TC/TS Base Mounted Vertical Split Case Pumps

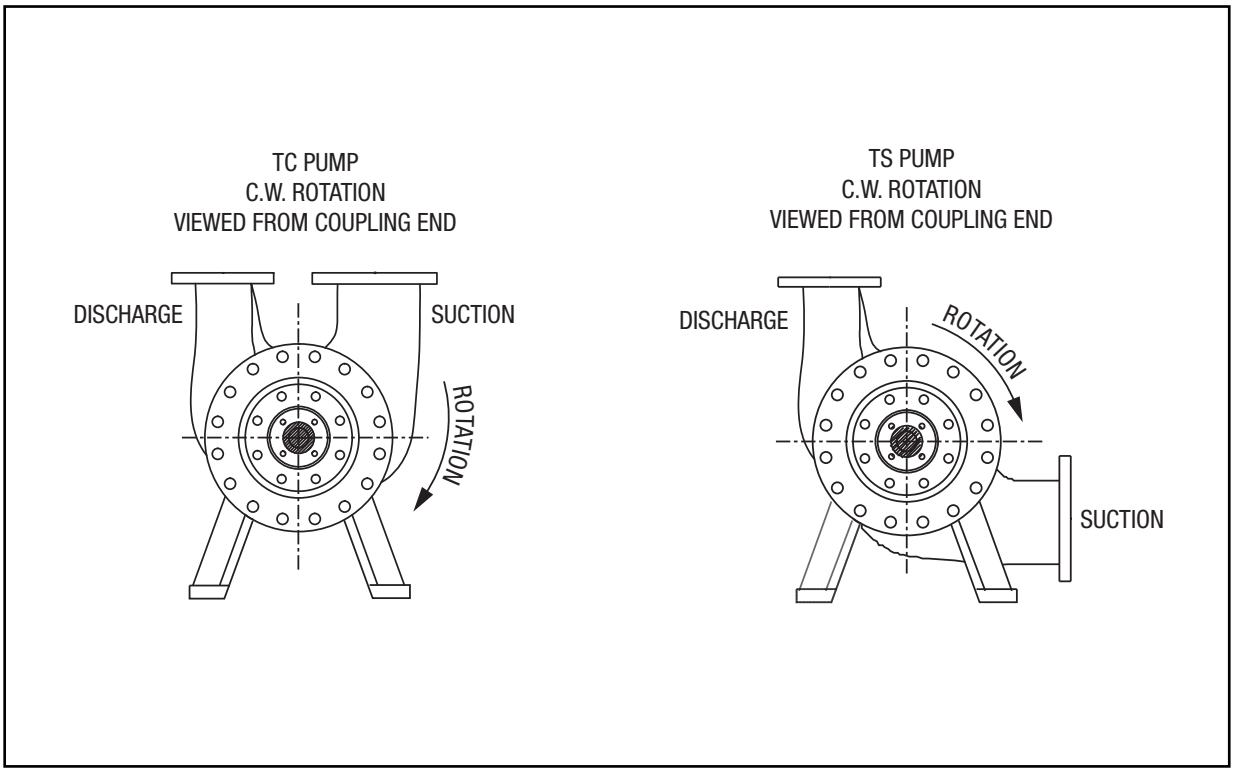
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Instruction and Operating Manual

SUPERSEDES: 06/10/2025

EFFECTIVE: 09/16/2026

Plant ID No. 001-3931



TC & TS Base Mounted Vertical Split Case Pumps

DESCRIPTION

The TC/TS Series centrifugal pumps are frame mounted pumps which feature high efficiency, rugged construction, compact design, foot mounted volute, center drop out coupler and regreasable bearings. These features along with the vertically split case make installation, operation and service easy to perform.

PUMP APPLICATION

The standard TC/TS Series centrifugal pump's bronze fitted construction make it ideal for service with the following liquids: unheated domestic and fresh water; boiler feed water; condensate, hydronic cooling or heating, pressure boosting, general pumping and benign liquids.

For other applications, contact your TACO representative.

INTRODUCTION

The pumps covered by these instructions, when correctly installed and maintained, should operate satisfactorily for a long period of time. These instructions are to be carefully studied and followed at all stages of the pump transportation, installation and operating life.

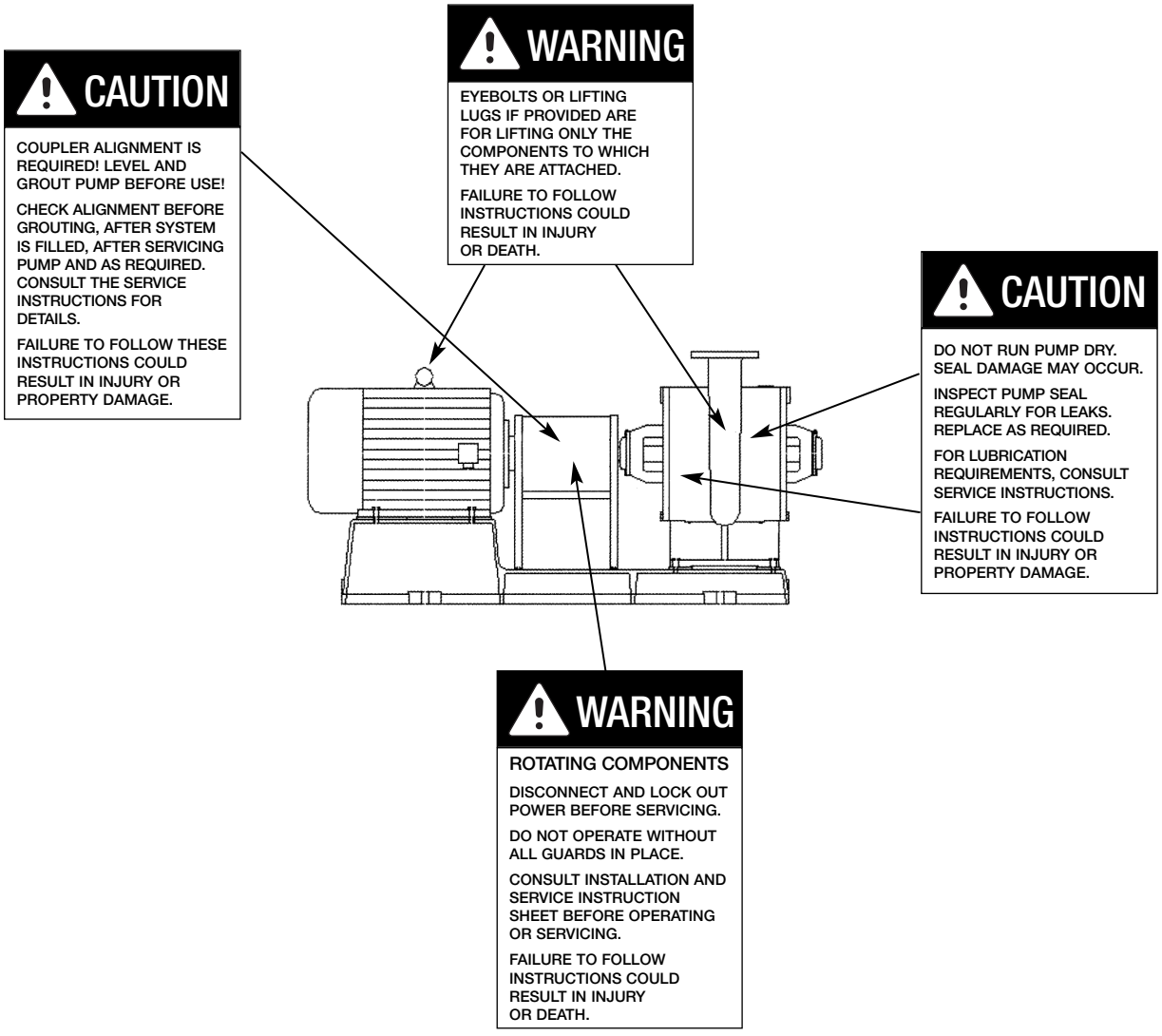
PUMP IDENTIFICATION

All pumps are designated by model number, size and type. This information is stamped on an identification plate which is mounted on the pump. Refer to pump identification in the specific instruction section of this manual for detailed information.

SAFETY INSTRUCTION

This safety alert symbol will be used in this manual and on the pump safety instruction decal to draw attention to safety related instructions. When used, the safety alert symbol means: **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.**

Your TC/TS Series pump should have the following safety instruction decals located approximately as shown. If the decals are missing or illegible, contact your local TACO representative for a replacement.



TRANSPORTATION

1. **Transport Safety**

   Lay the motor and pump horizontally to prevent damage during shipment.

2. **Lifting**

   The pumps and motor should be lifted carefully. The eye bolt on the motor is just for lifting the motor. The two lugs on the pump set are just for the bare shaft pump. The sling load should be according to the illustration below (Figure 1).

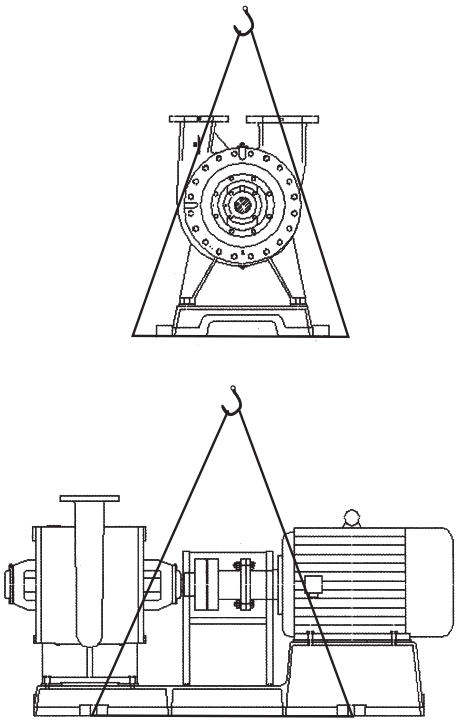


Figure 1

INSTALLATION

1. **Receiving Pump**

   Upon receipt of the pump, a visual check should be made to determine if any damage has been incurred during transit or handling. The main items to look for are:

   (a) Broken or cracked equipment, including base, motor or pump feet and flanges.

   (b) Bent shaft.

   (c) Broken motor end bells or damaged boxes on motor.

   (d) Missing parts.

   Parts or accessories are sometimes wrapped individually or fastened to the equipment. If any damage or losses have been incurred, promptly notify your TACO representative and the transit company that delivered the pump.

   When unloading pump units, lift equally at four or more points on the baseplate. **DO NOT LIFT ON THE DRIVER OR PUMP.**

   Shafts are in alignment when units are shipped. However, due to shipping, the pumps may arrive misaligned and therefore, alignment must be re-established during installation.

2. **Temporary Storage**

   If the pump is not to be installed and operated soon after arrival, store it in a clean, dry place having slow, moder-ate changes in ambient temperature. Steps should be taken to protect the pump from moisture, dust, dirt and foreign bodies. It is recommended that the following procedure is taken:

   (a) Ensure that the bearings are packed with the rec-ommended grease to prevent moisture from entering around the shaft. Rotate the shaft periodically (once per week) plus 1/4 turn

   (b) Ensure that suction and discharge branches of the pump and all other openings are covered with card-board, wood or masking tape to prevent foreign objects from entering the pump.

   (c) If the pump is to be stored where there is no pro-tective covering, it is advisable to cover the unit with a tarpaulin or other suitable covering.

3. **Preparation**

   Before installing the pump, clean the suction and dis-charge flange thoroughly. Remove the protective coat-ing from the pump shaft.

4. **Location**

   The pump should be installed as near the liquid source as possible with the shortest and most direct suction pipe practical.

   The pump should be installed with sufficient accessibility for inspection and maintenance. Ample space and headroom should be allowed for the use of an overhead crane or hoist sufficiently strong to lift the unit.

   Make sure there is a suitable power source available for the pump driver. If motor driven, electrical charac-teristics should be identical to those shown on the motor data plate.

5. **Foundation (see Figure 2)**

   The foundation should be sufficiently substantial to reduce vibrations and rigid enough to avoid twisting or misalignment.

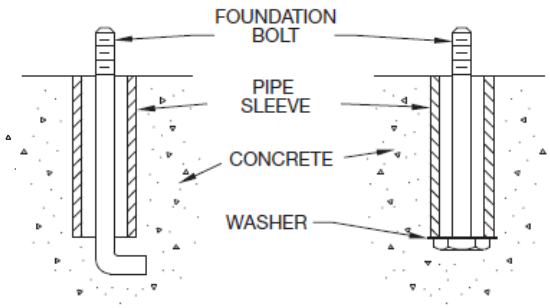


Figure 2

The foundation should be poured without interruptions to within ½ to 1½ inches of the finished height. The top surface of the foundation should be well scored and

grooved before the concrete sets. This provides a bonding surface for the grout. Foundation bolts should be set in concrete. Allow enough bolt length for grout, shims, lower baseplate flange, nuts and washers. The foundation should be allowed to cure for several days before the baseplate is shimmed and grouted.

6. **Baseplate Setting (see Figure 3)**

Use blocks and shims under base for support at foundation bolts and midway between bolts to position base approximately 1 inch above the concrete foundation with the studs extending through holes in the baseplate.

By adding or removing shims under the base, level the pump shaft and flanges. The baseplate does not have to be level.

Draw foundation bolt nuts tight against baseplate and observe pump and motor shafts or coupling hubs for alignment.

Check to make sure the piping can be aligned to the pump flanges without placing pipe strain on either flange.

Grout baseplate in completely and allow grout to dry thoroughly before attaching piping to pump (24 hours is sufficient time with approved grouting procedure).

7. **Grouting Procedure (see Figure 3)**

Grout compensates for uneven foundation, distributes weight of unit and prevents shifting. After setting and levelling unit, use an approved, non-shrinking grout as follows:

(a) Build strong form around foundation to contain grout.

(b) Soak top of concrete foundation thoroughly, then remove surface water.

(c) Baseplate should be completely filled with grout and, if necessary, drill vent holes to remove trapped air.

(d) After the grout has thoroughly hardened, check the foundation bolts and tighten if necessary.

(e) Check the alignment after the foundation bolts are tightened.

(f) Approximately 14 days after the grout has been poured or when the grout has thoroughly dried, apply an oil base paint to the exposed edges of the grout to prevent air and moisture from coming in contact with the grout.

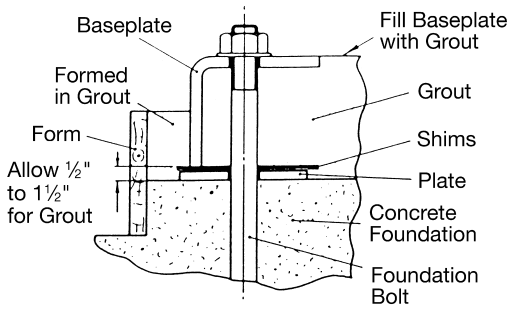


Figure 3

8. **Alignment Procedure (see Figure 4)**

The pump driver, if supplied, is correctly aligned on its baseplate at the factory. A certain amount of deformation of the baseplate is possible during transit and it is therefore essential to check alignment prior to final grouting.

A flexible coupling will only compensate for a small amount of misalignment and should not be used to compensate for excessive misalignment of the pump and driver shafts. Inaccurate alignment results in vibration and excessive wear on the bearings, sleeve or shaft and wear rings.

There are two forms of misalignment:

(a) Angular – shafts with concentric axes but not parallel.

(b) Parallel – shafts with axes parallel but not concentric.

To check for angular alignment, insert a pair of inside calipers or taper gauge at four points at 90 degree intervals around the coupling. Angular alignment is achieved when the measurements show that all points around the coupling faces are within 0.050 inches of each other.

To check for parallel alignment, place a straight edge across both coupling rims at the bottom and at both sides. Parallel alignment is achieved when the straight edge rests evenly on the coupling rim at all positions.

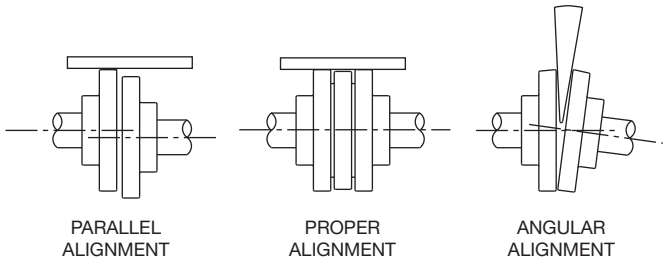


Figure 4

Alignment adjustments can be made by shimming under the driver mounting feet. After each adjustment, it is necessary to recheck all features of alignment.

Alignment should be performed after the baseplate has been properly set and grout has dried thoroughly according to instructions. Final alignment should be made by shimming driver only. Alignment should be made at operating temperatures.

After final alignment, it is recommended to dowel pump and driver feet to the baseplate. Drill and ream diagonal feet of both for dowels.

9. **Suction and Discharge Piping**

When installing the pump piping, make sure to observe the following precautions:

Piping should always be run to the pump. Do not move pump to pipe. This could make final alignment impossible.

Both suction and discharge piping should be supported independently and close to pump so that no strain is transmitted to the pump when the flange bolts are tightened. Use pipe hangers or other supports at necessary

intervals to provide support. When expansion joints are used in the piping system, they must be installed beyond the piping supports closest to the pump.

It is advisable to increase the size of both suction and discharge pipes at the pump connection to decrease the loss of head from friction.

It is not recommended running the suction line parallel with the pump shaft with an elbow or suction diffuser leading directly to the pump. Install piping as straight as possible, avoiding unnecessary bends. Where necessary, use 45 degree fittings or a TACO suction diffuser at right angles to the pump shaft.

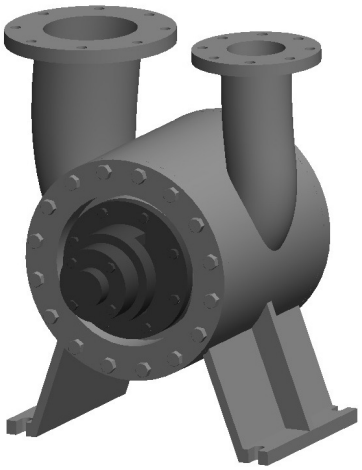
Make sure that all piping joints are air tight. Provide pipe expansions when hot fluids are to be pumped. Where reducers are used, eccentric reducers are to be fitted in suction lines and straight taper reducers in discharge and vertical lines. Undulations in the pipe runs are also to be avoided. This or misuse of reducers may cause the formation of air pockets in the pipe thus preventing the correct operation of the pump.

The suction pipe should be as short and direct as possible. Where suction lift is not very high, it is advisable to use a foot valve. The horizontal suction line must have a gradual rise to the pump.

The discharge pipe is usually preceded by a non-return valve or check valve and a discharge gate valve. The check valve is to protect the pump from excessive back pressure and reverse rotation of the unit and to prevent back flow into the pump in case of stoppage or failure of the driver. The discharge gate valve is used in priming, starting and when shutting down the pump.

CAUTION

Insulating around bearing housings and seal covers can lead to trapped fluid and accelerated wear. To ensure proper function, and avoid premature failure, avoid placing insulation around the highlighted area in the figure below



OPERATION

1. **Before Starting**

   Before initial starting of the pump, make the following inspection:

   (a) The unit baseplate is grouted and bolted to the foundation.

   (b) Alignment between pump and motor.

   (c) Motor is correctly wired to starting device. Check voltage, phase and frequency on motor nameplate with line circuit.

   Ensure correct direction of rotation prior to coupling to pump. Check by starting motor and switching off immediately. Observe that rotation is the same as the arrow direction on the pump casing.

   (d) Bearing lubrication is provided (see lubrication section). Also check driver lubrication.

   (e) Check if correct mechanical seal has been fitted or stuffing box has been packed to match temperature limitations of materials.

   (f) All rotating parts are found to be free when turned by hand.

   (g) Pump is primed. Never run the unit dry. The liquid in the pump serves as a lubricant for close running fits within the pump. The pump may be damaged if operated dry. The pump may be primed by using an ejector, exhaustless or vacuum pump. If a foot valve is used in the suction line, the pump may be primed by venting and filling the casing with liquid.

2. **Starting**

   Close drain valves and valve in discharge line.

   Open fully all valves in the suction line.

   Prime the pump.

   Open the air valve on top of pump casing. Close when all air has been removed.

   Start the pump driver.

   When the pump is operating at full speed, open the discharge valve slowly. Do not operate pump for prolonged periods with closed discharge valve so as to avoid overheating.

   The pump should be shut down at once and the trouble corrected if the pump is running at its rated speed and found to have any of the following problems:

   (a) No liquid delivered.

   (b) Not enough liquid delivered.

   (c) Not enough pressure.

   (d) Loss of liquid after starting.

   (e) Excess vibration.

   (f) Motor runs hot.

   (g) Pump bearing overheating.

3. **Running**

   While the pump is running, a periodic inspection should be made of:

   (a) Bearings. Check the bearings for temperature, which should not exceed pumped liquid temperature or 200°F, whichever is the lower.

   (b) With mechanical seal fitted pumps, check that there is no leakage from the stuffing box.

   (c) Suction and discharge gauge readings (if fitted).

4. **Stopping**

(a) Slowly close delivery valve and shut down driving unit in accordance with manufacturer's instructions.

(b) Successful operation of the pump depends on accurate alignment. It is recommended to recheck the alignment after preliminary run.

MAINTENANCE

1. **Disassembly**

(a) Shut down the pump driver.

(b) Close the suction and discharge valves.

(c) Open the drain valves and casing vents.

(d) Remove the coupling guard.

(e) Remove the coupling elements between the pump and driver.

(f) Remove the capscrews on the bearing cap and remove the bearing cap.

(g) Remove the locknut.

(h) Remove the capscrews on the bearing housing.

(i) Remove the bearing housing using jacking screws.

(j) Remove the spacer on the shaft.

(k) Remove the capscrews on the mechanical seal cover and remove the mechanical seal cover with stationary seal seat.

(l) Remove the 0-ring.

(m) Remove the mechanical seal.

(n) Remove the capscrews on the cover plate.

(o) Remove the cover plate using jacking screws.

(p) Remove the shaft sleeve.

(q) Repeat steps (f) through (p) to remove the other side.

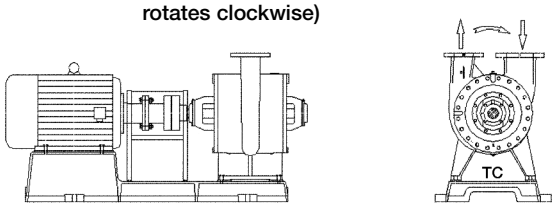
2. **Reassembly**

Reassembly is the reverse order of above.

The rotation of impeller should be according to the following drawing (see Figures 5 and 6).

TC/TS PUMP ROTATION

Clockwise (CW) - (viewed from motor end, the pump rotates clockwise)



Counter-Clockwise (CCW) - (viewed from motor end, the pump rotates counter-clockwise)

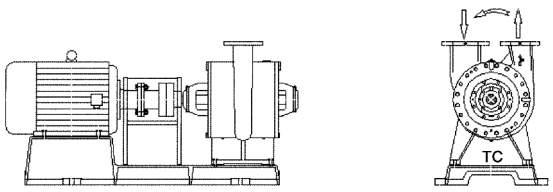


Figure 5

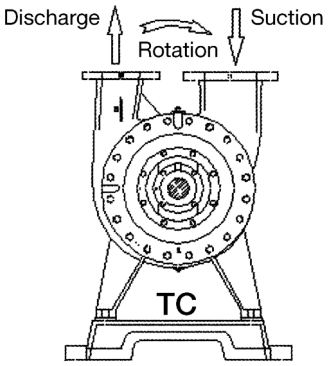


Figure 6

O-rings and other seal parts should be replaced. Seal chamber should be cleaned out.

Do not reuse the bearing. Use new bearing only.

Heat up the bearing. Do not exceed 120.8°C.

3. **Mechanical Seal Change and Installation** Dismantle (refer to Maintenance sections 1(a) to 1(p). Make sure all the parts are clean before installation. Pressure must be equal when inserting the static ring. The seal surfaces must be untouched at all times. Change all the O-rings.

4. **Fasten All Parts, Lock all Nut Parts**

Refer to the table below to fasten the casing, pump cover and flange nuts:

Nut Standard	M16	M20	M24	M27	M30
Spanner Moment	360 Nm	430 Nm	530 Nm	645 Nm	710 Nm

5. **Maintenance and Check Period**

MAINTENANCE PERIOD	MAINTENANCE TASK
DAILY	For leakage of the seals.
WEEKLY	Check the running condition (pressure, temperature of the shaft, vibration and noise).
MONTHLY	Check alignment of the coupling. If necessary, start the standby pump for 5 minutes.
Every 80000 Hrs. or 4 years	Capital repair. Disassembly. Check, change damaged and worn parts.

6. **Lubrication**

CAUTION: To avoid damage to bearings, grease must be kept free of dirt.

WARNING: Taco TC/TS pumps have been lubricated with a Lithium Complex grease and the greases listed are to be used. If you wish to change to Polyrex (Poly Urea) grease used in the motors you will have to clean out the

TC/TS Pump Bearing Sizes	
Pump	**Bearing**
050308, 10, 14	6308
060410, 16	
060412	6310
080510, 12, 15, 20	
080612, 14	
080618, 22	6312
080613, 16	
100821, 121014	6314
121018	6316
141213	6314
161217, 161415	6316

bearing cap and bearings before recharging with the Polyrex grease.

Re-lubrication Procedure: Be sure that the grease you are adding to the pump bearings is compatible with the grease already in the bearings. Remove the bearing covers and clean out old grease and re-lubricate the bearings and add required grease per table above. Do not overgrease. The amount of grease dispensed per stroke of the grease gun can be measured with a teaspoon. The teaspoon volume per bearing size can be found in the following table and the strokes to teaspoon calculation can be applied.

CAUTION: Do not overlubricate the bearings as this may cause premature bearing failure. Overlubrication can cause excessive bearing temperatures, premature bearing breakdown and bearing failure.

1. With pump stopped, clean all grease fittings with a clean cloth.

2. Add the recommended amount of grease.

Bearing Sizes and Types (These are the "Large" bearings (shaft end) in each frame size)				
Bearing	Weight of Grease to Add *		Volume of Grease to be Added	
	ounce	grams	in^3	tspn
6308	0.47	12.5	0.7	2.5
6310	0.61	17.0	1.2	3.9
6312	0.76	20.1	1.2	4.0
6314	0.81	23.0	1.5	5.2
6316	1.25	33.0	2.0	6.6
6318	2.12	60.0	4.1	13.4

Relubrication Intervals: It is recommended to check the condition of the grease every 2,000 hours of runtime.

Refer to additional information in the following tables.

Service Conditions			
Severity of Service	Hours per Day of Operation	Ambient Temperature Maximum	Atmospheric Contamination
Standard	8	40°C	Clean, little corrosion
Severe	16 Plus	50°C	Moderate dirt, corrosion
Extreme	16 Plus	> 50°C * or Class H Insulation	Severe dirt, abrasive dust, corrosion, heavy shock or vibration
Low Temperature		< -29°C **	

* Special high temperature grease is recommended (Dow Corning DC44). Note that Dow Corning DC44 grease does not mix with other grease types. Thoroughly clean bearing and cavity before adding grease.

** Special low temperature grease is recommended (Aeroshell 7).

NOTE: Use a good quality #3 or #2 Lithium based grease.

Recommended Greases	
Make	Grade
Exxon	Unirex N2
Valvoline	Valplex EP
Mobil	Mobilith AW2
Esso	Temperex N2

Note above warning if other type grease has been used.

7. Spares

Please provide the following information if you have any questions when you purchase spares:

Factory Number: _____

Pump Type: _____

The information on the label.

If ordering spare parts, please provide the following information:

Part Number: _____

Part Name: _____

See the following table for recommended spare quantities:

SUGGESTED PARTS/QUANTITIES

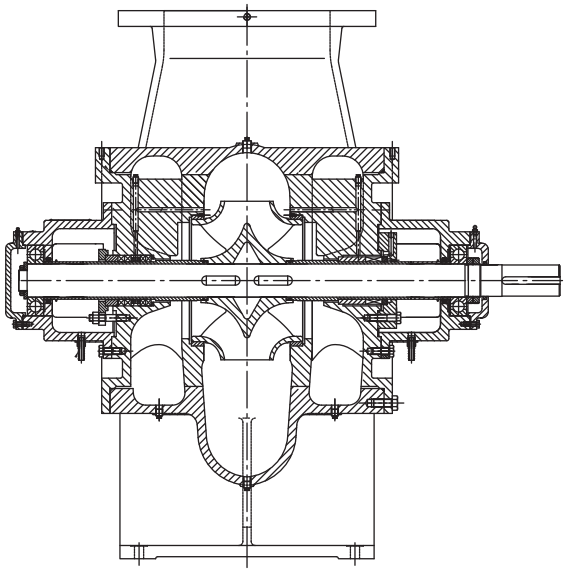
NUMBER OF PUMPS (include emergency pump)	2	3	4	5	6	8	≥10
Impeller	1	1	1	2	2	3	30%
Seal Ring for Pump	4	4	4	6	6	8	50%
Axis, Key and Axis Nuts	1	1	2	2	2	3	30%
Bearing	1	1	2	2	3	4	50%
Packing Shaft Sleeve	2	2	2	3	3	4	50%
Seal Axis Sleeve A	2	2	2	3	3	4	50%
Seal Axis Sleeve B	1	1	2	2	3	4	50%
Packing Bushing	1	1	2	2	2	3	30%
Packing	16	16	24	24	24	32	40%
Gasket for all set	4	6	8	8	9	12	150%
Mechanical Seal	2	3	4	4	4	6	90%

MATERIALS OF CONSTRUCTION

Item	All Iron	
	Standard	Optional
Casing	Cast Iron ASTM A48 Class 30A	N/A
Impeller	Stainless Steel AISI 304	Stainless Steel AISI 304
Wear Ring	Stainless Steel AISI 420	Stainless Steel AISI 420
Shaft	Carbon Steel AISI 1045	Stainless Steel AISI 420
Shaft Sleeve	Stainless Steel AISI 420	N/A
Mechanical Seal	Carbon/ Silicon Carbide Viton	N/A
Seal Flush Line	N/A	N/A

CF - Consult Factory N/A - Not Available

SECTIONAL ARRANGEMENT



LIMITED WARRANTY STATEMENT

Taco, Inc. will repair or replace without charge (at the company's option) any commercial pump product or part which is proven defective under normal use within one (1) year from the date of start-up or one (1) year and six (6) months from date of shipment (whichever occurs first).

Motors provided on commercial pumps are not covered by this warranty, and are warranted by the motor manufacturer. For complete details on motor warranty returns, the purchaser should contact the motor manufacturer's local service repair center or contact the motor manufacturer directly.

Seals provided on commercial pumps are not covered by this warranty.

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local Taco stocking distributor or Taco in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local Taco stocking distributor or Taco. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any Taco product or part not installed or operated in conformity with Taco instructions or which has been subject to misuse, misapplication, the addition of petroleum-based fluids or certain chemical additives to the systems, or other abuse, will not be covered by this warranty.

If in doubt as to whether a particular substance is suitable for use with a Taco product or part, or for any application restrictions, consult the applicable Taco instruction sheets or contact Taco at [401-942-8000].

Taco reserves the right to provide replacement products and parts which are substantially similar in design and functionally equivalent to the defective product or part. Taco reserves the right to make changes in details of design, construction, or arrangement of materials of its products without notification.

TACO OFFERS THIS WARRANTY IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY WARRANTY IMPLIED BY LAW INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS IS IN EFFECT ONLY FOR THE DURATION OF THE EXPRESS WARRANTY SET FORTH IN THE FIRST PARAGRAPH ABOVE.

THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR STATUTORY, OR ANY OTHER WARRANTY OBLIGATION ON THE PART OF TACO.

TACO WILL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS OR ANY INCIDENTAL COSTS OF REMOVING OR REPLACING DEFECTIVE PRODUCTS.

This warranty gives the purchaser specific rights, and the purchaser may have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts or on the exclusion of incidental or consequential damages, so these limitations or exclusions may not apply to you.

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