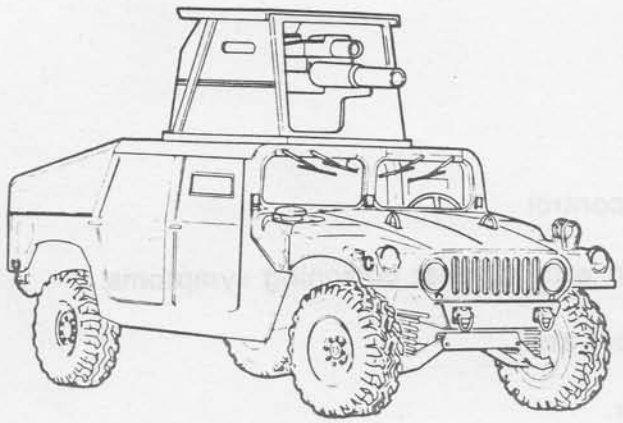
HMMWV

HIGH MOBILITY MULTIPURPOSE WHEELED VEHICLE OPERATOR'S MANUAL



APRIL 12, 1982

AM General Corporation
14250 PLYMOUTH ROAD
DETROIT, MICHIGAN 48232

WARNING

EXHAUST GASES CAN KILL!

1. DO NOT operate your vehicle engine in enclosed area.
2. DO NOT idle vehicle engine with windows closed.
3. DO NOT drive vehicle with inspection plates or cover plates removed.
4. BE ALERT at all times for exhaust odors.
5. BE ALERT for exhaust poisoning symptoms. They are:

   Headache

   Dizziness

   Sleepiness

   Loss of muscular control

6. If YOU SEE another person with exhaust poisoning symptoms:

   Remove person from area.

   Expose to open air.

   Keep person warm.

   Do not permit person to move.

   Administer artificial respiration, if necessary.

WARNING SUMMARY

- Do not touch hot exhaust pipes with bare hands. Severe burns will result.
- Severe burns can result from opening surge tank filler cap while engine is running or before engine has cooled below 165° F (74° C).

WARNING SUMMARY (Cont'd)

- Drycleaning solvent used to clean parts can be harmful to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 138° F (56° C).
- Don't smoke, or cause sparks around the batteries, especially if the caps are off. Batteries can explode and cause severe injury.
- Do not perform fuel system checks or inspections while smoking or near fire, flames or sparks. Fuel could ignite causing damage to vehicle, severe injury or death.
- Do not coast downhill with transmission in "N" (neutral). Vehicle may go out of control.
- Do not attempt to disengage the winch cable drum when there is a load on the winch cable. Cable could whip and cause severe injury.
- Wear leather gloves when handling winch cable. Broken wires can cause painful injuries.
- Make sure all slack from adjusting strap is removed. Seat belts do retract but do not lock in any position. Serious injury could result if seat belt retracting strap is not extended to its full travel.
- Vehicle operation in snow is a hazardous condition. Maintain safe stopping distances.
- Do not rely on service brakes until they dry out. Keep applying brakes until uneven braking ceases.
- Do not attempt to cross water deeper than 60 inch (152.4 cm). Limit vehicle speed while fording to 3 or 4 miles per hour (5 or 6 kilometers per hour).
- Do not exceed more than 20 mph (32 kph) with both rear tires flat. Loss of vehicle control may occur, causing severe inury or death.
- Starting aid fluids will not be used on the HMMWV engine. Damage to engine and severe injury to personnel could result.

LIST OF ABBREVIATIONS

All abbreviations that appear in this manual are listed below:

Feet	ft
Inch	in.
Centimeter	cm
Farenheit	F
Centigrade	C
Pound	lb
Kilogram	kg
Pounds Per Square Inch	psi
Kilopascals	kPa
Gallon	gal.
Pint	pt
Quart	qt
Ounce	oz
Liter	l
Miles Per Gallon	mpg
Kilometers Per Liter	km/l
Miles Per Hour	mph
Kilometers Per Hour	km/h
Each	ea
Revolutions Per Minute	rpm
Preventive Maintenance Checks and Service	PMCS
With Winch	w/w
Without Winch	wo/w

HOW TO USE THIS MANUAL

THIS MANUAL:

1. Contains information for safe and efficient operation of your equipment. These instructions provide you with a general knowledge of the equipment, its characteristics and normal and abnormal operating procedures.

2. Provides best possible operating instructions under most circumstances. Multiple emergencies, adverse weather, terrain, etc., may require modification of these procedures.

3. Takes a positive approach and normally states only what is necessary to operate and maintain the vehicle.

4. Provides you with troubleshooting procedures to enable you to detect vehicle malfunctions before serious damage to equipment or personal injury.

Problem: Operator finds that the engine fails to crank.

a. *How do you start?*
Turn to the cover of your manual.
On the right-hand side you will find a listing for "TROUBLESHOOTING". Beside this is a page number and a black marker. Follow either to the first page in the troubleshooting section.

b. *What is the quickest way to find the solution to the problem?*
Turn to page 3-1.
This is the "TROUBLESHOOTING" section. Follow the listing under "ENGINE" until you see item, Engine Fails to Crank, under the "CONDITION" column.

c. *What causes the problem?*
Go to the next column "POSSIBLE CAUSE".
Here you will find the most likely causes of the problem. Follow each step in the order listed.

d. *How do you fix the problem?*
Go to the next column "CORRECTION".
Here you will find the necessary actions required to correct the problem.

EXAMPLE OF TROUBLESHOOTING TABLE:

CONDITION	POSSIBLE CAUSE	CORRECTION
Engine fails to crank	1. Transmission select lever not in "N" (neutral) position.	1. Place selector in "N" (neutral) position.
	2. Voltmeter reads in yellow or red.	Report to maintenance.
	3. Battery cables or terminals loose, damaged or or corroded.	3. Have cables or terminals repaired.
	4. Other causes.	4. Report to maintenance.

HIGH MOBILITY, MULTIPURPOSE WHEELED VEHICLE (HMMWV)

OPERATOR'S MANUAL

TRUCK, 1-1/4 TON, XM966 SERIES VEHICLES

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a better way to improve the procedures, let us know. Mail your letter to AM GENERAL CORPORATION, ATTN: ILS DEPARTMENT, 14250 Plymouth Road, Detroit, Michigan 48232.

Table of Contents

Table of Contents (Cont'd)

Table of Contents (Cont'd)

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. Scope

a. This manual contains instructions for operating and servicing the 1-1/4 Ton XM966 Series Vehicles. These vehicles are:

1. XM966 Truck, Guided Missile Equip: Weapon Carrier, with and without winch.

2. XM996 Truck, Ambulance: 4x4, 2 litter.

3. XM997 Truck, Ambulance: 4x4, 4 litter.

4. XM998 Truck, Utility: with and without winch.

b. The contents of the manual provides operators with information and procedures needed to provide for safe and efficient operation of XM966 vehicles. This information includes:

1. Descriptions of each vehicle and its operation.

2. Vehicle limitations such as load limits.

3. Cautions and warnings to operators regarding safety to personnel and equipment.

4. The function of panel controls and indicators.

5. The function of body controls and indicators.

6. Scheduled operator maintenance checks and services procedures.

7. Troubleshooting procedures.

NOTE

Operator maintenance is preventive maintenance. It is the required duty of each operator to keep the vehicle operational. These duties consist of maintenance checks and services and troubleshooting. They are not mechanical repairs. Mechanical repairs of XM966 vehicles are accomplished at a higher level of maintenance.

1-2. Vehicle Designations

The vehicles covered in this manual are called the 1-1/4 ton, 4x4, XM966 series.

a. The 1-1/4 ton refers to the vehicle's load limit rating.

b. The 4x4 indicates that each vehicle has four-wheel drive.

c. The XM966 is simply a code number assigned to this particular series of vehicles.

d. The 1-1/4 ton load limit rating of the XM966 vehicles indicates the maximum amount of cargo weight the vehicle's axles and frame can withstand when operating under the worst cross-country conditions.

Section II. DESCRIPTION AND DATA

1-3. Description

a. The 1-1/4 ton, XM966 series vehicles are designed for use over all types of roads as well as cross-country terrain and in all weather conditions. The vehicles have four driving wheels.

b. Powered by a V-8 liquid-cooled diesel engine, these vehicles have four-wheel hydraulic service brakes and a mechanical parking brake. All vehicles are provided with a pintle hook, tie-down eyes and lifting eyes for towing, air, rail or sea shipment.

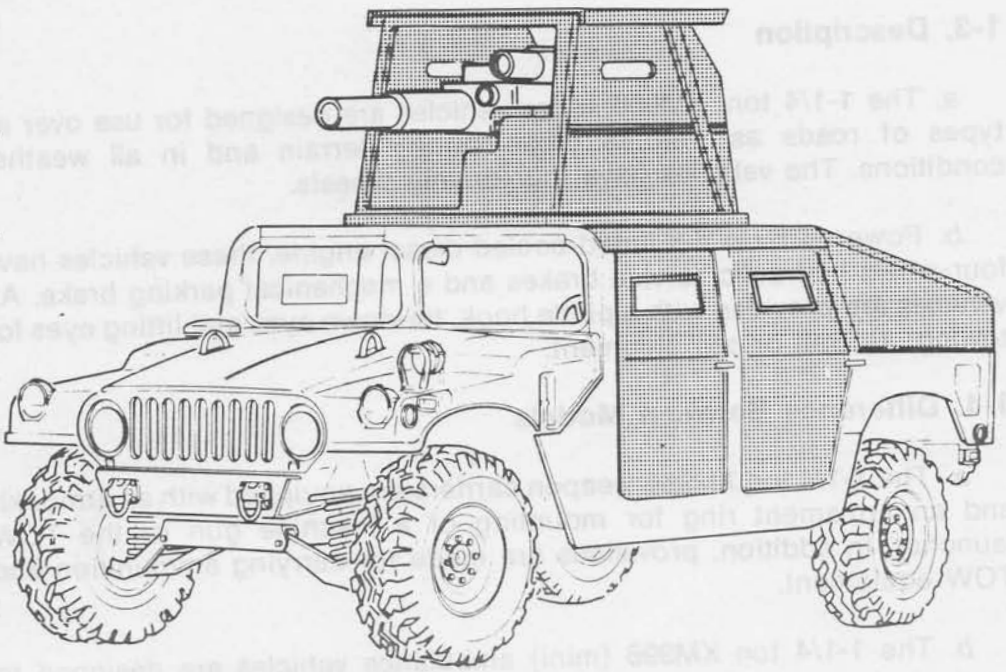
1-4. Difference Between Models

a. The 1-1/4 ton XM966 weapon carriers are equipped with an armor kit and an armament ring for mounting of a machine gun or the TOW launcher. In addition, provisions are made for carrying ammunition and TOW equipment.

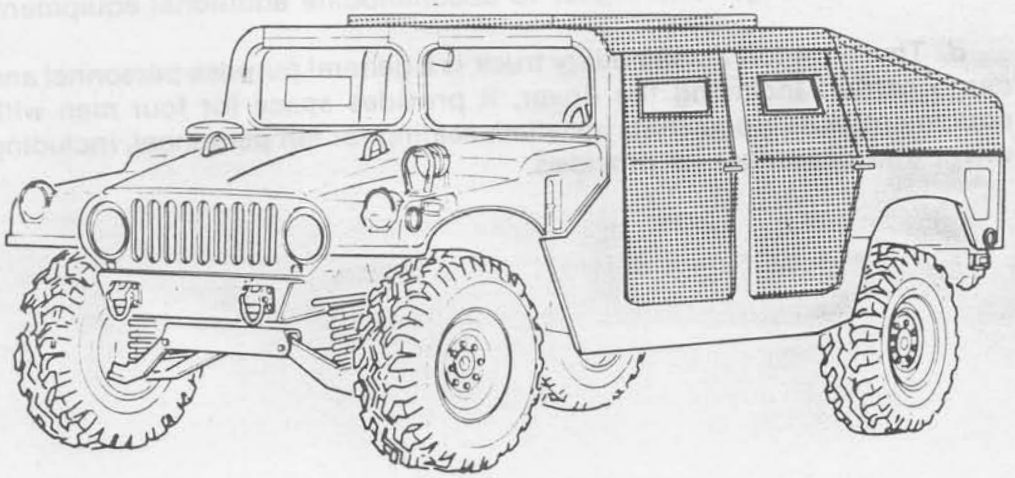
b. The 1-1/4 ton XM996 (mini) ambulance vehicles are designed to carry two litters, a driver and two ambulance attendants. The vehicle height is reducible to accommodate transportability.

c. The 1-1/4 ton XM997 (maxi) ambulance vehicles are designed to carry four litters, a driver and two ambulance attendants. The cargo area of the vehicle is longer and higher to accommodate additional equipment.

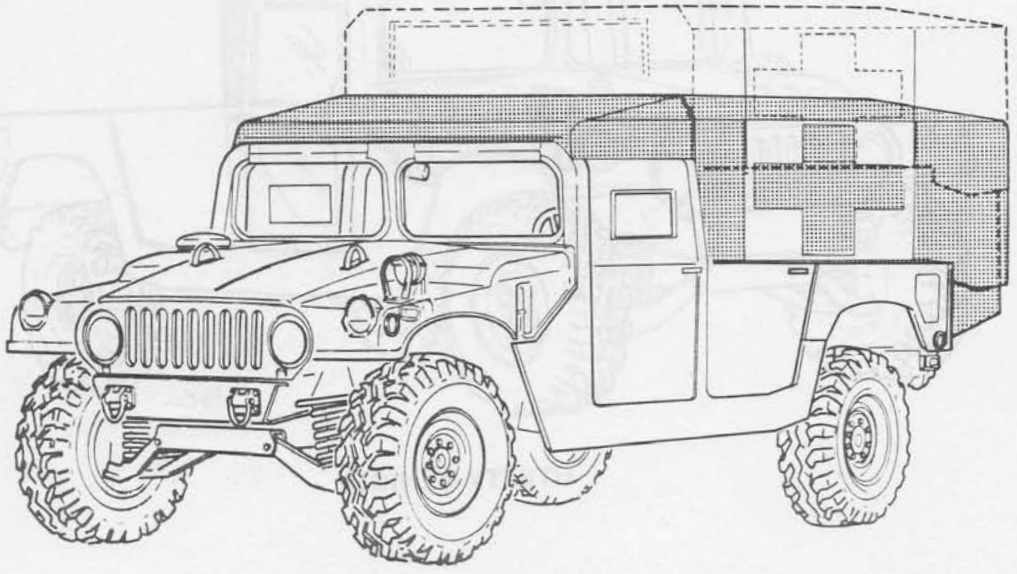
d. The 1-1/4 ton XM998 utility truck is a general purpose personnel and cargo carrier. Including the driver, it provides space for four men with equipment. With troop seats installed, seating for ten personnel, including driver and passenger, is provided.



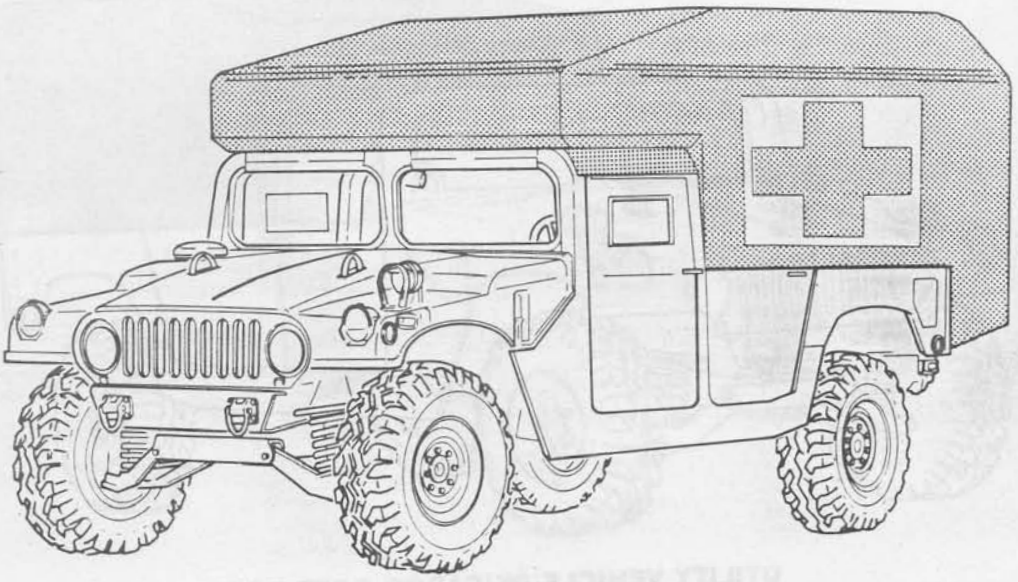
WEAPONS CARRIER (FIRING MODE)



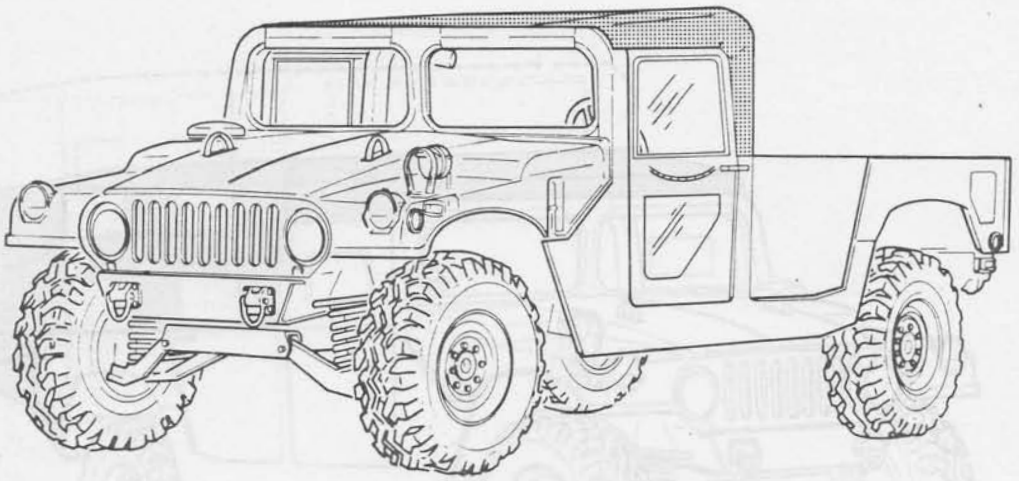
WEAPONS CARRIER (EXTENDED TRAVEL MODE)



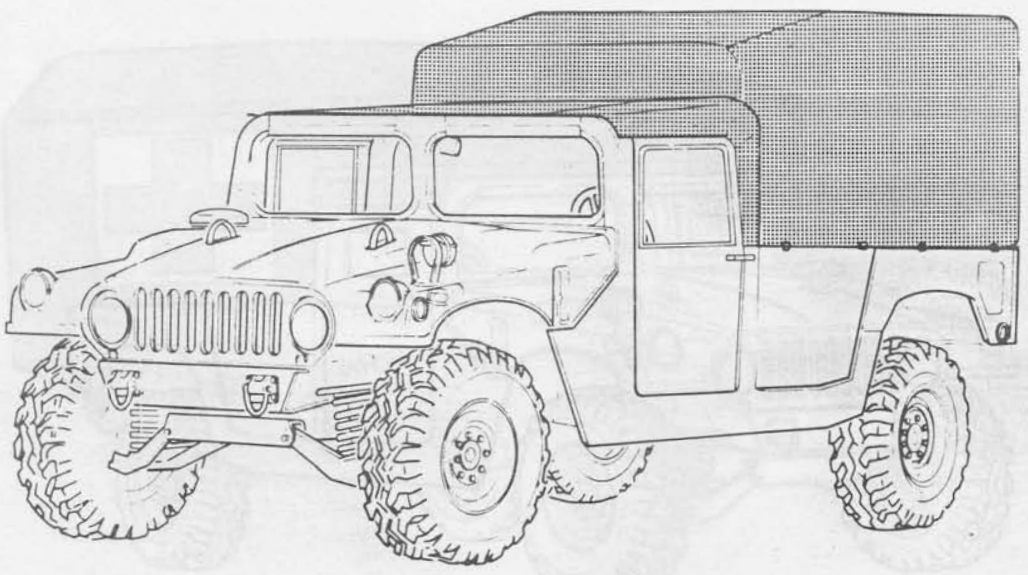
AMBULANCE (MINI)



AMBULANCE (MAXI)



UTILITY VEHICLE



UTILITY VEHICLE (W/CARGO SOFT TOP)

NOTE

Standard and metric measurements are used in tables. Metric measurements are shown in parentheses.

1-5. Tabulated Data

This paragraph organizes vehicle specifications and capacities in table form for easy reference by operators.

Table 1-1. Vehicle Dimensions and Weights

	XM966	XM966 (W/SUPPLEMENTARY ARMOR)	XM998
Overall length wo/w	185 in. (469.9 cm)	185 in. (469.9 cm)	185 in. (469.9 cm)
Overall length w/w	194.6 in. (494.3 cm)	194.6 in. (494.3 cm)	194.6 in. (494.3 cm)
Overall width	85 in. (215.9 cm)	85 in. (215.9 cm)	85 in. (215.9 cm)
Overall height	76.2 in. (194 cm)	76.2 in. (194 cm)	69 in. (175.3 cm)
Wheelbase	130 in. (330.2 cm)	130 in. (330.2 cm)	130 in. (330.2 cm)
Curb weight	5817 lb (2641 kg)	7500 lb (3405 kg)	4991 lb (2266 kg)

Table 1-2. Capacities

Description	Capacities (All Vehicles)	
Cooling system	25 qt	(23.6 l)
Engine oil	9 qt	(8.5 l)
Fuel tank:		
Primary tank	20.7 gal.	(78.31 l)
Secondray tank	4 gal.	(15.5 l)
Power steering pump	1.25 pt	(.59 l)
Transmission	13.6 qt	(12.96 l)
Transfer case	2.7 qt	(2.6 l)

Table 1-3. Tire Inflations

Tire Inflation (All Vehicles)

Condition	Front	Rear
Road (hard surface)	20 psi (138 kPa)	22 psi (152 kPa)
Off Road (cross country)	20 psi (138 kPa)	22 psi (152 kPa)

Table 1-4. Engine and Cooling System Data

Engine	
Type	V-8, diesel, naturally-aspirated, liquid-cooled
Brake horsepower	145 bhp @ 3600 rpm (gross)
Oil pressure at idle	15 psi (103 kPa)
Oil pressure at cruise	30-45 psi (206.8-312 kPa)
Oil pressure at full power	60 psi (417 kPa)
Fuel consumption (approx.)	16 mpg (7 km/l)
Cooling System	
Surge tank cap pressure	15 psi (103 kPa)
Radiator type	Downflow
Fan	19 in (66 cm), 7 blade
Operating temperature	
Thermostat operation	165°F to 195°F (74°C to 90.5°C)
Cooling system range	165°F to 230°F (74°C to 110°C)

Table 1-5. Automatic Transmission Data

Oil	Dexron II
Oil temperature:	
Maximum operating temperature	300°F (148.8°C)
Normal operating temperature	220°F (104.4°C)

Table 1-6. Electrical System

Type batteries	12 volt, 6 TN
Quantity	2
System voltage	24 volt

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. CONTROLS, INDICATORS AND EQUIPMENT

2-1. Know Your Controls and Indicators

Before you attempt to operate your equipment, be sure you are familiar with the location and function of all controls and indicators. The location and function of vehicle controls and indicators are described in this section as follows:

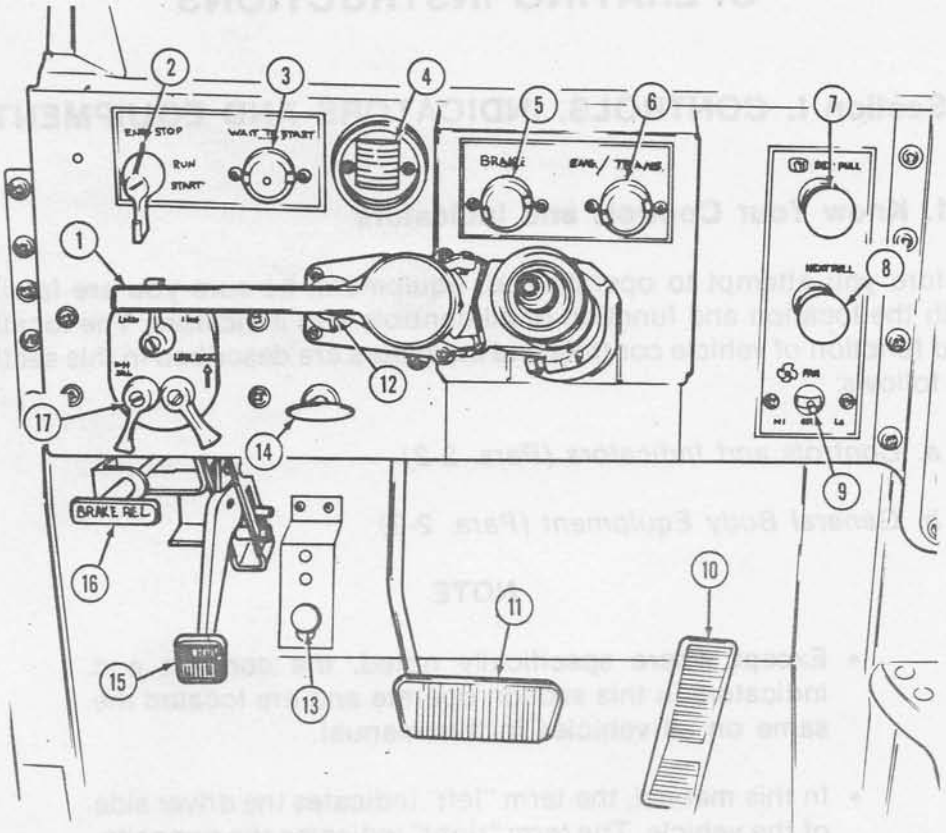
a. Controls and Indicators (Para. 2-2).

b. General Body Equipment (Para. 2-3).

NOTE

- Except where specifically noted, the controls and indicators in this section operate and are located the same on all vehicles in this manual.
- In this manual, the term "left" indicates the driver side of the vehicle. The term "right" indicates the opposite, or crew/companion side of the vehicle.

2-2. Controls and Indicators



KEY ITEM AND FUNCTION

1 *Turning Signal Control Lever* is moved down to operate vehicle left turn signal; up to operate right turn signal.

2 *Start/Run Switch* has STOP, RUN and START positions. When positioned to start, the starter will engage and crank the engine. Spring-loaded switch automatically returns from start to run when the switch is released.

3 *Engine Start Glow Plug Indicator (Wait-to-Start)* illuminates when glow plugs are activated; flashes off when engine is ready to be started.

4 *Air Cleaner Indicator* signals the operator that some restriction exists in the air cleaner. When the yellow indicator reads 25% or more restriction, air cleaner servicing is required.

5 *Brake Warning Indicator* illuminates when master cylinder fluid level is low, or parking brake is applied.

6 *Multipurpose Warning Indicator (Eng/Trans.)* illuminates when the vehicle has high coolant temperature, low engine oil pressure, low tranmsmission oil pressure or high transmission temperature. Vehicle must be shutdown immediately when this indicator illuminates.

7 *Defroster Control Lever* opens vents below windshield to direct heated air to the windshield.

8 *Heat Temperature Control Lever* controls the temperature of heat blown in the vehicle.

9 *Heater Fan Switch* has HIGH (HI), OFF, and LOW (LO) settings to regulate air flow into vehicle.

10 *Accelerator Pedal* is the operators' foot control for varying vehicle speed.

11 *Service Brake Pedal* is depressed to slow or stop the vehicle.

12 *Turn Signal Indicator* illuminates when turn signals are activated.

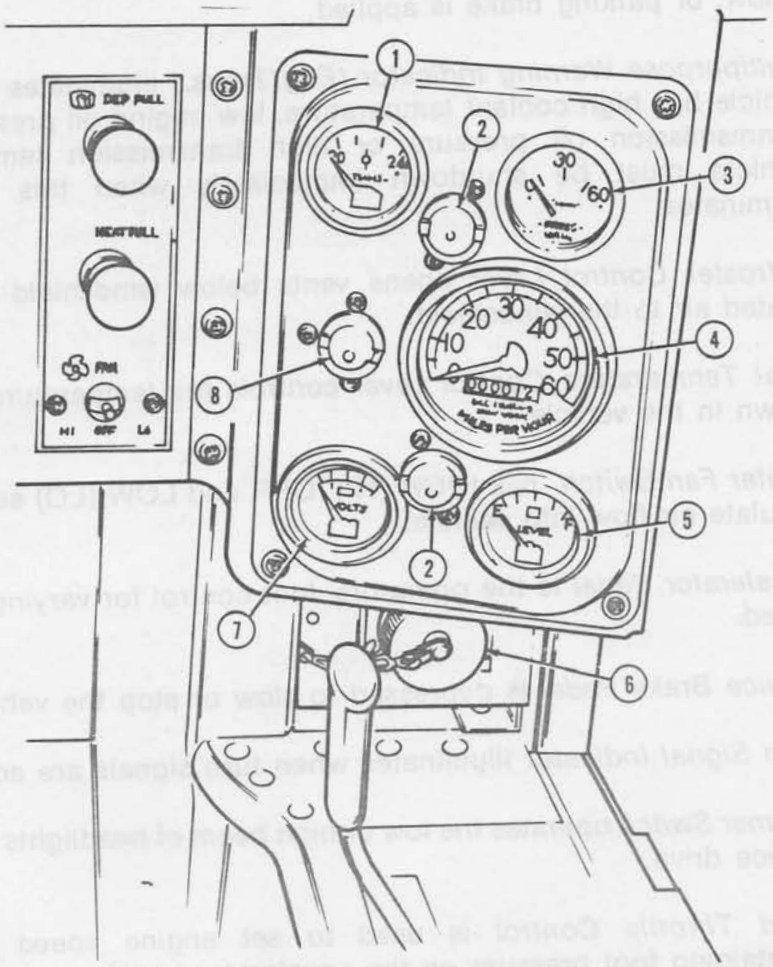
13 *Dimmer Switch* operates the low or high beam of headlights when in service drive.

14 *Hand Throttle Control* is used to set engine speed without maintaining foot pressure on the accelerator pedal.

15 *Parking Brake Pedal* is depressed to set parking brake.

16 *Parking Brake Hand Lever* is pulled to disengage parking brake.

17 *Light Switch* controls operation of vehicle service and blackout lights.



KEY ITEM AND FUNCTION

1 *Engine Temperature Gauge* indicates engine coolant temperature.

2 *Instrument Panel Lights* illuminates instrument panel.

3 *Oil Pressure Gauge* indicates the engine oil pressure when the engine is running.

4 *Speedometer/Odometer* indicates vehicle speed and accumulated mileage.

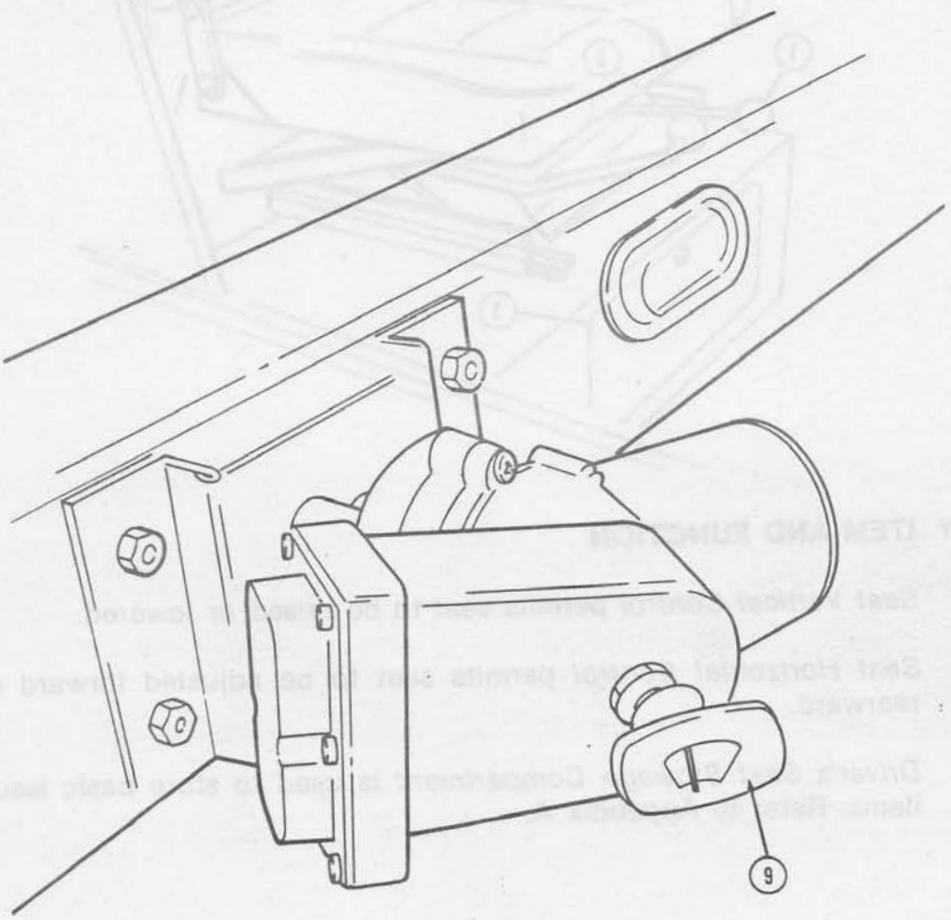
5 *Fuel Gauge* indicates fuel level in fuel tank.

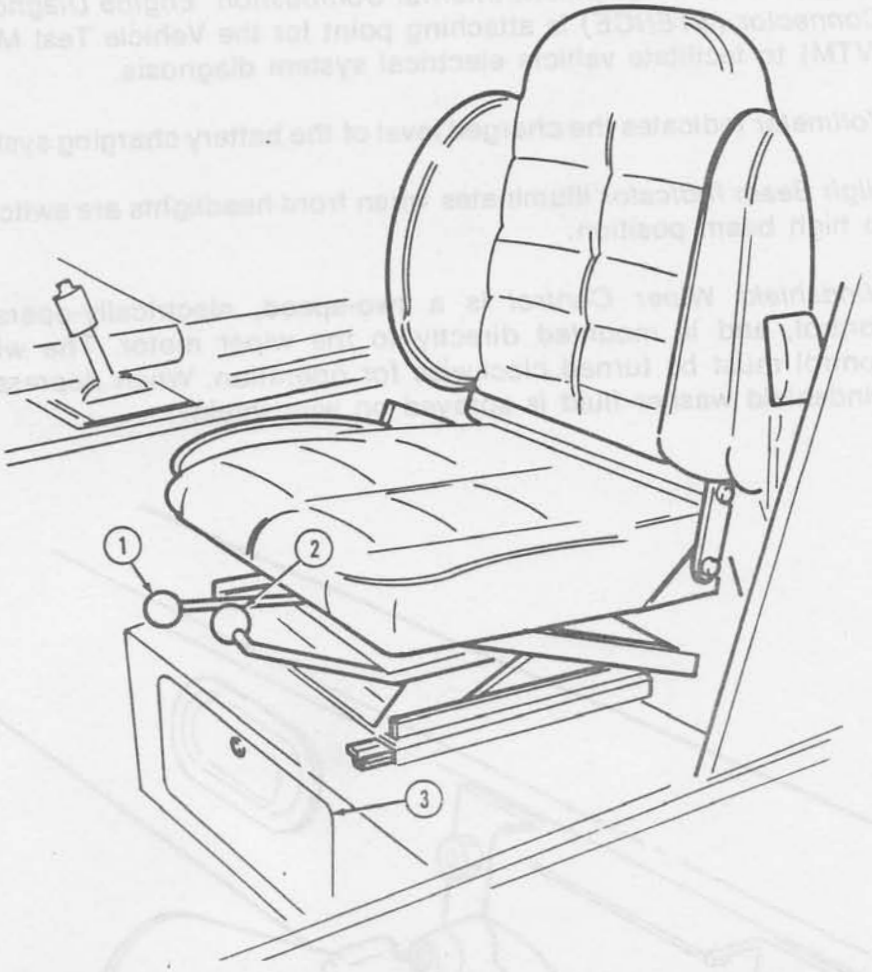
6 *Simplified Test Equipment/Internal Combustion Engine Diagnostic Connector (STE/ICE)* is attaching point for the Vehicle Test Meter (VTM) to facilitate vehicle electrical system diagnosis.

7 *Voltmeter* indicates the charged level of the battery charging system.

8 *High Beam Indicator* illuminates when front headlights are switched to high beam position.

9 *Windshield Wiper Control* is a two-speed, electrically-operated control, and is mounted directly to the wiper motor. The wiper control must be turned clockwise for operation. When depressed, windshield washer fluid is sprayed on windshield.





KEY ITEM AND FUNCTION

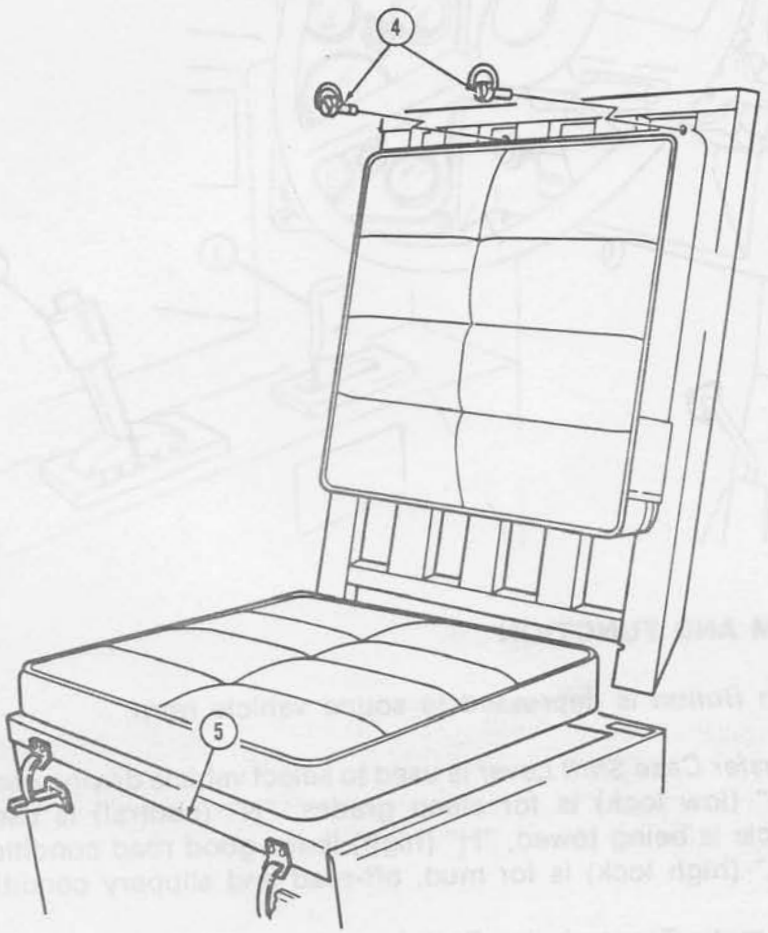
1 *Seat Vertical Control* permits seat to be raised or lowered.

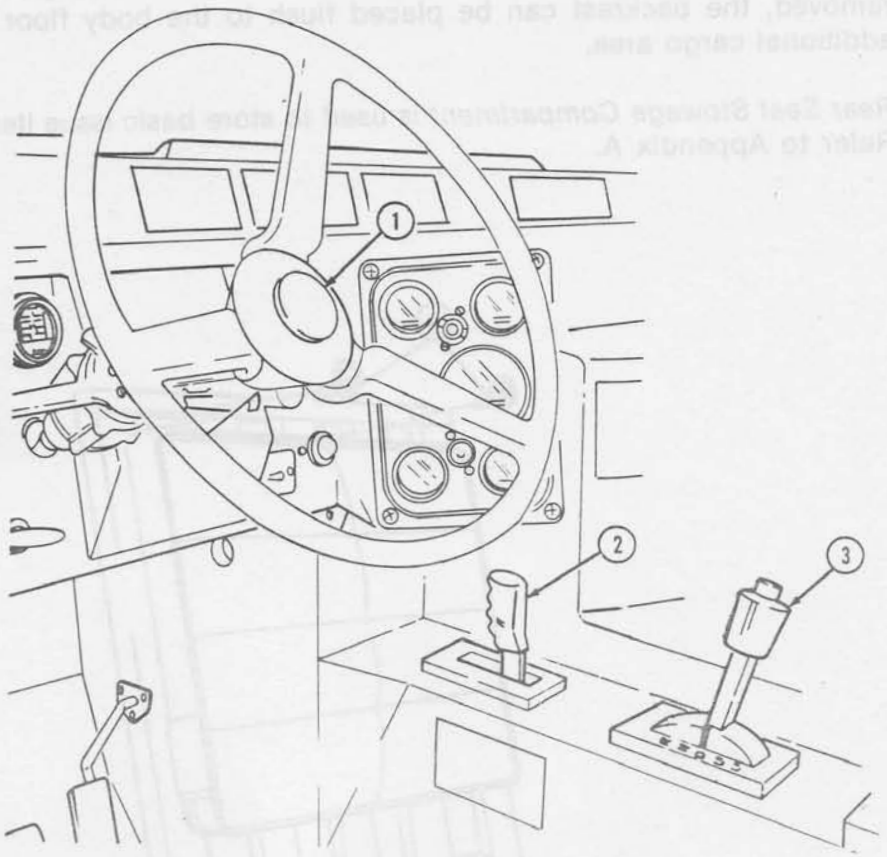
2 *Seat Horizontal Control* permits seat to be adjusted forward or rearward.

3 *Driver's Seat Stowage Compartment* is used to store basic issue items. Refer to Appendix A.

4 *Rear Seat Backrest Securing Pins* secure backrest to the body. Once removed, the backrest can be placed flush to the body floor for additional cargo area.

5 *Rear Seat Stowage Compartment* is used to store basic issue items. Refer to Appendix A.





KEY ITEM AND FUNCTION

1 *Horn Button* is depressed to sound vehicle horn.

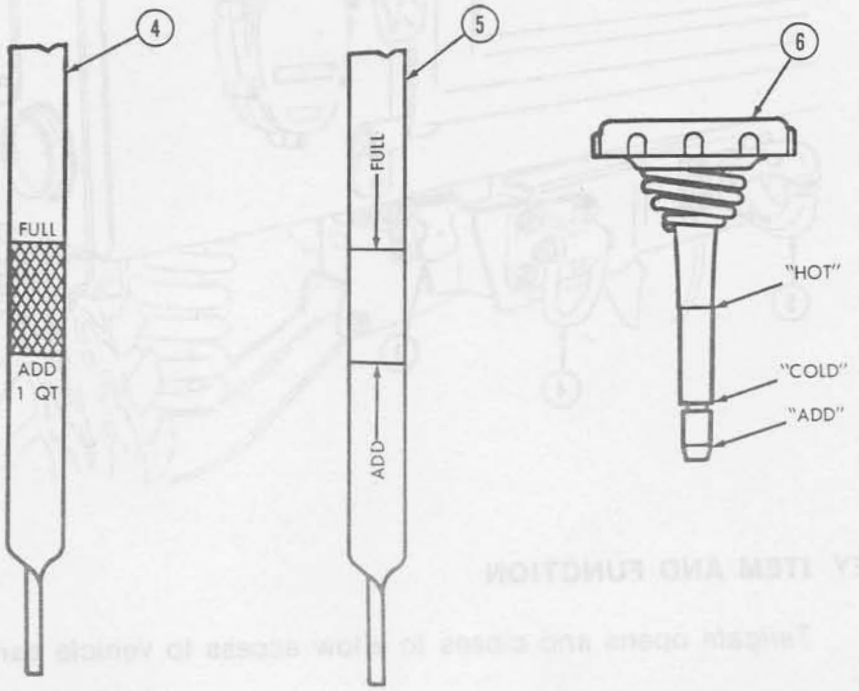
2 *Transfer Case Shift Lever* is used to select vehicle driving gear range. "L/L" (low lock) is for steep grades, "N" (neutral) is used when vehicle is being towed, "H" (high) is for good road conditions, and "H/L" (high lock) is for mud, off-road and slippery conditions.

3 *Automatic Transmission Shift Lever* is used to select vehicle driving gear, "R" (reverse), "N" (neutral), "D" (drive), "1" (first), and "2" (second) gear position.

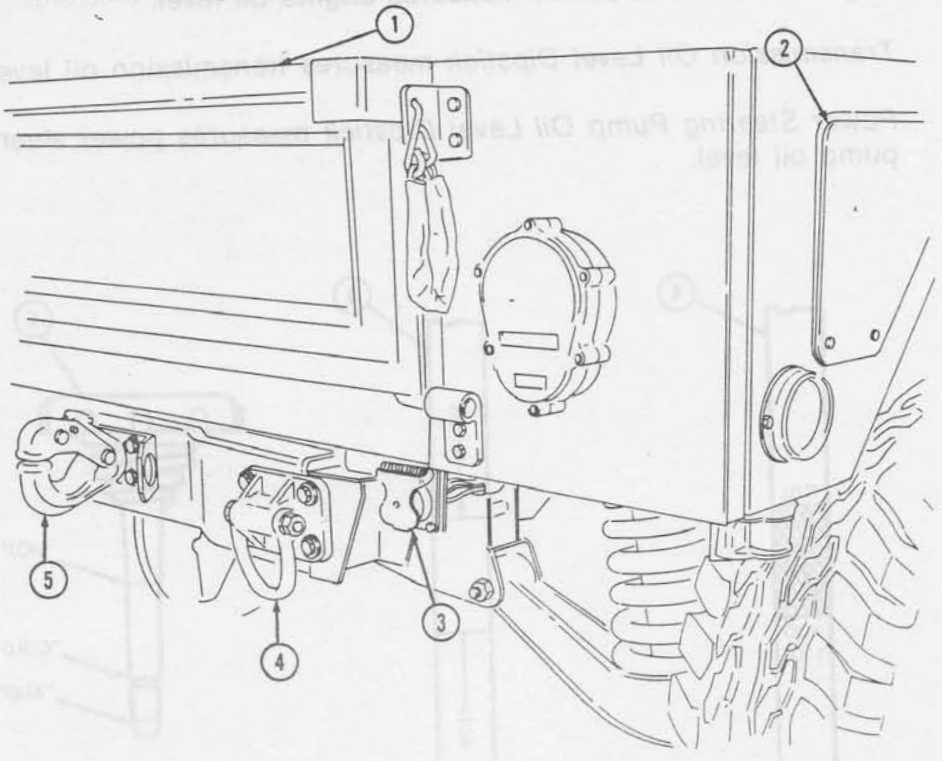
4 *Engine Oil Level Dipstick* measures engine oil level.

5 *Transmission Oil Level Dipstick* measures transmission oil level.

6 *Power Steering Pump Oil Level Dipstick* measures power steering pump oil level.



2-3. General Body Equipment



KEY ITEM AND FUNCTION

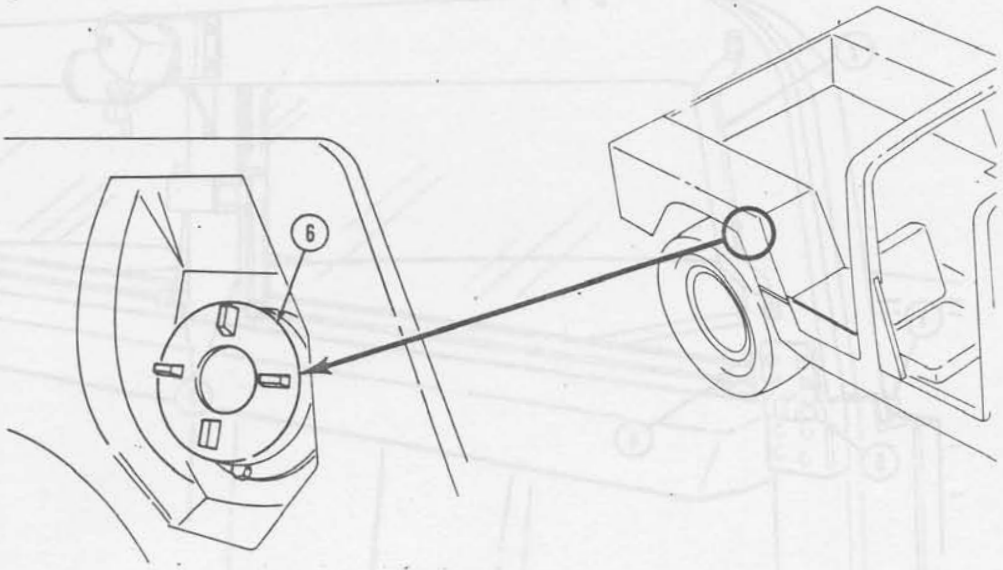
1 *Tailgate* opens and closes to allow access to vehicle cargo area.

2 *Rear Stowage Compartment* is used to store basic issue items. Refer to Appendix A.

3 *Trailer Power Outlet Receptacle* provides electrical power outlet for towed equipment.

4 *Lift Eyes* at front and rear of vehicle are used to lift/tie-down vehicle during transport or maintenance.

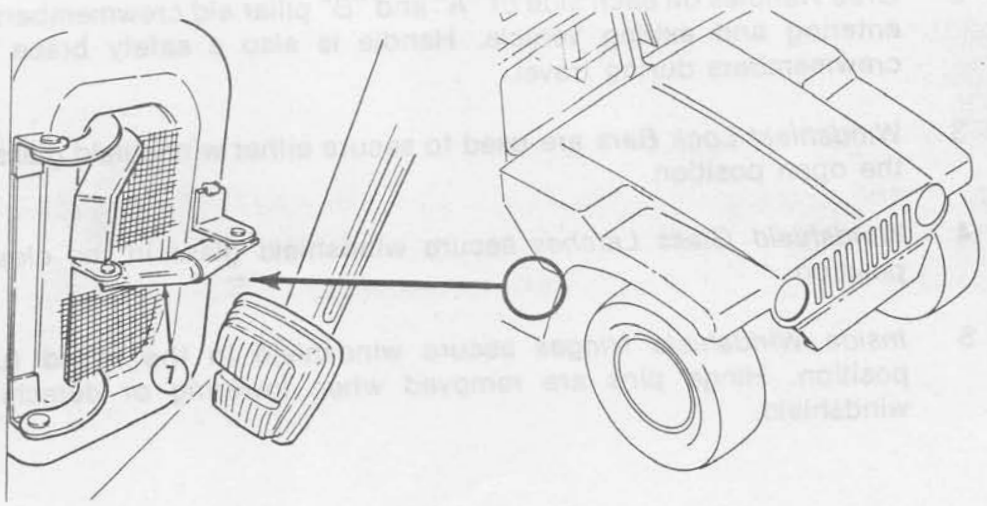
5 *Pintle Hook* provides connection point for towing.



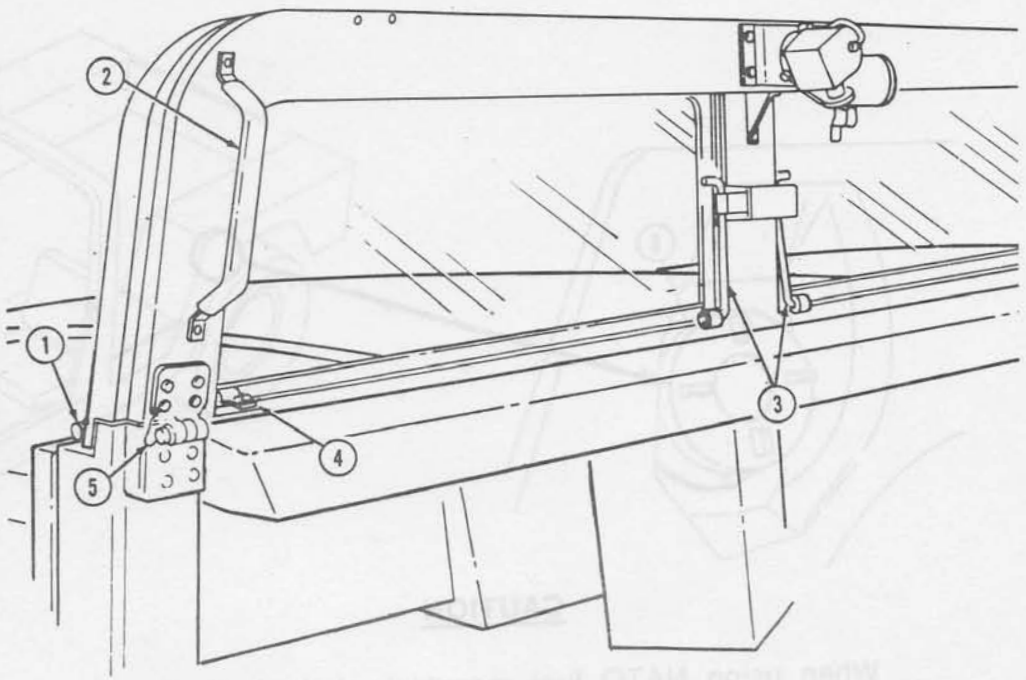
CAUTION

When using NATO fuel receptacle, hold fuel nozzle firmly in fuel inlet to prevent back pressure from pushing nozzle out.

6 *Fuel Tank Filler Cap* covers fuel tank inlet. Internal extension tube slides out for servicing from fuel can or drum. Fuel tank inlet is sized for servicing with NATO receptacle.



7 *Side Vent Handle* holds air vent open and closed. Air vent must be closed during off-road travel.



KEY ITEM AND FUNCTION

1 *Outside Windshield Folddown Hinges* are used as a hinge point when windshield is down. Hinge pins are removed when detaching windshield assembly.

2 *Grab Handles* on each side of "A" and "B" pillar aid crewmembers in entering and exiting vehicle. Handle is also a safety brace for crewmembers during travel.

3 *Windshield Lock Bars* are used to secure either windshield glass in the open position.

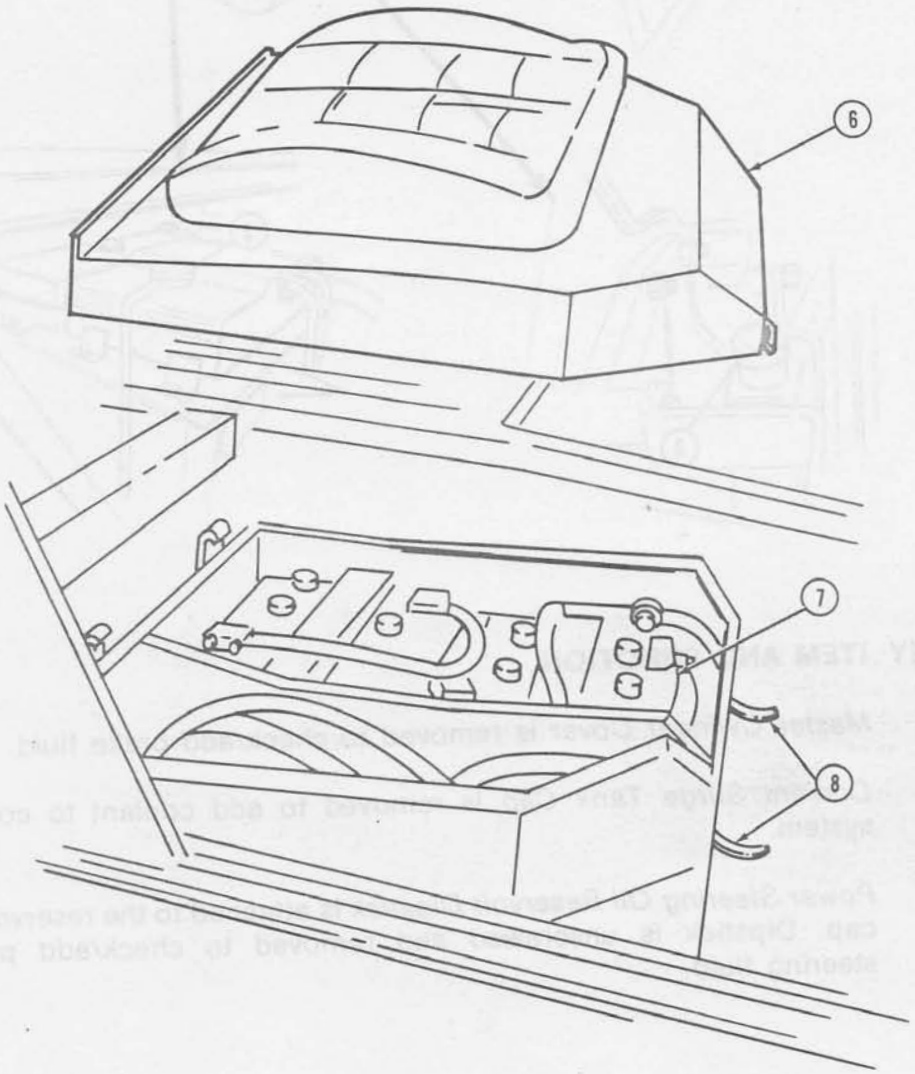
4 *Windshield Glass Latches* secure windshield glass in the closed position.

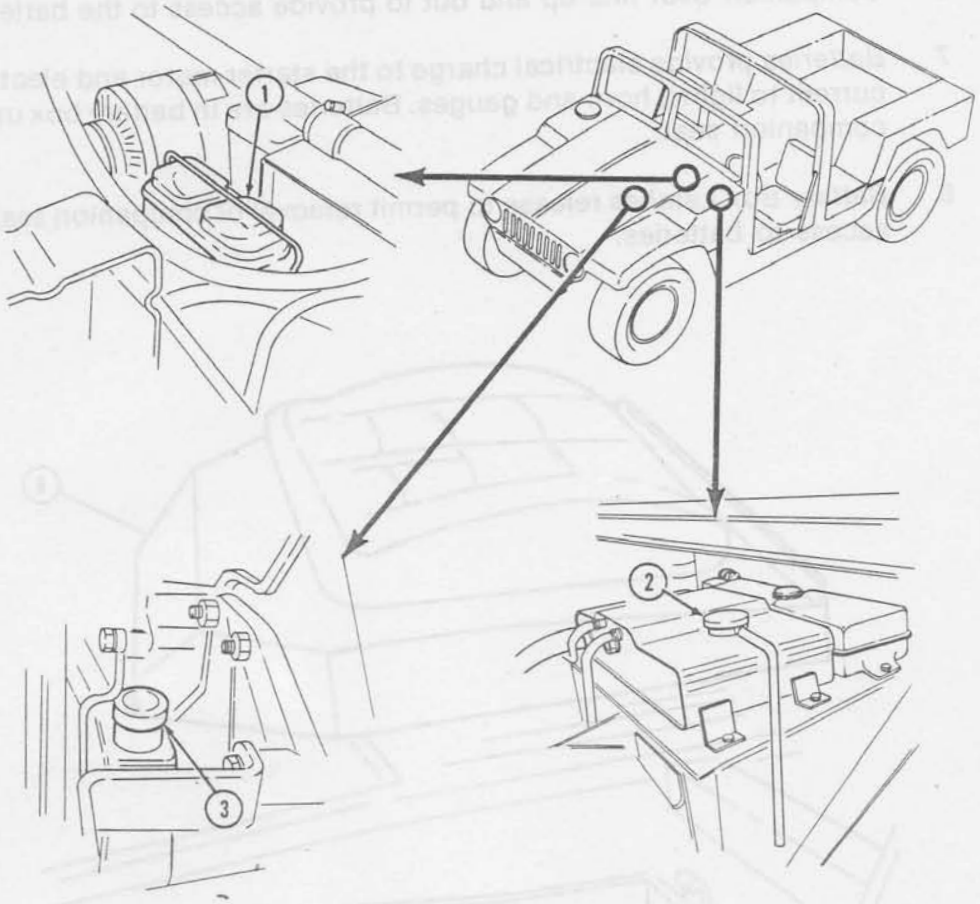
5 *Inside Windshield Hinges* secure windshield in the raised (up) position. Hinge pins are removed when lowering or detaching windshield.

6 *Companion Seat* lifts up and out to provide access to the batteries.

7 *Batteries* provide electrical charge to the starter motor and electrical current to lights, horn and gauges. Batteries are in battery box under companion seat.

8 *Battery Box Latches* release to permit removal of companion seat for access to batteries.





KEY ITEM AND FUNCTION

1 *Master Cylinder Cover* is removed to check/add brake fluid.

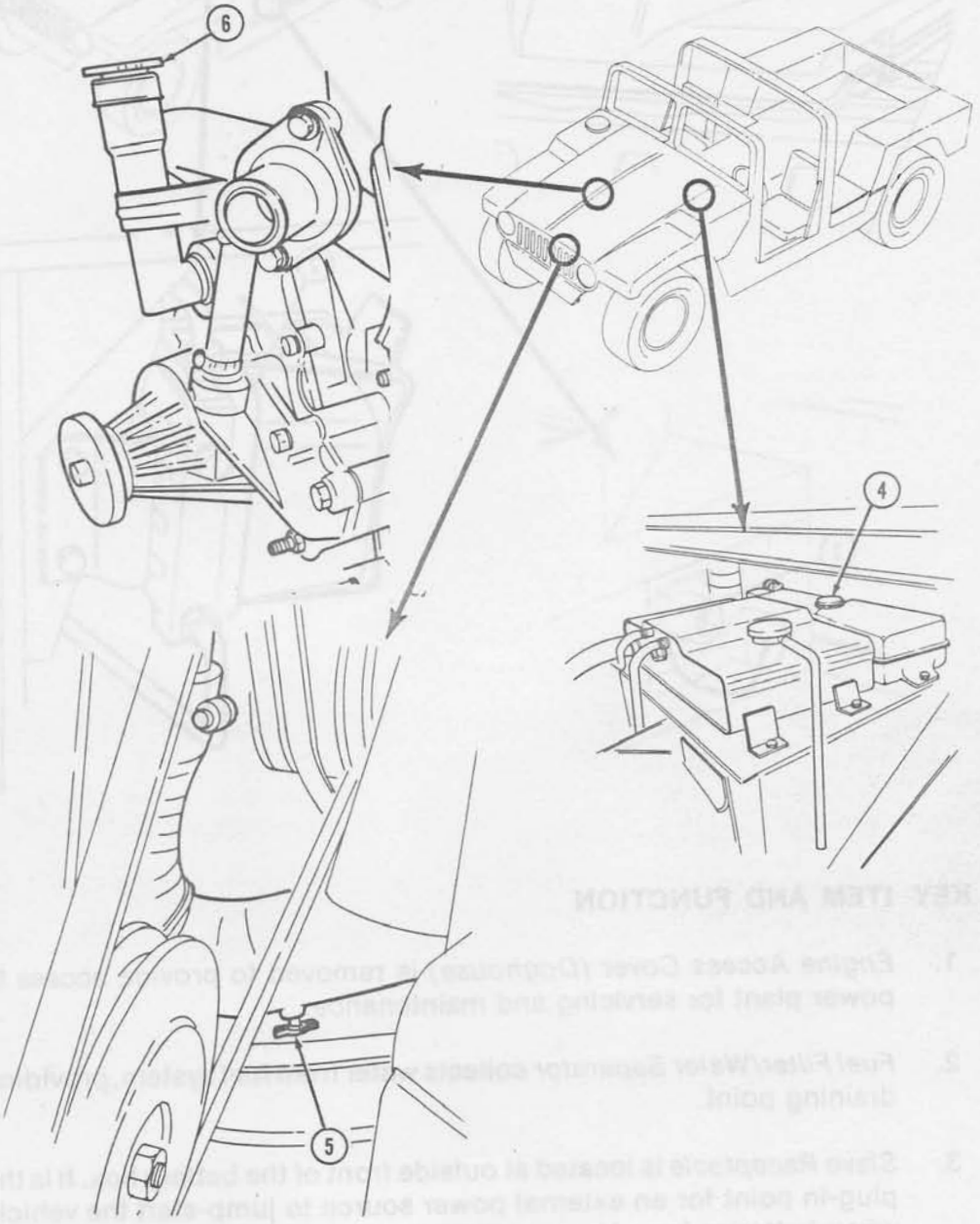
2 *Coolant Surge Tank Cap* is removed to add coolant to cooling system.

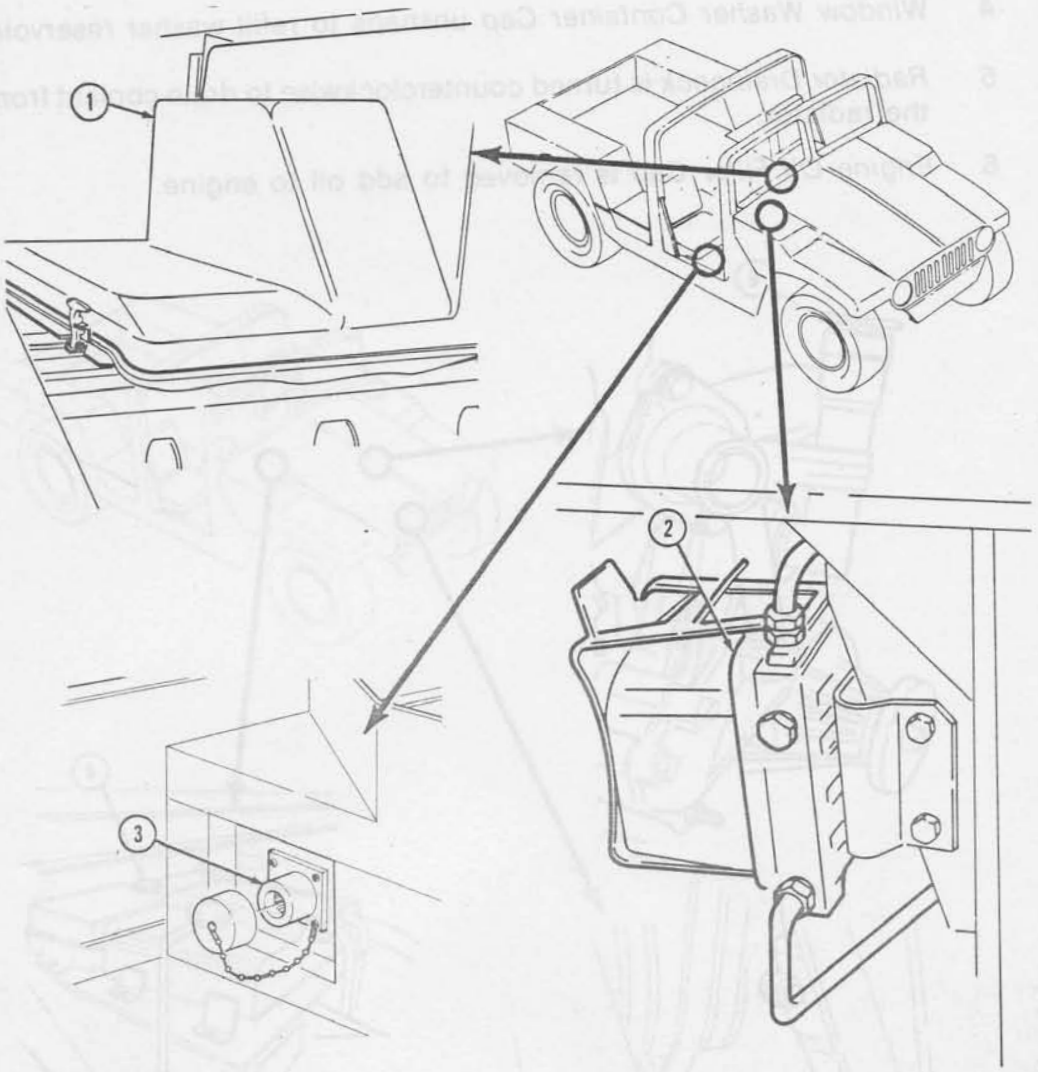
3 *Power Steering Oil Reservoir Dipstick* is attached to the reservoir fill cap. Dipstick is unscrewed and removed to check/add power steering fluid.

4 *Window Washer Container Cap* unsnaps to refill washer reservoir.

5 *Radiator Draincock* is turned counterclockwise to drain coolant from the radiator.

6 *Engine Oil Filler Cap* is removed to add oil to engine.





KEY ITEM AND FUNCTION

1. *Engine Access Cover (Doghouse)* is removed to provide access to power plant for servicing and maintenance.

2. *Fuel Filter/Water Separator* collects water from fuel system, providing draining point.

3. *Slave Receptacle* is located at outside front of the battery box. It is the plug-in point for an external power source to jump-start the vehicle when batteries have become discharged.

(XM966 WEAPONS CARRIER ONLY)

4 *Side Panel Reinforcement* braces swing down to stabilize upper and lower side panels in a vertical position. Swings to full up position to release side panels when lowering gunners' station.

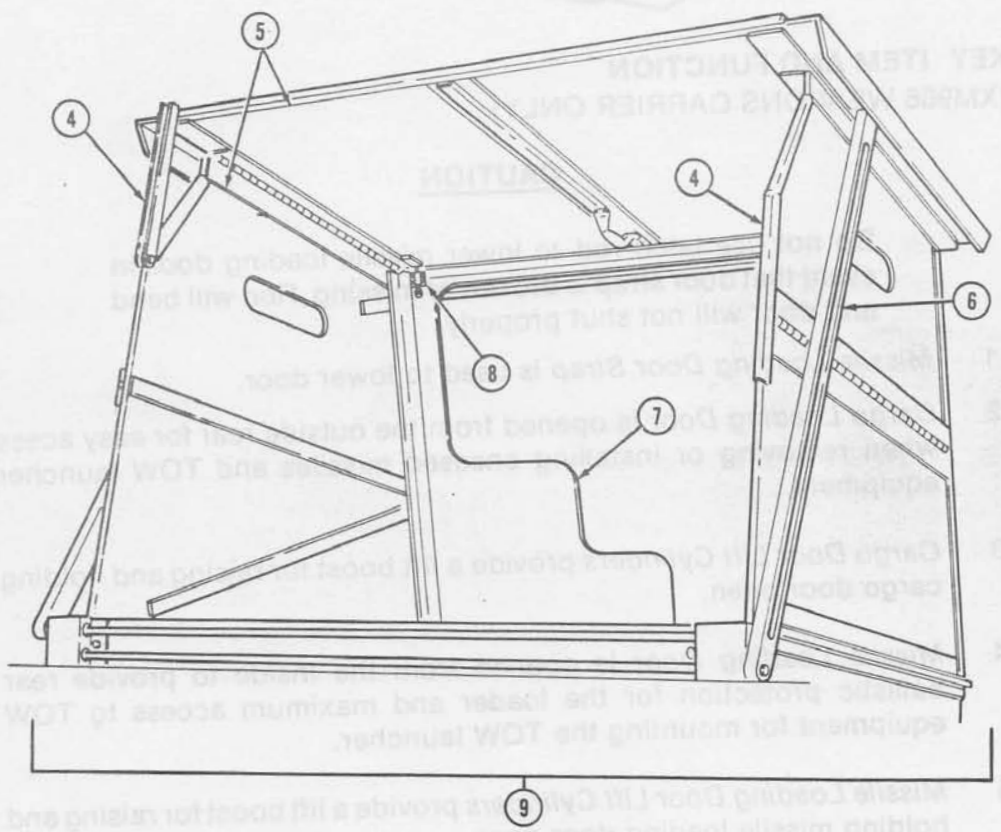
5 *Top and Side Panels* unfold when raised to form weapons carrier gunners' station.

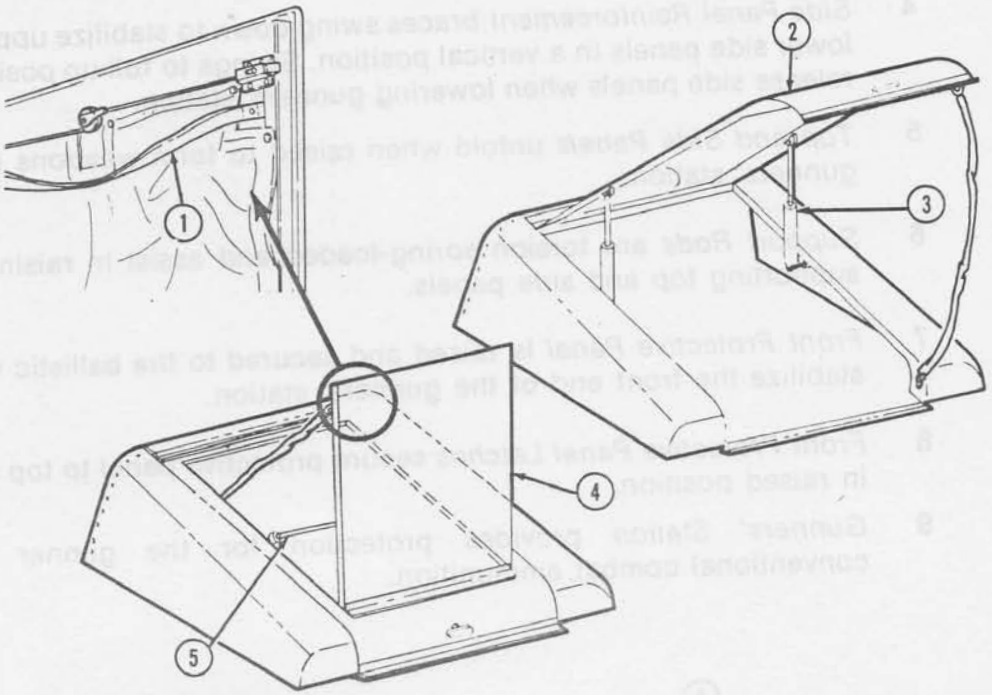
6 *Support Rods* are torsion spring-loaded and assist in raising and supporting top and side panels.

7 *Front Protective Panel* is raised and secured to the ballistic top to stabilize the front end of the gunners' station.

8 *Front Protective Panel Latches* secure protective panel to top panel in raised position.

9 *Gunners' Station* provides protection for the gunner from conventional combat ammunition.





KEY ITEM AND FUNCTION
(XM966 WEAPONS CARRIER ONLY)

CAUTION

Do not use latch rod to lower missile loading door in event that door strap is broken or missing. Rod will bend and door will not shut properly.

1 *Missile Loading Door Strap* is used to lower door.

2 *Cargo Loading Door* is opened from the outside rear for easy acess when removing or installing encased missiles and TOW launcher equipment.

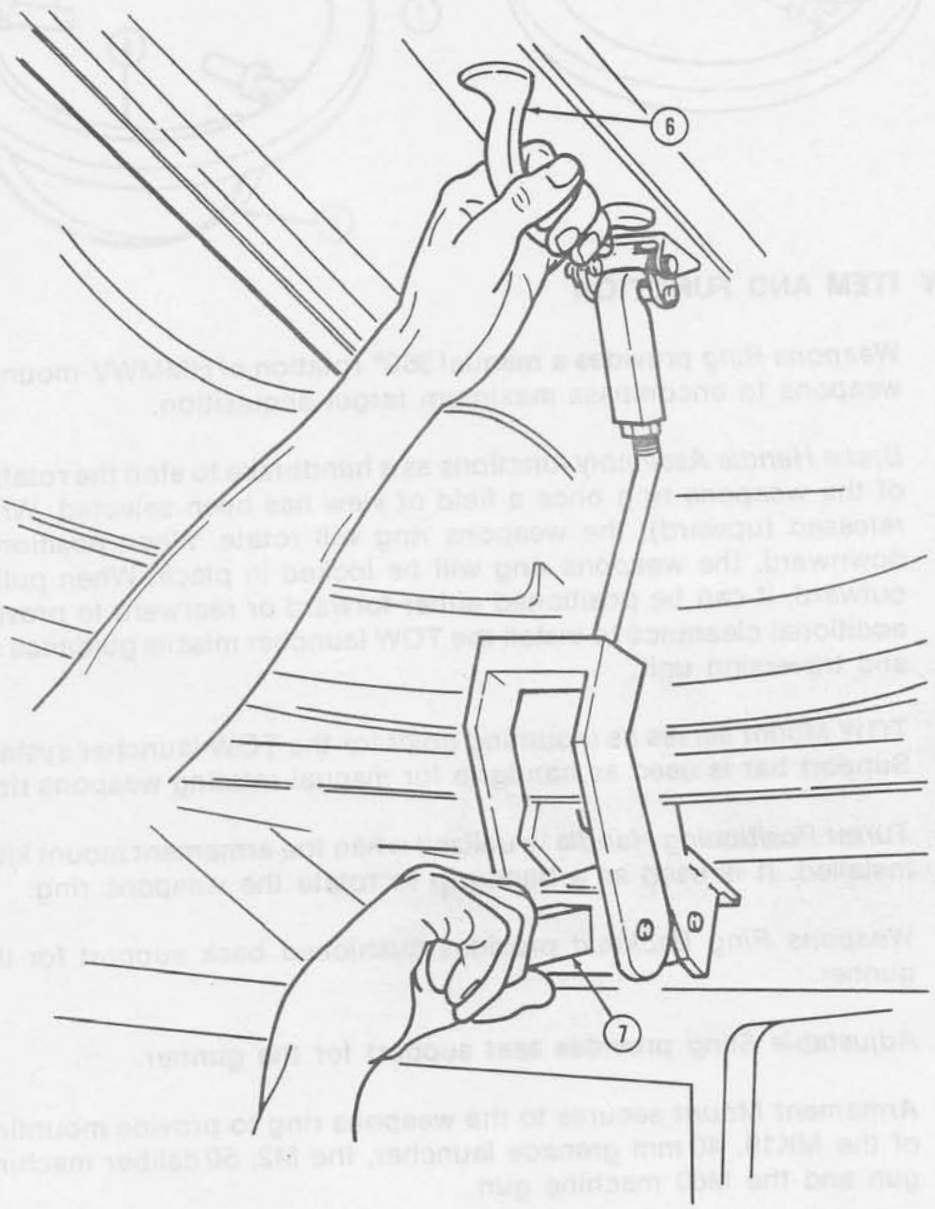
3 *Cargo Door Lift Cylinders* provide a lift boost for raising and holding cargo door open.

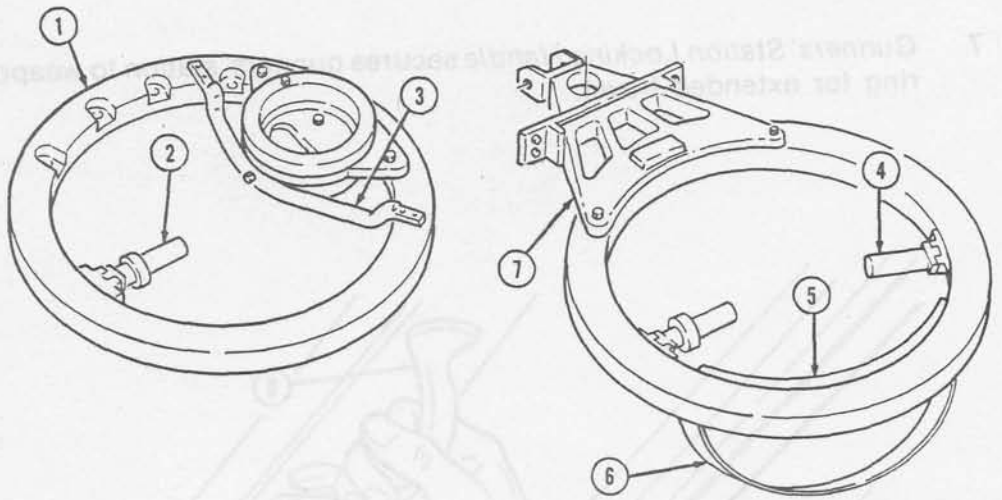
4 *Missile Loading Door* is opened from the inside to provide rear ballistic protection for the loader and maximum access to TOW equipment for mounting the TOW launcher.

5 *Missile Loading Door Lift Cylinders* provide a lift boost for raising and holding missile loading door open.

6 *Top Panel Handle* is used in lowering and securing weapons station in closed position.

7 *Gunners' Station Locking Handle* secures gunners' station to weapon ring for extended travel.





KEY ITEM AND FUNCTION

1 *Weapons Ring* provides a manual 360° rotation of HMMWV-mounted weapons to encompass maximum target acquisition.

2 *Brake Handle Assembly* functions as a handbrake to stop the rotation of the weapons ring once a field of view has been selected. When released (upward), the weapons ring will rotate. When positioned downward, the weapons ring will be locked in place. When pulled outward, it can be positioned either forward or rearward to provide additional clearance to install the TOW launcher missile guidance set and traversing unit.

3 *TOW Mount* serves as mounting point for the TOW launcher system. Support bar is used as handgrip for manual rotating weapons ring.

4 *Turret Positioning Handle* is utilized when the armament mount kit is installed. It is used as a handgrip to rotate the weapons ring.

5 *Weapons Ring Backrest* provides cushioned back support for the gunner.

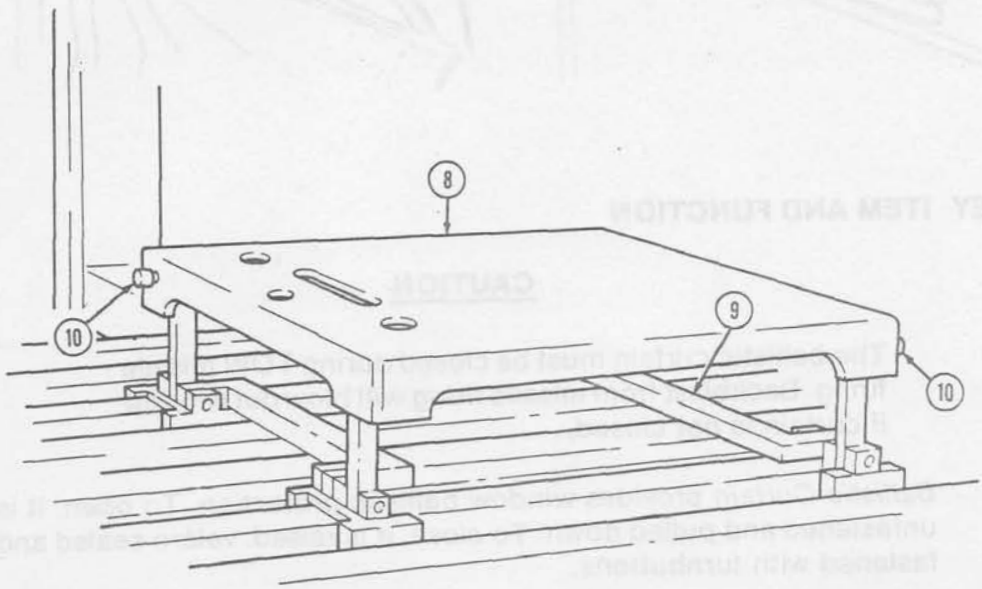
6 *Adjustable Sling* provides seat support for the gunner.

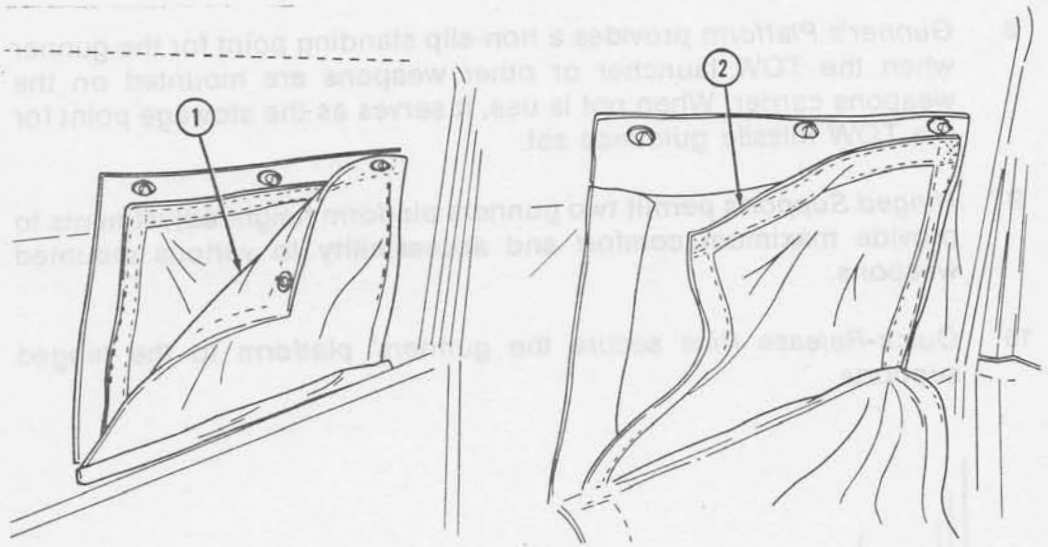
7 *Armament Mount* secures to the weapons ring to provide mounting of the MK19, 40 mm grenade launcher, the M2, 50 caliber machine gun and the M60 machine gun.

8 *Gunner's Platform* provides a non-slip standing point for the gunner when the TOW launcher or other weapons are mounted on the weapons carrier. When not is use, it serves as the stowage point for the TOW missile guidance set.

9 *Hinged Supports* permit two gunners platform height adjustments to provide maximum comfort and accessibility to various mounted weapons.

10 *Quick-Release Pins* secure the gunners' platform to the hinged supports.





KEY ITEM AND FUNCTION

CAUTION

The ballistic curtain must be closed during TOW missile firing. Backblast from missile firing will blow out window if curtain is not closed.

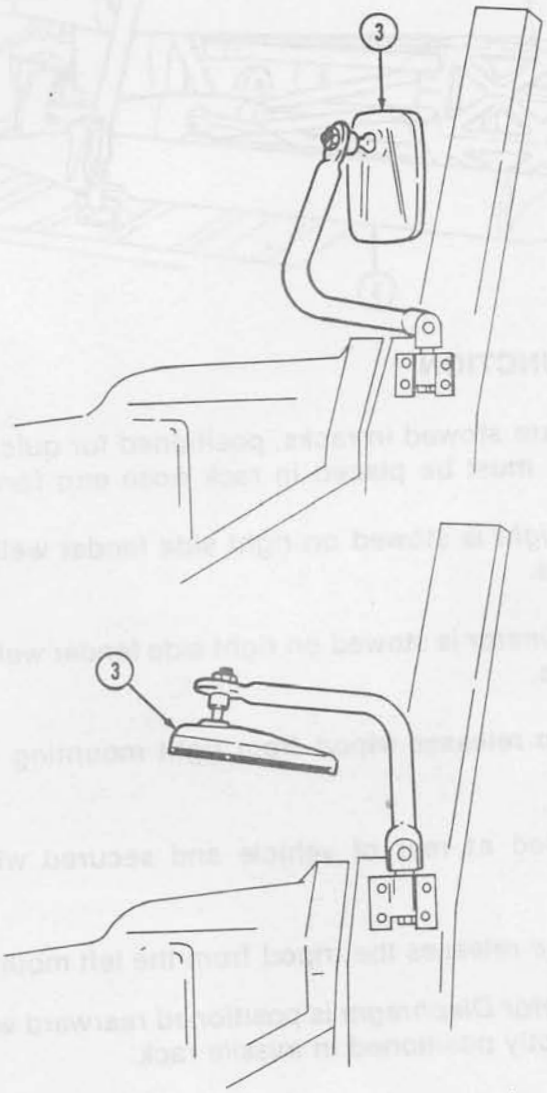
1 *Ballistic Curtain* provides window ballistic protection. To open, it is unfastened and pulled down. To close, it is raised, velcro sealed and fastened with turnbuttons.

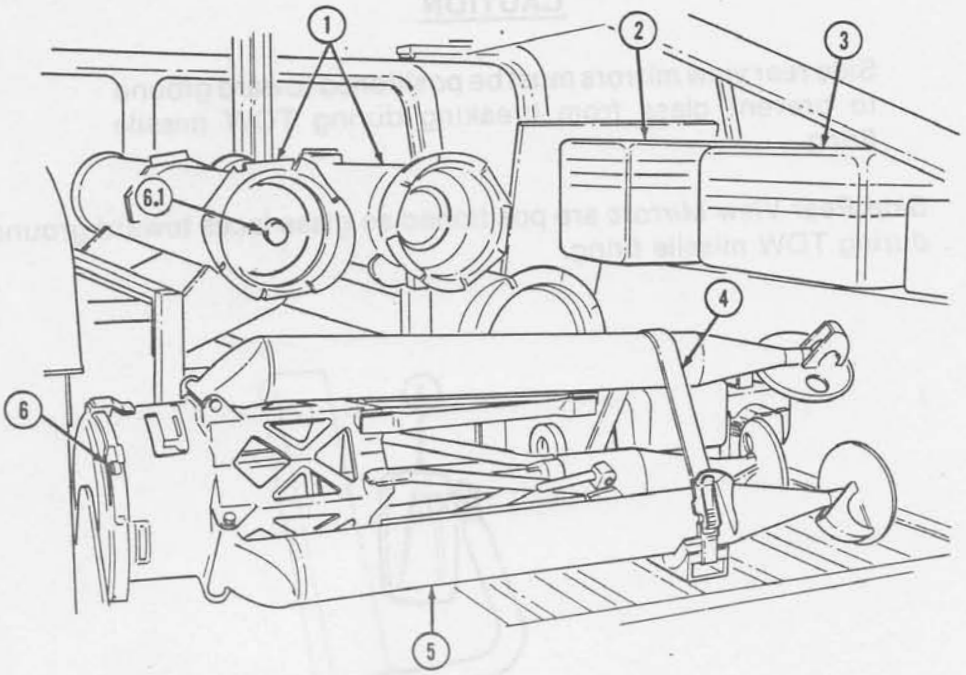
2 *Rear Door Window* provides side visibility when curtain is down. To open, pull down. To close, raise and velcro seal to door.

CAUTION

Side rear view mirrors must be positioned toward ground to prevent glass from breaking during TOW missile firing.

3 *Side Rear View Mirrors* are positioned so glass faces toward ground during TOW missile firing.





KEY ITEM AND FUNCTION

1 *Tow Missiles* are stowed in racks, positioned for quick loading and firing. Missiles must be placed in rack nose end forward.

2 *Night Vision-Sight* is stowed on right side fender well and secured with two straps.

3 *Boresight Collimator* is stowed on right side fender well and secured with two straps.

4 *Mounting Strap* releases tripod from right mounting bracket.

5 *Tripod* is stowed at rear of vehicle and secured with strap and bracket.

6 *Mounting Clamp* releases the tripod from the left mounting bracket.

6.1 *Humidity Indicator Diaphragm* is positioned rearward when encased missile is correctly positioned in missile rack.

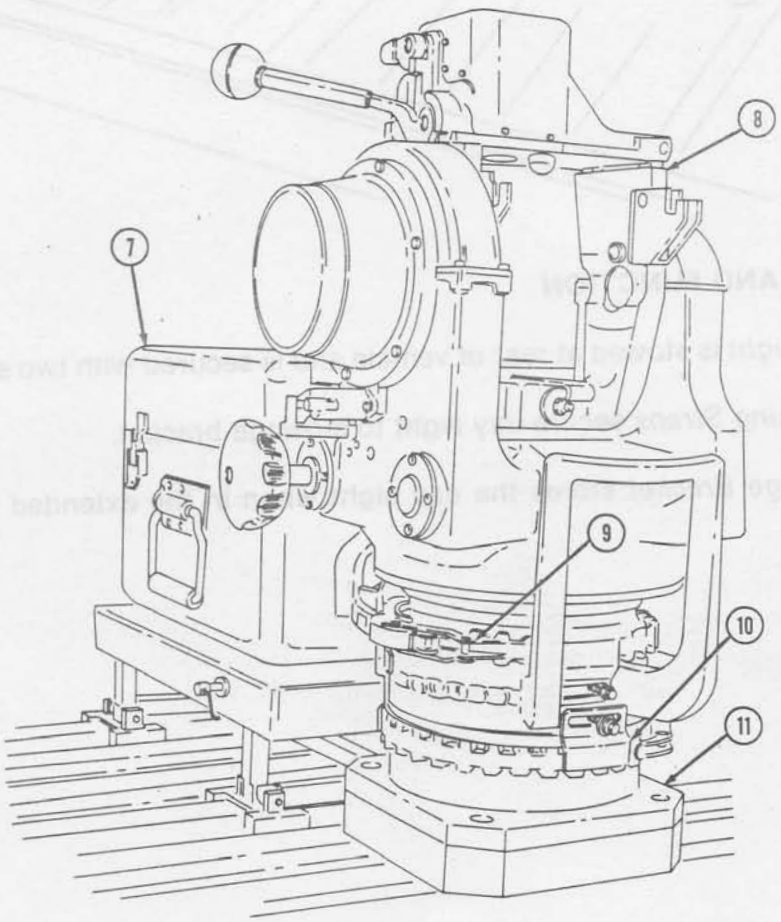
7 *Missile Guidance Set* mounts to gunners platform when in extended travel mode.

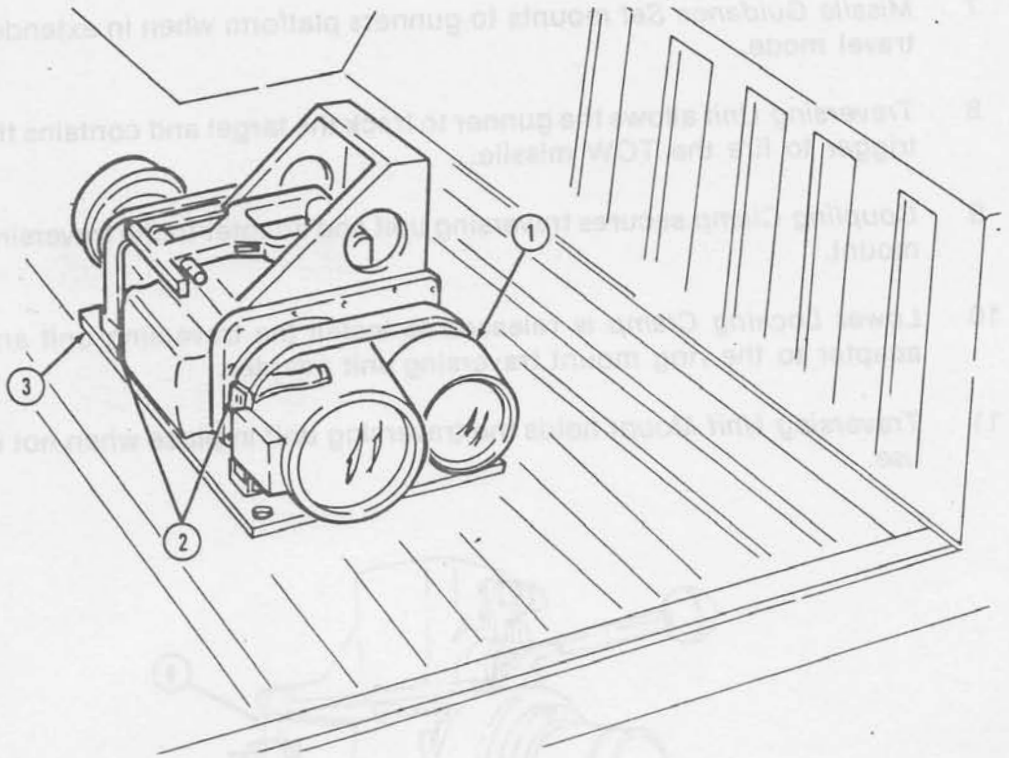
8 *Traversing Unit* allows the gunner to track the target and contains the trigger to fire the TOW missile.

9 *Coupling Clamp* secures traversing unit and adapter to the traversing mount.

10 *Lower Locking Clamp* is released to install the traversing unit and adapter to the ring mount traversing unit adapter.

11 *Traversing Unit Mount* holds the traversing unit in place when not in use.





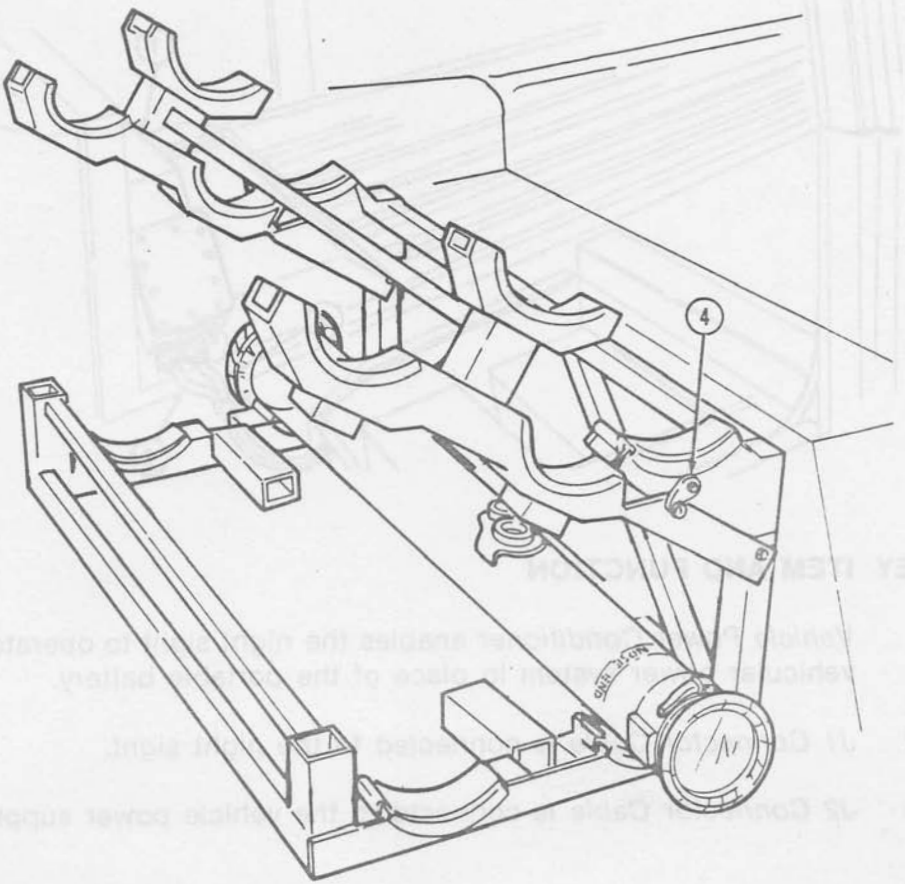
KEY ITEM AND FUNCTION

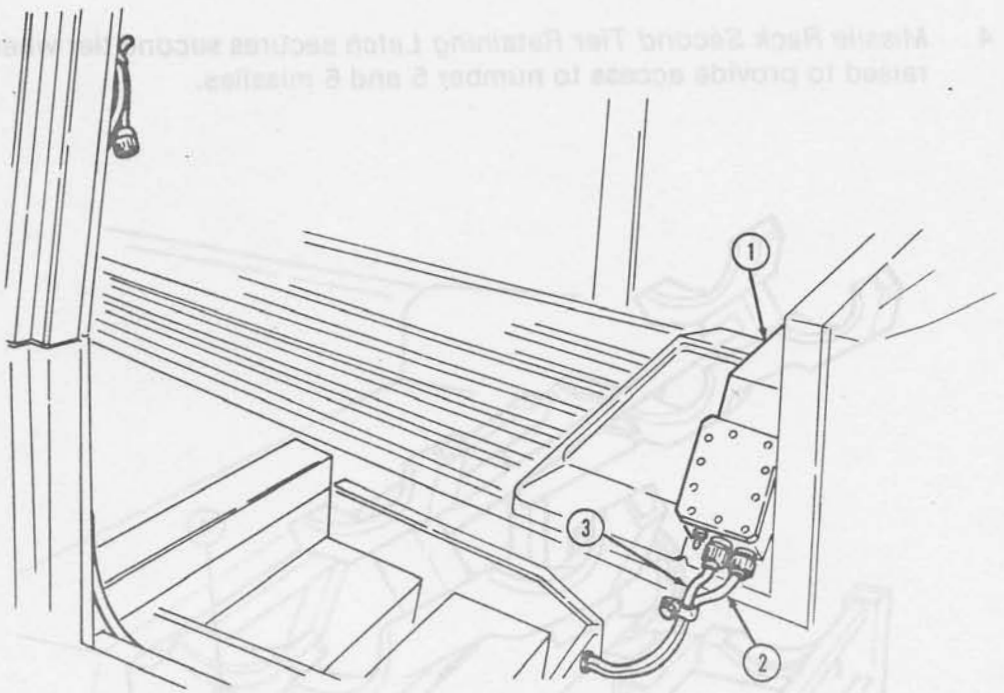
1 *Day Sight* is stowed at rear of vehicle and is secured with two straps.

2 *Retaining Straps* secure day sight to stowage bracket.

3 *Stowage Bracket* stores the day sight when in the extended travel mode.

4 *Missile Rack Second Tier Retaining Latch* secures second tier when raised to provide access to number 5 and 6 missiles.



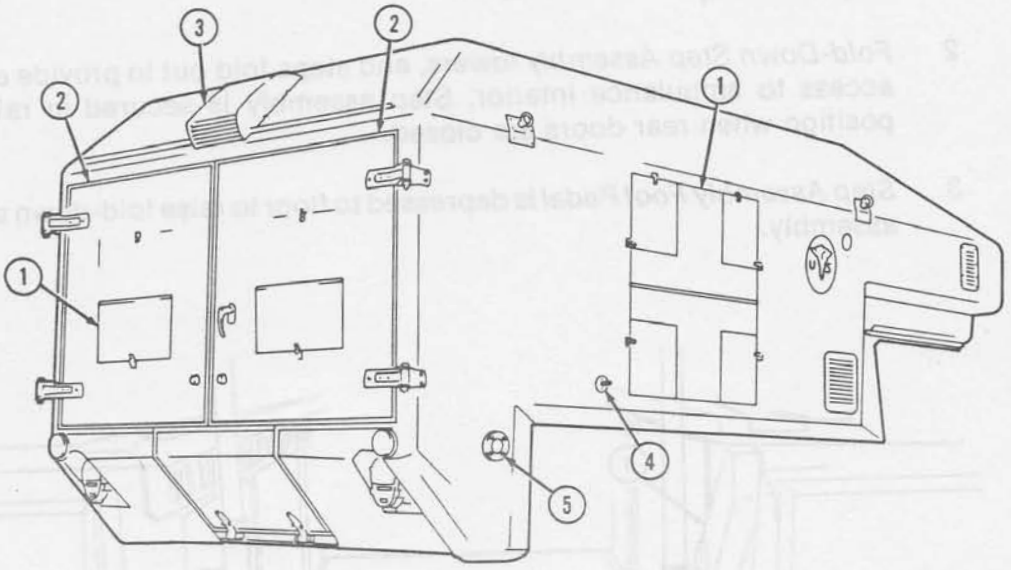


KEY ITEM AND FUNCTION

1 *Vehicle Power Conditioner* enables the night sight to operate from vehicular power system in place of the portable battery.

2 *J1 Connector Cable* is connected to the night sight.

3 *J2 Connector Cable* is connectd to the vehicle power supply.



KEY ITEM AND FUNCTION
(XM997 MAXI AMBULANCE ONLY)

1 *Red Cross Markings* are at seven locations on outside of ambulance body; one on each rear door, one on each side, two on front and one on roof. Markings are held open with latches for ambulance use. For non-ambulance use, unfasten latches and fold down marking. Secure in closed position with lower latches.

2 *Rear Doors* are opened from either inside or outside of ambulance.

3 *Rear Exhaust Fan* is located above rear doors, and is used to exhaust air from ambulance interior.

4 *Rear Door Stop Latches* are positioned out to secure doors in open position. When doors are closed, latches are positioned up or down for travel.

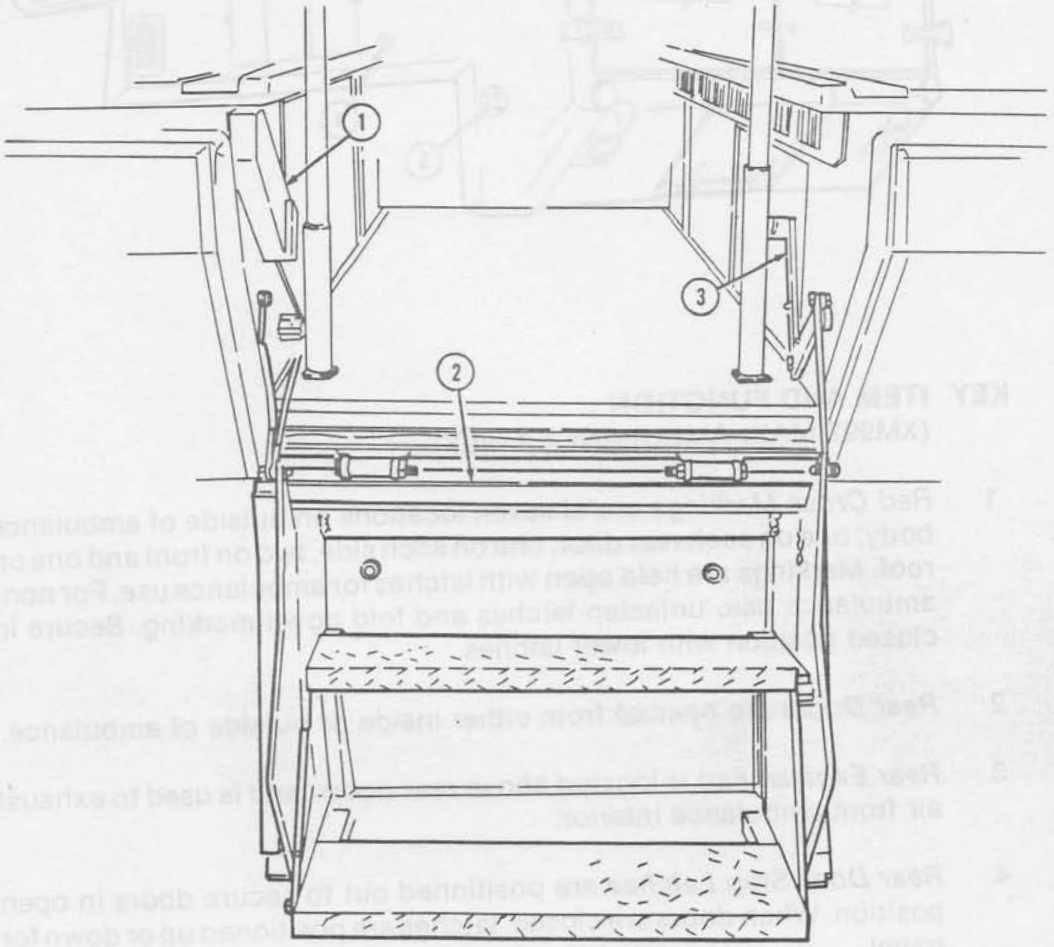
5 *Heater Exhaust Outlet* vents exhaust gases from heating/air conditioning unit.

KEY ITEM AND FUNCTION

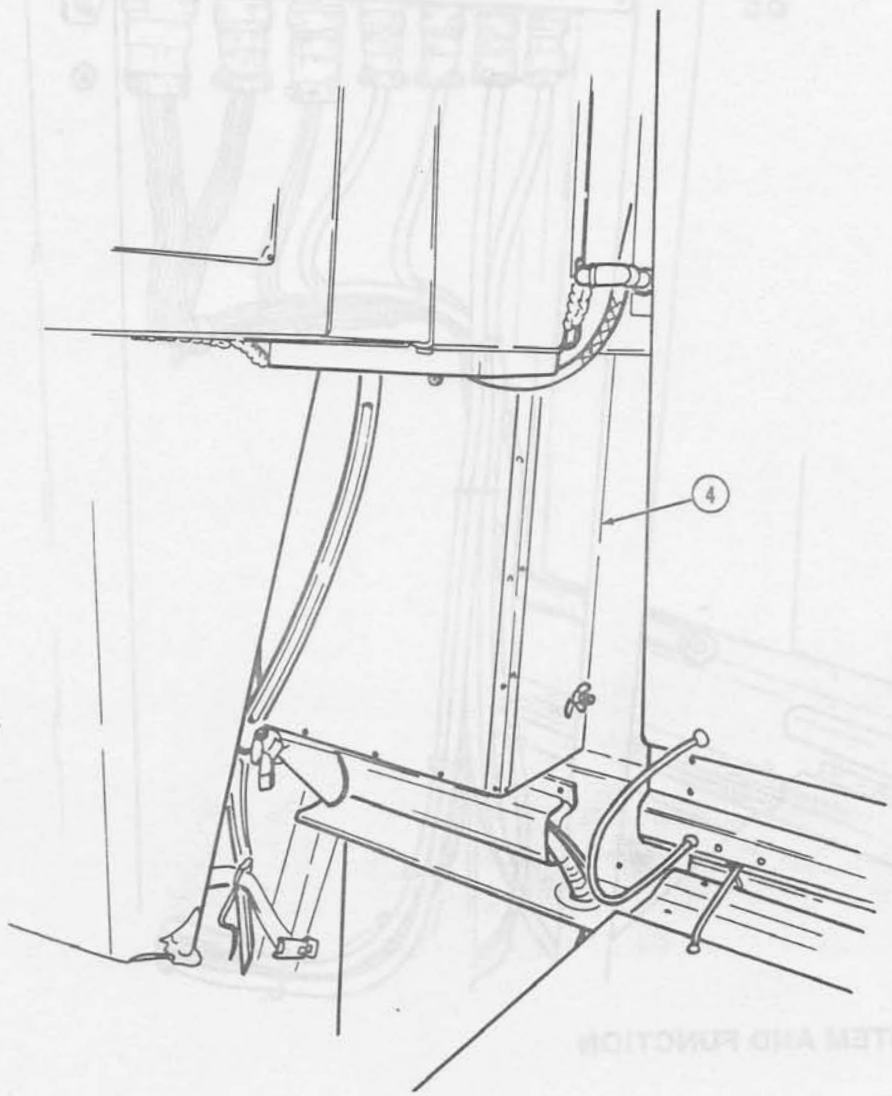
1 *Step Assembly Lift Cylinder* provides a lift boost for raising fold-down step assembly.

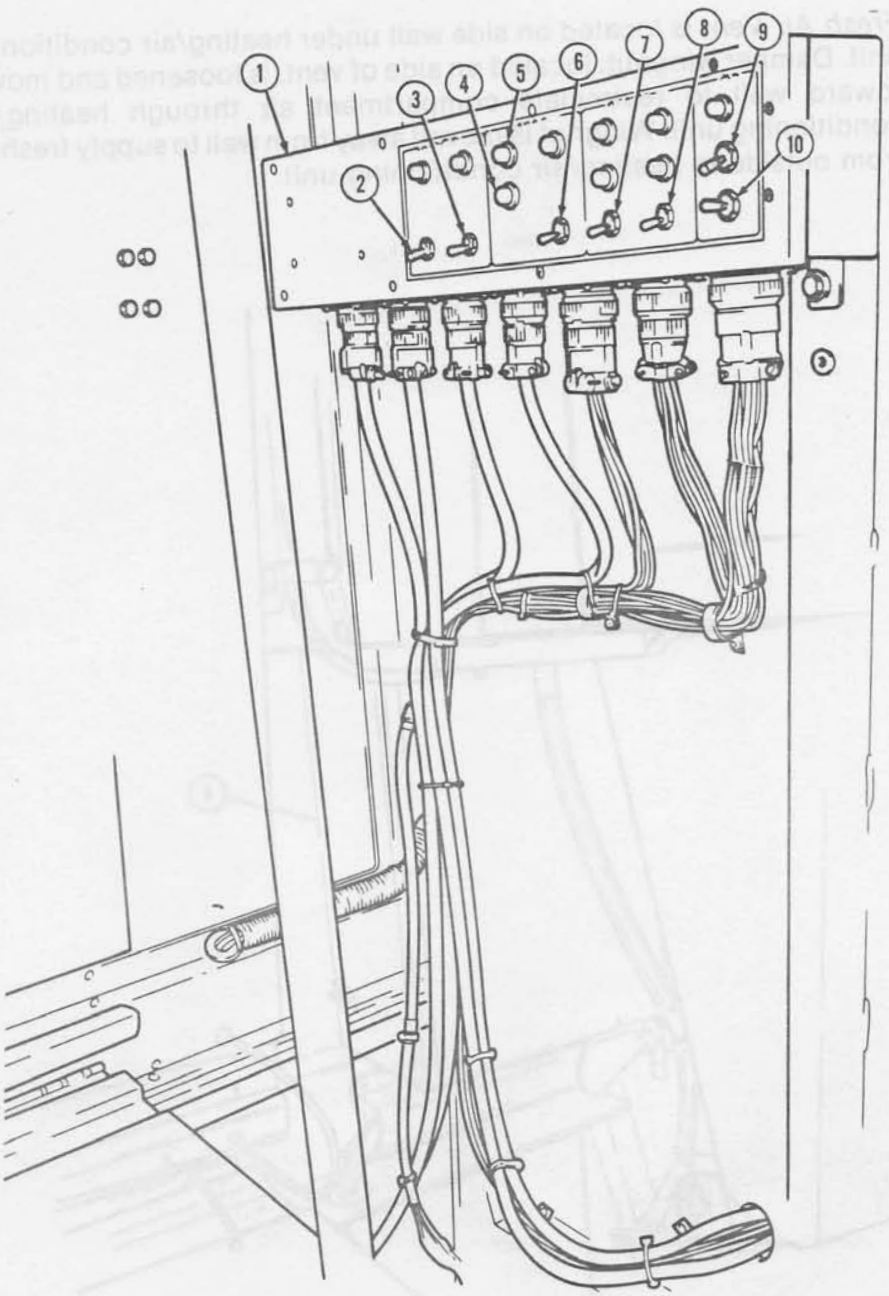
2 *Fold-Down Step Assembly* lowers, and steps fold out to provide easy access to ambulance interior. Step assembly is secured in raised position when rear doors are closed.

3 *Step Assembly Foot Pedal* is depressed to floor to raise fold-down step assembly.



4 *Fresh Air Vent* is located on side wall under heating/air conditioning unit. Damper wingnut, located on side of vent, is loosened and moved toward wall to recirculate compartment air through heating/air conditioning unit. Wingnut is moved away from wall to supply fresh air from outside to heating/air conditioning unit.





KEY ITEM AND FUNCTION

1 *Electrical Panel* is located at left front of ambulance interior.

2 *NBC Switch* is placed in "ON" position to activate NBC protection components.

3 *Exhaust Fan Switch* is a two-speed control which activates rear exhaust fan.

4 *Door Ajar Indicator Lamp* will illuminate if rear or attendant doors are ajar during blackout condition.

5 *Status Indicator Lamp* flashes on and off when main light switch in vehicle cab is placed in blackout position. Lamp will automatically go out if any door is ajar. Main power switch does not need to be "ON" for status lamp to operate.

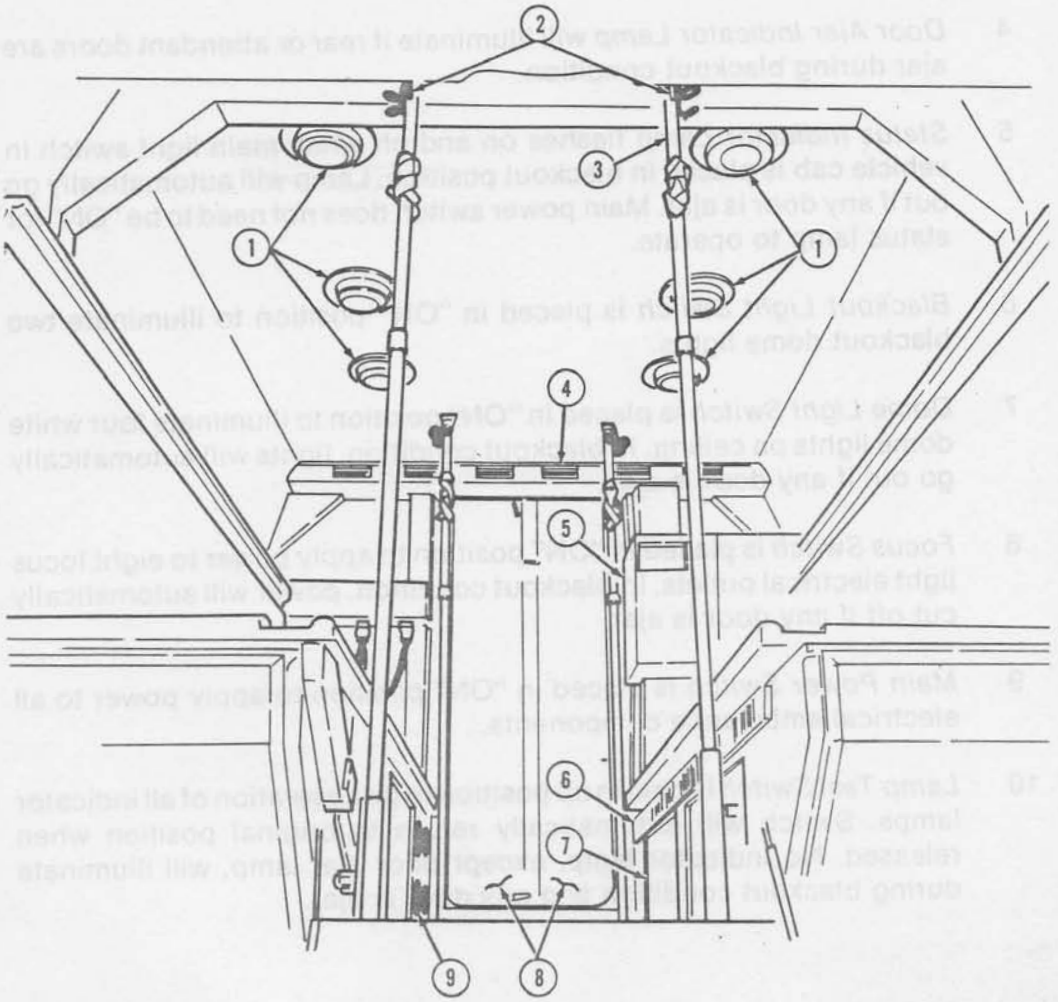
6 *Blackout Light Switch* is placed in "ON" position to illuminate two blackout dome lights.

7 *Dome Light Switch* is placed in "ON" position to illuminate four white dome lights on ceiling. In blackout condition, lights will automatically go out if any door is ajar.

8 *Focus Switch* is placed in "ON" position to apply power to eight focus light electrical outlets. In blackout condition, power will automatically cut off if any door is ajar.

9 *Main Power Switch* is placed in "ON" position to apply power to all electrical ambulance components.

10 *Lamp Test Switch* is held in up position to test operation of all indicator lamps. Switch will automatically return to original position when released. No indicator lamp, except door ajar lamp, will illuminate during blackout condition and any door is ajar.



KEY ITEM AND FUNCTION

1 *Four Dome and Two Blackout Lamps* are located on ceiling.

2 *IV Hooks and Straps* are located at top of center support posts.

3 *Center Support Posts* provide securing point for upper litter racks when racks are in raised position. Two rear center support posts are raised to provide overhead grab rails.

4 *Air Conditioning Ducts* direct cooled air into ambulance interior.

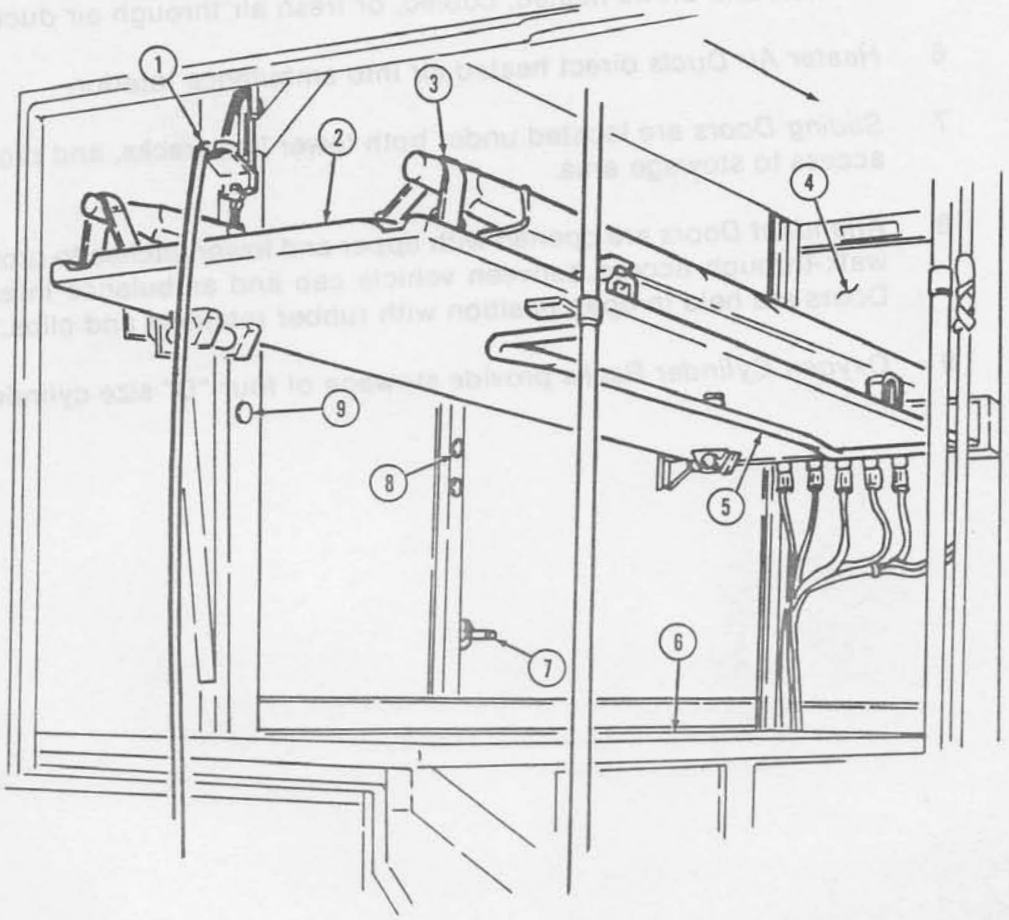
5 *Heating/Air Conditioning Unit* is located at right front of ambulance interior, and blows heated, cooled, or fresh air through air ducts.

6 *Heater Air Ducts* direct heated air into ambulance interior.

7 *Sliding Doors* are located under both lower litter racks, and provide access to stowage area.

8 *Attendant Doors* are opened with upper and lower latches to provide walk-through access between vehicle cab and ambulance interior. Doors are held in open position with rubber retainers and clips.

9 *Oxygen Cylinder Racks* provide stowage of four "D" size cylinders.



KEY ITEM AND FUNCTION

1 *Block and Tackle* is used to raise loaded upper litter rack. Block and tackle is stowed on hook located at left rear wall.

2 *Upper Litter Racks* are lowered at rear to enable loading of litters from ground, then raised using block and tackle. Racks also serve as backrests for ambulatory patients.

3 *Litter Straps* are used to hold litters in place once installed on upper or lower racks. Straps are located at rear of each litter rack.

4 *Attendant's Seat* is stowed above electrical panel. Seat fits between each lower litter rack and slides both forward and rearward.

5 *Backrest Support Brace* is used when upper rack is in lowered position. Brace is released from retaining clip at underside of upper rack and lowered to hold rack from side wall, enabling upper litter rack to serve as backrest for ambulatory patients and for litter stowage.

6 *Lower Litter Racks* each are capable of carrying a litter or seating four ambulatory patients. Upper access to stowage area is provided by releasing two rubber retainers and raising lower rack.

7 *Upper Rack Stop Latches* are positioned out to secure racks in folded down position. Latches are positioned up or down when upper racks are raised.

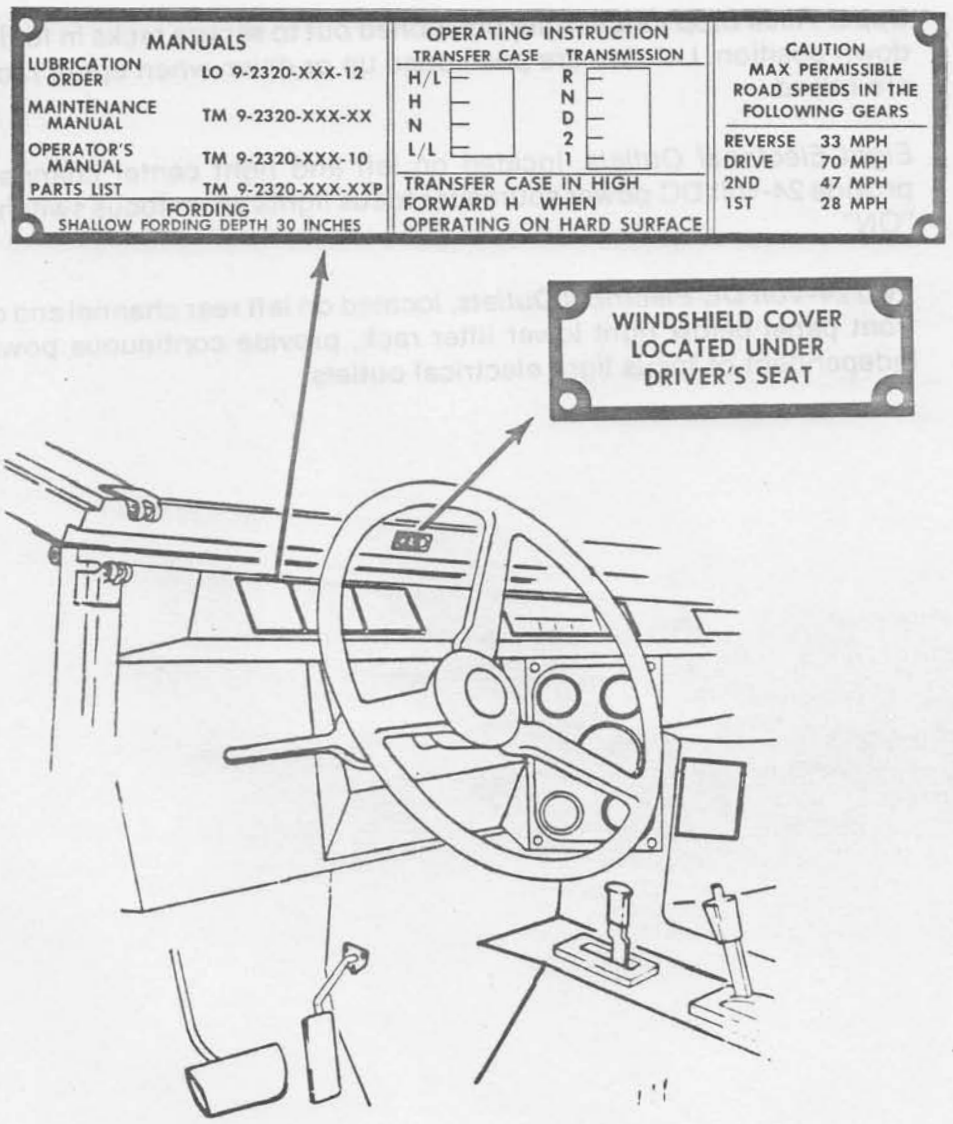
8 *Eight Electrical Outlets,* located on left and right center channels, provide 24-volt DC power source for focus lights when focus switch is "ON".

9 *Two 24-Volt DC Electrical Outlets,* located on left rear channel and on front panel below right lower litter rack, provide continuous power independent of focus light electrical outlets.

Section II. LOCATION AND CONTENTS OF CAUTION, DATA AND WARNING PLATES

2-4. General

The location and contents of caution, data and warning plates are provided in this paragraph. If any of these plates are worn, broken, painted over, missing or unreadable, they must be replaced.



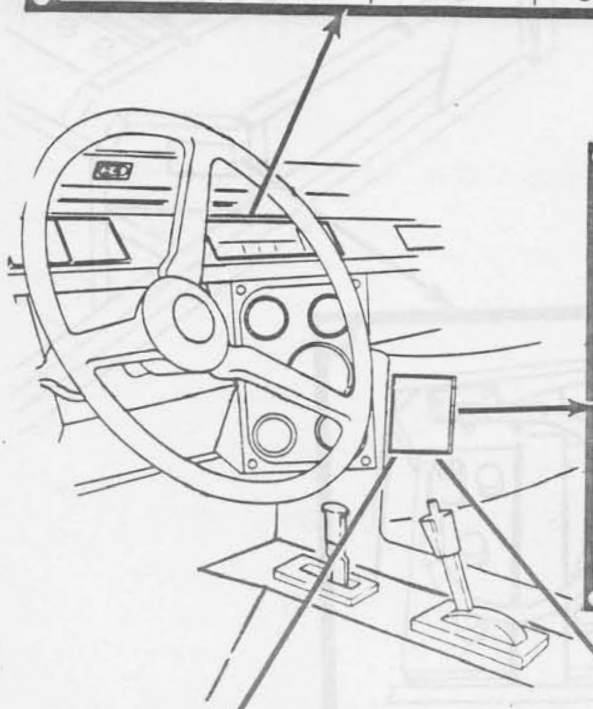
SERVICING DATA

FUEL			DIESEL NO. 2
FUEL TANK CAPACITY			25 GALS
COOLING SYSTEM CAPACITY			25 QTS
CRANKCASE CAPACITY			8 QTS + 1 QT FOR FILTER
TEMPERATURE	ABOVE 32°F	40° TO -10°F	0° TO 15°F
ENGINE OIL	OE-30	OE-10	OEA
GEAR OIL	GO 80/90	GO 80/90	GO 75
GREASE	GAA	GAA	GAA

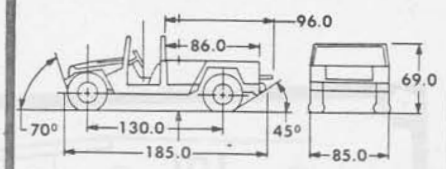
TIRE INFLATION PRESSURE (P.S.I.)

FRONT	20
REAR	22

TO DRAIN COOLING SYSTEM OPEN DRAIN COCK LOCATED AT LOWER RADIATOR TUBE



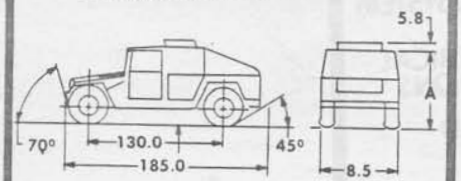
TRUCK UTILITY: 1 1/4 TON W/E XM998
WEIGHT AND DIMENSIONAL DATA



VEHICLE	FRONT AXLE	REAR AXLE
EMPTY	2767	2224
W/2500 LB. PAYLOAD	3326	4165

MAX. TOWED LOAD 3400 LBS.
VERTICAL PINTLE LOAD 200 LBS.
SHIPPING CUBAGE 654 CU. FT. REDUCIBLE TO 560 CU. FT. SHIPPING WEIGHT DRY 4737 LBS

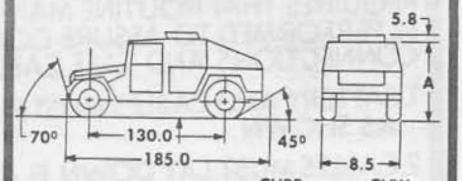
TRUCK GUIDED MISSILE EQUIPT: XM966
WEAPONS CARRIER
WEIGHT AND DIMENSIONAL DATA



	CURB	CVW
FRT. AXLE WT.	2983 LBS.	3550 LBS.
RR. AXLE WT.	2834 LBS.	4462 LBS.
TOTAL WT.	5817 LBS.	8012 LBS.
A	70.4 INS.	69 INS.

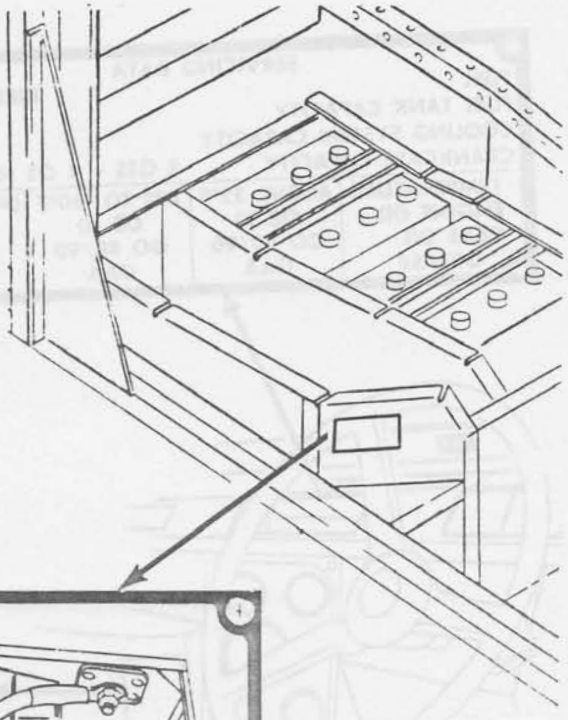
MAX. TOWED LOAD	3400 LBS.
VERTICAL PINTLE LOAD	200 LBS.
SHIPPING CUBAGE	682 CU. FT.
SHIPPING WEIGHT DRY	5892 LBS.

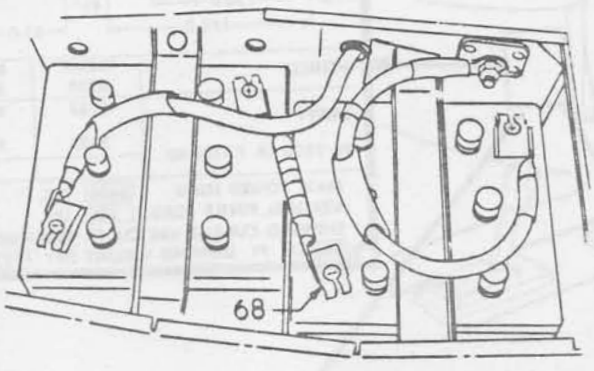
TRUCK GUIDED MISSILE EQUIPT: XM966
WEAPONS CARRIER—SUPPLEMENTARY ARMOR
WEIGHT AND DIMENSIONAL DATA



	CURB	CVW
FRT. AXLE WT.	3083 LBS.	3650 LBS.
RR. AXLE WT.	3063 LBS.	4489 LBS.
TOTAL WT.	6146 LBS.	3139 LBS.
A	70.2 INS.	69 INS.

MAX. TOWED LOAD	3400 LBS.
VERTICAL PINTLE LOAD	200 LBS.
SHIPPING CUBAGE	682 CU. FT.
SHIPPING WEIGHT DRY	5892 LBS.



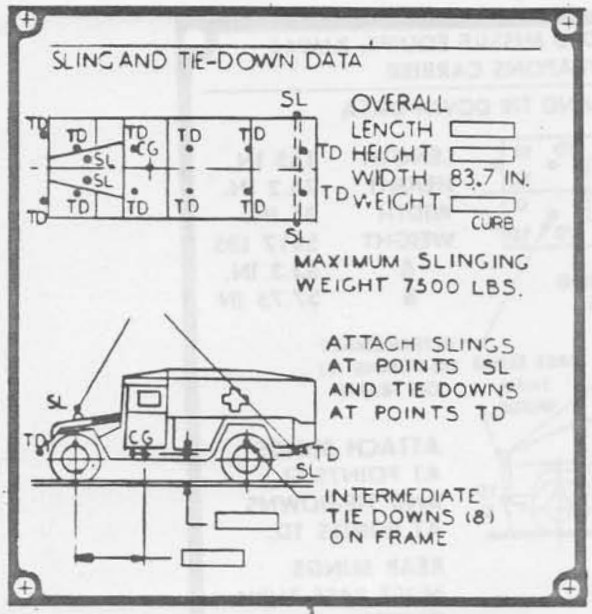


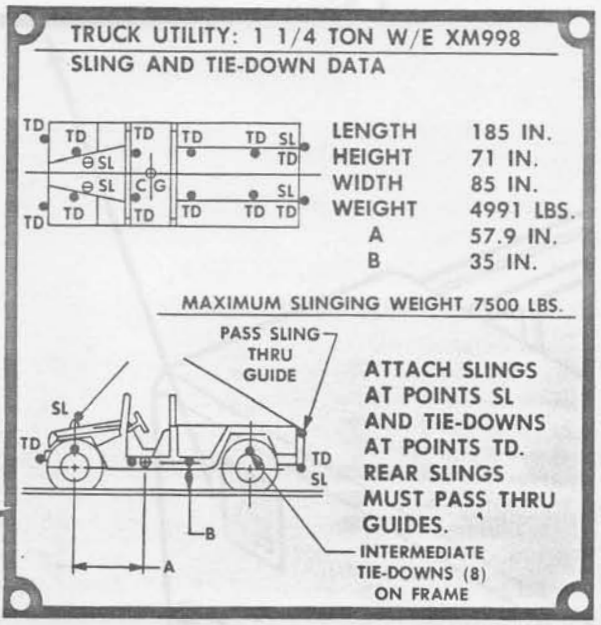
CONNECTING BATTERY CABLES

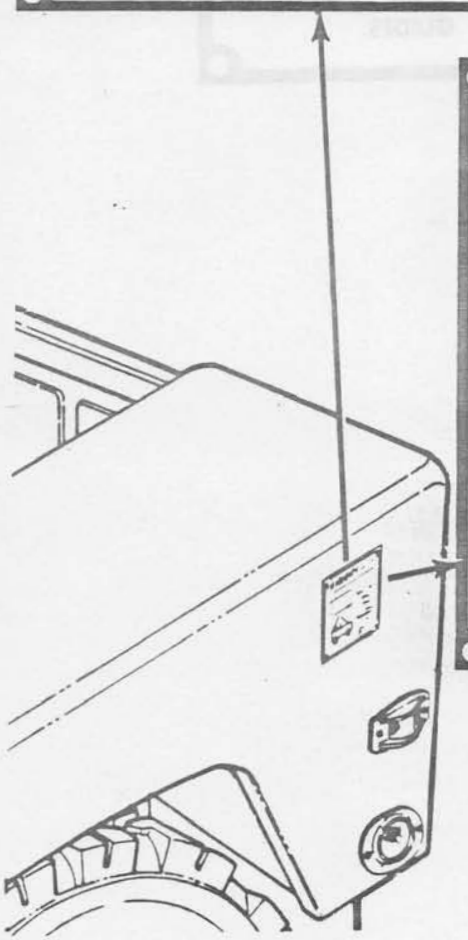
CAUTION

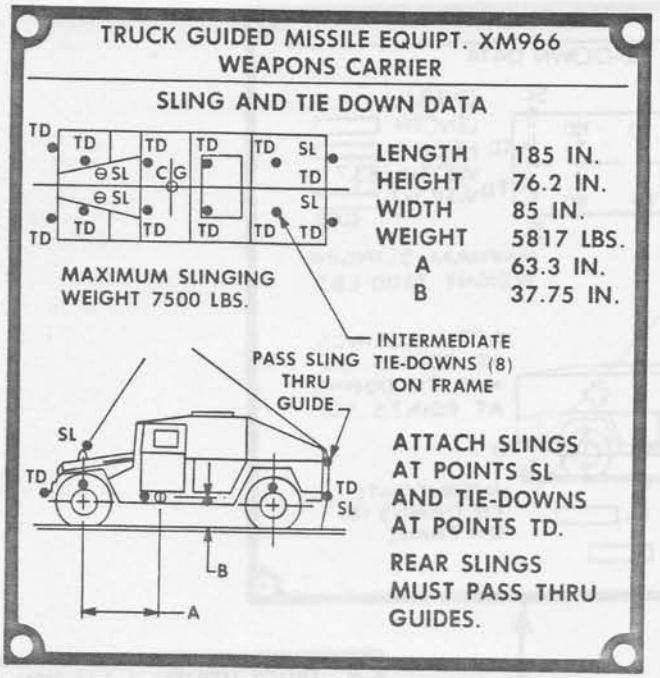
CONTINUED RELIABILITY OF ELECTRICAL SYSTEM REQUIRES THAT ROUTINE MAINTENANCE BE PERFORMED TO ASSURE GOOD ELECTRICAL CONNECTIONS AND SAFE CABLE POSITIONS

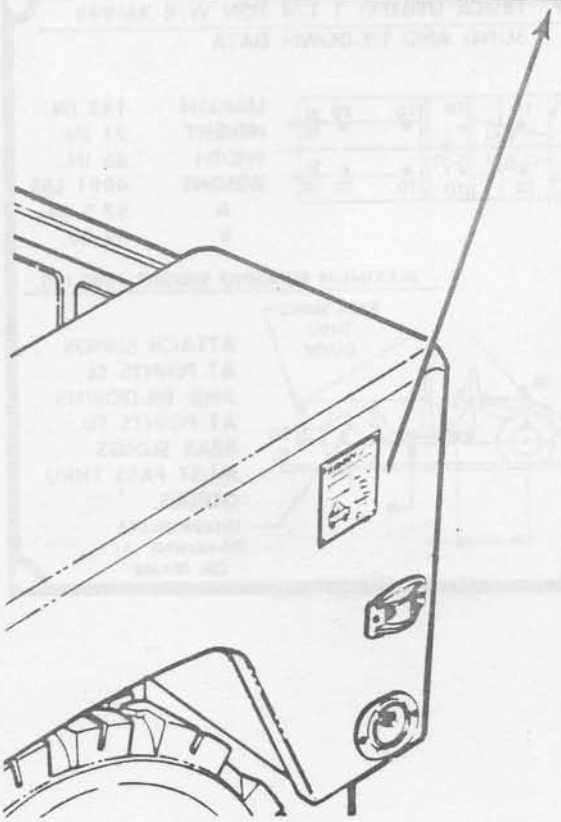
1. BATTERY AND CABLES MUST BE INSTALLED AS SHOWN.
2. CABLES MUST LAY DOWN FLAT ON TOP OF BATTERIES.
3. LEAD 68 IS 12-VOLT POWER
4. KEEP TERMINALS AND CONNECTIONS CLEAN AND TIGHT. APPLY A HEAVY COAT OF GREASE TO BATTERY TERMINALS

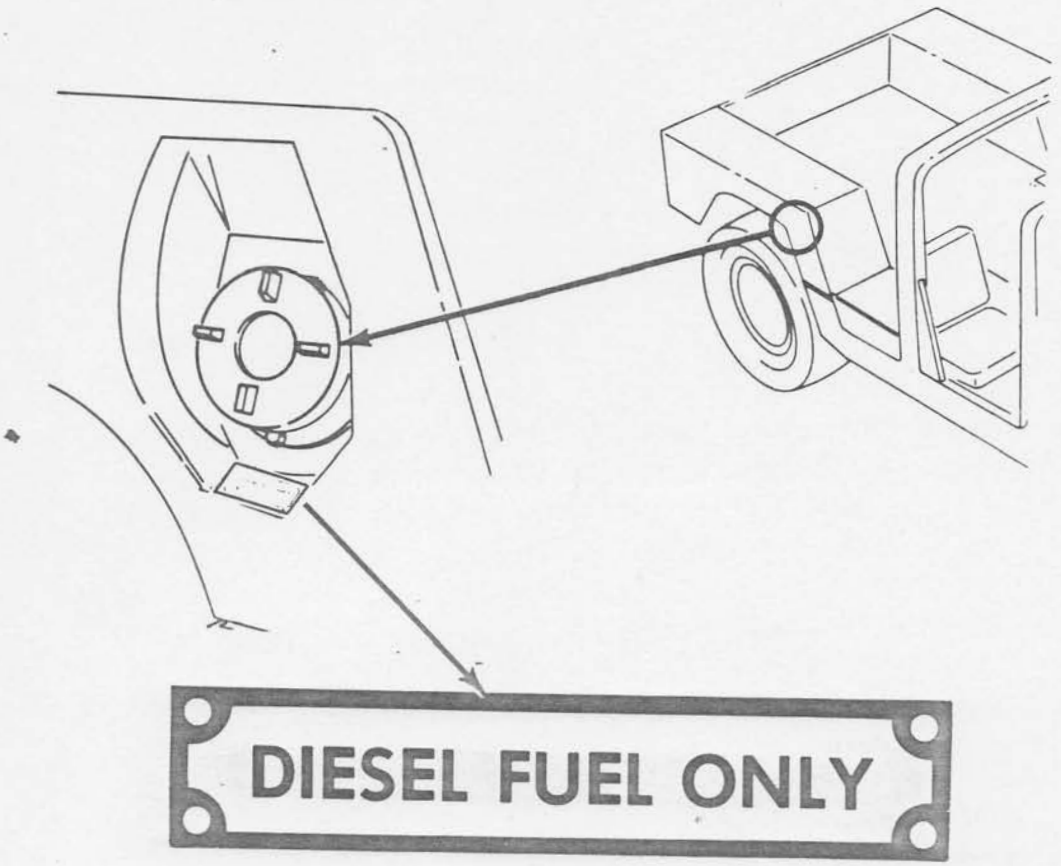

SLING AND TIE-DOWN DATA
SL
TD
CG
OVERALL
LENGTH
HEIGHT
WIDTH 83.7 IN.
WEIGHT
CURB
MAXIMUM SLINGING
WEIGHT 7500 LBS.
ATTACH SLINGS
AT POINTS SL
AND TIE DOWNS
AT POINTS TD
INTERMEDIATE
TIE DOWNS (8)
ON FRAME


TRUCK UTILITY: 1 1/4 TON W/E XM998
SLING AND TIE-DOWN DATA
LENGTH 185 IN.
HEIGHT 71 IN.
WIDTH 85 IN.
WEIGHT 4991 LBS.
A 57.9 IN.
B 35 IN.
MAXIMUM SLINGING WEIGHT 7500 LBS.
PASS SLING THRU GUIDE
ATTACH SLINGS AT POINTS SL AND TIE-DOWNS AT POINTS TD. REAR SLINGS MUST PASS THRU GUIDES.
INTERMEDIATE TIE-DOWNS (8) ON FRAME




TRUCK GUIDED MISSILE EQUIPT. XM966
WEAPONS CARRIER
SLING AND TIE DOWN DATA
TD
SL
C G
MAXIMUM SLINGING
WEIGHT 7500 LBS.
LENGTH 185 IN.
HEIGHT 76.2 IN.
WIDTH 85 IN.
WEIGHT 5817 LBS.
A 63.3 IN.
B 37.75 IN.
INTERMEDIATE
TIE-DOWNS (8)
ON FRAME
PASS SLING
THRU
GUIDE
ATTACH SLINGS
AT POINTS SL
AND TIE-DOWNS
AT POINTS TD.
REAR SLINGS
MUST PASS THRU
GUIDES.
B
A




DIESEL FUEL ONLY

Section III. SPECIAL PURPOSE KITS OPERATION

2-5. General

This section provides instruction for special purpose kits operation. For detailed kit decriptions, refer to HMMWV Maintenance Manual.

2-6. Deep Water Fording Kit

To operate vehicle with deep water fording kit installed, refer to paragraph 2-34.

2-7. Troop Seat Operation

The troop seat kit is used to convert the XM998 utility vehicle into a troop carrier.

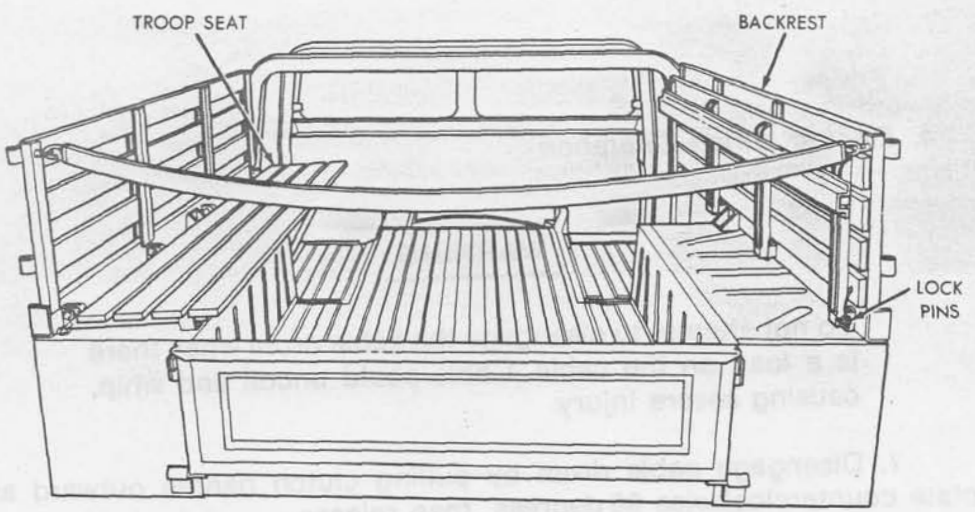
a. Raising Troop Seat

1. Remove lock pins, and raise troop seat upward to backrest.

2. Secure troop seat to backrest with lock pins.

b. Lowering Troop Seat

1. Lowering troop seat is reverse of fold-up procedures.



2-8. Electric Winch

The vehicle electrical system is used to power the winch. It is advisable to have the engine running at a fast idle while operating so the alternator recharges the battery. The winch can be operated for short durations from only battery power.

Table 2-1. Winch Specifications

Manufacturer	Ramsey
Model	2001
Weight (winch only)	73 lbs.
Rated line pull	8,000 lbs.
Cable diameter	3/8 in.
Cable breaking strength	13,120 lbs.
Cable length	100 ft.
Operating modes	Unwind, neutral, wind

Layer of cable	1	2	3	4	5	6
Rated line pull per layer (lbs.)	8,000	6,900	6,000	5,400	4,800	4,000
Cable capacity per layer (ft.) Model 2001	22	44	69	97	128	162

a. Electric Winch Operation

WARNING

Do not attempt to disengage the cable drum when there is a load on the cable. Cable could uncoil and whip, causing severe injury.

1. Disengage cable drum by pulling clutch handle outward and rotate counterclockwise 90 degrees, then release.

WARNING

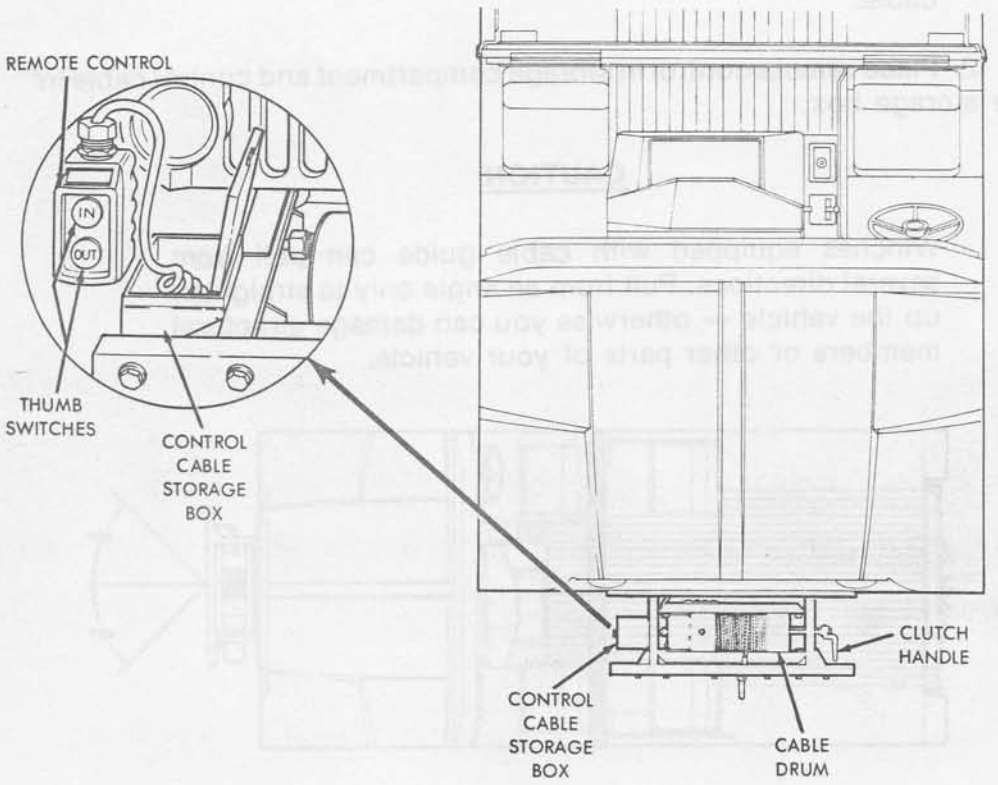
Wear leather gloves when handling winch cable. Do not allow cable to run through hands. Broken wires cause painful injuries.

NOTE

If clutch handle cannot be pulled out, run the winch momentarily in reverse to relieve pressure on the clutch jaws.

2. Pull off cable by hand to desired length and connect to load.

3. Engage cable drum by rotating clutch handle left or right until the handle moves inward and engages.



4. Wind or unwind winch cable with thumb switch in control handle until load has been retrieved.

WARNING

Direct all personnel to stand clear of winch operation. A snapped cable can cause serious injuries.

b. Securing Winch After Operation

1. Wind winch cable until hook contacts cable guide in bumper.

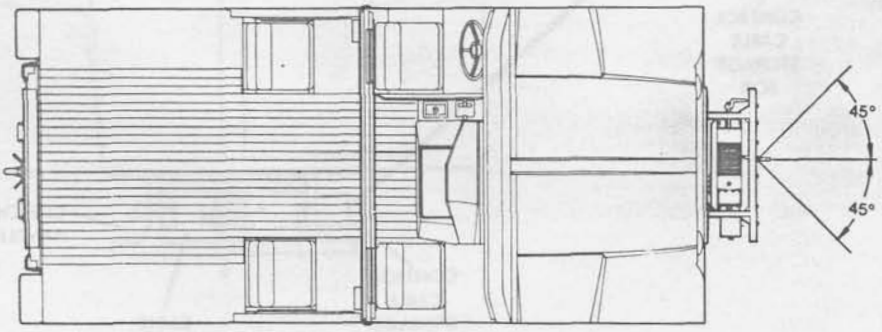
CAUTION

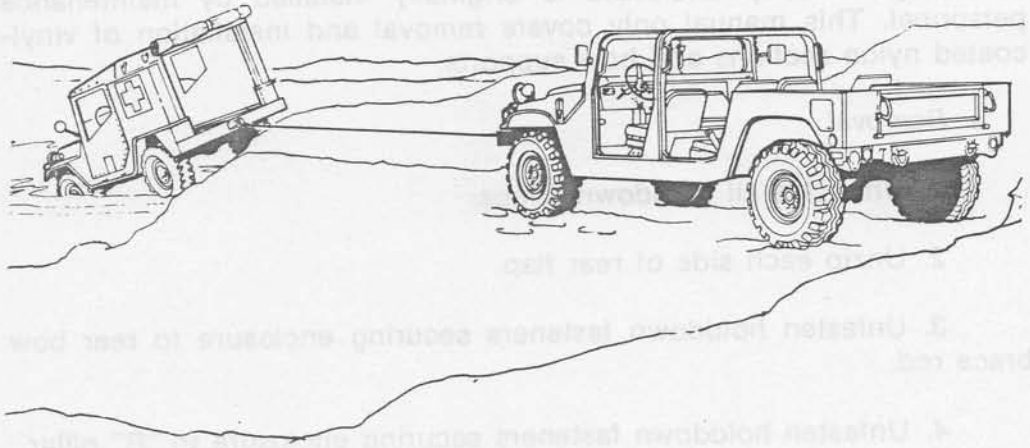
Remote control must be placed in storage compartment to prevent thumb switches from being depressed by cable.

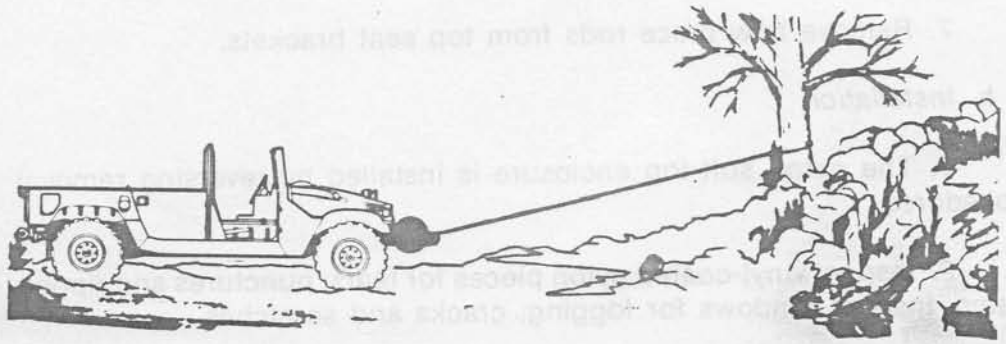
2. Place remote control in storage compartment and control cable in cable storage box.

CAUTION

Winches equipped with cable guide can pull from several directions. Pull from an angle only to straighten up the vehicle — otherwise you can damage structural members or other parts of your vehicle.







2-9. Soft-Top Enclosure (Cargo Vehicles)

The cargo soft-top enclosure is originally installed by maintenance personnel. This manual only covers removal and installation of vinyl-coated nylon sections and bow supports.

a. Removal

1. Unbuckle all holddown straps.

2. Unzip each side of rear flap.

3. Unfasten holddown fasteners securing enclosure to rear bow brace rod.

4. Unfasten holddown fasteners securing enclosure to "B" pillar.

5. Separate velcro from front two door enclosures.

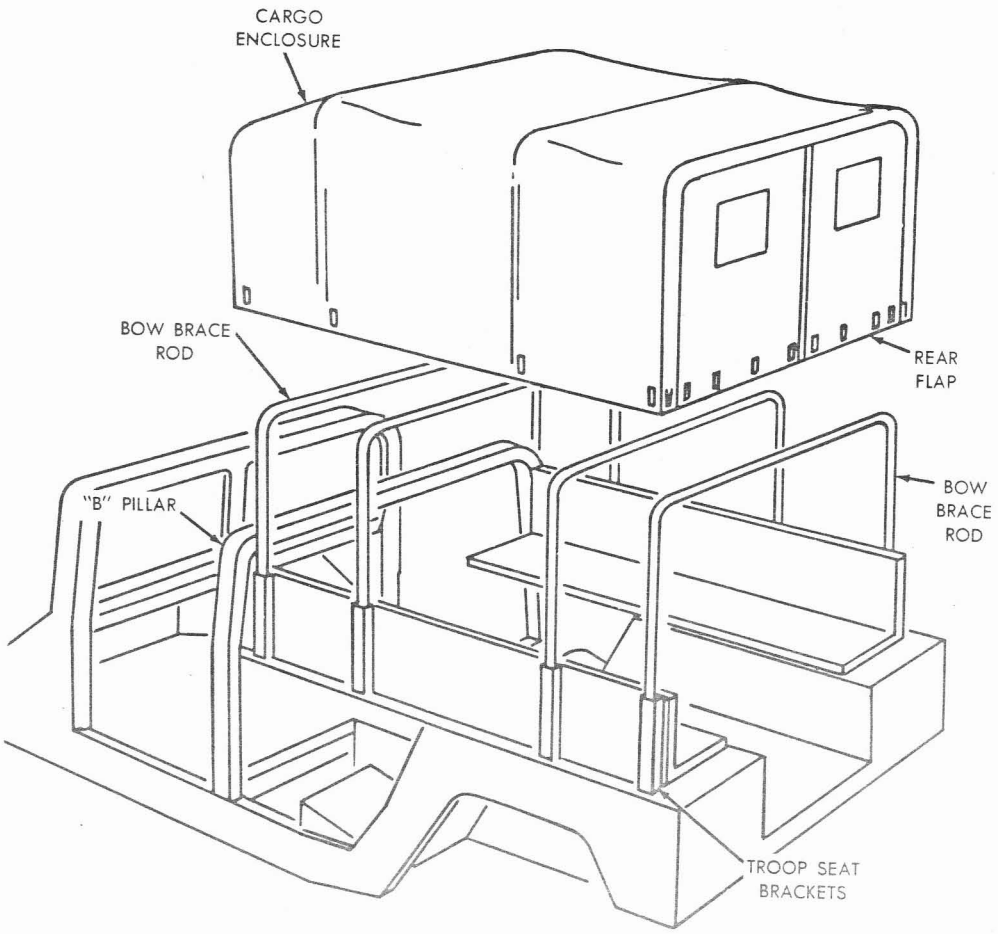
6. Slide cargo enclosure off bow brace rods.

7. Remove bow brace rods from top seat brackets.

b. Installation

1. The cargo soft-top enclosure is installed by reversing removal procedures.

2. Inspect vinyl-coated nylon pieces for tears, punctures and ripped seams. Inspect windows for fogging, cracks and scratches.


CARGO ENCLOSURE
BOW BRACE ROD
REAR FLAP
"B" PILLAR
BOW BRACE ROD
TROOP SEAT BRACKETS

2-10. Soft-Top Enclosures (Two-Door Vehicles)

The cargo soft-top enclosure is originally installed by maintenance personnel. This manual only covers removal and installation of vinyl-coated nylon sections.

a. Removal

1. Open front doors and lift off of hinges.

2. Unfasten holddown fasteners securing cab partition to "B" pillar.

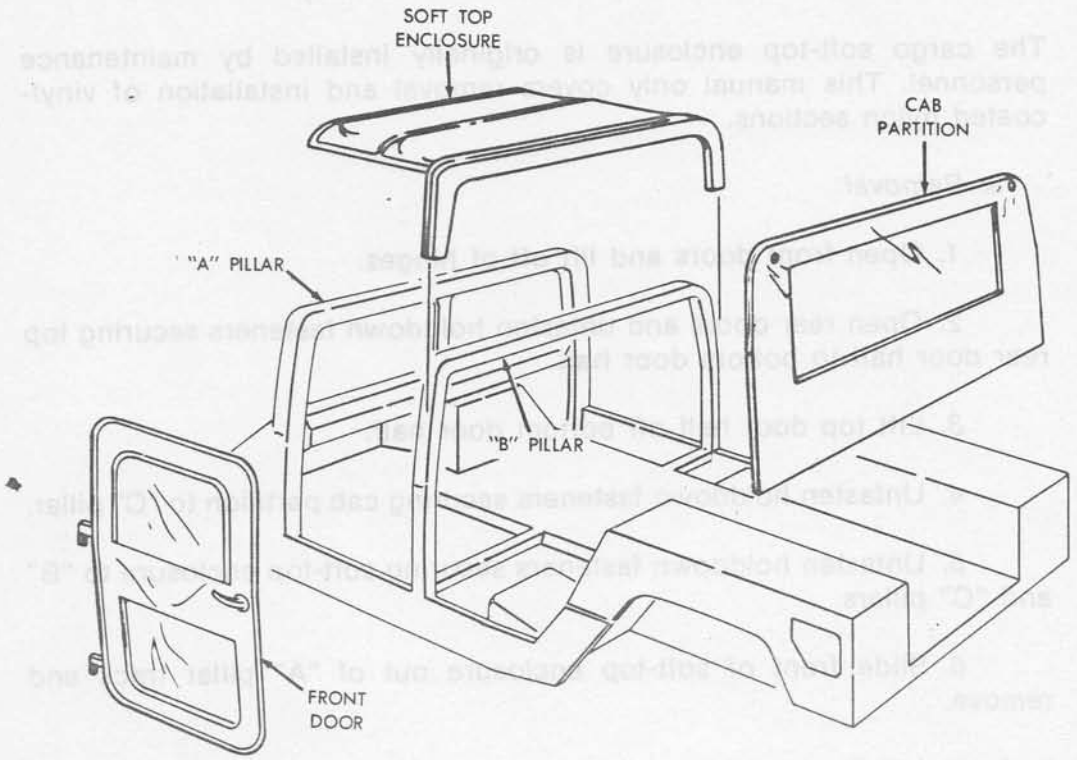
3. Unfasten holddown fasteners securing soft-top enclosure "A" pillar.

4. Slide front of soft-top enclosure out of "A" pillar track and remove.

b. Installation

1. The two-door soft-top enclosure is installed by reversing removal procedures.

2. Inspect for tears, punctures and ripped seams. Inspect windows for fogging, cracks and scratches. Have damaged items repaired.


SOFT TOP
ENCLOSURE
CAB
PARTITION
"A" PILLAR
"B" PILLAR
FRONT
DOOR

2-11. Soft-Top Enclosures (Four-Door Vehicles)

The cargo soft-top enclosure is originally installed by maintenance personnel. This manual only covers removal and installation of vinyl-coated nylon sections.

a. Removal

1. Open front doors and lift off of hinges.

2. Open rear doors and unfasten holddown fasteners securing top rear door half to bottom door half.

3. Lift top door half off bottom door half.

4. Unfasten holddown fasteners securing cab partition to "C" pillar.

5. Unfasten holddown fasteners securing soft-top enclosure to "B" and "C" pillars.

6. Slide front of soft-top enclosure out of "A" pillar track and remove.

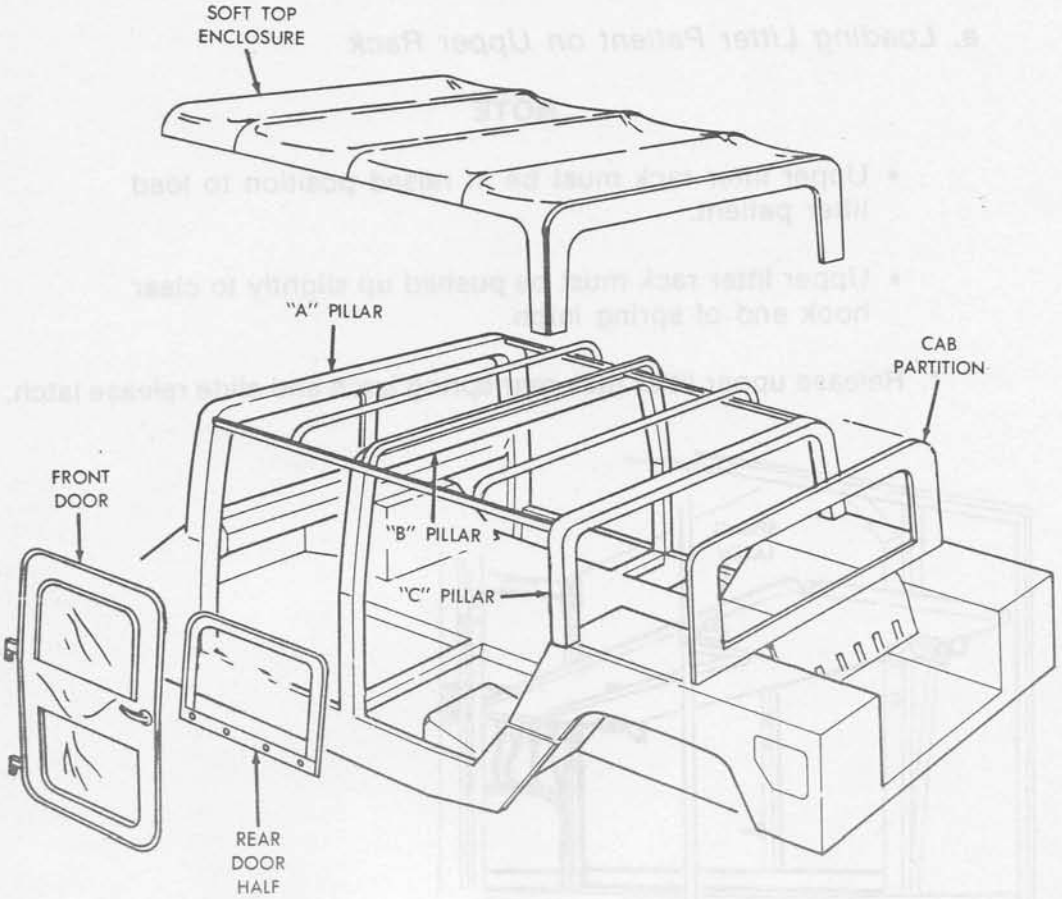
b. Installation

1. The four-door soft-top enclosure is installed by reversing the removal procedures.

2. Inspect for tears, punctures and ripped seams. Inspect windows for fogging, cracks and scratches. Have damaged items repaired.

2-11.1. Mini Ambulance

Procedures to raise the ambulance top (roof) to the elevated position, lowering the top (roof) to the mini position, and installation and removal of litter racks are found in Appendix D.


SOFT TOP
ENCLOSURE
"A" PILLAR
CAB
PARTITION
FRONT
DOOR
"B" PILLAR
"C" PILLAR
REAR
DOOR
HALF

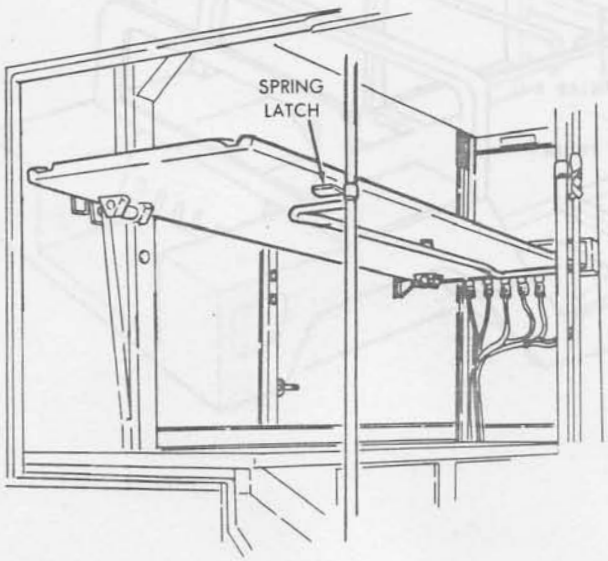
2-11.2. XM997 Maxi Ambulance Operation

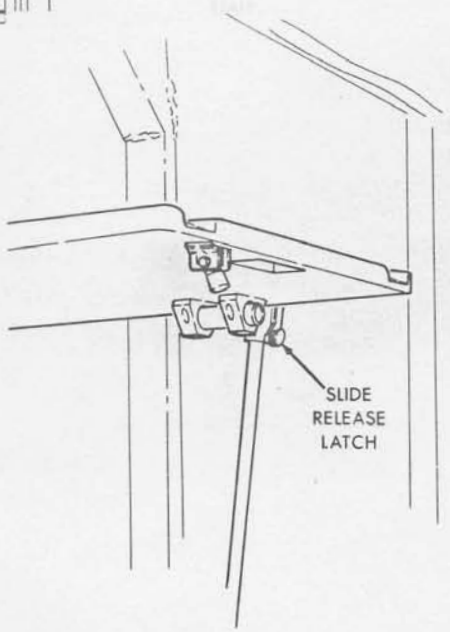
a. Loading Litter Patient on Upper Rack

NOTE

- Upper litter rack must be in raised position to load litter patient.
- Upper litter rack must be pushed up slightly to clear hook end of spring latch.

1. Release upper litter rack rear spring latch and slide release latch.



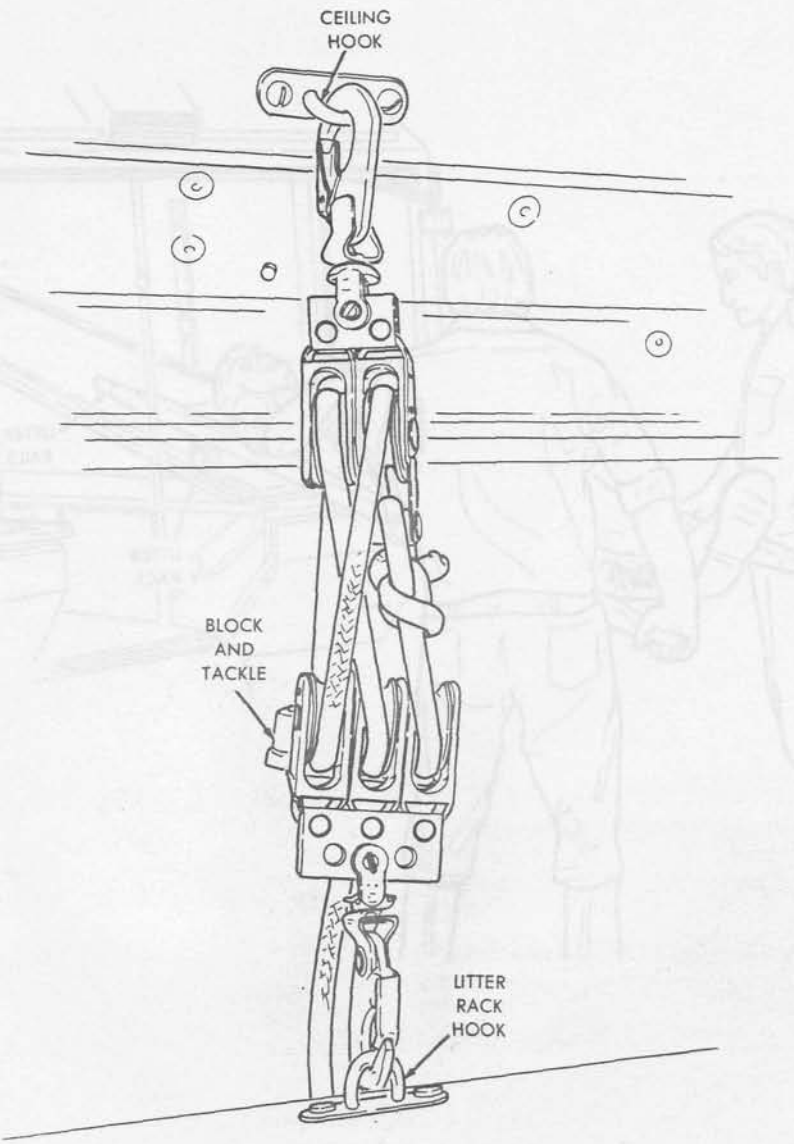


2. Lower rear end of upper litter rack.

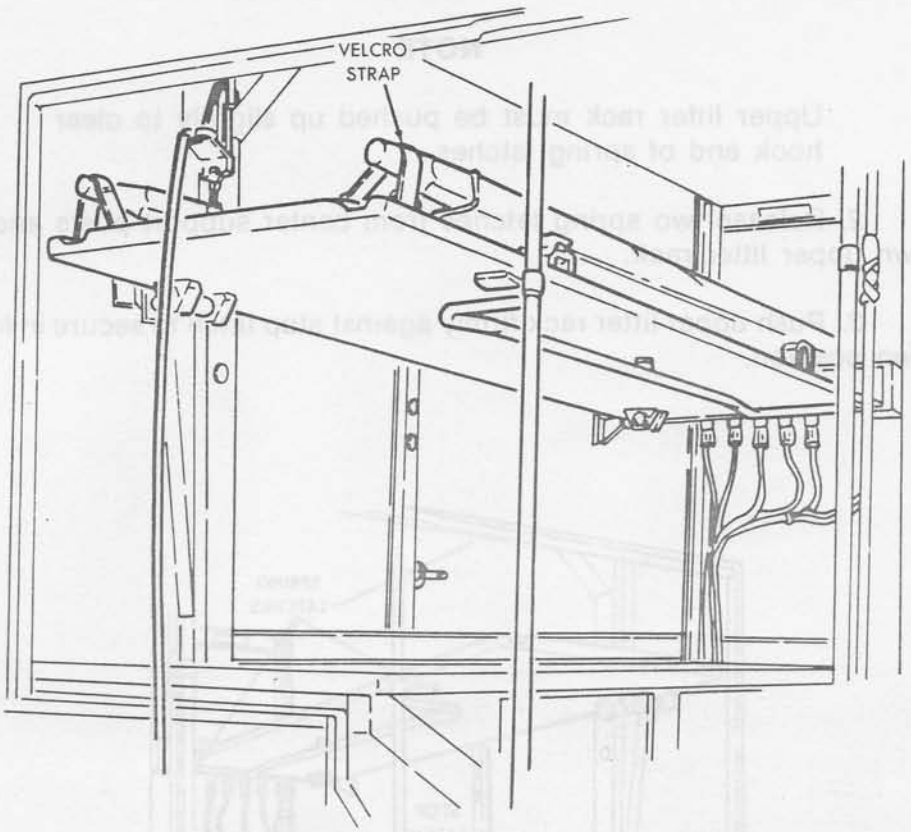
3. Place litter rails in tracks of upper litter rack and slide up.

4. Secure litter in upper rack using velcro litter straps.

5. Attach block and tackle to hooks in ceiling and upper litter rack.



6. Hoist upper litter rack using block and tackle until rear spring latch and slide release latch snap into place.



b. Unloading Litter Patient from Upper Rack

Reverse patient loading procedure to unload litter patient from upper rack.

c. Folding Down Upper Litter Racks

NOTE

This procedure is performed when lower litter rack will be carrying litter patient and upper litter rack is not in use.

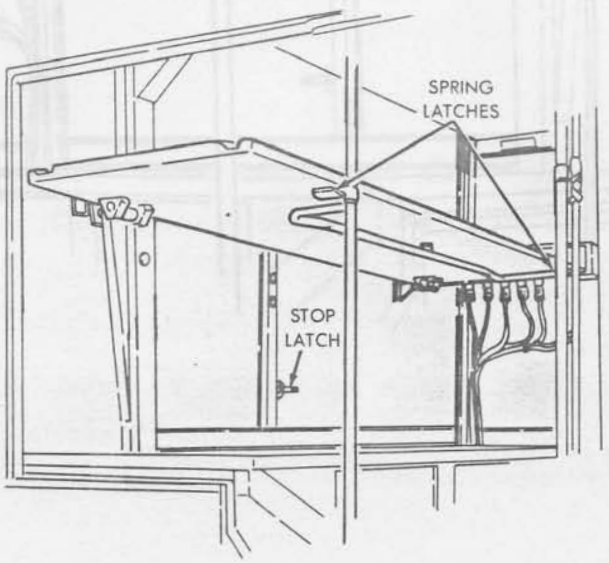
1. Place upper litter rack stop latch to out position.

NOTE

Upper litter rack must be pushed up slightly to clear hook end of spring latches.

2. Release two spring latches from center support posts and fold down upper litter rack.

3. Push upper litter rack firmly against stop latch to secure in folded down position.



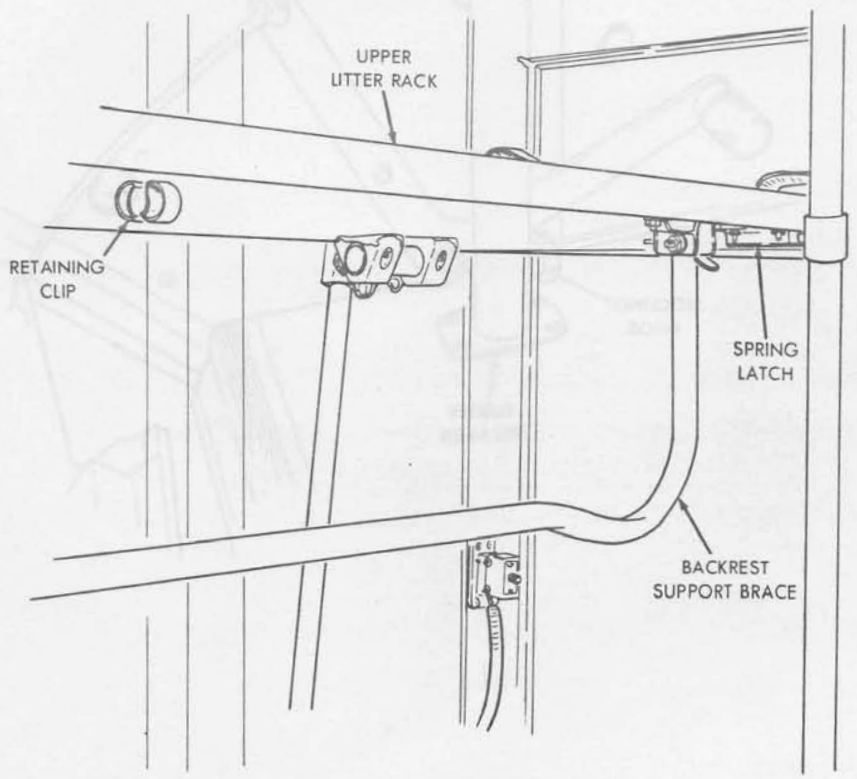
d. Placing Upper Litter Rack in Backrest Position

NOTE

- Upper litter rack, when in backrest position, is also used for litter stowage. Litters are stowed behind upper rack on top of backrest support brace.
- Do not perform step 1 if upper litter rack is already in folded down position.
- Upper litter rack must be pushed up slightly to clear hook end of spring latches.

1. Release two spring latches from center support posts and fold down upper litter rack.

2. Release backrest support brace from retaining clip located at underside of upper litter rack and lower to hold upper litter rack from side wall.

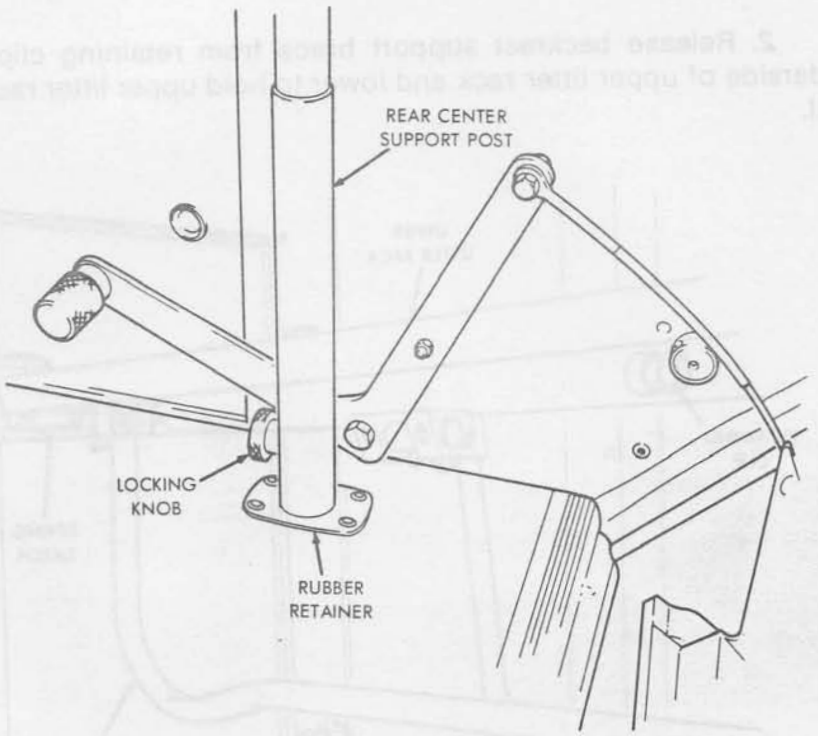


e. Assembly of Overhead Grab Rail

NOTE

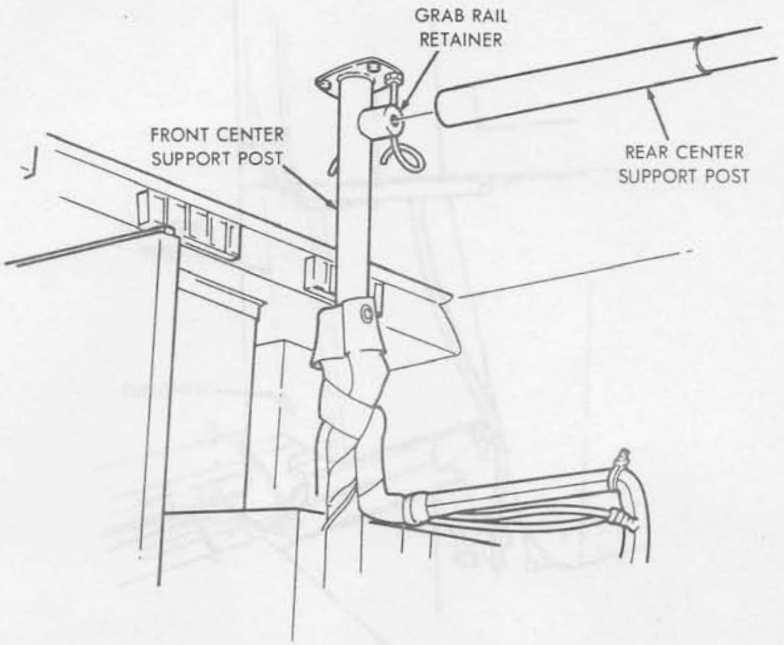
This procedure converts rear center support posts into overhead grab rails.

1. Loosen locking knob at base of rear center support post.
2. Lift rear center support post off rubber retainer located on floor.



3. Swing rear center support post up toward front of vehicle and telescope out.

4. Slide rear center support post over grab rail retainer located on front center support post.



5. Tighten locking knob to secure.

f. Disassembly of Overhead Grab Rail

Reverse assembly procedure to disassemble overhead grab rail.

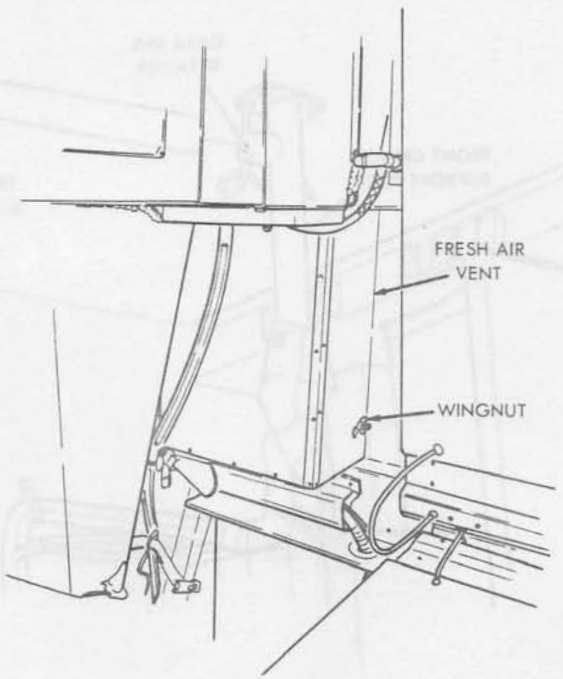
g. Operation of Heating/Air Conditioning Unit

NOTE

Maxi ambulance heating/air conditioning unit serves three functions. Unit is used as heater, air conditioner, or power vent depending on climatic conditions.

1. Heater Operation.

(a) Loosen wingnut and place fresh air vent lever up to recirculate interior air or down to draw fresh air from outside.



NOTE

Ensure heater power switch is in "OFF" position before selecting unit mode.

(b) Place mode select lever in "HEAT" position.

(c) Place duct control lever in "HEAT" position.

(d) Place heater power switch in "HEAT" position. Green light should illuminate.

NOTE

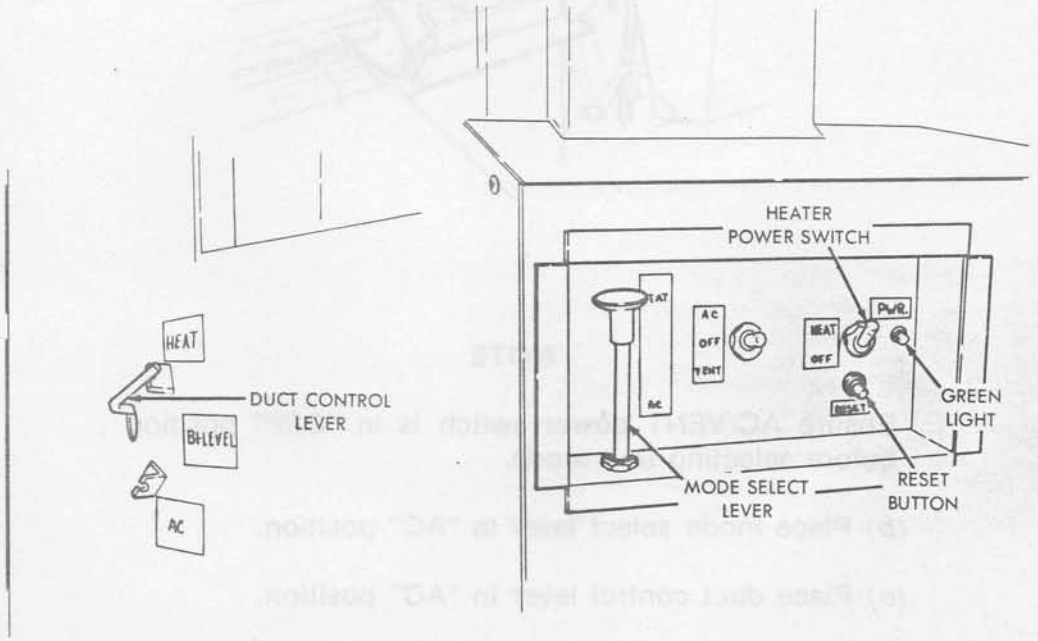
If green light does not illuminate, depress reset button. If green light still does not illuminate, notify maintenance.

(e) Heater will ignite and blower motor will operate in approximately ten seconds.

NOTE

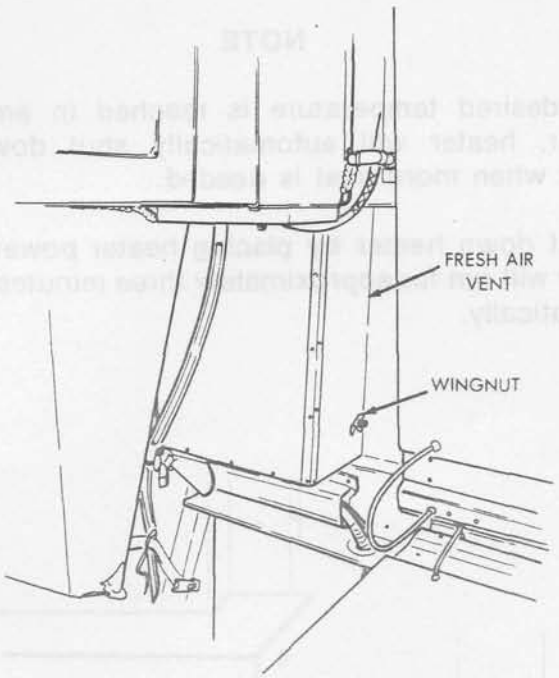
After desired temperature is reached in ambulance interior, heater will automatically shut down, then restart when more heat is needed.

(f) Shut down heater by placing heater power switch in "OFF" position. Heater will run for approximately three minutes to purge fuel and shut off automatically.



2. Air Conditioner Operation.

(a) Loosen wingnut and place fresh air vent lever up to recirculate interior air or down to draw fresh air from outside.



NOTE

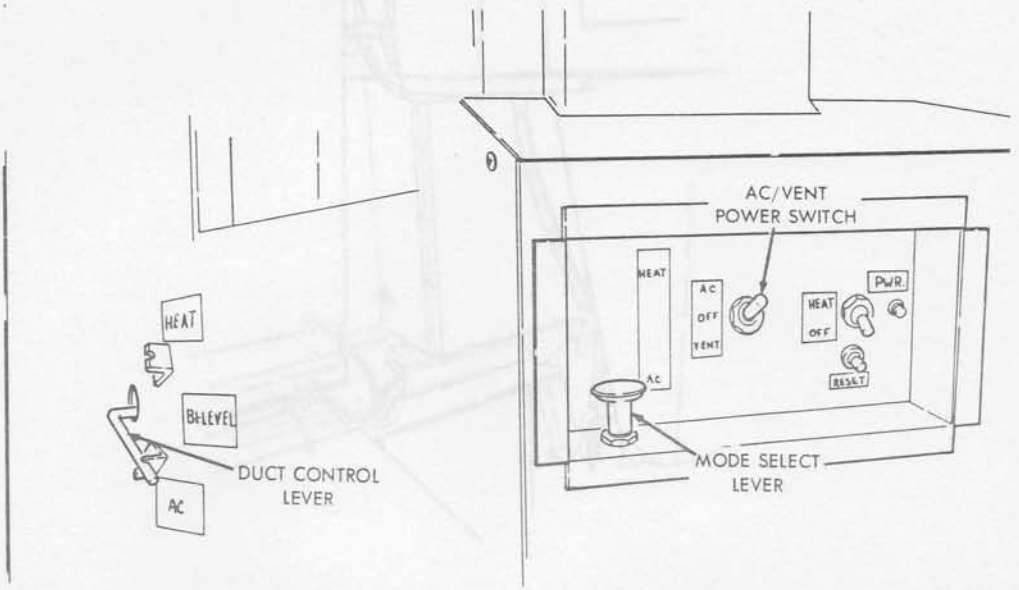
Ensure AC/VENT power switch is in "OFF" position before selecting unit mode.

(b) Place mode select lever in "AC" position.

(c) Place duct control lever in "AC" position.

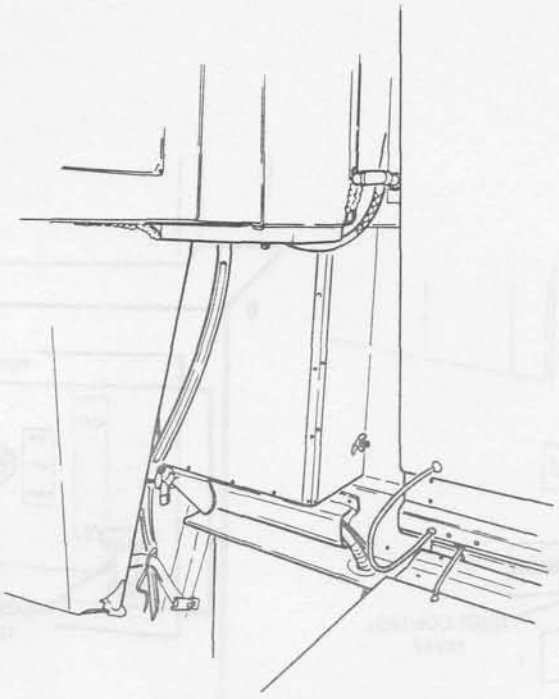
(d) Place AC/VENT power switch in "AC" position and air conditioner will begin to operate.

(e) Shut down air conditioner by placing AC/VENT power switch in "OFF" position. Air conditioner will shut down immediately.


AC/VENT
POWER SWITCH
HEAT
AC
OFF
VENT
HEAT
OFF
PWR.
RESET
AC
HEAT
BI-LEVEL
AC
DUCT CONTROL
LEVER
MODE SELECT
LEVER

3. Power Vent Operation.

(a) Loosen wingnut and place fresh air vent lever up to recirculate interior air or down to draw fresh air from outside.



NOTE

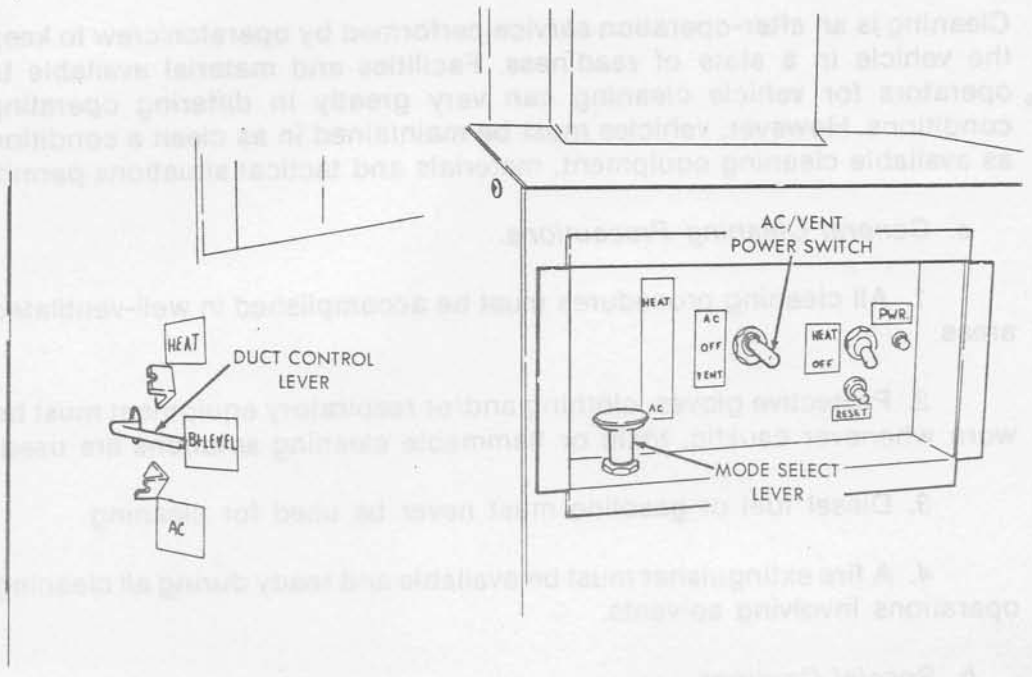
Ensure AC/VENT power switch is in "OFF" position before selecting unit mode.

(b) Place mode select lever in "AC" position.

(c) Place duct control lever in "AC", "BI-LEVEL", or "HEAT" position depending on where vented air is desired.

(d) Place AC/VENT power switch in "VENT" position and power vent will begin to operate.

(e) Shut down power vent by placing AC/VENT power switch in "OFF" position. Power vent will shut down immediately.


AC/VENT
POWER SWITCH
HEAT
DUCT CONTROL
LEVER
B-LEVEL
AC
HEAT
AC
OFF
VENT
PWR
HEAT
OFF
RESET
AC
MODE SELECT
LEVER

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2-12. General

A permanent record of the service, repairs and modifications made to these vehicles must be recorded in vehicle log book.

2-13. Cleaning Instructions and Precautions

Cleaning is an after-operation service performed by operator/crew to keep the vehicle in a state of readiness. Facilities and material available to operators for vehicle cleaning can vary greatly in differing operating conditions. However, vehicles must be maintained in as clean a condition as available cleaning equipment, materials and tactical situations permit.

a. General Cleaning Precautions.

1. All cleaning procedures must be accomplished in well-ventilated areas.

2. Protective gloves, clothing and/or respiratory equipment must be worn whenever caustic, toxic or flammable cleaning solutions are used.

3. Diesel fuel or gasoline must never be used for cleaning.

4. A fire extinguisher must be available and ready during all cleaning operations involving solvents.

b. Special Cautions.

1. Do not allow cleaning compounds to come into contact with rubber, leather, vinyl or canvas materials.

2. Do not allow corrosion-removing cleaning compounds to contact painted surfaces.

3. Do not use pressure steam or air in cleaning vehicle interiors.

4. The rear of the radiator is always cleaned first in order to blow debris, insects or other obstructions out and away from the radiator core.

c. General Guidelines.

Table 2-3 provides a general guideline to cleaning materials used in removing contaminants from various vehicle surfaces.

2-14. Preventive Maintenance Checks and Services (PMCS)

a. Designated Intervals

NOTE

Observe cautions and warnings.

1. BEFORE checks and services (B) of PREVENTIVE MAINTENANCE must be performed prior to placing vehicle or its components in operation.

2. DURING checks and services (D) of PREVENTIVE MAINTENANCE will be performed while the vehicle and/or its components/systems are in operation.

3. AFTER checks and services (A) of PREVENTIVE MAINTENANCE are performed upon completion of mission.

4. WEEKLY checks and services (W) of PREVENTIVE MAINTENANCE are performed once every seven days.

5. MONTHLY checks and services (M) of PREVENTIVE MAINTENANCE are performed once every 30 days.

b. Procedures

1. Troubleshoot malfunctions. Refer to table 3-1.

2. Tools included with vehicle are to be used when making PREVENTIVE MAINTENANCE checks and services. Also, wiping cloths are sometimes needed to remove dirt or grease.

c. Troublespots

NOTE

Dirt, grease, oil and debris may cover up a serious problem. Clean as you check. Following precautions printed on container, use drycleaning solvent on all metal surfaces. On rubber or plastic material, use soap and water.

1. Check all bolts, nuts and screws. If loose, bent, broken, or missing, either tighten or have replaced.

2. Look for loose or chipped paint, and rust or gaps at welds. If a broken weld is found, notify maintenance.

3. Inspect electrical wires and connectors for cracked or broken insulation. Also, look for bare wires, or broken connections. Tighten loose connections or notify maintenance to replace or repair bare wires.

4. Check hoses and fluid lines for wear, damage and leaks. Make sure clamps and fittings are tight.

2-15. Oil and Gasket Leakage

Wetness around seals, gaskets, fittings or connections indicates leakage. A stain also denotes leakage. If a fitting or connector is loose, tighten it. If broken or defective, notify maintenance. When determining the seriousness of a leak, use the following as a guide:

1. *Class I.* Leakage indicated by wetness or discoloration not great enough to form drops.

2. *Class II.* Leakage great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.

3. *Class III.* Leakage great enough to form drops that fall from the item being checked/inspected.

CAUTION

Operation is allowable with class I or class II leakage. You must, of course, consider fluid capacity of the item/system. When operating with class I or II leaks, check fluid levels as required in the PMCS. Class III leaks should be repaired immediately.

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
						NOTE Perform weekly (W) as well as before (B) PMCS if: *a.* You are the assigned operator but have not operated vehicle since the last weekly PMCS. *b.* You are operating the vehicle for the first time.	
1						EXTERIOR OF VEHICLE	
	•					*a.* Visually check for obvious damage to body and cab that would impair operation.	
	•					*b.* Check tires for cuts, gouges, or cracks. Remove all penetrating objects.	Tires have cuts, gouges, or cracks which would result in the failure during operation. One or more tires missing or flat.
	•					*c.* Look under vehicle for evidence of fluid leakage (fuel, oil and coolant).	Any fuel leakage. Class III leakage of oil or coolant is evident.
						d. Check condition of:	
	•					*1.* Windshield and windows.	
	•					*2.* Windshield wiper arms and blades.	
	•					*3.* Mirrors.	
	•					*4.* All locking and fastening devices.	
	•					*5.* Check operation of doors and windows.	
	•					*6.* Check operation of headlights, taillights, flashers, blackout lights and turn signals.	

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
2						TIRES	
				•		Gauge tires for correct pressure using tire inflation gauge and hose assembly. Adjust front tire air pressure to 16 psi (110 kPa) and rear tire air pressure to 18 psi (124 kPa).	
3						EXHAUST SYSTEM	
						WARNING Do not touch hot exhaust pipes with bare hands. Severe burns will result.	
		•				Inspect exhaust pipes, muffler and manifold for leaks and rusted-through condition.	
						CAUTION Any time hood is raised, cover must be placed over intake tube to prevent objects from entering air intake system. Remove cover prior to closing hood.	
4						FUEL SYSTEM	
						WARNING Do not perform fuel system checks or inspections while smoking, near fire, flames, or sparks. Fuel could ignite, causing damage to vehicle, severe injury or death.	

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
			•			*a.* Drain fuel water separator into fuel container until fuel is clear. Prime system after draining.	
		•				*b.* Check fuel gauge for "full" reading.	
				•		*c.* Inspect fuel tank for leaks and broken supports.	
				•		*d.* Check fuel lines and hoses for leakage and damage.	Any fuel leakage evident. Fuel tank or lines damaged or loose.
5						BATTERIES	
						WARNING Don't smoke, have open flames or make sparks around the batteries, especially if the caps are off. Batteries can explode and cause injury.	
						NOTE Batteries are located under companion seat. Unlatch, raise, and remove companion seat to gain access to battery compartment.	
				•		*a.* Check battery fluid level. Add distilled water as necessary.	
					•	*b.* Visually inspect batteries for cracked or leaking casing and broken or burnt terminal posts.	
					•	*c.* Visually inspect battery compartment for corrosion.	

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
6						FRAME	
					•	Visually inspect frame side rails, cross-members and underbody supports for loose or broken bolts, cracks, breaks, broken welds, missing rivets and rusted-through conditions.	Evidence of damage.
7						DIFFERENTIALS	
					•	Visually inspect front and rear differentials for oil leaks.	Evidence of damage or Class III leaks.
8						TRANSMISSION AND TRANSFER	
					•	*a.* Check all hose connections within reach on transmission for looseness. Have loose connections tightened. Inspect connections for damage.	
				•		*b.* Visually check transmission and transfer for damage and leakage.	Evidence of damage or Class III leaks.
						ENGINE COMPARTMENT **CAUTION** Any time hood is raised, cover must be placed over intake tube to prevent ojbects from entering air intake system. Remove cover prior to closing hood.	
9						SURGE TANK	
	•					*a.* Check coolant level in surge tank. Tank should be at a minimum 3/4 full before operation. Fill as necessary.	
					•	*b.* Check all hoses for deterioration and/or leakage. Have loose, leaking hose connections tightened.	Evidence of damage or Class III leaks.
10						ENGINE OIL LEVEL **CAUTION** Do not overfill engine crankcase.	

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
						NOTE Engine oil level is checked with engine stopped and with dipstick removed, wiped clean, and slowly reinserted for a reading.	
	•					Pull out dipstick and check for proper oil level. Level should be between "add" and "full" marks. Add oil as necessary.	
11						PULLEY BELTS	
				•		Check for cracked, frayed or broken alternator drive belt, fan belts and power steering pump drive belts.	Belts are cracked, frayed, broken or missing.
12						ALTERNATOR	
				•		Check for security of mounting or damage.	
13						POWER STEERING PUMP	
					•	*a.* Check pump fluid level.	Evidence of damage or Class III leaks.
	•					*b.* Visually inspect pump for leakage.	
	•					*c.* Visually inspect pump hoses for deterioration and leaks.	
14						POWER STEERING GEAR	
					•	*a.* Inspect power steering gear for secure mounting and leaks.	Evidence of damage or Class III leaks.
					•	*b.* Check fluid lines for cracks, breaks and leaks.	
15						WINDSHIELD WASHER RESERVOIR	
	•					Check fluid level in reservoir. If less than half full, fill with washer fluid.	

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
						INTERIOR OF VEHICLE	
16						SEAT BELTS	
	•					Check for security of mounting and latching devices.	
17						ENGINE OPERATION	
		•				*a.* Start engine. Check instruments.	Engine inoperative.
		•				*b.* Listen for unusual noises or vibrations, especially during acceleration.	Unusual noises or vibrations.
18						INSTRUMENTS	
						With transmision in neutral and engine at idle, the following instrument readings should be:	
		•				*a.* Air cleaner indicator less than 25%.	Air cleaner indicator stays in "red".
		•				*b.* Battery indicator gauge needle in "green" area.	Battery indicator needle in "red" area.
		•				*c.* Engine oil pressure gauge.	Engine oil pressure reads less than 5 psi or does not operate.
		•				*d.* Fuel gauge indicates fuel.	
		•				*e.* Engine coolant temperature gauge.	Temperature gauge reads greater than 230° F (110° C) or does not operate.
19						TRANSMISSION OIL LEVEL	
						CAUTION	
						Withdraw transmission dipstick slowly. Removing dipstick too quickly creates a vacuum within the filler tube which may result in a false oil level reading.	

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
						CAUTION Do not permit dirt, dust or grit to enter transmission filler tube. Serious internal transmission damage may result if transmission is contaminated. Do not overfill transmission.	
						NOTE Start engine, engage vehicle brakes and move transmission control lever through all forward gears and reverse before checking oil level in neutral.	
					•	After thoroughly cleaning dipstick handle and end of filler tube, check for proper oil level with transmission in neutral and engine at idle. Add transmission oil as necessary.	
20						TRANSMISSION	
		•				Shift transmission in all ranges, observing any unusual stiffness or binding of shifting linkage.	Transmission is inoperative.
21						BRAKE SYSTEM	
					•	All hydraulic lines and hoses leading to and from brake chambers for deterioration leaks.	Any reservoirs or lines and hoses are leaking.
		•				*a.* Operate service brakes to determine stopping ability. Check for any pulling, grabbing or other abnormal operation.	Service brakes do do not operate properly.
				•		*b.* Determine parking brake ability to hold vehicle by first engaging brake, then engage transmission. Vehicle should not move.	
22						TRANSFER	
		•				Check shifting operation for unusual noises, stiffness or jumping out of gear.	Transfer is inoperative.

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
23						HORNS	
		•				Check for operation if tactical situation permits.	
24						FRONT AND REAR DRIVE AXLES AND PROPELLER SHAFTS	
		•				Listen for unusual noises or vibrations. Vibrations, clicking, or clunking noise indicate worn U-joints or damaged propeller shafts.	Unusual noises or vibrations are evident.
25						ARCTIC KIT	
				•		*a.* Inspect quilted engine compartment cover, and quilted cargo compartment cover for good condition.	
						b. Inspect fuel burning personnel and engine coolant heaters for the following:	
				•		*1.* Fuel lines and connections for signs of leakage.	Evidence of any fuel leakage.
	•					*2.* Make sure all coolant shutoff cocks are open.	
				•		*3.* Engine coolant heater hoses for abrasions and leakage.	Evidence of Class III leaks.
	•					*4.* Make sure air intake and exhaust tubes are not damaged and are free from obstructions.	Evidence of any exhaust leakage.
	•					*5.* Check heater controls by depressing indicator lamps to make sure they illuminate.	
		•				*6.* Listen for unusual noises from heaters during operation.	
26						AMBULANCE	
	•					Check litter racks for general condition and security.	

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
	•					Check all litter rack quick-release pins for security.	
	•					Check seat belts, litter canvas and straps for fraying and cleanliness.	
	•					Check heater hoses, ducting, electrical connections control, and attaching hardware for security and damage.	
		•				Observe heater operation and quantity of exhaust smoke for any change.	
		•				Check heater fuel lines for any leakage.	
			•			Check ambulance interior for overall cleanliness.	
27						DEEP WATER FORDING KIT	
	•					Check all exhaust and intake extensions and tubes for security.	
28						FRONT WINCH KIT	
	•					*a.* Check all winch controls for proper operation.	No control response.
	•					*b.* Check cable for kinks, frays and breaks.	Cable is kinked, frayed, broken or missing.
	•					*c.* Check oil level in worm gear box on spur gear box.	
29						SOFT TOP ENCLOSURE KIT	
	•					*a.* Inspect vinyl coated nylon pieces for tears, punctures and ripped seams.	
				•		*b.* Inspect windows for fogging, cracks and scratches.	
				•		*c.* Inspect bows and mounting brackets for security and mounting or damage.	

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
30						WEAPONS CARRIER	
						a. Gunners Station	
				•		1. Inspect for security of mounting. Make sure gunners station rotates freely without binding, 360° in both directions.	
				•		2. Inspect gunners station panels for bends, cracks, warped or damaged areas.	
				•		3. Inspect side panel reinforcement braces for bends, breaks, binding or interference. Make sure channel does not hamper engagement of top and side panels.	
				•		4. Inspect torsion bars for bends, binding and ease of operation.	
				•		5. Inspect gunners station locking strap (footman loop) for rips, tears or frays.	
				•		6. Inspect locking handle for ease of operation. Inspect locking pin for bends and breaks.	
						b. Cargo and Missile Loading Doors	
				•		1. Inspect for bends, warping, binding and ease of closing. Inspect latching mechanisms for proper operation.	
				•		2. Inspect lift cylinders for leaks, bends and security of mounting.	
				•		3. Inspect chains for wear and security.	
						c. Bearing Assembly	
				•		1. Inspect hand brake for ease of operation.	
				•		2. Inspect adjustable sling for tears or frays.	

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services (Cont'd)

NOTE: These checks are to be made in the order listed, within designated interval.

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

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed	EQUIPMENT IS NOT READY/ AVAILABLE IF:
						d. Gunners Platform	
				•		*1.* Inspect hinge supports for bends, binding and ease of operation.	
31						BRAKE FLUID LEVEL **CAUTION** • Do not permit dirt, dust or grit to enter master cylinder when removing cover; clean cover before removing. Serious damage may result if master cylinder is contaminated. • Do not overfill master cylinder.	
					•	*a.* Check master cylinder fluid level.	
					•	*b.* Visualy inspect master cylinder for leaks.	
					•	*c.* Check fluid lines for cracks, breaks and leaks.	

Table 2-3. General Cleaning Instructions

Surface	Cleaning Materials Used to Remove		
	Oil/Grease	Salt/Mud/Dust/Debris	Surface Rust/Corrosion
Body	Grease cleaning compound; cold, running water; rags.	High pressure water steam; soapy, warm water; soft brush; damp and dry rags.	Bristle brush; dry rags, lubricating oil.*
Vehicle Interior (Metals)	Grease cleaning compound; damp and dry rags.	Damp and dry rags.	Bristle brush; dry rags, lubricating oil.*
Vehicle (Glass)	Issued glass cleaning solution; clean dry rags.	Issued solution; dean, dry rag.	Not applicable.
Vehicle Interior (Material)	Saddle soap; warm water, soft brush, and dry rags.	Soft brush; soapy, warm water, damp and dry rags.	Not applicable.
Frame	Grease cleaning compound rinsed with cold, running water; rags.	High pressure water steam; soapy, warm water, wire brush; damp and dry rags.	Corrosion-removing compound; wire brush, dry rags, lubricating oil.*
Engine Transmission	Mixed solution, 1 part grease cleaning compound, 4 parts, dry cleaning solvent; cold running water; rags.	High pressure water steam; soapy, warm water; soft wire brush; damp and dry dry rags.	Bristle brush; warm soapy water, dry rags.
Glass	Issued glass cleaning solution; clean dry rags.	Issued glass cleaning solution; clean, dry rags.	Not applicable
Radiator	Not applicable.	Low pressure water steam air; soapy, warm water; damp and dry rags.	Not applicable.

*After cleaning, apply light grade of lubricating oil to all unprotected surfaces to prevent continued rust.

Table 2-3. General Cleaning Instructions (Cont'd)

Surface	Cleaning Materials Used to Remove		
	Oil/Grease	Salt/Mud/Dust/Debris	Surface Rust/Corrosion
Rubber Insulation	Saddle soap; damp and dry rags.	Saddle soap; damp and dry rags.	Not applicable.
Tires	Soapy water; steam bristle brush.	High pressure water steam; bristle brush.	Not applicable.
Wood	Detergent; warm water, damp and dry rags.	Low pressure water; soapy, warm water; damp and dry rags.	Not applicable.

*After cleaning, apply light grade of lubricating oil to all unprotected surfaces to prevent continued rust.

Section V. OPERATION UNDER NORMAL CONDITIONS

2-16. General

This section provides instructions for vehicle operation under normal conditions. For vehicle operation under abnormal conditions, refer to section VI of this manual.

NOTE

Before you attempt to operate your vehicle, be sure to perform the preventive maintenance checks and services. Refer to paragraph 2-14.

2-17. Starting the Engine

NOTE

To start the engine under blackout conditions, refer to paragraph 2-24.

1. Make certain parking brake is engaged. If not, apply brakes.

2. Adjust operator's seat.

3. Adjust left and right rear view mirrors. Make sure both mirrors provide a clear rear view.

4. Make sure vehicle windshield is clean. If not, clean before attempting to start vehicle.

WARNING

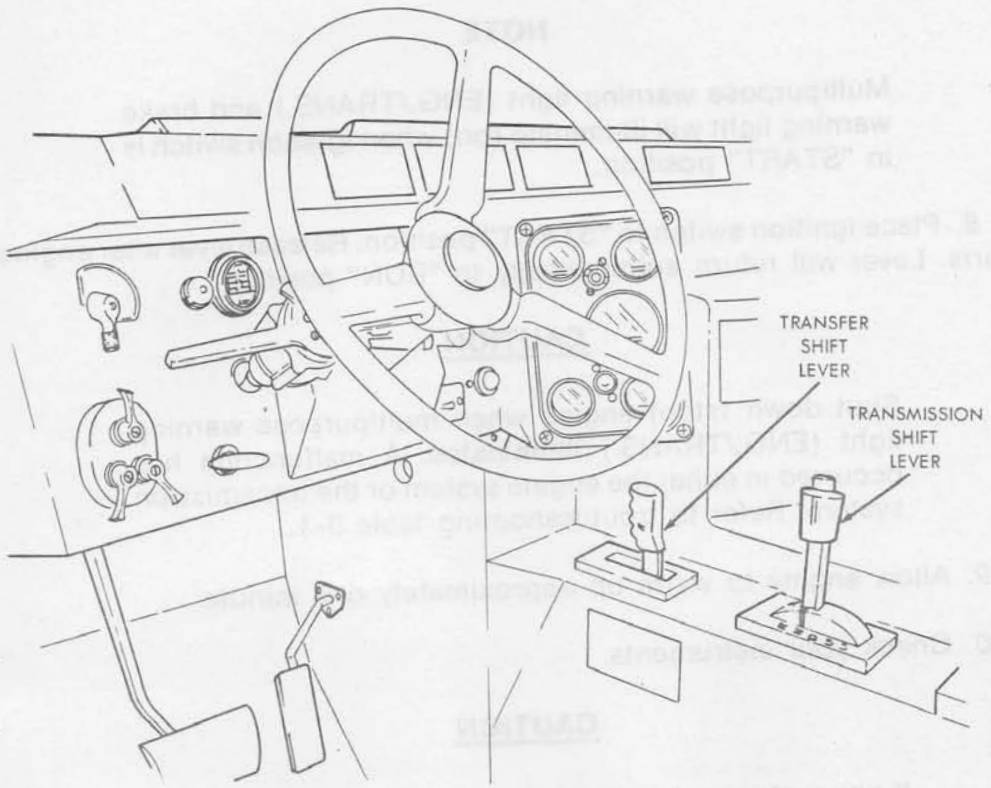
Make sure all slack from seat belt adjusting strap is removed. Seat belts retract, but do not lock at any position. Serious injury could result if seat belt retracting strap is not extended to its full travel.

5. Buckle seat belts.

6. Place automatic transmission gearshift lever in "N" (neutral) position and transfer case shift lever in desired range.

CAUTION

Do not operate starter continuously for more than 20 seconds at a time or with headlights on (which will drain the batteries). Wait 10 to 15 seconds between periods of starter operations.



7. Place ignition switch to "RUN" position and wait until engine start glow plug indicator (wait-to-start) light goes out.

WARNING

Starting aid fluids will not be used on the HMMWV engine. Damage to the engine and severe injury to personnel could result.

NOTE

Multipurpose warning light (ENG./TRANS.) and brake warning light will illuminate (on) when ignition switch is in "START" position.

8. Place ignition switch to "START" position. Release lever after engine starts. Lever will return automatically to "RUN" position.

CAUTION

Shut down (stop) engine when multipurpose warning light (ENG./TRANS.) illuminates. A malfunction has occurred in either the engine system or the transmission system. Refer to troubleshooting table 3-1.

9. Allow engine to warm up approximately one minute.

10. Check your instruments.

CAUTION

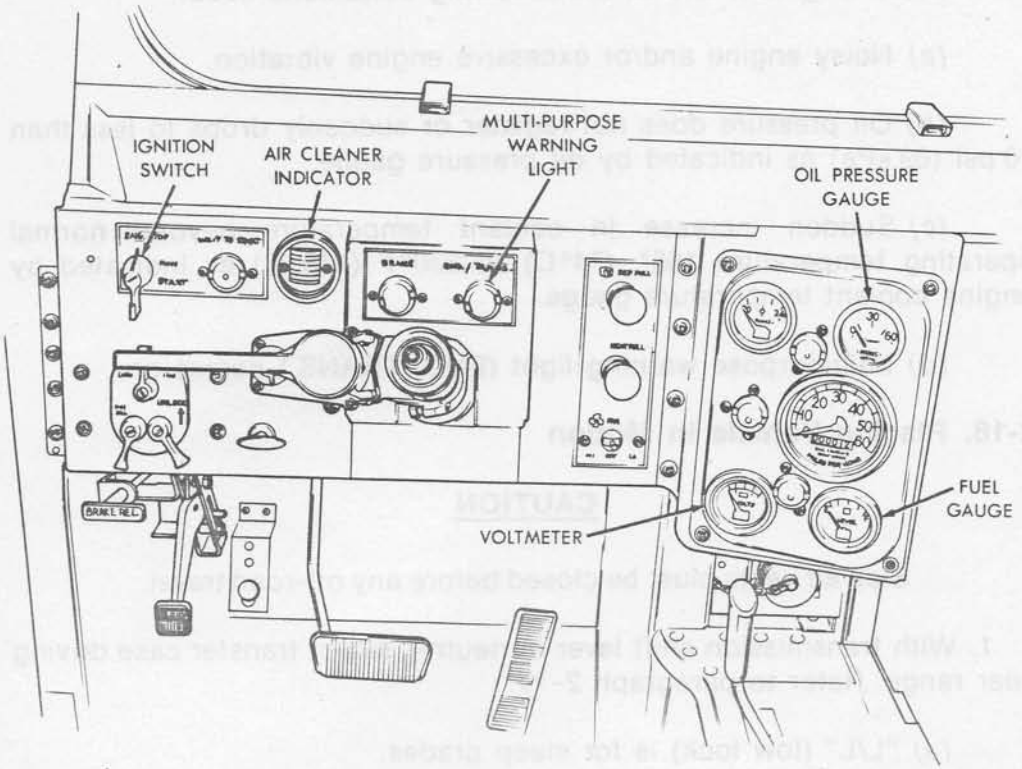
If any instrument reading is not normal, STOP engine. Refer to troubleshooting table 3-1.

(a) Oil pressure gauge should register at least 10 psi (69 kPa).

(b) Battery/generator indicator (voltmeter) should register in green area.

(c) Fuel gauge indicates fuel level in fuel tank.

(d) Air cleaner indicator should register less than 25 percent.


IGNITION SWITCH
AIR CLEANER INDICATOR
MULTI-PURPOSE WARNING LIGHT
OIL PRESSURE GAUGE
FUEL GAUGE
VOLTMETER

11. STOP engine if any of the following conditions occur.

(a) Noisy engine and/or excessive engine vibration.

(b) Oil pressure does not register or suddenly drops to less than 10 psi (69 kPa) as indicated by oil pressure gauge.

(c) Sudden increase in coolant temperature beyond normal operating temperature 165° (74°C) to 230°F (110°C) as indicated by engine coolant temperature gauge.

(d) Multipurpose warning light (ENG./TRANS.) comes on.

2-18. Placing Vehicle in Motion

CAUTION

Side air vents must be closed before any off-road travel.

1. With transmission shift lever in neutral, select transfer case driving gear range. Refer to paragraph 2-19.

(a) "L/L" (low lock) is for steep grades.

(b) "H" (high) is for good road conditions.

(c) "H/L" (high lock) is for mud, off road and slippery road conditions.

2. Start engine. Refer to paragraph 2-17 for instructions.

NOTE

Be sure all auxiliary equipment and tools are securely stored for travel.

3. Set vehicle light switch. Refer to paragraph 2-20 for light switch operating instructions.

4. Depress service brake pedal and disengage parking brake.

5. Engage vehicle transmission.

(a) Select "D" (drive) if operation is on good roads, grades and traffic conditions.

(b) Select "2" (second) gear if operation is over steep grades in heavy traffic and/or rough terrain.

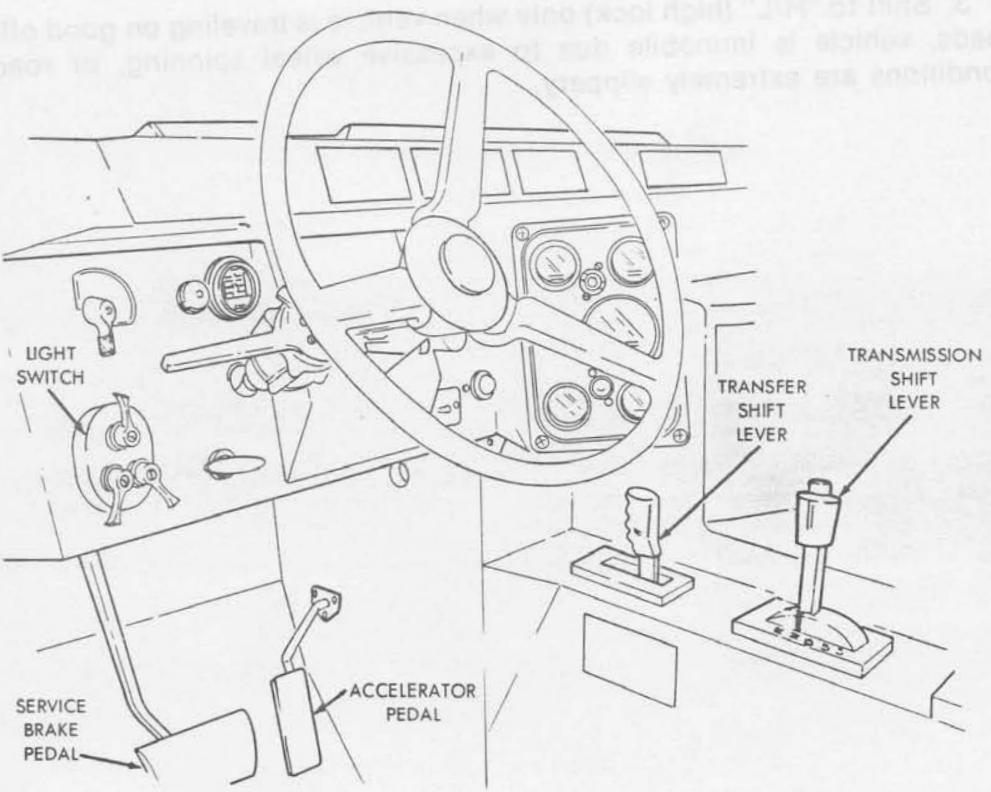
(c) Select "1" (first) when starting under heavy loads, operating on extreme grades and/or rough terrain.

6. Release brake pedal, and depress accelerator pedal. Accelerate at a safe, steady speed.

WARNING

Do not coast downhill with transmission in "N" (neutral). Vehicle may go out of control.

7. Upshift or downshift transmission shift lever only when road and/or traffic conditions change.



2-19. Shifting Transfer Case

CAUTION

- Shift transfer case shift lever smoothly from "H/L" (high lock) or "H" (high) to "L/L" (low lock) for smooth transfer engagement.

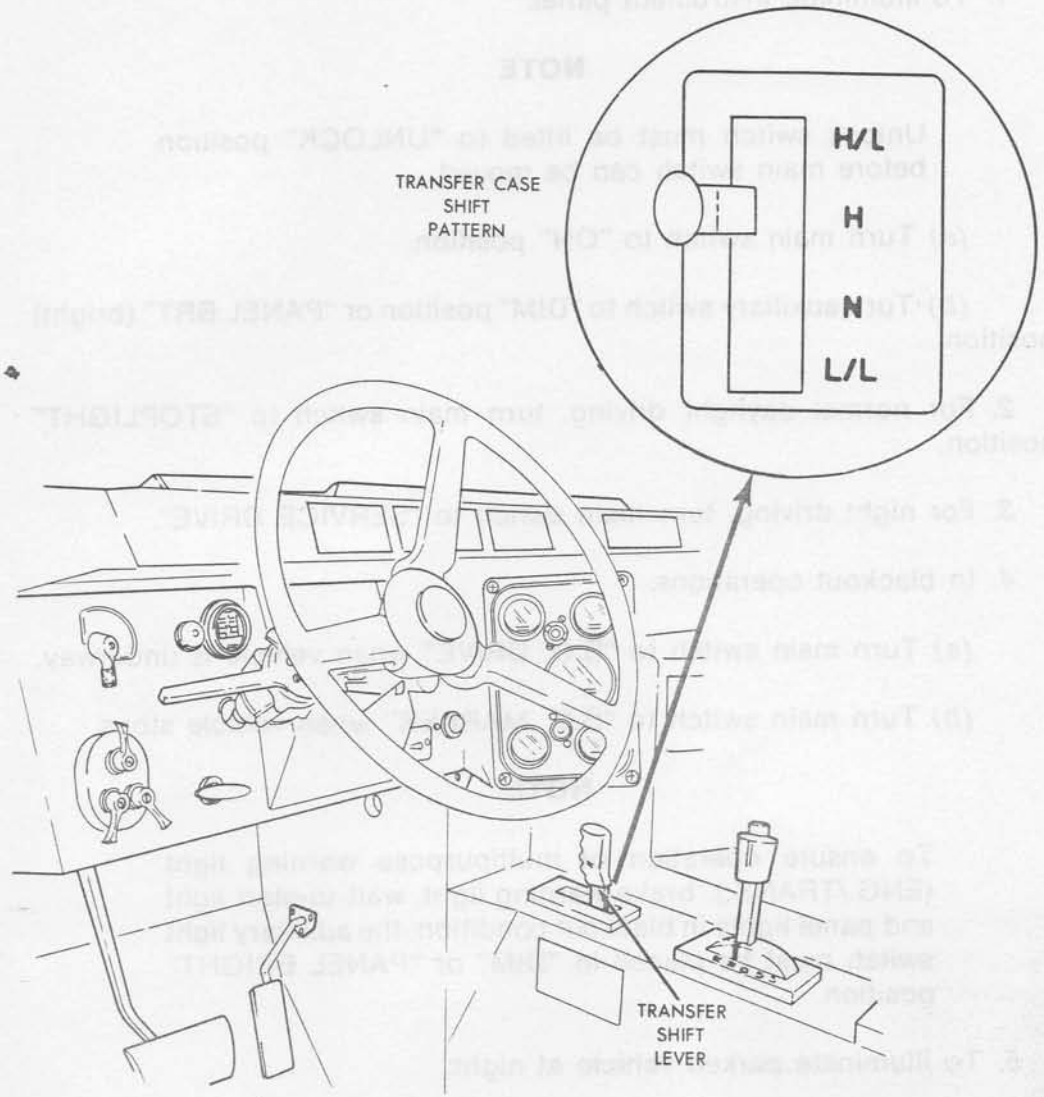
- Vehicle must be stopped and transmission select lever in "N" (neutral) before transfer case can be shifted to "LOW" range (low lock).

- Do not operate in "L/L" (low lock) or "H/L" (high lock) on dry, paved surfaces for sustained periods.

1. Shift to "L/L" (low lock) when lower vehicle speed and maximum torque from both axles is required.

2. Shift to "H" (high) for normal driving conditions.

3. Shift to "H/L" (high lock) only when vehicle is traveling on good off-roads, vehicle is immobile due to excessive wheel spinning, or road conditions are extremely slippery.


TRANSFER CASE
SHIFT
PATTERN
H/L
H
N
L/L
TRANSFER
SHIFT
LEVER

2-20. Operation of Vehicle Service Lights

1. To illuminate instrument panel:

NOTE

Unlock switch must be lifted to "UNLOCK" position before main switch can be moved.

(a) Turn main switch to "ON" position.

(b) Turn auxiliary switch to "DIM" position or "PANEL BRT" (bright) position.

2. For normal daylight driving, turn main switch to "STOPLIGHT" position.

3. For night driving, turn main switch to "SERVICE DRIVE".

4. In blackout operations:

(a) Turn main switch to "B.O. DRIVE" when vehicle is underway.

(b) Turn main switch to "B.O. MARKER" when vehicle stops.

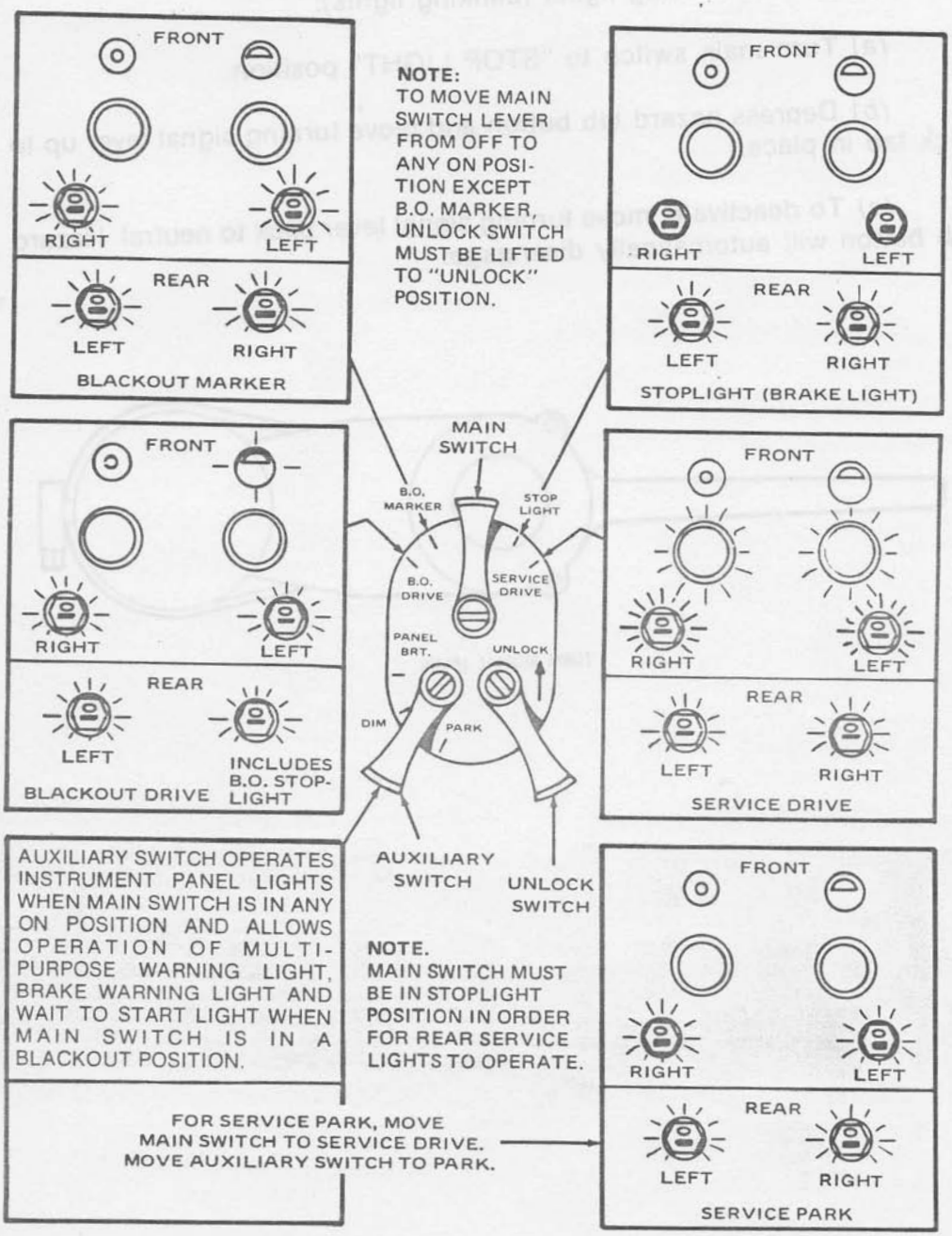
NOTE

To ensure operation of multipurpose warning light (ENG./TRANS.), brake warning light, wait-to-start light and panel lights in blackout condition, the auxiliary light switch must be placed in "DIM" or "PANEL BRIGHT" position.

5. To illuminate parked vehicle at night:

(a) Keep main switch in "SERVICE DRIVE" position.

(b) Turn auxiliary switch to "PARK".


FRONT
RIGHT
LEFT
REAR
LEFT
RIGHT
BLACKOUT MARKER
NOTE:
TO MOVE MAIN SWITCH LEVER FROM OFF TO ANY ON POSITION EXCEPT B.O. MARKER, UNLOCK SWITCH MUST BE LIFTED TO "UNLOCK" POSITION.
FRONT
RIGHT
LEFT
REAR
LEFT
RIGHT
STOPLIGHT (BRAKE LIGHT)
FRONT
RIGHT
LEFT
REAR
LEFT
INCLUDES B.O. STOP-LIGHT
BLACKOUT DRIVE
MAIN SWITCH
B.O. MARKER
STOP LIGHT
B.O. DRIVE
SERVICE DRIVE
PANEL BRT.
UNLOCK
DIM
PARK
FRONT
RIGHT
LEFT
REAR
LEFT
RIGHT
SERVICE DRIVE
AUXILIARY SWITCH OPERATES INSTRUMENT PANEL LIGHTS WHEN MAIN SWITCH IS IN ANY ON POSITION AND ALLOWS OPERATION OF MULTI-PURPOSE WARNING LIGHT, BRAKE WARNING LIGHT AND WAIT TO START LIGHT WHEN MAIN SWITCH IS IN A BLACKOUT POSITION.
AUXILIARY SWITCH
UNLOCK SWITCH
NOTE.
MAIN SWITCH MUST BE IN STOPLIGHT POSITION IN ORDER FOR REAR SERVICE LIGHTS TO OPERATE.
FRONT
RIGHT
LEFT
REAR
LEFT
RIGHT
SERVICE PARK
FOR SERVICE PARK, MOVE MAIN SWITCH TO SERVICE DRIVE. MOVE AUXILIARY SWITCH TO PARK.

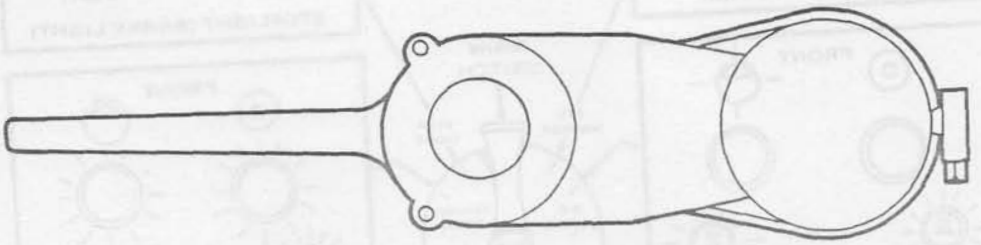
6. Move turning signal lever up for right turns, down for left turns.

7. For hazard warning lights (blinking lights):

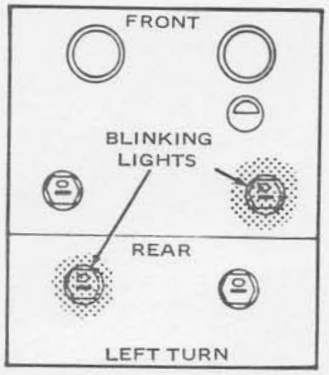
(a) Turn main switch to "STOP LIGHT" position.

(b) Depress hazard tab button and move turning signal lever up to lock tab in place.

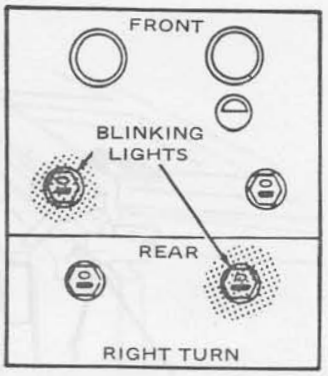
(c) To deactivate, move turning signal lever back to neutral. Hazard tab button will automatically disengage.

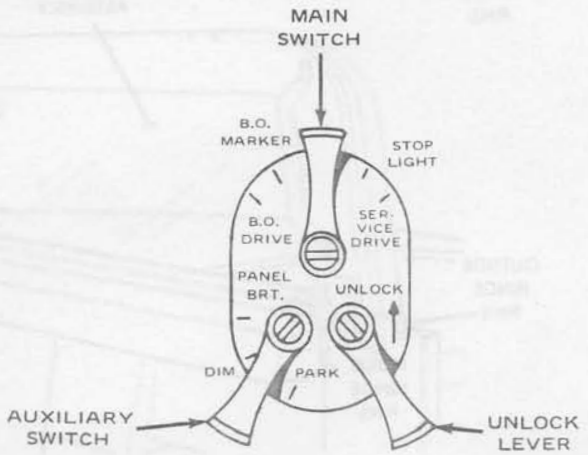


TURN SIGNAL LEVER

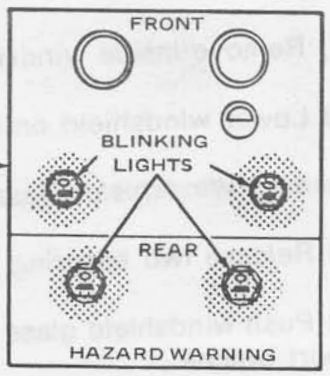


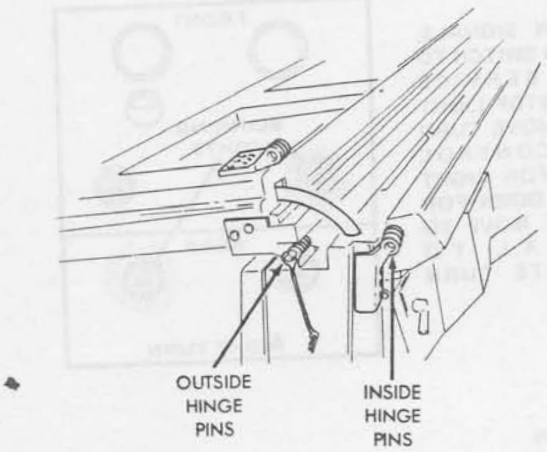
FOR TURN SIGNALS, MOVE MAIN SWITCH TO EITHER SERVICE DRIVE OR STOP LIGHT POSITION. MOVE TURN SIGNAL CONTROL LEVER UP FOR RIGHT TURN AND DOWN FOR LEFT TURN. MOVE TO NEUTRAL TO DEACTIVATE TURN SIGNALS.

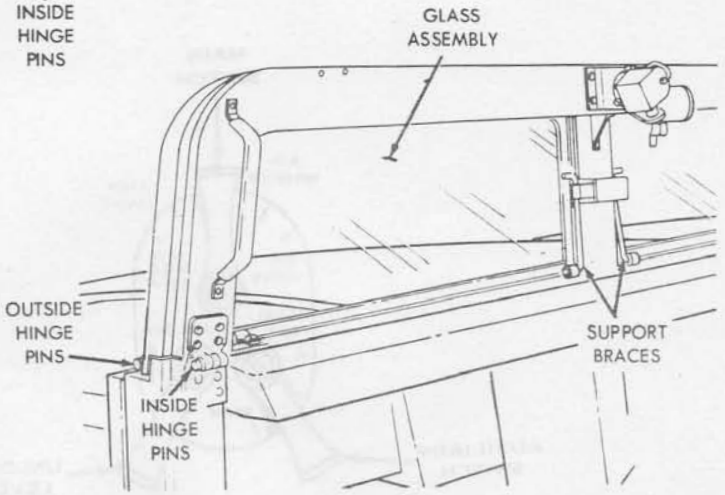




FOR HAZARD WARNING MOVE MAIN SWITCH TO EITHER SERVICE DRIVE OR STOP LIGHT POSITION. MOVE TURN SIGNAL CONTROL LEVER TO HAZARD WARNING POSITION. TO DEACTIVATE, MOVE TURN SIGNAL CONTROL LEVER TO NEUTRAL POSITION.







2-21. Windshield Assembly Operation

1. Lowering Windshield Assembly.

(a) Close and latch each windshield glass assembly.

(b) Remove inside windshield hinge pins.

(c) Lower windshield on hood.

2. Opening Windshield Glass Assemblies.

(a) Release two securing latches.

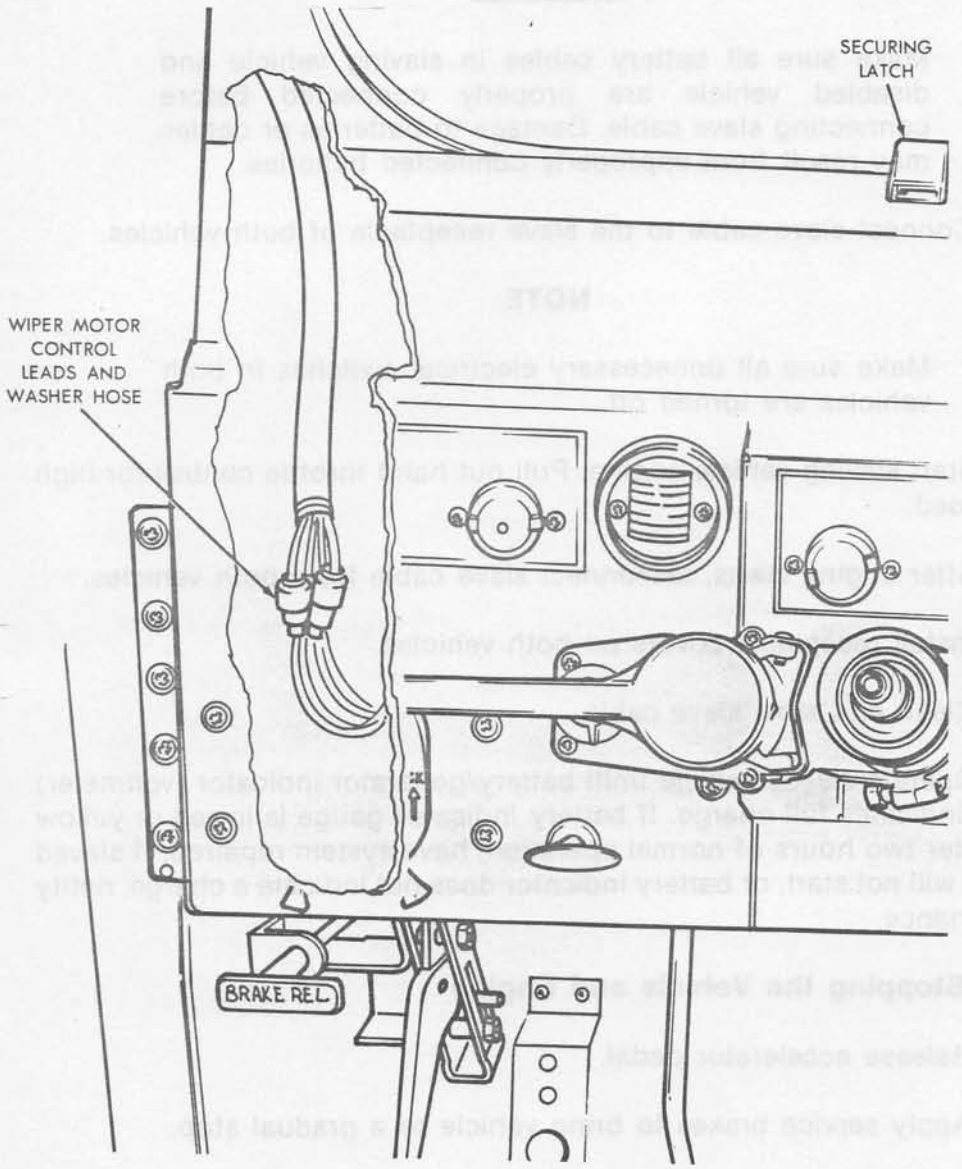
(b) Push windshield glass forward and secure in open position with two support braces.

3. Windshield Assembly Removal.

(a) Disconnect windshield wiper motor control leads and windshield washer hose.

(b) Remove inside and outside windshield hinge pins.

(c) Remove windshield assembly.



2-22. Using Slave Receptacle to Start Engine

1. Position slaving and vehicle to be slave started as close to each other as possible to permit intervehicular cable hookup.

2. Stop slaving vehicle engine.

3. Pull cover from slave receptacles of disabled vehicle and slaving vehicle.

CAUTION

Make sure all battery cables in slaving vehicle and disabled vehicle are properly connected before connecting slave cable. Damage to batteries or cables may result from improperly connected batteries.

4. Connect slave cable to the slave receptacle of both vehicles.

NOTE

Make sure all unnecessary electrical switches in both vehicles are turned off.

5. Start slaving vehicle engine. Pull out hand throttle control for high idle speed.

6. After engine starts, disconnect slave cable from both vehicles.

7. Install receptacle covers on both vehicles.

8. Clean and stow slave cable.

9. Operate slaved vehicle until battery/generator indicator (voltmeter) gauge indicates full charge. If battery indicator gauge is in red or yellow area after two hours of normal operation, have system repaired. If slaved vehicle will not start, or battery indicator does not indicate a charge, notify maintenance.

2-23. Stopping the Vehicle and Engine

1. Release accelerator pedal.

2. Apply service brakes to bring vehicle to a gradual stop.

3. Move transmission shift lever to "N" (neutral) position.

4. If vehicle must be backed into parking position, have another person act as a ground guide to direct reverse operation.

WARNING

Fully depress parking brake pedal when parking vehicle on steep grades. If parking brake is not fully engaged, vehicle will roll causing severe injury.

5. Once vehicle is completely stopped, engage parking brake.

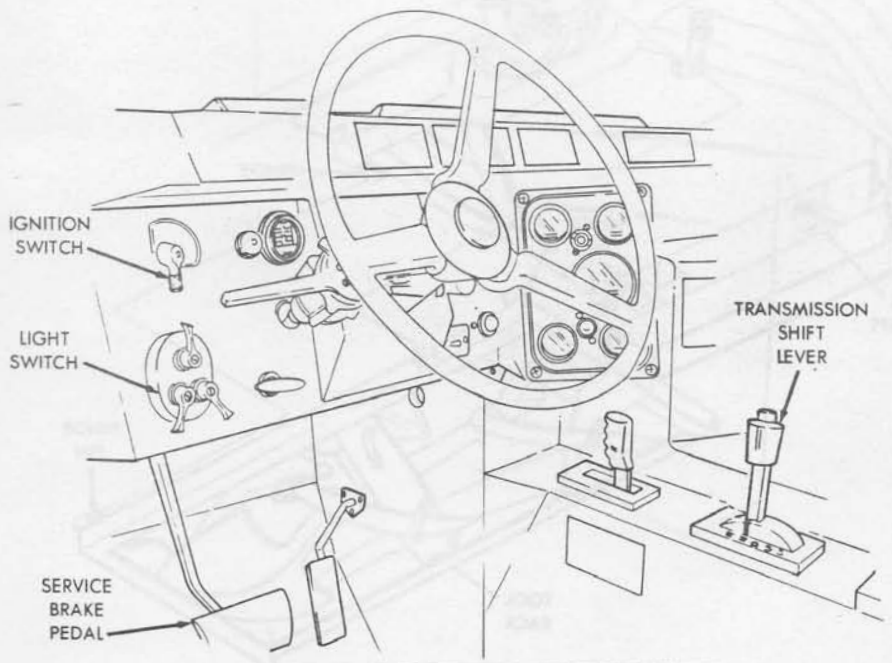
CAUTION

Do not shut down engine if engine temperature gauge is above 230° F (110° C).

6. Let engine run at fast idle for three minutes if temperature gauge reads above 230° F (110° C).

7. Turn vehicle light switch to "OFF" position.

8. Place ignition switch lever in "OFF" position.



2-23.1. Pioneer Tool Rack

a. Removal

1. Remove retaining pin.

2. Grasp tool rack firmly, and slide rack to the right.

3. Lower tool rack.

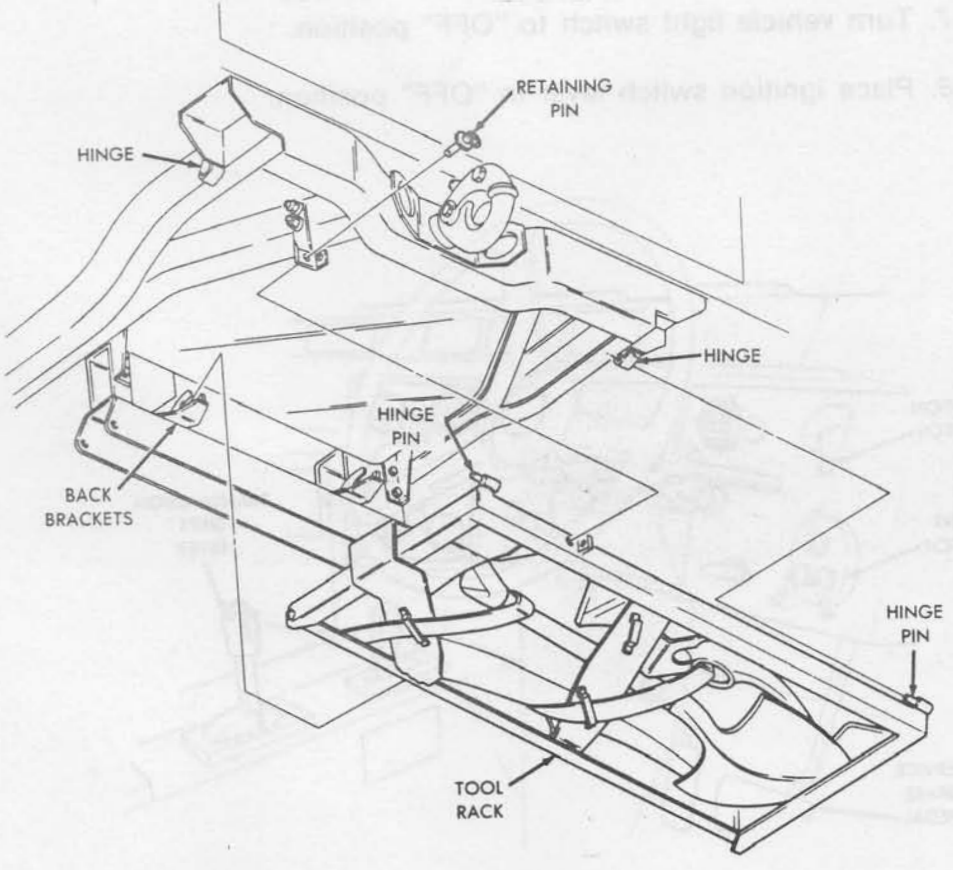
4. Lift rack out of back support brackets and remove tool rack.

b. Installation

1. Place tool rack in back support brackets.

2. Lift rack and slide rack to the left, alining hinge pins and the hinges.

3. Secure retaining pin.



2-23.2. Servicing Fuel Tank

NOTE

The HMMWV is equipped with primary and secondary tanks, having a common fuel filling point. To ensure complete fuel tank servicing, the fuel nozzle must be forced into the filler neck rubber cone. This creates a seal enabling fuel to be forced into both tanks. The fuel nozzle must be held firmly against the filler spout to prevent back pressure from pushing nozzle out of rubber cone.

a. *Filling Tanks with Pressure Nozzle*

NOTE

The HMMWV is equipped with an isolation valve between primary and secondary tanks. This valve must be open to fill both tanks.

1. Remove fuel tank filler cap.

2. Force fuel nozzle into filler neck rubber cone to create a seal and to force fuel into both tanks.

3. Visually check fuel level in fuel inlet and on fuel gage. If level has dropped, repeat step 2, and "top off" fuel level.

4. When tanks are full, install fuel tank filler cap.

b. *Filling Tanks from Fuel Can or Drum*

NOTE

When filling tanks from can or drum, fuel transfers from primary tank to secondary tank automatically when isolation valve is open.

1. Remove fuel tank filler cap.

2. Place pour spout into filler neck rubber cone and pour fuel in tanks.

3. Visually check fuel level in fuel inlet and on fuel gage. If level has dropped, repeat step 2, and "top off" fuel level.

4. When tanks are full, install fuel tank filler cap.

Section VI. OPERATION UNDER ABNORMAL CONDITIONS

2-24. Starting the Engine Under Blackout Conditions

CAUTION

Side air vents must be closed before any off-road travel.

1. Make certain parking brake is applied. If not, apply brake.

2. Adjust operator's seat.

3. Adjust left and right rear view mirrors. Make sure both mirrors provide a clear rear view.

4. Make sure vehicle windshield is clean. If not, clean before attempting to start vehicle.

WARNING

Make sure all slack from seat belt adjusting strap is removed. Seat belts do not recoil and have to be adjusted to be secure.

5. Buckle seat belts.

6. Place automatic transmission gearshift lever in "N" (neutral) position and transfer case shift lever in desired range.

CAUTION

Do not operate starter continuously for more than 20 seconds at a time or with headlights on (which will drain the batteries). Wait 10 to 15 seconds between periods of starter operations.

NOTE

Multipurpose warning light (ENG./TRANS.), brake warning light, wait-to-start light and panel lights will not illuminate with main light switch in blackout condition and auxiliary switch in the "OFF" position. To allow operation of these lights, the auxiliary light switch must be placed in "DIM" or "PANEL BRT" position or "PARK".

7. Place main light switch in blackout position.

8. Place ignition switch to "RUN" position and wait five seconds before starting to allow for glow plug operation.

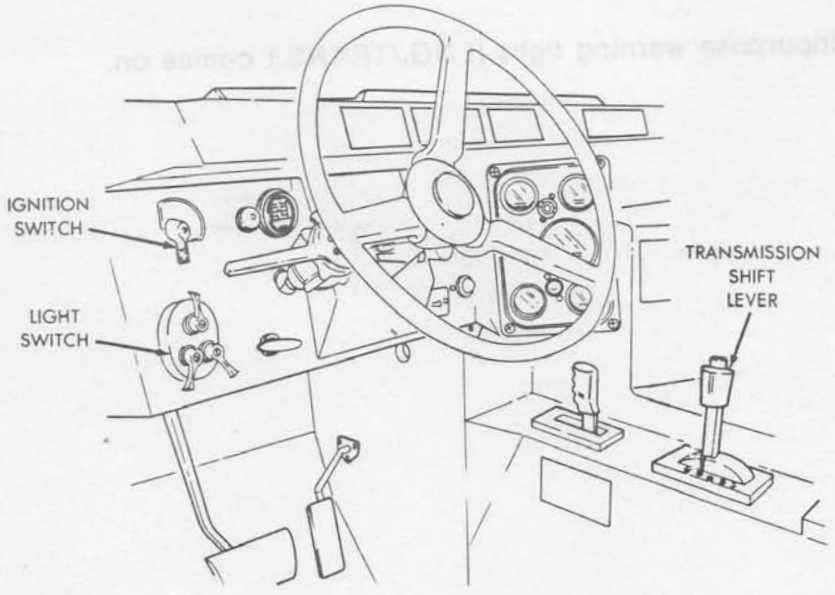
WARNING

Starting aid fluids will not be used on the HMMWV engine. Damage to engine and severe injury to personnel could result.

9. Place ignition switch to "START" position. Release lever after engine starts. Lever will return automatically to "RUN" position.

CAUTION

Multipurpose warning light (ENG./TRANS.) and brake warning lights will not be operational unless auxiliary light switch is placed in "DIM" or "PANEL BRT" position. Shut down (stop) engine when multipurpose light (ENG./TRANS.) illuminates. A malfunction has occurred in either the engine system, or the transmission system. Refer to troubelshooting table 3-1.



10. Allow engine to warm up approximately one minute.

11. Check your instruments:

CAUTION

If any instrument reading is not normal, STOP engine. Refer to troubleshooting table 3-1.

(a) Oil pressure gauge should register at least 10 psi (69 kPa).

(b) Battery/generator indicator (volt meter) should register in green area.

(c) Fuel gauge indicates fuel level in fuel tank.

(d) Air cleaner indicator should register less than 25 percent.

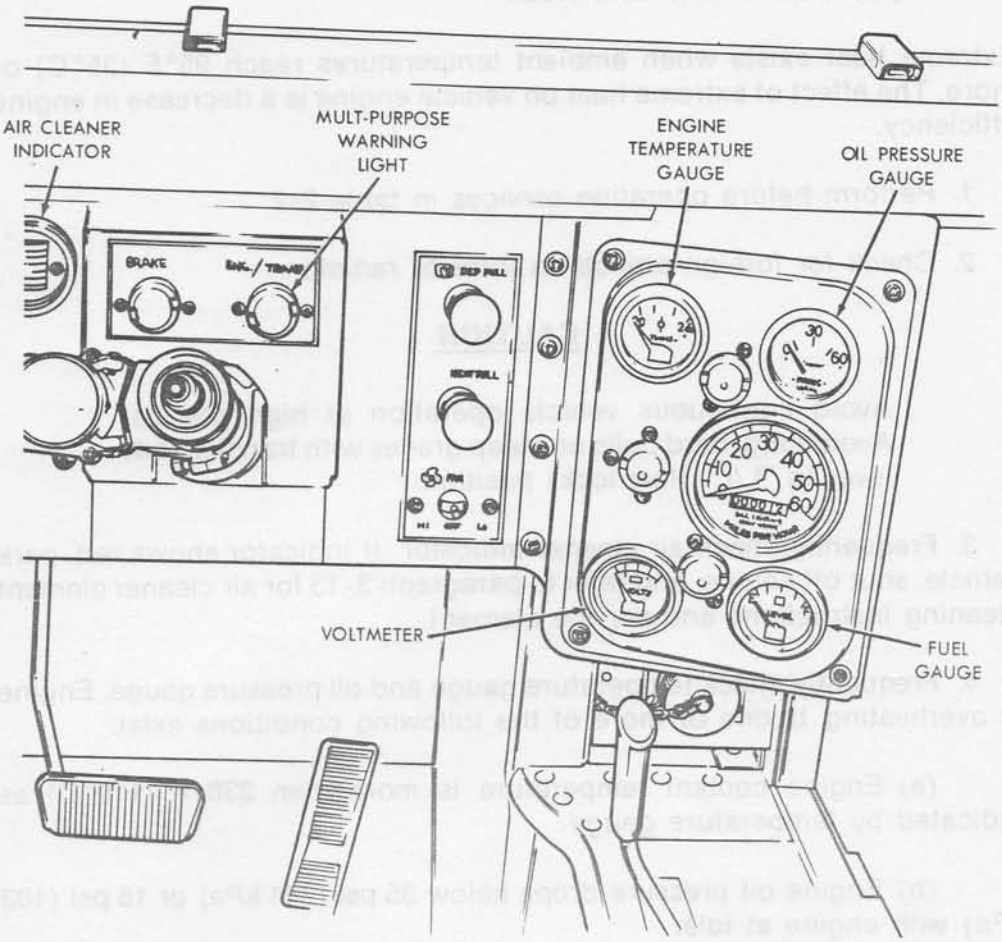
12. STOP engine if any of the following conditions occur.

(a) Noisy engine and/or excessive engine vibration.

(b) Oil pressure does not register or suddenly drops to less than 10 psi as indicated by oil pressure gauge.

(c) Sudden increase in coolant temperature beyond normal operating temperature 165°F to 230° (74°C to 110°C) as indicated by engine coolant temperature gauge.

(d) Multipurpose warning light (ENG./TRANS.) comes on.


AIR CLEANER INDICATOR
MULT-PURPOSE WARNING LIGHT
ENGINE TEMPERATURE GAUGE
OIL PRESSURE GAUGE
VOLTMETER
FUEL GAUGE

2-25. Operation in Extreme Heat

Extreme heat exists when ambient temperatures reach 95°F (35°C) or more. The effect of extreme heat on vehicle engine is a decrease in engine efficiency.

1. Perform before operation services in table 2-2.

2. Check for foreign objects in front of radiator.

CAUTION

Avoid continuous vehicle operation at high speeds. Avoid long, hard pulls on steep grades with transfer shift lever in "L/L" (low lock) position.

3. Frequently check air cleaner indicator. If indicator shows red, park vehicle, shut off engine, and refer to paragraph 3-13 for air cleaner element cleaning instructions and service element.

4. Frequently check temperature gauge and oil pressure gauge. Engine is overheating if one or more of the following conditions exist:

(a) Engine coolant temperature is more than 230°F (110°C) as indicated by temperature gauge.

(b) Engine oil pressure drops below 35 psi (241 kPa) or 15 psi (103 kPa) with engine at idle.

5. If engine overheating occurs:

CAUTION

Do not raise vehicle hood. Engine will cool faster at idle with hood closed.

(a) Park vehicle, allowing engine to idle.

(b) Observe temperature gauge and engine oil temperature gauge for indications that engine is steadily cooling.

(c) Shut off vehicle engine when engine temperature reaches normal operating temperatures 165°F to 230°F (74°C to 110°C) as indicated by temperature gauge.

(d) Perform troubleshooting procedures as listed in table 3-1, after engine has cooled to normal operating temperatures 165°F to 230°F (74°C to 110°C).

WARNING

Severe burns can result from opening surge tank filler cap while engine is running or before engine has cooled below 165°F (74°C) as indicated by temperature gauge. If surge tank filler cap must be removed before engine has cooled, follow step *e*. If engine has cooled, proceed to step *f*.

(e) Place a thick cloth over surge tank filler cap. Carefully turn cap counteclockwise to its first stop to allow pressure to escape.

(f) Remove cap when cooling system pressure is vented and check coolant level.

NOTE

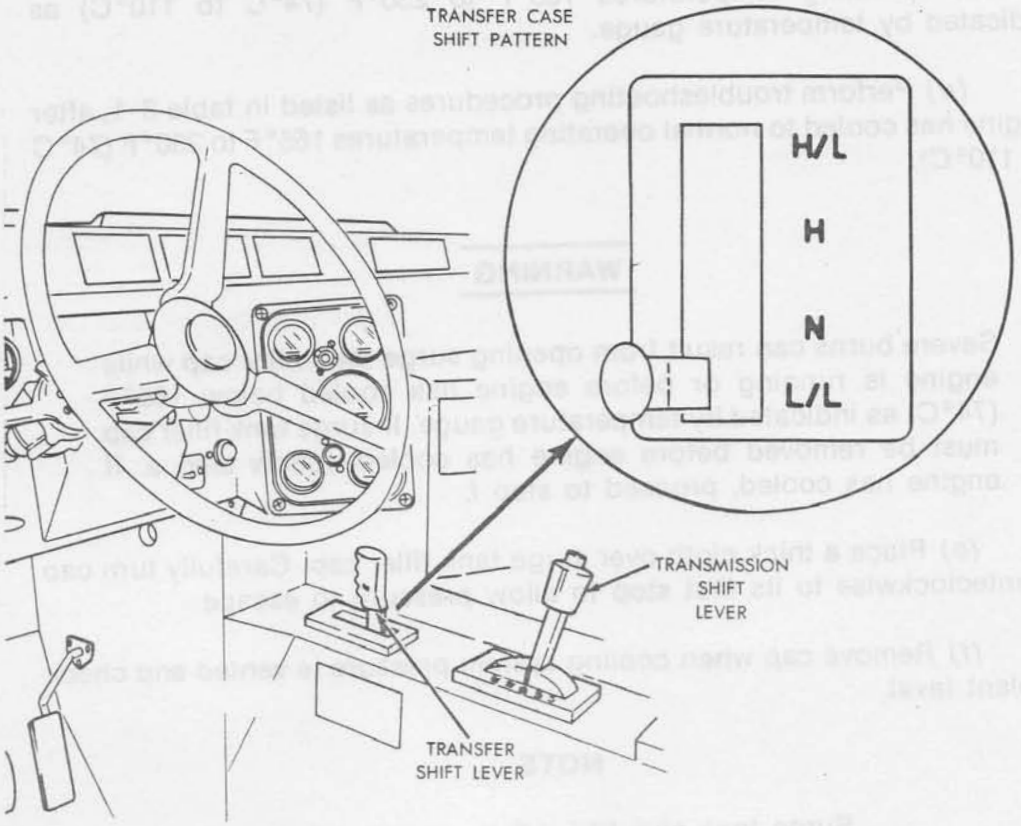
Surge tank should be three-quarters full.

(g) Start vehicle engine and add engine coolant as required.

CAUTION

Do not add coolant when engine is hot, unless engine is running. Add coolant slowly.

6. Proceed with operation. If overheating occurs again, report overheating to maintenance.



2-26. Operation in Dusty, Sandy Areas

(1) Vehicles operating in dusty or sandy areas require frequent servicing of the air filter, cooling system and lubrication points. Operators should be alert to engine overheating.

(2) When starting in sand or soft ground, place transfer shift lever in "L/L" (low lock) position and transmission shift lever in "D" (drive).

(3) Accelerate slowly so wheels will not spin and dig into sand.

CAUTION

Use a second vehicle with winch or wrecker to recover vehicles in deep sand. Do not attempt to jump vehicles out of deep sand with quick transmission gear changes. Damage to transmission could occur.

2-27. After Operation in Dusty, Sandy Areas

1. Park vehicle under cover whenever possible to protect tires, canvas, paint, wood, seals and batteries from sun, dust and sand.

2. At end of daily operation, remove all sand from vehicle engine and areas around brakes.

3. If cover is not available, cover vehicle with paulin. When entire vehicle cannot be covered, protect windows and engine compartment with paulin to prevent entry of sand or dust.

4. Use caution while refueling to prevent dust or sand from entering fuel tank. Tighten filler cap securely after refueling.

2-28. Cold Weather Starting (Below +32°F) (0°C)

WARNING

Starting aid fluids will not be used on the HMMWV engine. Damage to engine and severe injury to personnel could result.

1. Perform normal starting procedure (paragraph 2-17).

NOTE

If engine cranks slowly and battery indicator gauge indicates low battery charge level, attempt to slave start vehicle. Refer to paragraph 2-22. If vehicle still will not start, proceed to troubleshooting on table 3-1.

2. Adjust engine to high idle with hand throttle control.

3. Allow engine to warmup approximately three minutes at high idle. After warmup period, unlock hand throttle control by turning it left or right and push control in to allow engine speed to drop to normal idle.

2-29. Operation in Extreme Cold or Snow

1. Operate arctic winterization equipment if installed on vehicle. If operating in extreme cold, refer to cold weather starting (paragraph 2-28).

CAUTION

Attempting operation without all four wheels equipped with tire chains will result in damage to drive train.

2. Operating on snow or ice may require the use of tire chains. Refer to paragraph 3-12 for installation of tire chains.

WARNING

Vehicle operation in snow is a hazardous condition. Operators should travel at reduced speeds and be prepared to meet sudden changes in road conditions and traffic speeds. Maintain safe stopping distances.

3. Place transmission selector lever in "D" (drive) and transfer shift lever in "H/LK" (high lock). Place vehicle in motion slowly without causing wheels to spin.

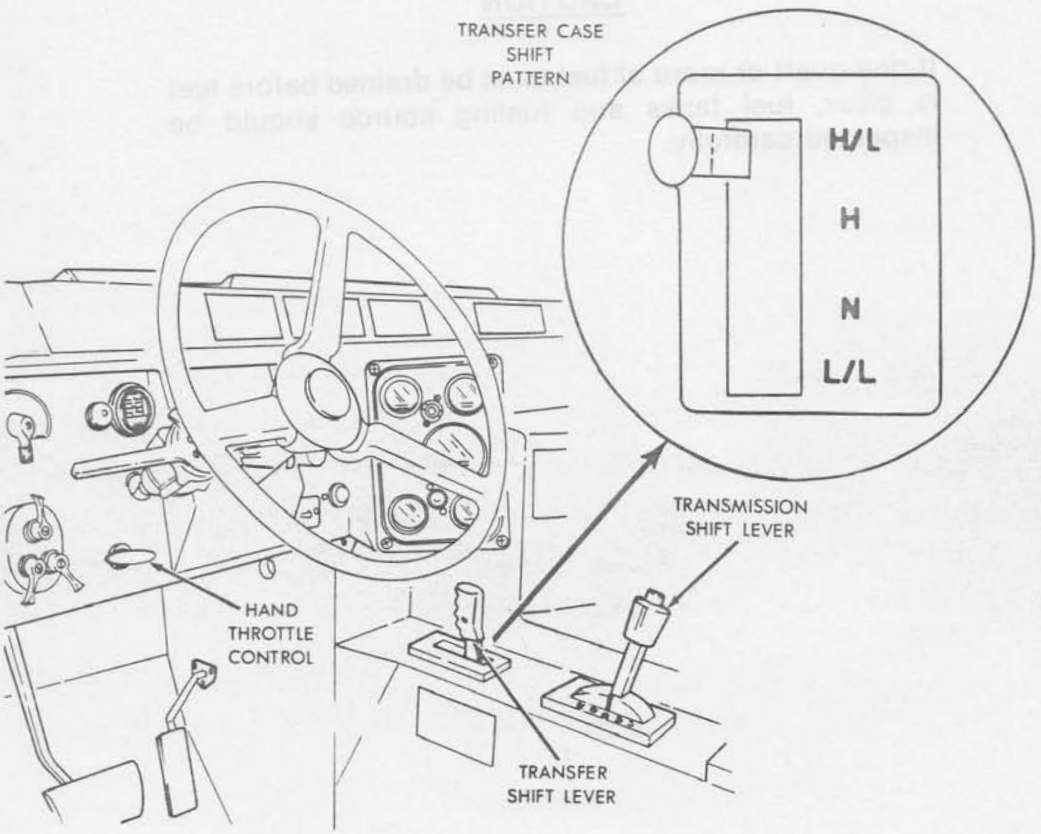
NOTE

If operating in deep snow that exceeds the 16 inch (41 cm) ground clearance, traverse the front wheels left to right to gain additional traction through snow plowing (clearing snow with wheels). This should be done only when absolutely necessary.

4. If rear vehicle skidding occurs:

(a) Instantly turn steering wheel into direction of the skid.

(b) Let up on accelerator pedal and apply brake pedal in a gradual pumping manner.



2-30. After Operation in Extreme Cold or Snow

1. Remove all ice and snow from underside of vehicle, air intake stack and fuel tank filler spout.

2. Drain water from fuel filter/water separator by opening petcock at bottom of separator and allowing fuel to drain until clear of water and/or impurities. Prime fuel system after filter has been drained. Refer to paragraph 3-6.

CAUTION

Wait ten minutes after shutting off vehicle before draining fuel filter/water separator. Ten minutes will allow enough time for water to settle in separator, but is short enough time to drain water before it freezes.

3. Refuel fuel tank as soon as possible.

CAUTION

If one quart or more of fuel must be drained before fuel is clear, fuel tanks and fueling source should be inspected carefully.

CHAPTER 3
OPERATOR MAINTENANCE

Section I. TROUBLESHOOTING

3-1. Scope

The following troubleshooting table contains instructions that will help the operator identify and correct simple vehicle malfunctions. The table also helps the operator identify major mechanical difficulties that must be referred to a higher level of maintenance. For quick reference, vehicle malfunctions are categorized under the following headings:

NOTE

Operators should perform all troubleshooting diagnosis contained in table 3-1 in the order listed. This will ensure logical fault isolation and prompt resolution of a problem.

2-31. Operation in Rain or Humid Conditions

1. Material inactive for long periods in hot, humid weather can rust rapidly. Fungus growth may develop in the fuel tank as well as on canvas paulin, seats and other components. Frequent inspections, cleaning and lubrication are necessary to maintain the readiness of vehicles in rainy or humid conditions.

2. Fuel filter/water separator must be drained frequently because of high condensation in fuel system. To drain fuel filter/water separator, refer to paragraph 3-5.

2-32. Operation in Deep Mud

1. Approach muddy terrain with transfer shift lever in "H/L" (high lock) and transmission shift lever in "D" (drive) gear.

2. Be alert at all times to vehicle speed. Be prepared to downshift transmission shift lever from "D" (drive) to "2" (second) to prevent vehicle from bogging down and becoming mired.

3. Skidding and sudden loss of steering control are operating problems in mud. When rear end skidding occurs, immediately turn wheels in direction of skid.

CAUTION

Use winch, if equipped, or second vehicle with winch to recover vehicles sunk in deep mud. Do not spin wheels. Do not attempt to jump vehicle out of deep mud with quick transmission gear changes.

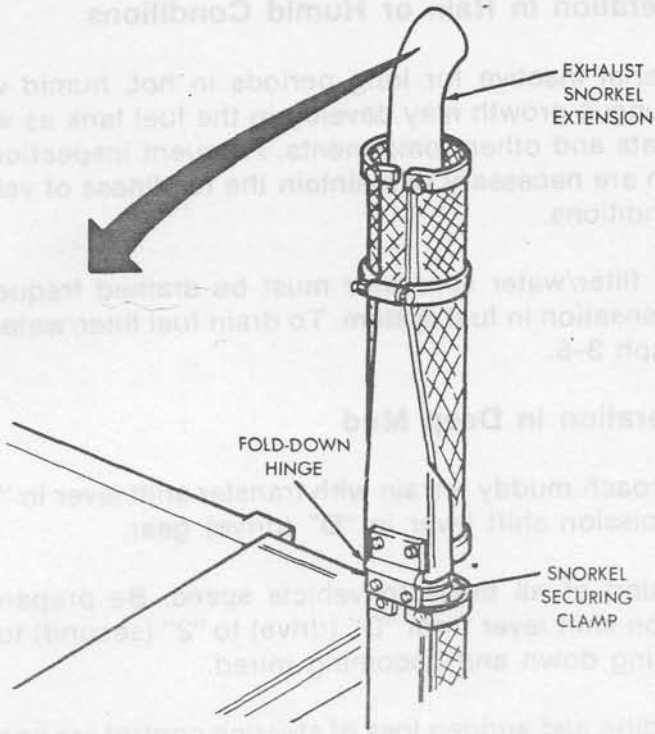
2-33. After Operation in Deep Mud

1. Wash all mud from vehicle as soon as possible, before it has time to dry and harden.

2. Remove tire chains if installed.

3. If vehicle front winch was used, clean and lubricate.

4. Clean dust ejector at bottom of air cleaner.



2-34. Deep Water Fording Operation

The deep water fording kit allows HMMWV, XM966 Series, vehicles to ford water up to 60 inches (152.4 centimeters) deep. Vehicles not equipped with a deep water fording kit can only ford water 30 inches (76.2 centimeters) deep.

CAUTION

Never attempt deep water fording unless water depth is known to be 60 inches (152.4 centimeters) or less, and water bottom is known to be hard.

a. Operator/Crew Preparation for Fording

1. Make sure oil dipstick, transmission dipstick, oil fill cap and fuel tank cap are secure.

2. Secure all loose objects on vehicle.

3. Make sure battery caps are all present and tight.

4. Make sure intake and exhaust snorkel extensions are secured tightly.

5. Have maintenance personnel pressure-check deep water fording kit.

WARNING

Do not attempt to ford water deeper than 60 inches (152.4 centimeters). Limit vehicle speed while fording to 3 or 4 miles per hour (5 or 6 kilometers per hour).

6. Adjust hand throttle for desired engine speed.

7. Enter water slowly and maintain even vehicle speed while fording.

b. After Fording Operation

1. Exit water in area with gentle slope.

2. Disengage hand throttle.

WARNING

Do not rely on service brakes until they dry out. Keep applying brakes until uneven braking ceases.

3. If fording operation was through salt water, wash and wipe off all salt deposits as soon as possible.

NOTE

Vehicles completing a deep water operation must be lubricated and serviced by maintenance as soon as possible.

2-35. Shallow Water Fording Operation

The HMMWV XM966 series vehicles have a 30-inch (76.2 centimeter) shallow water fording capacity without the deep water fording kit installed.

CAUTION

Never attempt shallow water fording unless water depth is known to be 30 inches (76.2 centimeters) or less, and water bottom is known to be hard.

a. Operator/Crew Preparation for Fording

1. Make sure oil dipstick, transmission dipstick, oil fill cap and fuel tank cap are secure.

2. Secure all loose objects on vehicle.

3. Make sure battery caps are all present and tight.

WARNING

Do not attempt to ford water deeper than 30 inches (76.2 centimeters) without deep water fording kit installed. Limit vehicle speed while fording to 3 or 4 miles per hour (5 or 6 kilometers per hour).

4. Enter water slowly and maintain even vehicle speed while fording.

b. After Fording Operation

WARNING

Do not rely on service brakes until they dry out. Keep applying brakes until uneven braking ceases. If fording operation was through salt water, wash and wipe off all salt deposits as soon as possible.

NOTE

Vehicles completing a shallow water operation must be lubricated and serviced by maintenance as soon as possible.

Exit water in area with gentle slope.

2-36. Runflat Tire Operations

The vehicle is equipped with runflat tires, allowing vehicle to be driven with one or more tires flat. For runflat tire operations, refer to table 2-4 shown below.

WARNING

Do not exceed more than 20 mph (32 km/h) with both rear tires flat. Loss of vehicle control may occur causing severe injury or death.

Table 2-4. Run-Flat Tire Operation

Combination of Flat Tires	Recommended Vehicle Speed
Two tires flat — rear only	20 mph maximum (32 km/h)
One tire flat — any location	30 mph (48 km/h)
Two tires flat — same side	30 mph (48 km/h)
Two tires flat — front only	30 mph (48 km/h)
All four tires flat	30 mph (48 km/h)

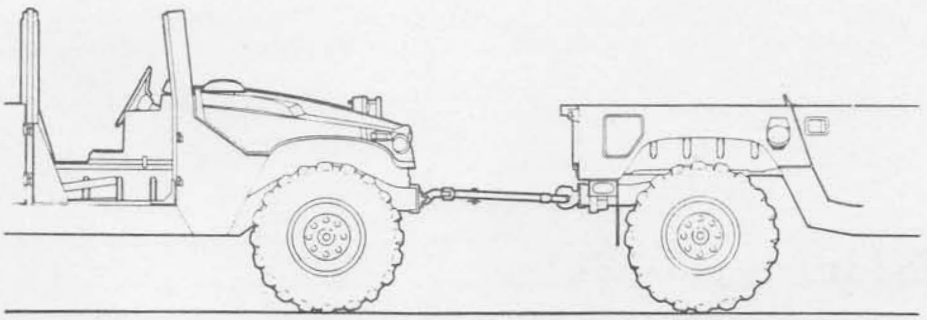
2-37. HMMWV Towing Operations

CAUTION

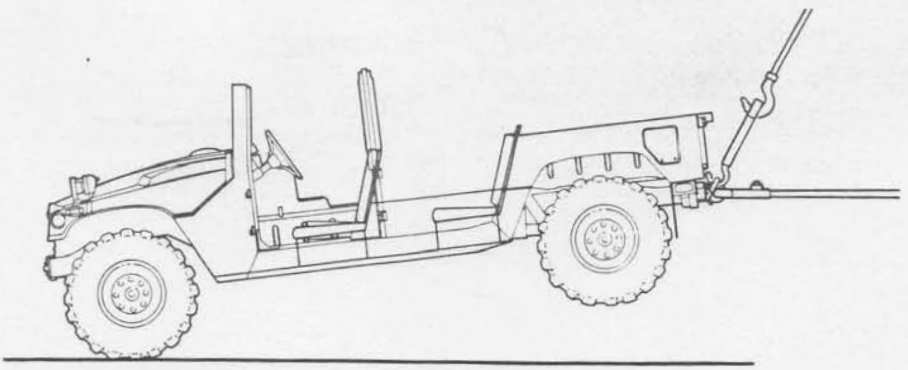
Do not exceed maximum towing speed or distance outlined in this procedure when towing a disabled HMMWV without first removing the recommended propeller shaft(s). Always place transmission and transfer case shift levers in recommended ranges before towing. Failure to follow these precautions will result in damage to the transmission or transfer case.

a. When towing a disabled HMMWV with four wheels on the ground or two rear wheels off the ground:

1. Place transmission and transfer case shift levers in "neutral".
2. Do not exceed a towing speed of 30 mph (48 kph).
3. Do not exceed a towing distance of 30 mi. (48 km).



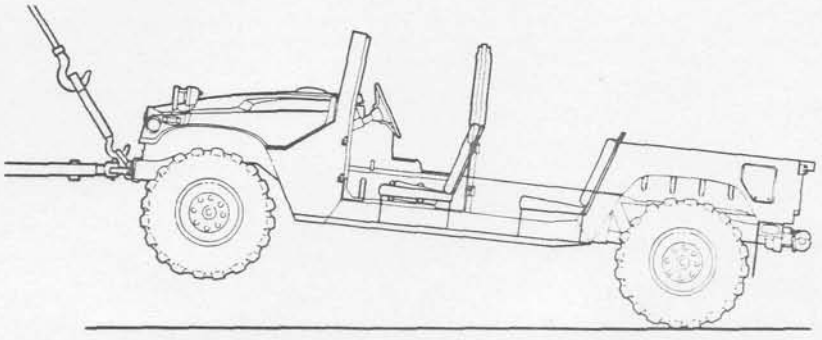
WITH ALL FOUR WHEELS ON GROUND.



WITH REAR WHEELS UP.

b. When towing a disabled HMMWV with two front wheels off the ground:

1. Place transmission shift lever in "neutral".
2. Place transfer case shift lever in "high" (H).
3. Do not exceed a towing speed of 20 mph (32 kph).
4. Do not exceed a towing distance of 30 mi. (48 km).



WITH FRONT WHEELS UP

c. If, for any reason, the conditions stated in *a* and *b* above cannot be met, the propeller shaft(s) must be removed in accordance with table 2-5.

Table 2-5. Towing Operations

VEHICLE TOWING MODE	PROP SHAFTS
Rear wheels up	Front off
Front wheels up	Rear off
Four wheels on ground	Front and rear off

Table 3-1. Troubleshooting (Cont'd)

CONDITION	POSSIBLE CAUSE	CORRECTION
INSTRUMENT PANEL WARNING SYSTEM		
Multipurpose warning (ENG./TRANS.) light illuminates (on)	1. Low coolant level.	1. Allow engine to cool, and add coolant as necessary.
	2. Low engine oil.	2. Check engine oil level and add oil as necessary.
	3. Low transmission oil.	3. Check transmission oil level and add transmission oil as necessary.
	4. Other causes.	4. Report to maintenance.
ENGINE		
Engine fails to crank	1. Transmission select lever not in "N" (neutral) position.	1. Place selector in "N" (neutral) position.
	2. Voltmeter reads in yellow or red.	2. Report to maintenance.
	3. Battery cables or terminals loose, damaged or or corroded.	3. Have cables or terminals repaired.
	4. Other causes.	4. Report to maintenance.
Engine cranks slowly	1. Battery cables or terminals loose, damaged or corroded.	1. Have cables or terminals repaired.
	2. Other causes.	2. Report to maintenance.
Engine cranks but does not start	1. Fuel tank empty.	1. Fill fuel tank.
	2. Malfunction in glow plug system; glow plug indicator fails to light.	2. Have glow plug system repaired.
	3. Air in fuel lines.	3. Prime system (para. 3-6).
	4. Other causes.	4. Report to maintenance.
Engine smokes:		
Black	1. Restricted air cleaner.	1. Clean air cleaner element.
	2. Other causes.	2. Report to maintenance.
Blue	All causes.	Report to maintenance.
White	All causes.	Report to maintenance.

Table 3-1. Troubleshooting (Cont'd)

CONDITION	POSSIBLE CAUSE	CORRECTION
Engine starts but misfires, runs rough, or lacks power	1. Air in fuel system.	1. Purge fuel system of air.
	2. Water or impurities in fuel supply.	2. Report to maintenance.
	3. Restricted air cleaner	3. Clean air cleaner.
	4. Other causes.	4. Report to maintenance.
Engine overheats according to engine coolant temperature gauge	1. Low coolant level.	1. Allow engine to cool, and add coolant as necessary.
	2. Debris blocking radiator.	2. Clear debris from radiator.
	3. Broken or missing belts.	3. Report to maintenance.
	4. Fan not turning.	4. Report to maintenance.
	5. Other causes.	5. Report to maintenance.
Low engine oil pressure according to oil pressure gauge	1. Low engine oil level.	1. If low, add oil.
	2. Other causes.	2. Report to maintenance.
Excessive oil consumption	1. Leaking oil filter.	1. Report to maintenance.
	2. Leaking drain plug.	2. Report to maintenance.
	3. Leaking oil line.	3. Report to maintenance.
	4. Other causes.	4. Report to maintenance.
Excessive fuel consumption	1. Restricted air cleaner.	1. Clean air cleaner.
	2. Water separator drain-cock left open.	2. Close draincock.
	3. Ruptured fuel tank or fuel line.	3. Report to maintenance.
	4. Other causes.	4. Report to maintenance.
Excessive exhaust smoke	1. Restricted air cleaner	1. Clean air cleaner element.
	2. Other causes.	2. Report to maintenance.

Table 3-1. Troubleshooting (Cont'd)

CONDITION	POSSIBLE CAUSE	CORRECTION
	HEATING SYSTEM	
Hot water personnel heater fails to produce heat after engine reaches operating temperatures	1. Hot water valve closed.	1. Pull hand control and open.
	2. Blower motor switch in OFF position.	2. Put blower motor switch in HIGH or LOW position.
	3. Other causes.	3. Report to maintenance.
	TRANSMISSION	
Transmission overheats according to multipurpose warning (ENG./TRANS.) light	1. Transmssion fluid level low.	1. Check fluid level and add fluid if low.
	2. Other causes.	2. Report to maintenance.
No response to shift lever movement	1. Transfer case shift lever in "N" (neutral).	1. Stop engine and select gear range.
	2. Other causes.	2. Report to maintenance.
Rough shifting	All causes.	Report to maintenance.
Oil thrown from filler tube	1. Transmission fluid dipstick loose.	1. Secure dipstick.
	2. Other causes.	2. Report to maintenance.
Slippage in all ranges	1. Transmission fluid level low.	1. Check fluid level; add if low.
	2. Other causes.	2. Report to maintenance.
Lubricant leakage	1. Loose hose and pipe connections.	1. Tighten all loose connections using crescent wrench.
	2. Other causes.	2. Report to maintenance.
	ELECTRICAL	
Engine does not crank; some electrical systems inoperative or weak	Cracked battery; broken or loose terminal, frayed cable.	Tighten terminal or report to maintenance.
All vehicle electrical systems inoperative	1. Battery cables improperly installed or loose.	1. Check and reconnect batteries.
	2. Dead batteries.	2. Report to maintenance.

Table 3-1. Troubleshooting (Cont'd)

CONDITION	POSSIBLE CAUSE	CORRECTION
TRANSFER		
Transfer selector lever will not shift	All causes.	Report to maintenance.
Lubricant leakage	1. Loose drain plugs.	1. Tighten loose drain plugs.
	2. Other causes.	2. Report to maintenance.
Excessive noise	All causes.	Report to maintenance.
BRAKES		
Poor braking action	All causes.	Report to maintenance.
Service brakes dragging	All causes.	Report to maintenance.
Parking brake dragging (warning light on)	1. Parking brake partially applied.	1. Disengage parking brake.
	2. Other causes.	2. Report to maintenance.
WHEELS, TIRES AND HUBS		
Wheels wobble or shimmy	1. Loose wheel stud nuts.	1. Tighten loose nuts.
	2. Other causes.	2. Report to maintenance.
Excessive or uneven tire wear	1. Incorrect tire air pressure.	1. Inflate or deflate tires to correct air pressure.
	2. Other causes.	2. Report to maintenance.
Vehicle wanders or pulls to one side on level pavement	1. Incorrect tire air pressure.	1. Inflate or deflate tires to correct air pressure
	2. Other causes.	2. Report to maintenance.

Table 3-1. Troubleshooting (Cont'd)

CONDITION	POSSIBLE CAUSE	CORRECTION
	STEERING	
Hard steering	1. Low steering fluid.	1. Add steering fluid.
	2. Power steering pump inoperative.	2. Report to maintenance.
	3. Incorrect tire air pressure.	3. Inflate or deflate tires to correct air pressure.
	4. Other causes.	4. Report to maintenance.
Fluid leak	All causes.	Report to maintenance.
	WINCH	
Winch inoperative	1. Clutch handle not engaged.	1. Engage clutch handle.
	2. Low battery power (engine not running).	2. Start engine and charge batteries.
	3. Other causes.	3. Report to maintenance.
	ARCTIC KIT	
Blower motor inoperative	1. Circuit breaker open.	1. Reset circuit breaker.
	2. Other causes.	2. Report to maintenance.
No heat output	1. Fuel tank empty.	1. Fill tank.
	2. Other causes.	2. Report to maintenance.
Indicator light inoperative	Defective lamp.	Use start feature. If defective, report to maintenance.
Inadequate windshield defrosting	1. Diverter damper doors closed.	1. Open damper doors.
	2. Hose not connected to defroster.	2. Position hose to nozzle, and clamp securely.
	3. Other causes.	3. Report to maintenance.

Table 3-1. Troubleshooting

CONDITION	POSSIBLE CAUSE	CORRECTION
Excessive smoke from heater exhaust	1. Clogged intake air screen.	1. Clean intake air screen.
	2. Other causes.	2. Report to maintenance.
AIR CONDITIONING SYSTEM (MAXI-AMBULANCE ONLY)		
Air conditioning system inoperative	All causes.	Report to maintenance.

Section II. MAINTENANCE PROCEDURES

3-2. General

The operator/crew is responsible for daily, weekly and monthly preventive maintenance checks and services listed in table 2-2. Certain other maintenance services, also the responsibility of the operator/crew, are explained in this section.

CAUTION

Any time hood is raised, cover must be placed over intake tube to prevent objects from entering air intake system. Remove cover prior to closing hood.

NOTE

To perform engine service, the hood must be unlatched and secured in the opened position. After completing engine service, lower hood to fixed position, and latch it.

3-3. Raising and Lowering Engine Hood

a. Raising Hood

CAUTION

Any time hood is raised, cover must be placed over intake tube to prevent objects from entering air intake system. Remove cover prior to closing hood.

1. Release left and right hood latches.

2. Raise hood. Remove support rod from retaining latch. Position support rod in air lift bracket hole.

3. Place cover over air intake tube.

b. Lowering Hood

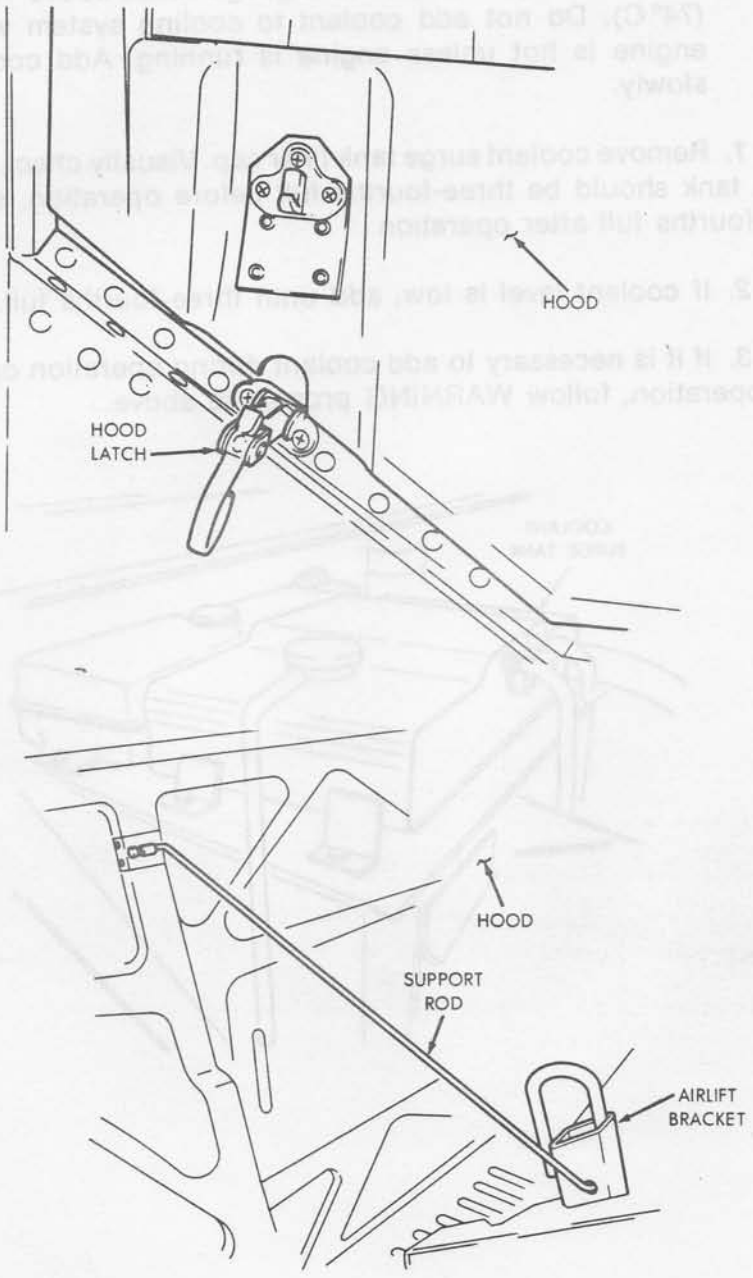
1. Remove cover from air intake tube.

2. While supporting hood, release and clamp support rod in storage bracket.

CAUTION

Do not slam hood when lowering. Damage to hood components will result.

3. Lower hood and secure in closed position with hood latches.



3-4. Filling Coolant Surge Tank

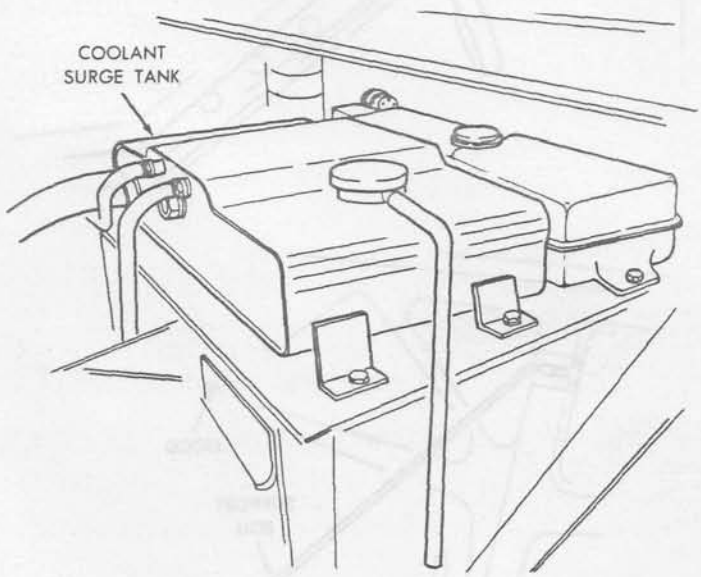
WARNING

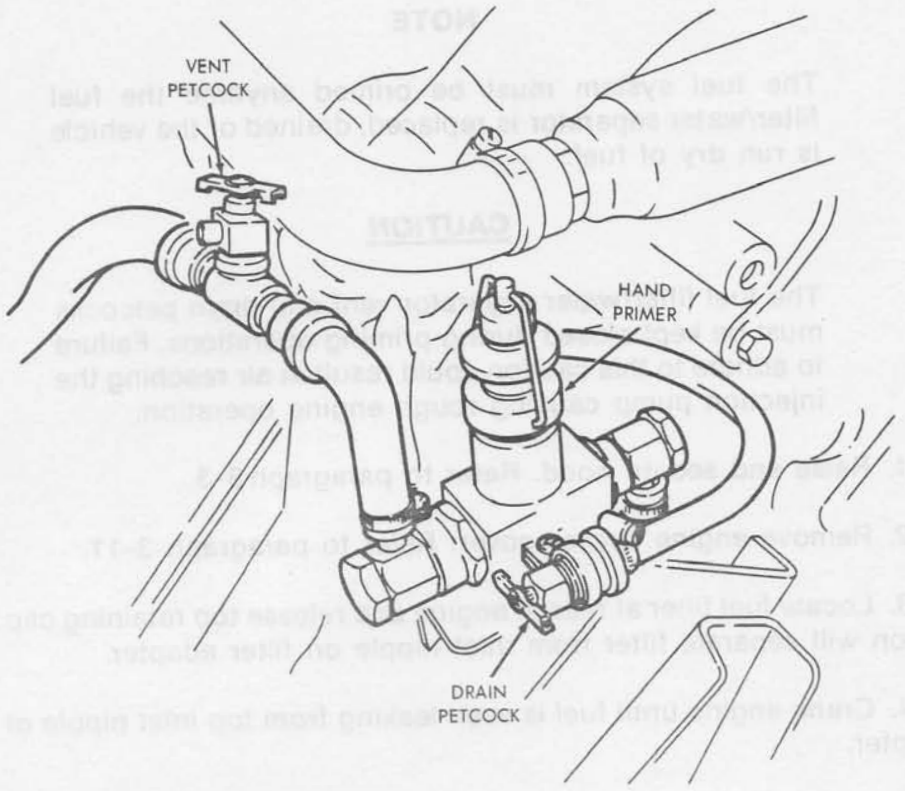
Extreme care should be taken when removing surge tank filler cap if temperature gauge reads above 165° F (74° C). Do not add coolant to cooling system when engine is hot unless engine is running. Add coolant slowly.

1. Remove coolant surge tank filler cap. Visually check coolant level. Surge tank should be three-fourths full before operation, slightly above three-fourths full after operation.

2. If coolant level is low, add until three-fourths full.

3. If it is necessary to add coolant during operation or immediately after operation, follow WARNING procedure above.





3-5. Draining Fuel Filter/Water Separator

1. Raise and secure hood. Refer to paragraph 3-3.

2. Locate vent petcock and drain petcock positioned fore and aft of the primer pump on the right side of the engine.

3. Open vent petcock and then the drain petcock. Close vent and drain petcocks when fuel begins to drain.

4. Prime fuel system. Refer to paragraph 3-6.

3-6. Priming Fuel System

NOTE

The fuel system must be primed anytime the fuel filter/water separator is replaced, drained or the vehicle is run dry of fuel.

CAUTION

The fuel filter/water separator vent and drain petcocks must be kept closed during priming operations. Failure to adhere to this caution could result in air reaching the injection pump causing rough engine operation.

1. Raise and secure hood. Refer to paragraph 3-3.

2. Remove engine access cover. Refer to paragraph 3-11.

3. Locate fuel filter at rear of engine and release top retaining clip. This action will separate filter from inlet nipple on filter adapter.

4. Crank engine until fuel is seen leaking from top inlet nipple of filter adapter.

5. Secure fuel filter retaining clip.

6. Start engine.

NOTE

- If engine fails to start, or dies in a short time, repeat steps 1 through 6. If engine fails to start after third priming attempt, notify maintenance.

- The HMMWV is equipped with a hand-operated primer pump for use when battery conditions prohibit adequate cranking battery reserve. To operate the hand primer pump, proceed with steps 7 through 12.

7. Release fuel filter top retaining clip.

8. Unscrew primer pump plunger hold down nut and swing hold down to the side.

9. Using an up-down motion, operate pump plunger repeatedly until fuel is seen flowing from top inlet nipple of filter adapter.

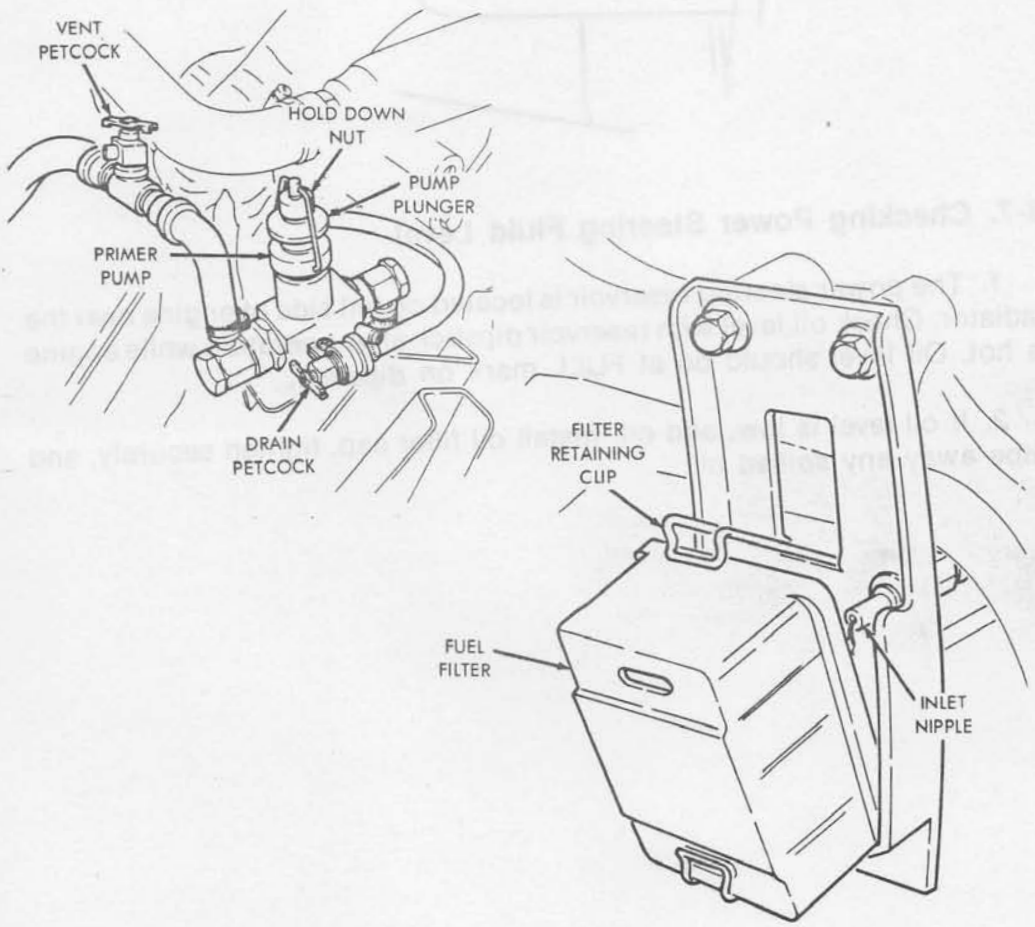
10. Secure fuel filter retaining clip.

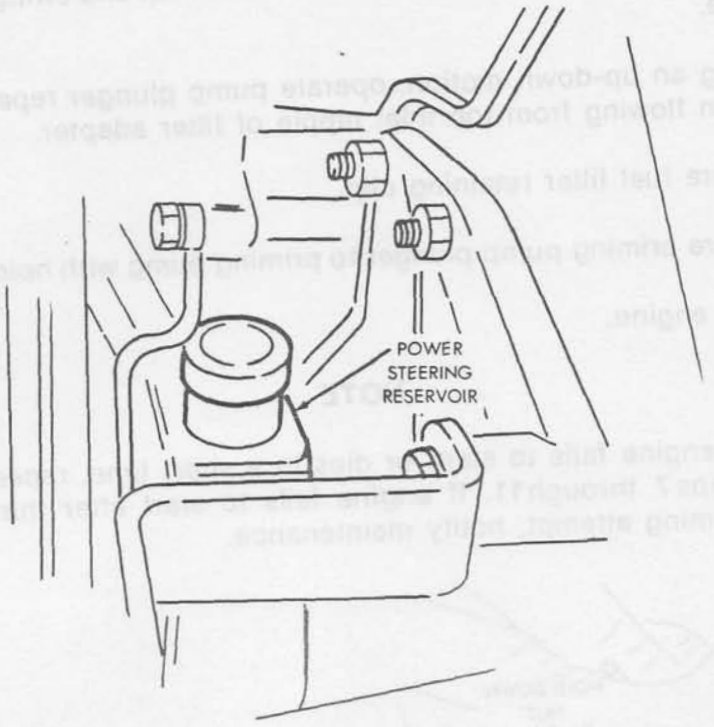
11. Secure priming pump plunger to priming pump with hold down nut.

12. Start engine.

NOTE

If engine fails to start, or dies in a short time, repeat steps 7 through 11. If engine fails to start after third priming attempt, notify maintenance.

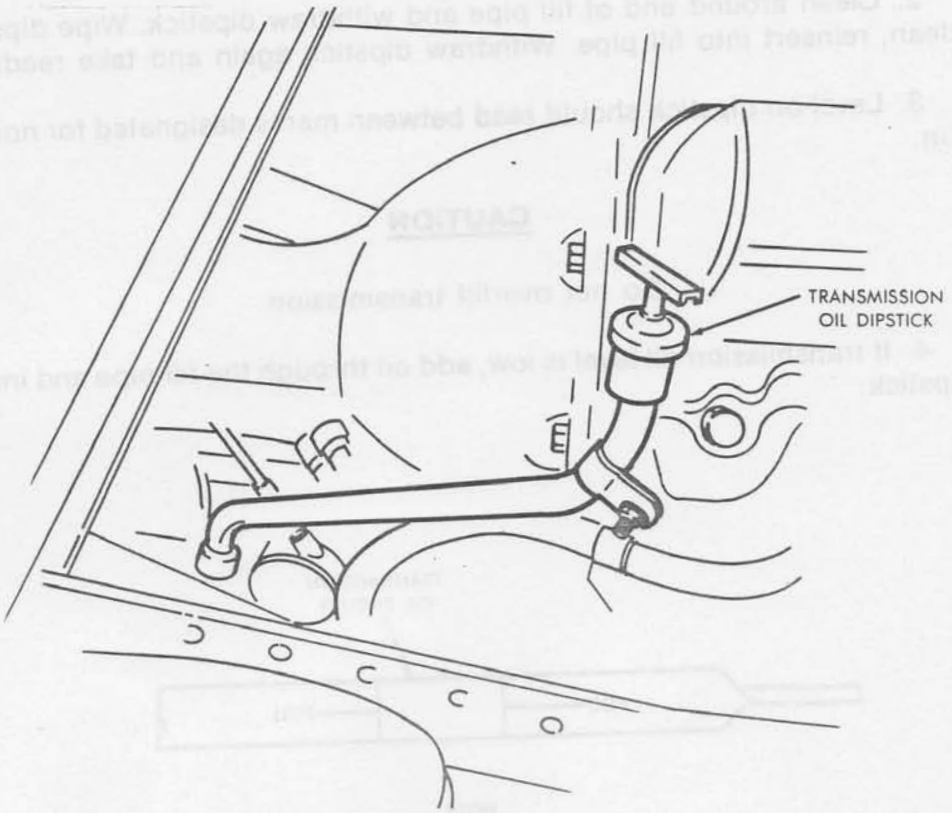




3-7. Checking Power Steering Fluid Level

1. The power steering reservoir is located on left side of engine near the radiator. Check oil level with reservoir dipstick after operation while engine is hot. Oil level should be at FULL mark on dipstick.

2. If oil level is low, add oil. Install oil filler cap, tighten securely, and wipe away any spilled oil.



3-8. Transmission Oil Servicing

WARNING

Check transmission with engine running at idle and transmission in neutral and parking brake engaged.

1. Remove engine cover (dog house). Refer to paragraph 3-11.

CAUTION

Withdraw transmission dipstick slowly. Removing dipstick too quickly creates a vacuum within the filler tube which may result in a false oil level reading.

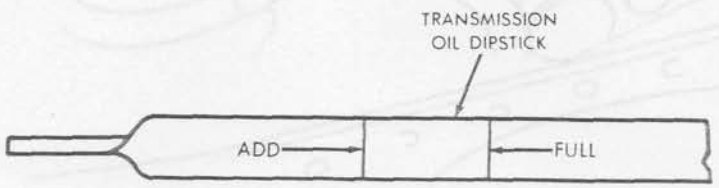
2. Clean around end of fill pipe and withdraw dipstick. Wipe dipstick clean, reinsert into fill pipe. Withdraw dipstick again and take reading.

3. Level on dipstick should read between marks designated for normal run.

CAUTION

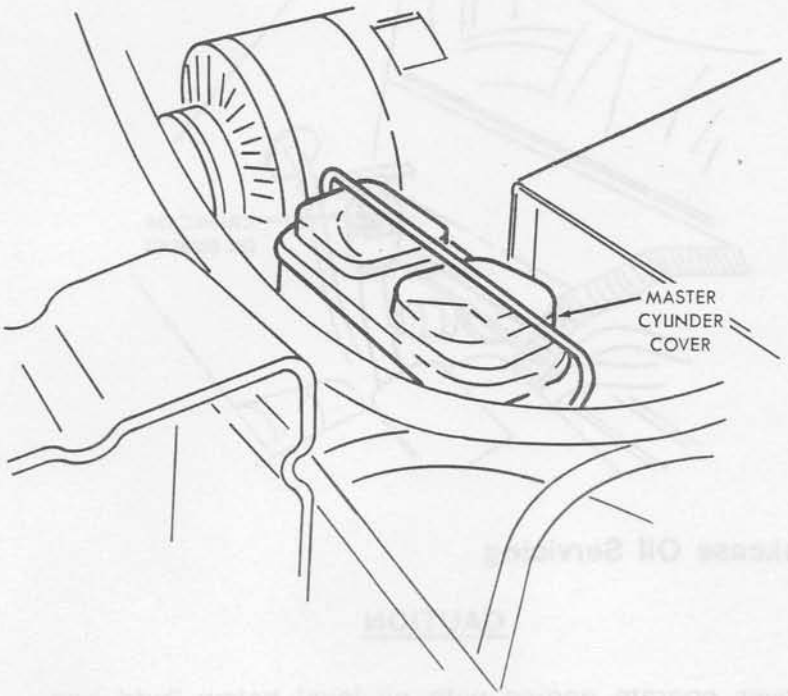
Do not overfill transmission.

4. If transmission oil level is low, add oil through the fill pipe and insert dipstick.



NOTE

DO NOT OVERFILL. IT TAKES ONLY ONE PINT (.473 LITER) TO RAISE LEVEL FROM "ADD" TO "FULL" WITH A HOT TRANSMISSION.



3-9. Brake Fluid Servicing.

CAUTION

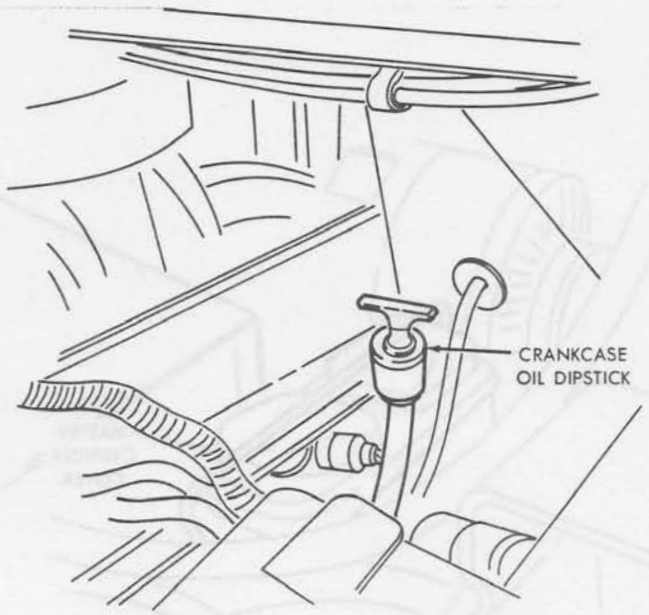
Thoroughly clean exterior of master cylinder before removing cover. Dirt, water and grease will contaminate brake fluid causing brake system damage.

1. The master cylinder is located on the left side of the engine and should be checked monthly.

2. Remove cover from master cylinder with screwdriver, and check fluid in front and rear reservoirs.

3. Fluid should be 1/4 inch (6 mm) from the top of the reservoir. If low, add fluid as necessary.

4. Secure cover to master cylinder and wipe away any spilled fluid.



3-10. Crankcase Oil Servicing

CAUTION

Never operate engine with oil level below "add one quart" level mark or above "FULL" level mark.

1. Oil level dipstick is located on left rear side engine compartment directly below coolant surge tank.

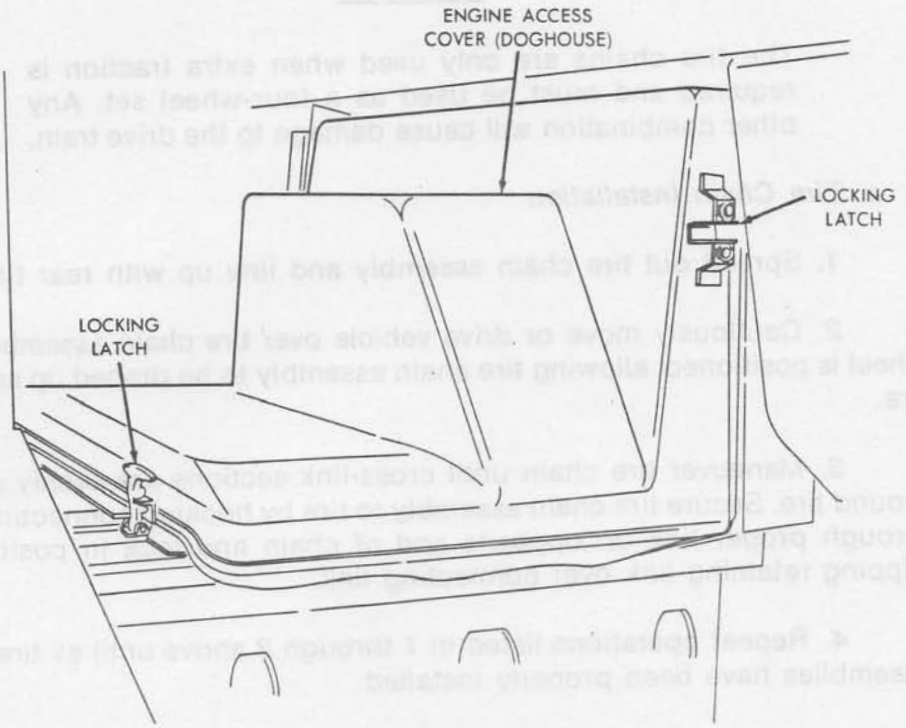
2. Turn dipstick handle counterclockwise to free dipstick from dipstick tube and withdraw dipstick.

3. Wipe clean and return to dipstick tube, but do not tighten handle.

4. Withdraw dipstick slowly to prevent a false reading. Keep oil level as near as possible to "FULL" mark on dipstick.

5. If engine oil level is low, remove oil filler cap located at top of engine, and add engine oil. Do not overfill. Replace oil filler cap, tighten cap securely, and wipe away any oil spilled.

6. After checking or adding oil, reinstall dipstick in tube. Make sure dipstick is seated in tube opening, then tighten handle by turning it clockwise.



3-11. Engine Access Cover (Dog House) Removal and Installation

NOTE

The engine cover (dog house) is removed for access to transmission dipstick.

a. Engine Access Cover (Dog House) Removal

1. Unfasten four locking latches securing dog house to body.
2. Remove dog house.

b. Engine Access Cover (Dog House) Installation

Installation of dog house is reverse of dog house removal procedures.

3-12. Tire Chain Installation and Removal

CAUTION

The tire chains are only used when extra traction is required and must be used as a four-wheel set. Any other combination will cause damage to the drive train.

a. Tire Chain Installation

1. Spread out tire chain assembly and line up with rear tire.

2. Cautiously move or drive vehicle over tire chain assembly until wheel is positioned, allowing tire chain assembly to be draped up and over tire.

3. Maneuver tire chain until cross-link sections are evenly spaced around tire. Secure tire chain assembly to tire by hooking connecting links through proper link on opposite end of chain and lock in position by slipping retaining link over connecting link.

4. Repeat operations listed in *1* through *3* above until all tire chain assemblies have been properly installed.

NOTE

After vehicle is driven the first one or two miles, stop and retighten tire chains.

b. Tire Chain

CAUTION

Remove tire chains from tires as soon as possible after leaving area requiring their use.

1. Position retaining link to allow connecting link to be unhooked. Unhook connecting links.

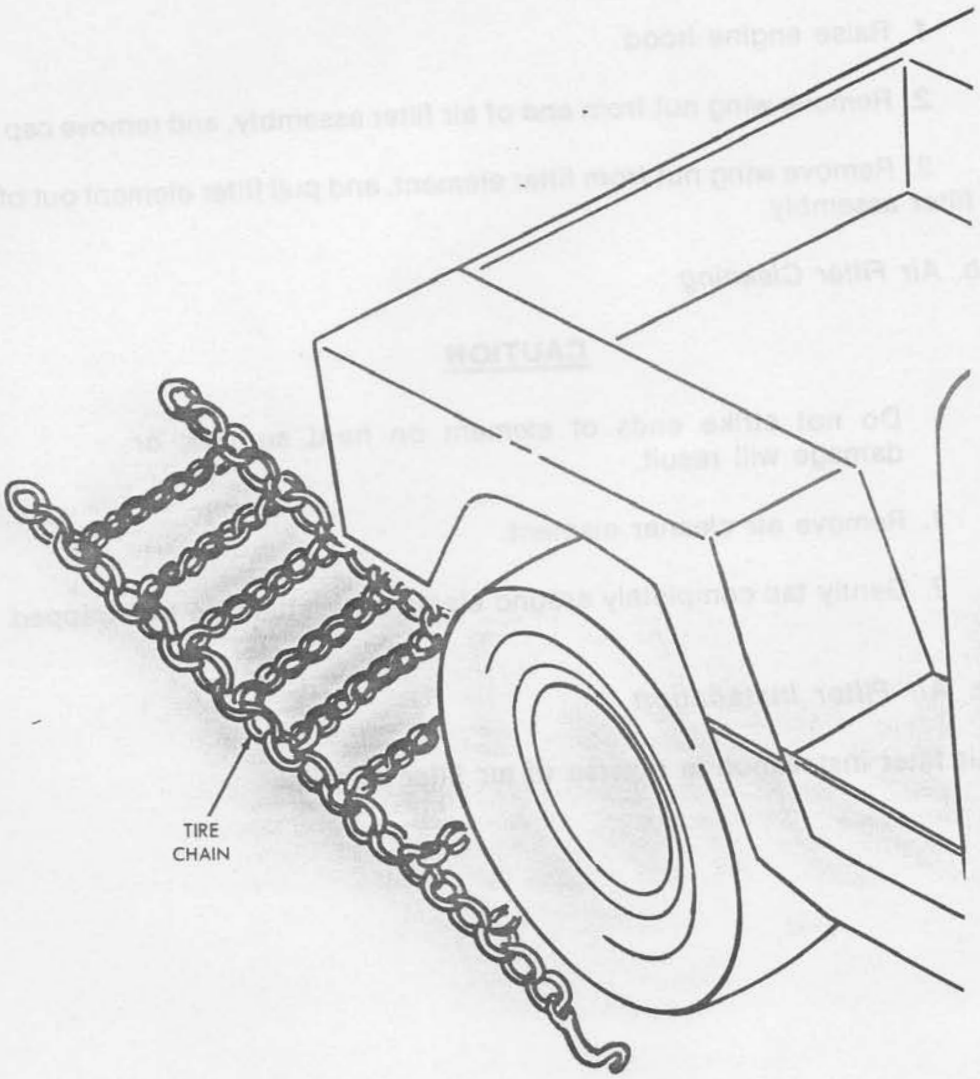
2. Remove tire chain assembly from tire.

CAUTION

Make sure tire chain assembly has been completely removed from tire before driving vehicle over chain.

3. Drive vehicle off tire chain assembly.

4. Repeat operations listed in 1 through 3 above, until all tire chain assemblies have been removed from tires.



3-13. Air Cleaner Servicing

Air cleaner service is required when air cleaner indicator reads 25 percent or higher.

CAUTION

Do not operate engine without air cleaner element except in extreme emergency.

a. Air Filter Removal

1. Raise engine hood.

2. Remove wing nut from end of air filter assembly, and remove cap.

3. Remove wing nut from filter element, and pull filter element out of air filter assembly.

b. Air Filter Cleaning

CAUTION

Do not strike ends of element on hard surface, or damage will result.

1. Remove air cleaner element.

2. Gently tap completely around element with hand to free trapped dirt.

c. Air Filter Installation

Air filter installation is reverse of air filter removal.

3-14. Plastic Window Cleaning

NOTE

This paragraph provides instructions for cleaning the XM966 Weapons Carrier inside windshield and plastic windows. This procedure is to be used on plastic surfaces only.

1. Clean the window of dirt and other particles using soap and water and a soft, clean cloth.

2. Rinse with clean water.

3. Apply cream cleaner (NSN 8520-00-262-7177) to plastic window.

4. Wipe cream cleaner off with dry cloth. Cream cleaner enhances visual clarity after cleaning with soap and water.

APPENDIX A
BASIC ISSUE ITEMS

A-1. General

This appendix contains the minimum essential items required to place and maintain XM966 series vehicles in operation. Although shipped separately packed, basic issue items should accompany the vehicle during operation. The illustrations will assist you to identify each basic issue item. For basic issue item location, see page A-7.

A-2. Explanation of Columns

1. *Item Number.* This number is assigned to each entry in the listing.

2. *National Stock Number.* Indicates national stock number assigned to item which is used for requisitioning.

3. *Description.* Indicates a minimum description to identify each item.

4. *Federal Supply Code for Manufacturer (FSCM):*

Code	*Manufacturer*
19207	U. S. Army Tank-Automotive Command
34623	AM General Corporation
81349	Military Specification Promulgated by Standardization Div. Directorate of Logistic Services DSA
96906	Military Standards

5. *Usable On Code.* Helps you identify which items are used on different models. Codes used are:

XM 966	— Weapons Carrier
XM 996	— Ambulance (Mini)
XM 997	— Ambulance (Maxi)
XM 998	— Utility Vehicle
A	— All Models

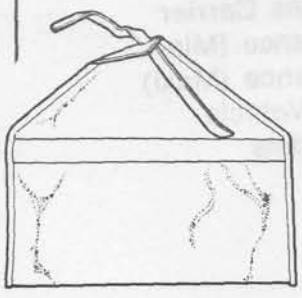
BASIC ISSUE ITEMS

Item No.	National Stock No.	Description FSCM and Part No.	Usable On Code	Qty. Furn. With Equp.
		COMMON EQUIPMENT — COMMON TOOLS		
1	2540-00-670-2459	BAG: pamphlet, cotton duck 3 in. x 9-1/4 in. x 11-1/4 in. (19207) 7961712	A	1
2	N/A	BINDER: Equipment log book 2-1/2 in. x 8 in. x 10 in. (19207) 11677003	A	1
3	N/A	BAG: Tool, cotton duck, 10 in. x 20 in. w/flap (19207) 7714142	A	1
4	N/A	GAUGE: Tire pressure, 11 Lg-type ICL-A (81349) GG-G-91D	A	1

PAMPHLET BAG

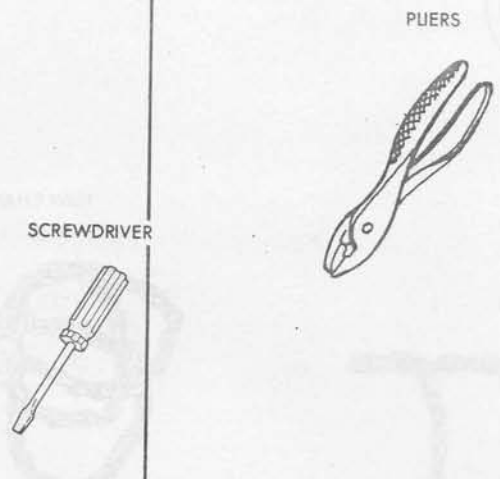
GAUGE

TOOL BAG



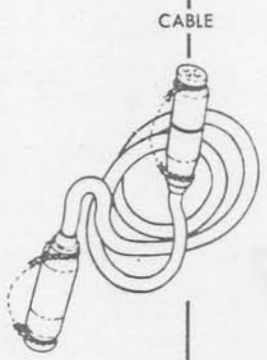
BASIC ISSUE ITEMS (Cont'd)

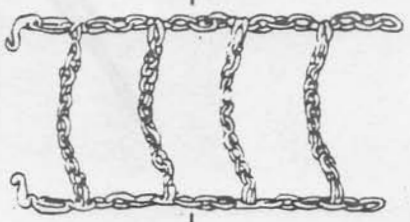
Item No.	National Stock No.	Description FSCM and Part No.	Usable On Code	Qty. Furn. With Equp.
5	5120-00-494-1911	PLIERS, combination, slip joint straight nose w/cutter 8 in. long, phosphate finish (19207) 11655775-3	A	1
6	N/A	SCREWDRIVER, flat tip, flared sides, plastic handle, round blade, 1/4 in. wide tip - 7-3/4 in. long (19207) 11655777-2	A	1
7	N/A	SCREWDRIVER, cross tip, Phillips type, plastic handle, point no. 2, 7-1/2 in. long (19207) 11655777-8	A	1

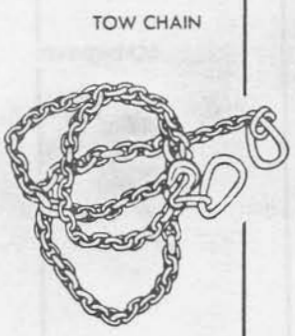


BASIC ISSUE ITEMS (Cont'd)

Item No.	National Stock No.	Description FSCM and Part No.	Usable On Code	Qty. Furn. With Equp.
8	N/A	CABLE, slave electric, 24-volts, 1 in. diameter, 12 ft long (19207) 11682379-4	A	1
9	N/A	ADAPTER (19207) 11677570	A	2
10	N/A	CHAIN, tire, 7/32 side x 1/4 cross link, 2 ea. (34623) EX5569255	A	4
11	N/A	CHAIN, tow 9/32 link x 12 ft long (34623) EX5569246	A	1

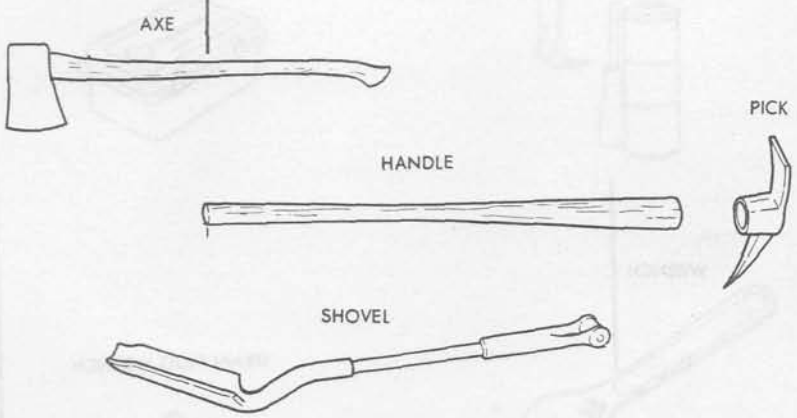






BASIC ISSUE ITEMS (Cont'd)

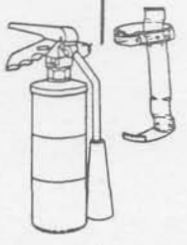
Item No.	National Stock No.	Description FSCM and Part No.	Usable On Code	Qty. Furn. With Equp.
		TOOLS PIONEER		
12	5110-00-293-2336	AXE, single bit, 4 lb head weight, 36-1/2 in. long, type 1, class 1, design A (19207) 6150925	A	1
13	N/A	SHOVEL, hand, round point, 40-1/2 in. long (19207) 11655784	A	1
14	5120-00-288-6574	HANDLE, mattock pick, clay, 36 in. long (19207) 11677021	A	1
15	5120-00-243-2395	PICK, head clay, 19-1/2 in. long (19207) 11677022	A	1



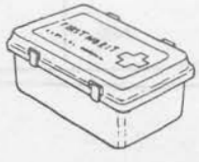
BASIC ISSUE ITEMS (Cont'd)

Item No.	National Stock No.	Description FSCM and Part No.	Usable On Code	Qty. Furn. With Equp.
16	4210-00-555-8837	FIRE EXTINGUISHER, hand, CF 3 BR (freon) 2-3/4 lb capacity w/bracket (19207) 10916537	A	1
17	N/A	BRACKET, fire extinguisher MTG supports fire extinguisher (19207) 10924916	A	1
18	N/A	FIRST AID KIT, 2-1/8 x 5-5/8 x 7-1/2 in., type I, size 2 (81349) GG-K-392	A	1
19	N/A	WRENCH, adjustable, open end, 8 in. long (19207) 11655778-3	A	1
20	5315-00-732-1019	WRENCH, oil drain plug, straight bar key, 1/2 in. square, 2-1/2 in. long (96906) MS20066-543		

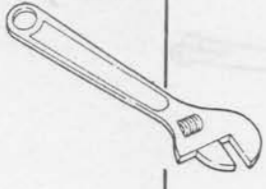
FIRE EXTINGUISHER



FIRST AID KIT

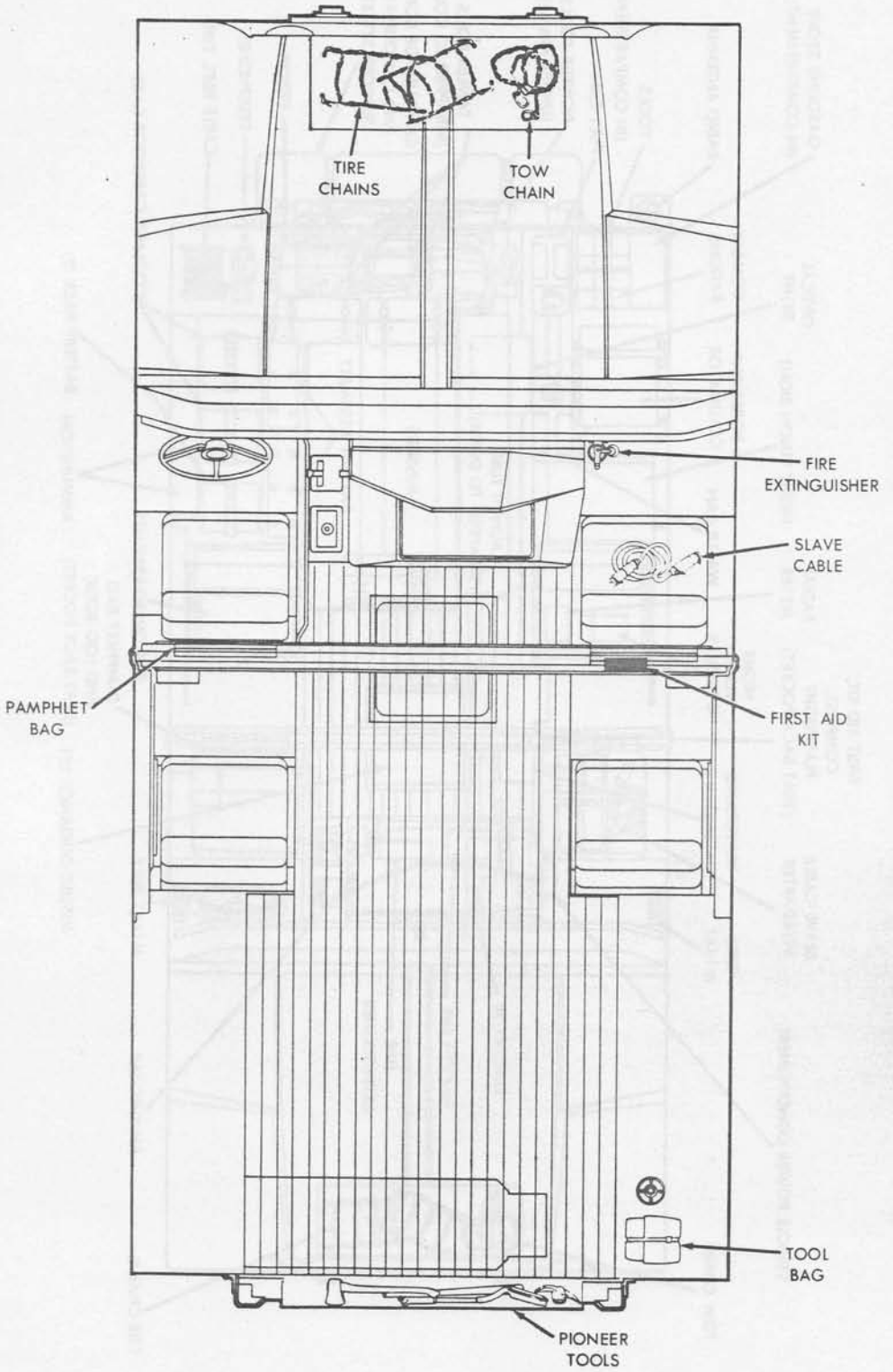


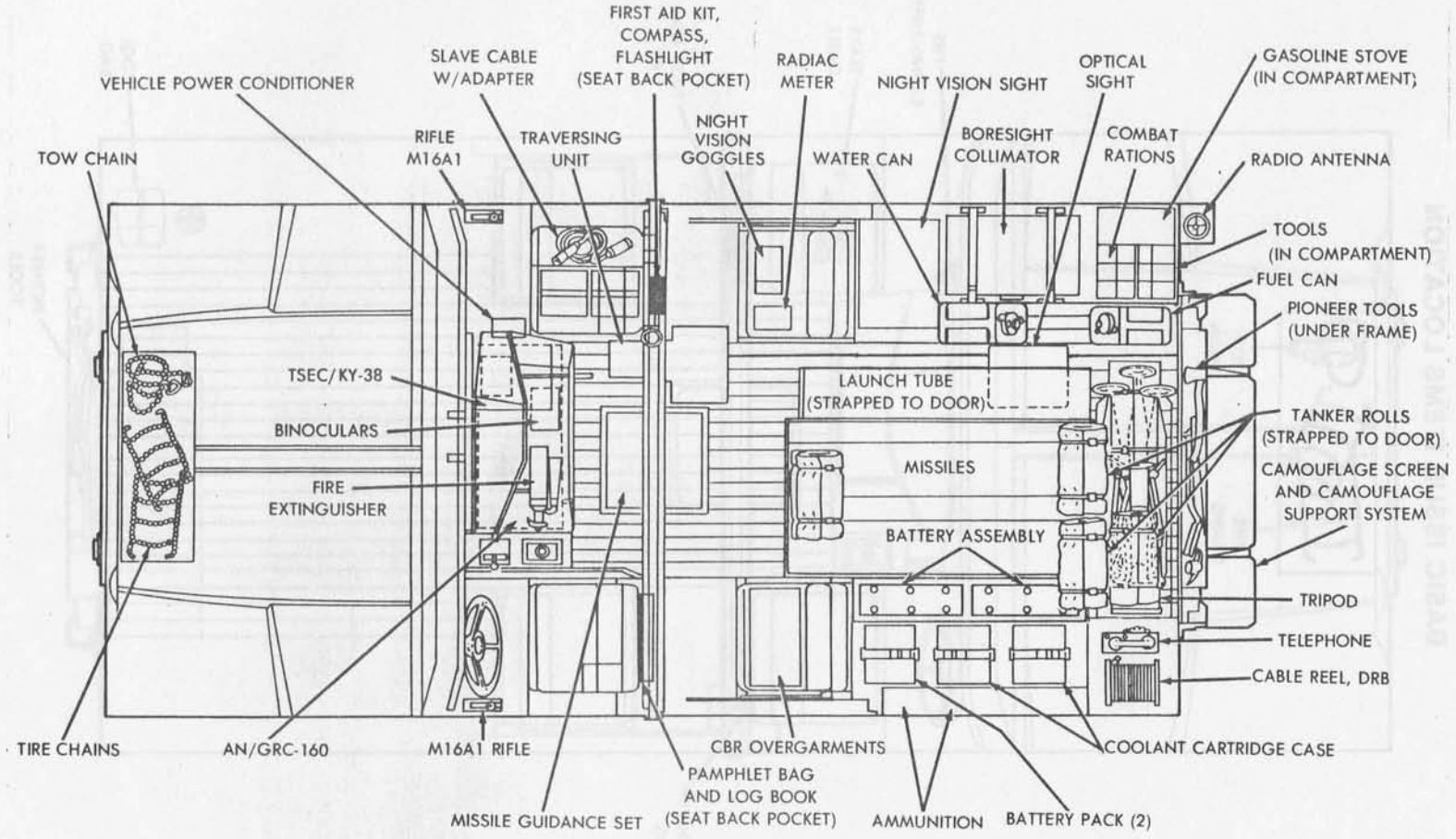
WRENCH



DRAIN PLUG WRENCH

BASIC ISSUE ITEMS LOCATION





XM966 WEAPONS CARRIER STOWAGE LOCATIONS WITH BASIC ISSUE ITEMS

APPENDIX B
ADDITIONAL AUTHORIZATION LIST

B-1. General

This appendix lists additional items that do not accompany the vehicle, and are used for support of the XM966 Series vehicles.

B-2. Explanation of Listing

1. Descriptions, national stock numbers and part numbers are provided to help you identify and request additional items you require to support this equipment. If an item required differs for different models, the model shown is under the "Usable On" heading in the description column. Codes used are the same as in Appendix A — Basic Issue Items.

2. U/M is unit of measure for items listed.

3. QTY. AUTH is the quantity of the item authorized.

ADDITIONAL AUTHORIZATION LIST (Cont'd)

NATIONAL STOCK NUMBER	DESCRIPTION PART NO. AND SCM	USABLE ON CODE	U/M	QTY AUTH
N/A	Binoculars w/case 5 x 8-3/4 x 9, 1/4 in. (19207) 6702518	XM966	EA	1
N/A	Bracket, water/gasoline can (96906) MS53052-1	XM966	EA	1
7240-00-222-3088	Can, Fuel, steel MIL type, 5 gallon (19207) 11677019	XM966	EA	1
N/A	Can, water, plastic, 5 gallon (19207) 11655985	XM966	EA	1
N/A	Flashlight, 2 x 3-1/2 GFST x 8 in. (19207) SC-D-21772	XM966	EA	1
N/A	Radio set, 9 x 14 x 16 in. (19207) GRC-160	ALL	EA	1
N/A	Ration, combat, individual, 3 x 5 x 6 in. (81349) MIL-M-35048	XM966	EA	12
N/A	Stove, gasoline burner, M1950 w/case, 4-1/2 dia. x 7 in. (81349) MIL-S-10736	XM966	EA	1
N/A	Tripod mount, w/cover, M3, Mach. gun (19207) 8403398	XM998	EA	1

APPENDIX C
EXPENDABLE SUPPLIES AND MATERIALS LIST

C-1. General

This appendix lists expendable supplies and materials you will need to operate and maintain XM966 Series vehicles.

C-2. Explanation of Columns:

1. *Item Number.* This number is assigned to each entry in the listing.

2. *Level.* Not applicable.

3. *National Stock Number.* Indicates national stock number assigned to item which is used for requisitioning.

4. *Description.* Indicates the item name, description, if required, and part number.

5. *U/M.* Indicates the unit of measure.

EXPENDABLE SUPPLIES AND MATERIALS LIST

ITEM NO.	LEVEL	NATIONAL STOCK NO.	DESCRIPTION	U/M
			ANTIFREEZE: PERMANENT ETHYLENE GLYCOL (-65°F) INHIBITED (O-A-548, TYPE 1)	
1		6850-00-243-1992	1 GAL. CONTAINER	GAL.
2		6850-00-224-8730	5 GAL. CONTAINER	GAL.
3		6850-00-243-1990	55 GAL. DRUM	GAL.
			ANTIFREEZE: PERMANENT TYPE ARCTIC GRADE (-90°F) (0-1-490) (MIL-C-11755)	
4		6850-00-174-1806	55 GAL. DRUM	GAL.
5		9150-00-065-0029	2-1/4 OZ TUBE	OZ
6		9150-00-935-1017	14 OZ CARTRIDGE	OZ
7		9150-00-190-0904	1 LB CAN	LB
8		9150-00-190-0905	5 LB CAN	LB
9		9150-00-190-0907	35 LB CAN	LB
10		9150-00-190-7369	120 LB DRUM	LB
			OIL, FUEL, DIESEL DF-2, REGULAR (VV-F-800)	
11		9150-00-286-5295	5 GAL. CAN	GAL.
12		9150-00-286-5287	55 GAL. DRUM, 16 GAUGE	GAL.
13		9150-00-286-5296	55 GAL. DRUM, 18 GAUGE	GAL.
14		9150-00-286-5294	BULK	
			OIL, FUEL DIESEL DF-A (ARCTIC)	
15		9150-00-286-5282	5 GAL. DRUM	GAL.

EXPENDABLE SUPPLIES AND MATERIALS LIST (Cont'd)

ITEM NO.	LEVEL	NATIONAL STOCK NO.	DESCRIPTION	U/M
16		9150-00-286-5284	55 GAL. DRUM, 16 GAUGE	GAL.
17		9150-00-286-5285	55 GAL. DRUM, 18 GAUGE	GAL.
18		9150-00-286-5283	BULK	GAL.
			OIL, LUBRICATING, ENGINE, ARCTIC (ICE, SUB-ZERO) OEA (MIL-L-46167)	
19		9150-00-402-4478	1 QT CAN	QT
20		9150-00-402-2372	5 GAL. CAN	GAL.
21		9150-00-491-7197	55 GAL. DRUM, 16 GAUGE	GAL.
			OIL, LUBRICATING, EXPOSED GEAR CW (VV-L-751)	
22		9150-00-234-5197	5 LB CAN	LB
23		9150-00-261-7891	35 LB PAIL	LB
			LUBRICATING OIL, GEAR MULTI-PURPOSE, GO 80, 90 (MIL-L-2105)	
24		9150-01-035-5392	1 QT CAN	QT
25		9150-01-035-5393	5 GAL. DRUM	GAL.
26		9150-01-035-5394	55 GAL. DRUM, 16 GAUGE	GAL.
			LUBRICATING OIL, GEAR MULTI-PURPOSE, G0 75 (MIL-L-10324)	
27		9150-01-035-5390	1 QT CAN	QT
28		9150-01-035-5391	5 GAL. DRUM	GAL.
			OIL, LUBRICATING, OE/HDO 10 (MIL-L-2104)	

EXPENDABLE SUPPLIES AND MATERIALS LIST (Cont'd)

ITEM NO.	LEVEL	NATIONAL STOCK NO.	DESCRIPTION	U/M
29		9150-00-189-6727	1 QT CAN	QT
30		9150-00-186-6668	5 GAL. DRUM	GAL.
31		9150-00-265-9429	55 GAL. DRUM, 16 GAUGE	GAL.
32		9150-00-191-2772	55 GAL. DRUM, 18 GAUGE	GAL.
33		9150-00-753-4763	BULK	GAL.
			OIL, LUBRICATING, OE/HDO 30 (MIL-L-2104)	
34		9150-00-186-6681	1 QT CAN	QT
35		9150-00-188-9558	5 GAL. DRUM	GAL.
36		9150-00-188-9859	55 GAL. DRUM, 16 GAUGE	GAL.
37		9150-00-189-6729	55 GAL. DRUM, 18 GAUGE	GAL.
38		9150-00-753-4764	BULK	GAL.
			GREASE MOLYBDENUM DISULFIDE (GMD) (MIL-G-21164)	
39		9150-00-935-4017	14 OZ. CARTRIDGE	OZ
			LUBRICATING OIL, GEAR MULTIPURPOSE GO 90/140 (MIL-L-2105)	
40		N/A	1 QT CAN	QT
41		N/A	55 GAL DRUM, 16 GAUGE	GAL.
42		N/A	55 GAL DRUM, 18 GAUGE	GAL.
			FLUID, HYDRAULIC, NON-PETROLEUM BASE AUTOMOTIVE (HD)	

EXPENDABLE SUPPLIES AND MATERIALS LIST (Cont'd)

ITEM NO.	LEVEL	NATIONAL STOCK NO.	DESCRIPTION	U/M
43		N/A	1 PINT	PT
44		N/A	55 GAL. DRUM, 16 GAUGE	GAL.
45		N/A	55 GAL DRUM, 18 GAUGE	GAL.
			FLUID, HYDRAULIC, NON-PETROLEUM BASE AUTOMOTIVE ARCTIC TYPE (MIL-H-13910)	
46		N/A	1 PINT	PT
47		N/A	55 GAL. DRUM, 16 GAUGE	GAL.
48		N/A	55 GAL. DRUM, 18 GAUGE	GAL.
			FLUID, TRANSMISSION DEXRON, TYPE II	
49		9150-00-657-4959	1 QUART CAN	QT
50		N/A	55 GAL. DRUM, 16 GAUGE	GAL.
51		N/A	55 GAL. DRUM, 18 GAUGE	GAL.
			CLEANING COMPOUND, WINDSHIELD WASHER	
52		6850-00-926-2275	1 PINT	PT
53		N/A	55 GAL. DRUM, 16 GAUGE	GAL.
54		N/A	55 GAL. DRUM, 16 GAUGE	GAL.

APPENDIX D
MINI AMBULANCE OPERATING PROCEDURES

D-1. General

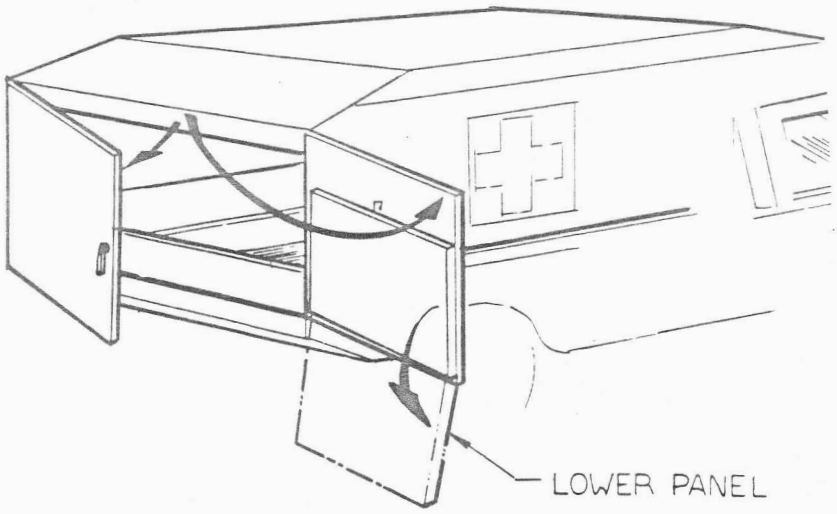
This appendix contains procedures to raise the ambulance top (roof) to the elevated position, lowering the top (roof) to the mini position, and installation and removal of litter racks.

D-2. Raising Ambulance Top (Roof) to the Elevated Position

PURPOSE: The following procedure describes the method to manually raise the mini-ambulance top to the upper position, and secure it in place.

TOOLS REQUIRED: None.

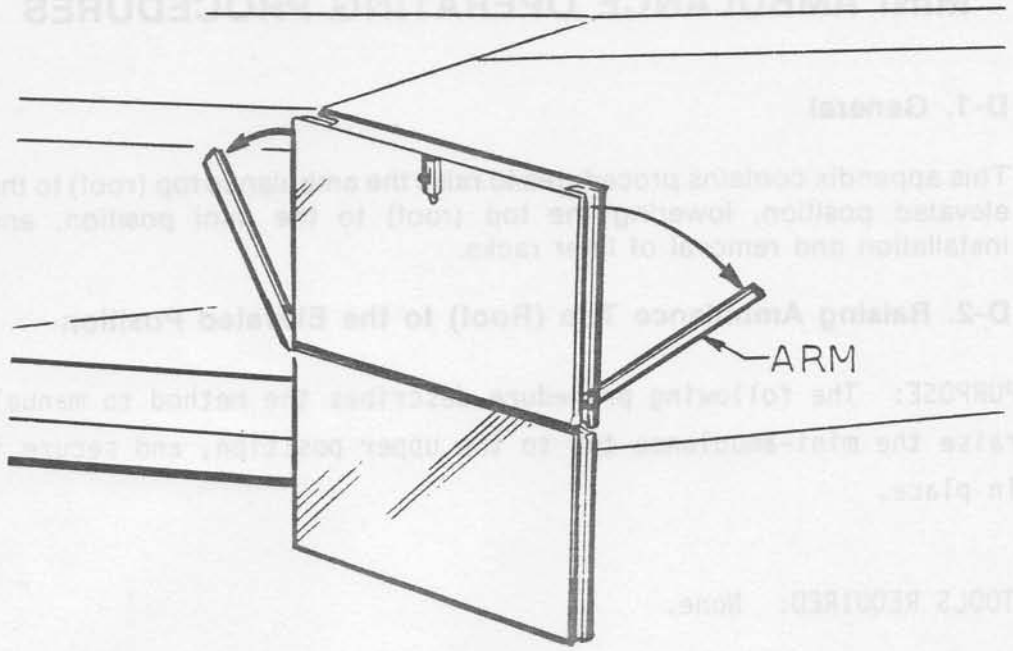
PROCEDURE:



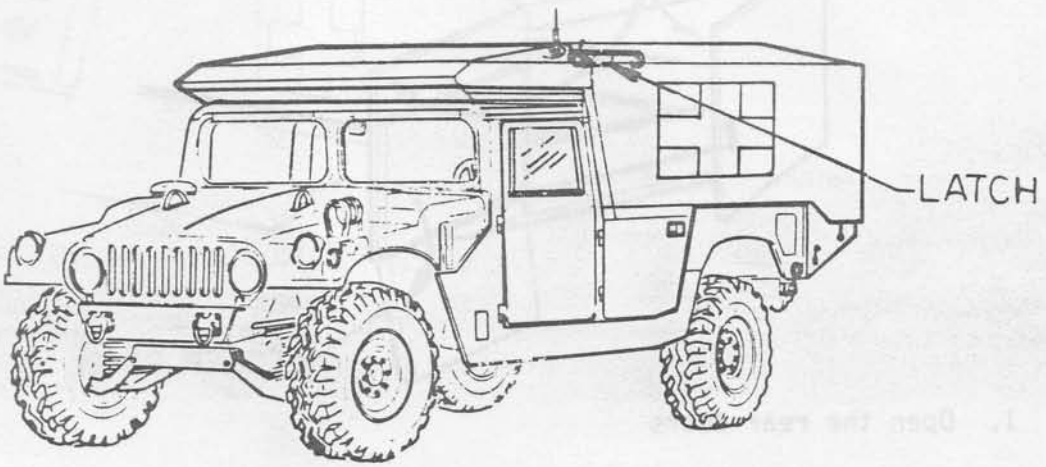
1. Open the rear doors

2. Unlatch the panel that is attached on the inside surface of each of the rear doors by sliding the latch bolt on the top of the door upward. Slowly swing the panel to the lowered position.

Raising Ambulance Top (Roof) to the Elevated Position (Cont'd)

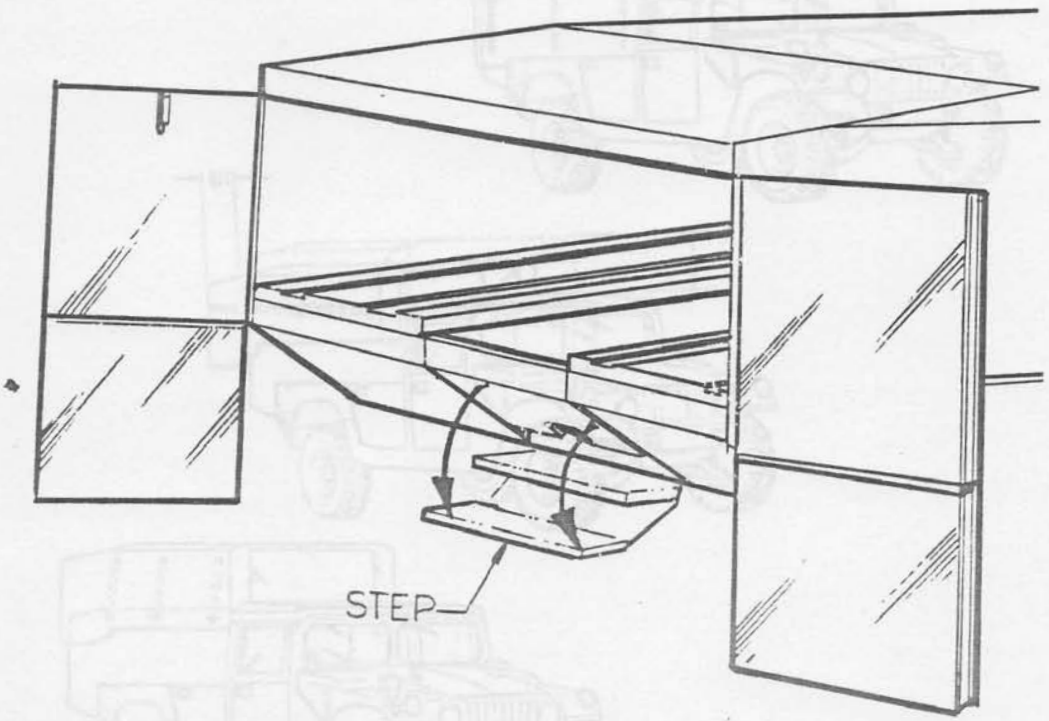


3. Secure the lower panel to the door by swinging the latching arms, located on the edges of the doors, out of their retainer pockets in to the recess in the lower panels.



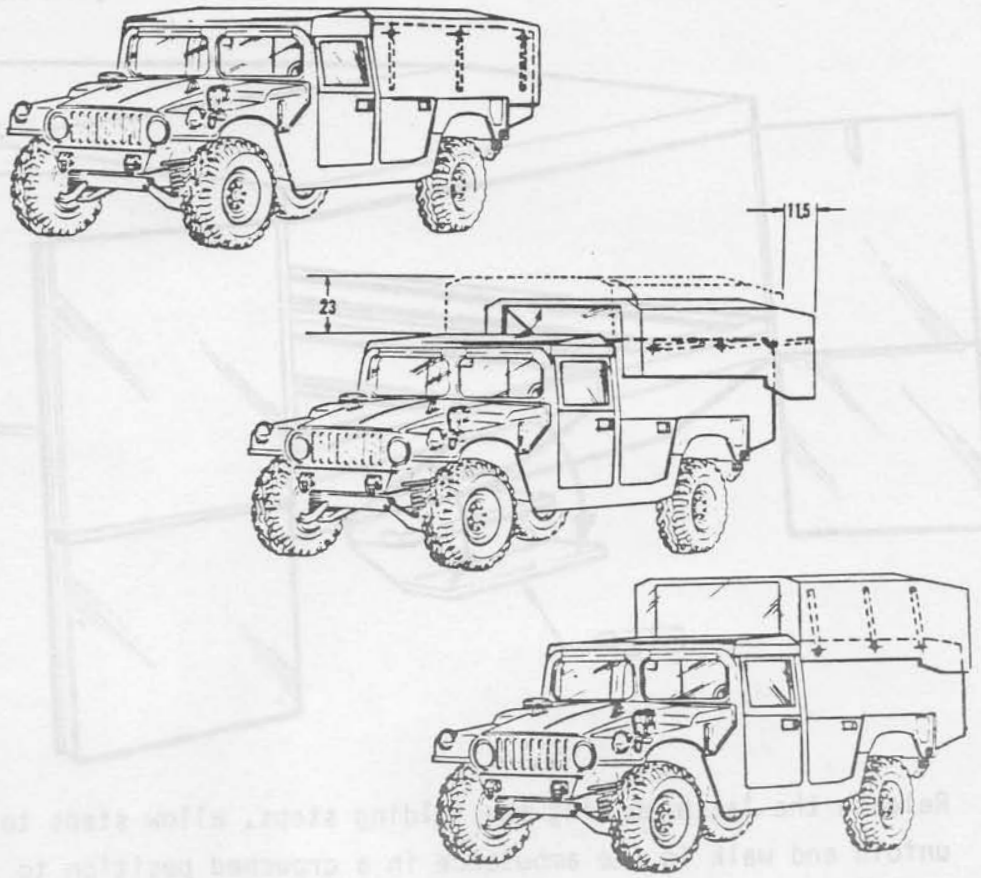
4. Release the roof retainer latches located on the outboard exterior surface, directly behind the driver's station.

Raising Ambulance Top (Roof) to the Elevated Position (Cont'd)



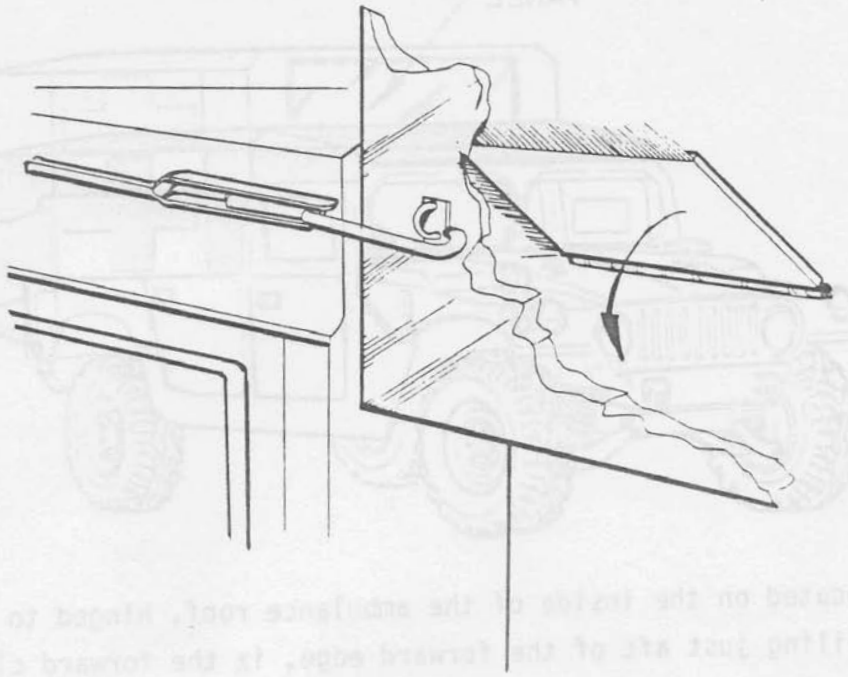
5. Release the latch holding the folding steps, allow steps to unfold and walk in the ambulance in a crouched position to forward of the ambulance body.
6. Raise the ambulance roof by first pulling the upper door frame at the rear of the ambulance aft. The roof will swing rearward, allowing the support springs to assist the operator.

Raising Ambulance Top (Roof) to the Elevated Position (Cont'd)



7. Two people are required to push the ambulance to the upright position. At the top of the stroke, the roof will swing forward to the locking position.

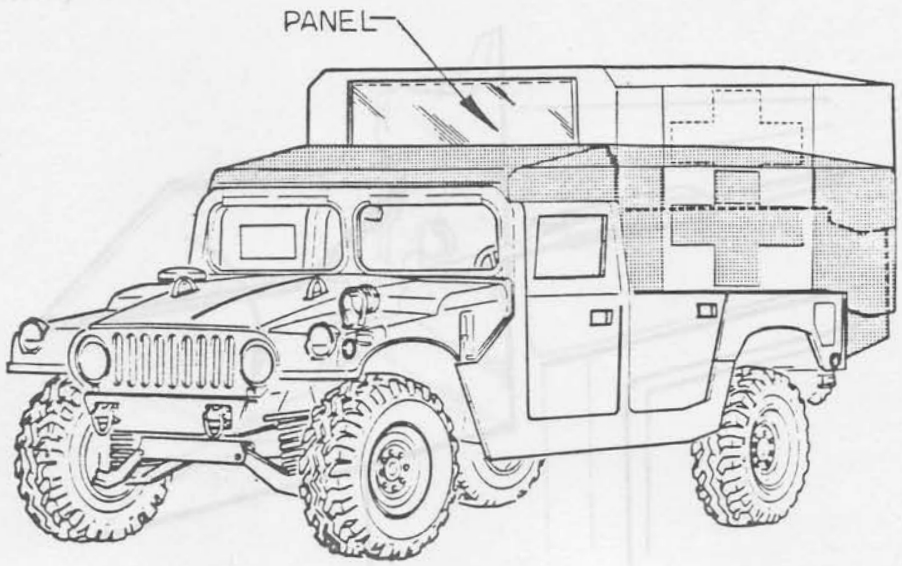
Raising Ambulance Top (Roof) to the Elevated Position (Cont'd)



8. With one person inside the vehicle to hold the top steady, the second person secures the top in position using the same latches that were disconnected in step 4 above.
9. On the inside of the ambulance, forward of the litter racks, is the corner sealing panel. A panel is located on each side of the vehicle. Flip the panel to the closed position.

   Note: The forward sealing panels must be locked in place to function also as a back-up latch to the external roof latches.

Raising Ambulance Top (Roof) to the Elevated Position (Cont'd)



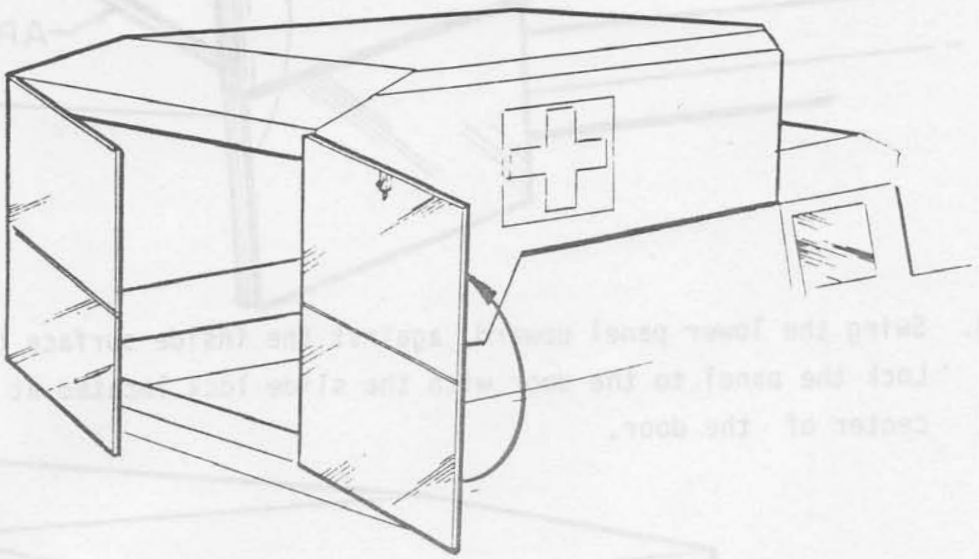
10. Located on the inside of the ambulance roof, hinged to the ceiling just aft of the forward edge, is the forward closure panel. After the roof is securely latched, the panel is unlatched from the roof, by sliding the two retainer lugs out of their slots. The panel is then carefully lowered to the closed position, and latched in place.
11. Swing the rear doors to the closed position.

D-3. Lowering the Top (Roof) to the Mini Position

PURPOSE: The following procedure describes the method to manually lower the ambulance roof to the lowered position, and secure in place.

TOOLS REQUIRED: None.

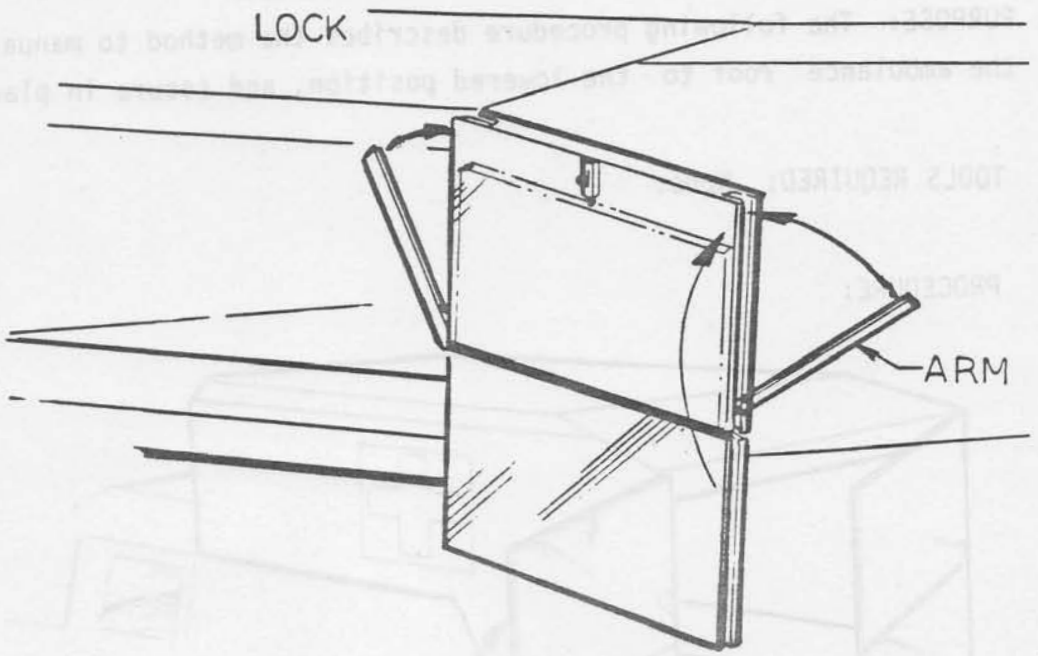
PROCEDURE:



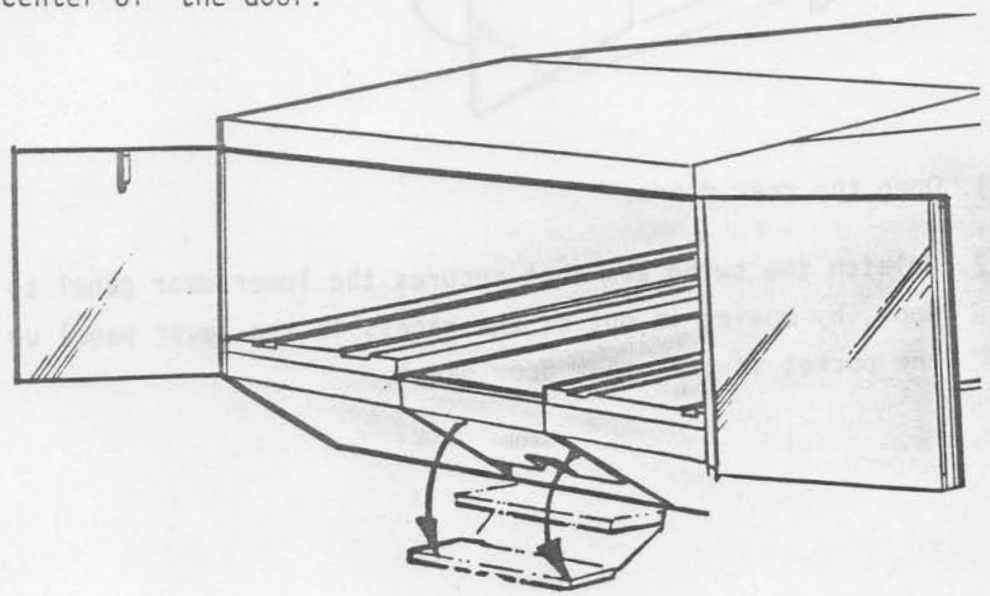
1. Open the rear doors.

2. Unlatch the swing arm that secures the lower door panel to the door, by moving it out of the recess in the lower panel up and in to the pocket in the upper door panel.

Lowering the Top (Roof) to the Mini Position (Cont'd)

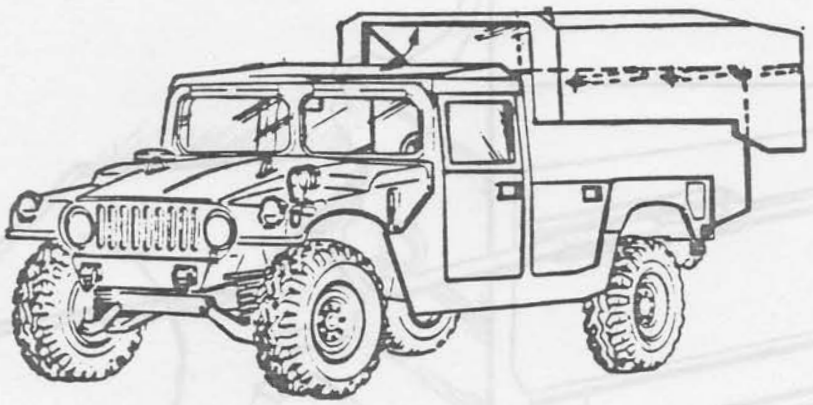


3. Swing the lower panel upward, against the inside surface of the door. Lock the panel to the door with the slide lock located at the top center of the door.

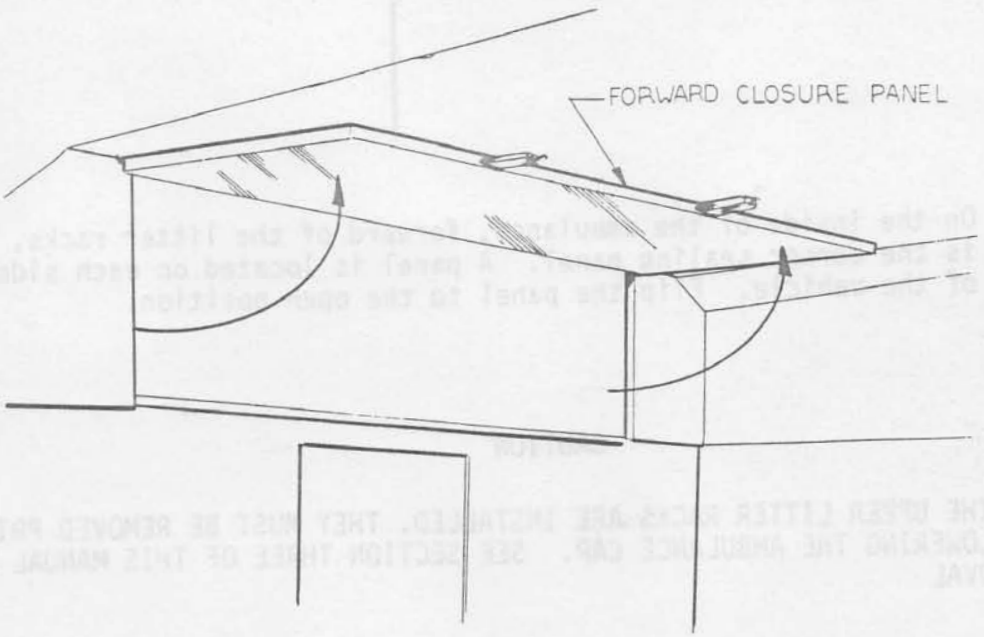


4. Release the latch holding the folding steps. Allow the steps to unfold and walk in to the ambulance.

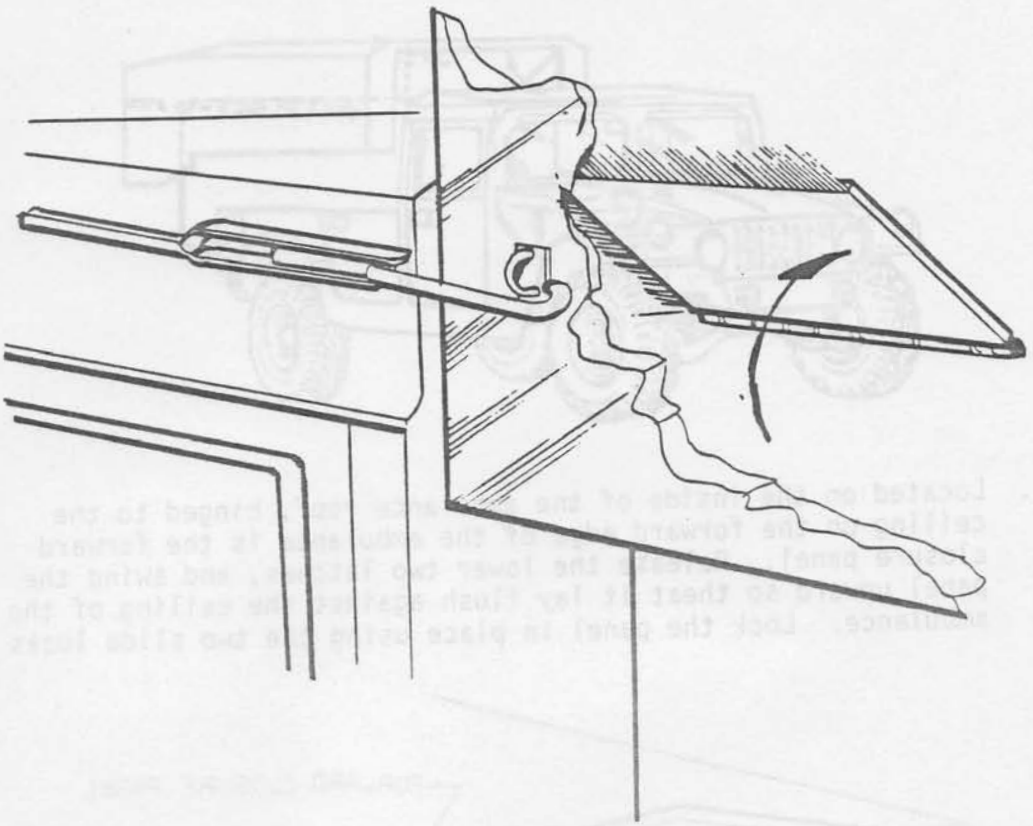
Lowering the Top (Roof) to the Mini Position (Cont'd)



5. Located on the inside of the ambulance roof, hinged to the ceiling on the forward edge of the ambulance is the forward closure panel. Release the lower two latches, and swing the panel upward so theat it lay flush against the ceiling of the ambulance. Lock the panel in place using the two slide locks



Lowering the Top (Roof) to the Mini Position (Cont'd)

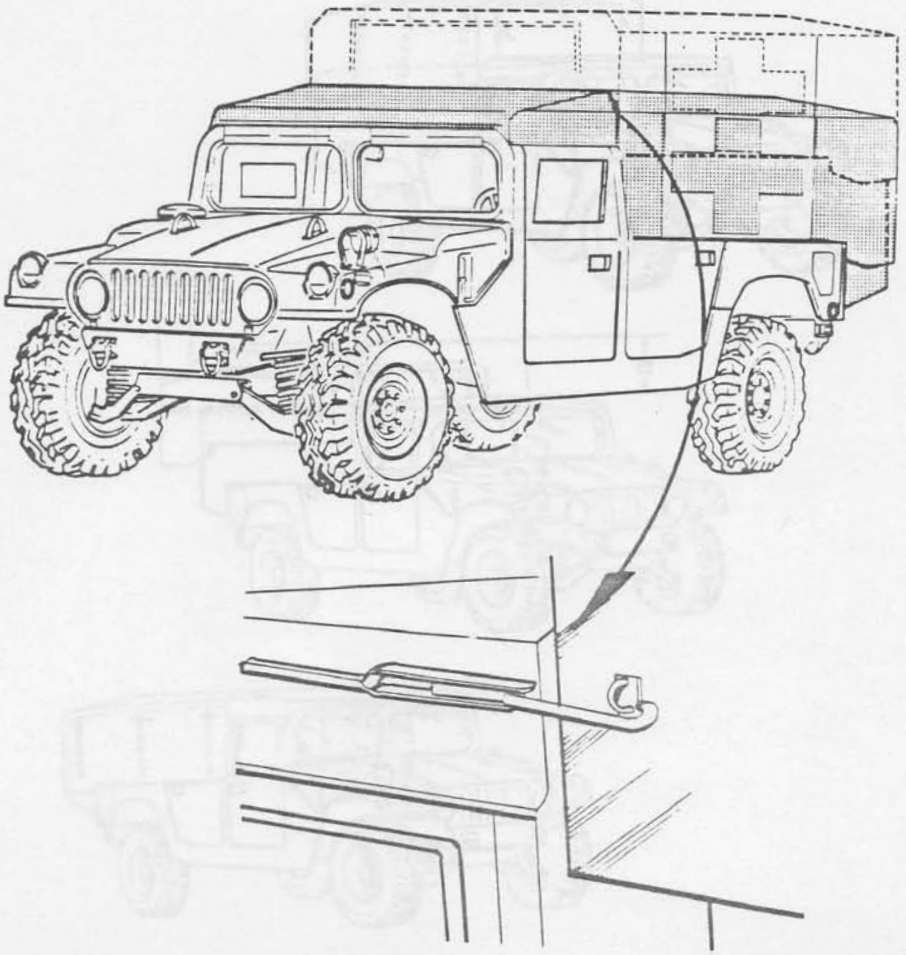


6. On the inside of the ambulance, forward of the litter racks, is the corner sealing panel. A panel is located on each side of the vehicle. Flip the panel to the open position.

CAUTION

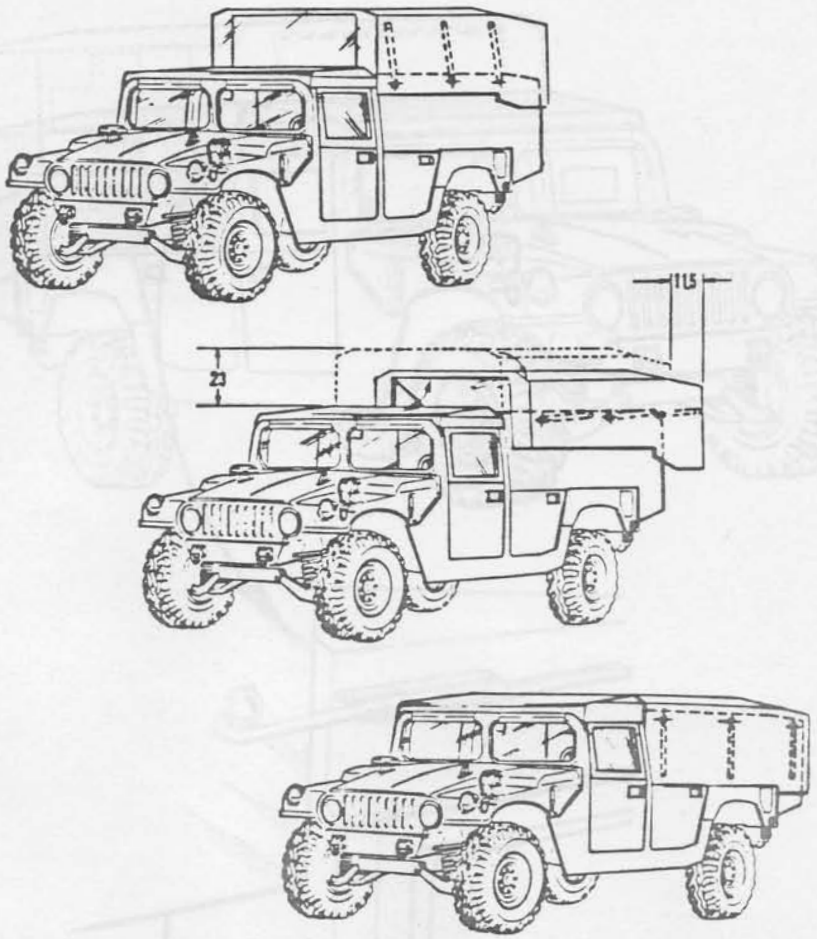
IF THE UPPER LITTER RACKS ARE INSTALLED, THEY MUST BE REMOVED PRIOR TO LOWERING THE AMBULANCE CAP. SEE SECTION THREE OF THIS MANUAL FOR REMOVAL

Lowering the Top (Roof) to the Mini Position (Cont'd)



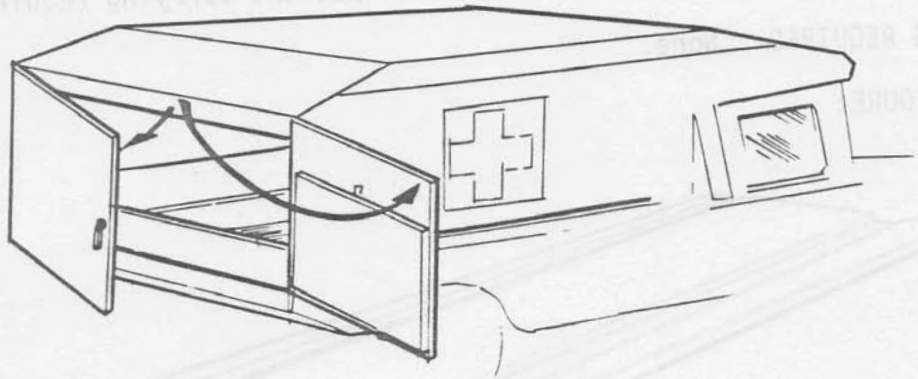
7. With one person inside of the ambulance to hold the roof steady, the second person unlatches the roof retainer latches located on the outboard exterior surface, directly behind the driver's station.

Lowering the Top (Roof) to the Mini Position (Cont'd)



8. The person inside of the ambulance now carefully pushes rearward on the upper door frame at the rear of the ambulance. The roof of the ambulance will move downward to the midpoint of the total travel.

Lowering the Top (Roof) to the Mini Position (Cont'd)



9. With both people on the outside of the ambulance, the top can be pulled close grasping the frame directly above the door opening at the rear of the ambulance.

10. The roof retainer latches that were unlatched in step 7 are now latched close, securing the cap to the ambulance body.

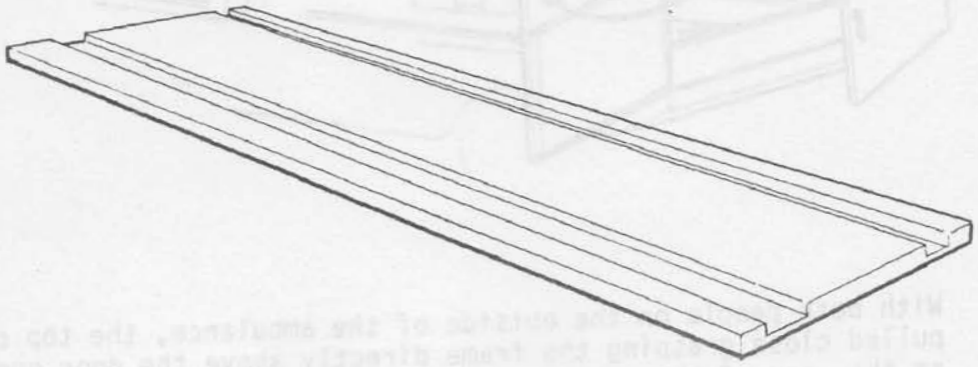
11. Close the collapsible steps and latch in place

D-4. Installation and Removal of Litter Racks

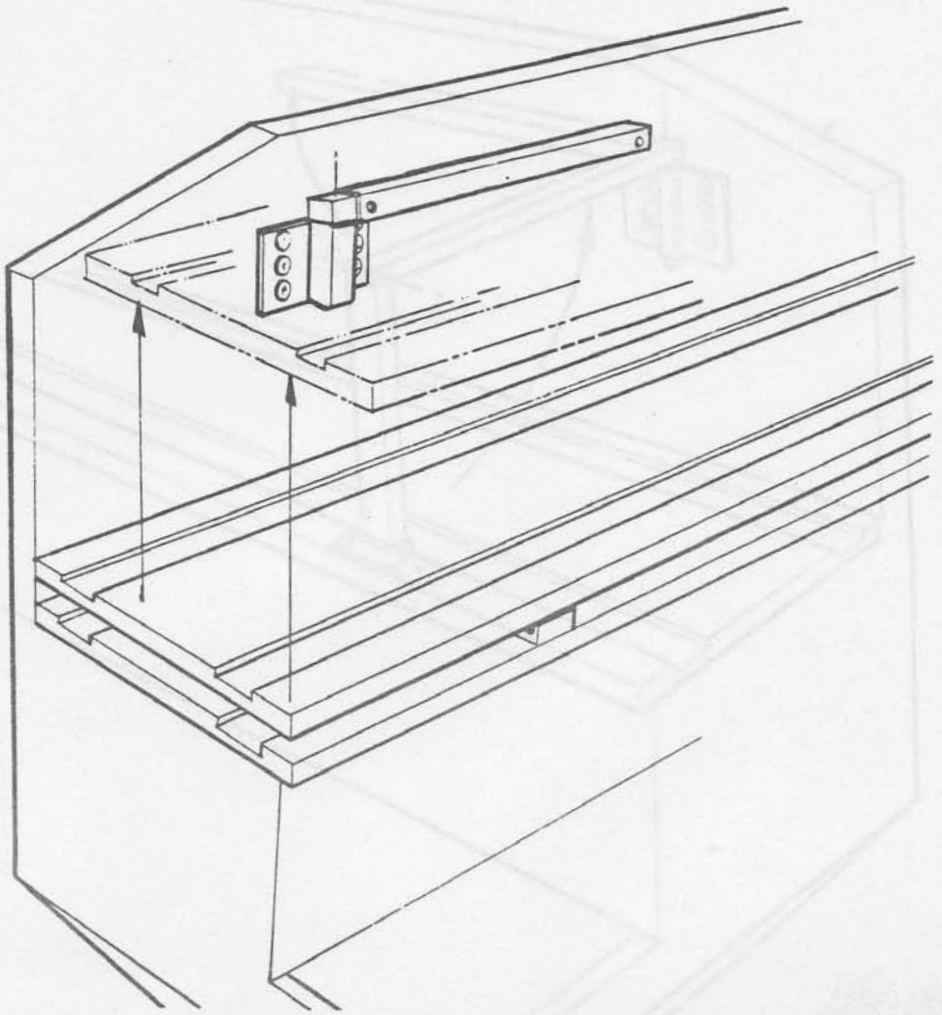
PURPOSE: The following procedure describes the method to remove or install the litter racks to accomodate patient carrying requirements.

TOOLS REQUIRED: None.

PROCEDURE:



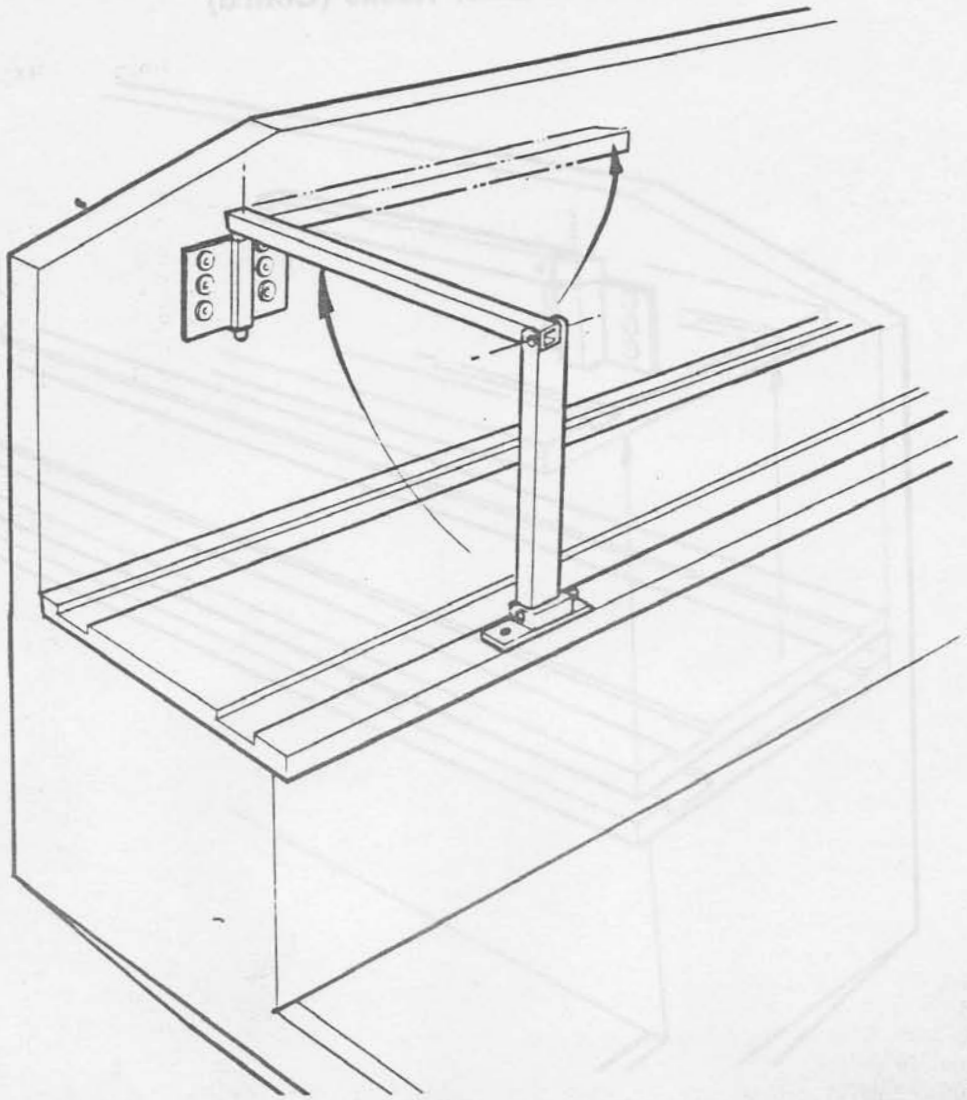
1. The ambulance litter trays are removable from the vehicle. The upper tray can be removed without special tools, by removing quick disconnect pins. The lower tray requires special tools for removal, and is not covered in this section.



2. When the ambulance is operating with the roof in the lowered position the upper litter tray is attached directly to the lower tray as shown. Removing the pull pin on the underside of the top litter will release it so that it can be moved to the raised position.

CAUTION

THE TOP LITTER CAN BE USED IN THE RAISED POSITION ONLY WHEN THE AMBULANCE TOP IS FULLY RAISED. ALSO, THE UPPER LITTER MUST BE REMOVED PRIOR TO LOWERING THE AMBULANCE TOP TO THE LOWERED POSITION.



3. At the front and rear of the litter tray, attached to the ambulance sidewalls are support legs for the upper litter tray. The legs are swung out from the sidewalls as shown and attached to the lower litter tray clevis as shown.

4. Once the support arms are in place, the upper litter tray is attached with pull pins to the support legs.

5. Removal of the upper litter tray is done by following the installation procedure in reverse order.

INDEX

INDEX (Cont'd)

INDEX (Cont'd)

INDEX (Cont'd)

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE
1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches
1 Kilometer = 1,000 Meters = 0.621 Miles

WEIGHTS
1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces
1 Kilogram = 1,000 Grams = 2.2 Lb
1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE
1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1,000 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 = 1,000 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