL |
|------|------------|-------------|-------------|------|---------------|----------|
| 17A | CSHH1 | 566917A | 568917A | 4 | BOLT/SCREW | SS |
| 17C | WASHER 1/4 | WASHER 5/16 | WASHER 5/16 | 4 | LOCKWASHER | SS |
| 17 | 564917 | 566917 | 568917 | 1 | FOLLOWER | 316L SS |
| *17B | 564917B | 566917B | 568917B | 1 | O-RING | FKM |
| 83C | 564983C | 566983C-1 | 568983C | 1 | STUFFING BOX | 316L SS |
| *83E | 564983E | 566983E | 568983E | 1 | O-RING | FKM |
| *80H | 564980H | 566980H | 568980H | 1 | SPRING | SS |
| 80J | 564980J | 566980J | 568980J | 1 | DRIVE COLLAR | 304 SS |
| *80G | 564980G | 566980G | 568980G | 2 | CUP | 304 SS |
| *80V | 564980V | 566980V | 568980V | 2 | O-RING | FKM |
| *80 | 564980 | 566980 | 568980 | 2 | CARBON SEAL | CARBON |
| 83D | 564983D | CSHH1 | 568983D | 4 | BOLT/SCREW | 316L SS |
| 11B | 564911B | 566911B | 568911B | 1 | BACKPLATE | 316L SS |
| *90V | 564990V | 566990V | 568990V | 1 | CASING GASKET | FKM |

* RECOMMENDED SPARE PARTS

Disassembly

At each step in the disassembly, process parts should be inspected for nicks, cuts, abrasions, and other wear. Replace parts if necessary. Care should be taken to protect all sealing surfaces from being damaged during disassembly.

- Disconnect suction and discharge piping from pump casing.
- Remove seal guard, casing, and impeller.
- Remove the 4 screws (17A) that retain the follower to the stuffing box.
- Remove the backplate and stuffing box.
- Remove the inboard carbon seal, seal cup, and seal spring.
- Remove the drive collar.
- Remove the carbon seal, seal o-ring, cup, and follower.

Reassembly

1. Scribe a mark on the shaft at location "A". (Figure 32)
2. Assemble the deflector, follower, one carbon seal, one seal o-ring, one seal cup, and the drive collar onto the shaft.
3. Position the drive collar in relation to the scribe mark "A" and tighten the setscrews. (Figure 32)
4. Assemble the seal spring, seal cup, seal o-ring, and seal onto the shaft.
5. Ensure the spring is seated in each cup and the drive collar ear on each cup is not in alignment with the drive pins on the drive collar.
6. Assemble the stuffing box and backplate assembly on the shaft and seal parts. (Figure 33)
7. Assemble the follower to the stuffing box with the four screws. (Figure 33)
8. Mount the seal guard on the adapter.
9. Attach the water inlet and outlet to the stuffing box. The stuffing two (2) 1/8" NPT water connections which are spaced 90° from each other and should be positioned 45° (except for the TF-C114) to vertical when assembling the pump. (Figure 34) Flush water must enter one connection and exit through the other.

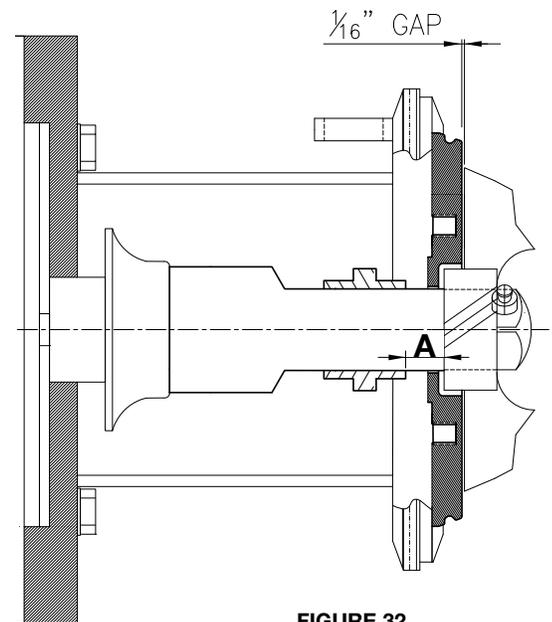


FIGURE 32

SEAL CHART

| MODEL | A |
|---------|-------|
| TF-C114 | 9/16" |
| TF-C216 | 9/16" |
| TF-C218 | 9/16" |
| TF-C328 | 9/16" |

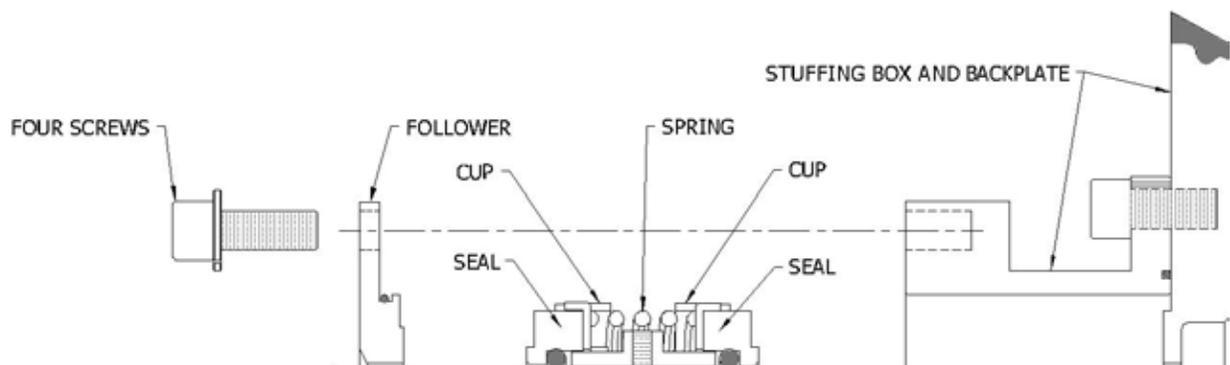


FIGURE 33

Reassembly (cont'd)

10. The amount of water needed will vary depending on the operating temperature of the pump. For vacuum applications, 10 drops per minute discharge is recommended.

NOTE: *Approximately 3 gallons per hour is required to maintain the seal temperature at 100°F when the product temperature is 175°F.*

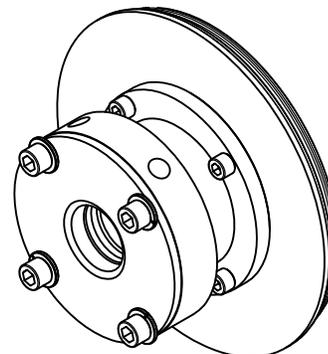
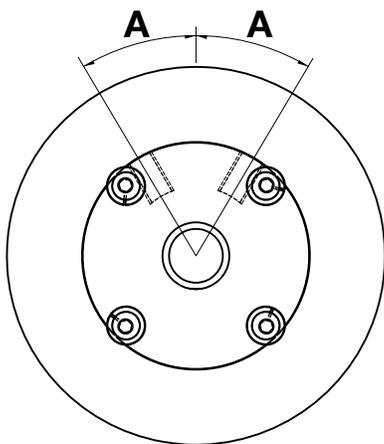


FIGURE 34

ANGLE CHART

| MODEL | A |
|---------|-----|
| TF-C114 | 31° |
| TF-C216 | 45° |
| TF-C218 | 45° |
| TF-C328 | 45° |

ROUTINE MAINTENANCE

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

- Check for unusual noise, vibration and bearing temperatures
- Inspect pump and piping for leaks
- Check mechanical seal area for leakage
Should be no leakage
- Check backplate gasket for wear/damage
- Bearing lubrication
(see motor manufacturer)
- Seal monitoring
- Vibration analysis
- Discharge pressure
- Temperature monitoring

TROUBLESHOOTING AND CAUSES

NOT ENOUGH LIQUID DELIVERED

- Impeller diameter too small for duty
- Discharge head too high
- Suction lift too high
- Air leak in supply or at seal area
- Wrong direction of rotation
- Pump not primed
- Speed too slow (low voltage, wrong frequency, wrong motor)
- Suction or discharge plugged or closed
- Air entrained in liquid
- Insufficient NPSH (Net Positive Suction Head) available

NOT ENOUGH PRESSURE

- Impeller diameter too small for duty
- Air leak in supply or at seal area
- Wrong direction of rotation
- Speed too slow (low voltage, wrong frequency, wrong motor)
- Air entrained in liquid

MOTOR OVERLOAD

- Discharge head too low allowing pump to deliver too much liquid
- Impeller diameter too large for duty
- Liquid heavier or more viscous than rating
- Electrical supply, voltage or frequency incorrect
- Mechanical abnormality in pump
 - Impeller interference
 - Seal binding
 - Defective motor
 - Faulty electrical connections
 - Overload heaters too small for motor

VIBRATION/NOISE

- Starved suction
- Insufficient NPSH (Net Positive Suction Head) available
- Supply line too long; too small; blocked
- Air entrained in liquid
- Liquid too hot, too viscous
- Impeller shaft loose or bent
- Impeller out of balance
- Impeller hub/impeller shaft wear
- Motor bearings worn
- Pump not level; legs not touching floor
- Foreign material in pump
- Piping not supported

RAPID SEAL WEAR

- Excessive spring loading
- Abrasive product
- Loose impeller shaft
- Water hammer
- Prolonged “dry” running
- Abrasive solids (unfiltered) in water flushed seal supply

SEAL LEAKS

- Gasket damaged or worn
- Seal not installed correctly
- Carbon seal worn or damaged
- Inlet/Outlet connection loose or no gasket
- Casing clamp loose

PARTS ORDERING

HOW TO ORDER PARTS

By Phone

Telephone your repair parts or fittings order to your Distributor.

To speed your order and avoid delays, please have your equipment model and serial number and the part numbers from the parts list before you call your Distributor.

If you do not know your Distributors number, call Top Line Process Equipment Company at:

Phone: **800-458-6095**

Fax: **814-362-4453**

Your call will be directed to a specialist who can provide you with Distributor information for your area.

HOW TO RETURN PARTS

Parts may be returned for a credit, subject to the conditions of our return goods policy. To obtain authorization to return a part, contact your Distributor.

Please give the following information:

- Invoice number and date
- Quantity
- Part Number (from parts list)
- Exact reason for return

Your Distributor will provide a Return Goods Authorization. (Returns will not be accepted without advance authorization.)

EQUIPMENT INFORMATION

Any correspondence concerning pump will require the following information be documented:

PRODUCT NAME/MODEL _____

SERIAL NUMBER _____

DATE OF PURCHASE _____

INVOICE NUMBER _____

INVOICE DATE _____

DISTRIBUTOR _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

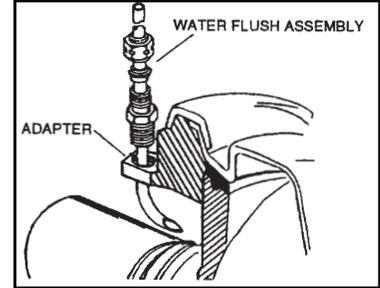
CONTACT _____

PHONE _____

FAX _____

SPARE PARTS

WATER CASCADE ASSEMBLY (#5649127) (Consists of threaded attaching ferrule, compression fitting with nut, and 1/4" diameter stainless water pipe.)



REPAIR KITS

To maintain continuous uninterrupted operation of your pump, the following kits are recommended.

“D” SEAL KITS

| TF-C100 | | | TF-C114 | | | TF-C216 | | | TF-C218/C328 | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------------|---------|---------|
| | BUNA | FKM | | BUNA | FKM | | BUNA | FKM | | BUNA | FKM |
| Kit #1 | 5629K-1 | 5629V-1 | Kit #1 | 5649K-1 | 5649V-1 | Kit #1 | 5669K-1 | 5669V-1 | Kit #1 | 5689K-1 | 5689V-1 |
| Kit #2 | 5629K-2 | 5629V-2 | Kit #2 | 5649K-2 | 5649V-2 | Kit #2 | 5669K-2 | 5669V-2 | Kit #2 | 5689K-2 | 5689V-2 |
| Kit #3 | 5629K-3 | 5629V-3 | Kit #3 | 5649K-3 | 5649V-3 | Kit #3 | 5669K-3 | 5669V-3 | Kit #3 | 5689K-3 | 5689V-3 |

Kit #1 (Consists of 1 - Carbon Seal, 1 - Casing Gasket, 1 - O-Ring, and 1 - Retaining Pin)

Kit #2 (Consists of 3 - Carbon Seals, 3 - Casing Gaskets, and 3 - O-Rings)

Kit #3 (Consists of 1 - Carbon Seal, 1 - Spring, 1 - Cup, and 1 - O-Ring)

“DG” SEAL KITS

| TF-C114 KIT | | | |
|--------------|-------|------|-----------------------------------|
| 5649K-1DG | | | |
| CONSISTS OF: | KEY # | QTY. | DESCRIPTION |
| 564980 | 80 | 1 | Carbon Seal, Rotating |
| 564924 | 24 | 1 | Impeller Retainer Pin |
| 564980N-SC | 80N | 1 | Stationary Seat, Silicone Carbide |
| 564980P | 80P | 1 | PTFE Gasket, Outboard |
| 564980R | 80R | 1 | PTFE Gasket, Inboard |
| 564980V | 80V | 1 | Seal, O-Ring FKM |
| 564990V | 90V | 1 | Casing Gasket, FKM |

| TF-C216 KIT | | | |
|--------------|-------|------|-----------------------------------|
| 5669K-1DG | | | |
| CONSISTS OF: | KEY # | QTY. | DESCRIPTION |
| 566980 | 80 | 1 | Carbon Seal, Rotating |
| 566924 | 24 | 1 | Impeller Retainer Pin |
| 566980N-SC | 80N | 1 | Stationary Seat, Silicone Carbide |
| 566980P | 80P | 1 | PTFE Gasket, Outboard |
| 566980R | 80R | 1 | PTFE Gasket, Inboard |
| 566980V | 80V | 1 | Seal, O-Ring FKM |
| 566990V | 90V | 1 | Casing Gasket, FKM |

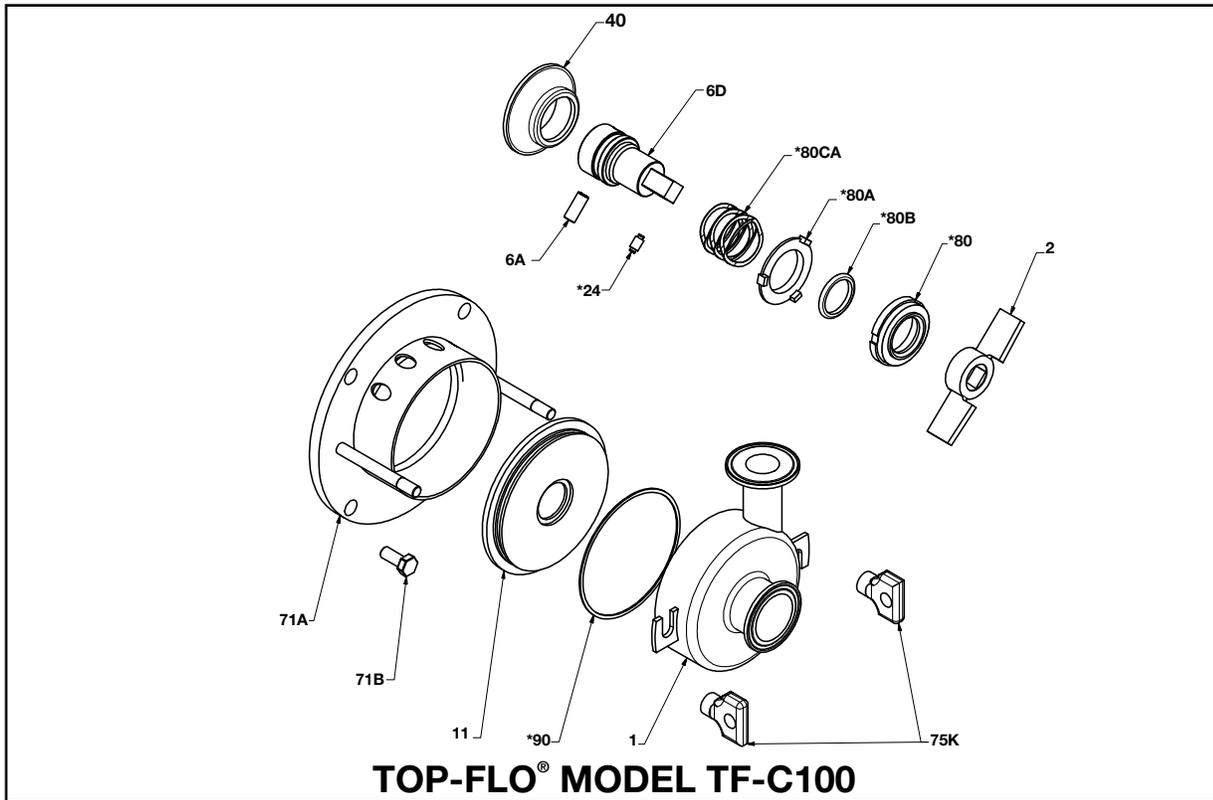
| TF-C218/328 KIT | | | |
|-----------------|-------|------|-----------------------------------|
| 5689K-1DG | | | |
| CONSISTS OF: | KEY # | QTY. | DESCRIPTION |
| 568980 | 80 | 1 | Carbon Seal, Rotating |
| 568924 | 24 | 1 | Impeller Retainer Pin |
| 568980N-SC | 80N | 1 | Stationary Seat, Silicone Carbide |
| 568980P | 80P | 1 | PTFE Gasket, Outboard |
| 568980R | 80R | 1 | PTFE Gasket, Inboard |
| 568980V | 80V | 1 | Seal, O-Ring FKM |
| 568990V | 90V | 1 | Casing Gasket, FKM |

“E” SEAL KITS

| TF-C114 KIT | | | |
|--------------|-------|------|-------------------|
| 5649EK-1 | | | |
| CONSISTS OF: | KEY # | QTY. | DESCRIPTION |
| 564980 | 80 | 2 | Carbon Seal |
| 564980V | 80V | 2 | Seal O-Ring FKM |
| 564980G | 80G | 2 | Cup (E Seal) |
| 564917B | 17B | 1 | O-Ring FKM |
| 564983E | 83E | 1 | O-Ring FKM |
| 564980H | 80H | 1 | Spring (E Seal) |
| 564990V | 90V | 1 | Casing Gasket FKM |

| TF-C216 KIT | | | |
|--------------|-------|------|-------------------|
| 5669EK-1 | | | |
| CONSISTS OF: | KEY # | QTY. | DESCRIPTION |
| 566980 | 80 | 2 | Carbon Seal |
| 566980V | 80V | 2 | Seal O-Ring FKM |
| 566980G | 80G | 2 | Cup (E Seal) |
| 566917B | 17B | 1 | O-Ring FKM |
| 566983E | 83E | 1 | O-Ring FKM |
| 566980H | 80H | 1 | Spring (E Seal) |
| 566990V | 90V | 1 | Casing Gasket FKM |

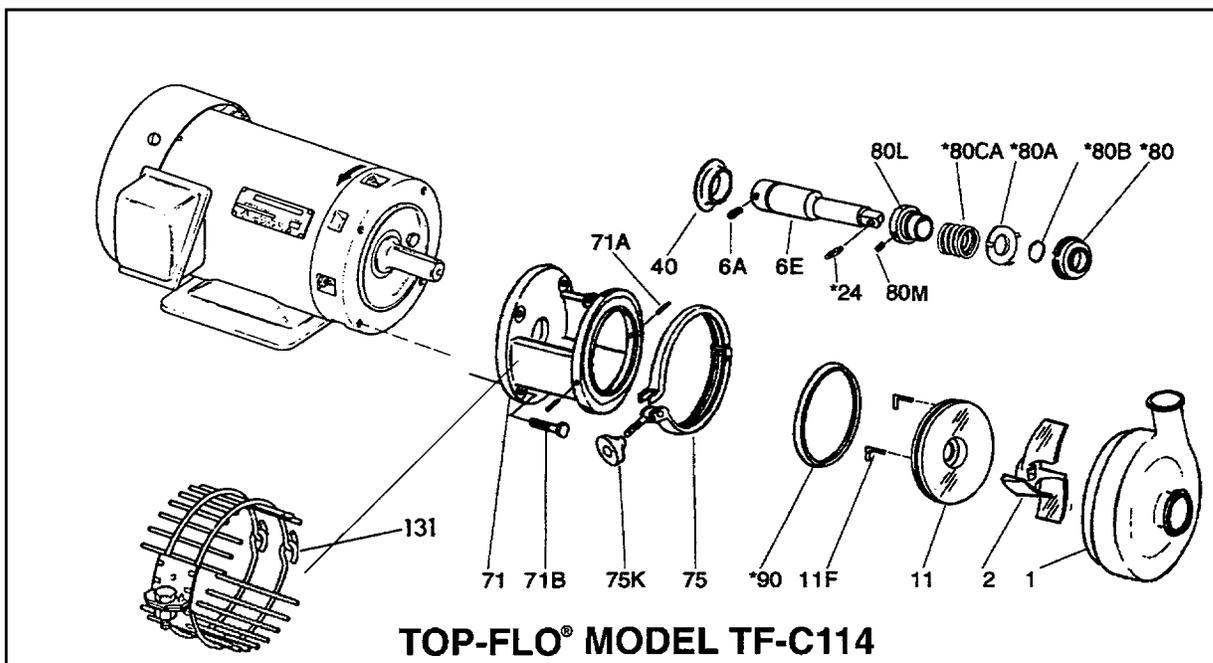
| TF-C218/328 KIT | | | |
|-----------------|-------|------|-------------------|
| 5689EK-1 | | | |
| CONSISTS OF: | KEY # | QTY. | DESCRIPTION |
| 568980 | 80 | 2 | Carbon Seal |
| 568980V | 80V | 2 | Seal O-Ring FKM |
| 568980G | 80G | 2 | Cup (E Seal) |
| 568917B | 17B | 1 | O-Ring FKM |
| 568983E | 83E | 1 | O-Ring FKM |
| 568980H | 80H | 1 | Spring (E Seal) |
| 568990V | 90V | 1 | Casing Gasket FKM |



| KEY | PART NO. | QTY. | DESCRIPTION |
|-----|-----------|------|-----------------------|
| 1 | 563911510 | 1 | Casing 1.5" x 1" |
| 2 | 56392 | 1 | Impeller 3.68" |
| 6A | 56396A | 2 | Shaft Set Screw |
| 6D | 5639605 | 1 | Stub Shaft, 56C Frame |
| 11 | 562911 | 1 | Backplate |
| *24 | 564924 | 1 | Impeller Retainer Pin |
| 40 | 564940 | 1 | Deflector |
| 71A | 56397156A | 1 | Adapter |
| 71B | CSHH4B | 4 | Adapter Mounting Bolt |
| 75K | 563971K | 2 | Wing Nut |

| KEY | PART NO. | QTY. | DESCRIPTION |
|-------|----------|------|---------------------|
| *80 | 563980 | 1 | Carbon Steel |
| *80A | 564980A | 1 | Cup |
| *80B | 563980B | 1 | Seal O-Ring, Buna |
| *80CA | 564980CA | 1 | Spring |
| *90 | 562990 | 1 | Casing Gasket, Buna |

*RECOMMENDED SPARE PARTS
See page 25 for spare part kits
EPDM and FKM elastomers available upon request

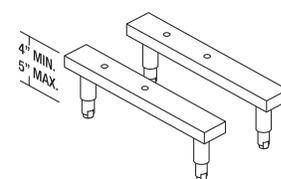


| KEY | PART NO. | QTY. | DESCRIPTION |
|-----|-----------|------|---------------------------------|
| 1 | 564911515 | 1 | Casing 1.5"x1.5" |
| 1 | 564912015 | 1 | Casing 2"x1.5" |
| 2 | 56492 | 1 | Impeller 4" |
| 6A | 56496A | 2 | Shaft Set Screw, 56C |
| 6E | 56496E56 | 1 | Stub Shaft, 56C Frame |
| 6E | 56496E14 | 1 | Stub Shaft 14T |
| 6E | 56496E18 | 1 | Stub Shaft 18T |
| 11 | 564911 | 1 | Backplate |
| 11F | 564911F | 2 | Backplate Pin |
| *24 | 564924 | 1 | Impeller Retainer Pin |
| 40 | 564940 | 1 | Deflector, 56C, 14T Frame |
| 40 | 566940 | 1 | Deflector, 18T Frame |
| 71 | 56497156S | 1 | Adapter, 56C, 14T Frame |
| 71 | 56497118S | 1 | Adapter 18T Frame |
| 71A | 564971A | 2 | Adapter Pin |
| 71B | CSHH4B | 4 | Adapter Mounting Bolt, 56C, 14T |
| 71B | CSHH10 | 4 | Adapter Mounting Bolt, 18T |

| KEY | PART NO. | QTY. | DESCRIPTION |
|-------|-----------|------|------------------------------------|
| 75 | 564975 | 1 | Clamp Assembly |
| 75K | 329901 | 1 | Wing Nut |
| *80 | 564980 | 1 | Carbon Seal |
| *80A | 564980A | 1 | Cup |
| *80B | 564980B | 1 | Seal O-Ring, Buna |
| *80CA | 564980CA | 1 | Spring |
| 80L | 564980L | 1 | Drive Collar |
| 80M | 564980M | 2 | Drive Collar Set Screw |
| *90 | 564990 | 1 | Casing Gasket, Buna |
| 131 | 5649131 | 1 | Seal Guard Assembly 56C, 14T Frame |
| 131 | 564913118 | 1 | Seal Guard Assembly 56C, 14T Frame |

ADJUSTABLE LEG KITS
(304 STAINLESS STEEL)

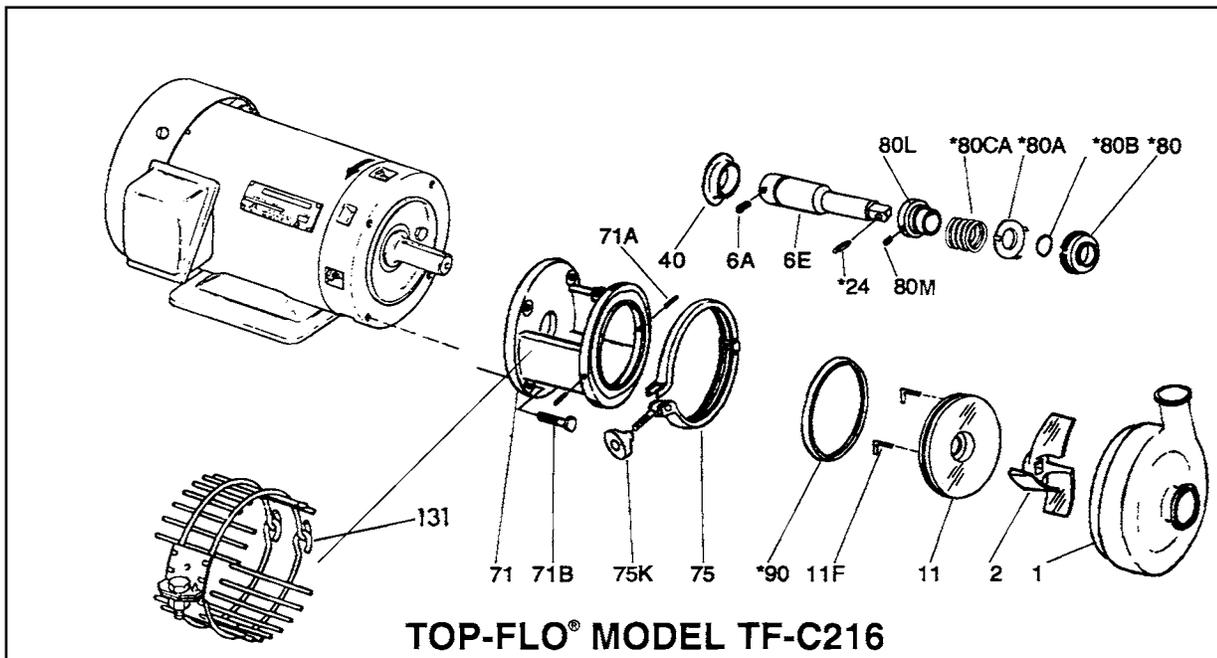
| PART NUMBER | FRAME SIZE |
|-------------|------------|
| 56S56C | 56C |
| 56S140TC | 143/145 |
| 56S180TC | 182/184 |
| 56S210TC | 213/215 |
| 56S250TC | 254/256 |
| 56S280TC | 284/286 |
| 56S320TC | 324/326 |



***RECOMMENDED SPARE PARTS**
See page 25 for spare part kits
EPDM and FKM elastomers available upon request

PARTS LIST

TF-C216



| KEY | PART NO. | QTY. | DESCRIPTION |
|-----|-----------|------|--|
| 1 | 566912015 | 1 | Casing 2"x1.5" |
| 1 | 566912515 | 1 | Casing 2.5"x1.5" |
| 2 | 56692 | 1 | Impeller 6" |
| 6A | 56696A | 2 | Shaft Set Screw, 14T, 21T, 25T |
| 6A | 56696A56 | 1 | Shaft Set Screw, 56C |
| 6A | 56496A | 1 | Shaft Set Screw, 18T |
| 6E | 56696E56 | 1 | Stub Shaft, 56C Frame |
| 6E | 56696E14 | 1 | Stub Shaft, 14T Frame |
| 6E | 56696E18 | 1 | Stub Shaft, 18T Frame |
| 6E | 56696E21 | 1 | Stub Shaft, 21T Frame |
| 6E | 56696E25 | 1 | Stub Shaft, 25T Frame |
| 11 | 566911 | 1 | Backplate |
| 11F | 564911F | 2 | Backplate Pin |
| *24 | 566924 | 1 | Impeller Retainer Pin |
| 40 | 566940 | 1 | Deflector, 56C, 14T, 18T Frame |
| 40 | 56694021 | 1 | Deflector, 21T Frame |
| 40 | 56694025 | 1 | Deflector, 25T Frame |
| 71 | 566971S | 1 | Adapter, 56C, 14T Frame |
| 71 | 56697118S | 1 | Adapter 18T Frame |
| 71 | 56697121S | 1 | Adapter 21T Frame |
| 71 | 56697125S | 1 | Adapter 25T Frame |
| 71A | 564971A | 2 | Adapter Pin |
| 71B | CSHH4B | 4 | Adapter Mounting Bolt, 56C, 14T Frame |
| 71B | CSHH10 | 4 | Adapter Mounting Bolt, 18T, 21T, 25T Frame |
| 75 | 566975 | 1 | Clamp Assembly |

| KEY | PART NO. | QTY. | DESCRIPTION |
|-------|-----------|------|------------------------------------|
| 75K | 329901 | 1 | Wing Nut |
| *80 | 566980 | 1 | Carbon Seal |
| *80A | 566980A | 1 | Cup |
| *80B | 566980B | 1 | Seal O-Ring, Buna |
| *80CA | 566980CA | 1 | Spring |
| 80L | 566980L | 1 | Drive Collar |
| 80M | 566980M | 2 | Drive Collar Set Screw |
| *90 | 566990 | 1 | Casing Gasket, Buna |
| 131 | 5669131 | 1 | Seal Guard Assembly 56C, 14T Frame |
| 131 | 566913118 | 1 | Seal Guard Assembly, 18T |
| 131 | 566913121 | 1 | Seal Guard Assembly, 21T, 25T |

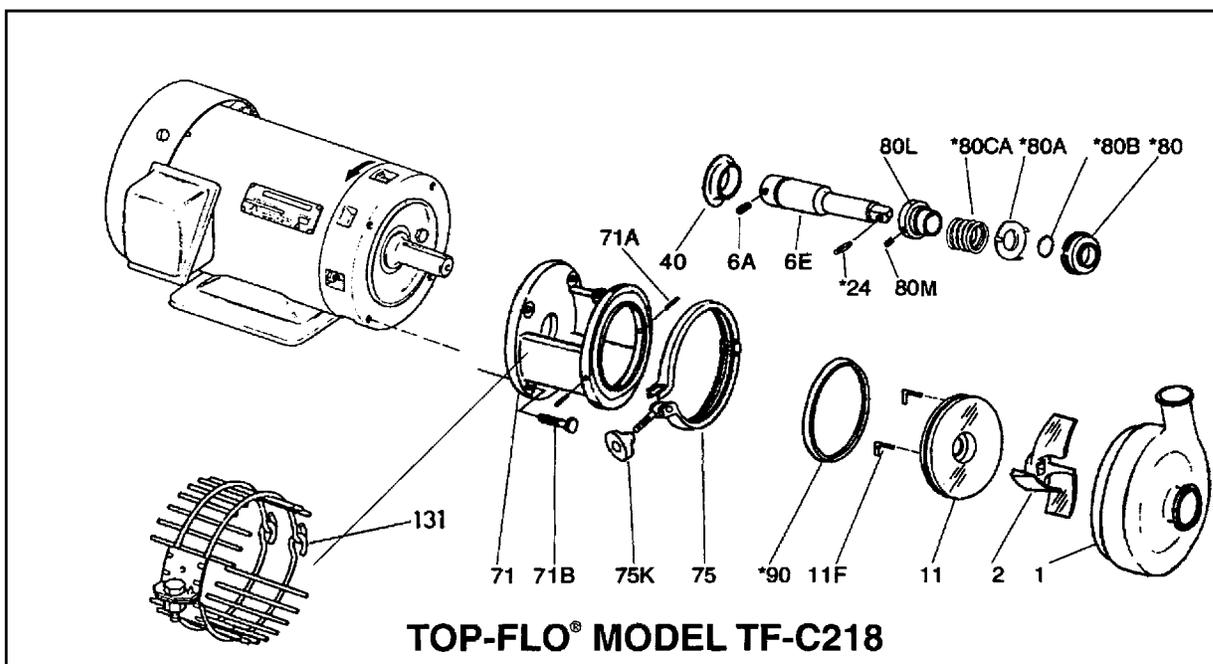
ADJUSTABLE LEG KITS (304 STAINLESS STEEL)

| PART NUMBER | FRAME SIZE |
|-------------|------------|
| 56S56C | 56C |
| 56S140TC | 143/145 |
| 56S180TC | 182/184 |
| 56S210TC | 213/215 |
| 56S250TC | 254/256 |
| 56S280TC | 284/286 |
| 56S320TC | 324/326 |

*RECOMMENDED SPARE PARTS
See page 25 for spare part kits
EPDM and FKM elastomers available upon request

PARTS LIST

TF-C218



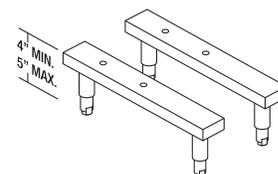
TOP-FLO® MODEL TF-C218

| KEY | PART NO. | QTY. | DESCRIPTION |
|------|-----------|------|----------------------------------|
| 1 | 568912015 | 1 | Casing, C218, 2"x1.5" |
| 1 | 568913015 | 1 | Casing, C218, 3"x1.5" |
| 2 | 56892 | 1 | Impeller 8" |
| 6A | 56896A | 2 | Shaft Set Screw |
| 6E | 56896E14 | 1 | Stub Shaft, 14T Frame |
| 6E | 56896E18 | 1 | Stub Shaft, 18T Frame |
| 6E | 56896E21 | 1 | Stub Shaft, 21T Frame |
| 6E | 56896E25 | 1 | Stub Shaft, 25T Frame |
| 6E | 56896E28 | 1 | Stub Shaft, 28T Frame |
| **6E | 56896E28S | 1 | Stub Shaft, 28TSC Frame |
| 11 | 568911 | 1 | Backplate |
| 11F | 564911F | 2 | Backplate Pin |
| *24 | 568924 | 1 | Impeller Retainer Pin |
| 40 | 56894014 | 1 | Deflector, 14T, 18T Frame |
| 40 | 56894021 | 1 | Deflector, 21T, 25T Frame |
| 40 | 56894028 | 1 | Deflector, 28T Frame |
| 71 | 56897114S | 1 | Adapter, 14T Frame |
| 71 | 56897118S | 1 | Adapter, 18T Frame |
| 71 | 56897121S | 1 | Adapter, 21T Frame |
| 71 | 56897125S | 1 | Adapter, 25T Frame |
| 71 | 56897128S | 1 | Adapter, 28T Frame |
| 71A | 564971A | 2 | Adapter Pin |
| 71B | CSHH4B | 4 | Adapter Mounting Bolt, 14T Frame |

| KEY | PART NO. | QTY. | DESCRIPTION |
|-------|-----------|------|---|
| 71B | CSHH10 | 4 | Adapter Mounting Bolt, 18T, 21T, 25T, 28T Frame |
| 75 | 568975 | 1 | Clamp Assembly |
| 75K | 329901 | 1 | Wing Nut |
| *80 | 568980 | 1 | Carbon Seal |
| *80A | 568980A | 1 | Cup |
| *80B | 568980B | 1 | Seal O-Ring, Buna |
| *80CA | 568980CA | 1 | Spring |
| 80L | 568980L | 1 | Drive Collar |
| 80M | 566980M | 2 | Drive Collar Set Screw |
| *90 | 568990 | 1 | Casing Gasket, Buna |
| 131 | 568913114 | 1 | Seal Guard Assembly, 14T |
| 131 | 568913118 | 1 | Seal Guard Assembly, 18T |
| 131 | 568913121 | 1 | Seal Guard Assembly, 21T |
| 131 | 568913125 | 1 | Seal Guard Assembly, 25T |
| 131 | 568913128 | 1 | Seal Guard Assembly, 28T, 32T |

ADJUSTABLE LEG KITS (304 STAINLESS STEEL)

| PART NUMBER | FRAME SIZE |
|-------------|------------|
| 56S56C | 56C |
| 56S140TC | 143/145 |
| 56S180TC | 182/184 |
| 56S210TC | 213/215 |
| 56S250TC | 254/256 |
| 56S280TC | 284/286 |
| 56S320TC | 324/326 |

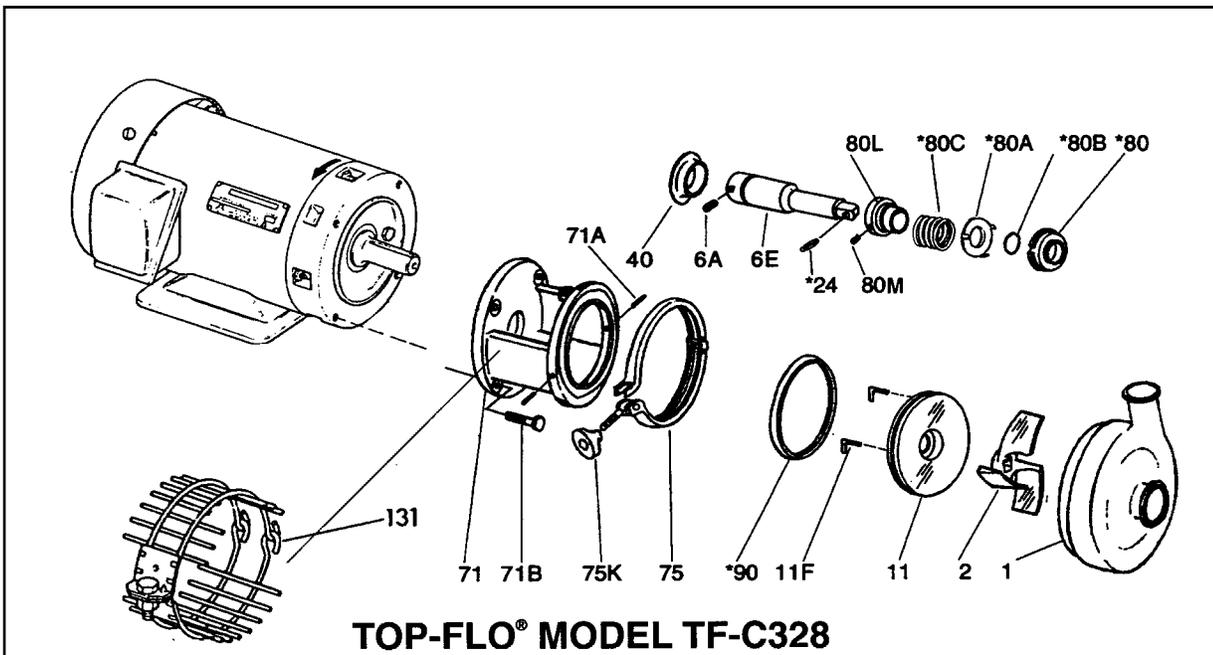


*RECOMMENDED SPARE PARTS

See page 25 for spare part kits

EPDM and FKM elastomers available upon request

** TSC Stub Shafts available upon request



TOP-FLO® MODEL TF-C328

| KEY | PART NO. | QTY. | DESCRIPTION |
|------|-----------|------|---|
| 1 | 568913020 | 1 | Casing, C328, 3"x2" |
| 1 | 568914020 | 1 | Casing, C328, 4"x2" |
| 2 | 568923 | 1 | Impeller 8" |
| 6A | 56896A | 2 | Shaft Set Screw |
| 6E | 56896E14 | 1 | Stub Shaft, 14T Frame |
| 6E | 56896E18 | 1 | Stub Shaft, 18T Frame |
| 6E | 56896E21 | 1 | Stub Shaft, 21T Frame |
| 6E | 56896E25 | 1 | Stub Shaft, 25T Frame |
| 6E | 56896E28 | 1 | Stub Shaft, 28T Frame |
| **6E | 56896E28S | 1 | Stub Shaft, 28TSC Frame |
| 6E | 56896E32 | 1 | Stub Shaft, 32T Frame |
| **6E | 56896E32S | 1 | Stub Shaft, 32TSC Frame |
| 11 | 568911 | 1 | Backplate |
| 11F | 564911F | 1 | Backplate Pin |
| *24 | 568924 | 1 | Impeller Retainer Pin |
| 40 | 568940 | 1 | Deflector, 14T, 18T Frame |
| 40 | 56894021 | 1 | Deflector, 21T, 25T Frame |
| 40 | 56894028 | 1 | Deflector, 28T Frame |
| 40 | 56894032 | 1 | Deflector, 32T Frame |
| 71 | 56897114 | 1 | Adapter, 14T Frame |
| 71 | 56897118 | 1 | Adapter, 18T Frame |
| 71 | 56897121 | 1 | Adapter, 21T Frame |
| 71 | 56897125 | 1 | Adapter, 25T Frame |
| 71 | 56897128 | 1 | Adapter, 28T Frame |
| 71 | 56897132 | 1 | Adapter, 32T Frame |
| 71A | 564971A | 2 | Adapter Pin |
| 71B | CSHH10 | 4 | Adapter Mounting Bolt, 18T, 21T, 25T, 28T Frame |
| 71B | CSHH6A | 4 | Adapter Mounting Bolt, 32T Frame |

| KEY | PART NO. | QTY. | DESCRIPTION |
|-------|-----------|------|-------------------------------|
| 75 | 568975 | 1 | Clamp Assembly |
| 75K | 329901 | 1 | Wing Nut |
| 80 | 568980 | 1 | Carbon Seal |
| *80A | 568980A | 1 | Cup |
| *80B | 568980B | 1 | Seal O-Ring, Buna |
| *80CA | 568980CA | 1 | Spring |
| 80L | 568980L | 1 | Drive Collar |
| 80M | 566980M | 2 | Drive Collar Set Screw |
| *90 | 568990 | 1 | Casing Gasket, Buna |
| 131 | 568913114 | 1 | Seal Guard Assembly, 14T |
| 131 | 568913118 | 1 | Seal Guard Assembly, 18T |
| 131 | 568913121 | 1 | Seal Guard Assembly, 21T |
| 131 | 568913125 | 1 | Seal Guard Assembly, 25T |
| 131 | 568913128 | 1 | Seal Guard Assembly, 28T, 32T |

ADJUSTABLE LEG KITS
(304 STAINLESS STEEL)

| PART NUMBER | FRAME SIZE |
|-------------|------------|
| 56S56C | 56C |
| 56S140TC | 143/145 |
| 56S180TC | 182/184 |
| 56S210TC | 213/215 |
| 56S250TC | 254/256 |
| 56S280TC | 284/286 |
| 56S320TC | 324/326 |

***RECOMMENDED SPARE PARTS**

See page 25 for spare part kits

EPDM and FKM elastomers available upon request

** TSC Stub Shafts available upon request

NOTES

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