TM 9-1265-375-10
Supersedes copy dated 18 October 1984

OPERATOR'S MANUAL

FOR

MULTIPLE INTEGRATED LASER

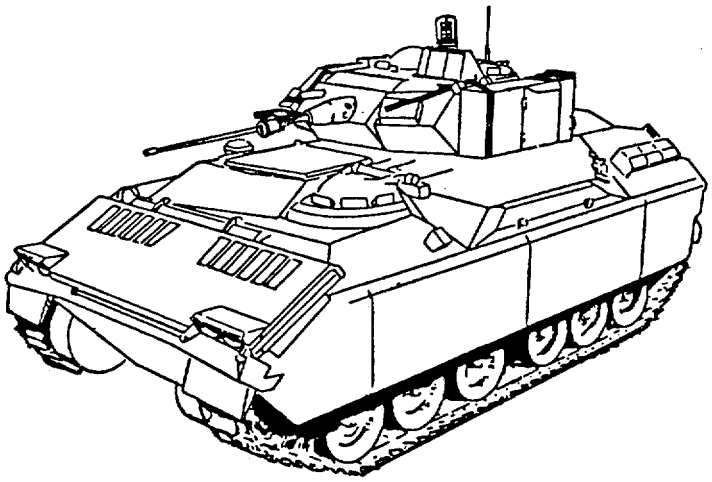
ENGAGEMENT SYSTEM

(MILES)

SIMULATOR SYSTEM, FIRING LASER: M83
(NSN 1265-01-158-4560)

FOR

M2/M3 FIGHTING VEHICLES



HEADQUARTERS, DEPARTMENT OF THE ARMY

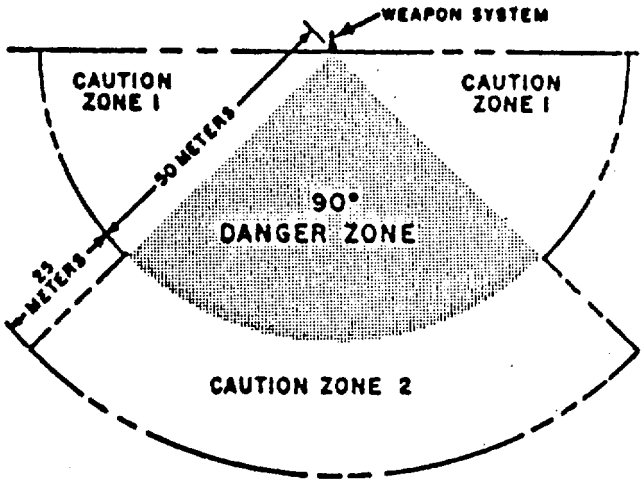
AUGUST 1988

WARNING

STAY OUT OF THE DANGER ZONE

CAUTION 1:
Ear Damage

CAUTION 2:
Flying Debris



Never stand within the danger zone while loading the ATWESS. Always stand to the right side of the rear of the launcher. After the cartridge is inserted into the chamber, keep hands, arms, and other portions of the body away from the hole in the center of the breech door. Failure to follow these instructions could result in personnel being burned by the backblast escaping through the hole in the center of the breech door.

Never arm an ATWESS until you are ready to fire.

Treat the TOW/MILES as you would any loaded and armed weapon. Do not drop TOW/MILES when ATWESS is loaded and armed. A strong jolt may set off the ATWESS.

Handle ATWESS cartridges with the same care you use with any live ammunition.

Always wear earplugs when firing the TOW/MILES.

Although the laser light emitted by MILES Laser Transmitters is considered eye safe by the Bureau of Radiological Health, suitable precautions must be taken to avoid possible damage to the eye from overexposure to this radiated energy. Take the following precautions:

- Never look at the laser emitter at close range (less than 12 meters).
- Never look at the laser emitter through optics such as BINOCULARS, TELESCOPES, or weapon sights at ranges less than 75 meters.
- Never look at the laser emitter directly along the axis of the bore of the weapon.

Primer is highly inflammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.

Ensure personnel stand clear of moving Launcher. Failure to comply may cause Injury or Death to personnel.

Do not install TOW simulator tubes containing ATWESS cartridges.

Use Manual Elevation Controls to raise or lower gun as required. Use of power controls could result in serious injury to personnel.

Make sure turret area is clear of personnel if TOW launcher is raised in power mode. Turn TURRET DRIVE SYSTEM to OFF after TOW launcher is up and locked.

Sudden turret movement can injure personnel. Make sure TURRET DRIVE SYSTEM switch is OFF when testing transmitters.

The M82 blank is the only ammunition authorized for use in the M240C Coax machine gun.

Treat ATWESS cartridges as you would live ammunition. A strong shock may set off the ATWESS cartridge.

Accidental turret movement may cause personnel injuries and errors in MILES alignment.

Make sure TURRET DRIVE SYSTEM is OFF.

Never stand behind TOW simulator when arming it or loading ATWESS cartridges.

Do not load the TOW simulator from the cargo hatch. ATWESS misfire could injure personnel inside vehicle.

Load from Gunner's station hatch by reaching around from simulator side. Always load outboard TOW simulator tube first. Accidental ATWESS firing could injure Loader.

Observe 10 second delay after first arming.

For Information on FIRST AID, see FM 21-11.

TECHNICAL MANUAL
No. 9-1 265-375-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 12 AUGUST 1988

OPERATOR'S MANUAL
FOR
MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM
(MILES)
SIMULATOR SYSTEM, FIRING, LASER: M83
NSN 1265-01-158-4560
FOR
M2/M3 FIGHTING VEHICLES

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 back of this manual direct to: Commander, US Army Armament, Munitions and Chemical Command, ATTN.: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you.

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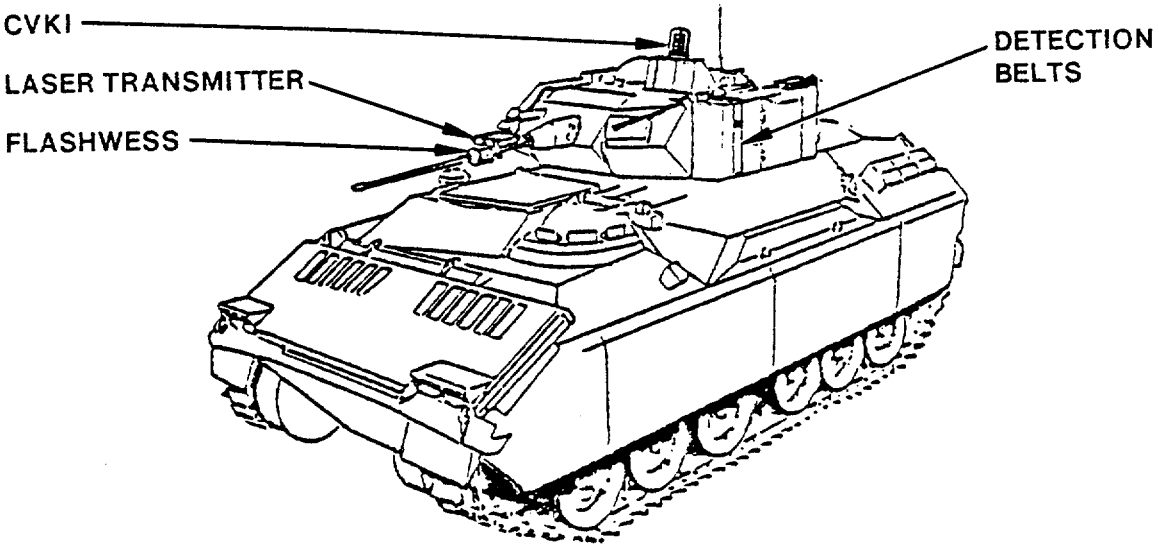
*Supersedes TIM 9-1265-375-10 dated 18 October 1984 , including all changes.

CHAPTER 1
INTRODUCTION

SECTION I. GENERAL INFORMATION



SCOPE

TYPE OF MANUAL. This manual shows you how to install, operate and maintain MILES simulator system equipment for the M2 and M3 Fighting Vehicles. Step-by-step instructions are given for all procedures necessary to use the system.

This manual covers only authorized operator maintenance. Any maintenance problems not coveted should be referred to organizational maintenance personnel.

NOTE

To use this manual you should be able to:

Aim and Fire all M2/M3 Vehicle weapons (see TM 9-2350252-10).

Install blank-fire adapter on the M240C machine gun (see TM 9-1005-313-10).

Complete DA Form 2402 and 2404.

If you cannot do these tasks, ask your NCOIC or Instructor to show you how. When you can do all these tasks, go on with this manual.

SCOPE (Continued)

PURPOSE OF EQUIPMENT. MILES equipment for the M2 and M3 Fighting Vehicles consists of two battery-operated laser transmitters and a detector system. It permits realistic combat training without the hazards of using live ammunition.

LIMITATION ON EQUIPMENT. MILES-equipped weapons have the same range and operational capabilities as the normal weapons, but a dirty laser transmitter lens may reduce the effective range of the transmitters.

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

HAND RECEIPT MANUAL. This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). The TM 9-1265-375-10-HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (i.e., COEI, BII, and AAL) you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from the following source in accordance with procedures in Chapter 3, AR 310-2:

Commander

The U. S. Army Adjutant General Publications Center

2800 Eastern Boulevard

Baltimore, MD 21220

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRS). If your MILES equipment for the M2 and M3 Fighting Vehicles needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail the Quality Deficiency Report to us at Commander, U. S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD, Rock Island, IL 61299-6000. We'll send you a reply.

NOMENCLATURE CROSS REFERENCE LIST

Common Name	Official Nomenclature
ATWESS	Anti-Tank Weapon Effects Signature Simulator
AWESS	Automatic Weapon Effect Signature Simulator
Control Console (Loader's Control Assembly - LCA)	Console, Simulator System: For M2/M3
Controller Gun	Controller's Gun, Simulator System, Laser
CVKI	Indicator Simulator System, Laser: Combat Vehicle KILL/HIT/MISS
Detector Belt Segments	Detector Belt Assembly, Segment No. 7 and Segment No. 8
FLASHWESS	Simulator, Weapon Fire
Helmet Harness	Detector Assembly, Simulator System, Laser: Man Worn
Main Gun/Coax Machine Transmitter	Transmitter Assembly, Simulator System, Laser: Gun 25 mm
Torso Harness	Detector Assembly, Simulator System, Laser: Man-Worn
TOW	Tube Launched, Optically Sighted, Wire Command Link-Guided Missile
TOW Transmitter	Transmitter Assembly, Simulator System, Laser: TOW
TOW Simulator Tube	Simulator, Anti-Tank Missile Fire, TOW

LIST OF ABBREVIATIONS

CLP	Cleaner, Lubricant and Preservative
CVKI	Combat Vehicle Kill Indicator
LCA	Loader's Control Assembly
MILES	Multiple Integrated Laser Engagement System
MWLD	Man-Worn Laser Detector
NCOIC	Non-Commissioned Officer In Charge
TOW	Tube Launched, Optically Tracked, Wire-guided

GLOSSARY

ATWESS Cartridge	Pyrotechnic device used to simulate backfire shock and noise of TOW firing.

GLOSSARY (Continued)

Common Name	Official Nomenclature
Control Console (Loader's Control Assembly - LCA)	MILES device used in vehicles to decode laser beam signals and fire laser transmitters.
Controller	Umpire or Referee in a MILES training exercise.
Controller Gun	Device used to test MILES detector systems. Also used to disqualify soldiers or vehicles from an exercise.
Controller Key	Green Key used by Controller to reset MILES transmitters.
Combat Vehicle Kill Indicator	MILES device attached to armored vehicles to provide external flashing light. Indicates that vehicle is under opposing fire ("NEAR MISS"), has been "HIT" or "KILLED."
Fastener Tape	Hook-and-pile tape. Used to hold Vehicle detector belts and other MILES equipment in place.
Helmet Harness	Part of the laser detector assembly worn on a combat helmet.
HIT	Simulated contact with opposing fire insufficient to disable vehicle or cause a fatality.
KILL	Simulated contact with opposing fire sufficient to disable vehicle or cause a fatality.
Laser Beam	Invisible beam of light which simulates weapon fire in MILES.
Laser Detector Belt Assembly	Device that senses the laser beam directed at it.
Laser Transmitter	Device that sends the laser beam.
Man-Worn Laser Detector	Helmet and torso assembly worn by personnel which senses a laser beam directed at it.
NEAR MISS	Simulated closeness to contact with opposing fire.
Simulator	Training device which takes the place of real equipment and which has many of its characteristics.
Torso Harness	Part of the laser detector assembly worn on the upper body.
TOW	Wire-guided anti-tank missile.
Orange Weapon Key	Silences intercom when inserted in control console. Also used to "SELF-KILL" vehicle.
Yellow Weapon Key	Carried by vehicle personnel wearing MWLDs. When continuous alarm sounds, it is put in the MWLD key receptacle to silence alarm.

SECTION II. EQUIPMENT DESCRIPTION

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

PURPOSE OF MILES SIMULATOR SYSTEM, LASER: M2/M3 FIGHTING VEHICLES

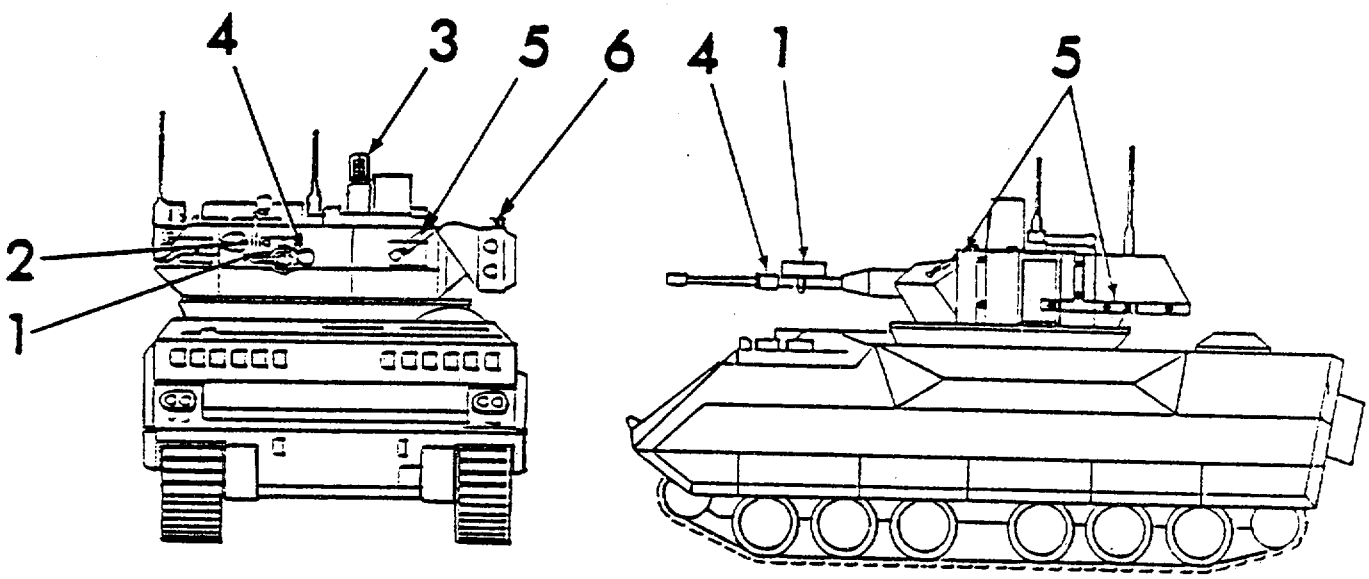
The MILES Simulator System, Laser: M2/M3 Fighting Vehicles, permits the Vehicle and Crew to take part in realistic combat training exercises. Actual firing conditions of all vehicle weapons are simulated using laser beams. Blank ammunition and an ATWESS firing device add to the system's realism.

Laser detectors mounted on the M2 and M3 vehicles and worn by crew members sense enemy fire.
MILES system electronics determine the accuracy and simulated damage of enemy fire. The system also detects the type of weapon directing enemy fire against the M2 and M3 vehicles.

FEATURES AND CAPABILITIES

- Easily installed and removed.
- Simulates firing capability of all M2 and M3 weapons.
    1. 25 mm Main Gun/Coax M240C Machine Gun
    2. TOW Missile
- Blank-Fire, FLASHWESS, and ATWESS firing devices add realism.
- Normal firing procedures used for all weapons.
- Detects all opposing fire.
    1. Attacking weapon accuracy
        a. "NEAR MISS"
        b. "HIT"
        c. "KILL"
    2. Attacking weapon identification
- Uses eye-safe battery-powered laser transmitters.
- Operates in temperatures from -35°C (-31°F) to 62°C (144°F).
- Compatible with all other MILES training devices.
- visibility CVKI strobe light signals vehicle "NEAR MISS," "HIT," or "KILL."

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



Main Gun/Coax Machine Gun Transmitter (1). Simulates firing effects of 25 mm Main Gun and M240C Coax Machine Gun by transmitting a special coded laser signal. Mounts on barrel of 25 mm main gun.

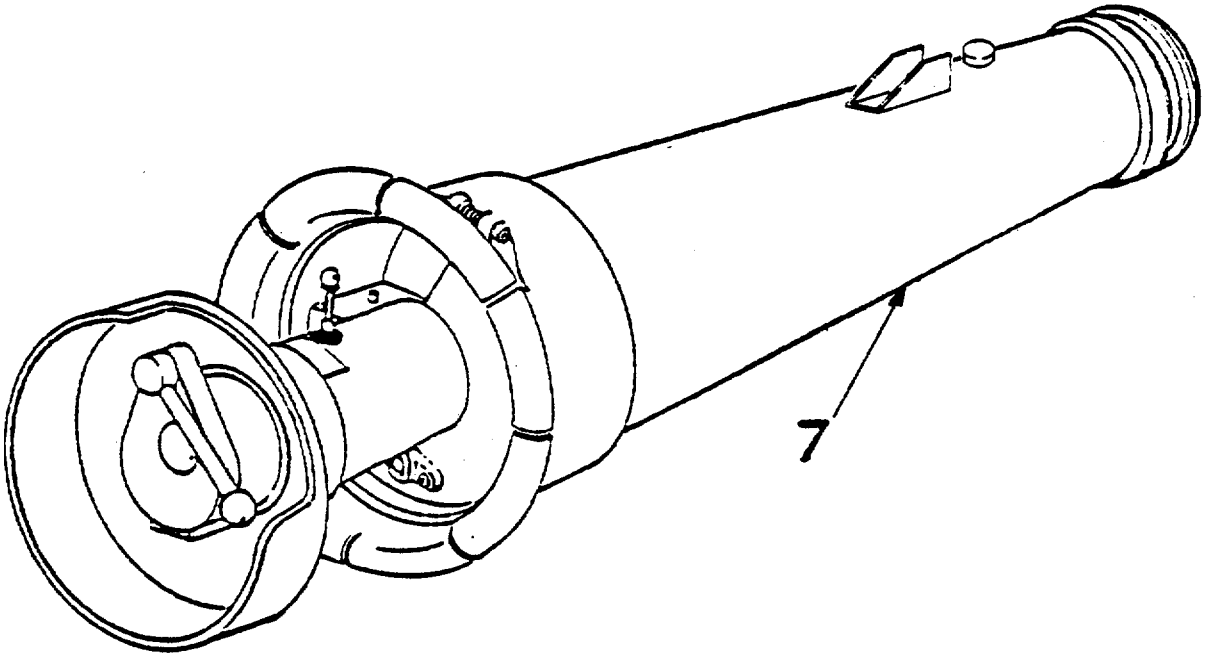
Blank Firing Attachment (2). Permits using blank ammunition in M240C machine gun.

Combat Vehicle Kill Indicator (3). Flashes strobe light for a "KILL," "HIT," or "NEAR MISS" indication. Mounts on top right side of the Integrated Sight Unit (ISU).

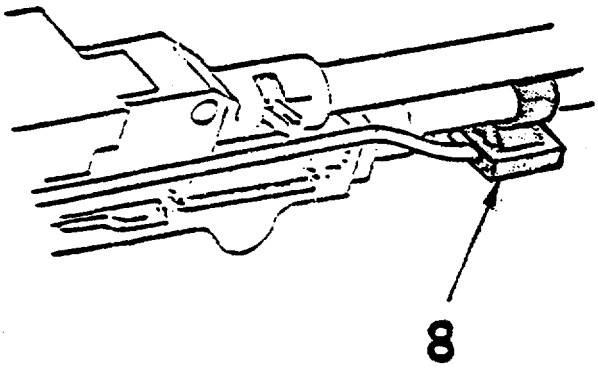
FLASHWESS (4). Lamp device powered by 24 V dc vehicle power. Flashes 120 times per minute when activated by gun system. Simulates light flashes generated by firing live ammunition. Attaches to main gun barrel.

Detector Belt System (5). Receives laser pulses from MILES-equipped opposing weapons. Generates, amplifies and routes electrical signals to the control console for determining whether signal was a "NEAR MISS," "HIT," or "KILL." Mounts on TOW launcher and sides, front, and rear of M2 and M3 vehicles.

TOW Transmitter (6). Simulates firing effects of TOW missile by transmitting a special coded laser signal. Attaches to side of raised TOW launcher.

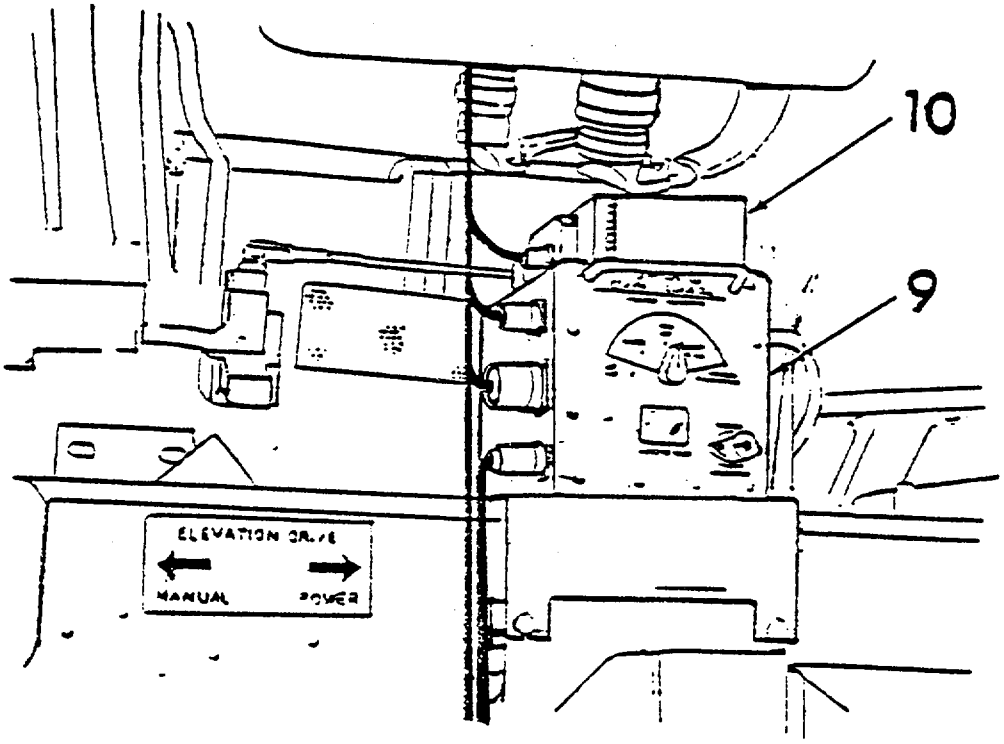


TOW Simulator (ATWESS) Tube (7). Simulates firing signature of TOW missiles. Mounts inside TOW launcher.



Coax Machine Gun Micro/hone (8). Actuates M240C Coax Machine Gun transmitter. Attaches to lower machine gun barrel.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT.)



Control Console (Loader's Control Assembly LCA) (9). Receives detected laser pulse signals from detector assemblies. Decodes these signals, and actuates appropriate audio and visual alarms. Provides electrical signals to fire main gun or machine gun and TOW transmitters. Contains a key receptacle for initializing system, silencing intercom alarm, and resetting system. Mounts on top of the HE ammunition cover.

Battery Box (10). Contains two 6-volt batteries for operating main gun or machine gun and TOW laser transmitters, control console, and detector belts. Mounts on top of the control console.

EQUIPMENT DATA

Table 1-1. MILES M2/M3 Equipment Data

Laser Transmitters	Weight (Pounds)	Dimensions (Inches)	Basic Load (Rounds)	Standard Kill Range (Meters)
25 mm/Coax Machine Gun	4.50	2.2 x 8.0 x 10.5	1500/4500*	25-3000/25-1000
TOW	4.50	5.7 x 2.0 x 10.5	12	65-3750

Detector Assemblies	Weight (Pounds)	Dimensions (Inches)	Number of Detectors
Belt #7	3.00	191 x 2	5
Belt #8	2.63	177 x 2	4
Man-Worn Helmet Harness	1.56	11.0 (dia.) x 3.5	5
Man-Worn Torso Harness	2.81	40 x 7.75 to 18 x 2	8

Equipment	Weight (Pounds)	Dimensions (Inches)
CVKI (without adapter)	11.62	14 x 7.3 (diameter)
Control Console (LCA) (without adapter)	8.50	8.5 x 5.5 x 5.5
Battery Box Assembly	1.31	7 x 5 x 4
TOW Simulator	20.00	56 x 8.0 (diameter)
FLASHWESS	8.5	6 x 5.1 (diameter)

*Dry-fire mode

SECTION III. TECHNICAL PRINCIPLES OF OPERATION

BASIC PRINCIPLES OF OPERATION

The MILES system uses semiconductor laser beams to simulate actual weapon fire. An eye-safe invisible laser beam is sent out by each weapon's transmitter when it is fired. The laser beam is coded and simulates all of the weapon's capabilities including range, accuracy, and destructive capability.

Laser detector systems are used to sense opposing fire. The detector systems register opposing laser beams and determine whether they have scored a "NEAR MISS," "HIT," or "KILL." The systems activate alarms indicating the presence and damage of opposing fire.

The MILES system of laser beam transmitters and detectors allows safe, realistic training exercises with a complete range of weaponry and vehicles.

MILES M2/M3 FIGHTING VEHICLE CONFIGURATION

All weapons on the M2/M3 Fighting Vehicles are equipped with laser transmitters that are fired using normal weapon operating procedures. The vehicle exterior has special detector belts attached that sense opposing fire. A control console mounted inside the vehicle determines the extent of opposing fire and its effect. A flashing light (CVKI) mounted on the vehicle's exterior is activated by the control console when opposing fire is detected.

Crew members wear MWLD torso and helmet harnesses. These detect opposing fire directed against the individual crew member. When opposing fire is detected, an audio alarm on the torso harness is set off.

MAIN GUN MILES FIRING

The MILES-equipped main gun is fired using normal procedures. A laser transmitter mounted on the main gun barrel fires when the gun is triggered in either the single shot or automatic modes. A shorting plug electronically disconnects the actual main gun during MILES exercises.

The low ammunition override button on the vehicle weapon control box must be pressed before firing the main gun.

The MILES system allows a basic load of 1500 main gun rounds. After firing the main gun, you can check to see how many rounds the MILES system has left. This is done by turning the switch on the control console to MAIN GUN, pressing the display button, and reading the displayed number. That number multiplied by 100 represents the rounds remaining.

MAIN GUN WEAPON SIGNATURE SIMULATION

The FLASHWESS device uses a high intensity lamp to simulate the light flash of actual 25 mm main gun firing. The device will flash approximately 120 times per minute. The Controller must set the key receptacle on the 25 mm gun transmitter to AWESS for FLASHWESS operation.

M240C COAX MACHINE GUN

The M240C Coax Machine Gun is fired using normal procedures. The gun is loaded with blank ammunition. The sound of blank fire is sensed by a microphone which triggers the coax machine gun transmitter mounted on the main gun barrel.

The laser transmitter will operate as long as blank ammunition is being fired. The control console will not indicate rounds remaining when using blank ammunition.

The machine gun may also be operated in a dry-fire mode without using blank ammunition. A dry-fire plug, P/N 19200-11749794 is required to operate in this mode.

The low ammunition override button on the vehicle weapon control box must be pressed before firing machine gun in dry-fire mode.

The MILES system allows a basic load of 4500 M240C Coax Machine Gun rounds in the dry-fire mode.
After firing the machine gun, you can check to see how many rounds the MILES system has left. This is done by turning the switch on in the control console to COAX, pressing the display button, and reading the displayed number. That number multiplied by 100 represents the rounds remaining.

TOW SYSTEM

The TOW system is fired using normal procedures. The launcher is equipped with two TOW simulator (ATWESS) tubes. A TOW laser transmitter is mounted on the exterior of the TOW launcher.

The TOW simulator tubes are loaded with ATWESS cartridges. When the TOW weapon is fired the ATWESS cartridges detonate, providing noise flash and smoke simulation of an actual missile launch.

The laser transmitter fires 1 second after the ATWESS device. TOW weapon sight must be used to track target for 11 seconds to secure a "HIT" or "KILL." A "HIT" or "KILL" indicates that the gunner has properly tracked the target and the 11 seconds simulates a tracking time of an actual missile.

After firing the TOW weapon, you can check to see how many rounds the MILES system has left. This is done by turning the switch on the control console to MISSILE, pressing the display button, and reading the displayed number. The TOW system may also be operated in a dry-fire mode without using ATWESS cartridges. The Controller must set the key receptacle on the TOW tube to Dry-Fire.

DRY-FIRE OPERATION

The laser transmitters on all MILES-equipped weapons can be fired without using blank ammunition or the ATWESS firing device. A Controller Key must be used to set the 25 mm Main Gun and TOW transmitters for dry-fire operation. The key is inserted in a receptacle on the TOW simulator tube and selects either dry-fire or ATWESS operation. The key is inserted in a receptacle on the 25 mm main gun transmitter to select either dry-fire or operation with the FLASHWESS.

The dry-fire plug, P/N 19200-11749794 is used to dry-fire the machine gun.

VEHICLE DETECTION SYSTEM

Two detector belts containing nine detectors are mounted on the turret of the M2 and M3 fighting vehicles. Opposing fire is sensed by the detectors. They generate electrical signals which are fed to a decoder in the control console.

The decoder identifies the type of weapon that fired the opposing laser beam. It determines whether the laser shot was accurate enough to cause a "HIT" or whether a "NEAR MISS" occurred. It also determines if the weapon was capable of causing damage to the target (an M16 rifle, for example, cannot disable a tank) and the probability of "KILL" for that weapon. The probability of "KILLING" a target is different for each attacking weapon.

If a detector on the M2 and M3 vehicles is "HIT" by laser fire, one of three things will happen:

1. Two tones will sound in the vehicle intercom and CVKI light mounted on the vehicle exterior will flash two times. This means a "NEAR MISS" occurred.

2. Four to six tones will sound in the intercom and CVKI light will flash four or six times. This means a "HIT" but not a "KILL" occurred.

3. The intercom tone will sound continuously and CVKI light will flash continuously. This means a "KILL" occurred.

The vehicle crew can determine what type of weapon has fired on them by setting the switch on the MILES control console to HIT/KILL and pushing the display button. A code number will appear on the display indicating the attacking weapon following a "HIT" or "KILL." No code number appears for a "NEAR MISS."

The intercom tone is turned off after a "KILL" by inserting an Orange Weapon Key in the control console receptacle and turning it. If the key is removed from the console the intercom tone will begin again. The CVKI light continues to flash until reset by a Controller.

MWLD DETECTION SYSTEM

The M2 and M3 fighting vehicle’s Gunner, Driver, and Commander each wear a helmet harness equipped with laser detectors and a torso harness equipped with laser detectors and an audio alarm.

If the detectors on a crew member sense opposing MILES-equipped weapon fire, one of two things will happen:

1. The alarm on the harness sounds briefly. This means a "NEAR MISS" occurred. It is a warning to take cover.

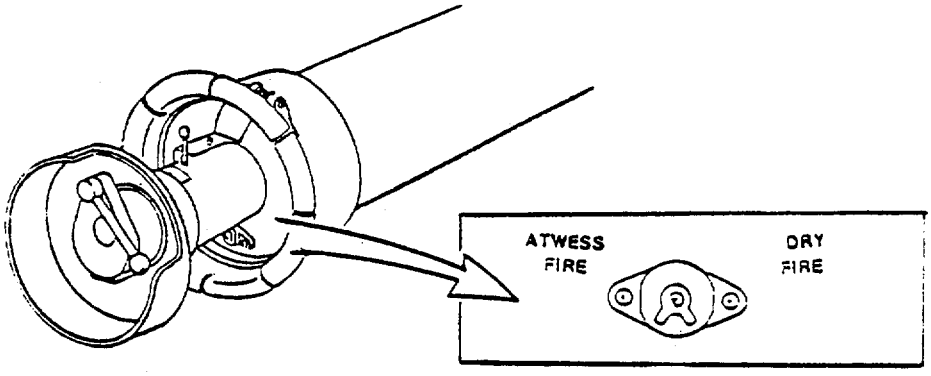
2. The alarm sounds continuously. This means the soldier has been "KILLED." He must use a Yellow Weapon Key to turn off the alarm.

CHAPTER 2
OPERATING INSTRUCTIONS

SECTION I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

MILES M2/M3 CONTROLS AND INDICATORS. The MILES M2/M3 Controls and Indicators are those associated with the TOW simulator tube and 25 mm main gun transmitter key receptacles and the control console (Loader's Control Assembly - LCA). All other controls and indicators needed for MILES operation, such as triggers and arming switches, are those actually associated with the M2/M3 weapons.

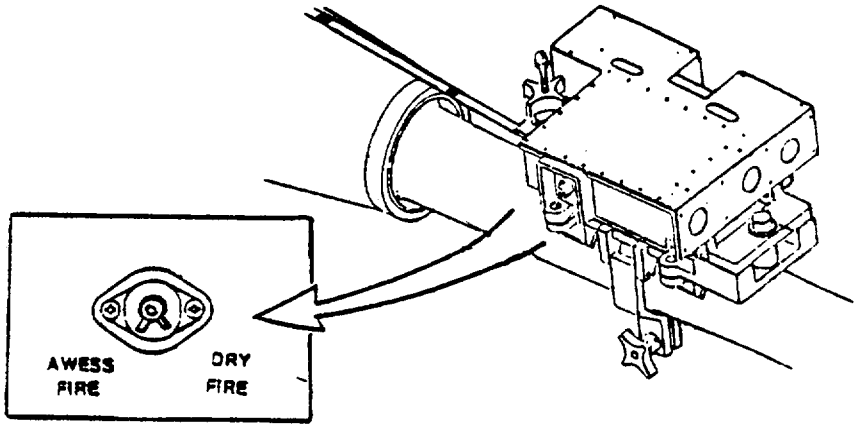
TOW SIMULATOR TUBE KEY RECEPTACLE



ATWESS FIRE - Enables TOW transmitter to be fired simultaneously with ATWESS cartridges.

DRY-FIRE - Enables TOW transmitter to be fired in dry-fire mode.

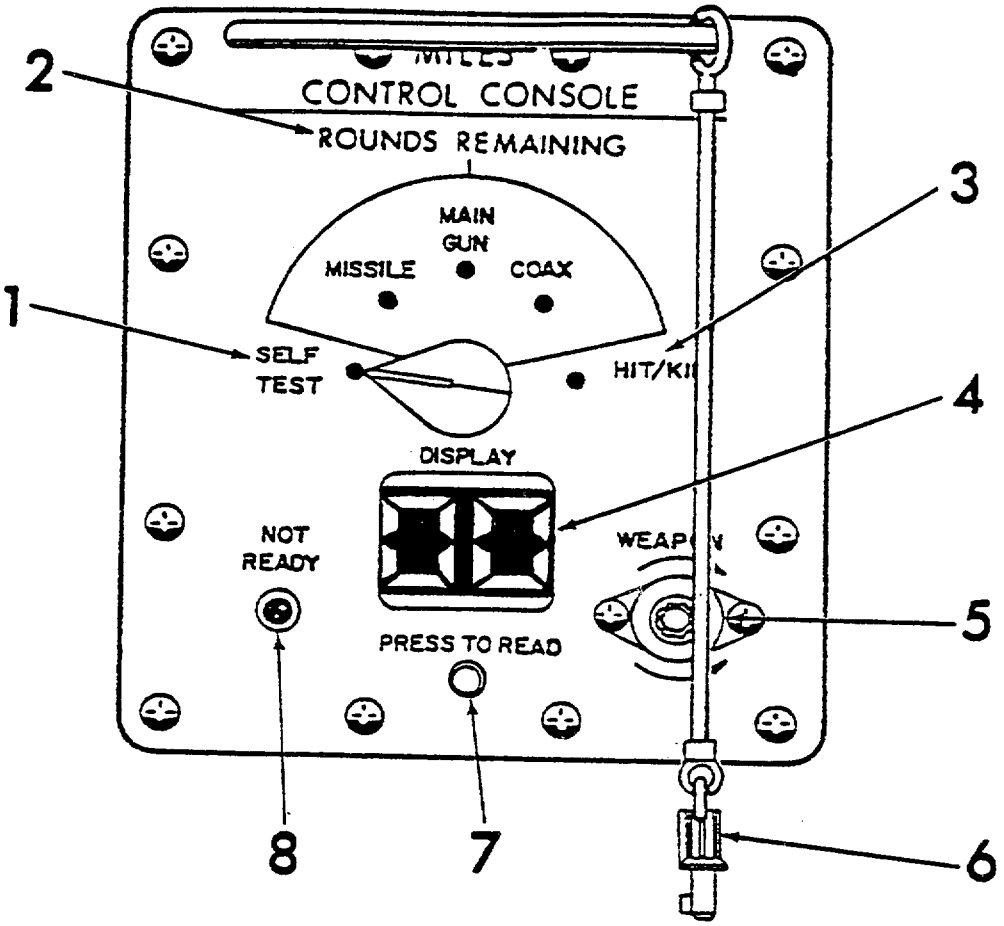
25 MM MAIN GUN TRANSMITTER KEY RECEPTACLE



AWESS FIRE - Enables main gun transmitter to be fired simultaneously with a FLASHWESS device.

DRY-FIRE - Enables main gun transmitter to be fired in dry-fire mode.

CONTROL CONSOLE ASSEMBLY (Loader's Control Assembly - LCA) CONTROLS AND INDICATORS. Controls and indicators for the LCA are listed in Table 2-1.



Control Console Assembly

Table 2-1. Control Console Assembly Controls and Indicators

Key	Description	Function	Operating Position
1	SELF-TEST	Performs self test	Turn to SELF-TEST, press PRESS TO READ, display should read 88.
2	ROUNDS REMAINING	Determines amount of unfired ammunition remaining	Turn to weapon of interest (MISSILE, COAX, MAIN GUN). Press PRESS TO READ. Display will show a number. For MISSILE, number indicates remaining unfired missiles. For MAIN GUN and Coax Machine Gun, number times 100 indicates remaining unfired rounds.
3	HIT/KILL	Identifies weapon firing on you	Turn to HIT/KILL, press PRESS TO READ, display will show a number.
4	DISPLAY	Displays numbers	N/A
5	WEAPON/ CONTROLLER KEY RECEPTACLE	Used to reset or silence intercom alarm	Turn Orange Weapon Key to WEAPON to silence intercom alarm. Turn Green Controller Key to CONTROLLER to reset system.
6	WEAPON KEY	Used to self-kill or silence alarm	On lanyard when not in use. Insert in WEAPON/CONTROLLER key receptacle to silence intercom alarm.
7	PRESS TO READ	Activates display	Press to activate display.
8	NOT READY	Lights when system not ready, i. e., "KILLED," or firing	N/A

SECTION II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

GENERAL. Preventive Maintenance Checks and Services will ensure that the MILES equipment will always be ready for operation and perform satisfactorily throughout its mission. Preventive maintenance checks consist of performing a systematic inspection to discover defects before they result in operational failure of the equipment. Defects or malfunctions discovered by the crew during use of the MILES equipment, or as a result of performing maintenance checks and services, will be reported using the proper forms (refer to DA PAM 738-750).

1. Before you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your "Before" (B) PMCS.

2. While you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your "During" (D) PMCS.

3. After you operate. Be sure to perform your "After" (A) PMCS.

4. If your equipment fails to operate. Troubleshoot with proper equipment. Ask your Controller to check your equipment. Report any discrepancies using the proper forms. See DA PAM 738-750.

5. If you find any problems, turn the item into the Training Aids Service Office (TASO).

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

NOTE
Within designated area, these checks are to be performed in the order listed.
B - Before Operation D - During Operation A - After Operation W - Weekly Operation M - Monthly Operation

ITEM NO.	INTERVAL B	D	A	W	M	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary.	Equipment Is Not Ready/Available If:
1	•					Belt Segments (2)	Wipe all detectors clean. Inspect harnesses for damage that would prevent normal operation.	Detectors broken.
2	•					CVKI	Inspect for cracks in plastic lens Check for receptacle damage	Cracks are evident. Strobe light does not work.
3	•					Cable and Connector Assemblies (5)	Inspect for worn or bare wires and damaged connectors	Bare wires are present.
4	•					Transmitter Assemblies (2)	Inspect for dirty or-damaged lens. Clean lens with lens paper. (Ref. Section II, Appendix D, Item 7)	Lens broken or cracked.
5	•					Control Console	Inspect for cracks in display window	Display window broken.
							Check that weapon key turns freely in WEAPON KEY receptacle.	Weapon key will not turn.
							Inspect for evidence of damage.	Switch broken.
6	•					Battery Box	Inspect for damaged connectors Check that connectors and interior battery contacts are intact. Inspect for battery acid.	Connections cannot be made or acid is present.
7	•					Batteries	Inspect for acid leaks.	Acid is present.

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

NOTE
Within designated area, these checks are to be performed in the order listed.
B - Before Operation D - During Operation A - After Operation W - Weekly Operation M - Monthly Operation

ITEM NO.	INTERVAL B	D	A	W	M	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary.	Equipment Is Not Ready/Available If:
8	•					TOW Simulator	Check each TOW simulator breech block for positive operation without binding. Clean entire breech if necessary.	Breech block binds.
							Check that SAFE/ARM lever falls to SAFE position when breech is opened.	Safe/Arm lever doesn't work.
							Feel to make sure firing pin is not exposed when breech is open.	Firing pin exposed.
9	•					ATWESS Cartridge	Inspect for cracks in cartridge case, dented primer, tears or punctures in copper disc	Cartridge torn, punctured, or cracked.
							Replace any damaged cartridges in accordance with local EOD procedures.	Primer dented.
10	•		•			FLASHWESS	Inspect for cracks or damage to lens. Clean lens with soft, dry cloth. - (Ref; Section II, Appendix D, Item 5)	Lens cracked or severely damaged.

NOTE
M240C Coax Machine Gun will be cleaned after use in accordance with instructions presented in TM 9-1005-313-10.

SECTION III. OPERATION UNDER USUAL CONDITIONS

GENERAL. Before the MILES equipment can be used, it must be properly installed on the M2 and M3 Fighting Vehicles. To speed up procedures, work is organized into various tasks. While some crew members are performing one set of tasks, others can be performing another set.

Before you begin,-**READ ALL STEPS IN THE TASK AND LOOK AT EACH ILLUSTRATION CAREFULLY**. To help perform a task, most steps have reference numbers to drawings. Do each step just the way you are instructed and in the order in which it occurs in this manual.

NOTE
Don't jump ahead. Don't skip any steps

If your MILES equipment has a problem you can't fix using this manual, report it on DA Form 2404. To get a replacement, turn in the faulty equipment and the completed forms (DA Form 2402 and 2404).

TASK ASSIGNMENT. The Vehicle Commander assigns crewmen to tasks. The crewman turns to the appropriate section in this manual and performs the required steps IN ORDER. Occasionally, the manual may tell a crewman to wait until he has made sure that another crewman has completed an earlier task.
On some tasks, two crewmen may have to work together.

Start at Task 1 after reading the Task Assignment.

Certain steps must be done with the Controller present. A Controller Key, carried only by the Controller, is required to reset the system. The Vehicle Commander will determine when to call the Controller.

Those tasks involving the Controller must be done in this order:

1. Outside Installation Task 11 (Install TOW Simulator Tubes) (see page 2-33)
2. MWLD Task 5 (Install Batteries in MWLD Harness) (see page 2-78)
3. Test Tasks 1 (Test Operation of MWLD) and 2 (Test. MILES System) (see pages 2-81 and 2-82)
4. Operational Tasks 5 (Recognizing Enemy Fire), 6 (Reset After a "KILL"), and 7 (Turn Off and Reset MWLD Alarm) (see pages 2-104, 2-105, and 2-106)

The Vehicle Commander, Gunner, and Driver wear Man-Worn Laser Detector (MWLD) assemblies. Only the Vehicle Commander, Gunner, and Driver do the MWLD Tasks.

The Vehicle Commander should coordinate the tasks, give assistance to any crewman who needs it, and check to make sure everything gets done.

LIST OF TASKS

Preinstallation Task

NOTE
Minimum vehicle temperature for clean and prime is approximately 320F.

Obtain all equipment needed to install and operate MILES M2/M3 Fighting Vehicle system from your NCOIC. Unpack vehicle transit case and TOW simulator transit case. Verify that all equipment is present and not visibly damaged. Check against illustrations in Appendix B, Components of End Item.

Obtain all Support Equipment (Appendix C), and Expendable/Durable Supplies and Materials (Appendix D).

Obtain Blank Fire Adapter, Blank Ammunition, and Ammunition Tray for M240C, Coax Machine Gun (TM 9-1005-316-12&P).

Obtain dry-fire plug for M240C, Coax Machine Gun (Appendix C).

Obtain ATWESS cartridges.

OUTSIDE INSTALLATION TASKS - LIST

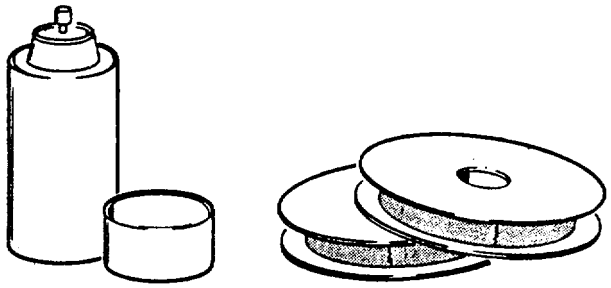
NOTE

Perform these tasks in the order given.

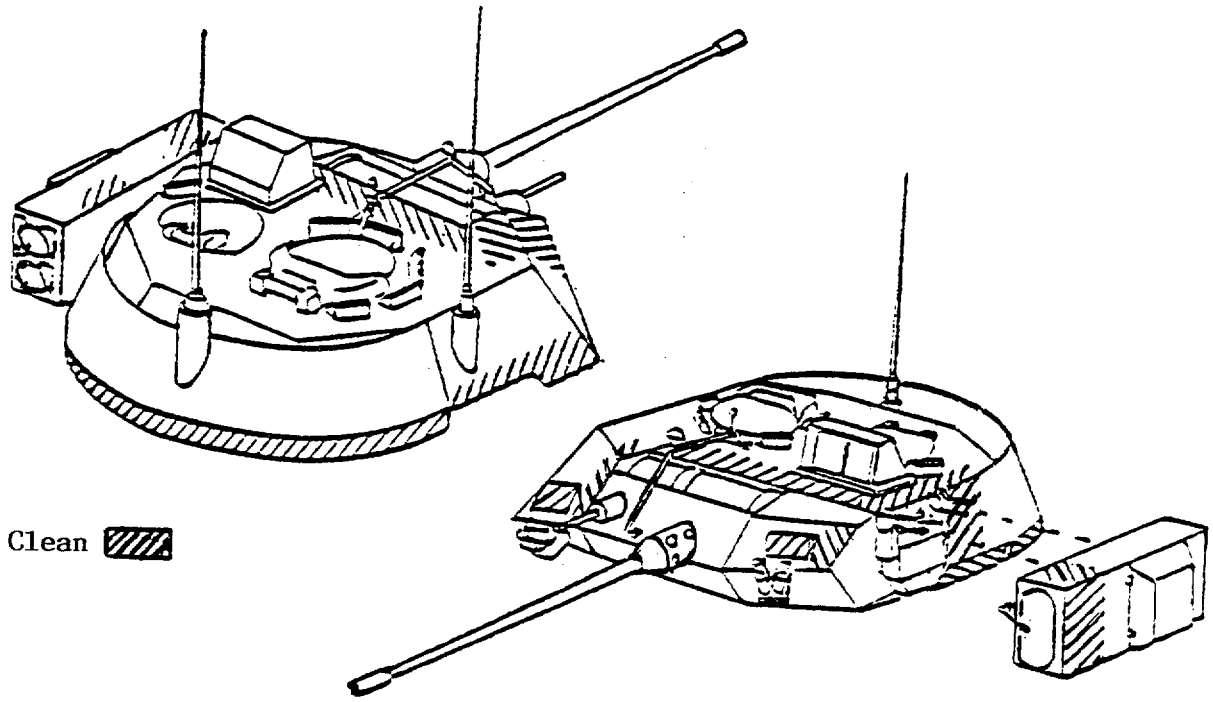
Outside Installation Task 1: Clean and Prime Vehicle. Hook fastener tape (Item 6, Appendix D) must be installed on the vehicle as a base for mounting detector belts and cable assemblies. Installation kit, including tape primer (Item 10. Appendix D) and fastener tape, is required to complete this task. Vehicle surface must be cleaned and primed before applying tape.

Before spraying tape primer, be sure you know where to mount the tape. Location of tape is illustrated in Outside Task 2.

Installation kit (tape primer and fastener tape).



If vehicle is already equipped with fastener tape, go directly to Outside Task 3: Inspect Fastener Tape.



Clean areas where tape will be installed. Use water, brush (Item 3, Appendix D), and rags (Item 8, Appendix D). Tape will not stick to dirty or greasy surfaces.

WARNING

Primer is highly inflammable, Do not spray near Heat, Sparks, or Open Flame. Use only in well ventilated area. No Smoking is permitted in the vicinity.

CAUTION

Ensure Integrated Sight Unit (ISU) ballistic doors are secured/closed prior to spraying primer.

Spray a heavy coat of tape primer on cleaned areas. Avoid spraying primer on periscope windows and sight windows. Allow primer to dry 3 to 5 minutes before applying fastener tape.

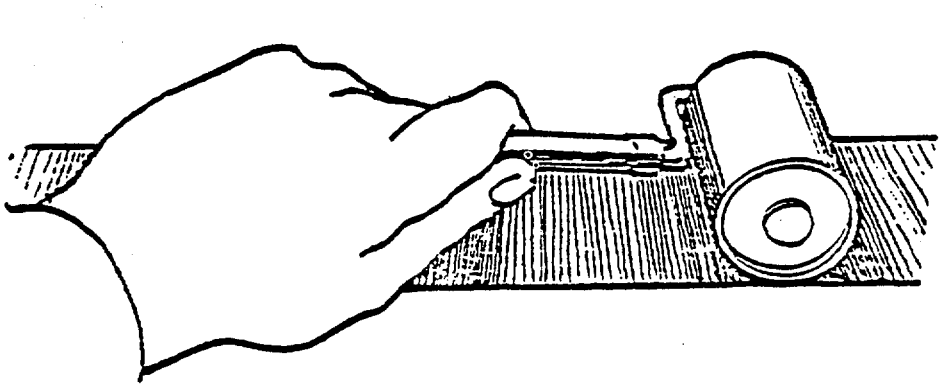
Outside Installation Task 2: Install Fastener Tape.

The tape has a protective paper backing which must be removed before installing. For small lengths, the entire backing may be removed before installing tape. For long lengths of tape, however, it is recommended that the backing material be removed while the tape is being installed. This will prevent adhesive on the back of the tape from accidentally sticking to itself.

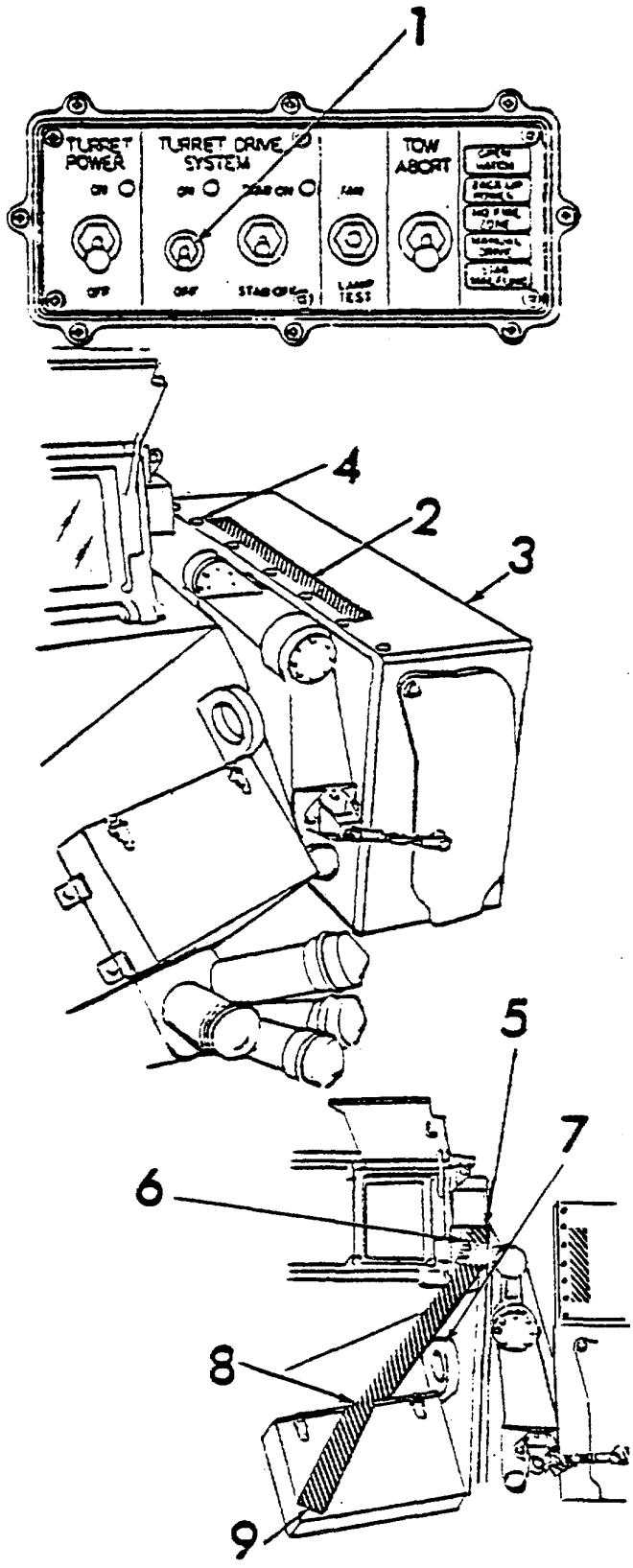
After tape is placed on primed areas, it must be pressed very hard with hand roller (Item 2, Appendix C).
Use roller as shown. The primer can lid may also be used.

More spray primer may be added as necessary.

Individual vehicles will vary in construction details. Apply tape in short strips to avoid placing tape directly over weld lines, bolt and screw heads, and other obstructions.



Outside Installation Task 2: Install Fastener Tape (Cont.).



WARNING

Ensure personnel stand clear of moving Launcher. Failure to comply may cause Injury or Death to personnel.

Place TOW launcher in stowed position. Per TM 9-2350-252-10.

Turn TURRET DRIVE SYSTEM switch (1) OFF.

Measure and cut a 27-inch (67 cm) length of fastener tape.

Position tape strip (2) on top of stowed launcher (3), starting 1-2 inches (2.5-5 cm) in front of second cap screw (4) from launcher rear edge. Apply tape lengthwise on stowed launcher, approximately 2 inches (5 cm) from launcher's bottom edge.

Strip should end approximately even with second cap screw from launcher front.

Begin installing additional tape along turret top. Tape may be cut in short sections to space between weld lines and creases in turret.

Start against edge as shown (5). Apply tape toward vehicle front. Cut tape at edge of bracket (6). Start new piece of tape on other side of bracket and continue down turret front on right side of lifting eye (7). Continue across top of left grenade box (8), and cut tape at top edge of box.

Measure and cut a 12-inch (30 cm) piece of fastener tape. Apply to front of grenade box (9).

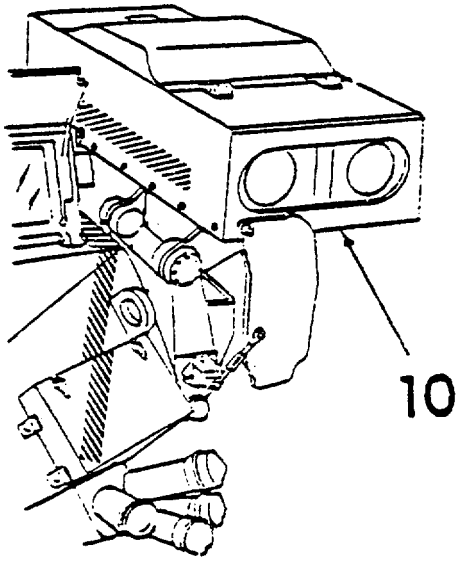
Turn TURRET DRIVE SYSTEM switch (1) ON.

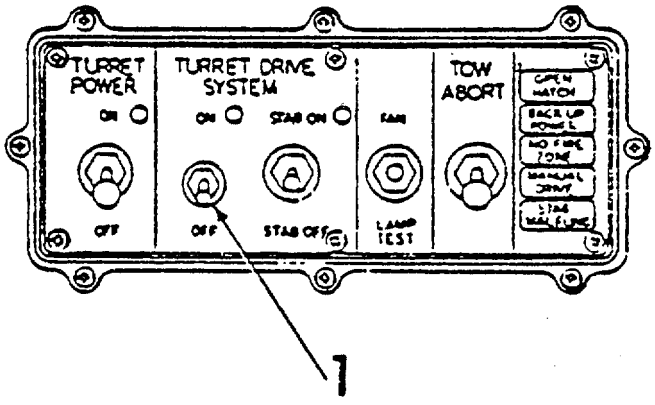
WARNING

Ensure personnel stand clear of moving Launcher. Failure to comply may cause Injury or Death to personnel.

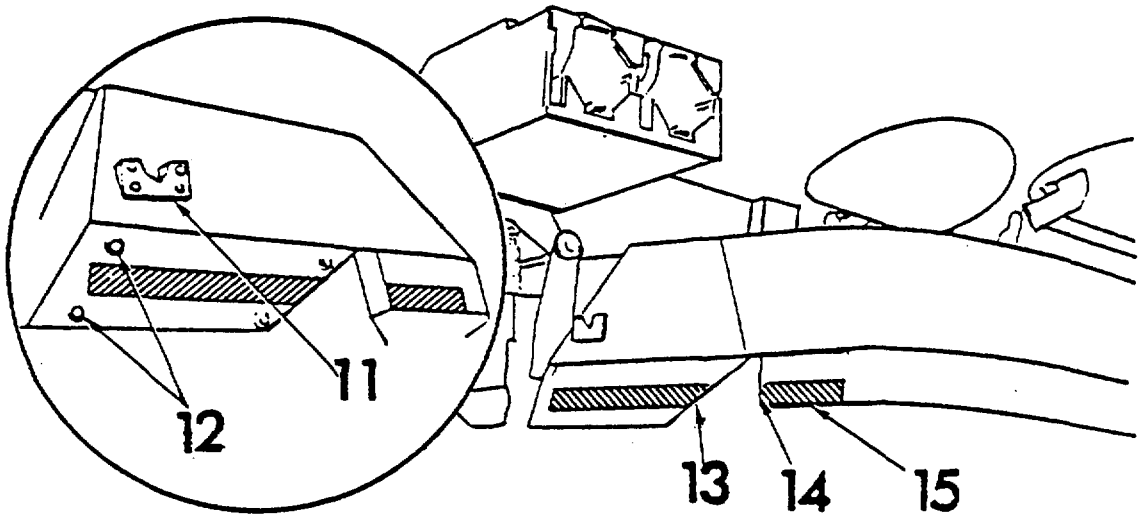
Raise TOW launcher (10) to firing position.

Turn TURRET DRIVE SYSTEM switch (1) OFF.





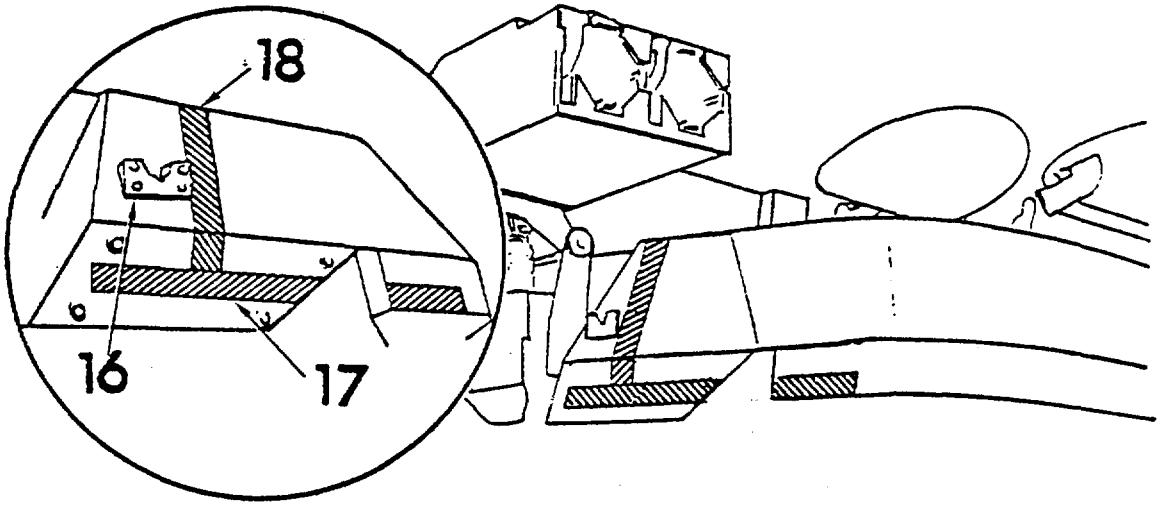
Outside Installation Task 2: Install Fastener Tape (Cont).



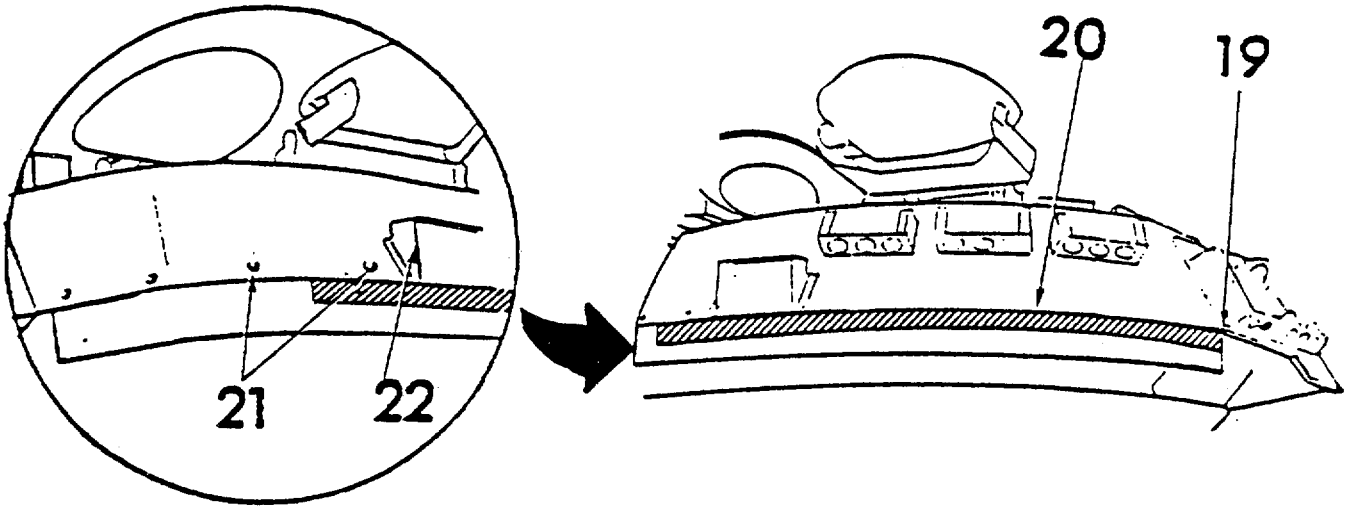
Begin on left side of vehicle turret.

Measure and cut a 24-inch (60 cm) length of tape. Start directly below TOW launcher lock (11) and between two turret bolt heads (12). Apply tape along turret skirt. Check that tape ends close to -opening in turret strip (13).

Measure and cut a 12-inch (30 cm) strip of tape. Apply to bottom edge of turret behind opening on skirt (14). Keep strip (15) even (in-line) with previous tape.



Measure and cut a 22-inch (55 cm) length of fastener tape. Position tape on left turret side beside TOW launcher lock (16). Start bottom edge against existing horizontal strip (17). Apply vertical strip. Check that tape strip ends on turret top (18).

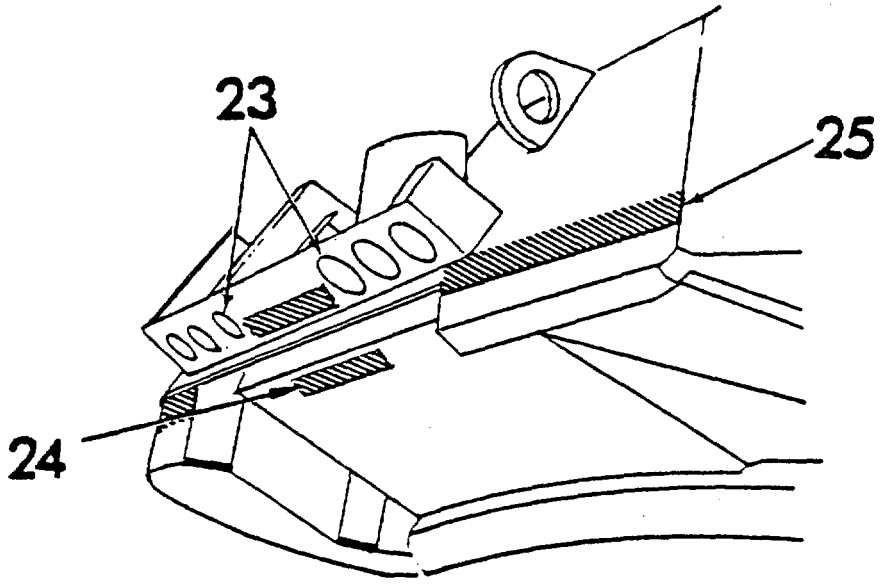


Start tape at right rear section (19) of skirt.

Position tape at top edge of skirt (20).

Continue applying tape around rear of turret.

Cut tape between first and second turret bolts (21) to left of utility rack (22).



Measure and cut a 10-inch (25 cm) length of tape.

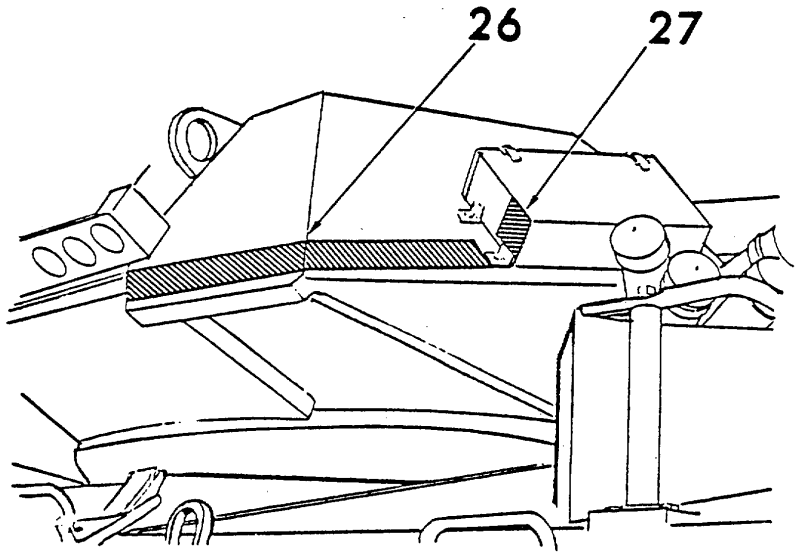
Position tape strip between two center holes (23) on bottom of right side storage rack. If vehicle is not equipped with storage rack or rack is too damaged for application of tape strip, position tape strip on bottom underside of turret (24).

Measure and cut a 14-inch (35 cm) length of tape. Position tape on turret edge (25), directly below and to the right of rack.

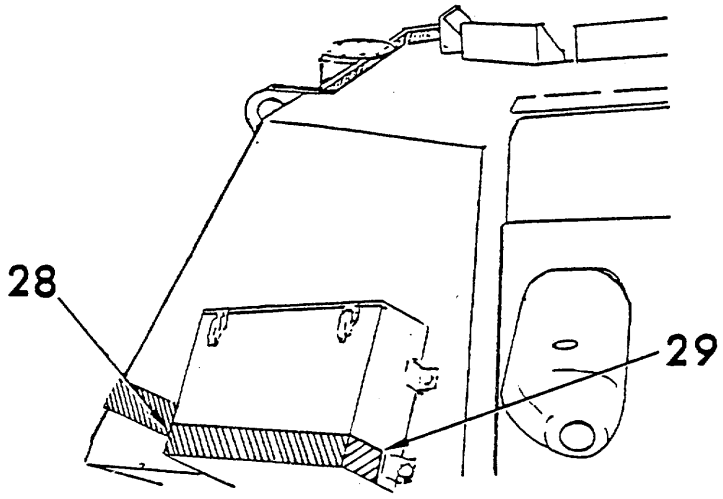
Outside Installation Task 2: Install Fastener Tape (Cont).

Start applying additional tape at right front turret crease (26). Angle tape towards left lower turret edge.

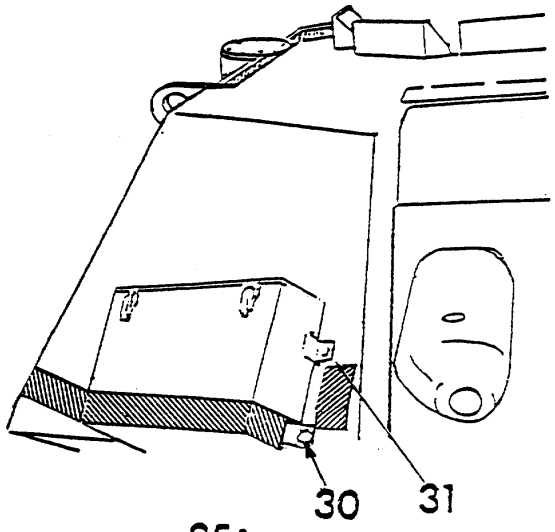
Apply tape to the right, across turret and up right side of grenade box (27). Cut tape at weld lines as shown.



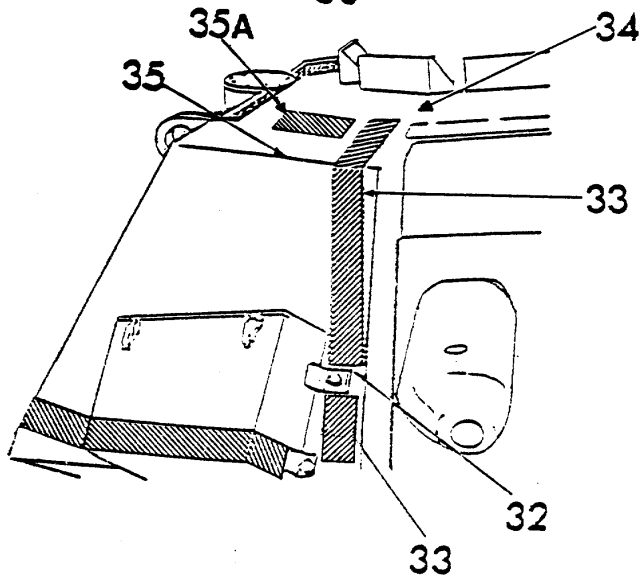
Continue applying tape across grenade box front (28) and down left side of box. Cut tape above weld line (29) at bottom left edge of box.



Apply a small tape strip vertically along right side of grenade box. Start bottom edge even with and close to bottom grenade box bracket (30). Cut tape below upper grenade box bracket (31).

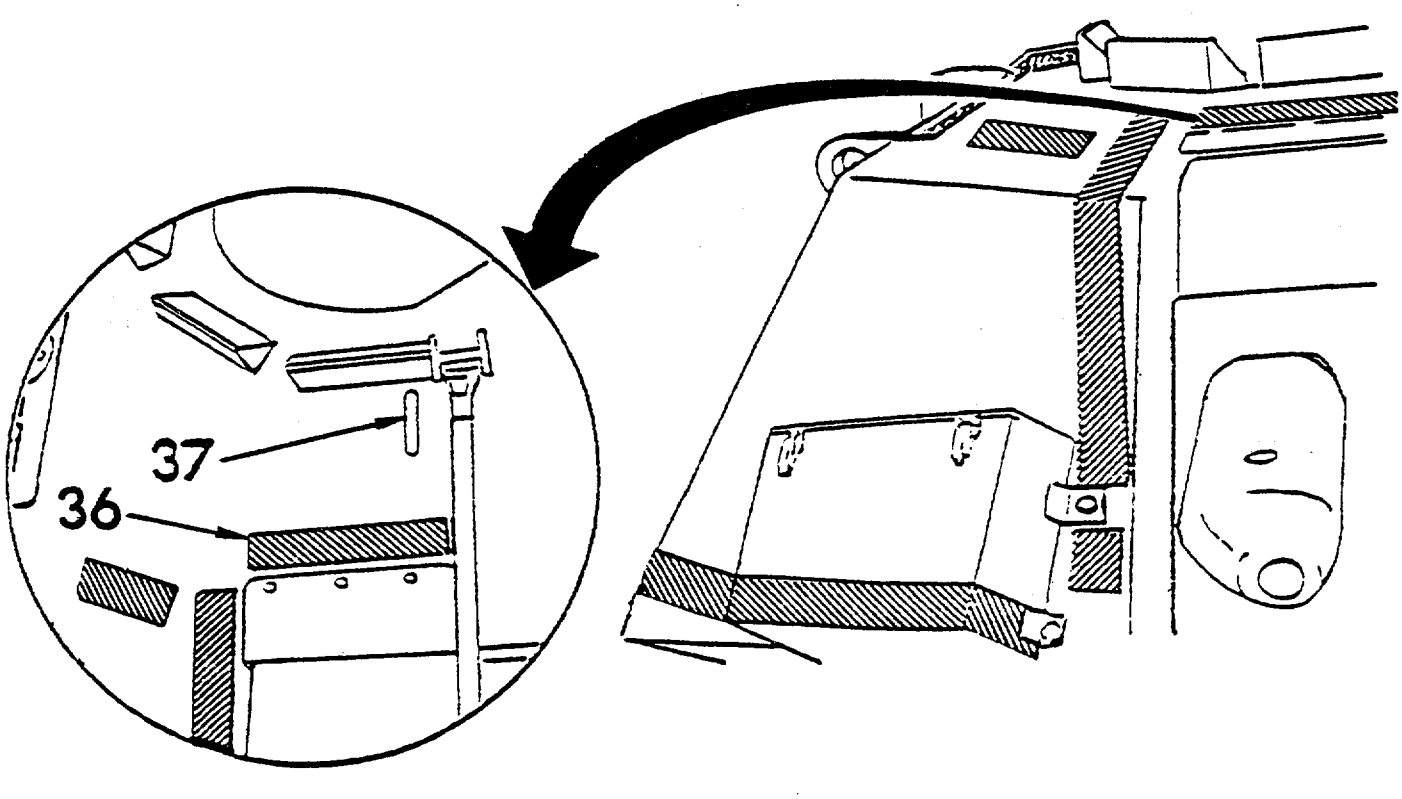


Apply tape vertically up front of turret. Start above grenade box top bracket on weld line (32) and previously installed tape (33). Continue strip onto turret top (34). Cut strip 18 inches (45 cm) from turret top front edge (35). Apply a 7-inch piece of tape (35A) so that it is lined up with the top end of the previously installed tape (33) and the back of the lifting hook.

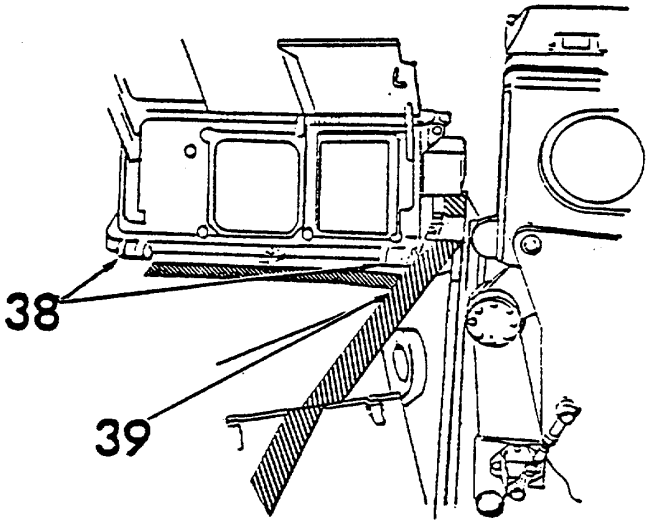


Outside Installation Task 2: Install Fastener Tape (Cont).

Measure and cut a 10-inch (25 cm) length of tape. Apply strip to turret top (36) in front of and to left of Coax Machine Gun manual sight (37), if your vehicle is equipped with one.



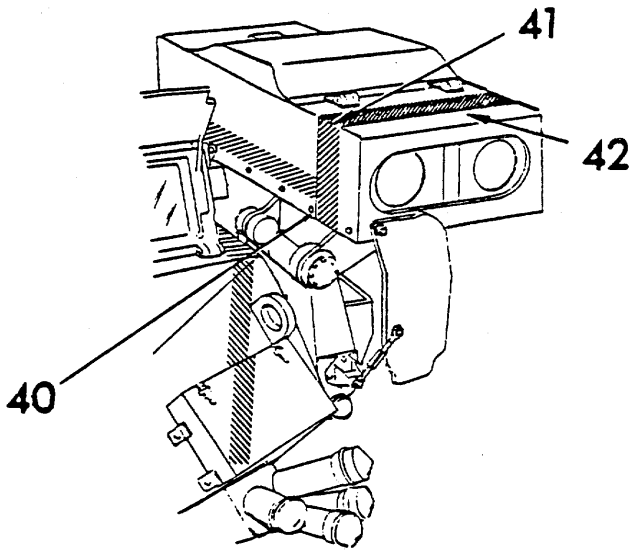
Apply tape strip to top of turret directly in front of ballistic sight door hinges (38). Start tape at right edge (39) of existing tape. Cut tape even with left edge of right sight door hinge.



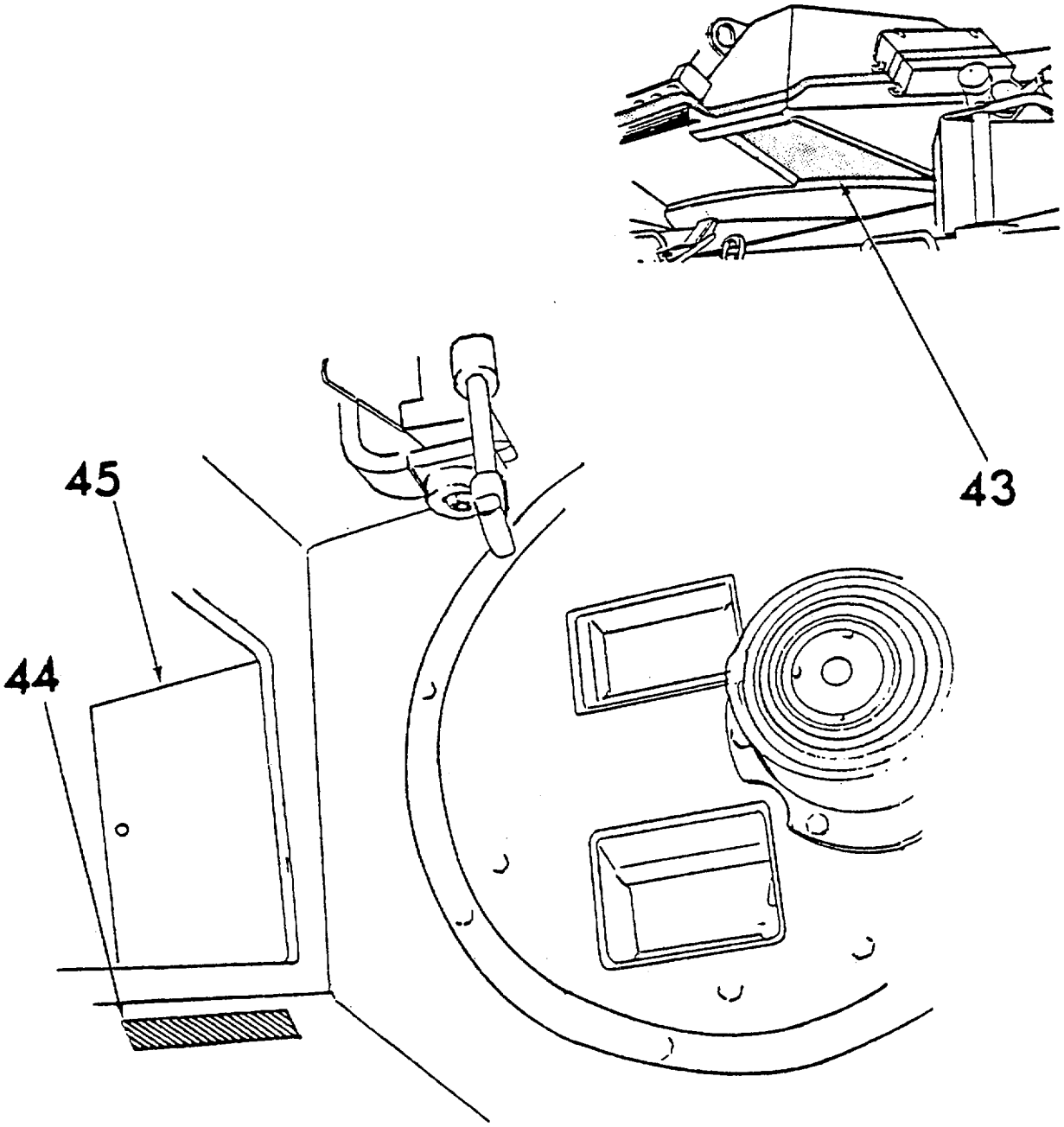
Apply tape to side and top of TOW launcher.

Start 5 inches (12.5 cm) from front at bottom edge (40) of launcher. Cut a 13inch (33 cm) length of tape. Apply tape so that tape strip ends at top front corner (41) of launcher.

Measure and cut a 22-inch (56 cm) strip of tape. Apply tape 5 inches (12.5 cm) back from front edge of TOW launcher top (42).



Outside Installation Task 2: Install Fastener Tape (Cont).



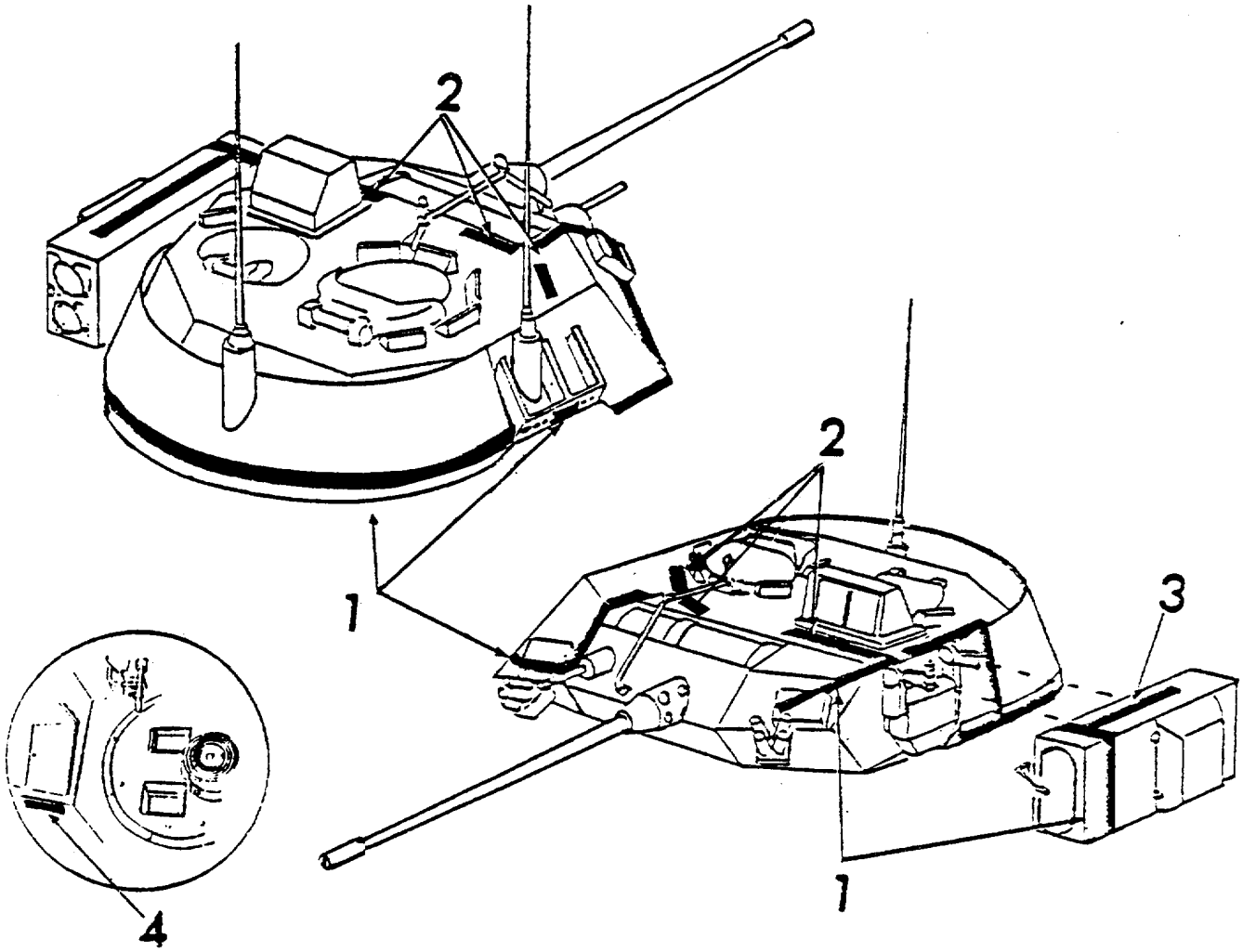
Measure and cut a 12-inch (30.5 cm) length of fastener tape.

NOTE

This step may be easier to accomplish from inside the vehicle (see Inside Installation Task 8).

Reach through link ejection opening (43) into M240C machine gun turret well. Apply tape strip (44) horizontally, centered approximately 4 inches (10 cm) below M240C machine gun access doors (45).

Outside Installation Task 3: Inspect Fastener Tape.



NOTE

If any fastener tape is missing from turret, mount tape on places it belongs. Use instructions given for Outside Tasks 1 and 2.

Check that fastener tape (1) is mounted on all sides of turret and along TOW launcher as shown (1).

Make sure strips of tape (2) are on top of turret as shown.

Check that strip of tape (3) is located on side of TOW launcher as shown.

Make sure strip of tape (4) is on turret wall below M240C Machine Gun access doors as shown.

Outside Installation Task 4: Obtain Equipment. Completion of remaining Outside Tasks requires equipment listed and illustrated below. Locate and set aside this equipment.

Detector Belt Segment Labeled Number 7 (1)

Detector Belt Segment Labeled Number 8 (2)

Wedge Assembly (3)

CVKI Assembly (4)

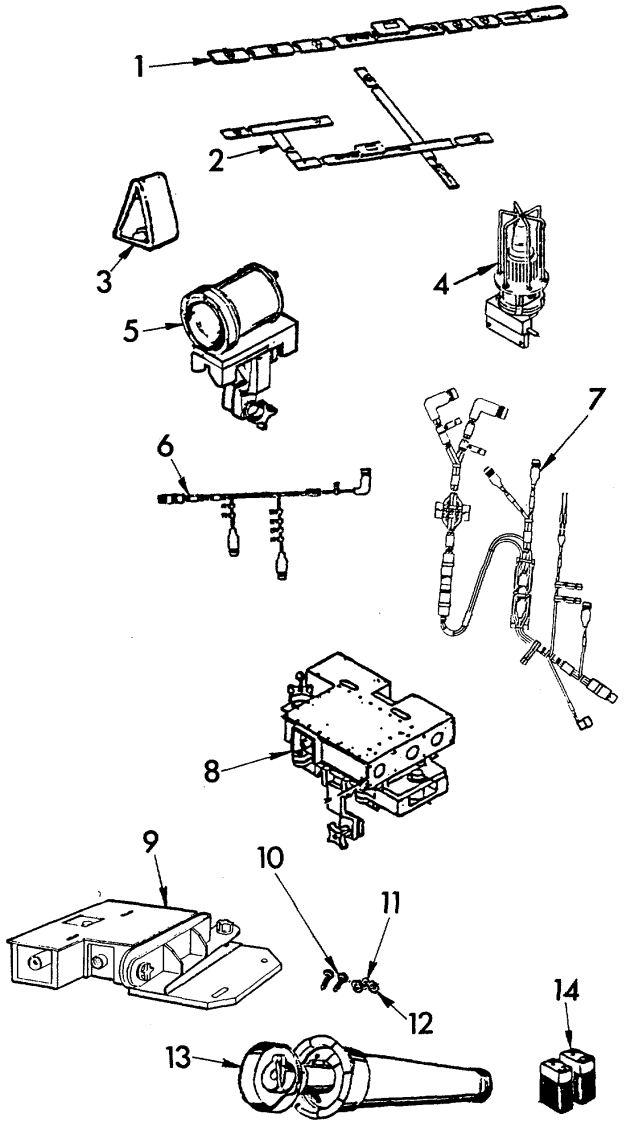
FLASHWESS Assembly (5)

25 mm Transmitter Cable Assembly (6),
P/N 11836256
and one Kill Indicator Cable
Assembly (7), P/N 9353113

Main Gun/Coax Machine Gun Laser Transmitter (8)

TOW Laser Transmitter (9) and two cap screws (10), two flat washers (11) and two lock washers (12)

Two TOW Simulator Tubes (13) and two 9-Volt Batteries (14)



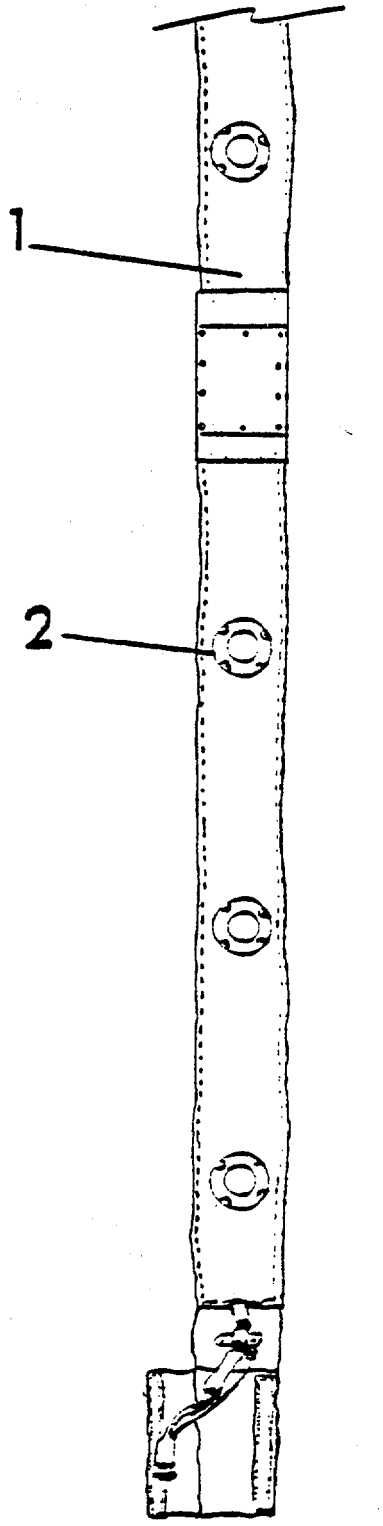
Outside Installation Task 5: Inspect and Service Detector Belt Segments. Both detector belt segments must be checked.

Look for any damage that would prevent normal operation of the belt segments (1).

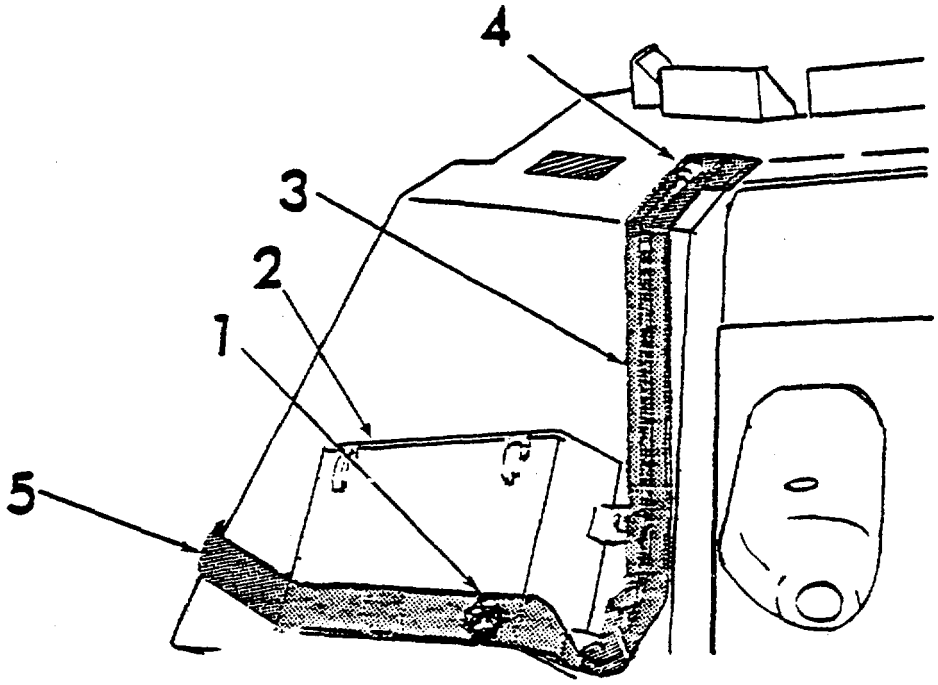
Wipe detectors (2) clean. (Clean all detectors.)

Report any damage on DA Form 2404.

Replace belt segments if damaged.



Outside Installation Task 6: Install Right Side Detector Belt Segment.



Locate detector belt segment labeled No. 7. Arrange belt so that connector end is on your right.

Start at connector end. Place the first detector (1) in corner of fastener tape on right front grenade box (2).

Work toward your right. Attach belt segment (3) along right side of grenade box and up turret front. Press connector end against tape on turret top (4).

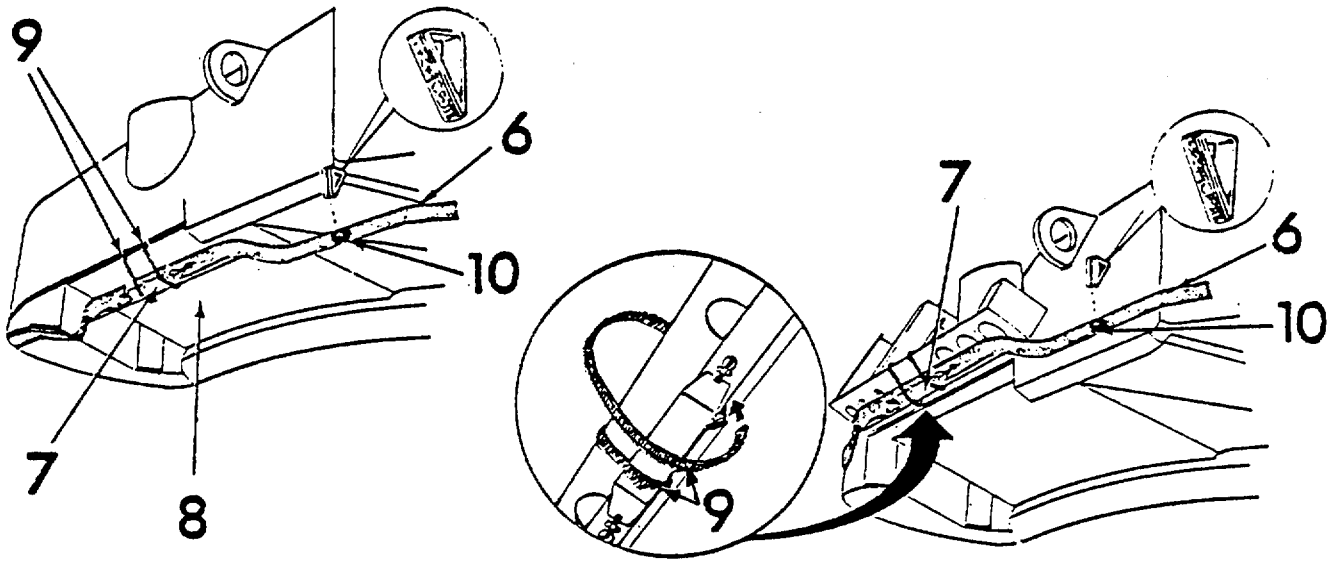
Return to right front grenade box and begin working to your left. Attach belt segment to left side of grenade box. Continue along front of turret and around turret crease (5).

Attach belt down turret side (6). Press belt segment electronics box (7) onto fastener tape along bottom of rack.

NOTE

If belt position prevents proper positioning of electronics box on rack bottom, remove belt and reposition on fastener tape. If storage rack is missing or too damaged for installation of electronics box, use alternate mounting method. Position electronics box on underside of turret (8). Locate two fastener ties (9) attached to belt segment behind electronics box. Fold ties back around belt lower side and slide up through opening in turret and secure around mounting bracket located next to interior antenna housing.

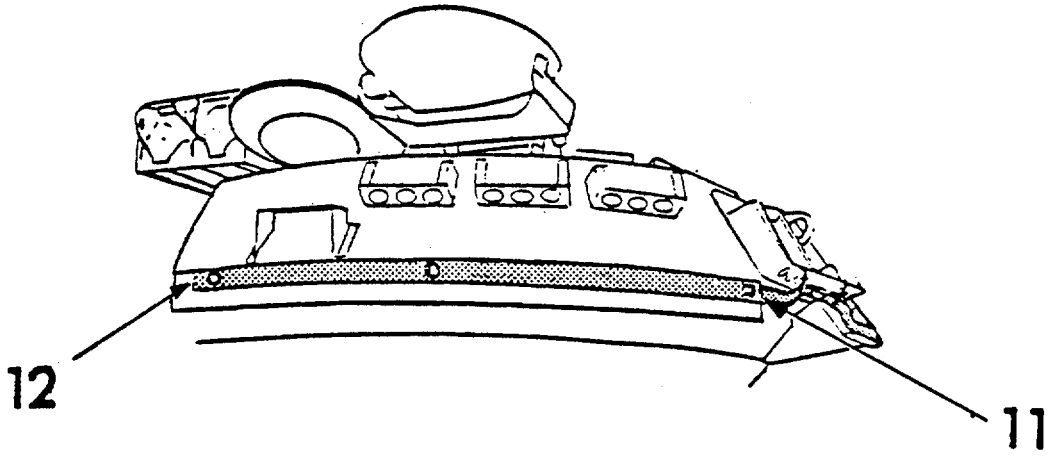
ALTERNATE MOUNTING METHOD



If storage rack is usable for mounting purposes, continue with the following installation procedure:

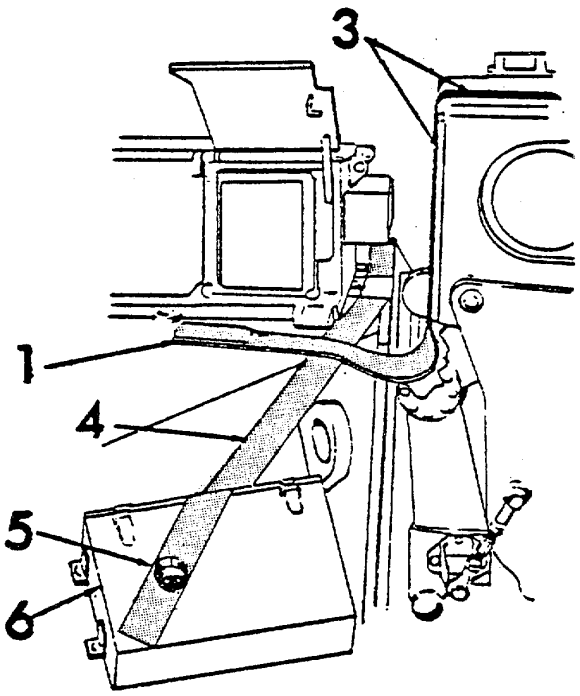
Locate two fastener ties (9) attached to belt segment behind electronics box (7). Fold ties back around belt lower side and slide up through space between rack and turret. Pull tight over rack outside edge, across electronics box, and up through space again. Press ties together to secure electronics box.

Place wedge block behind detector (10) to right of electronics box. Install wedge block with red side out (facing you) and pointed end down.



Continue attaching belt around bottom of turret. One detector (11) should mount at beginning of flat portion of turret. Check that belt end detector (12) is located as illustrated.

Outside Installation Task 7: Install Left Side Detector Belt Segment.



Turn TURRET DRIVE SYSTEM switch ON.

WARNING

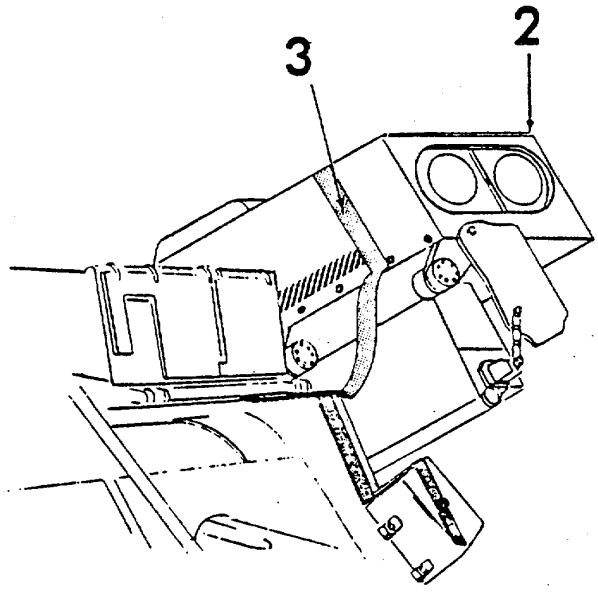
Ensure personnel stand clear of moving Launcher. Failure to comply may cause Injury or Death to personnel.

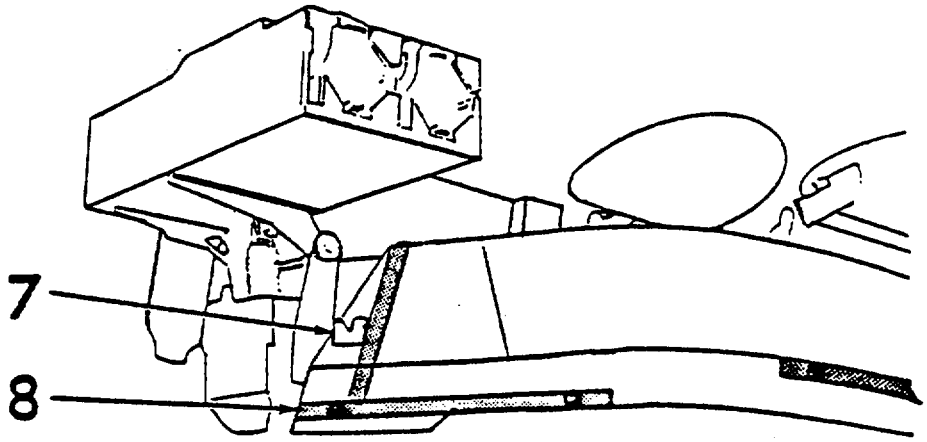
Raise TOW to maximum elevation (loading position).

Locate detector belt segment labeled No.8. Arrange belt so that connector end is on your left. Press belt connector end (1) against fastener tape in front of night sight window.

Locate belt section directly opposite connector. Position end of belt section at top left edge (2) at TOW launcher. Apply belt to top and down right side (3) of TOW launcher, working towards vehicle turret.

Attach forward belt section. Follow path of fastener tape down turret front (4), across top and front of grenade box. Detector (5) should be centered on grenade box (6) front.





Position TOW launcher to the firing position.

Follow path of fastener tape. Attach belt section down turret side under TOW launcher and just to right of launcher lock (7). Attach remaining belt section (8) across turret bottom below TOW launcher lock.

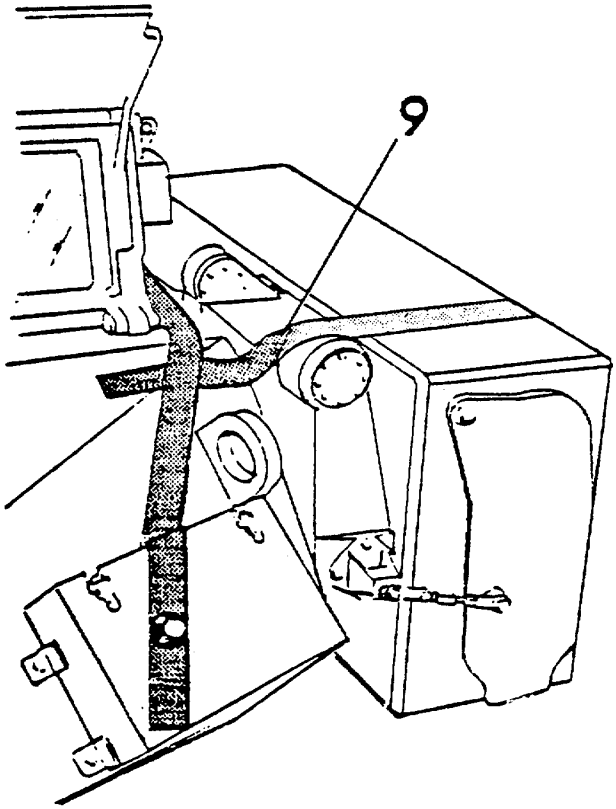
WARNING

Ensure personnel stand clear of moving Launcher. Failure to comply may cause Injury or Death to personnel.

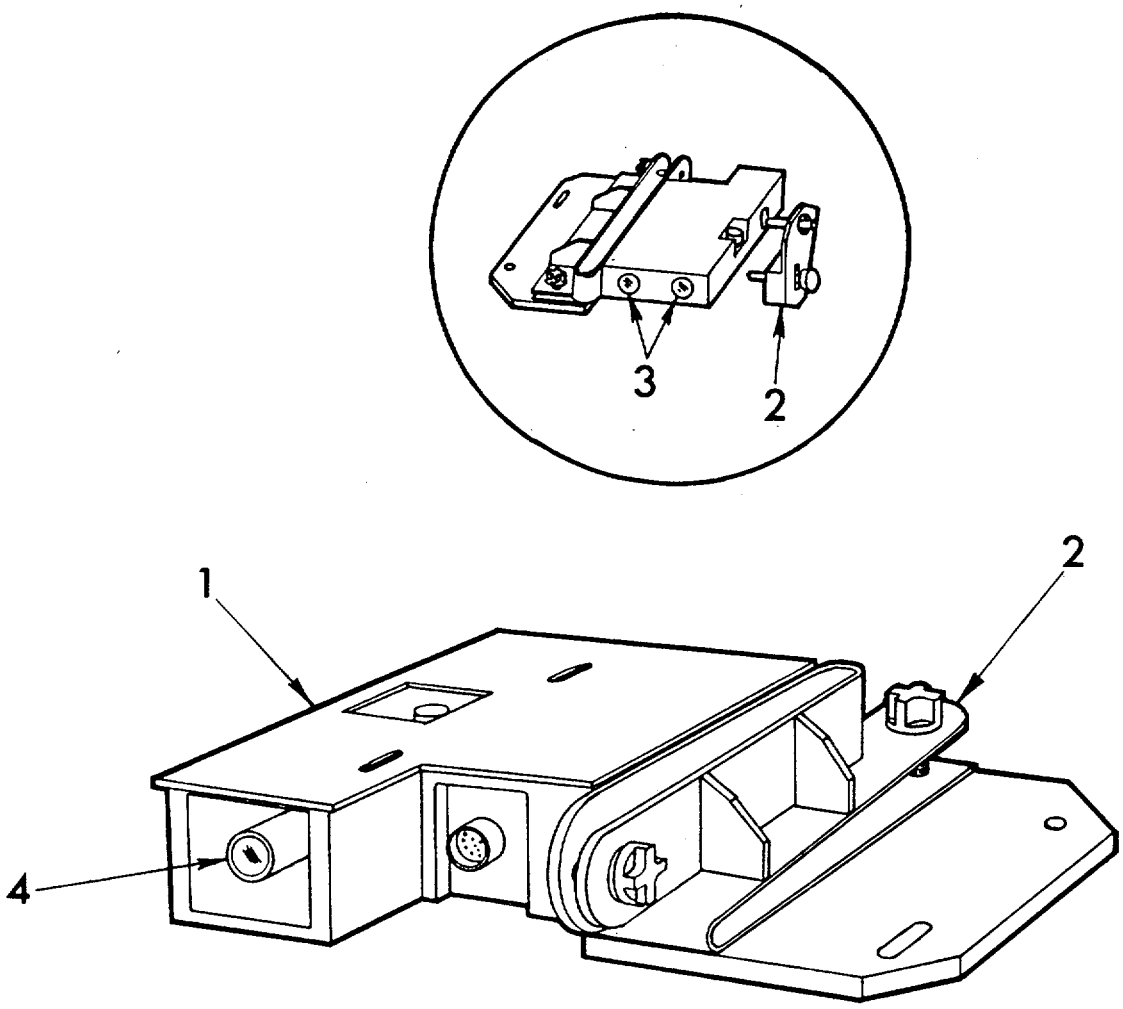
Lower launcher to stowed position.

Verify sufficient slack (9) exists in detector belt and does not interfere with launcher movement.

If belt slack is insufficient, turn off TURRET DRIVE SYSTEM and remove and reposition belt segment on top of launcher.



Outside Installation Task 8: Inspect TOW Laser Transmitter.



Inspect transmitter (1) and mounting brackets (2) for any damage that would prevent normal operation.

Remove any dirt or oil from lens (3) with lens paper (Item 7, Appendix D) or a soft, dry cloth (Item 5, Appendix D).

Look through telescope (4). Be sure you can see distant objects clearly.

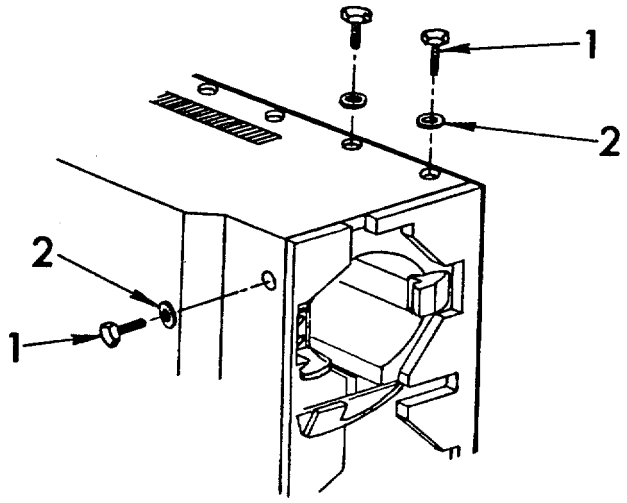
Report any damage on DA Form 2404. Replace transmitter or mounting brackets if damaged.

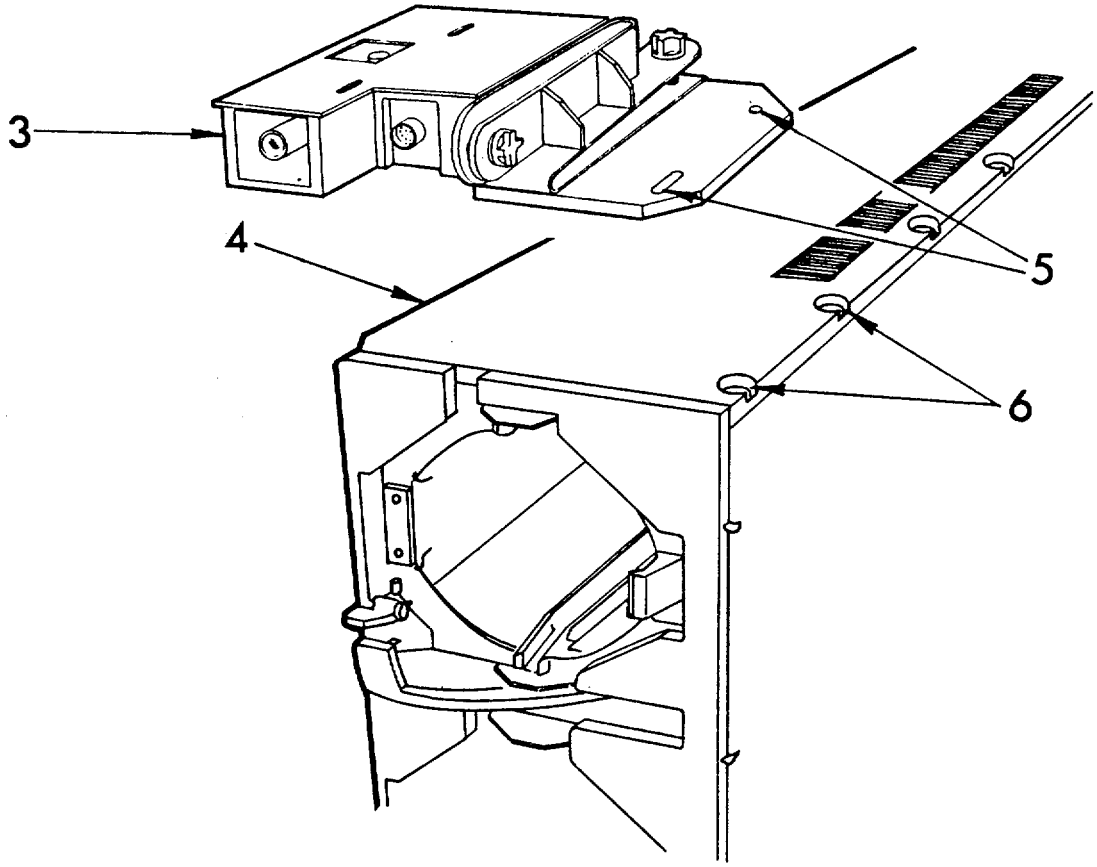
Outside Installation Task 9: Install TOW Laser Transmitter.

Remove TOW launcher dust and rain cover.

Make sure TOW launcher is in stowed position.

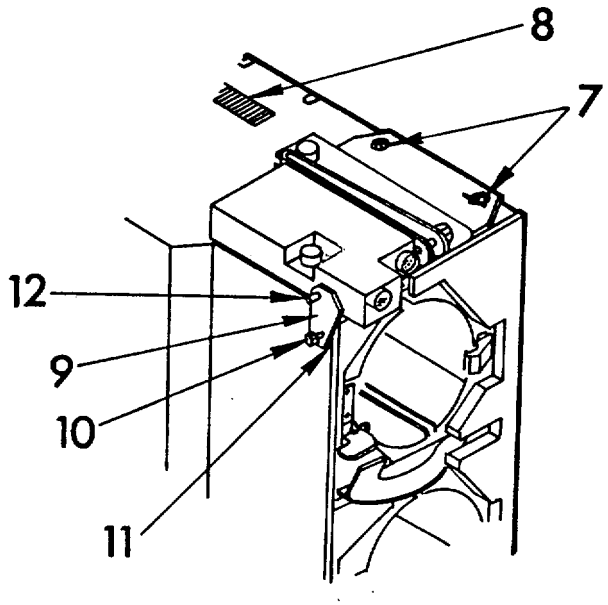
Remove two right-side rear and one top rear bolts (1) and washers (2) from TOW launcher. Store bolts and washers for return to vehicle following MILES exercises.





Place MILES TOW transmitter (3) on launcher (4). Line up holes on transmitter mounting plate (5) with exposed holes (6) on launcher.

Outside Installation Task 9: Install TOW Laser Transmitter (Cont).



CAUTION

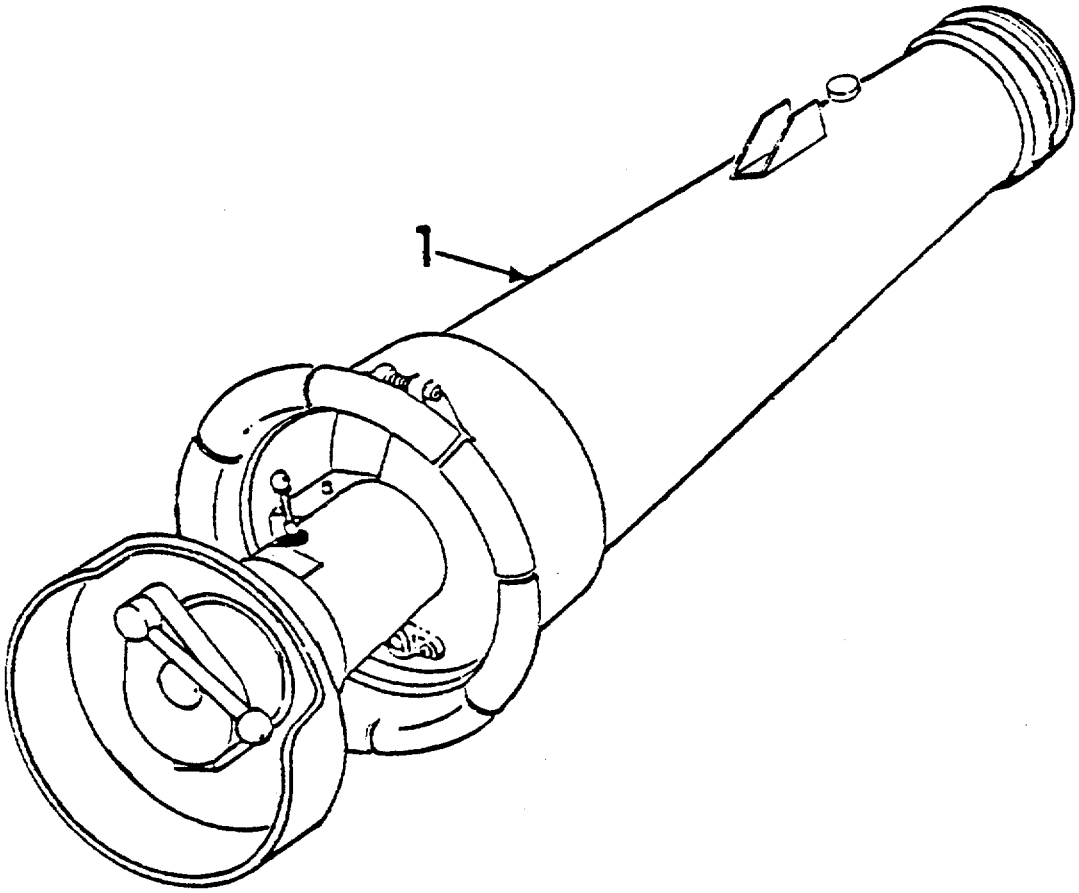
Failure to use correct screws, flat washers and lock washers may result in vehicle damage or allow the MILES TOW transmitter to loose boresight alignment.

Secure transmitter to launcher using two cap screws (7) (Item 4.I, Appendix B), two flat washers (Item 4-J, Appendix B), and two lock washers (Item 4-K, Appendix B) supplied with MILES system. Attach cap screws (7) only fingertight. Bolts must be loose for Alignment Tasks.

Line up the hole on the retainer (9) with the exposed hole on the launcher. Secure the retainer to the launcher using the captive screw (10). The corner boss of the retainer (11) should engage the edge of the launcher armor so that the retainer (9) does not rotate and strain the transmitter retainer pin (12).

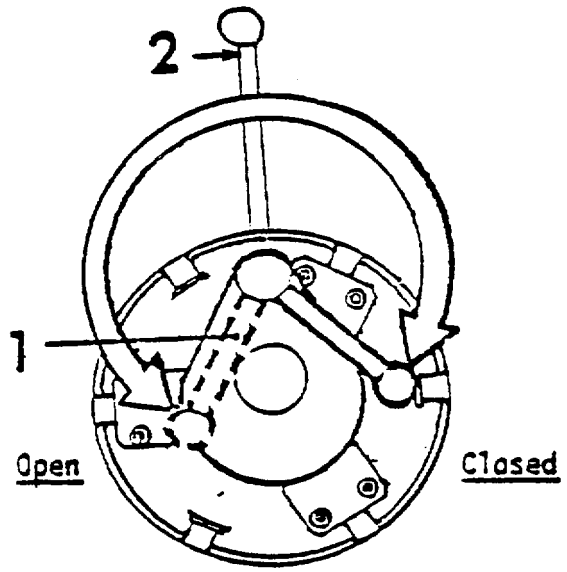
Retain any extra cap screws and washers for return with equipment.

Outside Installation Task 10: Inspect and Service TOW Simulator Tubes.



Check TOW simulator tubes (1) for any damage that would prevent normal operation.

Outside Installation Task 10: Inspect and Service TOW Simulator Tubes (Cont).



Check that ATWESS breech lock lever handle (1) will move counterclockwise from closed position to open position. Check that safety lever (2) falls to SAFE position when breech is opened.

Use brush, CLP, and rags (Items 3, 4, 5, Appendix D) to clean powder from breech door (3), breech lock lever (4), and contacts (5) in breech door.

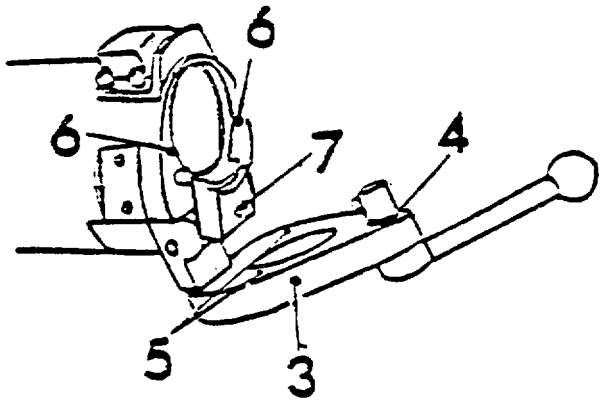
Use CLP to clean powder from terminals (6) in breech block. Clean entire breech block.

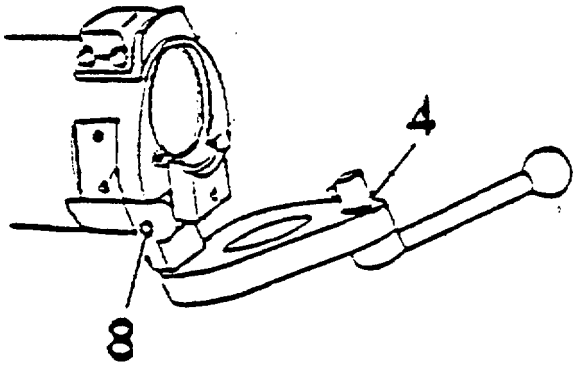
Use CLP to clean powder from cartridge extractor (7).

Put a drop of CLP at breech door hinge (8) and breech lock lever (4).

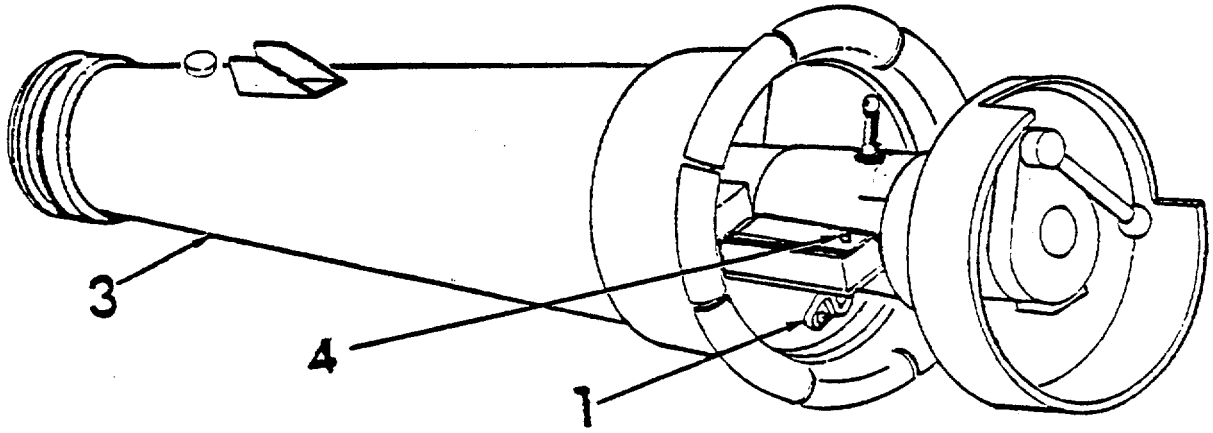
Close breech door and move lever clockwise to closed position.

Report any damage on DA Form 2404. Replace if damaged.





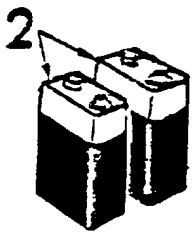
Outside Installation Task 11: Install TOW Simulator Tubes.



Have Controller turn key receptacle (1) to set both TOW simulators for dry-fire. Install batteries (2) in simulator tubes (3). Loosen thumbscrew (4) and open battery box doors (5). Insert battery in each battery box as shown (6). Push down batteries to make sure they fit correctly,

NOTE

There is a large slot and a smaller slot for battery contacts.

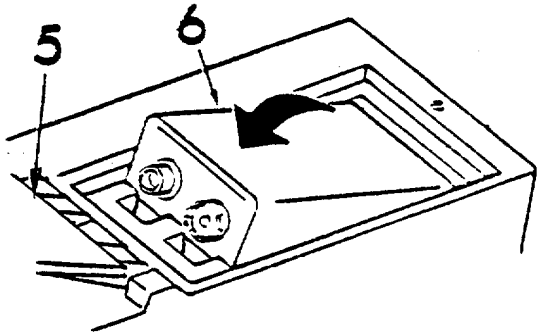


Close battery box doors and secure with thumbscrews.

Turn TURRET DRIVE SYSTEM switch (7) ON.

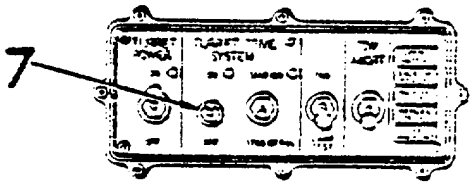
WARNING

Ensure personnel stand clear of moving Launcher. Failure to comply may cause Injury or Death to personnel.

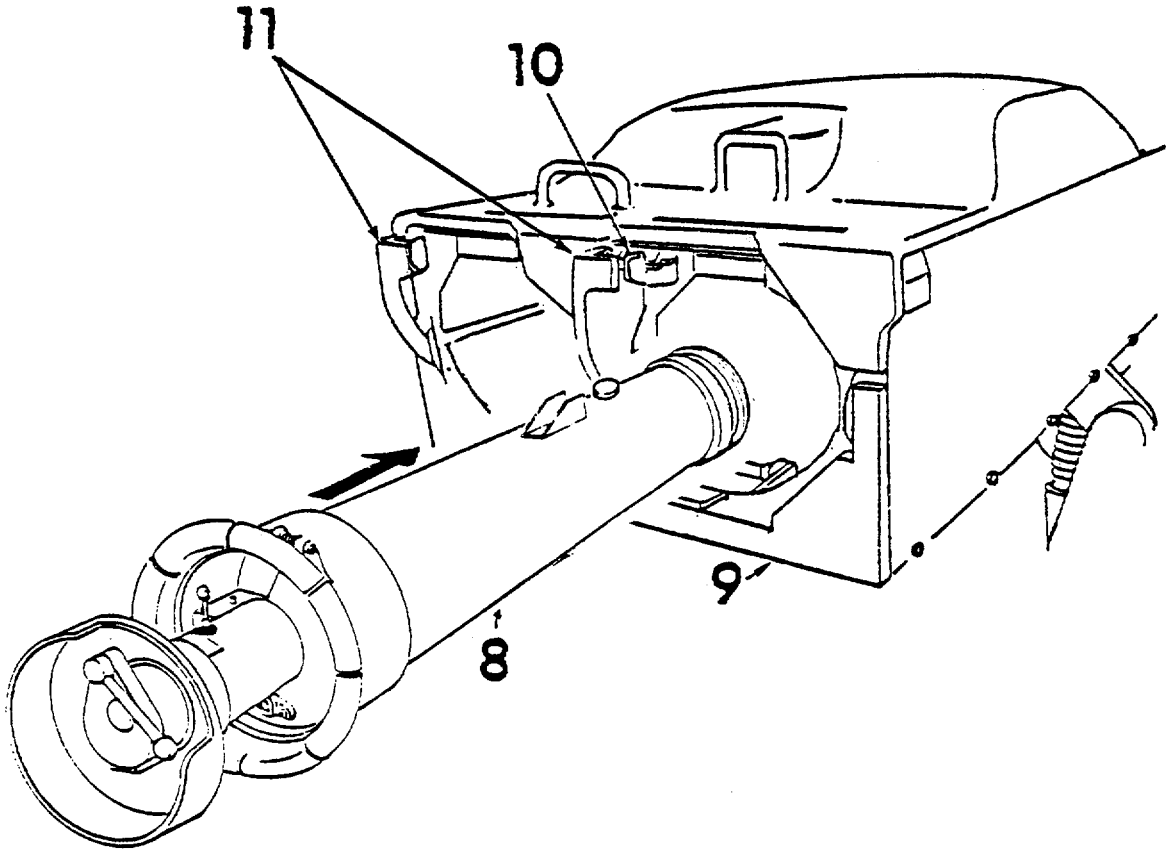


Raise TOW launcher to LOAD position.

Turn TURRET DRIVE SYSTEM switch (7) OFF.



Outside Installation Task 11: Install TOW Simulator Tubes (Cont).



WARNING

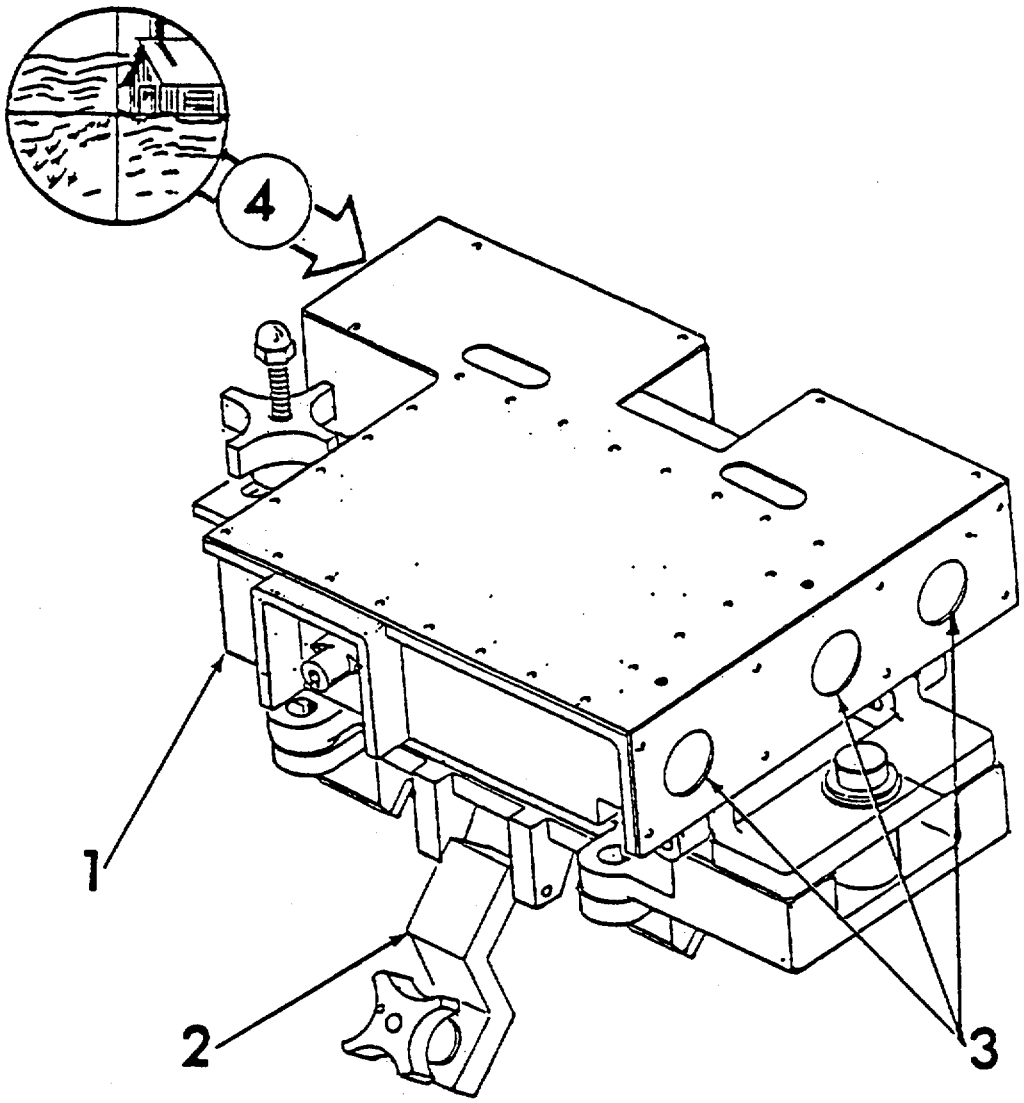
Do not install TOW simulator tubes containing ATWESS cartridges.

Install simulator tubes (8) into launcher (9) using normal TOW Missiles Loading procedures (see TM 9-2350-252-10).

Secure simulator tubes with latches (10). Pull handles (11) up to lock.

Place TOW launcher in the firing position.

Outside Installation Task 12: Inspect Main Gun/Coax. Machine Gun Laser Transmitter.



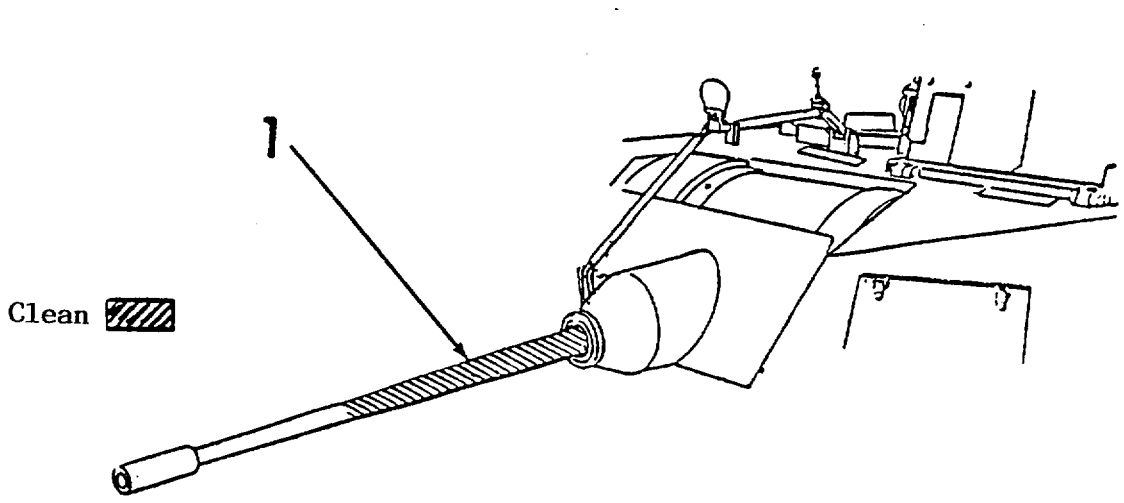
Inspect transmitter (1) and mounting brackets (2) for any damage that would prevent normal operation.

Remove any dirt or oil from lenses (3) with lens paper (Item 7, Appendix D) or a soft, dry lens cloth (Item 5, Appendix D).

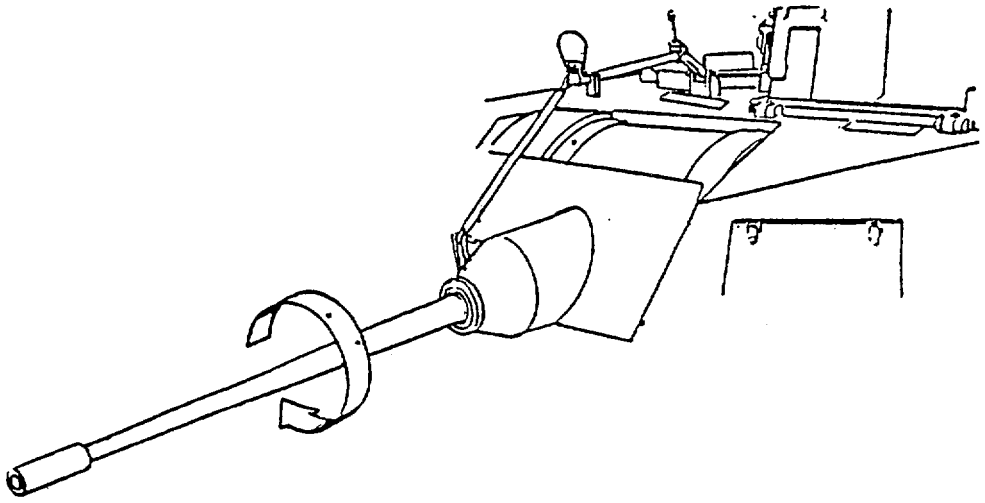
Look through boresighting telescope (4). Be sure you can see distant objects clearly.

Report any damage on DA Form 2404. Replace transmitter or mounting brackets if damaged.

Outside Installation Task 13: Install Main Gun/Coax Machine Gun Laser Transmitter.

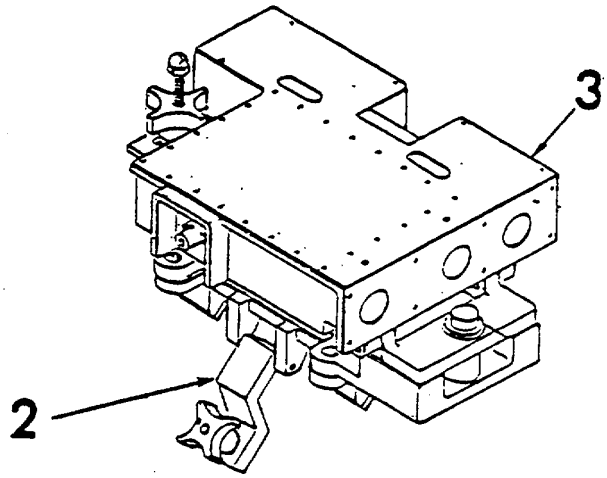


Clean 36 inches (91 cm) of breech end of main gun barrel (1). Use soap, water, and rags. Remove all grease, tape, and foreign material.



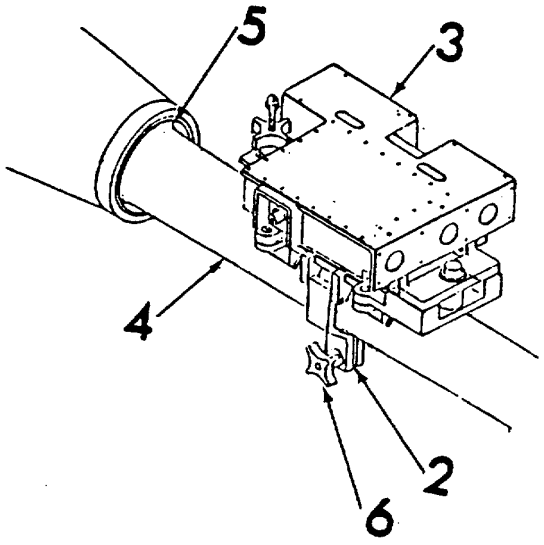
Turn main gun barrel clockwise (screw-in) until it stops.

Open clamp (2) on laser transmitter (3).

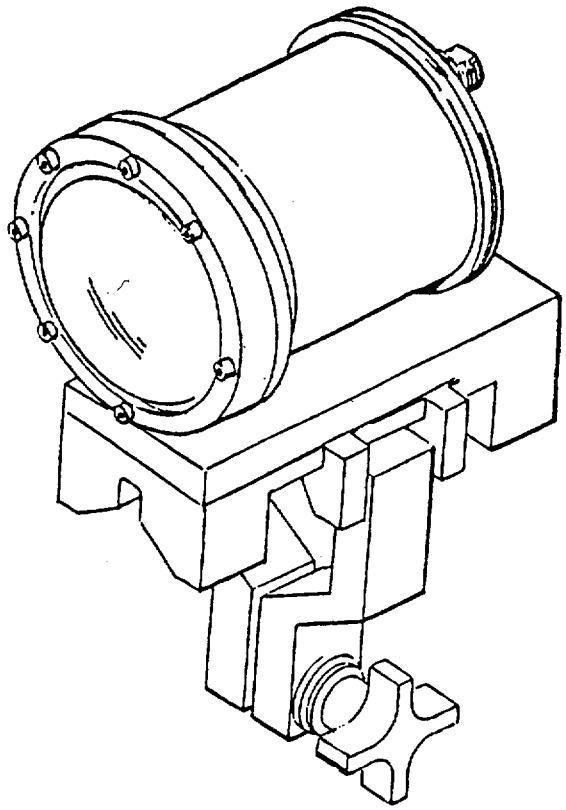


Place transmitter (3) on top of gun barrel (4) exactly 7 inches plus or minus 1/2 inch (17.78 cm + 1.27 cm) from barrel support (5) to rear of transmitter.

Hold transmitter -with one hand. Attach clamp (2) with free hand. Tighten knob (6) so that transmitter will not slip. Do not use a wrench or overtighten.



Outside Installation Task 14: Inspect FLASHWESS Adapter Assembly.



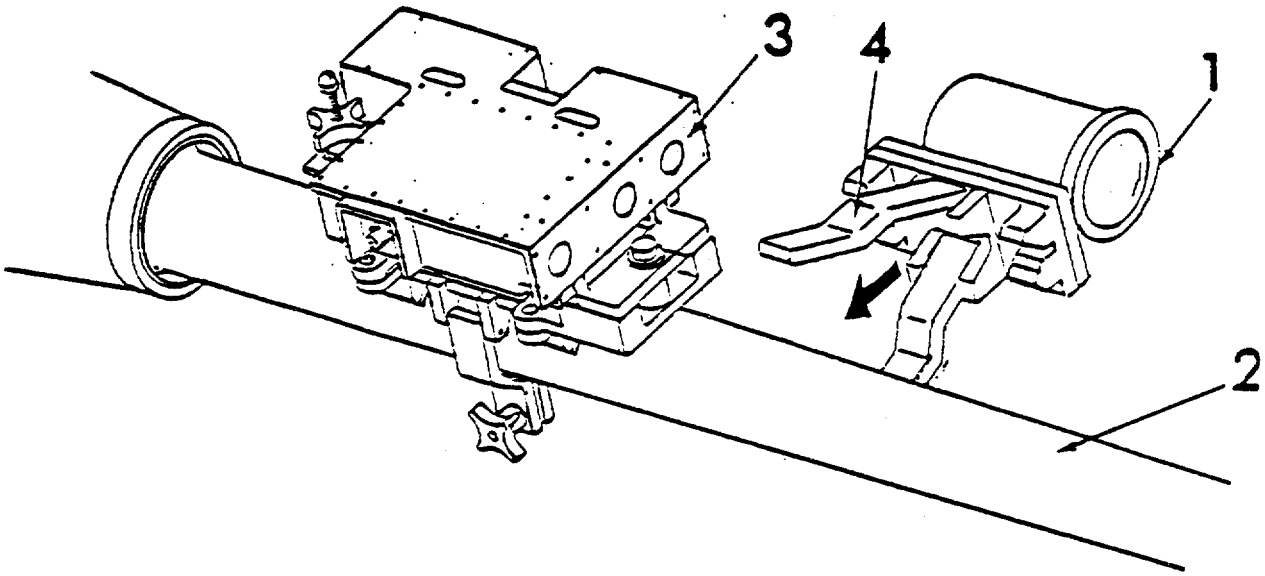
Inspect FLASHWESS Adapter Assembly for any visible damage that would prevent operation or installation.

Check that lens has no cracks and all bolts are tight.

Report any damage on DA Form 2404.

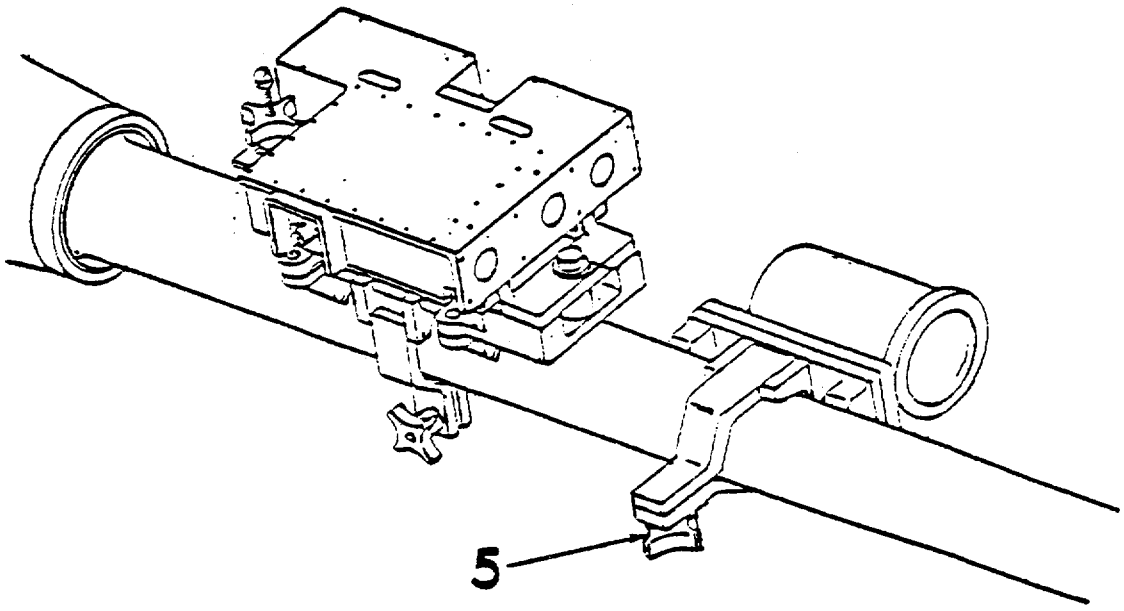
Replace FLASHWESS Adapter Assembly if damaged or impossible to install.

Outside Installation Task 15: Install FLASHWESS Adapter Assembly.



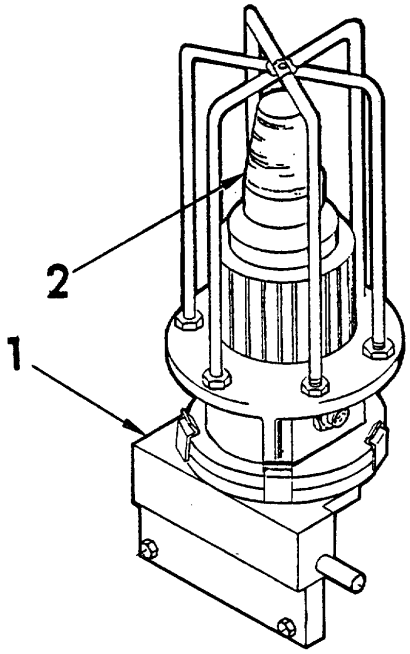
Position FLASHWESS Adapter Assembly (1) on left side of main gun barrel (2) approximately 6 inches (15.24 cm) in front of transmitter (3). Make sure glass lens faces forward.

Open FLASHWESS Adapter Assembly clamp (4) and slip around barrel.



Adjust assembly until FLASHWESS is approximately parallel with ground. Tighten knob (5) so that FLASHWESS Adapter Assembly will not slip. Do not use a wrench or overtighten.

Outside Installation Task 16: Inspect and Service CVKI Assembly.



Inspect CVKI assembly (1) for any damage that would affect proper installation or operation.

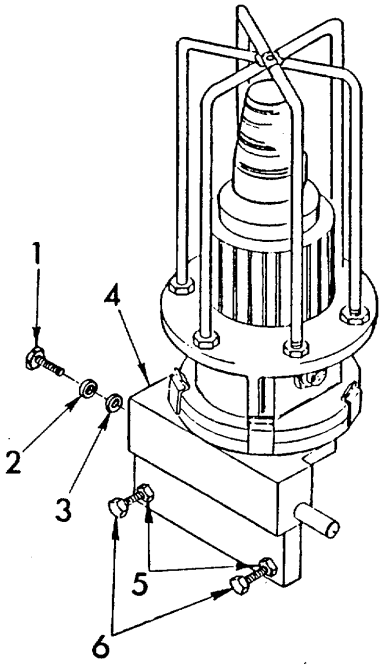
Inspect yellow lens (2) for cracks.

Report any damage on DA Form 2404. Replace only if lens is cracked or if unit is damaged.

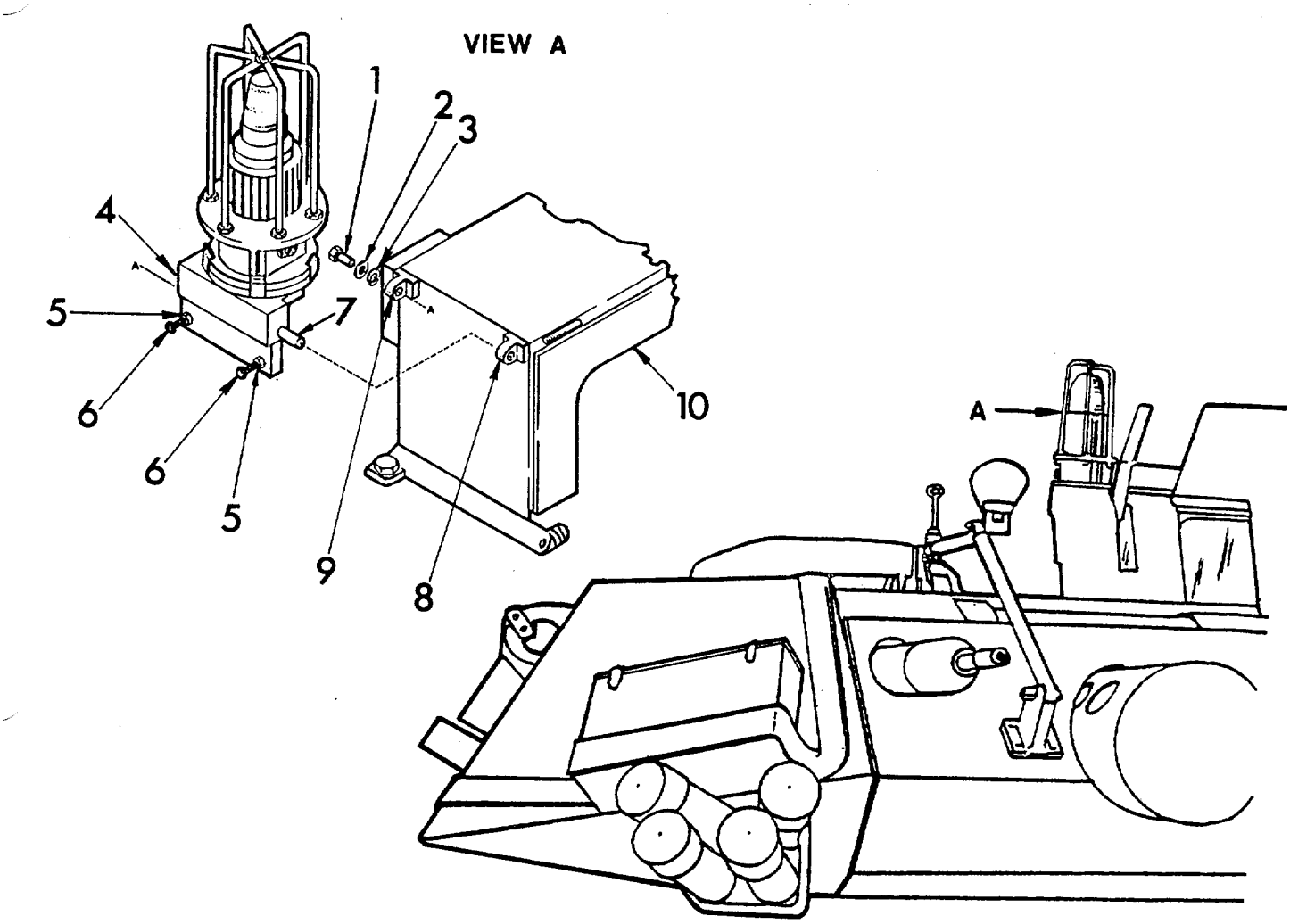
Outside Installation Task 17: Install CVKI Assembly.

Remove screw (1), lock washer (2) and flat washer (3) from CVKI adapter assembly (4).

Loosen two jam nuts (5) and back out two screws (6) flush with adapter.



Outside Installation Task 17: Install CVKI Assembly (Cont).



Insert the adapter assembly pin (7) into lifting eye (8) of the ISU and align tapped hole of adapter assembly (4) with lifting eye (9).

Install screw (1) with lock washer (2) and flat washer (3) through lifting eye (9) into adapter assembly (4) and tighten finger tight.

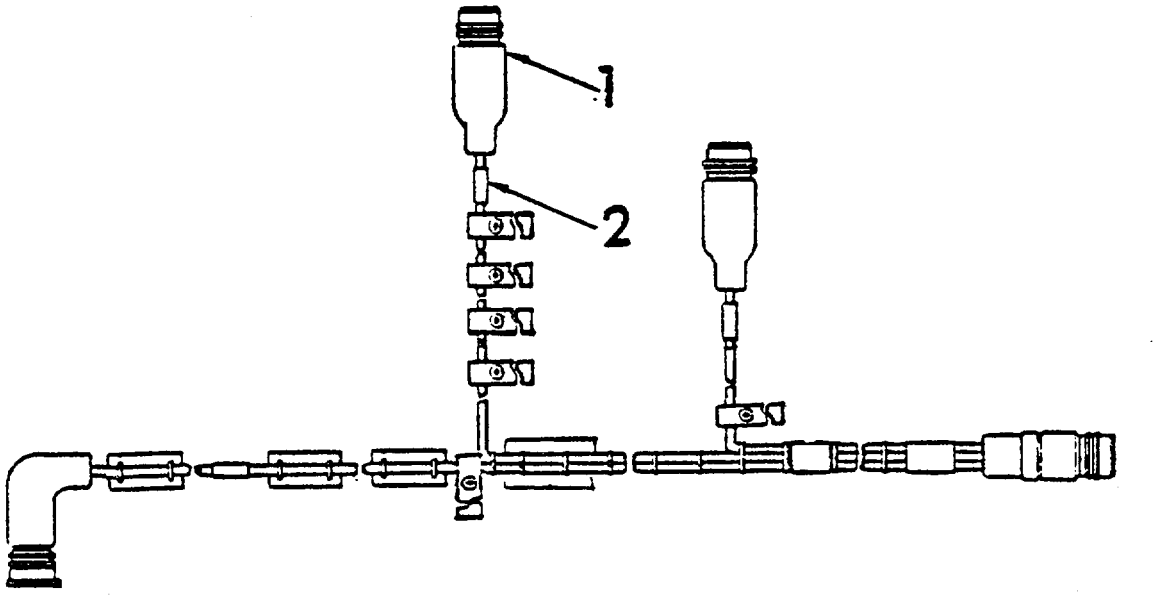
CAUTION

To prevent damage to the CVKI adapter, do not overtighten screws (6).

Adjust two screws (6) clockwise to firmly position boss on adapter assembly on top of ISU (10). Tighten screw (1).

Tighten two jam nuts (5) on two screws (6) against adapter assembly (4) to lock the adapter assembly in place.

Outside Installation Task 18: Inspect Transmitter Cable Assembly.



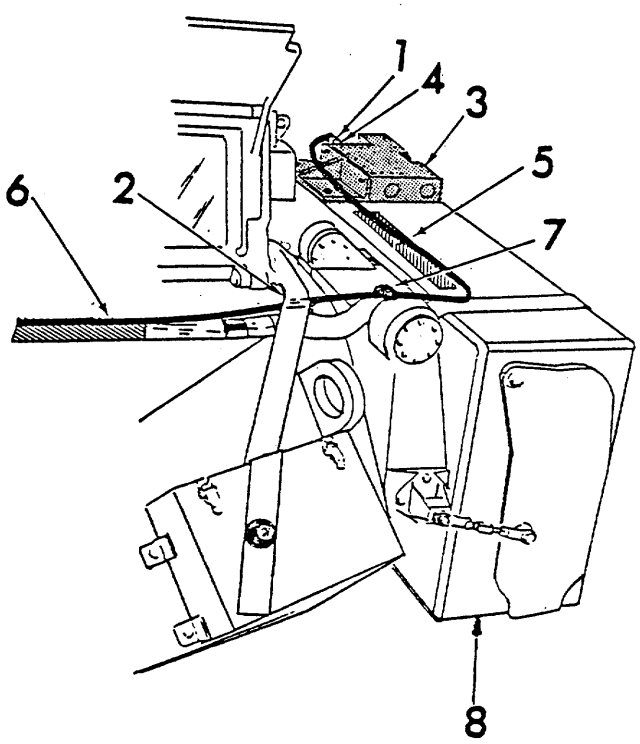
Find cable assembly labeled TRANSMITTER.

Each connector (1) should have label (2) showing where it goes.

Check all connectors for obvious damage and missing labels.

Report any damage on DA Form 2404. Replace transmitter cable assembly if damaged.

Outside Installation Task 19: Install Transmitter Cable Assembly.



Lower TOW launcher to stow position.

Locate connector (1) labeled P3 TOW TRANSMITTER. Slide under belt (2) and route towards-TOW transmitter (3).

Attach P3 to connector (4) on rear of TOW laser transmitter.

Press pad (5) attached to cable against strip of fastener tape located in front of transmitter on TOW launcher.

Press pad (6) attached to cable against strip of fastener tape in front of sight door.

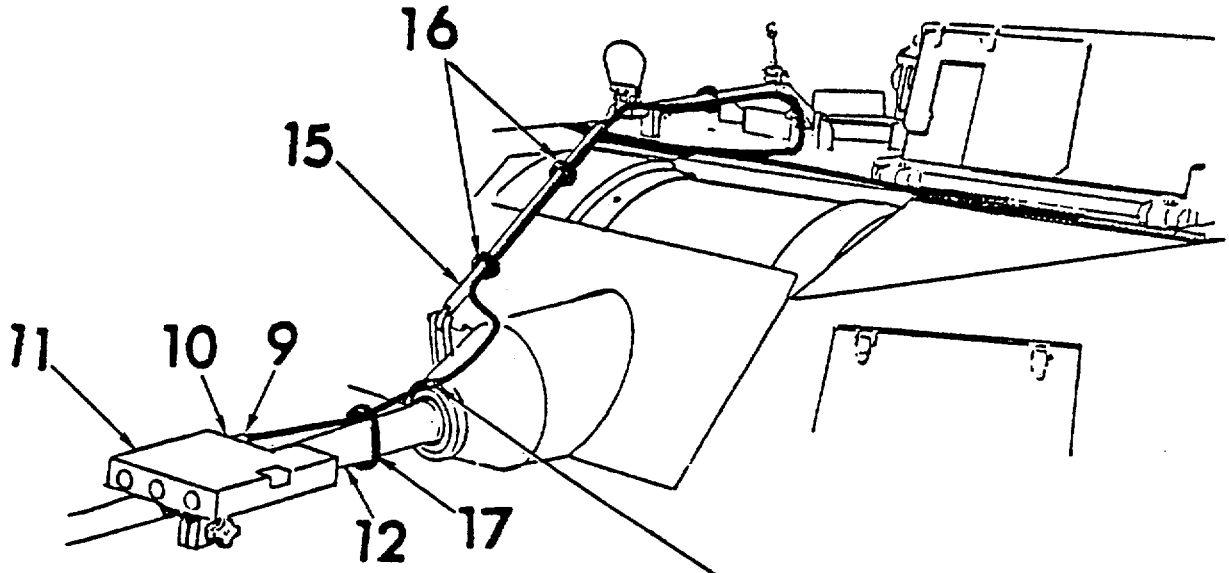
Secure cable to detector belt with cable tie on belt (7).

WARNING

Ensure personnel stand clear of moving Launcher. Failure to comply may cause Injury or Death to personnel.

Raise launcher (8) to maximum elevation firing position. Check that cable and belt have sufficient slack and do not interfere with launcher motion. Reposition if necessary. Lower launcher to stowed position.

Outside Installation Task 19: Install Transmitter Cable Assembly (Cont).



Locate connector (9) labeled P2 25 MM TRANSMITTER.

Attach P2 to connector (10) on rear of 25 mm laser transmitter (11).

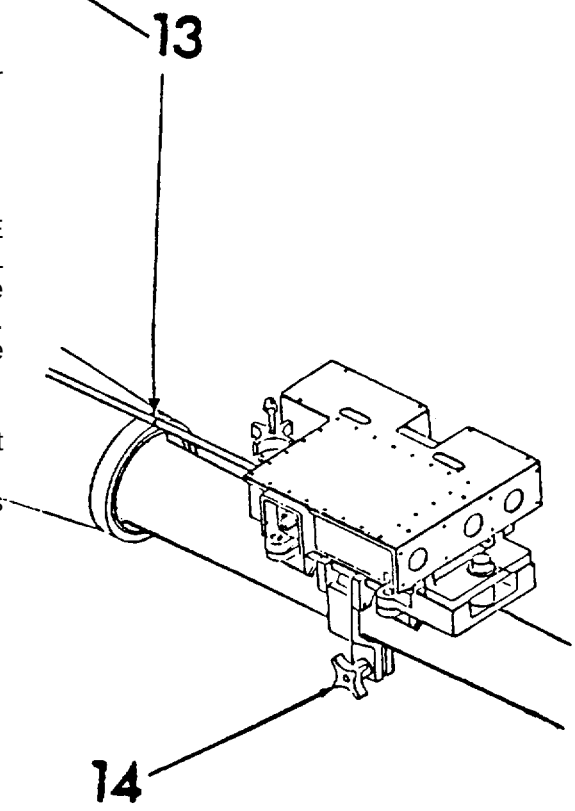
Run cable straight back along barrel (12).

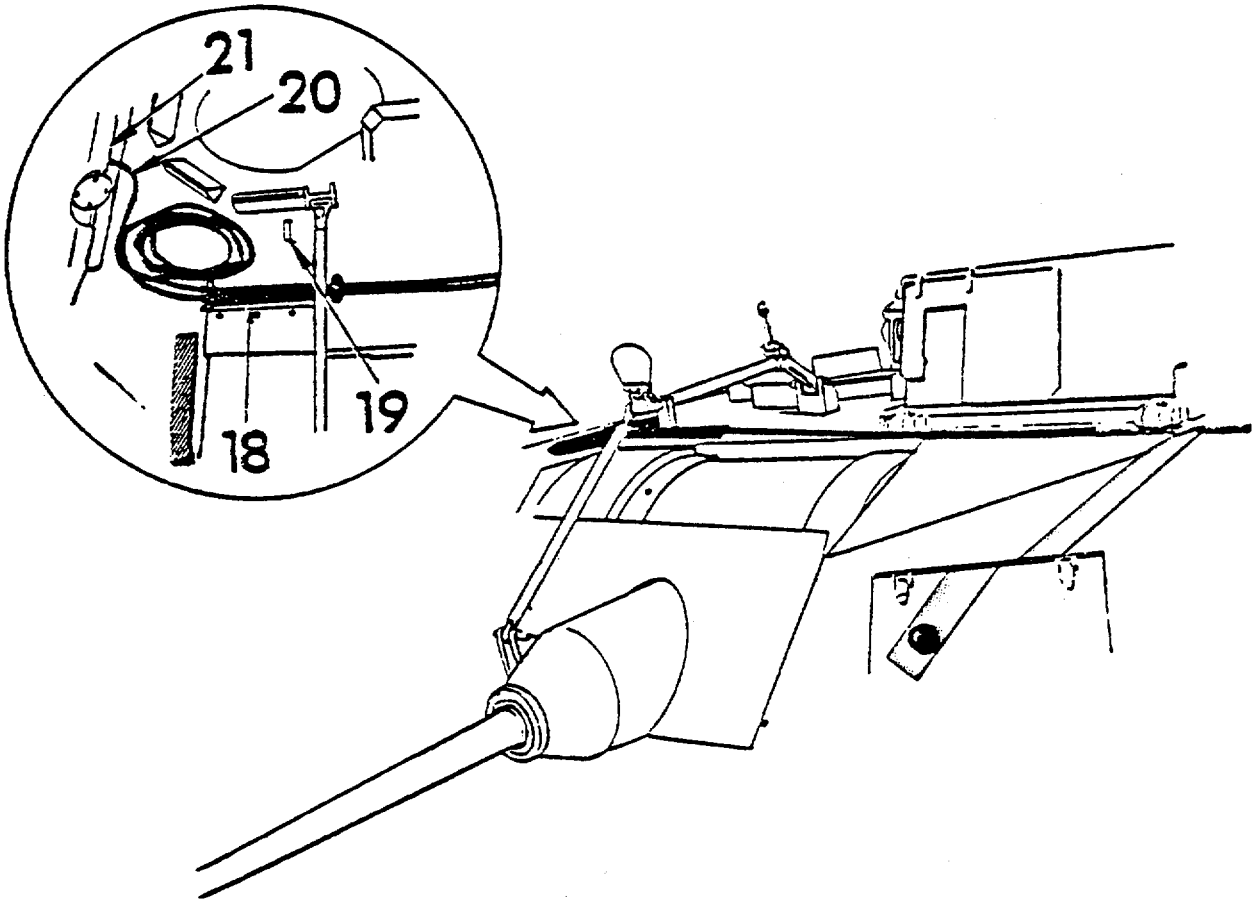
Note location of red band (13) on cable. BAND MUST BE LOCATED AT POINT WHERE BARREL ENTERS BARREL SUPPORT. Loosen laser transmitter clamp knob (14) and move transmitter on barrel to properly locate red band on cable. Securely tighten clamp knob when transmitter and red cable marking are correctly located. DO NOT USE WRENCH.

Continue routing cable over barrel support and up turret front alongside Manual Sight Assembly (15).
Temporarily secure to sight assembly using three fastener ties (16) attached to cable.

Temporarily secure to barrel using fastener tie (17).

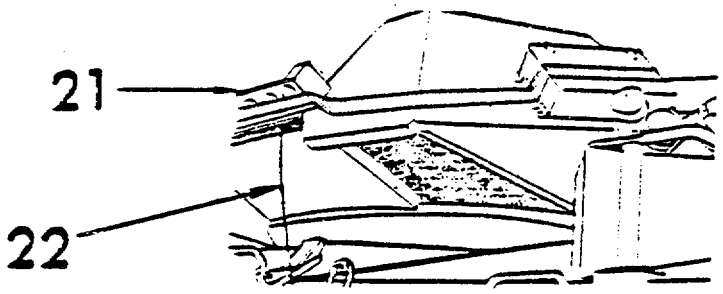
Fastener ties must be undone and retightened in later tasks.



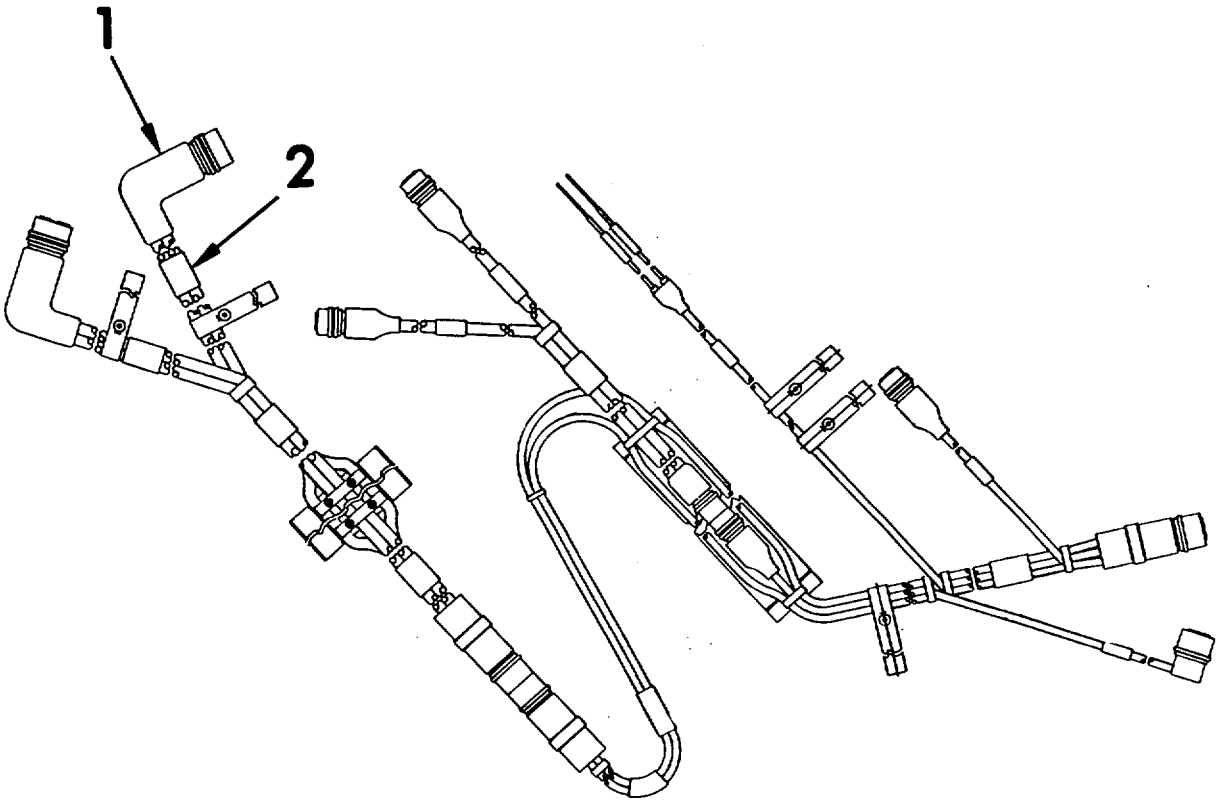


Align cable pad (18) with fastener tape in front of coax machine gun manual sight (19).

Feed remainder of cable assembly between turret wall (20) and storage rack (21). Temporarily leave cable assembly (22) hanging below storage rack (21).



Outside Installation Task 20: Inspect Kill Indicator Cable Assembly.



Find cable assembly labeled KILL INDICATOR.

Each connector (1) should have label (2) showing where it goes.

Check all connectors for obvious damage and missing labels.

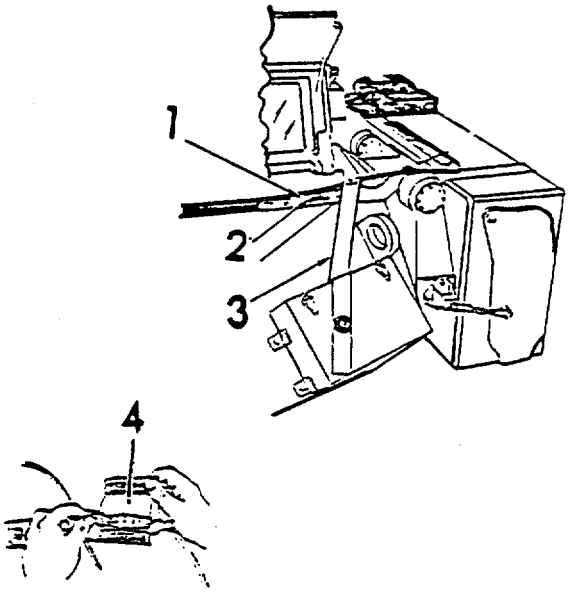
Report any damage on DA Form 2404. Replace kill indicator cable assembly if damaged.

Outside Installation Task 21: Install Kill Indicator Cable Assembly.

Locate connector (1) labeled P3 LEFT DETECTOR BELT.

Attach P3 to connector (2) on left detector belt segment (3).

Secure connectors under protective flap (4).



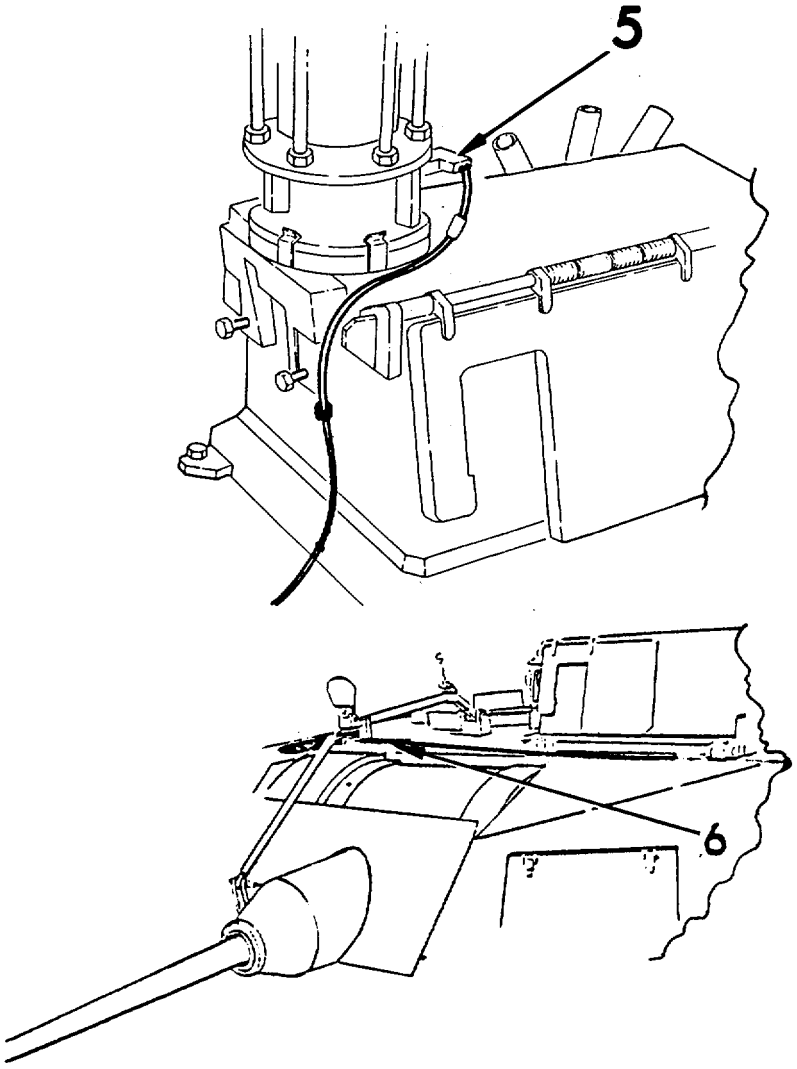
Outside Installation Task 21:. Install Kill Indicator Cable Assembly (Cont).

Locate connector (5) labeled P5 KILL INDICATOR.

Route cable segment up the right side of the integrated sight unit and attach P5 (5) to the connector on the CVKI.

Route cable across the top front surface of the turret (6).

Secure cable to the vehicle by attaching the cable protective plate to the hook fastener tape located on the right of the manual sight assembly.



Outside Installation Task 21: Install Kill Indicator Cable Assembly (Cont).

Locate connector labeled P9 FLASHWESS/AWESS.

Attach P9 to the connector on the rear of the FLASHWESS (7).

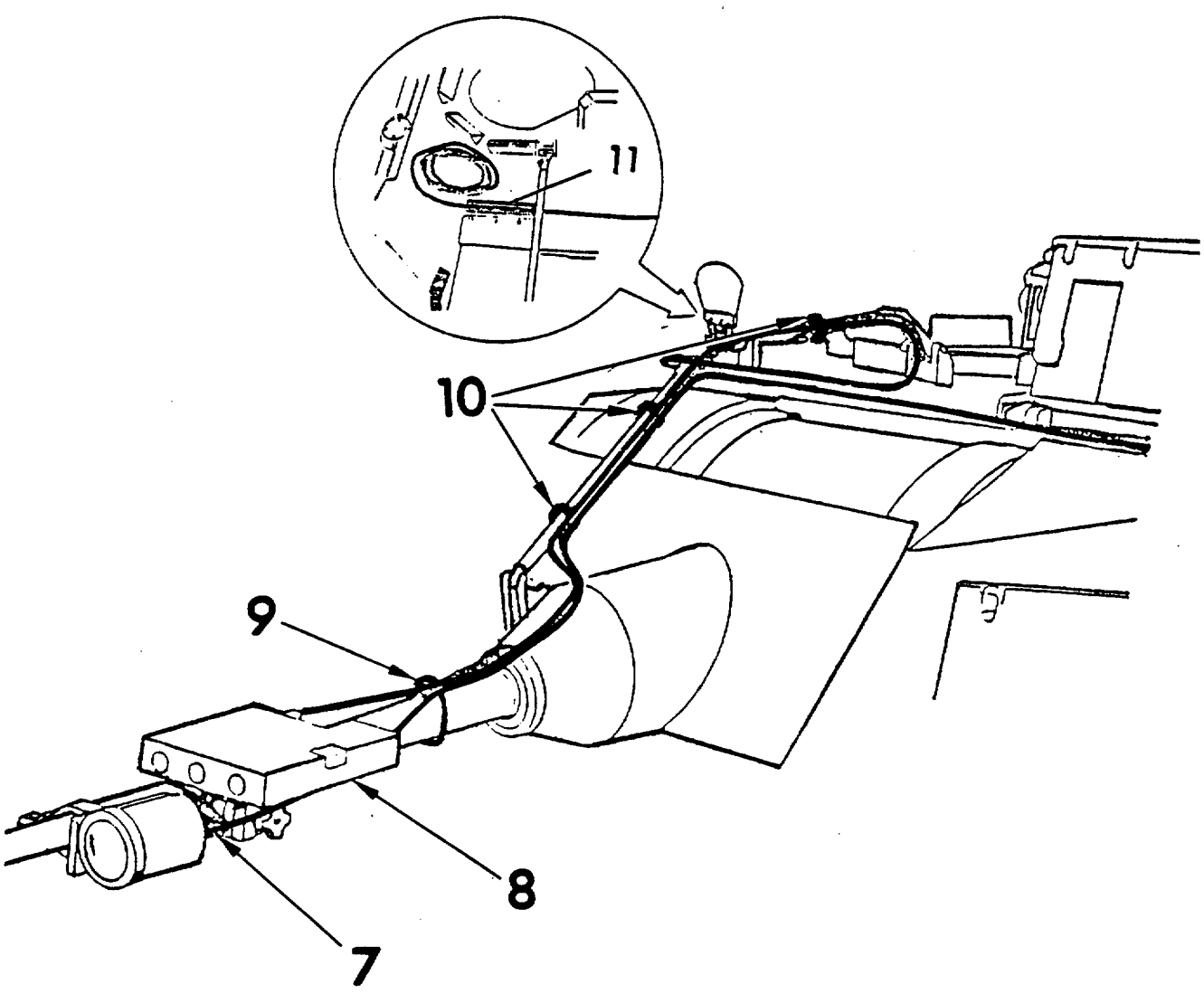
Route cable straight back along the barrel past the 25MM transmitter (8).

Secure the cable to the gun barrel using the fastener tie on the transmitter cable (9).

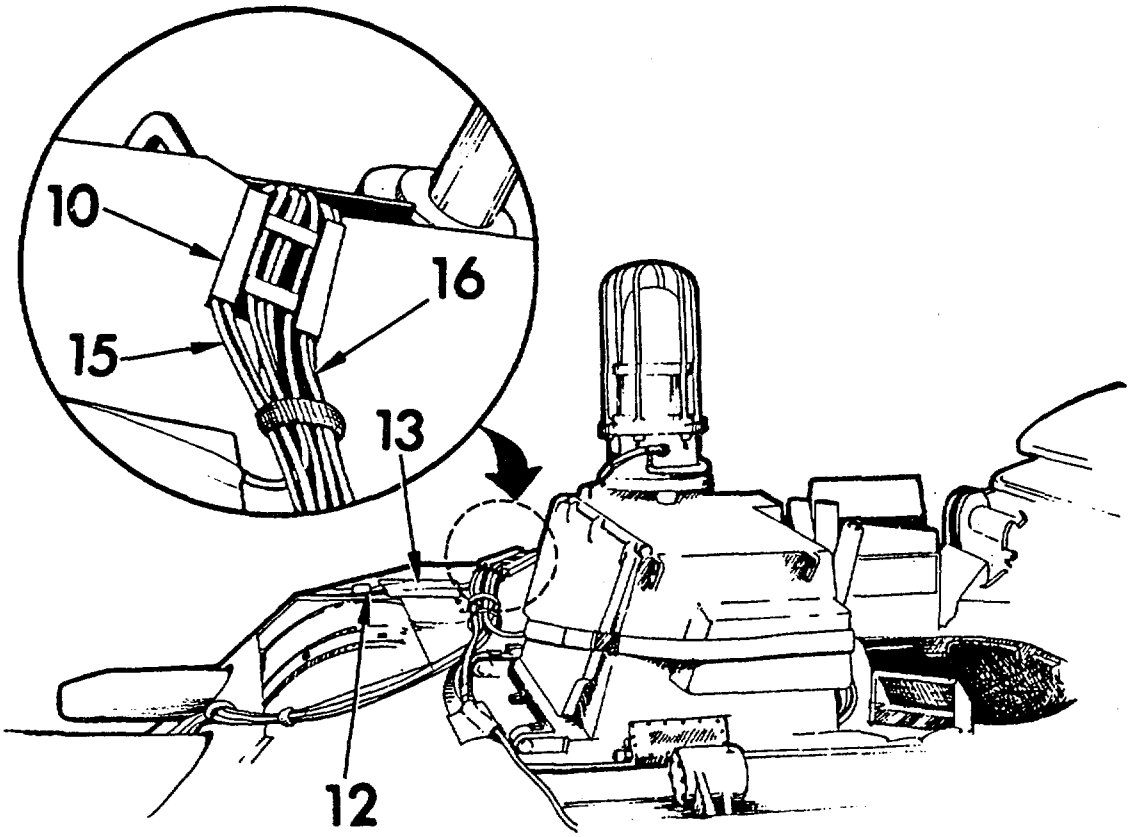
Route remainder of cable up the front of the turret following the path of the transmitter cable (10).

Secure cable to manual sight assembly with the fastener ties attached to transmitter cable (10).

Route cable towards the right lifting hook and secure with cable ties attached to transmitter cable (11).



Outside Installation Task 21: Install- Kill Indicator Cable Assembly (Cont).



Locate connector labeled P2 (12) RIGHT DETECTOR BELT.

Attach P2 to connector on right detector belt (13) and secure connectors under protective flap.

Locate the larger of two metal cable bracket assembly (14) which is attached to the KILL INDICATOR cable assembly.

Place the detector belt cable segments (15) within one outer channel of the bracket.

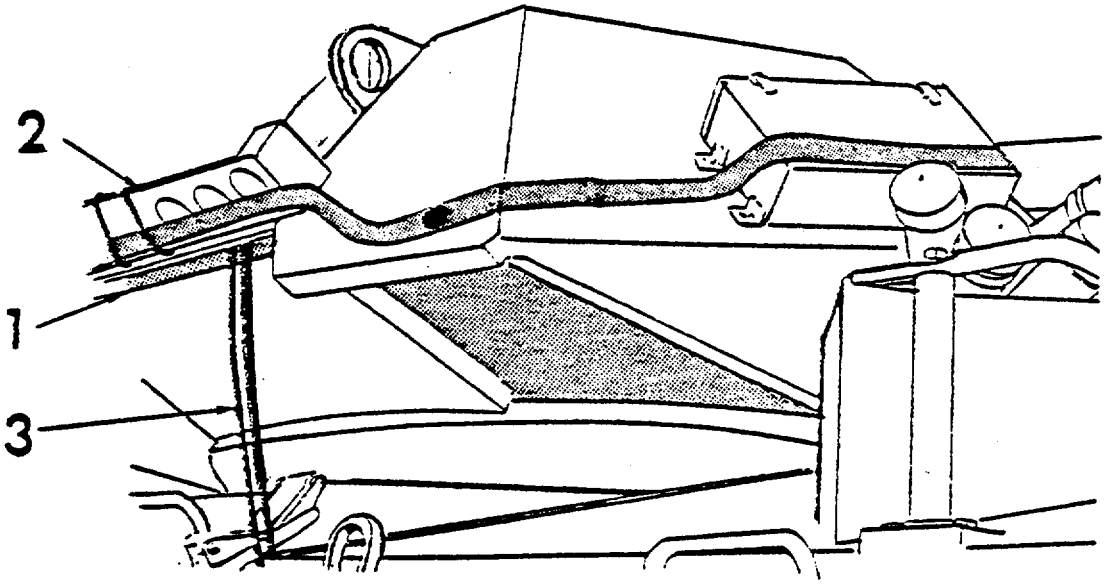
Place the transmitter cable segments (16) within the other channel of the bracket.

Secure the bracket to the vehicle by attaching the assembly to the fastener tape installed on the upper surface of the turret adjacent to the storage rack.

Outside Installation Task 22: Complete Outside Cable Installation.

Feed remaining Kill Indicator Cable connectors between turret wall (1) and storage rack (2). Follow route of Transmitter Cable (3).

Temporarily leave remainder of both cable assemblies hanging below storage rack (2).



INSIDE INSTALLATION TASKS - LIST

NOTE

Perform these tasks in the order given.

Inside Installation Task 1: Obtain Equipment. Completion of Inside Tasks requires additional equipment listed and illustrated below. Locate and set aside this equipment.

Control Console (Loader's Control Assembly - LCA) (1)

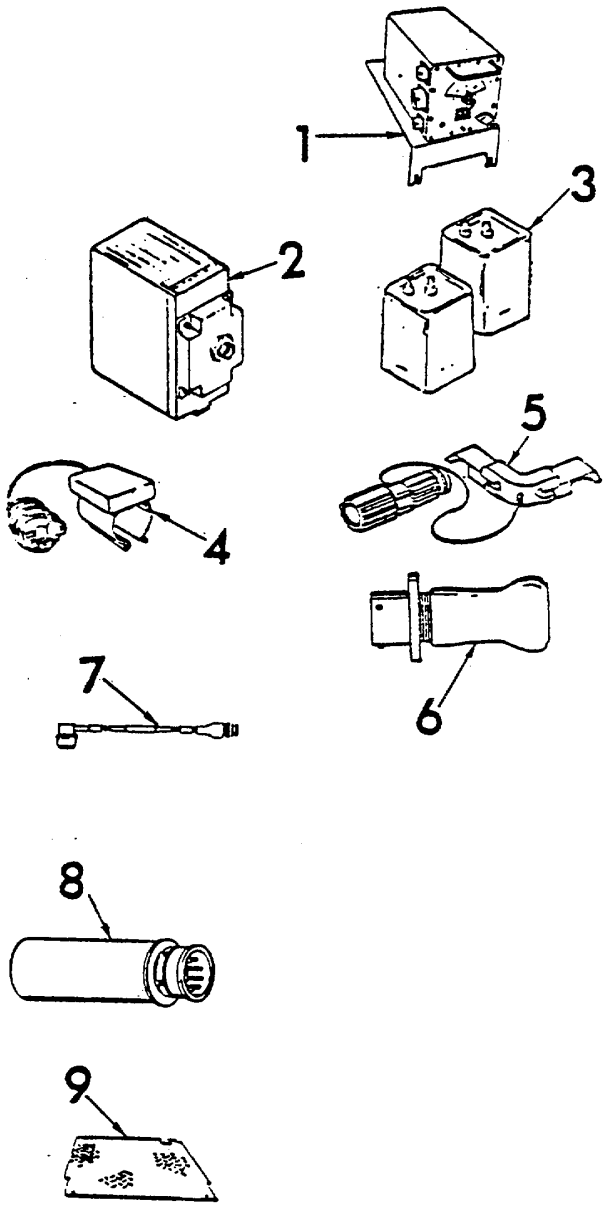
Battery Box (2) and two 6 V Batteries (3)

Coax Machine Gun Microphone (4), Blank Fire Adapter (5) and/or Dry-Fire Plug (6)

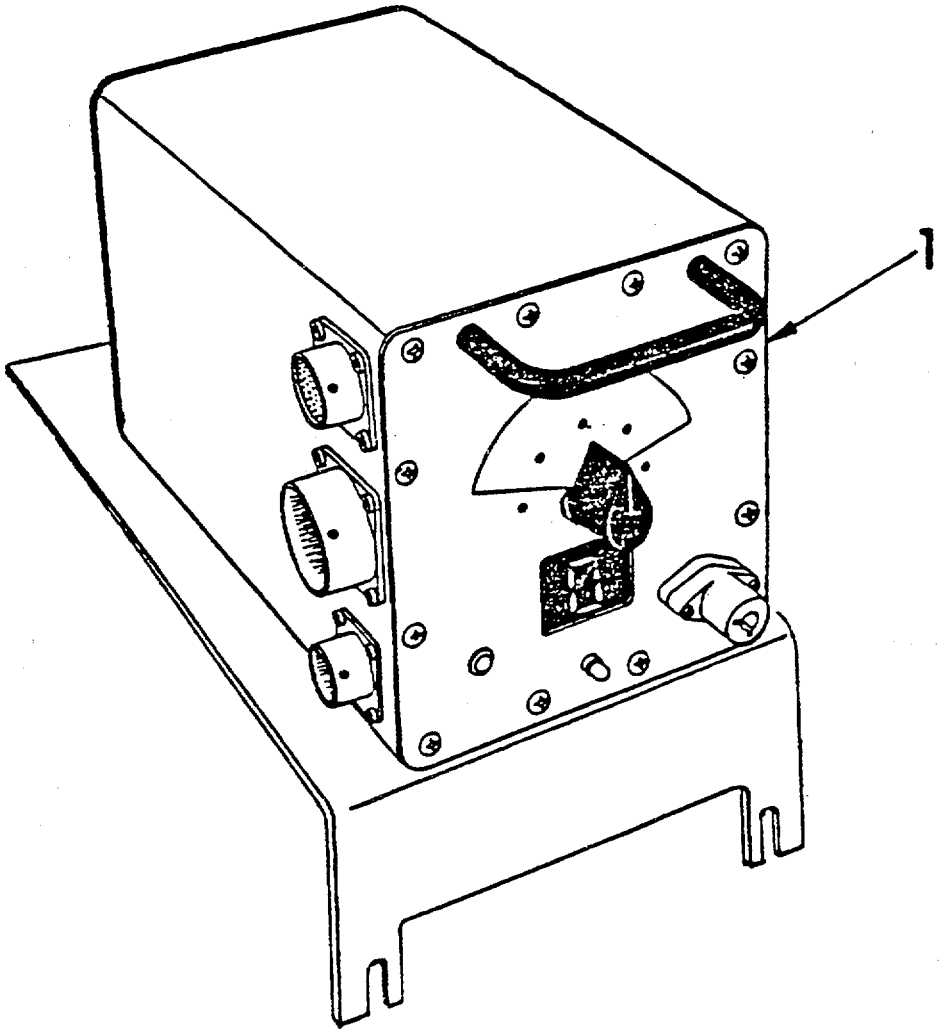
Trigger Cable Assembly (7)

Shorting Plug (8)

Floor Plate (9)



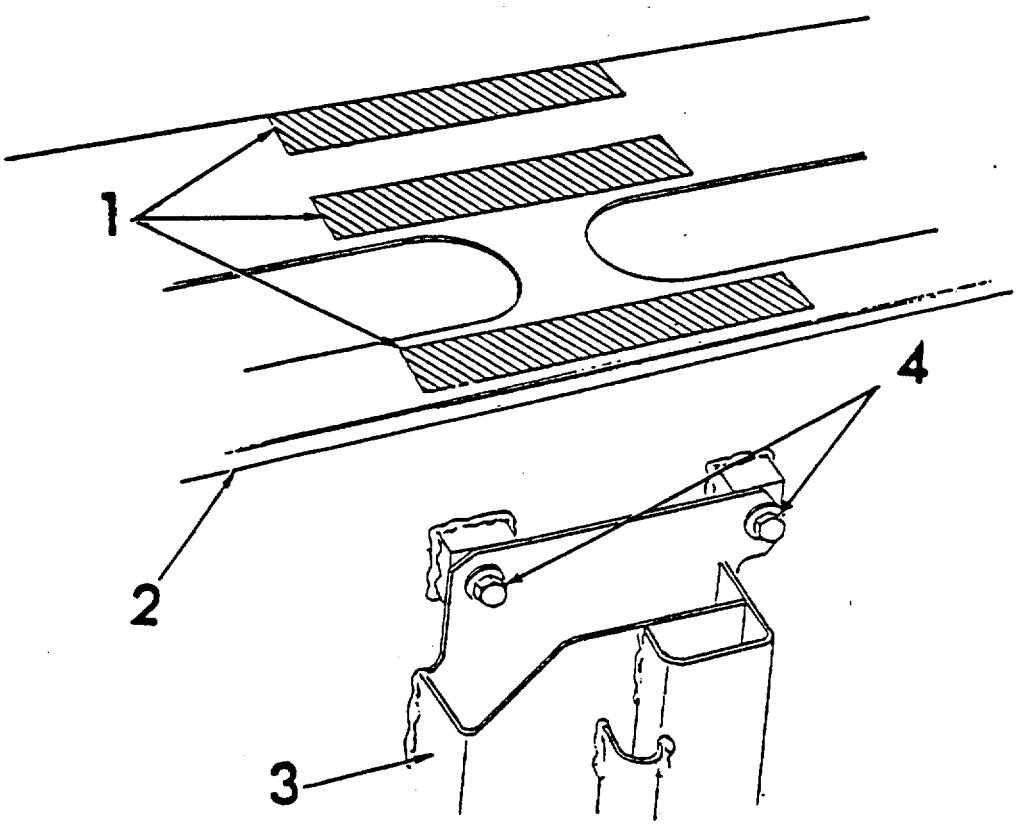
Inside Installation Task 2: Inspect Control Console Assembly.



Inspect control console (1) for any damage that would prevent normal operation.

Report any damage on DA Form 2404. Replace console if damaged.

Inside Installation Task 3: Install Control Console Assembly.



Measure and cut three 6-inch (15 cm) strips (1) of fastener tape.

Refer to cleaning instructions in Outside Task 1. Clean areas at (1).

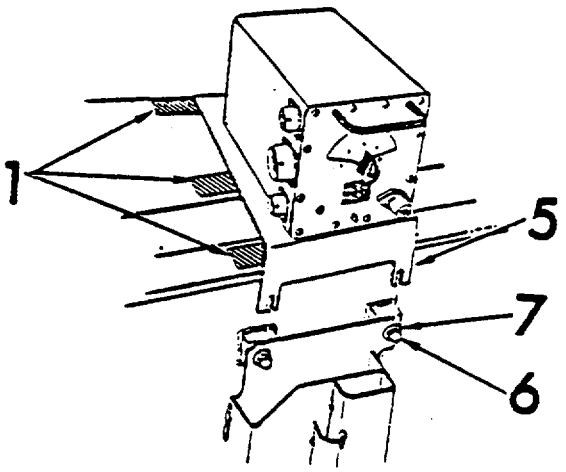
WARNING

Fastener tape primer is highly inflammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.

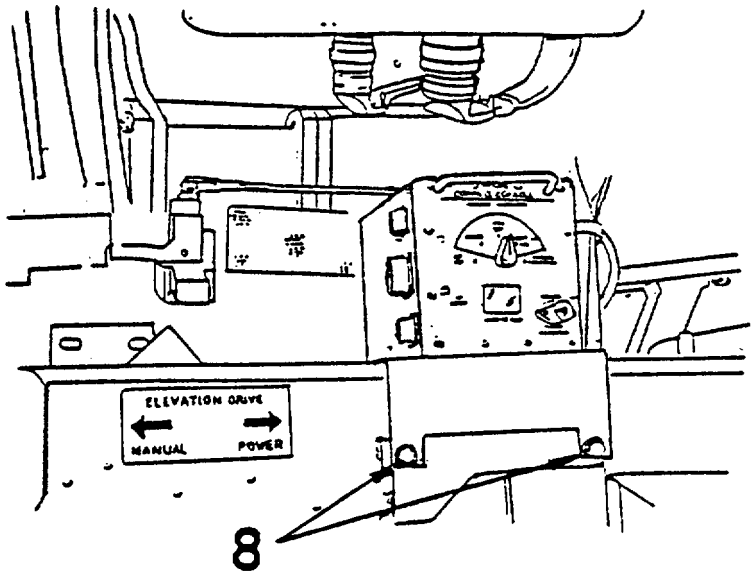
For instructions on applying fastener tape, see Outside Tasks 1 and 2.

Apply tape to top of HE Ammunition Cover (2). Position strips directly above tool rack (3).

Loosen, but do not remove, two bolts (4) holding tool holder to turret wall. Use adjustable wrench.

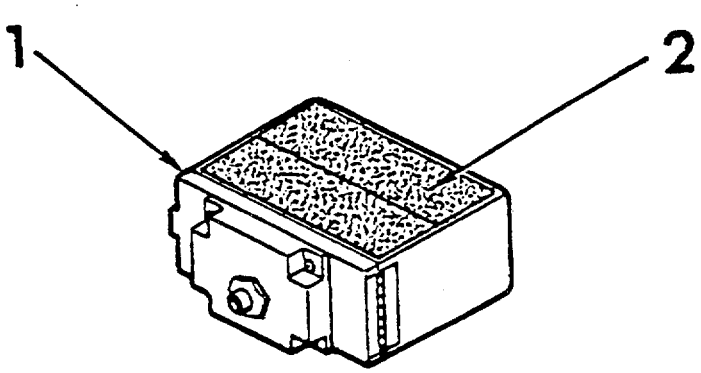


Slip control console assembly mounting bracket (5) under bolt heads (6) and washers (7). Make sure bolts seat at top of bracket slots. Press bracket firmly against turret ledge. Make sure fastener material on bracket bottom has adhered to fastener tape (1) (Item 6, Appendix D) on top of ammunition cover.



Tighten bolts (8) securely.

Inside Installation Task 4: Inspect Battery Box.



Inspect battery box (1) for damage that would prevent normal operation.

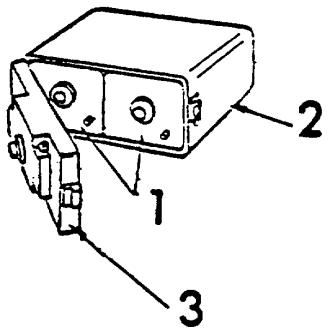
Report any damage on DA Form 2404. Replace if damaged.

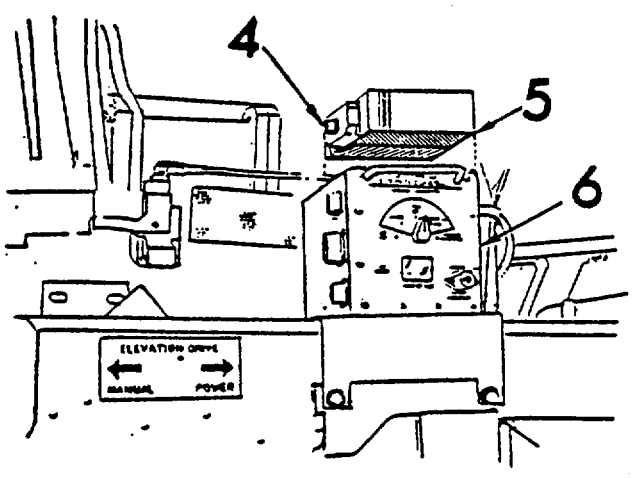
Make sure fastener tape (2) is attached to one side of battery box. If fastener tape is missing, do not attempt to install new tape. Report on DA Form 2404 and replace battery box.

Inside Installation Task 5: Install Battery Box.

Insert two 6 V batteries (1) in box (2).

Close and latch cover (3).





Hold battery box so that connector (4) points to your left and fastener material (5) is on box bottom.

Firmly press battery box against fastener tape on top of control console (6).

WARNING

Fastener tape primer is highly inflammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.

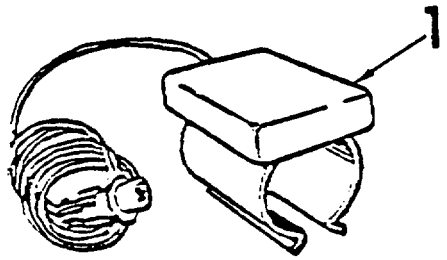
NOTE

If there is no fastener tape on top of control console, install two 6-inch strips. For instructions on applying fastener tape, see Outside Tasks 1 and 2.

Inside Installation Task 6: Inspect M240C Coax Machine Gun Microphone.

Inspect microphone (1) for any damage that will prevent normal operation.

Report any damage on DA Form 2404. Replace microphone if damaged.

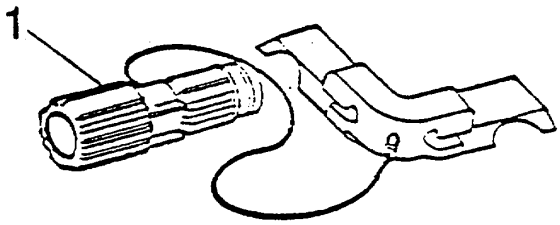


Inside Installation Task 7: Install M240C Coax Machine Gun Microphone.

NOTE

If necessary, the machine gun may be partially withdrawn from its mount to do this task.

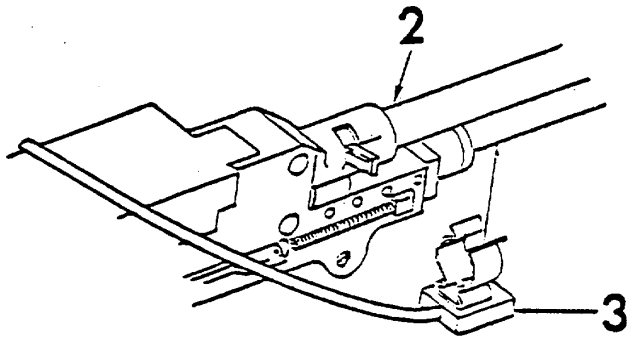
Install blank fire adapter (1) on Coax machine gun (2).



CAUTION

Keep cable away from machine gun barrel.

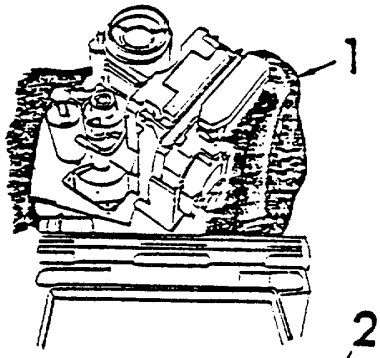
Reach through machine gun access door and clip microphone assembly (3) to machine gun (2) as shown.



Inside Installation Task 8: Route Cables to Turret Interior.

Unzip main gun cover (1).

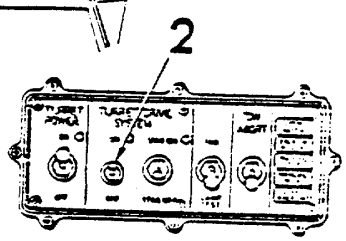
Turn TURRET DRIVE SYSTEM switch (2) OFF.



WARNING

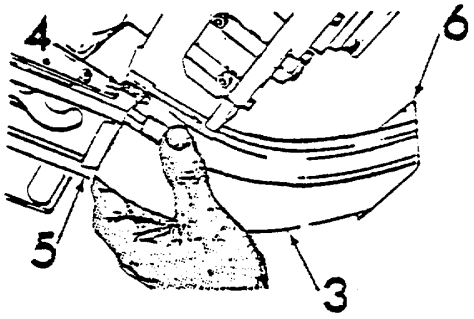
Use Manual Elevation Controls to raise or lower gun as required. Use of power controls could result in serious injury to personnel.

Remove lower main gun HE link ejection chute (3). Squeeze chute latches (4). Remove chute from feeder (5). Remove opposite end from ejection port (6). Stow ejection chute for reinstallation following MILES exercise.



WARNING

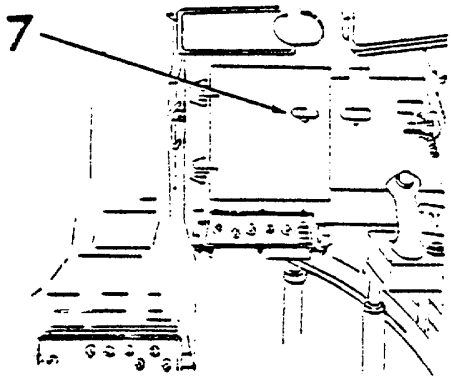
Primer is highly inflammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.



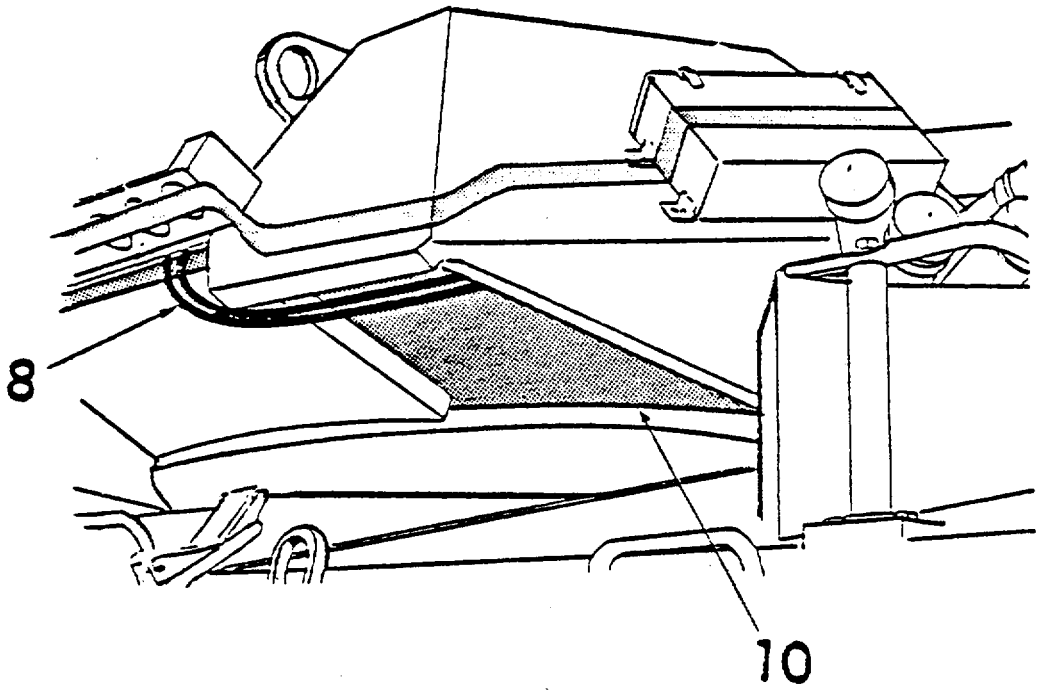
NOTE

If fastener tape was not installed below M240C machine gun access door as part of Outside Installation Task 2, install a 12- inch length of tape, horizontally, centered approximately 4 inches (10 cm) below access door.

Open M240C machine gun access doors (7).



Inside Installation Task 8: Route Cables to Turret Interior (Cont).



Route Transmitter and Kill Indicator Cable Assemblies (8) through link ejection port (10) in turret. Keep cables taut and free of loops or excess slack.

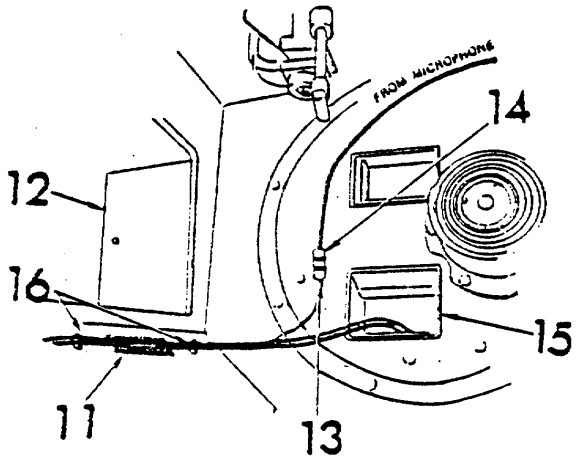
Press plate (11) on Kill Indicator Cable Assembly to fastener tape strip below M240C machine gun access door (12). If plate does not fit on tape, reposition cable or tape.

Locate plug (13) labeled P4 COAX MIC on Transmitter Cable Assembly.

Connect plug to microphone cable connector (14).

Feed Kill Indicator and Transmitter cables through lower ejection port (15) into turret.

Secure Kill Indicator and Transmitter Cable Assemblies and all excess microphone cable with cable ties (16).



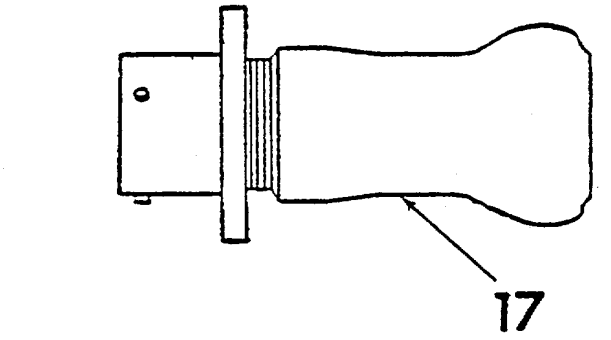
DRY-FIRE PLUG INSTALLATION

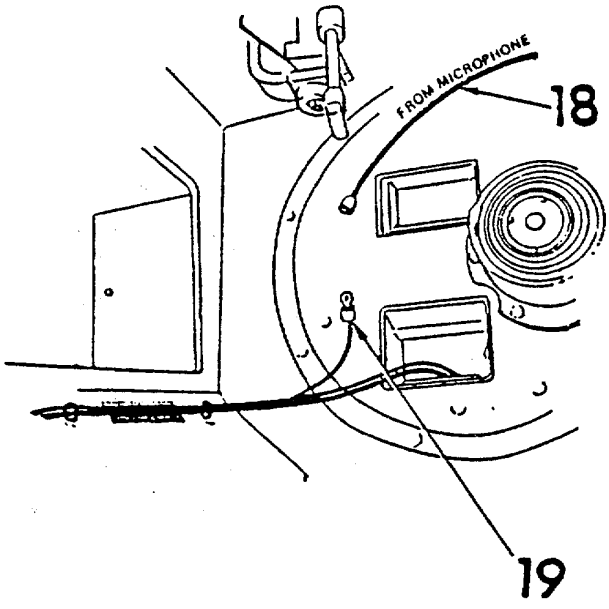
Dry-fire operation of the M240C machine gun may be required for system testing or training purposes. Dry-fire plug (Item 1, Appendix C) is required to operate in the dry-fire mode.

Inspect dry-fire plug (17) for obvious damage.

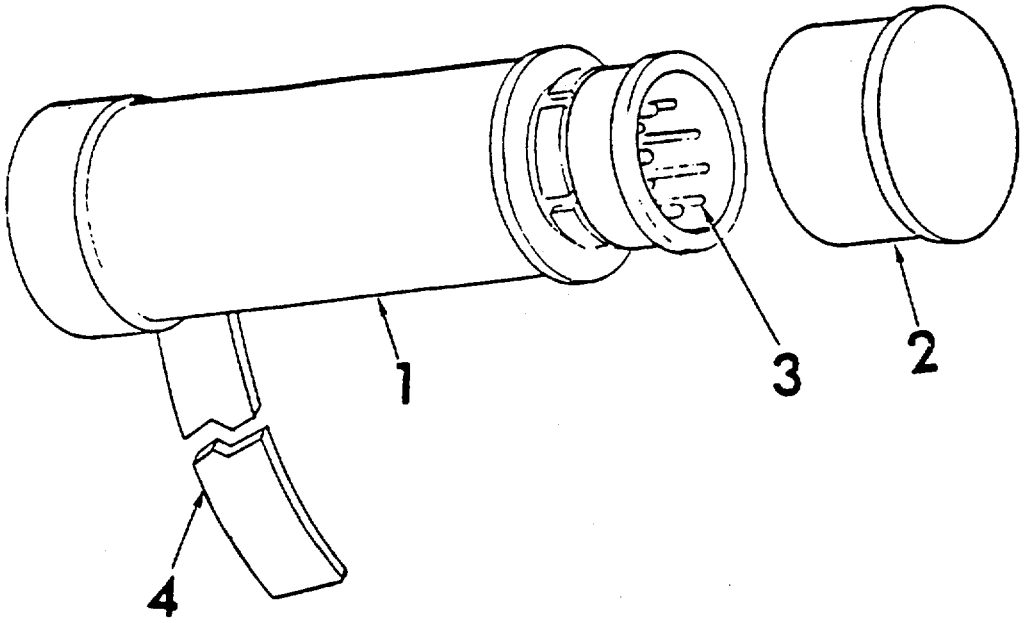
Disconnect microphone cable (18) from Transmitter Cable Assembly. Connect dryfire plug to P4 COAX MIC plug (19) on Transmitter Cable Assembly.

If only dry-fire operation is anticipated it is not necessary to install the M240C blank fire adapter or MILES microphone.





Inside Installation Task 9: Inspect Shorting Plug.



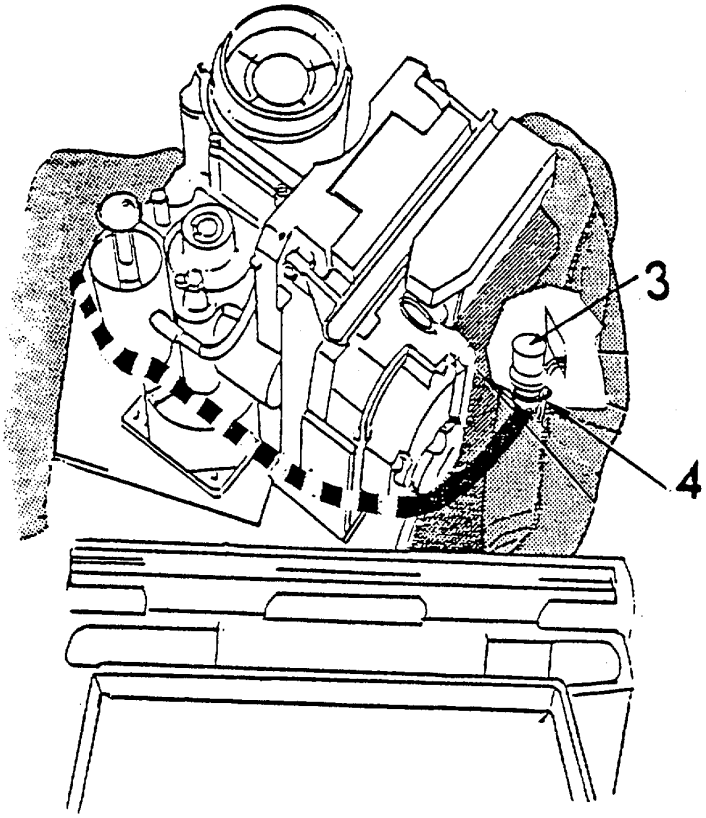
Check connector assembly (1) for visible damage.

Remove dust cap (2) and check plug pins (3) for signs of obvious damage.

Check safety strip (4) for tears or other damage.

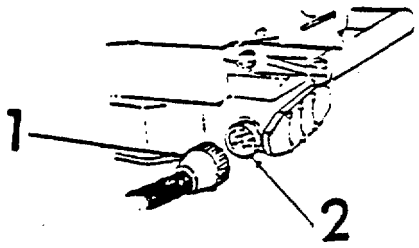
Report any damage on DA Form 2404. Replace plug assembly if damaged.

Inside Installation Task 10: Install Shorting Plug.



Route cables through main gun cover and to right of weapon control box.

Manually depress gun.



Disconnect main gun electrical cable 2W10 (1). from 25 mm gun receiver (2).

Connect shorting plug (3) to the 2W10 cable (4).

CAUTION

Do not twist gun cable when installing or removing shorting plug.

Push shorting plug into 2W10 connector and twist the connector ring clockwise to make connection.

Pull cable underneath gun mount and position so that the cable and shorting plug will not interfere with. or be damaged by movement of the gun.

Inside Installation Task 11: Complete Installation MILES Cables.

Completion of MILES cable installation consists of the following subtasks:

Inside Task 11-A: Complete Installation Kill Indicator Cable Assembly (see page 2-67)

Inside Task 11-B: Complete Installation Transmitter Cable Assembly (see page 2-70)

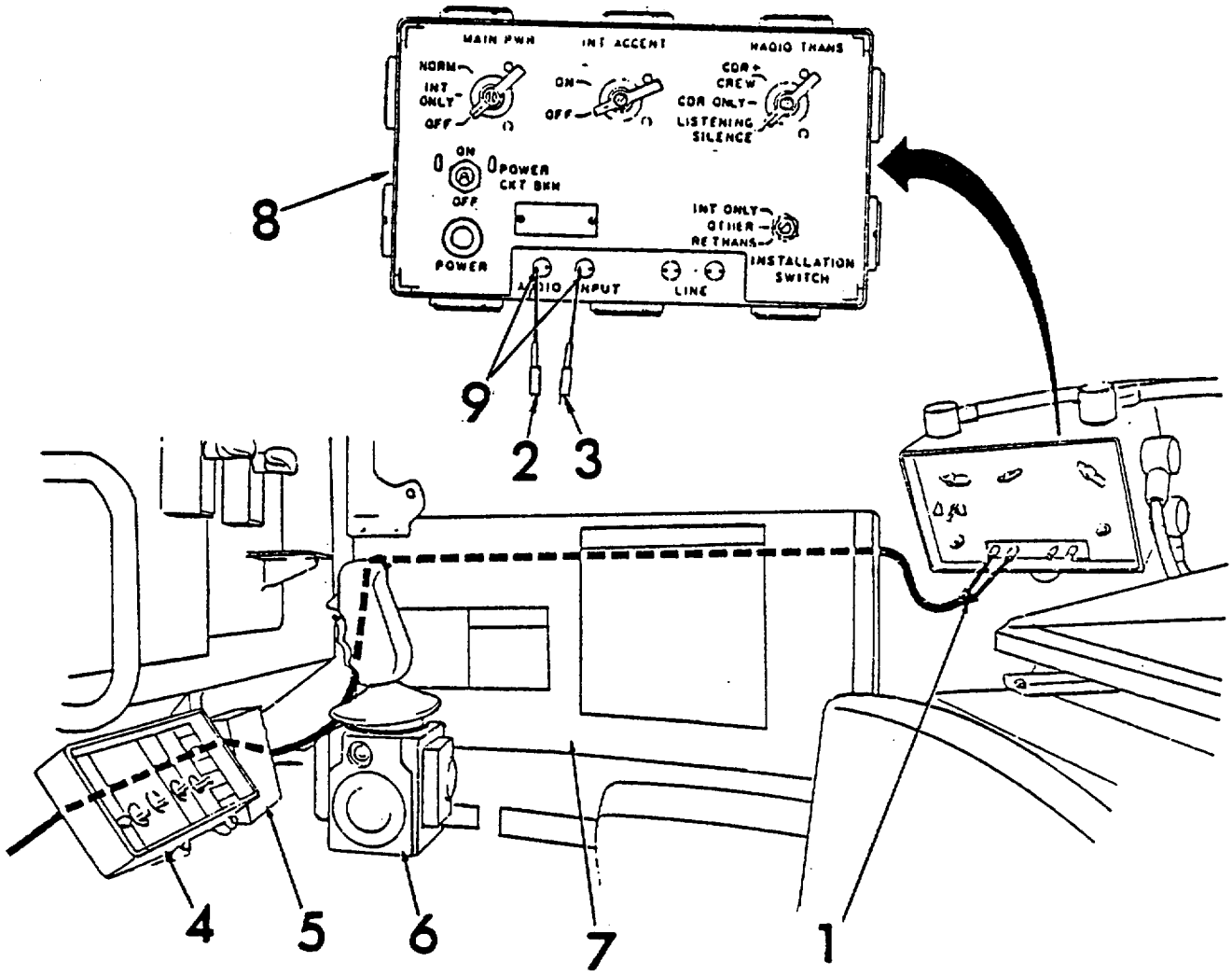
Inside Task 11-C: Inspect Trigger Cable Assembly (see page 2-71)

Inside Task 11 D-0: Install Trigger Cable Assembly (see page 2-72)

NOTE

Perform these tasks in the order given.

Inside Task 11-A: Complete Installation Kill Indicator Cable Assembly.



Locate connector (1) labeled INTERCOM on Kill Indicator Cable Assembly. It has two plugs labeled P7 (2) and P8 (3).

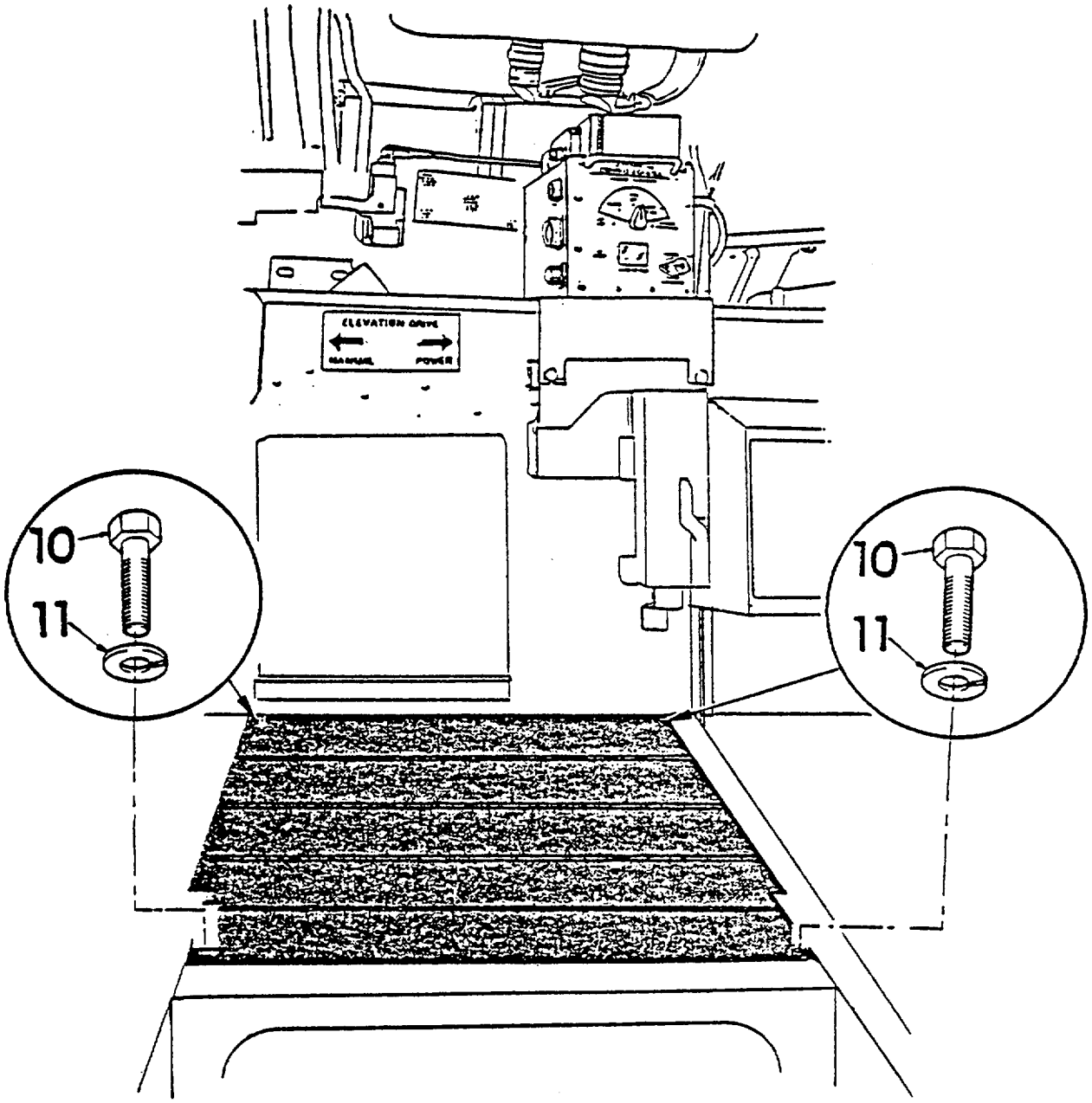
Route INTERCOM connector and cable under and behind turret control box (4) and turret position indicator (5), past commanders' control handle (6). Route cable up and behind 7.62 mm ammunition storage unit (7) and along turret wall towards turret amplifier (8).

Connect INTERCOM plugs P7 and P8 into AUDIO INPUT JACKS (9) on turret amplifier. Either plug can go into either jack.

NOTE

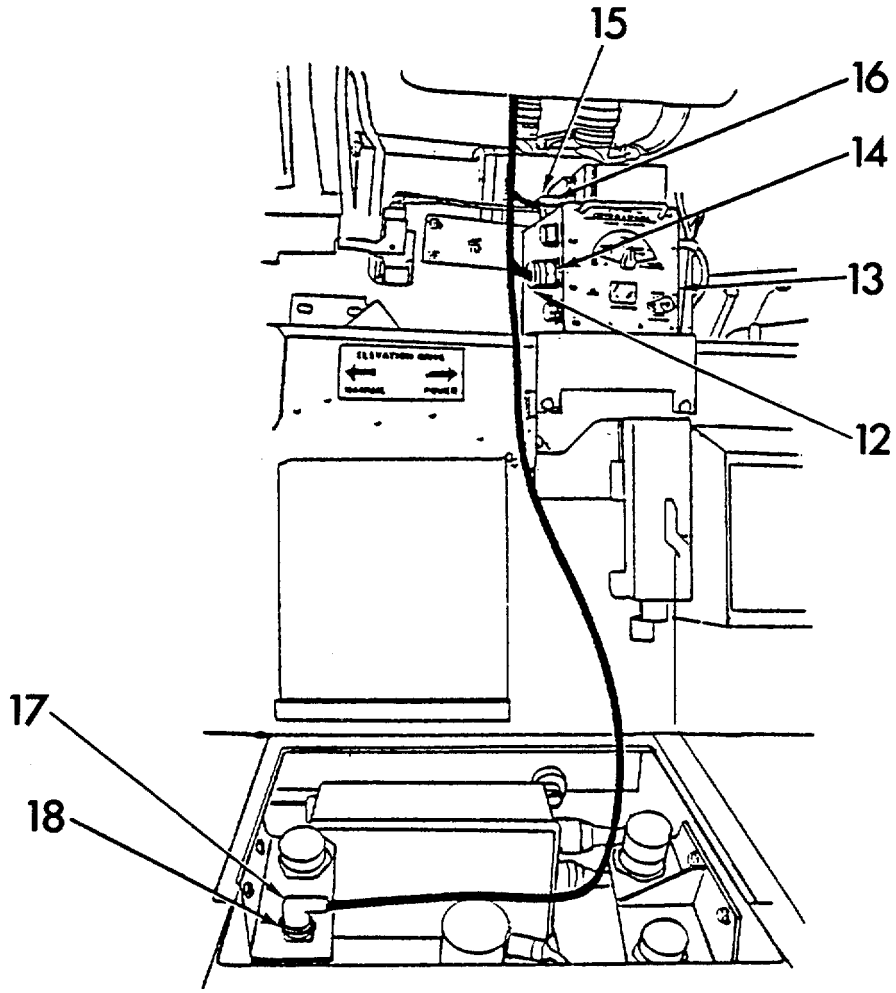
Use the slots not the holes on audio input jacks.

Inside Task 11-A: Complete Installation Kill Indicator Cable Assembly (Cont).



Remove four bolts (10) and lock washers (11) from corners of vehicle turret center floor plate (12). Stow floor plate for reinstallation following MILES exercise. Keep bolts and washers for use in future task (Inside Task 11D).

Inside Task 11-A: Complete Installation Kill Indicator Cable Assembly (Cont).



Locate connector (12) labeled P1 CONTROL CONSOLE J3 on Kill Indicator Cable Assembly.

Route connector and cable to control console (13). Connect to J3 (14) on control console.

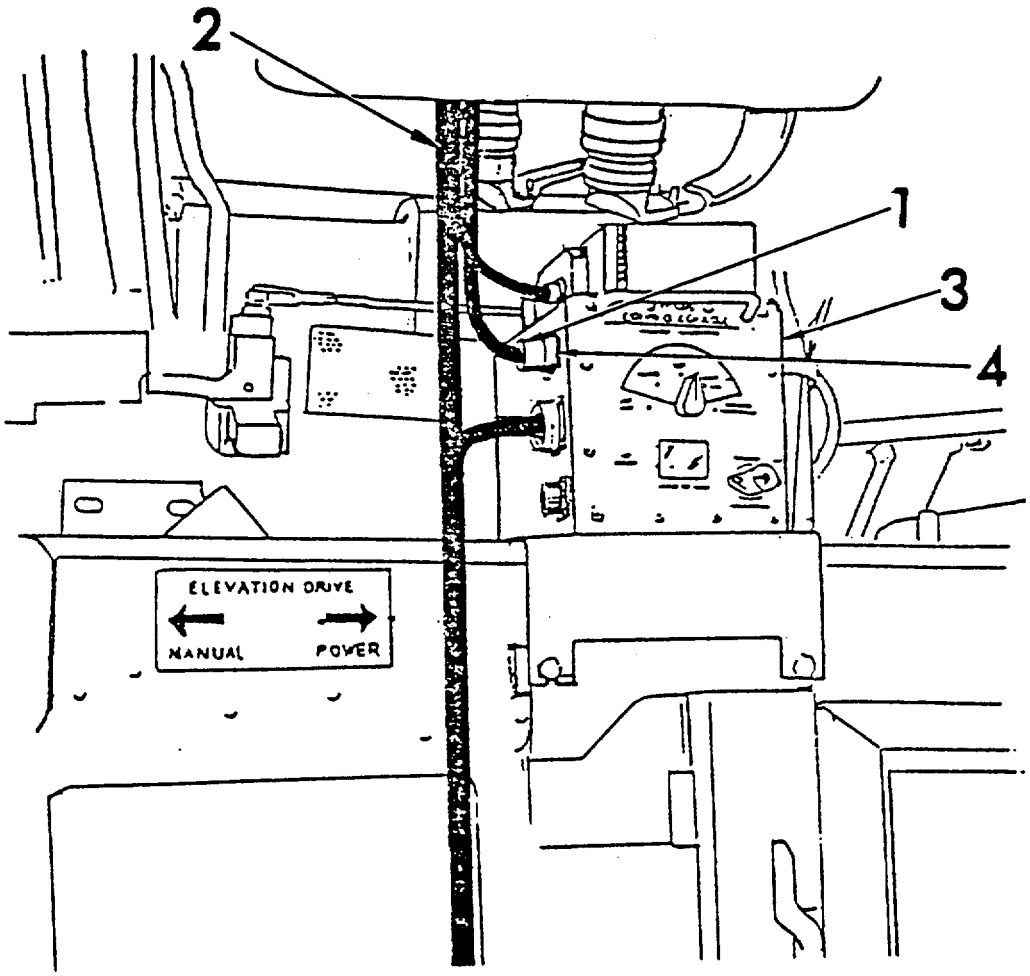
Locate connector (15) labeled P4 BATTERY on Kill Indicator Cable Assembly.

Connect P4 battery box receptacle (16).

Locate connector (17) labeled P6 UTILITY CONNECTOR on Kill Indicator Cable Assembly.

Connect P6 to receptacle J1 (18) located below turret floor on turret breakout assembly.

Inside Task 11 -B: Complete Installation Transmitter Cable Assembly.

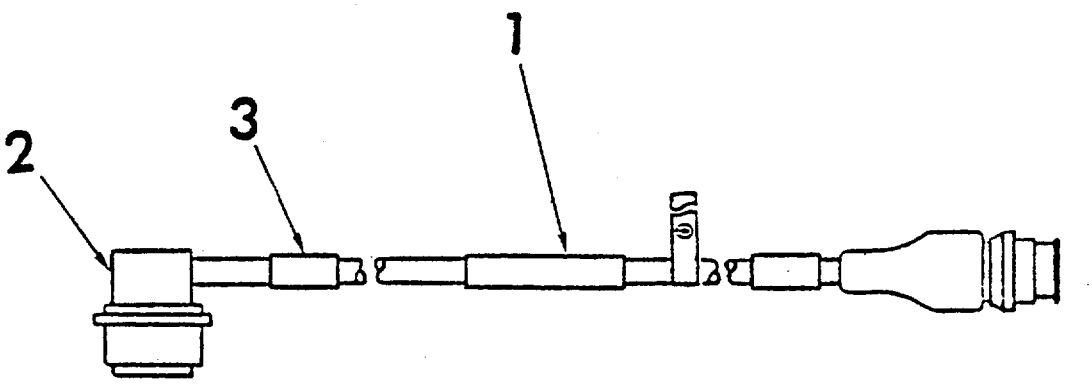


Locate connector labeled CONTROL CONSOLE P1 (1) on Transmitter Cable Assembly (2).

Route cable and connector to control console (3).

Connect P1 to J1 receptacle (4) on control console.

Inside Task 11-C: Inspect Trigger Cable Assembly.



Find cable assembly (1) labeled TRIGGER.

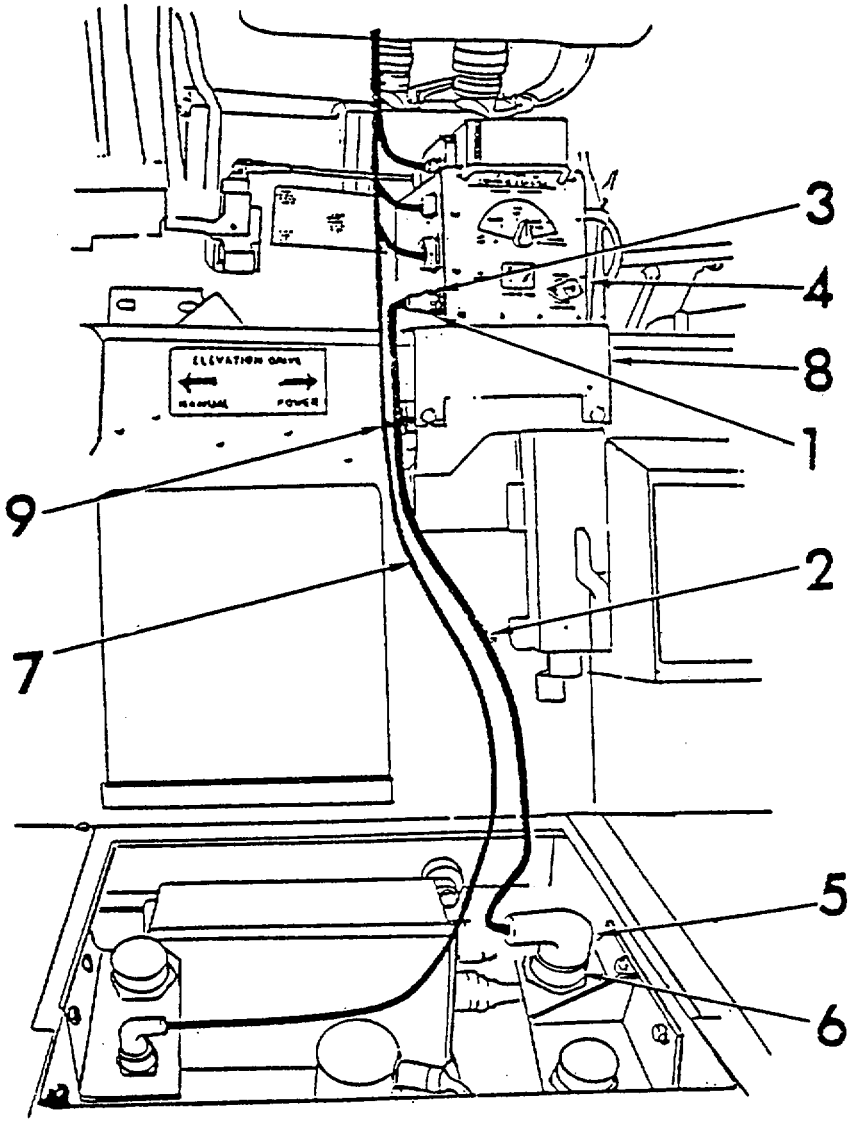
Check each cable assembly for worn insulation and bare wires.

Each connector (2) should have a label (3) showing where it goes.

Check all connectors for obvious damage and missing labels.

Report any damage on DA Form 2404. Replace cable assemblies if damaged.

Inside Task 11-D: Install Trigger Cable Assembly.

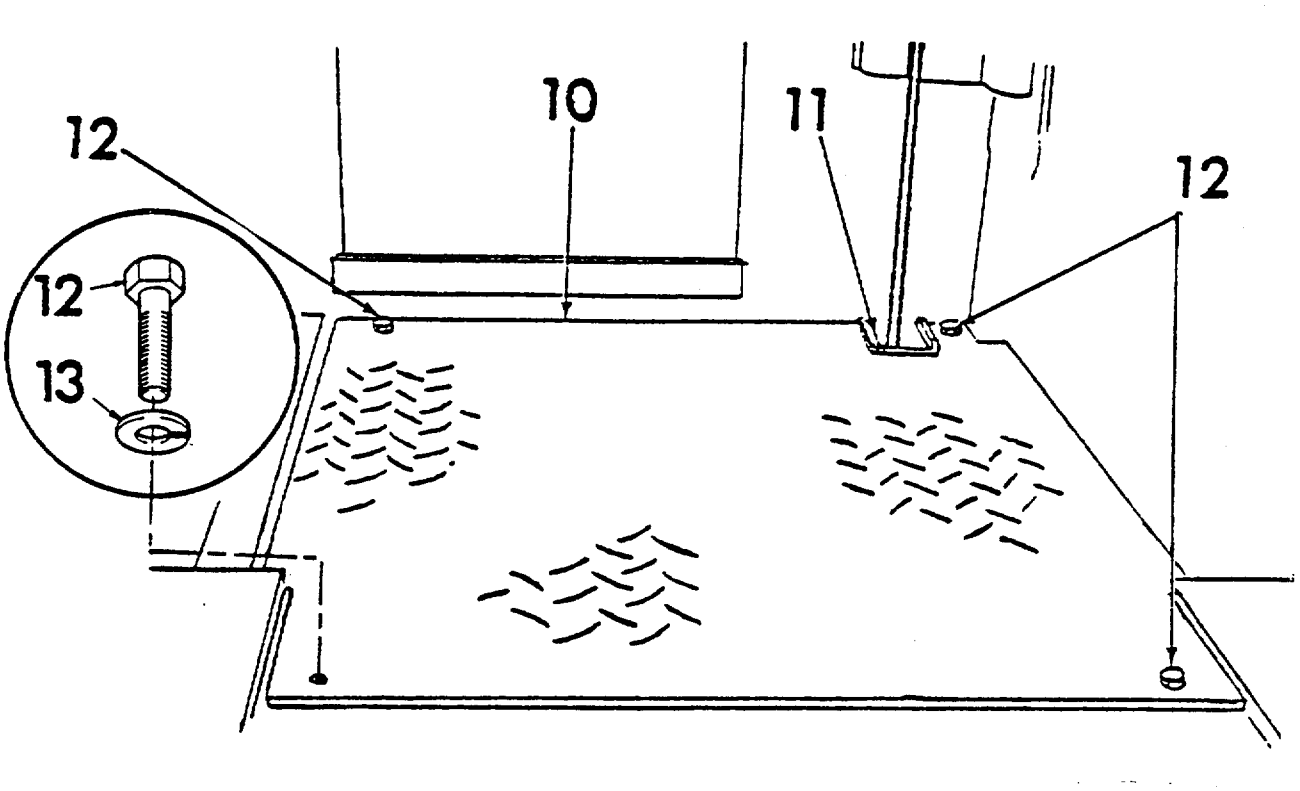


Locate connector (1) labeled P1 control console on Trigger Cable Assembly (2).

Connect P1 to J2 receptacle (3) on control console (4).

Route remaining cable and connector (5) labeled P4 to area below floor plate. Connect P4 to receptacle labeled J4 (6).

Secure Trigger Cable (2) and Kill Indicator Cable (7) Assemblies to tool rack (8) with cable tie (9).



Install MILES floor plate (10). Position so that MILES cables are routed through slot (11) in plate against HE ammunition cover. Secure plate with four bolts (12) and lock washers-(13) previously removed from vehicle turret floor plate.

MWLD TASKS - LIST

MWLD Task 1: Obtain Equipment. Completion of MWLD Tasks requires crew commander, gunner, and driver to each obtain the equipment listed and illustrated below. Locate and set aside this equipment.

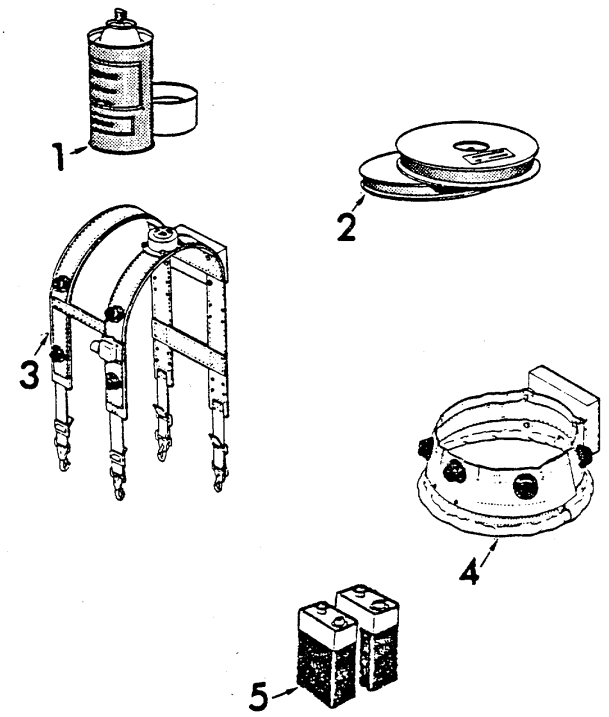
Tape Primer (1)

Fastener Tape (2)

Torso Harness (3)

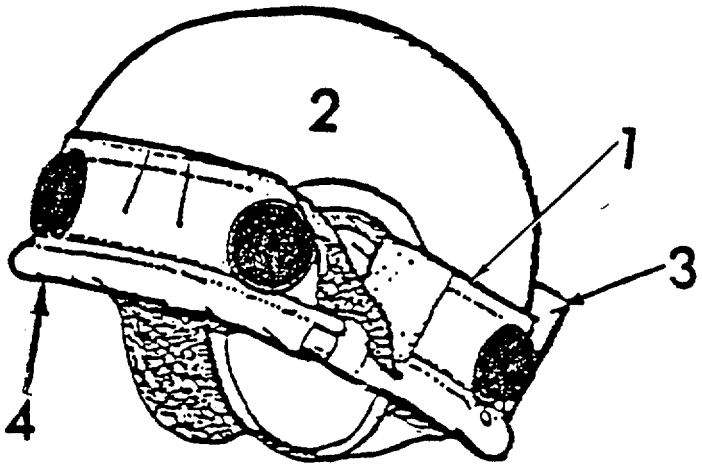
Helmet Harness (4)

9 V Batteries (two each) (5)
(Type BA 3090/U)



MWLD Task 2: Install Fastener Tape.

Crew helmets require three patches of fastener tape glued to the outside to hold the MWLD helmet harness in place. The fastener tape patches must be attached to the proper position on the helmet so that they will mate with three patches of fastener tape which are attached to the harness. Fastener tape is installed as follows:



Slip helmet harness (1) over helmet (2) so that electronics box (3) is at rear.

Make sure thick bottom edge (4) of harness completely covers and overhangs rim of helmet.

Pull harness tight. Mark helmet (2) where the three fastener patches on harness touch it. Remove harness.

WARNING

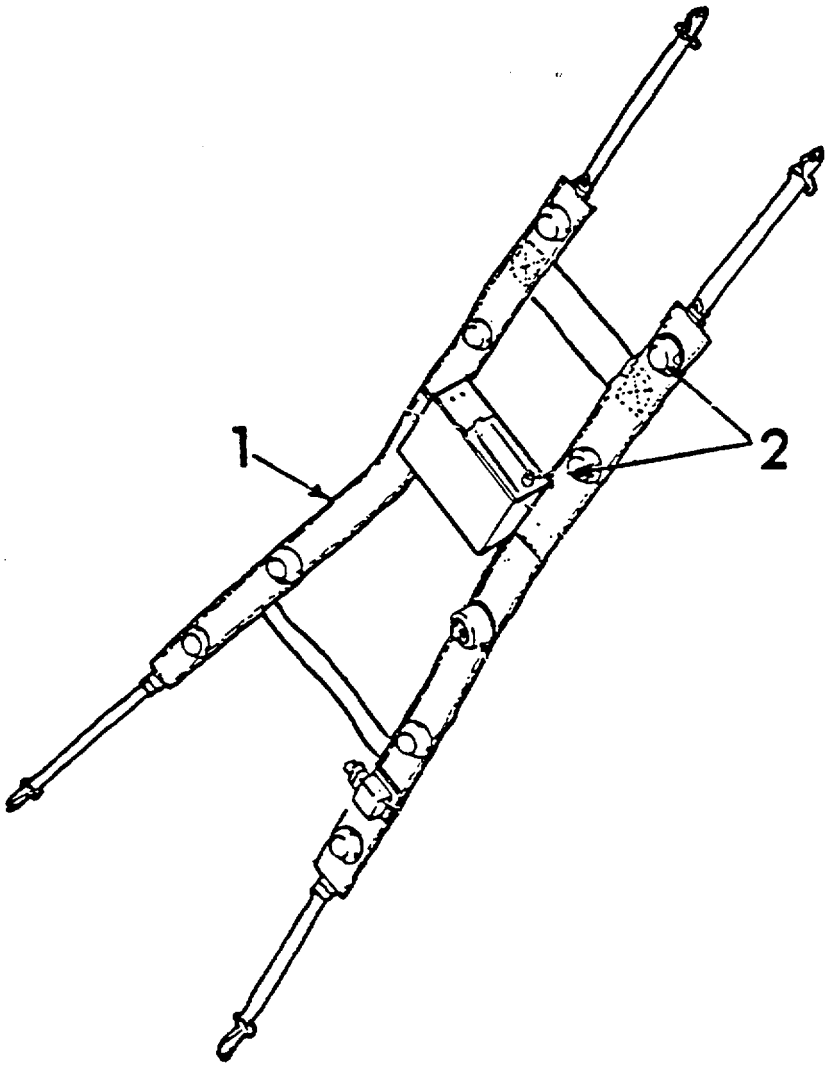
Primer is highly inflammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.

Spray tape primer (item 10, Appendix D) over marked areas where fastener tape will be attached. Allow spray to dry.

Use tape patches (Item 4F, Appendix B) supplied with MILES adapter kit or cut three strips of fastener tape (Item 6, Appendix D) (approximately 2 inches long).

Remove backing paper and firmly press tape patches onto helmet.

MWLD Task 3: Inspect and Clean Torso Harness.

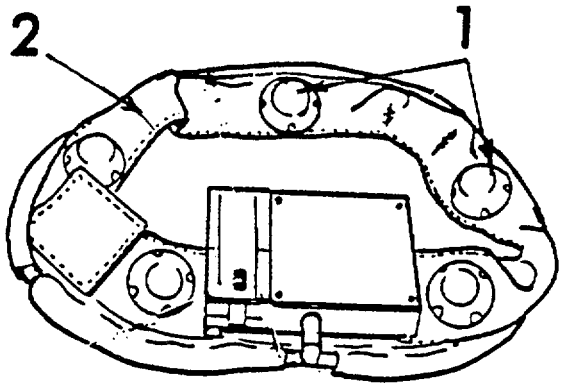


Inspect torso harness (1) for any damage that would prevent normal operation.

Wipe detectors (2) clean. Clean all eight detectors.

Report any damage on DA Form 2404. Replace torso harness if damaged.

MWLD Task 4: Inspect and Clean Helmet Harness.

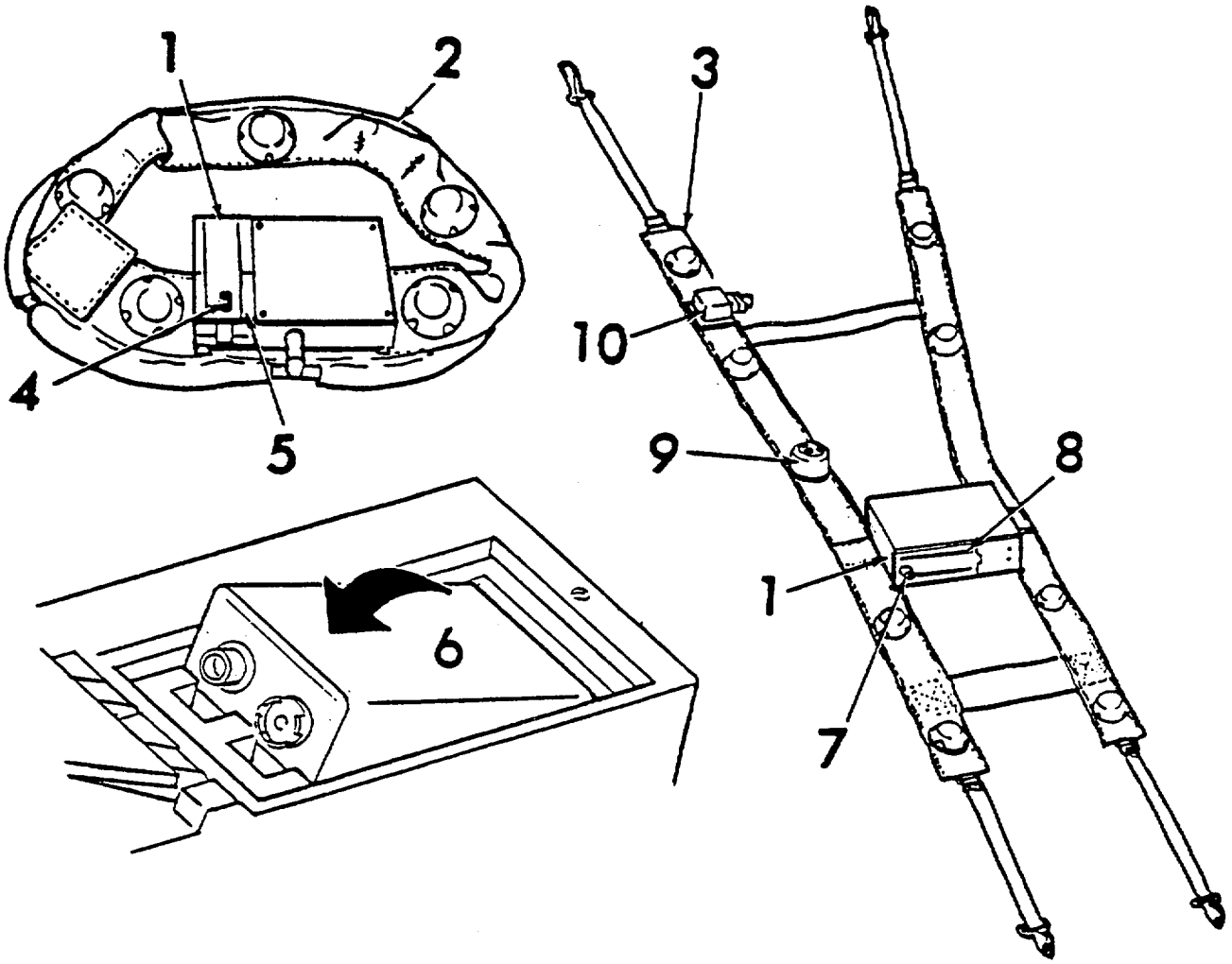


Wipe detectors (1) clean. Clean all five detectors.

Inspect helmet harness (2) for any damage that would prevent normal operation.

Report any damage on DA Form 2404. Replace helmet harness if damaged.

MWLD Task 5: Install Batteries in MWLD Harness.



Check battery boxes for cleanliness and absence of foreign material.

Locate battery boxes (1) on both helmet (2) and torso (3) harnesses.

Put a battery in helmet harness first. Loosen thumbscrew (4) and open door (5) on helmet harness battery box (1). Put in battery (6) as shown. Close door and tighten thumbscrew.

Loosen thumbscrew (7) and open door (8) on torso harness battery box. Put in battery (6) as shown. When you put a battery in torso harness, an alarm (9) should sound. Ask Controller to insert his green key in key receptacle (10) and silence alarm.

NOTE

Be sure to put a battery in both the torso and helmet harnesses.

MWLD Task 6: Put on Torso Harness.

If you are wearing them, remove the suspenders from your web gear.

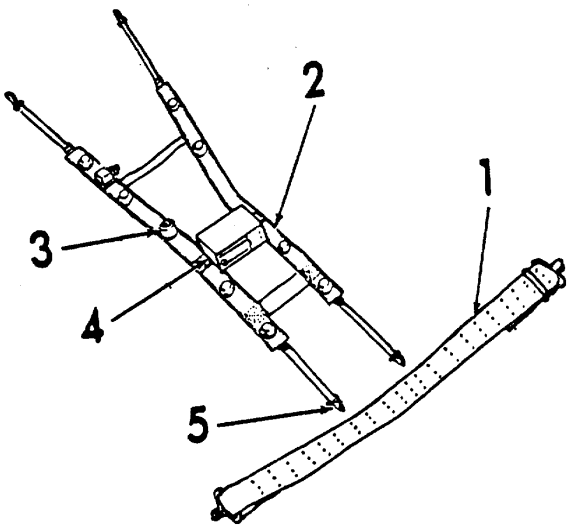
Remove your web belt (1) and lay it next to torso harness (2) as shown.

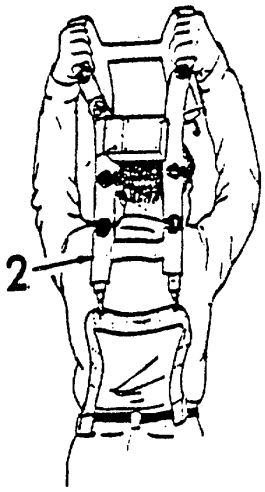
The harness (2) should look like this with the alarm (3) above the electronic module (4).

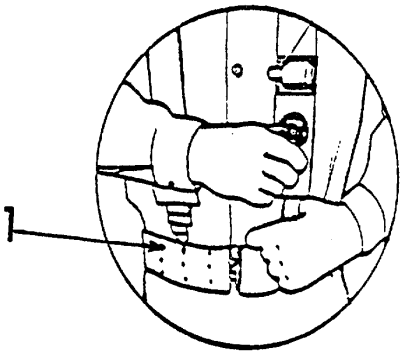
Fasten both clips (5) to the belt.

With your web belt at the bottom raise the harness (2) and then lower it over your head.

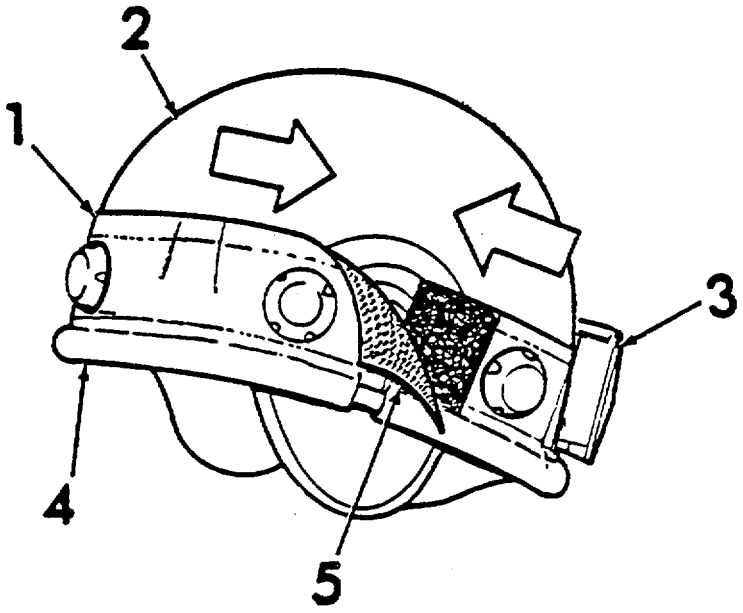
Connect the harness to your web belt (1). Adjust harness so battery box is at the back of your collar, at the collar line.







MWLD Task 7: Put Helmet Harness on Helmet.



NOTE

Your helmet must have three patches of fastener tape installed on the outside. If you do not have any fastener tape on your helmet, turn to MWLD Task 2 for instructions on installing the fastener tape.

Slip harness (1) over helmet (2) so that electronics box (3) is at rear.

Make sure heavy cable (4) overhangs the lip of helmet.

Adjust harness so that three pieces of fastener tape on inside of harness line up with fastener tape pieces attached to outside of your helmet.

Pull harness ends in direction of arrows to tighten harness.

Fasten the fastener tape flap (5) tightly.

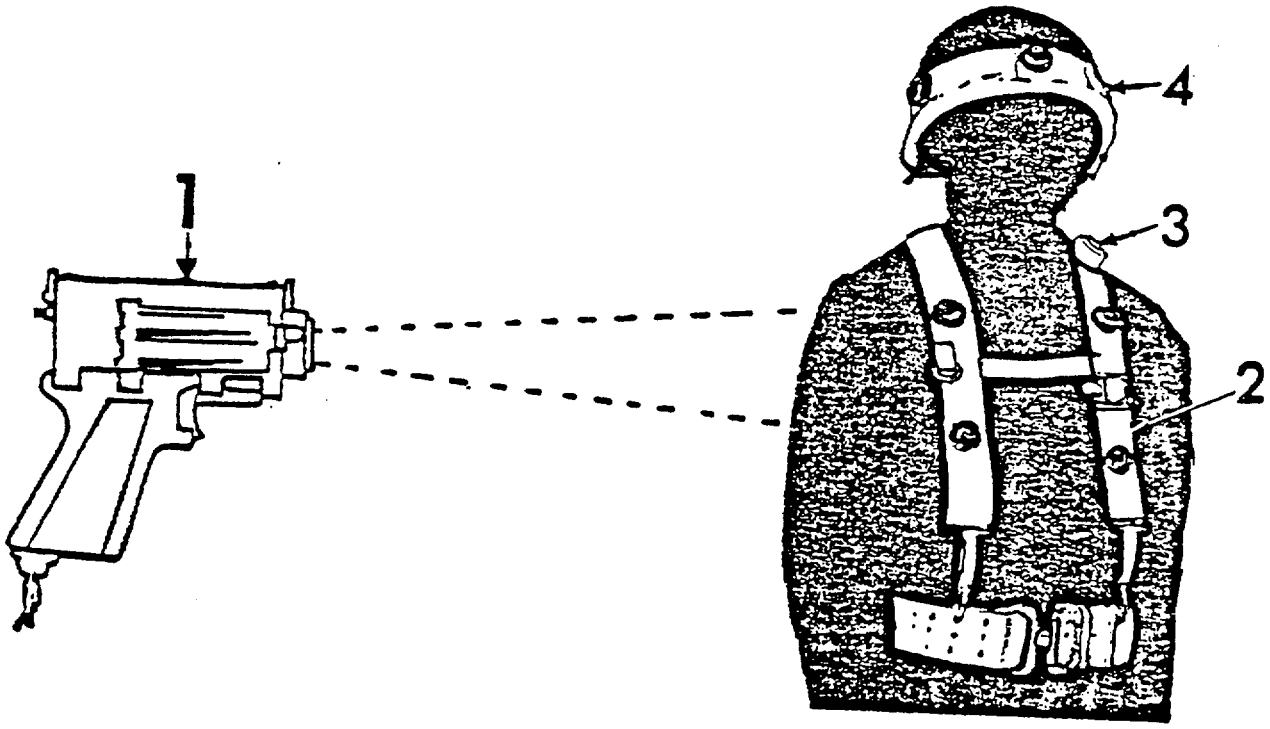
When you wear, your helmet, fasten the chinstrap. Added weight of harness makes this necessary.

TEST TASKS - LIST

NOTE

Perform all tasks in the order given.

Test Task 1: Test Operation of MWLD.



Ask Controller to set his controller gun (1) to "NEAR MISS." Ask him to test your torso harness (2).

When he fires, your alarm (3) should sound briefly.

Ask Controller to test helmet harness (4) for an alarm.

If alarms do not sound, turn to Troubleshooting, pages 3-2 and 3-3.

Test Task 2: Test MILES System. Testing of MILES system consists of the following subtasks:

Test Subtask 2.A: Control Console Test (see page 2-82)

Test Subtask 2-B: Trigger Interface Test (see page 2-84)

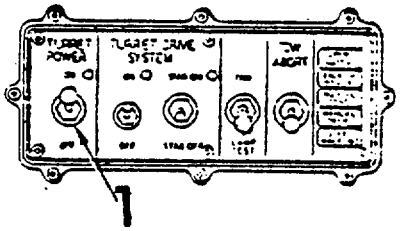
Test Subtask 2-C: Main Gun Transmitter Test (see page 2-86)

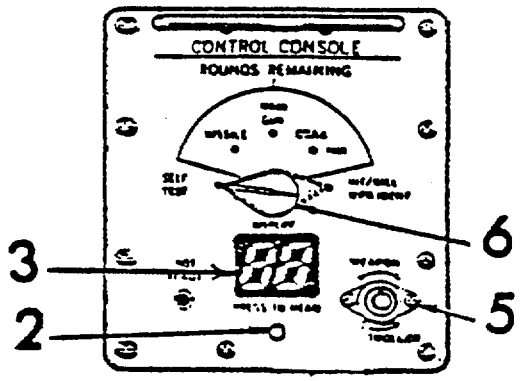
Test Subtask 2-D: Coax Machine Gun Transmitter Test (see page 2-88)

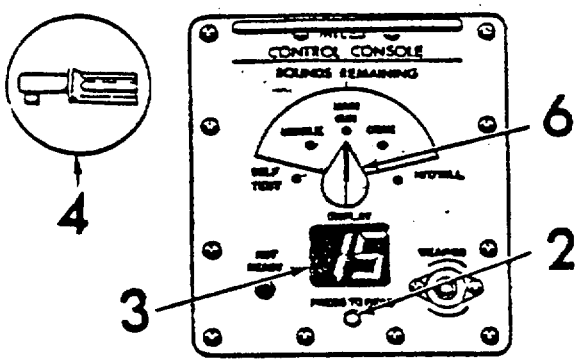
Test Subtask 2-E: TOW Transmitter Test (see page 2-89)

Test Subtask 2-F: Belt Test (see page 2-90)

Test Subtask 2-A: Control Console Test.







NOTE

Before doing this task check with your vehicle commander to make sure all Outside, Inside, MWLD tasks, and Test Task 1 have already been done.

Turn vehicle TURRET POWER switch (1).ON.

Press PRESS TO READ button (2) on control console. Display (3) should show 00.

If display does NOT show 00, go to Troubleshooting, page 3-4.

Ask Controller to reset system by inserting his green key (4) in key receptacle (5) on control console.

Turn counterclockwise to CONTROLLER. Turn back and remove key.

Turn console switch (6) to HIT/KILL. Then turn to SELF-TEST. Press PRESS TO READ pushbutton (2). Display (3) should show 88.

If display does NOT show 88, go to Troubleshooting, page 3-4.

Turn console switch (6) to MAIN GUN. Press PRESS TO READ pushbutton (2). Display (3) should show 15.

If display does NOT show 15, go to Troubleshooting, page 3-4.

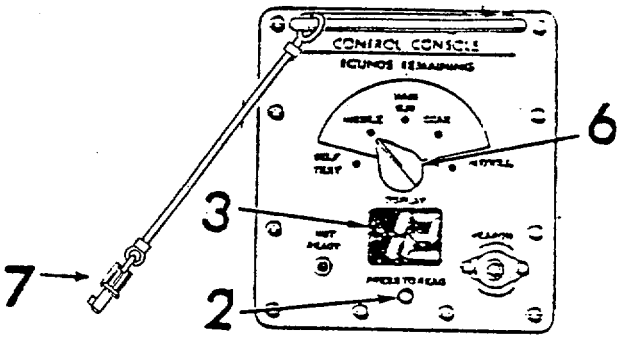
Turn console switch (6) to MISSILE. Press PRESS TO READ button (2). Display (3) should show 12.

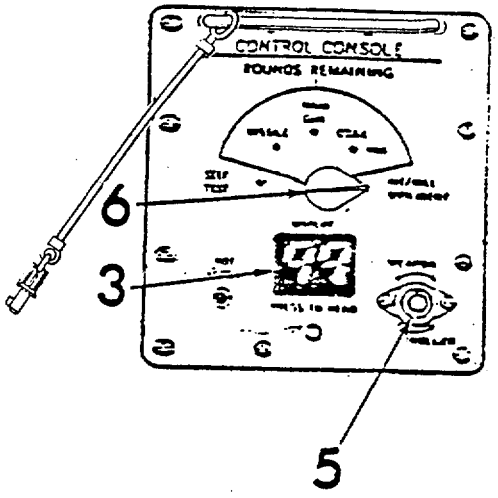
If display does NOT show 12, go to Troubleshooting, page 3-5.

Insert orange weapon key (7) into control console receptacle (5). Turn key clockwise to WEAPON position, then turn key back and remove. Verify that a tone sounds in the vehicle intercom and CVKI light flashes continuously. Turn console switch (6) to HIT/KILL. Verify that display (3) shows 99.

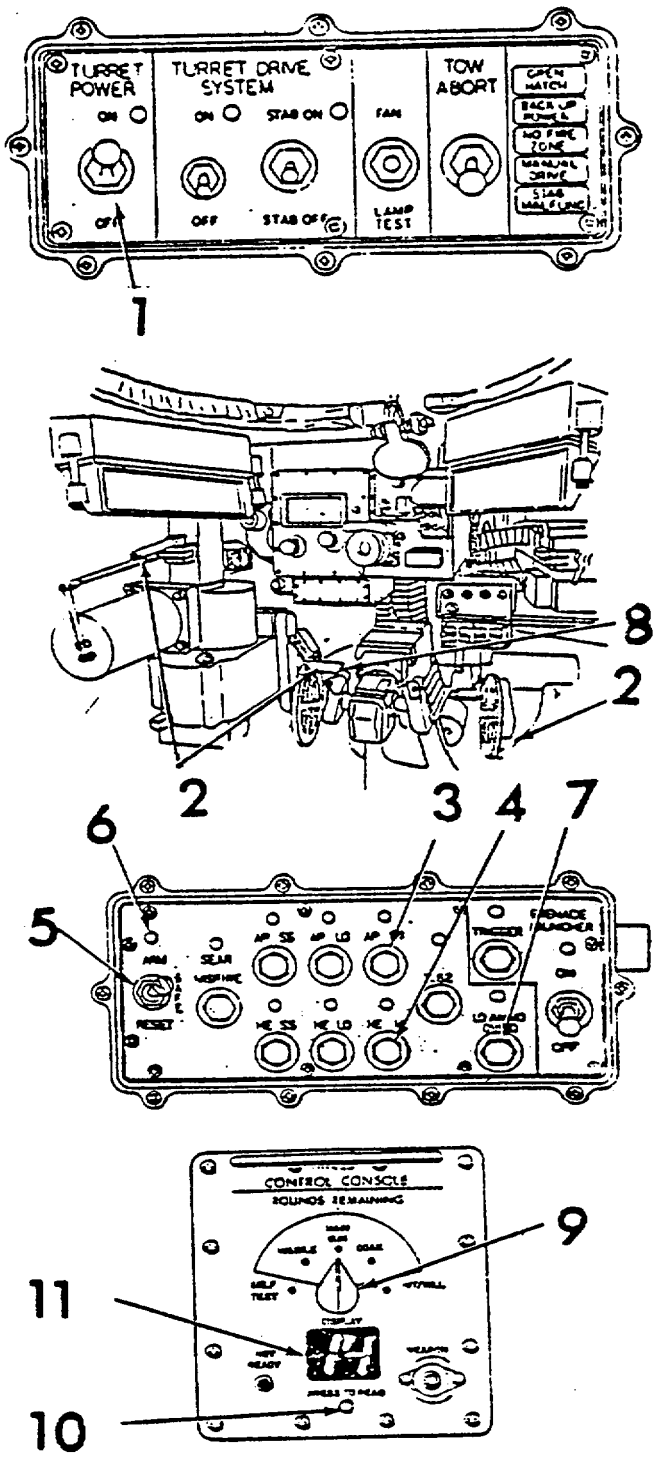
If no intercom tone, the CVKI does not flash or 99 is not displayed, go to Troubleshooting, pages 3-4, 3-7 and 3-8.

Ask Controller to reset control console.





Test Subtask 2-B: Trigger Interface Test.



Turn TURRET POWER switch (1) ON.

Set MANUAL/POWER levers (2) for MANUAL operation of turret.

Select either AP HI (3) or HE HI (4) ammo mode on weapon control box.

Pull out and move ARM-SAFE-RESET button switch (5) to ARM. Check that indicator light (6) comes on.

Push LO AMMO OVRD (7).

Fire 100 rounds (HIGH RATE) using trigger (8) on traverse hand wheel for a minimum of 30 seconds.

Turn console switch (9) to MAIN GUN. Press display button (10). Display (11) should show 14.

if display does NOT show 14, fire gun for an additional 10 seconds. Recheck display. If display still does not show 14, go to Troubleshooting, page 3-5.

Move ARM-SAFE-RESET switch (5) to SAFE.

WARNING

Make sure turret area is clear of personnel if TOW launcher is raised in power mode. Turn TURRET DRIVE SYSTEM to OFF after TOW launcher is up and locked.

Make sure TOW launcher (12) is in FIRE position.

Have Controller set MILES TOW simulator system for dry-fire.

Press TOW system button (13) on TOW control box.

TOW indicator light (14) will come on. TOW TEST light (15) will come on for about 12 seconds.

Move ARM-SAFE-RESET switch (5) on weapon control box to ARM.

Push MISSILE TUBE 1 button (16) on TOW control box. Check that indicator light (17) comes on.

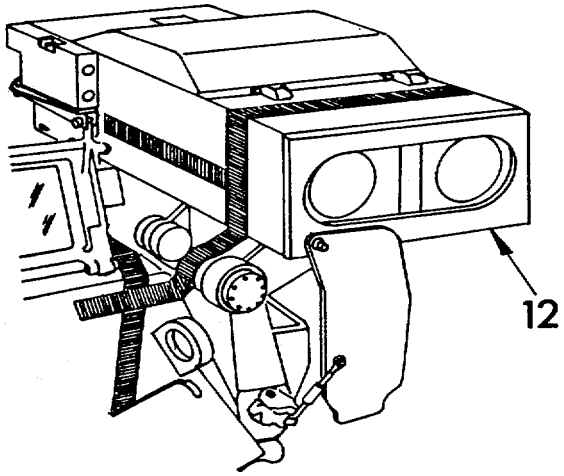
Fire missile. Verify the NOT READY light (18) comes on and stays on for 11 seconds.

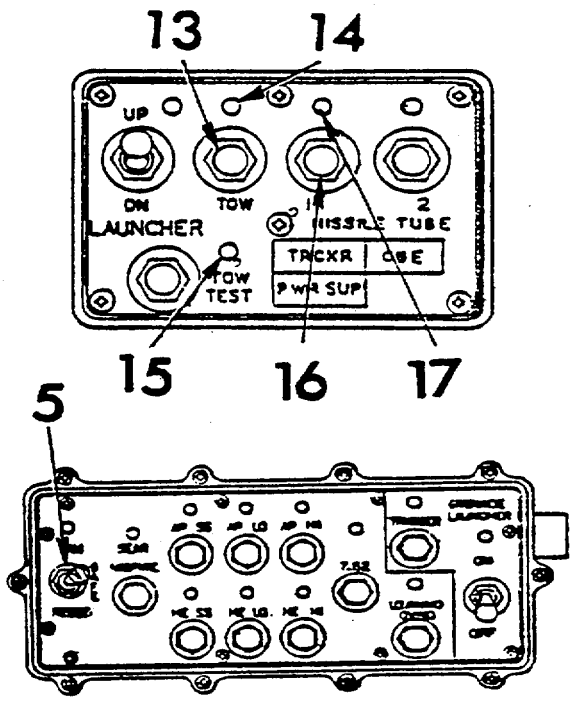
Move ARM-SAFE-RESET switch (5) on weapon control box to RESET and then to SAFE.

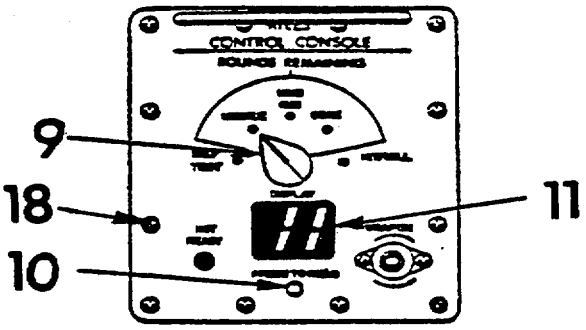
Turn control console switch (9) to MISSILE.

Press display button (10). Display (11) should read 11.

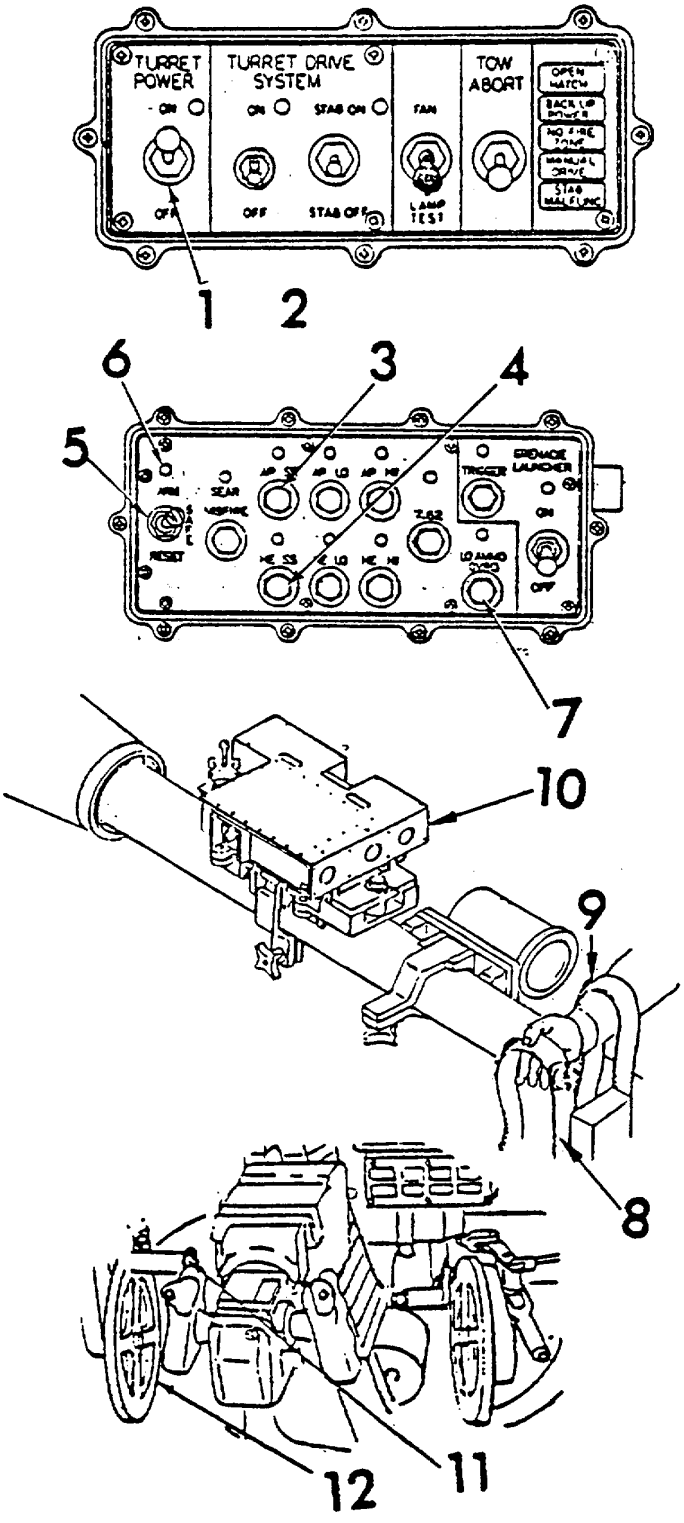
If display does NOT show 11, go to Troubleshooting, page 3-5.







Test Subtask 2-C: Main Gun Transmitter Test.



Have Controller select DRY FIRE mode on 25 mm Laser Transmitter.

WARNING

Sudden turret movement can injure personnel. Make sure TURRET DRIVE SYSTEM switch is OFF when testing transmitters.

Turn TURRET POWER switch (1) ON.

Turn TURRET DRIVE SYSTEM switch (2) to OFF.

Select either AP SS (3) or HE SS (4) Ammo mode on weapon control box.

Pull out and move ARM. SAFE-RESET switch (5) to ARM. Check that indicator light (6) comes on.

Push LO AMMO OVRD switch (7).

NOTE

Make sure torso harness used for test has a battery installed and has been tested for proper operation.

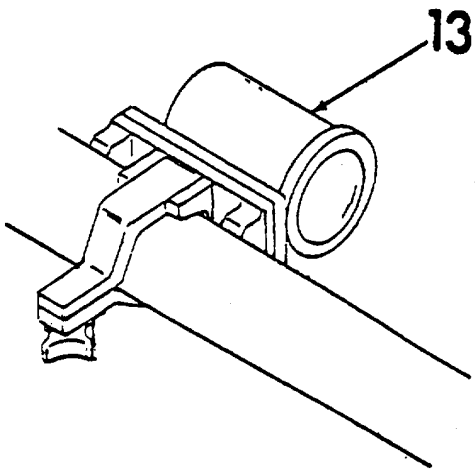
Have a soldier hold a torso harness (8) so that a detector (9) is directly in front of main gun transmitter (10).

Fire main gun using trigger (11) on traverse handwheel (12).

Listen for "KILL" indication from man-worn torso harness alarm.

If no "KILL" indication, go to Troubleshooting, page 3-6.

Ask Controller to reset torso harness.



Have Controller select AWESS mode on 25 mm Transmitter.

Fire main gun using trigger (11) on traverse hand wheel (12).

Verify FLASHWESS (13) flashes.

NOTE

When the laser transmitter is fired, the FLASHWESS lamp will flash approximately 120 flashes per minute.

Test Subtask 2-D: Coax Machine Gun Transmitter Test.

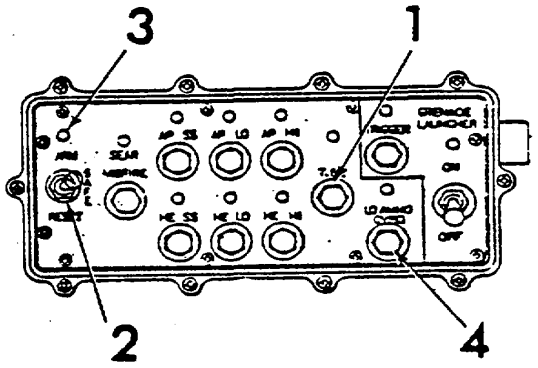
Make sure Coax machine gun is loaded with blank ammunition or dry-fire plug is installed.

Press 7.62 switch (1) on weapon control box.

Pull out and move ARM-SAFE-RESET button switch (2) to ARM. Check that indicator light (3) comes on.

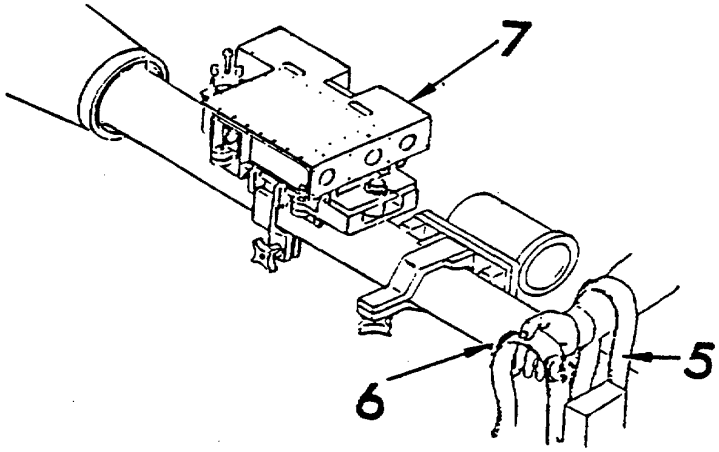
Press LO AMMO OVRD button (4).

Have a soldier hold a man worn torso harness (5) so that a detector (6) is directly in front of main gun transmitter (7). Make sure soldier does not stand in front of Coax machine gun barrel.



WARNING

Sudden turret movement can injure personnel. Make sure TURRET DRIVE SYSTEM switch is OFF when testing transmitters.

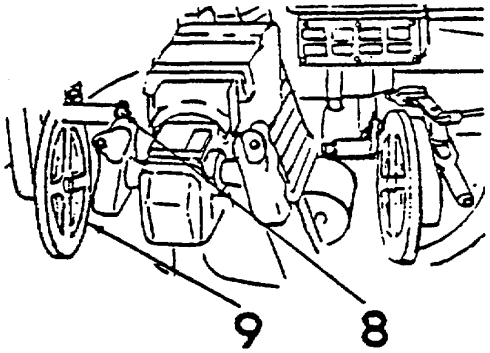


Fire coaxial machine gun using button (8) on traverse handwheel (9).

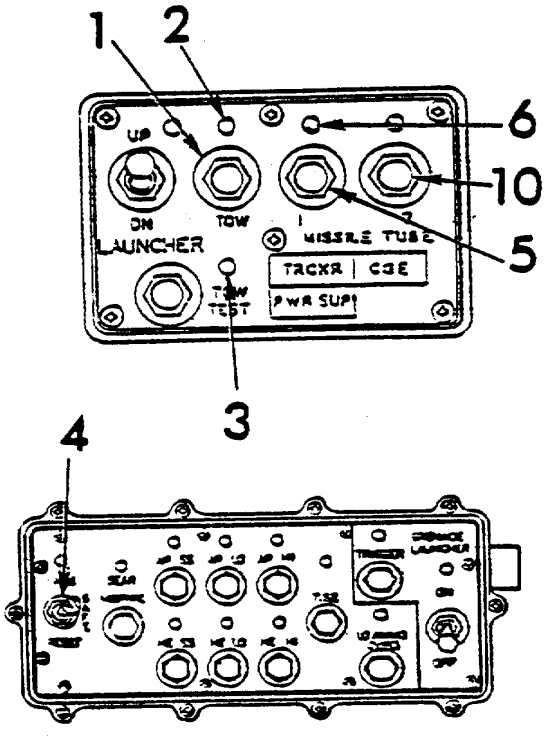
Listen for a "KILL" or "NEAR MISS" indication from torso harness alarm.

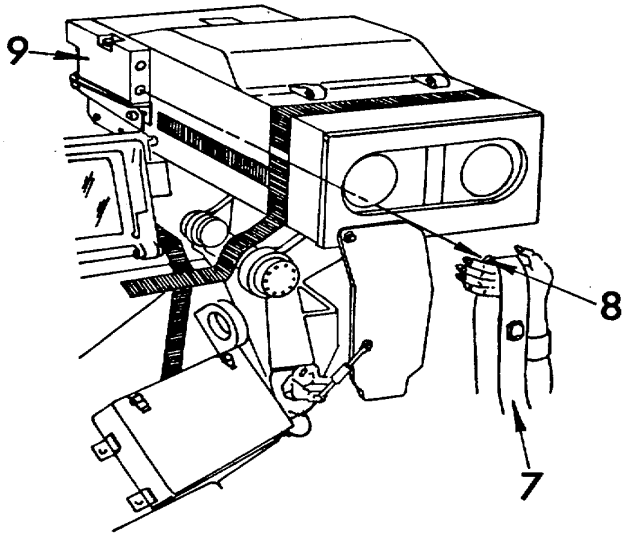
If no "KILL" indication, go to Troubleshooting, page 3-6.

Ask Controller to reset torso harness.



Test Subtask 2-E: TOW Transmitter Test.





Have Controller set MILES TOW simulator for dry-fire.

Press TOW system button (1) on TOW control box.

TOW indicator light (2) will come on. TOW TEST light (3) will come on for about 12 seconds.

Move ARM-SAFE-RESET switch (4) on weapon control box to ARM.

Push MISSILE TUBE 1 button (5) on TOW control box. Check that indicator light (6) comes on.

WARNING

Sudden turret movement can injure personnel. Make sure TURRET DRIVE SYSTEM switch is OFF when testing transmitters.

Have a soldier hold a man-worn torso harness (7) so that a detector (8) is directly in front of TOW transmitter (9).

Fire TOW missile. Continue holding torso harness in front of transmitter for at least 11 seconds.

Listen for a "KILL" indication from torso harness alarm.

Push MISSILE TUBE 2 button (10) and repeat test procedures.

Deactivate TOW by moving ARM-SAFE-RESET switch (4) on weapon control box to RESET and then to SAFE.

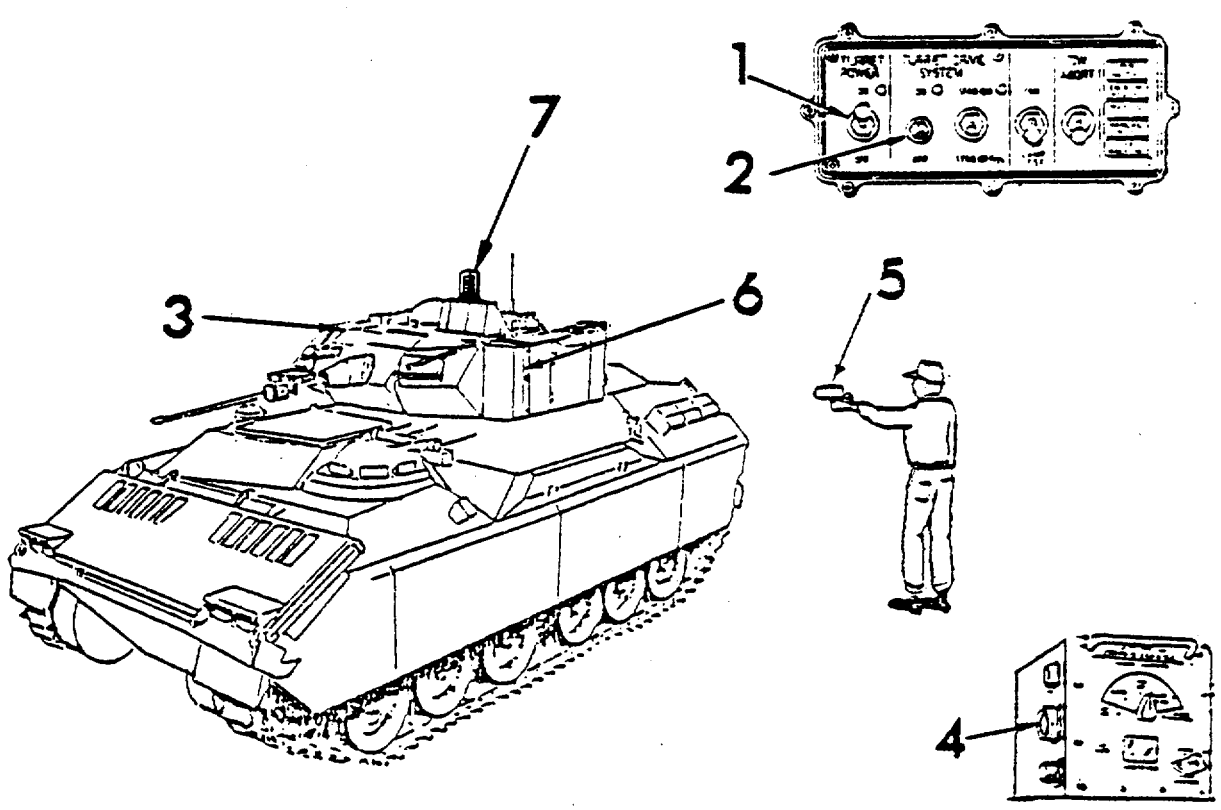
NOTE

You must hold torso harness in front of laser transmitter for a full 11 seconds or alarm will not sound.

If no "KILL" indication, go to Troubleshooting,, page 3-7.

Ask Controller to reset torso harness.

Test Subtask 2-F: Belt Test.



Make sure TURRET POWER switch (1) is ON and TURRET DRIVE SYSTEM switch (2) is OFF.

Check that all cable connections (3) to detector belt segments are tight. Ask a crewmate to check that CVKI cable connections (4) to control console are tight.

Ask Controller to test your belt segments by setting his controller gun (5) on "NEAR MISS," and firing at each detector (6) from a distance of 3 to 10 feet.

Each time he fires the CVKI light (7) should flash. If the CVKI fails to flash for some or all of the detectors, go to Troubleshooting, page 3-8.

NOTE

It is OK for one detector on each belt segment to be bad.

ALIGNMENT TASKS - LIST

NOTE

EXTREME CARE must be used during alignment procedures.

Even a slight error will severely affect your firing accuracy.

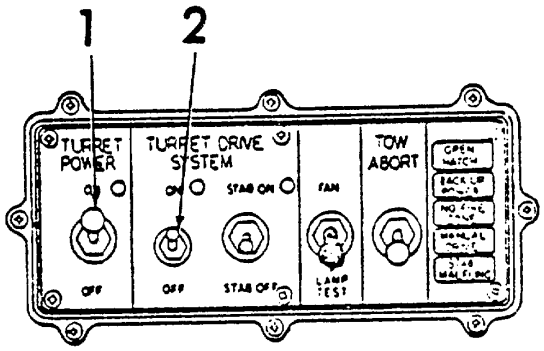
Alignment Tasks 1: Align TOW Laser Transmitter.

Turn TURRET POWER switch (1) ON.

WARNING

Accidental turret movement may cause personnel injuries and errors in MILES alignment.

Make sure TURRET DRIVE SYSTEM is OFF.

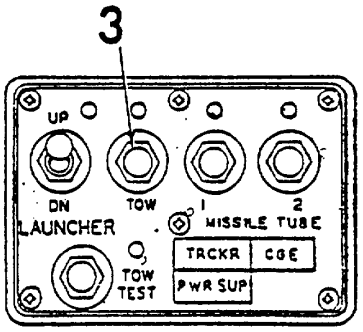


Turn TURRET DRIVE SYSTEM switch (2) ON.

Elevate TOW launcher using normal vehicle procedures.

Turn TURRET DRIVE SYSTEM (2) switch OFF.

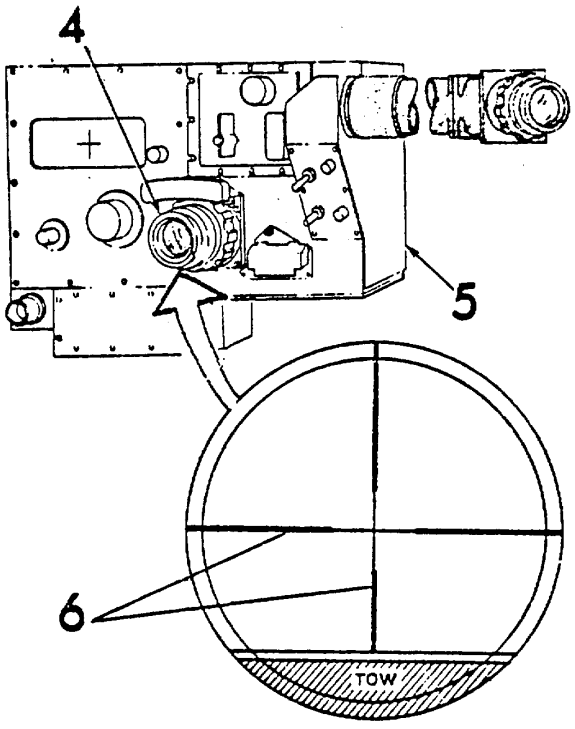
Press TOW system button (3) on TOW control box.

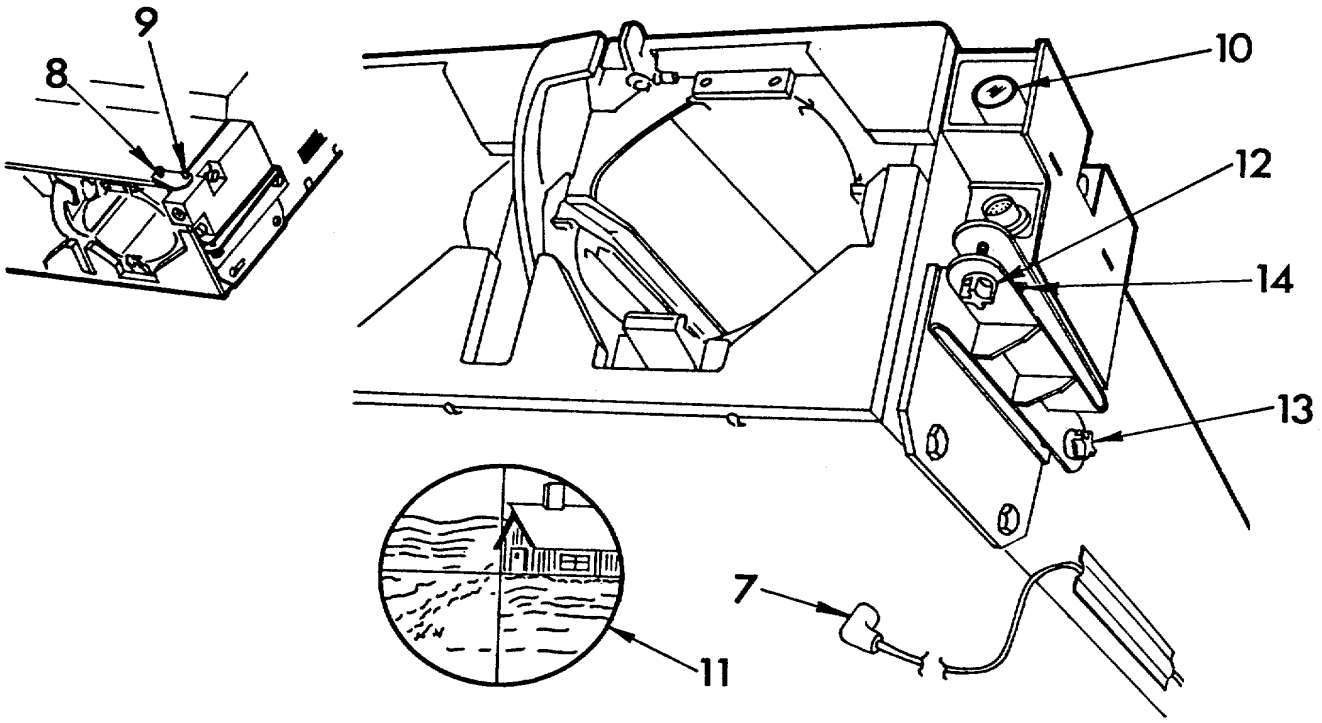


Select a target that is 2600 to 2500 meters distant.

Look through gunner's eye piece (4) on integrated sight unit (5).

Use normal vehicle procedures (see TM 9-2350-252-10) and manual controls to center TOW reticle crosshairs (6) on target.





Disconnect TOW transmitter cable connector (7).

Slightly loosen retainer screw (8) so that transmitter movement does not put a strain on retaining pin (9). Use adjustable wrench from vehicle tool kit.

Elevate TOW launcher and, using gunner's eyepiece on integrated sight unit, center launcher on a target between 2,000 and 2,500 meters away.

Look through transmitter's boresighting telescope (10).

While observing crosshair (11) in boresighting scope (10), rotate elevation adjustment knob (12) to move the transmitter in the vertical axis until the crosshair (11) is aligned vertically on the same target as the vehicle integrated sight unit.

Rotate the azimuth adjustment knob (13) to move the transmitter in the horizontal axis until the crosshair (11) is aligned horizontally on the same target as the vehicle integrated sight unit.

NOTE

If azimuth adjustment knob (13) does not permit accurate alignment, loosen transmitter mounting bolt (14) and rotate transmitter on slotted hole, tighten bolt and make final fine adjustment with adjustment knob (13).

Look through boresighting telescope and integrated sight unit eyepiece to check boresight accuracy.
Tighten retainer screw (8).

NOTE

Alignment of laser transmitter boresighting scope and vehicle sight unit must be exact or severe inaccuracy will result when firing MILES equipment. Excessive tightening of adjustment or pivot screws may cause screws to break or screw threads to strip.

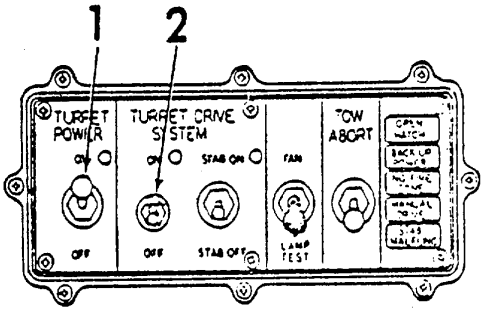
Repeat procedures if necessary to assure boresight accuracy.
Reconnect TOW transmitter cable connector (7).

Alignment Procedures 2: Align Main Gun/Coax Machine Gun Laser Transmitter.

WARNING

Accidental turret movement may cause personnel injuries and errors in MILES alignment.

Make sure TURRET DRIVE SYSTEM is OFF.



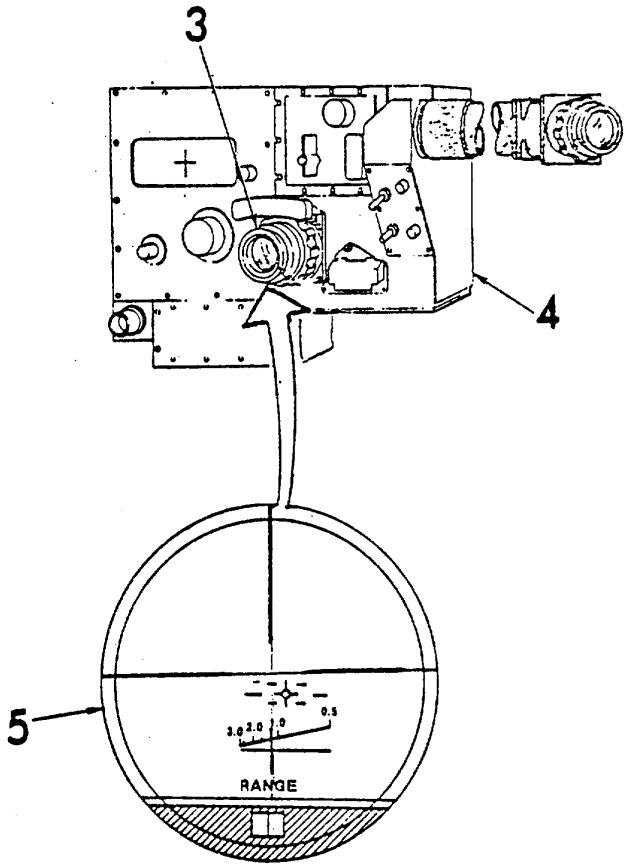
Turn TURRET POWER switch (1) ON.

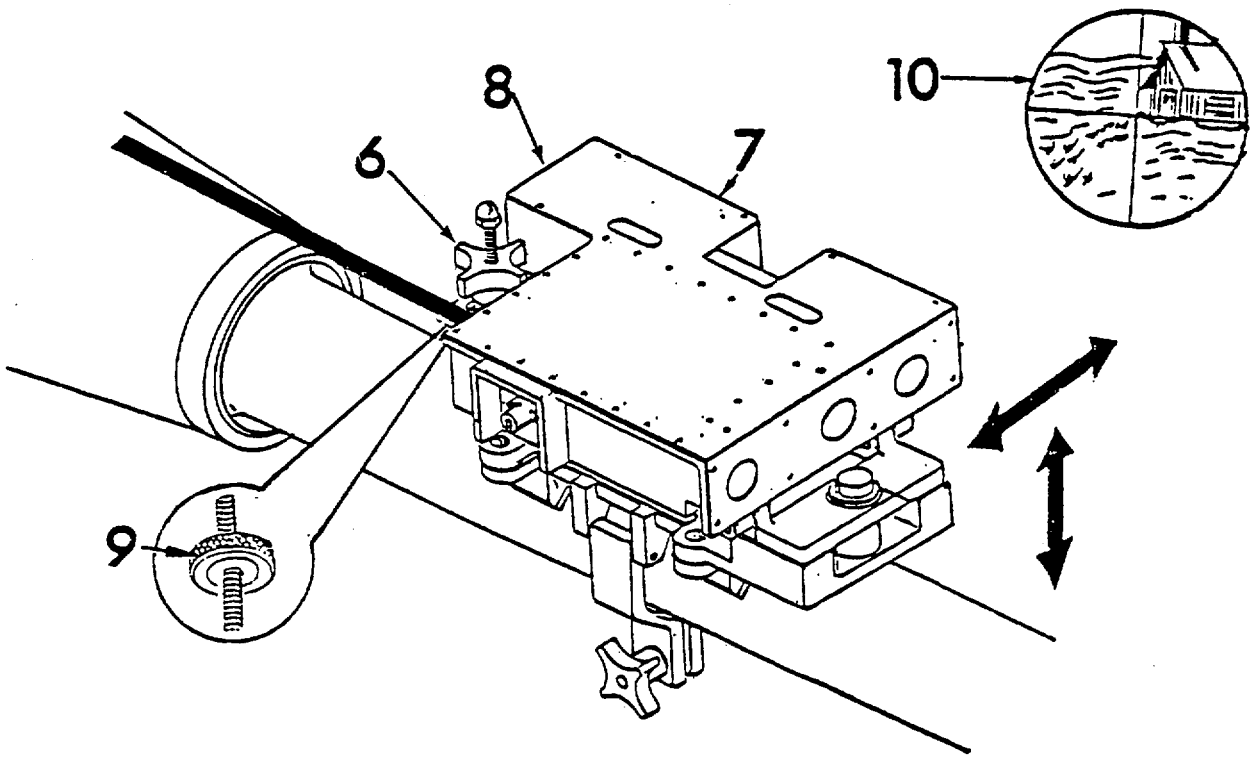
Turn TURRET DRIVE SYSTEM (2) switch OFF.

Select a target 2000 to 2500 meters distant.

Look through gunner's eye piece (3) on integrated sight unit (4).

Use normal vehicle procedures (see TM 9-2350-252-10) and manual controls to center 25 mm gun reticle crosshairs (5) on target.





Slightly loosen adjusting knob (6) on 25 mm/Coax Machine Gun laser transmitter (7).

Look through transmitter's boresighting telescope (8). Adjust elevation by turning knurled elevation screw (9). Adjust azimuth by pushing transmitter to left or right, as required. Adjust elevation and azimuth until crosshairs in transmitter telescope (10) are aligned on same target as vehicle sight unit.

Tighten adjustment knob (6).

Look through telescope and recheck boresight accuracy.

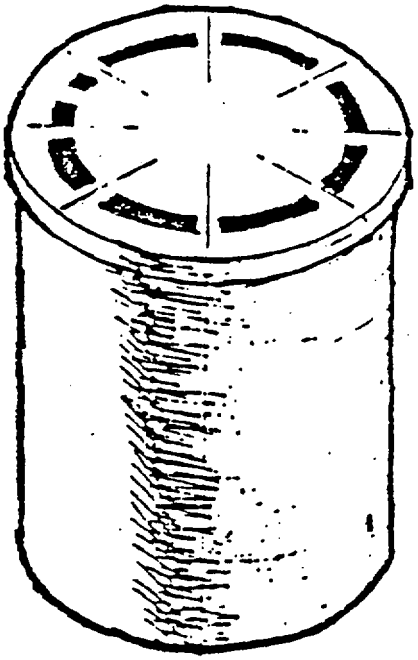
Repeat procedures, if necessary, to assure boresight accuracy. Alignment of laser transmitter scope and vehicle sight unit MUST be exact or severe inaccuracy will result when firing MILES equipment.

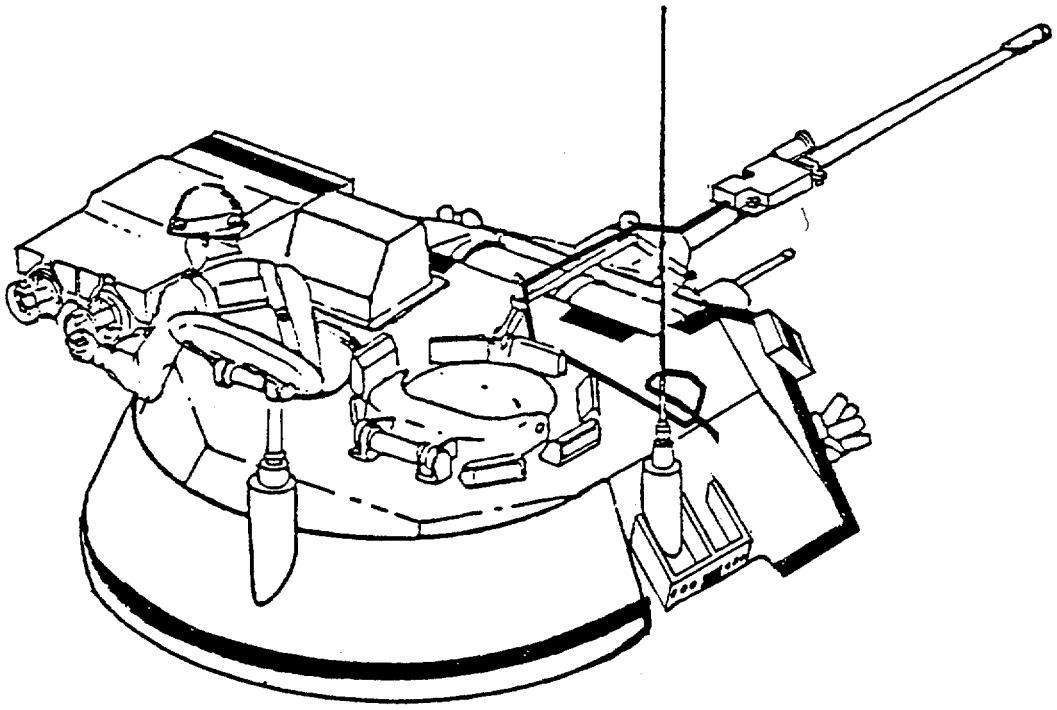
OPERATIONAL TASKS - LIST

Operational Task 1: Install ATWESS Cartridges in TOW Simulator.

WARNING

Treat ATWESS cartridges as you would live ammunition. A strong shock may set off the ATWESS cartridge.





WARNING

Never stand behind TOW simulator when arming it or loading ATWESS cartridges.

Do not do this task until you are ready to fire.

Do not load the TOW simulator from the cargo hatch. ATWESS misfire could injure personnel inside vehicle.

Load from Gunner's station hatch by reaching around from simulator side. Always load outboard TOW simulator tube first. Accidental ATWESS firing could injure Loader.

Operational Task 1: Install ATWESS Cartridges in TOW Simulator (Cont).

NOTE

Two ATWESS cartridges are required: one for each TOW simulator tube.

Push SAFE/ARM levers (1) to SAFE position.

Move breech lock levers (2) in counterclockwise direction to open position .

Open breech doors (3) as far as they go. This cocks the ATWESS. Visually check to see if the firing pins are protruding. If unsure, use one hand to feel if each firing pin has retracted to its full length. If a firing pin is protruding, or has not retracted to its full length, tag the simulator as unsafe, and return it to the point of issue .

Insert an ATWESS cartridge (4) in each TOW simulator. Load outside simulator first.

WARNING

Failure to follow these instructions could result in personnel being burned by the backblast escaping through the hole in the center of the breech door.

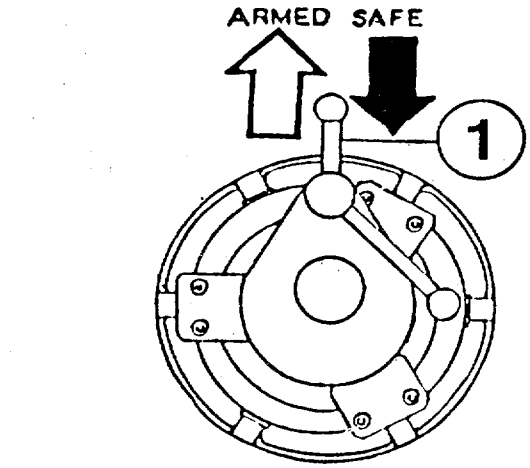
Stand in gunner's station position, using left hand, close breech door and move breech lock lever to closed position.

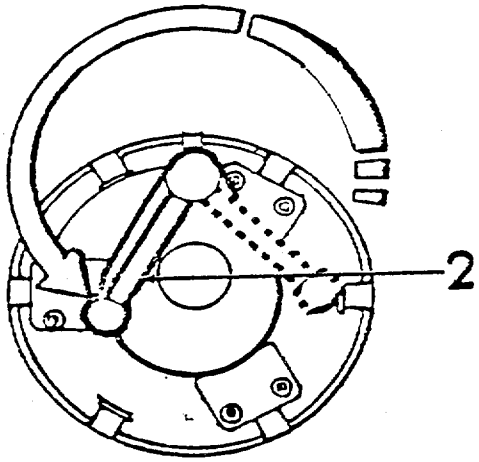
Pull SAFE/ARM levers (1) to ARMED position.

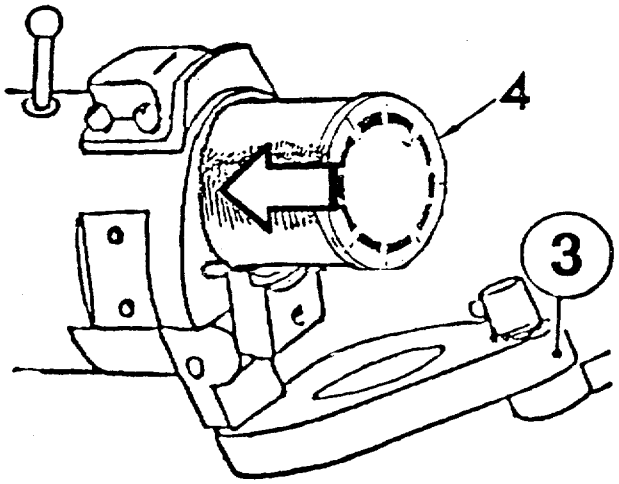
NOTE

If you decide not to fire, push SAFE/ ARM lever to SAFE position. Then open breech door and remove cartridges.

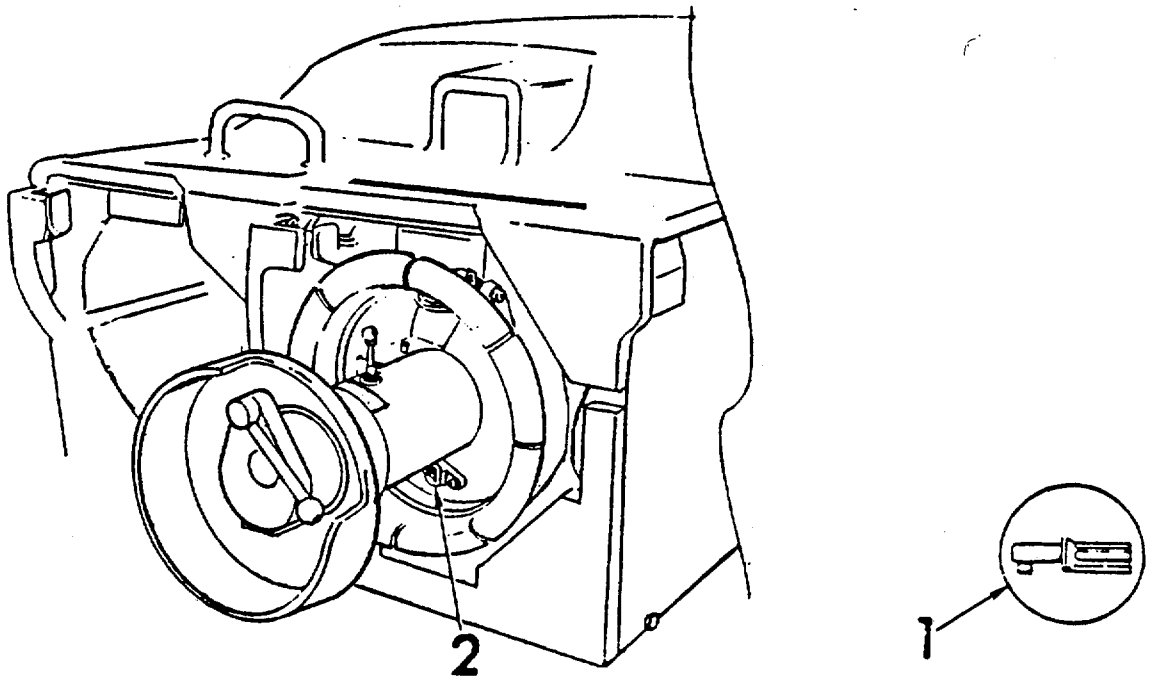
The ATWESS cartridge box will be closed and secured with Adhesive Tape (Item 9, Appendix D), or Fastener Tape (Item 6, Appendix D), BESIDE the Radio and directly BEHIND the Gunner's position.







Operational Task 2: Fire TOW Simulator.



Have Controller use green key (1) in TOW receptacle (2) to set simulator for ATWESS fire.

Aim TOW at target.

Fire TOW using normal vehicle firing procedures (see TM 9-2350-252-10). ATWESS cartridge will fire.

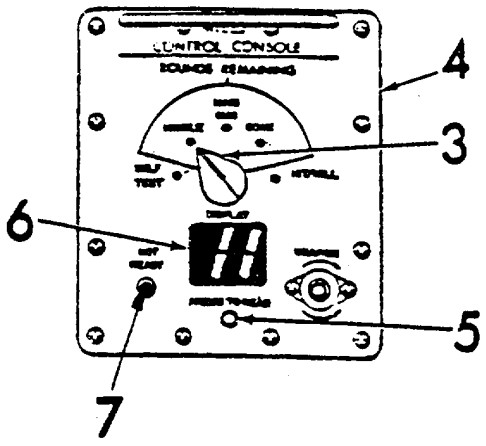
Track your target and count off 11 seconds. Laser starts to transmit 1 second after firing and continues to transmit for 10 seconds.

To see rounds remaining, turn switch (3) on control console (4) to MISSILE. Press PRESS TO READ button (5).

Rounds remaining will be displayed in window (6).

NOTE

To be sure of a "HIT" with a probability of a "KILL," you must track your target for a full 11 seconds. The last few seconds of tracking are the most important.



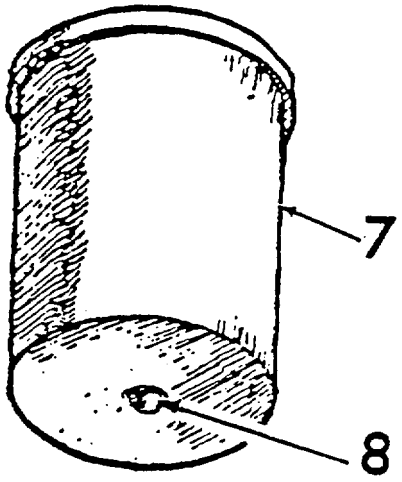
After firing one TOW missile, the second TOW missile is ready for firing as soon as the NOT READY light (7) goes off. If a second TOW missile is fired before the first 10-second track sequence is completed, the first sequence will be aborted (missile lost) and the second track sequence will commence.

Operational Task 2: Fire TOW Simulator (Cont).

IF ATWESS CARTRIDGE DOES NOT FIRE:

- Place ATWESS safety lever in SAFE position.
- Remove ATWESS cartridge (7) from ATWESS.

Inspect the cartridge primer (8). If dented, treat the cartridge as a DUD. REPORT THE DUD CARTRIDGE TO YOUR NCOIC FOR DISPOSAL.

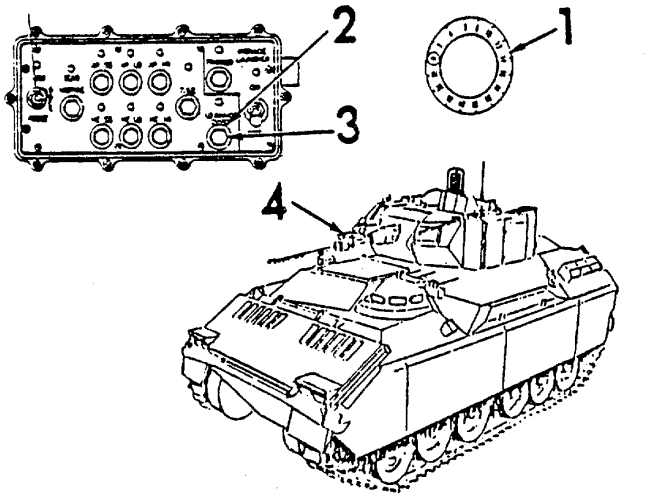


WARNING

Observe 10-second delay after first arming.

- Reload ATWESS cartridge, repeat firing sequence. If ATWESS does not fire, report on DA Form 2402 and replace the defective equipment.

Operational Task 3: Fire Main Gun or Coax M240C Machine Gun.



Both 25 mm main gun and Coax machine gun are fired using normal vehicle weapon firing procedures (see TM 9-2350-252-10).

Gunner leaves range knob (1) at same direction used during boresighting.

LO AMMO OVRD annunciator (2) on weapon control box will flash each time the 25 mm gun is to be fired. Push LO AMMO OVRD (3) each time the main gun is selected.

When firing the Coax machine gun in the dry-fire mode, the LO AMMO OVRD annunciator (2) on weapon control box will flash. Push LO AMMO OVRD (3) each time the Coax machine gun is selected.

The Coax machine gun transmitter (4) operates when blank ammunition is being fired. Transmitter will not operate when blank ammunition is gone.

NOTE

Make sure Alignment Task 1 procedures have been completed before attempting to fire.

If you wish to see how many rounds are left in your weapons:

Set control console switch (5) to weapon of interest (main gun, Coax machine gun or missile).

Press and hold PRESS TO READ button (6).

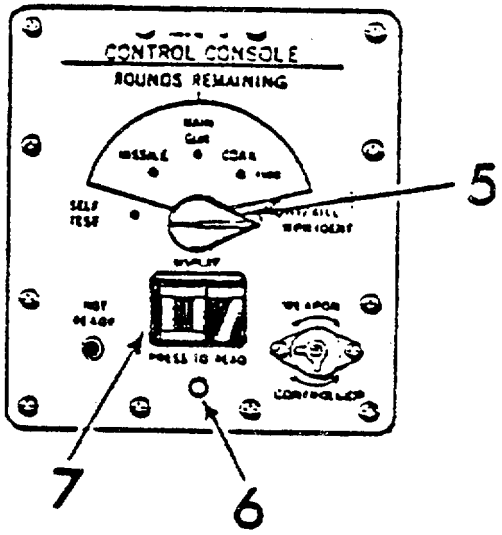
Read display (7) for rounds remaining.

If display shows 00, you have no rounds left.

The number of main gun and Coax machine gun rounds remaining is 100 times the number displayed.

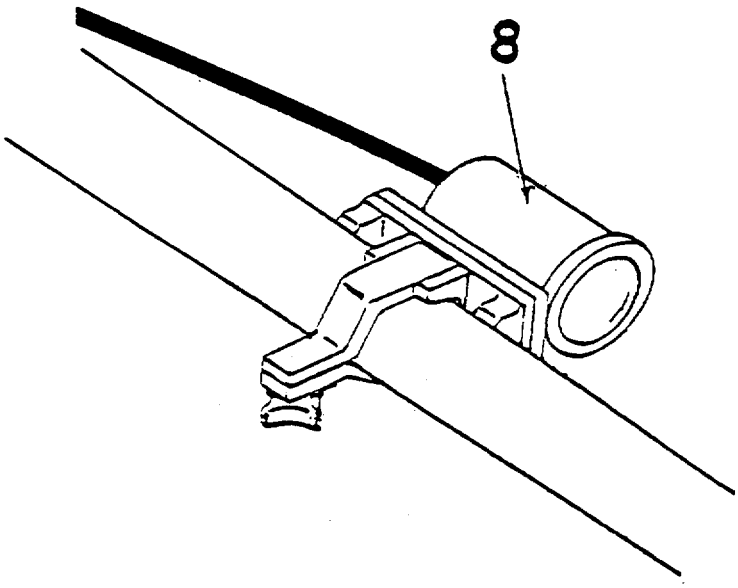
Rounds count will not decrease when firing Coax machine gun in blank fire mode.

The number of missiles rounds remaining is as displayed.

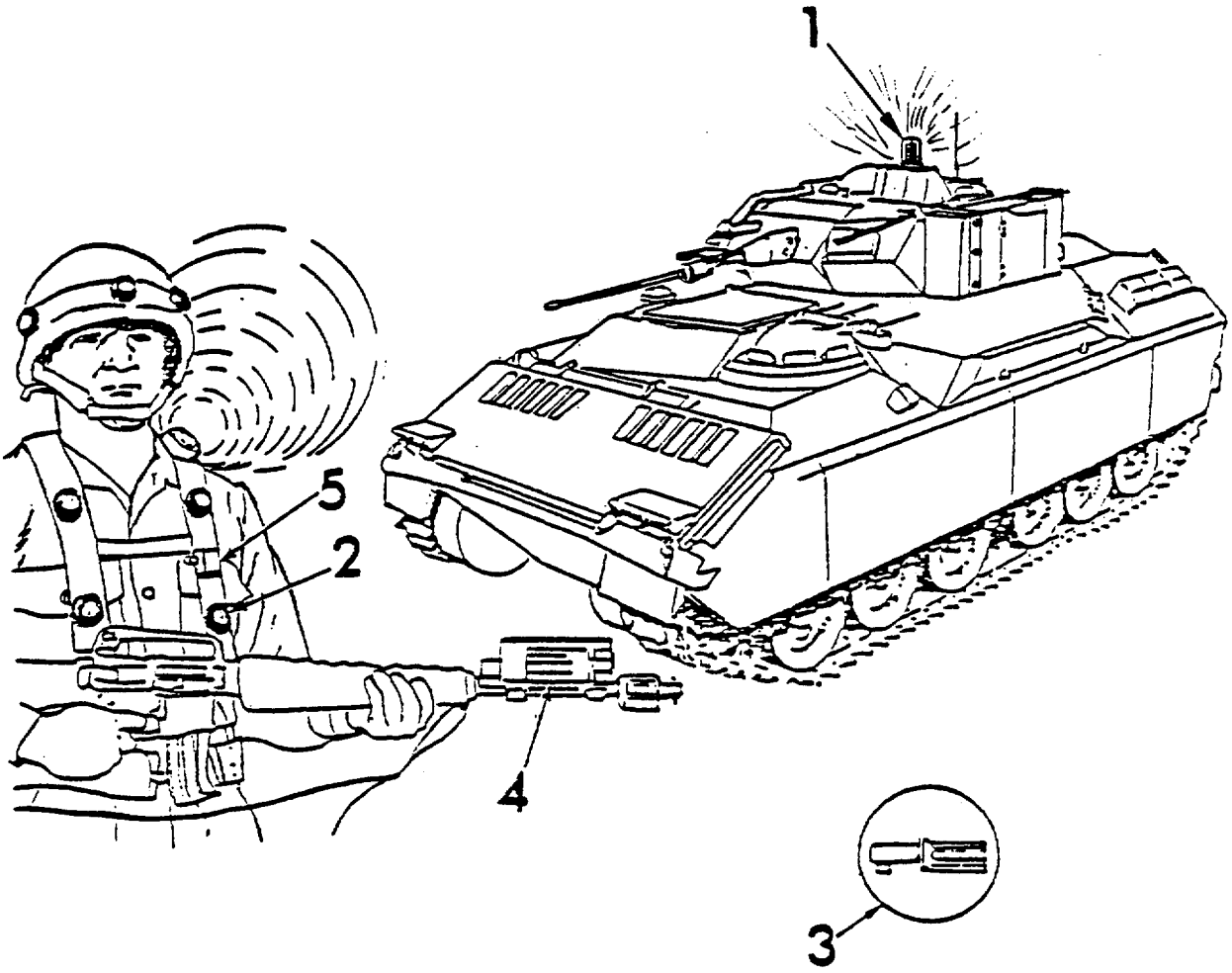


Operational Task 3: Fire Main Gun or Coax M240C Machine Gun (Cont).

The Flashwess lamp (8) will flash approximately 120 times per minute when the main gun laser transmitter is fired in the AWESS mode.



Operational Task 4: Observe Your Target.



The effect of your MILES-equipped weapon fire can be evaluated by observing your target during training exercise.

If detectors are hit by laser fire, alarms on vehicle CVKIs (1) will flash and personnel MWLD (2) will sound. Usually, you will not be close enough to hear the alarms.

If a vehicle is "KILLED," CVKI light flashes continually.

If a vehicle is "HIT" but not "KILLED," CVKI light flashes four to six times.

If a vehicle is "NEAR MISSED," CVKI light flashes twice.

If you "KILL" personnel, soldiers remove yellow keys (3) from M16 laser transmitters (4) and insert in their MWLD receptacles (5) to turn off buzzers.

Operational Task 5: Recognizing Enemy Fire.

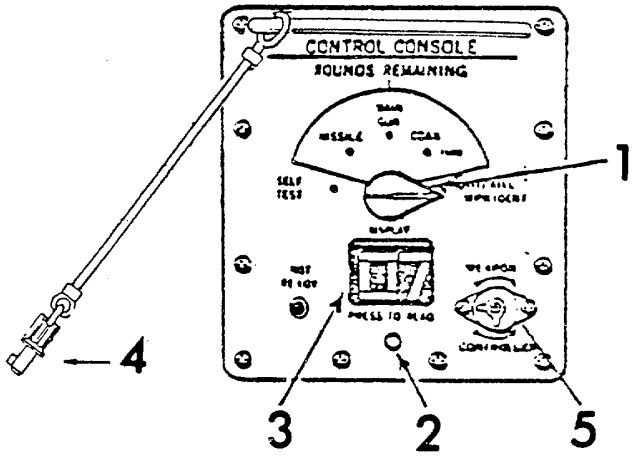
If you are hit by laser fire, CVKI light will flash. You will also hear tones on the intercom unit. A brief alarm (two CVKI flashes and two intercom beeps) means a "NEAR MISS." Repeated four to six intercom tones and four to six CVKI flashes mean a "HIT." Continuous CVKI flashing and INTERCOM TONE indicates a "KILL."

To determine what kind of weapon has fired on you, turn the switch (1) on the control console to HIT/KILL position. Weapon identification codes are not registered for "NEAR MISS" responses.

Press PRESS TO READ button (2).

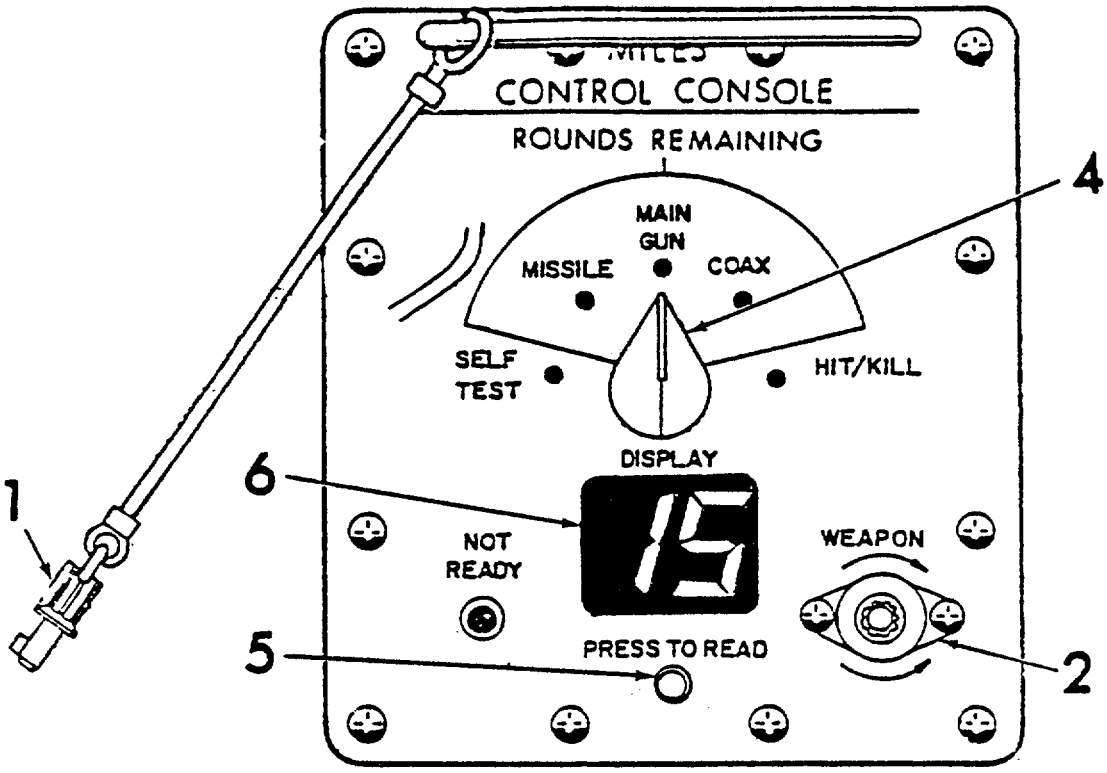
The display (3) will show a number. Use the chart below to match number on display with type of weapon firing on you.

Display Number	Weapon
00	Controller Gun
07	TOW or Shillelagh
08	DRAGON
12	105 mm
13	152 mm
14	2.75-inch Rocket
15	VIPER
16	120 mm
22	25 mm
23	VULCAN
99	Self-kill



"SELF-KILL" results when orange weapon key (4) is put in the control console receptacle (5) when you have not been "KILLED" by the laser fire. When the key is inserted and turned clockwise to WEAPON position, the number 99 will show, and the CVKI light will flash continuously. When key is removed, a continuous tone will be inserted in the intercom. You must then call the Controller to reset your system.

Operational Task 6: Reset After a "KILL."



If your vehicle is "KILLED," the main gun, Coax machine gun and TOW weapon transmitters are automatically turned OFF.

To silence your intercom alarm after a "KILL" use the orange weapon key (1) attached to the control console.

Insert the orange weapon key in the control console receptacle (2) and turn off the intercom alarm.

NOTE

If you remove key from receptacle, the alarm will begin again.

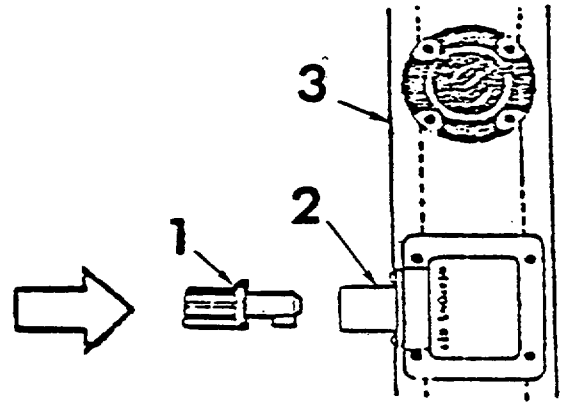
The CVKI light (3) continues to flash. It can be turned off only by the Controller.

To reset: Remove orange weapon key. Alarm will sound. Ask the Controller to turn off your intercom alarm and CVKI light. This resets control console.

Turn control console switch (4) to MAIN GUN. Press the display button (5). Display (6) should show 15. If no 15, turn to Troubleshooting, page 3-4.

The Controller will determine when to reset your system.

Operational Task 7: Turn Off and Reset MWLD Alarm.



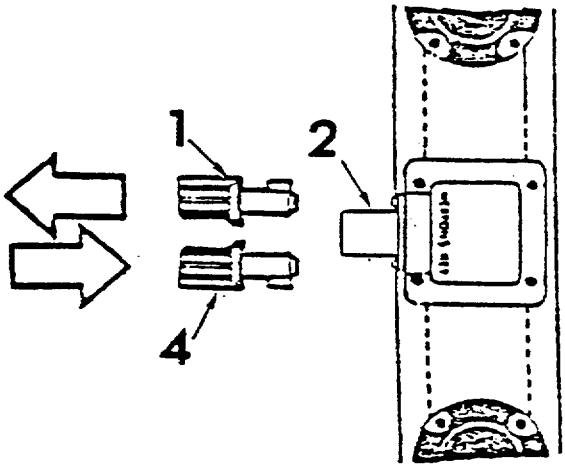
NOTE

Three yellow weapon keys are provided in the vehicle transit case. The Gunner, Driver, and vehicle Commander must each take a key and keep it on their person in an accessible place.

To turn off alarm:

Insert yellow weapon key (1) in receptacle (2) on torso harness (3).

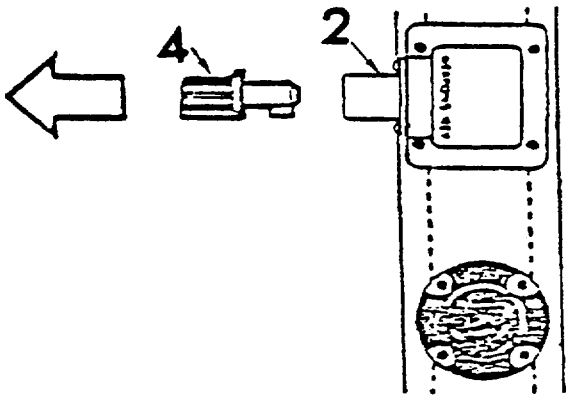
Turn off alarm.



To reset alarm, you must call the Cont roller.

Remove yellow weapon key (1) from receptacle (2). Alarm will sound.

Ask Controller to put green controller key (4) in receptacle (2) and turn off alarm.



Ask Controller to remove green controller key (4). Alarm is reset.

POSTOPERATIONAL TASKS - LIST

NOTE

If you need additional information on completing a Postoperational task, turn to referenced section. To complete Postoperational Task, perform referenced section procedure in reverse order.

Postoperational Task 1: ATWESS Postoperational Task.

Remove any unfired ATWESS cartridges. See Operational Task 1.

Postoperational Task 2: MWLD Postoperational Tasks.

Remove MWLD Harnesses. See MWLD Tasks 5, 6, and 7.

Remove batteries from MWLD harnesses and close battery doors. See MWLD Task 5.

Inspect and service the MWLD. See MWLD Tasks 3 and 4.

Postoperational Task 3: Inside Postoperational Tasks.

Remove and inspect MILES inside cables. See Inside Installation Tasks 8 and 11 (pages 2-61 and 2-66).

Remove battery box. Remove batteries from battery box and inspect battery box. See Inside Installation Tasks 4 and 5 (pages 2-58 and 2-59).

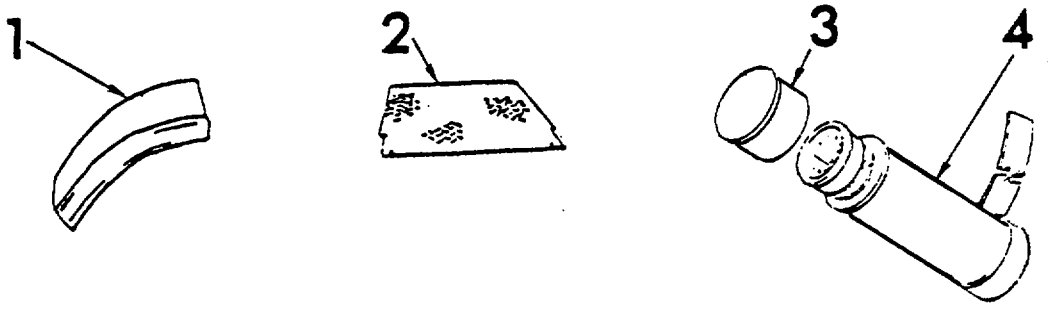
Remove and inspect control console. See Inside Installation Tasks 2 and 3 (pages 2-55 and 2-56).

Remove and inspect M240C Coax Machine Gun Microphone Assembly. See Inside Installation Tasks 6 and 7 (page 2-60).

Remove MILES turret floor plate and shorting plug. See Inside Installation Tasks 8, 9, and 10 (pages 2-61, 2-64 and 2-65).

Remove blank fire adapter. See Inside Installation Task 7 (page 2-60).

Reinstall main gun link ejection chute (1) and turret floor plate (2) on vehicle. Reinstall dust cap (3) on shorting plug (4).



Postoperational Task 4: Outside Postoperational Tasks.

Remove and inspect Transmitter Cable Assembly. See Outside Installation Tasks 18 and 19 (pages 2-42 and 2-43).

Remove and inspect Kill Indicator Cable Assembly. See Outside Installation Tasks 20 and 21 (pages 2-46 and 2-47).

Remove and inspect CVKI. See Outside Installation Tasks 16 and 17 (pages 2-40 and 2-41).

Remove and inspect Main Gun Transmitter Assembly. See Outside Installation Tasks 12 and 13 (pages 2-35 and 2-36).

Remove -and inspect detector belt segments. Leave fastener tape on the vehicle. See Outside Installation Tasks 5, 6, and 7 (pages 2-23, 2-24 and 2-26).

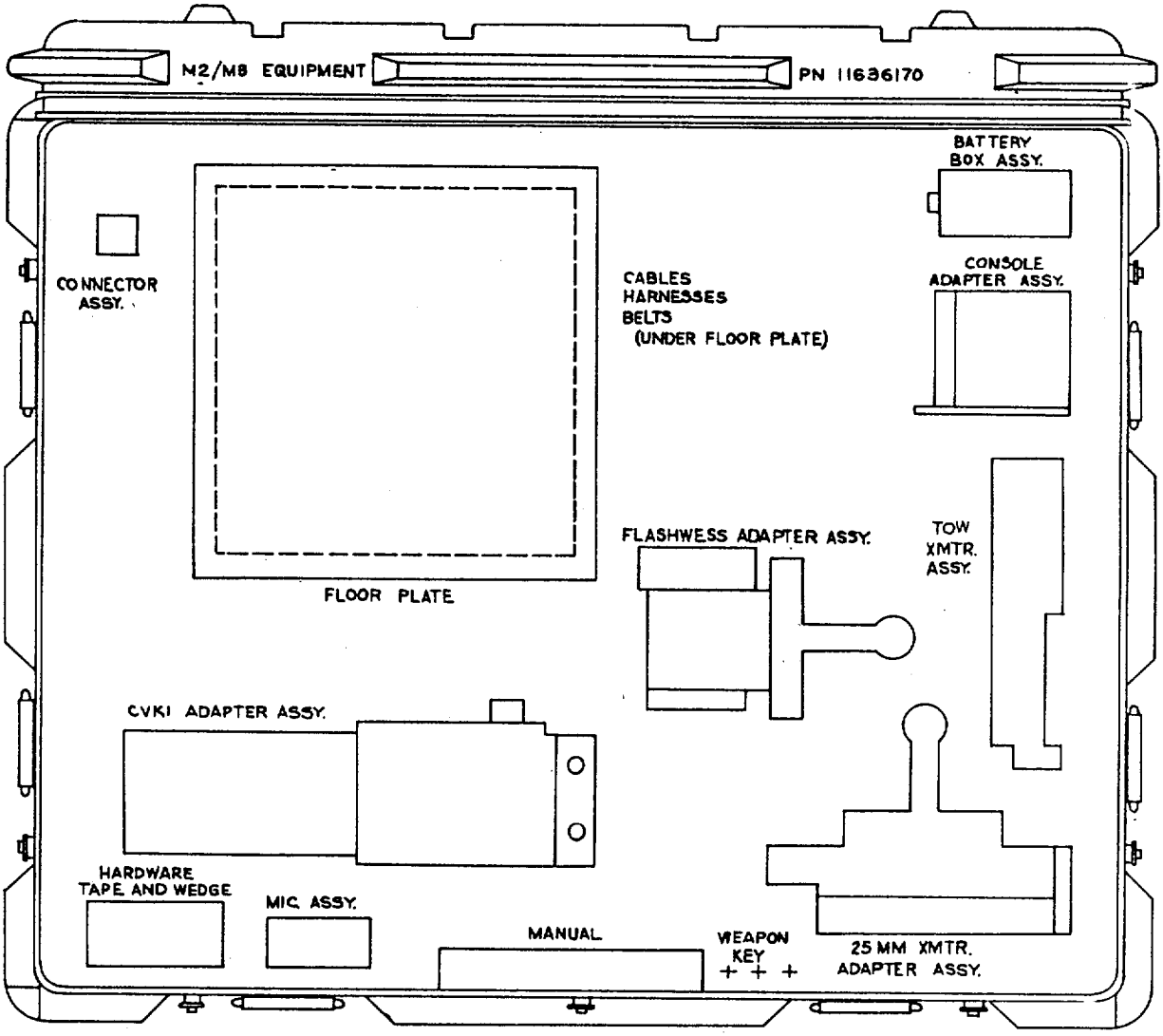
Remove and inspect TOW simulator tubes. Remove batteries. See Outside Installation Tasks 10 and 11 (pages 2-31 and 2-33).

Remove and inspect TOW laser transmitter. See Outside Installation Tasks 8 and 9 (pages 2-28 and 2-29).

Remove and inspect FLASHWESS. See Outside Installation Tasks 14 and 15 (pages 2-38 and 2-39).

Reinstall original bolts (1) on side of TOW launcher.

Postoperational Task 5: Transit Case Packing Instructions.



Place MILES M2/M3 equipment in storage locations as marked in the transit case.

TOW simulator tube assemblies are packed in their own separate transit case. Place each tube securely in foam cushions. Tube assemblies may be put in either way.

Postoperational Task 6: Return Equipment.

Return all equipment to your NCOIC.

Include:
- All MILES equipment.
- Blank fire adapter and blank ammunition tray
- Dry-Fire Plug
- Unused Supplies
- Unused blank ammunition
- Unused ATWESS cartridges

SECTION IV. OPERATION UNDER UNUSUAL CONDITIONS

Under Unusual Condition, operational procedures for the MILES equipment have the same limitations as the M2/M3 Fighting Vehicles.

Procedures for Fording are contained in TM 9-2350-252-10. After Fording, conduct a visual inspection to ensure equipment is still installed. A system checkout is required to check operational condition.

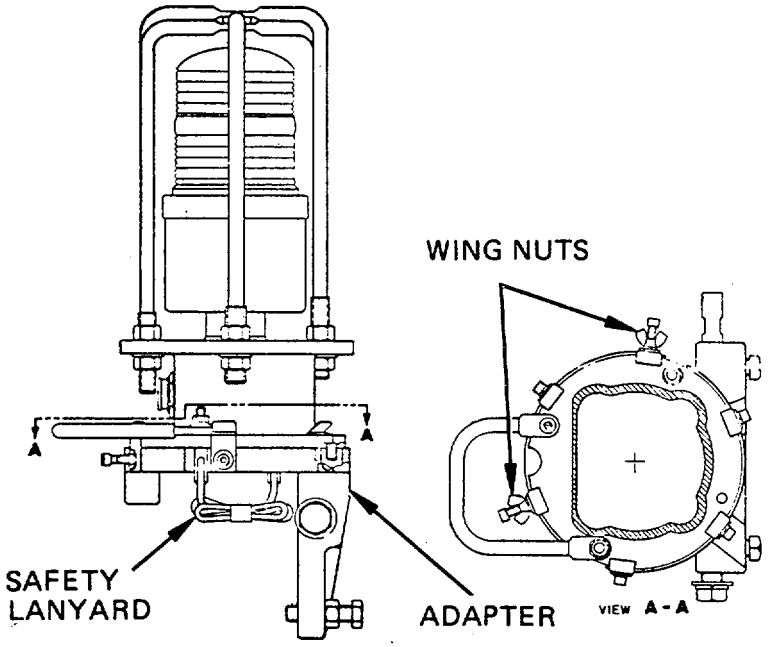
CVKI Operation under Unusual Conditions

Attached around the base of the CVKI are six equally-spaced spring clamps which enables the CVKI to perform a 'breakaway. This feature allows the CVKI to separate from the Adapter if the Assembly is subjected to a horizontal impact or load. The 'breakaway' will occur if the impact or load is in excess of 200 pounds to the mid-section of the CVKI cage.

A safety lanyard is also attached to the CVKI Assembly and Adapter which prevents the Assembly from causing damage after it has disengaged from the Adapter.

To replace the CVKI once it has broken away:

1. Locate and loosen the 2-wing nuts.
2. Align the CVKI light with the Adapter and snap it in.
3. Hand tighten the wing nuts securely until the CVKI is in its proper position.



CHAPTER 3

MAINTENANCE INSTRUCTIONS

SECTION I. LUBRICATION INSTRUCTIONS

The TOW simulator tubes require operator lubrication in the MILES M2/M3 System. These lubrication instructions are MANDATORY.

Before use and as needed during operation of the TOW simulator tubes, perform the following procedures.

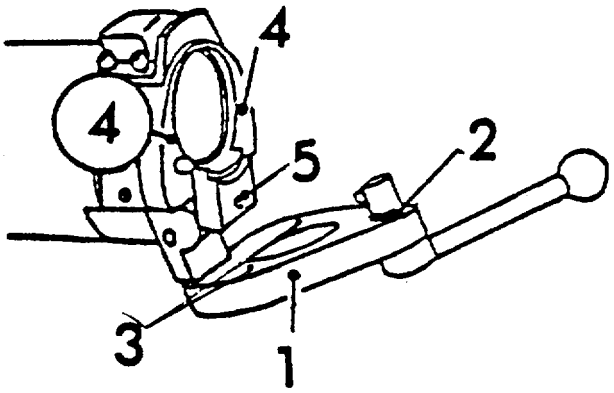
Use CLP (Item 4, Appendix D), Rags (Item 8, Appendix D), and Brush (Item 3, Appendix D) to clean powder from breech door (1), breech lock lever (2) and contacts (3) in breech door.

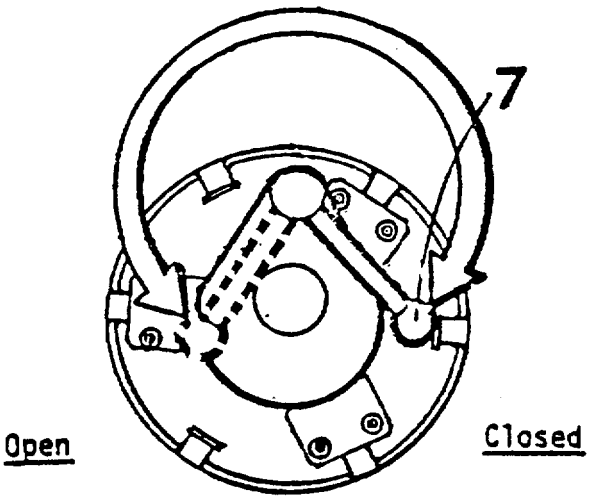
Use CLP to clean powder from terminals (4) in breech block. Also, clean entire breech block.

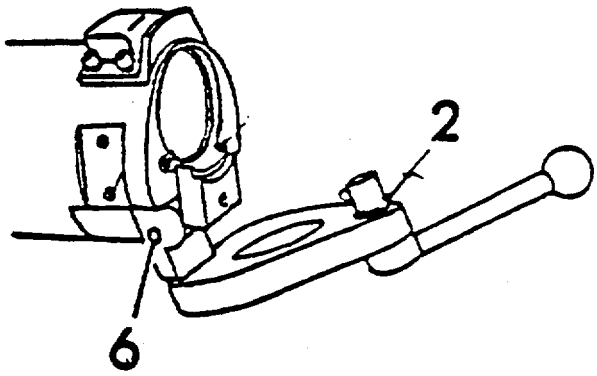
Use CLP to clean powder from cartridge extractor (5).

Put drop of CLP at breech door hinge (6) and breech lock lever (2).

Close breech door and move lever to closed position (7).







SECTION II. TROUBLESHOOTING PROCEDURES

Table 3-1 lists the common malfunctions which you may find during the operation or maintenance of the MILES simulator system for the M2/M3 Fighting Vehicles or its components. You should perform the tests/inspections and corrective actions in the order listed.

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

Table 3-1. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
MWLD EQUIPMENT
1. NO ALARM ON MWLD TORSO HARNESS UPON INSERTING BATTERY.
Step 1. Remove battery. Wait 10 seconds and reinsert battery. Retest.
Step 2. If still no alarm. Replace battery. Retest.
Step 3. If still no alarm. Report on DA form 2404. Replace torso harness.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. NO ALARM ON MWLD TORSO HARNESS WHEN TESTED.

Step 1. Remove battery.

Wait 10 seconds and reinsert battery.

Retest.

Step 2. If still no alarm.

Replace battery.

Retest.

Step 3. If still no alarm.

Report on DA Form 2404.

Replace torso harness.

3. NO ALARM WHEN HELMET HARNESS IS TESTED.

Step 1. Check that bottom of harness overhangs entire rim of helmet.

Retest.

Step 2. If still no alarm.

Remove battery. Wait 10 seconds and reinsert battery.

Retest.

Step 3. If still no alarm.

Place helmet on another soldier with operating torso harness.

Retest.

Step 4. If still no alarm.

Replace battery.

Retest.

Step 5. If still no alarm.

Report on DA Form 2404.

Replace Helmet Harness.

Table 3-1. Troubleshooting (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

MILES CONTROL CONSOLE

1. CONTROL CONSOLE DISPLAY INDICATES A NUMBER OTHER THAN 00 OR IS BLANKDURING TESTING.

Step 1. Disconnect, wait 10 seconds, then reconnect cable connectors labeled

Control Console or Battery.

Recheck for 00 by pressing control console display button.

Step 2. If display is still blank.

Ask Controller to check out equipment using vehicle test set.

2. CONTROL CONSOLE DISPLAY DOES NOT INDICATE THE NUMBER 88 DURING TESTING.

Step 1. Turn Console switch to HIT/KILL and back to SELF TEST.

Check display.

Step 2. If display still does not indicate 88.

Ask Controller to check out equipment using Vehicle test set.

3. CONTROL CONSOLE DISPLAY DOES NOT INDICATE THE NUMBER 99 DURING TESTING.

Step 1. Turn Console switch to HIT/KILL.

Check display.

Step 2. If display still does not indicate 99.

Ask Controller to check out equipment using vehicle test set.

4. CONTROL CONSOLE DISPLAY DOES NOT INDICATE THE NUMBER 15 DURING TESTING AT MAIN GUN SWITCH POSITION.

Step 1. Ask Controller to check out equipment using vehicle test set.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. CONTROL CONSOLE DISPLAY DOES NOT INDICATE THE NUMBER 14 DURING TESTING AT MAIN GUN SWITCH POSITION.

Step 1. Check all MILES trigger cable connections.

Tighten any loose connections.

Step 2. Fire Main Gun for 30 seconds at AP HI or HE HI.

Check for number 14 on display.

Step 3. If display still does not indicate 14.

Ask Controller to check out equipment using vehicle test set.

6. CONTROL CONSOLE DISPLAY DOES NOT INDICATE THE NUMBER 12 DURING TESTING AT MISSILE SWITCH POSITION.

Step 1. Ask Controller to check out equipment using vehicle test set.

7. CONTROL CONSOLE DISPLAY DOES NOT INDICATE THE NUMBER 11 DURING TESTING AT MISSILE SWITCH POSITION.

Step 1. Check all MILES trigger cable connections.

Tighten any loose connections.

Step 2. Fire TOW launcher.

Check for number 11 on display.

Step 3. If display still does not indicate 11.

Ask Controller to check out equipment using vehicle test set.

Table 3-1. Troubleshooting (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

MILES VEHICLE EQUIPMENT

1. NO "KILL" INDICATION WHEN MAIN GUN FIRED AT MWLD TORSO HARNESS DURING TESTING.

Step 1. Check all MILES transmitter cable connections.

Tighten any loose connections.

Step 2. Fire Main Gun at man-worn torso harness with detector held in front of transmitter.

Check for "KILL" indication.

Step 3. If still no "KILL" indication.

Ask Controller to check out system using vehicle test set.

2. NO "KILL" OR "NEAR MISS" INDICATION WHEN COAX MACHINE GUN FIRED AT MWLD TORSO HARNESS DURING TEST.

Step 1. Check Coax Machine Gun microphone cable connections.

Tighten any loose connections.

Step 2. Fire Coax Machine Gun at man-worn harness with detector held in front of Main Gun/Coax Machine Gun laser transmitter.

Check for hit indication.

Step 3. If still no indication.

Ask Controller to check out equipment using vehicle test set.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. NO "KILL" INDICATION WHEN TOW FIRED AT MWLD TORSO HARNESS DURING TESTING.

Step 1. Check all MILES transmitter cable connections.

Tighten any loose connections.

Step 2. Fire TOW transmitter at man-worn torso harness with detector held in front of transmitter.

Check for "KILL" indication.

Step 3. If still no "KILL" indication.

Ask Controller to check out system using vehicle test set.

4. NO INTERCOM TONE.

Step 1. Check vehicle intercom.

Turn to ON.

Step 2. Check vehicle intercom cable connections at intercom terminals.

Tighten any loose connections.

Step 3. If still no tone.

Ask Controller to check out equipment using vehicle test set.

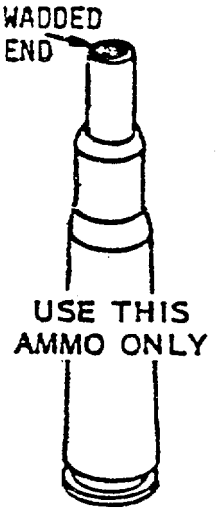
Table 3-1. Troubleshooting (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
MILES VEHICLE EQUIPMENT (Cont)
5. NO CVKI FLASH.
Step 1. Check CVKI cable connections, Tighten any loose connections.
Step 2. Check MILES connections at turret networks box. Tighten any loose connections.
Step 3. Check utility Power switch. Turn switch ON.
Step 4. If still no CVKI flash. Ask Controller to check out equipment using vehicle test set.
6. FAULTY DETECTOR BELT SEGMENTS.
Step 1. Check cable connections at detector belt segments. Tighten any loose connections.
Step 2. If detector belt segments faulty. Ask Controller to check out equipment.

CHAPTER 4

AMMUNITION

SECTION I. MILES AUTHORIZED AMMUNITION (ATWESS)

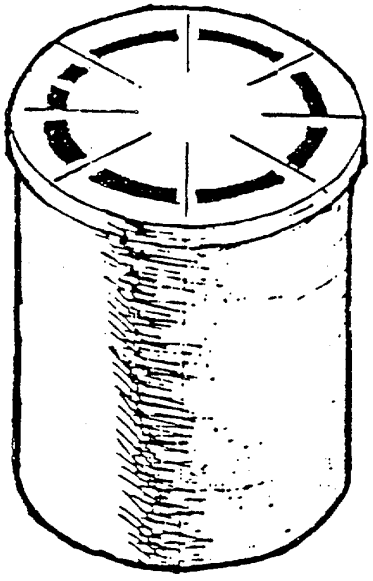


M82 BLANK

WARNING

The M82 blank is the only ammunition authorized for use in the M240C Coax machine gun.

The ATWESS cartridge (P/N 11749380) is the only type of cartridge authorized for use with the MILES equipment installed on the M2/M3 Fighting Vehicles.



ATWESS CARTRIDGE

WARNING

Treat ATWESS cartridges as you would live ammunition. A strong shock may set off the ATWESS cartridge.

Do not install TOW simulator tubes containing ATWESS cartridges.

Never stand behind TOW simulator when arming it or loading ATWESS cartridges.

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, and technical manuals referenced in this manual.

A-2. FORMS

SF 368	Quality Deficiency Report
DA Form 2028-2	Recommended Changes to Equipment Technical Publications
DA Form 2062	Hand Receipt
DA Form 2402	Exchange Tag
DA Form 2404	Equipment Inspection and Maintenance Work Sheet

A-3. FIELD MANUALS

FM 21-11	Field Manual: First Aid for Soldiers

A-4. TECHNICAL MANUALS

TM 9-1005-313-10	Operator's Manual Machine Gun, 7.62 mm, M240 (1005-01-025-8095) and Machine Gun, 7.62 mm, M240C (1005-01-085-4758)
TM 9-2350-252-10	Operator's Manual: M2/M3 Fighting Vehicles
TM 9-1265-375-10-HR	Hand Receipt Manual: MILES Simulator System, Firing, Laser, M2/M3
TM 9-1005-316-12&P	Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List), Blank Firing Attachment (BFA) M21, NSN 1005-01-148-7437 for 7.62 mm M240 Machine Gun

A-5. MISCELLANEOUS PUBLICATIONS

AR 310-2	Identification and Distribution of DA Publications
SB 11-6	Dry Battery Supply Data
DA PAM 738-750	The Army Maintenance Management System (TAMMS)

APPENDIX B

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

SECTION I. INTRODUCTION

B-1. SCOPE

This appendix lists components of end item and basic issue items for the MILES M2/M3 Fighting Vehicles System to help you inventory items required for safe and efficient operation.

B-2. GENERAL

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

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the MILES M2/M3 Fighting Vehicles System in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, Bll must be with the MILES M2/M3 Fighting Vehicles System during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. EXPLANATION OF COLUMNS

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

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

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

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

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

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

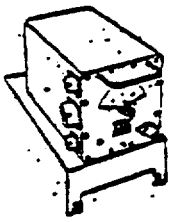
SECTION II. COMPONENTS OF END ITEM

(1) Illustration Number	(2) National Stock Number	(3) Description FSCM and Part Number Usable On Code	(4) U/M	(5) Qty Rqr.
1	*	Adapter Assembly, Console (19200) 11836185	EA	1
2	*	Adapter Assembly, CVKI (19200) 9353110	EA	1
3	*	Adapter Assembly, FLASHWESS (19200) 9352990	EA	1
4	*	Adapter Set, Simulator System, Laser: M2/M3 Vehicle (19200) 11836171	EA	1
		Line Item/Part Number 11836171 consists of the following components:		
4-A	*	Cable Assembly, Kill Indicator, M2/M3 (19200) 9353113	EA	1
4-B	*	Cable Assembly, Transmitter, M2/M3 (19200) 11836256	EA	1
4-C	*	Cable Assembly, Trigger M2/M3 (19200) 11836254	EA	1
4-D	*	Connector Assembly, Shorting Plug (19200) 9352767	EA	1
4-E	*	Fastener Tape, Crew Helmet (19200) 11749717	EA	18
4-F	1265-01-079-8475	Microphone Trigger Assy/Coax (19200) 11749403	EA	1

* Not available on publication date.

SECTION II. COMPONENTS OF END ITEM (CONT)

1



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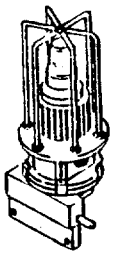

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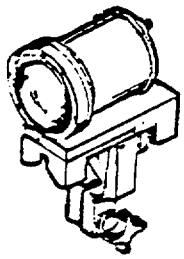

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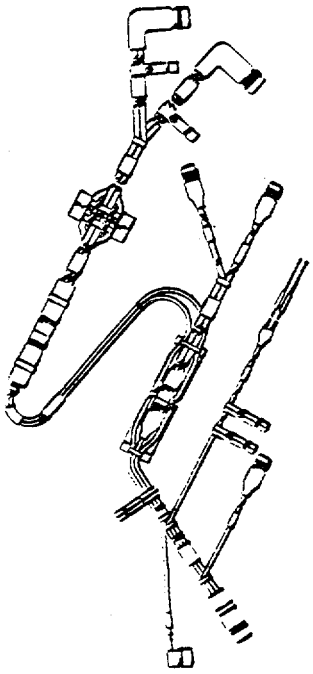

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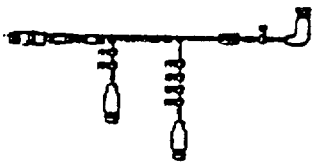

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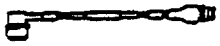


4-C

4-D

4-E

4-F

SECTION II. COMPONENTS OF END ITEM (CONT)

(1) Illustration Number	(2) National Stock Number	(3) Description FSCM and Part Number Usable On Code	(4) U/M	(5) Qty Rqr.
4-G	*	Plate, Floor (19200) 11835295	EA	1
4-H	5305-01-160-7558	Screw Cap, Hex Head 3/8 x 16 x 1.75 (96906) MS90728-65	EA	4
4-I	5310-00-773-7618	Washer, Flat .406 l.D (19200) MS15795-814	EA	4
4-J	5310-00-974-6623	Washer, Lock No. 3/8 (96906) MS35338-141	EA	4
4-K	1265-01-076-1993	Weapon Key, Man, Vehicle (19200) 11749329-1	EA	3
4-L	1265-01-080-7390	Wedge Assembly, Console Mounting, Detector Belt-CVLD (19200) 11749329	EA	1
5	*	Battery Box Assembly (19200) 11749790	EA	1
6	1265-01-075-4893	Detector Assembly, Simulator System, Laser: Man Worn (19200) 11748808	EA	3
7	1265-01-076-6522	Detector Belt Assembly Segment Number 7 - CVLD (19200) 11836186	EA	1

* Not available on publication date.

SECTION II. COMPONENTS OF END ITEM (CONT)

4-G

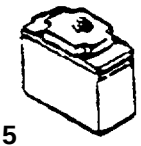
4-H

4-I

4-J

4-K

4-L



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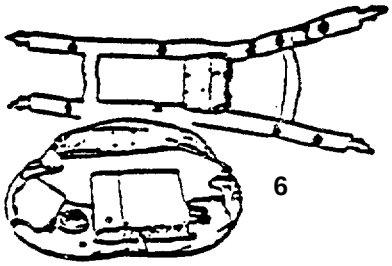

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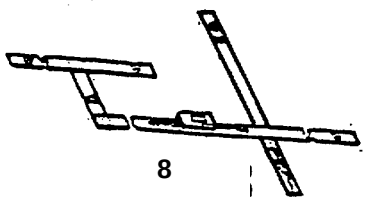
SECTION II. COMPONENTS OFEND ITEM (CONT)

(1) Illustration Number	(2) National Stock Number	(3) Description FSCM and Part Number Usable On Code	(4) U/M	(5) Qty Rqr.
8	*	Detector Belt Assembly Segment Number 8 - CVLD (19200) 11836190	EA	1
9	*	Installation Kit, M2/M3 Vehicle (19200) 11836172	EA	1
10	*	Transmitter Assembly, Simulator System, Laser: TOW (19200) 9353170	EA	1
11	*	Adapter Assembly, 25 MM Transmitter (19200) 9352792	EA	1
12	*	Transit Case Assembly, M2/M3, Vehicle (19200) 11836173	EA	1
13	*	Transit Case Assembly, TOW Tube (19200) 11836195	EA	1
14	*	Tube Assembly, Simulator, Antitank, Missile Fire, TOW (19200) 11836260	EA	2

* Not available on publication date.

SECTION II. COMPONENTS OF END ITEM (CONT)



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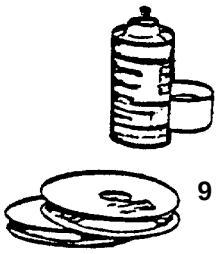

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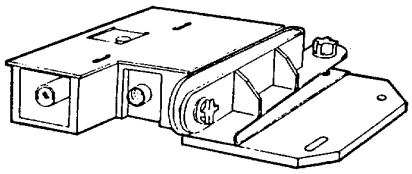

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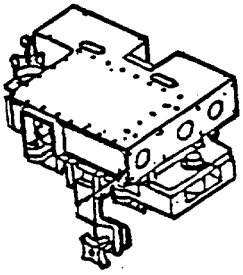

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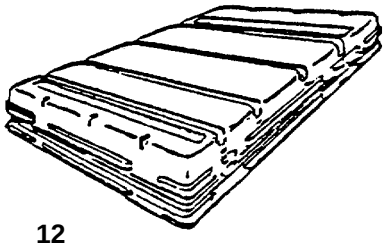

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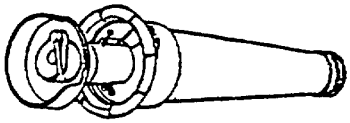

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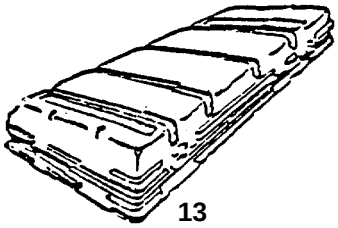

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SECTION III. BASIC ISSUE ITEMS

1 ea.	TM 9-1265-375-10	Operator's Manual f/ Simulator System, Firing Laser: M83 f/ M2/M3 Fighting Vehicles

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

SECTION I. INTRODUCTION

C-1. SCOPE

This appendix lists additional items you are authorized for the support of the MILES M2/M3 System.

C-2. GENERAL

This list identifies items that do not have to accompany the MILES M2/M3 System and that do not have to be turned in with it. These items are all authorized to you by either CTA, MTOE, TDA, or JTA.

C-3. EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name.

SECTION II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description FSCM And Part Number Usable On Code	(3) Qty.	(4) U/M
*	Plug Assembly, Dry Fire, M240C Machine Gun (19200) 11749794	1	EA
5120-00-243-9401	Roller, Hand (24617) 6523520	1	EA

* Not available on publication date.

APPENDIX D

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

SECTION I. INTRODUCTION

D-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the MILES M2/M3 Fighting Vehicles System. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items), or CTA, 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 material (e.g., "Use cleaning compound, Item 5, Appendix D.").

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew

c. Column (3) - National Stock Number. This is the National Stock Number (assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National stock number	(4) Description	(5) U/M
1	C	6135-00-050-3280	* Battery, 6-volt (80058) BA-200/U	EA
2	C	6135-01-063-1978	* Battery, 9-volt (80058) BA3090/U	EA
3	C	7920-00-255-7536	Brush, Cleaning	EA
4	C	9150-01-079-6124	Cleaner, Lubricant and Preservative (27412) CLP-4	OZ
5	C	7920-00-263-2765	Cloth, Lens	PK
6	C	8315-01-111-7170	Fastener Tape (19200) 11749428	YD
7	C	6640-00-240-5851	Paper, Lens (81349) NNN-P-40	PK
8	C	7920-00-205-1711	Rag, Wiping: Cot (81348) DDD-R-30, cl 12, gr B	BE
9	C	7510-00-890-9875	Tape, Pressure Sensitive: Adhesive (81348) PPP-T-60	RL
10	C	8010-01-040-0947	Tape Primer (19200)11749034	CN

* Dry battery listed is used with the equipment. It will not be preshipped automatically but is to be requisitioned in quantities necessary for the particular organization in accordance with SB 11-6.

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By Order of the Secretary of the Army:

CARL E. VUONO
General United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with Da Form 12-37, Operator's Maintenance requirements for MILES Simulator Sys, Firing, Laser, M83 (for M2/M3 IFV/CFV).

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 (°F -32) = °C

212° Fahrenheit is equivalent to 100° Celsius

90° Fahrenheit is equivalent to 32.2° Celsius

32° Fahrenheit is equivalent to 0° Celsius

9/5 C° +32 = F°

WEIGHTS

1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces

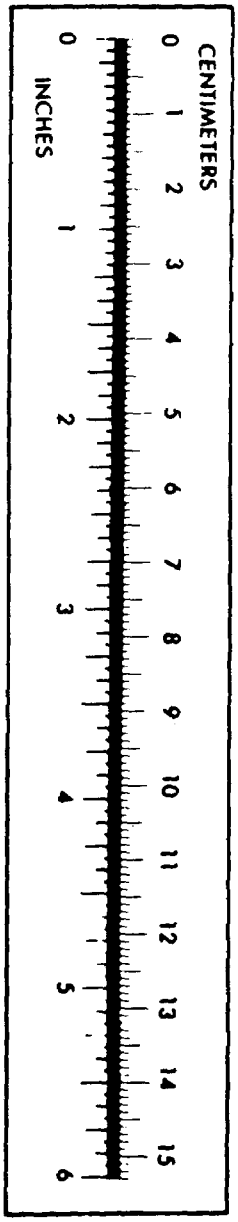
1 Kilogram = 1,000 Grams = 2.2 Lb.

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



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