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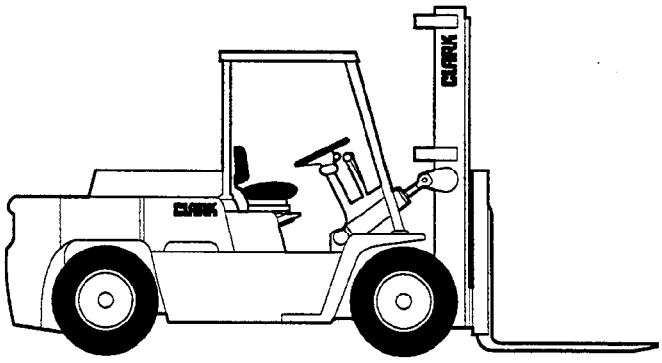
Service Manual

SM 591



GPH/DPH 50/60/70/75

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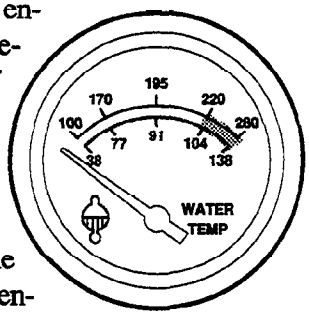
restart" feature requires that the key be returned to the "off" position before it can again be turned to "start." If engine does not start on the first attempt, do not re-engage the starter until engine comes to a complete stop (approximately 5 seconds). After the engine starts, let it warm up until it runs evenly.

Gauges, Meters, and Indicators

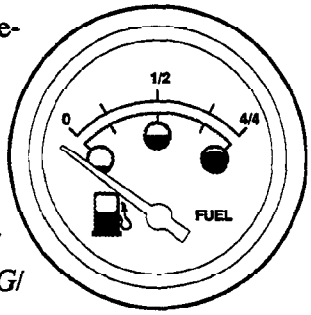
The gauges, hour meter, and indicator light in the instrument panel tell you many important things about the performance of your lift truck. Familiarize yourself with their location and purpose and make it a practice to scan the instrument panel as you start the engine, after it starts, and periodically as you operate the truck.

Water Temperature Gauge



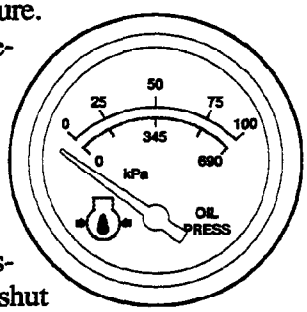
Indicates temperature of engine coolant water in degrees, 100-280°F (38-138°C). Water temperature should be about 180°F (82°C) after 10 minutes of operation. If the indicator registers in the "hot" zone, turn off the engine and troubleshoot the cooling system.

Fuel Gauge



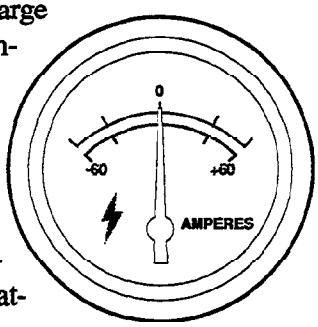
Indicates quantity of fuel remaining in the tank in fractions of the whole. Fuel level should be checked at the beginning of each shift. The tank should be full at the beginning of each shift. *(Not used on LPG/CNG.)*

Oil Pressure Gauge



Indicates engine oil pressure. Oil pressure should be between 30 psi (207 kPa)and 60 psi (414 kPa) at normal engine operating speeds. At idle, pressure should not fall below 20-25 psi (138 kPa). If pressure is low or erratic, shut down the engine and locate the problem.

Ammeter



Indicates rate of battery charge or discharge. With the engine running, the gauge should read slightly to the "+" side of 0. If the ammeter shows a continuous high rate of charge or discharge, or reads erratically, troubleshoot the battery charging system.

Transmission Temperature Light

This light comes on when oil temperature in the torque converter is too high. Shift to a lower range. If light stays on, shut the truck down and troubleshoot the transmission.

Air Restriction Indicator

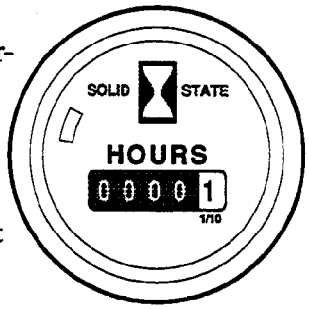
Located on the seat deck of diesel models, this indicator shows red when it is time to change the air filter element.

NOTICE

The electrically-operated gauges register correctly when the key switch is in the ON position. When the key switch is OFF, the indicator needle will not necessarily return to any given position.

Hour Meter

Indicates total engine operating time in hours and tenths. The indicated hours are used for planned maintenance. Record the hours on the PM Report Form.



Accelerator, Brake/Inching System, and Parking Brake

1. Push the brake (right) pedal down fully and hold. The brakes should apply 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.
2. Make sure the truck accelerates smoothly.
3. Depress the inching (left) pedal and depress the accelerator to see if the transmission disengages properly.
4. Check the function of the parking brake. Apply and then put truck in gear and accelerate to insure that brake holds. Park the 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.

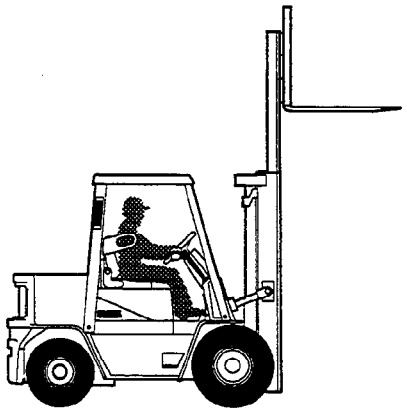
Lift Mechanisms and Controls

1. Check the function of the lift system and controls with the hydraulic pump (engine) running.
2. 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.

3. 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.

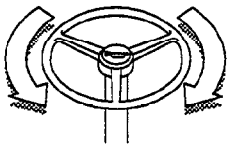
4. Push forward on the lift control lever. Watch the upright as it lowers. When the forks reach the floor, release the lever.

Auxiliary Controls

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

Steering System

The steering system, steer axle and steering linkage 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.

1. Push firmly on the brake (right) pedal. Release the parking brake. Move the directional control lever from "N" (neutral) to FORWARD travel position.
2. 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.
3. 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 shutdown procedures. Be sure to make a record of all maintenance and operating problems you find.

Under the Hood

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 face, hands, tools, loose clothing, etc. away from fan and drive belts. Also, remove watches, bracelets, and rings.

Belts and Hoses

Inspect the engine coolant hoses and fan belt(s). Look for leaking and obvious damage, worn (frayed) condition, breaks, etc. that 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. Air cleaner 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 the battery has removable cell caps, check to be sure the cells are all filled. If necessary, refill with distilled water.

Engine Cooling System

Check radiator coolant level (on a daily basis in high-cycle applications):

1. Remove the radiator cap, only when the engine is cold. First turn the cap slowly to release pressure that may be in the radiator. Then push the cap down fully and turn to release and remove the cap.

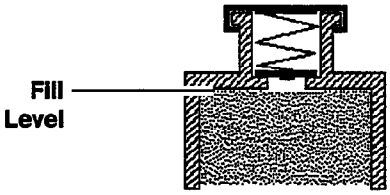
CAUTION

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.

2. 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.

3. The correct FULL level is the bottom 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.

4. Inspect the coolant\ condition. Look for excessive contamination or rust or oil in the coolant solution. Check the PM time interval for need to change coolant.

5. 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

With the truck level and the engine shut-down for at least 2 minutes, check the engine oil level.

Locate the engine oil dipstick. 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

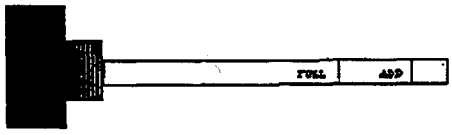
The time interval for changing engine oil will depend upon your application and operating conditions. To determine the correct schedule for your truck it is suggested that you periodically submit engine oil samples to a commercial laboratory for analysis of the condition of the oil.

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. See "Lubrication Specifications in Group 40.

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) 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 filter elements every 1000 hours and 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.

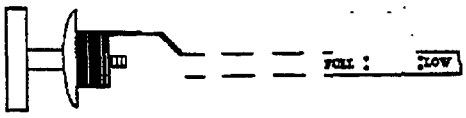
Sump Tank Breather

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.

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 "Amoco 1000" (Clark #2776236; 1 gal. can). Change fluid every 1000 hours.



Drive Axle Fluid Check

The drive axle fluid should be checked every PM (typically 50-250 hours). Change fluid every 1000 hours.

Air Cleaning the Truck

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 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 30 psi (207 kPa), maximum. (OSHA requirement).

CAUTION

Wear suitable eye protection and protective clothing.

Air clean: 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 and steer wheel mounting
- Counterweight mounting
- Overhead guard mounting
- Tilt cylinder mounting and yokes
- Upright mounting and components.

Truck Chassis Inspection and Lubrication

Lubrication requirements are given in Group 40 in Section 4, "Lubricant Recommendations," and in Section 5, "Lubrication Intervals."

Lubrication and inspection of truck chassis components includes steer wheels, steer axle linkage, steering cylinder, and wheel bearings. To check these items, the truck must be properly raised and blocked as described in "Lifting, Jacking, and Blocking" in Group 22, Section 1.

Check for play in wheel bearings by attempting to move the wheel side to side and up and down, by hand.

Inspect the steering cylinder piston rods, seal, and fasteners for damage and leaks, and looseness. Check for leaks at the steering gear.

Check linkages by observing whether the steer wheels lag when you turn the handwheel.

Lubricate the steer axle linkage rod ends and pivot points. Be sure to clean the grease fittings before lubricating. Remove the excess grease from all points after lubricating. Lubricate miscellaneous linkage as needed.

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 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.

WARNING

Do not attempt to repair a worn chain.

Replace worn or damaged chains.

Lift Chain Adjustment Check

Lift chains are correctly adjusted if the lower carriage rollers reach their end (lowest) position approximately 0.50 inch (13mm) from the lower edge of the inner rail.

On trucks with forks, measure the height of the fork from the floor, which should be approximately 0.50 (13mm) when the lift chain is correctly adjusted.

On trucks with attachments without forks, raise the carriage to a height that exposes several inches of the inner rail at the roller path. Apply a light 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. Now check the track the roller left in the grease and determine the correct adjustment of the chains.

Adjust lift chains by loosening or tightening of the chain anchor nuts.

On trucks with triple stage uprights, adjust back chains so that the inner rail top is 0.125 inch (3.2 mm) above the intermediate rail. Adjust chains for even tension.

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.