TECHNICAL MANUAL

OPERATOR'S MANUAL

FOR

TRUCK, FORKLIFT; 6,000 LB.
VARIABLE REACH, ROUGH TERRAIN
NSN 3930-01-158-0849

This manual supersedes TM 10-3930-660-10 dated 14 Ott 89.

Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MARCH 1993

SAFETY SUMMARY

WARNING

Do not travel with the automatic fork level switch in the ON position. It is possible to drop a load which can result in load damage, injury or death. (page 2-2)

WARNING

Shut the vehicle down immediately whenever the low brake pressure warning light is illuminated. Failure to do so can result in injury or death. (page 2-5)

WARNING

Do not raise or extend the boom until the frame is level. Failure to do so could cause the load to drop or machine to tip. (page 2-7)

WARNING

The back-up alarm does not operate in the blackout lighting mode. Use extreme caution when batting in the blackout mode. Do not disconnect this feature at any time. (page 2-1 2)

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in well ventilated area. Avoid contact with skin, eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point is 100° F -138° F. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately. (page 2-1 5)

WARNING

Unless otherwise specified, perform all maintenance procedures with all equipment lowered to the ground, transmission in neutral, parking brake applied and the engine stopped. Failure to perform these tasks could cause personal injury or death. (page 2-1 6)

WARNING

Cooling system is pressurized. Remove radiator cap slowly and only when engine is cool or painful bums could result. (page 2-18)

WARNING

Do not smoke or allow any open flame or spark in the vicinity while checking or filling batteries. The batteries generate hydrogen gas, a highly explosive gas. Personal injury or death can result. (page 2-19)

WARNING

Before operating the boom, use care to ensure that the boom does not come near overhead power lines or structures. (page 2-21)

WARNING

Do not raise or extend the boom unless the frame is level, (page 2-21)

WARNING

Use care when backing up. Have someone direct you if you cannot see where you are going. Watch clearances. (page 2-27)

WARNING

The vehicle is less stable when traveling with the load in a raised position. If you must move the vehicle with the load raised above the carry position (bottom of load at 24 inches above the ground):

– Avoid sharp turns and sudden starts/stops.
- Operate all controls smoothly.
– Move very slowly.
- Keep the vehicle level. (page 2-28)

WARNING

Extreme care must be taken to ensure that the boom does not come near overhead wires. Death or injury may result from contacting power lines. Never operate this vehicle close to electric power, or other lines. If lines are near to your operating area, notify your supervisor of the lines prior to starting work. (page 2-28)

WARNING

Travel on inclines, slopes, ramps and grades only as follows:

– Loaded Forklift: with forks (and load) pointing uphill.
– Empty Forklift: with forks pointing downhill.DO NOT STOP QUICKLY.
(page 2-28)

WARNING

Do not exceed 45% grade (25°) longitudinally. Vehicle becomes unstable and fluid levels are shifted. Internal components may not be properly lubricated causing vehicle damage. Tires may slip (loss of traction) or vehicle may tip causing possible operator injury or death. (page 2-29)

WARNING

Do not exceed 30% grade (17°) laterally. Vehicle becomes unstable and fluid levels are shifted. Internal components may not be properly lubricated causing vehicle damage. Tires may slip (loss of traction) or vehicle may tip causing possible operator injury or death. (page 2-30)

WARNING

DO NOT STOP QUICKLY. The load may drop off the forks causing damage or personal injury. (page 2-30)

DO NOT downshift at high speeds. vehicle will slow suddenly and drop the load or cause operator injury. (page 2-31)

WARNING

Do not turn fast as this may cause the forklift to tip and possibly lose the load. This is particularly true in the 4 wheel steering mode. Turn the vehicle in a lower gear or a slower speed. (page 2-32)

WARNING

Make sure the frame is level before raising or extending the boom with a load. Failure to do so could cause the load to drop, or vehicle to tip. (page 2-35)

WARNING

Never move any part of the vehicle or load near a power line or power lines. Failure to follow this precaution could result in immediate severe injury or death. (page 2-36)

WARNING

Ensure that the counterweight is in place. An unbalanced vehicle could tip over and could cause severe personal injury or death. (page 2-36)

WARNING

Always lift the load from its resting spot before extending or retracting the boom. Always extend or retract the boom before lowering the load to its resting spot. Failure to do so could cause vehicle instability and result in severe personal injury or death. (page 2-37)

WARNING

Use care when handling and transporting the ammunition pallets. Failure to do so could result in severe personal injury or death. (page 2-40)

WARNING

Always retract the boom before lowering or transporting a load. Failure to do so could cause vehicle instability and result in severe personal injury or death. (page 2-41)

WARNING

Do not operate the vehicle with the emergency steer switch in the Off position. If engine power is lost there will be a loss of emergency steering capabilities. Failure to follow this precaution could result in severe personal injury. (2-47)

WARNING

Carefully move the vehicle into position. Always use aground guide and any device necessary to lift the tow bar into position without standing directly between the vehicles. Failure to follow this precaution could result in personal injury or vehicle damage. (page 2-51)

WARNING

When the propeller shafts are disconnected and the parking brake disengaged, the vehicle may roll and could result in severe personal injury. Always chock the wheels properly. (page 2-52)

WARNING

If engine power is lost with the boom extended or raised, the boom must be fully retracted before it is lowered to prevent severe personal injury and vehicle damage. (page 2-54)

WARNING

Do not loosen the 1 inch hex nut or remove the stem on the flow control valve when the cylinder is pressurized due to a raised boom or load. High hydraulic pressure exists which, if released, the boom could drop and cause severe personal injury. (2-57)

WARNING

Damage to the radiator can occur if pressure cap is removed on a hot engine. Allow appropriate cool down time before checking the coolant level. Failure to follow this precaution could result in severe personal injury or vehicle damage. (page 3-2)

WARNING

The engine and radiator can be extremely hot. Contacting exposed skin to these areas could result in severe burns. (page 3-3)

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions. (page 3-9)

WARNING

The cooling system operates under pressure which is controlled by a radiator cap. It is dangerous to remove the cap while the system is hot because hot steaming gases will escape and bum you. Always turn the cap to the first stop and allow the pressure to escape before removing the cap completely. (page 3-12)

CAUTION

If the coolant temperature exceeds 220° For the warning light illuminates, shut the engine down immediately. Do not operate the vehicle continuously at a water temperature above 210° F. (page 2-3)

CAUTION

If the oil pressure fluctuates, drops, or if the warning light is illuminated, stop the engine and find the cause. Do not operate the engine at oil pressures lower than 10 psi. (page 2-3)

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). Of course, consideration must be given to fluid capacity in the item/system being checked/inspected. When operating with Class I or II leaks, continue to check fluid levels as required on your PMCS. (page 2-15)

CAUTION

New vehicle (break-in) maintenance is required on the 6KVRRTFL at 20 hours, 50 hours and 100 hours. See para. 2-18 and contact Unit Maintenance to avoid early wear or damage to the forklift and possible voidance of the warranty. (page 2-16)

CAUTION

When operating in desert or extremely dusty conditions, clean the Primary Air Cleaner Element after every 4 hours of operation. (page 2-22)

CAUTION

If the engine should turn over, do not continue. This indicates that the neutral safety switch is defective. (page 2-26)

CAUTION

Do not crank the starting motor for more than 30 seconds at a time. Continuous cranking can overheat and damage the starting motor. (page 2-26)

CAUTION

If the coolant temperature exceeds 220° For the warning light is illuminated, shut the engine down immediately. Do not operate the vehicle continuously at a water temperature above210° or below 140° F. (page 2-26)

CAUTION

Should the oil pressure fluctuate or drop, or if the warning light is illuminated, stop the engine and find the cause. Do not operate the engine at oil pressure lower than 10 psi. (page 2-26)

CAUTION

If oil pressure does not register within 15 seconds after the engine starts, stop the engine or serious damage may occur. Stop the engine by turning the starter-run control switch to the OFF position. (page 2-26)

CAUTION

The forks extend beyond the end of the carriage. The operator must be aware of the swing of the forks when turning and allow for adequate clearance between the forks and other objects. (page 2-27)

CAUTION

Make sure the lower cab door is closed when operating the vehicle. Vehicle wheels can contact the lower door if the door is left open. (page 2-28)

CAUTION

Operating the vehicle with a heavy load in high gear will cause the torque converter to slip excessively and the transmission may overheat. (page 2-30)

CAUTION

Before changing steering modes, synchronize steering, see para. 2-8, d. Steering System Synchronization. Failure to follow this caution will result in vehicle mistracking and tire damage. (page 2-32)

CAUTION

The forks extend beyond the end of the carriage. Be aware of the swing of the forks when turning. Allow for adequate clearance between the forks and other objects. (page 2-32)

CAUTION

With the load stabilizers attached, never set the load down on the ground. Possible damage to the MLRS pod may result. (page 2-40)

CAUTION

Do not lift more than one pallet with the forks. Pallets may topple and result in load or machine damage. (page 2-41)

CAUTION

Never remove the radiator cap from a pressurized system while the engine is running or hot. Hot water and/or steam will be expelled, resulting in possible severe burns. (page 2-46)

CAUTION

Use the engine primer button only while cranking the engine. Use only for starting a cold engine. Failure to follow this precaution could cause engine damage. (page 2-47)

CAUTION

Do not depress the engine primer button for more than 5 seconds. Failure to follow this precaution could result in vehicle damage. (page 2-47)

CAUTION

The secondary element is not intended to be cleaned. For the maximum engine protection and air cleaner service life, replace the secondary element with a new one every third primary element change or cleaning. (page 3-10)

CAUTION

Air restriction indicator will not function properly if an element has a break in the filtering paper or if the element is not properly seated in the canister. (page 3-10)

CAUTION

Do not tap the element against a hard surface as this damages the element. (page 3-1 O)

CAUTION

DO NOT wash element in fuel oil, oil, gasoline, or solvent. DO NOT use compressed air to remove water from an element. (page 3-11)

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TECHNICAL MANUAL
No. 10-393O-66O-1O

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 30 March 1993

OPERATOR'S MANUAL
FOR
TRUCK, FORKLIFT; 6,000 LB.VARIABLE REACH, ROUGH TERRAIN
NSN 3930-01-158-0849

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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 2020-2 located inback of this manual direct to: Commander, US Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

l This manual supersedes TM 10-3930-860-10 dated 14 Ott 89.

Approved for public release: distribution is unlimited.

HOW TO USE THIS MANUAL

This manual (TM10-3930 -660-10) is divided into 3 chapters and 5 appendixes with a subject index located after the last appendix. Chapters are divided into sections and sections are further divided into paragraphs.

Look in Chapter 1 for standard data found in all TM's, Chapter 1 will also help you to become familiar with the 6KVRRTFL through physical and functional descriptions of the equipment. All right and left indications noted in this manual are to be taken as viewed from the operator's seat.

Look in Chapter 2 for information regarding the safe operation of the 6KVRRTFL under a variety of conditions. Also find details on the operator's controls and indicators, as well as your PMCS responsibilities.

Chapter 3 begins with a troubleshooting table which will help you isolate and deal with problems which may occur. Operator's maintenance tasks are also contained in this chapter.

The table of contents will direct you to chapters and sections. But if you need to find a specific subject, go to the alphabetical subject index for its location in the manual.

CHAPTER 1

INTRODUCTION

SECTION L General Information

1-1. SCOPE.

a. Type of Manual. This manual contains operation and operator maintenance instructions for the 6KVRRTFL.

b. Model Number and Equipment Name. The 6KVRRTFL, 6000 lb. Variable Reach Rough Terrain Forklift Truck is equipped with a Multiple Launch Rocket System (MLRS) lifting tool.

c. Purpose of Equipment. The 6KVRRTFL is designed for loading and unloading Multiple Launch Rocket System (MLRS) pods and other munitions from transport vehicles and containers. The 6KVRRTFL is also designed for use as a standard rough terrain forklift.

d. Special Limitations on Equipment. The 6KVRRTFL has no special limitations. Normal limitations such as travel speed, lift capacity, etc. are given in paragraph 1-10.

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. HAND RECEIPT (-HR) MANUALS.

This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). The TM5-3930-660-10-H R consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (i.e., COEII, Bll, and AAL) you must account for. As an aid to property accountability y, additional -HR manuals may be requisitioned from the following source in accordance with procedures in Chapter 3, AR 310-2:

The US Army Adjutant General Publications Center
AITN: AGLD-OD
1655 Woodson Road
St. Louis, MO 63114

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR'S).

If your 6KVRRTFL 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 or performance. Put it on a SF 368 (Quality Deficiency Report). Mail it to Commander, U.S. Army Tank-Automotive Command, Attn: AMSTA-QRT, Warren, Ml 48397-5000. We'll send you a reply.

1-5. EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE DIGEST (EIR MD).

The quarterlv Equipment Improvement Report and Maintenance Digest, TB 43-0001-39 series, contains valuable field information on" the equipment covered in this manual. 'The information in the TB 43-0001-39 series is compiled from some of the Equipment Improvement Reports that you prepared on the vehicles covered in this manual. Many of these articles result from comments, suggestions, and improvement recommendations that you submitted to the EIR program. The TB 43-0001-39 series contains information on equipment improvements, minor alterations, proposed Modification Work Orders (MWOs) warranties (if applicable), actions taken on some of your DA Forms 2028-2 (Recommended Changes to Publications), and advance information which will help you in doing your job better and will help in keeping you advised of the latest changes to this manual. Also refer to DA PAM 310-1, Consolidated Index of Army Publications and Blank Forms, and Appendix A, References, of this manual.

1-6. WARRANTY INFORMATION.

Refer to the Warranty Technical Bulletin TB5-3930-660-15.

1-7. LIST OF ABBREVIATIONS.

This list consists of special or unique abbreviations, acronyms or descriptors not contained in MIL-STD-12.

Abbreviation	Description
MLRS	Multiple Launch Rocket System
6KVRRTFL	Variable Reach, Rough Terrain Forklift
ROPS	Roll Over Protective Structure
FOPS	Falling Object Protective Structure

Section II. Equipment Description

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. Purpose. The 6KVRRTFL is designed for loading and unloading munitions from transport vehicles and containers. Also, the 6KVRRTFL can be used as a forklift truck.

b. Equipment Characteristics, Capabilities, and Features.

(1) With the MLRS lifting tool and stop tube on the forks, the 6KVRRTFL can handle MLRS pods.

(2) With the MLRS lifting tool and stop tube removed and the backrest installed on carriage, the 6KVRRTFL can handle boxes and palletized ammunition loads.

(3) The lifting tool stop tube fits over the forks. It prevents the lifting tool from moving too far back on the forks and prevents the MLRS pod from contacting the frame or vehicle wheels when in the carry position.

(4) The vehicle frame can be tilted 9 degrees to left or right which allows vehicle to be level when traversing a sideslope.

(5) The MLRS attachment can be raised to a horizontal position for loading and unloading munitions.

(6) The forks tilt, level, and sideshift to maneuver loads.

(7) Lifts loads of 6,000 Ibs to a height of 23 ft. and 4,000 Ibs to a height of 26 ft.

(8) Can tow other vehicles weighing 27,100 pounds or less.

(9) The operator can select one of three steering modes: two wheel, four wheel, and crab wheel.

(lo) All weather operational.

(11) Can ford in up to 30 inches of water.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

a. Right Side View of the 6KVRRTFL.

(1) Radiator. Contains coolant which provides engine cooling.

(2) Boom Hoist Cylinder. Raises and lowers the boom.

(3) MLRS Lifting Tool and Stop Tube (shown in storage position). The stop tube prevents the lifting tool from moving too far back on the forks and prevents the MLRS pod from contacting the frame or vehicle wheels when in the carry position.

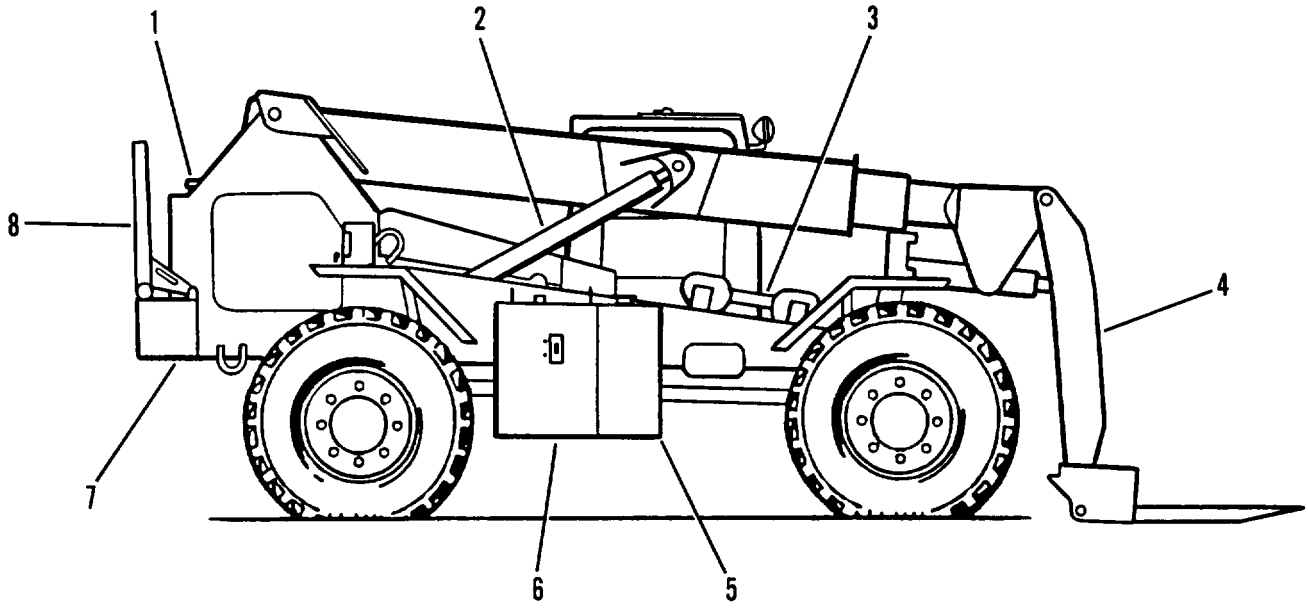
(4) MLRS Attachment. This attachment is required for MLRS and forklift operations. The MLRS attachment can be raised to a horizontal position, creating a low profile and extended reach configuration. This configuration is useful in loading and unloading munitions from transport vehicles and containers.

(5) Fuel Tank. Contains diesel fuel for engine operation.

(6) Hydraulic Oil Reservoir. Contains hydraulic fluid for the hydraulic system.

(7) Frame and Counterweight. The frame is a heavy-duty design constructed of 1-3/16 in. thick steel plates. The frame is equipped with tie-down lugs meeting air transport specifications, tow lugs, a pintle hook, and a 3,600 lb. counterweight. The counterweight is removable so that axle loading can be adjusted to meet air transport requirements for some aircraft.

(8) Load Backrest (Shown in storage position). Used to rest a load during non-MLRS operations. The backrest can be attached to the fork carriage and serves as a backstop or support for materials being carried on the forks.



b. Left Side View of the 6KVRRTFL.

(1) Forks and Carriage. Serve as an anchoring point of the forks. The fork carriage is also equipped with automatic fork leveling. Moving a switch will keep the forks level when raising or lowering the boom.

(2) Load Backrest (Shown in fork carriage position). Serves as a backstop or support for materials being carried on the forks.

(3) Boom. The telescopic, three stage boom is constructed of welded high strength steel. The boom will retract or extend the reach and height of the forks.

(4) Boom Angle Indicator. Shows the angle of the boom relative to the horizon.

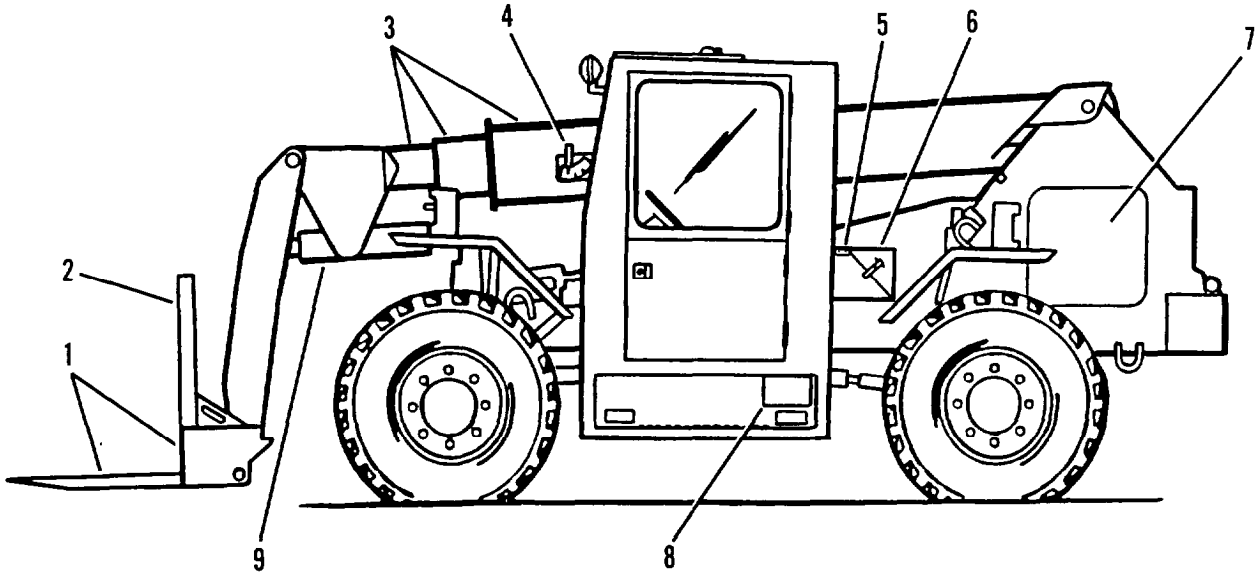
(5) NATO Slave Receptacle. Connection point for starting a disabled vehicle or for receiving starting assistance when disabled.

(6) Battery Box. Holds the batteries which provide current for the electric system.

(7) Engine. Provides the necessary power to drive the transmission. The engine also contains sending units for the Simplified Test Equipment for Internal Combustion Engines (STE/ICE) diagnostics.

(8) Tool Box. Storage area for tools and basic issue items.

(9) Attachment Hoist Cylinder. Moves the MLRS attachment forward and back.



1-10. EQUIPMENT DATA.

ENGINE:
- Model 6BT5.9
- Manufacturer . . . . . Cummins
- Horsepower (@ 2,500 RPM) . . . .152 hp
- Number of Cylinders 6
- Displacement . . . . . 359 in.
- Weight . . . . . 1,075 lbs.
- Maximum No Load RPM . . . .2650 to 2750 RPM

TRANSMISSION:
- Model 1723
- Manufacturer . . . . . Funk
- Powershift . . . ...3 speed forward and reverse
- Speed Range
  - First Gear . . . . . 0-4 mph, level surface
  - Second Gear . . . ...0-8 mph, level surface
  - Third Gear . . . . . 0-23 mph, level surface
- Weight . . . . . 846 lbs.

AXLES AND BRAKES:
- Model (Front) PSOC-205-HOB-205
- Model (Rear) PSOC-205-HOB-206
- Manufacturer . . . . . Rockwell
- Model (Front) PSOC-205-HOB-205
- Weight – Axle Assembly (Front or Rear) . . . . . 1,650 lbs.

DIMENSIONS AND WEIGHT
- Vehicle Operational Weight . . . .27.100 tbs.
- Boom Assembly Weight . . . .4.100 lbs.
- Inner Boom Weight . . . . . 955 lbs.
- Intermediate Boom Weight . . . .830 lbs.
- Outer Boom Weigh . . . .l.580 lbs.
- Boom Extend Cylinder . . . . . 537 lbs.
- Length (Carry Position) Maximum . ...312 in.
- Width . . . . . 102 in.
- Height (Maximum) . . . . . 101 in.
- Wheelbase . . . . . 124 in.
- Track Width (Tread) . . . . . 81.3 in.

CAPACITIES:
- Fuel Tank . . . . . 44 gallons
- Cooling System . . . . . 8 gallons
- Hydraulic Oil Reservoir . . . .56.6 gallons
- Engine Crankcase . . . . . 15 quarts
- Transmission . . . . . 5.5 gallons

MISCELLANEOUS:
- Lift (Maximum) . . . . . 6,000 lbs.
- Lift Height . . . . . 26 ft.
- Boom Lift Angle (Maximum) . . . .45 degrees
- Maximum Reach from Load Center to Front Tires . . . .24.16 ft.
- Maximum Reach Below Grade . . . .20 in.
- Ground Clearance . . . . . 14.3 in.
- Turning Radius (Curb to Curb) . . ...15 ft. 4 in.
- Frame Oscillation . . . .9 degrees to the left or right
- Fording Depth (Freshwater) . . . .30 in.
- Travel Speed (Maximum) . . . .23 mph

Section III. Technical Principles of Operation

1-11. GENERAL.

This section explains how components of the 6KVRRTFL work together. A functional description is given for the fuel system, engine lubrication system, engine cooling system, steering and brake system, electrical system, and hydraulic system.

1-12. FUEL SYSTEM.

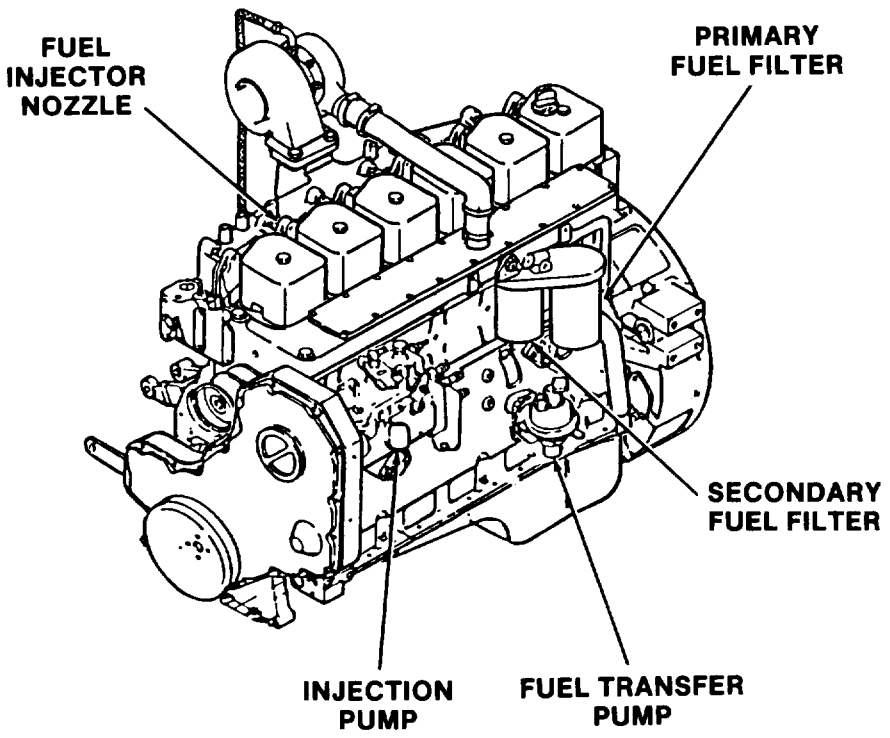
WATER SEPARATOR. Removes moisture from fuel. (Located ahead of the engine on the right side of frame.)

FUEL FILTER. Removes larger particles from the fuel before it reaches the injector pump.

FUEL TRANSFER PUMP. Pulls fuel from the fuel tank through the water separator, and sends it through the fuel filters to the fuel injection pump.

FUEL INJECTION PUMP. Sends exact amount of fuel to the injector nozzles.

FUEL INJECTOR NOZZLE. Turns the stream of fuel into a fine spray which permits good combustion in the cylinder. There is one nozzle for each cylinder.



1-13. ENGINE LUBRICATION AND COOLING SYSTEMS.

OIL PUMP. Located on the front housing cover side. The pump draws oil from the oil pan and sends it through the oil cooler, and then through the oil filter. From the filter, the oil enters the cylinder block to lubricate the engine and is then returned to the oil pan. From the filter, oil is also sent through the turbocharger and then returned to the oil pan.

OIL PAN. Contains the oil that lubricates moving parts in the engine. It is attached to the bottom of the engine.

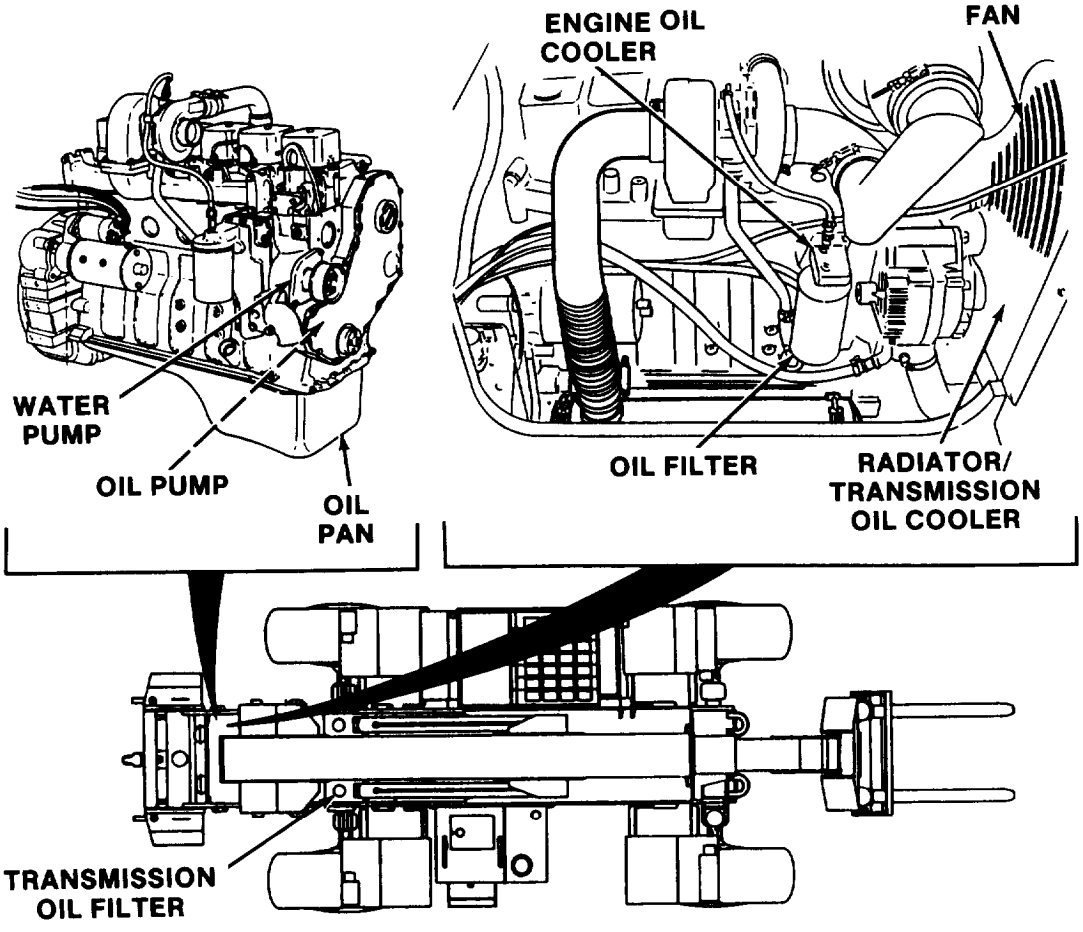
ENGINE OIL COOLER. Engine oil flows through the plates of the oil cooler. As the oil warms, the heat is transferred to the coolant which flows from the radiator. The coolant flows across the plates of the oil cooler.

OIL FILTER. Removes particles from the oil which could cause damage to the internal parts of the engine.

WATER PUMP. Draws coolant from the radiator and sends it through the oil cooler cavity and cylinder block to cool the engine. The coolant then returns to the radiator.

FAN. The fan is turned by the engine drive belt. It creates air flow through the radiator to lower the temperature of the coolant as it passes through the radiator.

RADIATOR. The 6KVRRTFL cooling system uses an overflow system. The system is full when 2 quarts of coolant are visible in the overflow bottle. Coolant circulates through the radiator to be cooled after leaving the cylinder block.



1-14. TRANSMISSION LUBRICATION AND COOLING SYSTEMS.

TRANSMISSION OIL FILTER. Located on right side, just above the boom hoist cylinder on the engine bulkhead. Filter removes particles in the oil which could damage internal components of the transmission. A pump inside the transmission produces oil flow through the filter, transmission, and oil cooler.

TRANSMISSION OIL COOLER. The cooler is located in the bottom of the radiator. Coolant from the radiator is circulated across the cooler to lower the transmission oil temperature.

1-15. STEERING AND BRAKE SYSTEM.

STEERING CYLINDERS. A cylinder is mounted at both ends of each axle and controlled by the steering wheel.

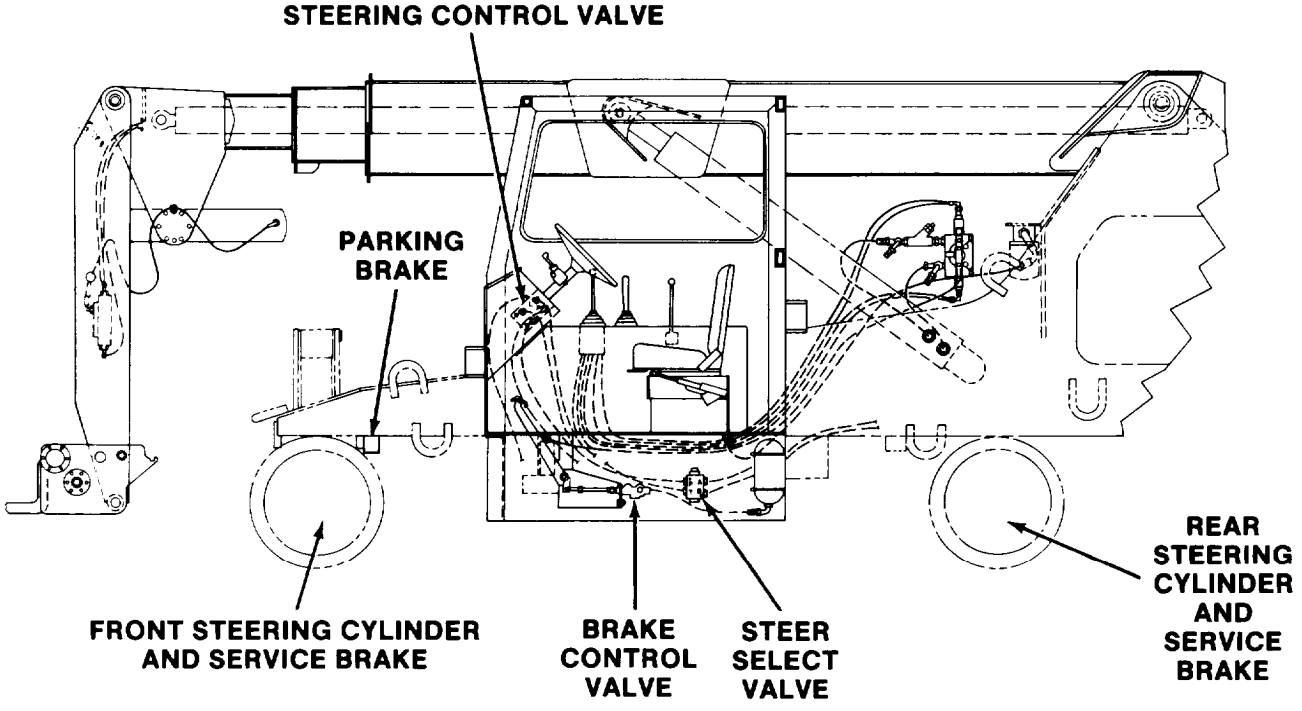
STEERING CONTROL VALVE. Connected directly to the steering wheel and located behind the instrument access panel. Controls the steering function by directing the flow of hydraulic fluid to the cylinders.

STEER SELECT VALVE. Externally mounted under the cab. Allows the selection of two wheel, four wheel, or crab steering through the steer select control, a three position switch.

BRAKE CONTROL VALVE. Located under the cab. Provides a priority flow to the brake system. Excess flow is directed by the priority valve to the frame tilt system.

SERVICE BRAKES. Dry disc, caliper type brakes are mounted on all four wheels. The service brakes are hydraulically actuated by pressing the brake or transmission disconnect pedals. An accumulator in the braking system enables a limited number of stops without engine power.

PARKING BRAKE. A mechanically actuated drum brake is mounted on the front axle input shaft. A lever in the cab engages and disengages the parking brake.



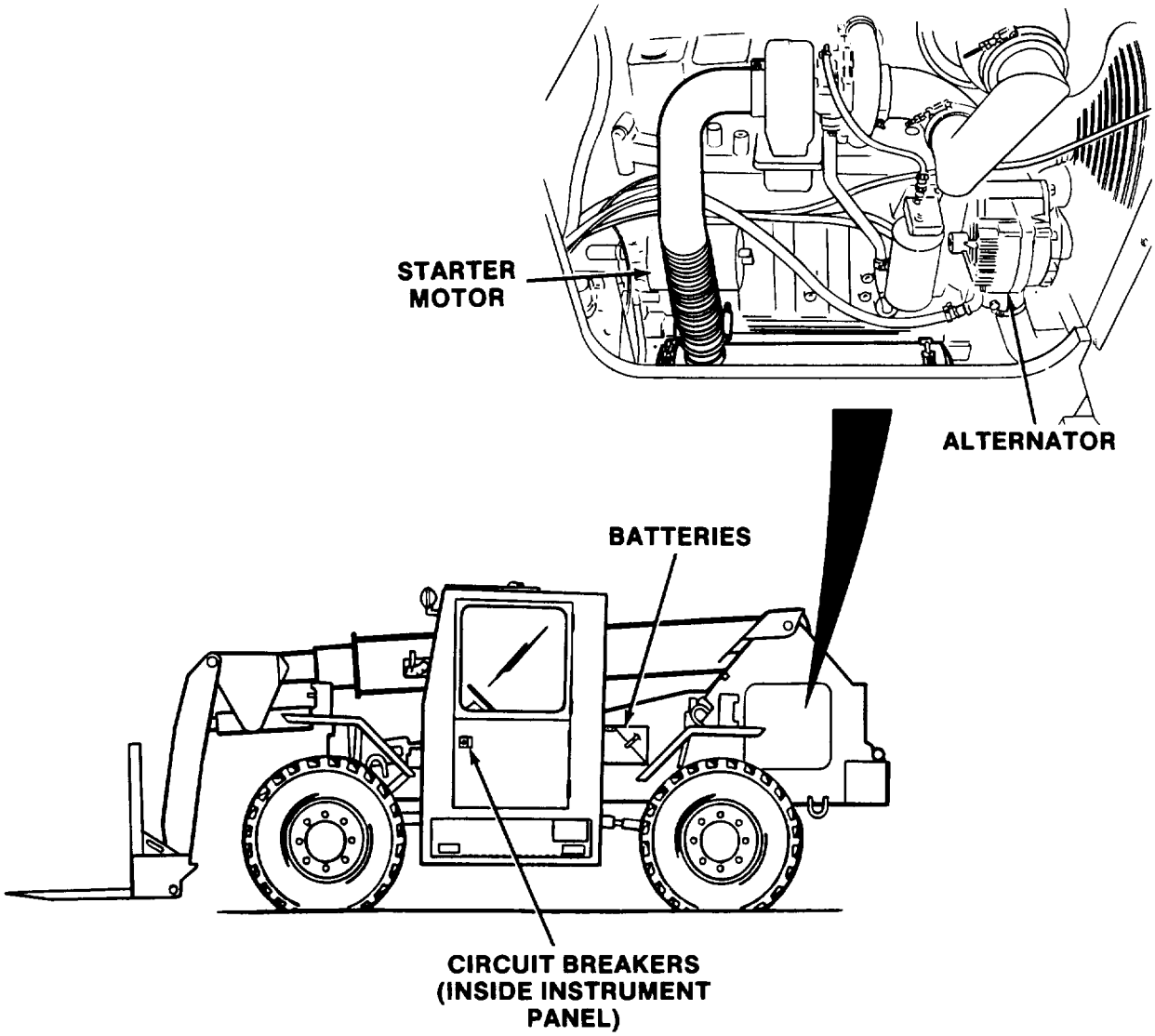
1-16. ELECTRICAL SYSTEM.

BATTERIES. Provide power for three circuits: the charging circuit, the starting circuit, and the lighting circuit. Two 12 volt batteries are connected in series to provide starting power.

ALTERNATOR. The 24 volt, 65 amp alternator, an integral part of the charging circuit, provides current to charge the batteries when the engine is running.

STARTER MOTOR. Part of the starting circuit, the starter motor is used to turn the engine flywheel fast enough to start the engine.

CIRCUIT BREAKERS. Located inside instrument panel. Switches that open the battery circuit if there is a shorted, grounded wire or excessive current draw by a defective component in the corresponding circuit. When the circuit is open, no current will flow through the electrical system. The circuit breakers will automatically reset once they cool. If a breaker continually trips, the electrical system requires repair.



1-17. HYDRAULIC SYSTEM.

HYDRAULIC OIL RESERVOIR. Contains oil for the entire hydraulic system.

HYDRAULIC OIL FILTER. Removes smaller harmful particles from the oil before the oil returns to the reservoir.

MAIN CONTROL VALVE. Located on the engine compartment bulkhead of the main frame (near back of transmission). Operated by the hydraulic joystick control valve to control: boom hoist/lowering and extend/retract.

MLRS ATTACHMENT CONTROL VALVE. Mounted on the attachment and controlled by an electrical joystick. Controls the three attachment functions: hoist/lowering, fork tilt, and fork sideshift.

FRAME TILT VALVE. Mounted inside the console located to the right of the operator's seat. Controls the tilting of the vehicle frame. Operated by frame tilt control lever.

HYDRAULIC JOYSTICK CONTROL VALVE. Located on the side console in cab. Controls the following boom functions: raise, lower, extend, and retract.

DUAL GEAR PUMP. Mounted to and driven by the transmission to supply hydraulic oil flow. This two section pump supplies hydraulic fluid for the following functions: boom hoist, boom extend, steering, brakes and frame tilt.

PISTON PUMP. Mounted to and driven by the transmission. This pump supplies hydraulic fluid for the following functions: attachment hoist, fork tilt and shift control.

EMERGENCY STEERING PUMP AND MOTOR. Located in the vehicle frame forward of the transmission. This pump supplies 5 gpm of emergency flow to the steering system whenever the starter-run control switch is on and there is a loss of hydraulic oil pressure. The pump is driven by an electric motor.

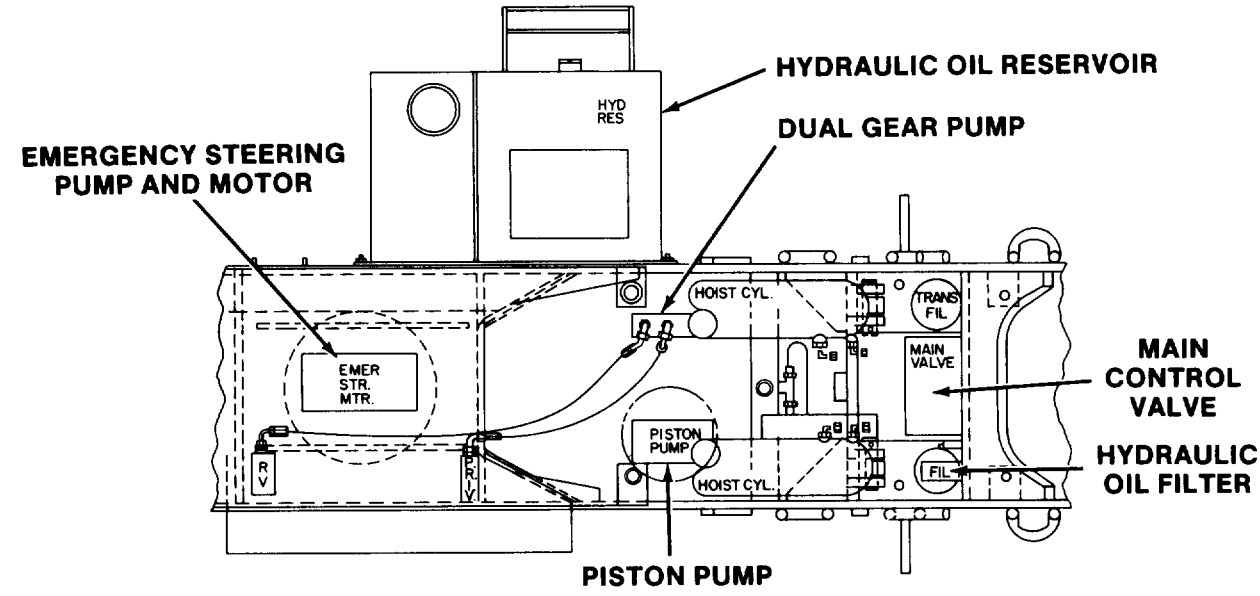
FORK SIDESHIFT CYLINDERS. Two cylinders controlled by one joystick control. Both cylinders can be operated at the same time to sideshift forks left or right, to move forks together or apart. The cylinders can also be operated individually.

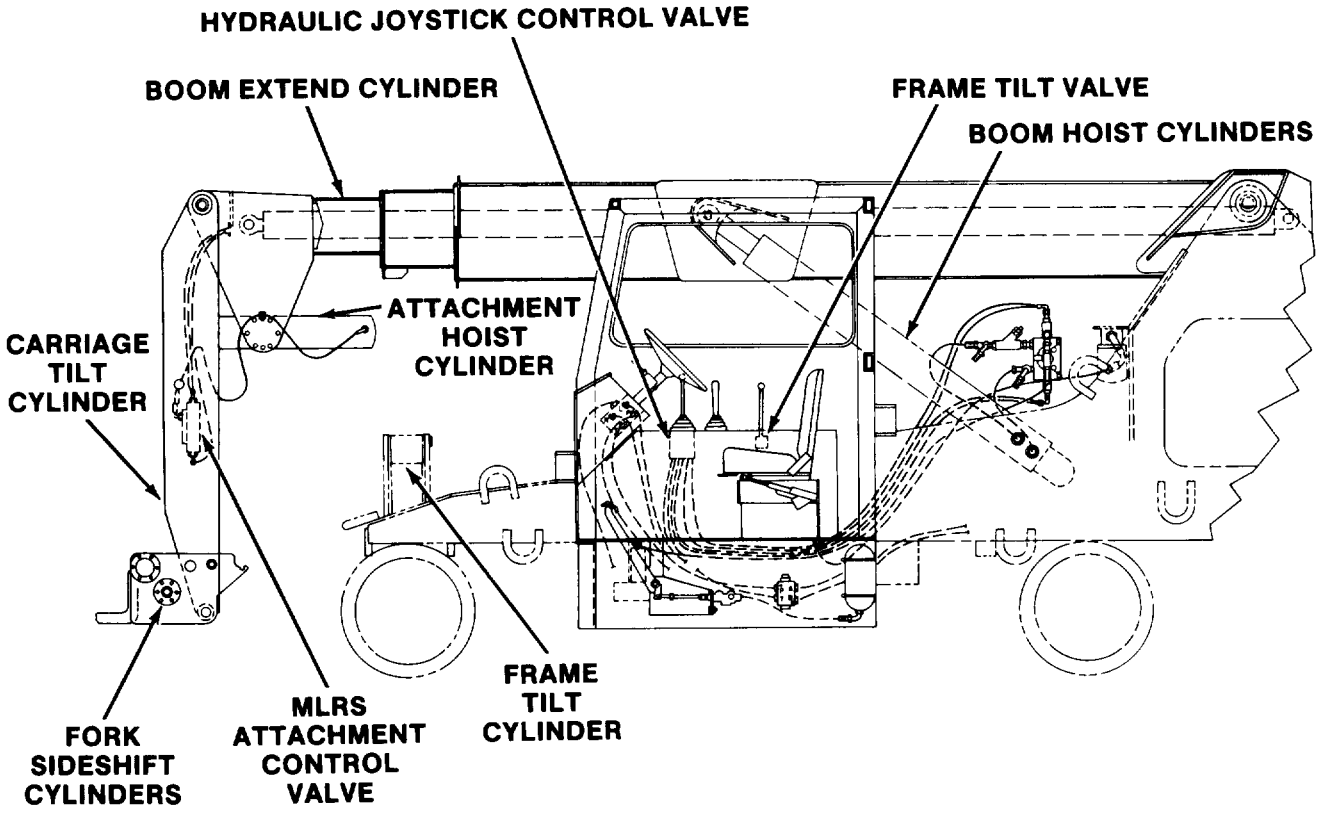
CARRIAGE TILT CYLINDERS. Two cylinders controlled by the electric joystick control. Moving the lever to the right causes the cylinders to extend and the fork tips to lower. Moving the lever to the left causes the cylinders to retract and the fork tips to raise.

ATTACHMENT HOIST CYLINDER. This cylinder is controlled by the attachment hoist control joystick. When the lever is pushed forward, the cylinder will retract. When the lever is pulled back, the cylinder will extend and raise the MLRS attachment.

BOOM EXTEND CYLINDER. This cylinder is controlled by the boom extend and retract joystick control. Moving the lever to the right causes the cylinder to extend and increase the reach distance or the height of the forks, depending on the angle of the boom. Moving the lever to the left causes the cylinder to retract.

FRAME TILT CYLINDER. This cylinder is controlled by the frame tilt control joystick. When the lever is moved forward, the cylinder extends and tilts the vehicle to the left. Pulling the lever back causes the cylinder to retract and tilt the frame to the right.





BOOM HOIST CYLINDERS. Two cylinders controlled by the boom hoist control joystick. When the lever is moved forward, the cylinders retract and the boom lowers. Moving the lever backward causes the cylinders to extend and the boom to raise.

CHAPTER 2

OPERATING INSTRUCTIONS

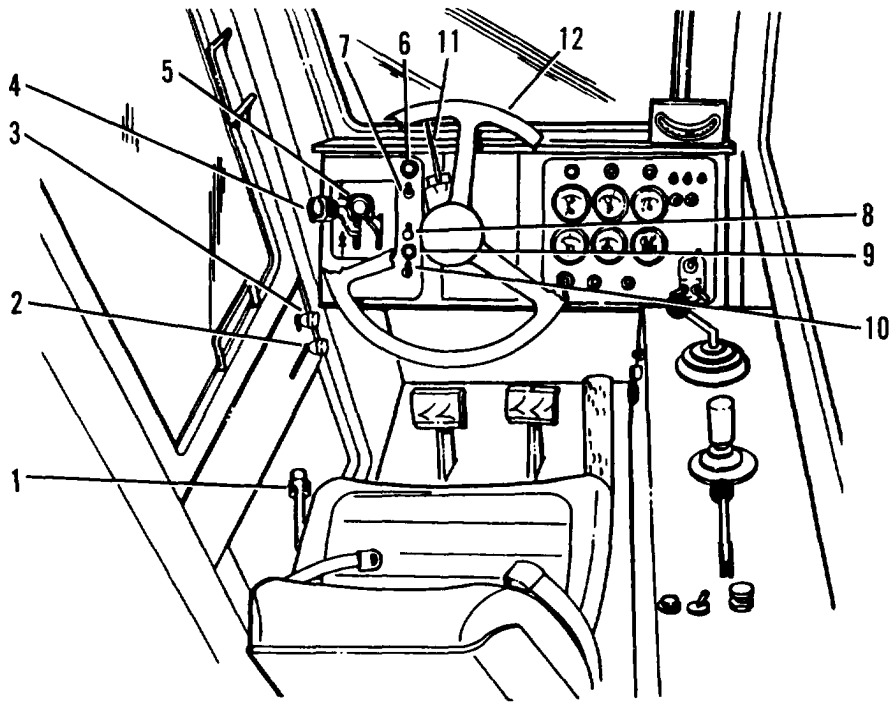
Section l. Description and Use of Operator's Controls and lndicators

2-1. OPERATOR'S CONTROLS AND INDICATORS.

This section describes, locates, and illustrates the controls and indicators used on the 6KVRRTFL.

a. Cab Door and Instrument Panel Controls.

Key	Control or Indicator	Function
1	Parking Brake Lever	Applies the parking brake. Pull the lever up to apply the brake. Push the lever down to release the brake. Adjust the brake by turning the knob on end of lever.
2	Lower Cab Door Release	Opens the upper and lower cab door. Pull back horizontally on the knob to open the door.
3	Upper Cab Door Release	Opens the upper cab door. Pull down on the knob to open the door. A rubber catch on the outside will hold the door in a full open position.
4	Travel Select Control	Controls the direction of travel. Move the lever all the way up to travel forward. Move the lever to the center position for neutral. Move the lever all the way down to travel in reverse.



Key	Control or Indicator	Function
5	Range Select Control	Controls the travel speed. Move the lever all the way up to position 3 for high ground speed. Move the lever to the center position 2, for normal speed conditions. Move the lever all the way down to position 1 for highest torque and pulling power.

WARNING

Do not travel with the automatic fork level switch in the ON position. It is possible to drop a load which can result in injury or death.

6	Automatic Fork Level Indicator Light	Illuminated whenever the automatic fork level switch is in the ON position.
7	Automatic Fork Level Switch	Automatically controls the level of the forks when in the ON position. In the OFF position, the forks can be tilted manually with the electric joystick control.
8	Front Window Wiper Switch	A three position switch which controls the front windshield wiper. Move the switch up for high speed operation, to the middle for "OFF" and down for low speed operation.
9	Front Window Wash Button	Spray fluid onto the front window. Push the button and use front wiper to wash the window.
10	Rear Window Wiper Switch	Three position switch controls the rear windshield wiper. Move the switch up for high speed operation, to the middle for "OFF" and down for low speed operation.
11	Directional Light Switch	Pull the tab out to operate four-way hazard fiasher. Move directional lever right or left to disengage hazard flashers. Operates with key on or off. Move directional lever right or left to operate turn signal lights.
12	Steering Wheel	Controls the direction of travel. Turn the wheel clockwise to turn right, counterclockwise to turn left.

b. Engine Gauges.

Key	Control or Indicator	Function

CAUTION

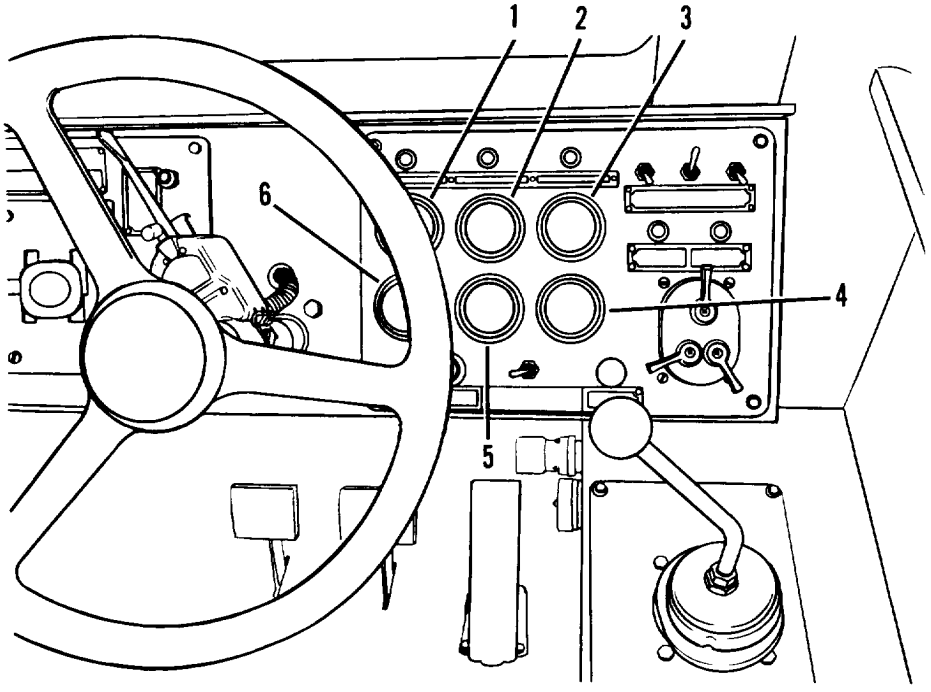
If the coolant temperature exceeds 220° For the warning light illuminates, shut the engine down immediately. Do not operate the vehicle continuously at a water temperature above 210° F.

1	Water Temperature Gauge	Indicates temperature of the engine water and coolant. Normal operating temperature of water/coolant is between 180° F and 210° F.

CAUTION

If the oil pressure fluctuates, drops, or if the warning light is illuminated, stop the engine and find the cause. Do not operate the engine at oil pressures lower than 10 psi.

2	Engine Oil Pressure Gauge	Indicates the oil pressure of the engine. Normal oil pressure at operating temperature and maximum governed rpm is between 30 psi and 80 psi.



Key	Control or Indicator	Function
3	Transmission Oil Temperature Gauge	Indicates the temperature of the transmission oil. The temperature must not exceed 250° F. If the temperature reaches 250° For the warning light illuminates, move the transmission range select lever to NEUTRAL and run the engine at low idle (between 1,000 and 1,200 rpm). Within two or three minutes, the temperature should drop to normal values. If not, stop the vehicle and correct the problem before continuing.
4	Fuel Gauge	Indicates the fuel level in the fuel tank.
5	Voltmeter	Indicates voltage of the electrical system. Normal operating voltage is between 24 and 28.5 volts.
6	Hourmeter	Records the hours of vehicle operation. Used to schedule periodic maintenance procedures.

c. Dash Lights and Indicators.

Key	Control or Indicator	Function

NOTE

To test a bulb and circuit, turn STARTER-RUN CONTROL “on” and press the lens in. If the light does not illuminate, then either a new bulb is required or the circuit is not functioning properly.

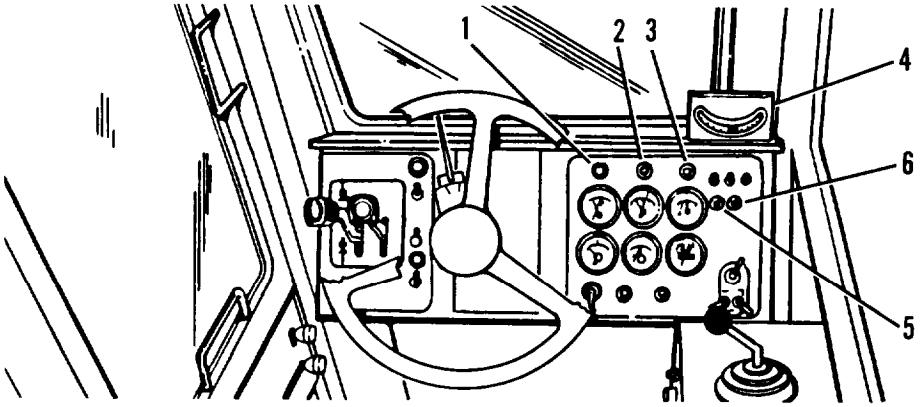
1	High Water Temperature (Engine) Warning Light	Indicates a high temperature of the engine coolant. Illuminated whenever the temperature exceeds 225° F.
2	Low Oil Pressure (Engine Warning Light	Indicates low oil pressure of the engine. Illuminated whenever the pressure drops below 10 psi.
3	High Transmission Temperature Warning Light	Indicates a high temperature of the transmission oil. Illuminated whenever the temperature exceeds 250° F.
4	Lateral Level Indicator	Indicates the angle of the main frame. Assists in maintaining a level attitude on sideslope up to 9 degrees (15% grade).

Key	Control or Indicator	Function
5	Parking Brake Indicator Light	Illuminated when the STARTER-RUN CONTROL switch is “on” and the parking brake is engaged.

WARNING

Shut the vehicle down immediately whenever the low brake pressure warning light is illuminated. Failure to do so can result in injury or death.

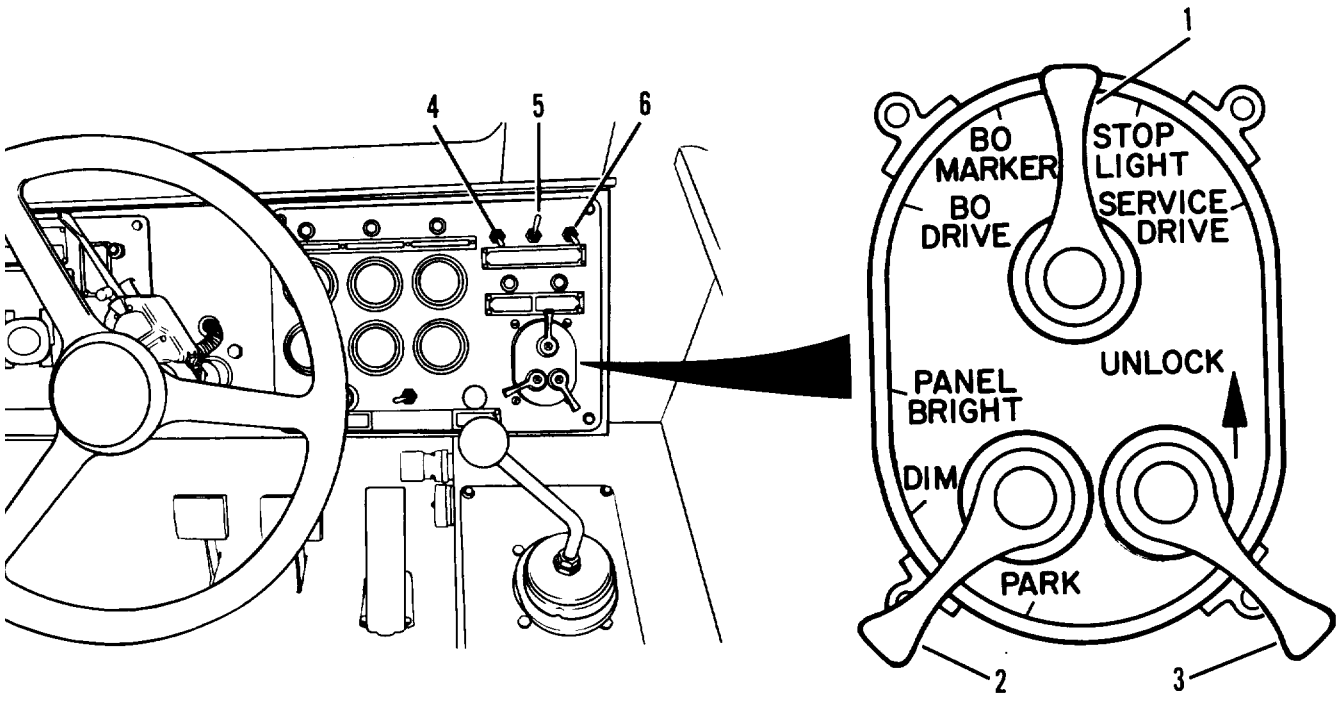
6	Low Brake Pressure Warning Light	Indicates low pressure of the service brakes. Illuminated whenever the hydraulic pressure in the accumulator drops below 650 psi.



d. Lighting Switches.

Key	Control or Indicator	Function
1	Service Lighting Control Switch	This light switch has five positions. The following lists the lights that will operate in each position: OFF Position - Only forard, rear and boom floodlights will operate. BLACKOUT MARKER Position - Blackout front markers will operate. Blackout tail lamps will operate. Blackout stop lamps will operate. BLACKOUT DRIVE Position - Blackout front markers will operate. Blackout tail lamps will operate. Blackout stop lamps will operate. Blackout drive lamp will operate. Back-up alarm will not operate.

Key	Control or Indicator	Function
2	Auxiliary Lighting Switch	STOP LIGHT Position - Service stop lamps will operate. SERVICE DRIVE Position - Service stop lamps will operate. Service tail lamps will operate. Service headlamps will operate. This switch has four positions. The following lists the lights that will operate in each position: OFF Position - Instrument panel light and parking light circuits are open and will not operate. PARK Position - Parking lights will illuminate if service light switch is in SERVICE DRIVE position. PANEL DIM Position - Instrument panel lights are on with minimum illumination. PANEL BRIGHT Position - Instrument panel lights are on with maximum illumination.



Key	Control or Indicator	Function
3	Switch Lock	This lock is used to prevent accidental movement of the main lighting control switch. Lift lock lever to move service lighting control switch to STOP LIGHT, SERVICE DRIVE and B.O. DRIVE positions.
4	Light Switch (Forward Floods)	Controls the forward floodlights.
5	Light Switch (Boom Flood)	Controls the boom floodlight.
6	Light Switch (Rear Floods)	Controls the rear floodlights.

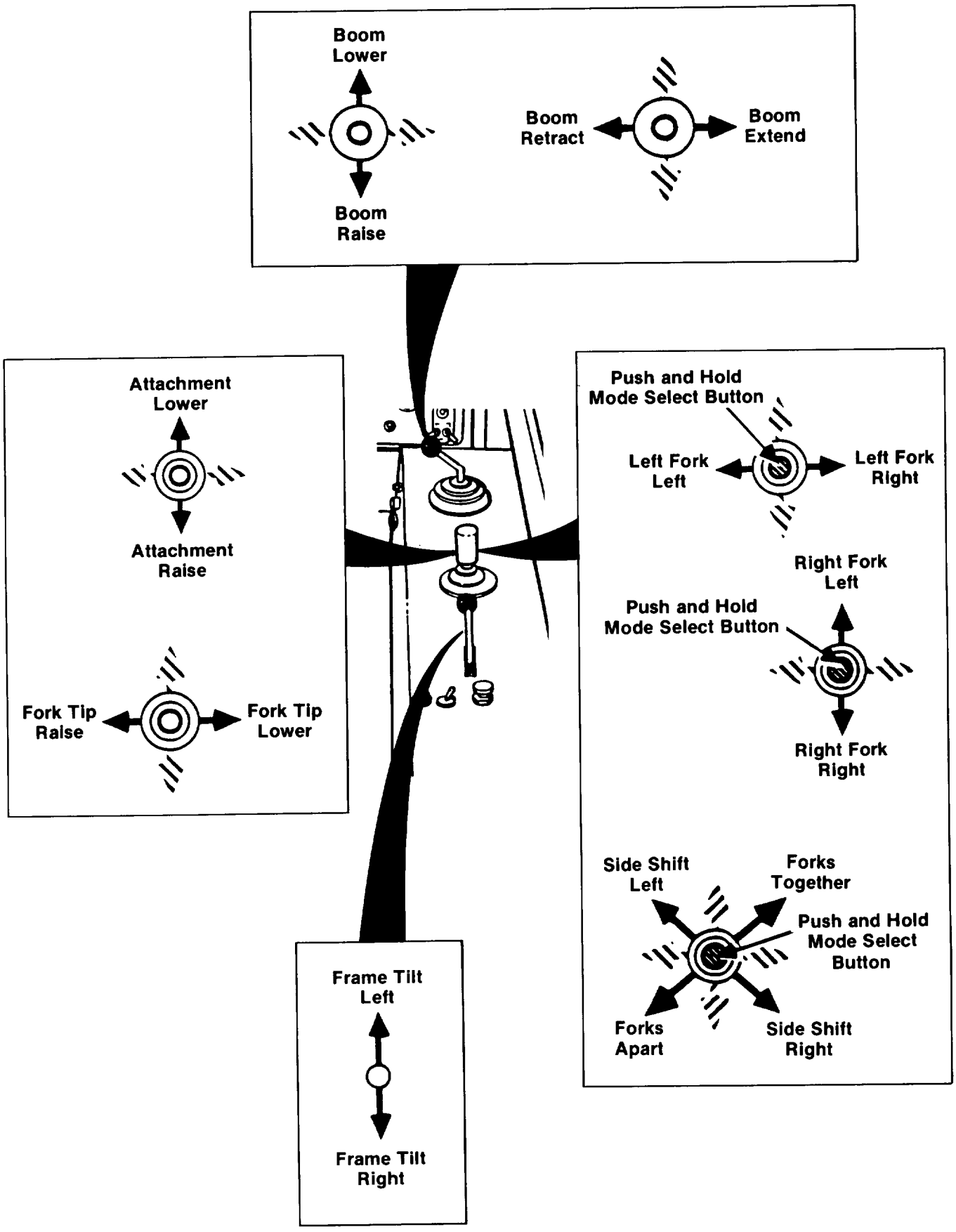
e. Boom, MLRS Attachment, Frame Tilt and Fork Controls.

Key	Control or Indicator	Function

WARNING

Do not raise or extend the boom until the frame is level. Failure to do so could cause the load to drop or machine to tip.

1	Hydraulic Joystick Control	Controls the movement of the boom: raising, lowering, extending, and retracting. Push the lever forward to lower the boom. Pull the lever back to raise the boom, Move the lever to the left to retract the boom. Move the lever to the right to extend the boom.
2	Electric Joystick Control	Controls the movement of the MLRS attachment and forks: MLRS raise and lower, forks sideshift and tilt. Push the lever forward to lower the attachment. Pull the lever back to raise the attachment. Move the lever to the right to lower the fork tips. Move the lever to the left to raise the forks tips. The fork tilt will operate only when the automatic fork level switch is in the Off position.

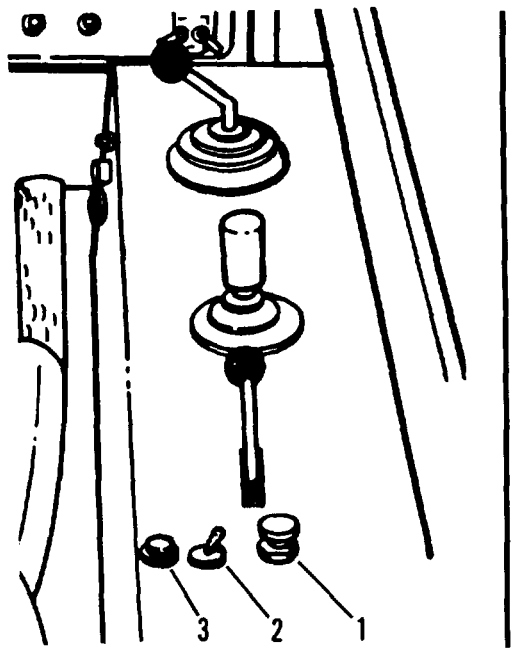

Boom Lower
Boom Raise
Boom Retract
Boom Extend
Attachment Lower
Attachment Raise
Fork Tip Raise
Fork Tip Lower
Push and Hold Mode Select Button
Left Fork Left
Left Fork Right
Right Fork Left
Push and Hold Mode Select Button
Right Fork Right
Side Shift Left
Forks Together
Push and Hold Mode Select Button
Forks Apart
Side Shift Right
Frame Tilt Left
Frame Tilt Right

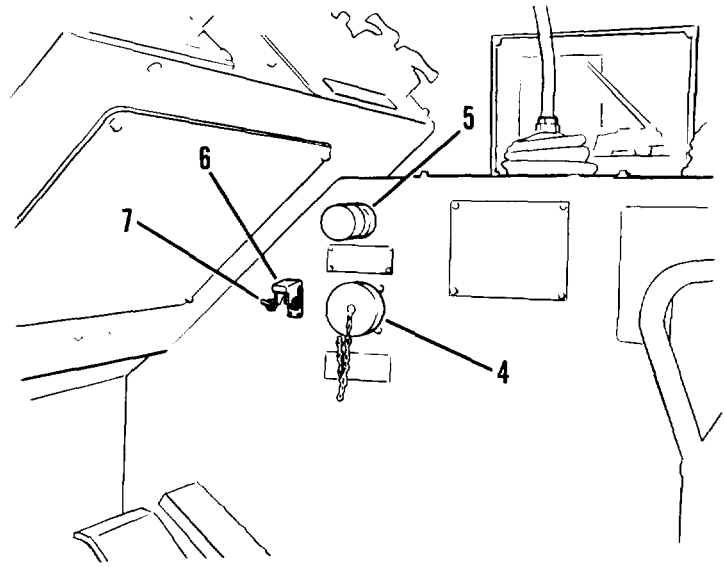
Key	Control or Indicator	Function
2	Electric Joystick Control - Continued	Push the button on top of joystick down and hold while moving to the left to shift the left fork to the left. Move the lever to the right to shift the left fork to the right. Push the button down and hold. Pull the lever back to shift the right fork to the right. Push the lever forward to shift the right fork to the left. To sideshift both left and right forks to the right, push the button down and pull the lever to the right rear corner. Push the button down and push the lever to the left front corner to sideshift left. To move the forks apart, push the button down and pull the lever to the left rear corner. Push the button down and push lever to right front to move forks together.
3	Frame tIlt Control	Controls tilt of the frame. Push the lever forward to tilt the vehicle left. Pull the lever back to tilt the vehicle right.

f. Side Console Switches and Controls.

Key	Control or Indicator	Function
1	Heater Temperature Control	Controls the temperature inside cab. Push to decrease temperature. Pull to increase temperature.
2	Heater Blower Switch	A three position switch controls the air flow of the heater. Blower is “off" in the center position. Move switch forward for high (two blowers operating) and backward for low (single blower operating).
3	Engine Primer Button	Aid for cold weather starting. Push the button to inject a measured amount of ether into the engine’s intake manifold.
4	STE/lCE Diagnostic Receptacle	A connection point for the STE/lCE test equipment.

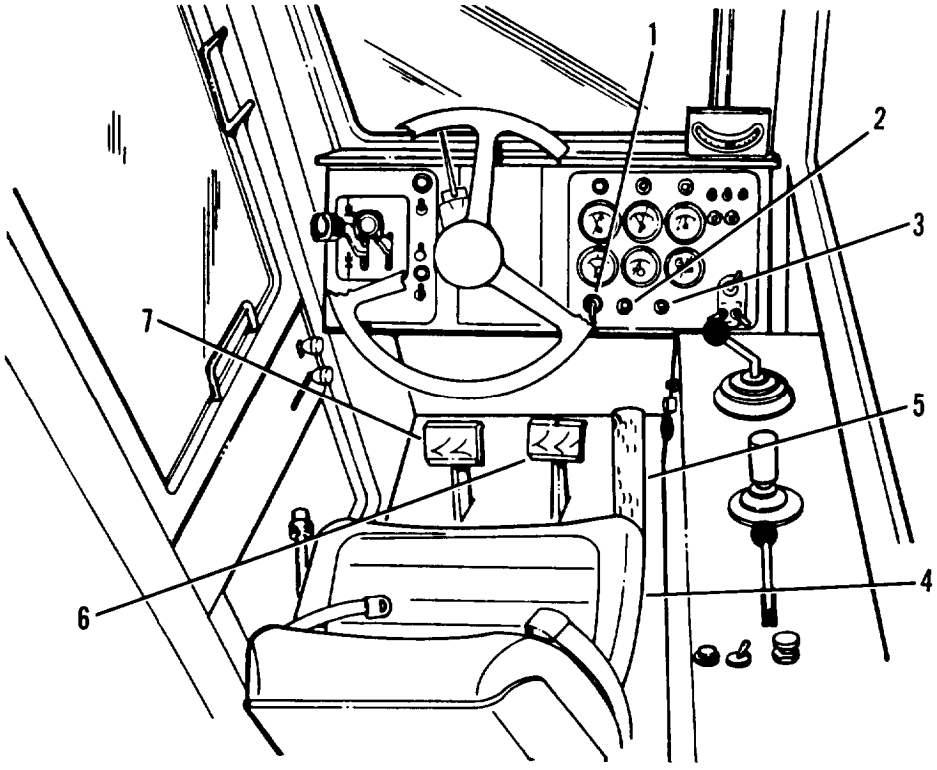
Key	Control or Indicator	Function
5	Instrument Resistor Module	Identifies the vehicle to the STE/ICE test equipment.
6	Emergency Steer Switch	Turns the steering pump circuit off during maintenance activities when it is not necessary to operate and for cold weather starting. The switch is On when the red cover is down and the switch is down. The switch is in the Off position when the red cover is up and the switch is up.
7	Auxiliary Fuel Shut-Off Switch	Permits cranking the engine without starting during Simplified Test Equipment for Internal Combustion Engines (STE/ICE) diagnostic testing. The switch is in the Off position when the switch is UP. The switch is On when it is down.





g. Miscellaneous Controls. Operator Seat and Foot Pedals.

Key	Control or Indicator	Function
1	Starter-Run Control Switch	Controls current flow from the batteries to the electrical system. In the Off position, the switch disconnects the flow of current between the battery and the electrical system. Also, the switch is used to shut the engine down. Once turned to the Off position, the fuel solenoid on the fuel injection pump is deactivated, stopping the flow of fuel from the pump to the injectors. In the Run position, all controls and indicators are operable; the emergency and steering pumps are activated. In the Start position, only the engine starting motor is engaged and the fuel solenoid is activated.
2	Steer Select Control	Allows the operator to control the steering mode: CRAB (left position), 2 WHEEL (center position), and 4 WHEEL (right position).
3	Horn Button	Depress the button to sound the horn.

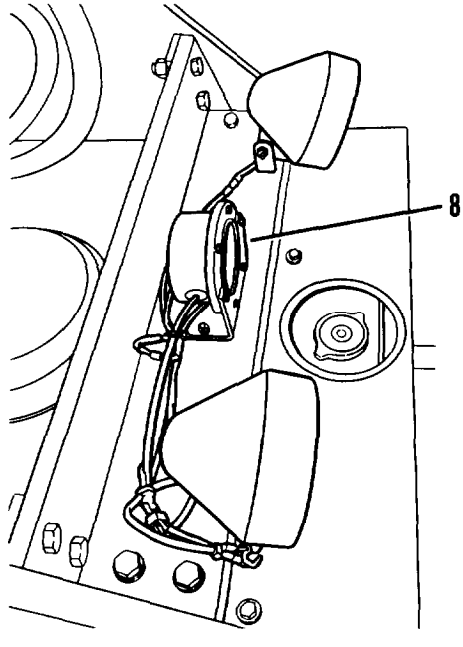


Key	Control or Indicator	Function
4	Operator's Seat	A lever under the seat controls the back and forth movement. Seat height can be adjusted by changing the elevation of the seat mounting plate.
5	Accelerator Pedal	Controls engine speed. Depress the pedal to increase engine speed. Release pressure on pedal to decrease engine speed.
6	Brake Pedal	Applies the service brakes. Depress the pedal to actuate the disc brakes on all four wheels. The brake lights illuminate when this pedal is pressed if the service lighting control switch is in the STOP LIGHT or SERVICE DRIVE position.
7	Transmission Disconnect Pedal	Engages the service brakes and disconnects the transmission from the drive train. Depressing pedal allows the operator to increase the engine rpm without shifting to NEUTRAL, thereby accelerating hydraulic functions.

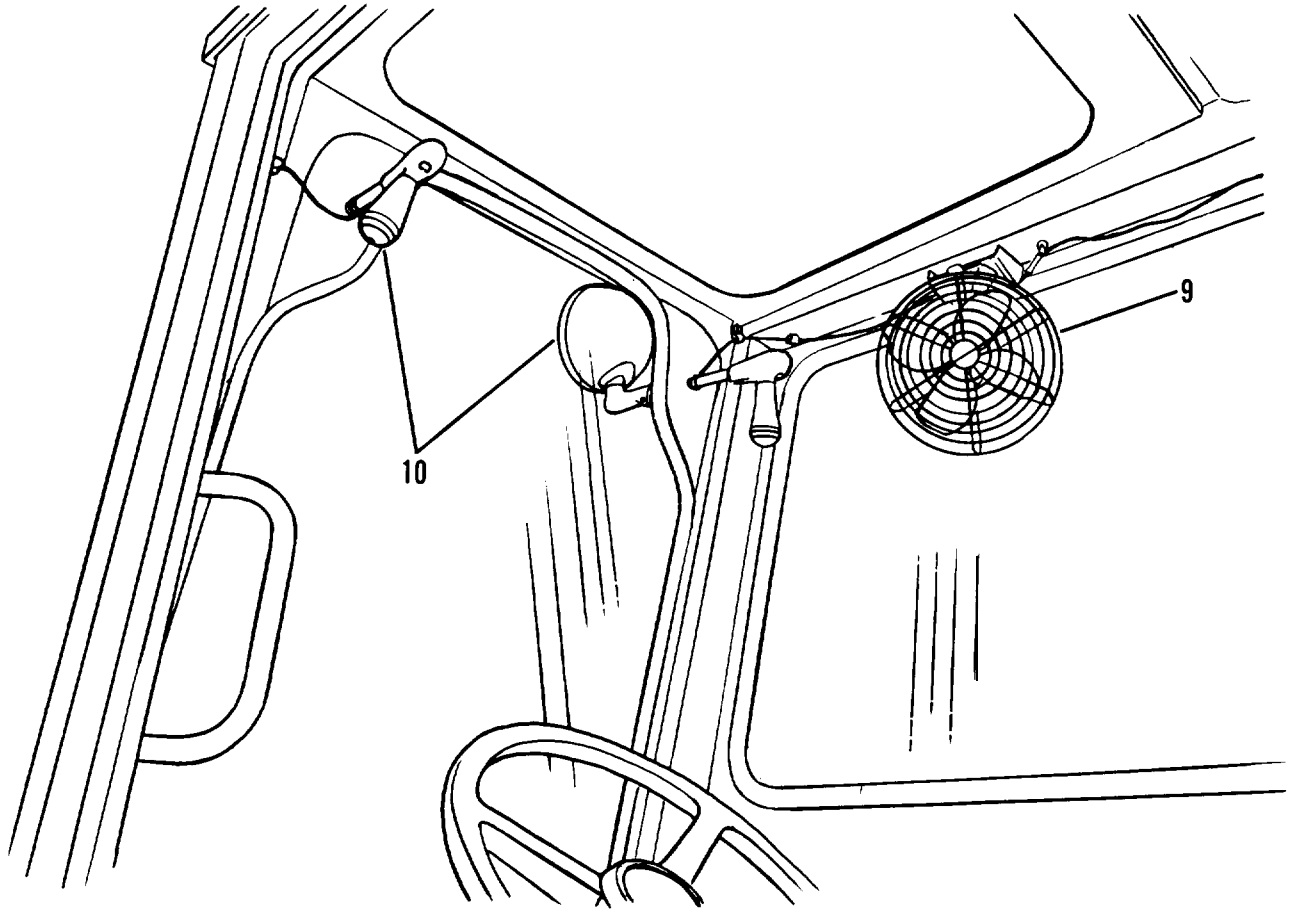
WARNING

The back-up alarm does not operate in the blackout lighting mode. Use extreme caution when backing in the blackout mode. Do not disconnect this feature at any time.

8	Back-Up Alarm	Activated whenever the range select lever is placed in the reverse travel position. The alarm will not operate in the blackout lighting mode.



Key	Control or Indicator	Function
9	Defroster Fans	Turn switch to “on” position on front and rear fans to remove moisture or frost from front and rear windows.
10	Front Floodlight Controls	Adjusts the positions of the front floodlights. Rotate the handle to turn the floodlight. Turn the handle assembly to change the axis of the light’s rotation.



Section II. Preventive Maintenance

2-2. GENERAL.

Your Preventive Maintenance Checks and Services table lists the inspections and care of your equipment required to keep it in good operating condition.

2-3. PMCS PROCEDURES.

a. The Item Number column of your PMCS is the source for the number used on the TM Number Column on DA Form 2404.

b. The Interval column of your PMCS table tells you when to do a certain check or service.

(1) Before you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your before (B) PMCS prior to the equipment leaving the containment area or performing its intended mission.

(2) While you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your during (D) PMCS when the equipment is being used in its intended mission.

(3) After you operate. Be sure you perform your after (A) PMCS after the equipment has been taken out of its mission mode or returned to its containment area.

(4) Do your weekly (W) PMCS once a week.

c. The Procedure column of your PMCS table tells you how to do the required checks and services. Carefully follow these instructions. If you do not have the tools, or if the procedure tells you to, have unit maintenance do the work.

d. If your equipment does not perform as required, refer to the manual troubleshooting section for possible problems. Report any malfunctions or failures on the proper DA Form 2404 or refer to DA Pamphlet 738-750.

NOTE

The terms ready/available and mission capable refer to the same status: Equipment is on hand and is able to perform its combat missions (AR 700-138).

e. “Equipment Is Not Ready/Available If” column: This column tells you when and why your equipment cannot be used.

f. Always do your PMCS in the same order so it gets to be a habit. Once you’ve had some practice, you’ll spot anything wrong in a hurry.

g. When you do your PMCS, take along a rag or two.

h. While performing PMCS, observe CAUTIONS and WARNINGS preceding those operations which could endanger your safety or result in damage to the equipment.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in well ventilated area. Avoid contact with skin, eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point is 100° F -138° F. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

(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, bare metal or rust around bolt heads. Tighten any bolt, nut or screw that you find loose.

(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 Direct Support Maintenance.

(4) Electric wires and connectors: Look for cracked or broken insulation, bare wires and loose or broken connectors. Tighten loose connections and make sure the wires are in good condition.

(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, tighten the fitting or connector. If something is broken or worn out, either correct it or report it to unit maintenance.

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

i. 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.

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). Of course, consideration must be given to fluid capacity in the item/system being checked/inspected. When operating with Class I or II leaks, continue to check fluid levels as required on your 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.

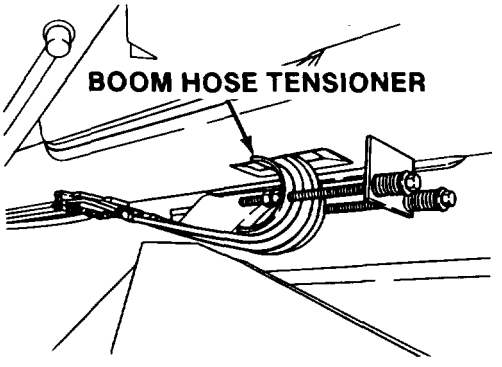
PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A- After** **W - Weekly**

Item No.	Interval B	D	A	W	item To Be inspected Procedure: Check for and repair, fill or adjust as necessary	Equipment is Not Ready/ Available if:
					IMPORTANT PERFORM WEEKLY (W) AS WELL AS BEFORE (B) OPERATOR'S PMCS iF: 1. You are the assigned operator and have not operated the vehicle since the last weekly check. 2. You are operating the vehicle for the first time. **WARNING** Unless otherwise specified, perform all maintenance procedures with all equipment lowered to the ground, transmission in neutral, parking brake applied and the engine stopped. Failure to perform these tasks could cause personal injury or death. **CAUTION** New vehicle (break-in) maintenance is required on the 6KVRRTFL at 20 hours, 50 hours and 100 hours. See para. 2-18 and contact Unit Maintenance to avoid early wear or damage to the forklift and possible voidance of the warranty.	
1					EXTERiOR OF FORKLiFT	
	•		•		a. Check for oil, fuel, coolant and hydraulic oil leaks.	Any Class III leaks are evident.
	•		•		b. Check the Cab/Roll Over Protective Structure (ROPS)/Falling Object Protective Structure (FOPS) and vehicle frame for obvious damage, cracks, bends, and evidence of loose mounting hardware.	Obvious damage, cracks, bends in weldments.

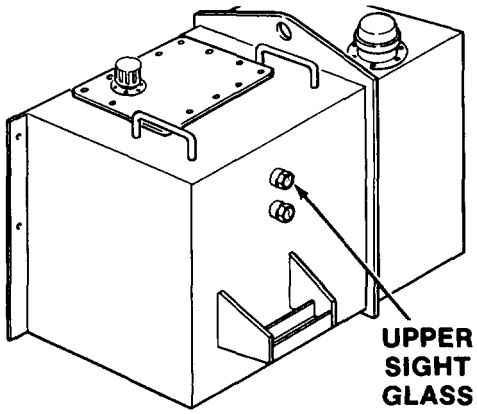
PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly**

Item No.	Interval B	D	A	W	Item To Be Inspected Procedure: Check for and repair, fill or adjust as necessary	Equipment Is Not Ready/ Available If:
	•		•		c. Inspect the boom, MLRS fork attachment, carriage, and MLRS lifting tool and stop tube for cracked, bent or broken members.	Boom MLRS fork attachment, carriage, or MLRS lifting tool are bent, cracked, broken, or missing.
	•		•		d. Check exterior wiring and connectors for secure mounting, frayed, broken or burned wires.	Wiring is frayed, broken, or burned.
	•		•		e. Check the frame tilt stops for cracks, bends or weld and other damage.	Any obvious damage, cracks or bend in weldment.
	•		•		f. Check that boom hoses and electrical cable are snug against tensioner and not crossed. 	Hoses or cable are crossed or obviously loose.
2					TIRES, WHEELS AND FLEXIBLE BRAKE LINES	
	•		•		a. Check tires for damage (i.e., cuts, gouges, foreign matter), obvious low tire pressure. (reference TM 9-2610-200-24.)	Obviously low tire inflation. One or more tires unserviceable.
	•		•		b. Check tires for proper inflation pressures (front tires: 45 psi, rear tires: 40 psi).	
	•		•		c. Check wheels for damage, and loose or missing mounting nuts.	
	•		•		d. Check flexible brake lines for signs of wear, cuts, or damage.	Cracks, loose or missing mounting nuts. Any signs of wear, cuts, or damage.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly**

Item No.	Interval B	D	A	W	Item To Be Inspected Procedure: Check for and repair, fill or adjust as necessary	Equipment Is Not Ready/ Available If:
3					HYDRAULIC TANK/RESERVOIR	
	•				With all cylinders retracted, check oil level in tank. Oil level should be risible in the upper sight glass. Refer to LO1 0-3930-660-12. 	
4					RADIATOR **WARNING** Cooling system is pressurized. Remove radiator cap slowly and only when engine is cool or painful burns could result. **NOTE** Use coolant overflow bottle to fill or check coolant level. If coolant is not visible in overflow bottle, the system must be refilled through the radiator cap.	
	•				a. Check the coolant level in the overflow bottle. Maintain level approximately 1/3 full to 2/3 full (2 qts.).	
	•				b. Visually check radiator for damage or obstruction. Remove any obstruction.	Radiator is leaking.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A- After** **W-Weekly**

Item No.	Interval B	D	A	W	Item To Be Inspected Procedure: Check for and repair, fill or adjust as necessary	Equipment Is Not Ready/ Available If:
5					ENGINE OIL LEVEL	
	•				Check oil level on dipstick. Maintain oil level to between the “ADD” and the “FULL” marks. Refer to LO10-3930-660-12.	
6	•				HYDRAULIC CYLINDERS	
					Check the external hydraulic lines and fittings for damage and leaks.	Class Ill leaks are evident.
7					BATTERIES	
					WARNING	
					Do not smoke or allow any open flame or spark in the vicinity while checking or filling batteries. The batteries generate hydrogen gas, a highly explosive gas. Personal injury or death can result.	
	•				a. Check batteries and battery box for corrosion and obvious damage.	Corrosion damage to batteries.
	•				b. Check the electrolyte level. If the level of electrolyte is below the top of the battery plates, notify Unit Maintenance.	
8	•				WINDOWS	
					Check windows for obvious damage and broken or cracked windows.	Vision is distorted due to crack in windshield.
9					SEAT AND SEAT BELT	
	•				a. Check seat belt for damage.	Seat belt torn.
	•				b. Check seat adjustment latch.	Seat latch inoperative or broken.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A- After** **W-Weekly**

Item No.	Interval B	D	A	W	item To Be Inspected Procedure: Check for and repair, fill or adjust as necessary	Equipment Is Not Ready/ Available If:
10					WINDSHIELD WIPERS	
	•				a. Check the wipers for proper operation.	Wipers inoperative.
	•				b. Check for missing or damaged wiper blades.	Wiper blades unserviceable, missing or damaged.
	•				c. Check windshield wiper washer fluid.	
11					EXTERIOR LIGHTS	
	•				Check all lights for proper operation.	
12					HORN AND BACK-UP AI-ARM	
	•				With ignition switch in “on” position, put travel select lever in the reverse position. Check for back-up alarm operation.	Back-up alarm inoperative.
13					INSTRUMENT PANEL AND CONTROLS	
	•				a. Inspect the instrument panel for broken glass and unserviceable gauges.	Any of the following gauges are unreadable: • Water temperature. • Engine oil pressure. • Transmission oil temperature.
					b. Press lenses to test warning lights.	
					NOTE Check Nos. 14,15, and 16 are performed with the engine running, prior to the equipment leaving the containment area or performing its intended mission.	

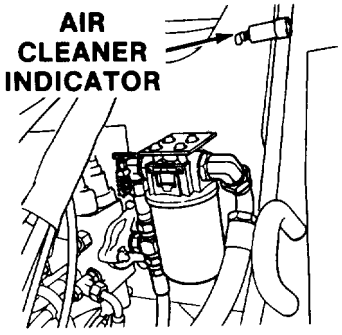
PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A- After** **W - Weekly**

Item No.	Interval B	D	A	W	Item To Be inspected Procedure: Check for and repair, fill or adjust as necessary	Equipment Is Not Ready/ Available If:
14					SYSTEMS OPERATIONAL CHECK	
	•				a. Operate two wheel, four wheel, and crab steering fully in one direction and then in the opposite direction. Check for proper and smooth operation.	Erratic or noisy operation.
	•				b. Press the service brake pedal and check to ensure that pedal is firm and does not depress completely to floor.	Pedal is spongy or goes to floor.
	•				c. Place transmission in forward gear and allow vehicle to move. Operate the service brakes. Vehicle should stop.	Vehicle does not stop.
	•				d. With parking brake applied, place travel select control lever in forward gear. Vehicle should not move.	Parking brake does not hold vehicle.
					WARNING Before operating the boom, use care to ensure that the boom does not come near overhead power lines or structures.	
					WARNING Do not raise or extend the boom unless the frame is level.	
	•				e. Operate the boom extend, retract, raise and lower. Check for smooth operation.	Boom operation is erratic. Boom does not function.
	•				f. Operate the frame tilt from full left to full right.	Frame tilt is erratic or does not tilt.
	•				g. Check fork movement, right and left, for proper operation.	Either fork does not operate.

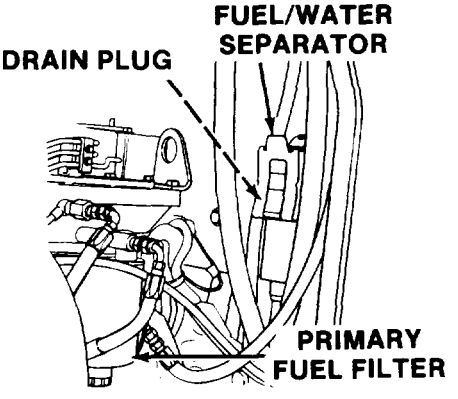
PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A- After** **W- Weekly**

Item No.	Interval B	D	A	W	Item To Be Inspected Procedure: Check for and repair, fill or adjust as necessary	Equipment Is Not Ready/ Available If:
15	•				TRANSMISSION OIL LEVEL With the engine running and transmission at normal operating temperature, check oil level on dipstick Maintain oil level between the "ADD" and the "FULL" marks. Refer to L010-3930-660-12.	
16	•				Monitor all gauges and warning lights during vehicle operation.	
					a. Water temperature 180°-210° F.	Water temperature above 210° F.
					b. Engine oil pressure 30 psi -80 psi.	Engine oil pressure less than 10 psi.
					c. Transmission oil temperature does not exceed 250° F.	Transmission oil temperature exceeds 250° F.
					d. Battery voltage indicator in safe zone, 24-28:5 volts.	Battery voltage indicator not in safe zone.
					CAUTION When operating in desert or extremely dusty conditions, clean the Primary Air Cieaner Eiement after every 4 hours of operation.	
17					AIR FILTERS	
			•		Check air cleaner indicator.  	Indicator shows fully red on gauge.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly**

Item No.	Interval B	D	A	W	Item To Be Inspected Procedure: Check for and repair, fill or adjust as necessary	Equipment Is Not Ready/ Available If:
18			•		FUEL FILTERS AND WATER SEPARATOR Drain water from the water separator. (1) Remove the drain plug located on the left side of separator base. (2) Allow the water to drain. (3) Tighten drain plug.  	
19					EXHAUST SYSTEM	
				•	a. Check the exhaust system for loose or missing clamps or hardware.	
				•	b. Check for evidence of leaks at all joints and connections.	
20					ENGINE LUBRICATION SYSTEM	
				•	Check for oil leaks at the valve covers, tappet covers, turbocharger oil line and engine oil filter.	Class III leaks are evident.

Sectlon lll. Operation Procedures

2-4. GENERAL.

[t is essential that the operator know how to perform every operation of which the vehicle is capable. This section gives instructions on starting and stopping the vehicle, on the basic motions of the vehicle and how to use these instructions to perform specific tasks for which the equipment was designed.

2-5. NEW VEHICLE BREAK-IN.

Controlled break-in is the ideal fitting of all internal moving metal parts. Using the proper oil and preventive maintenance program during this period will provide long life of the engine.

a. Starting the Engine See paragraph 2-6. Warm the engine to operating temperature (180°-190° F) before placing the engine under load.

b. Operation.

(1) Avoid constant speeds.

(2) Use the range select control lever to place the transmission in the appropriate gear to prevent engine lugging.

(3) Check the gauges to ensure normal operation of the engine.

(4) Check the coolant level and fill as necessary.

(5) Check the oil level. Add oil as necessary to keep it at the correct level. Do not overfill the crankcase.

(6) After the first 20 hours of operation, the transmission oil and the filter must be changed. Contact Unit Maintenance to change and lubricate with correct grade of lubricant according to LO1 0-3930-660-12. After the first 50 hours of operation, all the items listed below must be changed. Contact Unit Maintenance.

Planetary Gear Oil
Hydraulic Oil Filter
Engine Oil and Filter
Differential Oil

2-6. STARTING THE ENGINE.

a. Adjust the operator's seat so that when your seat belt is buckled you can still depress the foot pedals.

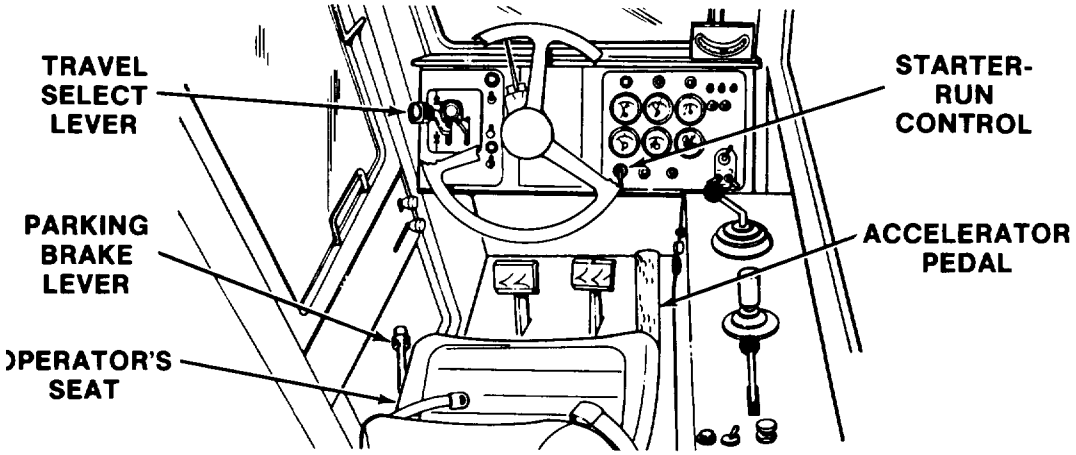
NOTE

Before starting the vehicle, ensure that the parking brake is engaged.

b. If the parking brake is not engaged, pull the lever up.

NOTE

Before starting the vehicle, ensure that the travel select lever is placed in Neutral, "N".

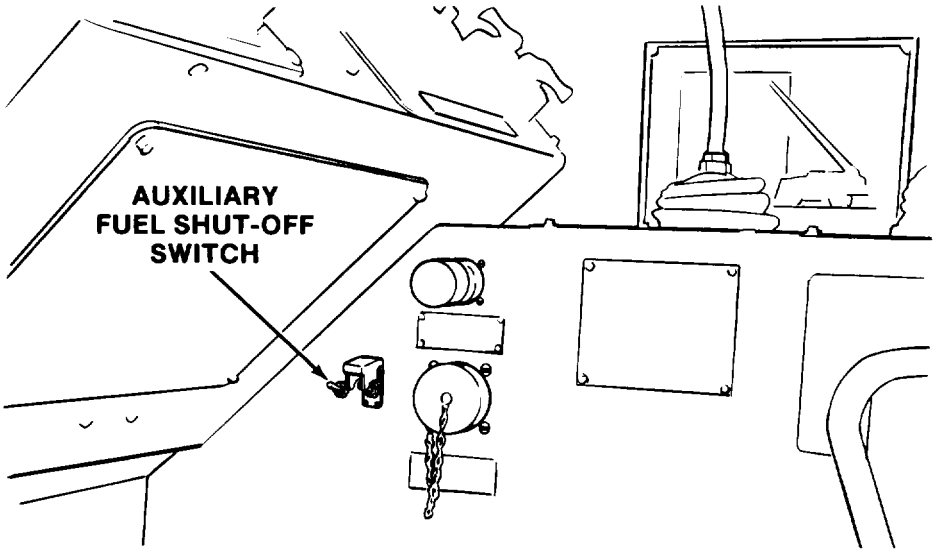


c. If the travel select lever is not in the neutral position, move the lever to Neutral, "N".

d. On the first start of the day, check the neutral safety switch for proper operation.

(1) Place the travel select lever in the Forward, "F" position.

(2) Ensure that the auxiliary fuel shut-off switch is Off (switch up).



CAUTION

If the engine should turn over, do not continue. This indicates that the neutral safety switch is defective.

(3) Turn the starter-run control switch to the START position. The engine should not turn over.

(4) Return the starter-run control switch to the OFF position.

(5) Return the travel select lever to the Neutral, “N” position.

(6) Place the auxiliary fuel shut-off switch to the On position.

e. Press the accelerator pedal to approximately half speed.

CAUTION

Do not crank the starting motor for more than 30 seconds at a time. Continuous cranking can overheat and damage the starting motor.

f. Turn the starter-run control switch clockwise to the START position. Release the switch as soon as the engine starts. If the engine fails to start on the first try, wait until the engine and starter have come to a complete stop. Then, return the switch to the OFF position before attempting to start again.

CAUTION

[f the coolant temperature exceeds 220° F or the warning light is illuminated, shut the engine down immediately. Do not operate the vehicle continuously at a water temperature above 210° or below 140° F.

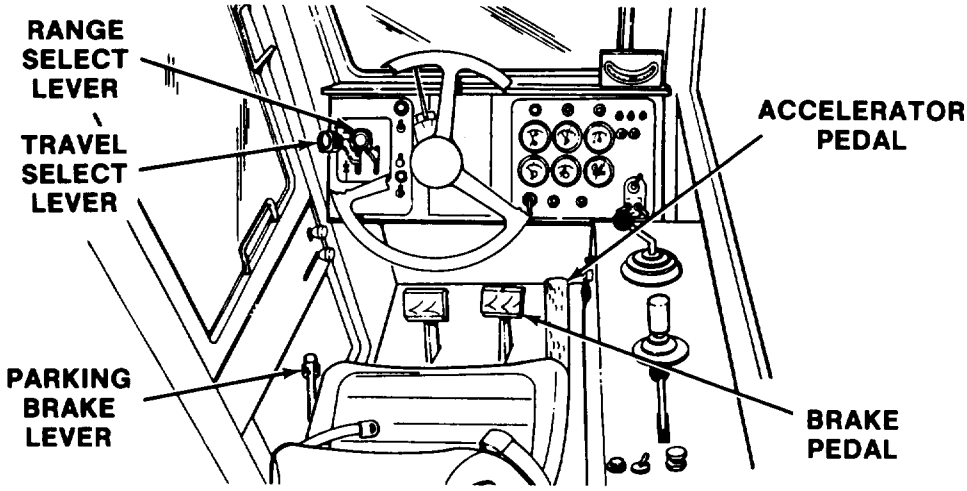
CAUTION

Should the oil pressure fluctuate or drop, or if the warning light is illuminated, stop the engine and find the cause. Do not operate the engine at oil pressure lower than 10 psi.

CAUTION

If oil pressure does not register within 15 seconds after the engine starts, stop the engine or serious damage may occur. Stop the engine by turning the starter-run control switch to the OFF position.

g. After the engine starts, operate the engine just above idle for 30 to 60 seconds before driving the vehicle. Check the readings on the gauges before moving the vehicle. Return engine speed to idle before moving the range select lever.



2-7. MOVING THE FORKLIFT.

WARNING

Do not travel with the automatic fork level switch in the ON position. It is possible to drop a load which can result in load damage, injury or death.

WARNING

Use care when backing up. Have someone direct you if you cannot see where you are going. Watch clearances.

CAUTION

The forks extend beyond the end of the carriage. The operator must be aware of the swing of the forks when turning and allow for adequate clearance between the forks and other objects.

a. Operating Safely.

(1) Do not allow riders on the vehicle.

(2) Understand vehicle's lifting limitations and keep the vehicle under control. DO NOT try to exceed limitations.

WARNING

The vehicle is less stable when traveling with the load in a raised position. If you must move the vehicle with the load raised above the carry position (bottom of load at 24 inches above the ground):

- Avoid sharp turns and sudden starts/stops.

- Operate all controls smoothly.

- Move very slowly.

– Keep the vehicle level.

(3) Always carry the load low (bottom of load 24 inches above the ground) for maximum stability.

CAUTION

Make sure the lower cab door is closed when operating the vehicle. Vehicle wheels can contact the lower door if the door is left open.

(4) Always operate the forklift with the lower cab door closed.

WARNING

Extreme care must be taken to ensure that the boom does not come near overhead wires. Death or injury may result from contacting power lines. Never operate this vehicle close to electric power, or other lines. If lines are near to your operating area, notify your supervisor of the lines prior to starting work.

(5) Should contact with power line occur, stay on the vehicle until the boom is cleared or until the current is turned off. Keep all personnel off the vehicle. If you must leave the vehicle, JUMP, DO NOT STEP OFF.

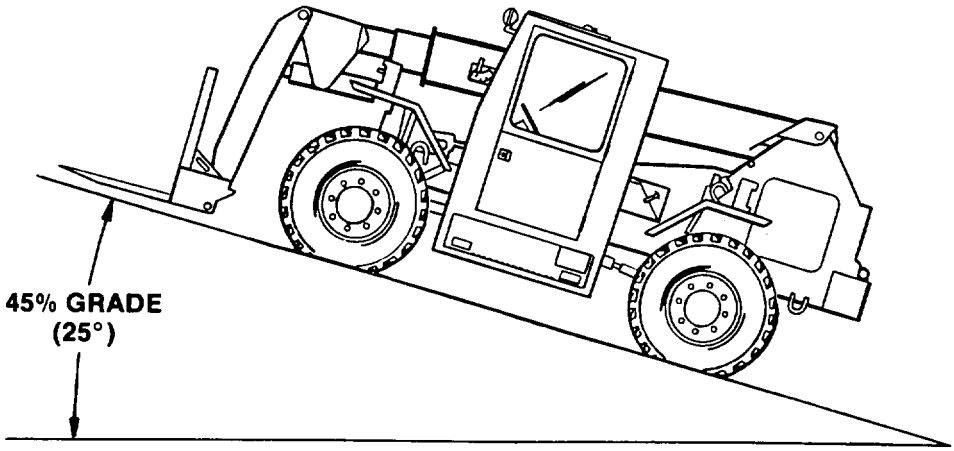
WARNING

Travel on inclines, slopes, ramps and grades only as follows:

– Loaded Forklift: with forks (and load) pointing uphill.

– Empty Forklift: with forks pointing downhill.

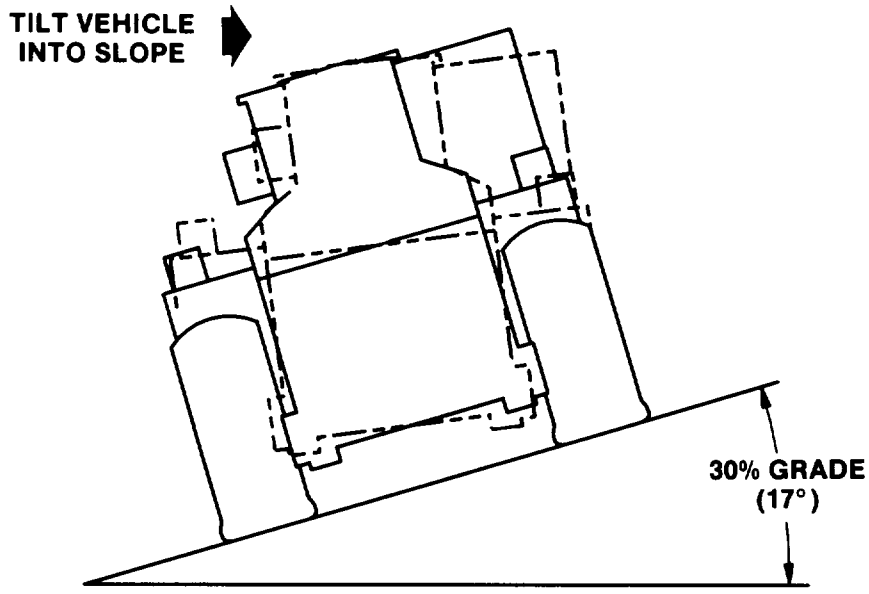
(6) Know your vehicle's operating limits for ascending, descending, and traversing slopes.



WARNING

Do not exceed 45% grade (25°) longitudinally. Vehicle becomes unstable and fluid levels are shifted. Internal components may not be properly lubricated causing vehicle damage. Tires may slip (loss of traction) or vehicle may tip, causing possible operator injury or death.

(a) With or without rated capacity load, for maximum longitudinal stability, do not exceed 45‰. grades (250).



WARNING

Do not exceed 30% grade (17°) laterally. Vehicle becomes unstable and fluid levels are shifted. Internal components may not be properly lubricated causing vehicle damage. Tires may slip (loss of traction) or vehicle may tip, causing possible operator injury or death.

(b) With or without rated capacity load, for maximum lateral stability, do not exceed 30‰ grade (17°).

b. Starting Travel Procedures.

(1) With the engine at idle speed, depress the brake pedal to apply the service brakes.

(2) Make sure the travel select lever is in the Neutral “N” position.

(3) Ensure that the forks are raised at least 24 inches above the ground.

(4) Place the range select lever to the desired gear ratio.

(5) Push the parking brake lever down to release the parking brake.

(6) Move the travel select lever to the Forward “F position for forward travel, or down to the Reverse “R” position for reverse travel.

(7) Release the brake pedal and press the accelerator pedal to control vehicle speed.

c. Changing Direction of Travel.

WARNING

DO NOT STOP QUICKLY. The load may drop off the forks causing damage or personal injury.

(1) Depress the brake or transmission disconnect pedal to apply the service brakes and bring the vehicle to a complete stop.

NOTE

When changing direction of travel, reduce engine speed.

(2) Move the travel select lever through Neutral, “N” to the desired direction.

d. Changing Gear Ratios.

CAUTION

Operating the vehicle with a heavy load in high gear will cause the torque converter to slip excessively and the transmission may overheat.

Upshifting and downshifting should be done in the normal sequence of speeds.

WARNING

DO NOT downshift at high speeds. Vehicle will slow suddenly and drop the load or cause operator injury.

NOTE

The gears should be engaged only after reaching the top speed of the next lower gear. If necessary, the vehicle should be slowed by means of the service brakes.

(1) Shifting to the next higher gear maybe accomplished at any engine RPM while the vehicle is in motion.

(2) When downshifting, DO NOT over-rev the engine. Allow the vehicle to slow before shifting to the next lower gear.

e. Accelerating Hydraulic Functions. To accelerate the operation of the hydraulic functions, use the following procedure.

(1) Depress and hold the transmission disconnect pedal.

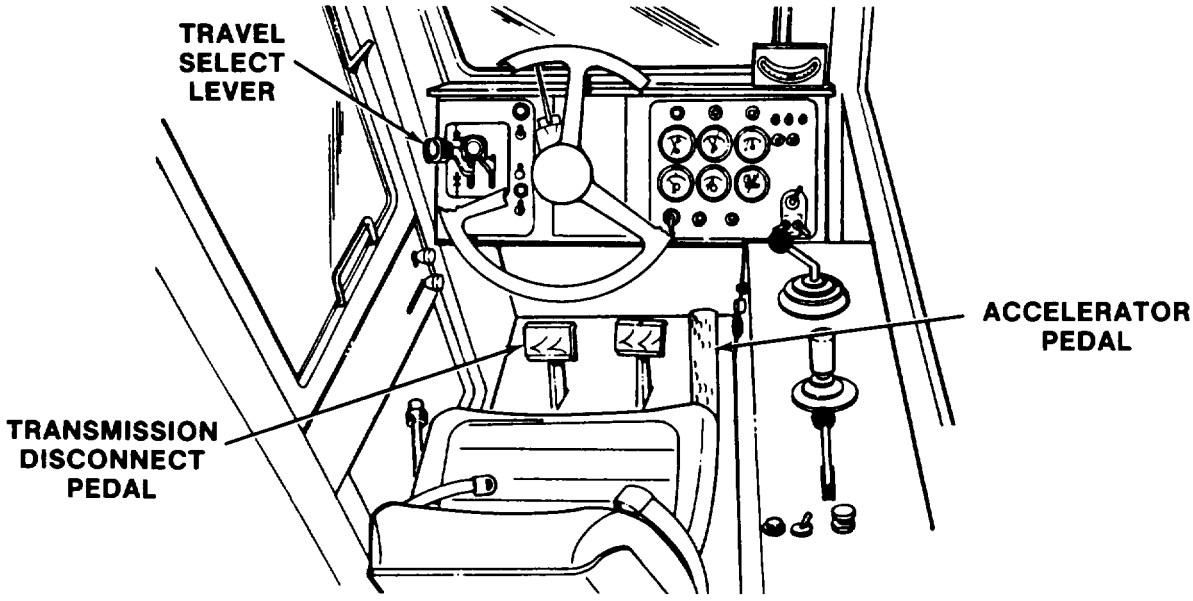
(2) Depress the accelerator pedal to increase and maintain higher engine speed.

(3) Perform the desired hydraulic functions.

(4) Reduce engine speed to idle after operations are completed.

(5) Shift the travel select control lever as necessary.

(6) Slowly release the transmission disconnect pedal.



2-8. STEERING THE FORKLIFT.

The forklift can be operated in three steering modes as selected with the steer select control switch: 4 wheel steer, 2 wheel steer, and crab steer.

WARNING

Do not turn fast as this may cause the forklift to tip and possibly lose the load. This is particularly true in the 4 wheel steering mode. Turn the vehicle in a lower gear or a slower speed.

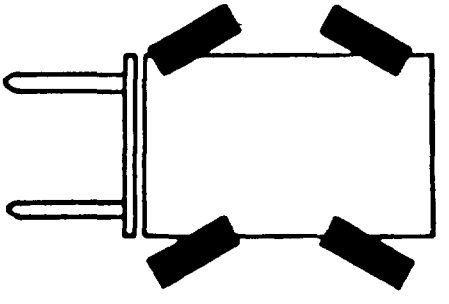
CAUTION

Before changing steering modes, synchronize steering, see para. 2-8, d. Steering System Synchronization. Failure to follow this caution will result in vehicle mistracking and tire damage.

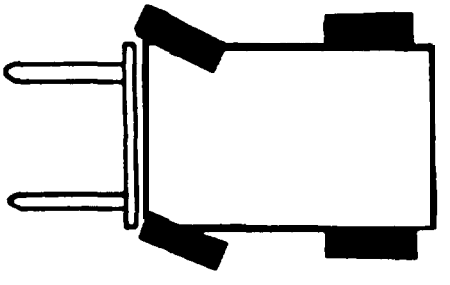
CAUTION

The forks extend beyond the end of the carriage. Be aware of the swing of the forks when turning. Allow for adequate clearance between the forks and other objects.

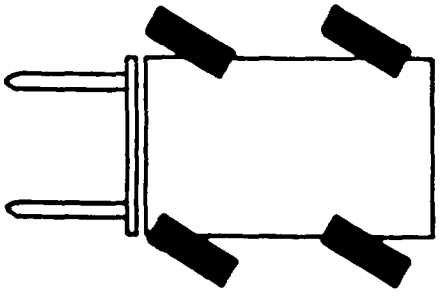
a. 4 Wheel Steering. Move the steer select control switch to the right position. The front wheels will steer the direction that the steering wheel is turned; the rear wheels will steer in the opposite direction. This mode allows an extremely short turn radius. It also enables the rear wheels to follow the tracking of the front wheels which is an advantage in mud or sand conditions.



b. 2 Wheel Steering. Move the steer select control switch to the center position. The front wheels will steer in the direction that the steering wheel is turned. The rear wheels will remain in the fixed forward position. This mode is used for on-highway travel or at higher speeds.



c. Crab Steering. Move the steer select control switch to the left position. All wheels will steer in the same direction. This mode permits the operator to move the vehicle sideways toward the landing point of the load. This is especially helpful in tight quarters on the job, where there is not enough space to move a conventional forklift back and forth several times in order to line up at the exact spot in front of the loading location.



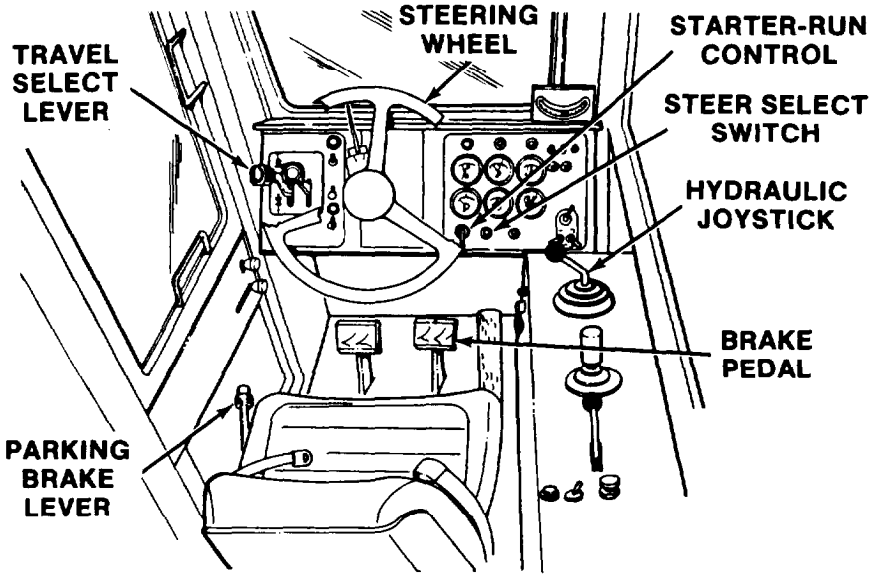
d. Steering System Synchronization Use the following procedures to align the front and rear wheels if the wheels are not set in the same direction after you change steering modes (4 wheel, 2 wheel, and crab steer).

(1) Use the steering wheel to put the rear wheels in a straight ahead position,

(2) Place the steer select control switch in the 2 WHEEL position (center).

(3) Use the steering wheel and adjust the front wheels to a straight ahead position.

(4) Move the steer select control switch to the desired mode for continued operation.



2-9. STOPPING THE FORKLIFT.

a. Depress the brake pedal to slow the vehicle down.

b. Bring the machine to a complete stop. Place the travel select lever in the Neutral “N” position.

c. Pull the parking brake lever up to apply the parking brake.

d. Move the hydraulic joystick control lever left to retract the boom extend cylinder.

e. Push the hydraulic joystick control lever forward to lower the boom until forks are resting on the ground.

2-10. STOPPING THE ENGINE.

a. Place the travel select lever in the Neutral “N” position.

b. Pull the parking brake lever up to apply the parking brake.

c. Move the hydraulic joystick control lever left to retract the boom extend cylinder.

d. Push the hydraulic joystick control lever forward to lower the boom until forks are resting on the ground.

e. Turn all lights and accessories off.

f. Allow the engine to idle for three minutes.

g. Turn the starter-run control switch to the OFF position.

h. Perform the after operation checks listed in the Preventive Maintenance Checks and Services.

2-11. OPERATING IN ROUGH TERRAIN.

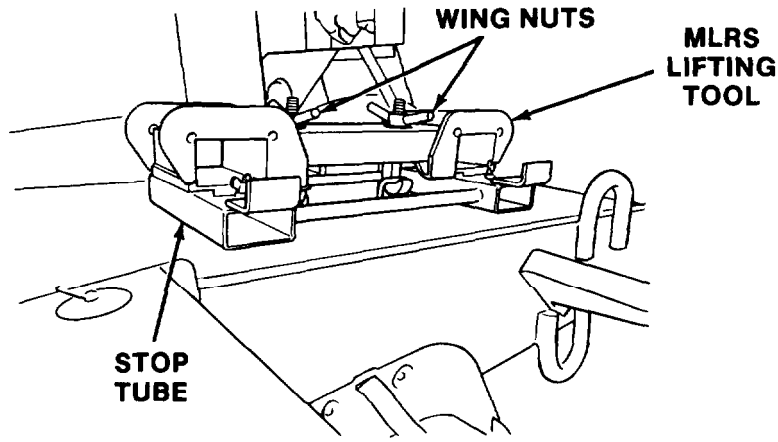
WARNING

Do not travel with the automatic fork level switch in the ON position. It is possible to drop a load which can result in load damage, injury or death.

2-12. INSTALLING THE MLRS LIFT TOOL AND STOP TUBE.

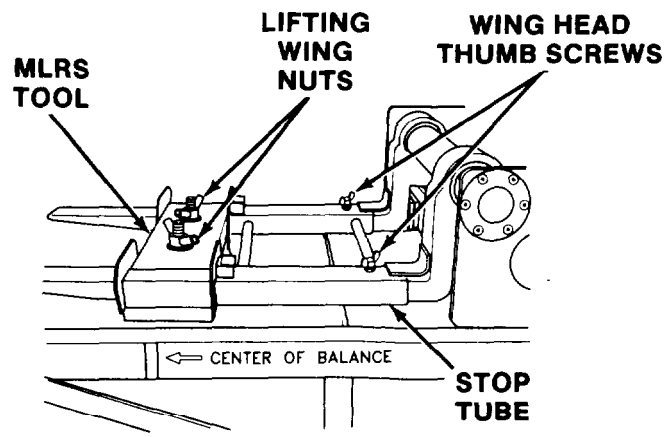
With the MLRS lifting tool attached to the MLRS pod and stop tube on the forks, the 6KVRRTFL can handle MLRS pods. The following procedure provides instructions for use of the lifting tool and stop tube.

a. The MLRS lifting tool and stop tube are stored on the vehicle deck. Loosen the two wing nuts and lift the MLRS lifting tool from the stop tube.



b. Attach the lifting tool to the MLRS pod to be moved. The hooks on the tool must be mounted to the lifting bar on the MLRS pod. Tighten the wing nuts on the hooks of the lifting tool.

c. Remove the stop tube from the vehicle deck and slide the stop tube all the way onto the forks. Tighten the wing head thumbscrews to secure the stop tube on the forks.



2-13. LOADING AND UNLOADING MLRS PODS FROM A GROUNDED CONTAINER OR TRAILER.

The 6KVRRTFL can extract an MLRS pod from a 20 ft. ISO grounded container or from a trailer as shown in illustrations. To move the MLRS pod, proceed as follows:

WARNING

Make sure the frame is level before raising or extending the boom with a load. Failure to do so could cause the load to drop or vehicle to tip.

WARNING

Never move any part of the vehicle or load near a power line or power lines. Failure to follow this precaution could result in immediate severe injury or death.

WARNING

Ensure that the counterweight is in place. An unbalanced vehicle could tip over and could cause severe personal injury or death.

a. Install the MLRS lifting tool and stop tube, paragraph 2-12.

b. Start the engine, paragraph 2-6.

c. Place the vehicle directly behind the MLRS pod container or trailer.

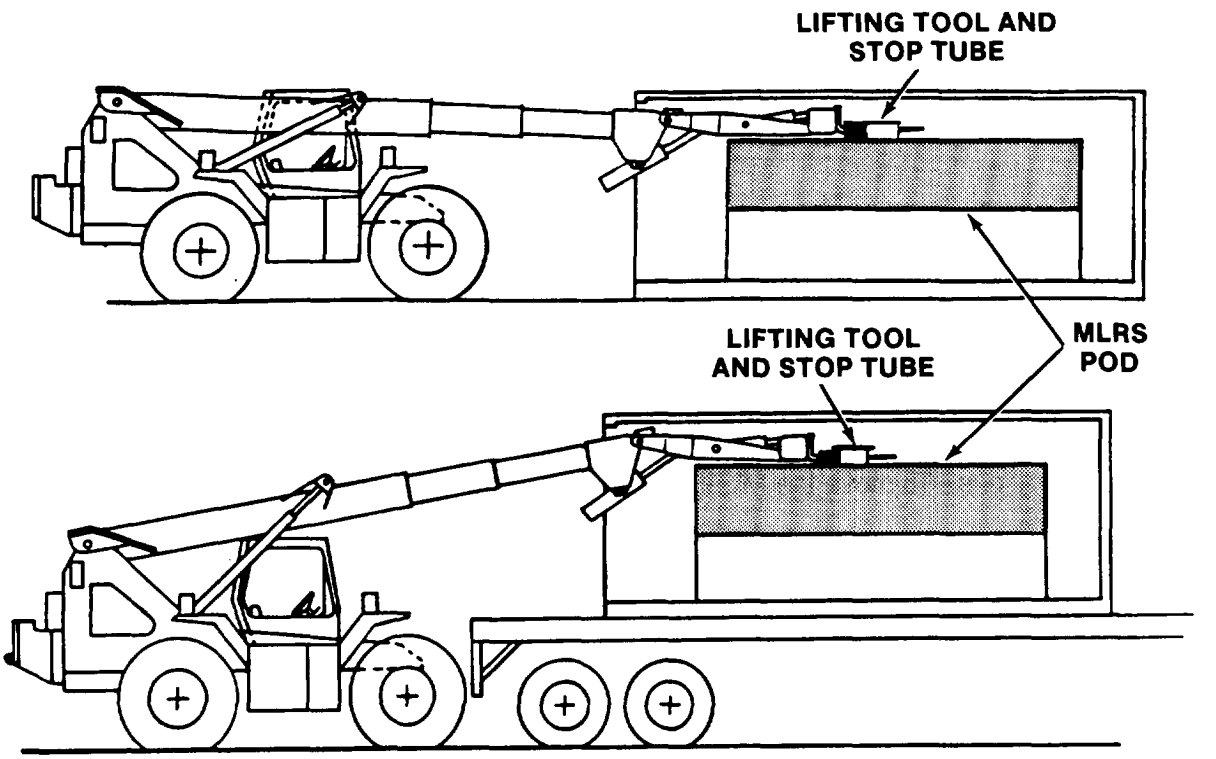
d. Check the lateral level indicator. If necessary move the frame tilt control lever to level the vehicle.

e. Move the automatic fork level switch to the On position.

f. Move the electric and hydraulic joysticks to maneuver the forks and boom into the MLRS lifting tool on top of the MLRS pod. Stop tube on forks must contact the lifting tool on the pod.

NOTE

The fork sideshift is limited to* 5 in. from centerline of the vehicle.

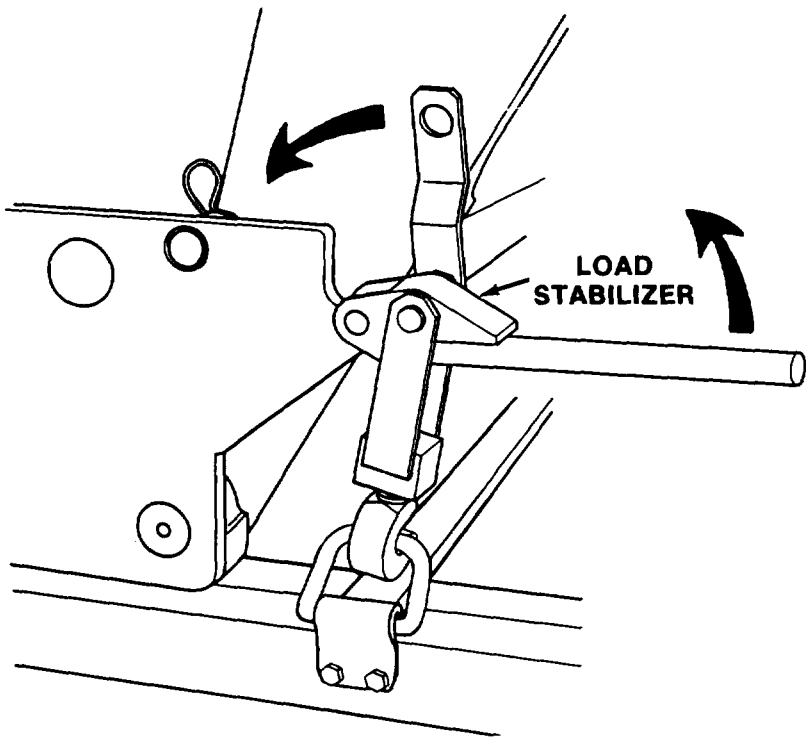


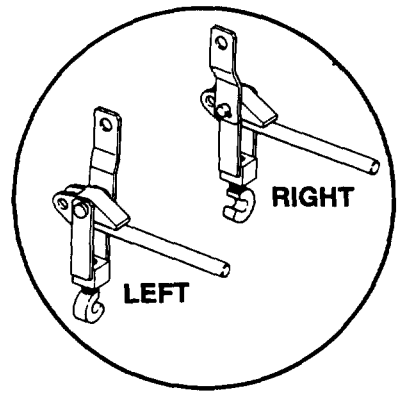
WARNING

Always lift the load from its resting spot before extending or retracting the boom. Always extend or retract the boom before lowering the load to its resting spot. Failure to do so could cause vehicle instability and result in severe personal injury or death.

g. Move the automatic fork level switch to the OFF position.

h. After lifting the pod, operate the carriage, forks, and boom as necessary and slowly back the vehicle away from the container or trailer.





i. Transport the MLRS pods to desired location. If the pods are to be carried more than a short distance or over rough terrain, install the load stabilizers, paragraph 2-14.

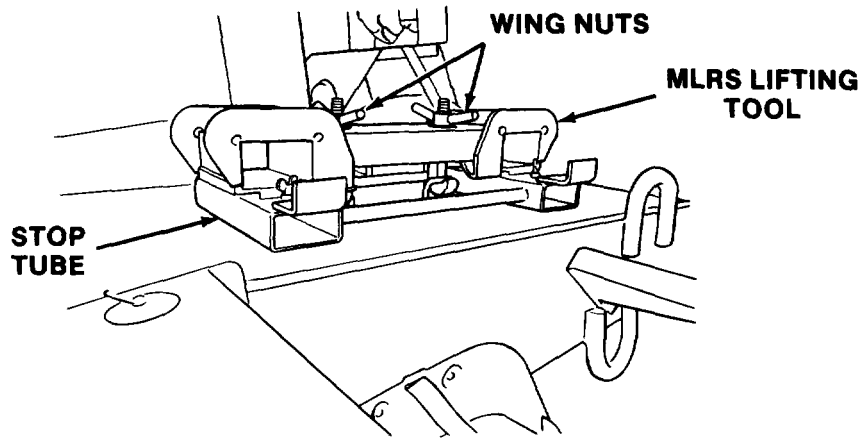
NOTE

Load stabilizers are marked “RH” and “LH”. Install the load stabilizer marked “RH” to the right-hand side of the fork carriage. Install the load stabilizer marked “LH” to the left-hand side of the fork carriage.

j. After a MLRS pod has been moved to desired location, loosen the wing nuts on the MLRS lifting tool and remove tool from pod. For moving additional MLRS pods, attach MLRS lifting tool to next pod, see para. 2-12. Repeat step c-j.

k. After operation, loosen the wing head thumbscrews on the stop tube. Slide the stop tube from the forks. Place the stop tube in storage area on vehicle deck.

1. Loosen the wing nuts on the MLRS lifting tool. Remove the tool from the pod and set it on top of the stop tube. Move the tool so that the hooks engage the attaching loops on vehicle frame. Tighten the wing nuts on the lifting tool which secure it and the stop tube to the vehicle frame.



2-14. INSTALLING THE LOAD STABILIZERS.

The 6KVRRTFL can be used to transport MLRS pods from one area to another. The load stabilizers must be attached if the pods are to be carried more than a short distance over rough terrain. To attach the load stabilizers, proceed as follows:

a. With a MLRS pod attached to the lifting tool, use the hydraulic joystick control to raise the load approximately one foot off the ground.

b. Remove the load stabliizers from the vehicle tool box.

NOTE

Load stabilizers are marked “RH” and “LH”. Install the load stabilizer marked “RH” to the right-hand side of the fork carriage. Install the load stabilizer marked “LH” to the left-hand side of the fork carriage.

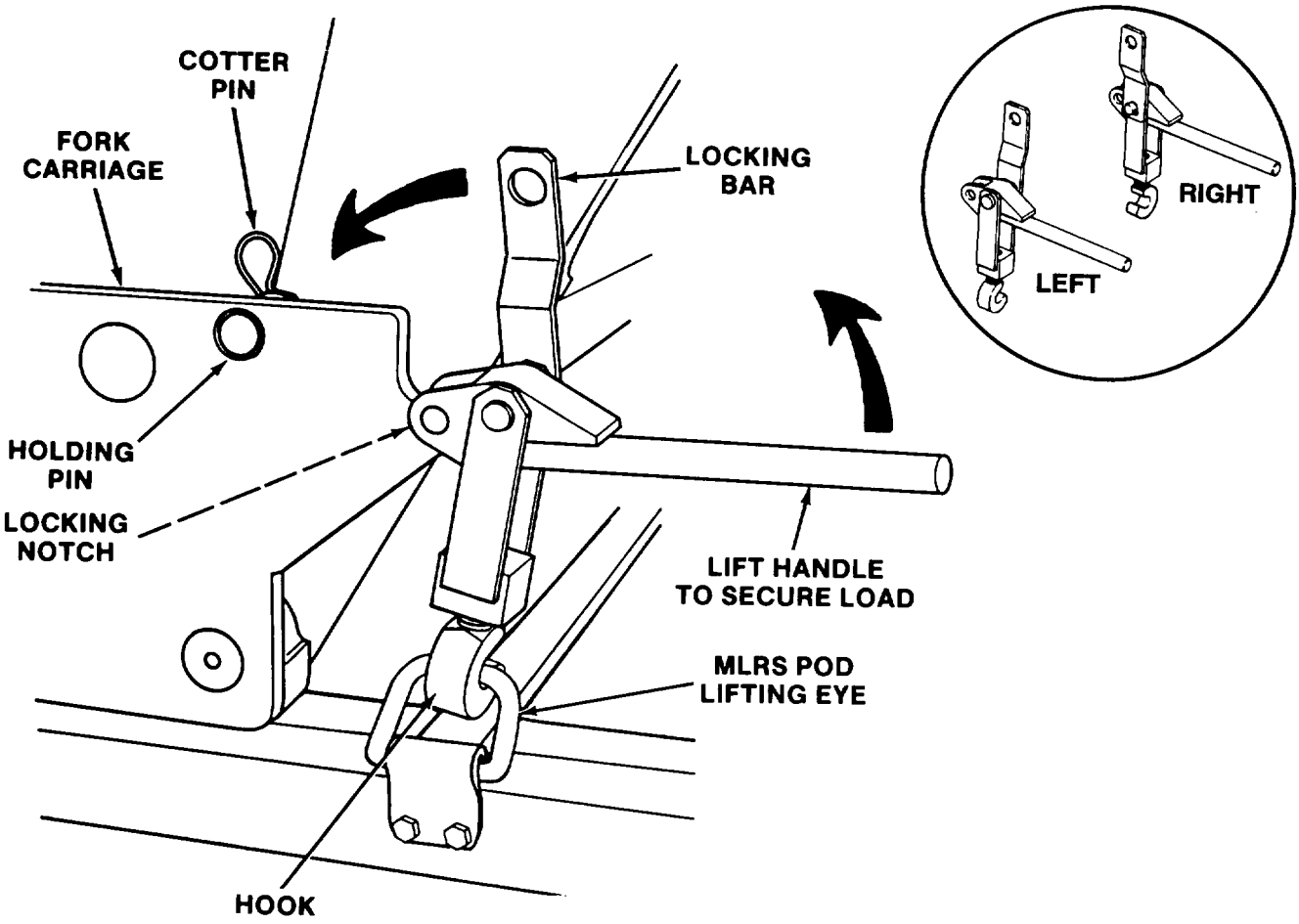
c. Attach the load stabilizers to the left and right side of the MLRS pod as follows:

(1) Place stabilizer hook through MLRS pod lifting eye.

(2) Put end of handle in locking notch of fork carriage.

(3) Lift handle up to secure pod.

(4) Align locking bar with holding pin hole in fork carriage.

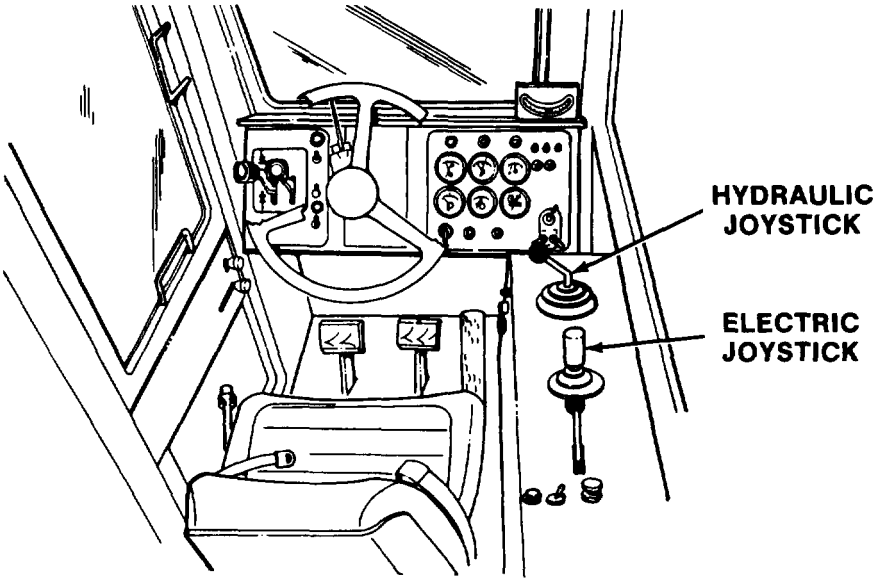


(5) Install pin through fork carriage and locking bar. Secure pin with cotter pin.

NOTE

If the fork carriage and MLRS pod do not make contact when the load stabilizers are locked in position (too loose) or the load stabilizers cannot be locked (too tight), release and adjust the stabilizer. Adjust the stabilizers by turning the hook in or out of the stabilizer block.

(6) Use the hydraulic joystick control to raise the load to travel position (bottom of load should be two feet above ground level).



CAUTION

With the load stabilizers attached, never set the load down on the ground. Possible damage to the MLRS pod may result.

(7) Before removing the load stabilizers, use the automatic fork level switch to level the forks, then turn switch Off.

2-15. LOADING AND UNLOADING AMMUNITION AND OTHER PALLETS FROM A CONTAINER OR TRAILER.

WARNING

Use care when handling and transporting the ammunition pallets. Failure to do so could result in severe personal injury or death.

WARNING

Never move any part of the vehicle or load near a power line or power lines. Failure to follow this precaution could result in immediate severe injury or death.

WARNING

Ensure that the counterweight is in place. An unbalanced vehicle could tip over and could cause severe personal injury or death.

WARNING

Always lift the load from its resting spot before extending or retracting the boom. Always extend or retract the boom before lowering the load to its resting spot. Failure to do so could cause vehicle instability and result in severe personal injury or death. Refer to Appendix E for Load Rating Chart.

a. Install the load backrest, paragraph 2-16, STEPS a and b.

b. Move the vehicle to the pallet.

CAUTION

Do not lift more than one pallet with the forks. Pallets may topple and result in load or machine damage.

c. Move the automatic fork level switch to the ON position. Use the hydraulic joystick control lever to position the forks at the bottom of the uppermost pallet.

d. Move the machine or extend the boom to engage the bottom of the pallet with the forks.

e. Use the hydraulic joystick control lever to raise the boom and lift the pallet slowly.

f. Maneuver the vehicle with pallet away from the pallet stack.

WARNING

Always retract the boom before lowering or transporting a load. Failure to do so could cause vehicle instability and result in severe personal injury or death.

g. Use the hydraulic joystick control lever to retract the boom and then lower the pallet to a travel position (approximately two feet above ground level).

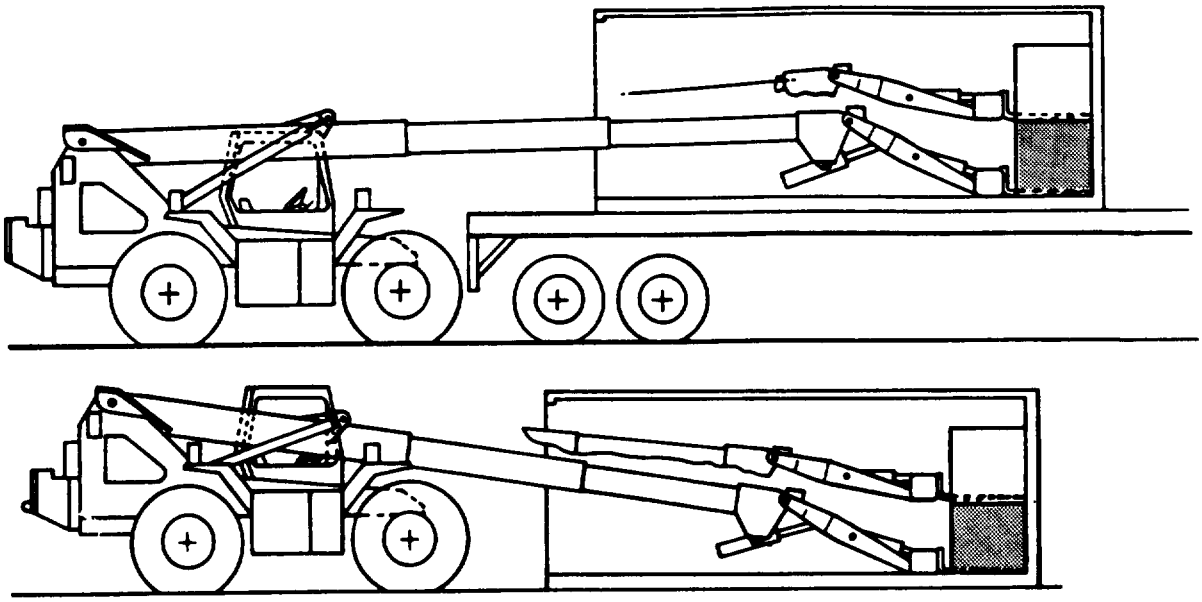
WARNING

Do not travel with the automatic fork level switch in the ON position. It is possible to drop a load which could cause load damage, injury or death.

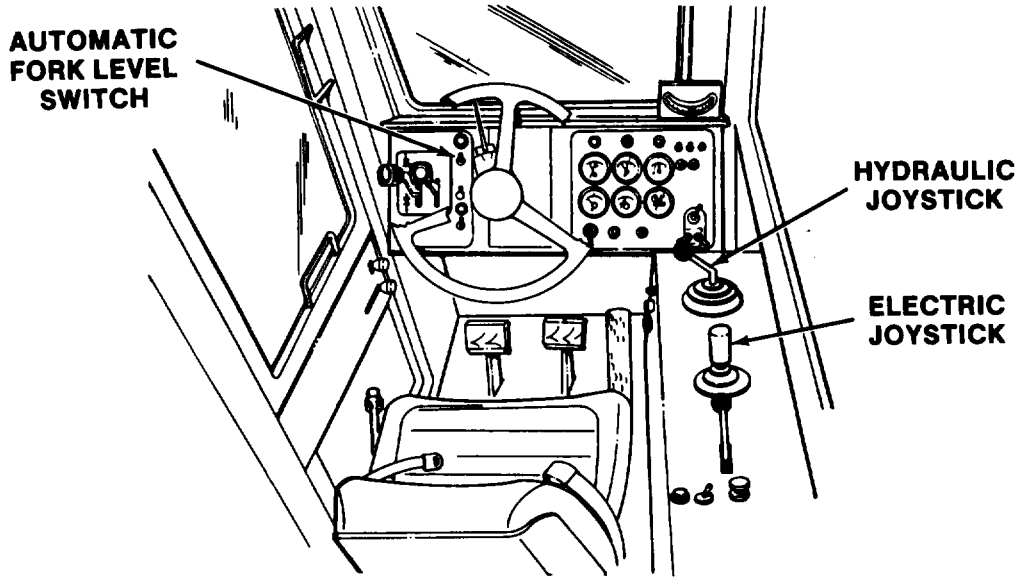
h. Move the automatic fork level switch to the OFF position before traveling.

i. Use the electric joystick control lever to raise the fork tips and enable the load to be supported by the backrest. Use care when traveling with a load.

j. Move the vehicle to the unloading area and in line with the unloading area.



k. Move the automatic fork level switch to the ON position. Use the hydraulic and electric joystick control levers to set the load down.



L Move the automatic fork level switch to the Off position and use the controls to remove the weight from the forks. Move the vehicle slowly away from the pallet.

m. Use the electric joystick control lever to move the forks to a carrying position.

n. Repeat STEPS b - p for continued operation.

2-16. USING THE LOAD BACKREST FOR ROUTINE FORKLIFT OPERATION.

a. Move forks together slightly so hooks on backrest fit on fork shaft of fork carriage.

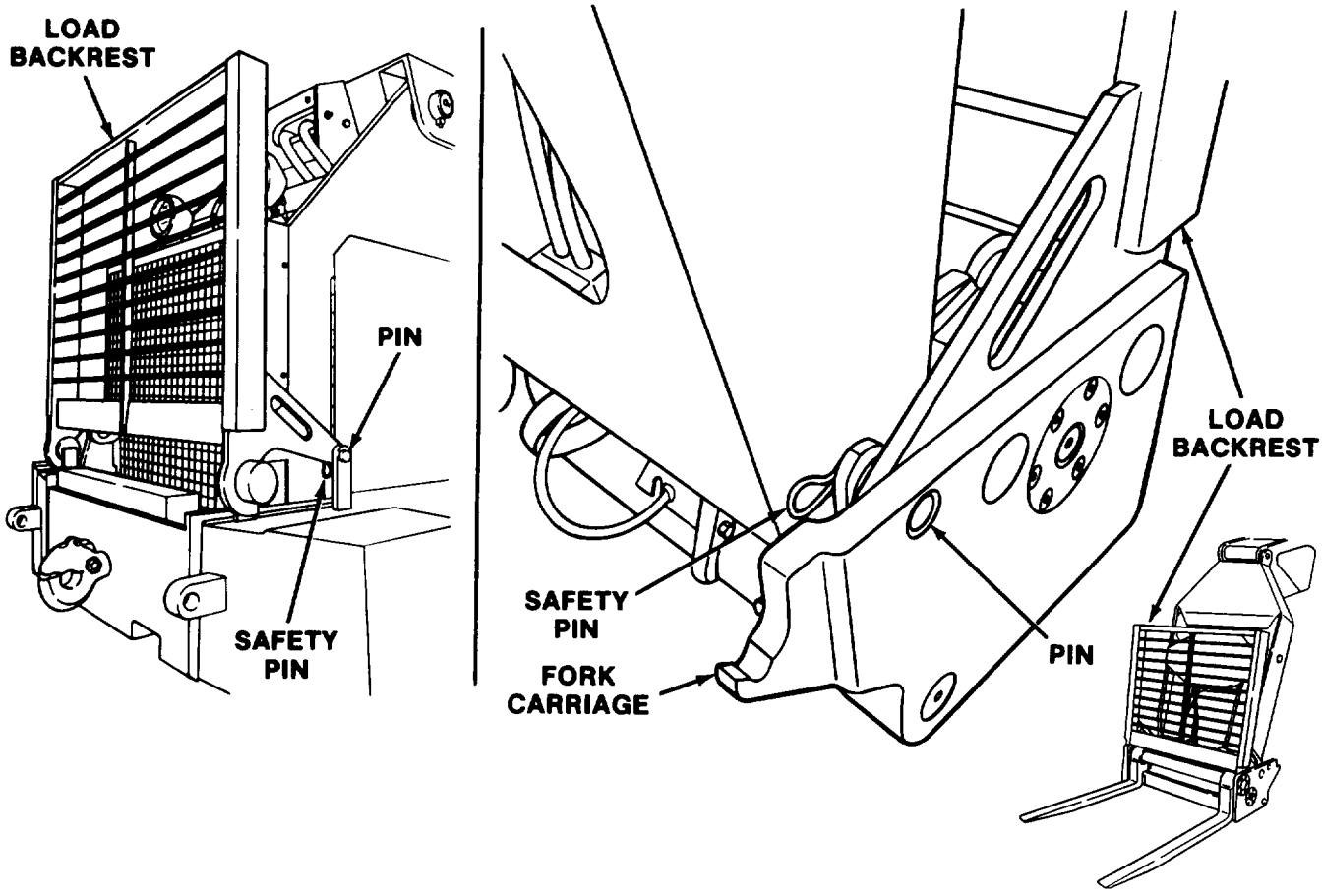
b. Using two personnel, remove the pins and safety pins which secure the load backrest to the counterweight. Remove backrest from counterweight.

c. Position the load backrest on the fork carriage. Ensure that the hooks on the load backrest are wrapped around the fork shaft on the fork carriage. Secure the backrest with pins and safety pins,

d. After completing operation with the load backrest, remove the safety pins and pins.

e. Tilt the load backrest forward and slide it back until the hooks are clear of the fork shaft. Remove the load backrest from the vehicle.

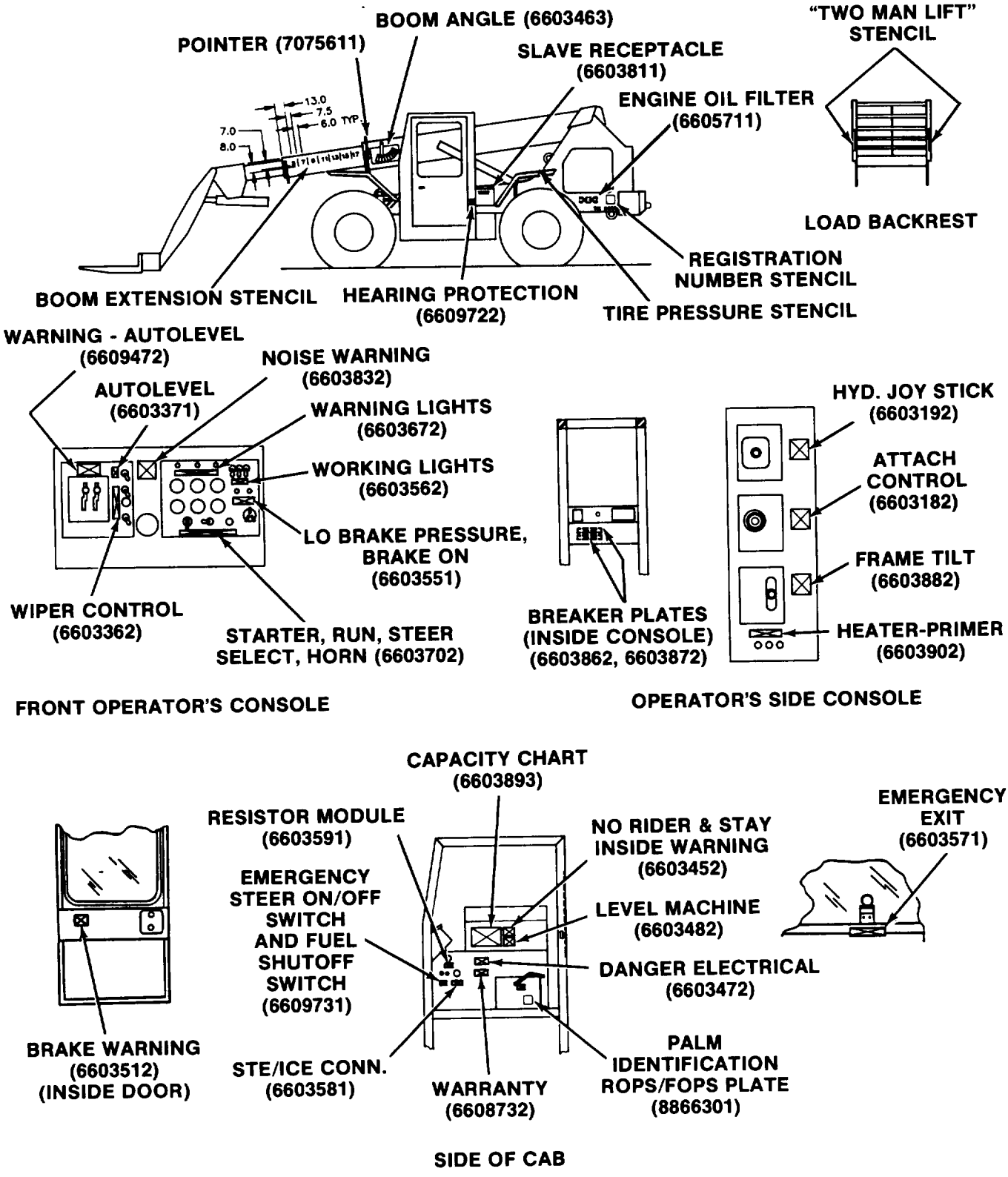
f. When the load backrest is not being used, place it in the storage position on the counterweight. Secure it with pins and safety pins.

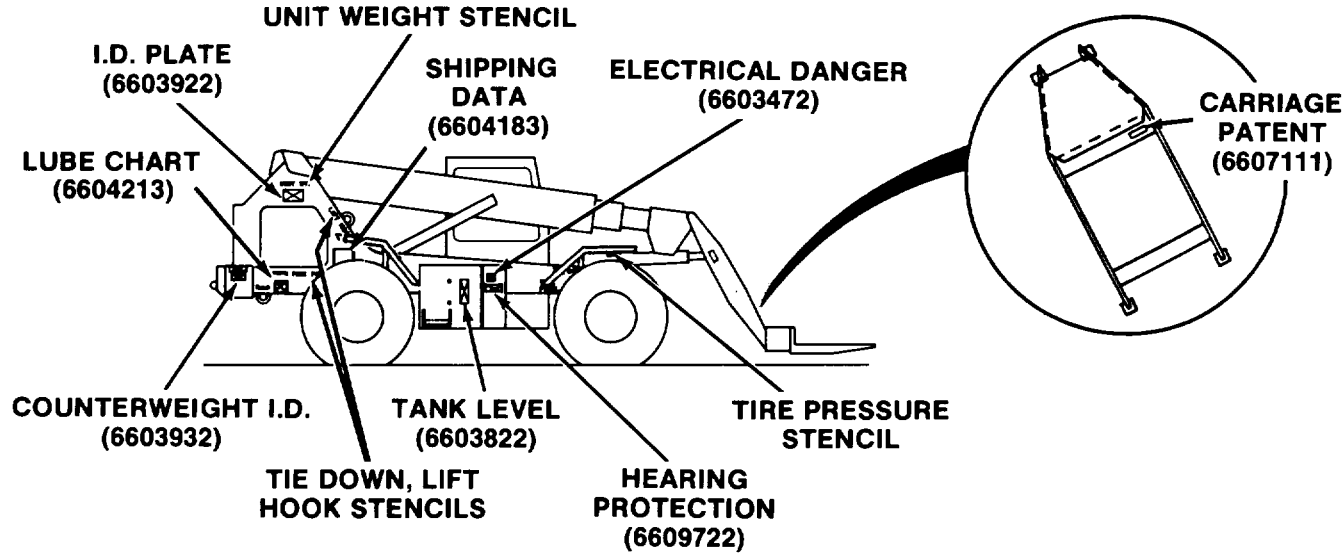


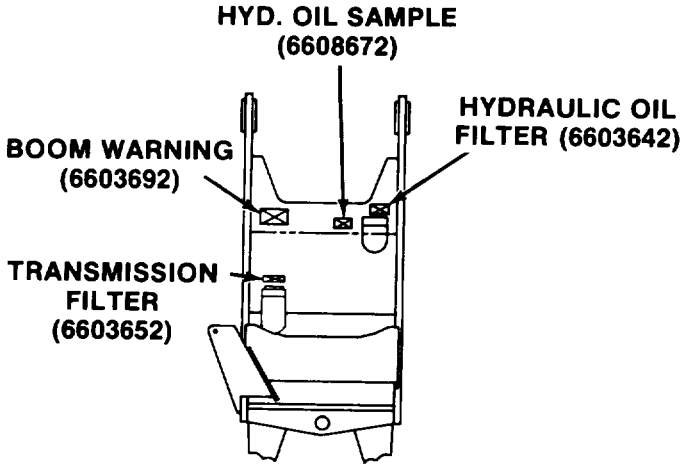
2-17. DECALS AND WARNING PLATES.

NOTE

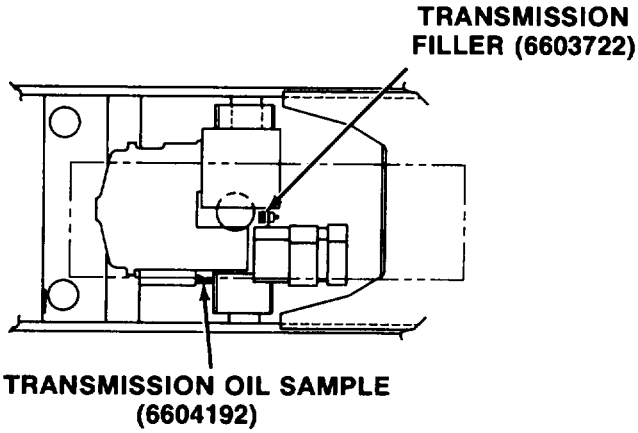
Refer to the next two figures for an illustration of the location of data plates, decals and warning plates.



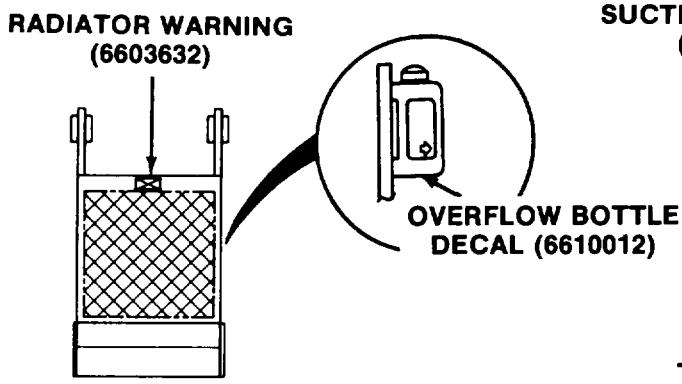




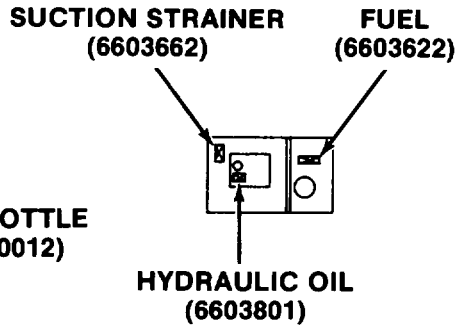
FRONT TRANSMISSION COMPARTMENT



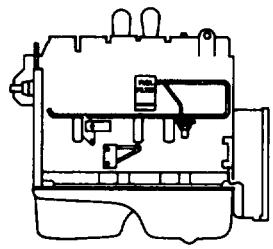
TOP OF TRANSMISSION



REAR OF VEHICLE



TOP OF FUEL/HYDRAULIC RESERVOIR



ENGINE

Section IV. Operation Under Unusual Condltlons

2-18. GENERAL.

This section provides the operator with additional instructions for operating in various environments and emergency situations.

2-19. OPERATION IN EXTREME MOIST HEAT.

At Parking or Halt.

(1) if possible, park the 6KVRRTFL under shelter.

(2) Dry the seat and wiring to prevent the formation of mildew.

(3) Keep the fuel tank full at all times to avoid condensation from forming in the tank.

(4) Contact Unit Maintenance to check all points of lubrication according to LO10-393O-660-12.

2-20. OPERATION IN EXTREME DRY HEAT. (Refer to FM 90-3, DESERT OPERATIONS)

a. Preparation. Precautions must be taken to avoid overheating.

(1) Contact Unit Maintenance to drain, flush and refill cooling system.

(2) Contact Unit Maintenance to lubricate the 6KVRRTFL with correct grade of lubricants in accordance with Lubrication Order, LO10-3930-660-12.

b. Operation.

CAUTION

Never remove the radiator cap from a pressurized system while the engine is running or hot. Hot water and/or steam will be expelled, resulting in possible severe burns.

(1) Check the water temperature gauge at frequent intervals.

(2) Check the air cleaner indicator frequently. Have the filter serviced often.

c. At Halt or Parking. Park the 6KVRRTFL in shaded area, if possible.

2-21. OPERATION IN EXTREME COLD.

a. Preparations. Extensive preparation of mechanical equipment is required when extreme cold weather is anticipated. The following steps will help protect the vehicle against subfreezing temperatures.

(1) Contact Unit Maintenance to prepare the cooling system by draining and then refilling with antifreeze appropriate for anticipated temperatures. Refer to Appendix D and FM 4-367.

(2) Contact Unit Maintenance to change the engine lubricating oil to the grade called for in LO1 0-3930-660-12 for cold weather operation.

b. Starting the Engine.

(1) Try starting the engine using the procedure given in paragraph 2-6.

WARNING

Do not operate the vehicle with the emergency steer switch in the Off position. If engine power is lost there will be a loss of emergency steering capabilities. Failure to follow this precaution could result in severe personal injury.

CAUTION

Use the engine primer button only while cranking the engine. Use only for starting a cold engine. Failure to follow this precaution could cause engine damage.

NOTE

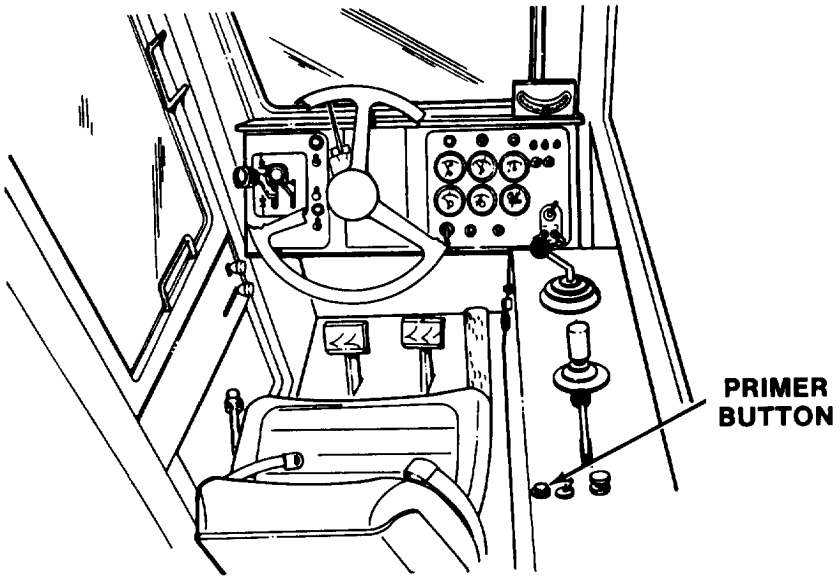
The engine primer will not function at temperatures above 34 ± 8° F.

(2) If the engine does not start, turn the emergency steering pump switch off (switch up).

CAUTION

Do not depress the engine primer button for more than 5 seconds. Failure to follow this precaution could result in vehicle damage.

(3) Crank the engine and press the engine primer button for no longer than 5 seconds.



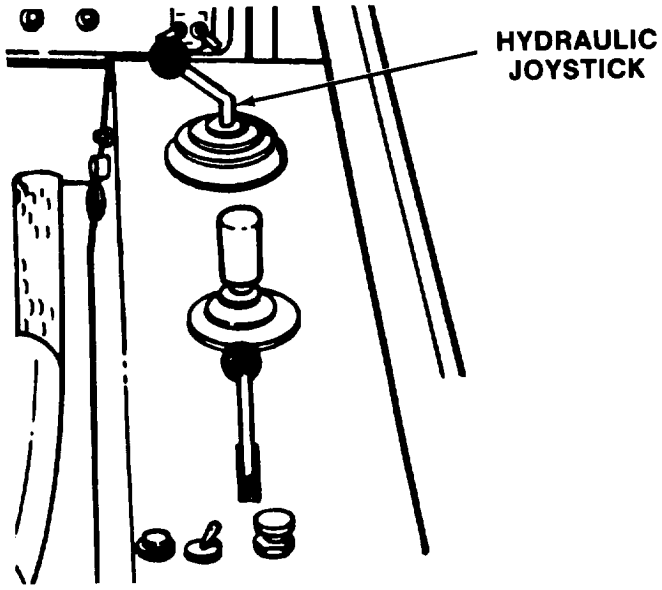
(4) Release the engine primer button (this injects a measured amount of starting fluid into the engine).

(5) If engine fails to start, repeat STEPS 2-4.

(6) After starting the engine, run at half throttle until engine warms to normal temperature (180°-190° F).

(7) Use the hydraulic joystick control lever to raise the boom until the forks are 6 inches from the ground and fully retract the boom.

(8) Continue to hold the hydraulic joystick control lever in the boom retract position for 10 to 15 minutes. This operation warms the hydraulic oil by forcing the oil through the boom circuit relief valve. Operate all hydraulic functions until warm oil has circulated through the cylinders.



(9) Turn the emergency steer switch to the On position (red cover down) after the oils warm and before driving the vehicle.

NOTE

When turning the emergency steer switch to On, the pump may operate for up to 10 seconds. If the pump runs longer than 10 seconds, oil is not warm enough. Turn the switch to Off. Repeat step 8 to allow hydraulic fluid to warm up before operating.

2-22. OPERATION IN SALT WATER AREAS.

At Halt or Parkiing.

(1) In saltwater area, keep the 6KVRRTFL as clean as possible. Salt water causes corrosion of exposed parts. After operation is completed, wash with fresh water, if available.

(2) Keep all lubricating points wiped clean and contact Unit Maintenance to lubricate as instructed in LO1 0-3930-660-12.

(3) Keep all wiring and connections clean and free from corrosion.

2-23. OPERATION IN DUST OR SANDSTORMS.

a. Operation.

(1) Check the radiator frequently and keep it clean of dust and sand.

(2) Check the air cleaner indicator frequently. Service the filter as often as required.

(3) Check the precleaned frequently and clear the screen of dust and sand.

b. At Halt or Parking.

(1) Contact Unit Maintenance to lubricate the 6KVRRTFL at more frequent intervals. Clean all fittings and lubrication openings thoroughly before lubricating to prevent entrance of dust or sand with the lubricant.

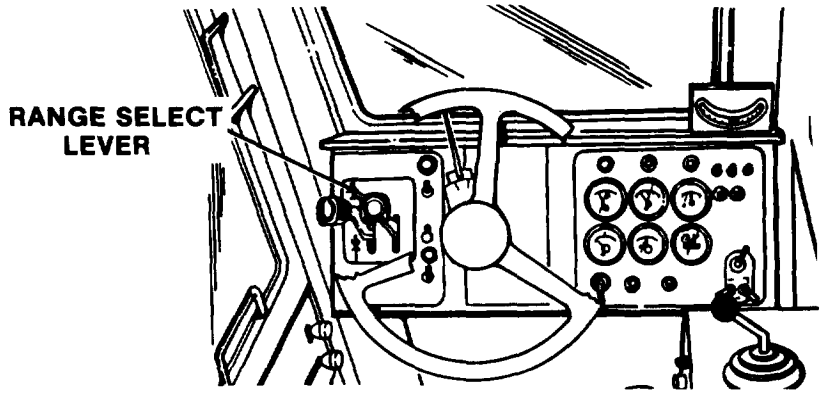
(2) When not in use, cover the operator's compartment, and utilize whatever means are available to protect the engine compartment from the entry of windblown dust or sand.

2-24. FORDING.

a. Check the water depth, allowing for inconsistency of the bottom. Do not attempt to ford even the narrowest stream that is more than 30 inches deep.

b. Make certain all gauges are indicating normal operating pressure and temperatures.

c. Use the range select lever to shift the transmission into the low speed range (position 1), and speed the engine up to minimize the danger of stalling. Enter the water slowly to minimize surges of backwash into the engine compartment. Fording speed should not exceed 3 to 4 miles per hour.



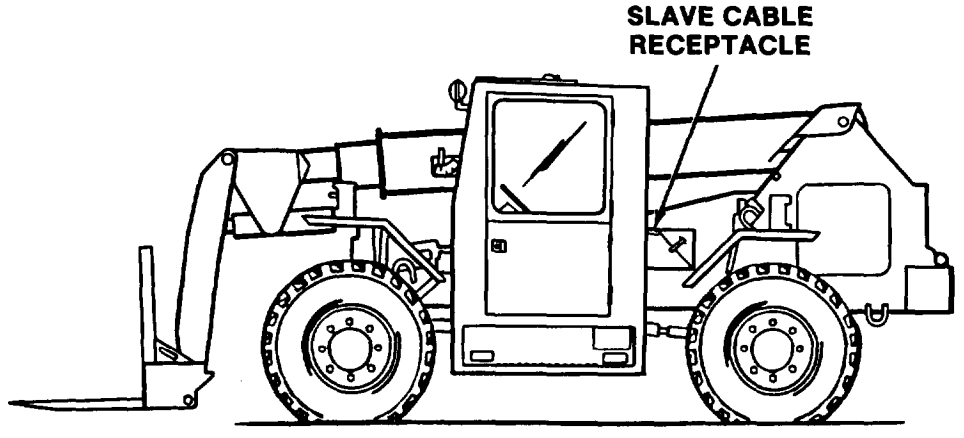
d. In the event of complete submersion, contact Unit Maintenance for appropriate disposition.

e. Contact Unit Maintenance to lubricate the 6KVRRTFL completely, as soon as possible, after fording.

2-25. SLAVE STARTING.

The 6KVRRTFL is equipped with a 24 volt, negative ground electric system. The slave receptacle is located on top of the battery box. Ensure that both vehicles are equipped with a NATO slave receptacle.

a. Connect the slave cable to the booster vehicle slave receptacle.



b. Connect the other end of the slave cable to the disabled vehicle slave receptacle.

c. Run the booster vehicle at a speed just above idle.

d. After starting the disabled vehicle, return the booster vehicle to idle.

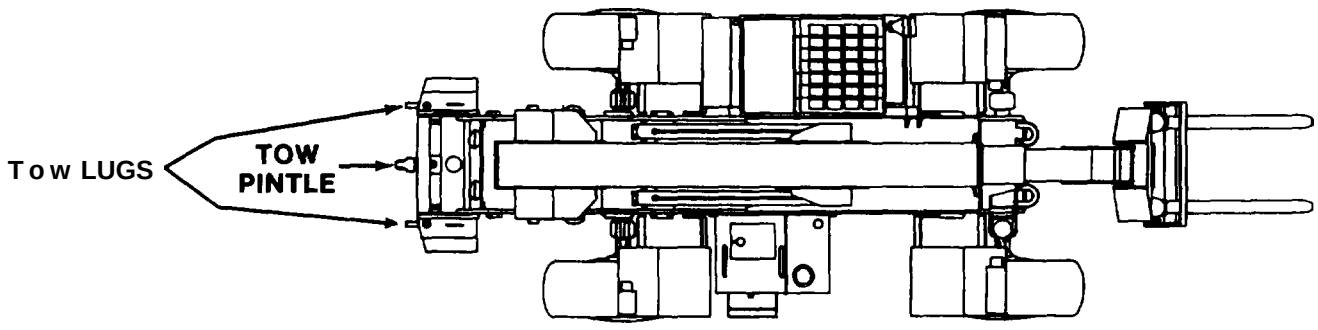
e. Remove the slave cable from the disabled vehicle, then from the booster vehicle.

2-26. TOWING OTHER VEHICLES.

WARNING

Carefully move the vehicle into position. Always use aground guide and any device necessary to lift the tow bar into position without standing directly between the vehicles. Failure to follow this precaution could result in personal injury or vehicle damage.

The 6KVRRTFL is equipped with a towing pintle and lugs. Towing should be limited to vehicles weighing 27,100 pounds or less. Whenever the 6KVRRTFL is used to tow another vehicle, use the tow pintle to attach the tow bar.



2-27. TOWING THE 6KVRRTFL.

WARNING

Carefully move the towing vehicle into position. Always use aground guide and any device necessary to lift the tow bar into position without standing directly between the vehicles. Failure to follow this precaution could result in personal injury or vehicle damage.

If the 6KVRRTFL must be towed, the tow lugs are used to connect the tow bar. The tow lugs are located at the rear of the vehicle, on the counterweight. Perform the following procedure when towing the 6KVRRTFL.

NOTE

Contact Unit Maintenance to perform the necessary preparation of the 6KVRRTFL for towing.

a. Position the forks approximately 24 inches above the ground.

WARNING

When the propeller shafts are disconnected and the parking brake disengaged, the vehicle may roll and could result in severe personal injury. Always chock the wheels properly.

b. Chock all wheels.

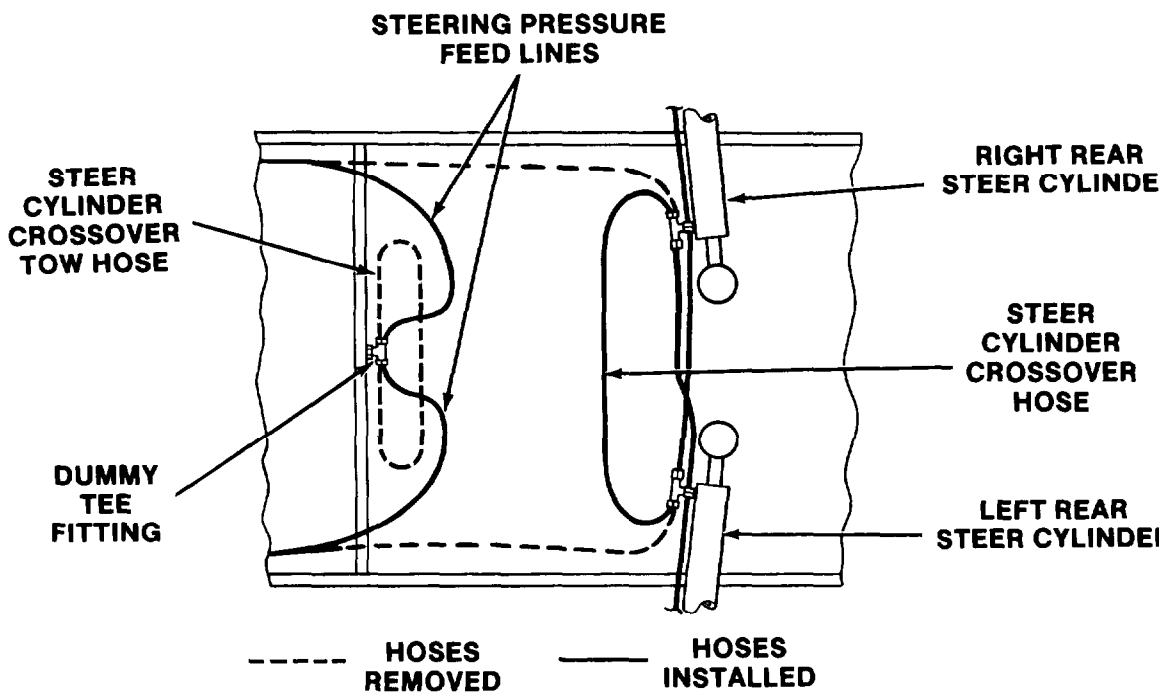
c. Disconnect the rear axle steering cylinder hoses as follows:

(1) Remove the towing steer cylinder crossover hose from the dummy tee fitting located on the main frame crossbar at the rear of the transmission.

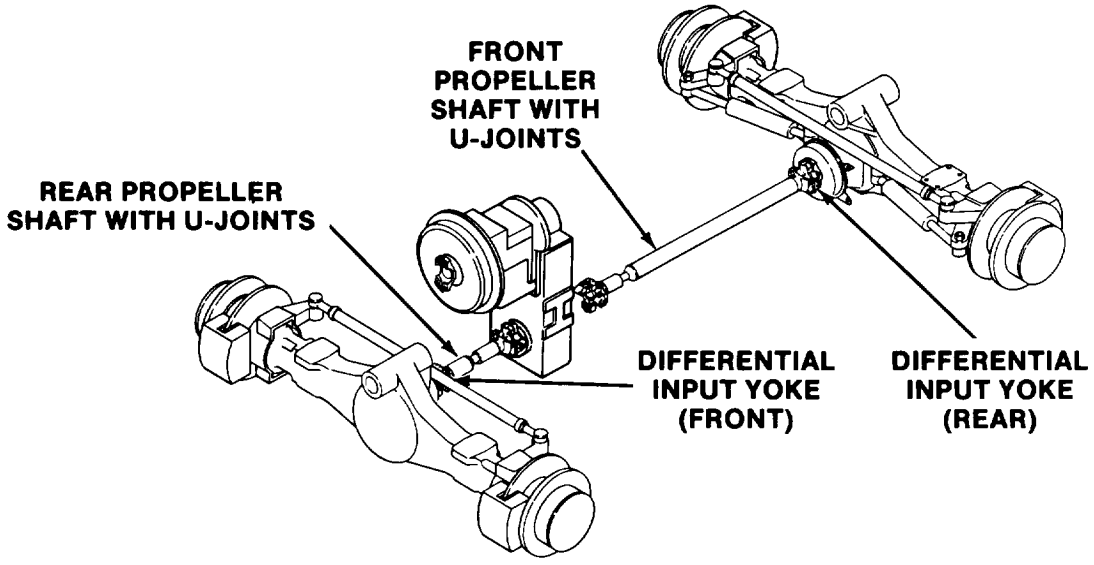
(2) Disconnect the steering hydraulic line from the rod end tee fitting of the left steer cylinder. Connect the line to one side of the dummy tee fitting.

(3) Disconnect the steering hydraulic line from the rod end tee fitting of the right steering cylinder. Connect the line to the other side of the dummy tee fitting.

(4) Using the steer cylinder crossover hose from Step 1, connect the left and right steer cylinders. Use open ports from which hoses were removed in Steps 2 and 3. Route the hose so that it clears the axle input yoke.



d. Remove the four bolts that secure the U-joint and rear propeller shaft to the input yoke of the rear differential. Place the unattached end of the propeller shaft in the hanger hook provided underneath the vehicle.



e. Remove the four bolts that secure the U-joint and front propeller shaft to the yoke on the front differential. Place the unattached end of the propeller shaft in the hanger provided underneath the vehicle.

f. Attach the tow bar to the tow lugs of the 6KVRRTFL.

9. Move the towing vehicle into position using a ground guide. Two people are required to lift the tow bar to the towing vehicle pintle.

h. Release the parking brake.

i. Remove and secure the wheel chocks. Ensure that all personnel and equipment are clear. Proceed to tow with caution.

j. After towing of the 6KVRRTFL is completed, set the parking brake, chock the wheels, and reconnect the propeller shafts and the steering lines by reversing Steps c through e.

k. Bleed any trapped air from the steering system using the following procedure:

(1) Synchronize the steering as described in paragraph 2-8.

(2) Turn the steering wheel two full turns right and left in all steering modes.

2-28. EMERGENCY BOOM OPERATIONS.

WARNING

If engine power is lost with the boom extended or raised, the boom must be fully retracted before it is lowered to prevent severe personal injury and vehicle damage.

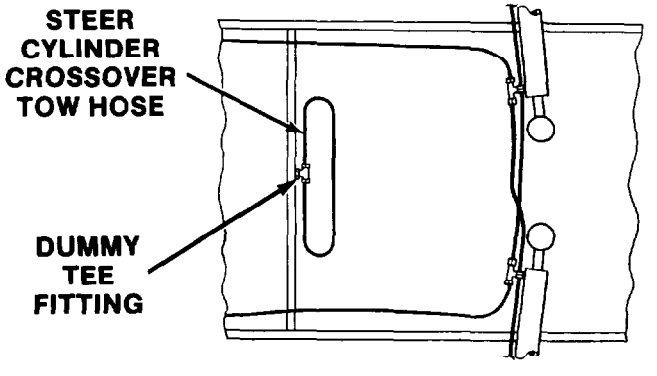
NOTE

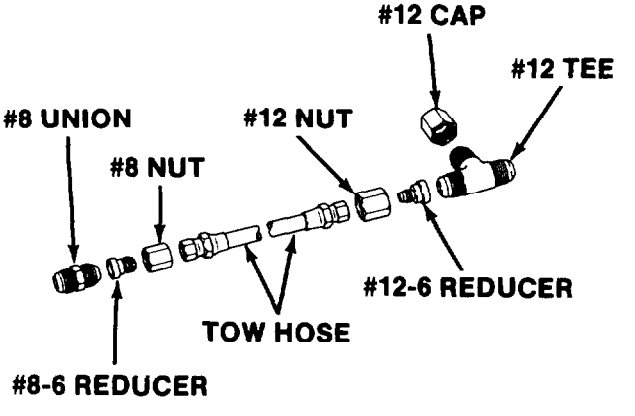
Contact Unit Maintenance to perform the necessary preparation of the 6KVRRTFL for emergency boom operations.

a. Emergency Boom Retracting. Whenever an emergency situation prevents the use of engine power for retracting the boom, proceed with the following:

(1) Remove the transmission cover.

(2) Remove the steer cylinder crossover tow hose from the dummy tee fitting, located on the main frame crossbar at the rear of the transmission. Install caps on-the dummy tee (two small caps are located in the tool box as part of the emergency lift/retract kit).

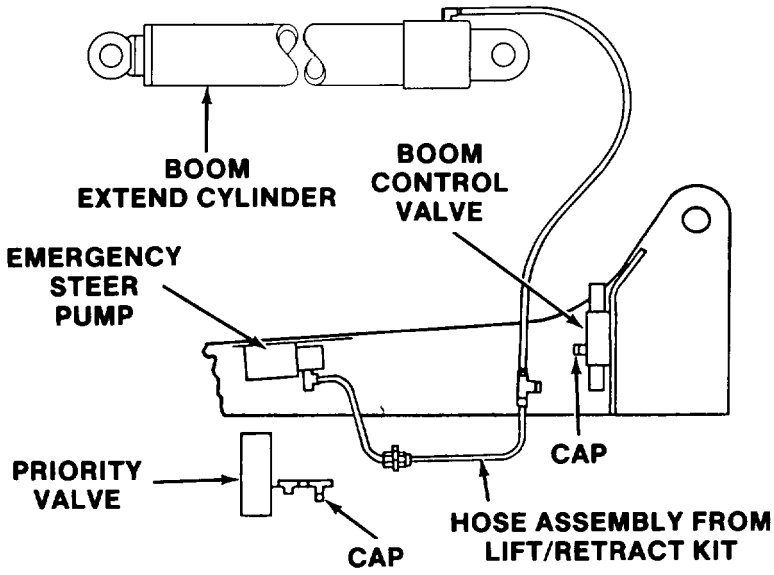




EMERGENCY LIFT/RETRACT KIT

(3) Assemble the #8 nut and the #8-6 reducer to the union (parts are from the emergency lift/retract kit) and install the assembly on one end of the tow hose.

(4) Assemble the #12 nut and the #12-6 reducer to one end of the #12 tee fitting (parts from the emergency lift/retract kit) and install on the other end of the tow hose. Install a #12 cap on branch of the tee fitting. Tighten all connections.



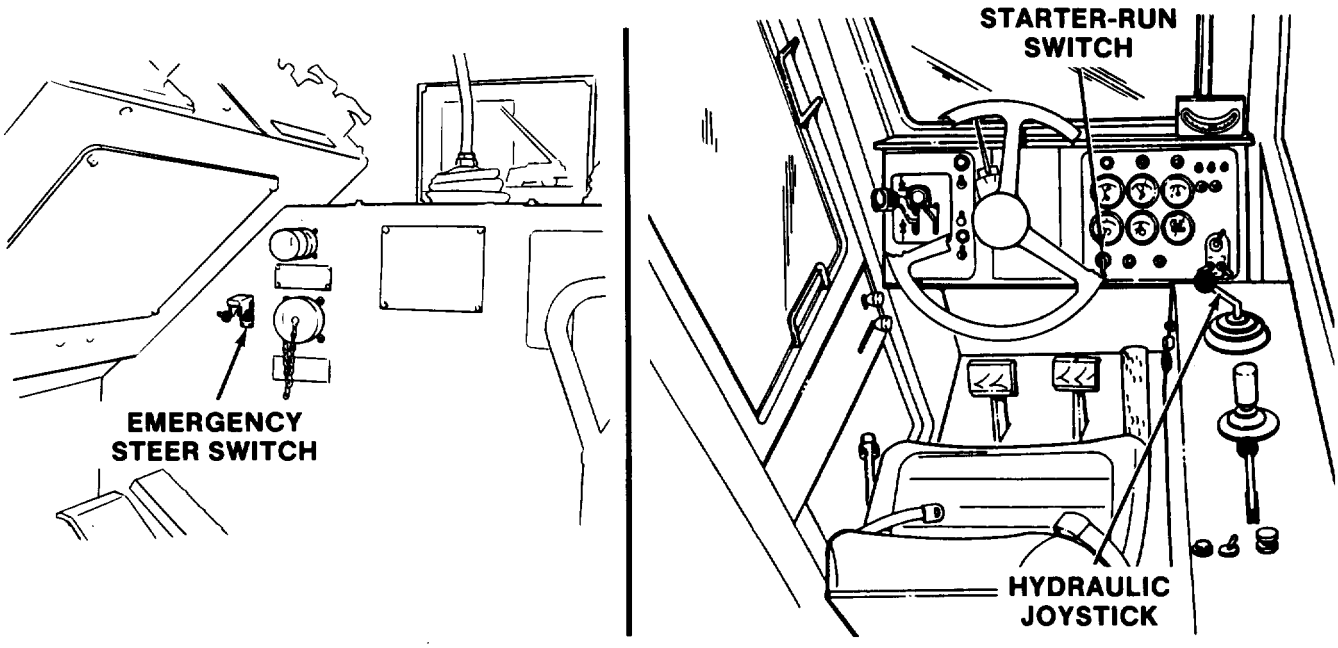
(5) Disconnect the output line from the emergency steer pump from the priority valve tee. Install a cap at the priority valve tee connection.

(6) Connect the union end of the tow hose to the emergency steer pump hose that was disconnected in Step 5.

(7) Disconnect the rod end hose of the boom extend cylinder from the main control valve (bottom middle port). Install a #12 cap on the main control valve fitting.

(8) Connect the tee end of the tow hose to the boom extend cylinder rod hose that was disconnected in Step (7).

(9) Operate the emergency steering pump by turning the starter-run control switch and the emergency steer switch to the ON position.



(1 O) Move the hydraulic joystick to the left until the boom is fully retracted. Turn the ignition switch off after the boom is fully retracted.

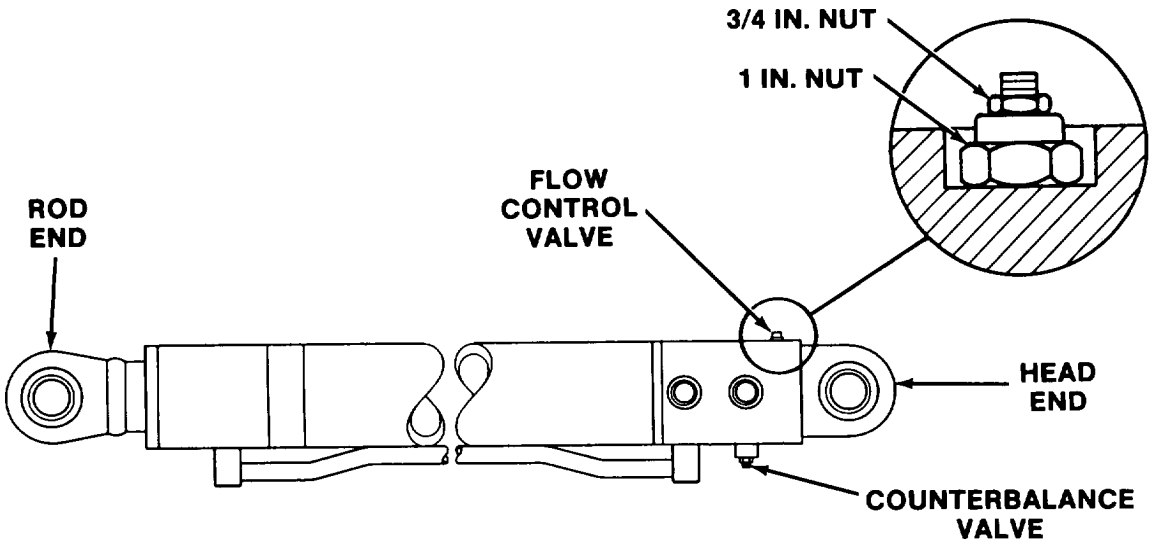
(11) After retracting the boom, reconnect the lines by reversing STEPS 2 through 8, and return fittings to the emergency lift/retract kit and the towing hose to the dummy tee.

(12) Install transmission cover.

b. Emergency Boom Lowering. Whenever an emergency situation prevents the use of engine power for lowering the boom, first perform step a if boom is extended, then proceed with the following:

(1) Remove the transmission cover.

(2) To retract the hoist cylinders, hydraulic oil must bypass the hoist cylinder counterbalance valves by flowing through the flow control valves. The flow control valves are located on the top side of the base of the hoist cylinders.



WARNING

Do not loosen the 1 inch hex nut or remove the stem on the flow control valve when the cylinder is pressurized due to a raised boom or load. High hydraulic pressure exists which, if released, the boom could drop and cause severe personal injury.

(a) Loosen the 3/4 inch hex nut locknut on the flow control valve stem (located on the top side of each hoist cylinder base end).

(b) Unscrew the stem with a 3/16 inch allen wrench to the internal stop.

(3) Actuate the emergency steering pump by turning the emergency steer switch and the starter-run control switch to the ON position.

(4) Move the hydraulic joystick forward to lower the boom until the load or forks are about 24 inches above ground level.

(5) Return the system to normal operation as follows:

(a) Return the hydraulic joystick to the neutral (center) position.

(b) Turn the starter-run control switch and the emergency steer switch to the OFF position.

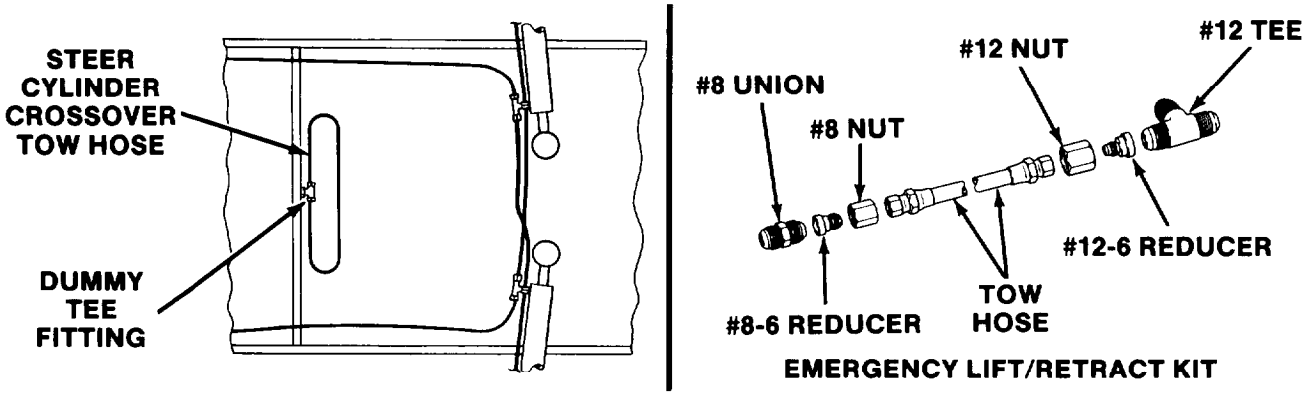
(c) Screw both flow control stems in until they are seated and tighten locknuts.

(d) Install the transmission cover.

c. Emergency Boom Raise. Whenever an emergency situation prevents the use of engine power for raising the boom, proceed with the following:

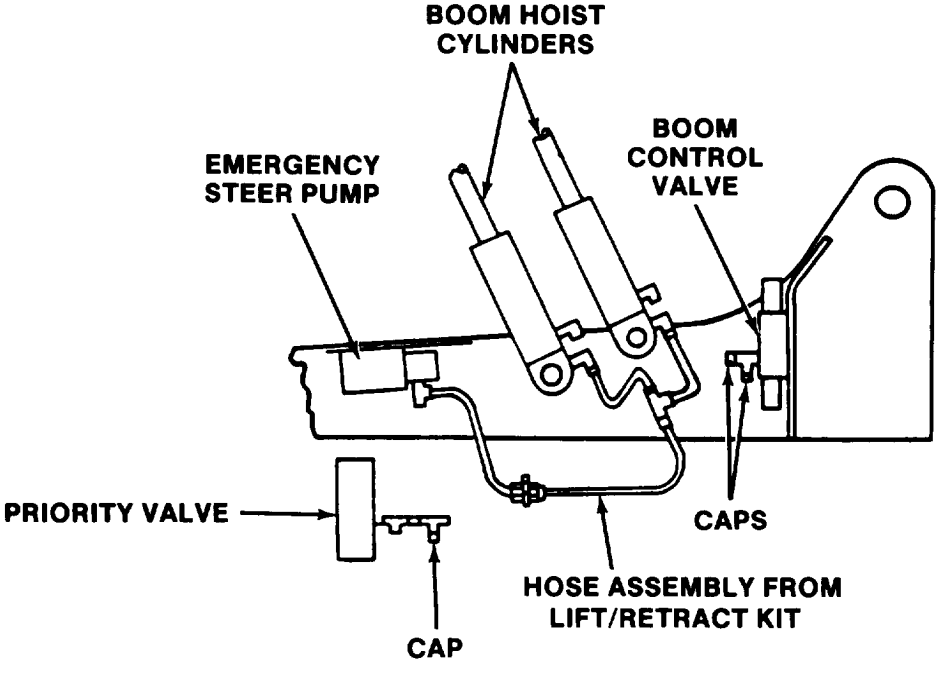
(1) Remove the transmission cover.

(2) Remove the steer cylinder crossover tow hose from the dummy tee fitting, located on the main frame crossbar at the rear of the transmission. Install caps on the dummy tee (two small caps are located in the tool box as part of the emergency lift/retract kit).



(3) Assemble the #8 nut and the #8-6 reducer to the union (parts are from the emergency lift/retract kit) and install the assembly on one end of the tow hose.

(4) Assemble the #12 nut and the #12-6 reducer to one end of the #12 tee fitting (parts from the emergency lift/retract kit) and install on the other end of the tow hose.



(5) Disconnect the output line from the emergency pump at the priority valve tee. Install a cap at the priority valve tee connection.

(6) Connect the union end of the tow hose to the emergency steer pump hose that was disconnected in Step (5).

(7) Disconnect both hoses from the base ends of the boom hoist cylinders at the main control valve tee fitting (bottom left port). Install caps on the main control valve tee fitting.

(8) Connect the tee end of the tow hose to the boom hoist cylinder rod hoses that were disconnected in Step (7).

NOTE

If the boom will not raise during step 9, move the hydraulic joystick lever to the boom raise position.

(9) To raise the boom, make sure the emergency steer switch is On. Turn the starter-run control switch On until the load or forks are about 24 inches from the ground. Turn the starter-run control switch Off.

(Io) After raising the boom, reconnect the lines by reversing STEPS 2 through 8 and return fitting to the emergency lift/retract kit and the towing hose to the dummy tee.

(11) Install transmission cover.

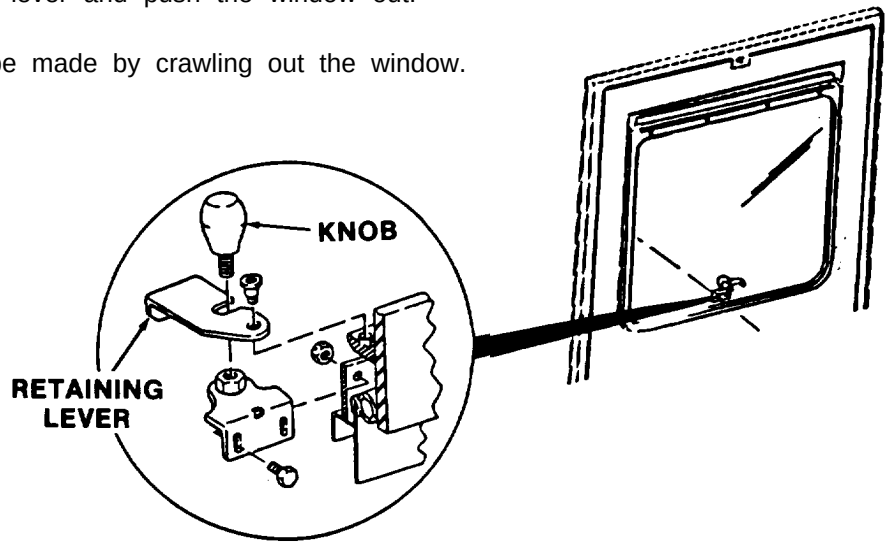
2-29. REAR WINDOW EMERGENCY EXIT.

The rear window can be used as an emergency exit when exit through the cab doors cannot be made. To open the emergency exit, proceed as follows:

a. Unscrew the knob securing the window retaining lever.

b. Swing the lever and push the window out.

c. Exit can be made by crawling out the window.



CHAPTER 3

OPERATOR MAINTENANCE INSTRUCTIONS

Section I. Lubrication instructions

3-1. LUBRICATION.

Perform all lubrication in accordance with LO1 0-3930-660-12.

Section II. Troubleshooting Procedures

3-2. GENERAL.

a. The table lists the common malfunctions which you may find during the operation or maintenance of the 6KVRRTFL or its components. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

3-3. TROUBLESHOOTING.

Refer to Table 3-1 for troubleshooting procedures.

Table 3-1. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. ENGINE WILL NOT CRANK
Check for loose or disconnected battery cables.
Notify Unit Maintenance.
2. ENGINE CRANKS BUT WILL NOT START
Step 1. Check to see if the auxiliary fuel shut-off switch is in the Off position.
Move the auxiliary fuel shut-off switch to the On position.
Step 2. Check to see if fuel tank is empty.
Fill fuel tank.
Step 3. Check the ambient temperature.
Use the engine primer button in extreme cold temperature to start the engine, paragraph 2-21.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 4. Check the water separator for water.

Drain the water separator. (Refer to para. 3-10.)

Step 5. Check to see if any fuel lines are damaged.

Notify Unit Maintenance.

3. ENGINE MISFIRES OR RUNS ROUGH

Step 1. Check to see if fuel tank is low or empty.

Fill fuel tank.

Step 2. Check to see if any moisture is present in water separator.

Drain the water separator. (Refer to para. 3-10.)

Step 3. Check for black or gray exhaust smoke. Plugged or dirty intake system.

Clean or replace air filters. (Refer to para. 3-8.)

Step 4. Check for white or blue smoke. Indicates engine is cold,

Allow engine to warm up.

Step 5. Check for leaks in fuel lines and injectors. Notify Unit Maintenance.

4. LOW ENGINE POWER

Step 1. Check air filter restriction indicator.

Clean the air filter. (Refer to para. 3-8.)

Step 2. Check the exhaust pipe for obstruction.

Remove any obstructions.

Step 3. Check for high engine oil level.

Notify Unit Maintenance if oil level is high.

5. ENGINE OVERHEATS

WARNING

Damage to the radiator can occur if pressure cap is removed on a hot engine. Allow appropriate cool down time before checking the coolant level. Failure to follow this precaution could result in severe personal injury or vehicle damage.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 1. Check for low coolant level.

Add appropriate amount of coolant to overflow bottle. (Refer to para.3-9.)

Step 2. Check for leaks and/or worn hoses.

Notify Unit Maintenance.

WARNING

The engine and radiator can be extremely hot. Contacting exposed skin to these areas could result in severe burns.

Step 3. Check for obstructions and trash build-up on the radiator fins.

Clean the radiator surface.

Step 4. Check for high engine oil level.

Notify Unit Maintenance.

6. LOW ENGINE OIL PRESSURE

Step 1. Check to see if the engine oil level is low.

Add oil as necessary. Refer to LO1 0-3930-660-12.

Step 2. Check for external oil leaks.

Notify Unit Maintenance.

7. THE VEHICLE STARTS BUT WILL NOT MOVE

Step 1. Check to be sure parking brake lever is released.

Move parking brake lever down.

Step 2. Check parking brake lever adjustment.

Make sure parking brake lever adjustment is not too tight causing the parking brake to drag. (Refer to para. 3-11.)

Step 3. Check transmission oil level.

Add oil as necessary. Refer to LO10-3930-660-1 2.

Step 4. Check if parking brake is dragging.

Notify Unit Maintenance.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 5. Check if service brakes are dragging.

Notify Unit Maintenance.

Step 6. Check transmission disconnect pedal for free movement.

Notify Unit Maintenance.

8 . THE ENGINE PRIMER BUTTON DOES NOT WORK

Check the ambient temperature.

The primer button will not work if the ambient temperature is above 34°+ 8° F.

9. ALL HYDRAULIC FUNCTIONS OPERATE SLOWLY

Step 1. Check to see if the hydraulic oil is cold.

Operate the hydraulic system until normal operating temperature is achieved. (Refer to para. 2-21.)

Step 2. Check to see if the hydraulic oil level is low.

Add oil as necessary. Refer to LO10-3930-660-12.

Step 3. Engine speed too low.

Increase engine speed with accelerator.

Step 4. Inspect hydraulic lines for signs of damage or leaks.

Notify Unit Maintenance.

10. THE HYDRAULIC OIL IS FOAMING

Step 1. Check to see if the hydraulic oil level is low.

Add hydraulic oil as necessary. Refer to LO10-3930-660-12.

Step 2. Check to see if the hydraulic oil is contaminated with water.

Replace the hydraulic oil. Refer to LO10-3930-660-12.

11. THE FORKS WILL NOT AUTOMATICALLY LEVEL

Step 1. Check to see if the automatic fork level switch is in the ON position.

Move the automatic fork level switch to the ON position.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Check for damaged or broken wire(s) from toggle switch to fork autoleveler switch.

Notify Unit Maintenance.

12. ONLY ONE HEATER FAN OPERATES

Check to see if the heater blower switch is in the LOW speed position.

Move the heater blower switch to the HIGH speed position. Only one fan operates on low speed. At high speed, both fans operate. [f malfunction is not corrected, notify Unit Maintenance.

13. THE FRONT AND REAR WHEELS ARE NOT ALIGNED IN THE STRAIGHT AHEAD POSITION

Check to see if the steer select control switch is in the CRAB or 4 WHEEL position.

The front and rear wheels do not always align straight ahead after changing steering modes. Proceed with steering system synchronization, paragraph 2-8.

14. POOR OR NO BRAKES

Step 1. Check hydraulic oil level at reservoir sight glass.

Add oil as necessary. Refer to LO10-3930-660-12.

Step 2. Check for oil leakage at brake calipers or hose connections.

Notify Unit Maintenance.

15. PARKING BRAKE WILL NOT HOLD VEHICLE

Check for loose parking brake lever linkage.

Adjust parking brake lever. (Refer to para. 3-11.) If adjustment is correct, notify Unit Maintenance.

16. PARKING BRAKE WILL NOT RELEASE

Check for tight parking brake lever linkage.

Adjust parking brake lever. (Refer to para. 3-11.) If adjustment is correct, notify Unit Maintenance.

Section III. Operator Maintenance Procedures

Alphabetical Index of Section III.

3-4. INTRODUCTION.

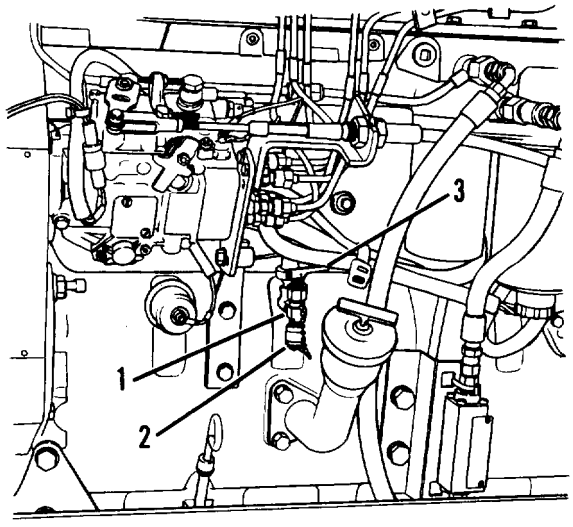
This section contains maintenance procedures which are the responsibility of the operator. See paragraph 2-3, the Preventive Maintenance Chart Services for additional maintenance not covered in this section. The maintenance procedures in this manual are authorized by the Maintenance Allocation Chart (refer to TM10-3930-660-20).

3-5. ENGINE OIL SAMPLING VALVE - SERVICE

This task covers:

Obtaining an engine oil sample for the Army Oil Analysis Program (AOAP).

1. CLEAN THE ENGINE OIL SAMPLING VALVE (1).
2. START THE ENGINE, PARAGRAPH 2-6. BRING IT TO NORMAL OPERATING TEMPERATURE.
3. OBTAIN THE OIL SAMPLE.
   a. With the engine at idle, remove the dust cap (2) on the oil sampling valve (1).
   b. Attach an appropriate size hose to the valve, if desired.



3-5. ENGINE OIL SAMPLING VALVE - SERVICE (Cont.)

c. Place a clean container under the valve (1) opening (or hose if used).

d. Push down or pull upon the lever (3) to drain approximately one pint of oil prior to taking a sample.

e. Place a sample bottle under the valve opening (or hose if used) and fill it to within 1/2" from top. Cap the bottle immediately.

f. Install the dust cap (2) on the oil sampling valve (1). Return the oil drained into container during step d to the engine.

g. Check oil level and add oil if necessary. Refer to LO10-3930-660-12.

3-6. TRANSMISSION OIL SAMPLING VALVE - SERVICE

This task covers:

Obtaining a transmission oil sample for the Army Oil Analysis Program (AOAP).

1. CLEAN THE TRANSMISSION OIL SAMPLING VALVE (l).

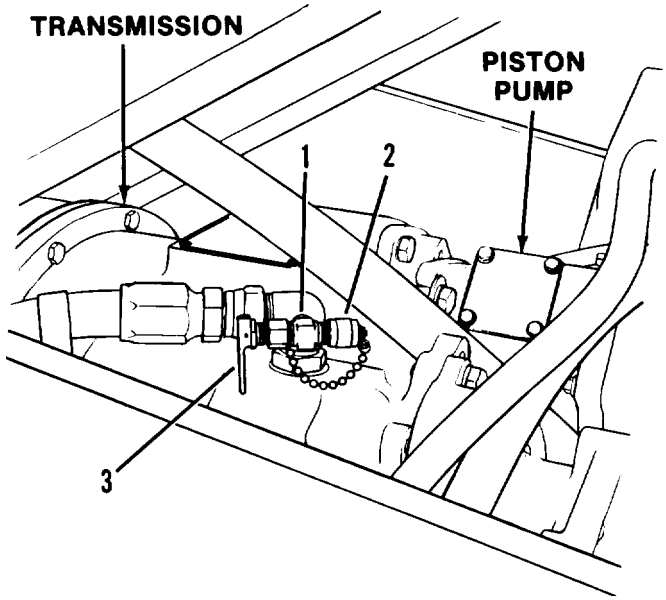
2. START THE ENGINE, PARAGRAPH 2-6. DRIVE THE VEHICLE APPROXIMATELY ONE MILE OR ALLOW TO IDLE IN GEAR FOR A WHILE TO BRING THE TRANSMISSION TO NORMAL OPERATING TEMPERATURE.

3. WITH THE ENGINE RUNNING, PLACE THE TRAVEL SELECT CONTROL LEVER IN NEUTRAL. APPLY THE PARKING BRAKE.

4. OBTAIN THE OIL SAMPLE.

   a. Remove the dust cap (2) on the transmission oil sampling valve (l).

   b. Attach an appropriate size hose to the valve, if desired.



3-6. TRANSMISSION OIL SAMPLING VALVE - SERVICE (Cont.)

c. Place a clean container under the valve (1) opening (or hose if used).

d. Push down or pull upon the lever (3) to drain approximately one pint of oil prior to taking a sample. Release the lever (3) to close the valve (1).

e. Place a sample bottle under the valve opening (or hose if used) and fill it to within 1/2" from top. Cap the bottle immediately.

f. Install the dust cap (2) on the transmission oil sampling valve (1). Return the oil drained into container during step d.

g. Check transmission fluid level and add oil if necessary. Refer to LO1 0-3930-660-12.

3-7. HYDRAULIC OIL SAMPLING VALVE - SERVICE

This task covers:

Obtaining a hydraulic oil sample for the Army Oil Analysis Program (AOAP).

1. CLEAN THE HYDRAULIC OIL SAMPLING VALVE (l).

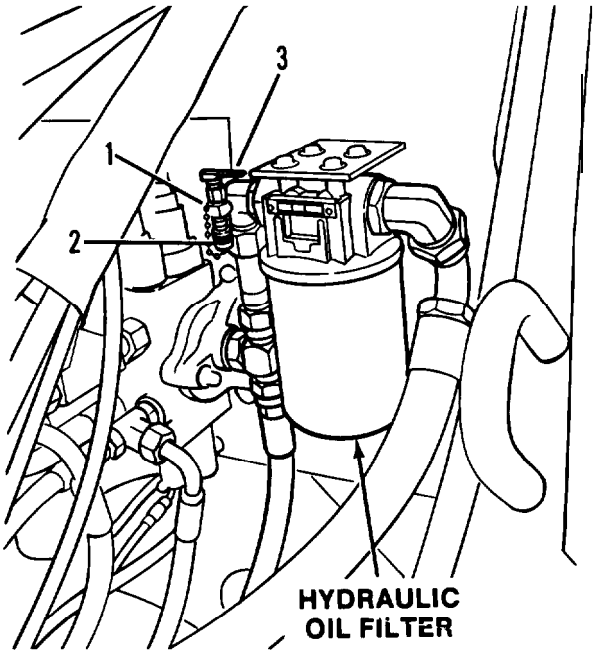
2. START THE ENGINE, PARAGRAPH 2-6. BRING THE HYDRAULIC FLUID TO NORMAL OPERATING TEMPERATURE. (SEE PARA. 2-21 TO WARM HYDRAULIC OIL.)

3. OBTAIN THE OIL SAMPLE.

   a. Remove the dust cap (2) on the hydraulic oil sampling valve (1).

   b. Attach an appropriate size hose to the valve, if desired.

   c. Place a clean container under the valve (1) opening (or hose if used).



3-7. HYDRAULIC OIL SAMPLING VALVE - SERVICE (Cont.)

d. Push down or pull up on the lever (3) to drain approximately one pint of oil prior to taking a sample. Release the lever (3) to close the valve (1).

e. Place a sample bottle under the valve opening (or hose if used) and fill it to within 1/2" from top. Cap the bottle immediately.

f. Install the dust cap (2) on the hydraulic oil sampling valve (1). Return the oil drained into container during step d to the hydraulic reservoir.

g. Check hydraulic oil level and add oil if necessary. Refer to LO10-3930-660-12.

3-8. AIR CLEANER - SERVICE

This task covers:

Inspecting the primary and secondary air filter elements. Cleaning or replacing elements as necessary.

WARNING

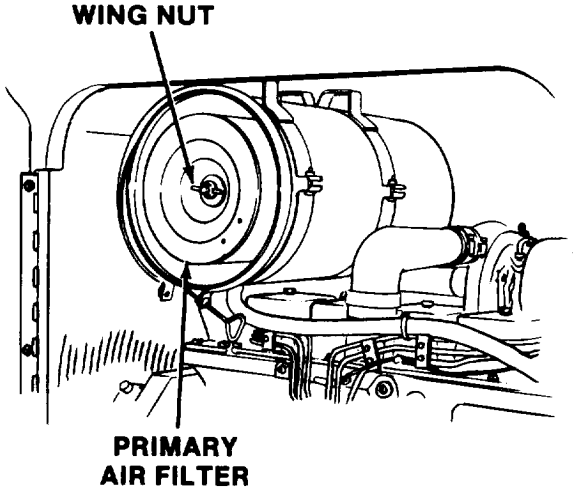
If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

1. REMOVE PRIMARY AIR FILTER ELEMENT.

a. Turn thumbscrew to loosen clamp. Remove outer cover.

b. Remove wing nut to remove primary filter element.

c. Use a damp cloth to remove dust and foreign material from inside canister.



3-8. AIR CLEANER - SERVICE (Cont.)

2. INSPECT SECONDARY AIR FILTER ELEMENT.

CAUTION

The secondary element is not intended to be cleaned. For the maximum engine protection and air cleaner service life, replace the secondary element with a new one every third primary element change or cleaning.

a. Check secondary element for damage. Replace element if it has the slightest damage to gasket or pleated element.

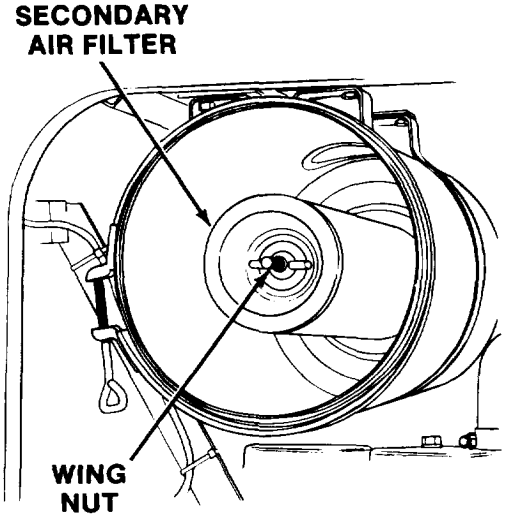
b. Replace secondary element if element is visibly dirty.

c. If secondary element is to be replaced, remove wing nut to remove element.

CAUTION

Air restriction indicator will not function properly if an element has a break in the filtering paper or if the element is not properly seated in the canister.

d. Install new secondary element with gasket end into canister first. Be sure the element is centered in canister before tightening wing nut.



3. CLEAN PRIMARY AIR FILTER ELEMENT.

CAUTION

Do not tap the element against a hard surface as this damages the element.

a. Remove loose dust by tapping element with palm of your hand. DO NOT use a hard surface.

3-8. AIR CLEANER - SERVICE (Cont.)

Always wear safety glasses whenever compressed air is used. Do not exceed 30 psig nozzle pressure when using compressed air.

b. To remove remaining dust, use compressed air under 30 psig. Blow the air up and down the pleats from the inside of the element. Be careful not to damage or tear paper element.

CAUTION

DO NOT wash element in fuel oil, oil, gasoline, or solvent. DO NOT use compressed air to remove water from an element.

c. To clean oily or sooty element, wash thoroughly with warm water and nonfoaming detergent. Rinse element with clean water and allow element to air dry. Clean outer cover and rubber evacuator valve with soap and water.

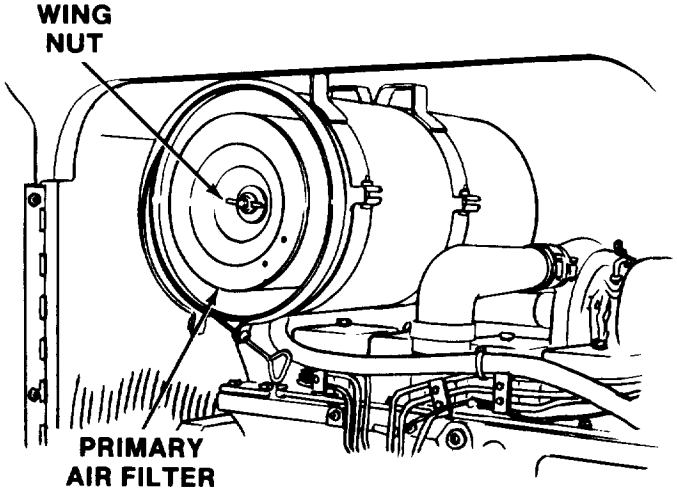
4. INSTALL PRIMARY AIR FILTER ELEMENT.

a. DO NOT install element until it is dry.

b. Inspect element for damage. Place a bright light inside the element and rotate element slowly. If any rupture, holes or damaged gaskets are discovered, replace the element.

c. If a new element is to be installed, inspect the element and gasket for shipping and storage damage.

d. Install the primary filter element in the air cleaner canister and secure with the wing nut.

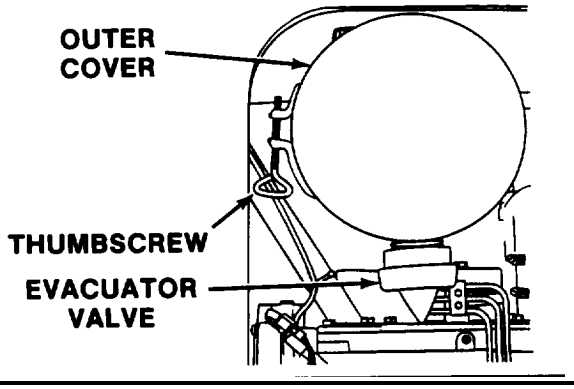


3-8. AIR CLEANER - SERVICE (Cont.)

e. Install the outer cover and clamp. Tighten the thumbscrew.

f. Check the rubber evacuator valve to be sure it is not plugged or damaged.

g. Reset the air intake restriction indicator by pressing button on end of indicator.



3-9. RADIATOR - SERVICE

This task covers:

Checking radiator coolant level and adding coolant as necessary.

1. CHECK COOLANT LEVEL IN OVERFLOW BOTTLE. BOTTLE MUST BE 1/3 TO 2/3 FULL.

NOTE

Use a 50-50 mix of ethylene glycol (MIL-A-46153B) and clean water for coolant. Plain water is not recommended. Make coolant mixture before adding ethylene glycol and water to the coolant bottle.

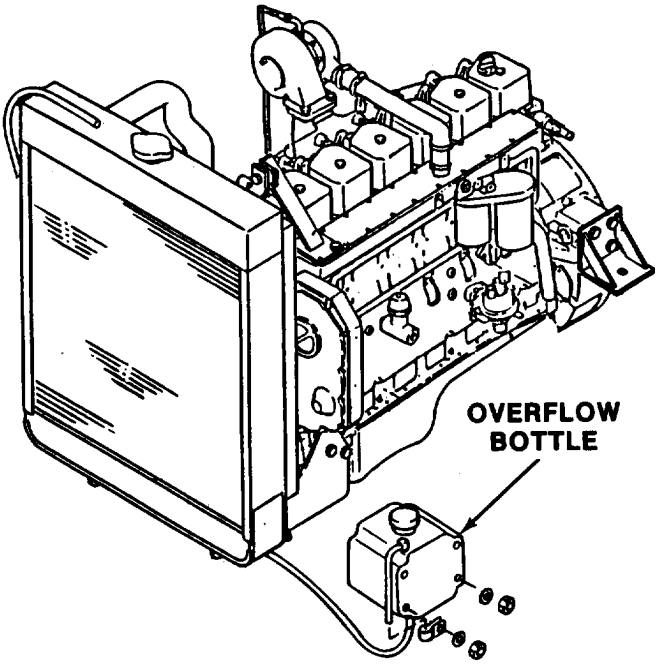
2. ADD COOLANT TO OVERFLOW BOTTLE.

a. If bottle is less than 1/3 full, add approximately one quart.

WARNING

The cooling system operates under pressure which is controlled by a radiator cap. It is dangerous to remove the cap while the system is hot because hot steaming gases will escape and burn you. Always turn the cap to the first stop and allow the pressure to escape before removing the cap completely.

b. If no coolant is visible in the bottle, add 2 quarts of coolant to bottle and fill radiator with coolant.

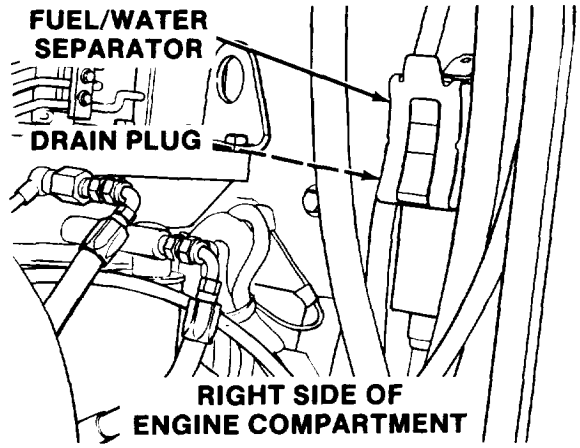


3-10. WATER SEPARATOR - SERVICE

This task covers:

Draining water from engine fuel water separator.

1. LOOK THROUGH GLASS OF WATER SEPARATOR FOR PRESENCE OF WATER OR SEDIMENT.
2. DRAIN WATER AND SEDIMENT FROM WATER SEPARATOR.
   a. Remove the drain plug located on the left side of separator base.
   b. Allow the water and sediment to drain.
   c. Install and tighten drain plug.

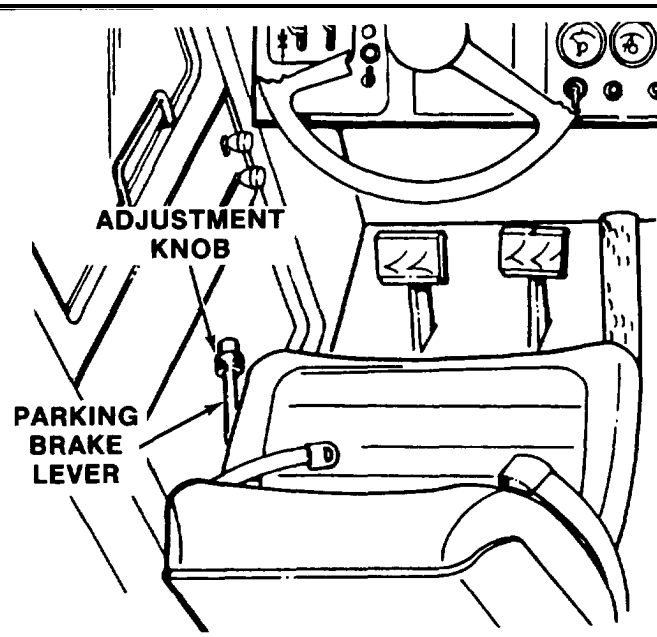


3-11. PARKING BRAKE LEVER - SERVICE

This task covers:

Adjustment to park brake lever for holding vehicle in park or halt.

1. TURN ADJUSTMENT KNOB ON END OF PARKING BRAKE LEVER.
   a. Turn knob clockwise to tighten parking brake lever linkage.
   b. Turn knob counterclockwise to loosen parking brake lever linkage.
2. CONTACT UNIT MAINTENANCE IF TURNING ADJUSTMENT KNOB WILL NOT TIGHTEN OR LOOSEN PARKING BRAKE SUFFICIENTLY.



3-12. FUEI/HYDRAULIC TANK - SERVICE

This task covers:

Draining and filling tank with fuel. Draining and filling tank with hydraulic oil.

1. DRAIN AND FILL FUEL SIDE OF TANK.

NOTE

Fuel side of fuel/hydraulic tank contains 44 gallons of fuel when full.

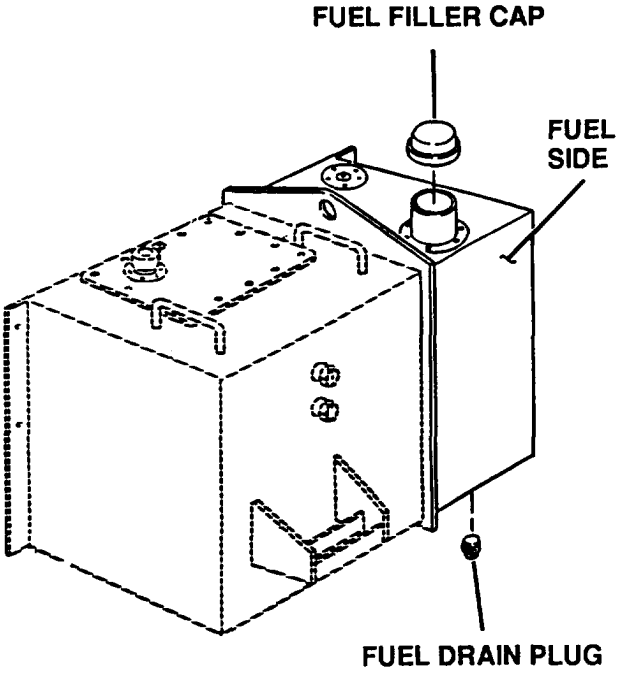
a. Remove fuel filler cap.

b. Place suitable drain pan under fuel drain plug.

c. Remove fuel drain plug from tank and allow fuel to drain completely.

d. Install fuel drain plug and fill tank with fuel.

e. Install fuel filler cap.



2. DRAIN AND FILL HYDRAULIC OIL SIDE OF TANK.

NOTE

Hydraulic oil side of fuel/hydraulic tank contains 56.6 gallons of oil when full.

a. Place all hydraulic cylinders in retracted position.

b. Remove hydraulic oil filler cap.

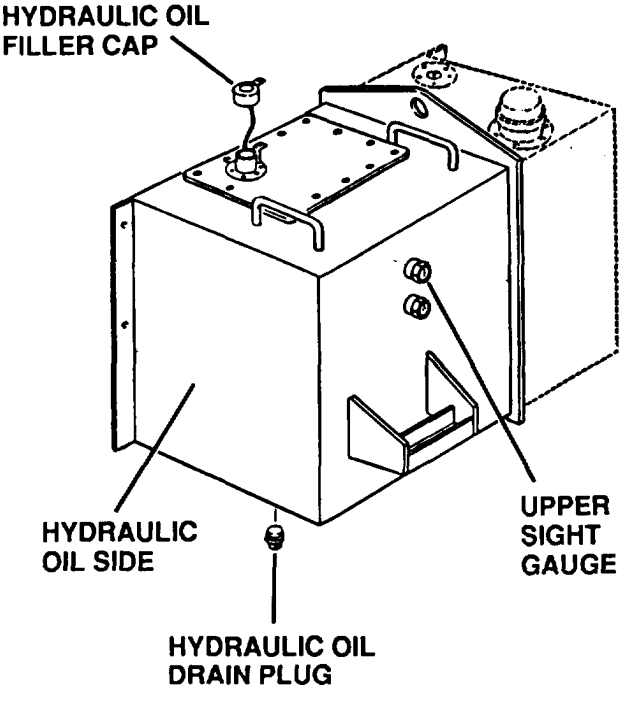
c. Place suitable drain pan under hydraulic oil drain plug.

d. Remove hydraulic oil drain plug and allow hydraulic oil to drain completely.

e. Install hydraulic oil drain plug.

f. Fill tank with hydraulic oil until oil level is visible in upper sight gauge.

g. Install hydraulic oil filler cap.



APPENDIX A

REFERENCES

A-1. PUBLICATION INDEXES AND GENERAL REFERENCES.

Indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to material covered in this publication.

a. MILITARY PUBLICATION INDEXES.

Consolidated Index of Publications and Blank Forms . . . . . DA PAM 310-1

b. GENERAL REFERENCES.

Dictionary of United States Army Terms . . . . . AR 310-25
Authorized Abbreviations and Brevity Codes . . . . . AR 310-50
Military Training Management . . . . . TC 21-5-7
Military Symbols . . . . . FM 21-30

A-2. OTHER PUBLICATIONS.

The following publications contain information pertinent to the major item materiel and associated equipment.

a. CAMOUFLAGE.

Camouflage . . . . . FM 5-20

b. DECONTAMINATION.

Chemical, Biological, and Radiological Decontamination . . . . . TM 3-220
Chemical, Biological, Radiological, and Nuclear Defense . . . . . TM 21-40

c. GENERAL.

Accident Reporting and Records . . . . . AR 385-40
Basic Cold Weather . . . . . FM 31-70
Manual for Wheeled Vehicle Driver . . . . . FM 21-305
Mountain operations . . . . . FM 90-6
Northern Operations . . . . . FM 31-71
Desert Operations . . . . . FM 90-3
Operation and Maintenance of Ordnance Materiel in Cold Weather (0° F to -65° F) . . . . . FM 9-207
Prevention of Motor Vehicle Accidents . . . . . AR 385-55
Procedures for Destruction of Tank Automotive Equipment to Prevent Enemy Use . . . . . TM 750-244-6
The Army Maintenance Management System (TAMMS) . . . . . DA PAM 738-750
Army Logistics Assistance Program . . . . . AR 700-4
Army Logistics Readiness and Sustainability . . . . . AR 700-138
Unit Status Reporting . . . . . AR 220-1

REFERENCES (cont.)

A-2. OTHER PUBLICATIONS. (cont.)

d. FIRST AID.

First Aid for Soldiers FM21-11

e. MAINTENANCE AND REPAIR.

Organizational, Direct Support and General Support Care, Maintenance and Repair: Pneumatic Tires and Inner Tubes ..... TM 9-2610-200-24

Description, Use, Bonding Techniques and Properties of Adhesives ..... TB ORD 103

Inspection, Care, and Maintenance of Antifriction Bearings ..... TM 9-214

Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materiels Including Chemicals ..... TM 9-247

Metal Body Repair and Related Operations ..... FM 43-2

Operation and Organizational Maintenance Manual for Lead-Acid storage Batteries ..... TM 9-6140-200-14

Organizational, Policies, and Responsibilities for Army Materiel Maintenance Concepts and Policies ..... AR 750-1

Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling System TB750-651

Welding Theory and Application ..... TM 9-237

Color, Marking, and Camouflage Painting of Military Vehicles Construction Equipment, and Materials Handling Equipment ..... TB 43-0209

Standards of Criteria for Technical Inspection and Classification of Tires ..... TM 9-2610-201-14

Safety Inspection and Testing of Lifting Devices ..... TB 43-0142

f. SHIPMENT AND LIMITED STORAGE.

Color Marking, and Preparation of Equipment for Shipment of Army Materiel ..... AR 746-1

Preservation and Packing of Military Supplies and Equipment ..... TM 38-230-1 & 2

Preservation of USAMECOM Mechanical Equipment for Shipment and Storage ..... TB 740-97-2

Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment Used by the Army ..... SB 38-100

Shipment and Limited Storage MIL-V-62038

Storage and Serviceability Standard: Tracked Vehicles, Wheeled Vehicles and Component Parts ..... SB 40-98-1

Storage and Supply Activities: Covered and Open Storage ..... SB 740-1

The Army Maintenance Management Systems (TAMMS) ..... DA PAM 738-750

Certification of Military Equipment for Transport in MAC/CRAF Aircraft ..... TB 55-45

Standards for Overseas Shipment or Domestic Issue of Special Purpose Vehicles ..... TB 9-2300-281-35

Transportability Guidance for Application of Blocking, Bracing and Tiedown Materials for Rail Transport ..... TM 55-2200-001-12

Transportation Reference Data ..... FM 55-15

APPENDIX B

BASIC ISSUE ITEMS (BII) LIST

Section I. Introduction

B-1. This appendix lists basic issue items for the 6KVRRTFL to help you inventory items required for safe and efficient operation. There are no Components of the End Item (COEI) for the 6KVRRTFL.

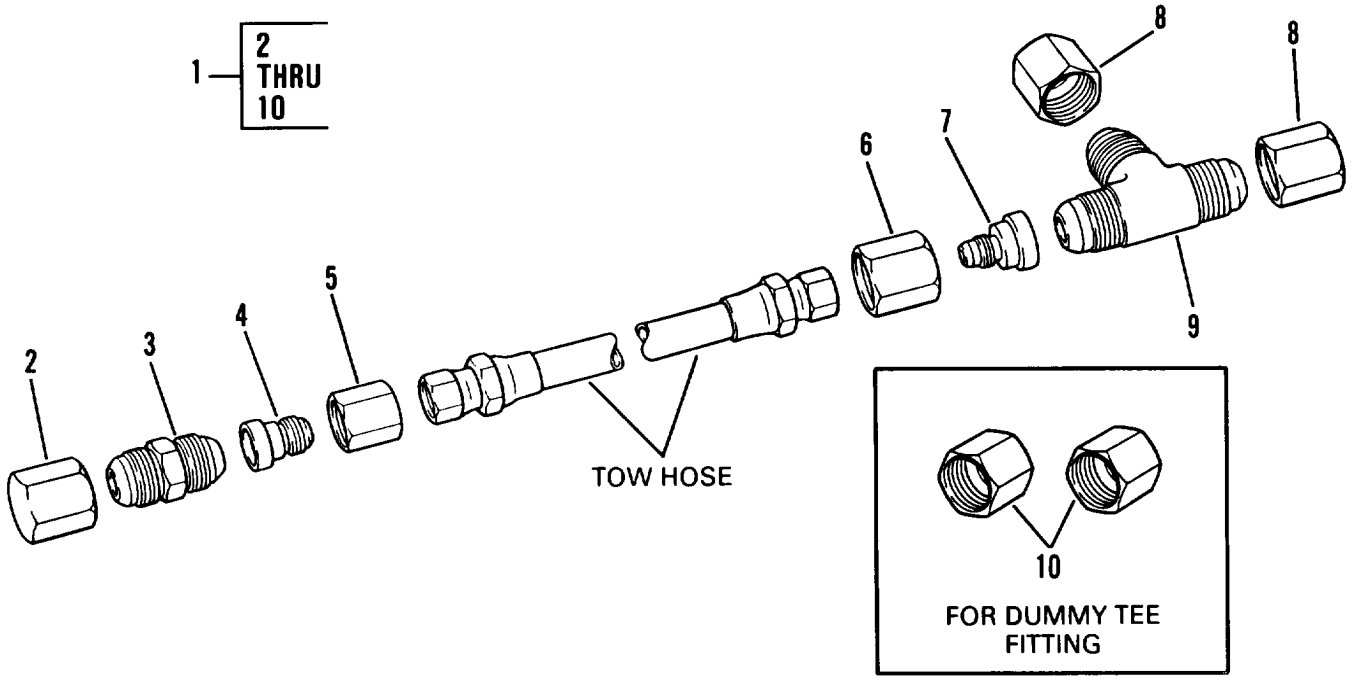
B-2. Basic issue items are the minimum essential items required to place the 6KVRRTFL in operation, to operate it, and to perform emergency repairs. BII must be with the 6KVRRTFL during operation and whenever it is transferred between property accounts. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

Section II. Basic Issue Items

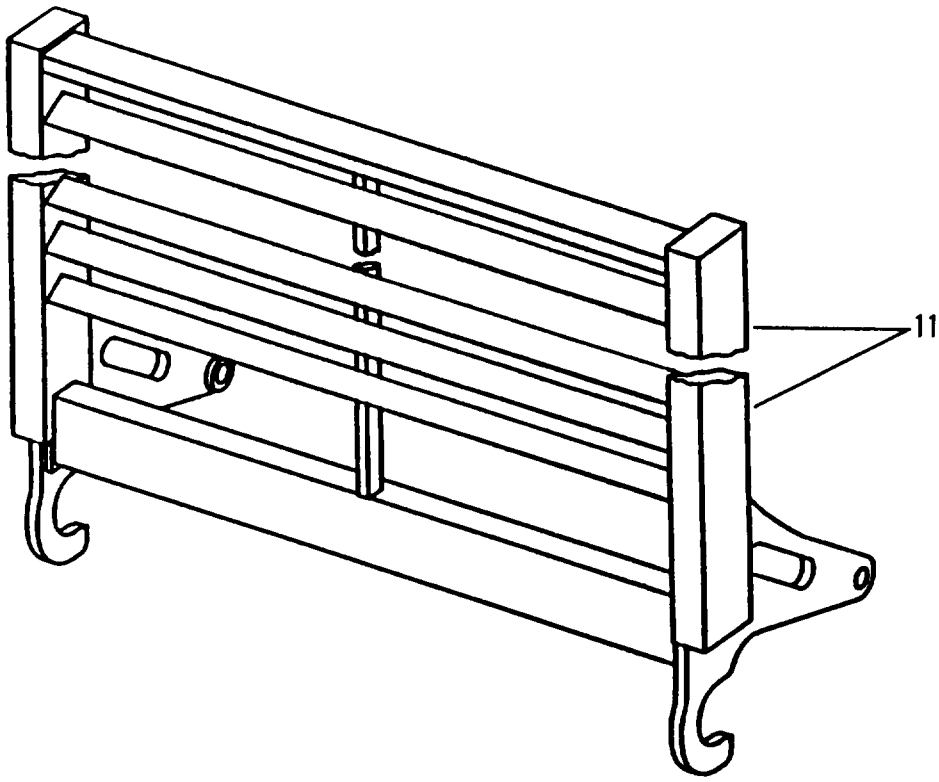
ILLUS. NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION	PART NUMBER AND CAGE	U/M	QTY
1	3950-01-291-8932	EMERGENCY BOOM LIFT AND RETRACT KIT	6607572 (3Y949)	EA	1
2	4730-00-585-6565	.CAP, TUBE	830FS08 (30327)	EA	1
3	4730-00-797-6567	.NIPPLE, TUBE	MS51501A8 (96906)	EA	1
4	4730-00-786-2247	.REDUCER BODY, TUBE	0603-8-6 (98441)	EA	1
5	4730-00-762-1239	.NUT, TUBE COUPLING	8 BTX-S (98441)	EA	1
6	4730-00-812-0924	.NUT, TUBE COUPLING	12 BTX-S (98441)	EA	1
7	4730-00-999-9831	.REDUCER, TUBE	12-6TRTXS (98441)	EA	1
8	4730-00-647-3311	.CAP, TUBE	06CP-12 (98441)	EA	2
9	4730-00-467-2597	.TEE, TUBE	MS5151OA12 (96906	EA	1
10	5310-00-257-6177	NUT, PLAIN, CAP	8760488 (34949)	EA	2
11	2540-01-289-9053	LOAD BACKREST	6608325 (3Y949)	EA	1
12	3930-01-292-6446	LOAD STABILIZER LEFT HAND	6609424 (3Y949)	EA	1
13	3930-01-292-9057	LOAD STABILIZER RIGHT HAND	6609414 (3Y949)	EA	1
14	5315-00-013-7214	PIN COTTER	MS24665-359 (96906	EA	1
15	3040-01-297-5408	LEVER, MANUAL, CONTR	6609273 (3Y949)	EA	1

Section II. Basic Issue Items (Continued)

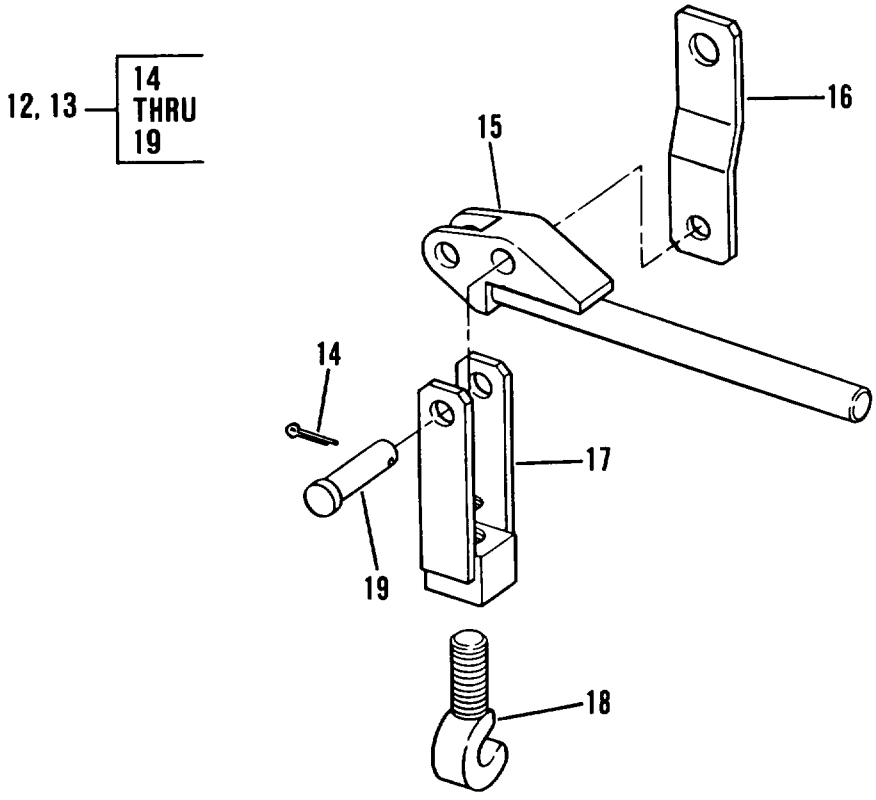
ILLUS. NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION	PART NUMBER AND CAGE	U/M	QTY
16	5365-01-297-6381	.SPACER, PLATE	6609842 (3Y949)	EA	1
17	5340-01-296-8838	.CLEVIS, ROD END	6609322 (3Y949)	EA	1
18	5306-01-297-9007	.BOLT,HOOK	6609832 (3Y949)	EA	1
19	5315-01-288-6747	.PIN, STRAIGHT HEADED	11-289 (96652)	EA	1
20	3930-01-313-4627	MLRS HOOK AND STOP ASSEMBLY	6611132 (3Y949)	EA	1
21	5310-00-809-8541	. WASHER, FLAT	MS27183-27 (96906)	EA	2
22	5310-01-296-8694	.NUT, PLAIN WING	6605982 (3Y949)	EA	2
23	3930-01-293-6929	.HOOK, ATTACHMENT	6605864 (3Y949)	EA	1
24	3930-01-296-9339	.STOP, HOOK	6609394 (3Y949)	EA	1
25	5305-01-297-3103	.THUMBSCREW	90196A712 (39428)	EA	2
26	5306-01-297-9008	.BOLT,HOOK	6606032 (3Y949)	EA	2
27	TM10-3930-660-10	OPERATOR'S MANUAL			



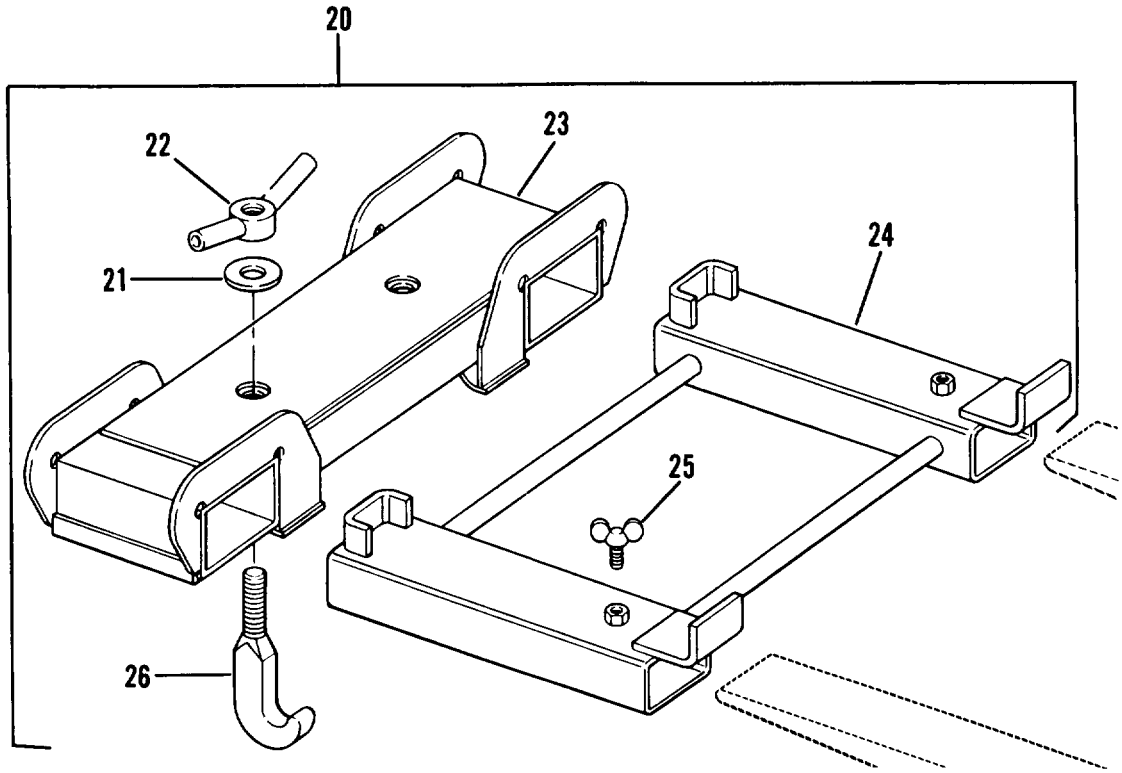
Emergency Boom Lift/Retract Kit



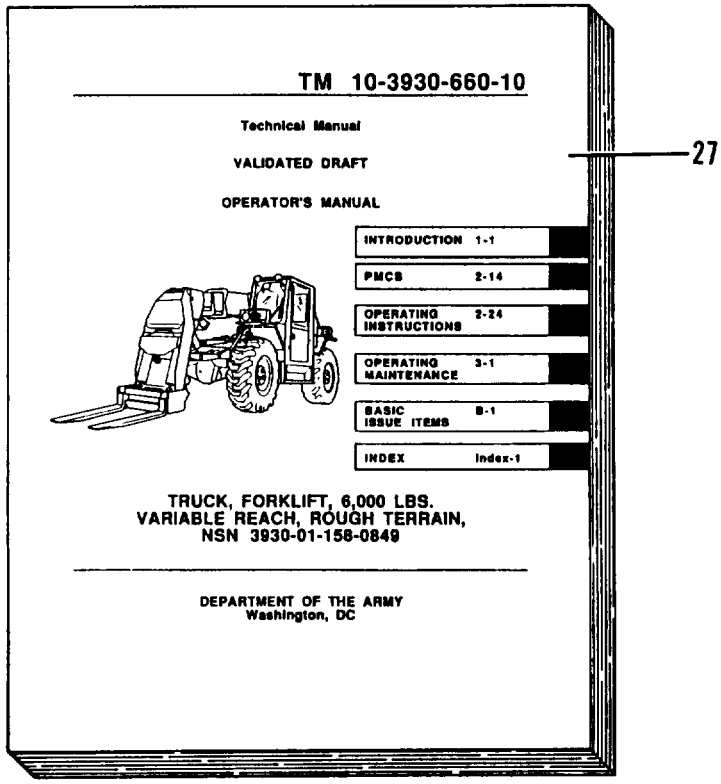
Load Backrest



Stabilizer Hooks R.H. and L.H.



MLRS Hook Attachment



Operator's Manual, 6KVRRTFL

APPENDI X C

ADDITIONAL AUTHORIZATION LIST

Section I. Introduction

C-1. SCOPE. This appendix lists additional items you are authorized for support of the 6KVRRTFL.

C-2. GENERAL. This list identifies items that do not have to accompany the 6KVRRTFL and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA or JTA.

C-3. EXPLANATION OF LISTING. National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you required to support this equipment.

Section II. Additional Authorization List

NATIONAL STOCK NUMBER	PART NUMBER AND CAGE	DESCRIPTION	QTY	
			U/M	AUTH
4210-00-115-8956	IRA 4210-031 5LB (98752)	Fire Extinguisher, Halon 1211, 5LB	EA	1
7520-00-559-9618	MIL-C-11743 (81349)	Case, Maintenance	EA	1

APPENDIX D

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Sectlon I. Introduction

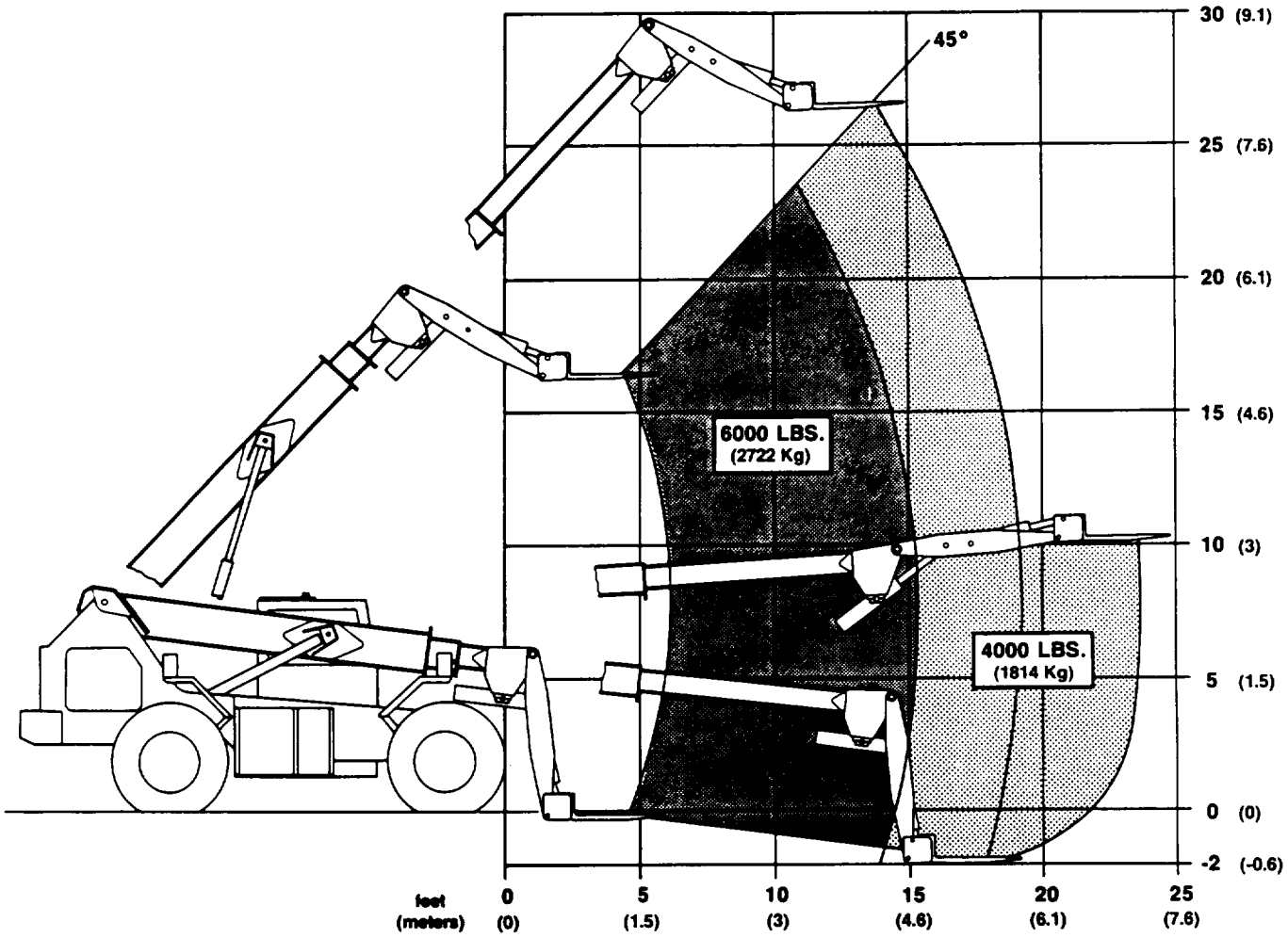
This appendix lists the expendable consumable maintenance supplies you will need to operate and maintain the 6KVRRTFL. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items.

Section II. Expendable/Durable Supplies and Materials List

ITEM NO.	NATIONAL STOCK NUMBER	DESCRIPTION/SPECIFICATION	U/M
1	9140-00-286-5294	Oil, Fuel, Diesel, DF-2, Regular, VVF-800 (81 348)	Bulk
2	9140-00-286-5286	Oil, Fuel, Diesel, DF-1, Winter, VVF-800 (81 348)	Bulk
3	9150-01-152-4119	Lubricating Oil, Engine, OE/HDO-l 5/40, MIL-L-4104D (81 349)	Qt
4	9150-00-402-4478	Lubricating Oil, Engine, Arctic, OE/A-OW/20, MI L-L-461 67, (81 349)	Qt
5	9150-00-189-6727	Lubricating Oil, Transmission/ Hydraulic, OE/HDO-lO MIL-L-2104D (81349)	Qt
6	6850-00-181-7929	Anti Freeze, Permanent, Ethylene Glycol, Grade NR, MIL-A-46153B (81349)	GI
7	6850-00-174-1806	Anti Freeze, Permanent, Arctic Grade NA, Ml L-A-l 1755 (81349)	GI
8	6850-00-281-3061	Dry Cleaning Solvent, PD-680, 402 (81 349)	CN
9	7920-00-205-3570	Rags, Wiping, A-A-531, 50 lb (58536)	BE

APPENDI X E

LOAD RATING CHART



ALPHABETICAL INDEX

Subject, paragraph

Subject, paragraph

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
03945

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SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
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TM X-XXXX-XXX-XX	Date of TM	Title of TM

BE EXACT. PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
3		2		Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.
109		51		Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N be furnished.
2-8			2-1	Preventive Maintenance Checks and Services. Item 7 under "Items to be inspected" should be changed to read as follows: Firing linkage and firing mechanism pawl.
12	1-6a			Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE

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US Army Tank-Automotive Command
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Warren, Michigan 48397-5000

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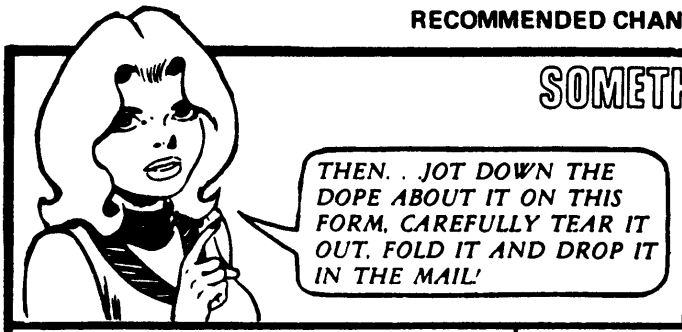

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

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

WEIGHTS

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

LIQUID MEASURE

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

SQUARE MEASURE

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

CUBIC MEASURE

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

TEMPERATURE

5/9 (° F – 32) = ° C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° celsius
9/5 C° + 32 = F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621