

# CECO Fybroc

## series 7530 close-coupled vertical pump

### INSTALLATION MANUAL



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### Ordering replacement parts

For future reference fill in the following information from the pump nameplate. This will be necessary to ensure accuracy when ordering replacement parts.

Model \_\_\_\_\_

Size \_\_\_\_\_

Serial Number \_\_\_\_\_

Impeller Diameter Installed \_\_\_\_\_

Material of Construction \_\_\_\_\_

# CECO Fybroc

## WARRANTY

FYBROC pumps are warranted by the Company, insofar as the same are of its own manufacture, against defects in materials and workmanship under proper and normal use and service, for a period of one year from the date of original shipment from the factory. FYBROC's obligation is limited, however, to furnishing without charge, F.O.B. its factory, new parts to replace any similar parts of its own manufacture so proving defective within said period, provided the Buyer has given FYBROC immediate written notice upon discovery of such defect. No allowance will be made for labor charges. FYBROC shall have the option of requiring the return of the defective material, transportation prepaid, to establish the claim.

FYBROC makes no warranty or guarantee whatsoever, either express or implied, of prime mover, starting equipment, electrical apparatus, parts or material not manufactured by Fybroc, except to the extent that warranty is made by the manufacturer of such equipment and material.

FYBROC assumes no liability for damages or delays caused by defective material, and no allowance will be made for local repair bills or expenses without the prior written approval or authority of FYBROC.

Under no circumstances will FYBROC be liable for indirect, special or consequential loss or damage of any kind and the Buyer assumes all liability for the consequences of its use or misuse by the Buyer, his employees, or others.

## PERFORMANCE GUARANTEE

Is at the specified point of rating only and will not cover performance under conditions varying therefrom, nor for sustained performance over any period of time.

## ACCEPTANCE TEST

If required, shall be conducted in accordance with the practices as set forth in the Hydraulic Institute Standards. The expense of any such tests shall be borne by the buyer.

## PERFORMANCE REPRESENTATION

Are based on shop laboratory tests with cold water as outlined in the Hydraulic Institute Standards.

## FIELD TESTING

Due to the inaccuracies of field testing, the results of any such tests conducted by or for the Buyer shall be interpreted as being only indicative of the actual field performance of the pump. No equipment will be furnished on the basis of acceptance by results of field tests. If the buyer, after such a test, questions the performance of the pump, he may at his option request a test to establish the performance. Such tests will be conducted in accordance with the above paragraph entitled "Acceptance Tests."

## ALL WARRANTIES

Are void if -

- a. Pipe strains are the cause of damage.
- b. Pump handles liquids other than those specified in detail.
- c. NPSH lower than required by pump impeller.
- d. Operating speed is higher than specified.
- e. Improper field installation.

## RECOMMENDATIONS FOR SPECIAL MATERIAL

To combat corrosion, abrasion, erosion, or pumping solids, foreign objects, or pumping liquids at elevated temperature, any such recommendations will be based on the best available experience of FYBROC and the supplier of the material and industry, BUT WILL NOT CONSTITUTE A GUARANTEE AGAINST THESE EFFECTS.

The foregoing warranty is made in lieu of all other warranties guarantees, obligations or liabilities, expressed or implied, by FYBROC or its representatives. All statutory or implied warranties, other than of title, are hereby expressly negated and excluded.

All illustrations and provisions in specifications are descriptive and are not intended as warranties. Penalty of any kind are not acceptable unless approved in writing by an officer of Met-Pro Corporation.

# INSTALLATION 7530 SERIES PUMPS

## GENERAL DESCRIPTION

Fybroc close-coupled vertical pumps, (Series 7530) are centrifugal type pumping units designed for installation in a pit or tank vented to atmospheric pressure. All pump parts in contact with fluid are constructed of glass reinforced vinyl ester (VR-1) or epoxy (EY-2) resin with the exception of the shaft and impeller locking hardware, which is of an alloy compatible with the pumped fluid.

## PUMP INSTALLATION

- 1) Inspect pump and any accessories packed with the unit to assure no damage has occurred during transit.
- 2) WHEN HANDLING THE PUMP UNIT, IT IS VERY IMPORTANT TO PICK UP THE UNIT BY THE TOP OR MOTOR END.  

A rope or sling should be attached to the motor for lifting. The pump assembly must be placed carefully into position. Care must be taken to guide the pump as it is lowered into place to avoid striking the sides.
- 3) When the pump is resting in the proper position, check the level of the unit, and shim if necessary to level the unit. The pump shaft must be vertical to avoid a bending stress on the shaft column, and to avoid bearing damage during operation. Check the shaft column (Item 91) with a level to be sure the unit is straight and plumb.
- 4) Bolt down the unit, and be sure it is adequately supported on both sides.

## PIPING THE PUMP

The pump has been designed with all necessary strength factors for long, reliable service life. However, due to the composite construction, care must be taken during installation to avoid unnecessary pipe strain. If piping strains are to be encountered, flexible connections are recommended. Flat face flange and full face gaskets are

recommended for pump piping. Raised face flanges or gaskets are not to be used. When lined piping is used, flange alignment should be carefully checked. Spacer ring gaskets are recommended to assure parallel alignment of pipe and pump flanges. The following flange bolt torque values should be used:

| Flange Size | Bolt Torque   |
|-------------|---------------|
| 1 1/2"      | 9-12 ft-lbs.  |
| 2"          | 18-24 ft-lbs. |
| 3"          | 23-30 ft-lbs. |
| 4"          | 27-36 ft-lbs. |
| 6"          | 35-50 ft-lbs. |

All piping must be supported independently of the pump. The piping should always line up naturally with the pump flanges. Never draw the piping to the suction or discharge flanges of the pump. Piping loads transferred to the pump column could result in damage to the column. Outside installations should be properly compensated for changes in ambient temperatures. Refer to pipe manufacturers standards for proper installation. Omission of this could result in severe strain transmitted to the pump flanges. If expansion joints are to be used, they should be installed in a location to prevent loading of the pump flanges.

The piping should be as short and direct as possible. Avoid all unnecessary elbows, bends and fittings, as they increase friction losses in the piping.

## DISCHARGE PIPING

- 1) Installation of a valve in the discharge line that can be used as a flow shutoff for inspection and maintenance is recommended. It should be of a design to allow throttling or flow control.
- 2) The diameter of the discharge pipe should be as large or larger than the pump discharge.
- 3) Provision for a discharge pressure gauge should be included.

## ELECTRICAL CONNECTIONS

- 1) All electrical work done to the unit should be performed by a qualified electrician. All local, state and federal electrical codes should be adhered to.
- 2) Wire motor according to motor manufacturers instructions. Ensure that all connections and covers are tight and that proper sized wire and switch-gear are used.

## START-UP AND OPERATING PROCEDURES

### STARTING

- 1) Inspect the pump casing for proper liquid submergence.
- 2) Open the discharge valve to approximately 25-50% flow.
- 3) Start and bring the pump up to operating speed and adjust the discharge valve to the desired flow rate.

**WARNING: DO NOT RUN PUMP WITH A CLOSED DISCHARGE VALVE AS THE LIQUID IN THE PUMP WILL RAPIDLY INCREASE IN TEMPERATURE, CAUSING DAMAGE TO THE PUMP.**

### OPERATION CHECKLIST

- 1) Periodically check for excessive vibrations and motor bearing temperatures. Correct if necessary.
- 2) Periodically check pressure gauge and flow-meters for correct flow-rate. Adjust discharge valve if necessary.

### MAINTENANCE

Fybroc pumps are designed for a long service life. The only scheduled maintenance items are the lubrication intervals for the motor bearings.

## ROTATION

All pumps operate in a clockwise direction when facing the motor fan guard. Connect electric motor to power supply and jog motor to check rotation. If motor is operating in wrong direction, reverse leads and recheck.

The motor relubrication intervals are greatly influenced by the environment it is in and the length of time it runs. Refer to the following chart for typical relubrication values for motors. Standard duty is when the motor is operated eight hours a day and the environment is free from dust. Severe duty is when the motor runs twenty-four hours per day with exposure to dirt and dust.

| Sync RPM Range | Motor Frame Range | Type of Service |             |
|----------------|-------------------|-----------------|-------------|
|                |                   | Standard Duty   | Severe Duty |
| 3600           | 213TCZ - 256TCZ   | 5 Yrs           | 3 Yrs       |
|                | 284TCZ - 286TCZ   | 1 Yr            | 4 Mos       |
| 1800           | 213TCZ - 256TCZ   | 7 Yrs           | 3 Yrs       |
|                | 284TCZ - 286TCZ   | 4 Yrs           | 1.5 Yrs     |

### Instructions For Lubricating Motors

Before greasing, be sure fittings are clean and free from dirt. Remove grease relief plug or plate, using a poker ensure that the relief tube is clear, then using a low pressure grease gun pump in the required grease. Do not over-grease. After relubricating allow motor to run for an hour before replacing relief hardware.

## TROUBLE CHECKLIST

Refer to the following diagnostic section if hydraulic problems are encountered in the pump operation.

**PROBLEM:** Insufficient liquid delivered or not enough pressure.

**CHECK:** Suction and/or pump casing not filled with liquid.

Speed too low.

NPSHA (Lower than NPSHR, pump will cavitate).

Impeller or suction plugged with solids.

Air leakage through suction gaskets if tailpipe is used and dynamic suction pressure is negative.

Suction strainer plugged, if used in suction line.

Insufficient submergence above suction entrance (vortexing).

Air or gases in the liquid.

Impeller diameter (smaller than required).

Mechanical defects (impeller clearance too great, impeller damaged, excessive restriction bushing clearance).

Pressure gauge or flow meter in poor location.

Viscosity of liquid.

Turbulence at pump suction (bends or area changes near pump entrance).

**PROBLEM:** Pump takes too much power.

**CHECK:** Speed too high.

Impeller diameter (larger than required).

Head lower than rating; pumping beyond design point.

Liquid heavier than specified; check viscosity and specific gravity.

Mechanical defects (bent shaft, rotating element binds, piping loads).

Motor defects.

Foreign object trapped in impeller.

## ASSEMBLY PROCEDURES FOR VERTICAL PUMPS

### GENERAL

The Fybroc pump is designed for easy inspection and service. For inspection or replacement of certain parts, the work can be done in place, without the necessity to remove the complete pump to a maintenance area. Refer to applicable Sectional Drawing in this manual for item numbers mentioned below.

Before any work is done the following procedures and precautions should be taken:

- 1) The electric motor should be either disconnected from its power source, or the switch or circuit breaker must be secured in an "off" position so that the motor cannot be accidentally started.
- 2) Depending upon the fluid being pumped, the proper protective equipment should be worn (gloves, mask, respirator, goggles or safety glasses, etc.) to prevent contact with the fluid in the pump or pipelines.
- 3) Check the valve on the discharge line to be sure it is closed and secured.
- 4) Any liquid trapped in the pump and piping should be drained. Care should be taken to either trap the fluid in a container or to divert it to a proper disposal area so that the area around the pump and floor will not be contaminated.

### DISASSEMBLY - VERTICAL 7530 SERIES

- 1) Ensure that the motor is shut off and lock out power supply. Check that discharge valves are shut and any liquid is drained.
- 2) Ensure motor power is locked out. Disconnect wiring to motor (tag wires for rotation check upon reassembly).
- 3) Remove discharge flange bolts and gaskets.
- 4) Attach a hoist or other suitable means for lifting the pump and remove the four mounting bolts.
- 5) Carefully lift out the pump and place it in horizontal position. Drain liquid from pump as necessary.
- 6) Remove casing bolts, washers and nuts (Items 1C, 1D & 1E). Remove the casing (Item 1). Remove o-ring (Item 73).
- 7) A strap wrench or similar device may be required to remove the impeller. With the impeller fixed, remove either the impeller screw (Item 2C),

washer (Item 2D) and lockwasher (Item 2E) or impeller nut (Item 24) if pump is provided with a shaft sleeve. Remove the impeller nut o-ring (Item 24B) if so equipped.

- 8) Remove impeller (Item 2), impeller key (Item 32). Remove shims (Item 67), unless pump has a shaft sleeve.
- 9) If pump is equipped with an optional shaft sleeve (Item 14), remove the impeller o-ring (Item 2B) from the rear of the impeller.
- 10) Remove column-motor screws (Item 91A). Remove column assembly (Item 91) from motor.
- 11) If pump is equipped with an optional shaft sleeve (Item 14), remove the sleeve and shims (Item 67).
- 12) Remove bushing snap ring (Item 63A), restriction bushing (Item 63), and bushing pin (Item 63B).
- 13) Remove vapor shield (Item 91B) from the inside of the column assembly (Item 91).
- 14) Remove slinger (Item 40) from motor shaft.

### ASSEMBLY - VERTICAL 7530 SERIES

- 1) Clean and inspect all items prior to assembling. New o-rings are recommended upon re-assembly.
- 2) Install vapor shield (Item 91B) in its respective groove in the column assembly. Be sure it is properly seated.
- 3) Insert restriction bushing (Item 63) into the column assembly (Item 91) after placing pin (Item 63B) in the cover indentation. Next, install snap ring (Item 63A) in groove to hold the bushing in place.
- 4) Mount the motor in a vertical position, resting on the fan cover. Check motor shaft for excessive end-play. The end-play should not exceed 0.002" TIR.
- 5) Install slinger (Item 40) on motor shaft.
- 6) If pump is equipped with an optional shaft sleeve (Item 14), install the shims (Item 67) that were previously installed on the motor shaft.
- 7) Install optional shaft sleeve. Be sure inside of sleeve is bottomed against shims (Item 67).

- 8) Lubricate the bore of the vapor shield (Item 91B) with a light coating of grease. Slide the column assembly (Item 91) over the motor shaft.
- 9) Insure that the motor pilot is properly engaged and seated in the column assembly pilot and install column-motor screws (Item 91A).
- 10) If pump is not equipped with the optional shaft sleeve, install the shims (Item 67), that were previously installed on the motor shaft.
- 11) Install impeller key (Item 32), impeller (Item 2) and mounting hardware. If the pump is equipped with an optional shaft sleeve, a new impeller o-ring (Item 24B) should be used under the impeller nut. Tighten impeller hardware carefully. If the back of the impeller starts to contact the column assembly, STOP and refer to the impeller adjustment procedure.
- 12) Check the impeller clearance per the impeller adjustment procedure.
- 13) Install the cover o-ring (Item 73), casing (Item 1), and casing hardware (Items 1C, 1D, 1E).

**IMPELLER ADJUSTMENT FOR 7530 SERIES**

The 7530 series design permits adjustment of the impeller clearance between the pump casing face and the impeller face. The pump impeller is adjusted at the factory during assembly and should not require further adjustment upon installation.

Impeller adjustment will be required when a drop in head and/or capacity indicates a change in clearance. Impeller adjustment will also be necessary if the pump was disassembled/reassembled and/or if motor and/or pump parts were replaced. Refer to the following table for recommended clearances of the impeller fan.

**TABLE 1**

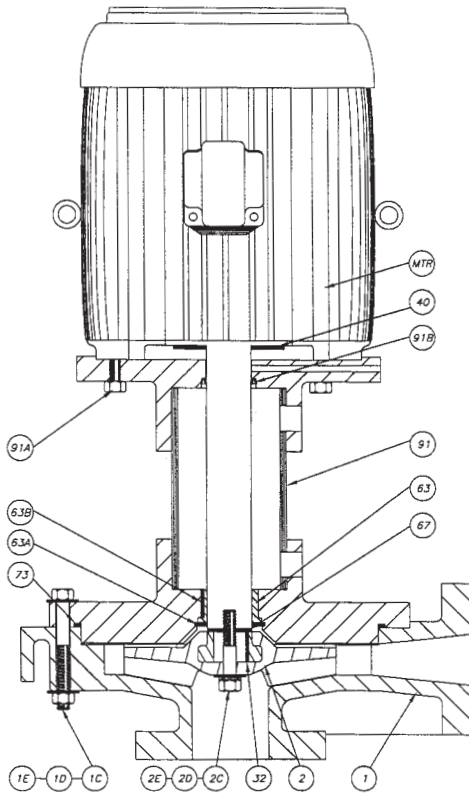
| impeller diameter | impeller clearance |
|-------------------|--------------------|
| UP TO 8"          | .015"              |
| 8" TO 10"         | .020"              |

If the pump has not been disassembled and reassembled, steps 1-4 below may be omitted.

- 1) Remove the casing hardware, casing, and cover o-ring (Items 1, 1C, 1D, 1E, 73).
- 2) Using a feeler gauge check the clearance between the back of the impeller (Item 2) and the face of the column assembly (Item 91).
- 3) Add or remove shaft shims (Item 67) until the clearance behind the impeller is .030" - .040".
- 4) Install the casing, without the cover o-ring.
- 5) Check the clearance between the front of the impeller vanes and the corresponding face of the casing with a feeler gauge.
- 6) Compare the clearance value obtained in 5) above with the recommended clearance values shown in Table 1.
- 7) If the clearance is incorrect, the amount of shaft shims (Item 67) must be adjusted to obtain the proper clearance.
- 8) Install the cover o-ring (Item 73), casing (Item 1) and casing hardware (Item 1C, 1D, 1E).



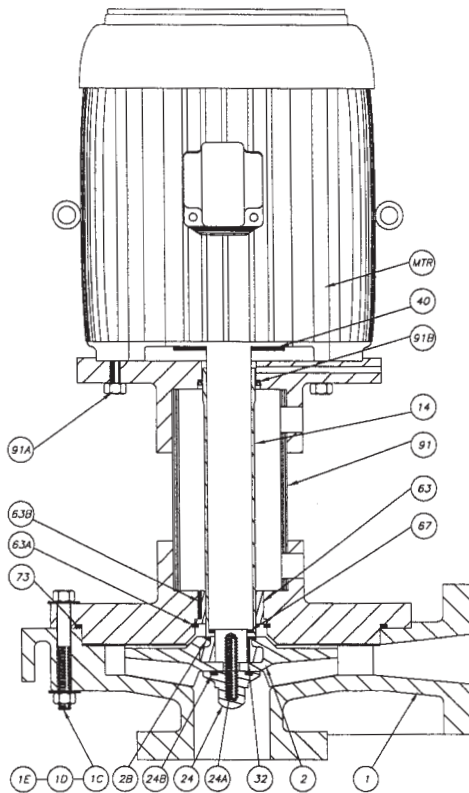
### 7530 SERIES SECTIONAL DRAWING



| part # | description           | Quantity |
|--------|-----------------------|----------|
| 1      | Casing                | 1        |
| 1C     | Nut, Casing           | 8        |
| 1D     | Bolt, Casing          | 8        |
| 1E     | Washer, Casing        | 16       |
| 2      | Impeller              | 1        |
| 2C     | Screw, Impeller       | 1        |
| 2D     | Washer, Impeller      | 1        |
| 2E     | Lock Washer, Impeller | 1        |
| 32     | Key, Impeller         | 1        |
| 40     | Slinger               | 1        |
| 63     | Restriction Bushing   | 1        |
| 63A    | Snap Ring, Bushing    | 1        |
| 63B    | Pin, Bushing          | 1        |
| 67     | Shims                 | *        |
| 73     | O-ring, Cover         | 1        |
| 91     | Column Assembly       | 1        |
| 91A    | Screw, Column-Motor   | 4        |
| 91B    | Vapor Shield          | 1        |
| MTR    | Motor, TCZ Frame      | 1        |

\* As required

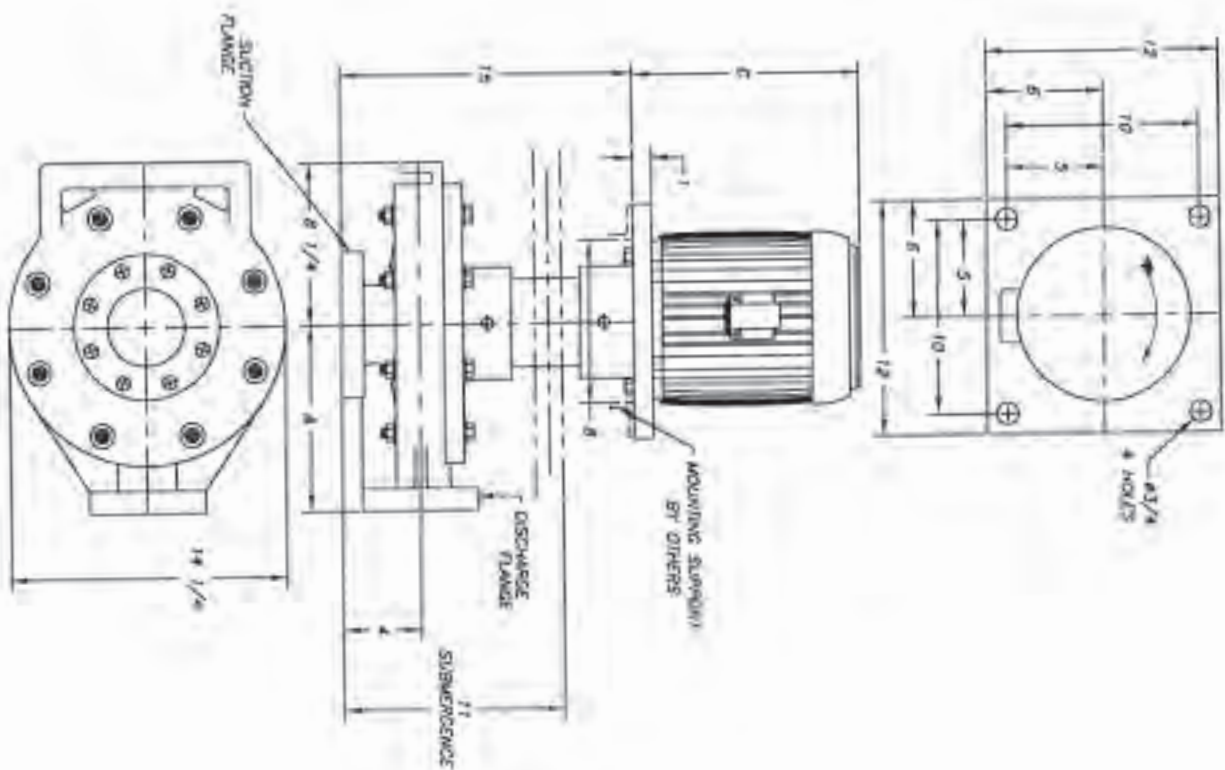
### 7530s SERIES SECTIONAL DRAWING



| part # | description         | Quantity |
|--------|---------------------|----------|
| 1      | Casing              | 1        |
| 1C     | Nut, Casing         | 8        |
| 1D     | Bolt, Casing        | 8        |
| 1E     | Washer, Casing      | 16       |
| 2      | Impeller            | 1        |
| 2B     | O-ring, Impeller    | 1        |
| 14     | Shaft Sleeve        | 1        |
| 24     | Impeller Nut        | 1        |
| 24A    | Stud, Shaft         | 1        |
| 24B    | O-ring Impeller Nut | 1        |
| 32     | Key, Impeller       | 1        |
| 40     | Slinger             | 1        |
| 63     | Restriction Bushing | 1        |
| 63A    | Snap Ring, Bushing  | 1        |
| 63B    | Pin, Bushing        | 1        |
| 67     | Shims               | *        |
| 73     | O-ring, Cover       | 1        |
| 91     | Column Assembly     | 1        |
| 91A    | Screw, Column-Motor | 4        |
| 91B    | Vapor Shield        | 1        |
| MTR    | Motor, TCZ Frame    | 1        |

\* As required

7530 SERIES OUTLINE DRAWING



| motor Frame   | c      |
|---------------|--------|
| 213TCZ/215TCZ | 18 1/4 |
| 254TCZ/256TCZ | 21     |
| 284TCZ/286TCZ | 24 1/4 |

| pump size  | suction | discharge | a     |
|------------|---------|-----------|-------|
| 1 1/2x3x8  | 3       | 1 1/2     | 8 1/2 |
| 2x3x8      | 3       | 2         | 9 1/2 |
| 3x4x8      | 4       | 3         | 11    |
| 1x2x10     | 2       | 1         | 8 1/2 |
| 1 1/2x3x10 | 3       | 1 1/2     | 8 1/2 |

| Flange | O.d.  | thick. | B.c.  | # of Holes | size of Holes |
|--------|-------|--------|-------|------------|---------------|
| 1      | 4 1/4 | 1      | 3 1/8 | 4          | 5/8           |
| 1 1/2  | 5     | 1 1/8  | 3 7/8 | 4          | 5/8           |
| 2      | 6     | 1 1/8  | 4 3/4 | 4          | 3/4           |
| 3      | 7 1/2 | 1 3/16 | 6     | 4          | 3/4           |
| 4      | 9     | 1 1/4  | 7 1/2 | 8          | 3/4           |

NOTES:

- (1) All dimensions in inches.  
Flanges are ASME/ANSI B16.5 Class 150 lb. Flat Face.
- (2) Rotation is clockwise facing motor fan guard.

Warning: **do not Operate Wit HOut LIquid In pump.**  
**do not Operate in reverse rotation.**

## **OPERATIONAL START-UP CHECKLIST**

- Pump mount is level and plumb.
- Mounting bolts are tight.
- Motor mounting bolts tight.
- Suction and discharge connections secure.
- Electrical connections secure and covered.
- Turn motor fan by hand, ensure that it does not bind.
- Jog motor/Check rotation. (Motor Fan)
- Discharge valve is slightly open.
- Ensure that pump is filled with liquid to the proper submergence.
- Start pump and open discharge valve to desired flow rate.
- Check for excessive vibration and motor bearing temperature.

**NOTES**

**NOTES**

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