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Motorized Trolleys

⚠ DANGER

Lifting Operations

Installation of equipment such as TC/American Crane's Motorized Trolleys requires performing overhead lifting operations. Proper lifting procedures involve training, skills and experience beyond the scope of this document. Workplace supervisors are responsible to assure that all persons under their supervision are properly trained, properly equipped, and are following safety practices appropriate for the lifting operation being employed.

⚠ DANGER

Overhead Mechanical Assembly

Persons performing installation and assembly of overhead equipment must use caution while lifting, assembling and adjusting components. These operations are frequently conducted from manlifts or platforms that require specific knowledge, training and operation skills beyond the scope of this document.

Access to the floor below the work area must be restricted to reduce the potential of personnel injury due to falling objects.

Workplace supervisors are responsible to assure that all persons under their supervision are properly trained, properly equipped, and are following appropriate safety practices.

⚠ DANGER

Electrical Equipment Installation, Service and Maintenance

Persons performing installation, service or maintenance activities on, near, or with equipment that is electrically powered are exposed to electrical hazards that could result in serious injury or death if proper precautions are not followed. Before performing such work, disconnect the electrical power source for the system at the disconnect device and lock it out, following appropriate Lockout/Tagout (LOTO) procedures, to prevent electric power from being applied while work is being performed.

All persons must use safe work practices appropriate to the electrical system, and follow all workplace procedures and policies. This requires specific knowledge, equipment and training beyond the scope of this document. Workplace supervisors are responsible to assure that all persons under their supervision are properly trained, properly equipped, and are following appropriate safety practices.

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Motorized Trolleys

TC/American Crane offers several models of Motorized Trolleys. Selection of the appropriate model depends upon the size of the rail on which the trolley will operate, the load to be carried on the trolley, speeds required, motor horsepower required, service duty class, and possibly other factors.

Motorized Trolley Model Numbers:

- The first character(s) of the Motorized Trolley Model Number indicates the rail size on which the trolley operates:
  - 3 = 325 Series Rail
  - 45 = 450 Series Rail
- The second set of characters, “MT,” identifies the product as a “Motorized Trolley.”
- The next number (if present) identifies the trolley wheel tread diameter:
  - 5 = 5” diameter
  - 6 = 6½” diameter
  - 9 = 9” diameter
- The intermediate numbers are the trolley capacity
  - 6200 = 6200 pound capacity
  - 8000 = 8000 pound capacity
  - 10000 = 10000 pound capacity
  - 15000 = 15000 pound capacity
- The last characters identify the trolley model and type of drive
  - AT = Model “AT” with timing belt and pulley reduction drive
  - A2 = Model “A” with spur gear reduction drive
  - B = Model “B” with spur gear reduction drive
  - C = Model “C” with spur gear reduction drive

TC/American Crane Motorized Trolleys are used as drive units on crane and hoist carrier applications, and must be one of the load carrying trolleys of a crane end truck or a carrier. The distributed weight of the crane, carrier, hoist and load on the motorized trolley provides the pressure of the wheels upon the rail tread for traction.

These general Installation Instructions are for the following current TC/American Crane models:

Motorized Trolleys	Model 3MT5-6200-AT
	Model 3MT5-6200-A2
	Model 3MT6-8000-A2
	Model 3MT9-10000-B
	Model 45MT-15000-C

NOTE: See the appropriate section(s) of these instructions for assembly, installation and maintenance details specific to your Motorized Trolley model.

NOTE: For a specific parts breakdown of the Motorized Trolley provided with an order, see the drawings provided with that shipment.

Drivetractors vs. Motorized Trolleys

Drivetractors differ from Motorized Trolleys in design, construction and application.

Drivetractor:

- may be used independently or separately from a hoist carrier or other trolleys,
- develops tractive force from pressure of drive tire against bottom of rail,
- pulls a load through a mechanical connection (drawbar) to the carrier,
- tractive effort is consistent, regardless of actual load.

Motorized Trolley:

- must be used in conjunction with a crane end truck or as part of a hoist carrier,
- load bar of the crane or hoist carrier is carried by the Motorized Trolley,
- weight of the crane or hoist carrier provides a load on the trolley wheels and thus develops traction,
- tractive effort will vary with the actual load.

Drivetractors and Motorized Trolleys are both effective components of a drive system for either monorails or cranes. The choice of one versus the other must be made with consideration of travel speeds, environmental conditions (is the rail likely to have moisture on it, resulting in a slippery tread surface), switches, curve radius, end approach required, etc.

General Installation Instructions

Before beginning the installation:

- When shipment is received, remove all shipping materials and check all parts for damage. Repair and/or replace if necessary.
- Check packing lists against materials received and identify all parts.
- Gather all equipment drawings and associated manuals (motor, reducer, brake, electrical components, etc.) and keep in a secure location for reference during installation and start-up, and to give to end user for future reference.
- Turn trolley wheels and guide rollers by hand to check for possible damage in shipment. Check for rough bearings, loose bearings and axles.
- Check electrical collectors (if provided) for condition and proper operation. Check collector wiring for routing and security.
- Check assembly of motorized trolley with respect to related equipment as shown on assembly drawings.

Installing Motorized Trolley on rail:

- Remove trolley drives from crane end trucks or hoist carrier (if they were shipped assembled on the equipment) or remove from shipping packaging. Place motorized trolleys, plain trolleys, and load bars (if applicable) in a clean, secure area prior to assembly. Orient all components relative to their eventual position when assembled on the rail. Verify that all components and parts have been received.

  Four wheel crane trucks or carriers have two-wheel trolleys at each end that can be removed from trolley loadbar by removing retaining bolt.

  Two-wheel trolleys can then be threaded onto rail (remove end stop), loadbar pulled up and two- wheel trolleys reassembled from each end. If there is no open end, or if obstructions or other barriers prevent access to an open end, you may bring the trolleys up onto the rail by removing trolley wheels from the trolley frame.

  For Plain Trolleys, verify that the cavity of the yoke is clean and the Spherical Seat is properly seated. Spherical Seats are made of an oil-impregnated material and do not require lubrication. Verify that the Thrust Bearing (tapered roller bearing) is clean, lubricated and properly installed (metal retainer on top). See Trolley Installation Instructions.

  For Motorized Trolleys, verify that the Thrust Washer(s) are in place between the loadbar and the bottom housing member. Quantity two (2) brass washers for the AT, A2, and B drives. Quantity one (1) hardened steel washer for the C drive. Lubricate washers before final installation. See Figures 13 and 14 in these instructions.

  Eight wheel crane trucks or carriers have four two-wheel trolleys plus load bars and a “saddle” that is usually bolted to the end truck or carrier frame. Remove entire saddle and trolley by removing bolts, place trolley on rail and bring crane or carrier up to the saddle.

  For Plain Trolleys, see instructions above.

  For Motorized Trolleys, see instructions above.

  For Load Bars, verify that Spherical Seats and Thrust Bearings are installed. Refer to drawings provided with the order and see typical instructions above.

- Lift into position on runway or monorail and re-assemble. Use extreme caution when lifting motorized trolleys and other equipment into place.
- For detail of mounting a Motorized Trolley onto the End Truck Saddle or onto a Carrier Loadbar, see “Connection of Motorized Trolley to Load Bar” on Page 11 of these instructions.

- Check lubrication of the motorized trolley unit. See decal on gearcase cover and these instructions. Fill gear case to the oil level plug with a good grade of SAE 90 gear oil (see Figure 18 in these instructions).

  Note: do not fill gearboxes with oil until after the motorized trolley is mounted on the saddle or loadbar AND the retaining screw has been installed. The motor may need to be removed to allow access for the retaining screw.

Connection to Hoist or Carrier:

- Power is supplied to system as covered by electrification section. See TC/American Crane Installation Instructions for conductor bar systems and collectors. Use extreme caution when working around electrical conductors.
- Check rotation of motor. Press forward and reverse buttons and interchange wires for phasing at motor terminal box to correct travel direction if necessary.
- For Motorized Trolleys with brakes - observe whether brake is open and not dragging when unit is running. Check stopping action of brake under full load. Refer to instructions on type of brake and adjust as necessary using manufacturer's instructions.

Initial Start-Up:

- Operate unit through entire system.
- Check clearances of all portions of carrier through curves and switches. See that motorized trolley frame, control box, or motor does not contact any portion of carrier on tightest turns both right and left hand.
- Check that swinging of unit does not increase possibility of interference.
- Check operation through all speeds and confirm conformance to specifications.

Motorized Trolley

Model 3MT5-6200-AT

(see Figure 1, shown less “C-Face” motor)

1) Use on 325 “L” or “H” Series rail
2) Timing Belt and Pulley drive
3) Maximum ½ HP
4) Standard 100 FPM, Optional 50 FPM with speed reducer installed between motor and frame. See Page 13, Figure 18 for typical example.
5) Used on equipment up to 3 ton capacity
6) Minimum 4’ radius curves
7) Compatible with 2000 Series Switches

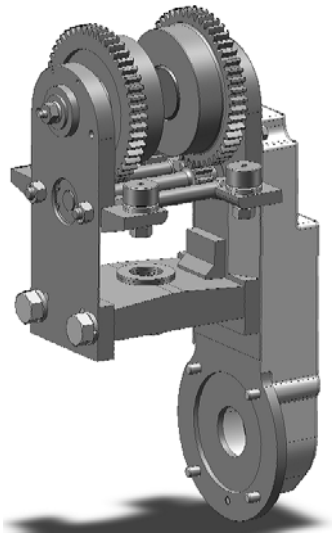

Figure 1

Drive Reduction: See Figure 2, shown less motor and motor pulley. Timing Belt and Pulley reduction drive is efficient, quiet and requires no lubrication, but has limited speed change capability. Use Variable Frequency Drive control for multiple speeds.

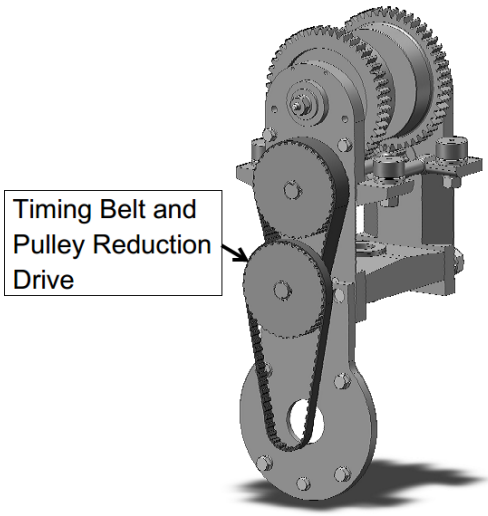

Figure 2

Lubrication: See Figure 3.

1) Wheels
2) Thrust Washers (at assembly)
3) Drive Pinion to Drive Wheels

For details, see *Lubrication* section of these instructions.

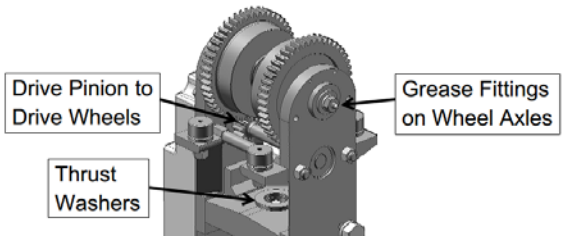

Figure 3

Motorized Trolley

Model 3MT5-6200-A2
Model 3MT6-8000-A2
(see Figure 4, 3MT5-6200-A2 shown, less “C-Face” motor)

1) 3MT5-6200-A2 has 5” diameter drive wheels
2) 3MT6-8000-A2 has 6½” diameter drive wheels
3) Use on 325 “L” or “H” Series rail
4) Spur gear drive in oil bath
5) Standard ½ HP. Optional ¾, 1 and 1.5 HP.
6) Standard 100 FPM. Optional speeds 50, 75, 125, 150 and 200 FPM by gear changes.
7) 3MT5-6200-A2 = 6200 lb. trolley load capacity
8) 3MT6-8000-A2 = 8000 lb. trolley load capacity
9) Minimum 4’ radius curves
10) Compatible with 2000 Series Switches

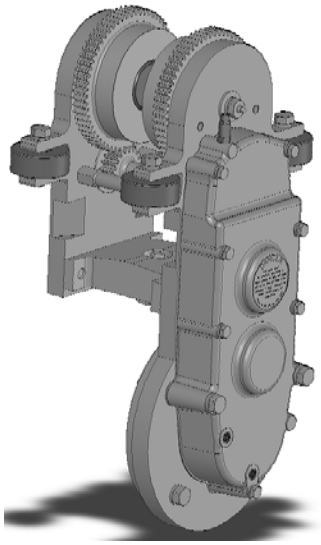

Figure 4

Drive Reduction: See Figure 5, 3MT5-6200-A2 shown, less cover, motor and motor pinion drive gear. Spur Gear reduction drive is simple, efficient and easy to change speeds. Use Variable Frequency Drive control for multiple speeds.

See Page 13, Figure 18 for example of speed reducer for additional optional travel speeds.

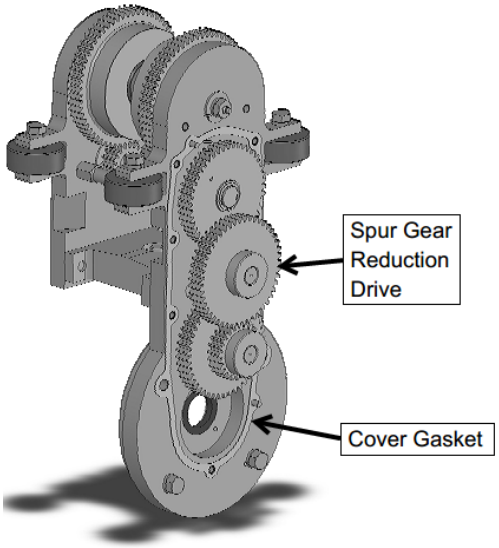

Figure 5

Lubrication: See Figure 6, 3MT6-8000-A2 shown.

1) Wheels
2) Thrust Washers (at assembly)
3) Drive Pinion to Drive Wheels
4) Gearcase Oil

For details, see *Lubrication* section of these instructions.

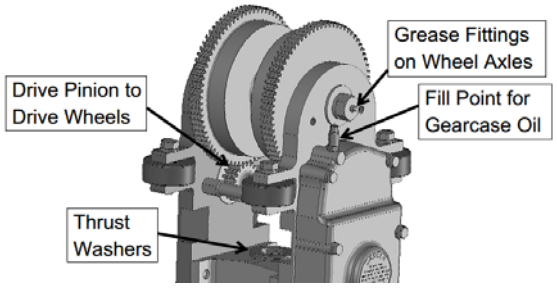

Figure 6

Motorized Trolley

Model 3MT9-10000-B
(see Figure 7, less "C-Face" motor)

1) 9" diameter drive wheels
2) Use on 325 "H" Series rail
3) Spur gear drive in oil bath
4) Standard ¾ HP. Optional up to 5 HP.
5) Standard 100 FPM. Optional speeds 75, 150, 175, 200, 250 and 300 FPM by gear changes.
6) 10000 lb. trolley load capacity
7) Straight rail only
8) Not compatible with switches

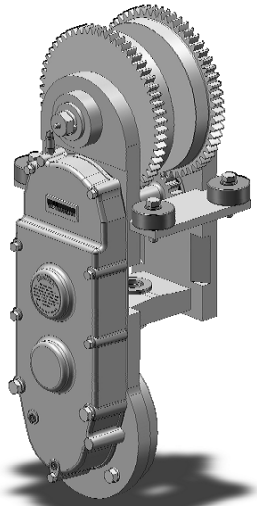

Figure 7

Drive Reduction: See Figure 8, less cover and motor. Spur Gear reduction drive is simple, efficient and easy to change speeds. Use Variable Frequency Drive control for multiple speeds.

See Page 13, Figure 18 for example of speed reducer for additional optional travel speeds.

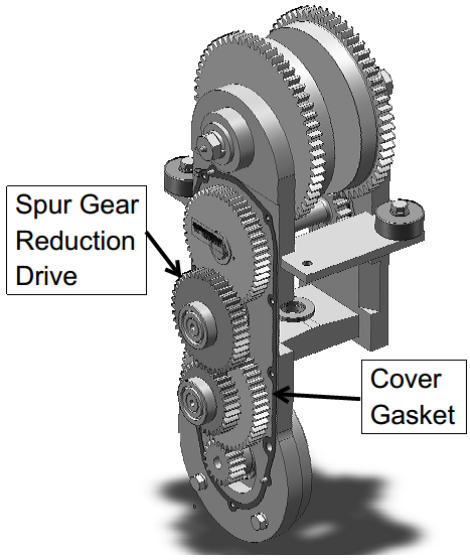

Figure 8

Lubrication: See Figure 9.

1) Wheels
2) Thrust Washers (at assembly)
3) Drive Pinion to Drive Wheels
4) Gearcase Oil

For details, see *Lubrication* section of these instructions.

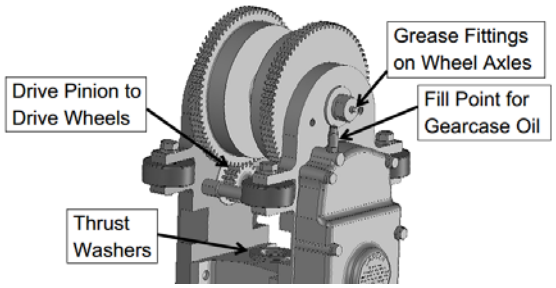

Figure 9

Motorized Trolley

Model 45MT-15000-C

(see Figure 10, shown less “C-Face” motor)

1) 9” diameter drive wheels
2) Use on 450 Series rail
3) Spur gear drive in oil bath
4) Standard ¾ HP. Optional up to 5 HP.
5) Standard 100 FPM. Optional speeds 75, 150, 175, 200, 250, 300 and 350 FPM by gear changes.
6) 15000 lb. trolley load capacity
7) Contact the factory for applications with curves and switches
8) Spur Gear reduction drive is simple, efficient and easy to change speeds. Use Variable Frequency Drive control for multiple speeds.
9) Connection to loadbar via pin (see Figure 11, drive shown with side rollers removed for clarity)

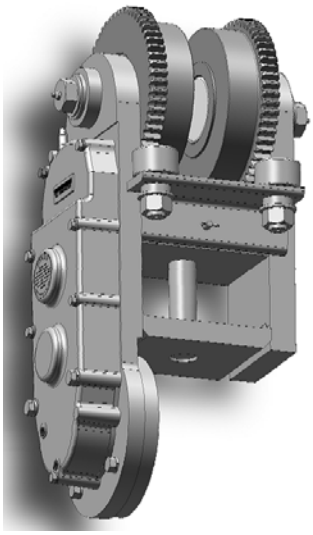

Figure 10

See Page 13, Figure 18 for example of speed reducer for additional optional travel speeds.

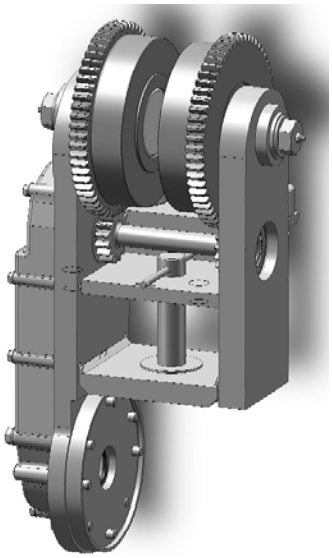

Figure 11

Lubrication: See Figure 12.

1) Wheels
2) Thrust Bearing (at assembly)
3) Drive Pinion to Drive Wheels
4) Gearcase Oil

For details, see *Lubrication* section of these instructions.

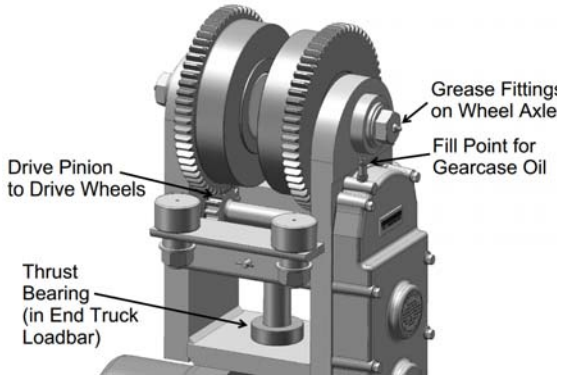

Figure 12

Connection of Motorized Trolley to Load Bar

3MT5-6200-AT
3MT5-6200-A2 / 3MT6-8000-A2
3MT9-10000-B

Typical connection of these drives to a saddle or loadbar is shown in Figure 13.

Position the end truck or carrier saddle or loadbar into the frame of the motorized trolley and on the Base Plate.

A boss on the bottom of the Adapter Lug (also called a saddle lug) sets into a pocket in the Motorized Trolley Base Plate (see Fig. 13A). Be sure the two thrust washers are lubricated and put into place during assembly.

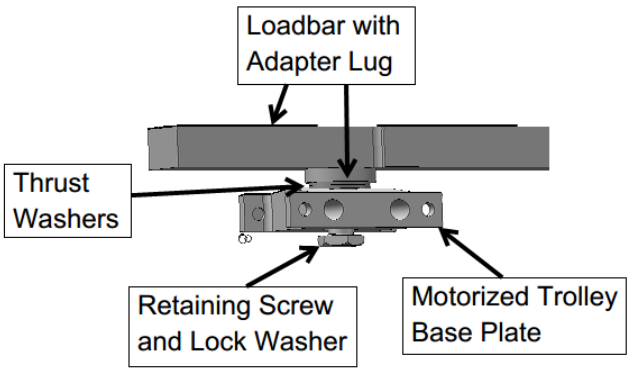

Figure 13

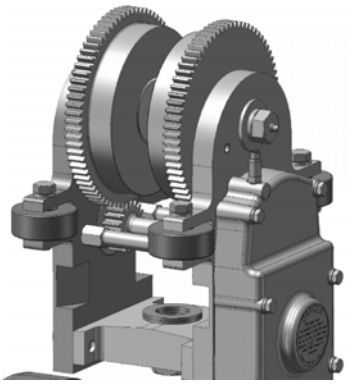

Fig. 13A

Insert the retaining screw from below into the threaded hole in the adapter to hold the trolley securely to the loadbar. Tighten until lock washer is firmly compressed.

NOTE: depending upon motor HP and frame size, the motor may need to be removed from the trolley to provide clear access to install the retaining screw. See details on Page 12.

45MT9-15000-C

This motorized trolley uses a loadbar pin as shown in Figure 14 and 14A to rigidly connect the loadbar to the trolley frame in the vertical axis.

The loadbar pin is captured in holes in the trolley frame above and below the loadbar. Because of the drive pinion, this pin must be installed from below, which requires the motor to be removed for access. See details on Page 12.

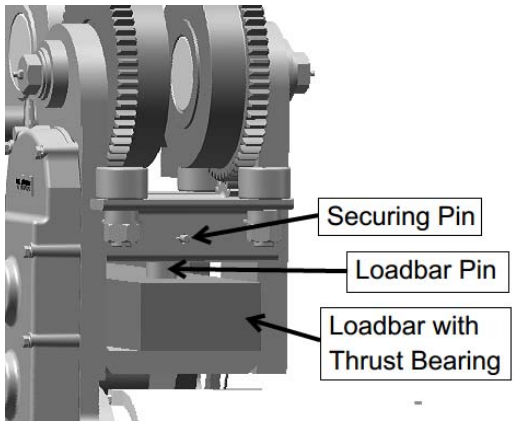

Figure 14

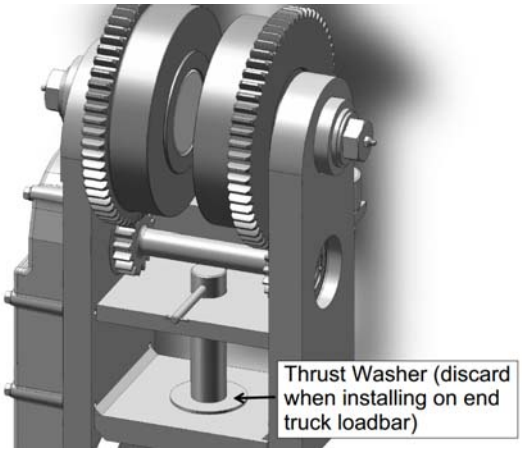

Fig. 14A

NOTE: when mounting this trolley on an end truck, the hardened thrust washer provided with the “C” drive is not used (see Fig. 14A, side rollers removed for clarity). Remove and discard this washer. New end truck loadbars are provided with a thrust bearing. See *450 Series End Truck Installation Instructions* for more detail.

(Thrust washer may be required if mounting as a complete replacement trolley on an old American Monorail end truck).

Trolley Adapters for C-Face motors

Motors are mounted onto the motorized trolley frame with a special adapter. See Figure 15 for a typical adapter mount (varies, depending upon motorized trolley model).

The C-Face adapter is bolted to the motor, then the motor and adapter are bolted to the Motorized Trolley Frame.

See Figures 16 and 17 for a typical C-Face Adapter, with hole, pinion seal and “O” ring locations.

Note: the diameter of the motor drive pinion gear is larger than the center hole of the adapter, so the motor must be bolted to the adapter before the motor pinion can be installed.

If removing the motor from the adapter, remove the motor pinion from the motor shaft before attempting to remove the adapter from the motor.

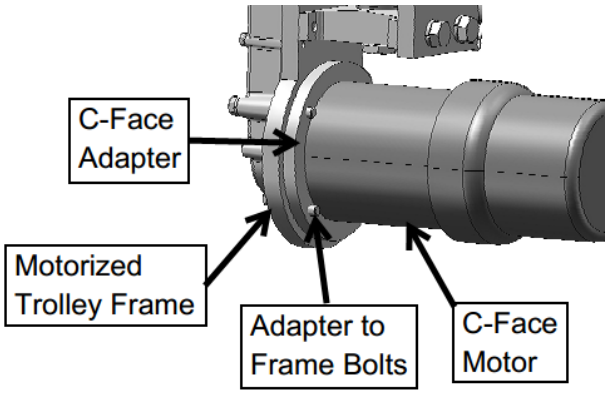

Figure 15

Removing Motor From Trolley Gearbox: if the motor is removed from a Motorized Trolley assembly (for example, to allow clearance to install the loadbar retaining screw, or for motor replacement), the motor and adapter assembly must be removed as a unit.

Note: if there is oil in the gearcase, it must be drained before removing the motor and adapter assembly from the trolley frame.

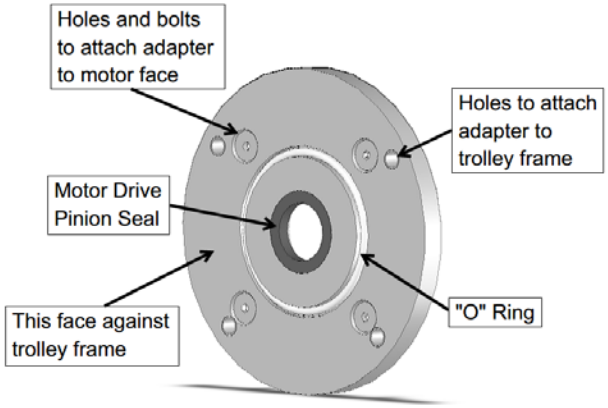

Figure 16

When re-installing the motor, drive pinion and adapter, it may be necessary to remove the gearcase cover to facilitate gear alignment.

When the gearcase cover has been removed, inspect cover gasket and replace if damaged.

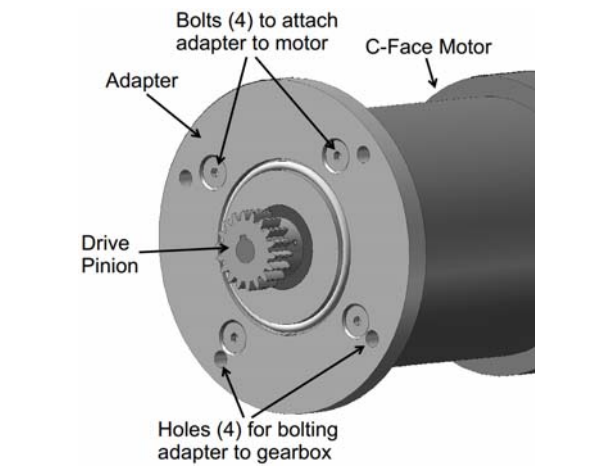

Figure 17

Sealant for Drives and Motors: If repairing or rebuilding a motorized trolley gearbox, apply Permatex 85224 or equal to any ungasketed or unsealed joints in the gearbox. In particular: output pinion/bearing, tie rods, drain plug and fill plug.

When mounting the motor drive pinion, remove the key from the motor shaft and apply sealant to the motor shaft, pinion bore, set screws, keyways and key to seal all joints.

Speed Reducer – mounted between motor and gearcase

For special speeds not available via gear changes in the gearcase (or in the Timing Belt and Timing Pulley reduction for an “AT” drive), a Speed Reducer may be provided between the motor and the motorized trolley frame. See Figure 18 for a typical speed reducer mount (shown on a 3ET-20000-4SR End Truck, ½ HP motor with brake, 50 FPM).

Typical reducer ratios are 2:1, 3:1, 4:1. Contact the factory for specifics.

Refer to the speed reducer vendor manual for maintenance, service and lubrication requirements.

See Figures 18A and 18B for detail of mount.

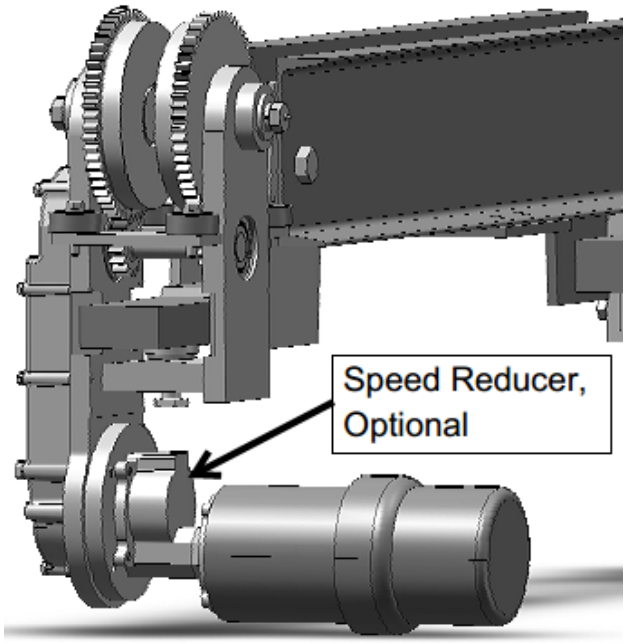

Figure 18

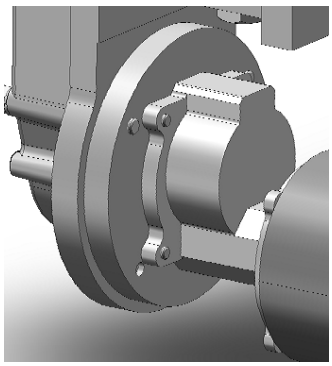

Fig. 18A

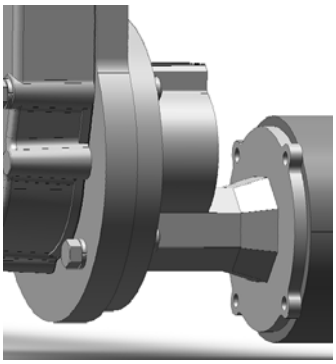

Fig. 18B

Lubrication

General Lubrication Information

1. Motorized Trolley Wheels
   - Trolley wheels with grease fittings in end of axles are packed with grease when assembled. Relubricate after use with multi-purpose lithium grease until a light film of grease appears around wheel axle. Wipe clean after greasing.
   - Trolley wheels with sealed bearings have no grease fittings and require no further lubrication.

2. Thrust Washer(s) or Thrust Bearing
   - At installation, apply a light coat of EP (Extreme Pressure) grease to the thrust washer(s) or thrust bearing before assembling the trolley to the load bar.

3. Trolley Side Rollers
   - Side rollers are generally provided with sealed bearings and require no further lubrication.
   - Special order motorized trolleys may have side rollers that are regreaseable. These will have a grease fitting on the side roller axle. Relubricate after use with multi-purpose lithium grease.

4. Motor
   - See the motor information provided with the motorized trolley for any lubrication requirements.

5. Motor Brake
   - See the brake information provided with the motorized trolley for any lubrication requirements.

6. Gear case
   - See Figure 19, typical for all A2, B, and C Drives. Drives are shipped less oil (see the information decal affixed to the gearcase cover, Fig. 19A).
   - Remove Pop-Safety Valve at top of gear case and remove Oil Level Plug.
   - Fill to Oil Level Plug with a good quality SAE 90 gear lube (slightly less than one pint required).
   - Replace Oil Level Plug and Pop-Safety Valve.

Fig. 19A

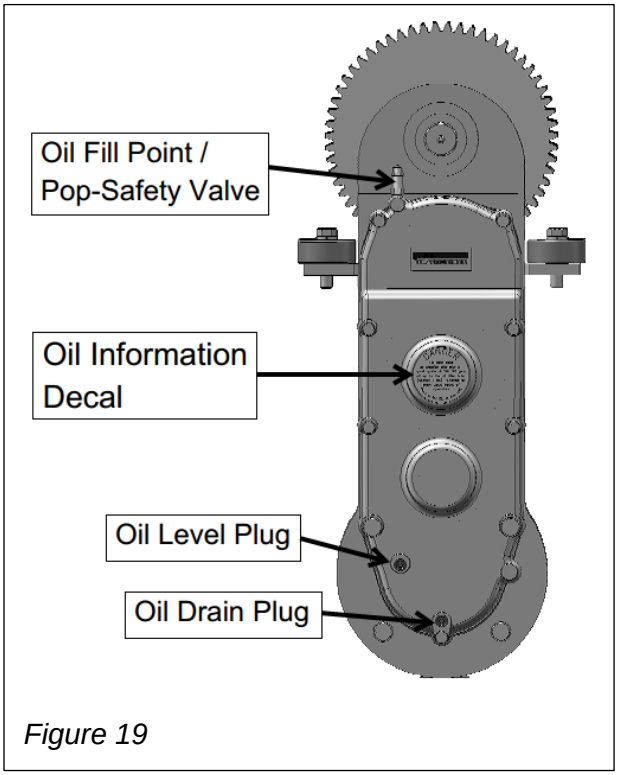

Figure 19

7. Speed Reducer, Optional (see Page 13)
   - See speed reducer vendor manual for maintenance, service and lubrication requirements.

Lubrication Frequency

There is no absolute definition for periodic relubrication of TC/American Crane motorized trolleys. Each application must be evaluated on its own merits, including: service duty, operating speed, number of operations per shift, and operating environment.

Upon initial installation, verify that oil has been put into the gearcase, thrust washers lubricated prior to mounting the motorized trolley, wheels greased, and gears on drive pinion and drive wheels have been greased, either at the factory or in the field. Do not apply lubricant to the timing belts or pulleys of an “AT” drive.

Operators should make observations before the beginning of each shift for any evidence of oil leaks or grease runs. If noted, notify maintenance personnel and have them check the equipment and take any needed corrective action.

Inspect all lubrication points after four weeks or one month of initial use and lubricate as necessary. Inspect monthly thereafter.

Maintenance personnel should develop and maintain a record of all monthly inspections. Frequency of lubrication may be adjusted and noted to match operational demands, based upon inspection reports.

Recommended Motorized Trolley Lubricants
(for standard industrial operating environments)

Trolley Wheels (if regreaseable)	Good grade multi-purpose lithium grease
Side Rollers (if regreaseable)	Good grade multi-purpose lithium grease
Thrust Washer(s) or Thrust Bearing	Good grade “EP” grease
Drive Pinion to Drive Wheels	Good grade “EP” grease
Gearcase (reducer)	SAE 90 gear lube (see operation notice below)
Motor	See vendor manual for recommendations
Brake	See vendor manual for recommendations
Speed Reducer (optional equipment for special speeds, mounted between the motor and the gearcase)	See vendor manual for recommendations

Note: TC/American Crane does not normally make a ‘brand name” recommendation for lubricants. Each customer may have a preference based upon many legitimate reasons. TC/A recommends to use a “good quality” lubricant and, when one is chosen, to not mix them.

Service of Gearcase (reducer) on Motorized Trolley (based upon ANSI/AGMA 6013-A06)

Initial Lubricant Maintenance: after the first 500 hours of operation or 4 weeks, whichever occurs first, the gear case should be drained, flushed and refilled with clean oil to the proper level. Do not overfill, as too much oil causes excess heating and leakage through the oil seals, decreasing the efficiency of the drive unit. Carefully inspect for any evidence of leakage.

Note: drain oil only after the gear drive is at operating temperature (operate the unit to exercise the drive and warm the oil).

Subsequent Lubricant Maintenance: under normal operating conditions, oil should be changed every 2500 hours or 6 months, whichever occurs first. These change frequencies can be extended if oil analysis indicates that degradation or contamination are within acceptable limits (see examples of typical contamination limits below).

If drive units exposed to outside weather conditions and are not operated during the winter: the gear case should be completely filled with oil to prevent moisture and rust from forming in the case. Drain oil to proper oil level before restarting the drive unit.

Abnormal Operating Conditions: rises and falls in temperature may produce internal condensation. Dust, dirt, chemical particles or fumes may react with the oil to form sludge. High temperatures may cause accelerated degradation of the oil. Under these conditions, the oil should be examined more frequently and changed as required. Each installation under these conditions must have a locally determined oil maintenance policy established.

An oil testing or examination program should include testing for:

- Changes in appearance or color
- Oil viscosity (oxidation)
- Water concentration
- Contaminant concentration
- Sediment and sludge
- Additive concentration and condition

General guidelines for contamination limits (when to change oil) are:

- Water content greater than 0.05% (500 ppm)
- Iron content exceeds 150 ppm
- Silicon (dust/dirt) exceeds 25 ppm
- Viscosity changes more than 15%

Tests should be performed on the initial fill of oil to establish a baseline for comparison.

Pop-Safety Valve: each motorized trolley gearcase cover is provided with a “pop-safety valve” to relieve any excess pressure within the gearcase. It is installed in the same hole in the cover used as an oil fill point. Valve body and seal are brass. These may be disassembled for cleaning and servicing when necessary. Inspect and clean at each oil change. Pop-Safety Valve is pre-set to relieve at 5 psi.