



Setup Guide

TS - 9972 / 9985



IMPORTANT!

Read contents carefully prior to operation.

Safety First

Important Safety Instructions

Observe these rules. They are recognized as practices that reduce the risk of injury to yourself and others, or damage to the container handling truck or load.


This manual contains maintenance and service procedures for filling, lubricating, removing, repairing, and installing various components comprising a container handling truck. Because of the size and weight of the container handling truck, and high pressures in some of the components and systems, improperly performing service on the truck can be dangerous.

Warnings and cautions are included to reduce the probability of personal injury, when performing maintenance procedures which if improperly performed could be potentially hazardous. Failure to comply with these warnings and cautions can result in serious injury and possible death.

No single rule in the booklet can be followed to the exclusion of others. Each rule must be considered in light of the other rules, the knowledge and training of the man (operator / maintenance), the limitations of the machine, and the workplace environment.

Report all mechanical problems to the appropriate management personnel.

Proper Training:

 **WARNING: Death or serious injury can occur from servicing or operating a powered industrial truck without proper training. Only trained and qualified personnel are permitted to service or operate the truck.**

Only trained and qualified personnel are permitted to perform the service and set-up procedures outlined in this guide. Only those who are trained and qualified to operate powered industrial trucks are permitted to operate the truck. Taylor Machine Works, Inc. publishes Safety Check, TMW-077 a booklet citing some safety precautions to observe during lift truck operation. One copy is shipped with each lift truck; additional copies are available at a nominal fee from the authorized Taylor dealer from which the equipment was initially purchased. Safety Check can also be downloaded free of charge, in various


languages, from the Taylor website www.taylorbigred.com/safety. Read and understand Safety Check, and the Operator Guide before operating this lift truck.. Read and understand the Maintenance Manual before performing maintenance on this lift truck. Read and understand the Set-Up guide before performing set-up procedures.

Minimum Required Personnel Safety Equipment

1. Hard Hat
2. Safety Shoes
3. Safety Glasses
4. Heavy Gloves
5. Hearing Protection
6. Reflective Clothing

Failure to follow the safety precautions outlined in this manual can create a dangerous situation. Some of the common ways this can occur are as follows:

1. Use of hoisting devices not capable of supporting the weight of the component being lifted.
2. Improper attachment of slings to heavy components being hoisted.
3. Use of inadequate or rotten timbers for support or improper alignment of supporting material.
4. Failure to securely block the wheels, when disconnecting or removing components that hold the container handling truck stationary under normal conditions.
5. Failure to read and understand the safety precautions in this manual.

 **WARNING: Know how to avoid accidents such as those described in the Maintenance / Service Accidents Section of Safety Check:**


Some Maintenance / Servicing Accidents Listed below:


1. Improperly refueling the truck.
2. Improperly checking for hydraulic leaks or diesel fuel leaks.
3. Improperly checking the engine cooling system.

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4. Improperly checking battery fluid levels or “jump” starting engines.
 5. Putting air in a multi-piece tire and rim assembly without proper tools and training.
 6. Attempting to service a multi-piece tire and rim assembly without proper tools and training.
 7. Entering the area around the steer tires.
 8. Using an improper chain while performing maintenance.
 9. Relying on jacks or hoists to support heavy loads.
 10. Operating a truck that is damaged or in need of repair.
 11. Climbing on the attachment, boom, top of the cab, or other high places on the container handling truck.
 12. Operating a machine which has been modified without the manufacturer’s approval. This includes the attachment, counterweight, tires, etc.
 13. Lifting people with an attachment not properly equipped for elevating personnel.
 14. Using replacement parts not approved by the manufacturer.
 15. Performing maintenance around the fan or radiator while the engine is running.


Maintenance / Service Personnel:


1. Keep the truck clean, free of oil, grease and fuel.
2. Steam clean / wash the truck prior to performing maintenance. Wear anti-slip footwear when performing maintenance procedures.
3. Use approved ladders and other proper cleaning accessories to access hard to reach maintenance places.
4. Keep gratings free of ice, dirt and gravel.
5. Regularly inspect and replace anti-slip mastic on the vehicle as needed.
6. Ensure all safety decals are in place on the vehicle.


 **WARNING: Remove all rings, watches, chains, other jewelry, and all loose clothing before working around moving parts!**


 **WARNING: Do not operate the vehicle or attempt to perform maintenance on the vehicle while under the influence of alcohol, drugs, or**

any other medications or substances that slow reflexes, alter safe judgement, or cause drowsiness.

 **WARNING: Never park the container handling truck on an incline. Always park the container handling truck on a level surface; otherwise, the container handling truck could possibly roll resulting in possible injury to personnel or damage to the truck or other property.**


 **WARNING: Maintenance and service personnel should never operate this lift truck unless they are thoroughly familiar with Safety Check, TMW-077 and the Operator’s Guide for this lift truck.**

 **WARNING: Electrical, mechanical, and hydraulic safety devices have been installed on this container handling truck to help protect against personal injury and / or damage to equipment. Under no circumstances should any attempt be made to disconnect or in any way render any of these devices inoperable. If you discover that any safety device is malfunctioning, Do Not operate the truck; notify appropriate maintenance personnel immediately.**

 **WARNING: Use only genuine Taylor replacement parts. Lesser quality parts may fail, resulting in property damage, personal injury or death.**

 **WARNING: Relieve pressure on the hydraulic system before repairing or adjusting or disconnecting any hydraulic component.**

 **WARNING: Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.**

 **WARNING: Under no circumstances, without prior written approval from Taylor Machine Works, Inc. Engineering Department, should the container handling truck be modified, i.e. adding of additional counterweights. As per OSHA 29 CFR1910.178 (a) (4).**

⚠ WARNING: Death or serious injury may occur from dangerous maintenance practices.

- Do not climb on the attachment, boom, on top of the cab, or on other high places of the truck while performing maintenance.
- Always use approved ladders, stands, or man lifts to reach high places on the truck.
- Never ride on the attachment of the truck.
- Do not use a material handling forklift as a means to elevate personnel.
- Never place any part of the body between moving parts of the boom or attachment.

⚠ WARNING: Death or serious injury may occur from improperly supporting an elevated load. The parts could move or fall without warning.

- Never get under, near, or between heavy parts that are not properly supported.
- Never work under or near an elevated boom, attachment or load supported only by the truck's hydraulic system.
- Never work under or near elevated parts supported by a hydraulic jack or by a hoist.
- Always use oak hardwood, or other cribbing to support the load.
- Do not rely on one elevated load to support another.

Emergency Hydraulic Movement Stop. The Emergency Hydraulic Movement Stop must be pulled to the out position to enable certain TICS controlled hydraulic functions. Should a hydraulic operation occur without an operator command, press the Emergency Hydraulic Movement Stop to disable the hydraulic function. The TICS controlled hydraulic functions that are disabled by the Emergency Hydraulic Movement Stop are boom and attachment functions and cab movement. Additionally, the forward and back-up alarms will be disabled, and neutral lock will be enabled causing the truck to automatically shift into neutral. Shut down the truck as soon as it is safe to do so. Do not place the truck to service until all faults have been corrected.

⚠ WARNING: Activation of the TICS Emergency Stop eliminates some of the con-

trols of the truck and should be used in emergency situations **ONLY**.

⚠ WARNING: When the TICS emergency stop is pressed, the TICS display and forward and back-up alarms are disabled.

⚠ WARNING: Should unwanted hydraulic function continue after pressing the TICS emergency stop, disable the hydraulics by shutting down the truck. It is vital to understand the means to shut down the truck which can vary due to truck options. Read and understand all truck starting and stopping instructions located in the truck's operator's guide and be prepared to shut down the truck in the event of an emergency.

Container Handling Truck Lock-out / Tag-out:

The engine should be locked-out / tagged-out to prevent it from being inadvertently started before performing maintenance or repairs. The battery should be locked-out / tagged-out to prevent accidental activation of the starter and possible starting the engine. Refer to **Lock-Out / Tag-Out Procedure** in the back of this section for the procedures to be followed to perform lock-out / tag-out.

⚠ WARNING: Do not start the engine if the ignition switch or engine control panel has been locked-out / tagged-out. Doing so can result in personal injury and / or damage to the equipment. If in doubt, contact the job supervisor.

⚠ WARNING: Turn the engine off and remove the ignition key before entering the tire pivot area to prevent death or serious injury from pivoting tires.


⚠ WARNING: Deflate tires before removing (the tires). Always remove the valve core and exhaust all air from a single tire and both tires of a dual assembly prior to removing any rim components or wheel components such as nuts and rim clamps. Run a piece of wire through the valve stem to make sure the valve stem is not damaged or plugged and all air is

exhausted.


 **WARNING:** Serious falls and injuries can result from improper mounting or dismounting of the container handling truck.


Mounting and Dismounting:


1. Face the container handling truck's steps when getting on or off the truck.
2. One hand and two feet or two hands and one foot must be in contact with the truck at all times (3 point contact).
3. Use handrails and other grab points.


 **WARNING:** Never operate the container handling truck without proper instruction. Ignorance of operational characteristics and limitations can lead to equipment damage, personal injury, or death.


 **WARNING:** If maintenance requires running the engine indoors, ensure the room has adequate flow-through ventilation!


 **WARNING:** During operation should the parking brake apply pressure drop below 1,500 psi (103 bar), a low brake pressure icon will appear on the main screen of the TICS display module, an audible buzzer will sound, and the Active Warnings screen will appear on the display module. The parking brake will be applied as brake pressure decreases. Shut down the truck. Do not operate the truck until all brake problems are resolved.


 **WARNING:** Do not operate the container handling truck without the seat belt properly and securely fastened.


 **WARNING:** Operating instructions, warnings, and caution labels are placed on the container handling truck to alert personnel to dangers and to advise personnel of proper operating procedures (of the container handling truck). Do not remove or obscure any warning, caution, danger, or instructional sign or label.

 **WARNING:** This equipment is not electrically insulated. Contact with electricity can cause severe injury or death. Electrocutation can occur without direct contact. Do not operate this container handling truck in areas with energized power lines or a power supply. Check local, state and federal safety codes for proper clearance. Use a groundman to ensure that there is proper clearance.

 **WARNING:** Do not allow anyone on the container handling truck during operation.

 **WARNING:** Death or serious injury could occur from being crushed by the boom. Never allow any portion of your body or anyone between the top of the cab and the boom.

 **WARNING:** Serious falls or injuries can result from riding on the container handling truck! Do not ride on the container handling truck.

 **WARNING:** Do not allow anyone near the container handling truck during operation - certainly not walking or standing under or beside the container or lifting mechanism.

Emergency Exit:

There is an emergency exit from within the cab, through the rear window, in the event that the cab door is blocked by the lift cylinder. If the operator needs to exit the cab when the cab door is blocked by the lift cylinder, the following steps must be followed:

1. Open the rear window by rotating the window release handle down.
2. Pivot the window up to open the window.
3. Carefully exit the cab through open window space.

Battery Safety:

 **WARNING: Lighted smoking materials, flames, arcs, or sparks may result in battery explosion.**

1. Keep all metal tools away from battery terminals.
2. Batteries contain sulfuric acid which will burn skin on contact; wear rubber gloves and eye protection when working with batteries.
3. Flush eyes or wash skin with water and seek medical attention immediately in case of contact.
4. When jump starting:
 - a. Do not lean over the battery while making connection.
 - b. First, connect the positive (+) terminal of the booster battery to the positive (+) terminal of the discharged battery.
 - c. Then, connect the negative (-) terminal of the booster battery to the engine or body ground (-). Never Cross Polarity of Terminals.
 - d. Disconnect cables in exact reverse order.

Lock-Out / Tag-Out Procedure

Purpose. This procedure establishes the minimum requirements for lock-out / tag-out of energy sources that could cause injury to personnel. All employees shall comply with the procedure.

Responsibility. The responsibility for seeing that this procedure is followed is binding upon all employees. All employees shall be instructed in the safety significance of the lock-out / tag-out procedure by (designated individual). Each new or transferred affected employee shall be instructed by (designated individuals) in the purpose and use of the lock-out / tag-out procedure.

Preparation for Lock-Out / Tag-Out. Employees authorized to perform lockout / tagout shall be certain as to which switch, valve, or other energy isolating devices apply to the equipment being locked out / tagged out. More than one energy source (electrical, mechanical, or others) may be involved. Any questionable identification of sources shall be cleared by the employees with their supervisors. Before lock-out / tag-out commences, job authorization should be obtained.

Sequence of Lock-Out / Tag-Out Procedure

1. Notify all affected employees that a lock-out / tag-out is required and the reason therefor.
2. If the equipment is operating, shut it down by the normal stopping procedure.
3. Operate the switch, valve, or other energy isolating device so that the energy source(s) (electrical, mechanical, hydraulic, etc.) is disconnected or isolated from the equipment. Stored energy, such as that in capacitors, springs, elevated crane members, rotating fly-wheels, hydraulic systems, and air, gas, steam, or water pressure, etc. must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding-down, etc.
4. Lock-out / tag-out the energy isolating devices with an assigned individual lock / tag.
5. After ensuring that no personnel are exposed and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate.



CAUTION: Return operating controls to neutral after the test.

6. The equipment is now locked out / tagged out.

Restoring Equipment to Service

1. When the job is complete and equipment is ready for testing or normal service, check the equipment area to see that no one is exposed.
2. When equipment is all clear, remove all locks / tags. The energy isolating devices may be operated to restore energy to equipment.

Procedure Involving More Than One Person.

In the preceding steps, if more than one individual is required to lock-out / tag-out equipment, each shall place his own personal lock / tag on the energy isolating device(s). One designated individual of a work crew or a supervisor, with the knowledge of the crew, may lock-out / tag-out equipment for the whole crew. In such cases, it shall be the responsibility of the individual to carry out all steps of the lock-out / tag-out procedure and inform the crew when it is safe to work on the equipment. Additionally, the designated individual shall not remove a crew lock / tag until it has been verified that all individuals are clear.

Rules for Using Lock-Out / Tag-Out Procedure.

All equipment shall be locked out / tagged out to

protect against accidental or inadvertent operation when such operation could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy isolating device bearing a lock / tag.

Setup Guide

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Setup Checklist

This checklist is a general guide for use in setting up a truck. Refer to sections for detailed information.

Steer Axle:

1. Steer Axle Shims In Place.
2. Steer Pivot Blocks Mounted. Refer to the **Steer Axle** section for torque values.
3. Steer Axle Hydraulic Connect.
4. Steer Wheels / Protectors / Lug Nuts. Refer to the **Steer Axle** section for torque values.
5. Tire Pressure. Refer to the Data Plate on the truck for pressure values.

Drive Axle:

6. Axle Bolts. Refer to the **Drive Axle** section for torque values.
7. Drive Axle Hydraulic Connect.
8. Drive Axle Cooling Connect.
9. Flow Control Hydraulic Connect.
10. U-Joint / Fasteners. Refer to the **Drive Axle** section for torque values.
11. Tire Pressure. Refer to the Data Plate on the truck for pressure values.
12. Check drive tire torque.

Body Hull / Fender Extensions (Front & Rear):

13. Rear Fenders / Fasteners.
14. Fire Extinguishers.
15. Front Fenders / Fasteners.
16. Fender Light / Fasteners.

Body Hull / Runningboards & Exhaust:

17. Runningboards / Supports / Spacers.
18. Exhaust.

Body Hull / Platform, Air Cleaner, & Mirrors:

19. Platform.
20. Steps.
21. Handrails / Set Screws.
22. Air Cleaner / Clamp.
23. Mirrors / Mounts.

Jacks (if equipped):

24. Remove Jacks Up Jumper.
25. Jack Cylinder Pins / Bolts. Refer to the **Jacks** section for torque values.
26. Jack Cylinder Shimming.
27. Jack Cylinder Collar Bolts. Refer to the **Jacks** section for torque values.
28. Jacks Hydraulic Connect.

Counterweight:

29. Counterweight.

30. Light Mounts.

31. Counterweight Bolts. Refer to the **Counterweight** section for torque values.

32. Tail Lights Electrical Connect.

Boom:

33. Remove Shipping Spacers.

34. Boom / Pins / Bolts. Refer to the **Boom** section for torque values.

35. Boom to Boom Tower Shimming.

36. Lift Cylinder / Pins / Bolts. Refer to the **Boom** section for torque values.

37. Lift Cylinder Shimming.

38. Boom to Tower Hydraulic Connect.

39. Boom to Tower Electrical Connect.

40. Angle Sensor / Clevis.

Attachment:

41. Attachment / Pins / Bolts. Refer to the **Attachment** section for torque values.

42. Attachment to Boom Shimming.

43. Damping Cylinders / Pins / Bolts. Refer to the **Attachment** section for torque values.

44. Damping Cylinder Shimming.

45. Dead End Bracket / Bolts. Refer to the **Attachment** section for torque values.

46. Attachment to Boom Hydraulic Connect.

47. Attachment to Boom Electrical Connect.

Attachment Calibration (LMI):

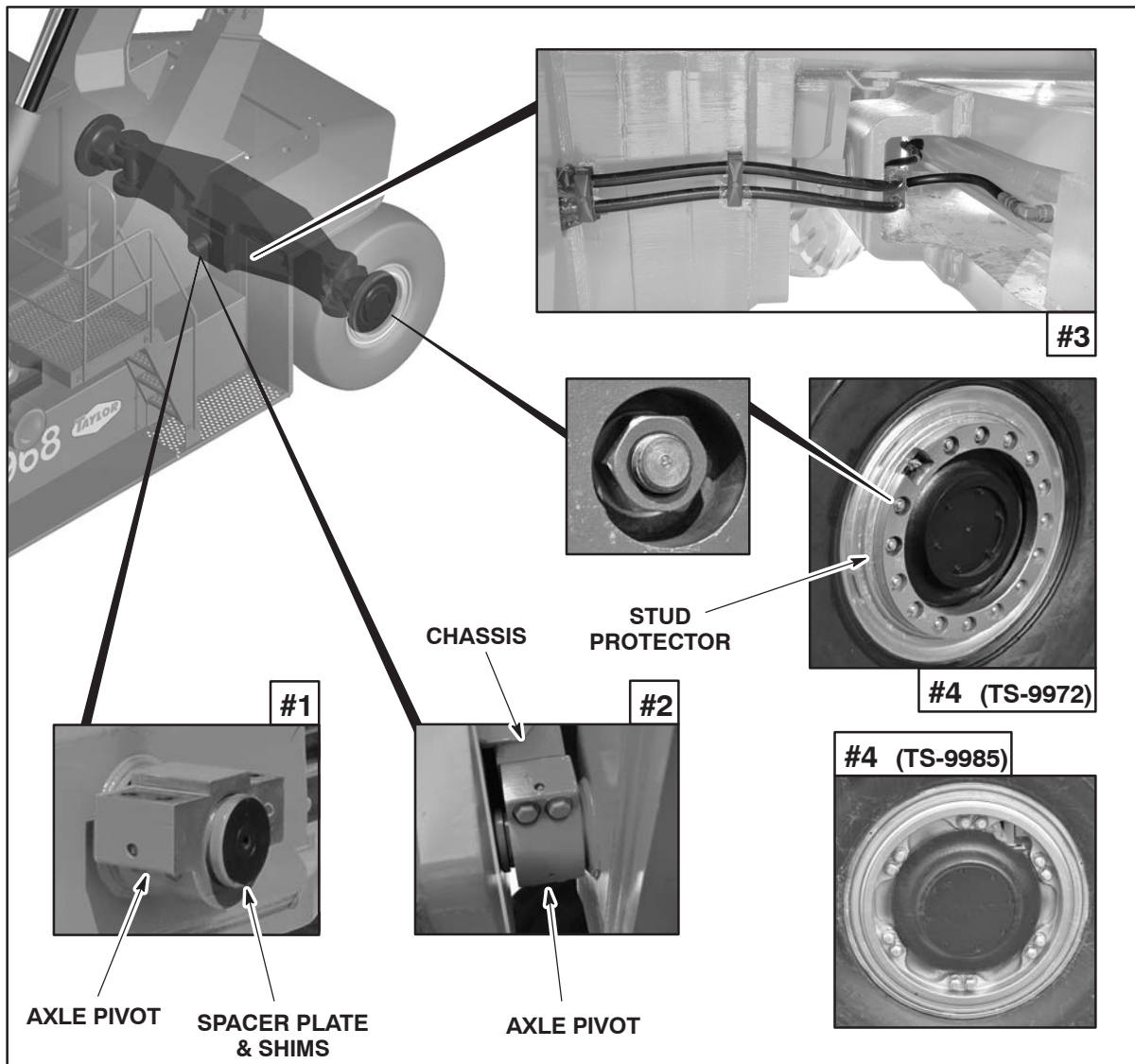
48. Calibrate Boom Angle Sensor

49. Calibrate Extension Sensor

50. Calibrate Rotation Angle Sensor

51. Check Calibration of Sensors

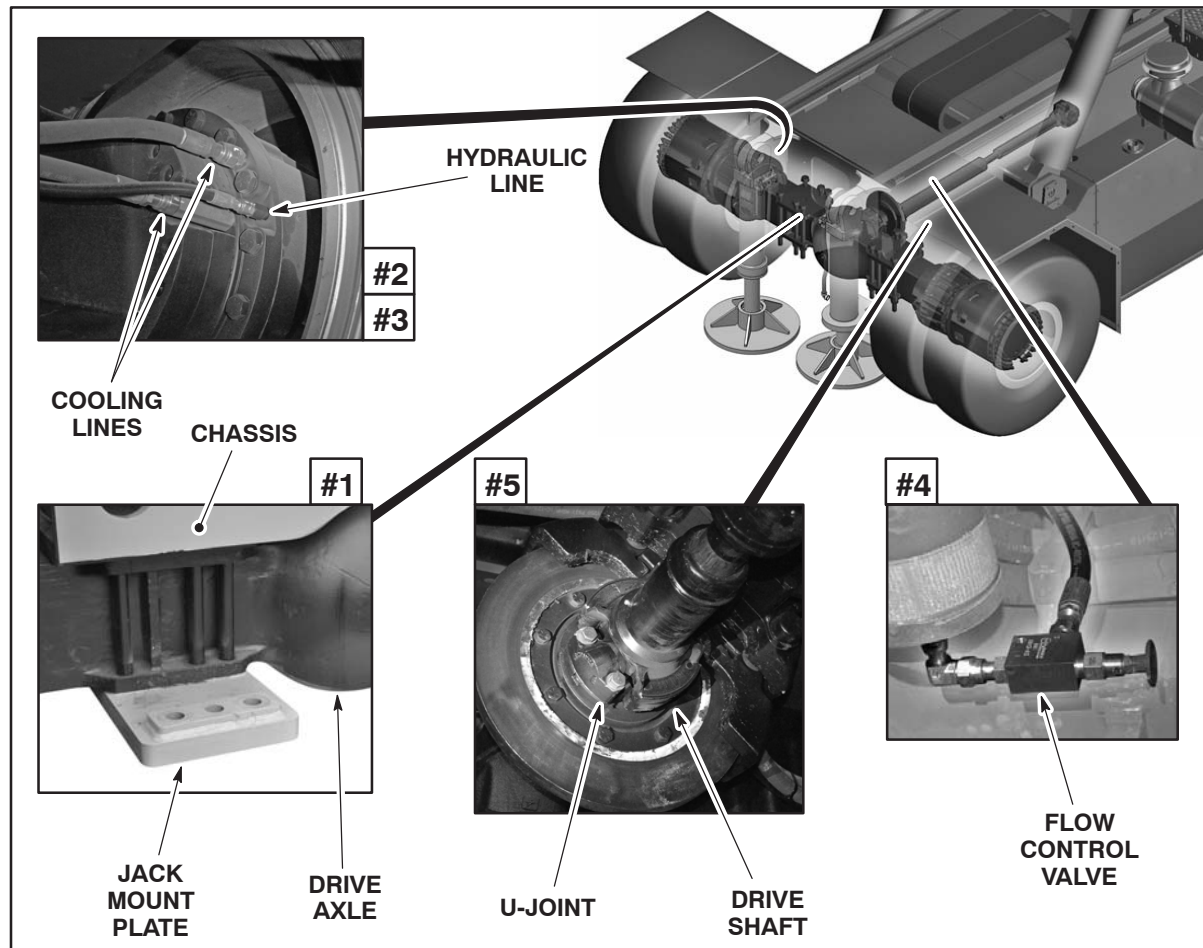
Steer Axle



Mounting the Steer Axle:

1. Ensure axle pivot shims are in place.
2. Raise steer axle into position and mount axle pivot blocks to the chassis. Apply a threadlocker and torque bolts to 500 ft-lbs (680 N·m).
3. Align and clamp the hydraulic lines to the chassis and attach to steer cylinder.
4. Mount steer tires and stud protectors with nuts and washers. Apply a threadlocker and torque bolts:
 - TS-9985 – 1,600 ft-lbs (2,175 N·m)
 - TS-9972 – 145 – 155 ft-lbs (200 – 210 N·m)
5. Check tire pressure for proper inflation (Refer to Data Plate on truck).
6. Check for leaks.

Drive Axle



Mounting the Drive Axle:

1. Mount the drive axle and jack mount plate (if equipped with jacks) to the chassis. Apply a threadlocker and torque bolts to 2,400 ft-lbs (3,260 N·m).

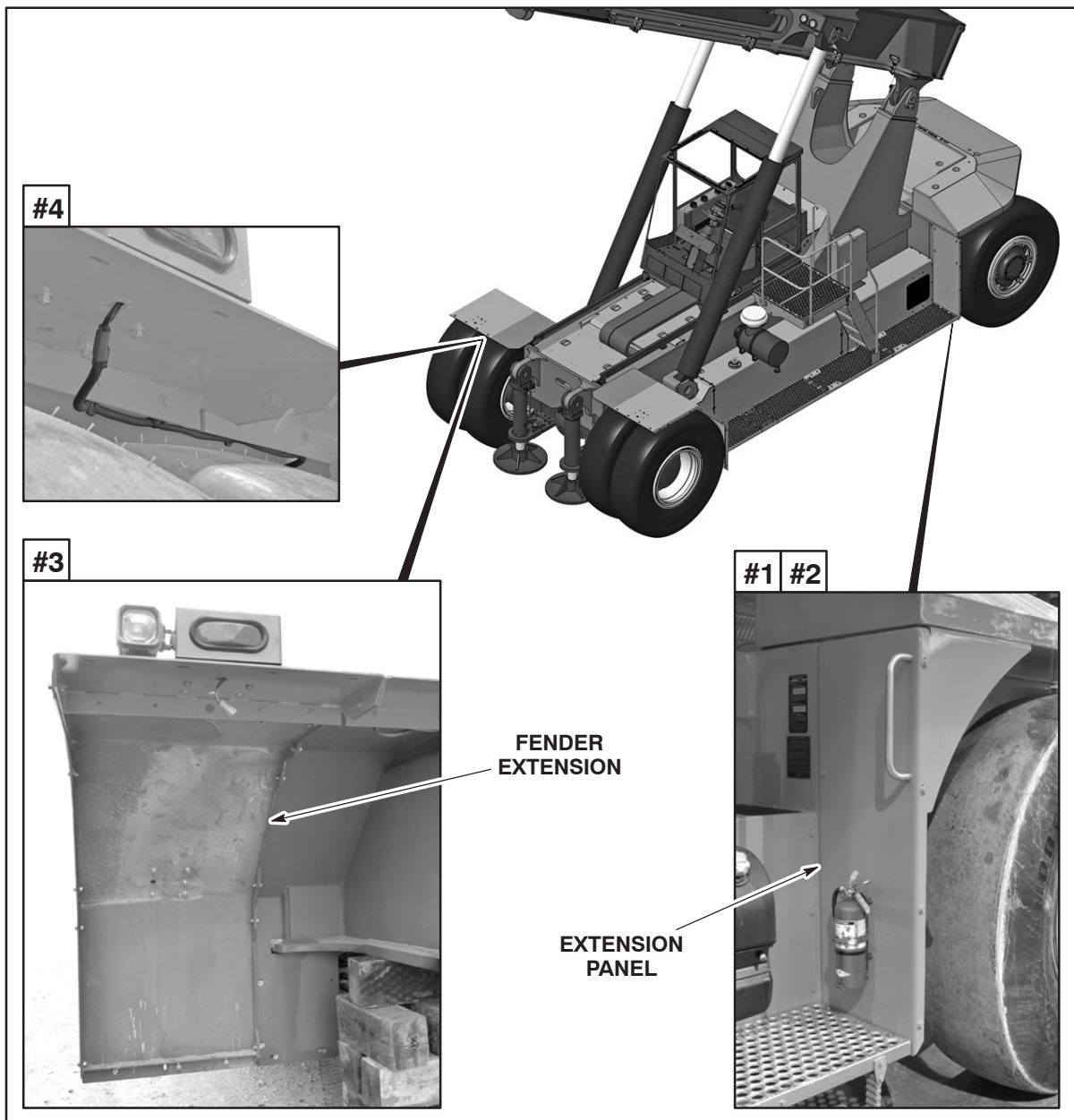
NOTE: If equipped with jacks, jack mount plate must be mounted before jacks can be installed.

2. Attach hydraulic lines to wheel ends.
3. Attach cooling lines to wheel ends.
4. Attach hydraulic line to flow control valve.
5. Attach drive shaft and u-joint to the drive axle. Apply a threadlocker and torque bolts to 110 ft-lbs (150 N·m).
6. Check tire pressure for proper inflation (Refer to Data Plate on truck).
7. Check for leaks.
8. Check drive tire torque:

TS-9985 – 1,600 ft-lbs (2,175 N·m)

TS-9972 – 330 – 350 ft-lbs (450 – 475 N m)

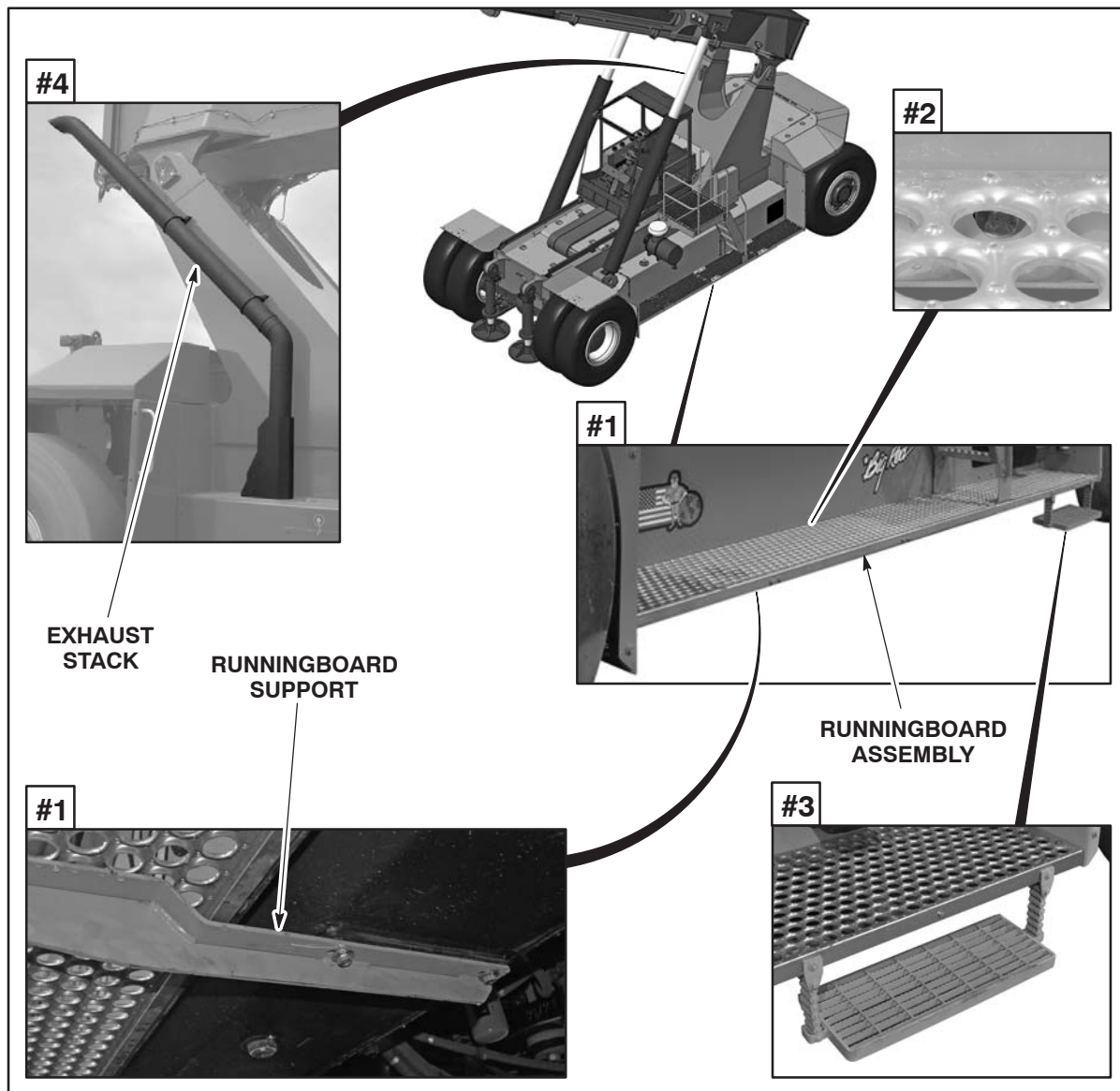
Body Hull: Fender Extensions (Front & Rear)



Mounting Fenders Components:

1. Rear Fender Extensions: Mount rear fender extensions to rear of chassis.
2. Fire Extinguishers: Install chassis mounted fire extinguishers.
3. Front Fender Extensions: Mount front fender extensions to front of chassis.
4. Fender Lights (if equipped): Connect fender mounted light cables and clamp to the fenders.

Body Hull: Runningboards & Exhaust



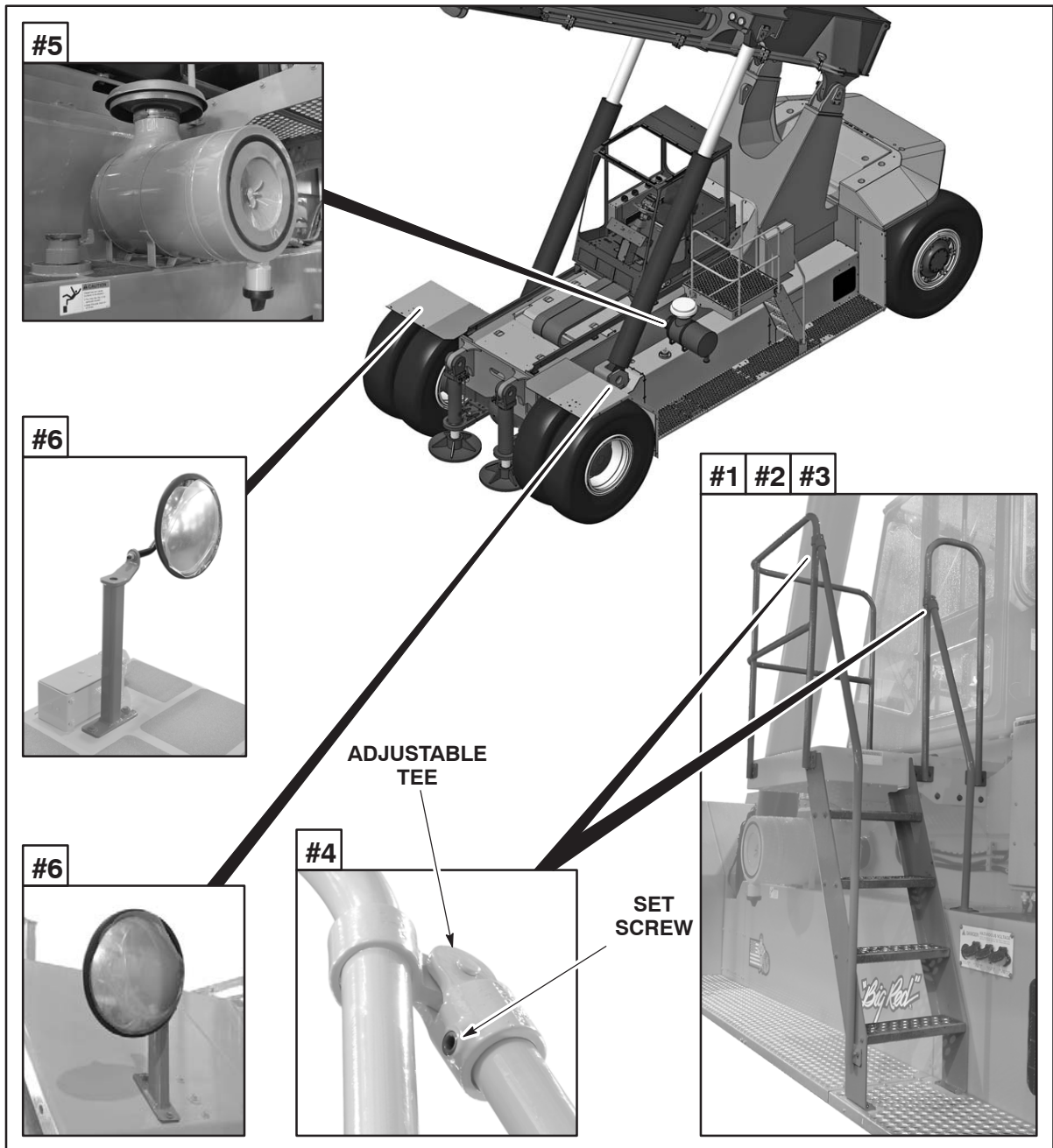
Mounting various Runningboard Components:

1. Mount the runningboards by attaching the runningboard supports and spacer plates to the chassis.
2. Further secure by bolting runningboards to chassis.
3. Mount step assembly to runningboard.

Mounting Exhaust Stack:

4. Exhaust: Attach exhaust stack and clamp.

Body Hull: Platform, Air Cleaner, & Mirrors



Mounting various Body Hull Components:

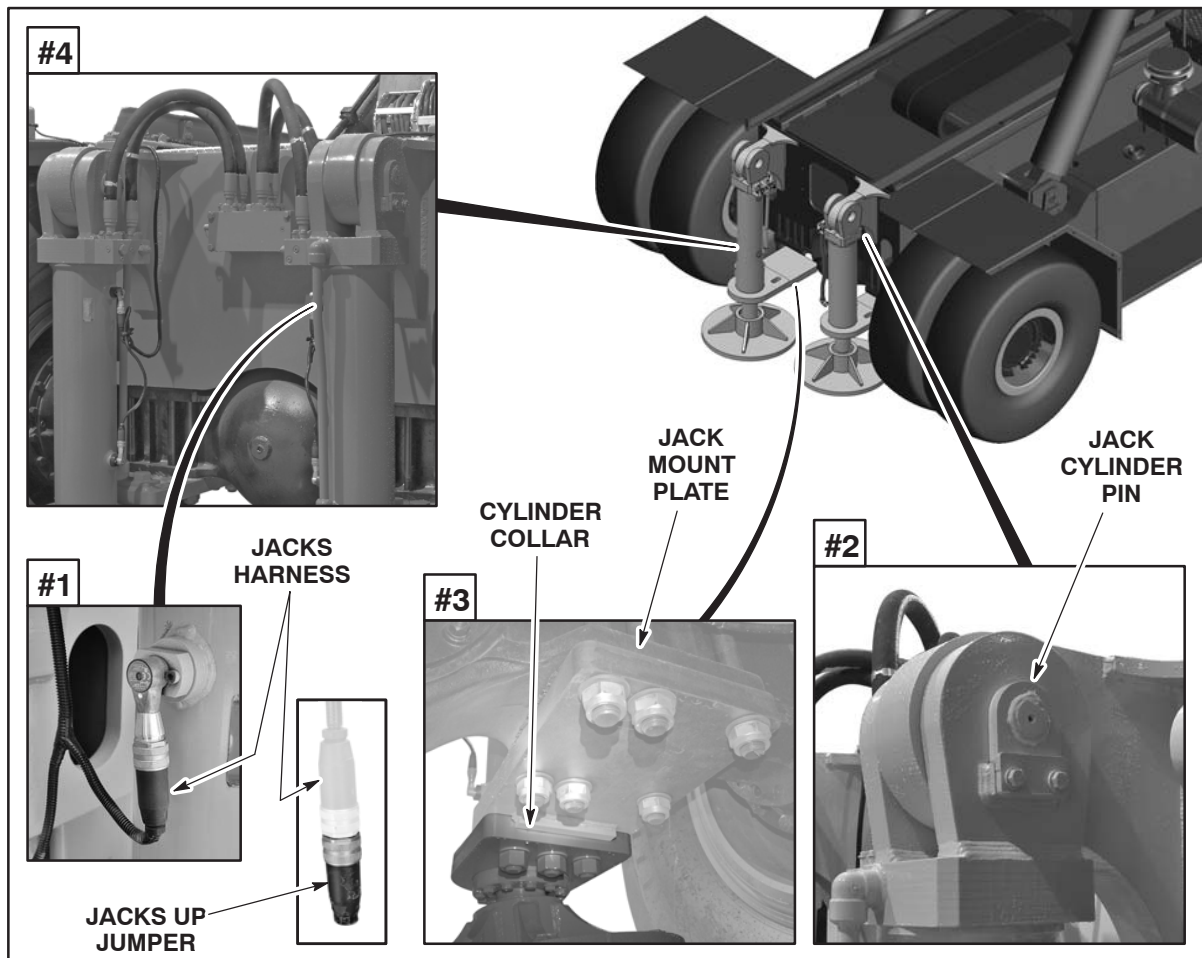
1. Platform: Attach platform to platform supports on the chassis.
2. Steps: Mount step assembly to platform.
3. Platform Hand Rails: Mount platform hand rails to platform.

4. Step Hand Rails: Mount step hand rails to step assembly and adjustable tees.

NOTE: Set screw in adjustable tees must be loosened in order to mount step hand rails and then tightened once rails are mounted.

5. Breather: Set air cleaner on top of tank, clamp elbow in place, and mount air cleaner with hardware.
6. Mirrors: Mount mirrors to front fenders. Ensure mirrors are adjusted so that the operator has a clear view from the operating position.

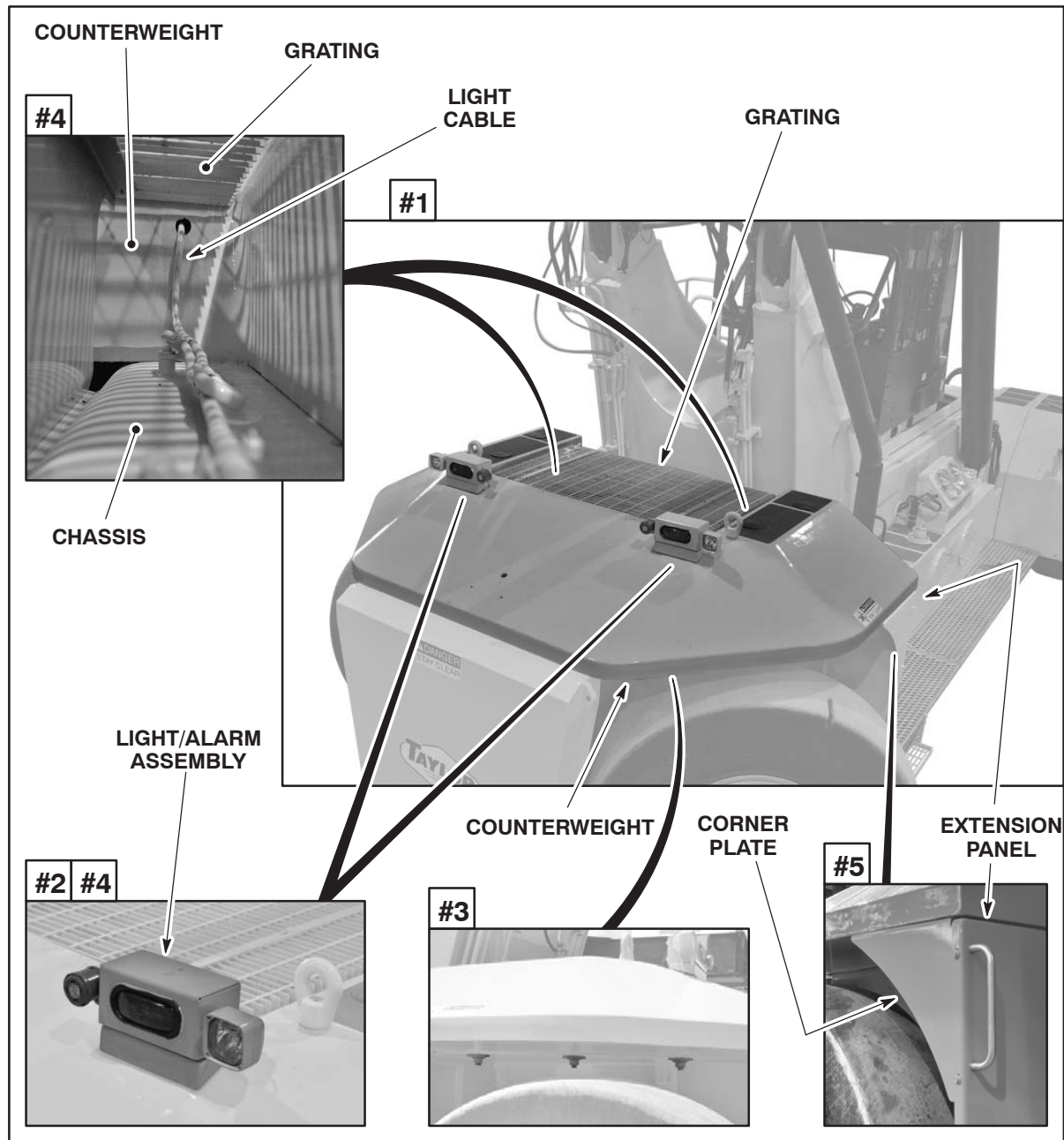
Jacks (if equipped)



Mounting the Jacks:

1. Remove the two jacks up jumpers from the jacks electrical harness.
2. Attach the jack cylinder ears to the chassis. Apply a threadlocker and torque pin bolts to 50 – 55 ft-lbs (70 – 75 N·m). Shim as necessary to align the jack cylinders vertically.
3. Mount cylinder collar to jack mount plate. Apply a threadlocker, torque bolts to 2,200 ft-lbs (2,990 N·m), and weld lock bars across bolts and nuts.
NOTE: Jack mount plate must be mounted before jacks can be installed.
4. Connect the jacks hydraulic/electrical lines to the jack regen valve.
5. Check for leaks.

Counterweight



Mounting various Counterweight Components:

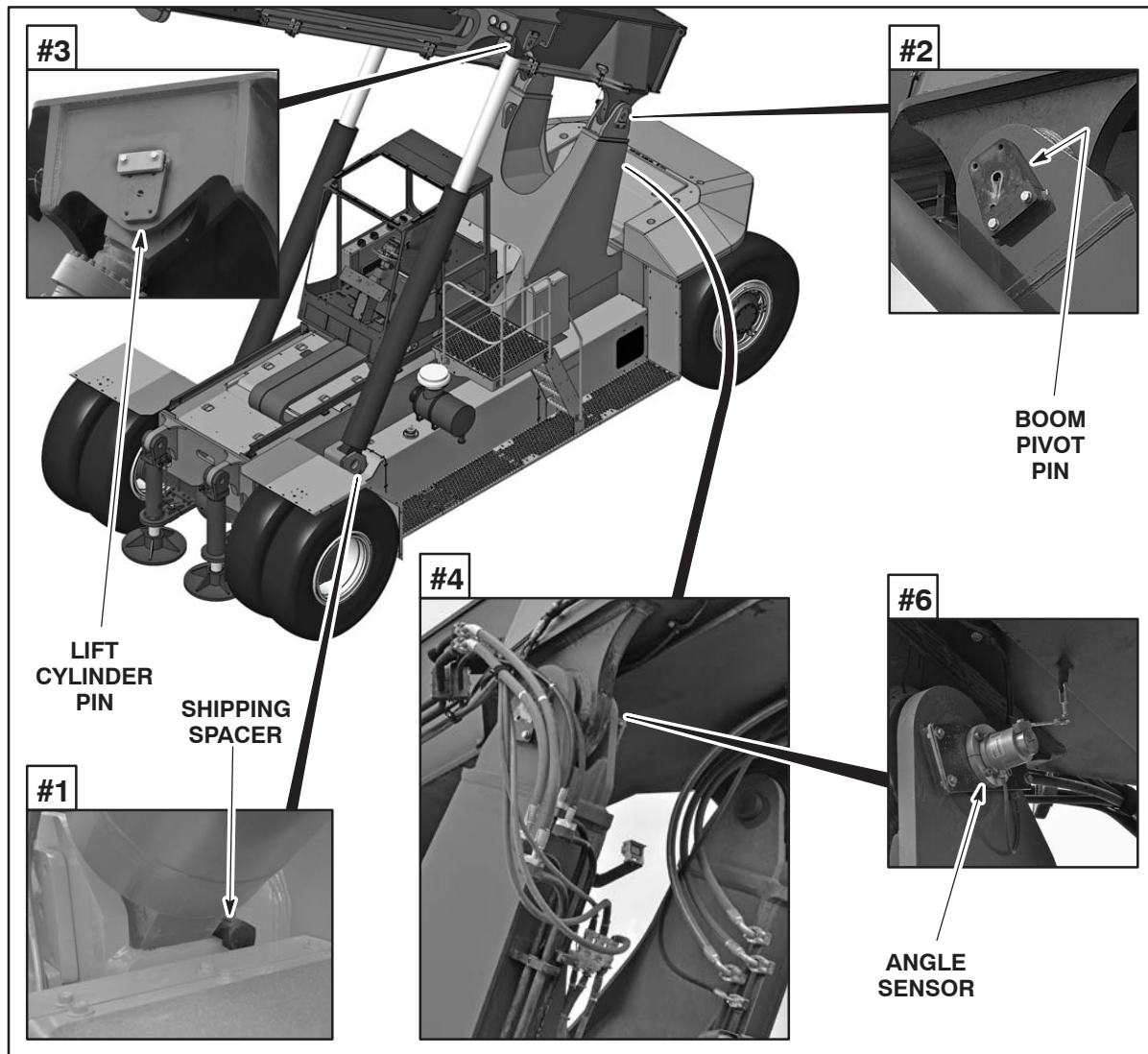
1. Align the counterweight with the rear counterweight plate first and then align counterweight sides with extension panels.

NOTE: The extension panels must be installed before installing the counterweight.

2. Set the tail light mount in place.

- 3.** Install counterweight bolts and tighten. Apply a threadlocker and torque bolts to 1,080 – 1,200 ft-lbs (1,470 – 1,630 N·m).
- 4.** Connect tail light cable first, then install tail light/alarm assembly to the tail light mount.
- 5.** Install the corner plate.

Outer Boom

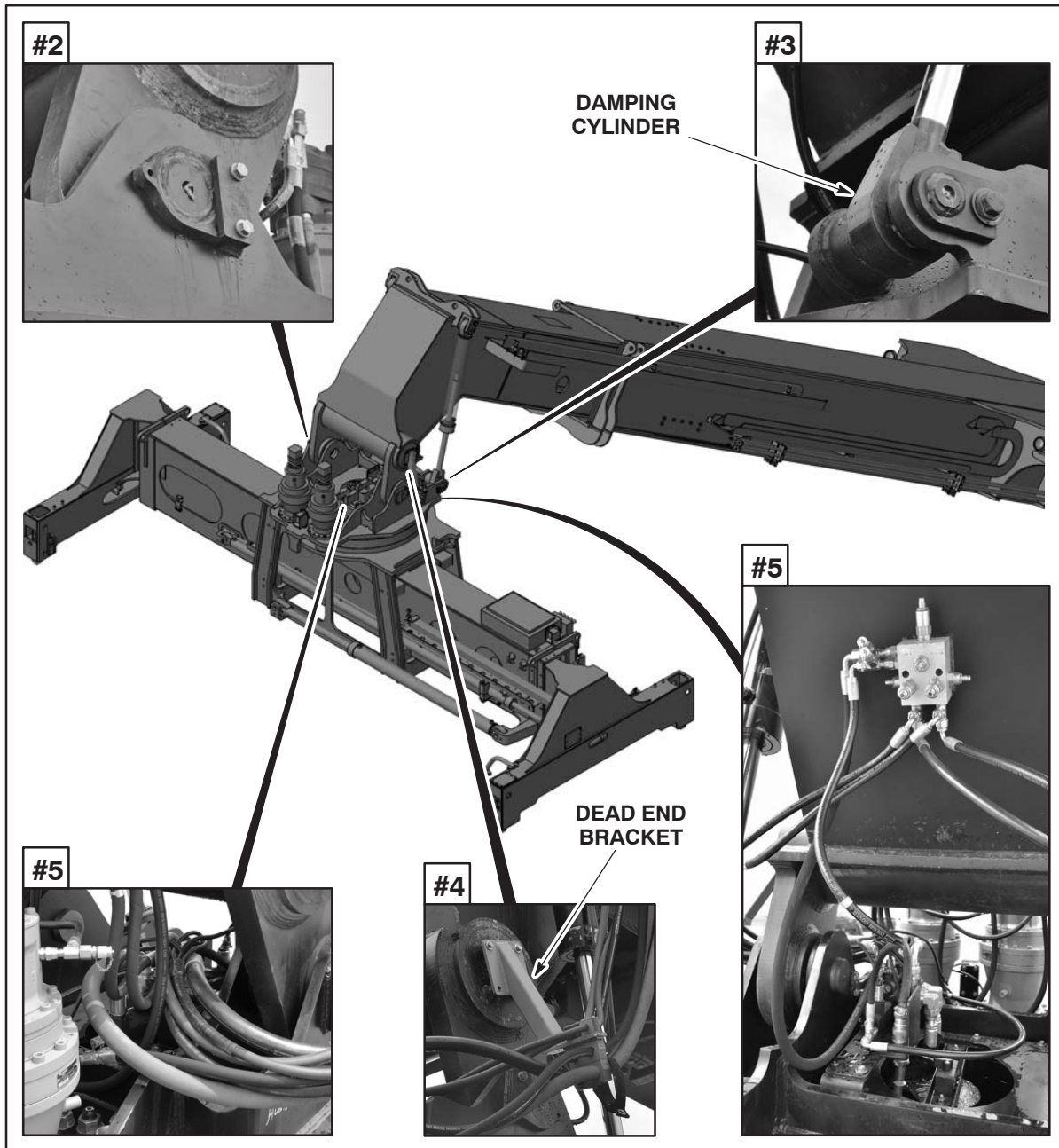


Mounting the Outer Boom:

1. Remove shipping spacers from between the lift cylinder and the cylinder anchor.
2. Mount the outer boom to the boom tower. Shim as necessary (refer to **Shimming Guidelines** in the **Appendices**). Apply a threadlocker and torque pin bolts to 150 ft-lbs (200 N·m).
3. Attach the lift cylinder to the outer boom. Shim as necessary (refer to **Shimming Guidelines** in the **Appendices**). Apply a threadlocker and torque pin bolts to 150 ft-lbs (200 N·m).
4. Connect hydraulic/electrical lines from the boom to the boom tower.

5. Ensure proper hose/cable installation in boom hose and cable track (refer to **Hoses & Electrical Cables** in the **Appendices**).
6. Attach angle sensor clevis to the boom and connect angle sensor electrical cable.
7. Check for Leaks.

Attachment



Attaching the Attachment:

1. Level the pile slope frame (if equipped with a powered pile slope attachment) to square up the attachment anchor ears for mounting.
2. Attach the attachment to the inner boom. Shim as necessary (refer to **Shimming Guidelines** in the **Appendices**). Apply a threadlocker and torque pin bolts to 75 – 80 ft-lbs (100 – 110 N·m).

3. Connect the damping cylinders to the attachment. Shim as necessary (refer to **Shimming Guidelines** in the **Appendices**). Apply a threadlocker and torque pin bolts to 270 – 300 ft-lbs (365 – 410 N·m).
4. Correctly position and secure the dead end bracket. Apply a threadlocker and torque bolts to 20 ft-lbs (30 N·m).
5. Attach the hydraulic/electrical lines to the main attachment valve and damping manifold.

NOTE: The hydraulic hose from the dead end bracket to the damping manifold must be routed from the front and through the pivot area.

6. Check for leaks.

Attachment Calibration (LMI)

See the Maintenance Manual for further information on calibration and operation of the Load Moment Indicator (LMI) system.

Calibration of Boom Angle Sensor

NOTE: Calibration of the Boom Angle Sensor should be performed with the truck's attachment unloaded.

The angle of the boom will vary from 0 degrees at full down to 60 degrees at full up. Calibration is made through the Boom Calibration Adjust Group. The feedback must be approximately 2000 mV with the boom fully raised as the TICS program is set up for feedback values to be 2000 – 4000 mV. This feedback can be found in the LMI Measure Group. Feedback is displayed in the measure group in two ways, as a scaled value and as a raw value. Scaled value is in degrees and raw value is in millivolts (mV). To calibrate, depress the C button at the LMI display (see the LMI Screen illustration in **Boom Calibration Setting Procedure**) to enable the Boom Angle Calibrate Mode (**NOTE:** This action will disable the cab protection feature for 4 minutes). Start with the boom fully lowered and select Max at the boom angle sensor page. Adjust the actual value using the up/down arrows until it reads 0 and depress OK to enter the value. Fully raise the boom and select Min. Adjust the actual value using the up/down arrows until it reads 60 and depress OK to enter the value. Boom angle calibrate mode should be turned on at the LMI display screen before the Max angle is calibrated. This will disable the auto vertical function and allow faster calibration. After completing the calibration, turn the boom angle calibrate mode off.

Calibration of Extension Sensor

NOTE: Calibration of the Extension Sensor should be performed with the truck's attachment unloaded.

The boom extension value will vary from 0 inches (0 cm) at full retraction to 280 inches (711 cm) at full extension. Calibration is made through the Boom Calibration Adjust Group. The feedback must be approximately 1000 mV with the boom fully retracted as the TICS program is set up for feedback values to be 1000 – 5000 mV. This feedback can be found in the LMI Measure Group. Feedback is displayed in the measure group in two ways, as a scaled value and as a raw value. Scaled value is in inches and raw value is in millivolts (mV). To calibrate, start with the boom fully retracted and select Min at the boom extension sensor page. Adjust the actual value using the up/down arrows until it reads 0 and depress OK to enter the value. Fully extend the boom and select Max. Adjust the actual value using the up/down arrows until it reads 280 and depress OK to enter the value.

Calibration of Attachment Rotation Angle Sensor

NOTE: Calibration of the Attachment Rotation Angle Sensor should be performed with the truck's attachment unloaded. The attachment angle value will vary from 95 degrees CW to 185 degrees CCW. The angle sensor is a rotary potentiometer located in the center of the attachment rotate joint. Calibration is made through the Boom Calibration Adjust Group. The feedback must be approximately 3,100 mV with the attachment in the normal working position as the TICS program is set up for feedback values to be 25 – 4,800 mV. This feedback can be found in the Attachment Auxillary Measure Group. Feedback is displayed in the measure group in two ways, as a scaled value and as a raw value. Scaled value is in degrees and raw value is in millivolts (mV). To calibrate, start with the attachment fully ro-

tated CCW and note the feedback value in mV. Fully rotate the attachment CW and note the feedback value in mV. Place the attachment parallel to the drive axle (normal working position) and note the feedback value in mV. Go to the Boom Calibration Adjust Group and select 0 degree rotation voltage feedback. Use the up/down arrows to adjust the actual value to match the mV feedback noted above with the attachment parallel to the drive axle and depress OK to enter.

Go to the Boom Calibration Adjust Group and select CW degree rotation voltage feedback. Use the up/down arrows to adjust the actual value to match the mV feedback noted above with the attachment

rotated fully CW and depress OK to enter.

Go to the Boom Calibration Adjust Group and select CCW degree rotation voltage feedback. Use the up/down arrows to adjust the actual value to match the mV feedback noted above with the attachment

rotated fully CCW and depress OK to enter.

Check The Calibration Of The Boom Angle and Extension Sensors

NOTE: Calibration Check of the Boom Angle and Extension sensors should be performed with the truck's attachment unloaded.

Check the Boom angle and Extension sensors daily for proper calibration. Ensure there is sufficient clearance to fully extend and fully raise the boom. Perform the following procedures:

1. From the operational screen on the TICS display, depress the LMI button (F2).
2. Fully lower the boom. The angle should indicate 0 degrees.
3. Fully raise the boom. The angle sensor should indicate 60 degrees.
4. Fully retract the boom. The length should indicate 0.
5. Fully extend the boom. The length should indicate 280.

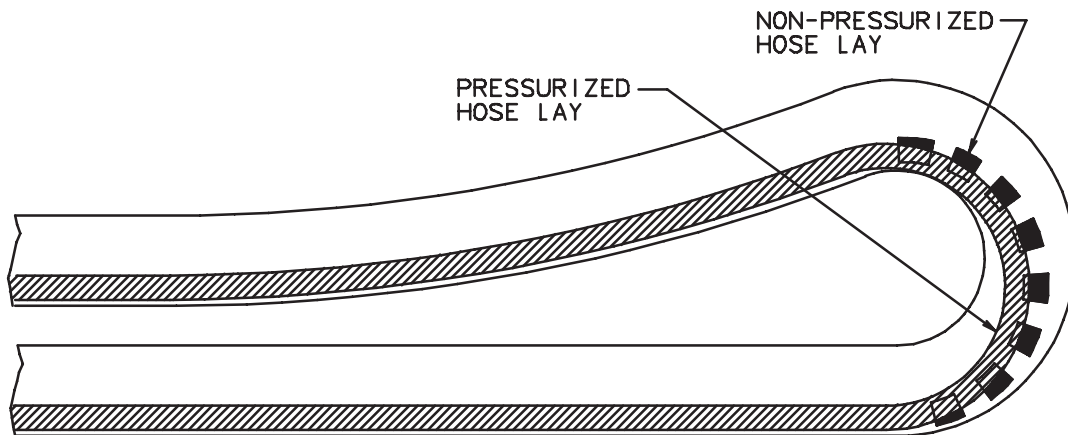
Appendices

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Hoses & Electrical Cables

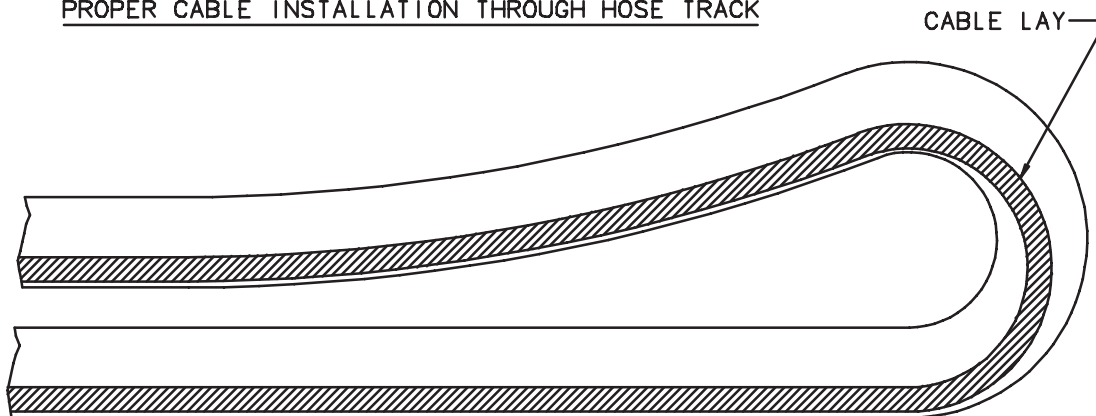
Proper installation and routing of electrical components, wiring harnesses, and hose assemblies are essential to ensure these components perform in a safe and reliable manner. Follow all general wiring and hydraulic hose installation practices while paying close attention to the following areas:

1. For wiring and electrical component installation:
 - a. Some areas requiring special attention include:
 - Areas where there is relative movement between components (i.e. engine / frame).
 - Areas where wiring runs around corners, edges of parts, or through holes.
 - Areas where components are exposed to high temperatures (i.e. near exhaust components).
 - Areas where components are secured with clamps, straps, ties, etc.
 - Battery cables (entire length) and terminals.
 - Connectors / connections.
 - Wire harnesses in cable tracks or over rollers.
 - b. Good practices include:
 - Use genuine Taylor parts (wire, connectors, looms, clamps, etc.).
 - Protect all wiring with approved loom.
 - Properly clamp connectors / terminals on wiring. Use proper crimping tools to attach terminals and connectors.
 - Never use connectors that are not approved by TMW.
 - Never use residential wiring connectors.
 - Use properly sized connectors for wire size.
 - Keep spacing between wire harness and moving parts.
 - Use rubber grommets to protect wiring and harnesses which run through holes.
2. For hydraulic hose assemblies and connections:
 - a. Some areas requiring special attention include:
 - Areas where there is relative movement between components (i.e. engine / frame).
 - Areas where hoses run around corners, edges, or through holes.
 - Areas where hoses cross.
 - Areas where components are exposed to high temperatures (i.e. near exhaust components).
 - Areas where components are secured with clamps, straps, ties, etc..
 - Adapters/ Connectors / connections between hoses and components.
 - Hoses in cable and hose tracks or over rollers.
 - Fuel lines and connections.
 - b. Good practices include:
 - Use genuine Taylor parts (hoses, adapters, clamps, sheathing, etc.).
 - Properly install connectors / adapters on hoses.
 - Never use hoses/connectors/adapters that are not approved by TMW.
 - Use properly sized connectors/adapters for hose size.
 - Maintain spacing between hoses and moving parts.
 - Maintain spacing between hoses and wiring.
 - Avoid hoses crossing over each other at perpendicular angles.
 - Always use properly sized clamps to firmly secure hoses.
 - Properly route hoses.
 - Use rubber grommets to protect hoses routed through holes.
 - Route hoses away from hot surfaces.
 - Keep electrical wires and harnesses separated from hydraulic hoses.



PROPER HOSE INSTALLATION THROUGH HOSE TRACK

PROPER CABLE INSTALLATION THROUGH HOSE TRACK



STEP 1. INSTALL CABLES AND HOSES

- A. ON SHORT TRACKS AND IF CARRIER ELEMENTS ALLOW PASSAGE OF FITTINGS OR CONNECTORS, HOSE AND CABLE MAY BE INSTALLED FROM THE END. CAREFULLY GUIDE END OF EACH CABLE OR HOSE THROUGH CARRIERS AND PULL UNTIL ENTIRE CABLE OR HOSE IS IN TRACK.
- B. ON LONGER TRACKS, OR IF FITTINGS OR CONNECTORS WILL NOT FIT THROUGH CARRIERS, USE THE FOLLOWING PROCEDURE:
 - 1. LAY TRACK ON SUPPORT SURFACE (TRAY, BLOCKS).
 - 2. REMOVE UPPER CARRIER ELEMENTS TO ALLOW ACCESS TO COMPARTMENTS.
 - 3. ARRANGE CABLES AND HOSES ON LOWER CARRIER ELEMENTS.
 - 4. CHECK ORIENTATION OF CABLES AND HOSES WITH MACHINE CONNECTION REQUIREMENTS.
 - 5. REPLACE CARRIER ELEMENTS. TIGHTEN ALL SCREWS HOLDING CARRIER ELEMENTS.
 - 6. ADJUST POSITIONS OF SEPARATORS (WHEN SUPPLIED) TO ENSURE CLEARANCE AROUND HOSES AND CABLES.

- STEP 2. BOLT BRACKETS ON FIXED END OF TRACK TO BOTTOM OF GUIDE TRAY OR OTHER SUPPORT SURFACE.
- STEP 3. INSTALL CARRIAGE, IF USED.
- STEP 4. BOLT BRACKETS ON TOW END OF TRACK TO TOW ARM ON MACHINE.
- STEP 5. ADJUST TENSION OF CABLES AND HOSES IN TRACK. TOO MUCH TENSION CAN CAUSE BINDING AND EXCESSIVE WEAR. TOO LITTLE TENSION INCREASES WEAR BECAUSE OF "SNAKING" WITHIN THE TRACK AS IT MOVES. NOTE THAT INITIAL TENSION FOR HYDRAULIC HOSES IS DIFFERENT THAN THAT FOR CABLES BECAUSE HOSES EXPAND AND LENGTHEN UNDER PRESSURE.
- STEP 6. SECURELY CLAMP CABLES AND HOSES IN PLACE WITHIN 20" OF EACH END OF TRACK.
- STEP 7. OPERATE TRACK SLOWLY THROUGH ONE COMPLETE CYCLE (BOTH DIRECTIONS) TO VERIFY CAPACITY AND OPERATION

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Track Hose and Cable Installation

Shimming Guidelines

The purpose of shimming is to center a component in its mounting location and to limit the component's movement in its mounting location by inserting material (shims) in excess space. In a single mount, the component's ear is to be centered within that mount, meaning that there should be equal amounts of shims on each side of the ear; as with hoist and tilt cylinder ears. When a component is anchored by two mounts, the component is to be centered between the mounts; as with mounting the boom to the boom towers or mounting the attachment to the boom. In this case, it is important to equally shim the inside of both ears to ensure the component is centered between both mounts. Then the outside of the ears can be shimmed as necessary.

Shims should be inserted so that the available space is eliminated without restricting the normal movement of the component.

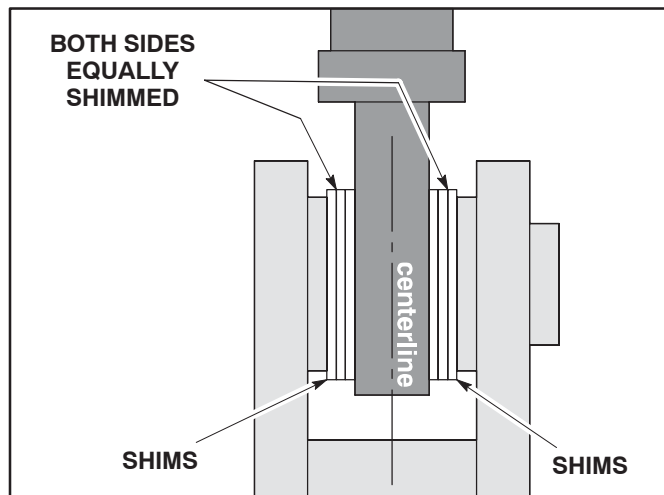


Illustration 1. Single Mount Shimming

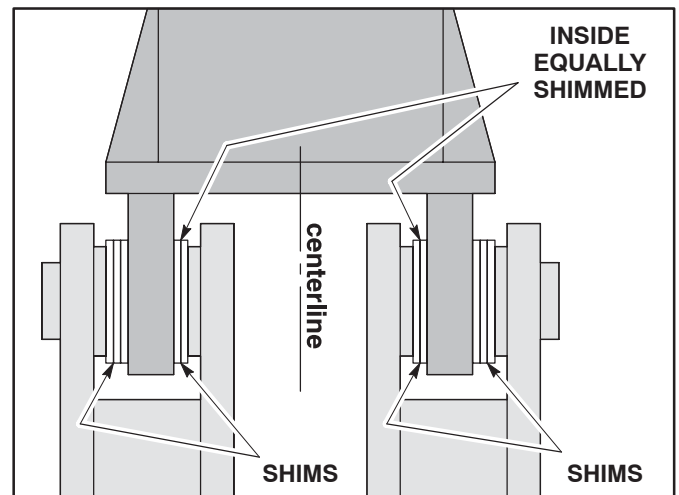


Illustration 2. Double Mount Shimming

Welding Precautions

Welding Precautions. It is possible for damage to occur when welding during service. Current passed from the electrode through a pin, bearing, cylinder piston or other part, seeking the ground, can cause damage to parts.

Care and common sense are the best guides to avoid such damage to the components.

⚠ WARNING: Death or serious injury could result from a runaway truck. Park the truck on a hard, level surface, apply the parking brake, block the wheels in both directions to prevent movement of the truck and Lock Out & Tag Out the truck before performing maintenance.

⚠ CAUTION: Before welding on any of the truck's or attachment structural members, the electrical connector connected to the electrical components, listed below, must be unplugged prior to any welding. Failure to disconnect the electrical connectors from these components may lead to damage.

⚠ CAUTION: Should any truck equipped with an APC module require welding on its structural members, the RS connector must be unplugged from the APC module prior to any welding. Failure to comply with this caution may lead to damage to the APC module.

⚠ CAUTION: Always connect the ground (closest to the area to be welded, as possible, to provide the shortest path for welding current flow) to the part or welded assembly that is to be welded.

Disconnection of Electrical Components. Some electrical components on the truck must be disconnected before attempting to weld on the truck. If the electrical components are not disconnected before welding, damage may occur. Electrical connectors that must be disconnected before welding include the following components (refer to Illustrations 1 through 3 for component location as well as the TICS Control Module Locations illustrations in the **Taylor Integrated Control System (TICS) Components of Section 6** for TICS modules locations:

1. TICS Control Modules
2. TICS MD3 Display

3. Engine Electrical Connectors
4. Transmission Pressure Transducer
5. Transmission Temperature Switch
6. APC Module (located on door of electrical box)
7. Reverse Camera Monitor
8. Reverse Camera
9. Lift Cylinder Pressure Transducers
10. Boom Angle Sensor
11. Boom Extension Sensor

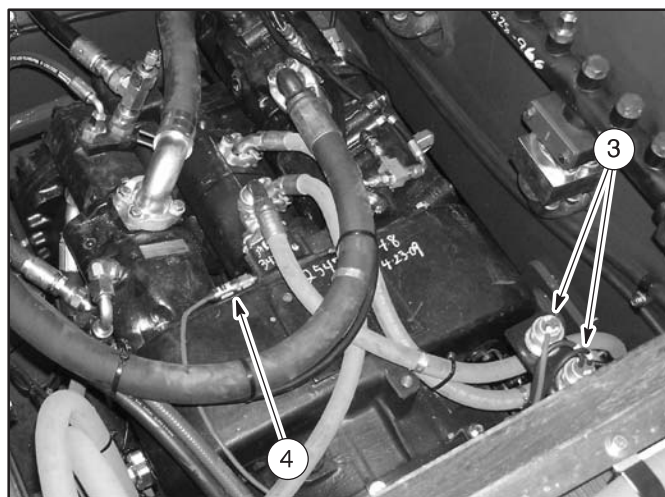


Illustration 1. Engine Electrical Connector and Transmission Pressure Transducer Location

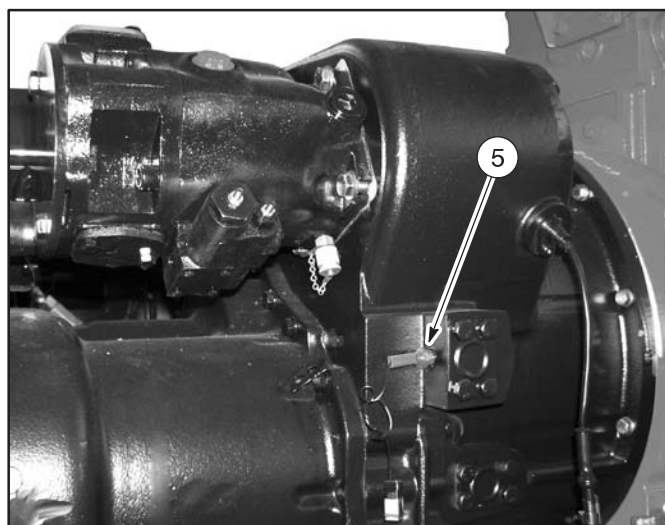


Illustration 2. Transmission Temperature Switch Location

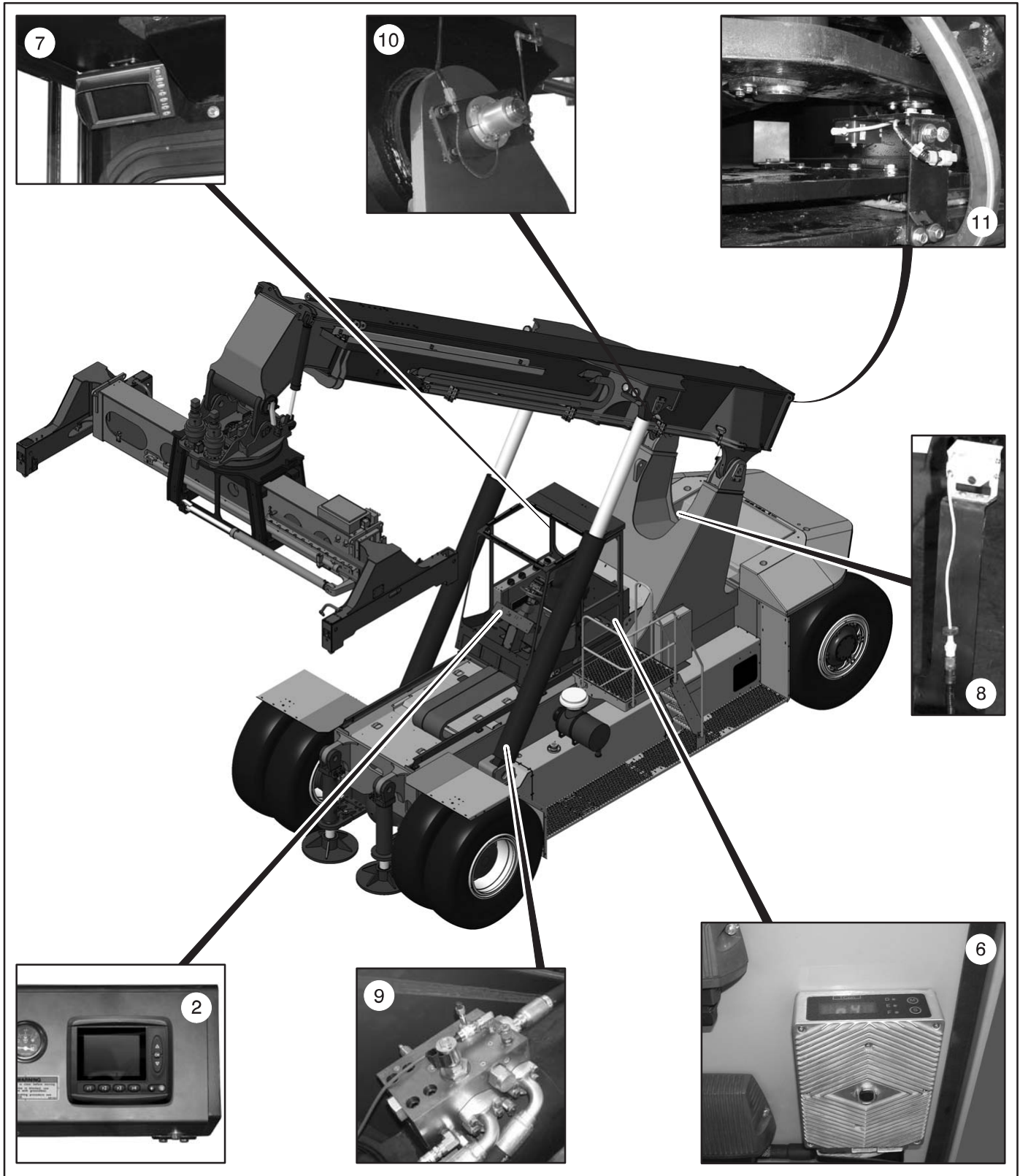
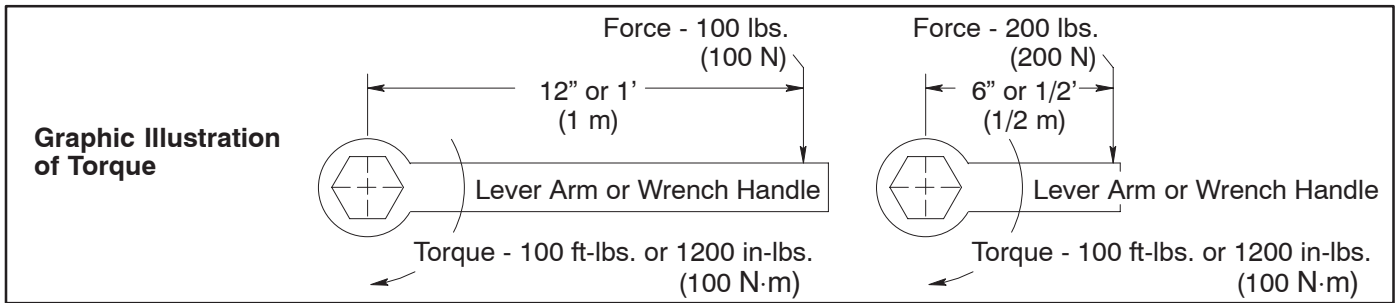


Illustration 3. Electrical Components Locations On The Truck

Torque Chart - Nuts and Bolts



NOTE: These charts are intended as a guide for the wrench torque that should be applied to tightening nuts and bolts, studs, or capscrews when no torque is specified on the assembly print or separate instructions. A steady pressure should be applied to the torque wrench until the torque value is obtained. A jerking action on the torque wrench may not yield the proper torque value.

When tightening a bolt with a slotted nut, torque to the lower value shown on the applicable chart. Then continue to tighten until the hole in the bolt and the slot in the nut line up.

Nuts must be of the same SAE grade as the bolts

on the chart. When nuts and bolts are of different grades, use the torque value for the lower of the two grades.

These charts are not intended for use in seating a stud in a housing. The torque values, listed in the charts, are the maximum and minimum lubricated torque values. To convert lubricated torque values to dry torque values, multiply the max. or min. lubricated torque value by 133% (1.33). Lubricated is defined as oil-coated bolts, Loctite® coated bolts, plated bolts or bolts used with hardened flatwashers.

Table 1. Recommended Torque, Foot-pounds (ft-lbs) / Newton-meters (N·m)

NF Threads	SAE Grade 5		SAE Grade 8		12pt Ferry Head Capscrew	
	ft-lbs	(N·m)	ft-lbs	(N·m)	ft-lbs	(N·m)
1/4 - 28 5/16 - 24	6 - 7 13 - 14	(8 - 10) (18 - 19)	9 - 10 18 - 20	(12 - 15) (24 - 27)	15 - 17 31 - 34	(20 - 23) (42 - 46)
3/8 - 24 7/16 - 20	23 - 25 36 - 40	(31 - 34) (49 - 54)	32 - 35 54 - 60	(44 - 48) (73 - 82)	59 - 65 92 - 102	(80 - 88) (125 - 138)
1/2 - 20 9/16 - 18	59 - 65 81 - 90	(80 - 88) (110 - 122)	81 - 90 117 - 130	(110 - 122) (159 - 177)	135 - 150 NA	(183 - 203)
5/8 - 18 3/4 - 16	117 - 130 198 - 220	(159 - 177) (269 - 299)	162 - 180 288 - 320	(220 - 245) (392 - 435)	271 - 301 482 - 536	(367 - 408) (654 - 727)
7/8 - 14 1 - 14	324 - 360 486 - 540	(441 - 490) (661 - 734)	450 - 500 684 - 760	(612 - 680) (930 - 1034)	793 - 881 1130 - 1255	(1075 - 1195) (1532 - 1702)
1-1/8 - 12 1-1/4 - 12	594 - 660 828 - 920	(808 - 898) (1126 - 1251)	972 - 1080 1350 - 1500	(1322 - 1469) (1836 - 2040)	NA NA	
1-3/8 - 12 1-1/2 - 12	1134 - 1260 1476 - 1640	(1542 - 1714) (2007 - 2230)	1836 - 2040 2394 - 2660	(2497 - 2774) (3256 - 3618)	NA NA	
NC Threads						
1/4 - 20 5/16 - 18	6 11 - 13	8 (15 - 18)	8 - 9 16 - 18	(11 - 12) (22 - 24)	11 21 - 23	(15) (29 - 31)
3/8 - 16 7/16 - 14	21 - 23 32 - 35	(29 - 31) (44 - 48)	32 - 35 50 - 55	(44 - 48) (68 - 75)	39 - 44 62 - 69	(53 - 60) (84 - 94)
1/2 - 13 9/16 - 12	50 - 55 72 - 80	(68 - 75) (98 - 109)	72 - 80 99 - 110	(98 - 109) (135 - 150)	90 - 100 NA	(122 - 136)

NC Threads	SAE Grade 5		SAE Grade 8		12pt Ferry Head Capscrew	
	Torque		Torque		Torque	
	ft-lbs	(N·m)	ft-lbs	(N·m)	ft-lbs	(N·m)
5/8 - 11	99 - 110	(135 - 150)	153 - 170	(208 - 231)	180 - 200	(245 - 272)
3/4 - 10	180 - 200	(245 - 272)	252 - 280	(343 - 381)	324 - 360	(441 - 490)
7/8 - 9	288 - 320	(392 - 435)	414 - 460	(563 - 626)	503 - 560	(684 - 762)
1 - 8	432 - 480	(588 - 653)	612 - 680	(832 - 925)	705 - 783	(959 - 1065)
1-1/8 - 7	540 - 600	(734 - 816)	864 - 960	(1175 - 1306)	NA	
1-1/4 - 7	756 - 840	(1028 - 1142)	1224 - 1360	(1665 - 1850)	NA	
1-3/8 - 6	990 - 1100	(1346 - 1496)	1602 - 1780	(2179 - 2421)	NA	
1-1/2 - 6	1314 - 1460	(1787 - 1986)	2124 - 2360	(2889 - 3210)	NA	

Table 2. Recommended Torque for Metric Bolts

Bolt Size	Torque			
	Class 8.8 (Equiv. to Grade 5)		Class 10.9 (Equiv. to Grade 8)	
	ft-lbs	(N·m)	ft-lbs	(N·m)
M6-1.00	5 - 6	(7 - 8)	8	11
M8-1.25	13 - 14	(18 - 19)	18 - 20	(24 - 27)
M10-1.50	25 - 28	(34 - 38)	36 - 40	(49 - 54)
M12-1.75	43 - 48	(58 - 65)	62 - 69	(84 - 94)
M16-2.00	108 - 120	(147 - 163)	153 - 170	(208 - 231)
M20-2.50	212 - 235	(288 - 320)	302 - 335	(411 - 456)
M24-3.00	365 - 405	(496 - 551)	522 - 580	(710 - 790)
M30-3.50	728 - 809	(990 - 1100)	1040 - 1155	(1414 - 1571)

Taylor Engineering Standards

Tightening procedure for countersunk flathead bolts with internal hex drive used for holding caps on tapered Timken® bearings (found on the mast and carriage main rollers):

1. The bolts and tapped holes must be clean and free of oil. (This can be done by using a spray degreaser (Zep Aerosolve® or equivalent) and drying with compressed air.)
2. Apply Loctite® to bolt threads.
3. Gradually tighten the bolts using a crossing pattern.
4. Repeat Step 3 until bolts hold at least the minimum torque value indicated in the torque chart below. Stake head at three places with a center punch.

5. When bearings are removed, it is necessary to run a tap in the threaded holes and a die on the bolts to remove Loctite® residue. If a die is not available, use new bolts.

Table 3. Recommended Torque for Countersunk Flathead Bolts with Internal Hex Drive (these torque values applies only to hold caps on tapered Timken® bearings found on the mast and carriage main roller assemblies)

Bolt Size	Torque			
	Min.		Max.	
	ft-lbs	(N·m)	ft-lbs	(N·m)
5/16 - 18	7.5	10	8.5	12
3/8 - 16	14	19	16	22
7/16 - 14	24	33	26	35
1/2 - 13	38	52	42	57
5/8 - 11	74	100	81	110
3/4 - 10	135	183	150	203

Tightening procedure for Grade 8 countersunk flathead bolts with internal hex drive used for retaining the slide bearing block housings (found on the mast and carriage):

1. Do Not use starwashers or any other type of “locking” washer with grade 8 bolts.
2. Generously lubricate the head and threads of the bolt with oil before installing.
3. Gradually tighten the bolts using a crossing pattern until they hold at least the minimum torque value as indicated in the torque chart below.
4. In order to achieve torque values of this magnitude, a high quality hex bit driver tool should be used.
5. In order to minimize bending stresses in the tool and thereby increase its life, the length of the hex bit should be as short as possible (e.g., Snap-On® “Stubby” length).

Table 4. Recommended Torque for Countersunk Flathead Bolts with Internal Hex Drive (these torque values applies only to those bolts used to retain the slide bearing block housings)

Bolt Size	Hex Bit Size	Torque			
		Minimum		Maximum	
		ft-lbs	(N·m)	ft-lbs	(N·m)
5/16 - 18	3/16	13	18	15	20
3/8 - 16	7/32	20	27	22	30
7/16 - 14	1/4	30	41	32	43
1/2 - 13	5/16	65	88	70	95
5/8 - 11	3/8	110	149	115	156
3/4 - 10	1/2	265	359	265	366

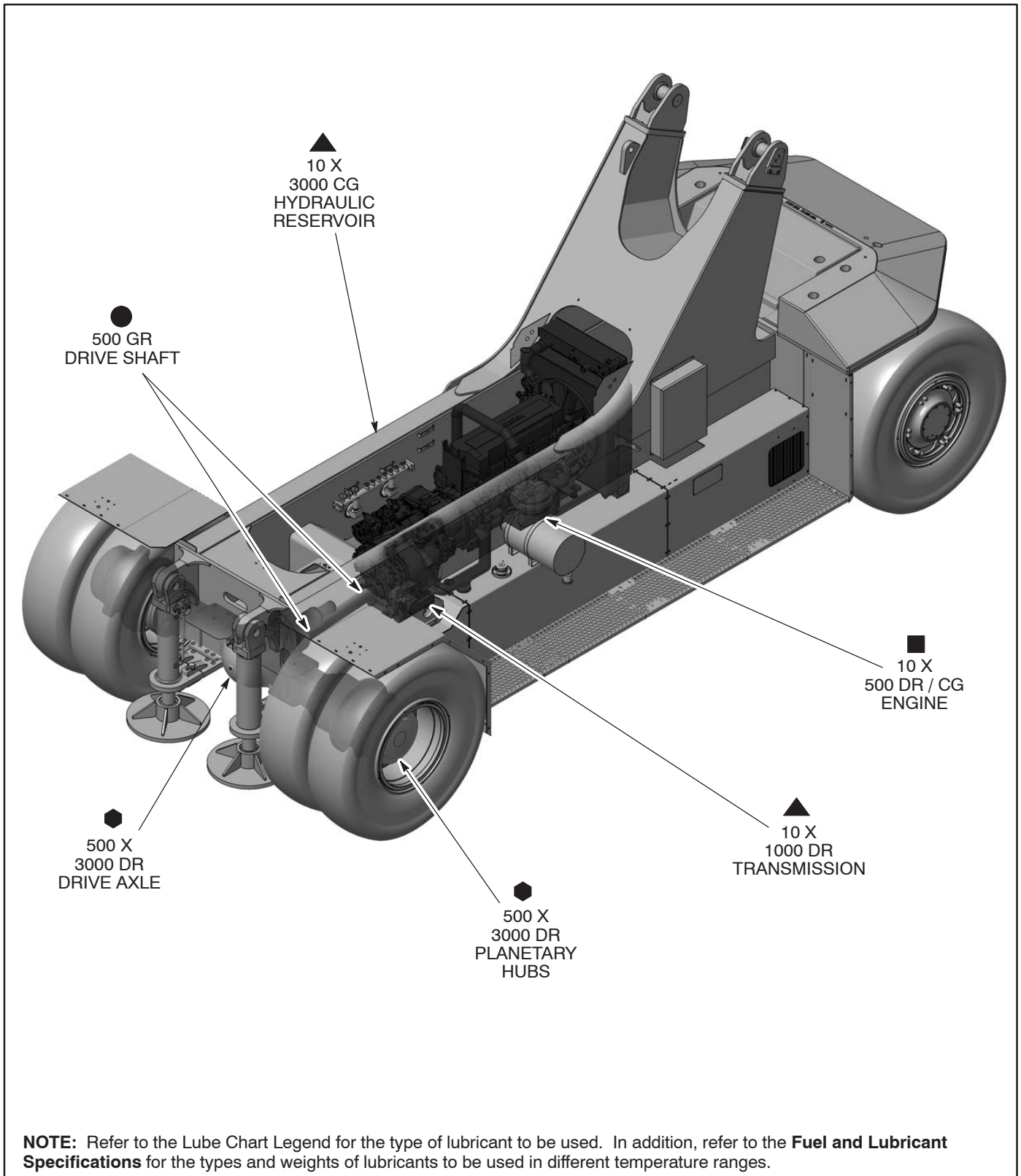


Illustration 1. Chassis Lubrication Points (See Lube Chart Legend for Lubrication Symbol Designation)

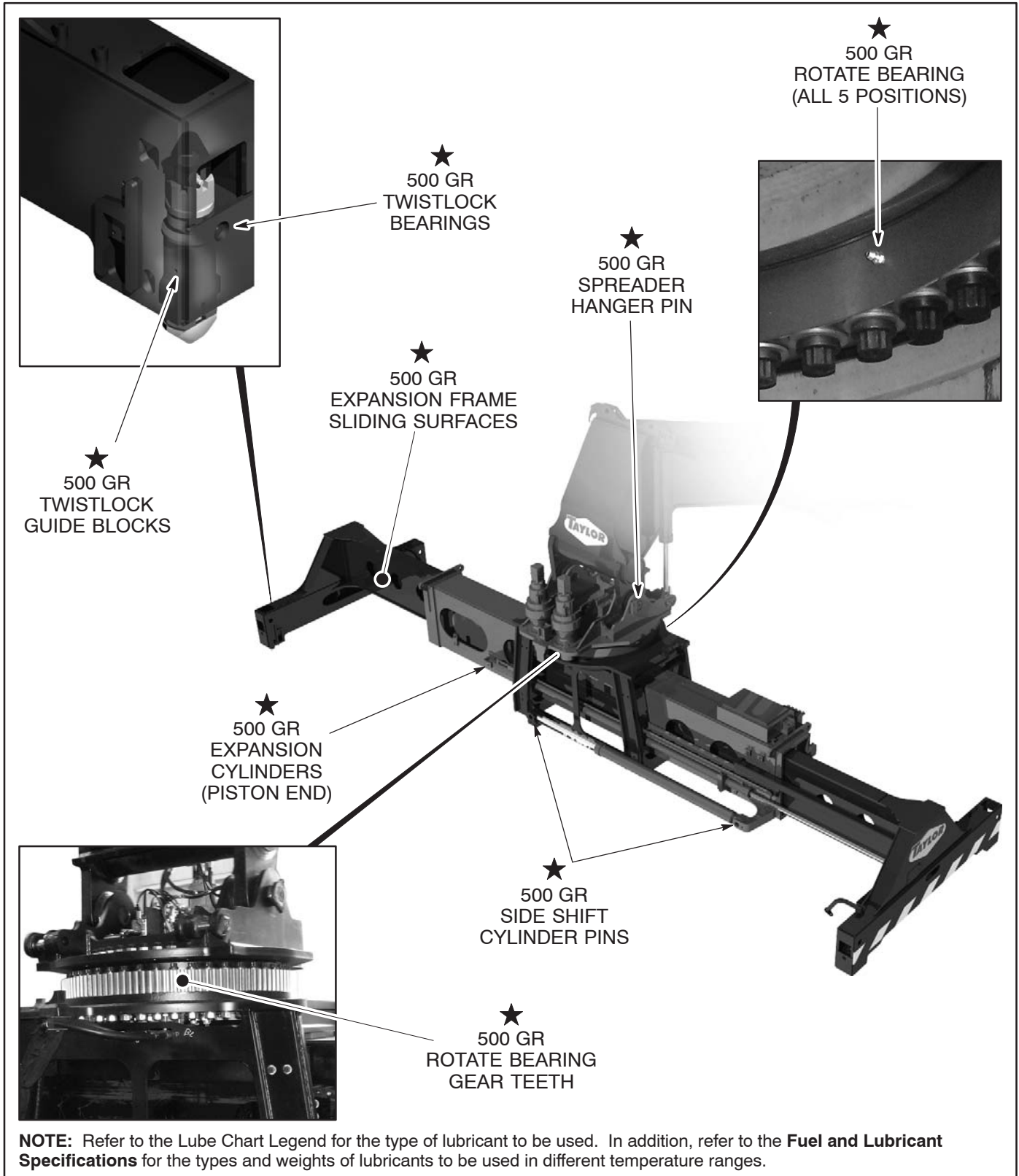


Illustration 2. Attachment Lubrication Points (See Lube Chart Legend for Lubrication Symbol Designation)

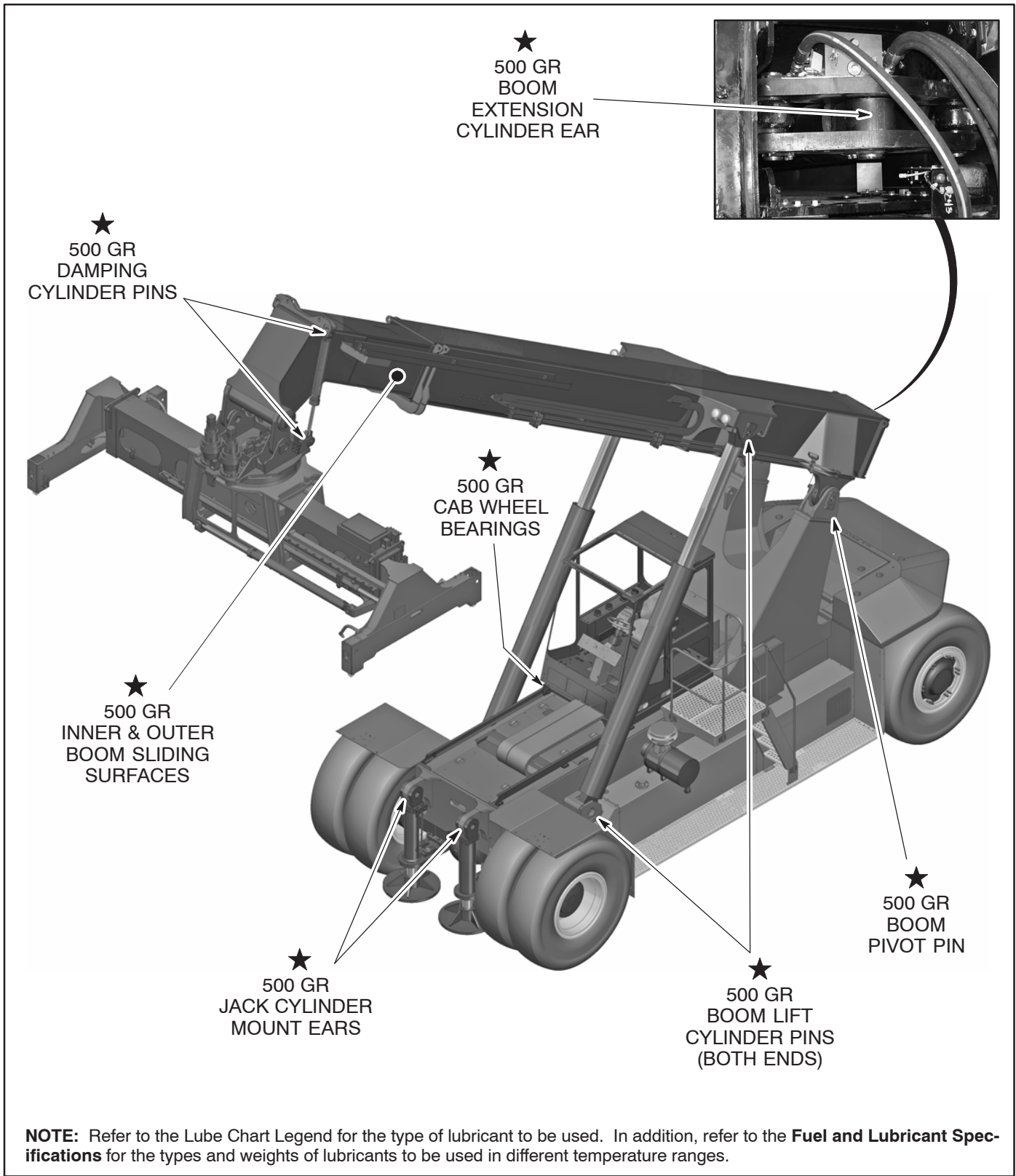


Illustration 3. Boom Lubrication Points (See Lube Chart Legend for Lubrication Symbol Designation)

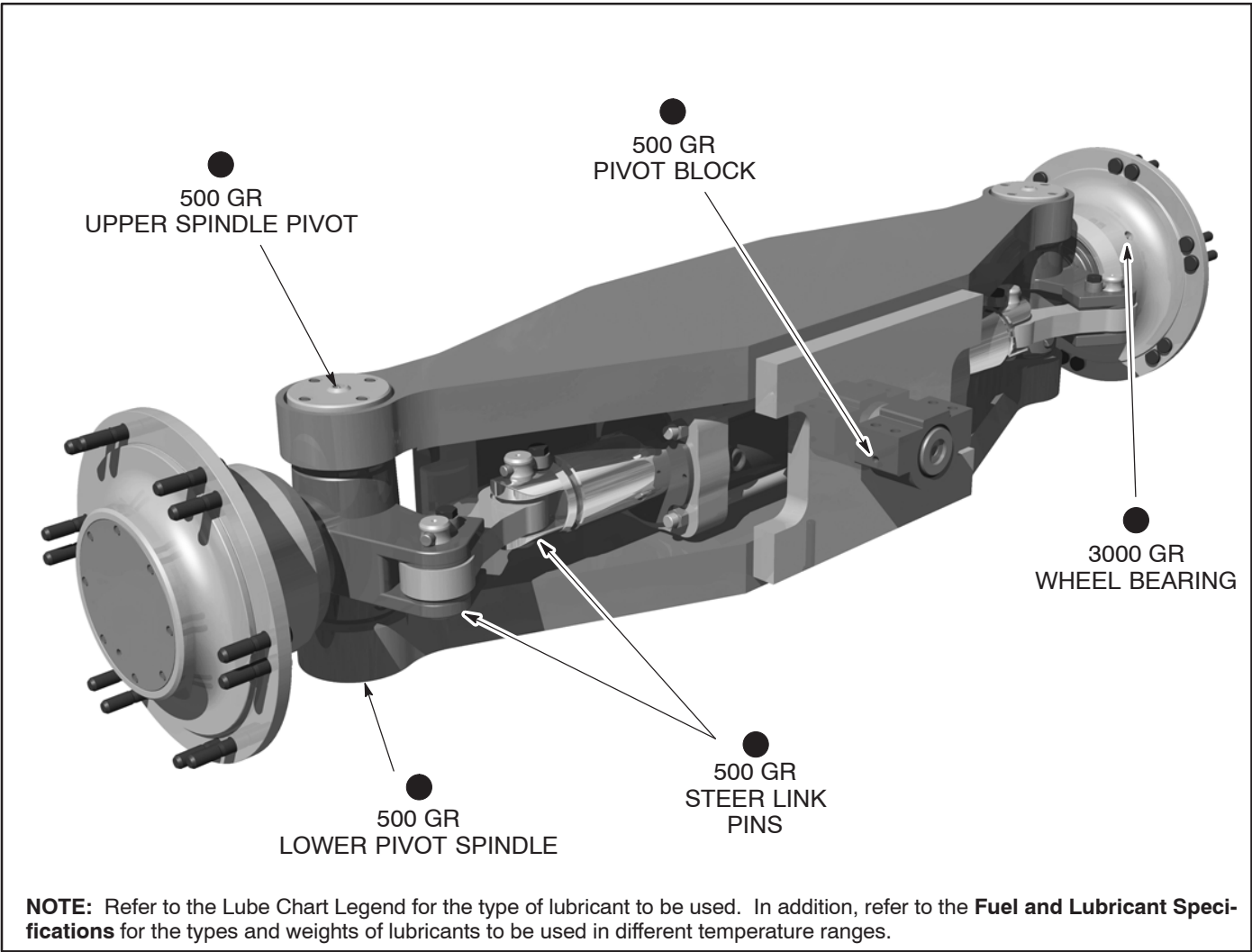


Illustration 4. Steer Axle Lubrication Points (See Lube Chart Legend for Lubrication Symbol Designation)

SYMBOL	LUBRICANT	ABBREVIATIONS
■	ENGINE OIL, CF4 SAE 15W 40	X - Check Lubricant Level DR - Drain and Refill GR - Grease CG - Change
▲	HYDRAULIC FLUID C-4 TYPE with FRICTION CONTROL MODIFIERS	
●	GEAR OIL, GL-5 OR MIL-2105D	
●	GREASE, CHEVRON ULTRA-DUTY OR EQUIVALENT	
★	GREASE, CHEVRON ULTI-PLEX OR EQUIVALENT	
+	VISTAC ISO 150 OR EQUIVALENT	

LUBE CHART LEGEND

