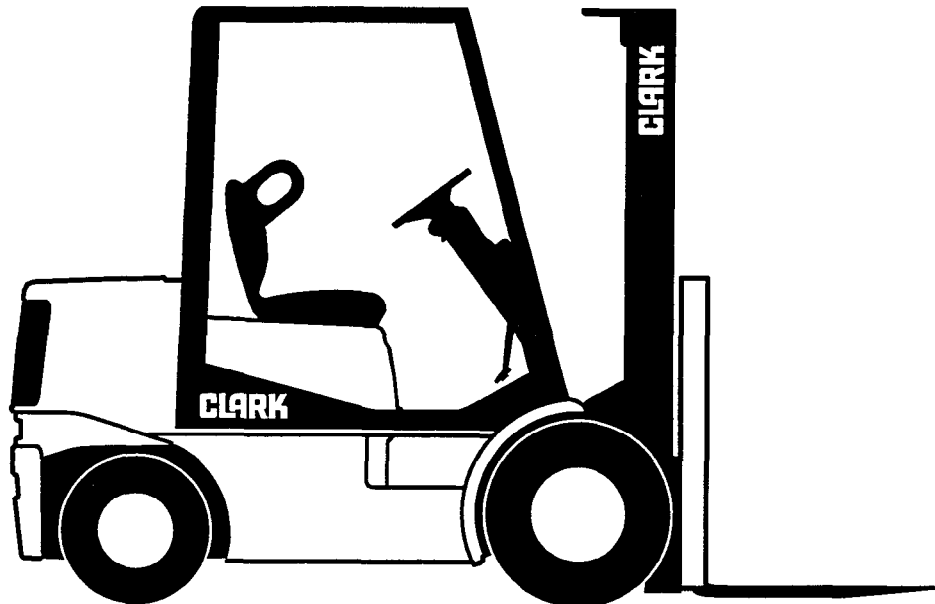


**SM-575**  
**C500 Y180-200-225S-225L**  
**250S-250L-300S-300L-350**

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**CLARK**

Technical  
Publications  
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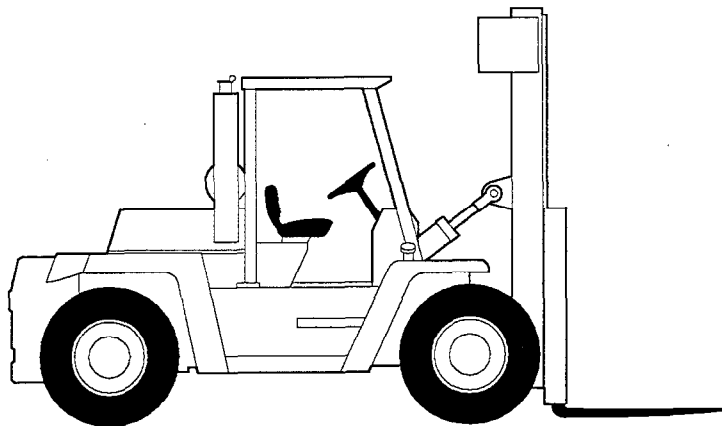
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# CLARK<sup>®</sup>

## Service Manual

C500 Y 180-200-225S-225L-250S-250L-300S-300L-350

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### LIFT TRUCK

Read and understand this manual before operating truck. Pay attention to the safety instructions. Safe operation is the responsibility of the operator. File this manual for future use.

This manual covers machine

Serial No. Y2235-1-7056 & above

Serial No. Y2235HT-1-7061 & above

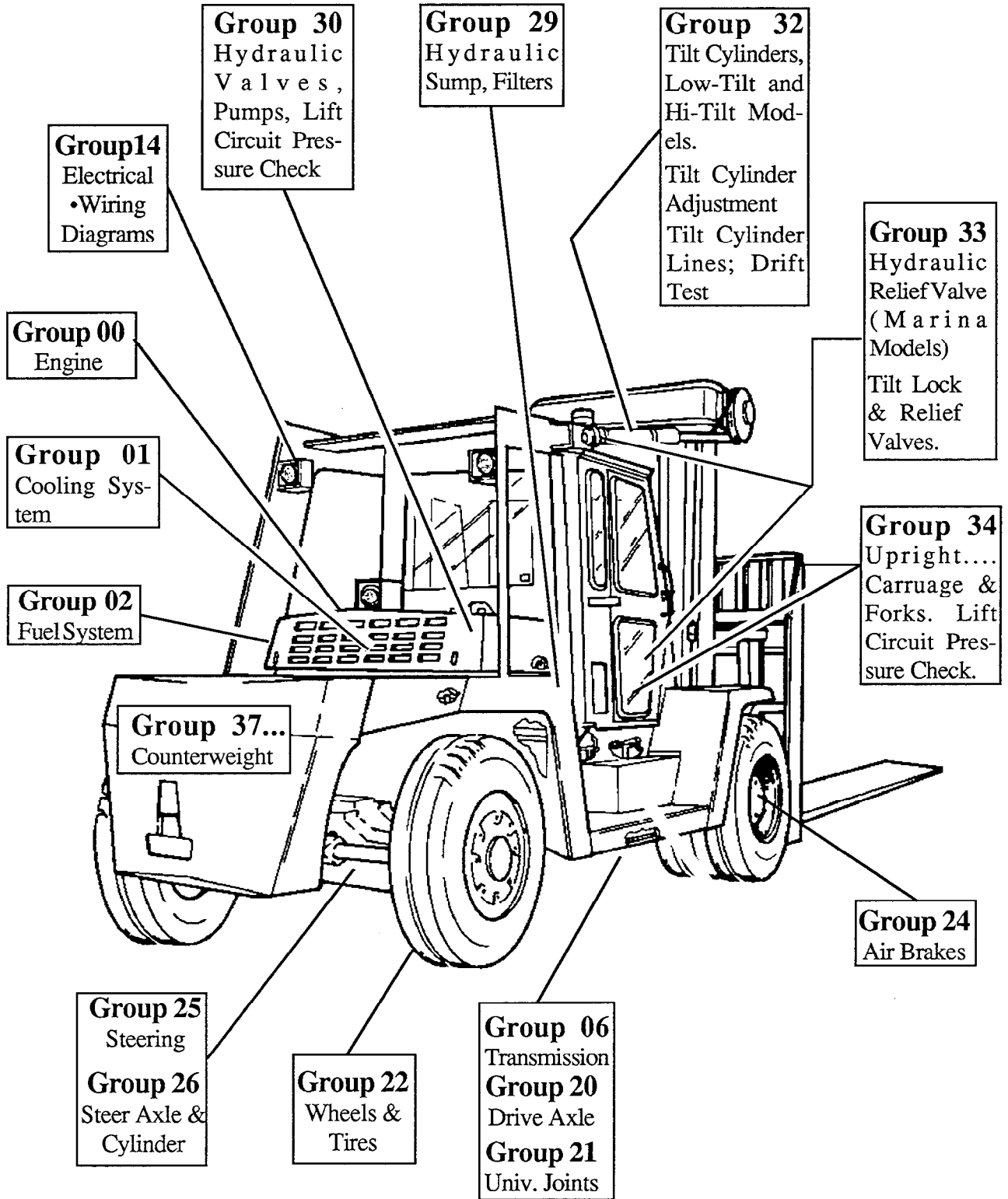
ALWAYS GIVE THE MACHINE SERIAL NUMBER  
WHEN ORDERING PARTS.

Book No. SM 575 2nd Revision

**CLARK** Material Handling  
Company

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Lexington, Kentucky 40507

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**Group 39**

Decal Replacement and Placement

**Group 40**

Truck and Engine Specifications. Lubrication Specifications and Grease Chart  
PM Inspection and Drivers Daily Inspection Forms

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		PM Section
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00	1	Engine Troubleshooting
00	2	Engine Removal
00	3	Ford Engine Specifications
00	4	Cummins Engine Specifications
01		COOLING SYSTEM
01	1	Troubleshooting
01	2	Radiator Removal
01	3	Testing and Maintenance
01	4	Radiator Repair
02		FUEL SYSTEM
02	1	Troubleshooting
02	2	Induction System
02	3	Accelerator Linkage
02	5	Impco LPG Lock-off Valve
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06		TRANSMISSION
06	1	Troubleshooting
06	2	Transmission Stall Test
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<u>GROUP</u>	<u>SECTION</u>	<u>DESCRIPTION</u>
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## SAFETY SIGNS AND MESSAGES

Safety signs and messages are placed in this manual and also on the lift truck to provide instructions and to identify specific areas where potential hazards exist and special precautions should be taken. Be sure you know and understand the meaning of these instructions, signs and messages. Damage to the truck or death or serious injury to you or other persons may result if these messages are not followed.

### NOTICE

**This message is used when special information, instructions or identification is required relating to procedures, equipment, tools, pressures, capacities and other special data.**

### IMPORTANT

**This message is used when special precautions should be taken to ensure a correct action or to avoid damage to or malfunction of the truck or a component.**



### CAUTION

**This message indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.**



### WARNING

**This message indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**



### DANGER

**This message indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.**

***NOTE:** The above terms have been adopted by Clark Material Handling Company. The same terms may be used in different context in service literature supplied directly or indirectly by vendors of truck components.*

## USER SAFE MAINTENANCE PRACTICES

The following instructions have been prepared from current industry and government safety standards applicable to industrial truck operation and maintenance. These recommended procedures specify conditions, methods, and accepted practices that aid in the safe maintenance of industrial trucks. They are listed here for the reference and safety of all workers during maintenance operations. Carefully read and understand these instructions and the specific maintenance procedures before attempting to do any repair work. When in doubt of any maintenance procedure, please contact your local Clark dealer.

1. Powered industrial trucks can become hazardous if maintenance is neglected. Therefore, suitable maintenance facilities, trained personnel and procedures must be provided.
2. Maintenance and inspection of all powered industrial trucks shall be done in conformance with the manufacturer's recommendations.
3. A scheduled planned maintenance, lubrication and inspection program shall be followed.
4. Only trained and authorized personnel shall be permitted to maintain, repair, adjust and inspect industrial trucks and in accordance with the manufacturer's specifications.
5. Properly ventilate work area, vent exhaust fumes and keep shop clean and floor dry.
6. Avoid fire hazards and have fire protection equipment present in the work area. Do not use an open flame to check for level or leakage of fuel, electrolyte or coolant. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.
7. Before Starting Work On Truck:
  - (a) Raise drive wheels off of floor or disconnect power source and use blocks or other positive truck positioning devices.
  - (b) Disconnect battery before working on the electrical system.
8. Before working on engine fuel system of gasoline or diesel powered trucks, be sure the fuel shut-off valve is closed.
9. Operation of the truck to check performance must be conducted in an authorized, safe, clear area.

### 10. Before Starting To Drive Truck:

- (a) Be in operating position.
- (b) Be sure parking brake is engaged.
- (c) Put direction control in neutral.
- (d) Start engine.
- (e) Check functioning of direction and speed controls, steering, brakes, warning devices and any load handling attachments.

### 11. Before Leaving The Truck

- (a) Stop truck.
- (b) Put directional control in neutral.
- (c) Apply the parking brake.
- (d) Stop the engine by turning off the ignition circuit.
- (e) Put blocks at the wheels if truck is on an incline.

12. Brakes, steering mechanisms, control mechanisms, warning devices, lights, governors, guards and safety devices and frame members must be carefully and regularly inspected and maintained in a safe operating condition.

13. Special trucks or devices designed and approved for hazardous area operation must receive special attention to ensure that maintenance preserves the original approved safe operating features.

14. Fuel systems must be checked for leaks and condition of parts. Extra special consideration must be given in the case of a leak in the fuel system. Action must be taken to prevent the use of the truck until the leak has been corrected.

15. The truck manufacturer's capacity, operation and maintenance instruction plates, tags or decals must be maintained in legible condition.

16. Batteries, motors, controllers, limit switches, protective devices, electrical conductors and connections must be inspected and maintained in conformance with good practice. Special attention must be paid to the condition of electrical insulation.

17. To avoid injury to personnel or damage to the equipment, consult the manufacturer's procedures in replacing contacts on any battery connection.

18. Industrial trucks must be kept in a clean condition to minimize fire hazards and help in the detection of loose or defective parts.

19. Modifications and additions that affect capacity and safe truck operation must not be done without the manufacturer's prior written approval. Capacity, operation and maintenance instruction plates, tags or decals must be changed accordingly.

20. Care must be taken to assure that all replacement parts, including tires, are interchangeable with the original parts and of a quality at least equal to that provided in the original equipment. Parts, including tires, are to be installed per the manufacturer's procedures. Always use genuine CLARK or CLARK-approved parts.

21. Use special care when removing heavy components from the truck, such as counterweight, seat deck, upright, etc. Be sure that lifting and handling equipment is of the correct capacity and in good condition.

NOTICE -- You should also be familiar with additional operating and maintenance safety instructions contained in the following publications:

ANSI/ASME B56.1 - Operator Control-Industrial Tow Tractors (Safety Standard For Powered Industrial Trucks). Published by: Society of Mechanical Engineers, United Engineering Center, 345 E. 47th Street, New York, N. Y. 10017.

NFPA 505-1982: Fire Safety Standard for Powered Industrial Trucks: Type Designations, Areas of Use, Maintenance and Operation. Available from: National Fire Protection Assoc., Inc., Batterymarch Park, Quincy, Ma 02269.

General Industrial Standards, OSHA 2206: OSHA Safety and Health Standards (29 CFR 1910), Subpart N-Materials Handling and Storage, Section 1910.178 Powered Industrial Trucks. For sale by: Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.



## PM - PLANNED MAINTENANCE PROGRAM.

A planned maintenance program of regular, routine inspections and lubrication is important for long life and trouble-free operation of your lift truck. Make and keep records of your inspections. Use these records to help establish the correct PM intervals for your application and to indicate maintenance required to prevent major problems from occurring during operation.

### PM Report Form

As an aid in performing and documenting your PM inspections, Clark has prepared a "GAS, LPG OR DIESEL PLANNED MAINTENANCE REPORT" form. Copies of this form may be obtained from your authorized Clark dealer. We recommend that you use this form as a checklist and to make a record of your inspection and truck condition.

The periodic maintenance procedures outlined in this manual are intended to be used with the PM report form. They are arranged in groupings of maintenance work that are done in a logical and efficient sequence.

A check mark or entry is made on the PM Report Form when the PM is performed. Please note the special coding system for indicating the importance of needed repairs and/or adjustments.

When you have finished the PM inspections, be sure to give a copy of the report to the designated authority or the person responsible for lift truck maintenance.

### **Do not make repairs or adjustments unless authorized to do so.**

Remove all jewelry (watch, rings, bracelets, etc.) before working on the truck.

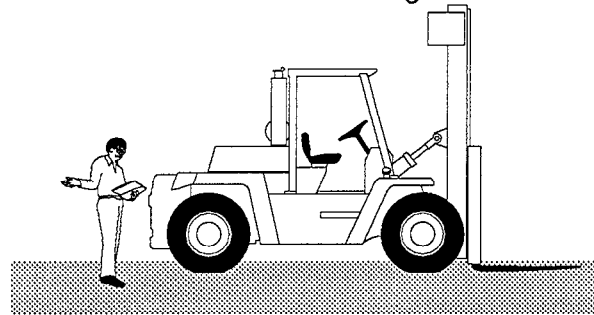
Disconnect the battery ground cable (-) from the engine or frame before working on electrical components.

Always wear safety glasses. Wear a safety (hard) hat in industrial plants and in special areas where protection is necessary or required.

### HOW TO PERFORM THE PM PERIODIC INSPECTION AND MAINTENANCE

#### Visual Inspection

First, perform a visual inspection of the lift truck and its components. Walk around the truck and take note of any obvious damage and maintenance problems. Check for loose fasteners and fittings.



Check to be sure all capacity, safety and warning plates and decals are attached and legible.

**NOTICE:** Do not operate a lift truck with damaged or missing decals and nameplates. Replace them immediately. They contain important information.

Inspect the truck, before and after starting engine, for any signs of external leakage: fuel, engine oil or coolant, transmission fluid, etc.

Check for hydraulic oil leaks and loose fittings. **DO NOT USE BARE HANDS TO CHECK.** Oil may be hot or under pressure.

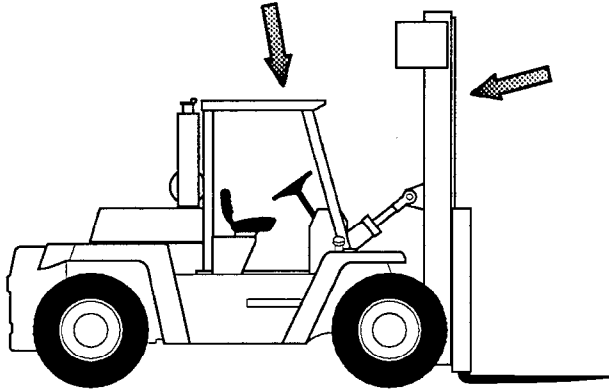


### **CAUTION**

#### **HYDRAULIC FLUID PRESSURE**

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

Be sure that the driver's overhead guard and any other safety devices are in place, undamaged and attached securely.



Check the overhead guard for damage. Be sure that it is properly positioned and all mounting fasteners are in place and tight.

Inspect the welds on the carriage and upright for cracks. Report any cracks noted immediately. Be sure that the mounting fasteners are in place and tight.

Inspect the upright assembly: rails, carriage rollers, lift chains, lift and tilt cylinders. Look for obvious wear and maintenance problems, damaged or missing parts. Check for any loose parts or fittings. Check for leaks, any damaged or loose rollers and rail wear (metal flaking). Carefully check the lift chains for wear, rust and corrosion, cracked or broken links, stretching, etc. Check that the lift and carriage chains are correctly adjusted to have equal tension. Check that the lift chain anchor fasteners and locking means are in place and tight.

Be sure all safety guards and chain retainers are in place and not damaged. Inspect the carriage stops and cylinder retainer bolts. Check all welded connections.

Inspect all lift line hydraulic connections for leaks. Check the lift cylinder rods for wear marks, grooves and scratches. Check the cylinder seals for leaks.

### CAUTION

**Uprights and lift chains require special attention and maintenance to maintain them in a safe operating condition. Refer to Lift Chain Maintenance section for additional information.**

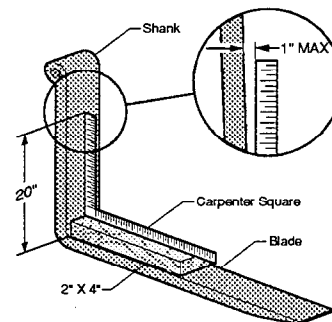
### Forks

Inspect the load forks for cracks, breaks, bending and wear. The fork top surface should be level and even with each other. The height difference between both fork tips should be no more than 3% of the fork length.

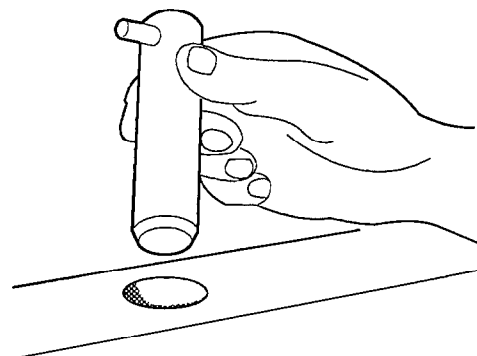
### WARNING

**If the fork blade at the heel is worn down more than 10 per cent, the load capacity is reduced and the fork must be replaced.**

Inspect the forks for twists and bends. Put a 2" thick metal block, at least 4" wide by 24" long on the blade of the fork with the 4" surface against the blade. Put a 24" carpenter's square on the top of the block and against the shank. Check the fork 20" above the blade to make sure it is not bent more than 1 inch maximum.



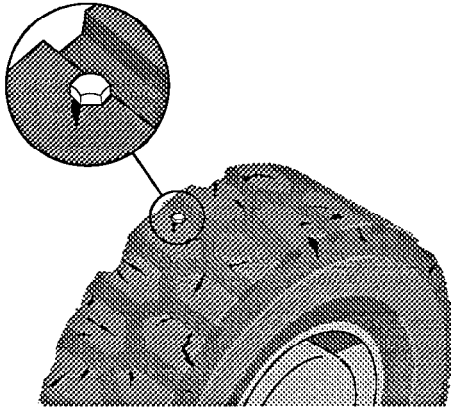
If the fork blades are obviously bent or damaged, have them inspected by a trained maintenance person before operating the truck.



Inspect the fork locking pins for cracks or damage. Reinsert them and note whether they fit properly.

**Wheels and Tires**

Check the condition of the drive and steer wheels and tires. Remove objects that are embedded in the tread. Inspect the tires for excessive wear or breaks or "chunking out".



Check all wheel lug nuts or bolts to be sure none are loose or missing. Have missing bolts or lug nuts replaced and tightened to the the correct torque before operating truck. Torque to 100-120 lbf ft [135,6 - 162,7 N•m].



**! WARNING**

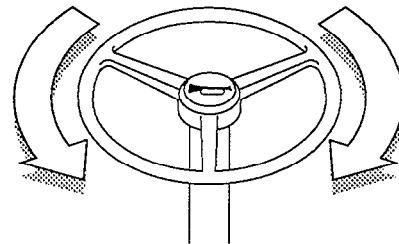
Check tire pressure from a position facing the tread of the tire, not the side. Use a long handled gauge to keep your body away from the side. If tires are low, do not add air. Check with a mechanic. The tire may require removal and repair. Incorrect (low) tire pressure can reduce stability of your lift truck. Proper cold inflation is 100 p.s.i.

**Function Tests**

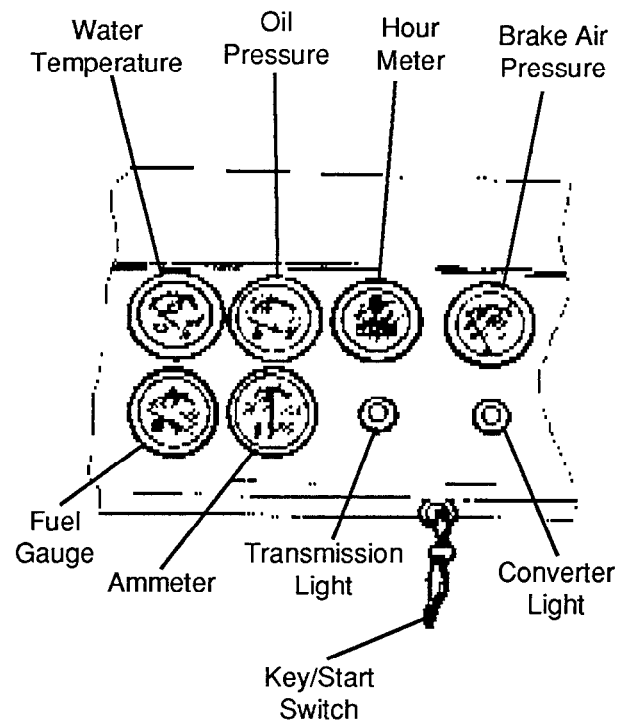
**Now be sure that all controls and systems are functioning correctly.**

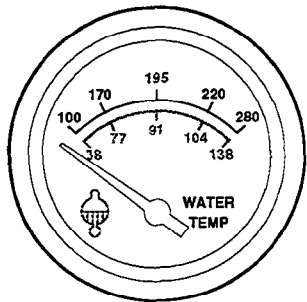
After checking that the parking brake is set, test horn, lights and all other safety equipment and accessories. Be sure they are properly mounted and working correctly.

Press the horn button to check horn function. If the horn or any other part does not operate, report the failure and have it repaired before the truck is put in operation.



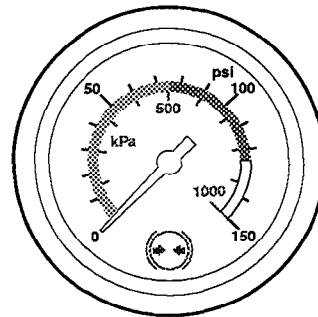
Check the operation of the neutral start switch by placing direction control lever in forward or reverse and turning key switch to START position. Starter must not engage until direction control lever is moved to NEUTRAL position.





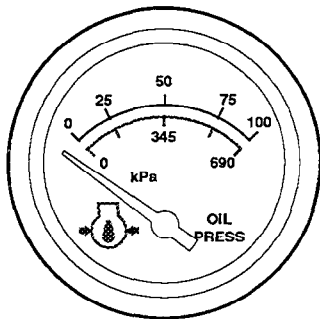
### Water Temperature Gauge

Indicates temperature of engine coolant water in degrees (F). 100 degrees F to 280 degrees F. Water temperature should be about 180 degrees F after 10 minutes of operation. If the indicator registers in the "hot" zone, turn off engine until trouble is located and corrected.



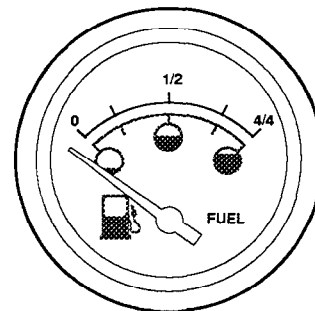
### Air Pressure Gauge

Indicates brake system air pressure from 0 to 150 PSI and [0 to 1000 kPa]. Air pressure should register between 110 and 130 PSI to assure proper operation of the brakes and the parking brake. A warning buzzer is activated if pressure drops below 60 PSI.



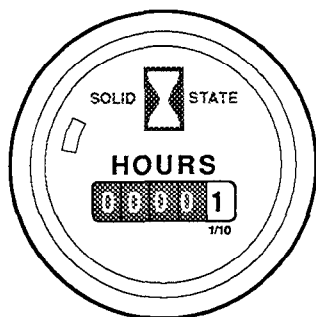
### Oil Pressure Gauge

Indicates engine lubricating oil pressure in PSI. 0 - 100 PSI at maximum engine speed. Oil pressure should be between 30 and 60 PSI on the oil pressure gauge at normal engine operating speeds. At idle, pressure should not fall below 15 PSI. If pressure is low or erratic, shut down engine until trouble is located and corrected.



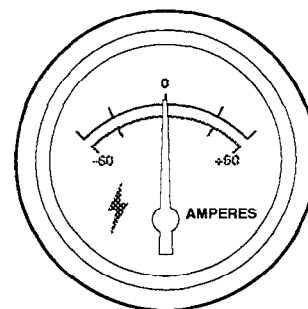
### Fuel Gauge

Indicates quantity of fuel remaining in the tank in fractions of the whole. Fuel level should be checked on the fuel gauge at the beginning of each shift. Always start with a full tank.



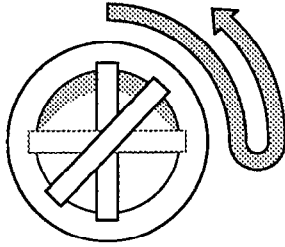
### Hour Meter

Indicates total engine operating time in hours and tenths. The indicated hours are used for planned maintenance. The total hours should be recorded at the beginning and end of each shift.



### Ammeter

Indicates rate of battery charge or discharge. With engine running, should read slightly to the + side of "0". If the ammeter shows a continuous high rate of charge or discharge, or reads erratically, report trouble to proper authority.



### Key/Start Switch

A 3-position switch is standard equipment. To start engine, rotate clockwise. Release to "run" position when engine starts. The switch incorporates an "anti-restart" feature which requires that the key be returned to the "off" position before it can again be turned to "start". If engine does not start on the first attempt, do not re-engage the starter until engine comes to a complete stop (approximately 5 seconds).

### Transmission Light

When illuminated, indicates inadequate converter oil pressure. Light will be illuminated when key/start switch is turned to "run" and "start" positions. It should go out shortly after engine starts. If light does not go out or if it comes on during truck operation you should immediately shut down the engine until the cause is located and corrected.

### Converter Light

Light will be illuminated when converter oil temperature is too high. Shift to a lower range. If light stays on, shut truck down until trouble can be located and corrected.

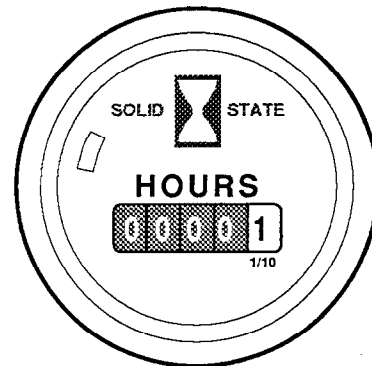
The gauges, lights and hour meter, conveniently grouped in the instrument panel, are designed to tell you at a glance many important things about the performance of your lift truck. Familiarize yourself with their location and purpose and make it a practice to scan the instrument panel as you start the engine, after it starts and periodically as you drive. Report to the designated authority if any gauge is not functioning properly.

NOTE: The electrically operated gauges register correctly when the key switch is in the "on" position. When the key switch is turned "off", the indicator needle will not necessarily return to any given position.

### Checks with the engine running...

Be sure that:

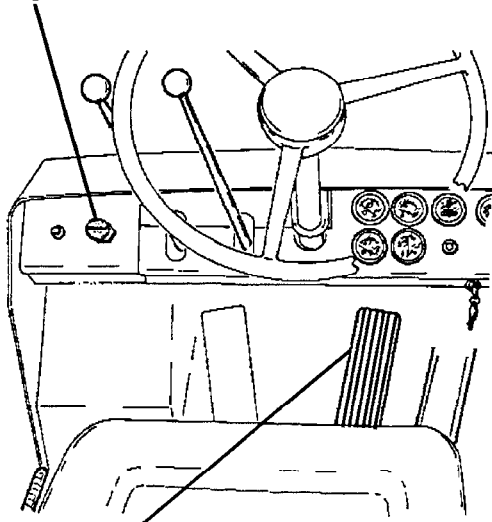
- Parking brake is applied.
- Directional control is in "N" (neutral).
- Start the engine and let it warm up until it runs evenly and accelerates smoothly when you push on the accelerator pedal.
- Check the hourmeter for operation with the engine running. Report any malfunction or damage.



Write the hour meter reading on the PM report form.

- Operate service and parking brakes, all hydraulic controls: lift, tilt and auxiliary (if installed), accelerator, directional controls and steering system. Be sure all controls operate freely and return to neutral properly. Check the service brake system. Push the brake pedal down fully and hold. The brakes should be applied before the pedal reaches the floorplate. If the pedal continues to creep downwards report the failure immediately. **DO NOT OPERATE THE TRUCK UNTIL THE BRAKES ARE REPAIRED.**

Parking Brake Control



Service Brake Pedal

- Check the function of the parking brake. Release, then reapply and then put truck in gear and accelerate to insure that brake holds.
- To check parking brake holding capability, park the lift truck on a grade and apply the parking brake. The parking brake should hold a lift truck with rated load on a 15% grade.



### CAUTION

Do not operate a lift truck if the service or parking brakes are not operating properly

#### Lift Mechanisms and Controls...

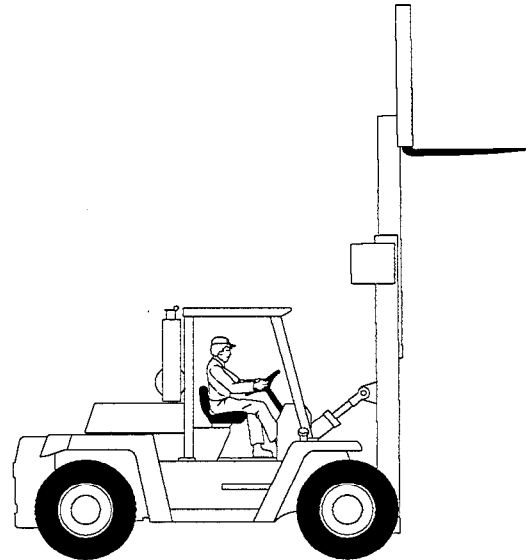
- Check the function of the lift system and controls with the hydraulic pump (engine) running.
- Pull back on the tilt control lever and hold until the upright reaches the full back tilt position. Push forward on the lever to return the upright to the vertical position. Release the lever.



### CAUTION

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

- Pull back on the lift control lever and raise the fork carriage to full height. 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. Watch for chain wobble or looseness; the chains should have equal tension and move smoothly without noticeable wobble. Release the lever.



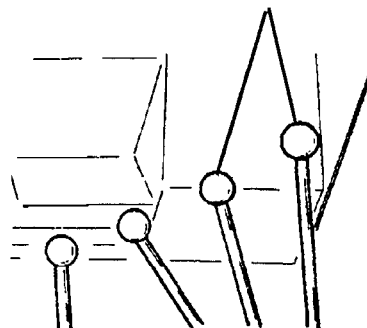
If the maximum fork height is not reached, this indicates there is an inadequate (low) oil level in the hydraulic sump tank or severe binding within the upright.

- Push forward on the lift control lever. Watch the upright as it lowers. When the forks reach the floor, release the lever.

#### Auxiliary Controls...

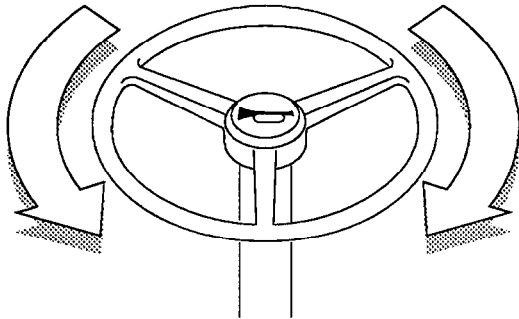
If your lift truck is equipped with an attachment, test the control lever for correct function and briefly operate the attachment.

Auxiliary Valve Lever(s)



**Steering System...**

NOTICE -- The steering system, steer axle and steering linkage on your truck should be inspected periodically for abnormal looseness and damage, leaking seals, etc. Also, be alert for any changes in steering action. Hard steering, excessive freeplay (looseness) or unusual sound when turning or maneuvering indicates a need for inspection or servicing.



- Check the steering system by moving the steering handwheel in a full right turn and then in a full left turn. Return the handwheel (steer wheels) to the straight-ahead position. The steering system components should operate smoothly when the steering wheel is turned.

**Never operate a truck which has a steering system fault.**

**WARNING**

**Fasten your seat belt before driving the truck.**

**Shift Control and Brakes**

Check and make sure that the travel area is clear in front of the truck.

- Push firmly on the brake pedal. Release the parking brake. Move the directional control lever from "N" (neutral) to FORWARD travel position.
- Remove your right foot from the brake pedal and put it on the accelerator pedal. Push down until the truck moves slowly forward. Remove your foot from the accelerator pedal and push down on the brake pedal to stop the truck. The brakes should apply smoothly and equally.

Be sure the travel area is clear behind the truck.

- Put the directional control lever in the REVERSE travel position. Push down on the accelerator pedal until the truck moves slowly in the reverse direction. Remove your foot from the accelerator pedal and push down on the brake pedal to stop the truck. The brakes should apply smoothly and equally.

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

**Be sure to make a record of all maintenance and operating problems you find.**

**Fluid and Filters**

**Check fluid levels and other components within the engine compartment...**

Unlatch and open the hood to access the engine compartment.

**CAUTION**

**To avoid the possibility of personal injury, never work in engine compartment with engine running except when absolutely necessary to check or make adjustments. Take extreme care to keep hands, tools and loose clothing, etc., away from fan and drive belts. Also, remove watches, bracelets and rings.**

**Engine Accessories**

Inspect the engine coolant hoses and fan belt(s). Look for leaking and obvious damage, worn (frayed) condition, breaks, etc., which could cause failure during operation.

**Engine Air Cleaner**

Check the engine air cleaner for damage and contamination (excessive dirt buildup and clogging). Check for correct mounting attachments of the air cleaner. Be sure that the air cleaner hose is securely connected (not loose or leaking). Fan or cone shaped dust deposits on tube or hose surfaces indicate a leak.

Change or service the air cleaner element every 50 to 250 operating hours, depending upon your application. Service intervals may also be determined by the air restriction indicator.

**Battery**

Inspect the battery for any damage, cracks, leaking condition, etc. If the terminals are corroded, clean and protect them with CLARK Battery Saver (available from your Clark dealer). If your battery has removable cell caps, check to be sure the cells are all filled. If possible, refill with distilled water.

### Engine Cooling System

- Check engine coolant level. The engine coolant level is checked by removing the radiator cap. Remove the cap only when the engine is cold. First turn the cap slowly to release any pressure that may be in the radiator. Then push the cap down fully and turn to release and remove the cap.

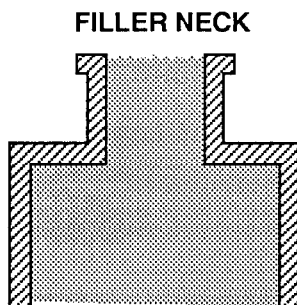


### CAUTION STEAM

**Do not remove the radiator cap when the radiator is hot. Steam from the radiator will cause severe burns.**

Never remove the radiator cap while the engine is running. Stop the engine and wait until it has cooled. Even then, use extreme care when removing the cap from the radiator. It is good safety practice to use a shop cloth to cover the radiator cap while it is being removed. Wrap the cloth around the cap and turn it slowly to the first stop. Step back while the pressure is released from the cooling system. When you are sure all the pressure has been released, press down on the cap, with the cloth in place, turn and remove it. Stand clear of the radiator opening; hot coolant may splash out. Failure to follow these instructions could result in serious personal injury from hot coolant or steam blowout and/or damage to the cooling system or engine.

The correct FULL level is the top edge of the filler neck. If level is low, add a 50/50 mixture of specified coolant and water to the correct fill level. If you have to add coolant more than once a month or if you have to add more than one quart at a time, check the cooling system for leaks.



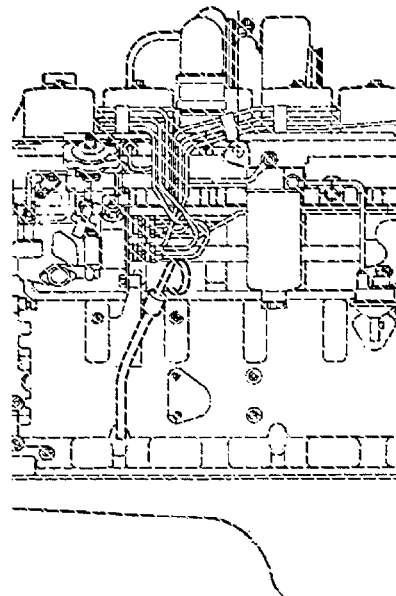
- Inspect the coolant for condition. Look for excessive contamination or rust or oil in the coolant solution. Check the PM time interval for need to change coolant.
  - Check condition of radiator cap rubber seal and radiator filler neck for damage. Be sure they are clean. Check overflow hose for clogging or damage.
- NOTICE - Your lift truck cooling system is filled with a factory-installed solution of 50% water and 50% permanent-type anti-freeze containing rust and corrosion inhibitors. You should leave it in year around. Plain water may be used only in an emergency, but replace it with the specified coolant as soon as possible to avoid damage to the system. With only water in the system, do not let the engine run hot. Do not use alcohol or methanol antifreeze.

### Engine Oil

Check the engine oil level.

Locate the engine oil dipstick (at left side of engine). Pull the dipstick out, wipe it with a clean wiper and reinsert it fully into the dipstick tube. Remove the dipstick and check oil level.

It is normal to add some oil between oil changes. Keep the oil level above the ADD mark on the dipstick by adding oil as required. **DO NOT OVERFILL.** Use the correct oil as specified under Lubricant Specifications.





**Engine Oil and Filter Change**

It is recommended to:

Drain and replace the engine crankcase oil every 50 to 250 operating hours. See NOTICE below.

Replace the engine oil filter every oil change.

Remove the oil pan drain plug to drain old oil, after truck has been in operation and engine (oil) is hot (at operating temperature).

**NOTICE** - The time interval for changing engine oil will depend upon your application and operating conditions. To determine the correct schedule for your truck it is suggested that you periodically submit engine oil samples to a commercial laboratory for analysis of the condition of the oil.

**OIL PERFORMANCE DESIGNATION** - To help achieve proper engine performance and durability, use only engine lubricating oils of the proper quality. These oils also help promote engine efficiency which results in improved fuel economy. A symbol has been developed by the API (American Petroleum Institute) to help you select the proper engine oil. It should be included on the oil container you purchase. For diesel engines, CLARK recommends that you use motor oil that meets API Service Classification CE/SF. CC/CD or CD/SF oils can be used in areas where CE oil is not available.

**Air Brakes****Adjustment**

- When the brake system is operating properly, the cam like action of the reaction arm allows self-adjustment for the total thickness of the brake linings. The self-adjustment feature eliminates the need for manual adjustment of the brakes.
- When the brake linings become worn beyond their designed limits, there will be a noticeable change in the brake effort required to stop the truck or brakes will become noisy during application. If either of these conditions are noted, have the brakes checked by a mechanic before continuing to operate the truck.

**Testing**

A simple operation test to determine whether the compressor unit is operating can be made as follows:

1. Start the engine and allow air to build up in the system and then shut the engine off.
2. Depress the brake pedal to a given point several times noting any increase in pedal pressure required to depress the pedal.
3. If, however there is no change in the amount of pedal pressure required between first and last test, then the power system is not functioning, necessitating corrective action. Have the brakes checked by a mechanic before operating truck.

**Hydraulic Sump Tank**

Check the hydraulic sump tank fluid level. Correct fluid level is important for proper 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. Therefore, it is preferable to check the fluid level at operating temperature (after approximately 30 minutes of truck operation). To check the fluid level, first park the truck on a level surface and apply the parking brake. Put the upright in a vertical position and lower the fork carriage fully down. Pull the dipstick out, (attached to the sump breather) (later models have a sight gauge instead of a dipstick) wipe it with a clean wiper and reinsert it. Remove dipstick and check oil level. Keep the oil level above the LOW mark on the dipstick by adding recommended hydraulic fluid only, as required. **DO NOT OVERFILL.**

Check the condition of the hydraulic fluid (age, color or clarity, contamination). Change (replace) the oil as necessary.

**Hydraulic Fluid and Filter Change**

Drain and replace the hydraulic sump fluid every 2000 operating hours.

(Severe service or adverse conditions may require more frequent fluid change). Replace the hydraulic oil filters elements at every oil change. Remove, clean and reinstall the hydraulic and steer system suction line screens at first PM and every 500 hours thereafter. Check for leaks after installation of the filters. Also, check that the hydraulic line connections at the filter adapter are tightened correctly.

### Sump Tank Breather Maintenance and Inspection

Remove the sump tank fill cap/breather and inspect for excessive (obvious) contamination and damage. Clean or replace the fill cap/breather, per recommended PM schedule or as required by operating conditions.

### Access to the Drive Axle

The best method to use for reaching the drive axle check points (oil level/filler plug and drain plug) is dependent upon the style of upright, carriage and attachments on your truck. One method is to raise the upright carriage to provide easy access to the drive axle.

Apply the parking brake and block the wheels. Be sure to put blocking under the carriage and upright rails.



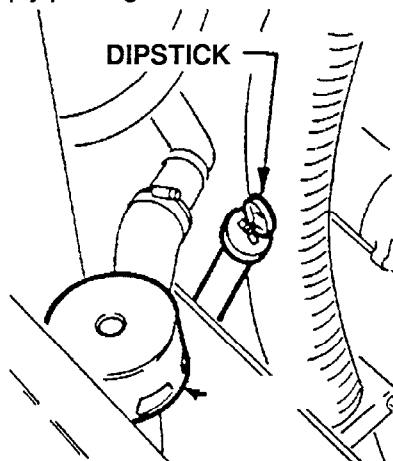
### WARNING

An upright or carriage can move unexpectedly. Chain or block the carriage and rails. Failure to follow this warning can result in serious injury.

Refer to Machine Jacking and Blocking for further information.

### Transmission Fluid Check

• Before making check, run engine until unit is at operating temperature. This is important as transmission oil temperature should be 200 degrees F and the engine water jacket should be at operating temperature. Apply parking brake.



• With the engine operating at idle and the transmission in NEUTRAL, check the fluid on the dipstick. Fill if necessary to the FULL mark on the dipstick, using "C-3 Dexron II D" or "Dexron".

### Differential Fluid and Breather Check

- Check the differential breather to be sure it is free of obstruction. Remove and clean in a Stoddard type cleaning solvent if necessary. Dry breather with compressed air before replacing it on differential.
- Remove fill/level plug and verify differential lubricant level. Level should be maintained to the height of the plug opening.

NOTICE: Check the planned maintenance interval (operating hours) or the condition of the oil to determine if the drive axle fluid needs to be changed.

### Truck Chassis Inspection and Lubrication

Lubrication and inspection of truck chassis components, including steer wheels, steer axle linkage, steering cylinder and wheel bearings will be easier if the truck is raised and blocked up under the frame. For additional information refer to the Machine Blocking and Jacking section.

Inspect the steering cylinder piston rods, seals and fasteners for damage, leaks and looseness.

Lubricate the steer axle linkage: rod ends and linkage pivot points. Be sure to clean the grease fittings before lubricating and remove the excess grease from all points after lubricating.

Lubricate miscellaneous linkage as needed.



### WARNING

Do not raise truck by lifting under the counterweight.

### Upright and Tilt Cylinder Lubrication

Clean the fittings and lubricate the tilt cylinder rod end bushings (forward end).

Clean the fittings and lubricate the tilt cylinder base rod end bushings (rear end).

Clean and lubricate the upright trunnion bushings.

### Lift Chains

Lubricate the entire length of the upright rail lift and carriage chains with Clark Chain and Cable Lube.

NOTE: Do not lubricate the carriage roller rails.

**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 or fuel spills. Keep the controls and floorboards clean, dry and safe. A clean truck makes it easier to see leakage, 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, dust or lint, (e.g. cotton fibers, paper dust, etc) in the air or on the floor or ground, will require more frequent cleaning. The radiator, especially, may require daily air cleaning to ensure correct cooling. If air pressure does not remove heavy deposits of grease, oil, etc., it may be necessary to use steam or liquid spray cleaner.

**LIFT TRUCKS SHOULD BE AIR CLEANED, AS NECESSARY, AT EVERY PM INTERVAL AND OTHERWISE AS OFTEN AS NECESSARY.**

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, maximum. (OSHA requirement).

**CAUTION**

**Wear suitable eye protection and protective clothing.**

Air clean the: Upright assembly - Drive Axle - Radiator, from both counterweight and engine side - Engine and accessories - Driveline and related components - Steer axle and steer cylinder.

**Critical Fastener Torque Checks**

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

**Check Torque Of Critical Items, Including:**

- Drive axle mounting
- Drive & steer wheel mounting
- Counterweight mounting
- Overheadguard mounting
- Tilt cylinder mounting & yokes
- Upright mounting & components

**LIFT CHAIN MAINTENANCE**

Lift chains are very important components of fork lift trucks. The chain system on your upright was designed for safe, efficient and reliable transmission of lifting force from hydraulic cylinder to the forks. Safe use of your truck with minimum down-time depends on the correct care and maintenance of the lift chains. Most complaints of unacceptable chain performance are a result of poor maintenance. Chains need periodic maintenance to give maximum service life.

**Lift Chain Adjustment Check**

The lift chains are correctly adjusted if the lower fork carriage rollers reach their end (lowest) position approximately [13 mm] 0.50 inch from the lower edge of the inner rail. This also positions the bottom of the forks the same (equal) distance above the floor. To check this dimension, raise the carriage to a height that exposes several inches of the inner rail at the roller path. Apply a layer of grease to the roller path on the inner rail. Lower the carriage and pick up a rated capacity load, (tilt the upright back slightly) and raise the load until the carriage rollers have passed over the greased area. Lower the load completely and remove the load from the forks. Raise the carriage again to expose the inner rail. You can now check the roller path pattern in the grease and determine the correct adjustment of the chains.

The lift chains can be adjusted by loosening or tightening of the chain anchor nuts.

**NOTICE:** It is important to make the lift chain adjustment check with a rated load to make sure that the chains are stretched to their maximum length.

**WARNING**

**Do not attempt to repair a worn chain. Replace worn or damaged chains.**

### Lift Chain Inspection and Measurement

Inspect and lubricate the lift chains every truck PM (50-250 hours). When operating in corrosive environments, inspect the chains every 50 hours. During the inspection, check for the following conditions:

- Rust and corrosion - Cracked plates - Raised or turned pins - Tight joints - Wear, worn pins or holes.
- When the pins or holes become worn, the chain becomes longer. When a section of chain is 3% longer than a section of new chain, the chain is worn and must be discarded.
- Chain wear can be measured by using a chain scale or a steel tape measure. When checking chain wear, be sure to measure a segment of chain that moves over a sheave. Do not repair chains by cutting out the worn section and joining in a new piece. If part of a chain is worn, replace all the chains on a truck.

### Lift Chain Lubrication

Lift chain lubrication is an important part of your maintenance program. The lift chains operate under heavy loadings and will function more safely and have longer life if they are regularly and correctly lubricated. Clark chain lubricant is recommended; it is easily sprayed on and provides superior lubrication. Heavy motor oil may also be used as a lubricant and corrosion inhibitor.

### Lift Chain Inspection and Wear Criteria

#### 1 - (NEW CHAIN LENGTH)

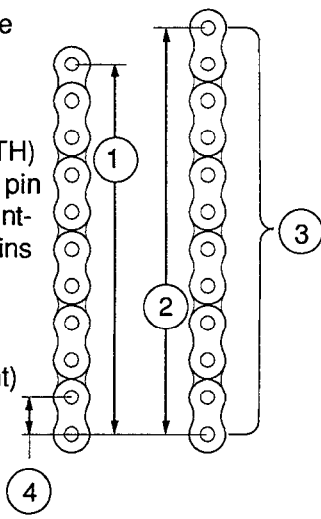
The distance from the first pin counted to the last pin counted in a span while the chains are lifting a small load.

#### 2 - (WORN CHAIN LENGTH)

The distance from the first pin counted to the last pin counted in a span while the chains are lifting a small load.

3 - (SPAN) The number of pins in the length (segment) of chain to be measured.

4 - (PITCH) The distance from the center of one pin to the center of the next pin.



### Lift Chain Replacement

All chains must be replaced if any strand has wear of 3% or more, or if any of the damaged conditions noted are found during inspection.

Order replacement chains from your CLARK dealer.

Replace all chains as a set.

Do not remove factory lubrication or paint new chains.

Replace anchor pins and worn or broken anchors when installing new chains.

Adjust tension on new chains.

Lubricate chains when they are installed on the upright.