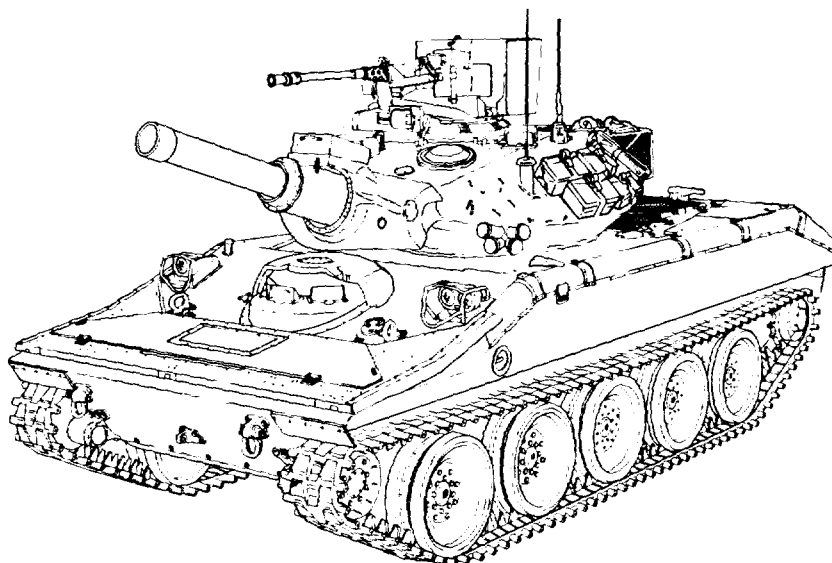


This copy is a reprint which includes current pages from Changes I and 2. TM 9-2350-230-10

SUPERSEDES COPY DATED JUNE 1976

OPERATOR'S MANUAL



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Full-Track	OPERATION UNDER UNUSUAL CONDITIONS	PAGE 2-272
152-mm Gun/Launcher	TROUBLESHOOTING PROCEDURES	PAGE 3-7
M551A1 (NSN 2350-00-140-5151)	MAINTENANCE PROCEDURES	PAGE 3-31
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Approved for public release;, distribution is unlimited.

WARNING**CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU**

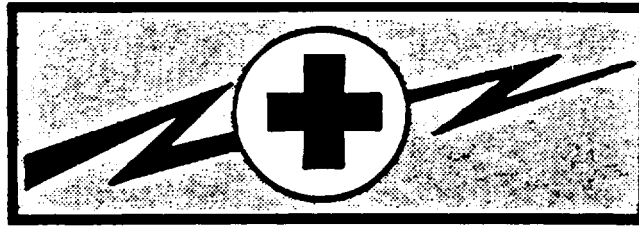
Carbon monoxide is a colorless, odorless, deadly poisonous gas which, when breathed, deprives the body of oxygen and causes suffocation. Breathing air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, drowsiness, and/or coma. Permanent brain damage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

Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. Carbon monoxide becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure the safety of personnel whenever the personnel heater or main or auxiliary engine of any vehicle is operated for maintenance purposes or tactical use:

1. DO NOT operate personnel heater or engine of vehicle in an enclosed area unless the area is adequately ventilated.
2. DO NOT idle engine for long periods without maintaining adequate ventilation in personnel compartments.
3. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.
4. 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 (see FM 2111); obtain medical treatment.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

WARNING: The M8A3 gas-particulate filter unit will not protect crew against carbon monoxide poisoning.

WARNING**HIGH VOLTAGE**

is used in the operation of the M551A1/fvi551NTC Sheridan.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions:

NEVER WORK on electronic equipment unless there is another person nearby. He or she should be familiar with the operation and hazards of the equipment. He or she should also be competent in giving first aid. Ask maintenance personnel about extremely hazardous areas of the vehicle prior to doing any maintenance.

Whenever possible, the MASTER SWITCH should be SHUT OFF before performing any maintenance. Use extreme caution around any electronic components of the vehicle. Some components store energy that can injure personnel even with the MASTER SWITCH turned off.

BE CAREFUL not to touch high-voltage connections when installing or operating any equipment.

Whenever possible, KEEP ONE HAND AWAY from the equipment to reduce the hazard of current flowing through vital organs of the body.

BEFORE MOVING THE VEHICLE, check the immediate area for overhead obstructions. If you think you're going to have a problem, tie antennas down.

KEEP ARMS AND LEGS from extending over side of vehicle. If an antenna contacts a power line while your body brushes against metal or wet objects (such as wet foliage or trees), you are grounded and death could result.

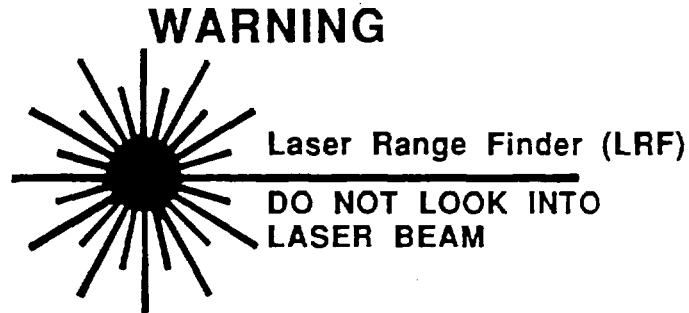
DO NOT work on the vehicle during an electrical storm or when a storm is threatening.

REMOVE rings, bracelets, wristwatches, neck chains, and any other jewelry before working around this or any other vehicle. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit and cause severe burns or electrical shock.

DO NOT be misled by the term "low voltage." Voltages as low as 50 volts can cause death.

For artificial respiration, refer to FM 2111.

b



THE LASER BEAM of the LRF can be dangerous and cause blindness if it enters the eye, either directly or reflected from a shiny surface.

YOU MUST have had laser safety training prior to operation of the laser.

THE LRF will be used only on ranges approved for and designated as laser firing ranges.

THE COVER on the external receiver/transmitter of the laser must be closed at all times except during actual lasing on approved ranges.

THE PRECAUTIONS required for direct-fire, line-of-sight weapons must be enforced while operating the laser.

LASER OPERATORS will fire only at designated targets which are non-reflective and will not fire at reflective surfaces, such as glass, mirrors, windows, etc.

THE LASER will NOT be used in two-sided tactical exercises unless all personnel are equipped with appropriate laser eye protection and the maneuver area has been designated a laser firing range.

LASER PROTECTIVE EYEWEAR must be worn by all personnel required to be down range of the laser. (Laser safety goggles, NSN 4240002582054, meet safety requirement.).

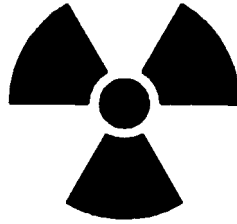
THE LASER must NOT be fired at targets closer than 200 meters to the laser LASER FIRING SYSTEMS may store a charge: take care to prevent accidental pulsing of the laser and to avoid electric shock.

OPTICAL INSTRUMENTS such as telescopes, periscopes, and binoculars will not be permitted to observe the target area during lasing unless all flat reflective surfaces have been removed from the target area or unless appropriate laser safety filters or goggles are used.

THE M127A1 TELESCOPE has a selector for either filter or clear viewing. The filter must be in position prior to lasing.

TB MED 524 and AR 38563 are the source documents for laser safety.

PERSONNEL routinely performing maintenance at the general support and depot levels are required to receive eye examinations per AR 4046.

WARNING**RADIATION HAZARD
Azimuth Indicator**

may contain dial pointers tipped with a coating of radioactive material. Hazardous radiation conditions exist when the plastic dial window is broken or removed from the indicator.

WARNING

DO NOT chamber 152-mm ammo until ready to fire, this ammo has a highly flammable cartridge case. Fire or remove ammo within 5 minutes of chambering.

KEEP ammo away from open flames, lighted cigarettes, smoldering residue, and other sources of ignition.

NEVER fire ammo with unauthorized fuses. Check fuses before loading.

WARNING

Before the crew leaves the vehicle, make certain that the MASTER SWITCH and CUPOLA/LASER POWER switch are in off positions. These switch settings prevent accidental automatic alignment of cupola to gun/launcher.

WARNING

Make sure seat belts are worn at all times when vehicle is in motion, except when performing water operations.

WARNING

If the scavenging system does not work, do not fire missiles or conventional ammunition on training missions until the scavenging system does work. Combat firings may continue at the discretion of the vehicle commander.

d Change 2

CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 5 September 1994

OPERATOR'S MANUAL
ARMORED RECONNAISSANCE/
AIRBORNE ASSAULT
VEHICLE
FULL-TRACKED
152-MM GUNILAUNCHER
M551A1 (NSN 235W140-511)
M551 NTC (NSN 235"1-115-1579)

TM 9-2350-230-10, 11 May 1992, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar adjacent to the material.
3. New or changed illustrations are indicated by a miniature pointing hand highlighting the change.

Remove Pages

c and d
2-213 and 2-214
2-217 thru 2-224

Insert Pages

c and d
2-213 and 2-214
2-217 thru 2-224

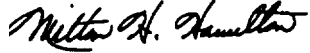
Approved for public release; distribution is unlimited.

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

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 12-37-E (Block 1024) requirements for TM 9-2350-230-10.

TM 9-2350-230-10

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 16 June 1994

**OPERATOR'S MANUAL
ARMORED RECONNAISSANCE/
AIRBORNE ASSAULT
VEHICLE
FULL-TRACKED
152-MM GUN/LAUNCHER
M551A1 (NSN 235000140-5151)
M551 NTC (NSN 2350-01-1151579)**

TM 9-2350-230-10, May 1992, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar adjacent to the material.
3. New or changed illustrations are indicated by a miniature pointing hand highlighting the change.

Remove Pages

c and d
1-11 and 1-12
2-23 thru 2-32
2-39 and 2-40
2-51 and 2-52
none
2-55 and 2-56
2-61 and 2-62
2-111 and 2-112
2-115 and 2-116
2-159 thru 2-162
2-211 and 2-212
2-225 and 2-226
4-19 and 4-20
none
B-11 and B-12
B-29 (B-30 blank)
INDEX-1 and INDEX-2
INDEX-5 and INDEX-6

Insert Pages

c and d
1-11 and 1-12
2-23 thru 2-32
2-39 and 2-40
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2-52.1/(2-52.2 blank)
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2-211 and 2-212
2-225 and 2-226
4-19 and 4-20
4-20.1/(4-20.2 blank)
B-11 and B-12
B-29 (B-30 blank)
INDEX-1 and INDEX-2
INDEX-5 and INDEX-6

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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 distribution in accordance with DA Form 1 2-37-E (Block 1024) requirements for TM92350123 10.

TECHNICAL MANUAL

NO. 9-2350-230-10

HEADQUARTERS
DEPARTMENT OF THE ARMY

Washington D. C., 11 May 1992

**OPERATOR'S MANUAL
ARMORED
RECONNAISSANCE/AIRBORNE
ASSAULT VEHICLE
FULL-TRACKED
152-MM GUN/LAUNCHER**

**M551 A1 (NSN 2350-00-140-5151)
M551 NTC (NSN 2350-01-115-1579)**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

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*This manual supersedes TM 9-2350-230-10, dated June 1976, including all changes thereto.

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HOW TO USE THIS MANUAL

GENERAL.

This manual contains operation and maintenance information for the M551A1/M551NTC Sheridan crew. It is divided into four chapters:

- CHAPTER 1-INTRODUCTION provides general information about the Sheridan, contains a list of abbreviations/acronyms and glossary, describes and identifies major components and systems, and provides principles of operation.
- CHAPTER 2-OPERATING INSTRUCTIONS describes and identifies the operating controls and indicators and explains how to use them. This chapter also covers Preventive Maintenance Checks and Services (PMCS), how to operate the Sheridan during usual and unusual conditions, and how to respond to some emergency conditions.
- CHAPTER 3-MAINTENANCE INSTRUCTIONS describes lubrication, troubleshooting, and maintenance procedures. The lubrication section provides information on lubricating and cleaning. The troubleshooting section provides information to help the crew solve problems through corrective action. The maintenance section provides information on repairs allowed at the crew level.
- CHAPTER 4-AMMUNITION identifies and describes the types of ammunition authorized for the Sheridan.

Each chapter begins on a right-hand page with the page number of 1. Pages are numbered after the chapter number. For example:

1-6 means Chapter 1, page 6.

COVER INDEX.

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WARNINGS, CAUTIONS, AND NOTES.

Warnings, cautions, and notes are provided throughout this manual in places which do not fit into a procedural step. A warning is provided where injury may occur to personnel on or near the Sheridan. Warnings are bolded and italicized with the word 'warning' boxed. For example:

WARNING

The obturator seal must be used with all types of ammo to prevent a fire hazard and gas wash.

WARNINGS, CAUTIONS, AND NOTES-Continued.

There are also general warnings that start on the first right-hand page immediately after the cover which should be read before operating the Sheridan.

A caution is provided where equipment may be damaged, but no injuries to personnel should result. Cautions are bolded and italicized with the word "caution" underlined. For example:

CAUTION
Do not clean bore with abrasives.

A note provides information, but no personnel injury or equipment damage should result. A note is bolded and italicized. For example:

NOTE
Do not use steel wool.

TASK TITLES.

Major task titles are bolded and capitalized, and appear before the first step of the task. For example:

3-2. SERVICE INTERVALS-UNUSUAL CONDITIONS.

When a major task has a number of sub-tasks, the titles of the sub-tasks appear as follows:

- a. Daily.** After completion of firing mission, clean the gun/launcher.
 - (1) Clearing 7.62-mm Machine Gun.
 - (a) Elevating/depressing gun/launcher.

INTERNAL REFERENCING.

In this manual, internal referencing is done by chapter, paragraph, section, and/or task. For example:

Gun/launcher cleaning and lubrication (see paragraph 3-3)

EXTERNAL REFERENCING.

Referencing outside this manual is done by the military publication number. For example:

For hull/vehicle lubrication, refer to LO 9-2350-230-12.

APPENDIXES.

There are six appendixes which provide additional information for the Sheridan:

WARNING**CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU**

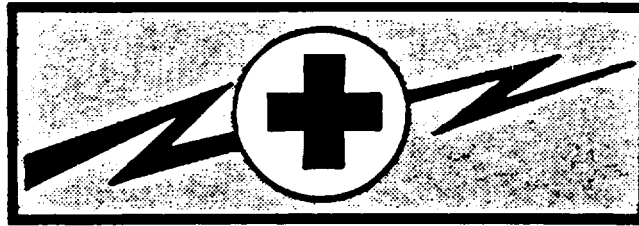
Carbon monoxide is a colorless, odorless, deadly poisonous gas which, when breathed, deprives the body of oxygen and causes suffocation. Breathing air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, drowsiness, and/or coma. Permanent brain damage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

Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. Carbon monoxide becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure the safety of personnel whenever the personnel heater or main or auxiliary engine of any vehicle is operated for maintenance purposes or tactical use:

1. DO NOT operate personnel heater or engine of vehicle in an enclosed area unless the area is adequately ventilated.
2. DO NOT idle engine for long periods without maintaining adequate ventilation in personnel compartments.
3. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.
4. 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 (see FM 2111); obtain medical treatment.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

WARNING: The M8A3 gas-particulate filter unit will not protect crew against carbon monoxide poisoning.

WARNING**HIGH VOLTAGE**

is used in the operation of the M551A1/M551NTC Sheridan.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions:

NEVER WORK on electronic equipment unless there is another person nearby. He or she should be familiar with the operation and hazards of the equipment. He or she should also be competent in giving first aid. Ask maintenance personnel about extremely hazardous areas of the vehicle prior to doing any maintenance.

Whenever possible, the **MASTER SWITCH** should be **SHUT OFF** before performing any maintenance. Use extreme caution around any electronic components of the vehicle. Some components store energy that can injure personnel even with the **MASTER SWITCH** turned off.

BE CAREFUL not to touch high-voltage connections when installing or operating any equipment.

Whenever possible, **KEEP ONE HAND AWAY** from the equipment to reduce the hazard of current flowing through vital organs of the body.

BEFORE MOVING THE VEHICLE, check the immediate area for overhead obstructions. If you think you're going to have a problem, tie antennas down.

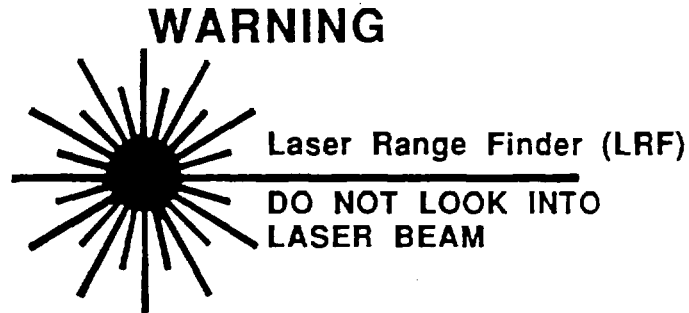
KEEP ARMS AND LEGS from extending over side of vehicle. If an antenna contacts a power line while your body brushes against metal or wet objects (such as wet foliage or trees), you are grounded and death could result.

DO NOT work on the vehicle during an electrical storm or when a storm is threatening.

REMOVE rings, bracelets, wristwatches, neck chains, and any other jewelry before working around this or any other vehicle. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit and cause severe burns or electrical shock.

DO NOT be misled by the term "low voltage." Voltages as low as 50 volts can cause death.

For artificial respiration, refer to FM 21-11.



THE LASER BEAM of the LRF can be dangerous and cause blindness if it enters the eye, either directly or reflected from a shiny surface.

YOU MUST have had laser safety training prior to operation of the laser.

THE LRF will be used only on ranges approved for and designated as laser firing ranges.

THE COVER on the external receiver/transmitter of the laser must be closed at all times except during actual lasing on approved ranges.

THE PRECAUTIONS required for direct-fire. line-of-sight weapons must be enforced while operating the laser

LASER OPERATORS will fire only at designated targets which are non-reflective and will not fire at reflective surfaces, such as glass, mirrors, windows, etc.

THE LASER will NOT be used in two-sided tactical exercises unless all personnel are equipped with appropriate laser eye protection and the maneuver area has been designated a laser firing range.

LASER PROTECTIVE EYEWEAR must be worn by all personnel required to be down range of the laser. (Laser safety goggles, NSN 4240-00-258-2054, meet safety requirement.)

THE LASER must NOT be fired at targets closer than 200 meters of the laser

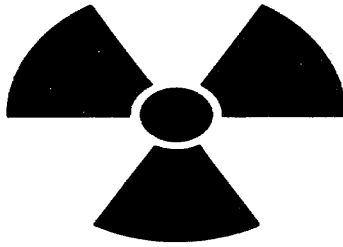
LASER FIRING SYSTEMS may store a charge: take care to prevent accidental pulsing of the laser and to avoid electric shock.

OPTICAL INSTRUMENTS such as telescopes, periscopes, and binoculars will not be permitted to observe the target area during lasing unless all flat reflective surfaces have been removed from the target area or unless appropriate laser safety filters or goggles are used.

THE M127A1 TELESCOPE has a selector for either filter or clear viewing The filter must be in position prior to lasing

TB MED 524 and AR 385-63 are the source documents for laser safety.

PERSONNEL routinely performing maintenance at the general support and depot levels are required to receive eye examinations per AR 40-46.

WARNING**RADIATION HAZARD****Azimuth Indicator**

may contain dial pointers tipped with a coating of radioactive material. Hazardous radiation conditions exist when the plastic dial window is broken or removed from the indicator.

WARNING

DO NOT chamber 152-mm ammo until ready to fire: this ammo has a highly flammable cartridge case. Fire or remove ammo within 5 minutes of chambering.

KEEP ammo away from open flames, lighted cigarettes, smoldering residue, and other sources of ignition.

NEVER fire ammo with unauthorized fuses. Check fuses before loading.

WARNING

Before the crew leaves the vehicle, make certain that the MASTER SWITCH and laser ON/OFF switch are in the OFF positions. These switch settings prevent accidental automatic alignment of cupola to gun/launcher.

WARNING

Make sure seat belts are worn at all times when vehicle is in motion, except when performing water operations.

TECHNICAL MANUAL

NO. 9-2350-230-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 11 May 1992

**OPERATOR'S MANUAL
ARMORED
RECONNAISSANCE/AIRBORNE
ASSAULT VEHICLE
FULL-TRACKED
152-MM GUN/LAUNCHER
M551 A1 (NSN 2350-00-140-5151)
M551 NTC (NSN 2350-01-115-1579)**

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WARNINGS, CAUTIONS, AND NOTES-Continued.

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Do not use steel wool

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3-2. SERVICE INTERVALS-UNUSUAL CONDITIONS.

When a major task has a number of sub-tasks, the titles of the sub-tasks appear as follows:

a. Daily. After completion of firing mission, clean the gun/launcher.

(1) Clearing 7.62-mm Machine Gun.

(a) Elevating/depressing gun/launcher.

INTERNAL REFERENCING.

In this manual, internal referencing is done by chapter, paragraph, section, and/or task. For example:

Gun/launcher cleaning and lubrication (see paragraph 3-3)

EXTERNAL REFERENCING.

Referencing outside this manual is done by the military publication number. For example:

For hull/vehicle lubrication, refer to LO 9-2350-230-12.

APPENDIXES.

There are six appendixes which provide additional information for the Sheridan:

CHAPTER 1 INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE. This operators manual is for your use in operating and maintaining the Armored Reconnaissance/Airborne Assault Vehicle (AR/ AAV), commonly known as the Sheridan M551A1/M551NTC. The purpose of the AR/MV M551A1/M551NTC is to provide forward reconnaissance, intelligence gathering, and airborne assault capabilities. This manual includes lists of References, Basic Issue Items (BI), Components of End Item (COEI), and Additional Authorization List (AAL). A Stowage and Sign Guide is also included in this manual.

The equipment/system described herein is non-metric and does not require metric common or special tools; therefore, metric units are not supplied. For the sake of clarity, tactical instructions are also non-metric.

1-2. MAINTENANCE FORMS AND PROCEDURES. Department of the Army Forms and Procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. CORROSION PREVENTION AND CONTROL (CPC). Primary responsibility for CPC lies with unit maintenance and will be handled at the depot level. Operators will notify unit maintenance of any excessive corrosion or wear that occurs with the M551A1/M551NTC.

1-4. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE. If captured, the M551A1/M551NTC and its equipment, ammunition, and fuel shall be destroyed in accordance with TM 750-244-6 to prevent their use by the enemy. If possible, attempt to salvage sighting and fire control equipment and short supply items prior to destruction. Destruction of vehicle shall be as total and extensive as the tactical situation permits.

1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs). If your M551A1/M551NTC 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. Fill out SF Form 368 (Product Quality Deficiency Report) and mail it to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MC, Warren, MI 48397-5000. We will send you a reply.

1-6. LIST OF ABBREVIATIONS/ACRONYMS.

A or amp	amperes
AAL	Additional Authorization List
AC	hydrogen cyanide
ac	alternating current
ammo	ammunition
ANT FREQ	antenna frequency
approx	approximately
AR/AAV	Armored Reconnaissance/Airborne Assault Vehicle
ASP	Ammunition Supply Point
auto	automatic
AZ	azimuth
BATT-GEN	battery-generator (switch)
BII	Basic Issue Items
BITE	Built-In Test Equipment
BO	blackout
°C	degrees Celsius or Centigrade
CAGEC	Commercial and Government Entity Code
cal	calibre
CARC	Chemical Agent Resistant Coating
CBSS	Closed Breech Scavenging System
CHAN SEL	channel selector
chg	charge
CK	cyanogen chloride
CKT BKR	circuit breaker
CLP	Cleaner/Lubricant/Preservation
cm	centimeter
CMR and CMDR	commander
CMR DSPL	commander's display
COAX	coaxial
COEI	Components of End Item
cont	continued
CONV	conventional (round)
CPC	Corrosion Prevention and Control
CPV	Cannon Pressure Vessel
CVC	Combat Vehicle Crewmember
dc	direct current
decon	decontamination
DMR	dimmer
DNV	Drivers Night Viewer
DOD	Department of Defense
DODAC	Department of Defense Ammunition Code
DODIC	Department of Defense Identification Code
DOT	Department of Transportation
DR	draining
dr	drive
DR Lamp	Draining Lamp
EFC	equivalent full charge
e.g	exempli gratia (for example)

EIR	Equipment Improvement Recommendation
EL	elevation
ELEV	elevate
EMER	emergency
ENG	engine
ENI	Electronic Null Indicator
EOD	Explosive Ordnance Disposal
EXT	external
F	degrees Fahrenheit
F	fire
FDA	Food and Drug Administration
FT	Firing Table
ft	foot or feet
FWD	forward
GAA	Grease, Automotive and Artillery
gal	gallon
GIA	Grease, Aircraft and Instrument
GO	Guidance and Control System Operation
gpm	gallons per minute
HC	smoke screening compound
hdl	handle
HEAT	High Explosive Anti-Tank
HEAT-T-MP	High Explosive Anti-Tank with Tracer, Multipurpose
HE-T	High Explosive with Tracer
hydr	hydraulic
Hz	hertz
IAW	in accordance with
ICC	Inventory Category Code
ICS	Intercommunication System
ID	inside diameter
i.e	id est (that is)
ILLUM	illuminate
in	inch
INT	internal
IR	infrared
JRTC	Joint Readiness Training Center (Fort Chaffee, Arkansas)
KC	kilohertz channel
kg	kilogram
lb	pound
LED	Light Emitting Diode
9	long
LO	Lubrication Order
LRF	Laser Range Finder
MAC	Maintenance Allocation Chart
MALF	malfunction
max	maximum
MC	megahertz channel
	machine gun
min	minimum

1-6. LIST OF ABBREVIATIONS/ACRONYMS-Continued.

mm	.....	millimeter
MOD	.....	modified
MODE	.....	modulator
mph	.....	miles per hour
MTOE	.....	Modified Table of Organization and Equipment
N	.....	neutral
NAR	.....	narrow
NATO	.....	North Atlantic Treaty Organization
NBC	.....	Nuclear, Biological, and Chemical
No	.....	number
norm	.....	normal
NSN	.....	National Stock Number
NTC	.....	National Training Center (Fort Irwin, California)
O/A	.....	overall
OPFORS	.....	Opposing Forces
opng	.....	opening
P	.....	park
para	.....	paragraph
PMCS	.....	Preventive Maintenance Checks and Services
psi	.....	pounds per square inch
psig	.....	pounds per square inch gauge
pt	.....	pint
PWR	.....	power
qt	.....	quart
R	.....	reverse
RAD TRANS	.....	radio transmitter
rpm	.....	revolutions per minute
RTCL	.....	reticle
S	.....	safety
SDC	.....	Signal Data Converter
sgl	.....	single
SIG	.....	signal
Signal Data CONV Lamp	.....	Signal Data Converter Lamp
skt	.....	socket
SPKR	.....	speaker
sq	.....	square
STAB	.....	stabilizer
STBY	.....	standby
std	.....	standard
stl	.....	steel
str	.....	straight
SYS	.....	system
SYS TEST	.....	system test
TM	.....	technical manual
TOE	.....	Table of Organization and Equipment
TP-T	.....	Target Practice with Tracer
TRAV	.....	traverse

TSW	test switch
TTS	Tank Thermal Sight
tubr	tubular
V	volt
V dc	volts direct current
veh	vehicle
w/ M	with
w/o	without
wd	width
WP	white phosphorus
wt	weight
XMTR	transmitter

1-7. GLOSSARY.

Abrasive	Having a rough surface that wears away other surfaces by friction. An abrasive surface can damage a smooth, delicate surface, e.g., sandpaper on glass.
Ambient	Referring to the conditions of the surrounding environment, e.g., the ambient air temperature is the temperature of the surrounding air.
Burrs	Loose pieces of metal or irregularities on a smooth metal surface. Burrs can foul the operation of weapons and machinery.
Coaxial	Mounted on a common axis. The 7.62-mm machine gun and the 152-mm gun/launcher are coaxially mounted.
Condensation	Water that has formed from vapor into droplets.
Electrolyte	The active chemical in a battery that stores and conducts electricity.
Noxious	Injurious or harmful to health.
Ogive	The part of a missile that is cone shaped.
Parallax	An apparent change in the direction of an object, caused by a change in observational position that provides a new line of sight.
Polarity	As used in this TM, polarity refers to the contrast between light and dark. Reversing polarity makes light objects dark and dark objects light.

Section II. EQUIPMENT DESCRIPTION

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES. The AR/AAV M551A1/M551NTC is a lightweight, full-tracked, diesel-powered armored reconnaissance and assault vehicle. This vehicle is designed and equipped for amphibious operation and is capable of maneuvering in water. The M551 A1/M551 NTC can be air transported and air delivered by cargo aircraft. The turret traverses full circle (3600).

A 152-mm gun/launcher that fires either conventional ammo or the Shillelagh missile is mounted on the turret. Residue and gases from firing are removed by the vehicle's Closed Breech Scavenging System (CBSS). Other armament consists of smoke grenade launchers (primarily used for laying a smoke screen), a 7.62-mm coaxial machine gun, a cal .50 machine gun, and a gunner's telescope (also mounted on the turret).

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. The components of the M551 A1/M551 NTC that are essential to the operation and maintenance of the vehicle are shown in figures 1-1 and 1-2.

1-10. DIFFERENCES BETWEEN MODELS. The hull, suspension, and miscellaneous hull components of the M551 A1 and M551 NTC are identical. The M551 became the M551A1 when equipped with the Laser Range Finder (LRF) ANNVG-1 and the Tank Thermal Sight (TTS) ANNSG-2B. The M551 became the M551 NTC when configured for use in training at the National Training Center (NTC) in Fort Irwin, California and the Joint Readiness Training Center (JRTC) in Fort Chaffee, Arkansas.

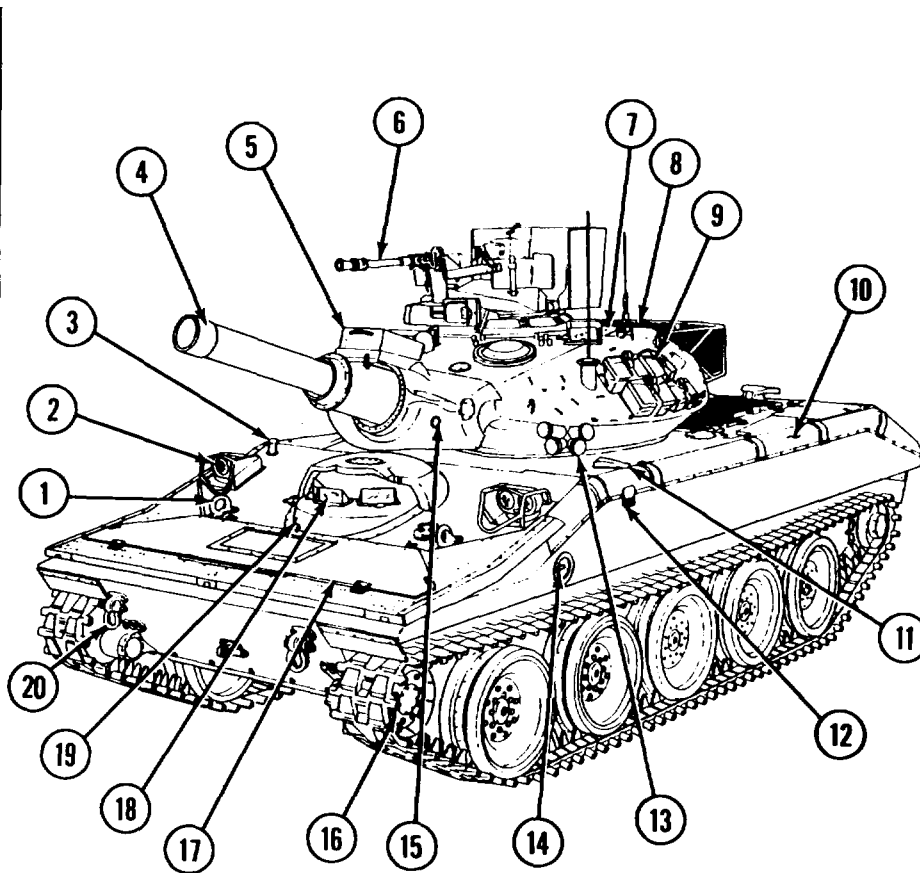
1-11. EQUIPMENT DATA.

a. General. The following are approximate weights and dimensions:

Weight classification.....	No. 20 (tons)
Combat loaded weight.....	36, 000 lb
Curb weight (less fuel, crew, and BI)	28, 525 lb
Overall length	20 ft 8 in.
Overall width.....	9 ft 2 in.
Overall height (over front ballistic shield plate).....	9 ft 8 in.
Ground clearance.....	19 in.

b. Performance.

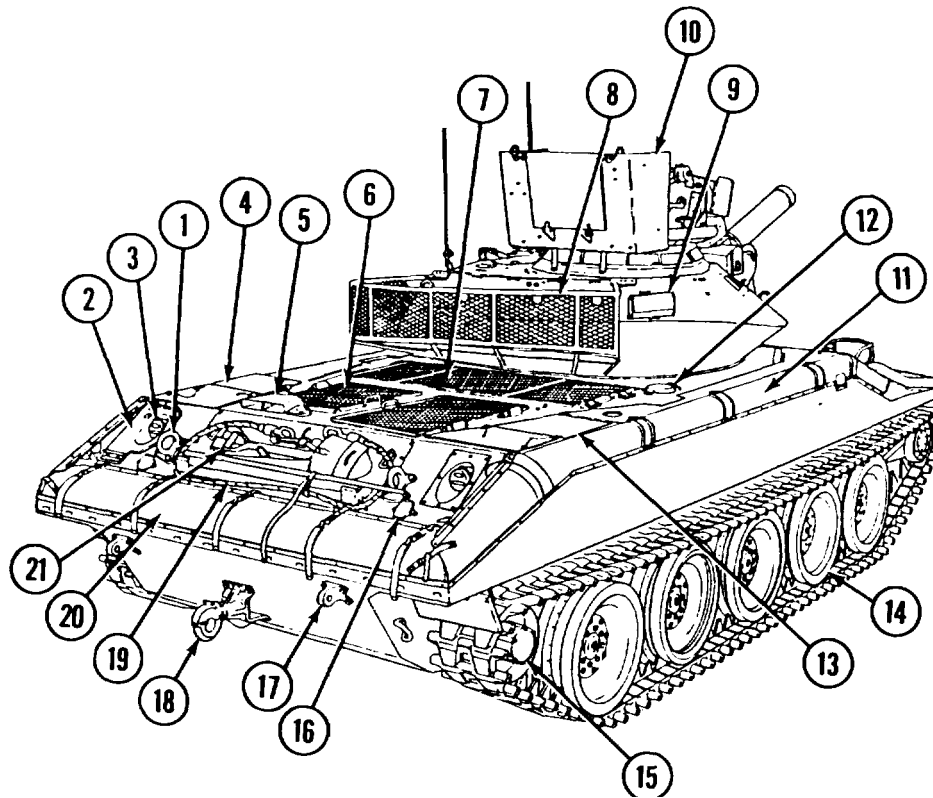
Maximum speed (fourth range)	43 mph
Maximum speed (reverse)	9 mph
Maximum grade (ascending or descending)	60%
Maximum trench crossing width	7 ft
Cruising range	373 miles
Maximum vertical height	33 in.
Minimum turning radius	Pivot



- | | |
|---|---|
| 1. Front lifting eye (2) | 12. Flotation barrier step (M551 A1) |
| 2. Front headlight (2) | 13. M243 grenade launcher |
| 3. 152-mm gun/launcher (M551A) | 14. Fixed fire extinguisher exterior actuator handle |
| 4. Personnel heater exhaust outlet | 15. 7.62-mm coaxial machine gun |
| 5. Missile subsystem transmitter door (M551 A1) | 16. Dual idler wheel (2) |
| 6. Cal .50 machine gun | 17. Flotation surfboard (M55A1) |
| 7. Loaders hatch cover | 18. M47 periscope (3) or M48 periscope/DNV AN/VVS-2V)3 (M551 A1) (in center for night vision) |
| 8. Water can | 19. Driver's rotatable hatch |
| 9. Cal .50 ammunition | 20. Front tow eye (2) |
| 10. Left side flotation barrier cover (M551A1) | |
| 11. Front bilge pump outlet | |

Figure 1-1. Armored Reconnaissance/Airborne Assault Vehicle (AR/AAV) M551A1/M551NTC-Left Front View

1-11. EQUIPMENT DATA-Continued.



- | | |
|--|---|
| <ul style="list-style-type: none"> 1. Rear lifting eye (2) 2. Intercom access door 3. Rear taillight (2) 4. Engine air cleaner access door cover 5. Engine exhaust outlet 6. Engine compartment exhaust grille (2) 7. Engine compartment air intake grille 8. Turret stowage rack 9. Cal .50 ammunition 10. Commander's ballistic shield (M551 A1) | <ul style="list-style-type: none"> 11. Right-side flotation barrier cover (M551A1) 12. Fuel filler cap cover (2) 13. Battery access door cover 14. Dual road wheel (10) 15. Dual drive sprocket wheel (2) 16. Engine compartment bilge pump outlet (2) 17. Rear towing eye (2) 18. Towing pintle 19. Tow cable(s) 20. Rear flotation barrier cover (M551 A1) 21. Pioneer tools |
|--|---|

Figure 1-2. AR/AAV M551A1/M551NTC-Right Rear View

c. Engine/Fuel System.

Type.....	Diesel
Regular grade (DF- 2)	+20 to +115°F
Winter grade (DF- 1)	-25 to + 200F
Arctic grade (DF-A).....	-65 to -250F

NOTE

During emergency conditions, JP-5/JP-8 aircraft turbine engine fuel may be used in lieu of diesel fuel

Maximum fuel tank acceptance rate 50 gpm

d. Component Capacities (Approximate).

	<u>Refill</u>	<u>Dry</u>
Engine lubricating system.....	18 qt	21 qt
Engine cooling system.....	32 qt	44-1/2 qt
Fuel tank capacity (center 25, sides 66).....	158 gal	
Transmission lubricating system	57.6 qt	69.6 qt
Compressor	3/4 pt	1 pt

e. Engine Cooling System. Use additives as follows:

Antifreeze (mixed with 50% water	-40F and above
Antifreeze (arctic type, full strength)	-40 to -65OF
Corrosion inhibitor (22-1/2 oz per veh)	+80°F and above

f. Electrical System.

Nominal voltage.....	24 V dc
Batteries	4

g. Driver's Periscopes.

M 4 7	3
M48 (infrared)	1

h. Driver's Night Viewer (DNV).

ANNVS-2(V)3	1
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i. Commander's Cupola. Mounted on top of the turret, the cupola can be traversed 3600 independently of the turret. A cal .50 machine gun mounts on top of the cupola.

j. Sighting and Fire Control.

(1) Loaders Periscope M37 (M551 Al). This 1 -power scope allows loader to scan-view the surrounding area.

1-11. EQUIPMENT DATA-Continued.

- (2) LRF ANNVG-1 (M551 AI). Mounted in the commander’s cupola, the LRF determines the distance to target in meters. This improves your first hit capabilities with conventional ammo.
- (3) Gunner’s Periscope M44 Series. This 9-power scope is primarily used for night operation.
- (4) Telescope Mount M149 (M551AI). Installed coaxially with the gun/launcher, this mount houses the gunner’s telescope and missile infrared tracker. Its checksight allows alignment of the tracker with the telescope.
- (5) Gunner’s Telescope M127/M127A1. Primarily used for daylight operation, the telescope gives you an 8-power or 12-power option.
- (6) Quadrant M13A1C. Mounted on the gun/launcher, this instrument is used to measure elevation/depression.
- (7) Azimuth Indicator. This instrument measures the deflection (azimuth) angle of the gun/launcher.
- (8) TTS ANNSG-2B (M551AI). This instrument provides the gunner with day and night vision capability.

k Sighting and Fire Control Data.

<u>Periscope M44 Series</u>	
Magnification	9x
Operable temperature range	-65 to +1 25OF
 <u>TTS ANNSG-2B (M551 AI)</u>	
Operating range	200 to 4700 meters (depends on atmospheric conditions)
Operable temperature range	-65 to +125OF
 <u>LRF ANNVG-1 (M551 AI)</u>	
Operating range	200 to 4000 meters
Accuracy	within ± 10 meters
Operable temperature range	-80 to +125°F
Operable altitude range	to 10,000 ft
Magnification	8X
Field of view	8°
Minimum sustained rangings	3 per minute sustained or 6 per minute for 2 minutes with 3-minute intervals between

	each 2-minute ranging period
Number of rangings from a fully charged power supply unit	30 rangings minimum at 75 +1 5°F at a rate of 3 per minute for a maximum operating time of 10 minutes. 10 rangings minimum at -25°F at a rate of 3 per minute for a maximum of 4 minutes. Minimum time between rangings: 4 seconds.
Reticle	3 circles of 1, 5, and 20 milliradians
<u>Telescope M127/M127A1</u>	
Magnification	BX and 12X
Operable temperature range	-65 to +125OF

I. Armament.

152-mm Gun/Launcher M81F1 (M551A1)

Recoil (conventional ammo).....	15 in.
Recoil (missile).....	5 in.
Elevation (max)	336 mils (190)
Depression (max).....	-142 mils (-8°)
Missile weight.....	62 lb
Conventional ammo weight.....	49 lb

7.62-mm Machine Gun M240 (M551 AI)

Rate of fire (cycle).....	650 to 950 rounds per minute
Effective range (max)	900 meters (tracer burnout point)
Method of target engagement.....	20- to 30-round burst

Cal .50 Machine Gun M2

Refer to TM 9-1005-213-10

m. Auxiliary Equipment.

Smoke Grenade Launcher

Discharger	
Weight	11.2 lb
Width	11.5 in.

1-11. EQUIPMENT DATA-Continued.

Height.....	9.5 in.
Depth	6.31 in.
Tubes (4 each)	
Length	7.13 in.
Inside diameter	2.62 in.

Discharger Cap (1 per Discharger Tube)

Weight.....	0.1 b
Outside diameter	3.37 in.
Depth	2.75 in.

n. Radio and Intercom Equipment.

NOTE

**The radio equipment Includes a choice of radios.
The Intercom equipment Is part of the vehicle
electronic equipment wiring harness.**

Radio Set ANNRC-12

Frequency range.....	30 to 75.95 megahertz
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Radio power transmission

High power.....	35 watts (min) with range of approx 20 to 30 miles
Low power.....	1 to 4 watts with range of approx 5 miles

Radio Set ANNRC-64

Frequency range.....	30 to 75.95 megahertz
Radio power transmission	0.5 to 4 watts with range of approx 5 miles

Intercom Equipment

Intercommunication set ANNIC-1 (V)	Audio frequency amplifier AM- 1780/VRC and crew- member control boxes C-2296/VRC, C-2297/VRC, and C-2298/VRC
Helmet for each crewmember	Combat Vehicle Crew- member (CVC) helmet with installed headset- microphone kit

o. M8A3 Gas-Particulate Filter Unit (M551A1/M551NTC).

- (1) Weight
 - M2A2 air purifier 20-1/4 lb
 - M10 hose assy 4-ft (ea) 2-1/4 lb
 - M6 hose assy 9-ft (ea) 5-1/2 lb

- (2) Dimensions
 - M2A2 air purifier 13 x 7-1/2 x 6 in.
 - Hose (ID) 7/8 in.

- (3) Electric Motor
 - Horsepower 1/20
 - Current:
 - ac 27.5 V, 60 Hz single phase
 - dc 24V,5A
 - Lubrication Sealed bearings
 - Rotation Counterclockwise

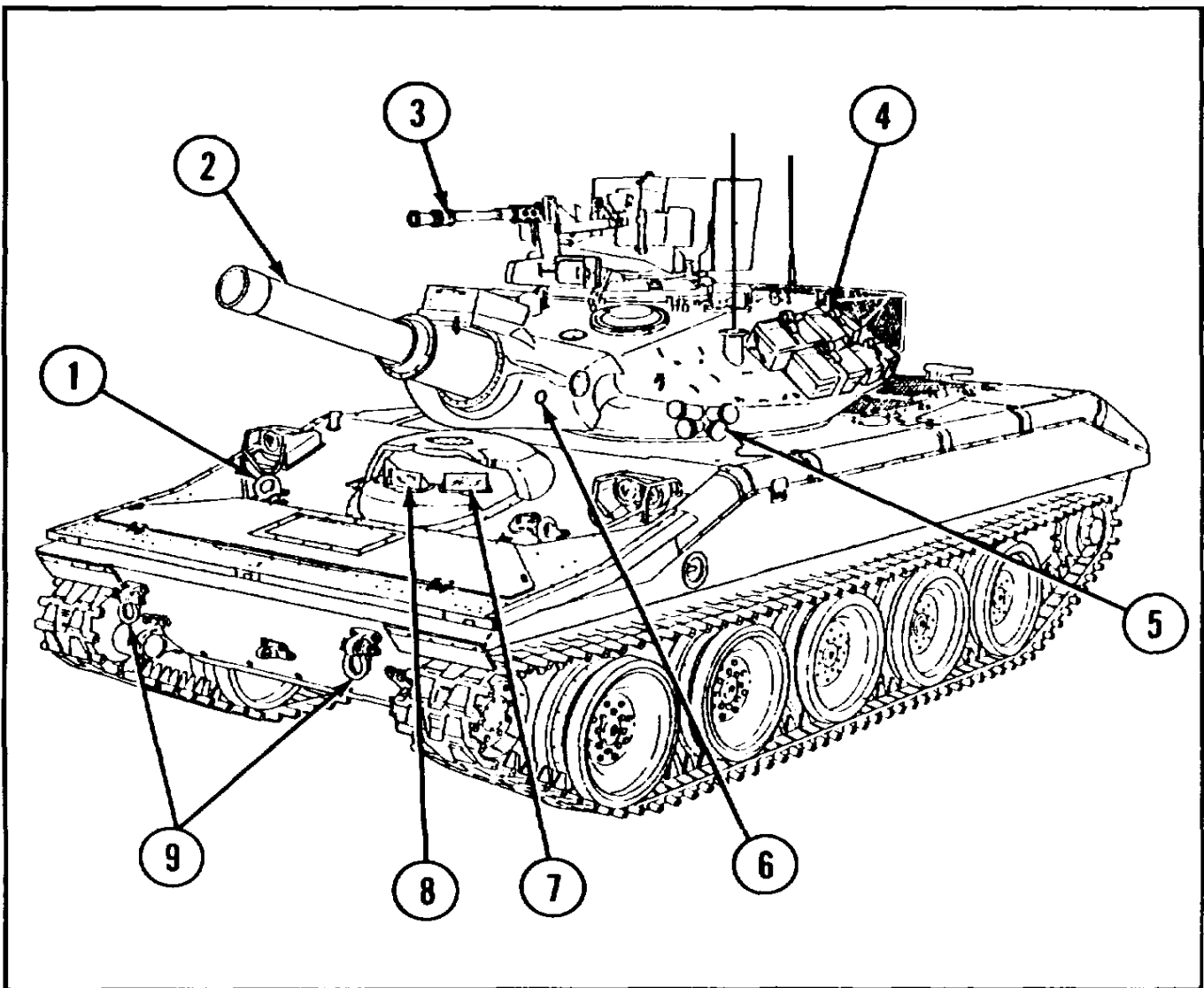
- (4) Filter Air Delivery 3.0 to 4.5 cubic feet per minute of filtered, breathable air at each mask

- (5) Personnel Protection Four or fewer persons per M8A3 filter unit

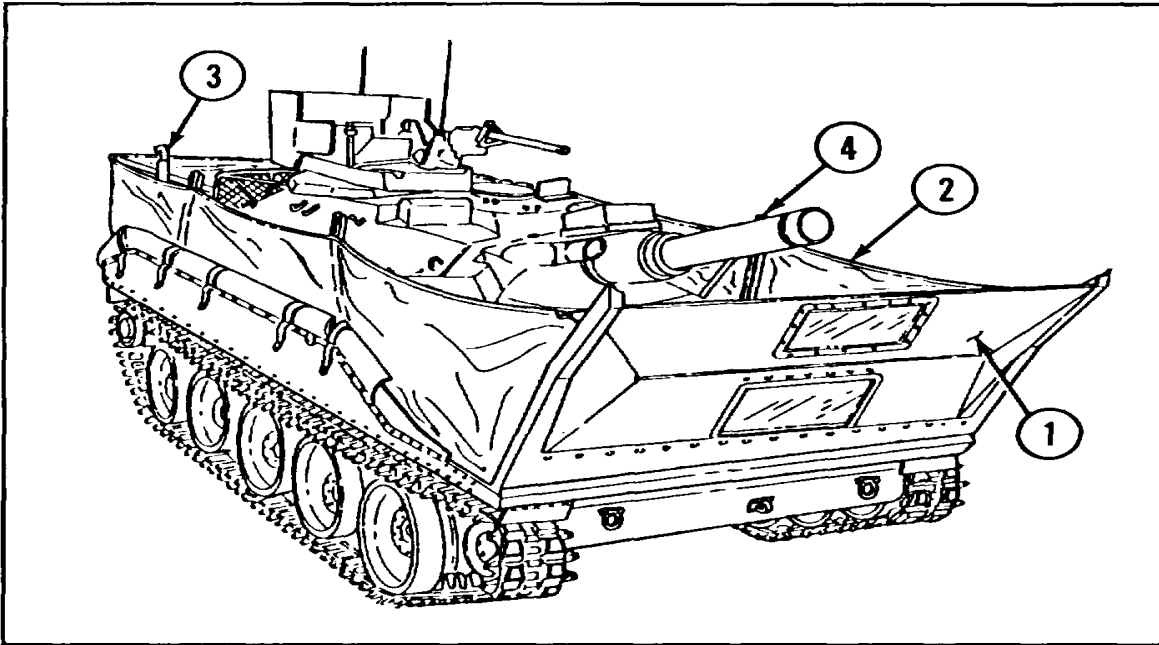
Section III. PRINCIPLES OF OPERATION

1-12. GENERAL. The M551A1/M551NTC is an Armored Reconnaissance/Airborne Assault Vehicle (AR/AAV) capable of amphibious operation. It is equipped with a barrier and surfboard device that makes it able to maneuver effectively in water. Propulsion and steering are the same on land and in water.

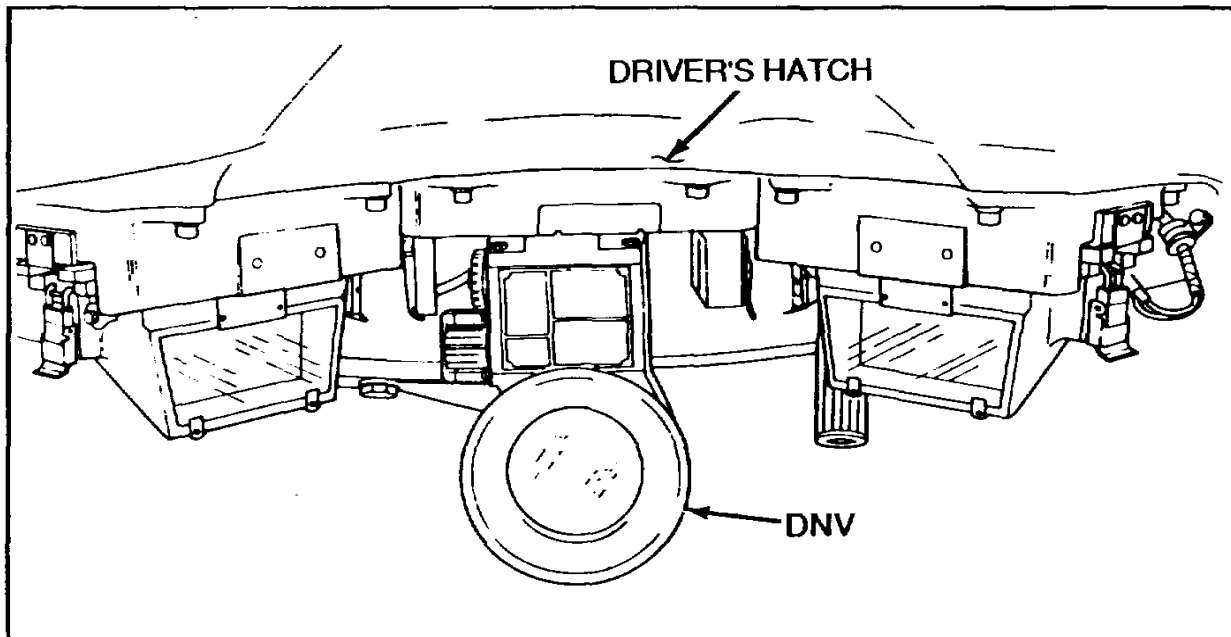
1-13. LAND OPERATION. Front lifting eyes (1) are used for transporting and air-dropping the vehicle. The 152-mm gun/launcher (2) is capable of firing conventional ammo or Shillelagh missiles; it is primarily used for vehicle defense, but can also be used in an assault capacity. The cal .50 machine gun (3) is capable of automatic and semi-automatic firing and its ammo (4) is stored in the left front of the vehicle's turret. The M243 grenade launchers (5) are primarily used to create a smokescreen through the deployment of smoke grenades. The vehicle can also be used as a weapon that fires conventional ammo. The 7.62-mm coaxial machine gun (6), located in the turret, is capable of firing 650 to 900 rounds per minute. The M47 periscopes (7) or the M48 periscope (8) provide vision for the driver during day or night operations. The front tow eyes (9) are to be used in case the M551A1/ M551NTC needs to be towed over land.



1-14. AMPHIBIOUS OPERATION. The flotation surfboard (1) and flotation barrier (2) are used during amphibious operations to keep the vehicle afloat. The rear (3) and front (4) bilge pump outlets are used to remove water that enters the vehicle during amphibious operations.

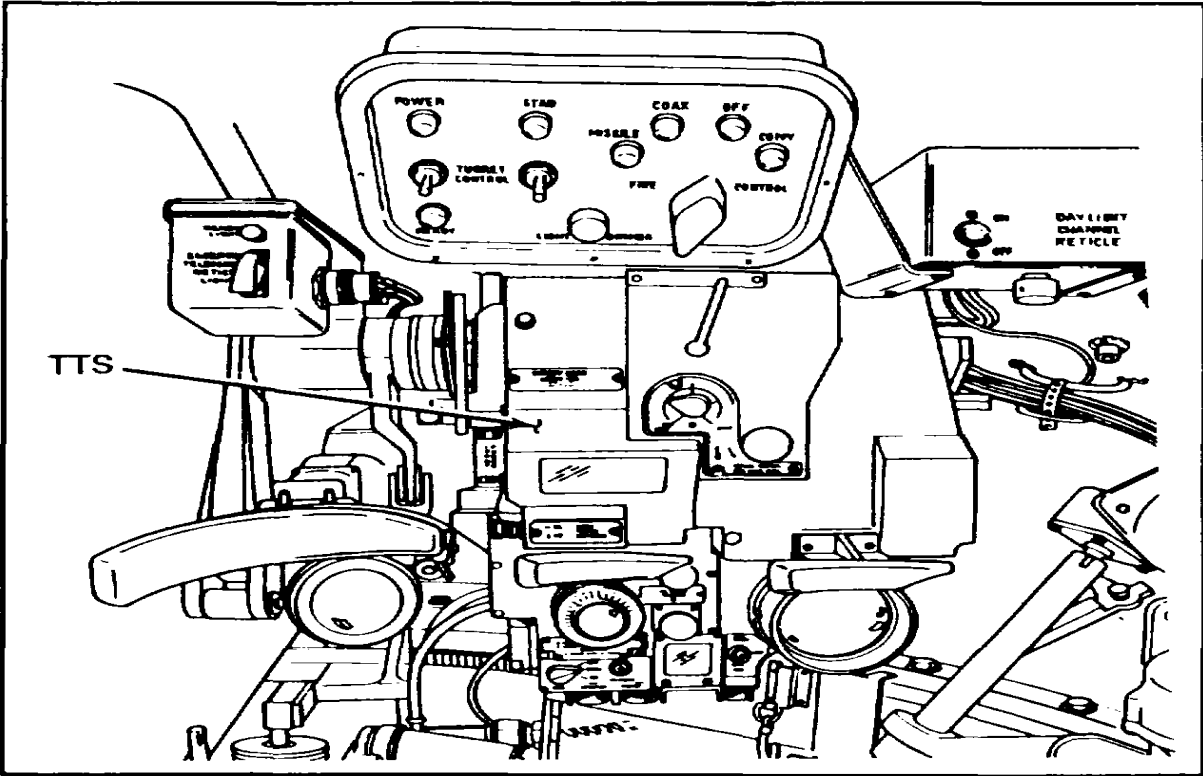


1-15. VIEWING OPERATION. The DNV for the M551A1 mounts on the drivers hatch, and is installed only at night. The DNV is used to facilitate night vision without attracting the attention of the enemy.

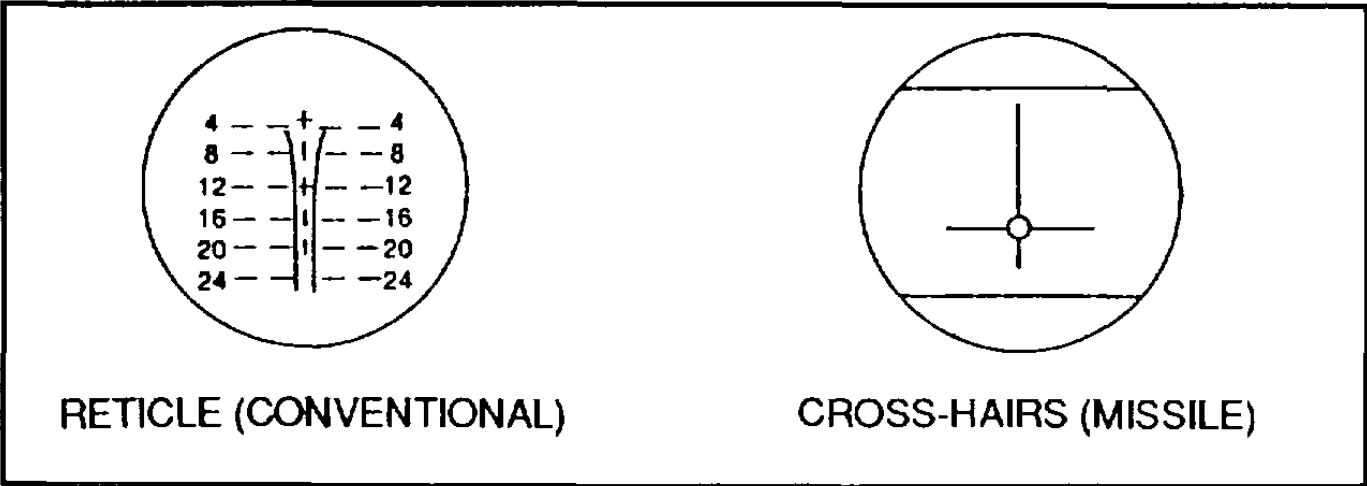


1-16. FIRE CONTROL SYSTEMS OPERATION.

a. **TTS.** The TTS enables the gunner to aim the 152-mm gun/launcher using the heat emissions of his target. Heat emissions are picked up through the TTS window located on top of the turret and channelled through the infrared-sensitive optics and circuitry of the TTS and appear as a visual image in the gunner's eyepiece.

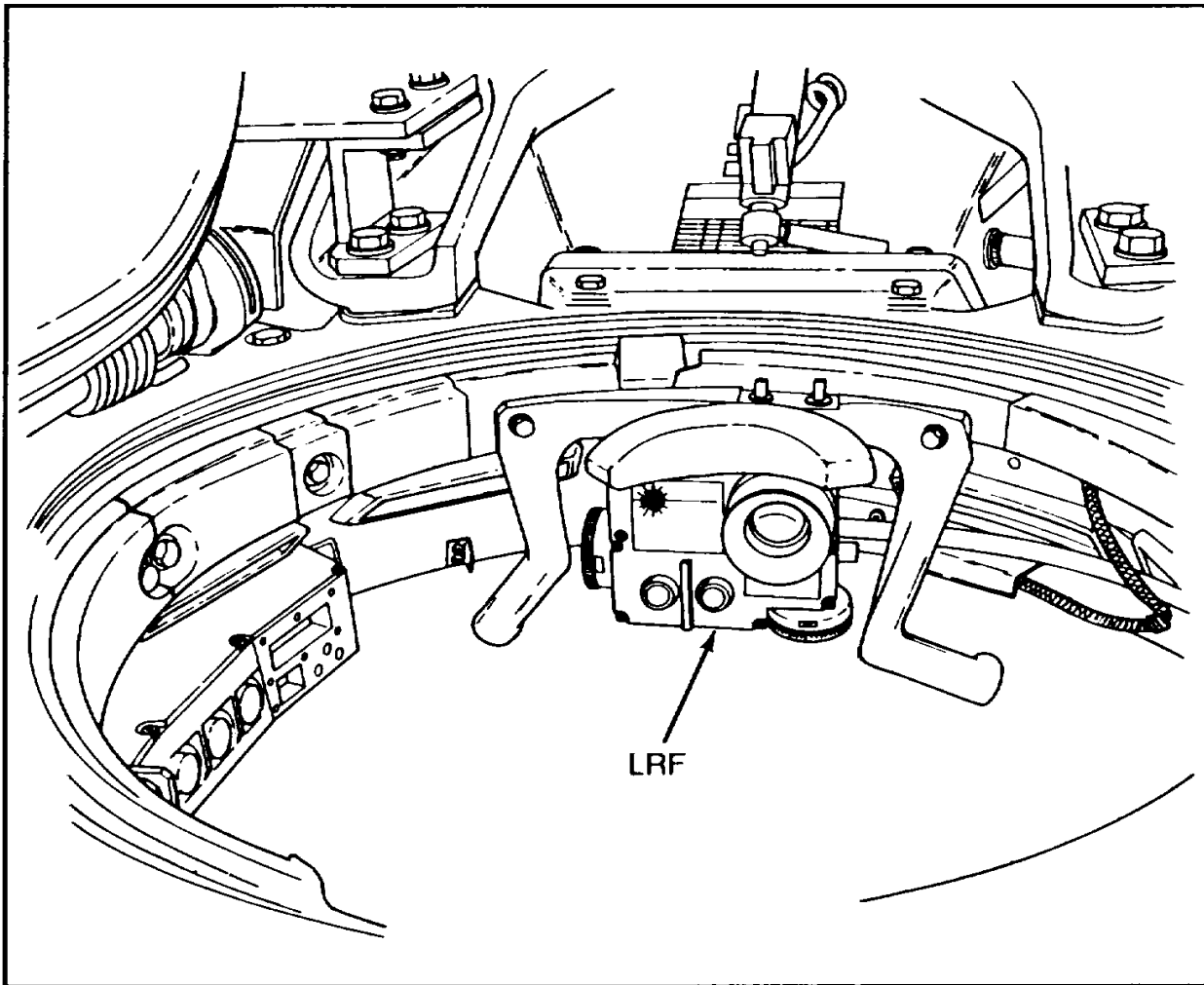


An electronic reticle or cross-hairs is projected onto the visual image, enabling the gunner to lay his weapon on target. The TTS can be adjusted for a wide or narrow field of view and focused using controls built into the unit.



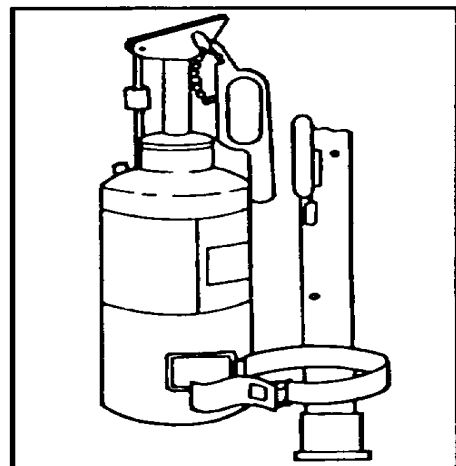
The TTS draws power from the M551A1's electrical system. It relies on internal circuitry that must be cooled to operating temperature before use, a process that may take 15 to 20 minutes.

b. **LRF.** The LRF system provides an extremely accurate means of determining distance to target. The system measures this distance by bouncing a laser beam off of a selected target and measuring the time it takes for the beam to return to the vehicle. The controls and readout for the LRF are located at the commander's station.



1-17. DECONTAMINATING APPARATUS

ABC-M11. The decontaminating apparatus is a fire extinguisher-like device used to spray DS2 on those surfaces of vehicles and equipment most likely to be touched by operators and crew. The apparatus comes with a mounting bracket which will be mounted on the screened cover of the compressor located in the loader's station. The unit is refillable and is charged by nitrogen cylinders.



**CHAPTER 2
OPERATING INSTRUCTIONS**

**Section I. DESCRIPTION AND USE OF OPERATOR'S
CONTROLS AND INDICATORS**

2-1. GENERAL. Chapter 2 contains the instructions which are necessary to operate the M551A1/M551NTC under usual and unusual conditions. Also included is information on servicing the vehicle when it first arrives, a description of controls and instruments, Preventive Maintenance Checks and Services (PMCS), and instructions for operating the equipment. An index for this chapter follows:

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2-2. GENERAL SERVICES. When your unit receives a new vehicle, it must be thoroughly checked out. If anything is wrong with the M551A1/ M551 NTC, record it on DA Form 2404.

2-3. SPECIFIC SERVICES.

- a. Check the vehicle for completeness of assembly. Make sure that all equipment and controls are present and in good condition.
- b. Check the components and support items supplied with the vehicle against the Basic Issue Items (BII) List (provided in Appendix B).
- c. Perform all BEFORE procedures in the PMCS in Chapter 2, Section 11.

2-4. DESCRIPTION AND CONTENT. This section locates and describes the controls and instruments used to operate the M551A1/ M551 NTC.

The crew must be familiar with the location and operation of the controls and instruments (see figures 2-1 through 2-7).

WARNING

If equipment fails to operate, see troubleshooting procedures in Chapter 3, Section II

CAUTION

When raising or lowering driver's seat, keep body weight on seat.

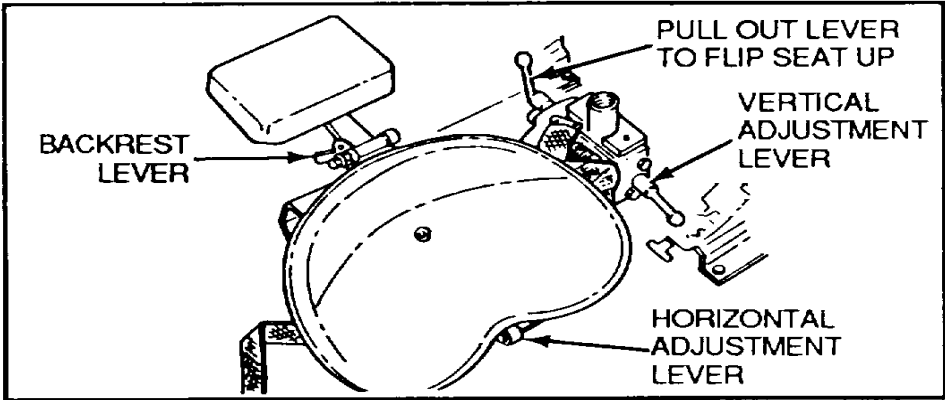
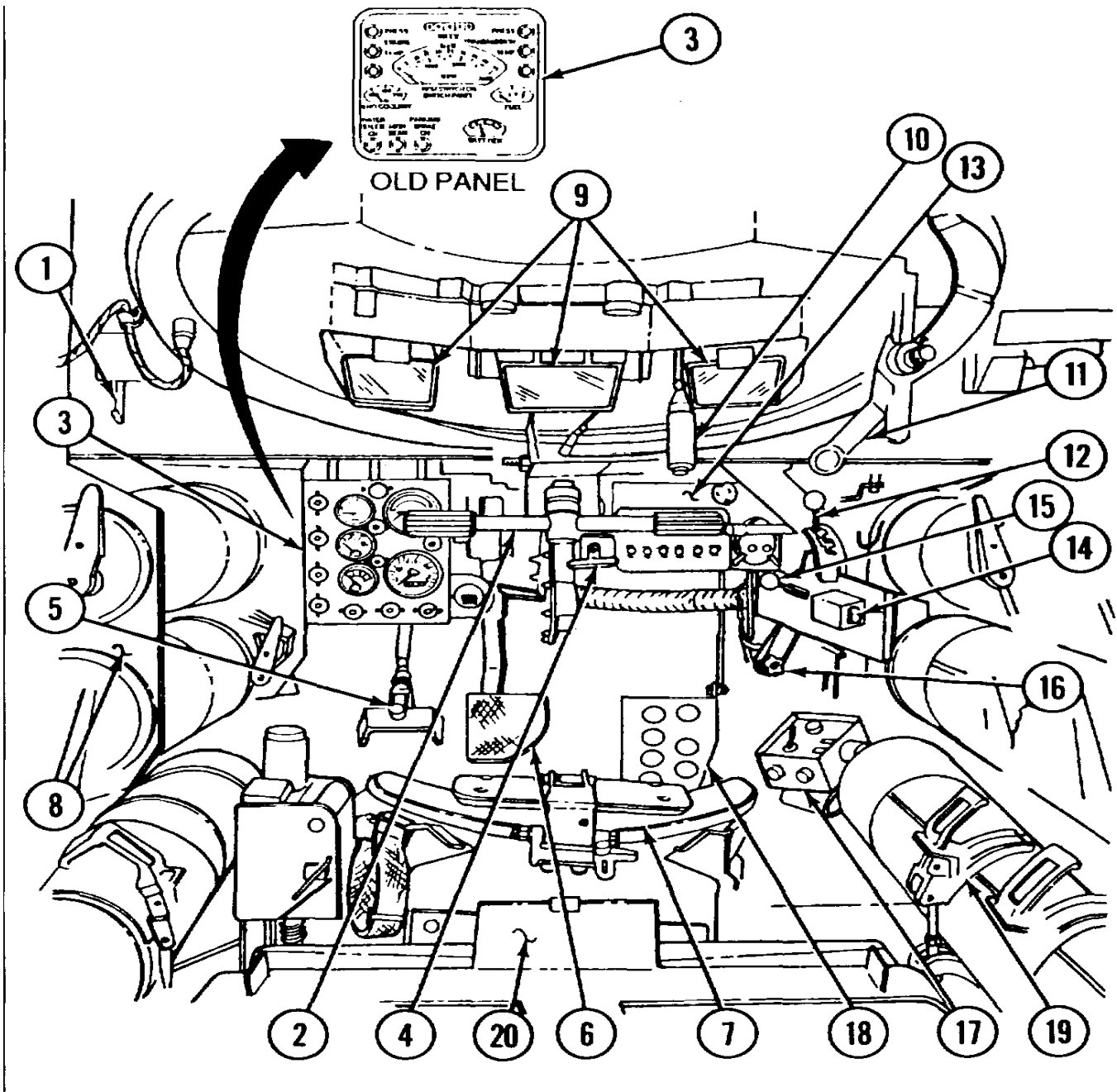


Figure 2-1. Driver's Seat



- 1. Hatch cover hold-open hook (2)
- 2. Steer bar
- 3. Indicator panel
- 4. Parking brake lock handle
- 5. Headlight dimmer switch
- 6. Brake pedal
- 7. Driver's seat
- 8. Conventional ammunition stowage rack
- 9. M47 periscope (3)
- 10. Hatch cover handle grip

- 11. Hatch cover locking lever
- 12. Transmission shift lever
- 13. Drivers switch panel
- 14. DNV switch
- 15. Water steer lever
- 16. Hand throttle control knob
- 17. C-2297/VRC intercom set
- 18. Accelerator pedal
- 19. Missile stowage rack (M551A1)
- 20. M48 periscope stowage box or DNV stowage box (M551A1)

Figure 2-2. Driver's Compartment

2-4. DESCRIPTION AND CONTENT-Continued.

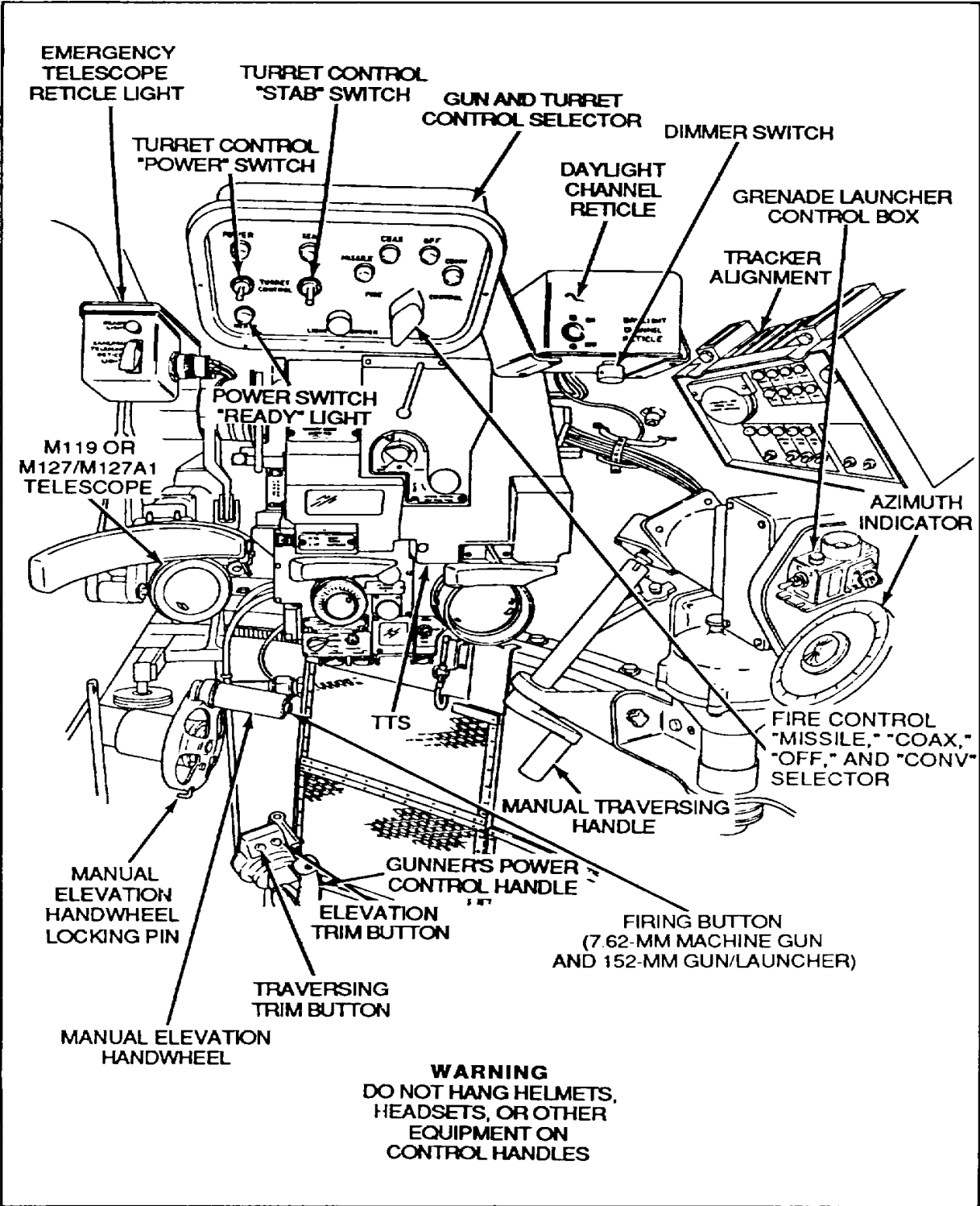


Figure 2-3. Gunner's Controls and Instruments (M551A1)

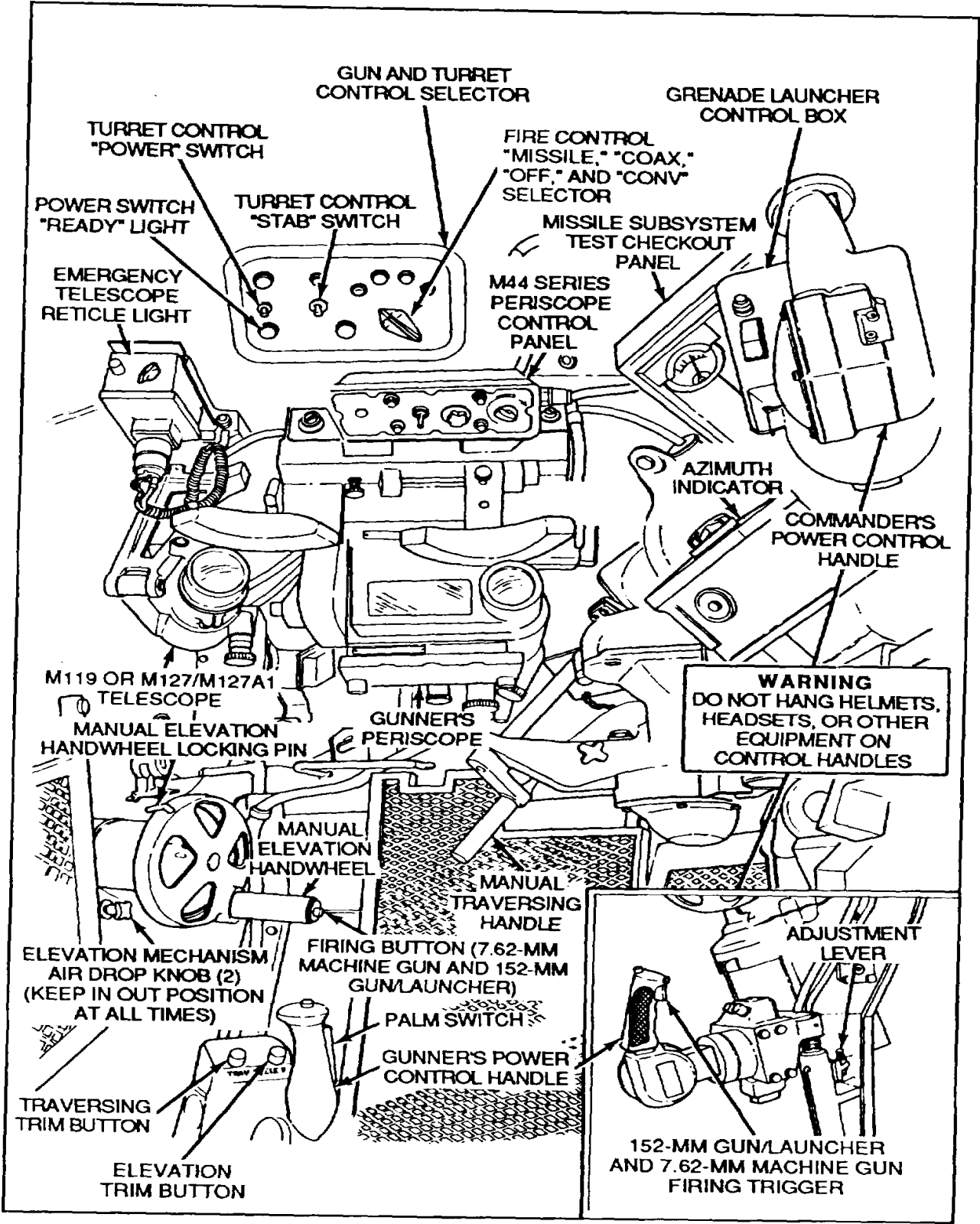
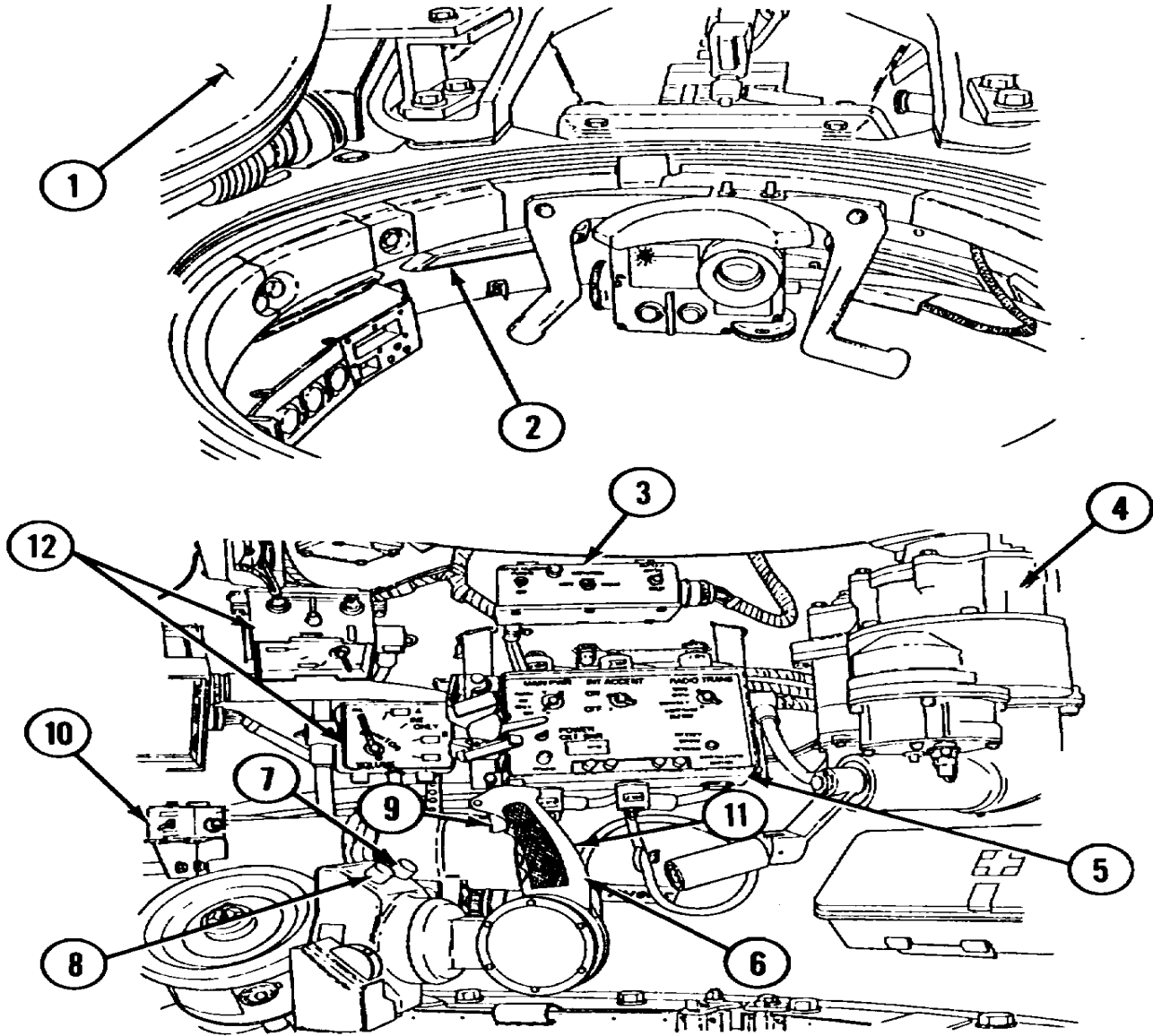


Figure 2-4. Gunner's Controls and Instruments (M551NTC)

2-4. DESCRIPTION AND CONTENT-Continued.



- 1. Split hatch cover
- 2. Vision block (10)
- 3. Cupola control assembly
- 4. Cupola traverse mechanism
- 5. AM-1780/VRC audio frequency amplifier
- 6. Commanders power control handle
- 7. Elevation trim button
- 8. Traversing trim button
- 9. 152-mm gun/launcher and 7.62-mm machine gun firing trigger
- 10. Grenade launcher control box
- 11. Palm switch
- 12. C-2298NRC control box

Figure 2-5. Commander's Power Assist Cupola Controls, Instruments, and Equipment (M551A1)

CAUTION

- Keep right front shield up when firing machine gun.
- Carrier handle for cal .50 barrel must always be installed in down position.

NOTE

- To remove and install ammunition box and tray, position left front shield assembly in the upright position or lay forward.
- When operating cupola on side slopes, weight of ballistic shield may cause cupola to rotate after rotation switch has been released. If so, momentarily actuate the rotation switch in the opposite direction to bring cupola to a stop and allow brake to engage.

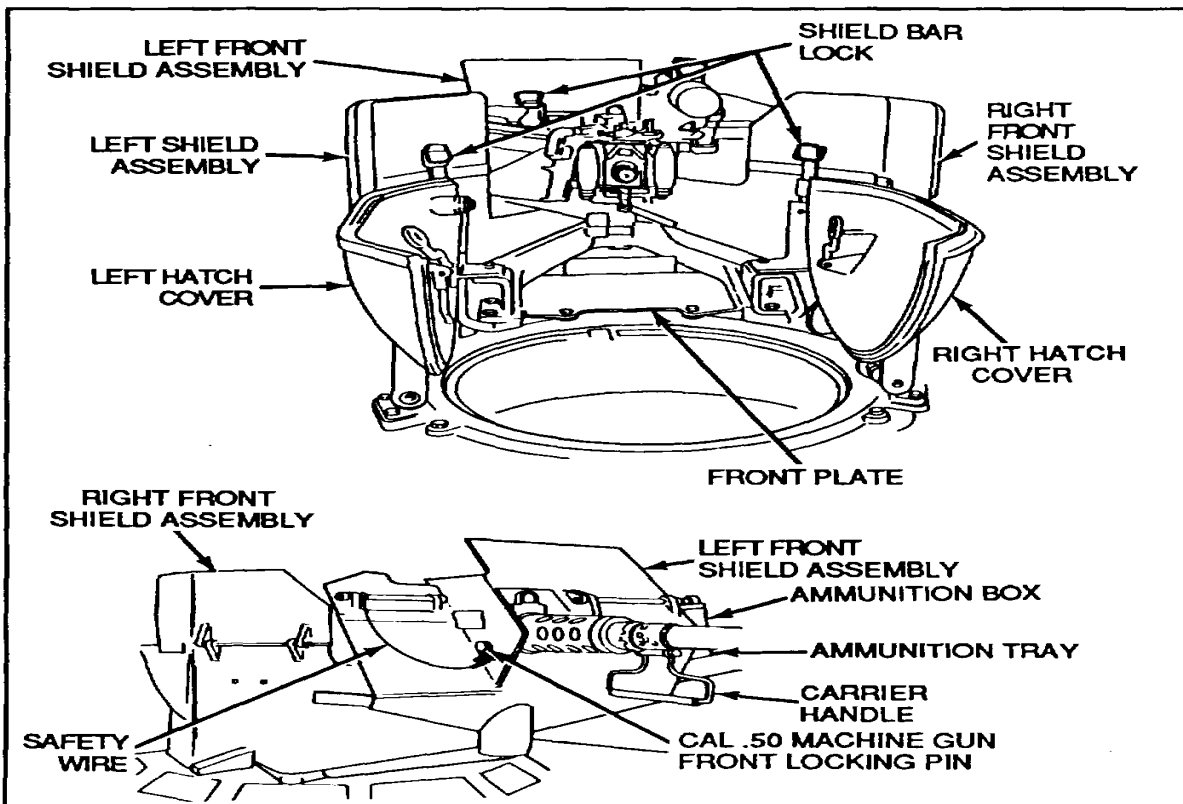


Figure 2-6. Commander's Ballistic Shield Plate Assemblies
(M551 A1)

2-4. DESCRIPTION AND CONTENT-Continued.

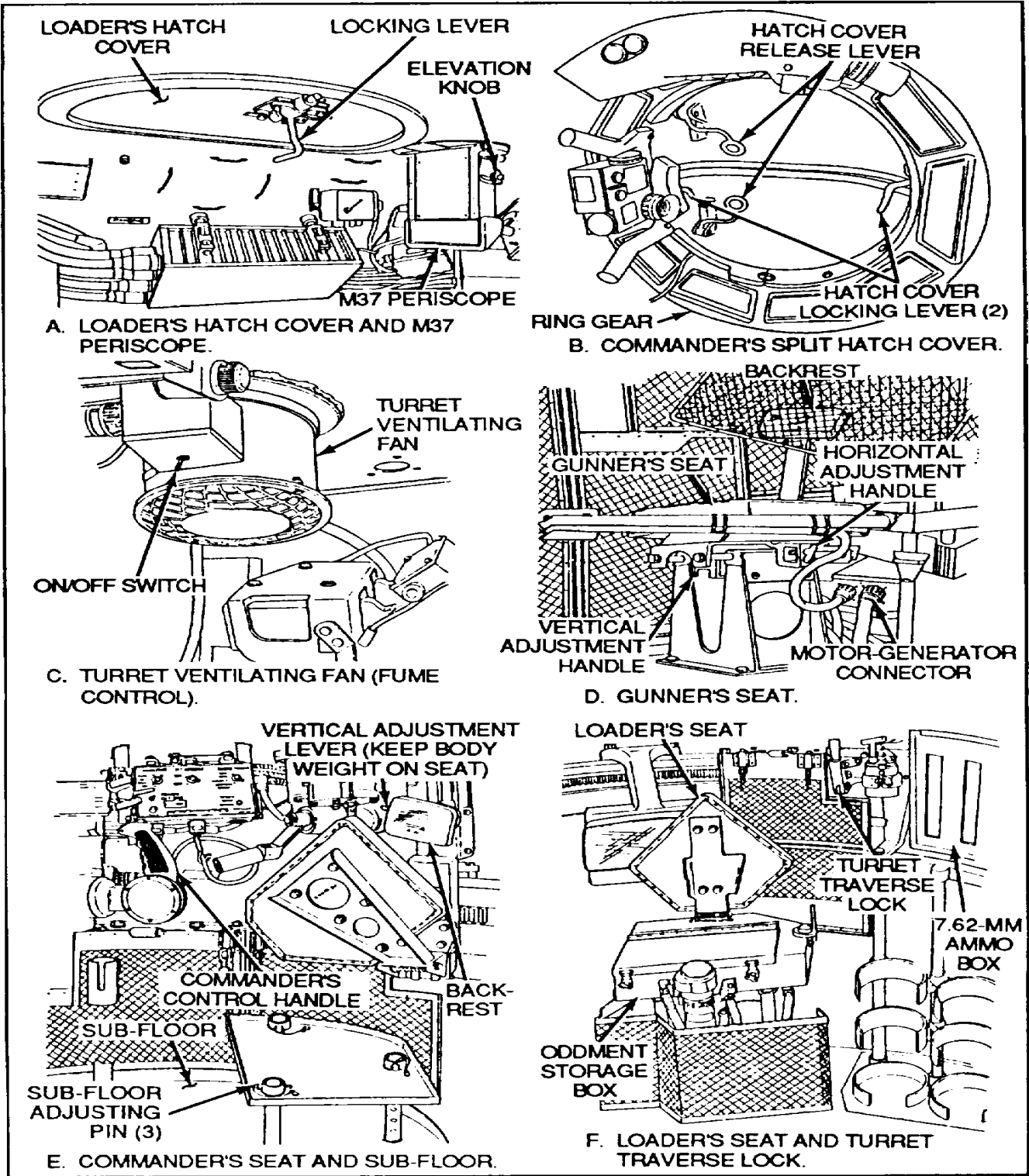


Figure 2-7. Turret Miscellaneous Controls

Section II. PMCS

2-5. INTRODUCTION TO PMCS TABLE.

a. General. Table 2-1 (PMCS) has been provided so you can keep your equipment in good operating condition and ready for its primary mission.

b. Warnings and Cautions. Always observe the warnings and cautions appearing in your PMCS table. Warnings and cautions appear before applicable procedures. You must observe these warnings and cautions to prevent serious injury to yourself and to others or to prevent your equipment from being damaged.

c. Explanation of Table Entries.

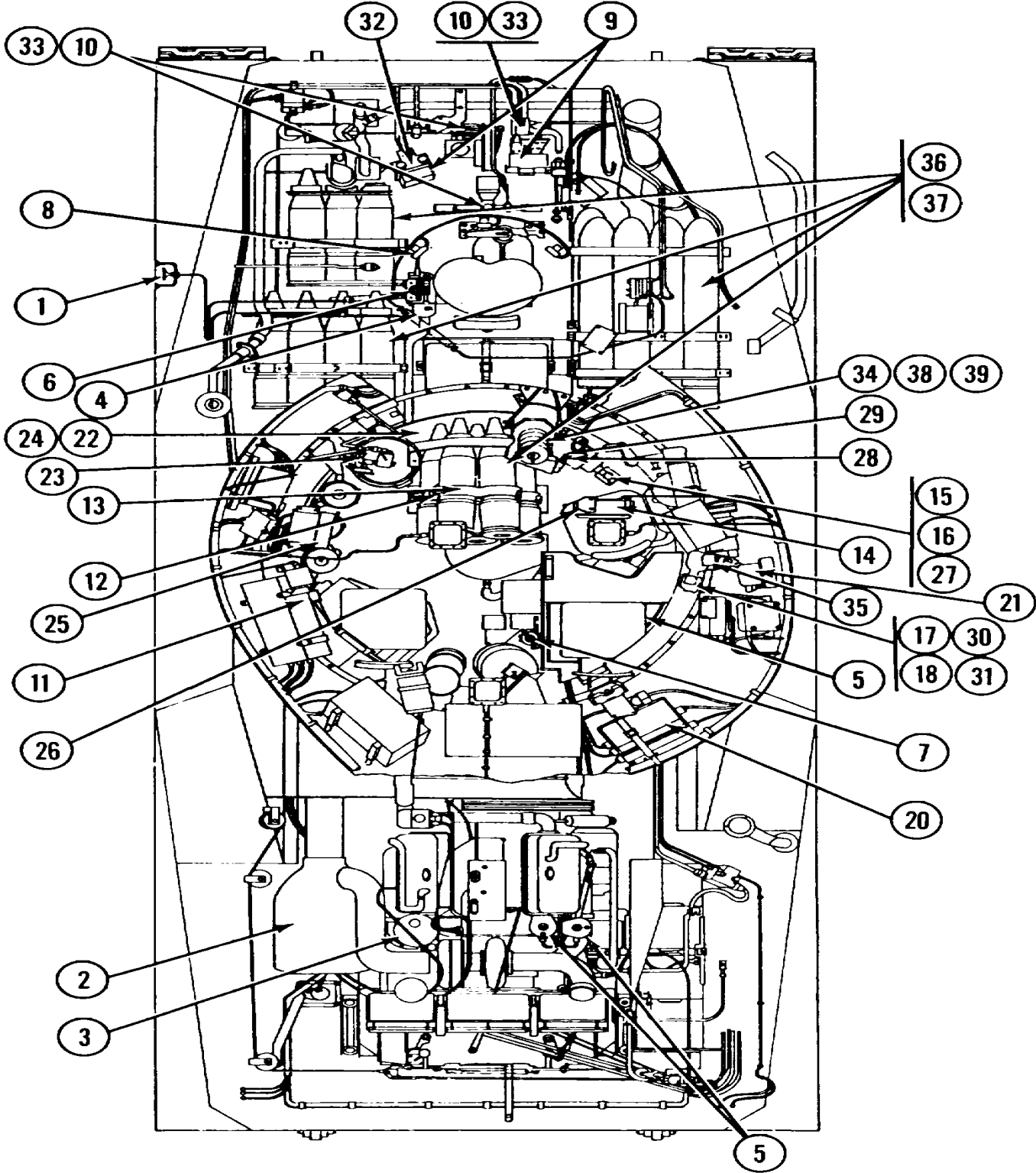
- (1) **Item No. Column.** Numbers in this column are for reference. When completing DA Form 2404, Equipment Inspection and Maintenance Worksheet, include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must do checks and services for the intervals listed.
- (2) **Interval Column.** This column tells you when to do a certain check or service. **BEFORE** procedures must be done before you operate or use the equipment for its intended mission. **DURING** procedures must be done during the time you are operating or using the equipment for its intended mission. **AFTER** procedures must be done immediately after you have operated or used the equipment.
- (3) **Item to Check/Service Column.** This column provides the location and the item to be checked or serviced.
- (4) **Crewmember/Procedure Column.** This column gives the procedure you must perform to check or service the item listed in the Check/Service Column to know if the equipment is ready or available for its intended mission or operation. You must do the procedure at the time stated in the Interval Column.
- (5) **Not Fully Mission Capable if: Column.** Information in this column tells you what faults will keep your equipment from being capable of performing its primary mission. If you make check and service procedures that show faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

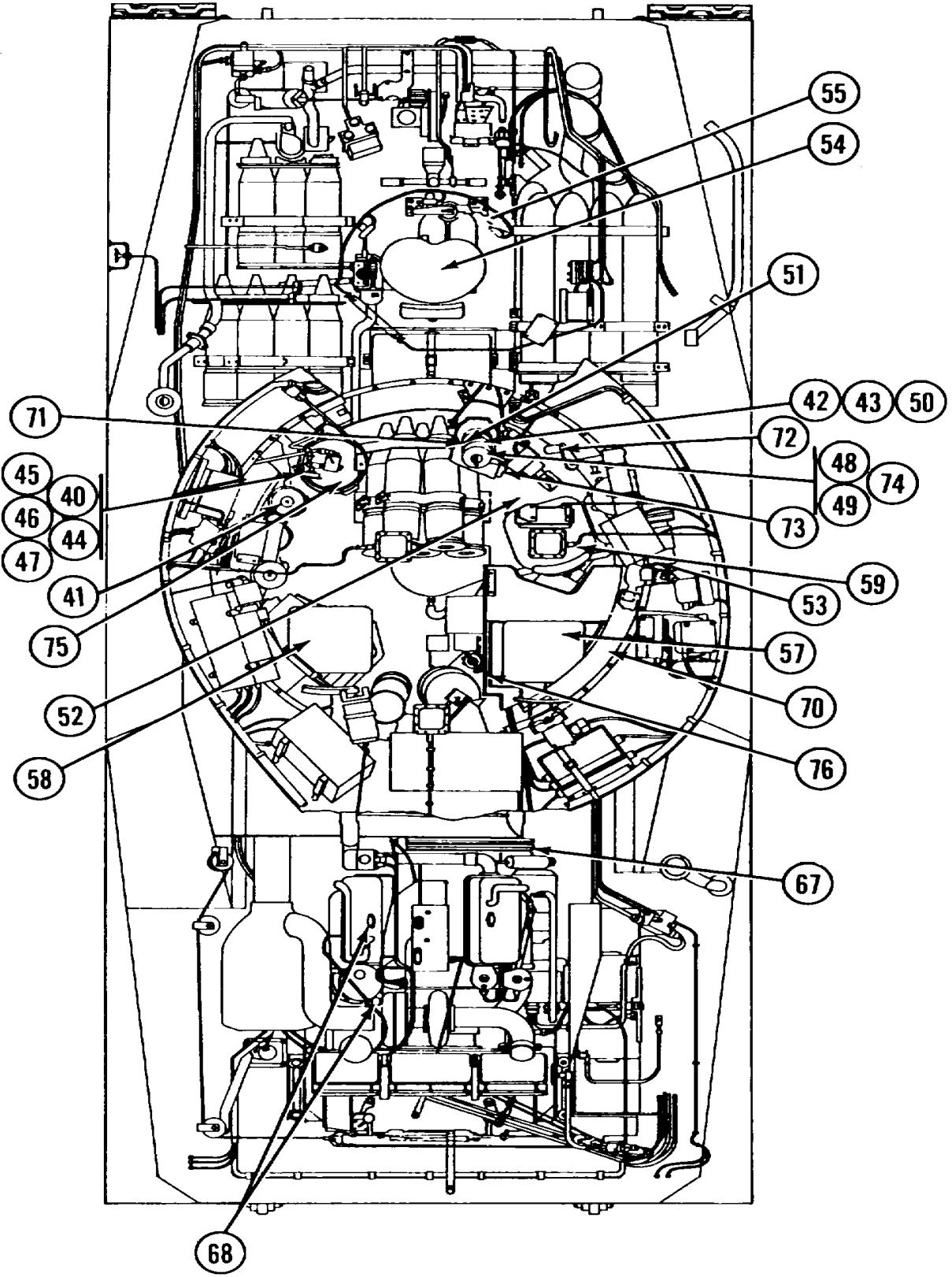
d. Other Table Entries. Be sure to observe all special information and notes that appear in your table.

2-6. ROUTING DIAGRAM.

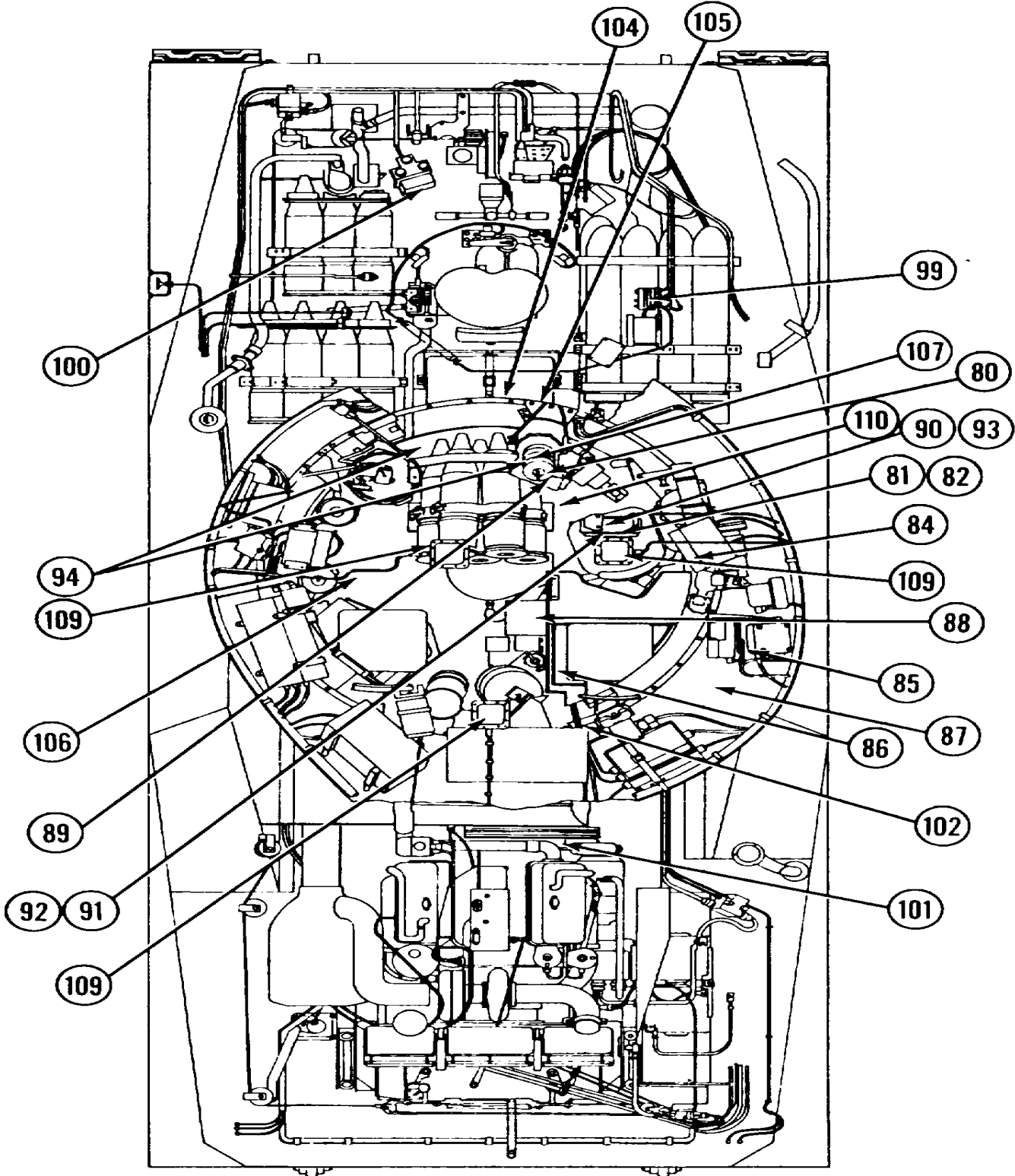
On the next four pages is a routing diagram of the PMCS.

2-6. ROUTING DIAGRAM-Continued.





2-6. ROUTING DIAGRAM-Continued.



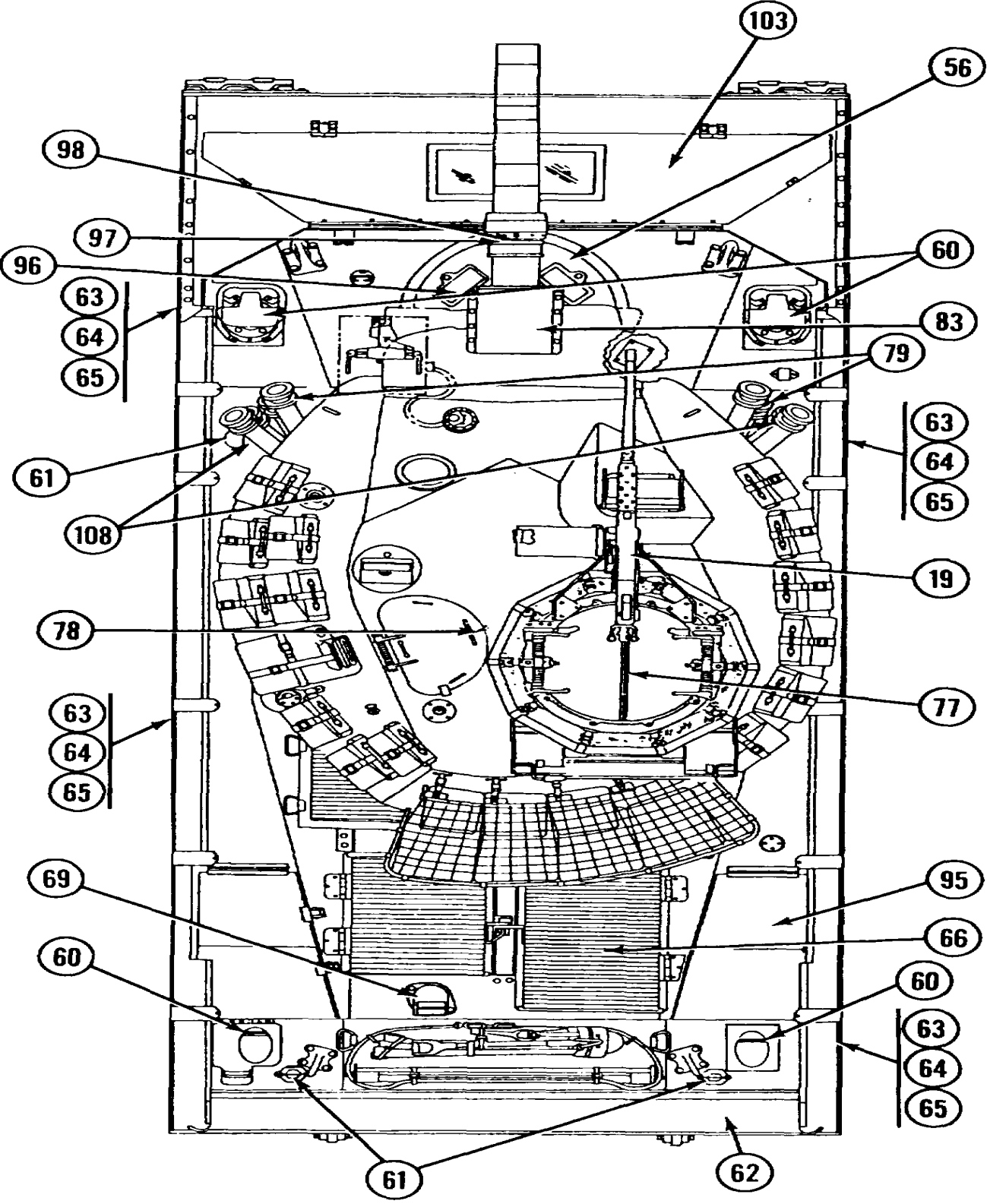
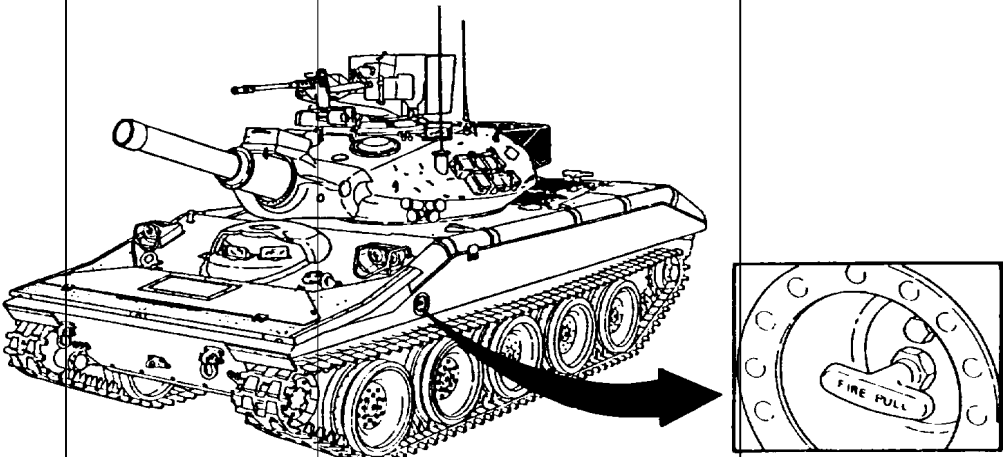


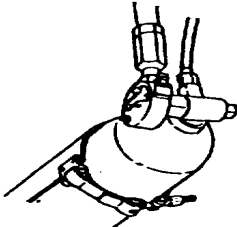
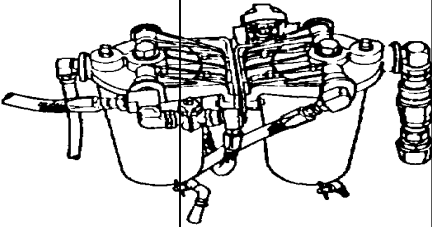
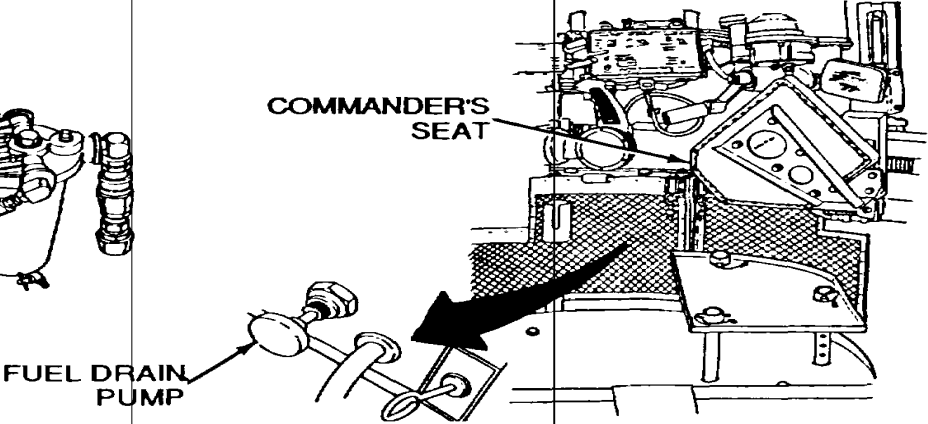
Table 2-1. PMCS

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
1	Before	Vehicle exterior	<p><u>Commander/Driver</u></p> <ul style="list-style-type: none"> a. Check exterior of vehicle for damage or missing items. Ensure all items are properly secured. b. Check outside of vehicle for signs of fuel, oil, or coolant leaks. c. Check wires and lead seals on external fire extinguisher handles 	<p>Any class III fuel, oil, or coolant leak is found.</p> <p>Wire or lead seal on external fire extinguisher handle is missing or broken.</p>
2	Before	Air cleaner (Note: this procedure is for old air cleaner.)	<p><u>Driver</u></p> <ul style="list-style-type: none"> a. Check air cleaner restriction indicator mounted on air cleaner under left deck lid b. If indicator is in red range, clean filter element. 	<p>Air cleaner element is unserviceable. Hoses, indicator, or seal are missing or damaged.</p>



ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
3	Before	Surge tank	<p>c. Check air cleaner cover seal. Check mounting brackets and hoses.</p> <p><u>Driver</u></p> <p>CAUTION Coolant other than the approved anti-freeze (Appendix D, Item 1) may be added In an emergency, but must be drained and replaced with the approved anti-freeze at the earliest opportunity.</p> <p>NOTE Approved antifreeze only may be added to radiator. In an emergency, water may be added if approved coolant is unavailable.</p> <p>a. Check surge tank coolant level. If coolant is below cold level mark, add coolant until it reaches cold level mark.</p> <p>b. Check to see that chain is installed on cap, and gasket under cap is not broken or missing</p>	<p>Radiator cap is unserviceable or missing Gasket is broken or missing.</p> <p>Radiator cap is unserviceable or missing. Gasket is broken or missing.</p>
4	Before	Engine compartment fixed fire extinguisher (left of driver)	<p><u>Driver</u></p> <p>a. Check wire and lead seal. Check mounting clamps and discharge lines</p>	<p>Wire or lead seal is broken or missing. Discharge lines or nozzle are broken or missing.</p>

Table 2-1. PMCS

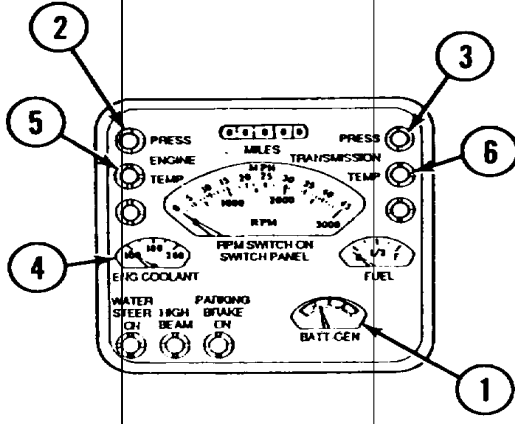
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	CREWMEMBER PROCEDURE	NOT FULLY MISSION CAPABLE IF:
4 cont	Before	Engine compartment fixed fire extinguisher (left of driver)	<p><u>Driver</u></p> <p>b. Check due date of next inspection; if passed, notify unit maintenance.</p> 	Due date for inspection has passed.
5	Before	Fuel filters and lines	<p><u>Driver</u></p> <p>a. Drain condensation from each fuel filter. b. Check fuel Ones and filters for leaks</p> <p><u>Loader</u></p> <p>Drain condensation from center fuel tank with fuel drain pump (located in turret).</p>  	Any fuel leak exists.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
6	Before	Engine and crew fixed fire extinguisher interior actuating handle	<p><u>Driver</u></p> <p>Check wire, seal, handle, and cover</p>	Wire or seal is broken or missing; handle is broken or damaged.
7	Before	Portable fire extinguisher	<p><u>Loader</u></p> <p>Check that inspection tag date does not exceed 90 days; check wire, seal, and handle.</p>	Due date for inspection has passed; wire, seal, or handle is broken or missing.
8	Before	Check for hydrostatic lock	<p><u>Driver</u></p> <p>a. Pull out fuel cutoff switch to cutoff position.</p>	

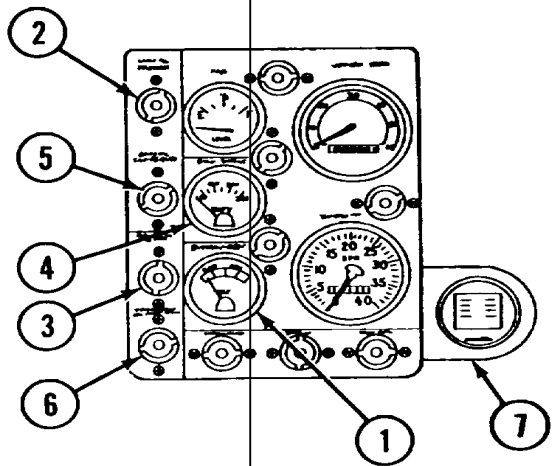
Table 2-1. PMCS

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
8 cont	Before	Check for hydrostatic lock	<p><u>Driver</u></p> <p>NOTE</p> <ul style="list-style-type: none"> • When hydrostatic lock exists or is suspected, stop cranking Immediately and notify unit maintenance. • Prior to starting vehicle during cold weather operations, perform WEEKLY procedure Item 100. <p>b. Intermittently bump starter switch. Indications of hydrostatic lock are:</p> <ul style="list-style-type: none"> • Engine starts to turn over with starter, then stops cranking. • Engine seems to strain while cranking. • Engine seems to bind up 	Hydrostatic lock present.
9	Before	Driver's instrument panel and indicator Lights	<p><u>Driver</u></p> <p>Check instrument panel gauges and lights.</p> <p>Turn on vehicle MASTER SWITCH.</p> <p>a. Check that battery indicator gauge (1) needle goes past middle of yellow or into green range.</p>	Battery indicator gauge pointer is in red zone or fails to register.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			<p>b. Check that engine oil pressure warning light (2) and transmission oil pressure warning light (3) are on.</p> <p>START ENGINE. When engine starts, place ENGINE START/TURRET POWER switch in OFF position; after 5 seconds, place ENGINE START/TURRET POWER switch in TURRET POWER position and allow power plant to warm up (3 to 5 minutes).</p> <p>c. Check engine coolant gauge (4) for proper operation. Gauge should register between 175 and 210°F when engine is warmed up.</p>	<p>Engine or transmission oil pressure warning light does not work.</p> <p>Coolant gauge will not register 175OF or goes above 210OF, or will not register at all.</p>



OLD PANEL



NEW PANEL

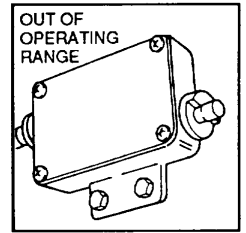
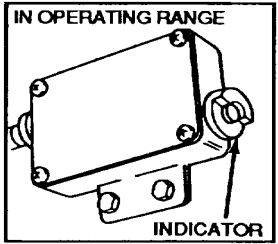
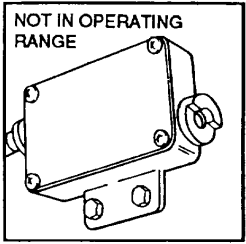
Table 2-1. PMCS

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
9 cont	Before	Driver's instrument panel and indicator lights	<p><u>Driver</u></p> <p>NOTE Engine and transmission oil temperature warning lights do not come on when MASTER SWITCH is placed in the ON position.</p> <p>d. Check that engine oil temperature warning light (5) and transmission oil temperature warning light (6) are NOT on.</p> <p>e. Check engine air cleaner restriction indicator (7); if indicator is in red range, check air cleaner filter unit.</p> <p>NOTE If the air cleaner is the old assembly, the air restriction Indicator is mounted on the air cleaner assembly and this task will be done when the surge tank is checked.</p> <p>f. Check air cleaner blower motor for proper operation by placing hand over discharge tube and feeling for air exhaust. If no air is felt, contact unit maintenance.</p>	<p>Engine or transmission oil temperature light comes on.</p> <p>Air filter is clogged or air filter assembly is damaged or has missing parts.</p>

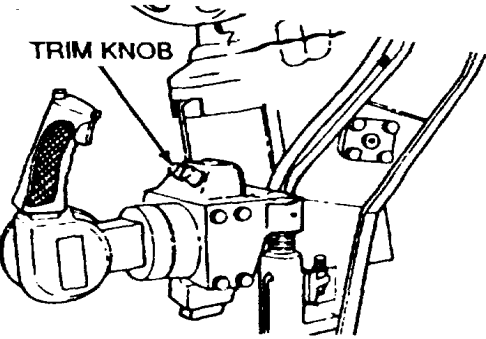
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
10	Before	Drivers controls	<p><u>Driver</u></p> <p>Check driver's controls for proper operation.</p> <p>a. Check accelerator pedal for proper operation</p> <div style="border: 1px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;">WARNING</div> <p>Ensure that the brakes are applied when checking the gear selector.</p> <p>b. Check gear selector operation. Ensure neutral safety switch is depressed with shift lever in park (P) or neutral (N) only</p> <div style="text-align: center; margin: 10px auto;"><u>CAUTION</u></div> <p>Make sure the steer selector is in LAND position.</p> <p>c. Check steering controls for proper operation.</p> <p style="text-align: center;">2-21</p>	<p>Accelerator pedal binds when pressed down and released. Engine does not return to idle when pedal is released. Engine stays at idle when pedal is depressed.</p> <p>Gear selector binds when moved. Transmission does not engage when selector lever is moved. Neutral safety switch is not depressed when lever is placed in park or neutral.</p> <p>Steering controls bind when steering is turned right or left.</p>

Table 2-1. PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
10 cont	Before	Drivers controls	<p><u>Driver</u></p> <p>d. Check that park brake will engage when handle is pulled out and up, and will disengage when released</p> <p>e. Check brakes for proper operation.</p>	<p>Park brake will not lock when handle is pulled out and up, or will not release when pressure is applied to brake pedal.</p> <p>Brake pedal goes to floor when pushed or fails to stop vehicle.</p>
11	Before	Turret lock	<p><u>Loader</u></p> <p>With vehicle on level ground, check that turret lock releases.</p>	
12	Before launcher safe-to-fire indicator (M551 A1)	Gun/	<p><u>Loader</u></p> <p>a. Check that safe-to-fire indicator rod is in operating range.</p> <p>b. If not, adjust by bleeding off or pumping up pressure.</p>	<p>Safe-to-fire indicator rod cannot be adjusted.</p>



ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
13	Before	Gun/ launcher reservoir (M551 A1)	<p><u>Gunner/Loader</u></p> <ul style="list-style-type: none"> a. Have gunner elevate gun/launcher to 265 mils. b. Check hydraulic fluid level in gun/launcher. 	
14	Before	Turret READY light (M551 A1)	<p><u>Gunner</u></p> <ul style="list-style-type: none"> a. Place TURRET CONTROL switch to on position. b. Check that POWER lamp illuminates. c. Check that turret READY light illuminates after 18 to 22 seconds. 	Turret READY light does not illuminate.
15	Before	Gunners control handle, motor generator, and control handle trim	<p><u>Gunner</u></p> <ul style="list-style-type: none"> a. Without moving gunner's control handle, depress palm switch. b. Listen for motor generator to run. c. If gun drifts up or down, check that drift can be trimmed out using elevation trim knob. 	

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
15 cont	Before	Gunner's control handle, motor generator, and control handle trim	<p><u>Gunner</u></p> <p>d. If turret drifts left or right, check that drift can be trimmed out using trim knob</p>	
				
16	Before	Gunner's control handle power traverse, and gun/launcher power elevation and depression	<p><u>Gunner</u></p> <p>a. Check that turret can be smoothly power traversed left and right</p> <p>b. Check that gun/launcher can be smoothly power elevated and depressed</p>	
17	Before	Commander's control override and trim	<p><u>Commander</u></p> <p>a. Without moving gunner's control handle, depress palm switch. Depress commander's palm switch, and elevate and traverse. Verify that commander's station overrides gunner's station.</p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
18	Before	Commander's control handle power traverse, and gun/launcher power elevation and depression depressed.	<p>b. Without moving commander's control handle, depress palm switch.</p> <p>c. If gun drifts up or down, check that drift can be trimmed out using elevation trim knob.</p> <p>d. If turret drifts left or right, check that drift can be trimmed out using traverse trim knob.</p> <p><u>Commander</u></p> <p>a. Check that turret can be smoothly power traversed left and right.</p> <p>b. Check that gun/launcher can be smoothly power elevated and</p>	
19	Before	Machine gun cal .50 (M551A1)	<p><u>Commander</u></p> <div style="border: 2px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;"> <p>WARNING</p> </div> <p>Be sure that the machine gun is clear of ammo and the barrel is free of obstructions.</p> <p>Check that machine gun will mount properly. For further PMCS, see TM 9-1005-213-10.</p> <p style="text-align: center;">Change 1 2-25</p>	

Table 2-1. PMCS - Continued

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
20	Before	Radio communication	<p><u>Commander</u></p> <p>Check that two-way communication with another vehicle is possible from commander's control box.</p>	Unable to communicate.
21	Before	Vehicle intercom	<p><u>Commander/Driver</u></p> <p>Check that communication is possible between commander and driver</p>	No communication between commander and driver.
22	Before	Coaxial machine gun M240 (M551A1)	<p><u>Loader</u></p> <p style="text-align: center;">WARNING</p> <p>Make certain the machine gun is clear of ammo and the barrel is free of obstructions.</p> <ol style="list-style-type: none"> a. Check that machine gun is mounted and secured properly. b. Check that electrical lead is connected. c. Have gunner move FIRE CONTROL selector to COAX position. d. Have gunner depress gunners control handle trigger switch, and listen for click of machine gun solenoid. 	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
23	Before	Closed Breech Scavenging System (CBSS) motor shut-off valve, manual discharge valve, and system pressure (M551A1)	<p><u>Loader</u></p> <ul style="list-style-type: none"> a. Place compressor switch in ON position. b. Check that compressor motor runs. c. Check that CBSS shutoff valve is placed in open position. d. Trip manual discharge lever for a second to check that system works, and listen for a sound like a foghorn. e. Observe and check that CBSS pressure gauge shows at least 750 psi <p>NOTE To make the vehicle not fully mission capable, the manual and electrical systems must not be functioning. If one system works, the vehicle is mission capable.</p>	Compressor will not develop and maintain a minimum of 750 psi.
24	Before	Gun tube bore, electrical breech opening, firing circuit check start, and manual breech closing (M551 A1)	<p><u>Loader</u></p> <ul style="list-style-type: none"> a. Open breech electrically b. Cock firing probe actuator, and install actuator over firing probe. <p style="text-align: center;">Change 1 2-27</p>	Breech will not operate manually and electrically.

Table 2-1. PMCS-Continued

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
24 cont	Before	Gun tube bore, electrical breech opening, firing circuit check start, and manual breech closing (M551 A1)	<p><u>Loader</u></p> <ul style="list-style-type: none"> c. Look down gun tube bore and check that bore is clear of obstructions. d. Manually close breech and electrically. 	Breech will not operate manually
25	Before	Loader's SAFE/READY switch (M551A1)	<p><u>Loader</u></p> <ul style="list-style-type: none"> a. Place SAFE/READY switch in READY position. b. Check that loader's READY lamp illuminates. 	
26	Before	Gunner's emergency telescope reticle light box READY fight (M551A1)	<p><u>Gunner</u></p> <p>When loader places SAFE/READY switch in READY position, check that READY lamp on emergency telescope reticle light box illuminates</p> <p>NOTE To make the vehicle not fully mission capable, the manual and electrical systems must not be functioning system works, the vehicle is mission capable. Gunner</p>	READY lights on loaders control box and emergency telescope reticle light box do not illuminate.
27	Before	Gunner's trigger switch firing circuit (M551 A1)	<ul style="list-style-type: none"> a. Place FIRE CONTROL selector in CONV position. 	If one

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
28	Before	Manual elevation handwheel firing button (M551A1)	<p>b. Depress gunners control handle palm and trigger switches, and release.</p> <p>c. Have loader manually open breech, and check that actuator button protrudes.</p> <p>NOTE</p> <p>To make the vehicle not fully mission capable, the manual and electrical systems must not be functioning. If one System works, the vehicle is mission capable.</p> <p><u>Loader/Gunner</u></p> <p>a. While breech is open, cock actuator again and install In breech chamber over firing probe.</p> <p>b. Manually close breech</p> <p>c. Have gunner depress firing button on manual elevation handwheel momentarily.</p> <p>d. Open breech manually, and check that actuator button protrudes.</p> <p>Change 1 2-29</p>	<p>Breech will not operate manually and electrically.</p> <p>Breech will not operate manually and electrically.</p> <p>Breech will not operate manually and electrically.</p>

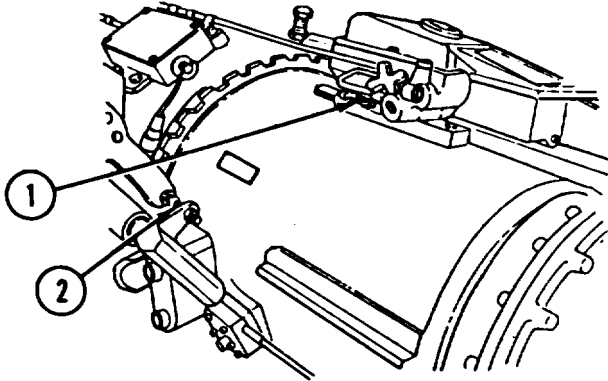
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
29	Before	Auxiliary firing circuit (blasting machine) (M551A1)	<p style="text-align: center;">NOTE</p> <p>To make the vehicle not fully mission capable, the manual and electrical systems must not be functioning. If one system works, the vehicle is mission capable.</p> <p><u>Loader</u></p> <ul style="list-style-type: none"> a. Cock actuator and again install in breech over firing probe. b. Manually close breech c. Remove safety pin from blasting machine and vigorously rotate blasting machine handle clockwise three times, holding handle in final position 2 to 3 seconds. Install safety pin. d. Open breech manually, and check that actuator button protrudes. <p style="text-align: center;">Change 1 2-30</p>	<p>Breech will not operate manually and electrically.</p> <p>Breech will not operate manually and electrically.</p>

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
30	Before	Commanders control handle firing circuit (M551A1)	<p style="text-align: center;">NOTE</p> <p>To make the vehicle not hilly mission capable, the manual and electrical systems must not be functioning. If one system works, the vehicle is mission capable.</p> <p><u>Commander</u></p> <ul style="list-style-type: none"> a. Have loader cock actuator again and place in breech chamber over firing probe, and manually close breech. b. Depress commanders control handle palm and trigger switches and release. c. Have loader manually open breech, and check that actuator button protrudes. <p style="text-align: center;">Change 1 2-30.1</p>	<p>Breech will not operate manually and electrically.</p> <p>All gun launcher firing circuit systems inoperable.</p>

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
31	Before	Firing circuit safety check, and a electrical breech closing (M551AI)	<p style="text-align: center;">NOTE</p> <p>Breech was opened electrically in item 24 above and opened and/or closed manually in items 24, 27, 28, 29, and 30. This is the final electric check.</p> <p>To make the vehicle not fully mission capable, the manual and electrical systems must not be functioning. If one system works, the vehicle is mission capable.</p> <p><u>Commander</u></p> <p>Have loader place SAFE/READY switch in SAFE position.</p> <p style="text-align: center;">Change 1 2-30.2</p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
32	During	Driver's indicator panel	<p>b. Have gunner place FIRE CONTROL selector in CONV position.</p> <p>c. Have loader again cock actuator and Install in breech chamber over firing probe, and manually close breech.</p> <p>d. Have gunner depress gunners control handle palm and trigger switches momentarily and release.</p> <p>e. Have loader open breech manually, and check that actuator button DOES NOT protrude</p> <p>f. Have loader close breech electrically and electrically.</p> <p><u>Driver</u></p> <p>During mission, monitor gauges for proper operation.</p> <p style="text-align: center;">Change 1 2-31</p>	<p>Actuator protrudes. Breech will not operate manually and electrically.</p> <p>Breech will not operate manually</p> <p>Failure of coolant gauge, battery indicator gauge, or any warning light.</p>

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
33	During	Driver's controls	<p><u>Driver</u></p> <ul style="list-style-type: none"> a. While operating, monitor steering controls for looseness or binding. b. While operating, monitor brakes for proper operation stop vehicle. 	<p>Steering controls too loose or binding.</p> <p>Brake pedal goes to floor when pushed or fails to</p>
34	During	Ammunition detent (M551 A1)	<p><u>Commander</u></p> <div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>WARNING</p> </div> <p>If flame or smoke escapes from the tube locking key area, STOP FIRING IMMEDIATELY.</p> <p>When gun/launcher is fired, check to see if any flame or smoke is escaping from tube locking key area (1) which will indicate an unserviceable ammunition detent (2).</p>	<p>Ammunition detent unserviceable.</p>



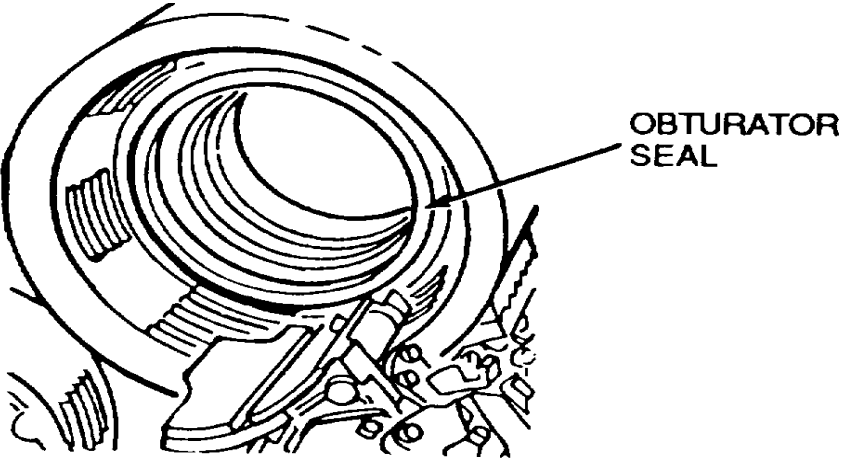
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
35	During	Commander's control handle upper and lower mounting brackets	<p><u>Commander</u></p> <p>a. Check that commander's control handle can be unlocked from lower mounting bracket, and moved to and locked in upper mounting bracket.</p> <p>b. Check that control handle can be unlocked from upper mounting bracket, and moved to and locked in lower mounting bracket.</p>	
36	During	Ammunition stowage racks, missile and conventional (M551 AI)	<p><u>Driver/Loader</u></p> <p>During loading of ammunition, check that ammunition can be stowed securely</p>	Six or more ammo racks damaged or missing.
37	During	Conventional ammunition case protective covers (M55iA1)	<p><u>Driver/Loader</u></p> <p>a. Check that ammunition case protective covers have not been removed (prior to firing is the only exception).</p> <p>b. During up-loading of ammunition, ensure that protective covers are not nicked or torn.</p>	Any protective cover missing.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
38	During	Turret protective screens	<u>Commander/Gunner/Loader</u> Check that protective screens are present and mounted securely.	Any protective screen missing.
39	During	Gun/launcher buffer (M551A1)	Loader/Gunner a. During firing, check that gun/launcher completely returns to battery without shock. b. During firing, check that recoil mechanism functions and returns to in battery position.	Buffer does not function properly. Recoil mechanism not functioning.
40	During	Turret ventilating fan (M551 A1)	<u>Loader</u> Check that fan operates properly	Turret fan does not work.
41	During	Vertical ammunition rack pads (M551A1)	<u>Loader</u> During loading of vertical ammunition, ensure eight ammunition rack pads are present.	
42	During	Breech coupling scribe marks (M551A1)	<u>Loader</u> After a conventional round or missile is loaded into gun/launcher and breech is fully closed, check that breech scribe mark is within the two coupling scribe marks.	Breech scribe mark and coupling scribe marks do not line up.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
43	During	Safe-to-fire indicator and gun/launcher reservoir (M551A1)	<p><u>Loader</u></p> <p>a. During firing, check that safe-to-fire indicator stays in operating range</p>	Safe-to-fire indicator will not stay in operating range.
44	During	CBSS compressor functioning during missile firing (M551A1)	<p>b. If safe-to-fire indicator is not in operating range, perform indicator adjustment.</p> <p>c. Once adjustment is made, elevate gun/launcher to 265 mils and check reservoir oil level.</p> <p><u>Loader</u></p> <p>Have gunner move FIRE CONTROL selector to MISSILE position. Check that compressor motor automatically shuts off.</p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
45	During	CBSS compressor moisture dump valve (M551 A1)	<p><u>Loader</u></p> <ul style="list-style-type: none"> a. Listen and check for operation of moisture dump valve. b. Valve should open every 30 minutes of operation or when compressor stops. A hissing sound will be made by valve when it is operating. 	
46	During	CBSS functioning and turret ventilating fan operation (M551A1) battery.	<p><u>Loader</u></p> <ul style="list-style-type: none"> a. When firing gun/launcher, listen for ventilating fan to turn off when gun recoils and returns to b. Listen for 2-second hissing sound (scavenging system functioning) when gun reaches in battery position. c. Listen for ventilating fan to turn back on instantly. 	CBSS not functioning.

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
47	During	Compressor system operating pressure (M551 A1)	<p><u>Loader</u></p> <p>Observe CBSS pressure gauge and check that compressor motor turns on at 2800 psi, shuts off at 3100 psi, and never falls below 750 psi.</p> <p>NOTE</p> <p>If the CBSS falls and pressure falls below 750 psi, there is a slave hose available for re-charging the CBSS storage tank from a functioning vehicle. Combat firing may continue at the discretion of the vehicle commander.</p>	Compressor will not develop 750 Psi
48	During	Obturator seal	<p><u>Loader</u></p> <div style="border: 2px solid black; padding: 2px; text-align: center; width: fit-content; margin: 10px auto;">WARNING</div> <p>If flame or smoke escapes from the breech, STOP FIRING and check the obturator seal.</p> <ol style="list-style-type: none"> a. When opening and closing breech, check that obturator seal remains in place and does not fall out. b. When main gun is fired, check to see if any flame or smoke is escaping from breech. 	

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
48 cont	During seal	Obturator	<p><u>Loader</u></p> <p>c. If flame or smoke is seen, STOP FIRING, open breech, remove obturator seal, and check seal and seal area in breech chamber for evidence of corrosion or gas wash.</p>	Obturator seal is missing or defective.
				
49	During	Ejector loading tray (M551A1)	<p><u>Loader</u></p> <p>a. When firing conventional ammunition, check that ejector lever is in up (non-eject) position.</p> <p>b. When firing missiles, check that ejector lever is in down (eject) position.</p> <p>c. After missile is fired, check that missile aft cap is ejected when breech is fully opened.</p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
50	During	Firing probe (M551A1)	<p><u>Loader</u></p> <p>When firing conventional ammunition, clean firing probe with rylon scouring pad (Appendix D item 25) after every fourth round when firing with 28 V firing circuit or after every fifteenth round when firing with 120 V (normal) power supply. DO NOT use steel wool.</p>	
51	During	Gun/launcher (M551 A1)	<p><u>Gunner</u></p> <p>Check for oil leaks on underside of gun/launcher mechanism during firing.</p>	Class III oil leak exists.
52	During	Telescope M127A1 and TTS (M551A1) or M44 (M551 NTC)	<p><u>Gunner</u></p> <ol style="list-style-type: none"> a. Check operation of adjustment knobs, slip scale, and filter selector. b. Check for presence of missile reticle when MISSILE mode is selected on FIRE CONTROL selector. c. Check for presence of conventional reticle when conventional mode is selected on FIRE CONTROL selector. d. Check that selector lever seats smoothly and firmly against stop when 8- and 12-power are selected on M127A1 telescope. <p style="text-align: center;">Change 1 2-39</p>	TTS or M44 and M127A1 are inoperative

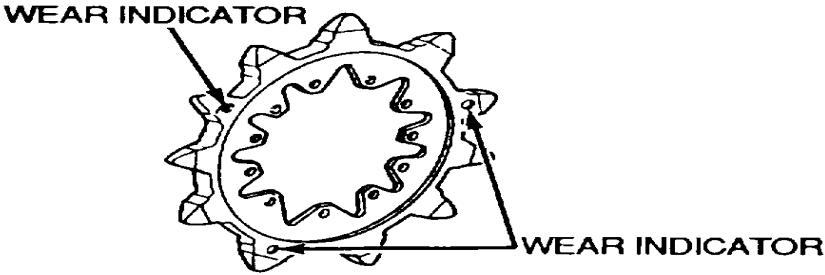
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
53	During	Azimuth indicator	<p><u>Gunner</u></p> <p>a. Check that dial lights. b. Check that resetter knob works properly.</p>	
54	After	Drivers seat	<p><u>Driver</u></p> <p>a. Check driver's seat adjustment for proper operation. b. Check seat belt harness for proper operation or any damage.</p>	<p>Seat is broken or will not adjust.</p> <p>Harness will not lock or is damaged.</p>
55	After	Driver's escape hatch	<p><u>Driver</u></p> <p>Check that lock mechanism works Properly. Ensure lock pin will screw down and that seal is not worn or deteriorated.</p>	<p>Hatch is missing or will not lock.</p>
56	After	Driver's hatch	<p><u>Driver</u></p> <p>a. Check that hatch locks in the open and closed positions. b. Check hatch seal for wear and damage.</p>	<p>Hatch will not lock in open or closed position.</p>
57	After	Command-ergs seat	<p><u>Commander</u></p> <p>Check that seat height can be adjusted, and that seat locks in place when adjustment lever is released.</p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
58	After	Loader's seat	<p><u>Loader</u></p> <p>Check that seat pulls down to sit, and springs up when seat is exited.</p>	
59	After	Gunner's seat	<p><u>Gunner</u></p> <p>a. Check that seat can be adjusted up or down with vertical adjustment handle.</p> <p>b. Check that seat can be adjusted forward or backward with horizontal adjustment handle.</p> <p>c. Check that seat back can be easily removed or installed.</p>	Gunner's seat missing or cannot be adjusted.
60	After	Lights	<p><u>Driver/Loader</u></p> <p>NOTE</p> <p>Have loader outside the vehicle.</p> <p>a. Check headlight and taillight operation.</p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
60 cont.	After	Lights	<p><u>Driver/Loader</u></p> <p>b. Check lens for discoloration, damage, or moisture.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;"> <p>WARNING</p> </div> <ul style="list-style-type: none"> • Do not look directly Into Infrared lights- you may damage your eyes. • Do not touch lens- you may burn your fingers. <p style="text-align: center;">NOTE</p> <p>Check the low Infra-red beam, then the high beam.</p> <p>c. Check operation of infrared lights by placing hand over lens-heat will be noticeable if light is working.</p>	
61	After	Bilge pumps (M551A1)	<p><u>Driver/Loader</u></p> <p style="text-align: center;">NOTE</p> <p>Have loader outside the vehicle. Turn on MASTER SWITCH. Turn on front and rear pumps one at a time. Have loader place hand over outlets and feel for airflow.</p>	Any bilge pump is inoperative.

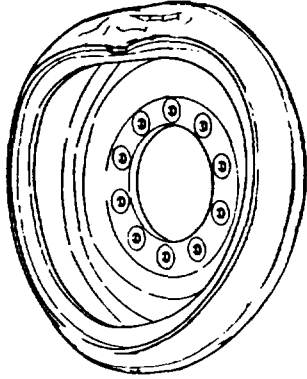
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
62	After	Hull access plugs	<p><u>Driver</u></p> <p>Check to ensure that all five hull access plugs are installed properly.</p>	Any hull access plug is damaged or missing.
63	After	Suspension system	<p><u>Driver</u></p> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 10px;">WARNING</div> <p>Hot roadwheel spindles, Idler hubs, sprocket hubs, and shocks can burn you Touch spindles, hubs, and shocks cautiously to see if they are hot.</p> <p>a. Check for over-heated roadwheel spindles, sprockets, and idler hubs Lightly feel spindles and hubs for noticeable variation in temperature.</p>	Any spindle or hub frozen or unserviceable. Any bolts or nuts bent or missing.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
63 cont	After system	Suspension	<p><u>Driver</u></p> <p>b. Check for missing, broken, leaking, or overheated shocks Bottom of shock should feel warmer than hull-f not, it is not working.</p> <p>c. Check for bent or broken roadwheel arms</p> <p>d. Check drive sprockets and carriers for broken teeth and cracks Check drive sprockets for wear</p>	<p>Any shock absorber is bent, broken, or missing, or is cold after operation. Any oil leakage.</p> <p>Any roadwheel arm is bent or broken.</p> <p>Drive sprocket is cracked or is missing teeth. Carrier is cracked or broken. Sprockets are worn beyond wear indicators. Bolts are missing and/or bolt holes are elongated.</p>

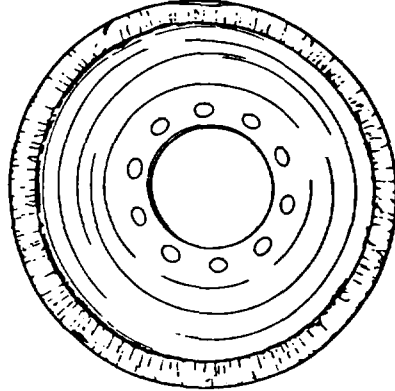


Replacement sprocket with built in wear indicator. Reverse sprocket when worn to indicator; replace when worn to indicator on both sides.

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
64	After	Road-wheels and idler wheels	<p>e. Check for broken torsion bars. Place crowbar under second, fourth, and fifth roadwheel (from front) and pry down to detect broken torsion bars. On third roadwheel, pry down from rear of vehicle and check. On first roadwheel, broken torsion bar may be detected by absence of sharp angle as track passes under roadwheel.</p> <p><u>Driver</u></p> <p>a. Check for bent, cracked, or broken road wheels or idler wheels broken idler wheels.</p>	<p>Any torsion bar is broken.</p> <p>More than one roadwheel is bent or cracked Any bent, cracked, or</p> <p>Bolts are missing or holes are elongated.</p>

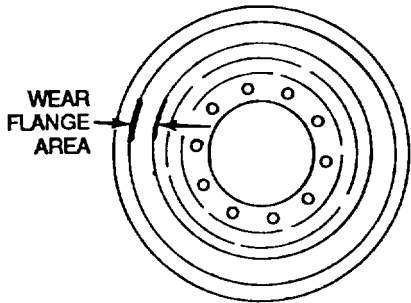


Unserviceable roadwheel-bent

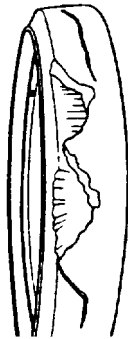


Unserviceable roadwheel elongated bolt holes

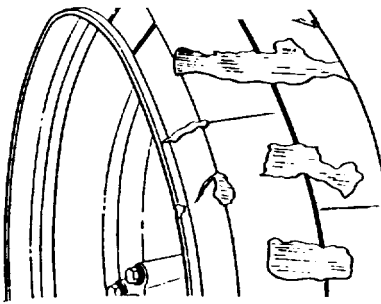
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
64 cont	After wheels and idler wheels	Road-	<u>Driver</u> b. Check roadwheels and idler wheels for loss of rubber, pitting, chunking, or separation of rubber from metal	More than one roadwheel or idler wheel has chunking to metal over more than half the width of surface, cracks that extend across entire width of surface, or a wear flange worn beyond limits.



Unserviceable roadwheel- wear flange worn beyond acceptable limits



Unserviceable roadwheel- chunking over more than half the width of tire



Unserviceable roadwheel damaged tread and chunking extending completely across

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
65	After	Track shoes and bushings	<p><u>Driver</u></p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;"> <p>WARNING</p> </div> <p>If you lose a track (break a track shoe or the vehicle throws a track), extreme caution must be exercised In maintaining control Immediately let up on the accelerator and allow the vehicle to coast to a stop. Do not apply braking action (brake pedal, laterals pivot, or any kind of steering controls)-this causes the vehicle to pull to the active or good track and could result In a rollover. Apply braking action ONLY If the vehicle Is approaching a ravine or cliff, or If you perceive the outcome to be catastrophic, probably resulting In fatalities. When rollover Is Imminent, all crew members should Immediately move Inside the vehicle, tighten seat belts, and hold on to a secure fixture until the vehicle comes to a complete stop.</p>	

Table 2-1. PMCS - Continued.

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
65 cont	After	Track shoes and bushings	<p><u>Driver</u></p> <p>NOTE</p> <ul style="list-style-type: none"> • Worn bushings are difficult to locate. Worn bushings will cause the track pin to appear off-center. The vehicle may have a protruding track pin or track pin nut, or unusual gaps between adjacent shoes. • Worn or missing track pads will mark the road surface. Replace worn track shoes. <p>a. Check track for broken shoes, missing center guides, shoes worn even with grousers, track pins bent or broken, or pin guides worn</p>	<p>Any track shoe is broken, two guides broken on the same shoe, or three guides in a row missing or broken. Any track shoe bushing deemed unserviceable. Any track pin bent, broken, or missing. Any track pin nut missing.</p>

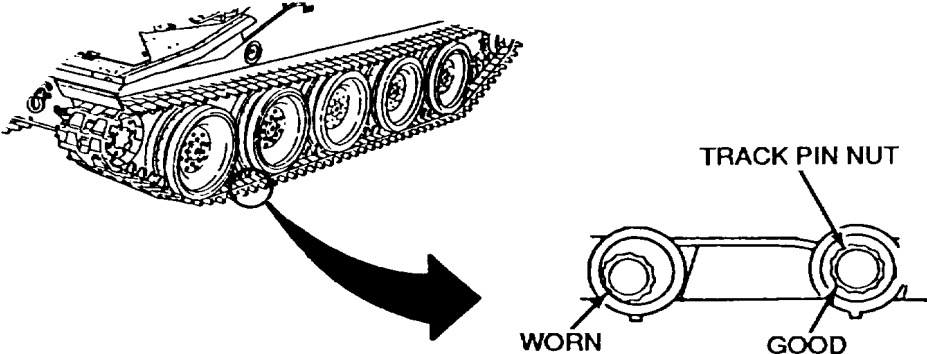
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			b. Check hydraulic track adjuster for damage or leaks.	Track adjuster is damaged or missing, leaks, or will not maintain track tension.
				
66	After	Engine compartment	<u>Driver</u> Check engine compartment and bilge area, and all hoses, clamps, and fittings for fuel, oil, or coolant leaks.	Any class III leak is found.
67	After	Generator fan drive and coolant pump belts	<u>Driver</u> a. Check generator V belts for breaks and cracks. Check V belt tension. If adjusting pin is less than 1/4 inch from bottoming out, notify unit maintenance to replace belts. b. Check coolant pump belts for breaks, cracks, and adjustment. Belt deflection should be approx. 1/4 inch.	Any belt is missing or unserviceable. Any belt is missing or unserviceable.

Table 2-1. PMCS---Continued.

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
68	After	Power pack oil levels	<p><u>Driver</u></p> <p>a. Check engine oil level---oil level should be between add and full mark. If low, fill with oil (Appendix D, item 14, 15, or 16) as needed.</p> <p>CAUTION <i>Do not overfill transmission. Transmission can be damaged when operated overfilled with oil.</i></p> <p>NOTE <i>if the oil looks milky or has air bubbles-in it, contact unit maintenance.</i></p> <p>b. Check transmission oil level-il level should be within operating range. If low, fill with oil (Appendix D, item 14, 15, 16, or 17) as needed.</p>	
69	After	Exhaust system	<p><u>Drive</u></p> <p>a. Check exhaust system for obvious leaks, or missing or damaged components.</p> <p>b. Check that exhaust deflector is mounted properly and not damaged.</p>	<p>Any exhaust leak or missing or damaged components.</p> <p>Exhaust deflector is damaged or missing.</p>

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
70	After	Turret fire extinguisher switch and crew compartment bottles	<p><u>Commander/Driver</u></p> <ul style="list-style-type: none"> a. Check that seal or wire on switch is not broken or missing. b. Check that safety wire and pin are in place. c. Check crew compartment fire extinguisher (mounted on right side of hull behind driver). Ensure that seal and wire are intact. d. Check cylinder pressure. 	<p>Wire or seal is broken or missing.</p> <p>Seal or wire is broken or missing.</p> <p>Gauge reads below pressure at stated temperature.</p>

Maintenance

Replace if pressure is below indicated psig for container temperature (*F)

-60/270	-40/300	-20/330	0/370
+20/410	+40/460	+60/530	+80/600
+90/640	+100/680	+110/720	+120/760

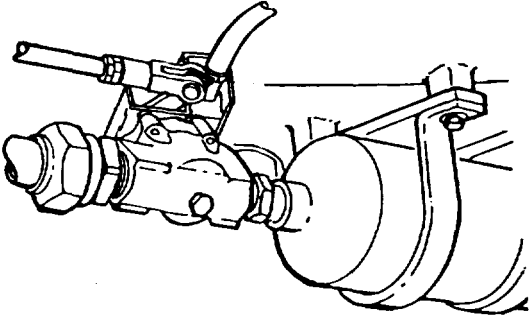


Table 2-1. PMCS - Continued

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
71	After	Branched cable assembly (U cord) (M551A1)	<p><u>Gunner/Loader</u></p> <p>Check cable for tears to outer jacket, separations or breaks that expose wire conductors, or cracked, crushed, or damaged molded portions of connectors.</p>	Any damage to cable assembly (U cord) exists.
<p>NOTE <i>To make the vehicle not fully mission capable, the manual and electrical systems must not be functioning. If one system works, the vehicle is mission capable.</i></p>				
72	After	Manual turret traverse	<p><u>Gunner</u></p> <p>Check that turret will traverse left and right manually.</p>	Turret will not traverse manually and electrically.

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
73	After	Manual gun/ launcher elevation and depression	<p>NOTE <i>To make the vehicle not fully mission capable, the manual and electrical systems must not be functioning. If one system works, the vehicle is mission capable.</i></p> <p><u>Gunner</u></p> <p>Check that gun/launcher will elevate and depress using manual mode.</p> <p>NOTE <i>Leave the gun/launcher at maximum depression when not in use to prevent water/ moisture from entering the tube.</i></p>	Gun/launcher does not elevate or depress manually and electrically.



ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
74	After	Obturator seal and sealing area (M551A1)	<p><u>Loader</u></p> <ul style="list-style-type: none"> a. Remove obturator seal and check seal for gas wash or erosion. b. Check seal seating area of gun tube for gas wash or erosion. c. Reinstall seal (if not defective) and ensure seal does not fall out. <p style="text-align: center;">NOTE <i>Leave the breech In full open position while not In use to prevent rusting of breech mechanism.</i></p>	<p>Seal is missing or defective.</p> <p>Seal seating area is defective.</p>
75	After	CBSS compressor (M551A1)	<p><u>Loader</u></p> <p style="text-align: center;">NOTE <i>Some compressors have a dipstick-type gauge and some have a sight gauge.</i></p> <ul style="list-style-type: none"> a. Check compressor oil level. b. Check that manual shut off valve is placed in closed position. c. With all systems shut down, listen for CBSS air leaks where tube slides in and out of telescoping tube assembly and striker housing. 	<p>Any air leak exists.</p>

Table 2-1. PMCS - Continued.

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
75 cont.	After	CBSS compressor (M551A1)	<u>Loader</u> d. Check compressor fittings and lines for oil leaks.	Class III oil leaks exist.
76	After	Gun/launcher (M551A1)	<u>Commander</u> Record equivalent full charge (EFC) rounds fired.	No EFC rounds remain.
77	After	Commander's split hatch lock	<u>Commander</u> Check that hatch lock functions in open and closed positions prior to exiting vehicle.	Hatch is missing or will not lock open or closed.
78	After	Loader's hatch cover	<u>Loader</u> Check that hatch lock functions in open and closed positions prior to exiting vehicle.	Hatch is missing or will not lock open or closed.
79	After	Smoke grenade launchers (M551 A1)	<u>Gunner/Loader</u> a. As turret is being exited, check that right and left smoke grenade launchers are present. b. Check that both launchers are not obviously out of alignment and are not damaged.	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
80	After	Gun/ launcher (M551 A1)	<p><u>Commander/runner/ Loader</u></p> <p>After firing, clean and lubricate gun/launcher and breech components.</p>	
81	Weekly	Gunner's STAB system	<p><u>Gunner</u></p> <p><u>CAUTION</u> <i>Turret may move suddenly when the STAB switch is placed in the on position. Before using, alert all crewmembers.</i></p> <ol style="list-style-type: none"> a. Turn on MASTER SWITCH and TURRET POWER. b. Turn TURRET CONTROL switch to POWER position. c. Wait 18 to 22 seconds for READY lamp to light. d. Place STAB switch in on position. e. Depress palm switch on gunner's control handle and check that turret traverses left and right, and that gun/launcher elevates and depresses. 	

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
82	Weekly	Commanders STAB system	<p><u>Commander</u></p> <p>CAUTION <i>Turret may move suddenly when the STAB switch is placed In the on position. Before using, alert all crewmembers.</i></p> <ul style="list-style-type: none"> a. Depress palm switch on commanders control handle. b. Check that gun drift up or down can be trimmed out using elevation trim knob. c. Check that turret drift-- can be trimmed out using traverse trim knob. d. Check that commander can traverse turret left and right. e. Check that commander can elevate and depress gun/launcher. 	
83	Weekly	Transmitter door and missile electrical firing circuit (M551A1)	<p><u>Gunner</u></p> <ul style="list-style-type: none"> a. Have loader electrically open breech. b. Have loader cock firing probe actuator and install over firing probe, then manually close breech. 	

Table 2-1. PMCS - Continued.

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
84	Weekly	Missile guidance and control system (M551 A1)	<u>Gunner</u> <ol style="list-style-type: none"> a. Perform tracker alignment self-test. b. Perform preliminary instructions. c. Perform lamp and meter test. d. Perform transmitter test. e. Perform check-sight lamp alignment test. f. Perform system self-test. g. Perform system self-test verification. 	<p>System fails any test.</p> <p>System fails any step of system self-test.</p>
85	Weekly	Cupola power traverse (M551 A1)	<u>Commander</u> <ol style="list-style-type: none"> a. Ensure that machine gun (if installed) is in travel lock position. b. Place CUPOLA/LASER switch in POWER position. 	

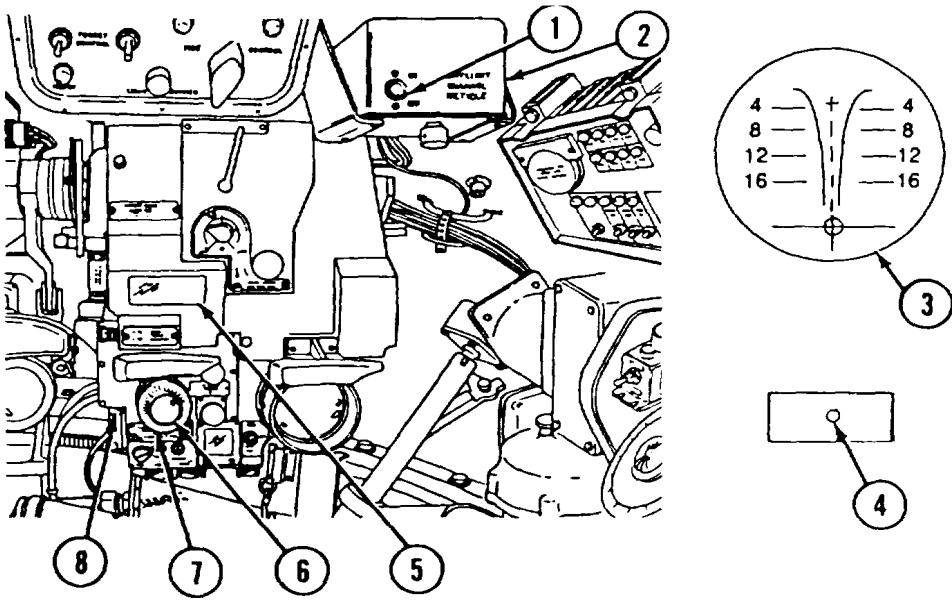
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
86	Weekly	Laser Range Finder (LRF) AN/VVG-1 (M551 A1)	<p>c. Check that cupola traverses left and right, using rotation switch.</p> <p><u>Commander</u></p> <p>a. Perform LRF optics check.</p> <p>b. Perform LRF built-in test.</p>	
87	Weekly	Cupola manual traverse and cupola align	<p><u>Commander</u></p> <p>a. Manually traverse cupola right, out of alignment with gun/launcher.</p> <p>b. Check for free cupola movement with no binding and minimum backlash.</p> <p>c. Alert crewmembers and place CUPOLA ALIGN switch in ALIGN position.</p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
87 cont.	Weekly	Cupola manual traversed. and cupola align	<p><u>Commander</u></p> <ul style="list-style-type: none"> d. Check that cupola moves and that cupola and LRF are lined up with gun/launcher; ensure that index pointers are lined up. e. Manually traverse cupola left, out of alignment with gun/launcher. f. Alert crewmembers and press CUPOLA ALIGN switch (near commander's control handle) up. g. Check that cupola moves and that cupola and LRF are lined up with gun/launcher. 	
88	Weekly	Nuclear, Biological, and Chemical (NBC) system	<p><u>All Crewmembers</u></p> <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">WARNING</div> <p><i>Contaminated filters must be changed by NBC-trained (in accordance with FM 3-4, 3-5, and 3-7) personnel; contaminated filters are considered hazardous material and must be disposed of appropriately.</i></p>	

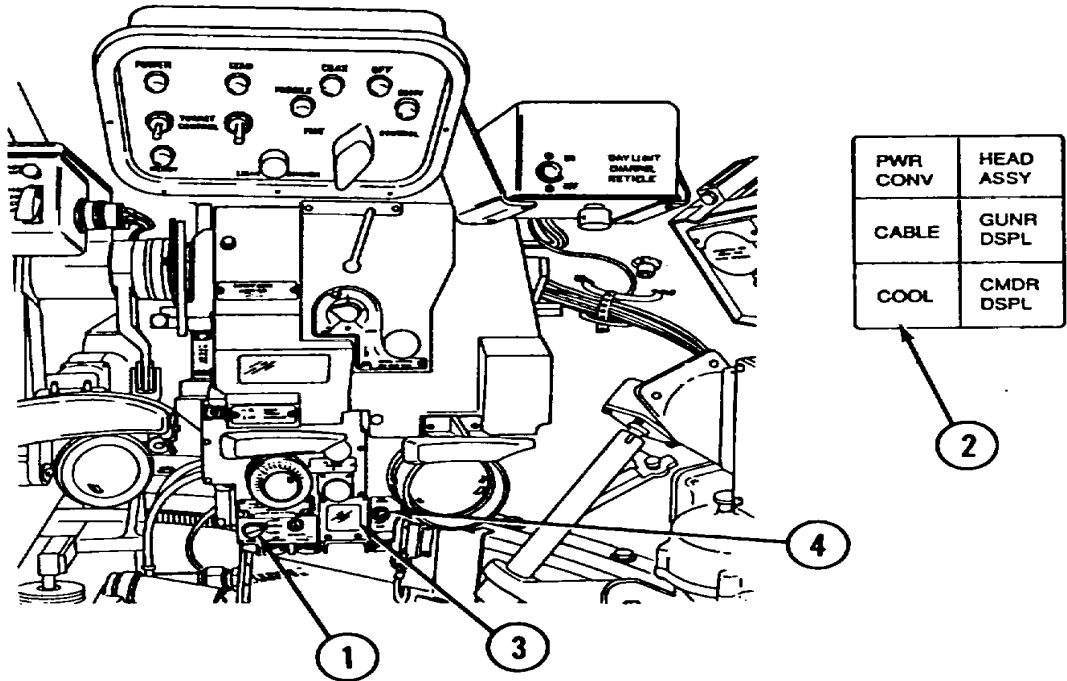
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
89	Weekly	Ejector loading tray (M551 A1)	<p>a. Activate gas-particulate filter unit.</p> <p>b. Check that airflow is present at all outlets.</p> <p>c. Check that air outlet caps are present and not damaged.</p> <p>d. Check spring clips for damage.</p> <p><u>Driver</u></p> <p>Check condition of M2A2 and M12IM13 filters.</p> <p><u>Loader</u></p> <p>a. Place ejector loading tray lever in down (eject) position.</p> <p>b. Manually open breech slowly and visually check that detent pin stays withdrawn until breech is fully open and ejector lever activates.</p>	
90	Weekly	Tank Thermal Sight (TTS) AN/VSG-2B mount	<p><u>Gunner</u></p> <p>a. Check operation of ballistic shield controls.</p> <p>b. Check that ballistic shield will lock in open and closed positions.</p>	Ballistic shield will not lock open or closed.

Table 2-1. PMCS - Continued.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
91	Weekly	TTS daylight channels	<u>Gunner</u> a. Place reticle power switch (1) on dimmer box (2) in ON position. Check that power is supplied to daylight channel (3) and unity channel (4) reticles. b. with daylight channel (3) and unity channel (4) reticles adjusted to be visible, check that view in unity power window (5) is sharp and clear. c. Check that view in daylight channel eyepiece (6) is sharp and clear. [Adjust diopter ring (7) if necessary.]	Daylight or unity channel reticle is inoperative, and M127A1 conventional reticle is inoperative.

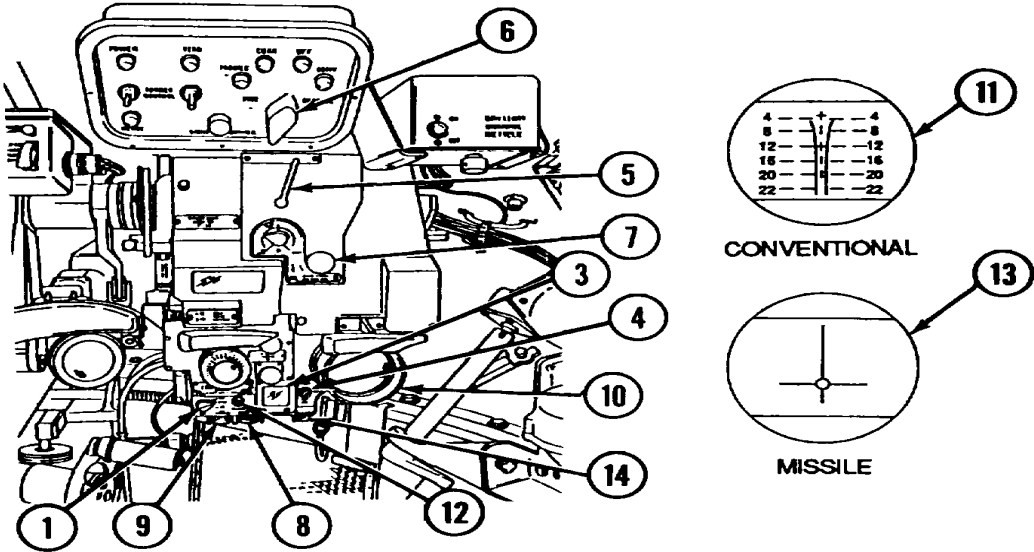


ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
92	Weekly	TTS thermal channel	<p>d. Check that all four colors can be selected with filter selector lever (8).</p> <p><u>Gunner</u></p> <p>a. Set mode switch (1) to standby. Check that COOL indicator (2) on BITE display (3) lights, then goes out within 15 minutes.</p> <p>b. Set mode switch (1) to ON and BITE test switch (4) to lamp test; check that all five BITE display (3) lamps light.</p>	



ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
92 cont.	Weekly	TTS thermal channel	<p><u>Gunner</u></p> <p>NOTE <i>Commander's display lamp will not light.</i></p> <p>c. Set BITE test switch (4) to systems test; check that none of BITE display (3) lamps light.</p> <p>d. Set thermal channel field of view selector (5) to narrow and FIRE CONTROL selector (6) to CONV. Adjust range focus (7) and bright (8) and contrast (9) controls for best display. Check that thermal channel view (10) is clear and that conventional reticle (11) is present. Check that channel polarity switch (12) reverses display polarity. Switch FIRE CONTROL selector (6) to MISSILE and check that missile reticle (13) is present. Set field of view selector (5) to wide and adjust range focus (7). Check that field of view has changed and that image is sharp and clear.</p>	TTS has no thermal channels or conventional or missile reticle, and M127/M127A1 telescope has no conventional or missile reticle.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			<p>e. Carefully check thermal channel view (10) for dead channels. Dead channels appear as black scan lines with no target information. No dead channel should be present in center 15% of display. The center 15% is approximately the area taken up by conventional reticle. Dead channels outside the center 15% are permissible, but should not interfere with target acquisition. Return mode switch (1) to standby.</p> <p>f. Check that reticle control (14) changes reticle brightness.</p>	<p>Dead channels are present in center 15% of display.</p>



ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
93	Weekly	Periscope M44 [NTC/ Opposing Forces (OPFORS)]	<p><u>Gunner</u></p> <p>NOTE <i>For daylight use, check that ON/OFF/EMER switch is in the OFF position.</i></p> <p>a. Open view window (if so equipped) and ballistic cover; look through view window and ensure that view is clear.</p> <p>b. With vehicle MASTER SWITCH and ENGINE START/ TURRET POWER switch on, turn TURRET CONTROL switch on and FIRE CONTROL selector to CONV; place filter selector lever in DARK position. Turn on periscope. Ensure that light intensity changes while moving filter lever.</p> <p>NOTE <i>If you see a brief, green flash and the image goes out, there is too much daylight. You will have to use the telescope until it gets darker outside.</i></p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
94	Weekly	Bore-sighting (M551 A1)	<p>c. Turn focus knob; check that image focus changes.</p> <p>d. Check that reticle light intensity knob varies brightness of reticle.</p> <p>e. Check that diopter knob adjusts reticle to a sharp image.</p> <p><u>Gunner</u></p> <p>a. Boresight gun/launcher.</p> <p>b. Boresight M240 machine gun.</p>	Gun/launcher cannot be boresighted.
95	Weekly	Batteries	<p><u>Driver</u></p> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">WARNING</div> <p><i>Acid fumes and electrolyte are harmful to eyes and skin. Upon contact, Immediately wash liberally with water and then seek medical attention.</i></p> <p>a. Check electrolyte level: if low, fill with distilled water (if distilled water is not available, use potable water).</p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
95 cont.	Weekly	Batteries	<p><u>Driver</u></p> <p>b. Check terminals and posts for arc damage. Check battery box and mounting brackets for corrosion.</p> <p>c. Check battery cables and connectors for tightness.</p> <p>d. Check vent holes in caps to ensure they are clear.</p>	<p>Any battery is missing or unserviceable. Batteries will not crank engine.</p> <p>Any terminal or post is arc damaged to the extent that terminal cannot be tightened.</p>
96	Weekly	Periscope M47	<p><u>Driver</u></p> <p>Check periscopes for scratches, cracks, and visibility.</p>	<p>Any periscope is 50% obstructed or missing.</p>
97	Weekly	Driver's Night Viewer (DNV) AN/VS-2(V)3 (M551A1)	<p><u>Driver</u></p> <p><i>CAUTION</i> <i>Do not remove the protective cover during daylight or in a bright area at night. The image tube can be damaged from bright light entering the viewer top even when off and without power.</i></p>	

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			<p>NOTE <i>Do not Install the battery with the vehicle power cable connected. The battery could explode and damage the DNV.</i></p> <ol style="list-style-type: none"> a. Check that DNV will slide up into slot and latch properly. b. Connect power cable and turn switch to ON position. Check that there is a green glow in DNV viewer. c. Disconnect power cable and install battery. Check that DNV operates with battery power. 	<p>DNV will not operate with vehicle or battery power.</p>

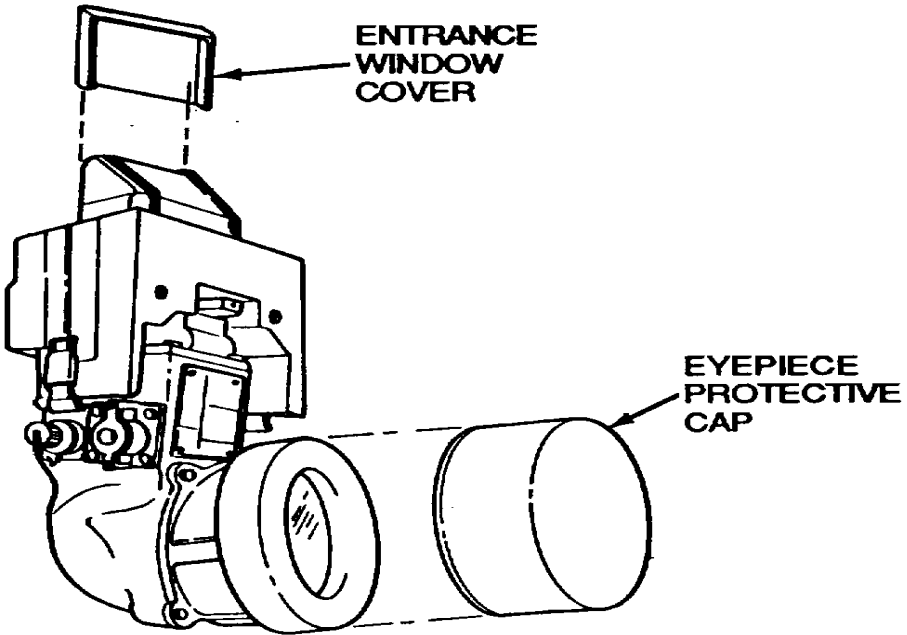
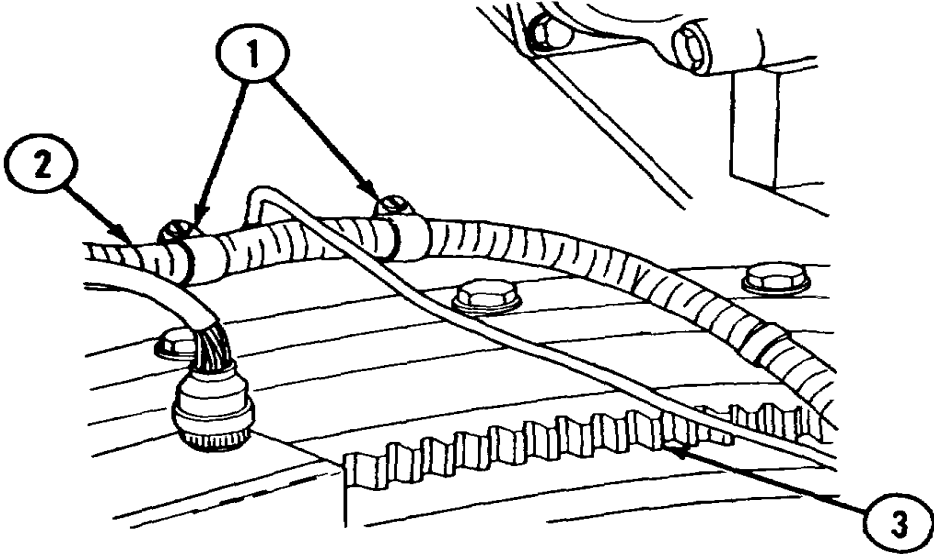


Table 2-1. PMCS - Continued.

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
97 cont.	Weekly	Driver's Night Viewer (DNV) ANNVS-2(V)3 (M551 A1)	<p><u>Driver</u></p> <p>d. Check that OFF/BRIGHT rotary switch brightens view.</p> <p>WARNING Remove the battery and stow in the DNV stowage box before the vehicle power cable is connected. If left in viewer, battery could explode and damage the DNV.</p>	
98	Weekly	Periscope M48	<p><u>Driver</u></p> <p>a. Check that periscope operates when connected to vehicle power.</p> <p>b. Check that periscope operates when switched to battery power.</p> <p>c. Check that viewer works when BO headlights are turned on.</p>	
99	Weekly	Personnel heater	<p><u>Driver</u></p> <p>a. Check fuel lines and connectors for leaks.</p> <p>b. Turn on MASTER SWITCH, start heater, and check for exhaust leaks.</p>	<p>Any fuel leak exists.</p> <p>Any exhaust leak exists.</p>

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
100	Weekly	Engine air box flame heater	<p><u>Driver</u></p> <p>NOTE <i>This will be a daily BEFORE check during cold weather operations.</i></p> <p>a. Check that indicator is in precharged area.</p> <p>b. Open fuel shutoff valve (if so equipped), unlock handle, and pump up to cold start area. Lock handle and shut off fuel valve. See if engine will start.</p>	Engine will not start with engine air box flame heater.
101	Weekly	Generator drive housing	<p><u>Driver</u></p> <p>Check oil level in generator drive housing. Remove gauge rod; oil level should be within operating range. If low, fill with oil (Appendix D, item 14, 15, or 16) as required.</p>	

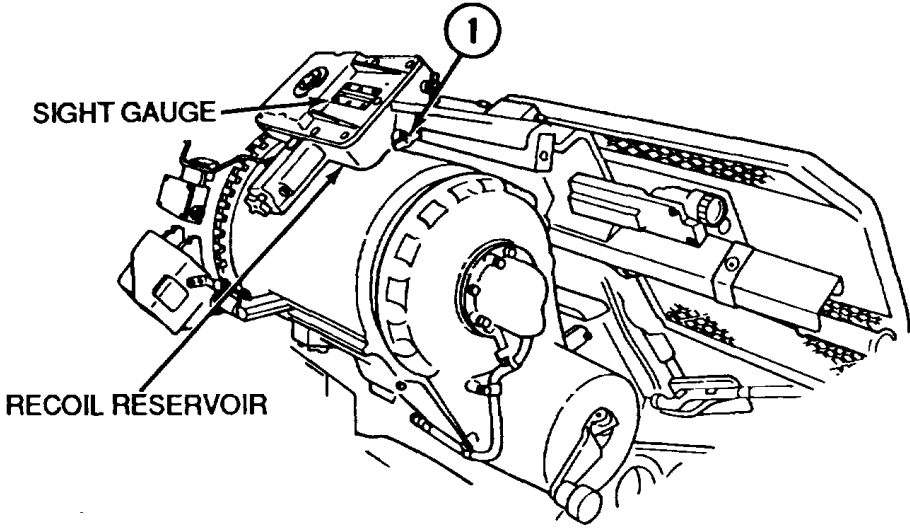
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
102	Weekly	J5 wiring harness	<p><u>Loader</u></p> <ul style="list-style-type: none">a. Check that two harness clamps (1) are secure and located on J5 harness (2) exactly as shown.b. Check that harness is not overstressed. <p>WARNING <i>Constant rubbing of the harness on the outer ring gear can cause shorting and a fire.</i></p> <ul style="list-style-type: none">c. As turret is being traversed and gun/launcher is elevated and depressed, check that J5 harness (2) does not contact or rub against outer ring near (3)	



ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
103	Monthly	Water barrier (M551 A1)	<p><u>All Crewmembers</u></p> <p>Erect water barrier.</p> <ol style="list-style-type: none"> a. Check that barrier is not torn. b. Check that all erector poles, brackets, straps, and locking pins are serviceable. c. Check that bilge pump outlet extension hose is serviceable. d. Check bilge pump operation by adjusting bilge pump lever up or down. 	<p>Water barrier is unserviceable.</p> <p>Any erector pole, bracket, strap, or locking pin is missing or unserviceable.</p> <p>Outlet hose is missing or unserviceable.</p>
104	Monthly	Turret traverse mechanism bolts	<p><u>Gunner/Driver</u></p> <ol style="list-style-type: none"> a. Position turret traverse mechanism over drivers compartment. b. Manually traverse turret left and right; have driver check for loose mechanism mounting bolts. 	
105	Monthly	Elevation mechanism mounting bolts	<p><u>Gunner/Driver</u></p> <ol style="list-style-type: none"> a. With elevating mechanism positioned over driver's compartment, manually elevate and depress gun" launcher. 	

Table 2-1. PMCS - Continued.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
105 cont.	Monthly	Elevation mechanism mounting bolts	b. Have driver look for loose bolts at top and bottom of mechanism.	
106	Monthly	Floor access covers	<u>Loader/Gunner</u> a. Raise turret floor access covers. b. Have gunner traverse turret 6400 mils; while traversing, check for debris or other obstructions that may catch and tear wiring harnesses. Remove any debris or obstructions.	
107	Monthly	Recoil mechanism reservoir moisture drain (M551A1)	<u>Loader</u> Elevate gun/launcher and open condensation drain valve (1); drain off any condensation.	



ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
108	Monthly	Smoke grenade launchers (M551A1)	<u>Commander/Gunner/Loader</u> a. Set grenade launcher switch to ON position and check that indicator light comes on. b. Set power switch to OFF position. c. Have loader/gunner check inside of launcher tubes for obstructions and/or damage. d. Have loader/gunner apply a light coat of oil (Appendix D, item 19) to inside of launcher tubes, being sure no oil gets on launcher solenoids.	

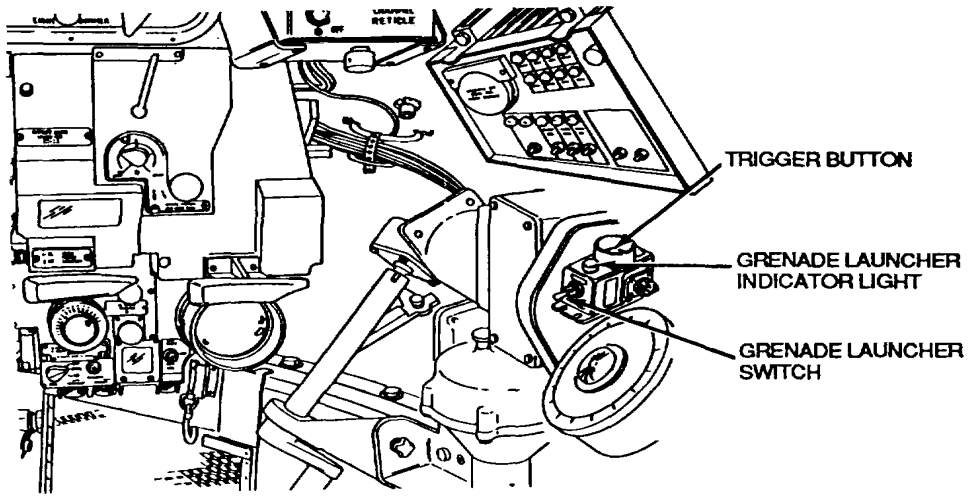
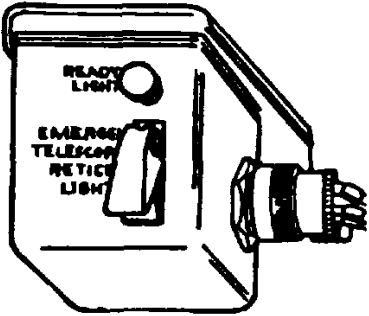


Table 2-1. PMCS - Continued.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	<u>CREWMEMBER</u> PROCEDURE	NOT FULLY MISSION CAPABLE IF:
109	Monthly	Dome lights	<u>All Crewmembers</u> Check operation of all dome lights. Check dimmer control and blackout on all lights. Replace bulbs as needed.	
110	Monthly	Emergency telescope reticle light power	<u>Gunner</u> a. Raise switch guard on emergency telescope reticle light box and turn emergency power switch on. b. Look into M127/M127A1 telescope eyepiece and check that emergency reticle appears. c. Adjust telescope reticle light knob and diopter knob as needed. d. Ensure authorized personnel replaces seal, if necessary.	



Section III. OPERATION UNDER USUAL CONDITIONS**2-7. GENERAL.**

a. This section contains instructions for operating the vehicle under usual conditions. Operation under unusual conditions is covered in Chapter 2, Section IV.

b. Before you start the engine and drive the vehicle, be sure to perform all the BEFORE PMCS procedures found in table 2-1.

WARNING

- Use caution until you are familiar with your vehicle.
- If a track is thrown while operating vehicle, do not apply brake; coast to a stop.
- During vehicle operation, wear ear plugs to prevent ear damage from engine noise.
- Do not move vehicle unless the hatches and doors are secured and equipment is properly stowed.

CAUTION

- Never leave your vehicle unattended while engine is running.
- Transmission must be shifted manually to prevent engine damage and overheating.

2-8. **ASSEMBLY AND PREPARATION FOR USE.** In order for the M551A1/M551NTC to fulfill its mission, the vehicle must be fully assembled and operational.

a. The vehicle should be delivered in a combat-ready and operational state, in which case the operator(s) need only ensure the operational state of the vehicle through inspections and checks prior to starting.

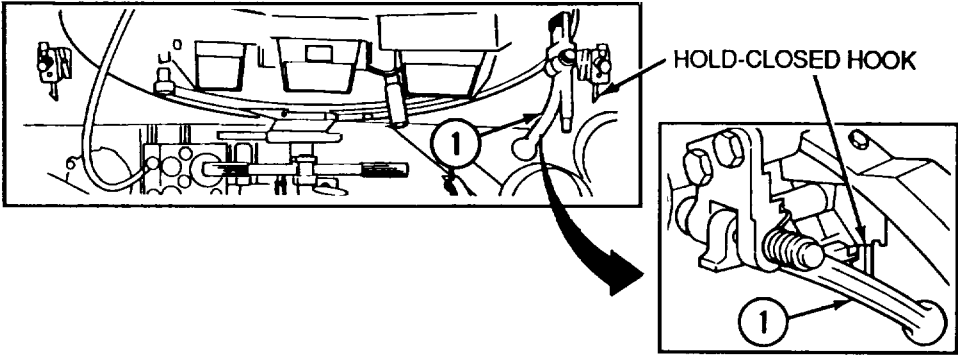
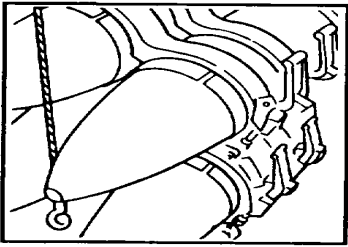
b. The vehicle must also be furnished with all items and articles specified in the BII list and the Components of End Item (COEI) list (see Appendix B). The vehicle operator(s) will use a checklist to inventory these items and ensure that all items are present in the correct amount.

c. All items must be either functionally mounted or stowed in their proper locations as specified in the operating procedures (see Appendix E).

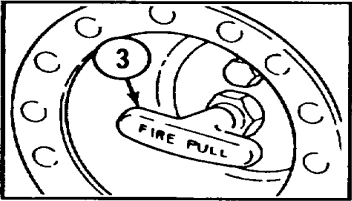
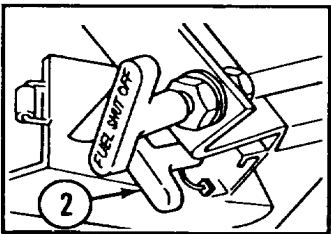
2-9. INITIAL ADJUSTMENTS AND CHECKS.

a. Prestarting Instructions.

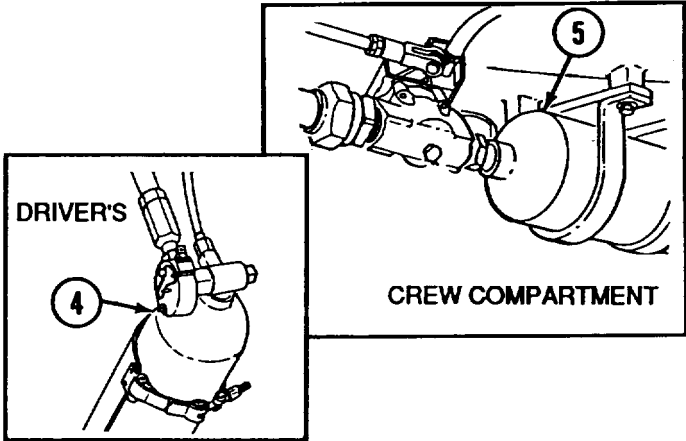
- (1) Perform BEFORE PMCS procedures presented in paragraph 2-6.
- (2) Secure turret traverse lock.
- (3) Make certain that missiles and ammunition are properly stowed.
- (4) Turn off all communication and accessory switches.
- (5) If required for night vision, install M48 periscope/DNV AN/WS- 2(V)3 (see paragraphs 2-26,b and 2-26,c).
- (6) Secure driver's hatch cover in open or closed position. Push lever (1) up to lock (down to unlock).



- (7) Open fuel tank valves at engine-to-turret bulkhead.
- (8) Make sure interior (2) and exterior (3) fire extinguisher actuating handles are safety wired.



- (9) Check safety wiring on drivers (4) and crew compartment (5) fire extinguishers (located behind driver and in turret).

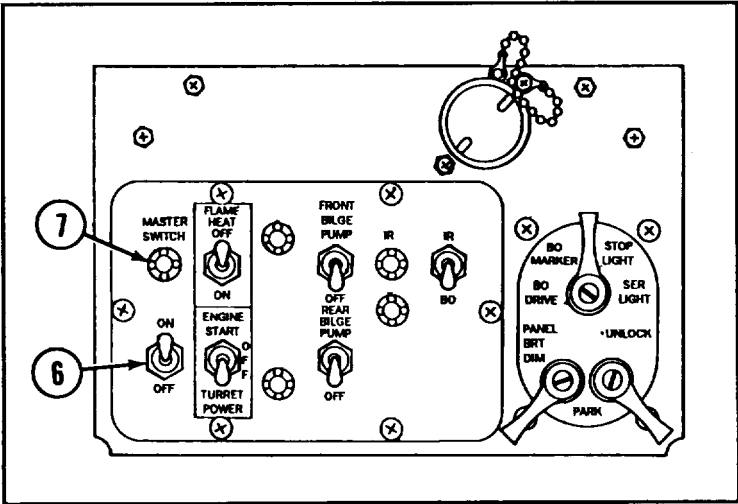


- (10) Know where portable fire extinguisher is located and how it works.

NOTE

See paragraph 2-29 for operation and maintenance of all fire extinguishers.

- (11) Turn MASTER SWITCH (6) on. MASTER SWITCH lamp (7) will light.

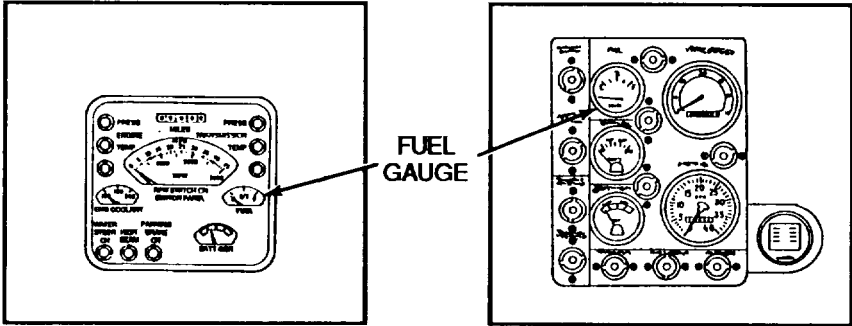


2-9. INITIAL ADJUSTMENTS AND CHECKS-Continued.

CAUTION

Do not run completely out of fuel. Injectors require full return flow for cooling.

(12) Check FUEL gauge. Add fuel if required.



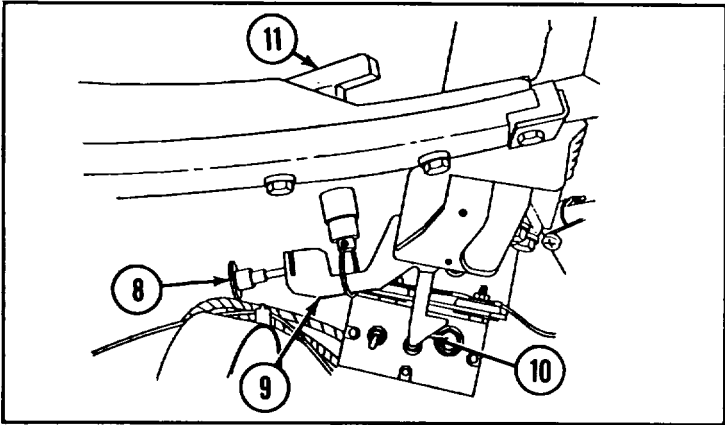
OLD

NEW

NOTE

Be sure you know how to operate your emergency outside latch release and the open position latch stop.

- (13) To open hatch from inside, pull out latch stop (8) and push up hook arm (9) to release latch hook (10).
- (14) To close hatch from inside, pull out latch stop (8) before rotating hatch to close and lock. Push in latch stop (8) to lock latch hook (10).
- (15) To open from outside, turn emergency outside latch release (11) counterclockwise six or more full turns, then pull up to release latch hook (10).
- (16) Reset by turning emergency outside latch release (11) clockwise six full turns.



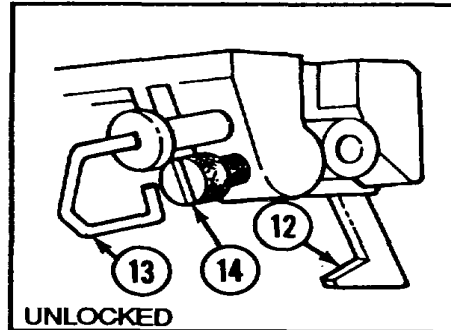
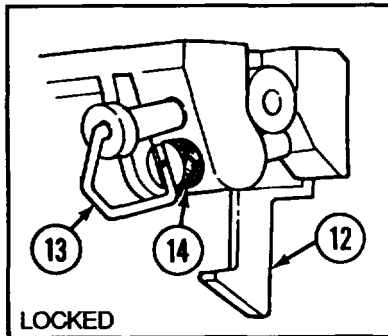
CAUTION

Always reset emergency outside latch release before operating vehicle.

- (17) To lock hatch cover open, push latch cover locking lever (12) to locked position. Then pull handle (13) clear of thumbscrew (14) notch and turn thumbscrew clockwise to locked position. Put handle (13) back in slot.
- (18) To close hatch cover, pull handle (13) clear of thumbscrew (14) notch and turn thumbscrew counterclockwise to unlocked position. Then release locking lever and rotate hatch cover.

WARNING

When operating vehicle with hatch open, handle and thumbscrew must be in locked position.



b. Check for Hydrostatic Lock.

NOTE

- Before starting, always check for hydrostatic lock by Intermittently bumping the starter switch with the fuel cutoff control pulled out (cutoff position).
- When hydrostatic lock is suspected or exists, stop cranking immediately and notify unit maintenance.

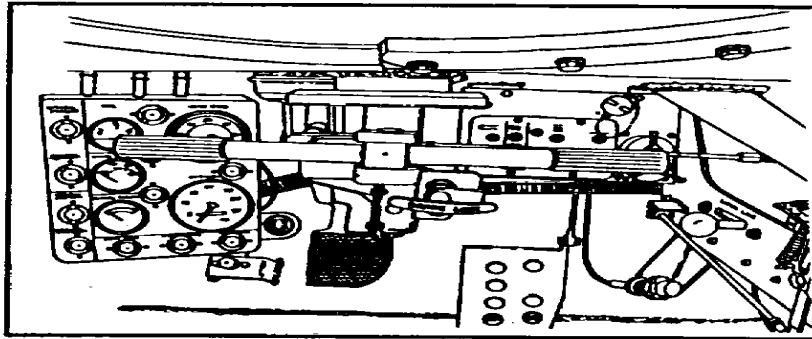
Indications of hydrostatic lock are:

- (1) Engine starts to turn over with the starter, then stops cranking.
- (2) When cranking the engine, the starter will sound as if it were straining.
- (3) Engine appears to be in bind-up.

2-9. INITIAL ADJUSTMENTS AND CHECKS-Continued.

c. Starting Vehicle.

- (1) Depress service brake pedal and pull out and up on parking BRAKE LOCK handle to set brake.
- (2) Pull WATER/LAND steer shift control to LAND.

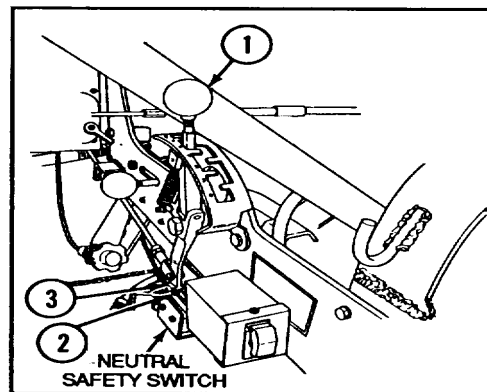


WARNING

- Maintain pressure on brake pedal when releasing brake.
 - Be sure WATER/LAND steer shift control is at LAND to prevent damage to transmission and possible loss of vehicle control
- (3) Place transmission shift control (1) to N (neutral).

CAUTION

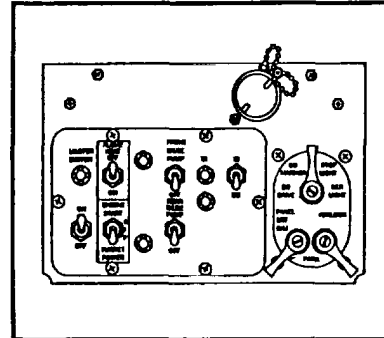
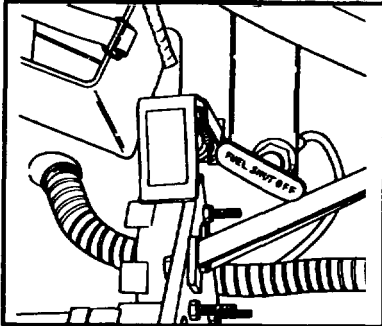
Neutral safety switch roller (2) should contact shift control lever (3) near center of actuating end when transmission shift control (1) is In neutral The switch roller (2) should not contact In any other shift position. If It does, notify unit maintenance.



(4) Push SPEED/RPM switch to RPM (M551NTC).

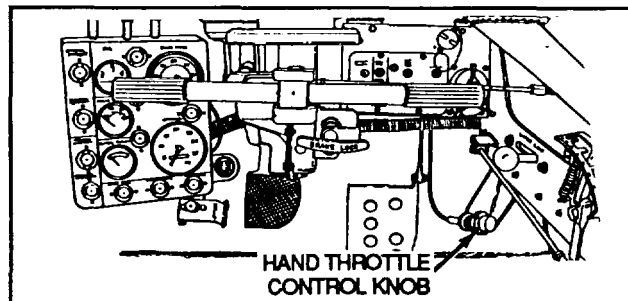
(5) Make sure FUEL SHUT OFF knob is pushed in.

(6) Push ENGINE START/TURRET POWER switch to ENGINE START.



CAUTION

- Do not crank engine for more than 30 seconds. If engine does not start within 30 seconds, wait 30 seconds before pushing ENGINE START/TURRET POWER switch again. If engine does not start after fifth attempt, see unit maintenance.
 - Check for hydrostatic lock (see paragraph 2-9,b above).
- (7) When engine starts, return ENGINE START/TURRET POWER switch to OFF position; pull out hand throttle control knob to fast idle for 5 seconds; and place ENGINE START/TURRET POWER switch to TURRET POWER position. Allow power plant to warm up (3 to 5 minutes).



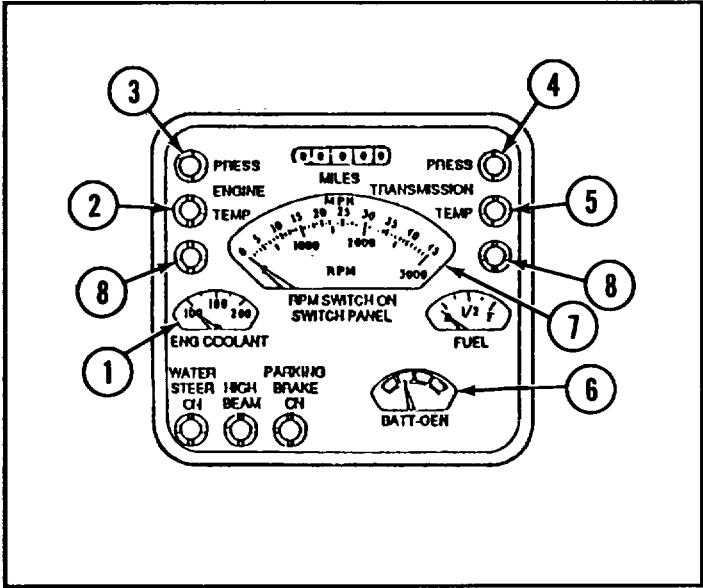
(8) During engine warm-up, refer to driver's indicator panel check procedure (see paragraph 2-9,d).

(9) Push SPEED/RPM switch to SPEED (M551NTC).

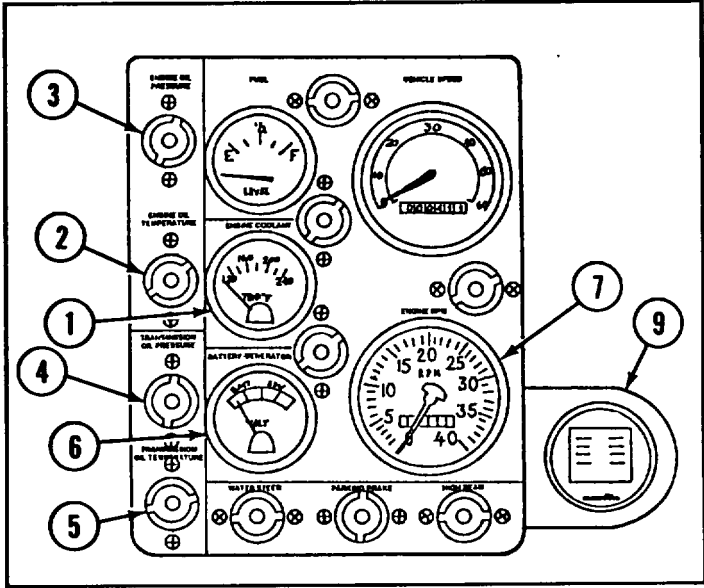
2-9. INITIAL ADJUSTMENTS AND CHECKS-Continued.

d. Driver's Indicator Panel Check Procedure.

Callout and Indicator	Purpose/Procedure
1. Engine coolant gauge	Indicates engine coolant temperature (175 to 210F is normal).
2. Engine temperature light	Indicates engine temperature. Lights if temperature reaches 2250F If light goes on, check engine coolant gauge (1), stop engine, and refer to troubleshooting (see Chapter 3, Section II).
3. Engine oil pressure light	Signals possible engine oil pressure problems If light stays on when engine is at fast idle, kill engine and start troubleshooting (see Chapter 3, Section II).
4. Transmission oil pressure light	Signals possible transmission oil pressure problems If light stays on when engine is at fast idle, kill engine and start troubleshooting (see Chapter 3, Section 11).
5. Transmission temperature	Signals possible overheating of transmission If light goes on, shift into neutral and idle at fast idle for 3 minutes; if light remains on, stop fast idle and notify unit maintenance.
6. Battery/generator gauge	Indicates generator charging If MASTER SWITCH is on and engine off, needle should be between NORMAL and LOW battery range If engine is running, needle should be in NORMAL range except for brief swing into OVERCHARGE range on startup If needle remains in yellow caution range or OVERCHARGE or SUBNORMAL range, stop engine and report to unit maintenance.
7. Tachometer	Indicates engine speed in rpm.
8. Panel lights, two (old)	Illuminate panel whenever MASTER SWITCH is on.
9. Air filter restriction gauge (new)	Indicates when air cleaner is restricted. When indicator is in red range, air cleaner needs servicing.



OLD



NEW

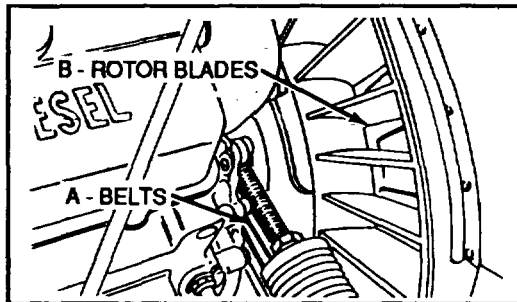
2-9. INITIAL ADJUSTMENTS AND CHECKS-Continued.**e. Fan-Clutch Functional Check with Cold Engine (Coolant Temperature below 100°F).**

- (1) Operate engine at idle speed.
- (2) Observe fan drive belt rotation at A.
- (3) Observe fan rotor blade rotation at B.
- (4) While observing belt and rotor rotation, have someone stop engine.
- (5) When drive belt rotation stops with a rocking action, fan rotor blades should continue to spin (freewheel) for a few seconds.

NOTE

Fan drive manual lock-up device must be disengaged at all times except during emergency operating condition.

- (6) If fan rotor does not freewheel, check fan drive manual lock-up device for proper DISENGAGED position.
- (7) If lock-up device is disengaged and rotor blades cannot be turned freely (by finger) when engine is cold, request detailed testing by unit maintenance.

**f. Fan-Clutch Functional Check with Hot Engine (Coolant Temperature above 175°F).**

- (1) Same procedures as for cold engine except that fan rotor blade will rotate with heavy drag at 180°F and will automatically lock at 225°F.
- (2) While observing belt and rotor blades during engine shutdown and checking that drive belts stop with rocking action, rotor should slow to a stop within 2 seconds.

- (3) With engine shut down (MASTER SWITCH at OFF and fuel cutoff pulled out), rotor should be difficult to move with a finger at 180°F.

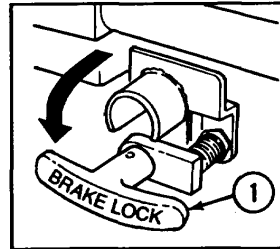
NOTE

Fan clutches without blue markings at rear of clutch will be operated in locked-up mode at all times.

g. Stopping Procedure.

- (1) Release accelerator and depress brake until vehicle stops.

- (2) With brake depressed, put shift lever in neutral. Pull out and down on parking BRAKE LOCK handle (1).



- (3) Push SPEED/RPM switch to RPM (M551 NTC).

- (4) Set hand throttle control knob to run engine at medium idle for 5 minutes to provide uniform distribution of engine heat.

- (5) Push hand throttle control knob in to return engine to normal idle.

- (6) Turn radio and all accessories off.

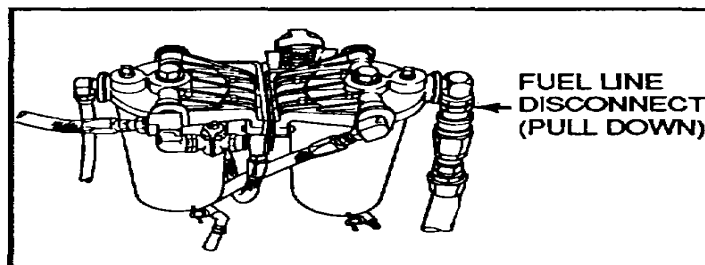
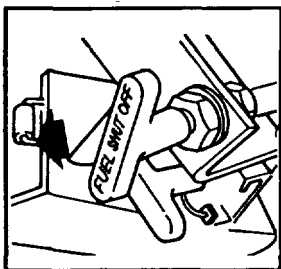
CAUTION

Do not apply excessive pull on FUEL SHUT OFF control handle.

NOTE

If FUEL SHUT OFF control handle doesn't stop engine, open engine exhaust grille and disconnect fuel line by pulling down at primary fuel filter.

- (7) Pull out FUEL SHUT OFF control handle (left of driver) to stop engine.



2-9. INITIAL ADJUSTMENTS AND CHECKS-Continued.

- (8) Turn MASTER SWITCH off.
- (9) Perform AFTER PMCS procedures found in table 2-1.

2-10. OPERATING PROCEDURES**a. Land and Water Operation.**

- (1) Operation on Land.

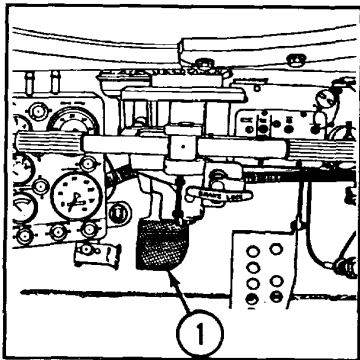
WARNING

If a track is thrown while operating vehicle, DO NOT apply brake. Coast to a stop.

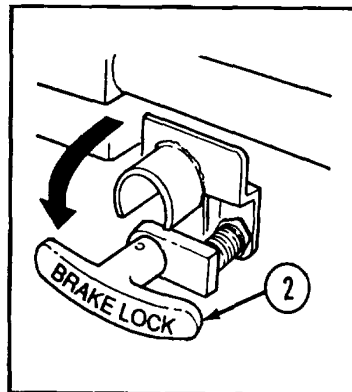
CAUTION

- Keep the gun/launcher straight forward when traveling through wooded areas to prevent damage to the grenade launchers.
- Never leave the driver's compartment while the engine is running.
- To prevent damage and overheating of the engine and transmission when starting from halt, begin with the transmission in the lowest range.

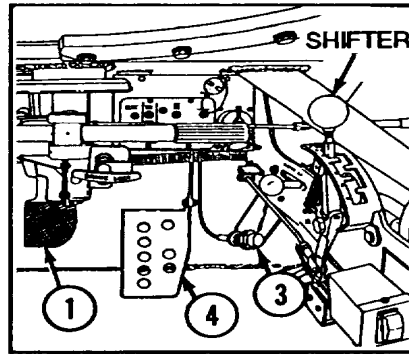
(a) Apply pressure on
brake pedal (1)



(b) Pull out and down on
BRAKE LOCK
handle (2) to release
brake.



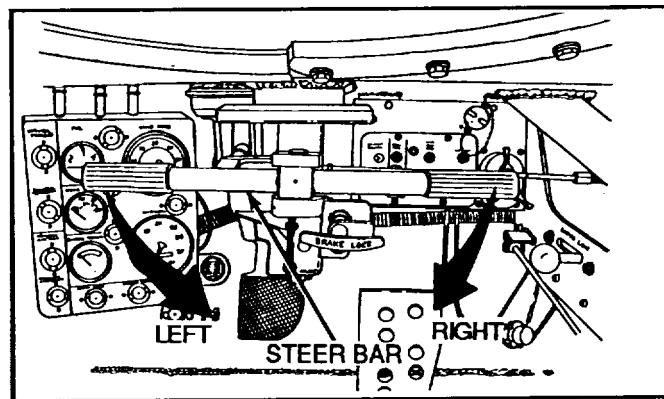
- (c) With brake pedal (1) depressed and hand throttle control knob (3) pushed in, shift from N to 1, release brake pedal (1), and step on accelerator pedal (4) to achieve desired speed. Shift from 1 through intermediate ranges to desired range.



CAUTION

Steer the vehicle with an even steady pull on the steer bar; jerking the steer bar may cause loss of control of the vehicle.

- (d) Turn to left (forward or reverse) by pulling on left end of steer bar.
- (e) Turn to right (forward or reverse) by pulling on right end of steer bar.



CAUTION

Shift In or out of reverse only after bringing the vehicle to a complete stop.

- (f) You can pivot steer in 1st (low) and in both reverse shift ranges during land driving.
- (g) Perform DURING PMCS procedures (see table 2-1), if tactical situation permits.

CAUTION

Do not drive below the specified minimum speed for each shift range or you'll overheat the transmission.

2-10. OPERATING PROCEDURES-Continued.

Operating Ranges

Shift Range	Minimum Speed	Maximum Speed	Ground Characteristics
1St (low)	0 mph	7 mph	Mud, snow, deep sand, steep grades
2nd	5 mph	10 mph	Semi-hard surface, moderate slopes
3rd	8 mph	19 mph	Hard surface, rolling terrain
4th	19 mph	40 mph	Flat and hard surfaces
1st	Reverse	5 mph	Use as required
2nd	Reverse	9 mph	Use as required

CAUTION

Do not down-shift above the specified maximum safe down-shift speed range or you'll damage the transmission.

Down-Shift Guide

Shift Range	Maximum Safe Speed
1st to neutral	3 mph
2nd to 1st	5 mph
3rd to 2nd	10 mph
4th to 3rd	19 mph
1st reverse to neutral	2 mph
2nd reverse to 1st reverse	5 mph

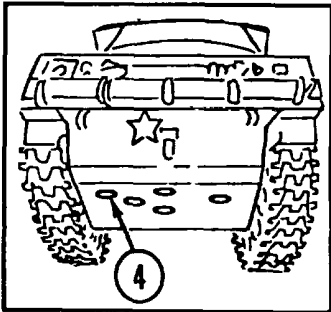
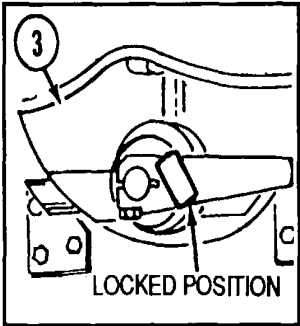
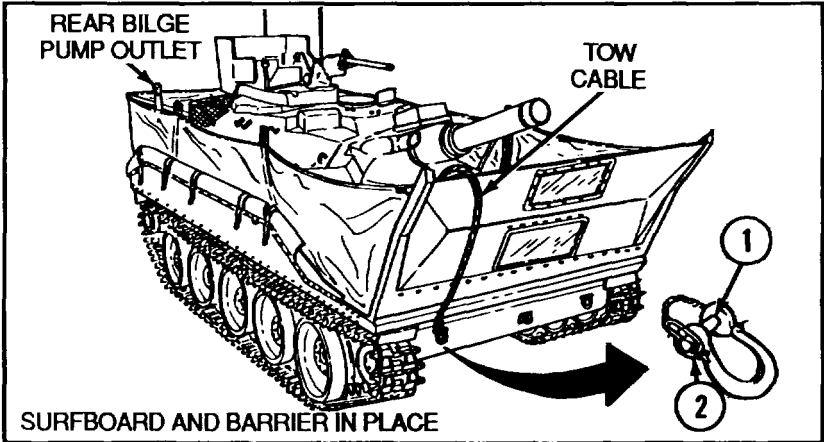
(2) Operation in Water (Swimming) (M551A1).

CAUTION

- When the vehicle is combat loaded, the equipment must be correctly stowed for proper balance in the water.
 - Attach the tow cable to the front or rear towing shackle before entering the water to be ready for emergency towing. Don't let the center portion of cable drag in the water.
- (a) Pre-operation checks and services. Perform BEFORE PMCS procedures (see table 2-1). Connect shackle to lugs with headed pins (1) and secure with retaining pin (2).

WARNING

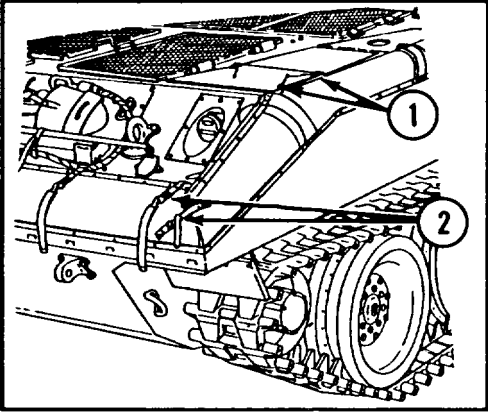
Be sure the driver's escape hatch (3) and five drain/access plugs (4) on hull bottom are secured.



2-10. OPERATING PROCEDURES-Continued.

(b) Erecting and securing surfboard and barrier.

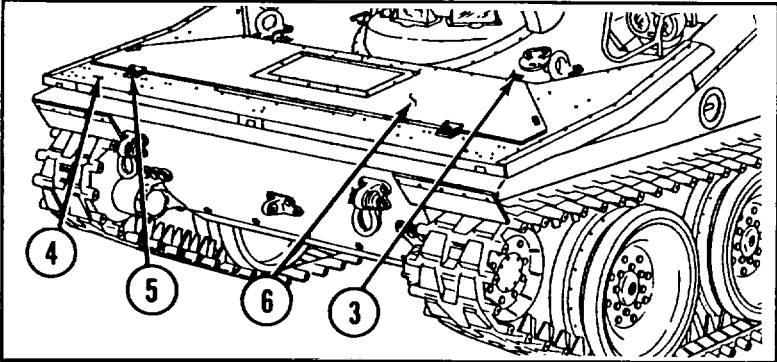
- 1. Release retaining straps from left and right barrier covers.
- 2. Pull out eight locking pins (1) securing side rear slope plate and rear barrier covers.
- 3. Unbuckle rear cover straps (2).
- 4. Pull side and rear barrier covers from stowed position and barriers from barrier tray.



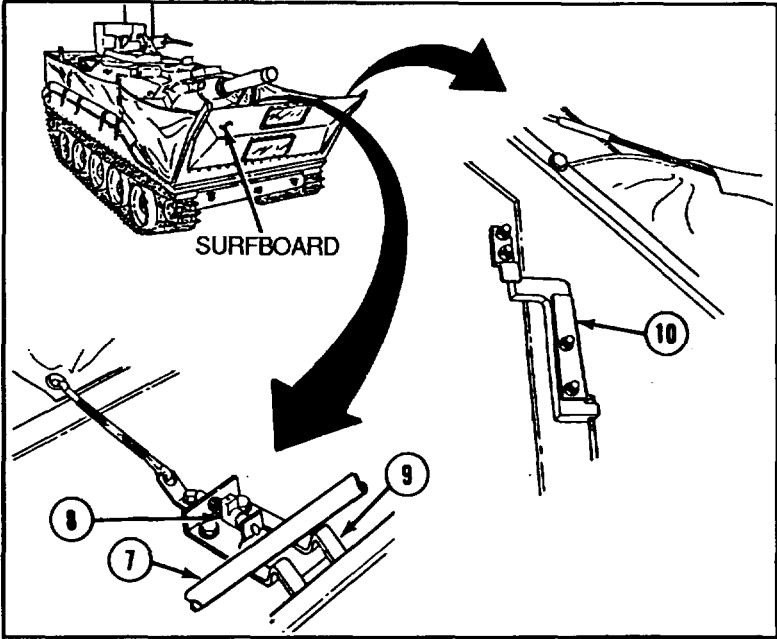
NOTE

Crew must now get up on the vehicle (two in front and two in rear) to erect the barrier correctly.

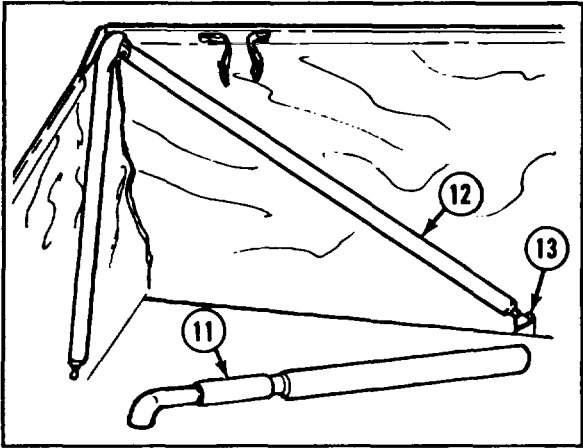
- 5. Loosen wing nuts (3) and rotate locking screws on surfboard (4).
- 6. Loosen wing nuts (5) on surfboard extension (6).



- 7. Raise surfboard and secure bar (7) by engaging release bracket trigger (8) over handle stop (9).
- 8. Raise surfboard extension and secure by engaging two latches (10). Remove inlet covers.

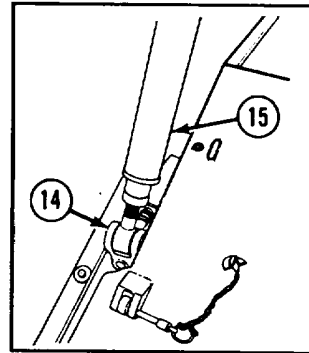


- 9. Remove two rear bilge pump outlet hoses (11) from diagonal supports (12).
- 10. Place two diagonal supports (12) into sockets (13). Make sure supports are seated.



2-10. OPERATING PROCEDURES-Continued.

11. Secure rear left barrier support by pulling out on plunger (14) and rotating support arm (15) into extended position until plunger snaps in and locks.



12. Each crewmember inserts one barrier side post (16) into square sockets provided in barrier trays.
13. Place straps (17) over top of post (16) and pull down through strap lock (18) to raise side barriers.
14. Remove water deflector (19) from front bilge pump outlet.
15. Attach end of hose (20) to post (16) with pin (21), and insert other end into outlet.
16. Insert rear bilge pump outlet hoses (22) and strap (23) to rear barrier.
17. Make certain drain holes in rear barrier tray are clear of debris.

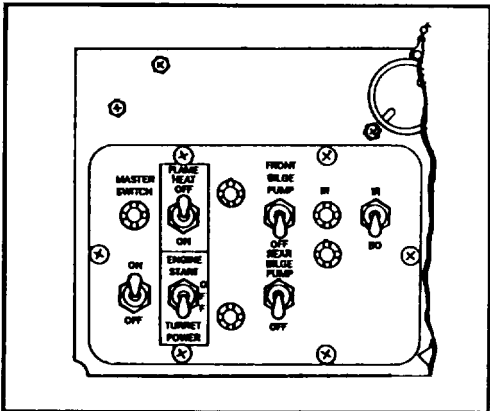
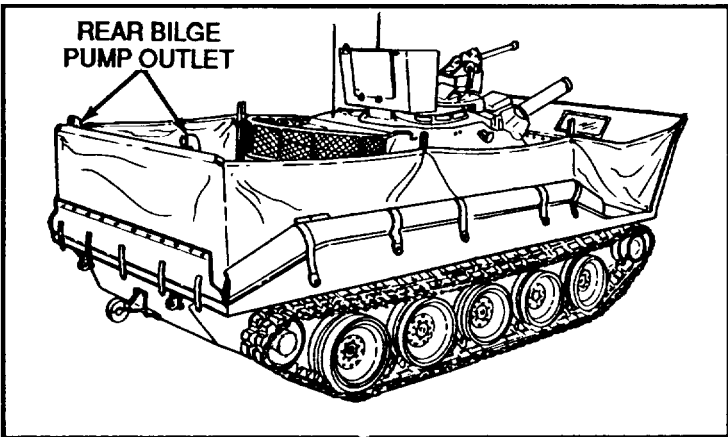
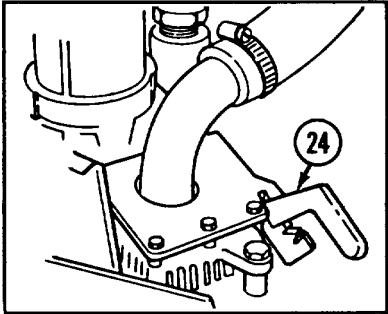
- 18. Check bilge operation by adjusting front bilge pump lever (24) as required (up evacuates surfboard cavity only, while down evacuates crew area only).

CAUTION

Do not operate the pumps for more than 15 minutes without the engine running.

NOTE

Reverse the procedure for vehicles serial numbered 1 through 139.



- 19. Turn MASTER SWITCH and BILGE PUMP switches on. Listen and make sure bilge pumps are working properly. If hull is dry, place hand over outlets to be sure air is being expelled.

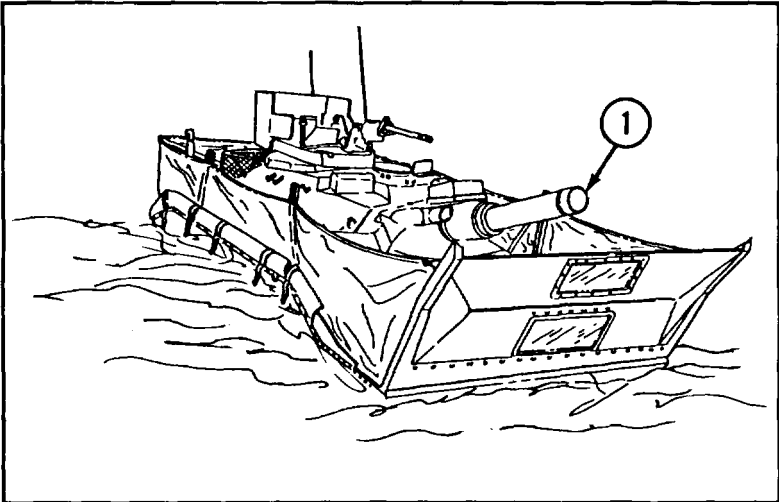
- 20. Turn BILGE PUMP switches to OFF and start engine.

2-10. OPERATING PROCEDURES-Continued.

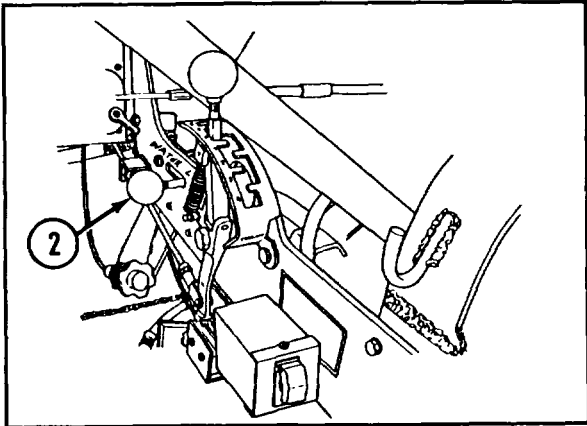
(c) Entering water with vehicle.

WARNING

So that the driver will have clearance If he has to evacuate the vehicle, elevate the gun (1) to about 90 mils and traverse to the left of the driver's hatch before entering water.



- 1. Push WATER/LAND steer shift control lever (2) forward to WATER position.
- 2. Shift into 1st.



Water Entry Precautions

- Select a gradual sloping bank of firm ground that is free of rocks, stumps, and debris to enter water. Avoid drop-offs into water, soft ground, or steep grades where vehicle may lose traction, bog down, or skid.
- Leave vehicle hatch covers open while entering water and during amphibious operation.
- If vehicle must be towed in water, do not exceed 5 mph.
- Ten mph is maximum safe water entry speed from gradual slopes:



- Five mph is maximum entry speed from medium slopes:



- Ease vehicle into water from steeper slopes. The vehicle front will become buoyant before entry is completed.



- Avoid entering at steep slopes if at all possible. High speed entries from slopes can cause failure of flotation components and, possibly, injury to the crew. You could swamp the vehicle.

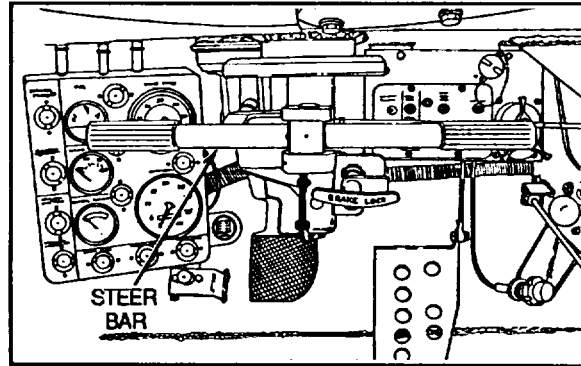
3. Drive vehicle carefully into water.

WARNING

- If a solid stream of water continues to flow from the bilge pump outlets, get your vehicle back on land and determine cause of leakage.
- If the engine stops and cannot be restarted immediately, prepare to evacuate. In case the vehicle starts sinking.

2-10. OPERATING PROCEDURES-Continued.

4. Immediately upon entering water, turn BILGE PUMP switches on and shift into 3rd range for best performance.
- (d) Driving in water. When turning vehicle, return steer bar to center position before turn is completed. Momentum of vehicle will complete turn. To get maximum turning response: let up on accelerator pedal, turn steering bar, then accelerate.

**NOTE**

Propulsion and steering are the same In water and on land.

(e) Stopping in water.

1. Release accelerator pedal and apply brake to stop tracks.
2. Shift to R2 (reverse). Release brake and gently accelerate.

NOTE

When traveling In reverse, the vehicle Is stopped the same way, except shift lever Is moved to 1st.

3. Release accelerator pedal when forward motion is stopped; shift to N.

(f) Leaving water.**CAUTION**

- Leave water via hard ground that Is free of obstacles.
- Avoid soft banks or steep slopes where the vehicle may bog down or stall.

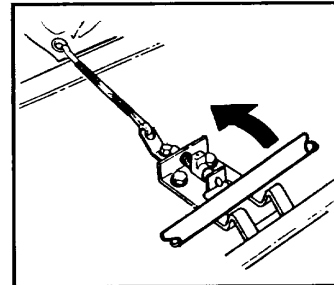
1. Approach bank squarely and ease up on accelerator to reduce track speed, allowing vehicle to coast until tracks contact solid ground.
2. Return WATER/LAND steer shift control lever to LAND position and proceed to land in 1st.

CAUTION

- If the vehicle has been submerged, notify unit maintenance to retrieve it.
 - After the vehicle is back on land, remove the hull access plugs and the driver's escape hatch.
 - Immediately, before any further operation, notify unit maintenance for servicing.
3. Stop vehicle when clear of water and on firm footing. Clear tracks and wheels of any debris.
 4. Turn bilge pumps off when all water possible has been removed from vehicle. Stop engine. If there is still water on the floor, loosen driver's escape hatch sufficiently to break seal and allow water to drain.

WARNING

Immediately move your hands clear when retracting the surfboard.



5. Retract surfboard and barrier by reversing procedure 2-10,b above.

6. Inspect suspension components and any other component which may have gotten wet. Service according to lubrication chart (reference LO 9-2350230-12).

b. Vehicle Towing.

WARNING

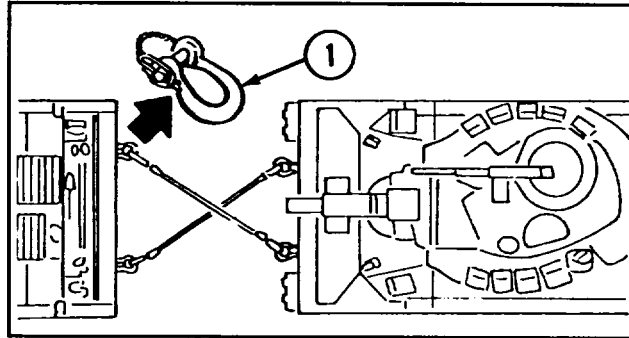
If drive shafts have been removed, use the tow bar only. You won't be able to steer or brake the vehicle.

2-10. OPERATING PROCEDURES-Continued.**NOTE**

If the vehicle is to be towed more than a 1/4 mile or if the sprocket drive shafts or transmission are damaged, notify unit maintenance.

(1) Towing a Disabled Vehicle on Land.

- (a) Connect tow cable shackles (1) to lugs (with headed and retaining pins) or connect tow bar to pintle (2) (with nut, washer, and cotter pin).

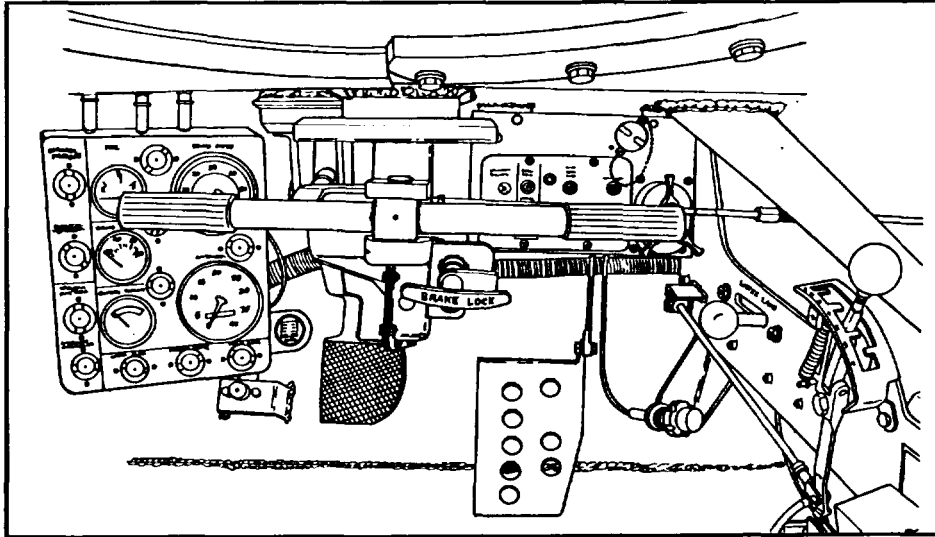


- (b) Shift to N.
(c) Release brake and signal towing vehicle.
(d) Start towing operation slowly and smoothly.

NOTE

In an emergency, the vehicle may be towed in forward or reverse for a 1/4 mile at no more than 5 mph.

- (2) Vehicle Towing to Manually Start Engine.
 - (a) Connect tow bar or tow cables (see paragraph 2-10,b,1).
 - (b) Shift into 2nd.
 - (c) Turn vehicle MASTER SWITCH on.
 - (d) Move WATER/LAND steer shift control lever to LAND.
 - (e) Depress brake pedal and release parking BRAKE LOCK. Release brake pedal.



WARNING

Never attempt turns at speeds over 5 mph and never depress the accelerator pedal on a towed vehicle.

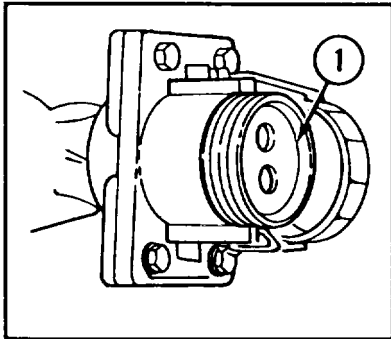
- (f) Tow vehicle in a straight line 6 to 19 mph to start engine.
 - (g) After engine starts, stop vehicle, shift to N, and adjust hand throttle control knob to run engine at fast idle.
 - (h) Disconnect towing vehicle.
- (3) Slave Start of Engine.

WARNING

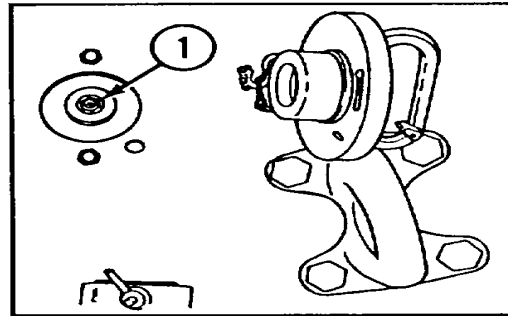
Do not allow personnel between the vehicles during the slave start operation.

2-10. OPERATING PROCEDURES-Continued.

- (a) Connect slave cable to stalled vehicle's auxiliary power receptacle (1) and to another vehicle or other power source.



OLD



NEW

CAUTION

- Polarity and voltage (24 V) must be identical in both vehicles.
- Be sure the vehicle MASTER SWITCH is at OFF in the stalled vehicle. All accessories must be off.

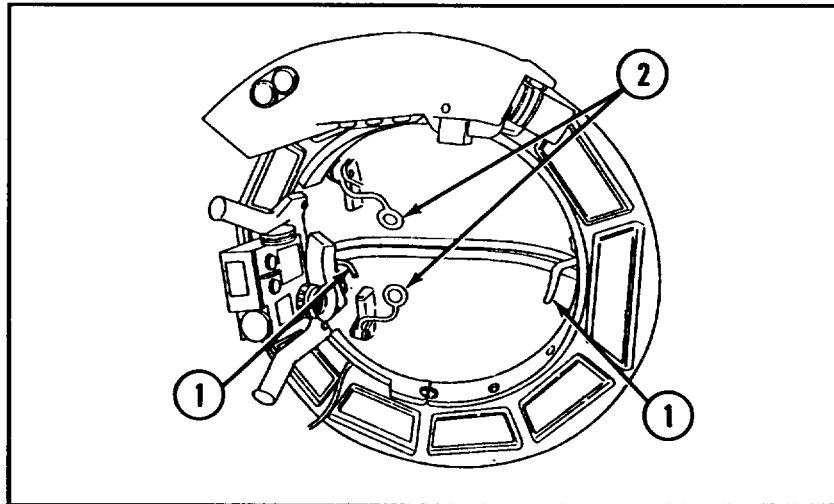
- (b) Shift to N and set parking brake.
- (c) Start engine of starting vehicle or power source and adjust throttle.

NOTE

- When using another M551A 1/M551NTC vehicle for the slave starting source, adjust the throttle control knob until the engine is at fast idle before cranking the stalled vehicle.
 - Do not speed up the engine during slave start.
 - Engine speed will decrease and the battery-generator indicator will normally drop into the yellow or red band during slave starting.
- (d) Press stalled vehicle ENGINE START/TURRET POWER switch.
- (e) When stalled engine starts, increase engine idle in starting vehicle.
- (f) Disconnect slave cable and quickly turn on MASTER SWITCH in vehicle being started.

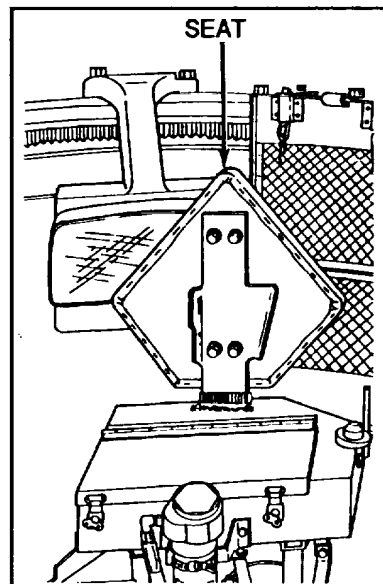
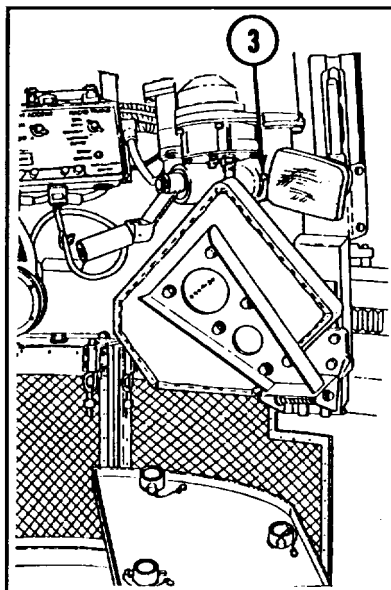
c. Operating Turret Controls and Components.

- (1) Commander's Split Hatch Doors. To open the commander's split hatch doors, turn two locking levers (1), pull down on release levers (2), and push open.

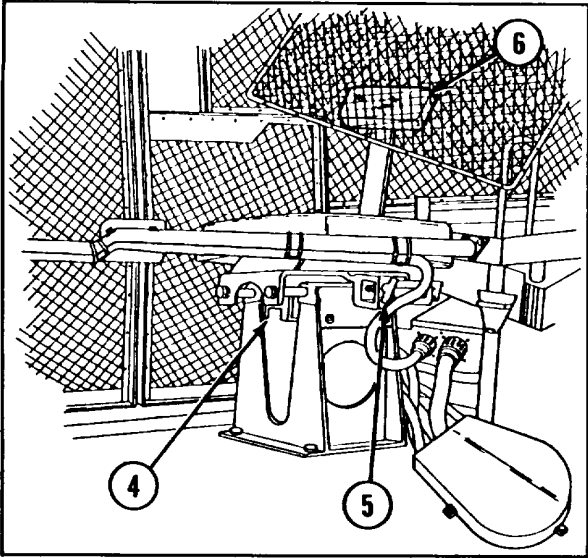


- (2) Commander's Seat. To adjust height of commander's seat, sit on seat and pull up on lever (3). At desired height, release lever.

- (3) Loader's Seat. Seat is spring loaded. Pull down to sit.

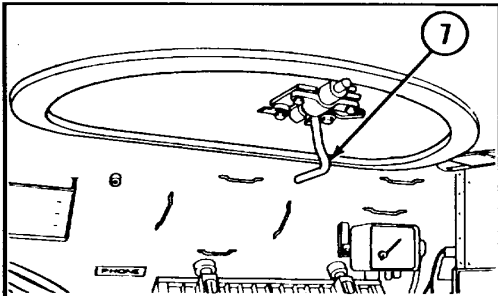


2-10. OPERATING PROCEDURES-Continued.

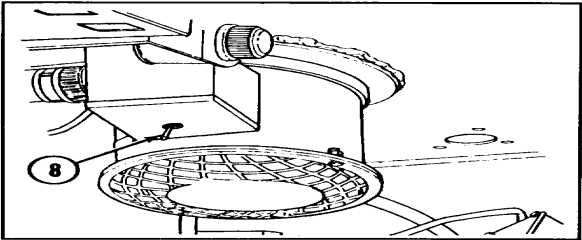


(4) Gunner's Seat. Adjust gunner's seat up or down with vertical adjustment handle (4); adjust forward or backward with horizontal adjustment handle (5). Back rest (6) is removable.

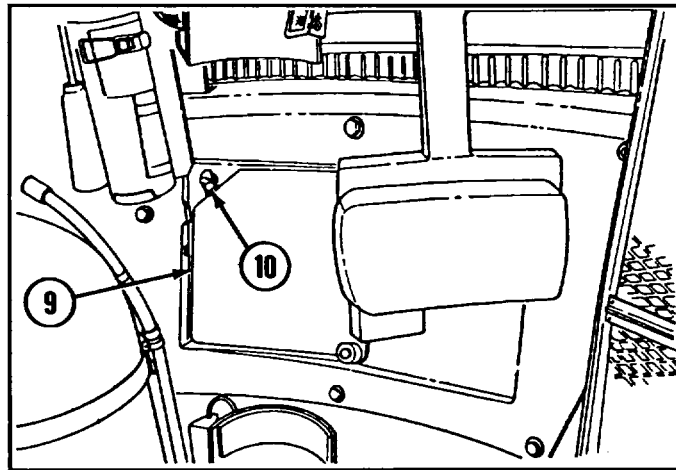
(5) Loader's Hatch Cover. Open loader's hatch by pulling out locking lever (7) and pushing up on cover.



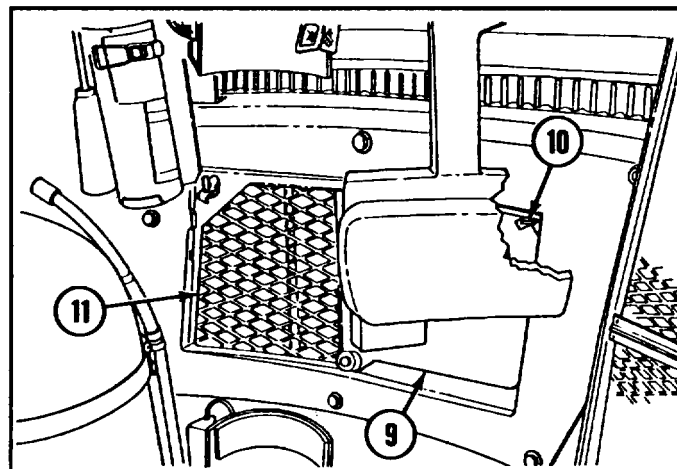
(6) Turret Ventilating Fan Ventilates turret when firing; turn fan on with switch (8).



- (7) Turret Bulkhead Opening. (a) For cold weather operation, pivot solid panel (9) over opening and lock with latch (10).



- (b) For increased ventilation, pivot solid panel (9) back and leave grille panel (11) over opening. Lock with latch (10).



- (8) Commanders Control Handle.

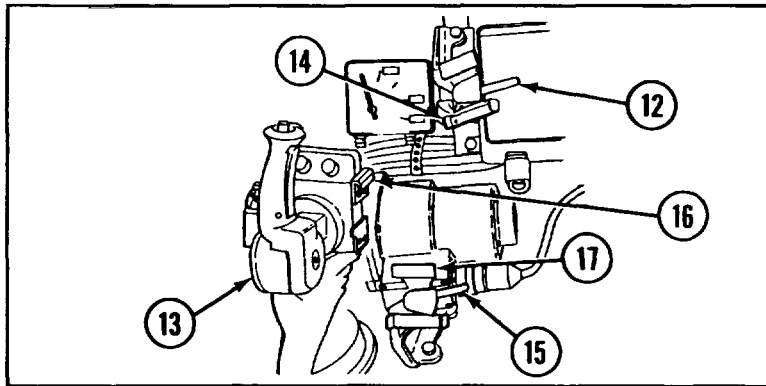
- (a) Operation. Operate commanders control handle from upper bracket while standing. When seated, move control handle to lower bracket.

2-105

2-10. OPERATING PROCEDURES-Continued.

- (b) Removal from upper bracket.
1. Raise locking lever (12) against stop to release control handle (13).
 2. Remove handle (13) from upper bracket (14).
- (c) Installation on lower bracket.
1. Raise locking lever (15) against stop.

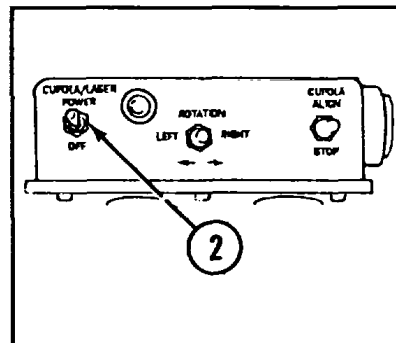
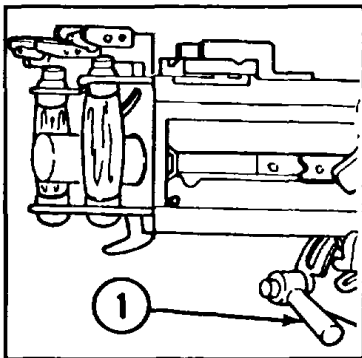
2. Hook block (16) over mounting plate (17) on lower bracket.
3. Push lever (15) down to lock control handle in place on lower bracket.



d. Traversing Cupola.

(1) Electrically Traversing Cupola.

- (a) Tell driver to turn on MASTER SWITCH.
- (b) For operation inside cupola:
 1. Place machine gun in travel-lock position (1).
 2. Push CUPOLAILASER switch (2) to POWER.



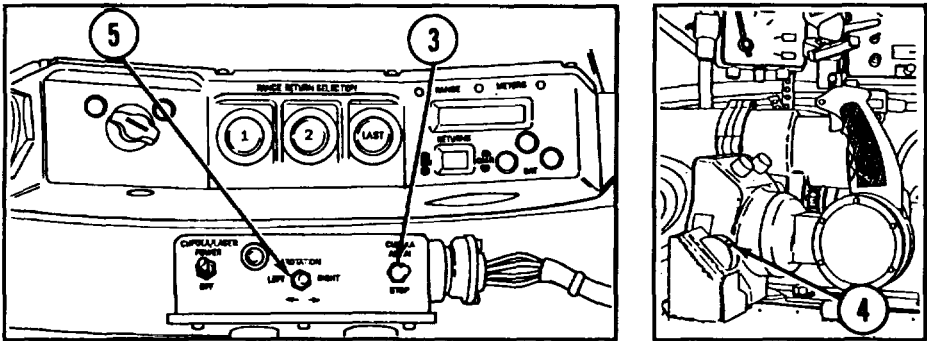
CAUTION

Maximum continuous electrical operation of cupola is 2 minutes out of every 10 minutes.

NOTE

You can also traverse the cupola by pushing up on the CUPOLA ALIGN switch (3) at the box or the CUPOLA ALIGN switch (4) next to the commander's control handle. Either switch will traverse the cupola until the LRF is approximately aligned with the gun launcher. Pushing either of these switches down to STOP halts the cupola before it is aligned. If the cupola doesn't stop, perform PMCS (see Chapter 2, Section II).

- 3. Push ROTATION switch (5) RIGHT or LEFT according to desired traversing direction.

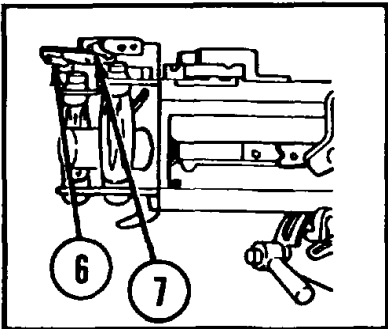


NOTE

Some vehicles are equipped with left and right control buttons instead of switches.

- (c) For operation outside cupola:

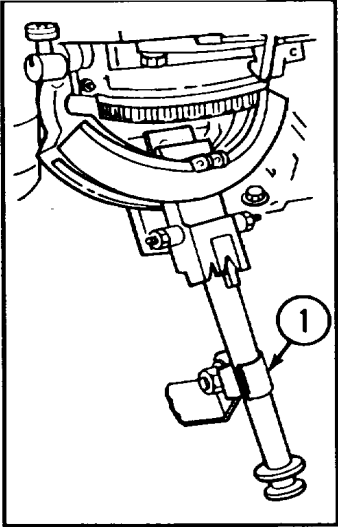
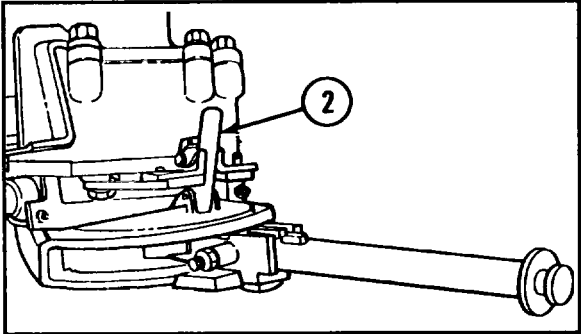
- 1. Traverse left by holding left switch (6) up and releasing it at desired cupola alignment.
- 2. Traverse right by holding right switch (7) up and releasing it at desired cupola alignment.



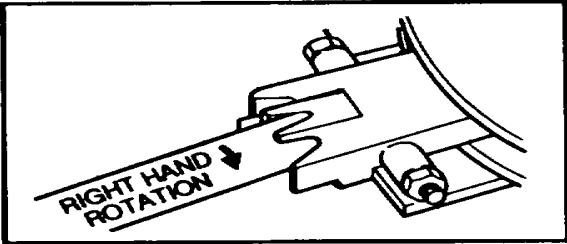
2-10. OPERATING PROCEDURES-Continued.

(2) Manually Traversing Cupola (M551NTC).

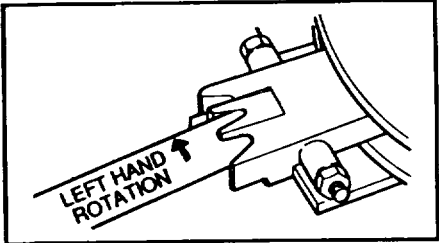
- (a) Check loaders hatch: it should be secured open or closed.
- (b) Check turret roof. Make sure all personnel are clear of path of cal .50 machine gun.
- (c) Release handle from clip (1).
- (d) Pull handle up to engage latch (2).



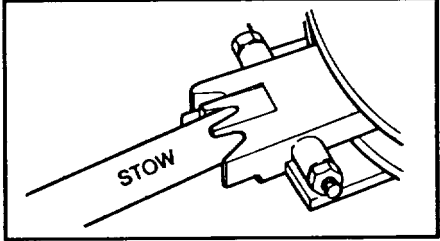
- (e) To traverse right, pull out on handle and turn to RIGHT HAND ROTATION; then move ratchet handle to right.



- (f) To traverse left, pull out on handle and turn to LEFT HAND ROTATION; then move ratchet handle to left.

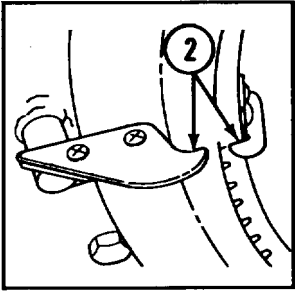
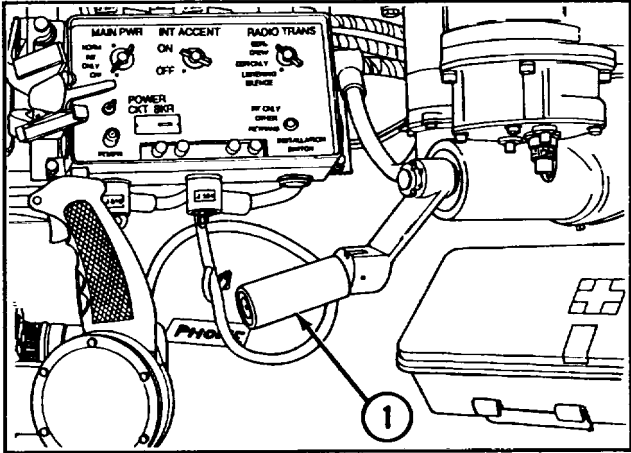


(g) To stow, pull out on handle and turn to STOW. Release handle from latch and snap into clip.



(3) Manually Traversing Cupola (M551A1).

- (a) Check loader's hatch: it should be secured.
- (b) Check turret roof. Make sure all personnel are clear of path of cal .50 machine gun.
- (c) Push down handle (1) to operating position.
- (d) Turn handle (1) to traverse right or left. To align LRF with gun/launcher, turn handle until index pointers (2) match up.
- (e) When desired position is reached, replace handle in stowed position.



2-10. OPERATING PROCEDURES-Continued.

- e. Traversing Turret and Elevating/Depressing Gun.

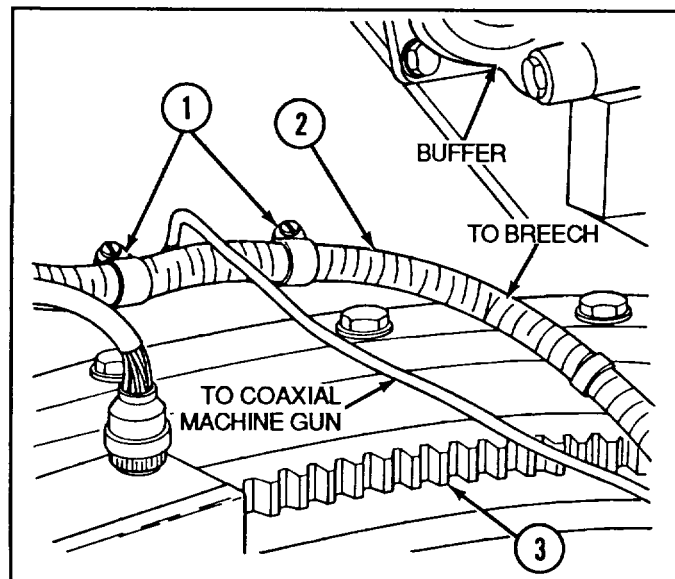
WARNING

Clamps (1) must be secure and located on the J5 breech wiring harness (2) exactly as shown. If not, elevating/depressing and traversing could cause wear of harness against outer ring gear (3). This could lead to a premature fire.

- (1) Before Traversing Turret and Elevating/Depressing Gun While elevating/depressing and traversing, check J5 wiring harness (2) to insure: (a) Harness is not overstressed; clamps (1) remain secure.
- (b) Harness does not contact outer ring gear (3).

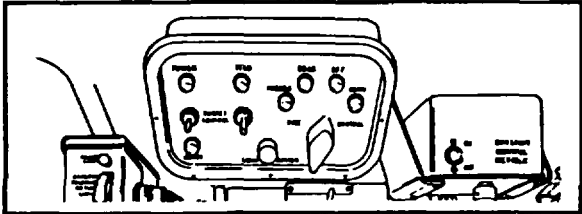
NOTE

Coaxial machine gun, mountings, and hardware removed for clarity In following Illustration.

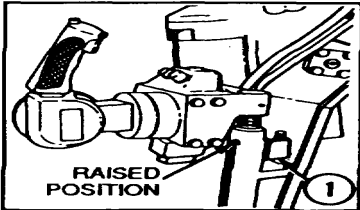
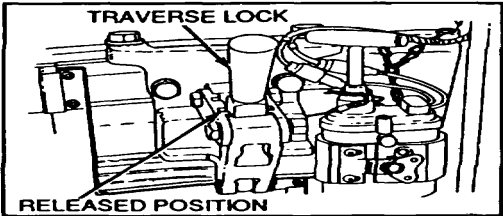


(2) Electrically Traversing Turret and Elevating/Depressing Gun

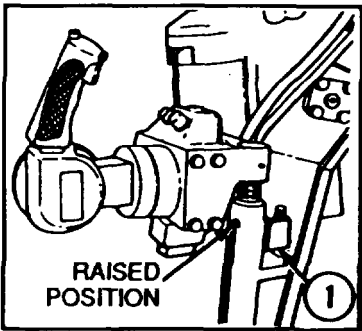
- (a) Make sure all personnel are in safe positions and clear of gun launcher and turret ring. Announce "POWER" to alert crew before engaging palm switches. Ensure all grilles and covers (in path of gun/launcher) are down and secured.
- (b) Check control selector panel. Make sure TURRET CONTROL switch, STAB switch, and FIRE CONTROL selector are off.



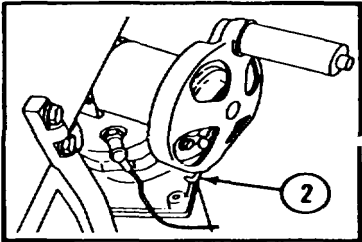
- (c) Release turret traverse lock. Push down and pull towards you 10 release turret traverse lock.



- (d) If gunners control handle is in lowered position, press lock release lever (1) and pull handle up to raised position.

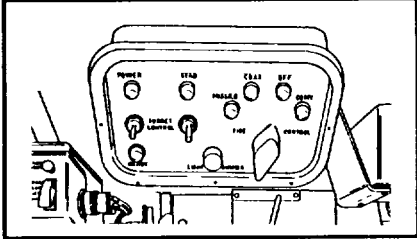


- (e) Make sure elevation handwheel is secured with locking pin (2).

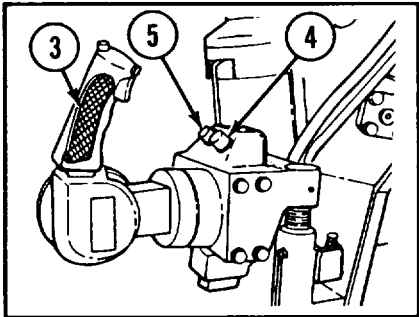


2-10. OPERATING PROCEDURES-Continued.

- (f) Tell driver to start engine. To be sure you have enough voltage, keep engine at fast idle.
- (g) Announce POWER, then turn TURRET CONTROL switch on. POWER lamp will light. Wait about 20 seconds until READY lamp lights.

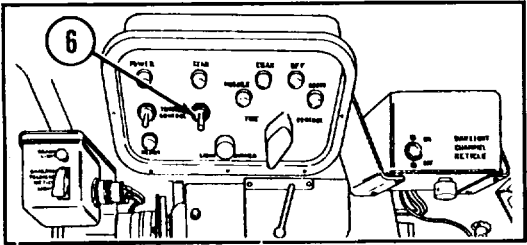


- (h) Without moving gunner's control handle, depress palm switch (3). If gun drifts up or down, trim out with ELEV button (4); if turret drifts, trim out with TRAV button (5). Now do the same at commander's control handle.



CAUTION

- The turret may move suddenly when the STAB switch is placed in the on position. Before using, alert all crewmembers.
- In the STAB mode, oscillation of the gun/launcher is normal in the extreme ELEVATE/DEPRESS position.



- (i) If stabilized mode is desired, turn STAB switch (6) on.

CAUTION

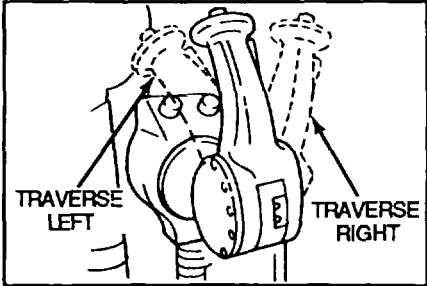
- If you elevate or depress the gun/launcher to its maximum, the contact limit switches will halt further movement. However, if these switches fail, the gun/launcher will elevate/depress until halted by mechanical stops. If this happens, immediately stop and back off to prevent damage to the servomotor and motor-generator. You'll recognize a stalled servomotor by a high pitched sound and/or burning odor from the motor-generator; if this happens, notify unit maintenance.
- When electrically traversing the turret, or elevating/depressing the gun, the key words are EASY DOES IT. To avoid damage to electrical and mechanical turret components, always practice the following DO's and DON'Ts.
- DO-press the palm switch before moving the control handle-this allows the motor-generator to build up speed and to disengage the magnetic clutches.
- DC-move the control handle gently and smoothly.
- DO-accelerate the speed of the turret and gun evenly.
- DO-return the control handle to the neutral position before releasing the palm switch.
- DON'T-suddenly reverse the control handle from full right to full left or from full left to full right. The same caution applies when elevating or depressing the gun.
- DON'T-suddenly release the control handle allowing it to spring back to neutral.

NOTE

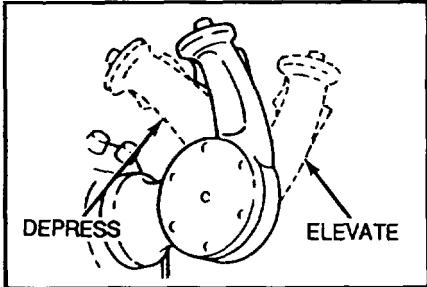
To maintain a stabilized mode, keep pressing the palm switch. This, in effect, automatically provides a stable, space-oriented gun/launcher. The gunner can now aim and track the target with relative ease, even when the vehicle is moving over rough terrain.

2-10. OPERATING PROCEDURES-Continued.

(j) To traverse turret, press palm switch and push handle left (traverse left) or right (traverse right).



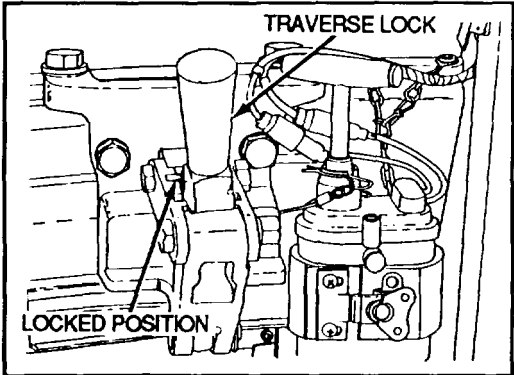
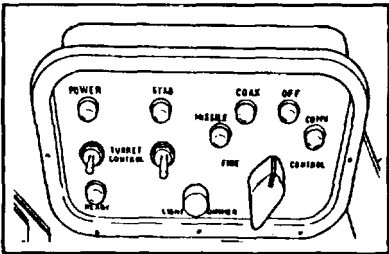
(k) To elevate/depress gun, press palm switch and push handle forward (depress or mill backward (elevate}).



NOTE

Commander can take charge and override the gunner by pressing his palm switch. He can elevate/depress, traverse, and fire the gun in either nonSTAB or STAB mode.

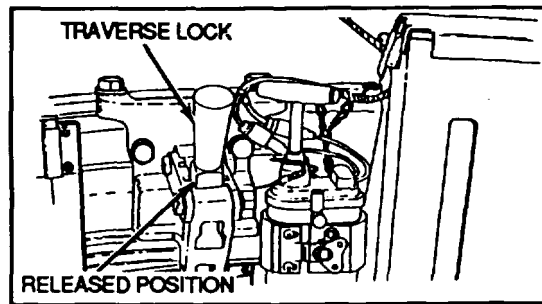
(l) When desired turret and gun positions are reached, turn STAB and TURRET CONTROL switches off and lock turret



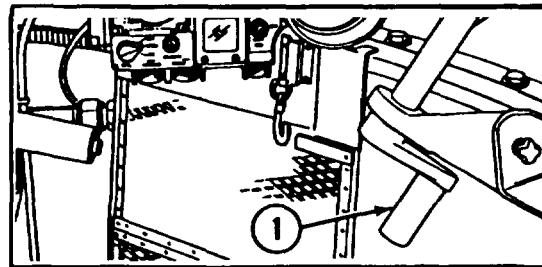
(3) Manually Traversing Turret and Elevating/Depressing Gun.

(a) Traversing turret.

1. Make sure all personnel are in safe positions and clear of gun/launcher and turret ring. Announce 'POWERS to alert crew before engaging palm switches. Ensure all grilles and covers (in path of gun/launcher) are down and secured.
2. down lever and place turret traverse lock in released position.



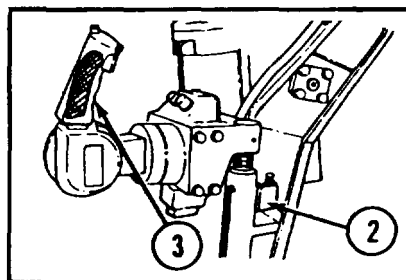
3. Traverse turret by cranking traverse handle (1).



4. When desired position is reached, lock turret with turret traverse lock.

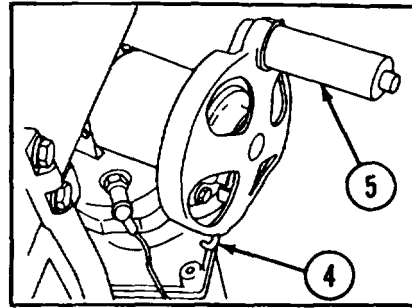
(b) Elevating/depressing gun/launcher.

1. Press adjustment lever (2) and push gunner's control handle (3) down to lowered position.



2-10. OPERATING PROCEDURES-Continued.

2. Pull out on locking pin (4)-elevate or depress gun by cranking handwheel (5).
3. When desired position is reached, lock pin (4). Make sure pin engages in receptacle.



2-11. OPERATION OF FIRE CONTROL EQUIPMENT.

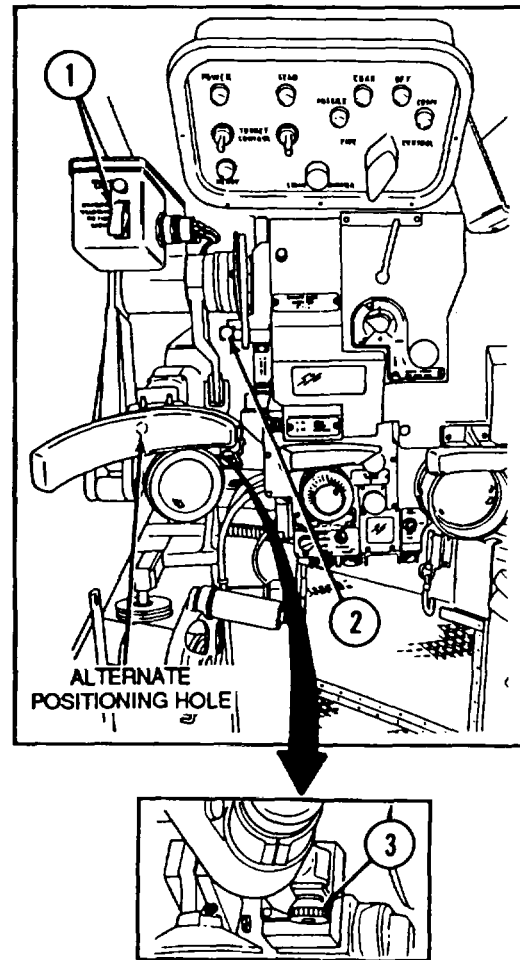
a. Operation of Telescope M127/M127A1.

- (1) Tell driver to turn on vehicle MASTER SWITCH and ENGINE START/TURRET POWER switch to TURRET POWER.
- (2) Adjust headrest to suit your eye if original setting isn't OK, remove headrest and reposition it.
- (3) Turn FIRE CONTROL selector to desired firing mode: CONV, MISSILE, or COAX.

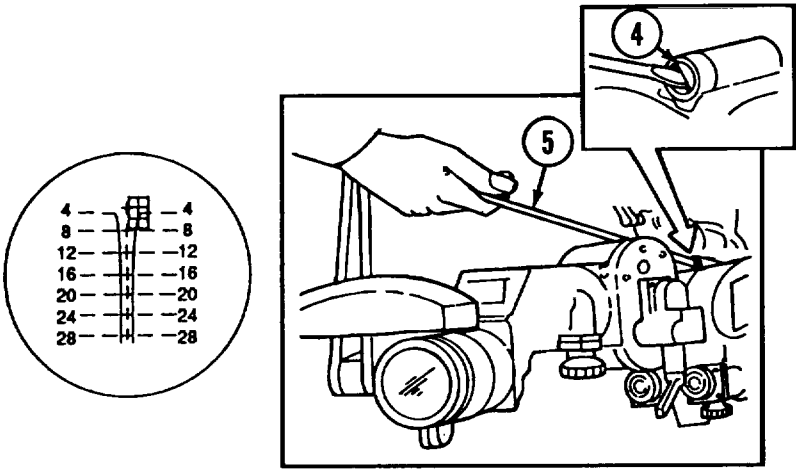
NOTE

If you've got an electrical problem, use the emergency power. Pull out on guard (1) to break safety wire and turn on switch.

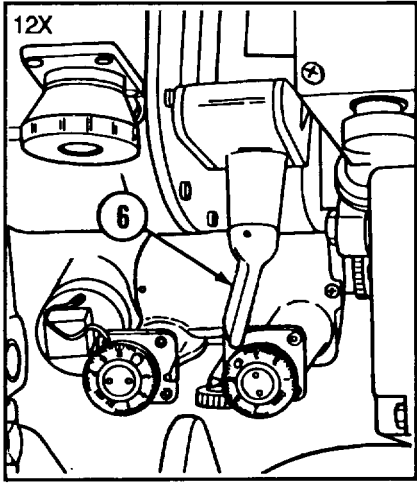
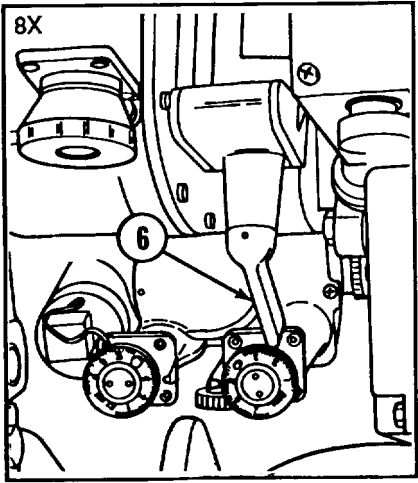
- (4) Look into telescope and adjust reticle light knob (2). Now adjust diopter knob (3) by pulling down and turning until you get the best image.



- (5) Look through telescope and concentrate on vertical reference line and a distant aiming point. Move your head up and down and sideways. If reticle marking on target seems to move, adjust parallax screw (4) (in or out) with long screwdriver (5) (Appendix B. item 62).



- (6) You can select 8 or 12-power magnification. With selector lever (6) away from you, you're at 8-power. Pull lever toward you and you're at 12-power.

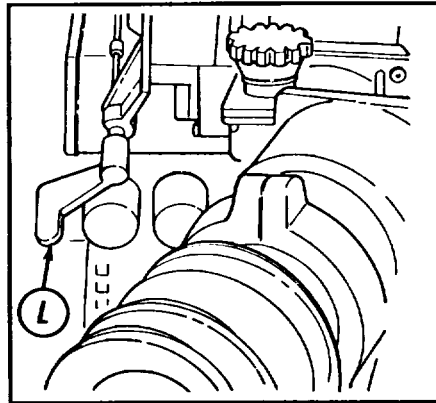


**2-11. OPERATION OF FIRE CONTROL EQUIPMENT-
Continued.**

WARNING

Before the laser is fired, always place the filter lever in full clockwise position-at this position, your telescope is safety filtered (M127A1). M127 does not have a laser filter.

- (7) Move filter lever (7) clockwise to a denser filter to eliminate glare.



- (8) If you turn FIRE CONTROL selector to another mode, you'll probably have to repeat paragraph 2-11 , a, 4. If you're going to boresight, see paragraph 2-15, c.

b. Operation of Gunner's Periscope M44 Series.

NOTE

Your periscope may be an M44E1 or M44E2. References to "periscope M44 series" represent both of these models.

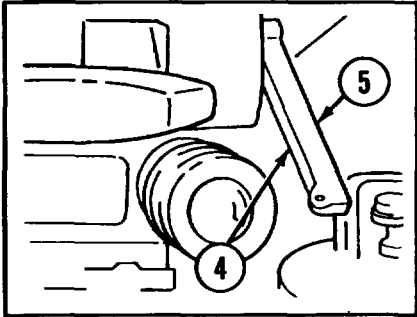
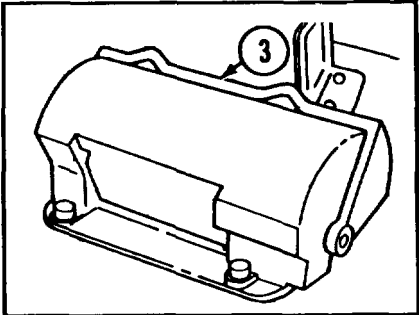
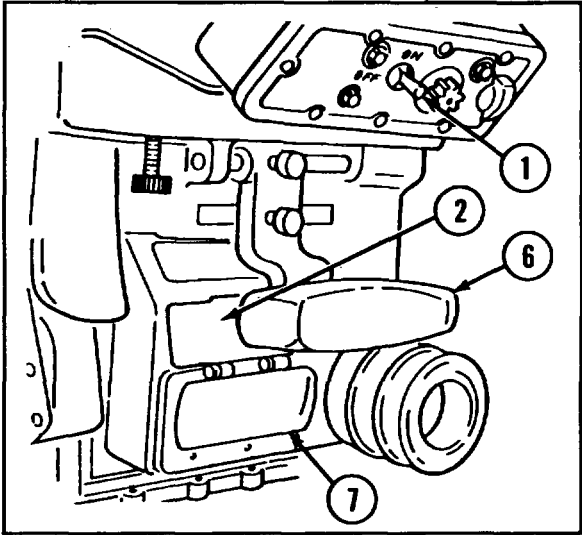
The gunner's periscope is primarily a night vision sight. However, scan-viewing through the 1 -power window allows you to view the surrounding terrain day or night.

- (1) **Day Use.**

CAUTION

Never expose periscope to direct sunlight. Be sure to place filter lever in the OFF position even though ballistic shield is closed.

- (a) For daylight use, periscope ON/OFF/EMER switch (1) must be at OFF.
- (b) Open view window cover (2) (if so equipped).
- (c) Open ballistic cover (3) by pressing finger latch (4) and pulling down handle (5).
- (d) Adjust headrest (6) to fit. Look through view window (7) and traverse turret to scan-view.

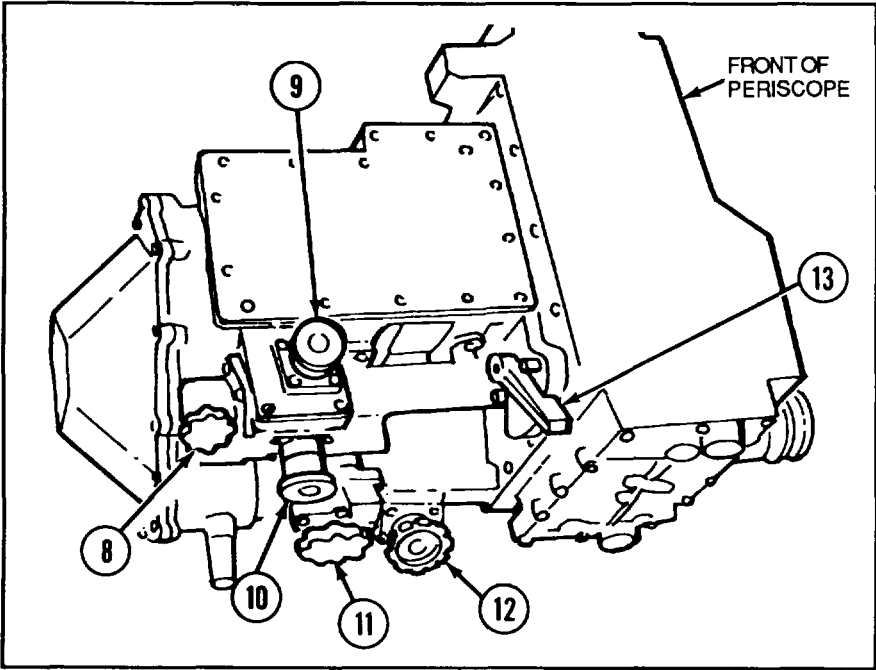


2-11. OPERATION OF FIRE CONTROL EQUIPMENT-
Continued.

NOTE

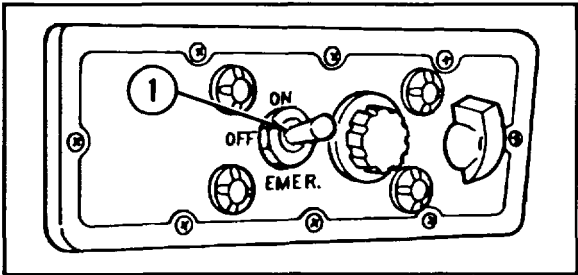
Since many of the controls are on the bottom of the periscope and some must be operated by touch, the picture below was made with the periscope out of the vehicle to help you identify the controls shown in the following steps.

- (e) Get familiar with the following periscope controls: reticle lamp knob (8), deflection boresight knob (9), elevation boresight knob (10), focus adjustment knob (11), diopter adjustment knob (12), and filter selector lever (13).



(2) Night Use.

- (a) Turn periscope ON/OFF/EMER switch (1) to OFF; reduce turret internal lights to a minimum.



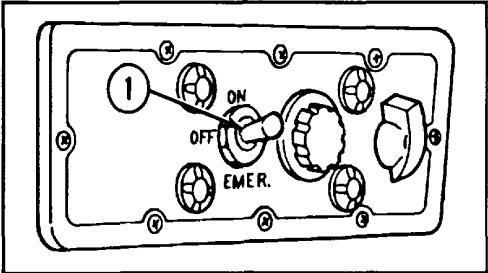
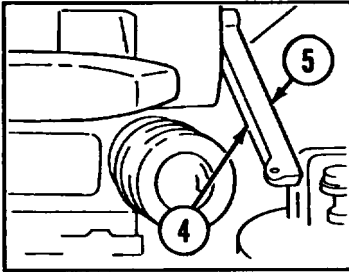
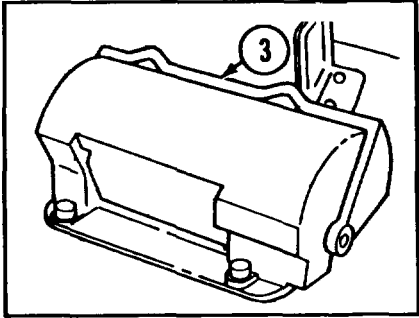
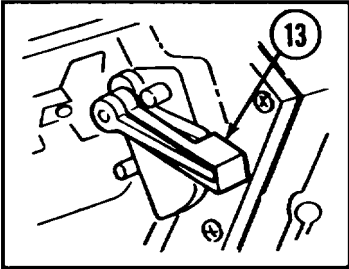
- (b) Tell driver to turn on MASTER SWITCH and ENGINE START/TURRET POWER switch to TURRET POWER. Turn TURRET CONTROL on and FIRE CONTROL selector to CONV.
- (c) Place filter lever (13) to dark, then open ballistic cover (3) by pressing finger latch (4) and pulling down handle (5).

NOTE

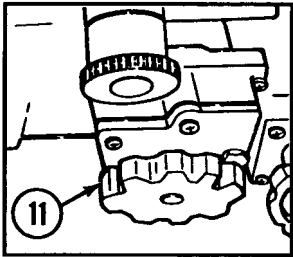
- If your vehicle has an electrical problem, go to emergency power by pulling out the ON/OFF/EMER switch and pushing down to EMER.
- If you see a brief, green flash and the Image tube goes out, It means that It's too light outside. You'll have to use the telescope until It gets darker.

(d) Turn on periscope by pulling out the ON/OFF/EMER switch (1) and pushing up to ON.

(e) Look through eyepiece and adjust headrest to fit. Now move filter lever (13) until you get best lighting condition.



(f) Turn focus knob (11) to infinity.

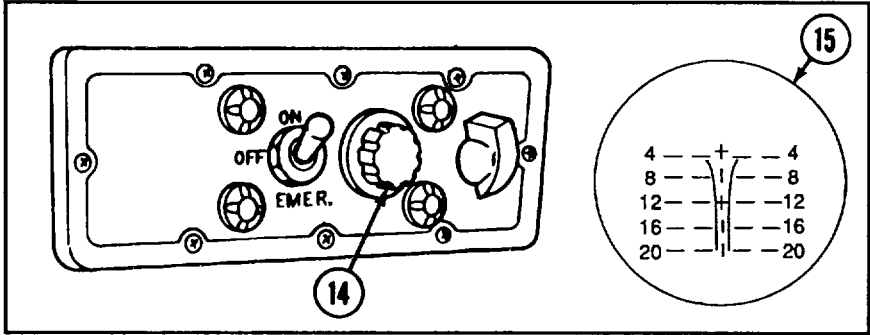


2-11. OPERATION OF FIRE CONTROL EQUIPMENT-
Continued.

(g) Adjust reticle light intensity knob (14) until you get a good reticle pattern (15).

NOTE

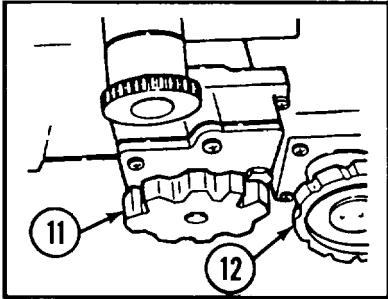
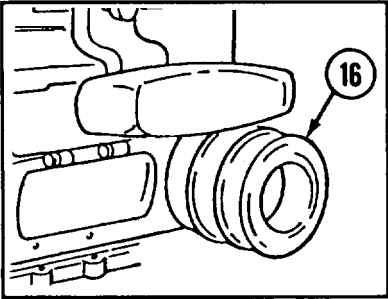
In a good pattern, the reticle is barely visible.



NOTE

When you're scanning for targets, turn off the reticle light and you'll see a lot better. If you're on emergency power, use the reticle light as little as possible to conserve battery power.

- (h) Look through eyepiece (16) and pull out and turn diopter knob (12) until reticle is sharp.
- (i) Set periscope on an aiming point and adjust focus knob (11) until target is sharp. If sharpness of reticle changes, readjust with diopter knob (12).



NOTE

Each time you change targets, you must adjust focus.

- (j) If you're going to boresight, see paragraph 2-15, d. If not, place ON/OFF/EMER switch to OFF. Turn filter lever to DARK (M44) or OFF (M44E1/M44E2). Close ballistic cover.

c. Operation of UTS (M551A1).

- (1) Preliminary Procedure.

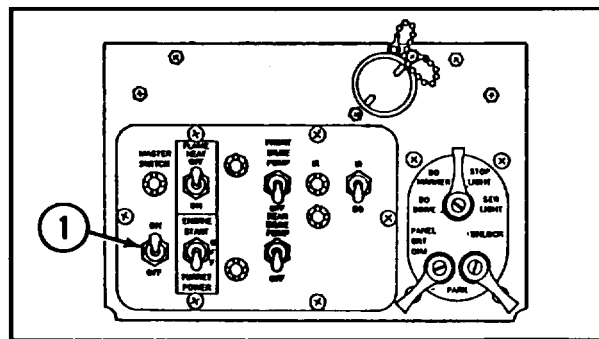
NOTE

If the equipment falls to function, refer to troubleshooting procedures (see Chapter 3, Section II).

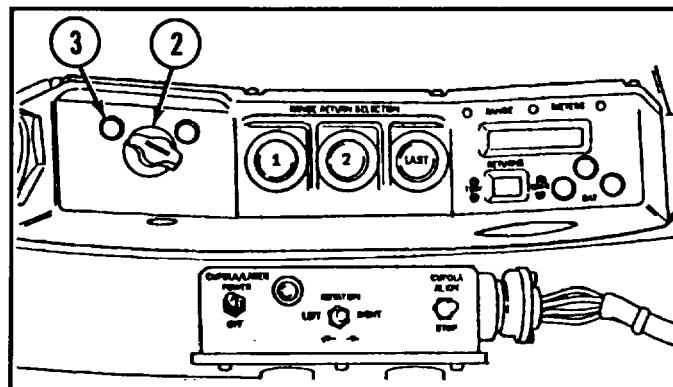
WARNING

The Infrared optics of the gunner's periscope contains an anti-reflective coating (thorium fluoride) which is slightly radioactive. The only potential hazard involves swallowing or inhaling this material. Dispose of broken lenses, etc., in accordance with AR 385-11.

- (a) Set MASTER SWITCH (1) to ON.

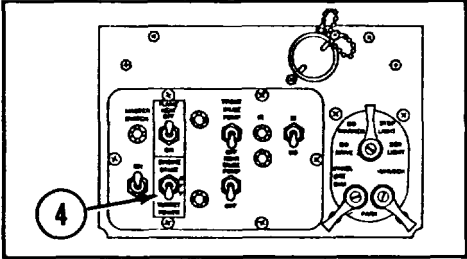


- (b) Turn MODE switch (2) on LRF to TEST (3) to prevent accidental firing of LRF.



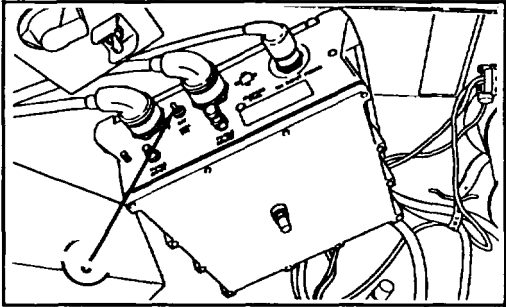
2-11. OPERATION OF FIRE CONTROL EQUIPMENT-
Continued.

(c) Turn ENGINE START/TURRET POWER switch (4) to TURRET POWER.



NOTE

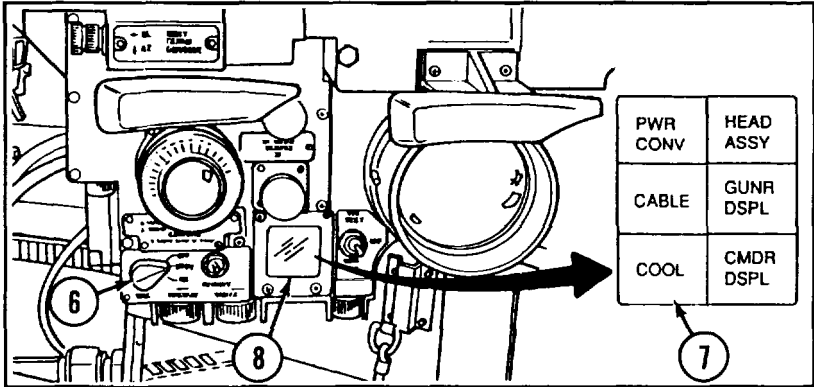
Always leave the TTS power converter 4CB1 switch (circuit breaker) (5), on the turret roof to the left of the loader, set to ON.



NOTE

Step (d) below is only necessary for thermal channel operation.

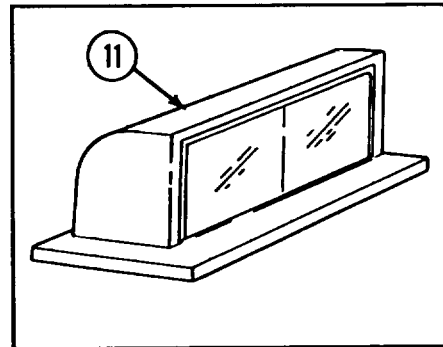
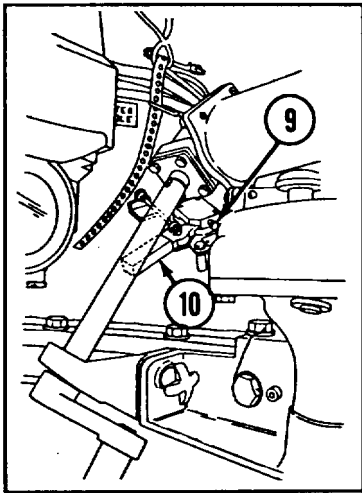
(d) Set MODE switch (6) to STBY. COOL indicator light (7) will light on built-in Test Equipment (BITE) display (8). When thermal detector has cooled to operating temperature (within 15 minutes), COOL indicator light (7) will go out and remain out.



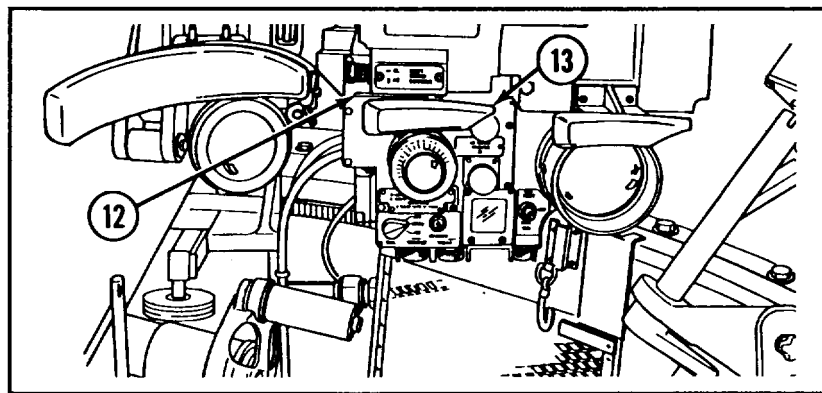
NOTE

- If only the daylight channels will be used, go to step e.
- The thermal channel display may be used before BITE display COOL lamp goes out, if necessary. System will operate best after complete cooldown.

- (e) Press pushbutton (9) in as you push handle (10) forward to its limit to open ballistic shield cover (11). Release pushbutton to lock handle.



- (f) Pull down lever (12) and adjust daylight channel headrest (13) to position you desire. Release lever to lock headrest in position.



**2-11. OPERATION OF FIRE CONTROL EQUIPMENT-
Continued.**

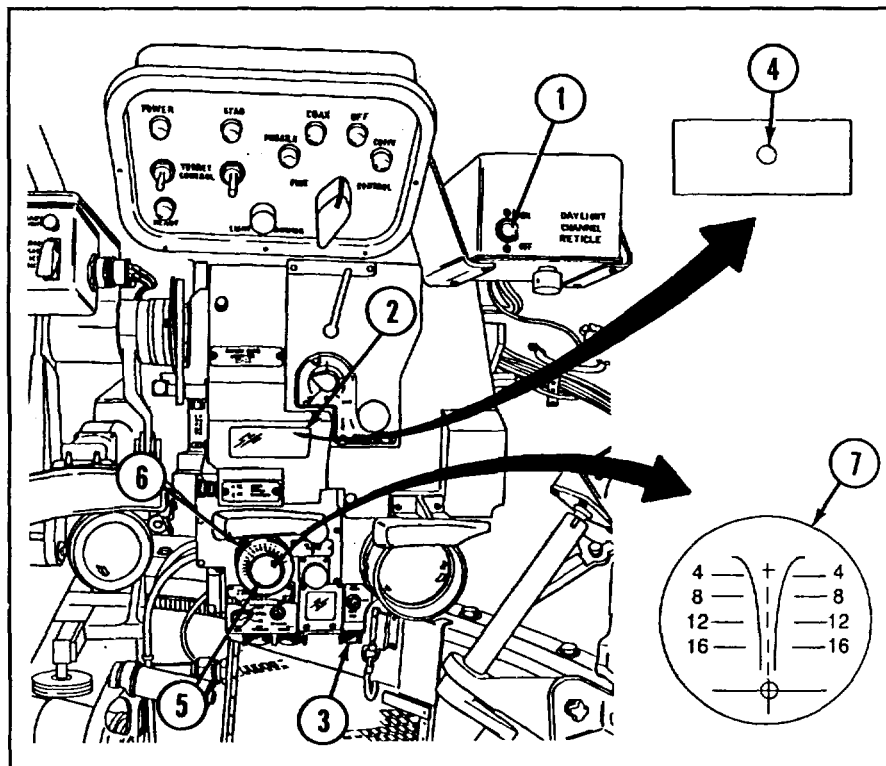
(2) Daylight Channel Operation.

- (a) After completing preliminary procedure, set DAYLIGHT CHANNEL RETICLE power switch (1) on dimmer box to ON.
- (b) Look into unity power window (2). View should be sharp and clear.

NOTE

It may be necessary to adjust the viewing angle to see the unity power reticle.

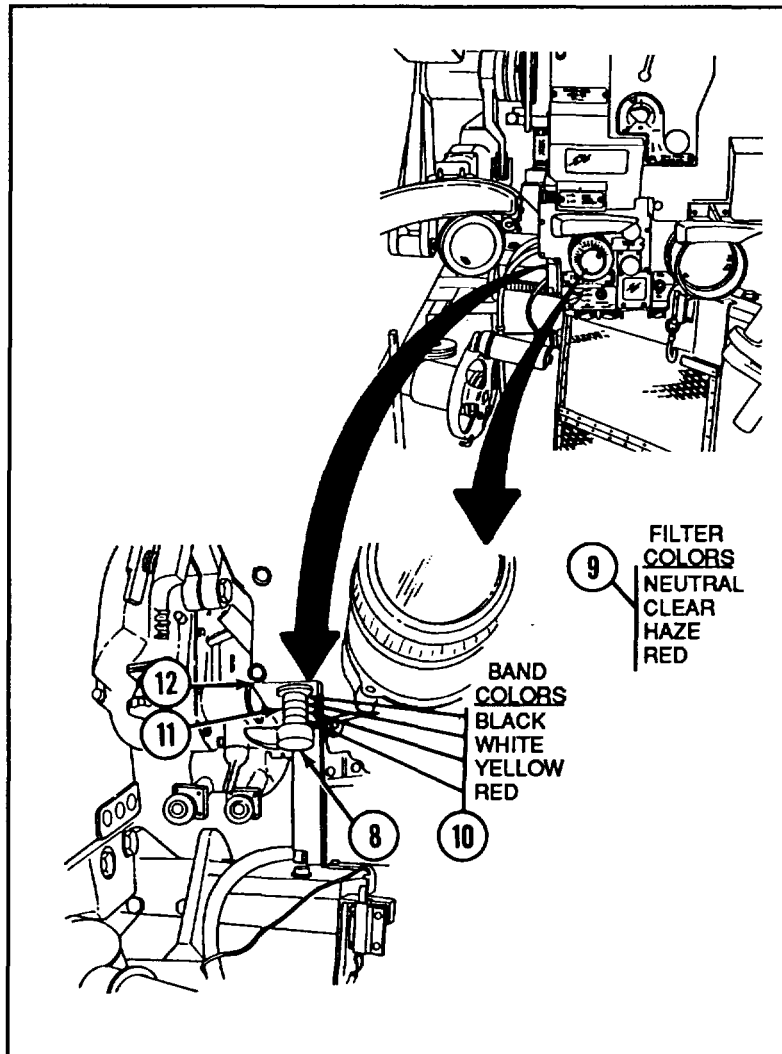
- (c) Adjust RTCL control (3) until unity power reticle (4) is visible.
- (d) While looking through daylight channel eyepiece (5), rotate diopter ring (6) until view is sharp and clear.
- (e) Adjust RTCL control (3) until daylight channel reticle (7) is visible.



CAUTION

One type filter must be selected at all times. Filter selector lever (8) must point forward (away from operator) to prevent parallax. Filters affect only daylight channel eyepieces.

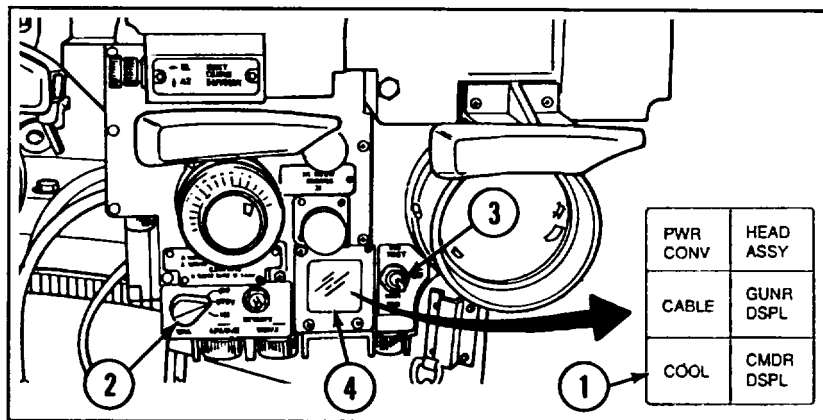
- (f) Select desired filter color (9) by moving filter selector lever (8) upward. Stop when desired band color (10) on selector shaft (11) aligns with lower edge of housing (12).
- (g) Rotate lever (8) away from operator. Release lever and it will lock in place.



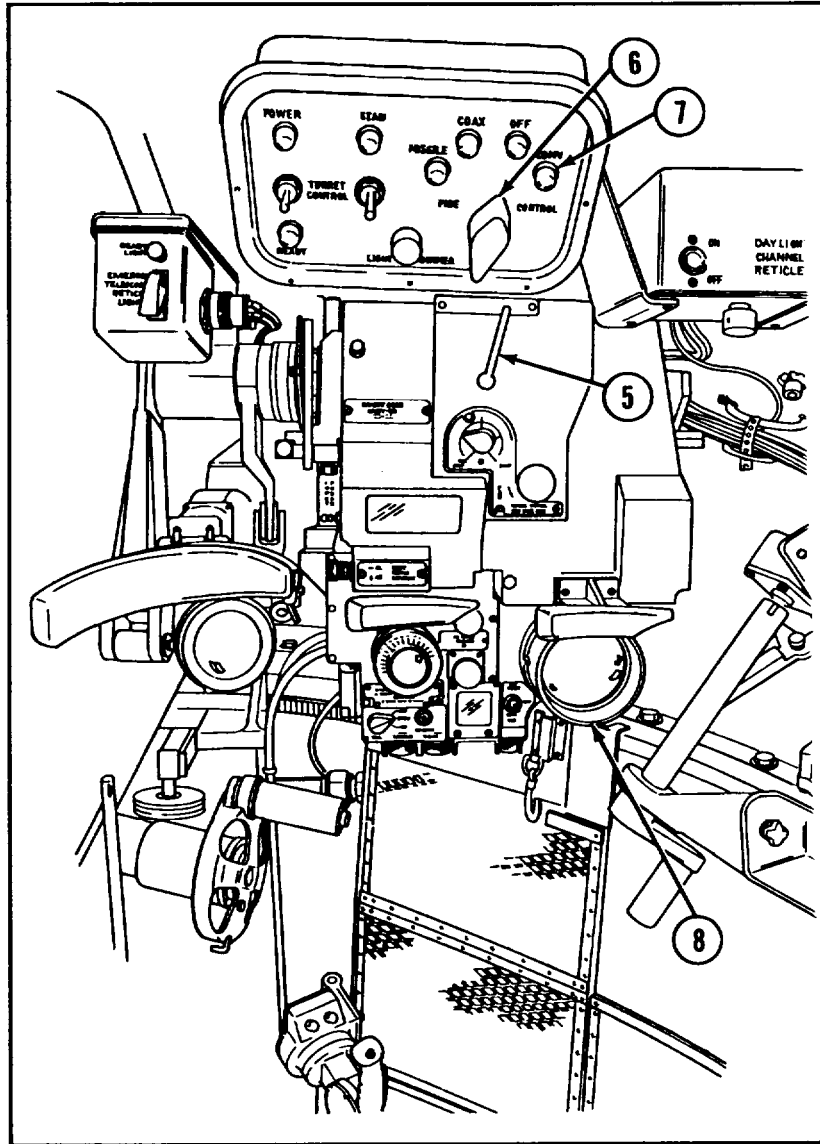
**2-11. OPERATION OF FIRE CONTROL EQUIPMENT-
Continued.**

(3) Thermal Channel Operation.

- (a) After completing preliminary procedures, COOL lamp (1) should be out. Set MODE switch (2) to ON.
- (b) Set BITE test switch (3) to LAMP TEST. All BITE indicator lamps (4) except CMDR DSPL should light. Switch will return to OFF when released. If any lamp (other than CMDR DSPL) fails to light, notify unit maintenance.
- (c) Set BITE test switch (3) to SYS TEST. None of the BITE indicator lamps should light. If CABLE lamp lights, check cable connectors. Make sure they are plugged in and that securing rings are tight. If CABLE lamp is still on or if any other BITE lamps are on, notify unit maintenance.



- (d) Move thermal channel field of view selector (5) to NAR.
- (e) Set FIRE CONTROL selector (6) to CONV (7) on gun and turret control selector panel.
- (f) Look through eyepiece (8) and select a target. Operate turret manual traversing and elevating controls if necessary.



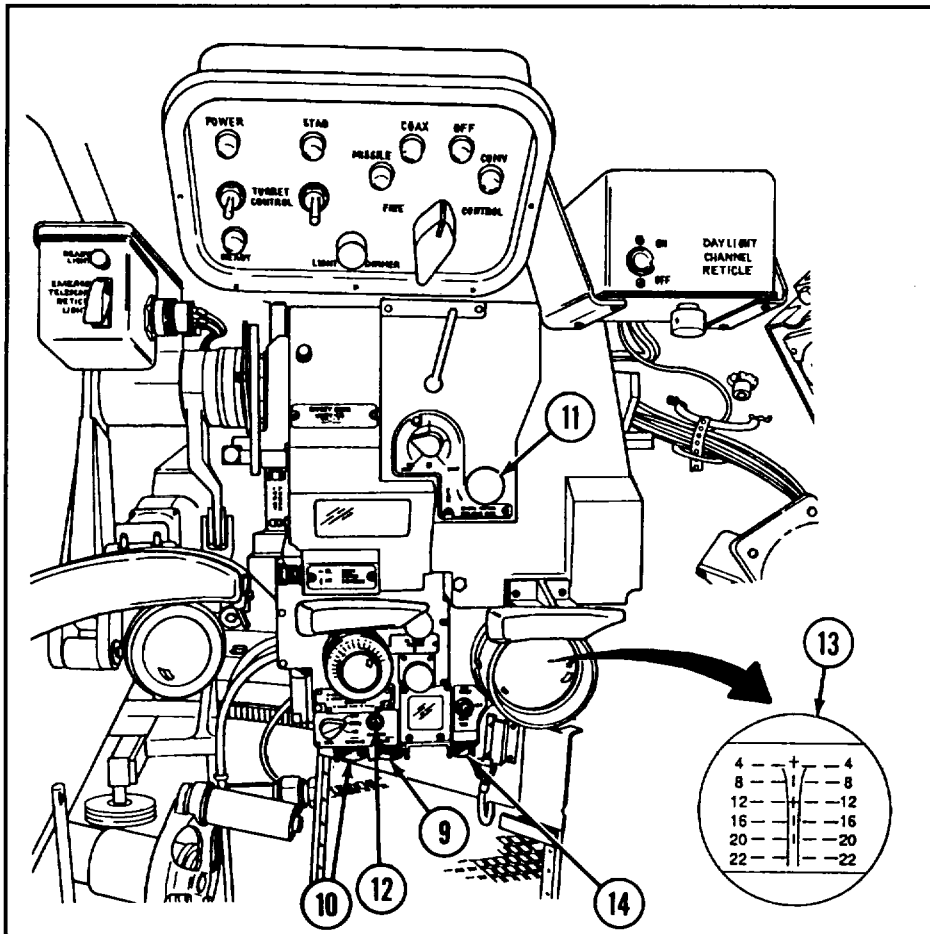
2-11. OPERATION OF FIRE CONTROL EQUIPMENT-
Continued.

- (g) Adjust bright (9) and contrast (10) controls for normal viewing.
- (h) Adjust thermal channel range focus (11) until view is sharp and clear.

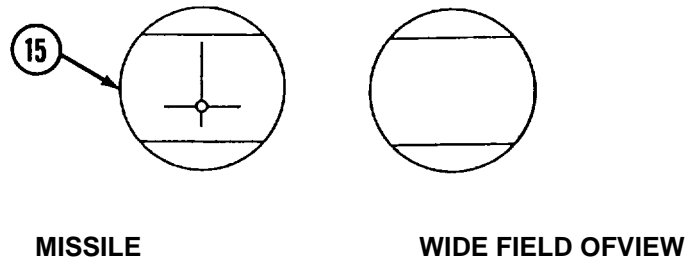
NOTE

You may need to change the polarity switch positions depending on scene, changes in temperature, and weather conditions.

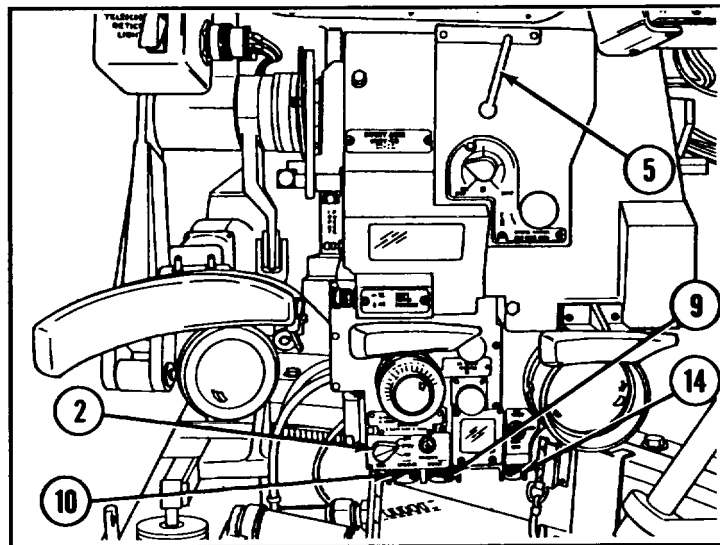
- (i) Move polarity switch (12) up or down for clearest view.
- (j) Make sure that NAR field of view reticle (13) lights. Adjust RTCL control (14), if necessary, until reticle is visible. Make sure that changing polarity switch (12) positions causes polarity of image to change.



- (k) Set FIRE CONTROL selector to MISSILE.
- (l) Make sure that NAR field of view missile reticle (15) lights. Adjust RTCL control (14), if necessary, until reticle is visible.
- (m) Move thermal channel field of view selector (5) to WIDE. If necessary, readjust bright (9) and contrast (10) controls.



- (4) Standby Operation. Set MODE switch (2) to STBY. Thermal detector will be maintained at operating temperature. System can be switched to ON for immediate use without waiting for cooldown.
- (5) Shutdown Operation.
 - (a) Set MODE switch (2) to OFF.

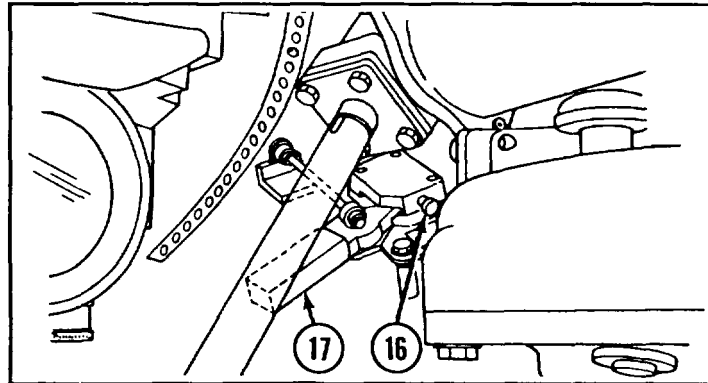


CAUTION

TTS cooler may continue to operate for a short time after MODE switch is set to OFF. If this occurs, DO NOT set MODE switch to STBY or ON while cooler continues to operate or damage to the thermal detector will result.

2-11. OPERATION OF FIRE CONTROL EQUIPMENT- Continued.

- (b) Depress pushbutton actuator (16) and pull handle (17) back to its limit to close ballistic shield cover. Make sure handle is locked when button is released.

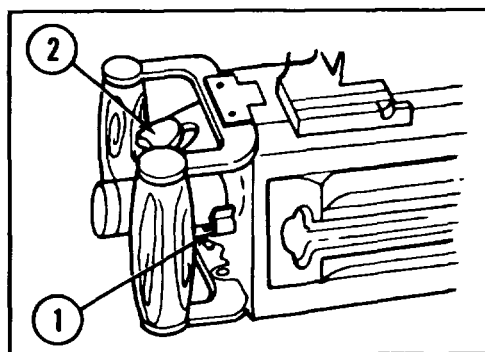


- (c) Set TURRET CONTROL switch off.
- (d) Set MASTER SWITCH and ENGINE START/TURRET POWER switch to OFF if tank power is not being used elsewhere.

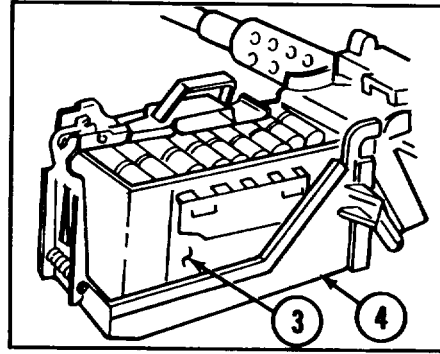
2-12. OPERATION OF CAL .50 MACHINE GUN.

a. Preparation for Firing Cal .50 Machine Gun.

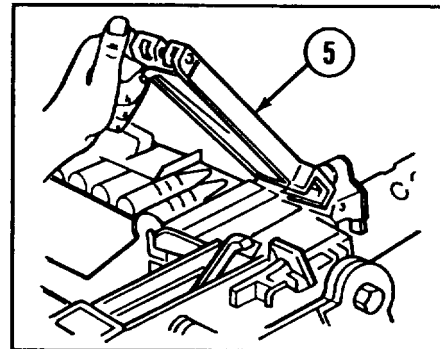
- (1) Install carrier assembly.
- (2) Install flash hider.
- (3) Check and adjust headspace and timing (reference TM 91005-213-10).
- (4) If you're going to fire one round at a time, turn lock (1) clockwise to raise bolt latch release (2). If you want to spray the target, press down on bolt latch release (2) and turn lock (1) counterclockwise.



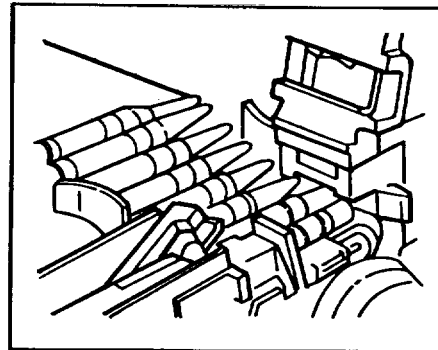
- (5) Remove ammo box cover and place box (3) in ammo tray (4). Double loop end of ammo belt must be leading.



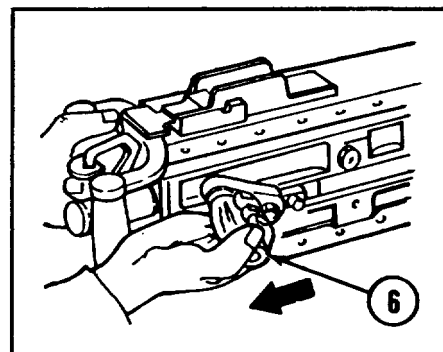
- (6) Raise cover (5).



- (7) Insert double loop end of ammo in feedway until first round is held by holding pawl. Close cover.



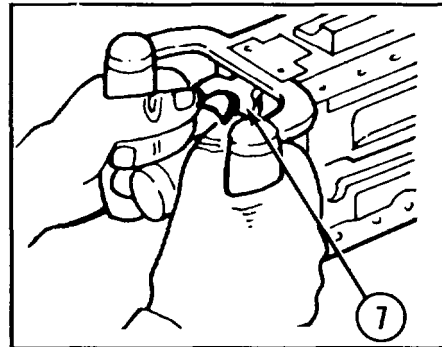
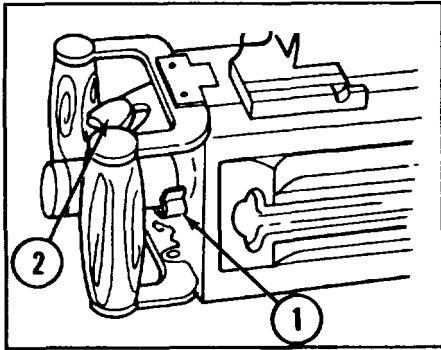
- (8) Half-load gun by pulling retracting slide handle (6) all the way back and pushing to the front.



2-12. OPERATION OF CAL .50 MACHINE GUN-Continued.

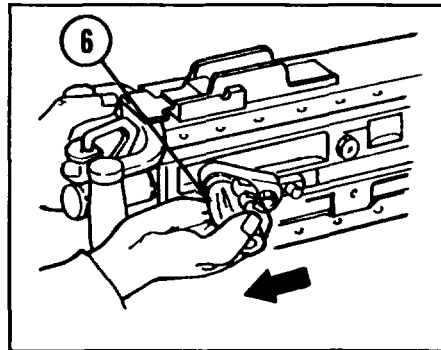
b. Firing Cal .50 Machine Gun.

- (1) Position lock (1) to engage bolt latch release (2). When release is depressed, bolt will go forward.
- (2) Gun is now half-loaded; to fully load, repeat preceding step 212, a, 8.
- (3) To fire semi-automatically, place bolt latch release (2) in up position (not locked down) and press trigger (7) to fire.
- (4) To fire automatically, place bolt latch release (2) in down (locked) position and press trigger (7) to fire. Or, if you're at semi-automatic, press down both trigger (7) and bolt latch release (2) for automatic fire.

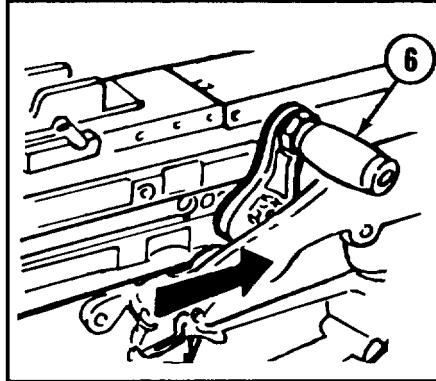


c. Unloading.

- (1) Raise cover and lift ammo away from weapon; close cover.
- (2) Pull retracting slide handle (6) back where it will be held by bolt latch.

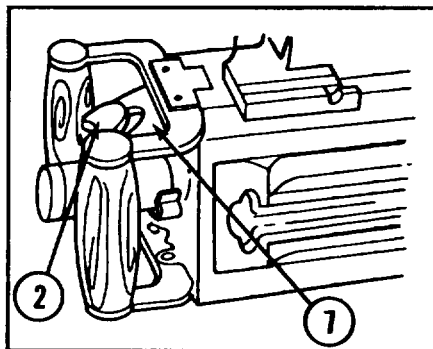


- (3) Open cover; check chamber and T-slot. If rounds are present, release handle and pull back until all cartridges are removed.
- (4) Release bolt by depressing bolt latch release (2); ease bolt forward with retracting slide handle (6); press trigger (7); close cover.



d. Immediate Action In Case of Failure-to-Fire Machine Gun.

- (1) If machine gun is cool (less than 150 rounds fired within 2 minutes):
 - (a) Retract bolt and push slide handle forward.
 - (b) Depress bolt latch release (2) to return bolt forward.
 - (c) Depress trigger (7).
 - (d) If gun doesn't fire, wait 5 seconds, retract bolt [bolt latch release (2) must be up], and return handle forward.



- (e) Unload gun.
- (f) Troubleshoot to determine cause of stoppage.

2-12. OPERATION OF CAL .50 MACHINE GUN-Continued.

WARNING

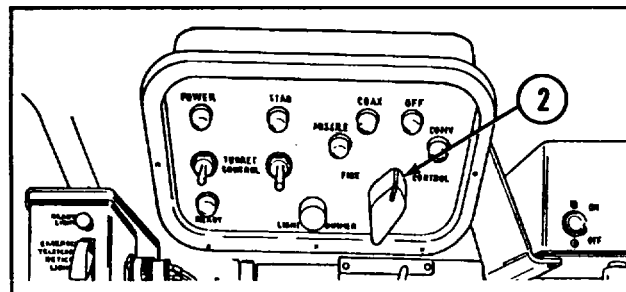
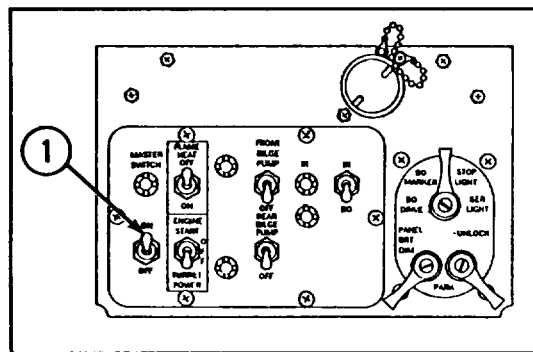
Because of the possibility of a cook-off, NEVER OPEN THE COVER to try to remove a round chambered In a very hot barrel (2) If machine gun is hot (more than 150 rounds fired within 2 minutes): (a) Stay clear of breech; keep gun on target.

- (b) Charge weapon to rear position; leave cover closed.
- (c) Keep gun on target and pointed down range; evacuate area for 15 minutes to allow for a possible cook-off.
- (d) After 15 minutes, unload gun and troubleshoot to determine cause of stoppage.

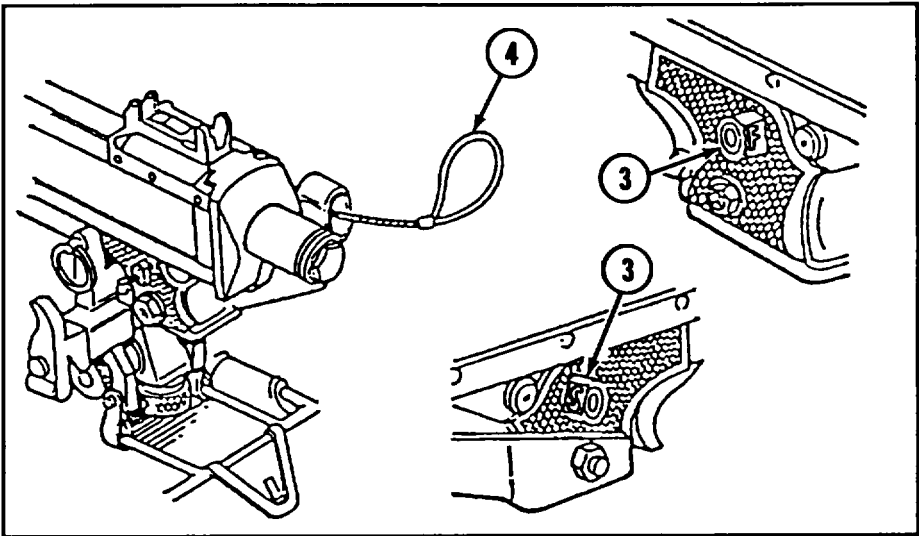
2-13. OPERATION OF 7.62-MM MACHINE GUN (M551A1).

a. Loading 7.62-mm Machine Gun.

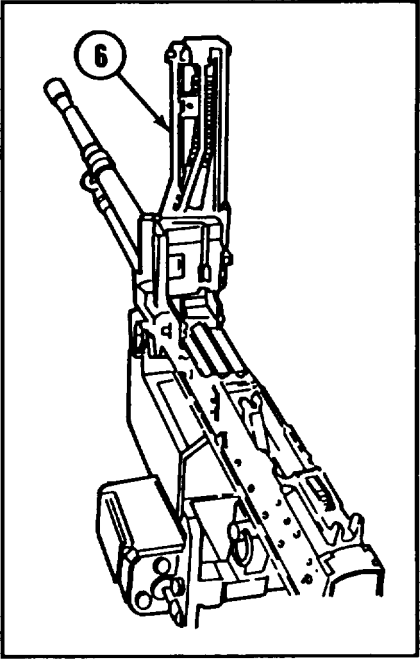
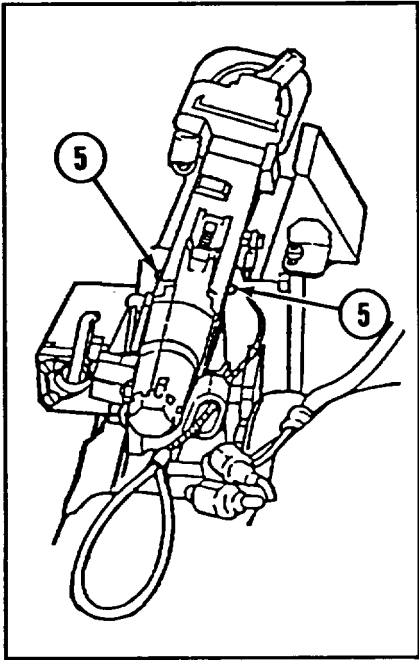
- (1) Set MASTER SWITCH (1) and FIRE CONTROL selector (2) to OFF position.



- (2) Set safety (3) to F (fire) position and pull charger cable (4) to rear.
- (3) Set safety (3) to S (safe) position.

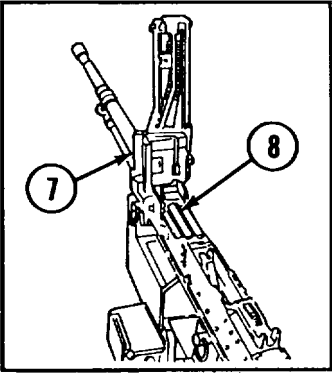


- (4) Push in cover latches (5) and raise cover (6).



2-13. OPERATION OF 7.62-MM MACHINE GUN-Continued.

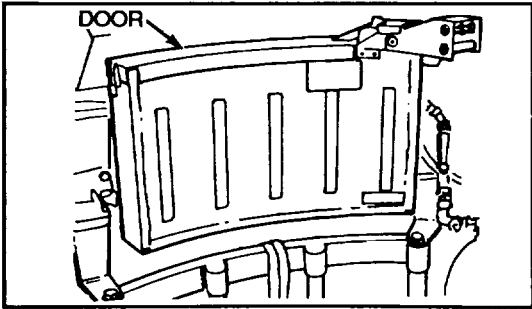
- (5) Raise feed tray (7).
- (6) Look into chamber (8) for unfired round or ruptured cartridge case (reference TM 9-1005-313-10 for removal instructions).



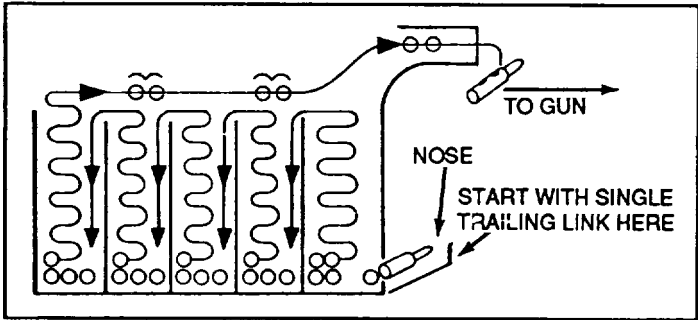
WARNING

Make sure 7.62-mm machine gun is clear of live rounds, spent brass, and link loops. Make sure safety is in S position before ammo belt is placed in feed tray.

- (7) Lower feed tray (7).
- (8) At ammo box, unhinge and remove door.

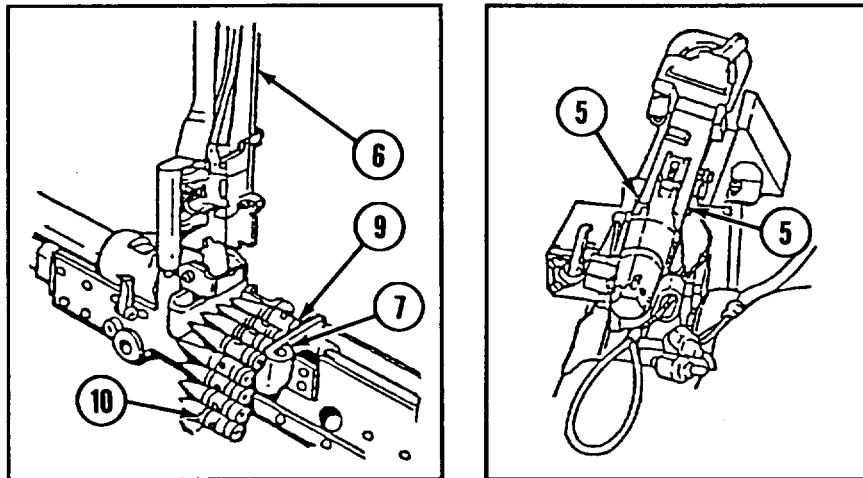


- (9) Start laying ammo in forward compartment with a single trailing link and nose of ammo facing turret wall. Lay ammo slightly above dividers and continue to next compartment. After last compartment is filled, run belted ammo forward through feed chute and on to machine gun. Replace door and lock with hinge.



(10) Place first round (9) of ammo belt (10) onto feed tray (7) with open side of link loops facing down.

(11) Close cover (6) and make sure that cover latches (5) lock.



WARNING

Make sure that safety is in the S position until the 7.62-mm machine gun is to be fired.

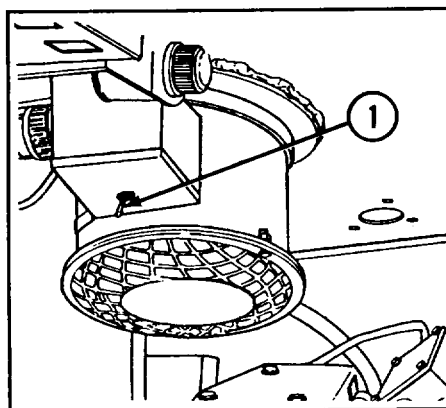
b. Manually Firing 7.62-mm Machine Gun.

(1) Set MASTER SWITCH to ON if hatches are closed and turret ventilating fan is to be used.

WARNING

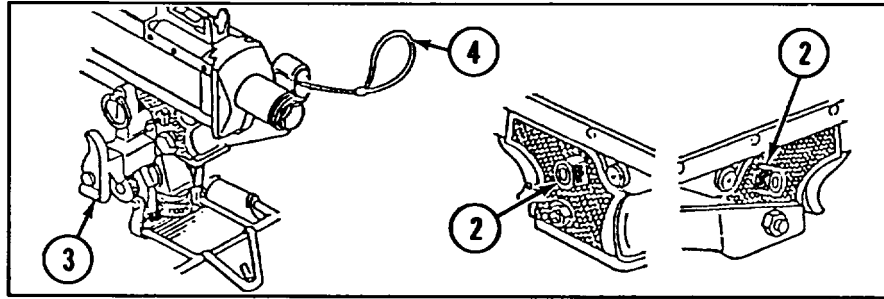
Turret ventilating fan must be operating when the hatches are closed to remove noxious gases during firing.

(2) Set turret ventilating fan switch (1) to ON position if hatches are closed.



2-13. OPERATION OF 7.62-MM MACHINE GUN-Continued.

- (3) Set safety (2) to F position.
- (4) Push manual trigger (3) to fire 7.62-mm machine gun.
- (5) After completion of firing, pull charger cable (4) to rear and set safety (2) to S.



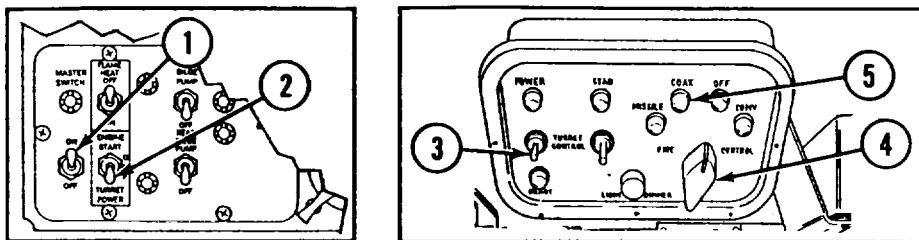
c. Electrically Firing 7.62-mm Machine Gun.

- (1) Set MASTER SWITCH (1) to ON; turn ENGINE START/TURRET POWER switch (2) to TURRET POWER; turn on TURRET CONTROL (3) power.

WARNING

Turret ventilating fan must be operating when the hatches are closed to remove noxious gases during firing.

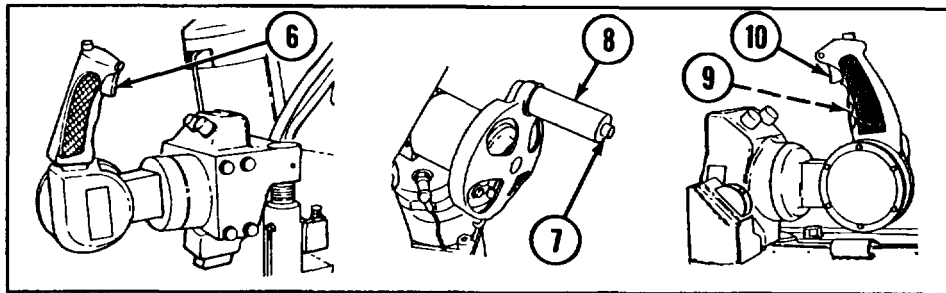
- (2) Set turret ventilating fan to ON position.
- (3) Set safety to F position.
- (4) Set FIRE CONTROL selector (4) to COAX position [indicator (5) will light].



WARNING

In case of "runaway" 7.62-mm machine gun, keep the weapon pointed down range. Grab the ammo belt and twist firmly to break, or let the weapon fire if near the end of the ammo bet.. Reload only after the weapon is repaired.

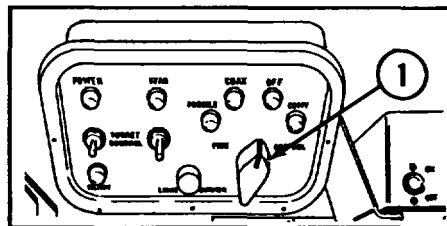
- (5) Fire 7.62-mm machine gun using any of the following three methods. Press gunner's trigger (6) on gunner's control handle; press button (7) on elevation handwheel (8); press palm switch (9) and commander's firing trigger (10) on commander's control handle.



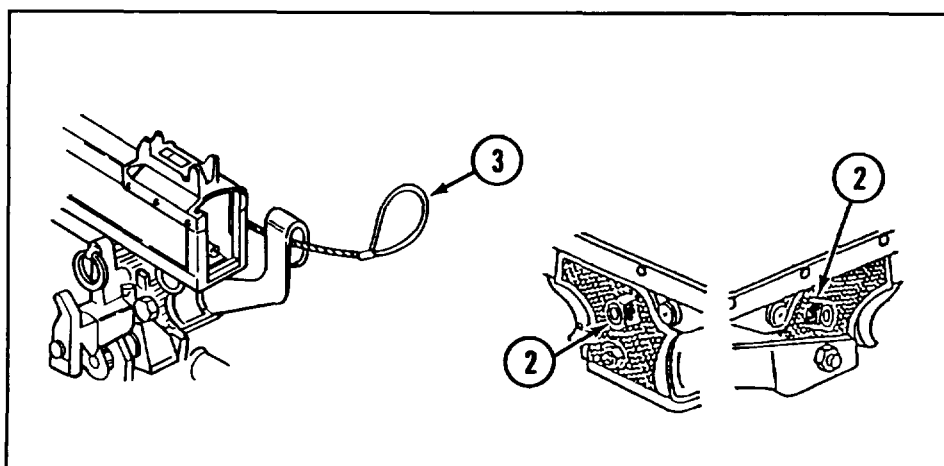
- (6) After completion of firing, pull charger cable to rear and set safety to S.

d. Clearing 7.62-mm Machine Gun.

- (1) Set FIRE CONTROL selector (1) to OFF position.

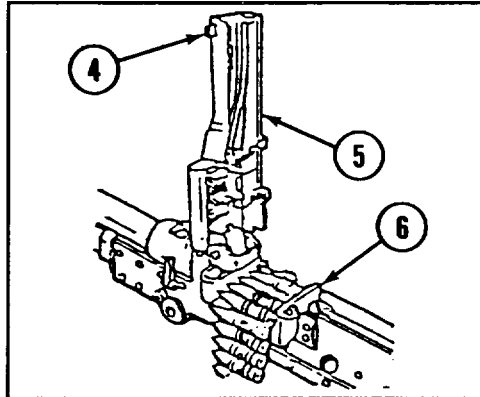


- (2) Set safety (2) to F position.
 (3) Pull charger cable (3) rearward to kick bolt and operating rod.
 (4) Set safety (2) to S position.

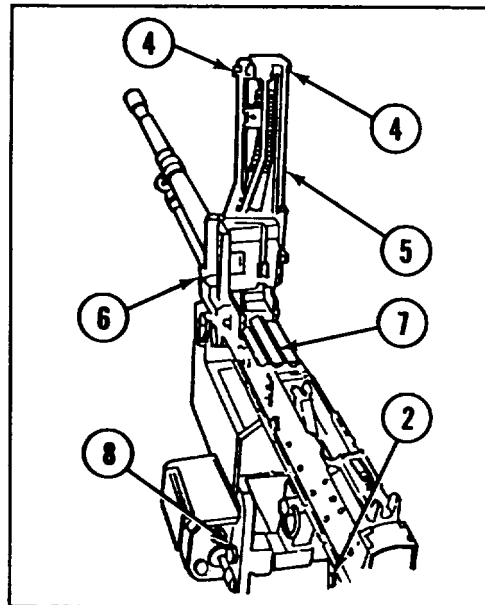


2-13. OPERATION OF 7.62-MM MACHINE GUN-Continued.

- (5) Depress cover latches (4) and raise cover (5).
- (6) Remove ammo belt and raise feed tray (6).



- (7) Look into chamber (7). If round is still chambered, refer to TM 9-1005-313-10 procedure for round removal and ruptured cartridge case removal.
- (8) If chamber is empty, lower feed tray (6) and close cover (5), making sure cover latches (4) lock.
- (9) Set safety (2) to F position and pull charger cable to rear. Keep tension on charger cable and push on manual trigger (8) allowing bolt and operating rod to close while slowly releasing charger cable.



2-14. OPERATION OF GRENADE LAUNCHER M243.

WARNING

- *Smoke grenades can explode and kill or injure soldiers. Handle the grenades with care.*
- *Do not drop or throw smoke grenades.*
- *Do not use damaged smoke grenades.*
- *Keep the grenades away from electric sparks and high heat.*
- *Keep containers sealed until you are ready to use the grenades.*

CAUTION

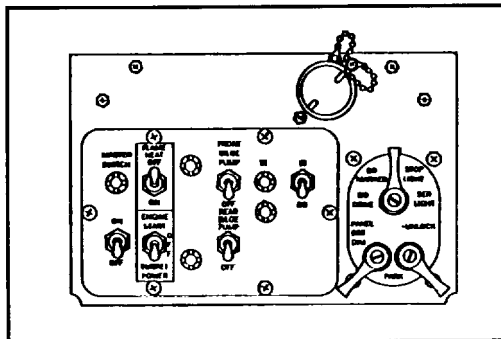
- *Smoke grenades can fall to fire.*
- *Keep the grenades free of dirt and grease.*
- *Do not let the firing contacts be damaged.*
- *Unused smoke grenades should be placed in the original containers and used first in the next firing operation.*

a. Stow and Load Smoke Grenades.

NOTE

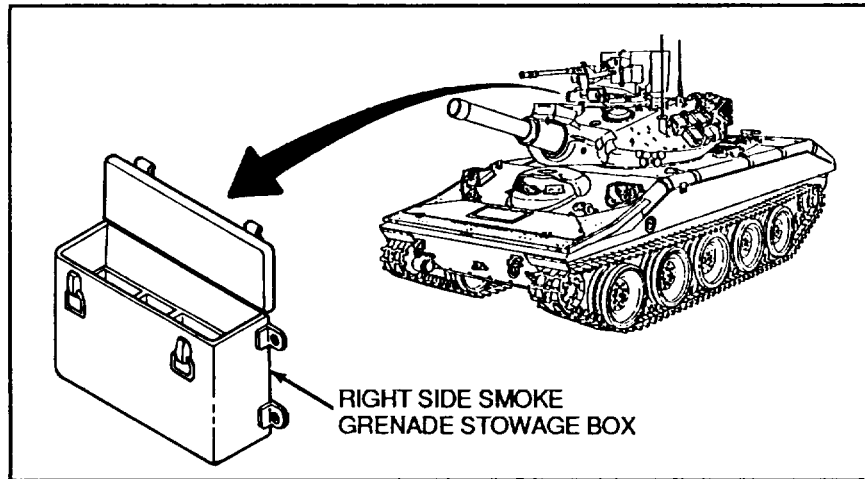
- *This task must be done upon receipt of the smoke grenades. There is no interior stowage for the smoke grenades.*
- *Make sure the vehicle is parked and the commander's hatch is open when commencing stowage and loading procedures.*

- (1) Move MASTER SWITCH to OFF.

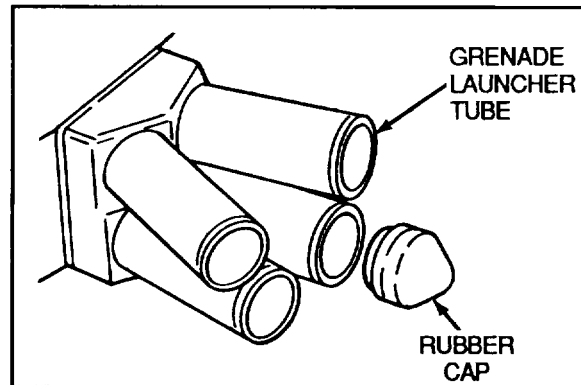


2-14. OPERATION OF GRENADE LAUNCHER M243-Continued.

- (2) Unlatch and open right side smoke grenade stowage box; check that inside is free of debris.



- (3) Remove four rubber caps from right side grenade launcher tubes; check that each grenade launcher tube is free of damage and debris.



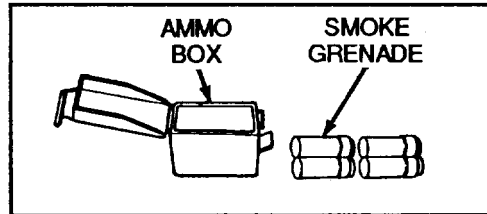
WARNING

Heat could set off smoke grenades and injure or kill soldiers. Do not place smoke grenades on hot surfaces.

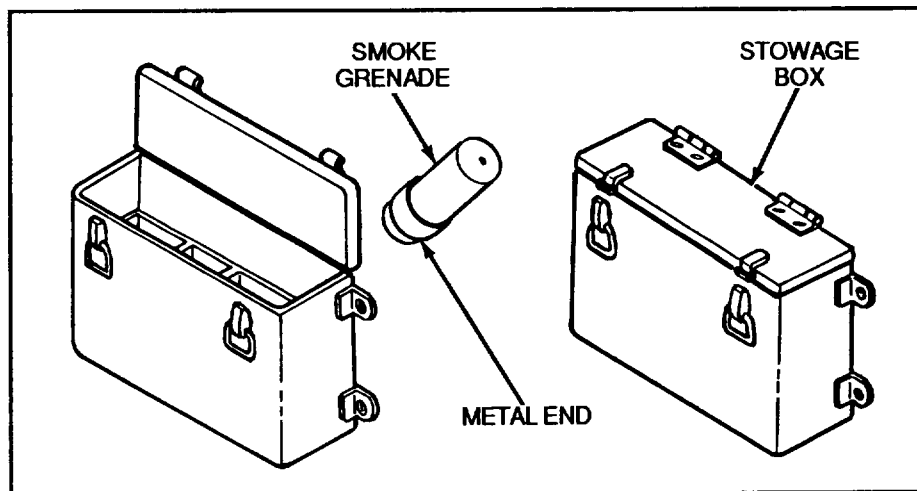
NOTE

There are four smoke grenades in each ammo box.

- (4) Unpack eight smoke grenades from two ammo boxes.
- (a) Unlatch and open two ammo boxes.
 - (b) Carefully remove packing materials. Lift out smoke grenades one at a time.



- (5) Stow four smoke grenades in right side smoke grenade storage box.
- (a) Carefully insert four smoke grenades, one at a time, into smoke grenade storage box with metal ends down.
 - (b) Close and latch smoke grenade storage box.

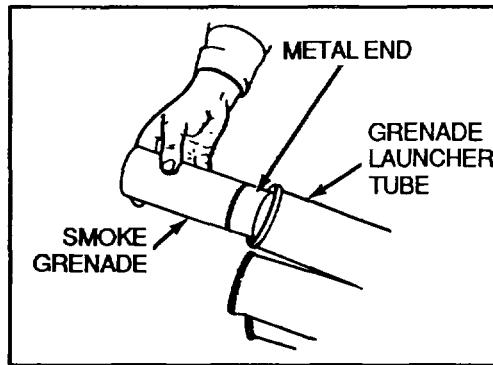
**WARNING**

Electrical trouble could cause smoke grenades to launch and kill or injure soldiers. Make sure TURRET CONTROL and smoke grenade launcher switches are off before you load grenades. Do not place any part of your body in front of smoke grenade launchers.

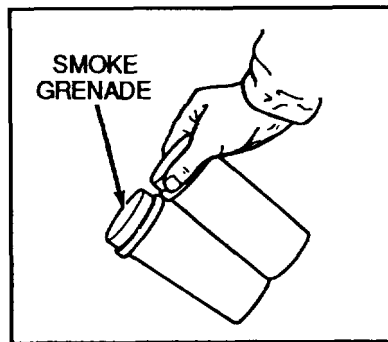
2-14. OPERATION OF GRENADE LAUNCHER M243-Continued.

(6) Load four smoke grenades into right side grenade launcher tubes.

(a) Carefully insert four smoke grenades, one at a time, into grenade launcher tubes with metal ends down.

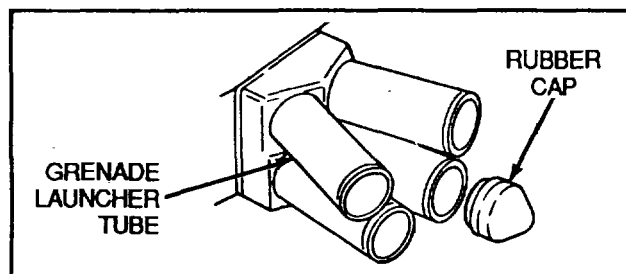


(b) Gently push on each smoke grenade until you feel two clicks. This tells you that smoke grenade is seated securely on firing pin.



(c) Turn each smoke grenade one-half turn clockwise to ensure good electrical contact.

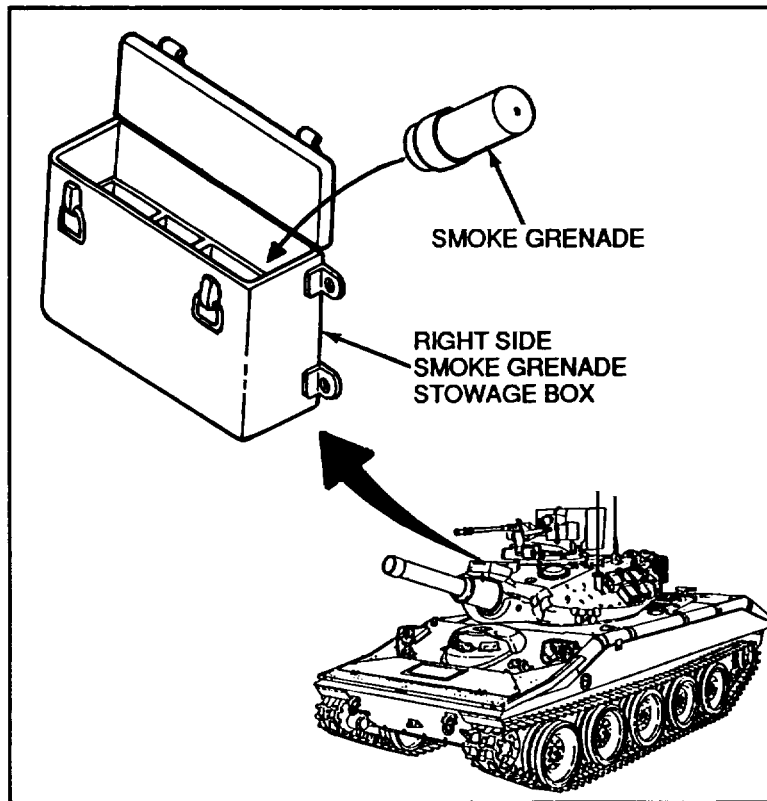
(7) Install four rubber caps on right side grenade launcher tubes.



- (8) Repeat steps 1 through 7 of this procedure to stow four smoke grenades in left side smoke grenade stowage box and load four smoke grenades in left side grenade launcher tubes.

b. Reload Smoke Grenades.

- (1) Prepare vehicle for reloading smoke grenades. Move MASTER SWITCH to OFF.
- (2) Remove four smoke grenades from right side smoke grenade stowage box.
 - (a) Unlatch and open smoke grenade stowage box.
 - (b) Remove four smoke grenades, one at a time, from smoke grenade stowage box.
- (3) Reload four smoke grenades in right side grenade launcher tubes. Repeat steps a, 6 and a, 7 above.
- (4) Unstow and reload four smoke grenades in left side grenade launcher tubes. Repeat steps a, 6 and a, 7 above.



2-14. OPERATION OF GRENADE LAUNCHER M243-Continued.**c. Launch Smoke Grenades.****WARNING**

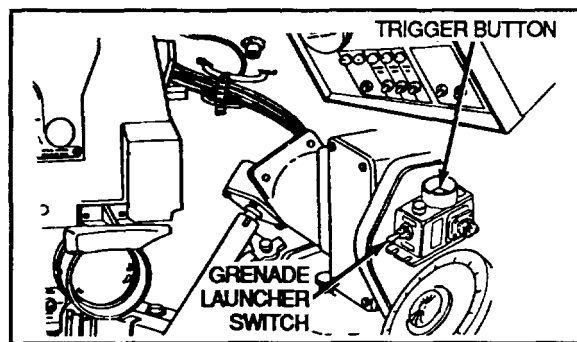
• *Smoke grenades explode and burn-handle them with care. Except when using your hand to load grenade launcher, never put any part of your body in front of loaded launcher tubes. You could be hurt or killed. Check that soldiers are clear of firing lines when launching grenades.*

• *Smoke grenades could hit open hatches and fall in and around hatch openings. Soldiers could be killed or injured. Close all hatches before launching grenades.*

NOTE

Smoke grenade launchers must be loaded and rubber caps removed and stowed before grenades can be launched.

- (1) Turn MASTER SWITCH on.
- (2) Turn TURRET CONTROL switch on.
- (3) Close loader's hatch cover.
- (4) Close commander's hatch cover.
- (5) Close drivers hatch cover.
- (6) Move grenade launcher switch to ARM.
- (7) Press trigger button to fire smoke grenades.
- (8) Take immediate action if smoke grenades fail to fire.
- (9) Move grenade launcher switch to OFF.



- (10) As soon as tactical situation permits, check that all smoke grenades have fired.
- (a) If one or more smoke grenades are still in smoke grenade launcher tubes, take immediate action. Proceed to step d below.
 - (b) If all smoke grenades have fired, reload smoke grenade launchers as required by mission.

d. Immediate Action When Smoke Grenades Fall to Launch.

WARNING

If misfired smoke grenades launch during unloading, soldiers in the area could be killed or injured. Keep the turret pointed down range until grenades are removed.

NOTE

A misfire is the failure of a smoke grenade to launch from a grenade launcher tube when the grenade launcher trigger is pressed.

- (1) Using intercom, tell driver to drive vehicle to a safe area. Vehicle must be at least 410 feet from nearest vehicle, building, personnel, or equipment.

NOTE

Be sure ENGINE START/TURRET POWER switch is in TURRET POWER mode and rubber caps have been removed from smoke grenade launchers.

- (2) Move grenade launcher switch to ARM.

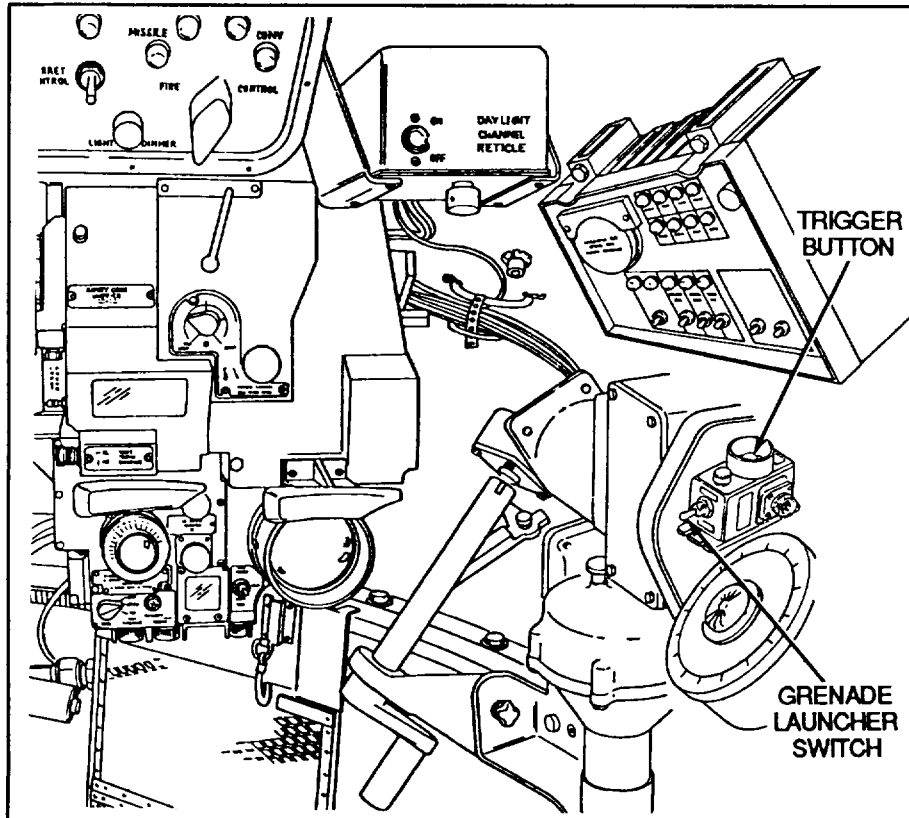
WARNING

Smoke grenades could hit open hatches and fall in or around hatch openings. Personnel could be killed or injured. Be sure all hatches are closed before launching grenades.

- (3) Fire smoke grenades.
 - (a) Press trigger button.
 - (b) Look for smoke through vision blocks.
- (4) Move smoke grenade launcher switch to OFF.

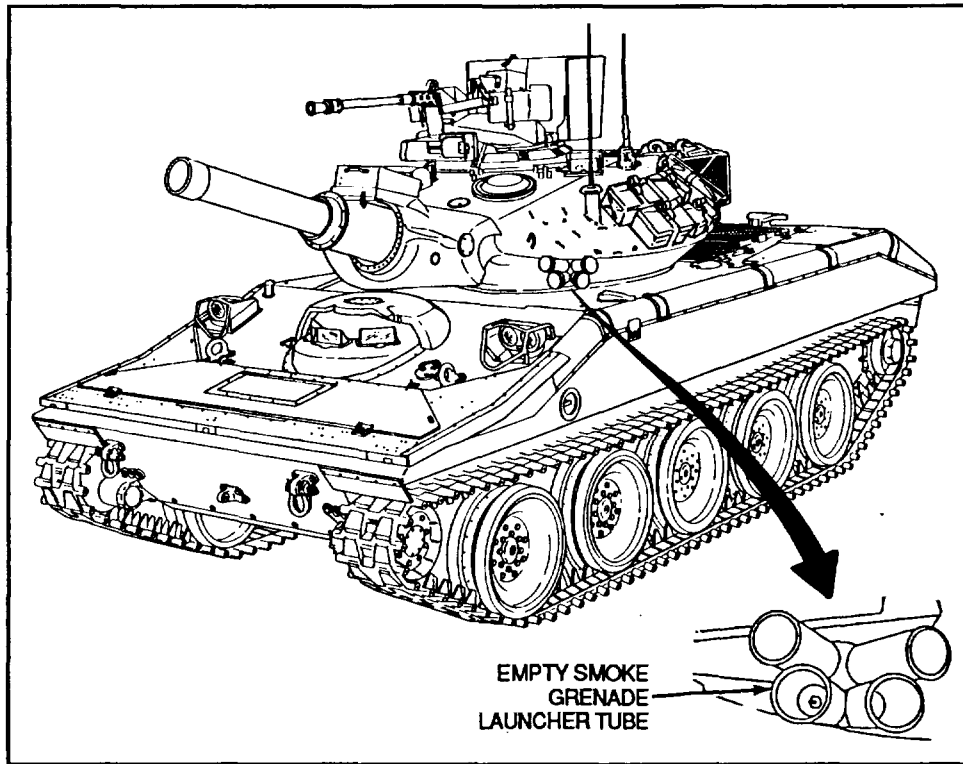
2-14. OPERATION OF GRENADE LAUNCHER M243-Continued.

- (5) Open commander's hatch cover.

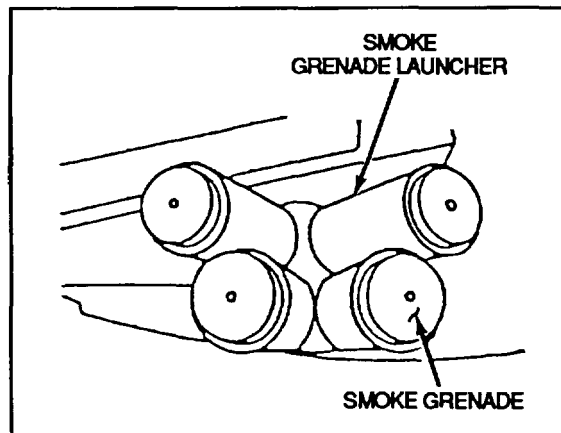
**NOTE**

Smoke does not mean that all eight smoke grenades have fired.

- (6) Check smoke grenade launchers for misfired smoke grenades.
- (a) Stand on commander's seat to inspect smoke grenade launchers. Raise seat, if necessary.
 - (b) If smoke grenade launchers are empty, task is completed.



(c) If you see smoke grenades in smoke grenade launchers, go to step 7.



- (7) Have two soldiers leave vehicle.
- (8) Turn TURRET CONTROL switch off.
- (9) Move MASTER SWITCH to OFF.

2-14. OPERATION OF GRENADE LAUNCHER M243-Continued.

WARNING

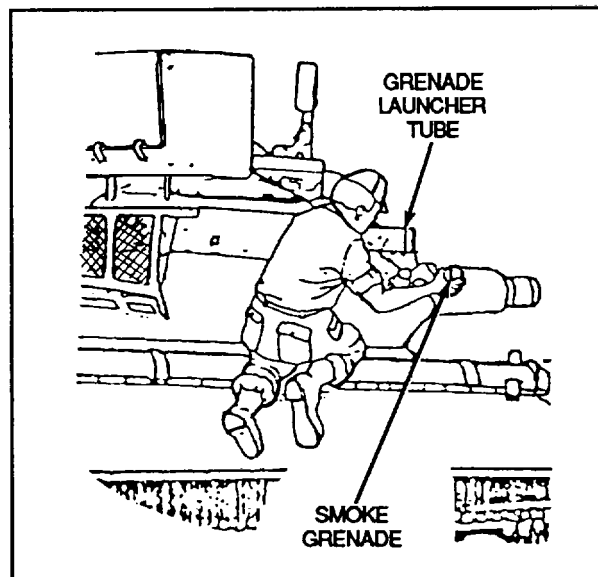
• *Misfired smoke grenades could kill or injure soldiers if mishandled. Very carefully hand smoke grenades to the soldier standing outside the vehicle.*

• *Heat could set off smoke grenades and kill or injure soldiers. Do not place grenades on hot surfaces.*

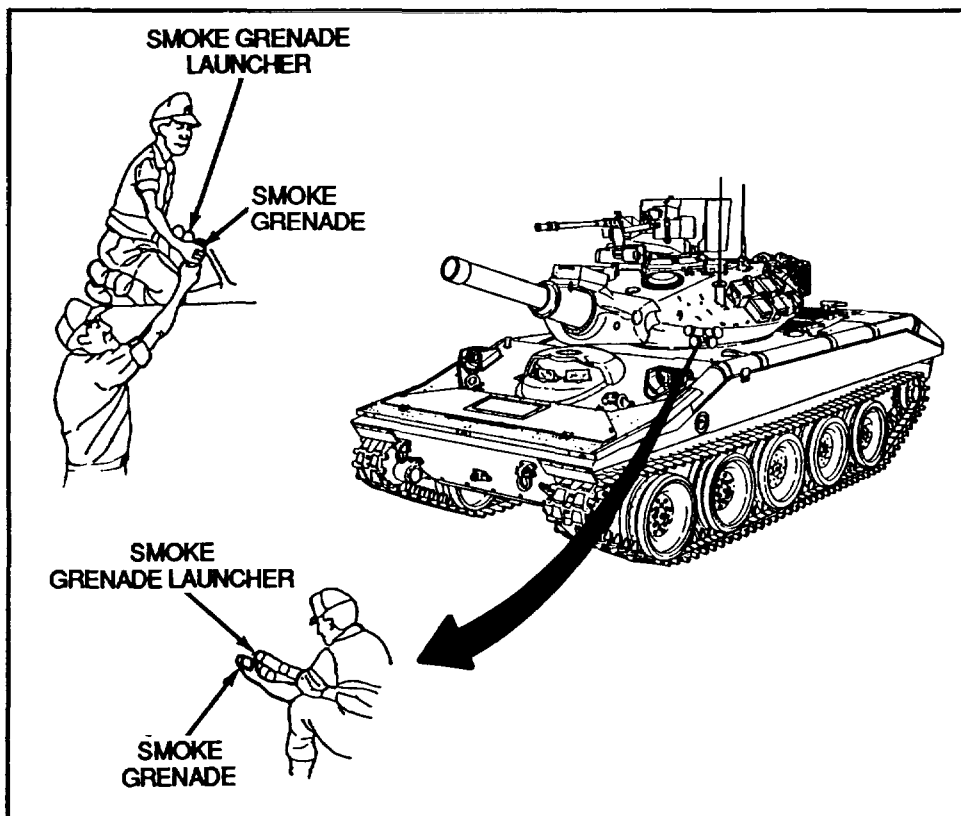
• *If misfired smoke grenades launch during unloading, soldiers could be killed or injured. Do not place any part of your body in front of the smoke grenade launcher tubes.*

(10) Remove misfired smoke grenades from right side smoke grenade launcher.

(a) Hold smoke grenade from side. Carefully pull and twist smoke grenade counterclockwise and remove from grenade launcher tube.



- (b) Pass smoke grenade to soldier standing on ground.
 - (c) Repeat steps a and b above until all misfired smoke grenades are removed from right side smoke grenade launcher tubes.
- (11) Remove misfired smoke grenades from left side smoke grenade launcher. Repeat step 10 of this procedure.
 - (12) Tell gunner that smoke grenade launcher tubes are clear of misfired smoke grenades and that soldiers are clear of turret.
 - (13) Move misfired smoke grenades to a well-marked spot at least 650 feet from nearest vehicle, building, personnel, or equipment.
 - (14) Notify chain of command of exact location, type, and number of misfired smoke grenades left at safe location.
 - (15) Notify unit maintenance that smoke grenade launchers on your vehicle have malfunctioned.



2-14. OPERATION OF GRENADE LAUNCHER M243-Continued.

e. Unload and Stow Smoke Grenades.

WARNING

• *Electrical trouble could cause smoke grenades to launch and kill or injure soldiers. Make sure TURRET CONTROL and smoke grenade launcher switches are off before you unload smoke grenades. Do not place any part of your body in front of smoke grenade launchers.*

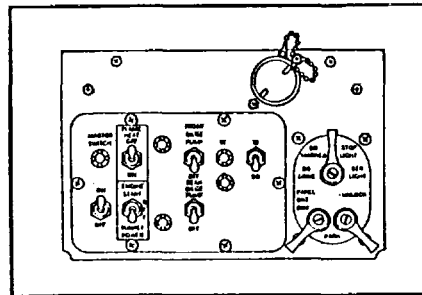
• *Heat could set off smoke grenades and kill or injure soldiers. Do not place grenades on hot surfaces.*

NOTE

• *Before smoke grenades may be unloaded, the vehicle must be stopped, the hand brake must be set, the turret travel-lock must be set, and the smoke grenade launcher switch turned to OFF.*

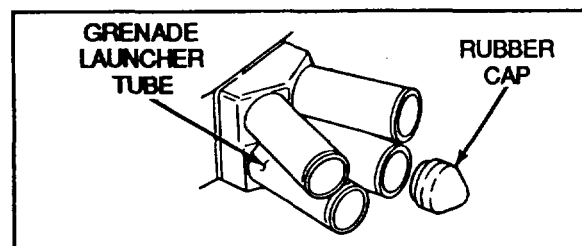
• *If smoke grenade launchers have been fired, but not reloaded, only steps 1 and 2 apply.*

- (1) Move ENGINE START/TURRET POWER switch to OFF.

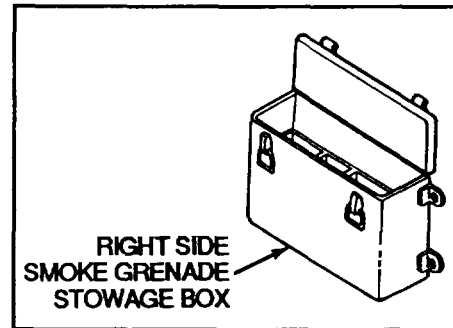
**NOTE**

If smoke grenade launchers have been reloaded, go to step 3.

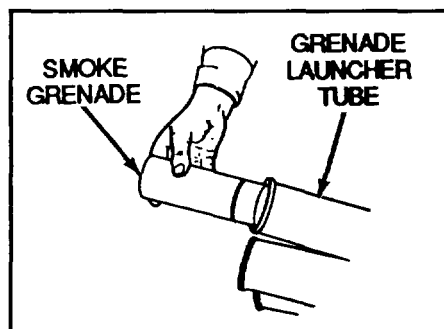
- (2) Install eight rubber caps on grenade launcher tubes.



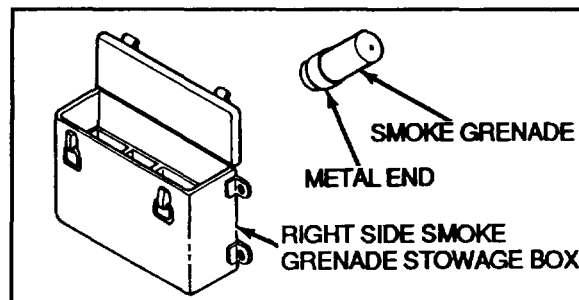
- (3) Unlatch and open right side smoke grenade stowage box.



- (4) Remove four rubber caps from right side grenade launcher tubes.
- (5) Remove four smoke grenades from right side grenade launcher tubes. Hold smoke grenade from side. Carefully pull and twist smoke grenade counterclockwise and remove from grenade launcher tube.



- (6) Stow four smoke grenades in right side smoke grenade stowage box.
 - (a) With metal end pointing down, carefully insert smoke grenades. one at a time, into smoke grenade stowage box.
 - (b) Close and latch grenade stowage box.



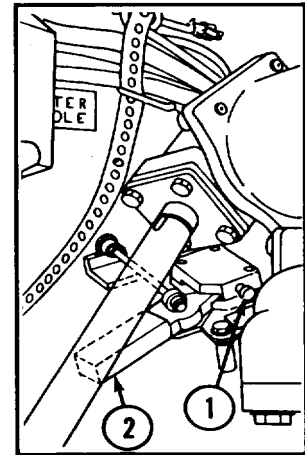
2-14. OPERATION OF GRENADE LAUNCHER M243-Continued.

- (7) Install four rubber caps on right side grenade launcher tubes.
- (8) Repeat steps 3 through 7 of this procedure to unload and stow smoke grenades on left side of turret.

2-15. PREPARATION FOR FIRING.

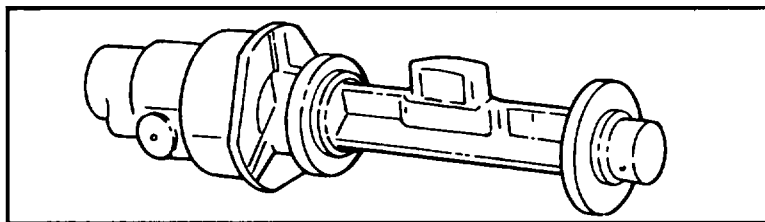
a. Preparation for Boresighting.

- (1) Perform all prepare-to-fire checks in accordance with this manual.
- (2) Position tank on level ground.
- (3) Clear all weapons and leave breech on gun/launcher open.
- (4) Ensure engine is off, MASTER SWITCH and TURRET POWER switch are on, and TTS is placed to standby position.
- (5) Select a target with clearly defined vertical and horizontal lines at the optimum boresight range of 1200 meters. Should a target not be available at 1200 meters, select a target at a known tank-to-target range as close to 1200 meters as possible.
- (6) Press pushbutton actuator (1) and push handle (2) forward to open ballistic shield cover.



b. Boresighting the M1271M127A1 Telescope [Muzzle Boresight Device (MBD) Method].

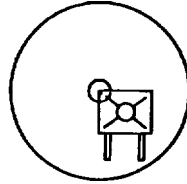
- (1) Insert MBD into muzzle end of gun/launcher with locking block on MBD in 12 o'clock position.



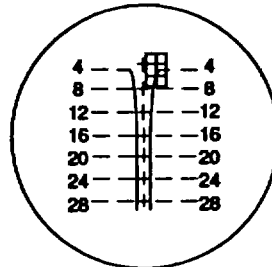
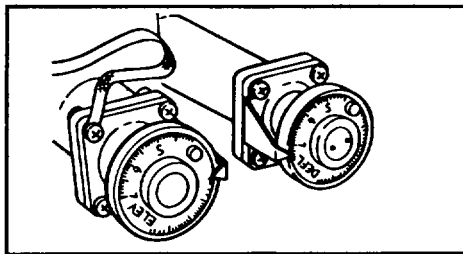
NOTE

During boresight procedures, the gunner should always use his manual controls when moving the gun/launcher.

- (2) Without touching gun/launcher or device, look through boresight device eyepiece and instruct gunner to traverse and elevate as required to lay boresight dot, in MBD, on upper left corner of target. Ensure last movement of gun/launcher is in elevation.



- (3) Turn FIRE CONTROL selector to CONV. Ensure conventional reticle is visible in M127/M127A1 telescope and all parallax is removed. Gunner will then pull out and rotate deflection and elevation knobs to bring boresight cross into alignment with aiming point.



- (4) Gunner will traverse and elevate off target using a "G" pattern and manual controls. Gunner will then re-lay gun back onto target ensuring final lay is in an upward (elevation) direction.
- (5) Gunner will let individual on ground know when gun is laid back onto target. Individual on ground will then check to see if MBD is laid onto upper left-hand corner of aiming point. If dot in MBD is not touching aiming point in any direction, one or more of the following conditions exist:
- Gunner has made an incorrect adjustment of reticle.
 - Gunner's lay is inconsistent.
 - Fire control equipment is faulty.
 - All parallax has not been removed from telescope.

NOTE

If any fault is discovered, correct it immediately and start the boresight procedure over.

- (6) If boresight dot is not exactly on aiming point but is within diameter of dot in any direction, repeat steps 2 and 3. Gunner will then slip scales on telescope boresight knobs to AZ 1 and EL 1.
- (7) Without disturbing lay of gun, remove MBD from gun, rotate device 180 degrees, and reposition it in muzzle (locking block should now be in 6 o'clock position).

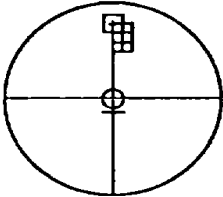
2-15. PREPARATION FOR FIRING-Continued.

- (8) Have gunner traverse and elevate off target and re-lay boresight cross of M127/M127A1 back onto aiming point, ensuring last movement is in elevation. Looking through eyepiece of MBD, note position of boresight dot. If boresight dot is precisely on aiming point, telescope is boresighted. Proceed to step 14.
- (9) If boresight dot is not on aiming point, realign dot by directing gunner to perform another 'G' pattern. Once dot in MBD is aligned on aiming point, have gunner realign reticle boresight cross by pulling out and rotating deflection and elevation knobs until boresight cross and aiming point are aligned.
- (10) Note boresight knob readings. Elevation and azimuth readings should read between 0.5 and 1.5. If either reading falls out of these limits, perform boresight procedure again starting at step 1. If, after re-boresighting, limits are again exceeded, turn in MBD to unit maintenance for collimation error and perform boresighting procedure again from step 1 with a different MBD.
- (11) Assuming second set of readings are within limits, note readings and rotate boresight knobs halfway back to 1.

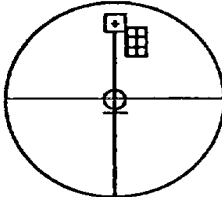
EXAMPLE: The second set of readings are AZ 1.4 and EL 0.8. Rotate the AZ knob to 1.2 and the EL knob to 0.9.

- (12) Using manual controls, gunner re-lays M127/M127A1 boresight cross onto aiming point.
- (13) Ensuring boresight cross remains on aiming point, gunner slips scales to AZ 1 and EL 1.
- (14) Turn FIRE CONTROL selector to MISSILE. Ensure missile reticle is visible in telescope. Ensure target aiming point is in missile boresight box. A perfect alignment will have missile boresight cross on aiming point. If aiming point is inside square box containing missile boresight cross or if it touches box, alignment is acceptable. If not, perform tracker alignment procedures. If aiming point is still outside box after tracker alignment, notify unit maintenance. Return FIRE CONTROL selector to CONV.

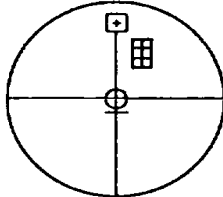
MISSILE BORESIGHT CROSS ALIGNMENT



PERFECT ALIGNMENT



ACCEPTABLE ALIGNMENT



UNACCEPTABLE ALIGNMENT

NOTE

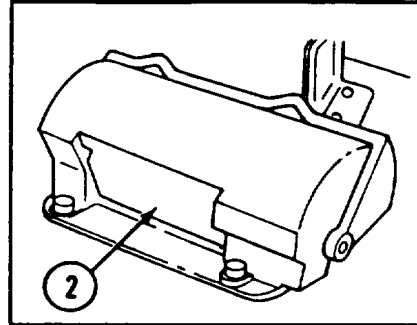
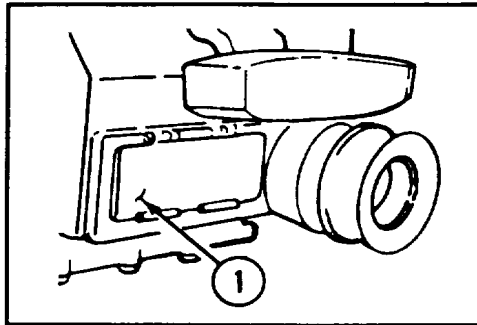
All Information on pages 2-159 and 2-160 deleted.

d. Boresighting Periscope M44 Series.**NOTE**

You must boresight the telescope first (see paragraph 2-15, c). Use the same distant aiming point for boresighting your periscope.

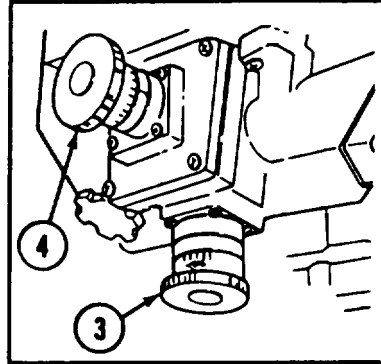
(1) Close cover (1) on view window.

(2) Open ballistic cover and window snap boresight aid (2) over outer window.



(3) Place filter lever at DARK position and turn on periscope.

(4) Look through periscope eyepiece and lay reticle pattern of same point by pulling out and turning elevation (3) and deflection (4) knobs. Ensure telescope conventional reticle is still laid on distant aiming point.



Change 1 2-161

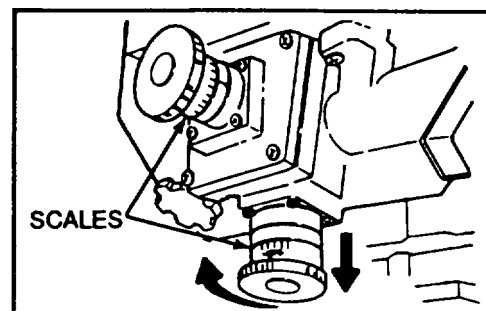
2-15. PREPARATION FOR FIRING-Continued.

- (5) Turn periscope OFF and move filter lever to OFF position. Remove boresight aid.

NOTE

• *To slip dial scales, turn only the scales. To turn knob, pull out on the knob and turn.*

• *If you're going to zero the periscope, skip to paragraph 2-15, o.*



- (6) Slip dial scales on deflection and elevation knobs to 4.
- (7) Turn elevation and deflection knobs to establish zero. Your established zero is the setting determined after you have once zeroed. If you do not have an established zero, turn to emergency zero of 5 for elevation and 2 for deflection.

NOTE

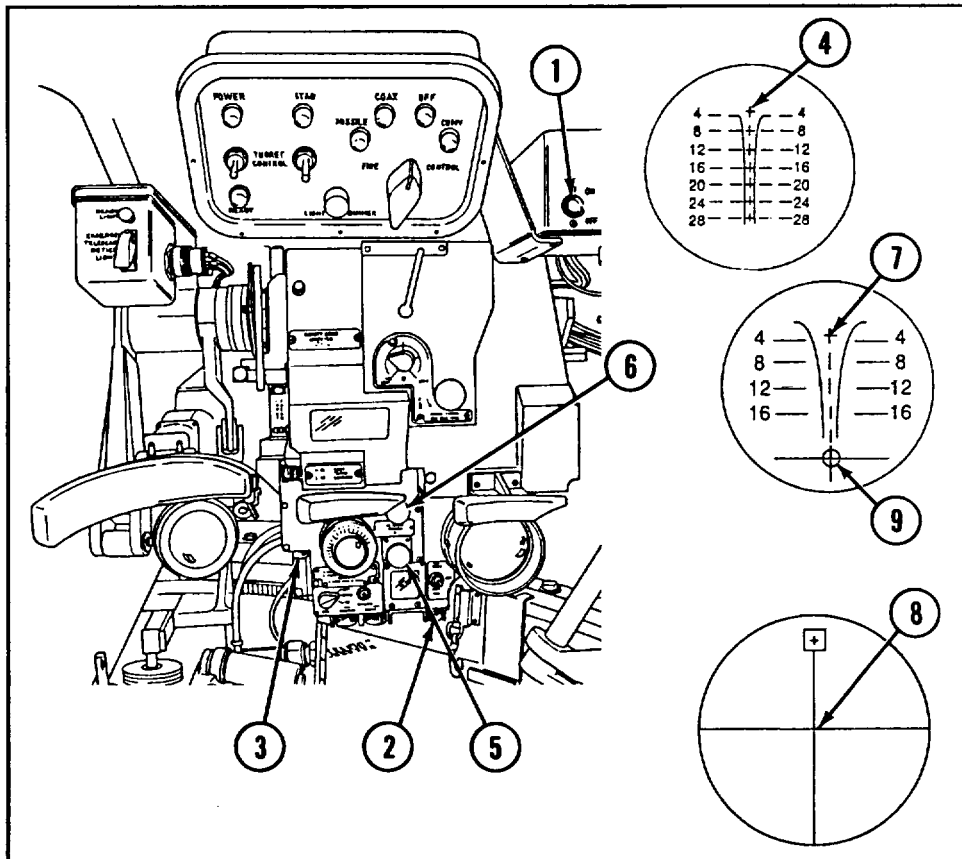
If you can't align the reticle, you'll need unit maintenance help.

e. Boresighting TTS (M551A1).**NOTE**

The M127IM127A1 telescope must be boresighted and zeroed and the missile system aligned before boresighting the TTS.

- (1) Daylight Channel.
- (a) Set FIRE CONTROL selector to CONV.
 - (b) Turn DAYLIGHT CHANNEL RETICLE switch (1) on and rotate RTCL control (2) until reticle is just visible against target background.
 - (c) Select appropriate filter (3) for clear picture.
 - (d) Using manual gun/turret controls, lay boresighted cross (4) of conventional reticle in M127/M127A1 telescope on upper left-hand corner of boresight panel (target).

- (e) Using TTS's daylight boresight knobs (5 and 6), lay boresight cross (7) on target.
- (f) Set FIRE CONTROL selector to MISSILE.
- (g) Using manual gun/turret controls, lay missile aiming cross (8) of M127/M127A1 telescope on target.
 1. If missile aiming cross (9) in TTS daylight channel is to left of target, set slip scale on azimuth boresight knob to "0."
 2. If missile aiming cross (9) in TTS daylight channel is to right of target, set slip scale on azimuth boresight knob to "7."
 3. If missile aiming cross (9) in TTS daylight channel is below target, set slip scale on elevation boresight knob to "0."
 4. If missile aiming cross (9) in TTS daylight channel is above target, set slip scale on elevation boresight knob to "7."



2-15. PREPARATION FOR FIRING-Continued.

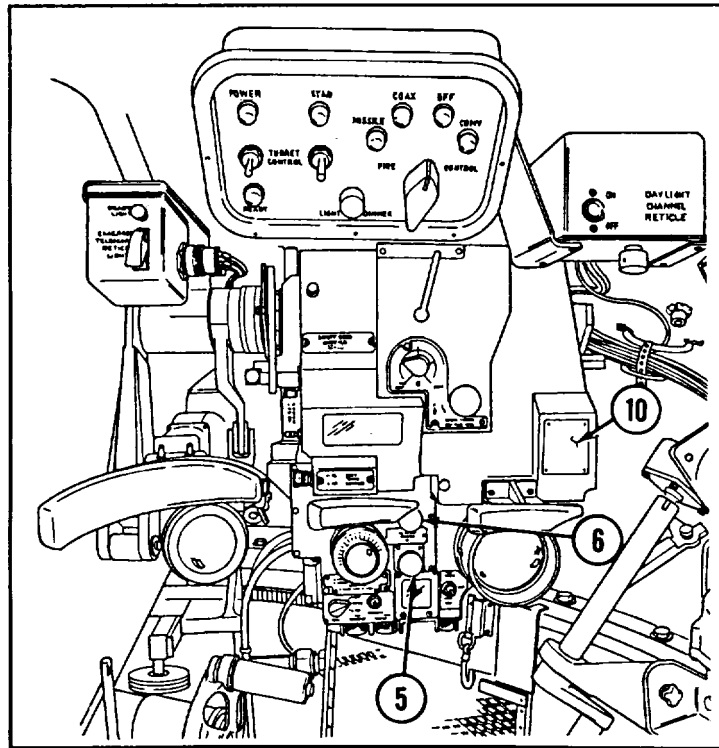
NOTE

The above settings of the azimuth and elevation slip scales are the zeroing settings on the TTS daylight channel for the conventional round. Record these settings on the decal (10) provided on the TTS.

- (h) Adjust TTS daylight boresight knobs (5 and 6) to align missile aiming cross to target.

NOTE

These settings are the daylight boresight knob positions for firing the missile. Record these settings on the decal (10) provided on the TTS.



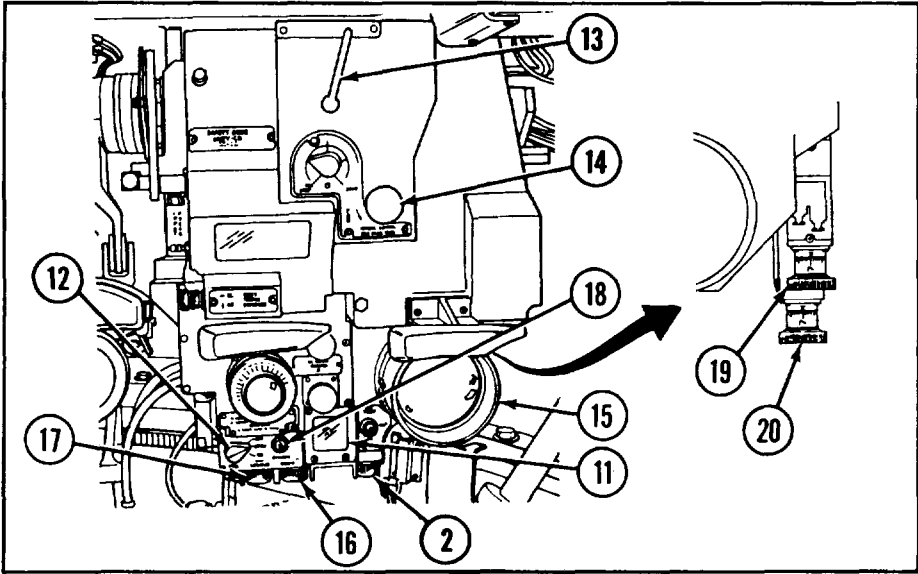
- (2) Thermal Channel.

NOTE

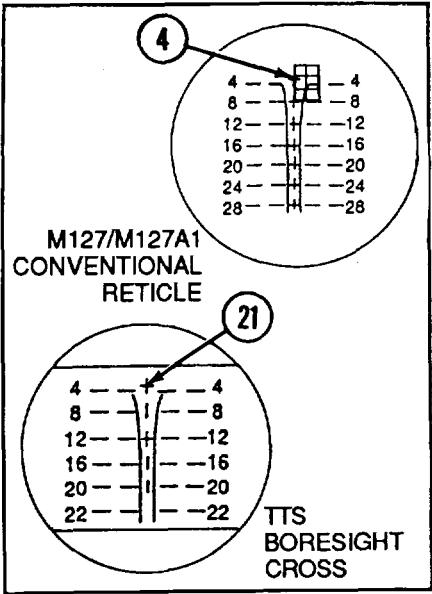
Make sure COOL light (11) is out, indicating the system is ready for thermal operation.

- (a) Set MODE switch (12) to ON, and FIRE CONTROL selector to CONV.

- (b) Set thermal channel field of view selector (13) to NAR.
- (c) Adjust thermal control range focus (14) for sharpest view through eyepiece (15).
- (d) Adjust bright (16) and contrast (17) for normal scene.
- (e) Set polarity switch (18) for best image.
- (f) Adjust RTCL control (2) until reticle is visible against target background.

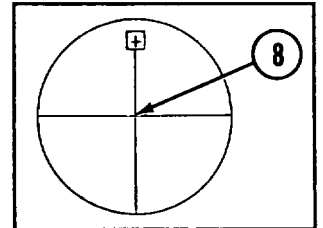


- (g) Using manual gun/turret controls, lay boresighted cross (4) of conventional reticle in M127/M127A1 telescope on upper left-hand corner of boresight panel (target).
- (h) Using TTS's thermal boresight knobs (19 and 20), lay boresight cross (21) on target.
- (i) Set FIRE CONTROL selector to MISSILE.

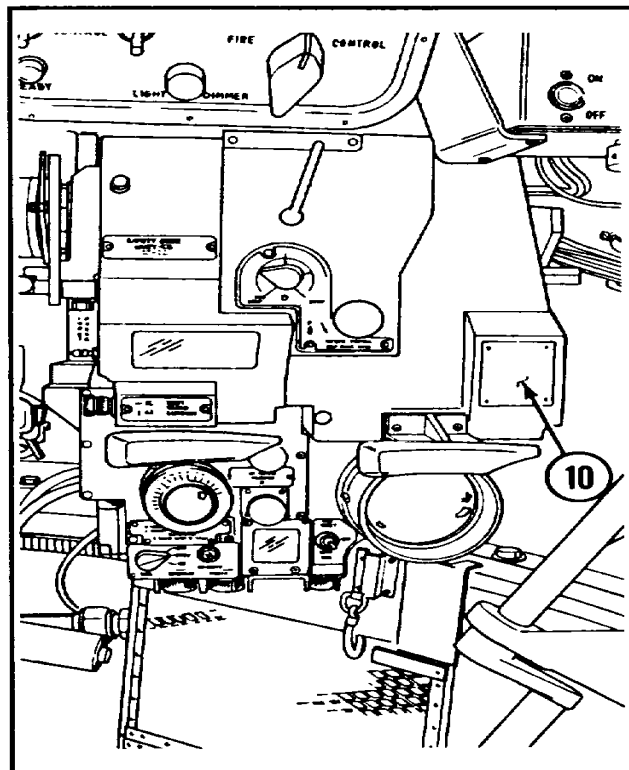
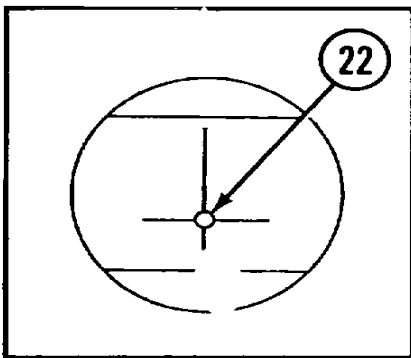


2-15. PREPARATION FOR FIRING-Continued.

- (j) Using manual gun/turret controls, lay missile aiming cross (8) of M127/M127A1 telescope on target.



1. If missile aiming cross (22) in TTS thermal channel is to left of target, set slip scale on azimuth boresight knob to "0."
2. If missile aiming cross (22) in TTS thermal channel is to right of target, set slip scale on azimuth boresight knob to "7."
3. If missile aiming cross (22) in UTS thermal channel is below target, set slip scale on elevation boresight knob to "0."
4. If missile aiming cross (22) in UTS thermal channel is above target, set slip scale on elevation boresight knob to "7."



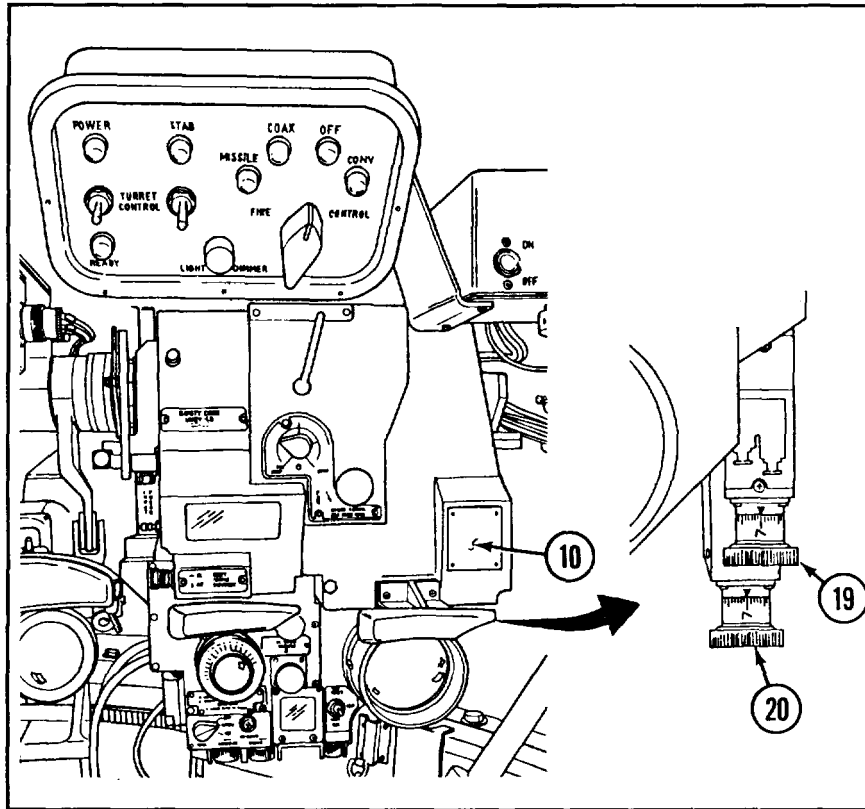
NOTE

The above settings of the azimuth and elevation slip scales are the zeroing settings on the TTS thermal channel for the conventional round. Record these settings on the decal (10) provided on the TTS.

- (k) Adjust TTS thermal boresight knobs (19 and 20) to align missile aiming cross to target.

NOTE

These settings are the boresight knob positions for firing the missile. Record these settings on the decal (10) provided on the TTS.



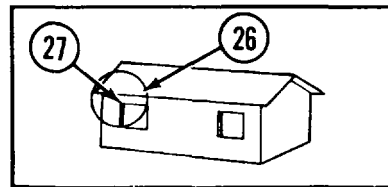
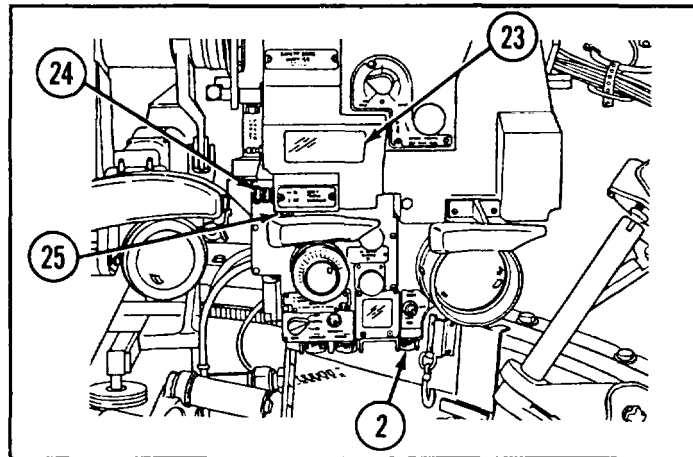
- (3) Boresighting TTS Unity Channel.

NOTE

Make sure that TTS is operational. Perform preliminary procedure (see paragraph 2-15, a) and daylight channel operation (see paragraph 2-15, e, 1).

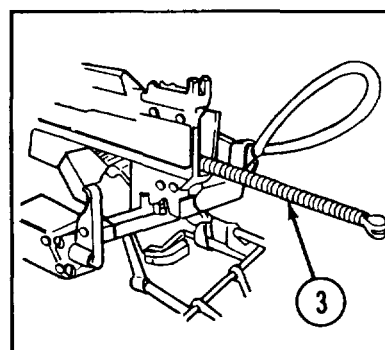
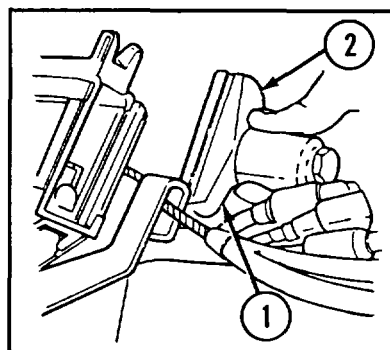
- (a) Sight through unity power window (23). Rotate RTCL control (2) until reticle is just visible against target background.
- (b) Pull out and rotate unity reticle boresight EL (24) and AZ (25) knobs. Align aiming circle (26) center on aiming point 197)

2-15. PREPARATION FOR FIRING-Continued.

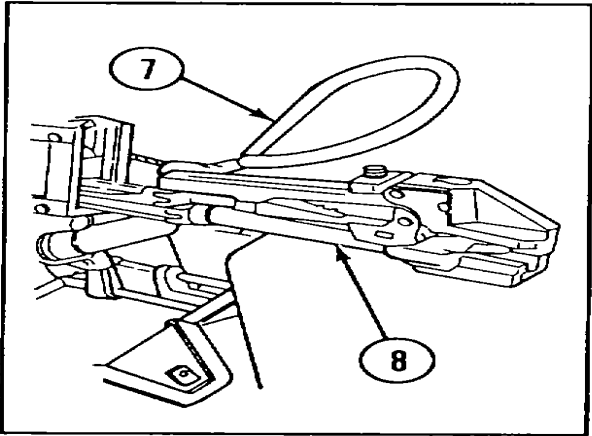
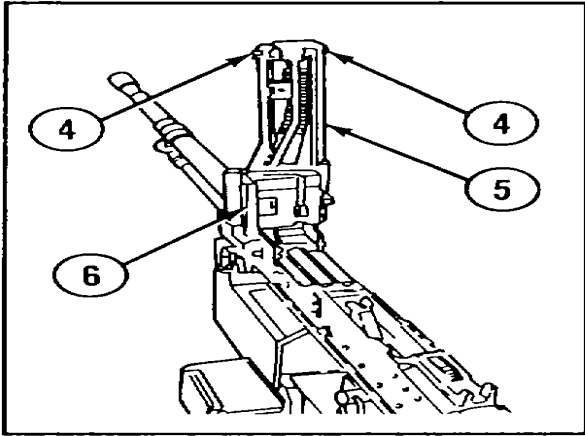


f. Boresighting 7.62-mm Machine Gun (M551A1).

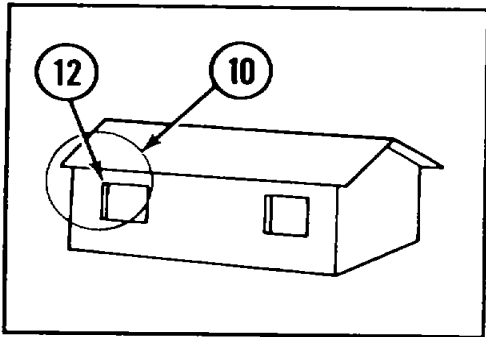
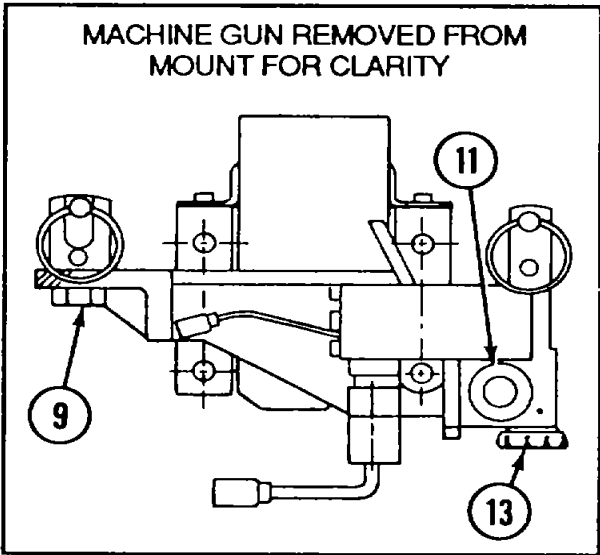
- (1) Clear 7.62-mm machine gun.
- (2) Depress release catch (1) and slide buffer (2) up and off.
- (3) Push drive spring (3) in, up, and out.



- (4) Push in on cover latches (4), and raise cover (5) and feed tray (6).
- (5) Pull back on charger cable (7).
- (6) Pull out bolt and operating rod (8).



- (7) Loosen mounting block nut (9)
- (8) Sight aiming circle (10) through 7 62-mm machine gun barrel bore using one side of M17A1 binocular
- (9) Rotate traversing knob (11) in either direction until barrel is horizontally centered on target aiming point (12)
- (10) Rotate elevation knob (13) in either direction until barrel is vertically centered on target aiming point (12)
- (11) Tighten mounting block nut (9) until tension is felt between nut and washer, then tighten an additional one-third turn
Recheck lay of 7 62-mm machine gun If error exists, repeat steps 7 through 11 of this procedure.



2-1 5. PREPARATION FOR FIRING-Continued.

(13) Push in bolt and operating rod (8).

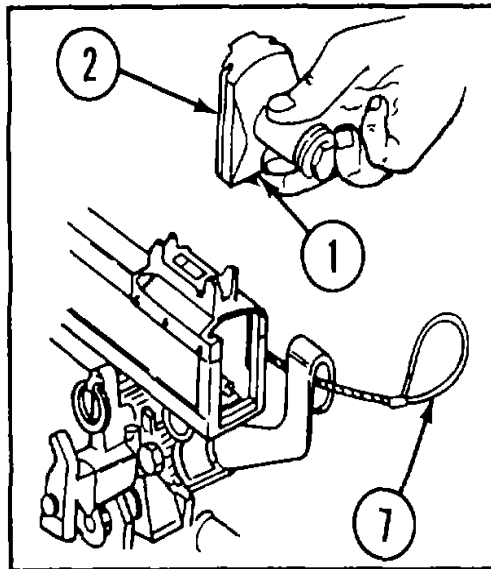
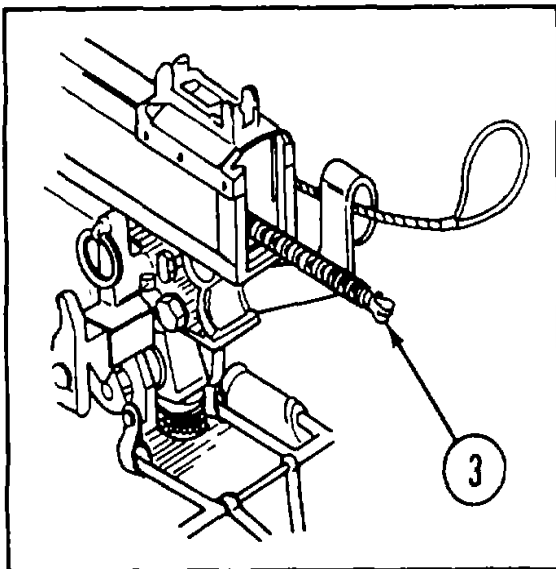
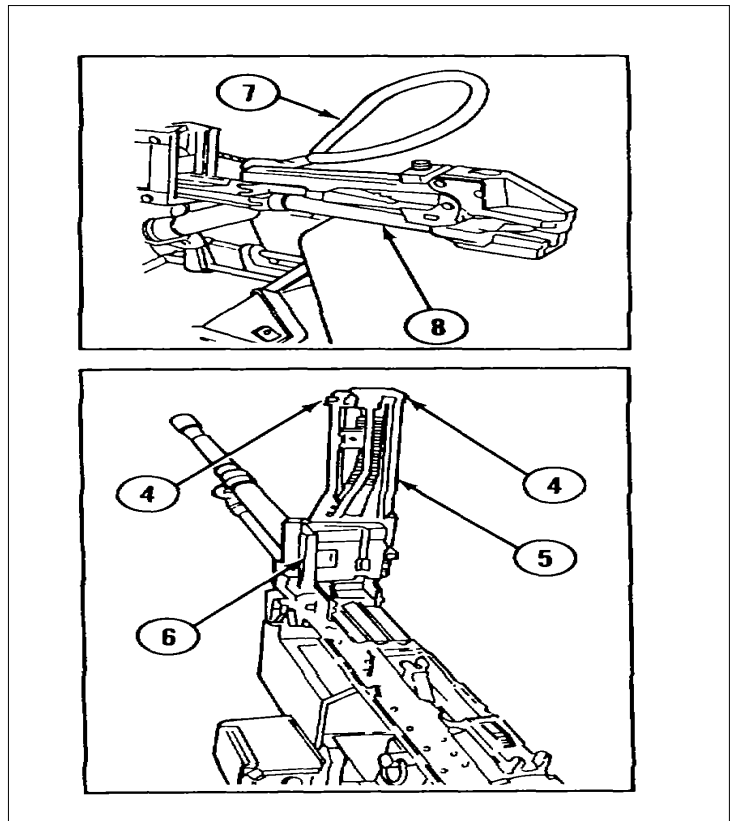
(14) Pull back charger cable (7).

(15) Lower feed tray (6) and cover (5) making sure cover latches (4) lock in place.

(16) Push in drive spring (3).

(17) Slide buffer (2) down until catch (1) locks.

(18) Pull back charger cable (7) to check operation.



(1) Before starting, make sure telescope and periscope are boresighted

(2) Basic Zero Confirmation Procedure.

- (a) After tank is boresighted, crew begins zero confirmation procedure This requires a zero target panel with a 77-inch diameter circle, a 48-inch diameter circle, and a center aiming point Target is placed 1200 meters from firing tank.
- (b) Apply established zero readings to the M127/M127A1 telescope.
- (c) Use "G" pattern to lay 1200-meter range line of telescope reticle on center aiming point of target and fire one round of TP-T If round strikes within 77-inch circle, zero is confirmed.
- (d) If round strikes outside 77-inch circle, have turret inspected by unit maintenance Any deficiencies are corrected, and confirmation procedure is restarted If no deficiencies are discovered, fire a second round If second round strikes within 77-inch circle, zero is confirmed.
- (e) If second round strikes outside 77-inch circle, fire a third round to complete shot group and proceed with step e of Basic Zeroing Procedure.

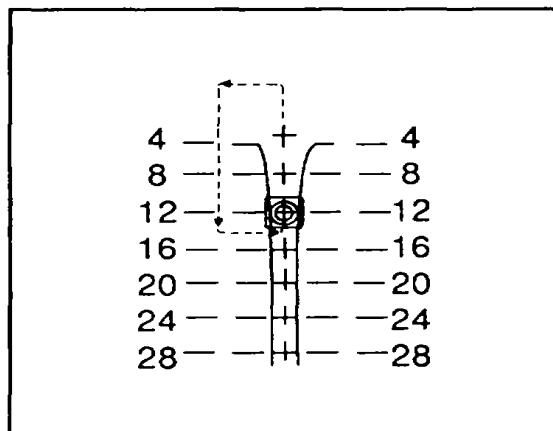
(3) Basic Zeroing Procedure.

- (a) Before starting zeroing procedure, tank must be boresighted and a zero target panel must be placed 1200 meters from firing tank Target will have a 77-inch diameter circle, a 48-inch diameter circle, and a center aiming point.
- (b) Apply emergency zero readings of AZ 2 and EL 5 to sights.
- (c) Looking through telescope and using manual controls and "Go pattern, lay 1200-meter range line on center aiming point of zero target panel and fire one round of TP-T.
- (d) Use "G" pattern again to re-lay 1200-meter range line back on center aiming point and fire a second round.
- (e) Using same technique, fire a third round, then re-lay on center aiming point.

2-15. PREPARATION FOR FIRING-Continued.

- (f) After determining center of shot group, pull out and rotate telescope boresight knobs to bring 1200-meter range line to center of shot group.

- (g) Lay on center aiming point, using "G" pattern, and fire a confirmation round. If round hits within 48-inch circle, telescope is zeroed.

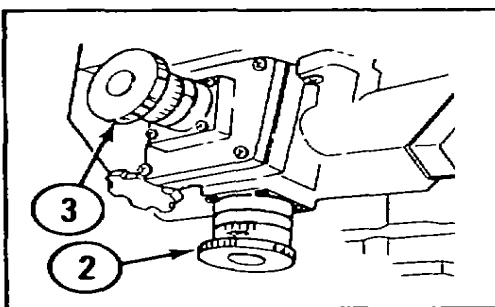
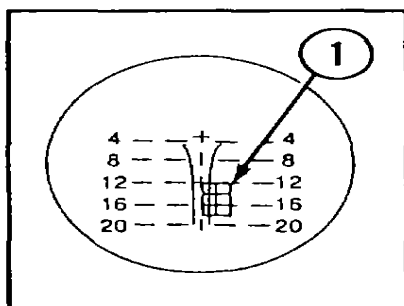


NOTE

Proceed to paragraph I if your vehicle is equipped with a TTS.

h. Zeroing Periscope M44 Series.

- (1) After zeroing telescope, lay 1200-meter cross (1) on aiming point. Look through periscope eyepiece and pull out and adjust elevation knob (2) and deflection knob (3) until 1200-meter cross is aligned with same aiming point.



- (2) Now you're zeroed. Record and store your established zero (knob settings) in a convenient part of turret for easy reference. Use format below:

PERISCOPE

Elevation _____
Deflection _____

2-172

TM 9-2350-230-10

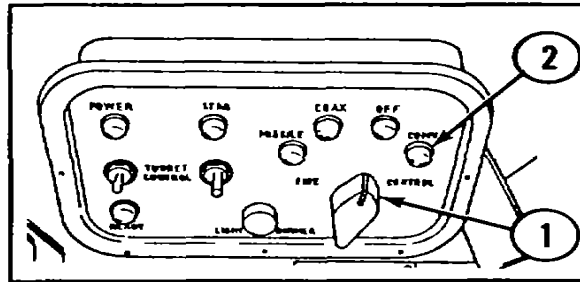
- (3) Slip dial scales on periscope elevation and deflection knobs to 4.

i. Zeroing TTS (M551A1).

- (1) Daylight Channel.

(a) Before starting, make sure:

1. TTS is boresighted.
2. FIRE CONTROL selector (1) is on CONV (2).



3. TTS reticle is still laid on 1200-meter distant aiming point.

(b) Set MASTER SWITCH to ON

(c) Switch TURRET POWER on

(d) Turn daylight reticle switch on dimmer box to ON

(e) Sight through daylight channel eyepiece (3) and adjust RTCL control (4) until reticle is just visible against target background.

(f) Sight through eyepiece (3) and adjust diopter ring (5) for best reticle focus.

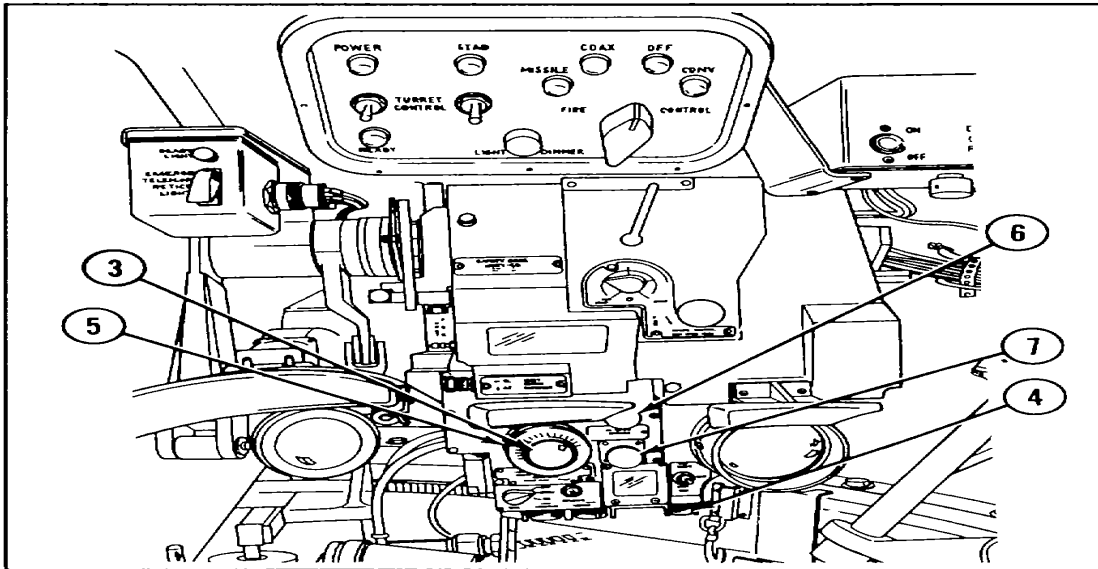
NOTE

Be sure not to disturb manual elevation or traversing control handles.

(g) Look through daylight channel eyepiece and pull out and adjust elevation knob (6) and deflection knob (7) until 1200-meter cross is aligned with 1200-meter aiming point.

(h) Now you're zeroed Record and store your established zero (knob settings) in a convenient part of turret for easy reference Use format below

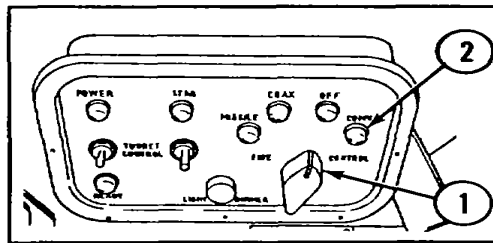
TTS Daylight Channel Elevation _____
Deflection _____



(2) Thermal Channel.

(a) Before starting, make sure:

1. TTS is boresighted.
2. FIRE CONTROL selector (1) is on CONV (2).



3. TTS reticle is still laid on 1200-meter distant aiming point.

(b) Set MASTER SWITCH to ON.

- (c) Switch TURRET CONTROL on
- (d) TTS MODE switch (8) to STBY When cool light goes out, indicating that system is ready for thermal channel operation, set MODE switch (8) to ON
- (e) Sight through thermal channel eyepiece (9) and adjust RTCL control (4) until reticle is just visible against target background
- (f) Sight through eyepiece (9) and adjust thermal channel focus control (10) for best reticle focus

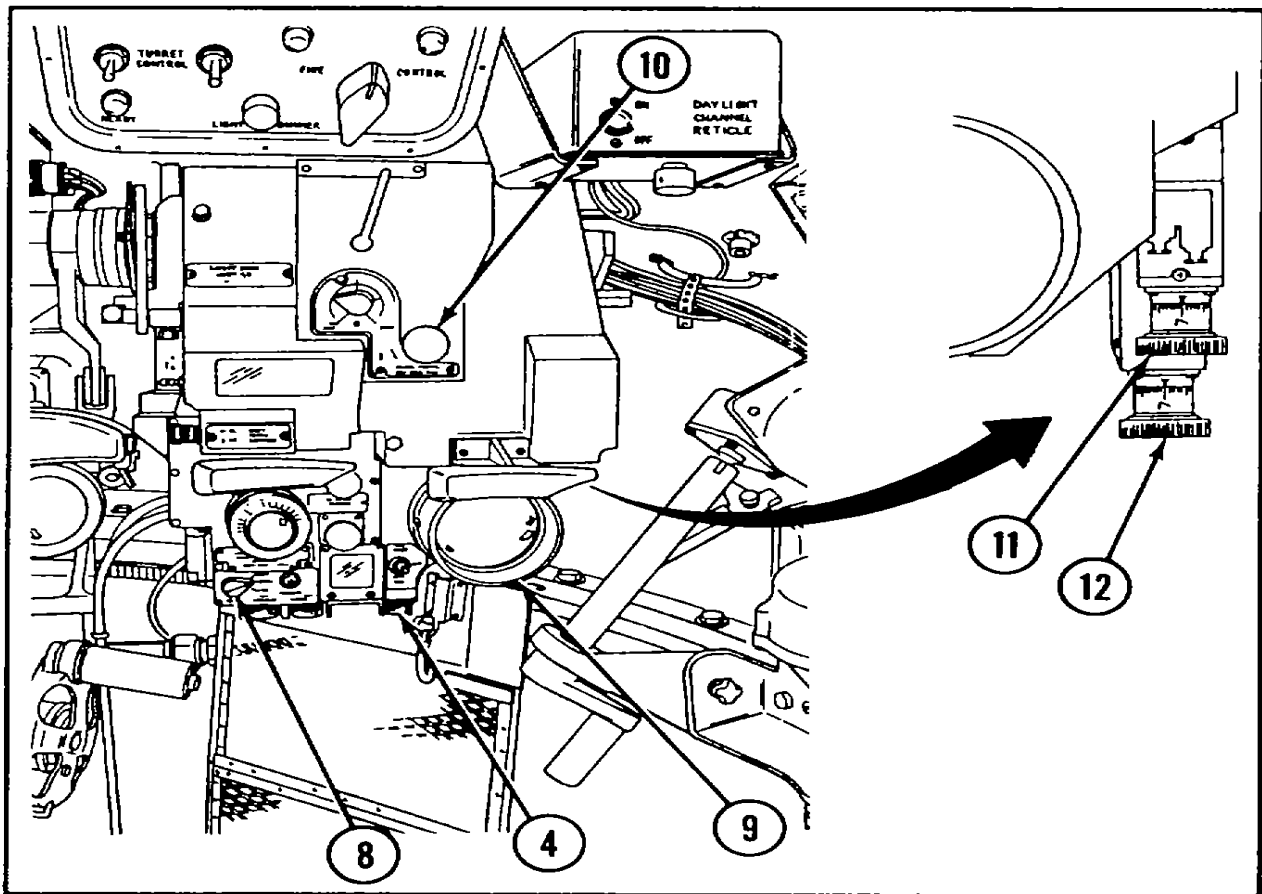
NOTE

Be sure not to disturb manual elevation or traversing control handles.

- (g) Look through thermal channel eyepiece and pull out and adjust elevation knob (11) and deflection knob (12) until 1200-meter cross is aligned with 1200-meter aiming point.
- (h) Now you're zeroed Record and store your established zero (knob settings) in a convenient part of turret for easy reference Use format below.

TTS Thermal Channel

Elevation _____
 Deflection _____



2-15. PREPARATION FOR FIRING-Continued.

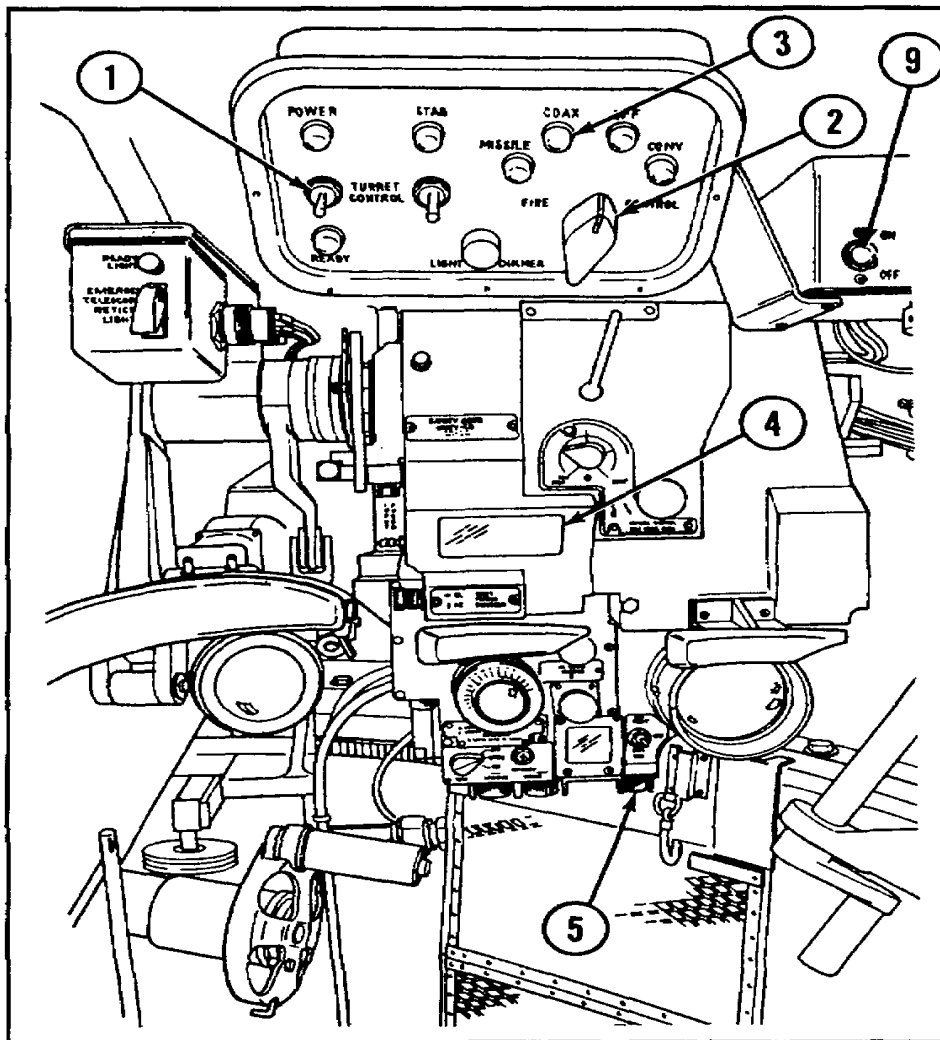
j. Zeroing 7.62-mm Machine Gun (M551A1).

- (1) Select a target at a distance of 800 meters.
- (2) With vehicle engine running, turn TURRET CONTROL switch (1) POWER, turn FIRE CONTROL selector (2) to COAX (3)

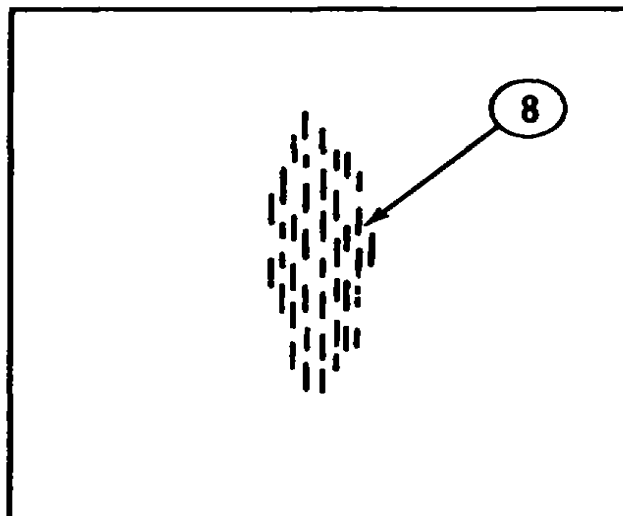
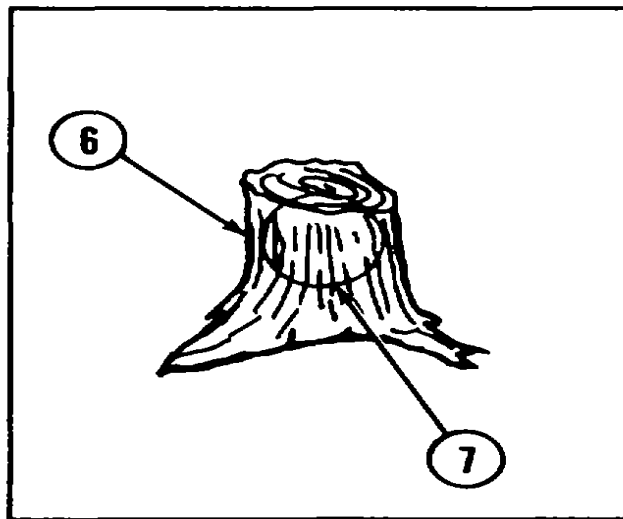
CAUTION

Don't touch the boresight knobs on the telescope. You only use these knobs when you boresight/zero with the gun/launcher.

- (3) on daylight reticle switch (9) mounted on dimmer box Sight through unity power window (4) Adjust RTCL control (5) until reticle is just visible against target background.



- (4) Sight through unity power window (4) Lay target (6) in center of aiming circle (7) by operating turret manual traversing and elevating handles
- (5) Load and charge machine gun.
- (6) Fire a burst of 20 to 25 rounds to determine strike area (8)
- (7) Check reticle in telescope If 800-meter mark is in center of burst, you're zeroed If not, proceed to next step
- (8) With adjusting screws, adjust machine gun toward 800-meter mark
- (9) Repeat steps 6, 7, and 8 until zeroed



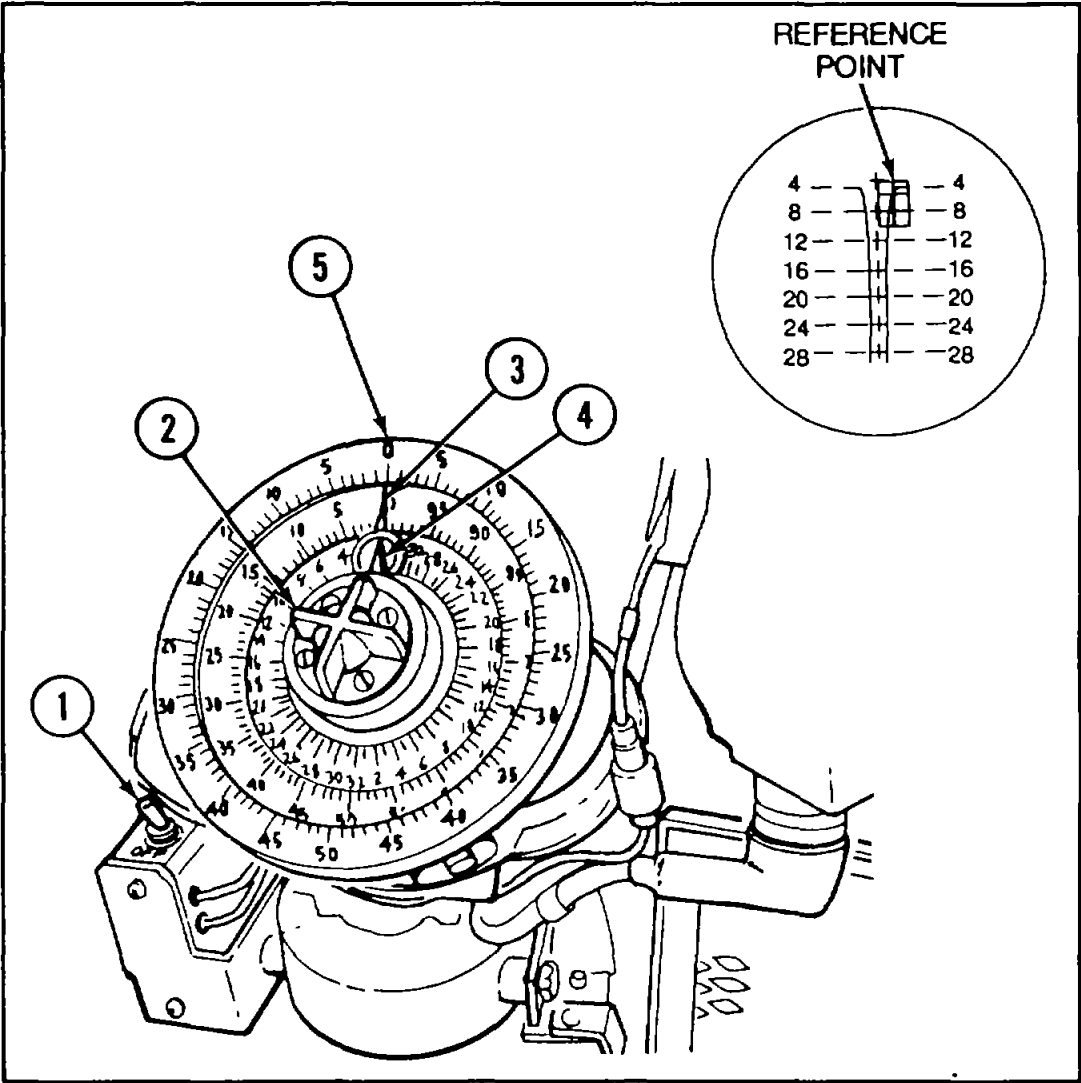
2-16. OPERATION OF AZIMUTH INDICATOR.

a. Deflection (Azimuth) Angle.

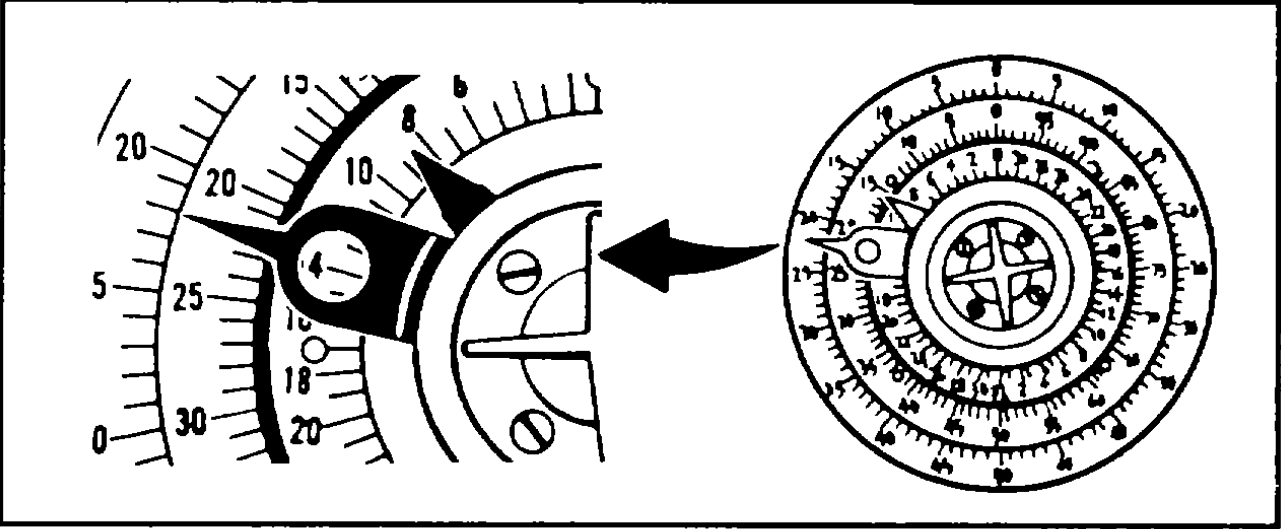
NOTE

Position the vehicle on level ground. Be sure the vehicle MASTER SWITCH Is on, TURRET POWER Is on, and FIRE CONTROL selector Is at COAX or CONV.

- (1) Select a well-defined reference point Look through gunners telescope or periscope and elevate or depress and traverse until conventional reticle is laid on reference point
- (2) At azimuth indicator [turn on lamp switch (1) if needed], turn reseller knob (2) until micrometer pointer (3) lays on azimuth pointer (4) Press down on resetter knob (2) and turn lay at zero (5).

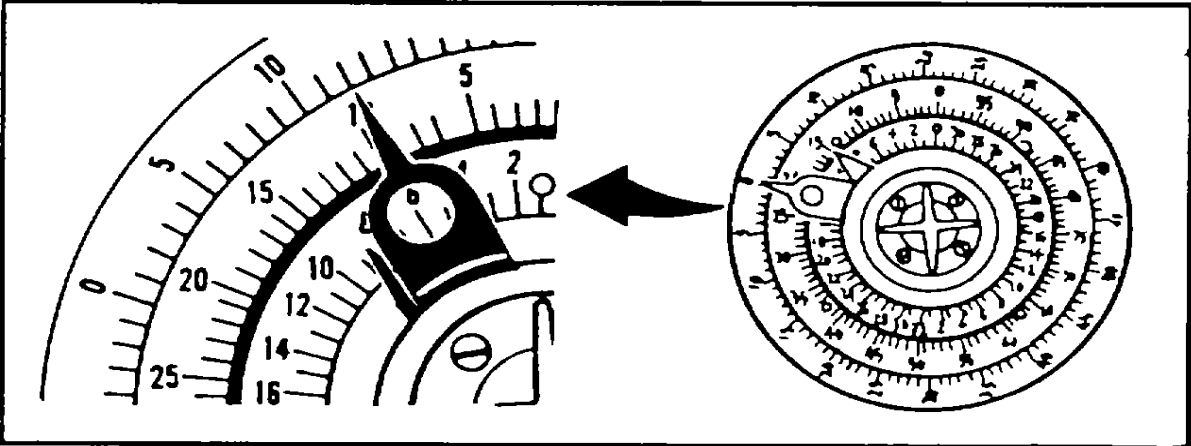


(3) When you locate a target, you can find deflection by traversing turret until conventional reticle is laid on target. Your deflection is the sum of your azimuth pointer (scaled to 100 mils) and micrometer pointer (scaled to 1 mil) For instance, if you've traversed left to get on target and your indicator looks like the following illustration, you have a left deflection of 822 mils



(4) If you must make a small deflection correction (50 mils or less in either direction), you can use gunner's aid dial as follows

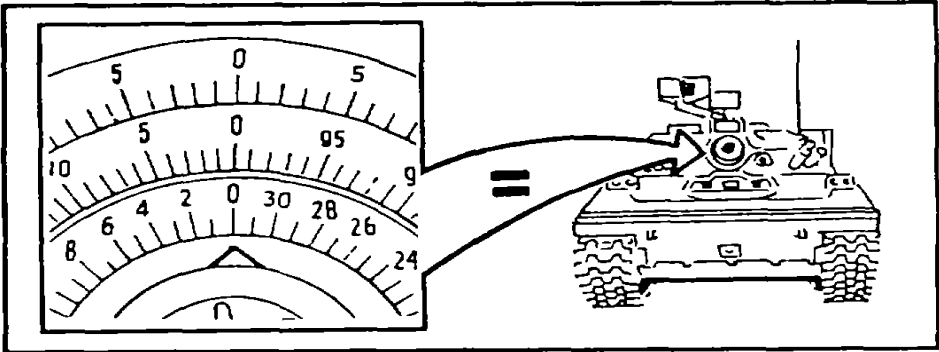
Say your first deflection was 822 mils to left. The commander determines you should deflect 12 mils to right before firing. By hand, turn gunner's aid dial until its zero is aligned with micrometer pointer. Slowly traverse turret to right until micrometer pointer aligns with 12 mils reading on gunner's dial. This eliminates mental subtraction of 12 from 22.



2-16. OPERATION OF AZIMUTH INDICATOR-Continued.

NOTE

The directional pointer tells you how far you've traversed the gun from front-center of the vehicle. You can't adjust this pointer, but you can traverse the turret until pointer is at zero to put your gun dead-center over the front.

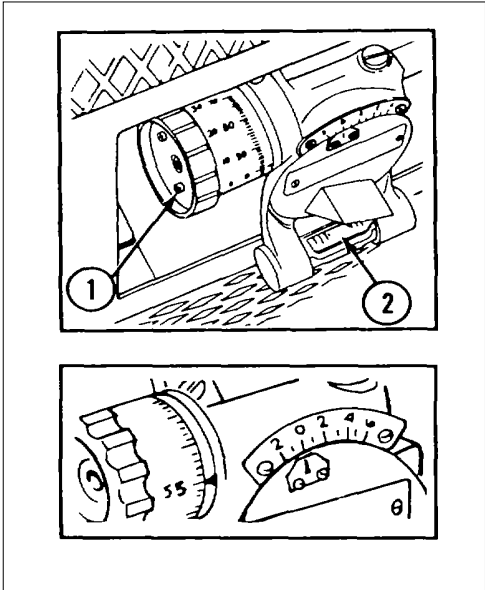


b. Elevation Angle.

NOTE

If you want to check the accuracy of your M13A1C quadrant, ask unit maintenance to verify it by using the M1A1 gunner's

- (1) Quadrant M13A1C. Let's say you need an elevation of 155 mils from zero elevation First, zero quadrant Now turn micrometer knob (1) counterclockwise a full turn, keep turning until black numbers are at 55 Elevate gun until bubble (2) centers



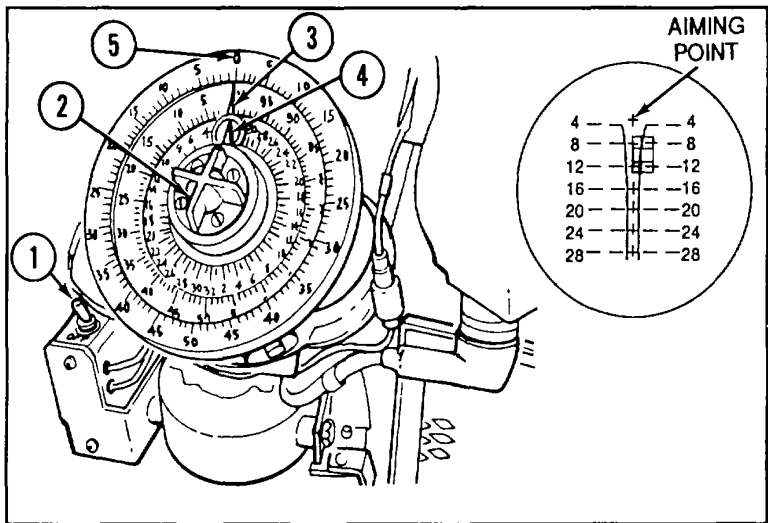
- (2) If you want to lower gun below zero elevation, here's how Say you need a depression of -112 mils Zero quadrant and turn micrometer knob clockwise a full turn Keep turning until red numbers are at 12 Depress gun until bubble centers

c. Accuracy Test (Indirect Fire Control Instruments).

NOTE

Vehicle must be on level ground with the **MASTER SWITCH** and **TURRET POWER** switch on and **FIRE CONTROL** selector at **CON V**.

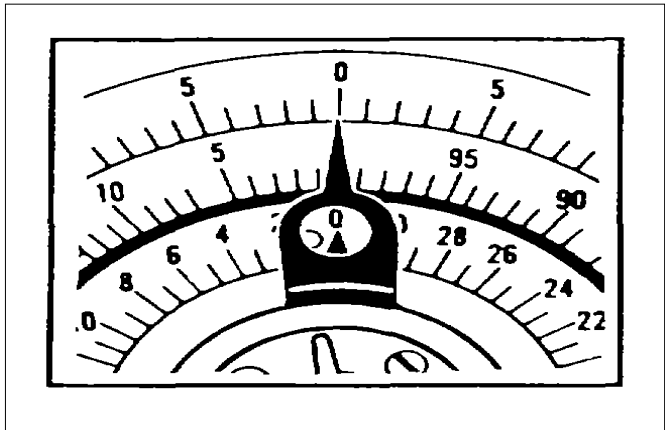
- (1) Look through telescope and manually elevate/depress and traverse until reticle aiming cross is on a definite aiming point (intersecting horizontal and vertical lines).
- (2) At azimuth indicator [turn on lamp switch (1) if needed], turn resetter knob (2) until micrometer pointer (3) lays on azimuth pointer (4).
- (3) Press down and turn resetter knob (2) until both micrometer and azimuth pointers are at zero (5).



NOTE

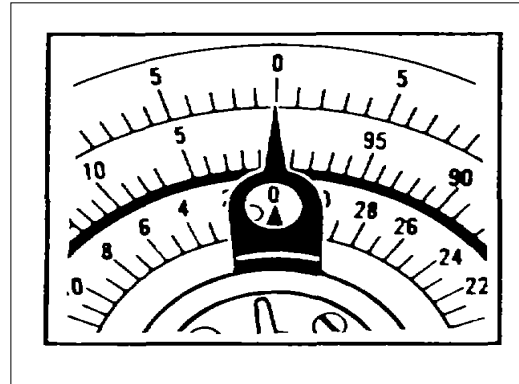
Go slow as you approach the aiming point so you don't over-travel. If you do over-travel, don't go back-just go around again.

- (4) Manually traverse turret through a complete circle, re-laying reticle aiming cross on same aiming point



2-16. OPERATION OF AZIMUTH INDICATOR---Continued.

- (5) Check indicator Both micrometer and azimuth pointers should be at zero If not, you'll need to notify unit maintenance.



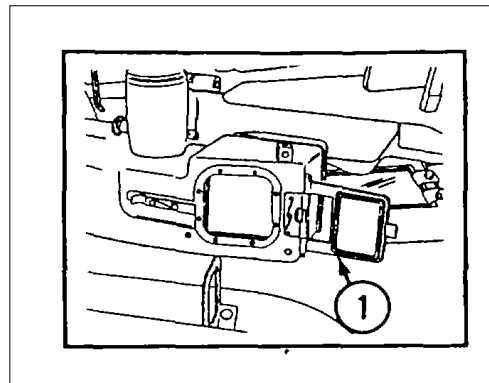
2-17. OPERATION OF LRF (M551A1)

a. Optics Check of LRF.

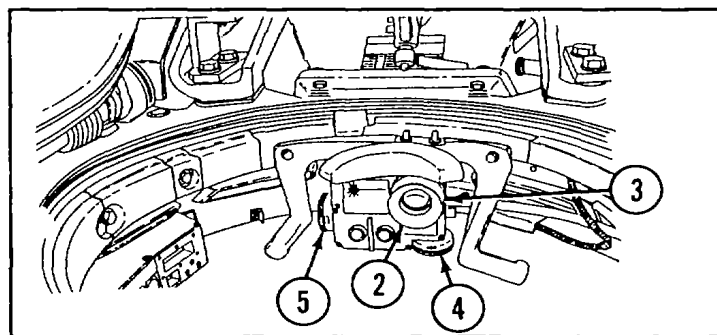
WARNING

Do not fire the LRF during optics check.

- (1) Unlatch and open dust cover (1).

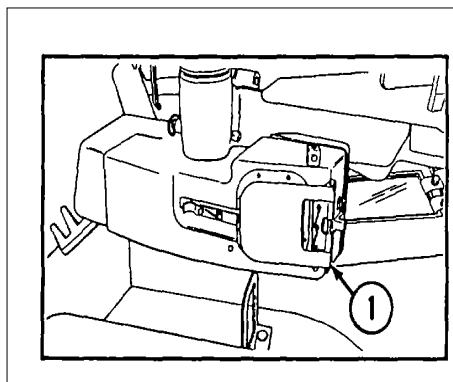


- (2) Look through LRF eyepiece (2) and check for dirty or scratched optics.
- (3) Traverse cupola and select a number of targets beyond 200 meters Look through eyepiece and rotate focus ring (3) to bring each selected target into sharp focus.
- (4) With a selected target beyond 200 meters, rotate azimuth (4) and elevation (5) controls to get exactly on target Make sure controls rotate smoothly and give positive sight pointing without excessive backlash.



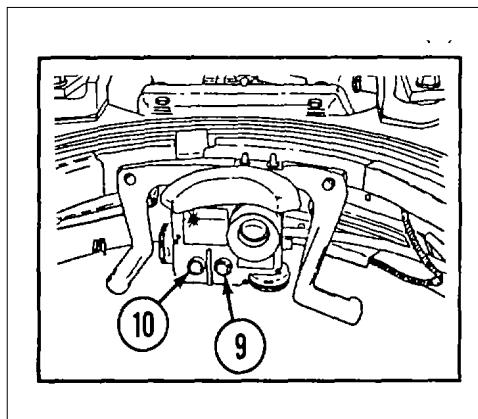
b. LRF Built-in Test Procedure.

- (1) Check to make sure dust cover (1) is closed and latched



- (2) Tell driver to start engine and throttle to a fast idle.
- (3) Push up CUPOLA/LASER switch (2) to POWER.
- (4) Using ROTATION switch (3), traverse cupola Check for following readouts RANGE (METERS) (4) is 9995, RETURNS (5) is 1 If you get these readouts, stop and notify unit maintenance You'll need contact ring and contact brush assemblies cleaned, inspected, and adjusted
- (5) At commander's display, set LASER MODE SELECTOR (6) to TEST-lamps light at TEST (7) and LAST (8) Readout at RANGE (METERS) (4) is 0000, readout at RETURNS (5) is 0.

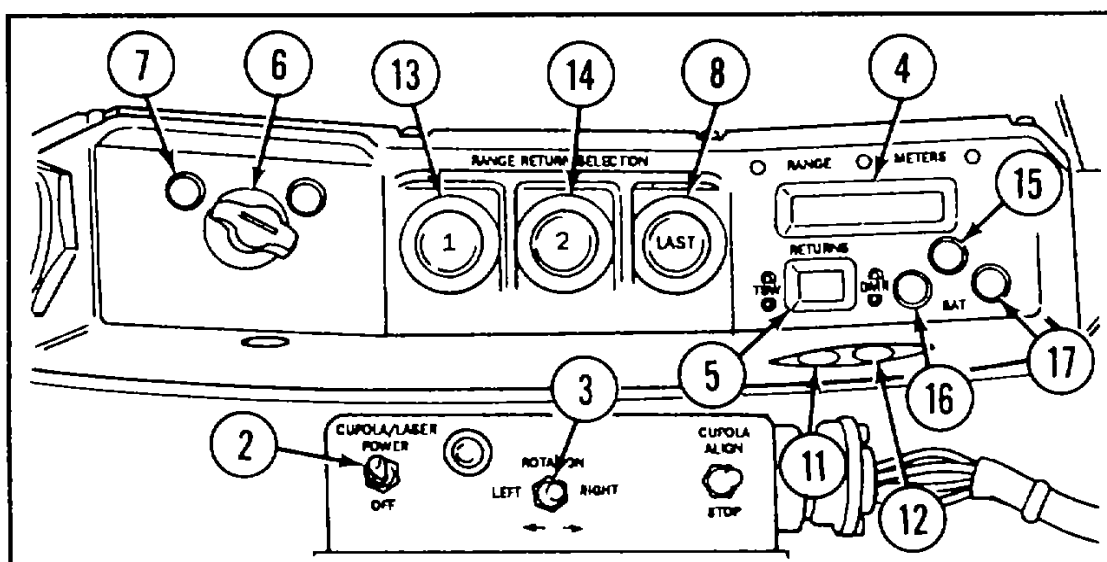
Also, at commander's control, lamps light at RESET (9) and RANGE (10) (without flashing)



- (6) Press TSW test switch (11) All lamps light on commander's display and commander's control Readout at RANGE (METERS) (4) is 8888, readout at RETURNS (5) is 8.
- (7) While pressing the TSW switch (11), press DMR dimmer switch (12) several times All lamps should alternately dim and brighten each time switch is pressed.
- (8) Press RANGE pushbutton (10) Readout at RANGE (METERS)(4) is 0830 to 0860, readout at RETURNS (5) is 1.
- (9) Press RANGE pushbutton (10) a second time Readout at RANGE (METERS) (4) is 1830 to 1860, readout at RETURNS (5) is 2.
- (10) Press RANGE pushbutton (10) a third time Readout at RANGE (METERS) (4) is 2830 to 2860, readout at RETURNS (5) is 3.

2-17. OPERATION OF LRF (M551A1)-Continued.

- (11) Press RANGE pushbutton (10) a fourth time Readout at RANGE (METERS) (4) is 2830 to 2860, readout at RETURNS (5) is 4.
- (12) At RANGE RETURN SELECTOR, press pushbutton 1 (13) RANGE RETURN SELECTOR 1 lamp lights and RANGE RETURN SELECTOR LAST lamp goes out Readout at RANGE (METERS) (4) is 0830 to 0860.
- (13) At RANGE RETURN SELECTOR, press pushbutton 2 (14) RANGE RETURN SELECTOR 2 lamp lights and RANGE RETURN SELECTOR 1 lamp goes out Readout at RANGE (METERS) (4) is 1830 to 1860, readout at RETURNS (5) is 4 Press RESET button (9) RANGE RETURN SELECTOR 2 lamp goes out and RANGE SELECTOR LAST lamp (8) lights Readout at RANGE (METERS) (4) is 0000, readout at RETURNS (5) is 0.
- (14) Press and hold RANGE pushbutton (10) Lamp should light at MALF (15) Readout at RANGE (METERS) (4) is 0002, readout at RETURNS (5) is 0.
- (15) Turn CUPOLA/LASER switch (2) to OFF Readout at RANGE (METERS) (4) is 0001 Lamps light at MALF (15) and DR (16); if auxiliary power supply is low, lamp lights at low (17).



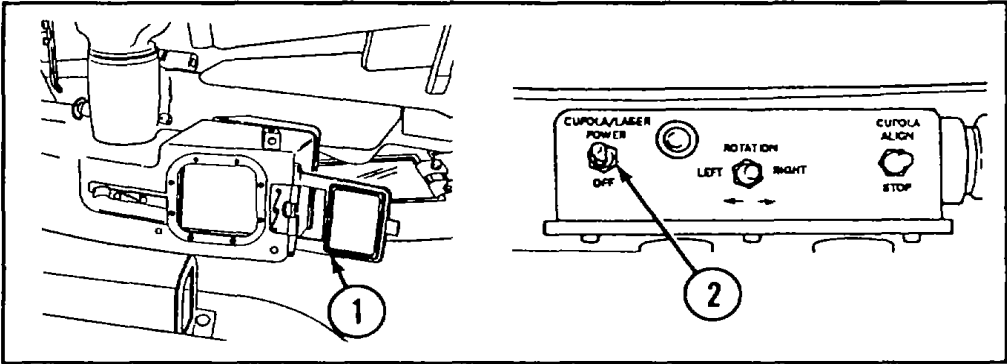
- (16) Push up CUPOLA/LASER switch (2) to POWER Step 15 readout should disappear and lamps should go out.
- (17) Set LASER MODE SELECTOR (6) to ON.
- (18) Press (flashing) RANGE pushbutton (10) Readout at RANGE (METERS) (4) is 9995, readout at RETURNS (5) is 0.
- (19) Shut down in sequence LASER MODE SELECTOR (6) to OFF, CUPOLA/LASER switch (2) to OFF, and, last, tell driver to turn off engine.

c. LRF Firing Test-Normal Conditions.

WARNING

Make certain friendly troops are not near the line-of-sight of the laser beam. Blindness can result if hit in the eye by the laser beam, either directly or indirectly from a shiny surface.

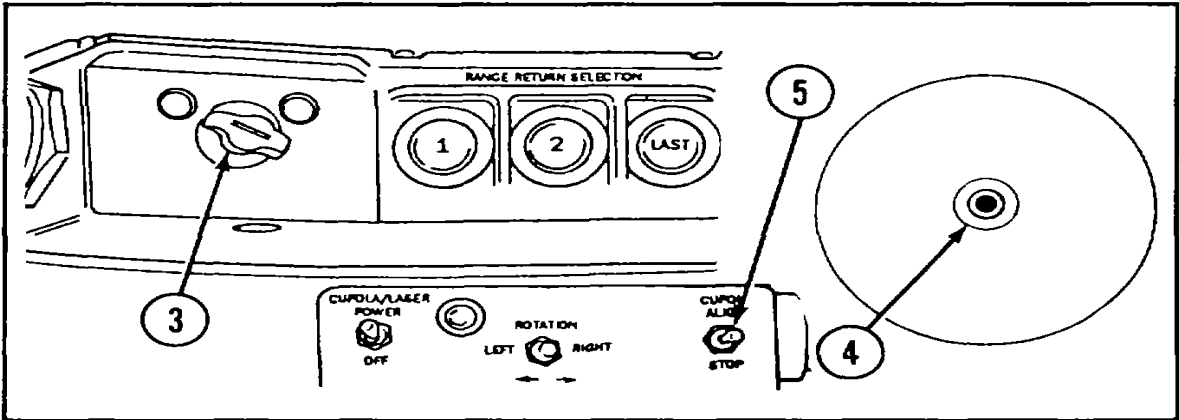
- (1) Select a target at a known range; the range must be between 200 and 4000 meters.
- (2) Unlatch and open dust cover (1).
- (3) driver to start engine and throttle to a fast idle.
- (4) Push up CUPOLA/LASER switch (2) to POWER.



- (5) At commander's display, set LASER MODE SELECTOR (3) to ON.

NOTE

Sight on the target so complete cross section (4) of the laser beam hits the target, with no obstructions between the LRF and the target.



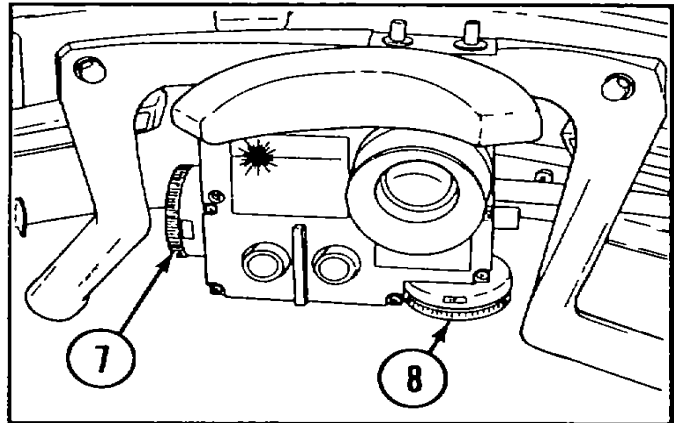
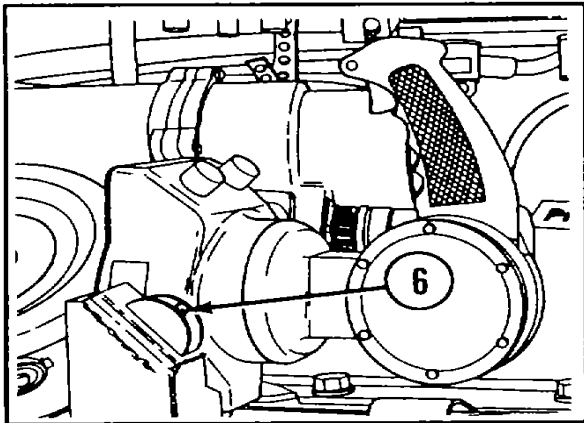
2-17. OPERATION OF LRF (M515A1)-Continued.

- (6) Have gunner traverse gun/launcher on selected target Traverse LRF on same target either electrically or manually.

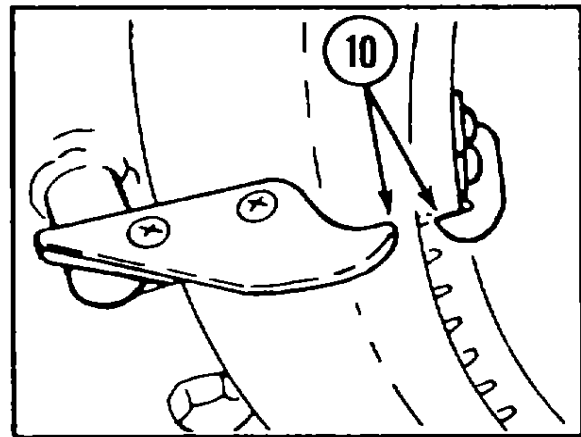
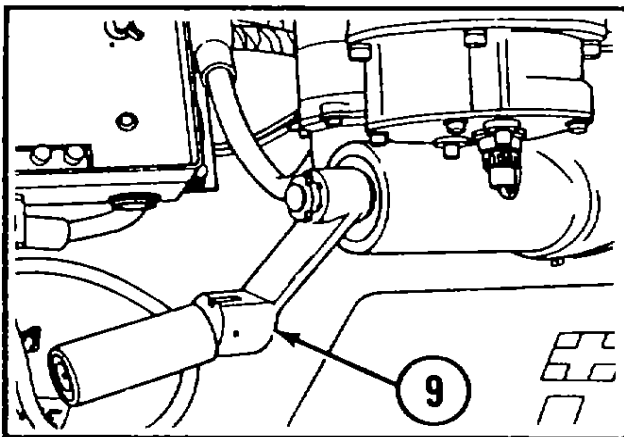
WARNING

For M551A1: make sure the loader is clear and informed before operating the cupola.

- (a) Electrically Traversing LRF. Push up on CUPOLA ALIGN switch (5) or remote switch (6)-either switch will traverse LRF in alignment with gun/launcher. At commander's control, adjust elevation control (7) to get cross section of LRF sight on target Adjust azimuth control (8) if needed.



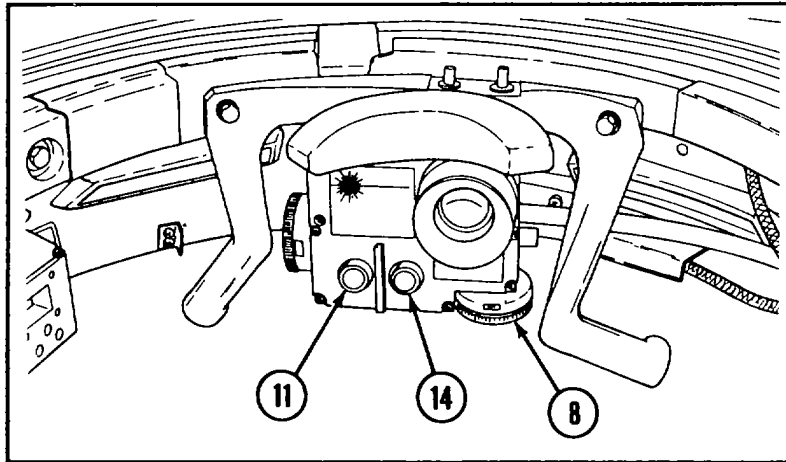
- (b) Manually Traversing LRF. Turn handle (9) until index pointers (10) match up At commander's control, adjust elevation control (7) to get cross section of LRF sight on target Adjust azimuth control (8) if needed.



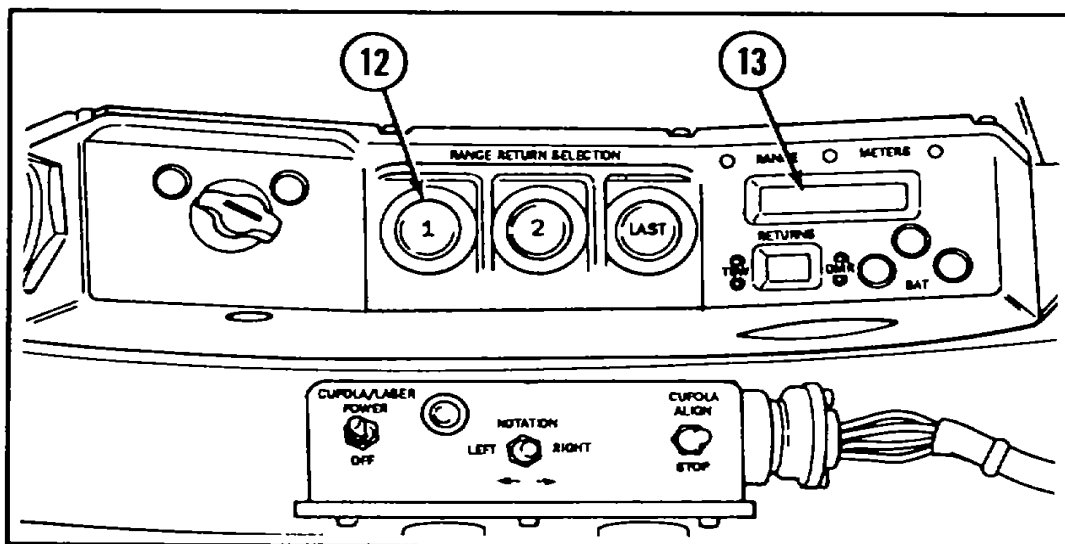
WARNING

When the laser is fired, the target can be viewed ONLY through the LRF eyepiece or the gunner's telescope M127A1 (with the filter lever at full clockwise position); these units are safety filtered. DO NOT view the target through any other M551A1 optics (the M127 telescope has no laser filter) and NEVER eyeball the target.

- (7) Warn crew before firing laser.
- (8) Fire laser by pressing RANGE pushbutton (11).



- (9) Tell crew that laser has been fired.
- (10) With no obstructions between target and laser beam, press pushbutton 1 (12) at RANGE RETURN SELECTOR.
- (11) Check readout at RANGE (METERS) (13) Readout should be within 10 meters of known distance to target.
- (12) Press RESET pushbutton (14).



- (13) At 20-second intervals, repeat steps 7 through 12 five more times, giving you a total of six laser fires and six readouts.

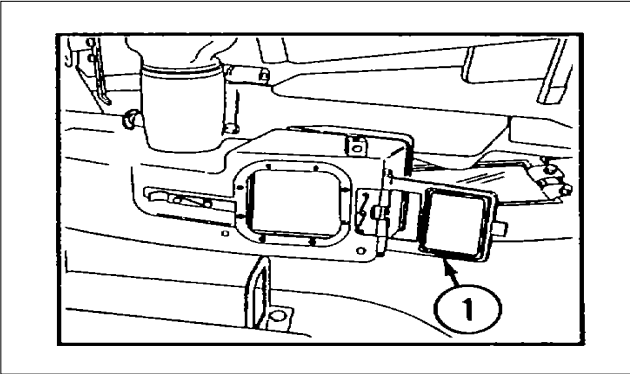
2-17. OPERATION OF LRF (M551A1)-Continued.

d. Preparation for Firing LRF.

WARNING

- Make certain friendly troops are not near the line-of-sight of the laser beam. Blindness can result if hit in the eye by the laser beam, either directly or indirectly from a shiny surface.
- To prevent accidental alignment of the cupola to the main weapon, make certain the MASTER SWITCH and laser ON/OFF switch are at OFF before the crew leaves the vehicle.

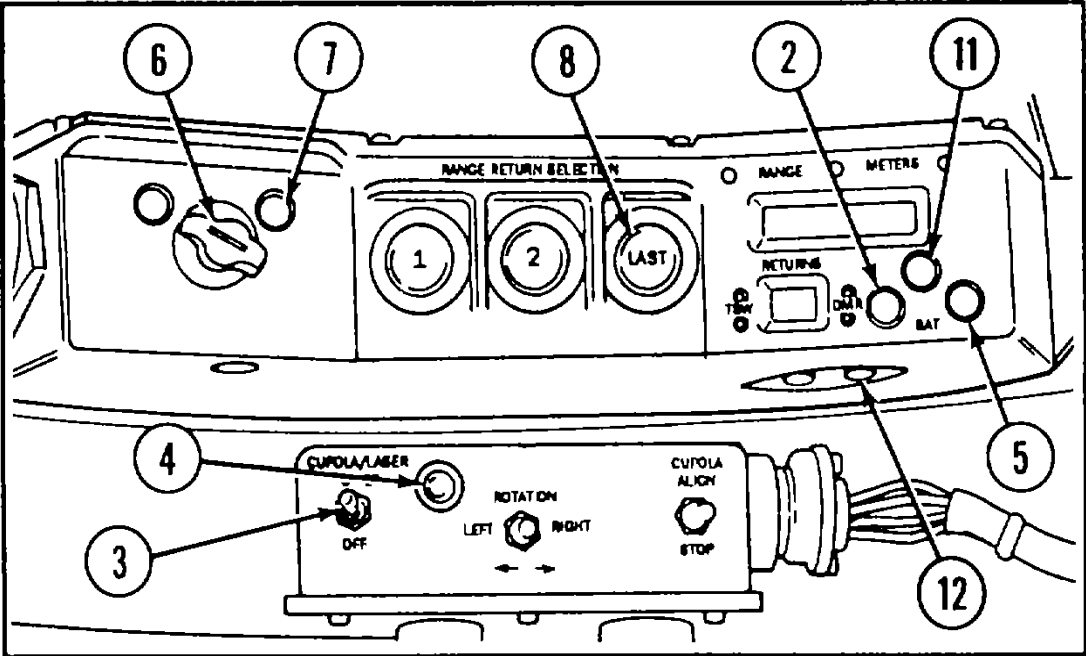
- (1) Unlatch and open dust cover (1).
- (2) Tell driver to turn on MASTER SWITCH if conditions permit, tell driver to start engine and throttle to a fast idle.



NOTE

An auxiliary power supply is provided only for emergency use. This power supply provides the juice to your LRF system when vehicle power is off or low; you'll know it's being used when the DR lamp (2) lights.

- (3) Push up CUPOLA/LASER switch (3) to POWER4amp (4) should light.



NOTE

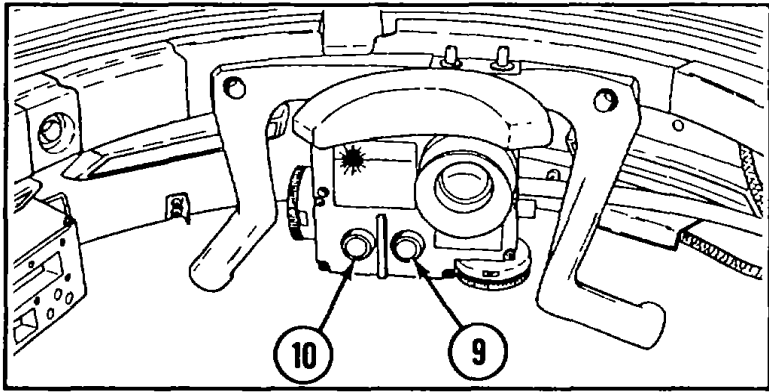
If you're using the auxiliary power supply [DR lamp (2) is lit], check the (amber) LOW lamp (5). A lit LOW lamp means your auxiliary power supply is low-you'll need unit maintenance to fix it.

- (4) At commander's display, set LASER MODE SELECTOR (6) to ON, lamps light at ON (7) and LAST (8) Also, at commander's control, lamp lights at RESET (9) and, within 4 seconds, lamp flashes at RANGE (10).

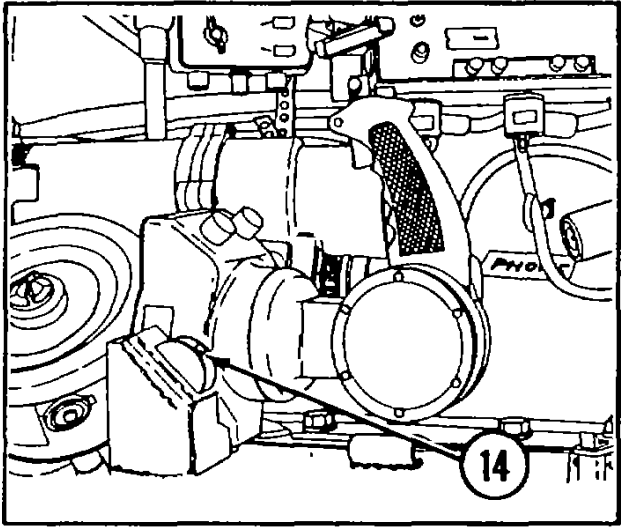
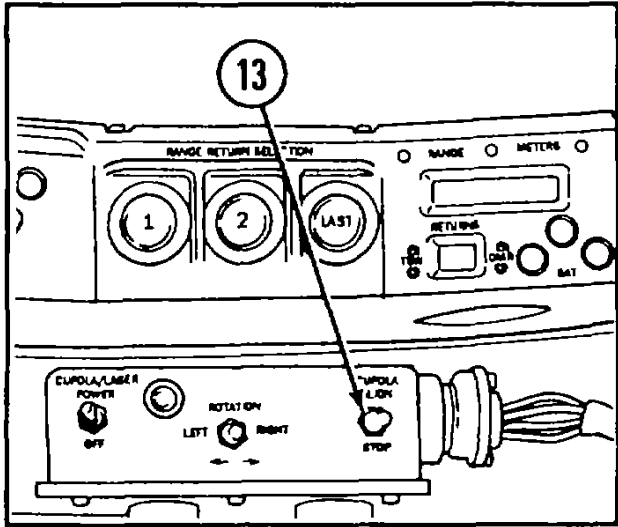
CAUTION

Eyeball the MALF lamp (11) often. When it lights, there's something wrong with the LRF circuitry-you'll need unit maintenance to fix it.

- (5) Check for proper lighting of LRF controls Use DMR switch (12) to adjust brightness.

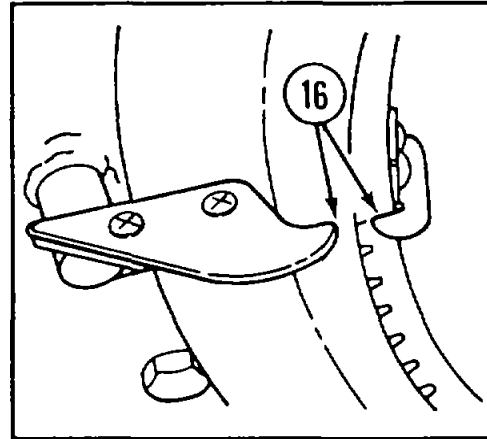
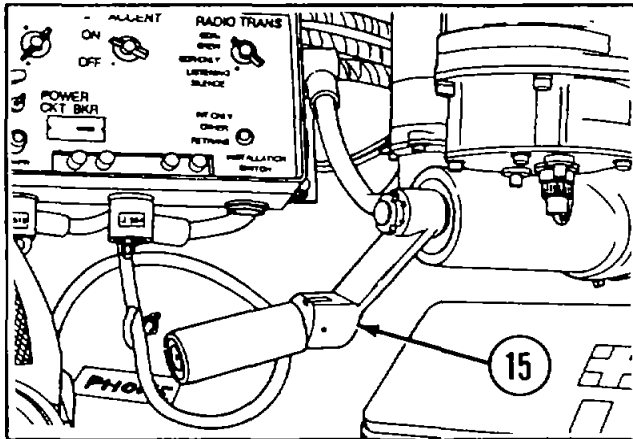


- (6) Electrically Traversing Cupola. If gunner has a target in his scope, traverse LRF on same target by pushing up on CUPOLA ALIGN switch (13) or remote switch (14)-either switch will traverse LRF to align with gun/launcher.



2-17. OPERATION OF LRF (M551A1)-Continued.

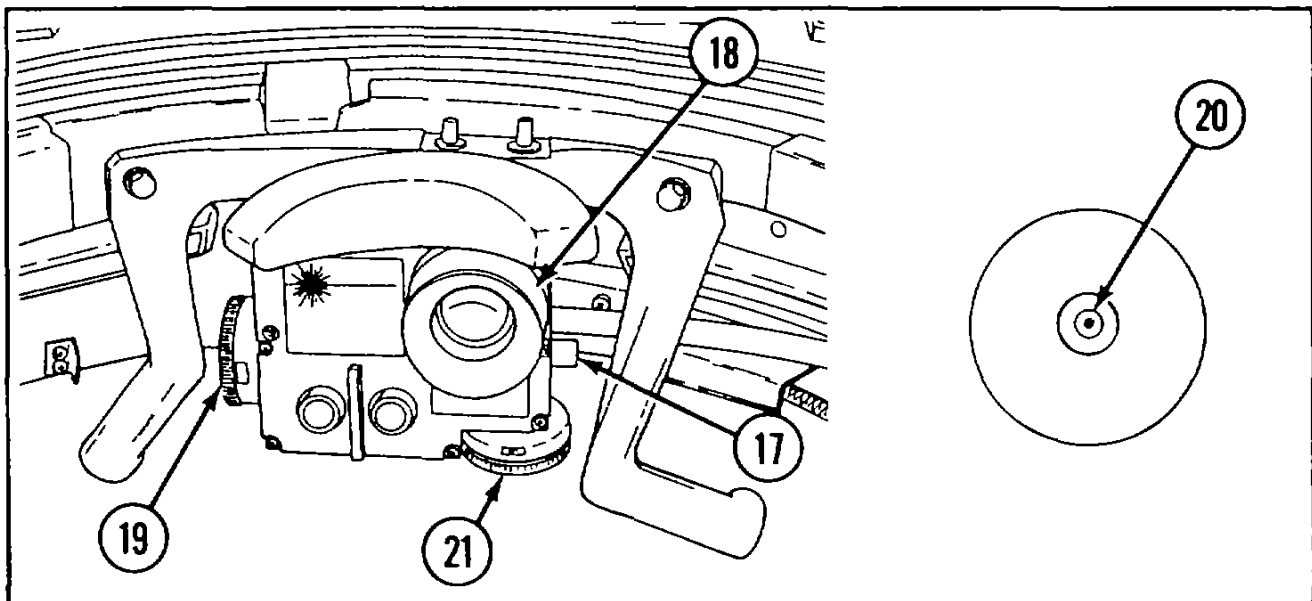
- (7) Manually Traversing Cupola. If gunner has a target in his scope, traverse LRF on same target by turning handle (15) until index pointers (16) match up. Once pointers are matched, LRF is aligned with gun/launcher.



NOTE

If the reticle in your LRF sight is too bright or too dim, adjust Intensity by turning RETICLE ILLUM (17).

- (8) Looking through LRF eyepiece, adjust focus ring (18) for sharpness. At commander's control, adjust elevation control (19) to get reticle cross section (20) on target, adjust azimuth control (21) if needed.

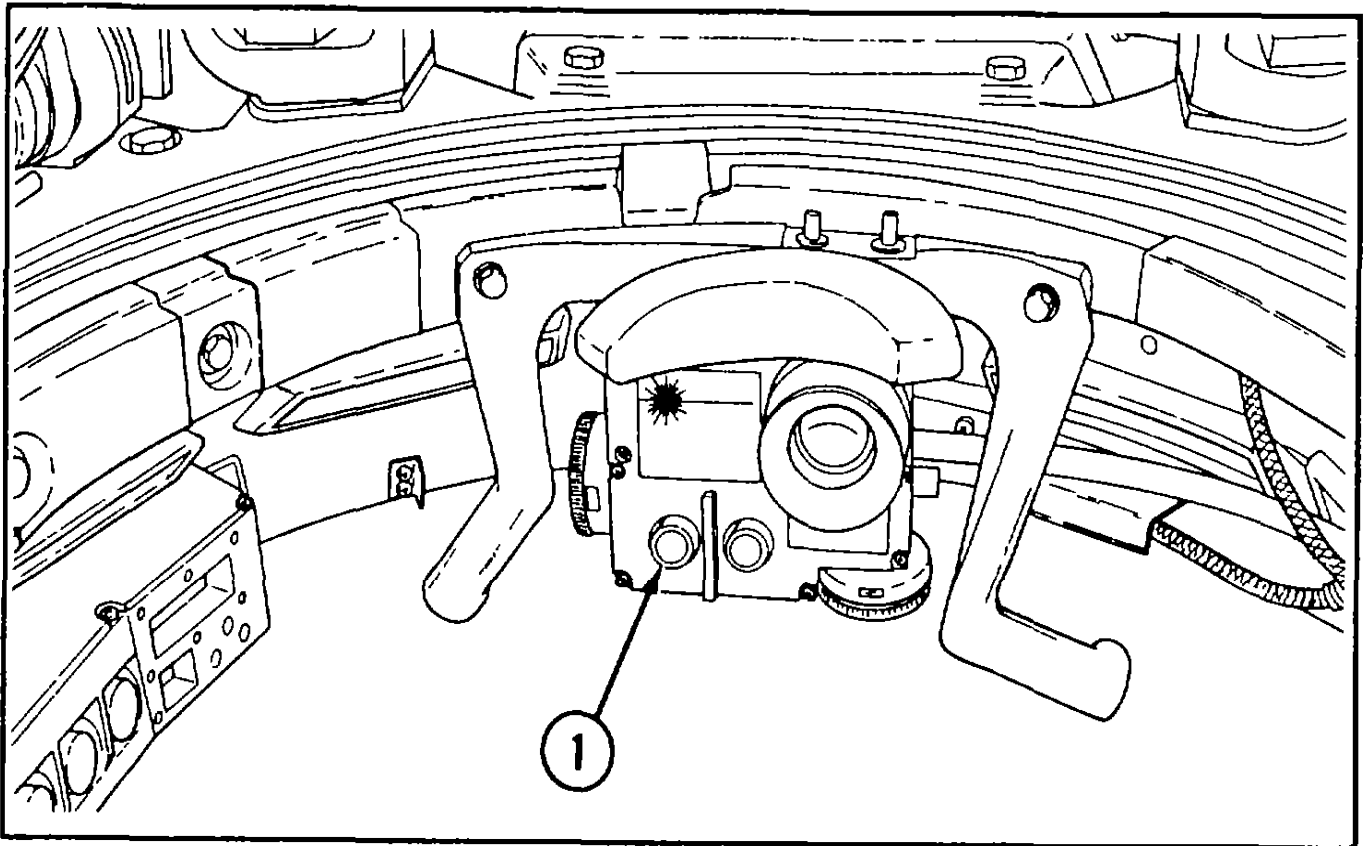


e. Firing LRF.

WARNING

*When the laser is fired, the target can be viewed **ONLY** through the LRF eyepiece or the gunner's telescope M127AI (with the filter lever at full clockwise position); these units are safety filtered. **DO NOT** view the target through any other M55IA1 optics (the M127 telescope has no laser filter) and **NEVER** eyeball the target.*

- (1) Warn crew before firing laser.
- (2) Fire laser by pressing RANGE pushbutton (1).
- (3) Tell crew laser has been fired.

**NOTE**

Until one of the RANGE RETURN SELECTORS is pressed, the readout at RANGE (METERS) (2) will be the last target range.

- (4) Check the RETURNS (3) readout This tells you how many "replies" the LRF received.

2-17. OPERATION OF LRF (M551A1)-Continued.

- (a) If readout is 1, only one reply was received. If on target, it also indicates a direct, unobstructed hit of target.
- (b) If readout is 2 or more, readout indicates number of replies received and that part of laser beam hit an obstruction and/or background in addition to hitting target.

(5) Determine correct RANGE RETURN SELECTOR pushbutton.

- (a) Press pushbutton 1 (4) if laser beam first hits target, as indicated by following examples.

EXAMPLE 1 RETURNS (3) readout is 1 AND total cross section of laser beam hits target.

EXAMPLE 2 RETURNS (3) readout is 2 or more AND there are no obstructions between laser beam and target. Part of cross section beam hits target, other part(s) of cross section hits background.

- (b) Press pushbutton 2 (5) if laser beam hits an obstruction before hitting target, as indicated by following examples.

EXAMPLE 1 RETURNS (3) readout is 2 AND part of cross section of beam hits obstruction between LRF and target, THEN hits target.

EXAMPLE 2 RETURNS (3) readout is 3 or more AND part of cross section of beam hits obstruction between LRF and target, THEN part of cross section of beam hits target, and, finally, part of cross section of beam hits background.

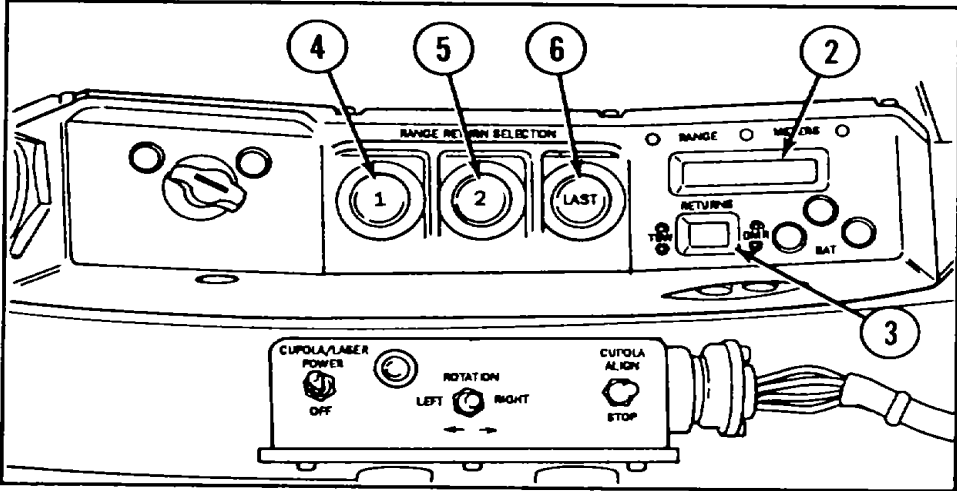
- (c) Press pushbutton LAST (6) if laser beam hits one or more obstructions before hitting target, as indicated by following examples.

EXAMPLE 1 RETURNS (3) readout is 2 AND part of cross section of beam hits obstruction between LRF and target and, finally, part of cross section goes out into space (no background).

EXAMPLE 2 RETURNS (3) readout is 3 AND part of cross section of beam hits two obstructions between LRF and target, then, part of cross section hits target.

EXAMPLE 3 RETURNS (3) readout is 4 through 8 AND part of cross section of beam hits two obstructions between LRF and target, then, part of cross section hits target and, finally, part of cross section hits background(s).

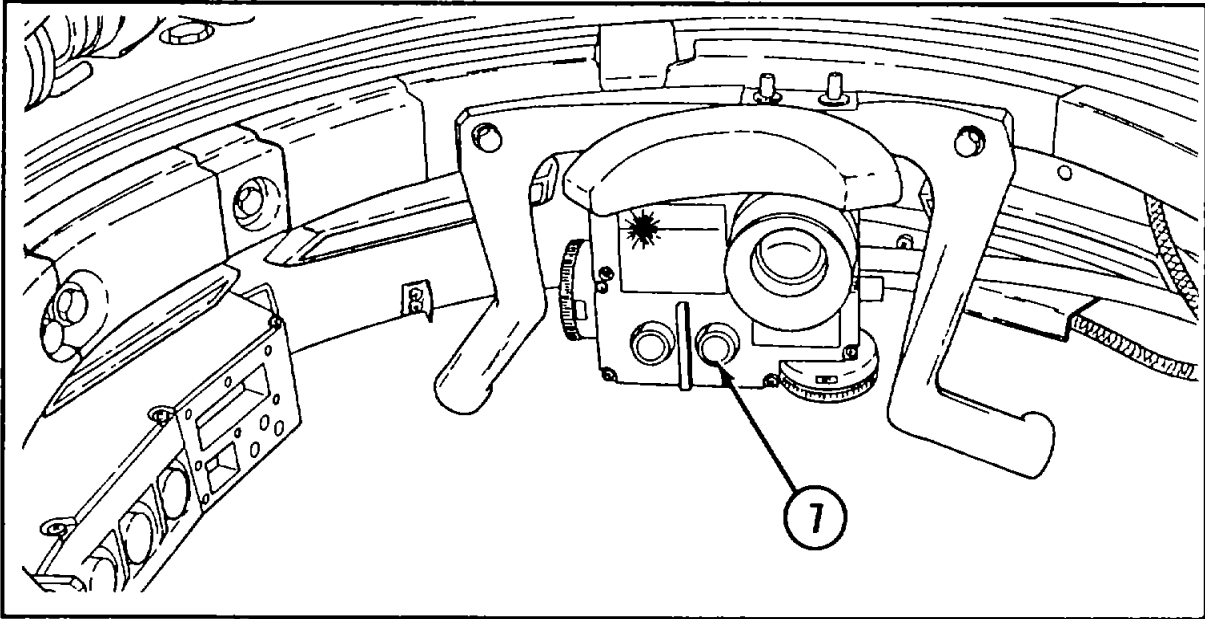
(6) Check readout at RANGE (METERS) (2) t will tell you distance to target.



NOTE

If a visual check of the target distance does not compare with the readout at RANGE (METERS) (2), make another pushbutton selection at step 5.

(7) To fire laser again, press RESET (7) and repeat steps 1 through 5.



2-17. OPERATION OF LRF (M551A1)-Continued.

- (8) When finished, turn LASER MODE SELECTOR to OFF and, when conditions permit, close and latch dust cover.

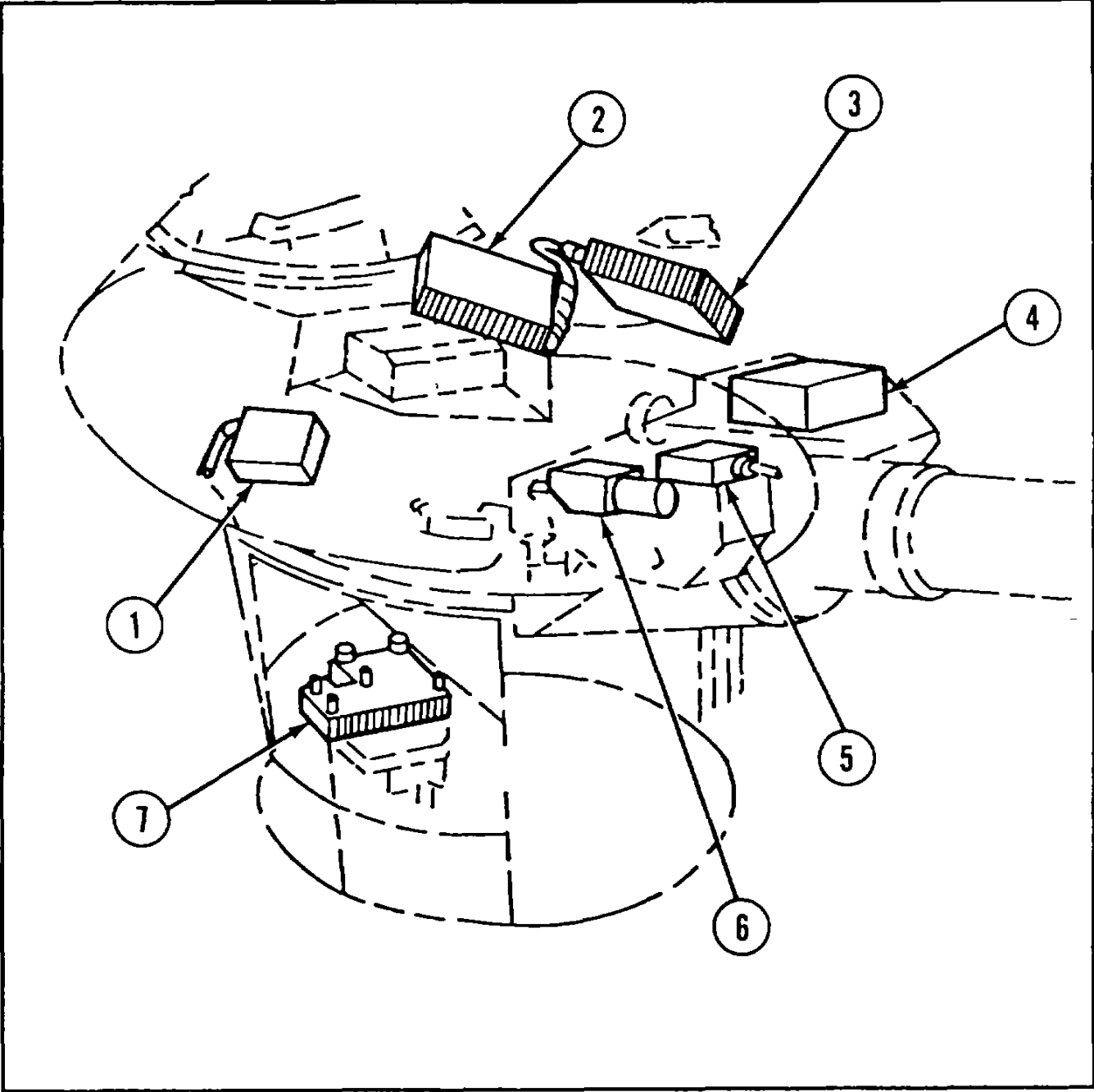
2-18.OPERATION OF MISSILE SYSTEM.

a. Missile Guidance and Control System (M551AI).

- (1) System ComponentsThe following components comprise the system used to guide missiles fired through the gun/launcher The cutouts correspond to the illustration on the following page.

Callout	Component	Location	Function
1	Remote control test set	Right of gunner	<ul style="list-style-type: none"> • Generates additional control signals for other guidance and control units in vehicle. • Checks operation of guidance and control system and identifies malfunctions.
2	Modulator (infrared)	Behind and to right of loader	Converts Signal Data Converter (SDC) signals for use in transmitter
3	SDC	Left of loader	Uses signals from tracker and rate sensing unit to keep missile on target.
4	Transmitter (infrared)	Outside, on top of gun/launcher	Sends infrared signals from modulator to missile for directional changes.
5	Rate sensing unit	Left of breech	Tells SDC how far gun/launcher moves up/down and right/left.
6	Tracker (infrared)	On top of and aligned with telescope.	Tracks missiles in flight, if missile is out of line, informs SDC unit.

Callout	Component	Location	Function
7	Power supply	Under commander's sub-floor	Provides power for missile guidance and control system.



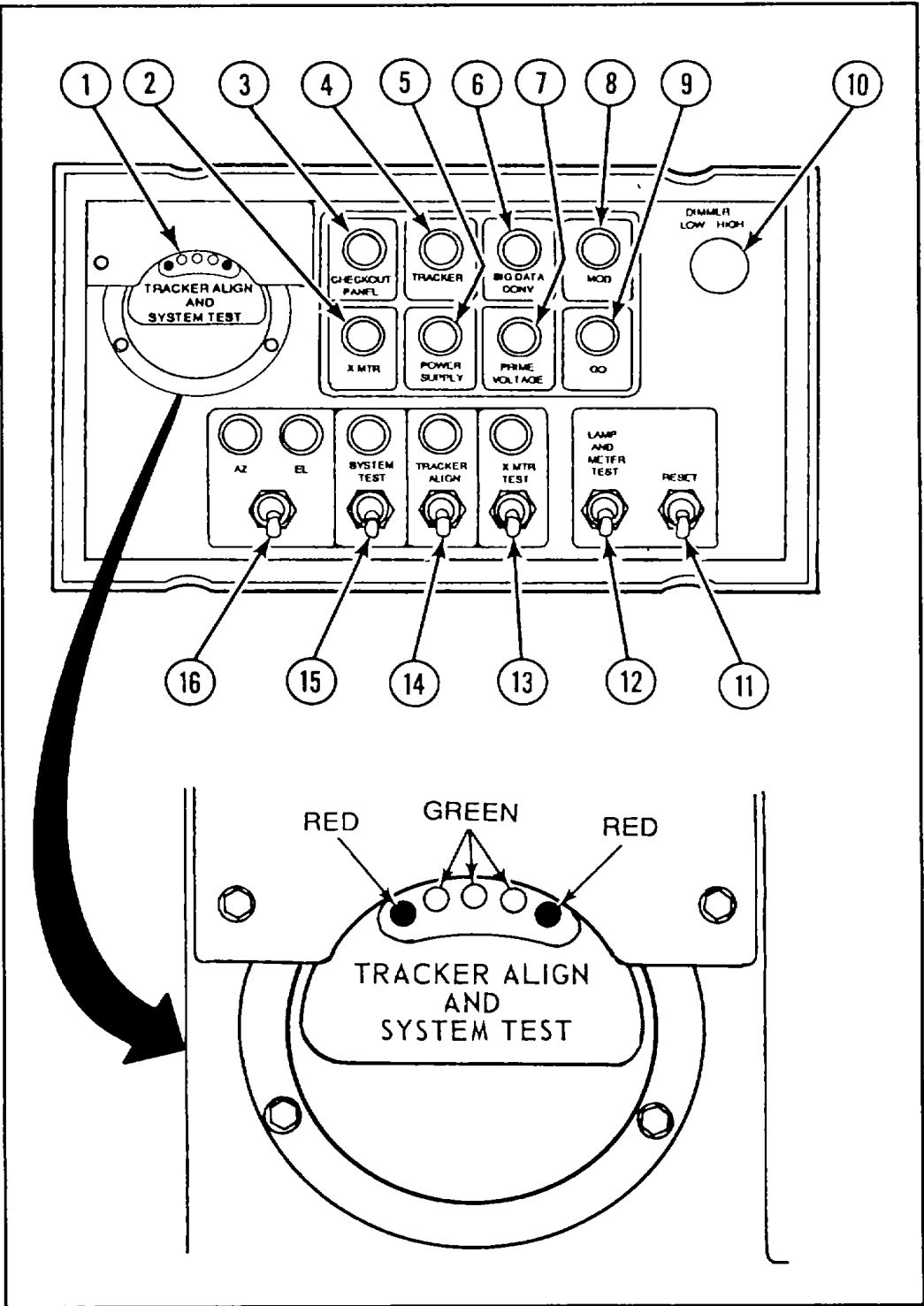
2-18. OPERATION OF MISSILE SYSTEM-Continued.

(2) Tracker Alignment (Self-Test). The tracker alignment (self-test) is performed with the remote control test set. The panel indicator and switch functions are listed below, and the illustration follows.

Callout	Name	Function
1	Electronic null indicator (ENI)	<ul style="list-style-type: none"> • Indicates alignment of checksight source during checksight lamp tracker alignment test. • Indicates operational condition of rate sensing unit.
2	XMTR lamp (red)	Indicates transmitter is not operational during system self-test.
3	CHECKOUT PANEL lamp (red)	Indicates checkout panel is not operational during system self-test
4	TRACKER lamp (red)	Indicates tracker is not operational during system self-test.
5	POWER SUPPLY lamp (red)	Indicates power supply is not operating.
6	SIG DATA CONV lamp (red)	Indicates SDC is not operational during system self-test.
7	PRIME VOLTAGE lamp (amber)	Indicates vehicle power is low.

Callout	Name	Function
8	MODE lamp (red)	Indicates modulator is not operational during system self-test.
9	GO lamp (green)	Indicates guidance and control system is operating at end of self-test.
10	DIMMER control	Controls brightness of all but NO/GO lamps.
11	RESET switch	<ul style="list-style-type: none"> • Turns off all control signals. • Resets guidance and control system.
12	LAMP & METER TEST switch	Initiates test of all lamps and null meter on this panel.
13	XMTR TEST switch and lamp (white)	Starts transmitter test.
14	TRACKER ALIGN switch and lamp (white)	Starts tracker alignment test.
15	SYSTEM TEST switch and lamp (white)	Starts system self-test.
16	AZ/EL switch and lamps (white)	Selects azimuth and elevation signals from rate sensing unit for test Also, during tracker alignment test, indicates azimuth and elevation alignment.

2-18. OPERATION OF MISSILE SYSTEM-Continued.

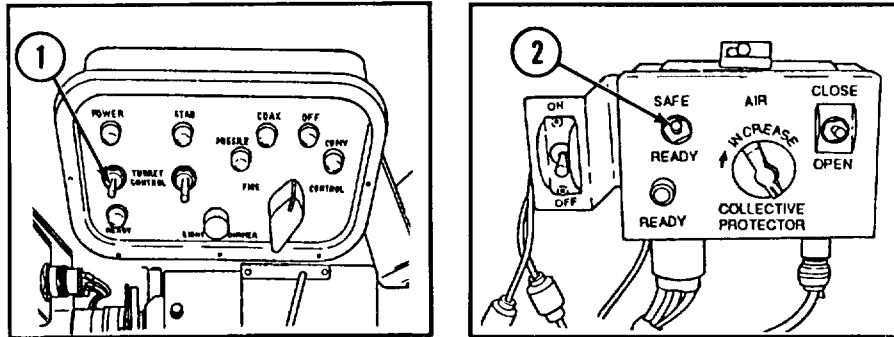


(3) Preliminary Instructions.

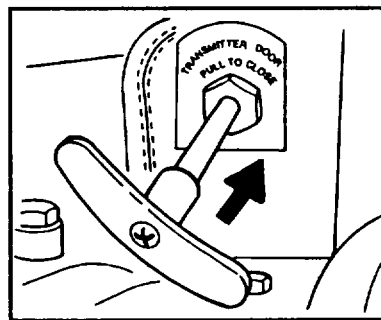
NOTE

Steps c, d, and e below are necessary only if you intend to launch a missile immediately after this checkout.

- (a) Make sure telescope has been boresighted (see paragraph 2-15, c).
- (b) Ensure that all guidance control units and cables are properly connected and secured in turret.
- (c) Turn TURRET CONTROL switch (1) off. Have loader move SAFE/READY switch (2) to SAFE.



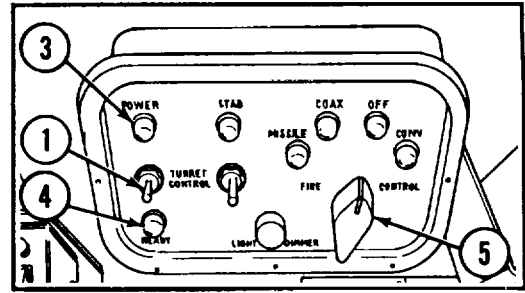
- (d) Open transmitter door by turning control handle counterclockwise and pushing forward. Lock door open by turning handle an eighth of a turn clockwise.



- (e) Tell driver to start engine and idle at fast idle.
- (f) Turn on TURRET CONTROL switch (1). POWER lamp (3) will light; wait about 20 seconds until READY lamp (4) lights.

2-18. OPERATION OF MISSILE SYSTEM-Continued.

- (g) Turn FIRE CONTROL selector (5) to MISSILE lamp will light.

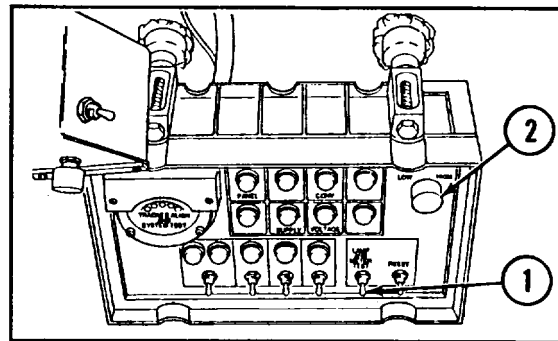


NOTE

POWER SUPPLY and PRIME VOLTAGE lamps will blink at first. Once the system warms up and the missile reticle appears in the telescope, the lamps should go out; if they stay on, notify unit maintenance.

(4) Lamp and Meter Test.

- (a) Hold LAMP & METER TEST switch (1) up. All lamps should light and only center green light emitting diode (LED) should be illuminated. If any LED other than in center is illuminated, or if center LED is not illuminated, notify unit maintenance.
- (b) With LAMP & METER TEST switch (1) still in up position, rotate DIMMER control (2); all lamps, except red, should vary in brightness. Release switch.



(5) Transmitter Test.

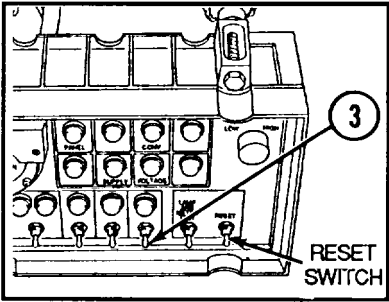
WARNING

Make certain all friendly troops are out of the path of the transmitter. Regardless of distance, Invisible Infrared rays sent out by the transmitter can cause serious eye damage.

CAUTION

When testing transmitter, don't leave the XMTR TEST switch (3) In up position for more than 1 minute.

- (a) Turn on XMTR TEST switch (3). XMTR TEST lamp should light. If XMTR TEST switch turns off in less than 10 or more than 20 seconds, system may be defective. Alert unit maintenance.

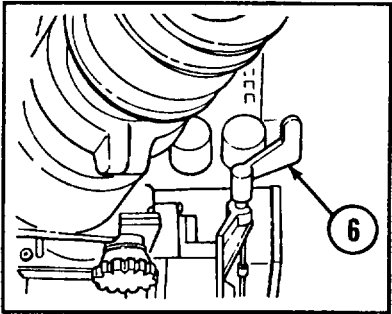
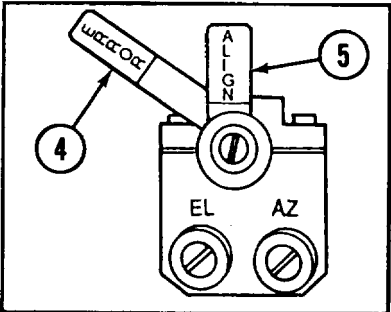


- (b) If XMTR TEST switch (3) did not turn off in less than 30 seconds, push RESET switch up; then release. XMTR TEST switch should return to off (down) position.

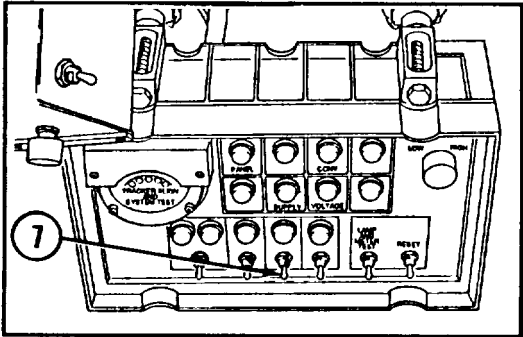
(6) Check sight Lamp Alignment Test.

- (a) On telescope mount M149, with ERROR lever (4) at full left, move ALIGN lever (5) to full right.

- (b) On telescope, filter lever (6) must be at CLEAR position.



- (c) Push TRACKER ALIGN switch (7) up to on position; lamp should light.

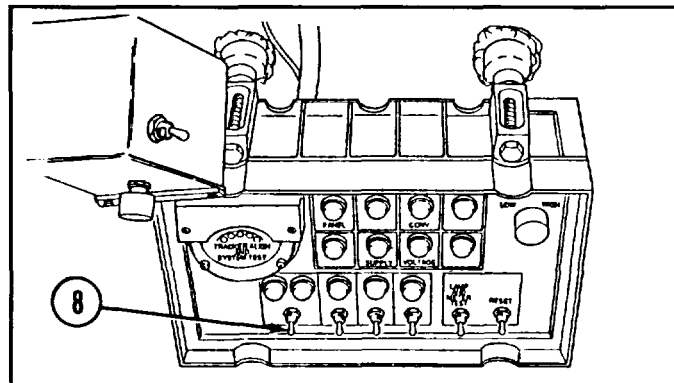


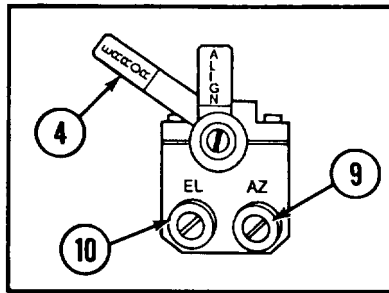
2-18. OPERATION OF MISSILE SYSTEM-Continued.

- (d) Look through telescope to see if a spot of light appears. If not, go to Troubleshooting (see Chapter 3, Section 11).

NOTE

- For better contrast when looking through the telescope, have someone temporarily cover or shade the telescope opening outside the turret.
 - When adjusting the AZ and EL telescope mount adjustments, as the spot of light in the telescope moves from perfect alignment (zero error with only the center green LED illuminated) to an alignment error within the allowable tolerance range, the green LED adjacent to the center LED will first be illuminated dimly but will increase in intensity as the alignment error tolerance limit is approached. When the alignment tolerance limit is exceeded, the adjacent red LED will become illuminated. If the alignment error is further increased, the red LED intensity will increase to maximum brightness. The direction in which the LEDs illuminate will depend on the direction of the alignment error. If the system is in perfect alignment and the mount adjustment is turned clockwise, the LED illumination will be clockwise; if the mount adjustment is turned counterclockwise, the LED illumination will be counterclockwise.
- (e) Push AZ/EL switch (8) to AZ (down) position-AZ lamp should light and only green LED of ENI should be illuminated. If a red LED is illuminated, adjust AZ screw (9) until only green LEDs are illuminated.

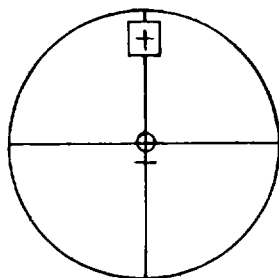
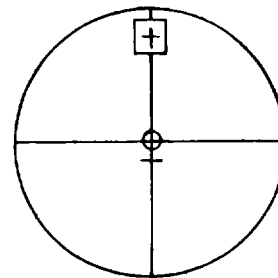
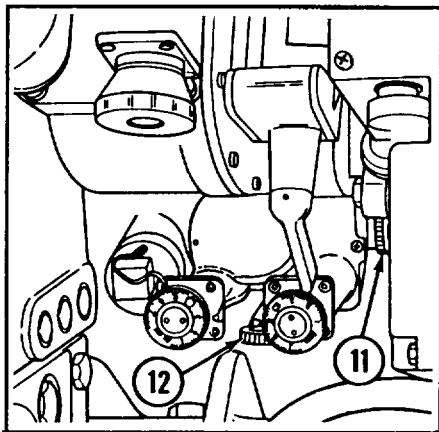




- (f) Push AZ/EL switch (8) to EL (up) position-EL lamp should light and only green LEDs of ENI should be illuminated. If a red LED is illuminated, adjust EL screw (10) until only green LEDs are illuminated.

- (g) Now, if you've made any screwdriver adjustments at step (e) and/or (f) above, repeat these steps until you get only center green LED illuminated or center green LED illuminated with adjacent green LEDs dimly illuminated.

- (h) Look into telescope. Using missile horizontal (11) and verticle (12) knobs, center missile reticle circle over spot of light.



- (i) Move ERROR lever (4) to full right position. Push AZ/EL switch (8) to EL (up) position-ENI LEDs to left illuminate.
- (j) Push AZ/EL switch (8) to AZ (down) position-ENI LEDs to right illuminate.
- (k) Move ERROR lever (4) to full left position-only green ENI LEDs illuminate.
- (l) Push AZ/EL switch (8) to EL (up) position-only green ENI LEDs illuminate.

NOTE

Whenever there is a rapid temperature change of 30°F or more, repeat the checksight lamp alignment test.

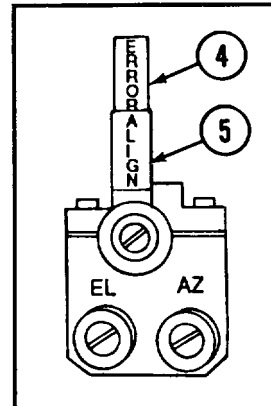
2-18. OPERATION OF MISSILE SYSTEM-Continued.

(7) System Self-Test.

CAUTION

Before proceeding, be sure check sight lamp alignment test steps 6, a through 6, 1 are performed and that missile reticle adjustment step 6, h has not been changed from vibration.

- (a) On telescope mount, move ALIGN (5) and ERROR (4) levers to full right position.

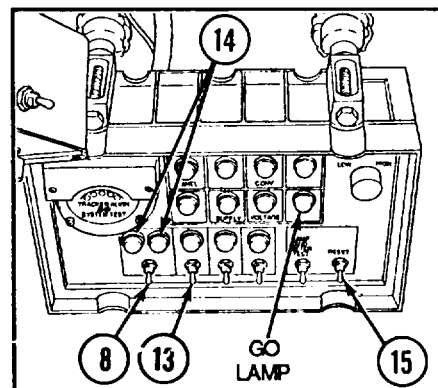


NOTE

If ALIGN lever (5) resets left at any time during this test, Immediately push lever to full right position and continue test.

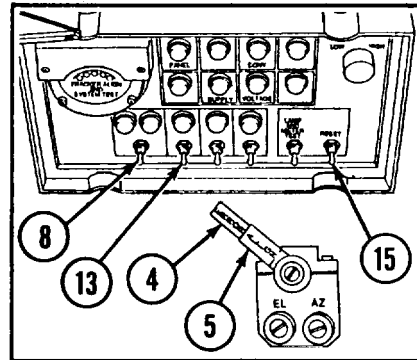
- (b) Push SYSTEM TEST switch (13) to up position. SYSTEM TEST lamp and AZ or EL lamp (14) will light. After about 30 seconds, if all guidance control units are go, GO lamp will light. If a unit malfunctions, the lamp above problem unit will light while GO lamp stays off.
- (c) If a lamp above a unit lights, indicating a malfunction, hold RESET switch (15) up and release. De-energize system (step 9) and notify unit maintenance.
- (d) If all units are still go, push AZ/EL switch (8) to AZ (down) position-AZ lamp should light.

- (e) Traverse turret left and right. ENI LED illumination moves in same direction as turret. When you stop traversing, only green LEDs should be illuminated. If not notify unit maintenance.



- (f) Push AZ/EL switch (8) to EL (up) position-EL lamp glows. Elevate/depress gun/launcher. The ENI LED illumination moves to right when gun/launcher is elevated, left when gun/launcher is depressed. When you stop elevating/depressing gun/launcher, only green LEDs should be illuminated. If not, notify unit maintenance.

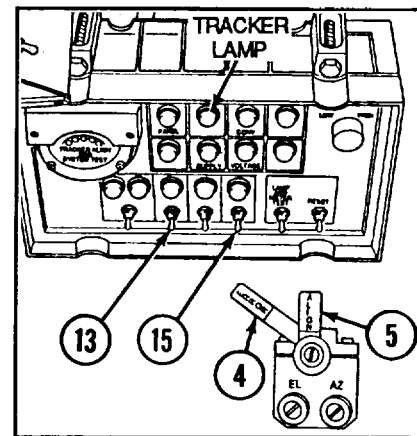
- (g) Push RESET switch (15)-SYSTEM TEST switch (13) turns off (down position) and ALIGN lever (5) moves to left position.
- (h) Push ERROR lever (4) to full left position.



(8) System Self-Test Verification.

- (a) With ALIGN (5) and ERROR (4) levers full left, push SYSTEM TEST switch (13) up to on. TRACKER lamp should light after approximately 30 seconds. If not, notify unit maintenance.
- (b) Push RESET switch (15) up and release.

- (c) Move ALIGN lever (5) full right and ERROR lever (4) full left. Again, push up SYSTEM TEST switch (13). TRACKER lamp should light after approximately 30 seconds. If not, notify unit maintenance.
- (d) Hold RESET switch (15) up and then release.



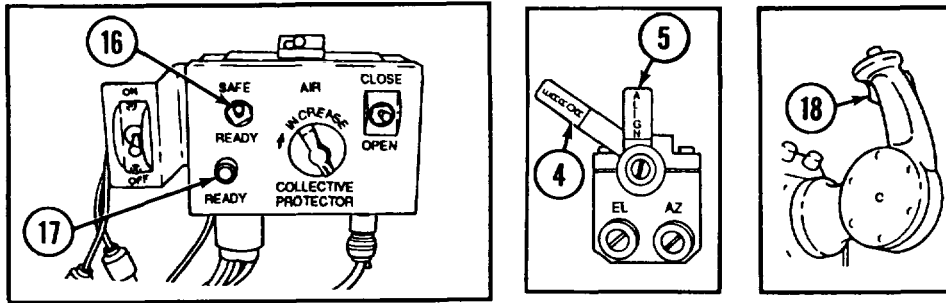
WARNING

Before going on, make sure all weapons are clear of live rounds.

- (e) Push SAFE/READY switch (16) down to READY position. Ensure that gunner's ready lamp (17) is glowing. Move ALIGN lever (5) full right and ERROR lever (4) full left. Push SYSTEM TEST switch (13) up.

2-18. OPERATION OF MISSILE SYSTEM-Continued.

- (f) Press firing trigger (18). SYSTEM TEST switch (13) flips down, ALIGN lever (5) moves to full left, and tracker motor runs for approximately 18 seconds. If not, notify unit maintenance.

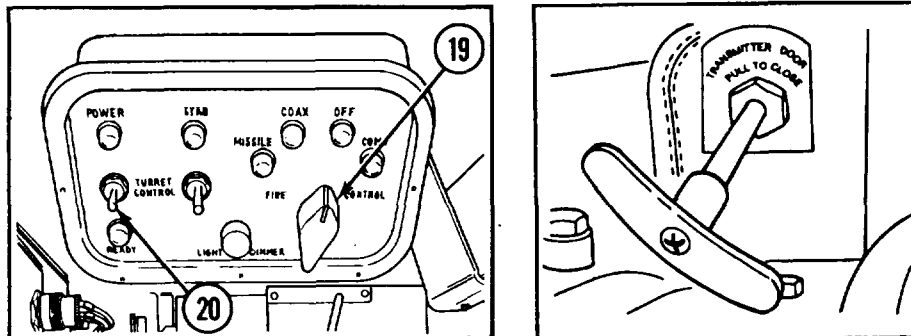


- (9) De-Energizing Missile Subsystem.

NOTE

If going directly Into a firing mission, DO NOT de-energize the subsystem.

- (a) Place SAFE/READY switch (16) in SAFE position.
- (b) Place FIRE CONTROL selector (19) at OFF. Lamp above switch and missile lamp go out. Turn off TURRET CONTROL switch (20).
- (c) Tell driver to turn engine off.
- (d) Close transmitter door by turning control handle counterclockwise and pulling rearward. Lock door closed by turning handle an eighth of a turn clockwise.



b. Failure-to-Fire and Cookoff.

- (1) Preventing a Failure-to-Fire or Cookoff. You'll seldom have to face this situation if you maintain and use only authorized ammo (see Chapter 4) and operate and maintain your weapons according to procedures in this manual.
- (2) Re Informed. Before firing gun/launcher, machine guns, or grenade launchers, become familiar with possible firing malfunctions that can occur and corrective procedures.

WARNING

If you have a failure-to-fire, keep your weapon on target and keep personnel clear of the muzzle and path of recoil.

- (a) Misfire. A misfire is when a chambered round fails to fire after you've triggered weapon according to firing procedures. Its cause could be a faulty firing mechanism or a faulty propelling charge. You can't be sure about a misfire it could be a hangfire.
- (b) Hangfire. A hangfire is a delayed firing caused by a slow reacting charge. At first it seems like a misfire, but once it functions, you can be sure it's a hangfire. Be cautious: follow specific Immediate Action in Case of Failure-to-Fire for gun/launcher or grenade launchers.
- (c) Stoppage (machine guns only). Stoppage is any interruption in the cycle of operation caused by faulty action of the machine gun or ammo. Any stoppage must be handled as a misfire.
- (d) Cookoff (machine guns only). A cookoff is firing of a chambered round in a hot weapon without pulling trigger. The round is fired by weapon's heat rather than its firing mechanism. Be cautious: follow specific Immediate Action in Case of Failure-to-Fire for machine guns.

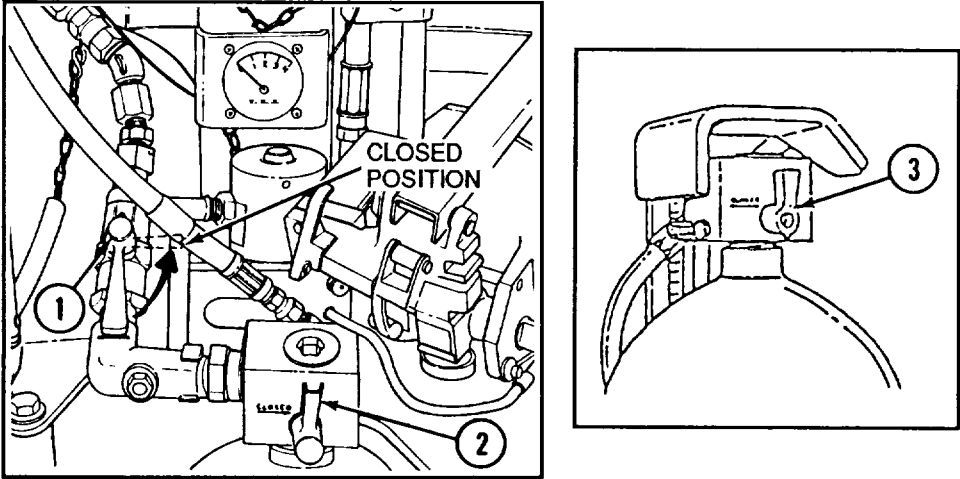
2-19. CBSS (M551A1)**a. Operation of CBSS.****WARNING**

- **Make sure the gun/launcher is clear of ammo.**
- **Check compressor oil level prior to operation.**

- (1) Open air shutoff valve (1).

2-19. CBSS (M551A1)-Continued.

(2) Open front (2) and rear (3) manifold shutoff valves.



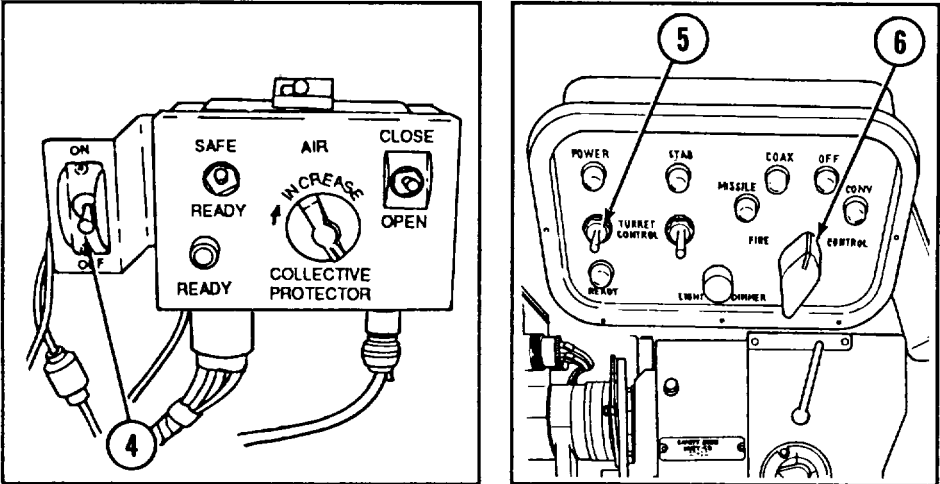
(3) Tell driver to start engine and throttle to a fast idle.

(4) Turn compressor switch (4) to ON.

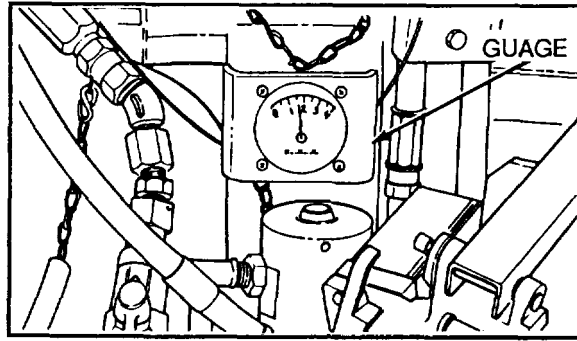
NOTE

Compressor will start if the compressor switch (4) is turned to ON without power at TURRET CONTROL (5), but compressor will not start if FIRE CONTROL selector (6) is at MISSILE.

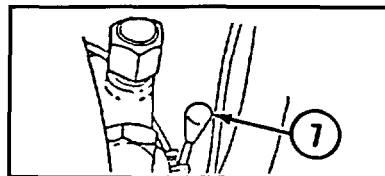
(5) FIRE CONTROL selector (6) can be at any one of three modes: COAX, OFF, or CONV.



- (6) Deserve gauge. Compressor should go on automatically at 1600 ± 200 psi.



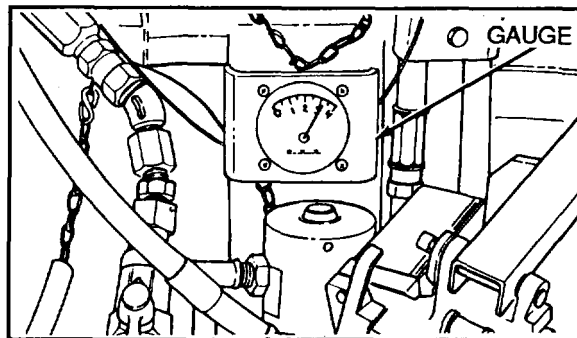
- (7) Observe gauge until pressure is above 300 psi. With breech closed, trip manual discharge lever (7) for a second to see if everything is working. You'll know it's working if you hear a sound like a foghorn. About every 25 to 35 minutes, compressor will shut down for 10 seconds to dump moisture, then start up again. This is normal.



- (8) Observe gauge. Compressor should shut off automatically at $3100 + 100$ psi.

WARNING

If the scavenging system does not work, do not fire missiles or conventional ammo on training missions until the scavenging system does work. Combat firings may continue at the discretion of the vehicle commander.



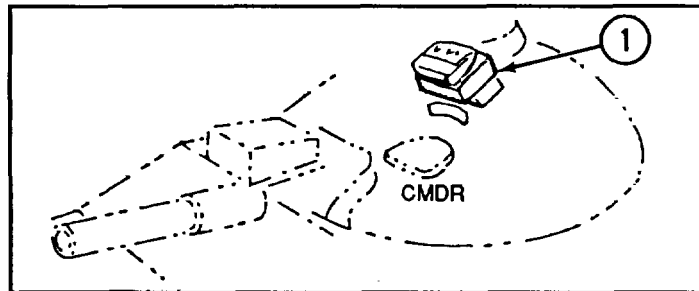
2-19. CBSS (M551A1)-Continued.

- (9) Check gauge before each firing. Compressor is shut off automatically when FIRE CONTROL selector is at MISSILE; if sufficient pressure is not available before firing a conventional round, there will be no scavenging effect.

b. Slaving of CBSS.**NOTE**

If you can't charge your CBSS with your vehicle controls, it can be charged by slaving from another vehicle, preferably one with a full charge.

- (1) Position two vehicles close together-your slave hose is about 25 feet long.
- (2) Remove slave hose (1) from stowed position.



- (3) At both vehicles, make certain 3-way valve (2) is shut off.
- (4) Remove dust cap (3) from both ends of slave hose (1).

NOTE

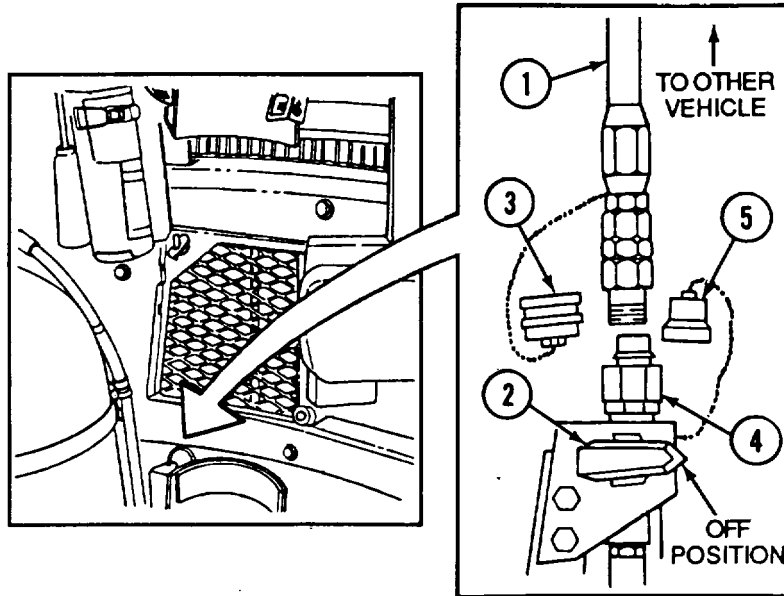
Air may be trapped between 3-way valve (2) and nipple (4), which can prevent connecting of slave hose to nipple. If this happens, turn 3-way valve (2) to drain and bleed air from system. Then return 3-way valve (2) to off position.

- (5) At both vehicles, remove dust cap (5) from nipple (4).
- (6) At both vehicles, connect slave hose (1) to nipple (4).
- (7) At both vehicles, turn 3-way valve (2) to charge position.

NOTE

Close the two bottle mounted valves slaving vehicle to prevent air in bottles from equalizing.

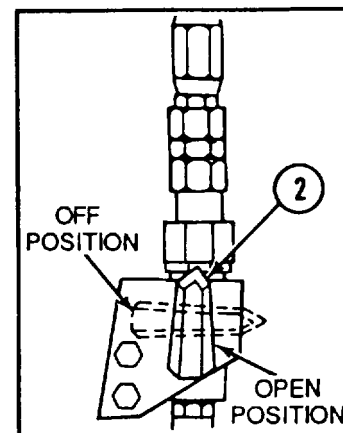
- (8) Keep engine running in vehicle with operating compressor. Turn COMPRESSOR switch to ON.
- (9) When air bottles of slaved vehicle have full charge, compressor will shut off.



NOTE

If deblistering of hoses is required, see paragraph 3-25.

- (10) When finished, turn off compressor. Turn 3-way valve (2) to off position on slaved vehicle. Bleed air from slaving vehicle.
- (11) Now turn 3-way valve (2) to off position on slaving vehicle. Disconnect slave hose (1). Install dust caps (5) on slave hose and nipples (4). Stow slave hose.



2-20. FIRING 152-MM CONVENTIONAL AMMO (M551A1).

WARNING

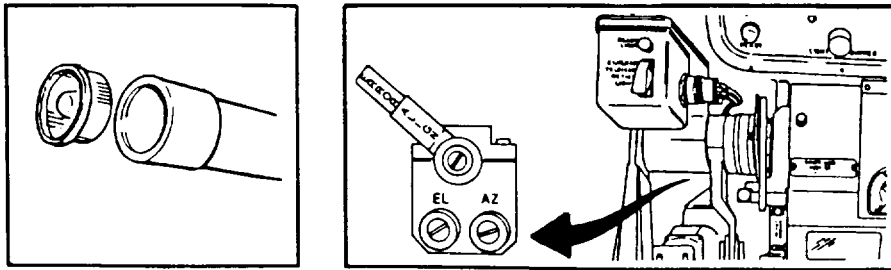
If the scavenging system does not work, do not fire missiles or conventional ammunition on training missions until the scavenging system does work. Combat firings may continue at the discretion of the vehicle commander.

CAUTION

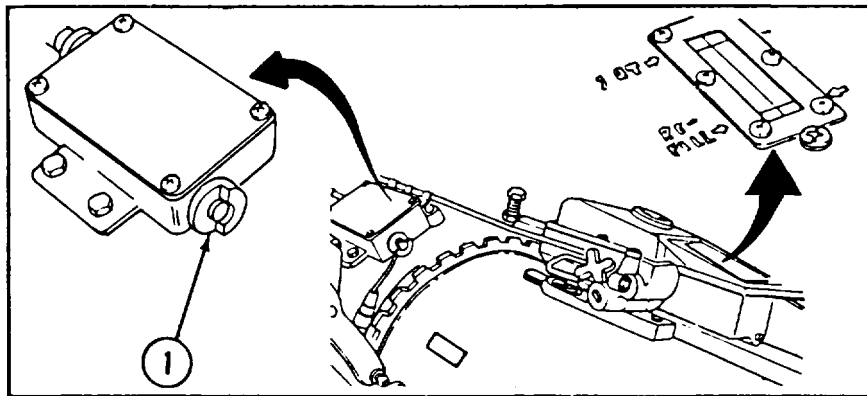
Close the cover of the 7.62-mm machine gun before firing the main gun.

a. Preparation for Firing.

- (1) Be sure muzzle plug is removed and gun tube is free of obstructions. Firing probe of firing mechanism must be free of oil. ERROR and ALIGN levers on telescope mount must be at full left position.



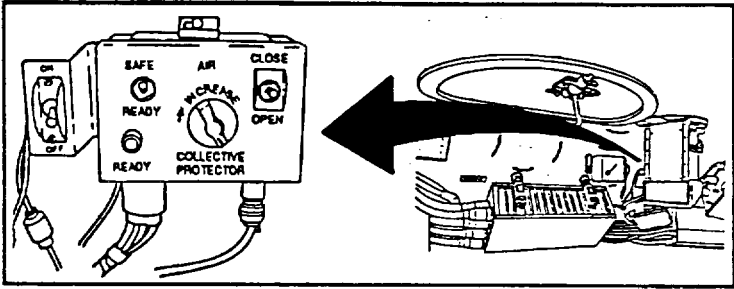
- (2) Indicator rod (1) should be in operating range. Reservoir should be filled with hydraulic fluid.



- (3) Be sure 7.62-mm machine gun cover is closed and locked. Check to see if hinges are sprung or latches are not fully latched (rear).
 (4) Conventional ammo must be properly stowed. Try to stow all ammo by lot number to cut down excessive dispersion when firing.

Change 1 2-212

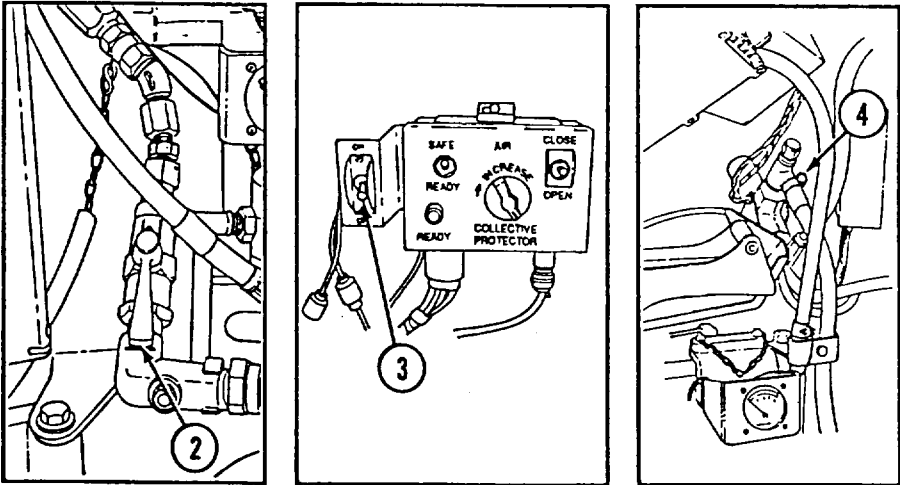
- (5) Tell driver to start engine and run engine at fast idle. Switch on turret ventilating fan.
- (6) At loader's control, SAFE/READY switch should be at SAFE.



WARNING

If the scavenging system does not work, do not fire missiles or conventional ammo on training missions until the scavenging system does work. Combat firings may continue at the discretion of the vehicle commander.

- (7) Open CBSS shutoff valve (2). Turn COMPRESSOR switch (3) to ON. Wait until gauge reads above 630 psi. With breech closed, trip manual discharge lever (4) for a second to see if scavenger works-you'll know it's working if you hear a sound like a foghorn.



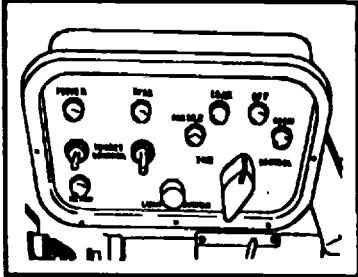
2-20. FIRING 152-MM CONVENTIONAL AMMO (MS51A1)-
Continued.

NOTE

It takes 1-112 to 1-34 hours to fully charge the CBSS system.

b. Loading Conventional Ammo.

- (1) Push up on TURRET CONTROL switch. Wait about 20 seconds until READY light comes on. Turn FIRE CONTROL selector to CONV. if you want your gun in a stabilized mode, push up on STAB switch.

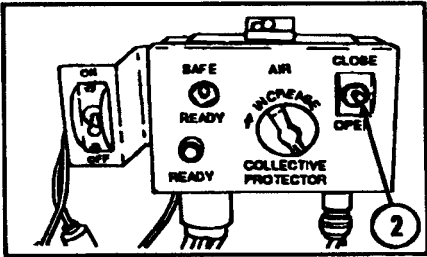
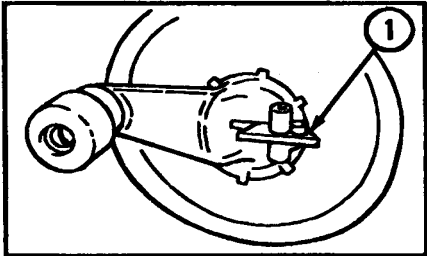


WARNING

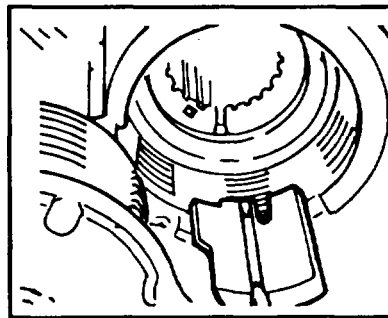
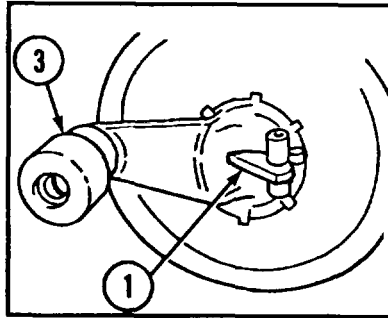
- The obturator seal must be used with all types of ammo to prevent a fire hazard and gas wash.
- Do not chamber 152mm conventional ammo until ready to fire; this ammo has a highly flammable cartridge case, therefore, firing is recommended within 5 minutes of chambering.
- Do not load a cartridge with moisture contamination, (cartridge case/base soft to the touch and/or swollen), if the case is partially or fully separated, or if it has a dented primer. A cartridge with any of these defects should be marked "Unserviceable" and turned in.

- (2) Open breech electrically or manually.

- (a) To open breech electrically, snap locking lever (1) into one of eight notches in rear cover. Hold down CLOSE/OPEN switch (2) until breech is fully opened.

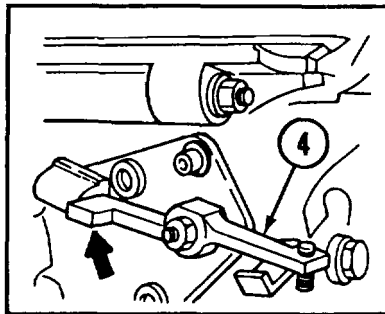


- (b) To open breech manually, snap locking lever (1) into spindle slot in center of rear cover. Turn handle (3) counterclockwise until breech is fully opened.



FULLY OPENED BREECH

- (3) Place ejector lever (4) in up (non-eject) position.



WARNING

Ejector lever must be in up position. If it's not, and you decide not to fire, the ejector will cut through the casing when you open the breech. The propellant charge from a cut casing could spill out and create a fire hazard.

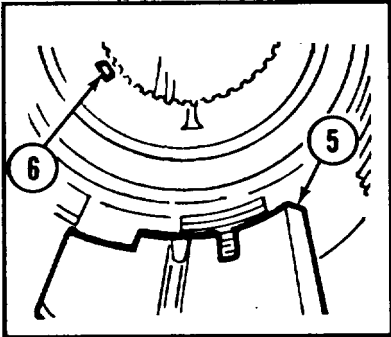
- (4) Remove round from stowage rack. Remove and stow ballistic (nylon) protective cover.

WARNING

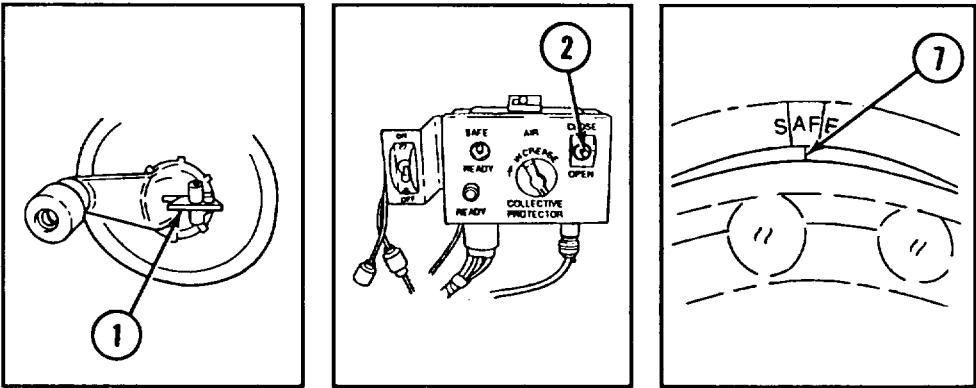
Avoid striking fuse or primer.

2-20. FIRING 152-MM CONVENTIONAL AMMO (M551A1)-
Continued.

- (5) Place round on loading tray (5). While loading round into gun tube, remove barrier bag. Shove round firmly into tube until detent pin (6) is engaged.



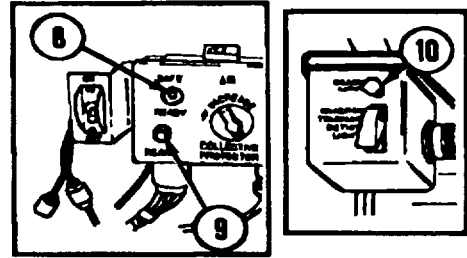
- (6) Close breech electrically or mechanically.
 - (a) To close breech electrically: with locking lever (1) in one of eight notches in rear cover, hold up on CLOSE/OPEN switch (2) until breech is fully closed. It's fully closed when breech scribe mark (7) is within two coupling scribe marks.
 - (b) To close breech manually: with locking lever (1) in spindle slot, turn handle clockwise until breech is fully closed. Snap locking lever back into one of eight notches in rear cover.



WARNING

Snapping locking lever into one of the eight notches frees handle from spinning once gun is fired and breech automatically opens. If you don't do this, you might get hit by the spinning handle.

- (7) At loader's control box, place SAFE/READY switch (8) at READY. Both loaders (9) and gunner's (10) ready lamp should light. Once they do, make sure your precharge pressure is up. You're now ready to fire.



WARNING

If ready lamps don't light, make sure breech is fully closed. Check scribe mark (7) from side of breech, keeping out of recoil path in case of premature fire. Make sure precharge pressure is correct.

C. Firing.

WARNING

- Before firing, make certain everyone is clear of the breech recoil path; the breech will recoil about 15 inches. Be &re careful during rapid-firing sessions
- During a live fire training exercise, if a 152mm conventional round must be downloaded, a minimum waiting period of 15 minutes from the time of chambering to breech opening must be observed. This waiting period is required to eliminate the potential of case material ignition due to burning residue in the chamber from a previous firing.

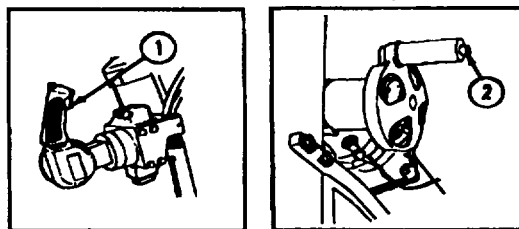
CAUTION

Make sure the cover is closed on 7.62-mm machine gun before firing the main gun. Before closing the cover, be sure the cover latch rods are forward as cover will not lock if rods are to rear.

NOTE

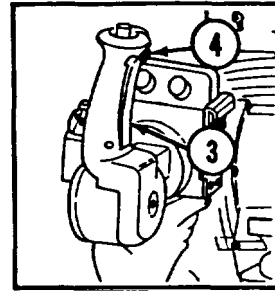
If a cartridge is chambered, it is recommended that it be fired down range, if possible, rather than be downloaded.

- (1) Procedures vary depending on who is going to fire.
- (a) Gunner. n gunner is going to fire. he gets on target and presses trigger (1) on his control handle, OR firing button (2) on his elevation handwheel; both will do the job. When firing with control handle, gunner must make sure elevation handwheel is in locked position.

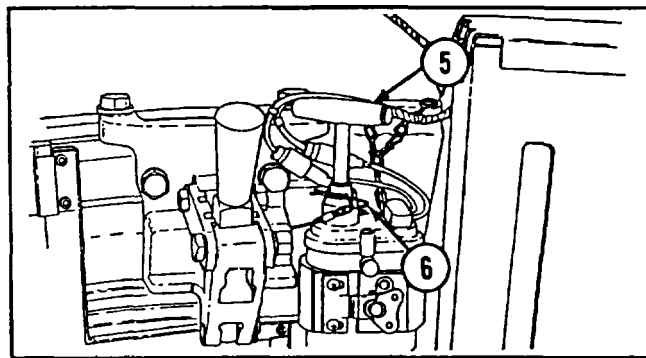


**2-20. FIRING 152-MM CONVENTIONAL AMMO (M551A1)-
Continued.**

- (b) Commander. If commander is going to fire, he first presses palm switch (3) to override gunner and then presses trigger (4).



- (c) Loader. In an emergency, loader can fire. With gun still on target, loader attempts to fire with blasting machine. Remove blasting machine (5) from bracket and get back on seat (out of recoil path). Remove safety pin (6) and announce 'ON-THE-WAY.' Wait 1 second, then turn handle clockwise three times as quickly as you can hold handle in final position for 2 to 3 seconds.



WARNING

Stop If smoke or fire is seen coming from the top of the coupling or around the chamber. Notify unit maintenance to check your obturator seal, detent, firing probe gasket, and CBSS valve. If you can't get a fire, see Immediate Action In Case of Failure-to-Fire, paragraph 2-20, d.

NOTE

When you fire a round, here's what happens at recoil. The ventilating fan turns off and the gun recoils about 15 inches, then returns to battery. The scavenging system blows out noxious gases and fumes (you'll hear a sound like a foghorn for about 2 seconds). The breech opens automatically and the ventilating fan turns back on.

- (2) Once breech is fully opened, place loaders SAFE/READY switch at SAFE.
- (3) If you're going to fire another round, check to see 9 Indicator rod is in operating range, make certain selector lever is still in up (non-eject) position, and load according to step b in paragraph 2-20.

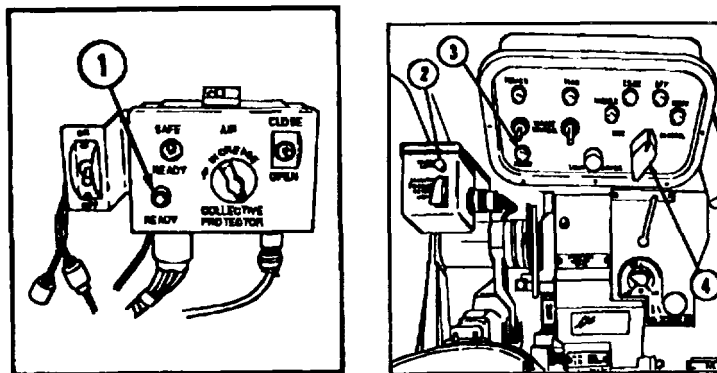
NOTE

Clean the firing probe with nylon scouring pad (Appendix D, itself 25) after every four rounds fired with a 24 V or 28 V firing circuit and after every 15 rounds fired with a 120 V firing circuit. **DO NOT** use steel wool as a metallic residue may cause a short and pre-ignition.

d. Immediate Action In Case of Failure-to-Fire.

WARNING

- Keep gun laid on target. Before firing, make certain everyone is clear of the breach recoil path - it'll recoil about 15 inches.
 - The following procedure, once initiated, must be completed. If downloading of the cartridge is necessary, a minimum of 15 minutes must have elapsed from the time of chambering before the breech is opened. This waiting period is required to eliminate the potential of case material ignition due to burning residue in the chamber from a previous firing.
- (1) As soon as a failure-to-fire becomes evident, gunner yells "MISFIRE, to alert crew.
 - (2) Recheck to be sure that both loader's (1) and gunner's (2) READY lights are on. TURRET CONTROL READY light (3) should be on and FIRE CONTROL selector (4) should be at CONV. Also, check your safe-to-fire indicator rod for proper precharge pressure.



2.20. FIRING 152-MM CONVENTIONAL AMMO (M551A1).

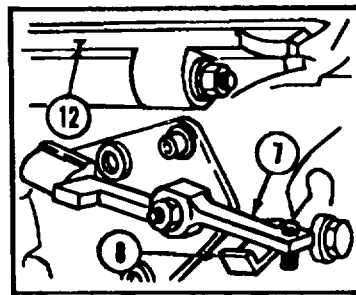
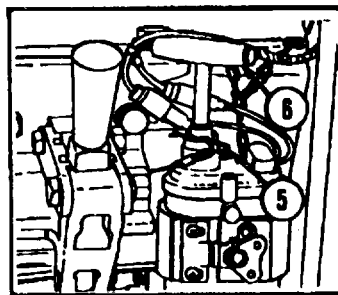
Continued.

- (3) With gun on target, announce "ON-THE-WAY" and try to fire using a different trigger (commander's trigger, gunner's trigger, or trigger on elevation handwheel).
- (4) If gun does not fire on second try, announce "MISFIRE" and repeat preceding step 3 using yet a different trigger.

WARNING

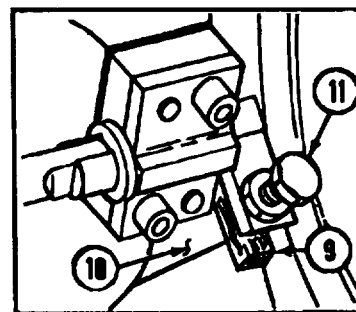
Keep the safety pin (5) installed on the blasting machine (6) and don't turn the handle until ready to Use. The circuitry from the blasting machine goes directly to the firing mechanism, bypassing normal safety circuits.

- (5) With gun still on target, loader tries to fire with blasting machine. Remove blasting machine (6) from bracket and get back on your seat (out of the way of recoil). Remove safety pin (5) and announce "ON-THE-WAY". Wait 1 second, then turn handle clockwise three times as quickly as you can - hold handle in final position for 2 to 3 seconds.
- (6) If still no fire, insert safety pin and return blasting machine to bracket. Set loader SAFE/READY switch at SAFE. Wait a minimum of 15 minutes from the time the ammo was loaded, keeping out of recoil path.
- (7) With ejector (7) still in up (non - eject) position, open breech.



NOTE

So that round can be guided out with two hands, have another soldier press and hold detent release handle (8) OR wedge a small (3/16-inch) piece of wood (9) between detent release plunger (10) and detent set screw (11)



- (8) Press and hold detent release handle (8) and grasp round. Gently slide round back onto loading tray (12) don't let go of handle (8) until round is clear of breach. Remove wedge, if used.
- (9) Inspect misfire cartridge for presence of initiator. If initiator is missing from cartridge, inspect probe, breach chamber, loading tray, and gun tube for initiator. If initiator is still missing, have vehicle commander check and ensure that initiator is not in vehicle.
- (10) Once a round is designated a misfire, replace protective cover and remove round from vehicle. Mark round unserviceable and forward to storage pending disposition by technical agency. No other attempt will be made to fire a round once it has been designated a misfire.
- (11) Report misfires, hangfires, and other malfunctions according to applicable regulations and local procedures.

e. After Firing Shutdown.

WARNING

- **Make sure the SAFE/READY switch is at SAFE.**
 - **During a live fire training exercise, if a 152mm conventional round must be downloaded, a minimum waiting period of 15 minutes from the time of chambering to breech opening must be observed. This waiting period is required to eliminate the potential of case material ignition due to burning residue in the chamber from a previous firing.**
- (1) Turn FIRE CONTROL selector to OFF.
 - (2) If a round is still chambered. remove according to steps d.7 and d.8.
 - (3) C-o breach.
 - (4) If you're in stabilized mode. push STAB switch off.
 - (5) Push TURRET CONTROL switch off.
 - (6) Turn CBSS COMPRESSOR switch to OFF and place shutoff valve in off position.
 - (7) Stow used ballistic covers; wipe off and return rubber barrier bags to Ammunition Supply Point (ASP) for salvage.
 - (8) Replace muzzle plug.
 - (9) Record number of rounds fired on DA Form 2408w.

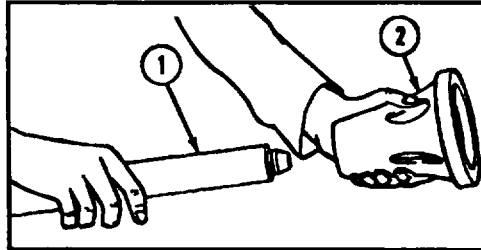
NOTE

A suck Fund can be removed from either the muzzle and or the breech end.

**2-20. FIRING 152-MM CONVENTIONAL AMMO (M551A1)-
Continued.**

1. Removing Stuck Round from Muzzle End.

- (1) Assemble M1 staff sections (1) to rammer (2).



WARNING

DO NOT hammer round. Keep your body clear of the muzzle as much as possible.

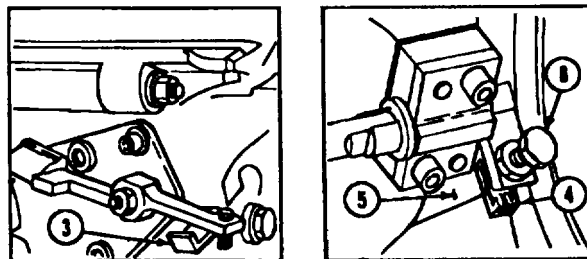
- (2) From muzzle, gently slide assembled rammer and staffs down gun bore until seated on ogive (cone) of projectile.

WARNING

During a live fire training exercise, if a 152mm conventional round must be downloaded, a minimum waiting period of 15 minutes from the time of chambering to breech opening must be observed. This waiting period is required to eliminate the potential of case material ignition due to burning residue in the chamber from a previous firing.

NOTE

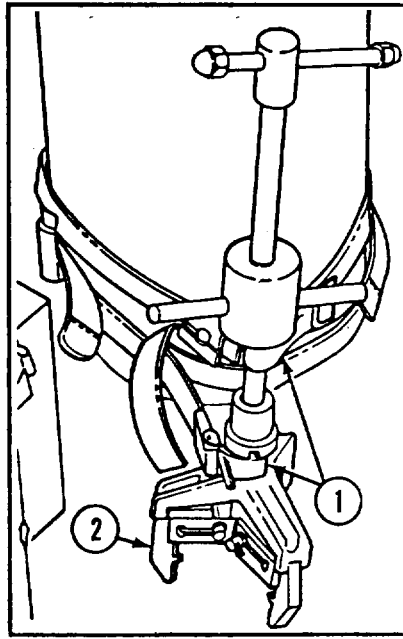
So that round can be guided out with two hands, have another soldier press and hold detent release handle (3) OR wedge a small (3/16inch) piece of wood (4) between detent release plunger (5) and detent set screw (6).



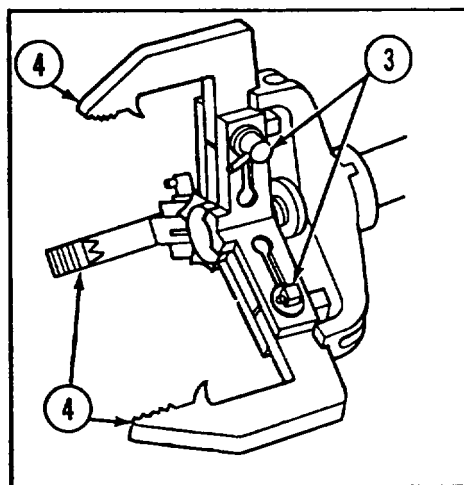
- (3) With breech opened, position a soldier behind breech. Press and hold detent release handle (3) and, while steady pressure is being applied from muzzle end, guide round out onto loading tray. Remove wooden wedge, if used.

g. Removing Stuck Round from Breech End.

- (1) Loosen straps (1) and remove round extractor (2) from stowed position.



- (2) Turn pins (3) and extend jaws (4). Turn pins to lock.

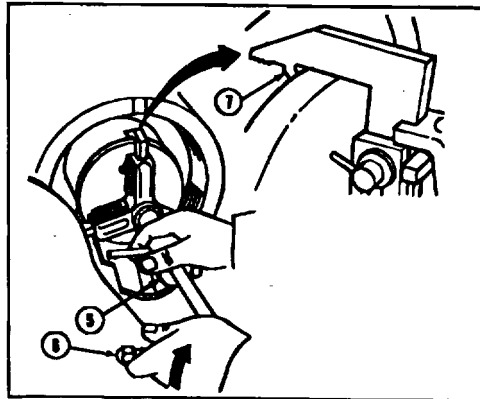


2-20. FIRING 152-MM CONVENTIONAL AMMO (M551A1)-
Continued.

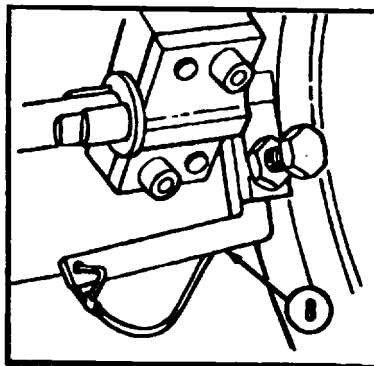
WARNING

During a live fire training exercise, if a 152mm conventional round must be downloaded, a minimum waiting period of 15 minutes from the time of chambering to breech opening must be observed. This waiting period is required to eliminate the potential of case material ignition due to burning residue in the chamber from a previous firing.

- (3) Open breech. Position extended laws over cartridge Case.
- (4) Push hammer (5) forward to engage locking lugs and hold firmly. Turn handle (6) clockwise until large teeth (7) close behind rim of cartridge case.

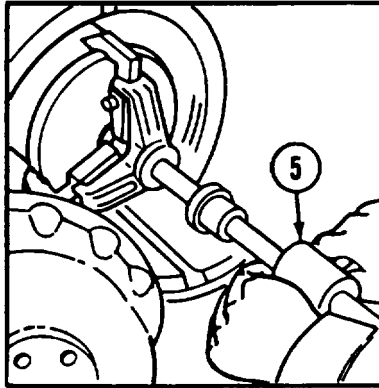


- (5) Push wedge (8) between detent release plunger and detent set screw to retract detent. Use cal .50 machine gun GO NO-GO fire gauge as wedge.



Change 2 2-224

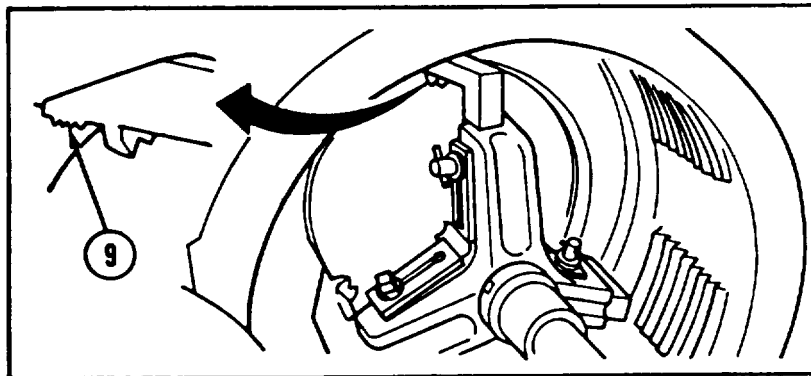
- (6) Slam hammer (5) back to loosen and release projectile.



NOTE

If case tears loose without releasing the projectile, go on to steps 7 through 12.

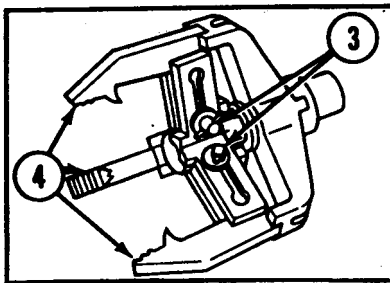
- (7) Remove torn case and loose propellant from vehicle.
- (8) With jaws extended, position small teeth (9) of jaws over locking ring on projectile boss.



- (9) Push hammer forward to engage locking lugs. Turn handle clockwise until small teeth are firmly seated.
- (10) Slam hammer back until projectile is released.
- (11) Push hammer forward to engage lugs. Turn handle counterclockwise until teeth release grip of projectile. Remove projectile and dispose in accordance with applicable regulations.

**2-20. FIRING 152-MM CONVENTIONAL AMMO (M551A1)-
Continued.**

- (12) Turn pins (3) and retract jaws (4) to stowed position. Strap extractor to rear CBSS cylinder.



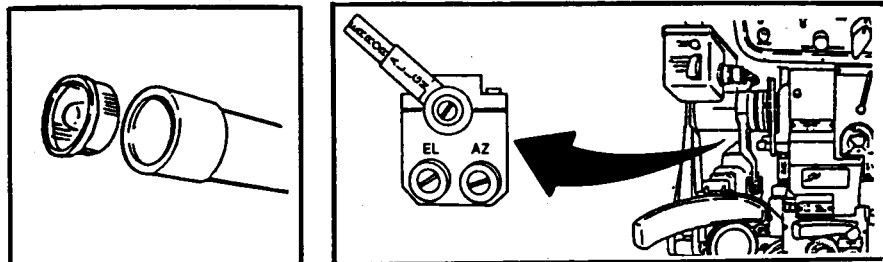
2-21. LAUNCHING MISSILE.

WARNING

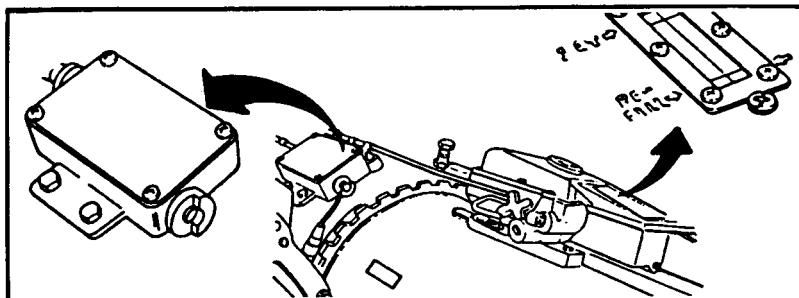
If the scavenging system does not work, do not fire missiles or conventional ammunition on training missions until the scavenging system does work. Combat firings may continue at the discretion of the vehicle commander.

a. Preparation for Launching.

- (1) Remove Muzzle Plug. Make sure gun tube is free of obstructions. Firing probe of firing mechanism must be free of oil. ERROR and ALIGN levers on telescope mount must be at full left position.



- (2) Indicator rod should be in operating range and reservoir filled with hydraulic fluid.



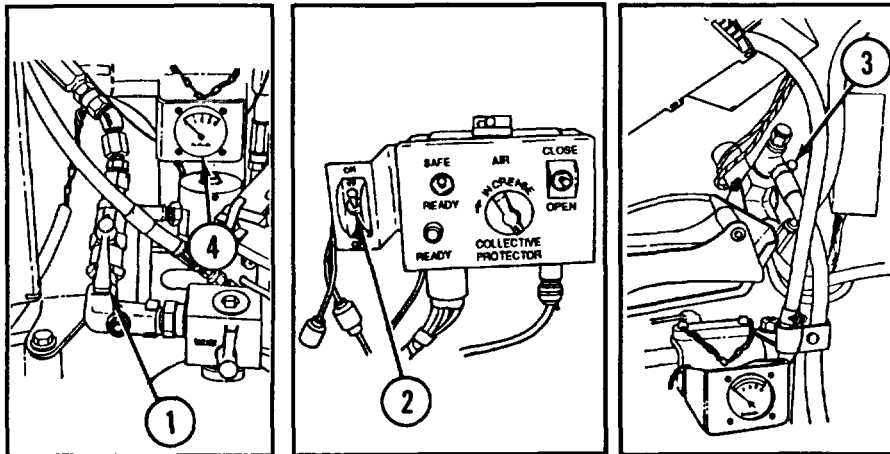
- (3) Be sure 7.62-mm machine gun cover is closed and locked.

- (4) Missiles to be launched must be in good condition and properly stowed.

WARNING

Do not attempt to fire High-Explosive Anti-Tank (HEAT) warhead missiles with dented nose cones.

- (5) Tell driver to start engine and run engine at fast idle. Switch on turret ventilating fan.
- (6) Open CBSS shutoff valve (1). Turn COMPRESSOR switch (2) to ON wait until gauge reads above 630 psi. With breech closed, trip manual discharge lever (3) for a second to see if scavenger works. You'll know it's working if it honks like a foghorn.
- (7) Check gauge (4). Make sure you have enough pressure to activate scavenging system.

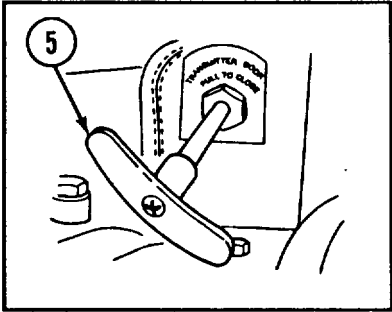


WARNING

The compressor automatically shuts down when you're in MISSILE mode. However, It's Important that the scavenging system has enough pressure to clean out the gun tube after each firing. Otherwise, an after-firing flare-back can occur; with all the flammables in the turret, death or Injury could result.

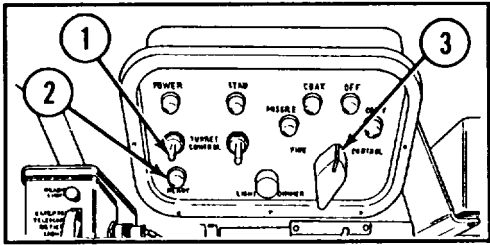
2-21. LAUNCHING MISSILE-Continued.

- (8) Open transmitter door by turning control handle (5) counterclockwise and pushing forward. Lock door open by turning handle an eighth of a turn clockwise.



b. Loading.

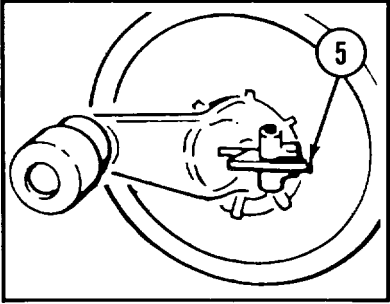
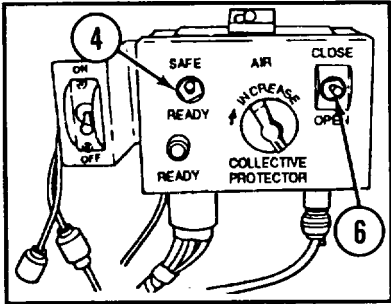
- (1) Push up on TURRET CONTROL switch (1). Wait about 20 seconds until READY light (2) comes on, then turn FIRE CONTROL selector (3) to MISSILE.



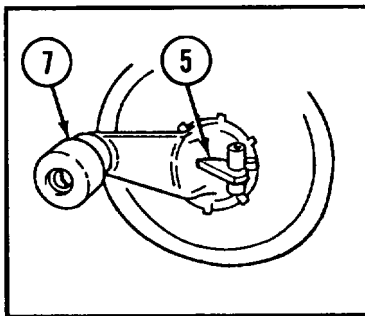
NOTE

Once you turn to MISSILE, the PRIME VOLTAGE and POWER SUPPLY lamps on your test set panel will blink. Once the system warms up, the lights will go out. Make sure a missile reticle appears in the telescope.

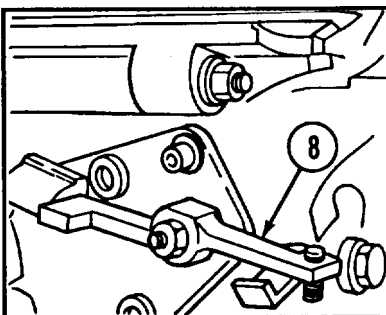
- (2) At loader's control box, make sure SAFE/READY switch (4) is at SAFE.
- (3) Open Breech.
 - (a) Electrically. Snap locking lever (5) into one of eight notches in rear cover. Hold down CLOSE/OPEN switch (6) until breech is fully opened.



- (b) Manually. Snap locking lever (5) into spindle slot. Turn handle (7) counterclockwise until breech is fully opened.

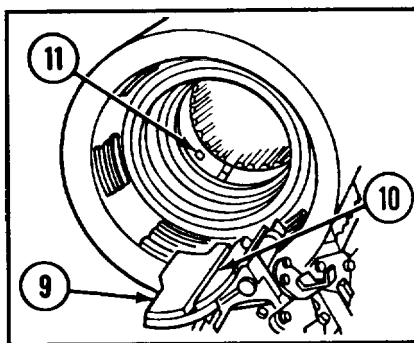


- (4) Place ejector lever (8) in down (eject) position.



- (5) Remove missile from stowage rack.

- (6) Place missile on loading tray (9) so that missile index key slides in slot (10). Shove firmly into tube until detent pin (11) is engaged.



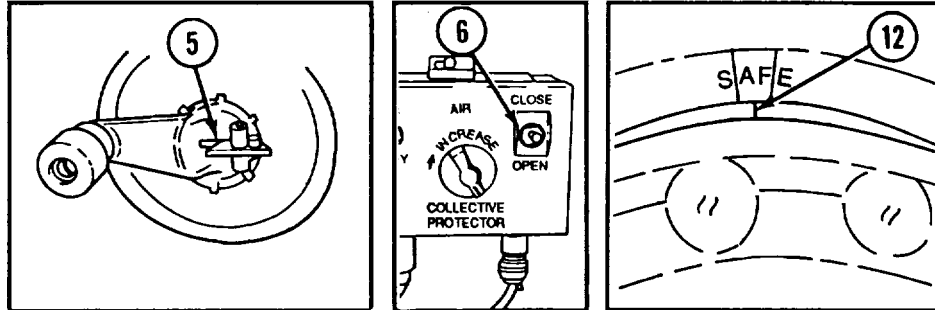
WARNING

Do not attempt to launch a HEAT warhead missile with a dented nose cone.

2-21. LAUNCHING MISSILE-Continued.

(7) Close breech.

- (a) Electrically. With locking lever (5) in one of eight notches in rear cover, hold up on CLOSE/OPEN switch (6) until breech is fully closed. It's fully closed when breech scribe mark (12) is within two coupling marks.

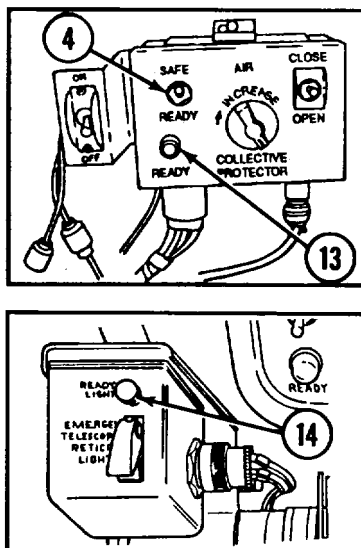


- (b) Manually. With locking lever in spindle slot, turn handle clockwise until breech is fully closed. Snap actuator lever back into one of eight notches in rear cover.

WARNING

Snapping locking lever into one of the eight notches frees the handle from spinning once the gun is fired and the breech automatically opens. If you don't do this, you might get hit by the spinning handle.

- (8) At loader's control box, place SAFE/READY switch (4) at READY. Both loader's (13) and gunner's (14) READY lamps should light. Once they do, you're ready to fire.



WARNING

If ready lamps don't light, make sure the breech is fully closed (see step 7). Check the scribe mark (12) from the side of the breech, keeping out of the recoil path in case of a premature fire.

c. Launching.

WARNING

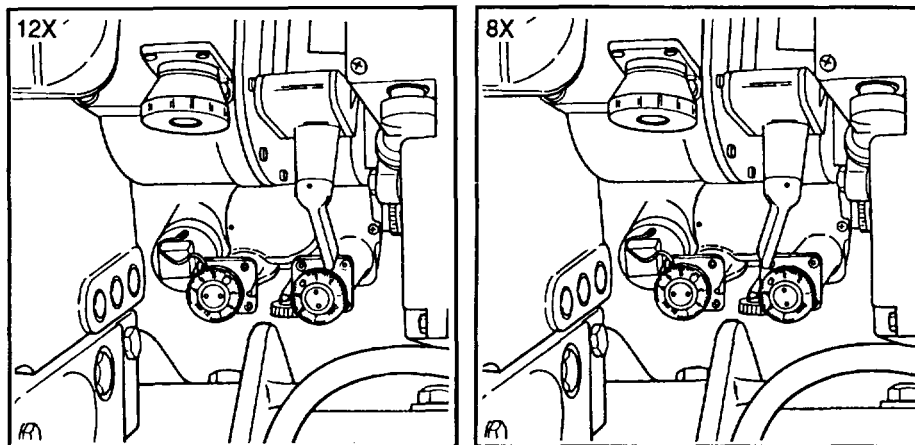
Before launching, make certain everyone is clear of the breech recoil path—it'll recoil about 5 inches.

CAUTION

Make sure the cover is closed on 7.62-mm machine gun before firing the main gun. Before closing the cover, be sure the cover latch rods are forward as the cover will not lock if the rods are to the rear.

NOTE

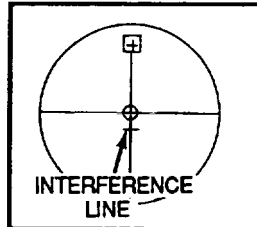
- Stop the vehicle before launching missile—this will give you the stable position needed to guide the missile on target.
- If you're firing at medium or extended ranges or in hazy light conditions, switch to 12-power. If you've got good daylight vision or short range, switch to 8-power.



2-21. LAUNCHING MISSILE-Continued.

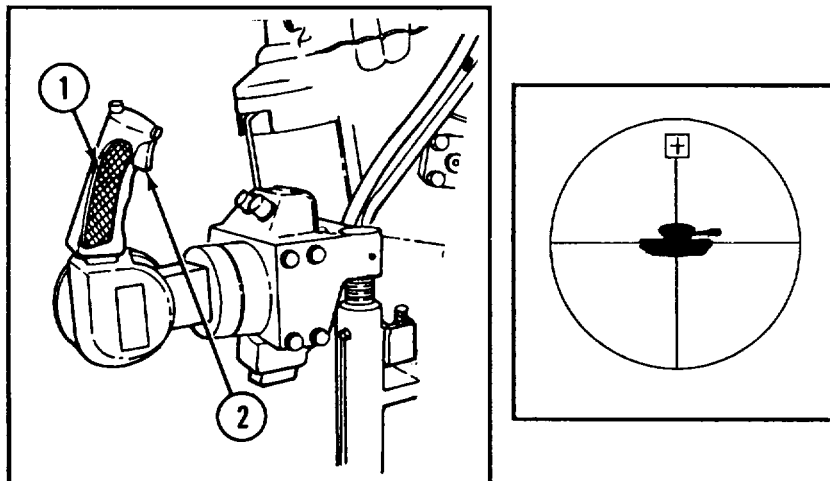
NOTE

- View through the gunner's telescope. **DON'T FIRE IF:** terrain obstacles are above Interference line (see illustration below) of missile reticle, **OR** these obstacles are directly In line-of-sight, **OR** these obstacles are within 500 meters of the vehicle, **OR** transmitter line-f-sight is blocked. if any of these conditions exist, move the vehicle and fire from a different position.

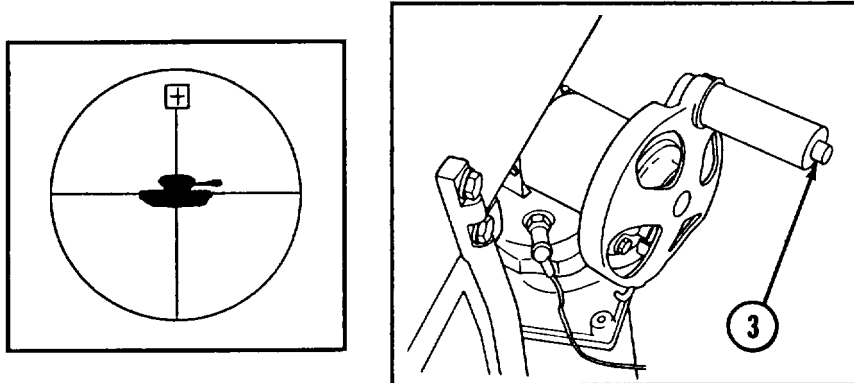


- *Missile can be launched electrically or manually.*

(1) Launching Electrically. Press palm switch (1) and establish target in center crosspoint of missile reticle, as illustrated. Continue tracking target and press trigger (2). It will take a second or so before missile launches. **DON'T** release trigger until missile launches. Continue tracking target until missile impact. **DON'T** try to track missile; if you do, you will never hit target.



(2) Launching Manually. With target in center crosspoint of missile reticle, press firing button (3) on elevation handwheel. It'll take a second or so before missile fires. Keep tracking target with manual controls, keeping target in center crosspoint of reticle until missile impact. DON'T track missile.



WARNING

If you don't get a fire, see paragraph e, Immediate Action In Case of Failure-to-Fire.

CAUTION

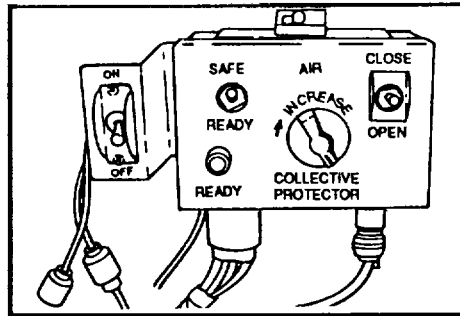
Don't load another missile until gunner indicates "hit, " "miss, " or "ground." The loading vibrations could hinder the gunner's tracking.

NOTE

- The commander can also launch the missile by pressing his palm switch (this electrically overrides the gunner's control) and then pressing the trigger. However, since the commander cannot accurately track the target, he should not launch missiles except in extreme cases.
- When you launch a missile, here's what happens at recoil. The ventilating fan turns off and the gun recoils about 5 inches, then returns to battery. The scavenging system blows out gases and debris (you'll hear a sound like a foghorn for about 2 seconds). The breech opens automatically and the missile aft cap pops out. Finally, the ventilating fan turns back on.

2-21. LAUNCHING MISSILE-Continued.

- (3) Once the breech is fully opened, place loader's SAFE/READY switch at SAFE.

**WARNING**

Before launching another missile, check CBSS gauge. Gauge should read about 650 psl or more.

- (4) If you're going to launch another missile, check CBSS gauge, check to see if safe-to-fire indicator rod is in operating range, and check to see if ejector lever is still in down (eject) position-then load and launch.

d. After Launching Shutdown.**WARNING**

Make sure SAFE/READY switch is at SAFE.

- (1) Turn FIRE CONTROL selector to OFF.
- (2) If a missile is still chambered, remove according to paragraph e.
- (3) Close breech.
- (4) Push TURRET CONTROL switch off.
- (5) Turn CBSS COMPRESSOR switch to OFF and place shutoff valve in off position.
- (6) Remove spent missile aft caps from turret.

e. Immediate Action In Case of Failure-to-Fire.**WARNING**

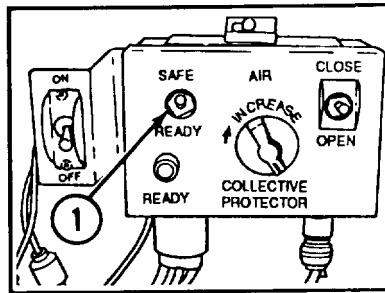
Keep gun laid on the target. Make certain everyone is clear of breech recoil path-t will recoil about 5 inches.

- (1) As soon as a failure-to-fire becomes evident, gunner hollers "MISFIRE" to alert crew.

WARNING

After a misfire, **DO NOT** make a second attempt to launch the misfired missile. It is highly probable that another attempt to launch will result in an uncontrolled missile flight.

- (2) Place loader's SAFE/ READY switch (1) at SAFE. Wait at least 10 minutes, keeping out of recoil path (this wait can be reduced to 4 minutes under combat conditions).



CAUTION

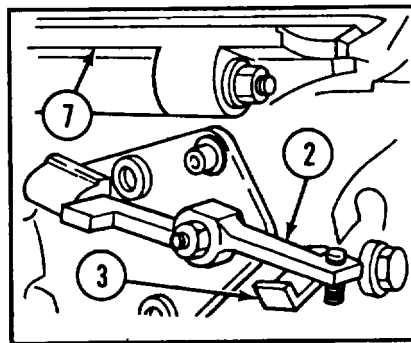
Ejector must be up. Otherwise, the ejector will damage the missile as it tries to eject.

- (3) Place ejector (2) in up (non-eject) position; open breech.

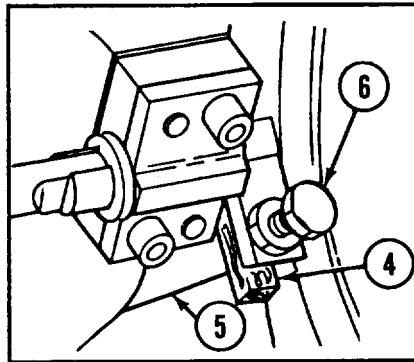
NOTE

So that round can be guided out with two hands, have another soldier press and hold detent release handle (3) OR wedge a small (3/16-Inch) piece of wood (4) between detent release plunger (5) and detent set screw (6).

- (4) Press in and hold detent release handle (3) and grasp missile. Gently slide round back onto loading tray (7). Don't let go of handle (3) until round is clear of breech. Remove wedge, if used.

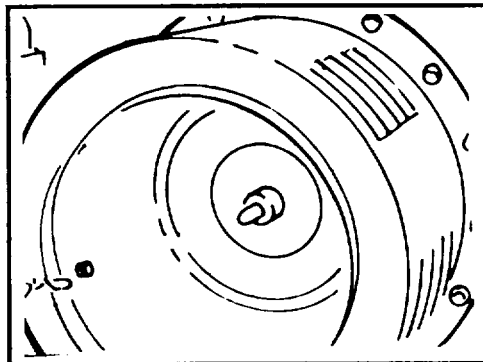


2-21. LAUNCHING MISSILE-Continued.

**NOTE**

In combat situations, dispose of missile immediately. In non-combat situations, cover aft end of missile with two layers of aluminum foil. Extend over rim of aft cap and secure foil. Tag missile with: "CAUTION: MISFIRED MISSILE, HANDLE WITH CAUTION." Place missile in missile container and tag outside of container with same caution. Evacuate through normal ammunition supply channels.

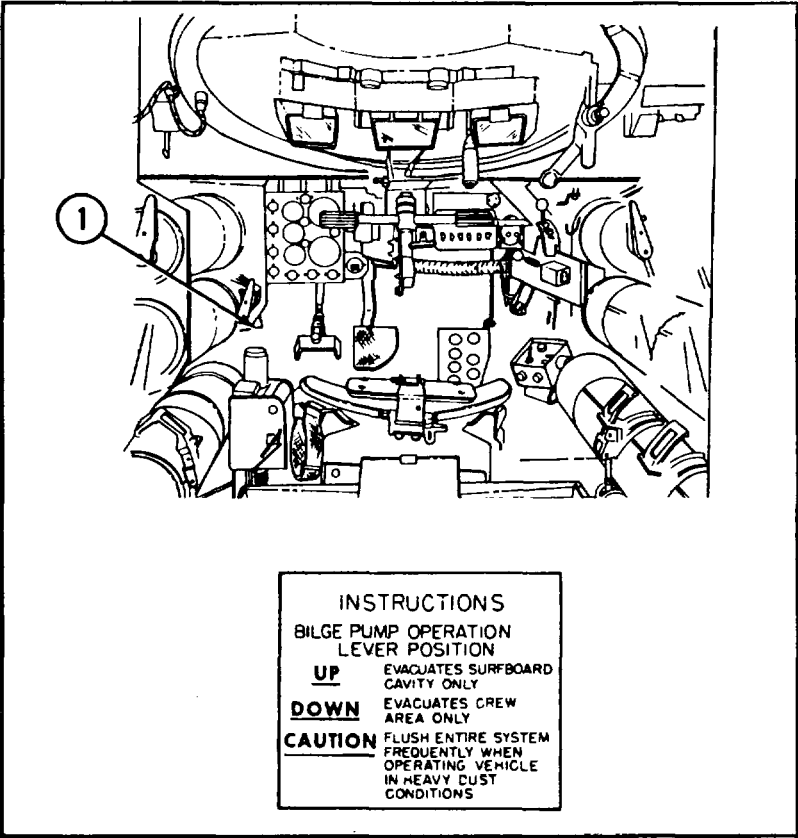
- (5) Before resuming fire, clean firing probe of firing mechanism with nylon scouring pad (Appendix D, item 25). Check continuity of firing circuit.



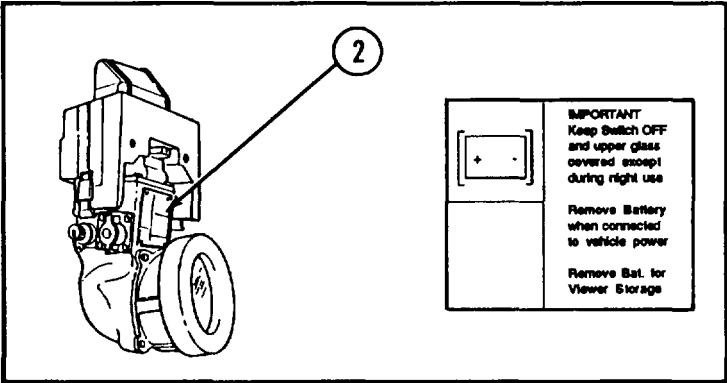
- (6) Report misfires, hangfires, and other malfunctions according to applicable regulations and local procedures.

2-22. DECALS AND INSTRUCTION PLATES.

a. Driver's Compartment.

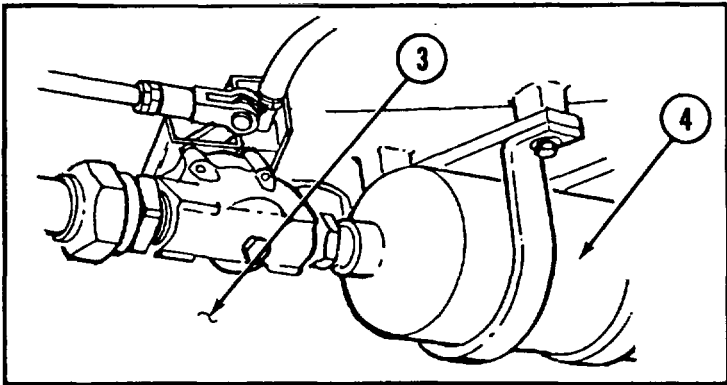


(1) Front bilge pump instruction plate (on left side of driver's compartment floor).



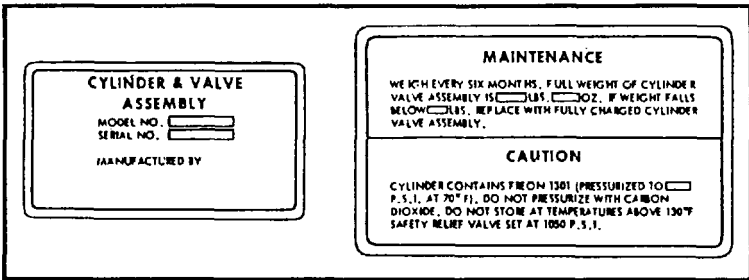
(2) DNV instruction plate (on front of DNV).

2-22. DECALS AND INSTRUCTION PLATES-Continued.



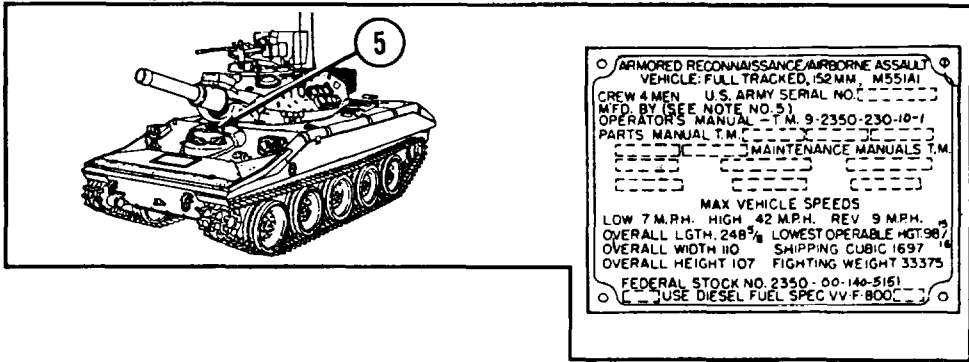
NOTE

These two plates are located in the driver's compartment, but are visible from the crew compartment.



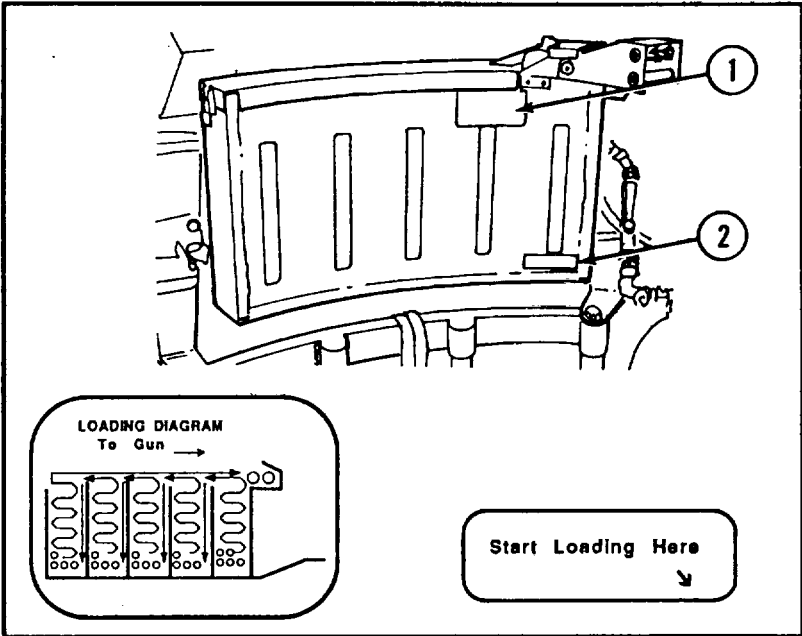
(3) Crew compartment fire extinguisher cylinder identification plate (attached to wall near fire extinguisher cylinder on inside of driver's compartment).

(4) Crew compartment fire extinguisher cylinder instruction plate (in driver's compartment on fire extinguisher cylinder attached to roof, right rear of drivers seat).



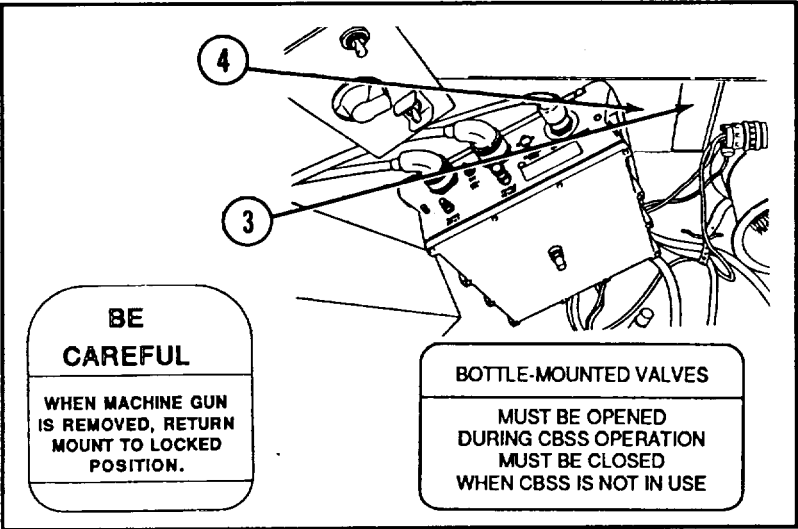
(5) M551A1 vehicle identification plate (on roof of drivers compartment).

b. Crew Compartment.



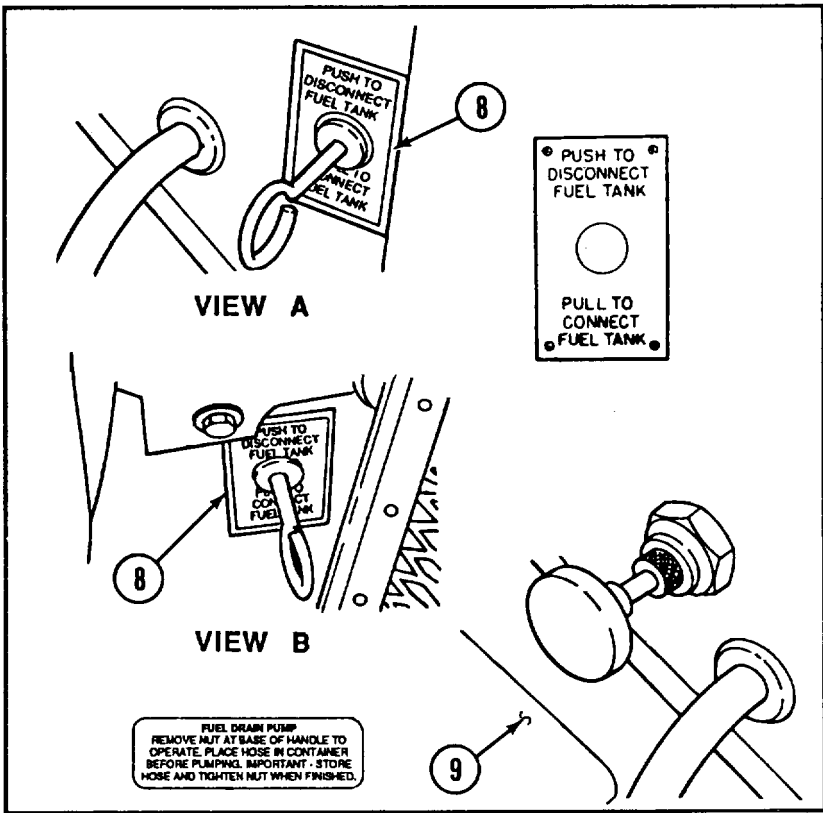
(1) 7.62-mm ammo loading diagram decal (located on 7.62-mm ammo loading Rack).

(2) 7.62-mm ammo loading decal (located on 7.62-mm ammo loading rack).



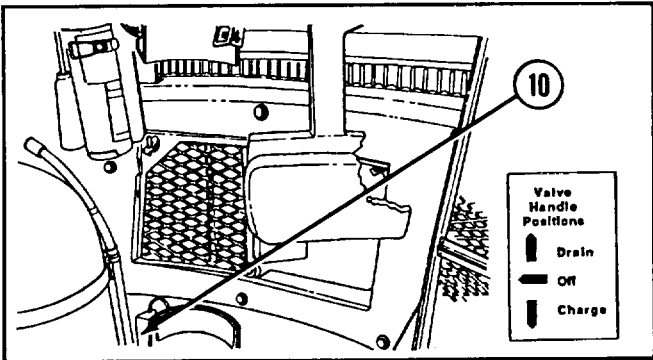
(3) 7.62-mm machine gun removal warning decal (located on roof of crew compartment near 7.62mm machine gun mount).

(4) CBSS operation decal (located on bulkhead at left front of crew compartment).



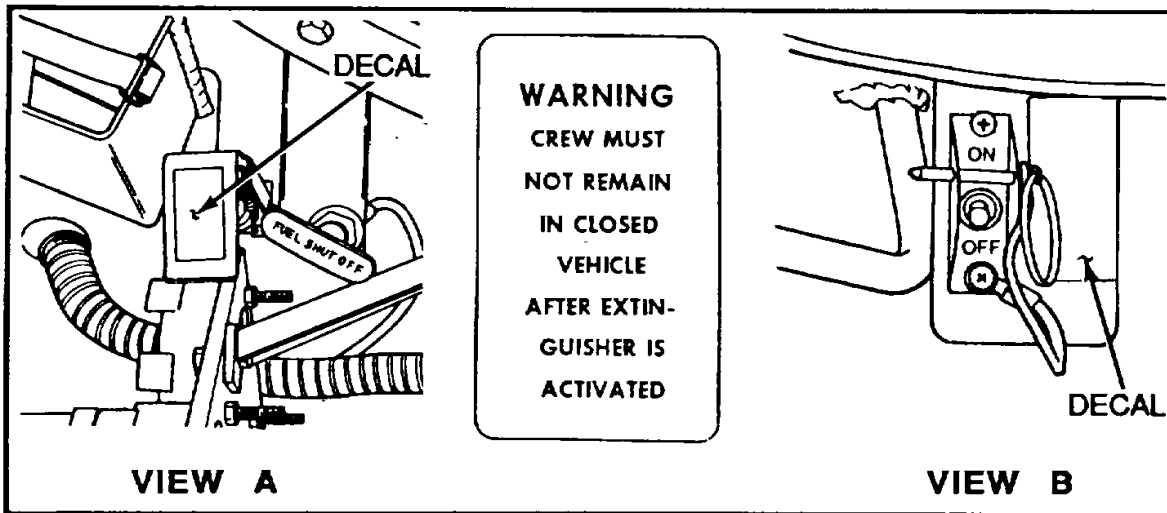
(8) Fuel shutoff valve indicator decals (two, located on rear bulkhead of crew compartment).

(9) Fuel drain pump decal (in crew compartment on rear bulkhead next to pump handle).



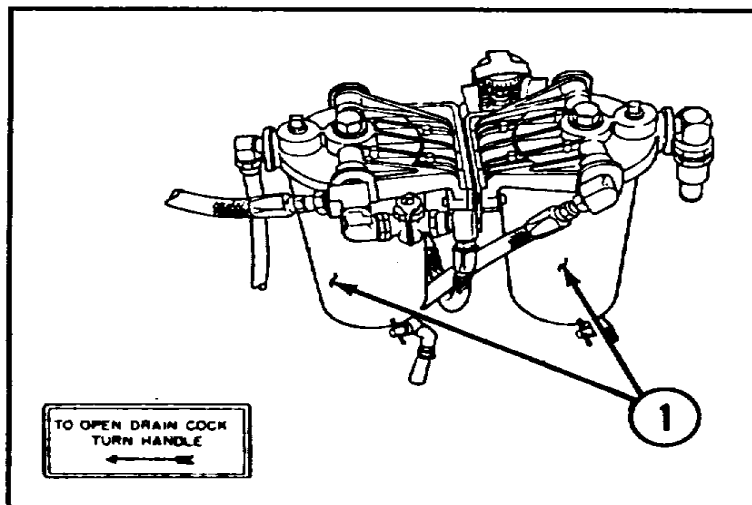
(10) Compressor valve operation decal (at rear of turret next to CBSS canister).

2-22. DECALS AND INSTRUCTION PLATES-Continued.

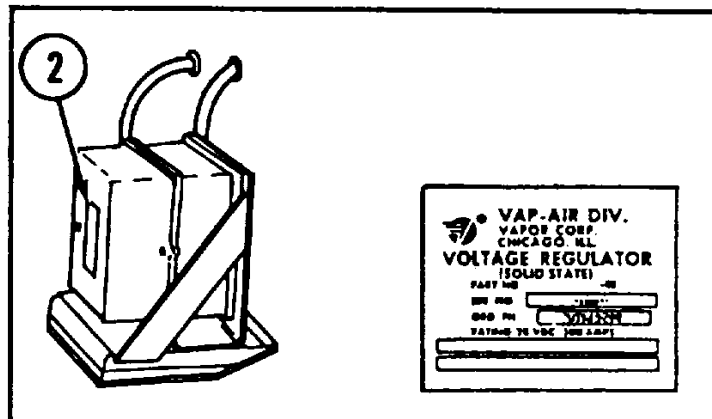


Fire extinguisher warning decals [two, on fire extinguisher actuator handles at driver's left (VIEW A) and right front of commander (VIEW B)].

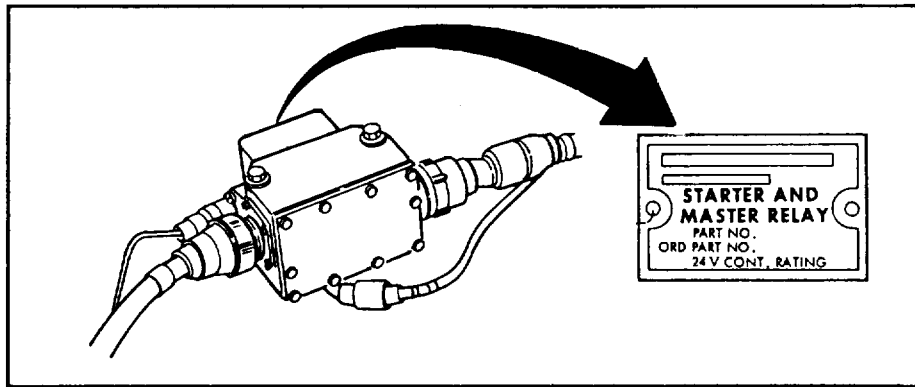
d. Engine Compartment.



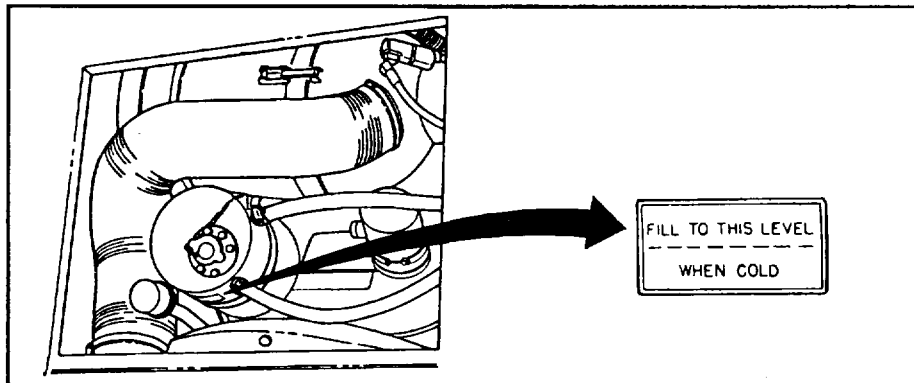
(1) Engine fuel filter drain instruction plate (in engine compartment on fuel filter, right side of engine).



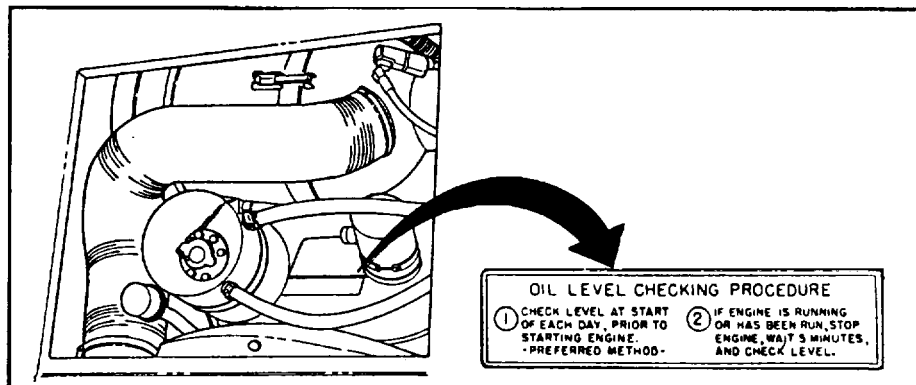
(2) Generator regulator identification plate (in engine compartment near right rear corner).



(3) Master relay identification plate (in battery compartment).



(4) Engine coolant drain instruction plate (on side of surge tank in engine compartment).

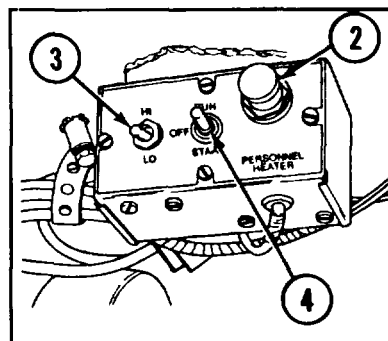
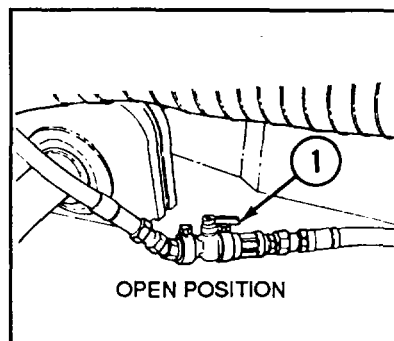


(5) Oil level instruction plate (in engine compartment on crankcase).

2-23. PERSONNEL HEATER OPERATION.**NOTE**

Heater operates with the **MASTER SWITCH** set to **ON** or **OFF**.

- a. Turn on **MASTER SWITCH**.
- b. Make sure fuel supply valve (1), located on floor to right of driver, is open before starting heater.
- c. Depress personnel heater light (2) to check lamp. If lamp does not light, replace it. If new lamp doesn't light, notify unit maintenance.
- d. Place heater selector switch (3) to **Hi** or **LO**.
- e. Hold **RUN/START** control switch (4) at **START** for 2 minutes (longer in extreme cold) until indicator lamp lights.
- f. Place **RUN/START** control switch (4) to **RUN**.
- g. To stop heater, set heater selector switch (3) to **OFF**. Indicator will stay on and blower will run for 2 or 3 minutes until combustion chamber is purged.

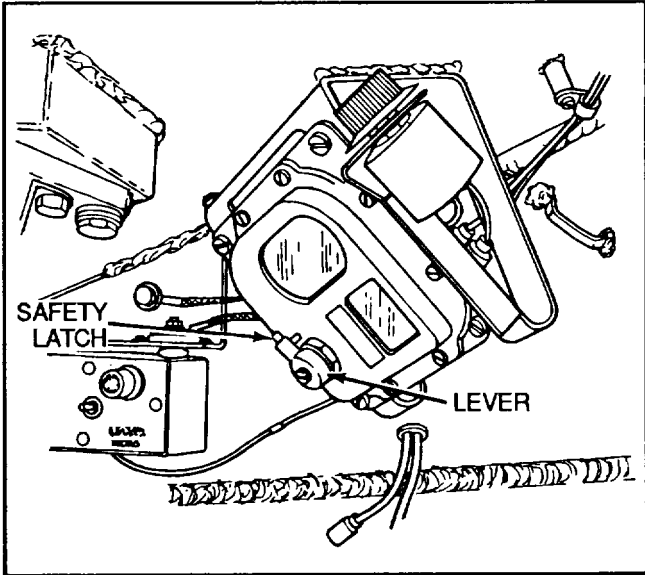


- h. After blower stops, close fuel supply valve and turn **MASTER SWITCH** to **OFF**.

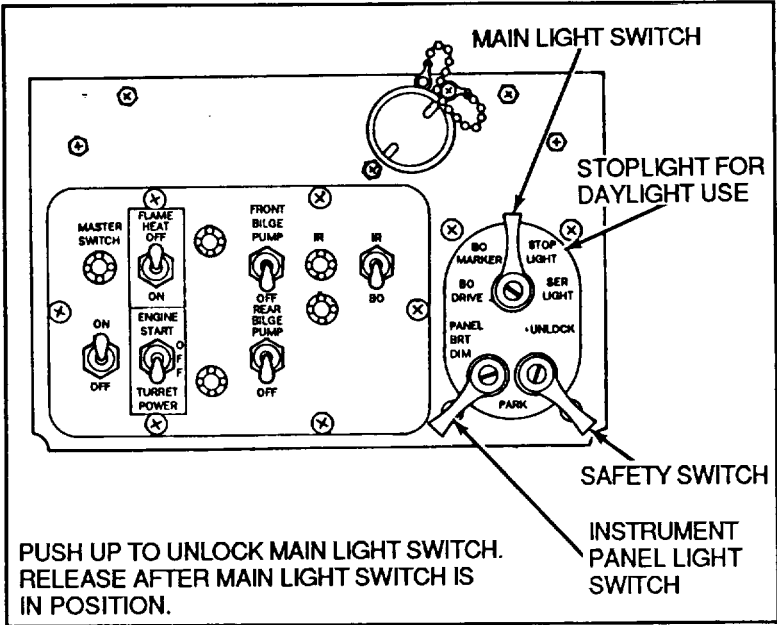
2-24. OPERATION OF LIGHTS.**a. Dome Light Control.**

- (1) Blue light on. Turn lever fully clockwise.
- (2) White light on. Press safety latch and turn lever counterclockwise past stop.

(3) Both lights off. Turn lever counterclockwise against stop.



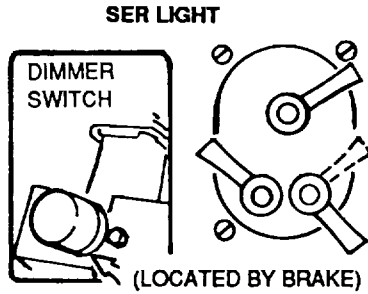
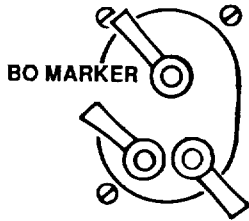
b. **Driving Lights.** Driving lights are controlled by the following switches:



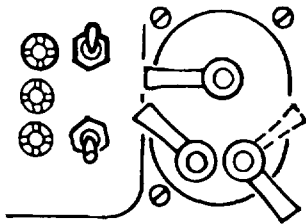
2-24. OPERATION OF LIGHTS-Continued.

c. **Switch Settings.** Settings and resulting driving light illumination are:

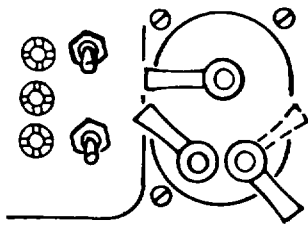
(1) Switch Setting.



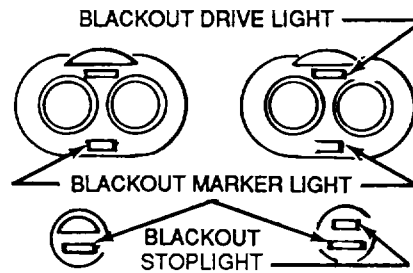
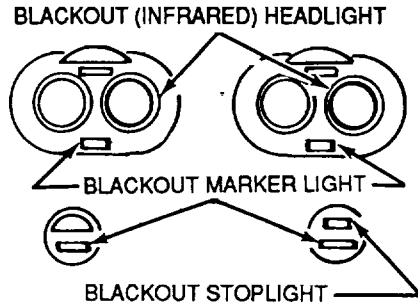
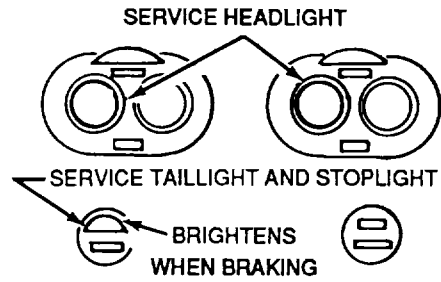
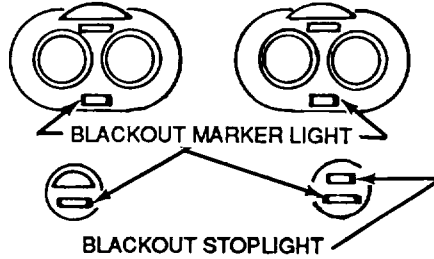
BO DRIVE (INFRARED)



BO DRIVE



(2) Lights Turned On.



2-25. M8A3 GAS-PARTICULATE FILTER UNIT AND PROTECTIVE MASK M25/M25A1.**WARNING**

- If you're In a toxic gas attack, **FIRST put on your mask-then start operating the M8A3 gas-particulate filter unit.**
- **The filter unit will NOT protect you from carbon monoxide.**
- **Frostbite to the cheekbone area of the face may be experienced by wearers of the M25/M25A 1 protective mask from subfreezing air delivered by the M8A3 gas-particulate filter unit. DO NOT connect the protective mask to the filter unit under sub-freezing conditions.**

NOTE

Your vehicle is equipped with a filter unit to provide each crewmember with clean breathable air during dusty conditions, and especially during chemical-biological agent attacks. Keep masks, carriers, and hoses in good shape and properly stowed.

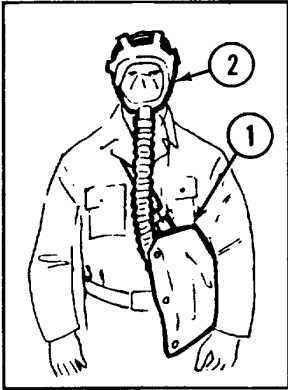
a. M8A3 Gas-Particulate Filter Unit Data.

- (1) Filter unit supplies filtered breathable air to four or fewer M25/M25A1 masks worn by crewmembers. It removes all known chemical agents, dust, and other particles from the air. Unit consists of an M2A2 air purifier, air hoses, and electrical cables. Purifier is located on turret floor to right of loader's seat.
- (2) Three hoses conduct breathable air directly from purifier to each turret crewmember's mask.
- (3) Fourth hose goes to a slip ring furnishing breathable air to driver.
- (4) Electrical power is provided to purifier by a cable from loader's control panel.
- (5) A spring clip and airflow control caps are used on air purifier to close opening during storage, when not in use, and when vehicle is being cleaned.

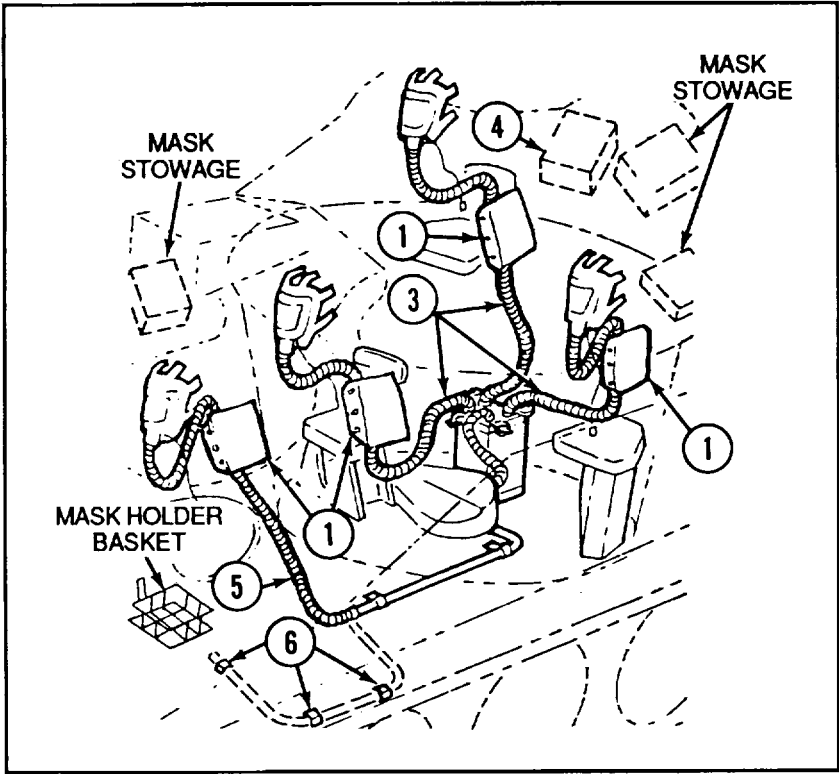
2-25. M8A3 GAS-PARTICULATE FILTER UNIT AND PROTECTIVE MASK M25/M25A1-Continued.

b. Operation of M8A3 Gas-Particulate Filter Unit.

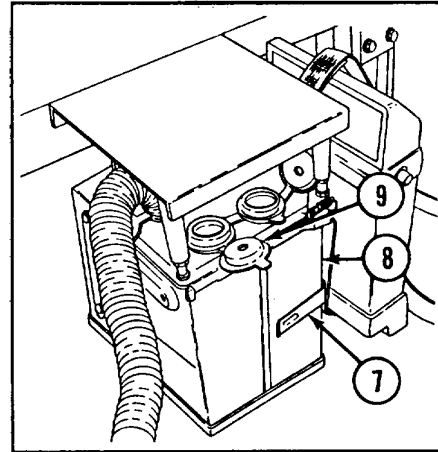
- (1) When a chemical-biological attack alarm is given, unstrap mask carrier (1) from stowed position and remove mask (2).
- (2) Don mask (2) and adjust headbands and facepiece in accordance with TM 34240-280-10.



- (3) Remove commander's, gunner's, and loader's air purifier-to-canister hoses (3) from stowage bag (4). Connect each hose to bottom fitting of each crewman's mask carrier (1).
- (4) Remove driver's hose (5) from spring clips (6) and connect to mask carrier (1).



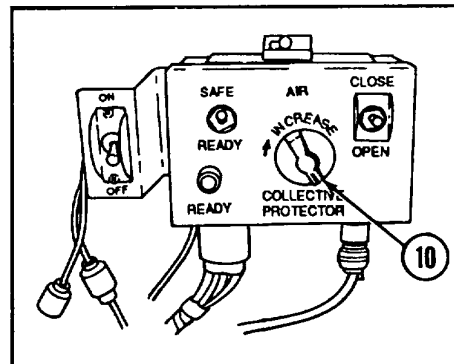
- (5) Slide spring clip (7) clear of air intake holes on air purifier (8).
- (6) Disconnect three caps (9) from filter unit and connect hoses.



NOTE

If filter unit is to be used by fewer than four crewmembers, cover unused outlet(s) with cap(s). When three outlets are used, cover fourth with cap without a center hole. When less than three outlets are used, cover one outlet with a cap without center hole and the other outlets with caps with center holes.

- (7) Tell driver to turn on vehicle MASTER SWITCH.
- (8) At loader's panel, turn AIR COLLECTIVE PROTECTOR control (10) full clockwise (on). This will turn on filter unit to maximum airflow. If airflow is uncomfortable for crew, adjust to comfort.



- (9) After operation, turn AIR COLLECTIVE PROTECTOR control (10) full counterclockwise (off).
- (10) Disconnect hoses and put solid caps (9) over open holes in air purifier. Slide spring clip (7) over caps.
- (11) Stow all masks and hoses.

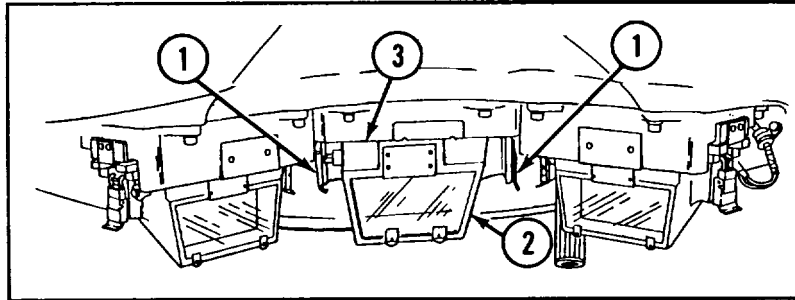
2-26. REMOVAL AND INSTALLATION OF PERISCOPES AND NIGHT VISION SIGHT.

a. Removal/Installation of M47 Periscope.

CAUTION

Vehicle MASTER SWITCH must be off for removal/Installation of periscope.

- (1) Unlatch catches (1) on both sides of periscope (2).
- (2) Remove M47 periscope (2) from mount by pulling straight down from hatch cover slot (3).



- (3) Install M47 periscope in reverse order of removal.

NOTE

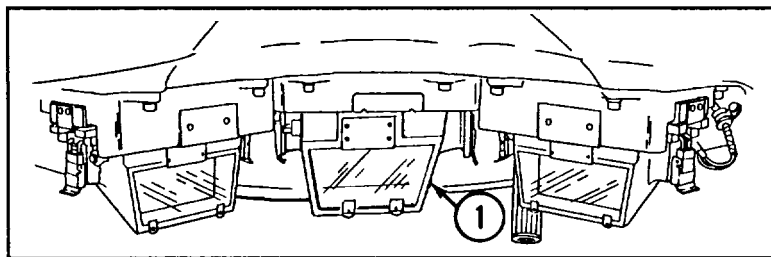
- Stowage box is used to stow M47/M48 periscope for M551NTC.
- Stowage box is used to stow M47/DNV AN/VVS-2(V)3 for M551A1.

b. Removal/Installation of M48 Periscope.

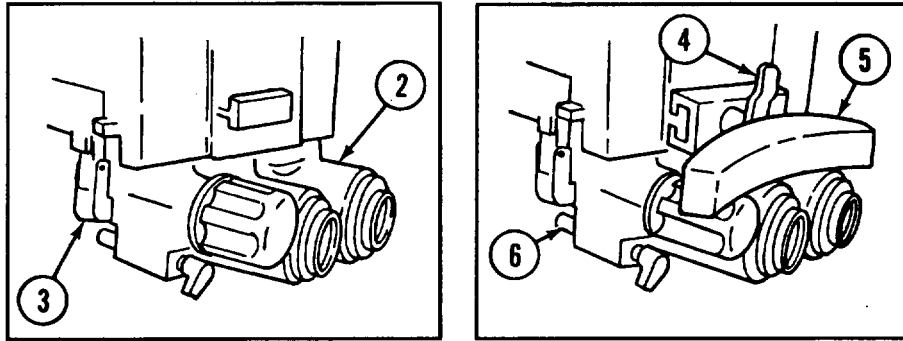
CAUTION

Vehicle MASTER SWITCH must be off for removal/Installation of periscope.

- (1) Remove M48 periscope from stowage box.
- (2) Remove M47 periscope (1) from mount.



- (3) Push M48 periscope (2) straight up into hatch cover slot until it is fully seated; latch side catches (3) to mount catches.
- (4) Pull out slide adjusting plunger (4) and install headrest (5).
- (5) Connect vehicle power supply cable to periscope plug (6).



- (6) Place M47 periscope in stowage box.
- (7) Remove M48 periscope in reverse order of installation.

NOTE

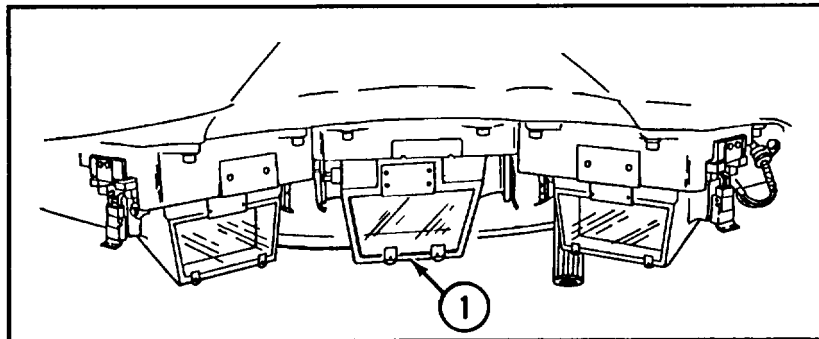
Stowage box is used to stow M47/M48 periscope for M551NTC.

c. Removal/Installation of DNV AN/VVS-2(V)3.

CAUTION

Vehicle **MASTER SWITCH** and **DNV switch** must be off for removal/installation of DNV.

- (1) Remove DNV from stowage box behind drivers seat.
- (2) Remove top and bottom of M47 periscope (1) from mount.

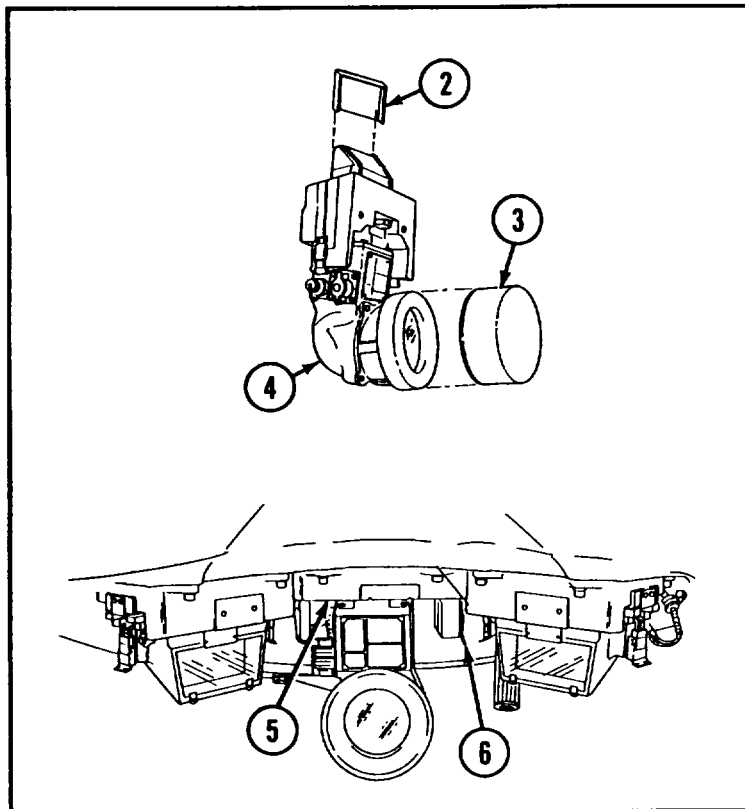


2-26. REMOVAL AND INSTALLATION OF PERISCOPES AND NIGHT VISION SIGHT-Continued.

CAUTION

Do not remove DNV protective covers during daylight or in a bright area at night. Image tube can be damaged from bright light entering viewer top even when off and without power.

- (3) Remove protective covers (2 and 3) from DNV (4).
- (4) Push DNV (4) straight up into hatch cover slot (5) until it is fully seated; latch side catches (6) to mount catches.
- (5) Connect vehicle power supply cable to periscope plug.



- (6) Place M47 periscope in stowage box.
- (7) Remove DNV in reverse order of installation.

NOTE

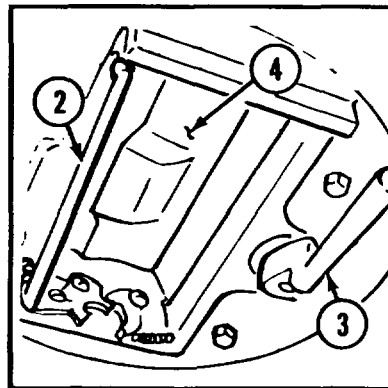
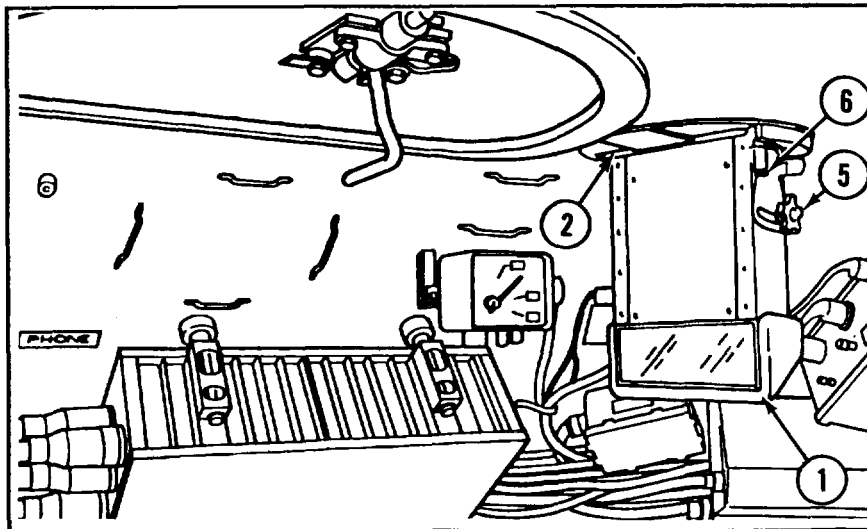
Stowage box is used to stow M47IDNV ANIVVS-2(V)3 for M551A1.

d. Removal/Installation of Loader's Periscope M37 (M551 A1).**(1) Removal:**

- (a) Hold base of periscope (1) with one hand and release latch (2) with other hand.
- (b) Stow periscope in bracket located on side of M8A3 gas-particulate filter unit.

(2) Installation:

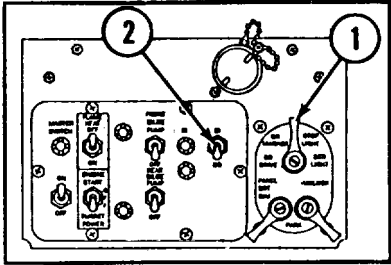
- (a) Turn locking lever (3) and push open door (4).
- (b) Place periscope in opening and push up until it locks.
- (c) Loosen knob (5) and turn adjusting screw (6) to tilt periscope for best viewing. Tighten knob (5).
- (d) To scan-view, just rotate periscope by hand.



2-27. OPERATION OF PERISCOPE AND NIGHT VISION SIGHTS.

a. Operation of M48 Periscope.

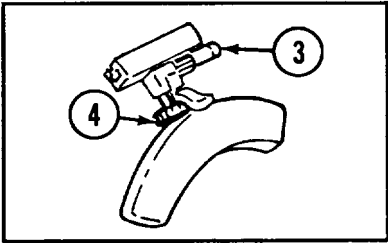
- (1) MASTER SWITCH must be on.
- (2) Place main light switch (1) in BO DRIVE. Push IR/BO switch (2) to IR.



CAUTION

Don't touch optics. Oil and acid from your fingers will etch; remove fingerprints with soft clean cloth (Appendix D, Item 23).

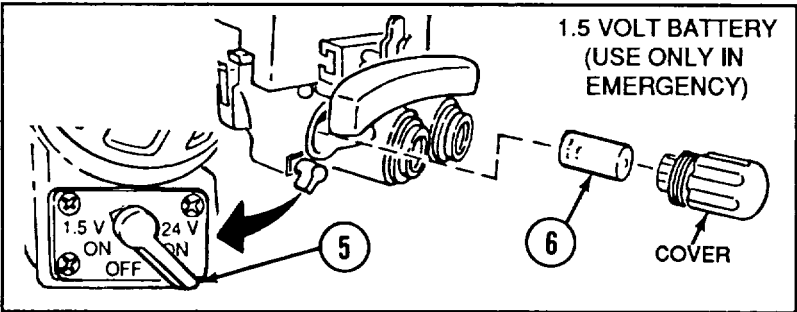
- (3) Adjust headrest with swivel knob (3) and linear adjusting knob (4).



NOTE

Store battery in periscope/DNV storage box when not in use. DO NOT store in M48 periscope: battery may leak and damage periscope. If battery power is used, dispose of battery in accordance with SB 11-30 after each operation. Normal battery life is 6 to 8 hours.

- (4) When using vehicle power, place infrared (IR) power switch (5) to 24 V ON. When using battery (6) power, place IR power switch (5) to 1.5 V ON.



b. Operation of DNV ANNVS-2(V)3 in Power Mode/Battery Mode (M551A1).

(1) Power Mode.

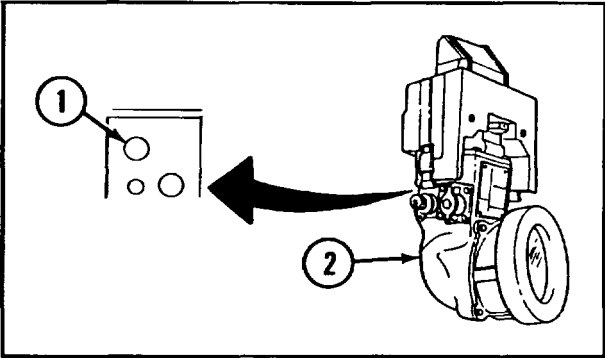
CAUTION

DO NOT Install vehicle power cable before battery is removed from DNV. Battery could leak and damage DNV.

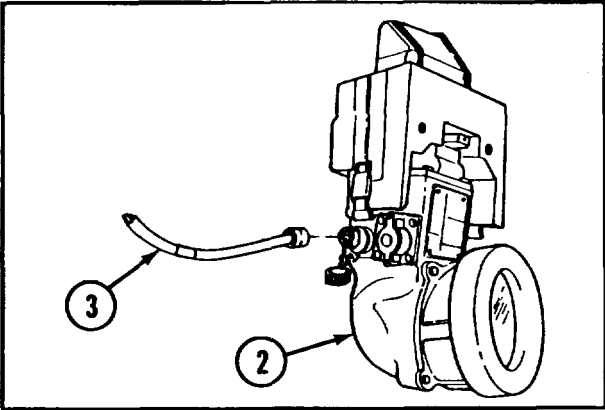
NOTE

- Store battery in periscope/DNV storage box when not in use. **DO NOT** store in DNV: battery may leak and damage DNV. If battery power is used, dispose of battery in accordance with SB 11-30 after each night's operation. Normal battery life is 6 to 8 hours.
- Make sure DNV power is turned off.

(a) Unscrew battery compartment cap (1) and check that battery is removed from DNV (2). Replace battery compartment cap (1).

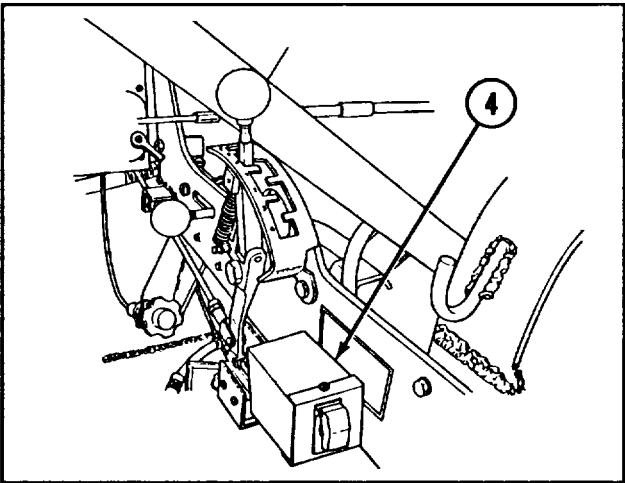


(b) Install vehicle power cable (3) on DNV (2).

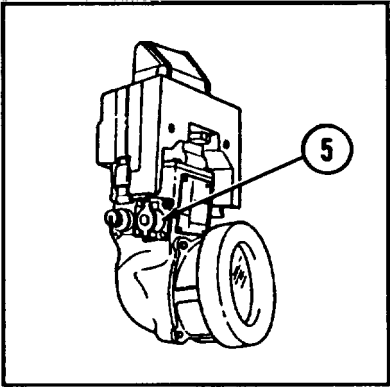


2-27. OPERATION OF PERISCOPE AND NIGHT VISION SIGHTS-Continued.

- (c) Turn vehicle MASTER SWITCH on.
- (d) Turn DNV power on at DNV switch box (4).



- (e) Turn off/bright rotary switch (5) to maximum bright position. Adjust brightness of DNV as required.



- (f) Position DNV by turning viewer by hand as required.
- (g) Turn off/bright rotary switch and DNV switch to off.
- (h) Turn off MASTER SWITCH.
- (i) Remove vehicle power cable from DNV.
- (j) Remove DNV, replace protective covers, and place in stowage box.

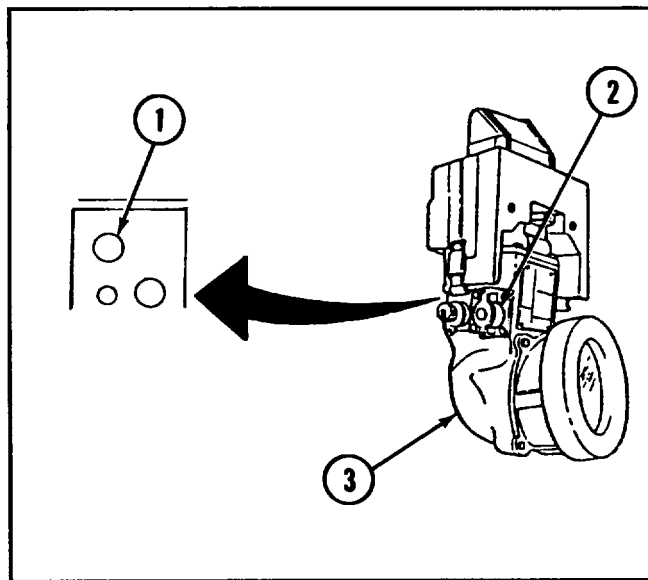
(2) Battery Mode.**CAUTION**

DO NOT Install battery before vehicle power cable is removed from DNV. Battery could explode and damage DNV.

NOTE

Be sure that MASTER SWITCH and DNV switch are off.

- (a) Unscrew battery compartment cap (1); install battery and replace cap.
- (b) Turn off/bright rotary switch (2) to maximum bright position.
- (c) To adjust brightness of DNV, look through lens and turn rotary switch (2) to desired brightness.
- (d) Turn DNV (3) by hand to desired position.
- (e) Turn off/bright rotary switch (2) to off.



2-27. OPERATION OF PERISCOPE AND NIGHT VISION SIGHTS-Continued.**NOTE**

Store battery in periscope/DNV stowage box when not in use. DO NOT store in DNV: battery may leak and damage DNV. If battery power is used, dispose of battery in accordance with SB 11-30 after each night's operation. Normal battery life is 6 to 8 hours.

(f) Remove DNV and battery. Stow DNV in periscope/DNV stowage box.

c. Crew Served Night Vision Sight AN/PVS-2 and AN/TVS-2. Two models of night vision sight, mounted on cal .50 machine gun, are presently used. Refer to following instructions for installation and use of these sights:

(1) For AN/PVS-2, refer to TM 11-5855-203-10.

(2) For AN/TVS-2, refer to TM 11-5855-202-13.

2-28. COMMUNICATION SYSTEMS.**a. Equipment Location and Configuration.**

(1) Vehicle radio set AN/VRC-12, shown in following illustration, consists of: * Audio frequency amplifier AM-178ONRC (1).

- Crewmember control boxes C-2298NRC (2).
- Driver's control box C-2297NRC (3).
- Control box C-2296/VRC (4) (located behind left taillight of vehicle).
- Radio receiver R-442 (*)/VRC (5).
- RT-246(*)NRC (6).
- MT-1029/VRC mounting (7).
- MT-1898/VRC mounting (8).

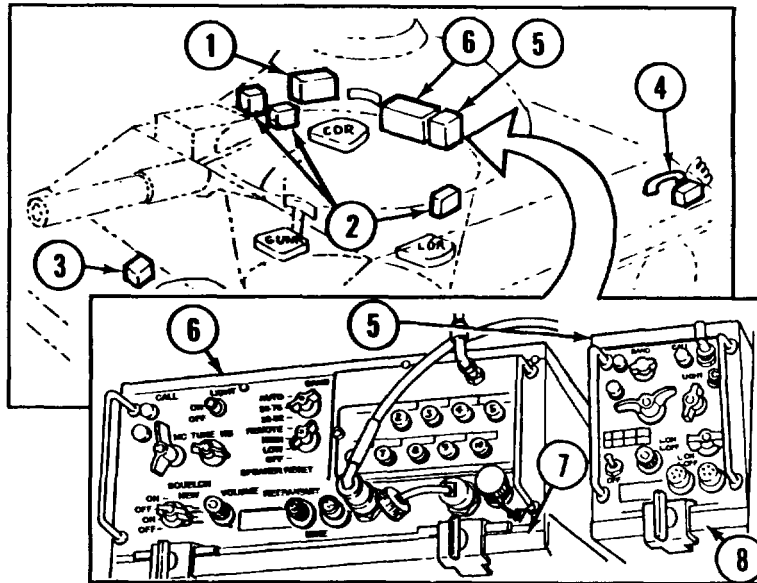
The following are not shown:

- Antenna AS-1729NRC.
- Transient electrical suppressor MX-7778(*)NRC.

- Frequency selector control C-2742NRC.

NOTE

The (*) In nomenclature number covers all models of the unit.



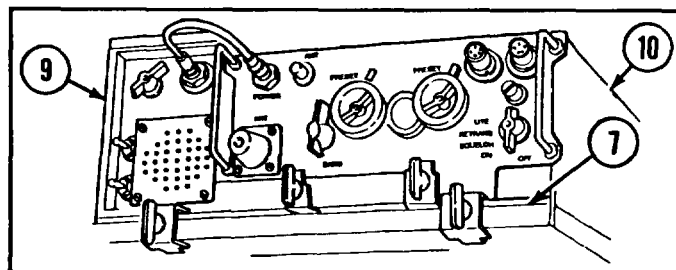
(2) Vehicle radio set ANNRC-64, shown below, consists of:

- Items (1) through (4) in paragraph 2-28,a,1.
- MT-1029NRC mounting (7).

NOTE

Radio set ANIVRC-64 can only monitor one frequency at a time. However, MT-1898/ VRC Is provided for Installation of an auxiliary receiver.

- Amplifier-power supply AM-2060/GRC (P/O OA-3633/GRC) (9).
- Radio, receiver transmitter RT-841/PRC-77 (P/O AN/VRC-64 radio set) (10).



2-28. COMMUNICATION SYSTEMS-Continued.

The following are not shown:

- Antenna AS-1729NRC.
- Transient electrical suppressor MX-7778(*)VRC.

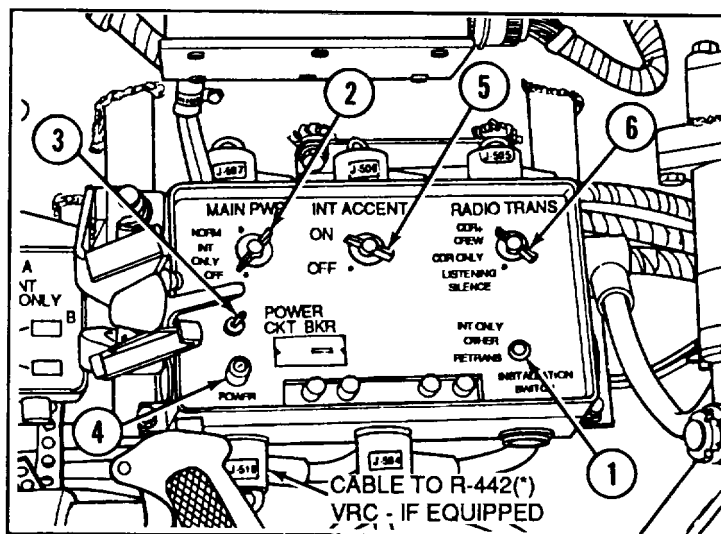
b. Communication Equipment Operation.

(1) Vehicle Intercom System ANNIC-1(V) Operation. The AM1780/VRC is master control for your radio and intercom systems. Nothing functions until both vehicle MASTER SWITCH and AM-1780NRC are turned on. Check INSTALLATION SWITCH (1); it should always be at OTHER.

CAUTION

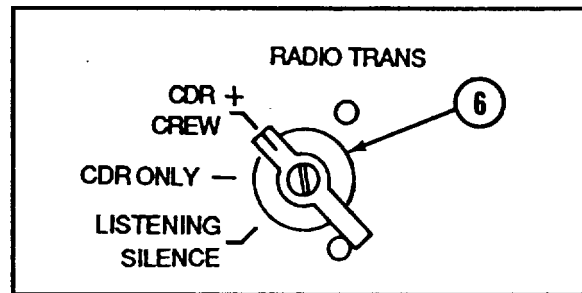
Before starting vehicle engine, make certain the MAIN PWR switch (2) is off. The initial start of the engine could damage the AM1 780/VRC.

- (a) Intercom Only Function. With vehicle power on, set MAIN PWR switch (2) to INT ONLY and POWER CKT BKR switch (3) to ON. POWER lamp (4) should light.
- (b) Radio and Intercom Function.
 1. With vehicle power on, set MAIN PWR switch (2) to NORM and POWER CKT BKR switch (3) to ON.



2. Turn on receiver-transmitter. POWER lamp (4) should light.

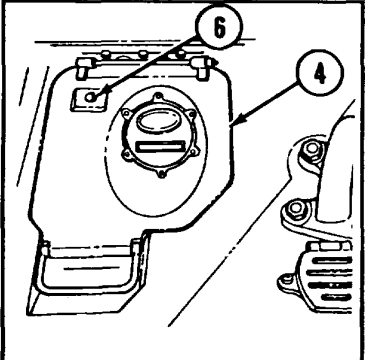
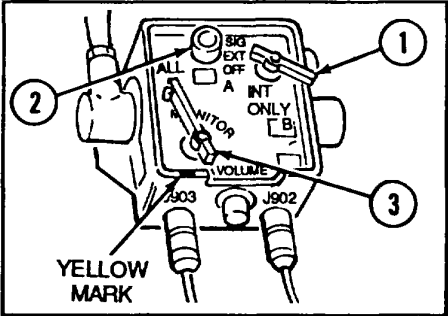
3. You will now pick up both radio and intercom signals. To make intercom signals louder, set INT ACCENT switch (5) to ON (at OFF, both signals are the same).
4. Set RADIO TRANS switch (6) to one of the following three settings:
 CDR + CREW: everyone can transmit on receiver-transmitter.
 CDR ONLY: only commander can transmit.
 LISTENING SILENCE: nobody can transmit, but everyone still receives.



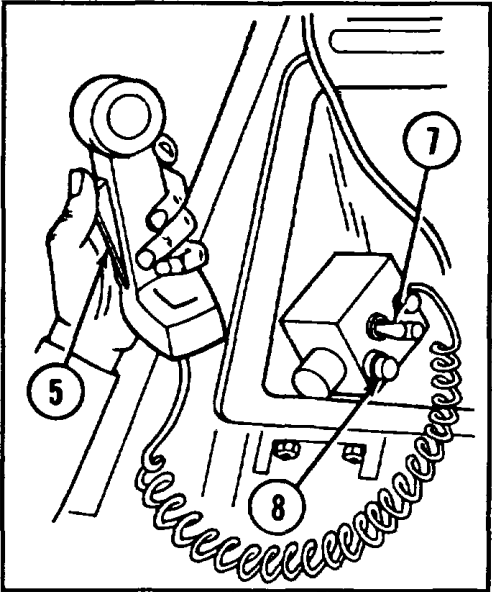
5. To turn off, set MAIN PWR (2) and POWER CKT BKR (3) switches to OFF. This also turns off radios.
- (2) Drivers Control Box C-2P97NRC Operation. Driver's control box operates in same manner as does C-2298NRC crewmember's control box (see paragraph 2-28,b,8), except that driver has added responsibility of allowing personnel outside of vehicle to communicate with crewmembers and operate radio using control box C-2296NRC (located behind left taillight of vehicle).
 - (3) External Control Box C-2296/VRC Operation. To use C-2296(VRC outside of vehicle, proceed as follows:
 - (a) Signal crewmember at C-2296NRC by turning signal switch (1) to SIG several times; each time, call lamp should light. Your signal lamp (2) also lights.
 - (b) To talk to person outside vehicle, set signal switch (1) to EXT [signal lamp (2) remains lighted], MONITOR switch (3) to INT ONLY, and helmet switch rearward.
 - (c) When signal lamp (2) lights, someone outside vehicle at C-2296NRC is calling. Establish contact as in previous step.

2-28. COMMUNICATION SYSTEMS-Continued.

(d) To call driver inside, open cover (4), take out handset, and press handset switch (5) once. Driver's signal lamp should light and stay lit until driver answers. Press switch (5) to talk; release to listen.



(e) When call lamp (6) flashes, driver is trying to attract attention of person outside vehicle. To answer, open cover (4) and take out handset. Press handset switch (5) to talk; release to listen.



- (f) To use receiver-transmitter, ask driver to set his MONITOR switch to A or ALL. When that is done, hold control switch (7) in RAD TRANS position. When transmitting, press handset switch (5); release both switches to listen.
- (g) Adjust VOLUME knob (8) as desired.
- (4) Radio Set AN/VRC-I2 Operation.

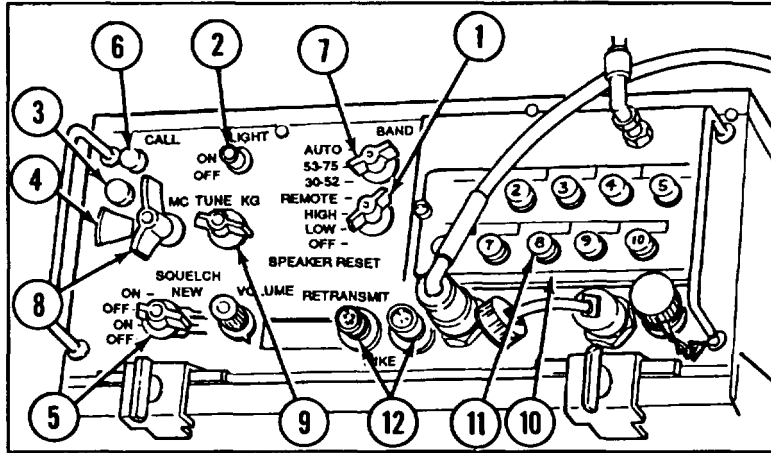
NOTE

For full-range radio communication, do not tie down the whip antenna (AS-1729/VRC), even when the vehicle is in motion.

- (a) AM-1780/VRC must be on with MAIN PWR switch at NORM.
- (b) Receiver-transmitter RT-246(*) VRC.
 1. Set power switch (1) to LOW; set LIGHT switch (2) to ON. Lamp (3) lights in dial window (4). Set SQUELCH switch (5) to NEW OFF. If you can't contact the other radio station, set power switch (1) to HIGH.
 2. For noise-free operation, set SQUELCH switch (5) to NEW ON. CALL lamp (6) lights when signal comes in.
 3. For manual operation, set BAND switch (7) to that span of frequency (A or B) that includes your assigned frequency. Turn megahertz channel (MC) (8) and kilohertz channel (KC) (9) knobs until you get your frequency in dial window.
 4. For pushbutton operation, first preset your frequencies by opening door (10) and following instructions inside. To use pushbuttons (11), set BAND switch (7) to AUTO and press button you want. Check your dial window (4)-your frequency should show up within 5 seconds.
 5. For remote operation (if issued), set up pushbutton as in step (4) above and set power switch to AUTO. Use one or the other C-2742/VRC frequency selector controls (located above TC and loader's C-2298/ VRCS) to control radio. This is accomplished by pushing toggle switch on left side of box. Amber lamp lights indicating control (lamp on other C-2742NRC goes out). To control radio output power, set C-2742/ VRC PWR switch to LO (or to Hi if you can't reach the other radio station). Set C-2742/VRC CHAN SEL switch to desired radio channel: counterclockwise position one corresponds to pushbutton one, position two to pushbutton two.

2-28. COMMUNICATION SYSTEMS-Continued.

6. To communicate on RT-246(*) VRC, use combat vehicle crewmember (CVC) helmet connected to control boxes (see paragraph 2-28,b,8). If you can't operate radio from any control box, connect shorter cord connector of CVC helmet (longer cord has a yellow band) to either MIKE receptacle (12).

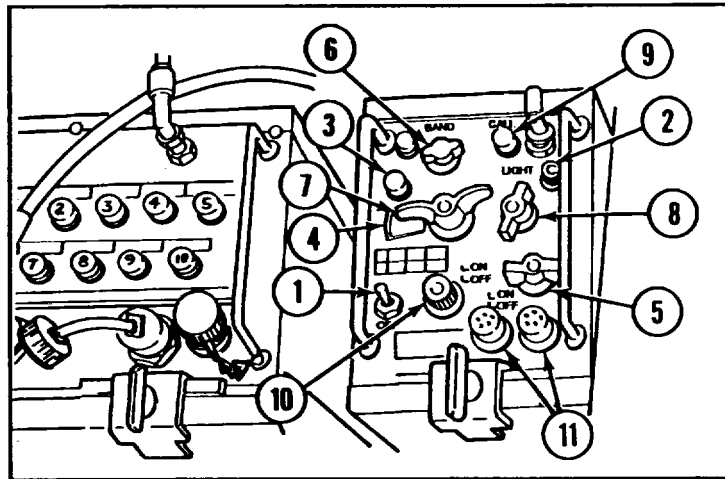


- (c) Receiver R-442(*)/VRC Operation.

NOTE

For full-distance communication, do not tie down the receiver antenna (AS-i729IVRC), even when the vehicle is in motion.

1. Set POWER switch (1) to ON-RESET; set LIGHT switch (2) to ON. Lamp (3) lights in dial window (4). Set SQUELCH switch (5) to NEW OFF.
2. To set or change frequencies, set BAND switch (6) to that span of frequency (A or B) that includes your assigned frequency. Then turn your MC (7) and KC (8) knobs until you get your frequency in dial window.
3. To eliminate rushing noise, set SQUELCH switch (5) to NEW ON. When signal comes in, CALL lamp (9) lights.
4. Turn VOLUME knob (10) to maximum (clockwise).
5. To listen to signals from R-442(*)/VRC, use CVC helmet connected to control boxes (see paragraph 2-28,b,8). If you can't hear receiver from any control box, connect shorter cord connector (longer cord has a yellow band) to either AUDIO receptacle (11).



6. To turn everything off, set AM-178ONRC MAIN PWR switch to OFF and set MX-7778/VRC circuit breaker to OFF.

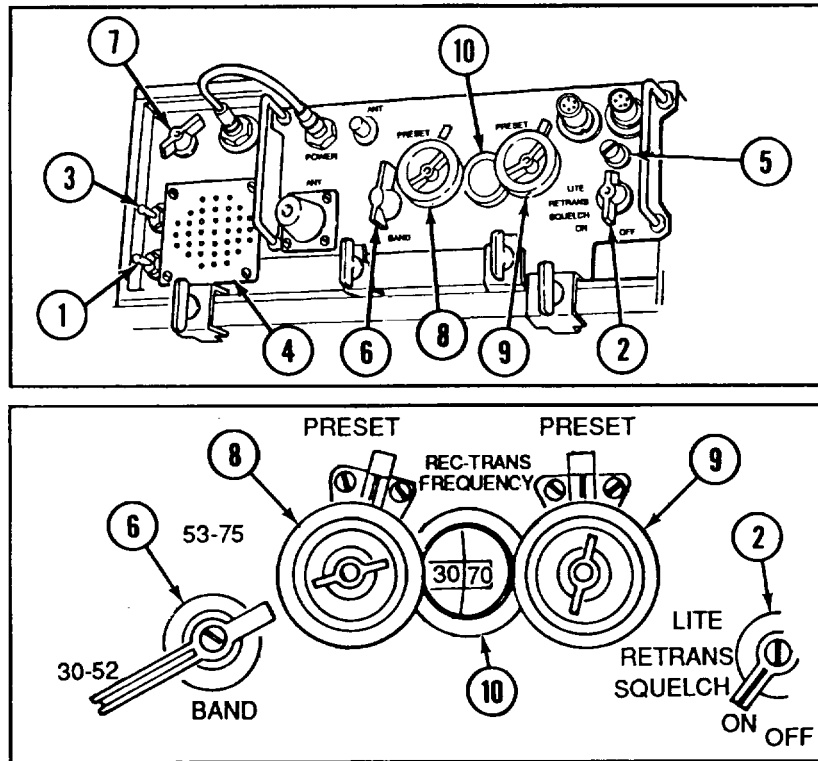
(5) Radio Set ANNVRC-64 Operation.

NOTE

For full-distance communication, do not tie down the receiver-transmitter antenna, even when the vehicle is in motion.

- (a) On the AM-178ONRC, MAIN PWR switch must be at NORM.
- (b) Set PWR switch (1) and function switch (2) to ON. For noise-free operation, set function switch (2) to SQUELCH.
- (c) Set SPKR switch (3) to OFF. If you're having helmet earphone problems, set SPKR switch (3) to ON and hear incoming calls on loudspeaker (4).
- (d) Turn VOLUME control (5) to maximum (clockwise).
- (e) To set or change frequencies:
 1. Set BAND switch (6) to that span of frequency (30 to 52 or 53 to 75) that includes your assigned frequency. Set ANT FREQ CONTROL (7) to click stop between frequencies containing your assigned frequency.
 2. Turn MC (8) and KC (9) knobs until you get your frequency in dial window (10). To light your dial window, push up function switch (2) to LITE.

2-28. COMMUNICATION SYSTEMS - CONTINUED.



- (f) To communicate on radio, use CVC helmet connected to control boxes (see paragraph 2-28,b,8). If you can't operate radio from any control box, connect shorter cord connector of CVC helmet (longer cord has a yellow band) to either AUDIO receptacle.
- (g) To turn everything off, set AM-1780/VRC MAIN PWR switch to OFF and MX-7778/VRC circuit breaker to OFF.
- (6) Intercom Only Operation. With vehicle power on and MX7778/VRC PWR switch in ON position, set MAIN PWR switch (1) to INT ONLY and PWR CKT BKR switch (2) to ON. POWER lamp (3) should light [under this situation, radio(s) is (are) turned off].
- (7) Radio and Intercom Operation.
 - (a) With vehicle power on and MX-7778NRC PWR switch on, set MAIN PWR switch (1) to NORM and POWER CKT BKR switch (2) to ON.

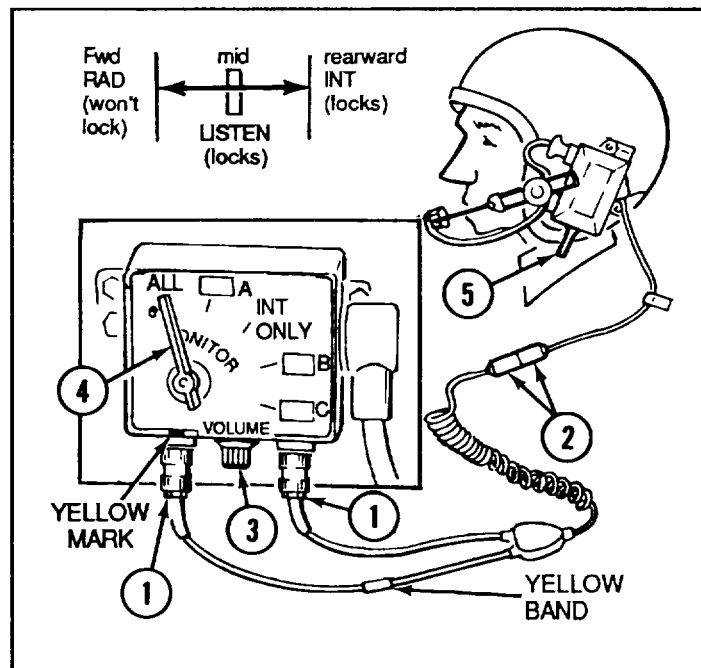
NOTE

With the AN/VRC-64, turn on the AM-2060/VRC.

2-28. COMMUNICATION SYSTEMS-Continued.

- (a) Connect CVC helmet cable connectors (1) to control box receptacles. Cable with yellow band (longer cable) connects to receptacle with yellow mark.
- (b) Check if bail-out connectors (2) are snapped in place.
- (c) During operation, adjust VOLUME knob (3) for best reception.
- (d) To use radio:
 1. Set MONITOR switch (4) to A or ALL. To talk on receiver-transmitter, push helmet switch (5) forward and talk into mike; release switch to listen. Leave in midposition to listen for radio and intercom signals.

Positions of CVC Helmet Switch (5)



NOTE

When MONITOR switch (4) is in ALL position, all signals (receiver-transmitter, receiver, and intercom) can be heard simultaneously.

2. To listen to radio receiver (when one is provided), set MONITOR switch (4) to B and helmet switch (5) to mid-position.

NOTE

When a crewmember, except the commander, is talking on the radio and another crew-member starts to talk on the Intercom, the radio connection is broken.

- (e) To use intercom, with MONITOR switch (4) at A, ALL, or INT ONLY, talk to other crewmembers by pushing helm switch (5) rearward. Set to mid-position when completed.

2-29. OPERATION OF FIRE EXTINGUISHERS.

a. Operation of Portable Fire Extinguisher.

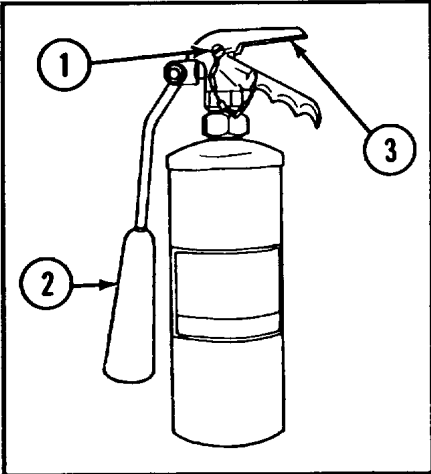
WARNING

Do not breathe smoke.

NOTE

The fire extinguisher is mounted in the turret.

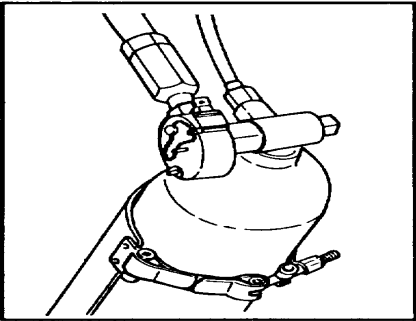
- (1) Pull ring pin (1).
- (2) Point horn (2) at base of fire.
- (3) Depress trigger (3) for discharge.
- (4) Keep base of flames covered.
- (5) After operation, see unit maintenance for refill.



b. Operation of Engine and Crew Compartment

WARNING

- Do not breathe smoke.
- Crew must evacuate vehicle after extinguishers are set off.
- Engine must be stopped for extinguisher agent to be effective.

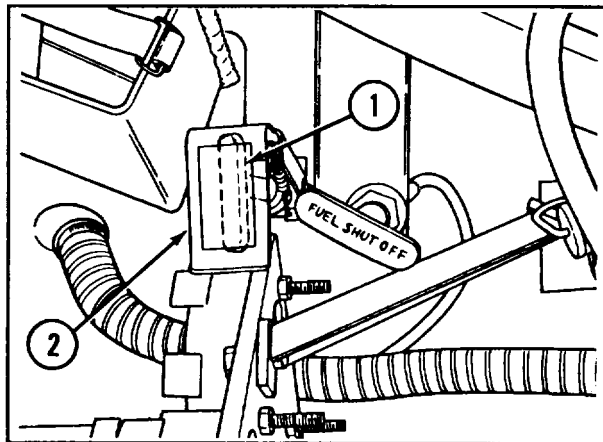


2-29. OPERATION OF FIRE EXTINGUISHERS-Continued.

NOTE

Driver's actuating handle (1) sets off both the engine and crew compartment fire extinguishers, and automatically shuts off fuel to the engine.

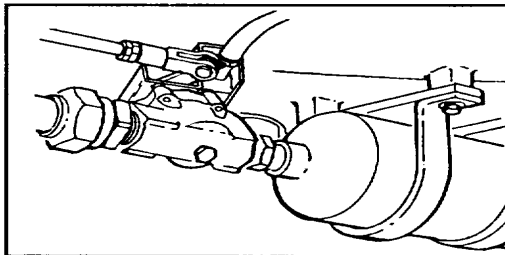
- (1) Before pulling handle (1), tell turret crew to exit vehicle.
- (2) Place MASTER SWITCH in OFF position. Pull FUEL SHUT OFF control handle to kill engine. Lift shield (2) and pull handle (1). Get out of vehicle and follow turret crew.
- (3) After operation, contact unit maintenance for refill.



c. Operation of Crew Compartment Fire extinguisher.

WARNING

- Do not breathe smoke.
- Crew must not remain in vehicle after extinguisher is set off.

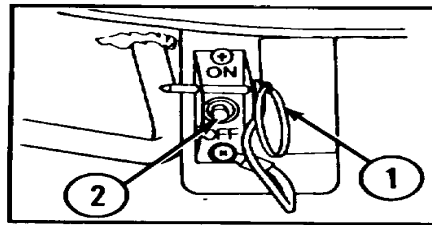
**CAUTION**

This extinguisher is to be used only to put out crew compartment fires.

- (1) Extinguisher is set off at commanders station.
- (2) Tell turret crew to get out of vehicle. Traverse gun 90 mils left or right to clear driver's hatch.

(3) Tell driver to pull FUEL SHUT OFF control handle to kill engine, and turn off MASTER SWITCH.

(4) Pull out safety ring pin (1) and push up on switch (2). Driver and commander must get out of and away from vehicle.



Commander's Switch In Turret

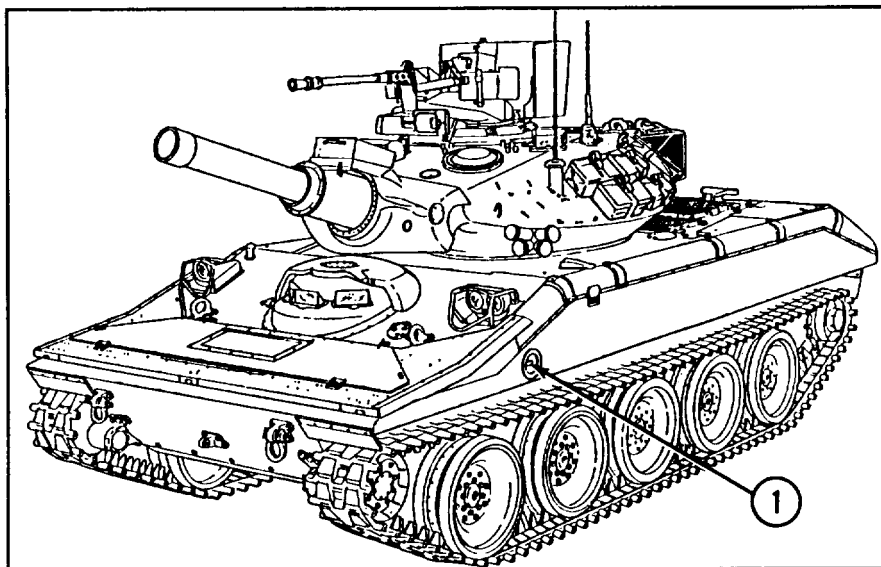
(5) After operation, see unit maintenance for refill and maintenance.

d. Operation of Exterior Actuating Handle for Crew and Engine Compartment Fire Extinguishers.

CAUTION

Exterior actuating handle (1) sets off both crew and engine compartment fire extinguishers, but does not shut off fuel to the engine.

- (1) Get crew out of vehicle and stand clear.
- (2) Pull handle (1).
- (3) Move away from vehicle.
- (4) After operation, see unit maintenance for refills and maintenance.



Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-30. UNUSUAL ENVIRONMENT/WEATHER.

a. **Cold Weather Starting.** Refer to FM 9-207, Operation and Maintenance of Ordnance Materiel in Cold Weather (0 Degrees F to Minus 65 Degrees F).

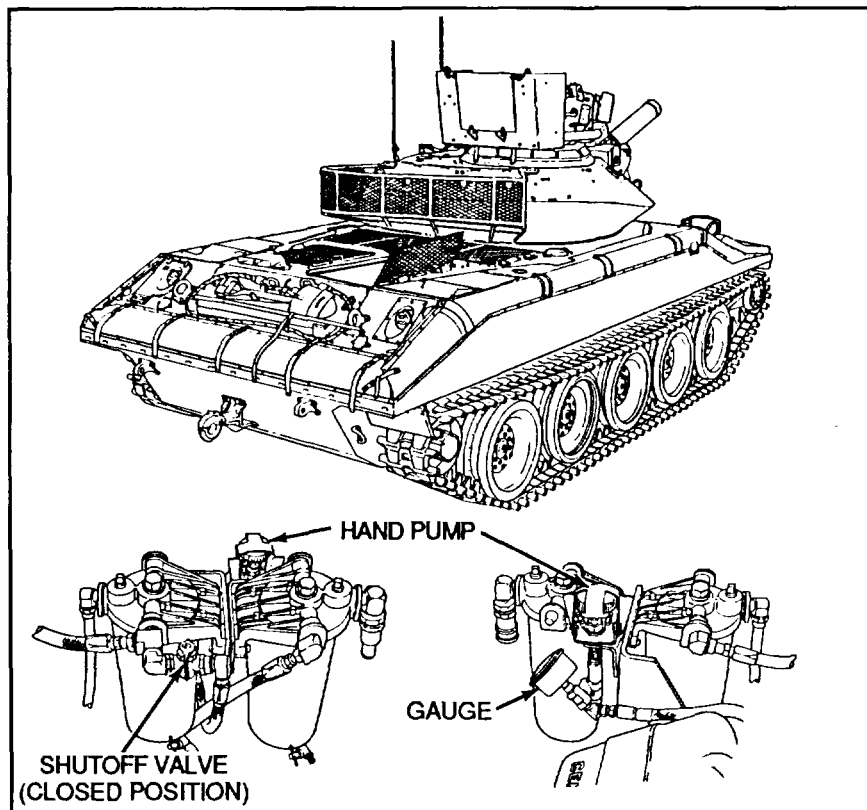
NOTE

Steps marked with an asterisk (*) are applicable only to vehicles with hand pump lock and air box flame heater fuel shutoff valve. All other steps are applicable to all vehicles.

(1) Preparation for Starting.

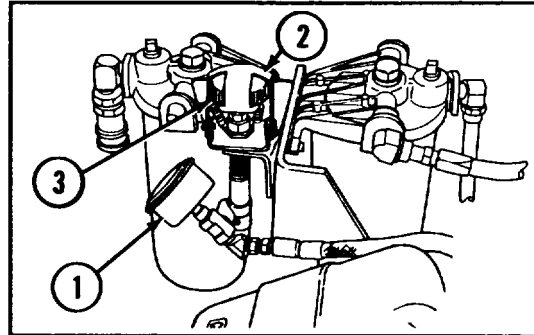
(a) Traverse turret to side and open engine compartment right exhaust grille.

* (b) Open air box flame heater fuel shutoff valve.



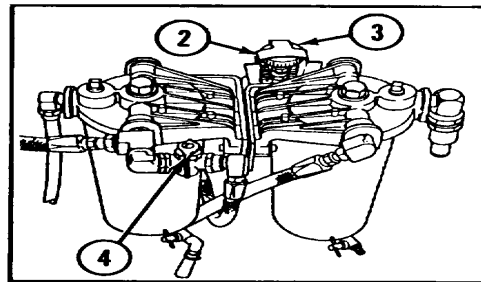
- (c) Check pressure gauge (1). Pressure indicator should be in cold start area of gauge. If not, use accumulator hand pump to increase pressure as follows:

- *1. Release accumulator hand pump lock (2).
- 2. Turn pump handle (3) to release from detent. Pump to increase pressure.



- (d) After attaining required pressure, rotate pump handle (3) to engage detent.

- * (e) Secure hand pump lock (2) and close fuel shutoff valve (4).



- (f) Close engine compartment grille.

(2) Starting.

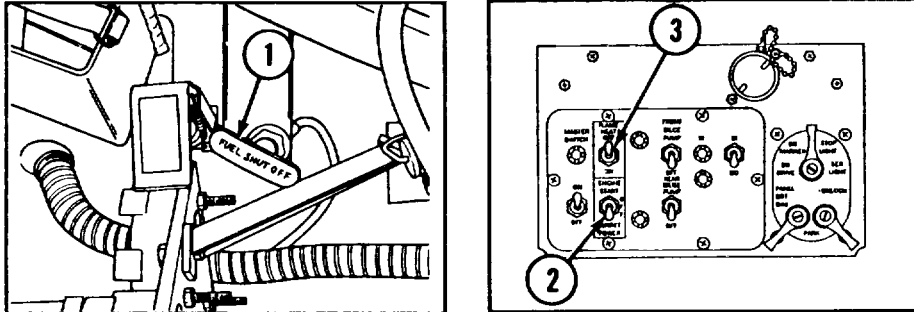
- (a) Shift to N. Depress service brake pedal and pull out and up on parking BRAKE LOCK handle to set brake. Move WATER/LAND steer shift control to LAND.
- (b) Turn vehicle MASTER SWITCH on.
- (c) Press SPEED/RPM switch to RPM (M551NTC).

NOTE

If coolant heater has been operating, you can skip step d on next page.

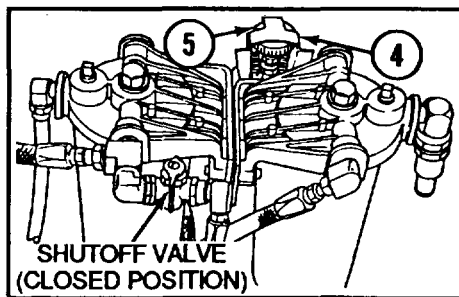
2-30. UNUSUAL ENVIRONMENT/WEATHER-Continued.

- (d) Pull out FUEL SHUT OFF control knob (1). Hold ENGINE START/TURRET POWER switch (2) in ENGINE START position and FLAME HEAT switch (3) in ON position for 15 to 20 seconds.
- (e) Push in FUEL SHUT OFF knob (1) and continue to hold ENGINE START/TURRET POWER switch (2) in ENGINE START position. Cycle FLAME HEAT switch (3) ON and OFF one or two times per second. Pause 2 seconds in OFF position every 7 to 10 seconds until engine reaches low idle. After reaching low idle, depress accelerator halfway and release ENGINE START/TURRET POWER switch (2).

**NOTE**

- If engine does not start firing after 40 seconds of cranking or If the Indication of cylinder firing ceases for a period of over 10 seconds, stop cranking.
 - Check pressure gauge for proper operation.
 - If a malfunction is evident, use troubleshooting procedure (see Chapter 3, Section 11) to determine the cause.
- (f) With brakes locked, shift into 4th and continue running engine at fast idle until ENG COOLANT gauge indicates 120 to 140 -. If TRANSMISSION TEMP warning light comes on, shift to N and idle engine at fast idle until light goes out.
- *(g) Open right exhaust grille and close flame heater fuel shutoff valve. Close grille.

- (h) When through with vehicle for the day, open right exhaust grille and recharge accumulator as follows:
- *1. Open flame heater shutoff valve.
 - *2. Unlock hand pump lock (4).
 3. Release pump handle (5) from detent.
 4. Run engine in neutral at fast idle until no further increase in pressure is apparent on accumulator pressure gauge.
 5. Return pump handle (5) to detent position.
 - *6. Secure hand pump lock (4).
 - *7. Close flame heater shutoff valve.



8. Close exhaust grille.

b. Extreme Hot and Cold Weather Operation.

- (1) Continuously observe engine and transmission warning lights and coolant temperature gauge for indications of incorrect operation.
- (2) In cold weather, avoid exhaling on optical surfaces to prevent deposits of condensation (which may freeze).

WARNING

Frostbite to the cheekbone area of the face may be experienced by wearers of the U25/ M25A 1 protective mask from sub-freezing air delivered by the M8A3 gas-particulate filter unit. DO NOT connect the protective mask to the filter unit under sub-freezing conditions.

- c. Operation of Winterization Kit Coolant Heater.** Coolant heater is used to raise temperature of engine oil, engine coolant, and battery electrolyte when engine is shut down in ambient temperatures of -25OF and below.

2-30. UNUSUAL ENVIRONMENT/WEATHER-Continued.

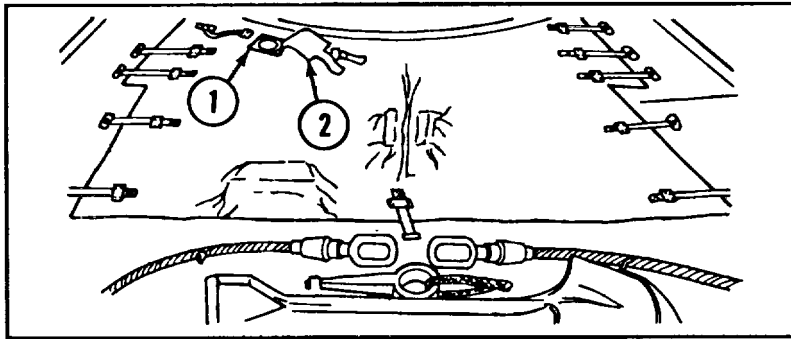
WARNING

Turret must be positioned so that all grenade launchers are clear of the heater exhaust outlet (1).

NOTE

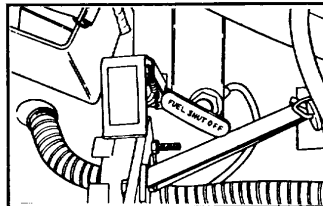
- On a cold-soaked vehicle, operate the heater for 3 to 5 hours before attempting to start the engine.
- Don't operate any other electrical equipment while using the heater.

(1) Fold back and secure flap (2) on forward left corner of grille cover to uncover heater exhaust outlet (1).



(2) To lessen battery drain, make sure vehicle MASTER SWITCH is off.

(3) Be sure FUEL SHUT OFF valve on center fuel tank is open.

**NOTE**

Coolant heater control box is located next to auxiliary power receptacle.

- (4) Depress indicator lamp (3) to check lamp. If lamp does not light, replace it. If new lamp doesn't light, notify unit maintenance.
- (5) Place heat selector switch (4) in LOW position.

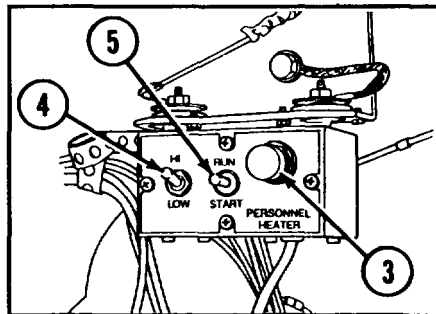
CAUTION

When trying to start the coolant heater, do not hold the heat control switch (5) at START for more than 2 minutes at a time.

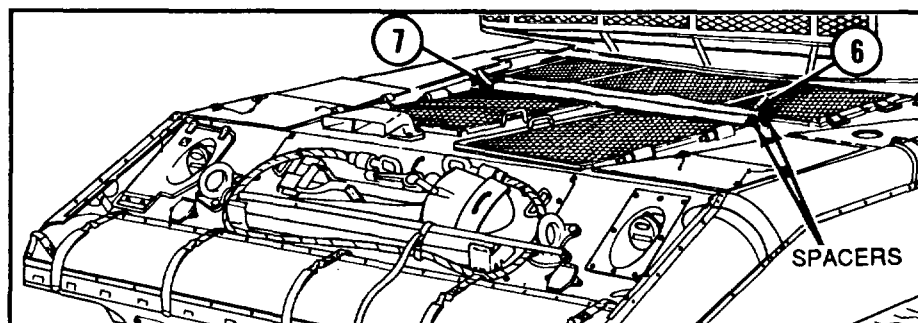
- (6) Hold heat control switch (5) in START position until indicator lamp (3) lights (1 to 2 minutes). Coolant heater has started.
- (7) If indicator lamp (3) does not light within 2 minutes, turn control switch (5) to OFF. Wait 5 minutes and repeat preceding step 6. If lamp does not light after third attempt, turn control switch to OFF and notify unit maintenance.
- (8) Move heat control switch (5) to RUN.
- (9) Ten minutes after indicator lamp (3) has lit, place heat selector switch (4) in Hi position.

NOTE

Heat selector switch (4) should remain at HI. The heater thermostat will automatically switch the heater from high to low heat, maintaining proper system temperature.



- (10) Unfasten two or four straps on engine intake grille cover (6). Roll cover to form smallest possible tube. Secure straps onto unused spacers at forward end of exhaust grille.
- (11) Unfasten three or five straps on exhaust grilles cover (7) and roll cover into smallest possible tube form. Secure straps onto spacers at rear end of intake grille.



2-30. UNUSUAL ENVIRONMENT/WEATHER-Continued.**NOTE**

Remove grille covers for prolonged engine operation or during firing of gun/launcher.

- (12) Move heat control switch to OFF. Indicator lamp will stay on and blower will continue to run for 2 or 3 minutes until combustion chamber has been purged. (MASTER SWITCH must be on.)
- (13) Start vehicle engine.

NOTE

Do not operate coolant heater when engine is running.

- (14) After vehicle operation, shut down engine and re-cover grilles.

d. Gun/Launcher Dust Shield. In warm temperatures where excessive moisture is evident, remove dust shield weekly. Dry all affected parts and check exposed portion of recoil mechanism sleeve for corrosion and rust.

e. Missile Tracker (M551A1). Temperature changes of 30OF or more can cause tracker to change alignment. If this occurs, realign tracker using checksight lamp alignment test (see paragraph 218,a,6).

f. Snowy Conditions-Missile Launching (M551A1). If you've got over 1/4 inch of snow on front of vehicle, sweep it off before firing. Launching a missile from a snow-covered vehicle blows snow back on tracker. This weakens guidance signals and could completely black them out. Also, snow will cover up optics.

g. Shillelagh Missiles (M551A1). Firing temperature limits are -25 to +1450F.

h. LRF AN/VVG-1 (M551A1).

(1) Cold Weather. When LRF is initially set up, check optical surfaces and test all mechanical devices for proper operation. Ice may have formed on optical surfaces, rotating mechanisms, and the like, and may be sufficient to hamper lasing operations. Make sure that snow or ice does not collect at receiver-transmitter unit. In addition, receiver-transmitter eyepiece may tend to fog during extended tracking operations (especially if a face mask is not worn) and may require cleaning. LRF operation may deteriorate if the ambient temperature is lower than -40°F. At temperatures below -25°F, system battery will not charge. In this case, a MALF 0001 indication will be detected. This does not indicate an equipment mal-

function. LRF will operate correctly if external power is adequate. When LRF is used to range on a target under these conditions, MALF 0001 indication will be replaced by actual target range. Upon resetting LRF, MALF 0001 will reappear.

- (2) Hot Weather. Operation of LRF may deteriorate if ambient temperature is higher than +125°F.
- (3) High Humidity. LRF is designed to operate properly regardless of humidity conditions. The only requirement is that target must be visible through telescope sight.
- (4) Altitude. LRF is designed to operate in atmospheric pressures equivalent to atmospheric pressure between sea level and 10,000 feet above sea level.
- (5) Low Auxiliary Battery. Low battery LOW light may remain lit. In this case, have unit maintenance replace auxiliary power supply unit (A78).

i. 7.62-mm (M551A1) and Cal .50 Machine Guns.

- (1) In Extreme Cold. To keep your machine guns operating in extreme cold, do the following:
 - (a) Keep all moving parts free of moisture. Before firing in subzero temperatures (if you've got time), disassemble, clean all parts, and lubricate (sparingly).
 - (b) Frequently hand-operate machine guns.
 - (c) After firing, clean and lubricate.
 - (d) Keep cal .50 machine gun covered when not in operation.
 - (e) If vehicle (or dismounted machine gun) is brought indoors, let guns reach room temperature-then disassemble, clean all parts, and lubricate.
- (2) In Hot, Dry, Humid, and Salty Climates. Because of thinning out effect these climates have on lubricants, you'll have to service your machine guns more frequently. Check unexposed parts and exposed surfaces for freedom from moisture then clean and lubricate.
- (3) In Dusty or Sandy Areas. Dust and sand can jam machine guns. To keep them operating, do the following:
 - (a) Inspect machine guns daily and clean as necessary.

2-30. UNUSUAL ENVIRONMENT/WEATHER-Continued.

- (b) Wipe lubricants from exposed and non-critical operating surfaces. This will prevent sand from sticking to lubricant and forming an abrasive.
 - (c) Immediately after use, clean machine guns.
 - (d) After handling, wipe machine guns with a dry rag (Appendix D, item 23) to remove any perspiration.
 - (e) Cover equipment as much as possible.
- (4) After Exposure to Water. If your machine gun is drenched or submerged in water, turn it in to unit maintenance for complete disassembly, cleaning, and lubrication.

j. Radio and Intercom Equipment.

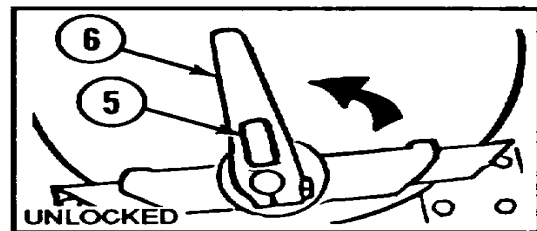
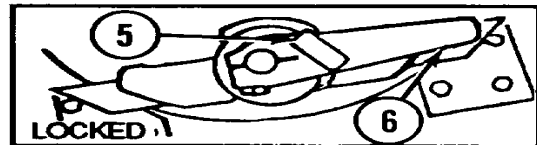
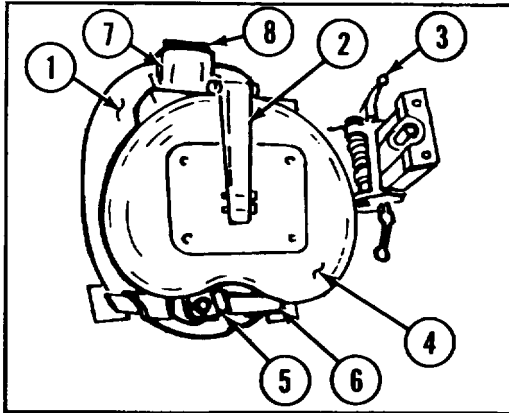
- (1) At Low Temperatures. To get maximum performance out of radio and intercom equipment, do the following:
- (a) Keep front panel controls free of ice-iced controls can prevent control shafts from turning.
 - (b) On receiver-transmitters, keep blower air intake and exhaust ports free of ice.
 - (c) Keep antenna(s) free of ice-iced antenna(s) cuts down receiver-transmitting capabilities.
 - (d) Be careful with cables. Cold weather makes them brittle and cables could break.
- (2) In Desert and Dusty Climates. Keep equipment as clean as possible. Keep receiver-transmitter blower air intake and exhaust ports free of sand and dust.

2-31. EMERGENCY PROCEDURES. These procedures provide instructions to follow to meet emergency operating conditions.

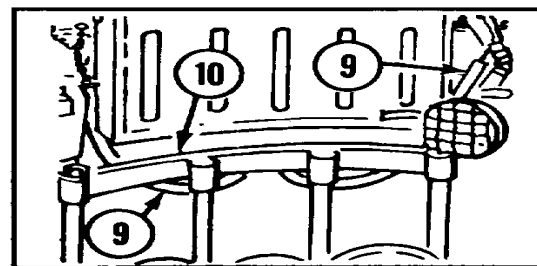
a. Emergency Exits.**CAUTION**

- If lever moves too easily into latched position, notify unit maintenance: cover isn't sealed.
- Do not operate vehicle without locking pin screwed down.

- (1) In an emergency, driver can escape through drivers escape hatch (1), providing belly armor is not present. Lower seat backrest (2) and pull lever (3) to lift seat (4). Unscrew locking pin (5) and move lever (6) to rear. Hatch (1) will drop out.
- (2) It takes two soldiers to install hatch (1). From beneath vehicle, lift cover into place in hatch opening with lug (7) hooked over hatch support block (8). Align cover in opening and push to rear as far as possible. Move lever (6) to latched position. Screw locking pin (5) down.



- (3) Driver can also escape through turret by traversing gun/launcher to 90° left position, pulling safety chains (9), and removing ammo rack (10). Screens are removable.



b. Manual Lock-up of Cooling Fan Drive.

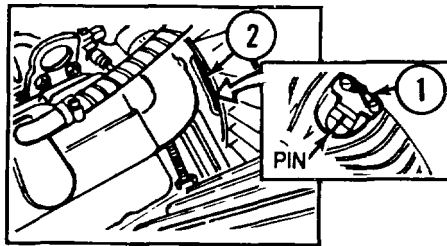
NOTE

Follow this procedure only In an emergency, when the engine is overheated (because of fan clutch failure) and you can't fix it, but you still have to drive the vehicle. Notify unit maintenance immediately.

- (1) Pull out engine FUEL SHUT OFF control handle.
- (2) Open right exhaust grille.

2-31. EMERGENCY PROCEDURES-Continued.

- (3) Have another soldier intermittently engage starter until fan drive manual lock-up device (1) appears inside stator slot (2).

**NOTE**

To see the fan drive manual lock-up device, you have to lie on engine compartment and shine a flashlight into the stator slot.

- (4) Turn MASTER SWITCH to OFF.
- (5) Depress pin on fan drive manual lock-up device (1) with screwdriver and rotate fan blades by hand until pin drops into clutch.
- (6) Rotate pin 90° to lock pin down under tab.

2-32. NBC DECONTAMINATION PROCEDURES. The following emergency procedures can be performed until NBC decontamination facilities are available. Vehicle commander will supervise, assign crew duties, and assist supporting NBC unit.

WARNING

If NBC attack is known or suspected, mask at once and continue mission. If inside, do not leave vehicle. If outside, follow decontamination procedures below to avoid taking contamination into the vehicle. Do not unmask until told to do so.

a. Nuclear Decontamination. Brush fallout from skin, clothing, and equipment with available brushes, rags, and tree branches. Wash skin and have radiation check made as soon as tactical situation permits. (You can find instructions for this check in FM 3-5.)

b. Biological decontamination. The vehicle has no facilities for detecting or decontaminating biological agents. Remain masked and continue mission until told to unmask.

c. Chemical Detection and Decontamination.**WARNING**

Do not use decontamination spray on personnel: It could cause personal injury.

- (1) Use M8 paper (from M256 chemical agent detector kit) or M9 paper to determine if liquid agent is present on vehicle surface.
- (2) If exposure to liquid agent is known or suspected, clean exposed skin, clothing, and personal gear (in that order) using M258A1 kit. Use the buddy system. Wash exposed skin and decontaminate as soon as tactical situation permits.
- (3) If M8 or M9 paper indicates that liquid chemical agent is present on vehicle surface, use ABC-Mi1 decontamination apparatus for partial decontamination of vehicle. Use loaders hatch for exit/entry. Avoid getting liquid agent into crew compartment. Spray only surfaces that will be touched getting in and out of vehicle.

NOTE

Decontamination procedures take time: do as much as you can based on the tactical situation.

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**CHAPTER 3
MAINTENANCE INSTRUCTIONS**

Section I. LUBRICATION INSTRUCTIONS

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	3-2 Service Intervals-Unusual Conditions.....	3-2
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3-1. SERVICE INTERVALS-NORMAL CONDITIONS.

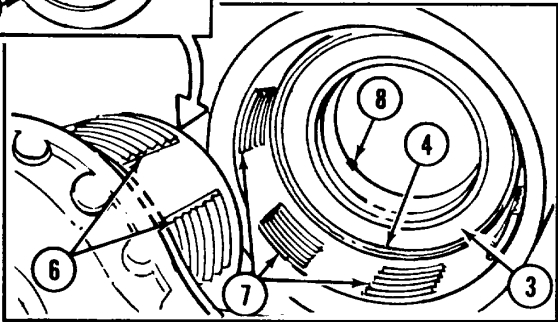
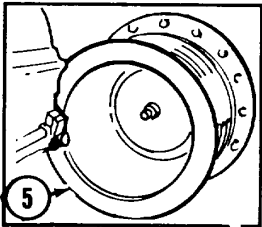
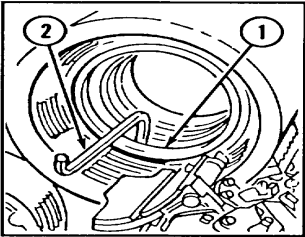
- a. Hull/Vehicle Lubrication. Refer to LO 9-2350-230-12.
- b. Turret Components and Armament. Refer to LO 9-2350-230-12.

3-2. SERVICE INTERVALS-UNUSUAL CONDITIONS. Lubricate as needed to compensate for abnormal operation and extreme conditions such as high or low temperatures, prolonged periods of high-rate operation, continued operation in sand or dust, or exposure to moisture. Lubrication intervals may be extended during inactive periods.

3-3. GUN/LAUNCHER CLEANING AND LUBRICATION (M551 A1).

a. Daily. After completion of firing mission, clean gun/launcher as follows:

- (1) Open breech and remove obturator seal (1) with offset screwdriver



(c) Saturate a clean, soft rag (Appendix D, item 23) with Cleaner/Lubricant/Preservation (CLP) (Appendix D, item 9) and wipe residue and dirt from obturator seal (1), rear face of gun tube (3), seal cavity (4), breech chamber and firing probe of firing mechanism (5), buttress threads of coupling (6), buttress threads of breech chamber (7), detent hole (8), and all exposed areas.

NOTE**Do not use steel wool**

- (3) With a clean soft rag (Appendix D, item 23), remove all traces of CLP.

NOTE

Make sure that buttress threads of coupling (6) and breech chamber (7) are well lubricated (see paragraph 3-3,b).

- (4) With a clean rag (Appendix D, item 23) or brush (item 4) saturated with PL-S (item 22), spread an even coat of oil on all areas cleaned above.

WARNING

The obturator seal must be used with all types of ammo to prevent a fire hazard and gas wash.

- (5) Check all areas for cleanliness. Install obturator seal (1) by snapping into place.

CAUTION

The nylon bore brush assembly issued with the gun/launcher cleaning kit should not be used with Rifle Bore Cleaner (RBC). RBC will destroy the bore brush assembly.

- (6) On the Day of Firing:

- (a) Remove one bottle of premeasured CLP and one bore brush assembly from gun/launcher cleaning kit. Attach bore brush assembly to standard U.S. Army rammer staff.
- (b) Inspect breech mechanism and gun/launcher tube and clear any obstructions. Pour 1/4 bottle of CLP onto bore brush and wet punch gun/launcher tube once forward and once back.
- (c) Repeat procedure with second, third, and final 1/4 of premeasured bottle of CLP.
- (d) Remove 1 liter spray bottle of CLP (Appendix D, item 9) from general supply. Wet all breech components thoroughly with CLP. Allow to soak for 10 to 15 minutes and wipe dry with clean cloth (item 23). Reapply light coat of CLP (item 9) to breech components and spray CLP (item 9) on exposed metal surfaces.

- (7) On the Day after Firing:

- (a) Remove two bottles of premeasured CLP (Appendix D,

3-3. GUN/LAUNCHER CLEANING AND LUBRICATION (M551A1)-Continued.

item 9), three disposable cleaning sleeves (Appendix D, item 26), and bore brush assembly. Attach bore brush assembly to standard U.S. Army rammer staff.

- (b) Wet punch gun/launcher tube with one bottle of premeasured CLP (Appendix D, item 9) following procedures above for day of firing.
- (c) Wrap bore brush assembly with disposable cleaning sleeve (Appendix D, item 26) and dry punch entire length of gun/launcher tube once forward and once back. Remove and dispose of cleaning sleeve.
- (d) Wrap bore brush with new cleaning sleeve (Appendix D, item 26) and wet punch gun/launcher tube with 1/2 of premeasured bottle of CLP (item 9). Remove and dispose of cleaning sleeve.
- (e) Repeat wet punch with new cleaning sleeve (Appendix D, item 26) and last 1/2 bottle of premeasured CLP (item 9).

NOTE

If gun/launcher tube has not been previously cleaned with CLP and there is a heavy buildup of coppering or carbon deposits, or severe heat cracking, it may be necessary to repeat cleaning procedures until gun/launcher tube has been thoroughly cleaned.

b. Cleaning and Lubricating Gun/Launcher when Not Used for Extended Periods.

CAUTION

Do not clean bore with abrasives.

NOTE

- **If you have the M81 modified gun/launcher, get the unit turret mechanic to help you clean the bore evacuator (reference L 0 9-2350-230-12).**
- **Failure to clean bore evacuator could cause a flareback during firing.**
- **Clean bore evacuator for three days in a row after every firing maneuver.**

- (1) Repeat steps 1 through 7 of paragraph 3-3, a.
- (2) Coat all cleaned surfaces with PL-S (Appendix D, item 22). If gun won't be fired for a month or longer, use Grease, Aircraft and Instrument (GIA) (item 13). Spread oil/grease with a clean saturated cloth (item 23) or brush (item 4).
- (3) Depress gun tube fully. Leave breech backed out, but not rolled over, at about 12 o'clock lockout position-this will prevent moisture drainage into tube and allow circulation to cut down condensation.
- (4) Every month, even if gun has not been fired, clean with CLP (Appendix D, item 9) and wipe dry. Lubricate as at step 4 of paragraph 3-3,a.
- (5) Before firing, wipe dry all areas lubricated EXCEPT buttress threads-always keep these threads lubricated.
- (6) At all times, keep recoil mechanism pressurized-unless maintenance requires de-pressurization.

3-4. SMOKE GRENADE LAUNCHER CLEANING AND LUBRICATION.

NOTE

- **Vehicle should be parked, MASTER SWITCH off, and turret shut down.**
- **Smoke grenade launcher tubes should be empty.**

a. Cleaning M243 Smoke Grenade Launchers.

- (1) Remove rubber caps from grenade launcher tubes.
- (2) Clean drain holes.
 - (a) Use pipe cleaner (Appendix D, item 27) to get into drain hole at bottom of each grenade launcher tube.
 - (b) Loosen and push out any dirt or debris from drain holes.

b. Cleaning Inside of Grenade Launcher Tubes.

WARNING

- **Solvent fumes can burn and could poison you.**
 - **Read warnings at front of this manual**
- (1) Put CLP (Appendix D, item 9) on 25-mm bore brush (item 5).

3-4. SMOKE GRENADE LAUNCHER CLEANING AND LUBRICATION-Continued.

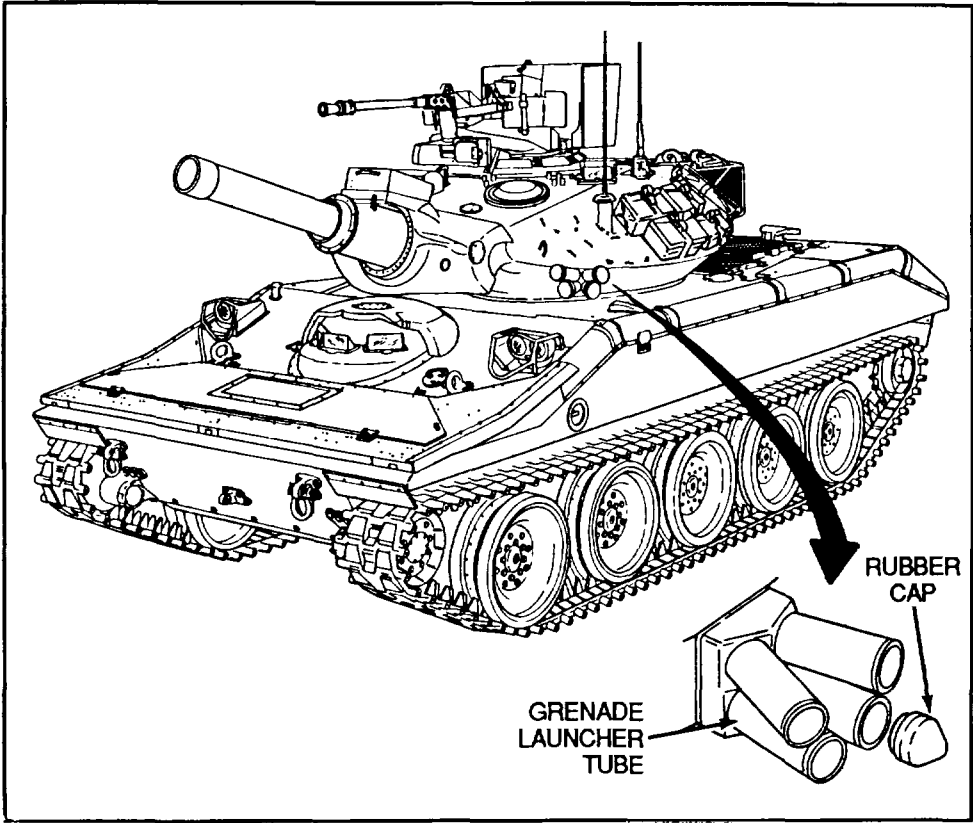
- (2) Screw bore brush (Appendix D, item 5) onto cleaning rod.
- (3) Clean inside of grenade launcher tubes using 25-mm bore brush (Appendix D, Item 5).
- (4) Dry with clean wiping rag (Appendix D, item 23).

c. Inspecting Grenade Launcher Tubes for Damage.

NOTE

Report any damaged grenade launcher tubes to unit maintenance.

- (1) Check smoke grenade launchers for crushed or bent grenade launcher tubes.
- (2) Check that electrical firing pins are not corroded.
- (3) Check that grenade launcher tubes are secure on smoke grenade launchers.
- (4) Install rubber caps on grenade launcher tubes.



Section II. TROUBLESHOOTING PROCEDURES

3-5. INTRODUCTORY INFORMATION.

a. This section contains troubleshooting Information for locating and correcting many of the operating troubles which may develop in the Armored Reconnaissance/Airborne Assault Vehicle (AR/MV). Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which help you determine probable causes and corrective actions to take. Perform the tests, inspections, and corrective actions in the order listed in table 3-1.

b. This manual cannot list all possible malfunctions that may occur, all tests and inspections needed to find the fault, or all corrective actions needed to correct the fault. If a malfunction is not listed or is not corrected by listed corrective actions, notify unit maintenance.

3-6. MALFUNCTION INDEX. The following index is provided to assist you in locating the correct troubleshooting procedure quickly:

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MISSILE GUIDANCE AND CONTROL SYSTEM

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Table 3-1. Troubleshooting Procedures

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE

- 1 ENGINE FAILS TO CRANK WHEN STARTER SWITCH IS ACTIVATED.
 - Step 1. MASTER SWITCH not on.
Turn MASTER SWITCH on.

 - Step 2. Transmission shift is not in N (neutral) position.
Move to N position.

 - Step 3. Loose, corroded, or broken cables.
Clean and tighten loose connections at battery, ground, and starter. If cables are broken, notify unit maintenance.

- 2 ENGINE CRANKS SLOWLY WHEN STARTER SWITCH IS ACTIVATED.
 - Step 1. Battery-generator gauge is not in green (normal charge) range.
Recharge batteries by allowing vehicle to run.

 - Step 2. Electrolyte level in battery cells is low.
If below split rings, add distilled or clean water until electrolyte is at bottom of O-ring (reference TM 9-6140-200-14). Recharge batteries by allowing vehicle to run.

- 3 ENGINE CRANKS BUT FAILS TO START.
 - Step 1. Check fuel gauge.
Fill fuel tank as necessary.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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- | | | |
|---------|---|--|
| Step 2. | Fuel shutoff control knob is pulled out.
Push in knob. | |
| Step 3. | Fuel tank valves are closed.
Open valves (see paragraph 3-13). | |
| Step 4. | Fixed fire extinguisher knob is pulled out and not reset.
Reset knob. Notify unit maintenance. | |
| Step 5. | Main fuel hose is disconnected.
Connect hose. | |

4 ENGINE STARTS BUT SPEED IS ERRATIC.

- | | | |
|---------|--|--|
| Step 1. | Insufficient fuel.
Inspect fuel lines and filters for breaks or loose connections. | |
| Step 2. | Water in fuel.
Drain condensation from fuel filters (see paragraph 3-14) and center fuel tank condensation drain pump (see paragraph 3-15). | |

5 ACCELERATING IMPROPERLY.

- | | | |
|---------|--|--|
| Step 1. | Insufficient air.
Check air cleaner restriction indicator (see paragraphs 3-11 and 3-12). | |
| Step 2. | Debris and foreign objects in accelerator linkage in driver's compartment.
Clean area. | |
| Step 3. | Insufficient fuel.
Check lines and filters for leaks. | |

6 ENGINE OVERHEATS.

- | | | |
|---------|--|--|
| Step 1. | If low oil pressure warning light is on or flashing, STOP engine IMMEDIATELY. Proceed to Malfunction 7. | |
| Step 2. | Examine front of radiator core for clogged exterior, and air inlet grille for debris clogging air passage.
If clogged, notify unit maintenance. | |
| Step 3. | After engine has cooled down, check engine crankcase oil and coolant levels. | |
| Step 4. | Check coolant-pump drive-belt tension for no more than 1/4 inch belt deflection. Check generator and fan drive belts for "drum skin" tightness. | |
| Step 5. | Check coolant pressure cap for serviceability. | |

Table 3-1. Troubleshooting Procedures-Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ENGINE-Continued.		
Step 6.	Check surge tank for leaks.	If leaks exist, notify unit maintenance.
7	LOW OR NO OIL PRESSURE.	
Step 1.	Inadequate oil level.	Check oil level. Fill to proper level.
Step 2	Oil leaks at oil sump drain plug, oil filter and filter plug, or in engine compartment.	Tighten connections and replenish oil. If oil leaks continue, notify unit maintenance.
Step 3	Check for loose electrical connections at transmitter and light.	
TRANSMISSION		
8	TRANSMISSION DOES NOT FUNCTION IN ANY RANGE (VEHICLE DOES NOT MOVE).	
Step 1.	Low transmission oil pressure.	Check oil level (see paragraph 3-16). Fill to proper level.
Step 2.	Cable damaged or broken. Notify unit maintenance.	
BATTERIES/GENERATING SYSTEM		
9	NO CURRENT IN BATTERY CIRCUIT.	
	Corroded or loose cable connections. Tighten cables and connections at batteries (see paragraph 3-18). If connections are corroded, notify unit maintenance.	
10.	BATTERIES DO NOT STAY CHARGED.	
	Check battery-generator indicator. If not in green (normal charge) range with engine running, notify unit maintenance.	
11.	MASTER SWITCH INDICATOR LAMP DOES NOT LIGHT.	
Step 1.	MASTER SWITCH is off. Turn MASTER SWITCH on.	
Step 2.	Burned out lamp. Replace lamp (see paragraph 3-19).	
Step 3.	Loose electrical leads. Ensure leads are fully seated. If leads are fully seated, notify unit maintenance.	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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TRACKS AND SUSPENSION

12. VEHICLE PULLS TO SIDE WITH STEER BAR IN CENTER POSITION.

Step 1. Mud or dirt build-up on tracks.
Clean.

Step 2. Check track tension.
Adjust if required (see paragraph 3-21).

13. VEHICLE THROWS TRACK.

Step 1. Excessively loose or worn track.
Adjust or replace (see paragraph 3-21).

Step 2. Improper vehicle operation.
Caution operator personnel.

PERSONNEL HEATER

14. HEATER FAILS TO START.

Review operating procedures (see paragraph 2-23).
If heater fails to start, notify unit maintenance.

15. HEAT EXCHANGER LOADS UP WITH SOOT.

Step 1. Fuel oil grade too heavy for ambient temperatures.
Drain and fill with proper fuel oil.

Step 2. Exhaust is restricted.
Remove restriction at exhaust outlet.

BILGE PUMPS

16. BILGE PUMPS DO NOT OPERATE WITH BILGE PUMP SWITCHES ON.

Step 1. MASTER SWITCH is off.
Turn MASTER SWITCH on.

Step 2. Loose electrical connections in operators compartment.
Tighten connectors.

Step 3. Frozen water in bilge pump(s).
Start engine and personnel heater.

Step 4. Bilge pump damaged.
Notify unit maintenance.

M47 PERISCOPES

17. POOR VISIBILITY.

Step 1. Dirty optical surfaces.
Clean surfaces with lens tissue (Appendix D, item 21).

Table 3-1. Troubleshooting Procedures-Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
M47 PERISCOPES-Continued.		
Step 2.	Condensation inside periscope.	Notify unit maintenance.
M48 PERISCOPE		
18. FOGGY/NO INFRARED VISION.		
Step 1	Power switch on periscope not on.	Turn on.
Step 2	If operating from battery power (see paragraph 2-27,a), battery power low.	Replace battery.
Step 3	M48 periscope still inoperable.	Notify unit maintenance.
DRIVER'S NIGHT VIEWER (DNV) AN/VVS-2(V)3		
19. POOR VISIBILITY, WON'T FOCUS.		
Step 1.	Condensation, dust, or dirt on optical surfaces (see paragraph 2-27,b).	Clean surfaces w/ lens tissue (Appendix D, item 21).
Step 2.	DNV still won't focus.	Check focus by setting up a resolution target 50 feet from system (do not tilt); adjust brightness control. If resolution is not clear, notify unit maintenance.
20. CONDENSATION/MOISTURE IN VIEWING LENS OR HEAD.		
		Notify unit maintenance.
21. DNV WILL NOT WORK.		
Step 1.	Vehicle MASTER SWITCH not on (see para 2-27,b).	Turn MASTER SWITCH on.
Step 2.	Power switch on DNV switch box not turned on.	Turn power switch on.
Step 3.	Loose electrical connections.	Tighten connections.
Step 4.	If operating from battery power, battery power low.	Replace battery (see paragraph 2-27,b).
Step 5.	DNV still inoperable.	Notify unit maintenance.
22. DNV HAS NO GREEN GLOW IN VIEWER.		
Step 1.	Outside cover has not been removed.	Remove outside cover.

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

- | | | |
|--------|---|--|
| Step 2 | Loose electrical connections.
Tighten connections. | |
| Step 3 | If operating from battery power, battery power low.
Replace battery. | |
| Step 4 | DNV still has no green glow.
Notify unit maintenance. | |

NOTE

For additional troubleshooting and Preventive Maintenance Checks and Services (PUCS), reference TM 11-5855-249-10.

CUPOLA ELECTRICAL TRAVERSING SYSTEM**23. CUPOLA TRAVERSES SLUGGISHLY.**

- | | |
|---------|---|
| Step 1. | Ring-gear contaminated with foreign matter.
Remove foreign matter and clean. |
| Step 2. | Electrical contact ring and contact-point assemblies contain dirt and foreign matter.
Remove foreign matter and clean. |
| Step 3. | Electrical power low.
Check battery-generator gauge. |

24. CUPOLA TRAVERSES IN ONE DIRECTION ONLY-WITH OR WITHOUT PUSHING ROTATION SWITCH.

- Loose connections at control assembly and traverse mechanism control box. Contact brush assemblies dirty/misaligned.
Tighten connections. Check for damaged electrical wiring harness to cal .50 machine gun.

25. CUPOLA WON'T TRAVERSE ELECTRICALLY.**CAUTION**

If a humming noise is heard from motor, turn CUPOLA/LASER switch off immediately.

- | | |
|---------|--|
| Step 1. | CUPOLA/LASER switch at cupola control is off.
Turn CUPOLA/LASER switch on. |
| Step 2. | Foreign matter in electrical contact ring.
Remove foreign matter and clean. |

Table 3-1. Troubleshooting Procedures-Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
CUPOLA ELECTRICAL TRAVERSING SYSTEM-Continued.		
Step 3.	Loose connections at control assembly and traverse mechanism control box.	Tighten connections.
Step 4.	Electrical power low.	Check battery-generator gauge.
GUN/LAUNCHER ELEVATING AND TURRET TRAVERSING SYSTEMS		
26. HARD TO ELEVATE OR DEPRESS GUN MANUALLY.		
Step 1.	Binding and obstructions in shield area, gear box, or trunnion bearing.	Remove obstructions.
Step 2.	Contaminated lubricant in elevating mechanism support bearings.	Lubricate, if needed.
27. CAN'T OPERATE ELEVATING MECHANISM ELECTRICALLY WITH PALM SWITCH DEPRESSED.		
Step 1.	Vehicle MASTER SWITCH is off.	Turn MASTER SWITCH on.
Step 2.	ENGINE START/TURRET POWER switch is off.	Turn ENGINE START/TURRET POWER switch to TURRET POWER.
Step 3.	TURRET CONTROL switch is off.	Turn TURRET CONTROL switch on.
Step 4.	Loose electrical connections.	Tighten connections.
Step 5.	Electrical power low.	Check battery-generator gauge.
28. EXCESSIVE DEAD SPACE EXISTS IN EITHER CONTROL HANDLE WHEN ELEVATING OR DEPRESSING.		
Step 1.	Binding and obstructions in shield area.	Remove obstructions.
Step 2.	Contaminated lubricant in elevating mechanism support bearings.	Lubricate, if needed.
29. TURRET WILL NOT TRAVERSE IN EITHER DIRECTION ELECTRICALLY OR MANUALLY.		
Step 1.	Turret traverse locked.	Unlock.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Obstructions in ring gear.
Clear obstructions.

30. GUN CREEPS UP OR DOWN AND/OR TURRET CREEPS RIGHT OR LEFT WITH PALM SWITCH PRESSED AND CONTROL HANDLE IN NEUTRAL POSITION.

ELEV and/or TRAV trim buttons out of adjustment.
Adjust buttons.

31. MOTOR-GENERATOR POWERED WITHOUT PRESSING PALM SWITCH.

Dirt in palm switch.
Notify unit maintenance.

32. OVERHEATING OF TRAVERSE AND/OR ELEVATION SERVOMOTOR(S) DURING OPERATION.

Step 1. Obstructions in turret ring gear/basket.
Remove obstructions.

Step 2. Check for smooth manual operation.
If manual operation is smooth, notify unit maintenance.

33. MOTOR GENERATOR DOES NOT OPERATE WITH PALM SWITCHES PRESSED.

Step 1. Vehicle MASTER SWITCH is off.
Turn MASTER SWITCH on.

Step 2. ENGINE START/TURRET POWER switch is off.
Turn ENGINE START/TURRET POWER switch to TURRET POWER.

Step 3. TURRET CONTROL switch is off.
Turn TURRET CONTROL switch on.

Step 4. Loose electrical connections on motor generator.
Tighten connections.

Step 5. Electrical power-low.
Check battery-generator gauge.

152-MM GUN/LAUNCHER (M551A1)

34. REPLENISHER HAND PUMP DOESN'T INCREASE PRESSURE OF RECOIL MECHANISM.

Step 1. Incorrect fluid level in reservoir (see paragraph 3-24).
Fill to proper level.

Step 2. Hand pump broken.
Notify unit maintenance.

35. GUN/LAUNCHER RETURNS TO BATTERY WITH EXCESSIVE FORCE.
Incorrect fluid level in counter recoil buffer.

Table 3-1. Troubleshooting Procedures-Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
152-MM GUN/LAUNCHER (M551A1)-Continued.		
		Increase pressure by using replenisher hand pump.
36. CAN'T FIRE CONVENTIONAL AMMO OR MISSILE-BOTH READY LAMPS ARE ON.	Step 1. Defective ammo/missile. Perform misfire procedure.	WARNING
		Check firing mechanism with ammo removed.
	Step 2. Dirty firing probe of firing mechanism. Clean firing probe with nylon scouring pad (Appendix D, item 25); perform firing circuit check with firing probe tester.	
37. LOADER'S AND/OR GUNNER'S READY LAMP(S) DO(ES) NOT LIGHT.	Step 1. Lamps, when pressed, do not light. Check lamp dimmer control. Replace lamp(s).	
	Step 2. Safe-to-fire indicator rod is not in operating range. Adjust pressure.	
	Step 3. Gun is out of battery. Check safe-to-fire indicator rod and, if necessary, increase pressure and return gun to battery. Check for air in recoil mechanism (use bleed valve).	
38. CAN'T FULLY CLOSE BREECH CHAMBER.		NOTE
		Open breech manually for inspection.
	Step 1. Obstructions and foreign matter between buttress threads or between chamber and tube facing. Remove obstructions and foreign matter.	
	Step 2. Obturator seal not seated. Seat obturator seal properly.	
PERISCOPE M44 SERIES AND TANK THERMAL SIGHT (TTS)		
39. NO RETICLE PATTERN, WITH RETICLE LIGHT ON (TTS).	Incorrect filter lever position. Adjust accordingly.	
40. POOR OR NO RETICLE LIGHT (M44/TTS).	Step 1. Defective reticle lamp. Replace lamp for M44; notify unit maintenance for TTS.	

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION**

-
- Step 2. Loose cable connections at control panel.
Tighten connections.
- Step 3. Electrical power low.
Check battery-generator gauge.
- Step 4. TTS daylight reticle not visible.
Turn on daylight reticle switch and adjust reticle brightness control. If daylight reticle still does not appear, notify unit maintenance.
41. VISION IS POOR DURING DAYLIGHT OPERATION (M44F-fS).
- Step 1. Dirty optical surfaces.
Clean surfaces w/lens tissue (Appendix D, item 21).
- Step 2. Condensation on lens.
Wipe lens dry. If condensation on inside of lens, notify unit maintenance.
42. CONTROL PANEL LAMP(S) DON'T LIGHT (M44).
Check lamp(s).
Replace defective lamp(s).
43. TOO MUCH LIGHT (TTS DAYLIGHT CHANNEL).
Incorrect filter lever position.
Move to darker position for better lighting.
44. SYSTEM WILL NOT MAINTAIN BORESIGHT ALIGNMENT (TTS).
- Step 1. Loose bolts on TTS mount.
Tighten bolts and boresight TTS.
- Step 2. Defective alignment system.
Notify unit maintenance.
45. RETICLE AND STATUS LAMPS NOT LIT (TTS).
- Step 1. TTS MODE switch not set to ON; daylight reticle switch not set to on for daylight and unity channels.
Rotate RTCL control fully clockwise. If reticles light, move Built-In Test Equipment (BITE) display test switch to LAMP TEST. All indicators should light.
- Step 2. MASTER SWITCH, ENGINE START/TURRET POWER, and/or TUS power converter 4CB1 ON/OFF switches not on.
Turn switches on. Repeat step 1 above. If lamps do not operate, notify unit maintenance.
46. COOL STATUS INDICATOR DOES NOT LIGHT AND COOLER DOES NOT COME ON (TTS).

Table 3-1. Troubleshooting Procedures-Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
PERISCOPE M44 SERIES AND TANK THERMAL SIGHT (TTS)-Continued.		
Step 1.	TTS MODE switch not set to ON or STBY.	Change switch position and continue operation.
Step 2.	MASTER SWITCH, ENGINE START/TURRET POWER, and/or TTS power converter 4CB1 ON/OFF switches not on.	Turn switches on and continue operation.
Step 3.	Indicator and light still do not come on.	Notify unit maintenance.
47. COOL INDICATOR DOES NOT GO OUT AND REMAIN OUT WITHIN 15 MINUTES (TTS).	TTS MODE switch not set to ON.	Set TTS MODE switch to ON. If abnormal function continues, notify unit maintenance.
48. THERMAL SCENE GRADUALLY FADES (TTS).	TTS operation affected by weather conditions (high humidity, fog, and/or rain).	Continue operations with degraded performance until weather clears. If TTS system does not function properly when weather clears, notify unit maintenance.
49. OPERATION SUDDENLY FAILS (TTS).	Step 1. TTS power converter 4CB1 ON/OFF switch not in ON position.	Set to ON and continue operation. If TTS fails again, notify unit maintenance.
	Step 2. TTS cables not connected properly.	Reconnect and continue operations. If TTS fails again, notify unit maintenance.
50. THERMAL SCENE BLURRED (TTS).	Step 1. COOL lamp is on.	COOL lamp should be off. Reverse TTS scene polarity using POLARITY switch. Adjust BRIGHT, CONTRAST, and FOCUS for best display.
	Step 2. COOL lamp has been on for more than 15 minutes.	Notify unit maintenance.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

- Step 3. Dirty or obscured optics.
 Clean optics per instructions in table 3-4. If vision does not clear, notify unit maintenance.

51. NO VISION-COOL STATUS INDICATOR OFF (TS).

- Step 1. Ballistic shield cover not open.
 Open ballistic shield cover.
- Step 2. MASTER SWITCH, ENGINE START/TURRET POWER, and/or TTS power converter 4CBI ON/OFF switches not on.
 Turn switches on.

52. THERMAL CHANNEL HAS BLINKING OR MISSING HORIZONTAL LINES IN DISPLAY (TTS).

- Step 1. Thermal scene is clear, and blinking and missing lines do not endanger mission.
 Continue mission, then notify unit maintenance.
- Step 2. Thermal scene is not clear, and blinking and missing lines endanger mission.
 Notify unit maintenance.

AZIMUTH INDICATOR

53. INDICATOR DIAL DOESN'T LIGHT.

- Step 1. Loose electrical connections.
 Tighten connections.
- Step 2. Defective lamps.
 Replace lamps.

MISSILE GUIDANCE AND CONTROL SYSTEM

54. A. (LAMP AND METER TEST) LAMPS DO NOT LIGHT, AND METER DOES NOT DEFLECT ON TEST CHECKOUT PANEL.

- Step 1. No power to test checkout panel.
 Check cable connections. Repeat test.

- Step 2. Test checkout panel defective.
 Notify unit maintenance.

B. (LAMP AND METER TEST) ENI INDICATION NOT PROPER [CENTER GREEN LIGHT EMITTING DIODE (LED) DOES NOT ILLUMINATE OR LED OTHER THAN CENTER GREEN ILLUMINATES], BUT LAMPS LIGHT.

Table 3-1. Troubleshooting Procedures-Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
MISSILE GUIDANCE AND CONTROL SYSTEM- Continued.		
Step 1.	Cable not properly connected.	Check cable connections. Repeat test.
Step 2.	Test checkout panel defective.	Notify unit maintenance.
C. (LAMP AND METER TEST) ENI INDICATION IS PROPER (ONLY ENI CENTER GREEN LED ILLUMINATES), BUT ONE OR MORE LAMPS DO NOT LIGHT.		
Step 1.	Cable not properly connected.	Check cable connections. Repeat test.
Step 2.	Defective lamps.	Replace defective lamps. Repeat test.
Step 3.	Test checkout panel defective.	Notify unit maintenance.
55. (CHECKSIGHT LAMP ALIGNMENT TEST) CANNOT SEE SPOT OF LIGHT THROUGH TELESCOPE.		
Step 1.	Telescope filter not in clear position.	Place telescope filter in clear position. Repeat test.
Step 2.	ALIGN and/or ERROR lever on telescope mount M149 not in position.	Move ALIGN lever to full right (up) and ERROR lever to full left (down) positions. Repeat test.
Step 3.	EL or AZ adjustment out of alignment.	Place EL and AZ adjustment screws (on telescope mount) at midrange. This is done by turning EL screw until it stops (DO NOT FORCE). Count number of turns in opposite direction until screw stops. Turn screw back half of this count and this should be approximately mid-range. Do same for AZ screw. Repeat test.
Step 4.	Checksight source lamp defective.	Replace checksight source lamp. Repeat test.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

56. (TRACKER ALIGNMENT TEST) ELECTRONIC NULL METER WILL NOT ADJUST TO CENTER GREEN LED USING AZ OR EL ADJUSTMENT SCREWS.
- Step 1. ERROR lever not in left (down) position.
Move ERROR lever to left (down) position.
Repeat test.

 - Step 2. ALIGN lever not in right (up) position.
Move ALIGN lever to right (up) position.
Repeat test.

 - Step 3. Checksight source lamp defective.
Look into telescope. Verify that checksight source spot of light is visible. If not, see paragraph 55 above. Repeat test.
57. (SYSTEM SELF-TEST) TRACKER LAMP GLOWS AT COMPLETION OF TEST.
- Step 1. ALIGN lever not in right (up) position.
Place ALIGN lever in right (up) position.
Repeat test.

 - Step 2. Tracker not properly aligned.
Perform tracker alignment (see paragraph 2-18,a,2). Repeat test.
58. (SYSTEM SELF-TEST) SIGNAL DATA CONVERTER (SDC) GLOWS AT COMPLETION OF TEST.
- Step 1. ERROR lever not in right (up) position.
Place ERROR lever in right (up) position.
Repeat test.

 - Step 2. Tracker not properly aligned.
Perform tracker alignment (see paragraph 2-18,a,2). Repeat test.

COMMUNICATIONS EQUIPMENT

59. UNABLE TO COMMUNICATE ON EITHER INTERCOM OR RADIO (ALL/SOME CREWMEMBERS HAVE THIS PROBLEM).
- Step 1. Defective helmet.
Connect a good helmet to control box. If communications can be established, replace faulty helmet.

Table 3-1. Troubleshooting Procedures—Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
COMMUNICATIONS EQUIPMENT-Continued.		
Step 2.	Other crewmembers not experiencing defective helmets.	Tighten cable connectors on top of amplifier AM-1780NVR and at vehicle connector.
Step 3.	Other crewmembers experiencing defective helmets and MASTER SWITCH is off.	Turn MASTER SWITCH on.
Step 4.	Radio is not pushed back fully on its mount and mounting clamps are not tightened fully.	Secure radio in mount; tighten clamps.
Step 5.	MX-7778NRC PWR switch is not set to ON.	Turn MX-7778NRC PWR switch to ON.
NOTE Next two steps for driver only.		
Step 6.	Control box ls not operating.	Set signal switch to EXT position. Lamp should light.
Step 7.	Loose connectors; EXT lamp does not light.	<ul style="list-style-type: none"> <li>a. Tighten connectors at sides of control box and at vehicle connectors. <li>b. In turret, tighten cable connectors on top of amplifier AM-1780NRC and at vehicle connector.
Step 8.	Cable connections to MX-7778NRC and radio mount are not fully tightened.	Tighten cables.
Step 9.	RT-246(')NRC is in REMOTE position and C-2742NRC PWR switch is set to Hi.	Turn PWR switch on C-2742NRC to LO.
Step 10.	PWR switch on radio is not turned on.	Turn PWR switch to ON.
Step 11.	AM-1780NRC MAIN PWR switch is not set to NORM.	Set MAIN PWR switch to NORM.
Step 12.	AM-1780NRC INSTALLATION SWITCH is not set to OTHER.	Set INSTALLATION SWITCH to OTHER.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

60. UNABLE TO TRANSMIT OR RECEIVE OVER RADIO SET.
- Step 1. VOLUME control knob on control box is not turned to an audible level.
Adjust VOLUME control to a comfortable listening level.
 - Step 2. Substituted operable helmet works.
Replace defective helmet.
 - Step 3. Incorrect frequency.
 - a. Incorrect assigned frequency is set up on radio—tune to correct frequency.
 - b. With C-2742NRC being used with RT-246(*)NRC, incorrect assigned frequency is displayed in RT-246(*)NRC dial window—rotate selector switch on C-2742NRC to correct frequency.
 - Step 4. Whip antenna is damaged or not intact.
Replace antenna.
 - Step 5. Antenna is touching a metal structure such as a bridge or vehicle Is under a bridge.
Move vehicle.
 - Step 6. One of Combat Vehicle Crewmember's (CVC's) helmets is kicked back in its Intercommunication System (ICS) intercom position.
Place switch in MONITOR position.
 - Step 7. Loose whip antenna section(s).
Tighten antenna section(s).
 - Step 8. Antenna cable is not connected to radio, and antenna and cable connections are loose.
Connect/tighten cable connection.
 - Step 9. Squelch operation is not being used.
Set SOUQLCH switch to OFF (or FUNCTION switch on AN/VRC-64 to ON).
61. UNABLE TO ESTABLISH RADIO CONTACT WITH DISTANT RADIO STATION (RADIO SIDETONE CAN BE HEARD, BUT OTHER CREWMEMBERS DO NOT HAVE THIS PROBLEM).
- Step 1. Communication possible with substituted helmet.
Replace defective helmet.

Table 3-1. Troubleshooting Procedures-Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
COMMUNICATIONS EQUIPMENT-Continued.		
	Step 2. Ask turret crewmember to check operation of radio by connecting his CVC helmet to radio. If this works, fault is in intercom system.	Notify unit maintenance.
62. UNABLE TO COMMUNICATE ON INTERCOM (SIDETONE IS HEARD, BUT OTHER CREWMEMBERS DO NOT HAVE THIS PROBLEM).	Step 1. Communication possible with substituted helmet.	Replace defective helmet.
	Step 2. Loose cable connectors.	
	a. Tighten connectors at sides of control box and at vehicle connectors.	
	b. In turret, tighten cable connector on top of amplifier AM-178ONRC and at vehicle connector.	
63. UNABLE TO HEAR OUTPUT OF RADIO RECEIVER (MONITOR SWITCH POSITION B; OTHER CREWMEMBERS DO NOT HAVE PROBLEM).	Step 1. Communication possible with substituted helmet.	Replace defective helmet.
	Step 2. Loose control cable connectors.	
	a. Tighten control cable connectors at sides of control box and at outlets in vehicle.	
	b. In turret, tighten control cable connectors on top of amplifier AM-178ONRC and at vehicle connector.	
64. UNABLE TO COMMUNICATE ON INTERCOM OR RADIO FROM OUTSIDE VEHICLE.	Step 1. MONITOR switch at drivers control box C-2298NRC is not set at A or ALL for radio function, or at INT ONLY for intercom communication.	Set signal switch to EXT; EXT indicator lamp must be lit.
	Step 2. Loose connectors at control box. Tighten connectors.	
	Step 3. Loose control cable on exterior control box. Tighten cable.	

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

65. UNABLE TO ATTRACT DRIVER'S ATTENTION BY OPERATING HANDSET SWITCH, BUT INTERCOM COMMUNICATION IS POSSIBLE FROM OUTSIDE VEHICLE.

Step 1. Defective EXT indicator lamp on drivers C-2297NRC.
 Replace lamp.

Step 2. Substituted EXT indicator lamp does not light. After replacing lamp and it still does not light.
 Notify unit maintenance.

66. LAMP OUTSIDE VEHICLE DOES NOT LIGHT WHEN SIGNALLED FROM DRIVER'S CONTROL BOX, BUT INTERCOM COMMUNICATION IS POSSIBLE.

Step 1. Defective lamp.
 Replace lamp.

Step 2. Loose cable to lamp connection.
 Tighten or connect to lamp receptacle.

CREW SERVED WEAPONS NIGHT VISION SIGHT

67. RETICLE WILL NOT ILLUMINATE.

Step 1. Weak or defective battery.
 Replace battery.

Step 2. Defective reticle lamp.
 Replace lamp.

Step 3. Faulty wiring.
 Notify unit maintenance.

68. IMAGE INTENSIFIER TUBE IS WEAK OR WILL NOT ILLUMINATE.

Step 1. Weak or defective battery.
 Replace battery.

Step 2. Weak or defective tube.
 Notify unit maintenance.

69. IMAGE IS BLURRED.

Step 1. Objective lens or eyepiece dirty or fogged.
 Clean lens with lens tissue (Appendix D, item 21).

Step 2. Objective lens out of focus.
 Adjust lens using focus knob.

Step 3. Eyepiece out of focus.
 Adjust focus ring.

Table 3-1. Troubleshooting Procedures-Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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CREW SERVED WEAPONS NIGHT VISION SIGHT-Continued.

- Step 4. Weak battery.
Replace battery.

70. CAN'T LEVEL VIAL OR SIGHT WILL NOT ILLUMINATE.

- Step 1. Weak or defective battery.
Replace battery.
- Step 2. Defective lamp.
Replace lamp.
- Step 3. Faulty wiring.
Notify unit maintenance.

**COMPRESSOR FOR CLOSED BREECH SCAVENGING SYSTEM
(CBSS) (M551A1)**

71. COMPRESSOR FAILS TO START WHEN COMPRESSOR SWITCH IS ON AND AIR PRESSURE GAUGE READS BELOW 2800 PSI.

- Step 1. FIRE CONTROL selector is at MISSILE.
Turn selector switch to something other than MISSILE.
- Step 2. Power cable to compressor disconnected.
Connect cable.
- Step 3. Compressor damaged.
Notify unit maintenance.

GAS-PARTICULATE FILTER UNIT

72. INSUFFICIENT AIRFLOW ALL STATIONS.

- Step 1. Spring clip attached.
Pull spring clip away.
- Step 2. Air hoses kinked or pinched; loose connections.
Straighten or replace hoses; tighten loose connections.
- Step 3. Low electrical power.
Check battery-generator gauge.

WARNING

Contaminated filters must be handled using adequate precautions (FM 3-4, FM 3-5, FM 3-7) and must be disposed of by trained personnel.

- Step 4. Filter clogged or contaminated.
Notify unit maintenance.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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73. IMPROPER AIRFLOW TO ALL STATIONS.

Step 1. Airflow too high.
Adjust AIR COLLECTIVE PROTECTOR knob to lower setting.

Step 2. Airflow too low.

- a. Adjust AIR COLLECTIVE PROTECTOR knob to higher setting.
- b. If filters are clogged, notify unit maintenance.

Step 3. Air purifier out of adjustment.
Notify unit maintenance.

74. GAS-PARTICULATE FILTER UNIT WILL NOT OPERATE WHEN AIR COLLECTIVE PROTECTOR CONTROL SWITCH IS IN ON POSITION.

Step 1. Ground wire loose or missing.
Notify unit maintenance.

Step 2. Electrical cable assemblies loose or missing.
Notify unit maintenance.

Step 3. Switch or circuit breaker defective.
Notify unit maintenance.

OPERATOR'S GAUGE PANEL

75. TACHOMETER OR SPEEDOMETER INOPERABLE.

Step 1. Loose electrical connections at back of gauge or at engine.
Tighten connections.

Step 2. Faulty wiring.
Notify unit maintenance.

76. ENGINE AND TRANSMISSION TEMPERATURE WARNING LIGHTS DO NOT LIGHT.

Step 1. Loose electrical connections at back of lights or at sending unit.
Tighten connections.

Step 2. Defective lamps.
Replace lamps.

Step 3. Faulty wiring or sending units.
Notify unit maintenance.

Table 3-1. Troubleshooting Procedures-Continued.

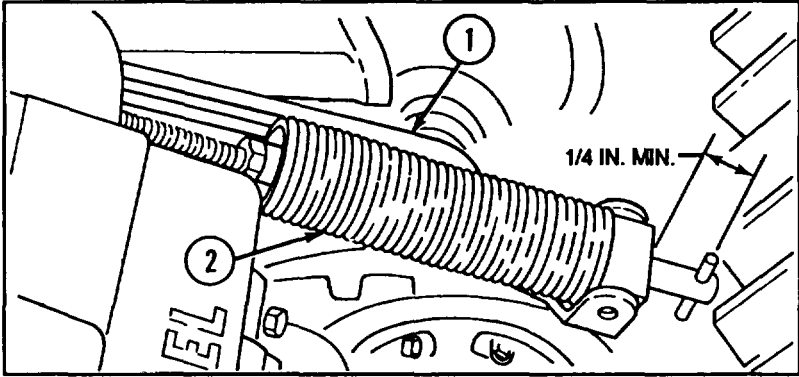
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
OPERATOR'S GAUGE PANEL-Continued.		
77. ENGINE AND TRANSMISSION OIL PRESSURE WARNING LIGHTS DO NOT LIGHT.	Step 1. Loose electrical connections at back of lights or at sending units.	Tighten connections.
	Step 2. Defective lamps.	Replace lamps.
	Step 3. Faulty wiring or sending units.	Notify unit maintenance.
78. ENGINE COOLANT GAUGE DOES NOT WORK.	Step 1. Loose electrical connections at back of lights or at sending unit.	Tighten connections.
	Step 2. Faulty wiring, gauge, or sending units.	Notify unit maintenance.
79. BATTERY-GENERATOR INDICATOR DOES NOT WORK.	Step 1. Loose electrical connections at back of gauge, battery, or generator.	Tighten connections.
	Step 2. Battery-generator indicator still does not work.	Notify unit maintenance.
80. AIR CLEANER RESTRICTION INDICATOR DOES NOT WORK.	Step 1. Loose hose connections at indicator or on air cleaner.	Tighten connections.
	Step 2. Faulty wiring or sending units.	Notify unit maintenance.
81. WATER STEER, PARKING BRAKE, HIGH BEAM, OR PANEL LIGHTS DO NOT WORK.	Step 1. Loose electrical connections at back of lights or at source.	Tighten connections.
	Step 2. Defective lamps.	Replace lamps.
	Step 3. Faulty wiring or sending units.	Notify unit maintenance.

Section III. MAINTENANCE PROCEDURES

3-7. PURPOSE AND SCOPE. This section provides hull and turret maintenance instructions to be performed by crew.

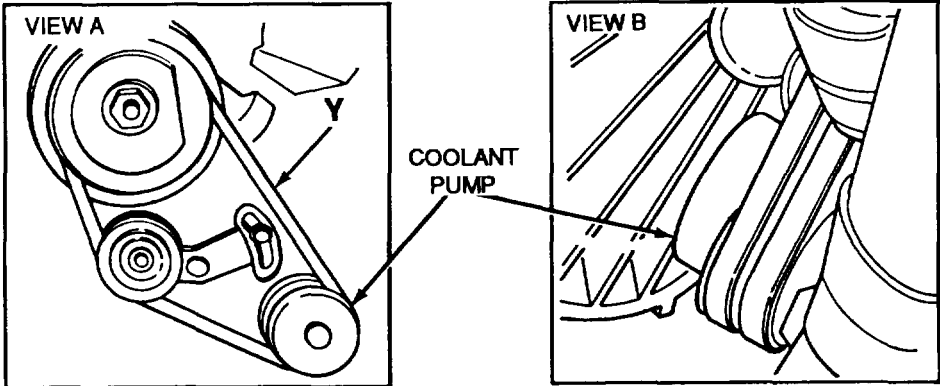
3-8. INSPECTING GENERATOR AND COOLANT PUMP BELTS.

- a. Traverse turret 90° right and open engine access covers.
- b. Inspect generator V-belts (1) for breaks and cracks. Check belt tensioner (2). If pin (3) is within approximately 1/4 inch of bottoming out, have unit maintenance replace belts.



NOTE

To inspect coolant pump belts, you must lie down on the left side of the engine compartment and lower your head until you can see the belts (VIEW B). VIEW A was made with the engine out of the vehicle. You must find point Y by touch; you can't see it.



- c. Inspect coolant pump belts for breaks and excessive wear. Check belt tension by pressing at point Y. Belts should depress approximately 1/4 inch. If you need new belts or belt adjustment, notify unit maintenance.

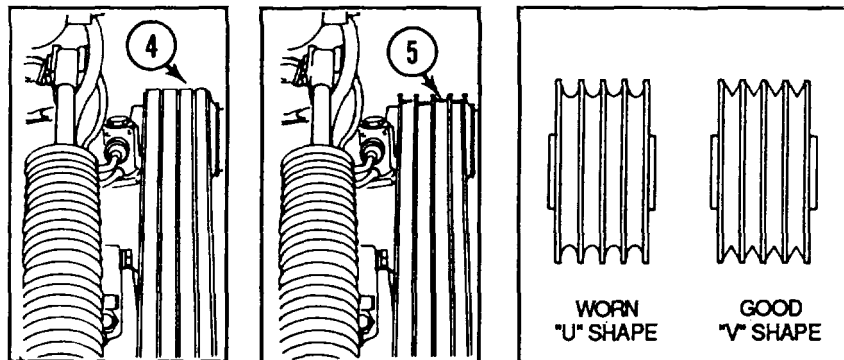
3-8. INSPECTING GENERATOR AND COOLANT PUMP BELTS-Continued.

- d. Check engine coolant. Fill to line on surge tank.

NOTE

New belts should not be installed when pulley sheaves are worn. The cooling-fan system must be replaced in accordance with the Maintenance Allocation Chart (MAC) to correct the pulley condition.

- (1) Insure correct engagement (4) of serviceable drive belts with serviceable drive pulley sheaves.
- (2) Watch for unsatisfactory engagement (5) due to worn-out pulley and/or worn-out belts.
- (3) Bottomed-out condition can occur from worn-out belts on serviceable pulley.



- e. Operators and crewmembers should check fan drive-belt tension for "drum-skin" tightness (no deflection) midway between generator and fan drive pulleys. If belt deflection is present, notify unit maintenance.

3-9. CLEANING HULL COMPARTMENT.

- a. Remove loose debris from driver's compartment.

CAUTION

Do not use water hose or steam in vehicle interior. Protect all electrical items against getting wet.

NOTE

During cold weather, operate vehicle engine and personnel heater as required to thaw frozen liquids.

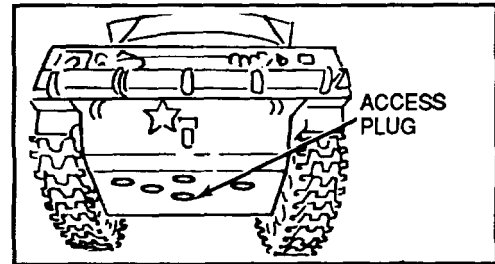
- b. Scrub floor and other dirty areas with detergent (Appendix D, item 8) and a minimum of water.

c. Use front bilge pump to remove liquids during cleaning. However, if front bilge pump is inadequate, rear bilge pumps and/or hull access plugs may be used as follows:

- (1) Assure that engine bulkhead drain holes are open.
- (2) Elevate front of vehicle slightly (6 to 10 inches) by driving up an incline.
- (3) Operate rear bilge pumps or remove one or more hull access plugs to drain liquids from engine compartment.

NOTE

For removal and installation of hull access plugs, see following steps 4 through 8.



NOTE

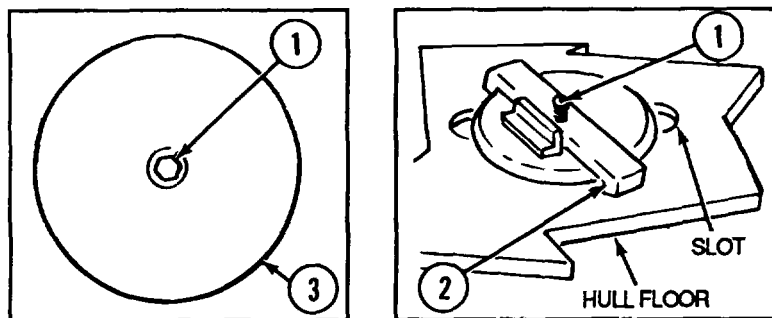
You may have to tap screwhead to loosen bar from hull floor.

- (4) Turn screw (1) to loosen bar (2) on hull access plugs.
- (5) Rotate plug (3) to align bar with slots and remove hull access plugs.

CAUTION

Access plugs must seat tightly to keep water out during amphibious operation. Notify unit maintenance to replace worn or damaged packing.

- (6) To replace hull access plugs, loosen screw (1) until flush with top of bar (2). Apply grease to screw threads.



- (7) Insert plug into access hole and turn approximately 90°.
- (8) Hold plug and tighten screw.

3-10. CLEANING TURRET COMPARTMENT.

NOTE

If you've got cold weather conditions, **FIRST** start engine and personnel heater; wait until frost and ice are thawed.

- a. Remove debris and spent brass from turret floor.
- b. Remove two screws, two flat washers, and access cover (1) from turret floor. Slowly traverse turret manually and remove all debris and spent brass from hull floor.
- c. Align feet on bottom of cover with turret floor, and install access cover, two flat washers, and two screws.

CAUTION

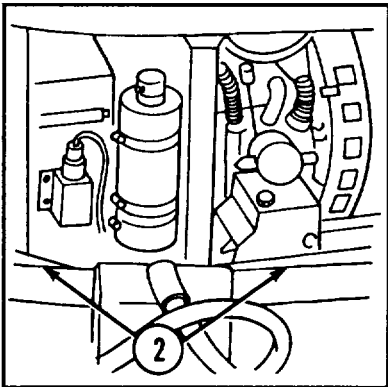
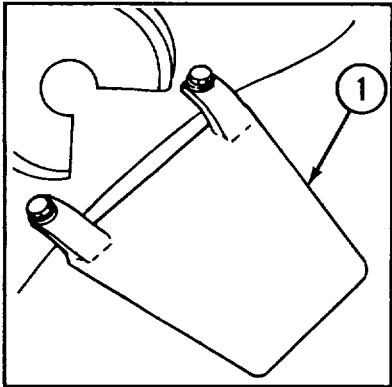
Never use a water hose or steam to clean inside of vehicle. Always protect electrical connections, cables, and components from water, gasoline, diesel fuel, or any similar fluids.

- d. Scrub floor and all other dirty areas with detergent (Appendix D, item 8) and a minimum of water.

CAUTION

Keep turret area (2) under the loader's seat and around the compressor clean and dry. Mud or debris could short out the compressor (MS51A 1).

- e. After cleaning, drain off liquids with front bilge pump, rear bilge pumps, or hull access plugs.



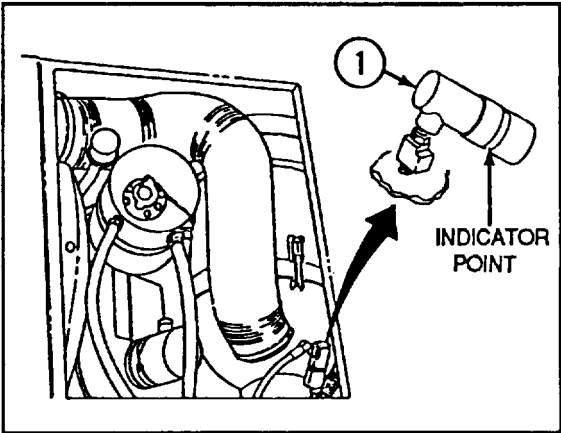
3-11. SERVICING ENGINE AIR CLEANER (OLD).

- a. Traverse turret 90° right and open left engine access cover.

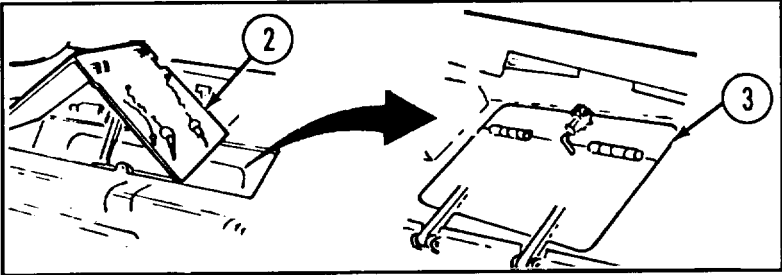
NOTE

Engine must be running when checking restriction Indicator.

- b. Check restriction indicator (1) from engine compartment. Indicator will show green when air cleaner is not restricted; indicator will show a little red when air cleaner is partly restricted, and maximum red for full restriction. Service air cleaner when indicator shows red.



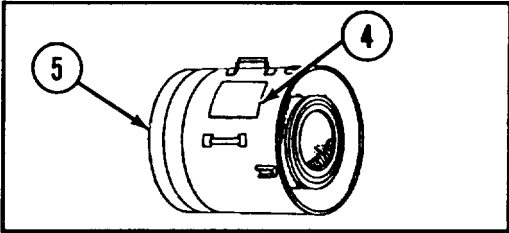
- c. If service is required, open left side cover doors (2) and air cleaner access door (3).



WARNING

Contaminated filters must be handled using adequate precautions (FM 34, FM 35, FM 37) and must be disposed of by trained personnel.

- d. Follow removal instructions (4) on housing (5).

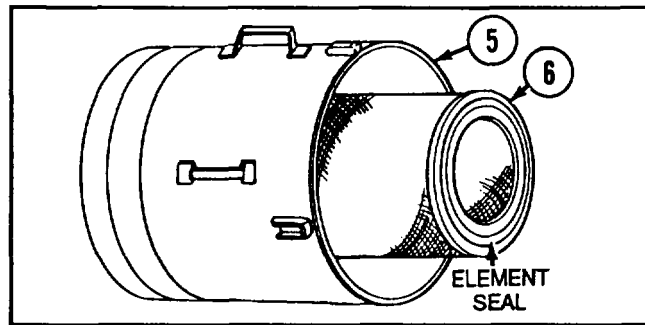


WARNING

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip-guarding and personal protective equipment (goggles/shield, gloves, etc.).

3-11. SERVICING ENGINE AIR CLEANER (OLD)-Continued.

- e. Remove filter element (6) from housing (5). Empty housing. Clean element with low-pressure air.



- (1) Direct a flow of air against inside of element using back and forth motion.
- (2) Repeat for outside of filter element.

NOTE

Some dirt may have blown in when outside was cleaned.

- (3) Clean inside of filter again.

- f. If element is caked with dust or soot (or if you don't have low-pressure air), clean as follows:

CAUTION

Element must not be cleaned in gasoline or other petroleum solvent.

- (1) Submerge element in solution of water and non-sudsing detergent or soap (Appendix D, item 8); agitate to clean.
- (2) Rinse thoroughly, particularly if soap was used.

NOTE

Under emergency conditions, element can be re-installed in housing after 5-minute drip period. Prior to operation under dusty conditions, idle engine for a short time to complete drying.

- (3) Dry element before re-installing in housing.

- g. Check element seal, housing seal, and element fabric for damage. If damaged, notify unit maintenance.
- h. To re-install filter, reverse procedure followed in steps d and e above.

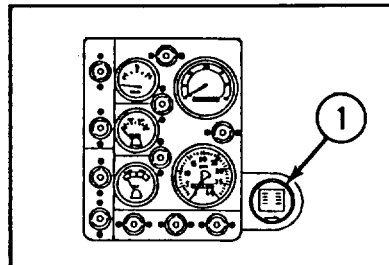
3-12. SERVICING ENGINE AIR CLEANER (NEW).

NOTE

Engine must be running when checking restriction Indicator.

a. Check restriction indicator (1) on side of gauge panel.

b. Service air cleaner when indicator is in red range.



c. If service is required, traverse turret 900 right and open left engine access cover.

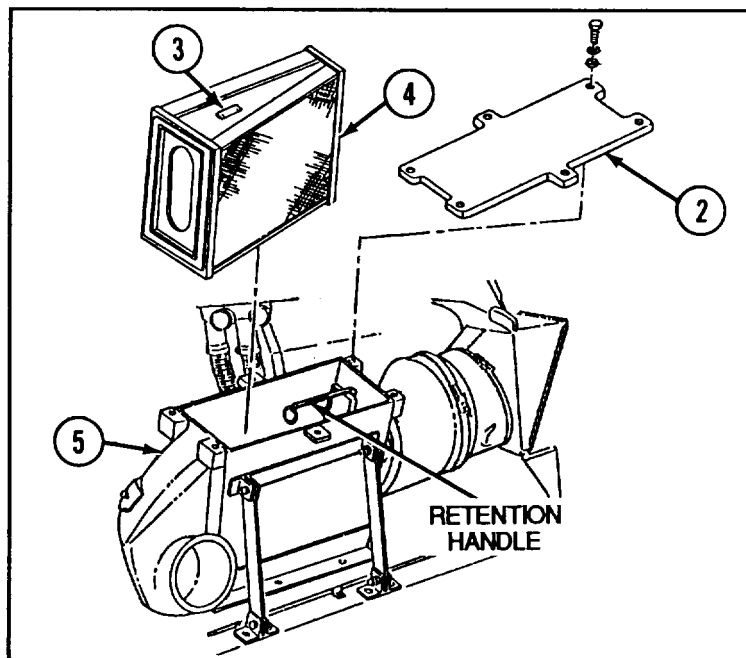
WARNING

Contaminated filters must be handled using adequate precautions (FM 3-4, FM 3-5, FM 3-7) and must be disposed of by trained personnel

d. Remove service door assembly (2).

e. Follow filter element removal instructions on instruction plate (3).

f. Lift retention handle to release filter element (4) from housing (5).



3-12. SERVICING ENGINE AIR CLEANER (NEW)-Continued.**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip-guarding and personal protective equipment (goggles/shield, gloves, etc.).

- g.** Clean element following instructions on instruction plate (3), using low-pressure air.
 - (1) Direct a flow of air against inside of element using back and forth motion.
 - (2) Repeat for outside of filter element.

NOTE

Some dirt may have blown in when outside was cleaned.

- (3) Clean inside of filter again.
- h.** If element is caked with dust or soot (or if you don't have low-pressure air), clean as follows:

CAUTION

Element must not be cleaned in gasoline or other petroleum solvent.

- (1) Submerge element in solution of water and non-sudsing detergent or soap (Appendix D, item 8); agitate to clean.
- (2) Rinse thoroughly, particularly if soap was used.

NOTE

Under emergency conditions, element can be re-installed in housing after 5 minute drip period. Prior to operation under dusty conditions, idle engine for a short time to complete drying.

- i.** Dry element before re-installing in housing.
- J.** Check element seal, housing seal, and element fabric for damage. If damaged, notify unit maintenance.
- k.** To re-install filter, reverse procedure followed in steps d through f above.
- l.** After air cleaner servicing, push reset button at restriction indicator (1) on side of gauge panel.

3-13. FUEL SYSTEM FILLIDRAIN.

WARNING

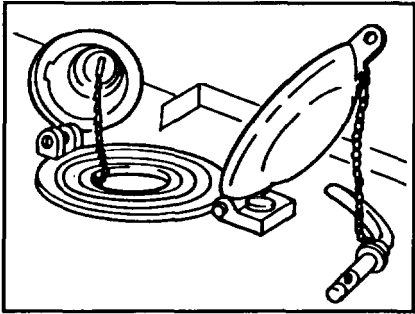
Clean up spilled fuel before and after operation and at halt in order to prevent fires.

CAUTION

In summer, drain the fuel tanks of water. Do this before operation and after amphibious (swimming) operations to prevent water from interfering with fuel flow and engine performance.

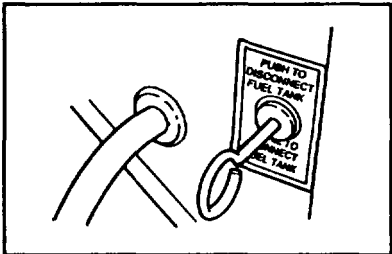
NOTE

- For proper venting when adding fuel, remove both left and right filler caps.
- Tanks hold 158 gallons of diesel fuel Maximum fueling rate is 50 gallons per minute (gpm).

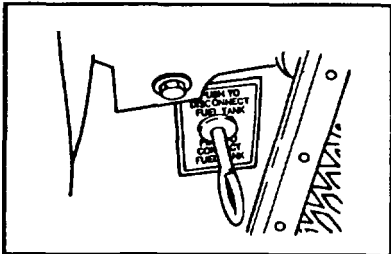


- a. **Filling Fuel System.** Fill each tank to 3 inches below filler neck while parked on level ground.
- b. **Draining Fuel System.**
 - (1) Open both fuel tank valves located in turret at left and right sides of engine bulkhead.

ROTATE TURRET TO ACCESS VALVES



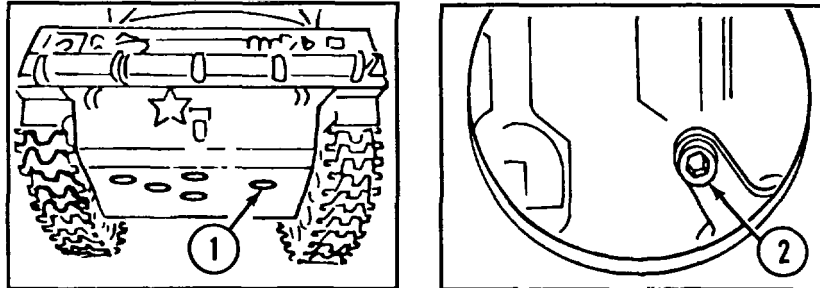
Left Fuel Tank Valve



Right Fuel Tank Valve

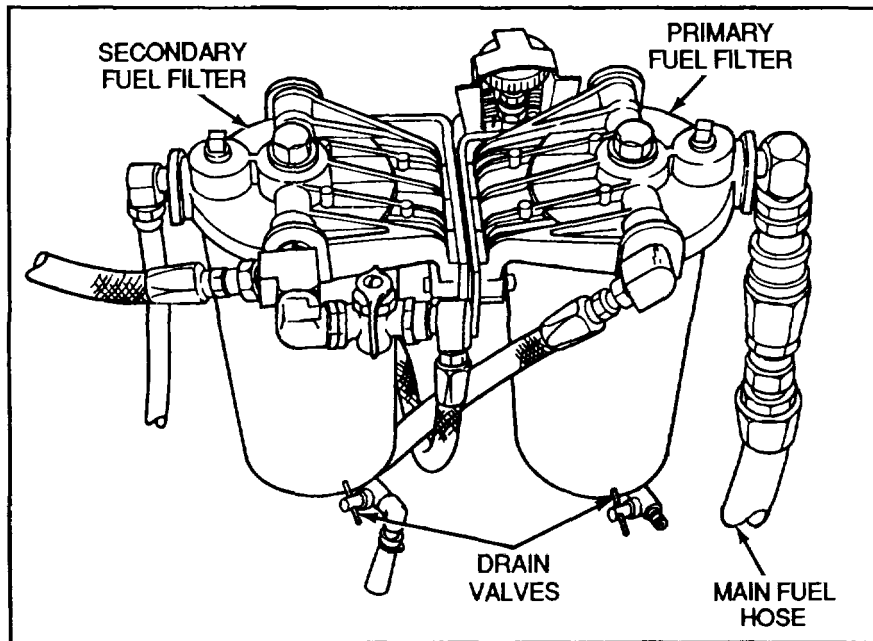
3-13. FUEL SYSTEM FILL/DRAIN-Continued.

- (2) Remove fuel tank drain access plug (1).
- (3) Remove outlet hose drain plug (2) and drain fuel into suitable container.
- (4) Replace outlet hose drain plug and access plug. Close valves.



3-14. DRAINING ENGINE FUEL FILTERS.

- a. Traverse turret 900 right and open engine access covers.
- b. Open drain valves and drain condensation into suitable container. Drain until you see clear fuel, then close valves.
- c. After all water is removed from fuel filters, drain condensation from center fuel tank with fuel drain pump (located in turret).

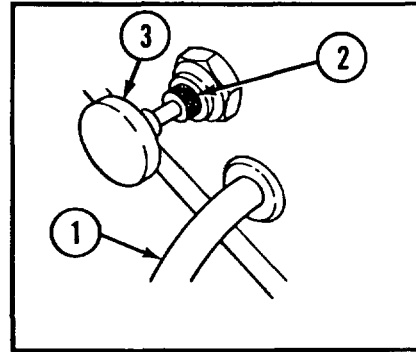


3-15. DRAINING CENTER FUEL TANK.

CAUTION

In summer, drain the fuel tanks of water. Do this before operation and after amphibious swimming) operation to prevent water from Interfering with fuel flow and engine performance.

- a. Place end of hose (1) in suitable container.
- b. Loosen nut (2) at base of handle (3).
- c. Pump handle (3). Keep pumping as long as water comes out. Stop pumping when you see clear fuel.
- d. Tighten nut (2) at base of handle.

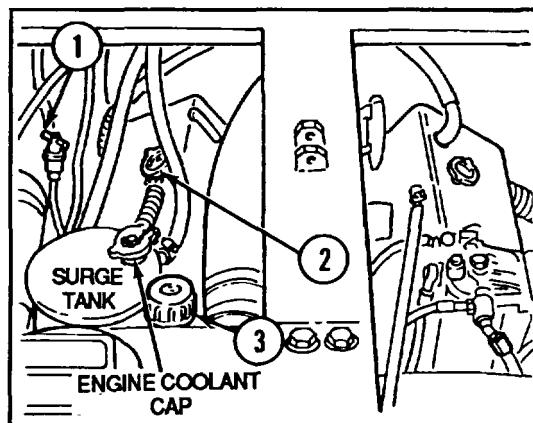


3-16. ENGINE AND TRANSMISSION OIL.

- a. Check engine oil level with dipstick (1) (turn handle and loosen rubber seal to prevent inadequate reading).
- b. Fill, as required, at filler cap (2) with proper OE/HDO or OEA oil (Appendix D, item 14, 15, 16, or 17). Reference LO 9-2350-230-12.
- c. Check transmission oil level with dipstick (3).
- d. Add oil, as required, at same place (3) oil is checked. Reference LO 9-2350-230-12 for correct level and grade of oil.

NOTE

Draining oil from either engine or transmission is done by unit maintenance.



3-17. DRAINING ENGINE BREATHER DRAIN COLLECTOR BOX AND INSPECTING HULL DRAIN HOLES.

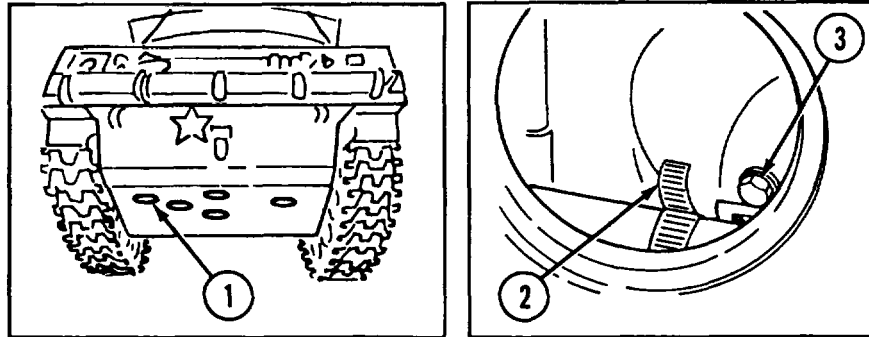
a. Engine Breather Drain Collector Box.

- (1) Remove engine oil filter hull access plug (1).
- (2) Remove outlet (2) from clip.

NOTE

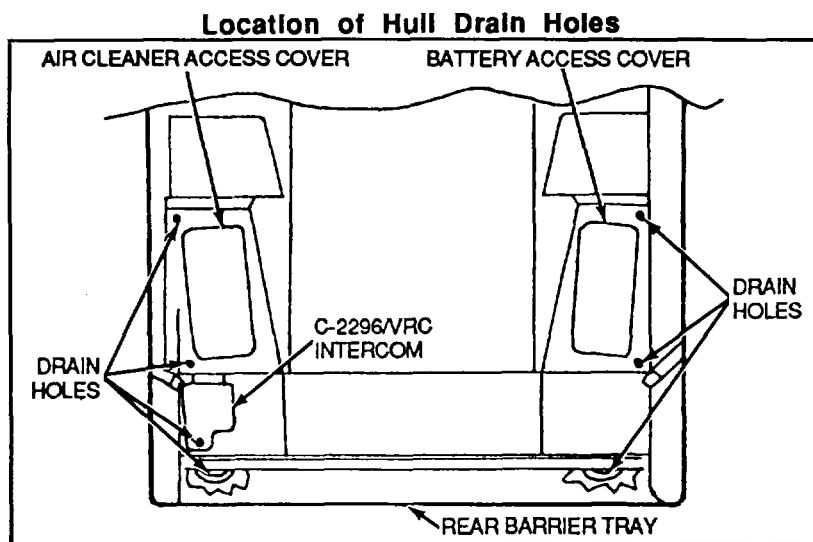
If outlet plug is removed, oil will drain out.

- (3) Loosen outlet plug (3) and drain condensation.
- (4) Tighten outlet plug (3) after condensation has been drained.
- (5) Install outlet to clip plug and oil filter access plug to hull.



b. Hull Drain Holes.

- (1) Inspect hull drain holes for debris and clogging.
- (2) Clean out drain holes.



3-18. INSPECTING BATTERIES.

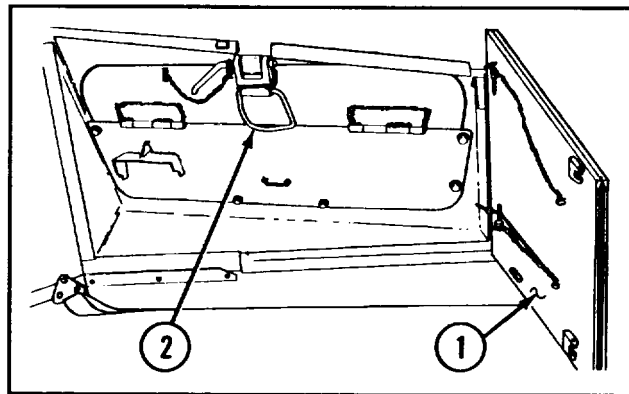
WARNING

- Do not smoke or use open flame when working around batteries. Fumes can be highly explosive.
- Acid fumes and electrolyte are harmful to eyes and skin. Upon contact, Immediately wash liberally with water and then get medical attention.

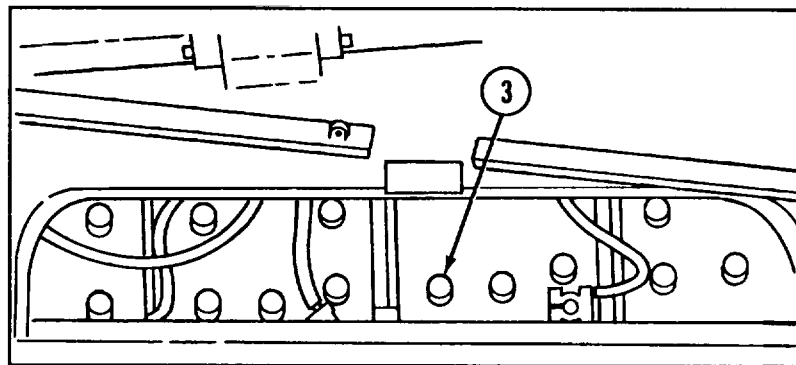
CAUTION

Batteries are heavy and can be hazardous if improperly handled. Operator will not remove batteries. Notify unit maintenance if batteries are to be removed.

- a. To inspect batteries (reference TM 9-6140-200-14), open cover doors (1) and battery access door (2).



- b. Remove 24 battery filler caps (3).



- c. Check battery electrolyte level; electrolyte should be up to split ring on battery filler opening. Add water if low. If electrolyte level is repeatedly low or batteries are boiling, notify unit maintenance. When temperature drops below 320F, run engine 5 minutes to allow water added to batteries to mix with electrolyte.

3-18. INSPECTING BATTERIES-Continued.

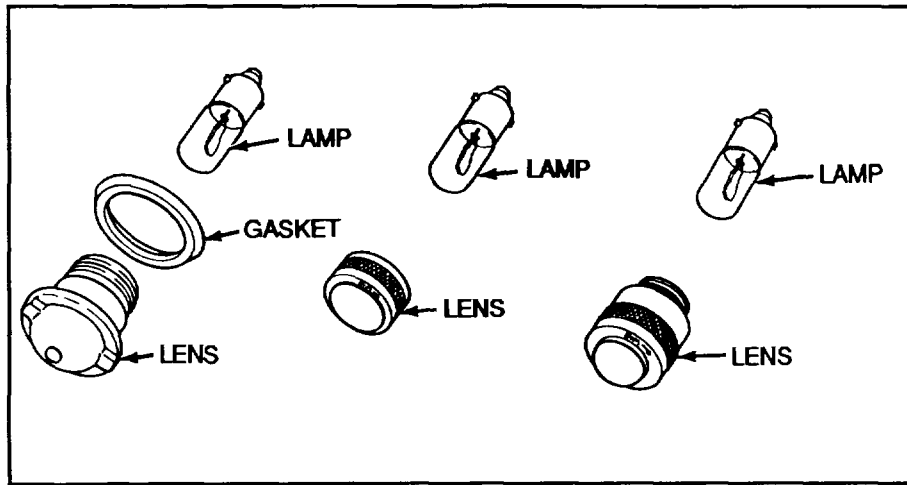
- d. Inspect lugs, terminals, and cables for corrosion. If corroded, notify unit maintenance. Check for loose battery holddowns and brackets. If loose, tighten.

3-19. HULL LAMP REPLACEMENT. Refer to table 3-2 and figure 3-1 for hull lamp replacement data.

Table 3-2. Hull Lamp Replacement

Qty	Description	Use Lamp NSN	Figure 3-1 Cross-reference
7	Drivers indicator panel (new)	6240-00-266-9940	a
1	Personnel heater control box	6240-00-950-1678	a
1	Coolant heater control box	6240-00-950-1678	a
1	C-2297/VRC intercom set control	6240-00-155-7967	a
1	Driver's dome light (under white lens)	6240-00-295-2668	b
1	Drivers dome light (under blue lens)	6240-00-019-3093	b
9	Driver's indicator panel (old)	6240-00-155-7836	c
3	Drivers switch panel	6240-00-155-7836	c
	<u>Left taillight</u>		
1	Service taillight	6240-00-019-0877	d
1	Service stoplight	6240-00-044-6914	d
1	Blackout marker light	6240-00-019-0877	d
1	C-2296/VRC intercom set control	6240-00-155-7967	d
	<u>Right taillight</u>		
1	Blackout stoplight	6240-00-019-0877	e
1	Blackout marker light	6240-00-019-0877	e
	<u>Headlight (2)</u>		
2	Blackout drive light	6240-00-044-6914	f
2	Blackout marker light	6240-00-019-0877	f

- a. **Driver's Indicator Panel (New), Personnel Heater Control Box, Coolant Heater Control Box, and C2297NVRC Intercom Set Control.** To replace lamp(s): turn lens counterclockwise to remove (be sure gasket is with lens, if applicable). Push lamp in while turning counterclockwise to remove. Install in reverse order of removal.



- b. **Driver's Dome Light.** To replace lamp(s): loosen eight screws (1) and lift door (2) over to side. Push lamp in while turning counterclockwise to remove. Install in reverse order of removal.

- c. **Driver's Switch Panel and Driver's Indicator Panel (Old).** To replace lamp(s): turn lens counterclockwise (be sure gasket stays with lens). Remove lamp by prying it off the lens. Install in reverse order of removal.

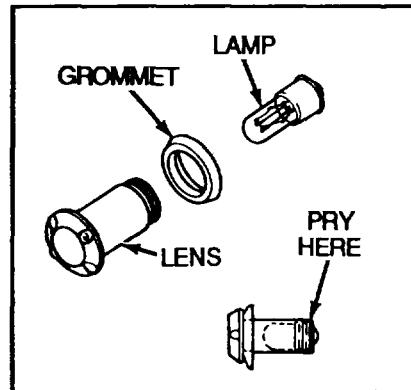
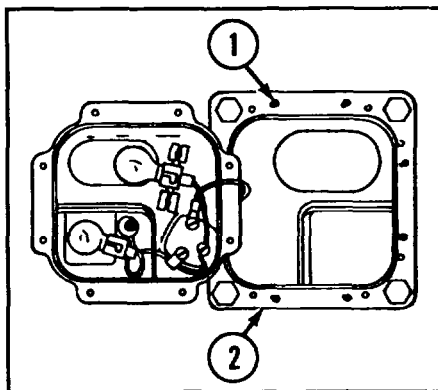
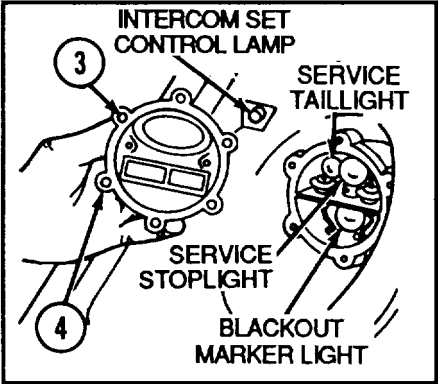


Figure 3-1. Hull Lamp Replacement (Sheet 1 of 2)

3-19. HULL LAMP REPLACEMENT-Continued.

d. Left Taillight and C-2296/VRC Intercom Set Control.

- (1) To replace service taillight, service stoplight, and blackout marker lamp(s): loosen six screws (3) and remove taillight cover (4). Push lamp in while turning counterclockwise and remove. Install in reverse order of removal.
- (2) To replace intercom set control lamp: turn lens counterclockwise and remove. Push lamp in while turning counterclockwise and remove. Install in reverse order of removal.



- e. **Right Taillight.** To replace taillight blackout stoplight or blackout marker lamp(s): loosen six screws (5) and remove taillight cover (6). Push lamp in while turning counterclockwise and remove. Install in reverse order of removal.

- f. **Headlight(s).** To replace left or right headlight blackout drive or blackout marker lamp(s): loosen four screws (7), four lockwashers (8), and headlight cover (9) (screws and washers remain in cover). Push lamp in while turning counterclockwise and remove. Install in reverse order of removal.

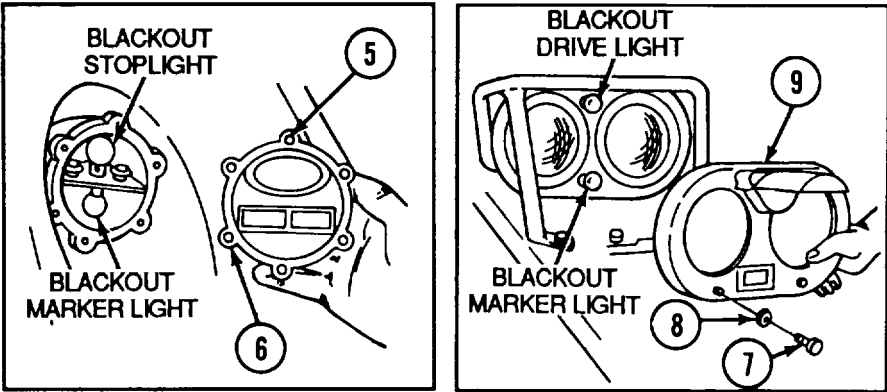


Figure 3-1. Hull Lamp Replacement (Sheet 2 of 2)

3-20. TURRET LAMP REPLACEMENT. Refer to table 3-3 and figure 3-2 for turret lamp replacement data.

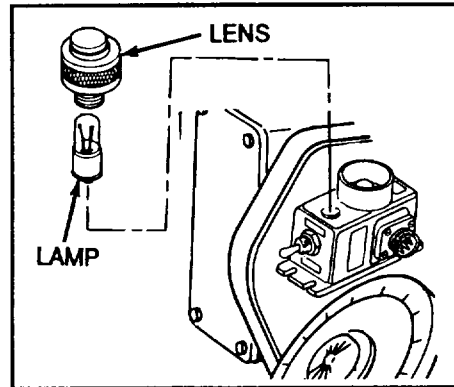
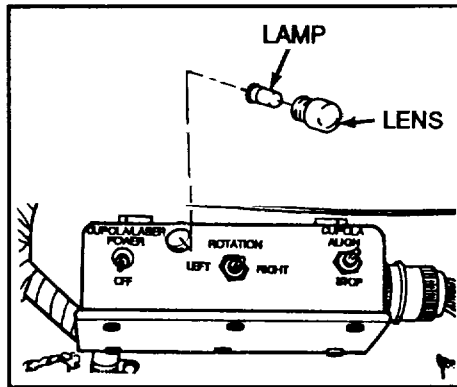
Table 3-3. Turret Lamp Replacement

Qty	Description	Use Lamp NSN	Figure 3-2 Cross-reference
1	Cupola control assembly	6240-00-155-7836	a
1	Grenade launcher arming firing unit	6240-00-763-7744	b
7	Gun and turret selector box	6240-00-080-2012	c
1	Emergency telescope reticle ready light	6240-00-155-7836	d
3	Dome light (white lens-one lamp each dome light)	6240-00-295-2668	e
3	Dome light (blue lens-one lamp each dome light)	6240-00-019-3093	e
15	Missile remote control test set	6240-00-155-7836	f
1	Checksight lamp	6240-00-909-5473	f
1	Loaders control box	6240-00-155-7836	9
2	Azimuth indicator	6240-00-051-4843	h
4	Periscope M44 series panel assembly	6240-00-155-7836	
1	Periscope M44 series	1240-00-817-9803	
2	Telescope M119 or M127IM127A1	6240-00-921-4493	k
2	Receiver transmitter RT-246(*)VRC	6240-00-155-7836	1
2	Receiver-transmitter RT-524(*)VRC	6240-00-155-7836	m
2	Radio receiver R-442(*)NRC	6240-00-155-7836	n
1	Audio frequency amplifier AM-1 78ONRC	6240-00-155-7836	0

3.20. TURRET LAMP REPLACEMENT-Continued.

a. **Cupola Control Assembly.** To replace lamp, turn lens counterclockwise. Make sure lamp socket does not turn. Remove lamp by prying off from lens. Install in reverse order of removal.

b. **Grenade Launcher Arming Firing Unit.** To replace lamp, turn lens counter-clockwise. Make sure lamp socket does not turn. Remove lamp by prying off from lens. Install in reverse order of removal.



c. **Gun and Turret Selector Box.** To replace lamp(s): turn lens counterclockwise (be sure O-ring stays with lens and lamp socket does not turn). Remove lamp by prying it off from lens. Install in reverse order of removal.

d. **Emergency Telescope Reticle Ready Light.** To replace lamp, turn lens counterclockwise (be sure lamp socket does not turn). Remove lamp by prying it off from lens. Install in reverse order of removal.

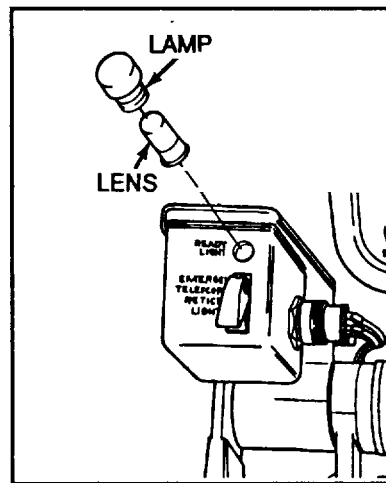
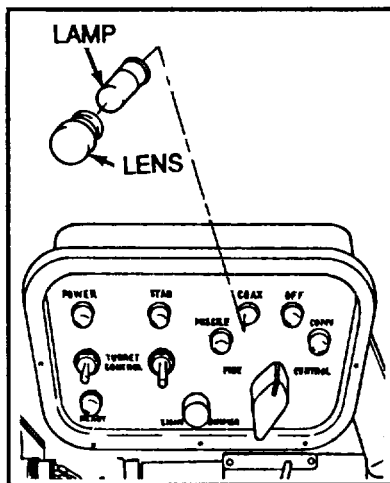
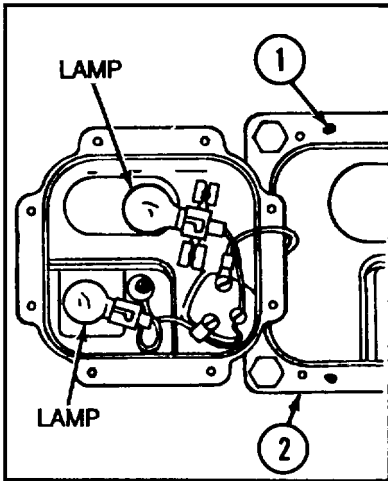
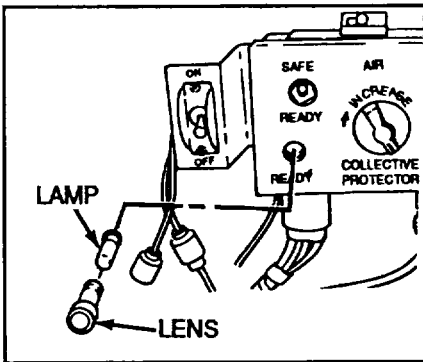


Figure 3-2. Turret Lamp Replacement (Sheet 1 of 4)

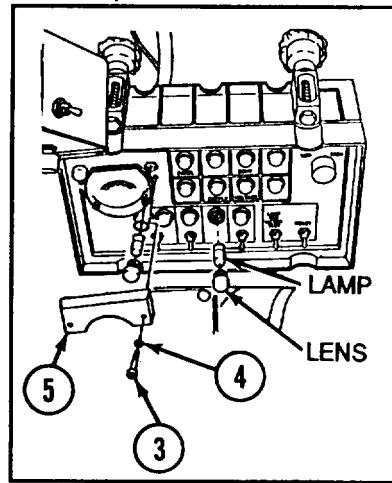
- e. **Dome Lights.** To replace lamp(s): loosen eight screws (1) and lift door (2) over to side. Push lamp in while turning counterclockwise to remove. Install in reverse order of removal.



- g. **Loader's Control Box.** To replace lamp, turn lens counterclockwise. Remove lamp by prying it off from lens. Install in reverse order of removal.



- f. **Missile Remote Control Test Set and Checksight Lamp.** To replace lamp(s): turn lens counterclockwise (be sure gasket stays with lens). Remove lamp by prying it off from lens. Install in reverse order of removal. To replace meter lamp(s): remove two socket head keys (3), washers (4), and cover (5). Turn lens counterclockwise and remove lamp by prying it off from lens. Install in reverse order of removal.



- h. **Azimuth Indicator.** To replace lamp, turn lens counterclockwise. Remove lamp by prying it off from lens. Install in reverse order of removal.

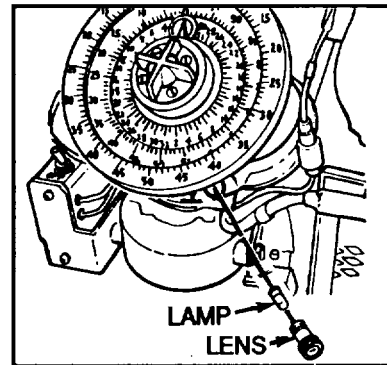


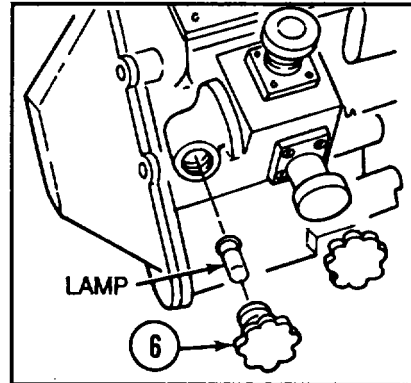
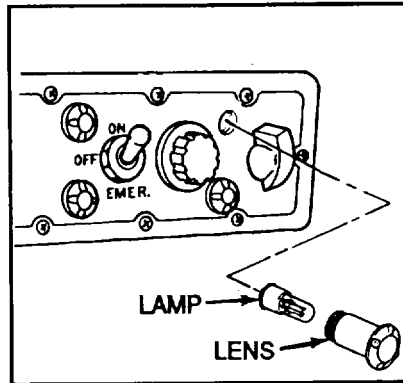
Figure 3-2. Turret Lamp Replacement (Sheet 2 of 4)

3-20. TURRET LAMP REPLACEMENT-Continued.

i. Periscope M44 Series Panel Assembly. To replace lamp(s): turn lens counterclockwise. Remove lamp by prying it off from lens. Install in reverse order of removal.

j. Periscope M44 Series.

To replace reticle lamp, turn reticle assembly (6) counterclockwise. Push lamp in while turning counterclockwise to remove. Install in reverse order of removal.



k. Telescope M119 or M127IM127A1.

- (1) To replace missile reticle lamp, push in and turn lampholder (7) counterclockwise to remove. Then push in lamp while turning counterclockwise to remove. Install in reverse order of removal.
- (2) To replace conventional reticle lamp, release catch and open cover (8), then push in lamp while turning counterclockwise to remove. Install in reverse order of removal.

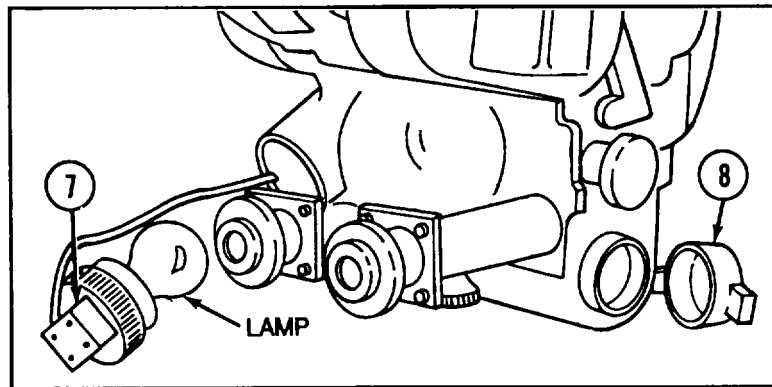
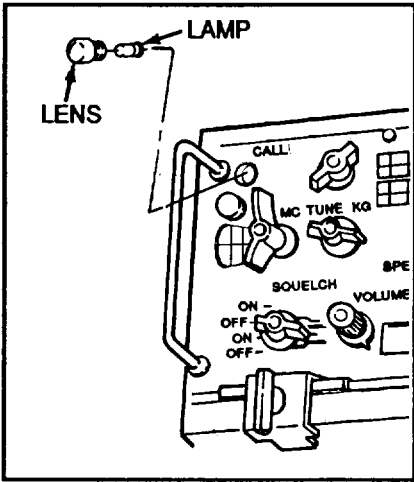
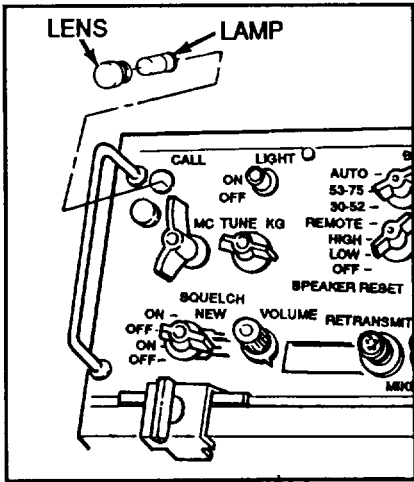


Figure 3-2. Turret :Lamp Replacement (Sheet 3 of 4)

- i. **Radio Receiver Transmitter RT-246(*)/VRC.**
To replace lamp(s): turn lens counterclockwise. Remove lamp by prying it off from lens. Install in reverse order of removal.
- m. **Radio Receiver Transmitter RT-524(*)/VRC.**
To replace lamp(s): turn lens counterclockwise. Remove lamp by prying it off from lens. Install in reverse order of removal.



- n. **Radio Receiver R-442 (*)NRC.** To replace lamp(s): turn lens counterclockwise. Remove lamp by prying it off from lens. Install in reverse order of removal.

- o. **Audio Frequency Amplifier AM-1780/VRC.** To replace lamp, turn lens counterclockwise. Remove lamp by prying it off from lens. Install in reverse order of removal.

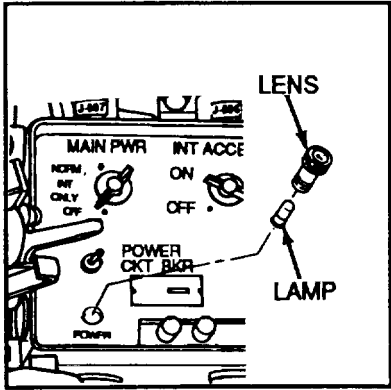
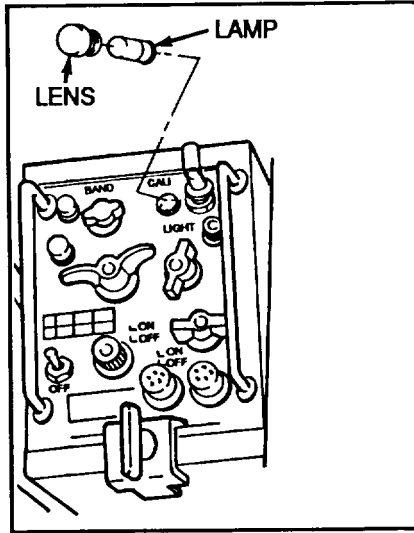


Figure 3-2. Turret Lamp Replacement (sheet 4 of 4)

3-21. TRACKS.

a. Checking Track Tension.

NOTE

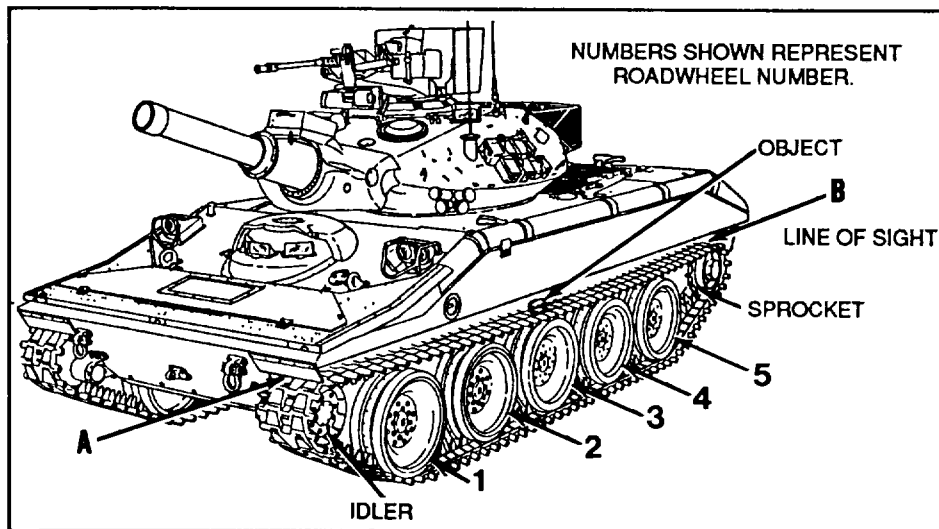
Sag in track between idler and sprocket must be kept between 3 1/2 and 4 inches at no. 3 roadwheel. Check track tension before and after vehicle operation.

- (1) Position vehicle on hard-face ground or pavement and allow it to coast to a stop before checking track tension.

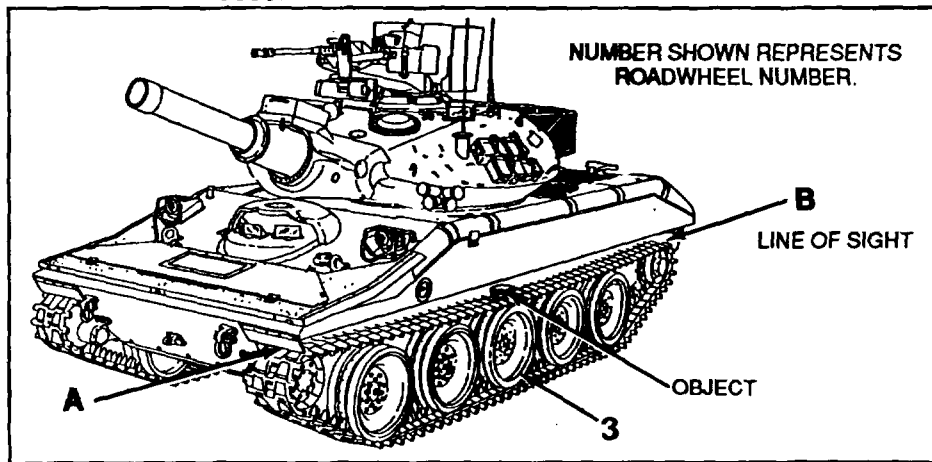
NOTE

Object can be canteen drinking cup, wood block, or any item of correct dimension (3 1/2 by 4 inches).

- (2) Place object (3 1/2 inch dimension upright) on track directly over no. 3 roadwheel.
- (3) Push in front mud guard and sight from point A (top of track on idler) to point B (top of track on sprocket).
 - (a) If top of object is in line with line of sight, track adjustment is correct.
 - (b) If top of object is above line of sight, track is too tight. Decrease track tension (see paragraph 321, a, 6) as required.
 - (c) If top of object is below line of sight, track may be too loose. Move to next step as a double check.



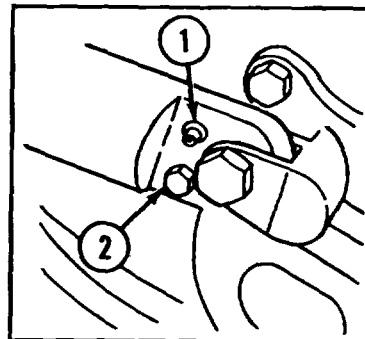
- (4) Place object (4-inch dimension upright) on track directly over no. 3 roadwheel.
 - (a) Track adjustment is correct if object obscures line of sight.
 - (b) If top of object is on or below line of sight, track is too



NOTE

Position of grease fitting (1) and pressure bleed plug (2) may be reversed in some vehicles.

- (5) Pump grease (Appendix D, item 12) into grease fitting (1) on track hydraulic adjuster until tension is adjusted.



WARNING

Do not stand in front of track hydraulic adjuster plug while releasing. Plug is under pressure and could come off with great force.

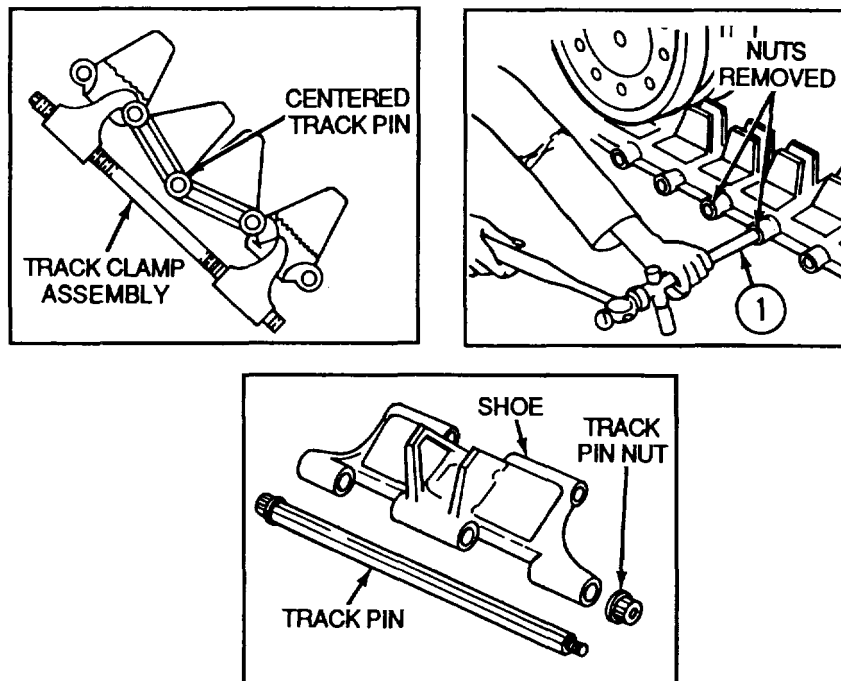
NOTE

If track sag cannot be taken up, decrease track tension, remove one track shoe, and adjust track tension.

- (6) If necessary, open pressure bleed plug (2) on track hydraulic adjuster and reduce pressure until tension is adjusted. Tighten plug.

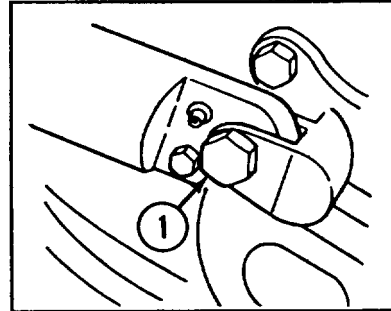
3-21. TRACKS-Continued.**b. Removing a Track Shoe.**

- (1) Remove a track shoe by decreasing track tension (see paragraph 3-21, a, 6) and installing clamp assembly (see paragraph 3-21, c, 3) and then continuing as follows.
- (2) Remove outside track pin nuts from adjacent track pins securing one shoe.
- (3) Drive out track pin centered in clamp assembly; then withdraw drift-pin (1).
- (4) Tap shoes with hammer or pry with crowbar to separate shoes. If necessary, loosen clamp assembly to disengage shoes.
- (5) Drive out second track pin and remove shoe from track.
- (6) Tighten clamp assembly while guiding loose shoe into position with fixed shoe. Use crowbar if necessary.
- (7) Install drift-pin through track shoe bushings from vehicle side of track.
- (8) To align track shoes for insertion of track pin, see paragraph Ca 3-21, d, steps 7 through 11.

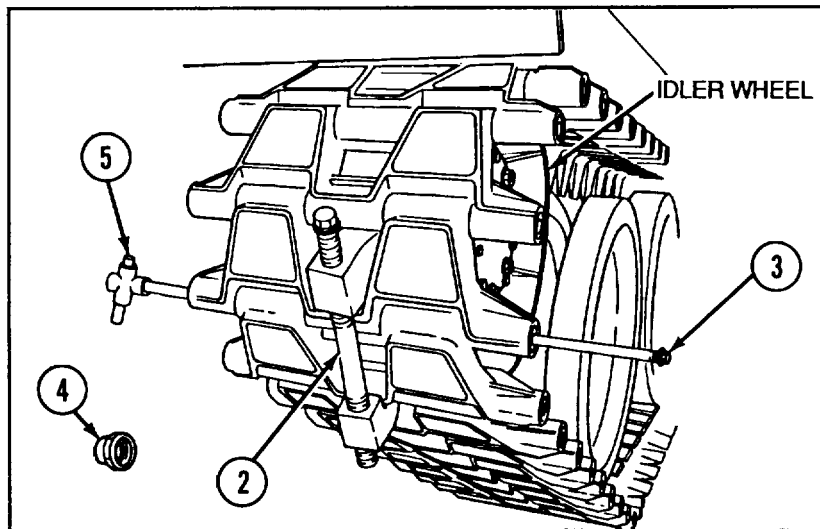


c. Removing Track.

- (1) Bring vehicle to a coasting stop on level ground without applying brake. Block track on other side.
- (2) Loosen pressure bleed plug (1) on track adjuster to decrease track tension.



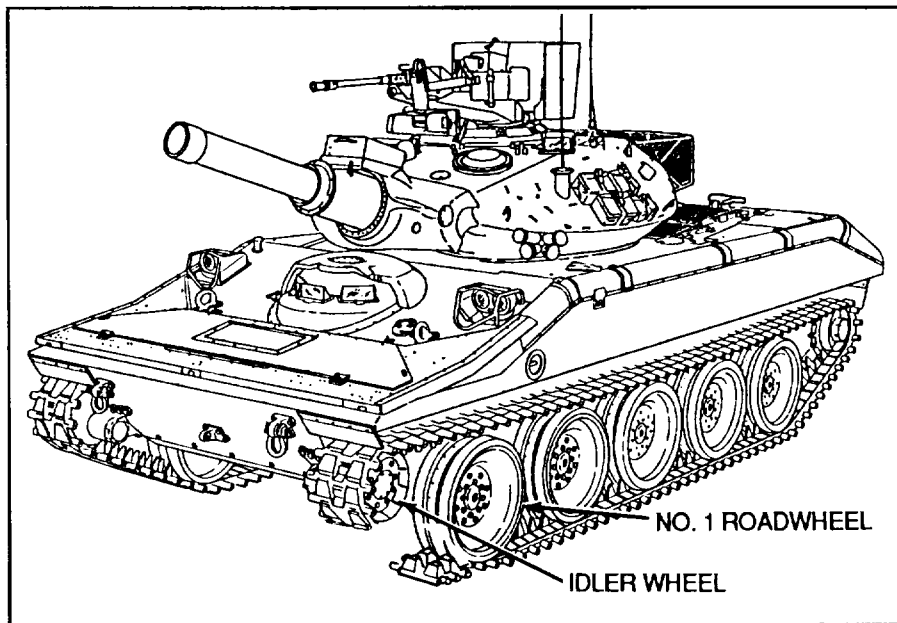
- (3) Install clamp assembly (2) between idler wheel and no. 1 roadwheel. Using wrench socket and handle, tighten to relieve tension from track pin (3).
- (4) Remove one track pin nut (4) and CAREFULLY drive track pin (3) out, using drift-pin (5).
- (5) Remove clamp assembly (2) and block from opposite Wrack. Drive vehicle slowly rearward until clear of track.

**d. Installing Track.**

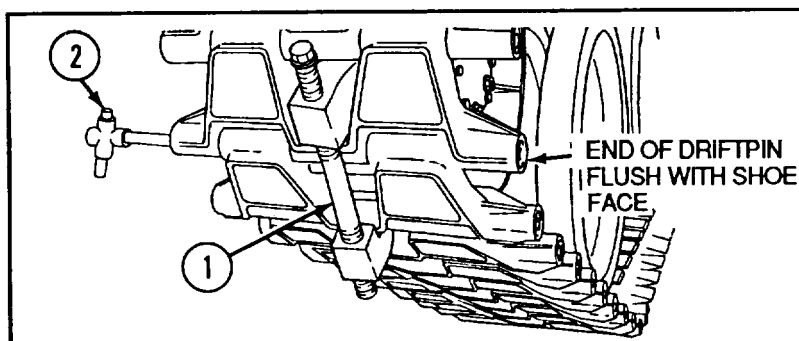
- (1) Drive vehicle forward slowly onto track until rear end of track on ground may be raised over and engaged with drive sprocket.

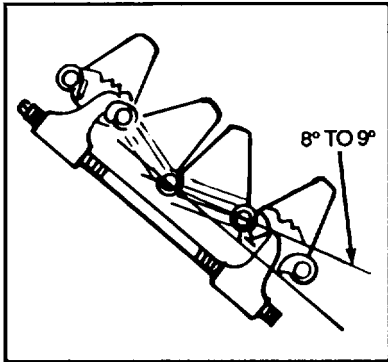
3-21. TRACKS-Continued.

- (2) Continue driving forward guiding track over roadwheels; stop when end of track on ground is midway between idler wheel and no. 1 roadwheel.

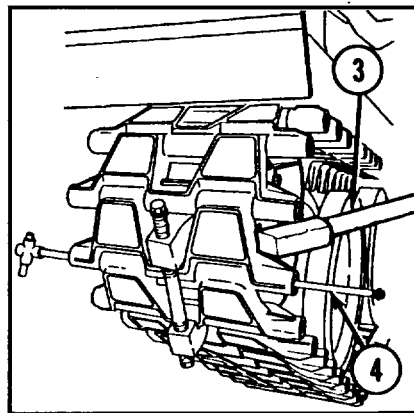


- (3) Shut off engine; leave parking brake off. Block opposite track.
- (4) Insert crowbar through track and pry forward over idler wheel to pull track tight.
- (5) Install clamp assembly (1) and tighten until track pin holes are aligned.
- (6) Drive drift-pin (2) from behind, through track pin holes, until flush with front face of shoe.





- (7) To properly align hex in shoes, depress connecting shoes 8 to 9° with crowbar (3) and drive track pin (4) in place.



- (8) Install one track pin nut and tighten.
- (9) Remove clamp assembly and adjust track tension (see paragraph 3-21, a).
- (10) Use paint (Appendix D, item 10) to mark track shoes where nuts have been disturbed.
- (11) As soon as possible, notify unit maintenance to torque disturbed nuts to 120-130 lb-ft; torque again after 50 miles.

e. Emergency Short-Tracking.

NOTE

A vehicle with a track blown off, damaged roadwheels, or broken Idler wheel can be short-tracked and made drivable.

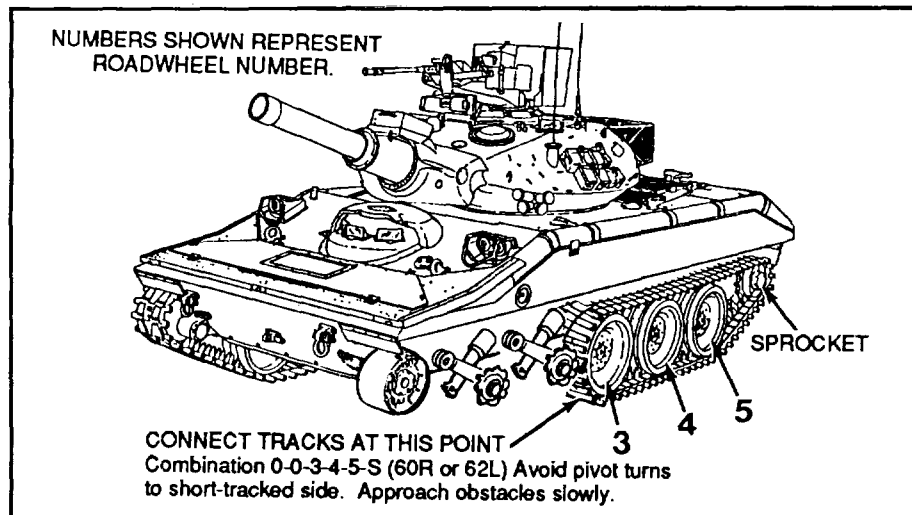
- (1) Select section of track to be used. If track is damaged, select least damaged shoes; remove remainder of track and stow on vehicle.
- (2) Maneuver and align section of track in front of roadwheels.

3-21. TRACKS-Continued.

NOTE

It may be necessary to break track into smaller sections for handling. Reconnect sections.

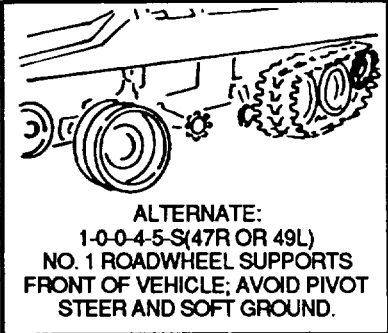
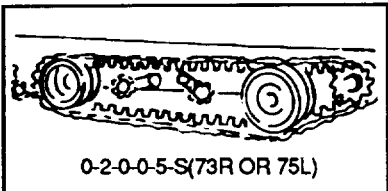
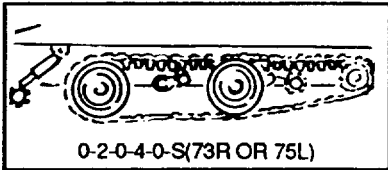
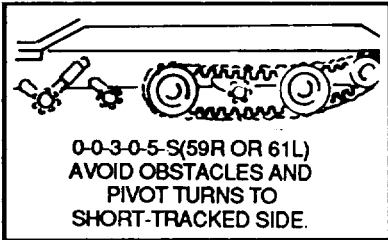
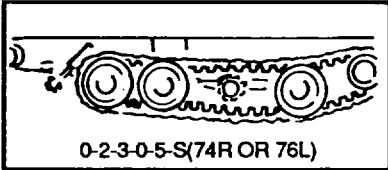
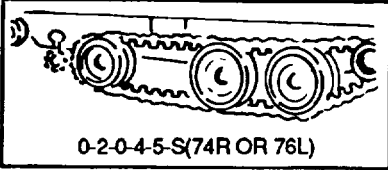
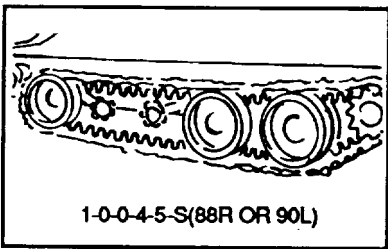
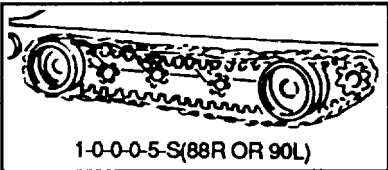
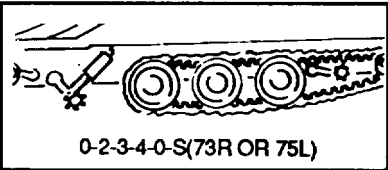
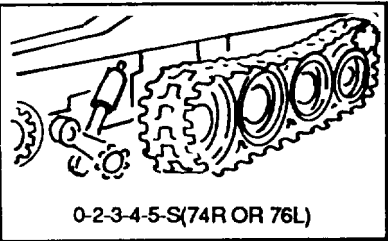
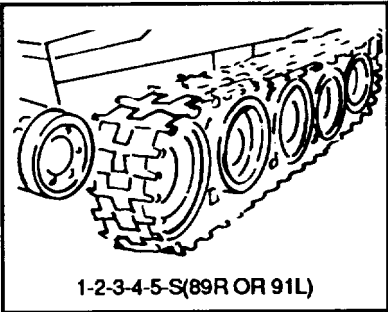
- (3) Drive vehicle slowly forward onto track.
- (4) As soon as vehicle position on track permits, guide rear end of track over sprocket so sprocket teeth engage track (use track pin or drift-pin to guide track).
- (5) Drive vehicle slowly forward, guiding top of track to 7: 00 to 7: 30 o'clock position at front of lead roadwheel.
- (6) Using clamp assembly, pull ends of track together. To connect track, remove some slack as follows: block behind leading roadwheel, and between wheel and track. Steer away from short-tracked side and very carefully apply power in forward gear to tighten track. Install track pin (see paragraph 3-21, d, steps 7 through 11).
- (7) Tie up any remaining roadwheel arms to avoid interference with obstacles and damage to spindles and arms.



NOTE

- The following are operable sprocket and roadwheel combinations (O Indicates removed roadwheel). Number of track shoes required is in parentheses.
- The left track requires two more shoes than the right track due to offset of torsion bars.

(8) When operating short-tracked vehicle, do not exceed 10 mph forward, 4 mph reverse, or 2 mph over an obstacle. Pivot and steering crossing obstacles are normal except with certain combinations of wheels (see panels).

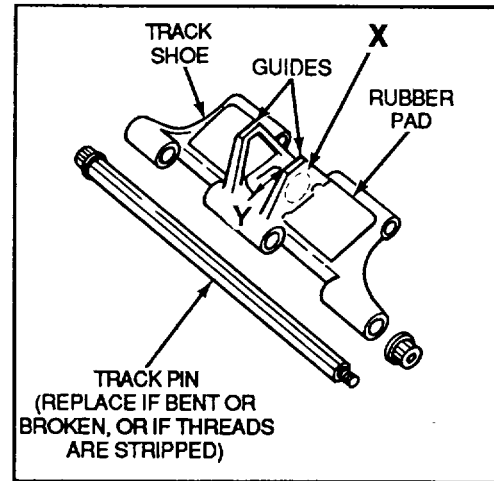


3-21. TRACKS-Continued.

- (9) Avoid pivot turns toward short-tracked side, when possible.
- (10) Steering will react slowly toward full-tracked side, quickly toward short-tracked side.

f. Criteria for Track Shoe Replacement.

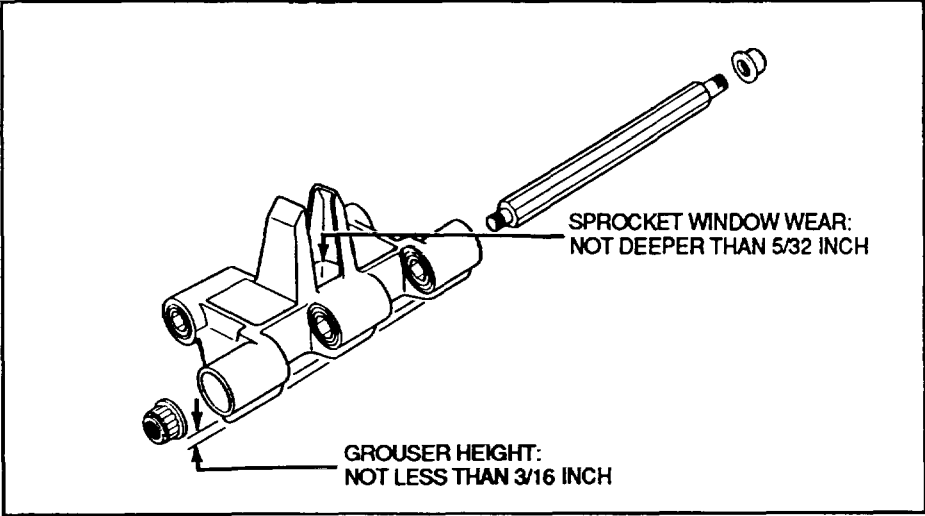
- (1) When both track shoe guides are missing on a single shoe, or when three or more guides in a row are damaged, shoe(s) should be replaced.
- (2) A guide is considered missing when 75% of guide is gone, and is considered damaged if more than 1/3 of guide is missing or guide is bent and interferes with related components. Replace shoe if thickness of guide at point X is less than 1/8 of an inch.

*Track Shoe and Pin Detail*

- (3) Shoes with wear notch in sprocket opening at point Y deeper than 5/32 of an inch are to be replaced.
- (4) If 25 or more guides are missing, entire track should be replaced.
- (5) In cases of emergency, three or more consecutive shoes with missing or damaged guides may be separated and relocated pending later replacement.
- (6) When rubber pads are missing from guide side of track shoe, replace shoe.
- (7) When 10% of rubber pads are missing from road side of one track assembly, replace all shoes involved. Replace shoes when grouser height is less than 3/16 of an inch.
- (8) When rubber pads are missing from three or more consecutive shoes, replace shoes or intermix with good shoes.

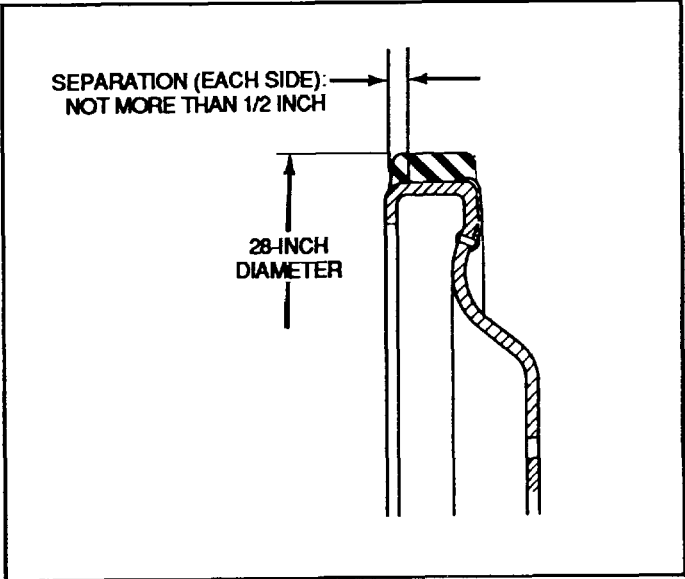
g. **Track inaction Criteria.** Inspect track for wear limits using measurements shown below.

Point of Reference and Track Wear Limits



h. **Roadwheel Inspection Criteria.** Inspect roadwheels for wear using measurements shown below. Illustrated examples of unserviceable roadwheels follow.

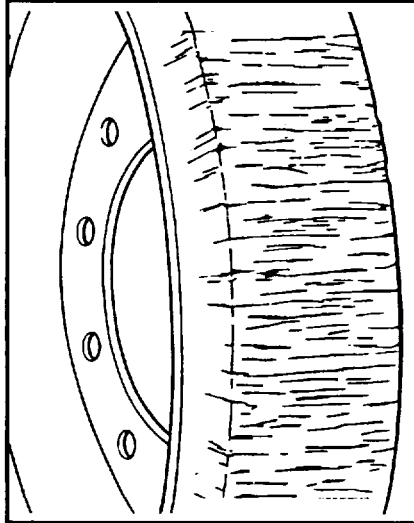
Roadwheel Wear Limits



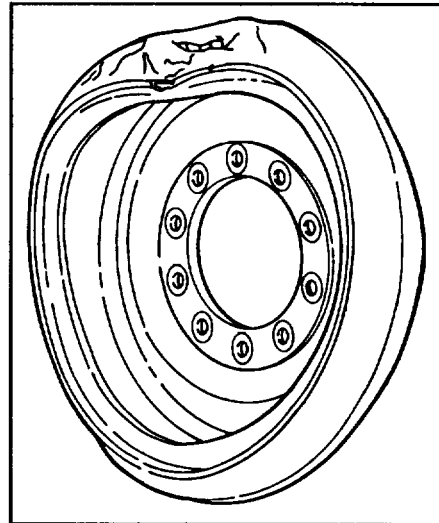
3-21. TRACKS-Continued.

Typical Damage to Roadwheels

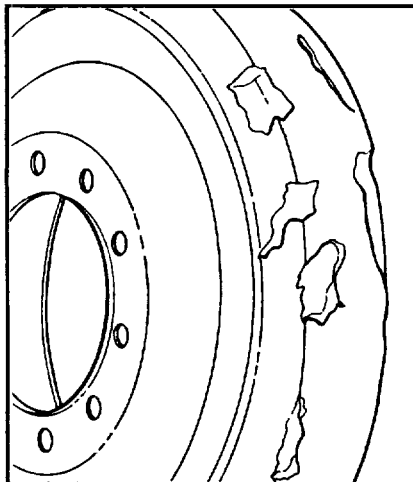
Unserviceable roadwheel-
weather cracks extending
completely across tread surface.



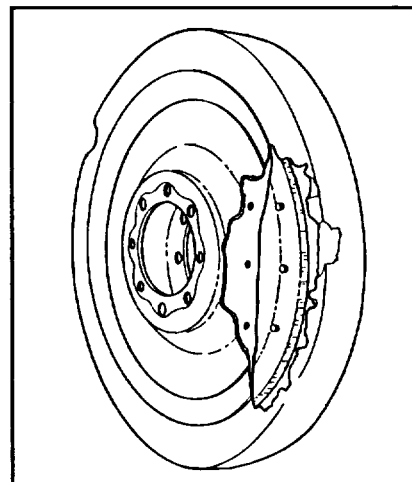
Unserviceable roadwheel-
bent.



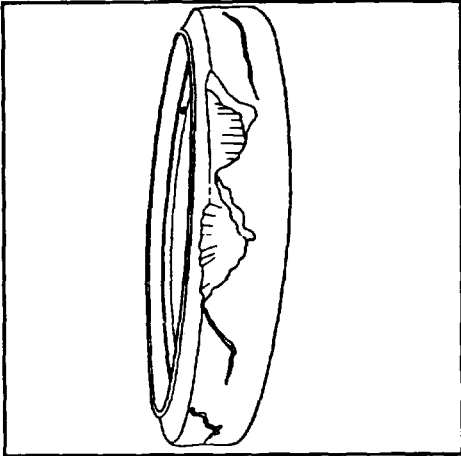
Unserviceable roadwheel-
chunking in excess of 20
percent.



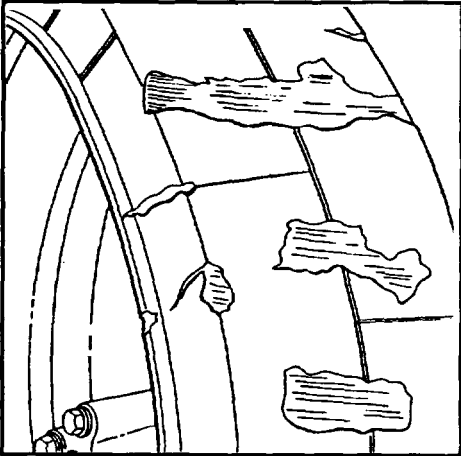
Unserviceable aluminum
roadwheel-replaceable wear
flange worn through.



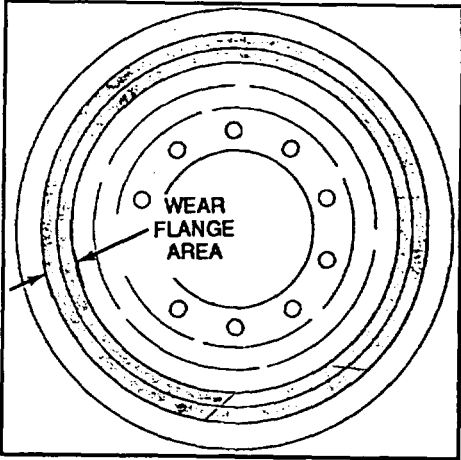
Unserviceable roadwheel-
chunking more than half the
width of the tire.
across tread.



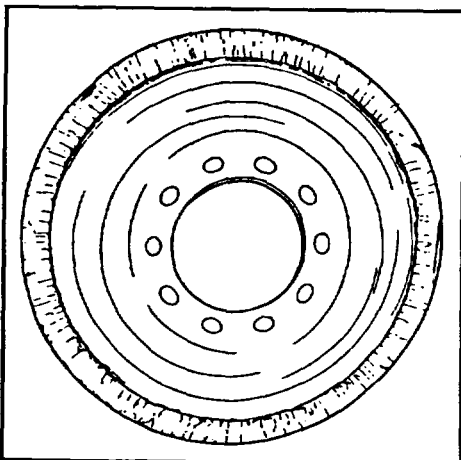
Unserviceable roadwheel-
damaged tread surface and
chunking extending completely
across tread.



Unserviceable roadwheel-
wear flange worn beyond
acceptable limits.

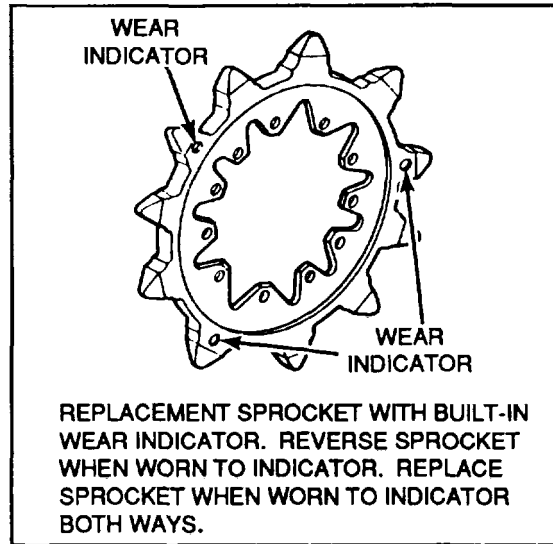


Unserviceable roadwheel-
elongated bolt holes.



3-21. TRACKS-Continued.

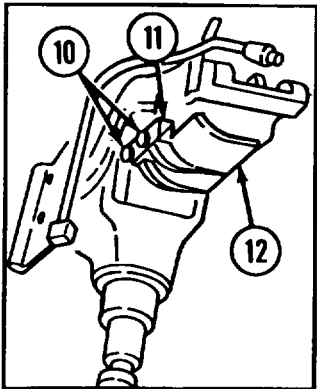
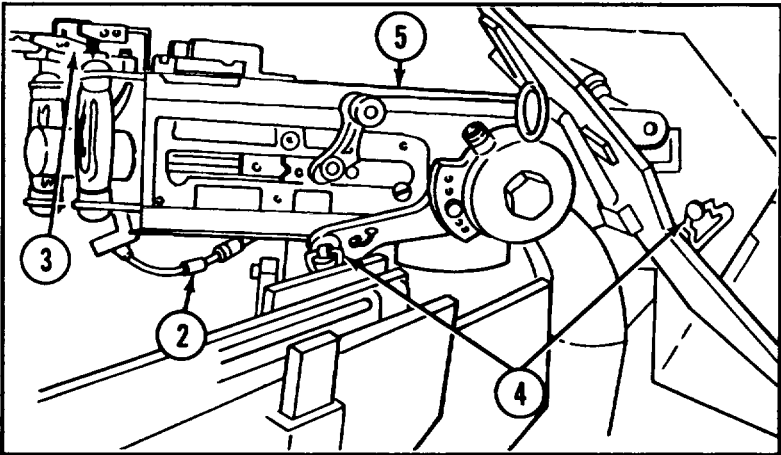
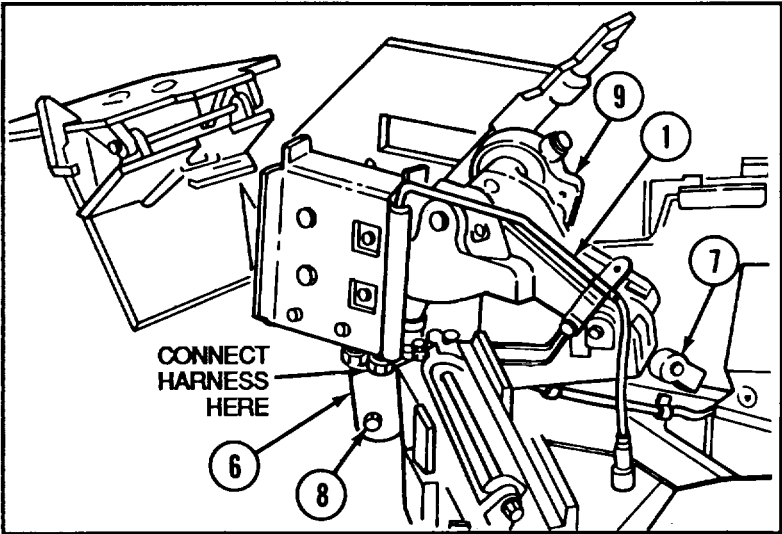
- i. **Sprocket Inspection.** Two types of sprockets may be issued with the M551A1/M551NTC vehicle. One type of sprocket has wear indicators and the other type must be gauged. If your vehicle does not have wear indicators, unit maintenance must gauge the sprocket; otherwise, check for wear as explained below.



3-22. CAL .50 MACHINE GUN (M551A1).

a. Removal/Installation of Cal .50 Machine Gun from Cupola.

- (1) Disconnect cupola traverse switch wiring harness (1) from switch assembly quick disconnect (2).
- (2) Remove four screws and cupola traverse switch assembly (3).
- (3) Remove two locking pins (4) and machine gun (5).
- (4) Disconnect support cable assembly (6) from cupola traverse switch wiring harness (1). Release travel lock lever (7) and quick release pin (8).
- (5) Remove ammo box tray from mount and remove cradle-pintle (9) from pintle support assembly.
- (6) Remove two bolts and washers (10), clamp (11), and ejection chute (12).
- (7) Install in reverse order of removal.



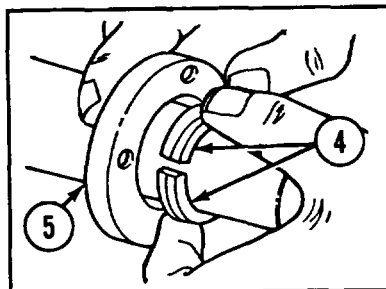
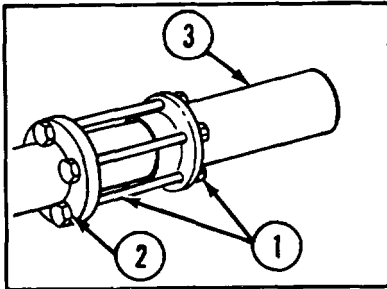
3-22. CAL .50 MACHINE GUN (M551A1)-Continued.

b. Removal/Installation of Barrel, Carrier, and Flash Hider.

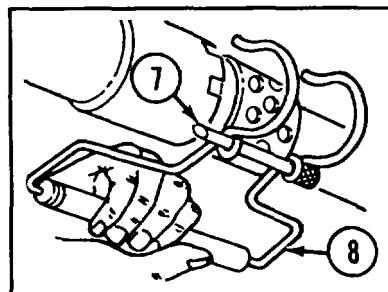
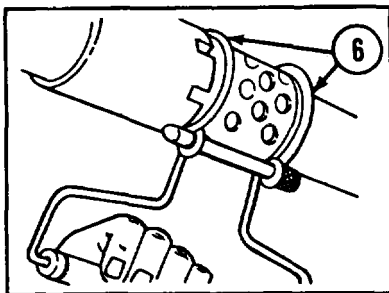
WARNING

Hot barrel requires use of asbestos mittens or gloves (Appendix D, Item 20).

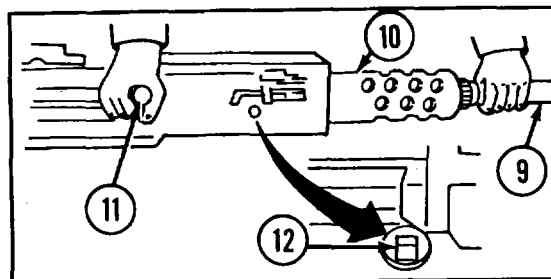
- (1) Remove bolts (1), nuts (2), and flash hider cone (3).
- (2) Remove ring segments (4) and ring (5).



- (3) Unhook clamps (6) from grooves in barrel.
- (4) Remove bolt (7) and carrier (8).



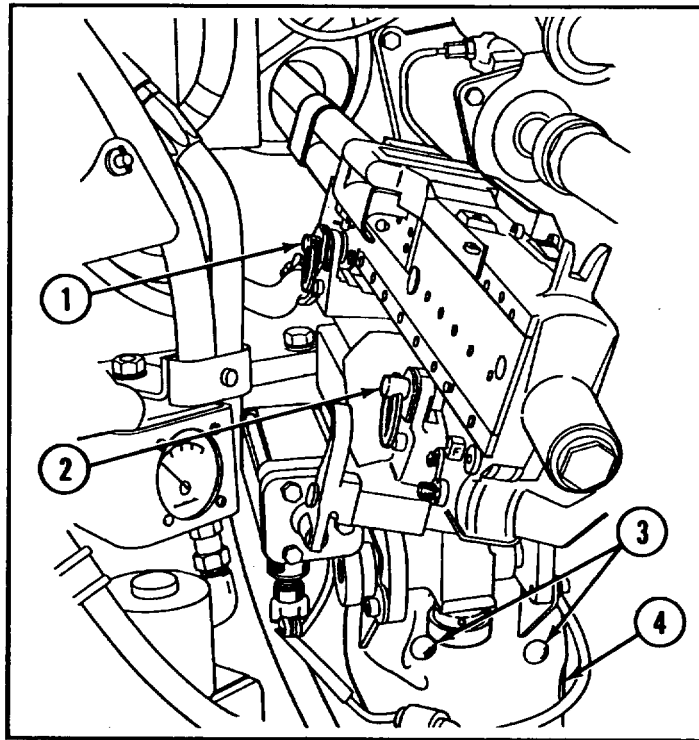
- (5) Unscrew barrel extension (9) from barrel (10).
- (6) Unlock barrel locking spring, slide handle (11) forward, and remove barrel (10).
- (7) Install in reverse order of removal, centering lug (12) in barrel locking spring hole.



3-23. 7.62-MM MACHINE GUN (M551A1).**a. Removing 7.62-mm Machine Gun and Empty-Cartridge Bag.****WARNING**

Make sure 7.62-mm machine gun is cleared of ammo.

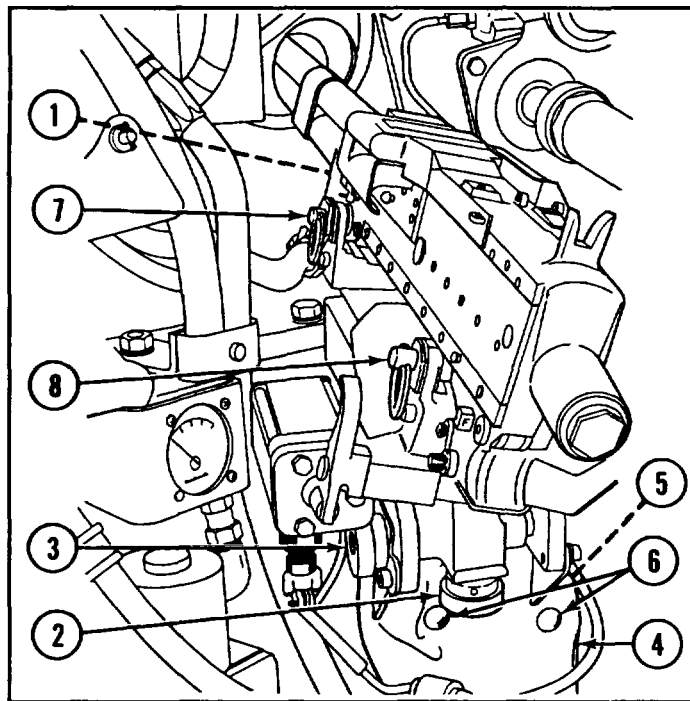
- (1) Pull front pin assembly (1) and rear pin assembly (2) out from one detent to next detent. 7.62-mm machine gun will be loose in mount, but pin assemblies will still be partially installed.
- (2) Lift base of 7.62-mm machine gun and then pull to rear to remove.
- (3) Install travel lock (stowed in oddment box under loader's seat) in place of 7.62-mm machine gun.
- (4) Push in front pin assembly (1) and rear pin assembly (2) until they snap in detents to secure travel lock.
- (5) Release snap fasteners (3) securing empty-cartridge bag (4) to bag support.
- (6) Remove empty-cartridge bag (4).



3.23. 7.62-MM MACHINE GUN (M551A1)-Continued.

b. Installing 7.62-mm Machine Gun and Empty-Cartridge Bag.

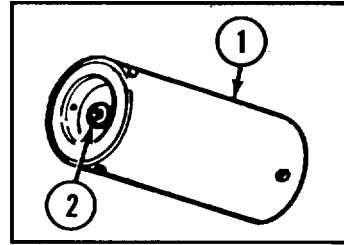
- (1) For initial installation of 7.62-mm machine gun on mount: (a) Loosen mounting block nut (1). Preset mount by turning elevation knob (2) clockwise until rear mounting bracket bottoms onto flange of elevation shaft.
 - (b) Turn elevation knob (2) counterclockwise for 23 clicks.
 - (c) Turn traversing knob (3) clockwise until traversing and elevating bracket backs up to its bottom of travel.
 - (d) Turn traversing knob (3) counterclockwise for 31 clicks.
- (2) Place empty-cartridge bag (4) on bag support (5) and secure with snap fasteners (6).
- (3) Pull front pin assembly (7) and rear pin assembly (8) out from one detent to next detent. Travel lock will be loose in mount, but pin assemblies will still be partially installed. Remove travel lock and stow in oddment box (under loader's seat).
- (4) Insert 7.62-mm machine gun into mount, and push in front pin assembly (7) and rear pin assembly (8) until they snap in detents. Tighten mounting block nut (1) until 7.62-mm machine gun is secured.



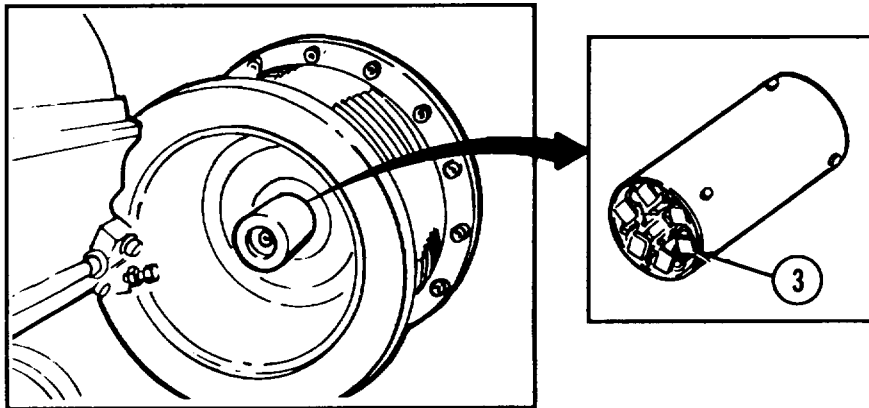
3-24. GUN/LAUNCHER (M551A1).

a. Checking Continuity of Firing Mechanism.

- (1) Turn on vehicle MASTER SWITCH.
- (2) Cock actuator (1) by pressing button (2).



- (3) Open breech. If needed, clean dirt and oil from firing probe (of firing mechanism) and chamber. Firmly seat magnetized end (3) of actuator over firing probe. Manually close breech.



- (4) Place SAFE/READY switch in READY position.

WARNING

Make sure personnel are clear of outside of turret and path of gun/launcher.

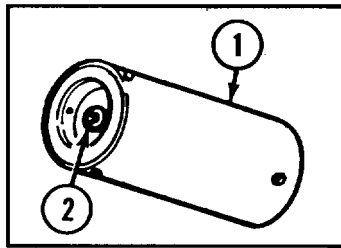
CAUTION

Don't use actuator on any power source other than those described below; it is designed only for these conditions.

- (5) Turn on TURRET CONTROL switch. Turn FIRE CONTROL selector to MISSILE, and obtain a READY light.
- (6) Don't pull any triggers. Rotate handwheel one complete turn. Open breech and check plunger. If button protrudes, call unit maintenance. Repeat these steps with FIRE CONTROL selector in OFF, COAX, and CONV positions.

3-24. GUN/LAUNCHER (M551A1)-Continued.

- (7) With palm switch depressed, fire gun from gunner's or commander's control handle.
- (8) Open breech and check actuator (1). You've got continuity if actuator button (2) is tripped (popped out). If button isn't tripped, notify unit maintenance.
- (9) Cock actuator and close breech by hand. Turn FIRE CONTROL selector to CONV and repeat steps 7 and 8.
- (10) Cock actuator and close breech by hand. Fire from blasting machine and check continuity (see step 8).



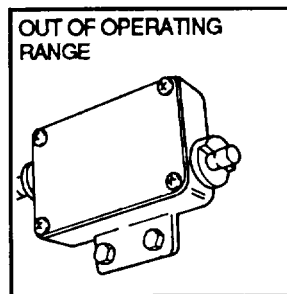
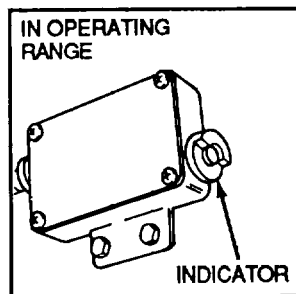
b. Maintaining Recoil Hydraulic Pressure and Fluid Level.

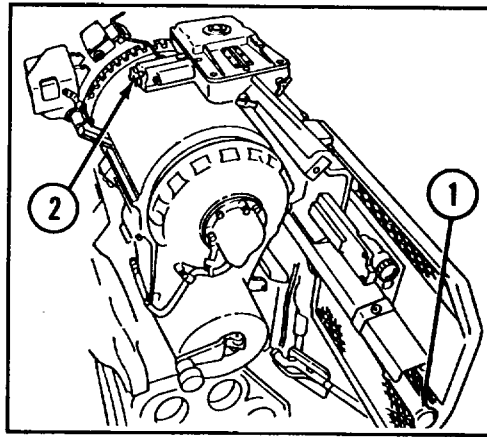
NOTE

• *Maintaining correct pressure and fluid level will give you the needed cushioning effect for the gun's recoil.*

• *Always check the pressure before adding or draining the hydraulic fluid.*

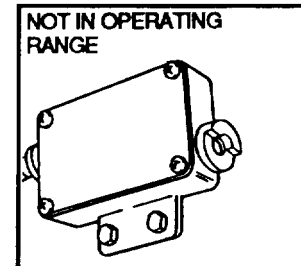
- (1) If indicator rod is in operating range, be sure replenisher handle (1) is secured with strap.
- (2) If indicator rod is out too far because pressure is low: pump replenisher handle (1) until rod goes back to operating range.



**NOTE**

- An automatic relief and bypass valve dumps any excess pressure.
- Step 3 is necessary only in case of malfunction.

- (3) If indicator rod is in too far:
- (a) Combat situations. Open bleed valve (2) until rod comes out to operating range.
 - (b) Non-combat situations. Notify unit maintenance.

**c. Checking Recoil Hydraulic Fluid Level.****NOTE**

During firing, fluid level may rise as fluid expands from heat. If it rises to top line on gauge at 265 mils elevation, drain the excess. When fluid cools, more may have to be added.

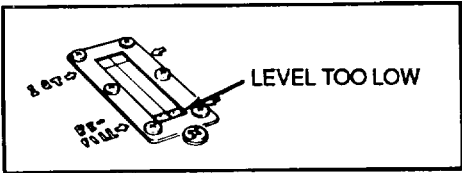
- (1) Check if indicator rod is in operating range. If not, adjust pressure first. Any adjustments can change fluid level.
- (2) Elevate gun to 265 mils and check fluid level.
- (3) Level is acceptable when between 1 qt and refill mark.

CAUTION

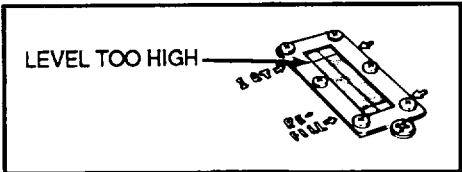
When adding fluid, be careful not to stick spout of can through filter.

3-24. GUN/LAUNCHER (M551A1)-Continued.

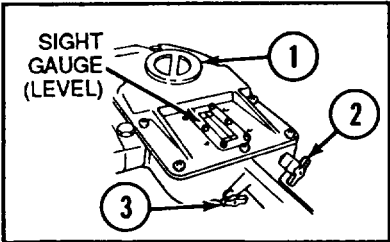
(4) Level too low: add fluid at filter cap (1).



(5) Level too high: drain at reservoir drain cock (2).



(6) Once a month, elevate gun/launcher and open condensation drain (3) to remove condensation from recoil reservoir.



Recoil Reservoir

d. Determining Remaining Life of Gun/Launcher.

You can fire all the missiles you want and it won't fatigue your gun/launcher, BUT use of conventional ammo causes tremendous pressure buildup that results in metal fatigue and tube stress. This eventually wears out your gun/launcher and you'll need a new one. Your direct support personnel may borescope your weapon. This will not determine the remaining life and, for this weapon, there is no pullover gauge to tell you when your gun/launcher needs to be replaced. To tell when your gun/launcher needs to be replaced, compare the number of equivalent full charge (EFC) rounds with the round life of your gun/launcher.

e. EFC Round. The EFC round lets you count down the life of the gun/launcher by the numbers. For conventional ammo, EFC round count is determined by ambient temperature.

Each conventional round when:	EFC round
Outside temperature is below 105OF	1
Outside temperature is above 105'F	2

f. Recording the EFC Round. For your own protection, you'll have to keep an accurate record of the EFC rounds fired. After a firing mission, grab your equipment logbook and fill out DA Form 2408-4 (Weapon Record Data); DA PAM 25-30 tells you how. Do not lose your 2408-4 card.

3-24. GUN/LAUNCHER (M551A1)-Continued.

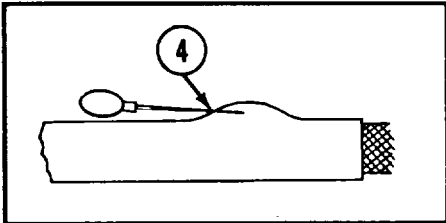
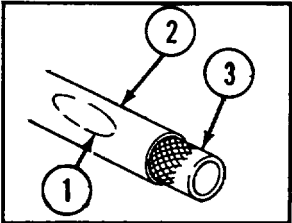
Component	Inspecting and Cleaning
Optical surfaces	<p>Brush lightly with clean artist's brush (Appendix D, item 2). To remove oil or grease below 32°F, moisten lens tissue paper (item 21) with alcohol (item 11) and clean. When cleaning optical surfaces above 32°F, use liquid lens cleaning compound (item 7) and lens paper (item 21).</p>
	<p style="text-align: center;">Missile Subsystem Units</p> <p style="text-align: center;">Inspecting</p>
Overall	<p>Check that all components are free from grease, dirt, foreign matter, rust, corrosion, and excessive wear.</p>
	<p style="text-align: center;">Cleaning</p>
Metal parts	<p>At regular intervals, and especially after operating in muddy, sandy, or dusty terrain, wipe equipment with a clean cloth (Appendix D, item 23) to remove dust, dirt, or grease.</p>
Transmitter door 2350-230-12).	<p>Lubricate hinge and actuating rod (reference LO 9-</p>
Transmitter lenses	<p>Refer to cleaning optical surfaces above.</p>

3-25. DEBLISTERING CBSS HOSE.

NOTE

A blister (1) develops when air gets trapped between the outer cover (2) and metal braided layers (3). Be sure to deblisten correctly-the idea is to puncture only the outer layer without damaging inner layers.

- a. Use awl, large needle, or some other sharp-pointed tool to puncture blister.
- b. With tool as near parallel to hose as possible, insert point (4) at base of blister. Rub out blister towards puncture.



3-26. SERVICING REQUIREMENTS FOR UNIT MAINTENANCE. Scheduled services performed by unit maintenance at specific intervals are listed in table 3-5. Notify unit maintenance when scheduled services become due (check your equipment logbook). Enter completion of scheduled services on appropriate logbook forms in accordance with DA PAM 738-750.

Table 3-5. Equipment Inspection List

Assembly, Component, or Procedure	Interval
Type III detent	Vehicles equipped with a type III detent do not require servicing unless there is smoke or fire leakage; In this case, unit maintenance is to be notified.
CBSS check valve (M551A1)	Not to exceed 100 rounds between cleanings (more frequently if there is carbon build-up or decrease in CBSS air volume). Upon completion of firing when additional firing is not anticipated.
Firing mechanism (M551A1)	Every 90 days when not firing. Not to exceed 200 conventional rounds. Every 90 days when not firing.
Compressor (CBSS) air intake filter/strainer oil level operation (M551A1)	Weekly or after 400 rounds or 30 hours of compression operation.
Replace cartridge	After 400 rounds or 30 hours of compression operation; more frequently under dusty conditions.
Drain and refill with oil	Quarterly or after 50 hours of compression operation; more frequently during extreme conditions such as extremely high or low temperatures or prolonged operation periods.
Service compressor (M551A1) Beam pattern check Cable assembly (U cord) (M551A1)	1200 rounds or 100 compressor hours. Semiannually. Quarterly.

3-26. SERVICING REQUIREMENTS FOR UNIT MAINTENANCE---Continued.

Assembly, Component, or Procedure	Interval
Electric drive and main weapons system tests (tests performed with fault isolation test set)	Quarterly.

3-27.GAS-PARTICULATE FILTER UNIT.

- a. **General.** Vehicle operator is responsible for maintaining filter unit to insure that it works at all times.
- b. **Operational Services.** Refer to PMCS (table 2-1) for all BEFORE procedures. These checks will be done each day vehicle is used.
- c. **Gas and Particulate Filter Serviceability.** For your maximum safety, it is vital that gas and particulate filters of gas-particulate filter unit be fully serviceable.

(1) Table 3-6 gives conditions that require replacement of these filters. Vehicle operator is responsible for notifying unit maintenance when one or more of these conditions exists.

WARNING

Contaminated filters must be handled using adequate precautions (FM 3-4, FM 3-5, FM 3-7) and must be disposed of by trained personnel.

- (2) Unit maintenance is responsible for changing filters.
- d. **Spring Clip Replacement.** Replace spring if:
 - (1) Missing or damaged.
 - (2) Rubber gasket missing or does not seal properly.
- e. **Airflow Control Cap Replacement.**
 - (1) Replace airflow control cap if:
 - (a) Missing or damaged.
 - (b) Cracked.
 - (2) Install new cap by disconnecting air hose and stretching center ring of device over manifold port.

f. Air Purifier.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes. DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The flash point is 100-1380F. If you become dizzy while using cleaning solvent, get fresh air immediately and seek medical aid. If contact with the eyes is made, wash your eyes with water and get medical aid immediately.

- (1) Wipe air purifier with a cloth moistened with SD dry cleaning solvent (Appendix D, item 24) and slide spring clip over air intake holes when finished operating unit.
- (2) Check for damaged or missing parts.
- (3) Install solid caps on all purifier manifold outlet pockets not connected to a hose.

Table 3-6. Replacement of M12A1 Gas and M13 Particulate Filters In M8A3

NOTE

You'll need unit maintenance for replacement of the filters when any of the following conditions exist.

Condition for Filter Replacement
<p>Gas Filter Change Criteria: Change M12A1 gas filter when any one of the following conditions exist:</p> <ul style="list-style-type: none"> • Physical damage. • Water immersion. • Low airflow to mask (see table 3-1, malfunction 72). • 5000-mile vehicle overhaul (peacetime). • 10, 000 hours of vehicle operation (wartime-no chemical agent operations). • 1500 hours of vehicle operation (approx. 5 months) (wartime-chemical agent operations). • At beginning of combat conditions and use of AC (hydrogen cyanide) or CK (cyanogen chloride) is expected.

3-27. GAS-PARTICULATE FILTER UNIT-Continued.

Condition for Filter Replacement---Continued.

- As soon as possible after each AC or CK attack.

Particulate Filter Change Criteria: Change M13 particulate filter whenever any of the following conditions exist:

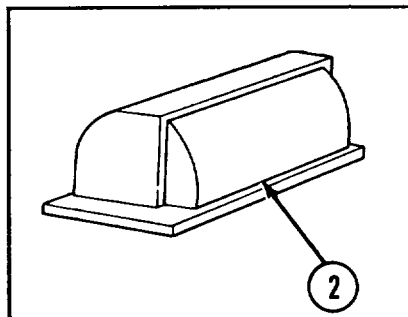
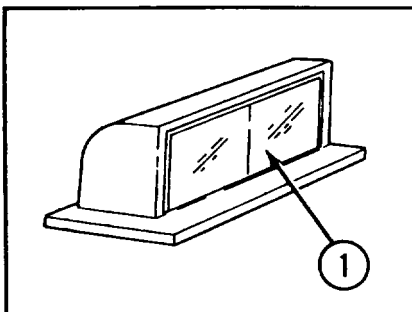
- Physical damage.
- Gas filter is changed.
- Particulate filter becomes clogged, resulting in insufficient airflow to any crewmember station.

3-28. CLEANING OF EXTERIOR OPTICAL WINDOWS AND LENSES, TTS.

CAUTION

- *Gunner's TTS periscope window front surface coating (1) is easily damaged.*
- *Do not attempt to remove frosting or abrasive dirt in any way which may cause damage to the coating.*
- *Do not use hot water or water under high pressure.*
- *Do not breathe on window surface.*
- *Do not disassemble.*
- *Keep ballistic shield cover (2) closed when TTS day/night sight is not in use.*

a. Basic Cleaning Procedures.



- (1) Using lens tissue (Appendix D, item 21), moisten surface of window or lens with small amount of liquid optical cleaning compound (item 7).

(2) Using a clean sheet of lens tissue (Appendix D, item 21), fold into triangle, having three or more thicknesses between fingers and surface to be cleaned. Starting at center and cleaning outward, move in a circular motion.

(3) Repeat steps 1 and 2 (as necessary) for all windows and lenses.

CAUTION

- *Optical glass is easily scratched.*
- *Clean only with clean lens tissue (Appendix D, Item 21).*
- *Do not use same place of lens tissue twice.*
- *Do not use excessive pressure.*

b. Cleaning After Exposure to Water, Rain, or High Humidity.

- (1) Clean windows and lenses following basic cleaning procedures. If system is exposed to salt water, flush windows and lenses with clean (drinking quality) water to remove any abrasive particles before cleaning.
- (2) Remove fogging, frost, or ice following basic cleaning procedures.
- (3) Remove caked-on mud or dirt from window using the following method:
 - (a) Rinse window with clean (drinking quality) water to soften mud or dirt.

CAUTION

Do not scrape off mud or dirt; use only lens tissue (Appendix D, Item 21) to pinch mud or dirt from window.

- (b) Using lens tissue (Appendix D, item 21), gently pinch mud or dirt off window.
- (c) If necessary, repeat steps a and b above.
- (d) Pat dry with clean lens tissue (Appendix D, item 21).
- (e) Clean window following basic cleaning procedures.
- (f) Repeat steps b, 1 through b, 3 for all windows and lenses.

CHAPTER 4 AMMUNITION

4-1. GENERAL. This section contains descriptions and diagrams of the ammunition used by the M551A1. Also included is packaging information, and stowage and handling instructions.

4-2. 152-MM CONVENTIONAL AMMO.

a. Authorized Rounds.

- (1) Authorized rounds of conventional ammo are listed in table 4-1.
- (2) This family of ammo is issued as fixed (complete and permanently assembled) rounds. It consists of these five types:

HE-T-High-Explosive with Tracer (figure 4-1).

HEAT-T-MP-High-Explosive Anti-Tank with Tracer, Multipurpose (figure 4-2).

Canister-Flechette-loaded, antipersonnel (figure 4-3).

TP-T-Target Practice with Tracer.

Dummy-Inert-loaded, drill.

b. Firing Tables. FT 152-A-1 contains firing data for 152-mm ammo.

c. Identification.

- (1) Complete rounds are identified by color (type of ammo) and marking (type, model number, lot number, caliber, weapon, etc.). Markings are stenciled on projectile in appropriate color. See table 4-1 for color coding, figures 4-1 and 4-3 for marking.
- (2) You can also identify 152-mm ammo by its distinctive cartridge case. Texture of nonmetallic case is similar to fiberboard; color is light yellow.

4-2. 152-MM CONVENTIONAL AMMO-Continued.

Table 4-1. Authorized Rounds

Color of Round	Action of Projectile	Fuse	Tactical Use
Cartridge, 152-mm: HE-T, M657A2 (M657) w/ fuse, PD: M720A1 (M720)	Olive-drab w/ yellow marking	Super-quick	Antipersonnel, antimateriel
Cartridge, 152-mm: HEAT-T-MP, M409 series w/ fuse, PIBD: M539	Black w/ yellow marking	Super-quick	Defeat armor, antipersonnel, antimateriel
Cartridge, 152-mm: canister, M625 series	Olive-drab w/ white marking and band of white diamonds	Un-fused	Antipersonnel (effective in dense foliage)
Cartridge, 152-mm: TP-T M411A3, (M411) w/ fuse, PD: M557	Blue w/ white marking and one yellow band	Super-quick	Training
Cartridge, 152-mm: TP-T M411A1, M411A2, M411A3	Blue w/ white marking	Un-fused	Training
Cartridge, 152-mm: dummy M596	Blue w/ white marking	Un-fused	Drill (handling)

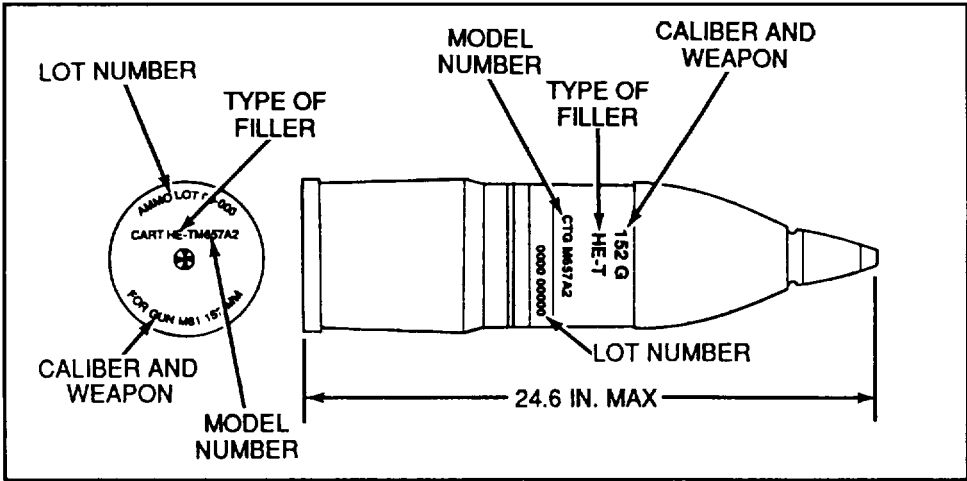


Figure 4-1. 152-mm HE-T Cartridge M657A2 with Cartridge Case M157

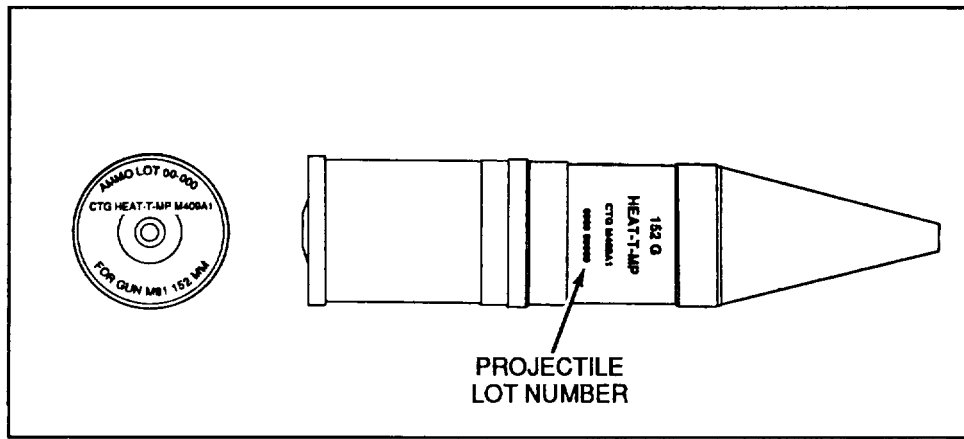


Figure 4-2. 152-mm HEAT-T-MP Cartridge M409A1

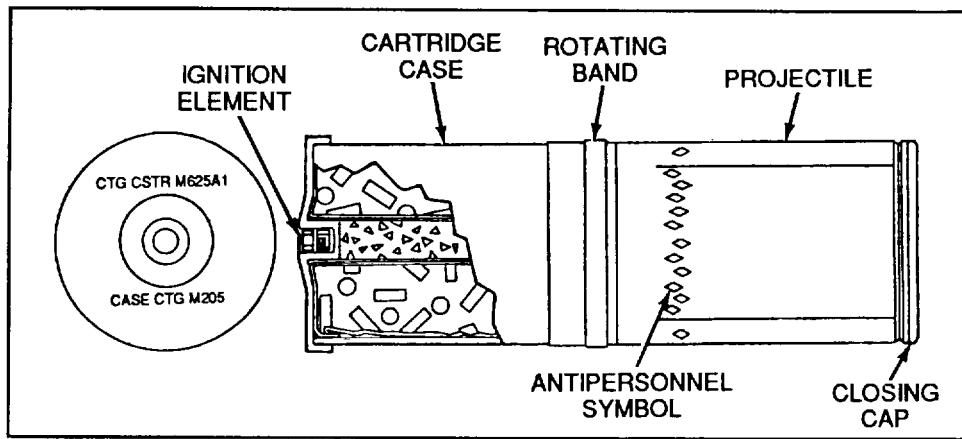


Figure 4-3. 152-mm Canister Cartridge

d. Packaging and Packing.

(1) To protect nonmetallic cartridge case from moisture, each round is packed in a neoprene or elastomeric barrier bag. Bag completely covers cartridge case and is drawn tight around base of projectile. Cuff of bag is folded back. A warning, REMOVE THIS BAG IMMEDIATELY PRIOR TO FIRING, is stenciled on bag.

(2) For shipping and storage, each bagged round is packed in a metal or fiber container containing a desiccant (drying agent) and a humidity indicator (new rounds do not contain humidity indicators). Fiber container is enclosed in a hermetically sealed, laminated, barrier bag (TYVEK) and overpacked in a

4-2. 152-MM CONVENTIONALAMMO-Continued.

wooden box lined with foamed polystyrene. Elastomeric- bagged rounds packed in metal containers, with desiccant on nose of projectile, are placed inside foamed polystyrene clamshells. Metal container is sealed by closing its lid.

- (3) Packaging is marked to identify round and to provide information needed for shipping and storage. Markings on both inner and outer packs are given in table 4-2.

Table 4-2. Markings on Packaging (Conventional Ammo)

Markings	Wood Box or Metal Container	Fiber Container
Department of Transportation (DOT) shipping designation	x	
National Stock Number (NSN) and Department of Defense Identification Code (DODIC)	x	
Department of Defense Ammunition Code (DODAC)		x
Ammunition lot number	x	x
Gross weight of packing container and contents	x	
Cubical displacement of packing container	x	
Date manufactured	x	
Descriptive nomenclature of packed item	x	x
Caliber and weapon designation	x	x

- e. **Prior to Loading Vehicle.** Because cartridges for 152-mm gun/launcher are fixed rounds, they require no preparation for firing except unpacking and inspection. Reject all rounds that fail to pass inspection outlined below and return rejected rounds to Ammunition Supply Point (ASP).

NOTE

Save all packaging material in metal containers for repackaging of unserviceable rounds.

- (1) Check markings on packing box to identify round.

CAUTION

Don't use axes, crowbars, or other tools which could damage Inner pack or ammo.

- (2) Open outer pack.
- (3) Remove fiber container enclosed in laminated TYVEK bag or foamed polystyrene clamshell-covered round from metal container.
- (4) Remove TYVEK bag from fiber container or remove foamed polystyrene clamshell from round.
- (5) Open fiber container.

CAUTION

Keep barrier bag on cartridge case. The ONLY time you remove this bag is after the round is on the loading tray when you chamber the round.

- (6) Remove cartridge (with barrier bag) and desiccant bags.
- (7) Check markings on projectile to confirm identification of rounds.
- (8) Visually inspect projectile for damage (dents or cracks) to projectile body, ogive, rotating band, or band coating which might result in difficulty in chambering, firing, or extracting.
- (9) Inspect for the following conditions, any one of which is cause for rejection:
 - (a) Moisture on barrier bag and/or projectile. (Disregard humidity indicator on barrier bag.)
 - (b) Loose fitting barrier bag, that is, one allowing easy insertion of a pencil or the little finger of your hand without stretching bag.
 - (c) Nicked or torn barrier bag.
- (10) Inspect for conditions below, any one of which is cause for rejection, by feeling through barrier bag:
 - (a) Separation of cartridge case from projectile.
 - (b) Separation of cartridge case base from body.
 - (c) Open cracks in cartridge case.

4-2. 152-MM CONVENTIONAL AMMO-Continued.

- (d) Presence of any loose material (which may include a chip of cartridge case flange, loose propellant, or the like).

NOTE

A ballistic protective cover is issued with your Armored Reconnaissance/Airborne Assault Vehicle (AR/AA V). Use it over barrier bag as additional protection for ammo stowed on board vehicle.

f. Loading Vehicle. Before placing cartridge in stowage rack, unfold cuff of barrier bag so that it extends forward as far as possible; cover rotating band, then fit ballistic protective cover over bagged cartridge.

g. Precautions In Firing.**NOTE**

• The lower firing temperature limit is -400F for all rounds except HE-T cartridge M657A2, which has a lower limit of +400F.

• Ammo kept clean, dry, and at uniformly moderate temperatures gives greater accuracy of fire. Successive firing of cartridges from the same lot minimizes dispersion at target.

• If temperature of barrier bag drops below -250F, barrier bag may become brittle and break when handled. If this happens, be sure that all barrier bag fragments are removed before chambering round.

- (1) Ensure that round is free of sand, mud, snow, ice, grease, or other foreign matter. Contamination may result in hot residue in gun chamber.
- (2) If cartridge is accidentally dropped, check by feeling through barrier bag for open cracks in case or separation of base from body of cartridge case. Visually check for dented projectile and loose windshield (nose) cap.
- (3) Before firing canister cartridge M625 series, clear all personnel from dispersion area (see figure 4-4). Firing over friendly troops is prohibited.

NOTE

• The canister M625 series cartridges are loaded with flechettes that function directly in front of gun muzzle. The dispersal pattern of the flechettes is shown in figure 4-4. For best results, with a target between 200 and 400 meters, elevate gun to 1200-meter graduation on gunner's telescope or periscope.

• Approximately a 10.5-meter increase in arc width results for each additional 50 meters of range.

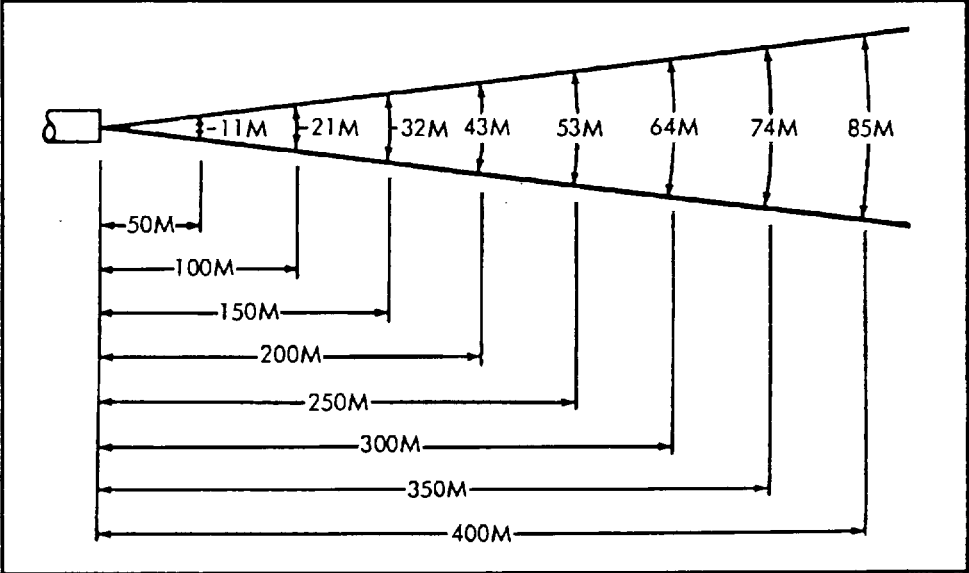


Figure 4-4. 152-mm Dispersion-Pattern for Canister Cartridge M625 Series

NOTE

Repeated loading and unloading of the same round may result in the separation of the ignition element from the round. No other attempt will be made to fire a round once it has been removed from the gun. Removed round will be checked for presence of ignition element. Vehicle commander will certify that missing ignition element does not constitute a hazard to crew.

- (4) In case of misfire after performing misfire procedures of paragraph 2-20, d, remove round and clean probe of firing mechanism.

4-2. 152-MM CONVENTIONAL AMMO-Continued.

- (5) Do not touch, move, or otherwise handle duds; their fuses may be armed. Have duds destroyed in place by authorized munitions personnel only.
- (6) Never fire HE-T cartridge M657A2 over friendly troops or through brush or other obstructions close to vehicle. Fuse M720A1 on this round is very sensitive and could cause premature detonation.

h. Prepared for Firing but Not Fired.

- (1) Remove round (see paragraph 2-20, d, 6).
- (2) If ammo is damaged: (a) Repackage ammo in original containers. (If original container is unsuitable, use expended packing material and transfer all markings.) (b) Conspicuously mark all layers of packing "UNSERVICEABLE" and indicate cause for rejection on exterior of outer pack.
 - (c) Return to ASP for disposition.

i. Care and Handling.

- (1) General. Ammo is carefully packed to protect it from exposure or damage during normal handling. If you handle it carefully and keep packing boxes from becoming broken or damaged, you won't be caught short when you need serviceable ammo. Remember:
 - (a) Fuses and primers are sensitive to shock. Protect them from hard knocks and blows, and from sources of electricity which could cause them to function accidentally.
 - (b) Don't drop, drag, throw, tumble, or strike a round of ammo, packed or unpacked. Carelessness could damage projectile, rotating band, windshield, and/or cartridge case or cause fuse and primer to function.
 - (c) Protect ammo from sources of high temperature (even direct sunlight), exposure to rain, excessive humidity, and ground moisture.
 - (d) Protect unpacked cartridges from exposure to water or oil by:
 1. Promptly repairing oil and water leaks in your vehicle.

2. Closing hatch covers and doors BEFORE hosing down outside of vehicle.
 3. Removing cartridges from stowage racks before cleaning inside of vehicle.
 4. Preventing oil or grease from contaminating ammo and stowage racks when lubricating internal parts of hull or turret.
- (2) Because nonmetallic cartridge case is subject to easy burning:
- (a) Don't smoke in crew compartment (or anywhere near unpacked ammo).
 - (b) Protect case from sparks, open flame, burning residue, etc.
 - (c) Don't remove ballistic protective bags until ready to fire.
- (3) Because cartridge case is nonmetallic:
- (a) Watch your step when entering vehicle. Don't step on rounds stowed next to hatch.
 - (b) Don't drop cartridge or hit it with anything that might puncture or dent sidewalls.
 - (c) Don't get cartridge wet.
 - (d) Don't break moisture seal on container until ready to use round.
 - (e) Don't expose ammo to oil, grease, or any other type of foreign matter.
- j. **Inspection.** Inspect unpacked, vehicle-stowed ammo every 3 months (during quarterly vehicle maintenance, if possible).

NOTE

Do not remove elastomeric or neoprene barrier bag at any time during Inspection.

- (1) Move ammo from stowage rack to sheltered area outside vehicle.

NOTE

If any of the following conditions are found, reject round and return to ASP (see paragraph 4-2, h).

4-2. 152-MM CONVENTIONAL AMMO-Continued.

- (2) Inspect each round for:
 - (a) Combination of loose fitting barrier bag and moisture on barrier bag and projectile.
 - (b) Loose fitting barrier bag or nicks and tears in bag.
 - (c) Separation of cartridge case from projectile.
 - (d) Separation of cartridge case base from body.
 - (e) Open cracks in cartridge case.
 - (f) Dents in projectile body or ogive.
 - (g) Damaged rotating band.
 - (h) Presence of any loose material (which may include a chip of cartridge case flange, loose propellant, or the like).
- (3) If barrier bag is not loose fitting and moisture is found on bag and/or projectile, wipe dry with a clean cloth (Appendix D, item 23) or paper towels. Return to service.

4-3. 152-MMGUIDEDMISSILE.

Firing Tables and Precautions. See FT 152-A-1. For general precautions, see TM 9-1300-206 and AR 385-63. For missile identification, shipping and storage, and service data, see tables 4-3 through 4-6. See figures 4-5 and 4-6 for identification of surface attack and practice type missiles. See figure 4-7 for missile inspection points.

Table 4-3. Guided Missile Identification-NSN and Part Number

Type	Model	NSN*	Part No
Surface attack	MGM-51 A	1410-00-999-0857	10398901
	MGM-51 B	1410-00-878-7219	10398964
		or 1410-00-150-8932	or 10399055
	MGM-51 C	1410-00-878-7219	10398964
		or 1410-00-150-8932	or 10399055

Type	Model	NSN*	Part No.
Practice	MTM-51 A	1410-00-999-0132	10398908
	MTM-51 B	1410-00-878-7218	10398965
		or 1410-00-150-8940	or 10399056
	MTM-51 C	1410-00-878-7218	10398965
		or 1410-00-150-8940	or 10399056

*NSN applies to missile and container as a unit of issue.

Table 4-4. Guided Missile Identification-Color

Nomenclature	Surface Attack	Practice
Missile: rocket motor section ¹	Olive-drab	Olive-drab
Markings	Yellow	White
Nose cone	Black with 2-inch yellow band over olive-drab	Olive-drab with 2-inch blue band ²
Container: overall	Olive-drab	Olive-drab
4-inch comer squares ³	Yellow	Brown
Markings	Yellow	White

¹Live rocket motor will have a 2-nch brown band around motor case.

²The word INERT is stamped on blue band in four places, 90° apart.

³Container corner markings are on diagonally opposite corners.

4-3. 152-MMGUIDEDMISSILE-Continued.

Table 4-5. Guided Missile Identification-Shipping and Storage

Nomenclature	Surface Attack	Practice
ICC shipping name on container	Rocket ammunition with explosive projectile	Rocket ammunition with inert loaded projectile
Shipping classification	Class A explosive	Class B explosive
Quality distance classification	7	2
Storage compatibility group	F	F

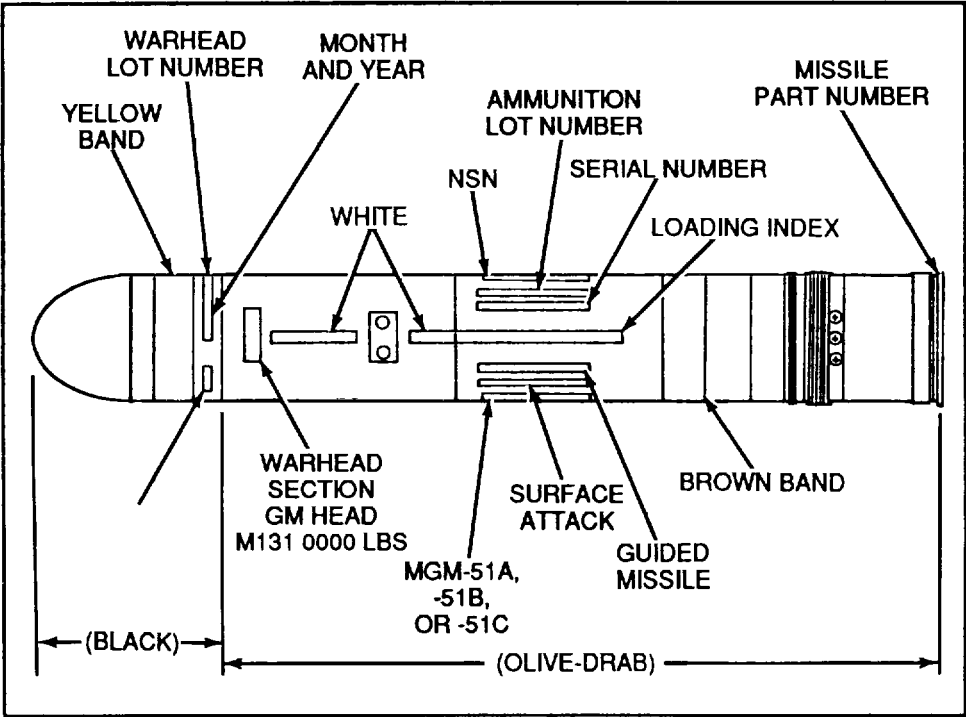


Figure 4-5. Surface Attack Missile Identification

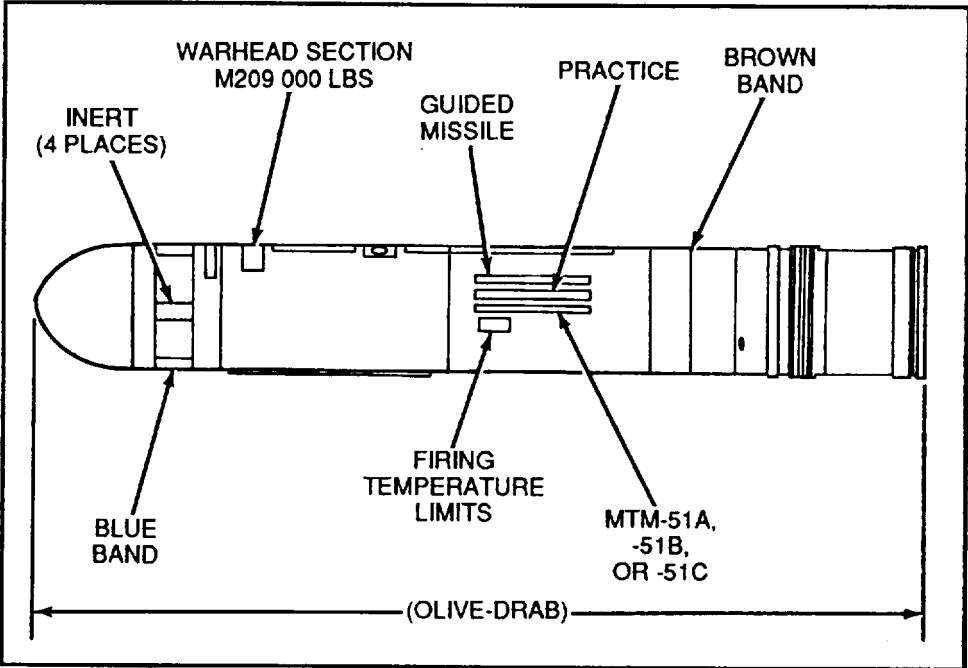


Figure 4-6. Practice Missile Identification

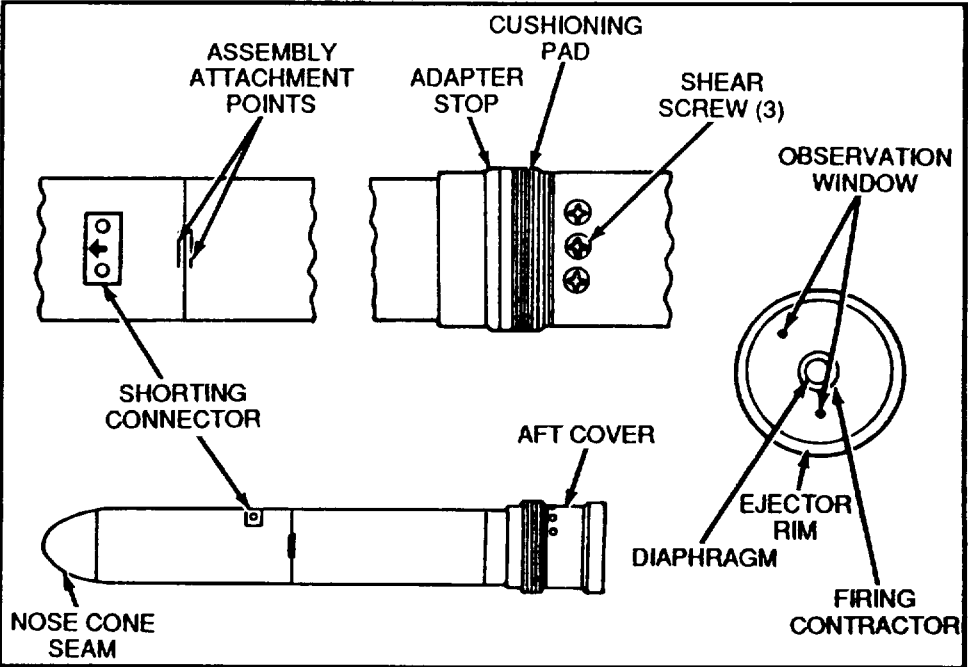


Figure 4-7. Missile Inspection Points

4-3. 152-MM GUIDED MISSILE-Continued.

Table 4-6. Service Upon Receipt of Missiles

Item	Action Required
<p>Missile Containers: Data marking and color coding Lead seals Surfaces</p> <p>Missiles:</p>	<p>Make sure correct type of missile has been received.</p> <p>Must not be broken from latches.</p> <p>Must not be punctured.</p> <p style="text-align: center;">NOTE <i>If containers are defective, do not open. Return missile and container to ASP. Report discrepancies on DA Form 2415.</i></p> <p>Removal</p> <p style="text-align: center;">NOTE <i>Except to perform Inspections required in table 4-7, missile containers must not be opened until immediately prior to stowing missiles in vehicle.</i></p> <p>a Depress pressure relief valve on container lid to relieve any pressure.</p> <p>b Cut seals; unlatch and remove container lid.</p> <p>c Remove missile from container.</p> <p><u>CAUTION</u> <i>If humidity Indicator "40" or "50" dot is pink, return missile and container to ASP.</i></p> <p style="text-align: center;">NOTE <i>Exercise care to avoid denting or damaging missiles.</i></p> <p>d Visually inspect missile container for moisture. If an accumulation of moisture is present, return missile and container to ASP.</p>

ITEM	ACTION REQUIRED
<p>Surface</p> <p>Shorting connector</p> <p>Assembly attachment points</p> <p>Nose cone seam</p> <p>Color coding and data markings</p> <p>Missile Aft Cover:</p> <p>Shear screws</p> <p>Ejector rim</p> <p>Adapter stop</p> <p>Cushioning pads</p> <p>Observation windows</p> <p>internal moisture.</p> <p>Firing contactor</p>	<p>e Replace lid on container.</p> <p>f Return to ASP all containers that are excess to unit requirements.</p> <p>Inspection (figure 4-7)</p> <p>Must not be dented, cracked, scratched, or corroded.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;"> <p>WARNING</p> </div> <p>Reject all HEAT warhead missiles that have dented nose cones.</p> <p style="text-align: center;">NOTE</p> <p>Scratches that do not have displaced metal are permitted.</p> <p>Must fit tight and its surface must not be higher than surface of missile skin. FWD arrow must point toward nose cone.</p> <p>All must fit tightly and joints at attachment points must not be loose.</p> <p>Must not be separated.</p> <p>Make sure correct type of missiles has been received.</p> <p>Must be tight.</p> <p>Must not be dented.</p> <p>Must not be dented.</p> <p>Not rolled or defaced.</p> <p>Tight and not cracked; no evidence of</p> <p>Must fit tight.</p>

4-4. M243 SMOKE GRENADE LAUNCHERS.

- a. **Description.** There are two M243 smoke grenade launchers, one mounted on each side of turret. Each launcher is a cluster of four launch tubes (capable of firing simultaneously), for a total of eight smoke grenades available for launch. Grenade launcher fires a smoke screening RP, L8A11/A3.
- b. **Use.** Grenade launchers are used primarily to provide a smoke screen for concealing tactical maneuvers. Exploding and incendiary action of RP, L8A1/A3 provides a secondary capability of producing casualties.
- c. **Markings.**
- (1) Smoke Grenades (figure 4-8). Tube of smoke grenade is painted olive-drab with one 1/2-inch yellow band and one 1 1/2-inch light green band. WP and HC is marked in red on light green band. GRENADE LAUNCHER M243 and LOT NO. 0000-00-0000 are marked in red on olive-drab below light green band.
 - (2) Shipping Box. A color code is located on two diagonally opposite edges of box. Yellow identifies high-explosive ammunition, light green identifies smoke ammunition, and light red identifies incendiary ammunition.

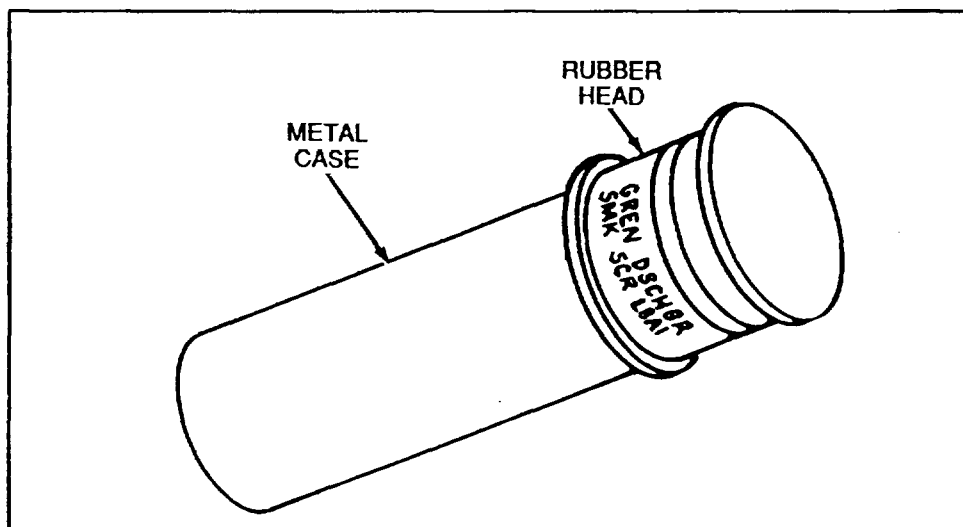


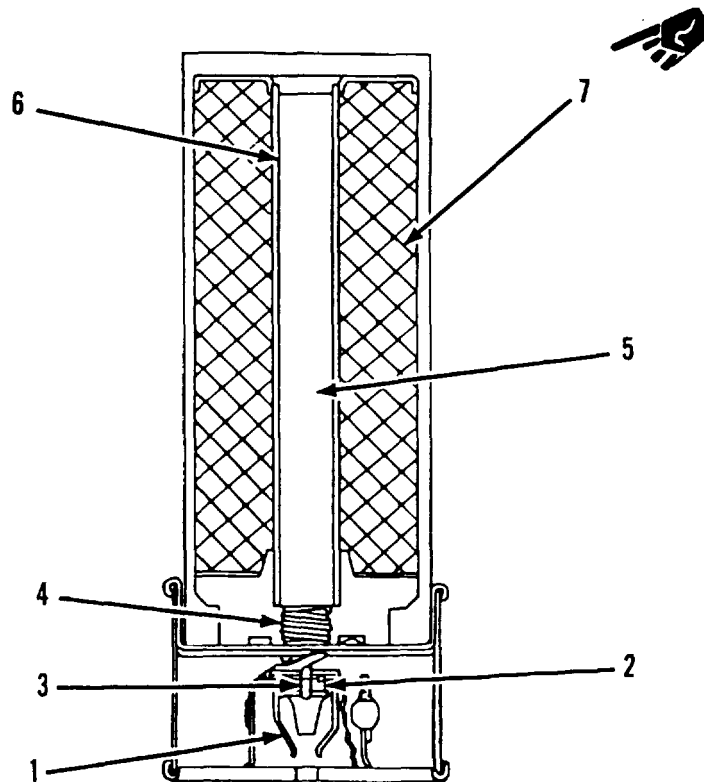
Figure 4-8. M243 Smoke Grenade Launcher Markings.

4-4. M243 SMOKE GRENADE LAUNCHERS-Continued.**d. Packaging and Packing.****WARNING**

- Do not open or repair a damaged smoke grenade shipping box, shipping container, or tube. Isolate box, container, or tube and notify Explosive Ordnance Disposal (EOD) personnel Immediately.
 - Always use caution when opening a smoke grenade shipping box or shipping container.
 - Always handle a smoke grenade as an armed, high-explosive, Incendiary munition.
 - Never place any portion of the body In front of either end of a smoke grenade.
 - Never attempt to disassemble a smoke grenade or sabot assembly: safety pins are removed from WP and HC grenades when smoke grenade Is assembled.
 - Do not use a smoke grenade that has been hit by small arms' fire or has cracks, dents, or other deformities. Isolate these smoke grenades and notify EOD personnel Immediately.
- (1) PBA-1 Series Lots. Each smoke grenade is packaged in a spirally wound fiber ammunition shipping container. Chipboard and felt filler pads are placed in container, as required, to keep smoke grenade from moving within container. Pressure-sensitive tape holds cover in place. Eight smoke grenades are packed (in two layers of four grenades each) in a nailed wood shipping box that has metal strapping. Filler pads are placed in shipping box, as required, to insure a tight pack. Each end of wood shipping box contains a rope handle.
 - (2) PBA-2. PBA-3. and PBA-4 Series Lots. Eight smoke grenades are packed in two rows of four each into a cleated plywood box. Box contains fiberboard packaging and interlocking partitions. Nailed wood box has two steel straps.
 - (3) PBA-5 and Subsequent Series Lots. Eight smoke grenades are packed in two rows of four each in a three-piece plastic foam box. Foam box is held together with tape and is packed in a wire-bound wood box that is closed with metal strapping and wire.

e. **Firefighting.** Unless units are deficient, it's almost impossible for a smoke grenade to self-ignite. However, should a packaging box catch fire, it's likely smoke grenades will ignite. If you have a fire, remember the following:

- (1) M243 launcher was designed to project smoke grenades a maximum distance of 150 feet, with the possibility of a maverick going 200 feet. Also, when WP grenade M34 explodes, shrapnel can be thrown for a distance greater than 150 feet. Therefore, to prevent injuries, maintain a restricted radius of 1000 feet from source of fire.
- (2) Water, continuously applied, will extinguish burning WP and control burning HC. However, since HC burns without atmospheric oxygen, there is no way of extinguishing HC. Therefore, apply water or appropriate fire extinguisher to contain fire and prevent burning HC from igniting other materials. Then notify EOD personnel.



f. **Functioning.** A smoke grenade is propelled from the discharger when electrical current at the firing contact (1) ignites the fuze (2). The fuze ignites the propellant charge (3) and a delay composition within the delay holder (4) and, in turn, the gun powder bursting charge (5). This bursts the rubber case (6) and ignites the red phosphorous/butyl rubber composition (7) to produce an immediate smoke cloud.

Change 1 4-19

4-5. 7.62-MM AMMO.

a. Authorized Rounds.

- (1) Authorized rounds of ammo are listed in table 4-8.
- (2) This family of ammo consists of these five types (see illustrations following table 4-8): ARMOR PIERCING Cartridge BS-MSR-11756003.

BLANK Cartridge Std-OTCM 36841.

BALL Cartridge-Std-MSR 07798001.

DUMMY Cartridge-Std-OTCM 36841.

TRACER Cartridge ON-MSR 11756003.

b. Firing Tables. FT 7.62-A-2 contains firing data for 7.62-mm ammo.

c. Identification. Ammo is identified by the shape and color of the bullet tip, and any markings found on the cartridge. See table 4-8 for description of ammo.

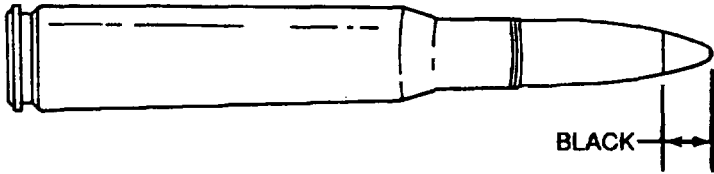
Table 4-8. Authorized Rounds

Cartridge	Type Classification	Description	Purpose
7.62-mm	OBS-MSR-1 11756003	ARMOR PIERCING Cartridge This round is identified and by a black bullet tip	Used in rifles and machine guns against personnel light-armored or unarmored targets, concrete shelters, and similar bullet-resisting targets.
7.62-mm	Std-OTCM 36841	BLANK Cartridge This round is identified by its double-tapered neck and the absence of a bullet.	Used in rifles and machine guns equipped with blank firing attachments to simulate firing in training exercises and for saluting purposes.

Table 4-8. Authorized Rounds-Continued.

Cartridge	Type Classification	Description	Purpose
7.62-mm	Std-MSR 07798001	BALL Cartridge This round is identified by a plain bullet tip	Intended for use against personnel and unarmored targets.
7.62-mm	Std-OTCM 36841	DUMMY Cartridge This round is identified by six longitudinal corrugations (flutings) on the cartridge. In addition, there is no primer, and no vent hole in the primer pocket.	Used for practice in loading 7.62-mm weapons for simulated firing to detect flinching of personnel during firing and for inspecting and testing the weapon mechanism.
7.62-mm	CON-MSR 11756003	TRACER Cartridge This round is identified by a maroon, red, or orange bullet tip.	Intended to permit visible observation of the bullet's in-flight path or trajectory to the point of impact.

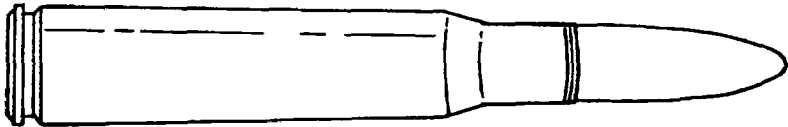
Change 1 420.1/(4-20.2 blank)



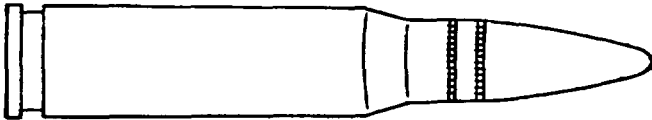
OBS-MSR-11756003 Armor Piercing Cartridge



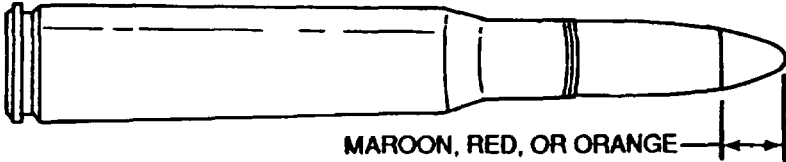
Std-OTCM 36841 Blank Cartridge



Std-MSR 07798001 Ball Cartridge



Std-OTCM 36841 Dummy Cartridge



CON-MSR 11756003 Tracer Cartridge

4-6. CAL .50 AMMO.**a. Authorized Rounds.**

- (1) Authorized rounds of ammo are listed in table 4-9.
- (2) This family of ammo consists of these thirteen types (see illustrations following table 4-9):

TRACER Cartridge-OBS-MSR 11756003.

INCENDIARY Cartridge-BS-MSR 11756003.

BLANK Cartridge-CONT-OTCM 36841.

BLANK Cartridge-Std-MSR 02806015.

DUMMY Cartridge-Std-OTCM 36841.

BALL Cartridge-Std-OTCM 36841.

ARMOR PIERCING-INCENDIARY Cartridge-

OBS-MSR 11756003.

TRACER Cartridge-Std-OTCM 37107.

TRACER Cartridge-CON-MSR 11756003.

ARMOR PIERCINGINCENDIARY-TRACER Cartridge-

OBS-MSR-04776009.

INCENDIARY Cartridge-Std-OTCM 36841.

BALL Cartridge-Std-OTCM 36841.

ARMOR PIERCING Cartridge-OBS-MSR 11756003.

b. Firing Tables. FT 0.50-H-3 contains firing data for cal .50 ammo.

c. Identification. Ammo is identified by the shape and color of the bullet tip, and any markings found on the cartridge. See table 49 for description of ammo.

Table 4-9. Authorized Rounds

Cartridge	Type Classification	Description	Purpose
Cal .50	OBS-MSR 11756003	TRACER Cartridge This round is identified by a red bullet tip	Intended to permit visible observation of the bullet's in-flight path or trajectory to the point of impact. (Limited to CONUS for training purposes only.)
Cal .50	OBS-MSR 11756003	INCENDIARY Cartridge. This round is identified by a blue bullet tip	Upon impact with a hardened or armored target, the incendiary composition bursts into flame and will ignite any flammable material.
Cal .50	CONT-OTCM 36841	BLANK Cartridge This round is identified by the absence of a bullet and has a crimped cartridge case mouth.	Used to simulate firing in training exercises.
Cal .50	Std-MSR 02806015	BLANK Cartridge This round is identified by the absence of a bullet and has a rosette crimp at the mouth. The round is also loaded with Dupont Hi Skor 700 X propellant.	Used to simulate firing in training exercises.

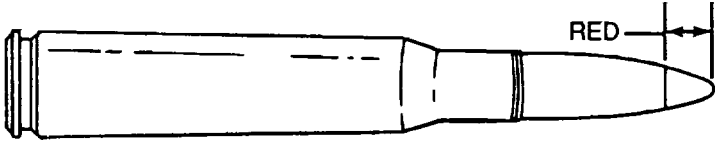
4-6. CAL .50 AMMO-Continued.

Table 4-9. Authorized Rounds-Continued

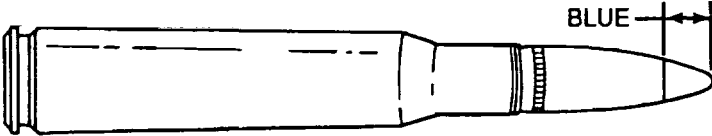
Cartridge	Type Classification	Description	Purpose
Cal .50	Std-OTCM 36841	DUMMY Cartridge. This round is identified by three drilled holes in the cartridge case and the absence of a primer.	Used for practice in loading for simulated firing and for inspecting and testing the mechanism of a weapon.
Cal .50	Std-OTCM 36841	BALL Cartridge This round is identified by a plain bullet.	Intended for use against personnel or unarmored targets.
Cal .50	OBS-MSR 11756003	ARMOR PIERCING-INCENDIARY Cartridge This round is identified by an aluminum bullet tip	Combines the functions of the M2 AP bullet and the incendiary bullet, and is used against flammable targets and light-armored or unarmored targets, concrete shelters, and similar bullet-resisting targets.
Cal .50	Std-OTCM 37107	TRACER Cartridge This round is identified by an orange bullet tip	Exhibits a visible trace from a point not greater than 100 yards from the muzzle of the weapon to a point not less than 1600 yards from the muzzle.
Cal .50	CON-MSR 11756003	TRACER Cartridge This round is identified by a brown bullet tip	Intended to permit visible observation of the bullet's in-flight path or trajectory to the point of impact.

Cartridge	Type Classification	Description	Purpose
Cal .50	OBS-MSR-04776009	<p>ARMOR PIERCING-INCENDIARY-TRACER Cartridge. This round is identified by a red bullet tip with an aluminum colored ring to the rear of the red tip.</p>	<p>Combines the functions of the AP and incendiary bullet, and is used against flammable targets and light-armored or unarmored targets, concrete shelters, and similar bullet-resisting targets.</p>
Cal .50	Std-OTCM 36841	<p>INCENDIARY Cartridge. This round is identified by a blue bullet tip with a light blue ring to the rear of the blue tip.</p>	<p>Used against flammable targets and is capable of initiating combustion of flammable materials upon target impact at 175 yards.</p>
Cal .50	Std-OTCM 36841	<p>BALL Cartridge This round is identified by a plain bullet tip.</p>	<p>Intended for use against personnel or unarmored targets.</p>
Cal .50	OBS-MSR 11756003	<p>ARMOR PIERCING Cartridge. This round is identified by a black bullet tip</p>	<p>Used against light-armored or unarmored targets, concrete shelters, and similar bullet-resisting targets.</p>

4-6. CAL .50 AMMO-Continued.



OBS-MSR 11756003 Tracer Cartridge



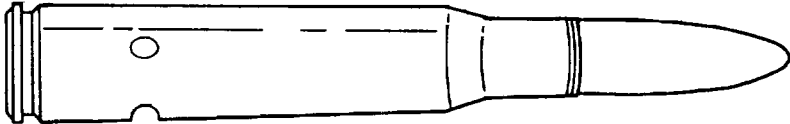
OBS-MSR 11756003 Incendiary Cartridge



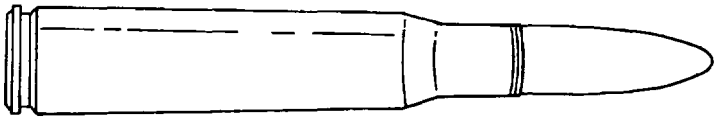
CONT-OTCM 36841 Blank Cartridge



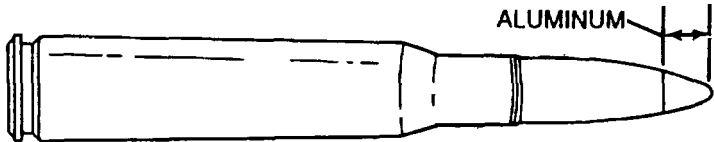
Std-MSR 02806015 Blank Cartridge



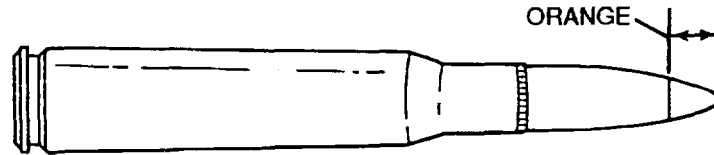
Std-OTCM 36841 Dummy Cartridge



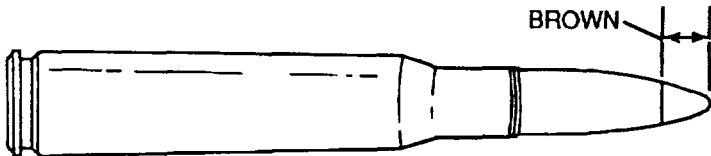
Std-OTCM 36841 Ball Cartridge



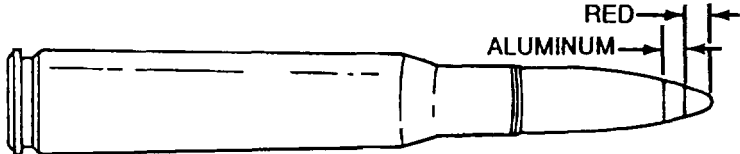
OBS-MSR 11756003 Armor Piercing-Incendiary Cartridge



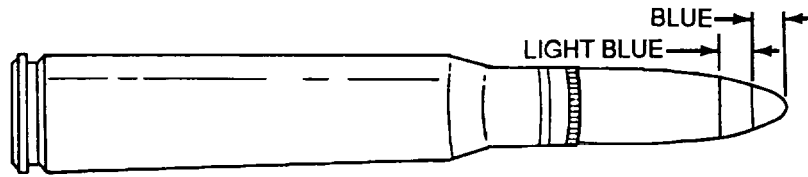
Std-OTCM 37107 Tracer Cartridge



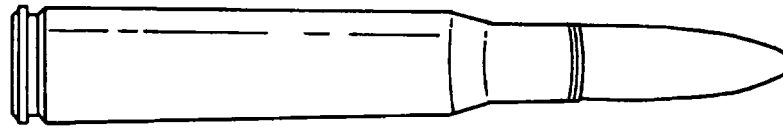
CON-MSR 11756003 Tracer Cartridge



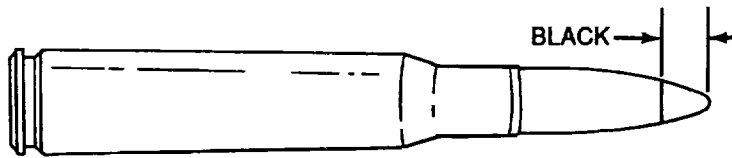
OBS-MSR-04776009 Armor Piercing-Incendiary-Tracer Cartridge



Std-OTCM 36841 Incendiary Cartridge



Std-OTCM 36841 Ball Cartridge



OBS-MSR 11756003 Armor Piercing Cartridge

**APPENDIX A
REFERENCES**

A-1. SCOPE. This appendix lists all bulletins, forms, field manuals, technical manuals, pamphlets, lubrication orders, regulations, and tables referenced in this manual.

A-2. ARMY REGULATIONS.

Control of Health Hazards from Lasers and Other High Intensity Optical Sources.....	AR 40-46
Ionizing Radiation Protection (Licensing, Control, Transportation, Disposal, and Radiation Safety)	AR 385-11
Policies and Procedures for Firing Ammunition for Training, Target Practice and Combat	AR 385-63

A-3. COMMON TABLES OF ALLOWANCES.

Army Medical Department Expendable/Durable Items	CTA 8-100
Expendable/Durable Items (Except: Medical, Class V, Repair Parts and Heraldic Items)	CTA 50-970

A-4. DEPARTMENT OF THE ARMY FORMS.

Ammunition Condition Report	DA Form 2415
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Recommended Changes to Equipment Technical Publications	DA Form 2028-2
Recommended Changes to Publications and Blank Forms	DA Form 2028
Weapon Record Data.....	DA Form 2408-4

A-5. DEPARTMENT OF THE ARMY PAMPHLETS.

Consolidated Index of Army Publications and Blank Forms	DA PAM 25-30
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A-5. DEPARTMENT OF THE ARMY PAMPHLETS-Continued.

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

A-6. FIELD MANUALS.

First Aid for Soldiers FM 21-11
 NBC Decontamination..... FM 3-5
 NBC Handbook FM 3-7
 NBC Protection..... FM 3-4
 Operation and Maintenance of Ordnance Materiel in Cold Weather (0 Degrees F to Minus 65 Degrees F)..... FM 9-207

A-7. FIRING TABLES.

Cannon, 152-mm Gun/Launcher: M81E1 and M81 on Armored Reconnaissance/Airborne Assault Vehicle: Full-Tracked, 152-mm, M551; Firing Cartridge, 152-mm: HEAT-MPT, M409A5; Cartridge, 152-mm: TP-T, M411A4 and M411A3; Cartridge, 152-mm: HE-T, M657A2; Cartridge, 152-mm: Canister, M625 FT 152-A-1

Machine Gun, Cal .50: Browning, M2 (Heavy Barrel, Turret Type) on Mount, Machine Gun, Trailer Mtd: Multiple Cal .50 Machine Gun, M55 and Machine Gun, Cal .50: Browning, M2 (Heavy Barrel, Flexible) on Mount, Machine Gun, Tripod Mtd, Cal .50 Machine Gun, M3; Firing Cartridge, Cal .50: AP, M2 and Cartridge, Cal .50: Ball, M2 FT 0.50-H-3

Machine Gun, 7.62-mm: M80 on Mount, Machine Gun: 7.62-mm, M122 and Machine Gun, 7.62-mm: M73 on Tank, Combat, Full-Tracked: 105-mm Gun, M60 Series and Rifle, 7.62-mm: M14; Firing Cartridge, 7.62-mm, Ball, NATO, M50; Cartridge, 7.62-mm, Ball, NATO, M80; Cartridge, 7.62-mm: AP, NATO, M61 and Cartridge, 7.62-mm: Tracer, NATO, M62 FT 7.62-A-2

A-8. LUBRICATION ORDER.

Armored Reconnaissance/Airborne Assault Vehicle: Full-Tracked, 152-mm, Gun/Launcher, M551 and M551A LO 9-2350-230-12

A-9. STANDARD FORM.

Product Quality Deficiency Report..... SF Form 368

A-10. SUPPLY BULLETIN.

FSC Class 6135; Primary Battery Management Data..... SB 11-30

A-11. TECHNICAL BULLETIN.

Occupational and Environmental Health: Controls of Hazards to Health from Laser Radiation TB MED 524

A- 12. TECHNICAL MANUALS.

Ammunition and Explosives Standards..... TM 9-1300-206

Operator's Manual: Machine Gun, Cal .50, Browning, M2, Heavy Barrel, Flexible, WIE; Mount, Tripod, Machine Gun, Cal .50, M2 W/E and Mount, Machine Gun, Antiaircraft: Cal .50, M63 W/E..... TM 9-1005-213-10

Operators Manual for Machine Gun, 7.62-mm, M240 and M240C and M240E1 TM 9-1005-313-10

Operator's Manual for Mask, Chemical-Biological: Aircraft, ABC-M24 and Accessories and Mask, Chemical-Biological, Tank, M25A1 and Accessories..... TM 3-4240-280-10

Operator's Manual for Night Vision Sight, Individual Served Weapon AN/PVS-2, AN/PVS-2A and AN/PVS-2B TM 11-5855-203-10

Operator's Manual for Viewers, Driver's, Night Vision, AN/VVS-2(V)1, AN/VVS-2(V)1A, ANNVS-2(V)2, AN/VVS-2(V)2A and AN/WS-2(V)3 TM 11-5855-249-10

Operator's Organizational, and Direct Support Maintenance Manual: Night Vision Sights, Crew Served Weapons, AN/TVS-2, AN/TVS-2A and AN/TVS-2B TM 11-5855-202-13

Operator's, Unit, Intermediate Direct Support and Intermediate General Support Maintenance Manual for Lead-Acid Storage Batteries; 4HN, 24 V (NSN 6140-00-059-3528) MS75047-1; 2HN, 12 V (NSN 6140-00-057-2553) MS35000-1; 6TN, 12 V (NSN 6140-00-057-2554) MS35000-3; 6TL, 12 V (NSN 6140-01-210-1964) MS52149-1 TM 9-6140-200-14

Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use..... TM 750-244-6

Transportability Guidance for Armored Reconnaissance/Airborne Assault Vehicle, M551 A1 TM 55-2350-230-12-1

A-12. TECHNICAL MANUALS-Continued.

Transportability Guidance: Shillelagh Guided
Missile System Surface Attack, Guided Missile,
MGM-51A, MGM-51B; Practice Guided Missile, MTM-51A,
MTM-51B; Launcher, Armored Reconnaissance/Airborne
Assault Vehicle, M551A1 and Launcher, Tank Combat,
Full-Tracked, M60A2 TM55-6920-465-15-1

Transportability Guidance for Transport of Cargo
on the Railway Car, Flat, 140-Ton Capacity TM 55-2220-058-14

**APPENDIX B
COMPONENTS OF END ITEM (COEI)
AND BASIC ISSUE ITEMS (BII) LISTS**

Section I. INTRODUCTION

B-1. SCOPE. This appendix lists COEI and BII for the M551A1/ M551NTC to help you inventory the items for safe and efficient operation of the vehicle and its equipment.

B-2. GENERAL. The COEI and BII lists are divided into the following sections:

- a. Section II, COEI. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the M551A1/M551NTC, but they are to be 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 accounts. Illustrations are furnished to help you find and identify the items.
- b. Section II, BII. These essential items are required to place the M551A1/M551NTC in operation, operate it, and do emergency repairs. Although shipped separately packaged, BII must be with the M551A1/M551NTC during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the Table of Organization and Equipment/Modified Table of Organization and Equipment (TOE/MTOE). Illustrations are furnished to help you find and identify the items.

B-3. EXPLANATION OF COLUMNS.

- a. Column (1), Ill. No., gives you the number of the item illustrated.
- b. Column (2), National Stock Number (NSN), identifies the stock number of the item to be used for requisitioning purposes.
- c. Column (3), Description and Usable on Code, identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line, below the description, is the Commercial and Government Entity Code (CAGEC) (in parentheses) and the part number.

B-3. EXPLANATION OF COLUMNS-Continued.

If the item you need is not the same for different models of the vehicle, a Usable on Code will appear on the right side of the description column on the same line as the part number. These codes are identified below:

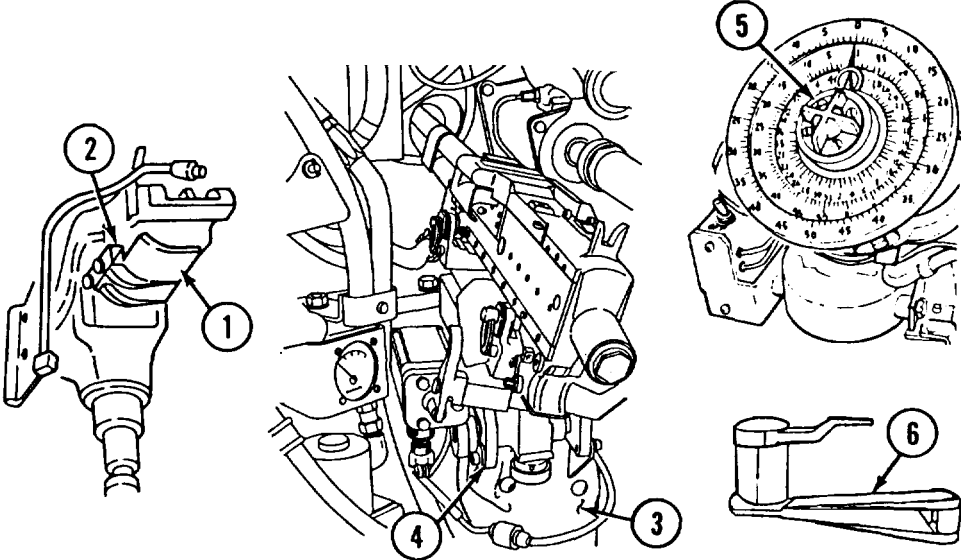
<u>Code</u>	<u>Used on</u>
A	Both models
B	M551 A1 only
C	M551 NTC only

d. Column (4), Unit of Issue (U/I), indicates how the item is issued the NSN shown.

<u>Abbreviation</u>	<u>Unit</u>
AY	assembly
BK	book
EA	each
PG	package
SE	set

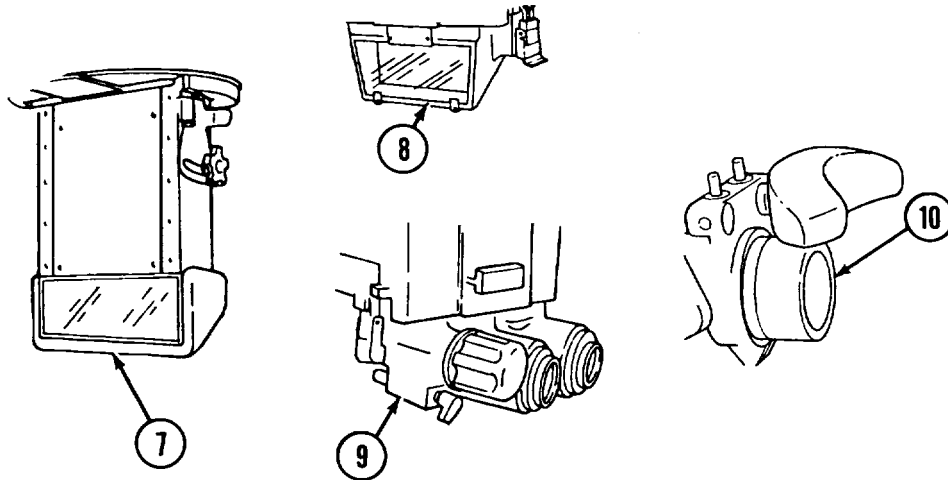
e. Column (5), Qty Rqr, indicates the quantity required.

Section II. COEI

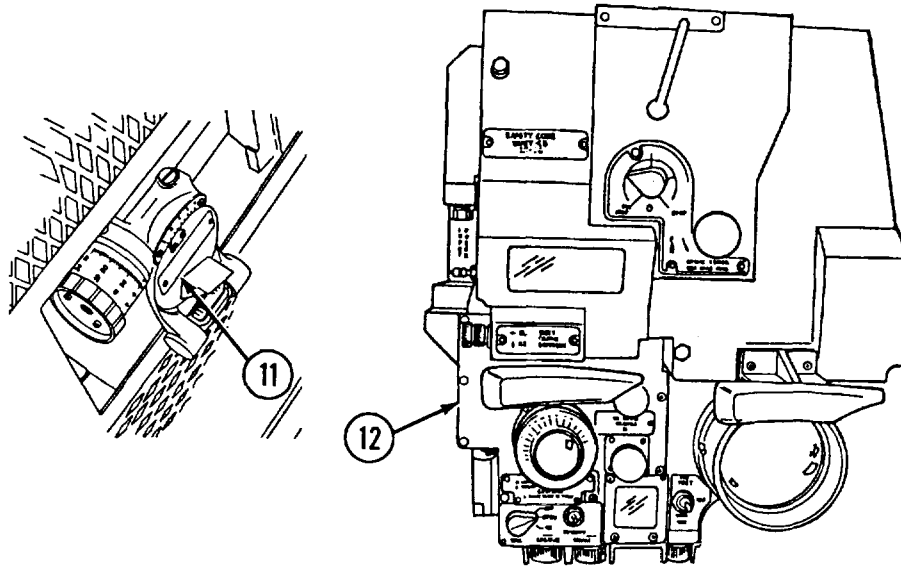


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/I	(5) QTY Reqd
1	1005-00-844-3488	CHUTE, EJECTION: Spent brass ejection chute, cal .50 machine gun (19204) 11593535	A	EA	1
2	5340-00-844-3560	CLAMP, EJECTION CHUTE: Spent brass clamp, cal .50 machine gun (19207) 11593536	B	EA	1
3	1025-00-134-3051	EXTENSION, CHUTE: 7.62-mm Machine Gun (19207) 11643756	B	EA	1
4	1025-00-113-9659	FRAME, COLLECTION BAG: 7.62-mm Machine Gun (19207) 11643642	B	EA	1
5	1290-00-901-8667	INDICATOR, AZIMUTH: This item is part of vehicle configuration (19207) 10954720	A	EA	1
6	1240-00-762-9334	MOUNT, TELESCOPE: For mounting telescope M127/MI27A1 (19200) 10527950	A	EA	1

Section II. COEI - Continued.

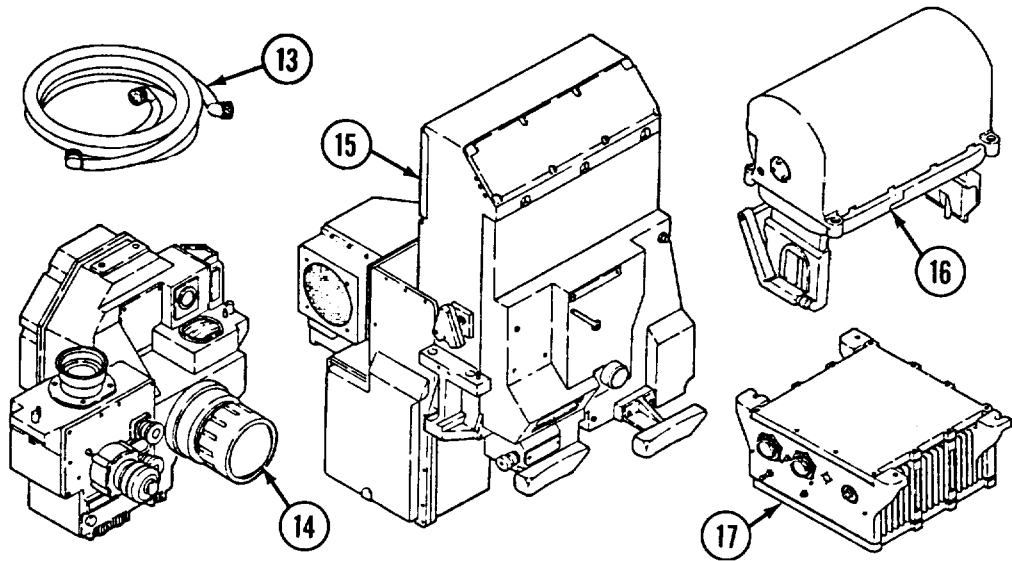


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code	(5) QTY Reqd
7	6650-00-856-9455	PERISCOPE, TANK(M37, Loader): Used by loader during mission (19200) 8635100	EA B	1
8	1240-00-788-5464	PERISCOPE, TANK (M47, Driver): Used by driver when buttoned up during daylight (19200) 8599700	EA A	3
9	1240-00-762-9336	PERISCOPE, TANK (M48, Infrared, Driver): Used by driver during night mission (19200) 10516700	EA A	1
10	1240-00-933-5630	PERISCOPE, TANK (M44E1): Gunner's sight for firing (19200) 10542200	EA C or	1

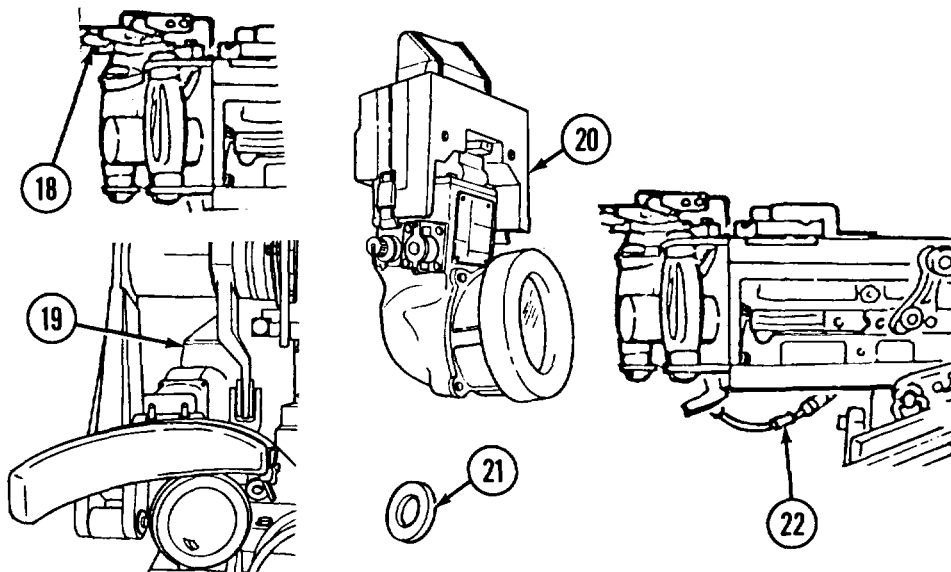


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code	(5) QTY Reqd
10	1240-00-176-1031	PERISCOPE, TANK (M44E2): Gunner's sight for firing (19200) 11731100	EA	1
10	1240-00-169-0912	PERISCOPE, TANK (M44E3): Gunner's sight for firing (19200) 10558201	EA	1
10	1240-00-184-9897	PERISCOPE, TANK (M44E4): Gunner's sight for firing (19200) 10558201-1	EA	1
11	1290-00-078-5568	QUADRANT, M13A1C (Elevation): Used by gunner for indirect fire (19200) 8286737	EA	1
12		SIGHT, THERMAL, TANK (TTS): ANNSG-2B (Consists of items 13, 14, 15, 16, and 17) (80058) ANNSG-2	EA	1

Section II. COEI - Continued.

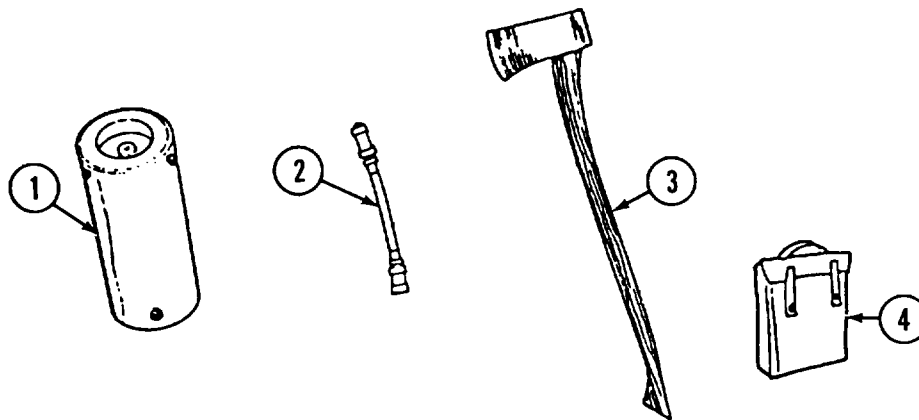


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/I	(5) QTY Reqd
13	5995-01-082-3749	CABLE ASSEMBLY, SPEC	B	EA	1
14	1240-01-322-8888	DISPLAY UNIT, GUNNER'S	B	EA	1
15	1240-01-237-1580	HEAD ASSEMBLY: (54490) 5006510	AY B	1	
16	1240-01-060-2819	MOUNT, PERISCOPE: For mounting TTS (80058) MT-4941 /VSG-2	EA B	1	
17	1240-01-063-6135	POWER CONVERTER UNIT: (80063) SM-C-804914	EA B	1	

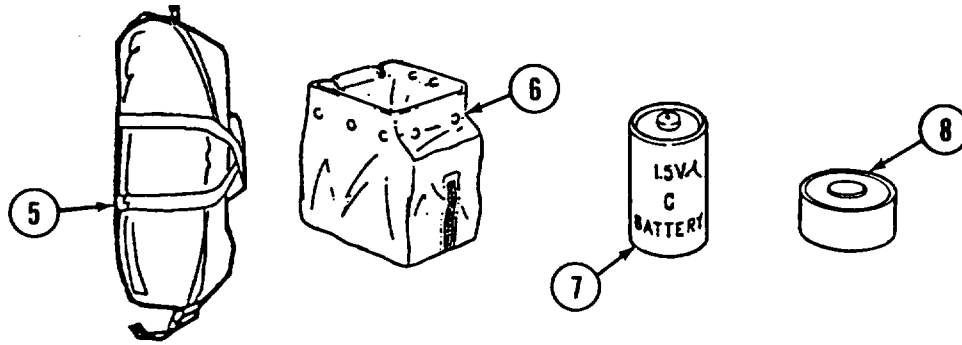


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/I	(5) QTY Reqd
18	5930-00-003-1046	SWITCH ASSEMBLY: Commander's Control Cal .50 Machine Gun (19204) 11665229	AY A	1
19	1240-00-437-1254	TELESCOPE, ARTICULATED: Gunner's M127/M127A1 (19200) 10553175	EA A	1
20	5855-01-105-7793	VIEWER, NIGHT VISION, DRIVER'S AN/VVS-2(V)3: For use by driver at night (80058) ANNVS-2(V)3	EA B	1
21	5310-00-194-0636	WASHER, FLAT: To attach to spent brass ejection chute (88044) AN122583	EA B	2
22	1025-00-369-9000	WIRING HARNESS: Commanders Control (19207) 11643730	EA B	1

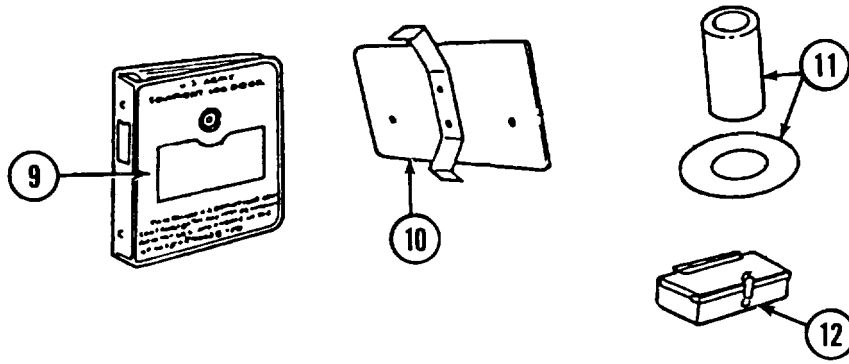
Section II. BII



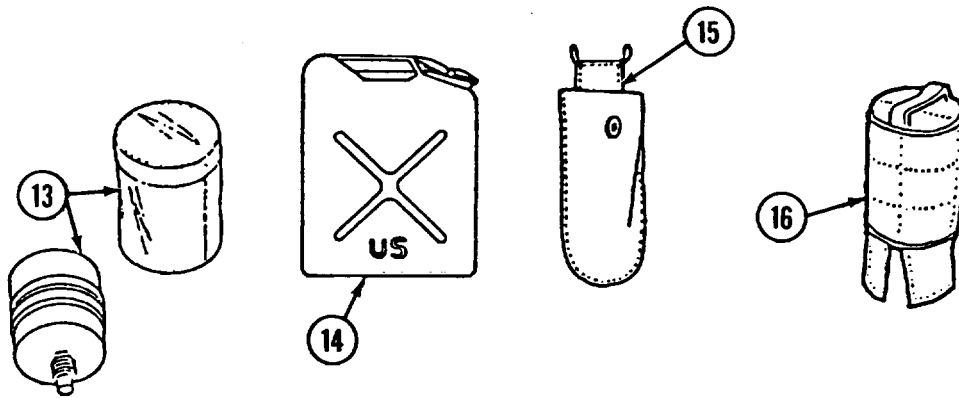
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/I	(5) QTY Reqd
1	3010-00-435-7736	ACTUATOR, ELECTROCHEMICAL, LINEAR: Firing Pulse To test firing circuit prior to use (19207) 11643755	EA B	1	
2	4930-00-288-1511	ADAPTER, GREASE GUN: Hydr., 12 In Used with grease gun to adjust track and lubricate vehicle (81349) MILL4387	EA Long A	1	
3	5110-00-293-2336	AXE, SINGLE BIT: 4 Lbs. Dislodge debris from suspension; cut trees or timber in emergency (81348) GGG-A-926	EA A	1	
4	2540-00-670-2459	BAG ASSEMBLY, PAMPHLET: To stow crew publications packed and issued with vehicle (56161) 10510977	EA I A		



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/I	(5) QTY Reqd
5	5140-00-473-6256	BAG, TOOL, SATCHEL: For stowage of hand tools on vehicle (81349) MIL-B-43663	EA A	1	
6	1005-00-113-9657	BAG, EMPTY-CARTRIDGE: Collection bag attached to 7.62-mm machine gun collection frame (19207) 11643641	EA A	1	
7	6135-00-120-1010	BATTERY, DRY: 1.5 V, C-size, Type BA42 (Sight/Fire Control) For infrared sights as emergency power (H1200) BA042	PG A	2	
8	6135-00-485-7402	BATTERY, DRY: 2.7 V, Flat Type, BA-1567/U For DNV AN/VVS-2(V)3 (80058) BA-1567/U	EA B	2	

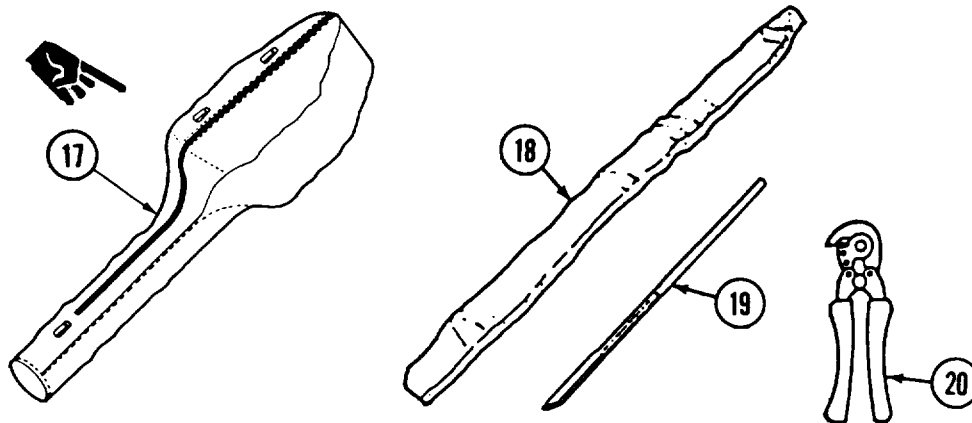


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code	(5) QTY Reqd
9	7510-00-889-3494	BINDER, LOOSE-LEAF, EQUIPMENT LOGBOOK: (In Pamphlet Bag) To stow logbook forms and Equipment Serviceability Criteria (ESC) (19207) 11677003	EA A	1
10	1240-00-950-1605	BORESIGHT AID ASSEMBLY: M44 Series Periscope Boresight periscope with gun (19200) 10516830	EA A	1
11	4933-00-852-6310	BORESIGHT ASSEMBLY: 152-mm Boresight prior to firing (19206) 11577285	EA B	1
12	2540-00-808-6858	BOX ASSEMBLY: Spare Lamp To stow spare bulbs as used in sights, instruments, and interior lights (19207) 11594202	EA A	1

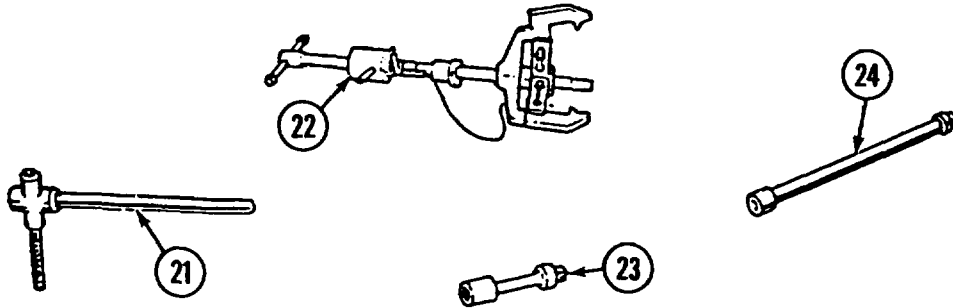


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
13	1025-01-196-2176	BRUSH AND BAG ASSEMBLY: 155-mm Clean tube after firing (27412) 155-110-401	EA B	1
14	7240-00-089-3827	CAN, WATER, MILITARY: Plastic 5gallon Replenishing coolant in radiator; also for personnel water (81349) MILC43613	EA A	1
15	5140-00-261-4994	CARRIER, TOOL: Wire Cutter To protect wire cutter when not in use (81348) GGG-C-1520	EA A	1
16	8140-00-421-3954	COVER ASSEMBLY: Ammo, Protective Safety protection for ammo (19207) 11653471	EA B	24

Section III. BII-Continued.

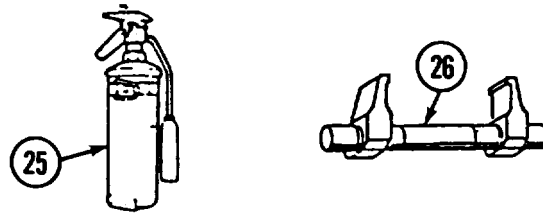


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/M	(5) QTY Reqd
17	1005-00-116-0591	COVER, GUN: Cal .50 Machine Gun Protect cal .50 machine gun when not in use (19207) 11636046	A	EA	1
18	1005-00-796-4436	COVER, SPARE BARREL: Cal .50 Machine Gun Protect spare barrel when stowed (19207) 7964436	A	EA	1
19	5120-00-224-1390	CROWBAR: Pinch Point To check for broken torsion bars; also to check suspension (34871) FAC01015	A	EA	1
20	5110-00-595-8229	CUTTER: Wire Rope, Hand Operated To cut bands on palletized ammo and to cut wire entangled in suspension (81337) JOD539DWGAJ591	A	EA	1

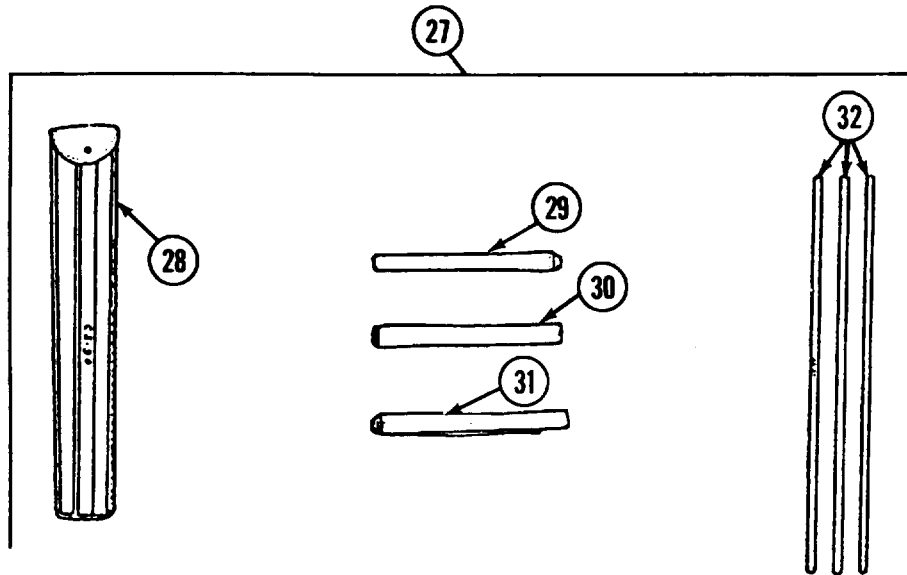


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
21	5120-01-006-8847	DRIFTPIN: Track Required for removal of track pin (19207) 11678718	EA	1
22	4933-00-146-0809	EXTRACTOR ASSEMBLY: Conventional Round To extract conventional round from chamber (19204) 11678962	AY	1
23	5120-00-243-7326	EXTENSION, SOCKET WRENCH: 1/2-inch Square Drive, 5 In. Long To assist in removal of roadwheels (58536) A-A-2170	EA	1
24	5120-00-240-8705	EXTENSION, SOCKET WRENCH: 1/2-inch Square Drive, 20 In. Long To remove air compressor cover to facilitate cleaning (58536) A-A-2170	EA	1

Section III. BII-Continued.



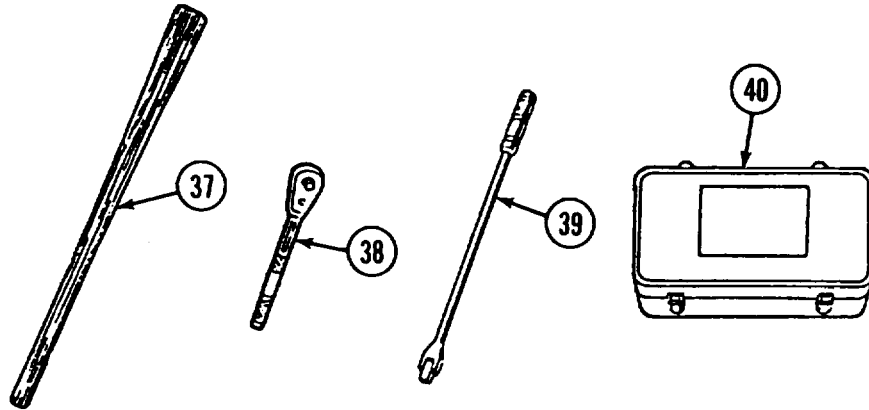
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code	(5) QTY Reqd
25	4210-00-555-8837	EXTINGUISHER, FIRE, MONOBROMOTRIFLUORO- METHANE: With Bracket, Hand Type For safety when refueling vehicle (06535) FH900-2	EA	1
26	5120-00-906-1053	FIXTURE, TRACK: Connecting Connect and disconnect track (19207).10955739	EA	1
27	8345-00-375-0223	FLAG SET: M 238 (Consists of Items 29,30,31,32, and 33) Signal devices during training and maneuvers (81349) MIL-F-40045	EA	1
28	8345-00-178-8437	FLAG CASE, CARRYING: M 238 To protect flag set (81349) MIL-F-40045	EA	1



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
29	8345-00-227-1406	FLAG, GREEN: MC 275 Signal devices during training and maneuvers (81349) MIL-F-40045	EA B	1
30	8345-00-227-1511	FLAG, RED: MC 273 Signal devices during training and maneuvers (81349) MIL-F-40045	EA B	1
31	8345-00-227-1405	FLAG, YELLOW: MC 274 Signal devices during training and maneuvers (81349) MIL-F-40045	EA B	1
32	8345-00-242-3650	FLAGSTAFF: MC 270 Signal devices during training and maneuvers (81349) MIL-F-40045	EA B	3

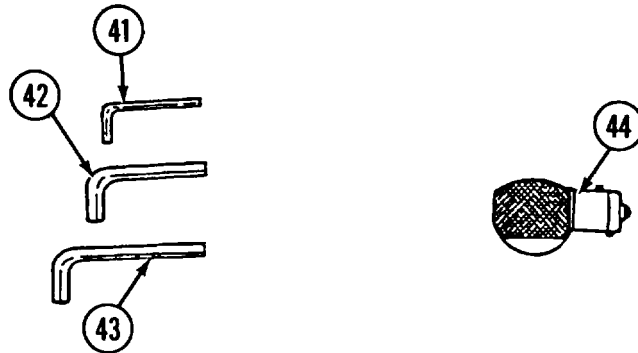
Section III. BII-Continued.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/M	(5) QTY Reqd
33	6230-00-264-8261	FLASHLIGHT: MX991/U, 6Z-400-991 Used for signaling and for ground-guiding of the vehicle at night (81349) MIL-F-3747	A	EA	2
34	1005-00-716-2072	FLASH HIDER: Cal .50 Machine Gun Used to hide muzzle flash when firing (19200) 7162072	B	EA	1
35	7240-00-404-9795	FUNNEL: 2-quart Galvanized To aid in adding oil to engine and transmission (81348) L-F-1593	A	EA	1
36	5120-00-061-8546	HAMMER, HAND: Machinist's, Ball Peen, 2 Lbs. To drive driftpin when disconnecting track; miscellaneous use (58536) A-A-1305	A	EA	1

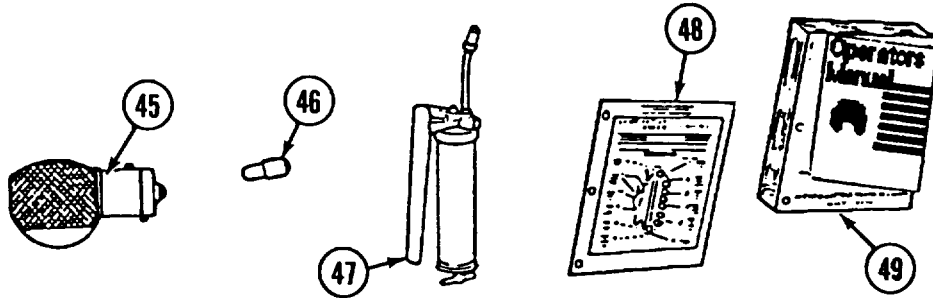


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code	(5) QTY Reqd
37	5120-00-288-6574	HANDLE: Mattock Pick Field expedients during mission (34623) MA207-21885	EA	1
38	5120-00-230-6385	HAN DLE, SOCKET WRENCH: Ratchet, 1/2-inch Square Drive, 9-1/2 In. Long For use with sockets (58536) A-A-2165	EA	1
39	5120-00-236-7590	HANDLE, SOCKET WRENCH: Hinged, 1/2-inch Square Drive, 18 In. Long To provide handle for sockets to tighten and loosen bolts and nuts (58536) A-A-2164	EA	1
40	6545-00-922-1200	KIT, FIRST AID: General Required for emergency medical aid (89875) SC C-6545-IL VOL 2	EA	1

Section III. BII-Continued.

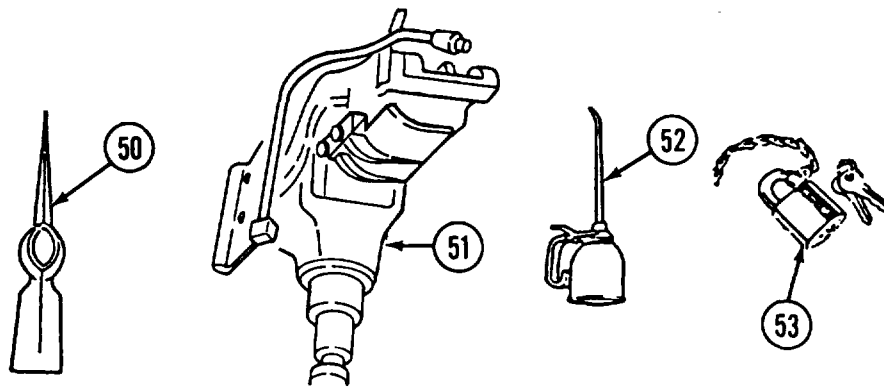


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
41	5120-00-240-5292	KEY, SOCKET HEAD SCREW: 1/8-inch Hexagon, 3-27/32 In. Long To tighten knob set screws on dome lights (58536) A-A-2473	EA A	1
42	5120-00-198-5410	KEY, SOCKET HEAD SCREW: 3/16-inch Hexagon, 5-19/32 In. Long To tighten screws in breech opening mechanism (58536) A-A-2473	EA A	1
43	5120-00-198-5409	KEY, SOCKET HEAD SCREW: 5/16-inch Hexagon, 6-3/32 In. Long To tighten M44 periscope mount (58536) A-A-2473	EA A	1
44	6240-00-921-4493	LAMP, INCANDESCENT: To replace lamp that illuminates reticle in M119 or M127/ M127A1 telescope (72914) 11405A	EA A	1

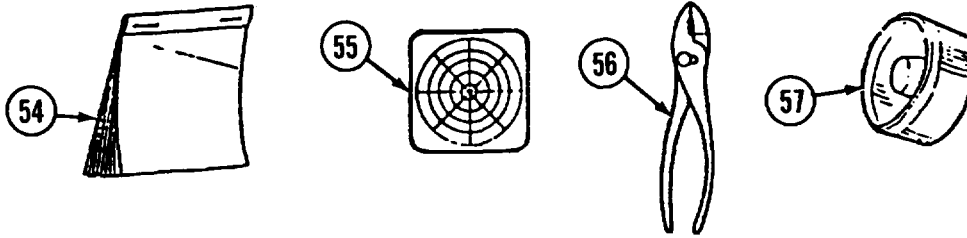


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
45	6240-00-763-7744	LAMP, INCANDESCENT: To replace lamp in grenade launcher ready light (81348) W-L-00111/7	EA B	1
46	6240-00-817-9803	LAMP, INCANDESCENT: To replace lamp that illuminates reticle in M44 periscope (61342) LTX316	EA A	1
47	4930-00-253-2478	LUBRICATING GUN: Hand To adjust track tension when loose; also to lubricate vehicle (81349) MIL-G-3859	EA A	1
48		LUBRICATION ORDER: (LO 9-2350-230-12) Lube instructions for crew A	EA	1
49		MANUAL, OPERATOR'S: (TM 9-2350-230-10) Operator/crew information A	EA	1

Section III. BII-Continued.

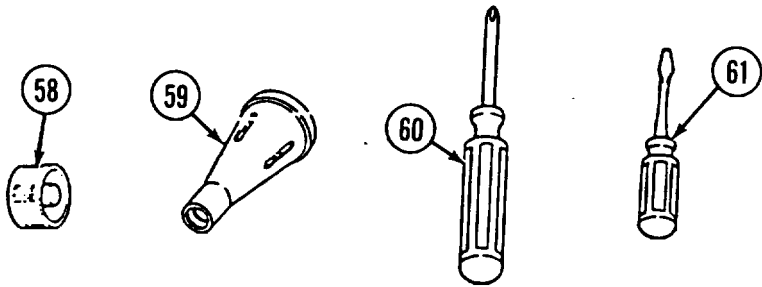


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
50	5120-00-243-2395	MATTOCK: Pick, Without Handle, 5 Lbs. Field expedients during mission (58536) A-A-315	EA	1
51	1005-00-704-6650	MOUNT, MACHINE GUN: Cal .50 Mount for cal .50 machine gun (19204) 7046650	EA	1
52	4930-00-169-8275	OILER, HAND, PUMP TYPE: 8-inch Spout To lubricate in accordance with LO (81348) GGG-0-591	EA	1
53	5340-00-912-4086	PADLOCK SET: 1-3/4-inch, with Clevis, with Two Keys To secure vehicle interior from unauthorized entrance (96906) MS21313-160	SE	1

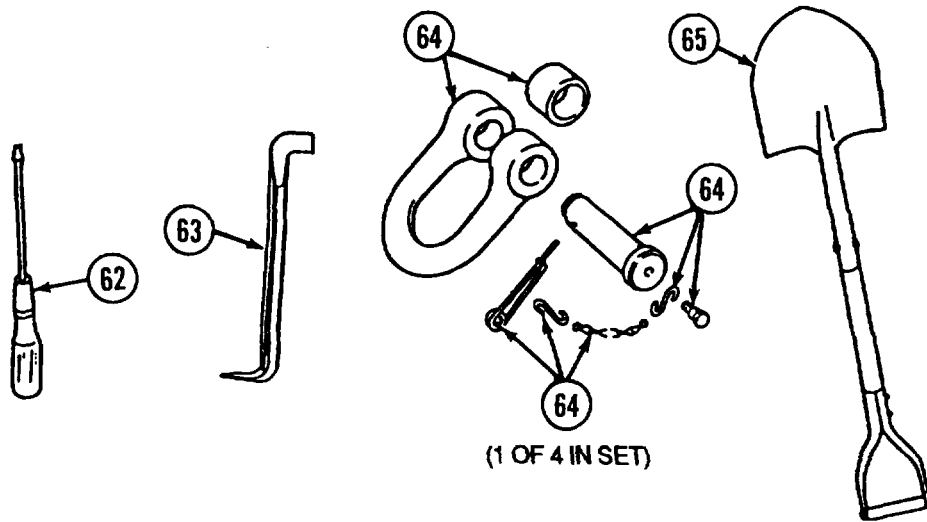


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/M	(5) QTY Reqd
54	6640-00-597-6745	PAPER, LENS: 50 Sheets Cleaning lens of sights (81348) NNN-P-40	A	BK	1
55	9905-00-624-3415	PLATE, INSTRUCTION: (Range Card) Firing during reduced visibility (19200) 8724207	B	EA	1
56	5120-00-223-7397	PLIERS, SLIP JOINT: With Cutter, 8 In To install and remove tow hook and pintle pin (34871) FAC01025	Long A	EA	1
57	1025-00-918-8129	PLUG, MUZZLE: For 152-mm Gun/Launcher To prevent foreign matter from entering gun when not in use (19206) 8769799	B	EA	1

Section III. BII-Continued.

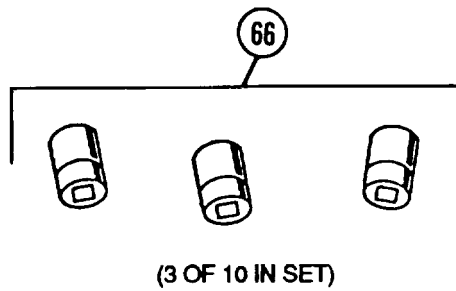


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
58	5340-00-792-9974	PROTECTIVE CAP, DUST: Telescope Opening in Protective Shield Protective plug when not being used (19207) 11636162	EA A	1
59	1025-00-918-8130	RAMMER, ARTILLERY: Cleaning and Unloading, 152-mm Unloading conventional stuck round (19206)	EA B 8769846	1
60	5120-00-234-8913	SCREWDRIVER, CROSS TIP: Number 2 Tighten water barrier screws (79061) BD122	EA A	1
61	5120-00-278-1283	SCREWDRIVER, FLAT TIP: 6 In. Long Removal of dome light lamp access doors (80204) B107.15-1986 TY1CL2DEB	EA A	1



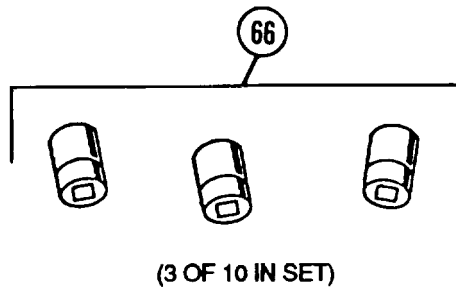
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
62	To Be Determined	SCREWDRIVER, FLAT TIP: 21-5/8 In. Long Overall Used to adjust tracker alignment (81348) GGG-S-121	EA	1
63	5120-00-287-2130	SCREWDRIVER, OFFSET: 4-1/2 In. Long Assist In removing and replacing obturator seal (81348) GGG-S-121	EA	1
64	4030-00-914-4705	SHACKLE, TOWING: With Pins and Locks For towing and extracting vehicle during emergency, to attach tow cable (19207) 7358028	EA	4
65	5120-00-293-3336	SHOVEL, HAND: General Purpose, D-Handle Field expedients during mission (81348) GGG-S-326	EA	1

Section III. BII-Continued.



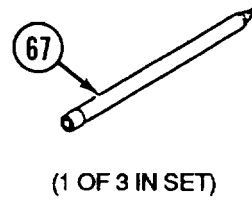
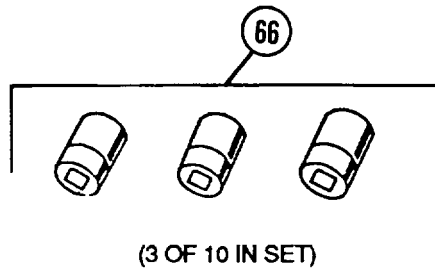
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
66	5120-00-189-7933	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 6 Point, 13/16-inch Opening Deep Socket Required for turret bearing lube plugs and lube fittings (80204) 11677025-5	EA A	1
66	5130-00-714-0593	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 6 Point, 7/16-inch Opening Deep Socket Required for turret bearing lube plugs and lube fittings (55719) 55719	EA A	1
66	5120-00-237-0984	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 12 Point, 1/2-inch Opening To tighten nuts and bolts on water barrier (58536) SP140	EA A	1

Section III. BII--Continued.

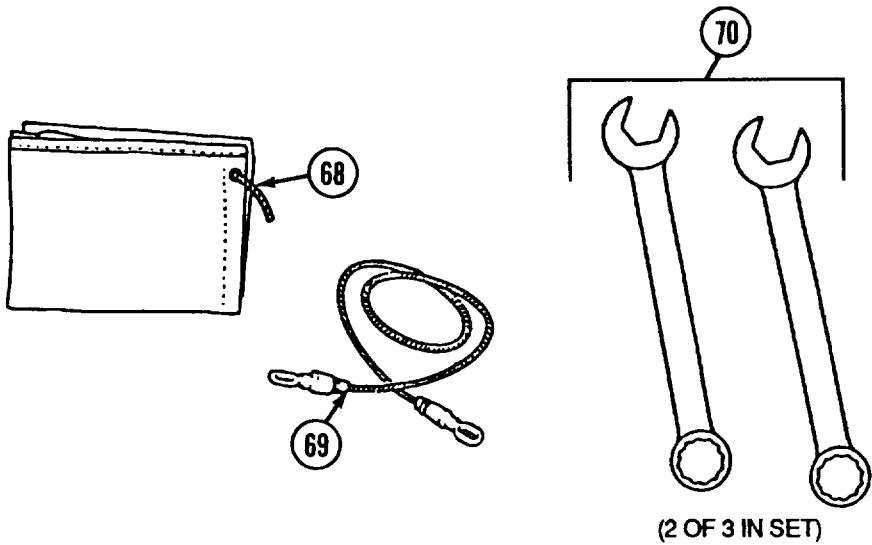


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
66	5120-00-189-7946	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 12 Point, 9/16-inch Opening To tighten nuts and bolts on water barrier (47805) 5416	EA	1
66	5120-00-189-7932	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 12 Point, 5/8-inch Opening To remove engine access plugs (19207) 11677025-1	EA	1
66	5120-00-235-5870	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 12 Point, 11/16-inch Opening To remove and install track pin nuts (19207) 11677025-3	EA	1
66	5120-00-189-7985	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 12 Point, 3/4-inch Opening To remove bolt and separate roadwheel (19207) 11677025-4	EA	1

Section III. BII-Continued.

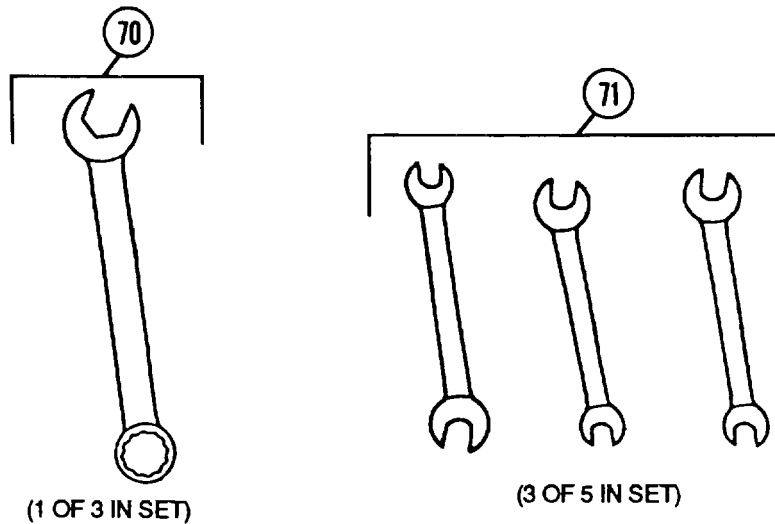


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code	(5) QTY Reqd
66	5120-00-189-7934	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 12 Point, 7/8-inch Opening To tighten roadwheel nuts (19207) 11677025-5	EA	1
66	5120-00-189-7935	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 12 Point, 15/16-inch Opening To tighten traversing mechanism (19207) 11677025-6	EA	1
66	5120-00-189-7914	SOCKET, SOCKET WRENCH: 1/2-inch Square Drive, 12 Point, 1-1/8-inch Opening For turning track fixture adjusting bolt and miscellaneous tightening (19207) 11677025-10	EA	1
67	1025-00-563-7232	STAFF SECTION: Cleaning, Artillery, M15 Used with bore brush and rammer (19206) 7309228	EA	3

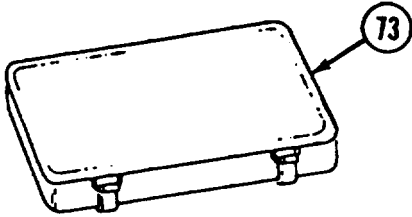
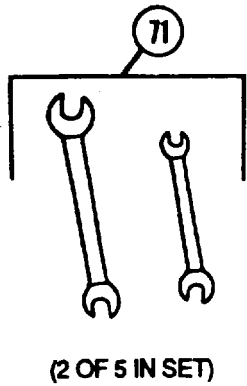


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
68	8340-00-841-6456	TARPAULIN: Nylon, 12 x 17 Ft. Used when loading ammo in field; also used as shelter protection to cover vehicle when not in use (81348) K-P-146	EA A	1
69	4010-00-767-3149	WIRE ROPE ASSEMBLY: Single Leg, Towing, Steel Towing and extracting disabled vehicles (two authorized for M551A1) (19207) 10861718	EA A	2
70	5120-00-228-9508	WRENCH, COMBINATION: Open and Box, 5/8-inch To hold roadwheel and mounting bolt (55719) OEX200	EA A	1
70	5120-00-228-9504	WRENCH, COMBINATION: Open and Box, 3/8-inch To remove and install battery mounting bolts (55719) OEX120	EA A	1

Section III. BII-Continued.



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
70	5120-00-228-9506	WRENCH, COMBINATION: Open and Box, 1/2-inch To tighten battery cables (55719) OEX160	EA A	1
71	5120-00-187-7131	WRENCH, OPEN END: Fixed, Double Head, 7/8-inch and 15/16-inch Openings To tighten traversing mechanism mount bolts (55719) S2830	EA A	1
71	5120-00-187-7133	WRENCH, OPEN END: Fixed, Double Head, 1-inch and 1-1/8-inch Openings To drain engine ventilation collector box (58536) A-A-1356	EA A	1
71	5120-00-224-3102	WRENCH, OPEN END: Fixed, Double Head, 5/8-inch and 3/4-inch Openings To hold nut when removing roadwheel mounting bolt (65814) 729	EA A	1



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) Usable On Code U/M	(5) QTY Reqd
71	5120-00-277-2342	WRENCH, OPEN END: Fixed, Double Head, 3/8-inch and 7/16-inch Openings To remove and install battery mounting bolts (19207) 11655789-1	EA A	1
71	5120-00-187-7124	WRENCH, OPEN END: Fixed, Double Head, 1/2-inch and 9/16-inch Openings To tighten battery cables (80009) 003-0738-00	EA A	1
72		DELETED		
73	5120-00-204-1999	WRENCH: Set Socket, 3/4-inch Drive (06542) FEDSTD353	SE A	1

Change 1 B-29 (B-30 blank)

**APPENDIX C
ADDITIONAL AUTHORIZATION LIST
(AAL)**

Section I. INTRODUCTION

C-1. SCOPE. This appendix lists the items authorized for the support of the M551A1/M551NTC.

C-2. GENERAL. A list of those additional expendable items (including spares, repair parts, and common tools) required by the operator/crew to support the end item during operation, but not required to place the end item in operation. The quantity of each item in the list is the maximum amount required to support one end item. The commander may determine the quantity of each item required based on equipment density. These items should not be turned in with the end item.

C-3. EXPLANATION OF LISTING. National Stock Numbers (NSNs), descriptions, and quantities recommended (Qty Recm) are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name; the unit of issue (U/1) in all cases is "each" (EA). If the item required differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description. If the item required differs for different models of this equipment, the model is shown under the 'Usable on Code" heading in the Description column. These codes are identified as follows:

<u>Code</u>	<u>Used On</u>
A	Both models
B	M551A1 only
C	M551NTC only

C-1

Section II. ADDITIONAL AUTHORIZED ITEMS LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION FSCM AND PART NUMBER	USABLE ON CODE	(3) U/M	(4) QTY AUTH
6240-00-155-7836	LAMP, INCANDESCENT: .04 AMP No. 327 Replace FIRE CONTROL selector lamp (88044) AN3140-327 A		EA	3
6240-00-019-3093	LAMP, INCANDESCENT: .37 AMP No. 623 Replace dome light lamp (96787) A6324	A	EA	1
6240-00-950-1727	LAMP, INCANDESCENT: .08 AMP No. 757 Replace personnel heater lamp (71744) CM757	A	EA	1
6240-00-019-0877	LAMP, INCANDESCENT: .23 AMP No. 1251 Replace taillight lamp (19207) A213667A	A	EA	1
6240-00-044-6914	LAMP, INCANDESCENT: 1.02 AMP No. 1683 Replace BO drive lamp (08108) ASA1683	A	EA	1
6240-00-295-2668	LAMP, INCANDESCENT: .61 AMP No. 1691 Replace dome light lamp (OCAO1) CM1691	A	EA	1
6240-00-155-7967	LAMP, INCANDESCENT: .10 AMP No. 1813 Intercom set control lamp (06845) A13244	A	EA	1
6240-00-155-7864	LAMP, INCANDESCENT AZIMUTH IND: Replace azimuth indicator lamp (72914) AN3136-323 (Box for all above lamps in BII)	A	EA	1

**APPENDIX D
EXPENDABLE AND DURABLE ITEMS
LIST**

Section I. INTRODUCTION

D-1. SCOPE. This appendix lists expendable and durable items that you will need to operate and maintain the M551A1/M551NTC. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except: Medical, Class V, Repair Parts and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

D-2. EXPLANATION OF COLUMNS.

a. Column 1, Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item, e.g., "Use cleaning compound (Appendix D, item 7)."

b. Column 2, National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

c. Column 3, Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number. This provides the other information you need to identify the item.

d. Column 4, Unit of Measure (U/M). This abbreviation shows the physical measurement or count of an item.

<u>Abbreviation</u>	<u>Unit</u>	<u>Abbreviation</u>	<u>Unit</u>
BE	bale	PG	package
BT	bottle	PR	pair
CN	can	PT	pint
CA	cartridge	OT	quart
EA	each	TU	tube
G L	gallon		

Section II. EXPENDABLE AND DURABLE ITEMS LIST

(1) ITEM NUMBER	(2) NSN	(3) Item Name, Description, CAGEC, Part Number	(4) (U/M)
1	6850-00-243-1992	Antifreeze, Type I (81349) MIL-A-46153	GL
2	8020-00-224-8024	Brush, Artist (81348) H-B-118	EA
3	8020-00-244-0153	Brush, Artist, Flat Chisel (81348) H-B-241	EA
4	8020-00-297-6657	Brush, Paint, Oval (81348) H-B-491	EA
5	7920-00-291-5815	Brush, Wire, Type II (72915) 8078883	EA
6	5350-00-221-0872	CA Cloth Abrasive: Crocus (81348) P-C-458	PG
7	6850-00-227-1887	Cleaning Compound, Lens (81349) MIL-C-43454	OT
8	6850-00-597-9765	Cleaning Compound, Solvent (81349) MIL-C-18718	GL
9	1025-01-196-2173	Cleaning and Preserving Kit, Tank, Bor-cap (Includes CLP) (59678) SK2-84JS	EA
10	8010-00-598-5936	Enamel, Semi-gloss O.D (Pressurized) (81348) TT-E-485	PT
11	6810-00-242-3645	Ethyl Alcohol (81348) O-C-265	GL
12	9150-00-935-1017 9150-00-190-0904 9150-00-190-0905	GAA Grease, Auto Artillery (81349) MIL-G-10924	CA CN CN
13	9150-00-985-7244	GIA Grease, Aircraft and Instrument (81349) MIL-G-23827 D-2	TU

SECTION II. EXPENDABLE AND DURABLE ITEMS LIST

(1) ITEM NUMBER	(2) NSN	(3) Item Name, Description, CAGEC, Part Number	(4) (U/M)
14	9150-00-189-6727	Lubricating Oil, Engine, OE/HDO10 (81349) MIL-L-2104	OT
15	9150-00-186-6681	Lubricating Oil, Engine, OE/HDO30 (81349) MIL-L-2104	OT
16	9150-01-152-4117 9150-01-152-4118	Lubricating Oil, Engine, OE/HDO15W40 (81349) MIL-L-2104	QT GL
17	9150-00-402-4478 9150-00-402-2372	Lubricating Oil, Engine, OEA (81349) MIL-L-46167	CT GL
18	9150-00-664-6518 9150-01-018-8958	Lubricating Oil, Instrument (81349) MIL-L-6085	BT GL
19	9150-00-949-0323	Lubricating Oil, Semi-fluid (81349) MIL-L-46150	TU
20	8415-00-266-8843	Mittens, Asbestos (81349) MIL-M-11199	PR
21	6640-00-285-4614	Paper, Lens Tissue, 7x11 In., Type I, Class 4 (81348) NNN-P-40	PG
22	9150-00-273-2389 9150-00-231-6689	PL-Special Lubricating Oil (81348) W-L-800	CN QT
23	7920-00-205-1711	Rag, Wiping, Cotton White (58536) A-A-2522	BE
24	6850-00-664-5685 6850-00-281-1985	SD Dry Cleaning Solvent (81348) P-D-680	QT GL
25	7920-00-753-5242	Scouring Pad, Nylon, Type 2 (81348) L-P-0050	PG
26	1025-01-311-3770	Sleeve, Cleaning, 155/203-mm (27412) 155/203-140	PG
27	1005-00-288-3565	Swab, Small Arms (19204) 5019316	PG
D-3 (D-4 blank)			

APPENDIX E
STOWAGE AND SIGN GUIDE

E-1. SCOPE. This appendix shows the locations for stowage of applicable Basic Issue Items (BII), Components of End Item (COEI) items, and Additional Authorization List (AAL) items to be carried on the M551A1/M551NTC and the locations of signs (stencils and decals) on the vehicle. For the locations of decals and instruction plates not related to stowage, see paragraph 2-22.

E-2. STOWAGE AND SIGN GUIDE. The following illustrations show the locations for the stowage of BII, COEI, and AAL items on the vehicle and the locations of signs. Stowage for a BII, COEI, or AAL item that is located with a sign is indicated by boxed text.

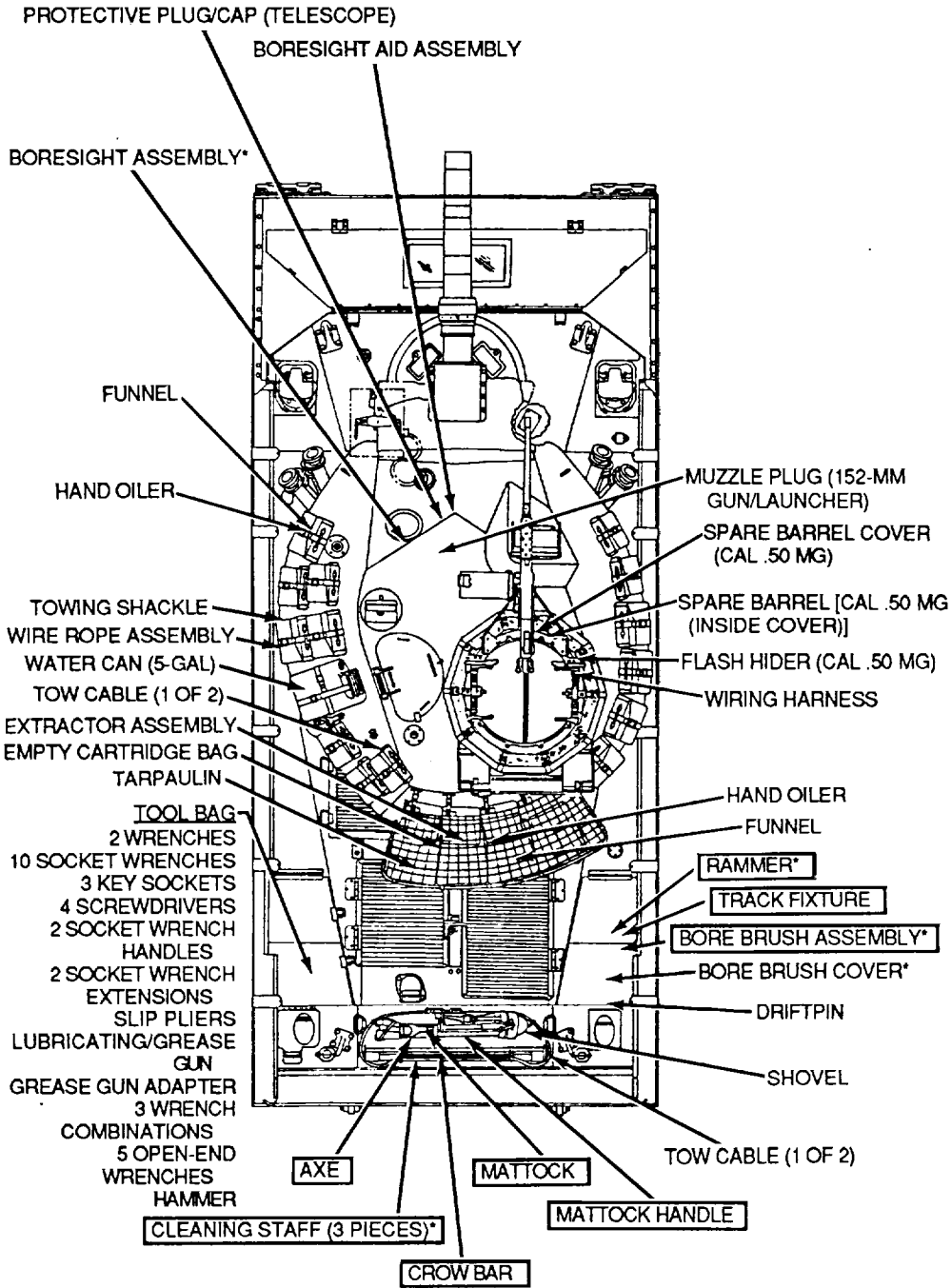
NOTE

Items on the following illustrations marked with an asterisk are not carried on the M551NTC.

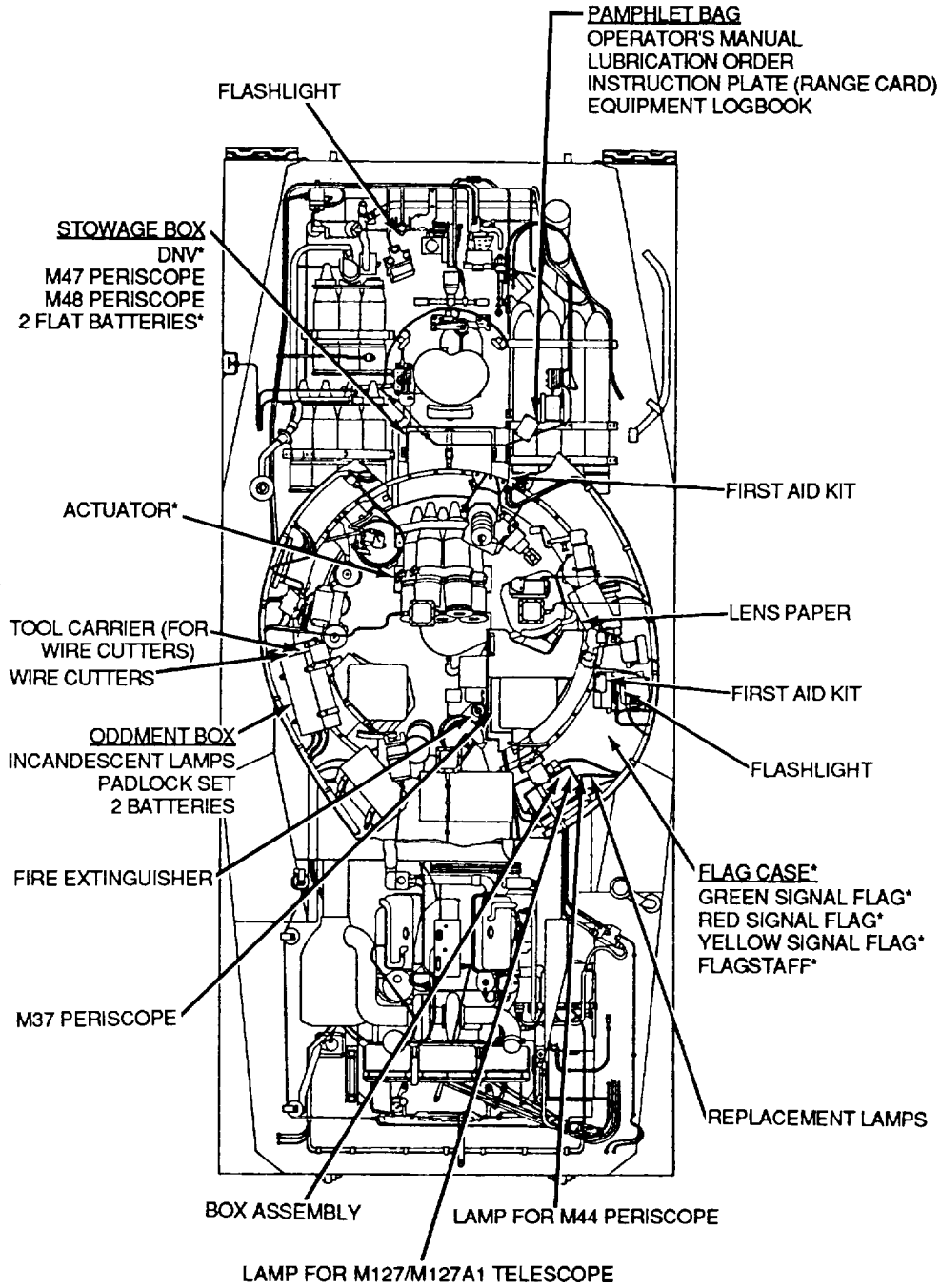
E-1

E-2. STOWAGE AND SIGN GUIDE-Continued.

Equipment Stowage-Vehicle Exterior

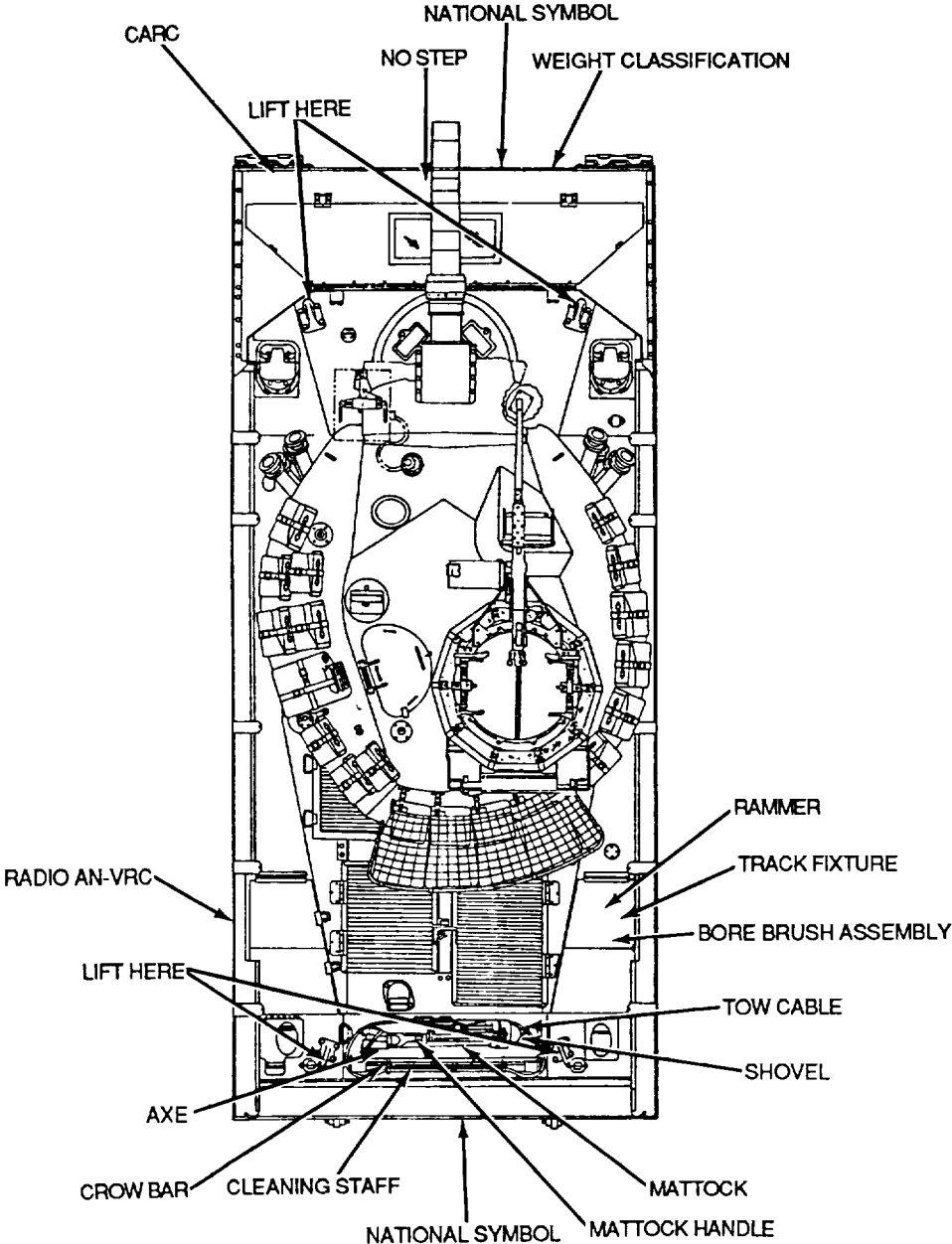


Equipment Stowage-Vehicle Interior

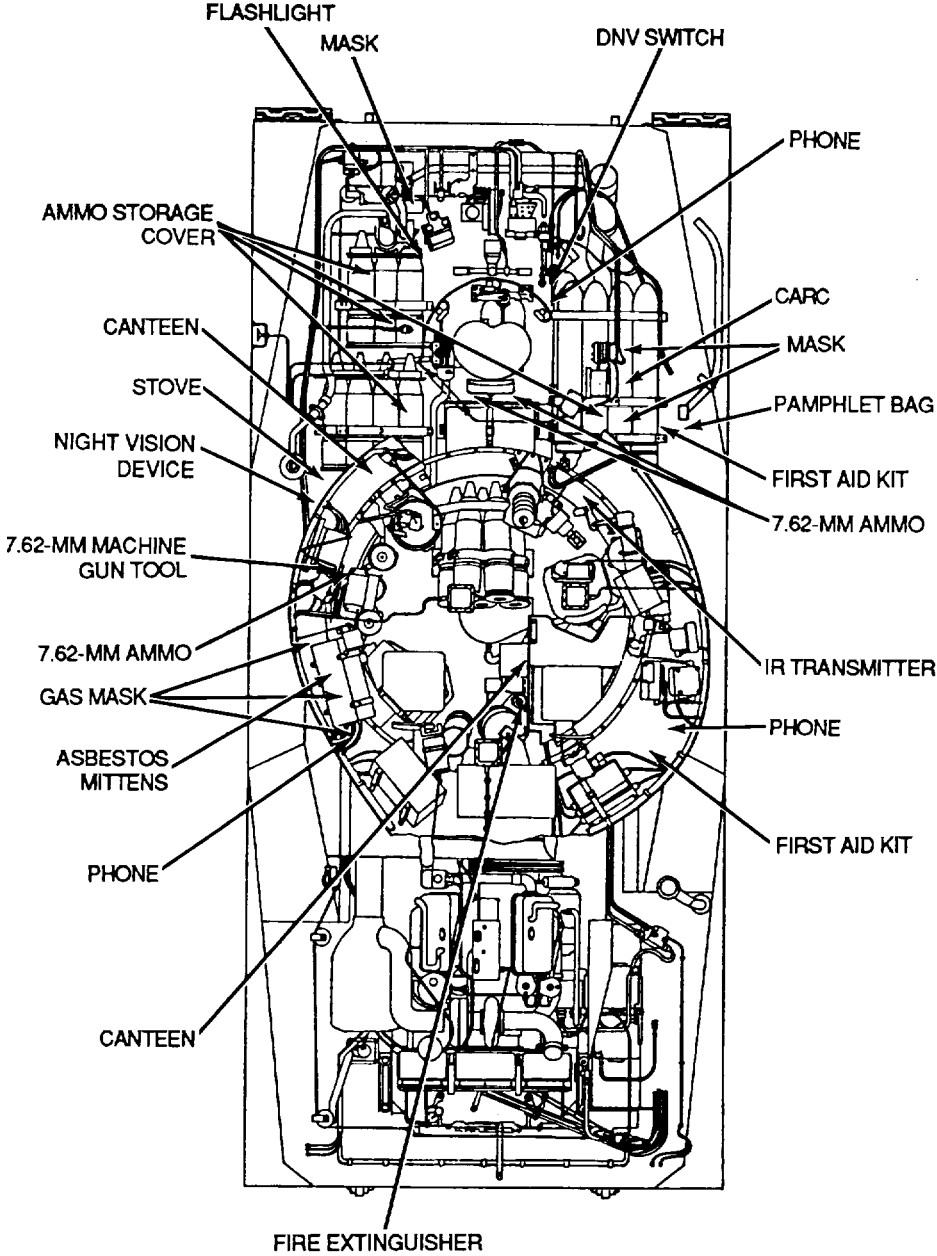


E-2. STOWAGE AND SIGN GUIDE-Continued.

Stowage Signs-Vehicle Exterior



Stowage Signs—Vehicle Interior

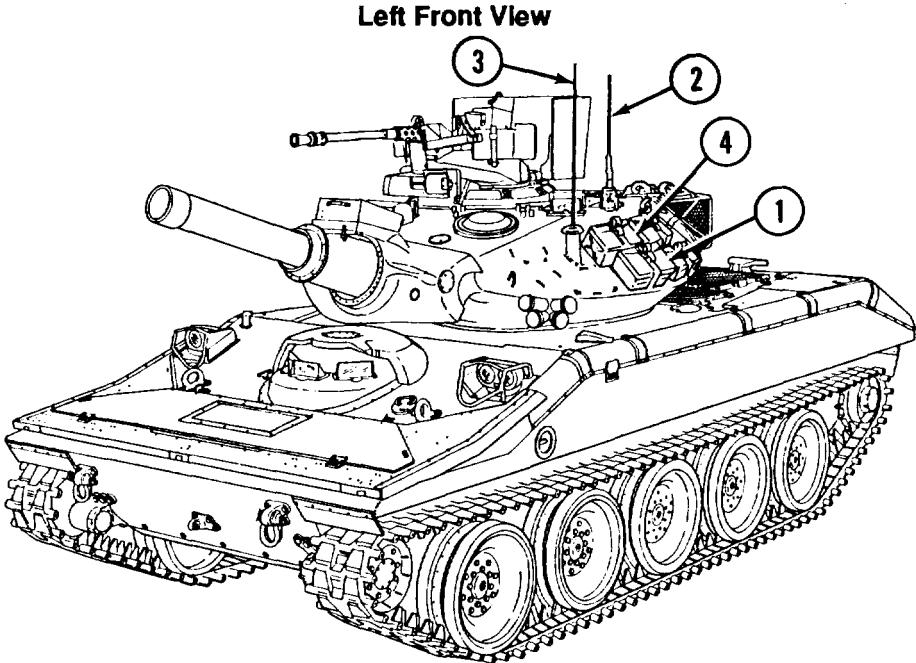


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**APPENDIX F
ON-VEHICLE EQUIPMENT LOADING
PLAN**

F-1. SCOPE. This appendix provides the On-Vehicle Equipment Loading Plan for the M551A1/M551 NTC.

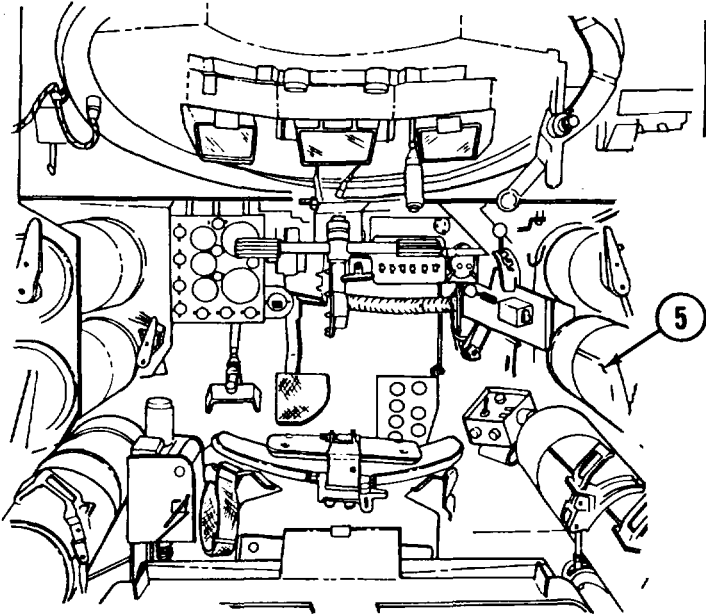
F-2. ON-VEHICLE EQUIPMENT LOADING PLAN. The items in this section are installed after the vehicle has been received.



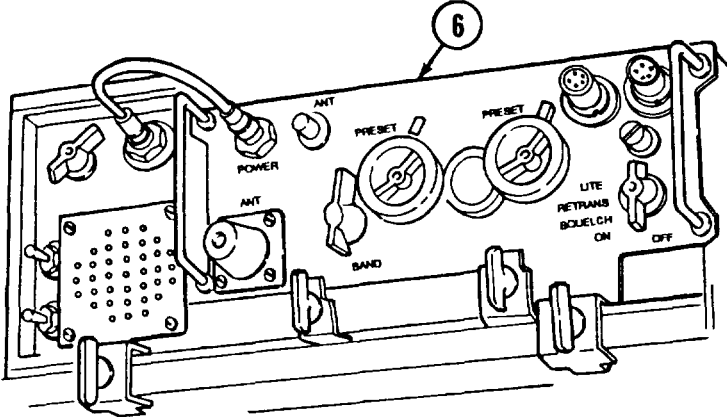
Callout	Item
1	Ammunition boxes (M551 AI)
2	Whip antenna AS-1 729NRC (receiver/transmitter)
3	Receiver antenna
4	Smoke grenades (M551 AI)

F-2. ON-VEHICLE EQUIPMENT LOADING PLAN—Continued.

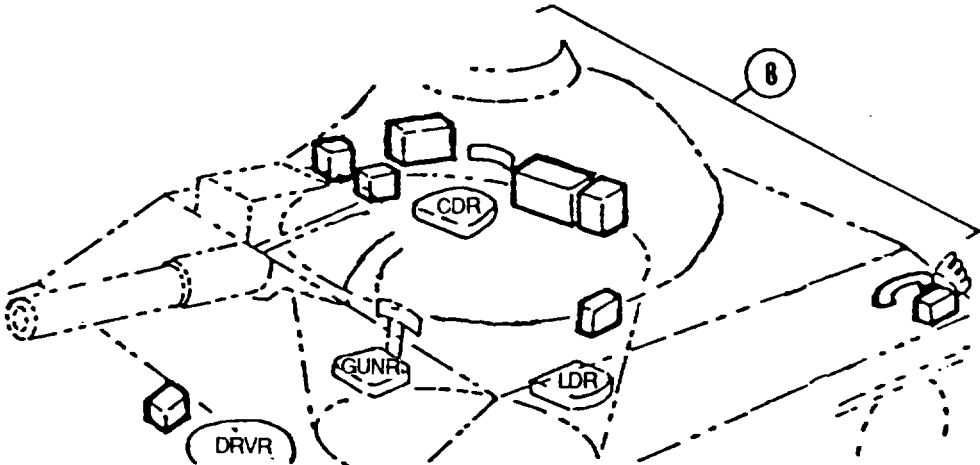
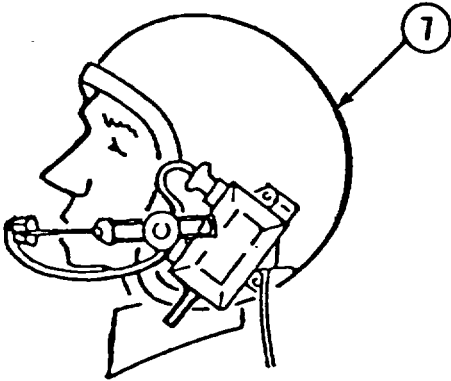
Driver's Compartment



Communications Systems



Callout	Item
5	Conventional and Shillelagh missiles (M551 AI)
6	Vehicle radio set AN/VRC-64



Callout	Item
7	Combat Vehicle Crewmember (CVC) helmet
8	Vehicle radio set ANNRC-12 (view shows placement of components in vehicle)

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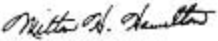
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By Order of the Secretary of the Army:

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

Official:


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Administrative Assistant to the
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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

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

SQUARE MEASURE

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

CUBIC MEASURE

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

LIQUID MEASURE

- 1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
- 1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

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

WEIGHTS

- 1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces
- 1 Kilogram = 1,000 Grams = 2.2 lb.
- 1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

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

