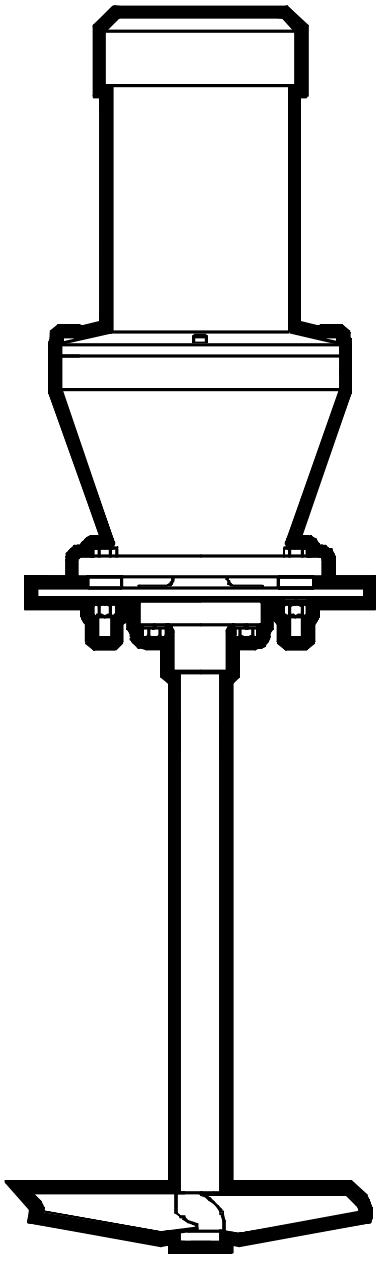
Chemineer

Manual 261

DT Small Mixers Installation, Operation, Maintenance Manual

Equipment Reference:
50DTC Style Mixer
50DTD Style Mixer



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INITIAL INSPECTION

Step 1: Inspect crates. Upon receipt, inspect all crates and equipment for shipping damage. Report shipping damage to your local Chemineer office or to the factory in Dayton, Ohio. A claim should be filed immediately with the carrier involved.

Step 2: Uncrate. Check the contents. Do not uncrate the unit until you have read the ***Mounting & Installation*** section of this manual and looked at the assembly drawing shipped with the unit. Be careful in uncrating and handling. Do not discard the crating without making sure that all mixer parts have been removed. Correct assembly of this unit requires referring to both the unit assembly drawing and this manual.

Step 3: Questions? Call Chemineer. If the shipment is not complete or you do not understand what you have received, please contact *your local Chemineer office* immediately.

CHEMINEER ASSISTANCE

Chemineer maintains a fully staffed Parts and Field Service Department ready to help you with any service requirement. Simply contact your local Chemineer office, or contact Parts/Field Service at the Chemineer Factory in Dayton, Ohio:

Chemineer, Inc.
P.O. Box 1123
Dayton, Ohio 45401
Phone: (937) 454-3200
FAX: (937) 454-3375

Services available are as follows:

Installation and maintenance training seminars,
Installation and start-up supervision,
Preventative maintenance planning,
Parts order service,
Special instructions.

STORAGE

Do not remove any protective packaging, coatings (generally applied to the motor output shaft), or any protective coverings that may be applied to the wetted parts until the mixer is to be put into service. If the equipment is to be stored, *do not stack crates*. Store in a clean dry indoor location that is free from wide variations in temperature. The storage area should be free from vibration and excessive heat.

Inspect for external rust at six-month intervals. Apply rust preventative as required. If the unit has been in storage for more than six months or subjected to adverse moisture conditions, the motor windings may have to be dried prior to operation.

CAUTION! Coated/rubber covered agitator parts require special handling to avoid damage to coatings/rubber coverings. Do not use chains or hooks on coated/covered surfaces. Special care is required to prevent damage to edges and outside corners. Contact Chemineer Field Service for instructions.

Short-Term Indoor Storage

Mixers should be stored indoors in areas with no vibration and relatively constant temperatures and humidity. The factory storage preparations should be acceptable for up to six months storage.

Rotate the drive coupling 10 to 15 revolutions at least once per month to reduce the possibility of brinelling of the bearings and to redistribute bearing grease.

50DTC – CLAMP/CUP PLATE MOUNT MIXER INSTALLATION

Correct unit installation requires both the unit assembly drawing and this manual.

The 50DTC is a gear reduced, clamp or cup plate mount, heavy duty mixer. The drive unit is typically shipped with the motor **[100]** and standard c-clamp **[150]** (or optional cup plate **[159]**) mounted to the cast aluminum housing **[201-04]**. Extension shaft attachment may be via either a plated chuck drive shaft **[249]** coupling or a flanged drive shaft **[251]** coupling, with bearing support that extends from the housing. The removable extension shaft coupling (if applicable) **[300]**, impellers **[500]** and all accessories are shipped in the main unit box. Shafting **[400]** is shipped separately.

Be certain to locate all contents before discarding packaging materials.

1. Remove all shipping constraints. A nylon strap, or similar, should be secured around the mixer housing **[201-04]** to lift and move the mixer. Please note the approximate net weight of the unit as shown on the assembly drawing and use caution when moving or lifting these items. *At no point during installation or maintenance of the mixer, should the extension shaft ever be used as a lifting point!*

   WARNING: DO NOT connect the mixer to the power source until the unit is fully assembled and properly positioned in the vessel.

2. Install the mixer drive assembly on the tank edge or other suitable support by means of the c-clamp **[150]** or cup plate **[159]** mounting. Support structure must be rigid enough to prevent deflection and vibration and clean from debris.

   The mixer should never be mounted with the shaft and impeller(s) installed.

3. Clamp mounted units should be set squarely on the mounting surface with the actual clamped surfaces contacting as much as possible.

4. The unit is shipped with the clamp **[150]** or cup plate **[159]** bolted to the housing. This connection is generally "loosely" bolted and will require tightening in the following installation order:

   a. For clamp **[150]** mounted units, lubricate the clamp bolt **[151]** and initially torque to 18 ft-lb (24.4 Nm). The clamp bolt should be tight enough to keep the unit located on the tank. For cup plate **[159]** mounted units, attach plate to mounting surface.

   b. After orientation of mixer is determined (reference *Figure 1, page 5*), torque hex nut **[155]** in the socket area to 50 ft-lb (67.8 Nm).

   c. For clamp mounted units, final torque the clamp bolt **[151]** to 36 ft-lb (48.8 Nm).

50DTC – CLAMP/CUP PLATE MOUNT MIXER INSTALLATION

5. For units with a chuck drive shaft, assemble the extension shaft **[400]** to the drive housing assembly **[200]** by inserting the shaft end with the machined recess and "flats" into the chuck coupling **[249]** until the shaft bottoms out, approximately 5" (127mm). Orient the shaft to allow the chuck coupling setscrews **[250]** (two at 90^{o}) to engage the "flats". Tighten chuck setscrews **[250]** with a 3/16" hex key wrench.

   For units with a flanged drive shaft, clean the extension shaft **[400]** turndown diameter and the removable shaft coupling **[301-02]** bore. Make sure both surfaces are completely dry and free from any burrs or nicks. Install the shaft key **[307-02]** into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft end bolt, lockwasher and flatwasher **[304, 305, 306]** and torque to the value shown in *Table 3, page 17*. Engage the two coupling setscrews **[308]** onto the shaft key **[307-02]**. Install two coupling bolts and lockwashers **[302, 303]** at 180^{o}. Tighten the bolts to engage the tenon and pull the removable coupling **[301-02]** and flanged drive shaft **[251]** coupling faces together. Install and tighten the remaining coupling bolts and lockwashers. Torque bolts to the value shown in *Table 3*.

6. For single impeller assemblies, install the impeller with the lower hub face even with the shaft end. Impeller orientation should allow the driving edge of the impeller to pump toward the bottom of the mixing vessel. Tighten the impeller setscrews (typically quantity two).

   For dual impeller assemblies, space the upper impeller at a recommended minimum of two impeller diameters and maximum of three impeller diameters above the lower impeller. The lower impeller should be a minimum of one impeller diameter below the liquid surface at all times during mixer operation.

50DTC – CLAMP/CUP PLATE MOUNT MIXER INSTALLATION

7. In operation, some adjustments of position may be required to obtain best mixing results. Adjust orientation of mixer as shown in *Figure 1, below* for best top to bottom flow and optimum mixing efficiency. Both the clamp and cup plate mount assemblies provide for 3-dimensional adjustment

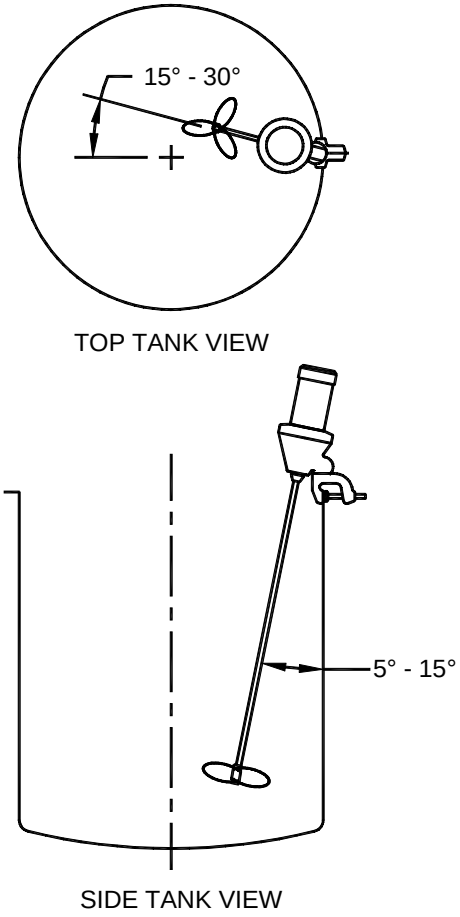


Figure 1: Model 50DTC, Installation

50DTC – CLAMP/CUP PLATE MOUNT MIXER INSTALLATION

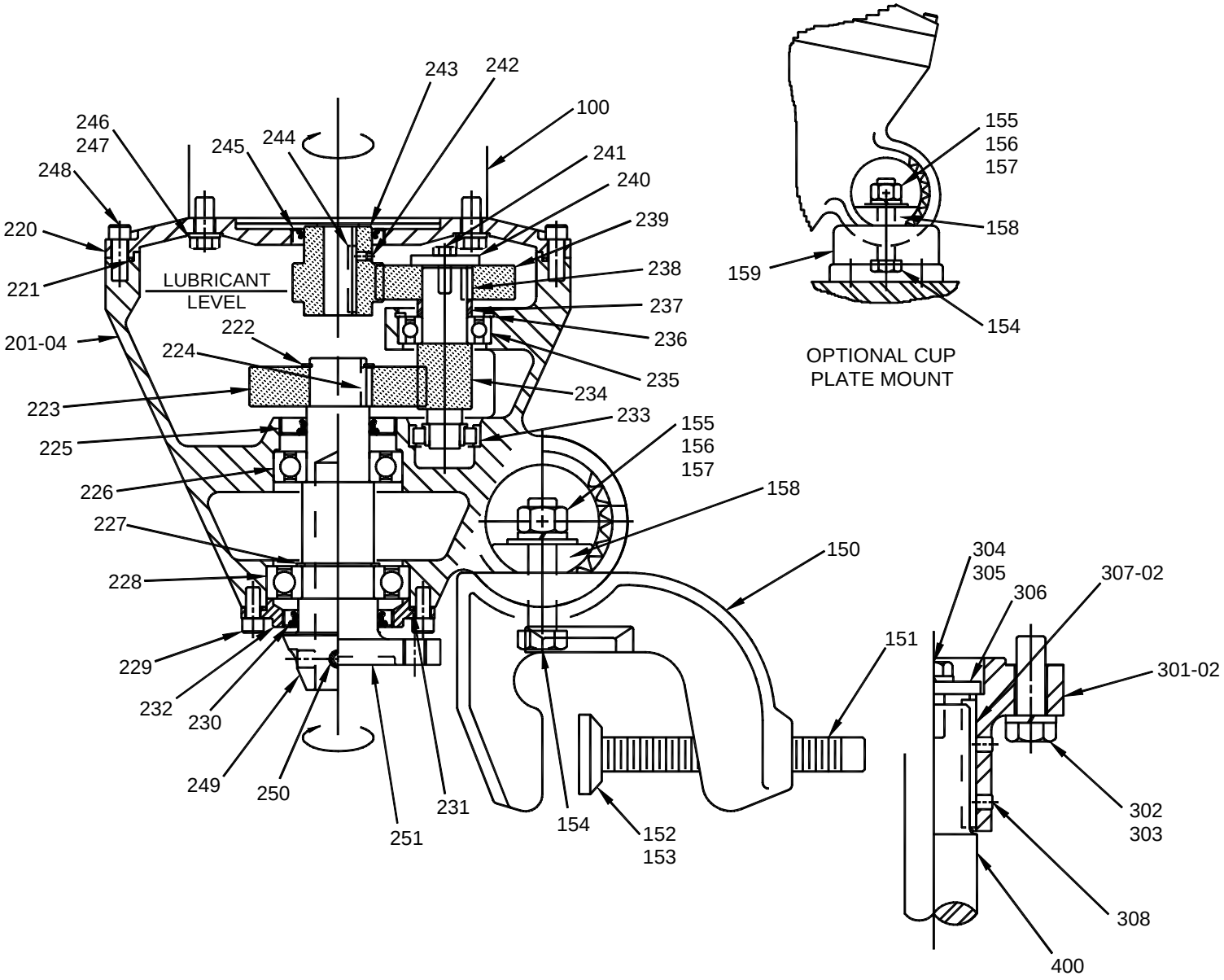


Figure 2: Model 50DTC

50DTD – OPEN TANK MIXER INSTALLATION

Refer to the mixer assembly drawing for the required support structure design loads.

In designing the structure to accommodate bending moment, the structure should be sufficiently rigid so that the mixer extension shaft will not move more than 1/64 inch (.4mm) per foot of length due to deflection of the mounting system.

The agitator support in open tanks is typically constructed of two steel beams with lateral bracing. See *Table 1, below* for beam size.

TABLE 1: RECOMMENDED BEAM SIZES

	TANK DIAMETER, FT (M)												
MODEL	**2 (.61)**	**2.5 (0.76)**	**3 (0.91)**	**4 (1.22)**	**5 (1.52)**	**6 (1.83)**	**7 (2.13)**	**8 (2.44)**	**9 (2.74)**	**10 (3.05)**	**12 (3.66)**	**14 (4.27)**	**16 (4.88)**
50DTD	C3x4.1	C3x4.1	C3x4.1	C3x4.1	C3x4.1	C3x4.1	C4x5.4	C4x5.4	C4x5.4	C4x5.4	C4x5.4	C4x5.4	C6x8.2

Diagonal bracing (45 degree) should be used between the span beams. The ends of the span beams should be boxed in. Both lateral bracing and diagonal bracing to be identical to span beams.

Model 50DTD units are supplied with a flat plate assembly and rubber vibration isolators as standard. Refer to *Figure 3, page 8* for mounting dimensions.

50DTD – OPEN TANK MIXER INSTALLATION

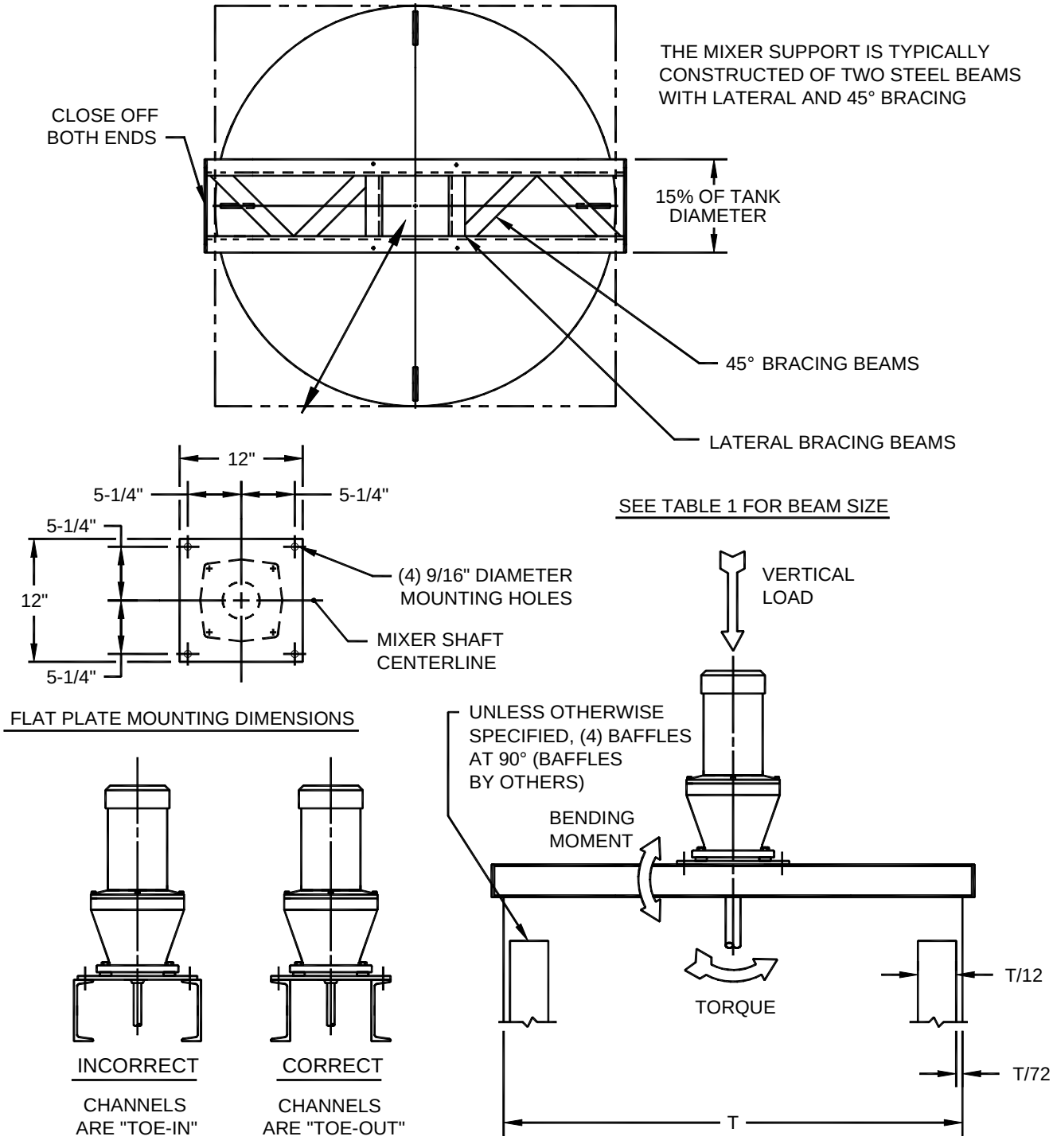


Figure 3: Model 50DTD, Installation

50DTD – OPEN TANK MIXER INSTALLATION

Correct unit installation requires both the unit assembly drawing and this manual.

The model 50DTD is a gear reduced, heavy duty, beam mount mixer. The drive unit is typically shipped with the motor **[100]** mounted to the cast aluminum housing **[201-05]**. Extension shaft attachment may be via either a plated chuck drive shaft **[249]** coupling or a flanged drive shaft **[251]** coupling, with bearing support that extends from the housing. Also in the main unit box may be separate cartons for the flat plate mounting assembly **[160]**, angle risers (if applicable) **[800]**, removable extension shaft coupling (if applicable) **[300]**, impellers **[500]** and all other required accessories. Shafting **[400]** is shipped separately.

Be certain to locate all contents before discarding packaging materials.

1. Remove all shipping constraints. A nylon strap, or similar, should be secured around the mixer housing **[201-05]** to lift and move the mixer. Please note the approximate net weight of the unit as shown on the assembly drawing and use caution when moving or lifting these items. *At no point during installation or maintenance of the mixer, should the extension shaft ever be used as a lifting point!*

   WARNING: DO NOT connect the mixer to the power source until the unit is fully assembled and properly positioned in the vessel.

2. Remove the flat plate assembly **[160]** components from the shipping carton and assemble to drive housing **[201-05]** as shown in *Figure 4, page 11*. Mount drive to support structure using customer supplied fastener set (1/2" bolts).

   The mixer should never be mounted with the shaft and impeller(s) installed.

3. For units with a chuck drive shaft, assemble the extension shaft **[400]** to the drive housing assembly **[200]** by inserting the shaft end with the machined recess and "flats" into the chuck coupling **[249]** until the shaft bottoms out, approximately 5" (127mm). Orient the shaft to allow the chuck coupling setscrews **[250]** (two at 90^{o}) to engage the "flats". Tighten chuck setscrews **[250]** with a 3/16" hex key wrench.

4. For units with a flanged drive shaft, clean the extension shaft **[400]** turndown diameter and the removable shaft coupling **[301-02]** bore. Make sure both surfaces are completely dry and free from any burrs or nicks. Install the shaft key **[307-02]** into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft end bolt, lockwasher and flatwasher **[304, 305, 306]** and torque to the value shown in *Table 3, page 17*. Engage the two coupling setscrews **[308]** onto the shaft key **[307-02]**. Install two coupling bolts and lockwashers **[302, 303]** at 180^{o}. Tighten the bolts to engage the tenon and pull the removable coupling **[301-02]** and flanged drive shaft **[251]** coupling faces together. Install and tighten the remaining coupling bolts and lockwashers. Torque bolts to the value shown in *Table 3*.

50DTD – OPEN TANK MIXER INSTALLATION

5. For single impeller assemblies, install the impeller with the lower hub face even with the shaft end. Impeller orientation should allow the driving edge of the impeller to pump toward the bottom of the mixing vessel. Tighten the impeller setscrews (typically quantity two).

   For dual impeller assemblies, space the upper impeller at a recommended minimum of two impeller diameters and maximum of three impeller diameters above the lower impeller. The lower impeller should be a minimum of one impeller diameter below the liquid surface at all times during mixer operation.

50DTD – OPEN TANK MIXER INSTALLATION

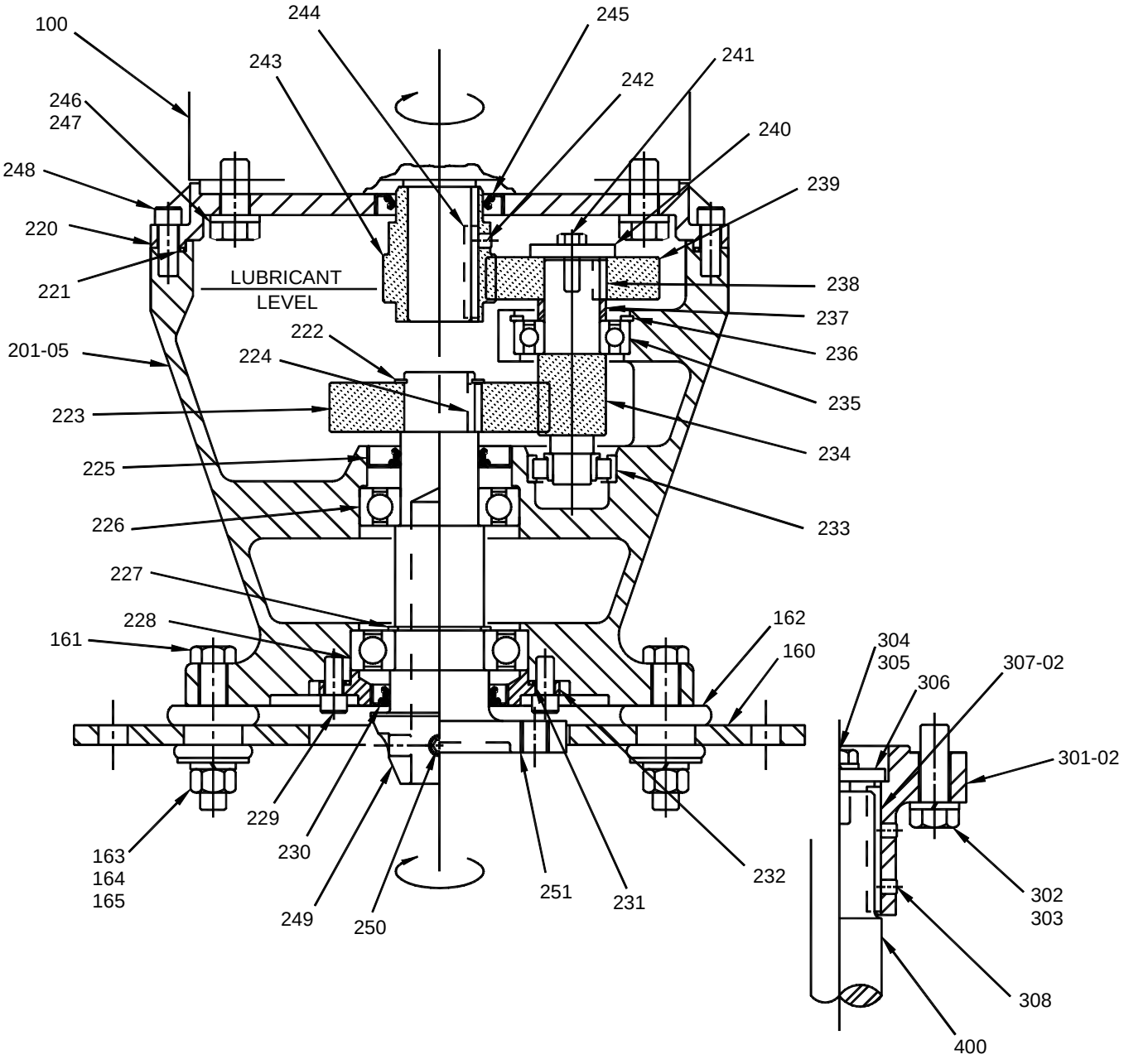


Figure 4: Model 50DTD

50DTD – OPEN TANK MIXER INSTALLATION
OPTIONAL ANGLE RISERS

Optional 10^{o} angle risers are available for the 50DTD unit.

If angle risers are supplied, refer to *Figure 5, below and Figure 6, page 13*. *The drive unit must be angle mounted with nameplate end "down".* Unit will attach to support structure using customer supplied fastener set (1/2" bolts).

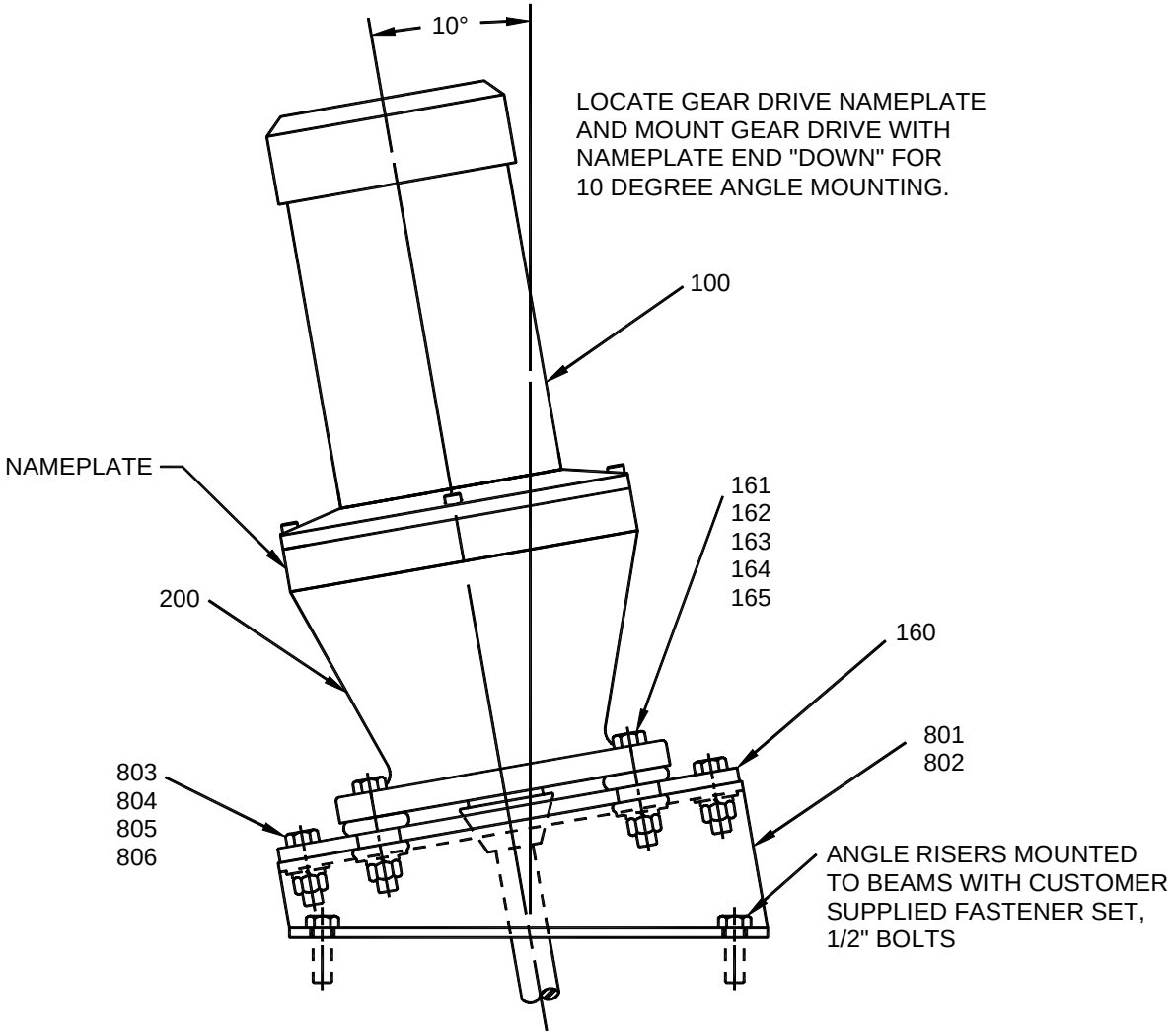


Figure 5: Angle Riser Mounting

50DTD – OPEN TANK MIXER INSTALLATION
OPTIONAL ANGLE RISERS

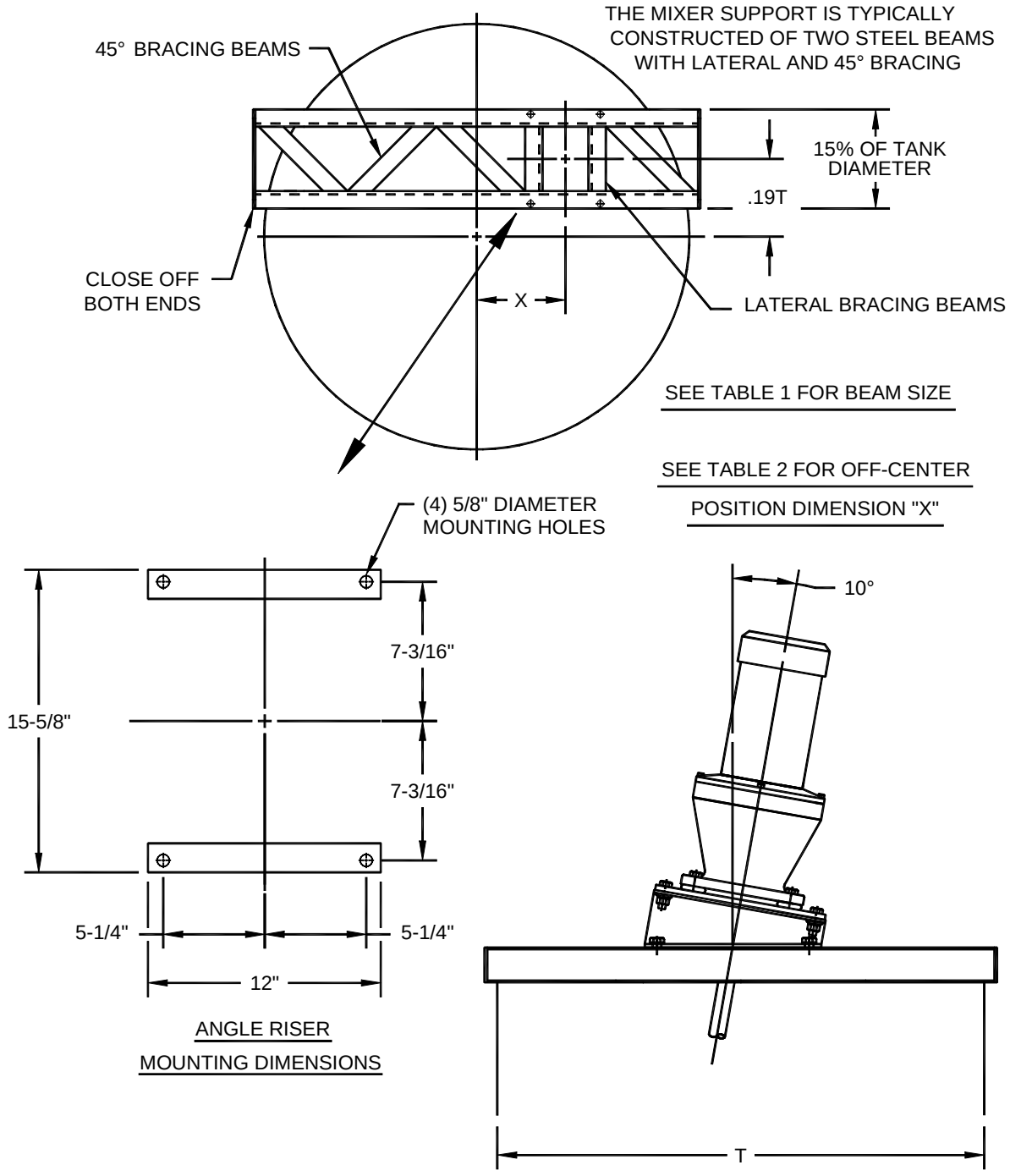


Figure 6: Angle Mount Installation

50DTD – OPEN TANK MIXER INSTALLATION
OPTIONAL ANGLE RISERS

TABLE 2: OFF-CENTER POSITIONING

SHAFT EXTENSION RANGE, IN (MM)	"X" DIMENSION, IN (MM)	MINIMUM TANK DIAMETER "T", IN (MM)
20" – 37" (508 – 940)	5" (127)	18" (457)
38" – 53" (965 – 1346)	7.5" (191)	22" (559)
54" – 76" (1372 – 1930)	10.75" (273)	32" (813)
77" – 110" (1956 – 2794)	15.5" (394)	46" (1168)
111" – 135" (2819 – 3429)	21.25" (540)	64" (1626)

MIXER INSTALLATION

ELECTRIC MOTORS

1. Check the nameplate data on the motor to assure that the available power supply agrees with the motor requirements. Protective devices should be of the proper size and rating to safely carry the load and interrupt the circuit on overloads.

2. If the motor has been stored in a damp location, the windings may require drying.

NOTE: Do not obstruct the normal flow of ventilating air through or over the motor.

3. Many of the motors supplied with this product are dual voltage. The motor cord supplied with a single phase motor is applicable for use on 125V systems only. Customer is responsible for supplying all necessary motor connections and for properly wiring the motors. Refer to wiring diagram *Figure 7, page 16* for normal motor connections. Consult *Chemineer Field Service* if there are any questions pertaining to the installation or operation of the motor or mixer unit.

4. Connect the motor in accordance with the National Electric Code and local requirements, but do not make the connections permanent until the motor/gearmotor rotation has been checked. Jog the motor to check for correct rotation prior to securing wiring. Refer to unit assembly drawing for unit rotation direction.

5. If any additional motor auxiliary devices such as space heaters or temperature sensors are used, connect them in proper circuits and insulate them from motor power cables.

AIR MOTORS

1. Air motors are designed to be driven by compressed air. Under no circumstances should they be driven with any other type of gas, fluids, particles, solids, or any substance mixed with air.

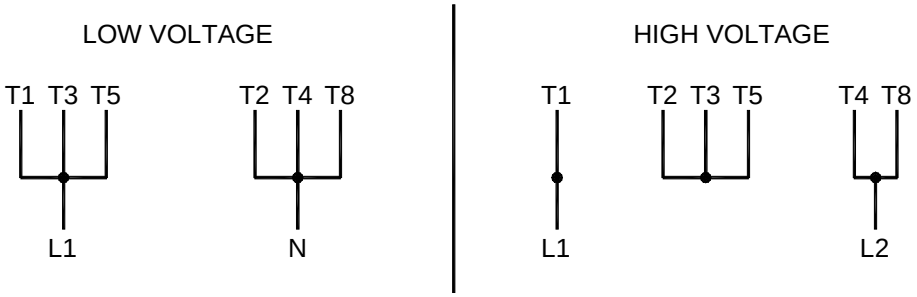
2. The muffler is shipped uninstalled on the air motor. Always install a moisture trap and filter in the air line ahead of the motor.

3. “Reversible” type air motors will work equally in both directions. A 4-way valve may be connected to both air ports to allow reversible operation. For efficiency of output and control of speed, use air lines of the same size or the next larger pipe size than the intake port of the motor.

4. *Lubrication of the air motor is required.* Refer to ***Lubrication*** section of this manual for more information.

MIXER INSTALLATION

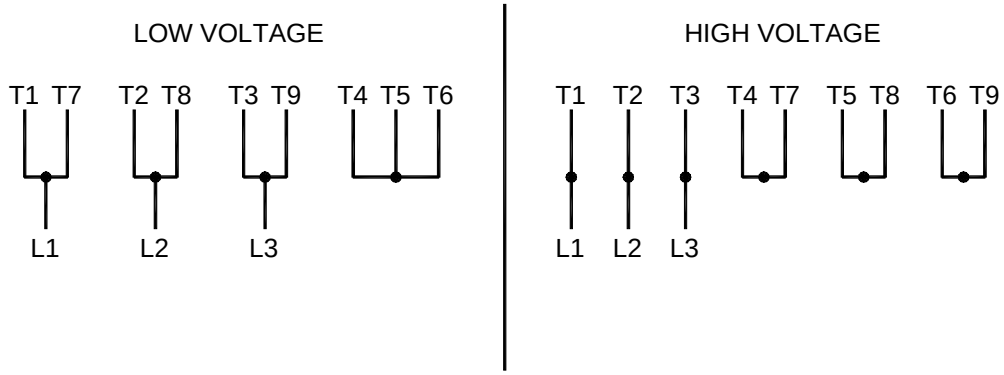
SINGLE-PHASE MOTOR
(WITHOUT THERMAL PROTECTOR)



CCW ROTATION (LOOKING AT THE MOTOR FROM THE SHAFT END)

NOTE: TO REVERSE MOTOR SHAFT ROTATION,
INTERCHANGE MOTOR LEADS T5 AND T8

THREE-PHASE MOTOR
(WITHOUT THERMAL PROTECTOR)



NOTE: TO REVERSE MOTOR SHAFT ROTATION,
INTERCHANGE ANY TWO LINE LEADS

CHECK MOTOR LEADS WITH CONNECTION DIAGRAMS ON MOTOR NAMEPLATE OR CONDUIT BOX FOR PROPER WIRING

CHECK THE MIXER SHAFT ROTATION AGAINST THE PROPER ROTATION INDICATED ON THE ASSEMBLY DRAWING

NOTE:
THE NORMAL MOTOR SHAFT ROTATION SHOULD BE CCW WHEN LOOKING AT THE MOTOR FROM THE SHAFT END.
THE NORMAL MIXER SHAFT ROTATION IS CW WHEN LOOKING INTO THE TANK FOR STANDARD ROTATION IMPELLERS.

Figure 7: Wiring Diagram, Motors

MIXER INSTALLATION

TABLE 3: BOLT TIGHTENING TORQUE

BOLT SIZE	CARBON STEEL (1)				300 SERIES STAINLESS (2)	
	GRADE 2		GRADE 5			
	Ft-lb	Nm	Ft-lb	Nm	Ft-lb	Nm
1/4-20	4.1	5.6	6	8.1	4.1	5.6
5/16-18	8.3	11	13	17	8.3	11
3/8-16	15	20	23	31	15	20
1/2-13	38	51	56	76	38	51
5/8-11	68	92	113	153	68	92
3/4-10	120	163	200	271	120	163

Tighten all fasteners to values shown unless specifically instructed to do otherwise. Lubricate all fasteners at assembly with grease, oil or an anti-seize material. Bolt threads and contact surfaces of bolt heads and nuts should be lubricated.

(1)If fasteners cannot be lubricated, multiply table values by 1.33.

(2)If fasteners cannot be lubricated, multiply table values by 1.25.

LUBRICATION

This section defines the proper oils and greases that must be used with this equipment.

ELECTRIC MOTOR

The motor bearings have been properly greased by the manufacturer. Motor bearings should be regreased at 12-month intervals when installed in clean, dry environments, or every six months for heavy duty and dusty locations. Any good quality general purpose grease consisting of a refined base oil stock and a lithium or calcium-complex based soap, with an NLGI No. 2 classification, will work satisfactorily. Most major oil companies offer such products, usually with extreme pressure (EP) additives for additional protection. *Table 5, page 19* lists some commonly available greases.

When regreasing, stop the motor, remove the outlet plug and add grease according to *Table 4* with a hand lever gun only. Run the motor for about ten minutes before replacing the outlet plug. Certain TEFC motors have a spring relief outlet fitting on the fan end. If the outlet plug is not accessible at the surface of the hood, it is the spring relief type and need not be removed when regreasing.

CAUTION! Overgreasing is a major cause of bearing and motor failure.

TABLE 4: MOTOR BEARING GREASE ADDITION

MOTOR FRAME SIZE	RELIANCE		LEESON		BALDOR	
	in^3	cm^3	in^3	cm^3	in^3	cm^3
56C	sealed for life		sealed for life		sealed for life	
140TC	sealed for life		sealed for life		0.6	9.8
180TC	0.5	8.2	N/A		0.6	9.8

ELECTRIC MOTOR

TABLE 5: TYPICAL NLGI NO. 2 GREASES

For Ambient Temperature Range of 0^o to 104^o F (-18^o to 40^o C)		
MANUFACTURER	**GENERAL PURPOSE**	**EP**
Amoco Oil Co.	Amolith grease: Grade 2	Amolith grease: Grade 2EP
Ashland Oil Co.		Multi-lube Lithium EP grease: Grade 2
		EP Lithium #2
Chevron U.S.A.Inc.	Industrial grease: Grade medium	Dura-Lith greases EP: Grade 2
CITGO Petroleum Corp.		Premium Lithium EP grease: Grade 2
Conoco Inc.		EP Conolith grease: Grade 2
Exxon Co. U.S.A.	Unirex N: Grade 2	Nebula EP: Grade 2
		Ronex MP: Grade 2
Mobil Oil Corp.		Mobilux EP 2
Pennzoil Products Co.		Pennlith EP grease 712
Phillips 66 Co.	Philube L Multi-purpose grease L-2	Philube EP grease: EP-2
Shell Oil Co.	Alvania grease 2	Alvania grease EP 2
		Alvania grease EP LF 2
Texaco Lubricants Co.	Premium RB grease	Multifak EP 2
Unocal 76		Unoba EP grease: Grade 2
		Multiplex EP: Grade 2

ELECTRIC MOTOR

The following table may be used as a guide in determining frequency of lubrication. The periods listed assume a clean, dry environment with an ambient temperature not exceeding 104°F (40°C). If conditions are less desirable than this, adjust the frequency accordingly. (*Table 6* is for motor speeds 1800 RPM or slower).

TABLE 6: LUBRICATION FREQUENCY

DUTY	LUBRICATION INTERVAL (Months)
Intermittent	36
8-16 Hours/Day	30
Continuous	24

AIR MOTOR

Lubrication of the air motor is required. An automatic air line lubricator must be installed in the air line just ahead of the air motor. The lubricator should be adjusted to feed one drop of oil for every 50-75 CFM of air going through the motor. Detergent SAE #10 automotive engine oil or equivalent is the recommended air motor lubricant.

GEAR DRIVE

The gear drive has been permanently lubricated with Mobilux EP023 grease at the factory. High ambient operating temperatures, excessive moisture, dust, corrosive fumes, and/or wide temperature fluctuations may require replacement of lubricant. Even under normal operating conditions, it is recommended that you inspect the gear drive regularly for lubricant leaks, abnormal noise, vibration, etc.

The gear drive is lubricated for operation at up to a 10 degree mounting angle (gear drive mounted with nameplate end "down"). Lubricant changes should always be performed while the gear drive is on a level surface and the gear drive output shaft is vertical. Refer to the ***Maintenance*** section of this manual for lubricant fill instructions.

MIXER

Proper operating procedures will allow maximum performance of your Chemineer DT Mixer. The following list will aid in the safe operation of your unit.

- **Do not** operate the unit before reading and following the instructions on all tags and nameplates attached to the unit.

- **Do not** operate the unit with less than one impeller's diameter liquid coverage above the lowest impeller. Increased side loading caused by operations at liquid level will decrease unit life.

- **Do not** operate the unit in a fluid with a specific gravity or viscosity higher than that for which the unit was designed.

- **Do not** attempt to start the unit with the mixing impeller buried in solids or a "set up" fluid.

- **Do not** locate tank internals or other rotating equipment close to the mixer impellers or extension shaft.

- **Do not** make any modifications to the mixer unit in the field (i.e. motor horsepower, mixer speed, shaft length, impeller diameter, etc.) without reviewing the change with *your local Chemineer office* or *Chemineer Field Service*.

CAUTION: There may be a speed range where the unit cannot be operated because of shaft resonant frequency. This range must be avoided or passed through quickly or destructive forces can be generated. Refer to main unit assembly drawing for speed range information or consult *your local Chemineer office*.

Should there be problems operating the unit, confirm that the installation is correct. If you are unable to resolve the problem, contact *your local Chemineer office*.

ELECTRIC MOTORS

Air circulation is very important to get full performance and long life from an electric motor. Do not block the suction inlets on fan-cooled motors. Motor life will be decreased if its temperature exceeds its thermal rating. The allowable temperature is stamped on the motor nameplate.

Prior to permanently wiring the electric motor:

- Check nameplate data on motor to assure that the available power supply agrees with the motor requirements. Protective devices should be the proper size and rating to safely carry the load and to interrupt the circuit on overloads.

- Check motor leads with connection diagrams on motor nameplate and/or conduit box so that the proper connections are made. All motors should be installed in accordance with the National Electric Code and local requirements.

- Check the output shaft rotation against the proper rotation indicated on the assembly drawing. For standard three-phase electric motors, the rotation is reversed by switching any two power leads.

- Check operating motor amperage against nameplate amperage.

The motor should start quickly and run smoothly. If the motor should fail to start or make abnormal noise, immediately shut motor off, disconnect it from the power supply, and investigate the cause. If the problem cannot be corrected, contact *your local Chemineer office* for assistance.

AIR MOTORS

Air motors are designed to be driven by compressed air. Under no circumstances should they be driven with any other type of gas, fluids, particles, solids, or any substance mixed with air.

Operating pressures should not exceed 100psi (689 kPa). The speed and torque can be regulated by using a pressure regulator or shut-off valve to obtain the desired power and conserve air.

MIXER MAINTENANCE

These instructions apply to both models 50DTC and 50DTD. Refer to *Figures 2 and 4, pages 6 and 11*.

Mixer Removal & Disassembly

CAUTION: Prior to removing mixer, review the installation to assure that all safety issues are resolved.

1. Lock out and disconnect all power to the mixer motor and any optional devices.

2. Remove the extension shaft **[400]**.

3. Remove the mixer drive unit from the tank and move to a suitable service area.

4. Remove the motor adapter mounting bolts **[248]**. Carefully separate and remove the motor **[100]** and motor adapter **[220]** assembly from the housing **[201]**. *NOTE: Housing should be positioned with the motor end up when removing the motor adapter.*

5. Remove the lubricant from the housing.

6. Remove the motor shaft setscrews **[242]**. Remove the motor pinion gear **[243]** from the motor shaft.

7. Remove the motor mounting bolts **[246]**, and remove the motor **[100]** from the motor adapter **[220]**.

8. Remove the lip seal **[245]** from the motor adapter.

9. Remove the bolt **[241]** and washer **[240]** from the driven pinion shaft **[234]**. Remove the high speed gear **[239]** from the pinion shaft.

10. Remove the bearing spacer **[237]** from the pinion shaft.

11. Remove the retaining ring **[222]** from the end of the drive shaft **[249 or 251]**.

12. Remove the bolts **[229]** from the lower seal housing **[232]**. *NOTE: For access to the bolts on units with a flanged drive shaft **[251]**, use the access hole provided in the drive shaft flange.*

MIXER MAINTENANCE

13. Mount the housing **[201]**, motor end up, in an arbor press. Press the drive shaft **[249 or 251]** through the output gear **[223]** and out of the housing.

14. Remove the upper shaft seal **[225]** from the housing.

15. Press the upper ball bearing **[226]** off of the drive shaft **[249 or 251]**.

16. Remove the drive shaft retaining ring **[227]**. Press the lower ball bearing **[228]** off of the drive shaft.

17. Remove the seal housing **[232]** from the drive shaft. Remove the lower shaft seal **[230]** from the seal housing.

18. Remove the retaining ring **[236]** from the driven pinion shaft **[234]** housing bore, and remove the driven pinion shaft **[234]** from the housing **[201]**.

19. Press the upper ball bearing **[235]** off the pinion shaft.

20. Remove the lower roller bearing **[233]** inner race from the pinion shaft.

21. Remove the lower roller bearing **[233]** outer race from the housing.

The mixer drive is now fully disassembled. Clean parts and inspect for wear. Replace worn parts as required.

MIXER MAINTENANCE

These instructions apply to both models 50DTC and 50DTD. Refer to *Figures 2 and 4, pages 6 and 11*.

Mixer Assembly

1. Install the lip seal **[245]** into the motor adapter **[220]** (seal lip facing away from the motor, flush with the top of the adapter). Apply grease to the lip of the seal.

2. Apply a bead of RTV Sealant, Three Bond #1215 or equal, to the motor adapter surface that mates with the motor **[100]**. Install the motor **[100]** onto the motor adapter **[220]**. Apply Loctite Threadlocker to the threads of the bolts **[246]**. Install bolts **[246]** and sealing washers **[247]**. Torque the bolts to the value shown in *Table 3, page 17*.

3. Install the motor key **[244]** onto the motor shaft using Loctite Adhesive. *NOTE: Key to be set back from the end of motor shaft 1/16"-1/8" (1.6-3.2mm).*

4. Install the motor pinion gear **[243]** onto the motor shaft (chamfered end toward motor). Set the end face of the pinion gear so that it extends 1/32" (.8mm) beyond the end of the motor shaft. Tighten setscrews **[242]** securely. Apply RTV sealant onto the end of the motor shaft, spread smooth and flush with the end face of the pinion, and allow sealant to fully cure.

5. Press the roller bearing **[233]** outer race (and rollers) in housing **[201]**, to the shoulder of the housing. *NOTE: Apply press to the outer race flange only, to avoid damaging the bearing.*

6. Press the roller bearing **[233]** inner race onto the driven pinion shaft **[234]**, to the shaft shoulder. *NOTE: The inner race integral flange must be positioned against the shaft shoulder to allow the inner race to engage the bearing rollers when installed.*

7. Press the ball bearing **[235]** onto the driven pinion shaft **[234]**, to the shaft shoulder. *NOTE: Apply press to the inner bearing race only, to avoid damaging the bearing.*

8. Press the driven pinion shaft **[234]** assembly into the housing **[201]**. Carefully align the lower bearing race to avoid damaging the rollers. *NOTE: Apply press to the outer bearing race only, to avoid damaging the bearing.*

9. Install the retaining ring **[236]** into the housing bearing bore.

10. Install the upper shaft seal **[225]** into the housing **[201]** (seal lip facing the motor, flush with the top of the housing). Apply grease to the lip of the seal.

MIXER MAINTENANCE

11. Install the shaft seal **[230]** into the seal housing **[232]** (seal lip facing the bearing, flush with the top of the seal housing). Apply grease to the lip of the seal.

12. Install o-ring **[231]** onto the seal housing **[232]**.

13. Slide the seal housing **[232]** assembly onto the chuck drive shaft **[249]** or flanged drive shaft **[251]**. *NOTE: Seal lip and o-ring side of seal housing assembly to be facing bearing.*

14. Press the lower ball bearing **[228]** onto the drive shaft, to the shaft shoulder. *NOTE: Apply press to the inner bearing race only, to avoid damaging the bearing.*

15. Install the retaining ring **[227]** onto the drive shaft.

16. Press the upper ball bearing **[226]** onto the drive shaft, to the shaft shoulder. *NOTE: Apply the press to the inner bearing race only, to avoid damaging the bearing.*

17. Position the chuck drive shaft **[249]** or flanged drive shaft **[251]** assembly in the housing **[201]**. Position the output gear **[223]** and key **[224]** onto the drive shaft. *NOTE: Output gear and key must be in position on the drive shaft before pressing the shaft into the housing.* Press the drive shaft assembly into the housing while also pressing the output gear onto the drive shaft.

18. Install the retaining ring **[222]** to the drive shaft.

19. Apply Loctite Threadlocker to the threads of the bolts **[229]**. Install the seal housing bolts **[229]**. Tighten bolts securely. *NOTE: For access to the bolts on units with a flanged drive shaft **[251]**, use the access hole provided in the drive shaft flange.*

20. Install the spacer **[237]** onto the driven pinion shaft **[234]**.

21. Install the key **[238]** into the driven pinion shaft keyway. Press the high speed gear **[239]** onto the pinion shaft.

22. Apply Loctite Threadlocker to the threads of the pinion shaft bolt **[241]**. Install the washer **[240]** and bolt **[241]**. Torque the bolt to the value shown in *Table 3, page 17*.

23. Fill the housing with approximately 1 U.S. gallon (3.8 liters) of Mobilux EP023 (or equal) grease. Refer also to the ***Lubrication*** section of this manual, *page 20*. Reference *Figures 2 and 4, pages 6 and 11* for lubricant level.

MIXER MAINTENANCE

24. Install the o-ring **[221]** onto the housing. Apply a bead of RTV Sealant to the motor adapter **[220]** surface that mates with the housing **[201]**.

25. Install the motor/motor adapter assembly onto the housing. *NOTE: Carefully lower the motor adapter assembly into the housing, allowing the motor pinion to mesh with the high speed gear, until firmly seated.*

26. Apply Loctite Threadlocker to the threads of the bolts **[248]**. Install the bolts and tighten securely.

Do not install the extension shaft at this time. Refer to the ***Mounting & Installation*** section of the manual for mixer drive installation instructions.

50DTC, 50DTD MIXER PART NUMBERS

Part #	Description	Qty.
100	Motor	1
150	C-Clamp	1
151	Clamp Bolt	1
152	Clamp Pad	1
153	Pad Retainer	1
154	Hex Bolt	1
155	Hex Nut	1
156	Spring Lockwasher	1
157	Flatwasher	1
158	Lock Shoe	1
159	Cup Plate	1
160	Flat Plate	1
161	Hex Bolt	4
162	Rubber Vibration Isolator	4
163	Flatwasher	4
164	Spring Lockwasher	4
165	Hex Nut	4
200	Housing Assembly	
201-04	Housing, Model 50DTC	1
201-05	Housing, Model 50DTD	1
220-01	Motor Adapter, 56C/140TC	1
220-02	Motor Adapter, 180TC	1
221	O-Ring	1
222	Retaining Ring	1
223	Output Gear	1
224	Key	1
225	Shaft Seal	1
226	Ball Bearing	1
227	Retaining Ring	1
228	Ball Bearing	1
229	Socket Head Bolt	4
230	Shaft Seal	1
231	O-Ring	1
232	Seal Housing	1
233	Roller Bearing	1
234	Driven Pinion Shaft	1
235	Ball Bearing	1
236	Retaining Ring	1

50DTC, 50DTD MIXER PART NUMBERS

Part #	Description	Qty.
237	Spacer	1
238	Key	1
239-01	High Speed Gear, 5:1	1
239-02	High Speed Gear, 10:1	1
240	Washer	1
241	Hex Bolt	1
242-01	Setscrew, 56C/140TC	2
242-02	Setscrew, 180TC	2
243-01	Pinion Gear, 5:1, 56C	1
243-02	Pinion Gear, 5:1, 140TC	1
243-03	Pinion Gear, 5:1. 180TC	1
243-04	Pinion Gear, 10:1, 56C	1
244-01	Motor Key, 56C	1
244-02	Motor Key, 140TC	1
244-03	Motor Key, 180TC	1
245-01	Lip Seal, 5:1	1
245-02	Lip Seal, 10:1	1
246-01	Hex Bolt, 56C/140TC	4
246-02	Hex Bolt, 180TC	4
247-01	Sealing Washer, 56C/140TC	4
247-02	Sealing Washer, 180TC	4
248	Socket Head Bolt	4
249	Chuck Drive Shaft	1
250	Setscrew	2
251	Flanged Drive Shaft	1
300	Removable Coupling Assembly	
301-02	Removable Flanged Shaft Coupling	1
302	Hex Bolt	4
303	Spring Lockwasher	4
304	Hex Bolt	1
305	Spring Lockwasher	1
306	Flatwasher	1
307-02	Key	1
308	Setscrew	2
400	Extension Shaft	1
500	Propellers/Impellers Marine Propeller, Type JP-3 High Efficiency Impeller, Type SC-3	

50DTC, 50DTD MIXER PART NUMBERS

Part #	Description	Qty.
800	Angle Riser Assembly	
801	Left Hand Angle Riser	1
802	Right Hand Angle Riser	1
803	Hex Bolt	4
804	Flatwasher	4
805	Spring Lockwasher	4
806	Hex Nut	4