

**TECHNICAL MANUAL
OPERATOR'S MANUAL**



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**TRUCK, FORKLIFT, CLEAN BURN
DIESEL, FRONT-LOADING,
4000 LB. CAPACITY, M483
CLARK MODEL GPX 25E DIESEL
NSN 3930-01-384-5310**

Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 1996

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death:

- Keep at least a B-C fire extinguisher within easy reach when working with fuel or a fuel system.
- When refueling, stop engine and apply parking brake. Ensure no open flame is near area. Never smoke. Never add fuel when engine is running. Do not have a driver seated when adding fuel.
- Ground fuel funnel or nozzle against filler neck to prevent sparks and be sure to replace fuel tank cap. After fuel is added, securely close fuel cap: a loose cap can cause a fuel leak or become a fire hazard.
- Never overfill the tank or spill fuel. If fuel is spilled, clean it up immediately. Before starting truck, check that no fuel is spilled on or around truck.

WARNING

The exhaust pipe and muffler are very hot. Do not touch these parts with bare hands or allow body to come in contact with exhaust pipe or muffler. Exhaust system parts can cause serious burns.

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

WARNING

Read and understand all of the safety precautions and warnings before performing any checks and services or personal injury can result.

WARNING

Wear eye glasses, safety shoes, and correct fitting clothing when working on lift trucks. Injury can result if you do not wear protection.

WARNING

Fasten your seat belt before driving the truck. Failure to fasten seat belt could result in injury or death.

WARNING

Make sure that there is adequate overhead clearance before raising the upright. Failure to do so could result in damage to equipment and injury or death to personnel.

WARNING

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

WARNING

Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat of flame. Never smoke when using solvent; the flash point for type I drycleaning solvent is 1000F (380C) and, for type II, is 140°F(600C). Failure to do so may result in injury or death to personnel.

If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

WARNING

Personnel hearing can be PERMANENTLY DAMAGED if exposed to constant high noise levels of 85 dB (A) or greater. Wear approved hearing protection devices when working in high noise level areas. Personnel exposed to high noise levels shall participate in a hearing conservation program in accordance with TB MED 501. Hearing loss occurs gradually but becomes permanent over time.

WARNING

Icy roads and surfaces are common during periods of severe cold. Care should be exercised when operating on icy surfaces. Sudden movements or lack of attention can cause accidents and injury or death to personnel.

WARNING

Do not smoke or have open flames or sparks in battery charging areas or near batteries. An explosion can result and cause injury or death.

WARNING

The battery contains corrosive acid which can cause injury. If acid contacts your eyes or skin, flush immediately with water and get medical assistance.

WARNING

Always wear your seat belt when operating your lift truck. Failure to fasten seat belt could result in injury or death.

Internal combustion engines generate toxic gases which can cause serious injury or death when inhaled. Be sure there is enough ventilation.

WARNING

Never leave your lift truck unattended while the engine is running. Transmission could engage causing injury or death to personnel.

WARNING

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

WARNING

Exhaust exhaust gases, particularly carbon monoxide, are harmful and can cause serious injury or death.

Never idle your lift truck engine in closed areas. Exhaust gases are harmful and can cause serious injury or death.

WARNING

Hearing protection is required for operator and also for all personnel working in and around this truck while truck is operating.

WARNING

- Always ensure that forks are as far apart as the load will allow to prevent the possibility of loads tipping off of forks and causing injury to personnel or damage to equipment.
- Always place forks centered beneath load to prevent possibility of loads tipping off of forks and causing injury to personnel or damage to equipment.
- Always ensure fork latch is seated completely to lock fork in position to prevent fork shifting and causing injury to personnel or damage to equipment.

WARNING

Engine and transaxle are very hot after running. Do not touch these parts with bare hands or allow body to come in contact. Hot engine and transaxle parts can cause serious burns.

WARNING

Do not work on this truck unless you are trained and authorized, and know the correct maintenance procedures. Injury or death could result.

WARNING

Be careful that the truck does not move unexpectedly during brake tests. Notify personnel in vicinity to stand clear. Unexpected movement of truck could cause injury or death to personnel.

CAUTION

Blowing dust and sand can scratch glass surface. When the truck is not being operated, glass surfaces must be covered for protection.

CAUTION

Damage to the truck can result if any of the warning indicators illuminate when the engine is running. Stop the engine. Do not operate the truck.

CAUTION

Do not overfill crankcase with engine oil or serious damage will occur to engine.

CAUTION

Continuous operation with coolant temperature above 212°F (100° C) can damage the engine.

CAUTION

Do not overfill tank with hydraulic fluid or serious damage to hydraulic system may occur.

CAUTION

Do not overfill transaxle with fluid or serious damage to transaxle may occur.

CAUTION

Use only a 12-volt jumper system. You can permanently damage a 12-volt starting motor and ignition system by connecting it to a 24-volt power supply (two 12-volt batteries in series, or a 24-volt generating set).

CAUTION

During periods of extreme cold, damage will occur if tires are allowed to freeze to the ground. If a sheltered area is not available when temperatures are forecast to be below 32° F (0° C), the truck should be parked in a high, dry area. Failure to do so may cause damage to equipment.

CAUTION

- Operating during periods of extreme heat [ambient temperatures above 100°F (38°C) can cause the truck engine and transmission systems to over-heat. Engine temperatures above 212°F (100°C) and transmission fluid temperatures above 210°F (99°C) can cause damage to engine and transmission system components. Transmission fluid temperatures should be checked often during periods of extreme heat to prevent damage to engine and transmission system components.
- Gaskets and seals are more likely to leak when engine and transmission system operating temperatures are high. Engine and transmission fluid levels should be checked more often during periods of extreme heat to prevent damage to engine and transmission components. Checks for leaks around gaskets, seals, and fittings should also be made more often.

TECHNICAL MANUAL

No. 10-3930-671-10

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DEPARTMENT OF THE ARMY
Washington, DC, 1 May 1996

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**TRUCK, FORKLIFT, CLEAN BURN
DIESEL, FRONT-LOADING,
4000 LB. CAPACITY, M483
CLARK MODEL GPX 25E DIESEL
NSN 3930-01-384-5310**

REPORTING OF ERRORS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Tank-automotive and Armaments Command, ATTN: AMSTA-IM-OPIT., Warren, MI 48397-5000. A reply will be furnished to you. You may also provide DA Form 2028-2 information to TACOM via datafax or e-mail. TACOM's datafax number for AMSTA-IM- OPIT is: (810) 574-6323 and the e-mail address is: amstaim-mmaa@cc.tacom.army.mil.

This manual is an authentication of the manufacturer's commercial literature and does not conform with the format and content specified in AR 25-30, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

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SAFETY SUMMARY

GENERAL PRECAUTIONS

The following are general safety precautions and instructions that personnel must understand and apply during many phases of operation and maintenance to ensure personnel safety and health. Portions of this information may be repeated in certain chapters of this publication for emphasis.

Batteries

When inspecting batteries, never smoke or expose battery to sparks or flames. Eye protection (face shield), acid-resistant rubber apron, and gloves must be worn when working around batteries.

Cleaner/Chemical Handling

Keep cleaners/chemicals in approved safety containers and in minimum quantities. Some cleaners/chemicals may have an adverse effect on skin, eyes, and respiratory tract. Observe manufacturer's WARNING labels and current safety directives. Use cleaners/chemicals only in authorized areas. Consult the local Bioenvironmental Engineer for specific precautions, protective equipment, and ventilation requirements.

Compressed Air

Use of compressed air can create an environment of propelled foreign particles. Air pressure shall be reduced to less than 30 pounds-per-square-inch gauged (psig) and used with effective chip guarding and personal protective equipment.

Jewelry

Jewelry (rings, bracelets, metal watches, or neck chains) shall not be worn while working on exposed equipment.

Personal Protective Equipment

Wear protective clothing/equipment (gloves, apron, eye protection, protective mask, etc.) approved for the materials, procedures, and tools being used as necessary.

GENERAL SAFETY PRACTICES

Read and thoroughly understand all instructions contained in this and all vendor manuals before attempting to operate or service the 4K Forklift Truck.

Only the operator is allowed on the truck during operation.

Clothing worn by all personnel working close to the truck should be close fitting and belted. Loose jackets, shirts, or pants should never be worn because of the danger of getting caught in moving parts.

Be certain that hand brake is set and the direction control levers and all switches are in the OFF or centered positions before starting the engine.

Make sure everyone is clear of the truck before starting so they cannot be struck by or caught in moving parts.

Keep operator's platform clean. Do not use it as a place to carry loose tools, lunch boxes, etc. Refuel truck only when engine has been shut off. Do not permit sparks, open flames, or smoking within 50 feet of truck when refueling.

Hydraulic fluid escaping under pressure can have sufficient force to penetrate the skin, causing serious personal injury. Before disconnecting lines, be sure to relieve all pressure. Before applying pressure to a system, be sure all connections are tight and that lines, tubes, and hoses are not damaged. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands, to search for suspected leaks.

If injured by escaping fluid, get medical attention at once. Serious infection or reaction can result if proper medical treatment is not administered immediately.

Refill the radiator only when the engine is stopped. The truck has a pressure cooling system. To avoid being scalded when radiator cap is removed, first turn cap slightly to the stop which allows steam to escape through the overflow pipe. After all pressure is relieved, remove cap.

Never lubricate or service truck when it is operating.

SAFETY SUGGESTIONS FOR OPERATING TRUCK

Be sure all hoods and doors are closed before operating truck.

Be certain the direction control lever is in **NEUTRAL** position before starting engine.

Check all functions of the truck for proper operation. Never attempt to use a malfunctioning machine.

Never permit anyone to climb or stand on the truck.

Keep all persons clear of forks when operating truck.

Before leaving the operator's seat, always be sure that all control switches are in the OFF or centered position, hand brake is applied, forks are lowered, and engine is shut off.

Never attempt to attach or remove any part or assembly on the truck while it is operating.

SAFETY SUGGESTIONS FOR SERVICING TRUCK

Before attempting to service, attach, or remove any part of assembly on the truck, make certain that:

- (1) All controls and switches are in the **OFF** or centered position.
- (2) Hand brake is applied.
- (3) Forks are lowered.
- (4) Engine is shut off unless otherwise instructed.
- (5) Wheels are chocked.

Batteries produce explosive gases. Keep all sparks and open flames away from batteries. If a battery needs recharging, avoid sparks by turning off the charger before making connections or disconnections.

Sulfuric acid in batteries is a poison and could cause severe burns. Avoid contact with skin, eyes, and clothing. When working around batteries, protect eyes and face from battery fluid and possible explosion.

Before starting the engine, be sure there is plenty of ventilation. If it is necessary to operate the engine inside an enclosed service area, be sure exhaust is properly vented.

Make sure everyone is clear of the truck before starting so they cannot be struck by or caught in moving parts.

CHAPTER 1 INTRODUCTION AND GENERAL INFORMATION

1-1. INTRODUCTION.

a. Purpose of This Manual. This is a supplemental manual designed to provide information concerning operation and maintenance not already covered in vendor manuals for the M483, 4000 lb Forklift Truck, hereafter referred to as the truck, manufactured by Clark Material Handling Company, Lexington, KY, Model GPX 25E Diesel (See Figure 1-1). This manual contains the following:

- (1) **Chapter 1 - Introduction and General Information:** General information about the make-up of this manual, including a general description of the truck and a specifications table.
- (2) **Chapter 2 - Operating Instructions:** Instructions for operation of the truck. When relevant procedures are presented in a vendor manual, that manual will be referenced.
- (3) **Chapter 3 - Operator Maintenance:** Instructions for preventive maintenance are presented in this chapter. When relevant procedures are presented in a vendor manual, that manual will be referenced.
- (4) **Chapter 4 - Operator Troubleshooting:** Instructions for step-by-step procedures to identify, locate, and isolate equipment malfunctions are presented in this chapter.
- (5) **Appendices - Army-Specific and Vendor Information:** Vendor material is tabularly arranged as appendices to this manual.

b. Function of This Manual. This manual provides instructions, illustrations, and associated data for operations and operator maintenance. This manual

shall enable an average journeyman to operate and maintain the truck.

c. WARNINGS, CAUTIONS, and NOTES. Warnings, cautions, and notes used in this manual are defined as:

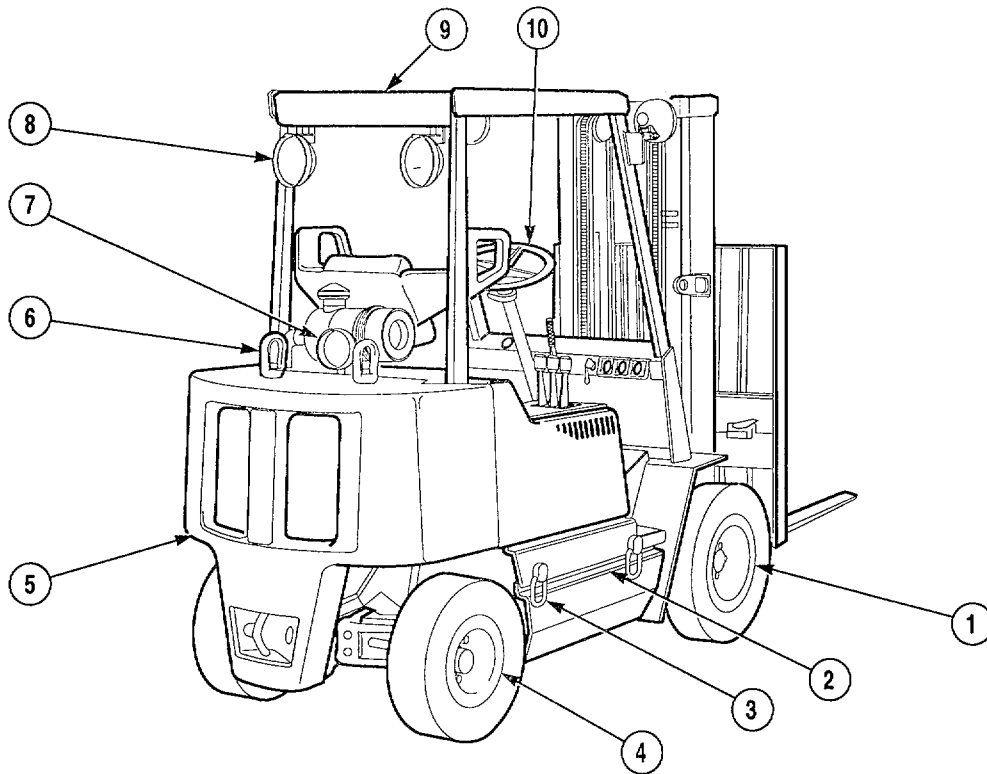
- (1) A "warning" identifies an operation or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment, and/or injury or loss of life.
- (2) A "caution" identifies an operation or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment.
- (3) A "note" highlights an essential operation or maintenance procedure, condition, or statement.

1-2. CAPABILITIES.

The truck is a 4-wheeled vehicle of material handling equipment capable of lifting palletized and certain loose loads, when appropriate, up to a maximum weight of 4000 lb (1814.4 kg). Over smooth and level surfaces, the truck can reach a maximum speed of 12 mph (19.3 kph) unloaded and 11.3 mph (18.1 kph) with a full load, when safety conditions merit.

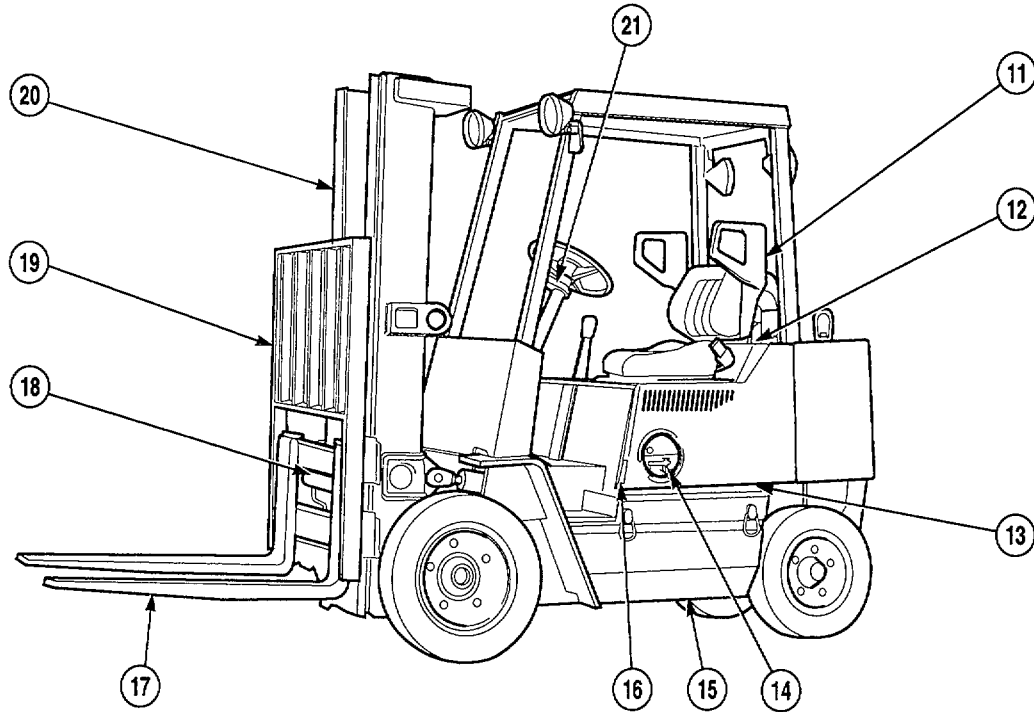
1-3. DESCRIPTION.

Single wheels in front of truck provide stability and ruggedness. Safety equipment consists of an automotive horn operable from steering wheel. Two floodlights on the overhead guard help illuminate the area in front of the truck while two floodlights in the back of the overhead guard illuminate the area behind truck. A brake light at the back of truck illuminates whenever the brake or inching pedal is depressed.



1. Drive Axle, Wheels, and Solid Rubber Tires
2. Hydraulic Sump Tank
3. Tie Downs
4. SteerAxle, Wheels, and Solid Rubber Tires
5. Counterweight
6. Lifting Eyes
7. Brake Light
8. Flood Lights
9. Overhead Guard
10. Steering Control Handwheel

Figure 1-1. M483 4K Forklift Truck - Right Rear View (Sheet 1 of 2)



- 11. Safety Seat and Seat Belt
- 12. Seat Deck Latch
- 13. Machine Serial Number (On Frame Inside Door)
- 14. Fuel Filler Opening
- 15. Fuel Tank Enclosure
- 16. Side Door Latch (Access To Engine Compartment)
- 17. Forks
- 18. Side Shift
- 19. Load Back Rest Extension
- 20. Upright
- 21. Directional Control Lever

Figure 1-1. M483 4K Forklift Truck - Left Front View (Sheet2 of 2)

Table 1-1. Description

Nomenclature	Description
Type of Vehicle	4000 lb Forklift Truck
Manufacturer	Clark Material Handling Company
Model Number	GPX 25E Diesel
Truck Capacity	4000 lb (1814.4 kg) @ 24-inch load center
Overall Length	
With Forks	144.9 in. (3680 mm)
Without Forks	102.9 in. (2614 mm)
Overall Width	82.7 in. (2101 mm)
Height (Top of Overhead Guard)	83 in. (2108 mm)
Maximum Lift Height	184 in. (4674 mm)
Collapsed Mast Height	83 in. (2108 mm)
Ground Clearance	
Under Mast	6.25 in. (159 mm)
Under Truck	8 in. (203 mm)
Weight	9735 lb (8952 kg)
Brakes	
Service	2-wheel Drum
Parking	2-wheel Drum
Maximum Gradeability	
With Load	24%
Without Load	25%
Drawbar Pull	
With Load	12030 lb (53512 N)
Without Load	7670 lb (34118 N)
Travel Speed	
With Load	11.3 mph (18.1 kph)
Without Load	12 mph (19.3 kph)
Turning Radius	134 in. (3404 mm)
Wheels	
Size (front)	7.00 x 12
Size (rear)	6.50 x 10
Type	Solid Rubber
Drift	
Lift Cylinders	Should not exceed 0.73 in. (18.5 mm) in a 5-minute period
Tilt Cylinders	Should not exceed 1.5 degree in a 5-minute period
Upright Speed	
Lifting - With Load	80 fpm (0.41 m/s)
Lifting - Without Load	87 fpm (0.44 m/s)
Lowering - With Load	69 fpm (0.35 m/s)
Lowering - Without Load	79 fpm (0.40 m/s)
Engine	
Manufacturer	Continental
Type	Diesel
Model	TMD 27
Weight (approximate w/accessories)	568 lb (258 kg)
Horsepower	60 hp (44.1 kW) @ 3100 rpm
Torque	119 lb-ft (161 N•m) at 1600 rpm
Bore/Stroke	3.58 in./4.06 in. (91 mm/103.1 mm)

Table 1-1. Description - CONT:

Nomenclature	Description
Engine (continued)	
Displacement.....	164 cu. in. (2.68 l)
Firing Order	1-3-4-2
Compression Ratio.....	20.5:1
Speed	
Governed Speed (no load).....	2600 rpm
Engine Idle	650-750 rpm
Oil Pressure.....	40-60 psi (276-414 kPa) with Oil at operating temperature
Lubricant.....	SAE 5W30
Fuel	45 cetane, minimum
Coolant	50/50 Water/Ethylene Glycol type antifreeze with rust and corrosion inhibitors
Drive Belt	
Type	V-belt
Deflection	0.20 in. (5.1 mm) in. long span at 2.5-3.2 lb-ft (3.4 -4.3 N) at center of alternator-crankshaft-pulley
System Voltage	12-volt, negative ground
Alternator	12-volt, 62 amp
Batteries (2)	
Type	BCI Group 24
Cold Crank Current	825 amps at 0°F (-18°C)
Reserve Capacity	155 amps min. at 80°F (26.7°C)
Starter.....	TMD27M516 (Nippondenso), 12-volt
Transaxle	
Manufacturer	Clark
Type	1-speed forward and reverse
Model.....	TA18
Weight	600 lbs (272k)
Hydraulic System	
Filter Size.....	10 micron
Main Relief Valve Setting	2600-2700 psi (17927 - 18616 kPa), non-adjustable
Pump Pressure.....	11.7 gpm (44.3 l/min) @ 3000 psi (20685 kPa) @ 1800 rpm @ operating temperature
Steering System	
Pressure	4 gpm (15.14 l/min) @ 3000 psi (10685 kPa) @ 1800 rpm @ operating temperature
Relief Pressure Setting.....	1200-1300 psi (8274 - 8964 kPa), non-adjustable
Capacities	
Crankcase	
With Filter	5.5 qt (5.2 l)
Without Filter	5 qt (4.73 l)
Cooling System	9 qt (8.5l)
Fuel	8 gal (30l)
Transaxle (Transmission & Drive Axle).....	16 qt (15.1 l)
Hydraulic Tank.....	5 gal (20.8l)

1-4. PERFORMANCE CHARACTERISTICS.

a. Engine. The truck is powered by a Continental water-cooled, 4-cylinder, in-line diesel engine. Model TMD-27 has 164 cubic inch (2.68 l) displacement which develops 60 hp at 3100 rpm.

b. Transaxle. One-speed transaxle delivers maximum torque, 100 lb-ft at converter stall in both forward and reverse.

c. Upright. 3-stage upright allows loads up to 4000 lbs. (1814.4 kg) to be lifted to a maximum height of 184 inches (4674 mm). Hydraulic tilt capability allows a maximum arc of $2.5 \pm .5$ degrees forward tilt and 6 degrees reverse tilt.

d. Lifting Forks. Width between forks is adjustable from 0 to 40 inches (0-1016 mm). Forks shift left or right, in tandem, 3.9 inches (99 mm) each way for a total distance of 7.8 inches (198.1 mm).

1-5. ENVIRONMENTAL INFORMATION.

The truck has sound suppression, air cleaner with replaceable element, and replaceable engine, transmission, and hydraulic oil filters.

1-6. TOOLS AND TEST EQUIPMENT.

There are no special tools or test equipment required to maintain the truck in operation.

1-7. SHIPPING AND HANDLING INSTRUCTIONS.

Refer to Chapter 2 for shipping and handling instructions.

1-8. STORAGE DATA.**Short-Term Storage (30 days or less):**

- (1) Start engine and allow to warm up.
- (2) Raise and lower forks fully several times.
- (3) Fully tilt upright forward and backward several times.
- (4) Coat all exposed, polished parts with rust-preventive lubricant.
- (5) Extend all hydraulic cylinders and coat rods with bearing grease; then, fully retract cylinders.
- (6) Clean truck thoroughly.
- (7) Check truck thoroughly for worn or damaged components and repair or replace as required.
- (8) Change engine oil and replace oil filter.
- (9) Replace air cleaner element.
- (10) Fill fuel tank with fuel and add 3 oz (90 ml) of inhibitor.
- (11) Clean exterior of engine and coat with rust-preventive lubricant.
- (12) Lubricate entire truck per instructions given in TM 10-3930-671-24.
- (13) Park truck with forks fully lowered and spread, upright tilted fully backward, and carriage centered on upright.

- (14) Drain hydraulic reservoir, change main hydraulic filters, and fill reservoir with recommended fluid.
- (15) Ensure that direction control levers are centered **(NEUTRAL)**.
- (16) Engage parking brake.
- (17) Remove and clean batteries. Store batteries in a cool, dry place and keep them fully charged.
- (18) Drain cooling system and close drain cocks.
- (19) Disconnect air intake piping from the manifold. Pour 3 ounces (90 ml) of inhibitor into intake system and connect the piping.
- (20) Seal all engine openings with weather-proof tape.
- (21) Clean exterior of the truck and touch up scratched, chipped, or painted surfaces.
- (22) Coat all exposed metal surfaces with grease or corrosion inhibitor.

1-7 (1-8 blank)

CHAPTER 2**OPERATING INSTRUCTIONS****2-1. INTRODUCTION.**

The following information provides descriptions, locations, and use of the operator's controls and indicators. Table 2-1 lists each control and indicator and the functions they perform.

2-2. LOCATION AND USE OF CONTROLS AND INDICATORS

Know the location and proper use of every control and indicator before operating the truck. Use this paragraph to learn how each control and indicator is to be used. Separate illustrations, with keys, are provided in Table 2-1.

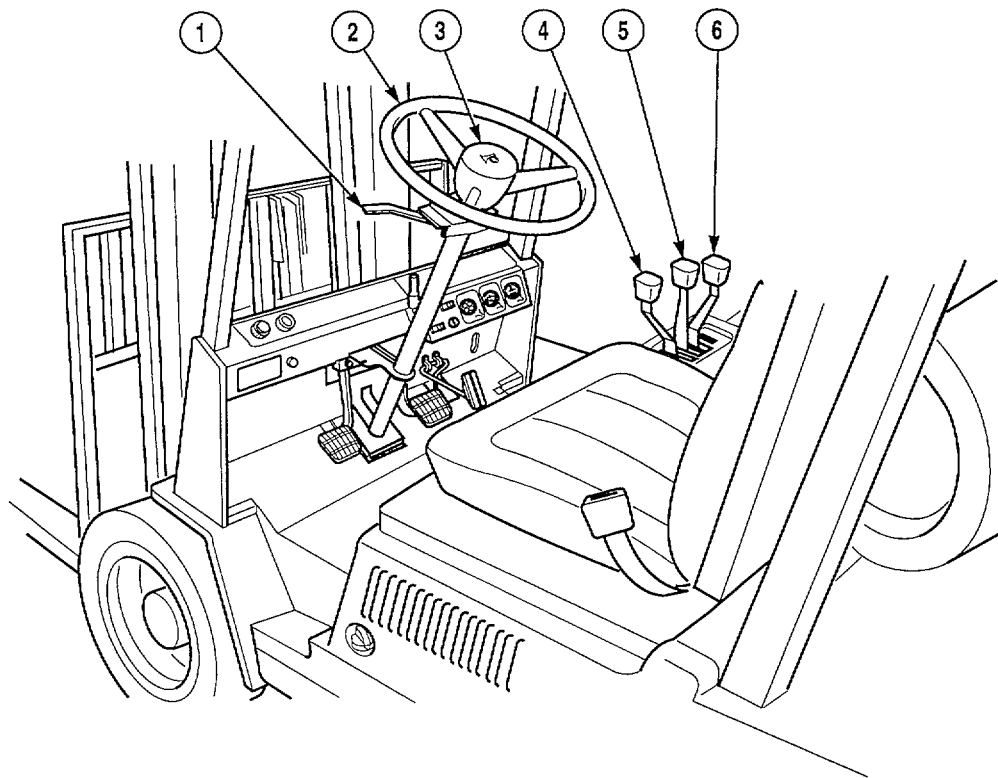


Table 2-1. Controls and Indicators

Key	Control/Indicator	Function
1	Directional Control	Controls direction of travel. Push forward for FORWARD ; pull back for REVERSE ; place in center for NEUTRAL
2	Steering Wheel	Turns rear wheels; controls specific direction of travel.
3	Horn Button	Push for horn to sound.
4	Lift Control Lever	Used to raise or lower carriage assembly. Push forward to lower carriage assembly; pull back to raise carriage assembly.
5	Tilt Control Lever	Used to tilt upright (mast). Push forward to tilt upright FORWARD ; pull back to tilt upright REARWARD .
6	Sideshift Control Lever	Used to shift carriage assembly to the left or right. Push to shift carriage assembly to the right; pull back to shift carriage assembly to the left.

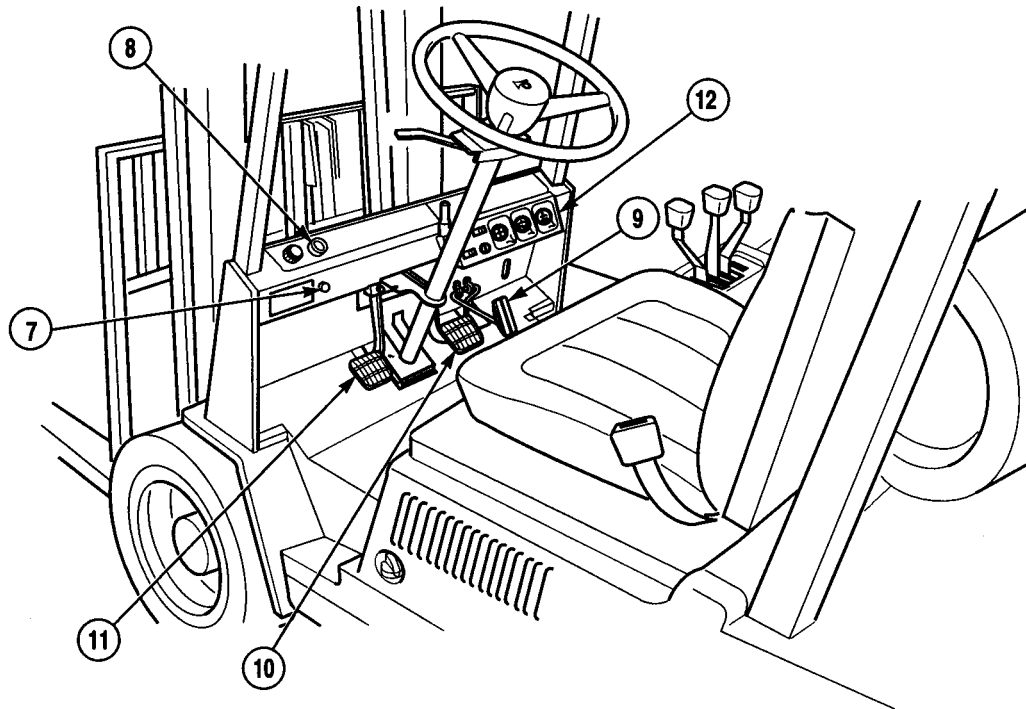


Table 2-1. Controls and Indicators - CONT.

Key	Control/Indicator	Function
7	Glow Plug Button	Used to energize engine glow plugs while starting engine in cold weather.
8	Transmission Temperature Gauge	Indicates temperature of transmission oil. Normal operating temperature should be 210°F (99°C).
9	Accelerator Pedal functions.	Used to control speed of engine, truck, and all upright/carriage/fork functions.
10	Service Brake Pedal	Used to stop truck, especially going up or down a ramp.
11	Inching Brake Pedal	Used to keep travel speed low while maintaining high engine rpm.
12	Instrument Panel	Panel contains ON/OFF switches for Front/Rear Flood Lights, Ignition Switch, Warning Indicator Light Cluster, Fuel Gauge, Hour Meter, and Seat Belt Warning Light.

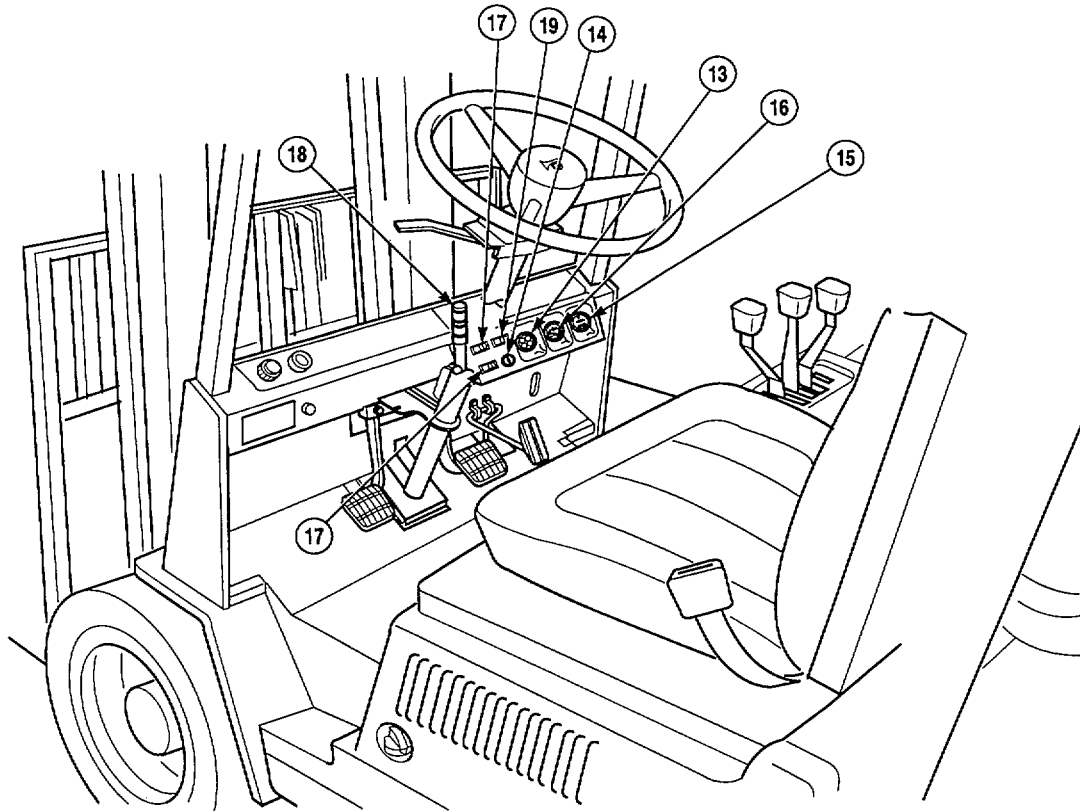


Table 2-1. Controls and Indicators - CONT.

Key	Control/Indicator	Function
13	Warning Indicator Light Cluster	Used to warn driver when water temperature is too high, transmission oil temperature is too high, engine oil pressure is too low, or electrical system is not charging.
14	Ignition Switch	Used to energize electrical system and start engine. Switch has three positions: OFF , START , and RUN .
15	Engine Hour Meter	Indicates total engine operation in hours and tenths.
16	Fuel Gauge	Indicates quantity of fuel remaining in fuel tank.
17	Flood Light Switches	Used to control electrical current to front and rear flood lights. Switches have two positions: ON and OFF .
18	Parking Brake Lever	Used when parking or stopping truck. Raise brake handle to engage parking brake; lower handle to release parking brake. With brake handle released, turn brake handle to the right to increase brake tension; turn to the left to decrease brake tension.
19	Seat Belt Warning Light	Illuminates during initial forklift startup. Used to remind operator to fasten seat belt for safety.

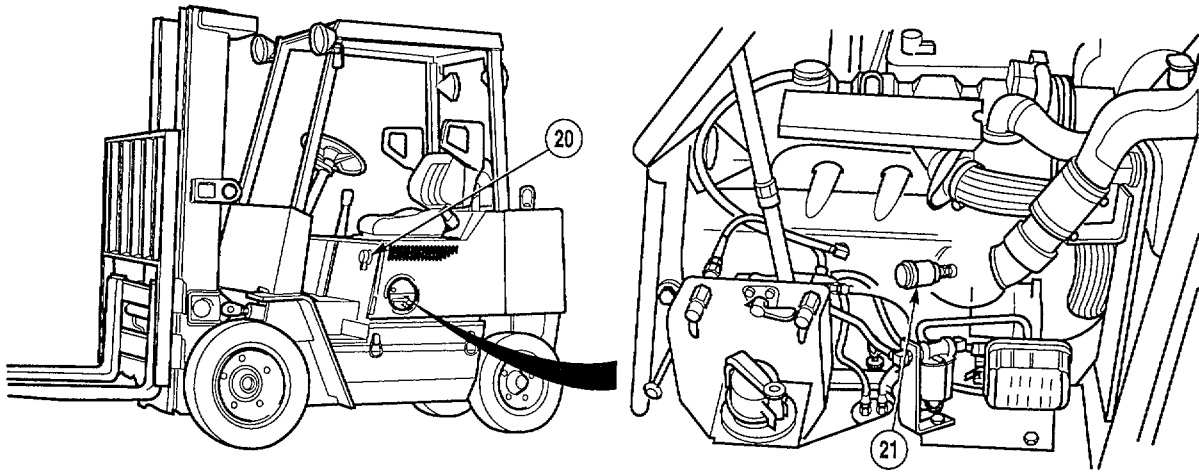


Table 2-1. Controls and Indicators - CONT.

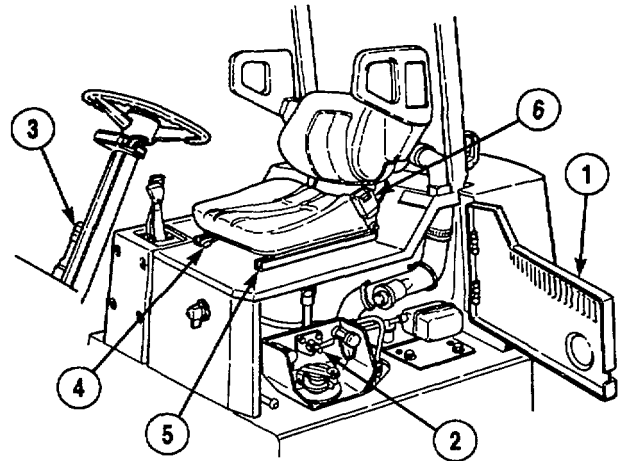
Key	Control/Indicator	Function
20	Master Electrical Switch	Used to control electrical current to all electrical components on truck and as emergency shutdown. Switch has two positions: ON and OFF .
21	Air Restriction Indicator	Indicates restriction of air intake system. When yellow flag is raised, air intake filter should be serviced.

2-3. PREPARATION FOR OPERATION.

a. **Operator Checks & Services.** Perform **Before** tasks outlined and listed in Operator Preventive Maintenance Checks and Services Table (Table 3-1).

b. Pre-Start Adjustments.

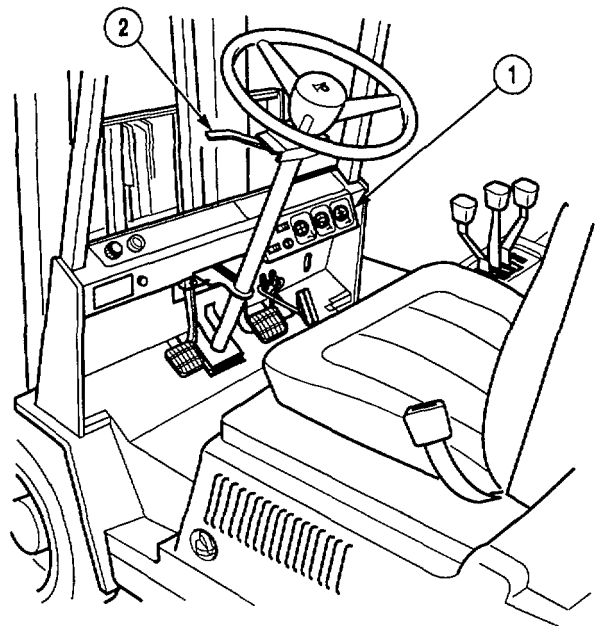
- (1) Open left side hood (1).
- (2) Place fuel shut-off valve (2) in ON position.
- (3) Engage parking brake (3).
- (4) Slide seat adjustment lever (4) to the left.
- (5) Adjust seat (5) to desired position and release lever (4).
- (6) Make sure seat (5) locks into position.
- (7) Fasten and adjust seat belt (6).



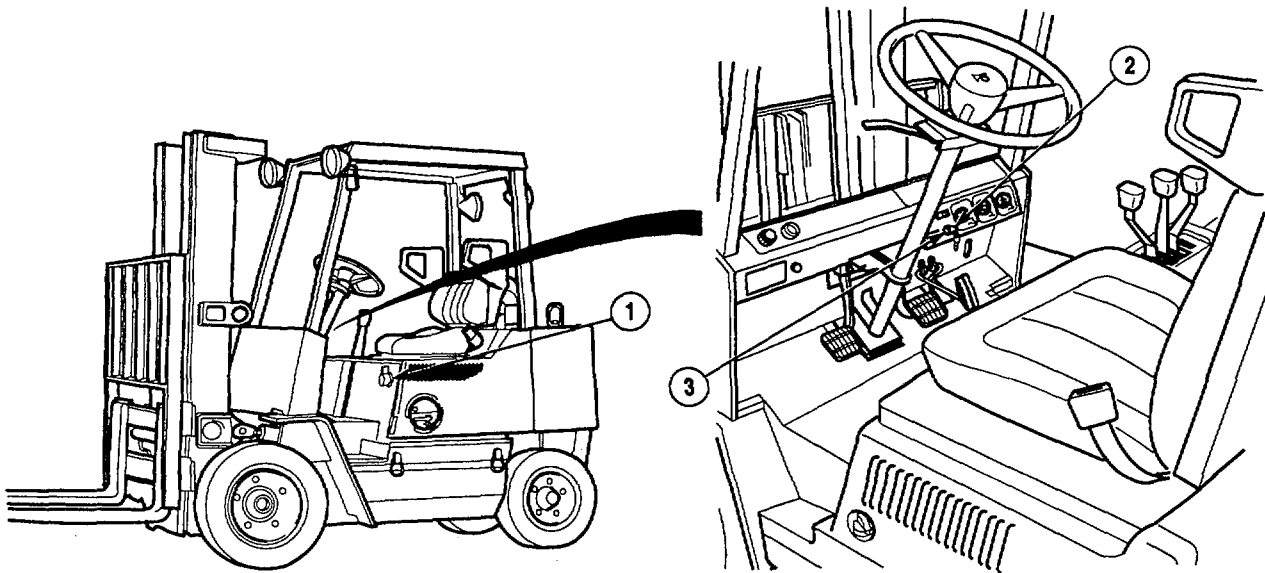
2-4. START-UP PROCEDURES.

a. Pre-Start Positions of Controls.

- (1) Perform Preparation for Operation Procedures (para 2-3 [b]).
- (2) Ensure all switches on instrument panel (1) are OFF.
- (3) Place directional control lever (2) in Neutral position.



b. Truck Start-Up



- (1) Place master electrical switch (1) to ON.

CAUTION

If engine fails to start within 10 seconds, wait 3 or 4 seconds before re-engaging starter to prevent possible serious damage to starter or engine.

- (2) Insert key (2) into ignition switch (3) and turn to START until engine starts. After engine starts, return key to RUN position.

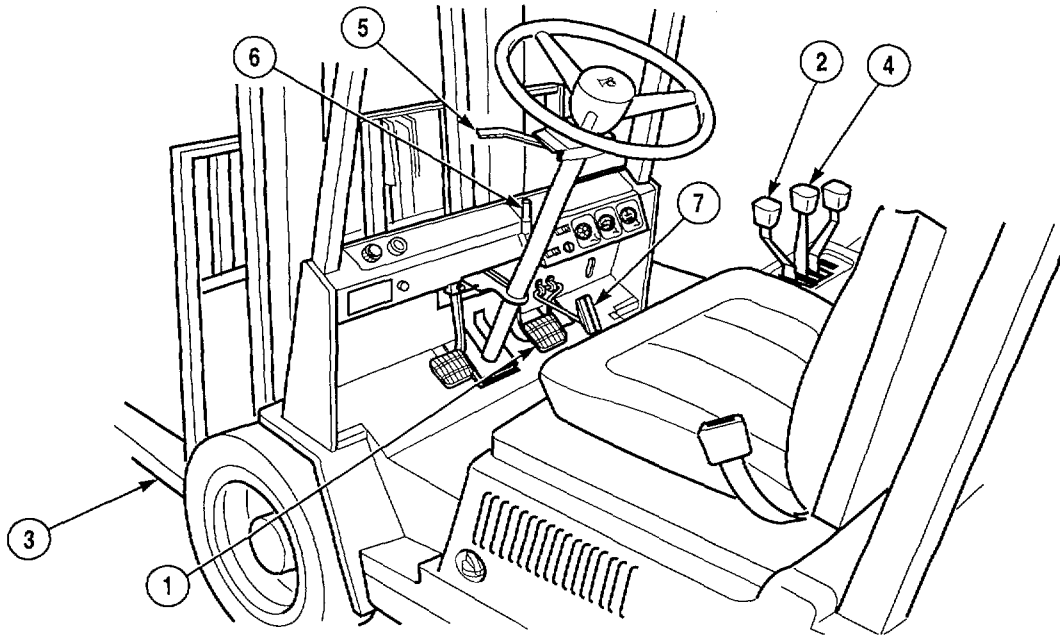
CAUTION

If engine oil light illuminates more than 15 seconds after starting, shut down engine immediately and notify supervisor.

- (3) Allow engine to warm-up to normal operating temperature before operating with a load.
 (4) Perform operator PMCS Procedures designated During in the interval column (Table 3-1).

2-5. DRIVING INSTRUCTIONS.

a. Truck Driving Procedures.



WARNING

Hearing protection is required for operator and also for all personnel working in and around this truck while truck is operating.

- (1) Read Commercial Operator's Manual, Appendix E.
- (2) Depress service brake pedal (1).
- (3) Start truck engine (para 2-4 [b]).
- (4) Pull lift control lever (2) to the rear and raise forks (3) 6 to 8 in. (152 to 203 mm) above the ground.
- (5) Pull tilt control lever (4) to the rear until forks (3) are tilted upward.
- (6) Place directional control lever (5) in appropriate position; push forward to travel **FORWARD**, pull back to travel in **REVERSE**, place lever in center position for **NEUTRAL**.
- (7) Disengage parking brake (6).

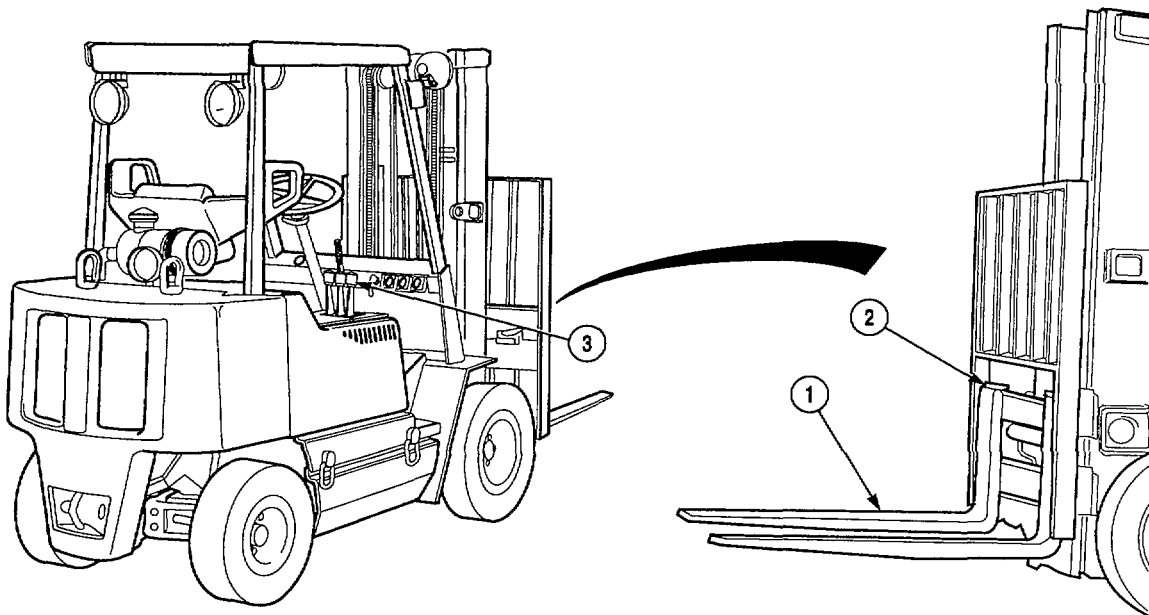
NOTE

If traveling in **REVERSE**, sound horn before moving vehicle.

- (8) Release service brake pedal (1) and depress accelerator pedal (7) smoothly and gradually.
- (9) Depress service brake pedal (1) to stop truck.

b. Inching Brake Pedal Operation. Inching brake pedal (11, Table 2-1) is used in combination with accelerator to vary lift and travel speeds independently. The farther the inching pedal is depressed, the more the driving clutch slips, reducing travel motion. With the inching pedal fully depressed, brakes automatically engage. Operate inching pedal for precise maneuvering, while operating the accelerator to vary lift speed.

c. **Adjusting Forks.**

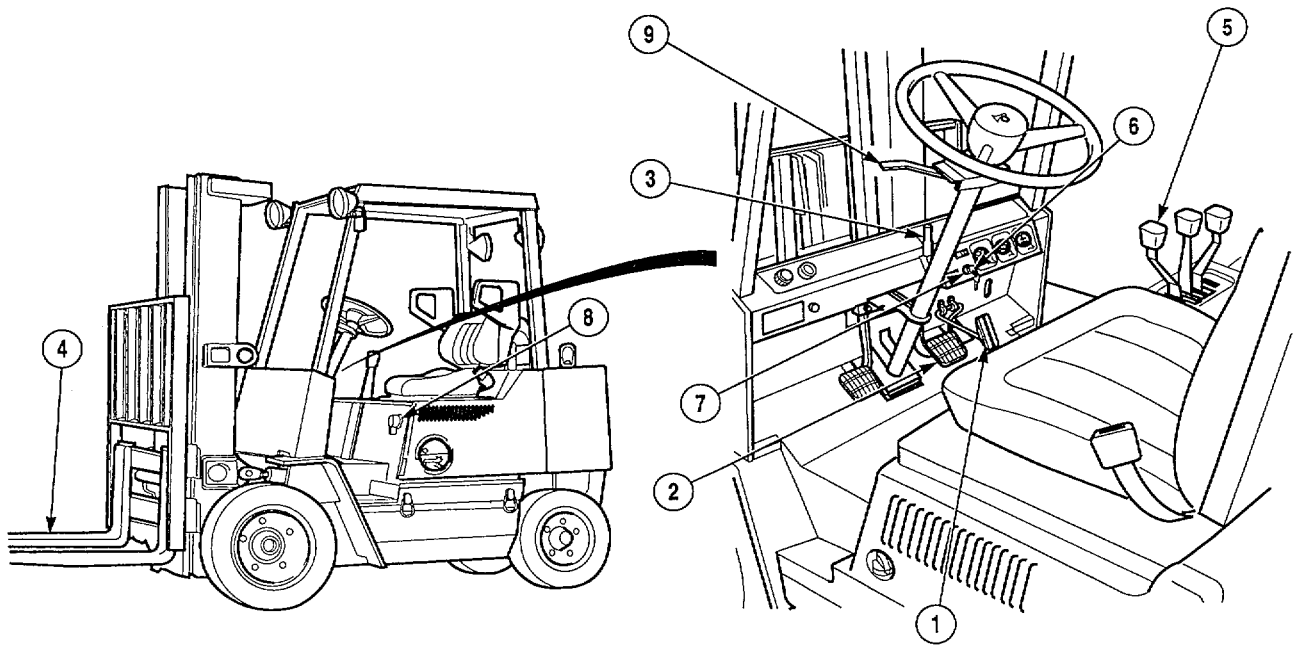


- (1) Read **Commercial Operator's Manual, Appendix E.**

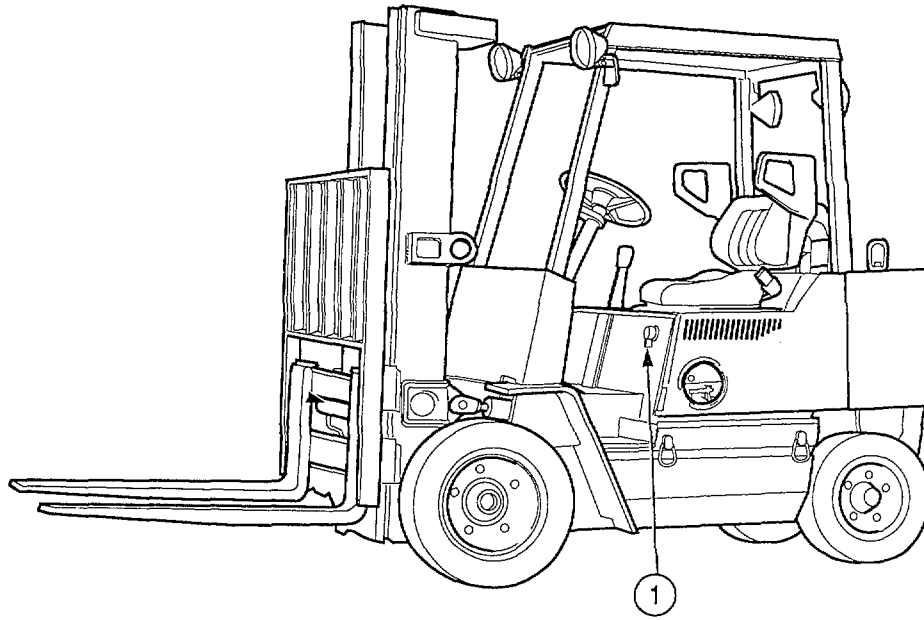
WARNING

- **Always ensure that forks are as far apart as the load will allow to prevent the possibility of loads tipping off of forks and causing injury to personnel or damage to equipment.**
 - **Always place forks centered beneath load to prevent possibility of loads tipping off of forks and causing injury to personnel or damage to equipment.**
 - **Always ensure fork latch is seated completely to lock fork in position to prevent fork shifting and causing injury to personnel or damage to equipment.**
- (2) Spread each fork (1) by lifting fork latches (2) and using foot to push fork left or right to desired position. Push fork latch (2) down to lock fork (1) in position.
- (3) Shift forks (1) to the left by pulling sideshift control lever (3). Shift forks (1) to the right by pushing sideshift control lever (3) forward.

d. **Truck Stopping Procedures.**



- (1) Release pressure on accelerator pedal (1), and gradually depress service brake pedal (2) until truck comes to a complete stop.
- (2) Engage parking brake (3).
- (3) Lower forks (4) with lift control lever (5) all the way to the ground.
- (4) Turn ignition key (6) to **OFF** and remove from ignition switch (7).
- (5) Turn master electrical switch (8) to **OFF**.
- (6) Set directional control lever (9) in **NEUTRAL** position.



2-6. EMERGENCY PROCEDURES.

If any emergency arises while operating the truck, immediately stop any operation and shut off engine by turning master electrical switch (1) to OFF.

2-7. UNUSUAL ENVIRONMENTIWN EATHER.

The truck can operate in many unusual conditions. Operator PMCS is designed to cover many of these conditions. However, operation in extreme heat or cold can require additional checks and services. The following paragraphs cover these conditions.

a. Operation In Extreme Heat.

CAUTION

- Operating during periods of extreme heat [ambient temperatures above 100°F (38°C)] can cause the truck engine and transmission systems to overheat. Engine temperatures above 212°F (100°C) and transmission fluid temperatures above 210°F (99°C) can cause damage to engine and transmission system components. Transmission fluid temperatures should be checked often during periods of extreme heat to prevent damage to engine and transmission system components.
- Gaskets and seals are more likely to leak when engine and transmission system operating temperatures are high. Engine and transmission fluid levels should be checked more often during periods of extreme heat to prevent damage to engine and transmission components. Checks for leaks around gaskets, seals, and fittings should also be made more often.

- (1) Check engine oil level (para 3-6) and operating temperature often for system temperature above 180°F (82°C). If engine operating temperature reaches 212°F (100°C), turn engine off.
- (2) Check transaxle fluid level (para 3-11) and operating temperature for system temperature above 210°F (99°C). If transmission operating temperature is above 210°F (99°C), shut off engine.
- (3) Perform operator PMCS more often than normal (Table 3-1).

b. Operation In Extreme Cold.

- (1) Remove all snow and ice from truck as soon as possible.
- (2) Prepare truck for operation in severe cold temperatures according to FM 9-207, FM 31-70, FM 31-71, and FM 21-305 as necessary.
- (3) Drain fuel filter and fuel/water separator before filling fuel tank to prevent any water in fuel from freezing. This will also prevent fuel filter from clogging.
- (4) Keep fuel tank as full as possible during cold weather operations.

NOTE

If engine fails to start within 10 seconds, discontinue cranking and wait 15 seconds before next attempt to allow starter motor to cool.

- (5) Start engine (para 2-4 [b]) and allow it to warm up to normal operating temperature (180° F [82° C]).
- (6) Slowly raise and lower mast assembly to allow hydraulic fluid to warm up.

WARNING

Icy roads and surfaces are common during periods of severe cold. Care should be exercised when operating on icy surfaces. Sudden movements or lack of attention can cause accidents and injury or death to personnel.

- (7) Operate truck on icy surfaces as follows:
 - (a) Turn steering wheel right and left to allow hydraulic fluid in steering system to warm up. Do this until steering feels normal. This should be done with the truck moving slowly to avoid creating flat spots on tires.
 - (b) Avoid making sudden turns and stops.
 - (c) When slowing or stopping, pump brake pedal to avoid sliding.
 - (d) Begin stopping sooner than normal to avoid sliding.
 - (e) Steer away from ruts and snow banks.
 - (f) Steer truck straight up and down grades when possible.

CAUTION

During periods of extreme cold, damage will occur if tires are allowed to freeze to the ground. If a sheltered area is not available when temperatures are forecast to be below 32°F (0° C), the truck should be parked in a high, dry area. Failure to do so may cause damage to equipment.

- (8) Park truck in sheltered area out of wind. If a sheltered area is not available, park truck so it does not face into wind.
- (9) Drain water from fuel/water separator immediately after operating.

c. Operation In Extreme Dust or Sand.

NOTE

The truck normally operates in non-dusty conditions and PMCS instructions are designed to handle these conditions. However, in deserts, dust conditions are more extreme and certain checks and services must be made more often than normal.

- (1) Check air filter restriction indicator more often than normal to ensure air cleaner is not becoming clogged.
- (2) Watch all gauges in instrument panel more closely to ensure truck is not affected by dusty conditions.
- (3) Park truck so it does not face into wind.

CAUTION

Blowing dust and sand can scratch glass surface. When the truck is not being operated, glass surfaces must be covered for protection.

- (4) Cover instrument panel, vacuum gauge, air restriction indicator, hydraulic fuel oil level indicator, fuel tank fill cap, and spotlights when truck is parked for extended periods of time in extremely dusty conditions.
- (5) Cover open space in fuel tank fill hole when adding fuel to tank.

2-8. NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION PROCEDURES.

- a. If attack is known or suspected, mask at once and continue mission.
- b. Brush fallout from skin, clothing, and equipment with available brushes and rags before going inside. Wash skin and have a radiation check made as soon as tactical situation permits.
- c. Do not unmask until told to do so.
- d. Detailed DECON procedures can be found in FM 3-3, FM 34, and FM 3-5.

2-9. SHIPMENT INSTRUCTIONS.

- a. Preparing For Shipment. Refer to TB 9-2300-281-35 for procedures covering preservation of equipment for shipment. General procedures for shipment are found in FM 55-15. Specific information may be found in TM 55-2200-001-12 for rail transport and TB 55-45 for air transport.
- b. Administrative Storage. Refer to TM 743-200-1 for instructions covering administrative storage of equipment.
- c. Weight Classification. The weight classification of the truck is 4000 lb. (1814.4 kg).

CHAPTER 3

OPERATOR MAINTENANCE

3-1. INTRODUCTION.

The following paragraphs and table contain Preventive Maintenance Checks and Services (PMCS) for the truck. The PMCS table lists checks and services necessary to ensure that the truck is ready for operation. Operator PMCS is limited to inspection and service tasks as they are listed in the Maintenance Allocation Chart (MAC). Operator maintenance is performed at the specified intervals listed on the PMCS table (Table 3-1). The operator performs these tasks before operating the truck, during the operation of the truck, and after it is shut down.

a. Before PMCS Procedures. **Before:** PMCS is performed just before operating the truck. Pay attention to WARNINGS, CAUTIONS, and NOTES.

b. During PMCS Procedures. **During:** PMCS is performed while the truck is in operation. Pay attention to WARNINGS, CAUTIONS, and NOTES.

c. After PMCS Procedures. **After:** PMCS is performed immediately after operating the truck. Pay attention to WARNINGS, CAUTIONS, and NOTES.

d. Weekly PMCS Procedures. **WEEKLY:** PMCS is performed once a week. Pay attention to WARNINGS, CAUTIONS, and NOTES.

e. Equipment Failure. If the truck or any of its components fail to operate, do not operate correctly, or if damage is observed, refer to troubleshooting instructions in Chapter 4. Any equipment failures or operation problems should be recorded on the proper forms. These forms are a permanent record of services, repairs, and modifications made on the truck. They are a checklist to know what was wrong with the truck after its last use and whether those faults have been checked. Refer to DA Pam 738-750 for information on forms and records.

f. Always perform PMCS in the same order until it becomes a habit. Once practiced in the same order, problems will be spotted in a hurry.

g. If something looks wrong and cannot be repaired immediately, enter it on the DA 2404 form. If something seems seriously wrong, report it immediately to unit maintenance.

h. When performing PMCS, take the tools and rags needed to make the checks.

3-2. GENERAL PMCS PROCEDURES AND CONDITIONS.

This section describes general procedures and conditions that should be observed when performing PMCS. If any of the components being inspected during the PMCS procedures show any of the conditions described in this paragraph, report it on a DA 2404 form and inform unit maintenance.

WARNING

- **Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat of flame. Never smoke when using solvent; the flash point for type I drycleaning solvent is 100°F (38°C) and, for type II, is 140°F (60°C). Failure to do so may result in injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**
- **Personnel hearing can be PERMANENTLY DAMAGED if exposed to constant high noise levels of 85 dB (A) or greater. Wear approved hearing protection devices when working in high noise level areas. Personnel exposed to high noise levels shall participate in a hearing conservation program in accordance with TB MED 501. Hearing loss occurs gradually but becomes permanent over time.**

a. Cleanliness. Dirt, grease, oil, and debris can cover and hide serious problems. Use drycleaning solvent on all metal surfaces.

b. Bolts, Nuts, and Screws. Check bolts, nuts, and screws for obvious looseness, missing, bent, or broken condition. Look for chipped paint, bare metal, or rust around bolt heads. If any part seems loose, notify unit maintenance.

c. Welds. Look for loose or chipped paint, rust, or gaps where parts are welded together. If bad welds are found, notify unit maintenance.

d. Electric Wires and Connectors. Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and make sure wires are in good shape. If bad wires or connector are found, notify unit maintenance.

e. Hydraulic Lines and Fittings. Look for wear, damage, and leaks, and make sure clamps and fittings are tight. Wet spots show leaks, and a stain around a connector or fitting can mean a leak. If a loose fitting or connector causes a leak, notify unit maintenance.

f. Damage is defined as: any conditions that affect safety or render the truck unusable for mission requirements.

g. Rust and Corrosion. Check truck body and frame for rust and corrosion. If any bare metal or corrosion exists, clean and apply a thin coat of oil. Report it to your supervisor.

3-3. FLUID LEAKAGE DEFINITION.

The following information describes the different types/classes of leaks and how they affect the status of the truck. Become familiar with them and remember WHEN IN DOUBT, NOTIFY UNIT MAINTENANCE. Class I and II leaks are considered minor leaks and operations can continue under these conditions. When operating with these types of leaks, fluid levels must be checked regularly as required in the PMCS. Class III leaks must be reported to unit maintenance for corrective action. If there is any doubt about the type of leak, notify unit maintenance.

a. Class I Leaks. Class I leaks are identified by a wetness or discoloration not great enough to form drops. It is more of a seepage than a leak.

b. Class II Leaks. Class II leaks are identified by a flow of fluid great enough to form drops but not great enough to cause the drops to fall from the leak point.

c. Class III Leaks. Class III leaks are identified by a flow of fluid great enough to form drops that fall from the leak point.

(1) If a Class III leak is discovered before operating the truck, the truck can be operated as long as the fluid level is between the maximum and minimum points on the dipstick. If the fluid level is below the minimum point on the dipstick, do not operate the truck and notify unit maintenance.

(2) If a Class III leak is discovered during the operation of the truck, the operation can be completed as long as the leak is drops only and not a steady stream of fluid. The fluid level must also be within its operating range. If the leak is a steady stream and/or fluid level falls below minimum point on dipstick, turn off the truck and notify unit maintenance.

(3) If a Class III leak is discovered after an operation is complete and the fluid level is below minimum on the dipstick, the truck cannot be operated until the leak is repaired.

3-4. PMCS TABLE DESCRIPTION.

The PMCS table is arranged in columns that inform the operator which item is being inspected/serviced, when a truck assembly or component should be inspected/serviced, where the item is located, the procedures necessary to accomplish the task, and the conditions that will prevent operation of the truck.

a. Item No. The Item No. column provides a logical sequence for performing the PMCS tasks. The items being inspected can be visible, inside, or under the truck.

b. Interval The Interval column provides the appropriate time interval for performing each task. This column lists all the tasks according to the interval: **DAILY** tasks **Before, During, After**, and **WEEKLY** tasks.

c. Location. This column lists the name of the assembly or component to be inspected/serviced and its location on the truck.

d. Procedure. The Procedure column provides the instructions necessary to accomplish the inspection/service. It also lists important Warnings, Cautions, and Notes related to each task. If a task is covered elsewhere in the manual, it is referenced by paragraph number rather than being repeated in this column.

e. Not Fully Mission Capable If. This column lists the conditions that will cause the truck to be inoperative. If any of these conditions exist, the truck shall not be operated until they are corrected.

Table 3-1. Operator Preventive Maintenance Checks and Services - CONT.

Item No.	Interval	<u>Location</u> Item To Check/ Service	Procedure	Not Fully Mission Capable If:
2	DAILY-Continued Before	EXTERIOR-Continued Perform walk-around inspection-Continued Safety decals, data plates, etc.	Visually inspect frame and mast for obvious cracks in welds, damage, deformation, or looseness. Check for damage and legibility. Notify unit maintenance, if necessary.	Cracks in welds, damage, deformation, or loose items.
3	Before	Brake Reservoir Fluid Level	Check brake reservoir fluid level. If not full, notify unit maintenance.	Brake reservoir fluid level is low.
4	Before	Operator's Seat and Seat Belt	Check seat for tears. Check seat belt straps for worn areas and tears. Check that seat belt is attached firmly. Check buckle for correct operation and damage.	Safety of operator during operation is impaired by conditions of seat. Seat belt or buckle is damaged.
5	Before	Tires, Lug Nuts, and Wheels	Check for missing lug nuts, damage to wheels, tire chunking, or object imbedded.	Two or more lug nuts are missing from same wheel. Tire chunking halfway across width of tire. Foreign objects imbedded in rubber.
6	Before	<u>ENGINE</u> Hydraulic Fluid Level	Check hydraulic fluid with upright lowered (Para 3-10). Notify unit maintenance, if necessary.	Not attached firmly to truck. Hydraulic fluid level is below low mark on dipstick.
7	Before	Hydraulic Tank, Lines, Fittings, and Gauge.	Check hydraulic lines and fittings for leaks or damage. Notify unit maintenance, if necessary.	Class III leak present.

Table 3-1. Operator Preventive Maintenance Checks and Services - CONT.

Item No.	Interval	<u>Location</u> Item To Check/ Service	Procedure	Not Fully Mission Capable If:
8	DAILY-Continued	<u>ENGINE-Continued</u>		
	Before	Batteries	<p style="text-align: center;">WARNING</p> <p>Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.</p> <p>Check that battery hold-down is in place and holding batteries securely. Notify unit maintenance, if necessary.</p> <p>Check that batteries and cables are free of corrosion. Notify unit maintenance, if necessary.</p> <p>Check that battery cables are secure. Notify unit maintenance, if necessary.</p>	Battery cables are loose.
	Before	Engine Coolant Level	Check coolant level (Para 3-7). Notify unit maintenance, if necessary. Coolant lower than cold	Class III leak exists. fill level in cooling system compensation tank.
	Before	Fuel Tank, Lines, and Fittings.	Check fuel lines, fuel injector lines, and fittings for leaks or damage. maintenance, if necessary.	Any leaks are present. Notify unit
	Before	Engine Oil Level	Check engine oil level (Para 3-6). Notify unit maintenance, if necessary.	Engine oil is below the ADD mark on dipstick.
	Before	Engine	Inspect that fan belt is present and fan is operating. Notify unit maintenance, if necessary.	Fan or fan belt is loose, missing, or damaged.

Table 3-1. Operator Preventive Maintenance Checks and Services - CONT.

Item No.	Interval	<u>Location</u> Item To Check/ Service	Procedure	Not Fully Mission Capable If:
13	DAILY-Continued During	<u>ENGINE-Continued</u> Engine	Listen for unusual noise, misfiring, or rough idling of engine. Notify unit maintenance, if necessary. WARNING The exhaust pipe and muffler are very hot. Do not touch these parts with bare hands or allow body to come in contact with exhaust pipe or muffler. Exhaust system parts can cause serious burns.	Engine is idling rough, misfiring, or making unusual noise.
14	During	Exhaust System	Check exhaust system with engine running for signs of leaks. Notify unit maintenance, if necessary. WARNING If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.	Muffler or exhaust pipes are leaking exhaust fumes.
15	During	Air Cleaner Restriction Indicator	Check air cleaner restriction indicator. If yellow flag is raised, air intake filter element requires servicing.	Yellow flag is in raised position. Air cleaner is missing.

Table 3-1. Operator Preventive Maintenance Checks and Services - CONT.

Item No.	Interval	<u>Location</u> Item To Check/ Service	Procedure	Not Fully Mission Capable If:
18	<p>DAILY-Continued</p> <p>During</p>	<p><u>OPERATOR'S POSITION</u> <u>Continued</u></p> <p>Instrument Panel- Continued</p>	<p style="text-align: center;">CAUTION</p> <p>Continuous operation with coolant temperature above 212°F (100°C) can damage the engine.</p> <p>c. Engine Temperature: Water temperature indicator lamp does not illuminate after engine starts.</p> <p>d. Hour Meter: Dial should rotate every 10th of an hour.</p> <p>e. Transmission Temperature: Transmission oil temperature does not illuminate after engine starts.</p> <p>f. Fuel Gauge: With the engine OFF and the ignition in RUN position, fuel gauge should indicate fuel level in tank.</p>	<p>Indicator light is in-operative. Water temperature indicator lamp light indicating hot engine.</p> <p>Indicator light is in-operative. Transmission temperature indicator lamp lights indicating hot transmission.</p>
19	During	Controls and Indicators	<p>Monitor all the gauges and warning lights during operation.</p> <p>Turn steering fully to the left and to the right.</p>	<p>Warning lights indicate a malfunction and corrective action by the operator does not correct the problem.</p> <p>Steer wheels do not respond.</p>
3-9				

Table 3-1. Operator Preventive Maintenance Checks and Services - CONT.

Item No.	Interval	<u>Location</u> Item To Check/ Service	Procedure	Not Fully Mission Capable If:
20	DAILY - Continued During	<u>EXTERIOR</u> Mast Assembly	<ul style="list-style-type: none"> a. Check that up and down mast movement is smooth. Notify unit maintenance, if necessary. b. Check that forward and backward mast tilt is smooth. Notify unit maintenance, if necessary. c. Check that carriage side-shift operates smoothly. Notify unit maintenance, if necessary d. Check that forks are not damaged or bent. Notify unit maintenance, if necessary. e. Check that tension is equal between all chains. Notify unit maintenance, if necessary. 	<p>Mast movement is not smooth.</p> <p>Mast tilt movement is not smooth.</p> <p>Side shift does not operate smoothly.</p> <p>Forks are damaged or bent.</p> <p>Chain tension is not equal.</p>
21	During	Horn, Floodlights, and Brakelight <u>ENGINE</u>	<p>Check for proper operation.</p> <p style="text-align: center;">WARNING</p> <p>Engine and transaxle are very hot after running. Do not touch these parts with bare hands or allow body to come in contact. Hot engine and transaxle parts can cause serious burns.</p>	<p>Light(s) or horn in-operative.</p>
22	After	Engine	Check for leaks and visible signs of damage.	Class III leak present.

Table 3-1. Operator Preventive Maintenance Checks and Services - CONT.

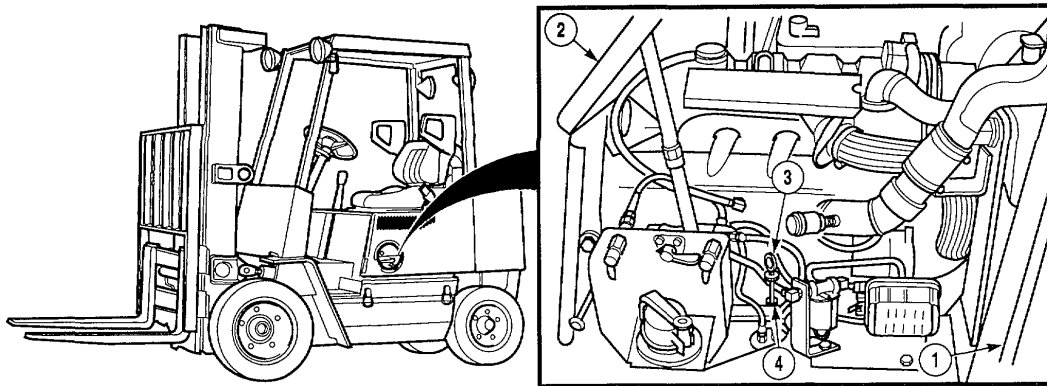
Item No.	Interval	<u>Location</u> Item To Check/ Service	Procedure	Not Fully Mission Capable If:
23	DAILY - Continued After	<u>EXTERIOR - Continued</u> Transaxle	Check for leaks and visible signs of damage.	Class III leak present.
24	After	Leaks	Check underneath truck for evidence of fluid leaks.	Class III leak present.
25	WEEKLY Weekly	<u>ENGINE</u> Exhaust System	WARNING The exhaust pipe and muffler are very hot. Do not touch these parts with bare hands or allow body to come in contact with exhaust pipe or muffler. Exhaust system parts can cause serious burns.	Muffler or exhaust pipe leaks.
26	Weekly	<u>EXTERIOR</u> Mast Assembly	Check muffler and exhaust pipe for corrosion, damage, and loose fasteners.	Muffler or exhaust pipe leaks.
27	Weekly	Frame	Check mast assembly for bends, dents, and cracks.	Mast assembly is damaged.
27	Weekly	Frame	Check for cracks in weldments or metal frame, loose or missing screws, and corrosion (see Para 3-12).	Loose or missing mounting screws.

3-5. OPERATOR MAINTENANCE INTRODUCTION.

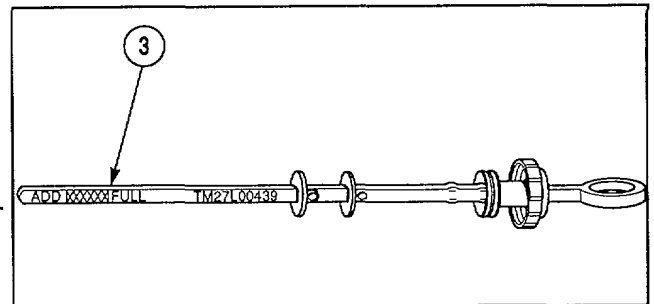
This section covers authorized operator maintenance tasks. The tasks covered in this section are defined in the MAC and limited to the inspection and servicing of truck components.

3-6. ENGINE OIL LEVEL CHECK AND SERVICE.

a. Oil Level Check.



- (1) Open left-side hood (1).
- (2) Open top hood (2) forward.
- (3) Remove oil dipstick (3) from dipstick tube (4)
- (4) Wipe oil from dipstick (3).
- (5) Insert dipstick (3) in dipstick tube (4).
- (6) Remove dipstick (3).
- (7) Check oil level. Oil level should be between FULL and ADD marks on dipstick (3)
- (8) Add oil as necessary (para 3-6[b]).
- (9) Install dipstick (3) in dipstick tube (4).
- (10) Close top hood (2).
- (11) Close left-side hood (1).



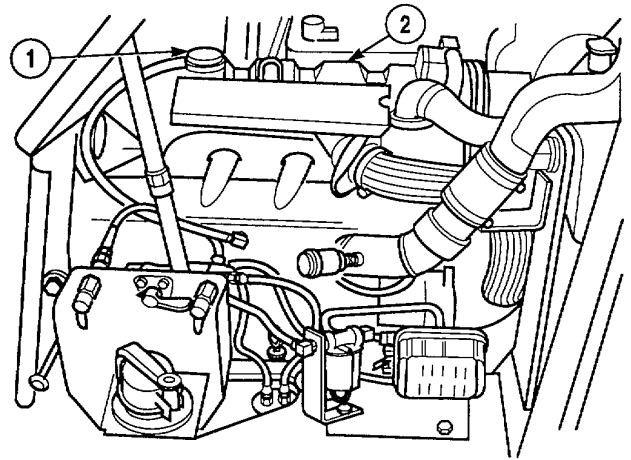
b. Oil Level Service.**CAUTION**

Do not overfill crankcase with engine oil or serious damage will occur to engine.

NOTE

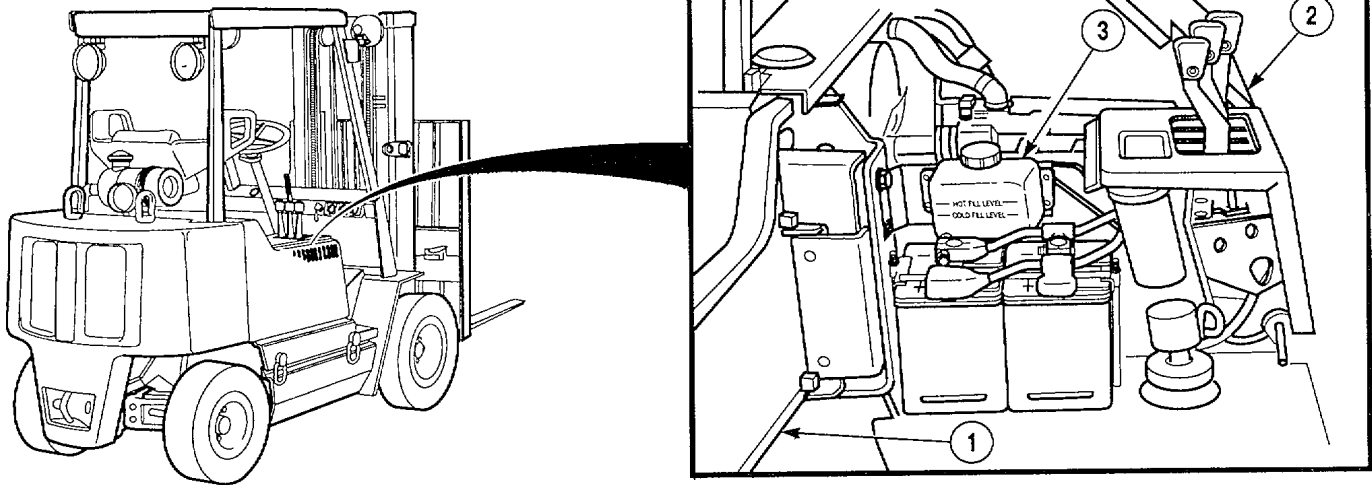
1 qt (.9L) will raise the engine oil level from the ADD mark to the FULL mark on the dipstick.

- (1) Check crankcase oil level (para 3-6 [a]).
- (2) Remove oil fill cap (1) from valve cover (2).
- (3) Add oil as indicated during oil level check (para 3-6 [a]).
- (4) Install oil fill cap (1) on valve cover (2).
- (5) Check crankcase oil level (para 3-6 [a]).



3-7. ENGINE COOLANT CHECK AND SERVICE.

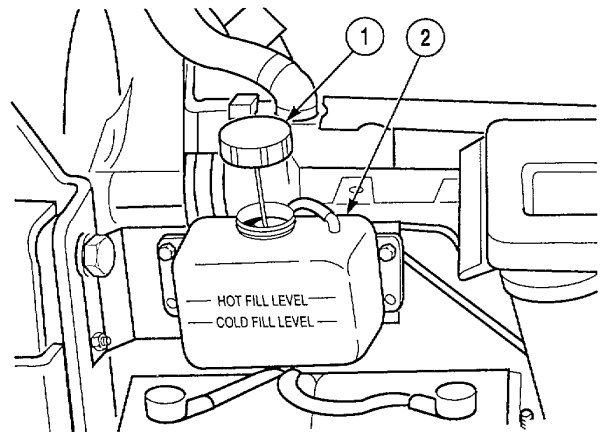
a. Engine Coolant Check.



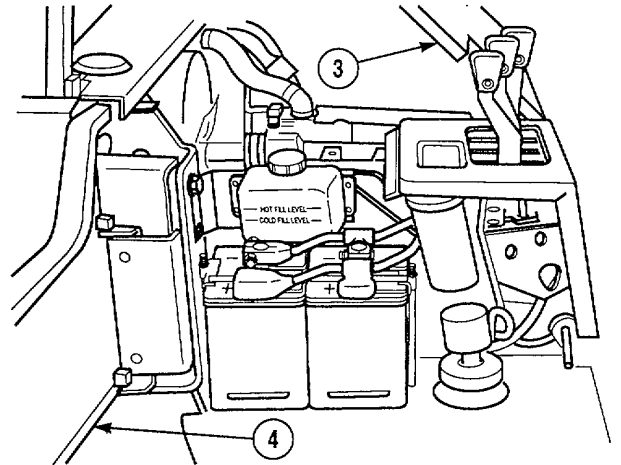
- (1) Open right-side hood (1).
- (2) Open top hood (2) forward.
- (3) Check fluid level in cooling system compensation tank (3). Fluid level should be at COLD FULL LEVEL mark when engine is cold and at HOT FULL LEVEL mark when engine is hot.
- (4) If necessary, add coolant/antifreeze mixture, at 50/50 concentration of coolant/antifreeze to water.
- (5) Close top hood (2).
- (6) Close right-side hood (1).

b. Engine Coolant Service

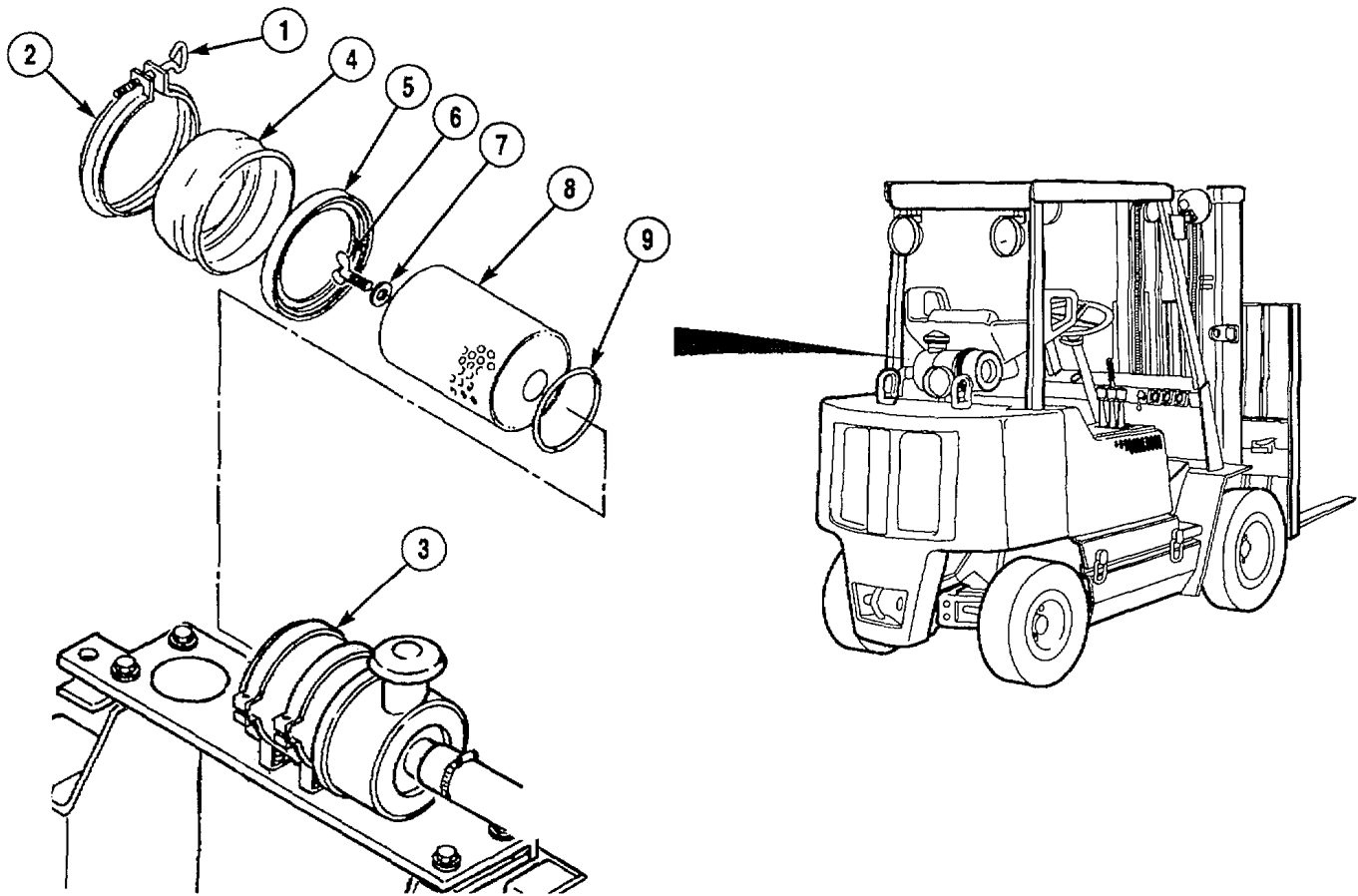
- (1) Check engine level (para 3-7 [a]).
- (2) Remove cooling system compensation tank cover (1) from cooling system compensation tank (2).
- (3) Add coolant/antifreeze, at 50/50 concentration of coolant/antifreeze to water as indicated during engine coolant level check (para 3-7 [a]).
- (4) Install cooling system compensation tank cover (1) on cooling system compensation tank (2).



- (5) Close top hood (3).
- (6) Close right-side hood (4).



3-8. AIR FILTER INSPECTION AND SERVICE.



a. Air Filter Removal.

- (1) Loosen clamp screw (1) and remove air cleaner cover clamp (2) from air cleaner housing (3).
- (2) Remove air cleaner cover (4) and seal (5) from air cleaner housing (3).
- (3) Remove screw (6), washer (7), filter element (8), and seal (9) from air cleaner housing (3).

b. Cleaning/inspection.

- (1) Hold filter element (8) up to light.
- (2) If light dims or cannot be seen through filter element (8), notify Organizational Maintenance.
- (3) If light can be seen through filter element (8), install filter element.

c. Air Filter Installation.

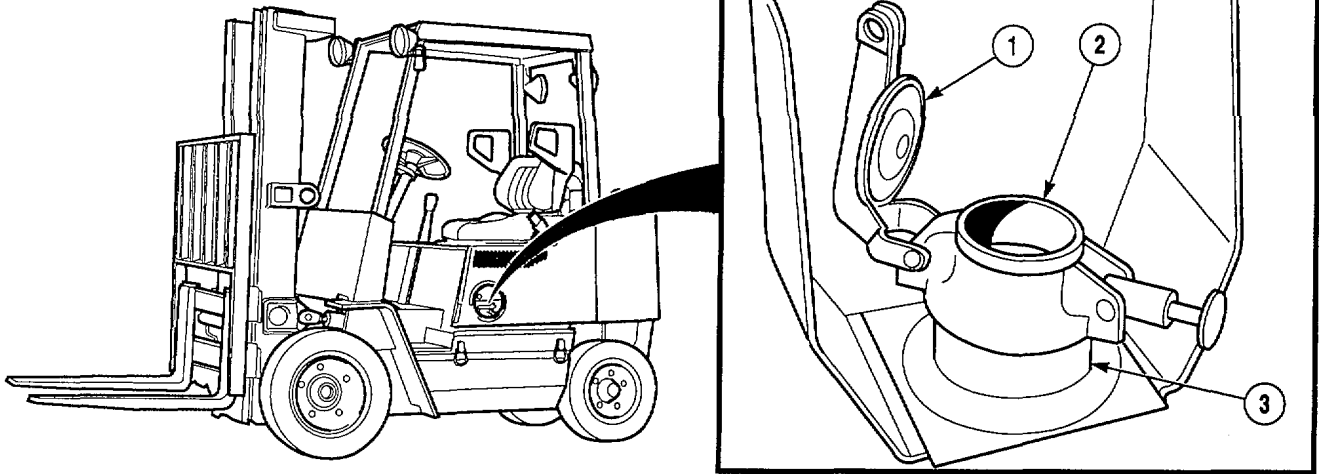
NOTE

Ensure filter and all seals are seated fully to prevent dust entering the engine.

- (1) Install seal (9) and filter element (8) in air cleaner housing (3) with washer (7) and screw (6). Tighten screw.
- (2) Install seal (5) and air cleaner cover (4) on air cleaner housing (3) with air cleaner cover clamp (2) and clamp screw (1). Tighten screw.

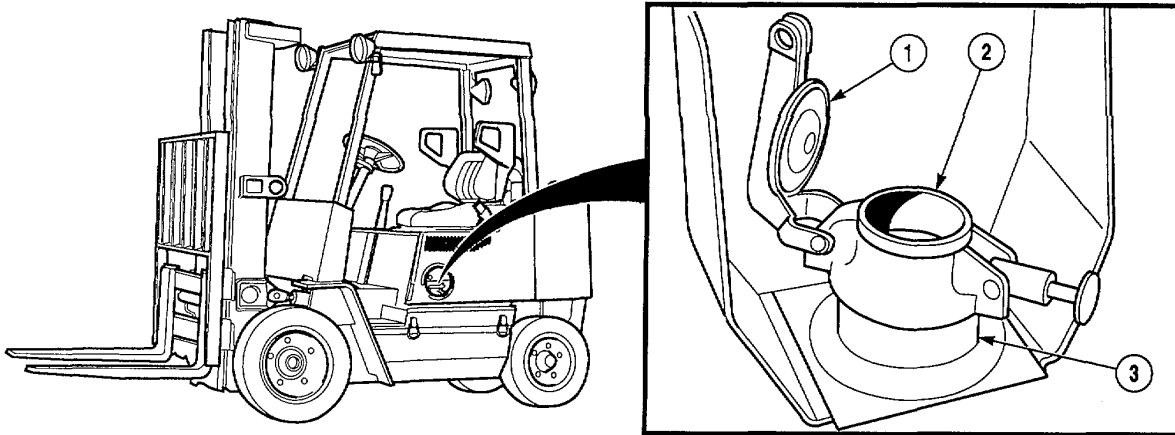
3-9. FUEL TANK CHECK AND SERVICE.

a. Fuel Tank Check.



- (1) Place master electrical switch (1) to ON.
- (2) Turn ignition (2) to RUN position (para 2-4 [b]).
- (3) Check fuel level on fuel level gauge (3).
- (4) Turn ignition (2) to OFF.
- (5) Place master electrical switch (1) to OFF.
- (6) Add fuel as necessary (para 3-9 [b]) per MIL-T-52864 and MIL-T-83133.

b. Refueling Procedures.



WARNING

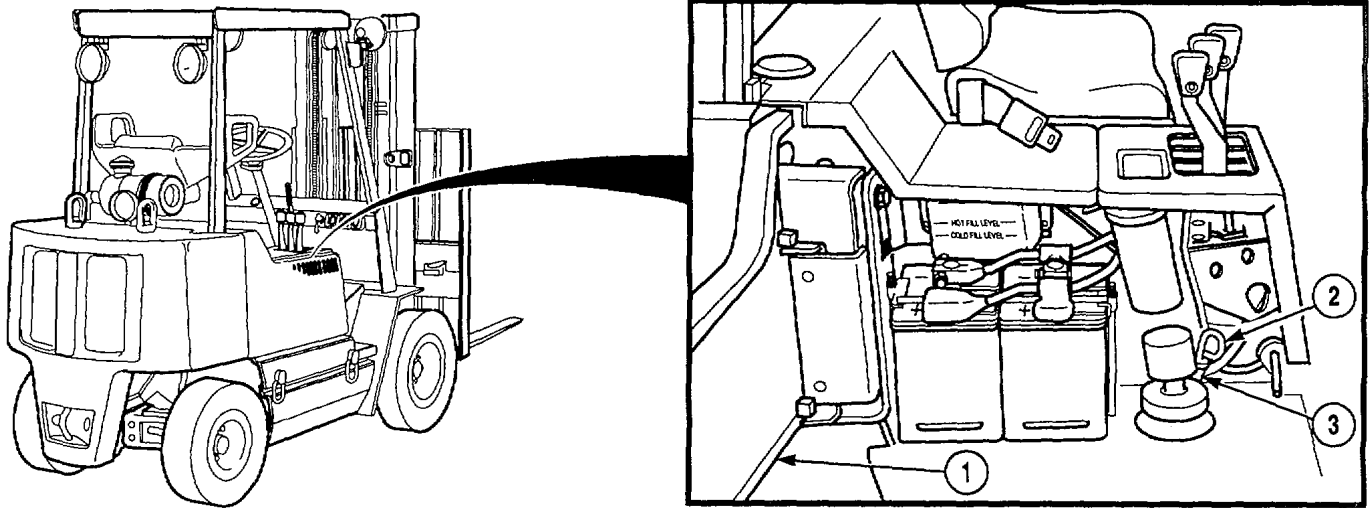
Fuel is very flammable and can explode easily. To avoid serious injury or death:

- **at least a B-C fire extinguisher within easy reach when working with fuel or a fuel system.**
- **refueling, stop engine and apply parking brake. Ensure no open flame is near area. Never smoke. Never add fuel when engine is running. Do not have a driver seated when adding fuel.**
- **fuel funnel or nozzle against filler neck to prevent sparks and be sure to replace fuel tank cap. After fuel is added, securely close fuel cap: a loose cap can cause a fuel leak or become a fire hazard.**
- **overflow the tank or spill fuel. If fuel is spilled, clean it up immediately. Before starting truck, check that no fuel is spilled on or around truck.**

- (1) Stop truck (para 2-5 [d]).
- (2) Turn ignition to OFF position (para 2-5 [d]).
- (3) Set parking brake (para 2-5 [d]).
- (4) Unhook and open fuel tank cap (1).
- (5) Ground funnel or nozzle against mouth of filler hole (2).
- (6) Fill fuel tank (3) with fuel per MIL-T-52864 and MIL-T-83133.
- (7) Close fuel tank cap (1) securely.

3-10. HYDRAULIC FLUID TANK CHECK AND SERVICE.

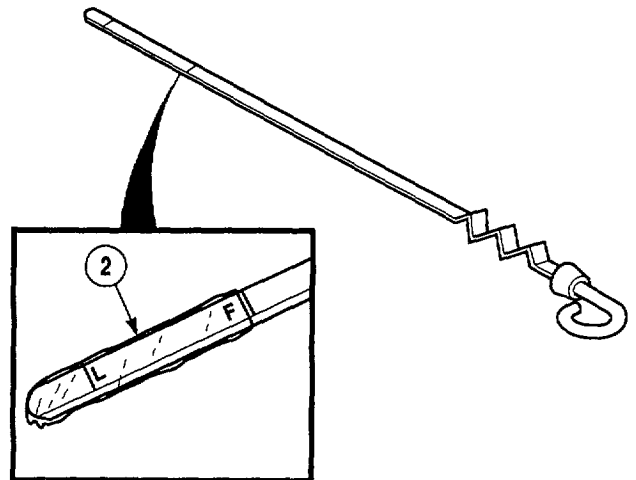
a. Hydraulic Fluid Level Check.



NOTE

Hydraulic fluid level check must be performed with the engine OFF and the upright tilted rear ward and lowered completely.

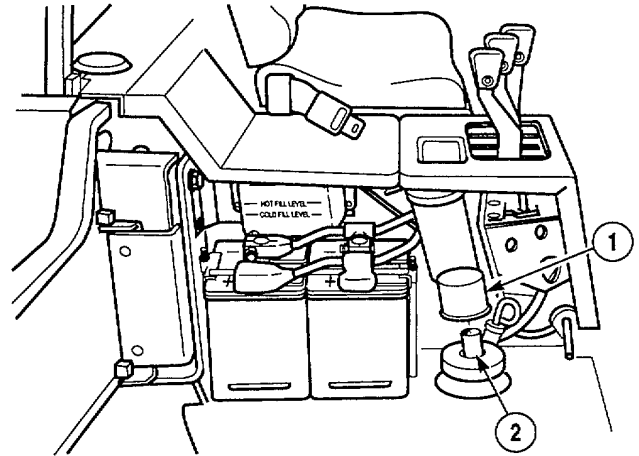
- (1) Open right side hood (1).
- (2) Remove hydraulic fluid dipstick (2).
- (3) Wipe fluid from dipstick (2).
- (4) Insert dipstick (2) in fill tube (3).
- (5) Remove dipstick (2).
- (6) Check fluid level. Hydraulic fluid level should be between "L" and "F" marks on dipstick (2).
- (7) If hydraulic fluid level is low, add hydraulic fluid (para 3-9 [b]).
- (8) If hydraulic fluid level is not low, install dipstick (2).
- (9) Close right side hood (1).



b. Hydraulic Fluid Service.**CAUTION**

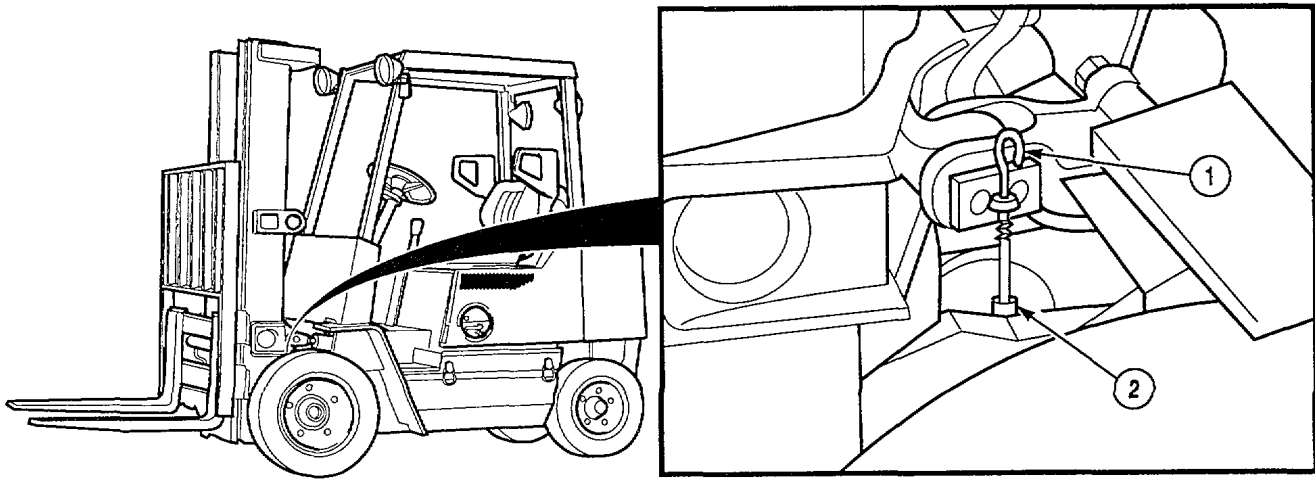
Do not overfill tank with hydraulic fluid or serious damage to hydraulic system may occur.

- (1) Check hydraulic fluid level (para 3-10 [a]).
- (2) Remove hydraulic sump breather (1) from fill tube (2).
- (3) Add oil to hydraulic tank until hydraulic fluid is at correct level (para 3-10 [a]).
- (4) Install hydraulic sump breather (1) on fill tube (2).
- (5) Check hydraulic fluid level (para 3-10 [a]).



3-11. TRANSAXLE LEVEL CHECK AND SERVICE.

a. Transaxle Fluid Level Check.



- (1) Start engine (Para 2-4 [b]).

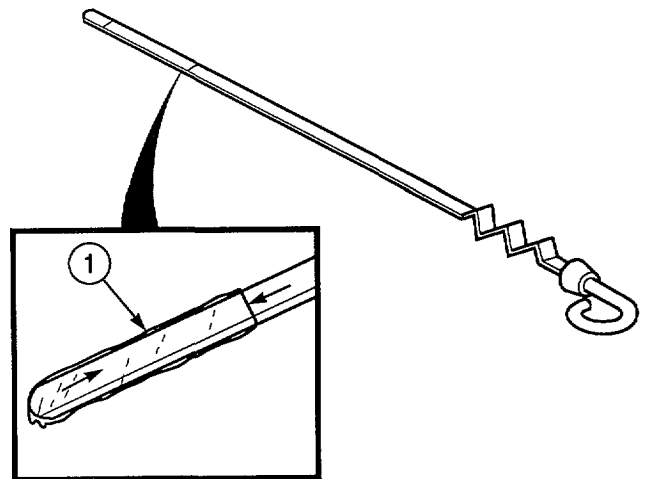
WARNING

Engine and transaxle are very hot after running. Do not touch these parts with bare hands or allow body to come in contact. Hot engine and transaxle parts can cause serious burns.

- (2) Operate vehicle until transaxle temperature is 180°- 200°F (82°- 930C).

NOTE

Engine must be running to check transaxle fluid level.



- (3) Stop vehicle (Para 2-5 [d]). Do not stop engine.
- (4) Remove transaxle dipstick (1) from fill tube (2).
- (5) Wipe transaxle fluid from dipstick (1).
- (6) Insert dipstick (1) in fill tube (2).
- (7) Remove dipstick (1).
- (8) Check fluid level. Transaxle fluid level should be between arrows on dipstick (1).
- (9) If transaxle fluid level is low, add transaxle fluid (Para. 3-11 [b]).
- (10) If transaxle fluid is not low, install dipstick (1) in fill tube (2).

b. Transaxle Fluid Service.

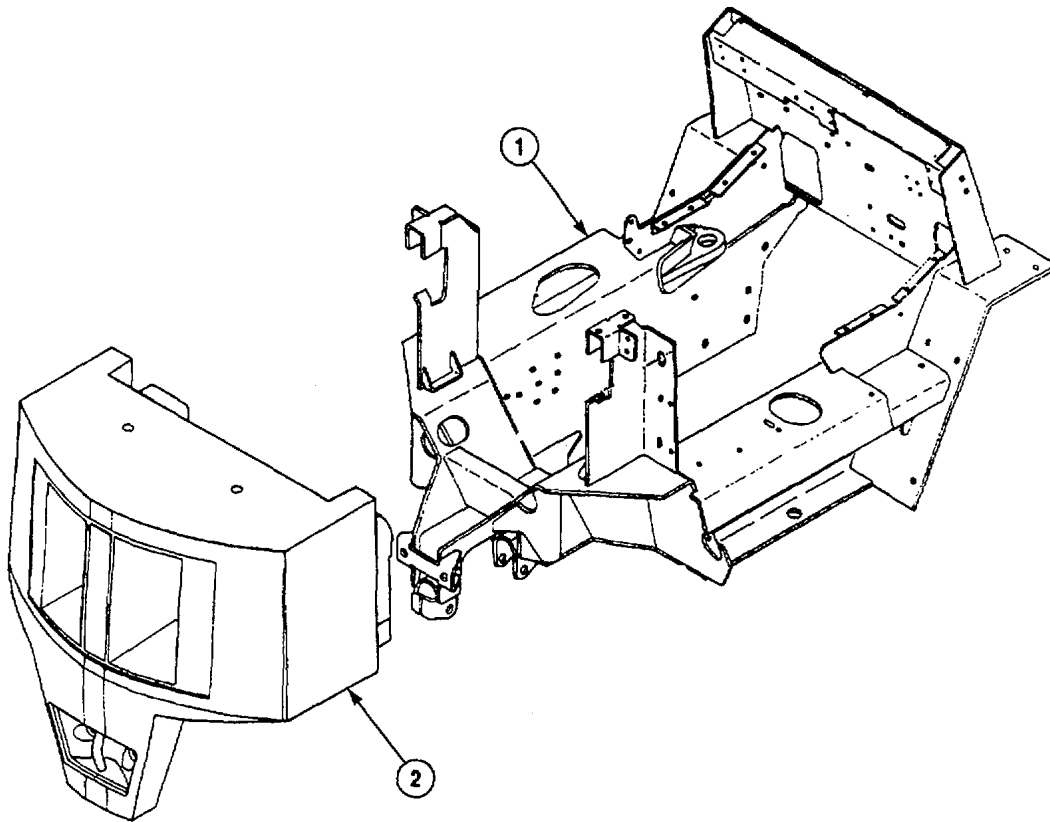
- (1) Check transaxle fluid level (Para 3-11 [a]).
- (2) Remove dipstick (1) from fill tube (2).

CAUTION

Do not overfill transaxle with fluid or serious damage to transaxle may occur.

- (3) Add transaxle fluid at fill tube (2).
- (4) Install dipstick (1) in fill tube (2).
- (5) Check transaxle fluid level (Para 3-11 [a]). Repeat as necessary.

3-12. MAIN FRAME INSPECTION.

**NOTE**

It is only necessary to remove those items which would prevent an accurate inspection of frame assembly. To save time on removal and installation, inspect frame in sections. Remember, much of the frame can be inspected from beneath truck.

- a. Check for dents or visible cracks in metal on frame (1) and counterweight (2).
- b. Check welds for visible cracks and damage on frame (1).
- c. Check screws and screw holes for irregular size and shape on frame (1) and counterweight (2).
- d. Check for excessive corrosion and wear on frame (1).
- e. Check for chipped paint.
- f. If faults are discovered, notify unit maintenance.

CHAPTER 4

OPERATOR TROUBLESHOOTING

4-1. TROUBLESHOOTING INTRODUCTION.

This section contains step-by-step procedures for identifying, locating, and isolating equipment malfunctions.

4-2. TROUBLESHOOTING SYMPTOMS.

Table 4-1 lists the most common malfunctions found during operation of the truck. Tests or inspections and corrective actions should be performed in the order listed. This symptom index lists corrective actions that can be performed by the operator. If a malfunction is not listed or a corrective action fails to correct a problem, notify unit maintenance.

Table 4-1. Operator Troubleshooting Symptom Index

Troubleshooting Fault	Page
ENGINE	
1 Engine will not start.....	4-2
2 Engine does not run evenly.....	4-2
3 A loss of power	4-3
4 Engine temperature above normal	4-3
5 Black exhaust smoke	4-4
6 White exhaust smoke	4-4
7 Truck slow to accelerate	4-4
8 Engine knocking	4-4
HYDRAULIC SYSTEM	
9. No lift, tilt, or sideshift function	4-5
10. Load cannot be lifted to maximum height	4-5
11. Upright lift speed sluggish.....	4-5
12. Pump not delivering hydraulic fluid	4-5
TRANSAXLE	
13. Transaxle will not operate in forward or reverse.....	4-6
14. Transaxle shifts slowly	4-6
15. Transaxle slips	4-6
16. Transaxle lacks power	4-6
17. Transaxle overheats	4-7
ELECTRICAL SYSTEM	
18. Engine will not crank.....	4-7
19. Gauges do not operate	4-7
20. Cold start system does not operate	4-8
21. Horn does not operate	4-8
22. Transmission oil temperature and engine oil pressure lights do not operate	4-8
23. Brakelight does not operate	4-8
24. Front floodlights do not operate	4-9
25. Rear floodlights do not operate.....	4-9

4-3. TROUBLESHOOTING PROCEDURES.

Table 4-2 contains the malfunctions listed in Operator Troubleshooting Symptom Index (Table 4-1), test and inspection instructions required to determine cause of malfunction, and corrective actions for repairing the faulty equipment.

Table 4-2. Operator Troubleshooting Procedures

Malfunction	Test or Inspection	Corrective Action
ENGINE		
1. ENGINE WILL NOT START.		
Step 1.	Check that engine is cranking.	If engine will not crank, go to ELECTRICAL SYSTEM troubleshooting. If engine will crank, go to Step 2.
Step 2.	Check indication on fuel gauge (Para 3-9 [a]).	If fuel gauge reads empty, refill tank (Para 3-9 [b]). If fuel gauge indicates there is fuel in tank, go to Step 3.
Step 3.	Check that fuel shutoff valve is open (Para 2-3).	If valve is closed, open valve (Para 2-3). If valve is open, go to step 4.
Step 4.	Check air cleaner restriction indicator.	If yellow flag is raised, notify unit maintenance. If yellow flag is not raised, notify unit maintenance.
2. ENGINE DOES NOT RUN EVENLY.		
Step 1.	Check air cleaner restriction indicator.	If yellow flag is raised, notify unit maintenance. If yellow flag is raised, go to Step 2.

Table 4-2. Operator Troubleshooting Procedures - CONT

Malfunction	Test or Inspection	Corrective Action
ENGINE (CONT)		
Step 2.	Check indication on fuel gauge (Para 3-9 [a]).	If fuel gauge reads empty, refill tank (Para 3-9 [b]).
		If fuel gauge indicates there is fuel in tank, go to Step 3.
Step 3.	Check radiator coolant level (Para 3-7).	If coolant level is low, add coolant (Para 3-7).

If coolant level is OK, notify unit maintenance.

3. A LOSS OF POWER.

- Step 1. Check air cleaner restriction indicator.
- If yellow flag is raised, notify unit maintenance.
- If yellow flag is not raised, go to Step 2.

- Step 2. Check radiator coolant level (Para 3-7).
- If coolant level is low, add coolant (Para 3-7).
- If coolant level is OK, notify unit maintenance.

4. ENGINE TEMPERATURE ABOVE NORMAL.

- Step 1. Check capacity of load on truck (maximum capacity of truck is 4000 lb [1814.4 kg]).
- If truck is overloaded, reduce size of load.
- If truck is not overloaded, go to Step 2.
- Step 2. Check engine oil level (Para 3-6 [a]).
- If oil level is below ADD mark, add oil (Para 3-6 [b]).
- If oil level is OK, go to Step 3.

Table 4-2. Operator Troubleshooting Procedures - CONT.

Malfunction	Test or Inspection	Corrective Action
ENGINE (CONT)		
Step 3.	Check radiator coolant level (Para 3-7).	If coolant level is low, add coolant (Para 3-7). If coolant level is OK, notify unit maintenance.
5. BLACK EXHAUST SMOKE.		
Step 1.	Check capacity of load on truck (maximum capacity of truck is 4000 lb [1814.4 kg]).	If truck is overloaded, reduce size of load. If truck is not overloaded, notify unit maintenance.
6. WHITE EXHAUST SMOKE.		
Step 1.	Check that fuel type is correct (Para 3-9) and not contaminated.	If fuel is incorrect type or contaminated, drain fuel tank and refill with correct/clean fuel. If fuel is correct type, notify unit maintenance.
7. TRUCK SLOW TO ACCELERATE.		
Step 1.	Check air cleaner restriction indicator.	If yellow flag is raised, notify unit maintenance. If yellow flag is not raised, notify unit maintenance.
8. ENGINE KNOCKING.		
Step 1.	Check engine oil level (Para 3-6 [a]).	If oil level is below ADD mark, add oil (Para 3-6 [b]). If oil level is OK, notify unit maintenance.

Table 4-2. Operator Troubleshooting Procedures - CONT.

Malfunction	Test or Inspection	Corrective Action
HYDRAULIC SYSTEM		
9. NO LIFT, TILT, OR SIDESHIFT FUNCTION.		
<p>Step 1. Check hydraulic fluid level (Para 3-10 [a]). If hydraulic fluid is below LOW (L) mark, add fluid (Para 3-10 [b]). If hydraulic fluid is OK, notify unit maintenance.</p>		
10. LOAD CANNOT BE LIFTED TO MAXIMUM HEIGHT.		
<p>Step 1. Check hydraulic fluid level (Para 3-10 [a]). If hydraulic fluid is below LOW (L) mark, add fluid (Para 3-10 [b]). If hydraulic fluid is OK, notify unit maintenance.</p>		
11. UPRIGHT LIFT SPEED SLUGGISH.		
<p>Step 1. Check hydraulic fluid level (Para 3-10 [a]). If hydraulic fluid is below LOW (L) mark, add fluid (Para 3-10 [b]). If hydraulic fluid is OK, notify unit maintenance.</p>		
12. PUMP NOT DELIVERING HYDRAULIC FLUID.		
<p>Step 1. Check hydraulic fluid level (Para 3-10 [a]). If hydraulic fluid is below LOW (L) mark, add fluid (Para 3-10 [b]). If hydraulic fluid is OK, notify unit maintenance.</p>		

Table 4-2. Operator Troubleshooting Procedures - CONT.

Malfunction	Test or Inspection	Corrective Action
TRANSAXLE		
13. TRANSAXLE WILL NOT OPERATE IN FORWARD OR REVERSE.	<p>Step 1. Check that parking brake is not engaged (Para 2-5 [a]). If parking brake is engaged, release parking brake (Para 2-5 [a]). If parking brake is not engaged, go to Step 2.</p>	
	<p>Step 2. Check transaxle fluid level (Para 3-11 [a]). If fluid level is below lower arrow mark, add fluid (Para 3-11 [b]). If fluid level is OK, notify unit maintenance.</p>	
14. TRANSAXLE SHIFTS SLOWLY.	<p>Step 1. Check transaxle fluid level (Para 3-11 [a]). If fluid level is below lower arrow mark, add fluid (Para 3-11 [b]). If fluid level is OK, notify unit maintenance.</p>	
15. TRANSAXLE SLIPS.	<p>Step 1. Check transaxle fluid level (Para 3-11 [a]). If fluid level is below lower arrow mark, add fluid (Para 3-11 [b]). If fluid level is OK, notify unit maintenance.</p>	
16. TRANSAXLE LACKS POWER.	<p>Step 1. Check transaxle fluid level (Para 3-11 [a]). If fluid level is below lower arrow mark, add fluid (Para 3-11 [b]). If fluid level is OK, notify unit maintenance.</p>	

Table 4-2. Operator Troubleshooting Procedures - CONT

Malfunction	Test or Inspection	Corrective Action
TRANSAXLE (CONT)		
17. TRANSAXLE OVERHEATS.		
<p>Step 1. Check transaxle fluid level (Para 3-11 [a]).</p> <p style="padding-left: 40px;">If fluid level is below lower arrow mark, add fluid (Para 3-11 [b]).</p> <p style="padding-left: 40px;">If fluid level is OK, notify unit maintenance.</p>		
ELECTRICAL SYSTEM		
18. ENGINE WILL NOT CRANK.		
<p>Step 1. Check that system energizes when master electrical switch is turned to ON (Para 2-4 [b]) and ignition key switch is turned to Run position (Para 2-4 [b]).</p> <p style="padding-left: 40px;">If system energizes, go to Step 2.</p> <p style="padding-left: 40px;">If system will not energize, notify unit maintenance.</p> <p>Step 2. Place direction control lever in NEUTRAL position (Para 2-5 [a]).</p> <p style="padding-left: 40px;">If truck still does not start with direction control lever in NEUTRAL, notify unit maintenance.</p> <p style="padding-left: 40px;">If truck does start, problem solved.</p>		
19. GAUGES DO NOT OPERATE.		
<p>Step 1. Ensure master electrical switch is ON and ignition key switch is turned to Run position (Para 2-4 [b]).</p> <p style="padding-left: 40px;">If gauges do not operate, notify unit maintenance.</p> <p style="padding-left: 40px;">If gauges operate, problem solved.</p>		

Table 4-2. Operator Troubleshooting Procedures - CONT.

Malfunction	Test or Inspection	Corrective Action
ELECTRICAL SYSTEM (CONT)		
20. COLD START SYSTEM DOES NOT OPERATE.	Step 1. Ensure master electrical switch is ON and ignition key switch is turned to START (Para 2-4 [b]).	If cold start system does not operate, notify unit maintenance.
		If cold start system operates, problem solved.
21. HORN DOES NOT OPERATE.	Step 1. Ensure master electrical switch is ON .	If horn does not operate, notify unit maintenance.
		If horn does operate, problem solved.
22. TRANSMISSION OIL TEMPERATURE AND ENGINE OIL PRESSURE LIGHTS DO NOT OPERATE.	Step 1. Ensure master electrical switch is ON and ignition key switch is turned to RUN (Para 2-4 [b]).	If transmission oil temperature and engine oil pressure lights do not operate, notify unit maintenance.
		If transmission oil temperature and engine oil pressure lights do operate, problem solved.
23. BRAKELIGHT DOES NOT OPERATE.	Step 1. Ensure master electrical switch is ON and ignition key switch is turned to RUN (Para 2-4 [b]).	If brakelight does not operate, notify unit maintenance.
		If brakelight does operate, problem solved.

Table 4-2. Operator Troubleshooting Procedures - CONT.

Malfunction	Test or Inspection	Corrective Action
ELECTRICAL SYSTEM (CONT)		
24. FRONT FLOODLIGHTS DO NOT OPERATE.		
Step 1. Ensure master electrical switch is ON and ignition key switch is turned to RUN (Para 2-4 [b]).		
If front floodlights do not operate, go to Step 2.		
If front floodlights do operate, problem solved.		
Step 2. Ensure front floodlight switch is ON .		
If front floodlights still do not operate, notify unit maintenance.		
If front floodlights do operate, problem solved.		
25. REAR FLOODLIGHTS DO NOT OPERATE.		
Step 1. Ensure master electrical switch is ON and ignition key switch is turned to RUN (Para 2-4 [b]).		
If rear floodlights do not operate, go to Step 2.		
If rear floodlights do operate, problem solved.		
Step 2. Ensure rear floodlight switch is ON .		
If rear floodlights still do not operate, notify unit maintenance.		
If rear floodlights do operate, problem solved.		

**APPENDIX A
REFERENCES**

A-1. SCOPE.

This appendix lists all forms, field manuals, technical manuals, and other publications referenced in this manual. Other manuals that should be consulted for additional information about truck operation are also listed herein.

A-2. PUBLICATION INDEX.

The following index should be consulted frequently for late changes or revisions to documents listed herein. This index also lists new publications relating to material covered in this manual.

Consolidated Index of Army Publications and Blank Forms DA Pam 25-30

A-3. FORMS.

The following forms are referenced within this manual. Refer to DA Pam 25-30 for index of blank forms.

- Standard Form 46, U.S. Government Motor Vehicle Operator's Identification Card.
- Standard Form 91, Operator's Report of Motor Vehicle Accident.
- Recommended Changes to DA Publications and Blank Forms (DA Form 2028, 2028-2).
- Equipment Inspection and Maintenance Worksheet (DA Form 2404)

Refer to DA Pam 738-750, The Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms required during the operation of this manual.

A-4. OTHER PUBLICATIONS.

a. Safety.

- Prevention of Motor Vehicle Accidents..... AR 385-55
- Safety Inspection and Testing of Lifting Devices..... TB 43-0142
- First Aid for Soldier FM 21-11

b. Vehicle Operation.

- Vehicle Recovery Operations FM 20-22
- Desert Operation FM 90-3
- Mountain Operation FM 90-6
- River Crossing FM 90-13
- Manual for Wheel Vehicle Driver..... FM 21-305

c. Cold Weather Operation and Maintenance.

- Operation and Maintenance of Ordnance Material in Extreme Cold
 - Weather (0 degrees to -65 degrees F)..... FM 9-207
- Basic Cold Weather Manual..... FM 31-70
- Northern Operations FM 31-71

d. Maintenance and Repair.

Charging System Troubleshooting (The Easy Way)DA Pam 750-33
 Metal Body Repair and Related Operations TC 9-510
 Ordinance Tracked and Wheeled Vehicle Hull and Chassis Wiring, Repair ofTB ORD 650
 Description, Use, Bonding Techniques, and Properties of AdhesivesTB ORD 1032
 Purging, Cleaning, and Coating Interior Ferrous and Terne Sheet Vehicle Fuel Tanks TB 43-0212
 Use of Antifreeze and Cleaning Compounds in Engine Cooling Systems TB 750-651
 Cooling Systems: Tactical Vehicles TM 750-254
 Rigging TM 5-725
 Inspection, Care, and Maintenance of Antifriction Bearings..... TM 9-214
 Welding Theory and Application..... TC 9-237
 Care and Use of Hand Tools and Measuring Tools TM 9-243
 Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordinance Material and
 Related Materials Including Chemicals TM 9-247
 Painting Instructions for Field Use..... TM 43-0139
 Color, Marking, and Camouflage Painting of Military Vehicles..... TB 43-0209
 Inspection, Use and Tightening of Metal Fasteners Used on Tank-Automotive Equipment.....TB 430218
 Operator, Unit, Direct Support, and General Support Maintenance Manual
 for Repair and Inspection of Pneumatic Tires and Inner Tubes..... TM 9-2610-200-14
 Tool Outfit, Hydraulic Systems Test and Repair (HSTRU) TM 9-4940-468-14
 Operator, Unit, Direct Support, and General Support Maintenance Manual
 for Lead Acid Storage Batteries TM 9-6140-200-14
 Organizational, Direct Support, and General Support Maintenance Manual
 for Truck, Forklift, Clean Burn Diesel, Front-Loading, 4000 lb. capacity,
 M483 TM 10-3930-671-24
 Repair Parts and Special Tools List for Truck, Forklift, Clean Burn Diesel, Front-
 Loading, 4000 lb. capacity, M483..... TM 10-3930-671-24P

e. Decontamination.

NBC (Nuclear, Biological, and Chemical) Contamination Avoidance..... FM 3-3
 NBC (Nuclear, Biological, and Chemical) Protection FM 3-4
 NBC (Nuclear, Biological, and Chemical) Decontamination..... FM 3-5
 NBC (Nuclear, Biological, and Chemical) Defense FM 21-40

f. General

Transportation Reference Data FM 55-15
 Transportability Guidance for Application of Blocking, Bracing and Tiedown TM 55-2200-001-12
 Certification of Military Equipment for Transport in MAC/CRAF Aircraft TB 55-45
 Storage & Material Handling Operations TM 743-200-1
 Standards for Overseas Shipment or Domestic Issue of Special Purpose Vehicles,
 Combat, Tactical, Construction and Selected Industrial and Troop Support
 US Army Tank-Automotive Materiel Readiness Command Managed Items TB 9-2300-281-35
 Principles of Automotive Vehicles TM 9-8000
 Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use..... TM 750-244-6
 Product Quality Deficiency Report.....SF 368
 Expendable/Durable Items CTA 50-970
 Turbine Fuel, Aviation, Kerosene Type, Grade JP-8.....MIL-T-83133
 Brake Fluid, Silicone, Automotive, All Weather, Operational and Preservative, MetricMIL-B-46176

APPENDIX B

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

THERE ARE NO ADDITIONAL BASIC ISSUE ITEMS
OR COMPONENTS OF END ITEMS.

B-1/(B-2 blank)

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

C-1. SCOPE.

This appendix lists additional items that are authorized for support of the 4000 lb. Forklift Truck.

C-2. GENERAL.

The Additional Authorization list identifies items that are not issued with the truck and do not have to be turned in with the truck. The items included on this list are authorized for use by the Common Table of Allowance (CTA), Modified Table of Equipment (MTOE), Table of Distributed Allowance (TDA), or Joint Table of Allowance (JTA).

C-3. EXPLANATION OF LISTING.

The Additional Authorization List is divided into four columns: national stock number, description, unit of measure (U/M), and quantity authorized (Qty Auth). The names of the columns are self-explanatory. In addition to the name of the authorized item, the description column also lists the items part number, the Commercial and Government Entity (CAGE) code, and the usable on code.

The are no additional authorization components issued with the truck.

National Stock Number	Description CAGE & Part No. Usable On Code	U/M	Qty Auth.
4210-00-889-2221	Extinguisher, Fire, 2 lb, 5-B:C, O-E-915, Type III, Class 2	ea	1

C-1 (C-2 blank)

APPENDIX D

EXPENDABLE/DURABLE SUPPLIES AND MATERIAL LIST

D-1. SCOPE.

This appendix lists expendable supplies and materials you may need to operate and maintain the 4000 lb. Forklift Truck. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Hydraulic Items).

D-2. EXPLANATION OF COLUMNS.

- a. Column (1) - Item.** This number is assigned to the entry in the listing.
- b. Column (2) - Level.** This column identifies the lowest level of maintenance that requires the listed items.
 - C - Operator/Crew
 - 0 - Organizational Maintenance
 - F - Direct Support Maintenance
- c. Column (3) National Stock Number.** This is the national stock number assigned to the item; use it to request or requisition the item.
- d. Column (4) Description.** Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.
- e. Column (5) Unit of Measure (U/M).** Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Table D-1. Expendable/Durable Supplies and Material List.

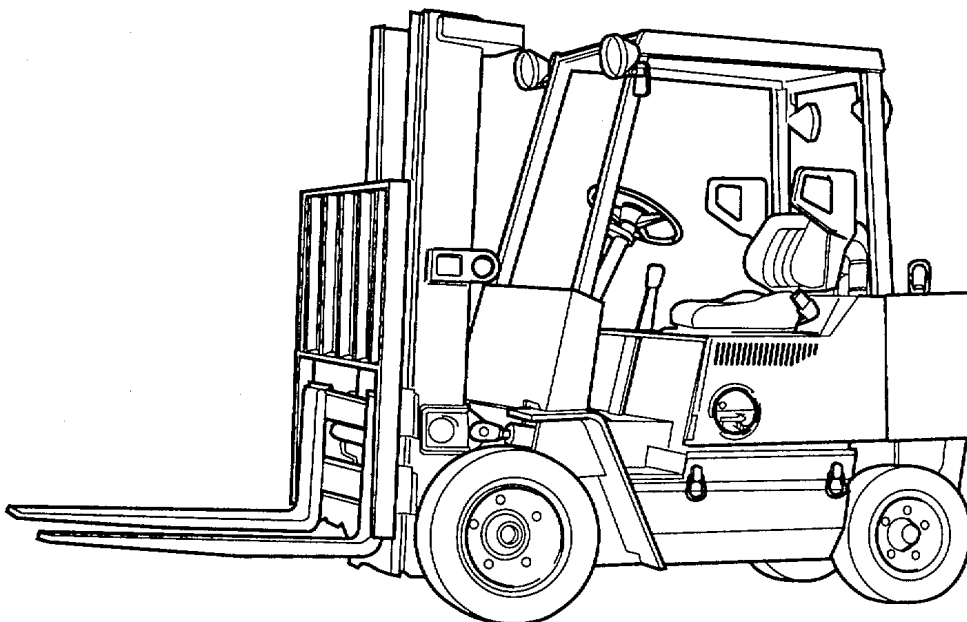
(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM	(5) UM/UI
1	C	7930-00-634-3935	Chips, Soap: (P-S-579) 200 lb drum	lb
2	C	7930-00-282-9699	Detergent: Non-sudsing, general purpose, liquid (80244)	
3	C	9150-00-065-0029 9150-01-197-7690 9150-00-190-0907	Grease, Automotive and Artillery (MIL-G-10924) 2 1/4 oz tube 1 3/4 lb can 35 lb can	oz lb lb
4	C	9150-00-145-0161	Grease, Silicone: Medium (MIL-G-46886) 8 oz tube	oz
5	C	9140-00-286-5286 9140-00-286-5287 9140-00-286-5288 9140-00-286-5289	Oil, Fuel, Diesel DF-1 Winter (VV-F-800) Bulk 5 gal can 55 gal drum, 16 gage 55 gal drum, 18 gage	gal gal gal gal
6	C	9140-00-286-5294 9140-00-286-5295 9140-00-286-5296 9140-00-286-5297	Oil, Fuel, Diesel DF-2 Regular (VV-F-800) Bulk 5 gal can 55 gal drum, 16 gage 55 gal drum, 18 gage	gal gal gal gal
7	C	9150-01-035-5390 9150-01-035-5391	Oil, Lubricating, Gear, GO 75 (MIL-L-2105) 1 qt can 5 gal can	qt gal
8	C	9150-01-035-5393 9150-01-035-5394	Oil, Lubricating, Gear, GO 80/90 (MIL-L-2105) 5 gal can 55 gal drum	gal gal
9	C	9150-00-189-6727 9150-00-186-6668 9150-00-191-2772	Oil, Lubricating, OR/HDO 10 (MIL-L-2104) 1 qt can 5 gal can 55 gal drum	qt gal gal
10	C	9150-01-152-4117	Oil, Lubricating: Internal combustion engine, tactical service (MIL-L-2104) 1 qt can	qt

Table D-1. Expendable/Durable Supplies and Material List - CONT:

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM	(5) UM/UI
11	C	9150-00-186-6681 9150-00-188-9858 9150-00-189-6729	Oil, Lubricating, OE/HDO 30 (SAE 30) (MIL-L-2104) 1 qt can 5 gal can 55 gal drum	qt gal gal
12	C	9150-00-405-2987 9150-00-189-6730 9150-00-188-9862	Oil, Lubricating, OE/HDO 40 (SAE 40) (MIL-L-2104) Bulk 1 qt can 55 gal drum	gal qt gal
13	C	9150-00-188-9864 9150-00-188-9865 9150-00-188-9867	Oil, Lubricating OE/HDO 50 (MIL-L-2104) 1 qt can 5 gal can 55 gal drum	qt gal gal

APPENDIX E

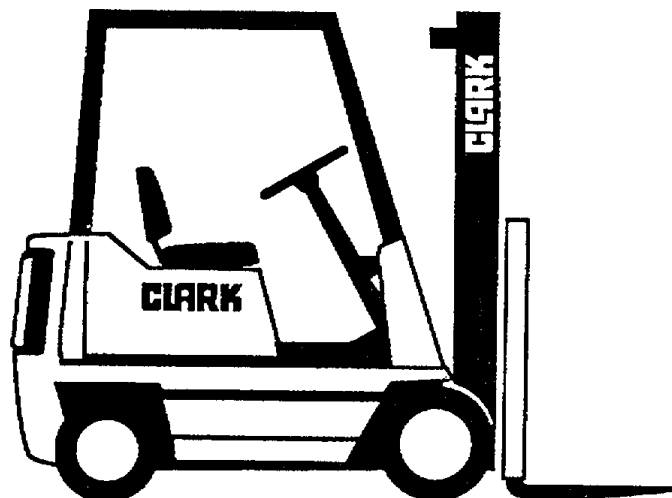
COMMERCIAL OPERATOR'S MANUAL



E-1/(E-2 blank)

Operator's Manual

**Do not remove this manual
from the truck**

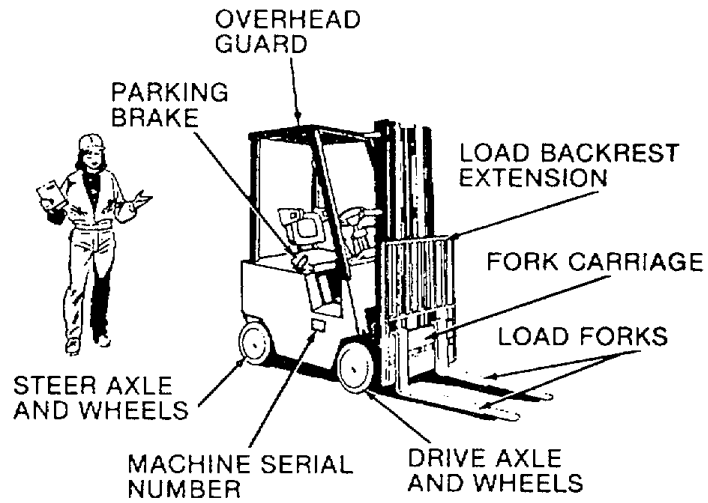


GPX 25E DIESEL

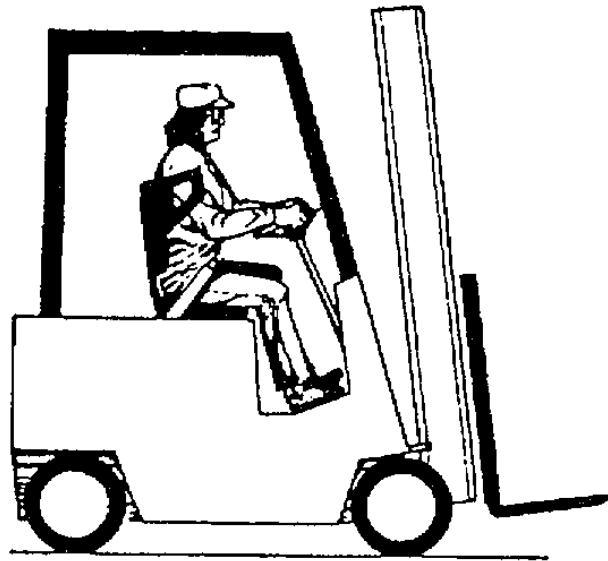
Operator's Manual
You must be trained and authorized to operate a lift truck.

Follow these rules:

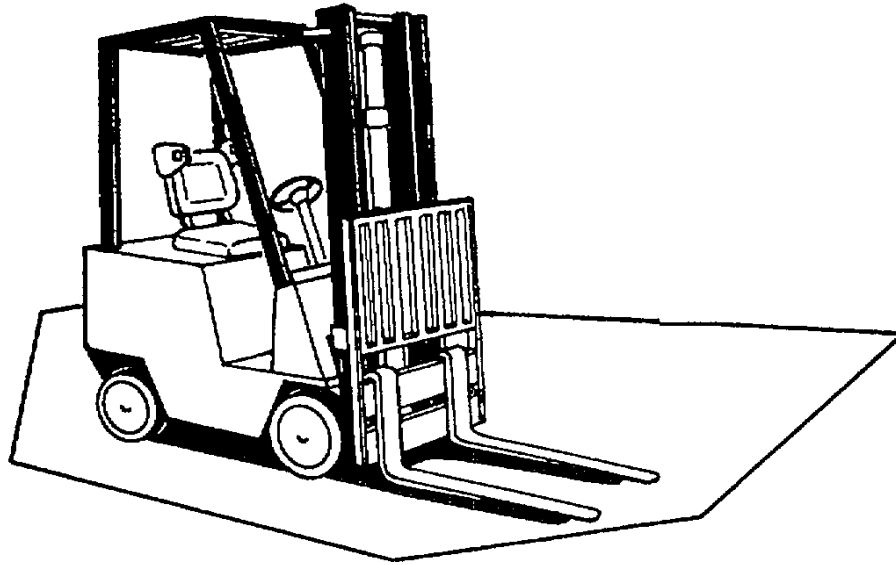
Read and understand your
Operator's Manual.



Learn safe operating rules
and practice operating
your truck.



Breaking these rules will cause serious or fatal injury to yourself and others.



CONTENTS

This manual covers GPX 25E Diesel truck.

A MESSAGE TO LIFT TRUCK OPERATORS	E-7
TRUCK APPLICATION	E-8
OPERATOR MAINTENANCE	E-9
GENERAL SAFETY RULES	E-13
OPERATING HAZARDS	E-27
KNOW YOUR TRUCK	E-37
OPERATING PROCEDURES	E-63
EMERGENCY STARTING	E-85
EMERGENCY TOWING	E-89
PLANNED MAINTENANCE AND LUBRICATION.....	E-93
SPECIFICATIONS.....	E-107

A Message to Lift Truck Operators

Lift trucks are specialized machines with unique operating characteristics designed to perform specific jobs. Their function and operation is not like a car or ordinary truck. They require specific instructions and rules for safe operation and maintenance.

Safe operation of lift trucks is of primary importance. Experience with lift truck accidents has shown that when accidents happen and people are killed or injured the causes are:

1. OPERATOR NOT PROPERLY TRAINED
2. OPERATOR NOT EXPERIENCED WITH LIFT TRUCK OPERATION
3. BASIC SAFETY RULES NOT FOLLOWED
4. LIFT TRUCK WAS NOT MAINTAINED IN A SAFE OPERATING CONDITION

This manual is designed to help you learn how to operate your lift truck safely. This manual shows and tells you about operator maintenance and the important general safety rules and hazards of lift truck operation. It describes the special components and features of the truck and their function. The correct operating procedures are shown and explained. Illustrations and important safety messages are included for clear understanding. And, finally, a section on maintenance and lubrication is included for the lift truck mechanic.

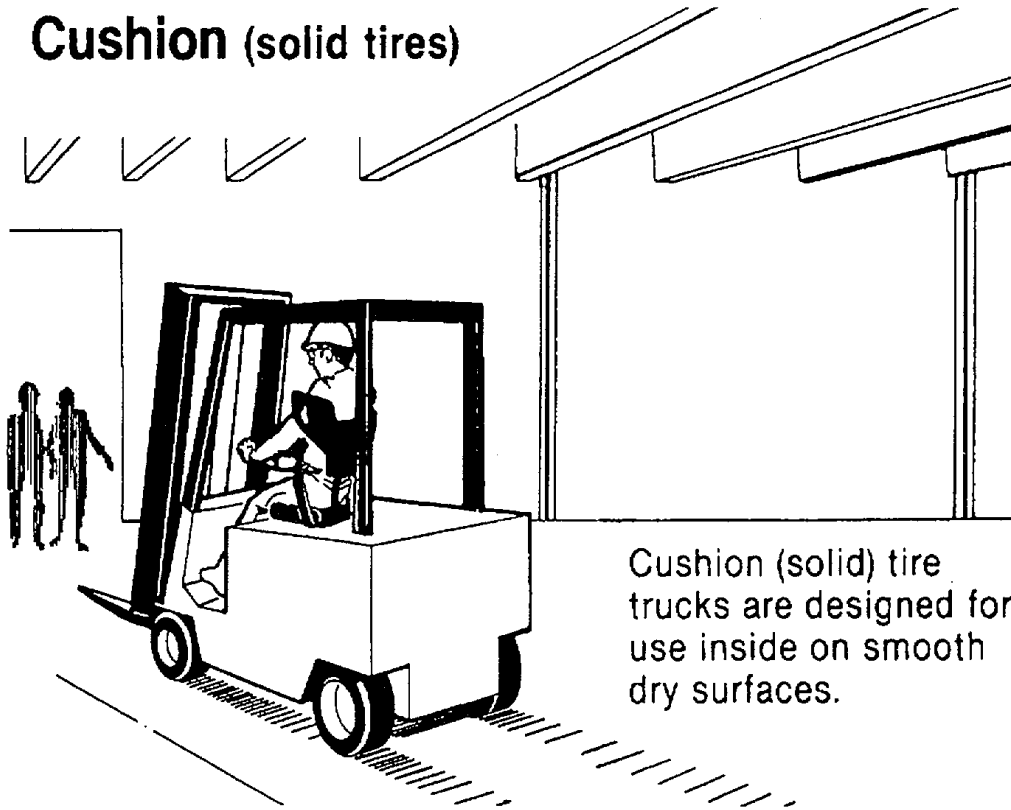
The operator's manual is not a training manual. It is a guide to help authorized operators safely operate their lift truck by illustrating the correct procedures. It cannot cover every possible situation which may result in an accident. You must watch for hazards in your work areas and correct them. It is important that you learn the information in this manual and know your company safety rules! Be sure that your equipment is maintained in a safe condition and do not operate a damaged truck. Practice safe operation every time you use your lift truck. Let's join together to set new standards in safety.

Remember, before you start operating this lift truck, be sure that you understand all driving procedures. It is your responsibility, and it is important to you and your family, to operate your lift truck safely and efficiently. And, be aware that the Federal Occupational Safety and Health Act and state laws require that operators be completely trained in the safe operation of lift trucks.

Truck Application

Each truck is designed for a specific application. Make sure you are using the correct truck for the job.

Cushion (solid tires)

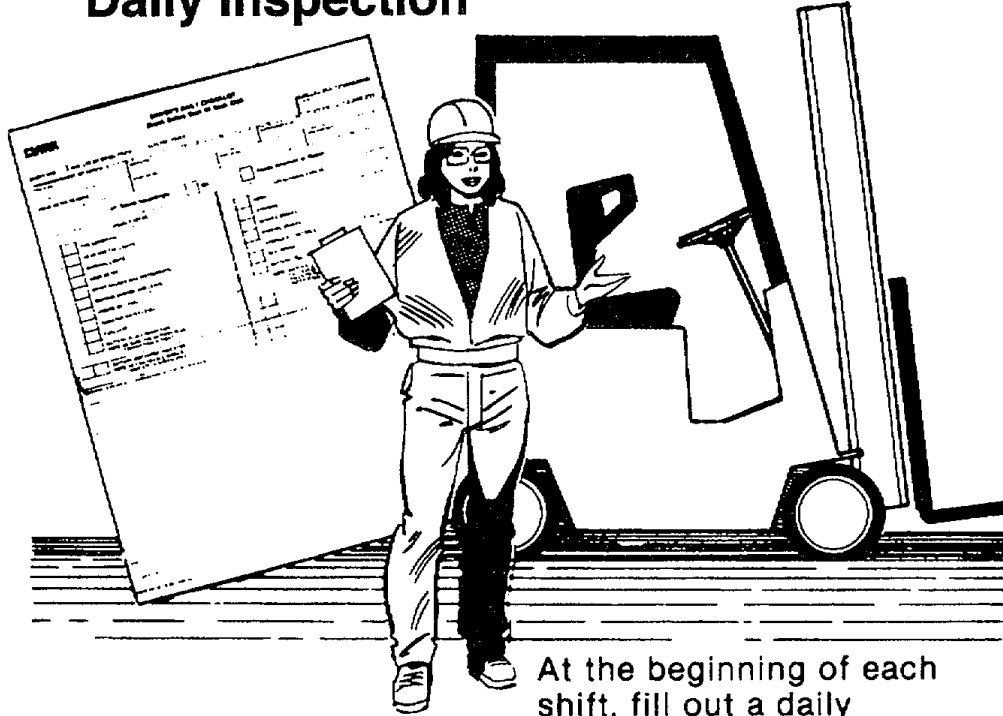


Cushion (solid) tire trucks are designed for use inside on smooth dry surfaces.

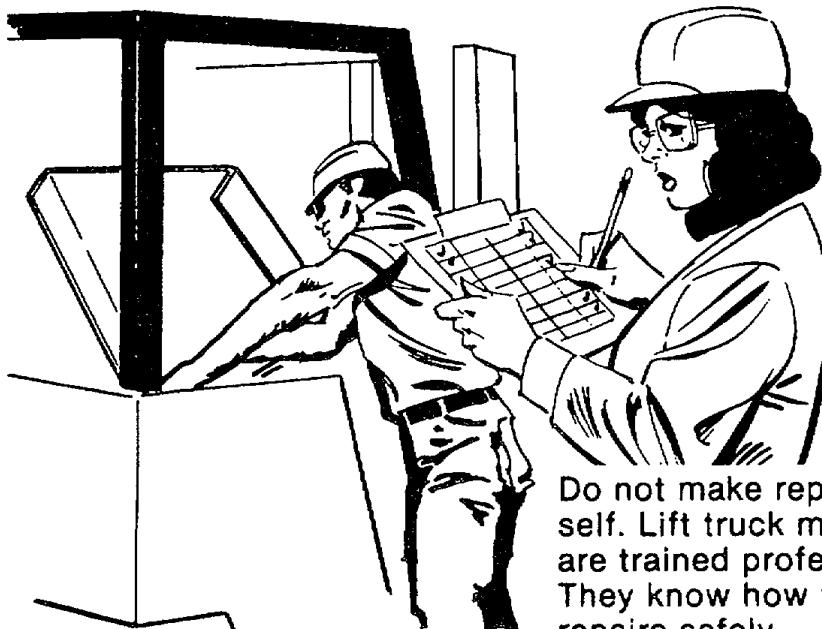
1 Operator Maintenance

Daily Inspection

Daily Inspection



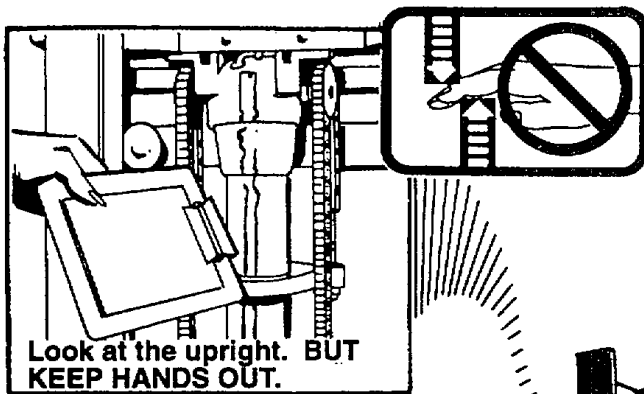
At the beginning of each shift, fill out a daily inspection sheet.



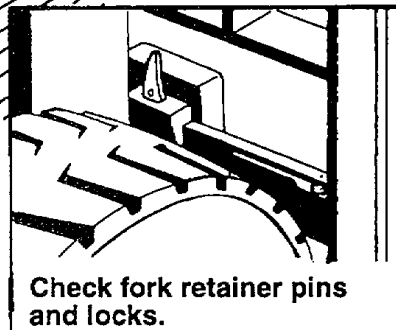
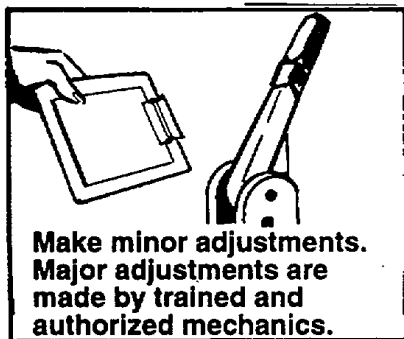
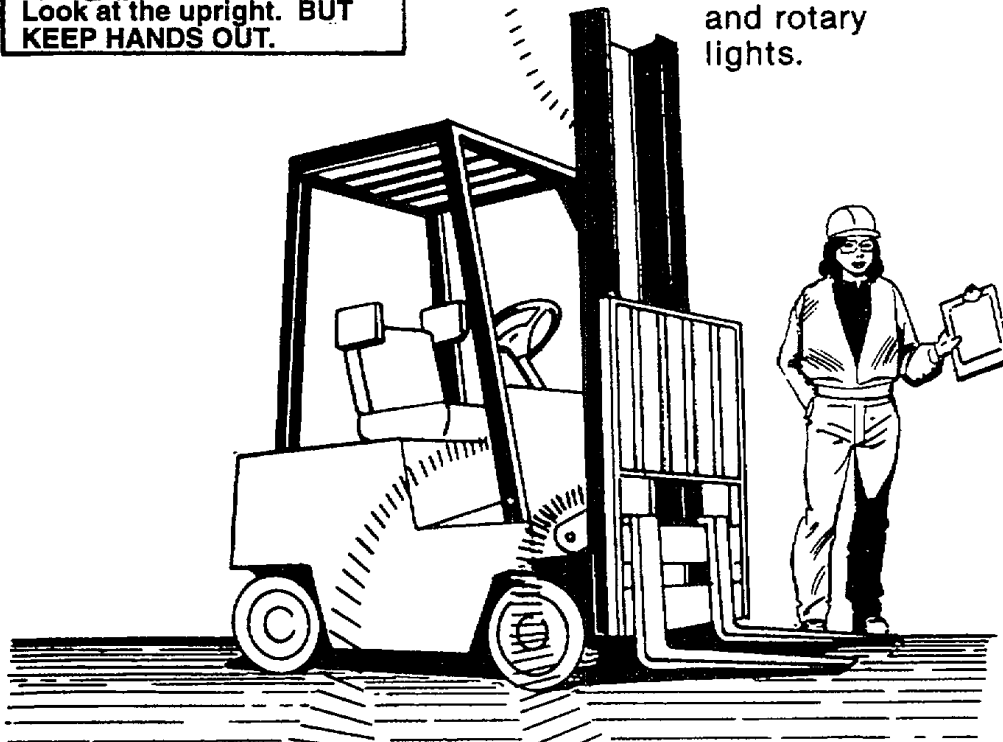
Do not make repairs yourself. Lift truck mechanics are trained professionals. They know how to make repairs safely.

Safety Inspection

Operator Maintenance

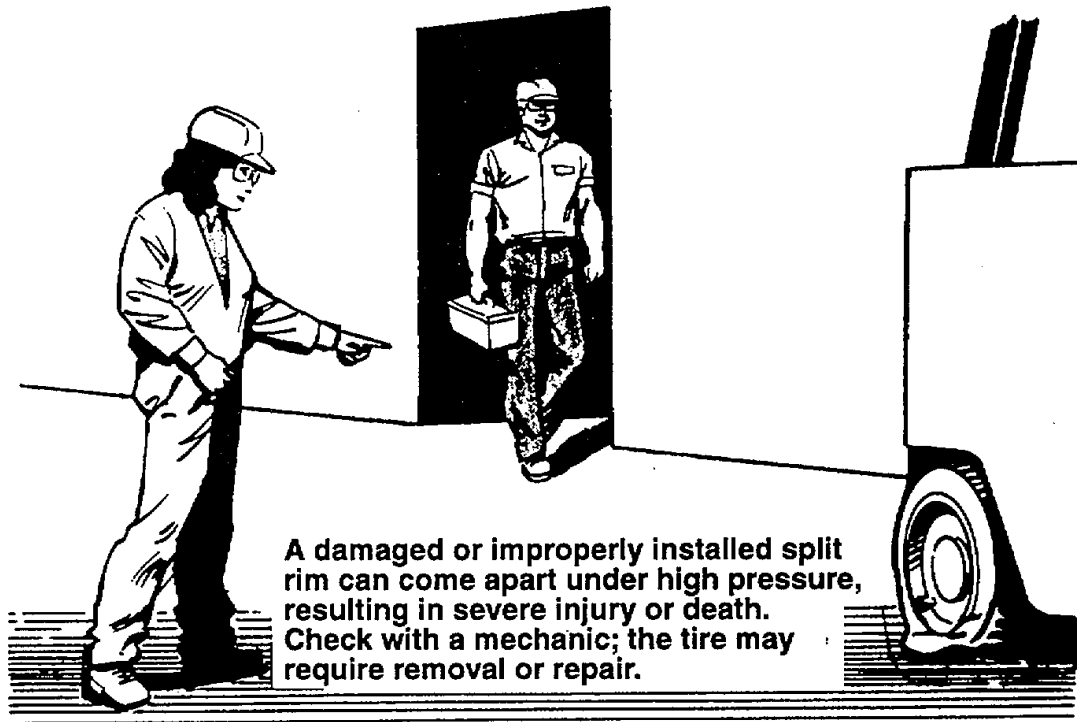


Check safety equipment — the overhead guard, load backrest extension, horn, and if present, backup alarms, and rotary lights.



Operator Maintenance

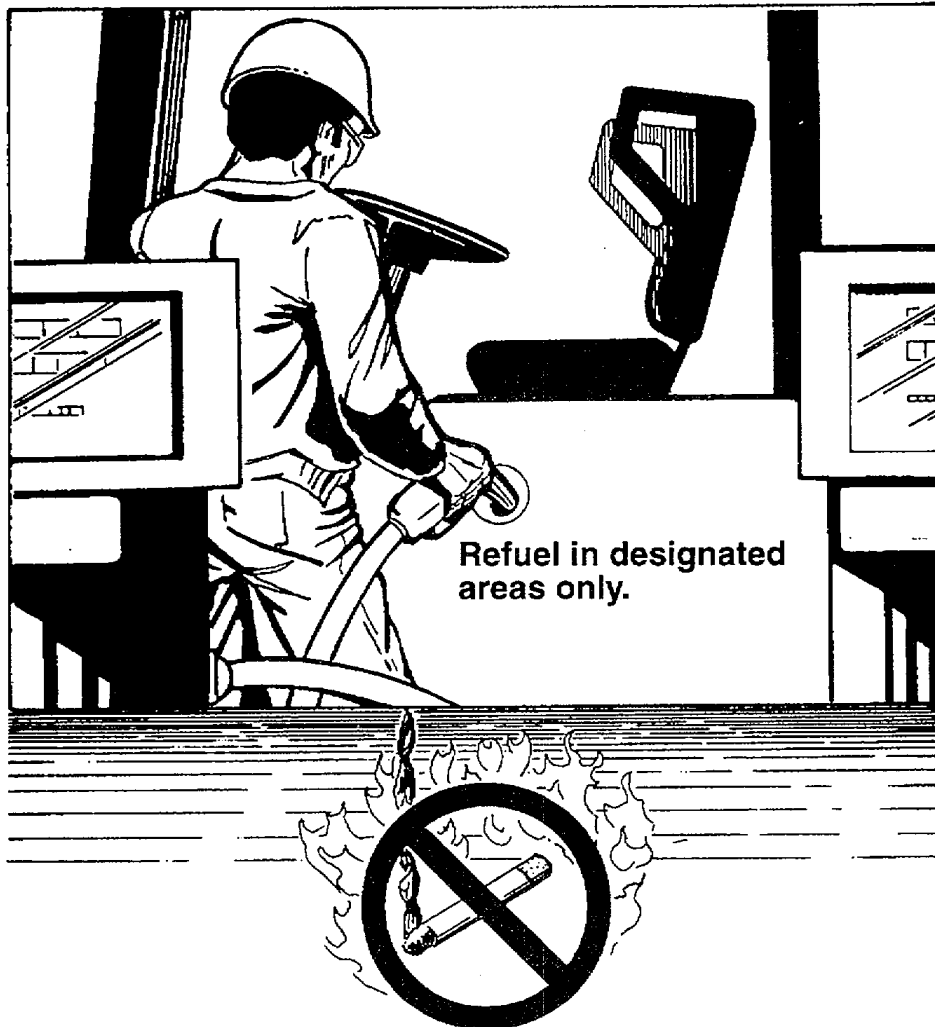
Tire Inspection



A damaged or improperly installed split rim can come apart under high pressure, resulting in severe injury or death. Check with a mechanic; the tire may require removal or repair.

Operator Maintenance

Refuel Diesel

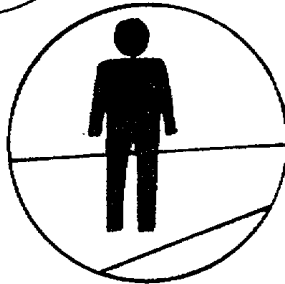


2 General Safety Rules

Follow the Rules



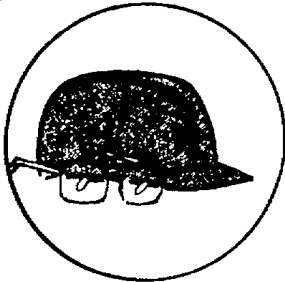
Never mix drugs and alcohol with your job.



Watch for pedestrians.



Don't block safety or emergency equipment.



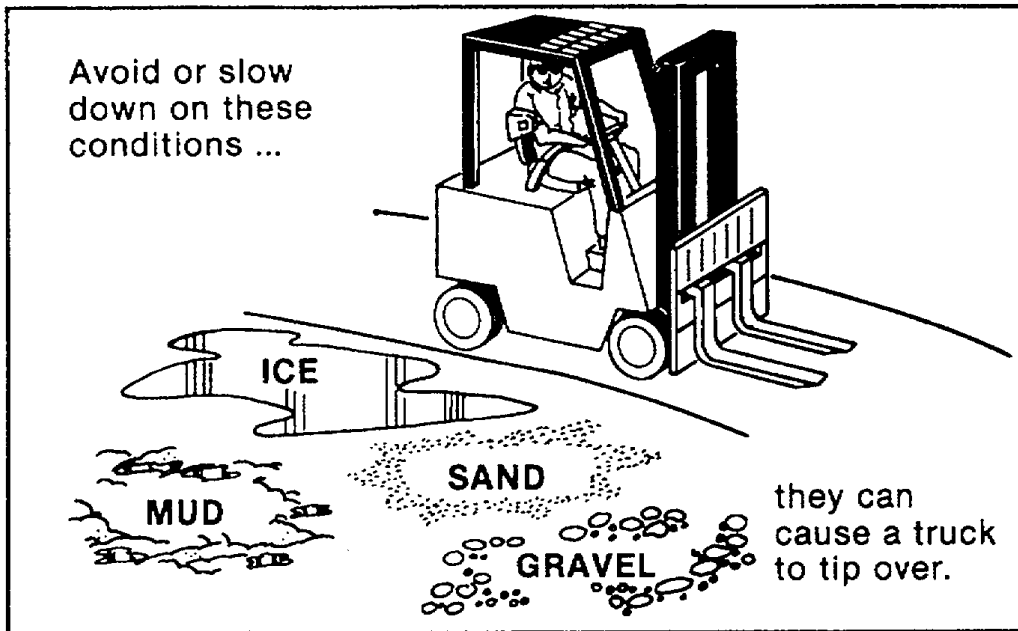
Wear safety equipment when required.



Watch those "No Smoking" areas.

General Safety Rules

Surface and Capacity

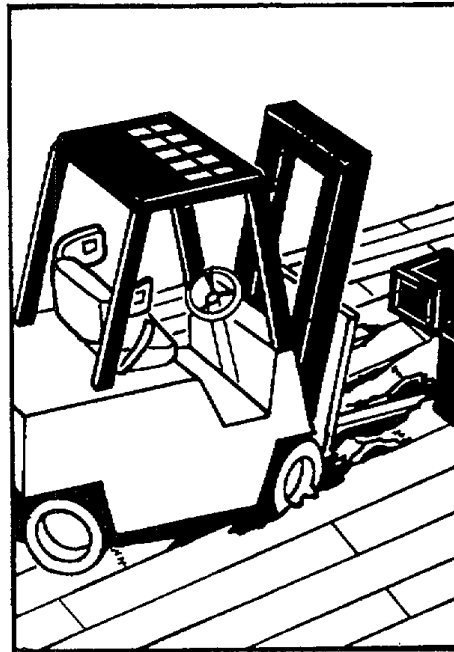


Know the weight of your truck and load.
Check capacities:

Elevators



Floors

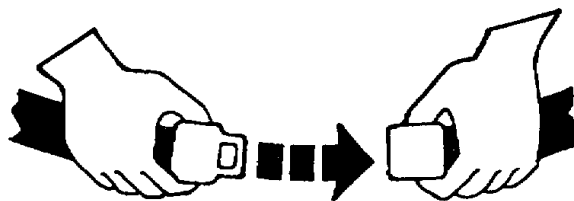


General Safety Rules

Seat Belts



ALWAYS BUCKLE UP



Seat belts and wing seats can reduce injuries.

General Safety Rules

No Riders



The operator is the only one who should be on a truck.

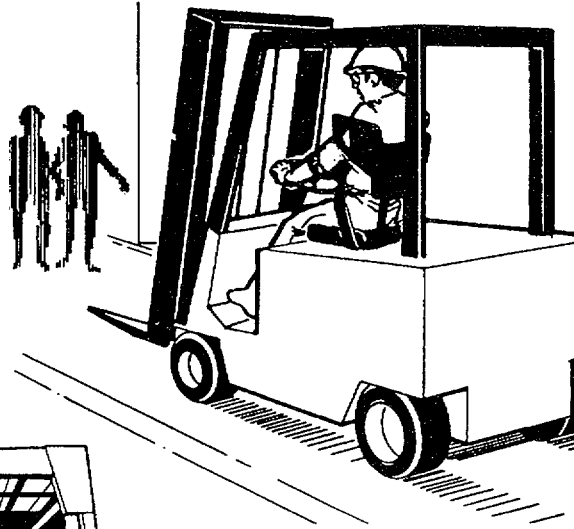
General Safety Rules

Pedestrians

Watch where you are going.

Pedestrians may use the same roadway you do.

Sound your horn at all intersections.



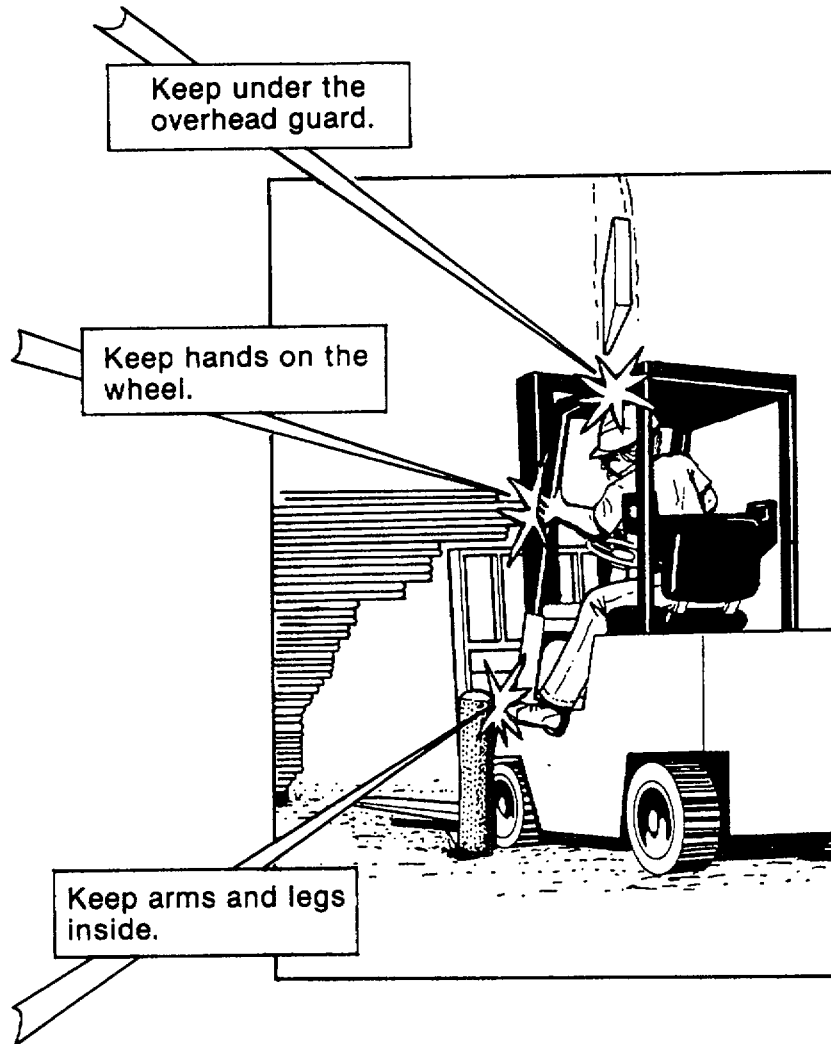
Watch for people in your work area even if your truck has warning lights or alarms. They may not watch for you.

Make people stand back, even when you are parked.



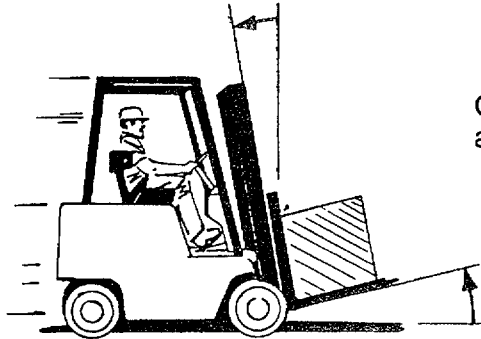
General Safety Rules

Stay In the Confines of the Truck



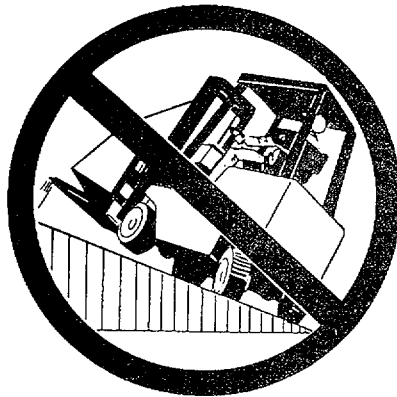
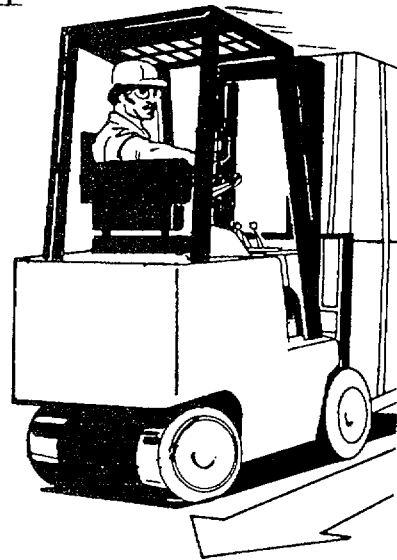
General Safety Rules

Travel



Carry loads low and tilted back.

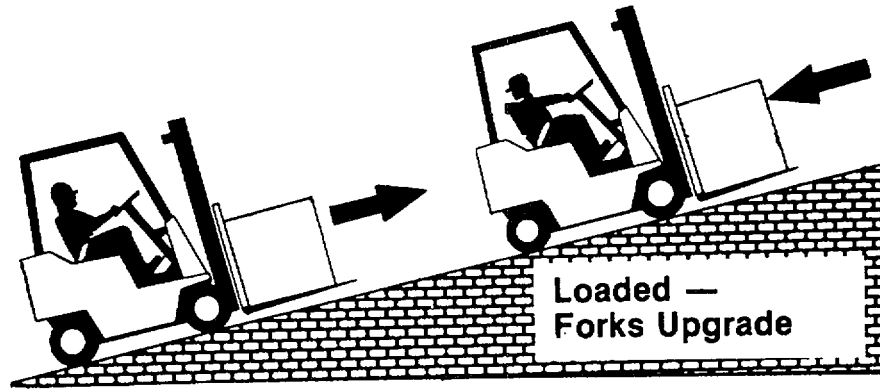
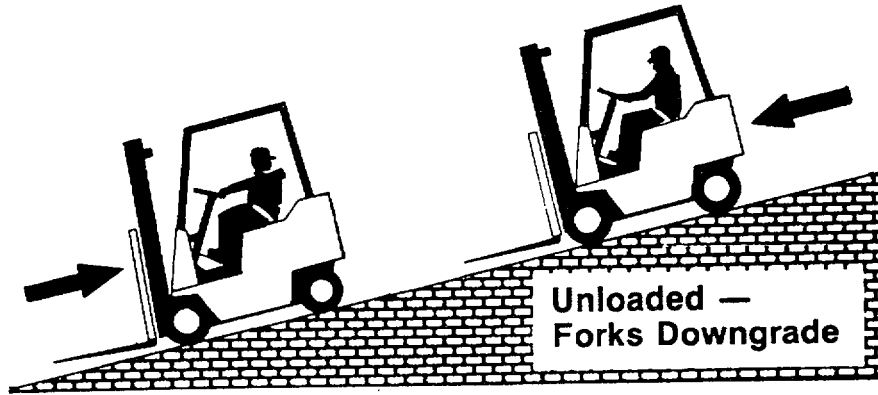
If load blocks your view, travel in reverse.



Never turn on a grade.

General Safety Rules

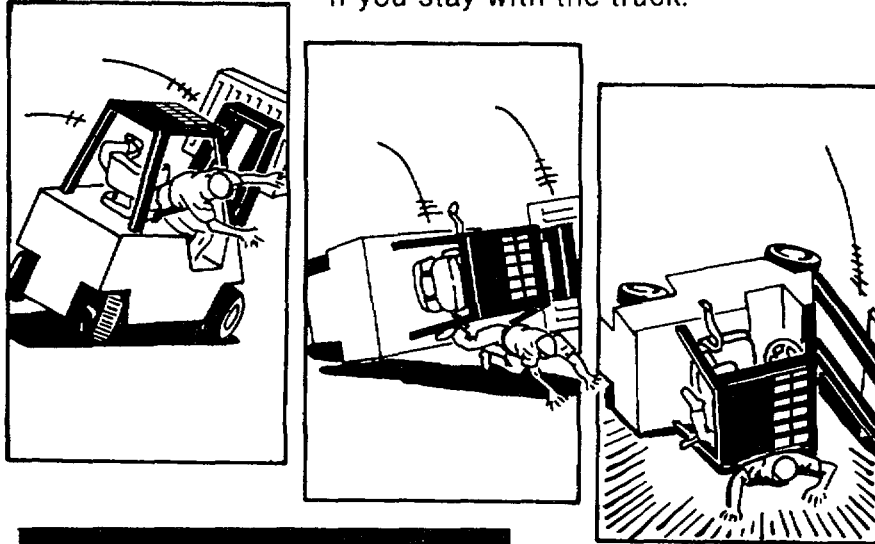
Grades, Ramps, Slopes, and Inclines



General Safety Rules

Don't Jump

Your chances for survival in a tipover are better if you stay with the truck.

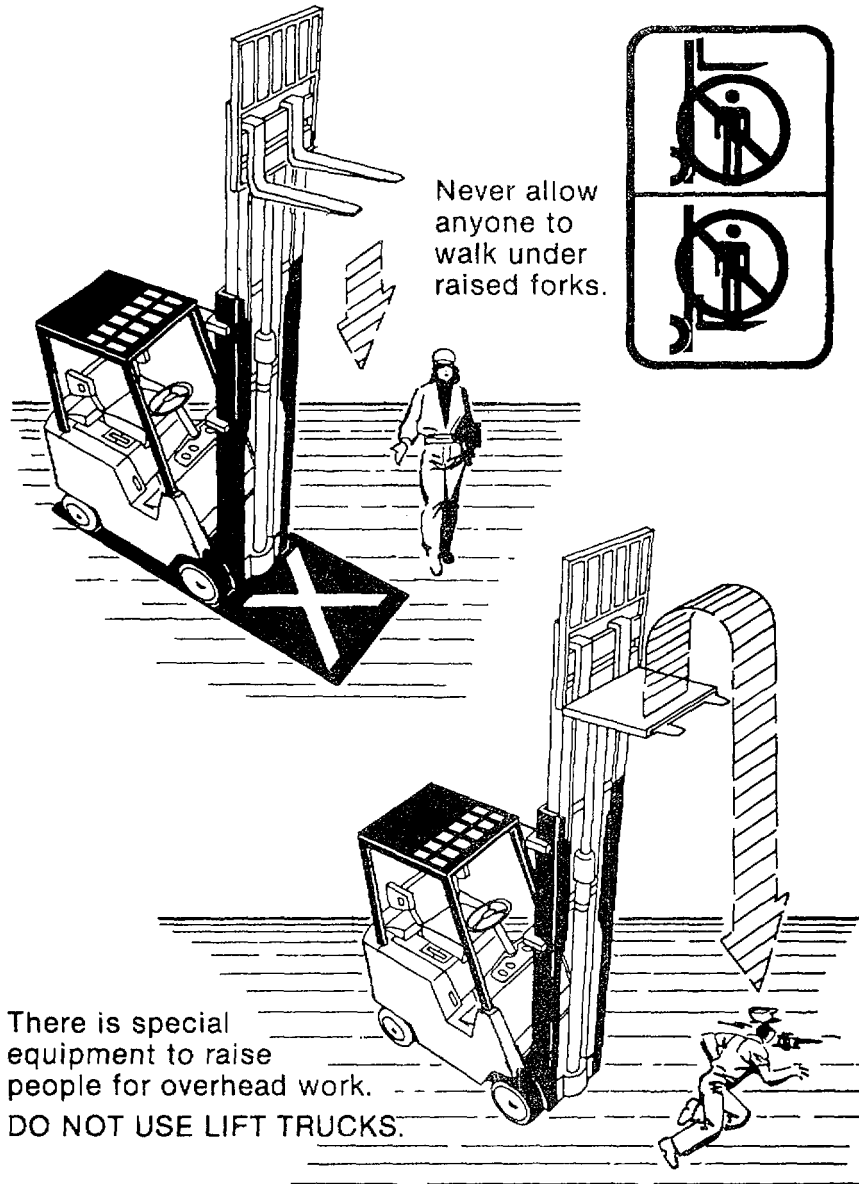


TIP WITH THE TRUCK



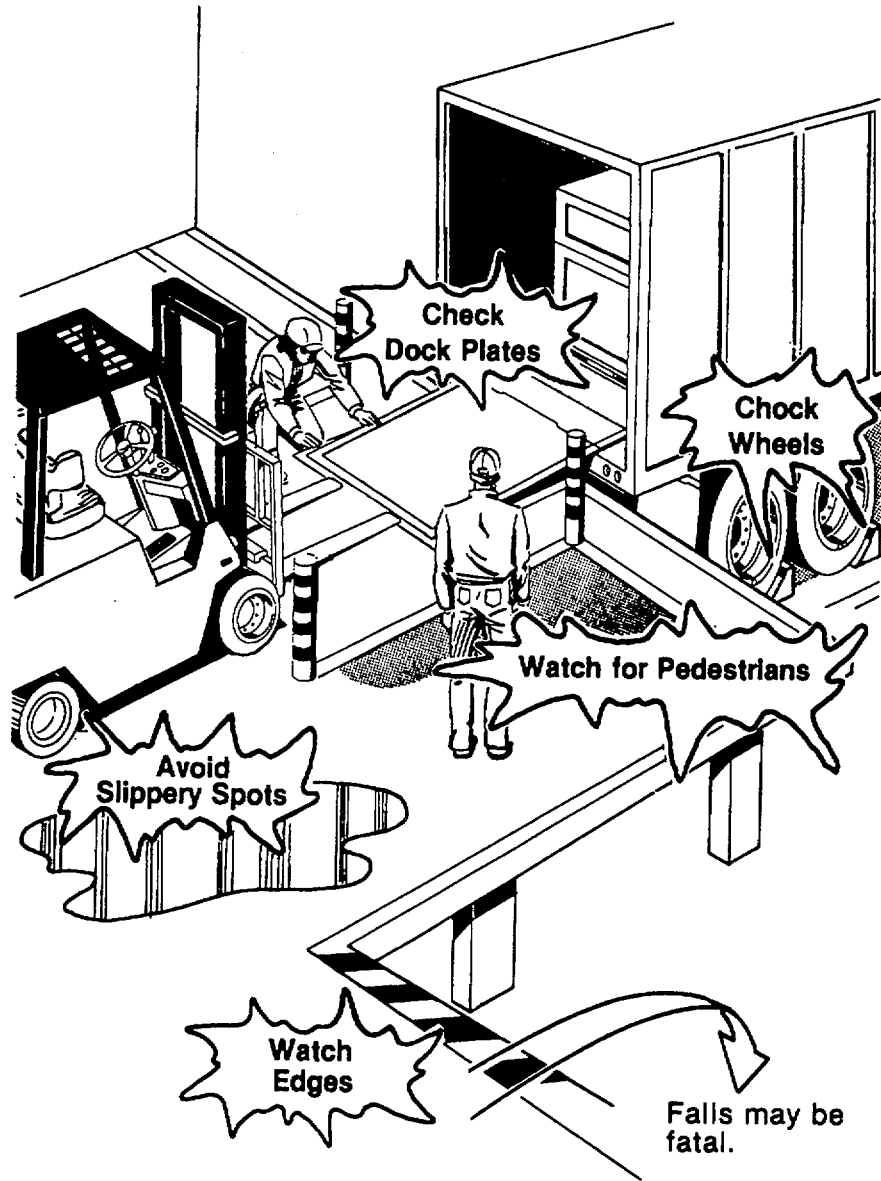
General Safety Rules

Fork Safety



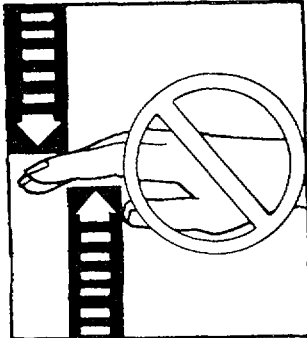
General Safety Rules

Loading Dock



General Safety Rules

Pinch Points



Keep hands, feet and legs out of the upright.

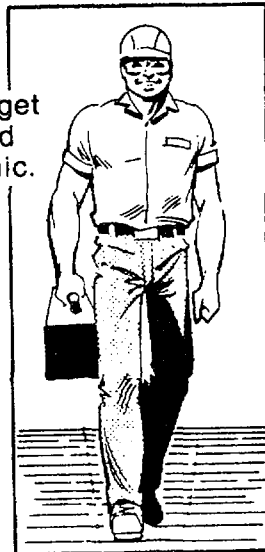


Don't use the upright for a ladder.



Never try to repair the upright, carriage, chain or attachment yourself ...

always get a trained mechanic.

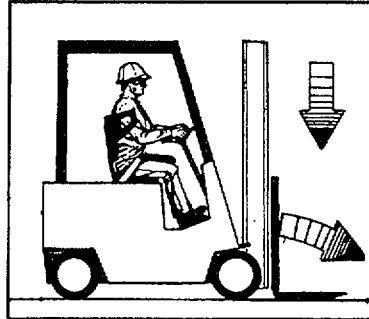


General Safety Rules

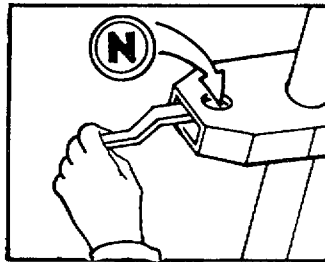
Parking



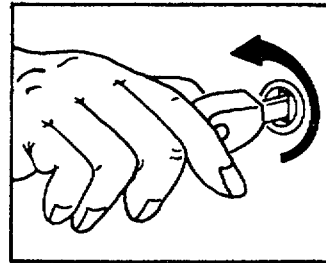
Never park on a grade.



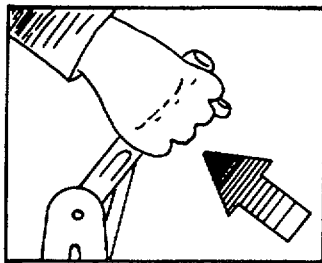
Lower forks fully to floor. Tilt forward until forks are flat.



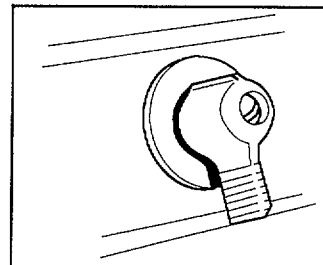
Put directional lever in neutral.



Turn key off.

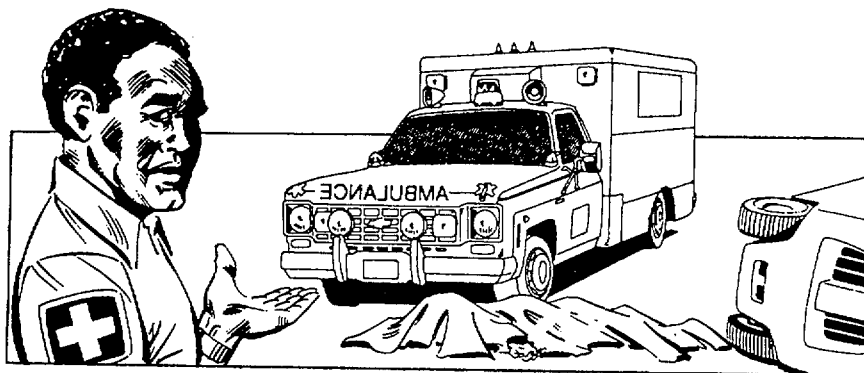


Set parking brake.



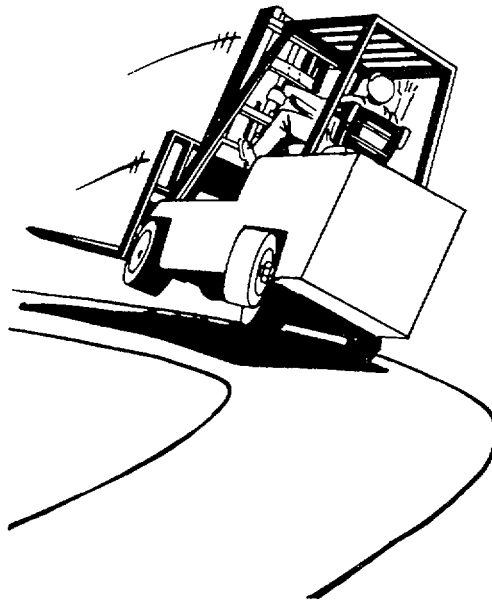
Turn master switch OFF

3 Operating Hazards



This section shows hazards that may cause you, or someone around you, to be killed or badly hurt. As the operator, you must look for other hazards. Get your boss to help identify and avoid those hazards.

Operating Hazards

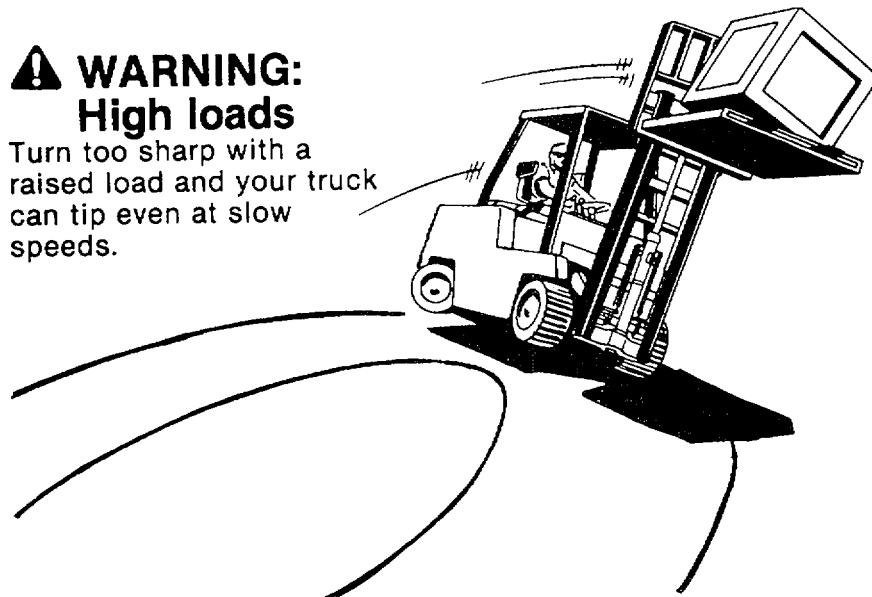


⚠ WARNING:
Fast turns

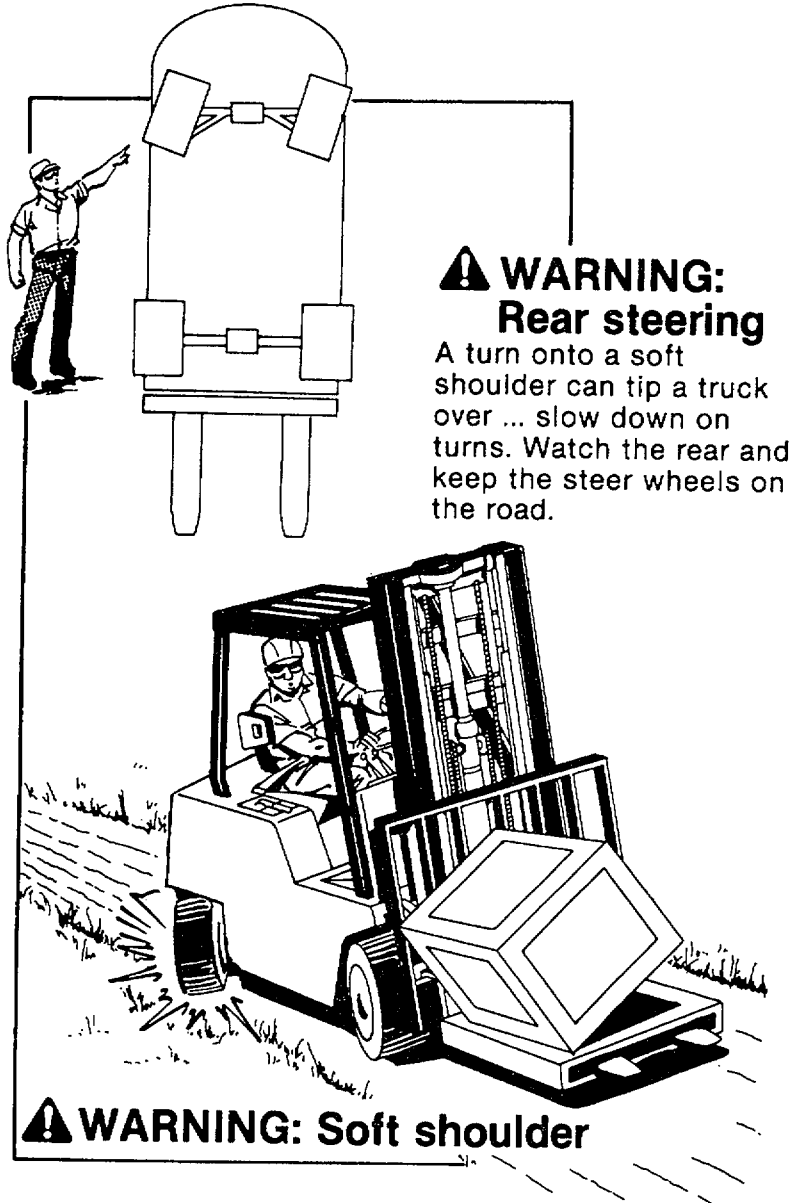
An empty truck can tip over easier than a loaded truck because they are rear-end heavy.

⚠ WARNING:
High loads

Turn too sharp with a raised load and your truck can tip even at slow speeds.

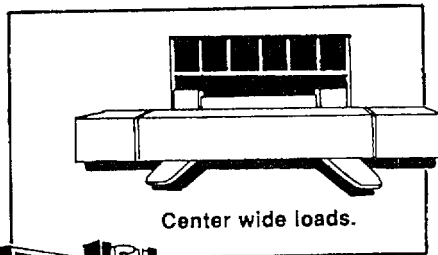
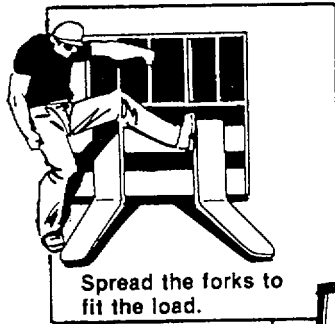
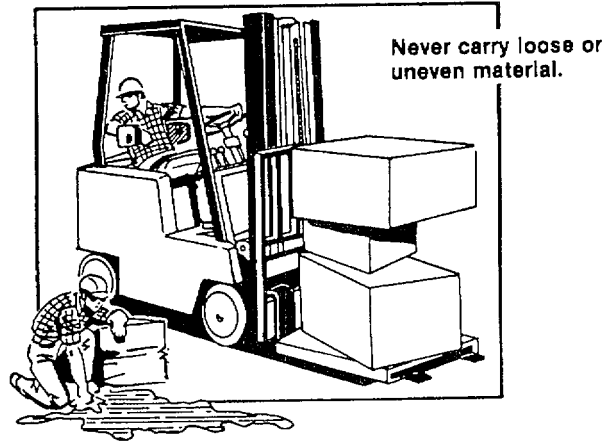


Operating Hazards

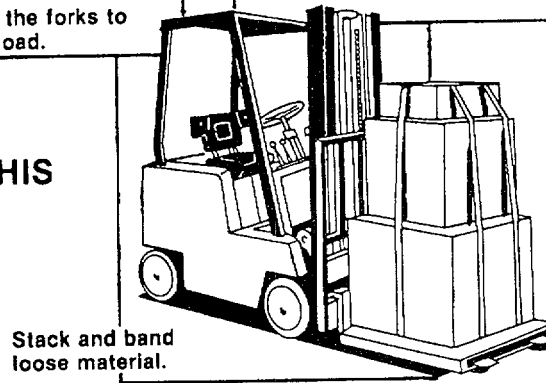


Operating Hazards

⚠ WARNING: Loose loads



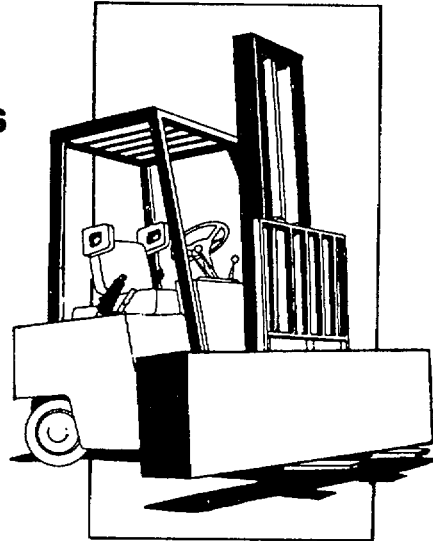
DO THIS



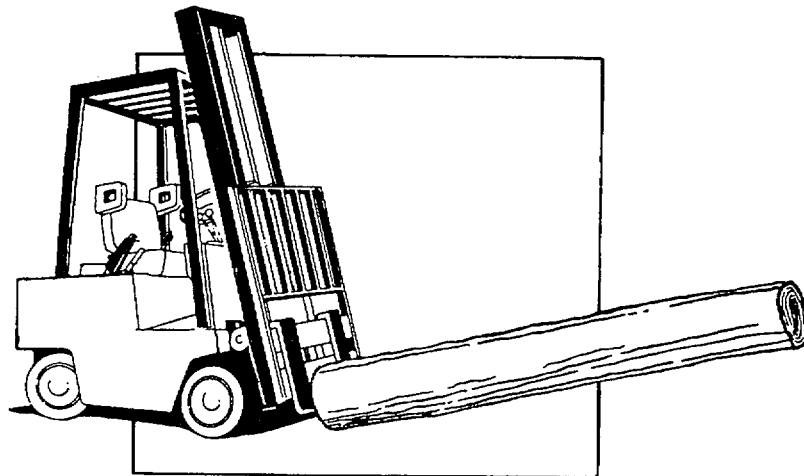
Operating Hazards

⚠ WARNING:
Long & wide loads

With long or wide loads you need more room ... so ... slow down and watch your clearance.

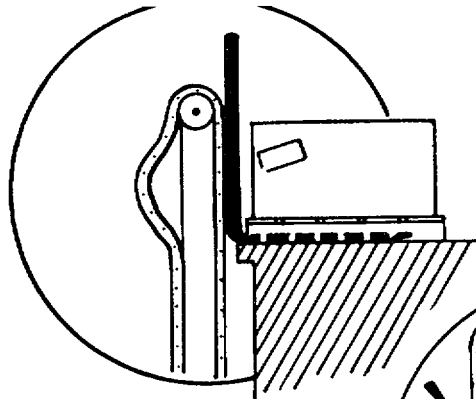


Wide loads ... keep them low and watch your balance.

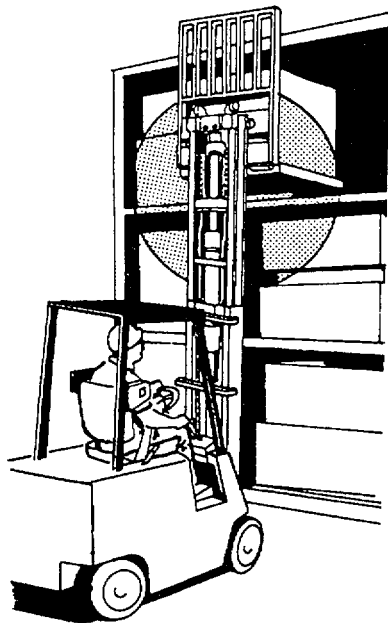
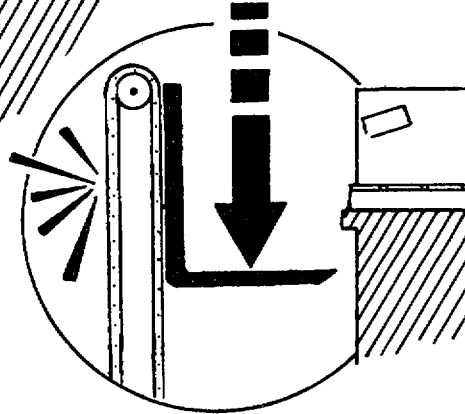


Remember, a long load will reduce the capacity of the truck.

Operating Hazards



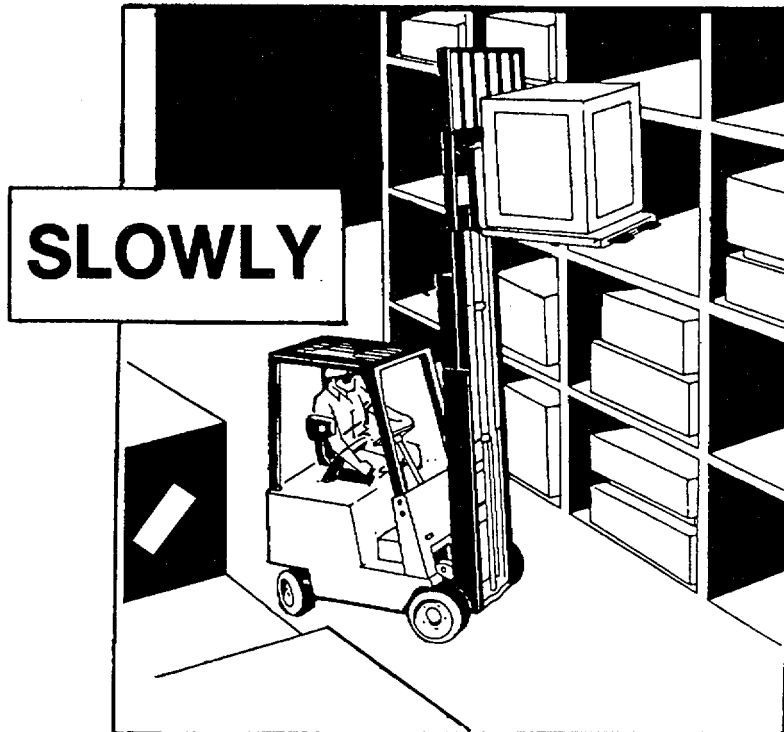
⚠ WARNING:
Chain slack



Slack chains mean rail or carriage hang-up. Raise the upright before you move.

Operating Hazards

⚠ WARNING: Right-angle stacking

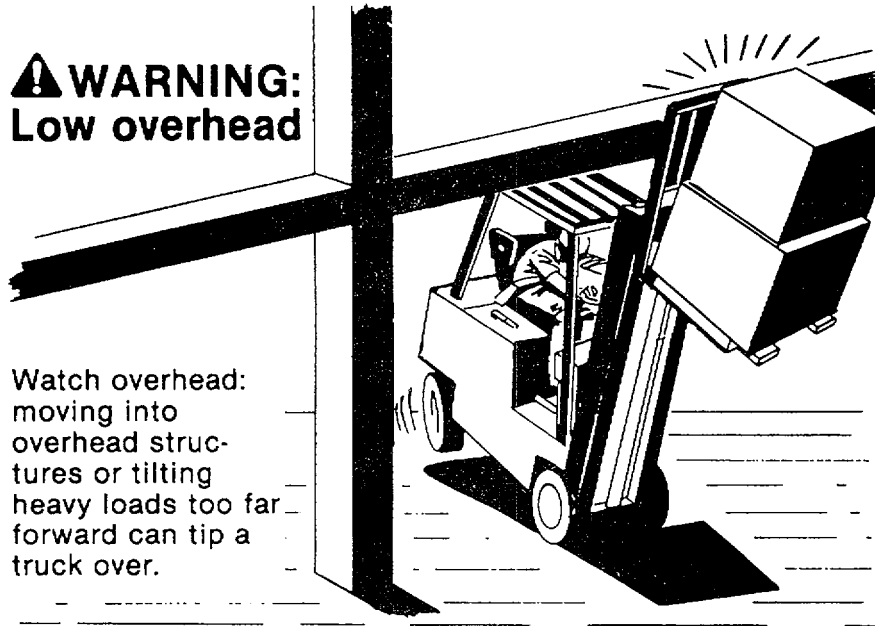


When right-angle stacking, or moving with a raised load to clear low objects, avoid sharp turns and move slowly.

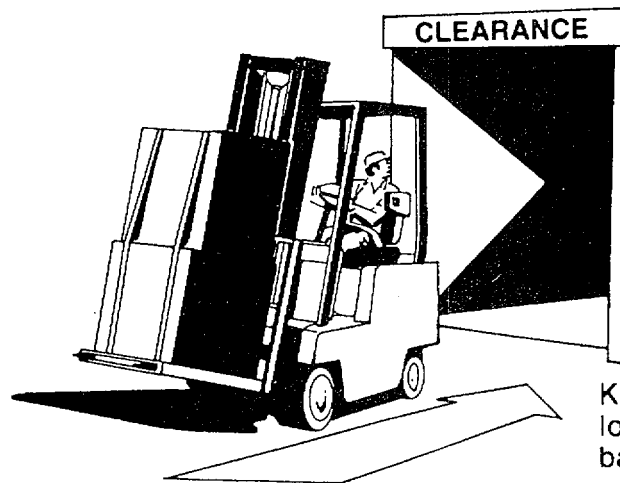
Operating Hazards

**⚠ WARNING:
Low overhead**

Watch overhead:
moving into
overhead struc-
tures or tilting
heavy loads too far
forward can tip a
truck over.



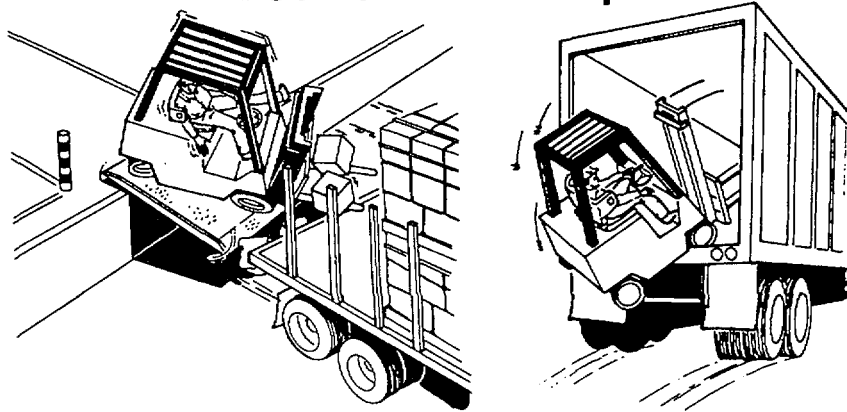
Know the height of your truck.
Check your clearance.



Keep loads
low and tilted
back.

Operating Hazards

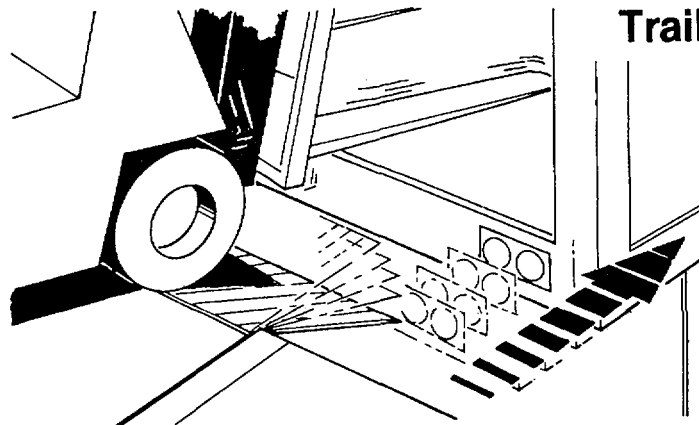
⚠ WARNING:
Dock or trailer drop-offs



To avoid these hazards you must:

- Talk to the truck driver yourself, make sure he does not move the trailer until you are done!
- Apply trailer brakes.
- Use wheel chocks.
- Use trailer-to-dock locking systems, if available.

⚠ WARNING:
Trailer creep



The impact of moving in and out of a trailer may cause the trailer to move.

Operating Hazards



WARNING:

Carbon monoxide

- Make sure there is enough ventilation.
- Avoid unnecessary extended idling.
- Never operate your engine in closed areas.
- Do not drive your truck into restricted areas.



4 Know The Truck

Truck Model Illustrations

Truck Components & Features

Operator's Compartment & Controls

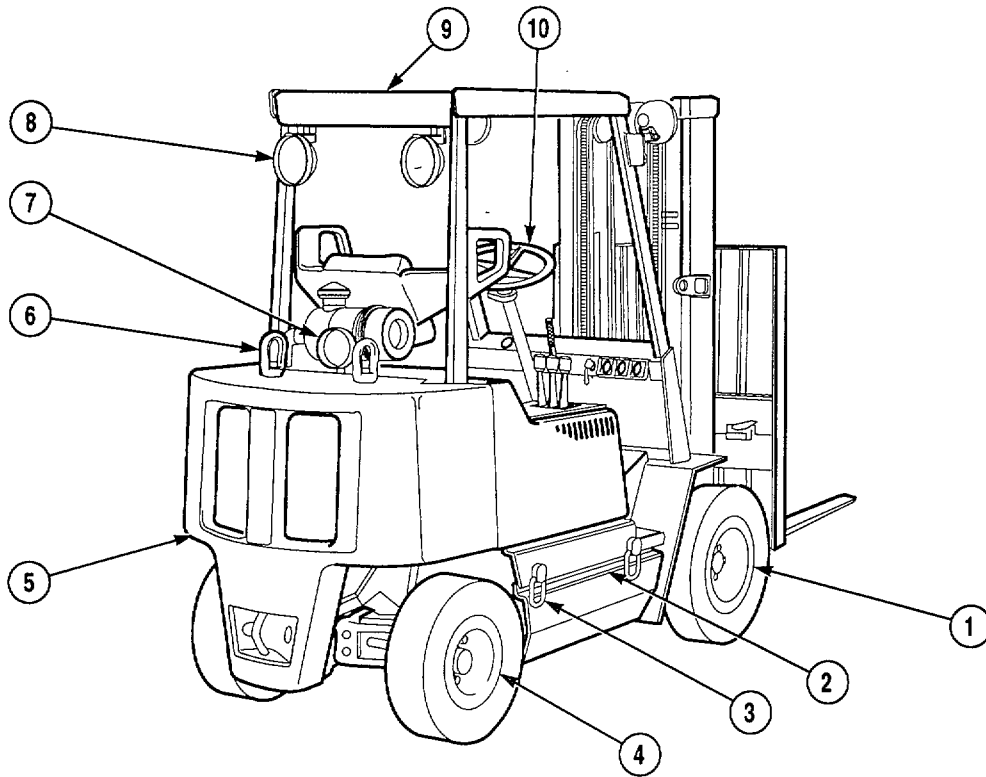
Truck Data & Safety Plates

Safety Decals

How The Lift Truck Operates

How To Start The Truck

Know The Truck
Truck Model Illustration

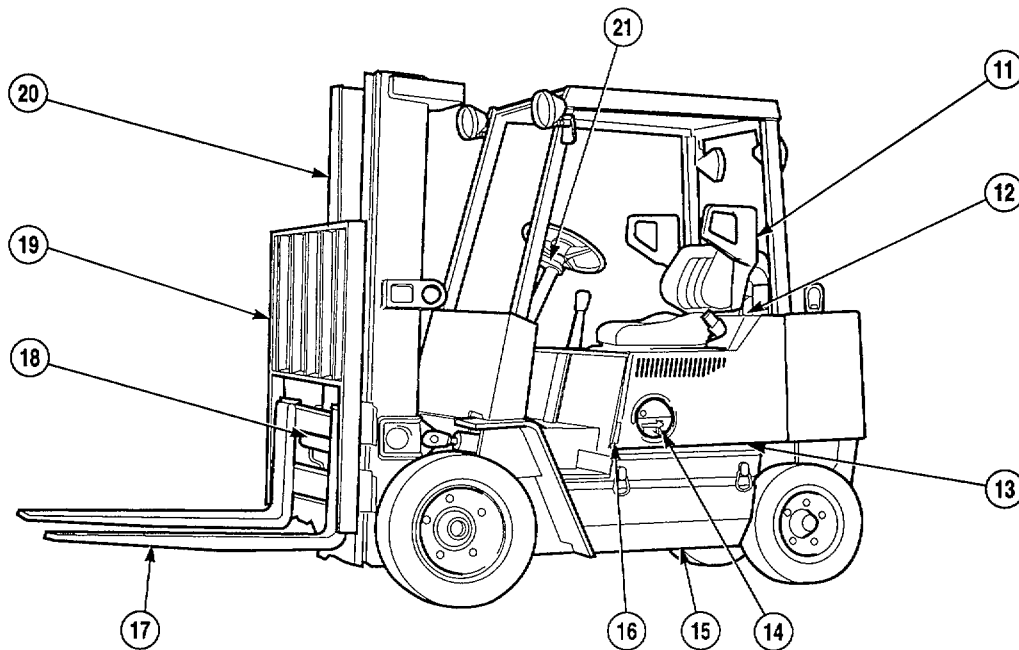


CLARK

GPX 25E DIESEL

1. Drive Axle, Wheels, and Solid Rubber Tires
2. Hydraulic Sump Tank
3. Tie Downs
4. Steer Axle, Wheels, and Solid Rubber Tires
5. Counterweight
6. Lifting Eyes
7. Brake Light
8. Flood Lights
9. Overhead Guard
10. Steering Control Handwheel

**Know The Truck
Truck Model Illustration**



CLARK

GPX 25E DIESEL

- 11. Safety Seat and Seat Belt
- 12. Seat Deck Latch
- 13. Machine Serial Number (On Frame Inside Door)
- 14. Fuel Filler Opening
- 15. Fuel Tank Enclosure
- 16. Side Door Latch (Access To Engine Compartment)
- 17. Forks
- 18. Side Shift
- 19. Load Back Rest Extension
- 20. Upright
- 21. Directional Control Lever

**See following pages for
general description of
truck components & features.**

Know The Truck

Truck Components and Features

Things You May Need or Want to Know About the GPX 25E Diesel:

Rated Load Capacity

- 4000 lbs. (1814.4 kg).

Frame & Chassis

- Standardized styling and design.
- Stamped and formed, welded construction, 10 Omm (except cowl 6mm).
- Removable fuel and hydraulic tanks.
- Basic design is to metric standard dimensions.
- Components and hardware dimensions are combination USA inch and metric.

Engines

Diesel Continental TMD 27 164 cu. in. (2.7L)

Transaxle

Model	Overall ratio
TA-18	1-spd. 15.875:1

**Know The Truck
Truck Components & Features**

Drive Wheels & Tires

Solid Rubber 7.00 x 12

Steer Wheels & Tires

Solid Rubber 6.50 x 10

Steer Axle

Integral power steering cylinder.

Cast body w/attached 3.38-inch double-acting cylinder.

Straight kingpins in tapered roller bearings.

Cushion 1-piece hub/wheel 75-degree turn angle.

Cooling System

Automotive crossflow radiator.

Air Intake

Dry-type, replaceable-element air filter.

Exhaust System

Muffler behind radiator, exhaust into air stream.

Fuel System

Metal fuel tank w/gauge sending unit, bolted into LH-side frame.

Filters

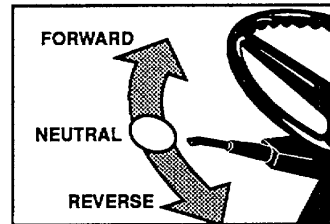
- Fuel - Paper element type
- Engine Air- Dry type
- Engine Oil - Spin on
- Transaxle Oil - Spin on
- Hydraulic Oil
 1. tank full tube screen
 2. tank breather cap
 3. return line - spin on

Know The Truck

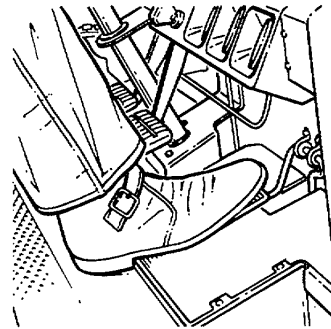
Truck Components & Features

Power Steering System

The forklift is equipped with hydrostatic power steering. Oil is supplied from main hydraulic pump through a priority-demand valve to steer gear. Priority demand valve gives correct oil flow for steering. Oil not used is added to lift or tilt system. Steering hand wheel operates a steering control valve which directs oil flow to a 2-way steering cylinder in the steer axle. The steering control valve will act as a pump to provide manual steering if main pump oil flow stops.



TA-18 directional control lever actuates electrical circuits that engage the "Forward" or "Reverse" clutch pack.



Accelerator Control Pedal

Travel speed and lift (pump) speed are controlled by engine speed. Engine speed is controlled with a foot pedal suspended from the cowl and linked to engine fuel system.

Know The Truck Truck Components & Features

TA18 Brake System

Service Brake

Dual foot pedals are connected to two master cylinders. Service brakes can be applied with both pedals. Trucks have a manual (not powered) brake system. The master cylinders apply pressure, through brake lines, to drum and shoe brakes at drive wheels. Brakes are self-adjusting. Service brakes are mechanically actuated for parking. Brake system is a closed circuit using silicon hydraulic brake fluid supplied from a separate reservoir.

Inching Brake

Left pedal is for normal inching control. Pushing gradually on pedal will smoothly disengage transmission. Pushing pedal further will apply service brakes.

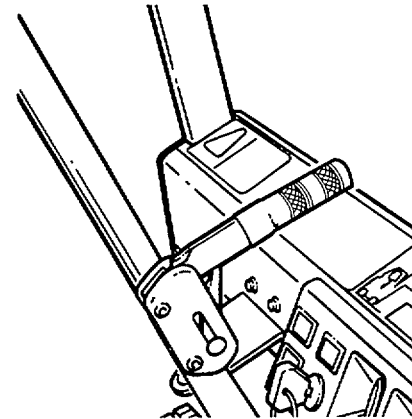
Parking Brake

A parking brake is provided by mechanical actuation of the service brakes. A hand-operated parking brake lever mounted at the dash is connected by cables to the brake assemblies, one to each drive wheel.

Main Hydraulic System/ Power Steering System

The parts of the main hydraulic system are the hydraulic sump tank, main hydraulic pump, priority demand valve, main control valve, hydraulic oil filter, and associated hydraulic lines and hoses.

The hydraulic sump is a separate, removable tank bolted in the right side compartment of the truck frame where it is protected from damage. It has a large opening at the top with a removable cover which includes the fill tube/breather, oil level dipstick, and oil filter return line. The cover is held on with a V-clamp for positive sealing and ease of servicing. The sump breather is a standard Clark part with a nominal 10 micron @ 98.5% efficiency rating.



The main hydraulic pump is mounted to an SAE pad on the transmission driven by a silent chain from the engine

The main hydraulic control valve features adjustable system pressure relief valves and a counterbalance valve in the tilt circuit with a pressure compensated flow control valve to control tilt speeds. All ports and connecting lines are on the bottom surface of the valve. The side shift attachment uses a single auxiliary section on the outer (RH) side of the standard (lift/tilt only) main valve.

The side shift attachment also has an adjustable relief valve and can be assembled with optional flow controls for 2.5, 4.0, 5.5, 7.0, or 10.0 gpm flow level.

The hydraulic system relief pressure level is "tuned" (adjusted) to match the need of each truck rated capacity. Maximum pressure is 3000 psi (20,700 kPa). A diagnostic demand valve allows access for checking main hydraulic and steer system pressure.

Know The Truck

Truck Components & Features

Tilt Cylinders

The tilt cylinders are mounted with self-aligning bearings at each end. The tilt requirement is satisfied with an adjustable rod end and a tilt limit spacer sleeve.

Driver's Seat

The driver's seat is a new safety seat equipped with seat belt. It has protective wrap-around arms at each side designed to support and hold the operator in the seat if the truck tips.

The seat is bolted to the center top of the engine compartment cover, which is locked in place by the control latch. The seat mounting base allows a 6-inch fore-and-aft adjustment of its slide mechanism.

Electrical Components

- Electrical Wiring: Two-piece wiring harness.
- Starter: Reduction type, positive engagement drive.
- Alternator: Delco 37-amp rating.
- Ignition Switch: Key switch, keyed alike.
- Master Power Switch: Two-position rotary switch.

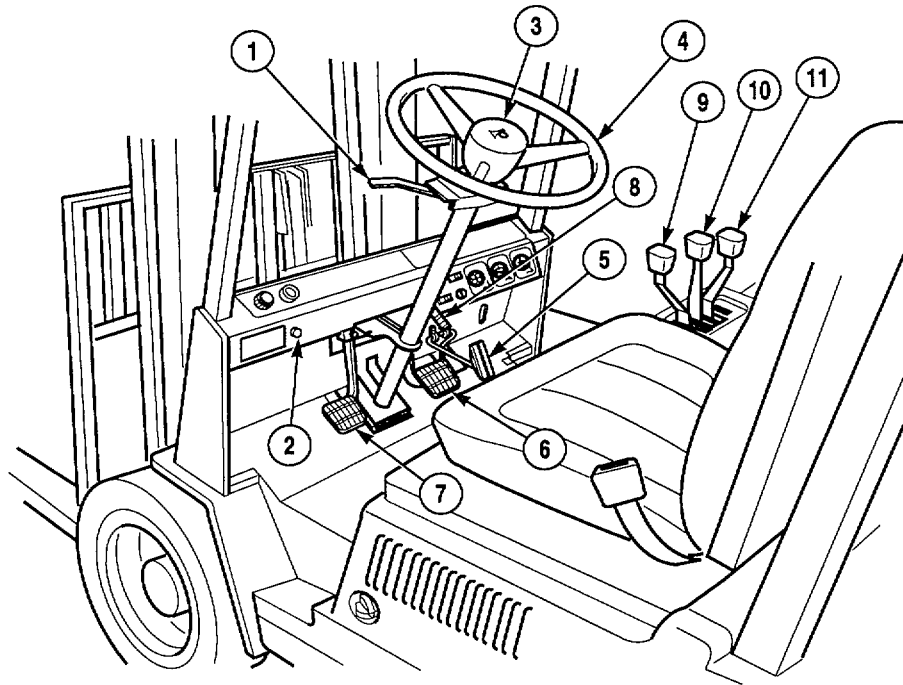
Instruments

- Fuel gauge.
- Indicator lights with international symbols.
 1. Engine coolant over-temperature.
 2. Transmission oil over-temperature.
 3. Engine oil low-pressure.
 4. Battery discharge.
- Hourmeter: Solid-state activated by engine oil pressure switch.

Uprights

- High-Visibility Three-Stage Unit.
- Uprights for forklift have separate bolt-on mounting trunnion brackets.

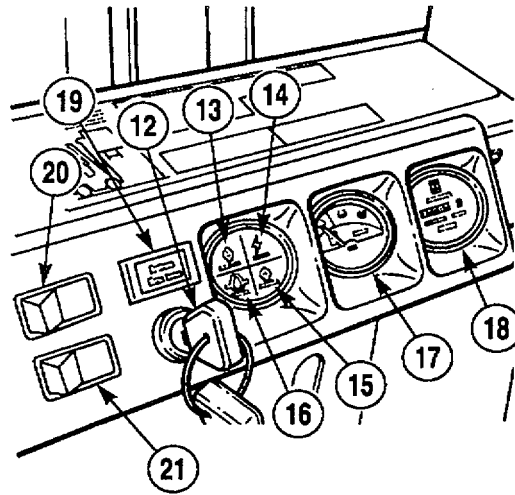
**Know The Truck
Operator's Compartment & Controls**



1. Directional Control Lever.
2. Glow Plug Button.
3. Horn Button.
4. Steering Handwheel.
5. Accelerator Pedal.
6. Service Brake Pedal.
7. Inching Pedal. and follow
8. Parking Brake Lever.
9. Lift Control Lever.
10. Tilt Control Lever.
11. Side Shift Control Lever.

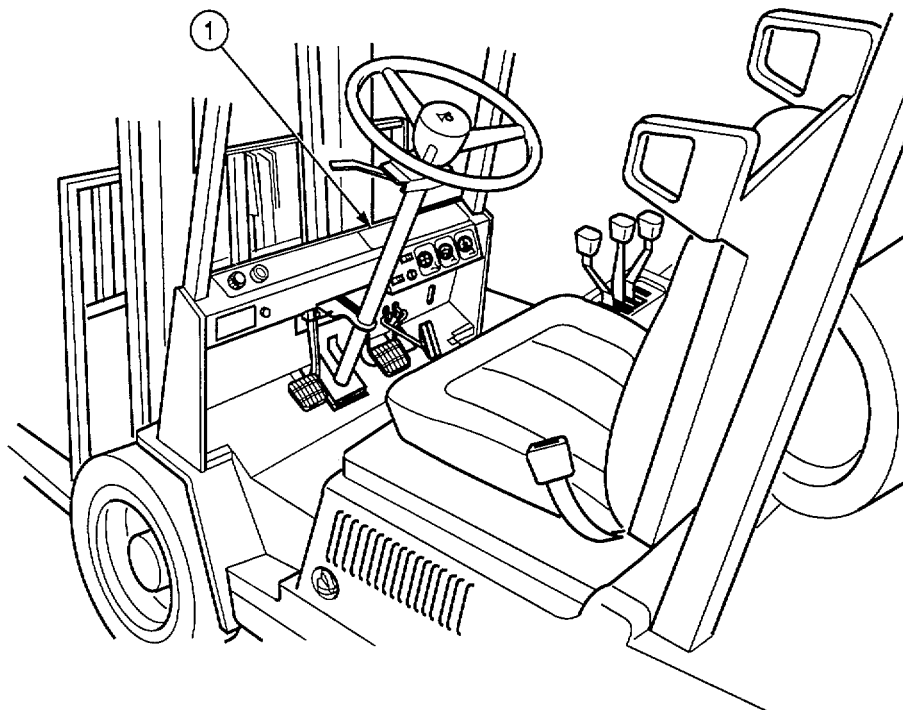
**Familiarize
yourself with the controls
and follow
safe operating rules.**

**Know The Truck
Operator's Compartment and Controls**



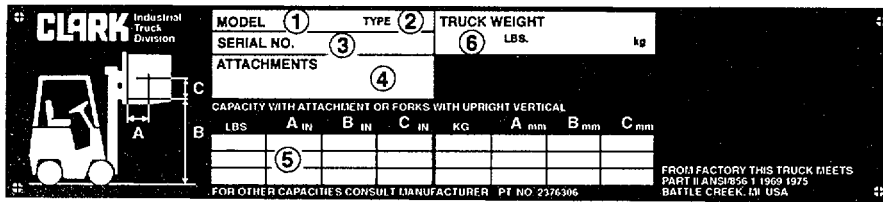
- 12. Ignition Key Switch.
- 13. Water Temperature Indicator.
- 14. Battery Charge Indicator.
- 15. Transmission Oil Temp Indicator.
- 16. Engine Oil Pressure Indicator.
- 17. Fuel Gauge.
- 18. Hourmeter.
- 19. Fasten Seat Belt Light.
- 20. Front Light Switch.
- 21. Rear Light Switch.

Know The Truck
Truck Data & Safety Plates



1. **Truck Data and Capacity Plate (Truck Nameplate).**

**Know The Truck
Truck Data & Capacity Plates**



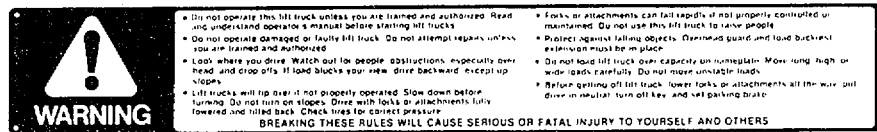
Know the location of your truck's ---

1. **Model Number.**
2. **Truck Type.** The code letter(s) signifies type of the protection construction. Check with proper authority before entering these areas where flammable or explosive material may be present.
3. **Serial Number.**
4. **Attachment description (if any).**

5. **Capacity.** Capacity, load center, and lifting height data are stamped in these areas. Do not exceed the maximum specified.

Important: If the truck is modified so as to effect capacity; or, if the plate is damaged or defaced, get a new plate.

6. **Truck Weight Less Load.**

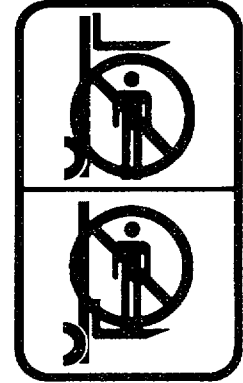


Operator Safety Warning Plate

The operator's warning plate describes basic instructions for safe operation of a lift truck. Read and understand these instructions and the other safety messages in this manual and on the lift truck.

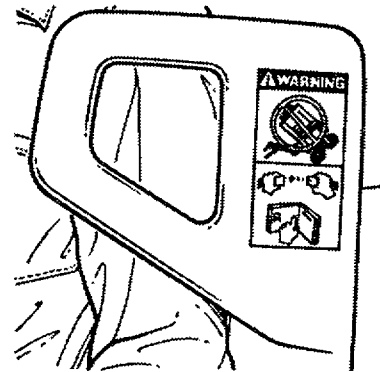
Seat Belt Warning Decal

This safety decal is placed on each side of the operator's seat arms to remind you to always wear your seat belt when driving a lift truck. To help in calling your attention to this important safety item, a seat belt warning light and a buzzer alarm are connected with the ignition key switch.

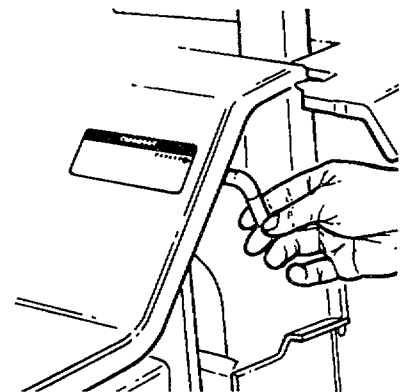


Lift trucks can be tipped over if operated improperly. Experience with lift truck accidents has shown that the driver cannot react quickly enough to jump clear of the truck and overhead guard as the truck tips. To protect operators from severe injury or death in the event of a tip-over, it is best to be held securely in the seat. The sides on the seat help to keep your body and arms safely within the confines of the truck and overhead guard.

So, please, always buckle-up when driving your lift truck.

**Seat Deck Opening Decal**

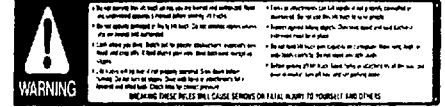
This safety decal describes the procedure for unlatching and opening the seat deck. The seat deck must be locked down to make the seat belt effective. Make sure that the seat deck is securely locked in place before operating the truck.



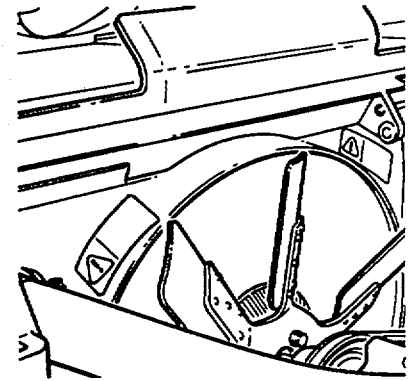
**Know The Truck
Safety Decals**

Fan Warning Decal

This safety decal is displayed on the cooling fan shroud of the radiator to warn of the danger of injury from turning fan blades when the engine is running.

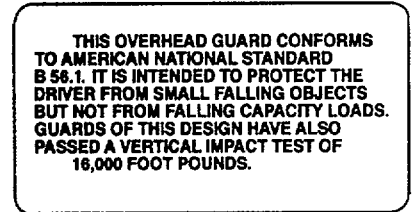


Make sure that you keep your hands, fingers, arms, and clothing away from a spinning fan. Don't stand in line with a spinning fan. Fan blades can break at high speed and be thrown out of the engine compartment.



Overhead Guard Conformance Plate

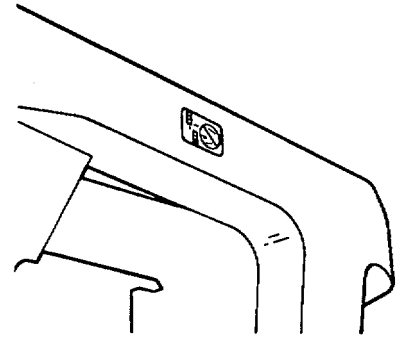
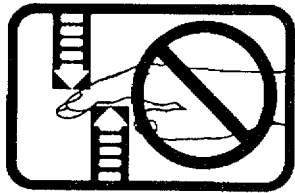
This plate is permanently attached to the inside of the overhead guard top to confirm that the overhead guard assembly design has been tested and conforms to the requirements of ANSI B56.1 safety standards.



**Know The Truck
Safety Decals**

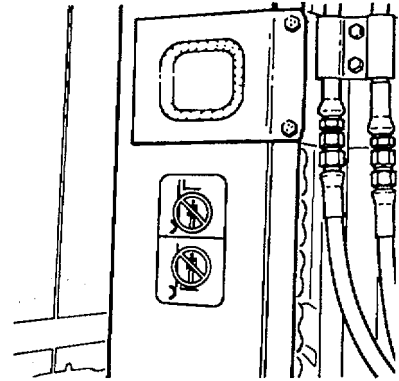
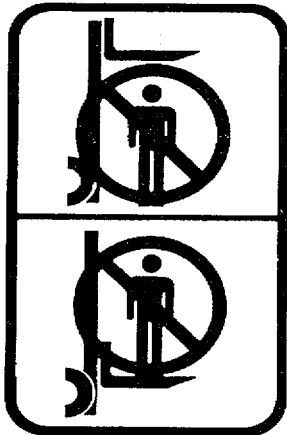
Upright Warning Decal

This safety decal is placed on the upright to warn of the danger of injury from movement between rails, chains, sheaves, fork carriage, and other parts of the upright assembly. Do not climb on or reach into the upright. Personal injury will result if any part of your body is put between moving parts of the upright.



Keep Away From Forks Decal

This safety decal is placed on the upright to warn of the danger of injury from forks when they are in the raised position. Do not ride on or stand under forks or attachments. The forks can fall and cause injury or death. Always make sure that the forks are in the fully lowered position when they are not being used to handle a load.

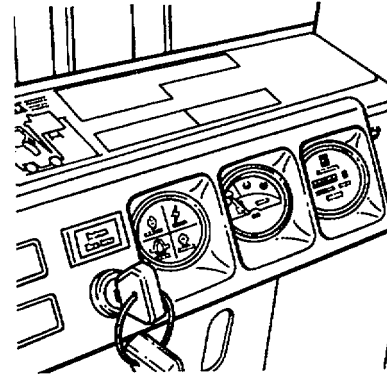


Know The Truck

How The Lift Truck Operates

The **instrument panel** includes the:

1. Ignition Key Switch.
2. Warning Indicator Lights.
3. Fuel Gauge.
4. Hourmeter
5. Fasten Seat Belt Light.
6. Light switch.

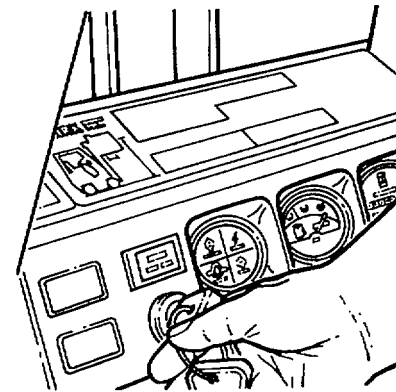


The **Ignition Key** Switch:

- connects and tests the warning indicator lights.
- connects the starter motor circuit when engine is to be started.

The Ignition Key Switch has three positions:

- OFF
- RUN
- START



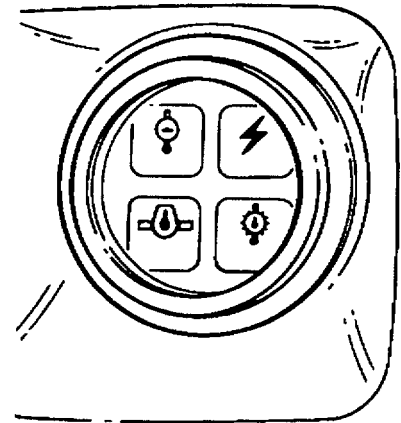
When the key is in the vertical "**OFF**" position, all engine and indicator light electrical circuits are disconnected (shut-off), and the key can be removed. From the "**OFF**" position, the key can be turned to the right (clockwise) to the "**START**" position, where the engine ignition and the starter motor are engaged. From the "**START**" position, when the key is released, it will return automatically back to the left (counterclockwise) for a part of its travel, to the "**RUN**" position where the engine starter is disengaged.

The key switch has a mechanical "anti-restart" feature, which prevents the engine starter from being engaged and damaged if the key switch is accidentally turned from the "**RUN**" position to the "**START**" position when the engine is running. If the engine stops running, the key switch must be turned to the "**OFF**" position to restart the engine.

**Know The Truck
How The Lift Truck Operates**

Warning Indicator Lights are provided for protection of four important systems of your lift truck:

1. Ammeter (Battery charging system).
2. Engine oil pressure.
3. Water temperature (Engine coolant).
4. Transmission oil temperature.



The ammeter warning light indicates when the battery is receiving no charging current. The engine oil pressure light indicates if a problem causes oil pressure to drop below a safe level. The water temperature light warns that the engine coolant is too hot and damage can result if operation is not stopped until the reason for high temperature is corrected. The transmission oil temperature light warns that the transmission oil is too hot and damage can result if operation is not stopped until the reason for high temperature is corrected.

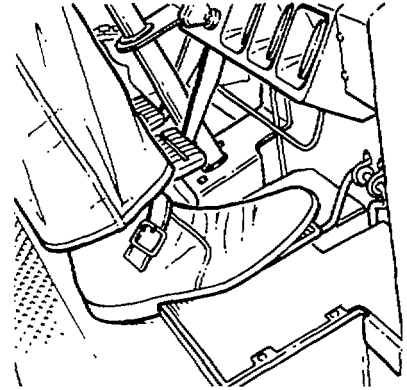
The warning lights can be tested with the ignition key switch.

Turn the ignition key switch clockwise to the "**RUN**" position. The ammeter and engine oil press lights should illuminate, and the fuel gauge needle should indicate fuel level.

The water temp and trans oil temp lights are also illuminated for checking when the ignition key switch is turned to the "**START**" position. Note: If you don't want to start the engine when checking these warning lights, move the directional control lever from "**NEUTRAL**" briefly only, while turning the ignition key switch to the "**START**" position. After checking the lights, turn the key switch back to "**OFF**."

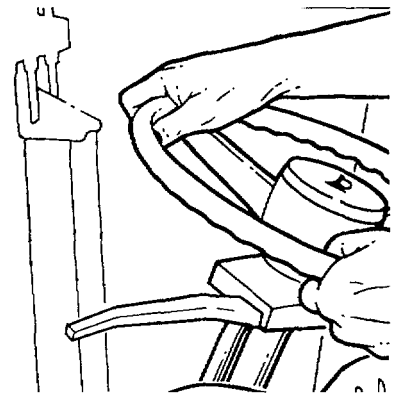
Know The Truck How The Lift Truck Operates

With the accelerator pedal, you control the engine to select the required truck travel speed and power, and the correct speed for lifting a load. The accelerator is mechanically connected to the fuel control.



The steering wheel is connected with a hydrostatic steering gear. Power steering is provided by oil pressure from the main hydraulic pump which flows to the steering gear used in the amount required for movement of the steering cylinder on the steer axle.

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

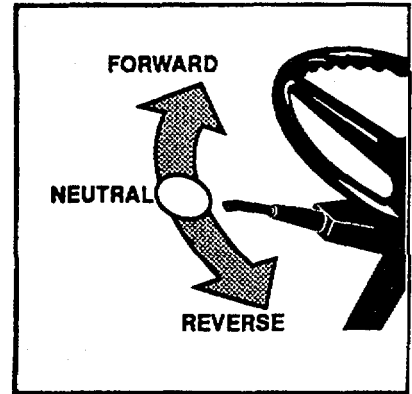


**Know The Truck
How The Lift Truck Operates**

Direction of travel is selected with the directional control lever.

- **FORWARD**
- **NEUTRAL**
- **REVERSE**

NOTICE - For safety, always bring truck to a complete stop before shifting to opposite direction.

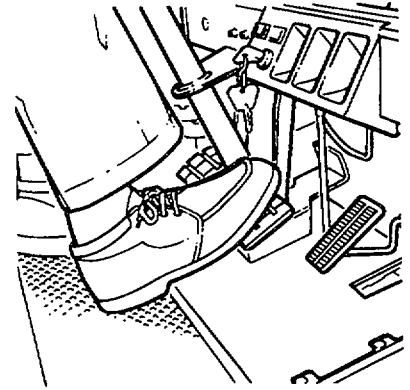


TA-18 control lever is held positively in each position by spring detents in the lever assembly. Direction of travel may be noted by visual check of lever positions.

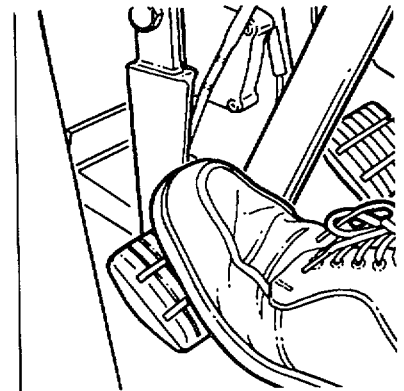
Know The Truck How The Lift Truck Operates

Service brakes can be applied by pushing on right brake pedal or left inching brake pedal.

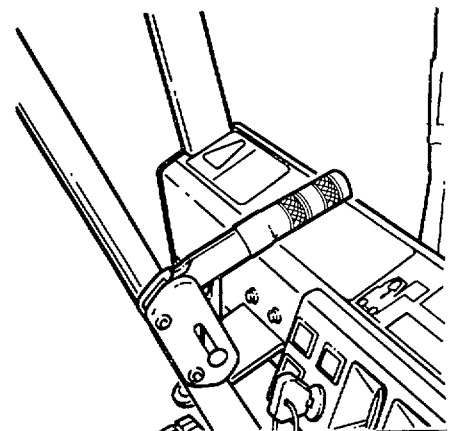
Never operate your lift truck if the service brakes are not working properly.



TA18 inching is controlled by using left inching brake pedal. Pedal will smoothly disengage transmission as it is pressed. When the pedal is pushed further, the service brakes are applied.

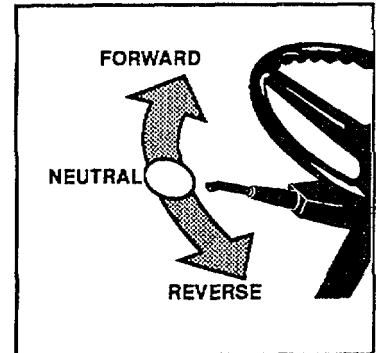


Parking brake lever mounted at right of steering column mechanically applies service brakes. Pull lever fully to vertical upright position to apply parking brake. Push lever forward to release parking brake. (Shown in released position).

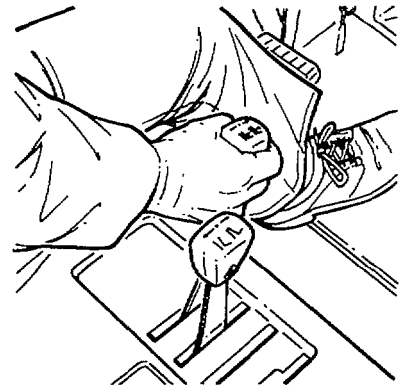


**Know The Truck
How The Lift Truck Operates**

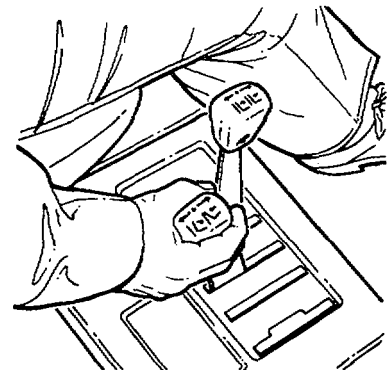
With the lift control lever, you are able to raise and lower the fork carriage on the upright. The lifting speed is controlled by varying engine speed and lever position.



When the lift control lever is pushed forwards, the fork carriage is lowered. By varying the amount of movement of the lever, you determine the lowering speed. You can also lower the fork carriage when the engine is stopped.



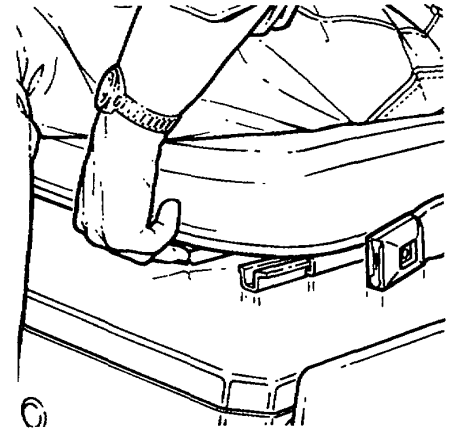
With the tilt control lever, you are able to control the tilting or vertical positioning of the upright. When the lever is pulled back, the upright also tilts backwards. If the lever is pushed forwards, the upright is tilted forward.



Know The Truck

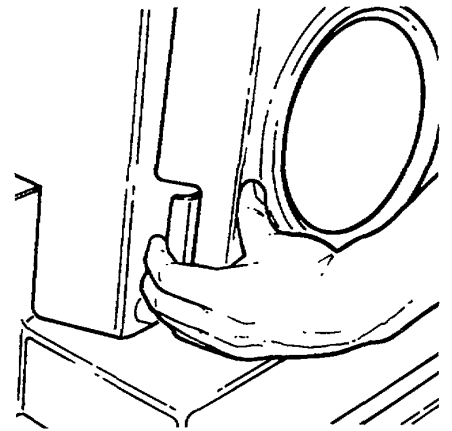
How The Lift Truck Operates

The seat adjustment lever is located on the left side under the seat. To unlock, push the lever to the left and adjust the seat so that all controls may be comfortably reached. Then, release the lever. Make sure that the seat locking mechanism is engaged.



Access to the Engine Compartment

The side doors of the engine compartment are held closed by a spring latch handle. Pull the latch handle towards the outside of the door to unlatch and open the door.

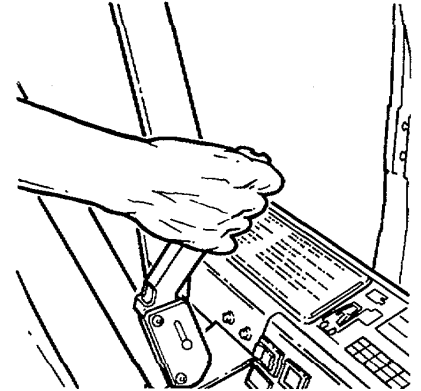


**Know The Truck
How To Start The Truck**

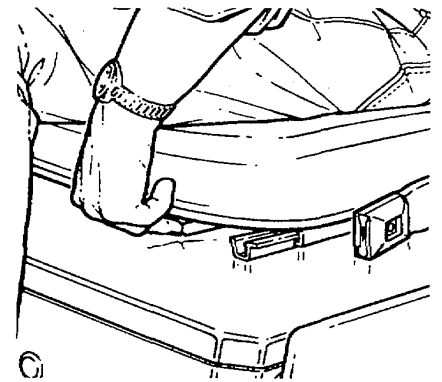
Before starting a lift truck, it is good practice to always start from a safe condition.

Check to see that:

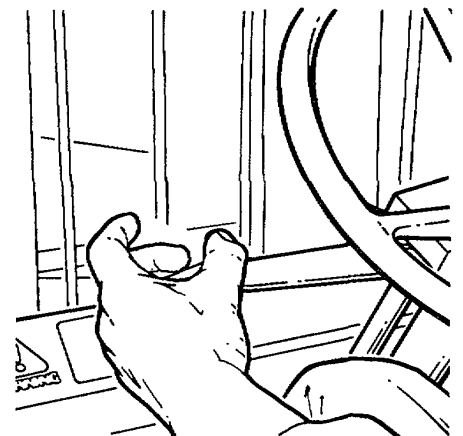
1. Parking brake is applied.
2. Forks are fully lowered to the floor.
3. You are familiar with how all the controls function.
4. All controls in neutral or other correct position.
5. Truck has been checked and is ready to operate.



This is a good time to adjust the seat to a comfortable position for you. Adjust the seat by moving and holding the release lever at the left from edge of the seat. Put the seat in a position which will provide easy reach to all controls. Release the seat lever. Make sure that the seat locking mechanism is engaged.



Put the directional control lever in the "**N**" (neutral) position. The truck should start only in the "**neutral**" position



**Know The Truck
How To Start The Truck**

Here are some Starting Tips:

- Turn off all optional equipment while you crank the engine. This will reduce the electrical load on your battery and supply extra power to the starter motor.
- Avoid excessive starter cranking (in excess of 30 seconds) with an intermittently firing engine. To avoid starter overheat or damage, do not crank the starter continuously for more than 30 seconds at a time. If the engine fails to start within a period of 30 seconds, wait 2 minutes before again attempting to start your lift truck.
- If your battery is "run down" (discharged) or becomes discharged while trying to start your truck, please refer to the "Emergency Starting How To Use Battery Jumper Cables" section of this manual.

WARNING

Never leave your lift truck unattended while the engine is running. Transmission could engage causing injury or death to personnel.

Starting and Operating
Recommendations

Avoid damage to your truck or possible harm to yourself. Follow these recommendations:

Avoid extended (in excess of 10 minutes) and unnecessary idling of the engine. If extended idling occurs or is anticipated beyond 10 minutes, turn off the engine.

CARBON MONOXIDE is colorless and odorless, but can be present with all other exhaust fumes.

WARNING

- EXHAUST GASES, PARTICULARLY CARBON MONOXIDE, ARE HARMFUL AND CAN CAUSE SERIOUS INJURY OR DEATH.
- NEVER IDLE YOUR LIFT TRUCK ENGINE IN CLOSED AREAS. EXHAUST GASES ARE HARMFUL AND CAN CAUSE SERIOUS INJURY OR DEATH.

**Know The Truck
How To Start The Truck**

1. Turn the ignition key switch to the "**START**" position. Release the key as the engine starts, to avoid starter damage.
2. If engine fails to start, turn the ignition key switch to the "**OFF**" position and then repeat the procedure.
3. When the engine starts, make sure there is oil pressure indicated on the oil pressure gauge 7-10 psi (idle), 40-60 psi (max).
4. Operate engine at fast idle for one to two minutes to circulate and warm the oil before operating the engine at maximum speeds.

To stop a diesel engine:

1. Stop the truck with the service brake.
2. Put all controls in the "**NEUTRAL**" position.
3. Engage the parking brake.
4. If engine is hot, operate at idle speed for 1-2 minutes.
5. Turn ignition key switch to the "**OFF**" position.

5 Operating Procedures

Before Operation

How To Perform the Daily Inspection.

Operation

How To Operate The Truck.

After Operation

After use of the truck.

Before Operation

How To Perform the Daily Inspection

Before operating the lift truck you should check its condition. Be sure that the truck is safe to operate.

Lift trucks should always be inspected daily, or at the start of each shift. The following pages point out important areas to check during the daily inspection.

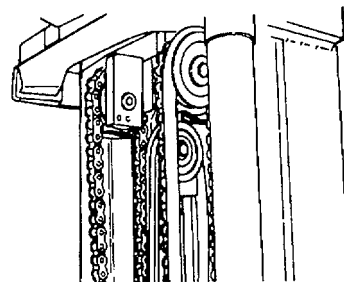
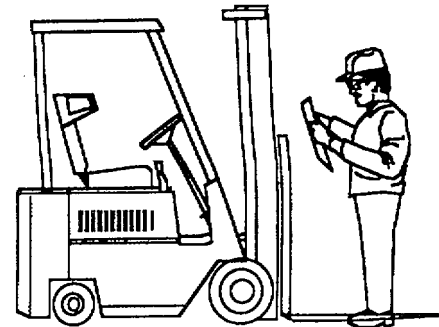
WARNING

WEAR EYE GLASSES, SAFETY SHOES, AND CORRECT FITTING CLOTHING WHEN WORKING ON LIFT TRUCKS. INJURY CAN RESULT IF YOU DO NOT WEAR PROTECTION.

First, perform a visual inspection of the truck and its components. Walk around the lift truck and take note of obvious damage which may have been caused by operation during the last shift. Check for leaks and loose fittings.

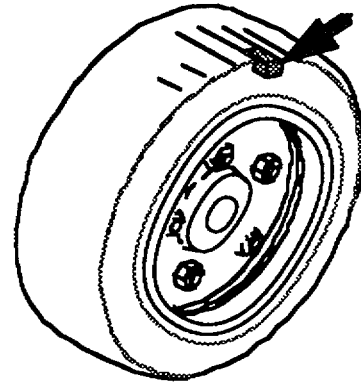
Then, check all of the critical components that handle or carry the load.

Inspect the upright assembly, rails, rollers, lift chains, and lift cylinders. Look for any loose parts or fittings. The lift and carriage chains must have equal tension. Check the lift chain anchor fasteners.

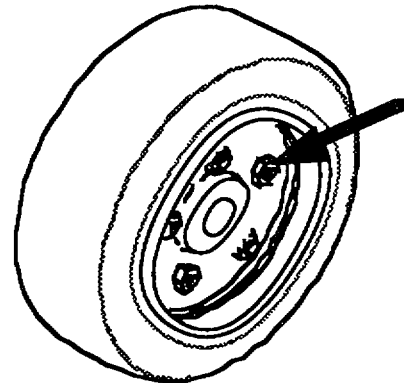


**Before Operation
How To Perform the Daily Inspection**

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 and breaks or "chunking out."

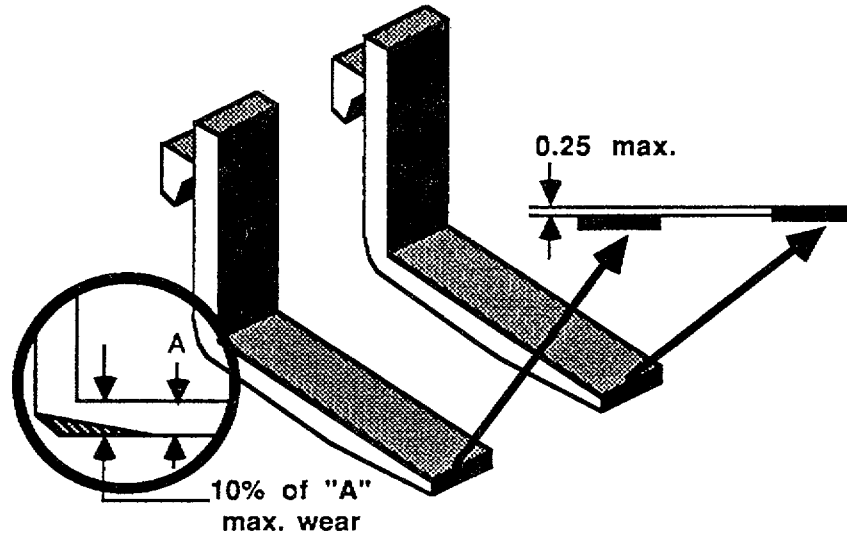


Check to make sure that all wheel lug nuts or bolts are tight.

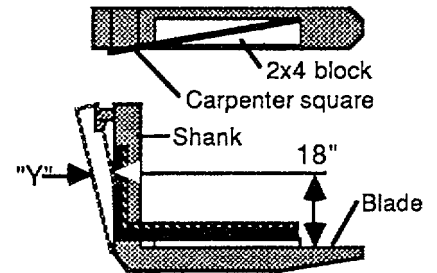


Before Operation
How To Perform the Daily Inspection

Inspect the lift forks for cracks, breaks, bending, and wear. The fork surfaces should be level and even with each other. The height difference between both fork tops should be no more than (6 mm) 0.25 inch maximum. If the fork blade at the heel of the fork is worn down by more than 10 percent, the load capacity of the forks is reduced and they must be replaced.

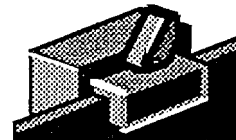


Inspect the forks for twists and bends. Put a 2"x4"x24" block on the blade of the fork with the 4" surface against the blade. Put a carpenter square on the top of the block and against the shank. Check the fork 18" above the blade to make sure it is not bent more than specified in the chart.



Fork Cross-section	Allowable Y values for various blade lengths			
	42" blade	48" blade	54" blade	60" blade
1-1/2x4	15/16	1-1/4	1-9/16	1-15/16
1-3/4x5	1/2	5/8	25/32	31/32

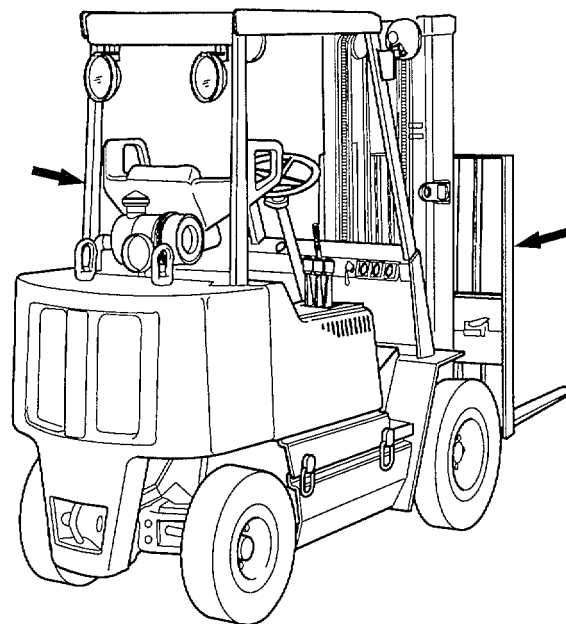
To prevent accidental shifting of the forks, inspect the fork latches. Make sure they are not damaged or broken, and that they operate freely and lock correctly.



Before Operation

How To Perform the Daily Inspection

Check the load back rest for damage. Make sure that the mounting fasteners are all in place and tight.



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

Unlatch and open each side door for access to the engine compartment.

Unlatch and lift the seat deck.

Inspect all components within the engine compartment.



Before Operation

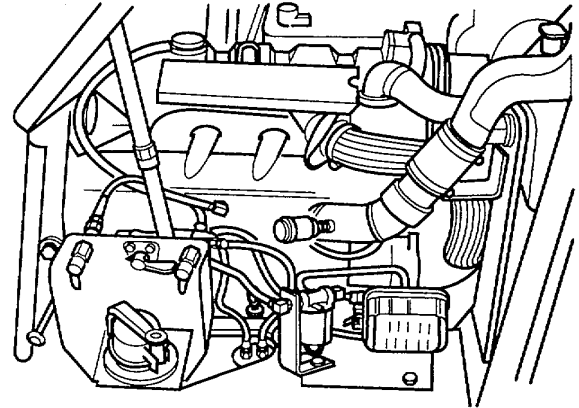
How To Perform the Daily Inspection

Check fluid levels and air filters.

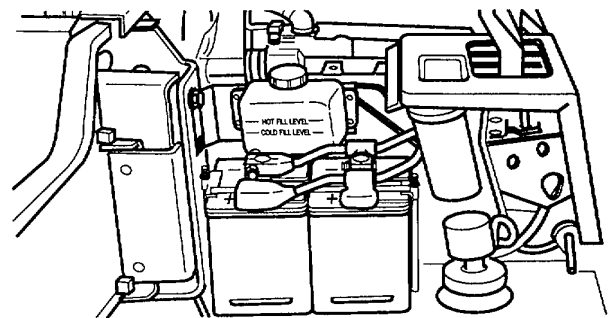
Locate the engine oil dipstick and check the engine oil level.

WARNING

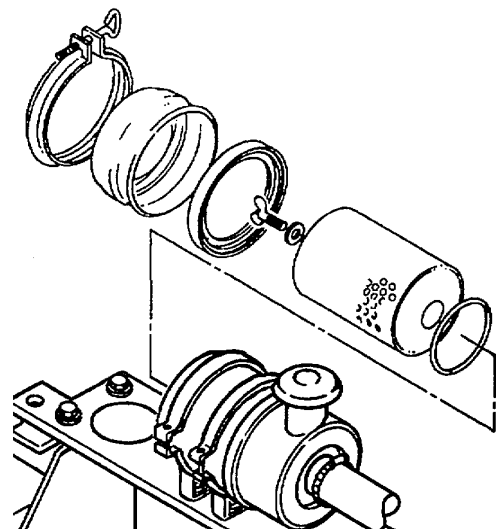
DO NOT REMOVE THE RADIATOR CAP WHEN THE RADIATOR IS HOT. STEAM FROM THE RADIATOR WILL CAUSE SEVERE BURNS.



Check the engine coolant level. Inspect the engine coolant hoses and fan belts.



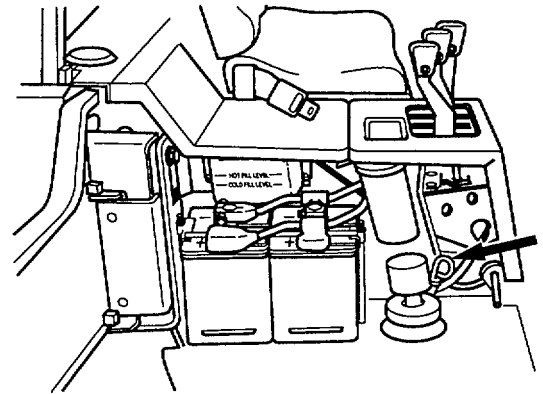
Check the engine air filter for contamination (dirt buildup and clogging) and damage.



Before Operation

How To Perform the Daily Inspection

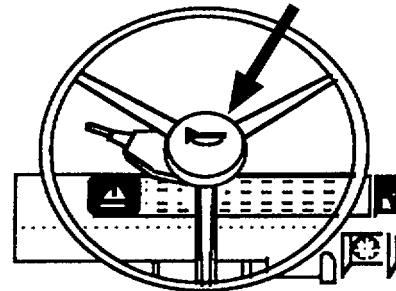
Check the hydraulic sump tank fluid level. Also, check the sump fill cap/breather for contamination and damage.



When you know that all of the components within the engine compartment are in satisfactory condition, lower the seat deck and close the side doors.

Now, make sure that all controls and systems are functioning correctly.

Press the horn button to check horn function. If the horn does not operate, report failure to unit maintenance and have it repaired before the truck is put into operation.



Before Operation

How To Perform the Daily Inspection

Test the warning indicator lights.

From the "OFF" position, turn the key switch to the "RUN" position to check ammeter and eng oil press indicator lights. Turn the key switch to the "START" position to check the water temp and trans oil temp indicator lights.

CAUTION

DAMAGE TO THE TRUCK CAN RESULT IF ANY OF THE WARNING INDICATORS ILLUMINATE WHEN THE ENGINE IS RUNNING. STOP THE ENGINE. DO NOT OPERATE THE TRUCK.

Report the failure to unit maintenance.

Start the engine and let it warm up until it runs evenly and accelerates smoothly when you push on the accelerator pedal.

With the engine running, check the hourmeter indicator for operation.

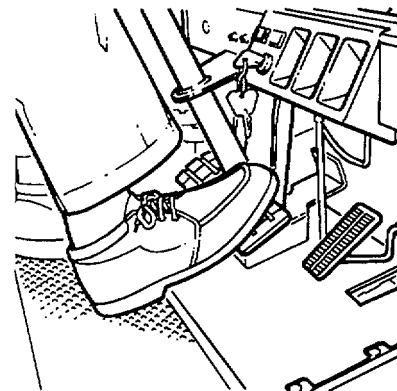
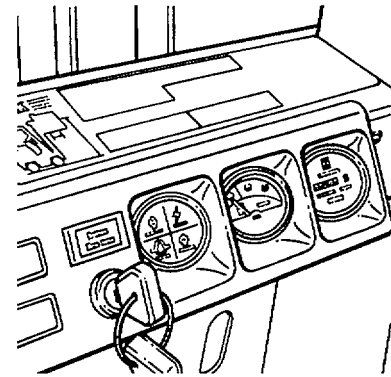
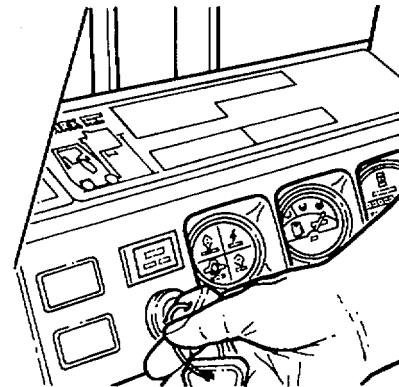
Check the service brake system. Push down on the brake pedal and hold. Check for a feeling of solid resistance when the pedal stops. The pedal must feel

firm and not move down farther after it stops. If the pedal continued to move downwards, report the failure immediately to unit maintenance. **DO NOT OPERATE THE TRUCK UNTIL THE BRAKES ARE REPAIRED.**

NOTE

A LOW PEDAL RESERVE (CLEARANCE AT FLOOR PLATE) IS NORMAL.

Check the function of the parking brake. Release, then apply the parking brake with the lever.



Before Operation

How To Perform the Daily Inspection

Check the function of the hydraulic system 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.

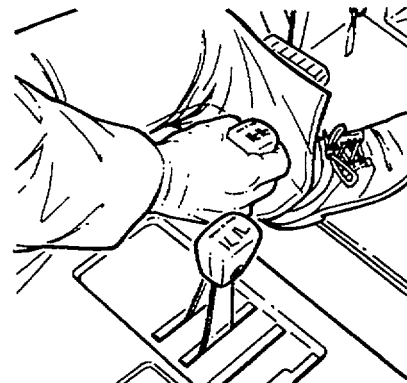
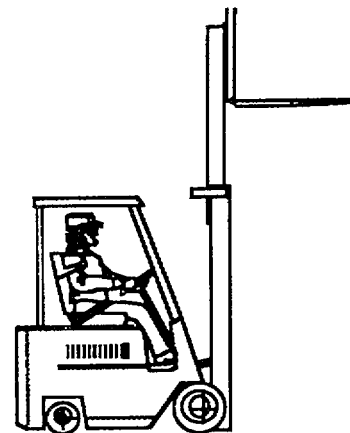
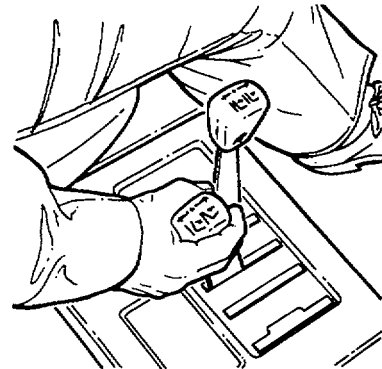
WARNING

MAKE SURE THAT THERE IS ADEQUATE OVERHEAD CLEARANCE BEFORE RAISING THE UPRIGHT. FAILURE TO DO SO COULD RESULT IN DAMAGE TO EQUIPMENT AND INJURY OR DEATH TO PERSONNEL.

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 and fork carriage must be even and smooth, without binding or jerking motion. Release the lever.

If the maximum fork height is not reached, this indicates that 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.



Before Operation

How To Perform the Daily Inspection

Move the steering handwheel in a full right turn, and then in a full left turn to check the steering. Return the handwheel (steer wheels) to the straight-ahead position.

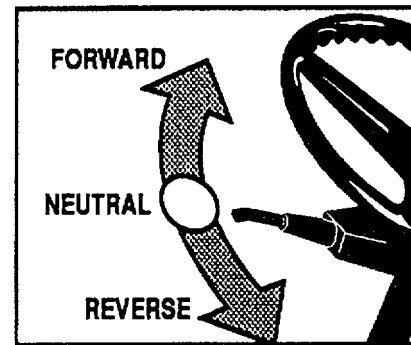
WARNING
FASTEN YOUR SEAT BELT BEFORE DRIVING THE TRUCK. FAILURE TO FASTEN SEAT BELT COULD RESULT IN INJURY OR DEATH.

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

Push firmly on brake pedal. Release the parking brake. Move the directional control lever from "N" (neutral) to the "**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.

Make sure that the travel area is clear behind the truck.



Before Operation

How To Perform the Daily Inspection

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.

Put the directional control lever in the "**N**" (neutral) position.

Apply the parking brake.

Turn the ignition key switch to the "**OFF**" position.

Make a record of all the operating and truck problems that you find.

If all of the "Before Operation" checks were normal or satisfactory, the truck can be operated.

Do not operate a lift truck that has a maintenance problem, or is not safe to operate.



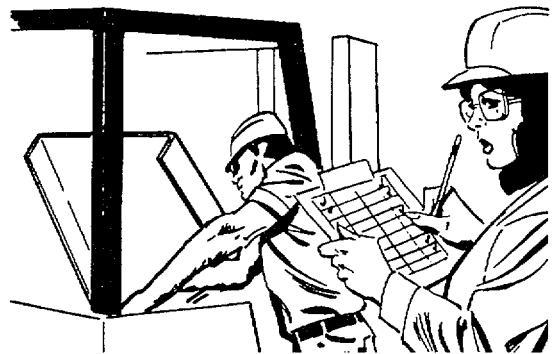
Operation

How To Operate The Truck

Be sure that you read and understand the information in the Operator's Manual before operating a lift truck.



Before operating a lift truck, each operator must check his truck and complete the "Driver's Daily Checklist." Please refer to the previous section "Before Operation" for information on "How To Perform the Daily Inspection."



Remember, before starting and operating a lift truck, it is good practice to always start from a safe condition. Check to see that:

- Parking brake is applied.
- Forks are fully lowered.
- You are familiar with how all the controls function.
- All controls are in neutral or other correct position.
- Truck has been checked and is ready to operate.

Operation

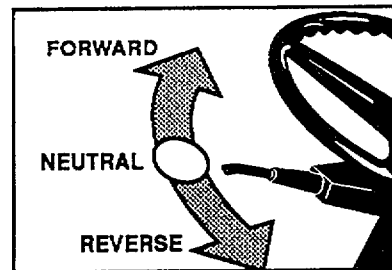
How To Operate The Truck

Buckle up. Make sure that your seat belt is engaged. Connect and adjust the seat belt strap to a snug, comfortable position.

Always wear the seat belt when operating a lift truck.



Be sure that the directional control lever is in the "N" (neutral) position.



Operation

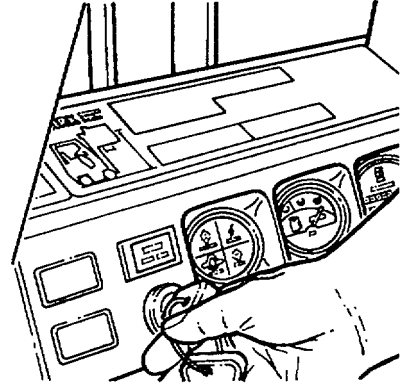
How To Operate The Truck

Start the engine.

Turn the master power switch to the "**ON**" position.

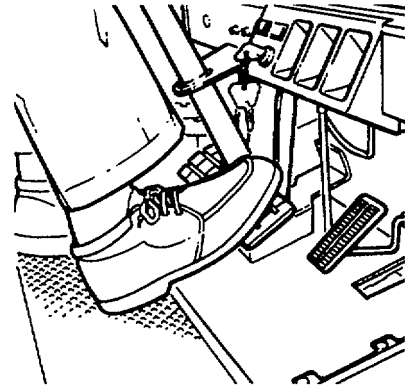
Turn the ignition key switch to the "**START**" position. When engine is running, release the key. The key will return to the "**RUN**" position.

If you are unfamiliar with this procedure, please refer to the section "How To Start The Truck."

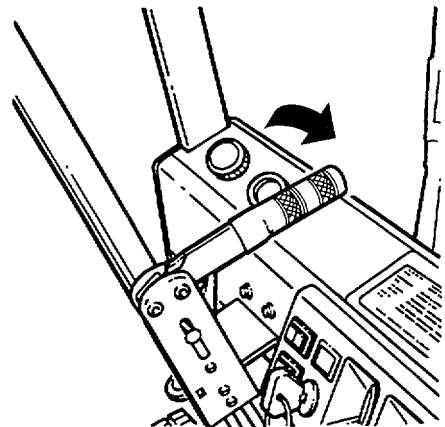


Be sure that the truck won't move unexpectedly before you are ready to drive.

Put your foot on the brake pedal and push down to apply the service brakes.



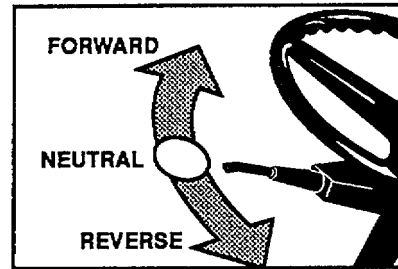
Release the parking brake.



Operation

How To Operate The Truck

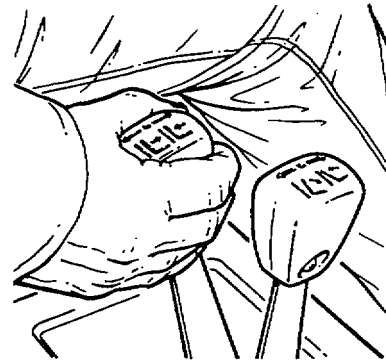
Put the direction control lever in the correct position for the desired direction of travel.



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



Pull back on the lift control lever and raise the forks approximately 2 inches (50 mm) above the floor.

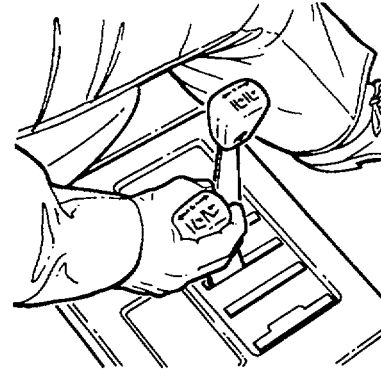


Operation

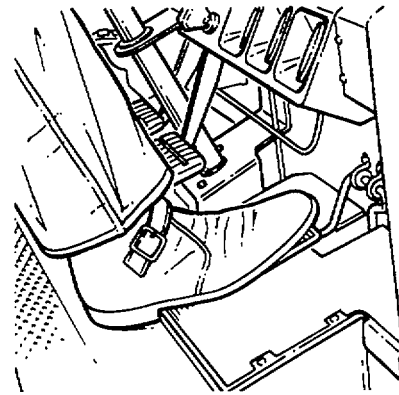
How To Operate The Truck

Using the tilt control, tilt the upright back slightly to raise the fork tips above the floor.

Raising the forks and tilting them back prevents the forks from catching on possible obstructions and reduces the wear on the fork blades if they strike or drag on the floor.



Put your foot on the accelerator pedal and push down smoothly until the truck is moving at the desired speed.



Be alert for pedestrians, other vehicles, or obstructions in the path of travel.

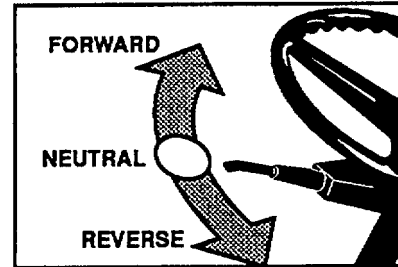


Operation

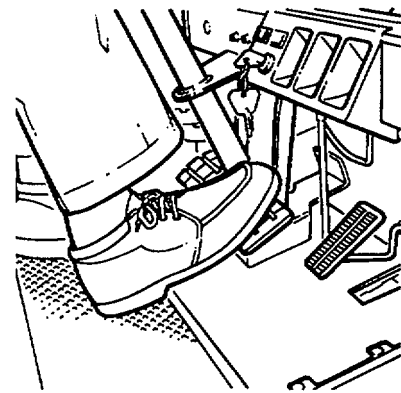
How To Operate The Truck

Always bring the truck to a complete stop before shifting to the opposite direction.

Any sudden change in direction can cause the load being carried to move or fall off the forks. Also, many components of the truck can be overloaded when a shift in direction is made without first slowing and stopping the truck.



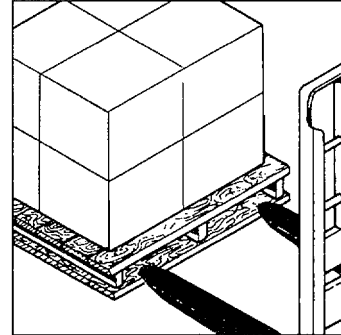
To stop the truck, lift the foot from the accelerator pedal and put it on the brake pedal. Push down on the brake pedal in a smooth, firm motion until the truck is stopped.



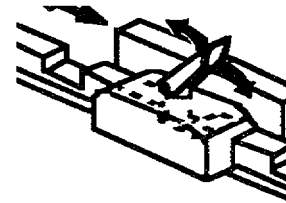
Operation

How To Operate The Truck

When picking up a load, enter the load carefully. The forks must be fully under the load and spread as wide as possible to provide good stability and balance.



If the forks need adjusting, lift the fork lock lever. Slide the forks on the fork bar of the lift carriage to get the correct width for the load. Make sure the fork lock pin fits into a locking notch on the fork carriage.

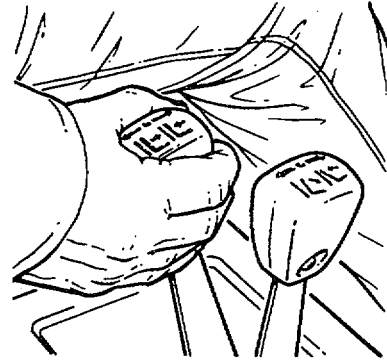


Lower the lever to lock the forks after they are in the correct position.

Operation

How To Operate The Truck

When driving, always raise the forks slightly 2-4 inches (50-100 mm) above the floor and tilt the upright (forks) backward slightly.



Practice safe operation every time the lift truck is used.

During your work, observe all functions of the lift truck. This will allow any problem or irregularity that could affect the safe operation of the truck to be immediately recognized. Do not continue to operate a truck that has a malfunction. Stop and have it fixed. Report to unit maintenance.

Operate the lift truck safely. Careful driving and operation is your responsibility. Follow this manual to avoid damage to the truck or the possibility of injury to yourself.



WARNING

- **ALWAYS WEAR THE SEAT BELT WHEN OPERATING YOUR LIFT TRUCK. FAILURE TO FASTEN SEAT BELT COULD RESULT IN INJURY OR DEATH.**
- **INTERNAL COMBUSTION ENGINES GENERATE TOXIC GASES WHICH CAN CAUSE SERIOUS INJURY OR DEATH WHEN INHALED. BE SURE THERE IS ENOUGH VENTILATION.**

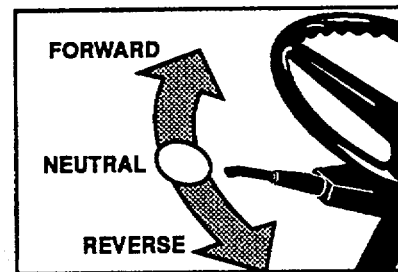
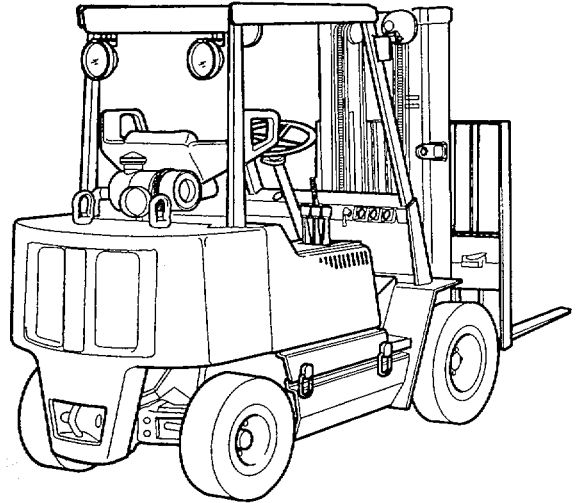


After Operation When You Have Finished Using The Truck

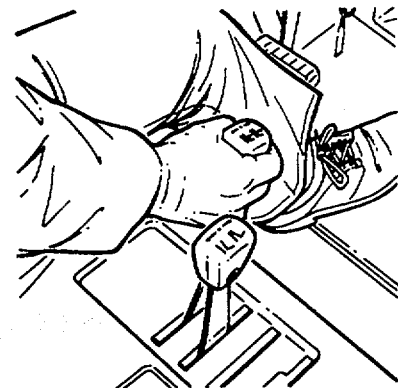
Always leave the lift truck in a safe condition

When you leave the truck, or park it, follow these safety rules:

- Park in a safe area away from normal traffic.
 - Never park on a grade.
 - Never park in areas which block emergency routes or equipment.
-
- Put the directional control lever in the "N" (neutral) position.

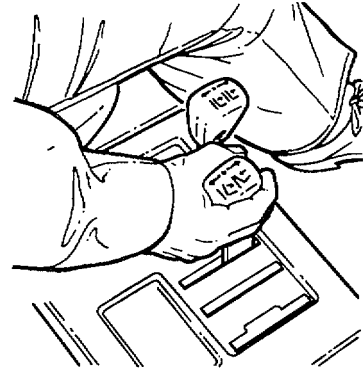


- Lower the forks or attachment to the floor.

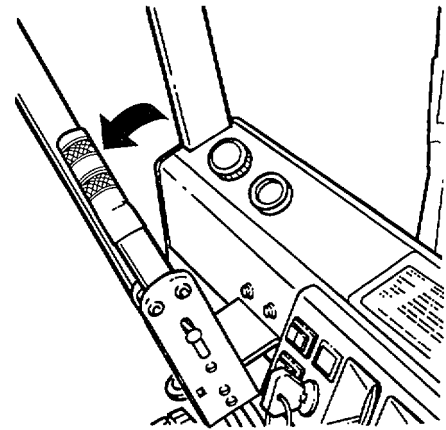


After Operation When You Have Finished Using The Truck

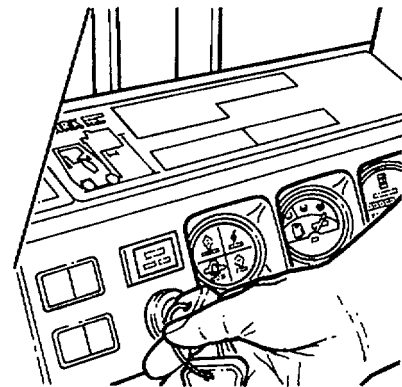
- Tilt the upright forward until the forks are level or flat on the floor.



- Apply the parking brake.
- Block the wheels if you have any doubt about the truck moving from a safe position.



- Turn the ignition key switch to the "OFF" position and remove the key.



6 Emergency Starting

Emergency Starting How To Use Battery Jumper Cables

These instructions apply to the use of a 12-volt lift truck with a fully-charged battery to start the engine of a lift truck with a discharged battery.

To avoid damage to the lift truck and battery, or the possibility of harm to yourself, follow these instructions and warnings. If you have any doubts, check with unit maintenance.

CAUTION

Use only a 12-volt jumper system. You can permanently damage a 12-volt starting motor and ignition system by connecting it to a 24-volt power supply (two 12-volt batteries in series, or a 24-volt generating set).

1. This truck has two 12-volt batteries in parallel and a negative ground electrical system. Make sure that the other truck also has a 12-volt battery and negative ground system. If you are not sure of the voltage, or if the ground is different, do not try to jump start, as personal injury or damage to the electrical system can result.

NOTE

If the truck has a battery with terminals on the side, you will need a set of jumper cables with matching connector clamps, or cable adapters for side-mounted battery terminals.

2. If the discharged battery has filler caps, check the fluid level. Do not use an open flame to check and do not smoke. If low, add distilled water to the correct level. Be sure to install the caps before jump starting. Do not jump start, charge, or test a sealed-type battery if the test indicator looks illuminated or had a bright color. Install a new battery.
3. Put the truck with the booster battery as near to the other truck as necessary for the jumper cables to reach both batteries. Check and make sure that the trucks do not touch each other.

Use particular care when connecting a booster battery to prevent sparks.

WARNING

The battery contains corrosive acid which can cause injury. If acid contacts your eyes or skin, flush immediately with water and get medical assistance.

Batteries contain sulfuric acid. Avoid contact with skin, eyes, or clothing. Also, shield your eyes when working near the battery to protect against possible splashing of the acid solution.

WARNING

Do not smoke or have open flames or sparks in battery charging areas or near batteries. An explosion can result and cause injury or death.

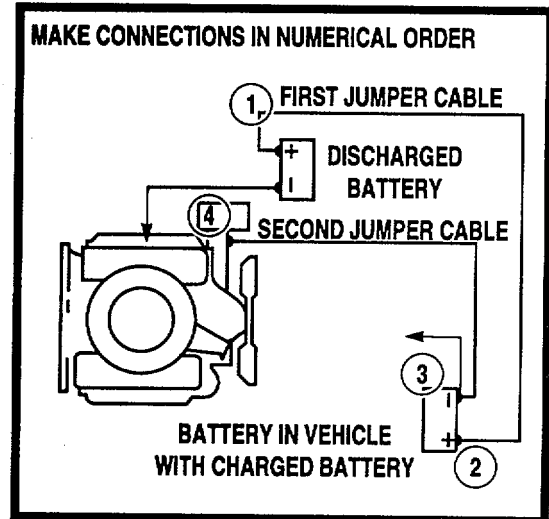
Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture can explode if flames, sparks, or lighted tobacco are brought near the battery. When charging or using a battery in an enclosed space, always provide ventilation and shield your eyes. Wear safety glasses when working around batteries.

**Emergency Starting
How To Use Battery Jumper Cables**

4. Turn all accessories to the "OFF" position and leave them off until after the engine has been started and the jumper cables removed.
- Turn the ignition key switch to the "OFF" position.
- Apply the parking brake.
- Put the directional control lever in the "N" (neutral) position.
5. Connect the jumper cables in the following sequence:
 - a. Connect the first jumper cable from the positive (+) (Red) terminal on one battery to the positive (+) (Red) terminal on the other battery. Never connect (+) (Red) to (-) (Black), or (-) to (+).
 - b. Next, connect the other end of the second jumper cable to a stationary solid metallic point on the engine of the truck with the discharged battery. (Not to negative (-) terminal of the battery). Make this connection at a point at least 18 inches (450 mm) away from the battery, if possible. Do not connect it to pulleys, fans, or other parts that move. Be sure not to touch hot manifolds which can cause severe burns.
6. Start the engine on the truck with the booster battery, and run the engine at a moderate speed

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.



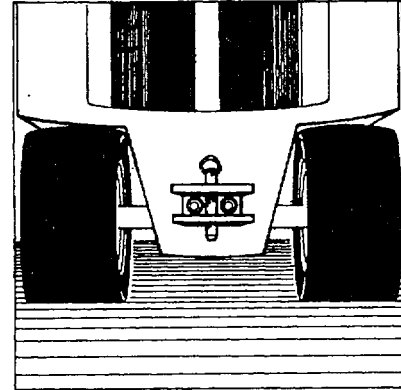
7. Start the engine of the truck with the discharged battery. Follow the starting instructions in the "Know The Truck" section of this manual. Make sure that the engine is at idle speed before disconnecting the jumper cables.
8. Remove jumper cables by reversing the above sequence exactly. Start by removing the last jumper cable, from the truck with the discharged battery, first. Remove the cable end from the engine block first, then the other end of the negative (-) cable.
9. Remove both ends of the positive (+) cable.

7 Emergency Towing

**Emergency Towing
How To Tow A Disabled Truck**

If your lift truck becomes disabled but can be moved freely on its own wheels without further damage, use the following procedures to tow it safely to a repair area.

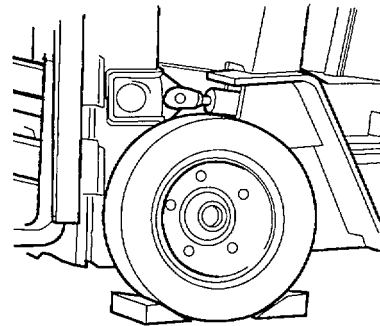
It is important for your safety and to the care of your lift truck to use the proper equipment and carefully follow these recommendations for safe towing.



Use an approved towing coupler that bolts to the axle through the counterweight.

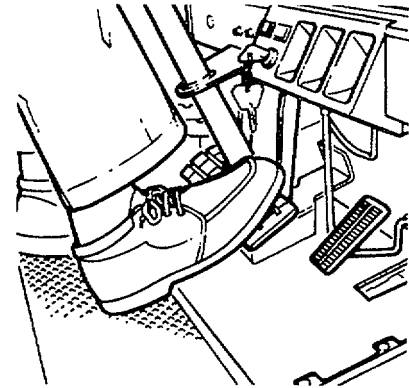
Towing equipment is optional equipment available from organizational maintenance.

1. Engage the parking brake.
2. Put blocks against the drive wheels

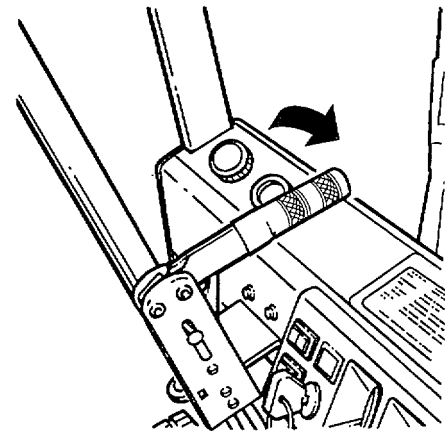


**Emergency Towing
How To Tow A Disabled Truck**

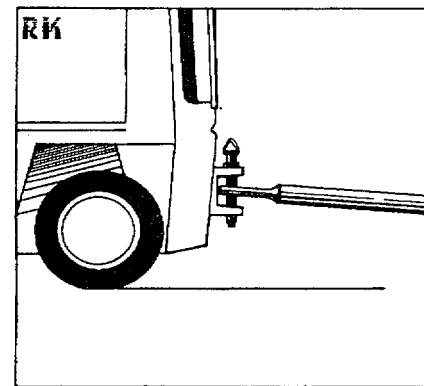
Connect an approved solid metal tow bar to the tow vehicle and to the truck to be towed. With a driver in the seat, push down on the foot brake pedal to prevent the truck from moving. Have the blocks removed from the drive wheels.



Push forward on the parking brake handle to release the brake.

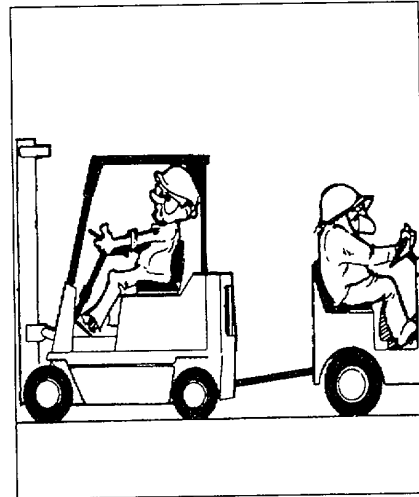


Correct towing is necessary to prevent injury to personnel or damage to the truck. The truck is to be towed at a speed of less than 5 mph [8 kph] with a driver in the seat. Do not lift the truck or any wheels off the floor while the truck is being towed.



**Emergency Towing
How To Tow A Disabled Truck**

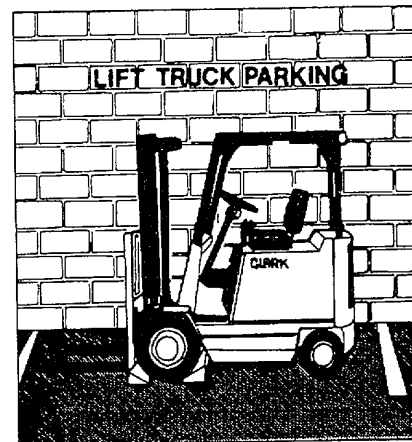
Power steering will not operate on the disabled truck when the engine will not run. The steering wheel will be difficult to turn.



CAUTION

Always engage the parking brake when parking a lift truck. The truck can move and cause injury or death to personnel near it.

Park the disabled truck in authorized areas only. Fully lower the forks to the floor, put directional control lever in "N" (neutral) position, and turn the ignition switch to the "OFF" position. Engage the parking brake. Remove the ignition key and put blocks behind the wheels to prevent the truck from rolling.



8 Planned Maintenance and Lubrication

WARNING

**DO NOT WORK ON THIS TRUCK UNLESS YOU ARE TRAINED AND AUTHORIZED,
AND KNOW THE CORRECT MAINTENANCE PROCEDURES. INJURY OR DEATH
COULD RESULT.**

Planned Maintenance and Lubrication

Recommended Planned Maintenance Intervals

Regular maintenance and care of the lift truck is essential for economy and utilization reasons, but most important for your safety. A faulty lift truck is a potential source of danger to the operator and to other personnel working near it.

Lift trucks should be inspected daily at the start of each shift. This daily inspection should include a visual check for leaks and any obvious damage which may have been caused by operation during the last shift. Check the tires and wheel bolts and fittings. Make sure that the overhead guard is in good condition. Check all of the controls. Make sure that all systems are functioning correctly. Check the engine oil, fuel, and coolant levels, as well as the hydraulic sump oil level. And, make sure that all instruments, warning lights, and the horn are operating correctly and that your truck is safe to operate. Use the daily inspection sheet as a check- list and record of your findings.

**Planned Maintenance and Lubrication
Recommended Planned Maintenance Intervals****Operating Conditions**

Time intervals between maintenance are largely determined by operating conditions. For example, operation in sandy, dusty locations requires shorter maintenance intervals than operation in clean warehouses. The indicated intervals are intended for normal operation. To allow better understanding of this aspect, the following clarification should be made:

NORMAL OPERATION:

Basically, eight-hour handling, mostly in buildings or in the open air.

SEVERE OPERATION:

Prolonged operating hours or constant usage.

EXTREME OPERATION:

1. In sandy or dusty locations, i.e., cement plant, lumber or flour mills, coal dust, or stone crushing sites.
2. High-temperature locations, i.e., steel mills, foundries, etc.
3. Sudden temperature changes (constant trips from buildings into the open air), e.g. refrigeration plant.

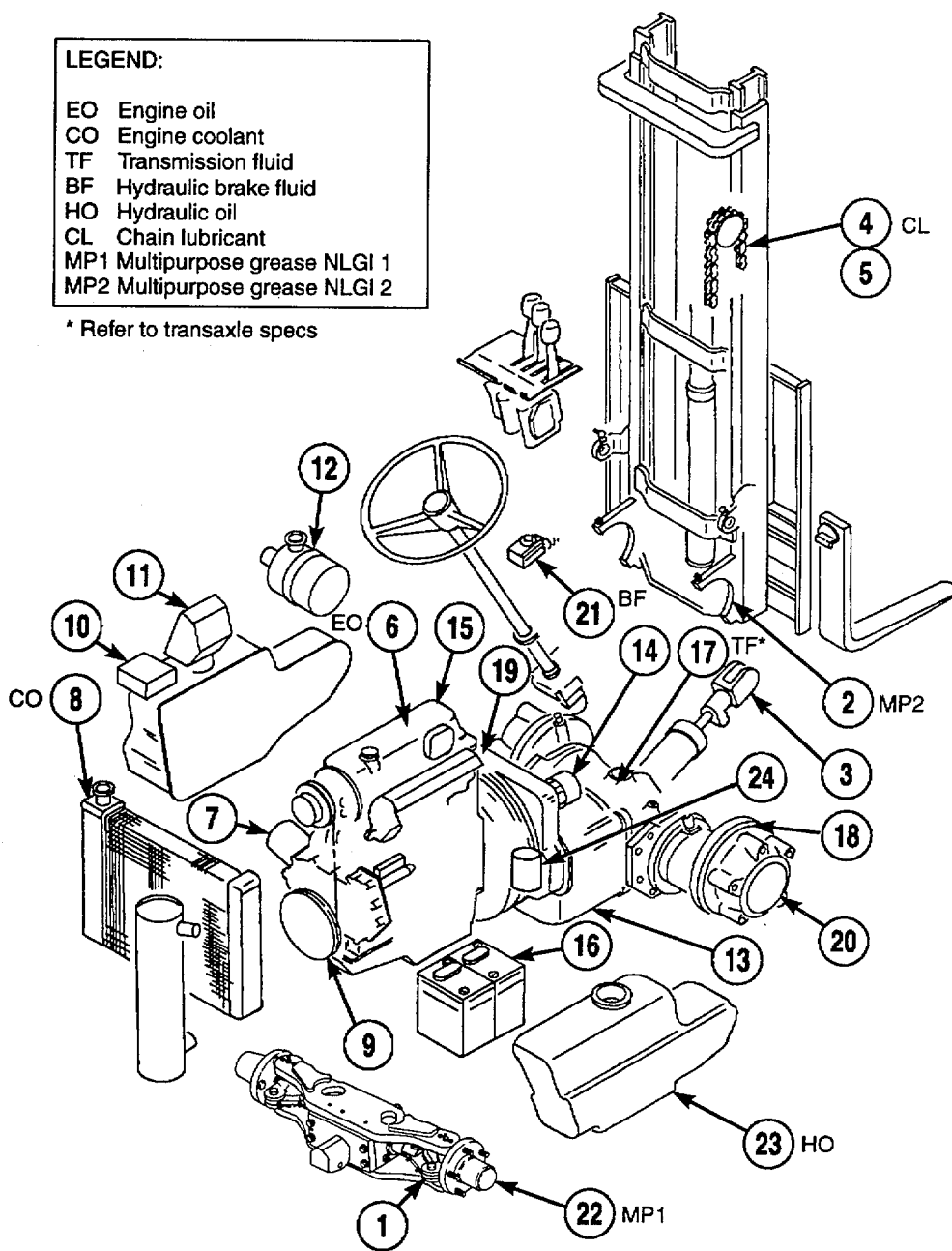
If your lift truck is used in Extreme Operating Conditions, you must shorten the maintenance intervals accordingly.

**ENSURE
OPERATIONAL
SAFETY**

**Planned Maintenance and Lubrication
Planned Maintenance and Lubrication Chart**

- LEGEND:**
- EO Engine oil
 - CO Engine coolant
 - TF Transmission fluid
 - BF Hydraulic brake fluid
 - HO Hydraulic oil
 - CL Chain lubricant
 - MP1 Multipurpose grease NLGI 1
 - MP2 Multipurpose grease NLGI 2

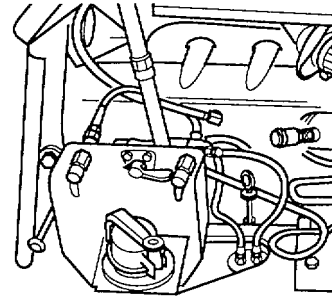
* Refer to transaxle specs



Planned Maintenance and Lubrication

Engine Oil Level Check

Check the engine oil level at left side of engine. Pull the dipstick out, wipe it with a clean wiper, and push it back into the dipstick tube. Remove the dipstick again and check the oil level.



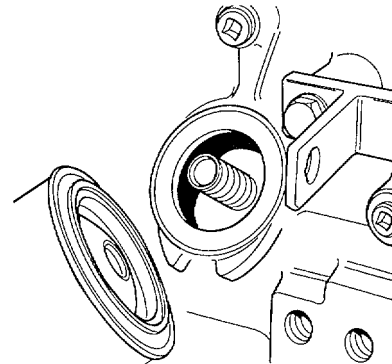
Engine Oil and Filter Change

It is recommended to:

- * * Drain and replace the engine crankcase oil every 50 to 250 operating hours.
- * Replace the engine oil filter every oil change.

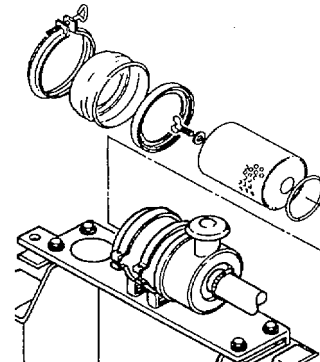
* NOTE

The time interval for changing engine oil will depend upon your application and operating conditions.



Engine Air Cleaner

Change the engine air filter element every 50 to 250 operating hours, depending upon your application and operating conditions.

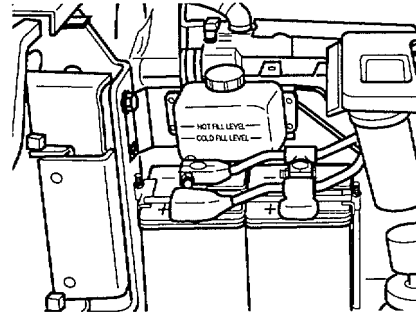


Planned Maintenance and Lubrication

Engine Coolant Check

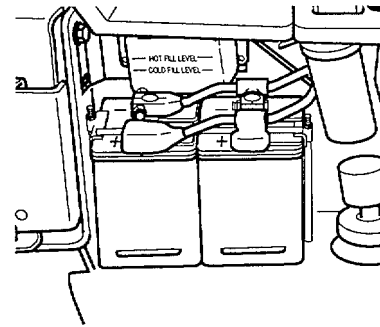
WARNING

- Do not remove the radiator cap when the engine is hot; steam and hot coolant can escape and burn personnel.
- Use extreme care when removing the radiator pressure cap. Sudden release of pressure can cause a steam flash which could seriously injure personnel. Slowly loosen cap to the first stop to relieve pressure before removing cap completely. After use, securely tighten cap.
- Use a clean, thick waste cloth or like material to remove the cap. Avoid using gloves. If hot water soaks through gloves, personnel could be burned.



Inspect the coolant level in the overflow bottle only. Do not remove the cap.

The coolant level should be at the "Cold Level" line on the coolant recovery bottle.



NOTE

The lift truck cooling system is filled with factory-installed solution of 50% permanent-type antifreeze and 50% water containing rust and corrosion inhibitors. You should leave it in the truck year-round.

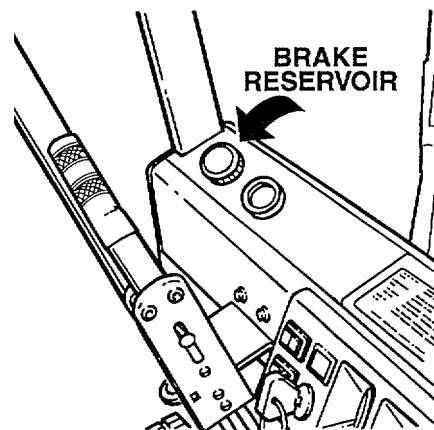
Battery - Water - Fill Type

Check the battery to be sure the cells are all filled. Inspect for cracks. If the terminals are corroded, clean and protect them.

Planned Maintenance and Lubrication

Brake Reservoir Fluid Level Check

Check brake fluid level by opening inspection/fill cap on brake reservoir mounted on left side of dash.



IMPORTANT
 USE SAE D.O.T. 3
 AUTOMOTIVE HYDRAULIC BRAKE
 FLUID ONLY.

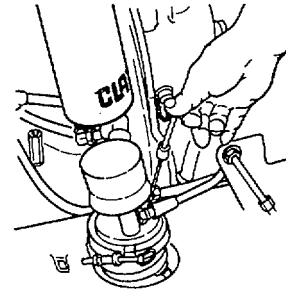
Planned Maintenance and Lubrication

Hydraulic Fluid Level Check

Check the hydraulic sump tank oil level with:

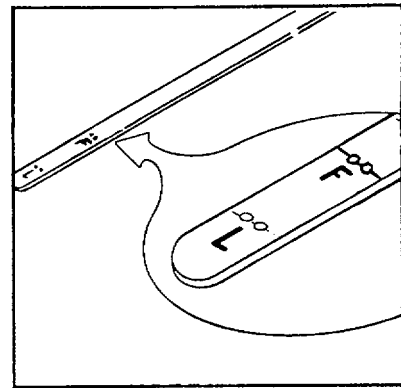
1. Truck on a level surface.
2. Upright in a vertical position.
3. Fork carriage fully down.
4. Oil at operating temperature.

Pull the dipstick out, wipe it with a clean wiper, and push it back into the dipstick tube. Pull the dipstick out again and check the oil level.



The hydraulic sump tank oil level should be up to the "F" (full) mark on the dipstick.

Approximately 1.0 gal (3.8 L) of hydraulic oil is required to fill the hydraulic tank from the "L" (low) mark to the "F" (full) mark. Do not overfill.



24917

Hydraulic Sump Tank Fluid & Filter Change**CAUTION**

Use recommended fluid only. Failure to use recommended fluid could result in damage to equipment.

It is recommended to:

- Drain and replace the hydraulic fluid every 2000 operating hours.
- Replace the hydraulic oil filter at every oil change.
- Replace the hydraulic sump tank breather/fill cap every 1000 operating hours.

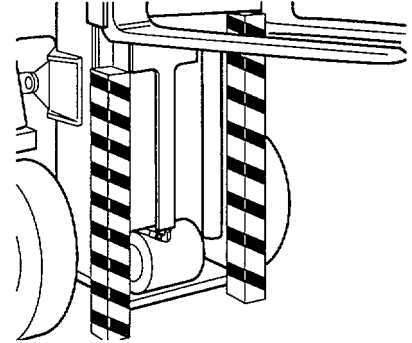


Planned Maintenance and Lubrication

Access to the Drive Axle

The best method to use for reaching the drive axle checkpoints dipstick, drain plug, and brake inspection plugs 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

DO NOT WALK OR STAND UNDER RAISED FORKS. THE FORKS CAN FALL AND CAUSE INJURY OR DEATH.

Transaxle Fluid Level Check

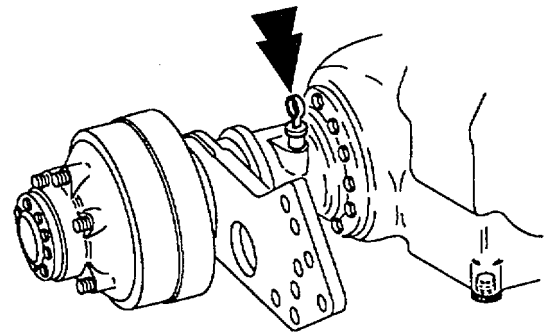
Check the transaxle fluid level with the:

1. Truck on a level surface.
2. Transmission in "**NEUTRAL**".
3. Engine idling.
4. Oil at operating temperature.

Remove the fluid level dipstick located on the top left surface of the drive axle housing.

The oil level is correct (full) when the oil is at the top arrow when measured on the dipstick portion of the plug.

After adding oil to the transaxle, wait a few minutes until the oil has distributed evenly throughout the unit. Do not overfill.



Transaxle Fluid & Filter Change

It is recommended to:

- Drain and replace the transaxle fluid every 1000 operating hours.
- Replace the transmission oil filter every 500 operating hours.

When the transaxle is new or rebuilt, it is recommended to change the oil filter after the first 50 hours and again after 100 operating hours. The reason for this is to be sure that the oil is cleaned of all harmful particles of material which may be loosened or flushed off new parts as they wear in.

To change oil in the transaxle:

1. The oil should be drained when it is warmed to operating temperature.
2. Put the truck in a level position.
3. Apply the parking brake and block the wheels to prevent the truck from moving.

NOTE

When suitable equipment is available, the truck may be raised or hoisted up and placed in a level position on wheel cradles to allow access under the axle. Otherwise, raise the folk carriage only high enough to provide access to the axle. Please refer to procedures described above in "Access to the Drive Axle".

NOTE

Frequent changes of lubricant and filters is an inexpensive way to protect and prolong the safe operating life of an essential and relatively more valuable major component--such as the transaxle.

Extending the recommended intervals at which transaxle fluid and filters are changed should be considered only after careful evaluation of your operating condition and analysis of the condition of the oil. Because the oil is heated to very high temperatures where torque converter and transmission are operated under heavy or sustained working conditions, it will "wear out" (break down) and lose its lubricating ability due to oxidation. When this happens, it will cause rapid wear and damage to seal bearings and clutch plates resulting in the need for a much more costly transmission rebuild.

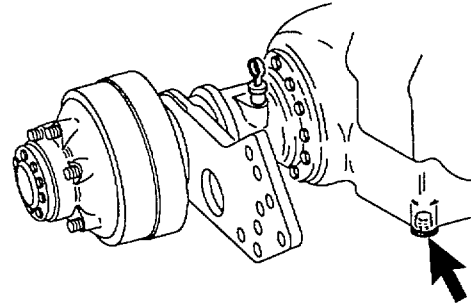
Planned Maintenance and Lubrication

Transaxle Fluid & Filter Change

The transaxle oil is drained from the drive axle drain plug.

Place flat drain pan of 32 pints (15 L) minimum capacity under drain opening.

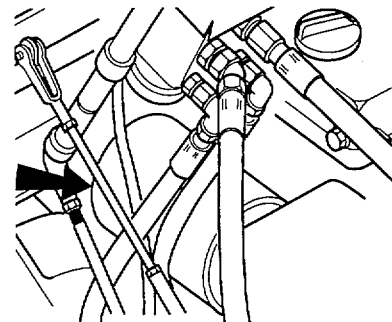
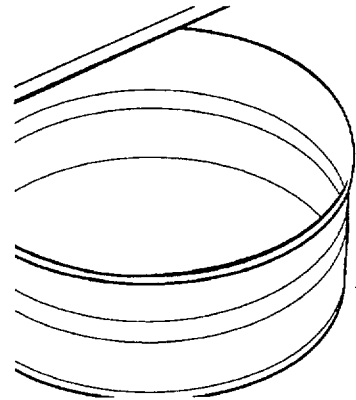
Remove drain plug.



Transaxle (Transmission) Oil Filter Change

The transaxle oil filter is located in a horizontal position on the top left front (towards drive axle) side of the transmission, and mounted on the charging pump.

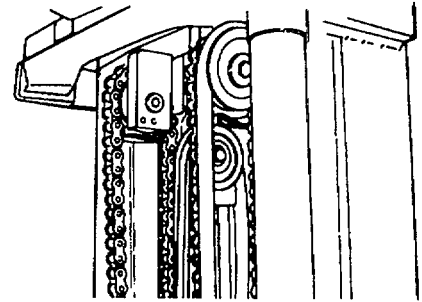
1. Remove the floorboards. You will see the transmission oil filter near the bottom of the steering column.
2. Remove the oil filter. Take special care when removing this filter to avoid draining any oil remaining in the filter onto the floor. It is recommended that you first loosen the filter using a standard filter wrench. Then, remove the filter while holding a pad of shop cloths, or other absorbent material, under the open end of the filter to absorb any excess oil that may drain out of the filter.
3. Install a new filter. Be sure to follow the installation instructions printed on the outside surface of the filter.
4. Inspect and clean the transaxle breather (air vent) located on the top of the converter housing near the charging pump.
5. Install the floorboards.



Planned Maintenance and Lubrication

Lift Chain Lubrication

Lift chain lubrication is an important part of your maintenance program. The lift chains operate under heavy loading and will function more safely and have longer lift if they are regularly and correctly lubricated. Clark chain lubricant is recommended. It is easily sprayed on and provides superior lubrication.

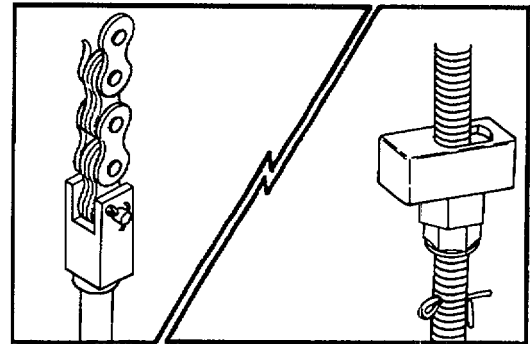
**Lift Chain Adjustment**

The lift chains are correctly adjusted if the lower fork carriage rollers reach their end (lowest) position approximately 0.50 inch (13 mm) 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 the chain anchor nuts.

NOTE

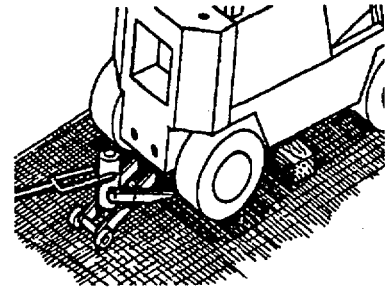
If the chains show slack due to an increase in length, they should be measured for wear. When the chains have stretched by wear more than 3% of their original length, they are not safe and must be replaced.



Planned Maintenance and Lubrication

Truck Lubrication

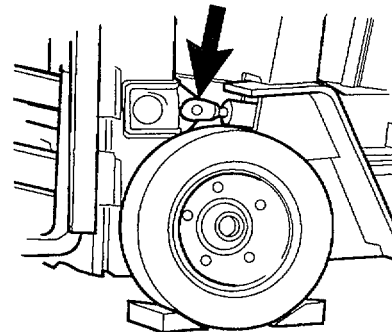
Raise the rear of the truck and place blocking under the frame for safety.



Lubricate the steer axle linkage -- tie rod ends and bearings. Be sure to clean the grease fittings before lubricating and remove the excess grease from all points after lubrication. Inspect the steering cylinder piston rod, seals, and fasteners for damage, leaks, and looseness.

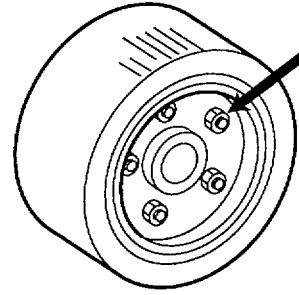
Remove the blocking and lower the rear of the truck.

Lubricate the tilt cylinder rod ends (at the forward end) and the upright trunnion bushings.

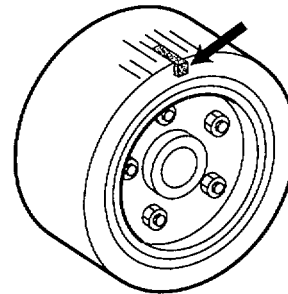


Planned Maintenance and Lubrication**Wheel and Tire Inspection**

Federal and state laws require persons to be fully trained and qualified before doing maintenance on wheels and tires. Injury or death can result from the explosive separation of rim components if service procedures are not done correctly.



Check tire for chunking, cracking, or foreign objects in rubber. Use a long-handled tool to keep your body away from the trajectory path of multi-piece rims and wheels.



9 Specifications

Specifications

Fuel Recommendations:

Diesel Fuel Oil ASTM Grade No. 1 D and 2D, 45 Cetane Minimum, 50 Cetane Preferred.

Engine Oil Recommendations:

Diesel - API Service Classification CD/SE MIL - 45199B

Ambient Temperature (Average) Viscosity:

32°F to 110°F (0°C to 43°C) SAE 30
70°F to 0°F (21°C to -17°C) SAE 20W
0°F to -30°F (-17°C to -34°C) SAE 10W

Engine Coolant Recommendation:

50% water and 50% ethylene glycol permanent-type antifreeze containing rust and corrosion inhibitors. (Antifreeze protection level -34°F [-37°C].)

Specifications

Fill Capacities/Fluid Volumes:

Fuel Tank	Diesel	8 gal. (30.0 L)
Cooling System	Continental 2.7 L Diesel.....	9 qt. (8.5 L)
Engine Oil, w/Filter	Continental 2.7 L Diesel.....	5.5 qt. (5.2 L)
Transaxle (Transmission & Drive Axle)	TA18	32 pints (15.1 L)
Hydraulic Sump Tank (Usable Volume)	20.8 gal.	(5.5 L)

Hydraulic System Relief Pressure Setting:

Lift and Tilt (Adjustable) Model.....	17.20	2350 psi. (16200 kPa)
	22.35	2650 psi. (18270 kPa)
	27.30	3000 psi. (20685 kPa)

Engine Speed Settings (+) (-) 50 rpm:

Engine	2.6 L
Transaxle.....	TA18
Idle Speed (rpm Max.).....	600
No Load (Governed Speed)	2300-2600rpm

- * Idle speed must be adjusted so truck has adequate oil supply to steer correctly.
- Idle speed must be adjusted so truck (when empty) does not have excessive creep speed.
- Creep speed should be limited to 2 ft. Per second.

Electrical System:.....	12 volt DC, Negative Ground
Alternator	37 amp.
Battery Rating (Cold Crank)	Diesel Maintenance-Free 12v DC--625 amps 0°F

Engine Crankcase Oil:

Gasoline/LPG Engines	API CC/SE Mil-Z104B MIL-45199B
----------------------------	-----------------------------------

Transmission Fluid:

Power-shift Transmission, Torque Converter, and Drive Axle	AMOCO 1000 (or TEXACO 1893 TDH)
---	------------------------------------

Hydraulic Fluid:

Hydraulic Sump	Clark Specification
----------------------	---------------------

Normal Application MS-68

Multi-Purpose Grease:

Axle Ends, Wheel Bearings	NLGI Grade No. 1
Steer Axle Linkage/ Tie Rod.....	Lithium soap base grease
Ends, Steer Axle Knuckle	Clark Specification MS-I 07C (or equivalent)

Chain Lube:

Upright Lift Chains	Clark #886399 Chain and Cable Lube (or equivalent)
---------------------------	--

Dry-Film Lubricant:

Side Shifter, Attachments	Dow Corning Milykote 321
Clamp Slides Bonded Lubricant	Graph-O-Kote #220, MolubAlloy #389 Dry Lube (or equivalent)

Battery:

(Unsealed type)	Distilled Water
-----------------------	-----------------

Filters:

Engine Fuel
Engine Oil
Engine Air
Transmission Oil
Hydraulic System Oil
Hydraulic Sump Breather

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By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON

*Administrative Assistant to the
Secretary of the Army*

01966

DENNIS J. REIMER
*General, United States Army
Chief of Staff*

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

PUBLICATION DATE

PUBLICATION TITLE

BE EXACT... PIN-POINT WHERE IT IS

PAGE NO.

PARA-GRAPH

FIGURE NO.

TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

TEAR ALONG PERFORATED LINE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE:

DA FORM 2028-2
1 JUL 79

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 Lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5 (^{\circ}\text{C} + 32) = \text{F}^{\circ}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609
TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

