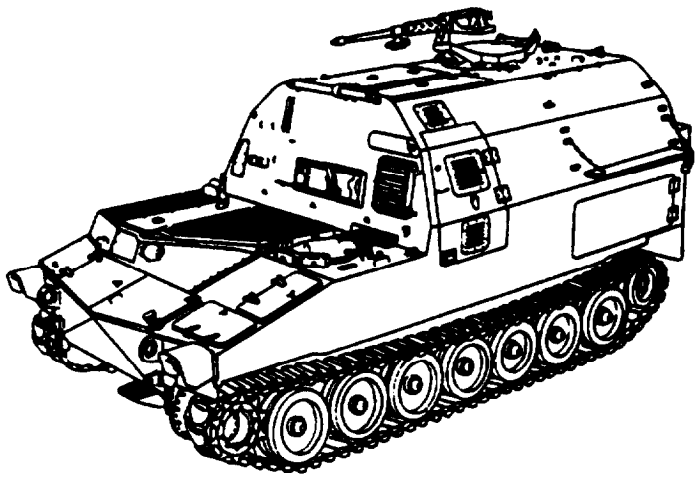
TM 9-2350-267-10*

★ This manual supersedes TM 9-2350-267-10 dated 30 September 1985

OPERATOR'S MANUAL



CARRIER, AMMUNITION, TRACKED M992 (2350-01-110-4660)

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HEADQUARTERS, DEPARTMENT OF THE ARMY
CURRENT AS OF OCTOBER 1991

Change 1

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 3 February 1997

OPERATOR'S MANUAL
FOR
CARRIER, AMMUNITION, TRACKED
M992
(NSN 2350-01-110-4660)

TM 9-2350-267-10, dated October 1991, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New, changed, or deleted material is indicated by a vertical bar in the margin of the page or by a deletion notice.
3. Added pages or changed page numbers are indicated by a vertical bar by the page number.

Remove Pages	Insert Pages
a through d	a through d
2-35 and 2-36	2-35 and 2-36
2-199 and 2-200	2-199 and 2-200
None	2-236.1 and 2-236.2
B-5 and B-6	B-5 and B-6
Cover	Cover

The correct address for DA Form 2028-2 is:

Commander. US. Army Tank-automotive and Armaments Command, ATTN: AMSTA-IM-OPIT, Warren, MI 48397-5000.

You may also provide DA Form 2028-2 information to TACOM via datafax or e-mail:

- TACOM's fax number is DSN 786-6323 or Commercial (810) 574-6323
- TACOM's e-mail address is tacom-tech-pubs@cc.tacom.army.mil

File this change sheet in front of the publication, for reference purposes.

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By Order of the Secretary of the Army:

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

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
02905

DISTRIBUTION:

To be distributed in accordance with the initial distribution number (IDN) 371214, requirements for TM 9-2350-267-10.

WARNING

High-intensity noise hearing protection required.

WARNING

Always attach the grounding cable to the howitzer, or a grounding post, whenever a propelling charge is being handled outside of the canister. This prevents the possible buildup of static electricity, which could cause the propellant to explode.

WARNING

In the event of fire in the engine or crew compartment, be prepared to use the portable fire extinguishers and/or discharge the automatic fire extinguishing system (AFES) manually.

WARNING

Diesel fuel is flammable. Do not smoke within 50 feet of the vehicle while refueling. While refueling, make sure that the engine is shut off.

WARNING

When operating the conveyor and upper rear door, keep hands clear of moving parts to avoid injury.

WARNING

Handle explosive ammunition and components containing explosives with utmost care. Do not drop, drag, throw, or strike packaged or unpackaged ammunition or related components. Explosive elements in primers and fuses are sensitive to shock.

WARNING

Stay away from automatic fire extinguisher nozzles. When extinguishers discharge, personnel near nozzles may suffer frostbite.

WARNING

Keep small objects away from automatic fire extinguisher nozzles. When extinguishers discharge, small objects may be propelled, causing serious damage or injury.

WARNING

Looking into infrared lights can cause eye damage. Do not look into blackout infrared headlamps.

WARNING

To avoid eye injury, do not use blackout infrared headlights as light source to check filter element.

WARNING

Prolonged exposure to Halon could make you dizzy and irritate your eyes and throat. After Halon discharge, vent fan in crew compartment comes on automatically. If vent fan does not come on, get all soldiers out of the vehicle within 5 minutes.

[Warning Deleted]

WARNING

If fire occurs again due to equipment malfunction or damage, soldiers could be killed or injured and equipment could be damaged. If fire extinguishers are empty and there is a possibility of fire occurring again, offload ail ammunition.

WARNING

If Halon is discharged into engine compartment while engine is running, engine exhaust may be poisonous. Poisonous gas can injure you. If Halon is discharged while engine is running, do not breathe engine exhaust.

WARNING

Never bring excess powder increments back to the howitzer or ammunition carrier. Death or severe burns to personnel may result from accidental ignition.

WARNING

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

WARNING

Do not place flammables or explosives on or near personnel heater.

CARBON MONOXIDE POISONING CAN BE DEADLY.

Carbon monoxide is a colorless, odorless, deadly, poisonous gas, which when breathed, deprives the body of oxygen and causes suffocation. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscle control, drowsiness, and coma. Permanent brain damage or death can result from exposure.

Carbon monoxide is present in the exhaust fumes of fuel-burning heaters and internal combustion engines; inadequate ventilation causes dangerous concentrations of this gas. The following precautions must be observed to ensure safety of personnel when operating the personnel heater, main engine, or auxiliary engine:

Do not operate heater or engine of vehicle in an enclosed area unless area is adequately ventilated.

Do not idle engine for long periods without maintaining adequate ventilation in personnel compartments.

Do not drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.

Be alert at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, immediately ventilate personnel compartments. If symptoms persist, remove affected personnel from vehicle and treat as follows: expose to fresh air; keep warm; do not permit physical exercise; if necessary, administer artificial respiration.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

WARNING

FIRE EXTINGUISHER (CO_2) HAZARDS

- **Remain CALM. Avoid breathing CO_2. It may quickly cause rapid breathing, loss of consciousness, and suffocation. Quickly exit vehicle if situation permits. If unable to exit, ventilate to remove the extinguisher gas. The driver is at the greatest risk. Ventilate the vehicle before reentry. Failure to follow this emergency procedure can result in serious injury or death to personnel.**

- **Fire extinguisher CO_2 can cause severe burns. Do not touch the cone when using fire extinguisher or discharge directly on skin.**

- **Handle fire extinguisher carefully. Do not bang or drop cylinder.**

WARNING

AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) HAZARDS

Any automatic fire extinguishing system (AFES) component in need of maintenance or repair is prone to accidental discharge. Accidental discharge could lead to frostbite or other injury. Small parts or tools become dangerous projectiles when propelled by Halon at 750 psi (5171 kPa).

TECHNICAL MANUAL

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 4 October 1991

OPERATOR'S MANUAL
FOR
CARRIER, AMMUNITION, TRACKED
M992
(NSN 2350-01-110-4660)

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual, direct to: Commander, US. Army Tank-Automotive Command, AITN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

* This manual supersedes TM 9-2350-267-10 dated 30 September 1985

Page

HOW TO USE THIS MANUAL

This operator's manual was designed to provide you with the information you will need to operate and maintain the M992.

The information contained in this manual is presented in four chapters and four appendixes. Each chapter is divided into sections to cover the subject or operating procedures for the vehicle systems or components. Where references are made to tables, figures, paragraphs and appendixes, refer to those portions of the text.

To find information relating to a specific component or system:

A - Determine the specific name or function of the component/system.

B- Find the name or function in the Subject Index listing, located at the end of this manual.

C - Refer to the appropriate page(s) called out in the Subject Index listing.

To find information pertaining to a broader range of information (such as vehicle troubleshooting, preventive maintenance and vehicle descriptions):

A - Identify the desired topic.

B- Find the general topic in the Table of Contents or in the Front Cover Index (both are located at the front of this manual).

C- Refer to the appropriate page(s) called out in the Table of Contents/Front Cover Index.

IMPORTANT

You must read and understand this manual BEFORE operating the M992.

Throughout this manual you will frequently see the phrase "notify Organizational Maintenance". When you are instructed to notify Organizational Maintenance, do exactly that; they have the tools and training to efficiently and correctly perform the next level of maintenance.

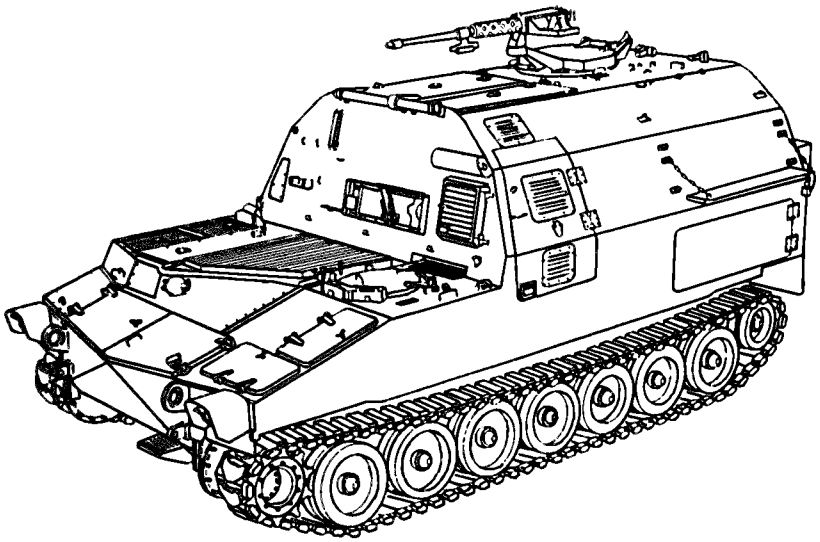
Throughout this manual you will also see **WARNING** and **CAUTION** headings. There are good reasons for every one of these notices:

WARNING

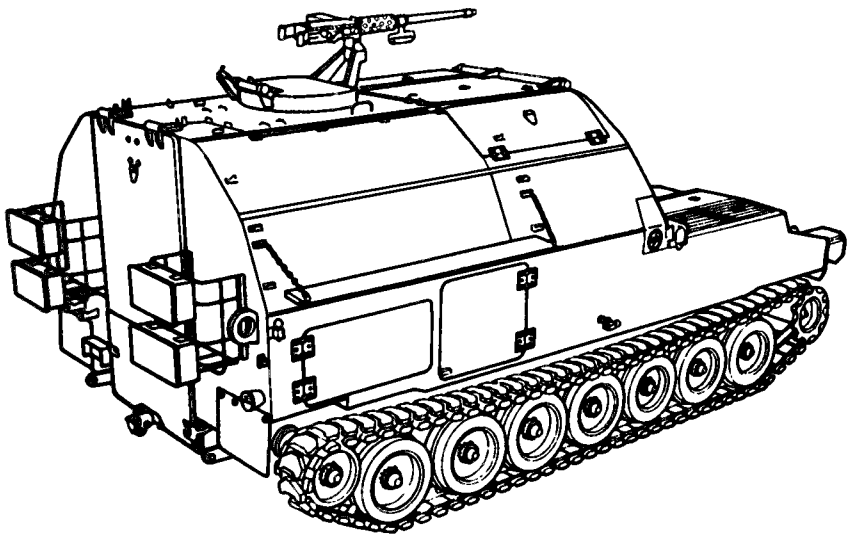
A Warning is used to alert the user of hazardous operating and maintenance procedures, practices or conditions that could result in injury to, or death of, personnel. Warnings must be strictly observed.

CAUTION

A Caution is used to alert the user of hazardous operating or maintenance procedures, practices or conditions that could result in damage to, or destruction of, equipment or mission effectiveness. Cautions must be strictly observed.

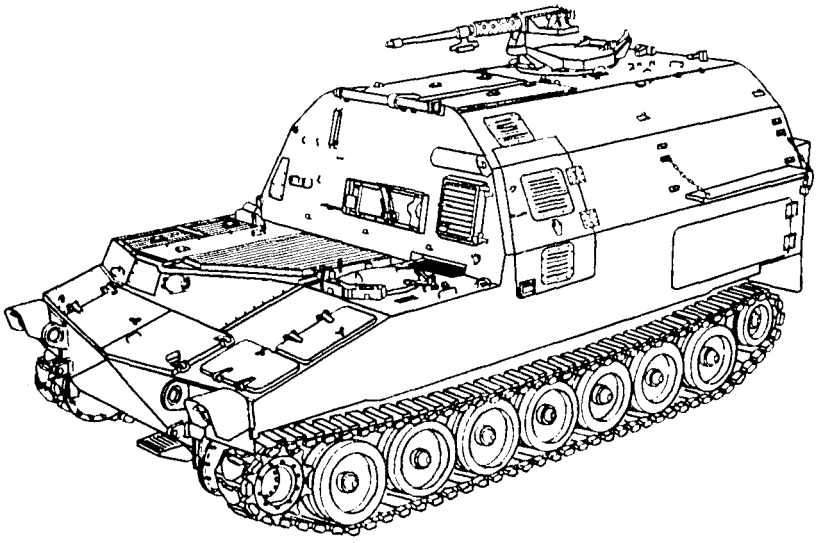


M992 FRONT LEFT VIEW

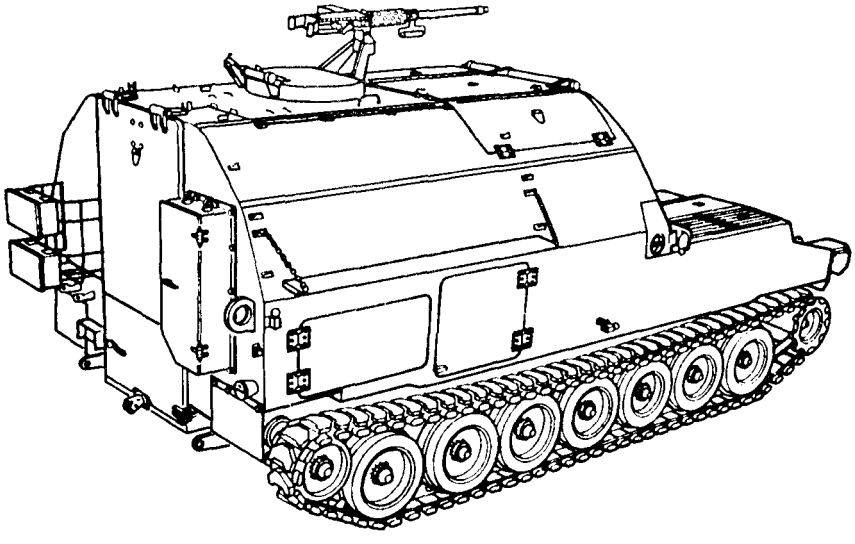


M992 RIGHT REAR VIEW

EFFECTIVE FOR VEHICLES 1-344



M992 FRONT LEFT VIEW



M992 RIGHT REAR VIEW

EFFECTIVE FOR VEHICLES 345 AND ABOVE

CHAPTER 1
INTRODUCTION

Chapter Overview

This chapter introduces the operator to the M992 CARRIER, AMMUNITION, TRACKED. Information found in Chapter 1 includes:

- Brief description and purpose of the M992
- Statement of intended vehicle use
- Reference to documents which pertain to the operator
- List of abbreviations used throughout this manual
- Vehicle data and specifications
- Location and description of equipment essential for successful mission completion
- Technical principles of operation for various complex M992 systems

Chapter 1 is divided into the following sections:

Section I GENERAL INFORMATION
Section II EQUIPMENT DESCRIPTION
Section Ill TECHNICAL PRINCIPLES OF OPERATION

Section I. GENERAL INFORMATION

Scope

This manual contains information you need to operate the M992 CARRIER, AMMUNITION, TRACKED. The primary use of the M992 is to provide overland transport of 155mm projectiles and charges from ammunition depots to howitzers in the field. Included are instructions for the proper use of on-board ammunition handling and stowage equipment, as well as driving and crew maintenance procedures.

In terms of driving capabilities and limitations, the M992 is comparable to the M109A2 SP howitzer. The speed, mobility and maneuverability of the M992 equals that of the M109A2, making the M992 well-suited for efficient re-supply of ammunition to M109A2 howitzers.

Maintenance Forms And Records

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

Hand Receipts (-HR) Manuals

This manual has a companion document with a TM number followed by -HR (which stands for Hand Receipt). The TM 9-2350-267-10-HR consists of preprinted hand receipts (DA Form 2062) that list end-item related equipment (i.e., COEI, Bll, and AAL) you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from the following source in accordance with procedures in AR 25-30:

The U.S. Army Adjutant General Publications Center
ATTN: AGLD-OD
1655 Woodson Rd.
St. Louis, MO 63114

Reporting Equipment Improvement Recommendations (EIR'S)

If your M992 CARRIER, AMMUNITION, TRACKED needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, US. Army Tank-Automotive Command, ATTN: AMSTA-MP, Warren, Ml 48397-5000. We'll send you a reply.

List Of Abbreviations

AHE	Ammunition Handling Equipment. AHE in the M992 consists of the stacker, the conveyor, the projectile rack assemblies and related components
APU	Auxiliary Power Unit
CK	Cyanogen Chloride, a chemical agent
F	Full; Fahrenheit
FES/AFES	Fire Extinguishing System/Automatic Fire Extinguishing System. Used interchangeably
LAW	Lubricating oil, for Aircraft Weapons
RRB	Right Rear Bottom (canister stowage area)
RRM	Right Rear Middle (canister stowage area)
RRT	Right Rear Top (canister stowage area)
LRB	Left Rear Bottom (canister stowage area)
LRT	Left Rear Top (canister stowage area)
N	Neutral
NBC	Nuclear, Biological, Chemical
PMCS	Preventive Maintenance Checks and Services
rpm	revolutions per minute
STE/ICE	Simplified Test Equipment/Internal Combustion Engine
VFP/VFPS	Ventilated Face Piece/Ventilated Face Piece System

Section II. EQUIPMENT DESCRIPTION

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

Purpose

The M992 is afield artillery ammunition support vehicle comparable to current field artillery weapons (M109A2 and M110A2 self-propelled howitzer class) in terms of speed, mobility, and survivability.

Capabilities

This full-tracked, self-propelled, diesel-powered vehicle is highly mobile and maneuverable. It is capable of long-range, high-speed operation on improved roads. It is also well-suited to rough terrain, muddy or marshy ground, sand, snow, and ice. The M992 can also ford waterways where maximum depth is 42 inches.

Features

- Ammunition handling equipment (AHE), including a hydraulically-operated conveyor and X-Y stacker, the projectile rack assemblies, and related components.
- A diesel-powered auxiliary power unit (APU) used to drive the hydraulic system and recharge vehicle batteries.
- Simplified test equipment for internal combustion engine (STE/ICE).
- Automatic Fire Extinguishing System (AFES).
    - AFES is an automatic and manual electric system that when actuated provides fire extinguishing capability for the engine and crew compartment. It consists of test/alarm panels, sensors and associated equipment explained later on in this section and the Chapter 4 operating instructions.
    - Automatic electric operation will automatically sense and discharge an agent to extinguish hydrocarbon fires. The crew system provides an automatic electric second shot capability should the fire continue burning or a second fire occurs.
    - Manual electric operation must be manually activated by the crew to discharge the agent to extinguish fires. The crew system second shot manual electric activation is available if the fire continues to burn. It must be manually activated by a crew member.
    - These systems will not activate unless the crew/engine test and alarm panel maintenance switches are in the horizontal power on-normal operational position. (See Chapter 4).
- Nuclear, biological, and chemical (NBC) agent detection and protection system.
- Ammunition storage racks and compartments.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

Shown on the following pages are locations and descriptions of major components used to operate the M992 effectively.

MAIN ENGINE EXHAUST OUTLET (1)

APU ENGINE EXHAUST OUTLET (2)

IDLER WHEEL (3) The right and left idler wheels guide, support, and maintain tension for the track.

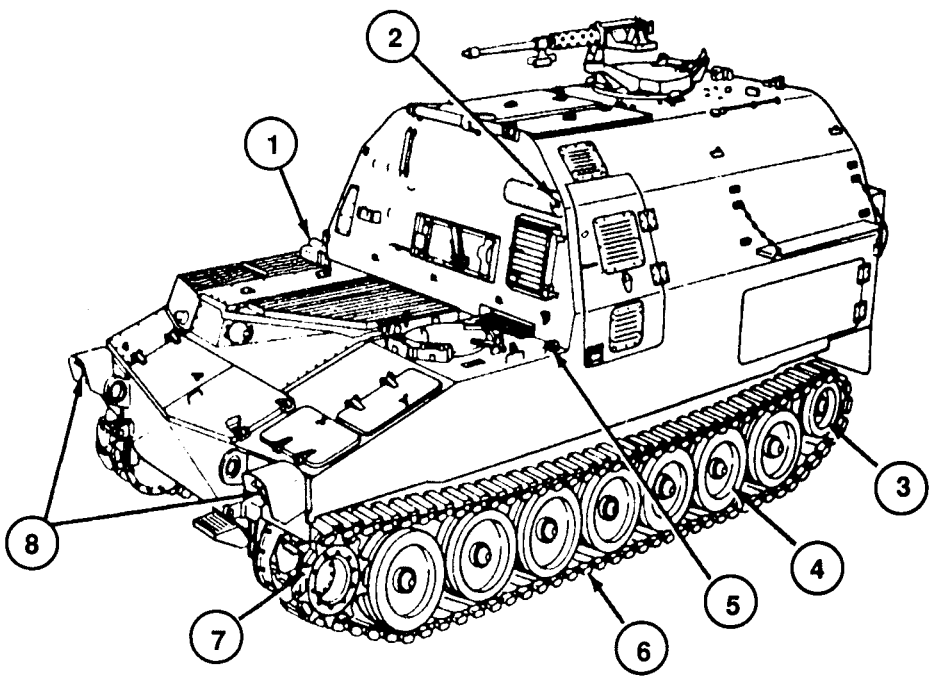
ROADWHEELS (4) Seven sets per side provide support and guide the track.

LANYARD CABLE PULL HANDLE (5) For emergency manual discharge of one engine compartment and two crew compartment extinguishers to extinguish fires in the engine and crew compartments.

TRACK (6)

DRIVE SPROCKET (7) Left and right sprockets are mounted on the final drives to drive each track.

HEADLAMPS (8) Provide light for night driving under normal or blackout (infrared) conditions.



M992 Left Front View

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

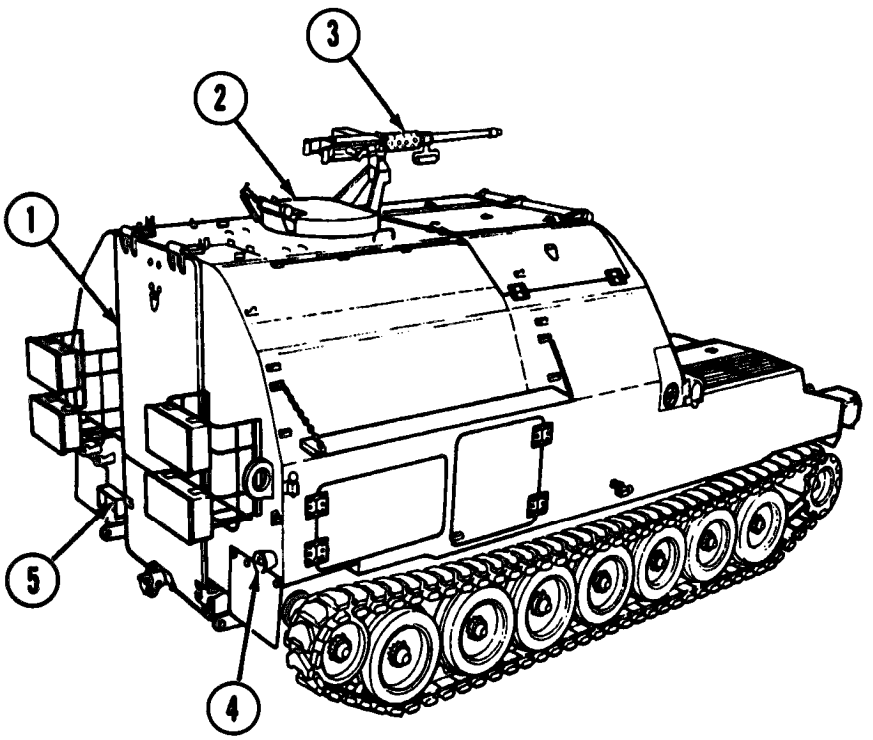
UPPER REAR DOOR (BALLISTIC SHIELD) (1)

COMMANDER'S CUPOLA (2) Provides access to machine gun mount; rotates manually 6400 roils (360 degrees).

MACHINE GUN (3) M2, .50-caliber heavy barrel.

TAILLIGHT/STOPLIGHT (4) Two combination taillight/stoplight units provide rear light for night driving under normal and blackout (infrared) conditions

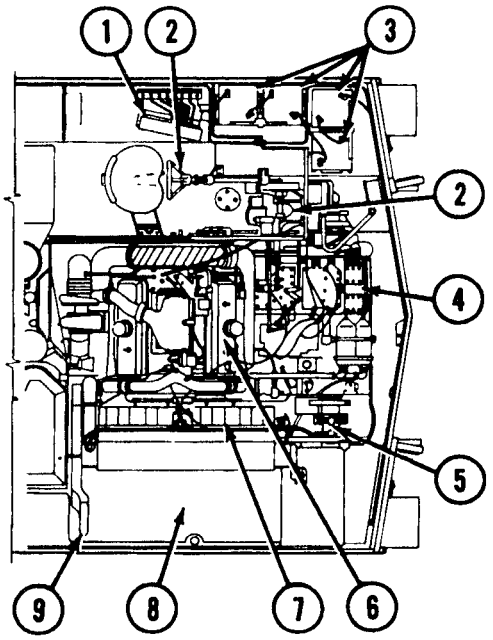
NATO SLAVE RECEPTACLE (5) Used to connect the M992 electrical system with that of another vehicle for slave starting operations, and to provide power access.



M992 Right Rear View

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

M992 Engine, Transmission and Driver's Compartments



DRIVER'S CONTROLS AND INDICATORS (1) Are contained entirely in the driver's compartment.

STEERING CONTROLS, DRIVER'S (2)

BATTERIES (3) Four 12-volt lead-acid batteries connect to provide 24-volt vehicle electrical system.

TRANSMISSION (4) XTG411-2A, contains cross-drive torque converter, four speeds forward and two reverse.

FINAL DRIVE ASSEMBLIES (5) Transfer direct drive from transmission to drive sprockets.

MAIN ENGINE (6) Diesel, 8V71T

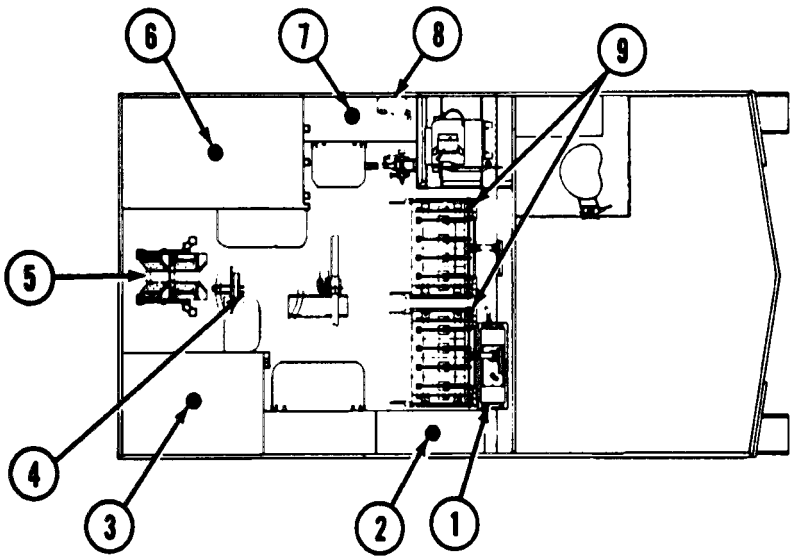
COOLING FANS AND RADIATOR (7)

FUEL TANKS, UPPER AND LOWER (8)

MAIN ENGINE EXHAUST SYSTEM (9)

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS- Continued

M992 Crew and Cargo Compartment



HYDRAULIC RESERVOIR (1)

RIGHT FRONT CHARGE CANISTER STOWAGE SHELVES (2) Provide stowage for M13A2 canisters and PA37A1 canisters.

RIGHT REAR CHARGE CANISTER STOWAGE SHELVES (3) Provide stowage for M13A2 canisters, PA37A1 canisters and .50-caliber ammunition.

COMMANDER'S SEAT (4)

CONVEYOR (5) Hydraulically or manually operated to load or unload ammunition.

LEFT REAR CHARGE CANISTER STOWAGE SHELVES(6) Provide stowage for M13A2 canisters, PA37A1 canisters, fuzes, 50-caliber ammunition, primer and three copperhead rounds.

LEFT FRONT CHARGE CANISTER STOWAGE AREA (7) Provides stowage for M13A2 canisters.

HYDRAULIC SYSTEM CONTROL PANEL (8) Contains controls and gages for operation of the hydraulic system.

PROJECTILE RACK ASSEMBLY(9) Two projectile rack assemblies, each containing five removabile and interlocking rack units, provide stowage capacity for ninety 155mm projectiles. Boxes above the rack assemblies provide stowage for PA37A2 canisters and M14A2 canisters.

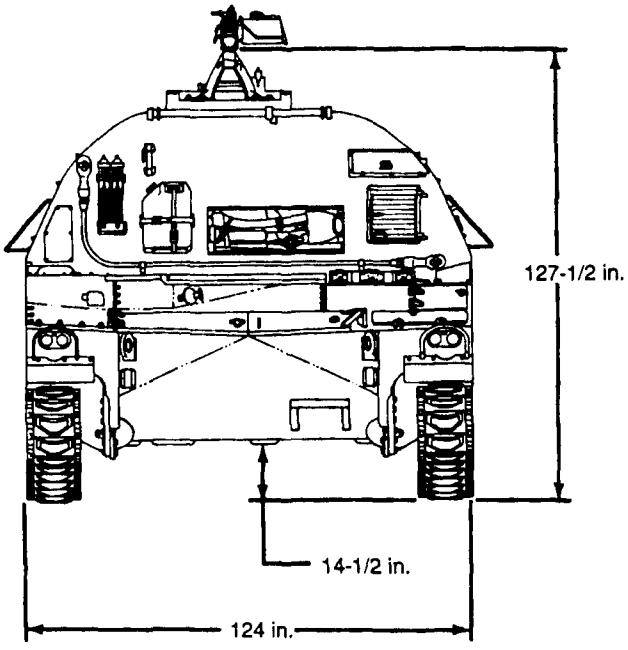
PERFORMANCE DATA

General

Armament . . . . . .50-Cal.M2, HB flex machine gun;
Three 5.56 mm, M16A1 rifles
Crew . . . . . During transit - max 8
During operation - 3
Engine . . . . . .2-cycle, 8V71T diesel
Transmission XTG411-2A

Weight and Dimensions

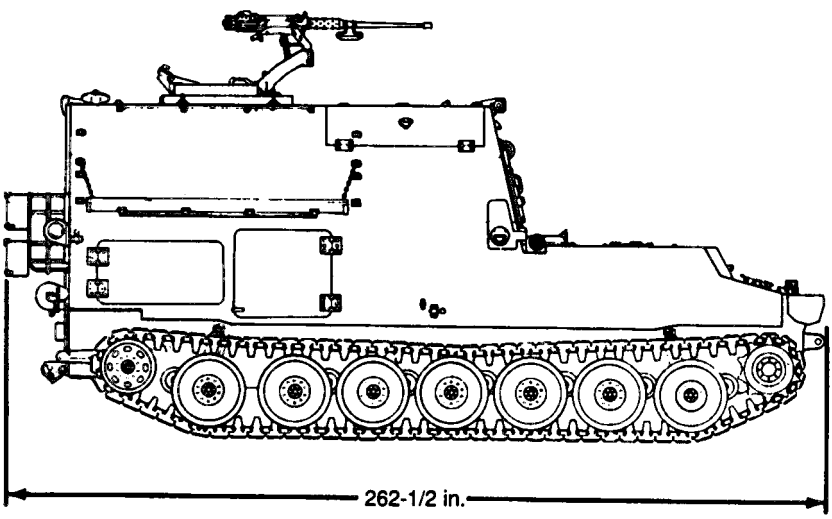
Combat loaded . . . . . 57,500 lbs
Overall length . . . . . .262-1/2 in.
Overall width . . . . . 124 in.
Overall height (combat loaded to top of machine gun mount) . . . . . 127-1/2 in.
Ground clearance . . . . . 14-1/2 in.
Electrical system:
Battery power . . . . . 24 vdc
Batteries 4



PERFORMANCE DATA - Continued

Capacities

Fuel tanks(diesel) . . . .135 gal (511.03 l)
Engine crankcase . . . .9-1/2gal.(35.96 l)dry
6-3/4 gal. (25.55 l) refill
Transmission . . . . . 22 gal. (83.28 l)dry
12 gal. (45.42 l) refill
Cooling systern . . . .20-1/4gal(76.65 l)dry
14-1 /2 gal. (54.89 l) refill
APU crankcase . . . . . 3-1/2 qts (13.25 l)
APU chaincase . . . .1 qt(.95 l)
Hydraulic reservoir . . . .18-1/2 gal. (70.03 l)dry
13 gal. (49.21 l) refill

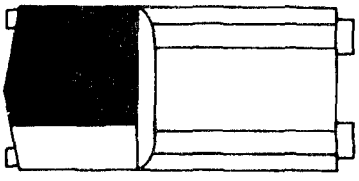


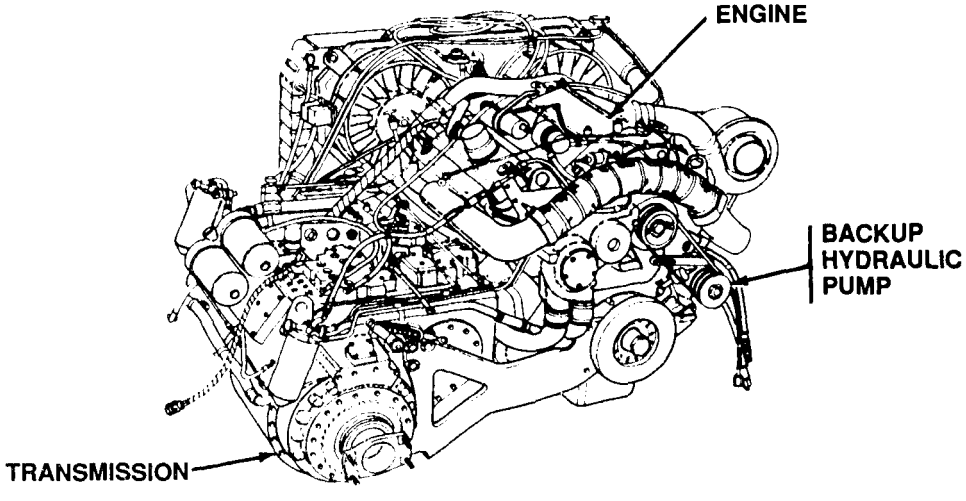
Performances

Maximum speed. . . . . ..35 mph
Maximum speed, reverse . . . .7 mph
Cruising range . . . .220 miles
Grade-ascending ability (max)..... . . . . 60 percent
Grade descending ability (max) . . . .60 percent
Maximum trench crossing width . . . .72 in.
Maximum vertical wall . . . .21 in.
Minimum turning radius . . . . . .1 vehicle length
Fording depth . . . .42 in.

Section III. PRINCIPLES OF OPERATION

POWERPACK



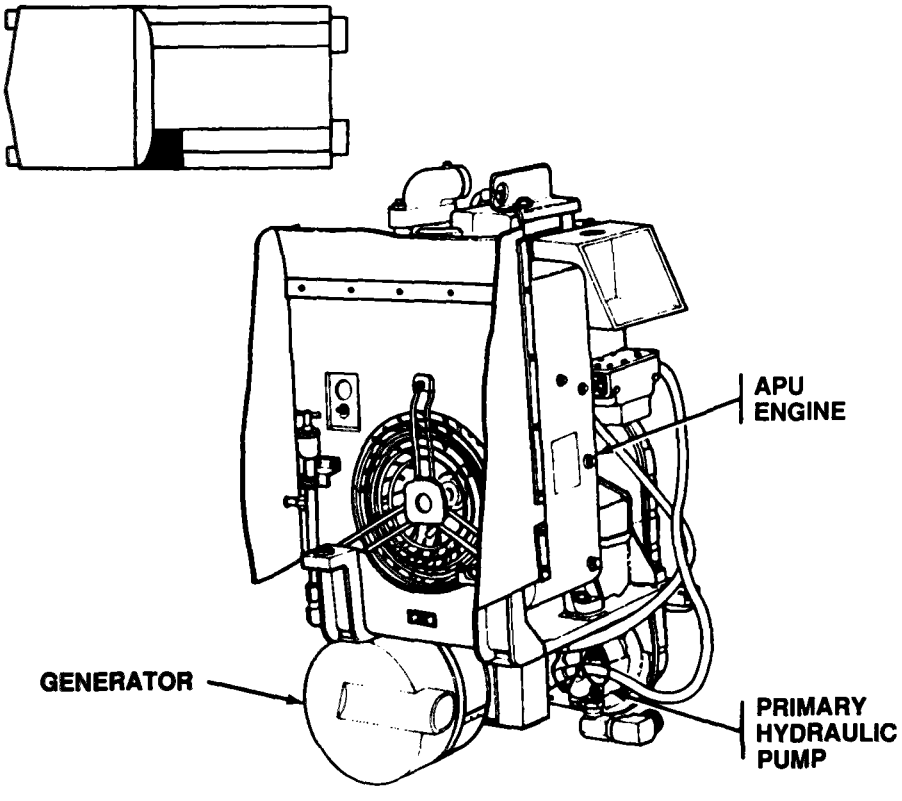


MAIN ENGINE - a turbocharged, 2-cycle, V-8 engine. The engine provides power necessary to drive the vehicle transmission. The engine also drives the hydraulic backup pump when the backup pump is engaged.

TRANSMISSION - transmission, differential, steering and braking are combined into one unit. Uses cross-drive torque converter to transmit torque to final drive assemblies. Provides 4-speed forward capability, 2-speed reverse.

BACKUP HYDRAULIC PUMP - an engine-driven backup pump is provided to supply hydraulic fluid if the auxiliary power unit (APU) fails. The backup pump is the rotary-gear type. The backup pump is connected to the engine by a manually operated pump and clutch system.

AUXILIARY POWER UNIT (APU)



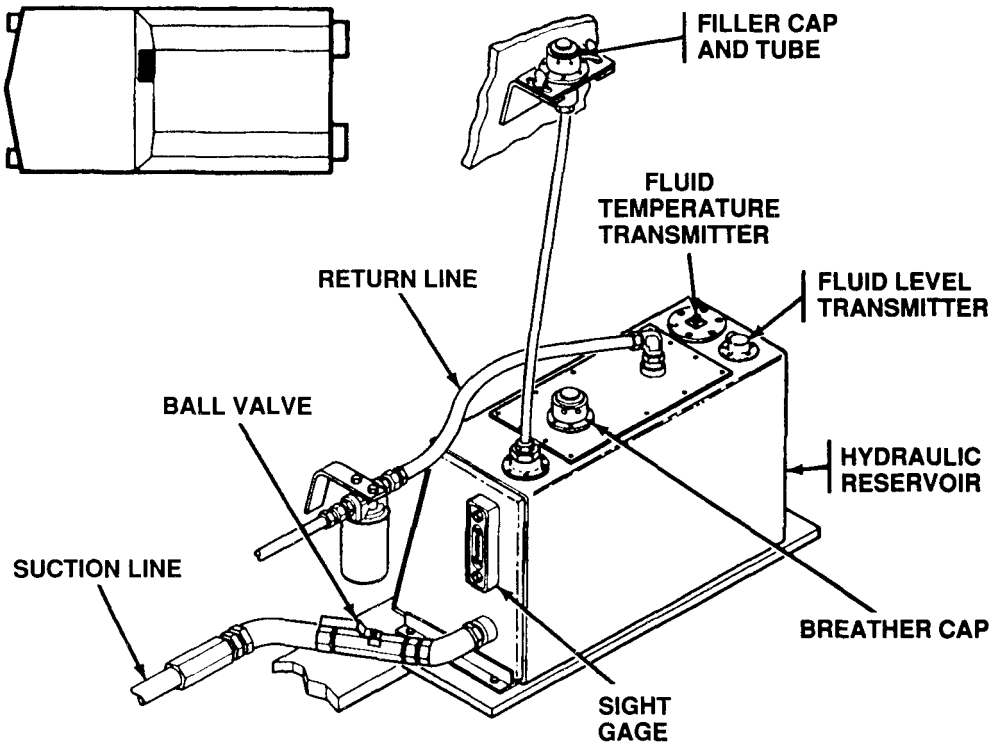
AUXILIARY POWER UNIT (APU) - the APU uses a separate and independent engine to drive (via a chain and sprocket arrangement) an electrical generator and primary hydraulic pump.

APU ENGINE - the engine is a 2-cycle, 11.5-horsepower diesel engine. Ignition, fuel supply switch and engine indicators are located on the APU control box in the cargo compartment.

GENERATOR - when driven, the generator will supply enough power to run its own electrical system and that of a supported vehicle, via slave receptacles and cable. This slave Power may be used to charge dead batteries of a disabled vehicle, or to operate the supported vehicle's electrical system.

PRIMARY HYDRAULIC PUMP - the primary pump supplies hydraulic fluid to all hydraulic circuits whenever the APU is functioning. The pump is of the rotary-gear type.

HYDRAULIC RESERVOIR



HYDRAULIC RESERVOIR - holds hydraulic system fluid. Reservoir capacity is 13 gallons (49.26 L).

SUCTION LINE - passes fluid to the main or backup hydraulic pump. A strainer at the inlet of the line prevents contaminants from entering the hydraulic circuits.

BALL VALVE - controls flow of hydraulic fluid through the suction line. This valve is manually operated and must be opened before main or backup pump is operated.

RETURN LINE - passes exhausted hydraulic fluid back to the reservoir. An in-line, 10-micron filter removes particles from the returning fluid.

BREATHER CAP - vents reservoir pressure to atmosphere.

FILLER CAP AND TUBE - permit ease of hydraulic fluid refill. A strainer is housed within the tube to prevent entry of contaminants.

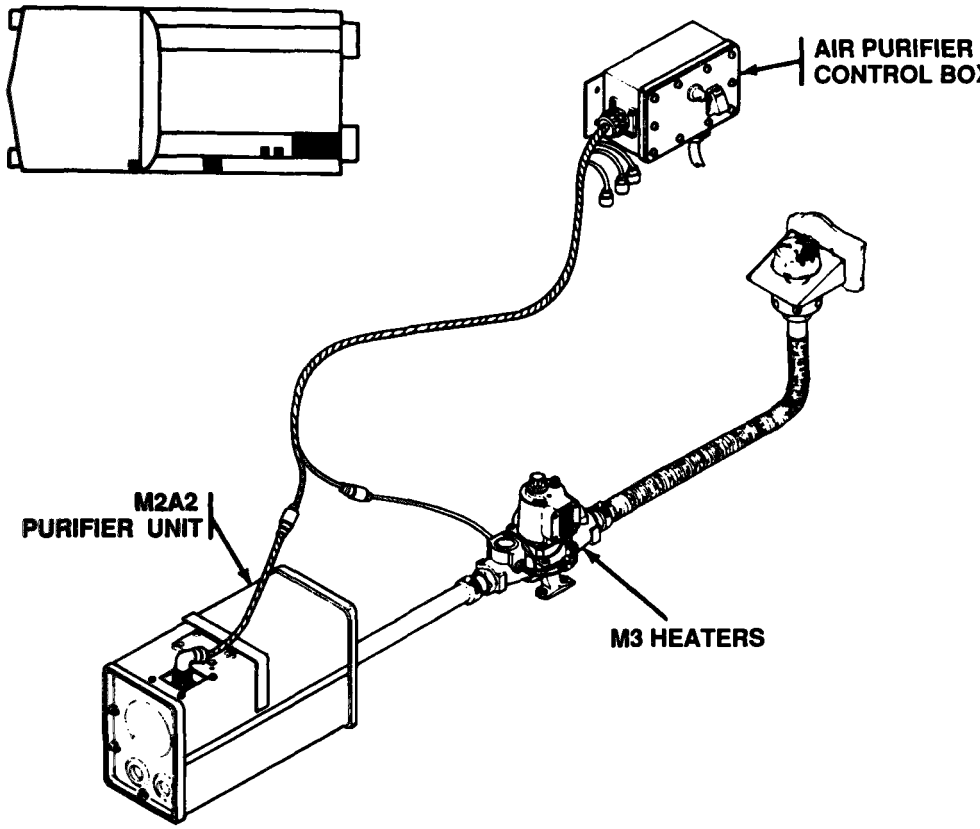
NOTE

Hydraulic reservoir sight gage is only found on vehicles 1-344. Vehicles 345 and above do not have this gage.

FLUID LEVEL TRANSMITTER - monitors the level of hydraulic fluid in the reservoir. The transmitter emits an electronic signal to a level gage on the hydraulic control panel.

FLUID TEMPERATURE TRANSMITTER - monitors the temperature of hydraulic fluid in the reservoir. The transmitter emits an electronic signal to a temperature gage on the hydraulic control panel.

VENTILATED FACE PIECE SYSTEM (VFPS)

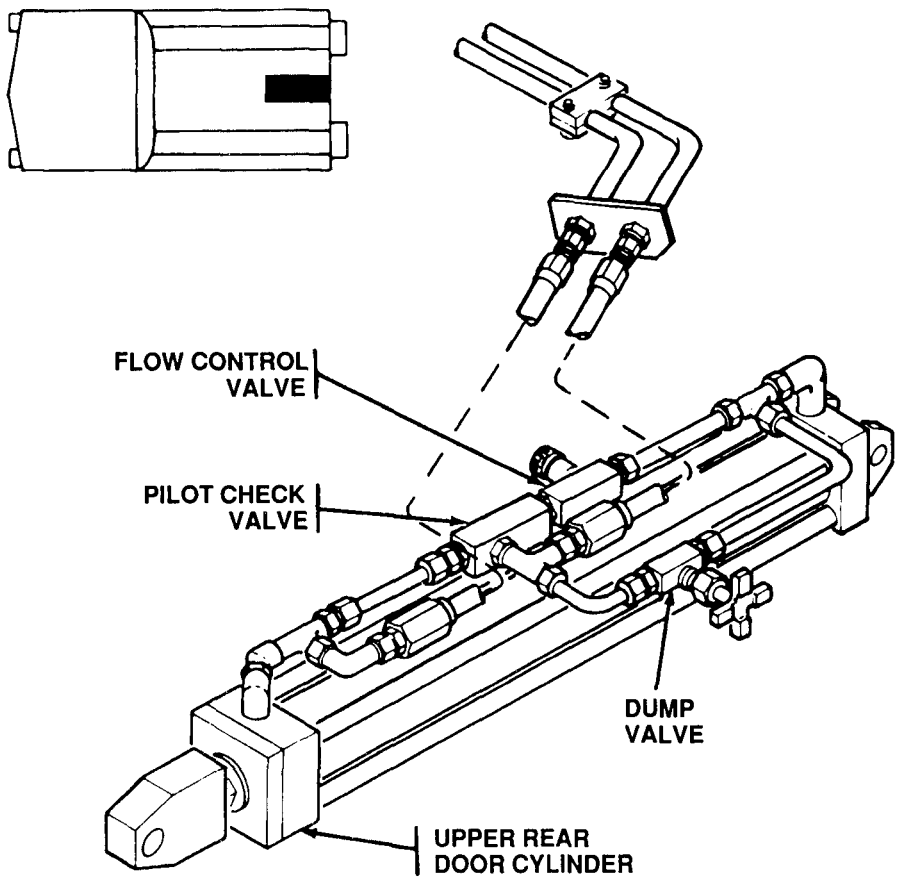


M2A2 AIR PURIFIER UNIT - removes all known chemical agents from the air. The air purifier can produce a flow of 12 cubic feet of breathable air per minute. The pure air is then supplied to up to four crew members through hosing and individual M25A1 face pieces. The air purifier unit consists of an Ml 3 particulate filter, an M12A1 gas filter and an Ml Al air purifier precleaner in a steel housing.

AIR PURIFIER CONTROL BOX - contains ON/OFF switch for operation of the VFPS.

M3 HEATERS - warm the air before it reaches the face pieces. A heater is connected in-line to each M25A1 face piece. Each heater is individually temperature-adjusted and swtiched (OFF/ON). Heaters must be turned on when operating the VFPS in outside temperatures of less than 40°F.

HYDRAULIC ACTUATORS AND RELATED COMPONENTS



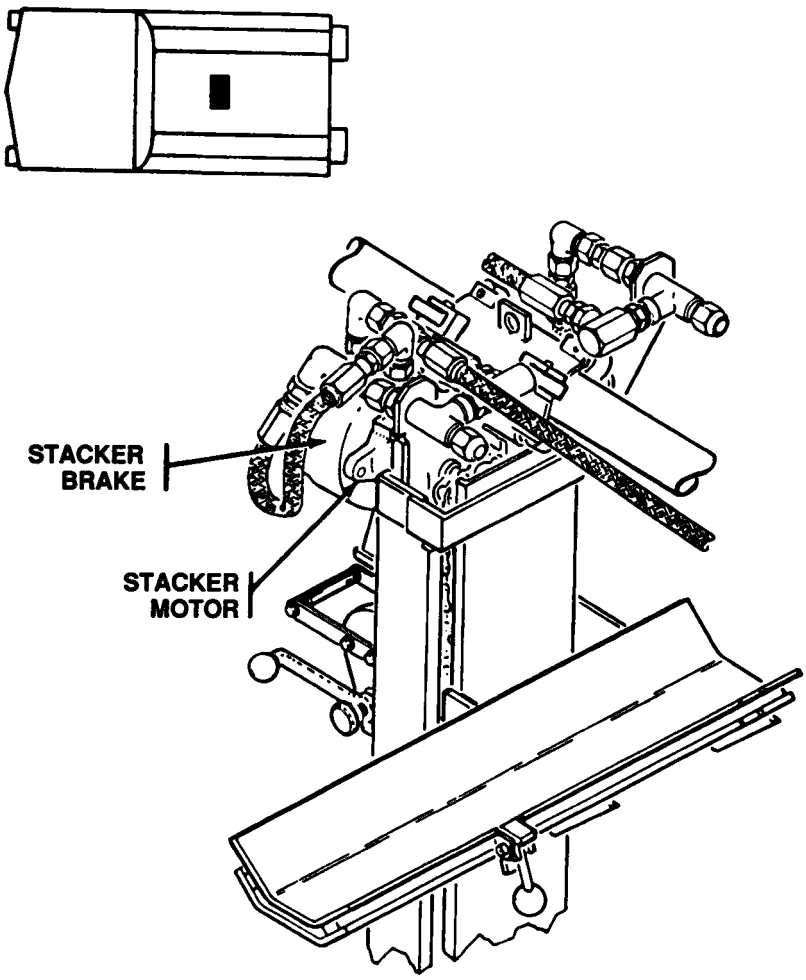
UPPER REAR DOOR CYLINDER - hydraulically opens and closes the upper rear door.

FLOW CONTROL VALVE - an adjustable valve used to smooth closing of the upper rear door. This valve is preset at the factory and should not require adjustment.

PILOT CHECK VALVE - prevents dangerous door drop if hydraulic line ruptures.

DUMP VALVE - enables the operator to close the door if hydraulic power is lost. This is accomplished by opening the dump valve and then shifting the BALLISTIC SHIELD directional control valve to the down position.

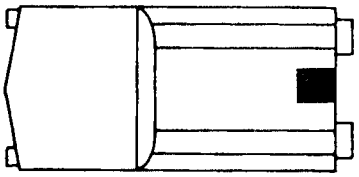
HYDRAULIC ACTUATORS AND RELATED COMPONENTS - Continued

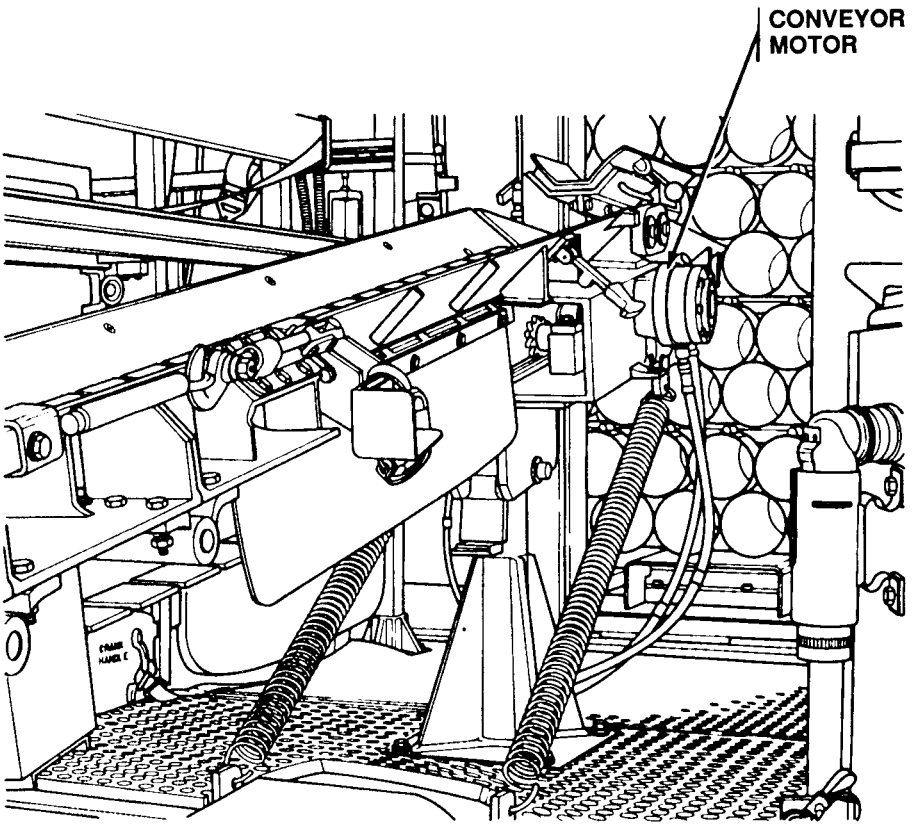


STACKER MOTOR - drives the stacker sprocket and chain. The motor is hydraulically operated and operation is reversible. Rotational direction of the motor is determined by the STACKHI directional control valve. Rotational speed of the motor is controlled by the setting of a flow control valve.

STACKER BRAKE - automatically applies whenever hydraulic pressure is removed from stacker motor supply line. This brake will prevent stacker tray movement until the motor supply line is again pressurized.

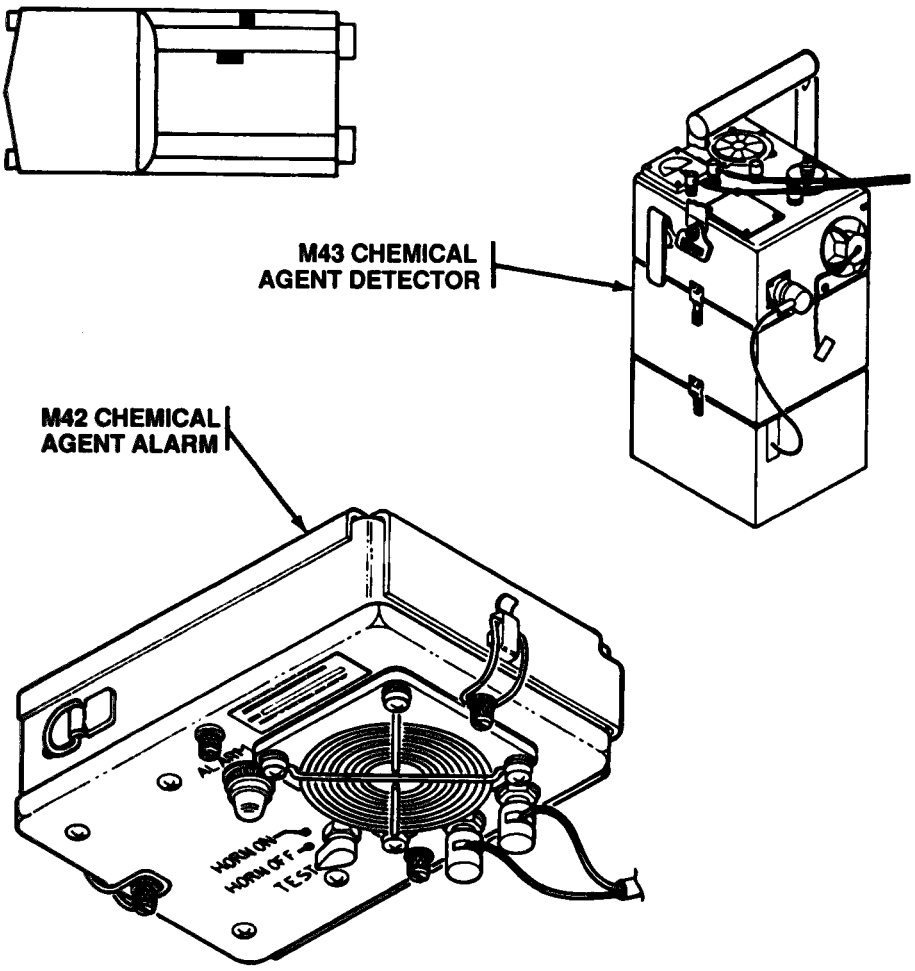
HYDRAULIC ACTUATORS AND RELATED COMPONENTS - Continued





CONVEYOR MOTOR - drives the conveyor sprocket and chain, The motor is hydraulically operated and operation is reversible. Rotational direction of the motor is determined by the CONVEYOR directional control valve. Rotational speed of the motor is controlled by the setting of a flow control valve.

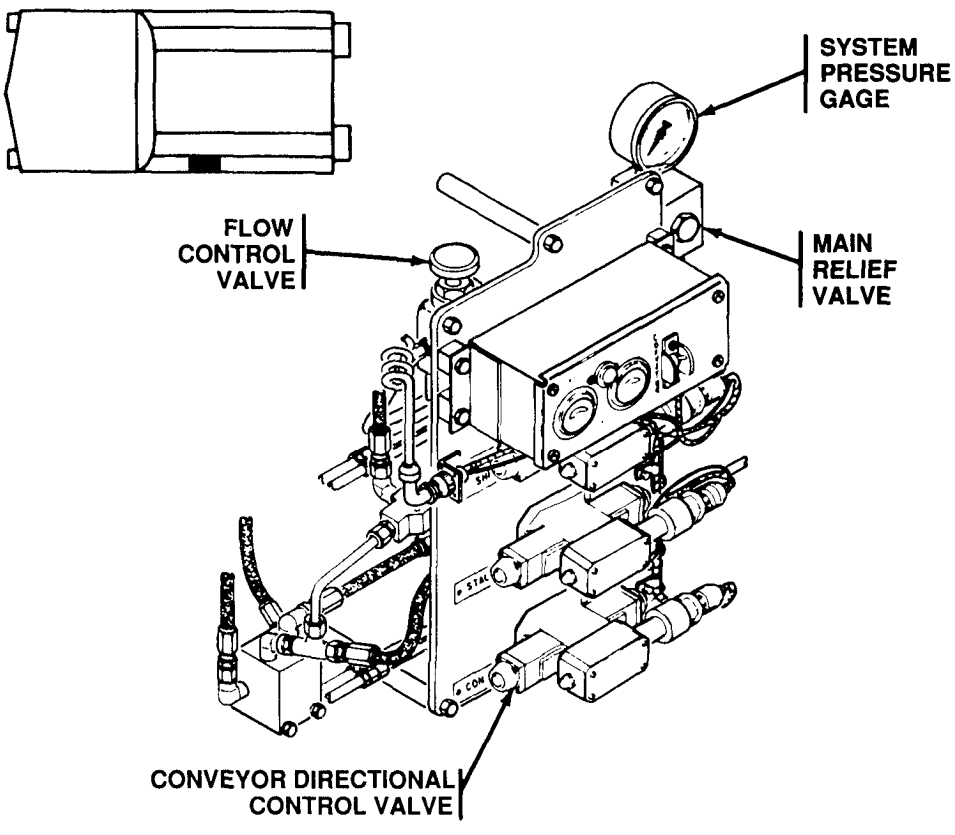
CHEMICAL AGENT DETECTION AND ALARM SYSTEM



M43 CHEMICAL AGENT DETECTOR - senses the presence of very low concentrations of chemical agents and breathable aerosols. Contaminants are sensed by the detector and an electrical signal is sent to the chemical agent alarm. The detector unit maybe operated using power from the vehicle's electrical system; it also may be battery operated.

M42 CHEMICAL AGENT ALARM-signals to crew members that chemical agents have been sensed by the M43 detector. The alarm may provide an audible and visual signal or a visual signal only, depending on setting.

HYDRAULIC CONTROL PANEL



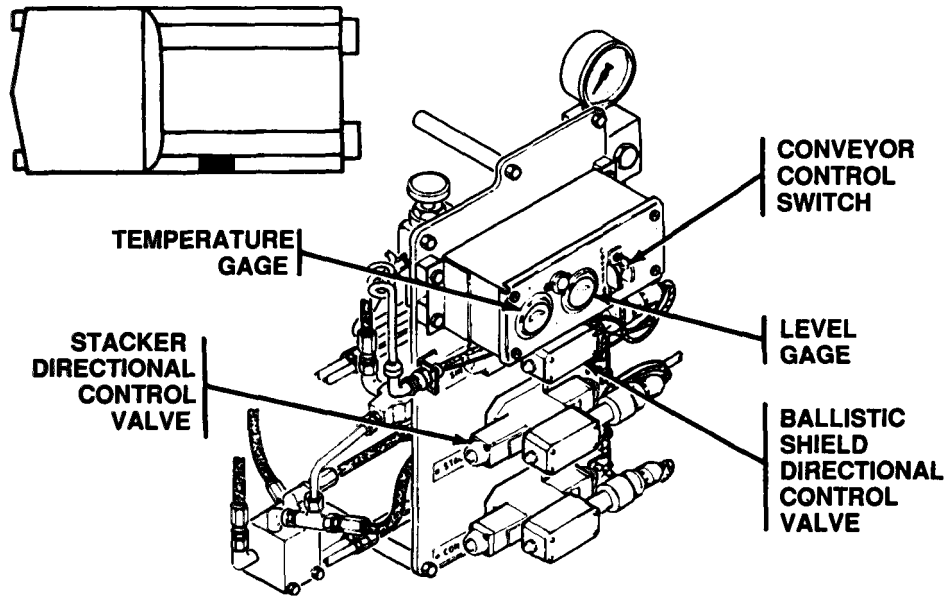
MAIN RELIEF VALVE - limits hydraulic system pressure, Normal maximum pressure setting is 1550 psi. System pressure over 1550 psi is relieved through the valve to the reservoir.

SYSTEM PRESSURE GAGE - monitors hydraulic system pressure.

FLOW CONTROL VALVE - regulates flow of hydraulic fluid. Valve can be adjusted manually to achieve desired speed of the conveyor and stacker.

CONVEYOR DIRECTIONAL CONTROL VALVE - controls direction of fluid flow to the conveyor motor. Positioning of an internal spool determines the direction of conveyor motor rotation. The valve may be electrically powered by the conveyor switch or manually operated by pressing the buttons at either side of the valve.

HYDRAULIC CONTROL PANEL - Continued



BALLISTIC SHIELD DIRECTIONAL CONTROL VALVE - controls direction of fluid flow to the upper rear door cylinder. Positioning of an internal spool determines direction of cylinder rod movement. The valve maybe electrically powered by either of the upper rear door switches or manually operated by pressing the buttons at either side of the valve.

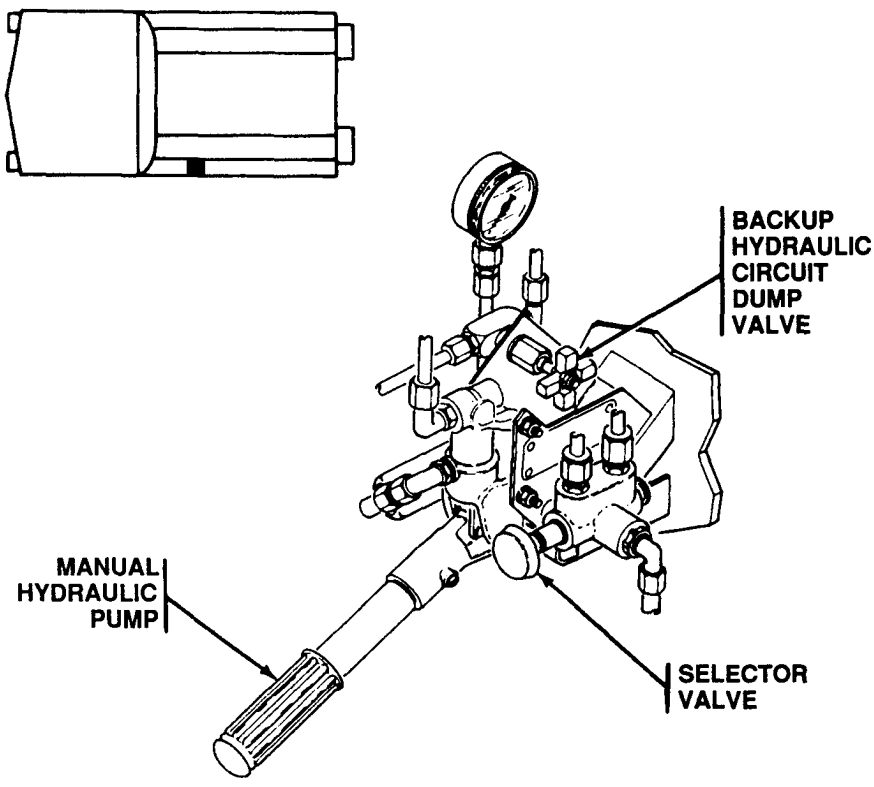
TEMPERATURE GAGE - displays the temperature of hydraulic system fluid monitored by the fluid temperature transmitter.

LEVEL GAGE - displays level of hydraulic system fluid in the hydraulic reservoir as monitored by the fluid ievel transmitter.

CONVEYOR CONTROL SWITCH - controls electrical activation of the conveyor directional control valve.

STACKER DIRECTIONAL CONTROL VALVE - controls direction of fluid flow to the stacker motor. Positioning of an internal spool determines the direction of stacker motor rotation. The valve maybe electrically powered by the stacker switch or manually operated by pressing the buttons at either side of the valve.

BACKUP HYDRAULIC COMPONENTS



MANUAL HYDRAULIC PUMP - engages the backup hydraulic pump to the main engine. Pressure generated by the pump is measured by a gage on the backup hydraulic panel. Pressure should be 125 to 150 psi to engage the pump with the main engine.

BACKUP HYDRAULIC CIRCUIT DUMP VALVE - when opened, permits the backup pump to disengage from the main engine. For the backup pump (and backup pump hydraulic circuit) to function, this valve must be closed.

SELECTOR VALVE - determines which pump hydraulic circuit is to be activated. When the valve handle is pushed in, the primary pump hydraulic circuit is selected. When the handle is pulled out, the backup pump hydraulic circuit is selected. For the hydraulic system to function, the appropriate pump must also operate.

CHAPTER 2

OPERATING INSTRUCTIONS

Chapter Overview

This chapter outlines procedures crew members must follow to properly operate the M992. Information found in Chapter 2 includes:

- Visual and functional descriptions of driver and crew controls and indicators.
- Checks and services required to maintain vehicle in working order.
- Stepby-step instructions for operating major vehicle systems under usual and unusual conditions.
- Operation of auxiliary equipment, backup systems and procedures to follow in emergency situations.

Chapter 2 is divided into the following sections:

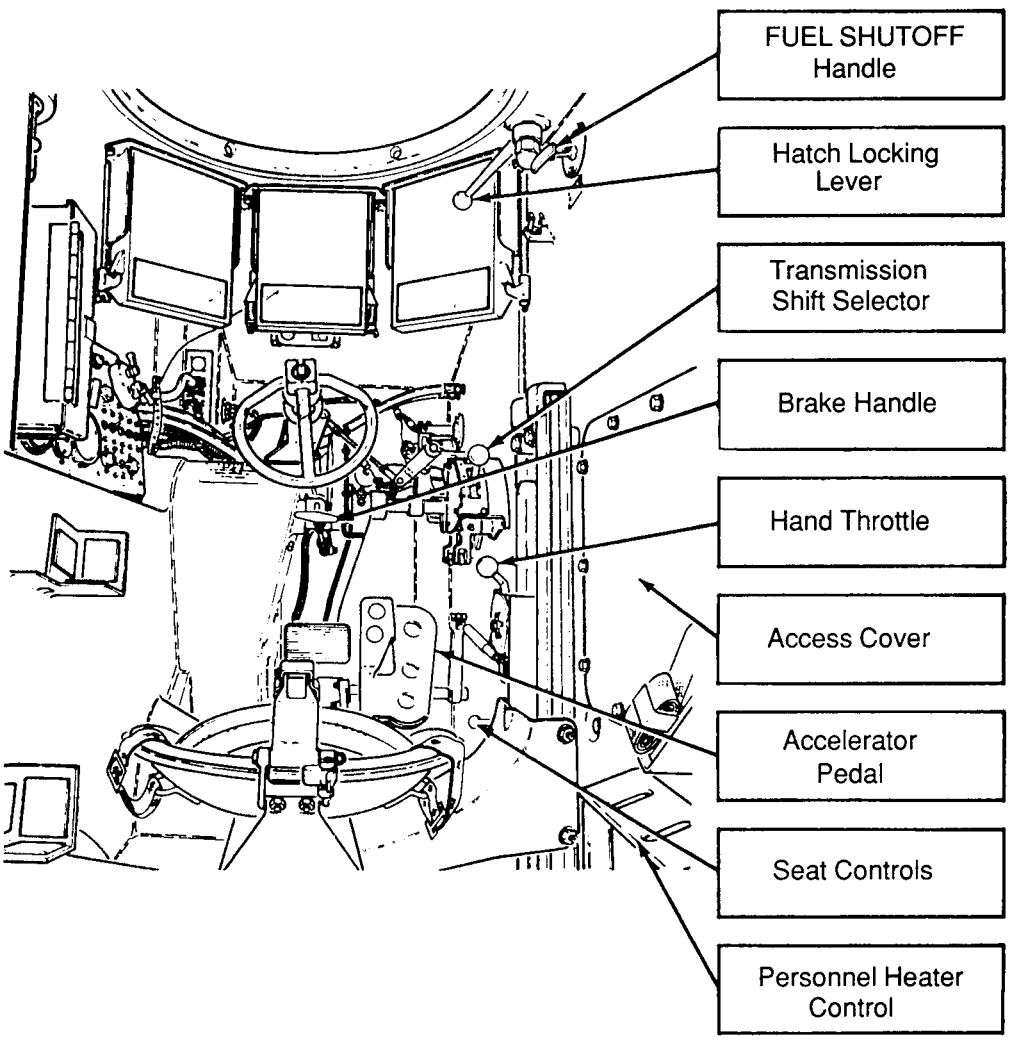
Section I	DESCRIPTION OF CONTROLS AND INDICATORS
Section II	PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)
Section Ill	OPERATION UNDER USUAL CONDITIONS
Section IV	OPERATION UNDER UNUSUAL CONDITIONS

Section I. DESCRIPTION OF CONTROLS AND INDICATORS

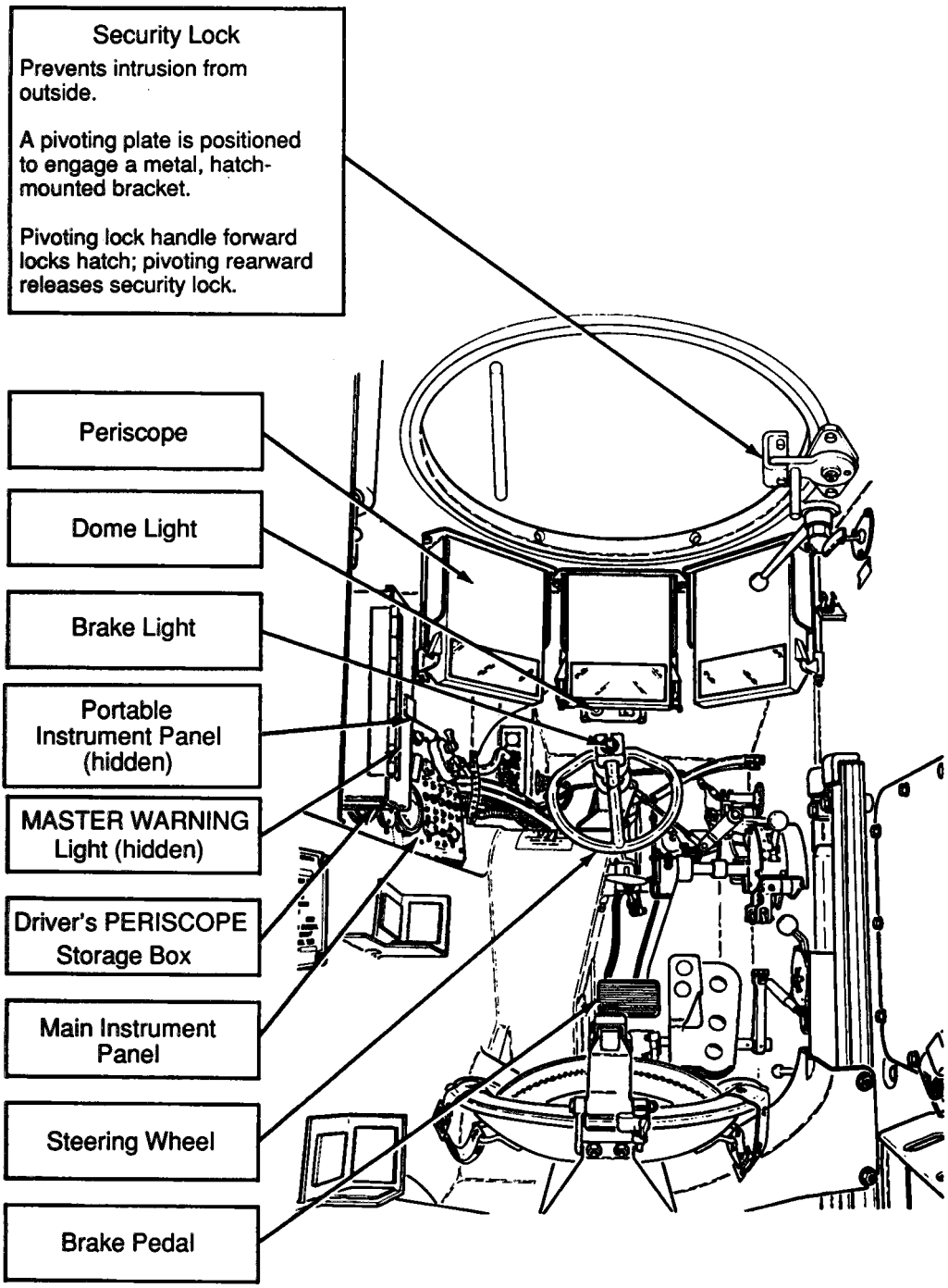
DRIVER'S CONTROLS AND INDICATORS

NOTE

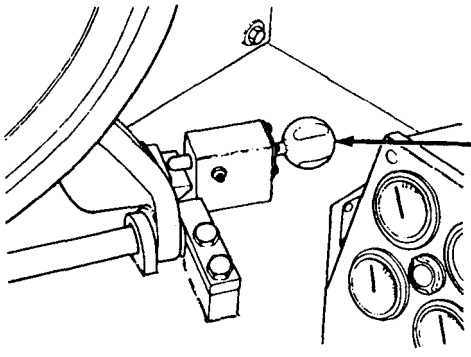
Detailed information for use of these items can be found in Chapter 2, Sections III and IV of this manual.



DRIVER'S CONTROLS AND INDICATORS - Continued



DRIVER'S CONTROLS AND INDICATORS - Continued



Hold-Open Latch

Holds hatch door open for entry, exit or driving with the seat raised.

Spring-loaded lock pin automatically engages when door is fully raised.

To release latch, pull latch knob outward.

CREW CONTROLS AND INDICATORS

Auxiliary Power Unit (APU) Control Box

FUEL SHUT-OFF Switch

This two-position toggle switch controls electrical power to the APU fuel solenoid and APU fuel pumps.

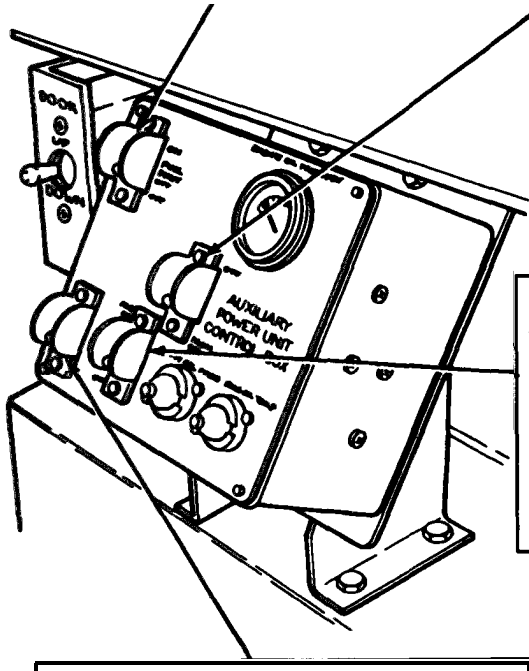
When the toggle switch and vehicle MASTER switch are ON, fuel is supplied for operation of the APU. When the switch is positioned to OFF, fuel supply is shut off.

The switch should always be turned OFF when APU is shut down.

PREHEAT Switch

Positioning this switch lever to MOMentary-ON turns on the preheating units in the APU combustion chamber, and supplies power to the START switch.

When the switch lever is released, the switch returns to OFF position, the pre-heating units turn off, and electrical continuity to the START switch is broken.



START Switch

With the PREHEAT switch held ON, positioning the START switch to MOMentary-ON will supply electrical power to APU starting components.

When the switch lever is released, the switch returns to OFF, and electrical continuity to APU starting components is broken.

APU GEN Switch

This two-position toggle switch turns APU generator ON and OFF.

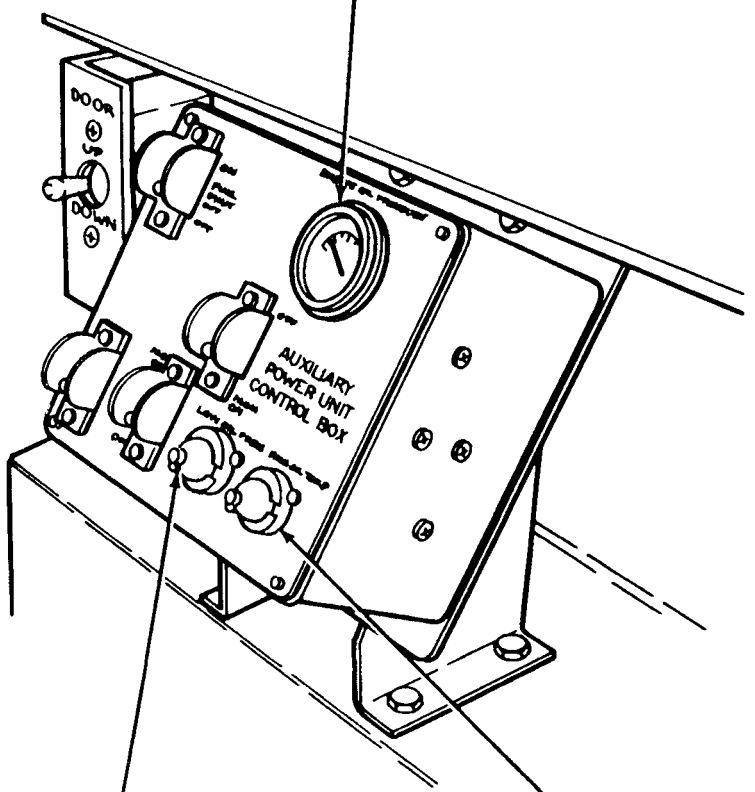
Switch must be OFF when starting the APU.

CREW CONTROLS AND INDICATORS - Continued

Auxiliary Power Unit (APU) Control Box - Continued

ENGINE OIL PRESSURE Gage

Monitors APU engine oil pressure in pounds per square inch (psi). The gage is graduated in 10-psi increments from 0 to 60 psi. Normal operating pressure ranges from 25 to 35 psi.



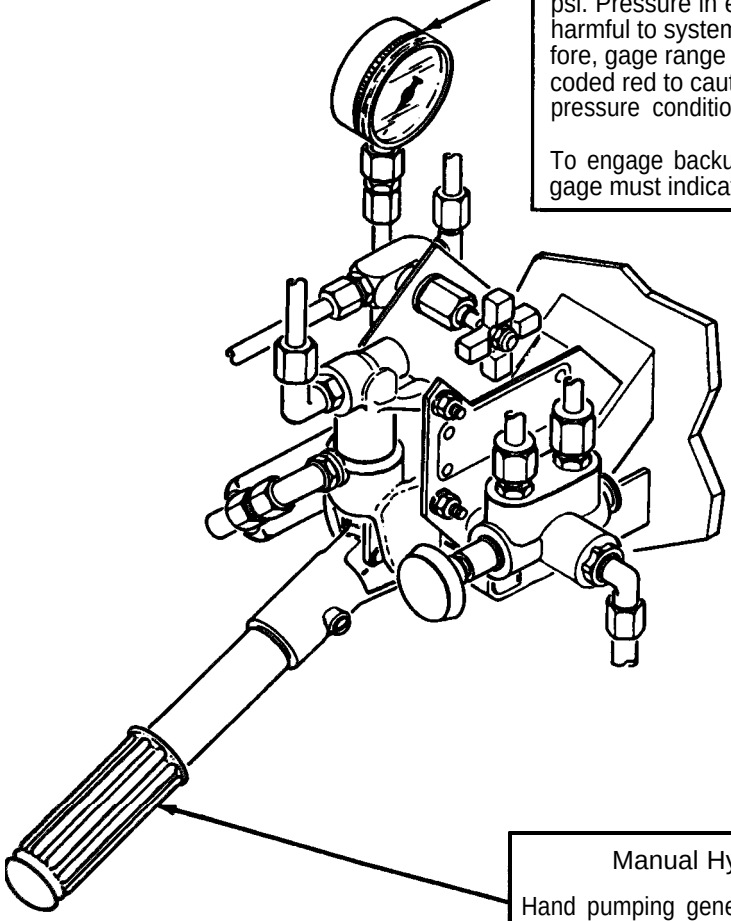
This red lamp lights when a low oil pressure condition exists in the APU lubricating system.

HIGH AIR TEMP Lamp

This red lamp lights when the APU overheats.

CREW CONTROLS AND INDICATORS - Continued

Backup Hydraulic Controls



Manual Hydraulic Pump Gage

The gage measures pressure generated by hand pump in pounds per square inch (psi).

The gage monitors pressures from 0-300 psi. Pressure in excess of 150 psi is harmful to system components; therefore, gage range from 150 to 300 psi is coded red to caution user of an overpressure condition.

To engage backup hydraulic pump, gage must indicate 125 to 150 psi.

Manual Hydraulic Pump

Hand pumping generates hydraulic pressure necessary to engage backup pump with the main engine.

CREW CONTROLS AND INDICATORS - Continued

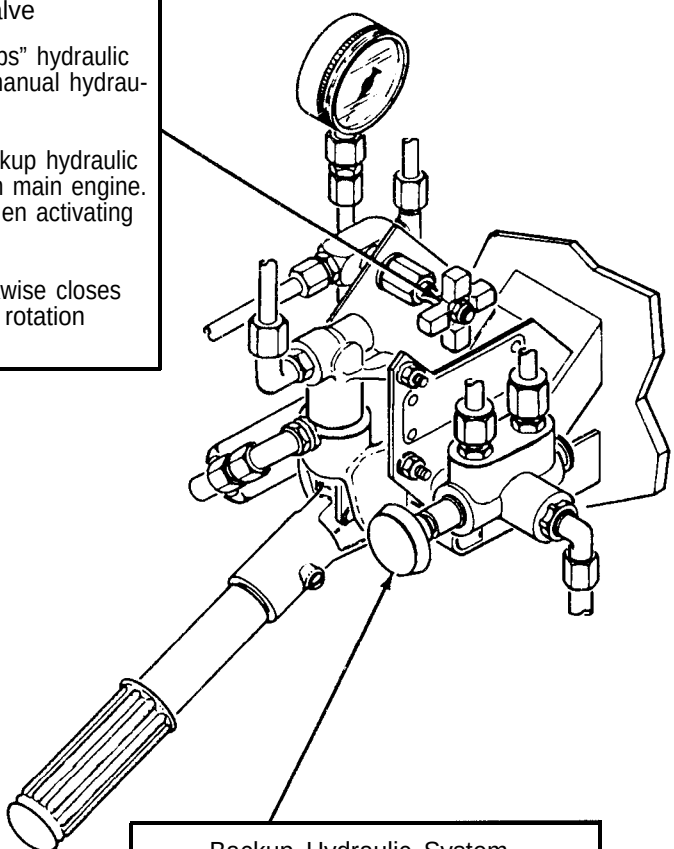
Backup Hydraulic Controls - Continued

Backup Hydraulic
Circuit Dump Valve

Opening this valve "dumps" hydraulic pressure generated by manual hydraulic pump.

When valve is open, backup hydraulic pump is disengaged from main engine. Valve must be closed when activating backup hydraulic circuit.

Turning valve knob clockwise closes valve. Counterclockwise rotation opens valve.



Backup Hydraulic System
Selector Valve

Selects between primary pump circuit and backup pump circuit operability.

When valve handle is pushed in, primary pump and circuit are operable. When valve handle is pulled out, backup hydraulic pump and circuit may be operated.

CREW CONTROLS AND INDICATORS - Continued

Hydraulic Control Panel

Hydraulic Pressure Gage

Monitors hydraulic system pressure from 0-3000 psi.

Gage should measure 100-300 psi with either hydraulic pump operating, conveyor, stacker and upper rear door OFF, and hydraulic fluid at normal operating temperature.

Flow Control Valve

Divides and meters flow of hydraulic fluid to conveyor and stacker motors.

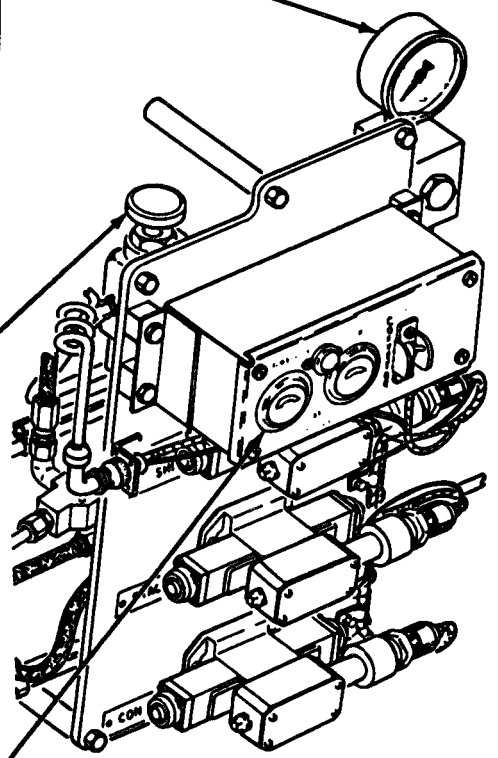
Valve can be manually adjusted to increase or decrease flow, and therefore, operating speed of conveyor and stacker.

HYDRAULIC RESERVOIR TEMPERATURE Gage

Monitors temperature of hydraulic fluid in the reservoir. Temperature is measured in degrees Fahrenheit.

Gage is graduated in 20° F increments from 120° F to 240° F.

Hydraulic temperature should not exceed 160° F.



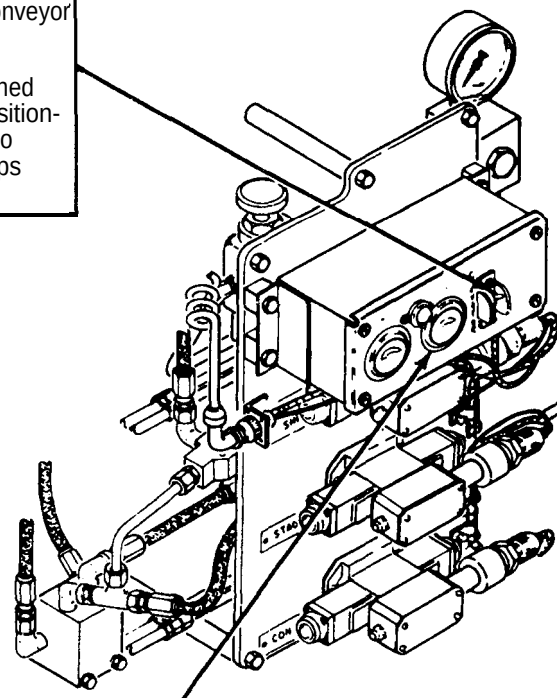
CREW CONTROLS AND INDICATORS - Continued

Hydraulic Control Panel - Continued

CONVEYOR Switch

Electrically controls operation of conveyor directional control valve.

The three-position switch is positioned down to load cargo IN. Upward positioning of switch is used to deliver cargo OUT. Switch in center position stops conveyor.



HYDRAULIC RESERVOIR LEVEL Gage

Monitors hydraulic reservoir fluid levels.

Gage is graduated from empty (E) to full (F) in 1/4-tank increments.

Fluid should not measure less than 3/4.

CREW CONTROLS AND INDICATORS - Continued

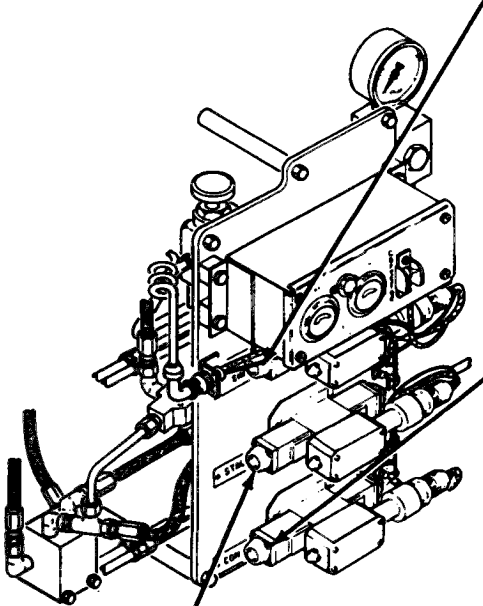
Hydraulic Control Panel - Continued

BALLISTIC SHIELD Directional Control Valve

Directs flow of hydraulic fluid to upper rear door (ballistic shield) actuator.

The valve may be electrically controlled by top or bottom upper rear door switch or may be manually operated at valve.

For manual operation, pressing right-hand button opens upper rear door; pressing left-hand button closes door.



CONVEYOR Directional Control Valve

Directs flow of hydraulic fluid to the conveyor motor.

The valve may be electrically controlled by the conveyor switches, or may be manually operated at the valve.

For manual operation, pressing the right-hand button moves the conveyor chain out; pressing the left-hand button moves the conveyor chain in.

STACKER Directional Control Valve

Directs flow of hydraulic fluid to the stacker motor.

The valve may be electrically controlled by stacker switch or manually operated at the valve.

For manual operation, pressing right-hand button raises stacker tray; pressing left-hand button lowers stacker tray.

CREW CONTROLS AND INDICATORS - Continued

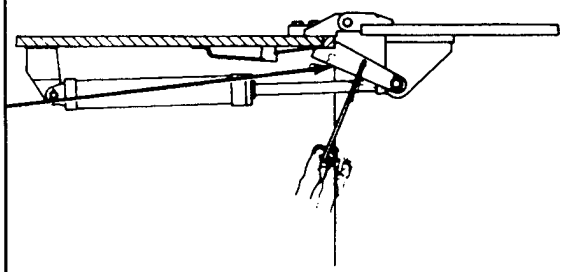
Upper Rear Door

Upper Rear Door
Mechanical Lock

Mechanically secures upper rear door in open position.

The mechanical lock holds door open in 45-degree or 90-degree position by wedging between door and roof plate.

When door opens, lock latches automatically.

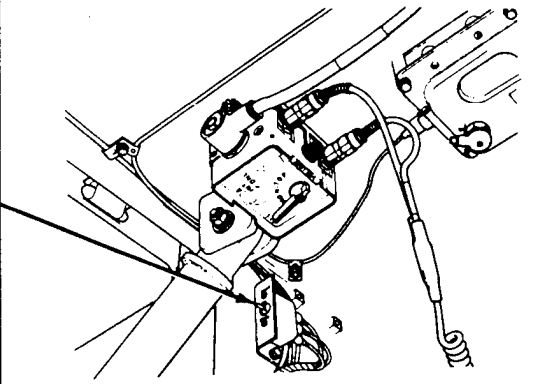


Upper Rear Door
Switch-Top

This three-position, momentary contact, centered-off switch controls electrical power for movement of the upper rear door (ballistic shield).

When switch is positioned UP, door opens. When switch is positioned DOWN, door closes.

When switch lever is released, it returns to center-off, and upper rear door movement stops.



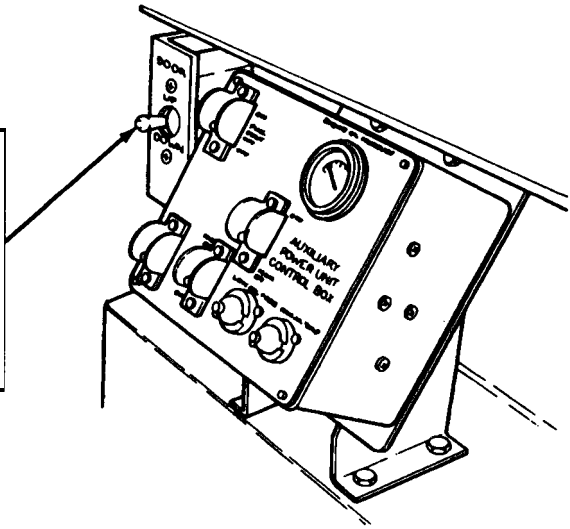
CREW CONTROLS AND INDICATORS - Continued

Upper Rear Door - Continued

Upper Rear Door
Switch-Bottom

Operation of this switch is identical to top switch.

The bottom switch is positioned just inside the left of **the lower rear door, well within reach of personnel outside vehicle.**

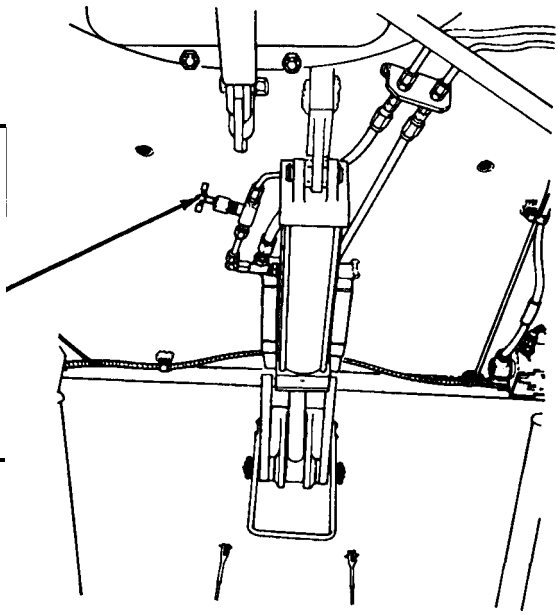


Upper Rear Door
Dump Valve

Valve is used to permit opening and closing of the door if hydraulic system fails.

Opening the valve allows hydraulic fluid to bypass flow-restrictive devices in circuit.

The valve should be used only in emergencies to open or close door manually.



CREW CONTROLS AND INDICATORS - Continued

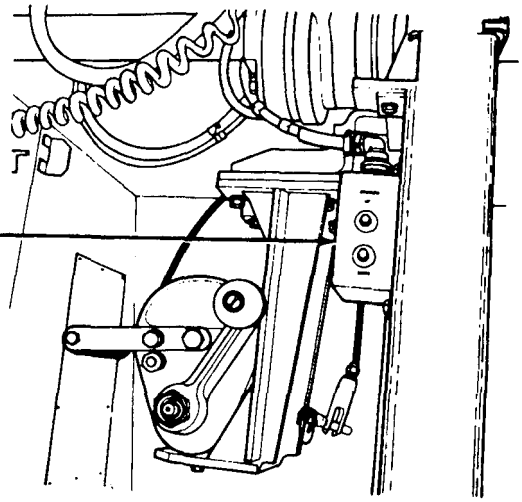
Stacker

Stacker Switch

Electrically controls operation of the STACKER directional control valve.

Two momentary-on buttons control vertical positioning of stacker tray.

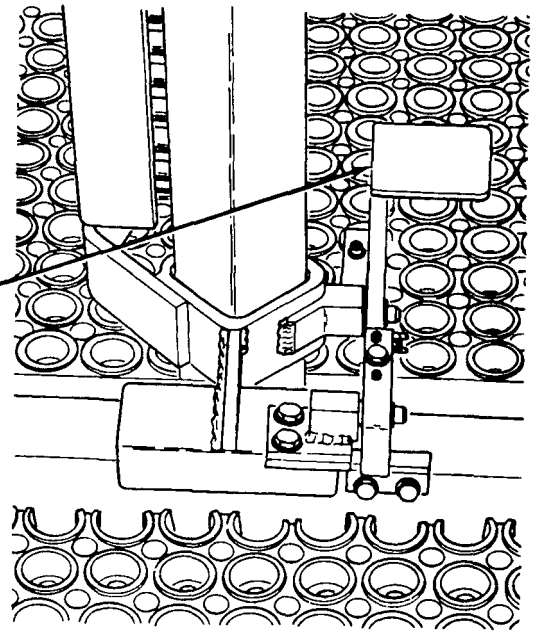
Pressing and holding UP button raises stacker tray. Pressing and holding DOWN button lowers stacker tray. Releasing buttons stops tray movement.



Stacker Foot Brake

Lateral movement of stacker maybe slowed, stopped and/or held by foot pressure at brake pedal.

Brake releases when foot pressure is removed.



CREW CONTROLS AND INDICATORS - Continued

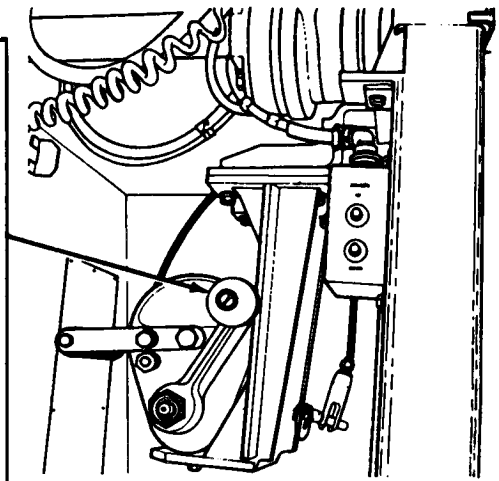
Stacker - Continued

Stacker Manual Winch

The winch is used to manually position stacker tray vetically when related hydraulic components fail.

When winch cable is connected to stacker tray and chain is disconnected, clockwise cranking of CONTROL HANDLE moves tray UP; counclockwise cranking of handle moves tray **DOWN.**

A mechanical brake automatically functions to hold tray at selected height. To activate brake, operator needs only to turn handle clockwise one “click”.



CREW CONTROLS AND INDICATORS - Continued

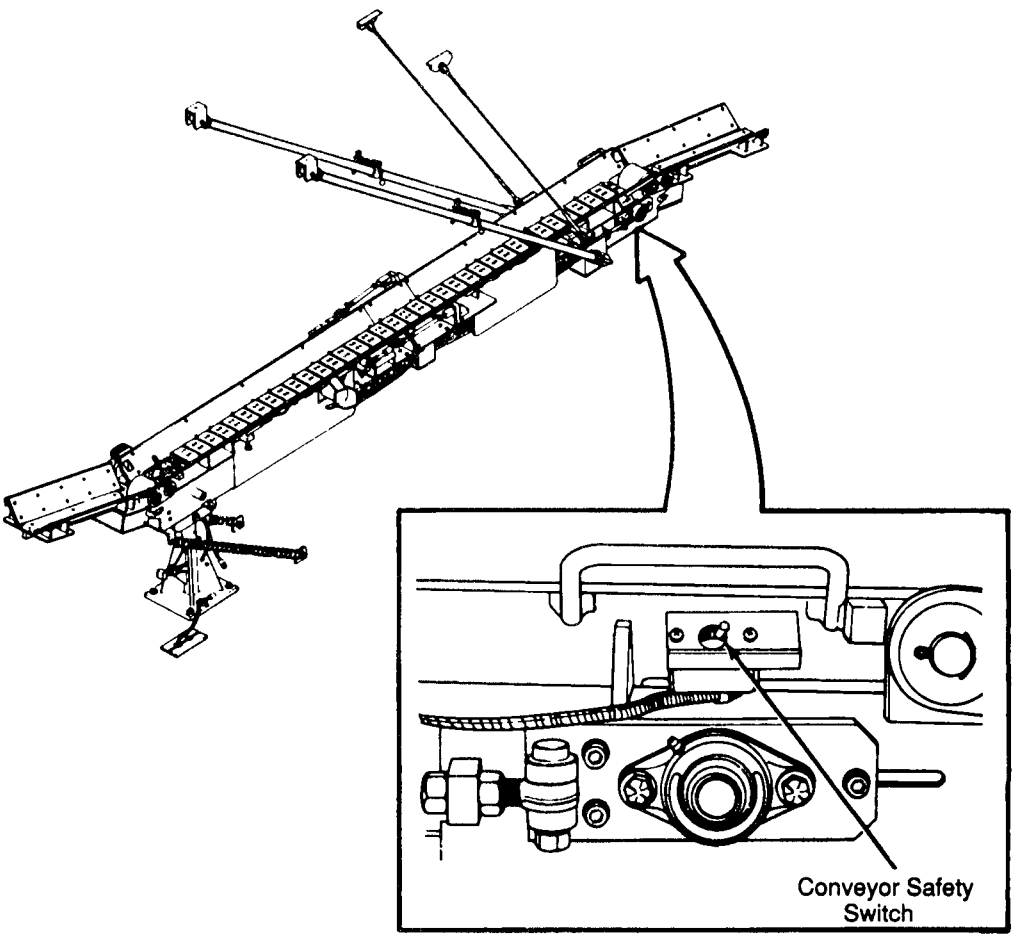
CONVEYOR

Conveyor Safety Switch

The two-position toggle switch is used to turn conveyor OFF from outside end of conveyor. It does this by breaking electrical continuity through conveyor circuit, overriding main CONVEYOR switch on hydraulic control panel. This switch should be turned OFF each time conveyor is stowed.

Turning switch OFF shuts down conveyor. With safety switch ON and CONVEYOR switch positioned to either IN or OUT, conveyor will operate in selected direction.

This switch is only a safety device, used to prevent pile-up of ammunition on conveyor. The main CONVEYOR switch should be used for normal operation.



CREW CONTROLS AND INDICATORS - Continued

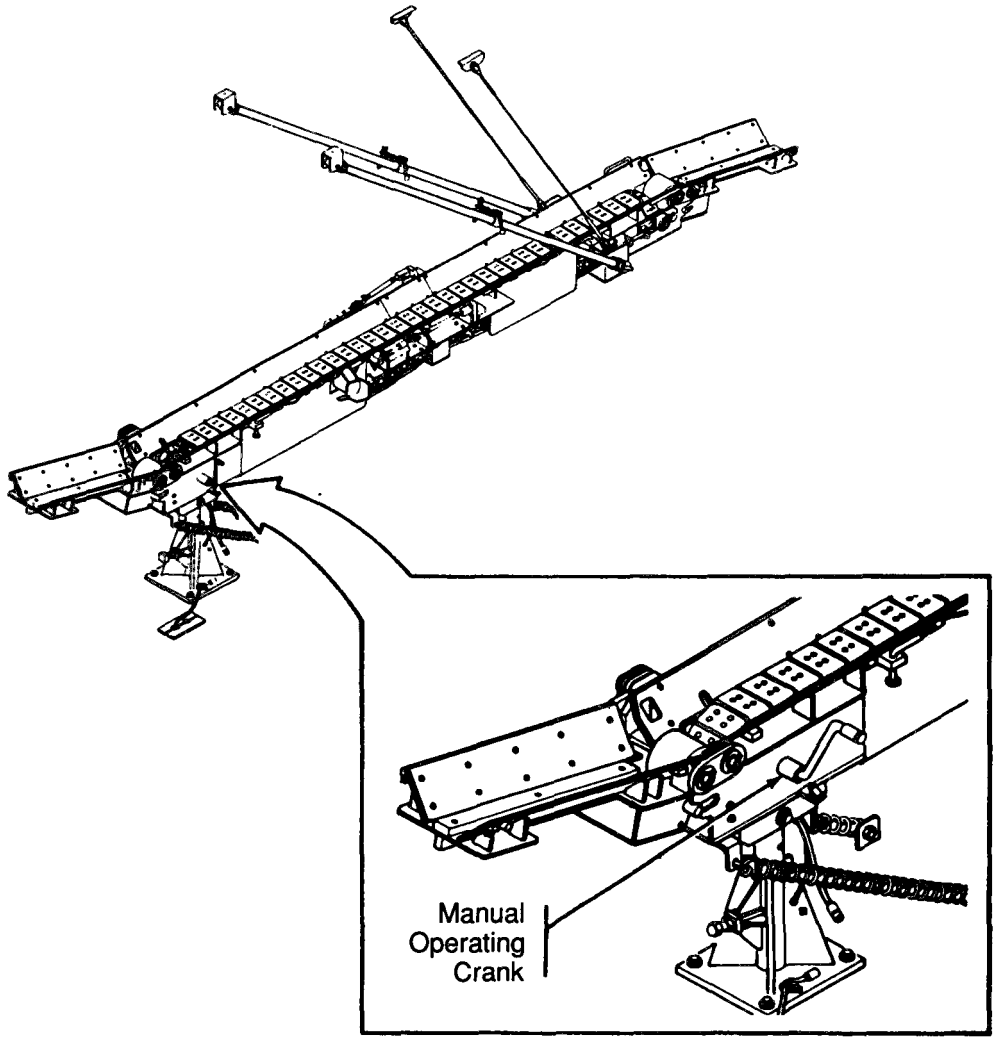
Conveyor - Continued

Manual Operating Crank

The crank is used to operate conveyor when related hydraulic components fail.

When needed, crank handle is removed from its stowage location at base of left rear canister compartment and inserted into hole opposite hydraulic motor.

Turning handle clockwise moves conveyor chain out. Turning handle counterclockwise moves conveyor chain in.



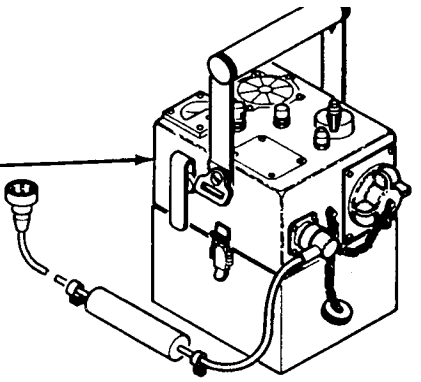
CREW CONTROLS AND INDICATORS - Continued

Chemical Agent Detection and Alarm System

Chemical Agent Detector - M43

Detects very low concentrations of chemical agent vapors and inhalable aerosols. Detector may be operated continuously but must be serviced every 12 hours.

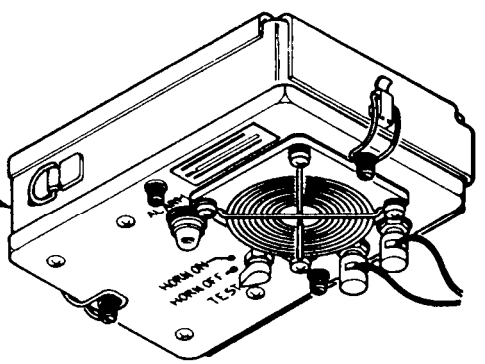
Refer to TM 3-6665-225-12 for detailed description of this unit.



Chemical Agent Alarm - M42

When connected to M43 detector, M42 alarm provides remote audible and/or visual signal if M43 detector senses a chemical agent.

For a detailed description of this unit, refer to TM 3-6665-225-12.



CREW CONTROLS AND INDICATORS - Continued

Ventilated Face Piece System (VFPS)

Control Box On/Off Switch

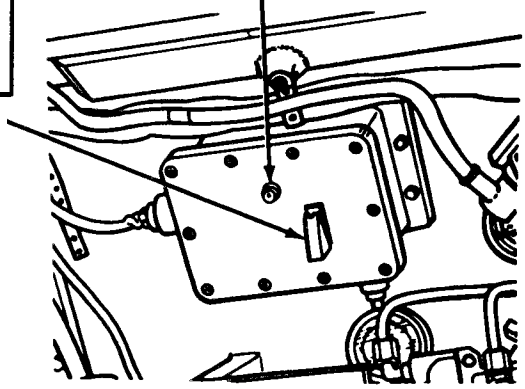
When ON, this switch activates air purifier unit and supplies electrical power for operation of M3 heaters.

This switch is a two-position toggle swtich, covered by a red guard.

The switch lever is positioned up for ON and down for OFF.

Control Box Power Indicator Lamp

This blue-green lamp lights when on/off switch is positioned ON.



M3 Heater Control Knob

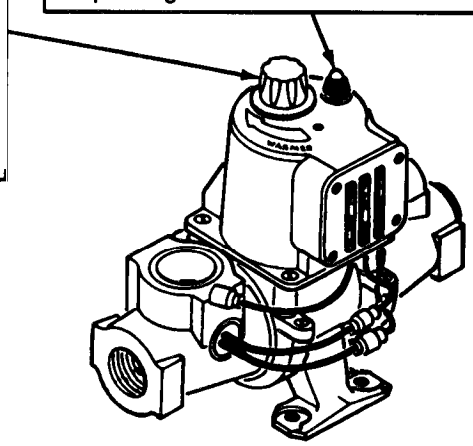
Warms breathable filter air received at each ventilated face piece (VFP).

When NBC power control box on/off switch is on, control knob at each heater can be turned on and adjusted for desired heater.

Turning control knob clockwise increases heat. Each heater is individually controlled.

M3 Heater Indicator Lamp

When a heater is turned on, its blue-green lamp will light.



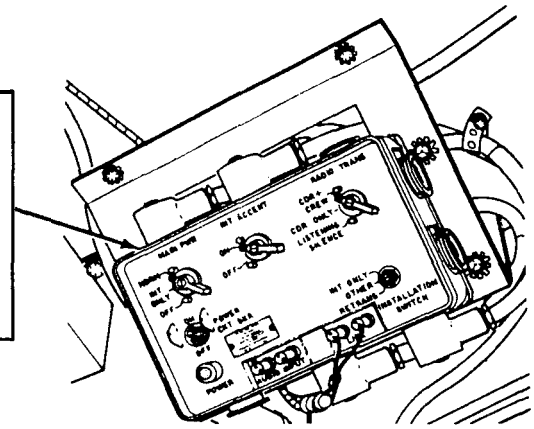
CREW CONTROLS AND INDICATORS - Continued

Intercommunications Equipment

AM 1780/VRC

This is the master control box for the intercommunications system. Unit must be properly set up for intercommunications system to work.

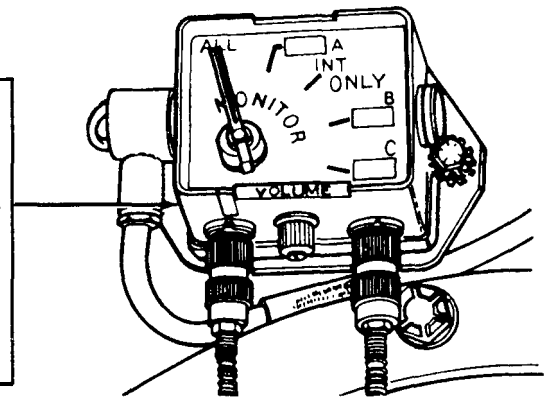
Refer to TM 11-5830-340-12 for detailed description of this unit.



C-2298/VRC

This is the individual control box for each crew member using an audio accessory. The audio accessory connects with intercommunications system via receptacles at base of C-2298/VRC.

Refer to TM 11-5830-340-12 for detailed description of this unit.



CREW CONTROLS AND INDICATORS - Continued

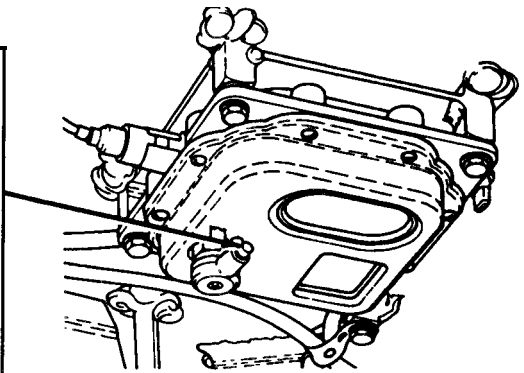
Miscellaneous Controls and Indicators

Dome Lamps

Five lamps provide lighting for interior of cargo compartment.

Each unit is individually switched on and off.

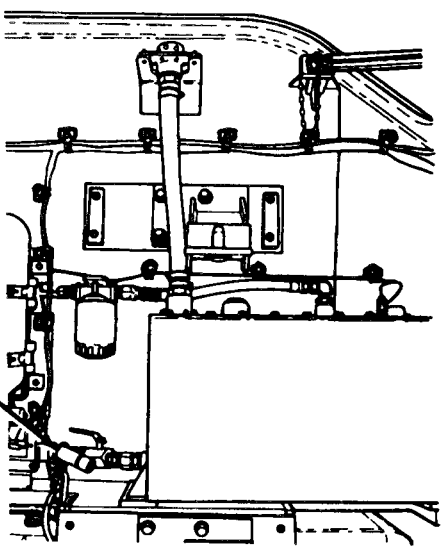
Turning switch lever fully clockwise turns on white light. For blue/green light on, press safety latch and turn switch lever counterclockwise past stop. To turn light off, turn lever to center position.



Air Cleaner Restriction Indicator

Indicates a restricted or blocked filter.

Signal window displays a green color when filter is unrestricted; window displays red when filter is restricted and requires servicing.

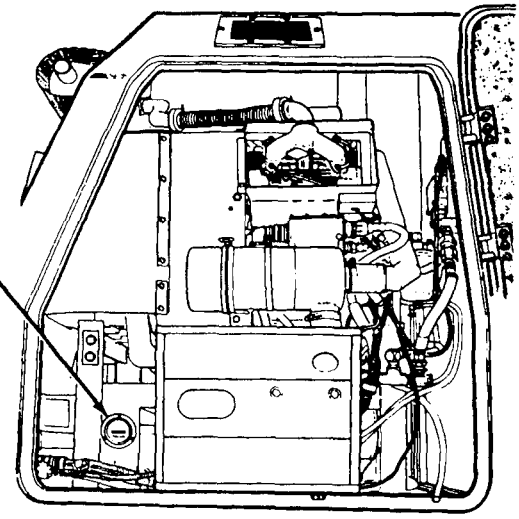


CREW CONTROLS AND INDICATORS - Continued

Miscellaneous Controls and Indicators - Continued

APU Hourmeter

Located in APU compartment, the hourmeter measures hours of APU operation in 1/10-hour increments.



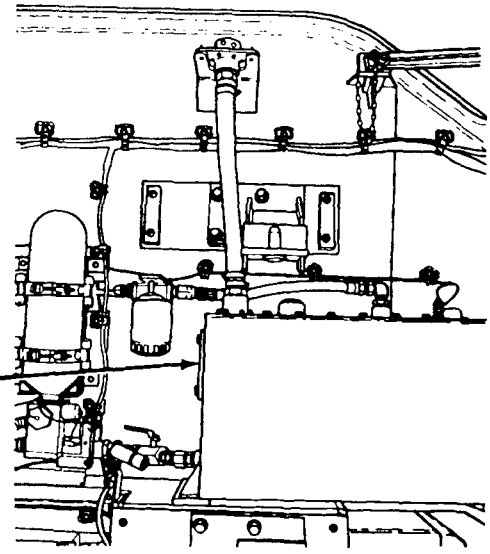
NOTE

Sight gage is only found on vehicles 1-344. Vehicles 345 and above do not have this gage.

Hydraulic Reservoir Sight Gage

Measures level and temperature of hydraulic fluid in reservoir.

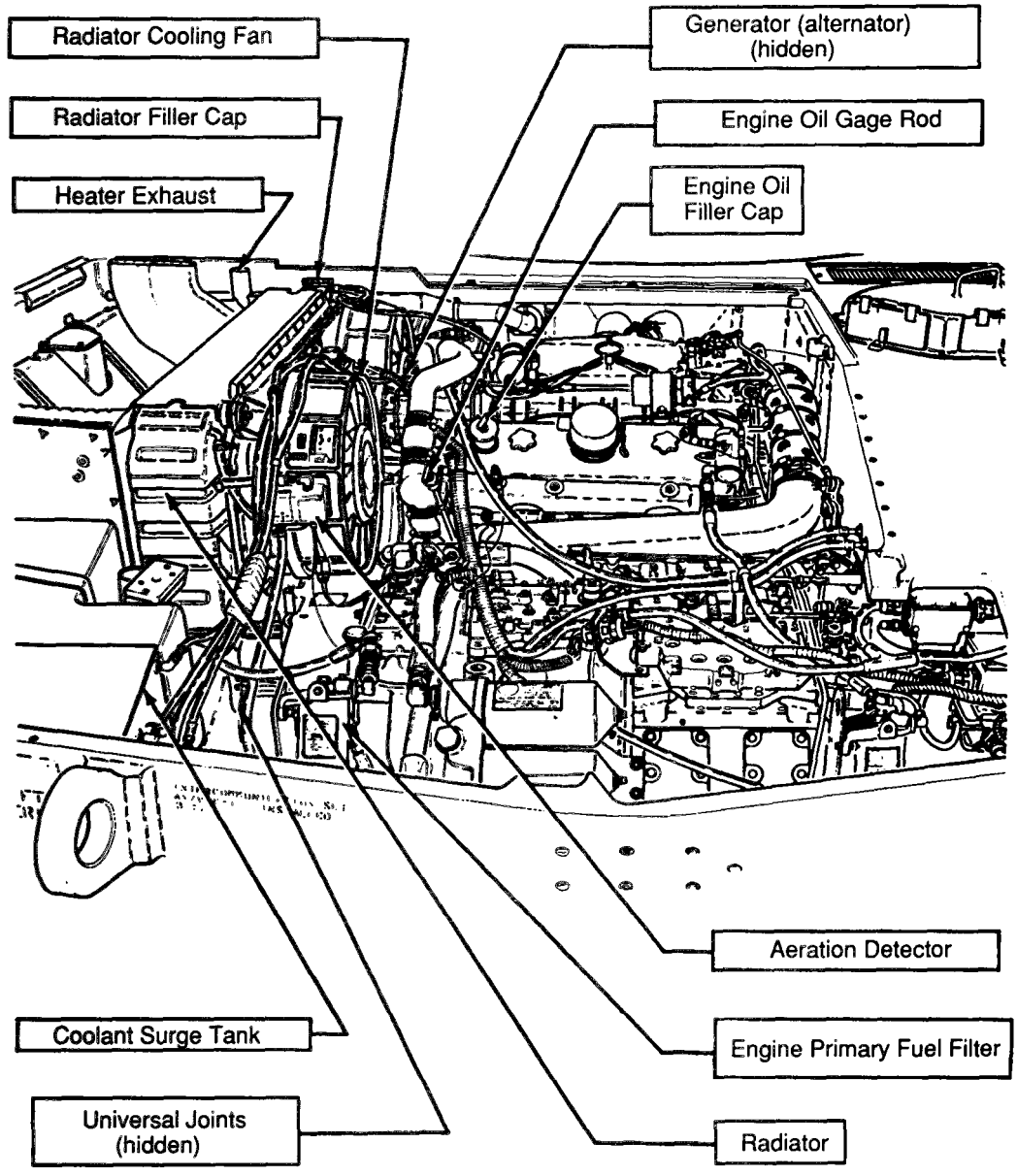
Mounted on side of reservoir, gage indicates HIGH and LOW levels and oil temperatures between 80° and 225° F.



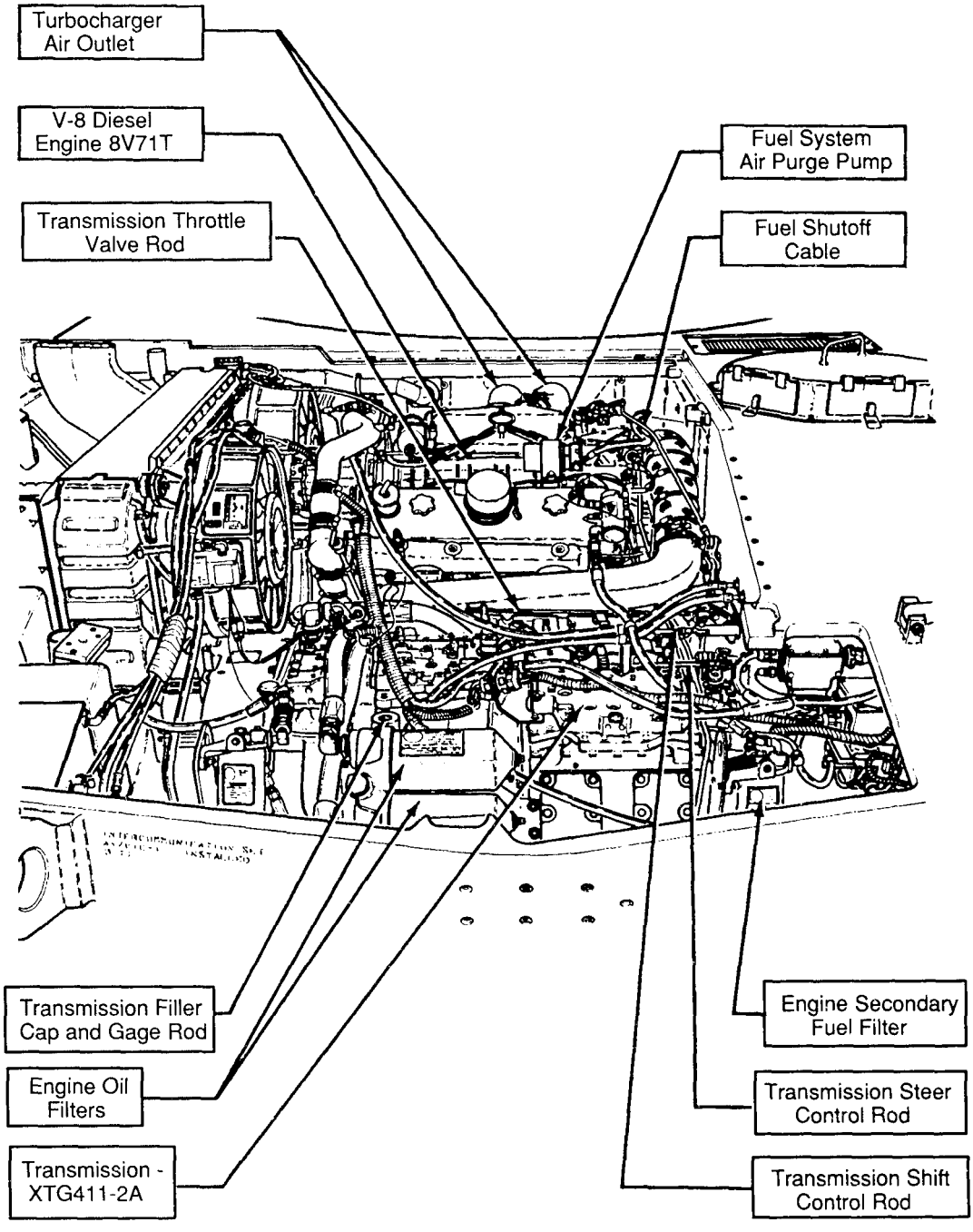
POWERPACK

NOTE

Detailed information for use of powerpack can be found in Chapter 2, Section III of this manual.



POWERPACK - Continued



Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

The purpose of PMCS is to discover and correct any defects before serious damage or failure occurs. Performing the PMCS, as outlined on the following pages, will help you keep a well-maintained and properly functioning vehicle. Always perform the PMCS in the same sequence each time; by doing so, you will develop habits which will help you to spot trouble quickly.

The PMCS are divided into two sections:

- DAILY- items which require checks or services each day the vehicle is operated. Required daily checks for each item shall be performed before (B) operation, during (D) operation or after(A) operation, according to the location of a dot in the "Interval" column.

- WEEKLY/MONTHLY - items that require periodic checks or services on a weekly or monthly basis. Each check listed in this section will be performed weekly (W) or monthly (M), according to the location of a dot in the "Interval" column.

Perform WEEKLY (W) checks as well as DAILY (D) checks, if:

- You are the assigned operator and have not operated the item since the last weekly check.

- You are operating the item for the first time.

The crew member responsible for each check is keyed into the "Done By" column. Check and/or service each item according to the procedures listed in the "Item To Be Inspected/ Procedure"column. Report the vehicle not ready if the status described in the "Equipment is Not Ready/Available If" column exists. Personnel will be denied use of "not ready" equipment until corrective maintenance is completed.

Always keep the **CAUTIONS** and **WARNINGS** in mind as you do PMCS. Take along all tools needed and a rag or two to make the checks.

To maximize the effectiveness of the PMCS, always watch for the following conditions:

- GREASE AND DIRT. Keep your vehicle clean. Dirt, grease, oil and other debris may hide a serious problem and will shorten the life of your equipment. Clean as you work. Use dry-cleaning solvent (item 13, Appx D) on all metal surfaces. Use soap and water when you clean rubber or plastic materials.

- LOOSE, DAMAGED OR MISSING BOLTS, NUTS AND SCREWS. Check for obvious looseness or damaged condition. Without using a wrench, it maybe difficult to spot loose hardware. However, you can often identify loose bolts by chipped or missing paint around the bolt head and bare metal at the base of the bolt head. If you find a loose bolt, tighten it. If a bolt is missing, or if a damaged bolt, nut or screw is discovered, report it to Organizational Maintenance.

- FRAYED ELECTRICAL WIRES AND LOOSE CONNECTORS. Electrical wiring should be checked for cracks due to aging or adverse weather conditions. Tighten loose clamps and connectors. If exposed wiring or damaged connectors are discovered, notify Organizational Maintenance.

- FLUID LEAKS. Look for wear, damage and leaks under fluid hoses, lines and fittings. Make sure fittings and clamps are tight. Wet spots indicate leaks but stains around a fitting can mean a leak too. If a leak comes from a loose fitting or connector, tighten the connection. If a hose, fitting orconnectoris broken or worn out, report it to Organizational Maintenance.

It is necessary for you to know how fluid leakage affects your vehicle. The following classification system defines the three types of leaks you will encounter while doing PMCS. Become familiar with the system so that you can determine the readiness status of your vehicle.

- CLASS I LEAK - Seepage of fluid (indicated by wetness or discoloration) not great enough to form drops.

- CLASS II LEAK - Leakage of fluid great enough to form drops, but not enough to cause drops to drip from the item being checked/inspected.

- CLASS Ill LEAK - Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

CAUTION

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

Class Ill leaks should be reported to your supervisor or Organizational Maintenance.

The section driver is responsible for doing all driver PMCS. Tasks assigned to the driver are indicated in "Crewmember Procedure" column.

The crewman is responsible for doing all crewman PMCS. Tasks assigned to the crewman are indicated "Crewmember Procedure" column.

PMCS tasks assigned to the Commander are indicated in "Crewmember Procedure" column. The Commander is always responsible for seeing to it that all PMCS tasks are completed; however he may assign his tasks, as necessary, to personnel who have no task assignments.

If anything is wrong with your vehicle and you cannot correct it, write it on DA Form 2404. In recording results of PMCS, use the number, listed in the "Item No." column of the PMCS, as a source for the "TM Number" column on DA Form 2404.

If a serious problem is discovered, report it to Organizational Maintenance.

Table 2-1. Preventive Maintenance Checks and Services for Model M992

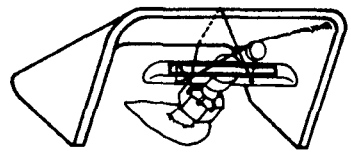
Item No.	Interval	Location Item to Check Service	Crewmember Procedure	Not Fully Mission Capable If:
1	Before	Vehicle Exterior	DRIVER Walk around vehicle. Check for any obvious leaks, missing items, or damage to equipment.	Any Class III leak found. Vehicle has damage or is missing items that would prevent operation.
2	Before	Subfloor Drain and Hull Plugs	DRIVER **CAUTION** **Do not ford if any drain plugs are missing.** Check all drain plugs and hull plugs for installation.	Any drain plugs or hull plugs missing.
3	Before	External Fire Extinguisher Handle	DRIVER Check to ensure handle is properly seated and laced. 	Wire seal broken, missing or extinguisher handle is pulled.

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER	
4	Before	Cooling System and Cooling Fans	a. Check radiator coolant level. Fluid should be at the filler neck top.	
			b. Check for leaks and serviceability of hoses, filler cap and gasket.	b. Class III leak exists.
			c. Check cooling fans.	c. Either cooling fan is missing, fin(s) broken or cracked.
			COMMANDER	
5	Before	Portable Extinguisher Bottle	Check the two portable fire extinguisher bottles in crew compartment to determine that they are properly sealed and mounted securely.	One or more fire extinguishers missing or damaged or seal is broken or missing.

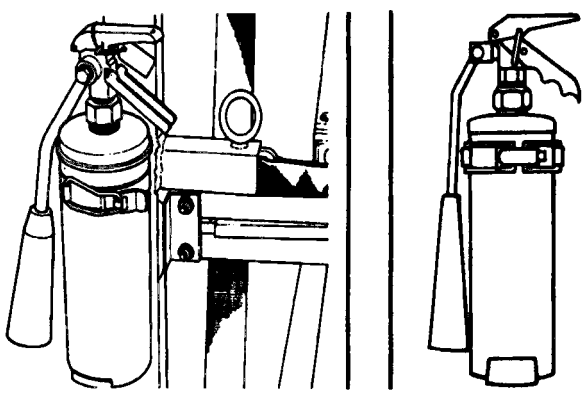


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location / Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER/COMMANDER	
6	Before	Engine Automatic Fire Extinguisher System	a. Perform the following checks at engine T/A panel. If indications below do not occur, troubleshoot engine AFES.	
			b. Maintenance switch must be in horizontal “POWER ON” position.	b. Maintenance switch in vertical “POWER OFF” position.
			c. Turn MASTER switch ON. POWER ON lamp on engine T/A panel should light.	c. POWER ON lamp not lit.
			NOTE Positions of lamps and SYSTEM TEST/LAMP TEST switch are the same for engine and crew T/A panels.	

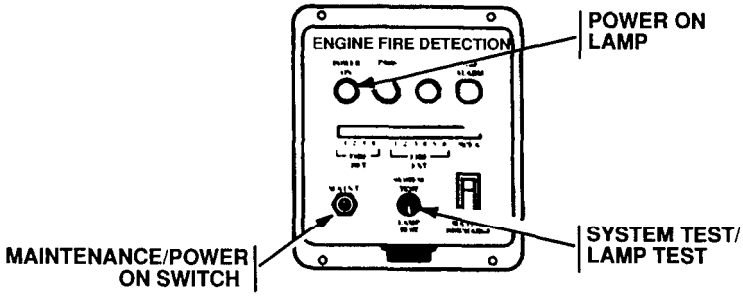


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
6	Before	Engine Automatic Fire Extinguisher System Continued	DRIVER/ COMMANDER **NOTE** The Engine AFES automatically goes through the BITE test cycle.	
			d. Observe PASS TEST lamp. It lights 4-6 seconds upon successful completion of BITE test.	d. PASS TEST lamp does not light.
			e. Observe that FAULT lamp does not light.	e. FAULT lamp is lit and one or more LED's are lit.
			f. Check AUTO and MANUAL extinguisher LED's. LED's should not be lit.	f. FAULT lamp is lit and one or more LED's are lit.

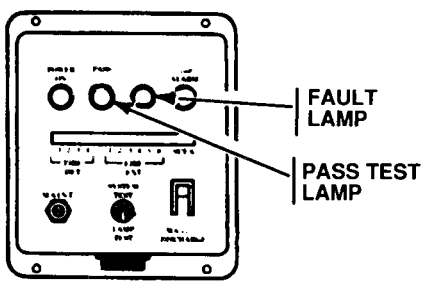


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
6	Before	Engine Automatic Fire Extinguisher System Continued	DRIVER/TC g. Position SYSTEM TEST/ LAMP TEST switch to LAMP TEST. All engine T/A panel lamps and LED's should light. In vehicles 345 and above, RSI lamp should light. **NOTE** Positions of lamps and SYSTEM TEST/LAMP TEST switch are the same for engine and crew T/A panels.	g. Any AFES lamp/ LED does not light.

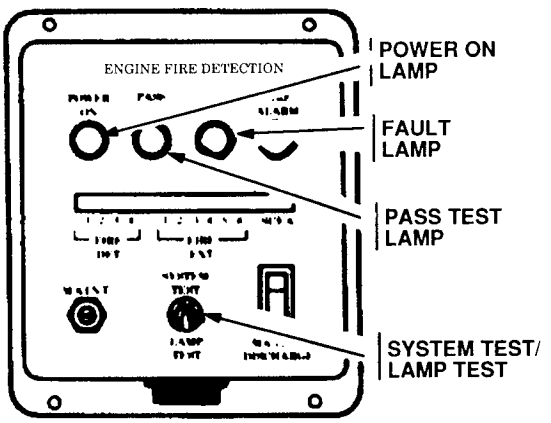


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			COMMANDER	
7	Before	Crew Automatic Fire Extinguishing System (AFES)	a. Perform the following checks at crew T/A panel. If indications below do not occur, troubleshoot crew AFES.	
			b. Maintenance switch must be in horizontal "POWER ON" position.	b. Maintenance switch in vertical "POWER OFF" position.
			c. Ensure Driver has turned MASTER switch ON. POWER ON lamp on crew T/A panel should light.	c. POWER ON lamp not lit.
			NOTE The Crew AFES automatically goes through the BITE test cycle.	
			d. Observe that PASS TEST lamp lights 4 – 6 seconds upon successful completion of BITE test.	d. PASS TEST lamp does not light.
			e. Observe that FAULT lamp does not light.	e. FAULT lamp is lit and one or more LED's are lit.

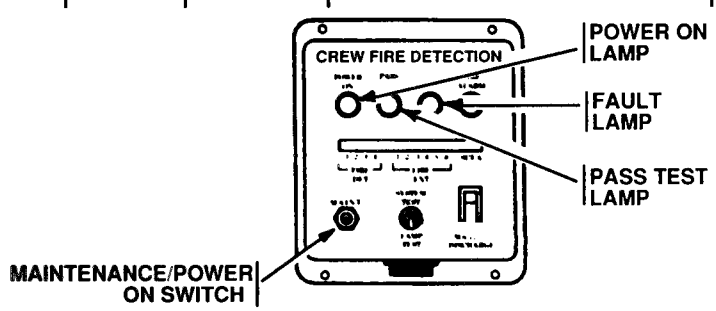


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			COMMANDER	
7	Before	Crew Automatic Fire Extinguishing System (AFES)	f. Check extinguisher No. 1 through No. 4 LED's on vehicles 1 through 344 or extinguisher No. 1 through No. 6 LED's on vehicles 345 and above. When any LED is lit, crew extinguisher cylinder in crew compartment is faulty.	f. FAULT lamp is lit and one more LED's are lit.
		Continued	g. Position SYSTEM TEST/ LAMP TEST switch to LAMP TEST. All crew T/A panel lamps and LED's should light. **NOTE** Positions of lamps and SYSTEM TEST/LAMP TEST switch are the same for engine and crew T/A panels.	g. Any AFES lamp/ LED does not light.

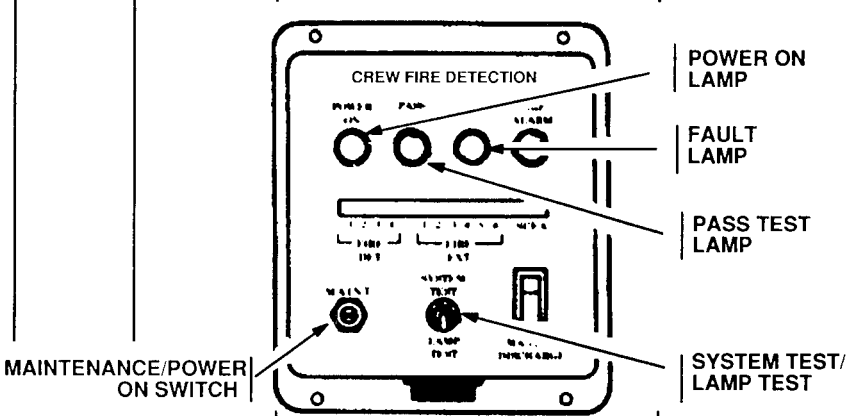


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER	
7.1	Before	Driver's Seat Assembly	Move driver's seat to several positions by operating driver's seat adjusting lever. When lever is released, plunger should seat into support and hold seat securely in position. Inspect adjusting lever, specifically the area that controls movement of the plunger.	Any indication that seat does not stay securely locked into position. Adjusting lever is broken or unserviceable.
7.2	Before	Accelerator Pedal	Check for smooth operation of accelerator pedal and missing or unserviceable accelerator pedal return spring.	Return spring is missing or unserviceable or accelerator pedal does not return to idle position after being depressed.
8	Before	Instruments and Gages	NOTE Vehicle may take longer to warm up depending on local climate. a. Start vehicle. Follow starting main engine procedures. Run engine at fast idle.	a. Engine will not start.

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location: Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER	
8	Before	Instruments and Gages (continued)	b. ENGINE COOLANT TEMPERATURE gage 170°F to 185°F minimum: 230°F maximum.	b. Coolant gage is inoperative or does not read within limits.
			c. ENGINE OIL PRESSURE gage 30 to 50 psi at fast idle.	c. Oil pressure gage is inoperative or does not read within limits.
			d. TRANSMISSION OIL TEMPERATURE gage 220°F to 240°F normal: 300°F maximum.	d. Transmission oil temperature gage is inoperative or does not read within limits.
			e. TRANSMISSION OIL PRESSURE gage 10 to 45 psi at fast idle.	e. Transmission oil pressure gage is inoperative or does not read within limits.

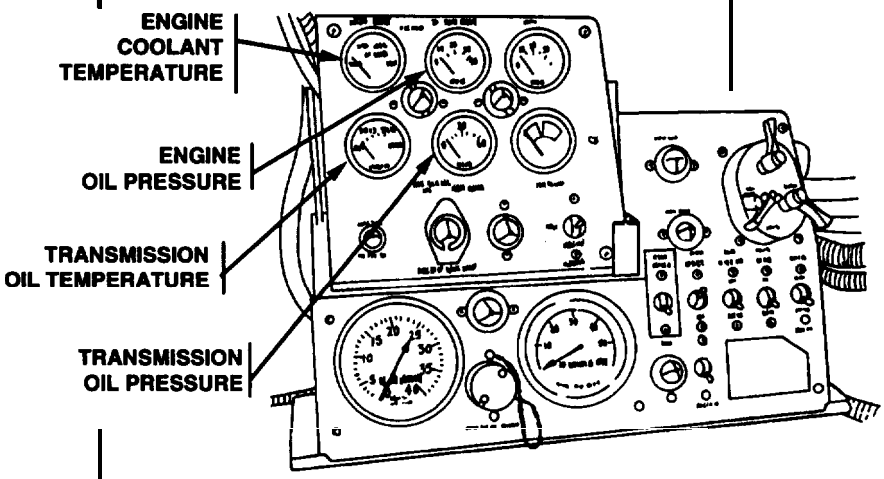


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER	
8	Before	Instruments and Gages Continued	f. BATTERY - GENERATOR Indication gage - green zone (charging).	f. Gage inoperative or does not read in green zone.
			g. TACHOMETER - Should operate without excessive fluctuation or unusual noises, at idle speed of 550 to 650 rpm.	
			h. Low COOLANT Level Warning Light - Press to test for proper operation.	h. Lamp missing or inoperative.

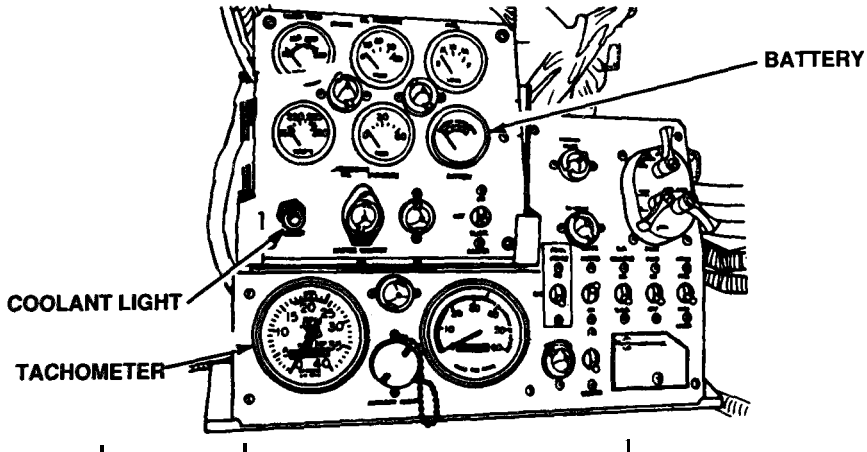


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			COMMANDER	
9	Before	.50 Cal, M2, Machine Gun	Mount weapon and perform PMCS IAW TM 9-1005-213-10.	
			COMMANDER	
10	Before	Intercom System	Check all controls and indicators for proper operation and PMCS IAW TM 11-5830-340-12	Communication is not possible between TC and driver.
			DRIVER	
11	Before	Parking Brake	Check parking brake operation.	Parking brake does not hold.
			DRIVER	
12	Before	Brakes	**WARNING** **Area must be clear of personnel before operating vehicle.** Check brake operation.	Locks up or binds; inoperative or intermittent, defective or out of adjustment,

Table 2-1. Preventive Maintenance checks and Services for Model M992

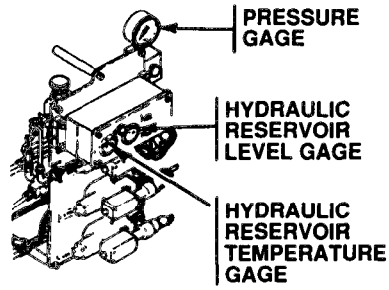
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
13	During	Steering	Check response to determine proper function.	Locks up or binds.
14	During	Power Pack	Check for unusual noises or vibrations. CREWMEN	Performance or function inadequate; unusual noises or vibrations; inoperative.
15	During	Hydraulic Gages/ Lines	Check gages for normal indication when operating hydraulic system.	
			a. Hydraulic pressure gage should measure 100 to 300 psi with either pump operating but no hydraulic actuators operating.	a. Hydraulic system gage reads below 100 or over 300 psi.
			b. Hydraulic Reservoir Temperature: Gage should not exceed 160° F during hydraulic system operation.	b. Temperature gage inoperative or exceeds 160° F.
			c. Hydraulic Reservoir Level Gage should read in the green range.	c. Reservoir level gage does not read in green range.
			d. Hydraulic Lines and Hoses: Check all hydraulic lines, hoses and connectors for any leaks.	d. Any Class III leaks.
				

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
16	During	Upper Rear door Mechanical lock	CREWMEN Check operation of upper rear door. Make sure mechanical locking device properly engages at 45-degrees and 90-degrees positions.	Safety latch is broken or missing.

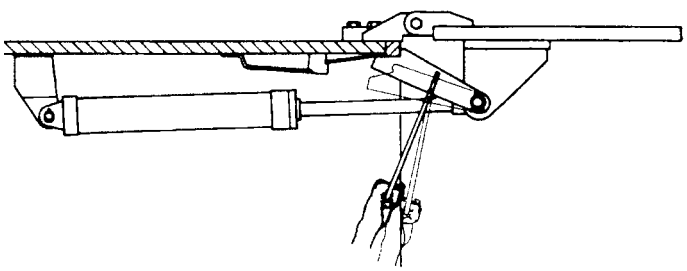


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
17	During	Conveyor	CREWMEN **WARNING** • **Make sure footing is firm and deployment area free of obstructions. When pulling conveyor-deploying handles, be prepared to move quickly - after conveyor begins to move it moves rapidly.** • **Keep fingers clear of telescoping rods and section hinges when deploying conveyor.** • **Make sure door is positioned at 120" from closed. This will help control speed of deployment.** **NOTE** Check tension prior to starting motor.	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			CREWMEN	
17	During	Conveyor Continued	Check conveyor chain tension. Tension is correct when top of plastic and steel conveyor pads are vertically alined with chain tension indication. If conveyor pads hang no lower than bottom of indicator, no adjustment is necessary. Listen for unusual noises made by conveyor motor. If motor grinds, shut down conveyor hydraulic circuit and operate manually.	Conveyor inoperative manually and hydraulically.

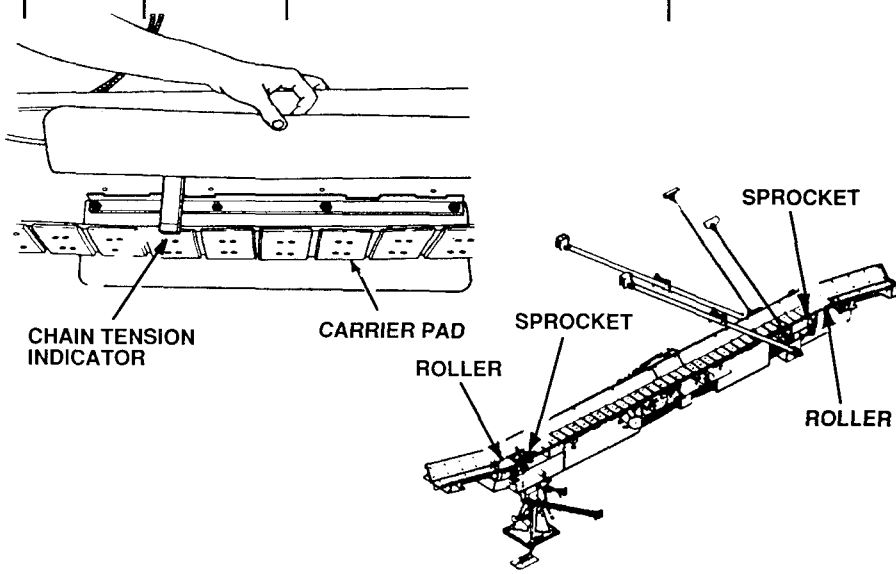


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
18	During	Stacker	CREWMEN Check stacker chain tension. Estimate a point midway between upper and lower sprockets. At this midpoint, try to press the two vertical lengths of chain together with your fingers. Chain tension is correct when chain midpoints just meet with no slack remaining. Adjust chain tension if necessary. Listen for unusual noises made by stacker motor. If motor grinds, shut down stacker hydraulic circuit and operate manually.	

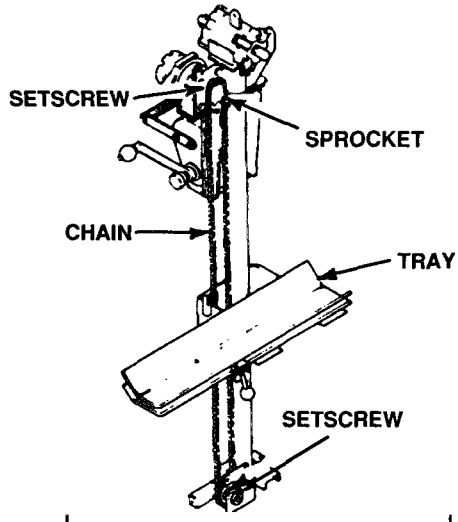


Table 2-1. Preventive Maintenance Checks and Services for Model M992

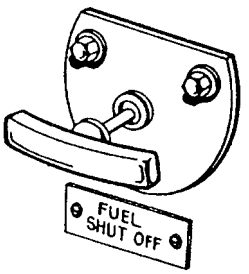
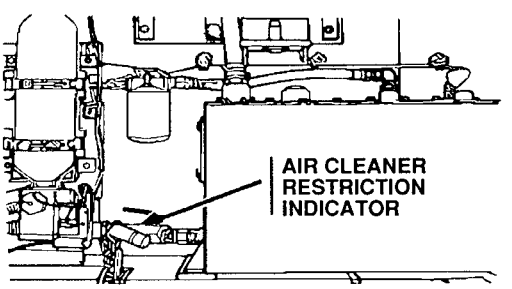
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
19	After	Fuel Shut-Off Cable	CREWMEN Check for proper operation.  	Fuel shut-off cable is broken or unserviceable.
20	After	Air Restriction indicator	COMMANDER **NOTE** Air cleaners should be checked daily in dusty conditions. Check from top hatch. Check air cleaner restriction indicator for green. If red, clean and service air cleaner filter packs as needed.	Air restrictor indicator cracked or unserviceable.
			 	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

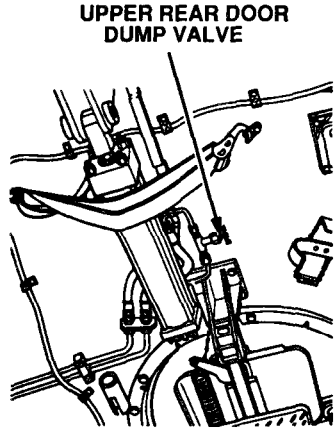
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
21	After	Upper Rear Door Dump Valve	CREWMEMBER Check upper rear door dump valve to make sure that it is closed (fully clockwise).  	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
22	After	Machine Gun Cal, .50	COMMANDER **WARNING** **Check that machine gun is clear of ammo and barrel is free of obstructions.** a. Disassemble, clean and lightly lube, perform PMCS IAW TM 9-1005-213-10. **CAUTION** **Never pull back bolt assembly with the safety on "S". The safety assembly will be damaged.** b. Reassemble and check for ease of operation.	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
23	After	APU Oil Level	DRIVER Open APU front door and check APU engine oil level. Add oil to bring level up to full (F) mark on dipstick. Add or drain as needed.	
24	After	APU Fuel Filters	DRIVER Turn MASTER switch ON and turn APU FUEL SHUT OFF switch ON. Drain first the primary and then the secondary APU fuel filter until contaminants are removed. Turn MASTER switch OFF and turn APU MASTER SHUT OFF switch OFF. Inspect fuel lines and hoses for damage, leaks and loose connections.	Class III leak exists.

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER	
25	After	APU Engine Air Passages	Check that air passages are free of dirt and debris. Inspect for clogging in louvers in front and side doors. Open APU front and inspect fan for dirt, debris or damage.	
			DRIVER	
26	After	Primary and Secondary Fuel Filters	Open bottom draincocks and drain water until clear fuel flows from filters. Close draincocks. Turn on fuel prime switch for 45 seconds before starting vehicle to purge fuel filters.	Any Class III leak.

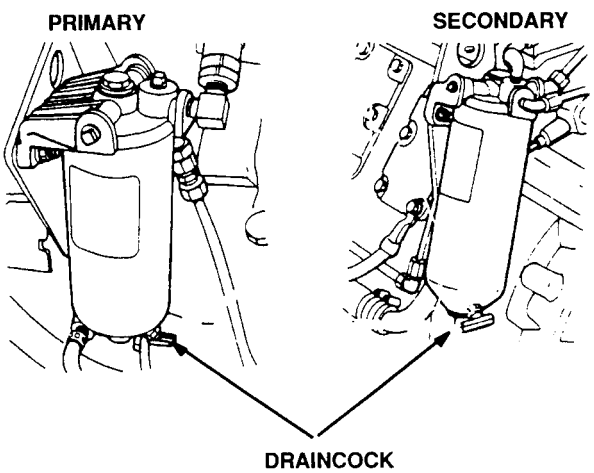


Table 2-1. Preventive Maintenance Checks and Services for Model M992

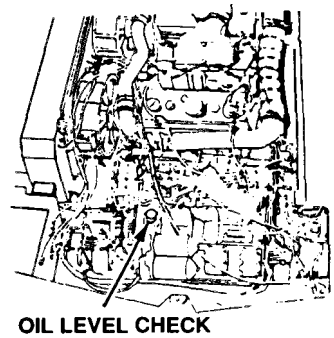
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
27	After	Final Drive U-Joints	DRIVER a. Inspect left and right final drive U-joints for presence and security of lacing wire. b. Check for oil leaks.	a. Any U-joint bolt is loose or missing. b. Class III leak exists.
28	After	**Transmission** Oil Level	DRIVER Check oil level; level should be within the "OPERATING RANGE" stamped on dipstick. Add or drain oil as required with OfE,/HDO. **CAUTION** **Power train assemblies must use OE/HDO-10 (MIL-L-2104) while under warranty.** **NOTE** **New** transmissions are delivered with preservative PE-10-1. Until first scheduled oil change, maintain proper oil level by adding OE/HDO or OEA.  OIL LEVEL CHECK	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
29	After	Engine Oil Level	DRIVER **NOTE** Make engine oil level check with vehicle on level ground if possible. Oil level will take approximately 20 minutes to stabilize in engine crankcase. After 20 minutes, check oil level; it should be within the "OPERATING RANGE" stamped on dipstick.	

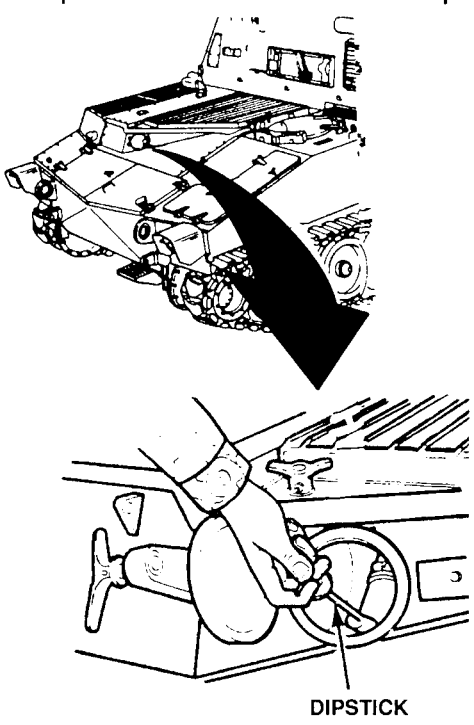


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
30	After	Track Adjuster	CREWMEMBER Check for bent or broken track adjusters. The track adjuster has reached its maximum extended limit at 3.50 inches (8.89 cm).	Track adjuster is bent, broken, or beyond maximum limits.

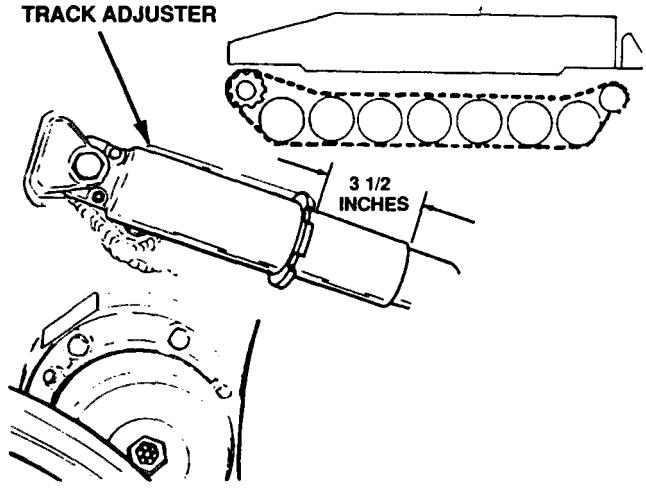


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
31	After	Track Tension	CREWMEMBER Move vehicle back and forth several times on level ground. Coast to a stop without braking. Place transmission in neutral. Turn off engine. Measure distance between top of the third roadwheel and the track. The distance should be 1/4 inch (0.63 cm). If not, adjust track tension. **CAUTION** **When increasing track tension, do not let track adjuster extend beyond 3-1/2 inches (8.89 cm).** To increase track tension, pump grease (GAA) into clean fitting on track adjuster until correct tension is obtained.	Track tension will not adjust.

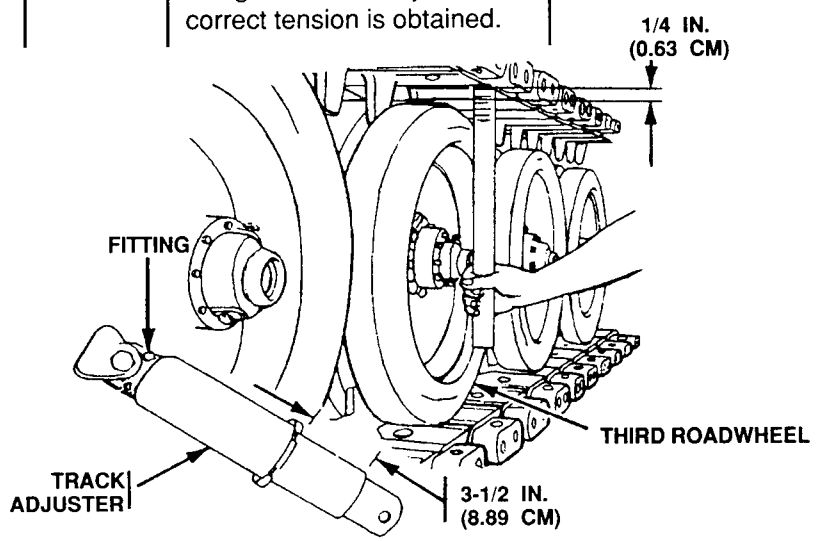


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
31	After	Track Tension Continued	CREWMEMBER **NOTE** • When measurement has reached 3.50 inches (8.89 cm) this means track adjuster has reached its maximum limit. Remove one shoe and re-adjust track tension. • If track sag cannot be taken up, decrease track tension; remove track shoe and adjust. **WARNING** **Lubricant is under high pressure. Loosen bleed plug slowly to avoid injury to personnel.** To decrease track tension, open bleed plug on track adjuster and reduce pressure until tension is released. Tighten plug and wipe away excess grease.	Track tension will not adjust.

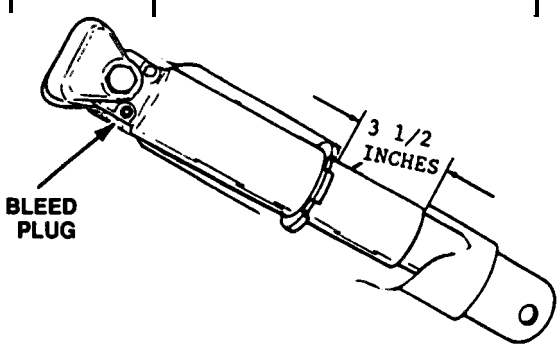
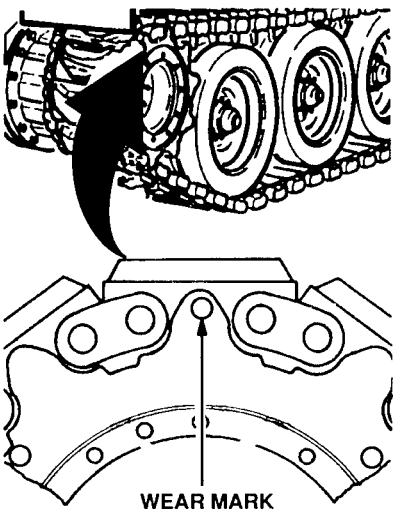


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER/CREWMEMBER	
32	After	Sprockets	a. Check sprockets for cracked, broken and missing teeth and loose and missing mount bolts to hub and carrier.	a. Any sprocket tooth is cracked, broken or missing. Any sprocket to carrier mount bolt missing or broken. Any sprocket carrier to hub mount bolt missing or broken.
			b. Check sprocket teeth for wear.	b. Sprocket tooth worn into wear mark edge.



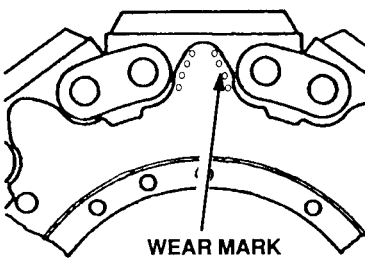


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER/CREWMEMBER	
33	After	Road Wheels and Idler Wheels	a. Check to make sure lug nuts are secure.	a. Two or more idler wheel mount nuts missing. Three or more roadwheel mount nuts on same hub missing.
			b. Check for loss of rubber, pitting, shrinking and separation of rubber from metal.	h. Missing, bent, warped or cracked roadwheel or idler wheel. Separation of 1-inch of rubber from metal surface around 3/4 of roadwheel and/or chunking that exposes metal extending 3 x 4 inches on wheel surface exists.
			c. Check for elongation of mounting bolts.	c. Mounting holes are elongated on any wheel.

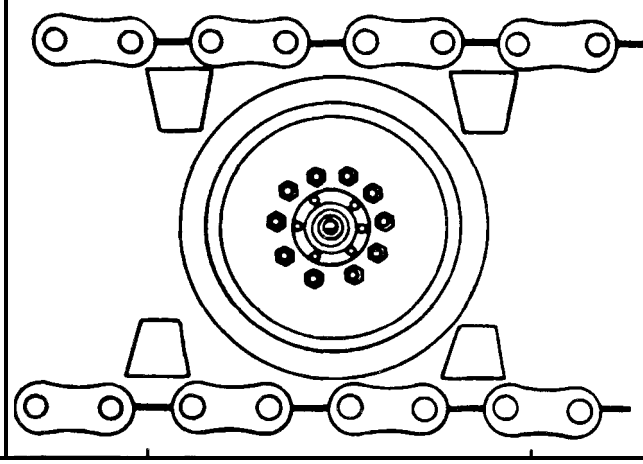


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER/CREWMEMBER	
			WARNING **Hubs may be hot.**	
34	After	Wheel Hubs And Shock Absorbers	a. Check for overheated hubs. After operation, touch all wheels hubs cautiously for noticeable temperature difference between components. An overheated hub indicates a maladjusted, inadequately lubricated or damaged bearing.	a. Wheel hub is overheating or any Class Ill leak.
			b. Check for proper oil level. Oil level should be visible half way up sight glass. Add oil ii needed.	
			c. Check lower end of shock absorber cautiously and check for temperature difference between hull area and shock absorber. If overheating occurs, notify unit maintenance.	c. Shock absorber broken, missing, inoperative or cold.
			NOTE If shock absorber is operating properly, it should be warmer than hull area around shock absorber.	
			If overheating occurs, notify unit maintenance.	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

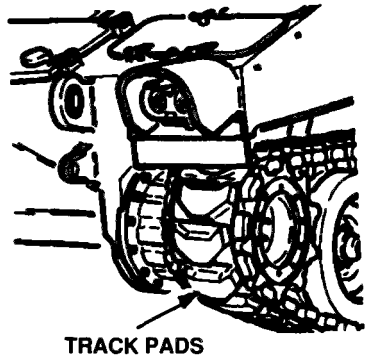
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
35	After	Track Shoes and Bush-ings	DRIVER/COMMANDER **WARNING** **If you lose a track (break a track shoe or vehicle throws a track), extreme caution must be exercised in maintaining control. Immediately release accelerator and let the vehicle coast to a stop. Do not apply braking action, i.e. brake pedal, laterals, pivot or any type of steering controls. This causes the vehicle to pull to the active or good track and could result in a rollover. If it is absolutely necessary, apply braking action only and we stress only, if the vehicle is approaching a ravine, a cliff, or if you perceive the outcome to be catastrophic, probably resulting in fatalities. When rollover is imminent, all crew members should immediately withdraw inside the vehicle, tighten seat belts and hold onto a secure fixture, until the vehicle comes to a complete stop.**	

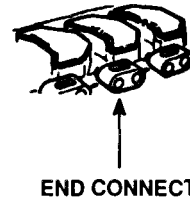
Table 2-1. Preventive Maintenance Checks and Services for Model M992

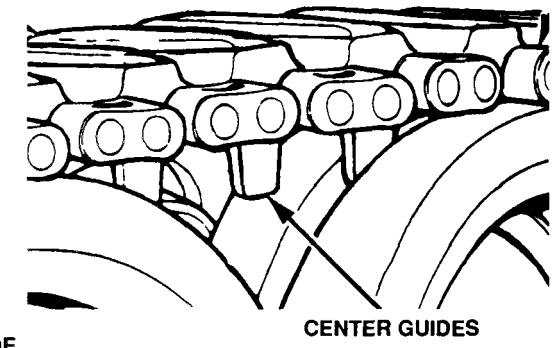
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
35	After	Track Shoes and Bushings Continued	DRIVER/COMMANDER a. Check track shoe for damaged pins, missing pin nuts and any unusual or uneven gaps between two adjacent track shoes which indicate worn bushings. **NOTE** Worn bushings are very difficult to locate. Worn bushings will cause the track pin to appear off-center. It may have protruding track pin or track pin nut and unusual gaps between two adjacent shoes. b. Check track shoe for damage. Report damaged track to unit maintenance. Damage ineludes cracked or broken shoe body, bent, broken or missing center guides, and chunked or missing roadwheel path rubber. **NOTE** Replace worn or missing track pads and track pad nuts.	a. Any one track shoe with worn bushing, protruding track Pin Or missing track pin nut. Any one bushing deemed unserviceable. Any track shoe bent, broken, or cracked. Any track pin is bent, broken or missing. b. Any one track shoe body bent, cracked or broken. Any one track pin bent, broken or missing.

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER/COMMANDER	
36	After	Tracks, End Connectors Center Guides, Track Pads.	Check for loose, missing or worn end connectors, center guides, track pads and wedge bolts.	Any missing or cracked end connectors, missing center guides, any wedge or wedge bolt missing.







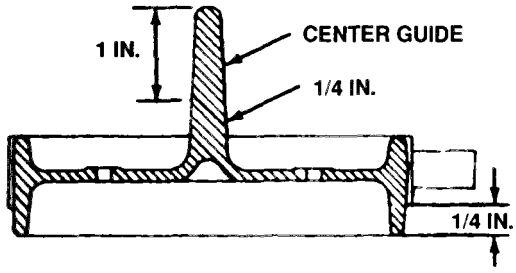
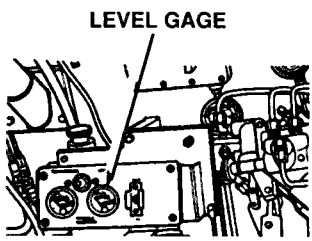


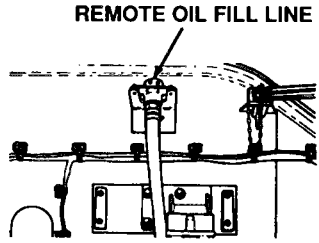
Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location / Item to Check/ Service	Crewmember / Procedure	Not Fully Mission Capable If:
37	After	Torsion Bars and Road Wheel Arms	DRIVER Check for bent, broken or missing road wheel arms and torsion bars. With crowbar, try to lift each road wheel. If any road wheel comes up easily, you have a broken or missing torsion bar. Report any broken or missing torsion bar to unit maintenance.	Torsion bar or road wheel arm is bent, broken or missing.

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
38	Weekly	Hydraulic Fluid Level	DRIVER/COMMANDER With MASTER switch ON, check HYDRAULIC RESERVOIR LEVEL gage. If necessary, add hydraulic oil through remote fill line to bring level up to F mark.	
39	Weekly	Manual Hydraulic Pump	DRIVER Operate pump to between 125-140 psi. Check for leaks.	Any leaks. Pump will not produce pressure.





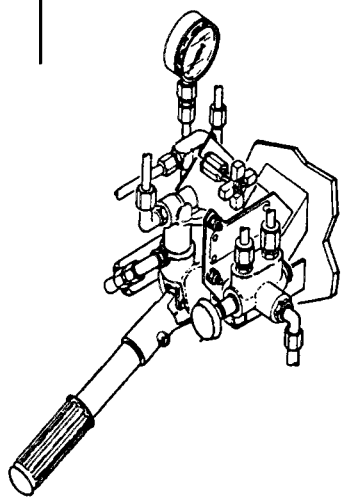


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER	
40	Weekly	Chemical Agent Detector Unit	**WARNING** **NBC contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.** Service detector unit. Replace reservoir fluid, change air filter only as needed. Perform PMCS IAW TM 3-666-225-12.	
41	Weekly	NBC System Air Purifier	Remove air inlet cover. With MASTER switch ON, turn VFPS power switch ON. Check motor for smooth operation. Check air outlets for air flow. Inspect filter assembly for dents, cracks, secure mounting or missing parts.	

VFPS POWER SWITCH

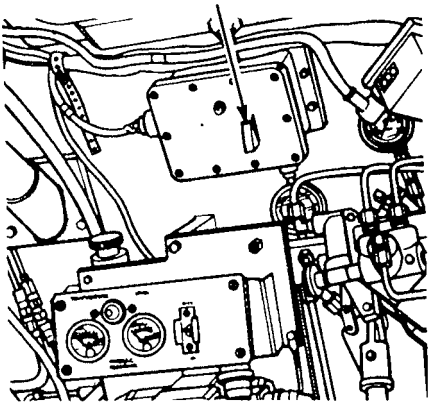


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check' Service	Crewmember Procedure	Not Fully Mission Capable If:
42	Weekly	Lights	DRIVER a. Check driving lights by turning driving lights switch on. Depress high-beam switch to make sure lights operate properly on high and low beams. b. Check HI BEAM indicator light, MASTER SWITCH ON indicator light. **NOTE** Driver will turn on lights and crew member will check for operation. c. Check that turn signals operate properly on both sides of carrier. d. Check stop light and taillights to see that they operate properly. Make sure lights brighten during braking. e. Check blackout drive-lights; Set main light switch lever to B.O DRIVE. Set I. R.-B.O SELECT switch to B.O.	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
42	Weekly	Lights Continued	DRIVER **WARNING** **Do not look directly into infrared lights. You may damage your eyes.** **Do not touch lens. You may burn your fingers.** f. Check infrared lights on both high and low beam. Do this by HOLDING YOUR HANDS OVER THE LENS, but do not touch the lens. If light is operating properly, you will feel heat.	
43	Weekly	Bilge Pumps	DRIVER **CAUTION** **Do not run bilge pumps for more than one minute dry, or more than 15 minutes wet without starting engine.** Check operation of each bilge pump. If a pump is dry, feel air outlet when pump is running.	Any bilge pump inoperative or missing.

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
44	Weekly	Batteries	DRIVER **WARNING** • **Lead-acid battery gases can explode. Don't smoke, have open flames or make sparks around battery, especially if caps are off. If gassing exists, notify Organizational Maintenance for removal and servicing.** • **Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short will result in instant heating of tools, damage to equipment, and injury to personnel.**	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER	
44	Weekly	Batteries Continued	Check electrolyte level. Check all connections for corrosion and ensure that the connections are tight. Refill batteries with distilled water, to bottom of split ring. After adding water run engine for 15 minutes.	A battery is missing or unserviceable or engine will not crank. Any loose cable or terminal. Any broken or cracked battery.

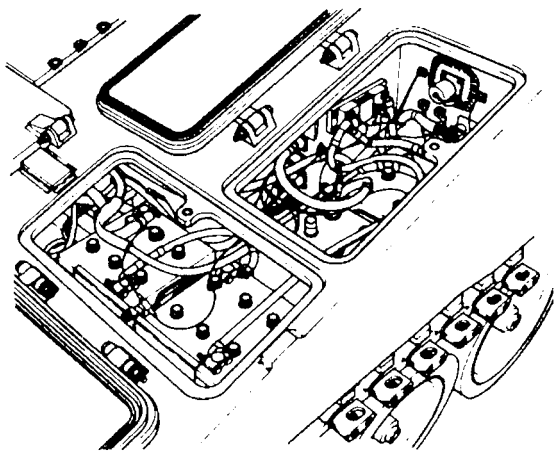


Table 2-1. Preventive Maintenance Checks and Services for Model M992

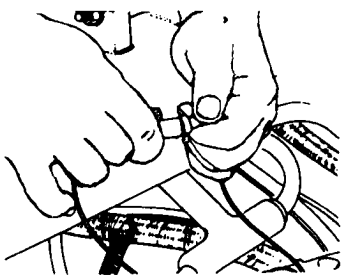
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
44	Weekly	Batteries Continued	DRIVER For those caps which have simplified test equipment combustion engine (STE/ICE), disconnect wire. Check that connections are tight and not corroded. Reconnect STE/ICE wire. Cap vents should be clean. Check for cracked batteries. 	
45	Weekly	Slave Cable	Check slave cable receptacles and caps for damage, burnt-out condition and corrosion (two locations).	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			COMMANDER	
46	Weekly	Doors, Hatches, And Latches	Check hatch/doors seals for looseness, tears or deterioration. Make sure that latches and doors lock securely in both open and closed position.	Driver or Commander's hatch will not lock open and/or closed. Rear door will not open or close or misaligned. Any hatch or door missing.
			DRIVER	
47	Weekly	Tow Pintle	Check pintle for proper operation. Inspect pintle for loose mounting bolts.	

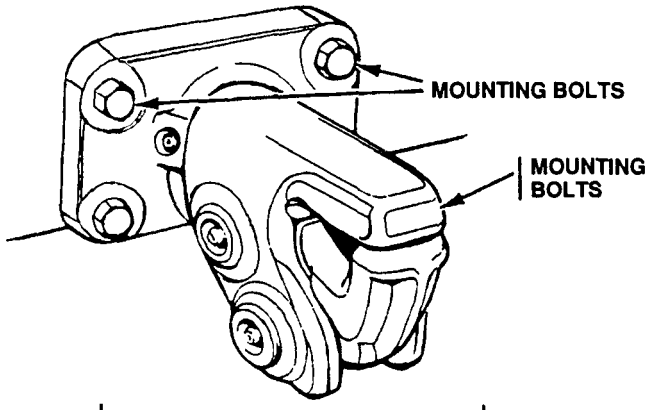


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location / Item to Check/ Service	Crewmember / Procedure	Not Fully Mission Capable If:
			DRIVER	
48	Weekly	M45 Periscope	**CAUTION** **Handle periscope carefully during removal to avoid damaging the frame and glass of the periscope.** Remove periscope by loosening two thumbscrews.	
			Check between carrier wall and periscope for dirt or moisture.	Any periscope over 50% vision obstrutted, missing or unserviceable.
			COMMANDER	
49	Weekly	M27 Periscope	Check for damage and cleanliness.	Any periscope over 50% vision obstrutted or missing.

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
50	Weekly	Personnel Heater	DRIVER/COMMANDER **WARNING** • **Do not operate personnel heater while vehicle is in motion.** • **if the heater operates improperly, fuel may overflow, causing danger of fire or explosion.** • **Be alert during heater operation for exhaust odors or signs of exposure to carbon monoxide. Carbon monoxide can kill you. if present shutoff the heater and ventilate the vehicle.** • **Explosive/flammable materials are a fire hazard. Do not store aerosol cans, solvents, fuel, etc., anywhere inside vehicle. Stow ammunition and powder in authorized stowage racks.**	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

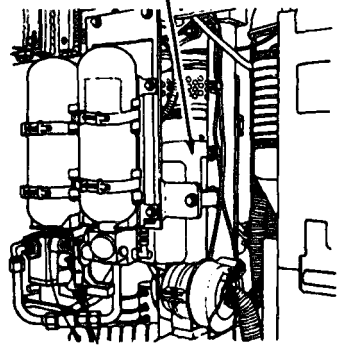
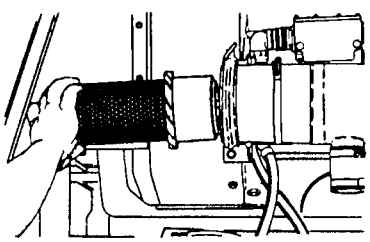
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
50	Weekly	Personnel Heater Continued	DRIVER/COMMANDER a. Start and operate heater (page 2-190). If heater does not start, notify Organizational Maintenance. b. Check crew/driver duct outlets for steady warm air output. If there is no warm air output, shut off heater and notify Organizational Maintenance. c. Check for evidence of fuel leakage by smell and looking at hull floor under heater area. PERSONNEL HEATER 	c. Any fuel leaks.
51	Weekly	APU Soundproof-Panels	**NOTE** No soundproof panel is required for forward wall. Open APU side door. Make sure soundproof panels are mounted securely.	

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
52	Weekly	APU Air Filter	DRIVER **CAUTION** **When assembling filter unit, make sure edge of cap marked TOP is positioned at top edge of canister.** Loosen filter cap clamp eyebolt. Remove cover. Remove filter wing nut and slide filter element from canister. Hold gasket end of filter element to light source. If light isn't visible through the element, service element. Remove rubber baffle from inside of cap. Empty dust from cap and wipe inside of cap with a clean damp cloth. Install baffle in filter cap. Reassemble filter unit.	
53	Weekly	Fatique Mats	COMMANDER Inspect fatigue mats in crew compartment for tears.	



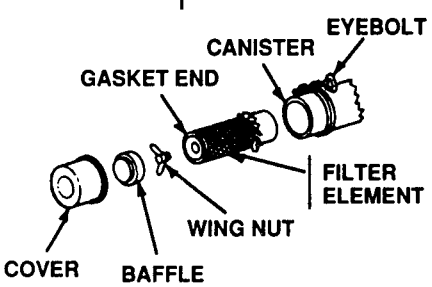
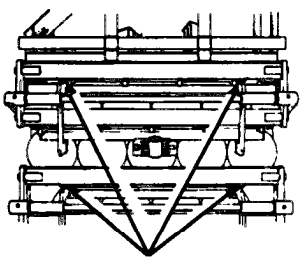


Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER/COMMANDER	
54	Monthly	Stowage Areas	Inspect all internal and external stowage boxes, stops, brackets, decals, shelves, nets, and restraints for damage. This is the duty of every crew member. Notify Organizational Maintenance if any damage exists.	
			COMMANDER	
55	Monthly	Projectile Racks	Remove projectile racks from against front wall of crew/cargo compartment. Inspect rack restraints for broken safety wire, loose or missing bolts. Check that rack-interlocking rods are not bent and are securely installed. Check that setscrew at each locking handle pivot is present and secure. Inspect locking bars for security. Reinstall racks.	Rack missing. Safety wire broken, loose or missing bolts. Rack interlocking rods are bent, cracked, or missing. Setscrew for locking handle missing. Locking bar will not lock.



LOCKWIRES

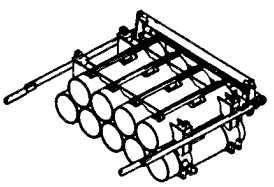


Table 2-1. Preventive Maintenance Checks and Services for Model M992

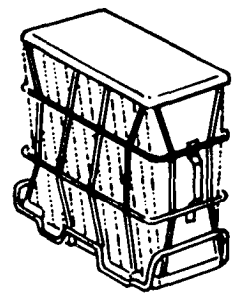
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER/COMMANDER	
56	Monthly	Engine Air Cleaner	a. Check air cleaner filter packs, page 3-28.	
			b. Check to see that access door closes and latches securely. Locking handles must be properly set for summer or winter.	b. Air cleaner doors, filter elements or hoses are missing. Air cleaner doors won't open or close properly. Any hose or filter torn or has hole.
			c. Blow filters out with low pressure air. Wash filters with warm water if needed. If washed, allow filters to completely dry before reinstallation.	c. Any evidence of leakage of unfiltered air into intake system.
			d. Check air filter doors, seals and hoses.	d. Any filter, hose or seal is missing or damaged.
				

Table 2-1. Preventive Maintenance Checks and Services for Model M992

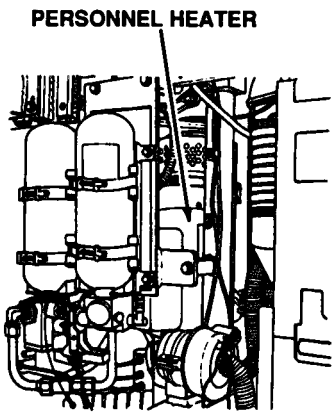
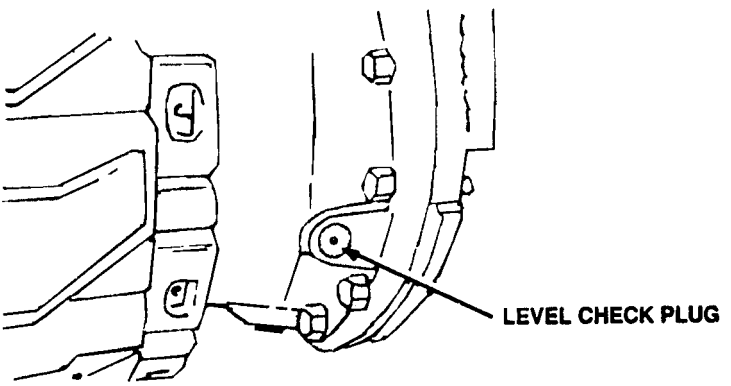
Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER/COMMANDER	
57	Monthly	Personnel Heater	a. Check personnel heater for signs of damage and fuel leaks.	a. Any fuel leak.
			b. Check all heater air outlets for obstructions.	
			c. Check all tubes, fuel filter, fuel pump and hoses for air and fuel leaks.	c. Any fuel leak.
				

Table 2-1. Preventive Maintenance Checks and Services for Model M992

Item No.	Interval	Location Item to Check/ Service	Crewmember Procedure	Not Fully Mission Capable If:
			DRIVER/COMMANDER	
58	Monthly	Final Drive Level	Remove level check plug. Oil should be level with bottom of opening. If not, add OE/HDO until oil flows from level plug opening. Clean and reinstall plug.	Any Class III leak.



Section III. OPERATION UNDER USUAL CONDITIONS

Assembly And Preparation For Use

Before operating anew or reconditioned vehicle, make sure Organizational Maintenance services the vehicle.

Initial Adjustment And Daily Checks

Perform the Preventive Maintenance Check and Services (PMCS) in Section II of this chapter to make sure that all adjustments and checks are completed.

Operating Procedures

Be familiar with all controls, instruments and procedures before attempting to operate the vehicle.

WARNING

- **Fasten the seat belt. Drive carefully. Take It easy until you can operate with skill.**
- **Protect your hearing. Due to high Intensity noise, hearing protection is required while operating vehicle.**
- **if a track is thrown while vehicle is moving, do not apply the brake; rather, allow vehicle to coast to a bait.**
- **Do not move vehicle until all latches and doors are secured and all equipment is properly stowed.**
- **Do not iook into blackout (infrared) light.**

CAUTION

- Never leave vehicle unattended while engine Is running.

- This vehicle does not have an automatic transmission. It must be shifted manually.

- To prevent overheating and damage of transmission and engine, observe the following precautions:

  - When starting from a halt, begin with transmission selector In Range 1.

  - Do not hold vehicle on an incline with transmission in gear.

  - Prior to shutting down engine, set hand throttle at 1000 to 1200 rpm for 3 to 5 minutes.

  - Run at idle for 1-3 minutes prior to shutting down engine.

  - Do not block engine air intake grille with camouflage or other materials.

  - Do not operate engine at idle for more than ten minutes. Using hand throttle at fast idle setting (1000 rpm) will help reduce engine overheating.

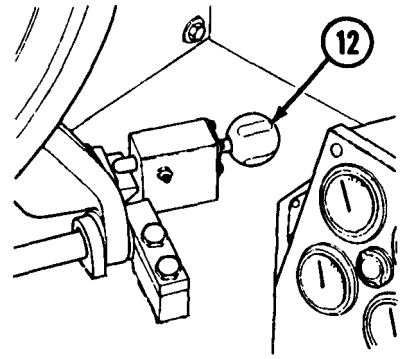
STARTING MAIN ENGINE

WARNING

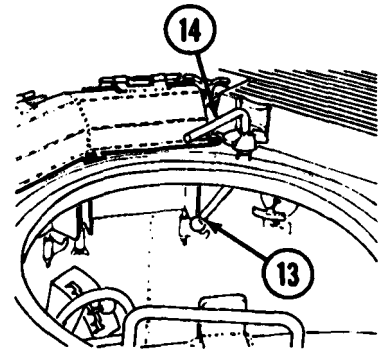
Whenever vehicle is operated with hatch cover opened, hatch cover must be locked.

1. Make sure that driver's hatch cover will lock in opened and closed positions. Lock driver's hatch cover in desired position.

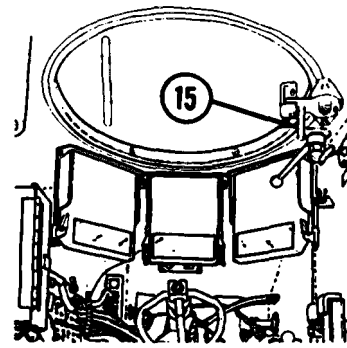
- Lock Opened. Engage hold-open lock (12) with latching pin positioned over flat portion of hatch cover locking tab.



- Lock Closed. With hatch cover closed, turn locking handle (13) to the rear to lock external hatch cover latch (14).



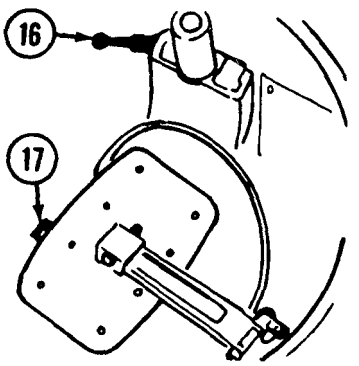
- Security Lock. To prevent entry from outside, push secu - rity latch handle (15) forward.



STARTING MAIN ENGINE - Continued

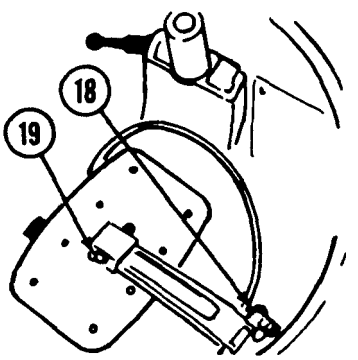
2. Adjust driver's seat as necessary.

- Adjusting up and down. Hold seat down and pull upon adjusting lever (16). With lever raised, lift or press seat to obtain correct height. Release adjusting lever to lock in position.



- Adjusting forward and backward. Pull up on adjusting tab (17) and move seat forward or backward. Release adjusting tab to lock in position.

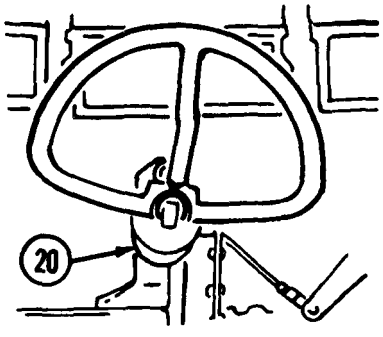
- Backrest positioning. Press pawl (18) and rotate backrest up and back. When backrest is positioned vertically, reposition pawl to lock backrest.



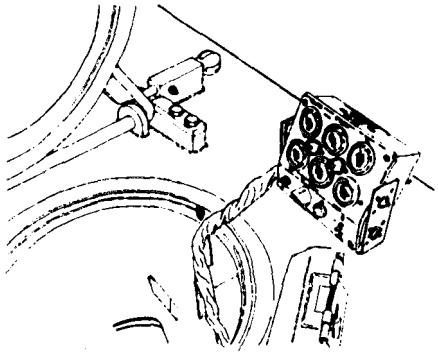
- Adjusting backrest height. Remove adjusting pin (19) and lower or raise backrest. When desired height is obtained, install pin in adjusting holes.

STARTING MAIN ENGINE - Continued

3. Adjust steering wheel by pressing sleeve bearing (20) forward and rotating steering wheel up or down. Raise wheel if driving with hatch open; lower wheel when driving with hatch closed. When correct adjusting is obtained, release sleeve bearing to lock position.



4. If driving in raised position, clip portable instrument panel into bracket (on top of hull just left of driver's hatch).

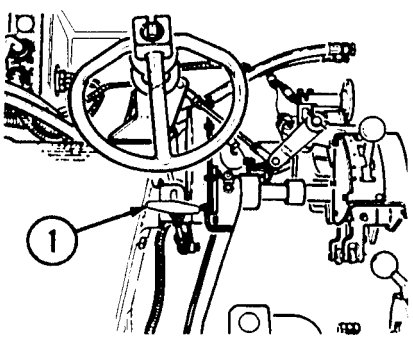


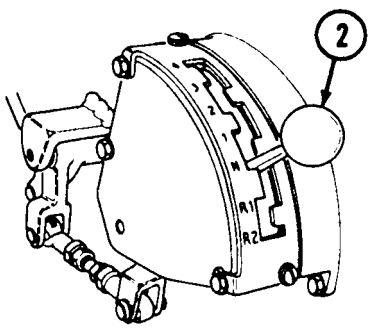
STARTING MAIN ENGINE - Continued

NOTE

Use following procedure for starting engine in normal temperature climates (+32°F). Refer to cold weather starting procedures when temperature is below 0°F, or if the engine will not start in moderately cold climates.

5. Set vehicle brake by pressing on service brake pedal and pulling out and down on BRAKE lock handle. Brake will be set when handle is released in this position.





6. Shift transmission selector lever (2) to N (neutral), and make sure it locks into position.

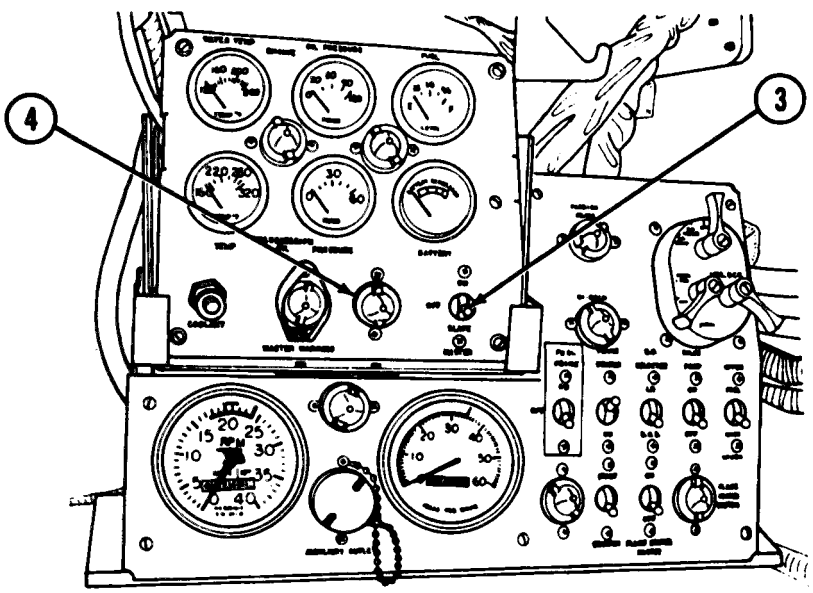
STARTING MAIN ENGINE - Continued

CAUTION

Before starting engine, you should check for hydrostatic lock. Intermittently actuate STARTER switch (with MASTER switch ON and FUEL SHUT OFF lever pulled out). The following symptoms Indicate hydrostatic lock:

- **Engine starts to turn over with starter, then stops.**
- **Starter sounds as if straining when engine Is cranking.**
- **Engine seems to bind.**

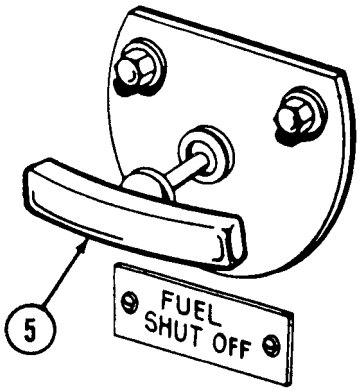
If you suspect a hydrostatic lock, stop cranking immediately and notify Organizational Maintenance.



7. Turn ON the MASTER switch (3). Indicator lamp (4) should light with MASTER switch ON.

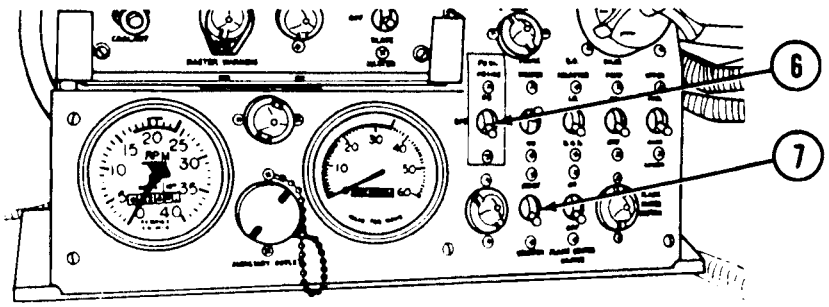
STARTING MAIN ENGINE - Continued

8. Pull FUEL SHUT OFF handle (5) to OFF position before checking for hydrostatic lock.
9. Check for hydrostatic lock by intermittently activating STARTER switch (with MASTER switch ON and FUEL SHUT OFF handle pulled out).
10. Release FUEL SHUT OFF handle (5).
11. Place throttle control lever to idle position.
12. If fuel filters have been drained since last start, hold FUEL PRIME switch (6) ON for 45 seconds. Release switch after allotted time.



WARNING

Protect your hearing. Due to high intensity noise, hearing protection is required when operating this vehicle.



CAUTION

Do not operate starter continuously for over 30 seconds. If engine does not start, allow l-minute cool-off period before again engaging starter. Notify Organizational Maintenance if engine fails to start on fourth try.

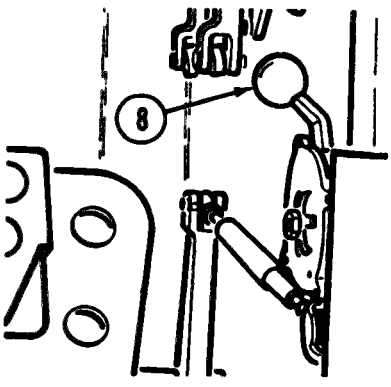
13. Push and hold engine STARTER switch (7) to START until engine starts. Do not operate continuously for over 30 seconds.

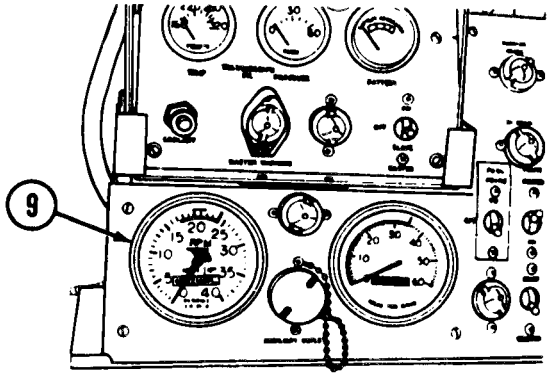
STARTING MAIN ENGINE - Continued

CAUTION

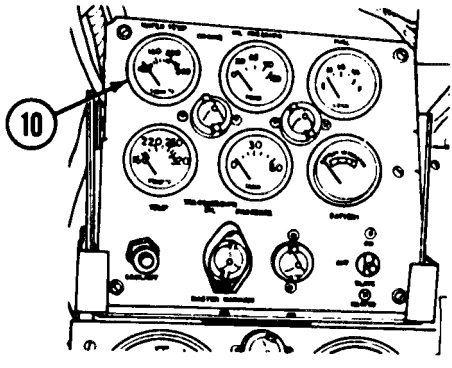
If you notice a shrill whine (above normal turbine whine), rubbing, unusual vibrations and/or sudden increase in exhaust smoke, shut off engine and notify Organizational Maintenance.

14. Set hand throttle (8) so that tachometer (9) reads 550 to 600 rpm. While engine is idling at this speed, watch ENGINE OIL PRESSURE gage. If engine oil pressure does not register 5 to 30 psi within 15 seconds of start, immediately pull FUEL SHUT OFF handle to stop engine, and notify Organizational Maintenance.





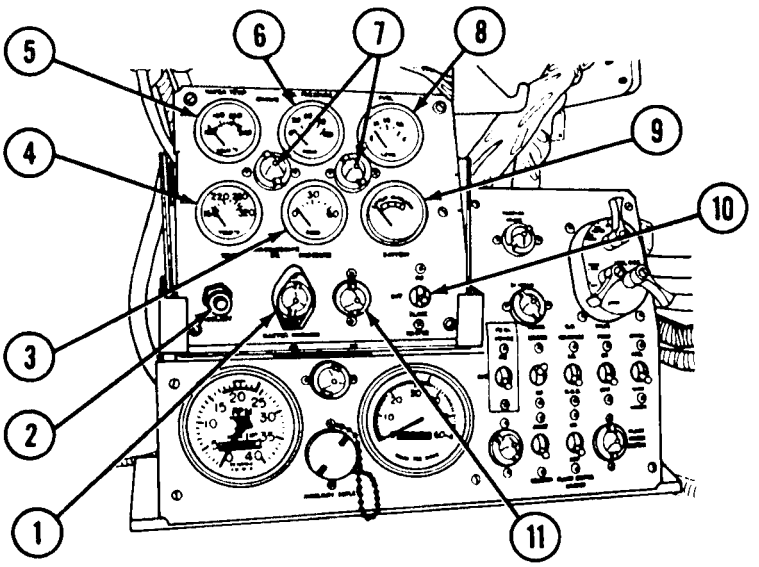
15. Idle engine for about two minutes; then adjust hand throttle (8) to set engine speed at 1000 rpm (fast idle) on tachometer (9). Continue to warm engine until ENGINE WATER TEMPERATURE gage (10) registers 170°F.



16. Perform instrument panel checkout procedures (p 2-83) during engine warmup.

PORTABLE INSTRUMENT PANEL CHECKOUT PROCEDURE

Frequently check the following gages and indicators to make sure vehicle power pack continues to operate correctly. If the following normal indications are not observed during this check, refer to troubleshooting section in Chapter 3. Troubleshooting procedures begin on page 3-5.



1. MASTER WARNING lamp (1) should go out after engine has run for 15 seconds.

CAUTION

If the MASTER WARNING lamp lights during operation, immediately check TRANSMISSION OIL TEMPERATURE gage, ENGiNE WATER TRANSMISSION gage, and ENGiNE OIL PRESSURE gage (steps 4,5,6, and 7, respectively) for readings in the normal ranges. if gage readings are correct, but iamp stays lit, notify Organizational Maintenance.

2. COOLANT level indicator lamp (2) should be OFF.

PORTABLE INSTRUMENT PANEL CHECKOUT PROCEDURE - Continued

3. Press COOLANT level indicator lamp (2) to check that lamp works.

4. TRANSMISSION OIL PRESSURE gage (4) should indicate 18-45 psi at 1835-1900 rpm. Minimum allowable pressure is 10 psi at 1000 rpm.

5. TRANSMISSION OIL Temperature gage (4) should indicate 220°F to 240°F. Maximum allowable temperature is 300°F.

6. ENGINE WATER Temperature gage (5) should indicate between 170°F and 185°F. Maximum allowable temperature is 230°F.

7. ENGINE OIL PRESSURE GAGE (6) should indicate between 30 and 50 psi at 1000 rpm and between 50 and 70 psi at 2100 rpm. Maximum allowable pressure is 70 psi.

CAUTION

If engine oil pressure Is below 30 psi at 1000 rpm, check Oil level.

8. Instrument panel lights (7) should be OFF at this time. Turn on lights, if desired,to illuminate portable instrument panel.

9. FUEL gage (8) should be near FULL mark at start of operations. If necessary, shut down engine and fill tanks.

WARNING

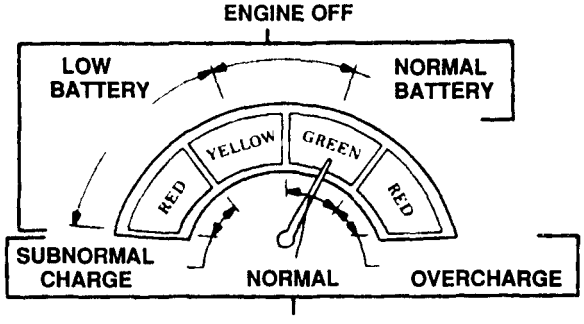
Never allow smoking or flame within 50 feet of fueling operations.

PORTABLE INSTRUMENT PANEL CHECKOUT PROCEDURE - Continued

11. BATTERY-GENERATOR indicator (9) needle should be in GREEN (normal) range.

CAUTION

If generator charging rate indicates subnormal charge or overcharge, notify Organizational Maintenance.



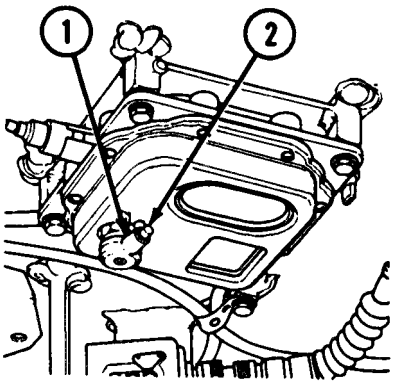
12. MASTER SWITCH (10) wiii be ON during vehicle operation.

13. Master indicator iight (11) should be on whenever MASTER switch is ON. If lamp does not light when switch is ON, or if iamp remains lit when switch is OFF, notify Organizational Maintenance.

OPERATION OF DRIVING LIGHTS AND DOME LIGHTS

Operation of Dome Light

1. For blue/green lamp ON, turn switch lever (1) fully clockwise.
2. For white lamp ON, press safety latch (2) and turn switch lever (1) counterclockwise past stop.
3. For both lamps OFF, position switch lever (1) in center position.

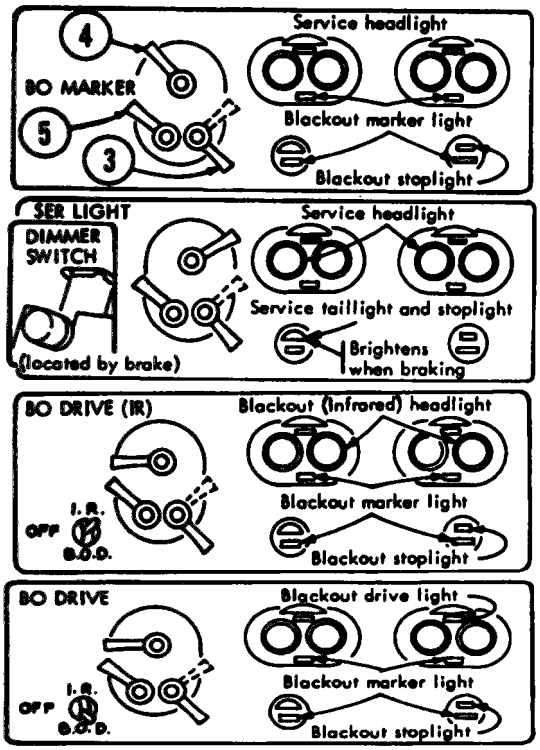


Operation of Light Switch Assembly

WARNING

To avoid eye Injury, avoid looking Into blackout infrared headlights. To check for operation, hold hand overhead-light lens; if blackout headlight is operating, heat will be felt.

The following panels show which lamps are turned on by different positions of main light switch.



1. Push up safety switch (3) to release main light switch (4). Release safety switch after main light switch is properly positioned.
2. Push up on instrument panel light switch (5) to turn on instrument panel lamps.

NOTE

Infrared lights operate on both high and low beams.

SHIFTING THE TRANSMISSION

The transmission is equipped with shift inhibitor which restricts movement of shift lever. This prevents downshifting of transmission until vehicle speed drops within correct operating limits for desired gear range.

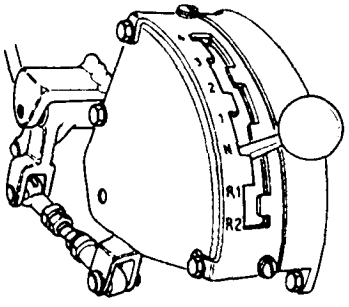
While downshifting, always brake vehicle to prevent vehicle speed from overrunning engine speed.

NOTE

Always shift to a lower transmission gear range when engine RPM is less than 1725.

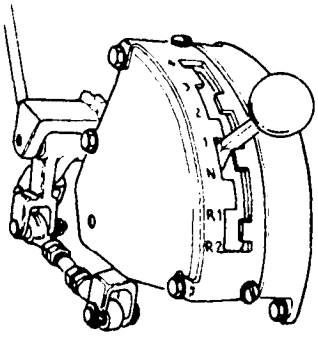
CAUTION

- **Never descend an incline with transmission In neutral.**
- **Do not hold vehicle on incline with transmission In gear; instead, lock brake and shift transmission to neutral.**



NEUTRAL (N) should be used when:

- Vehicle is stopped or parked.
- Engine is being started or shut down.
- Idling.

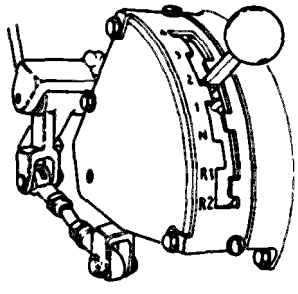


FIRST GEAR (1) should be used when:

- Setting vehicle in forward motion during field operation; upshift to higher gear when vehicle speed permits.
- Ascending or descending steep grades and on soft, muddy or rough terrain.

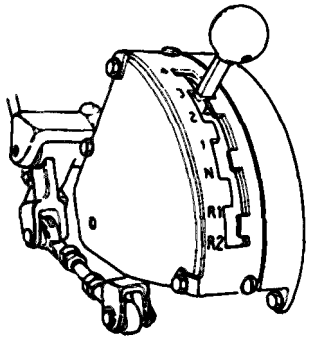
- Making short, forward radius turns. Short radius turns on hard surfaces should be initiated from a standstill. Top speed is 6 mph.

SHIFTNG THE TRANSMISSION - Continued



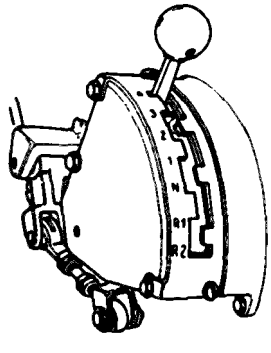
SECOND GEAR (2) should be used when:

- Towing heavy loads.
- Ascending or descending steep grades and on extremely muddy or rough terrain.
- Making forward short radius turns. Top speed-is 9 mph.



THIRD GEAR (3) should be used when:

- Vehicle is operating on hard surfaced roads until sufficient speed (12 to 15 mph) permits shifting to FOURTH GEAR range.
- Heavy pulling for sustained periods and for ascending or descending on long grades. Top speed is 24 mph.

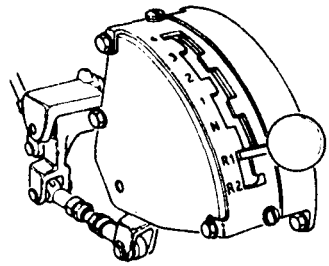


FOURTH GEAR (4) should be used when driving under normal conditions on firm, smooth, level ground. Top speed is 35 mph.

CAUTION

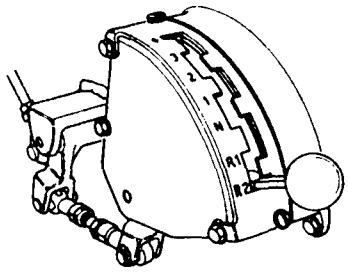
Never attempt to shift into reverse gear range unless vehicle is at stand still and engine is operating at idle rpm.

SHIFTING THE TRANSMISSION - Continued



1. REVERSE: SECOND GEAR RANGE (R1) should be used when:

- Backing up.
- Making turns with heavy loads, or on soft ground.
- Ascending steep grades backwards for maximum engine power. Top speed is 5 mph.



2. REVERSE: FIRST GEAR RANGE (R2) should be used when driving on level ground and hard surfaces when backwards movement for long distances becomes necessary. Top speed is 7 mph.

DRIVING THE VEHICLE

WARNING

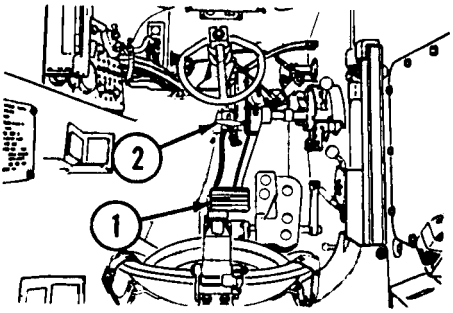
- Brake vehicle to prevent vehicle speed from overrunning engine speed. If vehicle speed overruns engine speed, you will not be able to downshift, and you may lose control of vehicle.
- Drive carsfully, especially if unfamillar with vehicle. Avoid over-steering and speeding on hard pavement; you could lose control of vehicle.
- Be sure driver's hatch cover is locked in either opened or closed position. To avoid injury to personnel, secure other covers, doors and hatches before moving.
- Make sure charge canisters, projectiles, fuzes and all other stowed items are securely restrained before moving vehicle.
- Never move vehicle without first receiving a signal from the ammunition team chief that all crew members are seated and that stowed items are secured. Always use seat belts while traveling.

CAUTION

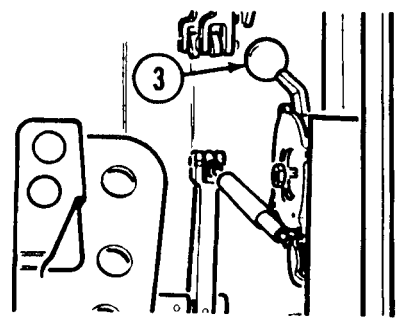
- Do not leave vehicle unattended while engine is running.
- When starting on a hill, depress brake and place transmission low "I" position. increase engine speed and release brake.
- Do not hold vehicle on an incline by using accelerator. Transmission overheating will result from this practice.
- Do not coast when descending grades; instead, downshift transmission.

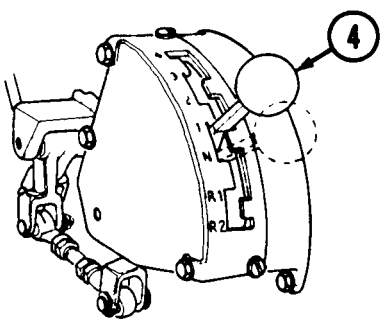
DRIVING THE VEHICLE - Continued

1. Press down on brake pedal (1) lift up and push in on brake lock handle (2) to release hand brake.

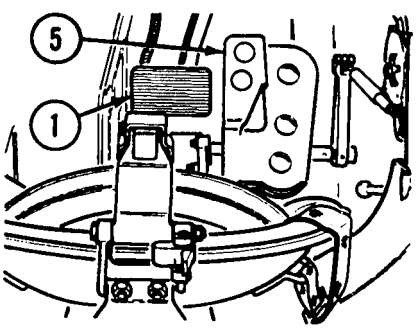


2. With brake (1) depressed and handle throttle control lever (3) adjusted to idle position, shift from neutral (N) to 1st (4).



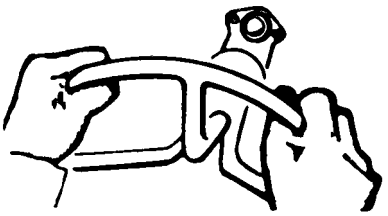


3. Release brake pedal (1) and push accelerator pedal (5) to obtain desired vehicle speed. Shift through intermediate ranges into desired speed range. See page 2-90 for transmission shifting instructions.

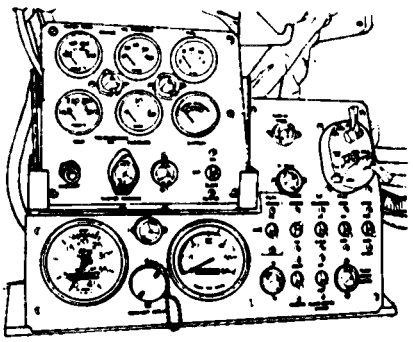


DRIVING THE VEHICLE - Continued

4. To turn the vehicle, turn steering wheel in the desired direction.



5. Frequently check tachometer and other instrument panel gages.



CAUTION

When engine speed isless than 1725 rpm, shift to lower range.

6. Perform during-operation PMCS.

CAUTION

- **Be sure to observe overhead and side clearances. When turning vehicle, allow ample clearance for corners of vehicle. When making sharp turns, shift to forward range 1 or 2.**
- **If vehicle throws a track, do not use the brake to stop; instead, stop accelerating and coast to a stop.**

DRIVING OVER ROUGH, SOFT OR HILLY TERRAIN

WARNING

- **To avoid vehicle damage and possible injury, approach obstacle head-on.**
- **Warn crew members to brace themselves.**
- **Hatches, doors and stowed items must be secured before proceeding over obstacle.**

1. Crossing a Ditch, Hole, or Trench. Apply brake and shift to low (1 (st) gear. When vehicle reaches bottom and starts to climb, depress accelerator for power needed to climb free of obstacle.

2. Driving Over Barrier. As vehicle approaches obstacle (21 inches maximum vertical height), release accelerator, apply brake, and shift to lower (1st) gear. Apply full power when starting over obstacle. Release accelerator pedal upon reaching crest, and permit vehicle to settle over it. Balance vehicle forward of the crest to begin descent. When front of tracks touch ground, add power and move on.

3. Starting Vehicle on an Upgrade. When vehicle is headed uphill, apply power before releasing brake to avoid rolling backward.

CAUTION

- **Do not use engine as braking source for a iong period of time. Transmission overheating will result from such practice.**
- **Using service brakes too long will burn them out. Release and apply brakes occasionally.**

4. Descending Steep Grades. Shift transmission into 1st gear and apply brake as necessary to slow vehicle.

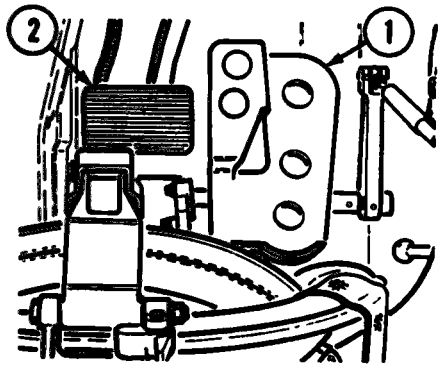
5. Driving In Loose Sand, Dirt, or Rocks. Shift into 1st gear and make series of short, gradual turns. This action will allow debris to be expelled from track.

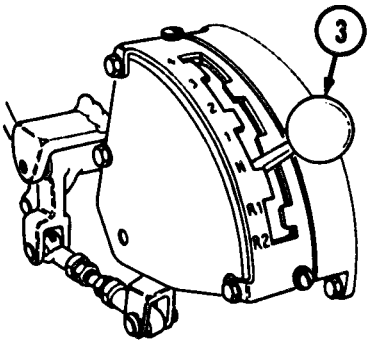
CAUTION

Making sharp turns in 1st gear may cause a track to be thrown.

STOPPING THE VEHICLE

1. Release accelerator pedal (1) and slowly depress brake pedal (2), until vehicle stops.

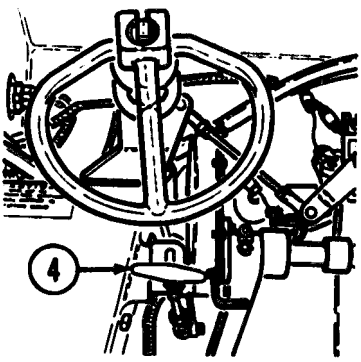




2. With brake pedal depressed, shift lever (3) into neutral, and pull parking brake lock handle (4) out and down. Release brake pedal.

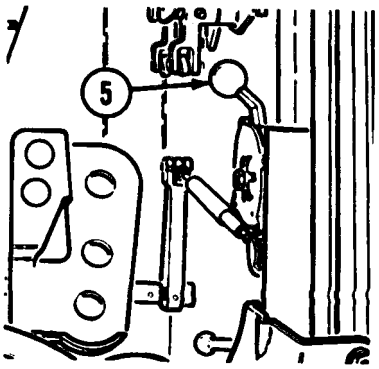
CAUTION

Failure to observe following procedures when shutting down the engine may result in engine damage.



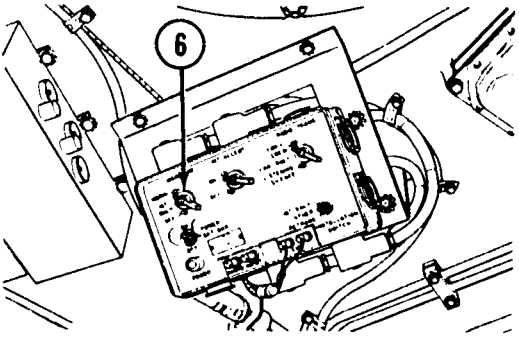
3. Set throttle control lever (5) to run engine at 1000 to 1200 rpm on the tachometer. Run engine at this speed for 5 minutes or until coolant temperature measures 185°F or less.

4. Set throttle lever (5) forward to return engine to normal idle (550 to 600 rpm). Idle 1-3 minutes before engine is stopped.



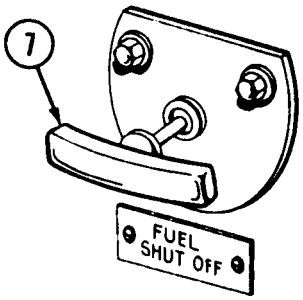
STOPPING THE VEHICLE - Continued

5. Turn OFF communications switch (6).



6. Turn OFF all light switches and accessory switches in driver's compartment and crew/cargo compartment.

7. Pull out FUEL SHUT OFF handle (7) to stop engine.

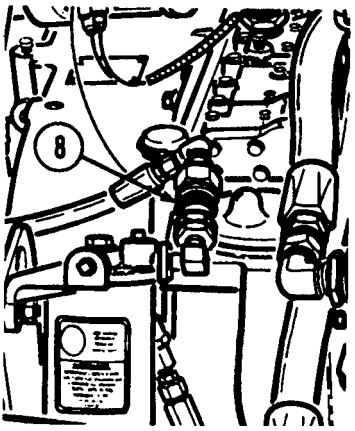


NOTE

If engine doesn't stop, disconnect main fuel inlet line at quick-disconnect connection (8) in engine compartment. Notify Organizational Maintenance.

8. Turn MASTER switch OFF.

9. Do after-operation PMCS.



BACKING THE VEHICLE

WARNING

For the safety of personnel in the area when backing, position two ground guides who can clearly see each other, with one being able to see the driver, the other able to see area behind vehicle. if necessary, one on-board guide, using a CVC helmet, can direct the vehicle back using VIC 1 intercommunication with driver.

Backing with Two or More Ground Guides.

1. Ground guides must be positioned so they can see obstructions behind the vehicle, and can relay backing instructions visually to the driver.
2. Ground guide at rear of vehicle will check vehicle path and manually signal backing instructions to front guide.
3. The front guide wiii relay backing instructions to driver.
4. Driver will back vehicle slowly, according to instructions.

BACKING THE VEHICLE - Continued

Backing with One On-board Guide

1. Open rear doors (p 2-135 and 2-136).

2. Driver and guide will connect CVC helmet cables to control box receptacles and switch on intercommunications equipment. Guide must use control box just inside vehicle rear doorway.

3. Driver and guide wiii establish intercommunications via communications equipment.

WARNING

For the safety of personnel in the area, if communications are interrupted during backing operations, driver must stop vehicle.

WARNING

To avoid damage to the upper rear door and injury to personnel in the area, ground guide must always consider rear clearance of opened door when instructing driver.

4. From rear doorway, guide wiil check vehicle path. Guide will verbally instruct driver in backing vehicle.

5. Driver will slowly back vehicle according to instructions.

6. Guide and driver wili continue in this manner until backing operations are complete.

7. After vehicle is properiy positioned, turn off intercommunications equipment; remove and stow CVC helmets.

TOWING OPERATIONS

NOTE

The M992 is authorized to tow only one vehicle at a time. The M992 is authorized to tow only when another vehicle is disabled, or when towing to start engine.

NOTE

In an emergency you can tow a vehicle for a short distance (not more than 1/4 mile) without disconnecting universal joints. Put shift lever in neutral position before starting towing operation. Do not tow disabled vehicle over 10 mph. Proceed as above, being extra careful not to accidently shift into gear.

Towing Precautions

The following precautions should be followed to ensure safety to personnel and to prevent damage to equipment:

- Vehicle engines will be shut off and brakes applied while tow cables are being connected or disconnected.
- An observer must be used to assist driver when rigging vehicle, and during towing operations.

TOWING OPERATIONS - Continued

Towing

WARNING

When tow bars or cables are used, a second vehicle is required when descending a grade of 20 degrees or more, or if road conditions require additional power. Do not exceed 10 mph.

CAUTION

When universal joints are disconnected, you can't steer or brake. Use tow bar only.

1. Disconnect universal joints as follows:

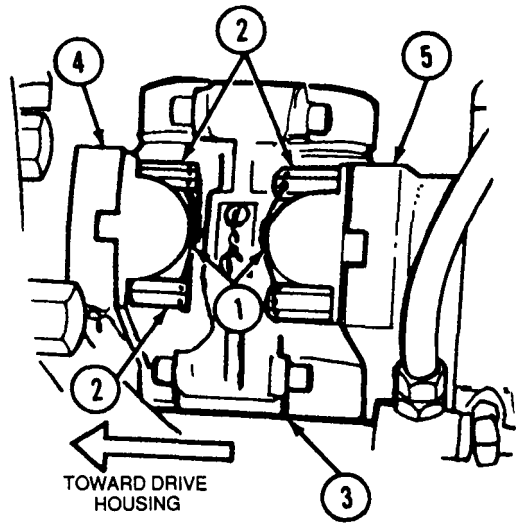
   a. Open right and left transmission doors.

   b. Cut lockwire (1) and remove eight screws.

   c. Pry spider (3) and flange (4) assemblies away from adapter (5). Move assemblies toward final drive housing as far as possible.

   d. Pry loose and remove spider assembly (3) from flange assembly (4).

   e. Remove flange assembly (4) from final drive shaft.



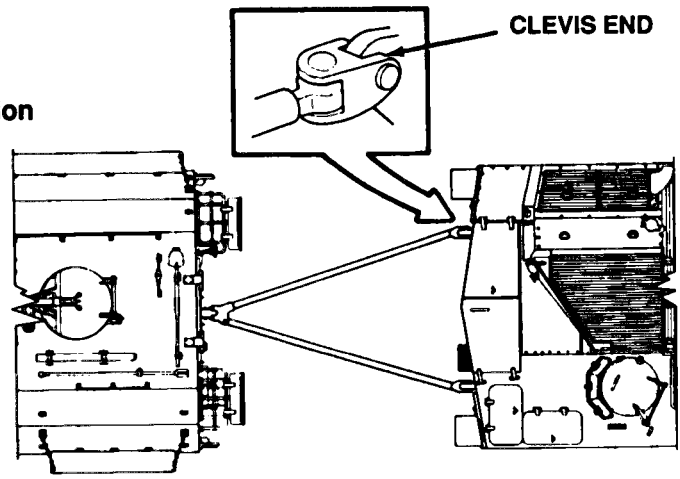
TOWING OPERATIONS - Continued

NOTE

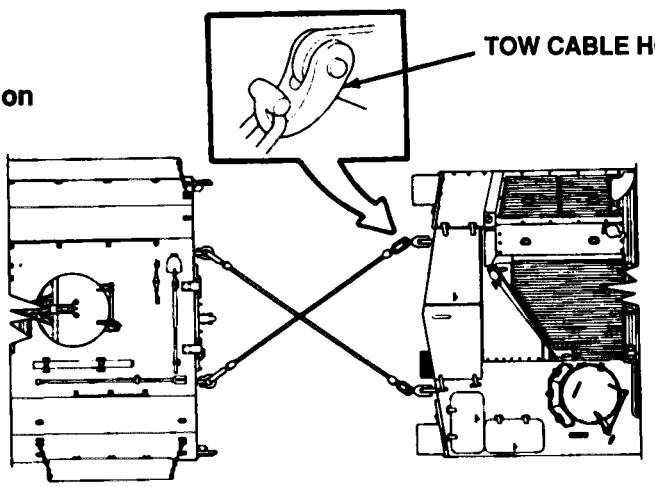
Check fluid level in final drive after installing assemblies. You can lose fluid with flange off.

2. Install tow bar or tow cable (TM 9-4920-496-10).

Tow Bar Installation



Tow Cable Installation



3. Shift into neutral.
4. Release brake and signal observer.

CAUTION

When towing, be sure to steer in a wide arc when turning to avoid collision.

Towing Vehicle to Start Engine

1. When M992 is towing to start an M109-family vehicle, M109 cab should be turned 180° to keep tube from striking M992.

2. Connect tow bar or tow cables.

3. Shift into 2nd.

4. Turn vehicle MASTER switch ON.

5. Depress brake pedal and release parking BRAKE LOCK.

CAUTION

Never depress accelerator pedal on towed vehicle.

6. Tow vehicle in straight line forward. Do not exceed 10 mph. Connect tow bar or tow cables.

7. After engine starts, shift to neutral and adjust hand throttle control lever to run engine at a fast idle (approximately 1000 rpm).

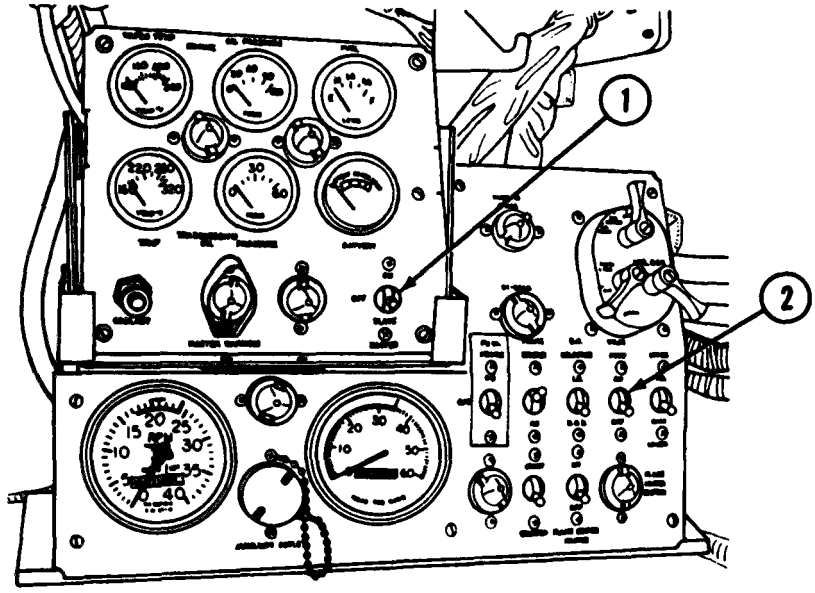
8. Disconnect towing vehicle.

OPERATING BILGE PUMP

To drain water out of engine compartment, turn MASTER switch (1) ON and turn BILGE PUMP (2) switch ON.

CAUTION

Do not operate bilge pump for more than 1 minute if dry, or more than 15 minutes if wet, without engine running.



COMMANDER'S SEAT

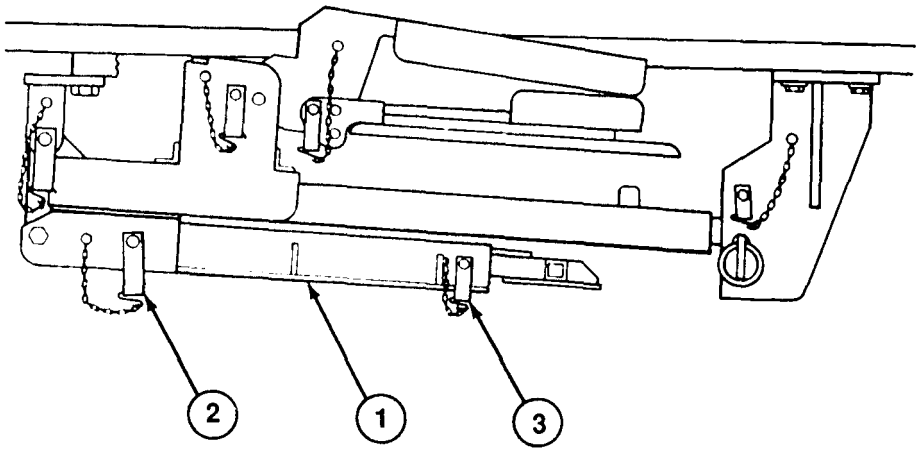
Deployment

WARNING

Always support footrest (1) before you remove quick-release pin (2). Failure to do this will allow footrest to swing freely, which could cause serious injury.

WARNING

Before deploying footrest, make sure quick-release pin (3) is securely positioned through holes In footrest tubes. If pin is not properly inserted, footrest will telescope when lowered and may cause injury.



NOTE

Stacker must be positioned to far right or far left of vehicle before seat deployment.

1. Support footrest (1) and remove quick-release pin (2). Slowly lower footrest and allow it to hang freely.

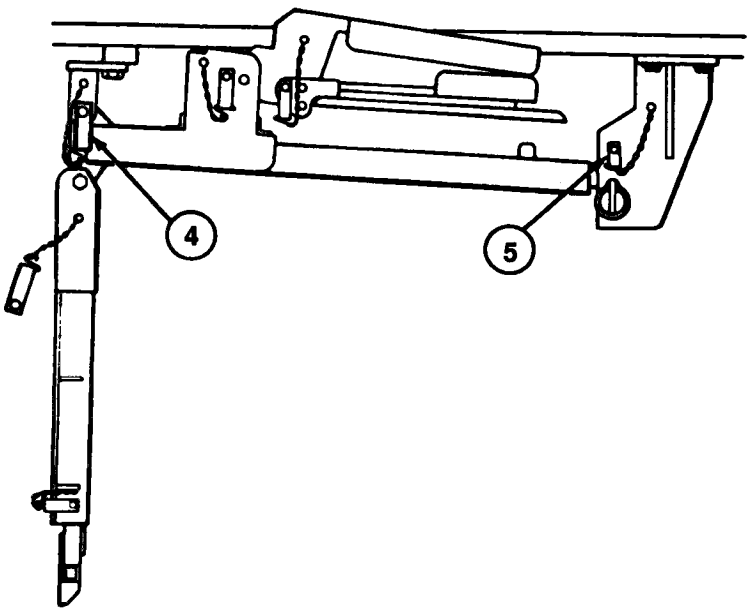
COMMANDER'S SEAT - Continued

WARNING

The commander's seat assembly is very heavy. it must be adequately supported before quick-release pin (4) is removed. Failure to do so may result in serious injury. Deployment of commander's seat shall always be a two-man operation.

2. Obtain an assistant to help support seat assembly and prevent footrest from swinging freely.

3. While suppotting seat post and footrest, remove quick-release pin (4) and then re move pin (5). Slowly lower seat assembly. Reinsert pin (5) into seat-stowage hole and pin (4) into support bracket.



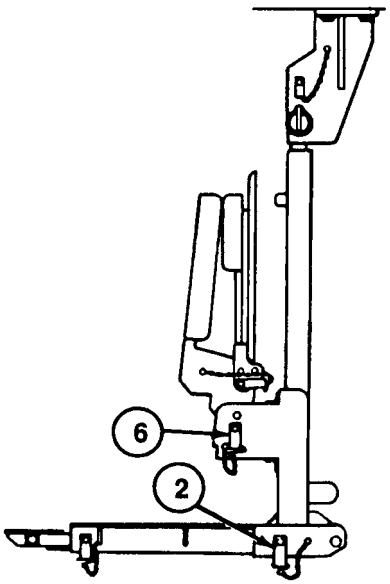
COMMANDER'S SEAT - Continued

4. Pivot footrest forward and up. Aline forward holes and insert quick-release pin (2).

WARNING

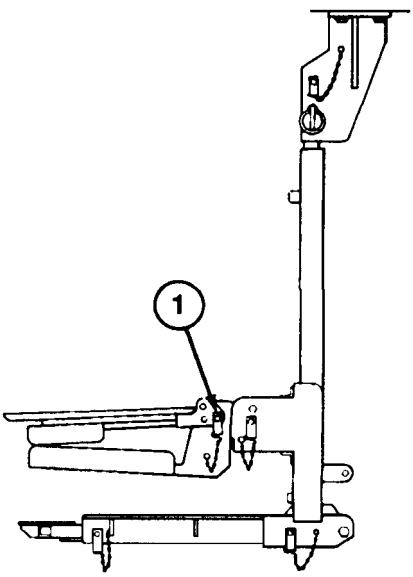
To avoid Injury, seat must be supported before removing quick-release pin (6).

5. Support seat and remove quick-release pin (6). Pivot seat downward. Aline holes and insert pin (6).



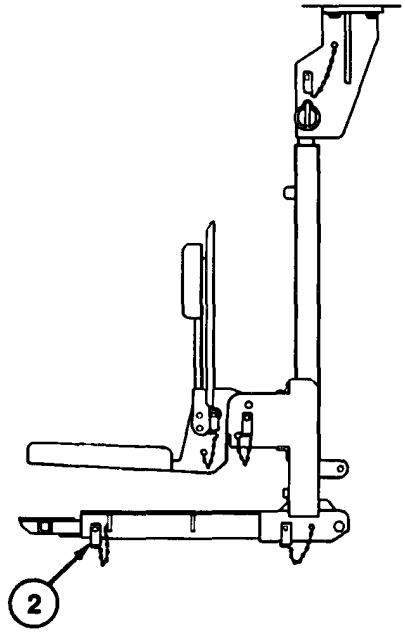
Adjustment

1. Backrest Adjustment. Remove quick-release pin (1). Rotate backrest up for sitting; down for standing. Aline pin holes and insert pin (1).



COMMANDER'S SEAT - Continued

2 Footrest Adjustment. Remove quick-release pin (2). Slide footrest in or out to desired position. Aline holes in inner and outer footrest tube and install quick-release pin (2).



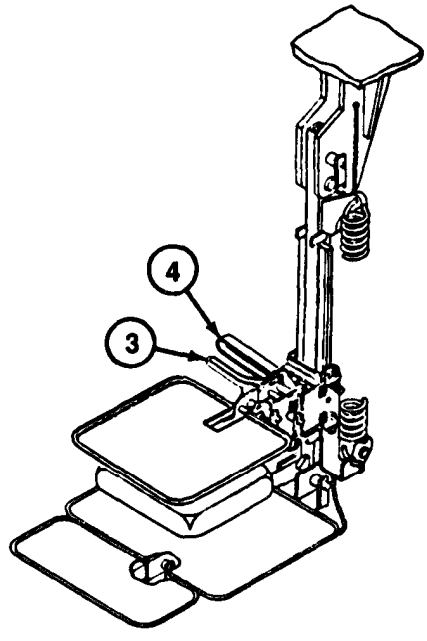
WARNING

To avoid Injury, sit on seat to apply downward pressure on seat before adjusting height-adjusting handle.

CAUTION

Do not use handle guard (4) for lifting; it is meant to prevent accidental actuation of the handle (3).

3. Seat Height Adjustment. Apply downward pressure to seat and pull adjusting handle (3) forward. Increase or decrease pressure to lower or raise seat height. When desired height is achieved, release handle and slowly release pressure until seat locks into position.



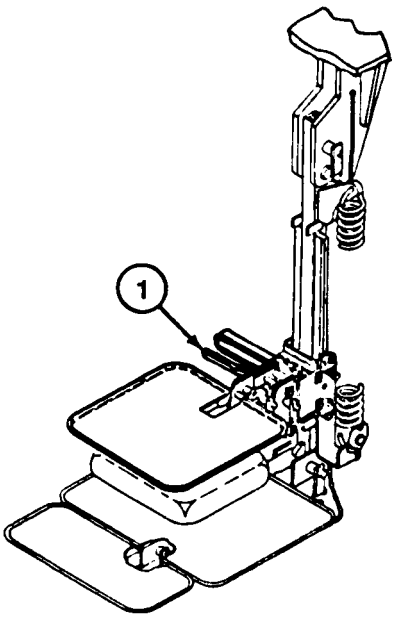
COMMANDER'S SEAT - Continued

Stowing

WARNING

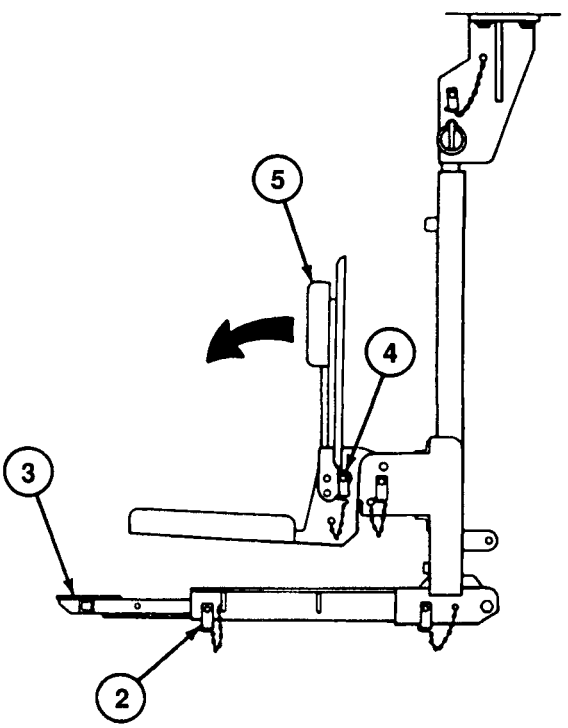
To avoid injury, sit on seat to apply downward pressure on seat before adjusting height-adjusting handle.

1 Apply downward pressure to seat and pull adjusting handle (1) forward. Press seat to its lowest point. Release handle and slowly release pressure until seat locks into position.



2. Remove quick-release pin (2). Push footrest (3) in as far as it will go. Aline pin holes of inner and outer footrest tubes and insert quick-release pin (2).

3. Remove quick-release pin (4) and pivot backrest (5) down. Aline pin holes and insert quick-release pin (4).



COMMANDER'S SEAT - Continued

4. Remove quick-release pin (6) and pivot seat up. Aline pin holes and install quick-release pin (6).

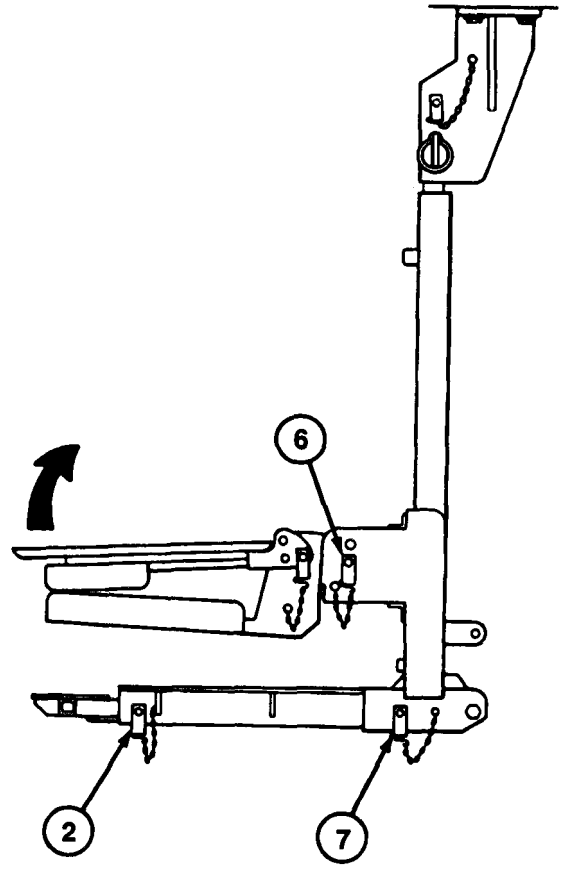
WARNING

Before lowering footrest, make sure quick-release pin (2) is securely inserted through holes in footrest tubes. If pin is not properly inserted, footrest will telescope when lowered and may cause injury.

WARNING

Always support footrest before you remove quick-release pin (7). Failure to do this will allow footrest to swing freely, which could cause serious injury.

5. Support footrest and remove quick-release pin (7). Slowly lower footrest and allow it to hang freely.



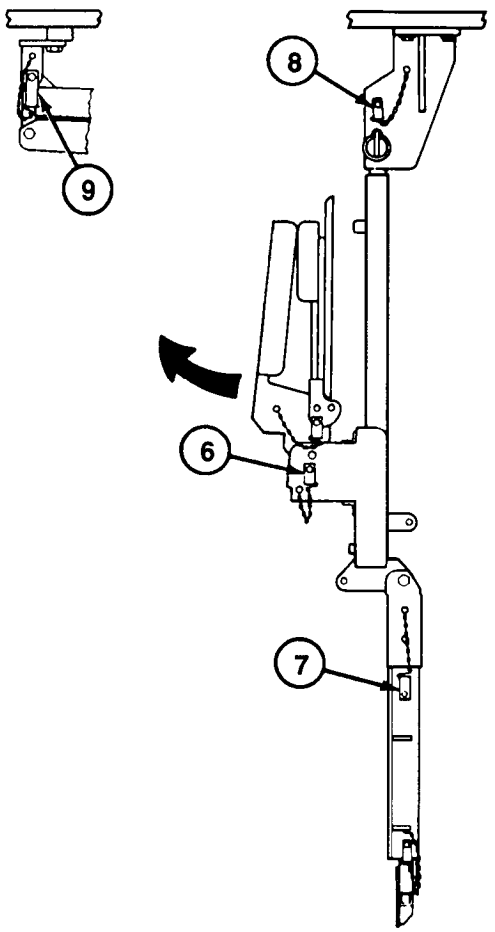
COMMANDER'S SEAT - Continued

WARNING

To avoid injury, use two men to lift seat assembly for stowage.

CAUTION

If commander's cupola periscope is to remain installed, you must rotate cupola so that periscope is 90° left of forward before you raise the seat assembly. Failure to do this may result in destruction of periscope. If periscope is removed, cupola may remain forward when seat is stowed.



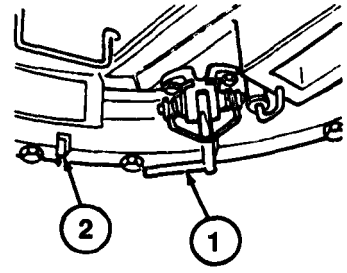
6. Obtain an assistant to help lift and support seat assembly and prevent footrest from swinging.
7. Remove quick-release pins (8 and 9). Pivot seat assembly forward and upward until seat post and stowage holes aline. Insert quick-release pin (9). Install quick-release pin (8).
8. Pivot footrest toward rear and up. Aline pin holes and in stall quick-release pin (7).

ROTATING THE COMMANDER'S CUPOLA

CAUTION

Never attempt to rotate commander's cupola while commander's seat Is stowed. Such an attempt will damage seat-height adjusting handle.

1. Deploy commander's seat (p 2-106).
2. Pull out on latch handle (1). Rotate cupola to desired position.
3. Release latch into one of 12 notches (2) around cupola circumference.



CREW SEATS

WARNING

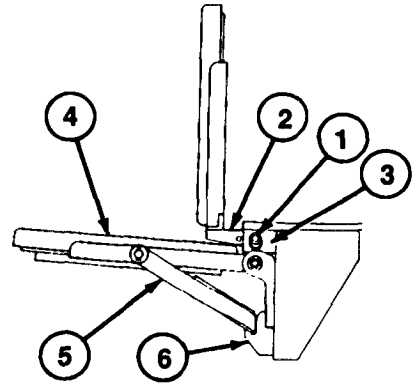
Seats are heavy. Support seats before pulling quick-release pins. Hinged seats, backrests and support brackets may swing down, causing personal injury.

NOTE

Prior to working in vehicle, stow all seats. This will allow for maximum work space. Seats are stowed in reverse order of deployment.

Left Rear Double Seat

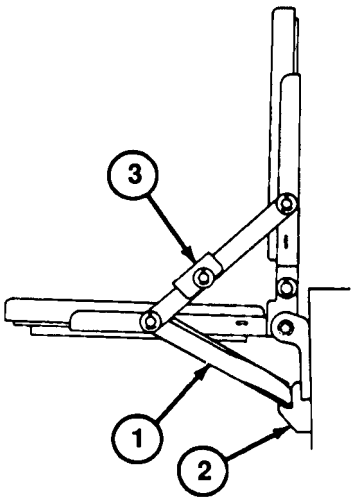
1. Remove quick-release pins (1) from backrest bars (2) and chan- nels (3).
2. Slide backrest outward and free of channels (3).
3. Invert backrest and reinsert back rest bars (2) into channels.
4. Swing seat (4) upward and pivot bracket (5) into notches (6).



CREW SEATS - Continued

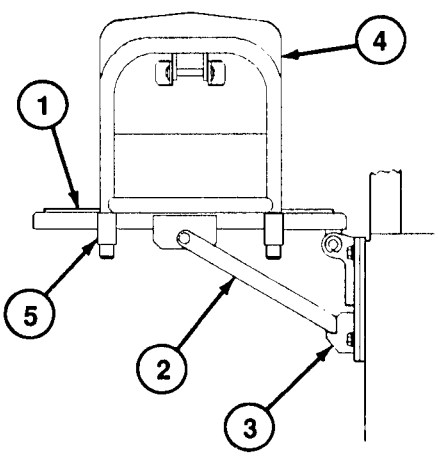
Left Front Seat

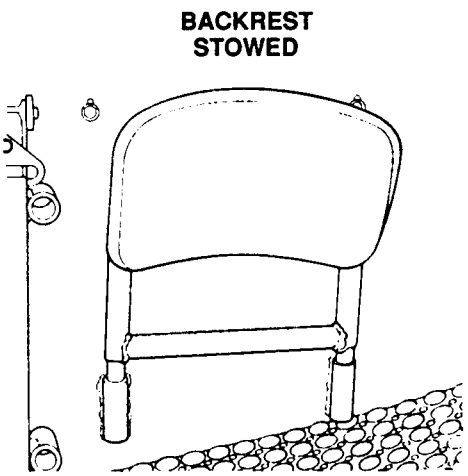
1. Grasp seat backrest and rotate it up and back. As backrest passes horizontal, seat will pivot upward.
2. As backrest and seat reach full deployment, pivot bracket (1) into slots (2).
3. Before releasing backrest, make sure support joint (3) is locked.



Right Rear Seat

1. Lift Seat (1) to slightly above horizontal. Pivot seat bracket (2) into slots (3).
2. Lift backrest (4) from stowage location.
3. Insert backrest tubes into backrest brackets (5).





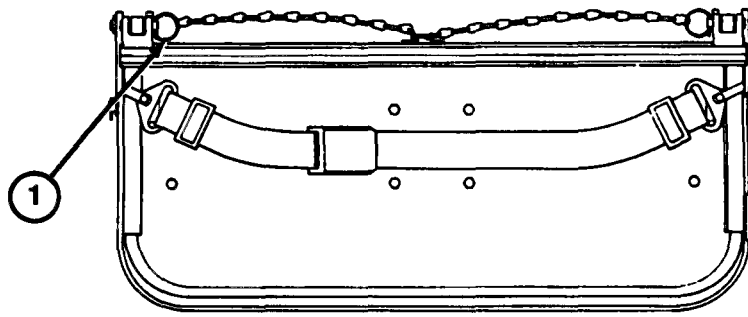
CREW SEATS - Continued

Right Front Double Seat

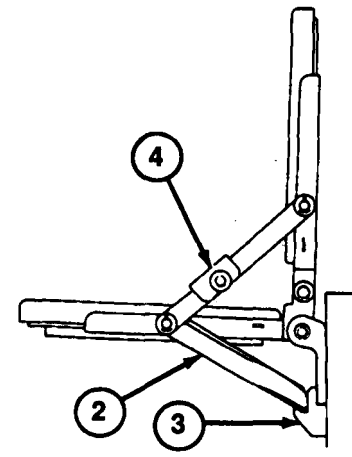
WARNING

Seat is heavy and difficult to maneuver alone. To avoid injury, obtain an assistant before proceeding.

1. Remove quick-release pins (1) which secure seat to left-hand sponson (under APU compartment).
2. Carry seat to mounting location at right-hand sponson.
3. Correctly aline mounting holes of seat and sponson lugs, and install pins (1).



4. Grasp seat bracket and rotate. As backrest passes horizontal, seat will pivot upward.
5. As backrest and seat reach full deployment, pivot bracket (2) into slots (3).
6. Before releasing backrest, make sure support joint (4) is locked.



OPERATING THE APU

Starting

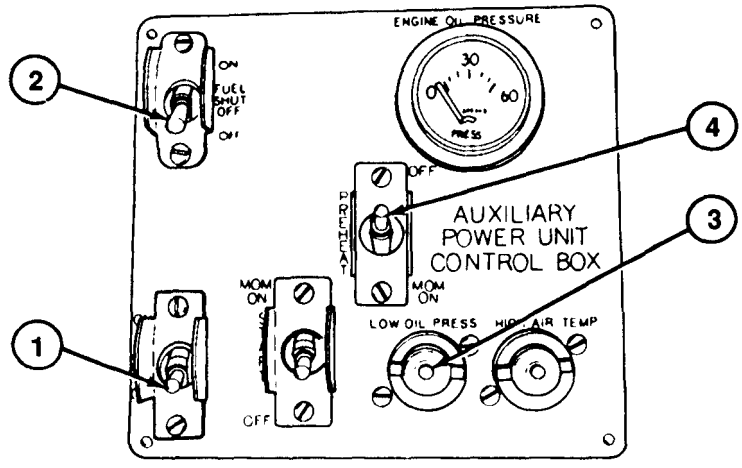
CAUTION

To avoid damaging radio components turn off all radio switches before starting APU.

NOTE

For operation in extremely cold weather (0° to -65° F), see Section IV of this chapter.

1. Turn off all electrical and radio switches.
2. Turn vehicle MASTER switch ON.



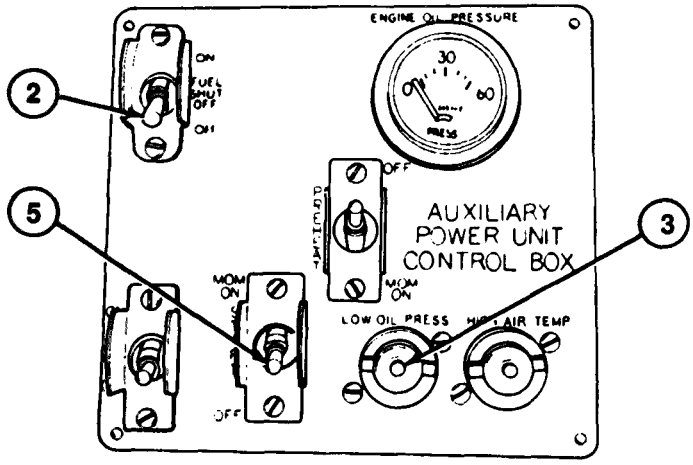
3. Make sure APU GENerator switch (1) is OFF.
4. Turn FUEL SHUTOFF switch (2) ON. The LOW OIL PRESSure lamp (3) will light until APU engine starts.
5. Turn PREHEAT switch (4) to MOMentary ON. Hold switch ON for 20 seconds if outside air temperature is above 55° F. Hold switch ON for one minute if outside air temperature is between 0° and 55° F. If air temperature is below 0° F, refer to Section IV of this chapter.

OPERATING THE APU - Continued

6. While holding PREHEAT switch ON, position and hold START switch (5) to MOMentary ON. Hold both switches ON until APU engine starts.

NOTE

if APU engine doesn't start within one minute, release START switch (5), but continue to hold PREHEAT switch ON for another 20 seconds (in temperatures above 55° F) or one minute (in temperatures below 55° F). After allotted time, hold START switch ON again. If engine still does not start, troubleshoot APU (p 3-11).



7. When APU starts, release PREHEAT switch and START switch.

CAUTION

To avoid damaging the APU engine, if oil PRESSure lamp (3) remains lit after engine starts, or if it lights during APU operation, turn FUEL SHUTOFF switch (2) OFF to stop APU. Notify Organizational Maintenance if this problem occurs.

OPERATING THE APU - Continued

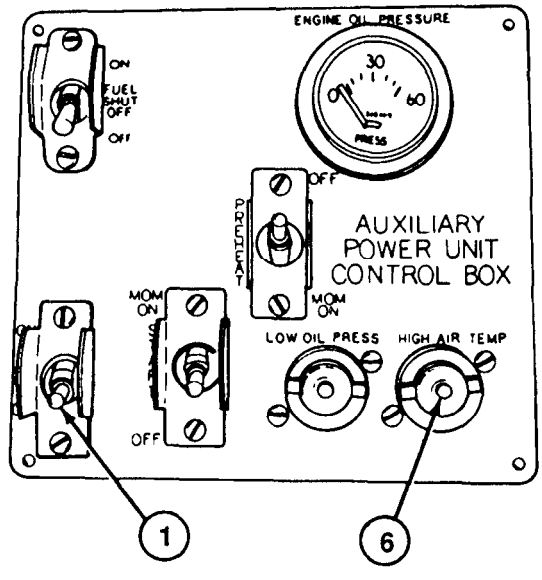
8. Allow APU to warm up for three minutes, then turn APU Generator switch (1) ON.

CAUTION

When operating the APU at high altitudes and/or high temperatures, continuous heavy-load demands by the electrical and hydraulic systems may cause the APU engine to overheat. In these extreme conditions, the APU GENerator switch should be turned OFF and hydraulic components shut down periodically. Continue to run APU without load for several minutes before again operating generator and hydraulic components.

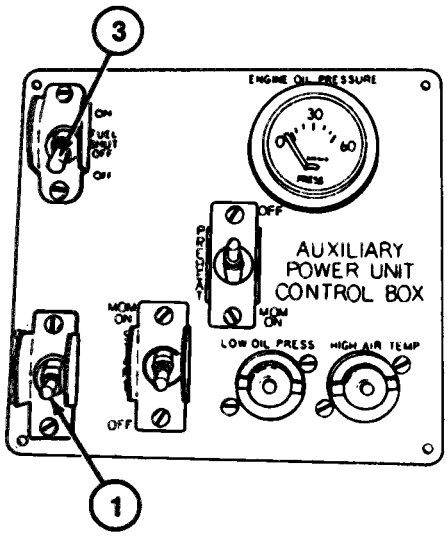
CAUTION

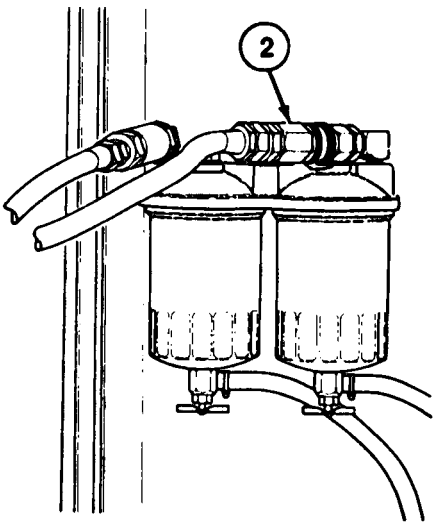
If HIGH AIR Temperature lamp (6) lights during operation, turn OFF the FUEL SHUT OFF switch. Allow APU to cool before restarting. Notify Organizational Maintenance if lamp lights often.



OPERATING THE APU - Continued

9. While APU is operating, check LOW OIL PRESSure lamp, HiGH AIR TEM-Perature lamp and ENGINE OIL PRESSURE gage for APU malfunctions. ENGINE OIL PRESSURE gage should indicate 25 to 35 psi.





Shutting Down

1. Turn APU GENerator switch (1) OFF.

NOTE

If APU does not stop running after step 2, turn MASTER switch OFF. if APU continues to run with MASTER switch OFF, open APU side door and disconnect fuel line (2) to APU fuei filters. Notify Organizational Maintenance.

2. Turn FUEL SHUT OFF switch (3) OFF.

3. Turn vehicle MASTER switch OFF.

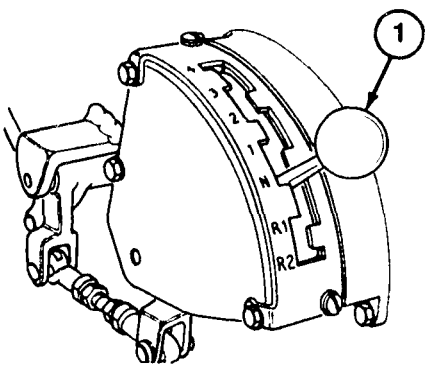
OPERATING THE APU - Continued

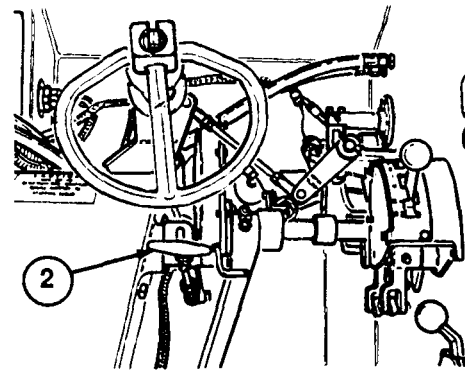
Electrical Support of Another Vehicle

Under normal conditions, APU generator can supply enough electrical power to operate its own electrical system and that of another vehicle (ie M109A2 or another M992) which possesses a compatible electrical system. There are limitations to the generator's output, however. When your vehicle's hydraulic system operates under load, the generator may occasionally switch off. This is only a temporary situation, and the generator wili automatically switch on when hydraulic pressure decreases.

1. Park your vehicle close enough to the supported vehicle so that the slave cabie can be interconnected at the slave receptacles of both vehicles. if your M992 is to support a self-propelled howitzer during conveyor operation, position your vehicle back-to-back with the howitzer and depioy the conveyor (p 2-148).

2. With the brake pedal depressed, place the shift iever (1) in N (neutral) and set parking brake lock handle (2).





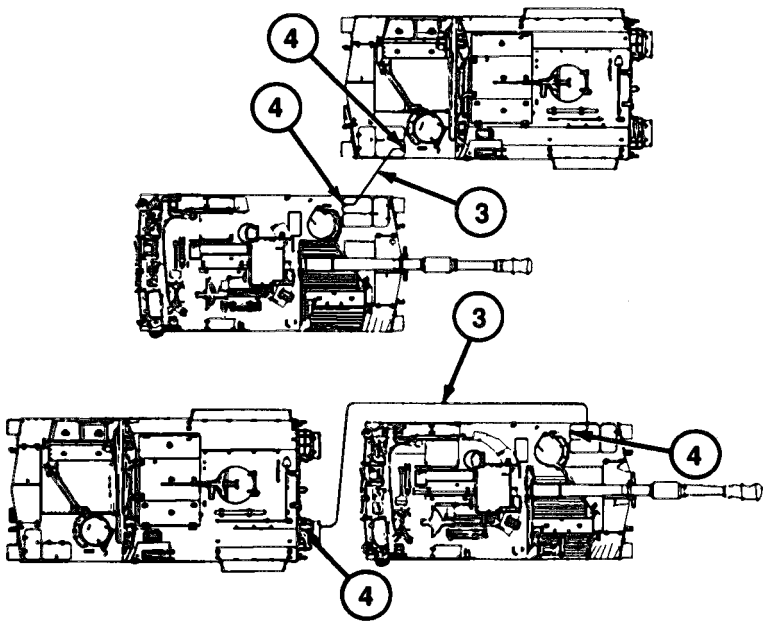
WARNING

To avoid personai injury and vehicle damage, turn OFF the MASTER switch and all other electrical switches in both vehicles.

3. Shut down vehicle main engine(s). Turn MASTER switches OFF in both vehicles.

OPERATING THE APU - Continued

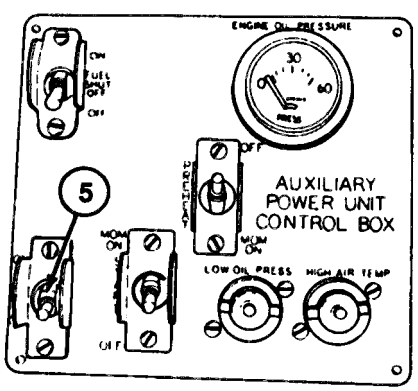
4. Attach slave cable (3) to slave receptacle (4) on both vehicles. Use adapter (item 1, appx B, Section III), if necessary.



5. Turn your vehicle's MASTER switch ON and start APU(p 2-116).

6. Allow APU to warm up for three minutes, then turn ON the APU GENerator switch (5).

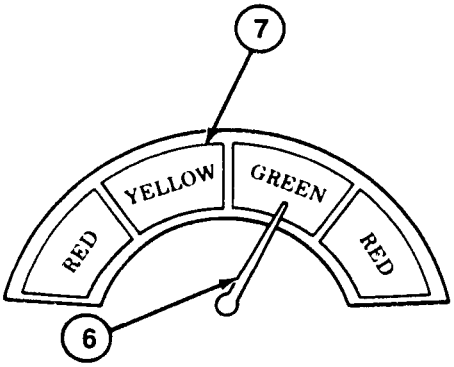
7. Turn ON the MASTER switch in supported vehicle to make power available to it.

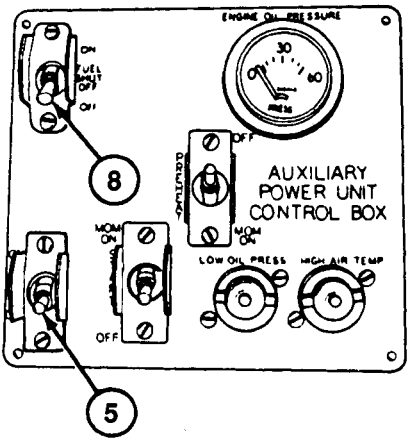


OPERATING THE APU - Continued

NOTE

Check BATTERY indicator in each vehicle at least once per hour. If charge indicator needle (6) drops below halfway in yellow range (7) in either vehicle, start both main engines. Allow engines to run until charge needles move into normal range. If indicators show low charge, do not shut down APU until both main engines are started.





8. To stop this operation, turn APU GENerator switch (5) OFF and turn OFF the APU FUEL SHUT OFF switch (8).

WARNING

To avoid injury, turn MASTER switches OFF in both vehicles before disconnecting slave cable.

9. Turn MASTER switch OFF in both vehicles.

10. Disconnect and stow cable.

OPERATING THE APU - Continued

Charging Low Batteries with APU

NOTE

This procedure applies only to vehicles with low-charge batteries. if no gages or lights function on a vehicle when its MASTER switch is ON, batteries are dead. To charge dead batteries, see page 2-125.

1. Before trying to charge batteries, do the following:

   a. Check batteries for broken case, broken cable, severe corrosion and other damage. Notify Organizational Maintenance if batteries are damaged.

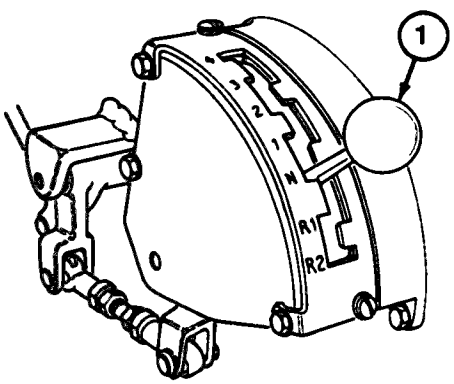
   b. Check electrolyte level (TM 9-6140 -200-14). Notify Organizational Maintenance if electrolyte is not at proper level.

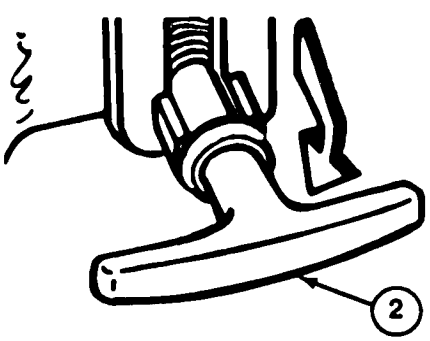
2. Park your vehicle close enough to supported vehicle so that slave cable can be interconnected at slave receptacles of both vehicles.

3. With brake depressed, place shift lever (1) in N (neutral) and set parking brake lock handle (2).

WARNING

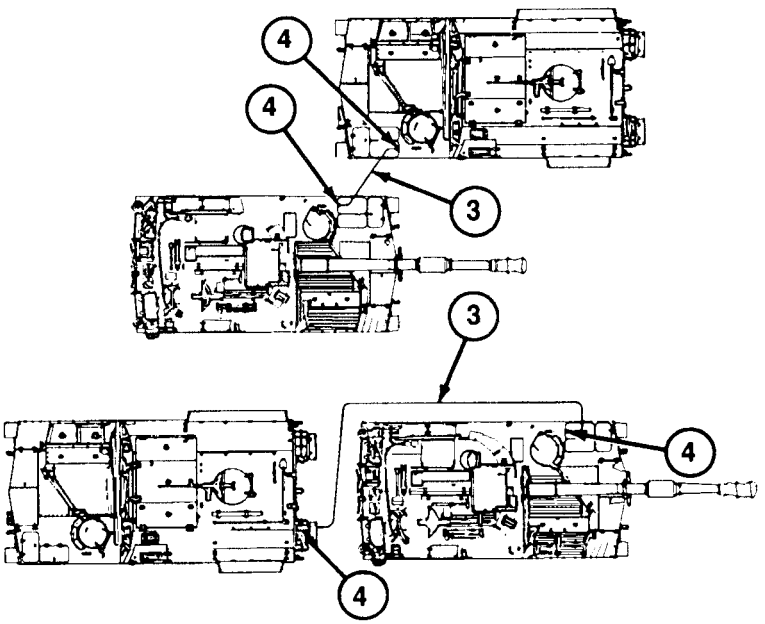
To avoid personai injury and vehicle damage, turn OFF the MASTER switch and all other electrical switches in both vehicles.





OPERATING THE APU - Continued

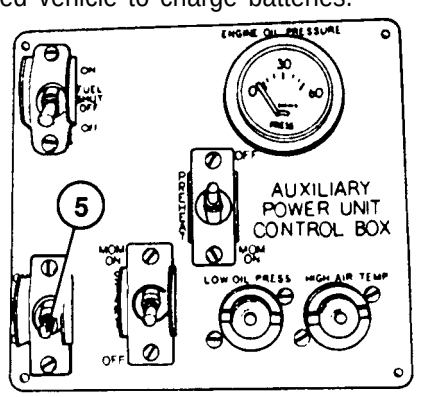
4. Shut down vehicle main engine. Turn MASTER switch OFF in both vehcles.
5. Attach slave cable (3) to slave receptacle (4) on both vehicles.



6. Turn your vehicle's MASTER switch ON and start APU (p 2-116)
7. Allow APU to warm up for three minutes, then turn ON the APU GENerator switch (5).
8. Turn ON the MASTER switch in supported vehicle to charge batteries.

NOTE

You may start your vehicle's main engine to increase power generation.



OPERATING THE APU - Continued

9. Continue charging batteries until charge indicator in supported vehicle reads well into normal range.

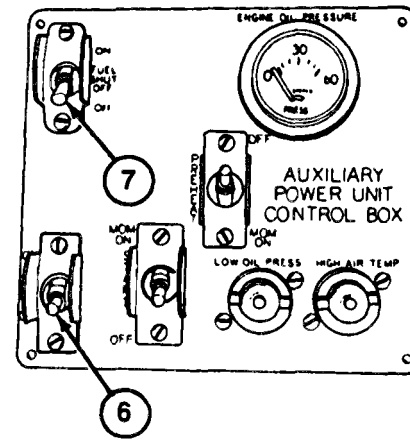
10. Turn APU GENerator switch (6) OFF, and turn APU FUEL SHUT OFF switch (7) OFF to shutdown APU.

WARNING

To avoid injury, turn MASTER switches in both vehicles OFF before disconnecting slave cable.

11. Turn OFF MASTER switch in each vehicle.

12. Disconnect and stow slave cable.



Charging Dead Batteries with APU

NOTE

This procedure applies only to vehicles with dead batteries. If any lights or gages function when a vehicle's MASTER switch is ON, batteries are low, not dead. To charge low batteries see page 2-123.

1. Before trying to charge batteries, do the following:

   a. Check batteries for broken case, broken cables, severe corrosion and other damage. Notify Organizational Maintenance if batteries are badly damaged.

   b. Check electrolyte level (TM 9-6140-200-14). Notify Organizational Maintenance if electrolyte is not at proper level.

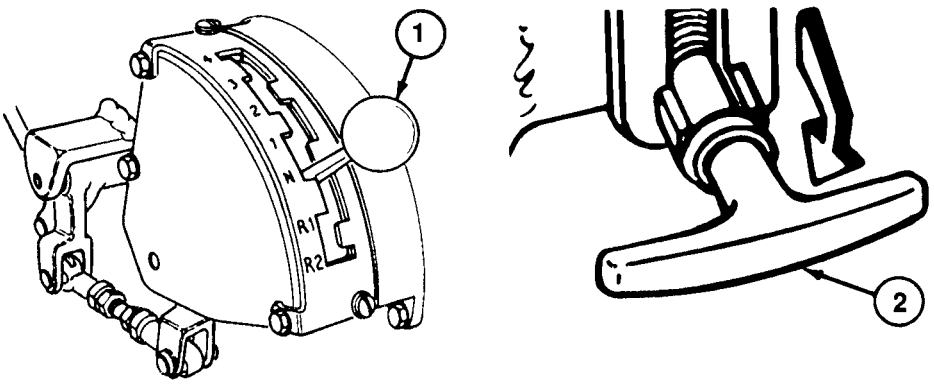
OPERATING THE APU - Continued

WARNING

Make sure that vehicles do not touch during this operation. Shorting through vehicles could cause serious injury and/or equipment damage.

2. Park your vehicle close enough to supported vehicle so that slave cable can be interconnected at slave receptacle of each vehicle.

3. With brake depressed, place shift lever in N (neutral) (1) and set parking brake lock handle (2).



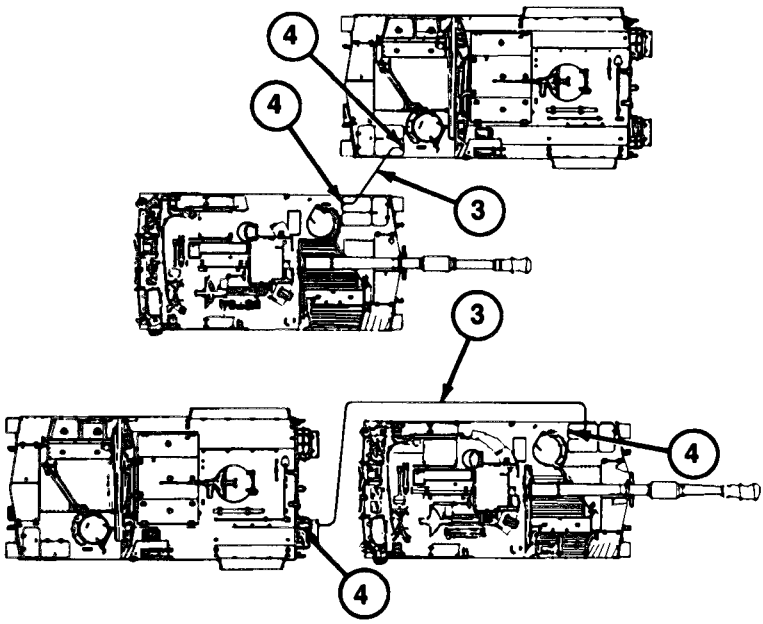
WARNING

To avoid personal injury and vehicle damage, turn OFF the MASTER switch and all other electrical switches in both vehicles.

4. Shut down main engine. Turn MASTER switch OFF in both vehicles.

OPERATING THE APU - Continued

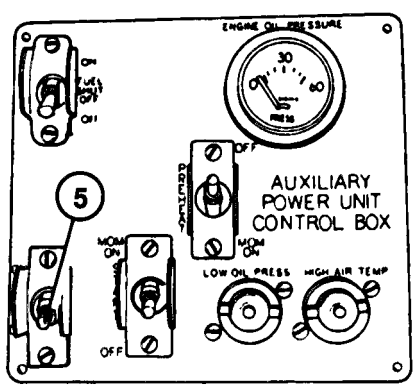
5. Attach slave cable (3) to slave receptacle (4) on both vehicles.



6. Turn your vehicle's MASTER switch ON and start APU(p 2-116).

7. Allow APU to warm up for three minutes, then turn ON the APU GENerator switch (5).

8. Turn MASTER switch in supported vehicle to SLAVE. Hold it to SLAVE five minutes to charge battery.



OPERATING THE APU - Continued

9. After five minutes of charging, turn OFF the APU FUEL SHUT OFF switch (6) to shut down APU.

10. Turn your vehicle MASTER switch OFF.

11. Turn MASTER switch ON in supported vehicle. If gages or lights do not function, return to step 6. If an additional five minutes of charging does not charge battery sufficiently for gage and light functioning, notify Organizational Maintenance.

12. If batteries in supported vehicle activate gages or lights unaided by APU, charge battery as follows:

    a. Turn MASTER switch ON in your vehicle.

    b. Start APU.

    c. Turn on the APU GENerator switch.

    d. Turn ON MASTER switch in supported vehicle. Batteries will charge.

    e. Continue to charge batteries until charge indicator in supported vehicle reads well into normal range.

CAUTION

Be sure APU GENerator switch is OFF before turning OFF the APU FUEL SHUT OFF switch.

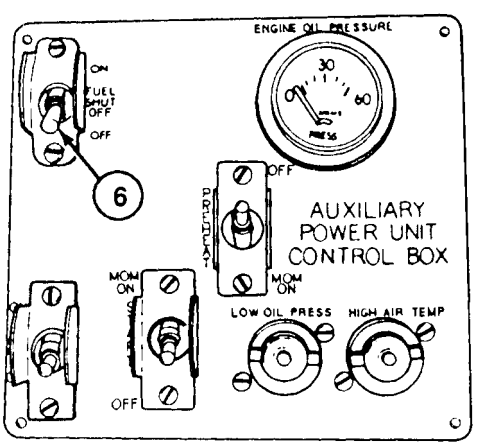
13. Turn APU FUEL SHUT OFF switch (6) OFF.

WARNING

To avoid injury, turn MASTER switches in both vehicles OFF before disconnecting slave cable.

14. Turn OFF MASTER switch in each vehicle.

15. Disconnect and stow slave cable.



PRIMARY HYDRAULIC PUMP OPERATION

CAUTION

Primary and backup pumps should not be operated at same time. Hydraulic system damage may result.

NOTE

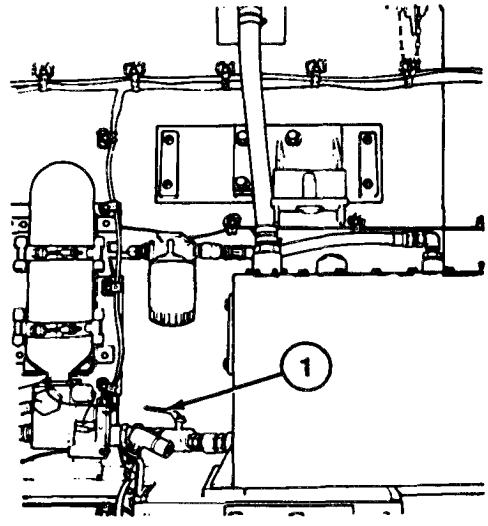
The M992 uses either a primary or backup pump to provide power for operation of the stacker, conveyor and upper rear door (ballistic shield). The primary pump is driven by the APU; the backup pump is driven by the vehicle main engine. The primary pump should be used during normal operation. The backup pump should be reserved for emergency use. For backup pump operation see page 2-236.

Operating the Primary Pump

CAUTION

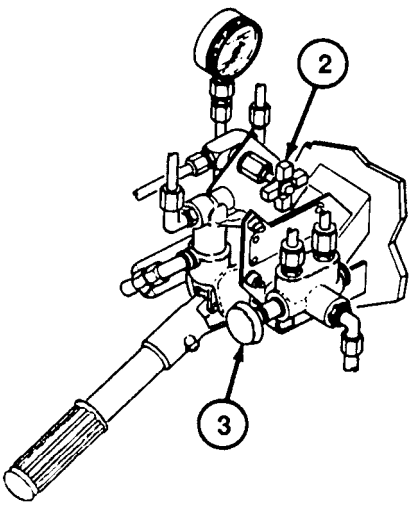
Be sure hydraulic reservoir ball valve (1) is OPEN before turning hydraulic pump on. Hydraulic system damage will result from operating pump with ball valve closed.

1. Check to see that hydraulic resevoir ball valve (1) is OPEN.

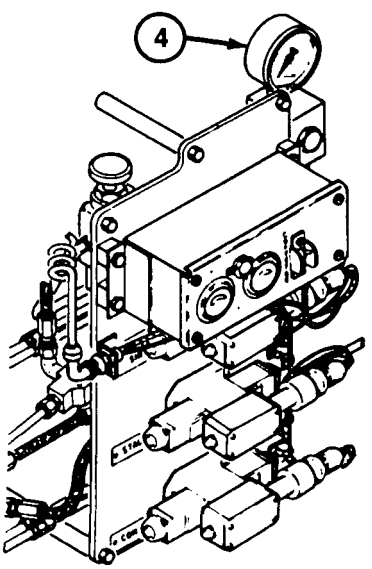


PRIMARY HYDRAULIC PUMP OPERATION - Continued

2. Open hydraulic dump valve by turning knob (2) fully counterclockwise.
3. Push in BACK-UP HYDRAULIC SYSTEM selector valve knob (3).
4. Start APU (p 2-116).



5. Check pressure gage (4) on hydraulic control panel. With pump operating, but no hydraulic actuators operating, pressure gage should indicate between 100 to 300 psi.
6. Operate hydraulic system as necessary (p 2-129 to 2-130 and 2-148 thru 2-171).
7. To turn off primary pump, shut down APU (p 2-122).



OPERATING DOORS

WARNING

To avoid injury, doors which must be open when loading or unloading ammunition should be secured when opened.

WARNING

To avoid damage or injury, close and secure all doors before moving vehicle.

WARNING

Keep hands, feet and head clear when opening or closing doors. Use lifting rings for hand grasps when possible.

WARNING

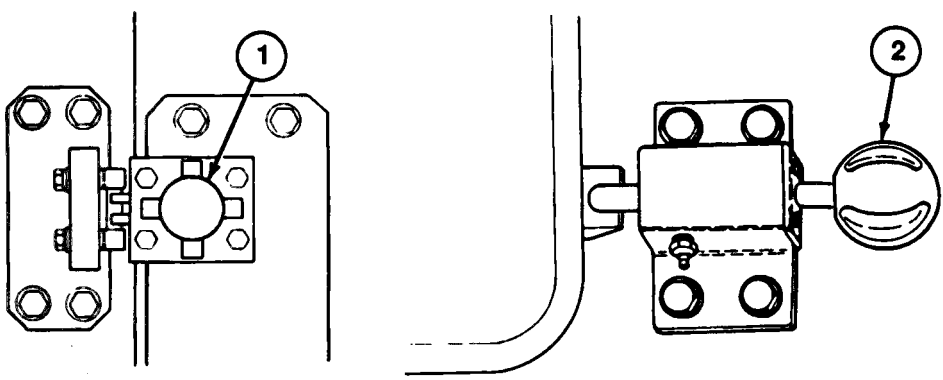
Stand clear when opening or closing upper rear door (ballistic shield). If you open or close this door from outside vehicle (using bottom switch), keep head and shoulders out of door's travel path.

Personnel Side Door

NOTE

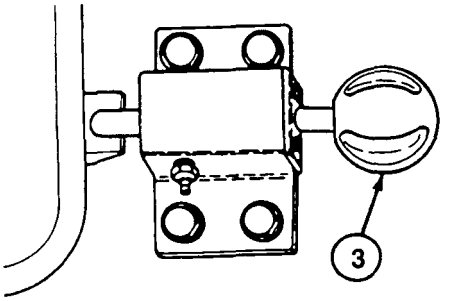
Latch handle is on outside of door only.

1. To open door, turn latch handle (1) counterclockwise to unlock, then clockwise to unlatch. Swing door open.
2. Secure door open with hold-open latch (2).



OPERATING DOORS - Continued

3. To close door, release hold-open latch by pulling knob (3). Push door closed. Make sure door latches securely.

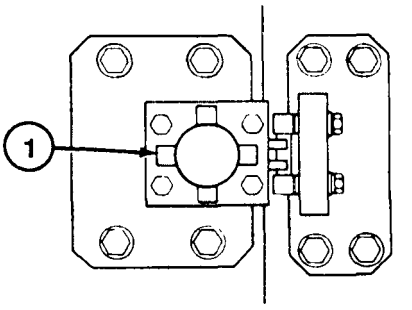


Canister Side Doors

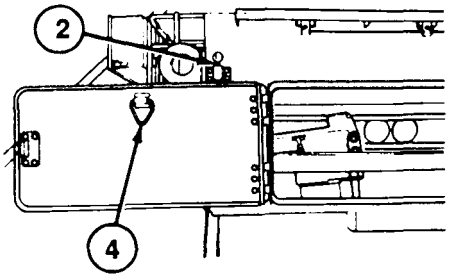
NOTE

Latch handles are on inside of doors only.

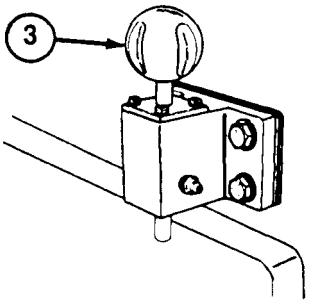
1. Turn latch handle (1) counterclockwise to unlock, then clockwise to unlatch door. Swing door open.



2. Secure door open with hold-open latch (2).



3. To close either door, release hold-open latch by pulling knob (3) up. Push door closed or use ring (4) to pull door closed. Make sure door latches securely.

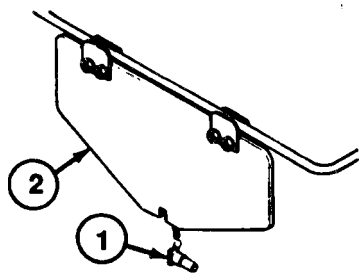


OPERATING DOORS - Continued

Top Middle Door

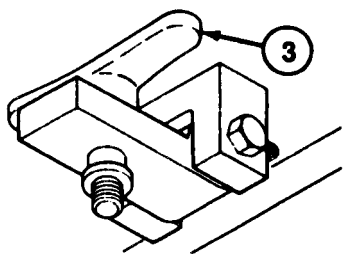
WARNING

This door is very heavy. To prevent injury you will need two assistants on top of vehicle.



CAUTION

Before closing top middle door, latch must be completely flipped over to rear to prevent damage to handle and latch.

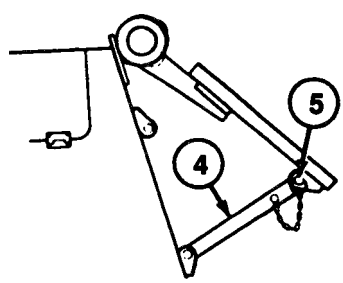


NOTE

You may haveto reposition machine gun before opening or closing door.

NOTE

Latch is on inside of door only.



1. Remove projectile rack stowage box guard quick disconnect pins (1) on left projectile racks. Fold down two guard plates (2).

2. To open door, turn latch handie (3) counterclockwise to disengage latches. With help of two assistants, raise door.

3. Release bar (4) from stowage location by pulling quick-release pin (5). Secure door with bar (4) and quick-release pin (5).

NOTE

if top right or top left doors have been opened, close them before closing top middle door.

4. To close door, remove quick-reiease pin (5) and bar (4). With help of two assistants, close door. Make sure door latches securely.

5. Stow bar (4) and secure with pin (5).

OPERATING DOORS - Continued

Top Side Doors (Left and Right)

NOTE

The following procedures apply to left and right top side doors.

NOTE

Top middle door must be opened before side doors may be opened.

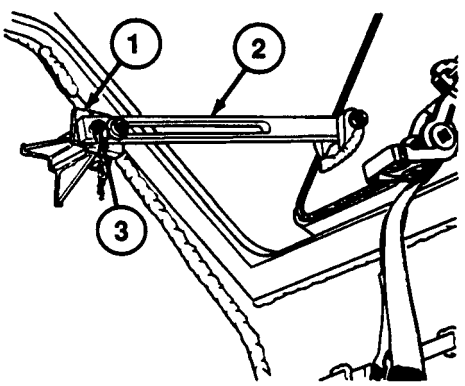
NOTE

You may need assistance to operate these doors.

1. Open top middle door (p 2-133).
2. Open top side door.
3. Aline holes in block (1) and sliding bar (2), and insert quick-release pin (3).

WARNING

To prevent injury, support door when removing quick-release pin.



4. To close door:
   a. Suppot door and remove quick-release pin from block.
   b. Lower door.
   c. Close top middle door, if necessary.

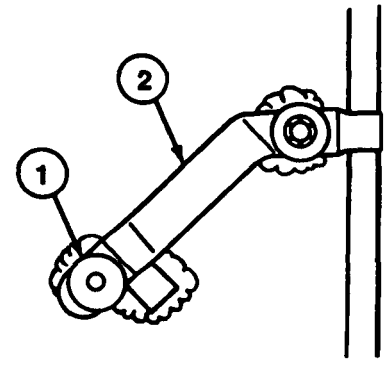
OPERATING DOORS - Continued

Lower Rear Door

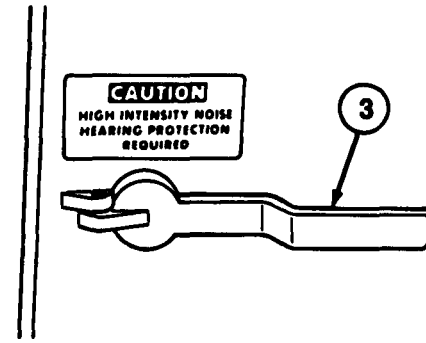
OPENING DOOR FROM INSIDE OR OUTSIDE VEHICLE

NOTE

The door-latch mechanism uses a plunger assembly to serve as a security lock. When engaged, the plunger prevents movement of inner or outer latch handles. Before the door may be opened from the inside or the outside the plunger knob (1), located at inside of door, must be pulled.

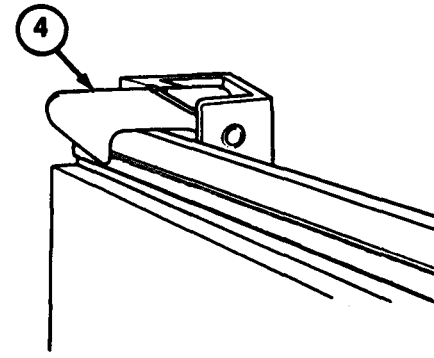


1. From inside vehicle, pull plunger knob (1).
2. Lift inner latch handle (2) or outer latch handle (3).
3. Open and secure door with hold-open latch (4).



CLOSING DOOR

1. Release door from hold-open latch (4).
2. Close door and secure with inner latch handle (2) or outer latch handle (3).



LOCKING DOOR

With door latched, push plunger knob (1) to lock door handles.

OPERATING DOORS - Continued

Upper Rear Door

WARNING

Make sure travel path of upper rear door is clear of personnel before opening or closing door. Call out "CLEAR" when opening or closing to prevent personnel from stepping in front of door.

WARNING

When opening door from outside using lower switch, be aware of head and shoulder clearance. serious personal injury may result if door strikes you.

WARNING

This door Is very heavy. Keep feet and hands clear of opening when opening or closing.

WARNING

During normal operation, mechanical safety lock should be used when positioning door. Lock supports door if hydraulic safety mechanisms fall.

WARNING

If conveyor is not to be deployed, make sure conveyor safety strap is secure (p 2-148) and cables are removed from conveyor before opening upper rear door. As door raises above 90 degrees with cable connected, outboard section of conveyor "jumps" from deployed position. Serious injury could result.

NOTE

Before opening or closing door, lower rear door must be open and latched.

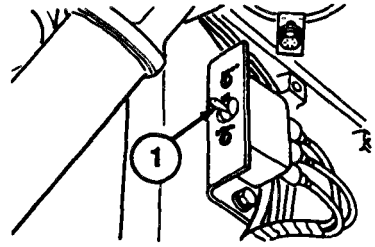
OPENING DOOR

1. Open lower rear door (p 2-135).

2. Activate either primary or backup pump (p 2-129 or 2-236).

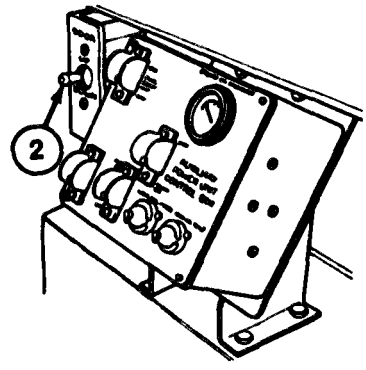
OPERATING DOORS - Continued

Upper Rear Door- Continued



3. Shift either upper (1) or lower (2) DOOR switch iever UP.

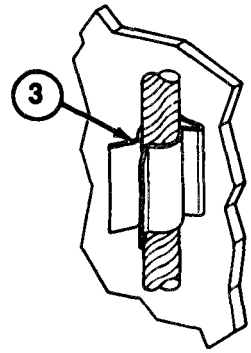
4. When door has opened approximately 3-4 feet, release conveyor cables from clip (3).



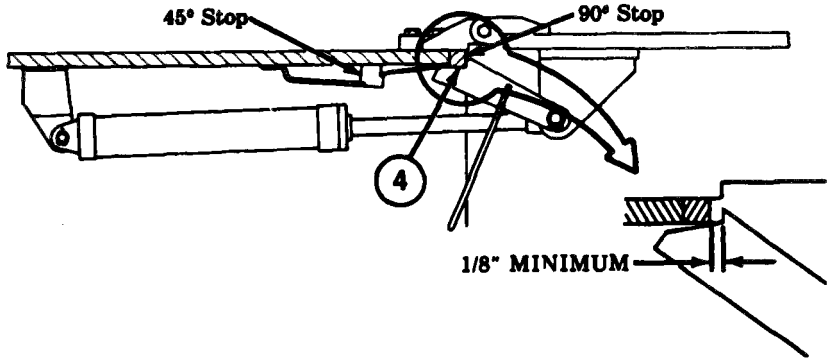
5. Release DOOR switch lever when door reaches correct height.

NOTE

Mechanical safety lock (4) will automatically engage at door elevations of 45 and 90 degrees.



6. Be sure that mechanical safety lock has engaged, and raise door so that approximately 1/8 inch exists between safety iock (4) and either lock stop.



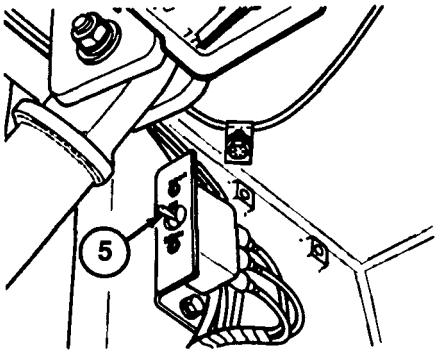
OPERATING DOORS - Continued

Upper Rear Door - Continued

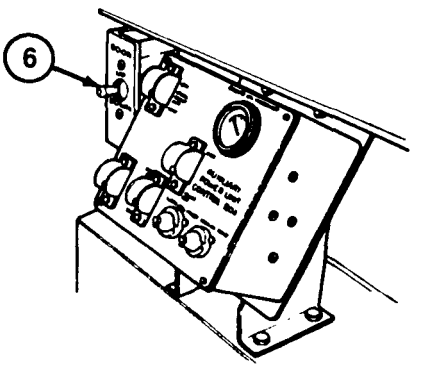
CLOSING DOORS

CAUTION

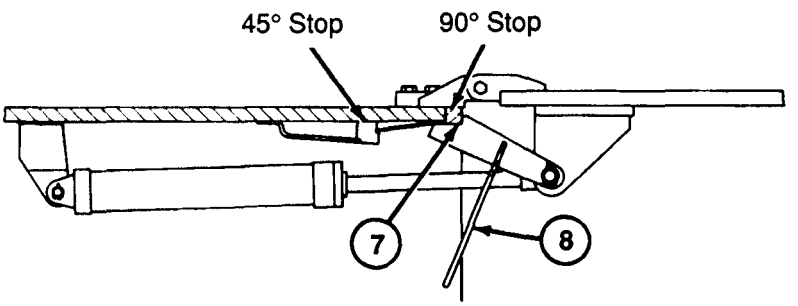
To avoid damage to doors, lower rear door must be open before closing upper rear door.



1. Activate either primary or backup pump (p 2-129 or 2-236).
2. Place either DOOR switch lever (5 or 6) UP, if necessary, to obtain a clearance of at least 1/2-inch between mechanical safety lock (7) and lock stop.



3. Pull downward on mechanical safety lock handle (8) and move DOOR switch DOWN. If closing door completely, continue to hold mechanical safety lock handle down until mechanical safety lock (7) clears 45-degree lock stop.

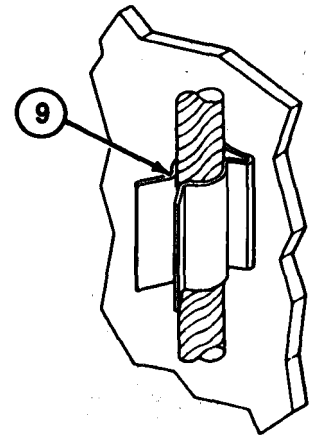


OPERATING DOORS - Continued

Upper Rear Door - Continued

4. Secure conveyor cables in door clips (9) when door is 3-4 feet above full-closed position.

5. If closing door completely, make sure that padded bracket (on upper rear door) alines with conveyor.



CAUTION

To avoid damage to doors, loiwer rear door must be open before closing upper rear door.

6. if necessary close lower rear door (p 2-135).

NOTE

if hydraulic power fails, refer to page 2-244 for upper rear door emergency operating procedures.

NOTE

if electrical power fails, refer to page 2-248 for upper rear door emergency operating procedures.

APU Side Door

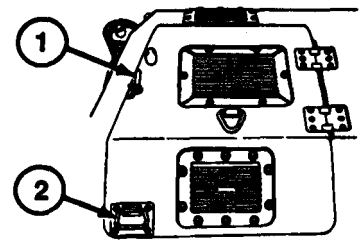
WARNING

This door is very heavy, Keep hands clear when opening or closing door.

1. To open door, turn latch handie (1) counterclockwise. Grasp “D” ring (2) and pull door open.

CAUTION

To avoid damage to latching mechanism, make sure that latch handie is in unlatched position before closing door.



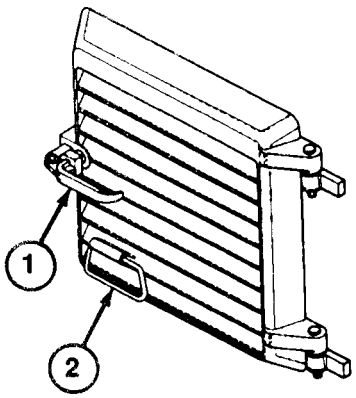
OPERATING DOORS - Continued

2. Close door. Secure door by turning latch handle clockwise to stop.

APU Front Door

1. To open door, turn latch handle (1) counterclockwise. Grasp “D” ring (2) and pull door open.

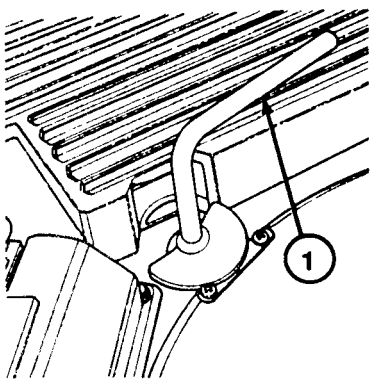
2. Close door. Turn latch handle (1) clockwise until it contacts stop.



Driver’s Hatch Door

NOTE

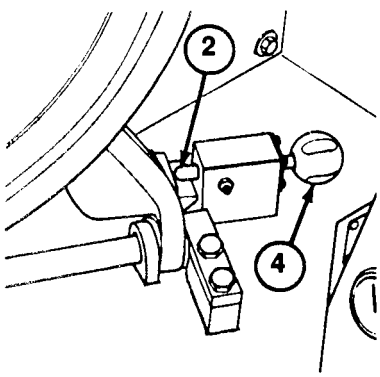
Driver’s hatch can be opened or closed from outside of vehicle unless security latch is fastened from inside.



OPENING HATCH DOOR

1. Turn handle (1) clockwise.

2. Open latch until hatch tab catches in hold-open latch pin (2).

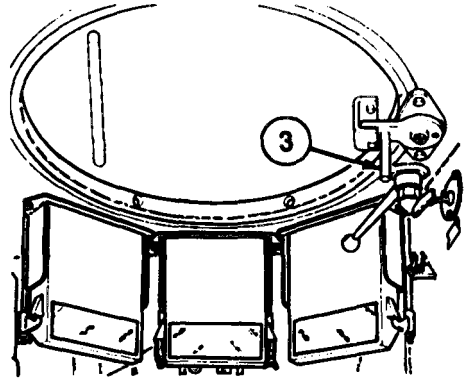


OPERATING DOORS - Continued

CLOSING HATCH DOOR

CAUTION

To avoid damaging security latch (3), check to make sure it is positioned out of doorway before closing door.



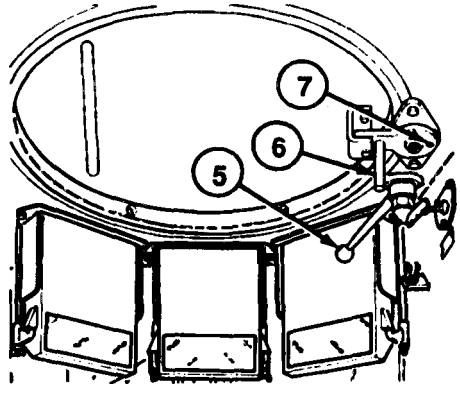
1. Pull hold-open latch knob (4) to release hatch door.
2. Close door and secure by turning handle (1) counter-clockwise.

Securing Against Outside Entry

1. Secure door latching handle (5).
2. Push security latch handle (6) forward until it contacts its stop.

CAUTION

When releasing security latch, make sure you move handle far enough for spring-loaded detent ball (7) to engage. Failure to do this may result in damage to security latch.



3. To release security latch, pull handle (6) to rear until spring-loaded detent ball (7) engages.

OPERATING DOORS - Continued

Commander's Cupola Hatch Door

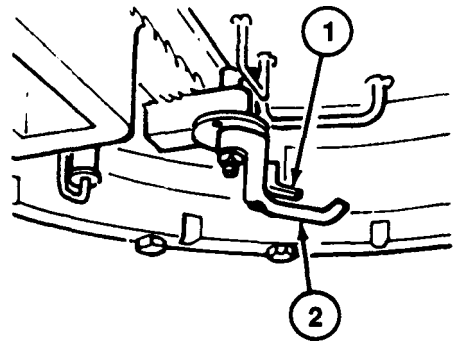
NOTE
Door may be operated only from inside vehicle.

OPENING HATCH DOOR

1. Deploy commander's seat (p 2-106).

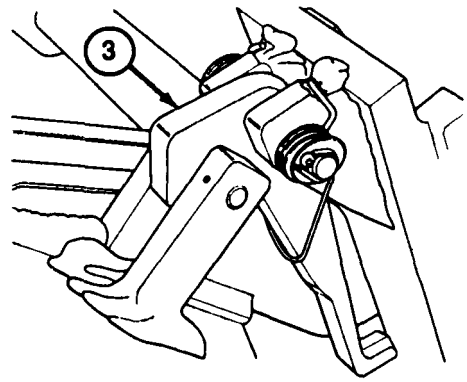
CAUTION

When opening door, make sure you move handle until spring-loaded pin engages. Failure to do this may result In damage to security latch.



2. Press handle-release button (1) and turn latch handle (2) clockwise.

3. Push hatch door open until hold-open latch (3) engages.



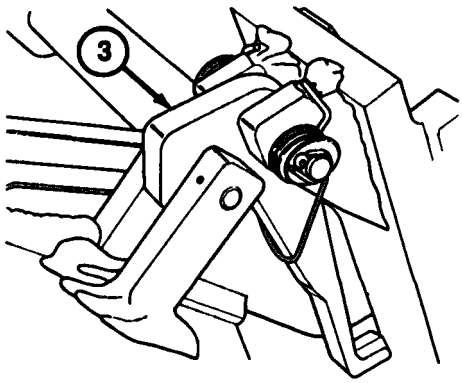
OPERATING DOORS - Continued

CLOSING HATCH DOOR

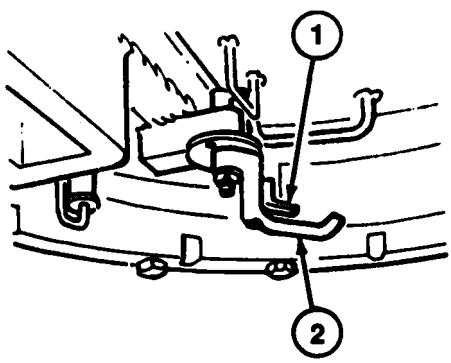
CAUTION

Check to make sure latch handle (2) is latched In open position. Failure to do this may result In damage to latch.

1. Release hold-open latch (3) and pull door closed.



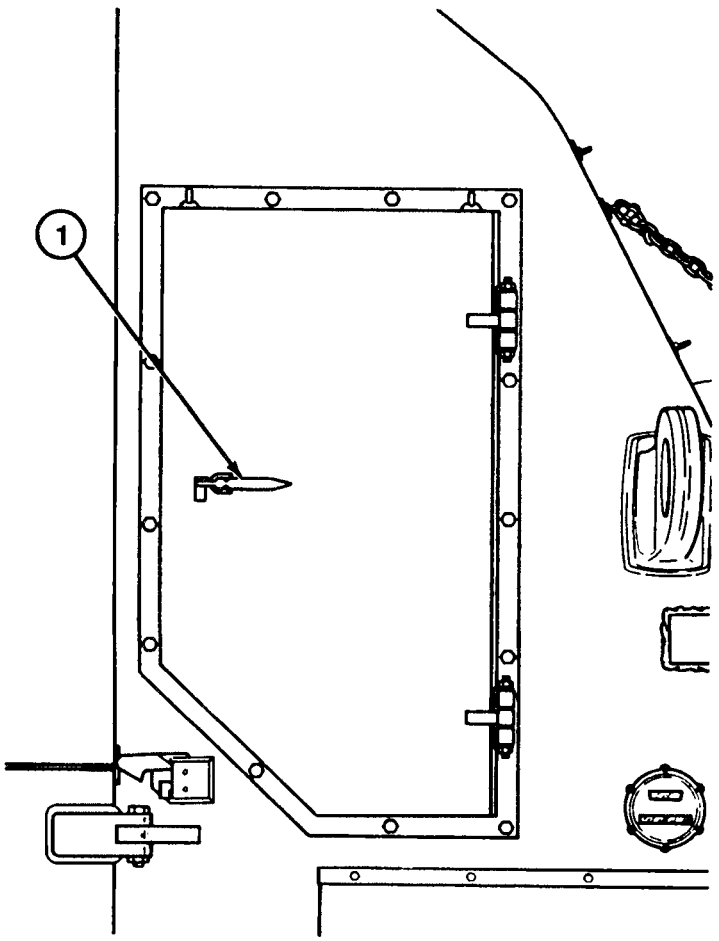
2. Press handle-release button (1) and turn latch handle (2) counterclockwise.



OPERATING DOORS - Continued

AFES Extinguisher Box Door

1. To open door, turn handle (1) counterclockwise and pull door open.
2. To close door, shut door and secure by turning handle (1) clockwise.



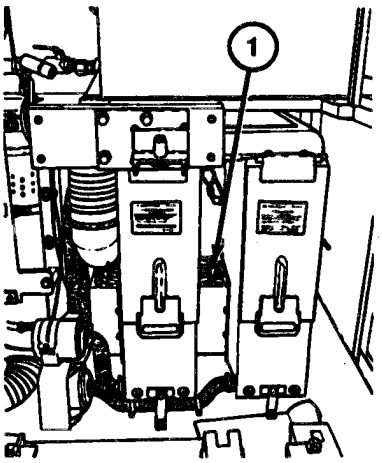
OPERATING MAIN ENGINE AIR CLEANER SYSTEM

Summer Position

NOTE

Right rack assembly must be moved before locking handles may be positioned.

In temperatures over 40° F, leave locking handles (1) in holders.



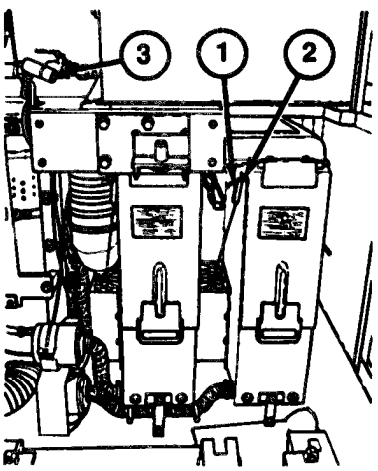
Winter Position

In temperatures below 25°F, raise handles (1) and fasten them on hooks (2).

Intermediate Temperatures

When operating in temperatures from 25° F to 40° F, position as follows:

1. Start engine with locking handles (1) in winter position.
2. When engine reaches operating temperature, place handles in summer position.



AIR CLEANER RESTRICTION INDICATOR

An air cleaner indicator gage (3) is located alongside hydraulic reservoir. It reads green when air cleaner is operating properly. When airflow is restricted, a red sleeve covers the green indicator indicating that air cleaner element should be service (p 3-28). Reset button on air cleaner restriction indicator will retract red sleeve and green signal will show again. If restriction has not been removed, red signal will return next time engine is operated.

AMMUNITION HANDLING EQUIPMENT

Loading Ammunition

1. Open lower and upper rear doors (p 2-135 and 2-136).
2. Deploy conveyor (p 2-148).
3. Install shrouds over rear doorway and conveyor (p 2-154), if necessary.
4. Operate conveyor to load projectiles onto M992 (p 2-156).
5. Operate stacker to transfer projectiles from conveyor to projectile racks (p 2-167).
6. Stow projectiles in projectile racks (p 2-184).
7. Load propelling charge canisters into appropriate stowage areas (p 2-179). Restrain canisters (p 2-180).
8. Place fuze boxes, .50-caliber ammunition boxes and primer boxes in appropriate locations (p 2-173). Secure boxes with straps (p 2-207).
9. After ammunition-loading operation is completed:
    a. Stow stacker (p 2-189).
    b. Remove and stow shrouds for conveyor and rear door.
    c. Stow conveyor (p 2-165).
    d. Close upper and lower rear doors (p 2-136 and 2-135).

Unloading Ammunition

1. Open lower and upper rear doors (p 2-135 and 2-136).
2. Deploy conveyor (p 2-148).
3. Install shrouds over rear doorway and conveyor (p 2-154), if necessary.
4. Unload projectile racks (p 2-188).
5. Operate stacker to transfer projectiles from projectile racks to conveyor (p 2-181).

AMMUNITION HANDLING EQUIPMENT - Continued

6. Operate conveyor to unload projectiles from M992 (p 2-158).
7. Unload propelling charge canisters from appropriate stowage areas (p 2-181).
8. Remove restraint straps (p 2-182) and unload fuze boxes, .50-caliber ammunition boxes and primer boxes from vehicle.
9. After ammunition unloading operation is completed:
    a. Stow stacker (p 2-171).
    b. Remove and stow shrouds for conveyor and rear door.
    c. Stow conveyor (p 2-161).
    d. Close upper and lower rear doors (p 2-138 and 2-135).

OPERATING THE CONVEYOR

Deploying the Conveyor

1. Open lower rear door (p 2-135).
2. Activate hydraulic system (p 2-129).

NOTE
Remove cables from clips as upper rear door opens.

3. Open upper rear door (ballistic shield) to 90-degree position (p 2-137).

WARNING

Make sure cables are properly attached to conveyor, or conveyor may drop.

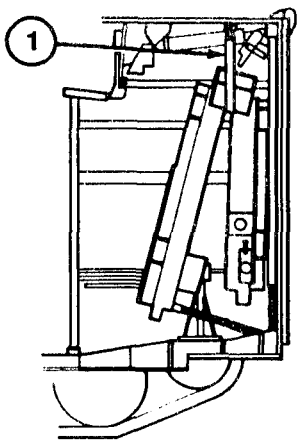
WARNING

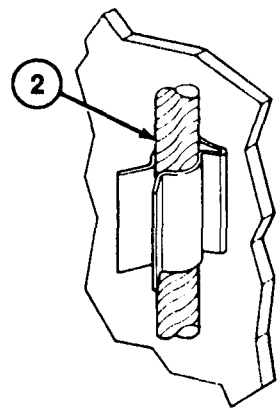
Have an assistant hold conveyor in stowed position as you release stowage strap (1). This will prevent conveyor from slipping from stowed position, causing serious injury to you or others.

WARNING

Keep all parts of your body clear of conveyor hinges.

4. Have an assistant restrain conveyor in stowed position. Make sure cables (2) are secure and release conveyor from stowage strap (1).





OPERATING THE CONVEYOR - Continued

WARNING

Make sure footing is firm and deployment area is free of obstructions. When pulling conveyor-deploying handies (3), be prepared to move quickly - after conveyor begins to move it moves rapidly.

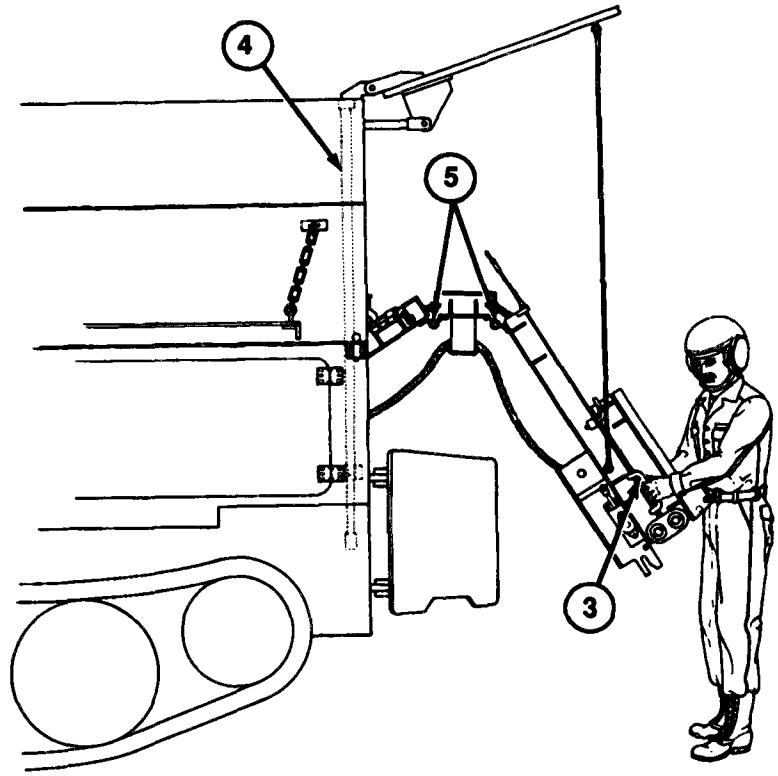
WARNING

Keep fingers clear of telescoping rods (4) and section hingea (5) when deploying conveyor.

WARNING

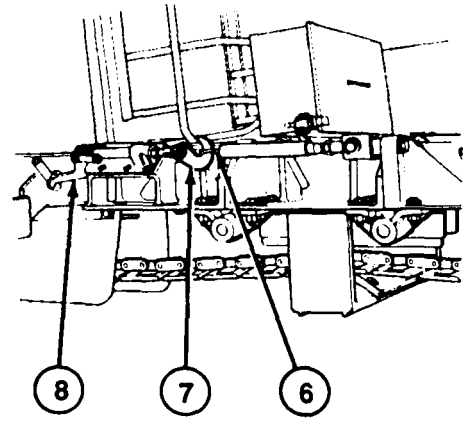
Make sure door is positioned at 120 degrees from closed. This will heip control speed of deployment.

5. Open upper rear door to 120 degrees from closed position (p 2-136). Pull conveyor deploying handles (3) toward rear. Pull handles (3) until conveyor extends fully.

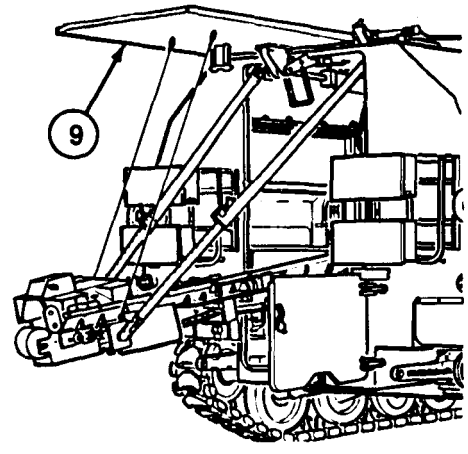


OPERATING THE CONVEYOR - Continued

6. Place loop (6) over hook (7). Pull forward on red handle (8). This stabilizes conveyor center hinges.



7. Position upper rear door (9) so conveyor reaches desired height.

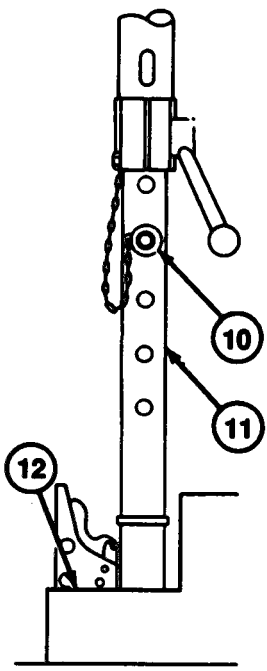


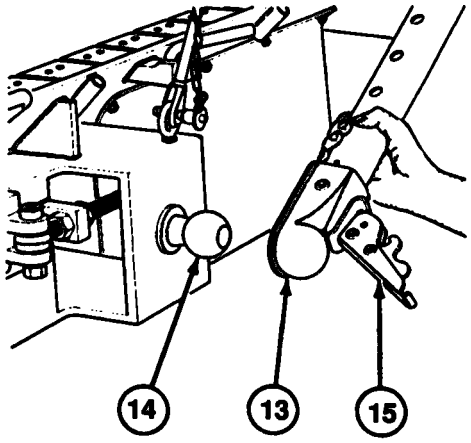
NOTE

If conveyor must be raised higher than is possible using door, conveyor may be lifted manually by three assistants.

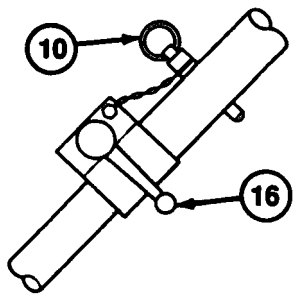
OPERATING THE CONVEYOR - Continued

8. Remove pins (10) from holes in left and right supports (11). Release conveyor supports from stowage brackets (12). Pivot and extend supports until end suckets (13) of supports aline with balls (14) of conveyor take-up section. Secure supports by closing hand clamps (15).





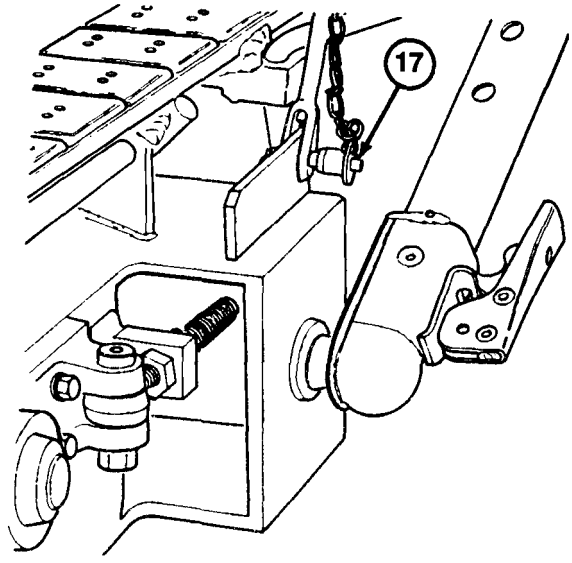
9. Drop pin (10) through holes and tighten friction damps (16) on conveyor supports.



OPERATING THE CONVEYOR - Continued

10. Lower upper rear door far enough to release cable tension.

11. Double check that friction clamps are tight and pins are properly placed through holes of supports. Then disconnect cables by removing quick-release pin (17) from each side. Move cables out of the way. Loop cables through handle of mechanical safety lock.



OPERATING THE CONVEYOR - Continued

WARNING

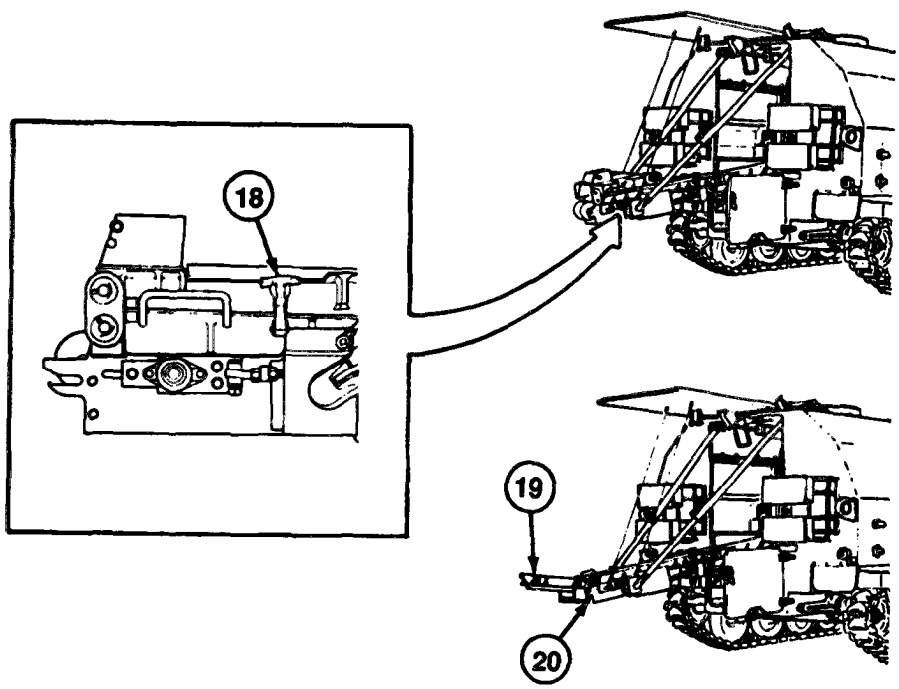
Always engage mechanical safety lock before beginning conveyor operations. This will prevent uppar resr door from dropping if hydraulic system falls.

12. Lower or raise upper rear door to either 45 or 90 degrees from closed position. This will engage mechanical safety lock. Raise door slightly until lock and lock stop are about 1/8 inch apart.

13. Release rubber end-section latch (18) at each end of conveyor. Flip out each end section (19) as shown below.

NOTE

Each conveyor end section (19) can be positioned at one of two angles (respective to angle of conveyor), using adjusting plates (20) under each end section.



OPERATING THE CONVEYOR - Continued

Installing Conveyor and Rear Door Shrouds

NOTE

When operating under blackout conditions or in bad weather, conveyor shroud and doorway shroud must be installed.

1. If necessary, install hoops (1) through channels in conveyor shroud (2).
2. Properly place conveyor hoops into conveyor hoop sockets (3).

NOTE

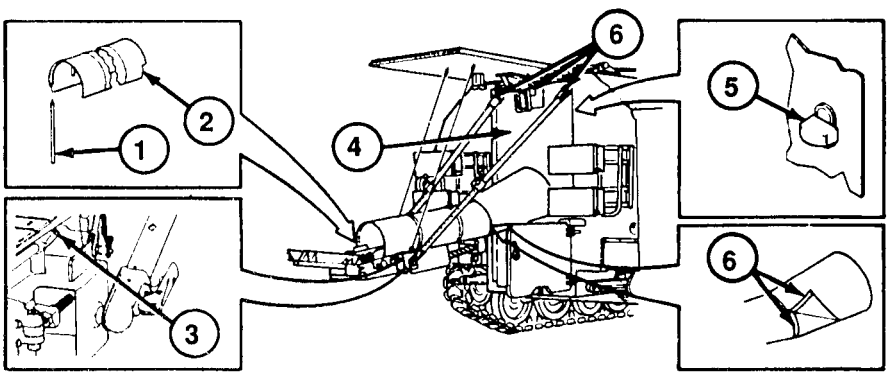
When positioning door shroud, observe stencil markings on shroud. Make sure side marked IN faces inside vehicle.

3. Position door shroud (4) over doorway. Secure shroud with fasteners (5).
4. Fasten shroud flaps around conveyor, conveyor supports and upper rear door cylinder using pressure-sensitive hook-and-pile tape (6).

CAUTION

Always remove and stow conveyor shroud, hoops and door shroud before stowing conveyor.

5. Before stowing conveyor, remove and stow conveyor shroud, hoops and door shrouds.



OPERATING THE CONVEYOR - Continued

WARNING

Keep hands clear of moving conveyor chain at all times.

WARNING

Do not operate conveyor with chain guard removed.

WARNING

When transporting powder charges on conveyor, always attach grounding cable to supported howitzer. This prevents buildup of static electricity, reducing chance of igniting a propelling charge.

WARNING

Do not drop or throw projectiles or propelling charges onto conveyor.

WARNING

Promptly remove projectiles and propelling charges from howitzer end of conveyor. Keep end section under observation. Turn off conveyor if ammunition begins to "pile up".

WARNING

Cables are not intended to support the conveyor under normal operating conditions. ONLY if conveyor support is missing or falls may cables be used to support conveyor during operation. When operating in this mode, avoid sudden movement of conveyor. Periodically inspect cables and attaching hardware for damage. Notify Organizational Maintenance immediately upon mission completion If cable damage exists.

OPERATING THE CONVEYOR - Continued

Loading Cargo onto M992

CAUTION

Never activate conveyor switches or directional control valve with conveyor stowed. Serious damage to conveyor could result from such action.

CAUTION

When positioning vehicle for conveyor operation, never allow weight of conveyor to be supported by cables only. Damage to cables and/or conveyor could result. Conveyor should be supported by left and right conveyor supports when positioning vehicle.

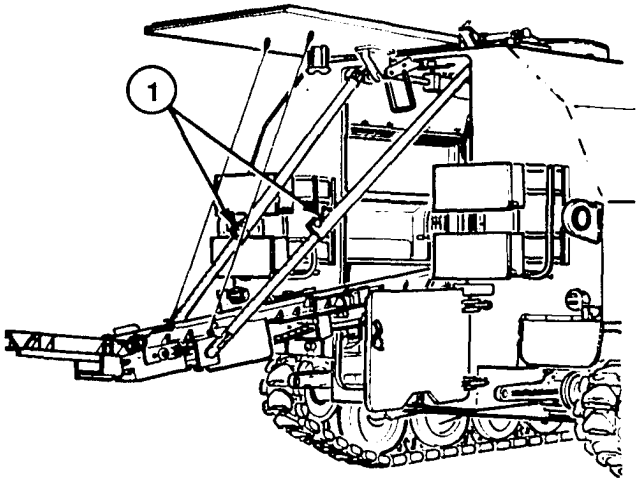
CAUTION

To avoid damage to the conveyor always stow conveyor before driving vehicle.

1. Deploy conveyor (p 2-148).
2. Position conveyor vertically and laterally for ammunition loader.

NOTE

If conveyor must be positioned above horizontal, it must be raised and held manually by three crewmen while a fourth man secures conveyor supports (1).



OPERATING THE CONVEYOR - Continued

WARNING

For safety of personnel in area when backing M992 Into position, always use ground guide(s).

NOTE

Backing instructions appear on page 2-99.

3. Back vehicle to ammunition stockpile. If ammunition is to be transferred from truck bed, back truck to M992, if possible.

WARNING

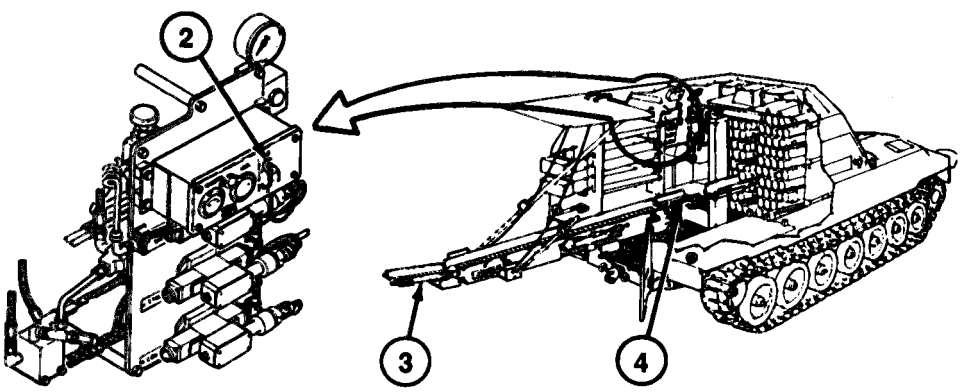
Attach ground cable to truck or stockpile. Failure to ground the M992 properly may result in explosion.

4. Attach ground cable to truck or stockpile.

5. Activate hydraulic system (p 2-129). Position conveyor switch (2) IN.

CAUTION

Loader must not Place ammunition onto conveyor at faster rate than it can be removed at inboard end.



6. Place ammunition onto outboard end section (3). Projectiles should be placed onto conveyor base-first.

7. Push ammunition onto conveyor chain. Conveyor will move ammunition to inboard end section (4).

OPERATING THE CONVEYOR - Continued

8. When ammunition reaches inboard end section, it must be removed promptly and stowed in designated areas.

Unloading Cargo from M992

1. Deploy conveyor (p 2-148).

WARNING

For safety of personnel In the area when backing M992 into position, always use ground guide(s).

NOTE

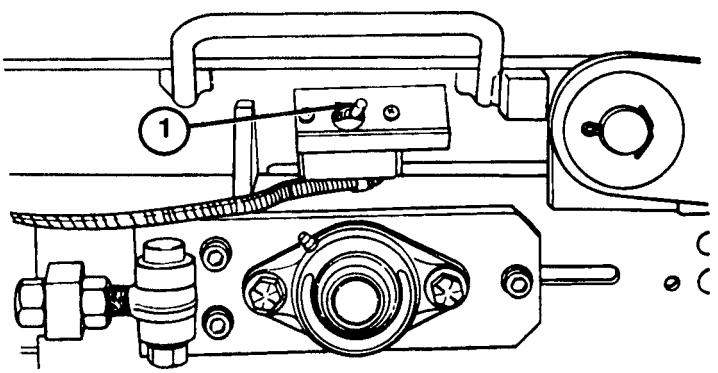
Backing instructions appear on page 2-99.

2. Back vehicle to receiving area. If cargo is to be unloaded to a supported howitzer, open howitzer rear personnel door, and back vehicle until conveyor reaches doorway.

3. Maneuver vehicle and conveyor, as necessary, to position outboard end section to comfortable unloading location for howitzer crew.

WARNING

Make sure conveyor override safety switch (1) is within easy reach of howitzer crew. This is necessary to provide the howitzer crew with capability to prevent ammunition "pile-up".

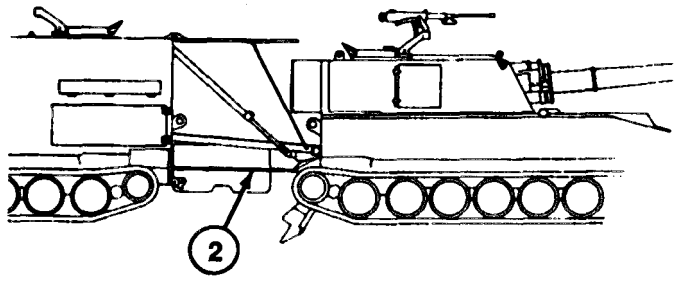


OPERATING THE CONVEYOR - Continued

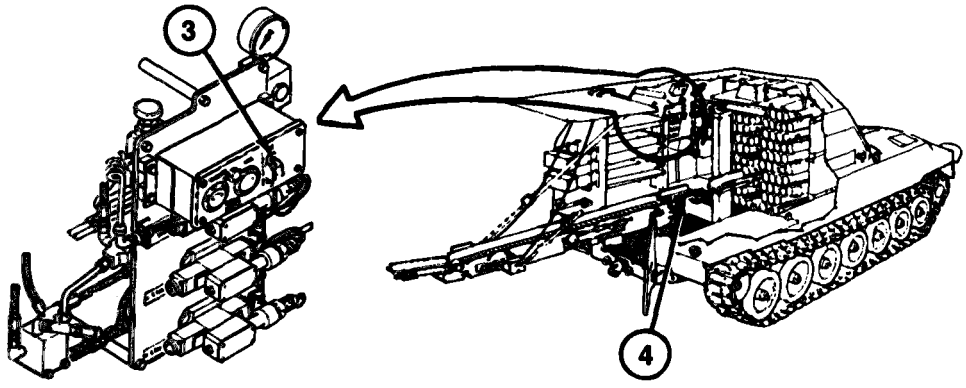
WARNING

Always attach grounding cable to howitzer before unloading ammunition. Failure to take this action may result in explosion of ammunition.

4. Attach grounding cable (2) to howitzer.



5. Activate hydraulic system (p 2-129). Move CONVEYOR switch (3) to OUT.



6. Remove a projectile from rack (p 2-184) using stacker (p 2-167), and slide projectile over inboard end section (4) onto conveyor chain.

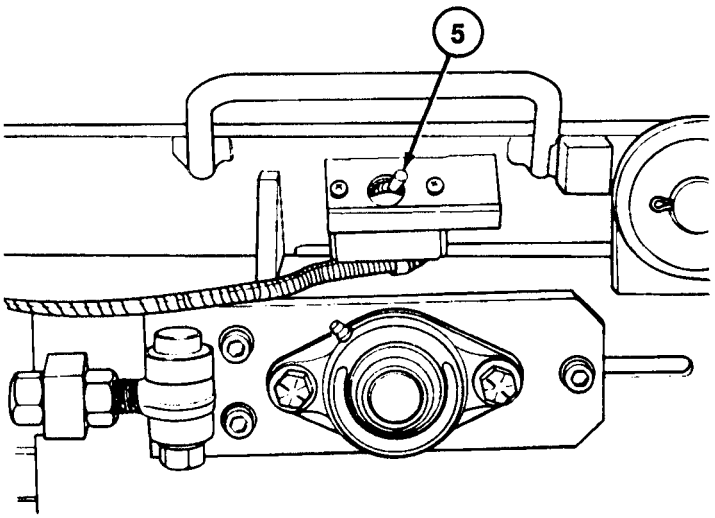
7. Place proper propelling charge (called for by howitzer crew) onto conveyor chain behind projectile.

OPERATING THE CONVEYOR - Continued

8. Howitzer personnel will remove projectiles and charges from outboard end section.

NOTE

Receiving personnel will use conveyor override switch (5), as necessary, to prevent “pile-up” of ammunition at outboard end section. It is responsibility of ATC to make sure that receiving personnel know of switch and are familiar with its use.



9. Repeat steps 6,7 and 8 to unload additional ammunition, as required.

OPERATING THE CONVEYOR - Continued

Conveyor Shutdown and Stowage

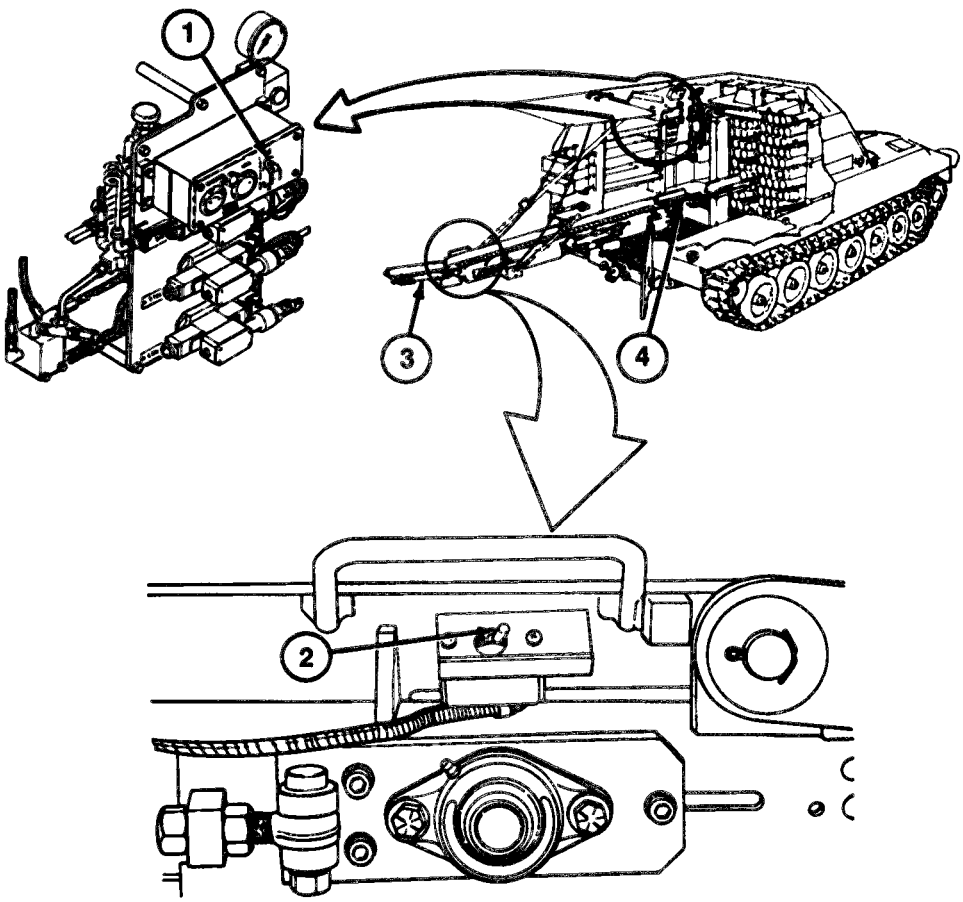
1. Move CONVEYOR switch (1) to middle OFF position.

2. Move conveyor override switch (2) to OFF.

CAUTION

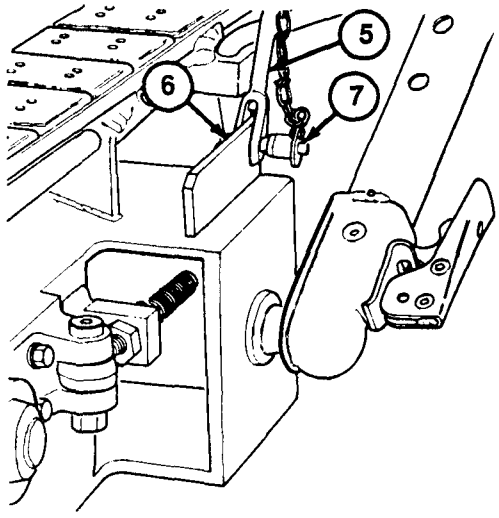
If rear door shrouds and conveyor shrouds have been Installed, they must be removed and stowed before conveyor is stowd.

3. Shutdown hydraulic system. Fold outboard and inboard end sections (3 and 4). Secure sections with rubber latches.



4. Remove ground cable from howitzer, truck or stockpile. Stow ground cable in space provided in your vehicle.

OPERATING THE CONVEYOR - Continued



5. Activate hydraulic system (p 2-129). Partially close upper rear door as necessary for each conveyor support cable (5) to reach its conveyor mounting eye (6).

6. Connect each cable, using quick-release pin (7).

7. Go to step a below if conveyor is positioned above horizontal. Go to step b if conveyor is positioned at, or below, horizontal.

   a. If conveyor is positioned above horizontal:

      1. Raise upper rear door to maximum height.

WARNING

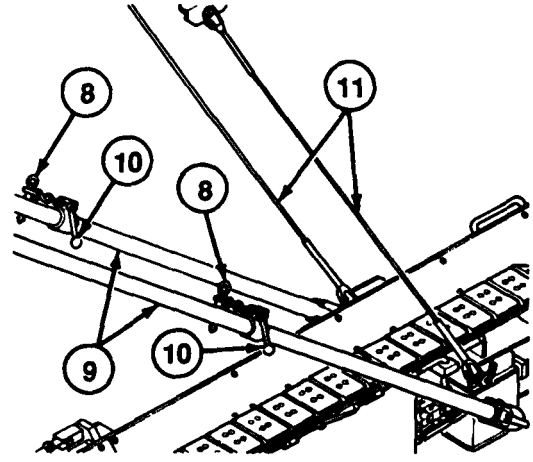
If conveyor is positioned above horizontal, it must be lowered manually. This is an operation for four people. Three people must restrain and lower conveyor slowly while a fourth person releases conveyor supports. Injury may result if the following procedure is done without enough assistance.

      2. Obtain three assistants to support and lower conveyor.

OPERATING THE CONVEYOR - Continued

3. When assistants have properly restrained conveyor, remove pins (8) from supports (9), and loosen friction clamps (10). The conveyor is now supported solely by assistants. Assistants shall lower conveyor slowly until it is held by cables (11).

4. Conveyor should now be in horizontal position; go to step b.



b. If conveyor is positioned at, or below, horizontal:

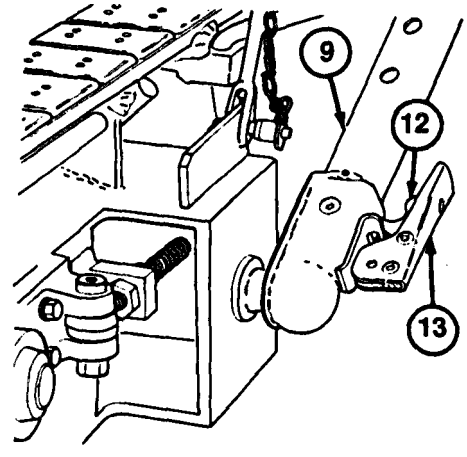
CAUTION

Do not draw cables so tight that undue stress is placed on them. Such stress could damage cables, upper rear door or conveyor.

1. Raise upper rear door until slack is removed from cables. Do not draw cables (11) so tight that stress is placed on them.

2. Restrain lower telescoping portions of supports (9) and disconnect supports by releasing safety latches (12) and latches (13).

3. If necessary, restrain lower telescoping portions of suppots (9) and remove pins (8) and loosen friction clamps (10). Retract supports and stow in bracets on floor. Install pins (8) through holes of supports (9).



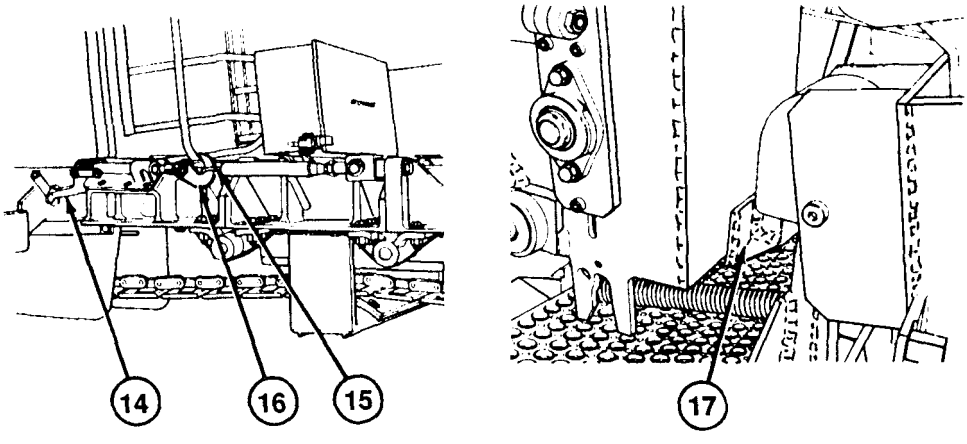
OPERATING THE CONVEYOR - Continued

WARNING

Before unlocking center hinges, operate upper rear door to raise conveyor above horizontal. This will make sure that conveyor clears the ground and operator's feet during conveyor stowing.

WARNING

NEVER unlock center hinges unless cables are attached. Failure to heed this warning will allow the conveyor to collapse, causing damage or serious injury.



8. Operate upper rear door to raise the conveyor above horizontal,

9. To unlock hinges at conveyor's center section, pull out on red handles (14). Remove loops (15) from hooks (16).

10. To fold conveyor into vehicle:

    a Position door at maximum height (120 degrees from closed).

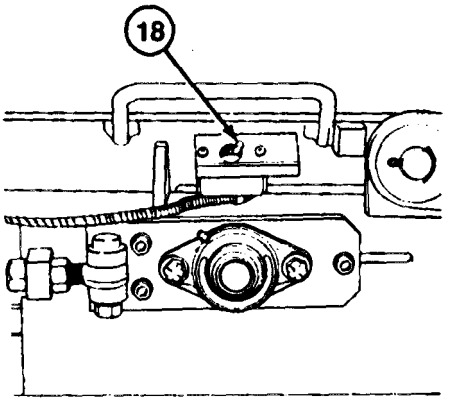
    b. Push down firmly on conveyor handles.

    c. Push forward and up quickly and firmly.

    d. After conveyor is folded inside vehicle, lift up on outboard conveyor end and place it on bracket (17).

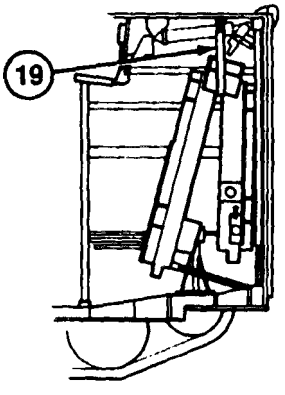
OPERATING THE CONVEYOR - Continued

11. Double check to make sure conveyor safety switch (18) is OFF.

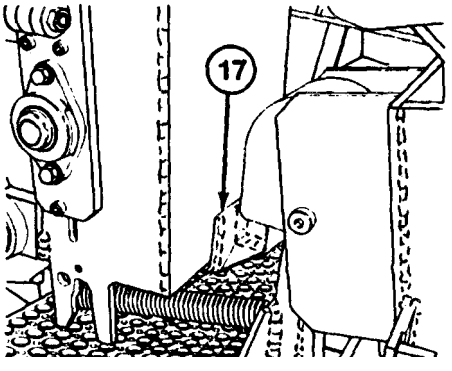


WARNING

To avoid damage to conveyor components and serious injury to personnel during upper rear door operation, secure conveyor with strap after placing it on bracket.



12. With assistant supporting conveyor, secure conveyor with stowage strap (19). Tighten strap (19).



13. Close upper rear door (p 2-136). As door closes, hold conveyor in place on bracket (17).

14. Shut down hydraulic system.

15. Close lower rear door (p 2-135).

OPERATING THE STACKER

WARNING

Keep fingers clear of tray (1) when loading projectiles onto stacker tray (1).

WARNING

To prevent Injury, stand clear of tray (1) as it raises or lowers.

WARNING

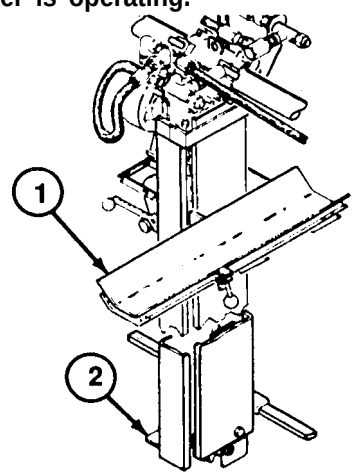
To minimize chances of dropping projectiles when loading or unloading tray (1), line up stacker tray (1) exactly with projectile rack tube or conveyor end section.

WARNING

Use stacker foot brake (2) to prevent lateral movement of stacker while loading or unloading. If this precaution Is not observed, projectiles may be dropped.

WARNING

Due to high intensity noise, hearing protection is required while stacker is operating.



CAUTION

Canister restraint bars on left rear canister compartment must be moved out of the way to fill/empty extreme left projectile rack tubes. Damage to projectiles, stacker or restraint bars will result if this precaution is not taken.

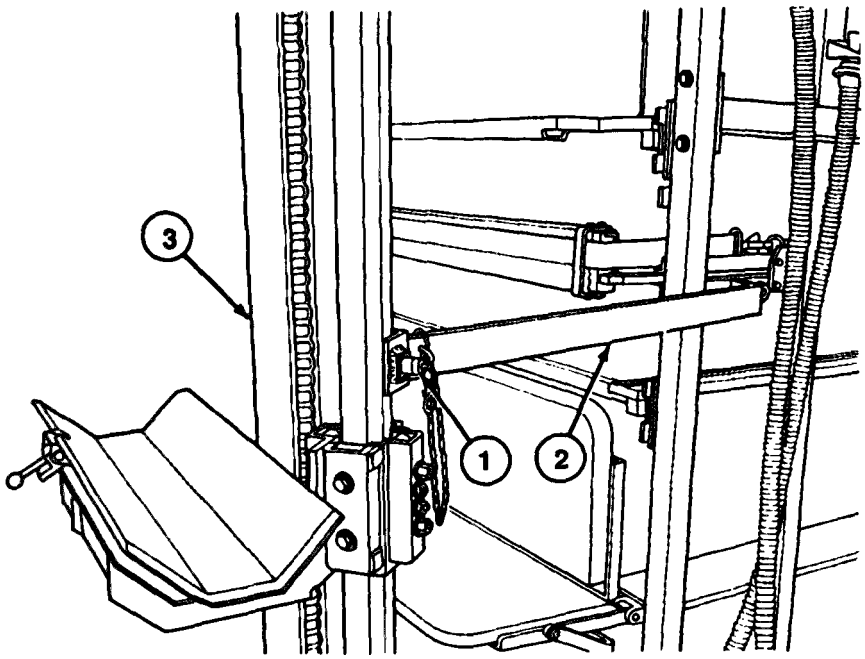
OPERATING THE STACKER - Continued

Using Stacker to Unload Projectiles

1. Turn on hydraulic system (p 2-129).
2. Prepare conveyor for operation (p 2-148).
3. Remove quick-release pin (1) securing restraint bar (2) to stacker vertical column. Pivot restraint bar downward to a position beside canister compartment. Reinsert quick-release pin through restraint bar (2).

WARNING

To avoid injury, never operate stacker without chain guards (3) in place.



4. Unlock appropriate projectile rack (p 2-184).

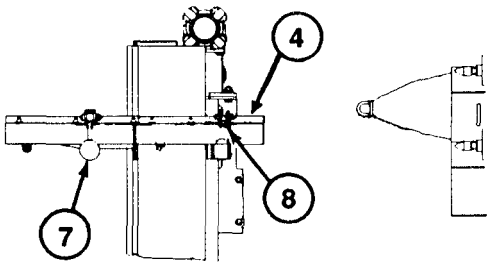
OPERATING THE STACKER - Continued

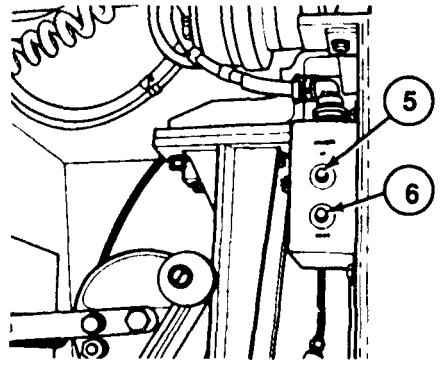
5. Move stacker left or right to horizontally aline tray (4) with desired projectile.

NOTE

Stacker tray (4) will not move up or down if upper rear door is operating.

6. Raise or lower stacker tray (4) to vertically aline top of tray with bottom of desired projectile tube. To raise tray, press and hold UP button (5); to lower tray, press and hold DOWN button (6).

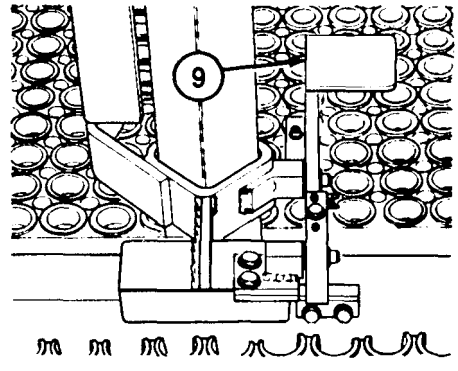




7. Raise tray handle (7) and slide stacker tray toward projectile. Drop handle into locking notch of tray carrier (8).

8. Place foot on stacker brake pedal (9). Apply sufficient pressure to pedal to prevent side-to-side movement.

9. Pull projectile from tube onto stacker tray.



10. Raise stacker tray handle and slide tray toward rear of vehicle.

11. Release stacker foot brake and move stacker left or right to aline stacker with conveyor inboard end section.

OPERATING THE STACKER - Continued

12. Raise or lower stacker tray by pressing UP or DOWN button; aline stacker tray with inboard end section of conveyor.

13. Apply stacker foot brake pedal to prevent side-to-side stacker movement.

14. Push/pull projectile onto conveyor inboard end section.

15. Operate conveyor to unload projectiles from vehicle (p 2-158).

NOTE

To unload quickly, conveyor operation may continue while next projectile is transferred by stacker.

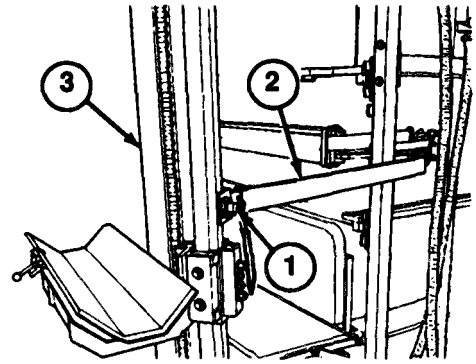
16. Repeat procedures to unload additional projectiles as required.

Using stacker to Loed Projectiles

1. Turn on hydraulic system (p 2-131).

2. Prepare conveyor for operation (p 2-148).

3. Remove quick-release pin (1) securing restraint bar (2) to stacker vertical column. Pivot restraint bar down ward to a position beside canister compartment. Reinsert quick-release pin through restraint bar.



WARNING

To avoid Injury, never operate stacker without chain guards (3) In place.

4. Unlock projectile rack that is to be loaded (p 2-1 84).

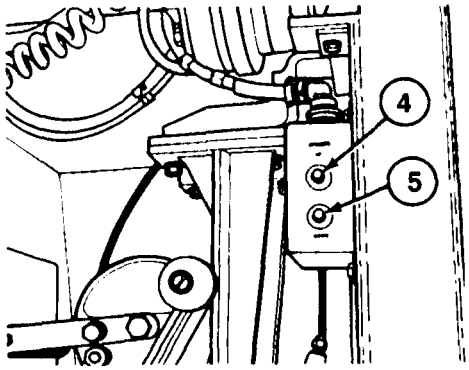
5. Move stacker left or right to horizontally aline stacker tray with conveyor.

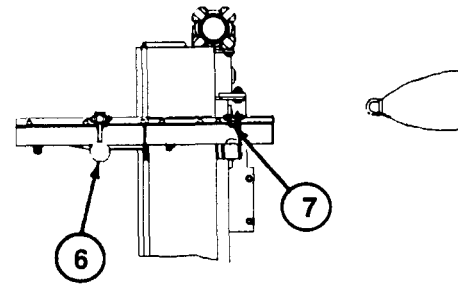
OPERATING THE STACKER - Continued

NOTE

Stacker tray will not move up or down if upper rear door is operating.

6. Raise or lower stacker tray to aline it with conveyor's inboard end section. To raise tray, press and hold UP button (4); to lower tray, press and hold DOWN button (5).





7. Raise tray handle (6) and slide stacker tray toward conveyor. Drop handle into locking notch of tray carrier (7).

8. Operate conveyor to load projectiles onto vehicle (p 2-157).

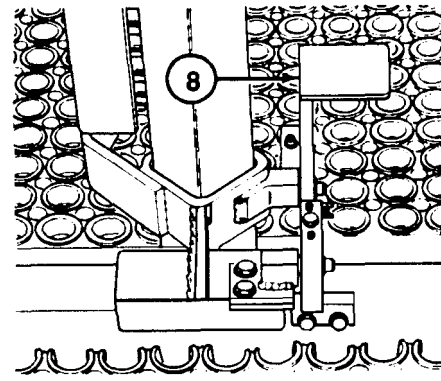
NOTE

To load quickly, conveyor operation may continue uninterrupted.

9. Place foot on stacker brake pedal (8). Apply sufficient pressure to pedal to prevent side-to-side stacker movement.

10. Pull projectile from conveyor onto stacker tray.

11 Release stacker foot brake and move stacker left or right to horizontally aline stacker with correct projectile tube.



OPERATING THE STACKER - Continued

12. Raise or lower stacker tray by pressing UP or DOWN button. In this manner, vertically aline projectile with correct tube.

13. Raise stacker tray handle and slide tray toward front of vehicle.

14. Apply stacker foot brake to prevent side-to-side stacker movement.

15. Push projectile into tube.

16. Repeat loading procedures to fill remaining four tubes. After rack is filled, lock rack (p 2-186).

Shutting Down and Stowing

1. Activate hydraulic system and lower stacker tray to the floor.

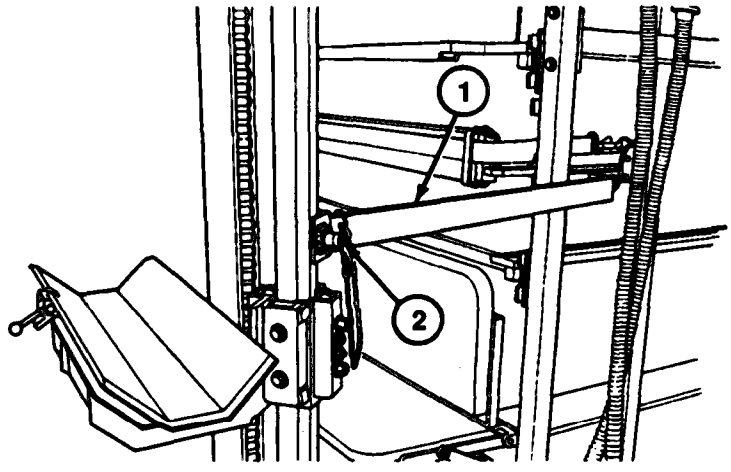
2. Shut down hydraulic system (p 2-122).

CAUTION

To avoid damage to stacker components, secure stacker with restraint bar (1) and quick-release pin (2) before moving vehicle.

3. Remove quick-release pin (2) from stacker-restraint bar (1). Move stacker and restraint bar as necessary to aline pin hole in vertical column of stacker with pin hole in bar.

4. insert quick-release pin through holes in stacker and bar.



PROPELLING CHARGE STOWAGE AREAS

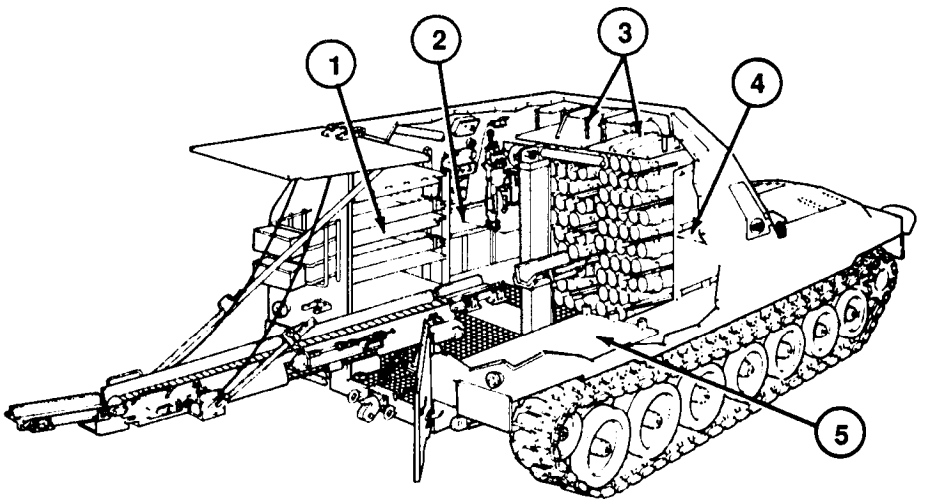
Stowage Locations

WARNING

Handle explosive ammunition and components containing explosives with extreme care. DO NOT DROP, DRAG, THROW OR STRIKE ammunition or related components. Explosive elements in primers and fuzes are sensitive to shock.

The M992 canister storage areas have been designed to carry 99 propelling charges for 155mm howitzer. A restraint system, using straps and bars, has been designed for canister storage areas. These restraints secure canisters during transit.

To take advantage of space available, an exact arrangement of canisters is specified. The basic areas for canister stowage are left rear shelf area (1), on left sponson (2), above projectile racks (3), in right front shelf area (4), in right rear shelf area (5). These areas also provide stowage for 13 fuze boxes, four boxes of .50-caliber ammunition, one box of primers and three copperhead rounds.



PROPELLING CHARGE STOWAGE AREAS - Continued

The following charts show stowage locations and quantities for charges, fuzes, 50-caliber ammunition, primer and copperhead rounds.

Quantity and Locations:

CHARGES

SIZE CHARGE		R.H. FRONT COMPT	R.H. REAR COMPT	L.H. FRONT COMPT	L.H. REAR COMPT	ABOVE RIGHT RACK	ABOVE LEFT RACK	ON THE SPONSON	TOTAL QTY
155mm	M3A1					2 EACH PER 5 CAN-ISTERS			10
	M4A2	5	11	20				9	45
	M119A2	3	24	15			2		44
									99

FUZE BOXES

L.H. REAR COMPT	ON THE SPONSON	BEHIND LEFT PROJECTILE RACK	TOTAL
3	8	2	13

.50-CAL. AMMUNITION

L.H. REAR COMPT	R.H. REAR COMPT	TOTAL
1	3	4

PRIMER

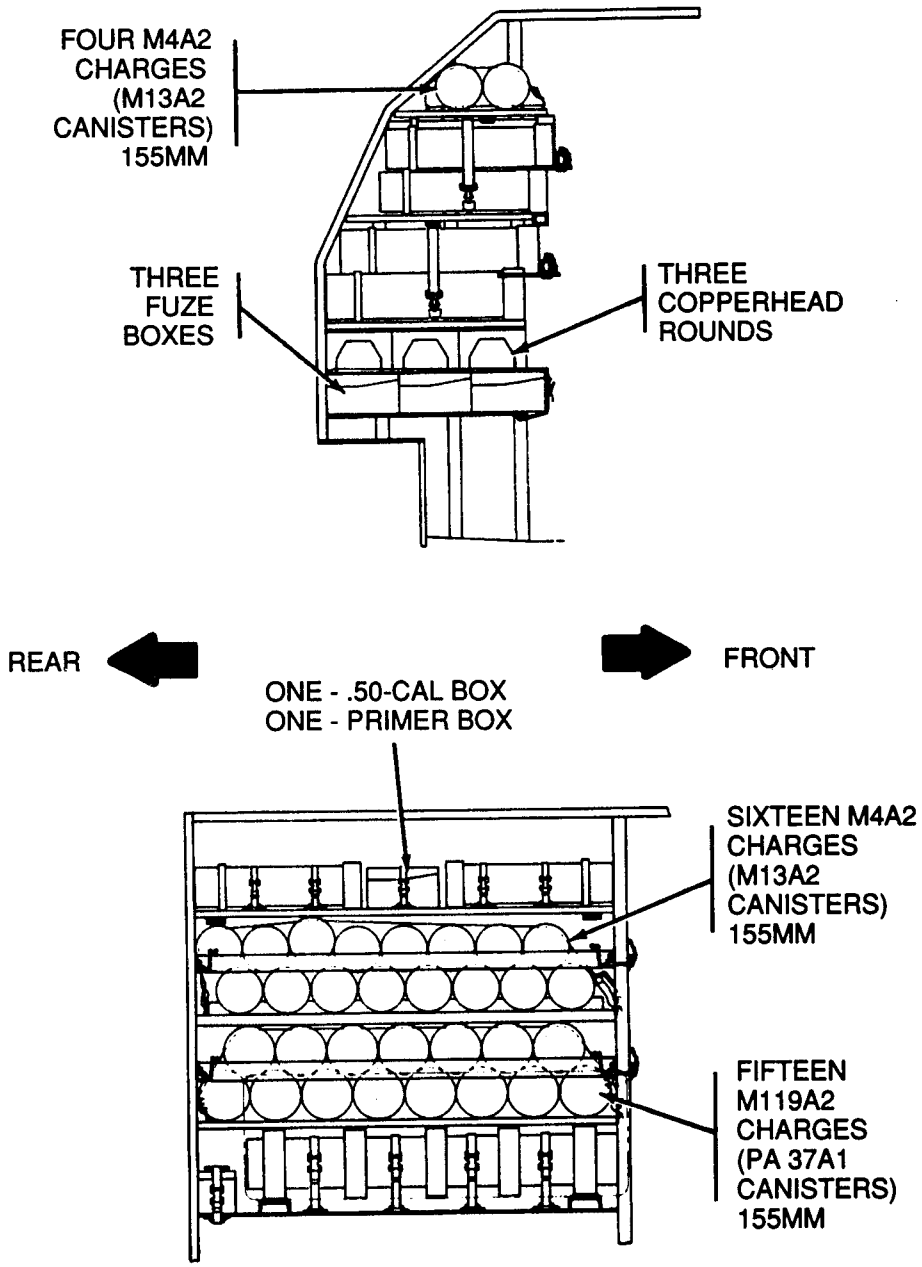
L.H. REAR COMPT
1

COPPERHEAD ROUNDS

L.H. REAR COMPT
3

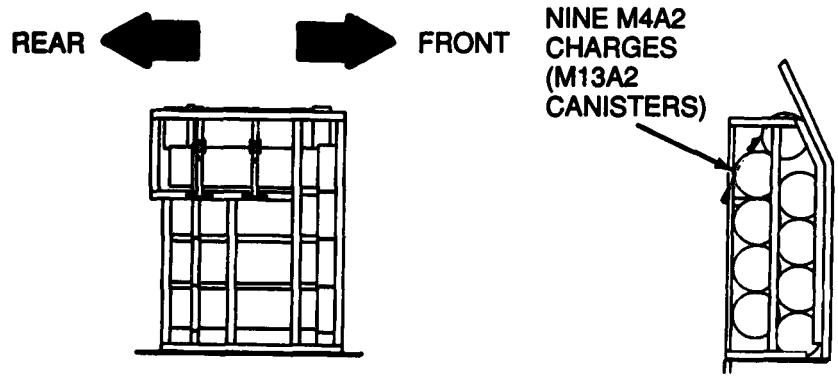
PROPELLING CHARGE STOWAGE AREAS - Continued

Left Rear Shelf Area

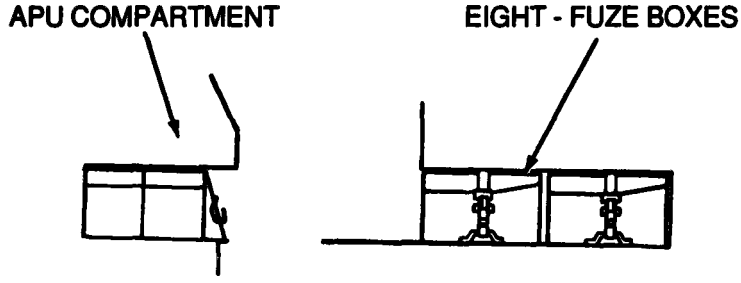


PROPELLING CHARGE STOWAGE AREAS - Continued

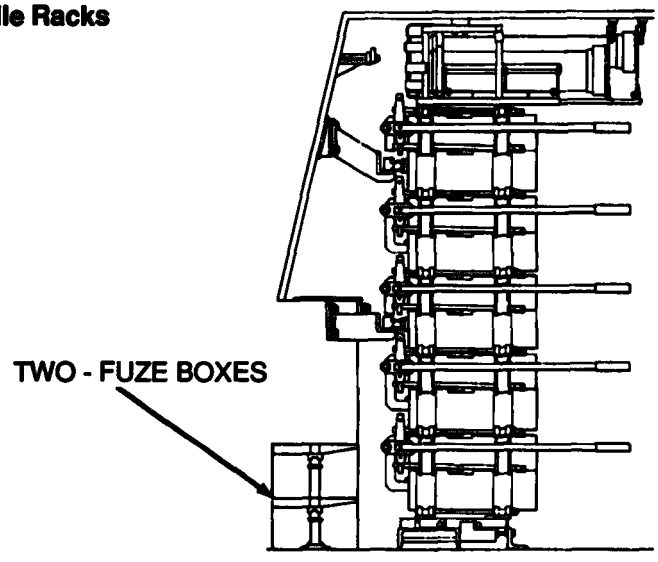
On The Sponson



On the Sponson, Under the APU Compartment

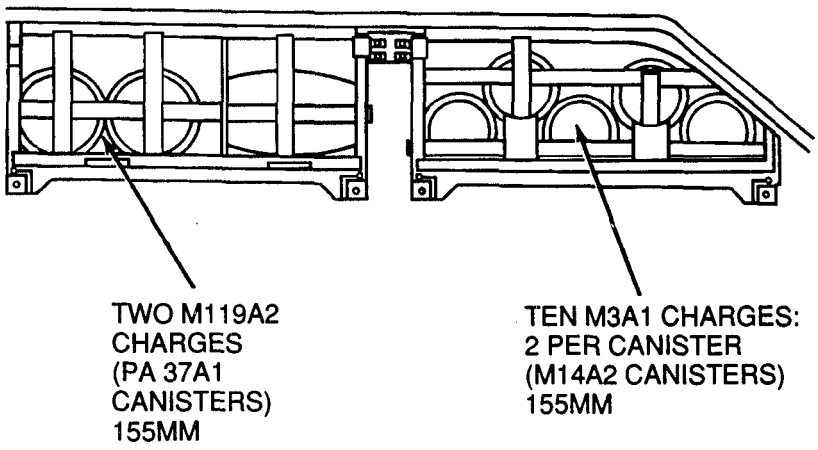


Behind Projectile Racks

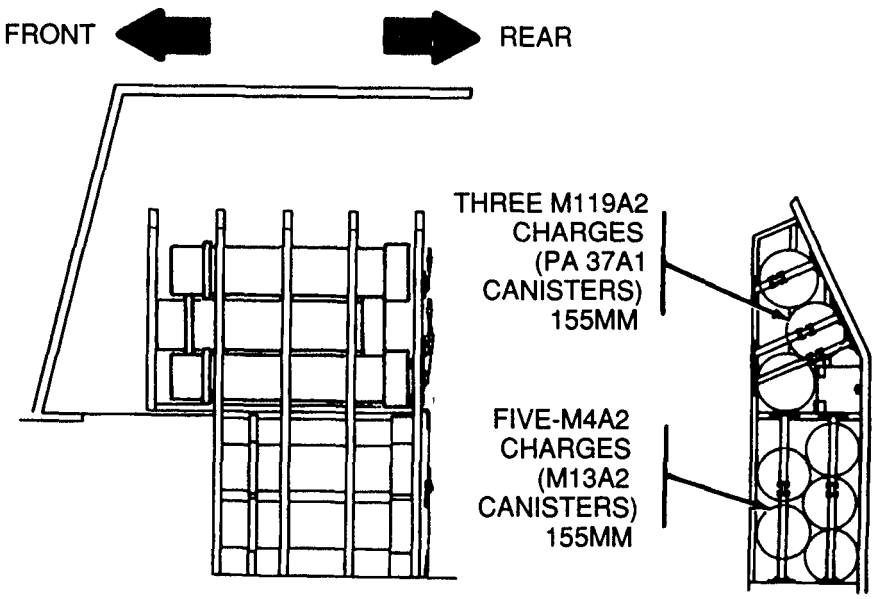


PROPELLING CHARGE STOWAGE AREAS - Continued

Above the Racks

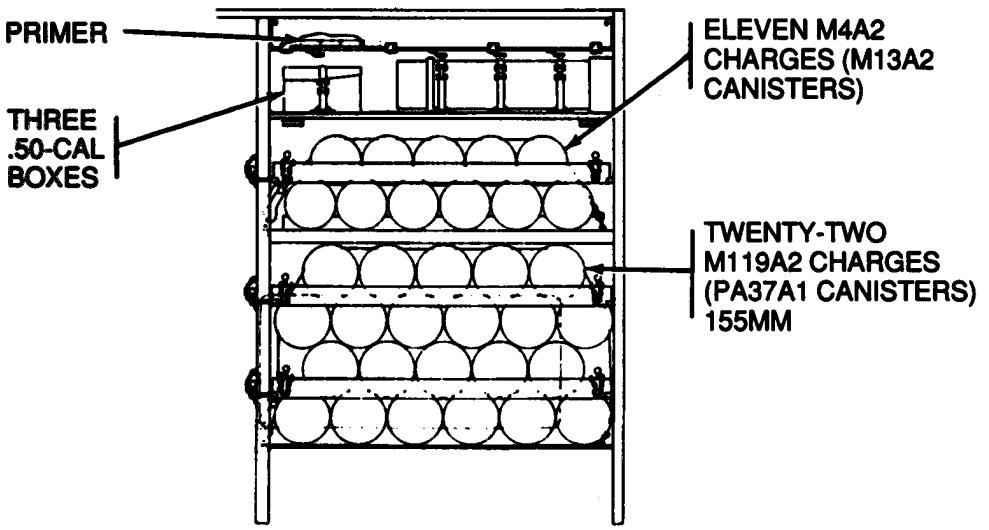


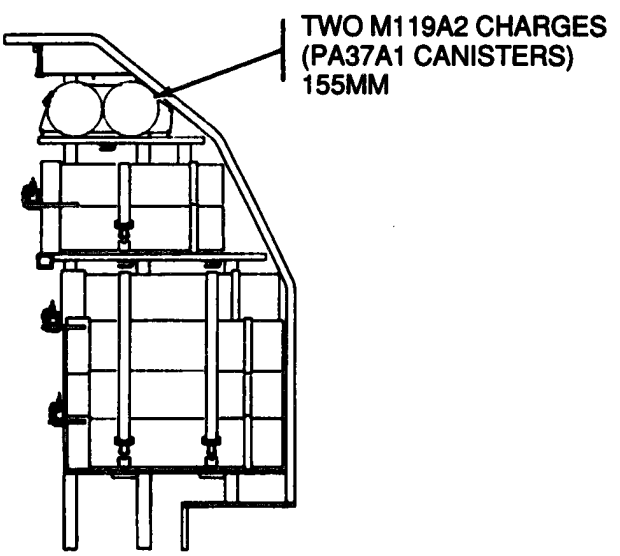
Right Front Shelves



PROPELLING CHARGE STOWAGE AREAS- Continued

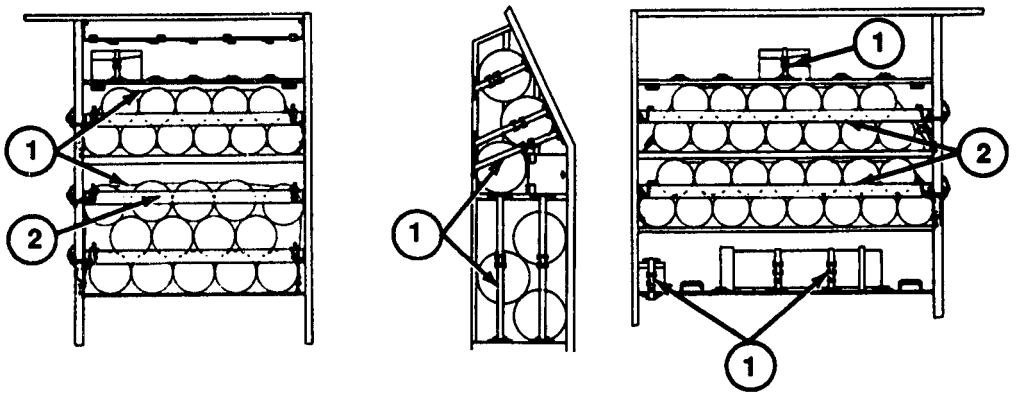
Right Rear Shelves





PROPELLING CHARGE STOWAGE AREAS - Continued

Restraint System



Straps (1) on canister shelves secure canisters at each shelf. These straps pass over canisters and must be loosened or removed before canisters can be loaded or unloaded. In most cases these straps do not have to be moved to remove charges from canisters.

Bars (2) on right and left rear canister stowage shelves secure canisters for transit. These bars must be removed when canisters are loaded or unloaded. They must also be removed when charges are taken from canisters.

CAUTION

Bars (2) at left rear shelves may Interfere with stacker operation. Before operating stacker at extreme ieft of machine, remove left-side bars. Damage to bare, stacker or projectile may result if this precaution is not taken.

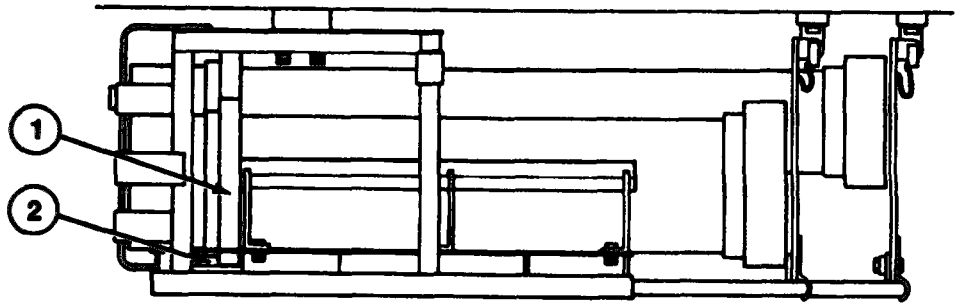
PROPELLING CHARGE STOWAGE AREAS - Continued

Loading Propelling Charge Canisters

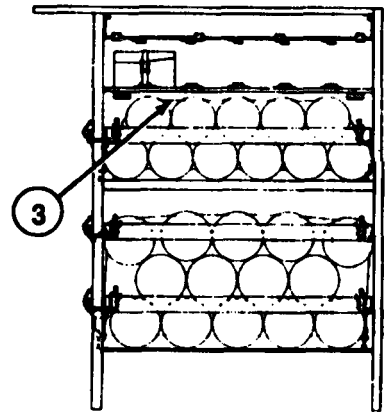
1. Open canister side doors (p 2-132) and/or deploy conveyor (p 2-148).
2. Load propelling charge canisters via conveyor (p 2-158) or canister compartment side doors.
3. Place propelling charge canisters in specified stowage areas (p 2-173).

NOTE

When loading canisters into stowage boxes above projectile racks, push canisters fully toward front of vehicle so that flange of canisters (1) drops into slots (2) at bottom of box. This will lock canisters into place.



4. Remove straps from hold-open hooks and tighten hold-down straps (3) at each canister stowage area.



PROPELLING CHARGE STOWAGE AREAS - Continued

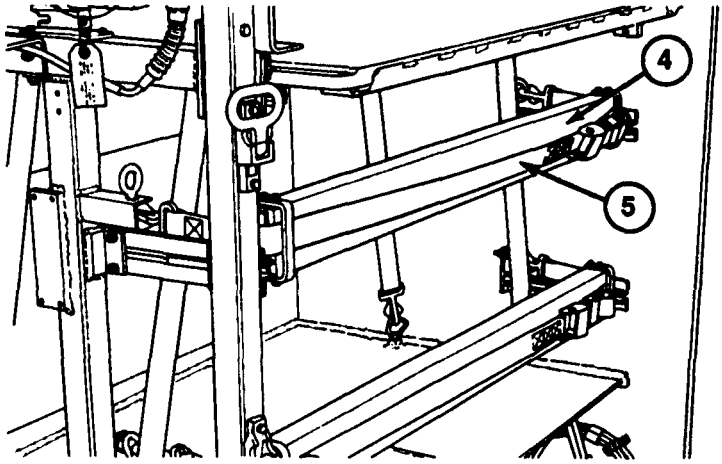
5. Secure each restraint bar (4) and strap (5) as follows:

   a. Slide bars into position against canisters.

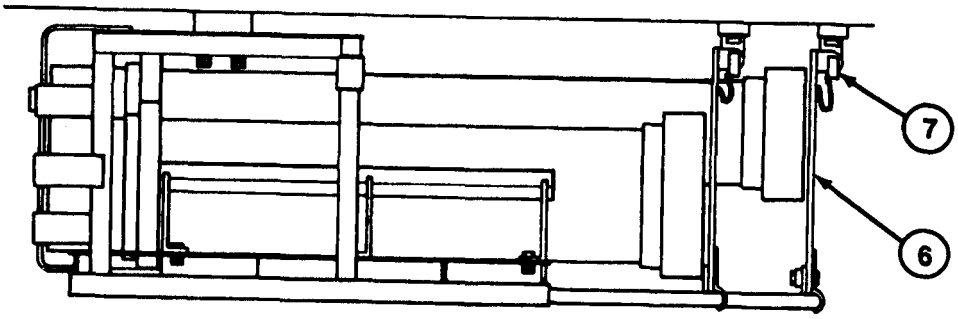
   b. Make sure restraint strap is hooked at each end.

   c. Tighten strap securely by pulling free end.

   d. Secure straps on sponson and right front areas.



6. Pivot guard plates (6) upward. Secure guard plates by installing quick-release pins (7).



PROPELLING CHARGE STOWAGE AREAS - Continued

Unloading Propelling Charge Canisters

NOTE

Canisters may be unloaded by hand through canister side door. They may also be unloaded using conveyor (p 2-148).

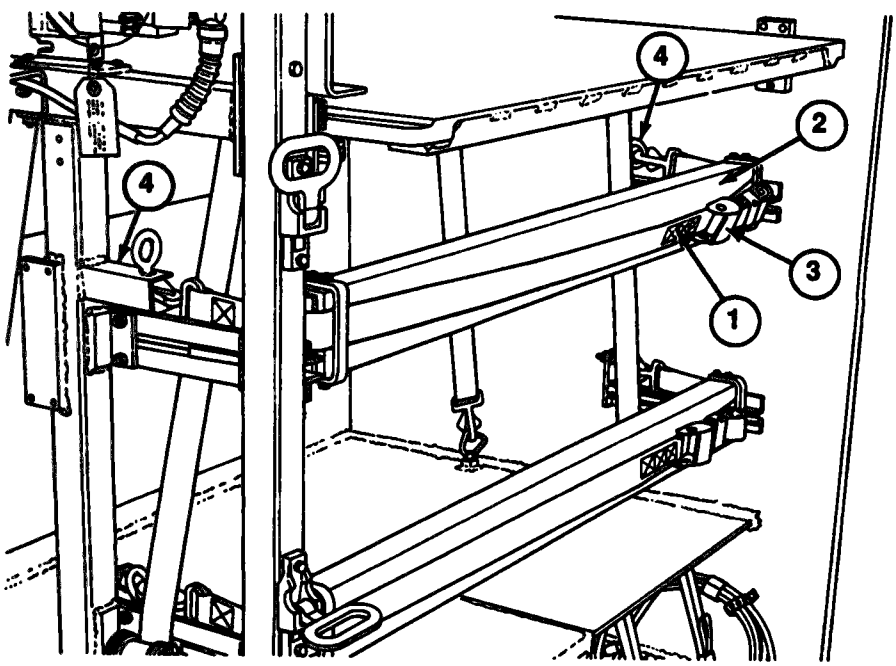
1. Open canister side doors (p 2-132) and/or deploy conveyor (p 2-148).
2. Loosen restraint straps (1) and bars (2) from left and right rear shelves as follows:

   a. Loosen straps by depressing lever (3) and pulling strap.

   b. Slide bar out and allow it to suspend from strap.

NOTE

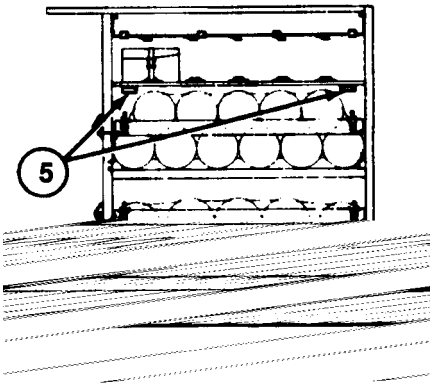
If necessary, bar and strap maybe removed by unhooking strap from eyes (4) and pulling bar from channels.

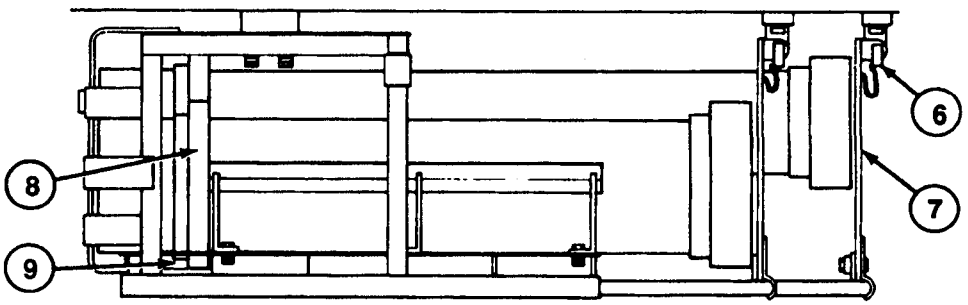


PROPELLING CHARGE STOWAGE AREAS - Continued

3. Loosen and lay aside all hold-down straps. Straps in left and right rear compartments may be retained by hold-open hooks (5).

4. Remove quick-release pin (6) from front guard plate (7).





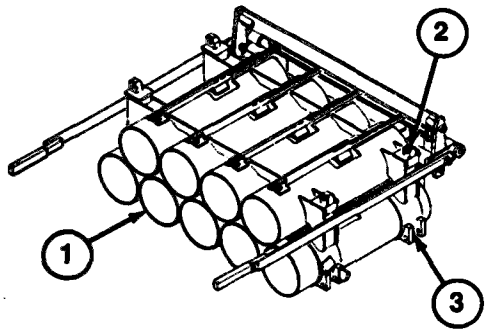
5. Remove canisters from left and right rear compartments, sponson, above projectile racks and from right front shelf area. Canisters may be unloaded via conveyor (p 2-158) or canister compartment side doors.

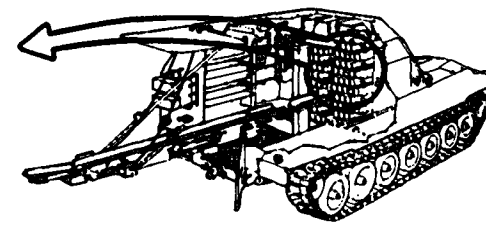
NOTE

Canisters stowed above projectile racks are locked in place by flange of canister (8) fitting into a slot (9) in bottom of box. To remove canisters, tip outer end of canister downward, freeing flange from slot.

PROJECTILE RACK OPERATION

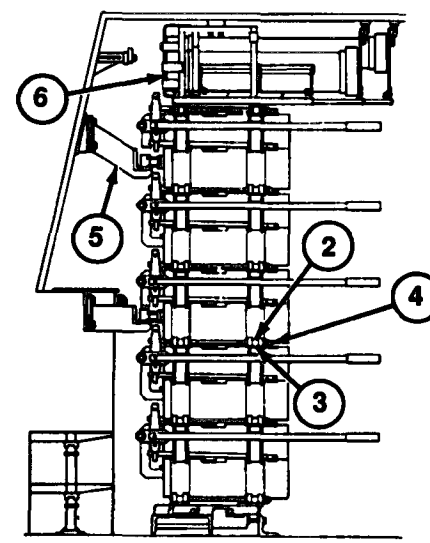
Projectile rack assemblies in M992 carry 90 projectiles. The rack assemblies are arranged in two sets of five racks (1) each. The rack assemblies are mounted against front wall of cargo compartment and are removable.





Each rack has four legs (2) which project from its top corners. Four receptacles (3) at the base of each rack slip over the legs of the rack below. Once in place, racks are pinned together with rods (4). Each rack assembly is secured to front wall by brackets (5). Rack assemblies are also secured at top.

Above each rack assembly a stowage box (6) attaches to rack below it.



WARNING

Handle projectiles carefully. Contact between projectiles and fire extinguisher could cause extinguisher to discharge, causing personal injury or damage to the vehicle.

NOTE

Right front double seat must be stowed (under APU compartment) before stowing or removing projectiles from tubes in the right lower corner.

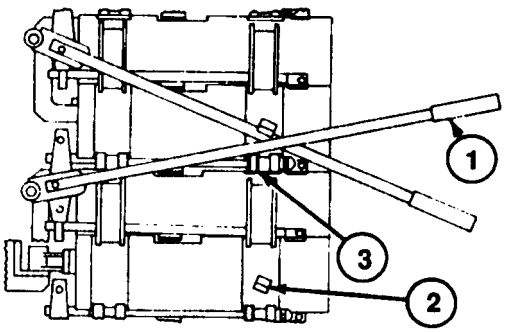
PROJECTILE RACK OPERATION - Continued

Loading and Stowing Projectiles

1. Unlock rack to be loaded by releasing both handles (1) from locking clips (2).

NOTE

If necessary, install extension handle over projectile rack handle to obtain additional leverage.



2. Secure handles in unlocked position by pushing them upward and locking them with locking clips (3) on rack above. Handles on top racks can be retained by locking clips on stowage boxes.

3. Use conveyor (p 2-148) and stacker (p 2-166) to move each projectile to rack tube.

CAUTION

Do not force projectiles into tubes. If projectile will not slide Into tube, check to make sure handles are retained upward. Damage to locking pad could result if projectile Is forced into tube with locking handles down.

4. Load each projectile into an unlocked rack tube,

5. As each rack is filled, lock projectiles in it by pushing rack handles out and down. Position both rack handles into locking clips,

6. After all projectiles have been loaded and locked into place, pull on each projectile. If any projectile can be pulled out, remove it, relocate it in another tube, or unload it. Lock rack and notify Organizational Maintenance.

PROJECTILE RACK OPERATION - Continued

Unloading Projectiles

NOTE

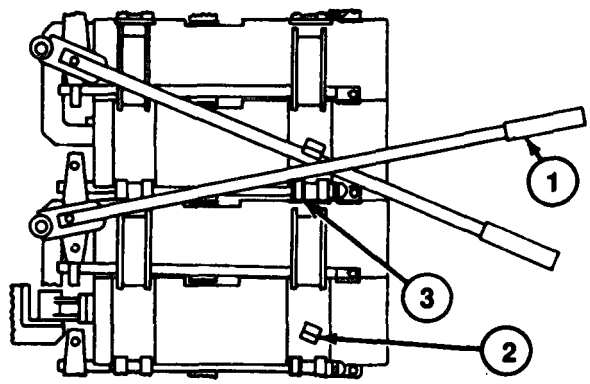
Before beginning to unload projectiles from racks:

- Vehicle must be on level ground.
- Conveyor must be deployed, positioned and operational (p2-148).
- Stacker must be released from its stowed position (p 2-167).

1. Unlock only rack to be unloaded by releasing both handles (1) from locking clips (2).

NOTE

If necessary, install extension handle over projectile rack handles to obtain additional leverage.



2. Secure handles in unlocked position by pushing them upward and locking them with locking clips (3) on rack above. Handles on top racks can be retained by locking clip on stowage boxes.

NOTE

If any projectile sticks, refer to troubleshooting section p 3-17).

PROJECTILE RACK OPERATION - Continued

3. Remove projectiles (one at a time) from unlocked rack. Use stacker and conveyor to move projectile from vehicle.

4. As each rack is unloaded, lock rack by pushing rack handles out and down. Position both rack handles into locking clips.

5. Repeat steps 1 through 4 to unload additional projectiles.

Moving Projectile Racks

WARNiNG

Before moving rack assemblies, park vehicle on level ground. if vehicle is not level, racks may tip, causing injury or damage.

WARNING

if both rack assemblies are to be moved, move right rack assembly first. After ieft rack assembly is moved, leave hoisting hook attached; this support is necessary because the racks tend to tip forward when both rack assemblies are moved back.

WARNiNG

This operation requires two persons - one on top of vehicle and one inside crew compartment. Obtain an assistant before proceeding.

WARNiNG

Handie projectiles carefully. Contact between projectiles and fire extinguisher could cause extinguisher to discharge, causing personai injury or damage to the vehicle.

NOTE

For some PMCS, it will be necessary to gain access to area between projectile racks and front wail.

1. Remove all projectiles from rack assembly to be moved. Also, remove stowed items from stowage boxes at top of rack assembly.

2. If only one rack assembly is to be moved, position stacker at front of station ary rack assembly (Example: if oniy left rack assembly is to be moved, position stacker in front of right rack).

3. If both rack assemblies are to be moved, position stacker in front of ieft rack assembly and vertically position stacker tray midway up stacker column. Lift tray handle and pull stacker tray toward rear of vehicle; engage tray handle in notch.

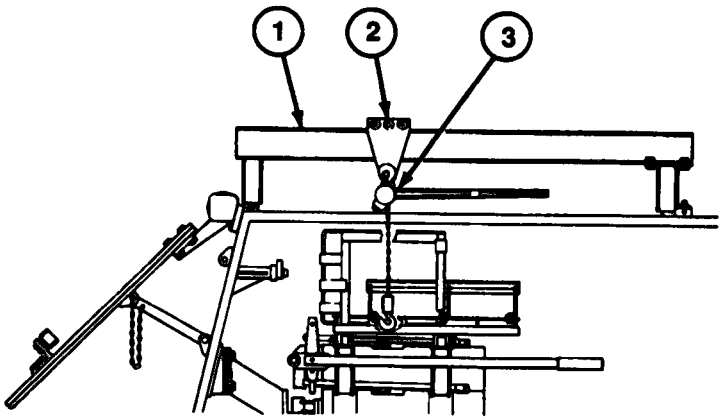
PROJECTILE RACK OPERATION - Continued

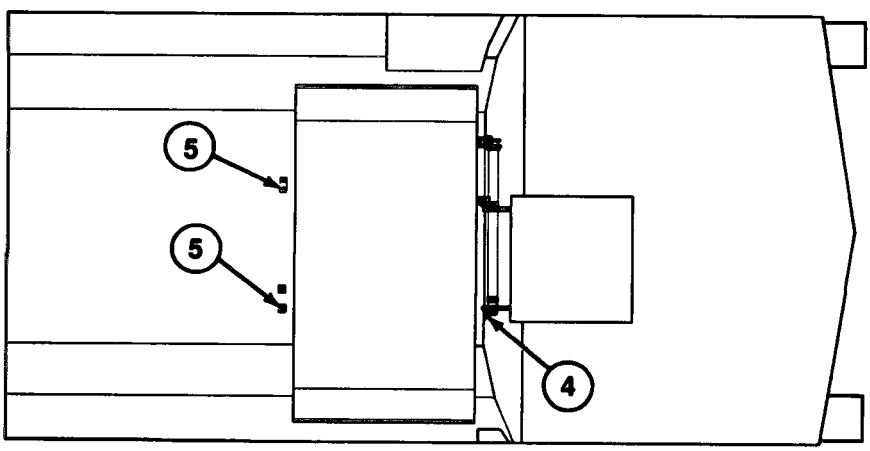
4. Open all three top doors (p 2-133 and 2-134).

5. Remove beam (1), trolley assembly (2) and hoist (3) from stowage locations. Assemble beam (1), trolley (2) and hoist (3).

WARNING

If both rack assemblies are to be moves, move right rack assembly first.





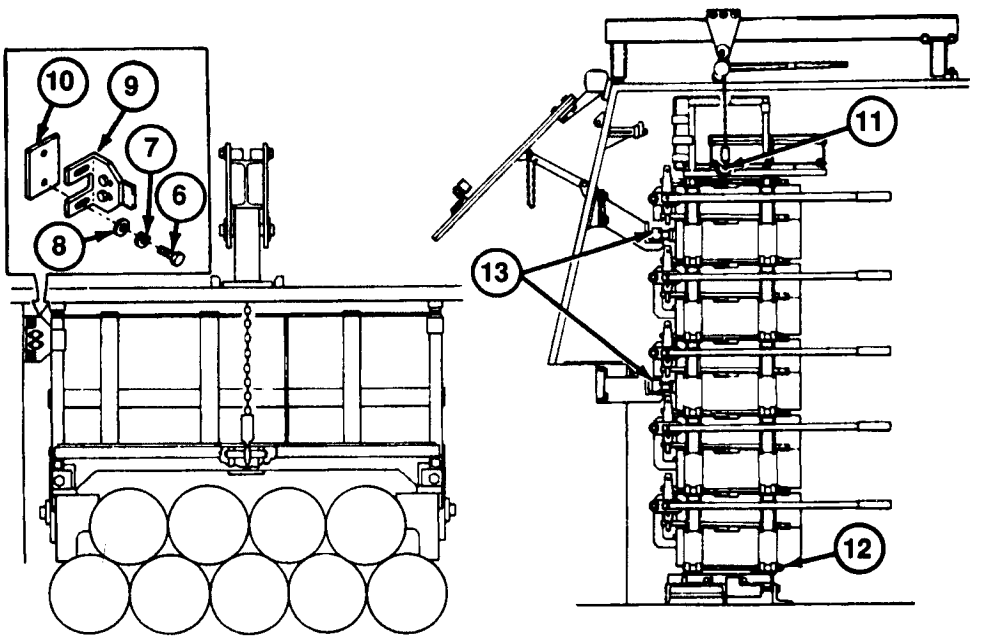
6. Position beam and trolley assembly above racks to be moved. Lower assembly so that support legs of beam engage block (4) and right pin (5) at either side of vehicle roof.

PROJECTILE RACK OPERATION - Continued

7. If left rack assembly is to be moved, remove two screws (6), two Iockwashers (7) and two flat washers (8) from angle (9). Remove angle (9) and spacer (10).

8. Attach hoist to trolley.

9. Lower hoisting hook and secure it around lifting rod (11). Pull free end of chain to take up slack.



10, Use a 3/4-inch socket wrench to remove bottom rods (12) which connect projectile rack assembly to floor.

11. Use hoist to lift rack assembly until rack-mounting socket clears rack-restraint pins (13).

WARNING

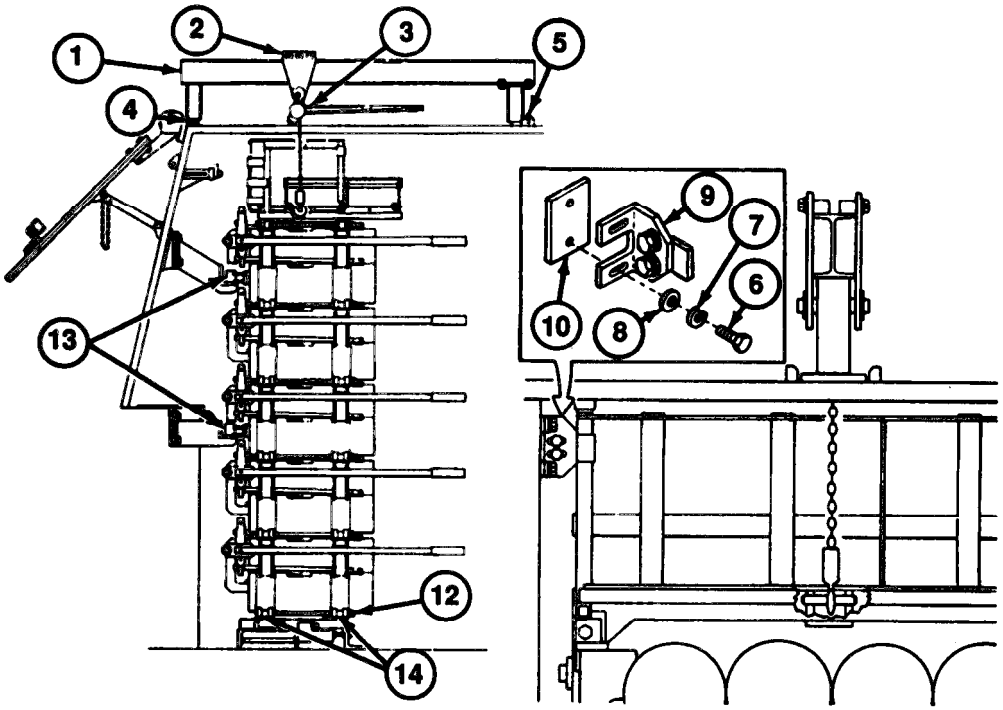
Before moving rack assembly toward rear of vehicle, make sure floor will provide a level resting place. If floor is not level, rack may tip, causing injury or damage.

12. Pull rack assembly toward rear of vehicle until clearance exists for personnel to move between rack(s) and front wall.

13. Using hoist, lower rack assembly until it rests on floor.

PROJECTILE RACK OPERATION - Continued

14. If only one rack assembly is to be moved, leave hoisting hook attached for , added support. If right rack assembly has been moved-and left rack assembly must also be moved, relocate lifting fixture (hoist, beam and trolley) to left side of roof. Repeat steps 6 through 13 for left rack assembly.



WARNING

When installing both rack assemblies, Install left rack assembly first.

15. Position hoist (3), beam (1) and trolley (2) over rack assembly to be moved, engaging block (4) and pin (5) with beam support legs.

16. Use hoist (3) and trolley (2) to position rack assembly onto rack-restraint pins (13) and floor pins (14). Secure rack assembly by installing bottom connecting rods (12).

17. Repeat steps 15 and 16 for right rack assembly, if necessary.

18. If left rack assembly is installed, secure its upper portion with angle (9), spacer (10), two flat washers (8), two lockwashers (7) and two screws (6).

19. Remove hoisting hook and beam, and stow beam, trolley and hoist,

20. Close top doors (p 2-133 and 2-134).

OPERATING AUXILIARY EQUIPMENT

Pages 2-191 through 2-206 provide operating instructions for personnel heater, M45 and M27 periscopes, ventilation blower, lights, fire extinguishers, communication equipment, ventilated face piece system, chemical agent detection and alarm system and 0.50-caliber machine gun.

OPERATING PERSONNEL HEATER

WARNING

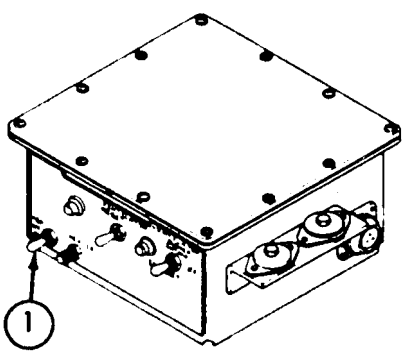
Do not place flammable materials or explosives on or near personnel heater. To prevent Injury to personnel and damage to equipment, do not block or restrict the heater vent.

Starting

1. Move the heater control switch (1) to “START” if the control system is a manual start, or to “ON-LOW” if the heater is not equipped with manual start.

2. If the heater does not staff within 2 minutes move the control switch to “OFF” for 10 seconds, and then immediately back to “START” or “ON - LOW”. The start attempt may be continued for an additional 1 minute.

3. If the heater has not started after item 2, again move the control switch to “OFF" for 10 seconds, and then immediately back to “START” or “ON - LOW”. Another 1- minute attempt maybe made. This will make a total start time of 4 minutes. If the heater has not started by this time, notify Organizational Maintenance.



Operating

Any time heater is started, it should be operated for at least 5 minutes to clear heater of all excess fuel introduced during starting. After heater starts, it maybe operated at either HIGH or LOW heat by positioning of the HIGH-LOW switch.

Shutdown

1. To stop heater operation, move the heater control switch to the “OFF” position. The blower will continue to operate for approximately 3 minutes to allow the system to cool.

2. DO NOT USE THE VEHICLE MASTER SWITCH TO SHUT THE HEATER DOWN. If this instruction is not followed, fuel vapors will accumulate in the ventilating air circuit and/or the heater may be damaged by reverse burning.

OPERATING PERSONNEL HEATER - Continued

Shutting Down

WARNING

Do not use vehicle MASTER switch to shut heater down, as fuel vapors may accumulate in ventilating air circuit.

CAUTION

If proper shutdown procedures are not followed, heater may be damaged by reverse burning.

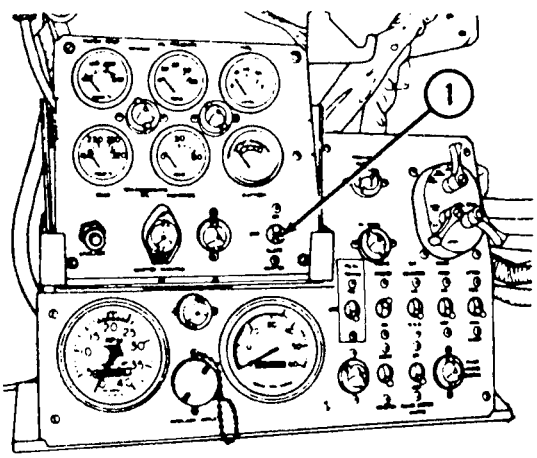
To stop heater operation, move heater control switch to OFF position. Blower will continue to operate for about 3 minutes to aHow system to cool.

NOTE

If blower continues to operate, or otherwise malfunctions, notify Organizational Maintenance.

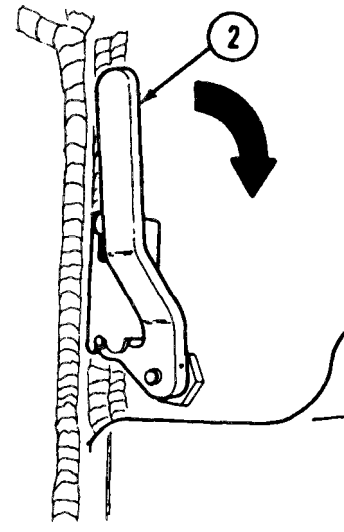
OPERATING VENTILATION BLOWER

1. Turn MASTER switch ON (1) (on driver's portable panel).



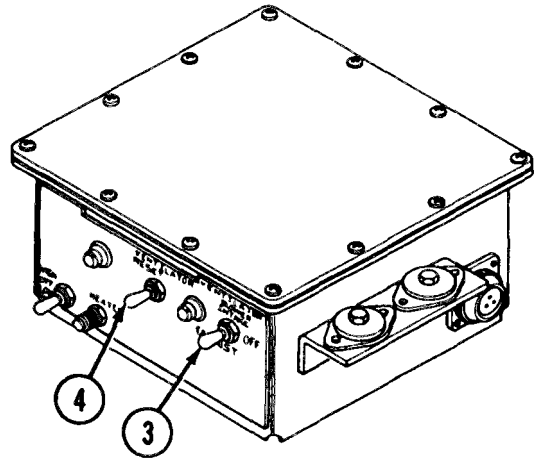
OPERATING VENTILATION BLOWER - Continued

2. To pull in fresh air, pull down air duct control handle (2) in driver's compartment. Turn VENTILATOR BLOWER switch (3) to INTAKE.



3. To clear out smoke, pull down on air duct control handle (2) and turn VENTILATOR BLOWER switch (3) to EXHAUST.

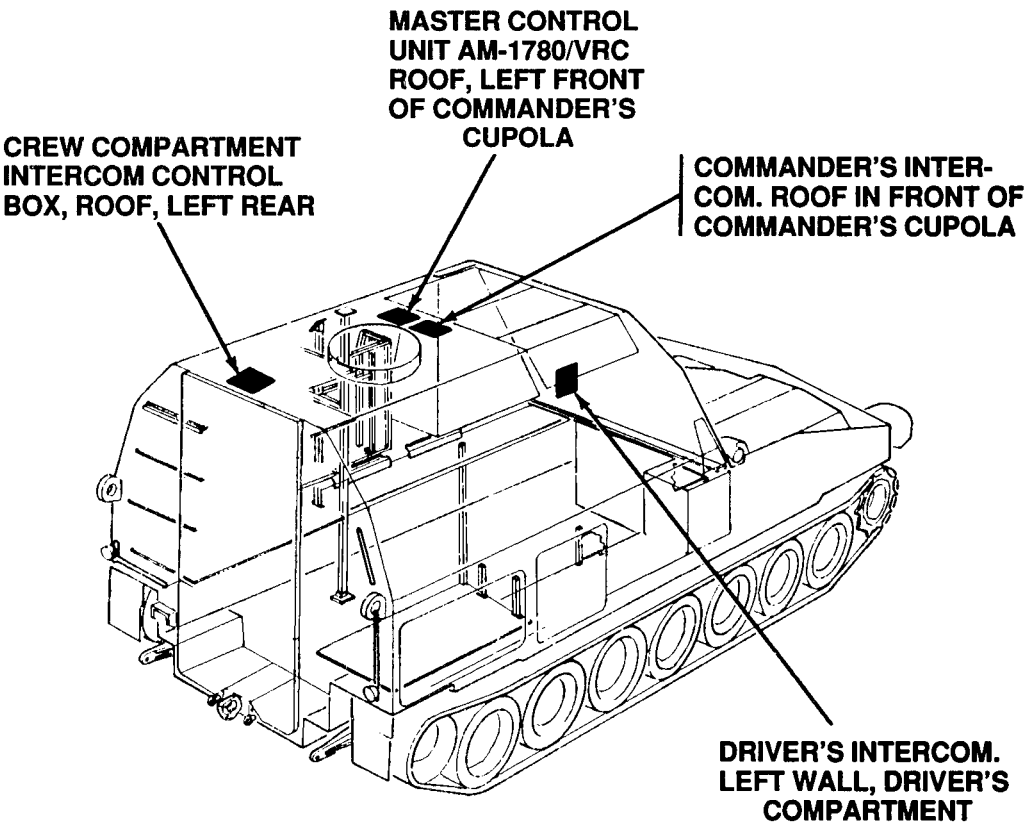
4. If automatic fire extinguisher system activates, ventilator blower turns to exhaust mode. Open vent after extinguisher discharge.



OPERATING COMMUNICATION EQUIPMENT

Refer to TM 11-5830-340-12 for operation and maintenance of intercommunication set AN/VIC-(v). Use of set for intercom only is given below.

See TM 11-206 for interphone controls C-980/V and C-981/V.



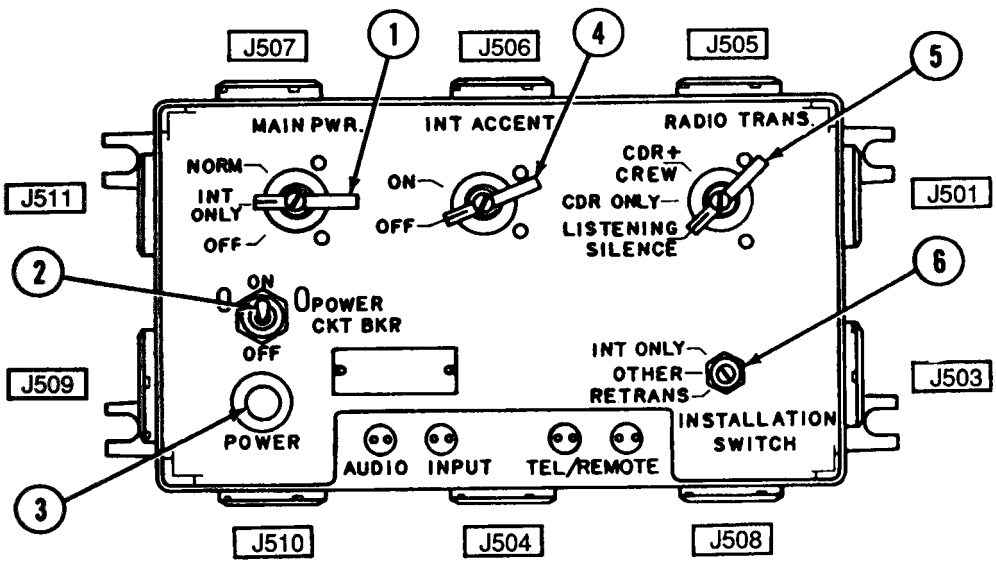
OPERATING COMMUNICATION EQUIPMENT - Continued

Operating AM-1780/VRC

The AM-1780/VRC is the master control for your intercom system. Nothing works until both driver's MASTER switch and AM-1780/VRC are turned on.

CAUTION

Before starting vehicle engine, make certain MAIN PWR switch (1) is off. Otherwise, engine start could damage AM-1780/VRC.

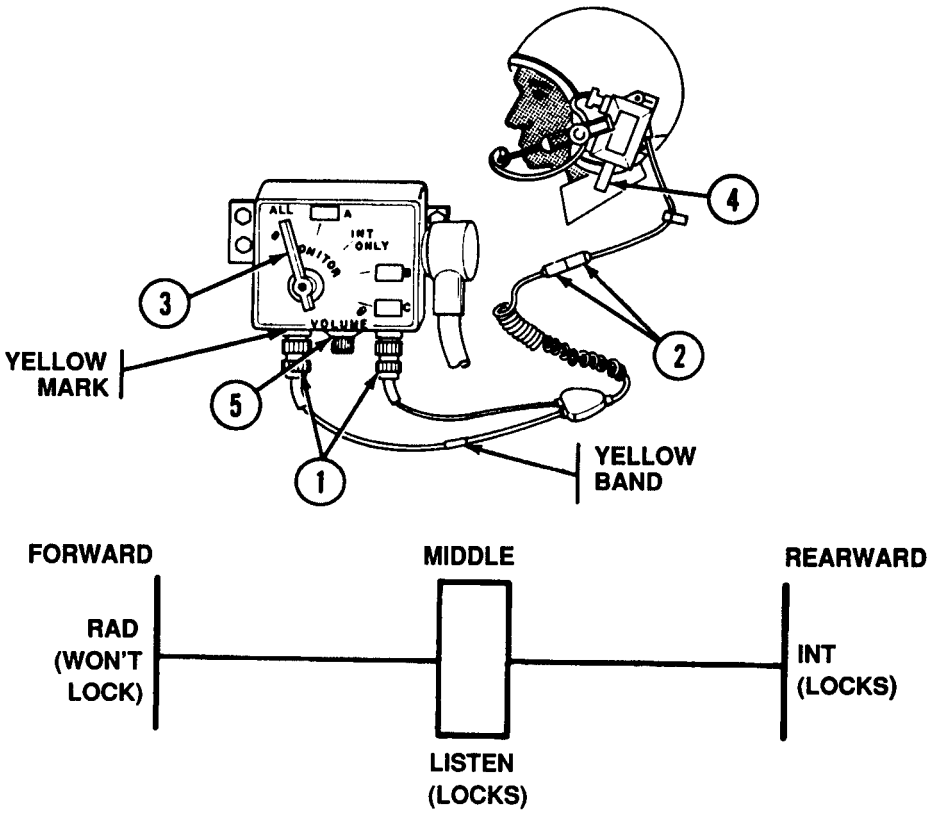


1. With vehicle power on, set MAIN PWR switch (1) to INT ONLY and POWER CKT BKR switch (2) to ON. POWER lamp (3) should light.

2. Leave INT ACCENT switch (4) at OFF, RADIO TRANS switch (5) at LISTENING SILENCE, and INSTALLATION SWITCH (6) at INT ONLY.

OPERATING COMMUNICATION EQUIPMENT - Continued

Positions of CVC Helmet (4)



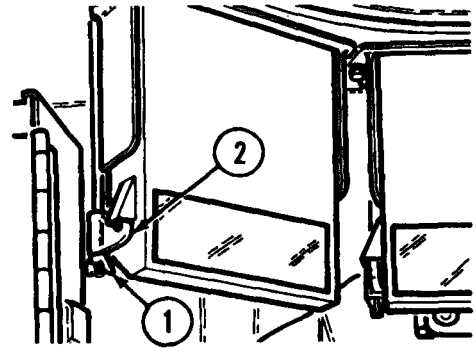
1. Connect CVC helmet cable connectors (1) to control box receptacles. Cable with yellow band (longer cable) connects to receptacle with yellow mark.
2. Check that bail-out connectors (2) are snapped in place.

   During operation, adjust VOLUME knob (5) for best reception.
3. Monitor switch (3) can beat A, ALL, or INT ONLY.
4. Talk to other crew members by pushing helmet switch (4) rearward. Set to middle position when finished.

REMOVING/INSTALLING M45 AND M27 PERISCOPES

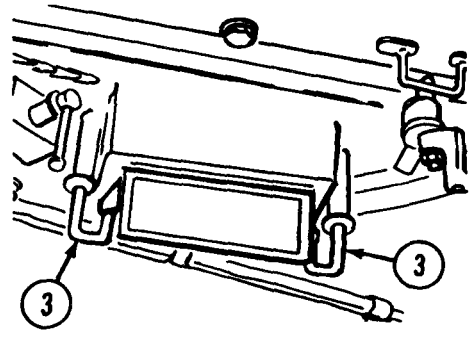
1. Remove by loosening wing nuts (1) to release lock supports (2).
2. Remove periscope.

Reverse procedure to install.



COMMANDER'S

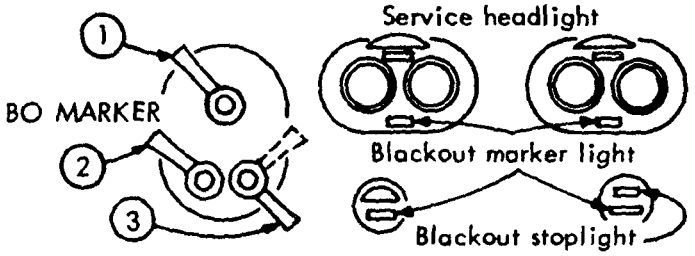
1. To remove, pull and turn retainers (3).
2. Remove periscope.
3. Reverse procedure to install.

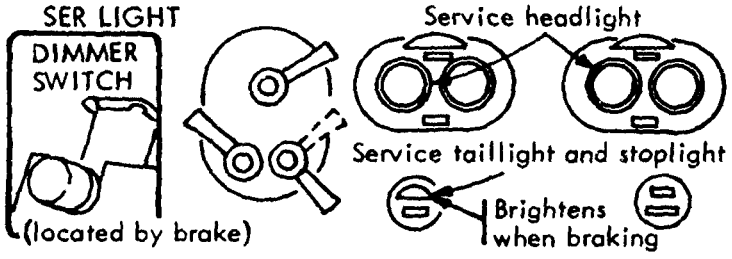


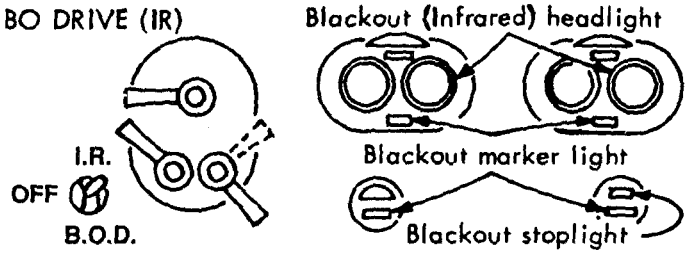
OPERATING THE LIGHTS

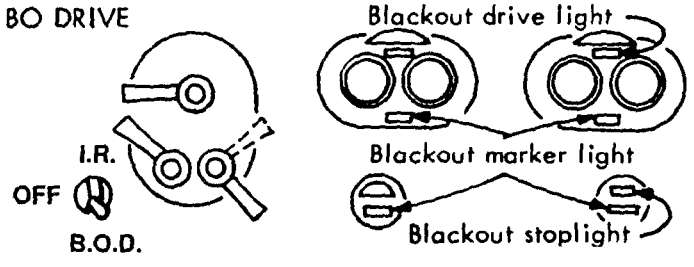
Driving Lights and Light Switch Assembly

The following panels show which lights are turned on by different positions of main light switch.









1. Main light switch (l).
2. Instrument panel light switch (2).
3. Safety switch (3). Push up to unlock main light switch. Release after main light switch is in position.

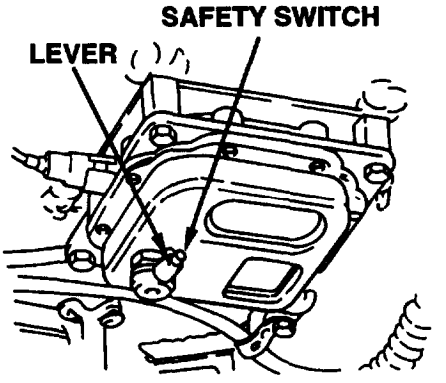
OPERATING THE LIGHTS - Continued

NOTE

Dome lights may be operated only if MASTER switch is ON.

Dome Lights

1. Blue/green light on-turn leverfully clockwise.
2. White light on-press safety switch and turn lever counterclockwise past stop.
3. Both lights off-position lever in center.

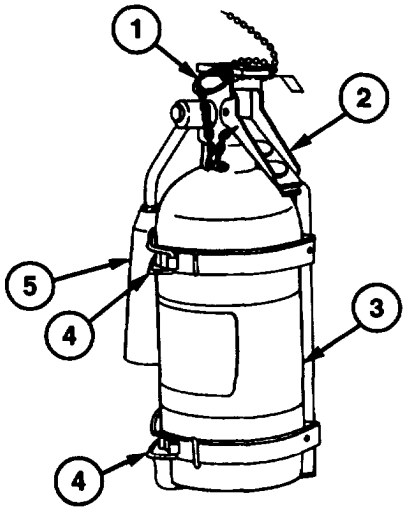


PORTABLE FIRE EXTINGUISHER COOPERATION

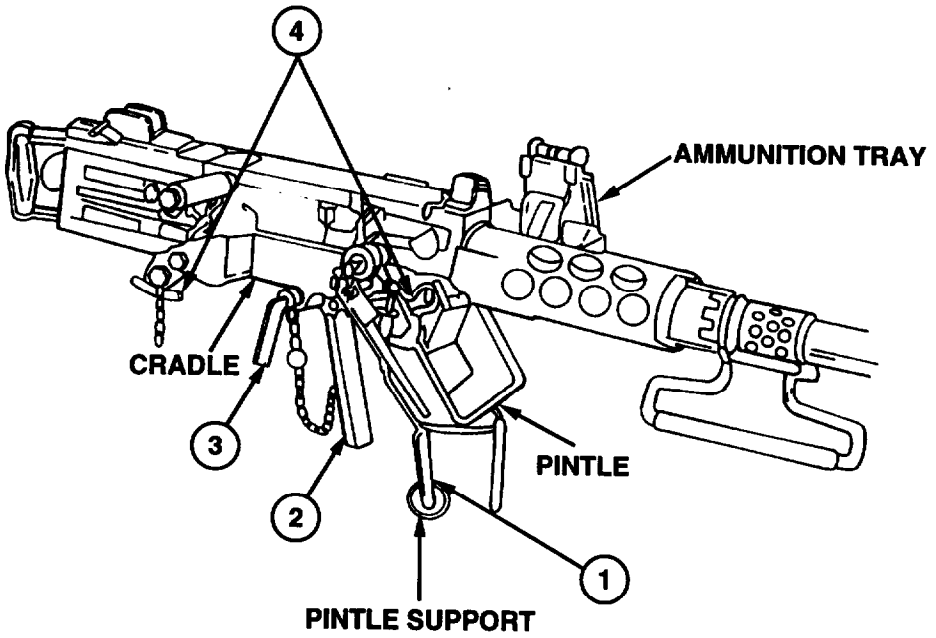
WARNING

- Remain CALM. Avoid breathing CO_2. It may quickly cause rapid breathing, loss of consciousness, and suffocation. Quickly exit vehicle if situation permits. If unable to exit, ventilate to remove the extinguisher gas. The driver is at the greatest risk. Ventilate the vehicle before reentry. Failure to follow this emergency procedure can result in serious injury or death to personnel.
- Fire extinguisher CO_2 can cause severe burns. Do not touch the cone when using fire extinguisher or discharge directly on skin.
- Handle fire extinguisher carefully. Do not bang or drop cylinder.

1. Pull two latches (4) to release fire extinguisher (3). Remove fire extinguisher (3).
2. Break safety wire and remove ring pin (1).
3. Aim discharge nozzle (5) at base of flames.
4. Squeeze trigger (2) to operate and direct the discharge at fire until extinguished.
5. After extinguishing flames, operate ventilation blower to clear vehicle.



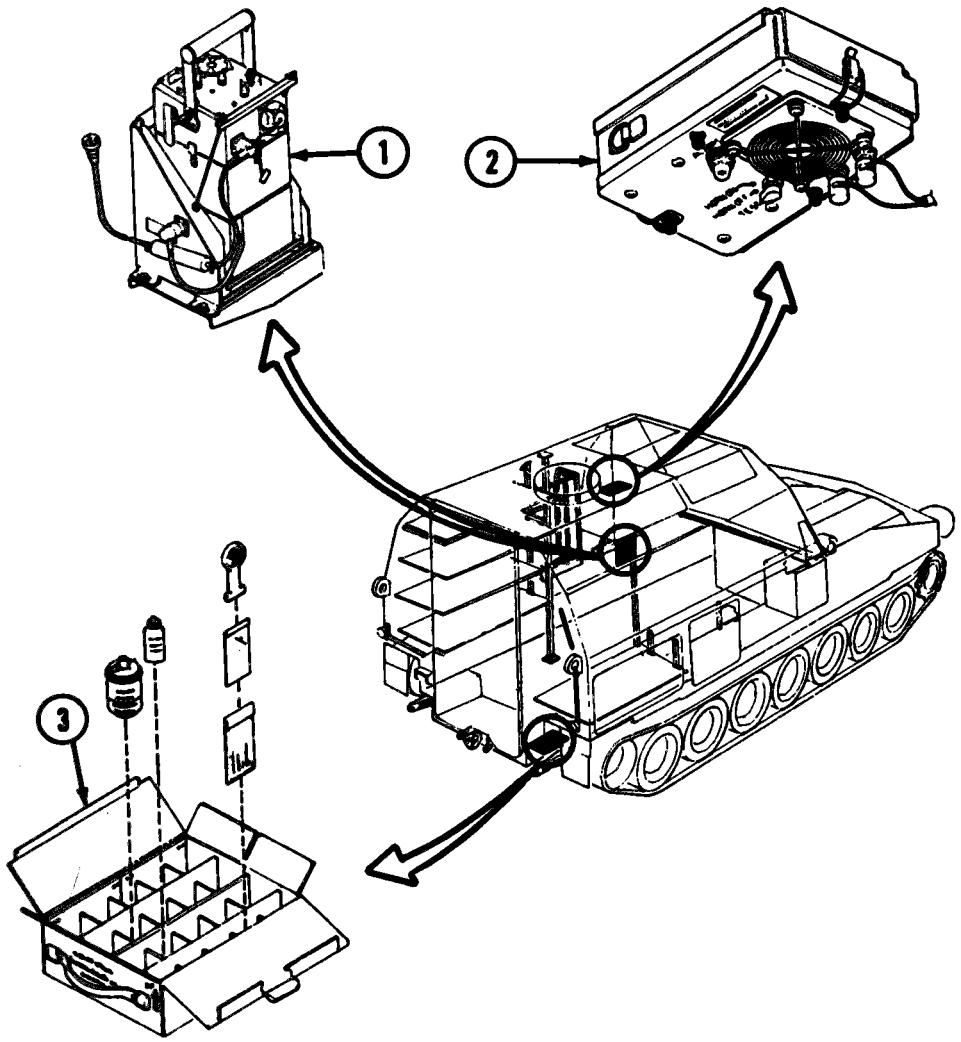
INSTALLING AND REMOVING THE 0.50-CALIBER MACHINE GUN



1. Pull lock handle (1) down to install pintle and cradle in pintle support.
2. Hold travel lock (2) with travel lock pin (3).
3. Install machine gun and hold with front and rear locking pins (4). Install ammunition tray.
4. To remove machine gun, reverse above procedure.

CHEMICAL AGENT DETECTION AND ALARM SYSTEM

An M43 Detector Unit (1), an M42 Alarm Unit (2) and an M229 Refill Kit (3) provide advance warning of chemical agents in the air.



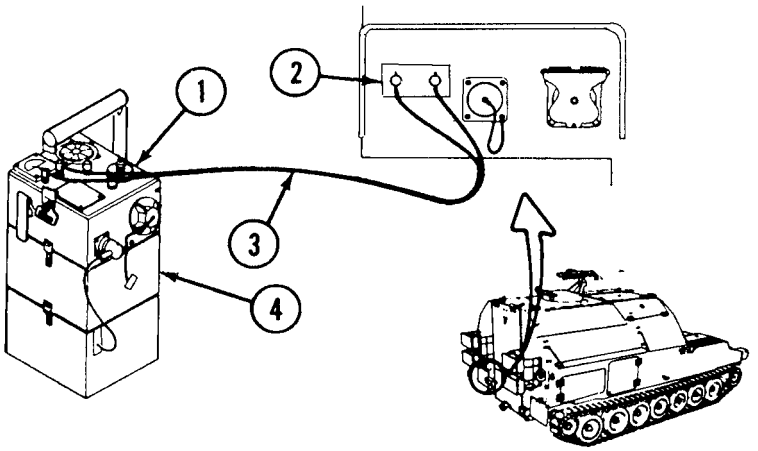
Operation and Maintenance

For general operating and maintenance instructions, refer to TM 3-6665-225-12, Operator's and Organizational Maintenance Manual, Automatic: Portable Chemical Agent Alarm.

CHEMICAL AGENT DETECTION AND ALARM SYSTEM - Continued

When used with the M992, the following instructions also apply.

- When vehicle is parked, connect detector unit (1) to vehicle hook-ups (2) via telephone cable (3). Detector must then be operated by its own power supply (4).



- Detector may also be used inside cargo compartment during transit, although effectiveness may be greatly reduced. For unit to operate in this situation, vehicle MASTER switch must be ON; detector and alarm system will then operate using vehicle electrical power.

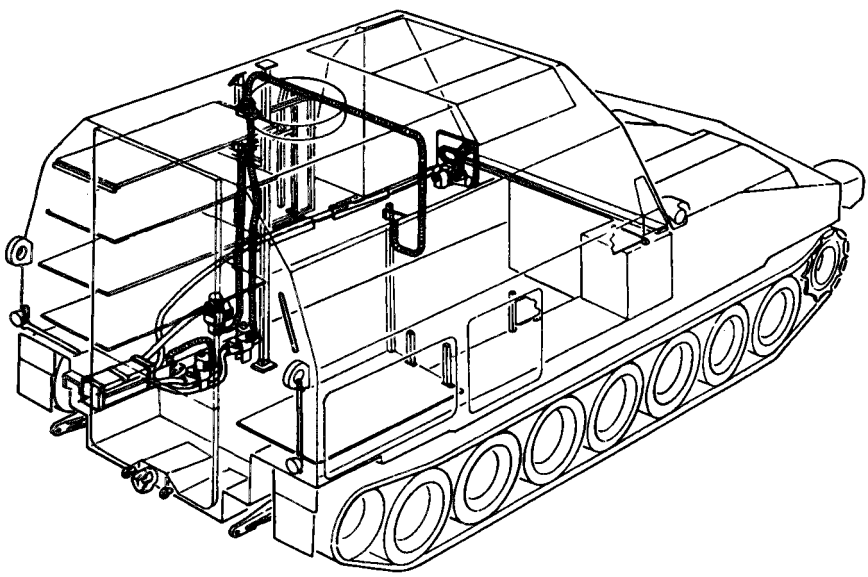
WARNING

During periods of continuous operation, detector unit's fluid reservoir and air filter must be changed every 12 hours. When operating less than 12 hours per day, reservoir and filter must be changed daily. See TM 3-6665-225-12 for complete instructions. Failure to observe this warning will greatly reduce the effectiveness of the system.

VENTILATED FACE PIECE SYSTEM (VFPS)

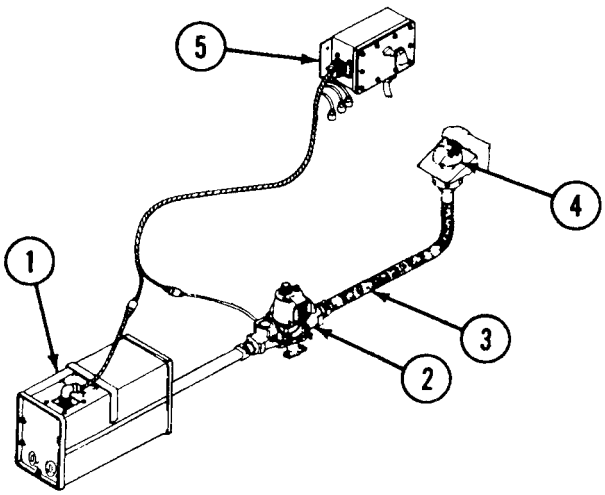
WARNING

- **Air purifier unit filters must be kept dry. Filters which have been wet will not provide protection from NBC contaminants.**
- **If temperature is less than 40° F outside, there is danger of lung damage from inhaling cold air. DO NOT connect hose to your mask canister until filter unit has been operating for at least 15 minutes with heater turned ON.**
- **Do not try to change filters yourself. If they are contaminated, special safety precautions must be taken.**
- **After suspected NBC exposure, all air filter media shall be handled only be personnel wearing full NBC protective equipment.**



VENTILATED FACE PIECE SYSTEM (VFPS) - Continued

The M992 VFPS includes an M2A2 air purifier (1), four M3 heaters (2), hose assemblies (3), couplings (4) and a control box (5).

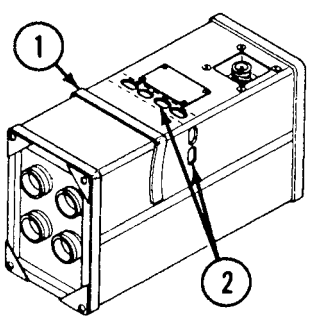


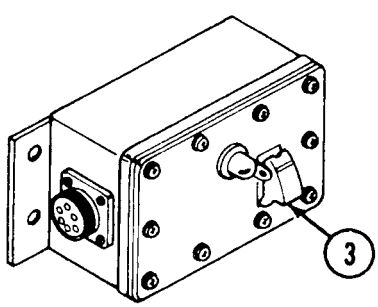
Starting and Operating

NOTE

MASTER switch must be ON to operate VFPS.

1. Put on and adjust face piece.
2. Position spring clip (1) up to open air inlet holes (2).



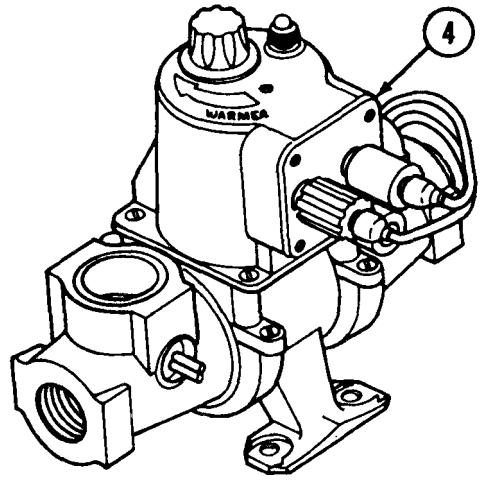


3. Turn VFPS control box switch (3) ON.

VENTILATED FACE PIECE SYSTEM (VFPS) - Continued

4. During cold weather operations, (outside temperatures below 40° F), turn on your individual M3 heater unit (4). Allow air to warm for 15 minutes before attaching hose to face piece.

5. Attach hose to face piece.



Stopping and Stowing

1. Turn off M3 heaters, if applicable.

2. Turn off VFPS control box switch.

3. Remove and stow face piece.

4. Stow face piece hose.

5. Move spring clip down to cover air purifier inlet holes.

Maintenance

WARNING

Crew members are not authorized to change contaminated filters.

1. Notify Organizational Maintenance to change M12A1 gas filter and/or Ml 3 particulate filter when one or more of the following conditions are observed:
   - Physical damage
   - Water immersion
   - Low air flow to face pieces
   - 5,000-mile vehicle overhaul (peacetime operation)
   - 10,000 hours of vehicle operation (no chemical agents used - wartime operation)
   - 1500 hours (approximately 5 months) of vehicle operation (chemical agents used - wartime operation)
   - After each CK (cyanagen chloride - a blood agent) attack
   - At beginning of combat conditions and when use of CK is expected.
2. Notify Organizational Maintenance to replace spring clip if:
   - Clip is missing or damaged.
   - Rubber gasket is missing or does not seal properly.

PREPARATION FOR MOVEMENT

Before moving the M992, check to see that all systems and cargo compartments are secured for travel. The following steps present specific items to be checked before moving.

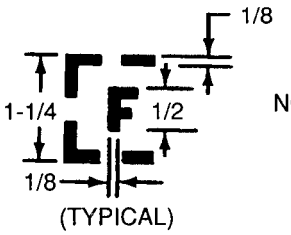
1. Make sure conveyor and stacker are properly stowed and secured (p 2-165 and 2-171).

PREPARATION FOR MOVEMENT - Continued

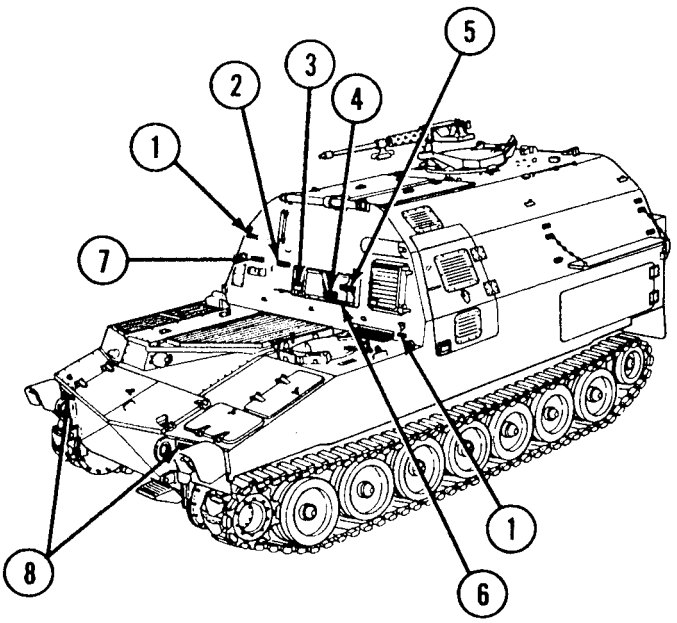
2. Make sure the following doors are closed and secured:
   - Personnel side door (p 2-131)
   - Left and right canister doors (p 2-132)
   - Top (left, right and middle) doors (p 2-133 and 2-134)
   - Upper rear door (p 2-138)
   - Lower rear door (p 2-135)
   - APU front and side doors (p 2-139 and 2-140)
   - Engine and transmission doors
3. If backup hydraulic pump has been operated, make sure it is disengaged before starting main engine (p 2-236).
4. Make sure driver's and commander's hatches are secured in either open position (with hold-open latches) or closed position (p 2-79 and 2-112).
5. Check to make sure the following items are secured with restraint straps (and bars, if applicable):
   - Charge canisters (p 2-180)
   - Fuze boxes
   - Primer boxes
   - 0.5@caliber ammunition boxes
6. Check to make sure all projectiles are locked in place.
7. All other loose items are stowed/secured.

STENCIL MARKINGS

Apply stencils to clean, painted surfaces only. Use black enamel (Class A, specification TT-E-489). When possible, position the stencil so that it is covered by the item named when the item is stowed in its proper place. Stencil dimensions and locations are shown below and to the right. See TB 746-95-1 for instructions on painting military vehicles.



NOTE: DIMENSIONS ARE IN INCHES

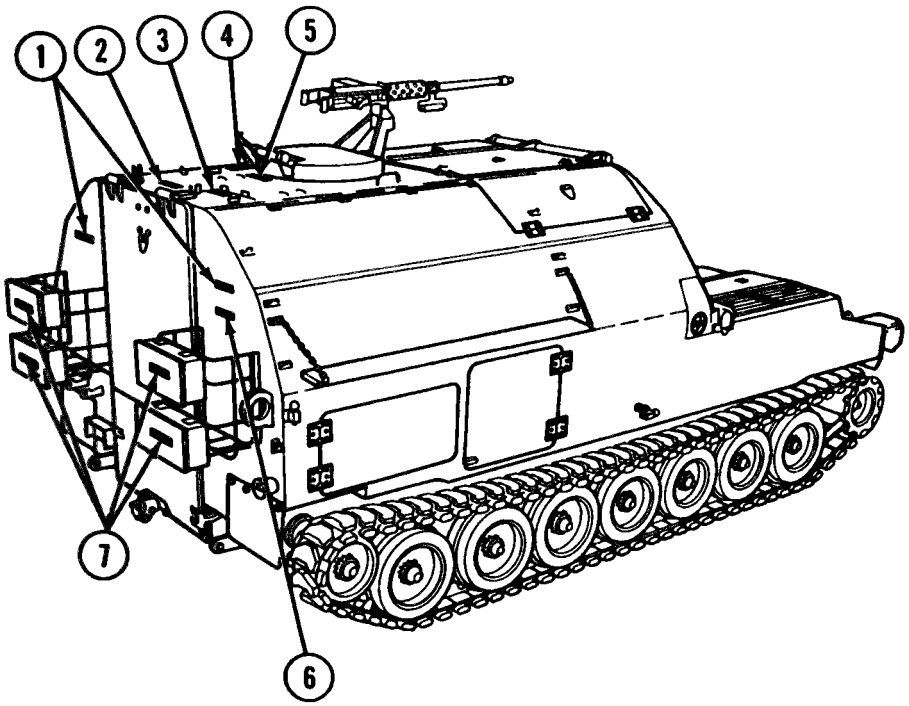


1. TOW CABLE
2. WATER CAN
3. AXE
4. MATTOCK
5. SHOVEL
6. MATTOCK HANDLE
7. TRACK FIXTURE
8. LIFT HERE

STENCIL MARKINGS - Continued

NOTE

Configuration shown for vehicles 1 thru 344.

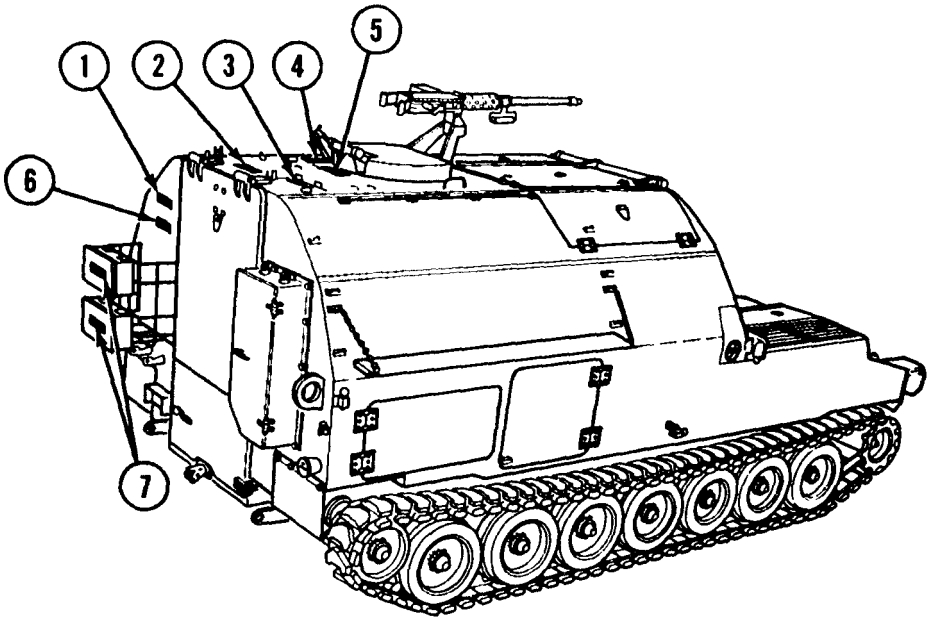


1. BEDROLL
2. SHOVEL
3. PICK
4. CROWBAR
5. 0.50-CAL BARREL
6. PAULIN
7. STOWAGE

STENCIL MARKINGS - Continued

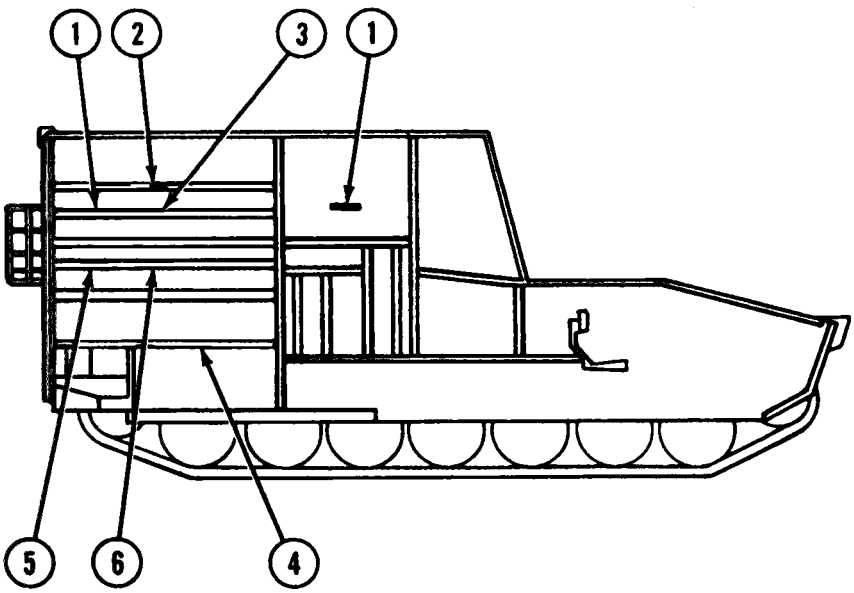
NOTE

Configuration shown for vehicles 345 and above.



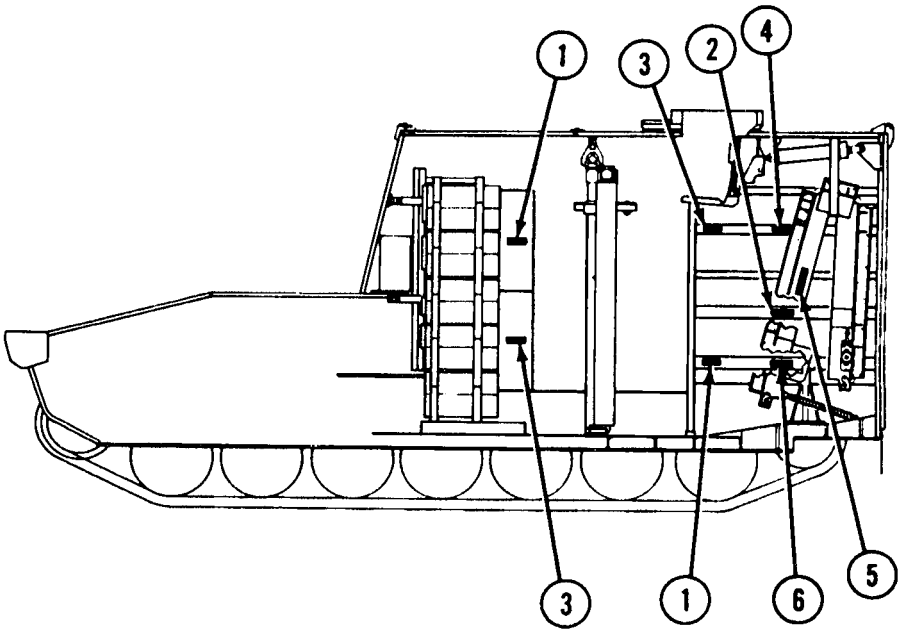
1. BEDROLL
2. SHOVEL
3. PICK
4. CROWBAR
5. 0.50-CAL BARREL
6. PAULIN
7. STOWAGE

STENCIL MARKINGS - Continued



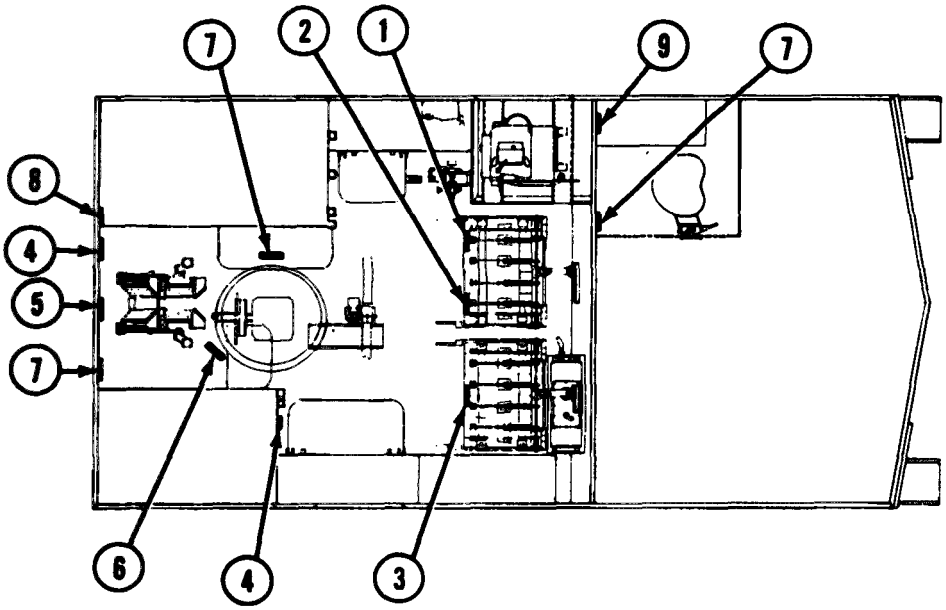
1. M13A2 POWDER CAN 155MM
2. FUZES
3. LRT
4. COPPERHEAD CONTAINERS 155MM
5. PA37A1 POWDER CAN 155MM
6. LRB

STENCIL MARKINGS - Continued



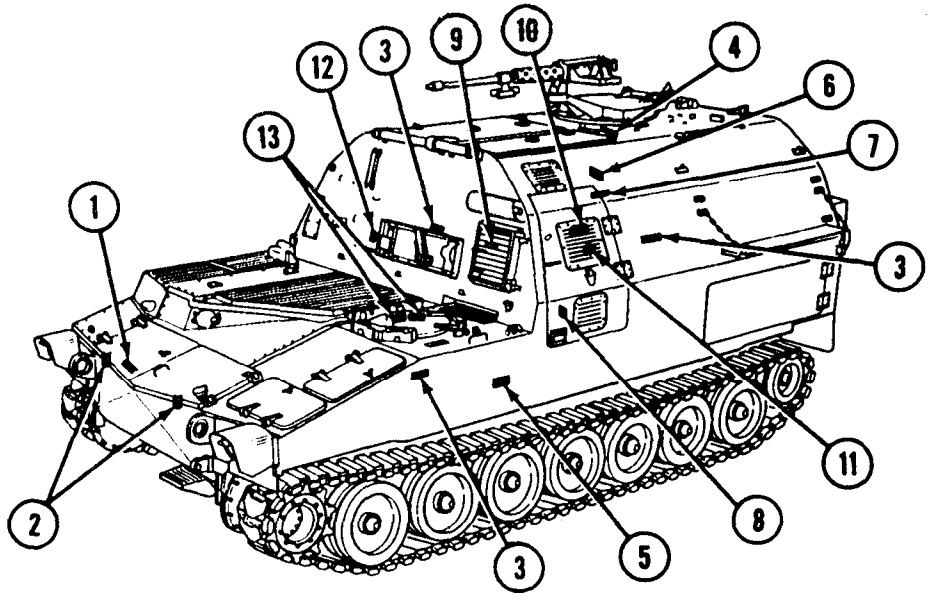
1. PA37A1 POWDER CAN 155MM
2. RRM
3. M13A2 POWDER CAN 155MM
4. RRT
5. RIFLE M16A2 (NOTE: ONE EACH SIDE OF CONVEYOR)
6. RRB

STENCIL MARKINGS - Continued



1. PA37A1 POWDER CAN 155MM
2. SUITS
3. M14A2 POWDER CAN 155MM
4. FIRE EXTINGUISHER
5. RIFLE M16A2
6. BINOCULARS
7. FLASHLIGHT
8. UP-DOWN
9. M45 PERISCOPE

OPERATING NAMEPLATES AND DECALS



KEY	ITEM/LOCATION	DESCRIPTION
1	Main engine oil filter change instruction on oil filter	Cautions against use of by-pass-type filter elements
2	Main engine fuel filter change instruction on fuel filter	Filter-draining instructions
3	High intensity noise caution plates in driv er's compartment, on stacker, on lower rear door	Warning to wear hearing protection when vehicle is operating
4	Communications equipment shutoff caution on ceiling forward of com-mander's cupola	Caution to turn off communication equip-ment before starting or stopping engine
5	Identification plate in driver's com-partment	Identifies model and provides specifica-tion information
6	Backup hydraulic system instruction plate at hvdraulic controls	Instructions to engage backup pump system
7	Selector valve instruction plate at hydrau-lic controls	Instructions to engage backup pump system
6	Chaincase oil drain/fill instruction in APU compartment	Instructions and precautions for servicing APU chaincase
9	APU engine crankcase oil fill/level in APU compartment	Instructions for filling and checking level
10	APU emergency fuel shutoff in APU	Instructions for shutting off fuel to APU
11	APU oil filter at inboard side of APU engine	Instructions for frequency and method of changing filter
12	Hydraulic oil filter at front wall of crew com-partment	Instruction for frequency and method of changing filter
13	Engine overheating cautions in driver's compartment	Do's and Don'ts to prevent engine over-heating conditions

Sectlon lV OPERATION UNDER UNUSUAL CONDITONS

NOTE

- When operating vehicle in extremes of temperature, humidity and terrain conditions, special care in lubricating and cleaning must be observed.
- TM 21-301 contains important instructions on driver selection, training and supervision. TM 21-306 gives driving instructions for operating your equipment under all conditions.

Vehicle armament maintenance procedures are the same as operating under usual conditions. The only difference is to use Lubricating Oil for Aircraft Weapons (LAW) in cleaning and lubricating to ensure proper functioning of your M2 0.50-cal machine gun.

USING WINTERIZATION KIT

Preparation for Use

NOTE

The winterization kit is installed by Direct Support Maintenance. It is used in extreme cold (0° to -65°F) to prevent coolant from freezing after vehicle has been shut down.

1. Both coolant level and fuel supply must be full.

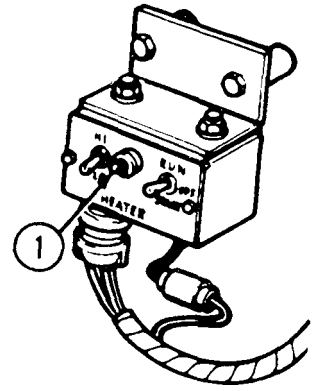
NOTE

Heater will operate with MASTER switch either ON or OFF.

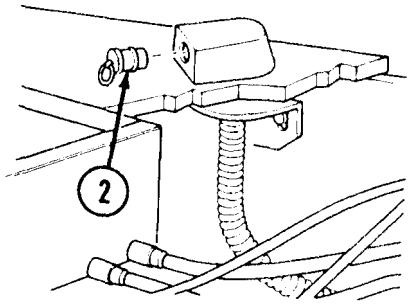
USING WINTERIZATION KIT - Continued

2. Depress press-to-test light (1) to check for electrical current.

3. Be sure engine coolant is at normal operating temperature of 170° F to 185° F. (You may have to start engine and bring coolant temperature up).

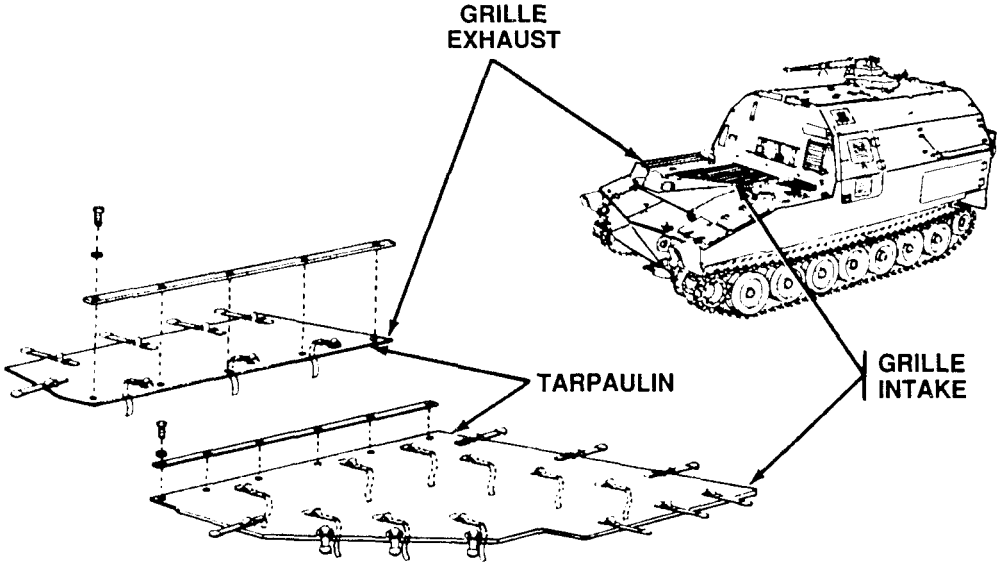


COOLANT HEATER CONTROL BOX



4. Remove heater exhaust outlet plug (2) located on left transmission door.

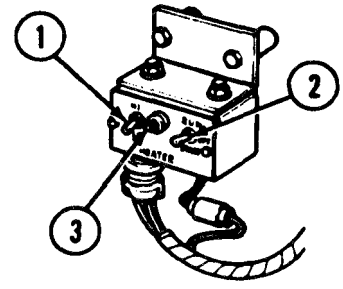
5. Secure tarpaulins over air intake and exhaust grilles. Tarpaulins will help keep out cold and retain heat.



USING WINTERIZATION KIT- Continued

Operating Coolant Heater

1. Turn HI-LO switch (1) to HI.
2. Hold START-RUN-OFF switch (2) at START.
3. Indicator lamp (3) will light, indicating heater is operating. Immediately move switch (2) to RUN position without hesitating in OFF position.



4. Set switch (1) for desired rate of heat. If set at Hl, heater will automatically go on to low heat when coolant temperature reaches 190° F. If coolant temperature falls below 120° F heat control will return to high. LOW position is suitable when heater must burn for an extended period of time.

NOTE

After heater starts, it will continue working as long as you have fuel, electric current, air and a flow of engine coolant. Heater will automatically stop if coolant temperature reaches 245° F. Heater maybe restarted by following starting procedure (steps 1 through 4).

5. To stop heater, place switch (2) in OFF. Heater will go in purge cycle. Fuel will shut off and burning will stop when remaining fuel in heater is exhausted. Blower will run at low speed until heater is cool and then heater will shut down.

MAIN ENGINE COLD WEATHER STARTING

NOTE

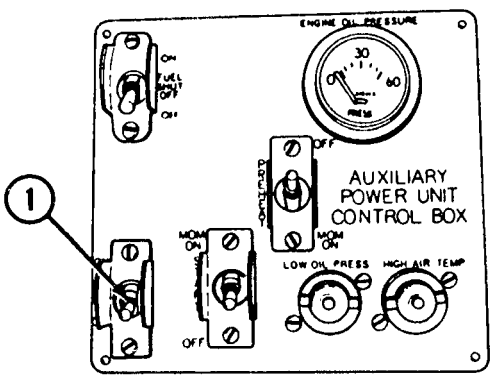
Cold weather starting procedures are to be used at 0° F and below. However, these procedures also apply when vehicle won't start at 32° F. Flame heater switch and starter switch must be activated at same time.

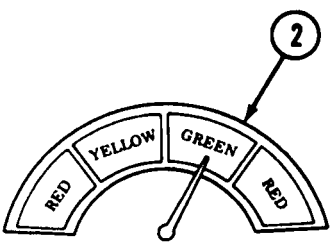
Prestarting Procedure

1. Start APU (APU Starting in Extremely Cold Weather, page 2-221).

2. After APU has been running for 3 minutes, turn APU Generator switch (1) ON.

3. After APU has been running for 15 minutes, turn off APU GENerator switch and check BAITERY-GENERATOR indicator gage (2).





4. If BATTERY-GENERATOR indicator gage indicates at least mid-yellow, turn APU GENerator switch ON and attempt cold weather engine start according to procedure on page 2-219.

5. If BATTERY-GENERATOR indicator gage indicates less than mid-yellow, turn APU GENerator switch ON again and continue charging batteries before starting.

6. Periodically check BATTERY-GENERATOR indicator gage by turning APU GENerator switch OFF. When gage indicates mid-yellow or better, commence cold weather start (page 2-219).

MAIN ENGINE COLD WEATHER STARTING - Continued

Starting the Main Engine

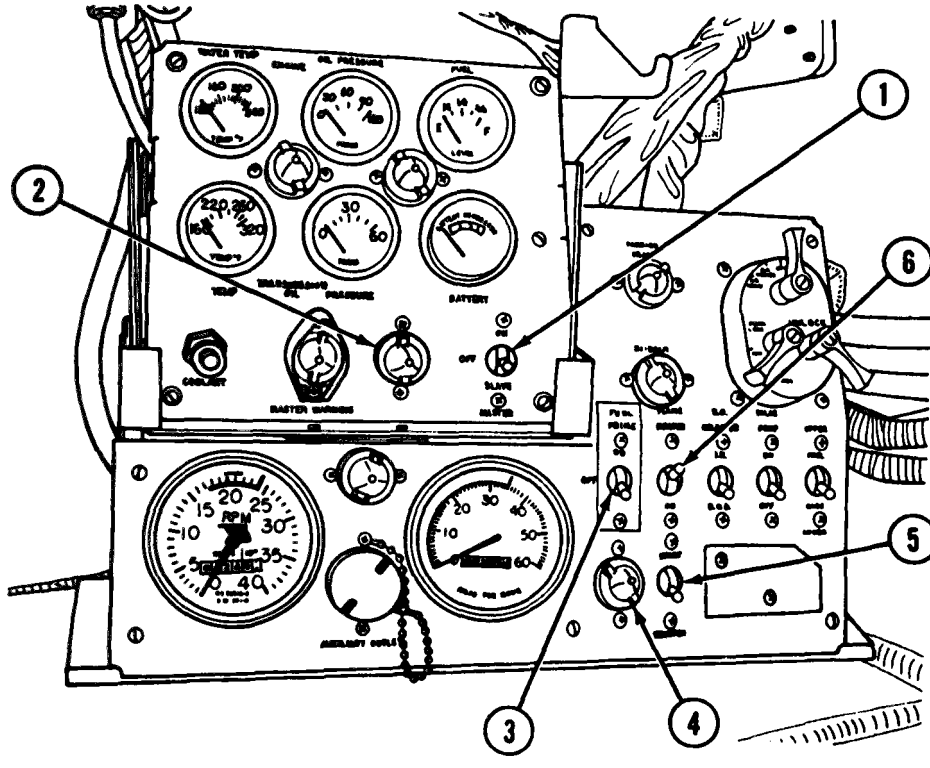
1. When using winterization heater, you must stop heater before trying to start engine. Remove and roll up tarpaulins. Secure tarpaulins with webbing assemblies. Install exhaust outlet plug.

2. Charge batteries (especially after 24 hours of winterization kit operation).

3. Press down on service brake pedal, pullout and down on brake lock handle, then release handle to set brake.

4. Shift into neutral (N).

5. Move MASTER switch (1) to ON. Indicator lamp (2) will light.



6. Turn FUEL PRIME switch (3) ON for 45 seconds and release. indicator lamp (4) will remain ON while switch is in ON position.

MAIN ENGINE COLD WEATHER STARTING - Continued

7. Leave throttle lever at idle position. Engage STARTER (5) and FLAME HEATER switch (6) at same time. Crank engine while applying heat for about 30 seconds. At this time, release heater switch and depress foot throttle about halfway. If engine starts, release STARTER switch (5).

8. If engine does not start, continue cranking with throttle in idle position. Cycle FLAME HEATER switch (6) 10 seconds ON and 3 to 4 seconds OFF until engine starts. If engine does not start after 30 seconds, or an indication of starting ceases for longer than 10 seconds, stop the starting procedure and notify Organizational Maintenance.

9. With brakes still locked, set throttle to run engine at 1200 rpm and shift transmission to 4th gear position. Continue to cycle FLAME HEATER switch (6) until engine coolant temperature gage indicates 120° F to 140° F. Then shift into neutral and idle engine. (If transmission temperature approaches 300° F during warm-up, immediately shift to neutral until temperature approaches normal range).

10. During warm-up, refer to instrument panel checkout procedure (p 2-88).

11. Shift transmission to 1 st gear position and drive vehicle slowly 100 yards, being careful not to stall engine. This warms lubricants sufficiently for normal operation.

APU STARTING IN EXTREMELY COLD WEATHER

CAUTION

To avoid damaging radio components, turn off all electrical and radio switches before starting the APU.

NOTE

- Before you start the APU in extremely cold weather (0° to -65° F), refer to LO 9-2350-267-12 for:

  - Engine crankcase oil grade and level
  - Chaincase oil grade and level
  - Hydraulic oil grade and level

- Change oil as necessary

- When operating in extremely cold weather, make sure winterization kit has been installed.

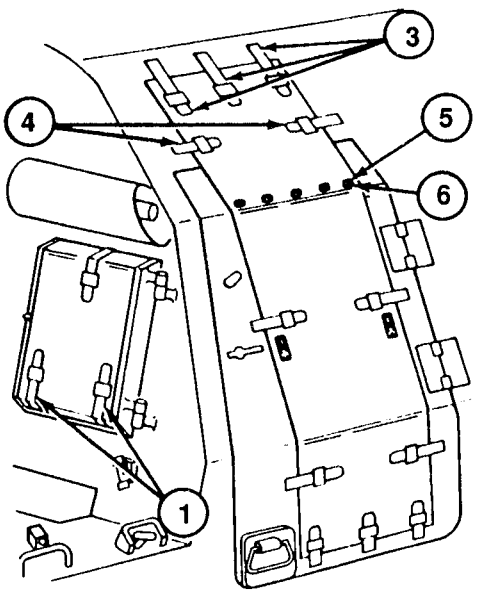
- When temperature is below -25° F outside, preheat APU compartment (p 2-225) prior to APU starting.

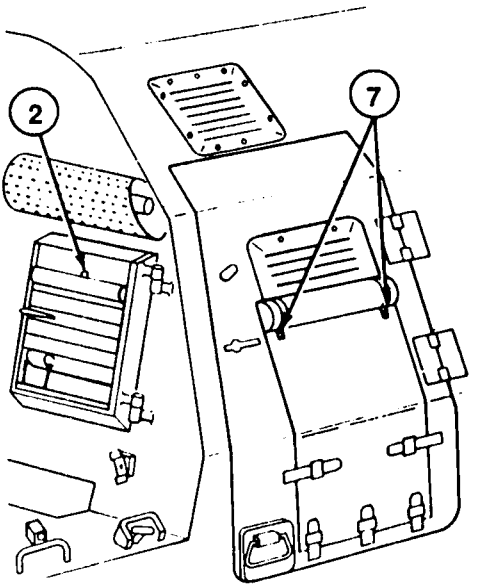
Starting When Temperature is 0° to -25° F

CAUTION

To avoid excessive demand on batteries, do not crank engine longer than 1 minute at a time. Do not attempt to atart APU for longer than 5 minutes total. If APU does not start In 5 minutes, notify Organizational Maln-tenance.

APU STARTING IN EXTREMELY COLD WEATHER - Continued





1. Unfasten two straps of paulin (1) at APU front door. Roll paulin upward into smallest tube possible and secure with webbing and chape (2).

2. Unfasten three straps (3) across top of APU side door paulin and unfasten strap (4) at each side near top.

3. Remove five screws (5) and washers (6). DO NOT DISCARD SCREWS AND WASHERS.

4. Place both ends of unfastened straps inward, and roll freed portion of paulin downward into smallest tube possible. Secure rolled paulin with webbing and chape (7).

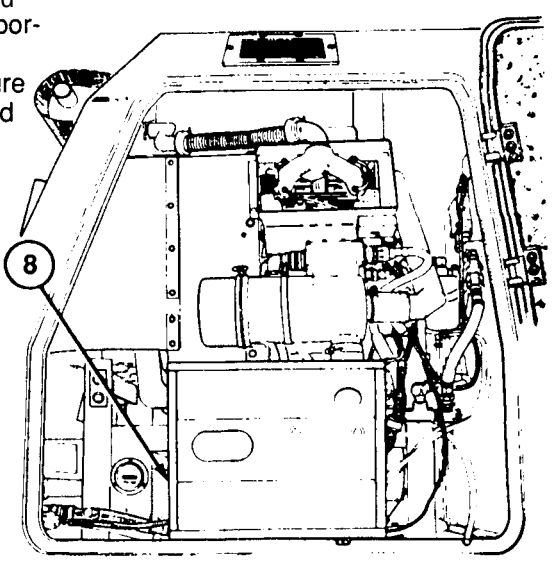
5. Open side APU door and open APU plenum door (8).

CAUTION

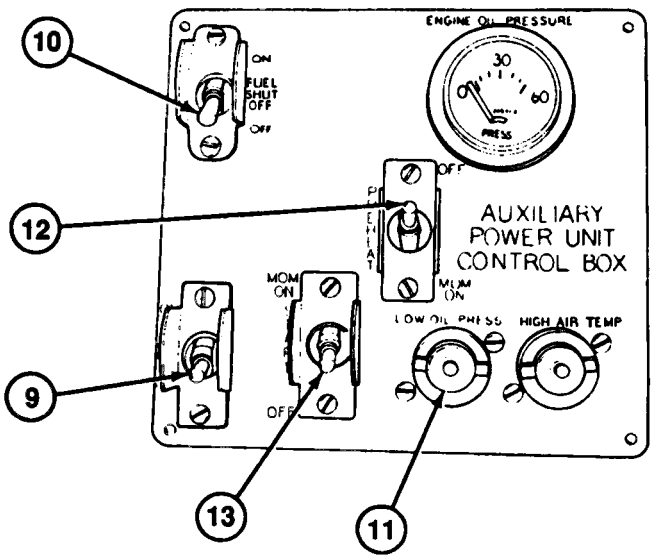
To avoid damaging radio components, turn off all electrical and radio switches before starting APU.

6. Turn all electrical and radio switches off.

7. Turn MASTER switch ON.



APU STARTING IN EXTREMELY COLD WEATHER - Continued



8. Check that APU GENerator switch (9) is OFF.

9. Turn FUEL SHUT OFF switch (10) ON. The LOW OIL PRESSure lamp (11) will light until APU engine starts.

10. Turn PREHEAT switch (12) to MOMentary ON. Hold switch ON for 2 min utes.

11. While holding PREHEAT switch ON, position and hold START switch (13) to MOMentary ON. Hold both switches ON until APU starts or until 30 seconds have passed.

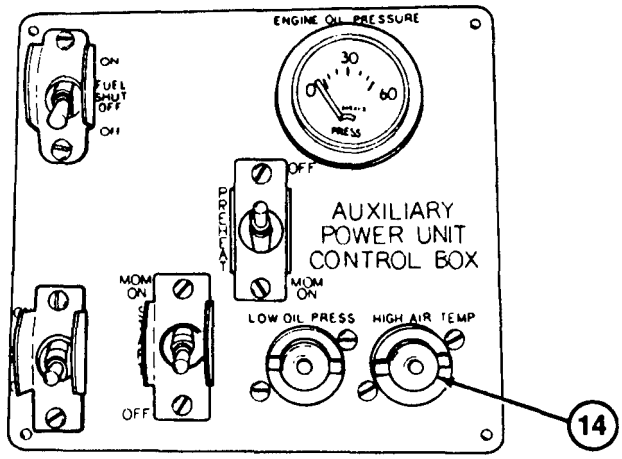
NOTE

If APU engine doesn't start within 30 seconds, release START switch (13), but continue to hold PREHEAT switch ON for another minute. After allotted time, position START switch ON again. If engine still does not start after another 30 seconds of starting procedure, refer to procedure for starting APU when outside temperature is -25° to -65° F (p 2-225).

APU STARTING IN EXTREMELY COLD WEATHER - Continued

CAUTION

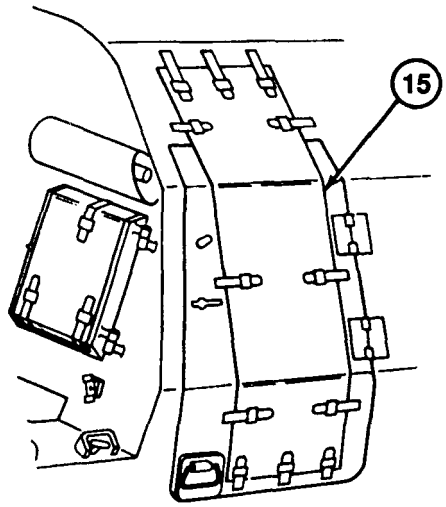
Watch APU HiGH AIR Temperature iamp (14) closely when operating APU with winterization kit installed. if HIGH AIR Temperature iamp lights, remove paulln (15) from APU side door and close plienum door. This will cool the APU.



NOTE

if the APU gasps or stalls after a successful start, secure all straps on paulin (15) at APU side door. Monitor APU HiGH AIR Temperature lamp (14).

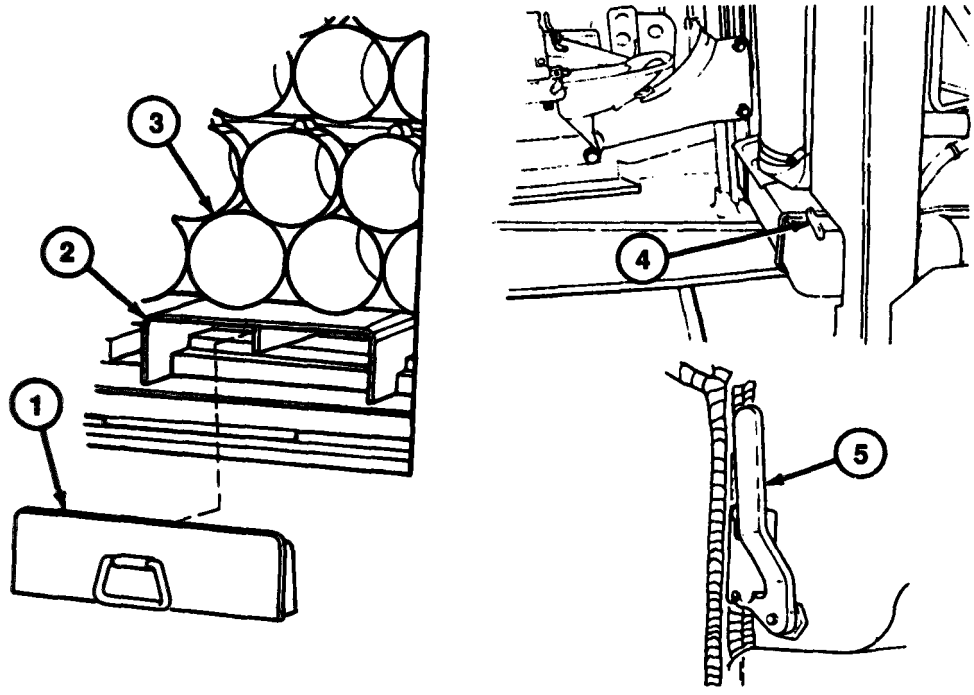
12. After the APU has run smoothly for at least 3 minutes, turn APU GENerator switch ON.



APU STARTING IN EXTREMELY COLD WEATHER-Continued

Starting When Temperature Is -25° To -65° F

1. Open driver's hatch.
2. Open lower rear door.
3. Open personnel door.
4. Install cover plate (1) into opening of heater vent (2) under ammunition racks (3). Install top of cover plate (1) first and bottom last. The plate should flex sufficiently to fit over vent opening completely.



NOTE

Pushing tee handle (4) will restrict flow of warm air to driver's station.

5. Push in tee handle (4) on driver's heat control.
6. Turn personnel heater on (p 2-200).
7. Pushup on air duct control handle (5), thereby restricting flow of warm air into exhaust air and blower plenum box.

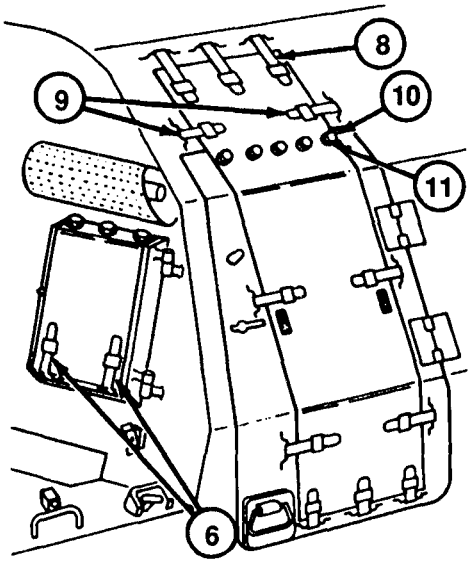
APU STARTING IN EXTREMELY COLD WEATHER - Continued

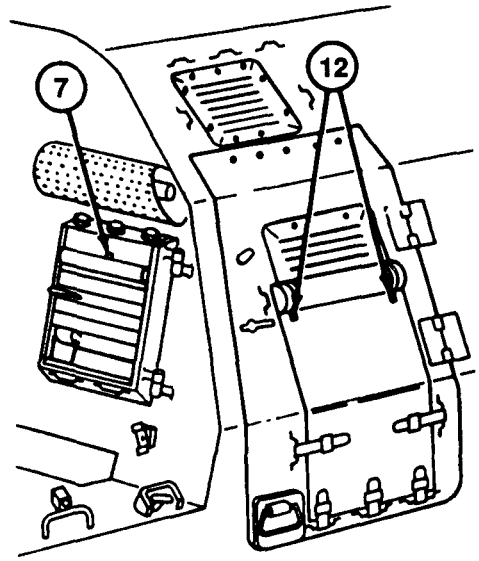
NOTE

All heated air from personnel heater should now be ducted through APU heater hose into APU compartment.

8. Allow APU compartment to warm for 15 to 30 minutes (depending on outside temperature) before attempting to start the APU.

9. Turn off personnel heater.





10. Unfasten two straps of paulin (6) at APU front door. Roll paulin upward into smallest tube possible and secure with webbing and chape (7),

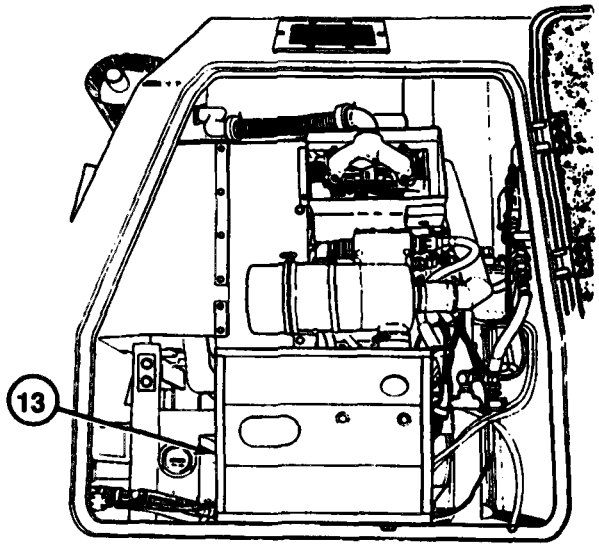
11. Unfasten three straps (8) across top of APU side door paulin and unfasten strap (9) at each side near top.

12. Remove five screws (10) and five washers (11). DO NOT DISCARD SCREWS AND WASHERS.

13. Place both ends of unfastened straps inward, and roll freed portion of paulin downward into smallest tube possible. Secure rolled paulin with webbing and chape (12).

APU STARTING IN EXTREMELY COLD WEATHER - Continued

14. Open side APU door and open AFW plenum door (13)



CAUTION

To avoid damaging radio components, turn off all electrical and radio switches before starting APU.

15. Turn all electrical and radio switches off (except MASTER switch and personnel heater switches).

16. Make sure APU GENerator switch (14) is OFF.

17, Turn FUEL SHUT OFF switch (15) ON. The LOW OIL PRESSure lamp (16) will light until APU engine starts.

18. Turn PREHEAT switch (17) to MOMentary ON. Hold switch ON for 2 minutes.

CAUTION

To avoid excessive demand on batteries, do not crank engine longer than 1 minute at a time. Do not attempt to start APU for longer than 5 minutes total. if APU doesn't start in 5 minutes, notify Organizational Maintenance.

19. While holding PREHEAT switch (17) ON, position and hold START switch (18) to MOMentary ON. Hoid both switches ON until APU engine starts or until 30 seconds have passed.

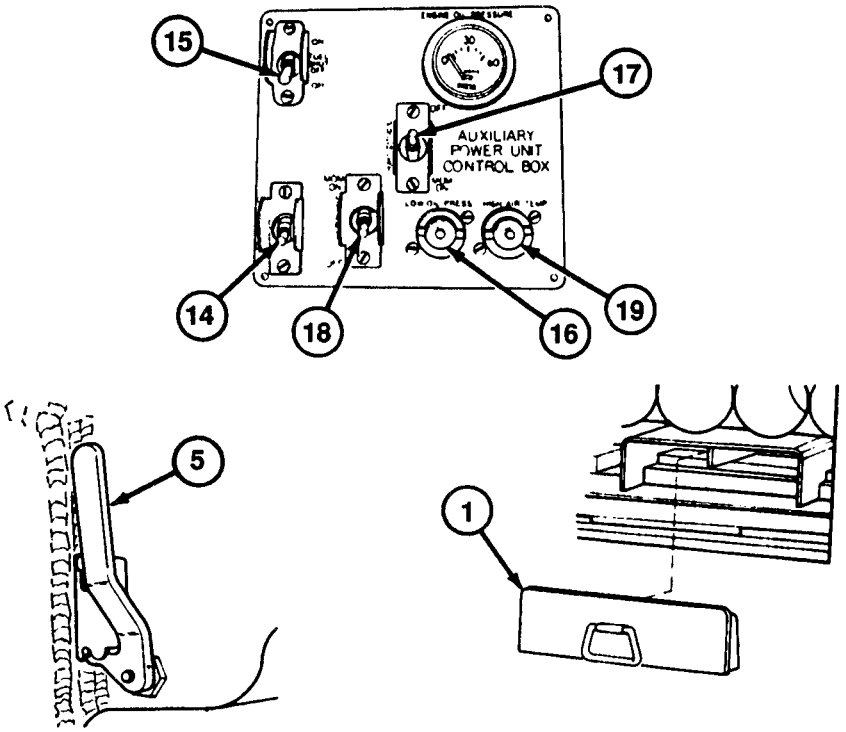
NOTE

If APU engine does not start within 30 seconds, release START switch (18), but continue to hold PREHEAT switch ON for another minute. After allotted time, turn START switch ON again. if engine still does not start, turn FUEL SHUTOFF switch OFF and allow APU to heat for an additional 15 to 30 minutes and repeat steps 14 through 17. Troubleshoot APU if engine has not started after this action.

APU STARTING IN EXTREMELY COLD WEATHER - Continued

CAUTION

To avoid engine damage, watch HiGH AIR TEMPerature iamp (19) closely when oparating APU with winterization kit installed. if HiGH AIR Temperature lamp lights, remove paulin from APU compartment side door and close pienum door.



NOTE

If the APU gasps or stalls after successful start, loosen cover on APU front door and restart.

20. After APU has run smoothly for at least 3 minutes, turn APU GENerator switch (14) ON at APU control panel. Remove cover plate (1).

21. Pull down on air duct control handle (5) to allow vent blower to exhaust air, if required.

22. Close lower rear door and personnel door.

23. Start main engine (Main Engine Cold Weather, p 2-219), if desired.

SLAVE STARTING DISABLED VEHICLE USING MAIN ENGINE

Before trying to slave start a disabled vehicle, take these preliminary actions:

- Check batteries for damage. Notify Organizational Maintenance if batteries are damaged.
- Check electrolyte level (TM 9-6140-200-14). Notify Organizational Maintenance if electrolyte is not at proper level.

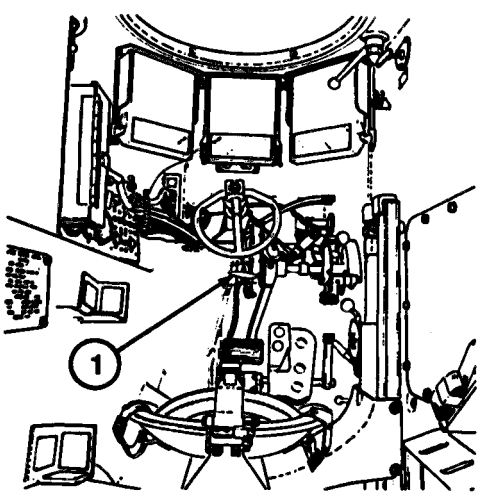
WARNING

Do not park M992 In front of disabled vehicle. Personnel injury or damage to vehicles could occur if vehicle drifts forward.

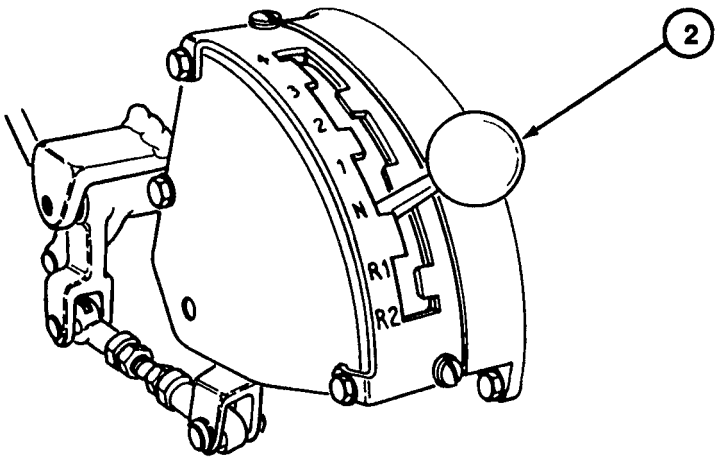
WARNING

Do not allow vehicles to touch. Allow enough space between them to permit working room. Shortad circuits could allow electricity to fiow through vehicles, causing injury to peraonnel and/or damage to equipment.

1. Set parking brakes (1) on both vehicles.



SLAVE STARTING DISABLED VEHICLE USING MAIN ENGINE - Continued



2. Place both vehicles' shift levers (2) in neutral (N) position,

3. Turn MASTER switch ON in disabled vehicle and check that there is enough power to activate gages and interior lights. If not, refer to Charging Dead Batteries (p 2-123).

WARNING

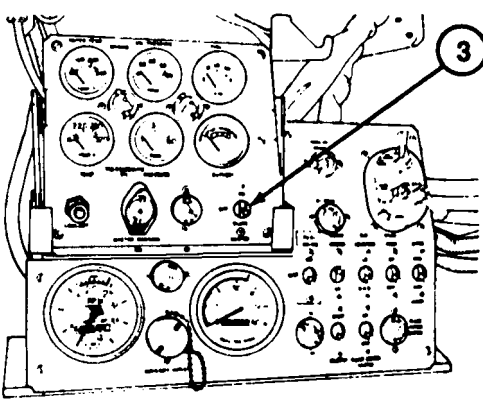
To avoid personal injury and vehicle damage, turn OFF the MASTER switch and other electrical switches.

4. Turn MASTER switch (3) in both vehicles to OFF position.

NOTE

It is not necessary to stop M992 main engine. It will continue to run with MASTER switch OFF.

5. Turn off all electrical switches in disabled vehicle.

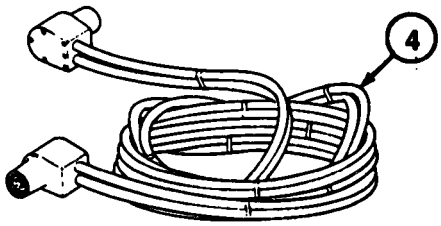


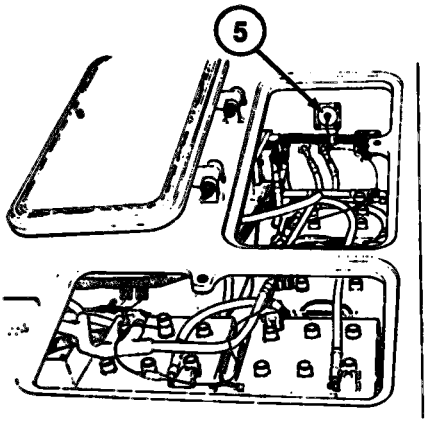
NOTE

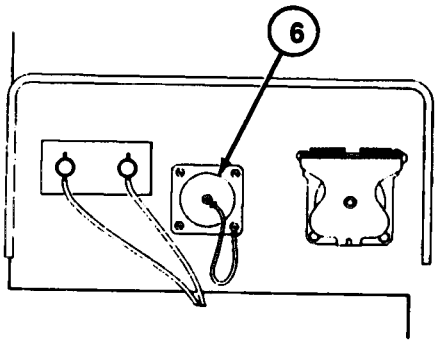
Either slave receptacle on M992 maybe used for this procedure. There is one in battery compartment and one on left rear of vehicle.

SLAVE STARTING DISABLED VEHICLE USING MAIN ENGINE - Continued

6. Attach slave cable (4) securely to slave receptacle (5) or (6) at both vehicles.







7. Turn MASTER switch ON in M992. Set engine speed to 1000 to 1200 rpm.
8. Turn MASTER switch ON in disabled vehicle.
9. Allow batteries in disabled vehicle to charge for 5 minutes before trying to start vehicle.
10. Try to start disabled vehicle. If it will not start, notify Organizational Maintenance.
11. After engine in disabled vehicle is running smoothly, turn MASTER switches OFF' in both vehicles.

WARNING

To prevent injury, make sure that MASTER switch Is OFF in both vehicles before disconnecting slave cable.

SLAVE STARTING DISABLED VEHICLE USING MAIN ENGINE - Continued

12. Disconnect slave cable from both vehicles.

13. Turn both MASTER switches ON again.

NOTE

After disconnecting slave cable, run both engines at 1000 rpm to stabilize generators (alternators) and charge batteries.

DRIVING OVER UNUSUAL TERRAIN

Mud

- Use first gear. Move steadily to prevent becoming stuck.
- If vehicle becomes stuck, do not dig deeper by attempting to drive out. Ar range for towing.
- If freezing temperatures are expected, park vehicle on solid ground to prevent tracks from freezing in mud.

Snow

- Drive carefully.
- When ascending grades, steer as straight as possible. Avoid sharp turns.
- It maybe possible for vehicle to ride on heavily crusted snow with only occasional breakthrough. To climb back onto crust, shift into first gear and accelerate slowly to obtain forward movement without slippage.

Ice

- Drive slowly and cautiously to avoid skipping. If vehicle skids, slowdown and proceed with caution. Do not spin tracks.
- Avoid grades and sharp turn, if possible.
- When ascending grades, steer as straight as possible.

DRIVING OVER UNUSUAL TERRAIN - Continued

Sand

- Avoid spinning tracks.
- Drive slowly to move vehicle steadily.
- Do not make sharp turns in first gear. Instead, make wide sweeping turns in second or third gear.

Dust

WARNING

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

- Frequently check air cleaner restriction indicator (p 2-145). Clean filter if necessary.

OPERATING IN EXTREME HOT WEATHER

Driving in Hot Weather

- Keep ventilating system on during operation.
- Check temperature gages and warning lights often.
- Vehicle may overheat during long, hard towing operations in high gear or when driving at high speeds. Stop to cool vehicle whenever practical.

WARNING

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

- Inspect air cleaner restriction indicator and air cleaners often.
- Inspect oil coolers often. Clean dust, insects and other debris from oil coolers by brushing off screens or flushing with low pressure water.

Parking In Hot Weather

- Don't park vehicle in sun for long periods of time.

Lubricate weapons more often because oil evaporates.

OPERATING IN HUMIDOR SALTY ENVIRONMENTS

When operating in humidor salty climates, you must protect your vehicle against rust and fungus.

1. Check vehicle often for rust and fungus. Clean and lubricate areas where this is evident. Pay particular attention to:
   - Hydraulic tank components.
   - Vision devices (periscopes, lenses).
   - Recesses and low areas where moisture may lay.
2. Wherever paint is chipped, touch-up paint is required immediately to prevent rusting.
3. Lubricate weapons more often.
4. Don't park vehicle in sun for long periods of time.

OPERATING IN DUSTY OR SANDY ENVIRONMENTS

Observe following precautions:

- Park vehicle under shelter; if none is available, cover vehicle with tarpaulins.
- Keep all weapons lubricated and covered when not in use.
- Before firing machine gun, remove lubricants from bolt assembly, receiver, trigger, feed tray, cover assembly, barrel and other moving parts.

FORDING

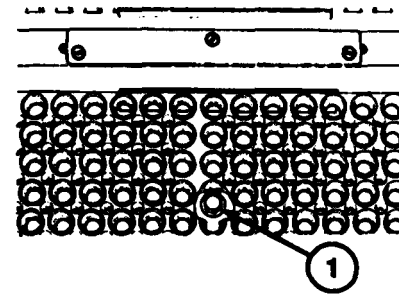
CAUTION

Normal fording (without extra equipment) Is allowable to depth up to 42 Inches. Make sure hull plates are Installed prior to fording operations. Check for soft mud or sandy bottoms. Reduce 42-inch fording depth by estimated amount of vehicle sinkage.

1. Make sure all access plates are installed on bottom of hull.

FORDING - Continued

2. Close drain valve (1).
3. Make sure engine is warm to prevent stalling while fording.
4. Enter water slowly.
5. Perform after-fording operations.



AFTER-FORDING OPERATIONS

1. Open drain valve (1).
2. Check engine and transmission oil for presence of water. If oil color has changed or water is detected, drain and refill (LO 9-2350-267-12).
3. Run engine for a few minutes to blow out and evaporate any water in or on engine.
4. Do complete vehicle lubrication immediately (LO 9-2350-267-12). Pay special attention to wheel hub sight gages for water contamination.

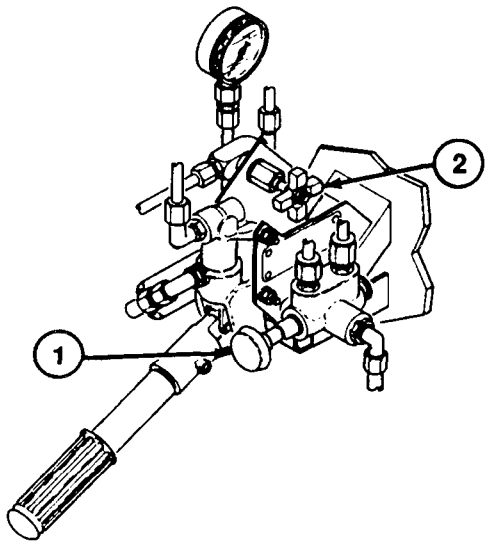
Backup operation capability is provided for many M992 systems. These backup capabilities permit mission completion even if major components fail. The following paragraphs include specific instructions for operating backup equipment.

Backup Hydraulic Pump

If the primary hydraulic pump fails, switch to backup hydraulic pump and notify Organizational Maintenance. Hydraulic operation may continue as follows:

1. Pull BACKUP HYDRAULIC SYSTEM selector valve handle (1) out.

2. Close backup system dump valve by turning handle (2) clockwise.



EMERGENCY PROCEDURES - Continued

Portable Fire Extinguisher CO_2

WARNING

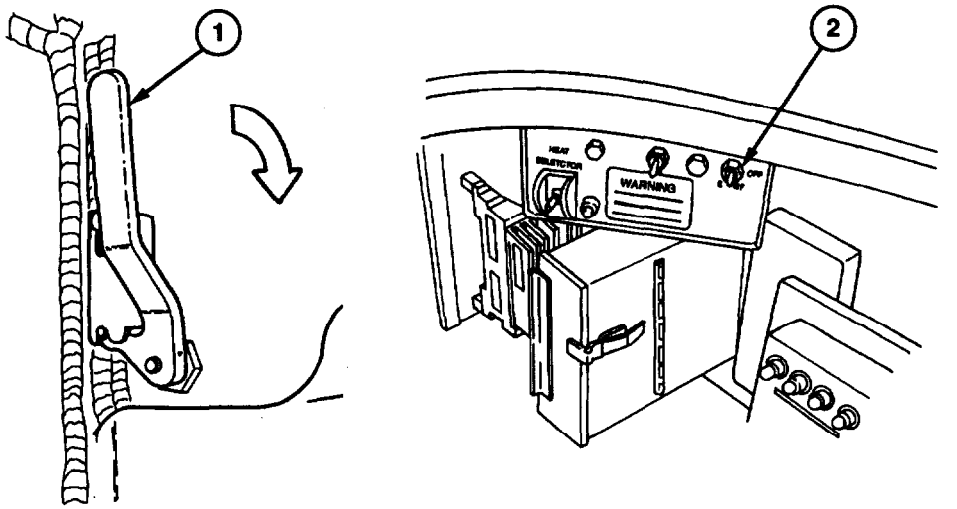
- **Remain CALM. Avoid breathing CO_2. It may quickly cause rapid breathing, loss of consciousness, and suffocation. Quickly exit vehicle if situation permits. If unable to exit, ventilate to remove the extinguisher gas. The driver is at the greatest risk. Ventilate thevehicle before reentry. Failure to follow this emergency procedure can result in serious injury or death to personnel.**
- **Fire extinguisher CO_2 can cause severe burns. Do not touch the cone when using fire extinguisher or discharge directly on skin.**
- **Handle fire extinguisher carefully. Do not bang or drop cylinder.**

1. Immediately notify other crew members, particularlythe driver, of fire detection and intent to use the portable fire extinguisher CO_2.

NOTE

If vent door will not open or blower motor does not operate in ventilation mode, the driver should open driver's hatch and other crew members should open the remaining hatches and doors.

2. The driver must immediately pull down on air duct control handle (1) to open the vent door and turn VENTILATOR BLOWER switch (2) to EXHAUST.

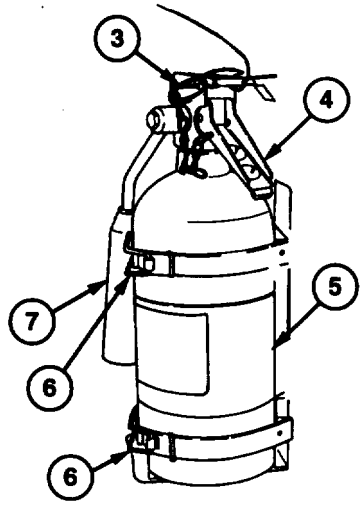


EMERGENCY PROCEDURES - Continued

WARNING

- **Remain CALM. Avoid breathing CO_2. It may quickly cause rapid breathing, loss of consciousness, and suffocation. Quickly exit vehicle if situation permits. If unable to exit, ventilate to remove the extinguisher gas. The driver is at the greatest risk. Ventilate the vehicle before reentry. Failure to follow this emergency procedure can result in serious injury or death to personnel.**
- **Fire extinguisher CO_2 can cause severe burns. Do not touch the cone when using fire extinguisher or discharge directly on skin.**
- **Handle fire extinguisher carefully. Do not bang or drop cylinder.**

3. Pull latch (6) to release fire extinguisher (5). Remove fire extinguisher (5).
4. Break safety wire and remove ring pin (3).
5. Aim discharge nozzle (7) at base of flames.
6. Squeeze trigger (4) to operate and direct the discharge at the fire until extinguished.
7. After discharging fire extinguisher, crew members, if able, will exit the vehicle to prevent overexposure to CO_2. Ventilate the vehicle prior to reentry.
8. If unable to exit, continue ventilation of the vehicle to clear all smoke, fire fumes, and CO_2.



EMERGENCY PROCEDURES - Contiued

CAUTION

Do not allow hand pump pressure to exceed 150 psi. Excessive pressure will damage hydraulic components if pressure exceeds 150 psi, immediately open dump valve (by turning handle (2) counterclockwise) until reading drops below 150 psi. Then close dump valve by turning handie (2) fully clockwise.

3. Pump manual hand pump (3) until hand pump pressure gage (4) reads between 125 and 150 psi. This will engage backup pump to main engine.

CAUTION

Be sure hydraulic ball valve (5) is OPEN before starting main engine with backup pump engaged. Serious demage to hydraulic components will result if this precaution is not taken.

CAUTION

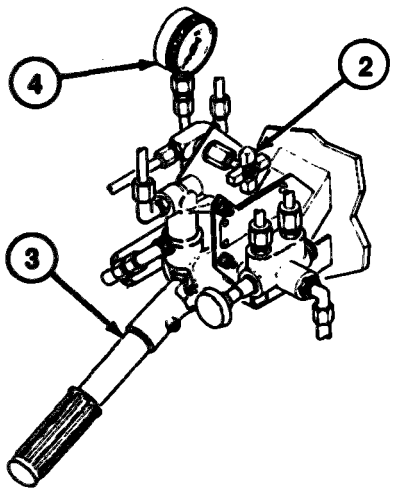
Do not move vehicle with backup pump engaged; damage to backup pump will result.

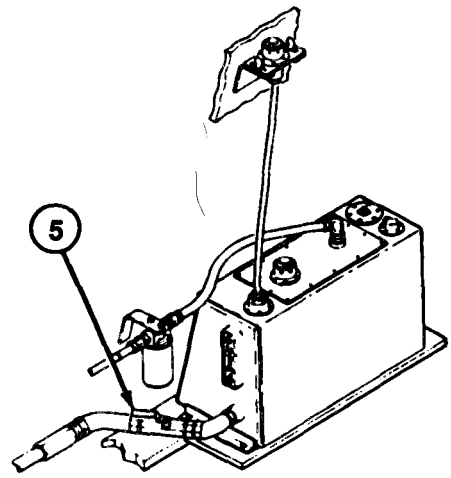
CAUTION

When operating backup pump, do not allow main engine speed to exceed 1100 rpm; damage to backup pump will result.

4. Strart vehicle main engine with throttle lever fully forward.

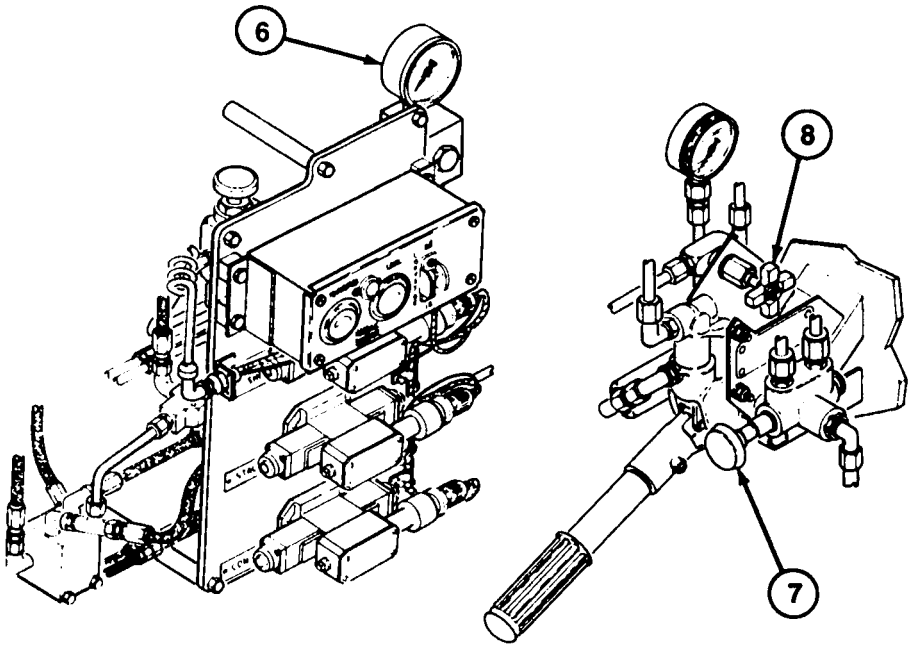
5. Pump speed will be adjusted by slowly moving throttle lever back. Do not allow tachometer reading to exceed 1100 rpm.





EMERGENCY PROCEDURES - Continued

6. Check pressure gage (6) on hydraulic control panel. With pump operating but no hydraulic actuators operating, pressure gage should indicate 100-300 psi.



7. Operate hydraulic equipment as necessary.

8. Shut down backup pump as follows:

   a Push throttle lever fully forward and idle main engine for 3-5 minutes.

   b. Push in BACKUP HYDRAULIC SYSTEM valve handle (7).

   c. Open dump valve by turning handle (8) counterclockwise.

EMERGENCY PROCEDURES - Continued

Stacker

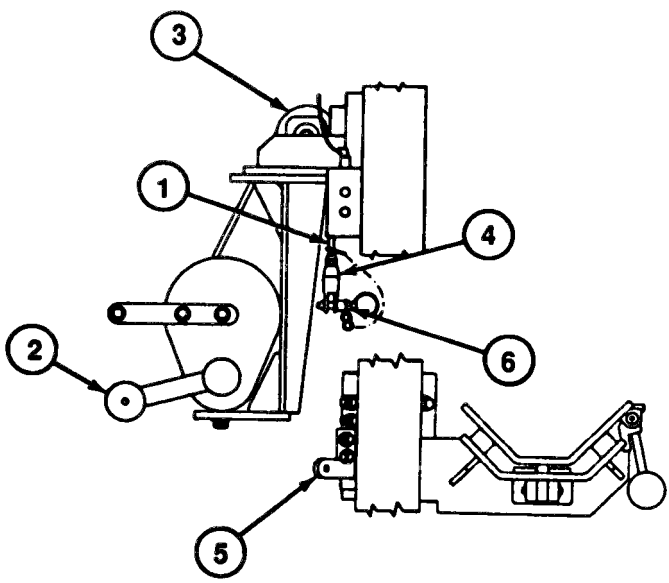
Hydraulic Failure. If stacker motor or hydraulic system fails or chain breaks, stacker may be operated according to procedures below.

NOTE

If chain is broken and time allows, repair it immediately (p 3-15). This is recommended so that hydraulic operation may continue and personnel fatigue may be kept at a minimum.

Report stacker motor or hydraulic system failure to Organizational Maintenance.

1. Pay out manual winch cable (1) by turning winch CONTROL HANDLE (2) counterclockwise. Route cable over pulley (3) and attach cable clevis (4) to eye on tray carrier (5) using pin (6).



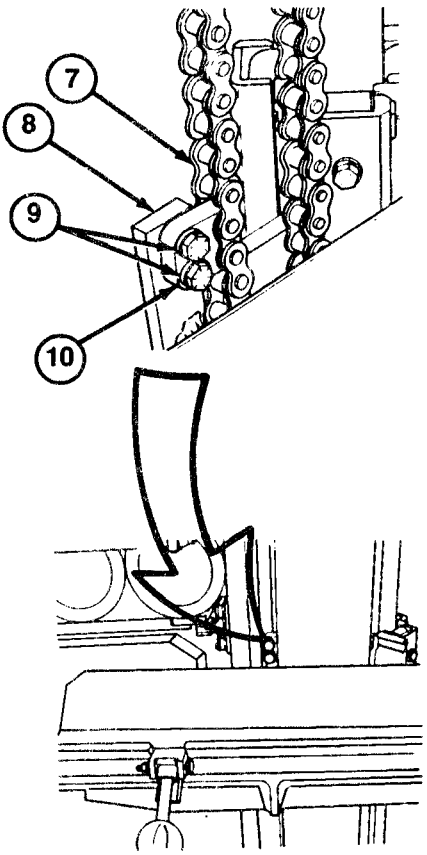
EMERGENCY PROCEDURES - Continued

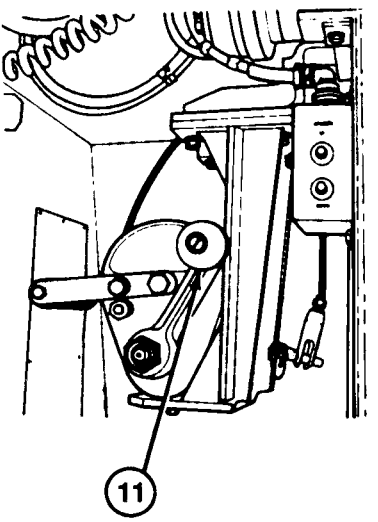
WARNING

Make sure cable clevis is securely attached to tray carrier before disconnecting chain from carrier. Failure to take this action will result in tray carder dropping to the floor.

2. Disconnect chain (7) from tray carrier (8) by removing two bolts and two Lockwashers (9) from master link (10).

3. Turn winch CONTROL HANDLE (11) counterclockwise to lower stacker tray, and clockwise to raise tray.





EMERGENCY PROCEDURES - Continued

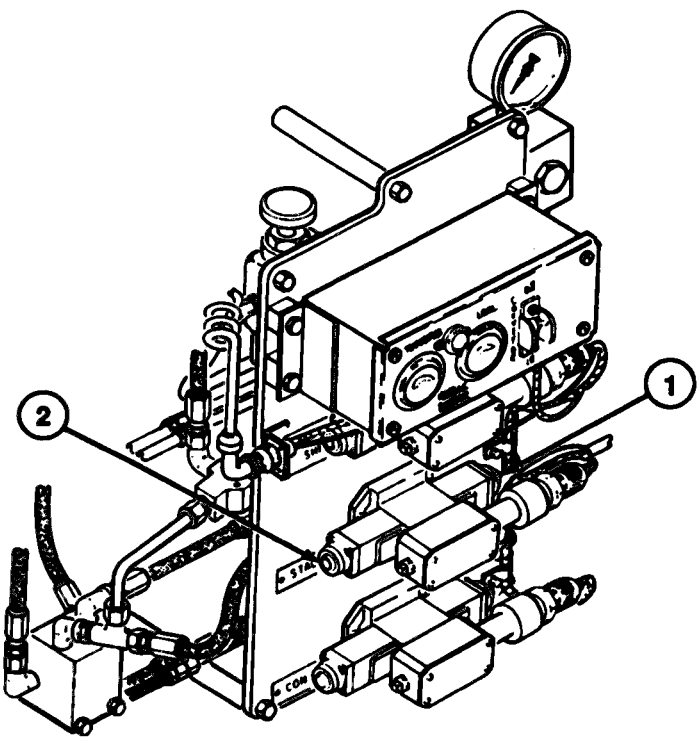
Eletrical Failure. if stacker electrical switching fails but hydraulic power is available, stacker; tray maybe positioned according to procedures below. Report electrical failure to Organizational Maintenance.

NOTE

SeCause of close tolerancing of valve components, an extreme force may be necessary to press valve buttons far enough to cause actuation. if may be necessary to press a small tool against button to create this force.

1. To raise stacker tray, firmly press button (1) on right-hand side of directional control valve.

2. To lower stacker tray, firmly press button (2) on left-hand side of directional control valve.

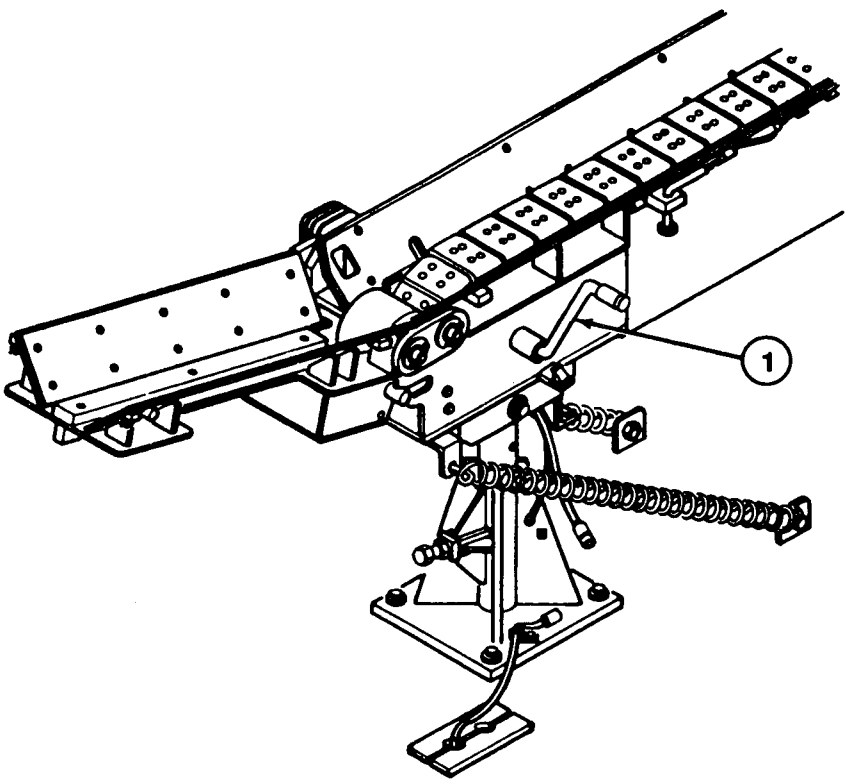


EMERGENCY PROCEDURES - **Continued**

Conveyor

Hydraulic Failure. If conveyor motor orhydraulic system fails, conveyor maybe operated according to procedures below. Report conveyor motor or hydraulic system failure to Organizational Maintenance.

1. Check for broken chain. If chain is broken, repair it (p 3-14), then try again to operate conveyor hydraulically.
2. If chain is not broken, insert manual hand crank (1) into socket at inboard end of conveyor.
3. Turn handle clockwise to move chain out, counterclockwise to move chain in.
4. If chain does not move properly, troubleshoot conveyor (p 3-15).

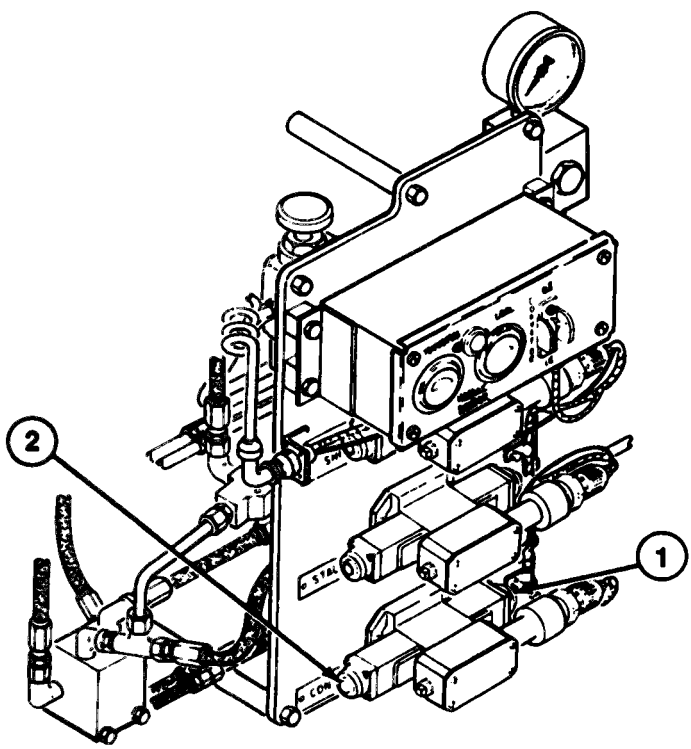


EMERGENCY PROCEDURES - Continued

Electrical Failure. If conveyor electrical switching fails but hydraulic power is available, conveyor maybe hydraulically operated according to procedures below.

Report electrical failure to Organizational Maintenance.

1. Cheek to make sure outboard conveyor safety switch is ON.
2. To move conveyor chain out, firmly press button (1) on right-hand side of directional control valve.
3. To move oonveyor chain in, firmly press button (2) on left-hand side of directional control valve.



EMERGENCY PROCEDURES - Continued

Upper Rear Door (Ballistic Shield)

Hydraulic Failure. If hydraulic system fails, upper rear door maybe opened manually according to following procedures. Report cylinder or hydraulic system failure to Organizational Maintenance.

WARNING

This door is very heavy. Three persons (one inside the vehicle and two outside the vehicle) are required to open or close It manually. Injury may result from attempting this procedure alone.

WARNING

Keep hands and feet clear of door frame.

WARNING

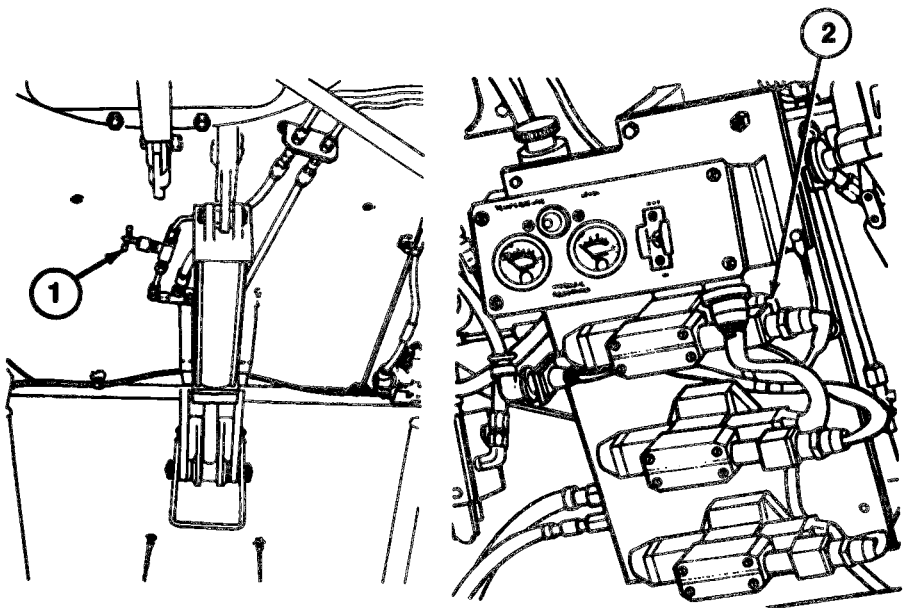
Open dump valve only when operating upper rear door manually. ALWAYS CLOSE DUMP VALVE AFTER COMPLETING OPENING PROCEDURE. Failure to do this will result in door dropping very quickly during normal operation.

EMERGENCY PROCEDURES - Continued

1. To open door:

   a. Turn MASTER switch ON

   b. Open dump valve (1)



   c. Have an assistant hold upper rear DOOR switch in UP position. If electrical power is not available, have assistant firmly press button (2) on right side of BALLISTIC SHIELD directional control valve.

   d With an assistant, pull open upper rear door from vehicle until safety lock engages at 45-degree position from closed.

   e. Close dump valve (1).

2. To close door:

WARNING

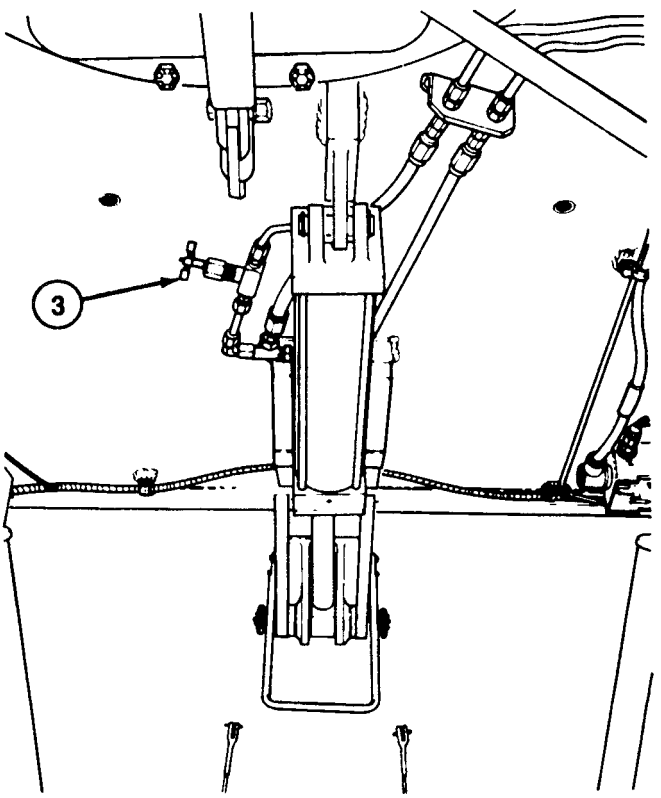
When safety handle is released in this procedure, door may drop rapidly. Two persons should support weight of door throughout this procedure to make sure door lowers slowly.

WARNING

Keep hands and feet clear of doorway.

a. Turn MASTER switch ON.

b. Open dump valve (3).



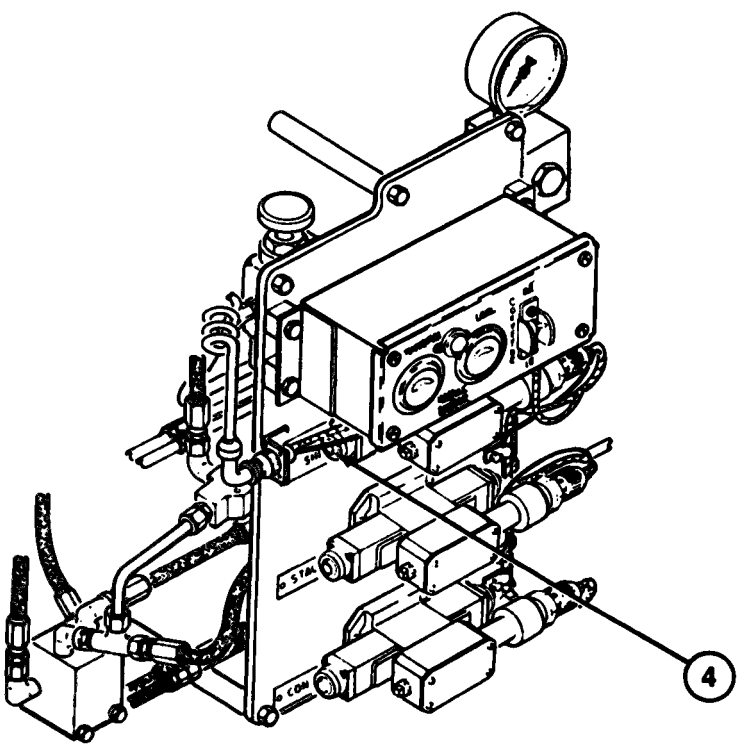
EMERGENCY PROCEDURES - Continued

c. With an assistant, pushup on door enough to remove door's weight from safety lock.

d. While holding door, release safety lock by pivoting handle down and toward rear.

e. While supporting door, have an assistant hold upper rear DOOR switch in DOWN position. Allow door to close slowly. If electrical power is not available, have assistant firmly press button (4) on left side of BALLISTIC SHIELD directional control valve.

f. After door has closed completely, close dump valve.

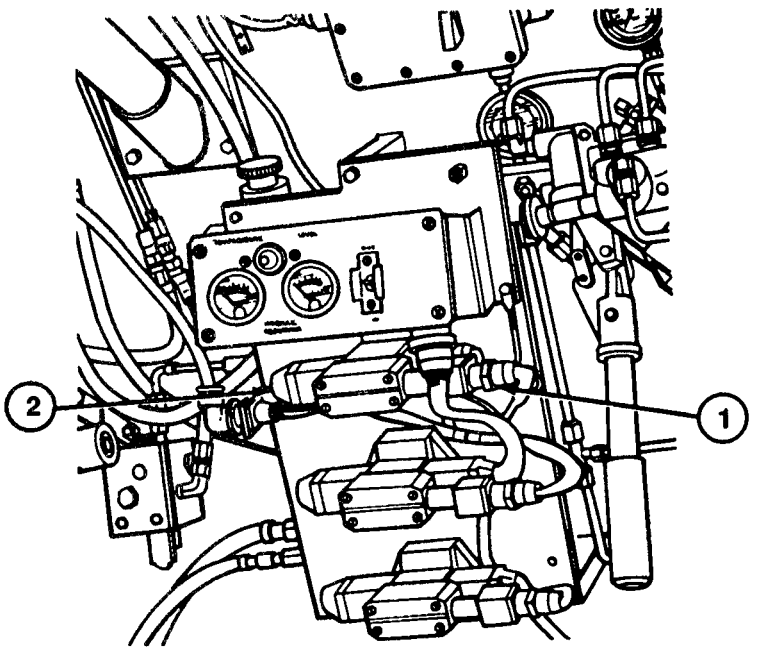


Electrical Failure. If upper rear door electrical switching fails, but hydraulic power is available, upper rear door may be hydraulically positioned according to procedure below. Report electrical system failure to Organizational Maintenance.

1. Activate hydraulic pump.

2. To open door, firmly press button (1) on right side of BALLISTIC SHIELD directional control valve.

3. To close door, release safety lock and have an assistant firmly press button (2) on left side of BALLISTIC SHIELD directional control valve.



Ventilated Face Piece System (VFPS)

If this system fails, use individual face mask protection.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

Chapter Overview

This chapter contains vehicle maintenance actions which crew members are authorized and required to perform. Chapter 3 contains the following information:

- Lubrication instructions for usual or unusual operating conditions.
- Troubleshooting tables listing observed malfunctions, step-by-step tests or inspections and corrective actions.
- Maintenance procedures that are normally performed by operator and crew.

Chapter 3 is divided into the following sections:

Section I LUBRICATION INSTRUCTIONS
Section II TROUBLESHOOTING
Section Ill MAINTENANCE PROCEDURES

Section I. LUBRICATION INSTRUCTIONS

Service Intervals - Normal Conditions

For application of materials and service intervals, see LO 9-2350-267-12 or appropriate instructions for specific components.

Service Intervals - Unusual Conditions

Lubricate more often to compensate for abnormal operation and extreme conditions. High or low temperatures, prolonged periods of high-rate operation, continued operation in sand, dust, or exposure to moisture may quickly destroy the protective qualities of the lubricant. Lubrication intervals may be extended during inactive periods.

Section II. TROUBLESHOOTING

The table lists common malfunctions which you may find during operation or maintenance of M992 or its components. You should perform tests/inspections and corrective actions in order listed.

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

NOTE

Before you use this troubleshooting table, be sure you have performed all applicable operating checks in Chapter 2.

The following Symptom Index is to assist you in locating the correct troubleshooting procedure quickly.

SYMPTOM INDEX

SYMPTOM INDEX - Continued

SYMPTOM INDEX - Continued

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

NOTE

- For corrective actions of malfunctions not listed in this table, notify Organizational Maintenance.
- Wherever the word “lubricate” appears, see LO 9-2350-267-12.

ENGINE

1. ENGINE FAILS TO CRANK, OR CRANKS SLOWLY, WHEN STARTER SWITCH IS ACTIVATED

Step 1. Check to see if MASTER switch is ON.

Move to ON position.

Step 2. Check to see if transmission lever is in (neutral) N position.

Place in N position.

Step 3. Check to see if battery cables are loose, broken or corroded.

If cables are loose, broken or corroded, notify Organizational Maintenance.

Step 4. Check to see if BAITERY-GENERATOR indicator gage reads in normal range.

If indicator reads low, notify Organizational Maintenance.

2. ENGINE CRANKS BUT FAILS TO START

Step 1. Check to see if FUEL gage indicates empty (E).

Fill, if no fuel.

Step 2. Check to see if FUEL SHUTOFF control handle is pulled out.

Push handie in completely.

TROUBLESHOOTING - Continued

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION

ENGINE - Continued

Step 3. Check for blocked fuel lines and hoses.

Disconnect and straighten kinked or pinched tubes and hoses. if lines or hoses are broken, notify Organizational Maintenance.

Step 4. Check for contaminated fuel.

Drain fuel filters.

Step 5. Prime fuel lines.

Hold fuel prime switch ON for 45 seconds to 1 minute. Then use normal start procedures (p 2-87).

3. LOSS OF ENGINE POWER

Check to see if water is in fuel.

Drain contamination from fuel filters (p 3-23).

4. LACK OF ACCELERATION

Step 1. Check for fuel leaks.

Tighten lines and filters.

WARNING

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

Step 2. Check to see if air cleaner filter is restricted. Check for red sleeve on indicator.

Clean air cleaner filter (p 3-28). Reset restriction indicator.

Step 3. Check to see if accelerator pedal is bent or binding.

If bent or binding, notify Organizational Maintenance.

Step 4. Check accelerator linkage for binding or damage.

if binding or damaged, notify Organizational Maintenance.

TROUBLESHOOTING - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

ENGINE - Continued

NOTE

If improper fuel is suspected, notify Organizational Maintenance.

5. ENGINE OVERHEATS (COOLANT WARNING LAMP IS LIT)

WARNING

NEVER remove radiator cap on overheated engine.

Step 1. Check to see if engine coolant is low and if any leaks are visible.

Fill (p 3-21).

If leaks are visible, notify Organizational Maintenance.

Step 2. Check to see if engine oil is low.

Fill (LO 9-2350-267-12).

Step 3. Check radiator cap for tight fit.

Tighten.

Step 4. Check to see if cooling fan is operating properly.

Notify Organizational Maintenance.

Step 5. Check to see if radiator/grille is clogged.

Unclog radiator/grille.

Step 6. Excessive engine idling at low rpm.

Increase idle speed to 1000-1200 rpm.

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE - Continued

6. LOW OR NO OIL PRESSURE

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

Fill (LO 9-2350-267-12).

Step 2. Check engine compartment for evidence of oil leaks.

Notify Organizational Maintenance.

TRANSMISSION

7. TRANSMISSION DOES NOT DRIVE IN ANY RANGE

Step 1. Check oil level.
Fill (LO 9-2350-267-12).

Step 2. Check for disconnected or broken universal joints.

Notify Organizational Maintenance.

STEERING

8. VEHICLE DIFFICULT TO STEER

Incorrect linkage or band adjustment.

Notify Organizational Maintenance.

BAITERIES/GENERATING SYSTEM

9. BATTERY WILL NOT CRANK ENGINE

Step 1. Check to see if battery cables are loose, broken or corroded.

Notify Organizational Maintenance.

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

BATTIERIES/GENERATING SYSTEM - Continued

Step 2. Check for dead or discharged batteries.

Notify Organizational Maintenance.

10. BATTERIES DO NOT STAY CHARGED

Step 1. Check for excessive use of electrical systems when engine is not running.

Check that all electrical accessories are OFF when not in use.

Step 2. Check for dead or discharged battery.

Notify Organizational Maintenance.

11. VEHICLE MASTER SWITCH LAMP DOES NOT LIGHT

Step 1. Check to see if MASTER switch is ON.

Turn ON.

Step 2. Check to see if bulb is burned out.

Replace.

Step 3. Check for loose electrical leads.

Notify Organizational Maintenance.

TRACKS AND SUSPENSION

12. VEHICLE PULLS TO ONE SIDE WITH STEERING WHEEL CENTERED

Step 1. Check for mud or dirt buildup on tracks.

Clean tracks.

Step 2. Check track tension.

Adjust (p 3-30).

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TRACKS AND SUSPENSION - Continued

13. VEHICLE THROWS TRACKS

Step 1. Look for excessively loose, worn track or end connectors.

Adjust or replace (p 3-30 and 3-31).

Step 2. Avoid improper driving/operation of vehicle.

Do not make high-speed turns.

PERSONNEL HEATER

14. HEATER SMOKES OR BANGS UPON STARTING; DOESN'T START

Check to see if you are starting heater correctly.

See starting procedures (p 2-201).

15. HEAT OUTPUT TOO LOW

Check to see if heater switch is in HI position.

Place in HI position.

16. HEAT EXCHANGER LOADS UP WITH SOOT AND CARBON

Check to see if exhaust outlet is restricted.

Clean.

BILGE PUMP

17. DOES NOT OPERATE WITH BILGE PUMP SWITCH ON

Step 1. MASTER switch is OFF.

Turn ON.

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

BILGE PUMP - Continued

Step 2. Outlet is restricted.

Clean.

AUXILIARY POWER UNIT ENGINE

18. APU ENGINE DOES NOT START

Step 1. Check MASTER switch.

Turn MASTER switch ON.

Step 2. Check for low battery charge indicated on BATTERY-GENERATOR gage (gage should read in at least the low-yellow range).

Notify Organizational Maintenance if indication is low.

Step 3. Check APU GENerator switch on AUXILIARY POWER UNIT CONTROL BOX.

Turn APU GENerator switch OFF.

Step 4. Check battery connections.

Notify Organizational Maintenance if battery connections are loose, broken or corroded.

Step 5. Check air intake for restriction.

Remove any restrictions and clean air filters (p 3-47).

Step 6. Check fuel level.

Refuel vehicle (p 3-25).

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

AUXILIARY POWER UNIT ENGINE - Continued

19. APU ENGINE STARTS, THEN STALLS OR RUNS ROUGHLY

Step 1. Check for water in fuel filters.

Drain filters (p 3-47).

Step 2. Check air intake filter for restrictions.

Remove restrictions or clear filters (p 3-47),

Step 3. Check fuel level.

Fill fuel tanks (p 3-25).

20. APU ENGINE DIFFICULT TO START

Step 1. Check for water in fuel filters.

Drain filters (p 3-47).

21. APU ENGINE HARD TO START ONLY IN COLD WEATHER

Step 1. Check to see if plenum door in APU compartment is open.

Open plenum door.

22. APU ENGINE OVERHEATING

Step 1. Check air intake passage for obstruction.

Remove obstruction.

Step 2. Check crankcase oil level (LO 9-2350-267-12).

Refill with oil as necessary.

TROUBLESHOOTING - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

AUXILIARY POWER UNIT ENGINE - Continued

23. APU ENGINE MISFIRES

Step 1. Check air intake filter.

Clean or replace filter element (p 3-47).

Step 2. Check for contaminants in fuel filters.

Drain filters (p 3-47).

24. APU ENGINE LACKS POWER

Step 1. Check air intake passage for obstruction.

Remove obstruction.

Step 2. Check for contaminants in fuel filters.

Drain filters (p 3-47).

HYDRAULIC SYSTEM

25. NO RESPONSE TO ANY CONTROL

Step 1. Check hydraulic fluid supply (LO 9-2350-267-12).

Fill resrvoir.

Step 2. Check that ball valve in suction line is open.

Open valve.

Step 3. Backup hydraulic system does not operate.

Notify Organizational Maintenance.

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - Continued

26. SLOW OPERATION

Step 1. Check hydraulic reservoir temperature.

If greater than 160°F, turnoff hydraulic system and allow fluid to cool. Notify Organizational Maintenance if fluid overheats repeatedly.

Step 2. Check hydraulic fluid level (LO 9-2350-267-12).

Refill reservoir as necessary.

Step 3. Stacker and conveyor operation only: Check flow-control valve settings (p 3-35).

Adjust valve as necessary.

Step 4. Backup pump operation only: Check main engine operating speed.

Adjust throttle to 1100 rpm.

CONVEYOR

27. CONVEYOR CHAIN WILL NOT MOVE

Step 1. Check conveyor safety (override) switch setting.

Turn switch ON.

Step 2. Check flow-control valve setting.

Turn flow-control valve knob counterclockwise slowly until chain speed is satisfactory.

Step 3. Check that conveyor chain is not jammed, broken or off a drive sprocket,

Remove obstruction, place chain around sprocket(s) or repair chain as necessary (p 3-37).

MALFUNCTION TEST OR inspection Corrective ACTION

CONVEYOR - Continued

Step 4. Check chain tension.

Adjust chain tension (p 3-39).

Step 5. Check hydraulic control panei PRESSURE gage for reading of between 100 and 300 psi.

Notify Organizational Maintenance if pressure is not within range.

28. CONVEYOR CHAIN MOVES SLOWLY OR ERRATICALLY

Step 1. Check chain tension.

Adjust chain tension (p 3-39).

Step 2. Check chain alinement.

Reposition chain on sprockets (p 3-38).

step 3. Check flow control valve setting.

Turn fiow control valve knob counterclockwise slowly until chain speed is satisfactory.

Step 4. Check main hydraulic pressure gage for reading of 100 to 300 psi.

Notify Organizational Maintenance if pressure is not within range.

STACKER

29. STACKER TRAY WiLL NOT MOVE

Step 1. Check that stacker chain is not jammed, damaged or off a sprocket.

Remove obstruction, place chain around sprocket(s) or repair chain (p 3-40).

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

STACKER - Continued

Step **2.** Check flow control valve setting.

Turn flow control valve knob clockwise slowly until chain speed is satisfactory.

30. STACKER TRAY MOVES SLOWLY OR ERRATICALLY

Step 1. Check flow control valve setting.

Turn flow control valve knob clockwise slowly until chain speed is satisfactory.

Step 2. Check main hydraulic pressure gage for reading of 100 to 300 psi.

Notify Organizational Maintenance if pressure is not within range.

Step 3. Check chain tension.

Adjust chain tension (p 3-44).

31. MANUAL WINCH WILL NOT OPERATE

Step 1. Check that cable is properly routed over pulley.

Rethread cable.

Step 2. Check that tray carrier is disconnected from chain.

Remove bolts that connect carrier to chain.

Step 3. Check that cable is properly connected to tray carrier.

Attach cable clevis.

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

PROJECTILE RACKS

32. PROJECTILE DOES NOT GO INTO RACK TUBE

Step 1. Check inner diameter of tube for obstruction or damage.

Remove obstruction if possible. Notify Organizational Maintenance if tube is damaged.

Step 2. Check locking shoe for locked position.

Open locking handles.

33. PROJECTILE(S) ARE NOT HELD IMMOBILE IN TUBE

Step 1. Check that handles are in locked position.

Place handles in locked position.

Step 2. Check for defective lock. If damaged, notify Organizational Maintenance.

34. PROJECTILES WILL NOT COME OUT OF TUBE(S)

Step 1. Make sure rack is unlocked and handles are positioned up (released).

Step 2. Remove projectiles by pulling on nose plug with cargo hook.

Notify Organizational Maintenance.

VENTILATED FACE PIECE SYSTEM

35. REDUCED OR NO AIR FLOW TO VENTILATED FACE PIECE

Step 1. Check vehicle MASTER switch.

Turn MASTER switch ON.

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

VENTILATED FACE PIECE SYSTEM - Continued

Step 2. Make sure BATTERY-GENERATOR gage indicates green range.

If BATTERY-GENERATOR gage indicates below green range, charge battery by running main engine (p 2-86) or the AFU (p 2-135). After BATTERY-GENERATOR gage indicates well into green range, turn off engine.

Notify Organizational Maintenance if indicator does not remain in green range.

Step 3 Check to see that VFPS control box switch is ON.

Turn ON.

Step 4. Check hoses and connectors for damage or kinks.

Remove kinks if possible. Report any damage to Organizational Maintenance.

Step 5 Check that spring clip is removed from inlet holes.

Remove spring clip.

Step 6. Check that air intake is unobstructed and listen for fan operation.

Notify Organizational Maintenance of clogged filters if intake is unobstructed and/or fan is not operating.

36. PRECLEANER DOES NOT OPERATE WITH VFPS SWITCH ON

Check vehicle MASTER switch.

Turn MASTER switch ON.

37. NO HEAT TO VENTILATED FACE PIECE(S), BUT AIR FLOW NORMAL

Step 1. Check to see that VFPS control box switch is ON.

Turn switch ON.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

VENTILATED FACE PIECE SYSTEM - Continued

Step 2. Check rotary switch on each heater. Make sure rotary switch is turned fully clockwise.

Turn on switch. Power lamp should light.

Step 3. Inspect outlet hose(s) and check for air flow.

Notify Organizational Maintenance if hose is damaged or if air flow is restricted.

Step 4. Wait a few minutes after completing step 3, then check periodically for warm air flow. Air should warm within 15 minutes.

Notify Organizational Maintenance if air does not warm.

UPPER REAR DOOR (BALLISTIC SHIELD)

38. UPPER REAR DOOR DOES NOT OPERATE WHEN SWITCH IS ENGAGED

Step 1. Check flow control valve setting.

Turn valve fully counterclockwise and attempt operation. Refer to p 3-35 for adjustment procedure.

Step 2. Check for hydraulic pressure between 100 and 300 psi.

Notify Organizational Maintenance if pressure is not within range.

Step 3. Check that dump valve is closed.

Close dump valve.

Step 4. Operate BALLISTIC SHIELD directional control valve manually.

If valve can be operated manually, notify Organizational Maintenance of electrical failure. If valve is not manually operable, notify Organizational Maintenance of hydraulic failure.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

UPPER REAR DOOR (BALLISTIC SHIELD) - Continued

39. UPPER REAR DOOR CYLINDER OPERATION IS SLOW OR ERRATIC

Check flow control valve setting on upper rear door cylinder.

Adjust flow control valve (page 3-35).

40. UPPER REAR DOOR DRIFTS CLOSED

Notify Organizational Maintenance.

AUTOMATIC FIRE EXTINGUISHiNG SYSTEM (AFES)

41. LAMP DOES NOT LIGHT DURING LAMP TEST OR FAILS DURING OPERATION

Replace lamp (p 3-50). Run lamp test (p 2-114).

If new lamp (p 3-50) or LED does not light during test, notify Organizational Maintenance.

42. FAULT LAMP LIGHTS

On vehicles 1 thru 344, open T/A panel cover and record Indication of the LED's. On vehicles 345 and above, record indication of T/A panel LED's. Notify Organizational Maintenance of the LED indication.

43. CREW AFES T/A PANEL FIRE DETECTION LED's LIGHT BUT NO FIRE

Cover window "eye" of the indicated optical fire sensing assembly (OFSA) to exclude sunlight and repeat test with "eye" covered. If LED lights, notify Organizational Maintenance.

44. AFES OR COMPONENT DAMAGE OR FAILURE DURING OPERATION

Notify Organizational Maintenance.

45. EMPTY, LOW PRESSURE OR DAMAGED EXTINGUISHER CYLINDERS

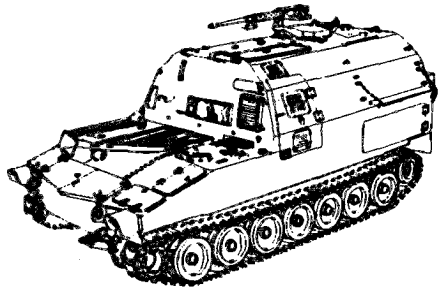
Notify Organizational Maintenance.

Section III MAINTENANCE PROCEDURES

HULL MAINTENANCE PROCEDURES

The following are hull maintenance procedures to be performed by driver and crew.

ENGINE COOLING SYSTEM



NOTE

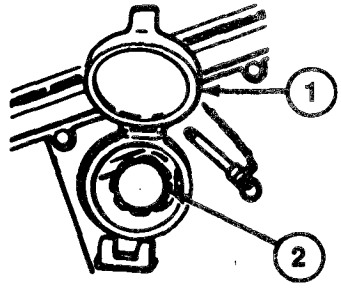
Overheating is caused by a faulty cooling system or low coolant level. Proper maintenance of cooling system will help prevent overheating.

Adding Coolant

WARNING

NEVER remove radiator cap on an engine until it has cooled.

1. Lower rpm below cruising speed on an overheated engine until temperature drops to oprating range. If temperature continues to rise, shutdown completely and allow 10 minutes for engine to cool before adding coolant.
2. Open radator cap access cover (1). Using a rag, slowly unscrew radiator cap (2). When steam subsides, remove cap.
3. Start engine and idle. Add coolant to top of filler neck and replace radiator cap.
4. Run engine for 1 minute longer to eliminate any air locks; recheck coolant level and add if necessary.



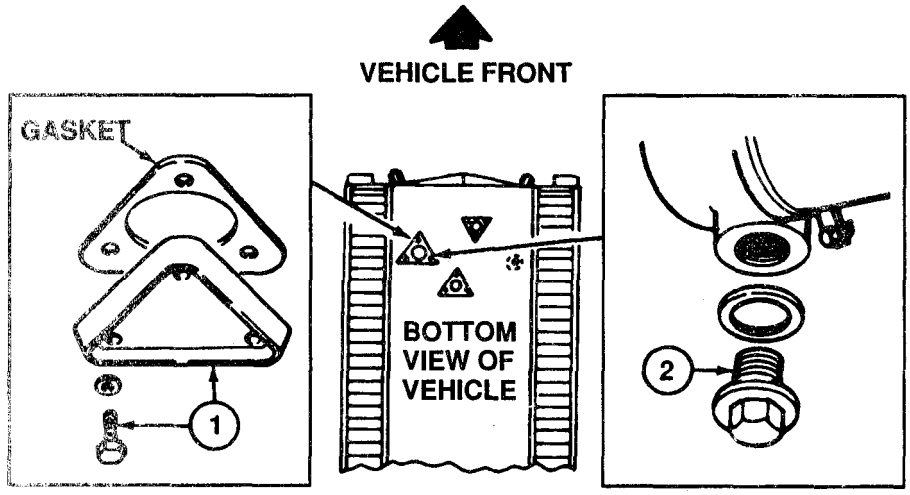
Faulty Cooling System

If radiator is clogged or dirty, notify Organizational Maintenance.

ENGINE COOLING SYSTEM - Continued

Draining Coolant

1. Monitor engine temperature on ENGINE WATER TEMPERATURE gage (p 2-91) and allow engine to cool to below 185°F.
2. Place vehicle on an incline, nose down, to facilitate coolant draining.
3. Remove access cover (1) on bottom of vehicle.
4. Using a socket wrench, remove coolant drain plug (2) and drain coolant.
5. Slowly remove radiator cap.
6. Replace plug and refill as outlined in steps 3 and 4 on page 3-21.
7. Install access cover (1).



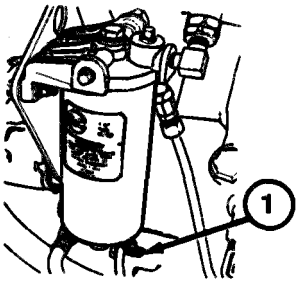
Coolant Temperature Ranges

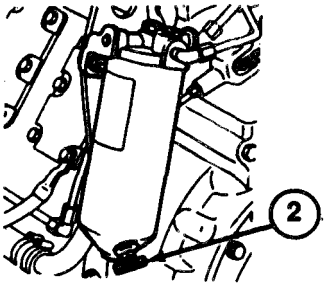
-65°F to -40°F	Antifreeze (Arctic-type, full-strength) (item 5, Appx D)
-40°F to +80°F	Antifreeze (50% water mixture) (item 3 or 4, Appx D)
Above +80°F	Add corrosion inhibitor (22-1/2 oz per vehicle) (item 26, Appx D)

SERVICING FUEL SYSTEM

WARNING

Diesel fuel is FLAMMABLE. DO NOT smoke in vicinity while performing servicing operations.





1. Open drain oocks at primary (1) and secondary (2) fuel filters to remove water and dirt. Place container under drain cocks.

2. When clear fuel is visible, close drain cocks.

NOTE

After primary and secondary fuel filters have been drained, use fuel system air purge by turning on FUEL PRIME switch for 45 seconds prior to starting engine.

NOTE

A fuel tank holds 135 gallons of fuel. Before draining, provide enough container capacity to hold fuel to be drained.

SERVICING FUEL SYSTEM - Continued

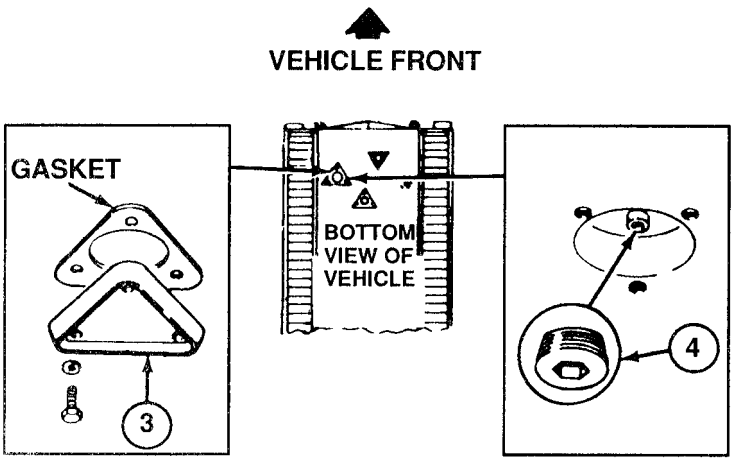
3. When necessary, remove water and dirt from fuel tanks as follows:

   a. Remove access cover (3).

   b. Remove fuel plug (4), using a socket head screw key.

   c. When clear fuel is visible, replace plug (4).

   d. Install access cover (3).



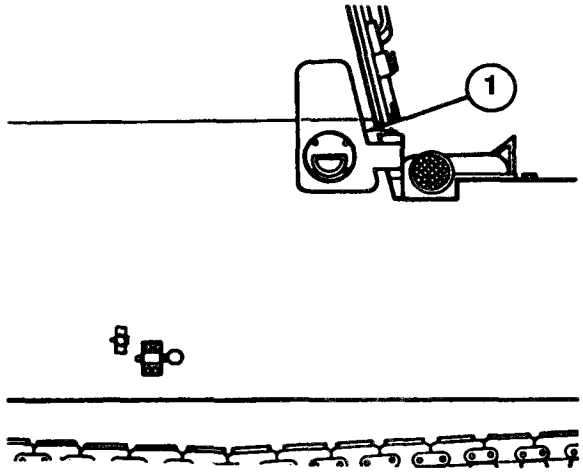
NOTE

After operation, keep fuel tank full to minimize condensation.

REFUELING

WARNING

Diesel fuel is FLAMMABLE. DO NOT smoke within 50 ft of the vehicle while refueling.



1. Shut off engine.

2. Open fuel cap access cover (1) and remove fuel cap slowly. Make sure fuel strainer is properly placed in mouth of filler neck.

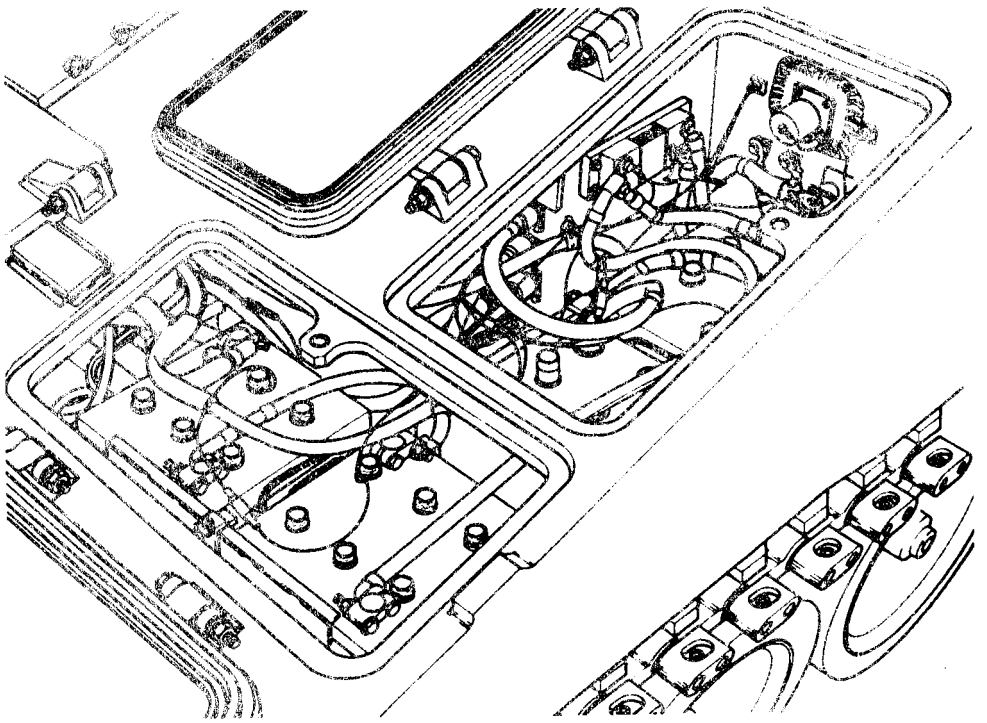
NOTE

Do not lay hose across vehicle.

3. Fill to a level 6 inches below top of filler neck.

4. Replace fuel cap and close cover.

SERVICING BATTERIES



Loose Connections

1. Connectors should be tight and all the way down on battery posts (TM 9-6140-200-14).
2. Battery hold-downs should be tight, but not so tight as to damage battery case.
3. If bolt threads are corroded so as to prevent a tight hold, notify Organizational Maintenance for replacement.
4. If cables or terminals are loose or broken, notify Organizational Maintenance.

WARNING

Lead-acid battery gases can explode. Don't smoke, have open flames or make sparks around a battery, especially if caps are off. If a battery is gassing, it can explode and cause injury to you.

ELECTROLYTE LEVEL

1. Clean off caps before removing. Do not allow dirt or foreign matter to get into battery cells.

2. Keep vent holes in caps clean to allow gases to escape from cells.

3. Electrolyte level must not drop below top of battery plates. If this condition exists, fill with distilled water to cover plates.

CORROSION

WARNING

Battery corrosion is an acid and will eat holes in your clothing. Wash any acid off skin immediately.

Corrosion tends to build upon battery posts, terminals and cables. This corrosion may damage cables and terminals. If corroded, notify Organizational Maintenance.

NOTE

Make sure battery caps are tight and no cracks are visible in battery case.

Clean top of battery with a damp cloth and wipe dry.

CAUTION

Complete discharge of batteries will lessen battery life and, in freezing weather, will burst battery case. Avoid running battery down.

UNSERVICEABLE BATTERIES

If batteries fail, notify Organizational Maintenance (TM 9-6140-200-14).

MAINTENANCE OF AIR CLEANER

WARNING

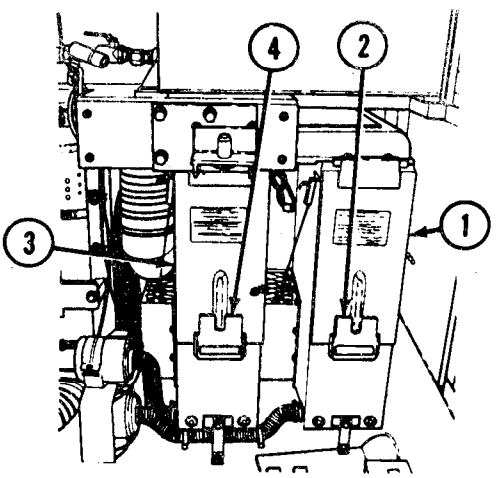
If NBC exposure is suspected, all air filter media will be handled by personnel wearing full NBC protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

Depending on conditions, air cleaner must be removed periodically for cleaning. Loss in engine power, an overheating engine or excessive black exhaust may indicate need for more frequent cleaning. If resistance indicator sleeve shows red, air cleaner is restricted and filters must be checked.

1. Park vehicle on level ground.
2. Shut off engine (p 2-97).
3. Remove all projectiles from right rack (p 2-185).
4. Remove canisters from right stowage box on top of projectile racks.
5. Move right rack toward rear of vehicle (p 2-186).
6. Remove right access door (1) by pulling locking latch (2) down and lifting door up.

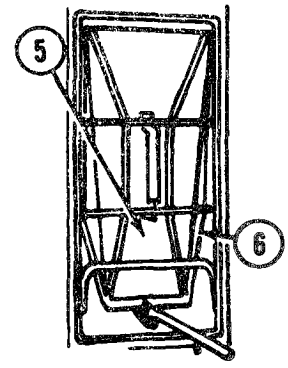
CAUTION

Do not pull left door up too far as this will cause binding and damage to door when removing.



8. Pull locking handles (5) down. Push filter IN and pull OUT.

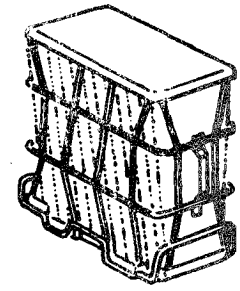
9. Pull filters (6) from cleaner.



WARNING

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chipguarding and personal protective equipment (goggles/shield, gloves, etc.).

10. Clean air filters with compressed air. (Emergency clean by rapping bottom or sides against flat surface. Do not strike open or sealing edge).

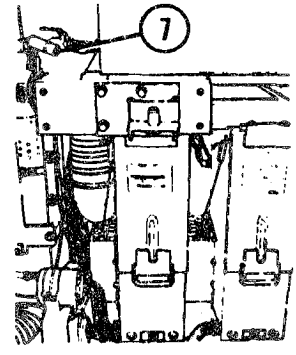


11. Clean filter compartments.

12. Replace filters; aline with outlet gaskets to assure proper sealing, and secure locking handles.

13. Slide right and left doors on air cleaner, and secure doors by pulling locking latch down and then up.

14. Reset air cleaner restriction indicator (7) by pushing UP on reset button (located on bottom of cylinder).



15. Start engine (p 2-82), If indicator changes to red, notify Organizational Maintenanc.

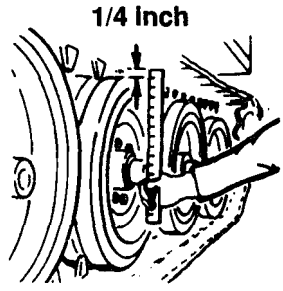
16. Install rack and stow hoist, trolley and beam (p 2-189).

MAINTENANCE OF TRACK

Checking Track Tension

1. Move vehicle forward and backward several times on level ground, stopping without applying brakes.

2. Check distance from top of third roadwheel (from drive sprocket) to track. If distance is more or less than 1/4 inch, track tension needs adjustment.

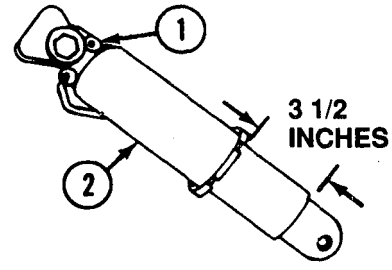


Increase Track Tension

Pump grease into clean fitting (1) on track adjuster (2) until correct tension is obtained

CAUTION

When increasing track tension, do not let track adjuster extend beyond 3-1 /2 inches or adjuster will bind in extended position and will require force to collapse.



NOTE

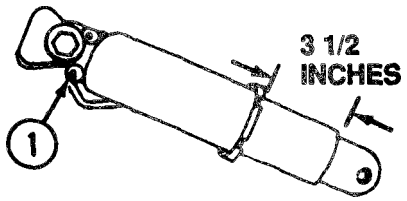
If track sag cannot be taken up, decrease track tension, remove track shoe and adjust.

MAINTENANCE OF TRACK - Continued

Decrease Track Tension

WARNING

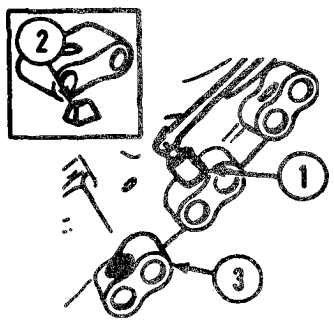
Lubricant is under high pressure. Loosen bleed plug (1) slowly to avoid injury to personnel.

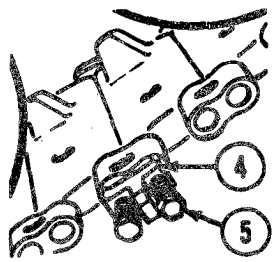


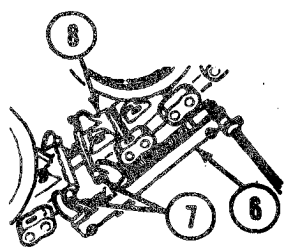
Open bleed plug (1) on track adjuster and reduce pressure until tension is adjusted. Tighten plug and wipe away excess grease.

Removing/Installing Track Shoe

1. Decrease track tension.
2. Remove bolts (1) retaining wedges (2) on all four end connectors (3) holding track shoes.
3. Install end connector puller (4) and tighten screws (5) against ends of track link pins.
4. Move all four end connectors out approximately 1 Inch, but do not remove.
5. Install track fixtures (6) on both sides of shoe being removed, engaging track link pins (7) on adjoining shoes.
6. Remove end connectors (3) and track shoe (8).
7. Install new track shoe by reversing procedures 6,5,4, and 2.
8. Tighten wedge screws to 90-100 lb-ft if torque wrench is available.







MAINTENANCE OF TRACK - Continued

Disconnecting Track

WARNING

Keep your toes clear of track.

1. Disconnect track in same manner as replacing track shoe, but only remove two connectors opposite each other.

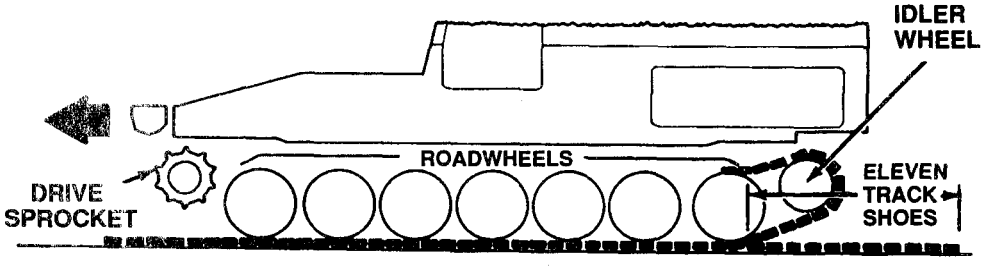
2. Before removing track fixtures, support weight of track with crowbar to lower track to ground.

3. To connect track, refer to page 3-34.

Installing Track

1. Lay track out in front of vehicle in straight line directly ahead of, and touching, first roadwheel (79 shoes per track).

2. Start engine and drive slowly onto track to point where enough track shoes to cover idler wheel extend past centerline of last roadwheel.

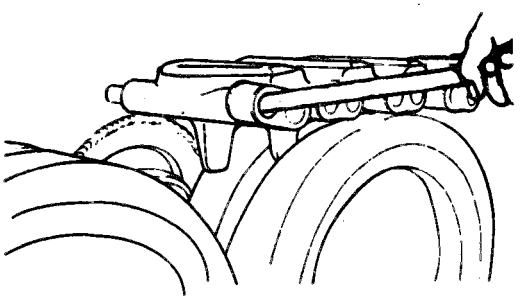


3. Stop engine; leave parking brake off.

4. Install stop block front and rear.

5. Place an end connector on end of track, and using track fixture handle, lift end of track over idler wheel until it rests on top of last roadwheel.

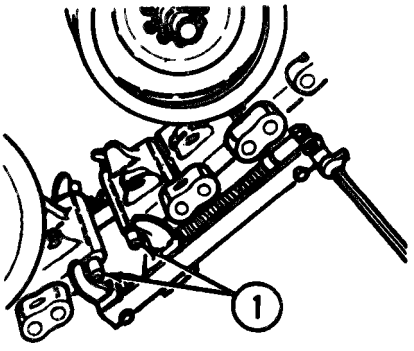
MAINTENANCE OF TRACK - Continued



6. Start engine, place shift lever in forward (F-1) with steering moved in direction of removed track. Move vehicle forward slowly, allowing track to rest on roadwheels, and lifting upon end of track to prevent end of it from getting caught between roadwheels.

7. Lay end of track on drive sprocket, turn steering wheel to opposite track and accelerate at low speed. This will clutch-brake opposite track final drive, pulling track forward.

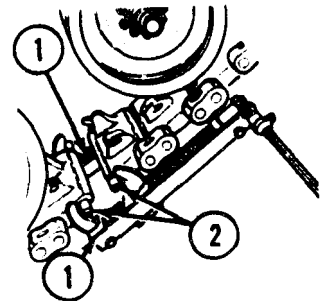
8. Stop engine when track fixtures can be connected to both ends of loose track and apply parking brake to hold sprocket in place. A crowbar maybe used to pry down or up on loose track to install track fixtures. Install fixture over link pins (1) on inside and outside of track. Release brake, and refer to page 3-34.



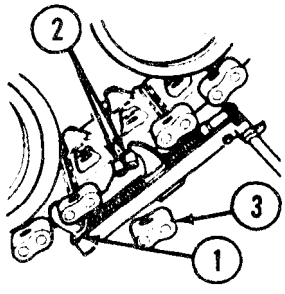
MAINTENANCE OF TRACK - Continued

Connecting Track

1. Install track fixture and tighten fixtures (1) evenly until link pins (2) are close enough to remove track fixtures (one at a time) and reinstall as illustrated in step 2.



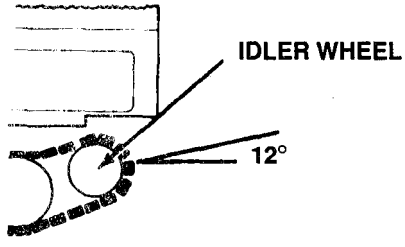
2. Continue to tighten fixtures (1) evenly until link pins (2) are close enough to install end connectors (3).



3. Install end connectors by tapping on with hammer. Do not attempt to install wedges at this time.

4. Position vehicle so connecting point is positioned on idler wheel where shoes are bent at approximately a 12- degree angle.

5. Install wedges and bolts; tighten.



NOTE

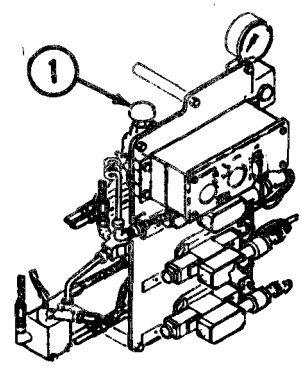
Notify Organizational Maintenance to torque wedge bolts. Torque again after 50 miles.

6. Adjust track tension (p 330).

ADJUSTING CONVEYOR/STACKER SPEED

NOTE

The flow-control valve (1) on hydraulic control panel regulates operating speed of conveyor and stacker. Valve is manually adjustable; however, valve is designed so that increasing speed of conveyor decreases speed of stacker, and vice versa.



1. To increase speed of conveyor, turn flow-control valve knob counterclockwise. Stacker speed will decrease.
2. To increase speed of stacker, turn flow-control valve clockwise. Conveyor speed will decrease.

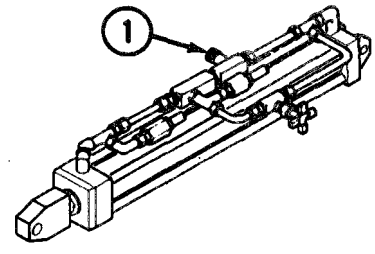
ADJUSTING UPPER REAR DOOR FLOW CONTROL VALVE

WARNING

Never operate upper rear door until door-travel area is clear of personnel.

NOTE

The door is most prone to erratic operation during the first three seconds of closing.



This valve is designed to smooth door closing.

To adjust:

1. Activate the primary or backup hydraulic system.
2. Open upper rear door.
3. Turn flow control valve (1) counterclockwise until fully open.
4. While closing the door, slowly turn flow control valve (1) clockwise until door closes smoothly.
5. Open door and repeat step 4. Continue to operate and adjust valve until the door operates smoothly for the entire closing cycle.

CONVEYOR CHAIN MAINTENANCE

WARNING

Keep hands clear of conveyor hinges during maintenance procedures.

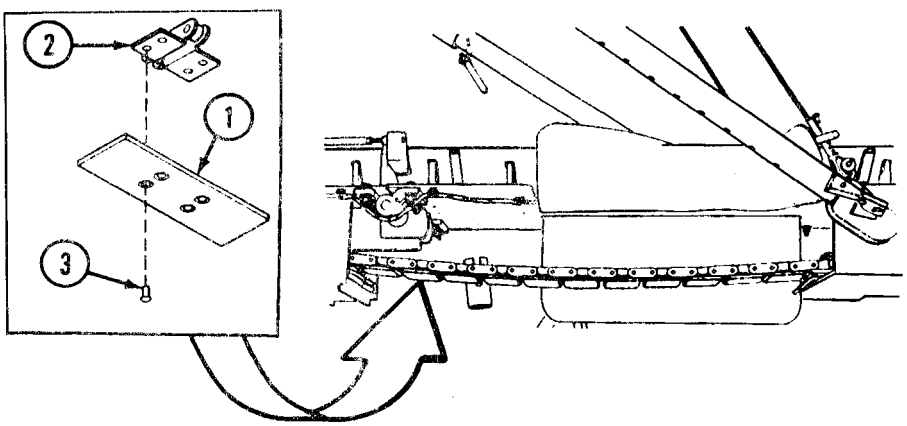
Conveyor Chain Pad Replacement

NOTE

Replace chain pads when pad is bent or when metal is exposed which could damage projectile bands.

It is not necessary to remove chain link(s) to replace damaged conveyor pads.

1. Turn off hydraulic system.
2. Use conveyor manual crank to move damaged pad(s) to bottom side of conveyor.



3. Insert chisel between pad (1) and plate (2). Tap with hammer to cut rivets (3). Remove rivets using a hammer and punch; and remove pad.

CONVEYOR CHAIN MAINTENANCE - Continued

4. Using four new rivet and nail assemblies (4) and rivet gun (5), install replamment pad(s) as follows:

   a. Spread rivet gun handles.

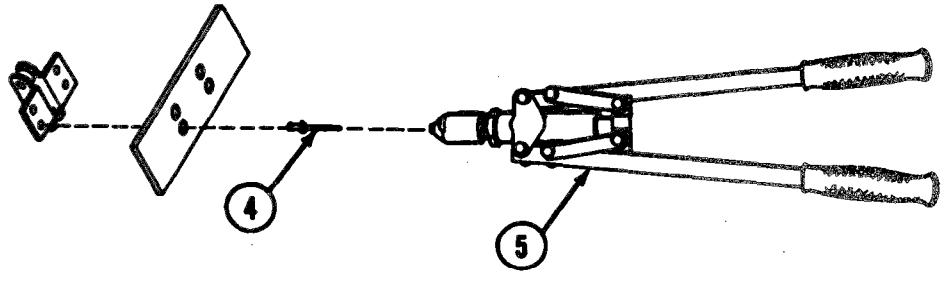
   b. lnsert new rivet and nail assemblies (4) Into rivet gun (5) as shown, pointed end first.

   c. Place rivet end of nail through hole of replacement pad and existing plate.

   d. While holding pad against plate with rivet and nail (4) and rivet gun (5), repeatedly squeeze rivet gun handles together until rivet 'pops" from nail.

   e. Spread rivet gun handles and remove nail.

   f. Repeat steps "a" through "e" for each pad hole until all replacement pads are installed.



Chain Repair

NOTE

It is not necessary to break chain to replace damaged conveyor pad(s). For pad replacement see page 3-36.

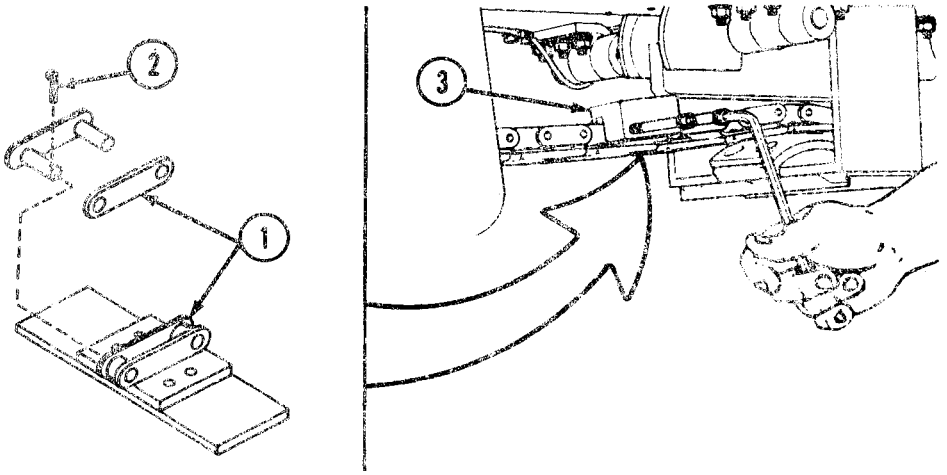
1. Turn off hydraulic system.

2. Use conveyor manual crank to move damaged portion of chain to bottom side of conveyor.

3. Relieve chain tension (p 3-39).

CONVEYOR CHAIN MAINTENANCE - Continued

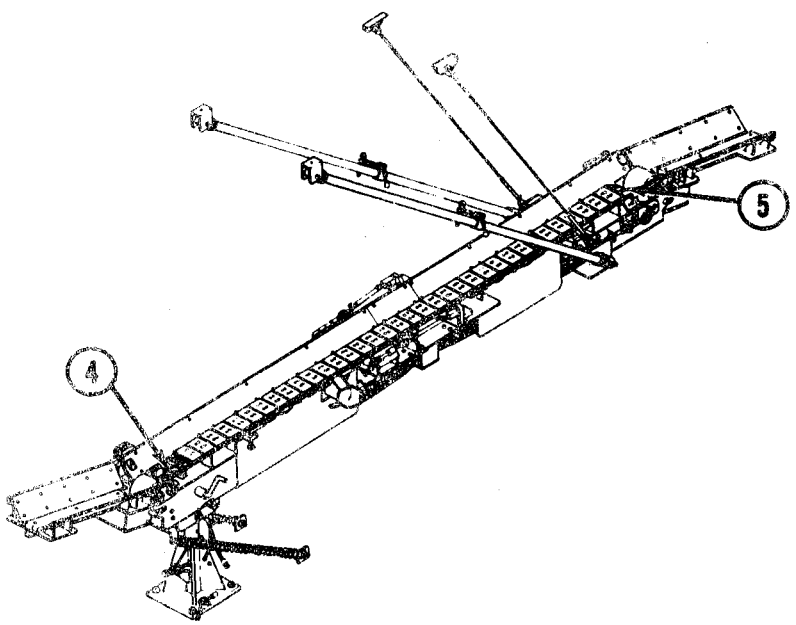
4. Remove any damaged links (1) by removing cotter pins (2), or by using chain breaker (3).



5. Make sure chain is properly meshed with drive sprocket (4) and idler sprocket (5).

6. Reconnect chain using chain links provided in chain repair kit. Secure links with cotter pins provided.

7. Adjust chain tension (p 3-39).



CONVEYOR CHAIN MAINTENANCE- Continued

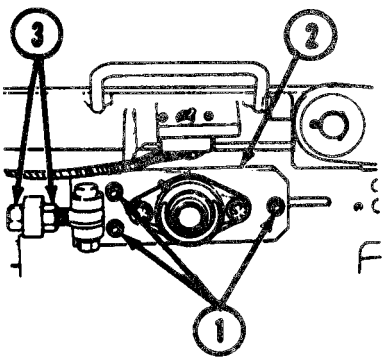
Chain Tension Adjustment

CAUTION

Capscrews (1) ara secured by nuts located internally. Nuts must be held in position while capscrews are loosened. If this precaution is not taken, damage to equipment may result.

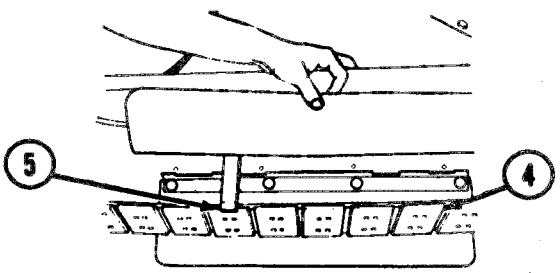
1. Loosen take-up plates (2) on both sides by loosening three hexagonal-head capscrews (1) on each plate.

2. Loosen or tighten rod-end adjusting nuts (3) on both sides to move takeup plates forward or backward.



CAUTION

Adjust tension evenly on both sides of sprocket.



3. Adjust tension so that conveyor pads (4) hang evenly with bottom of chain-tension indicator (5). If chain pads hang no lower than bottom of indicator or no higher than scribed line on indicator, no adjustment is necessary.

4. Secure take-up plates (2) by tightening the three hexagonal-head capscrews (1) on each plate.

5. Activate hydraulic system and operate conveyor in both directions to check for proper operation.

STACKER CHAIN MAINTENANCE

Chain Repair

1. Stow the stacker (p 2-171).

2. Remove stacker inner chain guard (1) as follows:

   a. Remove two screws (2), two lockwashers (3) and two flat washers (4) from bottom of guard.

   b. Manually lower stacker tray to bottom of travel (p 2-239).

   c. Remove screw (5), flat washer (6) and lockwasher (7) from horizontal hole at top forward portion of guard.

   d. Remove nut (8), two flat washers (9), lockwasher(10) and screw (11) from horizontal slot at top of guard.

3. Remove stacker outer chain guard (12) as follows:

   a. Disconnect electrical plug (13) from on top of stacker control box (14) by unscrewing plug from box.

   b. Remove two screws (15), two lockwashers(16) and two flat washers (17) from bottom of guard.

   c. Remove screw (18), flat washer (19) and lockwasher (20) from vertical hole at top of guard.

4. If necessary, remove tension from chain as follows:

   a. Loosen, but do not remove, four motor mount screws (21).

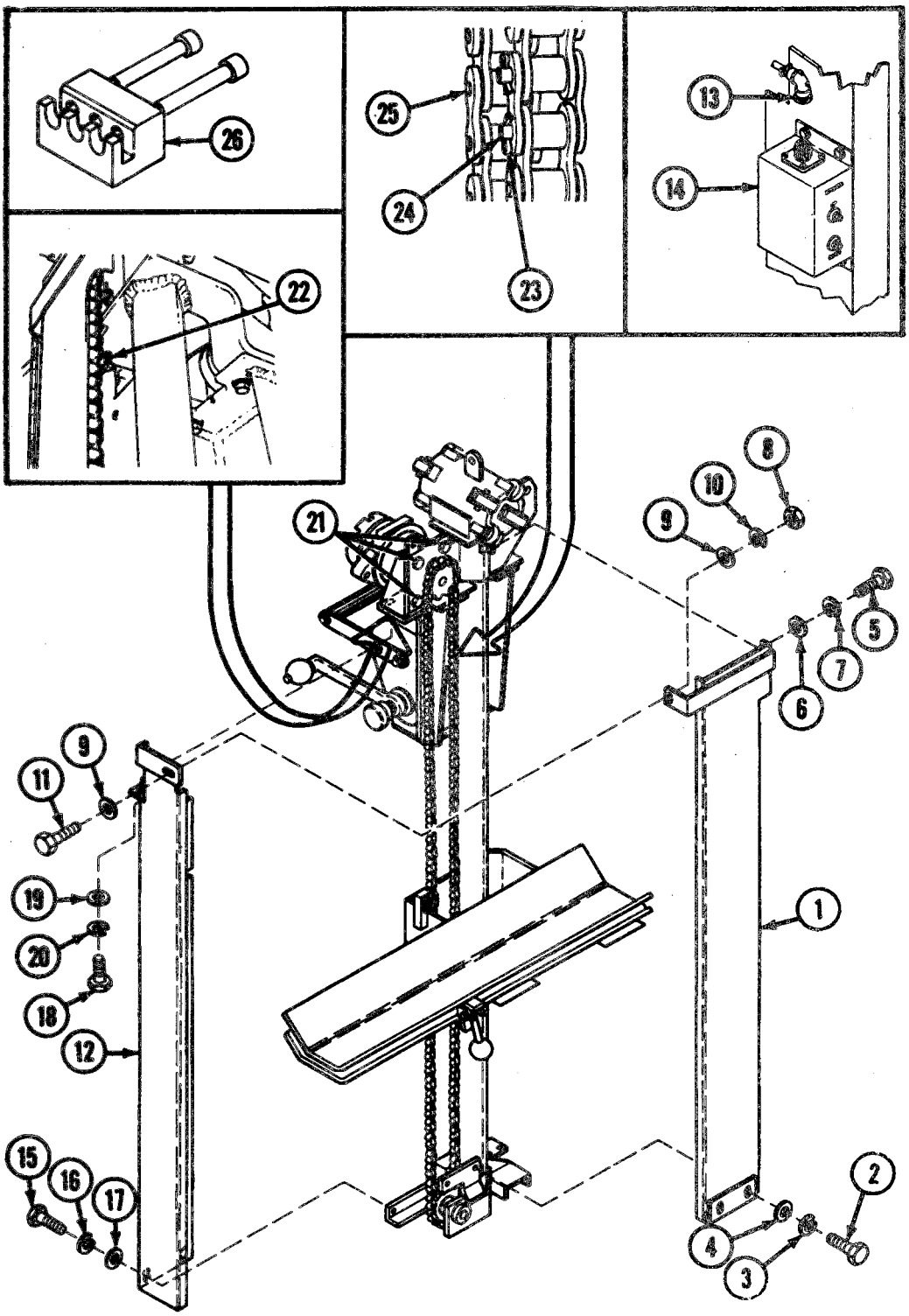
   b. Loosen locknut on tension-adjusting screw (22). Turn tension-adjusting screw (22) out to lower the motor.

NOTE

Previously replaced links are connected using cotter pins (23) and pins (24). Previously unreplaced links are connected with press pins (25).

5. Locate breaks or damage to chain. Remove any damaged links by removing cotter pins (23) and pins (24), or by using chain breaker (26). If chain breaker is to be used, one of the socket head chain breaker screws must be moved to center hole.

STACKER CHAIN MAINTENANCE - Continued



STACKER CHAIN MAINTENANCE - Continued

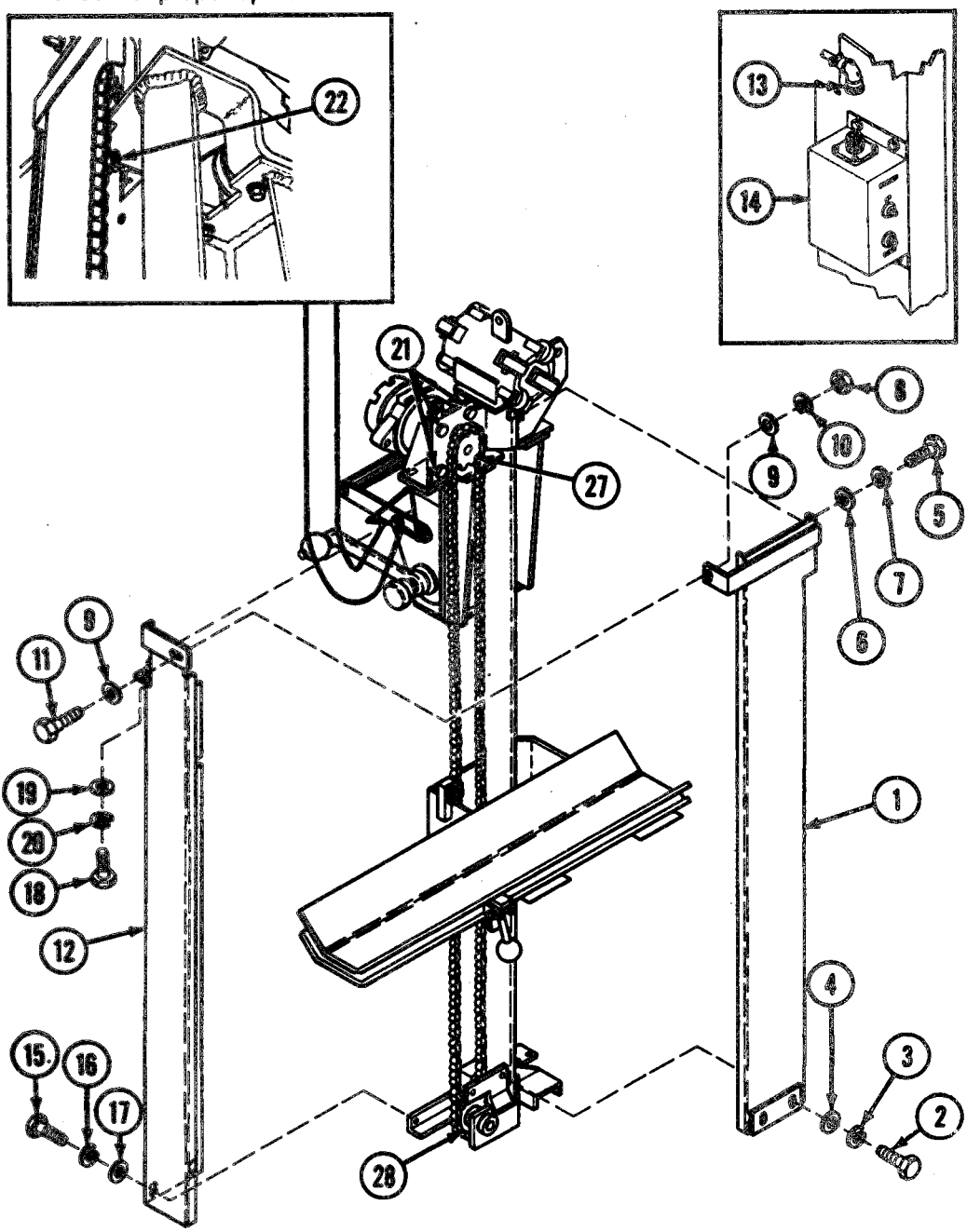
NOTE
Be sure pins on chain breaker are alined with pins on chain.

6. Position stacker chain around drive sprocket (27) and idler sprocket (28).
7. Install replacement links provided in chain repair kit, and connect chain with pins and cotter pins.
8. Position chain around sprockets. If necessary, remove tension from chain as follows:
    a. Loosen, but do not remove, four motor mount screws (21).
    b. Loosen locknut on tension-adjusting screw (22). Turn tension-adjusting screw (22) out to lower the motor.
9. Adjust chain tension as necessary (p 3-44).
10. Install stacker outer chain guard (12) as follows:
    a. Position chain guard (12) against stacker assembly. Aline top vertical holes and install screw (18), flat washer (19) and lockwasher (20). Do not tighten screw at this time.
    b. Aline bottom holes and install two screws (15), two flat washers (17) and two lockwashers (16).
    c. Tighten all screws.
    d. Thread electrical plug (13) onto stacker control box (14).
11. Install stacker inner chain guard (1) as follows:
    a. Position chain guard (1) against stacker assembly. Aline top horizontal holes and install screw (11), lockwasher (10), two flat washers (9) and nut (8). Do not tighten screw at this time.
    b. Aline top forward horizontal holes and install screw (5), lockwasher (7), and flat washer (6). Do not tighten screw at this time.
    c. Raise stacker tray from floor to provide access to bottom holes.
    d. Aline bottom holes and install two screws (2), two lockwashers (3) and two flat washers (4). Tighten screws (2).

STACKER CHAIN MAINTENANCE - Continuad

e. Tighten all screws at top of chain guard.

12. Activate hydraulic system and oprate stacker through full travel several times to check for proper operation.



STACKER CHAIN MAINTENANCE - Continued

Chain Tension Adjustment

1. Remove stacker inner chain guard (1) as follows:

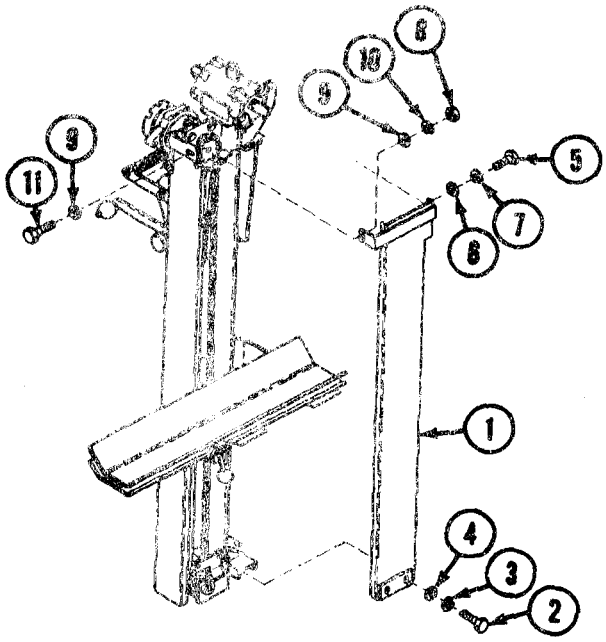
   a. Remove two screws (2), two lockwashers (3) and two flat washers (4) from bottom of guard.

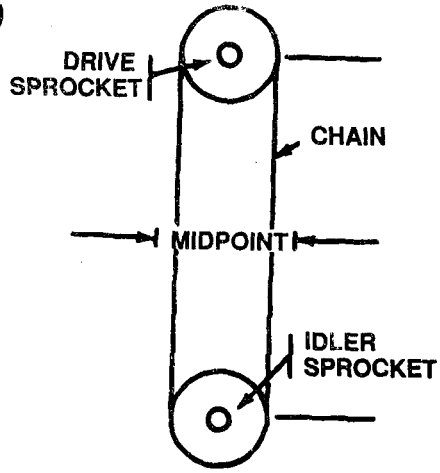
   b. Lower stacker tray to bottom of travel.

   c. Remove screw (5), flat washer (6) and lockwasher (7) from horizontal hole at top forward portion of guard.

   d. Remove nut (8), two flat washers (9), lockwasher (10) ad screw (11) from horizontal slot at top of guard.

   e. Remove inner chain guard.





2. Check tension as follows:

   a. Grip both sides of chain at approximate midpoint between upper and lower sprockets.

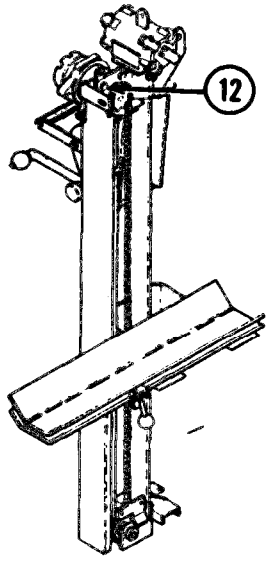
   b. With one hand, try to press chain sides together.

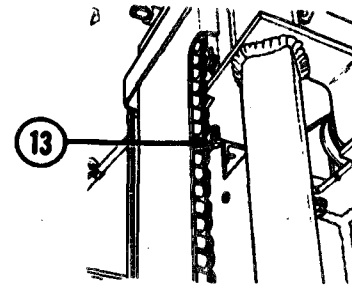
STACKER CHAIN MAINTENANCE - Continued

c. If chain is properly adjusted, chain sides will meet with no slack remaining. No adjustment is necessary.

d. If chain sides do not meet, chain tension should be decreased.

e. If chain sides meet and chain slack is present, chain tension should be increased.





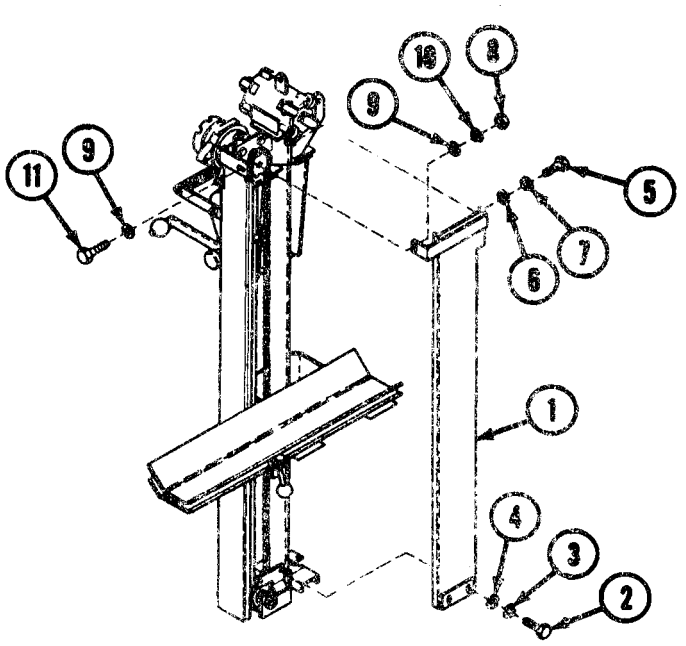
3. If chain rquires adjustment, proceed as follows:

a. Loosen, but do not remove, four motor mount screws (12).

b. Loosen locknut on tension-adjusting screw (13). Turn tension-adjusting screw (13) to raise or lower motor. Raising motor increases tension; lowering motor decreases tension.

c. After chain tension is adjusted, tighten motor mount screws. Tighten locknut on screw.

STACKER CHAIN MAINTENANCE - Continued



4. Install inner chain guard (1) as follows:

   a. Position chain guard (1) against stacker assembly. Aline top horizontal holes and install screw (1), lockwasher (10), two flat washers (9) and nut (8). Do not tighten screw at this time.

   b. Aline top forward horizontal holes and install screw (5), lockwasher (7) and flat washer (6). Do not tighten screw at this time.

   c. Raise stacker tray from floor to provide access to bottom holes.

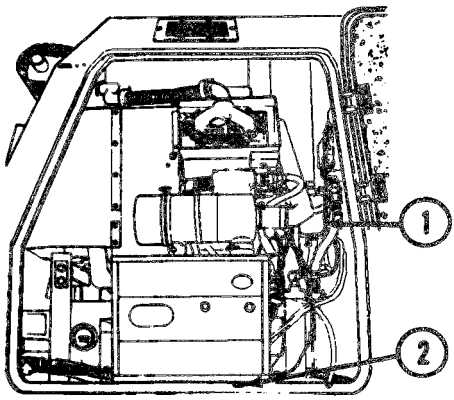
   d. Aline bottom holes and install two screws (2), two lockwashers (3) and two flat washers (4). Tighten screws (2).

   e. Tighten all screws at top of chain guard.

5. Activate hydraulic system and operate stacker through full travel several times to check for proper operation

APU MAINTENANCE

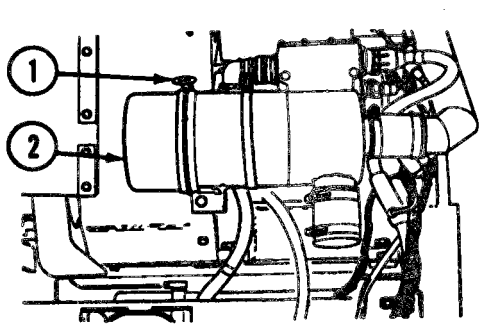
Draining Fuel Filters



1. Open APU side door. Locate two APLJ fuel filters (1) at inside rear wall of APU compartment.
2. Hold a glass or other small container beneath drain-hose end (2) of each filter.
3. Open each drain cock and allow contaminants to drain from filters.
4. close drain cocks.
5. Inspect fuel from each filter for signs of water or other contaminants. Report excessive amounts to Organizational Maintenance.
6. Close and secure APU side door.

Servicing APU Air Cleaner

1. Open APU compartment side door.

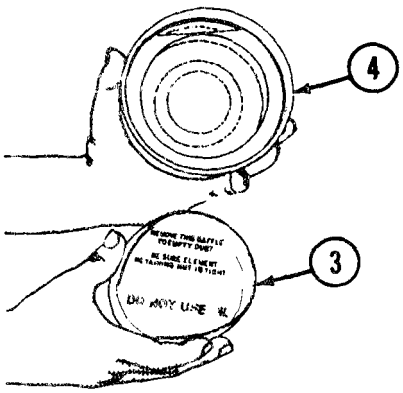


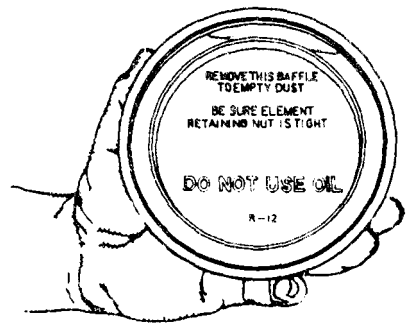
2. Loosen air filter housing clamp (1) to remove dust cap assembly (2).

APU MAINTENANCE - Continued

WARNING

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

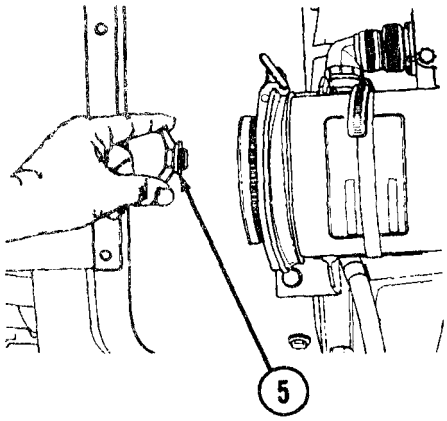


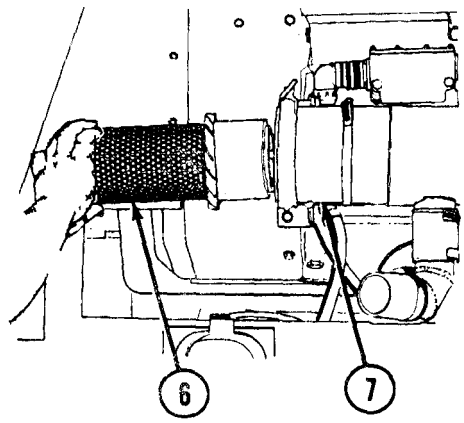


3. Remove baffle (3) from cap (4).

4. Empty dust cap (4).

5. Reinstall baffle (3).





6. Remove wing nut (5).

7. Remove filter element (6) from filter housing (7).

APU MAINTENANCE - CONTINUED

8. If filter element is torn, notify Organizational Maintenance

WARNING

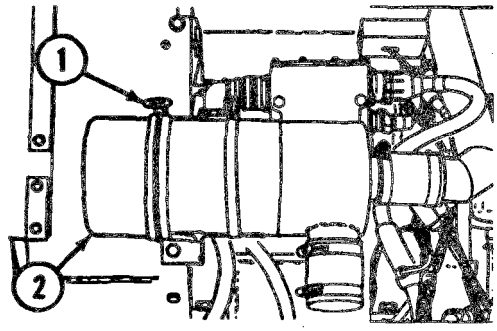
Compressed air used for cleaning pruposes will not exceed 30 psi. Use only with effective chip-guarding and personal protective equipment (goggles/shield, gloves, etc.).

9. If dirty or clogged, clean element with low-pressure compressed air directed to inside of element.

10. Wipe inside of air filter housing with a clean, damp cloth (item 40, Appx D). Inspect outside of hoses for holes and tears.

11. Place filter element (6) into filter housing (7).

12. Install wing nut (5).



NOTE

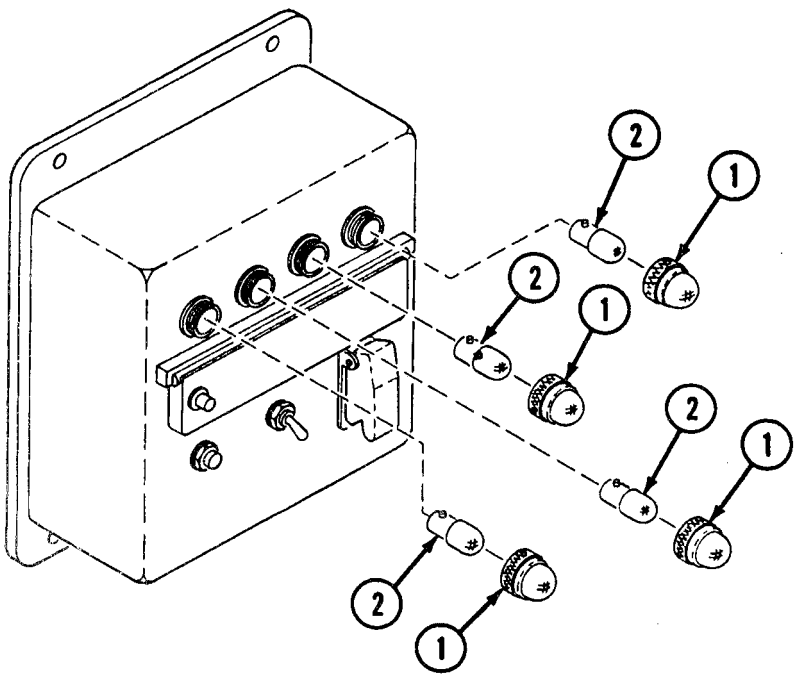
When installing cap, make sure outer edge of cap marked TOP is Iocatd at top of air cleaner.

13. Install dust cap assembly (2) and secure air filter housing clamp (1).

AFES MAINTENANCE

Test and Alarm Panel or Remote Status Indicator Lamp Replacement

1. Remove lens cover (1) from lamp (2) to be replaced.
2. Remove and discard burned-out lamp (2).
3. Install new lamp (item 26, Appx B).
4. Install lens cover (1).



DECAL MAINTENANCE

Decal Replacement

1. Lift up one corner of decal. Slowly peel decal from surface. If decal rips or tears, use a rag and solvent to help loosen sticky substances or adhesive backing. Scrub decal from surface. Dry surface using a rag. Discard decal.

NOTE

Surface area must be cfean and dry before attaching new decal

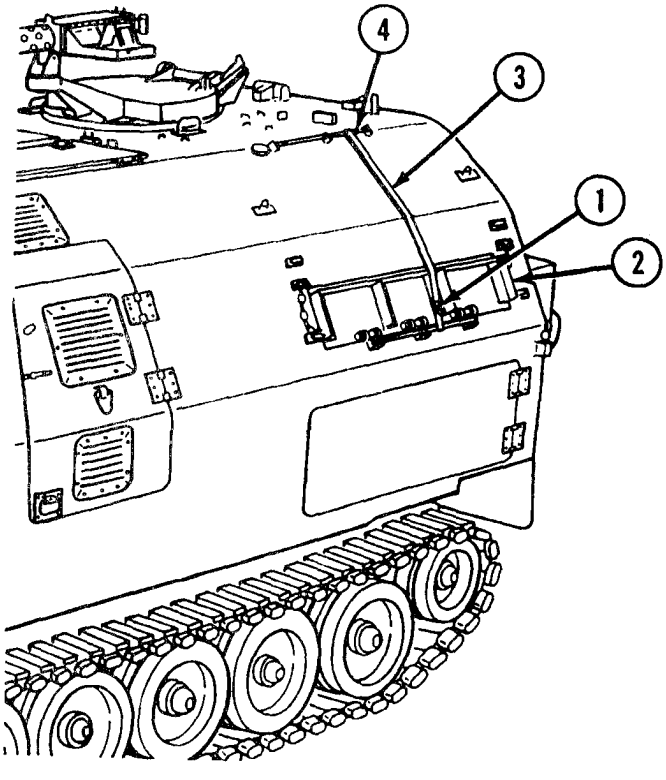
2. Remove protective backing from new decal. Position decal on surface. Using a dry rag, press decal into position starting from the center. Press outward to remove any air bubbles.

STRAP WEBBING - MAINTENANCE

WARNING

Duffle bag shelves (2) are heavy. Stand clear of deploying shelf to avoid serious injury.

1. Release buckle (1), allowing duffle bag shelf (2) to deploy. Pull strap (3) from around upper bar assembly (4) at top of hull.
2. Turn in strap (3) and any unserviceable hardware.
3. Install replacement strap (3) with buckle clamp (1) facing upward, so that running end of strap enters buckle from lower side.
4. Insert strap (3) gradually around upper bar assembly (4) at top of hull. Raise duffle bag shelf (2) to stowed position. Install strap (3) around box on shelf (2). Insert end of strap (3) through buckle (1) pulling tight.



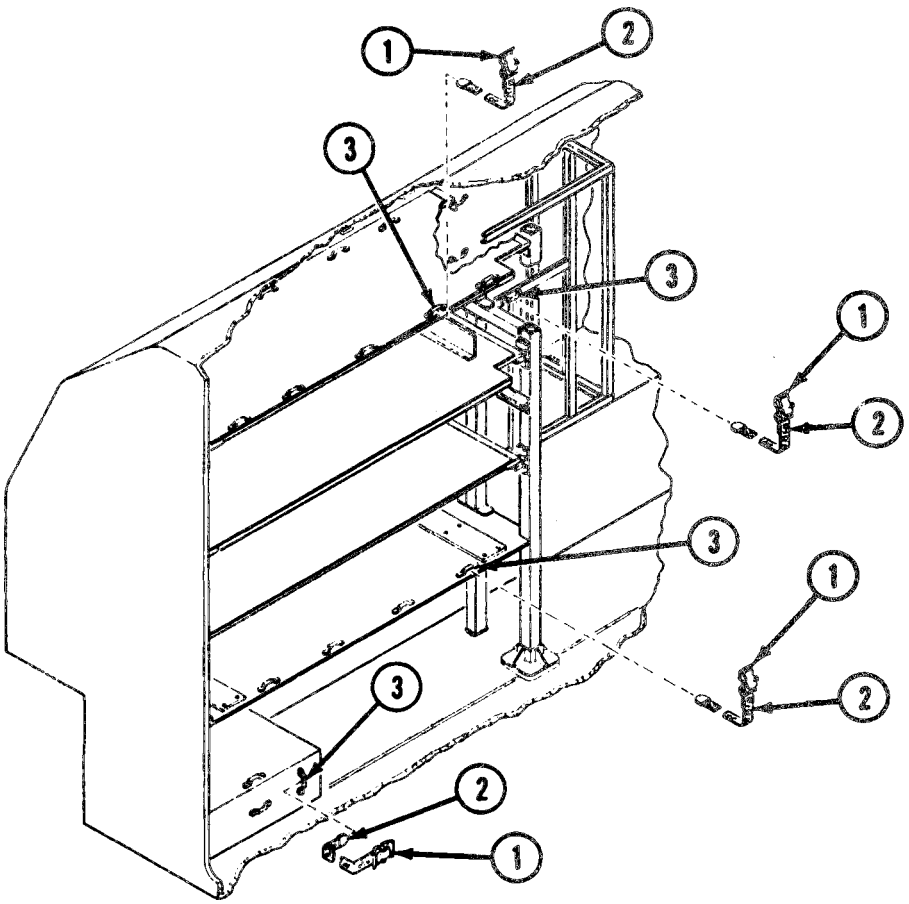
RESTRAINING STRAP MAINTENANCE

NOTE
The following procedure refers to stowage straps for lower and top shelves, conveyor crank, and canister compartment.

1. Release buckle (1) and pull strap (2) out of welded loop (3).
2. Turn in strap (2) and any unserviceable hardware.

NOTE
Install replacement strap (2) with running end on top.

3. Insert new strap (2) gradually through loop (3). insert end of strap (2) through buckle (1) and pull until tight.



CHAPTER 4

AUTOMATIC FIRE EXTINGUISHING SYSTEM

Section 1. EQUIPMENT DESCRIPTION

1. Characteristics

The Automatic Fire Extinguishing System (AFES) is an automatic electric system that, when actuated, provides fire extinguishing capability for the engine and crew compartments. It consists of test/alarm panels, sensors, and associated equipment explained later on in this section and the Section Ill operating instructions.

Automatic electric operation will automatically sense and discharge an agent to estinguish hydrocarbon fires. The crew system provides an automatic electric second shot capability should the fire continue burning or a second fire occur.

Manual electric operation must be manually activated by the crew to discharge the agent to extinguish fires. The crew system second shot manual electric activation is available if the fire continues to burn. It must be manually activated by a crew member.

These systems will not activate unless the crew/engine test and alarm panel maintenance switlches are in the horizontal power on-normal operational position, (See Section 1),

2. Capabilities

a. AFES Engine Compartment

- An automatic electric function that allows detection and discharge of an agent to extinguish hydrocarbon fires.
- A manual discharge backup to the electric function that enables the operator to electrically discharge an agent into the engine compartment when the automatic system does not function and fire is detected.

b. AFES Crew Compartment

- An automatic electric function that allows detection and discharge of an agent to extinguish hydrocarbon fires. There is a second shot discharge capability for use after 5 seconds if another fire ignites that discharges a second set of fire extinguishers.
- A manual electric discharge function exists to enable the crew to electrically discharge an agent into the crew compartment when the automatic electric function fails to work and a fire is detected.

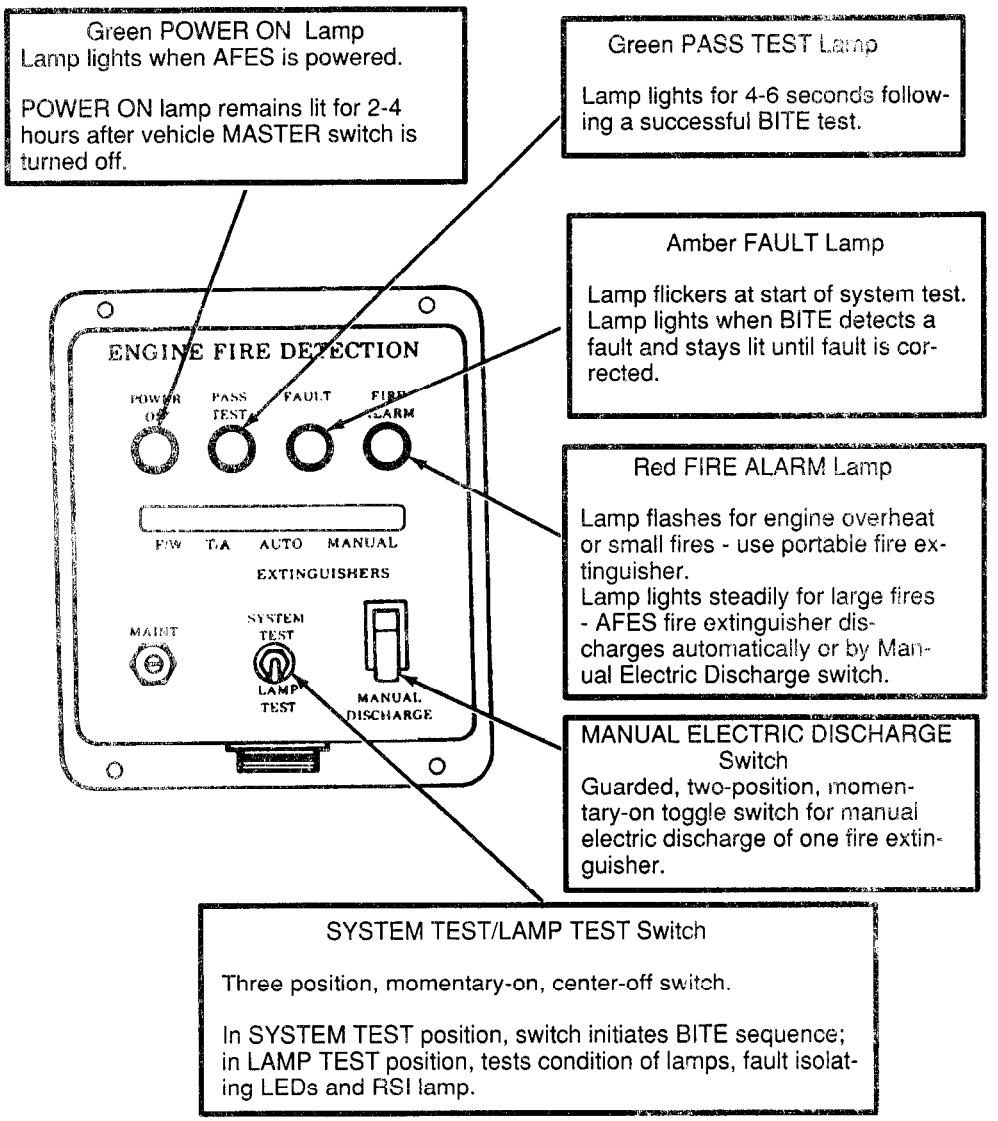
- A manual electric discharge capability exists after 5 secondsfor a second shot capability if another fire ignites that discharges a second set of fire extinguishers.

3. Features

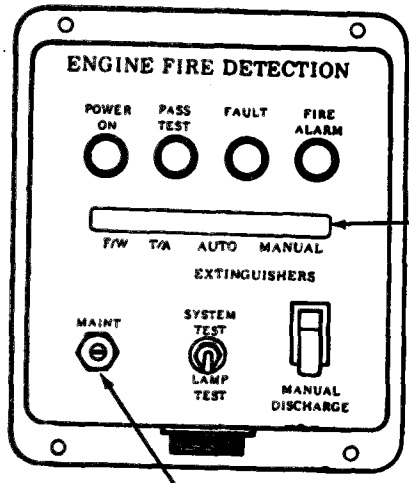
A. CONTROLS AND INDICATORS FOR ENGINE AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES)

NOTE

Engine compartment AFES T/A Panels are the same on all vehicles except for an LED access cover and RSI lamp test.



B. CONTROLS AND INDICATORS FOR ENGINE AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES)



Fault Isolation LEDs

If the FAULT lamp lights during BITE, fault isolating LEDs will also light to indicate which component(s) are nonoperational and require fault correction. The four LEDs are:

F/W ..... Fire Wire

T/A ..... Test and Alarm Panel

AUTO ..... Fire extinguisher no. 1

MANUAL ..... Fire extinguisher no. 2

LEDs will not light if the battery is low.

MAINTenance Switch

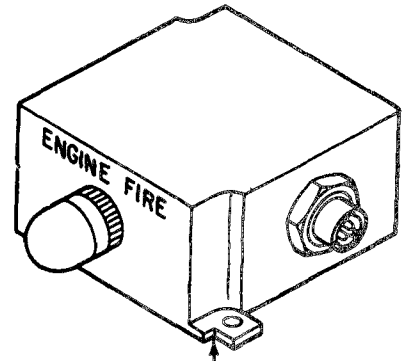
Two-position, screwdriver-activated, rotary switch.

Vertical position: Power OFF, AFES de-energized. Maintenance can be safely performed. Locking pins must be installed in fire extinguisher no. 2 valve actuator guard to prevent accidental discharge. Check no. 1 extinguisher pin.

Horizontal position: Power ON. Normal operations position. AFES extinguishers capable of automatic discharge. Locking pins must be removed from engine fire extinguisher no. 2 valve actuator guard.

CAUTION

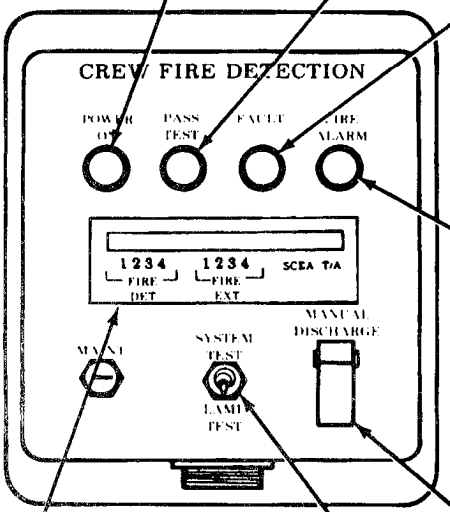
MAINTenance switch is to be used by authorized organization and support maintenance personnel only.



Red Remote Status Indicator (RSI) Lamp

Lamp flashes in crew compartment during an engine overheat or small fire; lights steadily during a large engine fire. Normally, lamp is not lit.

C. CONTROLS AND INDICATORS FOR CREW AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) (Vehicles 1 Thru 344)



Green POWER ON Lamp
Lamp lights when AFES is powered.

POWER ON lamp remains lit for 2-4 hours after vehicle MASTER switch is turned off.

Green PASS TEST Lamp

Lamp lights for 4-6 seconds following a successful BITE test.

Amber FAULT Lamp

Lamp flickers at start of system test. Lamp lights when BITE detects a fault and stays lit until fault is corrected.

Red FIRE ALARM Lamp

Lamp flashes for small fires - use portable fire extinguisher.
Lamp lights steadily for large fires - AFES fire extinguisher discharges automatically or by Manual Electric Discharge switch.

MANUAL ELECTRIC DISCHARGE Switch
Guarded, two-position, momentary-on toggle switch manually and electrically discharges two extinguishers. After 5 seconds a second set of two extinguishers, if available, can also be discharged.

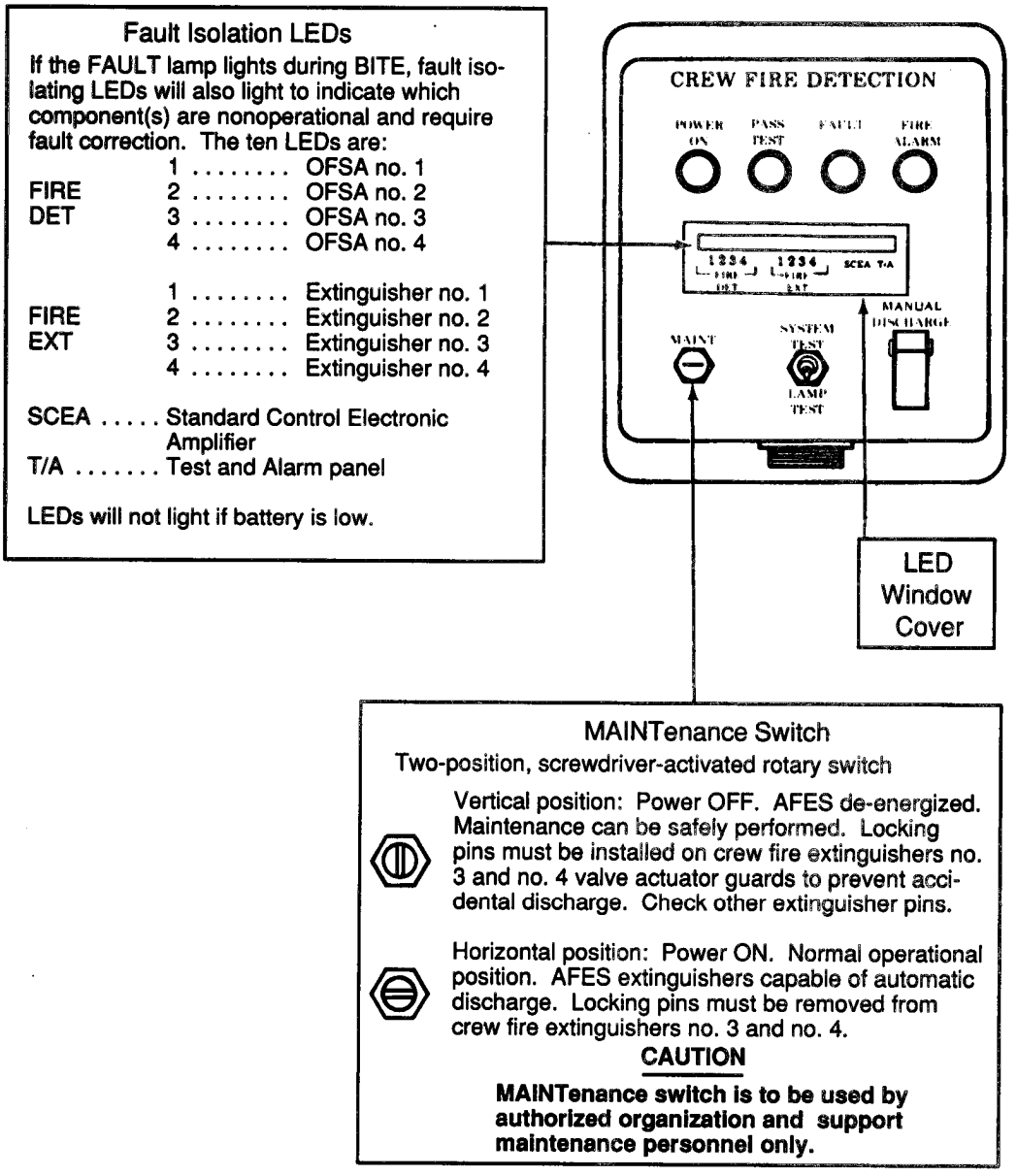
LED Window Cover

SYSTEM TEST/LAMP TEST Switch

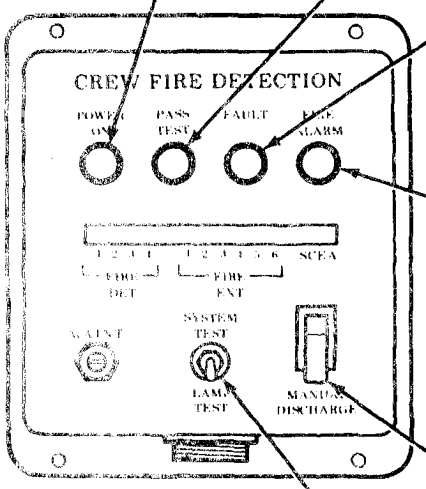
Three position, momentary-on, center-off toggle switch.

In SYSTEM TEST position, switch initiates BITE sequence; in LAMP TEST position, tests condition of lamps and fault isolating LEDs.

C. CONTROLS AND INDICATORS FOR CREW AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) (Vehicles 1 Thru 344) - Continued



D. CONTROLS AND INDICATORS FOR CREW AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) (Vehicles 345 And Above)



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Lamp flickers at start of system test. Lamp lights when BITE detects a fault and stays lit until fault is corrected.

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MANUAL ELECTRIC DISCHARGE Switch

Guarded, two-position, momentary-on toggle switch manually and electrically discharges three extinguishers. After 5 seconds a second set of three extinguishers, if available, can also be discharged.

SYSTEM TEST/LAMP TEST Switch

Three position, momentary-on, center-off toggle switch.

In SYSTEM TEST position, switch initiates BITE sequence; in LAMP TEST position, tests condition of lamps and fault isolating LEDs.

D. CONTROLS AND INDICATORS FOR CREW AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) (Vehicles 345 And Above) - Continued

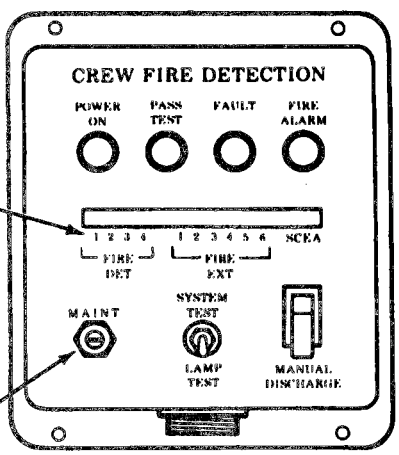
Fault Isolation LEDs

If the FAULT lamp lights during BITE, fault isolating LEDs will also light to indicate which component(s) are nonoperational and require fault correction. The eleven LEDs are:

FIRE DET	1	OFSA no. 1
	2	OFSA no. 2
	3	OFSA no. 3
	4	OFSA no. 4
FIRE EXT	1	Extinguisher no. 1
	2	Extinguisher no. 2
	3	Extinguisher no. 3
	4	Extinguisher no. 4
	5	Extinguisher no. 5
	6	Extinguisher no. 6

SCEA . . . . . Standard Control Electronic Amplifier

LEDs will not light if battery is low.



MAINTenance Switch

Two-position, screwdriver-activated rotary switch.

Vertical position: Power OFF. AFES de-energized. Maintenance can be safely performed. Locking pins must be installed on crew fire extinguishers no. 3 and no. 4 valve actuator guards to prevent accidental discharge. Check other extinguisher pins.

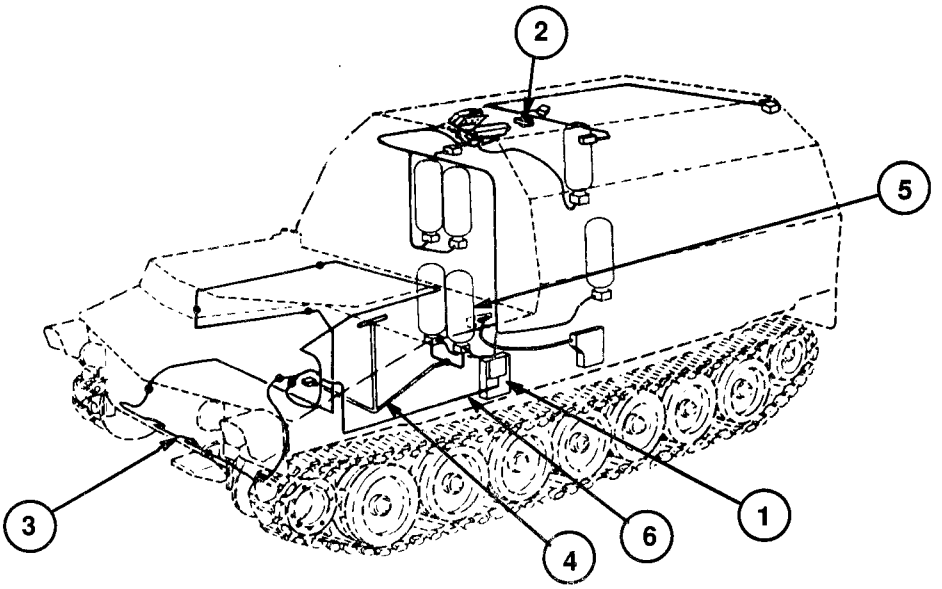
Horizontal position: Power ON. Normal operational position. AFES extinguishers capable of automatic discharge. Locking pins must be removed from crew fire extinguishers no. 3 and no. 4.

CAUTION

MAINTenance switch is to be used by authorized organization and support maintenance personnel only.

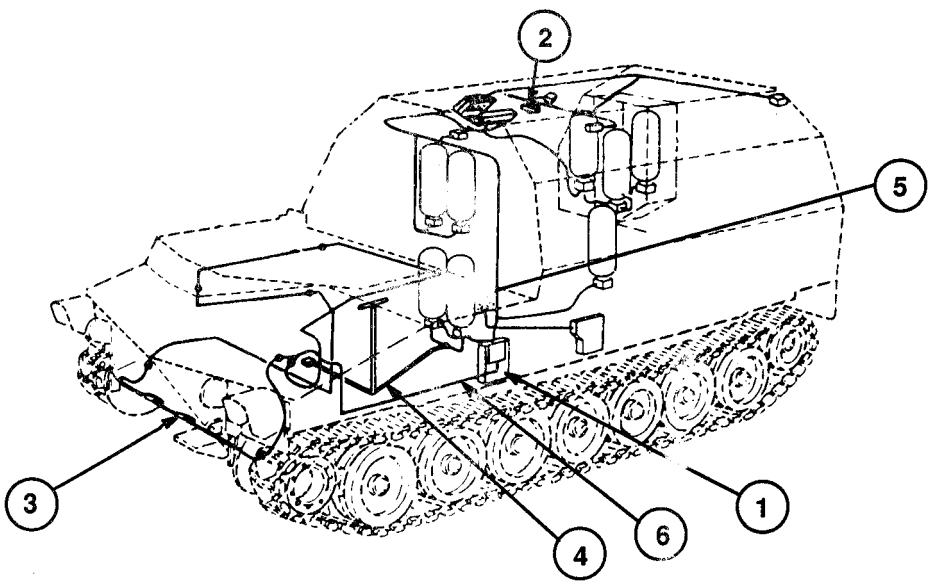
Section II. COMPONENT LOCATION

AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS (Vehicles 1 Thru 344)



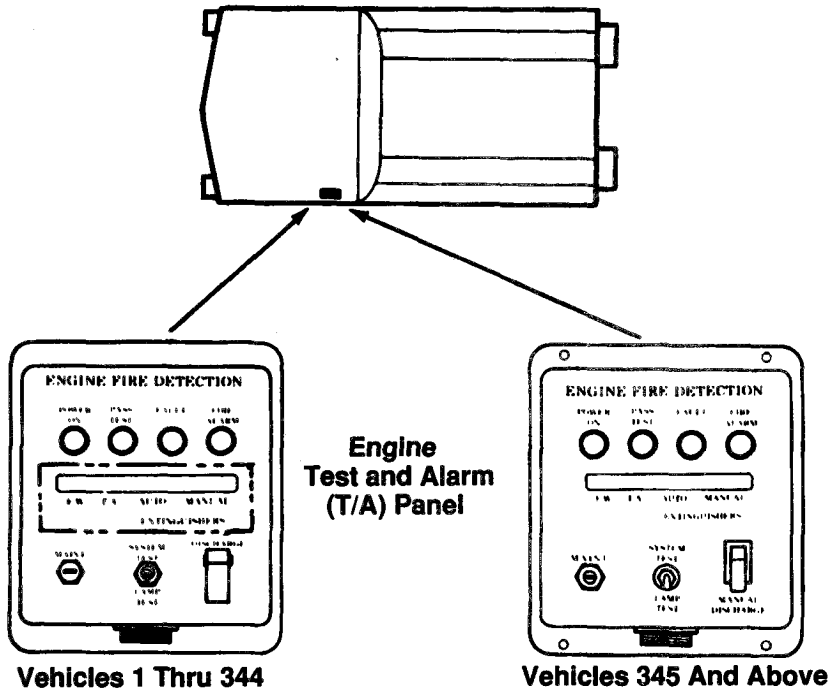
ENGINE

1. Engine T/A Panel
2. RSI
3. Thermal Detection System
4. Halon Distribution System
5. Engine Fire Ext No. 1
6. Ext Wire Harness W4



AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS (Vehicles 345 And Above)

ENGINE AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS

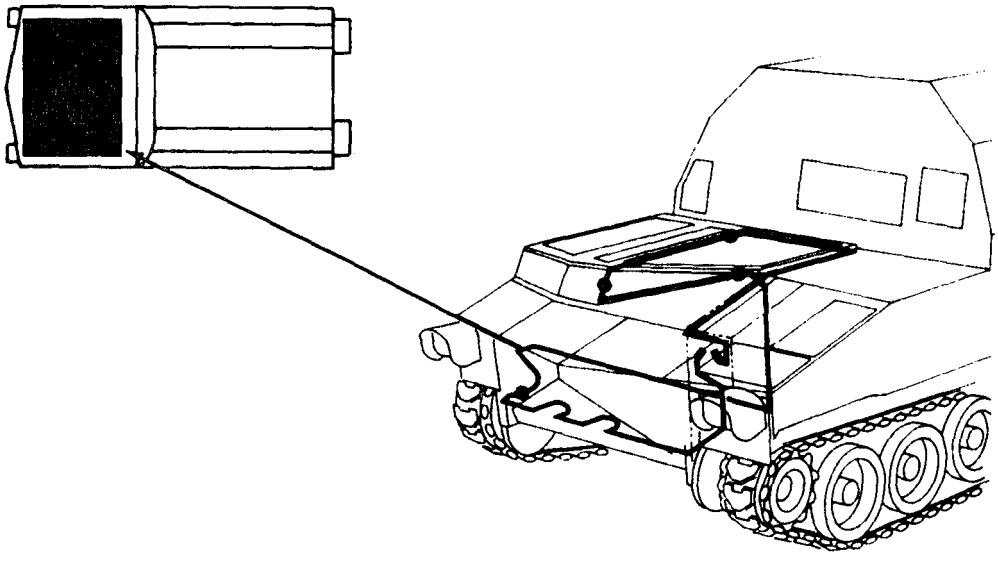


The engine AFES activates automatically when the thermal detection system detects engine fires. Engine AFES components are described below:

ENGINE TEST AND ALARM (T/A) PANEL

- Provides status lights and switches and contains the electronic circuitry necessary to automatically monitor the engine AFES.
- Monitors the thermal sensing element (fire wire), and activates one of the engine fire extinguishers when an engine fire is detected.
- When fire is detected, the red FIRE ALARM indicator on the T/A panel and the red ENGINE FIRE indicator on the Remote Status Indicator (RSI) in the crew compartment light.
- The engine AFES contains Built-In Test Equipment (BITE) which automatically monitors the status of AFES components.
- BITE permits the driver to check the status of AFES components for normal operation.

ENGINE AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS - Continued

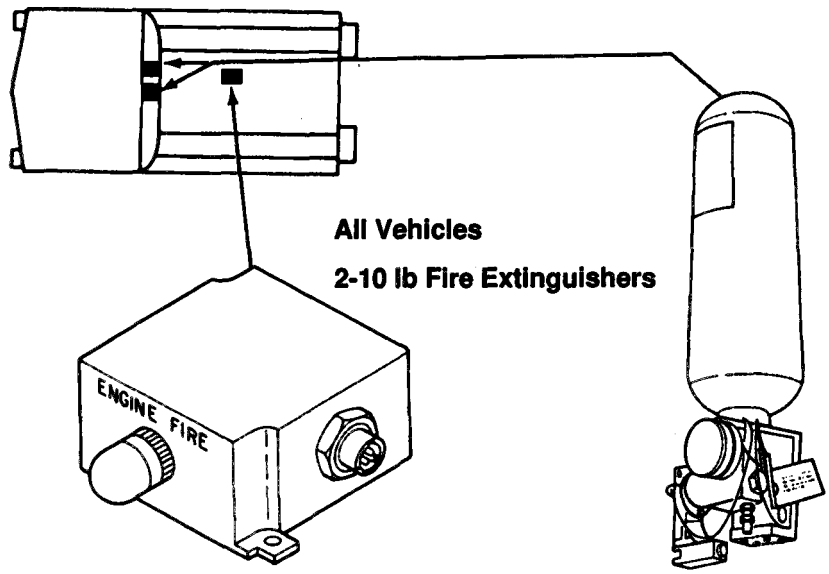


Thermal Detection System

THERMAL DETECTION SYSTEM

- The Thermal Detection system consists of fire sensing elements and couplings looped throughout the engine compartment.
- The fire sensing elements detect both engine overheat conditions and fires.
- When the system detects an engine overheat condition, the T/A panel FiRE ALARM lamp and the Remote Status Indicator (RSI) ENGiNE FIRE lamp flash.
- When it detects an engine fire, both indicator lamps light, and the system automatically activates the engine auto fire extinguisher.

ENGINE AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS - Continued



Remote Status Indicator **Fire Extinguisher**

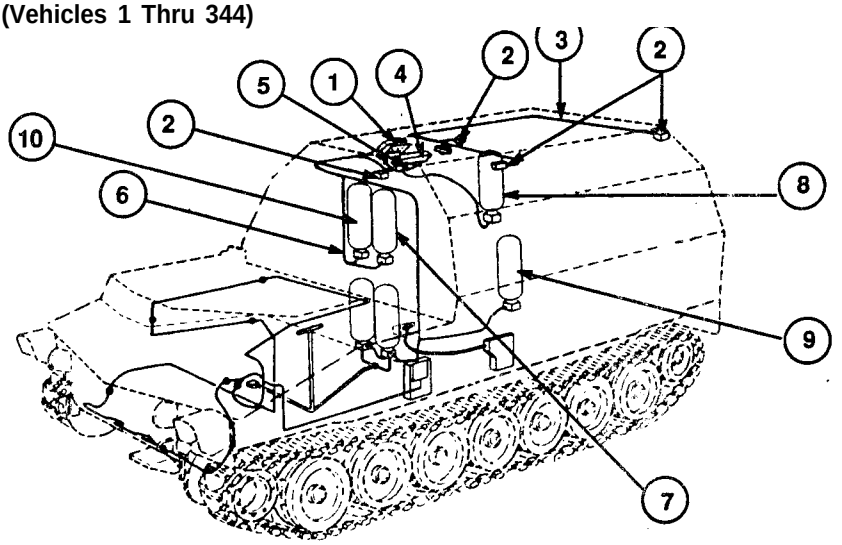
REMOTE STATUS INDICATOR (RSI)

- The RSI is a red alarm light that warns personnel in the crew compartment of engine overheat and fires.
- The red RSI ENGINE FIRE warning lamp and the red FIRE ALARM lamp on the engine T/A panel light at the same time.

FIRE EXTINGUISHERS

- The fire extinguishers consist of steel cylinders filled with Halon and equipped with a quick-release valve assembly.
- AFES cylinders contain Halon fire suppressant pressurized with dry nitrogen for use on hydrocarbon fuel fires only.
- The engine compartment has two fire extinguishers, One fire extinguisher interfaces with the thermal detection system through the engine compartment T/A panel. It activates automatically when the thermal deteotion system senses an engine fire. The second fire extinguisher is dedicated to the AFES/MDS. It is activated by pulling the lanyard cable pull handle located on the outside of the vehicle near the driver's hatch.

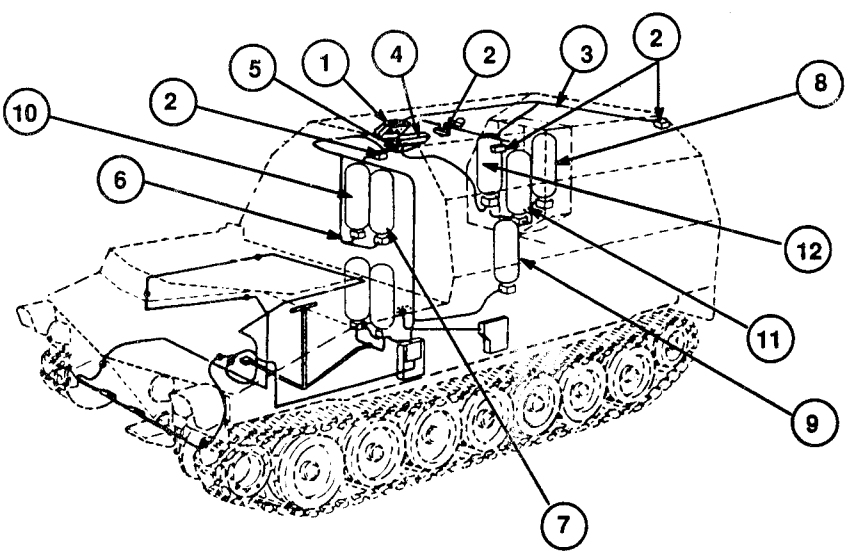
AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS (Vehicles 1 Thru 344)



CREW

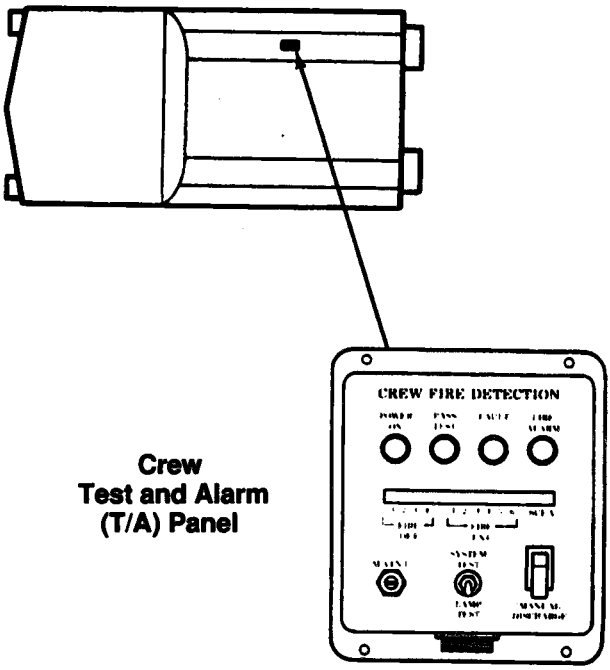
1. Crew T/A Panel
2. OFSA
3. OFSA Wire Harness W1
4. SCEA
5. SCEA Wire Harness W2
6. Ext Wire Harness W3
7. Crew Fire Ext No. 1
8. Crew Fire Ext No. 2
9. Crew Fire Ext No. 3*
10. Crew Fire Ext No. 4*
11. Crew Fire Ext No. 5
12. Crew Fire Ext No. 6

* Activated either by crew AFES or AFES/MDS



AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS (Vehicles 345 And Above)

CREW AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS

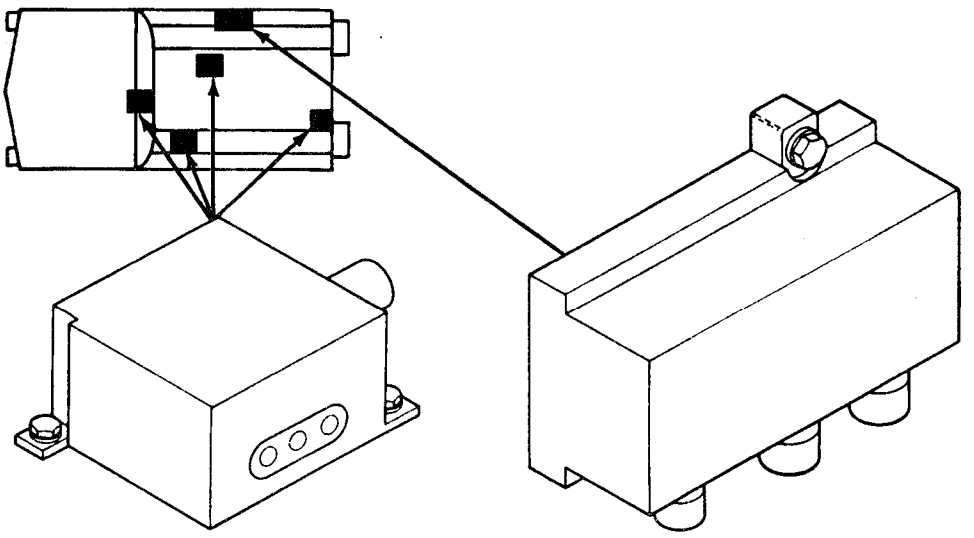


The crew AFES activates automatically when one of four Optical Fire Sensing Assemblies (OFSA) detects hydrocarbon fuel fires. Crew AFES components are described below:

CREW TEST AND ALARM (T/A) PANEL

- Provides status lights and switches and contains the electronic circuitry necessary to monitor the crew AFES.
- Interfaces with the Standard Control Electronic Amplifier (SCEA) and the OFSA.
- The crew AFES has BITE, which automatically monitors the status of components and allows crew members to test the components for normal operation.
- A red guarded, two-position MANUAL ELECTRIC DISCHARGE toggle switch permits the crew to manually discharge crew compartment fire extinguishers.

CREW AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS - Continued



Optical Fire Sensing Assembly

Standard Control Electronic Amplifier

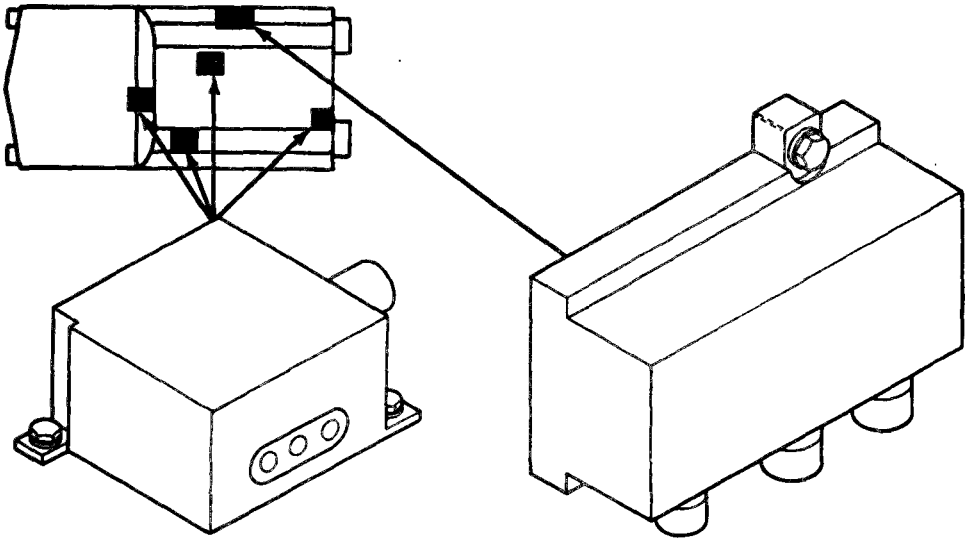
CAUTION

Do not use high pressure washing on AFES components.

OPTICAL FIRE SENSING ASSEMBLY (OFSA)

- OFSA is four sensor units located in the crew compartment, each using three infrared (IR) wavebands designed to detect hydrocarbon fuel fires.
- OFSA does not detect sunlight, electrical discharges, lamps, or flashes, fragmentation, or radiation from warheads or other battlefield activity.
- OFSA units are housed in individual shock resistant aluminum casings mounted on brackets.
- OFSA units have BITE, which internally tests each unit for normal operation. Bite indicates a fault in the OFSA by lighting a LED on the T/A panel.
- The four OFSA units provide complete coverage of the crew compartment.

CREW AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS - Continued



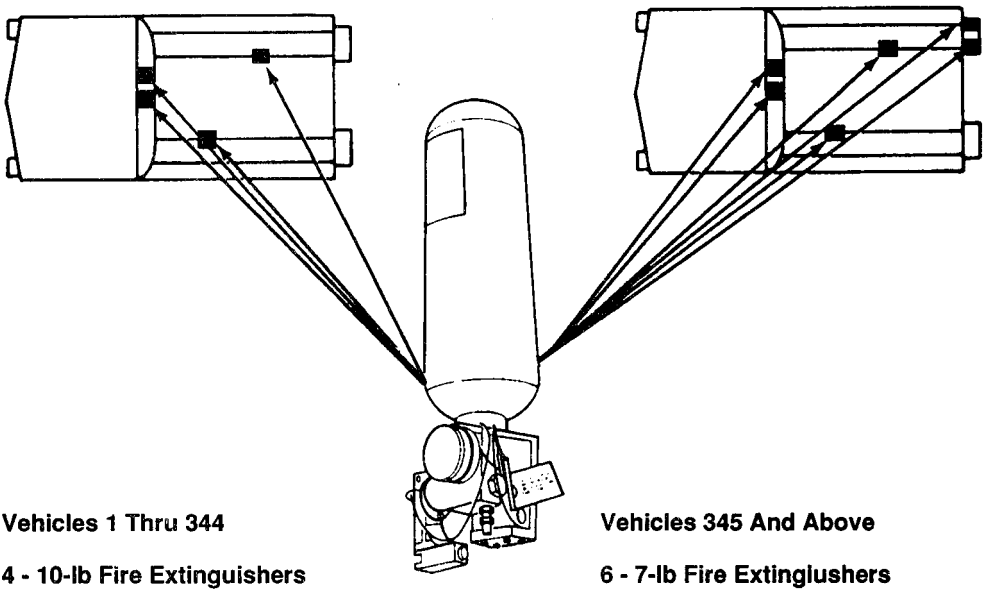
Optical Fire Sensing Assembly

Standard Control Electronic Amplifier

STANDARD CONTROL ELECTRONIC AMPLIFIER (SCEA)

- Processes input signals from OFSA units when hydrocarbon fuel fire is detected.
- If the fire is large, the S(XA lights the FIRE AMRM lamp on the crew compadment T/A panel and activates the two fire extinguishers on vehicles 1 thru 344 (three fire extinguishers on vehicles 345 and above).
- If the large fire continues, or a second large fire occurs, the SCEA activates the remaining crew compartment fire extinguishers.
- If the OFSAdetects a small fuel fire, the SCEA signals the T/A panel, and the red FIRE ALARM lamp on the T/A panel flickers. The crew uses a portable fire extinguisher or activates the red guarded MANUAL ELECTRIC DISCHARGE toggle switch on the T/A panel to put out the small fire.
- The SCEA contains BITE which internally tests the unit for normal operation.
- A LED on the T/A panel lights to indicate a fault in the SCEA unit.

CREW AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS - Continued



Vehicles 1 Thru 344

4 - 10-lb Fire Extinguishers

Vehicles 345 And Above

6 - 7-lb Fire Extinglushers

FIRE EXTINGUISHER

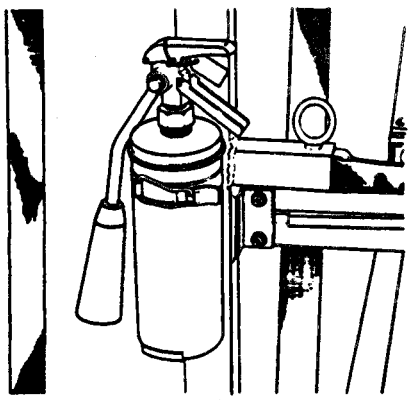
FIRE EXTINGUISHERS

- The fire extinguishers consist of steel cylinders filled with Halon 1301 and equipped with a quick-release valve assembly.
- The cylinders contain Halon fire suppressant pressurized with dry nitrogen for use on hydrocarbon fuel fires only.
- The crew AFES has four or six automatic fire extinguishers, depending on the vehicle configuration has shown above.
- Crew AFES fire extinguishers discharge automatically when the SECA receives an electrical pulse from an OFSA unit, or manually when a crew member operates the MANUAL ELECTRIC DISCHARGE toggle switch on the crew T/A panel.
- When the crew AFES activates, the ventilator blower automatically turns to the exhaust mode 8 seconds after extinguisher discharge, but the crew must open the exhaust blower vent (p. 2-193).

- Two crew and one engine compartment AFES fire extinguishers maybe discharged from outside the vehicle by pulling the lanyard cable pull handle located near the driver's hatch.

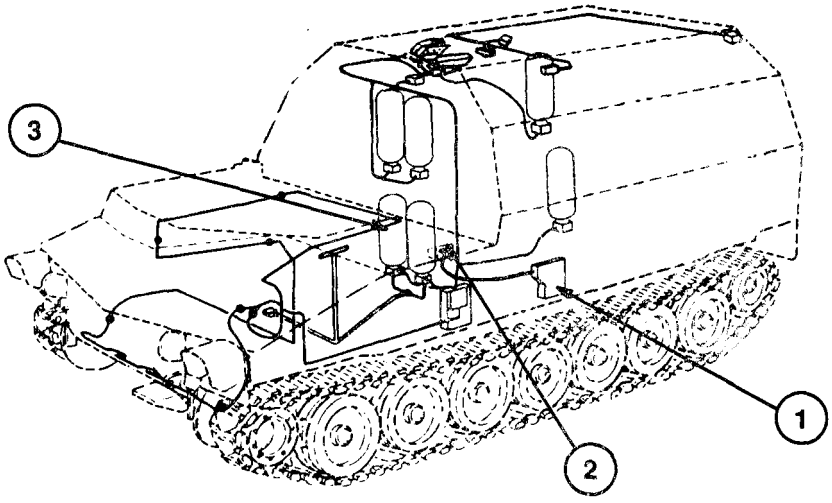
NOTE

Two portable CF_3BR (monobromotrifluoromethane) fire extinguishers are also located in the crew compartment and are separate from the AFES. One portable fire extinguisher is located on the lower rear door and the second is located on the right side rear canister rack. These portable fire extinguishers may be used as needed on fuel and electrical fires.



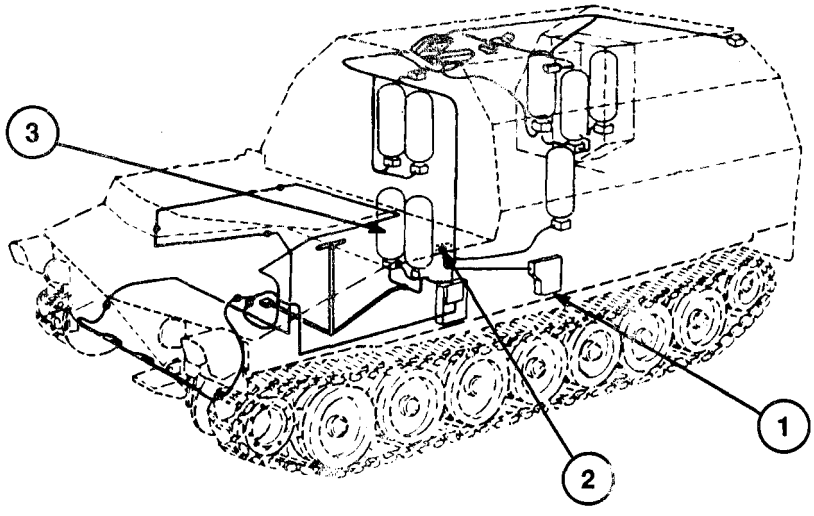
Portable Fire Extinguisher

AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS (Vehicles 1 Thru 344)



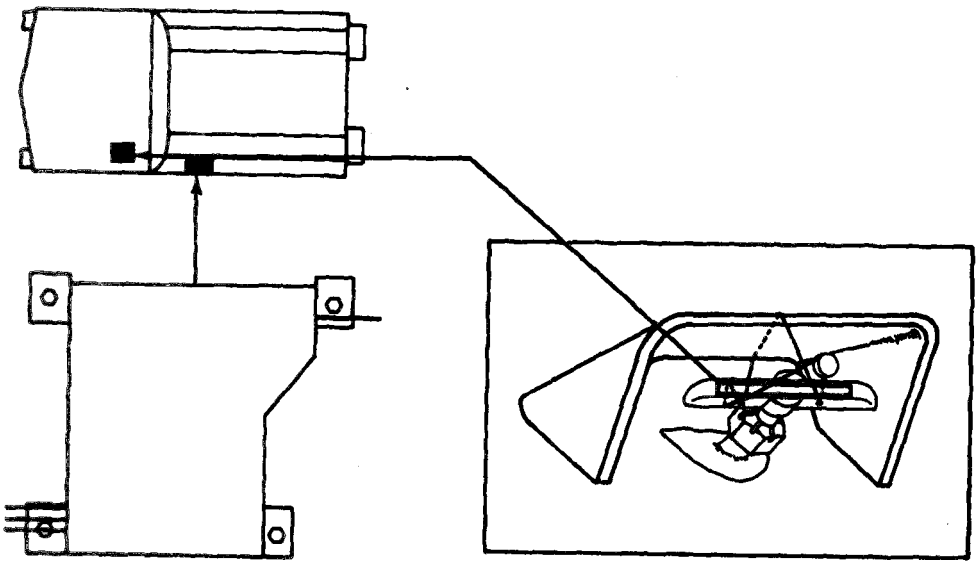
AFES MANUAL DISCHARGE SYSTEM COMPONENTS

1. Lanyard Assembly 2. Lanyard Cable Pull Handle 3. Engine Fire Ext No. 2



AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) COMPONENTS (Vehicles 345 And Above)

AUTOMATIC FIRE EXTINGUISHING SYSTEM MANUAL DISCHARGE SYSTEM (AFES/MDS) COMPONENTS



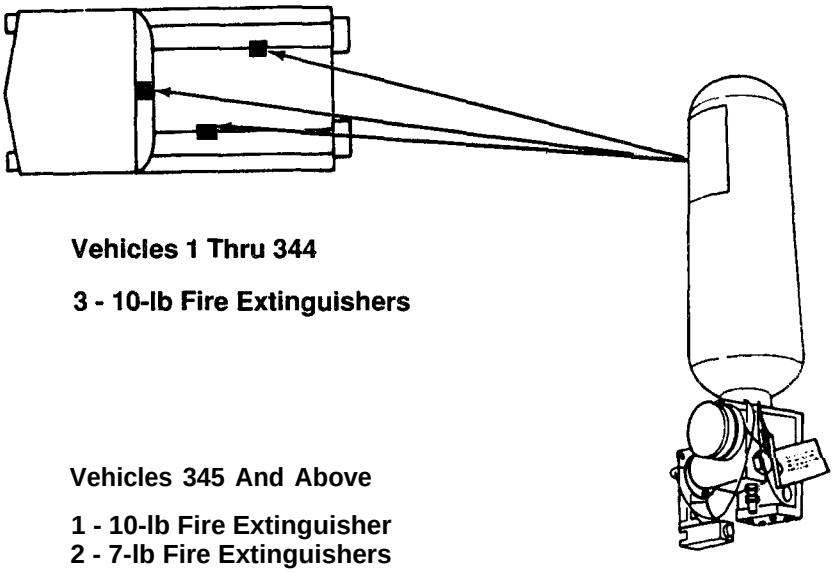
Lanyard Assembly **Lanyard Cable Pull Handle**

The AFES/MDS system allows the crew to manually activate, by mechanical means, one engine and two crew compartment fire extinguishers. The following are AFES/MDS components:

LANYARD ASSEMBLY - Controls and protects the mechanical cabling connecting the fire extinguishers to the lanyard cable pull handle.

LANYARD CABLE PULL HANDLE - Mechanically activates one engine and two crew compartment extinguishers. Located outside the vehicle near the driver's hatch, it is the only way to activate the second of two engine compartment fire extinguishers. A crew member must exert a 25-pound pull to break the sealed safety wire on the handle and to pull handle to its fullest extension to discharge the extinguishers. The safety wire prevents unauthorized/accidental use of AFES/MDS.

AUTOMATIC FIRE EXTINGUISHING SYSTEM MANUAL DISCHARGE SYSTEM (AFES/MDS) COMPONENTS - Continued



Vehicles 1 Thru 344

3 - 10-lb Fire Extinguishers

Vehicles 345 And Above

1 - 10-lb Fire Extinguisher
2 - 7-lb Fire Extinguishers

FIRE EXTINGUISHER

FIRE EXTINGUISHERS

- The fire extinguishers consist of steel cylinders filled with Halon 1301 and equipped with a quick-release valve assembly.
- The cylinders contain Halon fire suppressant pressurized with dry nitrogen for use on hydrocarbon fuel fires only.
- The AFES/MDS has three fire extinguishers. The one for engine fires can only be activated by using the lanyard cable pull handle. The other two AFES/MDS fire extinguishers, located in the crew compartment, can also be activated automatically by the SCEA or by activating the MANUAL ELECTRIC DISCHARGE toggle switch.
- All fire extinguishers will not activate at the same time when a crew member pulls the lanyard cable pull handle located near the driver's hatch on the outside of the vehicle. Handle must be pulled to fullest extension to discharge extinguishers.

NOTE

Two portable CF3BR (monobromotrifluoromethane) fire extinguishers are also located in the crew compartment and are separate from the AFES. These portable fire extinguishers may be used as needed on fuel and electrical fires. One portable fire extinguisher is located on the lower rear door and the second is located on the right side rear canister rack.

Section III. OPERATING INSTRUCTIONS

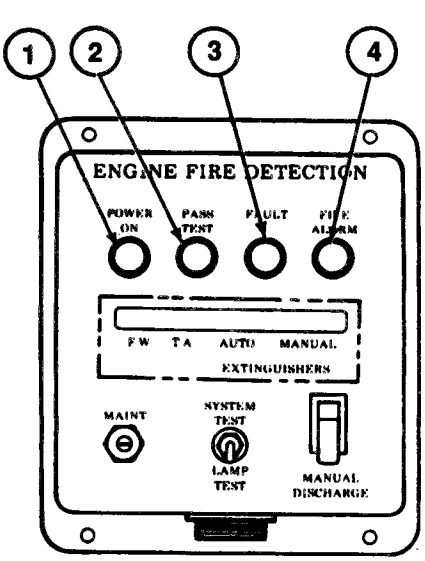
AUTOMATIC FIRE EXTINGUISHER SYSTEM (AFES) OPERATIONAL CHECKS

NOTE

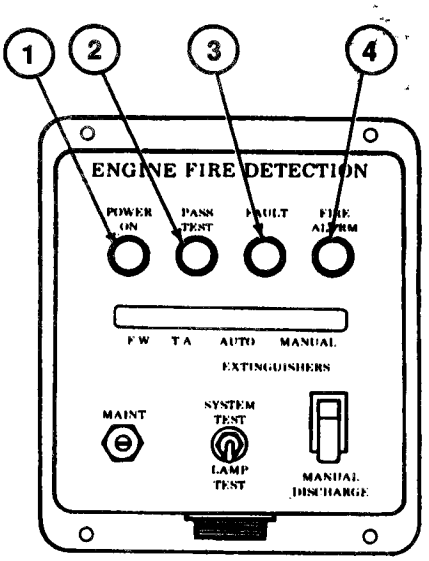
Operational check out is the same for both Engine and Crew.

This section describes, locates, and illustrates the controls and instruments of the M992 AFES. The location and function of all controls must be learned before operating the vehicle.

AUTOMATIC BUILT-IN TEST EQUIPMENT (BITE) TEST CYCLE



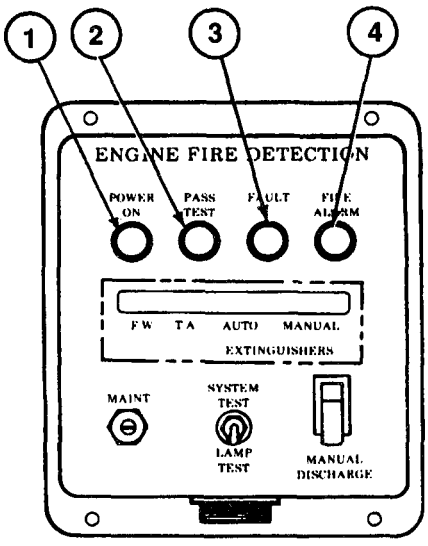
Vehicles 1 Thru 344



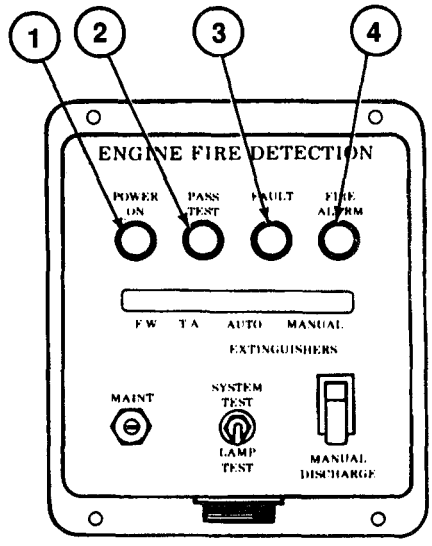
Vehicles 345 And Above

Key	Control or Indicator	Function
	Turn MASTER POWER Switch on	
1	POWER ON Lamp	Lamp is lit.
2	PASS TEST Lamp	Lights for 4-6 seconds after successful BITE test.

AUTOMATIC BUILT-IN TEST EQUIPMENT (BITE) TEST CYCLE - Continued



Vehicles 1 Thru 344



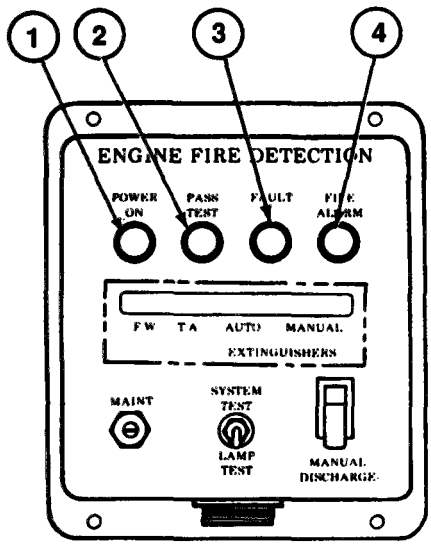
Vehicles 345 And Above

Key	Control or Indicator	Function
3	FAULT Lamp	Lamp is lit: Perform Lamp/LED test. Replace Lamp/LED. Perform system test. FAULT lamp or LED remains lit: Notify Organizational Maintenance.

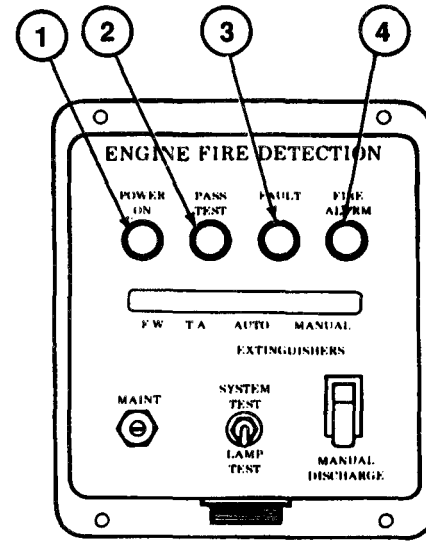
ENGINE AFES INDICATORS POWER ON OPERATION

NOTE

The engine AFES detects and indicates fire automatically, but the system may not automatically extinguish all fires. The driver should continually monitor the engine T/A panel during vehicle operation, watching for the following indications, and be prepared to take emergency action (p 4-31).



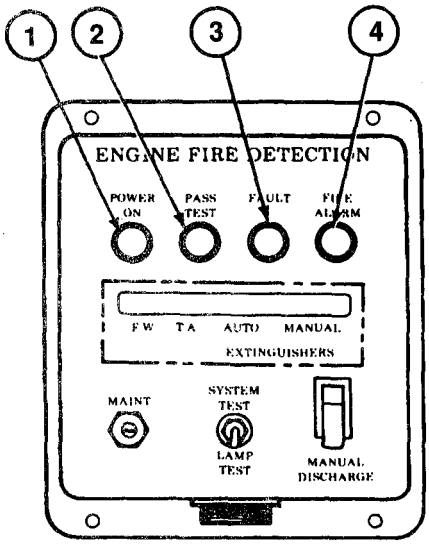
Vehicles 1 Thru 344



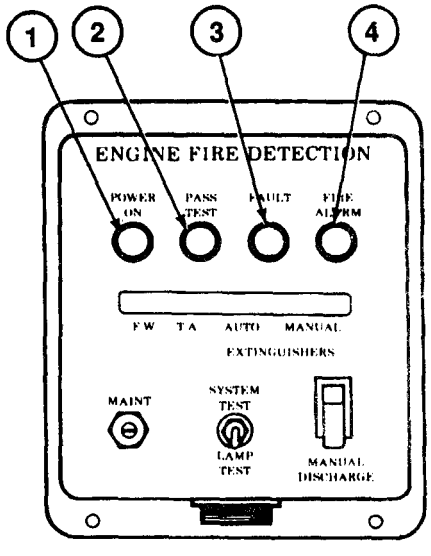
Vehicles 345 And Above

Key	Control or Indicator	Function
1	POWER ON Lamp	Lamp should remain lit throughout operation. If lamp goes out during operation, troubleshoot AFES (p 3-20).
3	FAULT Lamp	Lamp is not lit: No action is required. Lamp is lit (Amber): Notify Organizational Maintenance.

ENGINE AFES INDICATORS POWER ON OPERATION - Continued



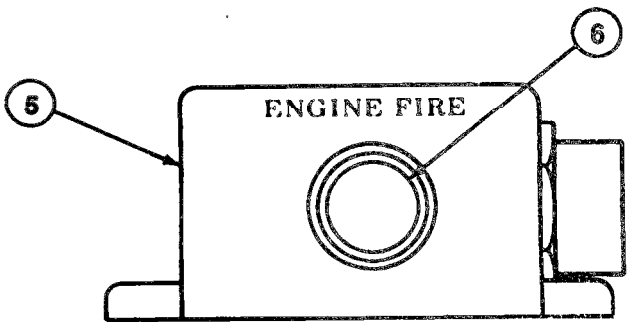
Vehicles 1 Thru 344



Vehicles 345 And Above

Key	Control or Indicator	Function
4	FIRE ALARM Lamp	Lamp is not lit: During normal operations, no action required. Lamp flickers: Small fire or engine overheat. Investigate and use portable fire extinguisher, if required. Lamp is lit (Red): Large fire exists in engine compartment. Automatic discharge should occur. Lamp will go out when fire is out.

ENGINE AFES INDICATORS POWER ON OPERATION - Continued



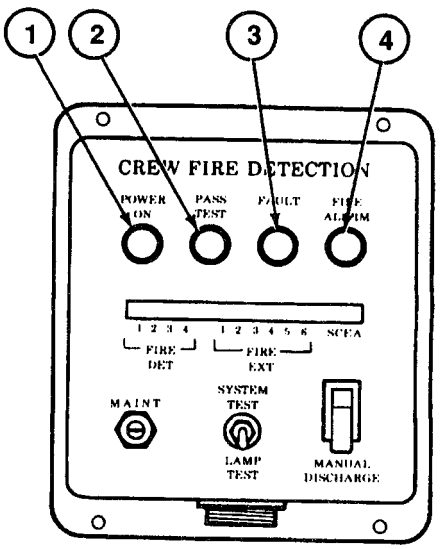
In addition to the indicators on the engine T/A panel, a Remote Status Indicator (RSI) (5) is mounted on the crew compartment ceiling to alert crewmen to an engine fire. An ENGINE FIRE lamp (6) at this unit flashes when an engine overheat or small fire condition exists. The ENGINE FIRE lamp also lights whenever a large engine fire exists. During lamp test in vehicles with an engine T/A panel with an LED access cover, this lamp will not light. In vehicles with an engine T/A panel without an LED acess cover, this lamp will light. During nomal operation, this lamp will not be lit.

Ventilation blower turns to exhaust mode when Halon discharges. Open vent after extinguisher discharges by pulling down on the air duct control handle (p. 2-193).

CREW AFES INDICATORS POWER ON OPERATION

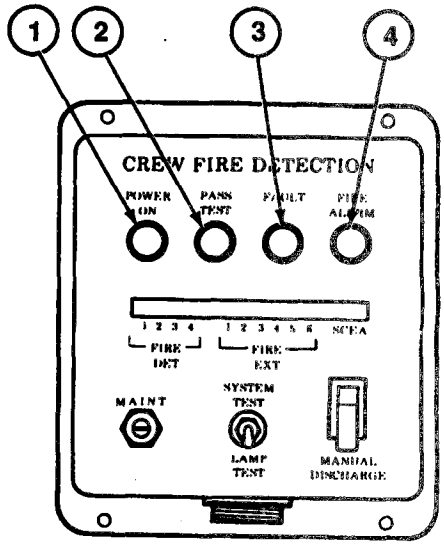
NOTE

The Crew AFES detects and indicates fire automatically, but the system may not automatically extinguish all fires. The crew must continually monitor the crew T/A panel and the RSI during vehicle operation, watching for the following indications, and be prepared to take emergency action (p 4-32).



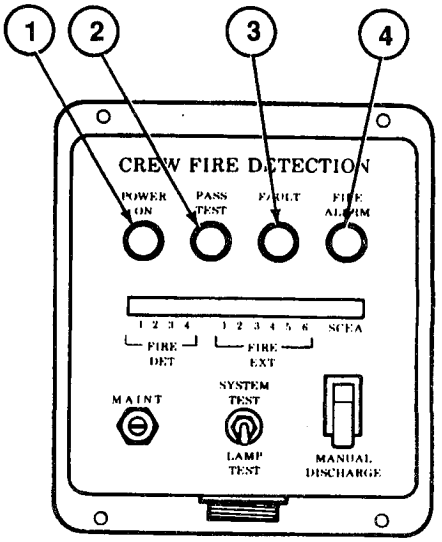
Key	Control or Indicator	Function
1	POWER ON Lamp	Lamp is lit: Lamp should remain lit throughout operation. If lamp goes out during operation, troubleshoot AFES (p 3-20).

CREW AFES INDICATORS POWER ON OPERATION - Continued



Key	Control or Indicator	Function
3	FAULT Lamp	Lamp is not lit: During normal operations, no action is required when lamp is not lit. Lamp is lit (Amber): Troubleshoot AFES (p 3-20).

CREW AFES INDICATORS POWER ON OPERATION - Continued



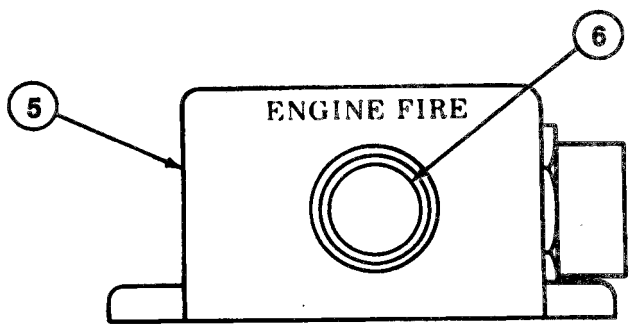
Key	Control or Indicator	Function
4	FIRE ALARM Lamp	Lamp is not lit: During normal operations, no action is required when lamp is not lit. Lamp is lit (Red): Large fuel fire exists in crew compartment. Automatic discharge should occur. Open ventilation vent after discharge and evacuate. Lamp will go out when fire is extinguished.

CREW AFES INDICATORS POWER ON OPERATION - Continued

Key	Control or Indicator	Function
4	FIRE ALARM Lamp Continued	Lamp flashes at Crew T/A Panel (Red): Small fire exists in crew compartment. Extinguish fire using portable fire extinguisher.

NOTE

Vehicles 1 thru 344 were manufactured with an engine T/A panel housing and LED access cover. Vehicles 345 and above were manufactured with an engine T/A panel without an LED access cover. Both of these engine T/A panels are interchangeable.



In addition to the indicators on the crew T/A panel, a Remote Status Indicator (RSI) (5), which is a component of the engine AFES, is mounted on the crew compartment ceiling to alert crewmen to an engine fire. An ENGINE FIRE lamp (6) at this unit flashes when an engine overheat or small fire condition exists. The ENGINE FIRE lamp also lights whenever a large engine fire exists. During lamp test in vehicles with an engine T/A panel with an LED acess cover, this lamp will not light. In vehicles with an engine T/A panel without an LED acess cover, this lamp will light. During normal operation, this lamp will not be lit.

Ventilation blower turns to exhaust mode when Halon discharges. Open vent after extinguisher discharges by pulling down on the air duct control handle (p. 2-193).

Section IV. EMERGENCY PROCEDURES

AFES MANUAL ELECTRIC DISCHARGE - ENGINE COMPARTMENT FIRES

- During normal AFES Operation, the Automatic Fire Extinguishing System will discharge agent to extinguish fires.
- The driver must be alert to manually discharge extinguishers if the automatic system malfunctions.

NOTE

For small fires, use portable fire extinguishers.

Use the following procedures if the automatic feature of the AFES malfunctions:

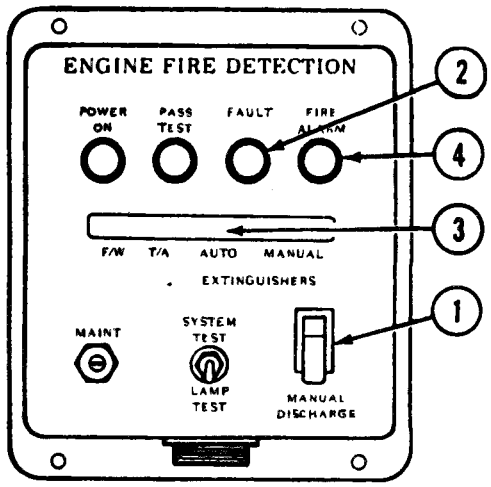
1. Lift MANUAL ELECTRIC DISCHARGE switch guard (1). Press switch up and release; FAULT lamp (2) and AUTO LED (3) will light, signifying cylinder has discharged; FIRE ALARM lamp (4) will go out when fire is extinguished.

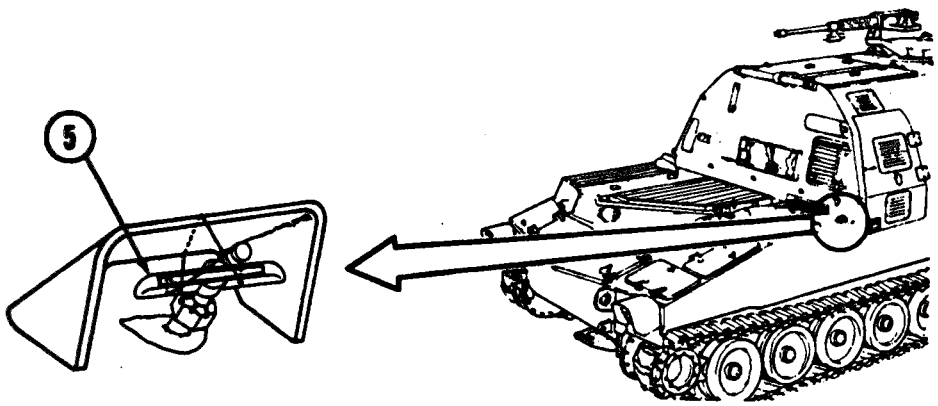
CAUTION

Not all emergency fire extinguisher bottles will manually discharge at the same time.

2. The following procedures must be followed if the fire does not go out:
   - Turn off vehicle MASTER switch.
   - Pull FUEL SHUT OFF handle until engine stops.
   - Driver must exit the vehicle and pull the MDS lanyard cable pull handle (5) located outside the vehicle near the driver's hatch.
3. If electrical power is not available, or if AFES malfunctions, driver must exit the vehicle and pull the MDS lanyard cable pull handle (5) out to its fullest extension for all emergency bottles to discharge. The handle is located outside of the vehicle near the driver's hatch.

AFES MANUAL ELECTRIC DISCHARGE - ENGINE COMPARTMENT FIRES - Continued





AFES MANUAL ELECTRIC DISCHARGE - CREW COMPARTMENT FIRES

- During normal AFES Operation, the Automatic Fire Extinguishing System will discharge agent to extinguish fires.
- The crew must be alert to manually discharge extinguishers if the automatic system malfunctions.

NOTE

For small fires, use portable fire extinguishers.

Use following procedures if the automatic feature of the AFES malfunctions:

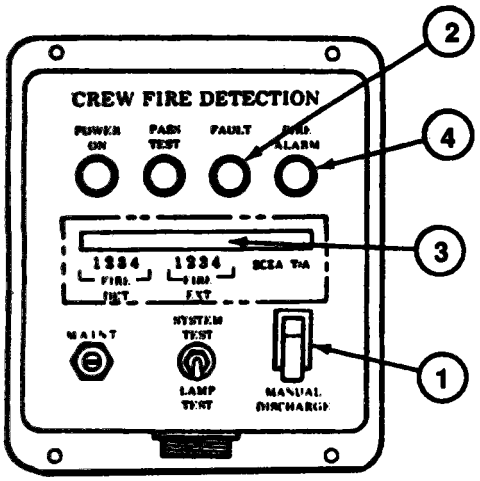
Lift MANUAL DISCHARGE switch guard (1). Press switch up and release. FAULT lamp (2) and fire extinguisher LEDs (3) will light, signifying cylinders have discharged. If fire is not extinguished, after 5 seconds again press switch up and release to discharge second set of fire extinguishers. FIRE ALARM lamp (4) will go off when fire is extinguished. Open vent after extinguishers discharge.

CAUTION

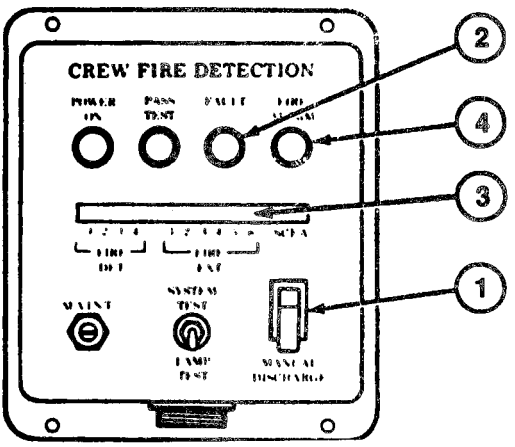
Not all emergency fire extinguisher bottles will manually discharge at the same time.

2. If electrical power is not available, or if AFES malfunctions, driver must exit vehicle and pull MDS lanyard cable handle (5) out to its fullest extension for all emergency bottles to discharge. The handle is located outside of the vehicle near the driver's hatch.

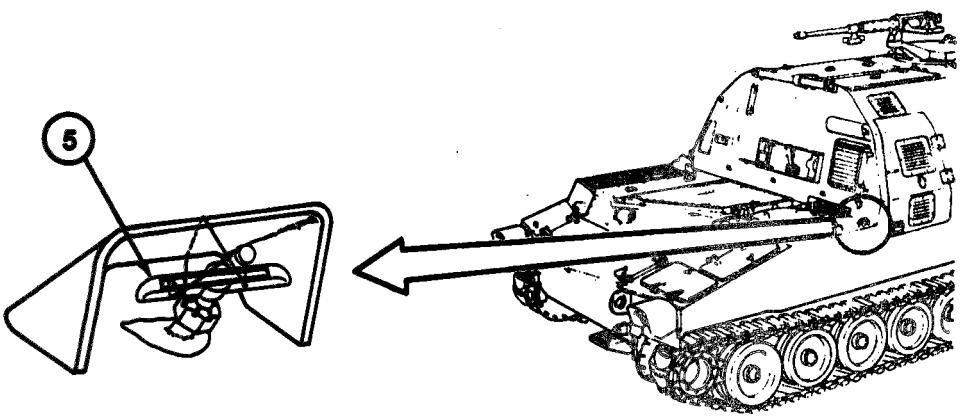
AFES MANUAL ELECTRIC DISCHARGE - CREW COMPARTMENT FIRES - Continued



Vehicle 1 Thru 344



Vehicle 345 And Above



APPENDIX A
REFERENCES

This appendix lists all forms, field manuals, regulations and technical manuals referenced in this manual.

Forms

Equipment Control Record . . . . DA Form 2408-9
Equipment Inspection and Maintenance Worksheet . . . . . DA Form 2404
Equipment Log Book . . . . . DA Form 2408
Maintenance Request . . . . . DA Form 2407
Motor Vehicle Utilization Record.. . . . . DD Form 1970
Oil Analysis Log . . . . DAForm 2408-20
Operator Report on Motor Vehicle Accidents . . . . . SF 91
Quality Deflciency Report . . . . . SF 368
Recomended Changes to Publications and Blank Forms . . . . . DA Form 2028
U.S. Government Motor Vehicle Operator's Identification Card . . . . . SF 46
Weapon Record Data . . . .DA Form 2408-4

Field Manuals

Basic Cold Weather Manual . . . . . FM 31-70
Browning Machine Gun .50-Cal., HB, M2 . . . . . FM 23-65
Camouflage . . . . . FM 5-20
First Aid for Soldiers . . . . . FM 21-11
Driver Selection, Training and Supervision,
Tracked Combat Vehicles . . . . . FM 21-17
Manual for Tracked Combat Vehicle Driver . . . . . FM 21-306
Mountain Operations (How to Fight) . . . . . FM 90-6(HTF)
Northern Operations . . . . . FM 31-71

Regulations

Packaging of Army Materials for Shipment and Storage . . . . AR 746-1

Techincal Manuals

Hand Receipt: Carrier, Ammunition,
Tracked, M992 . . . . TM 9-2350-267-10-HR
lntercommunications Sets AN/VIC/1 and AN/IC-1X . . . . . TM 11-2643
Interphone controls C-980/U and C-981/U and
Intercommunications Set control C-980 A/U . . . . . TM 11-206
Operator's Manual: Machine Gun, Cal 0.50, Browning,
M2, Heavy Barrel . . . . TM 9-1005-213-10
Operator’s Manual: For Motor Vehicle Towbar . . . . . TM 9-4910-496-10

Technical Manuals - Continued

Operator's and Organizational Maintenance Manual:
Alarm, Chemical Agent, Automatic: Portable . . . . . TM 3-6665-225-12
Operator's and Organizational Maintenance Manual:
Intercommunications Set AN/VRC-1 (V) . . . . . TM 11-5830-340-12
Operator, Organizational, DS and GS Maintenance
Manual for Lead-Acid Storage Batteries . . . . . TM 9-6140-200-14
Painting Instructions for Field Use..... . . . . . TM 43-0139

Miscellaneous Publications

Color, Marking, And Camouflage Pattern
Painting for Armament Command Equipment . . . . . TB 746-95-1
Lubrication Order: Carrier, Ammunition,
Tracked, M992 . . . . . LO 9-2350-267-12
The Army Maintenance Management
Systems (TAMMS) . . . . . DA Pam 738-750

APPENDIX B
COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

Scope

This Appendix lists integral components of and basic issue items for the M992 to help you inventory items required for safe and efficient operation.

General

The Compnents of End Items List is divided into the following sections:

Section II- Integral Components of End Item (ICOEI). This listing is for information purposes only, and is not authorized to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property amounts. Illustrations are furnished to assist you in identifying items.

Section III - Basic Issue Iterns (BII). These are the minimum essential items required to plain the M992 in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the M992 during operation and whenever it is transferred between property amounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on Tables of Organization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE) authorization of the end item.

Explanation Of Columns

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

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

Column (2) - National Stock Number. Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

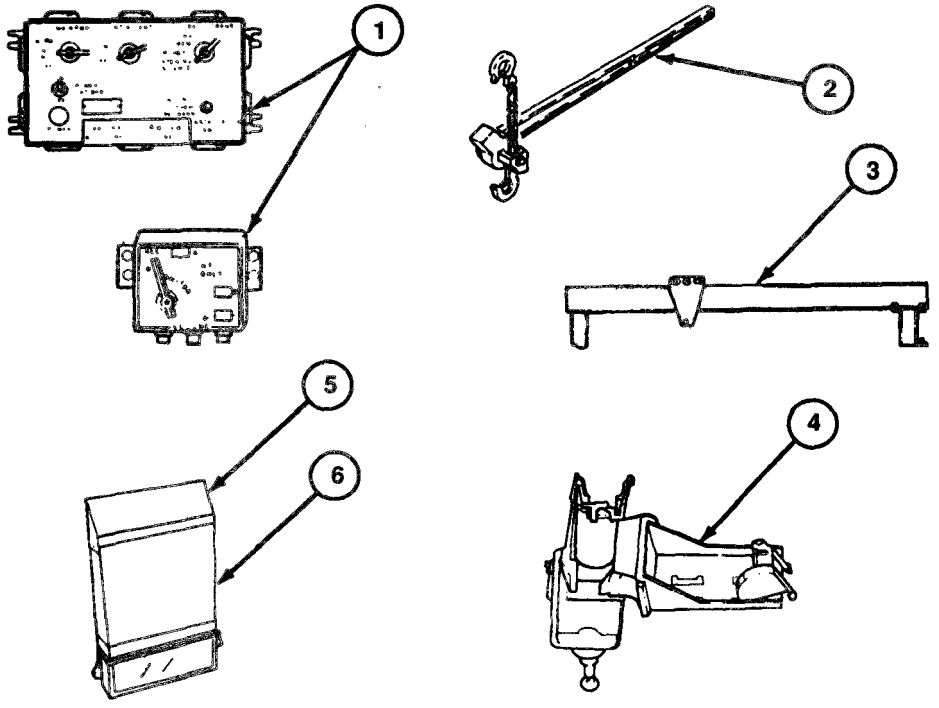
Column (3) - Description. Indicates the federal item name, and, if required, a minimum description to identify and locate the item. The last line for each item indcates the CAGE (in parentheses) followed by the part number. The "Usable On" codes in this column are included to identify which components are used on different models. This column is left blank for the M992.

Explanation Of Columns - Continued

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

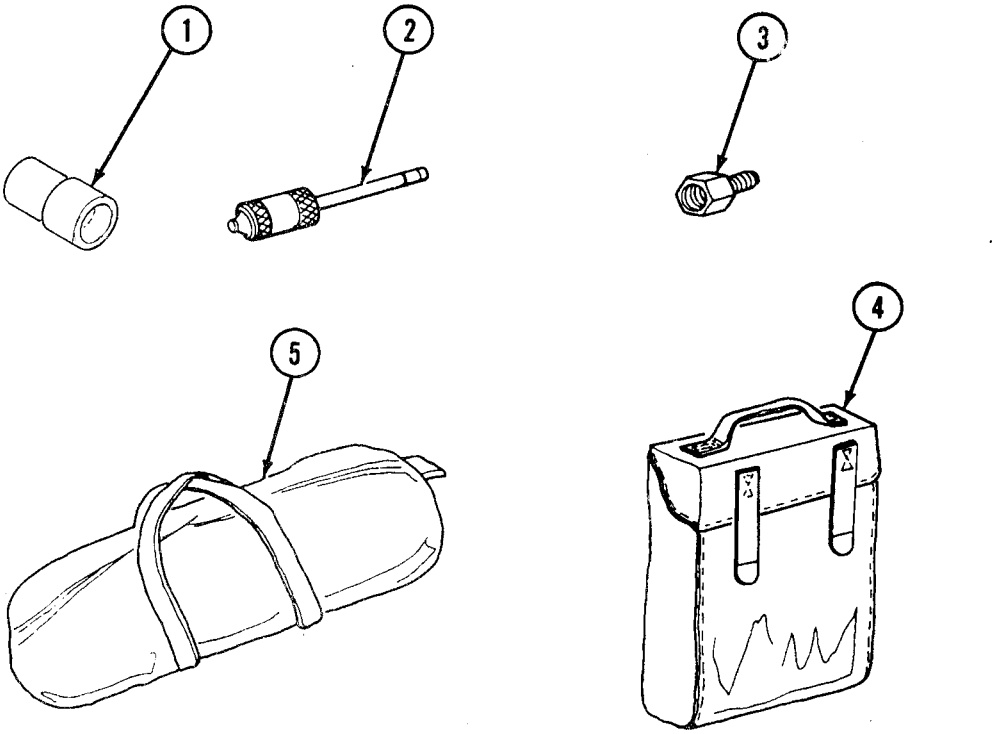
Column (5) - Quantity Required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. INTEGRAL COMPONENTS OF END ITEM (ICOEI)



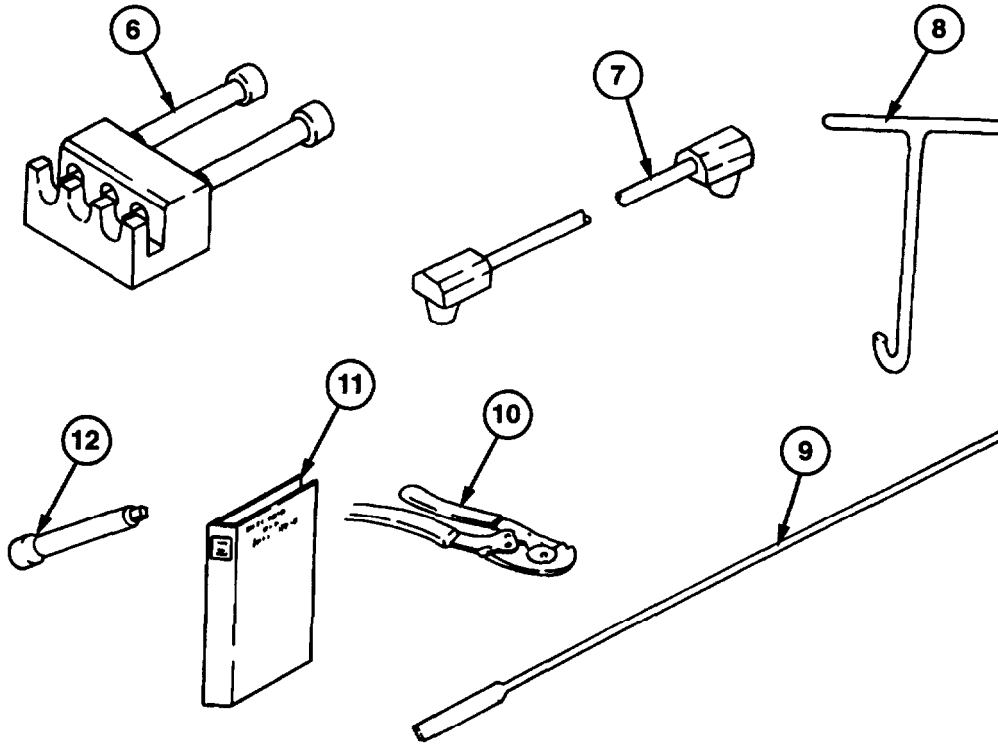
(1) Illus Number	(2) National Stock Number	(3) Description CAGE and, Part Number Useble On Code	(4) U/M	(5) Qty rqr
1	5820-01-128-6184	INTERCOM KIT (AN/VRC-1 WITH CABLES AND HARDWARE) (80063) PPL 10062	SET	1
2	3990-01-179-9141	HOIST (19207) 12332913	EA	1
3	2590-01-220-0123	LIFTING FIXTURE (19207) 12333570	EA	1
4	1005-00-704-6650	MOUNT, MACHINE GUN CAL 0.50 (19204) 7046650	EA	1
5	1240-00-34-4643	PERISCOPE, M27 (19200) 7633132	EA	1
6	1240-00-509-2743	PERISCOPE, M45 (19200) 8213430	EA	1

Section III. BASIC ISSUE ITEMS (BII)



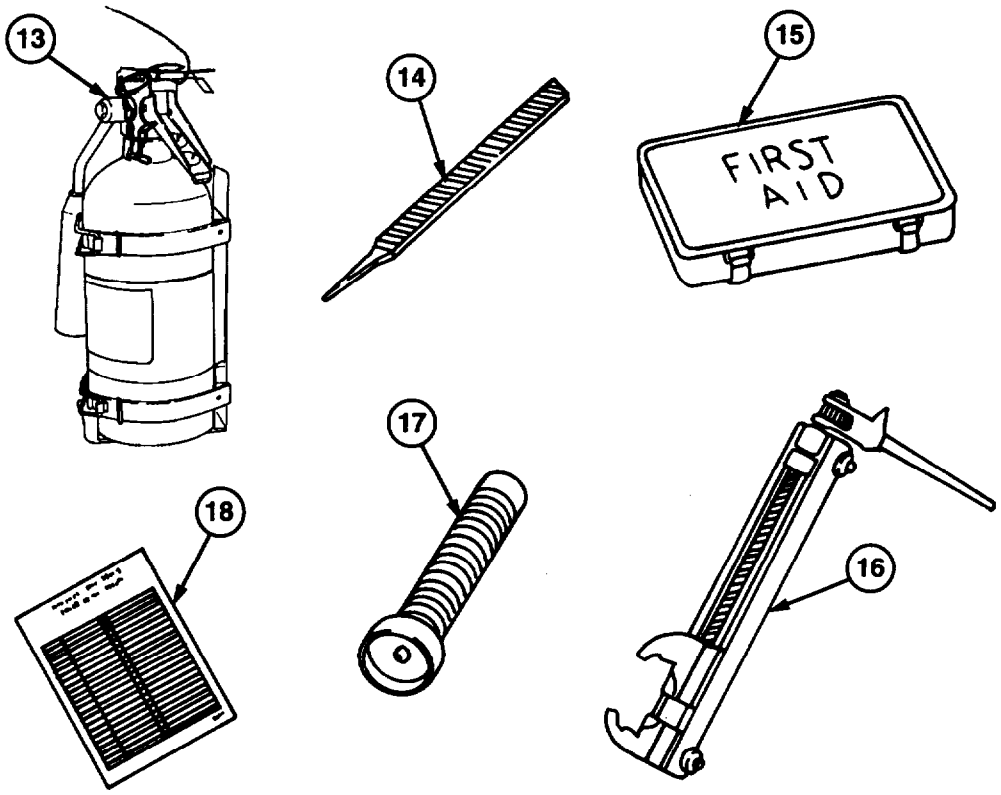
(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1	5935-00-322-8959	ADAPTER (19207) 11677570		EA	2
2	4930-00-204-2550	ADAPTER, GREASE GUN (19207) 5349744		EA	1
3	4933-00-087-1267	ADAPTER, GUN, OIL FILLING (19207) 11635708		EA	1
4	2540-00-670-2459	BAG ASSEMBLY, PAMPHLET (19207) 11676920		EA	1
5	5140-00-473-6256	BAG, TOOL SATCHEL (19207) 11655979		EA	1

Section III. BASIC ISSUE ITEMS (BII) - Continued



(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
6	5120-01-179-8995	BREAKER, CHAIN (19207) 12330762		EA	1
7	6150-01-248-9555	CABLE AND PLUG ASSY, INTERVEHICLE (19207) 11882336-6		EA	1
8	5120-01-179-8997	CARGO HOOK, PROJECTILE RACK (19207) 12333373		EA	1
9	5120-00-244-1390	CROWBAR (80064) 1833244		EA	1
10	5110-00-595-8229	CUTTER, WIRE ROPE, HAND (19207) 1165981		EA	1
11	7510-00-889-3494	EQUIPMENT LOG BOOK BINDER		EA	1
12	5120-00-243-7326	EXTENSION, SOCKET WRENCH, 5-IN., 1/2 DR (11876) 10394793		EA	1

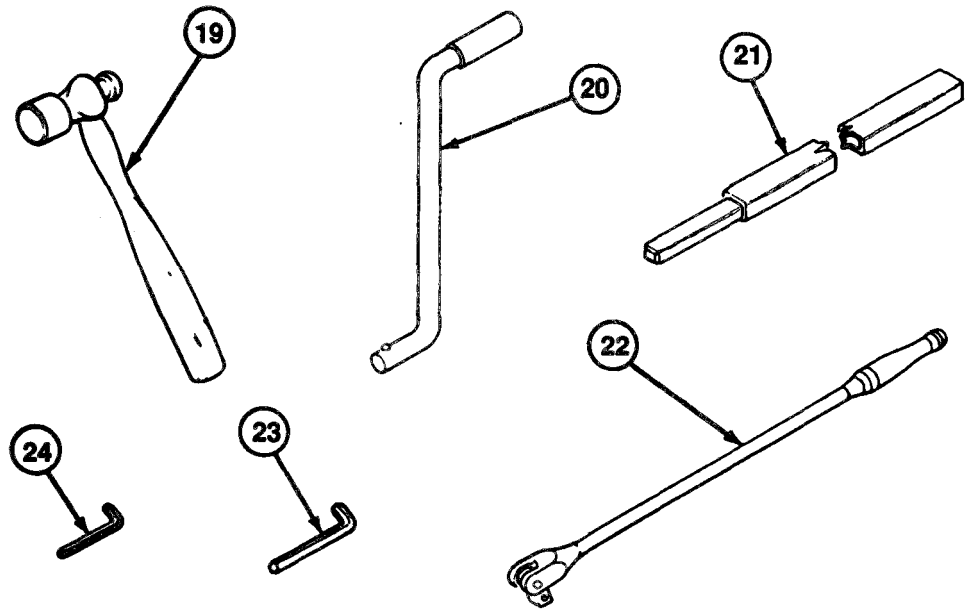
Section III. BASIC ISSUE ITEMS (BII) - Continued



(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
13	4210-01-388-7854	EXTINGUISHER, FIRE (CO,) (58536) A52471-1-S		EA	2
14	5110-00-156-0059	FILE, HAND, SMOOTH (19204) 41F1030		EA	1
15	6545-00-922-1200	FIRST AID KIT (33333) NO REF		EA	1
16	5120-00-605-3926	FIXTURE, TRACK CONNECTING (19207) 8741739		EA	2
17	6230-00-264-8261	FLASHLIGHT (81349) MIL-F-3747		EA	3
18	DA Form 2408	FORMS, EQUIPMENT LOG BOOK		EA	1

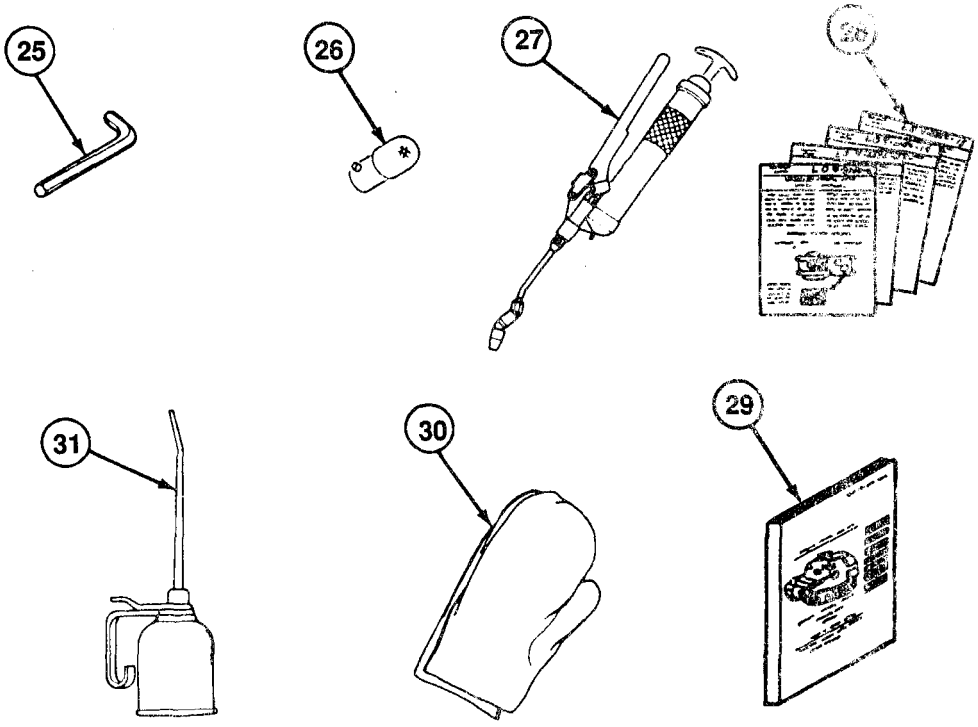
*U.S. GOVERNMENT PRINTING OFFICE: 1997 545-010/60033

Section III. BASIC ISSUE ITEMS (BII) - Contined



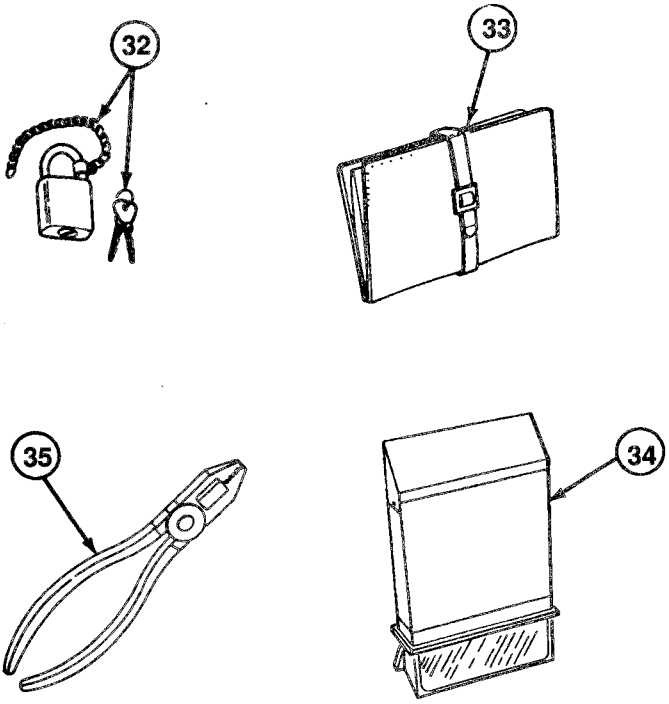
(1) Illus Number	(2) National Stock Number	(3) Description / CAGE and Part Number / Usable On Code	(4) U/M	(5) Qty rqr
19	5120-00-061-8546	HAMMER, HAND: BALL-PEEN (81348) GGG-H-86	EA	1
20	5340-01-179-8994	HANDLE ASSEMBLY, CONVEYOR MOTOR OVERRIDE (19207) 12333374	EA	1
21	2590-01-199-9941	HANDLE, PROJECTILE LOCK EXTENSION (19207) 12351610	EA	1
22	5120-00-236-7590	HANDLE, SOCKET WRENCH, HINGED, 1/2 DRIVE (19207) 11655786-1	EA	1
23	5120-00-198-5390	KEY, SOCKET HEAD SCREW, 3/8.IN: HEX (80064) 1940722	EA	1
24	5120-00-240-5274	KEY, SOCKET HEAD SCREW, 5/16-INCH: HEX (19200) 7596961	EA	1

Section III. BASIC ISSUE ITEMS (BII) - Continued



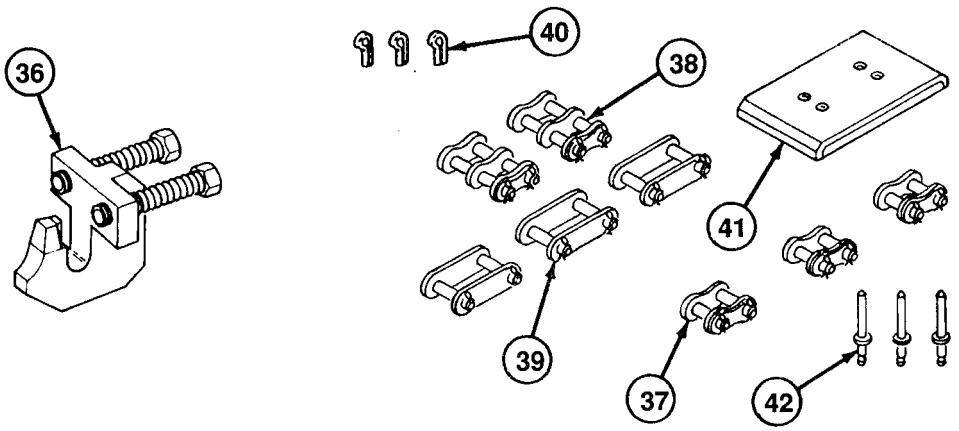
(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
25	5120-00-240-5300	KEY, SOCKET HEAD SCREW, 3/16-INCH HEX (64959) BA 27077-7		EA	
26	6240-00-266-9940	LAMP, INCANDESCENT (96906) MS25231-1829		EA	4
27	4930-00-766-3545	LUBRICATING GUN, HAND (36251) 102758		EA	1
28	LO 9-2350-267-12	LUBRICATION ORDER		EA	1
29	TM 9-2350-267-10	MANUAL, OPERATOR'S		EA	1
30	8415-00-092-0039	MITTEN, CLOTH (19207) 11655982		PR	1
31	4930-00-262-8868	OILER, HAND PUMP TYPE; 1 PT. CAPACITY (72798), 328		EA	1

Section III. BASIC ISSUE ITEMS (BII) - Continued



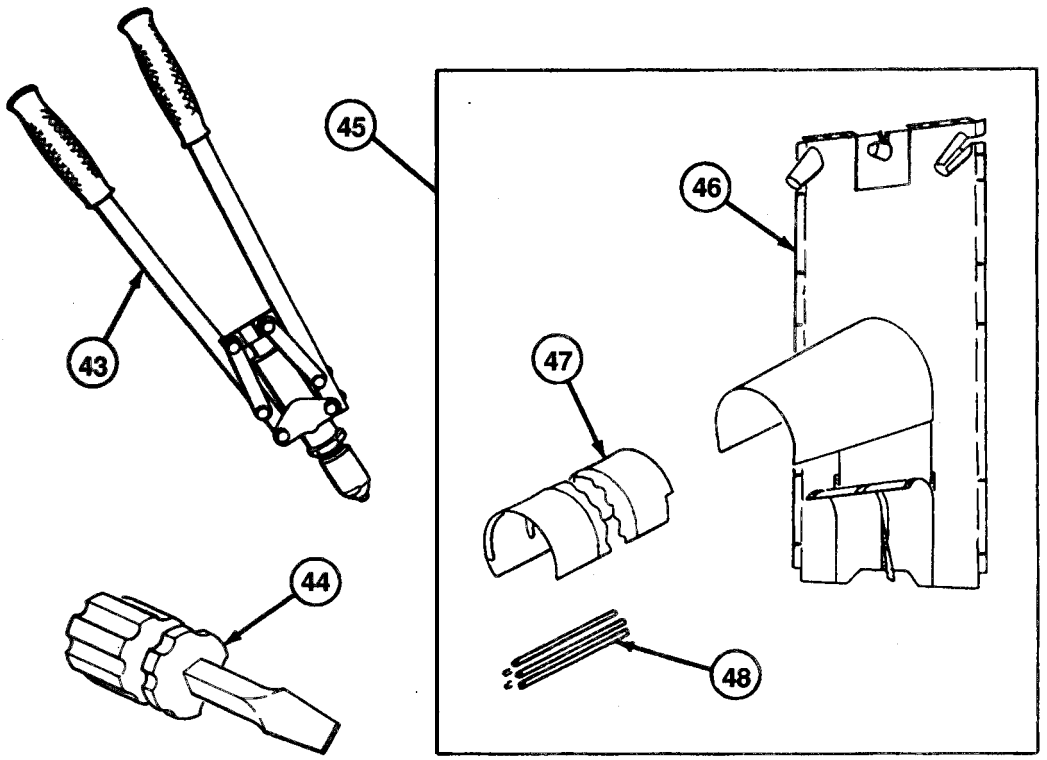
(1) Illus NUmber	(2) National Stock Number	Description On Code and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
32	5340-01-269-9345	PADLOCK SET, FIVE LOCKS AND SEVEN KEYS (96906) MS21313-53		EA	1
33	8345-00-174-6865	PANEL MARKER (81349) MIL-P-40061 AMEND 1		EM	2
34	1240-00-509-2743	PERISCOPE, M45 (19200) 8213430		EA	1
35	5120-00-239-8251	PLIERS (81348) GGG-P-471, TYPE 9, CLASS I, STYLE A		EA	1

Section III. BASIC ISSUE ITEMS (BII) - Continued



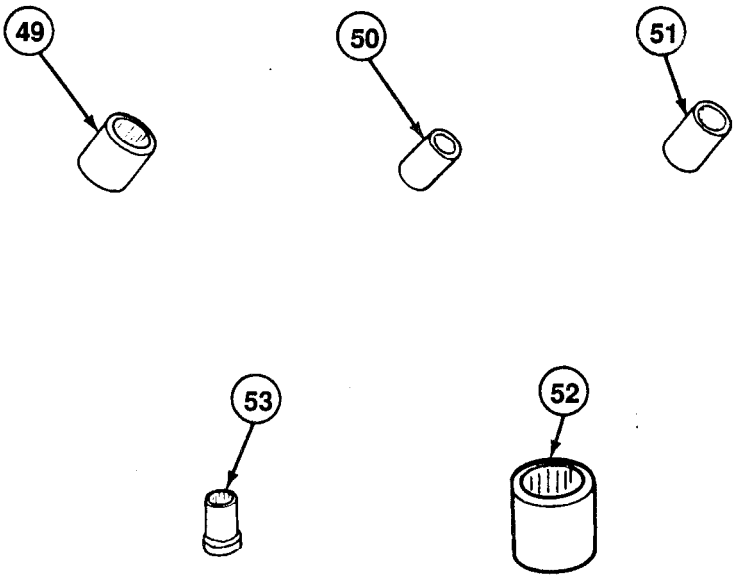
(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
36	5120-00-918-0596	PULLER, CONNECTOR (19207) 10955156		EA	1
37	3020-01-231-2804	CONNECTING LINK ASSY., STACKER (19207) 12330771		EA	3
38		CONNECTING LINK ASSY., COUPLING (19207) 12351678		EA	2
39		CONNECTING LINK ASSY., CONVEYOR (19207) 12330770		EA	5
40	3215-00-829-1480	COTTER PIN (96706) MS24665-208		EA	5
41	5340-01-158-3062	PLATE TOP, CONNECTING CHAIN (19207) 12330694		EA	20
42	5320-00-085-9227	RIVET,. 188 DIA (80205) NAS1398C6-4		EA	80

Section III. BASIC ISSUE ITEMS (BII) - Continued



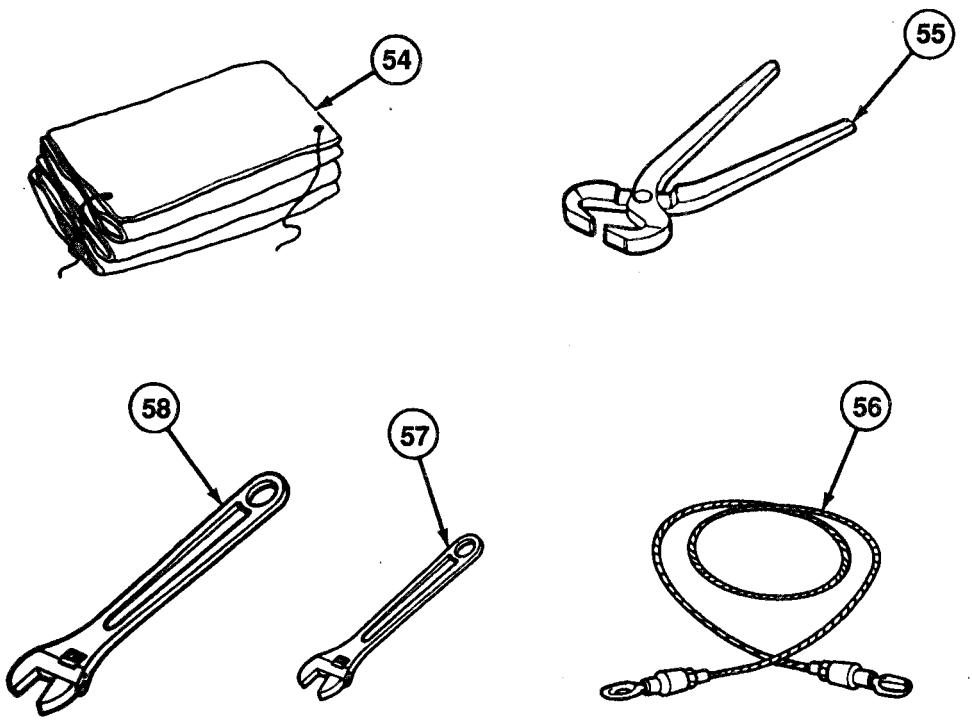
(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
43	5130-01-184-4893	RIVET GUN, POP (19207) 12330763		EA	1
44	5120-00-596-8502	SCREWDRIVER FLAT TIP (96906) MS15221-2		EA	1
45	2590-01-216-8642	SHROUD ASSEMBLY (19207) 12330491 COMPOSED OF:		EA	1
46	2540-01-179-9024	SHROUD, DOOR (19207) 12330492		EA	1
47	2540-01-179-9022	SHROUD TUNNEL (19207) 12330501		EA	1
48	2540-01-179-9023	ROD (19207) 12330505		EA	7

Section III. BASIC ISSUE ITEMS (BII) - Continued



(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
49	5120-00-189-7927	SOCKET, SOCKET WRENCH, 1-INCH, 1/2 DRIVE (19207) 11677025-7		EA	1
50	5120-00-189-7932	SOCKET, SOCKET WRENCH, 9/16-INCH, 1/2 DRIVE (19207) 11677025-1		EA	1
51	5120-00-189-7985	SOCKET, SOCKET WRENCH, 3/4-INCH, 1/2 DRIVE (19207) 11677025-4		EA	1
52	5120-00-189-7917	SOCKET, SOCKET WRENCH, 1-1/4-INCH, 1/2 DRIVE (19207) 3105A		EA	1
53	5120-00-237-0934	SOCKET, SOCKET WRENCH, 1/2-INCH, 1/2 DRIVE (95683) 41-W-3007		EA	1

Section III. BASIC ISSUE ITEMS (BII) - Continued



(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number Usable On Code	(4) U/M	(5) Qty rqr
54	2540-00-653-7589	TARPAULIN (19207) 6537589	EA	1
55	5110-00-221-1499	WIRE NIPPERS (81348) GGG-N-350	EA	1
56	4010-00-202-2425	WIRE ROPE ASSEMBLY (19207) 7360553	EA	1
57	5120-00-240-5328	WRENCH, ADJUSTABLE, 8-INCH (92878) 1500559	EA	1
58	5120-00-264-3796	WRENCH, ADJUSTABLE, 10-INCH (19207) 11655778-5	EA	1

APPENDIX C
ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

Scope

This appendix lists additional items you are authorized for the suppot of the M992.

General

This list identifies items that do not have to accompany the M992 and that do not have to be turned in with it. These items are all authorized to you by CTA 50-970.

Explanation Of Listing

National stock numbers, descriptions and quantities are provided to help you identify and request the additional items you require to support this equipment. If the item you require differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description. If item required differs for different models of this equipment, the model is shown under the “Usable on” heading in the description column.

Section II. ADDITIONAL AUTHORIZATION LIST (AAL)

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION Part Number & CAGE Usable On Code	(3) U/M	(4) QTY AUTH
4930-00-288-1511	ADAPTER, GREASE GUN 120349 (36251)	EA	1
5110-00-293-2336	AX, SINGLE BIT 6150925 (19207)	EA	1
5120-00-526-6044	BAR, PINCH: 1/2-INCH 5266044 (19204)	EA	1
2590-00-906-4741	BOX ASSEMBLY, SPARE 10870949 (19207)	EA	1
5140-00-261-4994	CARRIER, TOOL 11655787 (19207)	EA	1
1290-00-824-7245	CASE, CARRYING 8247245	EA	1
5110-00-236-3272	CHISEL, COLD, HAND S824 (55719)	EA	1
5120-00-227-8074	EXTENSION, SOCKET WRENCH, 10-INCH, 1/2 DR 11655788-1 (19207)	EA	1
5120-00-227-8079	EXTENSION, SOCKET WRENCH, 16-INCH, 3/4 DR L1-22 (55719)	EA	1
5120-00-273-9208	EXTENSION, SOCKET WRENCH, 3-INCH, 3/4 DR GGG-W-641 (81348)	EA	1
5110-00-241-9160	FILE, HAND 41F1572 (19204)	EA	1
5120-00-900-6097	HAMMER, HAND GGG-H-86 (81348)	EA	1
5120-00-099-8544	HANDLE, SOCKET WRENCH,: T-SLIDING 2479141 (50024)	EA	1
5120-00-249-1071	HANDLE, SOCKET WRENCH: NUTSPEEDER GGG-W-641 (55719)	EA	1
5120-00-230-6385	HANDLE, SOCKET WRENCH: RATCHET 1401502 (80064)	EA	1

Section II. ADDITIONAL AUTHORIZATION LIST (AAL)-Continued

(1) NATIONAL STOCK NUMBER	DESCRIPTION Part Number & CAGE Usable On Code	(3) U/M	(4) QTY AUTH
5120-00-241-3142	HANDLE, SOCKET WRENCH 510 (55719)	EA	1
5120-00-288-6574	HANDLE, MATTOCK-PICK 11677021 (19207)	EA	2
5110-00-222-0457	HATCHET, CLAW GGG-H-131 (81348)	EA	1
5120-00-224-2510	KEY, SOCKET HEAD SCREW, 5/32-INCH: HEX GGG-K-275 (81348)	EA	1
5120-00-224-4659	KEY, SOCKET HEAD SCREW, 1/4-INCH: HEX 1940720 (80064)	EA	1
5120-00-240-5292	KEY, SOCKET HEAD SCREW, 1/8-INCH: HEX 10545649-4 (19200)	EA	1
5120-00-242-7410	KEY, SOCKET HEAD SCREW, 3/32-INCH: HEX BA27077-4 (92674)	EA	1
6240-00-051-4843	LAMP, INCANDESCENT MS25236-8623 (96906)	EA	4
5120-00-243-2395	MATTOCK: PICK W/O HANDLE 11677022 (19207)	EA	1
5120-00-194-9458	PICK, DIGGING: RAILROAD W/O HANDLE GGG-H-506 (81348)	EA	1
5315-00-861-1473	PIN, LOCK 8767184 (19206)	EA	1
5120-00-223-7397	PLIERS SLIP JOINT: COMB. SLIP JOINT, W/CUTTER 5214421 (19207)	EA	1
5120-00-293-0791	PUNCH, DRIVE PIN GGG-P-831 (81348)	EA	1
4933-00-796-4537	ROLL ASSEMBLY 7964537 (19207)	EA	1
5120-00-234-5223	RULE GGG-R-791 (81348)	EA	1

Section II. ADDITIONAL AUTHORIZATION LIST (AAL) - Continued

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION Part Number & CAGE Usable On Code	(3) U/M	(4) QTY AUTH
5120-00-227-7338	SCREWDRIVER, FLAT TIP: MACH, EXTRA HEAVY DUTY D339 (77948)	EA	1
5120-00-236-2127	SCREWDRIVER, FLAT TIP 133690-10 (89905)	EA	1
5120-00-278-1283	SCREWDRIVER, FLAT TIP: COMMON 4151104 (19207)	EA	1
5120-00-188-8450	SHOVEL, HAND: GEN PURPOSE, LG HANDLE GGG-S-326	EA	1
5120-00-293-3336	SHOVEL, HAND: RD. PT., D-HANDLE 11655784 (19207)	EA	1
5120-00-189-7911	SOCKET, SOCKET WRENCH, 3/8-IN., 1/2-DR ST812 (65814)	EA	1
5120-00-189-7913	SOCKET, SOCKET WRENCH, 1-1/16-IN., 1/2 DR 11677025-9 (19207)	EA	1
5120-00-189-7914	SOCKET, SOCKET WRENCH, 1-1/8-IN., 1/2 DR 11677025-10 (19207)	EA	1
5120-00-1 89-7924	SOCKET, SOCKET WRENCH, 7/16-IN., 1/2 DR 4-1W005 (95683)	EA	1
5120-00-189-7930	SOCKET, SOCKET WRENCH, 1-3/8IN., 3/4 DR 5544 (47805)	EA	1
5120-00-189-7931	SOCKET, SOCKET WRENCH, 1-7/16-IN., 3/4 DR 5546, (47805)	EA	1
5120-00-189-7934	SOCKET, SOCKET WRENCH, 7/8-INCH, 1/2 DR 11677025-5 (19207)	EA	1
5120-00-189-7935	SOCKET SOCKET WRENCH, 15/16-INCH, 1/2 DR 11677025-6 (19207)	EA	1
5120-00-189-7946	SOCKET, SOCKET WRENCH, 5/8-INCH, 1/2 DR 11677025-2 (19207)	EA	1

Section II. ADDITIONAL AUTHORIZATION LIST (AAL) - Continued

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION Part Number & CAGE Usable On Code	(3) U/M	(4) QTY AUTH
5120-00-232-5681	SOCKET, SOCKET WRENCH, 1-5/16-IN., 3/4 DR GGG-W-641 (81348)	EA	1
5120-00-293-0094	SOCKET, SOCKET WRENCH, 1-1/2-INCH, 3/4 DR 5548 (47805)	EA	1
5130-00-221-8005	SOCKET, SOCKET WRENCH, 7/16-INCH, 1/2 DR P140 (55719)	EA	1
5130-00-221-8007	SOCKET, SOCKET WRENCH, 9/16-INCH, 1/2 DR P180 (55719)	EA	1
7310-00-265-6155	STOVE, GASOLINE BURNER MIL-S-10736 (81348)	EA	1
5120-00-269-7971	UNIVERSAL JOINT WRENCH 5140 (18702)	EA	1
5120-00-187-7123	WRENCH, OPEN END, 7/16 X 1/2: ENGR, 15-DEG ANGLE, DBLE HD 41W1000 (19204)	EA	1
5120-00-187-7130	WRENCH, OPEN END, 13/16 X 7/8: ENGR, 15-DEG ANGLE, DBLE HD E2528 (07971)	EA	1
5120-00-224-3102	WRENCH, OPEN END, 5/8 X 3/4: ENGR, 15-DEG ANGLE, DBLE HD 729 (65814)	EA	1
5120-00-264-3777	WRENCH, SPANNER 464 (65814)	EA	1
5120-00-277-2307	WRENCH, OPEN END, 5/16 X 3/8: ENGR, 15-DEG ANGLE, DBLE HD 51012 (55719)	EA	1
5120-00-277-7025	WRENCH, OPEN END, 15/16 X 1 11655789-5 (19207)	EA	1
5120-00-277-9076	WRENCH, SPANNER 5218469 (19207)	EA	1
5120-00-293-2134	WRENCH, OPEN END, 9/16 X 11/16: ENGR, 15-DEG ANGLE, DBLE HD 5323330 (19207)	EA	1

APPENDIX D
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the M992. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts and Heraldic Items).

Explanation

Column (1) - Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (eg, “Use cleaning compound, item 5, appx D“).

Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item:

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

Column (3) - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

Column (4) - Description. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (such as ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1		8040-00-262-9025	ADHESIVE (81349) MIL-A-5092 Type I	OZ
2		8040-00-262-9026	ADHESIVE (81349) MIL-A-5092 Type I	PT
3		6850-00-181-7929	ANTIFREEZE, PERM O-A-548, 1 GAL CAN (81349) MIL-A-46153	GL
4		6850-00-181-7933	ANTIFREEZE, PERM O-A-548, GAL CAN (81349) MIL-A-46153	GL
5		6850-00-174-1806	ANTIFREEZE, ARCTIC TYPE 55-GAL DRUM (81349) MIL-A-11755	DR
6		6850-00-598-7328	CLEANING COMPOUND, 2 CCMP CAN (81349) MIL-C-1-0597	KT
7		6850-00-227-1887	CLEANING COMPOUND (81349) MIL-C-43454	QT
8		6850-00-224-6665	CLEANING COMPOUND (81349) MIL-C-11090	CN
9		6850-00-224-6657	CLEANING COMPOUND, RIFLE (81349) MIL-C-372	CN
10		6850-00-224-6663	CLEANING COMPOUND, RIFLE (81349) MIL-C-372	GL
11		5350-00-221-0872	CLOTH, ABRASIVE CROCUS, .50 SHEETS (81348) PC458	PG
12		6850-00-901-0591	DEICING-DEFROSTING COMPOUND, 5-GAL CAN (81349) MIL-A-8243	CN
13		6850-00-281-1985	DRY-CLEANING SOLVENT (02978) PS661	GL
14		6850-00-281-3061	DRY-CLEANING SOLVENT, 4 OZ CAN (81348) PD680	DR
15		8010-00-527-2050	ENAMEL, GLOSS, BLACK, 1-GAL (81348) TT-E-489CLASSA	P T

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST- Continued

(1) NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
16		8010-00-527-2053	ENAMEL, GLOSS, BLACK, 1-QT CAN (81348) TT-E-489CLASSA	QT
17		8010-00-297-2105	ENAMEL, SEMIGLOSS, OLIVE DRAB (81348) TT-E-485	GL
18		8010-00-297-2109	ENAMEL, SEMIGLOSS, OLIVE DRAB (81348) TT-E-485TYPE2	PT
19		8010-00-664-7653	ENAMEL, SYN, GLOSS, WHITE (81348) TT-E-489	QT
20		9110-00-391-7813	FUEL, JELLIED, ALCOHOL) 2.625-OZ CAN (94745) 4006	CN
21		9150-00-935-1017	GREASE, AUTOMOTIVE ART, 14-OZ CAN (81349) MIL-G-10924	TY
22		9150-00-190-0904	GREASE, AUTOMOTIVE ART (9318308) MIL-G-10924	LB
23		9150-00-190-0905	GREASE, AUTOMOTIVE ART (98308) MIL-G-10924	LB
24		9150-00-935-9808	HYDRAULIC FLUID, PET, OHT (98308) MIL-H-6083	GL
25		9150-00-935-9807	HYDRAULIC FLUID, PET, OHT (98308) MIL-H-6083	QT
26		6850-00-753-4967	INHIBITOR, CORROSION (81348) R-I-0049OB	OZ
27		9150-00-231-6689	LUBRICATING OIL, GEN PL SPC (81348) VV-L-800	QT
28		9150-00-189-6727	LUBRICATING OIL (81349) MIL-L-2104D	QT
29		9150-00-188-9858	LUBRICATING OIL (81349) MIL-L-2104D	CN
30		9150-00-186-6668	LUBRICATING OIL ENG (81349) MIL-L-2104D	CN

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST - Continued

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
31		9150-00-186-6681	LUBRICATING OIL ENG (81349) MIL-L-2104D	QT
32		9150-00-231-9062	LUBRICATING OIL, GEN, 5-GAL CAN (81348) VV-L-800	GL
33		9150-00-231-2361	LUBRICATING OIL, GEN (81349) MIL-L-3150	QT
34		9150-00-231-2356	LUBRICATING OIL, GEN (81349) MIL-L-3150	CN
35		9150-00-402-2372	LUBRICATING OIL, OEA 5-GAL CAN (15445) CONOCODN600 FLUID TYPE I	CN
36		9150-00-402-4478	LUBRICATING OIL, OEA, 1-QT CAN (15445) CONOC000600 FLUID	QT
37		6640-00-285-4694	PAPER, LENS (81348) NNN-P-40	HD
38		9150-00-250-0926	PETROLATUM TECHNICAL (81348) VV-P-236	LB
39		9150-00-250-0933	PETROLATUM, TECHNICAL: 5-LB CAN (81348) VV-P-236	LB
40		7920-00-205-1711	RAG, WIPING (81348) DDD-R-30	BE
41		8030-00-159-8176	SEALING COMPOUND (81349) MIL-S-45180	TU
42		8030-00-252-3391	SEALING COMPOUND (77247) AGASKETNO2	OZ
43		8010-00-242-2089	THINNER, PAINT MIXER (81348) TT-T-291 GR1 - 1 GAL	GL
44		8010-00-558-7026	THINNER, PAINT, MINERAL (81348) TT-T-291	CN
45		5610-00-141-7838	WALKWAY COMPOUND, 1 - GAL CAN (81349) MIL-W-5044Type2	GL

INDEX

S U B J E C T

Page

A

SUBJECT **Page**

SUBJECT **Page**

B

C

SUBJECT **Page**

S U B J E C T **Page**

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

E

F

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

I

SUBJECT **Page**

L

SUBJECT **Page**

M

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

P

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

SUBJECT **Page**

V

W

By Order of the Secretary of the Army:

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

Official:

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

Distribution:

To be distributed in accordance with DA Form 12-374-E Block 1214, Operator's maintenance requirements for TM 9-2350-267-10

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
Co. B, 1st BN, 2nd Brigade
Ft. Hood, TX 76445

DATE SENT
17 Dec 1989

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-2350-264-10-1		Operator Controls, PMCS, and Operation Under Usual Conditions

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
3		2	
109		51	
2-8			2-1
12	1-6a		

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

Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam

Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N be furnished.

Preventive Maintenance Checks and Services. Item [illegible] "Items to be inspected" should be changed to read as follows: Firing [illegible] and firing mechanism pawl.

Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER
Pete Moss 1LT AV272-4162

SIGN HERE
Pete Moss

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DEPARTMENT OF THE ARMY

Co. B, 1st BN, 2nd BRIGADE
Ft. Hood, TX 76445

OFFICIAL BUSINESS

SAMPLE

FOLD BACK

TEAR ALONG PERFORATED LINE

Commander
U.S. Army Tank-Automotive Command
ATTN: AMSTA-MB
Warren, MI 48397-5000

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PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-2350-267-10	Oct 91	Operator's Manual Carrier, Ammunition, Tracked, M992

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

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

WEIGHTS

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

LIQUID MEASURE

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

SQUARE MEASURE

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

CUBIC MEASURE

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

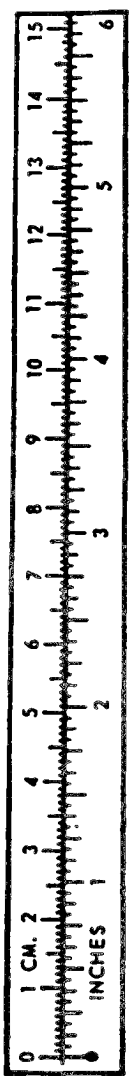
TEMPERATURE

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

APPROXIMATE CONVERSION FACTORS

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

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



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