TECHNICAL MANUAL

OPERATOR'S MANUAL

FOR

MULTIPLE INTEGRATED LASER

ENGAGEMENT SYSTEM

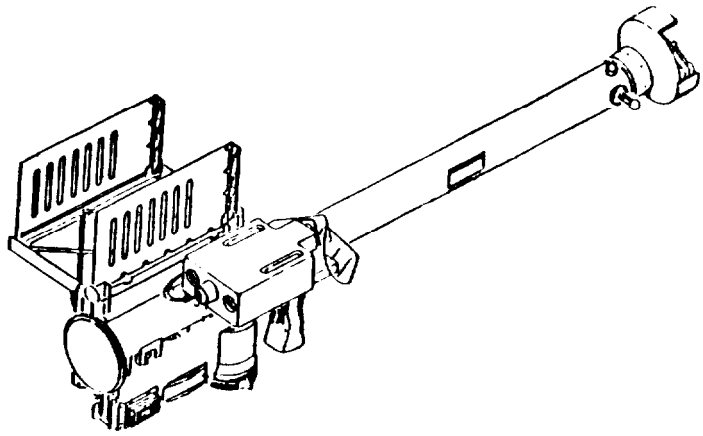
(MILES)

SIMULATOR SYSTEM, FIRING, LASER: M74

NSN 1265-01-159-0485

FOR

STINGER WEAPON SYSTEM



HEADQUARTERS, DEPARTMENT OF THE ARMY
OCTOBER 1984

CHANGE
NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 15 APRIL 1987

OPERATOR'S MANUAL
MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM
(MILES)
SIMULATOR SYSTEM, FIRING, LASER: M74
NSN 1265-01-159-0485
FOR
STINGER WEAPON SYSTEM

TM 9-1265-209-10, 22 October 1984, is changed as follows:

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2. New or changed text is indicated by a vertical bar in the margin of the page.
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Old Page	New Page
1-1 and 1-2	1-1 and 1-2
2-23 and 2-24	2-23 and 2-24
-	2-24.1 and 2-24.2 (blank)
2-29 and 2-30	2-29 and 2-30
3-1 thru 3-5 (3-6 blank)	3-1 thru 3-5 (3-6 blank)
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General, United States Army
Chief of Staff

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Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-32, Operator's Maintenance requirements for MILES Simulator Sys, Firing, Laser M74 (for STINGER).

CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC,12 December 1986

OPERATOR'S MANUAL
FOR
MULTIPLE INTEGRATED LASER ENGAGEMENT
SYSTEM (MILES)
SIMULATOR SYSTEM, FIRING, LASER: M74
NSN 1265-01-059-0485
FOR
STINGER WEAPON SYSTEM

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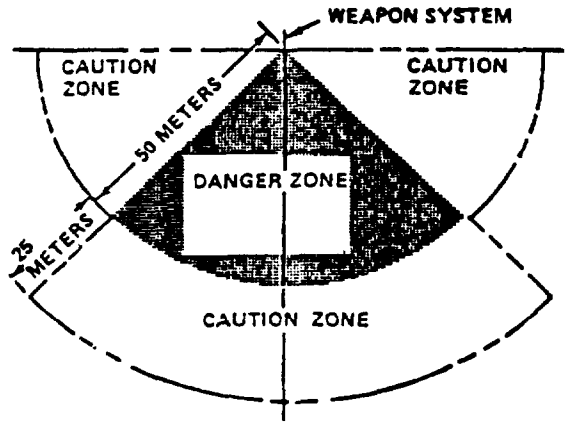
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-32, Operator Maintenance requirements for STINGER Missile System.

WARNING

Insure that the area around the weapon is clear of other personnel to a distance of 50 meters. Allow at least 5 meters safety distance from equipment or vehicles. Damage to equipment may result if it is within the backblast area.

BACK BLAST DANGER ZONES



Always wear earplugs within 5 meters when firing the MILES Stinger.

The radiated energy of laser light emitted by the Infantry System equipment is considered eye-safe by the United States Department of Health and Human Services (Regulation 21 CFR, Subchapter J, as applicable). Suitable precautions, however, must be taken to avoid overexposure to the laser light. While using the equipment, the following precautionary measures must be observed:

- Avoid viewing the laser emitter at close range (less than 12 meters). Increasing the eye-to-laser distance greatly reduces the risks of overexposure.
- Avoid viewing the laser emitter directly along the optical axis of the radiated beam.
- Avoid viewing the laser emitter directly along the optical axis of the beam through stabilized optics such as binoculars, telescopes, or periscopes at engagement ranges of less than 75 meters.
- While using the Controller Gun, NEVER aim it towards a person's eyes.

Insure that safe/arm shaft on ATWESS falls to safe position when breech is opened. Feel to make sure firing pin is not exposed when breech is opened,

Never arm the ATWESS until you are ready for a mission. Handle ATWESS cartridges with the same care you use with any live ammunition. A severe jolt to the ATWESS may cause it to go off.

WARNING

Do NOT fire the MILES STINGER weapon until the area immediately to the rear of the Stinger ATWESS is clear of all personnel and equipment.

Do not stand within danger zone while loading ATWESS.

Always stand on right side of rear of launcher.

After cartridge is inserted into chamber, keep hands, arms and other parts of body away from hole in center of breech door.

Failure to follow these instructions could result in being burned by blast pressure emissions escaping through hole in center of breech door.

Always assume that the ATWESS device is armed and take appropriate safety measures.

MILES Stinger should NOT be armed until just prior to acquisition of target.

Do NOT drop an armed MILES Stinger. A strong jolt may trigger the ATWESS. Treat the MILES Stinger as you would any loaded and armed weapon.

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

Do not do this task unless you have selected a target and are preparing to fire. Do not drop the Stinger when the ATWESS is loaded and armed. A strong jolt may set off the ATWESS

Do not stand behind ATWESS when loading ATWESS cartridges into Stinger.

Do not store MILES Stinger containing ATWESS cartridges.

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

TECHNICAL MANUAL
No. 9-1265-209-10

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DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 22 October 1984

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(MILES)
SIMULATOR SYSTEM, FIRING, LASER: M74.
NSN 1265-01-159-0485
FOR
STINGER WEAPON SYSTEM

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

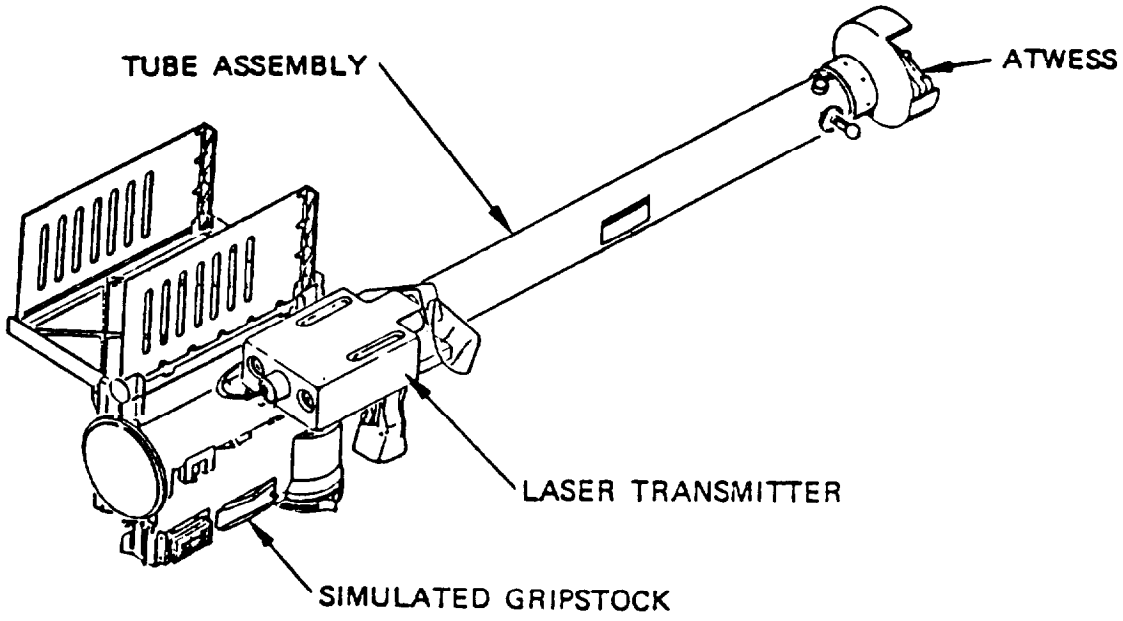
You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Armament, Munitions and Chemical Command, ATTN: DRSMC-MAS (R), Rock Island, IL 61299. A reply will be furnished to you.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

SECTION I. GENERAL INFORMATION



SCOPE

TYPE OF MANUAL. This manual shows you how to install, operate and maintain Multiple Integrated Laser Engagement System (MILES)/Air-to-Ground Engagement System/Air Defense (AGES/AD) for the Stinger Weapon system. Step-by-step instructions are given for all procedures necessary to use the MILES system.

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

NOTE

To use this manual you should be able to:

Aim and fire Stinger weapon (see FM 44-18-1).

Complete DA Forms 2402 and 2404.

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

PURPOSE OF EQUIPMENT. MILES Stinger Weapon System equipment consists of a battery-operated laser transmitter, tube-shaped Stinger simulator and ATWESS weapon signature simulator. 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 real weapons. 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 9-1265-209-10-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 he 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 Stinger Weapon System equipment 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 SF368 (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.

REFERENCE INFORMATION

This listing includes the nomenclature cross reference list, list of abbreviations, and explanations of terms (glossary) used in this manual.

A. NOMENCLATURE CROSS REFERENCE LIST

Common Name	Official Nomenclature
ATWESS	Simulator, Antitank Missile Fire
ATWESS Cartridge	Cartridge, Practice, M22
"Dummy" Battery	Battery Coolant Unit (BCU)
MWLD	Detector Assembly, Simulator System, Laser: Man Worn
Stinger Simulator	Simulator System, Firing, Laser: Stinger

B. LIST OF ABBREVIATIONS

AGES/AD	Air-to-Ground Engagement System/Air Defense
ATWESS	Antitank Weapons Effect Signature Simulator
BCU	Battery Coolant Unit
CLP	Cleaner, Lubricant and Preservative
IR	Infrared
MILES	Multiple Integrated Laser Engagement System
PMCS	Preventive Maintenance Checks and Services
THT	Tracking Head Trainer

C. GLOSSARY

ATWESS	Device that simulates the flash, bang, and smoke of a Stinger Missile being fired.
Laser	Light Amplification by Stimulated Emission of Radiation
Laser Beam	Invisible beam of light which simulates weapon fire.
Laser Transmitter	Device that sends the laser beam.
Simulator	Training device which takes the place of real equipment and which has many of its characteristics.

SECTION II. EQUIPMENT DESCRIPTION

EQUIPMENT PURPOSE, CAPABILITIES, AND FEATURES

PURPOSE OF MILES SIMULATOR SYSTEM, FIRING, LASER: FOR STINGER WEAPON SYSTEM

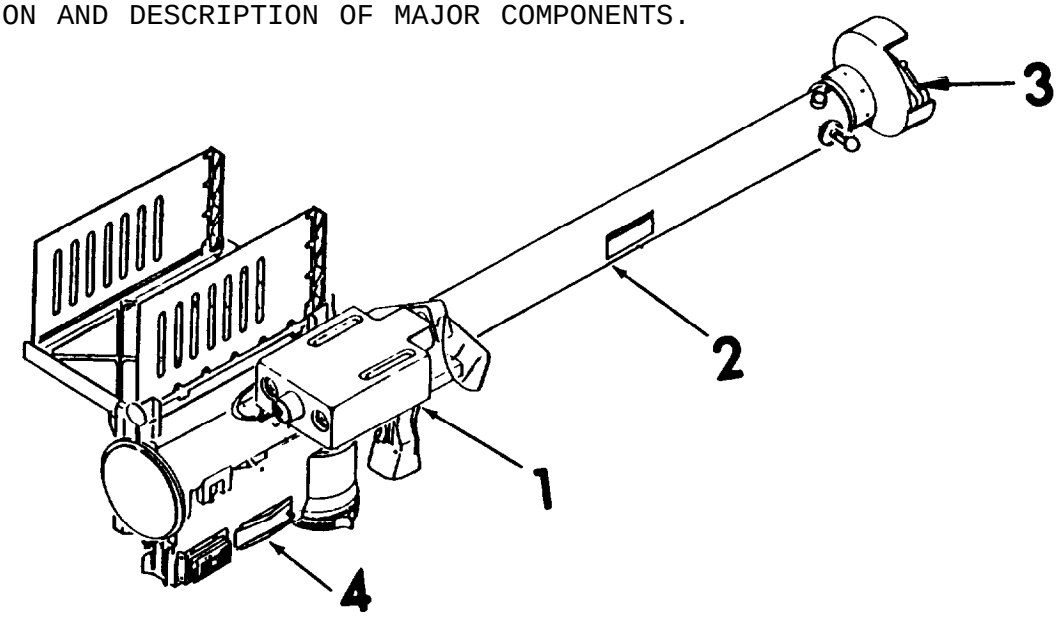
The MILES Simulator System, Firing, Laser: For Stinger Weapon System, permits the weapon to take part in realistic combat training exercises. Actual firing conditions of the weapon are simulated using laser beams. An ATWESS firing device adds to the system's realism.

Laser detectors worn by the Stinger operator sense enemy fire. MILES system electronics determine the accuracy and simulated damage of enemy fire.

FEATURES AND CAPABILITIES

- Easily installed and removed.
- Simulates Stinger weapon system.
    1. Range
    2. Accuracy
    3. Weight
    4. Dimensions
- ATWESS firing device adds realism.
- Uses normal Stinger firing procedures.
- Stinger gunner wears Man Worn Laser Detector (MWLD).
    1. Detects opposing fire
    2. Attacking weapon accuracy
        a. "NEAR MISS"
        b. "KILL"
- 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.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.



Stinger Transmitter Assembly (1). Simulates firing of Stinger missile by transmitting a coded laser signal. Contains telescope with Stinger reticle pattern for tracking targets. Provides pseudo-acquisition tones to operator through a loudspeaker and bone vibrator. Indicates rounds remaining. Mounts on forward section of tube assembly. Folds down for storage.

Stinger Tube Assembly (2). Simulates weight and dimensions of an actual Stinger missile-round. (An exception to this simulation is the bell mounted on the rear of tube. Bell provides protection for ATWESS firing device.) Provides locations for mounting Stinger transmitter assembly and MILES gripstock.

ATWESS (3). Simulates flash, bang and smoke of a Stinger missile being fired. Mounts in rear of tube assembly.

GRIPSTOCK ASSEMBLY (4). Simulates shape, weight, and dimensions of actual Stinger gripstock. Contains trigger, battery box and simulated BCU receptacle. Mounts on forward section of tube assembly.

EQUIPMENT DATA

Table 1-1. MILES Stinger Data

Item	Weight (pounds)	Dimensions (inches)
MILES Stinger	35.0 ± 1.0	59.0 x 6.0 x 10.0

Table 1-2. MILES Stinger Technical Characteristics

Item	Characteristic
Power	9 V dc battery
Reset/Initialization	Controller (green) Key
Enable	Weapon (yellow) Key
Operating Modes	Test (DRY FIRE) Normal (ATWESS)
Static Range	4000 meters
Basic Load	6 rounds
Actuation-to-Trigger-Pull Time	47 Sec. Max.

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 transmitter and detectors allows safe realistic training exercises with a complete range of weaponry and vehicles.

MILES Stinger Weapon System

The MILES Stinger weapon system simulates the size, shape, weight and firing characteristics of the Stinger missile launcher. It consists of a tube assembly, gripstock, transmitter, and ATWESS. The tube assembly and gripstock are shaped very much like those of the actual Stinger weapon.

The MILES Stinger simulator is used in the same manner as the Stinger weapon. It can be carried, aimed, and fired by a single soldier.

The transmitter fires an eye-safe laser beam that simulates the range, accuracy and destructive capability of the Stinger missile. A normal load of 6 laser rounds is stored within the transmitter. A visible display indicates the number of rounds remaining.

An ATWESS device simulates the noise, smoke and flash of a Stinger missile launch. The device must be loaded with an ATWESS cartridge for each firing.

The MILES Stinger weapon system transmitter may be fired without the ATWESS device. The controller must use a special controller's key to set the MILES Stinger for this "dry fire" operation. Dry fire operation is normally used only for testing and checkout of the MILES Stinger weapon system.

MWLD DETECTION SYSTEM

The MILES Stinger Weapon System operator wears a helmet harness equipped with laser detectors and a torso harness equipped with laser detectors and an audio alarm. These form the Man Worn Laser Detector System (MWLD). This system is supplied separately from the MILES Stinger System.

If the detectors on an MWLD 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 key to turn off the alarm. His Stinger weapon system may be transferred to another soldier possessing a yellow key.

For additional information on the MWLD system see TM 9-1265-370-10-1.

CHAPTER 2

OPERATING INSTRUCTIONS

SCOPE. This chapter provides those instructions needed by the soldier to operate, checkout and store MILES Stinger.

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

TRANSMITTER ASSEMBLY CONTROLS AND INDICATORS. Controls and indicators for the transmitter assembly are listed in Table 2-1. Key receptacle settings are shown below.

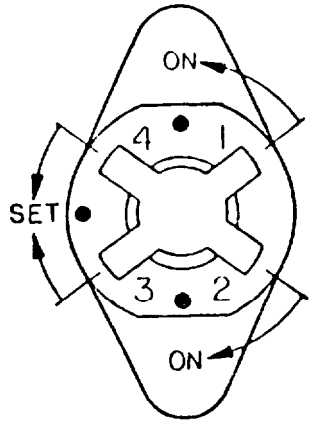
CONTROLLER KEY (GREEN)

ATWESS FIRE

INSERT KEY
TURN TO SET
TURN TO 4 - REMOVE KEY

DRY FIRE

INSERT KEY
TURN TO SET
TURN TO 3 - REMOVE KEY



WEAPON KEY (YELLOW)

DRY FIRE

INSERT KEY AT 1
TURN TO "ON"

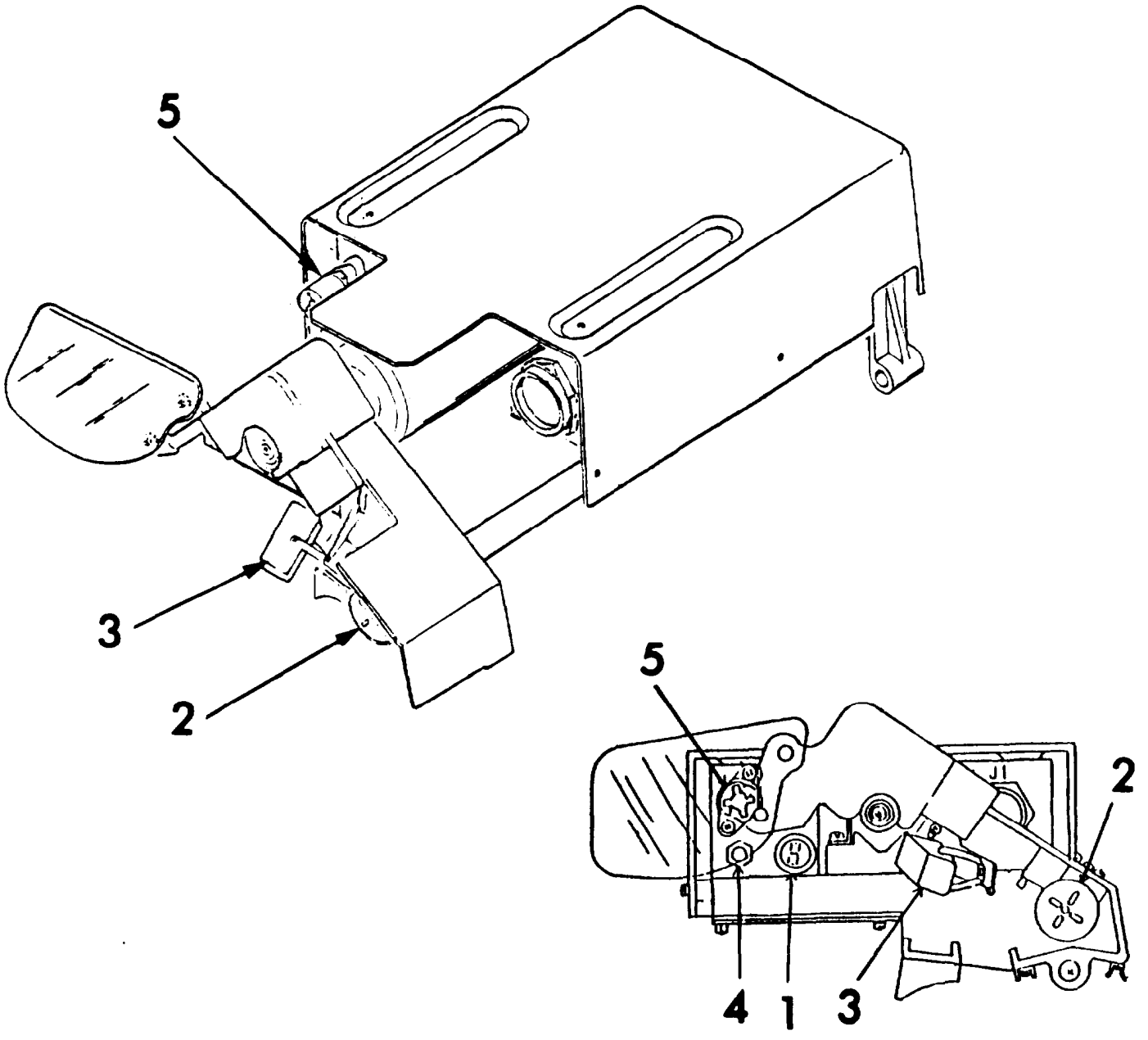
ATWESS FIRE

INSERT KEY AT 2
TURN TO "ON"

KEY RECEPTACLE SETTINGS

Table 2-1. Transmitter Assembly Controls and indicators

Illustration Key	Description	Function	Operating Position
1	Display	a. Displays rounds remaining b. Indicates when laser is firing	
2	Loudspeaker	Provides audio output of pseudo-tones	
3	Bone Vibrator	Provides bone conduction output of pseudo-tones	
4	Display	Activates display	Normally OFF
5	Key Receptacle	Initializes/Resets and Enables system. Selects firing mode.	ON

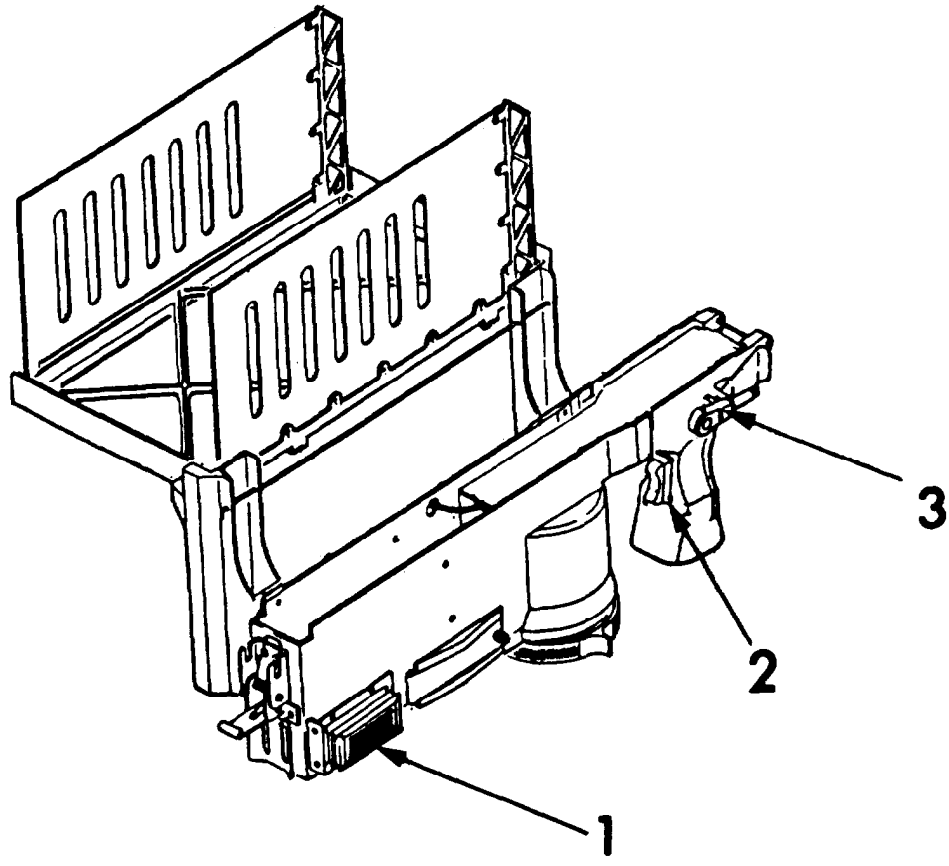


Transmitter Assembly Controls and Indicators

GRIPSTOCK ASSEMBLY CONTROLS. Controls and indicators for the gripstock assembly are listed in Table 2-2.

Table 2-2. Gripstock Assembly Controls and Indicators

Illustration Key	Description	Function	Operating Position
1	Uncaging Switch	Uncages gyro	Held ON during tracking
2	Trigger	Fires ATWESS	Press to fire
3	Safety and Actuator Device	Weapon Safety	Forward and down to arm

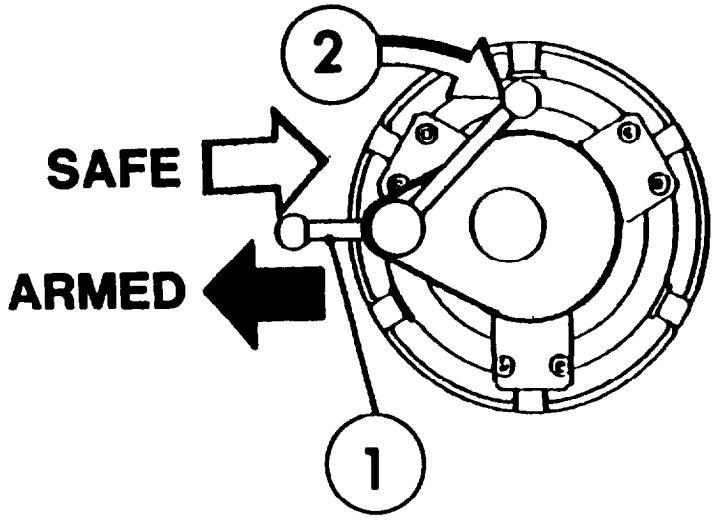


Gripstock Assembly Controls and Indicators

ATWESS CONTROLS. Controls and indicators for the ATWESS assembly are listed in Table 2-3.

Table 2-3. ATWESS Controls

Illustration Key	Description	Function	Operating Position
1	PULL TO ARM	Arms ATWESS	Extended to ARM
2	Breech Lock Lever	Secures breech door	Normally closed Open for loading
1	ARM WARNING	Alerts that device is armed	Visible when armed



ATWESS Controls

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). If you find any problems, turn the item in to the issuing facilities.

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. Report any discrepancies using the proper forms. See DA PAM 738-750.

Table 2-4. Operator/Crew Preventive Maintenance Checks and Services

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

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
1	•		•			Transmitter Assembly	Inspect for dirty or damaged lenses. Clean lenses with soft, dry cloth. NOTE Unscrew and remove peep sight to clean lens on rear of telescope (sight).	Lens or connectors are damaged.
							Check for damaged connector	Connections are broken.
							Inspect for cracks in display window.	Display window is cracked.
							Check for missing or damaged loudspeaker, key receptacle, switches or bone vibrator.	Loudspeaker, key receptacle, switches or vibrator are damaged.
							Inspect for damaged reticle or lenses of telescope.	Reticle or telescope lens broken.
2	•		•			Tube Assembly	Check for worn or bare wires. or damaged connectors on cable assemblies.	Connectors are broken or wiring is cut or bare.
							Inspect for missing, torn or obscured pull-to-arm decal.	Decals cannot be read.
3	•		•			ATWESS	Inspect for positive operation of ATWESS breech block without binding.	Breech block binds during operation.

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

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
							Verify Safe/Arm shaft drops to SAFE position when breech door is opened.	Safe/Arm shaft binds during operation.
							Use CLP (Item 3, Section II, Appendix D) to clean entire breech. Put drop of CLP on breech lock lever and breech block hinge.	
4	•		•			ATWESS Cartridge	Inspect for cracks in cartridge case, dented primer, or tears or punctures in copper disc. Replace any damaged cartridges in accordance with local EOD procedures.	Cartridge case is cracked, primer is dented, copper disc is torn or punctured.
5	•		•			Gripstock	Check condition of battery coolant unit and gasket.	Gasket is torn or cap is cracked.
							Check BCU interior for foreign matter and clean contacts.	Contacts are not clean.
							Depress safety and activator device; rotate it out and forward to limit of its travel. A click should be heard. Releaser: device should return to safe position and lock into place.	Device fails to click or return and lock.

Table 2-4. Operator/Crew Preventive Maintenance Checks and Services (Cont)

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

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
							Pull firing trigger to limit of travel. A click should be heard. Release, trigger should return to original position.	Trigger fails to click or return.
							Alternately depress uncaging switch at each end and in middle position of switch. A click should be heard each time the switch is depressed. Release, switch should return to original position.	Uncage switch fails to click or return.
							Check 9V battery box for damaged connectors. Check that connectors and interior battery contacts are serviceable.	Damage would prevent normal operation.

SECTION III. OPERATION UNDER USUAL CONDITIONS

GENERAL. Before the MILES equipment can be used, it must be properly installed on the Stinger Weapon System. To speed up procedures, work is organized into various tasks.

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 illustrations. 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 form.

CONTROLLER TASKS. Certain steps must be done with the Controller present. A controller key, carried only by the Controller, is required to reset the system. Your squad leader will determine when to call the Controller.

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

1. Checkout Tasks (page 2-16)
2. Pre-Operation Tasks (page 2-20)
3. Operation Tasks (page 2-22)

The squad leader should coordinate the tasks, give assistance to any soldier who needs it, and check to make sure everything gets done.

NOTE

For field training, a complete basic load of Stinger transit cases is needed. To simulate such a ready rack, consult Appendix B of FM 44-18-1.

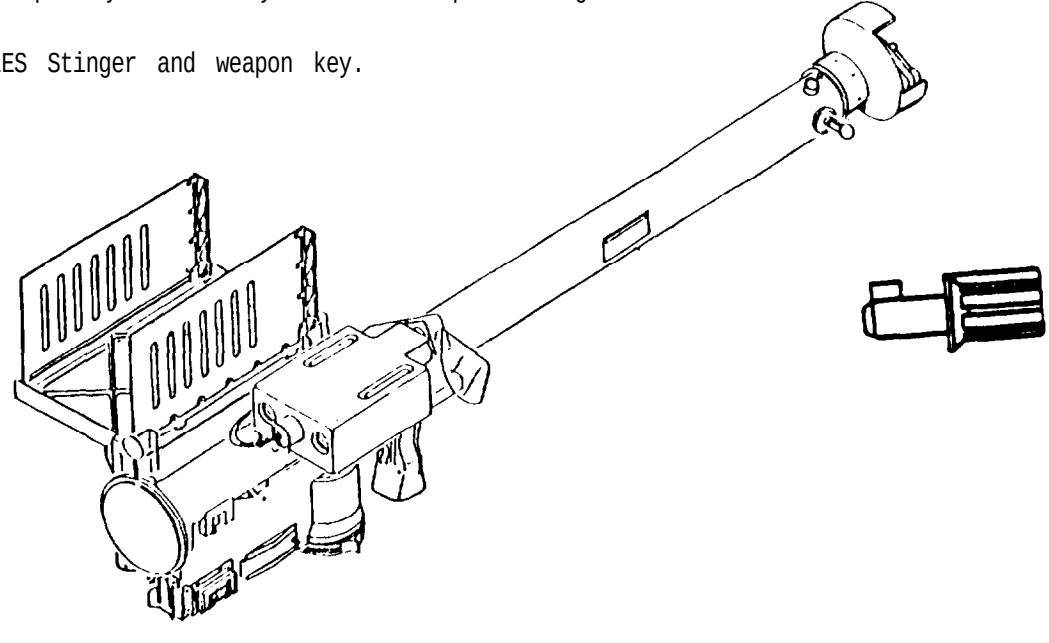
LIST OF TASKS

ASSEMBLY AND PREPARATION FOR USE

PREPARATION TASKS - LIST

Preparation Task 1: Obtain Equipment. Obtain all equipment needed to assemble and operate MILES Stinger weapon system from your NCOIC. Unpack Stinger Transit Case.

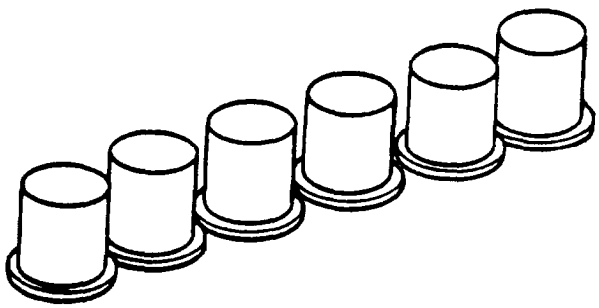
Set Aside: MILES Stinger and weapon key.



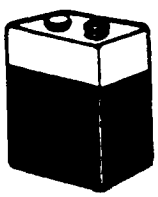
Obtain all Additional Authorization List Equipment (Section II, Appendix C) and all expendable items (Section II, Appendix D).

Set Aside:

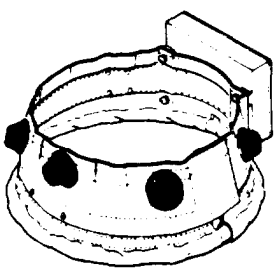
6 ATWESS cartridges



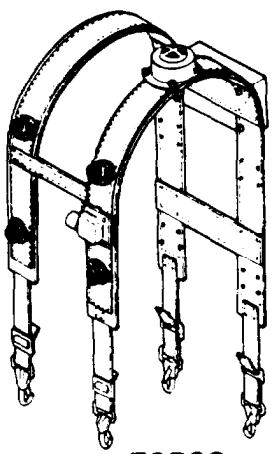
9 V dc Battery



Man Worn Laser Detector (MWLD)
(2 sets per team)

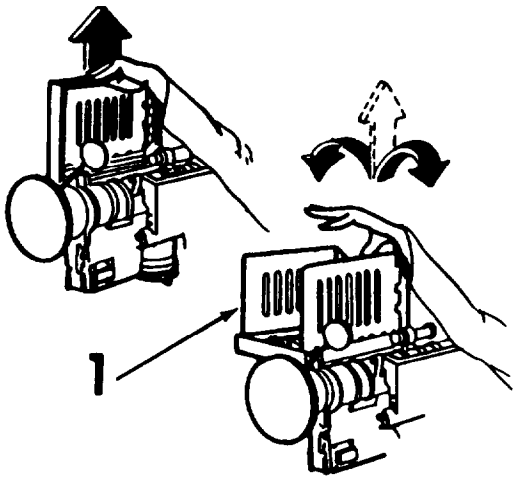


HELMET HARNESS

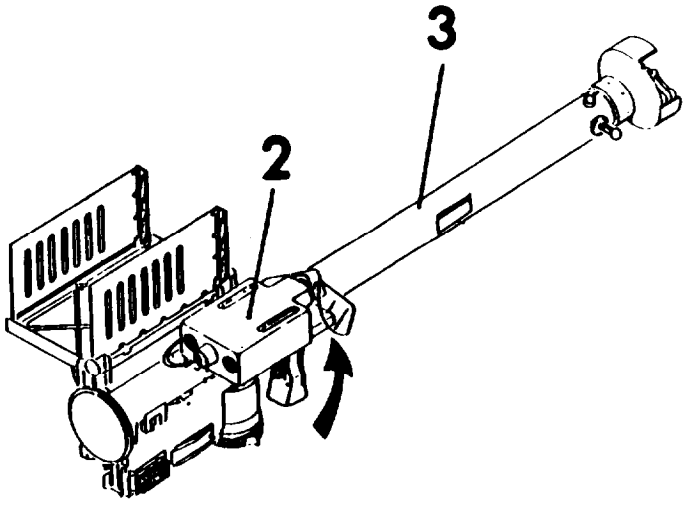


TORSO HARNESS

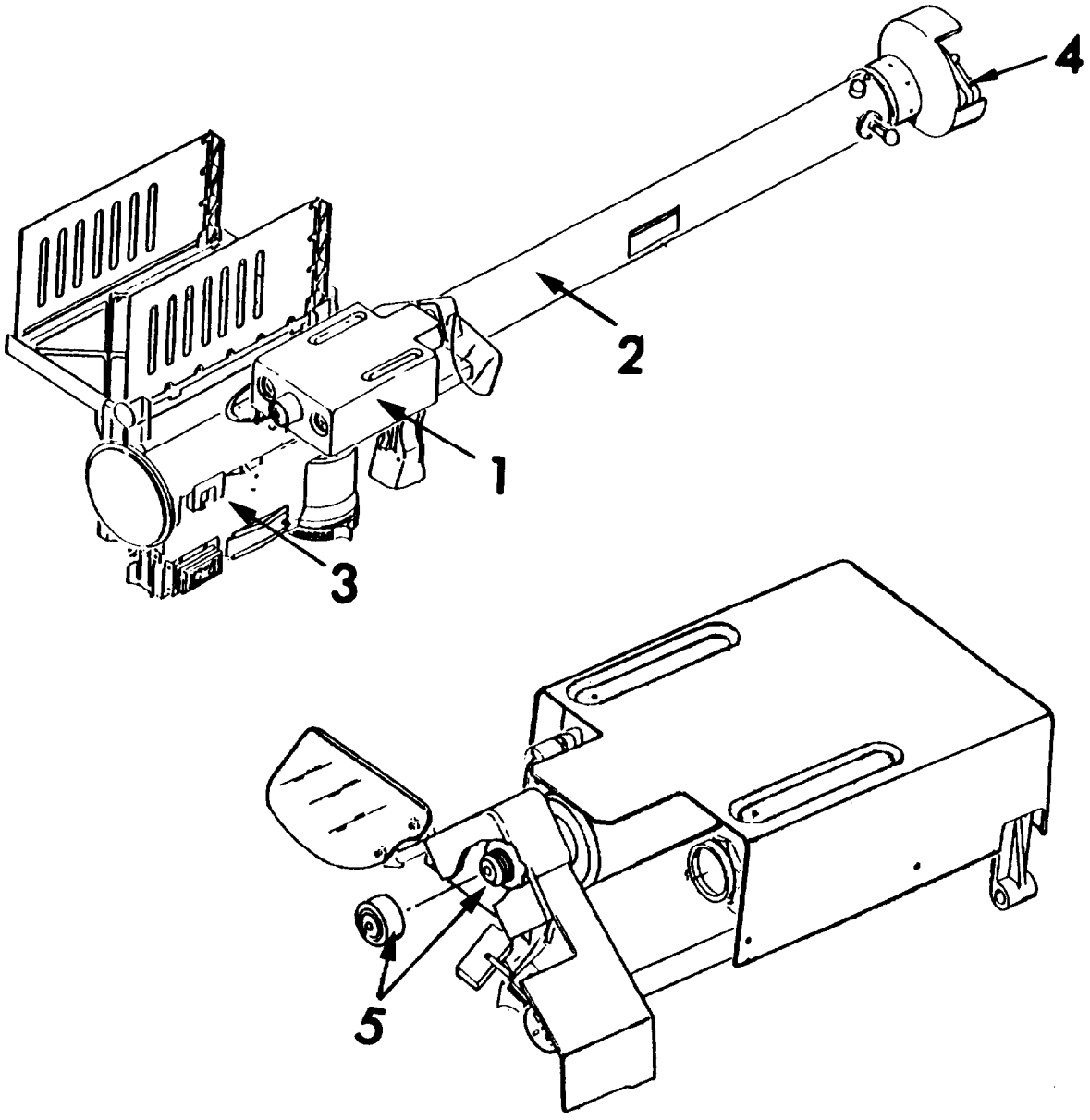
Preparation Task 2: Inspect and Service MILES Stinger.



Open MILES IFF antenna (1) using same procedure as with actual Stinger weapon.



Rotate transmitter assembly (2) around tube assembly (3) until it snaps into place.



Inspect MILES Stinger assembly for visible damage that would prevent assembly or use. Perform Preventive Maintenance Checks and Services (PMCS) Table 2-4, on transmitter assembly, (1), tube assembly (2), gripstock assembly (3), and ATWESS (4).

Remove any condensation from lens (5) on rear of telescope.

Report any damage on DA Form 2404. Replace MILES Stinger Assembly only if not operable.

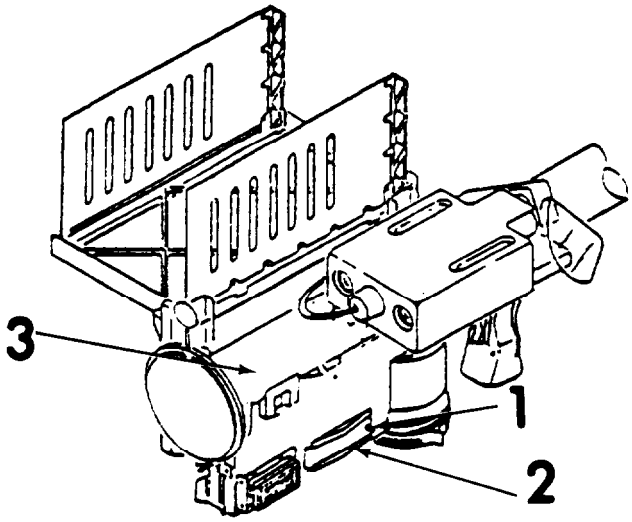
INITIAL ADJUSTMENTS, DAILY CHECKS, AND SELF TEST

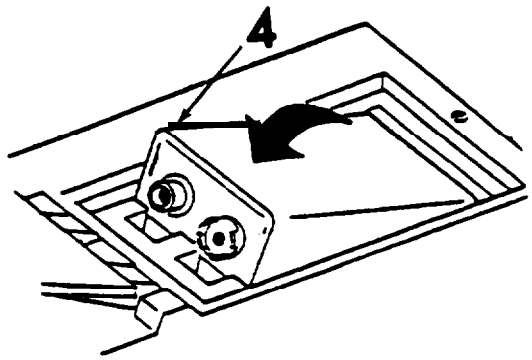
CHECKOUT TASKS

NOTE

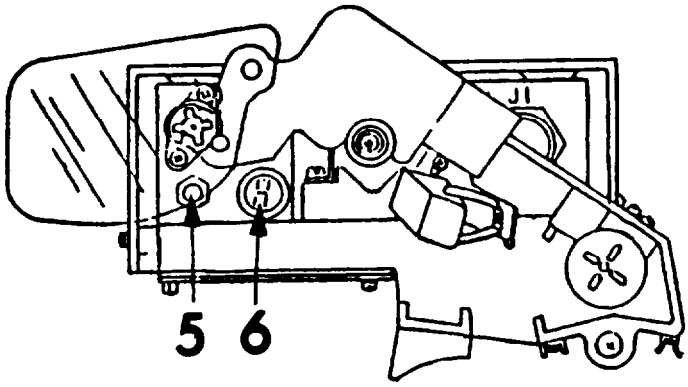
System checkout must be performed prior to each training exercise. These Checkout Tasks are normally performed at your place of issue. For these tasks you will require the assistance of the Controller.

Perform these steps in the order given.

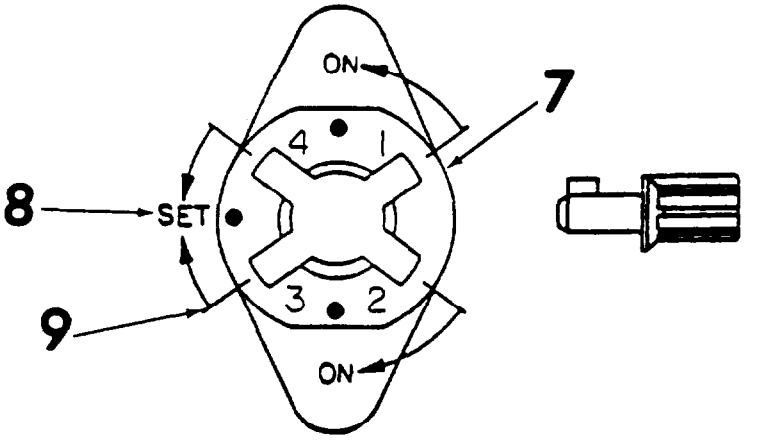




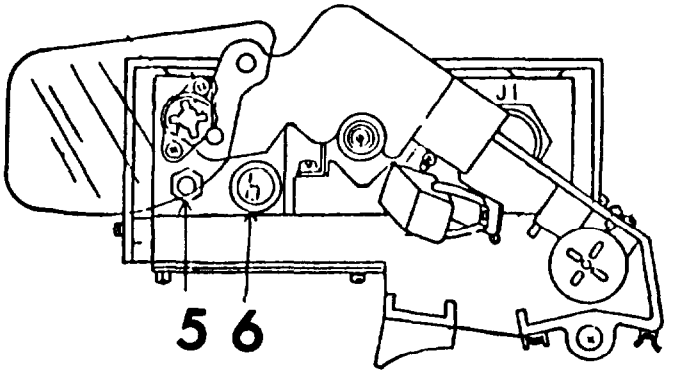
Loosen thumbscrew (1) and open battery box door (2) on gripstock (3). Put in battery (4) as shown, close door and tighten thumbscrew.



Push display button (5) on transmitter. Rounds remaining display (6) should be blank.



Have the Controller insert the controller (green) key in key receptacle (7) at either switch position 3 or 4. Turn to SET (8). Turn to switch position three (9) then remove key. This step places MILES Stinger in Dry Fire (Test) Mode.



Push display button (5). Verify rounds remaining display (6) indicates 6 rounds.

CHECKOUT TASKS (Cont).

Insert weapon (yellow) key (10) in key receptacle (7) at switch position 1 and turn to ON (11). Leave weapon key in ON position.

Remove and reinstall MILES BCU (12) in gripstock BCU housing (13).

MILES BCU MUST be installed to fire the Stinger. MILES BCU MUST be removed and reinstalled after each round fired or if the 47 second time period allowed prior to firing has elapsed.

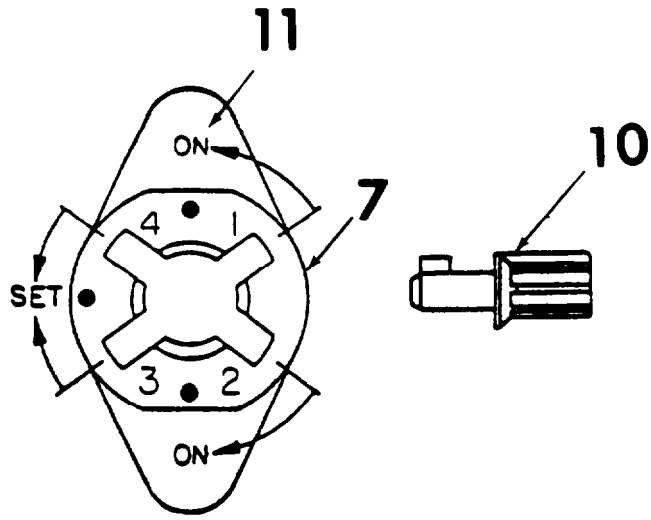
Operate safety and actuator device (14).

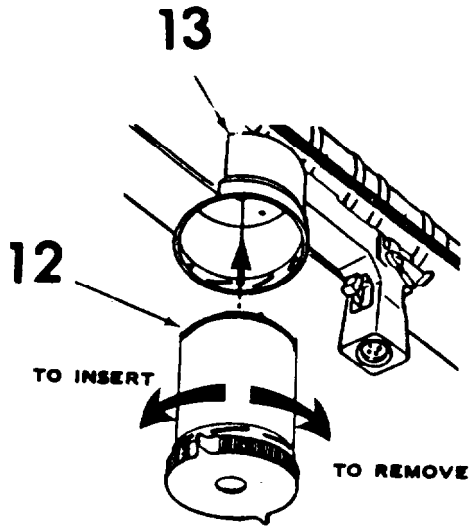
Listen for gyro spin-up tone and a distinct acquisition tone.

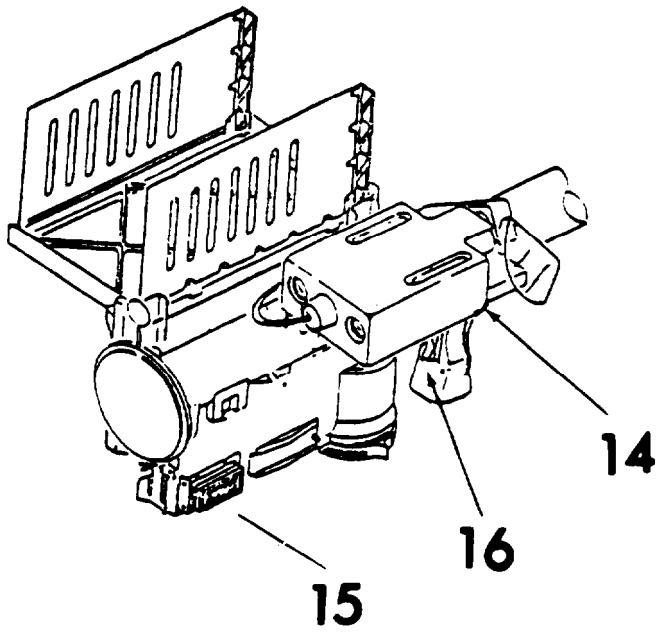
Press and hold uncaging switch (15).

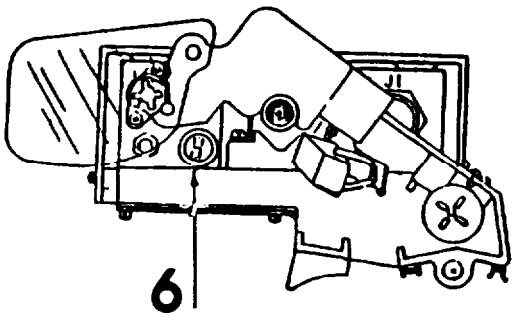
Listen for uncaged tone.

While observing display (6), squeeze trigger (16). Decimal point in display should light and remain on for approximately 6.5 seconds.

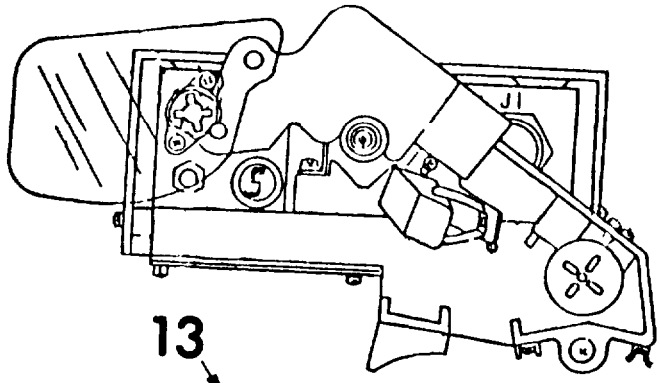




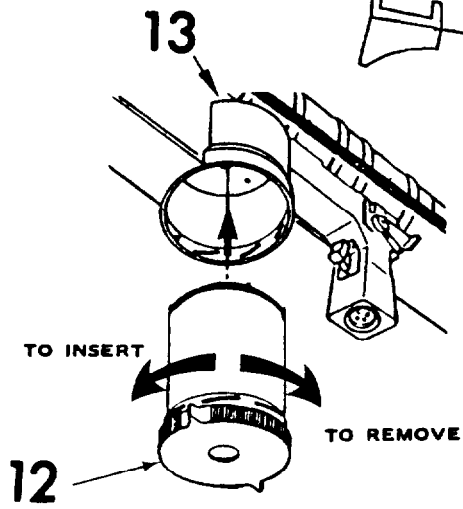




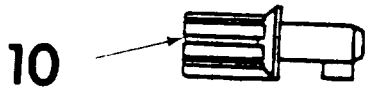
After firing is completed, verify display indication of 5.



Remove and reinstall MILES BCU (12) in gripstock BCU housing (13).



Remove and retain the weapon key (10).



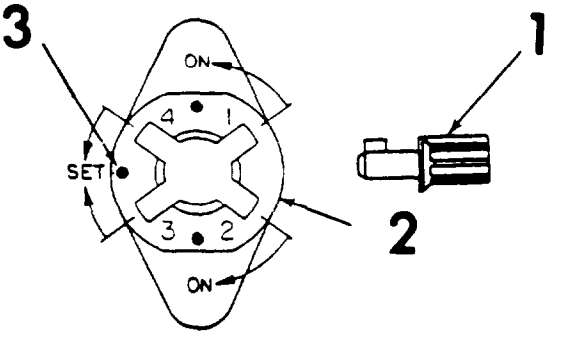
If you do not receive all of the proper displays and tones, refer to Chapter 3 for Troubleshooting Procedures.

This completes your checkout task.

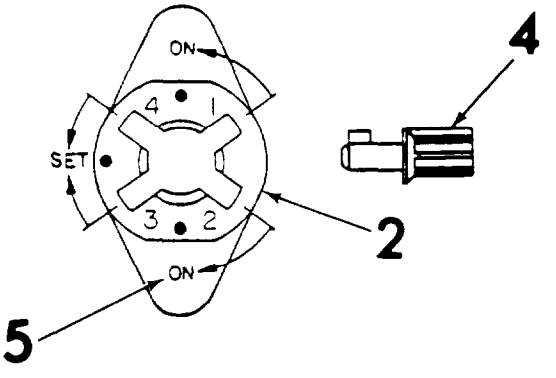
PRE-OPERATION TASKS. Pre-Operation tasks are performed just prior to participating in a training exercise. For this task you will require the assistance of a Controller.

Have the Controller insert the controller (green) key (1) in key receptacle (2) at switch position 3. Turn to SET (3). Turn to switch position 4. Then remove key.

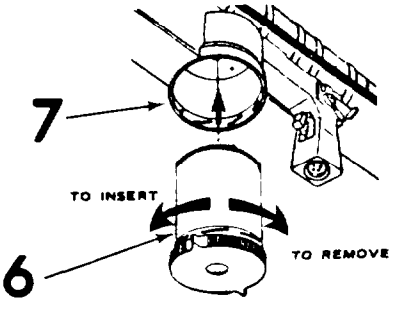
This step places MILES Stinger in ATWESS (Normal) Mode.

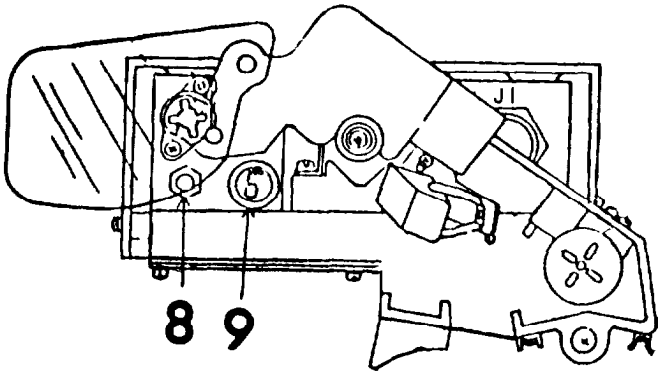


Insert weapon (yellow) key (4) in key receptacle (2) at switch position 2. Turn to ON (5). Leave weapon key in ON position.

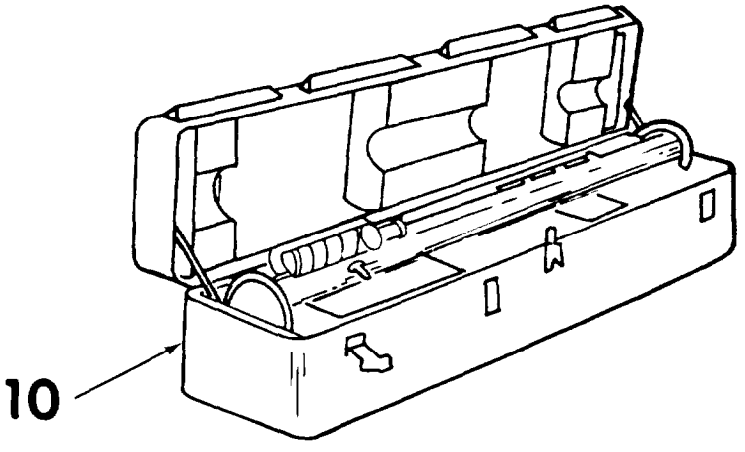


Remove and reinstall MILES BCU (6) in gripstock BCU housing (7).





Push display button (8) and verify rounds remaining display (9) of 6 rounds. You are now ready to train using the MILES Stinger weapon.



The MILES Stinger Weapon System may now be packed for transportation to the field if necessary. (See Postoperational Task 2, page 2-32)

After arrival in field, remove MILES Stinger from transit case (10). You may now proceed with exercises. A Controller is not needed to re-initialize the MILES Stinger weapon.

OPERATION TASKS - LIST

Operation Task 1: Stinger Weapon Procedures.

The MILES Stinger simulates the Stinger Weapon System. Procedures from Chapter 3, FM 44-18-1. for using and firing the Stinger Weapon will also be used for the MILES Stinger.

Stinger procedures to be used with MILES Stinger weapon include:

Readying the Stinger for Firing

Weapon Activation

Target Acquisition

IR Acquisition

Uncaging MILES Superelevation and Lead

Firing

MILES Tracking

Post Fire Procedures

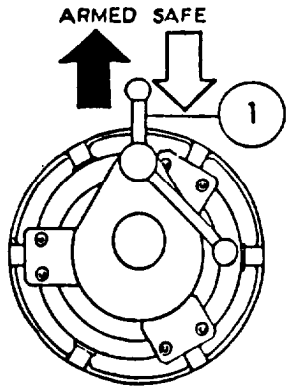
Operation Task 2: ATWESS Cartridge Installation.

WARNING

TREAT THE STINGER MILES AS YOU WOULD ANY LOADED AND ARMED WEAPON. DO NOT DROP WHEN ATWESS IS LOADED AND ARMED. A STRONG JOLT MAY SET OFF THE ATWESS.

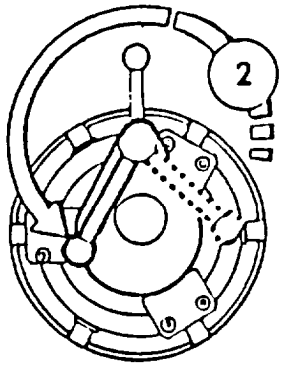
NEVER STAND BEHIND ATWESS WHEN ARMING ATWESS OR LOADING ATWESS CARTRIDGES.

DO NOT DO THIS TASK UNLESS YOU ARE PREPARING TO FIRE.



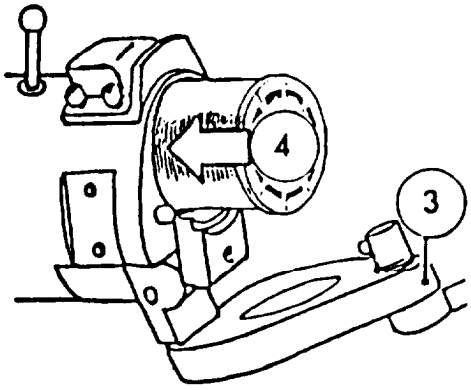
Push SAFE/ARM lever (1) to the "SAFE" position.

Move ATWESS breech lock lever (2) to the open position.

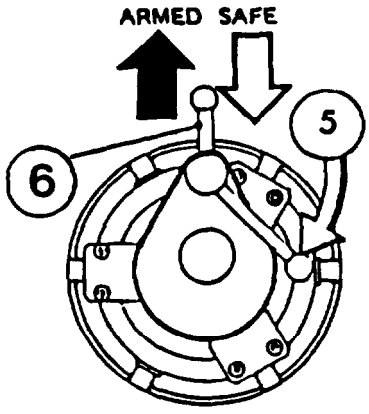


Open breech door (3) as far as it will go. This cocks the ATWESS. Visually check to see if the firing pin is protruding. If unsure, use one hand to feel if firing pin has retracted to its full length. If firing pin is protruding, or has not retracted to its full length, tag the ATWESS as unsafe, and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

Insert an ATWESS cartridge (4).



Operation Task 2: ATWESS Cartridge Installation (Cont.)



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 to the right side of the rear of the launcher, face away from the target, and use your right hand to close the breech door of the ATWESS. Move the breech lock lever to the closed position.

Pull SAFE/ARM lever (6) up to the "ARM" position.

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

Operation Task 3: Arming MILES Stinger.

WARNING

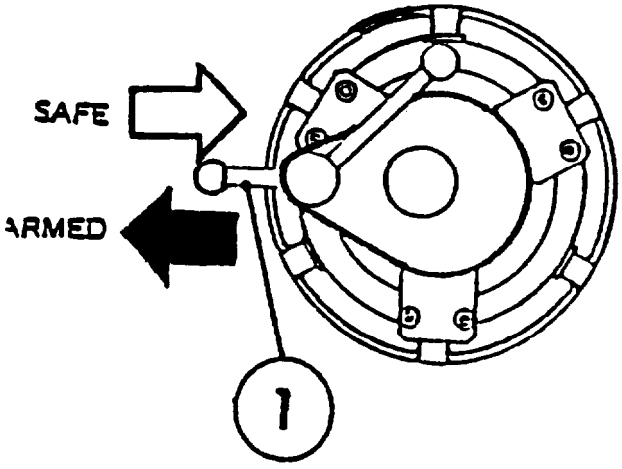
Always assume that the ATWESS device is armed and take appropriate safety measures.

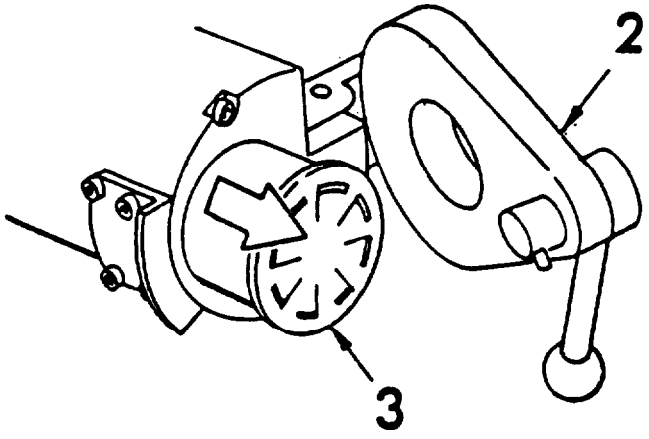
MILES Stinger should NOT be armed until just prior to acquisition of target.

Do NOT drop an armed MILES Stinger. A strong jolt may trigger the ATWESS. Treat the MILES Stinger as you would any loaded and armed weapon.

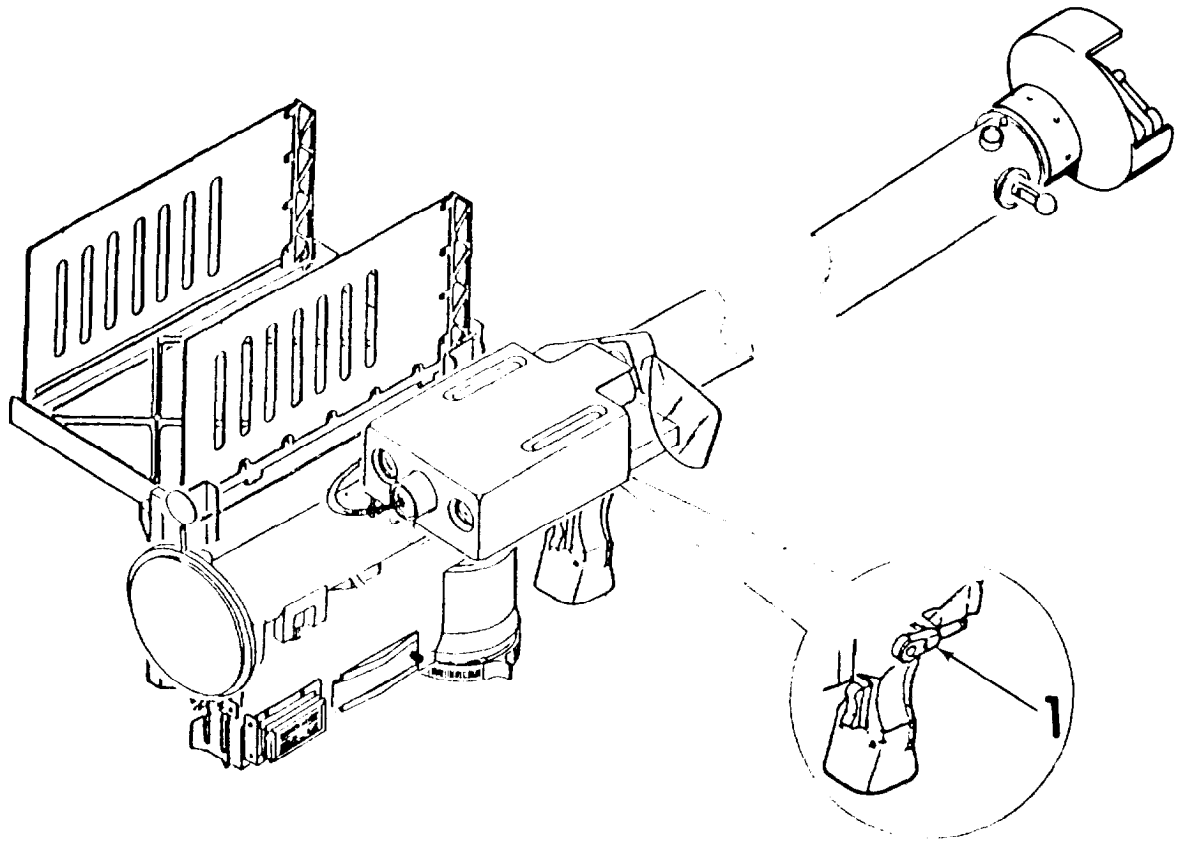
MILES Stinger is armed by pulling out the ATWESS SAFE/ARM shaft (1).

If you decide not to fire, push ATWESS SAFE/ARM shaft to SAFE position. Then open breech door (2) and remove cartridge (3).





Operation Task 4: MILES Stinger Activation.



WARNING

Do NOT fire the MILES STINGER weapon until the area immediately to the rear of the Stinger ATWESS is clear of all personnel and equipment.

MILES Stinger is activated with the safety and actuator device (1) on the gripstock. Once activated, you have approximately 47 seconds to fire MILES Stinger. The following conditions MUST be met to start 47 second time period.

a. Rounds not depleted

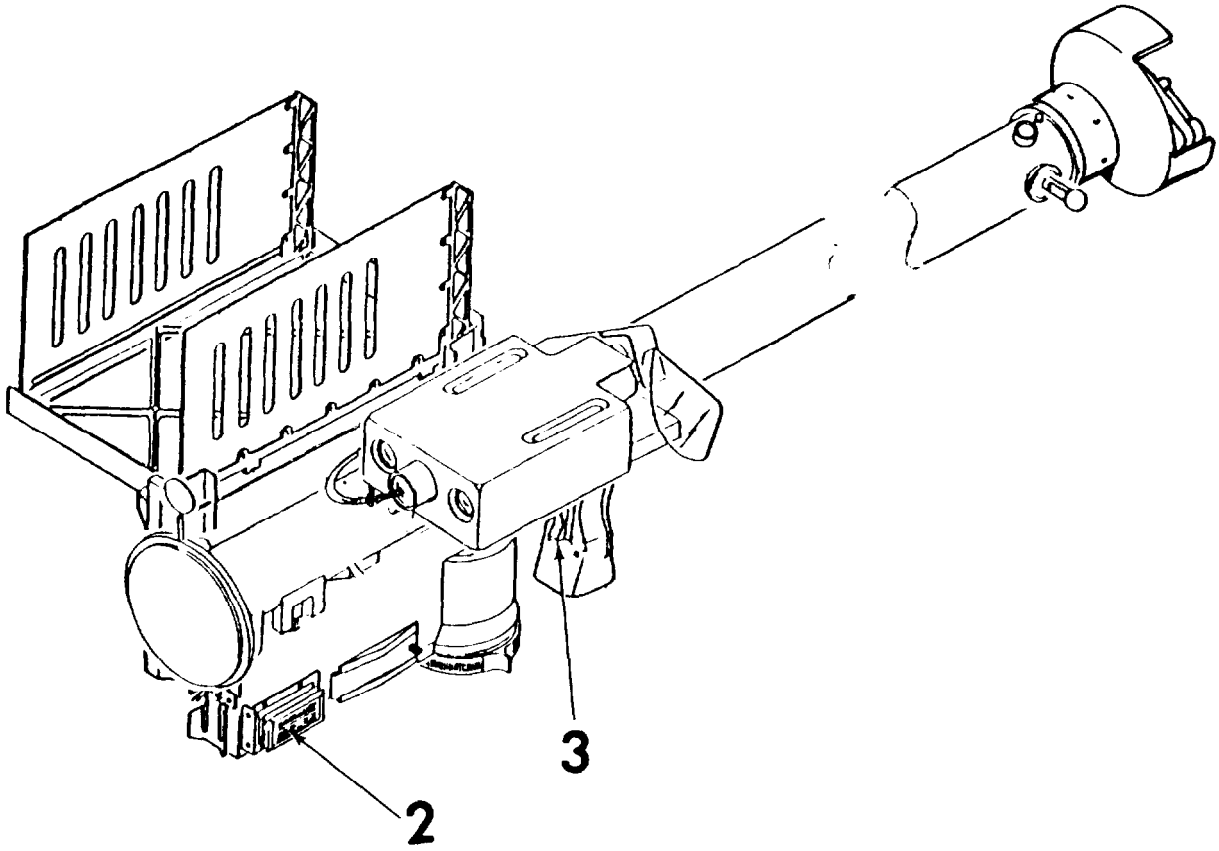
b. Dummy battery removed and reinstalled

c. Weapon key engaged

d. Live ATWESS cartridge installed

e. ATWESS device armed

Operation Task 4: MILES Stinger Activation (Cont).



If you have NOT fired MILES Stinger within 47 seconds after activation. the system will de-activate. To re-activate MILES Stinger, you must perform the following:

Remove and re-insert dummy battery (BCU). Re-engage safety and actuator device.

After pushing the actuator switch. a “spin-up” tone will be audible for one second. This will be followed by a “caged non-acquisition” tone lasting an additional second. This initial two second period following activation is warmup time and no other switch or operations are required during this period.

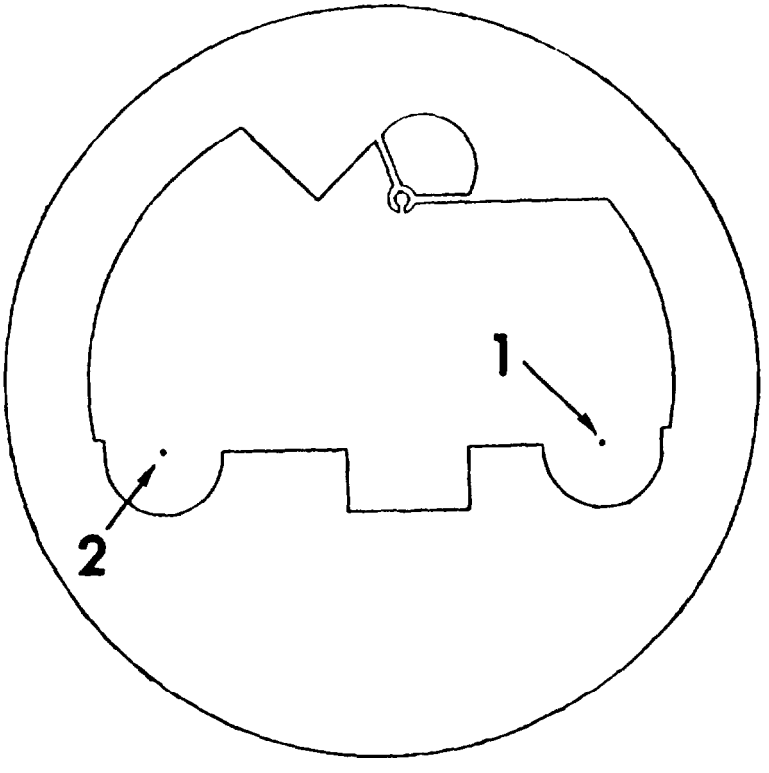
A “caged acquisition” tone starts after warmup and continues for 45 seconds or until the uncaging switch (2) is drpressed. An “uncaged” tone begins following Gyro Uncaging switch activation.

The uncaging switch (2) may be drpressed any time after the first two seconds and before the 47 second activatior period has ended.

The Stinger trigger (3) must be pressed during the same time period as the uncage switch is activated and before the 47 second activation period has ended. All audio tones (except the ATWESS when in ATWESS mode) cease when the trigger is pressed.

Operation Task 5: MILES Superelevation and Lead.

Both the left and right reticles contain small dots (1, 2) at their centers. The two laser tubes have been factory aligned to these dots. When you apply superelevation and lead to MILES Stinger, ensure that one of these dots remains centered on the target. After squeezing trigger, keep reticle dot centered on target for the duration of laser firing (approximately 6.5 seconds).



Operation Task 6: Observing Your Target.

If detectors on your target sense laser fire, an alarm will sound in the aircraft intercom. In addition, you will observe the following:

For a “NEAR MISS”, the strobe light attached to the aircraft skid will flash twice.

For a “HIT”, the strobe light will flash four to six times

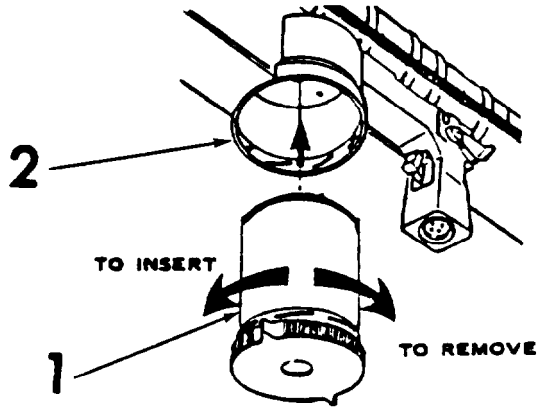
For a “KILL”, the strobe light will flash continuously and a smoke device also attached to the aircraft skid will activate.

Operation Task 7: MILES Post Fire Procedures.

Remove MILES BCU (1) from battery receptacle (2).

NOTE

The MILES BCU dummy battery must be removed after each round is fired. Re-insert the BCU when you are preparing to fire MILES Stinger again.



Remove spent cartridges from ATWESS.

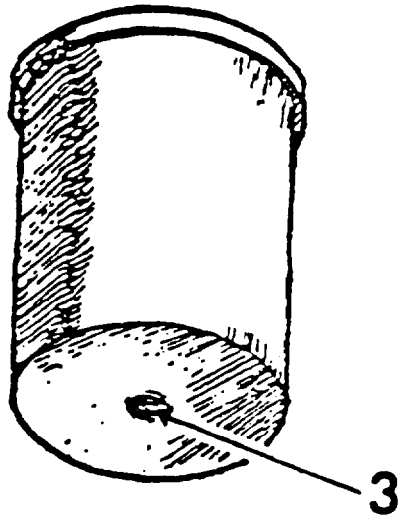
IF ATWESS CARTRIDGE DOES NOT FIRE:

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

  Inspect the cartridge primer (3). If dented, treat the cartridge as a DUD. REPORT THE DUD CARTRIDGE TO YOUR NCOIC FOR DISPOSAL.

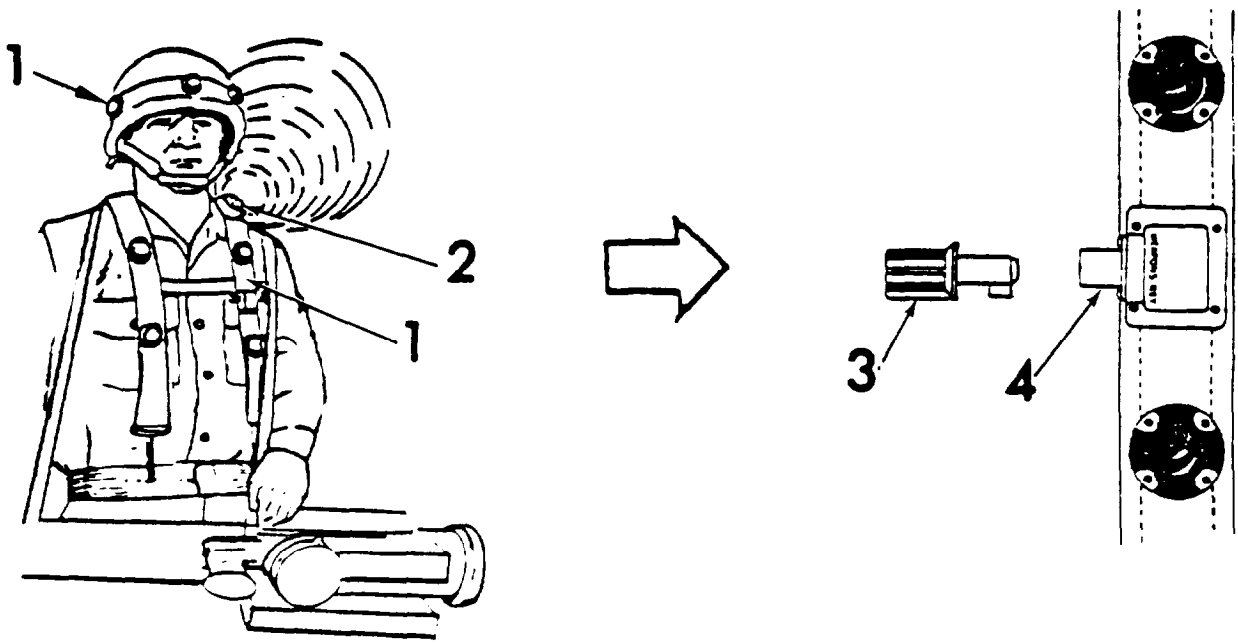
  Press the display button. Check the rounds remaining display. If no rounds are remaining, RESET the system.

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



Operation Task 8: Recognizing Enemy Fire.

During MILES training exercises all soldiers will be issued a Man Worn Laser Detector assembly (1) (Section II, Appendix C). These items are issued separately from the MILES Stinger. Complete instructions for preparing, wearing, using and maintaining the Man Worn Laser Detector assembly is found in TM 9-1265-370-10-1.



If you are hit by enemy fire, the buzzer (2) on your MWLD will sound. A short beep indicates a "NEAR MISS." A continuous alarm means you have been "KILLED." To turn off alarm after a "KILL":

(1) Remove Yellow weapon key (3) from Stinger transmitter.

(2) Insert key in receptacle (4) on torso harness and turn key to silence alarm.

NOTE

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

Operation Task 9: Resetting After a Kill.

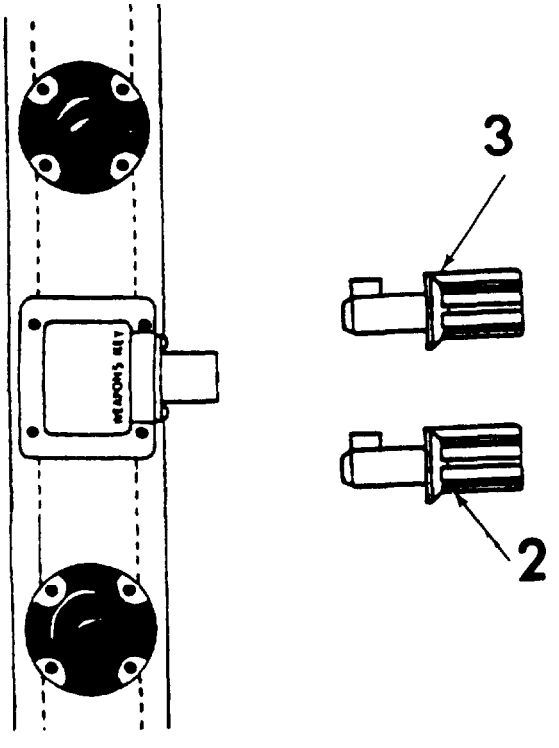
To reset your MWLD (1) after a "KILL."

Ask your NCOIC to call the Controller.

Remove Yellow weapon key (2) from torso harness. Alarm will sound.

Ask controller to use his Green key (3) to silence your alarm.

Put Yellow weapon key back in Stinger transmitter and turn to ON position.



NOTE

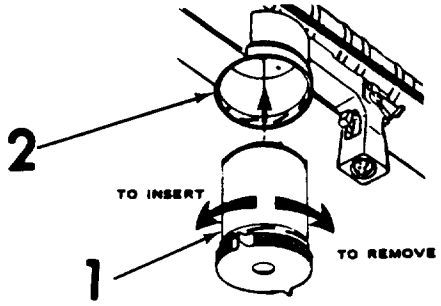
If you are "KILLED," another soldier can still use your MILES Stinger by inserting his Yellow weapon key in the MILES Stinger key receptacle and turning it to the ON position. This will disable his present weapon (for example. M16 Al rifle).

POSTOPERATIONAL TASKS - LIST

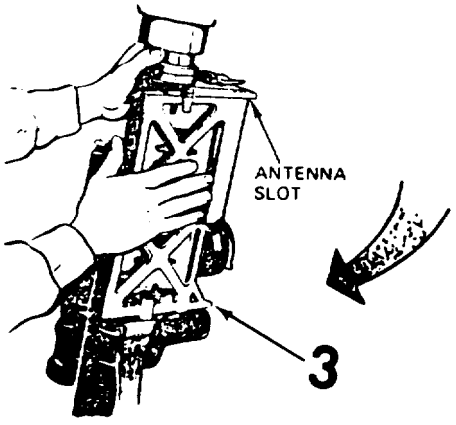
Perform these tasks in the order given.

Postoperational Task I: Inspect and Service MILES Stinger. Inspect and service MILES Stinger using PMCS Table 2-4.

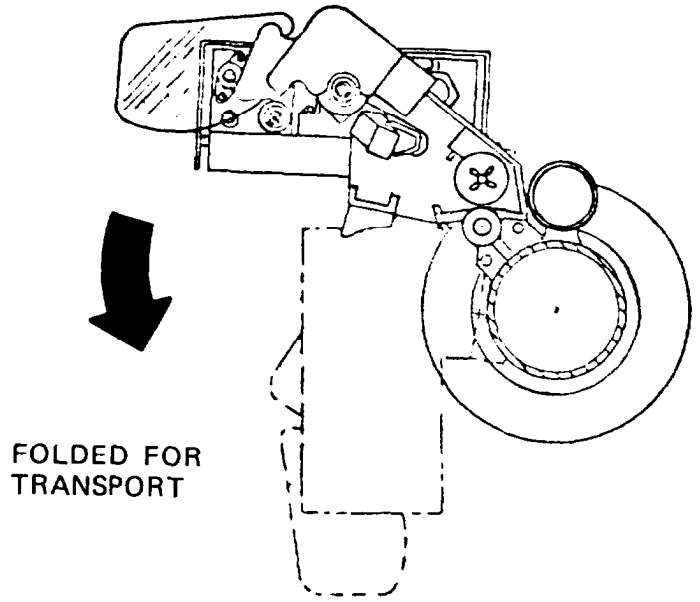
Postoperational Task 2: Store MILES Stinger.



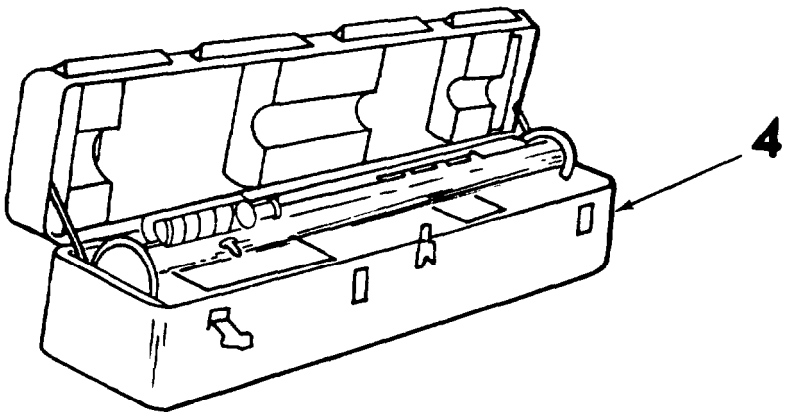
Remove and reinstall MILES BCU (1) in gripstock BCU housing (2).



Fold down IFF antenna (3) for storage.



Release and rotate transmitter assembly for storage.



Store MILES Stinger in transit case (4) as shown.

SECTION IV. OPERATION UNDER UNUSUAL CONDITIONS

Under unusual conditions, operational procedures for the MILES equipment have the same limitations as the Stinger Weapon System. (See TM 9-1425-429-12.)

CHAPTER 3

MAINTENANCE INSTRUCTIONS

SECTION I. LUBRICATION INSTRUCTIONS

The ATWESS device requires operator lubrication in the MILES Stinger.

Before use and as needed during operation of the ATWESS device, perform the following lubrication instructions:

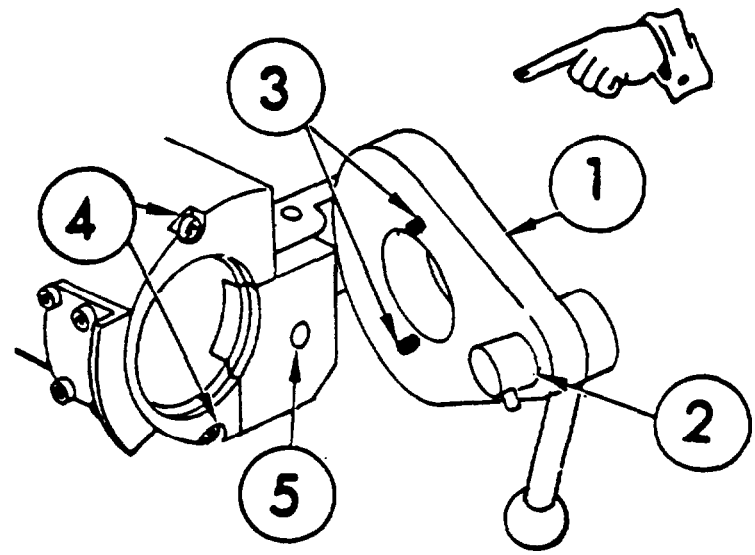
Use CLP (see item 3, appendix D) to clean powder from breech door (1) breech lock lever (2) and contacts (3) in breech door.

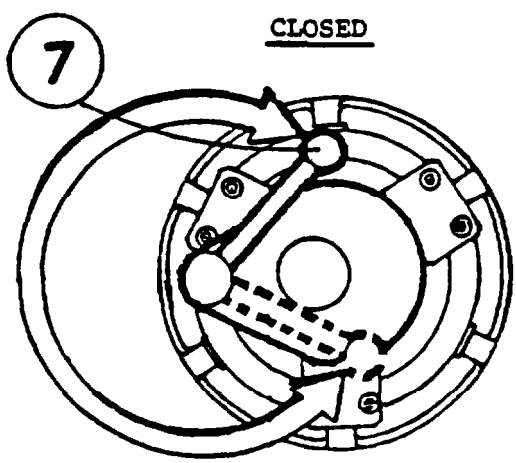
Use CLP to clean powder from terminals (4) in breech block. Also, clean entire breech block.

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

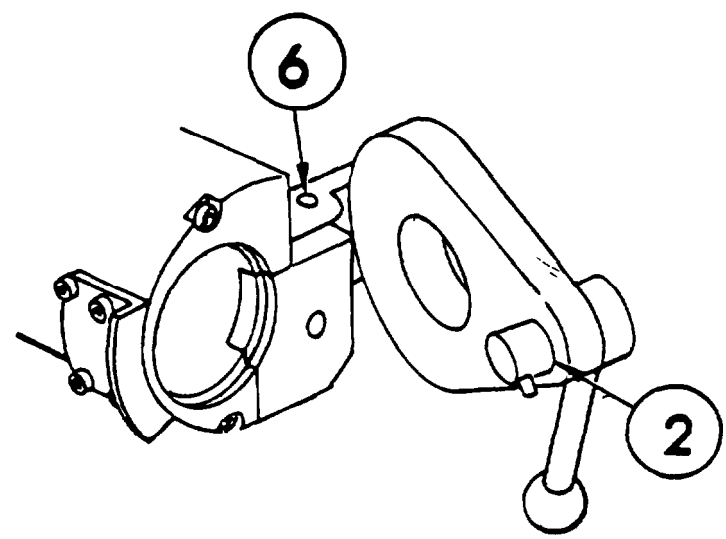
Put drop of CLP at breech door hinge (6) and breech lock lever (2).

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





OPEN



SECTION II. TROUBLESHOOTING PROCEDURES

Table 3.1 lists the common malfunctions may find during operation or maintenance of the MILES simulator system for the Stinger Weapon System 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 NCOIC.

SYSTEM INDEX

(NO TEST SET)

Table 3-1. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

NOTE

During this Troubleshooting procedure, any item that is replaced - that is, removed from service - should be tagged with a DA Form 2402.

1. STINGER TRANSMITTER ASSEMBLY

(1) Improper Display Indication

Remove 9 V battery from STINGER Gripstock. Wait five seconds and reinstall 9 V battery.

Insert Controller (Green) Key into WEAPON key receptacle. Turn to SET. Pause one second, then remove key at position 3.

Depress Display Pushbutton and verify Display indicates 6.

If display indication is correct, return Stinger system to service.

If display is not correct, remove 9 V battery from gripstock. Insert new battery.

Insert Controller (Green) Key into WEAPON key receptacle. Turn to SET. Pause one second, then remove key at position 3.

Depress Display Pushbutton and verify Display indicates 6.

If display is correct, discard old battery and return Stinger system to service.

If display is not correct, replace defective Stinger system.

(2) Improper or No Audio Tones

(2.1) No Tone - Test Mode

Depress Display Button and verify rounds are remaining. If no rounds are remaining, reset the system.

Verify a Weapon (Yellow) Key is installed in the WEAPON key receptacle at position 1 and is rotated counterclockwise to the ON position.

Remove Gripstock BCU. Pause one second, then insert battery.

Actuate the Safety and Actuator Device. Verify an audible tone.

If audible tone is present, return system to service.

If no audible tone is present, replace defective Stinger system.

Table 3-1. Troubleshooting (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
(2) Improper or No Audio Tones (Cont)
(2.2) No Tone - Normal Mode
Depress the Display Button and verify rounds are remaining. If no rounds are remaining, reset the system.
Verify a Weapon (Yellow) Key is installed in the WEAPON key receptacle at position 2 and is rotated clockwise to the ON position.
Remove Gripstock BCU. Pause one second, then insert battery.
Verify a “LIVE” ATWESS cartridge is installed in the ATWESS device.
Actuate Safety and Actuator Device. Verify an audible tone.
If an audible tone is present, return system to service.
If no audible tone is present, place the ATWESS Safe/Arm shaft in the SAFE position.
Open ATWESS breech door. Rotate the ATWESS cartridge 90° Close and lock the breech door.
Actuate the Safety and Actuator Device. Verify an audible tone.
If an audible tone is present, return system to service.
If no audible tone is present, replace defective STINGER system.
(2.3) Audio Tone Level Is Weak
Remove the 9 V battery from the STINGER Gripstock. Insert a NEW 9 V battery.
Step-up and fire the STINGER system. Verify the audio tone level is normal.
If tone level is acceptable, return system to service.
If tone level is unacceptable, replace the defective STINGER system.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

(2.4) Improper Tone

Improper Tones in the STINGER system indicate a problem with the STINGER system.

Replace defective STINGER system.

(3) No Laser Output

Failure of the STINGER system to produce laser output from one or both laser tubes when all other parameters function correctly, i.e., display and tone indications, indicates a problem with the STINGER system.

Replace defective STINGER system.

2. GRIPSTOCK ASSEMBLY

(1) ATWESS Does Not Operate/Misfire

Remove ATWESS cartridge from the ATWESS.

Check the cartridge primer and verify primer is dented.

If primer is dented, the ATWESS cartridge is a dud. Dispose of cartridge in accordance with local EOD procedures.

If primer is not dented, the ATWESS has not fired. Replace the ATWESS cartridge in the ATWESS device. Close and lock the breech door.

Verify a Weapon (Yellow) Key is installed in the WEAPON key receptacle at position 2 and is rotated clockwise to the ON position.

Depress the Display Button and verify rounds are remaining. If no rounds are remaining, reset the system.

Arm the ATWESS device by pulling out ATWESS Safe/Arm shaft.

Trigger the STINGER system. Verify that ATWESS fires.

If ATWESS fires, return system to service.

If ATWESS fails to fires, replace defective STINGER system.

CHAPTER 4

AMMUNITION

SECTION I. MILES AUTHORIZED AMMUNITION (ATWESS)

The ATWESS cartridge (P/N 11749630) is the only type of cartridge authorized for use with the MILES equipment installed on the Stinger Weapon System.

WARNING

Handle ATWESS cartridges with the same care you use with live ammunition. A strong jolt may trigger the ATWESS cartridge.

Do not store MILES Stinger containing ATWESS cartridges.

Do not stand behind ATWESS when loading ATWESS cartridges into Stinger.

If ATWESS cartridge does not fire, be sure firing device is turned off before attempting to remove. Wait 5 minutes before removing.

If cartridge has cracks, tears, punctures in copper disk, or if cartridge primer is dented, return to your NCOIC for disposal IAW local EOD procedures.

If cartridge primer is not dented after attempting to fire, the ATWESS itself has not fired. Put another cartridge in ATWESS. Return unused cartridge to storage.

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals, and miscellaneous publications 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
FM 44-18-1	Stinger Team Operations

A-4. TECHNICAL MANUALS

TM 9-1425-429-12	Operator's and Organizational Maintenance Manual for Intercept Aerial Guided Missile System (Stinger)
TM 9-1265-209-10-HR	Hand Receipt for Simulator System, firing, Laser: Stinger Weapon System
TM 9-1265-370-10-1	Simulator System, Firing Laser: M60 for M16A1 Rifle

A-5. MISCELLANEOUS PUBLICATIONS

AR 310-2	Identification and Distribution of DA Publications
SB11-6	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 Stinger Weapon 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 Stinger Weapon System in operation. to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the MILES Stinger Weapon 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.

NOTE

National stock numbers (NSNs) have not been assigned to all COEI, BII, and AAL items because these items are presently supported by contractor logistics support (CLS). When decision is made to assume Government support, NSNs will be assigned, and hand receipt entries (columns a, c, d, and e) will be furnished.

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 No.	National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty. rqr.
1		DELETED		
2	1265-01-159-0485	Simulator System, Firing Laser: Stinger (19200) 9339569	AY	1
3	*	Transit Case (19200) 9339566	CO	1
4	1265-01-076-1993	Weapon Key, Man (19200) 11749094-1	EA	1

* Not Available on Publication Date.

*U.S. GOVERNMENT PRINTING OFFICE: 1988 542-043/80204

SECTION III. BASIC ISSUE ITEMS

1 ea. TM 9-1265-209-10	Operator's Manual f/Simulator System, Firing, Laser: M77 f/Stinger Weapon System

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 Stinger Weapon System.

C-2. GENERAL

This list identifies items that do not have to accompany the MILES Stinger Weapon 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	(3) U/M	(4) Qty. Auth.
1265-01-075-4893	Detector Assembly, Simulator System, Laser: Manworn (19200) 11748808	AY	2

INDEX

INDEX (CONT)

INDEX (CONT)

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

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* U.S. GOVERNMENT PRINTING OFFICE: 1984-554-049:10033

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

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DATE SENT

Date you send in form

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1265-209-10	1 FEB 1984	(MILES) Simulator System Firing, Laser: M74 for Stinger Weapon System

BE EXACT. PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.
8	5		
12	1		
12	7		
14	4		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Line 5. Change spelling of word unitl to read until

Change the word harnesses to read harness

Change to read: Ask controller to insert his green key into the key receptacle and turn off alarm.

Delete the word it from sentence

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN SMITH SP/3 XXX-XXXX

SIGN HERE:

John Smith

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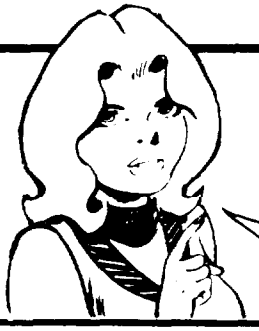

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PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1265-209-10	22 Oct 84	Simulator System Firing, Laser: M74 For Stinger Weapon System

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

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

WEIGHTS

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

LIQUID MEASURE

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

SQUARE MEASURE

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

CUBIC MEASURE

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

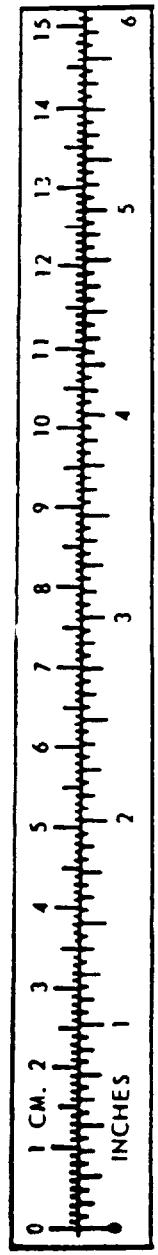
TEMPERATURE

$5/9\,(^{0}F - 32) = {}^{0}C$
212^{0} Fahrenheit is equivalent to 100^{0} Celsius
90^{0} Fahrenheit is equivalent to 32.2^{0} Celsius
32^{0} Fahrenheit is equivalent to 0^{0} Celsius
$9/5\,C^{0} + 32 = F^{0}$

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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