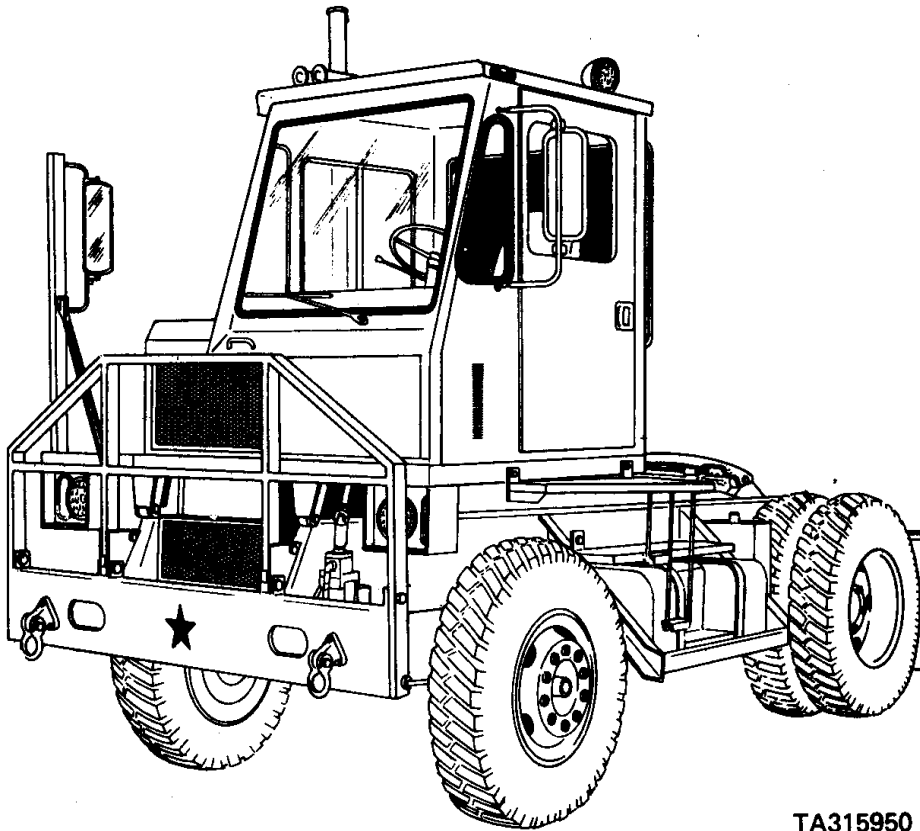


OPERATOR'S MANUAL



TA315950

TRUCK TRACTOR, YARD TYPE,
43,500 LB GVW, DED, 4X2,
ARMY MODEL M878A1
(OTTAWA MODEL 50)
(NSN 2320-01-121-2102)

HEADQUARTERS, DEPARTMENT OF THE ARMY

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MAINTENANCE
PROCEDURES
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JUNE 1985

WARNING

Do not remove radiator cap when radiator is hot; stop engine and allow to cool before removing radiator cap. Failure to do so could cause serious injury due to burns or scalding caused by steam.

WARNING

Battery electrolyte is toxic and corrosive. Remove all rings/jewelry. Use protective goggles and gloves when removing battery caps and checking electrolyte. Avoid contact with skin, eyes, clothes, and don't breathe vapors. Do not smoke or use an open flame near batteries. To do so could cause serious injury or death due to batteries exploding.

WARNING

Battery box lid is heavy. Do not allow battery box lid to fall on you.

WARNING

Diesel fuel is combustible. Provide a metal-to-metal contact between the fuel tank and fuel container before and during fueling operation.

WARNING

Do not use ether starting fluid switch without cranking engine. Over-charge of ether starting fluid can cause explosion of engine air intake system.

WARNING

Compressed air used for cleaning or drying parts must not exceed 30 psi. Wear safety glasses when using compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

WARNING

Do not operate tractor if AIR PRESS gage reading is less than 60 PSI. This is the minimum safe pressure for operation of the service brakes. Operating tractor when AIR PRESS gage indicates less than 60 PSI could cause serious injury or death and extensive property damage due to loss of braking power.

WARNING

After operation, drive axle and differential may be very hot. Do not touch them with your bare hands.

WARNING

Do not remove breather cap when hydraulic oil is hot. Hot oil can cause severe injury.

WARNING

Always fasten seat belt when operating tractor. Failure to do so could cause serious injury or death if you are in an accident while operating the tractor.

WARNING

Do not operate engine for prolonged periods in an unventilated area. Internal combustion engines produce poisonous carbon monoxide gas which is extremely toxic if allowed to accumulate in a closed area.

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Flash point of solvent is 138 degrees F (59 degrees C). Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air and medical attention immediately. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water and obtain medical aid immediately.

WARNING

Never operate FIFTH WHEEL UNLATCH CONTROL or allow anything to touch it while tractor is in motion. Failure to follow this procedure may result in serious injury.

Refer to FM 21-11 for first aid for injured personnel.

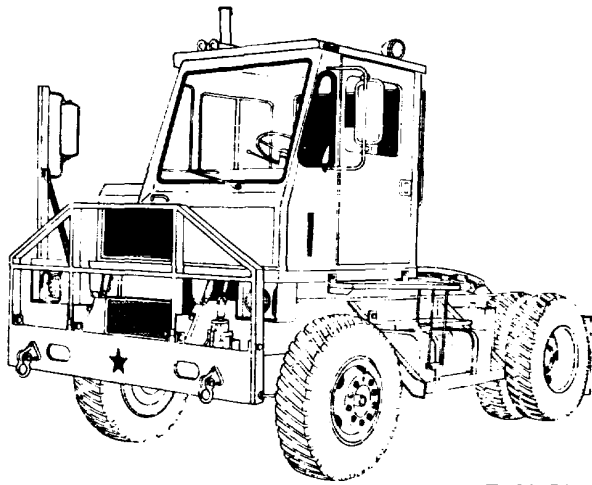
Operator's Manual

TRUCK TRACTOR, YARD TYPE
43,500 LB GVW, DED, 4X2,
ARMY MODEL M878A1
(OTTAWA MODEL 50)
NSN 2320-01-121-2102

REPORTING OF ERRORS

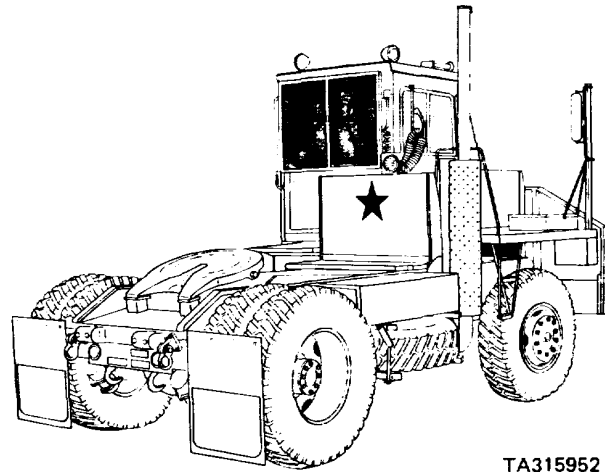
You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Tank-Automotive Command, ATTN: DRSTA-MBP, Warren, MI 48090. A reply will be furnished to you.

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TA315951

LEFT FRONT VIEW



TA315952

RIGHT REAR VIEW

M878A1 Yard Tractor

HOW TO USE THIS MANUAL

This manual:

- Contains information for safe and efficient operation of your tractor. These instructions provide you with a general knowledge of the tractor, its characteristics, and usual and unusual operation procedures.
- Provides you with troubleshooting procedures, so that you can keep your tractor operating properly.
- Provides best possible operating instructions under most circumstances. Adverse weather or multiple emergencies may require modification of these procedures.
- Takes a "positive approach" and normally states only what you can do. Unusual operations or configurations are prohibited unless specifically included. Before attempting any questionable operation, which is not specifically permitted in this manual, clearance must be obtained from your supervisor.

**CHAPTER 1
INTRODUCTION**

CHAPTER OVERVIEW

The purpose of this chapter is to acquaint you with the maintenance forms, records, and reports that you must maintain for the M878A1 yard tractor, to familiarize you with the purpose and capabilities of the vehicle, and to give you a brief description of its different systems and components.

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1-1. SCOPE

- a. Type of Manual. Operator’s manual for M878A1 tractor.
- b. Model Number and Equipment Name. Truck Tractor, Yard Type, Diesel Engine Driven, 43,500 Pounds Gross Vehicle Weight, Model M878A1.
- c. Purpose of Equipment. Movement of truck trailers within a terminal yard.

1-2. MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, The Army Maintenance Management System (TAMMS).

1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)

If your M878A1 tractor needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, US Army Tank-Automotive Command, ATTN: DRSTA-MP, Warren, MI 48090. We'll send you a reply.

1-4. WARRANTY INFORMATION

The M878A1 tractor is warranted by Ottawa Truck Division, Ottawa, Kansas for 15 months or 1500 hours of operation. Warranty starts on the date found in block 23 on DA Form 2408-16 in the logbook. Report all defects in material or workmanship to your supervisor who will take appropriate action.

1-5. ORIENTATION

In this manual, right and left sides of the tractor are from the viewpoint of the operator when sitting in the operator's seat facing toward the front of the tractor.

1-6. LIST OF ABBREVIATIONS

| | |
|-------|--|
| A | Ampere |
| AR | Army regulation |
| ATTN | Attention |
| DA | Department of the Army |
| DD | Department of Defense |
| DED | Diesel engine driven |
| EIR | Equipment improvement recommendations |
| F | Fahrenheit |
| FM | Field Manual |
| FSCM | Federal Supply Code for Manufacturers |
| LO | Lubrication Order |
| MAC | Maintenance Allocation Chart |
| MPH | Miles per hour |
| N | Neutral |
| NSN | National stock number |
| Para | Paragraph |
| PSI | Pounds per square inch |
| R | Reverse |
| RPM | Revolutions per minute |
| TAMMS | The Army Maintenance Management System |
| TM | Technical Manual |
| V | Volts |
| Vac | Alternating current voltage |
| PTO | Power takeoff |

Section II. EQUIPMENT DESCRIPTION

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| Equipment Purpose, Capabilities, | | Location and Description of | |
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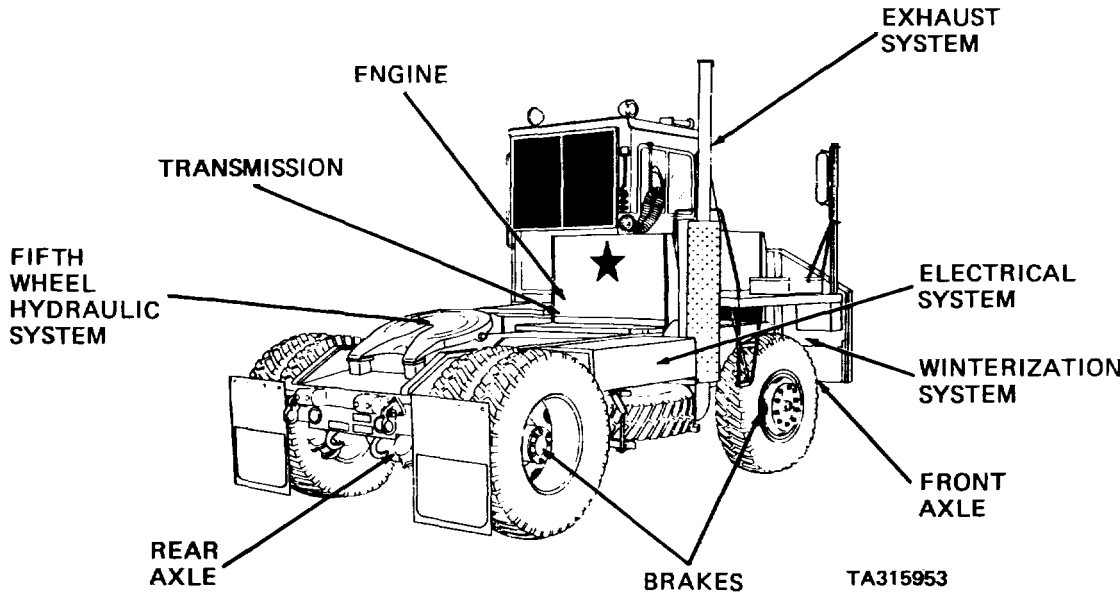
1-7. EQUIPMENT PURPOSE, CAPABILITIES, FEATURES AND CHARACTERISTICS

a. Purpose of M87AM1 Tractor. Perform terminal yard operations such as spotting and moving trailers.

b. Capabilities and Features.

- (1) Hydraulically operated fifth wheel enables lowering or raising of fifth wheel for alignment with trailers.
- (2) Pneumatically operated fifth wheel unlatch.
- (3) Hand operated cab tilt pump enables tilting of cab to 45 degrees. Cab may then be manually tilted to 90 degrees.
- (4) Six cylinder diesel engine and five speed automatic transmission.
- (5) Power steering.
- (6) Fail-safe brakes: loss of air pressure automatically allows large spring in rear axle brakes air chambers to apply parking brake.

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



Engine - 6-cylinder turbocharged diesel.

Transmission - Automatic, with five forward speeds, neutral, and reverse.

Exhaust System - Consists of muffler and exhaust pipe.

Brakes - Drum type, pneumatic operated.

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Continued)

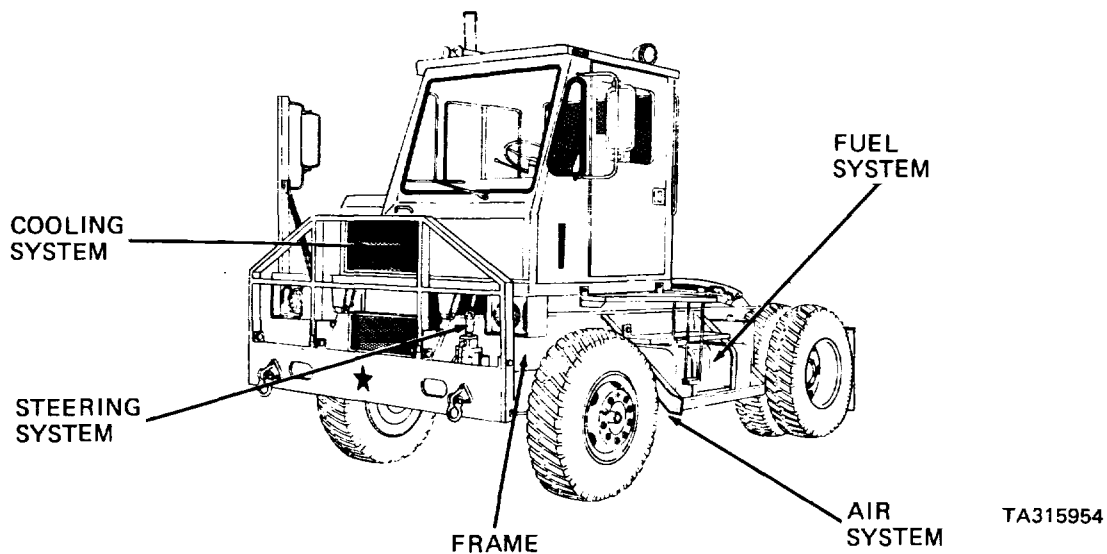
Electrical System - 12 volt. Includes four wet-cell batteries, wiring harnesses, and electrical components.

Winterization System - Consists of accessory heater systems for cold-weather operation.

Front Axle - I-beam type steerable axle.

Rear Axle - Heavy duty double-reduction drive unit.

Fifth Wheel Hydraulic System - Includes hydraulic reservoir bolted to chassis directly behind fuel tank, hydraulic pump, and fifth wheel.



Frame - Two heavy duty flange beams extending the length of the tractor.

Air System - Includes air compressor, two air reservoirs consisting of a service tank and a supply tank, and warning buzzer and light.

Steering System - Includes steering wheel and column connected at cab floor to steering gear; hydraulic power assisted.

Cooling System - Includes radiator, fan, and water pump.

Fuel System - Includes vented fuel tank mounted to left side of frame, mechanical gear pump, fuel filters, fuel injectors, connecting tubing and fittings, and air cleaner and precleaner.

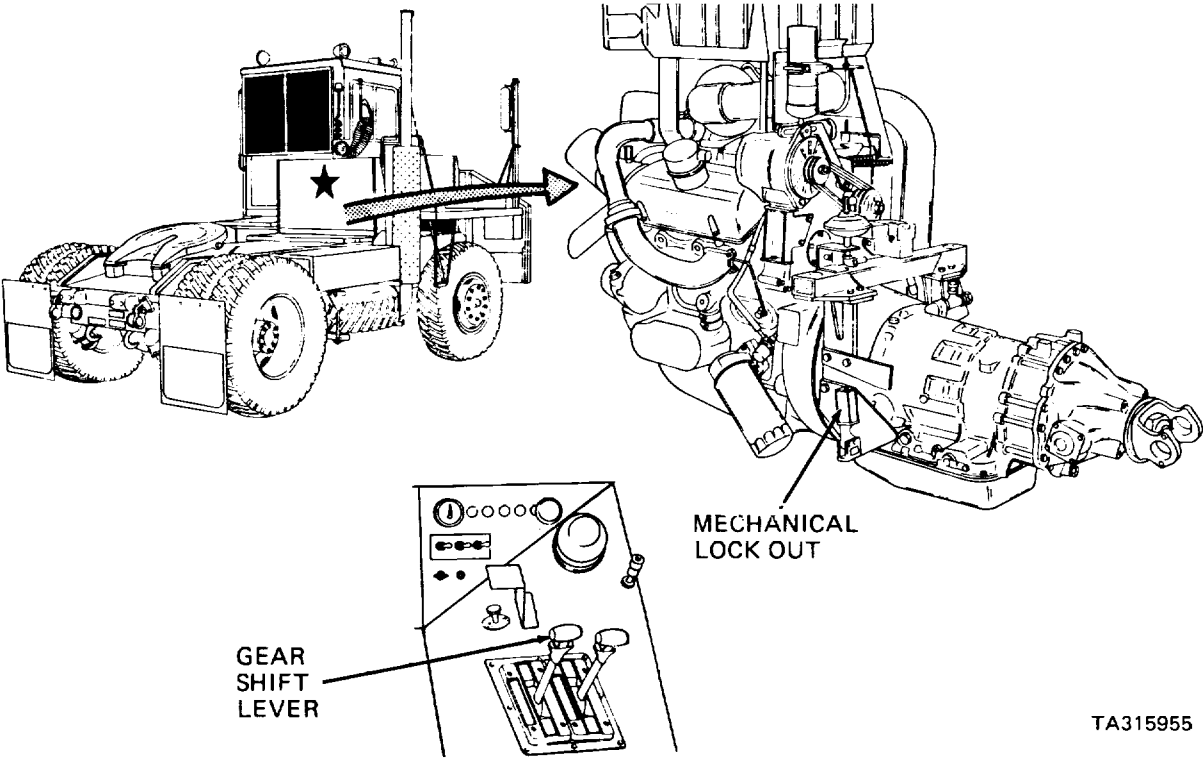
Section III. TECHNICAL PRINCIPLES OF OPERATION

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| Electrical System | 1-15 | Fifth Wheel Hydraulic System | 1-19 |
| Vehicle Lights | 1-15a | Winterization System | 1-20 |

1-10. FRAME

Frame - Left and right frame rails provide mounting facilities for engine, transmission, front and rear axles, operator's tilt cab, and fifth wheel boom.

1-11. TRANSMISSION

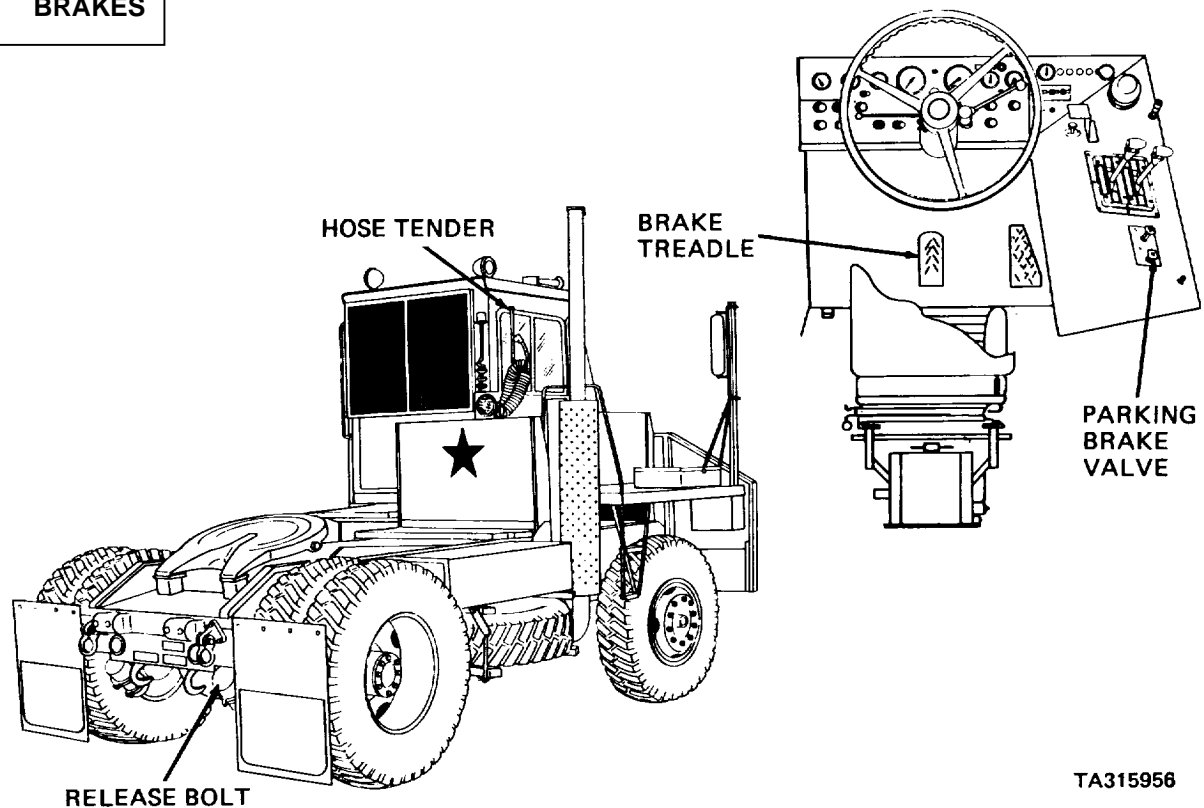


TA315955

Transmission - Consists of torque converter and transmission. Torque converter transmits power from engine to transmission gearing. Torque converter serves as both a fluid coupling and a torque multiplier. Four planetaries within transmission establish speed ratios. Planetaries controlled by six hydraulic applied clutches.

Gear Shift Lever - Selects gear range.

Mechanical Lock Out - Prevents shifting to or from reverse unless brake treadle is depressed.

1-12. BRAKES

TA315956

PARKING BRAKE Valve - Pulled out, applies rear spring brakes; pushed in, releases brakes.

Release Bolt - Built into rear axle brake air chambers, provides means for retracting fail-safe spring if air pressure can't be restored.

Brake Treadle - Movement of foot pedal on valve controls amount of air pressure delivered to or released from service brake air chambers, which determines braking force.

Hose Tender - Flexible hoses and quick-disconnect couplings connect tractor brake systems to towed trailer.

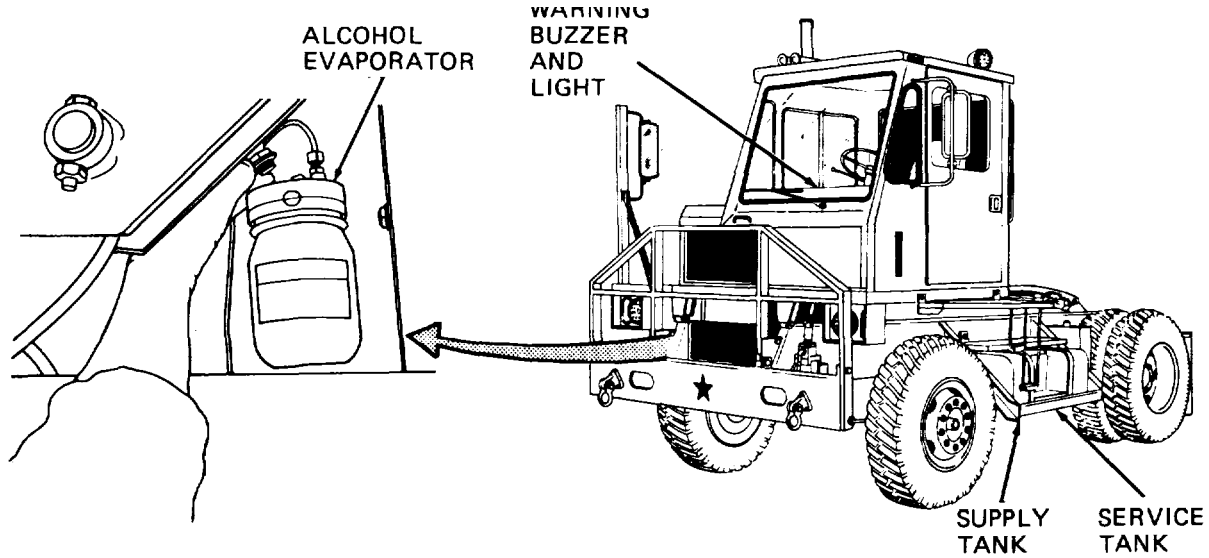
1-13. AIR SYSTEM

Supply Tank - Air enters this tank first. It allows compressed air from air compressor to cool and water vapor to condense. This tank includes an automatic drain valve to automatically drain water and a safety valve to vent air to the atmosphere if air pressure is excessive.

Service Tank - Serves as air reservoir; cool, moisture free air from supply tank is stored in this tank and applied to pneumatic system components. A drain cock allows manual draining of water.

Alcohol Evaporator - Distributes alcohol vapor throughout air system to increase operating efficiency in cold weather.

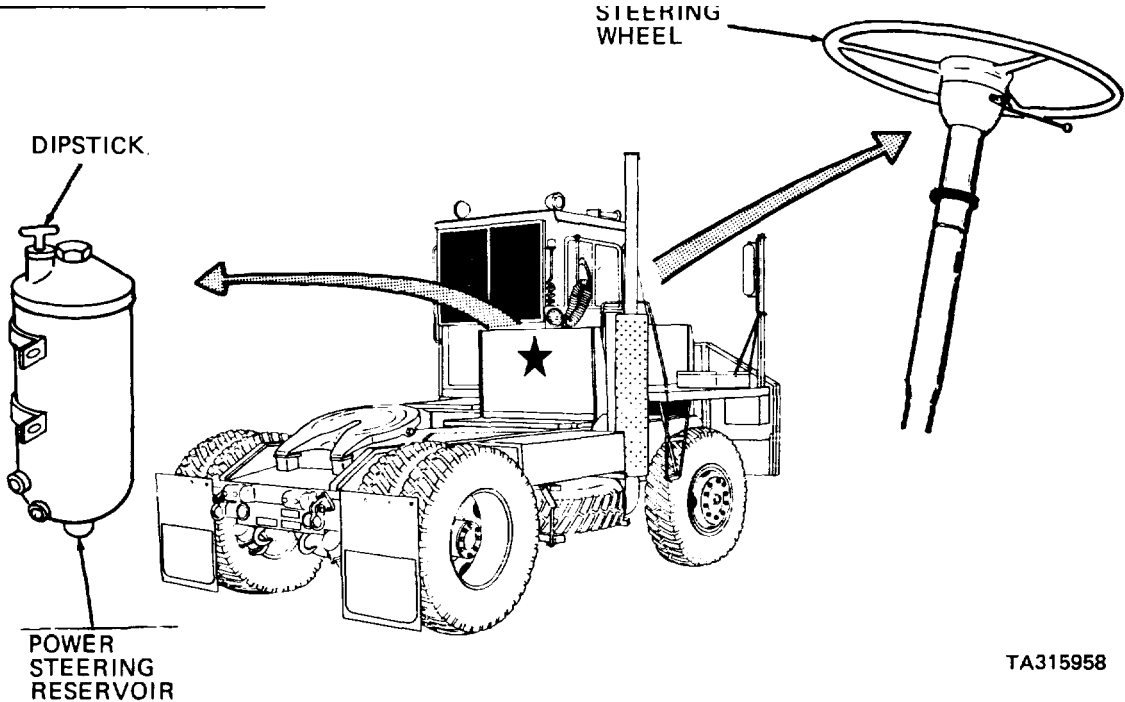
1-13. AIR SYSTEM (Continued)



TA315957

Warning Buzzer and Light - Turn on whenever air pressure falls to a point where brakes may fail to stop tractor.

1-14. STEERING SYSTEM

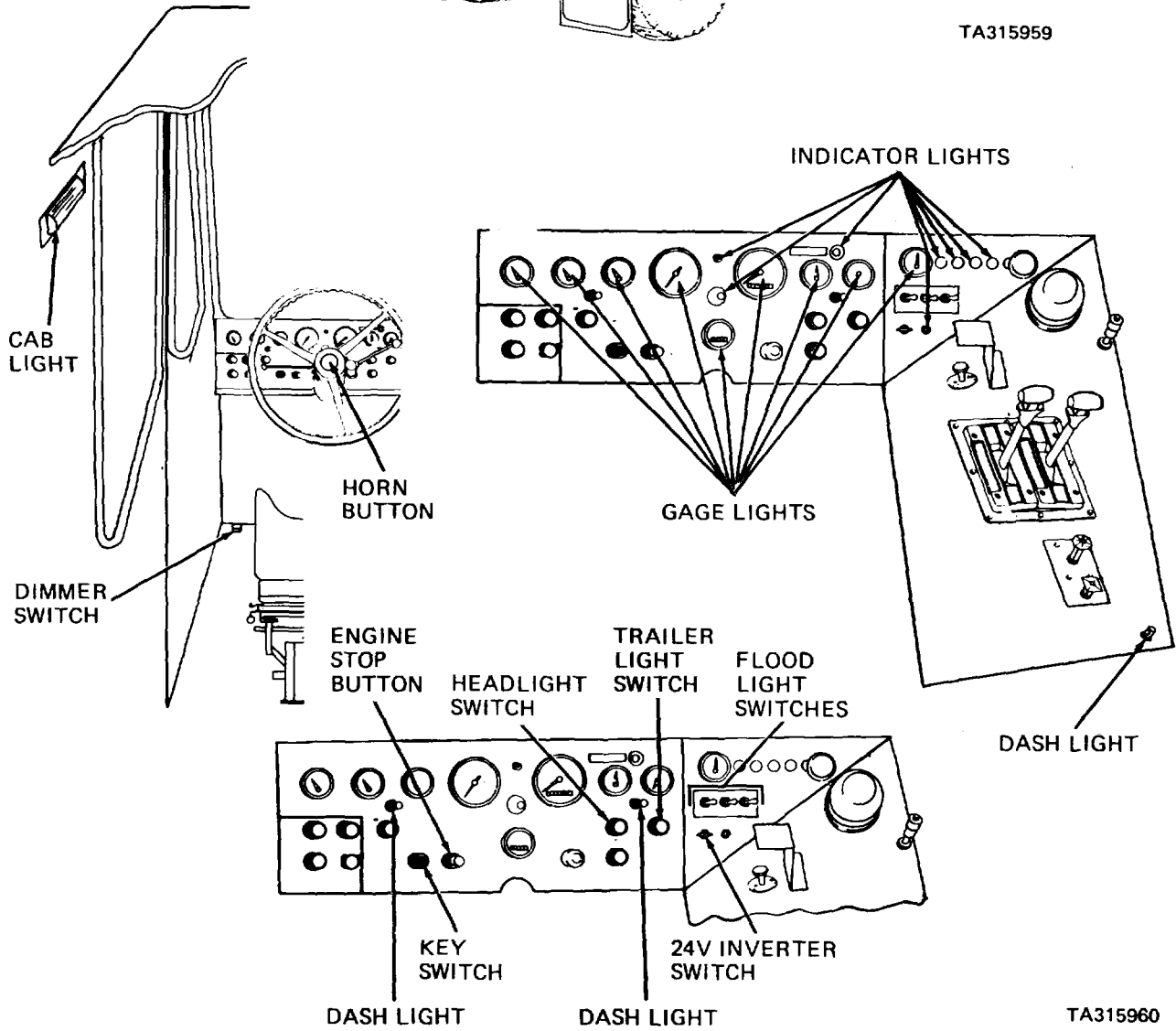
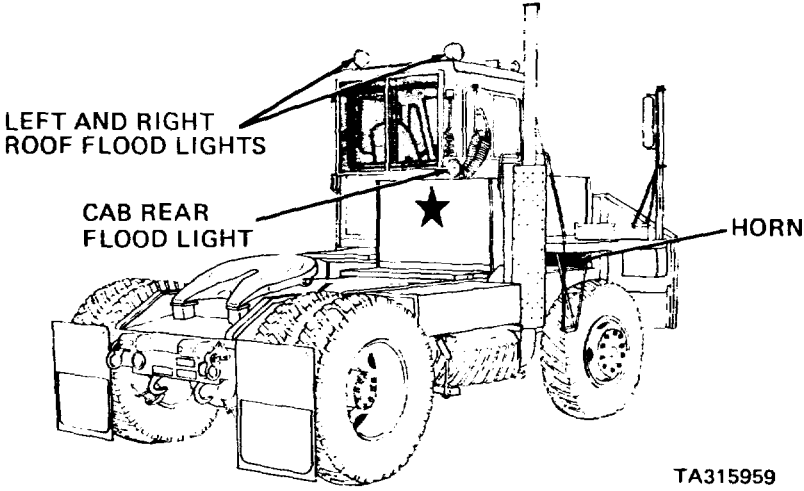


TA315958

Dipstick - Located at power steering reservoir and filter, provides convenient fill and check point. Power steering reservoir located at front side of rear cab guard.

Steering Wheel - When engine is running, turning the steering wheel causes internal valving at steering gear. This admits hydraulic fluid under pressure to assist operator's steering effort.

a. Vehicle Lights.



1-15. ELECTRICAL SYSTEM (Continued)**a. Vehicle Lights (continued).**

Dash Lights - Post-type lights illuminate controls when headlights are on; rotate headlight switch clockwise to decrease brightness, counterclockwise to increase brightness.

Gage Lights - Internal lights illuminate gage faces and pointers when headlights are on; headlight switch controls brightness: counterclockwise to brighten, clockwise to dim.

CAB REAR FLOOD LIGHT - Incandescent lamp and clear lens, mounted on rear cab guard, illuminates fifth wheel area. Turned ON and OFF with appropriate FLOOD LIGHT switch, or when transmission is shifted into reverse during tractor operation.

LEFT and RIGHT ROOF FLOOD LIGHTS - Two sealed-beam type lamps, mounted on rear of cab roof, illuminate container numbers when tractor drives in aisles at night. Turned ON and OFF by appropriate FLOOD LIGHT Switches.

FLOOD LIGHT Switches - Three separate FLOOD LIGHT switches control three flood lights. Push up for ON, down for OFF.

Cab Light - Incandescent lamp with cover mounted on cab roof, left hand side. Controlled by cab light switch located next to light; push up to turn ON, down to turn OFF.

Headlight Switch Pulling out to notched position turns on clearance, dash and gage, side marker, and front and rear parking lights. In second notched position, also turns on headlights. When electrical cable is connected between tractor and trailer, first and second notched positions also turn on trailer clearance, parking, and side marker lights.

Dimmer Switch - Foot-operated switch installed in cab floor, left hand side. Press with left foot to select head light high beam or low beam.

Trailer Light Switch - With 12V electrical cable connected to trailer, delivers power to trailer interior lights, independent of trailer exterior lights; pull out to turn ON, push in to turn OFF.

b. Horn.

Horn - Electric horn operated by pressing horn button on steering wheel. Mounted on front frame crossmember.

Horn Button - Spring loaded button located at center of steering wheel. Horn sounds when button is pressed (unless key switch is in OFF position), turns off when button is released.

c. Switches and Indicator Lights.

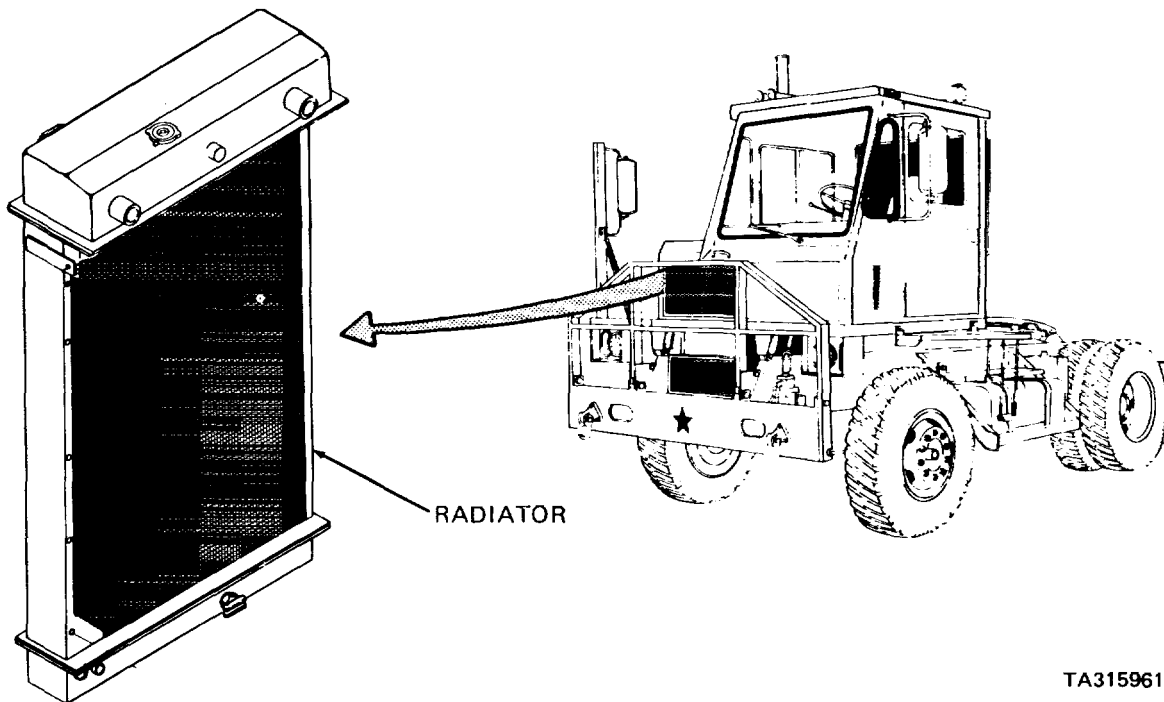
Engine Stop Button - Stops fuel flow to engine when pressed. Release when engine stops; to restart engine, key switch must be used to crank starter.

1-15. ELECTRICAL SYSTEM (Continued)**c. Switches and Indicator Lights (continued).**

Key Switch - Four position switch controls power to vehicle electrical circuits; first clockwise position delivers power to all circuits except starter, second clockwise position cranks starter, first counterclockwise position delivers power to accessory circuits only. Key removes in original (OFF) position.

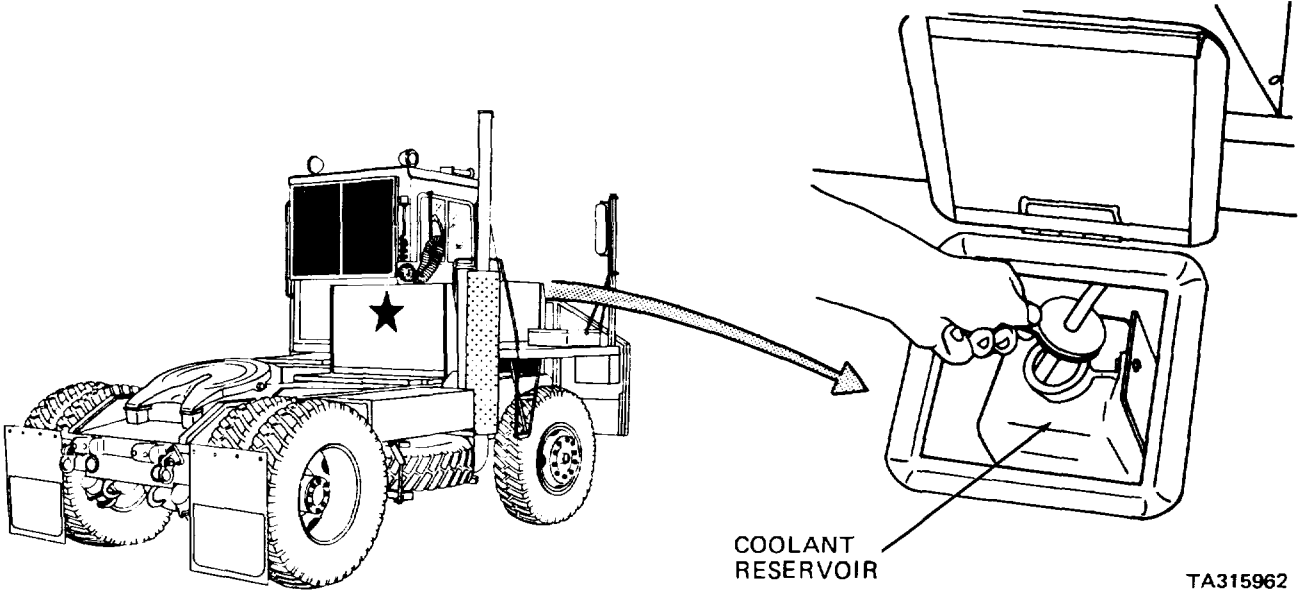
24V INVERTER Switch - Converts tractor 12V output to 24V to enable connecting cable to power 24V trailer lighting system. Push up to turn ON, down to turn OFF. Turn ON only when connecting to trailer with 24V lighting system.

Indicator Lights Eight light assemblies, each with incandescent lamp and red lens. With engine running, WATER LEVEL, WATER TEMP, OIL PRESSURE, LOW AIR, and TRANS/TORQUE CONVERTER Lights glow red to signal malfunction. 24V INVERTER Light glows red when 24V INVERTER switch is on. High Beam light glows red when headlights are on high beam. LOW FUEL INDICATOR light glows red when fuel level in tank is too low for operation.

1-16. COOLING SYSTEM

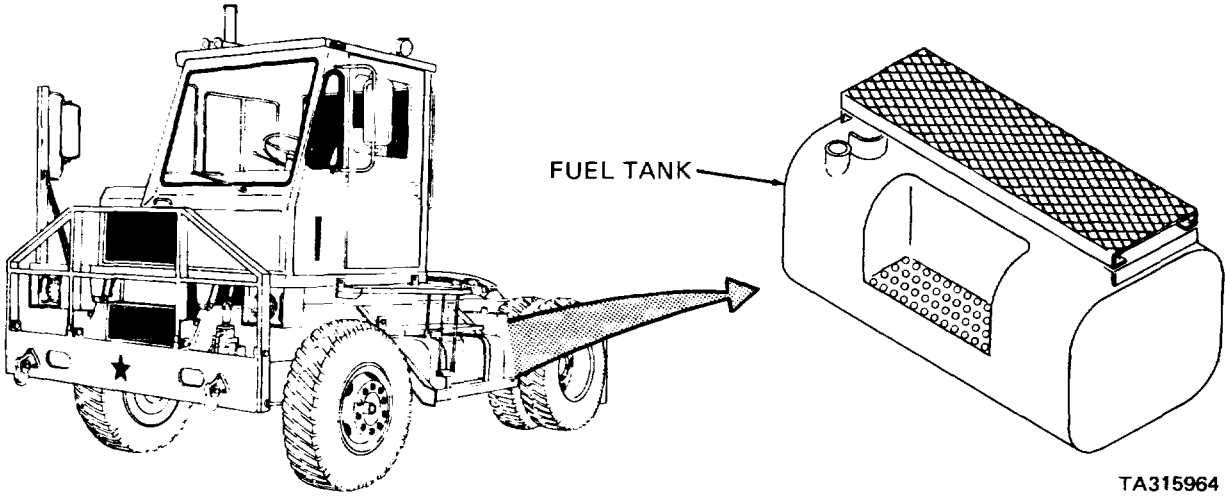
Radiator - Tube-and-fin type. Engine coolant circulated through radiator where it gives up heat to air stream developed by belt driven fan. Engine driven water pump draws cooled coolant from bottom of radiator and discharges it into lower part of cylinder block.

1-16. COOLING SYSTEM (Continued)



Coolant Reservoir - Storage for excess coolant; check coolant at, and add to, reservoir rather than removing radiator cap. Access to reservoir is through access plate located on engine hood.

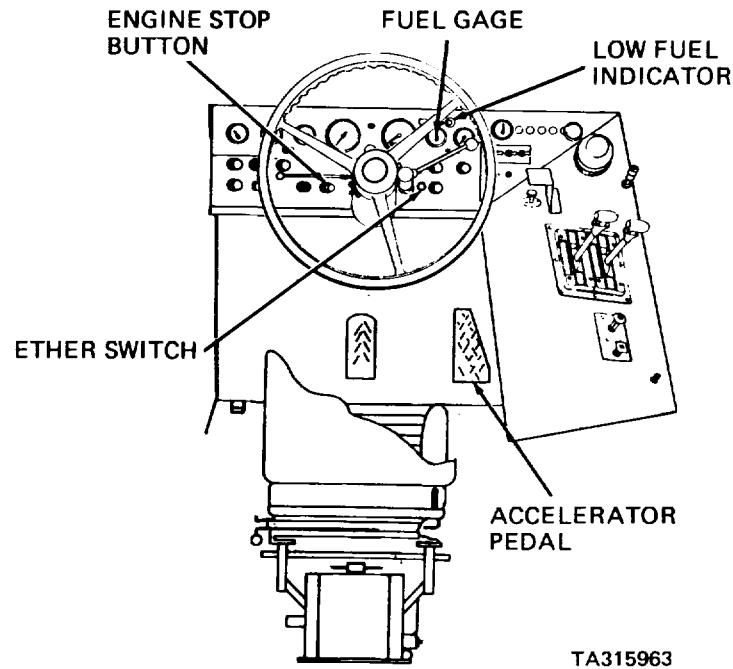
1-17. FUEL SYSTEM



Fuel Tank - Holds 50 gallons of diesel fuel. Mounted on left side of tractor.

Fuel Gage - With key switch in on position, indicates amount of fuel remaining in fuel tank.

Accelerator Pedal - When depressed, increases amount of fuel supplied to engine and engine speed increases; when released, decreases amount of fuel supplied to engine and engine speed decreases.

1-17. FUEL SYSTEM (Continued)

Engine Stop Button - Stops flow of fuel to engine stopping engine operation. Push in to stop fuel flow to engine; release when engine stops.

WARNING

Do not stop engine with transmission in reverse or tractor will be inoperable.

Ether Switch - Injects volatile ether into engine air intake manifold for cold weather starting.

WARNING

Do not use ether switch without cranking engine. Over-charge of ether can cause explosion of engine air intake system.

LOW FUEL INDICATOR - Lights red when amount of fuel in fuel tank is too low for operation on 30 degree grades or side slopes of 10 percent.

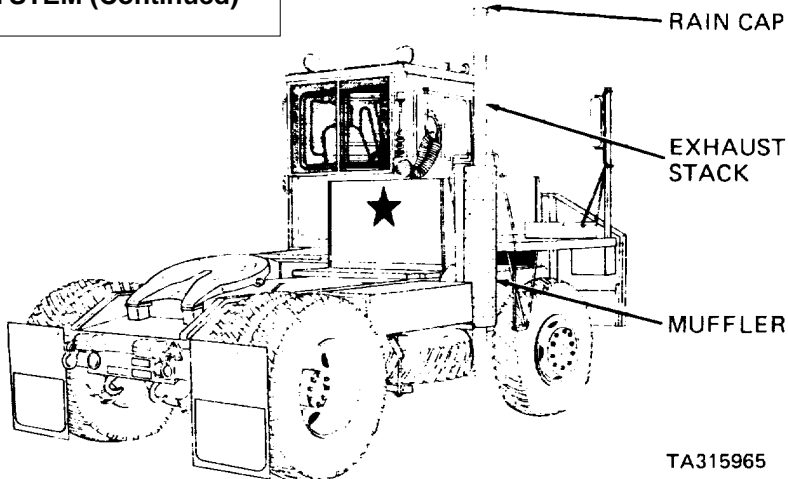
1-18. EXHAUST SYSTEM

Muffler - Quiets engine noise. Personnel protected from muffler by cage around outside of muffler. Perforations in cage allow heat to escape.

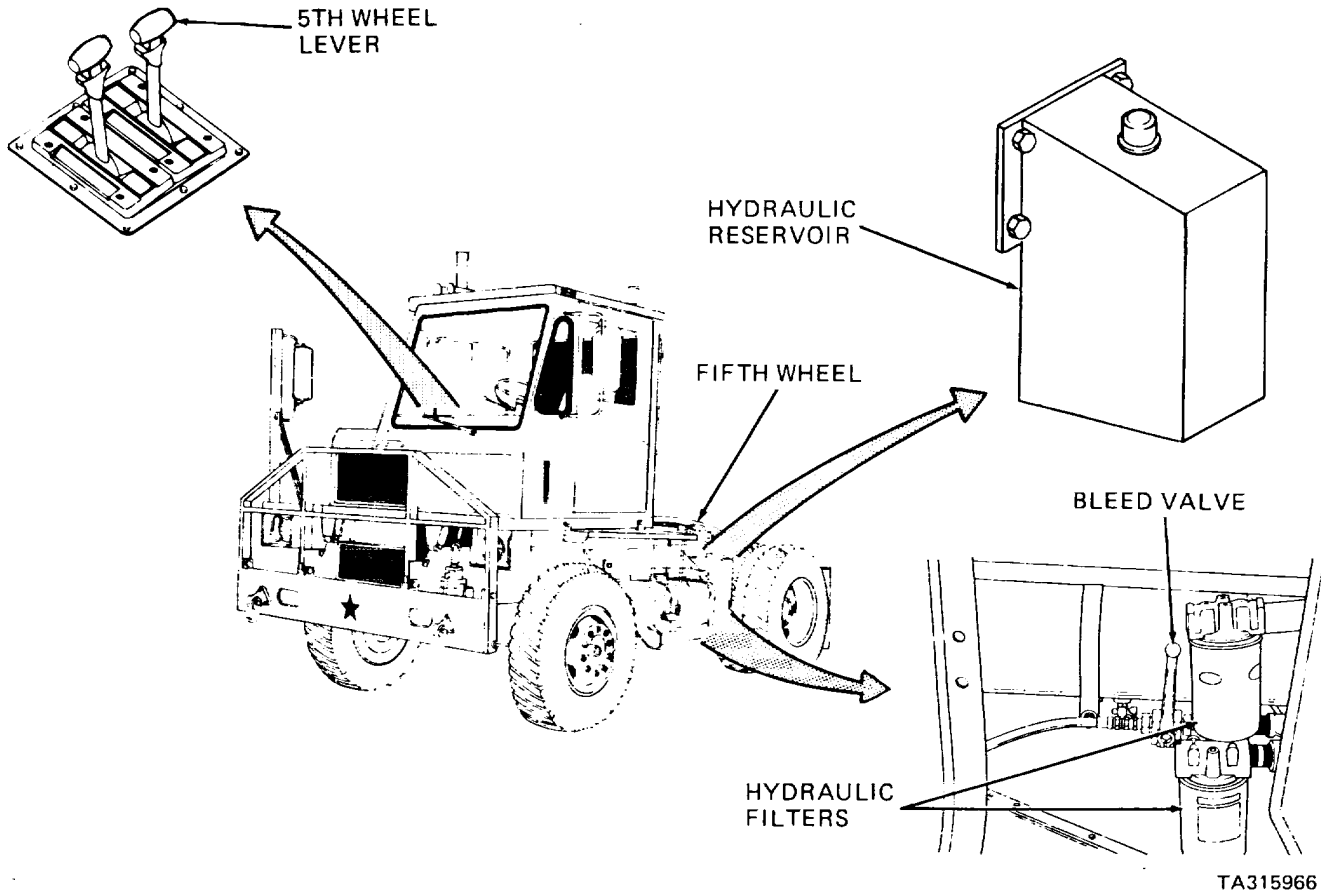
Exhaust Stack - Routes exhaust fumes and gases away from operator's cab; hinged for reduction in overall height of tractor.

Rain Cap - Protects exhaust system against water entry.

1-18. EXHAUST SYSTEM (Continued)



1-19. FIFTH WHEEL HYDRAULIC SYSTEM



Hydraulic Reservoir - Holds 7 gallons of hydraulic oil. Supplies hydraulic fluid to system; provides fill and check point. Drain plug located at bottom provides for draining oil and removing sediment. Hydraulic power for system supplied by hydraulic pump mounted on right hand side of transmission.

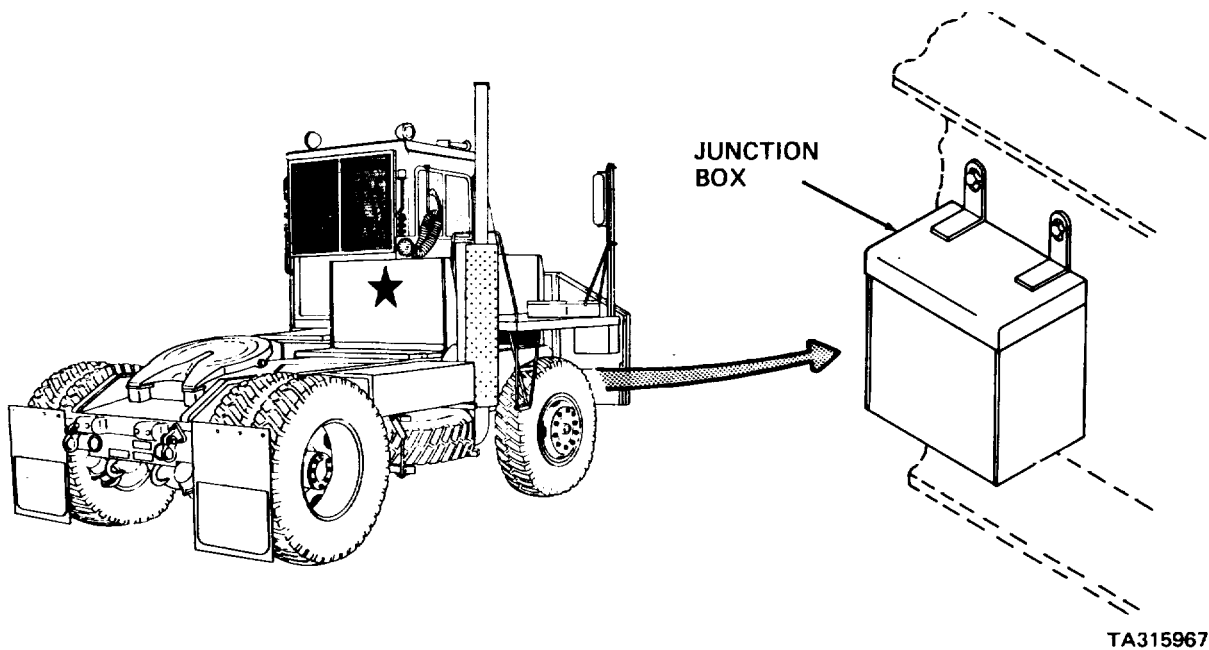
5th WHEEL lever - Connected by control cable to fifth wheel hydraulic valve. Movement of lever causes spool in hydraulic control valve to change position allowing hydraulic oil to flow to two hydraulic cylinders mounted on fifth wheel.

1-19. FIFTH WHEEL HYDRAULIC SYSTEM (Continued)

Fifth Wheel Consists of boom and platform. Two hydraulic cylinders, one mounted on each side of fifth wheel boom, control raising or lowering of boom. When hydraulic oil flows to cylinders from hydraulic control valve, piston in each cylinder will either extend to raise boom or retract to lower boom depending on position of hydraulic control valve spool. (Positioning of spool is determined by 5th WHEEL lever position.)

Hydraulic Filters - Two filters, one located on suction side, other located on return side, filter hydraulic oil.

Bleed Valve - Provides for manually lowering elevated fifth wheel, returns hydraulic fluid to reservoir.

1-20. WINTERIZATION SYSTEM

Winterization System Cable - Normally stored in tool box; connects 110 Vac power to junction box at front bumper of tractor, powering heaters for batteries, engine oil, and coolant.

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CHAPTER 2

OPERATING INSTRUCTIONS

CHAPTER OVERVIEW

The purpose of this chapter is to familiarize you with the equipment so that you can operate it safely, efficiently, and effectively.

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| Section | Title | Page |
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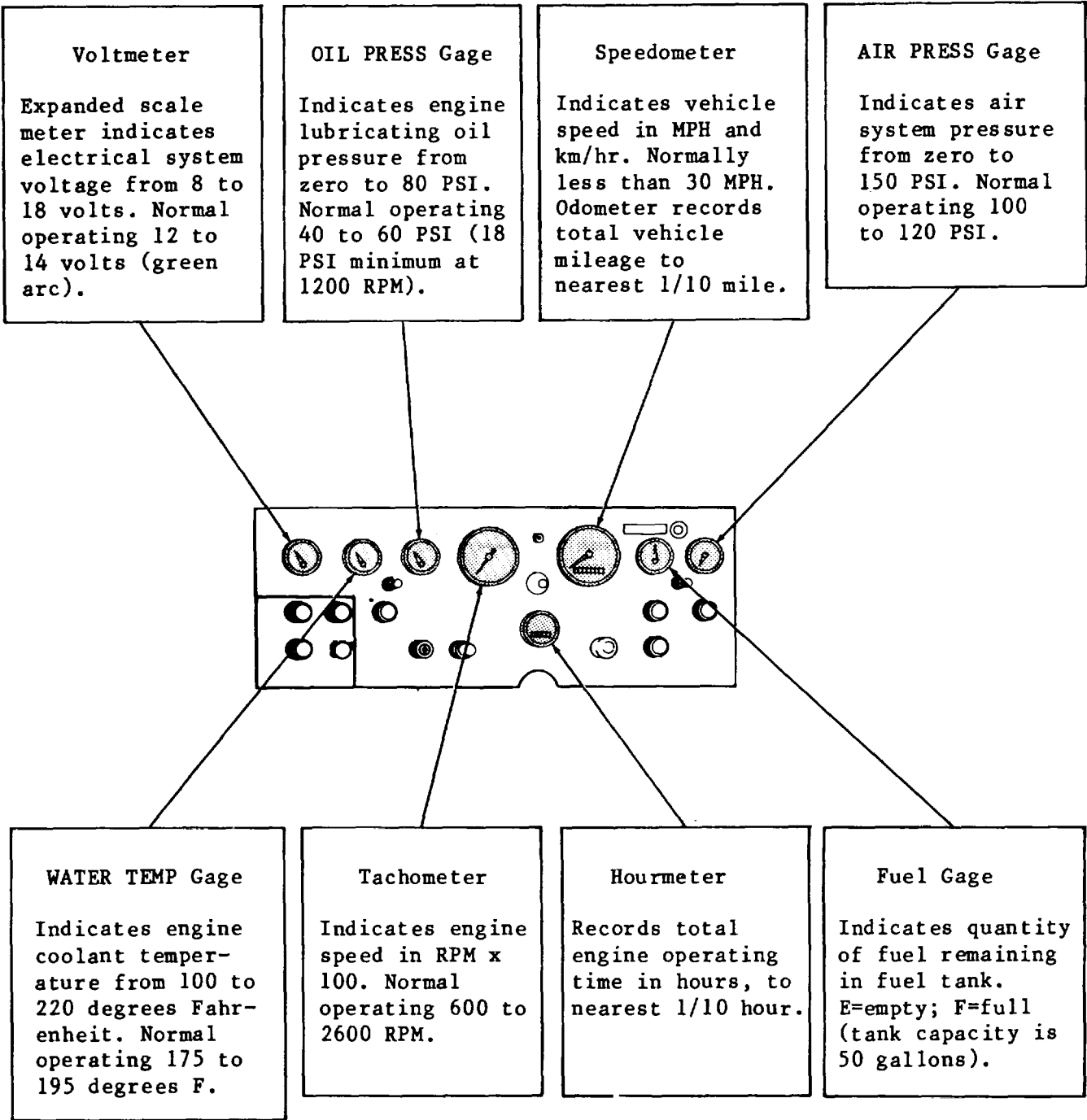
Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

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| Instrument Panels | 2-1 | Accelerator Pedal and | |
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2-1. INSTRUMENT PANELS

a. Front Instrument Cluster.

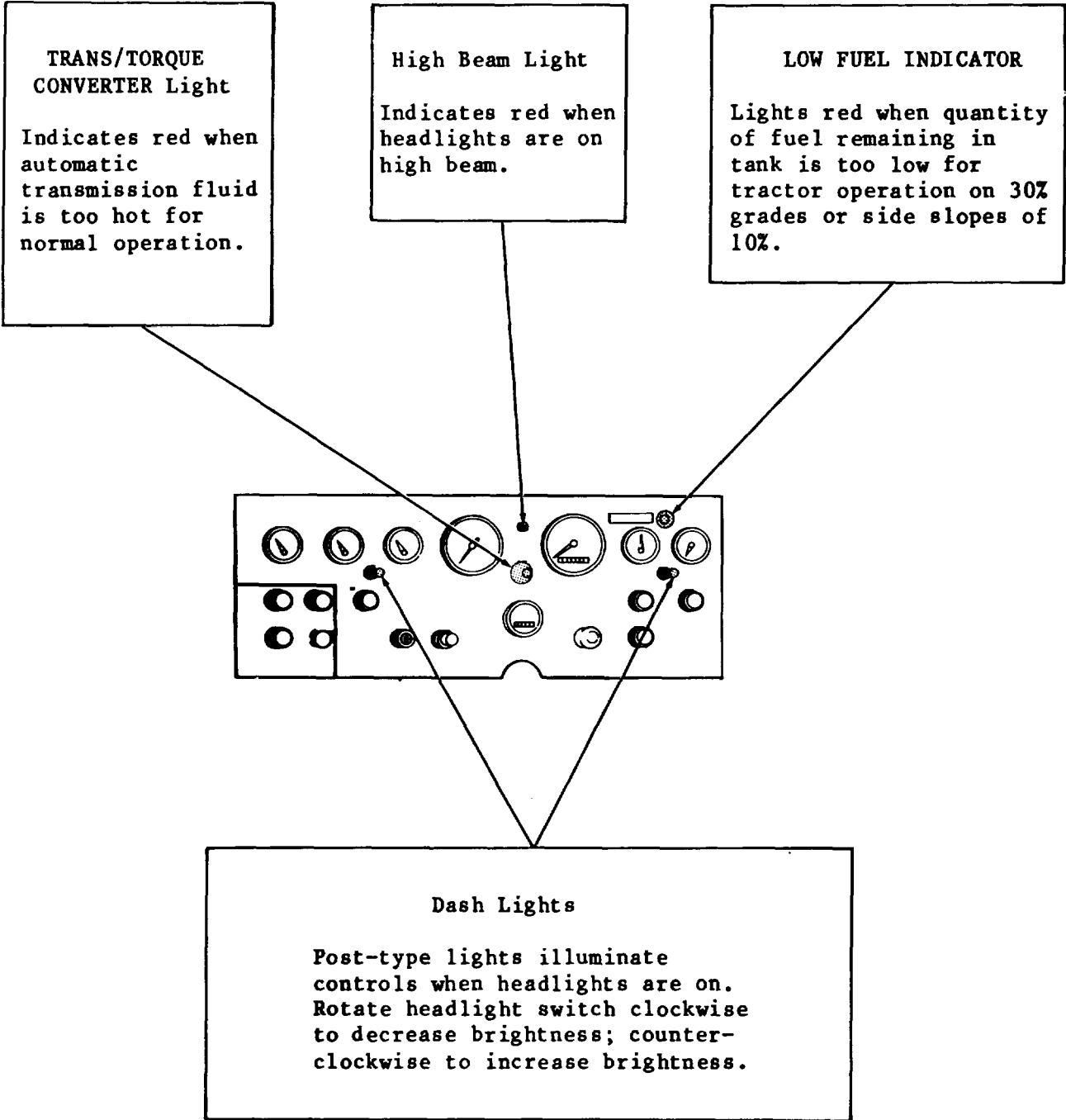
(1) Gages.



2-1. INSTRUMENT PANELS (Continued)

a. Front Instrument Cluster (continued).

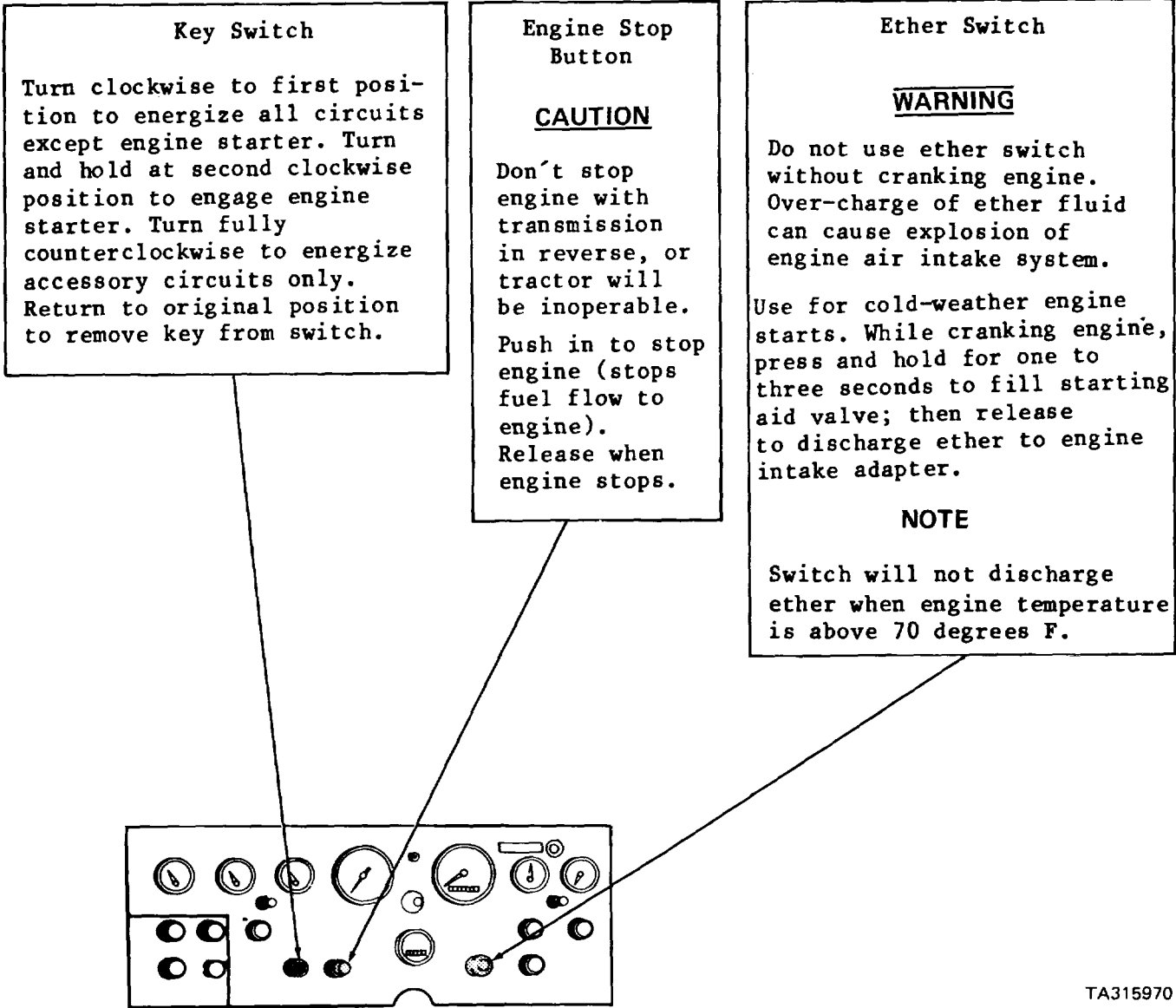
(2) Lights.



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2-1. INSTRUMENT PANELS (Continued)

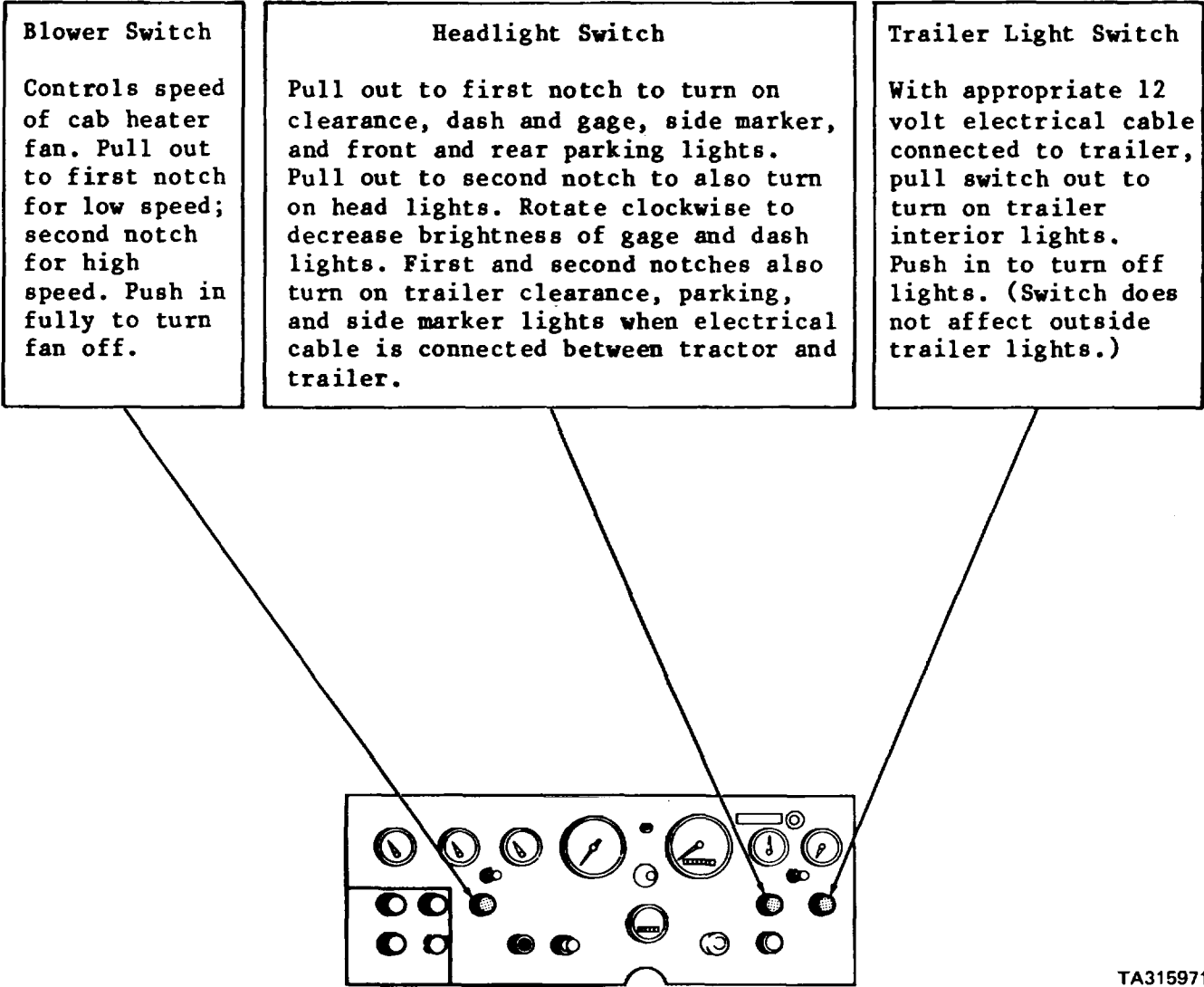
- a. Front Instrument Cluster (continued).
 - (3) Start and Stop Switches.



TA315970

2-1. INSTRUMENT PANELS (Continued)

- a. Front Instrument Cluster (continued).
 - (4) Other Switches.



TA315971

2-1. INSTRUMENT PANELS (Continued)

a. Front Instrument Cluster (continued).

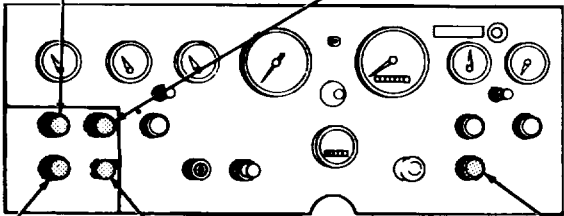
(5) Controls.

Fresh Air Control

Regulates amount of outside air applied to cab heater. Pull out fully for maximum flow of outside air, push in fully to recirculate cab air through heater. For air flow in warm weather, pull out fully with temperature control pushed in fully.

Temperature Control

Regulates hot water flow to cab heater. Pull out for maximum heat; push in fully for no heat.



Defroster Control

Pull out to direct cab heater air through windshield defroster vents. Push in fully to stop defroster air flow.

WIPER Control

Turn counterclockwise to RUN position to operate windshield wiper blade. Turn further counterclockwise to increase wiper speed. Turn clockwise to PARK to return blade to park position.

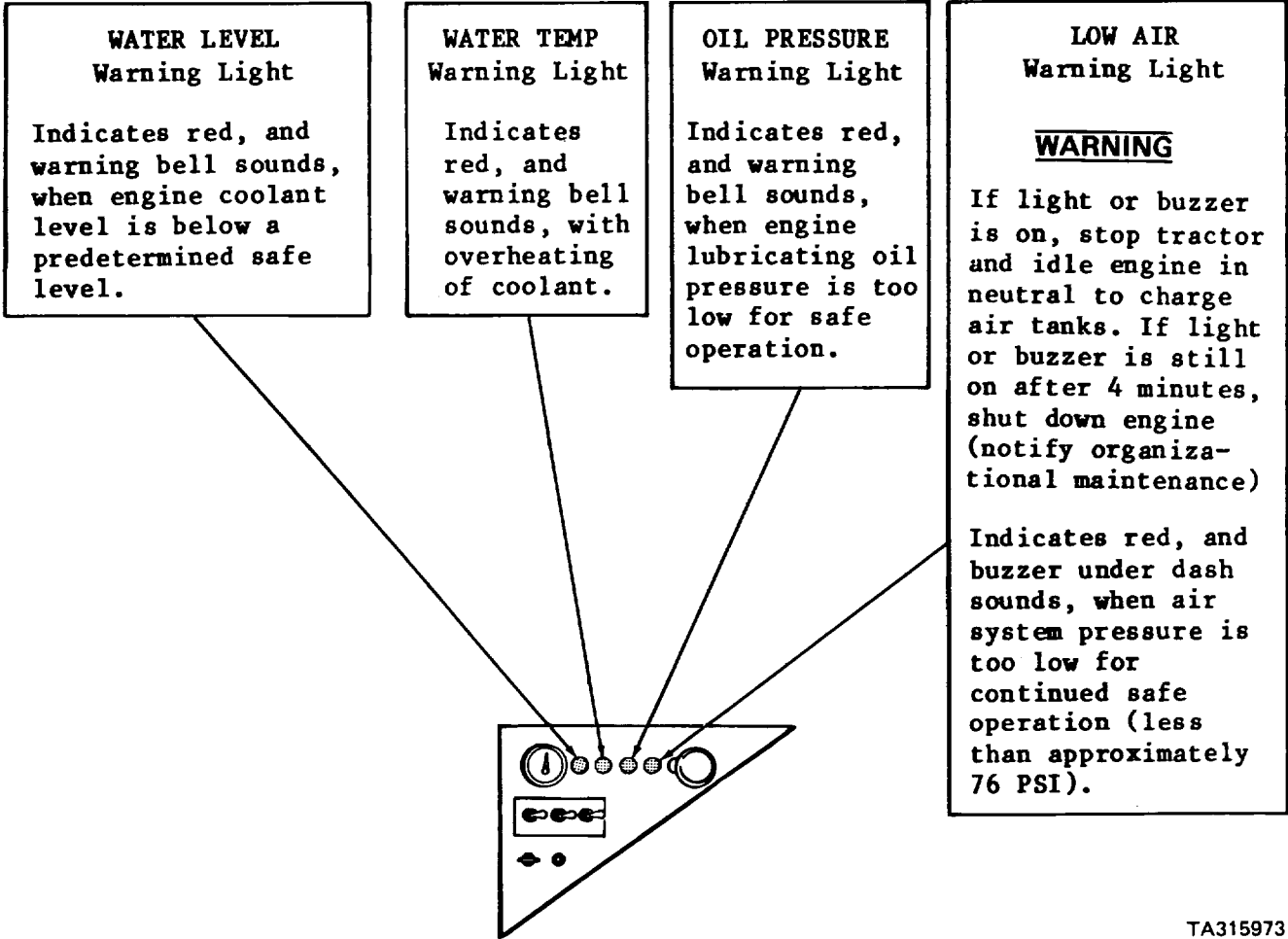
WASHER Button

Used with windshield wiper to clean windshield. Push in to apply two streams of washing solvent to windshield. Release button to stop flow.

2-1. INSTRUMENT PANELS (Continued)

b. Right Corner Instrument Cluster.

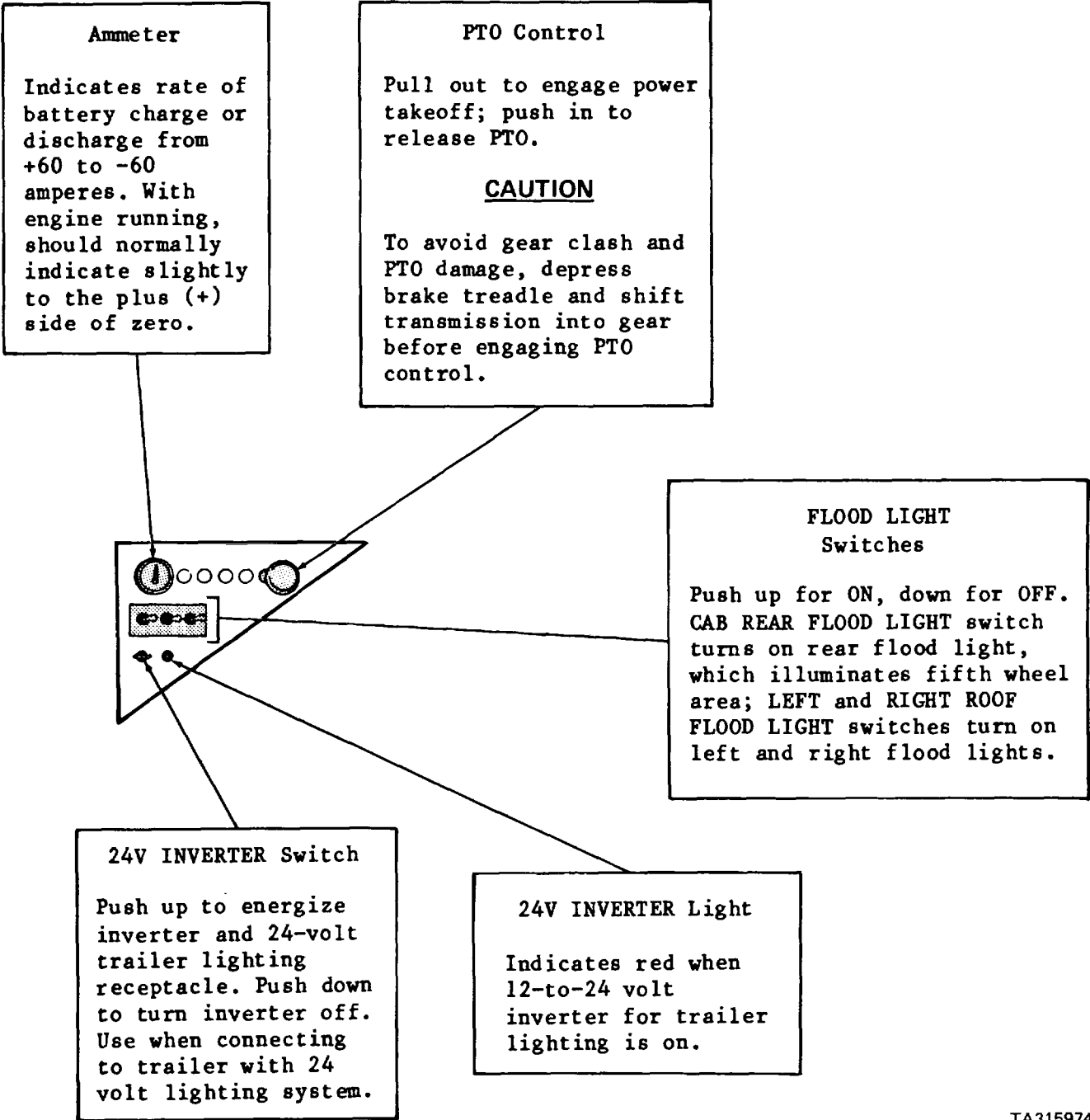
(1) Warning Lights.



TA315973

2-1. INSTRUMENT PANELS (Continued)

- b. Right Corner Instrument Cluster (continued).
 - (2) Controls and Indicators.



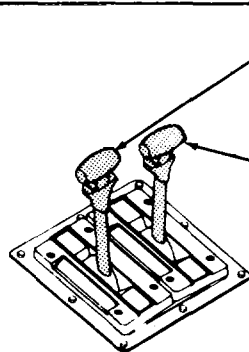
TA315974

2-1. INSTRUMENT PANELS (Continued)

c. Right Instrument Cluster.

(1) Levers.

| Gear Shift Lever | | |
|--|--------------------|--|
| Selects transmission gear ranges for tractor operation. | | |
| Gear | Description | Operation |
| R | Reverse | Bring tractor to complete stop and idle engine before putting tractor in reverse gear (see CAUTION below). |
| N | Neutral | Idle engine, then put tractor into neutral gear. Use for operation of fifth wheel or for starting engine. |
| 2-5 | Drive | Idle engine before putting into drive gear. Use for normal operation. Transmission automatically shifts from 2nd thru 5th gears. |
| 2-4 | Intermediate range | Restricts automatic shifting to no higher than 4th gear. Use for greater engine braking or pulling power. |
| 2 | Intermediate range | Restricts automatic shifting to no higher than 2nd gear. Use for greater engine braking or pulling power. |
| 1 | Creeper | Restricts tractor to 1st gear. Use for going up steep grade with heavy load, or for pulling through mud or snow (see CAUTION below). |
| <u>CAUTION</u> | | |
| Brake treadle must be fully depressed while shifting into or out of reverse. | | |
| When at full throttle, do not shift between 1st gear and any forward gear. | | |

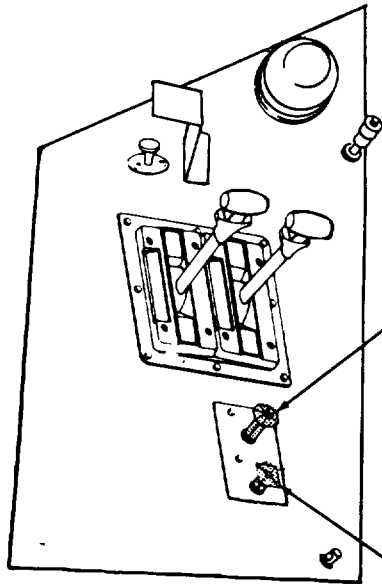


5th WHEEL Lever

With power takeoff engaged and transmission in neutral, pull back to raise fifth wheel. Push forward to lower fifth wheel.

2-1. INSTRUMENT PANELS (Continued)**c. Right Instrument Cluster (continued).**

(2) Valves.

**TRAILER AIR SUPPLY Valve**

After connecting both brake hoses to trailer, push in to supply service air to trailer brake system (releases trailer spring brakes). When dropping a trailer, before disconnecting either brake hose, pull out to evacuate trailer brake lines (applies trailer spring brakes). Do not use for parking.

PARKING BRAKE Valve

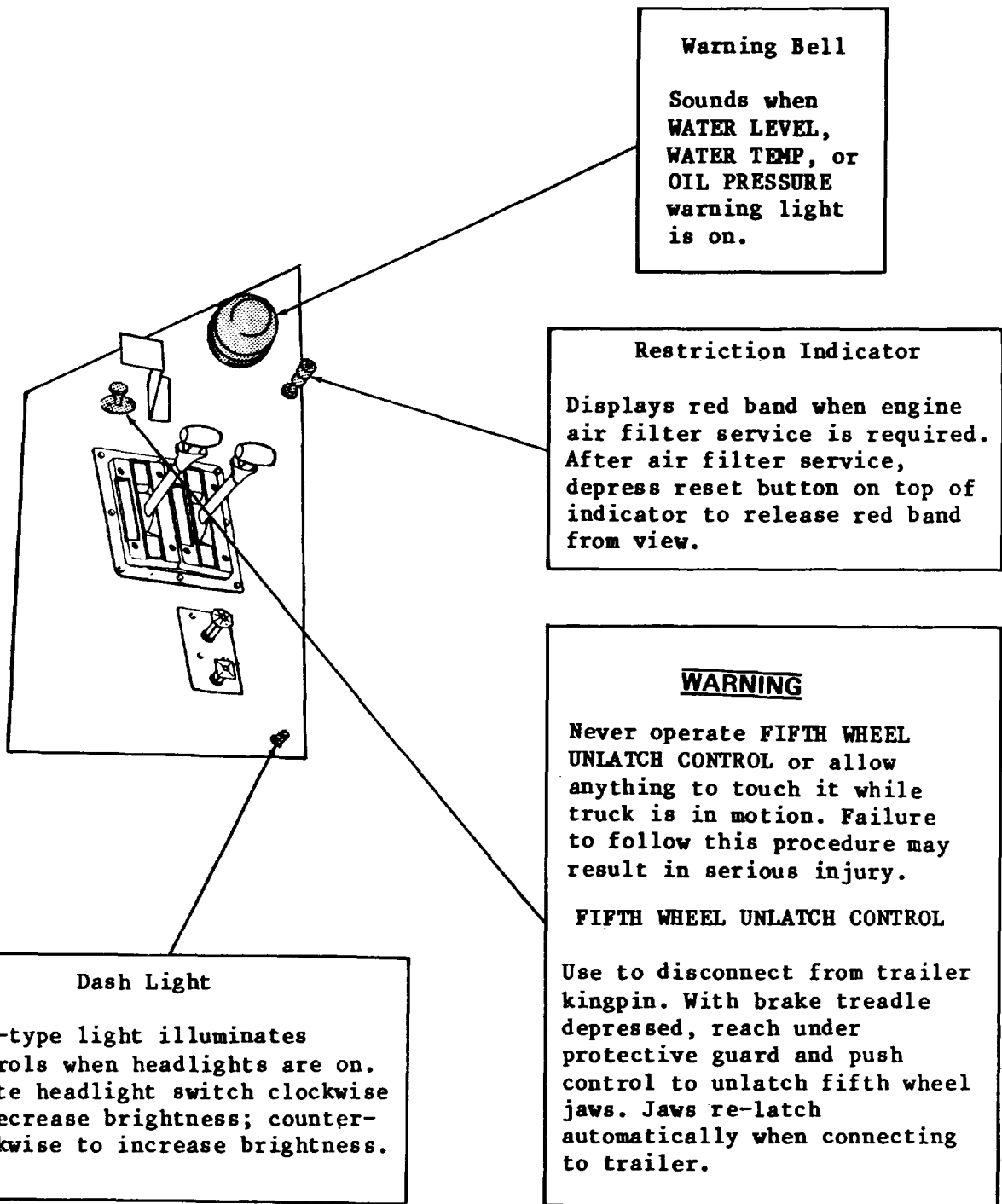
Pull out to apply rear wheel parking (spring) brakes. Push in to release parking brakes.

TA315976

2-1. INSTRUMENT PANELS (Continued)

c. Right Instrument Panel (continued).

(3) Controls and Indicators.



Warning Bell

Sounds when WATER LEVEL, WATER TEMP, or OIL PRESSURE warning light is on.

Restriction Indicator

Displays red band when engine air filter service is required. After air filter service, depress reset button on top of indicator to release red band from view.

Dash Light

Post-type light illuminates controls when headlights are on. Rotate headlight switch clockwise to decrease brightness; counter-clockwise to increase brightness.

WARNING

Never operate FIFTH WHEEL UNLATCH CONTROL or allow anything to touch it while truck is in motion. Failure to follow this procedure may result in serious injury.

FIFTH WHEEL UNLATCH CONTROL

Use to disconnect from trailer kingpin. With brake treadle depressed, reach under protective guard and push control to unlatch fifth wheel jaws. Jaws re-latch automatically when connecting to trailer.

2-2. TURN SIGNALS AND FLASHER

Turn Signal Lever

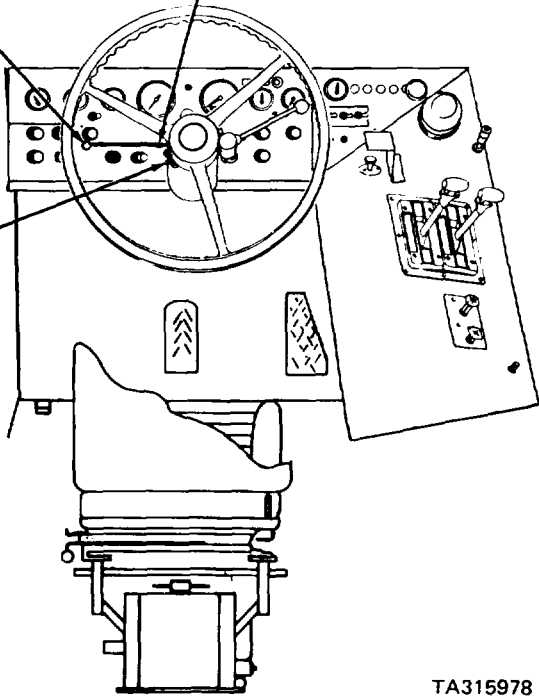
Push forward to signal right turn. Pull back to signal left turn. Lever will automatically return to neutral when turn is completed.

Turn Signal Light

Flashes green to indicate that left turn signal, right turn signal, or warning flasher lights are operating.

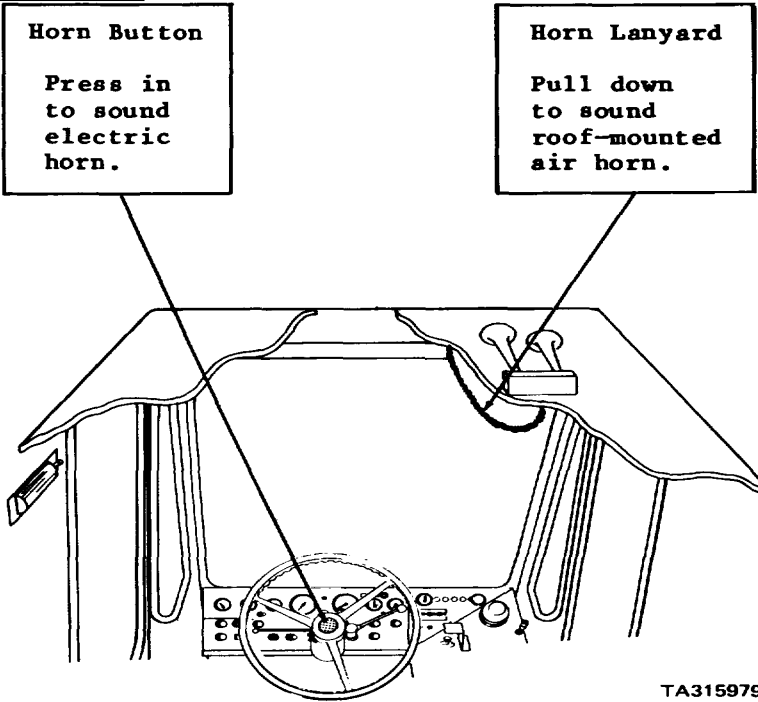
Hazard Warning Switch

Push in to flash all turn signal lights in unison. Pull out to turn off lights.



TA315978

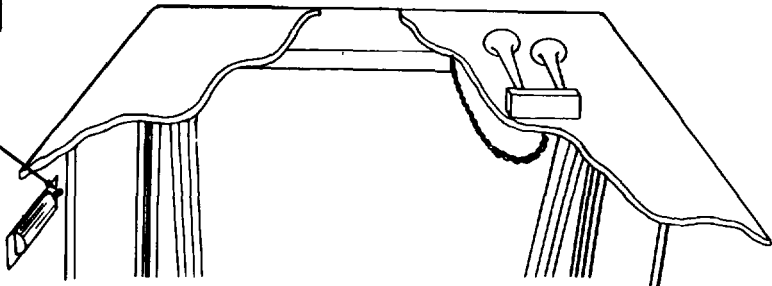
2-3. HORN BUTTON AND LANYARD



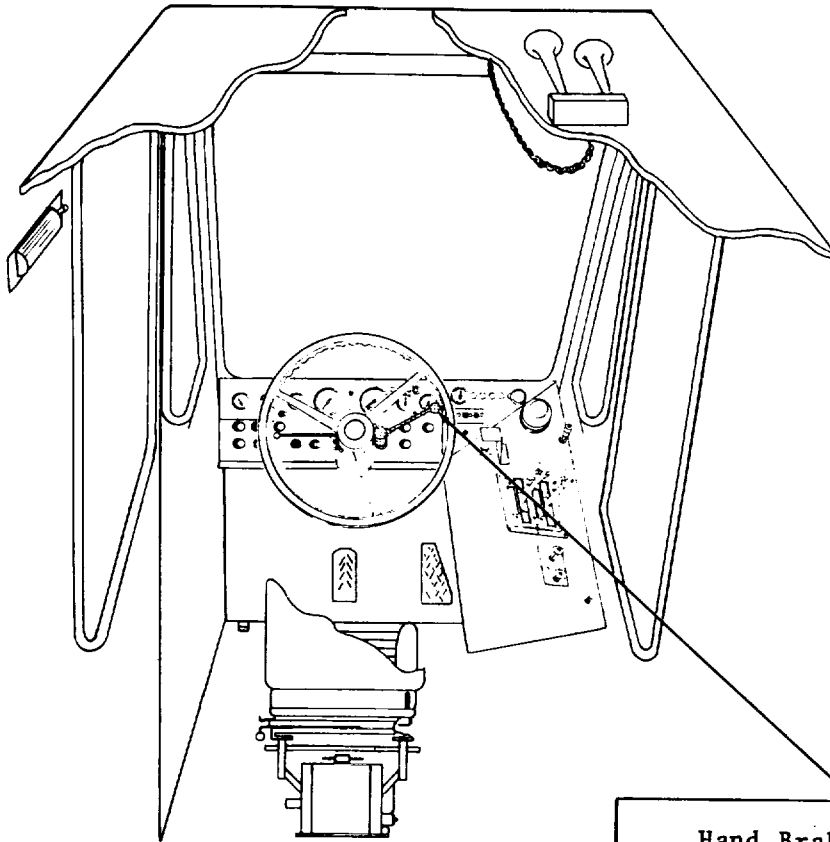
TA315979

2-4. CAB LIGHT SWITCH

Cab Light Switch
Push up to turn on cab dome light;
push down to turn light off.



TA315980

2-5. HAND BRAKE CONTROL**Hand Brake Control**

Use to apply trailer brakes without applying tractor brakes. With emergency and service air hoses connected to trailer, gradually pull down to apply trailer brakes. Push lever up to release trailer brakes. Do not tow trailer with lever partly down, and do not use as a parking brake.

TA315981

2-6. OPERATOR'S SEAT

Isolation Lever

Pull lever out and back to engage fore and aft isolator. To lock out, push lever forward and in.

Back Angle Adjustment Cam

While leaning forward in seat, pull cam out and turn it to select back cushion angle.

Position Lever

Pull lever forward to slide seat forward or back. Push down to secure adjustment.

Tilt Handle

Shift weight to rear of seat; then grasp tilt handle to select one of three bottom cushion positions.

Height Adjustment Handle

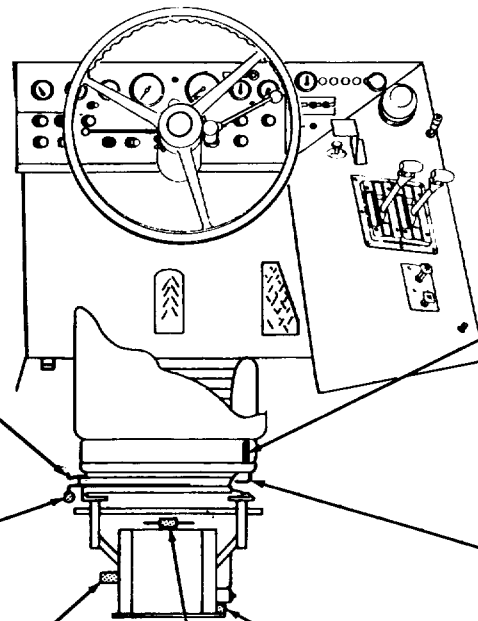
Turn handle to raise or lower seat and adjust for leg length.

Weight Adjustment Handle

Use to adjust seat torsion spring to driver's weight. Turn clockwise to put more preload on the spring. Turn counterclockwise for a softer ride.

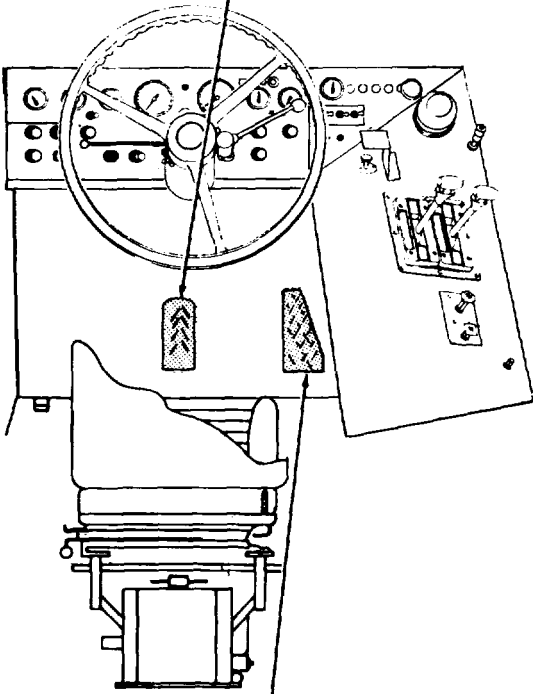
Release Lever

Press with right heel of foot to disengage and reset automatic shock absorber. Shock absorber will automatically engage on the next rough, bumpy stretch of road.



2-7. ACCELERATOR PEDAL AND BRAKE TREADLE

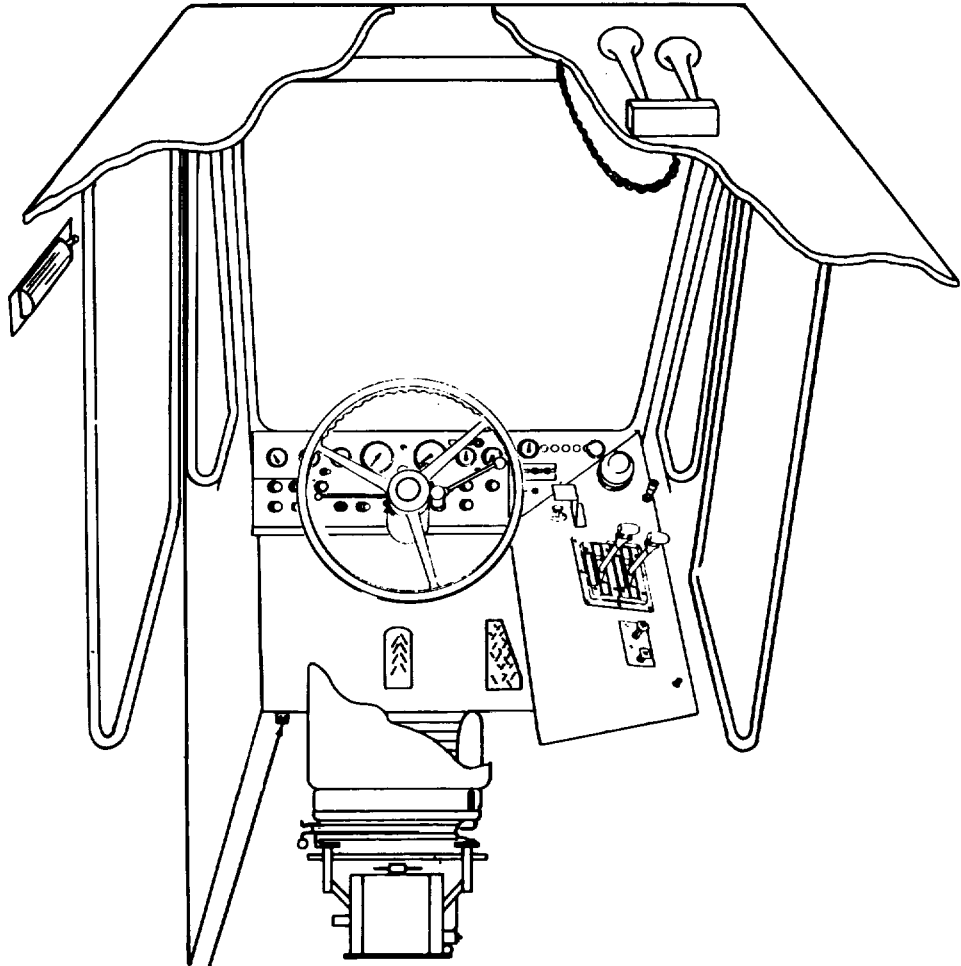
Brake Treadle
Press to apply service brakes.



Accelerator Pedal
Press to increase engine speed.

TA315983

2-8. DIMMER SWITCH

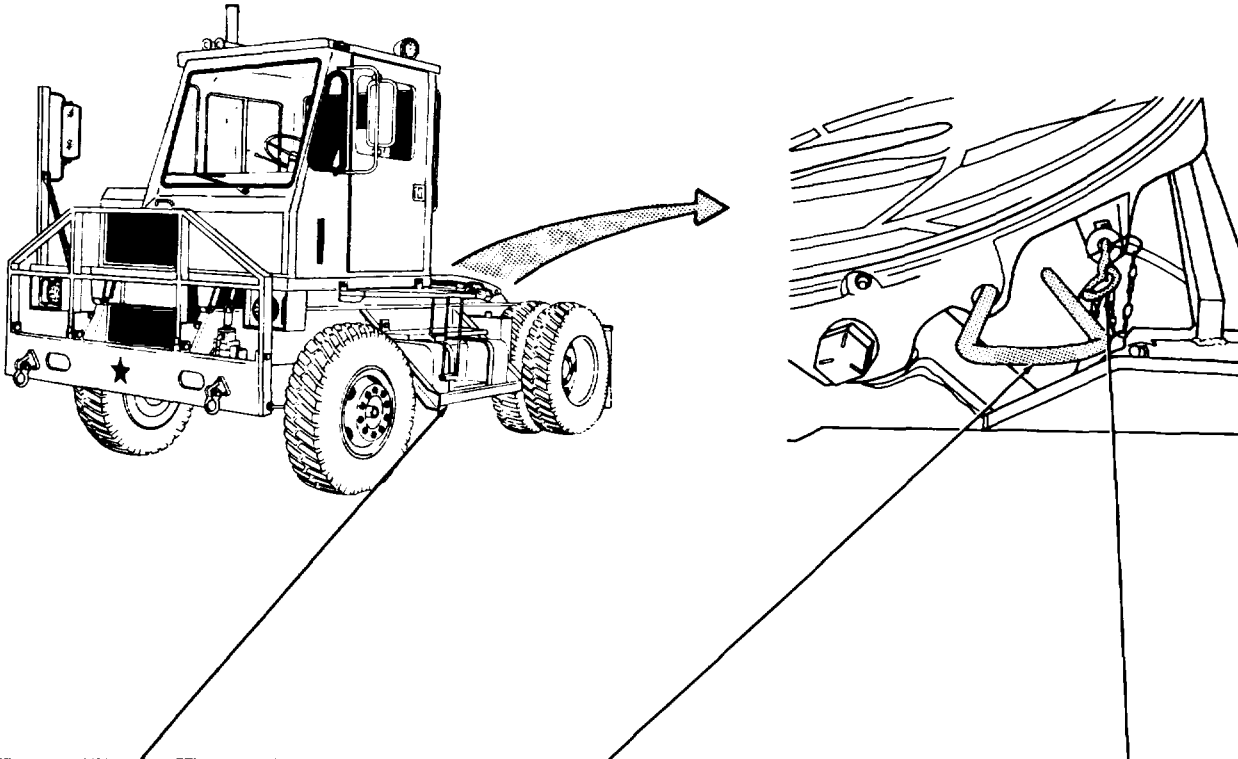


Dimmer Switch
With headlights on,
press with left foot
to select head light
high beam or low beam.

TA315984

2-9. EXTERNALLY MOUNTED CONTROLS AND INDICATORS

a. Fifth Wheel Controls.



WARNING

Stand away from hydraulic fifth wheel when operating bleed valve. Hot oil may be expelled from filler cap.

Bleed Valve

Use to lower elevated fifth wheel only in case of failure of fifth wheel hydraulic system. Rotate valve handle 90 degrees.

Release Arm

Use to manually unlatch fifth wheel jaws in case of failure of FIFTH WHEEL CONTROL. With secondary lock handle pulled out and lock handle pin installed, grasp release arm and pull out until fifth wheel jaws lock in unlatched position and release arm stays out.

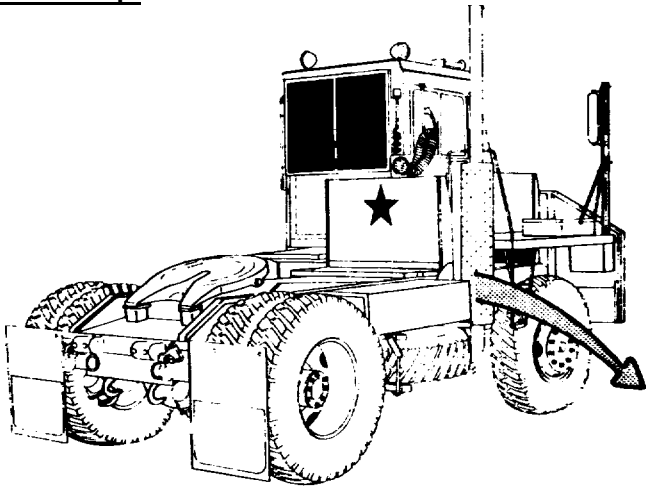
Secondary Lock Handle

Use to enable or prevent unlatching of fifth wheel jaws. To unlatch, either automatically (using FIFTH WHEEL CONTROL) or manually (using release arm), be sure handle is in pulled out position and pin is installed. To prevent unlatching, remove pin and push handle all the way in; jaws will not unlatch automatically or manually with handle pushed in.

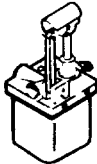
TA315985

2-9. EXTERNALLY MOUNTED CONTROLS AND INDICATORS (Continued)

b. Cab Tilt Pump.



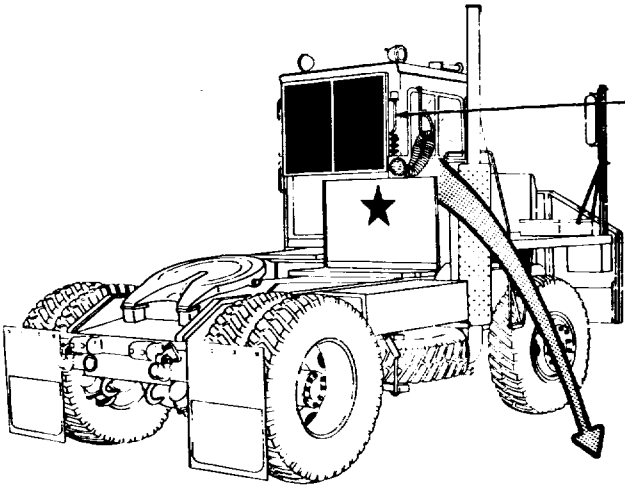
Cab Tilt Pump
Use to tilt and lower tractor cab (pump handle stored in brackets in cab rear, left hand side corner post).



TA315986

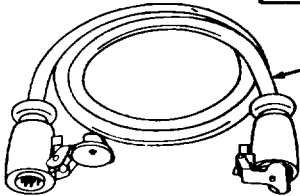
2-10. OTHER OPERATOR'S CONTROLS AND INDICATORS

a. Trailer Lighting Cables.



12 Volt Trailer Lighting Cable
Use to supply electrical power to 12-volt trailers. Disconnect cable connector plug from plug holder. Then plug cable into trailer receptacle.

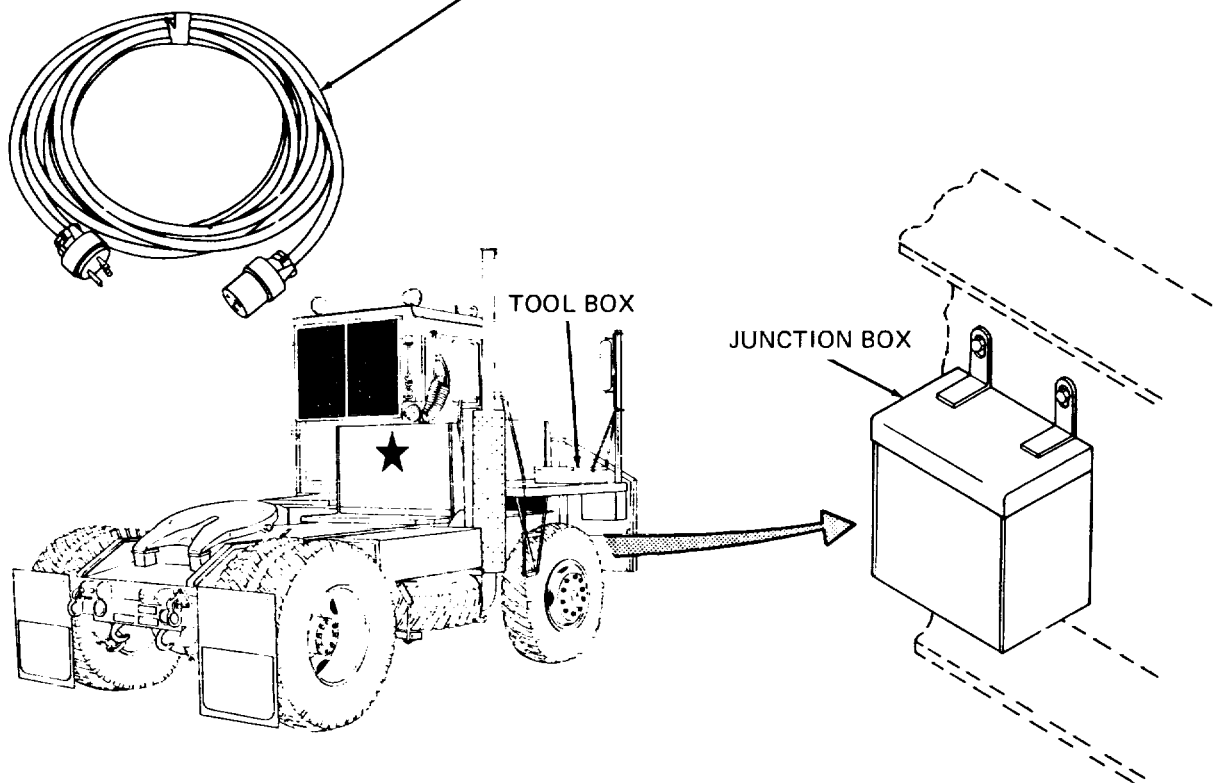
24 Volt Trailer Lighting Cable
Use to supply electrical power to 24 volt trailers. Connect cable to tractor 24 volt receptacle and to receptacle on trailer. Push up 24V INVERTER switch to energize inverter.



TA315987

2-10. OTHER OPERATOR'S CONTROLS AND INDICATORS (Continued)**b. Winterization System Cable.****Winterization System Cable**

Use to raise the temperature of batteries, engine oil, and coolant before cold weather operation. Remove from tool box and connect female end of cable to receptacle in junction box located at right hand side of front bumper. Connect other end to 110Vac power source with 30A capacity. Operation is fully automatic and thermostat controlled. Allow 2 to 4 hours warming time. Disconnect cable and store in tool box before resuming operation of tractor.



TA315988

2-10. OTHER OPERATOR'S CONTROLS AND INDICATORS (Continued)

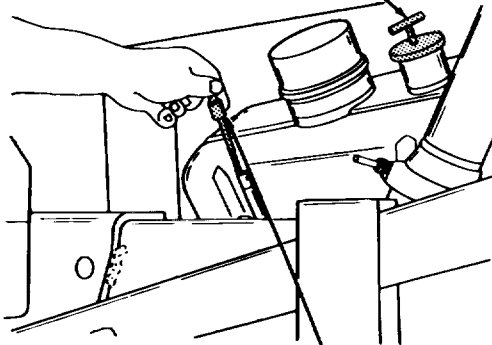
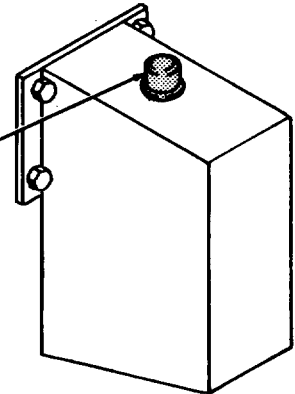
c. Dipsticks and Fills.

Engine Oil Filler Cap

Use to fill engine crankcase. Unscrew T-handle counterclockwise; then pull out.

Hydraulic Reservoir Filler Cap

Use to check and fill hydraulic reservoir. Remove filler cap and check that hydraulic oil is at or slightly above bottom of reservoir screen.

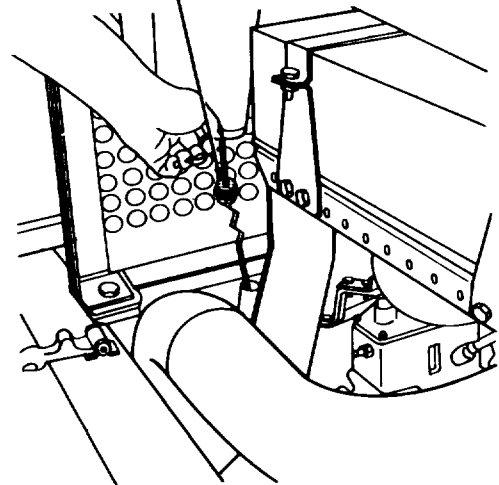


Transmission Fluid Level Dipstick

Use to check transmission oil pan fluid level. With engine running, operating temperature above 140 degrees, and transmission in neutral, remove dipstick, wipe with cloth, and reinsert. Pull out dipstick and check that fluid level is at FULL mark. Add transmission oil if necessary.

Engine Oil Level Dipstick

Use to check engine crankcase oil level. With engine off and oil cool, pull out dipstick, wipe with cloth, then reinsert dipstick. Pull out dipstick and check that oil level is between ADD and FULL marks.

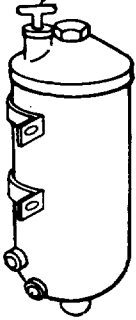


2-10. OTHER OPERATOR'S CONTROLS AND INDICATORS (Continued)

c. Dipsticks and Fills (continued).

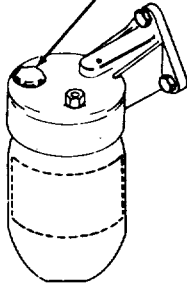
Power Steering Reservoir Dipstick and Fill

Use to check and fill power steering hydraulic reservoir. With engine stopped, unscrew dipstick, wipe with cloth, then reinsert. Remove dipstick and check that oil level reaches FULL mark. If necessary, add hydraulic oil through dipstick opening.



Alcohol Evaporator Filler Plug

Use to check and fill alcohol evaporator reservoir. Unlatch and raise engine hood, unscrew alcohol evaporator filler plug, and visually check alcohol level. If necessary, add methanol alcohol.



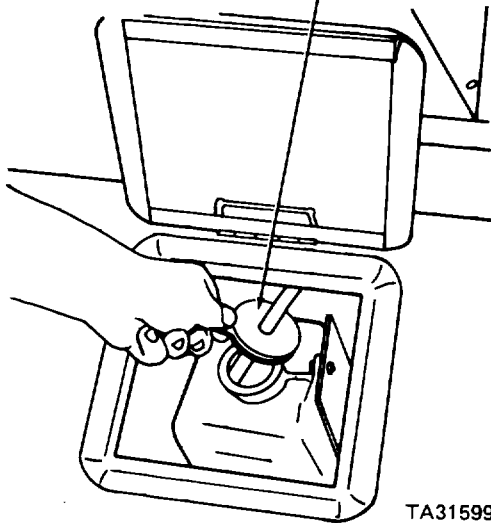
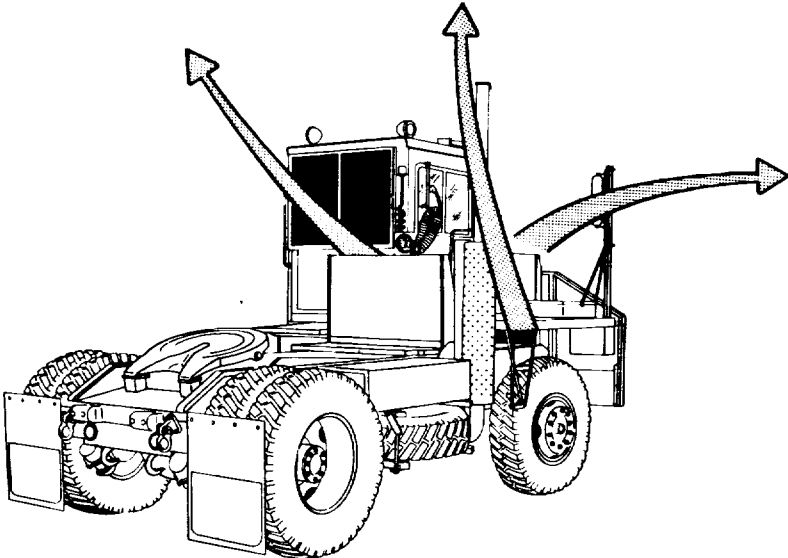
ALCOHOL RESERVOIR
USE PURE
METHANOL ALCOHOL

CAUTION

If ambient temperature is expected to fall below 32 degrees F, also check level of antifreeze protection by testing coolant with a hydrometer.

Coolant Reservoir Filler Cap

Use to check and fill coolant overflow recovery reservoir. Unlatch and raise radiator access panel. Check that coolant level is approximately 2 to 4 inches below top of coolant reservoir filler neck. If necessary, remove filler cap and add solution of 50 percent water and 50 percent ethylene glycol.



TA315990

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

| | |
|---|-------------|
| | Para |
| Genera 1..... | 2-11 |
| Preventive Maintenance Checks and Services | 2-12 |

2-11. GENERAL

Every mission begins and ends with the paperwork. There isn't much of it, but you have to keep it up. The forms and records you fill out have several uses. They are a permanent record of the services, repairs and modifications made on your vehicle. They are reports to organizational maintenance and to your commander. They are a checklist for you when you want to know what was wrong with the vehicle after its last use and whether those faults have been fixed. For the information you need on forms and records, see DA Pam 738-750.

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

a. The item numbers of the table indicate the sequence of the PMCS. Perform at the intervals shown below:

(1) Do your before (B) PREVENTIVE MAINTENANCE just before you operate the vehicle. Pay attention to the CAUTIONS and WARNINGS.

(2) Do your during (D) PREVENTIVE MAINTENANCE while the equipment and/or its component systems are in operation. Pay attention to the CAUTIONS and WARNINGS.

(3) Do your after (A) PREVENTIVE MAINTENANCE after operations.

(4) Do your weekly (W) PREVENTIVE MAINTENANCE once a week.

(5) Do your monthly (MO) PREVENTIVE MAINTENANCE once a month.

b. If something doesn't work, troubleshoot it according to the instructions in this manual or notify your supervisor.

c. Always do your PREVENTIVE MAINTENANCE in the same order so it gets to be a habit. Once you've had some practice, you will spot anything wrong in a hurry.

d. When you do your PREVENTIVE MAINTENANCE, take along a rag or two.

e. While performing PMCS, observe warnings and cautions preceding those operations which could endanger your safety or result in damage to the equipment.

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid allowing solvent to contact skin, eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If solvent comes in contact with skin or clothing, wash with water. If solvent gets in your eyes, flush eyes with water and get medical aid immediately.

f. If anything looks wrong and you can't fix it, write it on your DA Form 2404. The number column is the source for the numbers used on the TM Number Column on DA Form 2404. If you find something seriously wrong, report it to organizational maintenance RIGHT NOW.

(1) Keep it clean: Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent (P-D-680) to clean metal surfaces. Use soap and water when you clean rubber or plastic material.

(2) Bolts, nuts, and screws: Check that they are not loose, missing, bent, or broken. You can't try them all with a tool, of course, but look for chipped paint, -V bare metal or rust around bolt heads. Report it to organizational maintenance if you can't tighten it.

(3) Welds: Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to organizational maintenance.

(4) Electric wires and connectors: Look for cracked or broken insulation, bare wires and loose or broken connectors. Report damaged or loose wiring to organizational maintenance.

(5) Hoses and fluid lines: Look for wear, damage, and leaks. Make sure clamps and fittings are tight. Wet spots show leaks but a stain around a fitting or connector can also mean a leak. If leakage comes from a loose fitting or connector, report it to organizational maintenance. If something is broken or worn out report it to organizational maintenance.

(6) Vehicle must be on level ground in order to get correct fluid level measurement.

g. It is necessary for you to know how fluid leaks affect the status of your equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them and REMEMBER when in doubt, notify your supervisor.

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)**Leakage Definitions for Operator PMCS**

| | |
|-----------|---|
| Class I | Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops. |
| Class II | Leakage of fluid great enough to form drops, but not enough to cause drops to drip from the item being checked/inspected. |
| Class III | Leakage of fluid great enough to form drops that fall from the item being checked/inspected. |

CAUTION

Equipment operation is allowable with minor leakage (Class I or II). Of course, consideration must be given to the fluid capacity in the item/system being checked or inspected. When operating equipment with Class I or II leaks, continue to check fluid levels as required in your PMCS. Class III leaks should be reported to your supervisor or Organizational Maintenance.

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

Table 2-1. Operator PMCS

NOTE: Within designated interval, these checks are to be performed in the order listed.

| | | B - Before | | | | | D - During | A - After | W - Weekly |
|---------|----------|------------|---|---|---|--|------------|-----------|--|
| ITEM NO | INTERVAL | | | | | ITEM TO BE INSPECTED | | | Equipment is Not Ready/Available If: |
| | B | D | A | W | M | PROCEDURE: Check for and have repaired, filled, or adjusted as needed | | | |
| | | | | | | <p align="center">NOTE</p> <p>Perform weekly (W) as well as before (B) PMCS if:</p> <p>a. You are the assigned operator, but have not operated the vehicle since the last weekly (W) PMCS, or</p> <p>b. You are operating the vehicle for the first time.</p> <p>Make the following walk-around checks:</p> | | | |
| 1 | | | | | | <p>TIRES</p> <p>a. Check tires for correct air pressure (Ref page 3-30):</p> <p style="padding-left: 40px;">Front axle tires 120 PSI</p> <p style="padding-left: 40px;">Rear axle tires 120 PSI</p> | | | |
| | • | | | | | <p>b. Check tires for cuts and foreign objects</p> | | | Threat of tire failure from gouges, cuts, or cracks. |
| 2 | | | | | | <p>EXTERIOR OF VEHICLE</p> <p>a. Check for body and under-carriage damage.</p> <p>b. Look for evidence of fluid leakage (hydraulic oil, engine oil, coolant, water, and transmission fluid).</p> | | | Any Class III leaks. |

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

Table 2-1. Operator PMCS (Continued)

| | | | | | | B - Before | D - During | A - After | W - Weekly | M - Monthly | |
|---------|----------|---|---|---|---|---|---|-----------|------------|-------------|--|
| ITEM NO | INTERVAL | | | | | ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed Ready/Available If: | Equipment is Not | | | | |
| | B | D | A | W | M | | | | | | |
| 3 | | | • | | | c. Check for damaged components (springs, brake chambers, prop shaft, oil pans, lines, hoses and fittings, frame crossmembers, steering control systems, etc) | Broken or damaged spring, brake chamber, prop shaft, frame member, etc. Any Class III leak. | | | | |
| | | • | | | | d. Check windshield and windows | Any window cracked, broken, or missing. | | | | |
| | | • | | | | e. Check windshield wiper arm and blade | Missing wiper arm or blade. | | | | |
| | | • | | | | f. Check mirrors | Any mirror cracked, broken, or missing. | | | | |
| 4 | | | | | | FUEL TANK | | | | | |
| | | | | | | <p style="text-align: center;"><u>WARNING</u></p> <p>Diesel fuel is combustible.</p> <p>Inspect fuel tank and lines for leakage and damage</p> | Any leaks are detected. | | | | |
| | | | | | | EXHAUST SYSTEM | | | | | |
| | | | | | | <p style="text-align: center;"><u>WARNING</u></p> <p>Do not operate engine for prolonged periods in an un-ventilated area combustion engines produce poisonous carbon monoxide which is extremely toxic if allowed to accumulate in a closed area.</p> <p>Visually inspect the muffler and exhaust pipes for damage, leaks, and insecure mounting restricts exhaust system.</p> | Internal Any leaks, insecure mountings, or damage that punctures or | | | | |

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

Table 2-1. Operator PMCS (Continued)

| | | INTERVAL | | | | | ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as neededReady/Available if: | Equipment is Not | | | | | |
|------------|------------|-----------|------------|-------------|---------|---|---|------------------|---|---|---|---|--------------------------------------|
| B - Before | D - During | A - After | W - Weekly | M - Monthly | ITEM NO | B | | | D | A | W | M | |
| | | | | | | 5 | | | | | | <p>BATTERIES</p> <p><u>WARNING</u> Battery electrolyte is toxic and corrosive Use protective goggles and gloves when removing battery caps and checking electrolyte. Avoid contact with skin, eyes, clothes, and don't breathe vapors Do not smoke or use an open flame near batteries To do so could cause serious injury or death due to batteries exploding.</p> <ul style="list-style-type: none"> • a. Check battery compartment for broken hasp or hinge, cracks in cover, and loose mounting bolts. Clean bolts (Ref TM 9-6140-200-14) • b. Check battery fluid level (Ref page 3-28). • c. Check terminals for damage or corrosion. Inspect for cracked casing and burned, broken, or loose battery terminal posts (Ref TM 9-6140-200-14). | Any terminal damage or cracked case. |

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

Table 2-1. Operator PMCS (Continued)

B - Before D - During A - After W - Weekly M - Monthly

| ITEM NO | INTERVAL | | | | | ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed Ready/Available if: | Equipment is Not |
|---------|----------|---|---|---|---|--|---|
| | B | D | A | W | M | | |
| 6 | | | | | | <p>AIR RESERVOIRS</p> <p><u>WARNING</u> Do not operate tractor if AIR PRESS gage reading is less than 60 PSI. This is the minimum safe pressure for operation of the service brakes. Operating tractor when AIR PRESS gage indicates less than 60 PSI could cause serious injury or death and extensive property damage due to loss of braking power.</p> <p>Check for leaks and damage Check for loose or damaged air lines and fittings.</p> <p>Open petcock to drain water from service tank (Ref page 3-30)</p> <p>NOTE During hot days, drain as often as several times daily.</p> | <p>Reservoir or lines leaking.</p> <p>Petcock damaged or inoperative.</p> |
| 7 | | | | | | <p>HYDRAULIC RESERVOIR</p> <p><u>WARNING</u> Do not remove breather cap when hydraulic oil is hot. Hot oil can cause severe injury.</p> | |

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

Table 2-1. Operator PMCS (Continued)

| | | | | | | B - Before | D - During | A - After | W - Weekly | M - Monthly | | |
|---------|----------|---|---|---|---|---|------------------|-----------|------------|-------------|--|---|
| ITEM NO | INTERVAL | | | | | ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed Ready/Available If: | Equipment is Not | | | | | |
| | B | D | A | W | M | | | | | | | |
| 7 | | | | | • | | | | | | <p>HYDRAULIC RESERVOIR (Continued)</p> <p>Check for leaks or damage at the reservoir and loose or damaged fittings and hoses. Be sure fluid level is at or slightly above bottom of reservoir screen (Ref page 3-32).</p> | Any Class III leaks or fluid level below bottom of reservoir screen. |
| 8 | | | | | | • | | | | | <p>FIFTH WHEEL</p> <p><u>WARNING</u> Never operate FIFTH WHEEL UNLATCH CONTROL or allow anything to touch it while tractor is in motion. Failure to follow this procedure may result in serious injury.</p> <p>a. Check lift cylinders for leaks and damaged hydraulic lines and fittings (Ref page 3-25)</p> <p>b. After engine has been started and air pressure is up: check air cylinder for proper operation, air leaks, and damaged lines.</p> | <p>Cylinders or lines ar inoperative or leaking.</p> <p>Air cylinder is inoperative or leaking.</p> |
| 9 | | | | | | • | | | | | <p>AXLES</p> <p><u>WARNING</u> After operation, drive axle and differential may be very hot. Do not touch them with your bare hands.</p> <p>a. Check front hub oil level (Ref LO 9-2320-285-12)</p> | Class III leak. |

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

Table 2-1. Operator PMCS (Continued)

| B - Before | | | | | | D - During | A - After | W - Weekly |
|------------|----------|---|---|---|---|---|--|------------|
| ITEM NO | INTERVAL | | | | | ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed | Equipment is Not Ready/Available If: | |
| | B | D | A | W | M | | | |
| 9 | | | • | | | AXLES (Continued) b. Check for overheating of hubs, drums, axles, and differential. | | |
| 10 | | • | | | | SEAT a. Check operator's seat for loose mountings and damage b. Be sure operator's seat is properly adjusted. Check for missing or damaged seat belts. | Any loose mountings or damage. Missing or unserviceable seat belts. | |
| 11 | | • | | | | INSTRUMENT GAGES, CONTROLS, AND INDICATORS a. Engine OIL PRESS gage indicates 40 to 60 PSI/1200 RPM. b. After warm-up, be sure WATER TEMP gage indicates 175 to 195 degrees F. c. Be sure all warning lights, buzzer, and warning bell are off d. Check for damaged, illegible, or missing data, warning, and instructions decals and plates. e. Check all lights for proper operation. | Less than 18 PSI at Any warning light, buzzer, or warning bell on. | |
| 12 | | • | | | | TRANSMISSION a. Check transmission fluid level (Ref page 3-29). | | |

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

Table 2-1. Operator PMCS (Continued)

| | | INTERVAL | | | | | ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed | Equipment is Not Ready/Available if: |
|---------|---|----------|---|---|---|--|--|---|
| ITEM NO | B | D | A | W | M | | | |
| 12 | | • | | | | TRANSMISSION (Continued) b. Check for smooth operation of gear shift lever | Shifts roughly, slips, or is unusually noisy. | |
| 13 | | • | | | | WINDSHIELD WIPER a. Check wiper for proper operation | Windshield wiper doesn't work. | |
| | | • | | | | b. Check wiper blade for damage and excessive wear. | | |
| | | | | • | | c. Check wiper arm for looseness and damage. | Damaged wiper arm. | |
| 14 | | • | | | | POWER STEERING a. With engine running, turn steering wheel fully right and left - check for unusual noise, binding, or resistance. | Steering binds or is unresponsive. | |
| | • | | | | | b. Check power steering reservoir fluid level; fill to FULL mark if necessary. | | |
| | | | | • | | c. Check lines and connections for leaks. | Any Class III leak. | |
| 15 | | • | | | | BRAKES a. Check for noise or side pull | Noise or side pull. | |
| | | • | | | | b. Check service brakes for poor stopping power. | Truck does not stop. | |
| | | • | | | | c. With transmission in gear: be sure parking brake prevents tractor motion. | Parking brake not operating properly. | |

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

Table 2-1. Operator PHCS (Continued)

| | | INTERVAL | | | | | ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as neededReady/Available If: | Equipment is Not | | |
|------------|------------|-----------|------------|-------------|---------|---|--|--|---|---|
| B - Before | D - During | A - After | W - Weekly | M - Monthly | ITEM NO | B | | | D | A |
| 16 | | | | | | | <p>ENGINE OIL</p> <ul style="list-style-type: none"> a. Check dipstick oil level; fill to FULL mark as necessary (Ref page 3-26). b. Shut down engine, allow approximately 20 minutes for oil to drain and check dipstick oil level; fill as necessary to bring level between ADD and FULL marks. c. Excessive oil consumption | <p>Engine has used excessive amount of oil (10 quarts in 1000 miles) or Class II leakage is evident.</p> | | |
| 17 | | | | | | <p>RADIATOR</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Do not remove radiator cap when radiator is hot; stop engine and allow to cool before removing radiator cap Failure to do so could cause serious injury due to burns or scalding caused by steam.</p> <ul style="list-style-type: none"> a. Check that coolant level is 2 to 4 inches below top of filler neck; fill as necessary with ethylene glycol solution (Ref page 3-27). b. Check for leaks, clogged or damaged fins, and loose or damaged hoses to and from engine. | <p>Any Class III leakage evident.</p> | | | |

2-12. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

Table 2-1. Operator PMCS (Continued)

| | | B - Before | | D - During | | | A - After | | W - Weekly | | M - Monthly | |
|---------|----------|------------|---|------------|---|---|---------------------|------------------------------------|------------|--|-------------|--|
| ITEM NO | INTERVAL | | | | | ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed | Ready/Available If: | Equipment is Not | | | | |
| | B | D | A | W | M | | | | | | | |
| 18 | | | | | | <p>BELTS</p> <p>Check for cracked, worn, and frayed belts</p> | | Any cracked, worn, or frayed belt. | | | | |
| 19 | | | | | | <p>ALCOHOL EVAPORATOR</p> <p>In freezing temperatures: check alcohol level; fill as necessary (Ref page 2-51).</p> | | | | | | |
| 20 | | | | | | <p>WINDSHIELD WASHER FLUID LEVEL</p> <p>Check washer reservoir fluid level; fill as necessary (Ref page 3-31).</p> | | | | | | |
| 21 | | | | | | <p>AIR CLEANER RESTRICTION INDICATOR</p> <p>Check that restriction indicator red band is not visible (Ref page 3-24) If it is, notify organizational maintenance (air cleaner element is clogged).</p> | | Red indicator band is visible. | | | | |

Section III. OPERATION UNDER USUAL CONDITIONS

| | Para | | Para |
|-------------------------------|-------------|--|-------------|
| Initial Checks | 2-13 | Operating Procedures (Continued) | 2-14 |
| Operating Procedures | 2-14 | Tilting Cab 45 Degrees | 2-14g |
| Starting Engine | 2-14a | Lowering Cab to Normal | |
| Mobile Operation | 2-14b | Operating Position..... | 2-14h |
| Coupling to Trailer | 2-14c | Preparation for Movement..... | 2-15 |
| Towing Trailer..... | 2-14d | General | 2-15a |
| Uncoupling from Trailer | 2-14e | Preservation and Packaging | 2-15b |
| Stopping Tractor..... | 2-14f | Operating Instructions on Decals..... | 2-16 |

2-13. INITIAL CHECKS

Refer to current lubrication order and lubricate tractor. Refer to paragraph 2-12 above and perform before (B) operation PMCS.

WARNING

To reduce the possibility of bodily injury, you must become thoroughly familiar with all controls and instruments, and must also become acquainted with the specific handling and operating characteristics of this vehicle.

2-14. OPERATING PROCEDURES

a. starting Engine.

WARNING

Always fasten seat belt when operating tractor.

Do not operate engine for prolonged periods in an unventilated area. Internal combustion engines produce poisonous carbon monoxide gas which is extremely toxic if allowed to accumulate in a closed area.

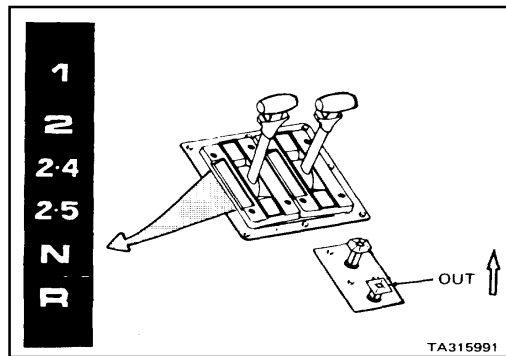
NOTE

Troubleshoot any malfunctions, using the instructions in this manual. Or, notify organizational maintenance.

2-14. OPERATING PROCEDURES (Continued)

a. Starting Engine (continued).

- (1) Pull PARKING BRAKE valve out to keep tractor motionless while engine is being started,
- (2) Be sure gear shift lever is in neutral (N) position.



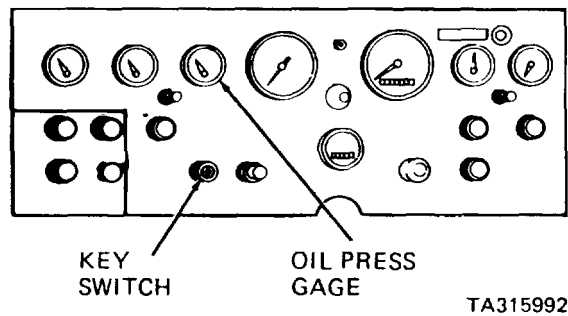
CAUTION

Do not operate starter motor continuously for more than 20 seconds. If engine fails to start after 20 seconds, allow starter motor to cool for at least two minutes before attempting to start the engine again. After engine starts, run it at low idle for two minutes to allow oil to flow to turbocharger. High speed operation immediately after starting engine will damage turbocharger.

NOTE

As key switch is rotated to START position, the WATER LEVEL and OIL PRESSURE warning lights and warning bell will turn on until engine is running. LOW AIR warning light and buzzer will also turn on if air pressure is below approximately 76 PSI.

- (3) Insert key into key switch and turn fully clockwise to crank engine. When engine starts, release key switch.



2-14. OPERATING PROCEDURES (Continued)**a. Starting Engine (continued)**

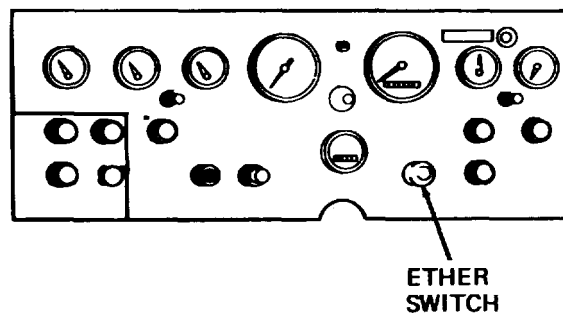
(4) Observe all gages and warning lights for normal operation; observe OIL PRESS gage for normal reading (18 PSI minimum within 10 to 15 seconds). If OIL PRESS gage indicates less than 18 PSI, or OIL PRESSURE warning light and bell do not go off, or any gage or warning light indicates abnormal operation, immediately shut down engine and refer to troubleshooting sections in this manual or notify your supervisor.

(5) If the engine does not start due to cold weather (less than 40 degrees F) proceed as follows:

(a) Turn key switch fully clockwise to crank engine.

WARNING

Do not use ether switch without cranking engine. Over-charge of ether starting fluid can cause explosion of engine air intake system.

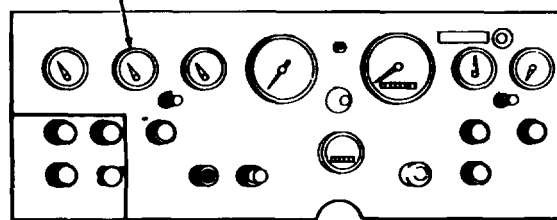


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(b) Press and hold ether switch for one to three seconds, then release to discharge ether to engine.

(c) Release key switch when engine starts. Repeat step (5) if engine does not start on first attempt.

WATER TEMP GAGE



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(6) Warm engine until it idles smoothly; avoid full throttle operation until WATER TEMP gage indicates at least 140 degrees F.

2-14. OPERATING PROCEDURES (Continued)

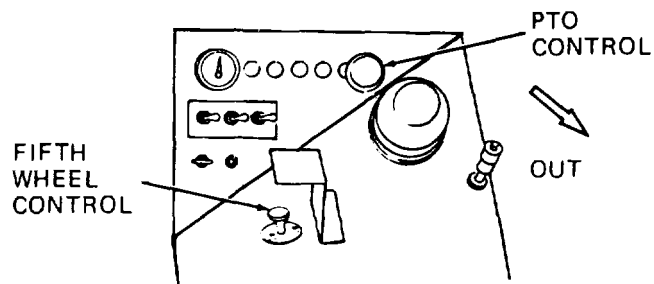
b. Mobile Operation. Familiarize yourself with the steering and performance of vehicle before doing any actual towing. Avoid sudden starts, stops, and turns except in an emergency.

CAUTION

Disengage power takeoff (PTO) if tractor is to be driven more than 1/2 mile with engine speed more than 2000 rpm. Refer to step (14) of paragraph 2-14c below.

c. Coupling to Trailer.

- (1) Back the tractor up to front of trailer so that trailer kingpin is in line with fifth wheel jaws on tractor.
- (2) Engage hydraulic pump power takeoff as follows:
 - (a) Depress brake treadle, idle engine, and place gear shift lever in any drive position.



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- (b) Pull PTO control out to engage power takeoff.
 - (c) Place gear shift lever in neutral position.
- (3) Momentarily depress brake treadle and FIFTH WHEEL CONTROL to unlock fifth wheel jaws.

CAUTION

Be sure gear shift lever is in neutral (N) position.

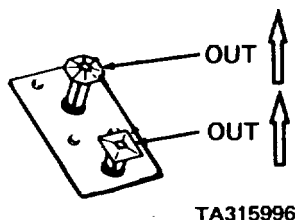
NOTE

To couple to a low trailer, perform step (4) below. Otherwise proceed to step (5) below.

2-14. OPERATING PROCEDURES (Continued)**c. Coupling to Trailer (continued).**

(4) To couple to a low trailer, proceed as follows:

(a) Shift to neutral and push 5th WHEEL lever forward to lower fifth wheel.



(b) Pull out PARKING BRAKE valve to apply tractor spring brakes.

(c) Pull TRACTOR AIR SUPPLY valve out, connect service and emergency air hoses and electrical cable to trailer.

(d) Push TRAILER AIR SUPPLY valve in and pull hand brake control to set trailer service brakes.

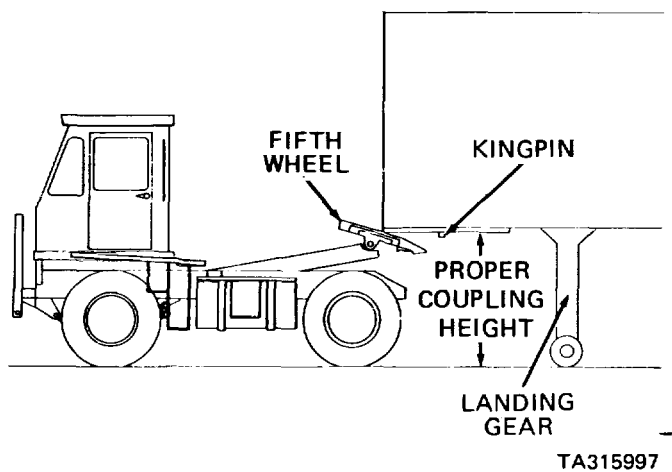
(e) Shift to reverse and release tractor brakes.

(f) Slowly back tractor under trailer until fifth wheel plate is just covered by nose of trailer.

(g) Shift to neutral and pull 5th WHEEL lever back to raise fifth wheel approximately five inches.

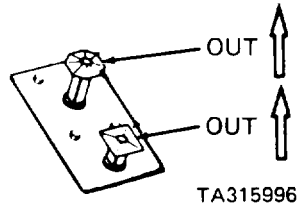
(h) Slowly finish backing tractor under trailer until fifth wheel jaws engage trailer kingpin and lock automatically.

(i) Proceed to step (11) below.

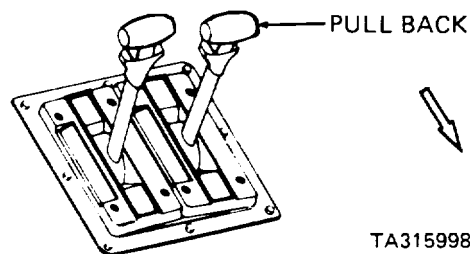


2-14. OPERATING PROCEDURES (Continued)**c. Coupling to Trailer (continued).**

- (5) Shift to neutral and operate 5th WHEEL lever to obtain the proper coupling height, as illustrated.



- (6) Pull out PARKING BRAKE valve to apply tractor spring brakes.
- (7) Pull TRAILER AIR SUPPLY valve out, connect service and emergency air hoses and electrical cable to trailer.
- (8) Push TRAILER AIR SUPPLY valve in and pull hand brake control to set trailer service brakes.
- (9) Shift to reverse and release tractor brakes.
- (10) Slowly back tractor under the trailer until fifth wheel jaws engage the trailer kingpin and lock automatically.
- (11) Test coupling: shift transmission into a forward gear, release tractor brakes, and increase engine RPM slightly. Then, return gear shift lever to neutral (N) position.



- (12) With tractor brakes released, pull back 5th WHEEL lever to raise trailer to maximum height.

NOTE

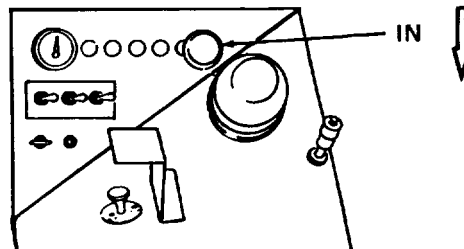
Trailer lifting speed may be increased by accelerating tractor engine. Fifth wheel boom will not raise unless PTO is engaged and transmission is in neutral.

If receptacle and cable for 24-volt trailers is used, push 24V INVERTER switch up to turn on inverter.

2-14. OPERATING PROCEDURES (Continued)

c. Coupling to Trailer (continued).

- (13) Push hand brake control forward to release trailer service brakes.
- (14) If you are going to drive tractor more than 1/2 mile with engine speed greater than 2000 rpm, disengage power takeoff as follows:
 - (a) Press brake treadle, idle engine, and place gear shift lever in any drive position.

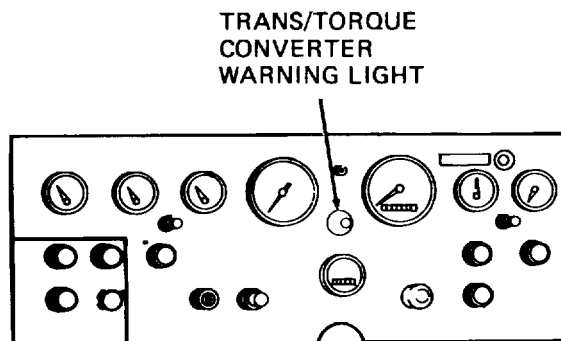


- (b) Push PTO control in to disengage power takeoff.

- (15) Shift transmission into desired gear and drive away with trailer. Refer to paragraph 2-14d for towing of trailer.

d. Towing Trailer.

- (1) When towing uphill, keep transmission in a gear range that will provide enough pull. Go slow enough to be able to stop safely.
- (2) When turning or operating in areas of low clearance, always keep in mind the size and steering characteristics of trailer being towed.



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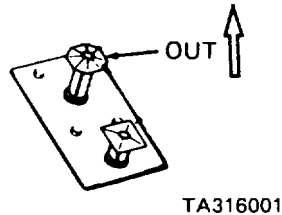
- (3) When towing heavy loads, check the TRANS/TORQUE CONVERTER warning light periodically. If warning light indicates red, stop tractor, shift to neutral range, and run engine at 1200 to 1500 RPM until TRANS/TORQUE CONVERTER warning light goes off.

2-14. OPERATING PROCEDURES (Continued)**d. Towing Trailer (continued).**

(4) When driving tractor more than 1/2 mile with engine speed greater than 2000 rpm, disengage power takeoff.

e. Uncoupling from Trailer.

(1) Be sure gear shift lever is in neutral (N) position.



(2) Pull TRAILER AIR SUPPLY valve out to set trailer brakes.

(3) Extend the trailer landing gear, if retracted, and disconnect the brake air hoses and electrical system cable from the trailer.

(4) With tractor brakes released, push the 5th WHEEL lever forward until trailer landing gear is on the ground.

(5) Momentarily depress brake treadle and FIFTH WHEEL UNLATCH CONTROL firmly until fifth wheel jaws lock open.

NOTE

If fifth wheel jaws do not lock open, pull fifth wheel secondary lock out and pull manual release lever at right side of fifth wheel. If fifth wheel jaws do not unlock, notify organizational maintenance.

(6) Shift into forward gear and drive away from trailer.

f. Stopping Tractor.

(1) Let up on accelerator pedal.

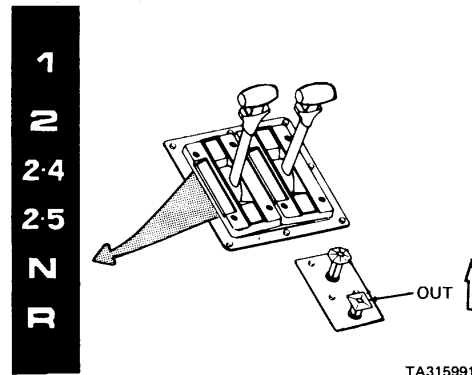
(2) Depress brake treadle to bring tractor to a stop. Avoid sudden application of full braking effort except in case of emergency.

NOTE

A smooth stop results when foot pressure is gradually released as tractor speed decreases. Do not apply brakes lightly at first and then harder as tractor slows. This results in a rough stop. The engine may be used to assist the brakes in stopping the tractor if engine governed speed of 2500 RPM is not exceeded.

2-14. OPERATING PROCEDURES (Continued)

- f. Stopping Tractor (continued).
 - (3) Place gear shift lever in neutral (N) position.
 - (4) Pull PARKING BRAKE valve out to apply tractor brakes.

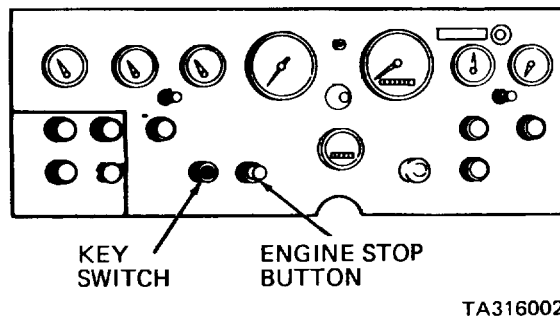


CAUTION

Do not shut engine down while gear shift lever is in reverse (R) position or tractor will be inoperable. Be sure lever is in neutral (N) position when shutting down.

NOTE

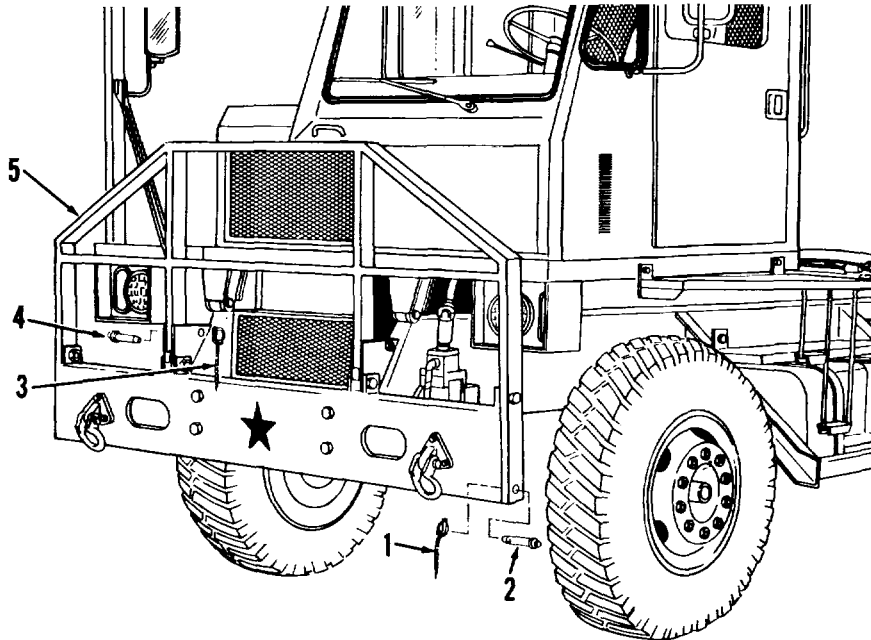
If engine has been operating at, or near, full load, it should be allowed to run at 800 to 1200 RPM for several minutes after the load is removed before being stopped.



- (5) Press and hold engine stop button until engine stops, then release. Turn key switch counterclockwise to the off position and remove key to prevent unauthorized use of vehicle.

2-14. OPERATING PROCEDURES (Continued)g. Tilting Cab 45 Degrees.

- (1) Turn key switch off and pull out PARKING BRAKE valve to apply tractor spring brakes.
- (2) Tilt cab grille guard forward; refer to illustration below and proceed as follows:



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- (a) Pull two pin retainers (1) from two pins (2).
- (b) Pull two pins (2) from ends of cab grille guard (5).
- (c) Pull two pin retainers (3) from two pins (4).
- (d) Support cab grille guard (5).

WARNING

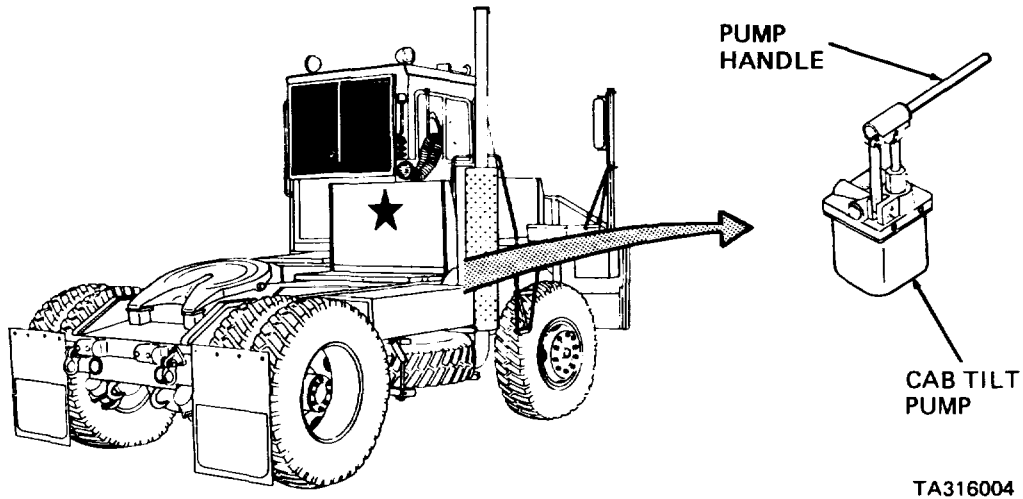
Support cab grille guard when performing step 2-14g(2)(e) below. The grille guard is heavy; do not allow it to fall forward freely. Carefully ease top of grille guard forward. Failure to follow this procedure could result in injury from falling grille guard. If you are injured, obtain medical aid immediately.

- (e) Pull two pins (4) from cab grille guard (5).
- (f) Carefully tilt cab grille guard (5) forward.

2-14. OPERATING PROCEDURES (Continued)

g. tilting Cab 45 degrees (continued).

- (3) Remove pump handle from brackets at left rear inside corner of cab.

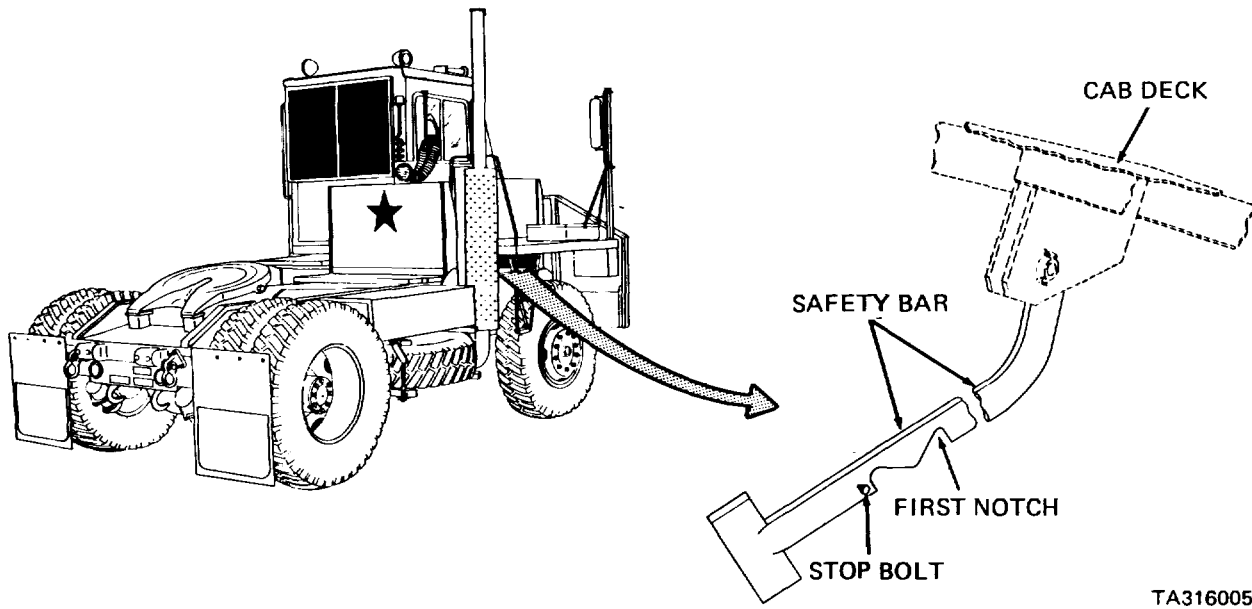


- (4) Insert pump handle in cab tilt pump and rotate control valve clockwise until control valve is against stop.

WARNING

Stay out from under cab unless safety bar is supporting full weight of cab. Failure to follow this procedure could result in severe injury from falling cab.

- (5) Move pump handle up and down to raise cab until safety bar drops into first notch. Do not attempt to jack cab past safety bar stop bolt.

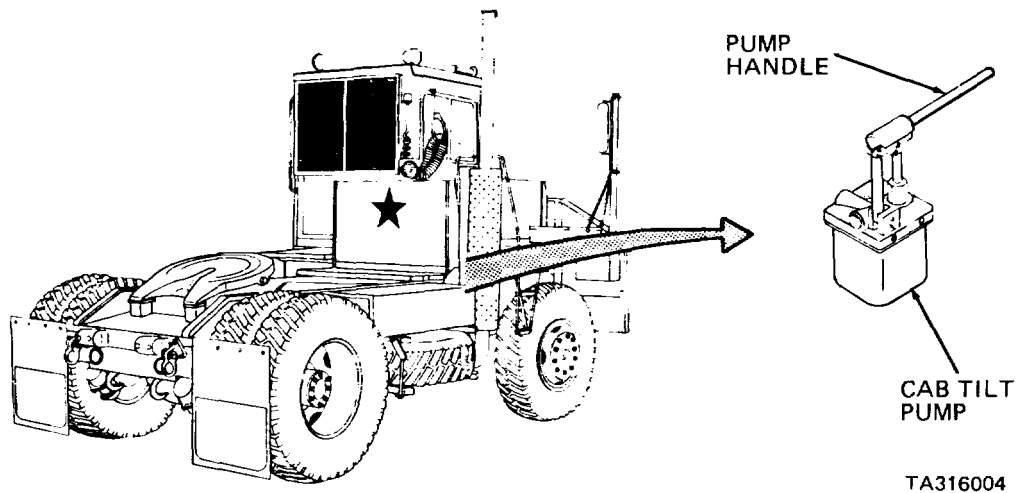


2-14. OPERATING PROCEDURES (Continued)g. Tilting Cab 45 Degrees (continued).

- (6) Carefully and slowly rotate control valve counterclockwise until full weight of cab rests upon safety bar.
- (7) Rotate control valve clockwise against stop.

h. Lowering Cab to Normal Operating Position.**WARNING**

Stay out from under cab unless safety bar is supporting full weight of cab. Failure to follow this procedure could result in severe injury from falling cab.



- (1) With cab tilted 45 degrees, move pump handle up and down to raise cab just enough to take weight of cab off safety bar.
- (2) Remove pump handle and use it to lift safety bar out of notch.

NOTE

Do not allow cab to fall quickly; velocity fuse will set and cab will not lower.

- (3) Slowly rotate control valve counterclockwise to bring cab down slowly.
- (4) After safety bar is past its first notch, remove pump handle and stand aside as cab lowers.
- (5) When cab has stopped moving, rotate control valve fully counterclockwise. Be sure cab latch hooks fully engage latch brackets.

2-14. OPERATING PROCEDURES (Continued)**h. Lowering Cab to Normal Operating Position (continued).**

(6) If velocity fuse has set, proceed as follows:

- (a) Rotate control valve clockwise against stop and move pump handle up and down to raise cab slightly.
- (b) Follow steps (4) thru (6) above to lower cab.

2-15. PREPARATION FOR MOVEMENT

a. **General.** Follow these procedures to protect the tractor when you ship it from one site to another.

b. **Preservation and Packaging.**

- (1) Do your before (B), weekly (W), and monthly (M) PMCS (refer to Section II of this chapter). Especially, check coolant system to be sure it is filled to the proper level with a clean solution of ethylene glycol compound conforming to NIL-A-46153A. Refer to Table 2-2 below and check that coolant has the proper mixture for the required amount of antifreeze protection.

Table 2-2. Antifreeze Specifications

| Lowest Estimated Temperature In Geographic Area | Antifreeze Mixture Percent by Volume | Antifreeze Specification Requirement |
|--|---|---|
| +20 to -30 degrees F | 50% Ethylene Glycol & 50% Water | MIL-A-46153A |
| -30 to -55 degrees F | 60% Ethylene Glycol & 40% Water | MIL-A-46153A |

(2) Refer to current lubrication order and lubricate tractor. Operate engine until lubricant has been circulated throughout system. Do not drain oil from crankcase.

(3) Hydraulic System. Retract the pistons as far as linkage will permit and secure in retracted position. Coat exposed portions of the hydraulic piston ram shafts with type P-6 preservative (CL) conforming to MIL-C-11796, class 3. Grease, automotive and artillery, conforming to MIL-G-10924 may be used if type P-6 preservative is unavailable. Wrap the coated shafts with type 1, class 2, grade A, greaseproof barrier material conforming to NIL-B-121.

(4) Exterior Surfaces. Coat exposed machined ferrous metal surfaces, such as fifth wheel plate, with type P-6 preservative (CL) conforming to MIL-C-11796, class 3. GAA grease may be substituted if type P-6 preservative is not available.

(5) Openings. Seal openings that will permit direct entry of water with pressure-sensitive tape conforming to PPP-T-60, type IV. Bridge large openings with waterproof barrier material conforming to PPP-B-1055, and secure the edges of the barrier material to adjacent surfaces with pressure-sensitive tape.

2-15. PREPARATION FOR MOVEMENT (Continued)

b. Preservation and Packing- (continued).

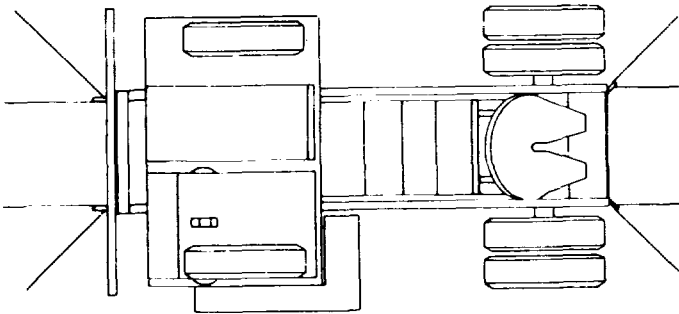
(6) Cab. Close windows and door fully. Insert key into door lock and rotate 90 degrees clockwise to lock door. Remove, package, and place keys in tool box. Secure tool box hasp with a padlock.

(7) Batteries and Cables. Ensure that batteries are filled and fully charged and secured in the battery box. Disconnect cable terminals and secure to the battery support with tape to prevent grounding. Secure battery box hasp with a padlock.

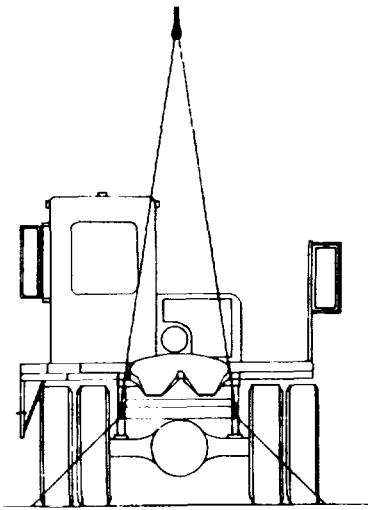
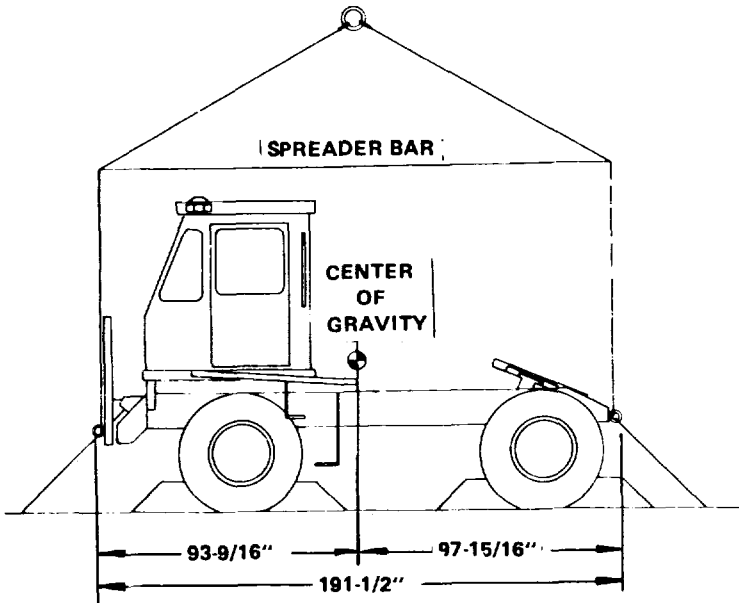
(8) Spare Tire. Secure spare tire to carrier with supplied chain and padlock.

(9) Disassembly. Remove components and parts that are subject to pilferage or damage.

(10) Lifting and Tie Down. Use cables, chains, or straps of sufficient capacity to lift or tie down tractor. Refer to illustration below for attachment locations. Use spreader bar as shown to lift tractor; use chock blocks as shown to tie down tractor.

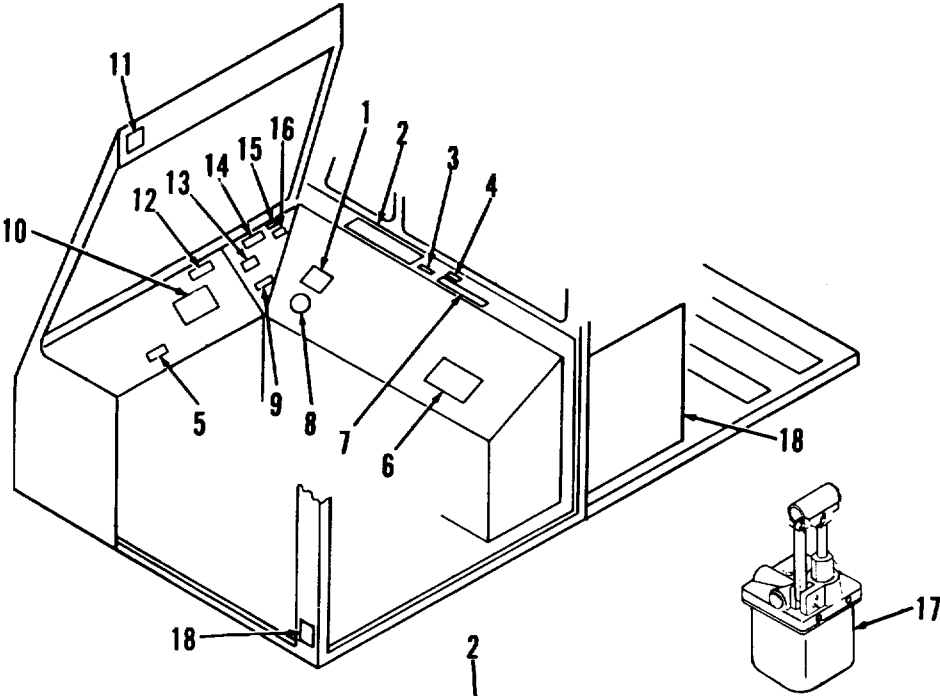


LIFTING AND TIEDOWN
ACTUAL WEIGHT - 15,500 POUNDS
LIFTING-Use cables, chains, or straps of sufficient capacity to lift unit as shown. Spreader bar should be used to prevent damage to cab and bumper guard.
TIE DOWN-Use cables, chains, or straps of sufficient capacity, and tie down as shown. Chock blocks should also be used as shown.



TA316006

2-16. OPERATING INSTRUCTIONS ON DECALS



CAUTION
 TO PREVENT SERIOUS INJURY
 NEVER OPERATE THIS CONTROL,
 OR ALLOW ANYTHING TO TOUCH
 IT WHILE TRUCK IS IN MOTION.

1

CAUTION

OPERATING INSTRUCTIONS

- ① WHEN VEHICLE IS TO BE DRIVEN OVER-THE-ROAD FOR AN EXTENDED DISTANCE, HYDRAULIC PUMP P.T.O. SHOULD BE DISENGAGED.
- ② WHEN CRANKING ENGINE, DO NOT LEAVE STARTER ENGAGED OVER 20 SECONDS. WAIT 1 TO 2 MINUTES BEFORE RE-ENGAGING STARTER FOR ANOTHER 20 SECONDS MAXIMUM CRANKING PERIOD.
- ③ STOP MACHINE BEFORE SHIFTING FROM FORWARD TO REVERSE OR FROM REVERSE TO FORWARD.
- ④ TO COUPLE TO LOW TRAILERS:
 - A - LOWER 5th WHEEL AND DRIVE UNDER TRAILER UNTIL 5th WHEEL PLATE IS JUST COVERED BY TRAILER NOSE.
 - B - RAISE 5th WHEEL APPROX. 5 INCHES.
 - C - FINISH DRIVING UNDER TRAILER UNTIL 5th WHEEL LATCHES.

CAUTION

BRAKE TREADLE
 MUST BE FULLY DEPRESSED WHILE SHIFTING
 INTO OR OUT OF REVERSE

DO NOT SHUT ENGINE DOWN WHILE SELECTOR
 IS IN REVERSE

3

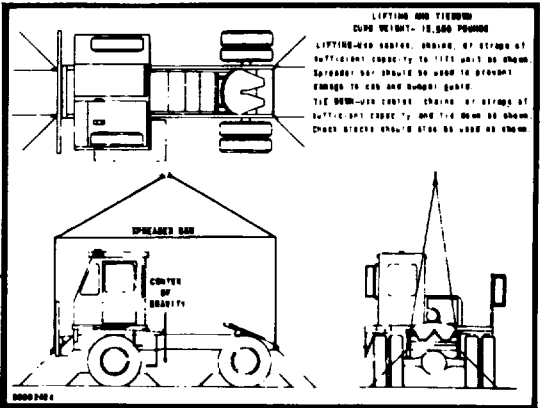
CAUTION

DO NOT TOW VEHICLE
 OVER 20 MPH, AND
 NO MORE THAN 15 MILES

4

**TRANS TORQUE
 CONVERTER**

5



6

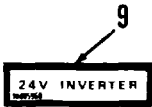
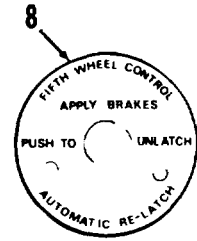
TA316007

2-16. OPERATING INSTRUCTIONS ON DECALS (Continued)

7

**CAB TILT
MANUAL OPERATING INSTRUCTIONS**

| | |
|---|--|
| <p>TO RAISE CAB:</p> <ol style="list-style-type: none"> 1. ROTATE PUMP LEVER CLOCKWISE AGAINST STOP. 2. MANUALLY PUMP WITH JACKHANDLE UNTIL SAFETY BAR DROPS INTO NOTCH. 3. ROTATE LEVER COUNTER-CLOCKWISE AGAINST STOP. <p>WARNING: STAND CLEAR OF CAB UNTIL SAFETY BAR IS SEATED</p> | <p>TO LOWER CAB:</p> <ol style="list-style-type: none"> 1. ROTATE PUMP LEVER CLOCKWISE AGAINST STOP. 2. MANUALLY PUMP WITH JACKHANDLE UNTIL SAFETY BAR CLEARS NOTCH. 3. RAISE SAFETY BAR AND ROTATE LEVER COUNTER-CLOCKWISE APPROXIMATELY 1/2 TURN. 4. ROTATE LEVER COUNTER-CLOCKWISE AGAINST STOP. |
|---|--|



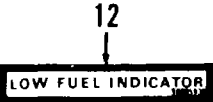
10

STARTING INSTRUCTIONS QUICK START MEASURED SHOT

IMPORTANT: Use Only For Starting Read Complete of SMALL ENGINES (under 450 CUB) Actuate valve DURING cranking. LARGE ENGINES (over 450 CUB) Actuate valve AFTER cranking.

TO ACTUATE VALVE

1. Pull handle (OR snap switch) 3 seconds to 1st shot.
2. Push handle in (OR release switch) to discharge shot.
3. Allow 3 seconds for shot to discharge.

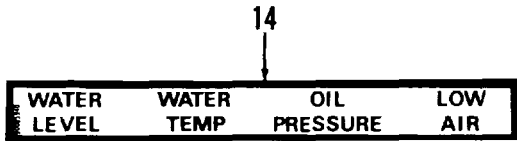


13

FLOOD LIGHT

| | | |
|----------|-----------|----------|
| ON | ON | CAB ON |
| ROOF | | |
| OFF LEFT | OFF RIGHT | OFF REAR |

80004419



17

WARNING

Lever Must Be In Released Position
When Cab Is Down Or Bodily Injury May Result

Released Position



TA316008

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

| | | | |
|------------------------------------|---------------|-------------------------------------|--------------------|
| Operation in Unusual Weather | Para 2-17 | Cooling System | Para 2-18 b |
| Extreme Cold | 2-17 a | Lubrication | 2-18 c |
| Extreme Heat | 2-17 b | At Halt | 2-18 d |
| Rainy or Humid Conditions | 2-17 c | Fifth Wheel | 2-18 e |
| Operation in Dusty or | | Operation in Salt Water Areas | 2-19 |
| Sandy Areas | 2-18 | Operation at High Altitudes | 2-20 |
| General | 2-18 a | Operation in Snow | 2-21 |

2-17. OPERATION IN UNUSUAL WEATHER

a. Extreme Cold.

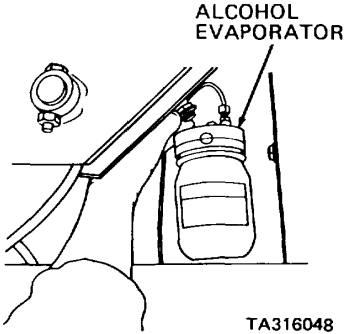
(1) General. Extensive preparation of the vehicle is required when extreme cold weather is anticipated. Extreme cold causes lubricants to thicken, presents a risk of freezing batteries and diminishes their electrical efficiency, can crack electrical insulation to cause short circuits, prevents fuel from vaporizing readily to form the combustible mixture necessary for starting, and causes various materials to become hard, brittle, and easily damaged. You must make sure the cooling system has been filled with the appropriate anti-freeze solution to protect the system against sub-freezing temperatures.

(2) Cooling System. Before the cooling system is drained and filled, inspect the system for leaks and general condition. All deteriorated or damaged hoses must be replaced. Make sure that all clamps are tight and that drain cocks are properly closed. When anti-freeze is added to the cooling system, be sure ample space is allowed for the required amount of anti-freeze. Be sure you operate the engine for 15 minutes to allow the solution to properly mix.

(3) Lubrication. Be sure that the correct grade of lubricant is applied to the lubrication points. If necessary, drain and refill if the lubricant grade is not correct for cold weather operation.

(4) Fuel System. Be sure precautions are taken to eliminate water and moisture from the fuel system by completely filling the fuel tank after each operating period to avoid water condensation. The fuel tank must not be allowed to remain partly empty over long periods of time and all ice and snow must be completely removed from around the filler opening before refilling the fuel tank.

(5) Air System. At end of daily operation, drain water and sediment from air reservoir. Be sure that alcohol evaporator reservoir is filled; check it daily. Do not use if temperature is above 32 degrees F.



2-17. OPERATION IN UNUSUAL WEATHER (Continued)**a. Extreme Cold (continued).****(6) Engine Operation.**

(a) Use ether switch to start the engine (refer to paragraph 2-17(3) above).

(b) Run the engine at reduced speed only long enough to circulate the oil through the engine, then increase speed to 1000 rpm and warm-up the engine. Low idling speeds during extremely cold temperature can result in incomplete combustion and heavy deposit formations on the valves.

(c) Cover the radiator if necessary to bring engine up to operating temperature.

(7) At Halt or Parking.

(a) Park vehicle in sheltered place if possible. Cover to protect engine, accessories, and controls from ice and snow.

(b) Run vehicle onto planks to prevent tires from freezing to ground.

(c) Be sure you clean wet snow or mud from tires and cylinders before it freezes.

(d) In extremely cold weather, remove the batteries and store them in a moderately warm area. Reinstall the batteries just before starting the engine.

b. Extreme Heat.

(1) General. Check temperature gage and lights frequently for indication of overheating. Allow engine to idle when it is overheated until temperature gage indicates less than 195 degrees Fahrenheit.

(2) Cooling System.

(a) Check coolant level at frequent intervals and keep radiator cap tight.

(b) Be sure that radiator is free of bugs, dust, and other foreign matter.

(c) Check drive belts tension frequently.

(3) Lubrication. Lubricate the vehicle with correct grade of lubricants in accordance with current lubrication order. Change filter elements at shorter intervals than normal.

(4) At Halt or Parking. Park the vehicle in a shaded area if possible.

c. Rainy or Humid Conditions. Keep vehicle protected when not in use. Dry off seat and wiring to prevent formation of mildew. Keep fuel tank full. Service filters more frequently than normal. Keep all moving parts well lubricated.

2-18. OPERATION IN DUSTY OR SANDY AREAS

a. General. Sand and dust are abrasive and can cause wear on many parts of the vehicle. Airborne sand and dust can clog the radiator and air cleaner.

b. Cooling System. Be sure you check the radiator frequently and keep air passages open.

c. Lubrication. Lubricate the vehicle at more frequent intervals. Clean all fittings and lubrication openings thoroughly before lubricating to prevent entry of dust or sand with the lubricant. Take care to prevent contamination of lubricants with dust or sand.

d. At Halt. When the vehicle is not in use, cover the operator's compartment, and utilize what ever means are available to protect the engine compartment from the entry of wind blown dust or sand.

e. Fifth Wheel. Periodically check sliding mating parts for build-up of dust, dirt, or sand. Clean as necessary using cleaning solvent (item 8, appendix D).

2-19. OPERATION IN SALT WATER AREAS

Keep vehicle as clean as possible; after use, wash with fresh water. Keep all lubrication points lubricated. Keep all wiring and connections clean and free from corrosion.

2-20. OPERATION AT HIGH ALTITUDES

Keep a constant watch on coolant level. Add coolant if necessary. Keep close watch on engine instruments during operation.

2-21. OPERATION IN SNOW

Keep fuel tank full and snow and ice away from fuel filler when servicing the vehicle. Clean snow from operating controls and indicators.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

CHAPTER OVERVIEW

The purpose of this chapter is to provide you with lubrication instructions, troubleshooting procedures, and maintenance procedures to help you keep your equipment in good operating condition.

Index

| Section | Title | Page |
|---------|----------------------------------|------|
| I | Lubrication Instructions | 3-1 |
| II | Troubleshooting Procedures | 3-2 |
| III | Maintenance Procedures | 3-24 |

Section I. LUBRICATION INSTRUCTIONS

| | Para |
|---------------------------------------|------------------|
| General Lubrication Information | 3-1 |
| Lubrication Information | 3-2 |
| Care of Lubricants | 3-2 _a |
| Cleaning | 3-2 _b |
| Points of Lubrication | 3-2 _c |

3-1. GENERAL LUBRICATION INFORMATION

This section contains general lubrication instructions in addition to those contained in lubrication order LO 9-2320-285-12.

3-2. LUBRICATION INFORMATION

a. Care of Lubricants. Keep all lubricants in clean, closed containers and store in a dry area away from external heat. Don't allow dust, dirt, or other foreign matter to mix with lubricants during storage or use. Keep all lubrication equipment clean and ready for use.

b. Cleaning. Keep all external parts that do not require lubrication free of lubricants. Wipe all dirt and other foreign matter from lubrication points using a clean cloth. Clean caps, covers, and plugs and surrounding area before removing them from the tractor. Clean lubrication points after lubrication to prevent accumulation of foreign matter.

c. Points of Lubrication. Refer to the lubrication order for lubrication points and intervals of lubrication.

Section II. TROUBLESHOOTING PROCEDURES

SYMPTOM INDEX

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|--|--------------------------------------|
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| Require Daily Filling | 3-17 |
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| Won't Start | 3-5 |
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| Excessive Smoke | 3-13 |
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| OIL PRESSURE Warning Light Is On | 3-13 |
| TRANS/TORQUE CONVERTER Light Is On | 3-14 |
| WATER LEVEL Warning Light Is On | 3-13 |
| WATER TEMP Warning Light Is On | 3-11 |

3-3. GENERAL

a. The troubleshooting table (paragraph 3-4) lists common malfunctions which you may find during operation of the M878A1. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all possible malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed (except when malfunctions and causes are obvious), or is not corrected by listed corrective actions, notify your supervisor.

3-4. TROUBLESHOOTING TABLE

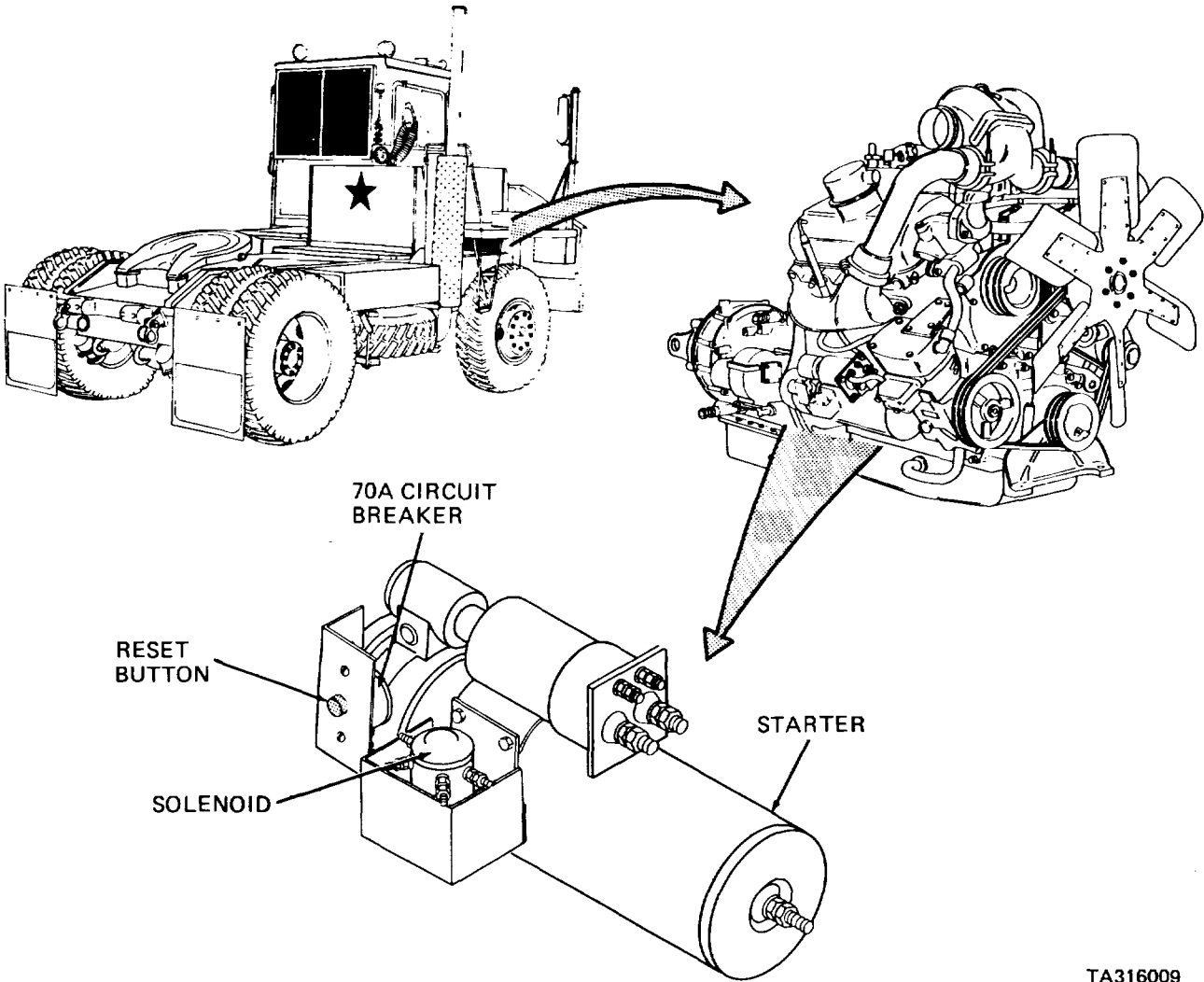
**MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION**

1. ENGINE WILL NOT CRANK

Step 1. Check that gear shift lever is in neutral (N) position.

- a. If gear shift lever is in a drive position, place it in neutral (N) position.
- b. If gear shift lever is in neutral (N) position, go to step 2.

Step 2. Check 70-ampere circuit breaker on starter motor for tripped condition.



TA316009

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|--------------------|---------------------------|--------------------------|
|--------------------|---------------------------|--------------------------|

1. ENGINE WILL NOT CRANK (Continued)

Step 2 (continued).

- a. Press red reset button on 70-ampere circuit breaker.
- b. If engine still will not crank, go to step 3.

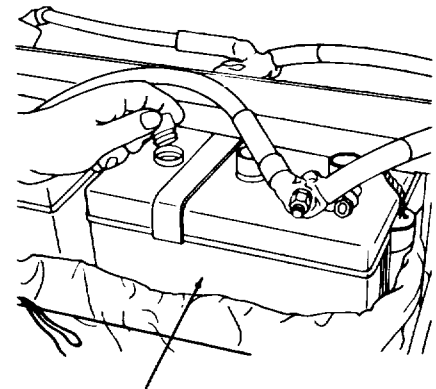
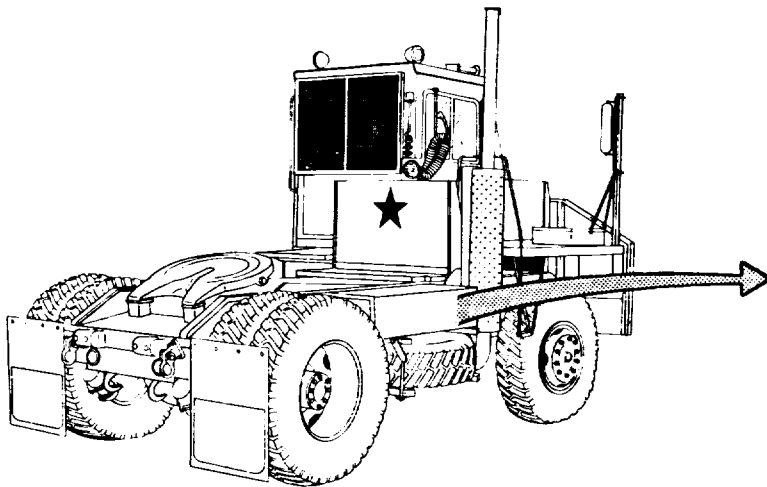
Step 3. Check cable connections to starter motor, solenoid, and 70-ampere circuit breaker for looseness.

- a. If connections are tight, go to step 4.
- b. If connections are loose, notify organizational maintenance.

WARNING

Battery box lid is heavy. Do not allow battery box lid to fall on you. If you are injured, obtain medical aid immediately.

Step 4. Remove padlock from battery box hasp. Raise lid and check for loose, corroded, or damaged battery cables and connections.



BATTERIES

TA316010

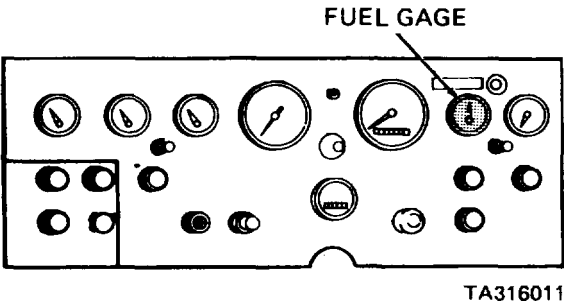
If battery cable connections are loose, or if cables or connections are damaged or corroded, notify organizational maintenance.

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

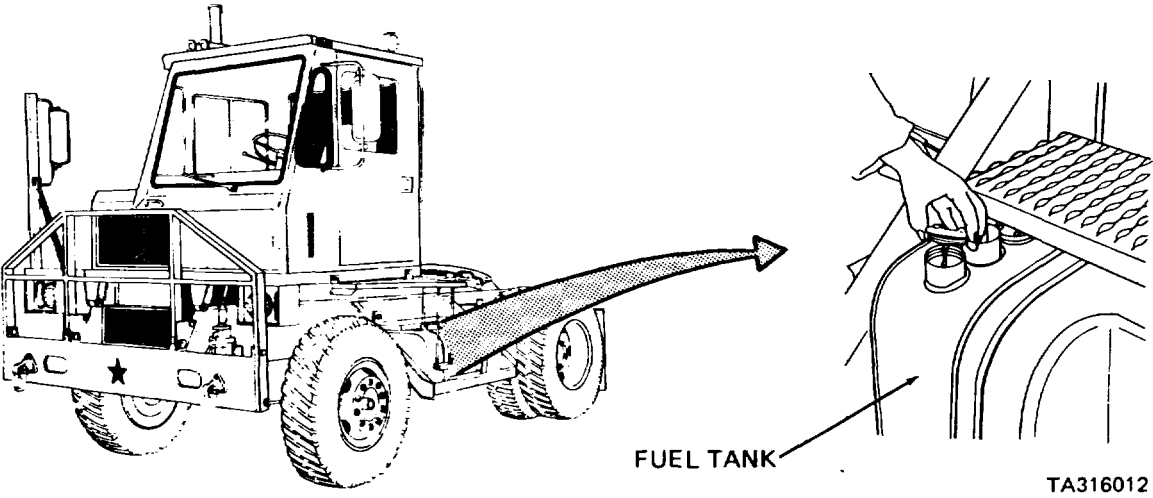
2. ENGINE CRANKS BUT WILL NOT START

Step 1. Check if there is fuel in fuel tank.



WARNING

Diesel fuel is combustible. Provide a metal-to-metal contact between the fuel tank and fuel container before and during the fueling operation.



- a. If fuel tank is empty, fill with diesel fuel (item 9, appendix D). If tank was run dry, engine may not start due to air trapped in fuel filters or lines (notify organizational maintenance).
- b. If fuel tank is not empty, go to step 2.

3-4. TROUBLESHOOTING TABLE (Continued)

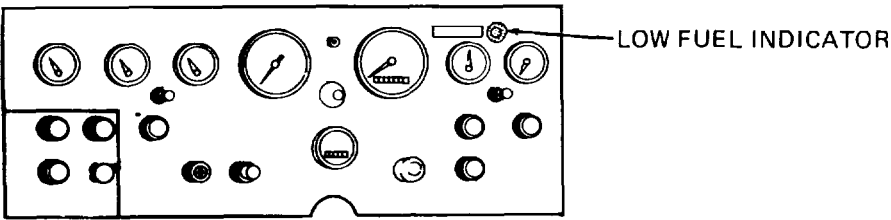
| MALFUNCTION |
|--------------------|
| TEST OR INSPECTION |
| CORRECTIVE ACTION |

2. ENGINE CRANKS BUT WILL NOT START (Continued)

Step 2. If operating on a grade of 30% or more, or a side slope of 10% or more, check if LOW FUEL INDICATOR is on. If operating on level surface, go to step 3.

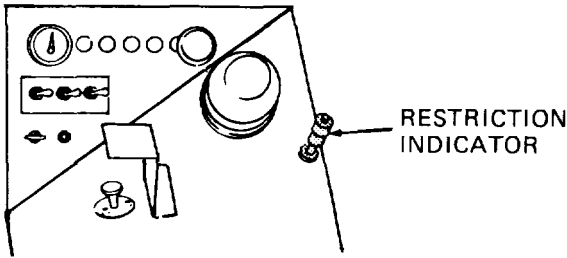
WARNING

Diesel fuel is combustible. Provide a metal-to-metal contact between the fuel tank and fuel container before and during fueling operation.



TA316013

- a. If LOW FUEL INDICATOR is on, add diesel fuel (item 9, appendix D) to fuel tank until indicator goes off.
- b. If LOW FUEL INDICATOR is not on, got to step 3.



- a. If red band is visible, press red reset button on top of indicator and check that red band disappears from view. (If red band does not disappear from view, notify organizational maintenance that restriction indicator is defective.) Crank engine and check if red band reappears; if red band is visible, air cleaner element is clogged (notify organizational maintenance).
- b. If red band is not visible, go to step 4.

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|--------------------|---------------------------|--------------------------|
|--------------------|---------------------------|--------------------------|

2. ENGINE CRANKS BUT WILL NOT START (Continued)

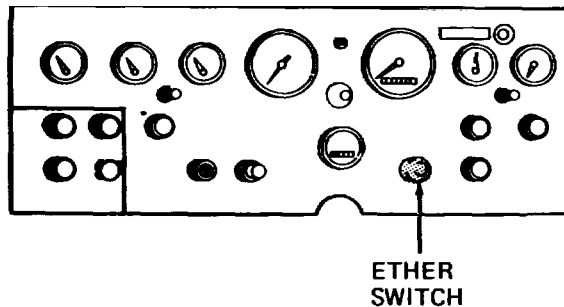
Step 4. Check for incorrect or contaminated fuel in fuel tank. (If contaminated, fuel will have a milky-white coloring. During cold weather operation, the temperature at which wax crystals begin to form in diesel fuel should be 10 degrees F below the lowest expected outside temperature.)

- a. If fuel is incorrect or contaminated, notify organizational maintenance (fuel tank draining and fuel system cleaning is required).
- b. If fuel is okay, go to step 5.

Step 5. Check if ether switch is used when temperature is less than 40 degrees F.

WARNING

Do not use ether switch without cranking engine. Over-charge of ether can cause explosion of engine air intake system.



TA316015

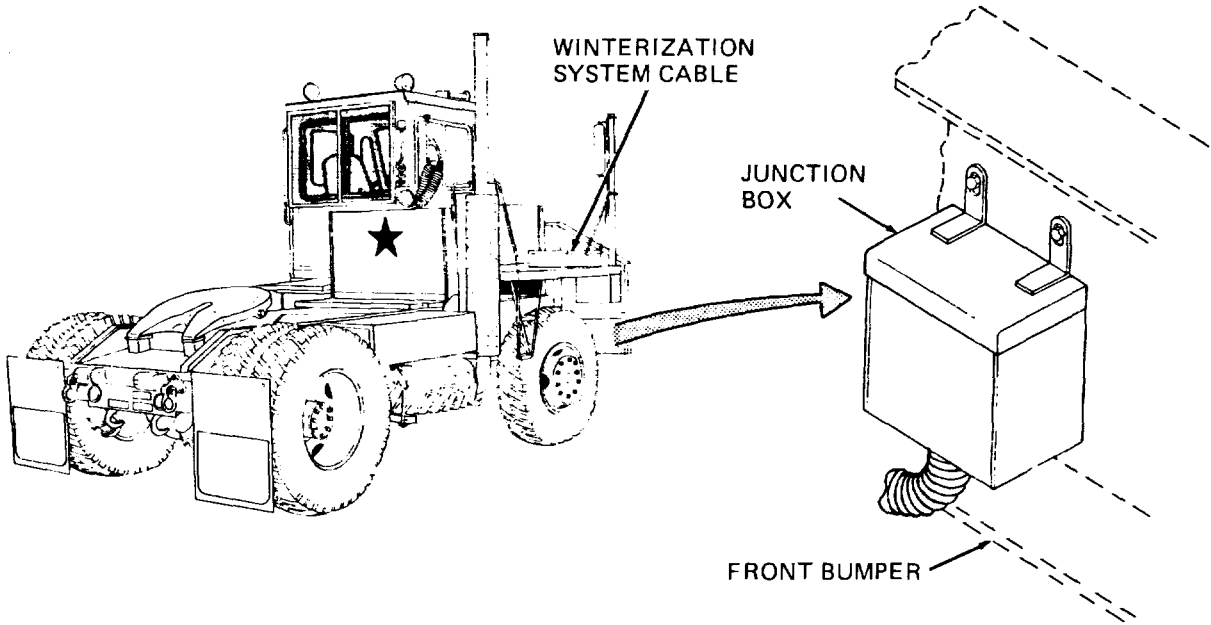
- a. If ether switch was not used, use ether switch while cranking engine (refer to chapter 2, paragraph 2-1a(3)).
 - b. If ether switch is used, go to step 6.
- Step 6. If temperature is less than 20 degrees F, check if winterization system cable is connected when tractor is parked outside. (If temperature is more than 20 degrees F, or if tractor is parked in a heated shelter, notify organizational maintenance.)

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

2. ENGINE CRANKS BUT WILL NOT START (Continued)

Step 6 (continued).

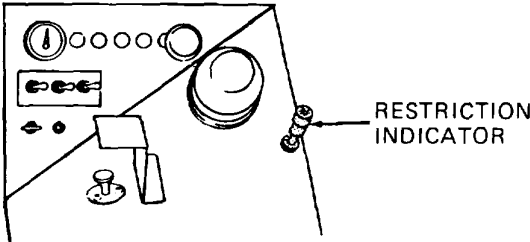


TA316016

- a. If cable is not connected, connect cable (refer to paragraph 2-10b). Allow 2-4 hours for heaters to raise temperature of batteries, engine oil, and coolant. If engine will not start, notify organizational maintenance.
- b. If cable is connected, notify organizational maintenance.

3. ENGINE STALLS FREQUENTLY OR RUNS UNEVENLY

Step 1. Check if restriction indicator red band is visible.



TA316014

| |
|---|
| 3-4. TROUBLESHOOTING TABLE (Continued) |
|---|

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|--------------------|---------------------------|--------------------------|
|--------------------|---------------------------|--------------------------|

3. ENGINE STALLS FREQUENTLY OR RUNS UNEVENLY (Continued)

Step 1 (continued).

- a. If red band is visible, press reset button on top of indicator and check that red band disappears from view. (If red band does not disappear from view, notify organizational maintenance that restriction indicator is defective.) Crank engine and check if red band reappears; if red band is visible, air cleaner element is clogged (notify organizational maintenance).
- b. If red band is not visible, go to step 2.

Step 2. Check for fuel contamination and condensation in fuel tank. (If contaminated, fuel will have a milky-white coloring. During cold weather operation, the temperature at which wax crystals begin to form in diesel fuel should be 10 degrees F below the lowest expected outside temperature.)

If any of the above conditions are seen, notify organizational maintenance.

4. EXCESSIVE ENGINE OIL CONSUMPTION

NOTE

Normal engine oil consumption is less than 10 quarts in 1000 miles.

Step 1. Check ground under tractor for engine oil leakage.

- a. If oil leaks are observed, notify organizational maintenance.
- b. If oil leaks are not observed, go to step 2.

WARNING

Do not remove radiator cap from a hot radiator; stop the engine and allow it to cool before removing the cap. This will avoid injury by scalding.

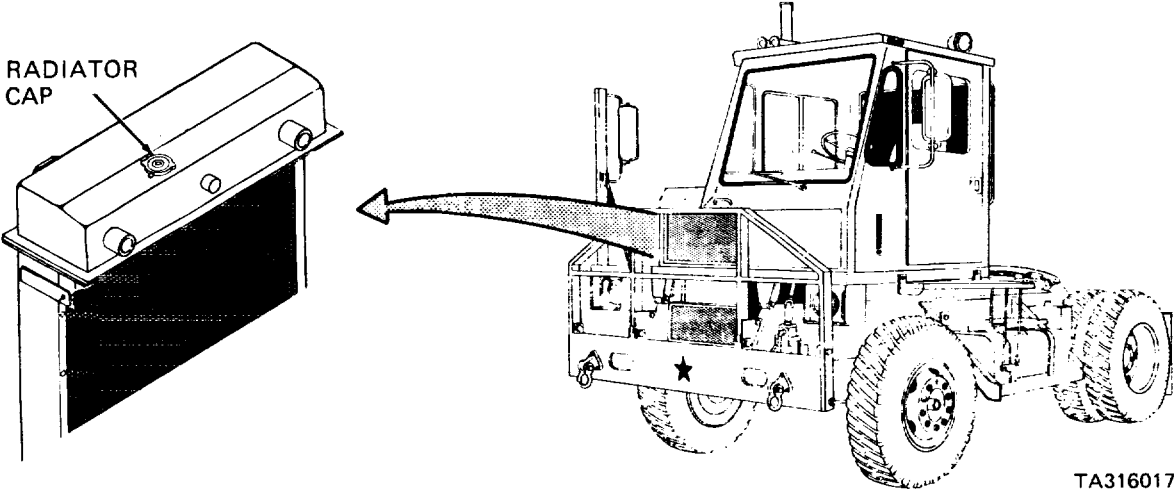
Step 2. Tilt cab 45 degrees, remove radiator cap, and inspect coolant for lubricating oil contamination.

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION |
|--------------------|
| TEST OR INSPECTION |
| CORRECTIVE ACTION |

4. EXCESSIVE ENGINE OIL CONSUMPTION (Continued)

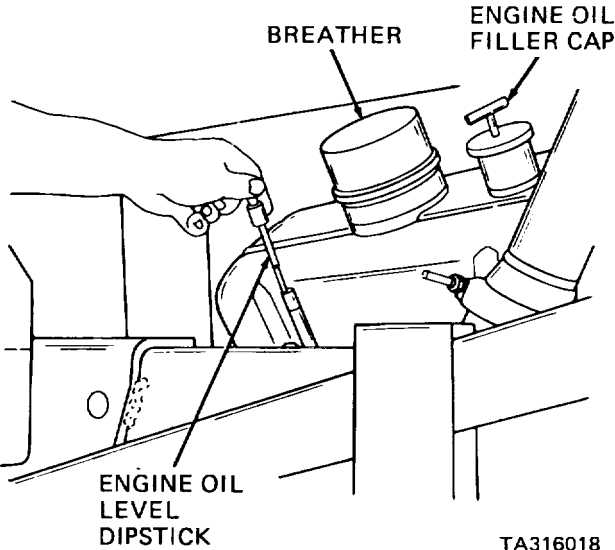
Step 2 (continued).



TA316017

- a. If coolant is contaminated with lubricating oil, notify organizational maintenance (oil cooler core must be replaced.)
- b. If coolant is not contaminated, go to step 3.

Step 3. Check that dipstick, breather, and oil filler caps are installed on engine.



TA316018

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

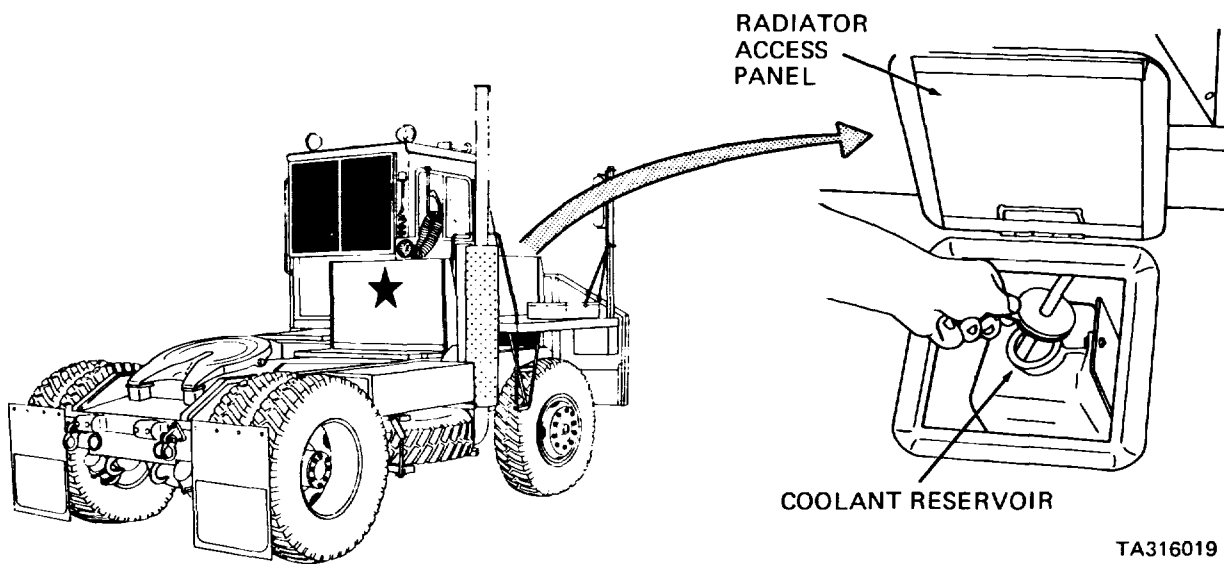
4. EXCESSIVE ENGINE OIL CONSUMPTION (Continued)

Step 3 (continued).

- a. If dipstick or oil filler caps are not installed, install them.
Add engine oil to FULL mark on dipstick, and close engine hood.
- b. If breather caps are not installed, notify organizational maintenance.

5. WATER TEMP WARNING LIGHT IS ON

Step 1. Shut down engine, open access panel on engine hood and check coolant level in overflow recovery reservoir.



TA316019

- a. If coolant level is low, add coolant.
- b. If coolant level is not low, go to step 2.

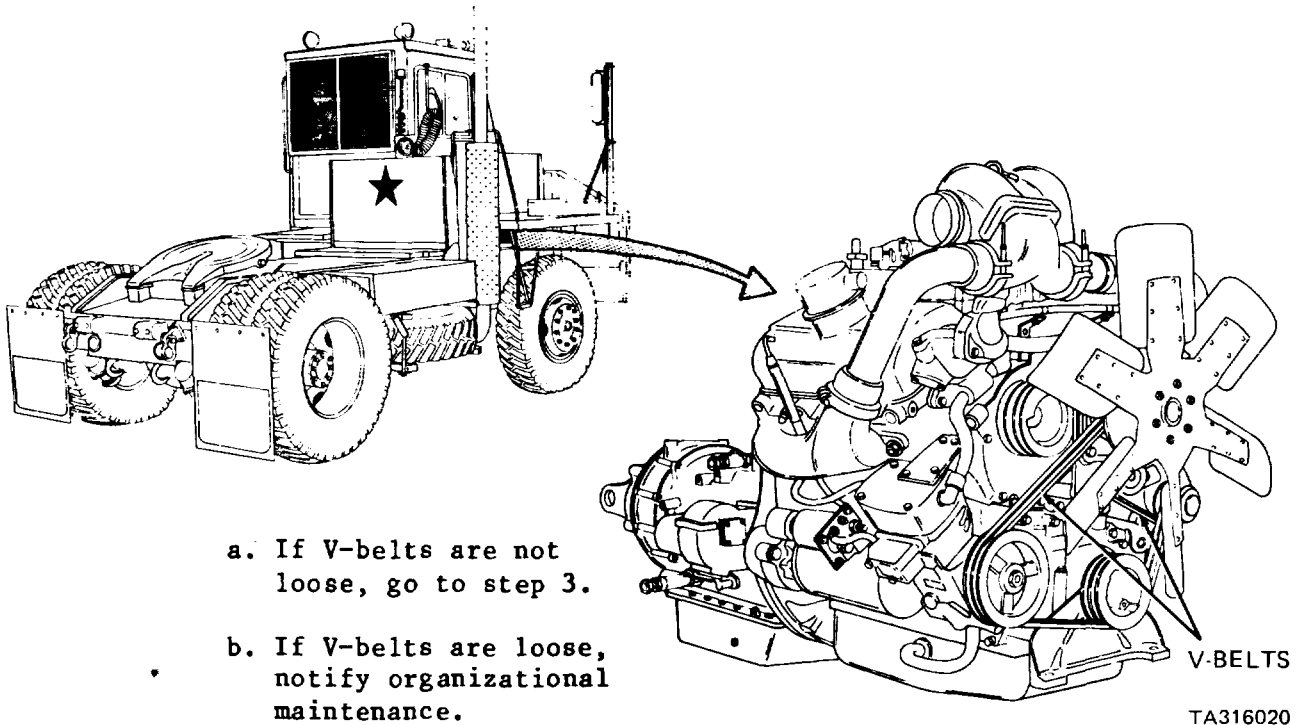
Step 2. Open engine hood and check V-belts at front of engine for proper tension (approximately 1/2 inch deflection).

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

5. WATER TEMP WARNING LIGHT IS ON (Continued)

Step 2 (continued).



Step 3. Check radiator fins for obstruction or accumulation of dirt.

- a. If radiator fins are obstructed, remove obstruction.

WARNING

Compressed air, used for cleaning purposes, will not exceed 30 PSI. Safety glasses must be used when cleaning parts with compressed air. Failure to do so could cause **SERIOUS INJURY** to your **EYES** and possible **BLINDNESS**. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

- b. If radiator fins are dirty, clean fins with water and compressed air at not more than 30 PSI.
- c. If radiator fins are not obstructed or dirty, notify organizational maintenance.

3-4. TROUBLESHOOTING TABLE (Continued)

**MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION**

6. WATER LEVEL WARNING LIGHT IS ON

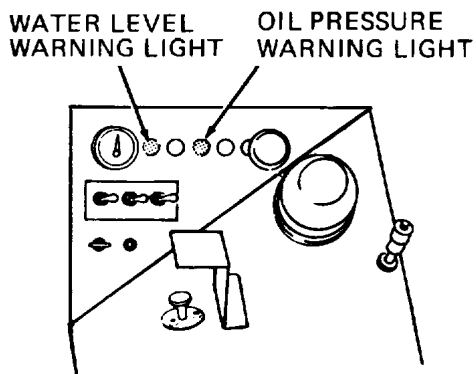
Shut down engine and go to MALFUNCTION 5.

7. OIL PRESSURE WARNING LIGHT IS ON

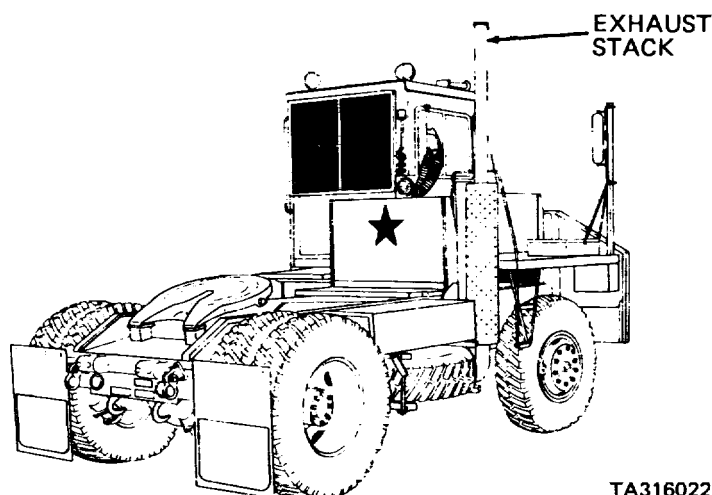
Shut down engine and notify organizational maintenance.

8. EXCESSIVE ENGINE EXHAUST SMOKE

Step 1. Check if exhaust smoke is black or gray.



TA316021



TA316022

- a. If exhaust smoke is black or gray, go to step 2.
- b. If exhaust smoke is blue or white, notify organizational maintenance.

Step 2. Check WATER TEMP gage reading (normal operating 175 to 195 degrees F).

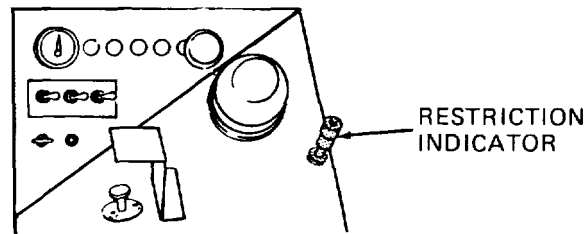
- a. If WATER TEMP gage indicates less than 160 degrees F, warm up engine. Exhaust smoke from cold engine is normal if smoke decreases when engine is warm. If smoke does not decrease when engine is warm, go to step 3.
- b. If WATER TEMP gage indicates 175 to 195 degrees F, go to step 3.

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

8. EXCESSIVE ENGINE EXHAUST SMOKE (Continued)

Step 3. Check if restriction indicator red band is visible.

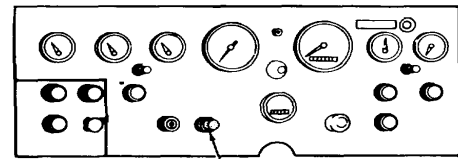


- a. If red band is visible, press reset button on top of indicator and check that red band disappears from view. (If red band does not disappear from view, notify organizational maintenance that restriction indicator is defective.) Crank engine and check if red band reappears; if red band is visible, air cleaner element is clogged (notify organizational maintenance).
- b. If red band is not visible, notify organizational maintenance.

9. ENGINE WILL NOT SHUT DOWN

Check if engine stop button is pushed.

- a. If engine stop button is not pushed, push in and hold button until engine stops.
- b. If engine stop button is pushed, idle engine, place gear shift lever in neutral (N) position, pull PARKING BRAKE valve out to apply brakes, and notify organizational maintenance.



ENGINE STOP BUTTON

TA316023

10. TRANS/TORQUE CONVERTER LIGHT IS ON

Step 1. Stop tractor, shift transmission to neutral (N), and run engine at 1200 to 1500 RPM for three minutes.

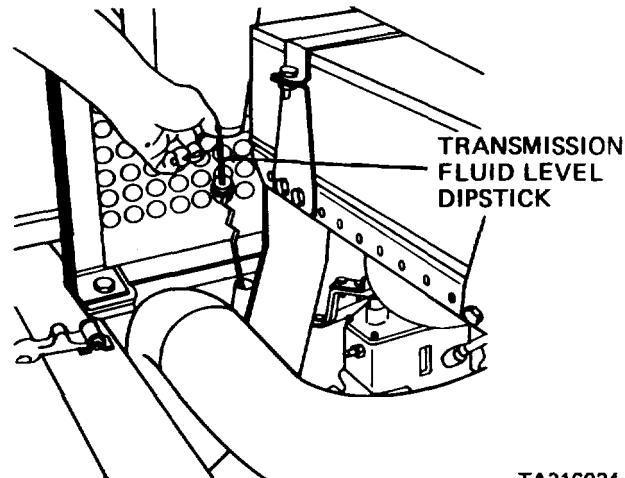
- a. If TRANS/TORQUE CONVERTER light goes out, problem was temporary overheating due to maximum capacity load.
- b. If TRANS/TORQUE CONVERTER light does not go out, go to step 2.

| |
|--|
| 3-4. TROUBLESHOOTING TABLE (Continued) |
|--|

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

10. TRANS/TORQUE CONVERTER LIGHT IS ON (Continued)

Step 2. Open engine hood. With engine running, check fluid level on transmission dipstick with transmission at operating temperature.



- If fluid level is below ADD mark, fill with transmission fluid to FULL mark (refer to current lubrication order).
- If fluid level is above FULL mark, notify organizational maintenance (draining of excess transmission fluid required).
- If fluid level is above ADD mark and at or below FULL mark, go to step 3.

Step 3. Shut down engine and check ground under tractor for transmission fluid leakage.

Notify organizational maintenance.

11. LOW AIR WARNING LIGHT IS ON

Step 1. Check AIR PRESS gage reading (normal operating 100 to 120 PSI).

WARNING

Do not operate tractor if AIR PRESS gage reading is less than 60 PSI. This is the minimum safe pressure for operation of the service brakes.

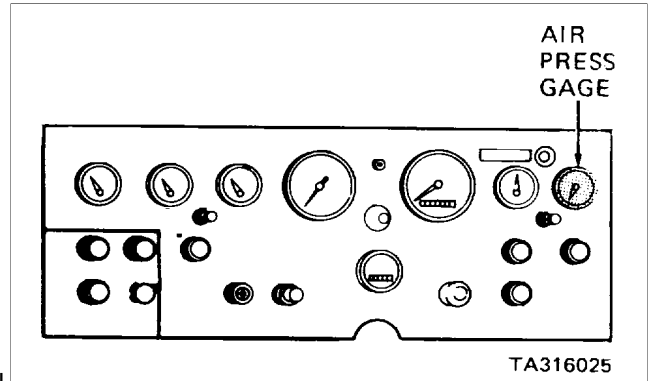
3-4. TROUBLESHOOTING TABLE (Continued)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

11. LOW AIR WARNING LIGHT IS ON (Continued)

Step 1 (continued).

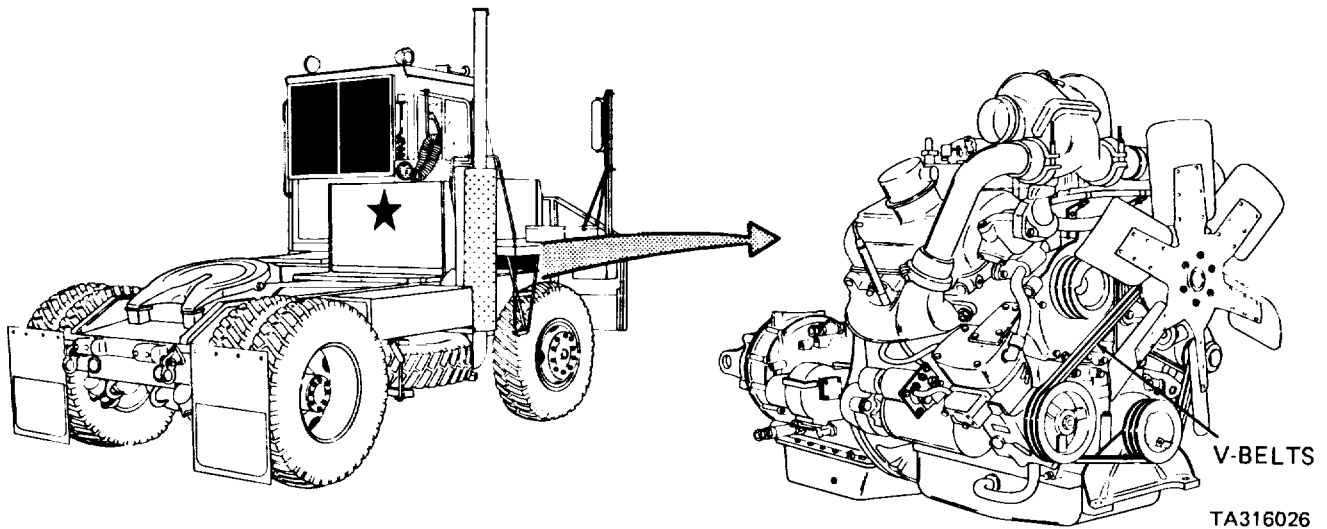
- a. If AIR PRESS gage indicates less than 76 PSI, immediately stop tractor and go to step 2.
- b. If AIR PRESS gage indicates at least 76 PSI, and increases as the engine is running, notify organizational maintenance (trouble in LOW AIR warning light circuit).



Step 2. With engine running at 1200 RPM, record time required for AIR PRESS gage reading to increase from 50 to 90 PSI.

- a. If more than five minutes is required, go to step 3.
- b. If less than five minutes is required, air system is operating normally.

Step 3. Stop engine, open engine hood and check air compressor V-belts at front of engine for proper tension (approximately 1/2 inch deflection).



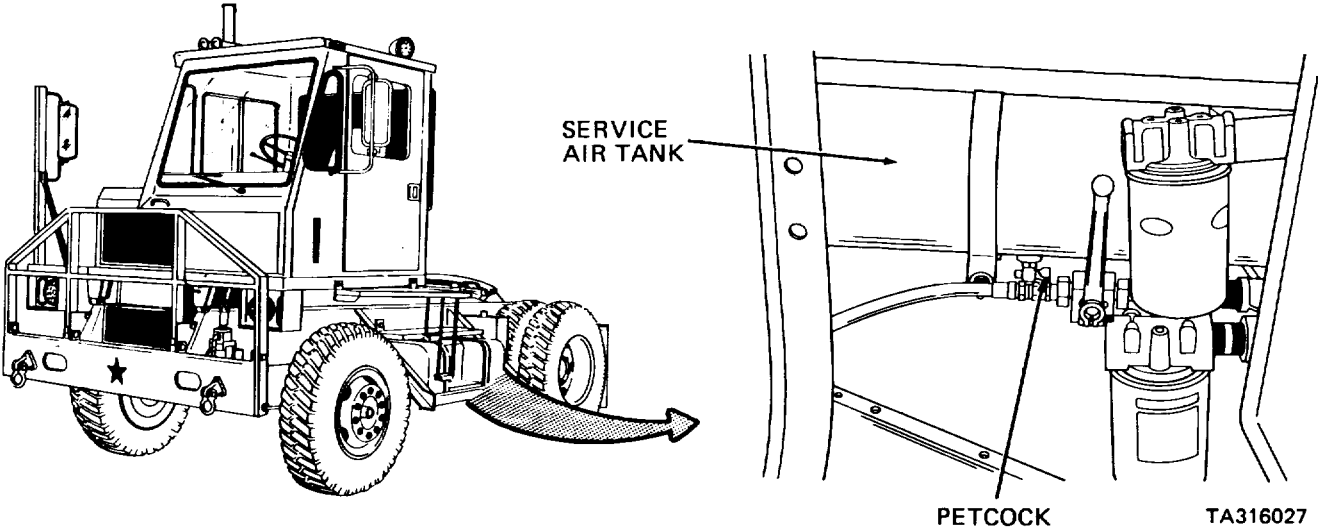
- a. If V-belts are loose, notify organizational maintenance.
- b. If V-belts are not loose, go to step 4.

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

11. LOW AIR WARNING LIGHT IS ON (Continued)

Step 4. Check for open petcock on service air tank.



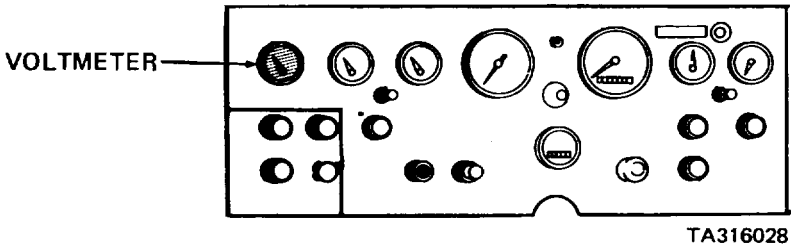
- a. If petcock is open, close it.
- b. If petcock is closed, go to step 5.

Step 5. With engine stopped and brake treadle released, record drop in AIR PRESS gage reading during one-minute period.

- a. If AIR PRESS gage reading drops more than 2 PSI per minute, notify organizational maintenance.
- b. If AIR PRESS gage reading drops less than 2 PSI per minute, air system leakage is satisfactory.

12. BATTERIES REQUIRE DAILY FILLING

Step 1. With engine running at 1200 rpm, check voltmeter reading.



3-4. TROUBLESHOOTING TABLE (Continued)

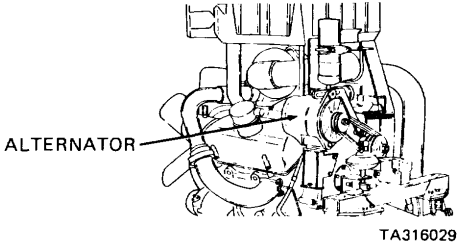
| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

12. BATTERIES REQUIRE DAILY FILLING (Continued)

Step 1 (continued).

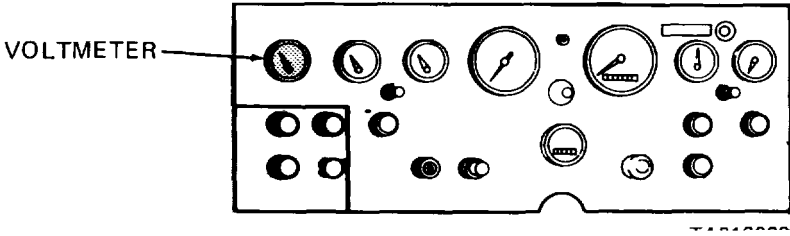
- a. If voltmeter reading is within green arc, go to step 2.
- b. If voltmeter reading is above green arc, shut down engine and notify organizational maintenance.

Step 2. Shut down engine, tilt cab 45 degrees and check for loose alternator connections at rear of engine. Notify organizational maintenance.



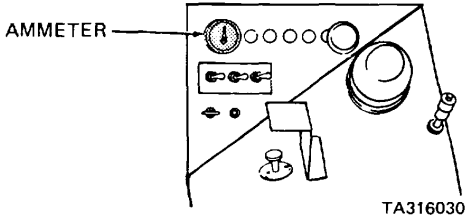
13. BATTERIES FAIL TO MAINTAIN CHARGE

Step 1. Note voltmeter reading with key switch and head lights on and engine shut down; then run engine at 1200 RPM and record increase in voltmeter reading.



- a. If voltmeter reading does not increase from lower green arc to upper green arc, go to step 3.
- b. If voltmeter reading increase from lower green arc to upper green arc, got to step 2.

Step 2. With head light switch on, start engine and run at 1200 RPM; then immediately record ammeter reading.



3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

13. BATTERIES FAIL TO MAINTAIN CHARGE (Continued)

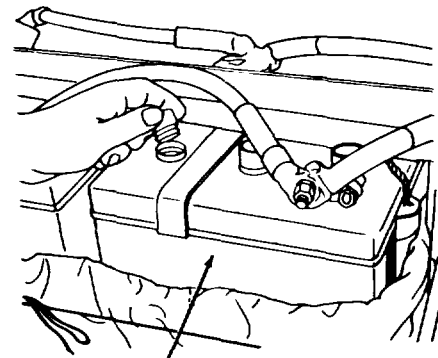
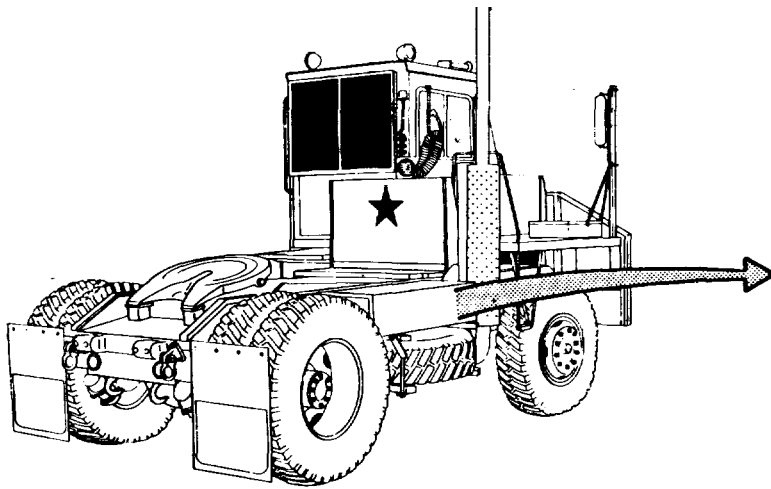
Step 2 (continued).

- a. If ammeter indicates plus (+) side of zero, go to step 6.
- b. If ammeter does not indicate plus (+) side of zero, go to step 3.

Step 3. Remove padlock from battery box hasp. Raise lid and check level of electrolyte in batteries.

WARNING

Battery electrolyte is toxic and corrosive. Use protective goggles and gloves when performing the following. Avoid contact with skin, eyes, clothes, and don't breathe vapors. Do not smoke or use an open flame near batteries.



BATTERIES

TA316010

- a. If electrolyte level is below plates of any cell, add distilled water to bring level 3/8 inch above plates.
- b. If electrolyte level is above plates of all cells, install cell covers and go to step 4.

3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|--------------------|---------------------------|--------------------------|
|--------------------|---------------------------|--------------------------|

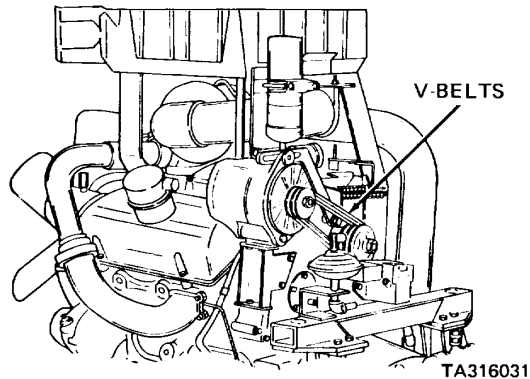
13. BATTERIES FAIL TO MAINTAIN CHARGE (Continued)

Step 4. Check for loose battery cables and broken battery terminals.

- a. If battery cables are loose, notify organizational maintenance.
- b. If battery cables are not loose and terminals are not broken, go to step 5.

Step 5. Tilt cab 45 degrees and check alternator V-belts at rear of engine for proper tension (approximately 1/2 inch deflection).

- a. If V-belts are loose, notify organizational maintenance.
- b. If V-belts are not loose, go to step 6.



Step 6. Inspect battery tops and terminals for corrosion build-up.

Clean battery tops and terminals (Ref TM 9-6140-200-14).

14. TIRES WEAR RAPIDLY OR UNEVENLY

Check that tires are inflated to 120 PSI.

- a. If tires are not properly inflated, inflate to 120 PSI.
- b. If tires are inflated to 120 PSI, notify organizational maintenance.

15. STEERING SYSTEM NOT FUNCTIONING PROPERLY (HARD STEERING)

Step 1. Check fluid level on power steering reservoir dipstick.

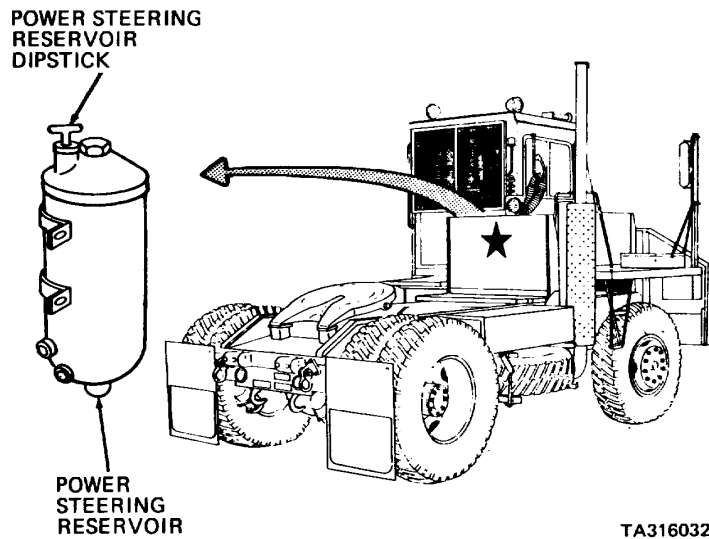
- a. If fluid level is above FULL mark, notify organizational maintenance (draining of excess fluid is required).
- b. If fluid level is below ADD mark, fill with hydraulic oil until level is at FULL mark.
- c. If fluid level is at or slightly below FULL mark, go to step 2.

| |
|--|
| 3-4. TROUBLESHOOTING TABLE (Continued) |
|--|

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

15. STEERING SYSTEM NOT FUNCTIONING PROPERLY (Continued)

Step 1 (continued).



Step 2. Check ground under tractor for fluid leakage.

- a. If fluid leaks are observed, notify organizational maintenance.
- b. If fluid leaks are not observed, go to step 3.

Step 3. Check that front tires are inflated to 120 PSI.

- a. If tires are not properly inflated, inflate to 120 PSI.
- b. If front tires are inflated to 120 PSI, notify organizational maintenance.

16. FIFTH WHEEL DRIFTS DOWN UNDER LOAD

Step 1. Check ground under tractor for oil leakage.

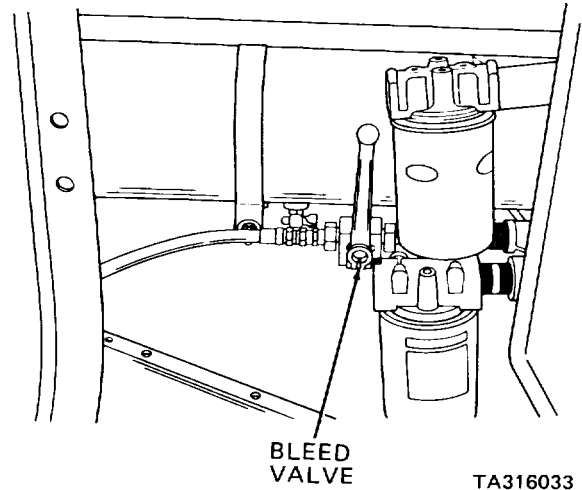
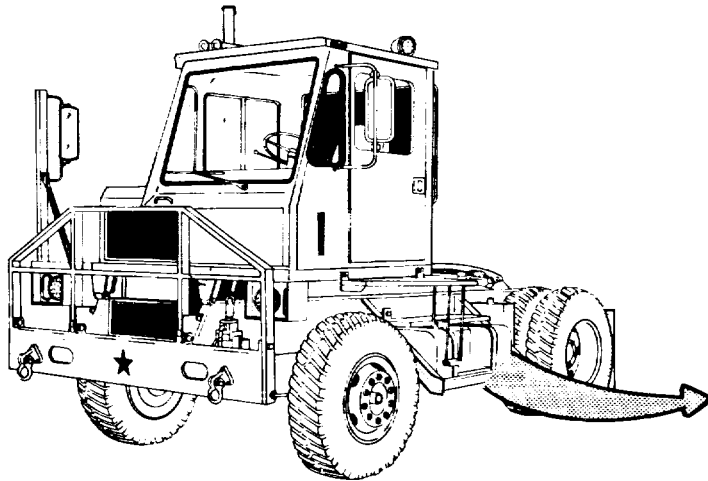
- a. If oil leaks are observed, notify organizational maintenance.
- b. If oil leaks are not observed, go to step 2.

3-4. TROUBLESHOOTING TABLE (Continued)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

16. FIFTH WHEEL DRIFTS DOWN UNDER LOAD (Continued)

Step 2. Check if bleed valve is closed (valve handle in vertical position).

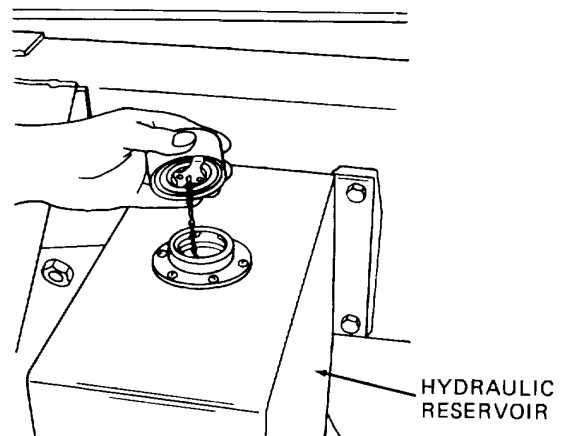


- a. If bleed valve is partly open, close it fully.
- b. If bleed valve is fully closed, notify organizational maintenance.

17. FIFTH WHEEL DOES NOT LIFT, LIFTS SLOWLY, OR HYDRAULIC PUMP NOISY

Step 1. Remove hydraulic reservoir breather cap and check oil level.

- a. If oil level is below bottom of screen, fill with hydraulic oil until level is at bottom of screen (refer to current lubrication order).
- b. If oil level is at or above bottom of screen, go to step 2.



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3-4. TROUBLESHOOTING TABLE (Continued)

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|--------------------|---------------------------|--------------------------|
|--------------------|---------------------------|--------------------------|

17. FIFTH WHEEL DOES NOT LIFT, LIFTS SLOWLY, OR HYDRAULIC PUMP NOISY (Continued)

Step 2. Check if bleed valve is fully closed (valve handle in vertical position).

- a. If bleed valve is partly open, close it fully.
- b. If bleed valve is fully closed, notify organizational maintenance.

18. FIFTH WHEEL WILL NOT LOWER OR LOWERS ONLY SLIGHTLY, THEN STOPS

Pull back 5th WHEEL lever and increase engine speed. Then push 5th WHEEL lever forward to lower fifth wheel very slowly.

- a. If fifth wheel lowers, fifth wheel had been lowered too quickly (velocity fuses locked, stopping flow of oil from hydraulic cylinders).
- b. If fifth wheel does not lower, notify organizational maintenance.

Section III. MAINTENANCE PROCEDURES

| | | | |
|-----------------------------------|----------|----------------------------|-----------|
| Introduction | Para 3-5 | Fuel Tank | Para 3-7b |
| Inspecting | 3-6 | Radiator | 3-7c |
| Engine Assembly | 3-6a | Batteries | 3-7d |
| Restriction Indicator | 3-6b | Transmission Oil Pan | 3-7e |
| Fuel Lines | 3-6c | Service Tank | 3-7f |
| Trailer Brakes Lines and | | Tires..... | 3-7g |
| Couplings | 3-6d | Rearview Mirrors | 3-7h |
| Cab Tilt Hydraulic Cylinder | 3-6e | Windshield Washer | 3-7i |
| Fifth Wheel Hydraulic | | Hydraulic Reservoir | 3-7j |
| Cylinder | 3-6f | Testing | 3-8 |
| Servicing | 3-7 | Lights | 3-8a |
| Engine Crankcase | 3-7a | Horns | 3-8b |

3-5. INTRODUCTION

This section provides maintenance procedures consisting of inspections and servicing of the various components and systems to be performed by the operator as authorized in the Maintenance Allocation Chart.

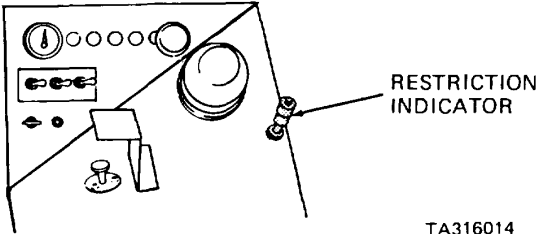
3-6. INSPECTING

a. Engine Assembly.

- (1) Check ground below engine for leaks.
- (2) Unlatch and raise engine hood.
- (3) Check engine assembly for engine component damage.

b. Restriction Indicator.

- (1) Start engine.
- (2) Check restriction indicator for visible red band. If red band is not visible, inspection is completed.
- (3) If red band is visible, stop engine.
 - (a) Press reset button on top of restriction indicator.
 - (b) Check restriction indicator for visible red band. If red band reappears, with engine off and reset button pushed, notify organizational maintenance (restriction indicator defective).
 - (c) If red band is no longer visible, start engine.



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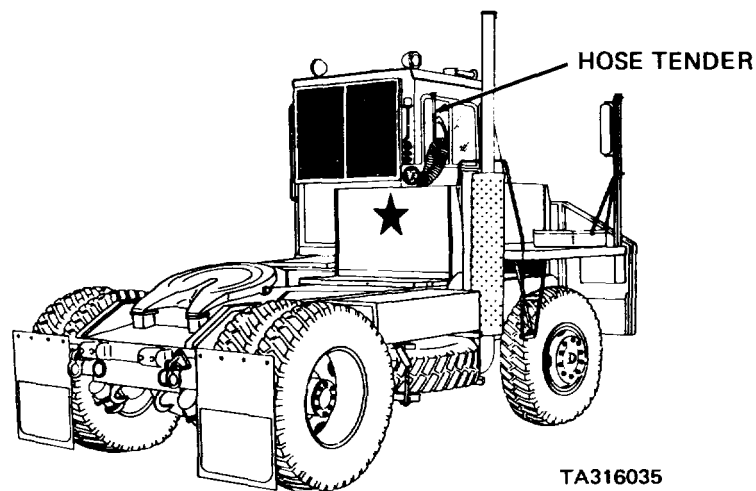
3-6. INSPECTING (Continued)**b. Restriction Indicator (Continued).**

(3) (Continued).

- (d) Check restriction indicator for visible red band. If red band reappears, notify organizational maintenance (air cleaner is clogged).

c. Fuel Lines.

- (1) Inspect fuel lines, filters, fuel tank, and ground under tractor for fuel leaks.
(2) Be sure fuel lines are securely strapped or clamped to tractor.

d. Trailer Brakes Lines and Couplings.

Check hose tender flexible hoses and quick-disconnect couplings for leaks or damage.

e. Cab Tilt Hydraulic Cylinder.

- (1) Check ground under tractor for hydraulic oil leaks.
(2) Check hydraulic oil lines running from cab tilt cylinder to cab tilt pump for leaks.

f. Fifth Wheel Hydraulic Cylinder.

Check ground under fifth wheel hydraulic cylinders for hydraulic oil leaks.

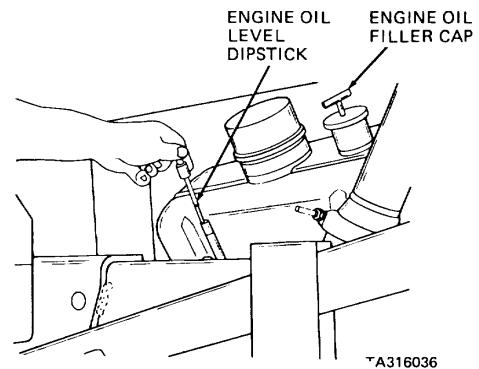
3-7. SERVICING**a. Engine Crankcase.****(1) Checking:**

- (a) Unlatch and raise engine hood.

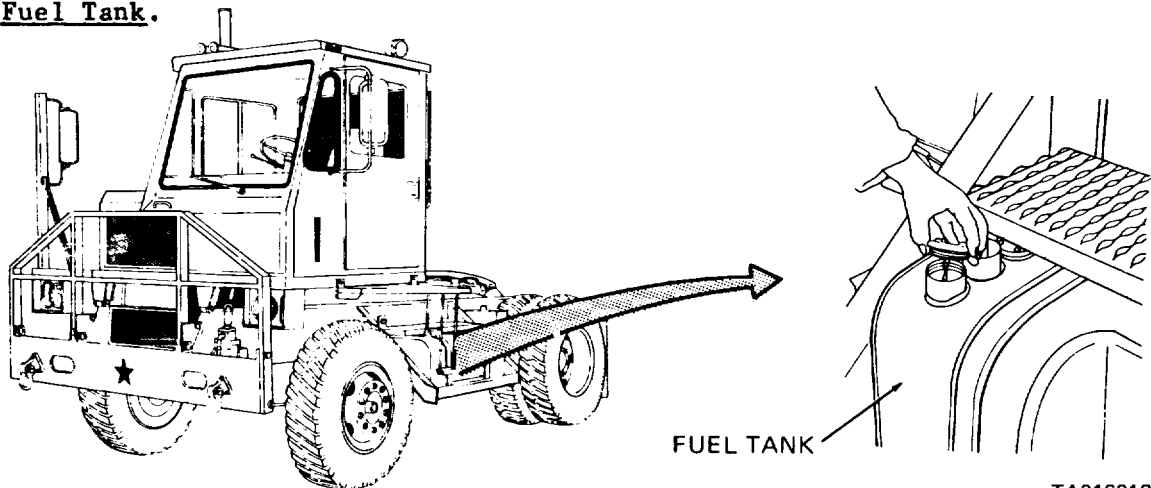
WARNING

After operation exhaust pipes may be very hot. Do not touch exhaust pipe with your bare hands. If you are burned, seek medical attention immediately.

- (b) Remove engine oil dipstick from engine crankcase.
- (c) Wipe dipstick with cloth (item 7, appendix D).
- (d) Reinsert dipstick in crankcase.
- (e) Remove dipstick and check that engine oil level is between FULL and ADD marks on dipstick. Fill if necessary.

**(2) Filling:**

- (a) Remove engine oil filler cap (unscrew T-handle counterclockwise and pull out).
- (b) Fill crankcase with engine oil (item 6, appendix D).
- (c) Reinstall engine oil filler cap (turn T-handle clockwise until tight).

b. Fuel Tank.

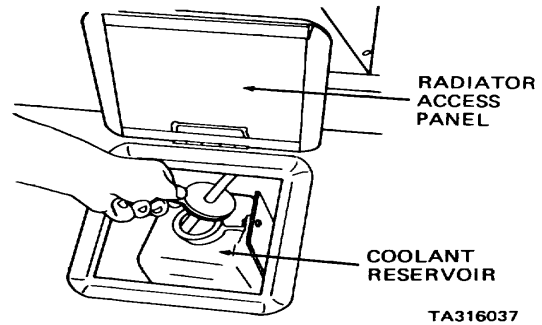
3-7. SERVICING (Continued)**b. Fuel Tank (Continued).**

- (1) Remove filler cap from fuel tank.
- (2) Fill tank with diesel fuel (item 9, Appendix D).
- (3) Install filler cap.

c. Radiator.

Checking and Filling:

- (1) Unlatch and raise radiator access panel.
- (2) Check that coolant level reaches the full mark, or 2 to 4 inches below the top of filler neck on coolant reservoir.

**NOTE**

If coolant reservoir is empty, perform step (3) below. Otherwise go to step (4).

WARNING

Do not remove radiator cap from a hot radiator; stop the engine and allow it to cool before removing the cap. This will avoid injury by scalding.

CAUTION

If coolant is hot do not add coolant to radiator unless engine is running. Allow engine to run for several minutes to enable coolant being added to mix and circulate. Failure to observe this precaution may cause engine damage.

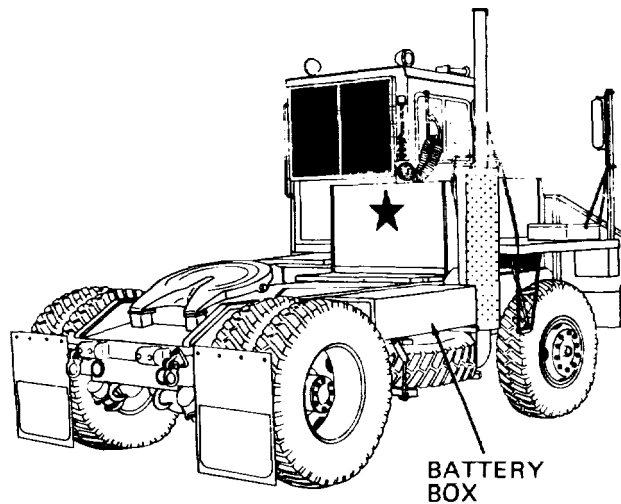
- (3) Tilt cab 45 degrees, carefully remove radiator cap, and check coolant level in radiator. Fill to within two inches of top of radiator if level is low. Reinstall radiator cap and lower cab to normal operating position.

3-7. SERVICING (Continued)**c. Radiator (Continued).**

- (4) If necessary, remove coolant reservoir cap and add coolant. Use solution of 50 percent water and 50 percent ethylene glycol (item 3, appendix D). Fill to 2 to 4 inches below top of filler neck on coolant reservoir.
- (5) Reinstall coolant reservoir cap, if removed.
- (6) Close and latch radiator access panel.

d. Batteries.

Checking and Filling:



TA316038

- (1) Remove padlock (if present) from battery box hasp.

WARNING

Battery box lid is heavy. Do not allow battery box lid to fall on you.

- (2) Raise battery box lid and prop open or tie back.

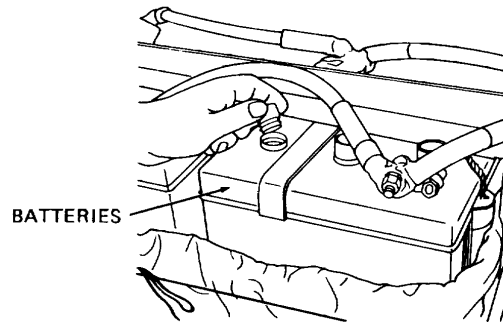
WARNING

Battery electrolyte is toxic and corrosive. Use protective goggles and gloves when removing battery caps and checking electrolyte. Avoid contact with skin, eyes, clothes, and don't breathe vapors. Do not smoke or use an open flame near batteries.

3-7. SERVICING (Continued)**d. Batteries (Continued).**

Checking and Filling (Continued):

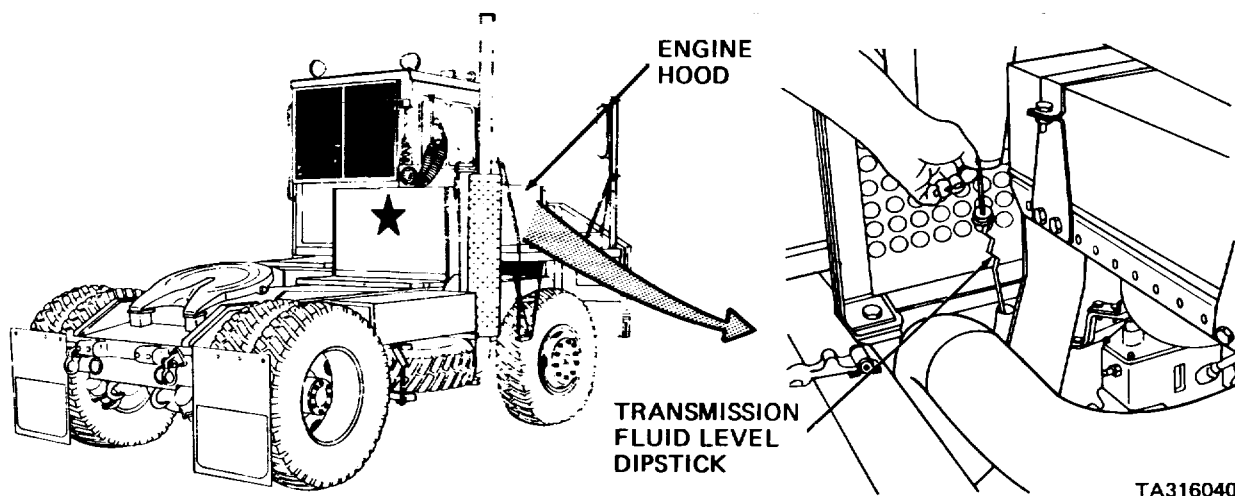
- (3) Remove battery caps from all four cells.
- (4) Be sure electrolyte level in all batteries is above plates.
- (5) Add water if necessary. Add just enough water to bring level $\frac{3}{8}$ inch above plates.
- (6) Install battery caps.
- (7) Close battery box lid.



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e. Transmission Oil Pan.

Checking:



TA316040

- (1) Start engine and run until engine operating temperature reaches 140 degrees. Then idle engine.
- (2) Unlatch and open engine hood.

CAUTION

Do not check fluid level or add transmission fluid. until engine reaches operating temperature specified above. Failure to follow this procedure may result in excessively high transmission fluid level at operating temperature.

- (3) Remove transmission fluid level dipstick.

3-7. SERVICING (Continued)**e. Transmission Oil Pan (Continued).**

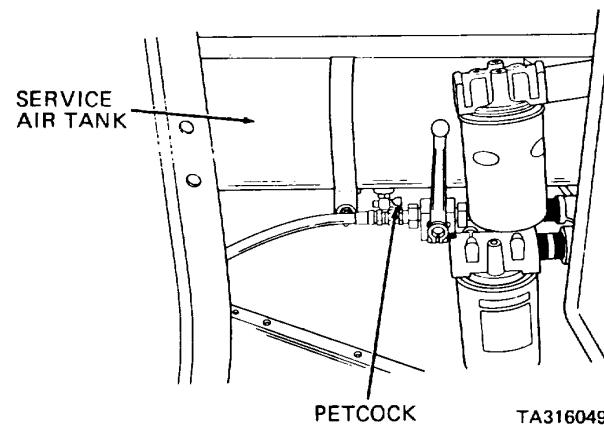
Checking (Continued):

- (4) Wipe dipstick with cloth (item 7, appendix D).
- (5) Reinsert dipstick.
- (6) Remove dipstick and check that fluid level is at FULL mark on dipstick.
- (7) Add transmission fluid to FULL mark on dipstick if level is low.
- (8) Reinsert dipstick.
- (9) Close and latch engine hood.

f. Service Tank.

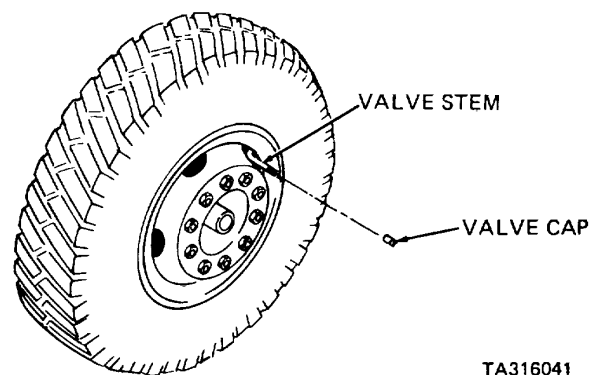
Draining:

- (1) Locate service air tank at left hand frame rail underside.
- (2) Open service tank petcock to drain water.
- (3) Close service tank petcock.

**a. Tires.**

Checking and Inflating:

- (1) Remove valve cap from valve stem of tire to be checked.
- (2) Use tire pressure gage to check if tire is inflated to 120 PSI. If necessary, inflate tire to 120 PSI.
- (3) Reinstall valve cap.
- (4) Repeat for all tires.

**h. Rearview Mirrors.**

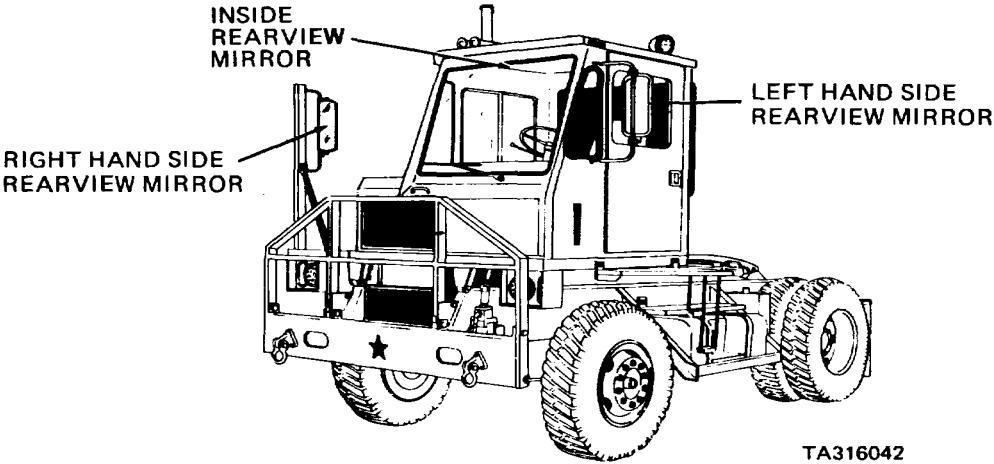
(1) Adjusting:

- (a) Sit in operator's seat.
- (b) Adjust inside rearview mirror to proper angle

3-7. **SERVICING (Continued)**

h. Rearview Mirrors (Continued).

(1) Adjusting (Continued):



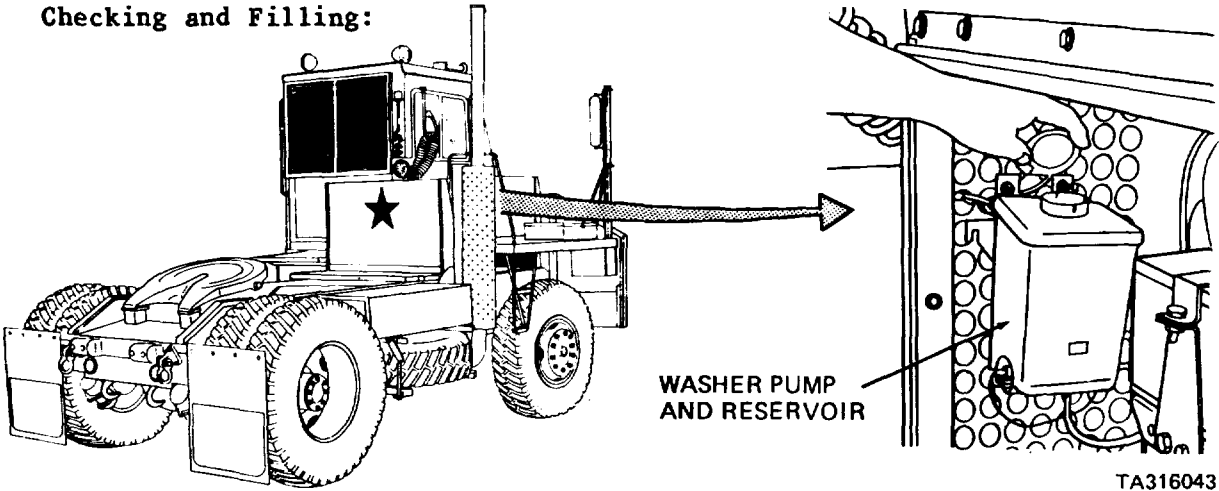
- (c) Adjust left hand side rearview mirror (reach through open window and rotate mirror for proper viewing angle).
- (d) Have assistant positioned at right hand rearview mirror.
- (e) Have assistant rotate mirror in response to your voice signals ("right more", etc.) until mirror is properly angled.

(2) Cleaning:

- (a) Clean all mirrors using window cleaner.
- (b) Dry using clean cloths (item 7, appendix D).

i. Windshield Washer.

Checking and Filling:



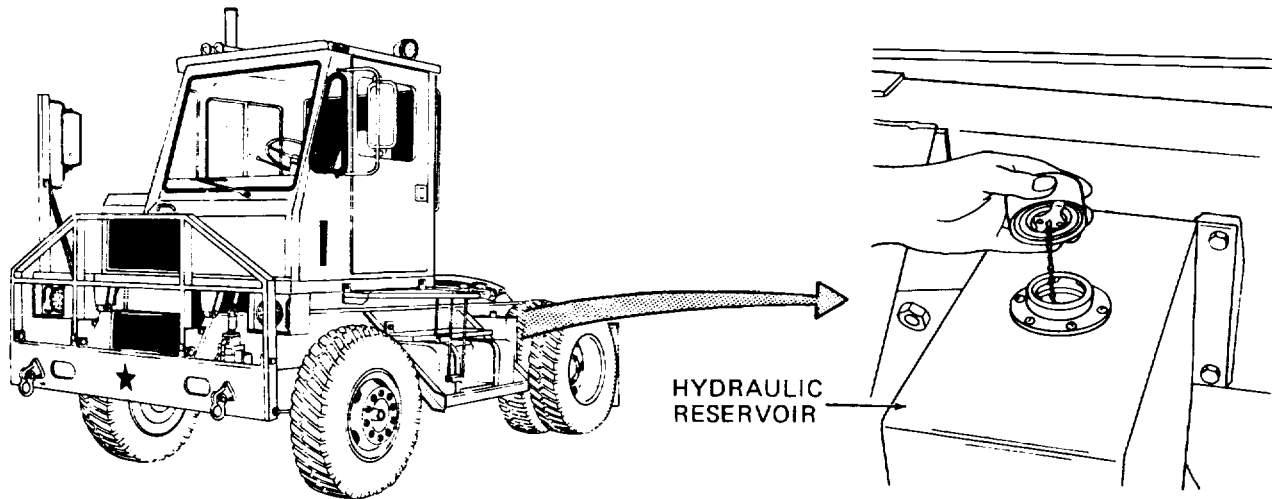
3-7. SERVICING (Continued)i. Windshield Washer (Continued).

Checking and Filling (Continued):

- (1) Unlatch and raise engine hood.
- (2) Remove cap from washer pump and reservoir.
- (3) Be sure reservoir is full of washer fluid.
- (4) Fill if necessary. Use solution of 50 percent isopropyl alcohol (item 1, appendix D) and 50 percent water.

i. Hydraulic Reservoir.

Checking and Filling:



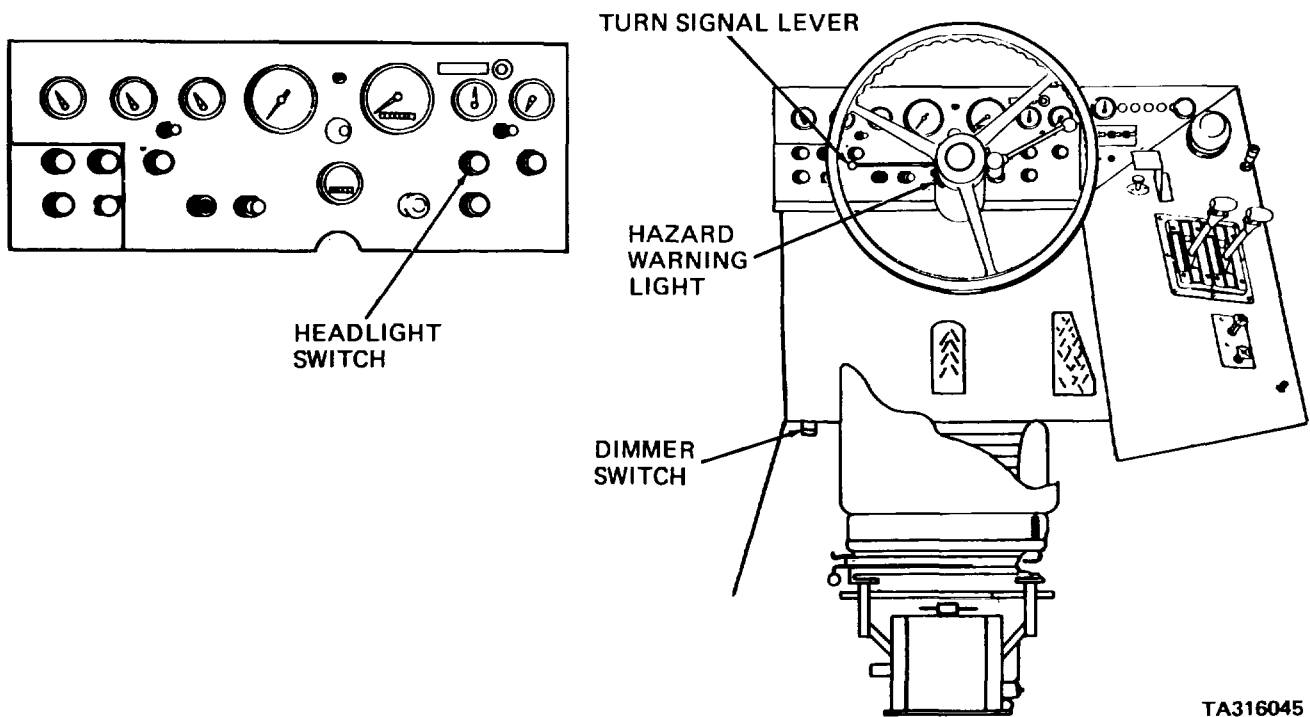
- (1) With engine stopped and 5th wheel boom down fully, remove hydraulic reservoir filler cap.
- (2) Check that hydraulic oil is at or slightly above bottom of reservoir screen.
- (3) Fill, if necessary, with hydraulic oil (item 5, appendix D).

3-8. TESTINGa. Lights.

- (1) Pull out headlight switch to second position.
- (2) Check that headlights, dash and gage lights, clearance lights, side marker lights, and front and rear park lights are operable.

3-8. TESTING (Continued)

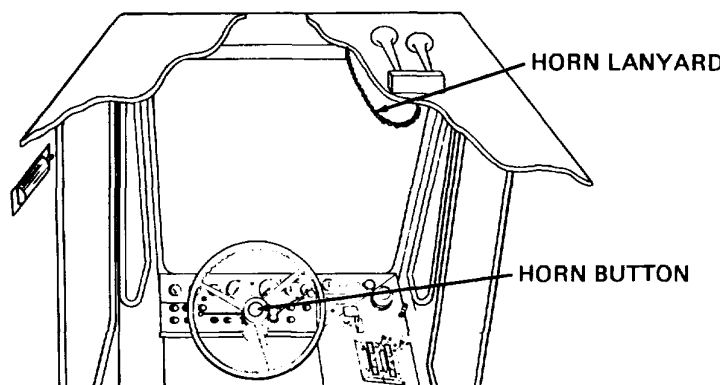
a. Lights (Continued).



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- (3) Press dimmer switch to check headlight low beam and high beam operation.
- (4) Operate turn signal lever and hazard warning switch to check operation of left and right turn signal lights.

b. Horns.



- (1) Start engine.
- (2) Press steering wheel horn button to be sure electric horn will sound.
- (3) Pull horn lanyard to be sure that air horn sounds.

APPENDIX A**REFERENCES****A-1. SCOPE**

This appendix lists all forms and publications referenced in this manual.

A-2. FORMS

DA Form 2028-2 Recommended Changes to Equipment Technical Publications

DA Form 2404 Equipment Inspection and Maintenance Work Sheet

SF 368 Quality Deficiency Report

A-3. FIELD MANUAL

FH 21-11 First Aid for Soldiers

A4. TECHNICAL MANUALS

DA Pam 738-750 The Army Maintenance Management System (TAMMS)

TM 9-2320-285-24 Maintenance Manual: Truck Tractor, Yard Type, M878A1

TM 9-2320-285-24P Repair Parts and Special Tools List: Truck Tractor, Yard Type, M878A1

TM 9-6140-200-14 Operator's and Maintenance Manual for Lead Acid Storage Batteries

A-5. MISCELLANEOUS PUBLICATION

LO 9-2320-285-12 Lubrication Order: Truck Tractor, Yard Type, M878A1

A-1/(A-2 blank)

APPENDIX B

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

B-1. SCOPE

This appendix lists components of end item and basic issue items for the M878A1 tractor to help you inventory items required for safe and efficient operation.

B-2. GENERAL

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II - Components of End Item. Not applicable.

b. Section III - Basic Issue Items. These are the minimum essential items required to place the M878A1 tractor in operation and to operate it. Although shipped separately packaged BII must be with the tractor during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

a. Column 1 - Illustration Number (Illus number). This column indicates the number of the illustration in which the item is shown.

b. Column 2 - National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Column 3 - Description. Indicates the National item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

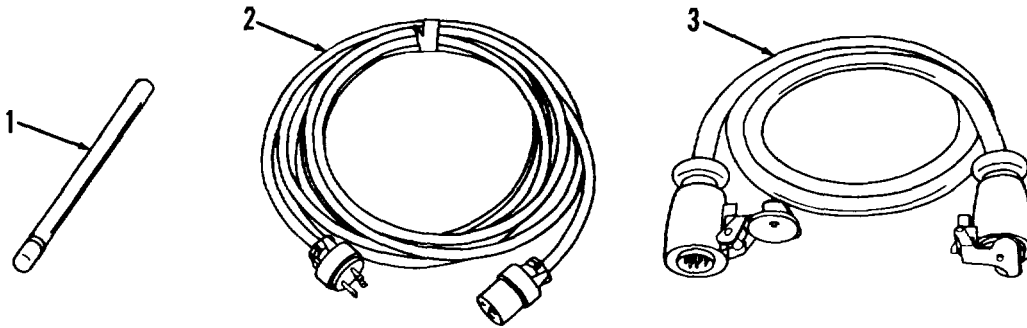
d. Column 4 - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two- character alphabetical abbreviation (e.g., ea, in, pr).

e. Column 5 - Quantity Required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM

(Not Applicable)

Section III. BASIC ISSUE ITEMS



TA316047

| (1) ILLUS NUMBER | (2) NATIONAL STOCK NUMBER | (3) DESCRIPTION, FSCM and Part Number | (4) Usable On Code U/M | (5) QTY Reqd |
|------------------------|------------------------------------|---|---------------------------------|--------------------|
| 1 | | HANDLE, CAB TILT PUMP (90915) 53510042 | EA | 1 |
| 2 | 6150-01-164-6444 | CABLE, WINTERIZATION (90915) 53516378 | EA | 1 |
| 3 | | CABLE, 24 VOLT LIGHTING (13445) 11244 | EA | |

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

(Not Applicable)

C-1/(C-2 blank)

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain tractor M878A1. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. EXPLANATION OF COLUMNS

a. Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use isopropyl alcohol (item 1, appendix D).").

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item. The symbol designations are as follows:

C.....Operator or crew

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 3 - 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 4 - 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.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

| (1) ITEM NUMBER | (2) LEVEL | (3) NATIONAL STOCK NUMBER | (4) DESCRIPTION | (5) UNIT OF MEAS. |
|-----------------------|--------------|------------------------------------|---|----------------------------|
| 1 | C | 6810-01-127-4246 | ALCOHOL: Isopropyl TT-I-735 (81348) | EA |
| 2 | C | | ALCOHOL, METHYL: Methanol O-M-232 (81348) | |
| | | 6810-00-597-3608 | 1 Gal Can | EA |
| | | 6810-00-275-6010 | 5 Gal Can | EA |
| 3 | C | 6850-00-243-1992 | ANTIFREEZE, ENGINE: Ethylene Glycol, Inhibited O-A-548 (81348) 1 Gal Can | EA |
| 4 | C | | DETERGENT: General Purpose P-D-220 (81348) | |
| | | 7930-00-559-9616 | 1 Gal | EA |
| | | 7930-00-559-9617 | 5 Gal | EA |
| 5 | C | | OIL, HYDRAULIC: Petroleum Base, MIL-H-5606 (81349) | |
| | | 9150-00-252-6383 | 1 Qt Can | EA |
| | | 9150-00-223-4134 | 1 Gal Can | EA |
| 6 | C | | OIL, LUBRICATING, ENGINE: MIL-L-2104 (81349) | |
| | | 9150-00-188-9858 | SAE 30, 5 Gal Can | EA |
| | | 9150-00-188-9860 | SAE 40, 5 Gal Can | EA |
| 7 | C | 7920-00-205-1711 | RAGS, COTTON: Wiping | BL |
| 8 | C | 6850-00-264-9038 | SOLVENT: Dry Cleaning P-D-680, Type II (81348) 5 Gal Can | EA |
| 9 | C | 9140-00-286-5294 | FUEL, DIESEL: Type DF2 to -20 degrees F W-F-800 (81348) | BL |

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