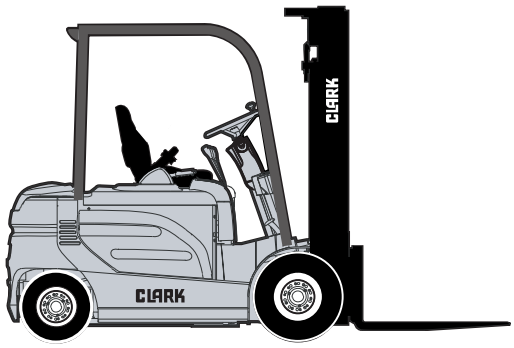
SERVICE MANUAL

GEX 20/25/30s/30/32

Rated Capacity : 2000-3000kg



Part No. 8051045
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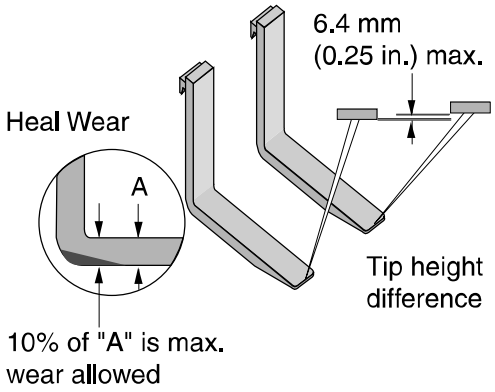
Contents by Group and Section

(Alphabetical listing of contents appears on next page.)
Contents are listed here by Group number and name followed by Section number and name:

Forks

Inspect the load forks for cracks, breaks, bending and wear. The fork top surfaces should be level and even with each other. The height difference between both fork tips should be no more than 6 mm (0.25 in.)



NOTE

Your Clark dealer has special tools for measuring fork wear.

WARNING

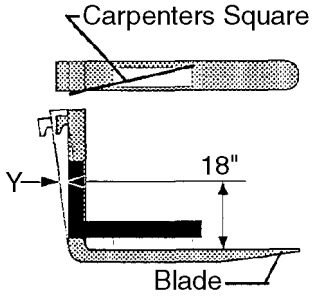
If the fork blade at the heel is worn down by more than l0%, the load capacity is reduced and the fork must be replaced. DO NOT attempt to fill with weld. See Group 34 for inspection procedure.

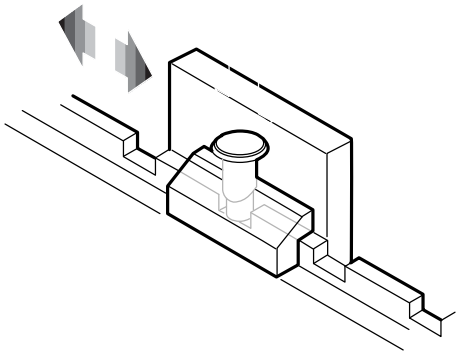
Check the amount of wear at the heel of the fork.

CAUTION

If the forks are obviously bent or damaged, have them inspected by a trained maintenance person before operating the truck.

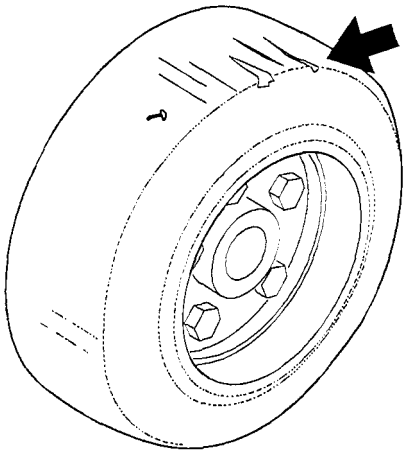
Inspect the forks for twists and bends. To check, put a 2 x 4 x 24 in. long block on the blade of the fork with the 4 in. surface against the blade. Put a 24 in. carpenter's square on the top of the block and against the shank. Check the fork 18 in. above the blade to be sure it is not bent more than 14.5 mm (0.6 in.) at Y.



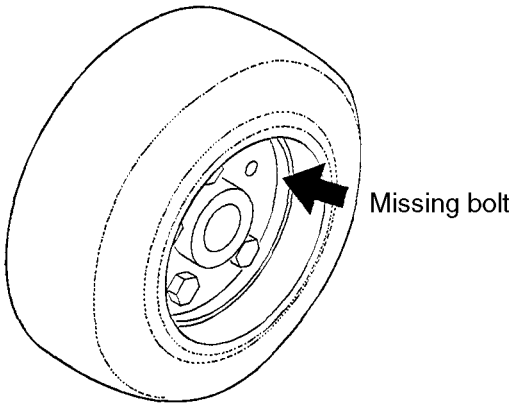


Inspect the fork latches. Be sure they are not damaged or broken, operate freely and lock correctly. Check the fork stop pins (or bolt and washer) for secure condition.

Wheels and Tires



Check the condition of the drive and steer wheels and tires. Remove objects embedded in the tread. Inspect the tires for excessive wear, break, "chunking out," and bond failure between the tire and rim.



Check all wheel mounting bolts to be sure none are loose or missing.

CAUTION

Personnel working on wheels and tires must be trained and qualified to do wheel and tire maintenance.

Replace missing bolts and tighten loose bolts to the correct torque before operating the truck.

Operational Checks

1. Check horn to be sure it operates.

IMPORTANT

Because the battery is such an important part of electric truck operation, it requires its own specialized maintenance program, which should include full-scale cleaning and inspection. Refer to Group 13 for specific instructions.

2. Using the Display

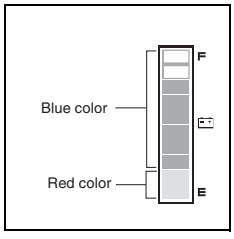
Seat Belt: At start up this symbol displays along with an audio alarm for 4 seconds. This display reminds you to fasten your seat belt.

Parking Brake: The symbol is displayed and "-255" status code appears on the numeric display when parking brake is applied. Release parking brake to operate truck.

Service Status: The following 5 codes are usually operator fault codes, and can be corrected by as explained in "Section 5, Operating Procedures." If you see any other codes displayed, the truck needs to be serviced.

- -01 Seat Switch Open
- -061, -065 ,-140, -203, -207 Overheat of motor and controller (Restart after cooling down)
- -66 Low Battery (truck will go into lift lockout when the dash display shows less than 15%)
- -77 Maintenance Hours (preset hour meter reading indicating that it is time to have the truck serviced. Truck will reduce the top speed if desired)
- -79 Incorrect Start Up Sequence (SRO)
- -217, -245 Wrong set battery
- -255 Parking Brake Switch Open

Battery discharge indicator



It displays the battery discharge condition of forklift truck.
The one bar indicates 10% charging condition.
If the battery is charged more than 20% (8 bars or more), blue LED is displayed, but it is less than 20% (2 bars or less), red LED is displayed. If it is less than 10% (1 bar), it will flicker and buzzer sound.

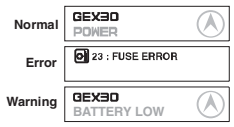
Slow-speed indicator (Turtle shaped)

The traveling speed of truck is limited to set speed.
The upper mark is slow speed operating icon, and the figure shows the limited max. speed. (In upper example, the limited max. speed is 2km/h)

Hourmeter & Speed

• It displays the accumulated operating hour and traveling speed of truck.
• When the traveling speed is less than 0.5km/h, it displays the accumulated operating hour.
• When the traveling speed is more than 0.5km/h, it displays the traveling speed.

Message display



The model name, POWER selection, travel direction, warning and error message are displayed.
• In normal operating condition: Model name/POWER/Travel direction

- When several messages are simultaneously displayed, it will be displayed in the order of Error, Warning and Normal condition.

• If many error conditions are simultaneously occurred, the priority 2 Errors will be displayed. (The priority means Error number)

Travel direction icon

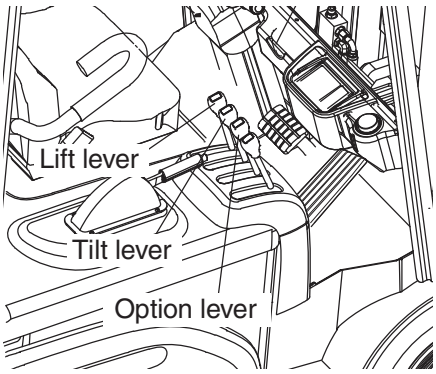
• It displays the traveling direction or angle of steering wheel..
• The direction icon rotates in 10 degrees. (Total 36 icon)

Error icon

- When error occurs this icon is displayed to distinguish the condition easily. When the error message is displayed, this icon is simultaneously displayed.

3. Check Function Control Levers

- Gently pull back on the lift control lever. The pump motor should turn on and the carriage should begin to elevate.
- Release the control lever. It should return to neutral without binding. The pump motor should turn off. The control lever should not bind when moving it to any position.
- Repeat procedures with tilt control lever. Forks should tilt evenly and smoothly.
- If lift truck is equipped with an attachment, test the auxiliary control lever for a correct function.
- Briefly operate the attachment.



4. Check Drive Motor (Brake) Cut-Off Switch

- Move the truck forward slowly. Slowly depress brake pedal. Drive motor should cut off before the brakes apply.
- If operation is not satisfactory, DO NOT operate the truck. Take truck out of service and report condition to designated authority.

5. Check Upright

- Note any excessive “slop” or “noise” in the upright. It may indicate roller damage, or that roller shimming, repair or adjustment may be required.

6. Check Tilt Cylinder (Refer to Group 32 to do the following)

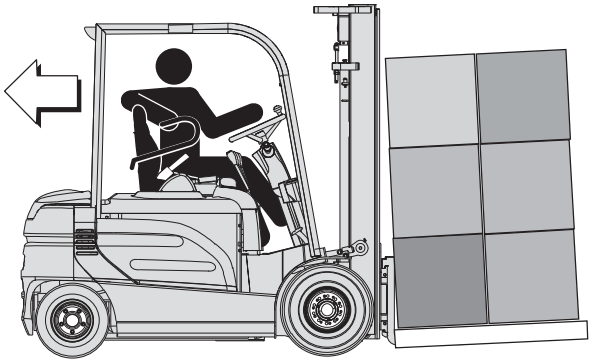
- Perform drift test.
- Perform check and adjustment procedure.
- Check rod seal condition.
- Check mounting. Tighten as needed.
- Check rod end. Tighten as needed.

7. Check Truck Performance

WARNING

Check all around to be sure that your intended path of travel is clear of obstructions and pedestrians.

- Drive the truck forward in a straight line at a high rate of speed. Listen for unusual drive train noise. Stop truck.
- Check acceleration from a stop to top travel speed. Acceleration should be smooth without hesitation. Stop the truck. Repeat procedure in reverse.
- Report condition on PM report form.

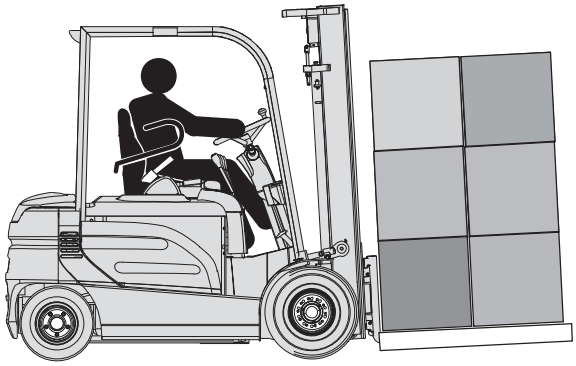


Test Drive Truck with Load

NOTE

Conduct these tests with a rated capacity load, if possible.

Test the truck for proper operation and drive train function by driving the truck in both the forward and reverse directions. Drive first in a straight line and slowly through a series of full right and left turns. Then repeat, driving in opposite direction.



Carry Load Low & Tilt Back

Test for correct function of the transistor control.

Check Controlled Plugging (Braking)

1. Operate the truck with parking brake set. It should not move. Release parking brake.
2. Operaten the truck at a slow speed in a forward direction of travel. Reverse direction of travel. The truck should slow down to a smooth controlled stop, and accelerate normally in the opposite direction.

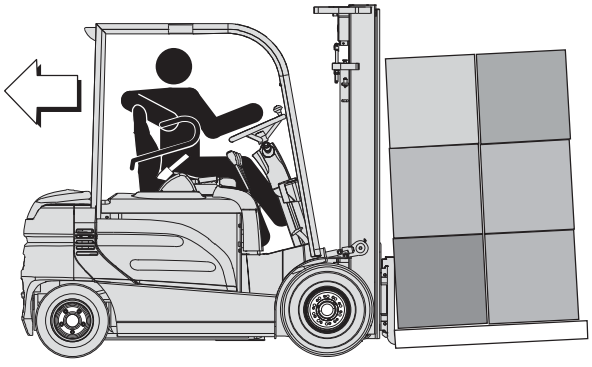
   If plugging is as specified, then repeat the procedure at high speed. The truck should come to a smooth controlled stop in approximately 20 feet (6.10 mm) with accelerator in maximum travel position.
3. Repeat the procedure at high speed with the direction lever moved in reverse direction.

   If plugging (braking) is not as specified, refer to the adjustment instructions in Group 19 of this manual. Report condition to designated authority.

Check Accelerator

1. After checking to see that you have a clear path ahead, drive the truck in a straight line at a high rate of speed in a forward direction of travel. Listen for unusual drive train noise. Stop truck
2. Check acceleration from a stand still condition to top travel speed. Acceleration should be smooth without hesitation.
3. After checking to see that you have a clear path behind, drive the truck in reverse. Check acceleration from stand still condition through top travel speed. Acceleration should be smooth.

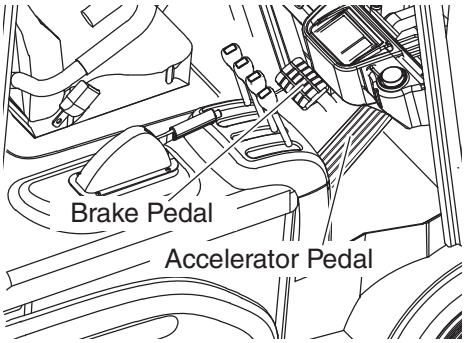
Check the accelerator pedal while conducting the speed range tests. It must move easily and smoothly throughout the acceleration stroke and return without binding. There should be no restriction to movement on either acceleration or deceleration.



CAUTION

DO NOT operate lift truck if the brakes are not operating properly. Use Hydraulic oil RANDO HD32 or NUTO H32.

Test the service brake (drive motor cut-off) switch. Drive the truck FORWARD (or in REVERSE) at creep speed. While holding the accelerator pedal steady in creep speed position, depress brake pedal. The braking action should interrupt power to the drive motor and stop the truck. Release the brake pedal. The drive motor should again start moving the truck.



Test brake operation by depressing and releasing the brake pedal several times while driving the truck. The brakes should bring the truck to a smooth stop without pulling, squealing, or shuddering. Have the brakes adjusted or repaired as necessary. Drive motor should cut off before brakes apply.

To check brake holding capability and adjustment, park the truck on a grade and depress brake pedal. The brake should hold a lift truck with rated load on a 15% grade.

Check Steering

CAUTION

DO NOT operate lift truck if steering system is not operating properly.

Check steering control operation. First, drive the truck in a straight line. The truck must drive in a straight line without drifting toward either side. Then drive slowly (creep speed) through a series of full right and left turns. Check steering response and smoothness of operation. Turning effort must be the same in either direction. You will hear the hydraulic pump operate over relief when in a full turn. If there is a steering problem, have it repaired.

NOTE

Conduct the following test with a rated capacity load.

Test for general drive train operation. Drive the truck at various speeds and operating conditions, in both FORWARD and REVERSE directions. Test shifting from NEUTRAL to FORWARD, then back to NEUTRAL. Test shifting from NEUTRAL to REVERSE, then back to NEUTRAL. Check for positive control action when changing directions.

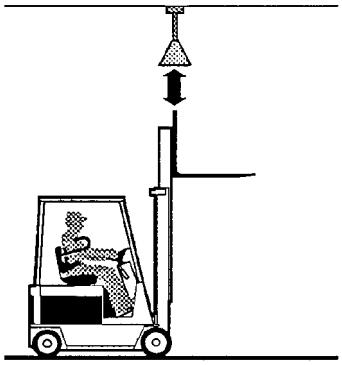
Listen for clunking, squealing, grinding, scraping, or other unusual noises. Check for vibration. Listen for wheel bearing or other specific running noise.

Lift Mechanism and Controls

NOTE

Conduct these tests with a rated capacity load.

Test the operation of the hydraulic system and upright.



CAUTION

Be sure there is adequate overhead clearance before raising the upright.

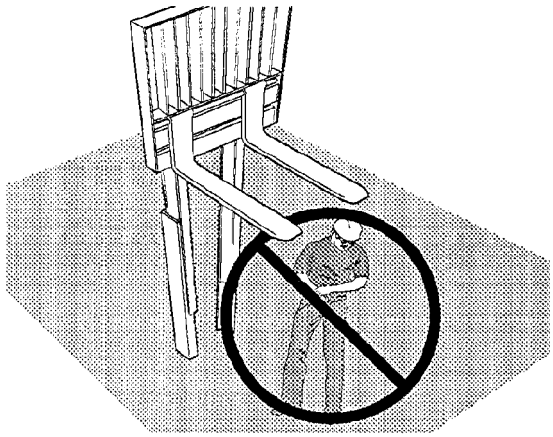
Cycle (raise to full height and then lower) the upright at both slow and fast speed, with the upright tilted slightly backward. Watch the upright assembly as it rises. All movements of the upright, fork carriage, and lift chains must be even and smooth, without binding or jerking motions. Watch for chain wobble or looseness. The chains should have equal tension and move smoothly, without noticeable wobble.

Check function of the control lever and main hydraulic valve. Listen for abnormal noises in the hydraulic valve, main hydraulic pump, and system components.

If the maximum fork height is not reached, either the fluid level in the hydraulic sump tank is low, or there is severe binding within the upright.

WARNING

FALLING FORKS. Do not walk or stand under raised forks. The forks can fall and cause injury or death.



Never Walk Under Raised Forks!

Check the upright rails, rollers, carriage, lift chains, and cylinders as they move. Watch for binding or excessive freeplay (looseness) between the carriage and the upright rails and rollers. Listen for abnormal noises. If there is excessive clearance between the rails and channels, the upright roller needs adjustment. If the rails or carriage bind or hesitate when lowering, the rollers are either damaged or roller adjustment is incorrect.

Check the upright for excessive downdrift. Stop the fork carriage in an intermediate position. Check that it holds its position without moving down. If you observe downward movement (drift) or have a report of a drift problem, the lift cylinder seals may be worn. With forks elevated, turn key switch off. Pull back on the lift lever. The forks should not lower This tests the check valve.

Test the tilt function. Check for excessive tilt cylinder drift. Stop the upright at a position near vertical. Check that the upright holds its position without moving forward. If you observe forward movement (drift) or have a report of a tilt drift problem, the tilt cylinder seals may be worn.

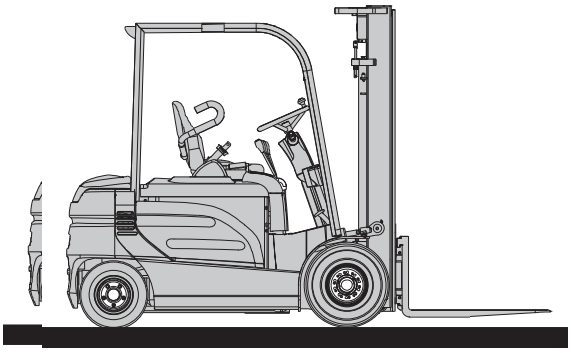
Check fork height adjustment and carriage chain adjustment. Tilt the upright to the vertical position and fully lower the carriage. The forks should stop and be held approximately 13 mm (0.50 in.) above the floor. If the forks hit the floor, the carriage lift chains should be adjusted. Also check the rail chains.

If truck is equipped with an attachment, briefly operate the attachment to check the controls for correct function.

Test for correct tilt cylinder rod adjustment. Raise the carriage to an intermediate position. Tilt the upright fully forward without a load on the forks. Check for upright racking (twisting) as the tilt cylinders reach the end of their stroke. Tilt the upright fully back. The upright should not rack (twist) when the tilt cylinders reach the end of their travel. If forward upright racking is found, adjustment of the tilt cylinder rod ends (yokes or spacers) is required. If backward racking is found, adding or removing shims is required. Refer to Group 32.

CAUTION

When you have completed the operational tests, park and leave truck according to standard shutdown procedures.



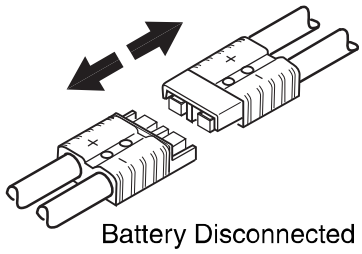
Standard Shutdown Procedures:

- Come to a complete stop.
- Park only in authorized locations.
- Lower the forks fully, tilt upright forward until fork tips touch floor.
- Allow travel control to return to neutral.
- Turn the key switch OFF.
- Apply the parking brake.
- Disconnect Battery

Make a record of all maintenance and operating problems you find.

Battery Compartment Inspection

Turn key switch OFF. Disconnect battery from truck receptacle.



Inspect condition of the battery connector and truck battery receptacle. Check the spring-loaded terminals, connectors, and retaining tabs. Look for poor connections due to burning, bad crimps, or broken or loose retainers. Check the molded body for damage from overheating, burning, and chips or cracks. Replace receptacle terminals if pitted or corroded.

Inspect condition of the battery and cables. Check the battery cables for wear or other damage. Check for signs of interference or rubbing with other components. Be sure that the cable terminals are tight and clean. Clean off any deposits of corrosion found on the battery.

Never wash the battery when it is in the truck.

Check battery post terminals for corrosion and damage. Clean all corrosion from cable end and battery post. Check tighmess of cable and post terminals.

If necessary, check the state-of-charge condition of the battery. Take a specific gravity test of the electrolyte with a hydrometer. Be sure to check a minimum of six battery cells.

Check the electrolyte level of the battery. Add distilled water, as required, to fill each cell to the correct level.

Check to be sure the vent hole in each battery cell cap is open. If cap vents are plugged with corrosion, remove the caps and wash in a solution of baking soda and water.

Refer to Group 12, Battery, for additional information.

Motor Transistor Controls Inspection

IMPORTANT

Do not clean electrical components with steam. Only approved solvents should be used to clean controls.

Turn key switch OFF. Disconnect battery from truck receptacle. Remove the control compartment cover from the counterweight.

Discharge the capacitor using a 10W~100W resistance connected from the +Batt(pos.) to the -Batt(neg.).

Inspect the transistor controls for clean condition. Check for oily dirt buildup on contactors, Inspect all control wiring terminals for any obvious damage. Look for cracks or worn areas in the wiring insulation. Check for loose connections at the control terminals. Air-clean as necessary. Treat the control panel plugs with Clark 1801145"Lectric-Like" Spray or Clark 1803827-brush on cleaner.

Hydraulic Compartment Inspection

Remove the floorplate.

Check the condition of all hydraulic system components, hoses, piping, and connections. Check for wear, leakage, and damage.

Remove the battery.

Inspect the drive motor, hydraulic pump motor power cables. Check drive motor mounting fasteners. Check hydraulic pump motor. Check pump motor mountings.

DANGER

HYDRAULIC FLUID PRESSURE: Do not use your hands to check for hydraulic leakage. Fluid under pressure can penetrate your skin and cause serious injury.

Brake Shoe and Drum Inspection

The brake linings, drum and adjustment setting can be inspected without removing the drum or hub. Refer to Group 23, Section 6 for inspection procedure.

Air-Cleaning

Always maintain a lift truck in a clean condition. Do not allow dirt, dust, lint, or other contaminants to accumulate on the truck. Keep the truck free from leaking oil and grease. Wipe up all oil spills. Keep the controls and floorboard clean and dry. A clean truck makes it easier to see leaks and loose, missing or damaged parts, and will help prevent fires. A clean truck will run cooler.

The environment in which a lift truck operates will determine how often and to what extent cleaning is necessary. For example, trucks operating in manufacturing plants which have a high level of dirt or lint (e.g., cotton fibers, paper dust, etc.) in the air or on the floor, will require more frequent cleaning. If air pressure does not remove heavy deposits of grease, oil, etc., it may be necessary to use steam or liquid spray cleaner. DO NOT clean electrical components with steam.

NOTE

See special provision for blowing dust from pump and drive motors on page 14 of this section.

CAUTION

Battery must be disconnected and capacitors discharged before inserting air wand through access holes.

CAUTION

Wear suitable eye protection and protective clothing.

Lift trucks should be air-cleaned at every PM interval, and as often as required.

Air-cleaning should be done using an air hose with special adapter or extension having a control valve and nozzle to direct the air properly. Use clean, dry, low-pressure compressed air. Restrict air pressure to 207 kPa (30 psi).

Air-clean the following: upright assembly; drive axle; battery, cables, switches and wiring harness; transistor controls and wiring; drive and hydraulic pump motors; steering axle and steering cylinder.

Critical Fastener Torque Checks

Fasteners in highly loaded (critical) components can quickly fail if they loosen. Loose fasteners can cause damage or component failure. For safety, it is important that the correct torque be maintained on all fasteners of components which directly support, handle or control the load, or protect the operator.

Check torque of critical items, including: overhead guard, drive axle mounting, drive and steering wheel mounting, counterweight mounting, load backrest extension, tilt cylinder mounting and yokes, upright mounting and components. Refer to Group 40 for torque specifications.

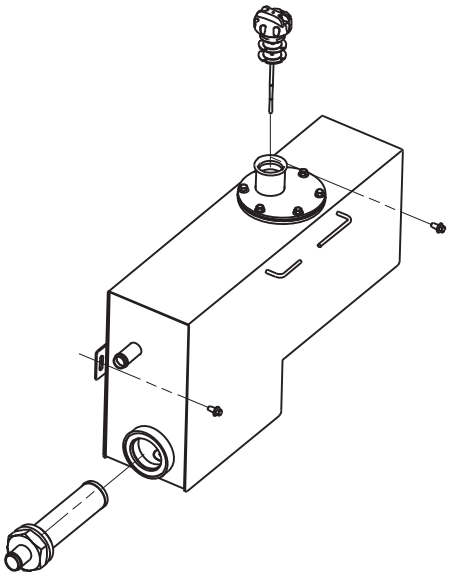
Lubrication, Fluids, and Filters

Hydraulic Sump

Check the hydraulic sump tank fluid level. Correct fluid level is important for proper hydraulic system operation. Low fluid level can cause pump damage. Overfilling can cause loss of fluid or lift system malfunction.

Hydraulic fluid expands as its temperature rises. Check the fluid level at operating temperature, after approximately 30 minutes of truck operation. To check the fluid level, park the truck on a level surface. Put the upright in a vertical position and lower the fork carriage fully down. Remove the floorplate and observe the fluid level marking on the sump tank. Refer to Group 29, Section 1 for more information on the sump tank. DO NOT overfill.

Check the condition of the hydraulic fluid for color, clarity, and contamination. Change (replace) the hydraulic fluid as necessary.



Hydraulic Fluid and Filter Change

Drain and replace the hydraulic sump fluid every 2000 operating hours, or sooner, as required. Replace the