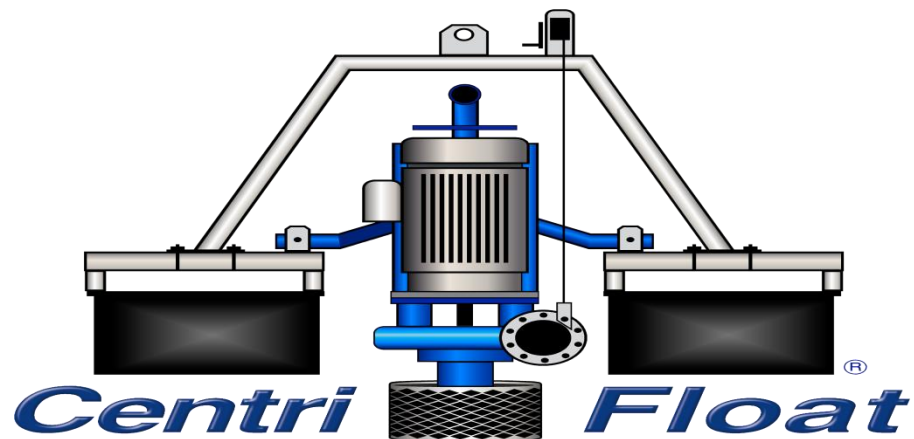


Installation Operation & Maintenance INSTRUCTIONS



Canfield Custom Pumps

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Section 1

FORWARD

This manual contains instructions for the installation, operation and maintenance of your *Turbi-Float®* or *Centri-Float®* pumping equipment.



WARNING

All wiring and electrical connections should comply with the Current Version of the National Electrical Code (NEC) and with all *Local Codes and Practices*.

Persons involved with the installing, operating and maintenance of this equipment must exercise good judgement and proper safety practices to avoid equipment damage or personal injury.



At no time shall personnel be under the pump equipment during assembly, hoisting or installation!



As with any electrical machinery, work should be done only by ***qualified personnel*** in accordance with applicable codes.



Power from all sources must be disconnected and locked out when working on equipment, failure to follow proper lock-out/tag-out procedure may result in serious injury or death.

Section 2

RECEIVING

Upon receipt of your *Turbi-Float®* / *Centri-Float®* pumping unit, the shipment should be checked to see that no transit damage has occurred. Damaged freight claims will be adjusted through the appropriate carrier. ***Damaged freight must be reported immediately.***

Any shortages of components or errors must be reported to Canfield Custom Pumps ***immediately upon receipt*** to obtain credit for correction.

Section 3

HANDLING



WARNING

Care must be exercised when handling any type of heavy equipment. Careless handling may result in damage to equipment, serious injury and/or death to persons involved.

Hoisting equipment must be of sufficient capacity and size to safely handle weight of the complete assembly plus an appropriate safety factor. Consult factory for various model weights.

When lifting a **Turbi-Float®** pump and motor assembly only (without the floatation system), insert an appropriate hoisting hook into the lifting eye on the pump body directly above the pump discharge (**Figure 1**). **Centri-Float®** pumps without the floatation system attached may be lifted by the lifting eye at the top end of the mounting bracket. (**Figure 1**)

Complete pump-floatation assemblies should be hoisted by the lifting eye on the top-crossover brace. (**Figure 2**)



WARNING



Extreme shock-loading to any lifting point may result in failure with resultant damage to equipment, injury or death to personnel.



Under no circumstances should a lifting eye be used if damaged, or distortion of any kind is present to the eye, pump body, or center support assembly. Structural damage to components or welds of any kind must be cause for repair or replacement of the damaged component by qualified personnel.



Never lift the entire pump by the motor's lifting points(s) which are designed for lifting of the motor only! This mistake may occur when handling the pump-motor only as for instance setting the pump into the floatation frame cradles during assembly or removal during disassembly.



Lifting points are not intended for overhead lifting! Use "tag-lines" to maintain safe distances from equipment being hoisted.

SECTION 4

ASSEMBLY

Your new *Turbi-Float®* / *Centri-Float®* is quite easy to set up and put into operation. Here are a few important tips to ensure your successful installation....

- 4.1 Remove the *Turbi-Float®* unit from its shipping skid or container using lifting bail just above the pump's discharge outlet. *Centri-Float®* models have a lifting bail built onto the motor rain-canopy mount. This lifting eye will easily support the assembled unit's weight. Never use this lifting point if it is damaged or deformed or for overhead lifting. Use only approved lifting equipment for this purpose. Inspect your pump for any freight damage.



Lifting eyes/points on all Turbi-Float®/ Centri-Float® equipment shall not be used for overhead lifting!

- 4.2 On a firm level working surface, position the floatation framesets in parallel the same distance apart as they will be when attached to the pump body (*Turbi-float®*) or mounting bracket (*Centri-Float®*) and attach the rear stabilizer bar. Note the offset of the pontoon frame which compensates for the weight of the discharge when filled with water when the pump is running. (*See Figure 1*) The longer section of the pump should be on the discharge side of the assembly. Lower the pump into the pivot-lug cradle mounts, install the retainer-bolts above the pivot lugs, and complete the assembly with the top and front crossover braces (front brace not used on all models)

Next attach the yoke and rear brace assembly to both ends of both pontoon frames with the supplied U-bolts as shown in ***Figure 2***.

Now you can attach the center support assembly using the supplied U-bolts as shown in ***Figure 2***.

Next attach the rear support brace assemblies and winch if supplied as shown in ***Figure 2***. *Note: Winch does not appear in figure.*

The final step in the assembly procedure is to screw in the spring loaded grease cup and fill with light weight #2 grease as per instructions on the pump body. (*See Figure 3*). ***NOTE: Turbi-float® only.***



WARNING

4.3 Make electrical connections now.



All wiring and electrical connections should comply with the Current Version of the National Electrical Code (NEC) and with all *Local Codes and Practices*.



Use only approved power cable coded for use in an outdoor water environment. Type SOWA or equal recommended. ***Never use submersible pump cable designed for water well applications!***



All motor splices must be made in accordance with motor nameplate. Only qualified personnel complying with all relevant codes shall perform electrical connections, both on the motor and at the shoreline power panel. ***In addition to potential shock hazards, poor splices cause high resistance and increased motor operating temperatures!***



Power cable must be sized to prevent excessive power loss and voltage drop to the motor. Undersized power cable will result in low voltage at the motor/high operating temperatures and shortened motor life.



Strain reliefs at both ends of the power cable are recommended to prevent disconnection of wire and damage.

4.4 Attach discharge hose or piping.



Several types of service discharge systems may be used with your floating pump. High quality lay-flat hose is popular for most general purpose applications, but high pressure systems or installations requiring the discharge piping to act as a standoff to situate the pump out into the pond may use HDPE or other rigid piping with pipe floats. ***Use caution with high pressure lines as bursting can result in injury or death!***



WARNING



NOTE: A Coast Guard Approved personal floatation device shall be worn by all personnel near or on the water at this time. Installation and/or service should be performed in teams of two or more individuals.


- 4.5 Move the pump into the water until it is deep enough to accommodate the pump in its running position 18" to 36" depending on model. Rotate the pump into the vertical plane and insert the two supplied swivel lock pins for a rigid assembly as shown in ***Figure 3.***

- 4.6 Correct rotation, marked on the unit, may be checked either before or after launching the pump. This is counter-clockwise when viewed from above for *Turbi-Float®* products and clockwise for *Centri-Float®* models.
- 4.7 Attach your selected tethering (moorings) lines to the pump and pull the unit into its desired operating location. 3/8" polypropylene line is a good choice for small to medium pumps. Larger (>1200#) pumps or those situated high-stress applications such as canals or rivers may require stronger lines with special anchoring.

Your pump is now ready to operate.

Section 5

START-UP PROCEDURE

1. Review safety requirements prior to the operation of the *Turbi-Float®/Centri-Float®* pump system.
2. It is assumed that the pump has been installed in the body of water and is floating in its normal operating position with all guards in place.
3.  *These pumps are electrically powered, and as such the area in and around the unit must be considered a potential electrical hazard! Under no circumstances should anyone enter the water while the pump is operating! If entrance into the water is required for any reason all electrical supply disconnects must be locked-out/tagged-out!*
4. Check to confirm that all hose and piping connections are tight. If the installation has a blow-down valve to prevent hydraulic shock on the hose system, open it now.
(See Typical Agricultural Installation Drawing)
5. Check the electrical system for proper line voltages.
6. Start the pump and confirm correct rotation. (**NOTE: Reverse rotation of the pump during this step will not cause damage to the assembly.**) If the pump is situated far enough out into the pond where this is inconvenient, operate unit in both directions by reversing two of the power leads on three-phase motors. (Single-phase units are shipped from the factory with the motor leads connected for proper rotation, and can only be reversed by changing the connections inside the motor.) Correct rotation is counter clockwise when viewed from the top of the motor for *Turbi-Float®* units and clockwise for *Centri-Float®* pumps and can also be determined by noting what direction delivers maximum performance and smoothest operation while running. **Some models will deliver significant production operating in**

reverse. If a visual check cannot be made be certain to run the pump in both directions to determine maximum performance and proper rotation!

7. Slowly close the blow-down relief valve, if used.
8. Confirm the proper motor loading with a standard amp meter *under the system's intended design conditions*. Reference the motor name-plate date for the full load and service factor ratings. Some models will only use a portion of the service factor.
9. Observe pump operation. If any excessive noise, vibration, or other difficulty is noted, **stop the pump immediately** and refer to the trouble-shooting chart on Page 18 of this manual.

Section 6

OPERATING CHARACTERISTICS

Turbi-Float®/Centri-Float® pumps use vertical lineshaft turbine bowls and end-suction volute designs correspondingly, which operate similarly to those standard pump types. As such, these units will have the following characteristics:

1. The first or bottom stage impeller must be sufficiently submerged for the pump to operate. This in effect makes this pump “self-priming”. Generally, ***Turbi-Float®*** units should have the complete first-stage impeller submerged, while ***Centri-Float®*** models require one-half of the volute to be under water with the top half of the discharge coupling above the surface. ***Turbi-Float®*** units are engineered for proper submergence and if used with the correct floatation system will operate under normal conditions. ***Centri-Float®*** pumps have an adjustable mounting system to allow for changes in impeller submergence as may be necessary.
2. With any centrifugal pump design, the flow of each pump model can and will vary depending on the system's head/pressure. (i.e., flow will usually increase at lower system pressures and decrease with higher system pressure.) The actual performance range of your pump is a function of several interactive factors peculiar to the model in question. Horsepower loading on the motor may change relative to the operating point on the curve. In general, higher pressures and lower power demands are at reduced flows, while lower pressures and higher power requirements are present at higher flows. The pump should always be operated within its performance curve limits. (Contact Canfield Custom Pumps for your pump's specific information.)

Section 7

MAINTENANCE

Very little maintenance is required for your *Turbi-Float®/Centri-Float®* equipment. Only a few maintenance areas need to be addressed:



WARNING



Any service to this product must be accompanied by lock-out/tag-out of electrical service.



Personnel servicing units on or near the water must wear a Coast Guard Approved personal floatation device and to work in groups of two or more.

7.1 Motor Lubrication

All pumps which use motors with Alemite (zerk) fitting should be relubricated as specified by the motor manufacturer with a high temperature polyurea type electric motor bearing grease. (*See decal on electric motor*) Polyurea greases are specially engineered to properly lubricate ball bearings in modern electric motors. Be certain to remove the relief plug (if equipped) which is either 1/4 or 1/2 around from the grease fitting. Some motors use a spring loaded relief fitting on the motor to relieve excess grease. Excess grease should appear at the relief port after only a few strokes of the grease gun. **Over greasing of bearings will damage motor.** An ideal time to lubricate the motor on an agricultural installation is at the end of the irrigation season before winter storage in addition of mid-season lubrication at specified hourly intervals.

Some motors incorporate sealed bearings which are lubricated for the life of the bearing. No additional greasing is required. If you suspect moisture to have entered the motor it is important to have a qualified electric motor repair shop check out the motor and replace bearings as necessary.

NOTE:

Continued operation of a unit with noisy or failing motor bearings may result in extensive damage to the motor and pump end.

7.2 Pump Lubrication

Turbi-Float®: The spring-loaded re-greasing cup is an aid to gradually introduce additional lubricant into the enclosing tube tension bearing assembly, if grease is lost during normal operation. You may notice that the cup empties its contents into the pump after only a short time, but this is not a concern. The cup's function is to allow a slow-re-greasing of the

pump's upper shaft end which is not as easily done with a standard Alemite fitting. Excess grease may accumulate in the tension bearing area and is normal.

Centri-Float®: Models with a grease fitting on packed-box models may be lubricated at any convenient time, particularly if packing gland adjustment is required.

(*See lubrication chart*) for pump lubrication. Additional grease may be added at approximately 250 hour intervals.

Section 8

REPAIR, SERVICE

The design of the **Turbi-Float®** and **Centri-Float®** products incorporates standard vertical lineshaft turbine pump bowls or end suction centrifugal pump components. A working knowledge of these products is required to successfully disassemble, repair, and reassemble these types of pumps. If you are unfamiliar with pump repairs relative to either type, it is recommended that a qualified repair service center be contacted for repairs or major service.

8.1 Motor Separation



WARNING

NOTE: *Before any type of service or repair is performed, all electrical power must be disconnected and locked-out. Discharge isolation valves (if used) should be closed.*



Although field removal of the motor from the pump body is possible, it is recommended to transport the assembly into a facility where proper lifting and support equipment is available. Large electric motors are heavy and constitute a lifting hazard.

1. With the unit in the horizontal position, support both the motor and pump end separately with slings or floor supports of an approved design. Note that when the motor is removed, balance will be affected and the two components will require full support as separate items.
2. Remove the coupling safety guards to expose the pump drive coupling.
3. Four (4) GRD #8 bolts are used to fasten the pump half coupling to the motor half coupling. A pair of slip joint pliers may be used to hold the coupling from turning. While removing the bolts, you may notice a gap of 1/16" to 3/16" open up between the coupling halves when the last bolt is removed; this is normal. (*See Figure 4*)

4. Remove the four large cap screws holding the motor to the pump motor base. Remove the one cap screw with thick washer from the center of the motor half coupling and pull the coupling from the motor shaft. The motor may now be serviced.

8.2 **Reassembly**

IMPORTANT: When reinstalling the motor half coupling onto the motor shaft, use a new cap screw of the original grade and size. Loctite® #242 (Blue) thread locker or equal must be applied to clean threads to prevent separation and torqued to 25 ft. lbs. for the 3/8" bolt size and 75 ft. lbs. for the 1/2" size.

NOTE: *Failure to properly install the motor coupling half retainer bolt may allow separation and damage to the pump.*

Align and attach the motor to the C-face mounting base on the pump end. Proceed with care as the drive coupling register may bind and prevent motor seating on the C-face if not properly aligned.

IMPORTANT: A gap of 1/16" to 3/16" must be present between the motor half coupling and the pump coupling. When the four (4) 5/16" bolts are pulled tight, this gap will close and raise the impeller stack off bottom for proper running clearance.

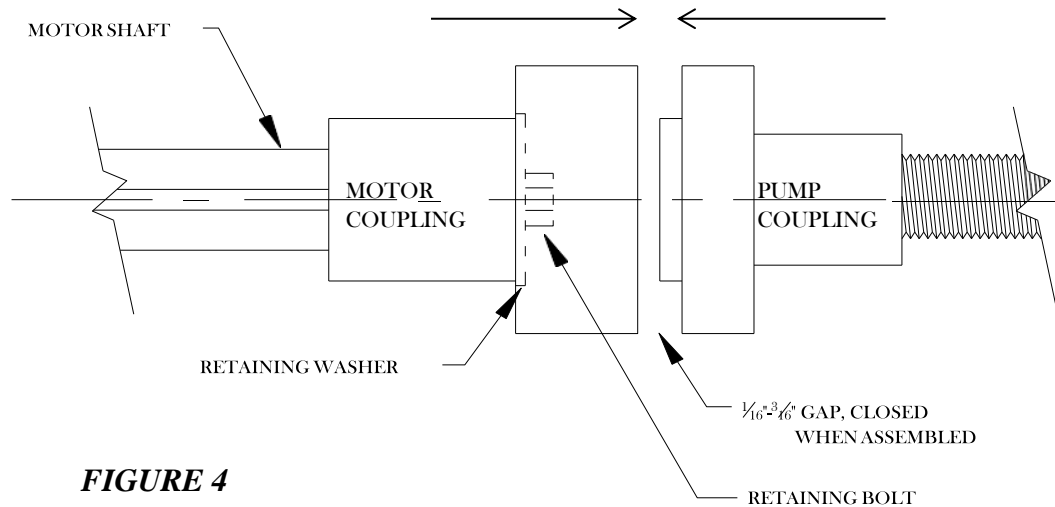


FIGURE 4

It may be necessary to gently force the coupling halves apart to determine this lateral gap, due to grease in the suction bearing of the bowl. If the correct gap of 1/16" to 3/16" cannot be confirmed, the lateral impeller setting must be readjusted.

Resetting lateral gap on drive coupling:

With the motor securely bolted to the pump body, note the relative gap available between the coupling halves. If no gap is apparent and the motor C-face cannot be easily drawn up against the pump body, ***do not force them together***. Binding and damage may result.

1. Gap too small (less than 1/16")

Pull motor away from pump body and set aside. Look down into the pump half coupler and note the visible part of the gibb key. Using a pair of heavy shank needle nose pliers or vise-grip pliers, pull on the head of the key while rotating the pump coupler back and forth. The key can then be withdrawn from the coupler bore. The pump coupling half can now be screwed down in one turn increments to obtain the correct lateral gap. The pump shaft is a 12 thread per inch right hand thread, so one turn will change the lateral setting by 1/12th or 0.083". Repeat the trial fit up as previously described and readjust as necessary. Reinstall and seat the key to lock the pump coupling in place.

2. Coupling gap too large (greater than 3/16")

Remove drive key as previously described and unscrew the pump coupling (counter-clockwise) from the pump shaft in one turn increments until available gap is within the correct range (1/16" to 3/16"). Reinsert key and assemble motor onto pump.

Incorrect gap setting will cause the impeller stack to be either too high or low, resulting in reduced pump performance or internal damage.

Section 9

Shutdown and Storage Procedures

Shut-Down Procedure:

1. There are not special shut-down procedures for the *Turbi-Float*® pump system. However, it is recommended that a check valve be used in the discharge piping system to prevent a back flow of the pumped fluid as shown in Typical Installation example.

High-volume backflow conditions will cause the pump to spin at high rpm in reverse. Pump startup during high speed backspin may result in shaft failure!

If an in-line check valve is not used, a suitable time-delay relay in the motor control circuit may be used to prevent a restart during drain back of the discharge line.

Storage Procedure:

It is recommended that pumping equipment not operated during freezing conditions be removed from the water to prevent damage from ice heaving and shifting.

1. If the unit is to be out of use in conditions where freezing is possible, it is recommended that the pump be removed from service, re-lubricated and stored in a clean dry environment. Units stored outdoors should be elevated off-grade with blocking and covered with tarping.
2. Lubricate the motor and pump end with the appropriate grease.
3. Inspect pontoons for damage and signs of taking-on water from shell damage. Replace as necessary.
4. Inspect floatation framework for cracked or broken welds, repair as necessary.
5. Power cable and discharge hose is susceptible to rodent damage when left on the ground in coils. Take appropriate precautions.

❄ ***Equipment that must be left in place or operated during freezing weather can be protected from damage with the use of motorized de-icing equipment available from marine supply outlets.***

TROUBLESHOOTING CHART

CONDITION	PROBABLE CAUSE	REMEDY
Pump Will Not Run	<ol style="list-style-type: none"> 1. Motor overload protection contacts open. <ol style="list-style-type: none"> a. Incorrect control box. b. Faulty wiring. c. Faulty overloads. d. Low voltage. e. Ambient temperature of control box or starter too high. 2. Blown fuse, broken or loose electric connections. 3. Defective Motor. 4. Faulty control equipment 5. Faulty switch. 6. Pump Binding. 	<ol style="list-style-type: none"> 1. a. Check nameplate for HP and voltage. b. Check wiring diagram furnished with starter. c. Replace. d. Check voltage at pump side of control box. e. Use ambient compensated relays. 2. Check fuses, relays or heater elements for correct size and all electrical connections. 3. Repair or replace. 4. Check all circuits and repair. 5. Repair or replace. 6. Pull master switch, rotate pump by hand to check. Check impeller adjustment or disassemble unit to determine cause.
Pump Runs But No Water Is Delivered	<ol style="list-style-type: none"> 1. Line check valve backwards. 2. Line check valve stuck. 3. Unit running backwards. 4. Lift too high for pump. 5. Pump not submerged. 6. Intake strainer or impeller plugged, or pump in mud or sand. 7. Impeller loose on shaft. 	<ol style="list-style-type: none"> 1. Reverse check valve. 2. Free the valve. 3. See Start Up and Operation Section. 4. Check with performance curve. 5. Lower pump if possible and add fluid to the system. 6. Start and stop pump several times or use line pressure if available to back flush. Pull pump and clean. 7. Pull unit and repair.
Reduced Capacity	<ol style="list-style-type: none"> 1. Motor not coming up to speed. 2. Strainer or impellers partly plugged. 3. Scaled or corroded discharge pipe or leaks anywhere in the system. 4. Excess wear due to abrasives. 5. Impeller loose on shaft. 	<ol style="list-style-type: none"> 1. Check voltage while unit is running. 2. Start and stop pump several times or use line pressure if available to back flush. Pull pump and clean. 3. Replace pipe or repair leaks. 4. Replace worn parts. 5. Pull unit and repair.
Motor Overload	<ol style="list-style-type: none"> 1. Line voltage not correct. 2. Faulty equipment used to check. 3. Specific gravity higher than design. 4. Operation at point on pump curve other than design. 5. Motor speed too high. 6. Impellers dragging. 7. Pump in bind. 	<ol style="list-style-type: none"> 1. Check and correct. 2. Check equipment. 3. Correct specific gravity or re-evaluate system. 4. Check performance curve. 5. Line voltage too high or incorrect frequency. 6. Re-adjust. 7. Pull master switch, rotate pump by hand to check. Disassemble unit to determine cause.
Pump Noisy and Vibrating Excessively	<ol style="list-style-type: none"> 1. Unit running backwards. 2. Loose fasteners. 3. Badly worn motor or pump bearings. 4. Impeller loose on shaft. 5. Pump and Motor shafts misaligned. 	<ol style="list-style-type: none"> 1. See "initial Starting of Unit". 2. Check all bolts, nuts, etc. 3. Pull unit and repair. 4. Pull unit and repair. 5. Pull unit and repair.
Excessive Wear	<ol style="list-style-type: none"> 1. Abrasives. 2. Pump in bind. 3. Vibration. 	<ol style="list-style-type: none"> 1. Clean System. 2. Pull master switch, rotate pump by hand to check. Disassemble unit to determine cause. 3. Determine cause and correct.
Corrosion	<ol style="list-style-type: none"> 1. Impurities. 2. Corrosive liquid. 	<ol style="list-style-type: none"> 1. Analyze fluid. 2. Change to Corrosion resistant materials.

WIRE SIZE CHARTS



WARNING

All wiring and electrical connections should comply with the Current Version of the National Electrical Code (NEC) and with all *Local Codes and Practices*. Undersized wire between the motor and the power source will limit the starting and load carrying abilities of the motor. ***The minimum recommended copper wire sizes are shown in Chart 1 and Chart 2 below:***

**CHART 1 – SINGLE PHASE
MOTORS (230 VOLTS)**

HP	VOLTS	** 100' LENGTH
5	230	6
7.5	230	6
10	230	4
		GAUGE OF WIRE

NOTE: Approved wire splicing connection at motor is essential to a low resistance connection. Improperly spliced power cable will result in a high resistance connection which may result in motor failure.

***** For longer wire lengths consult a Licensed Electrical Contractor.***

**CHART 2 – THREE PHASE
MOTORS (230 & 460 VOLTS)**

HP	VOLTS	**100' LENGTH
5	230	10
5	460	12
7.5	230	8
7.5	460	12
10	230	8
10	460	10
15	230	6
15	460	8
20	230	4
20	460	8
25	230	2
25	460	6
30	230	0
30	460	6
40	230	0
40	460	4
50	460	2
60	460	0
75	460	0
		GAUGE OF WIRE

WARRANTY: Canfield Custom Pumps and its employees are proud of our products and are committed to providing our customers and end users with the best designed and manufactured floating pump systems. This Warranty and Service Policy describes Canfield Custom Pumps warranty and warranty procedures.

Comments and Questions: We welcome comments and questions regarding our products. Please contact us at:

CANFIELD CUSTOM PUMPS

111 West Street

PO Box 519

Fort Morgan, CO 80701

Telephone: (970) 867-2943

Toll Free: (877) 887-2435

Facsimile: (970) 867-0313

Scope of Warranty: All Canfield Custom Pumps floating pump systems are warranted against defects in materials and workmanship.

Pump Warranty Period: Canfield Custom Pumps Turbi-Float® is warranted for 24 months from the date of shipment to customer. All warranty claims must be submitted to the Canfield Custom Pumps Service Center prior to the expiration of the warranty period.

Warranty Service Center Location: Warranty service is available for all Canfield Custom Pumps products from Canfield Custom Pumps Service Center in Fort Morgan, Colorado.

Electric Motor Warranties: Electrical motors are warranted through the manufacturer and adjustments are per the manufactures policies. Specifics on electrical motor warranties can be found by going to the following web sites depending on where it was manufactured:

www.baldor.com

OR

www.usmotors.com

Procedure to Receive Warranty Service: Customers should deliver or ship prepaid the Canfield Custom Pumps product requiring warranty service to the Authorized Service Center. Please include an explanation of the defect or problem, a description of the way which the Canfield Custom Pumps product is used and your name, address and telephone number.

Repair by Other than the Canfield Custom Pumps- Authorized Service Center: Customers who are unable to take or ship the Canfield Custom Pump product to the Authorized Service Center, or who desire a repair to be made by other than the Authorized Service Center, should contact the Canfield Customer Pumps Office. A repair by anyone other than the Canfield Custom Pumps Service Center must be approved in advance by Canfield Custom Pumps.

Repairs or Replacement Within the Scope of the Warranty: If a Canfield Custom Pumps product is defective due to a manufacturing defect and said defect occurs during the warranty period, then Canfield Custom Pumps will either repair the product or replace it as per the option of Canfield Custom Pumps. Canfield Custom Pumps is not responsible for removal and shipping of the Canfield Custom Pumps product to the service center, the reinstallation of the Canfield Custom Pumps product upon its return to the customer, or any incidental or consequential damages resulting from the defect, removal, reinstallation, shipment, or otherwise.

Repairs Outside the Scope of the Warranty: This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, accident, neglect, or from improper operation, maintenance, installation, modification, or adjustment. If the Canfield Custom Pumps Authorized Service Center determines that the problem with a Can- field Custom Pumps product is not due to defects in Canfield Custom Pumps workmanship or materials, then the customer will be responsible for the cost of any necessary repairs.

Product Specifications: All product specifications, applications and other information provided in Canfield Custom Pumps written materials are subject to correction and change without notice and should be confirmed with Canfield Custom Pumps prior to ordering.

Other Warranties: Canfield Custom Pumps makes no warranty as to motor or other material not of its manufacture, since the same are usually covered by warranties of the respective manufactures thereof.

No Other Warranties and Liability Limitation: The Warranty and Service Policy represents Canfield Custom Pumps sole and exclusive warranty obligation with respect to Canfield Custom Pumps products. Canfield Custom Pumps liability to a customer or any person shall not exceed the Canfield Custom Pumps sales price of the applicable Canfield Custom Pumps products.

THESE WARRANTIES ARE EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SELLER SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION OR LIABILITY ON THE PART OF THE SELLER WHETHER ANY CLAIM IS BASED UPON NEGLIGENCE, BREACH OF WARRANTY, OR ANY OTHER THEORY OR CAUSE OF ACTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND.

Appendix A

DISASSEMBLY PROCEDURE

DISASSEMBLY PROCEDURE

Familiarity with standard shop procedures with regard to safety practices and vertical line shaft pump construction methods are essential to the successful disassembly and reassembly of the discharge body and bowl unit. The following is a general guide for disassembly in a properly equipped repair facility for inspection and evaluation for repair.



DUE TO THE SIZE AND WEIGHT OF THESE PUMPS, THEY DEMAND PROPER HANDLING TECHNIQUES! SERIOUS INJURY OR DEATH CAN RESULT FROM IMPROPER METHODS BEING USED TO AFFECT THE FOLLOWING PROCEDURES!

1. Support the pump and motor assembly on a suitable platform with blocking.
2. Disconnect the pump intake/suction strainer assembly. Some units have a basket strainer screwed directly into the bowl, while others will use a “clip on” style strainer. Counterweights (if used) can be removed at this time if necessary.
3. Remove the four (4) 5/16” cap screws from the motor-pump coupling.
4. Motor Separation: Support the motor and pump with slings, blocking or other suitable rigging and remove the four (4) cap screw/bolts that hold the motor to the discharge body plate. **This step will change the balance of the unit! Use caution to prevent dropping the motor or tipping the pump assembly!**
5. Remove the gibb drive key from the pump drive coupling. Short shank needle nose pliers work well for this step. It may be necessary to twist the coupling back and forth to loosen the key from its seat if removal is difficult. Extreme instances may require the use of a small heel bar to pry the key from the coupling.
6. Unscrew the pump drive coupling from the shaft. This is a right hand thread.
7. Remove the grease line from the hex bronze tension bearing.
8. Remove the hex bronze tension bearing. This is a left-hand thread. Special deep socket tool available if desired. (Consult factory for correct part number)

9. Remove the bowl unit from the discharge body. (Right-Hand Thread) This will require chain tongs sized for the diameters of the body and bowl unit in question.
The balance of the assembly will change when these components are separated! Use caution to prevent injury to personnel or damage to components!
10. The bowl assembly may now be disassembled with standard vertical line shaft turbine procedures. Consult the factory for assistance with specific models, if required.

Appendix B

REASSEMBLY PROCEDURE

REASSEMBLY PROCEDURE

Familiarity with standard shop procedures with regard to safety practices and vertical line shaft pump construction methods are essential to the successful disassembly and reassembly of the discharge body and bowl unit. The following is a general guide for disassembly in a properly equipped repair facility for inspection and evaluation for repair.



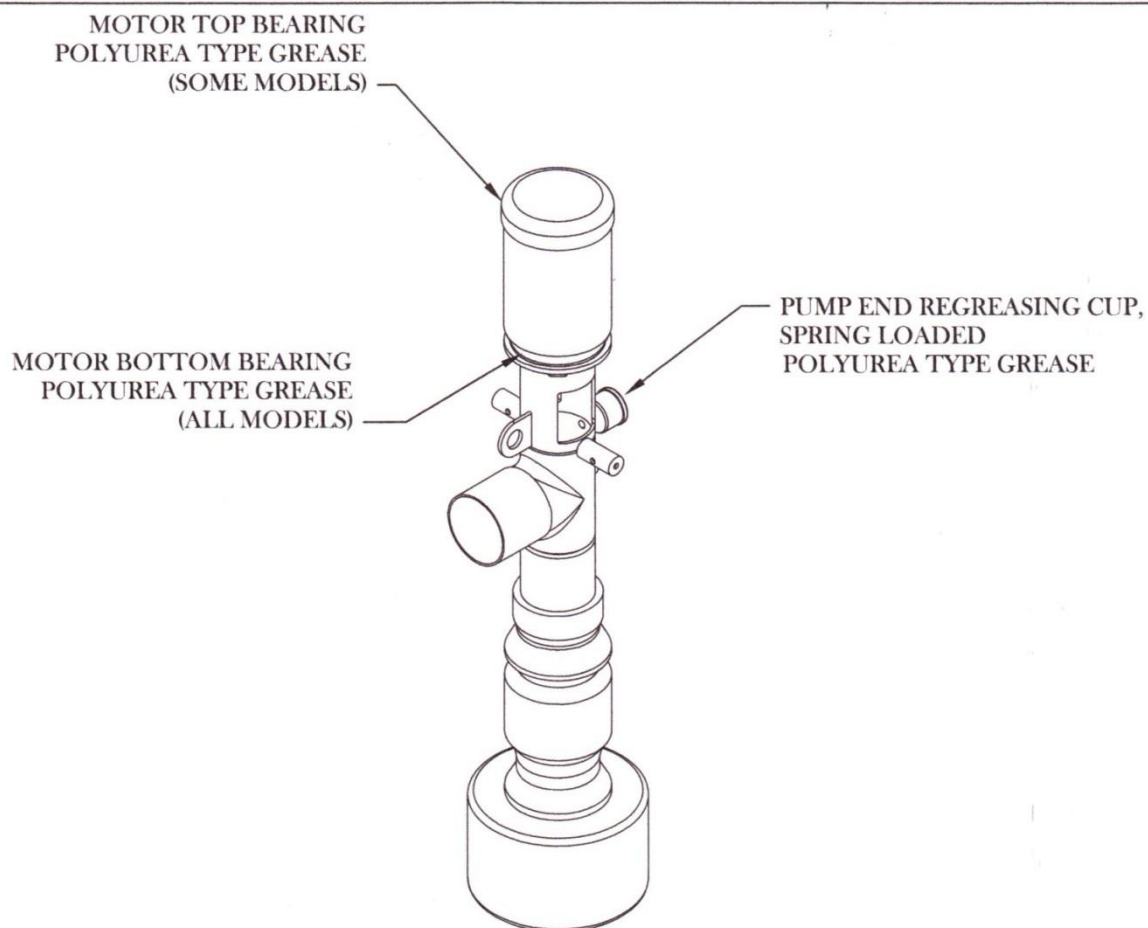
DUE TO THE SIZE AND WEIGHT OF THESE PUMPS, THEY DEMAND PROPER HANDLING TECHNIQUES! SERIOUS INJURY OR DEATH CAN RESULT FROM IMPROPER METHODS BEING USED TO AFFECT THE FOLLOWING PROCEDURES!

1. It is assumed the bowl unit has been previously assembled and prepared for final assembly to the discharge body. Consult factory for details regarding specific models as required.
2. Thread top enclosing tube onto bowl connector bearing and pre-lubricate cavity with a good grade of #2 lithium grease. (Factory recommendation is “Mystic JT-6”)
3. Clean and lubricate discharge body to bowl unit threads with a heavy-duty anti-seize thread compound.
4. Secure and support bowl assembly in a vertical position and thread discharge body into bowl discharge case. **Use care in guiding enclosing tube into bronze tension bearing sleeve or damage could occur to O-ring seal.** Tighten and butt threads with adequate torque for a proper joint. **Failure to properly make up connection may result in bowl becoming loose and causing damage to the pump.**
5. Lubricate and install hex head bronze tension bearing and tighten. Special tool (available from factory) may be required on some models.
6. Connect grease fittings and push-on tubing connectors between body bulkhead fitting and tension bearing.
7. Apply anti-seize compound to pump shaft threads and install pump drive coupling half. Adjust for proper lateral (see FIGURE 4). Align drive coupling and shaft key seats, lubricate key, and install gibb key to lock coupling to pump shaft
8. If motor drive coupling half has been previously removed, re-install as described in section

8.2 of this manual. At this time it is usually best to have both the motor and pump body in the horizontal plane for assembly. Support the motor with adequate slings or other approved lifting devices and mate the motor to the pump. Take care that the drive coupling halves align while mating the motor C-face to the pump body flange. After checking for proper shaft lateral setting (see section 8.2 of this manual) cross tighten the motor mounting bolts for a secure connection. Align the pump coupling and motor coupling bolt holes and pull the two pieces together with final bolt torque.

9. Reinstall the bowl suction screen assembly, and other components as required onto the discharge body. Install spring loaded pump grease pot and fill with #2 lithium grease.
10. Re-lubricate motor as required.
11. The assembled pump is now ready to reinstall.

LUBRICANT CHART



MOTOR LUBRICATION

GREASE

MANUFACTURER

MOBILE POLYREX EM	EXXON MOBILE
CHEVRON SRI 2	CHEVRON
LGHP 2	SKF
TRI-STAR EP	TRI-STAR TECHNOLOGIES

PUMP LUBRICATION

GREASE

MANUFACTURER

MOBILE POLYREX EM	EXXON MOBILE
CHEVRON SRI 2	CHEVRON
LGHP 2	SKF
TRI-STAR EP	TRI-STAR TECHNOLOGIES