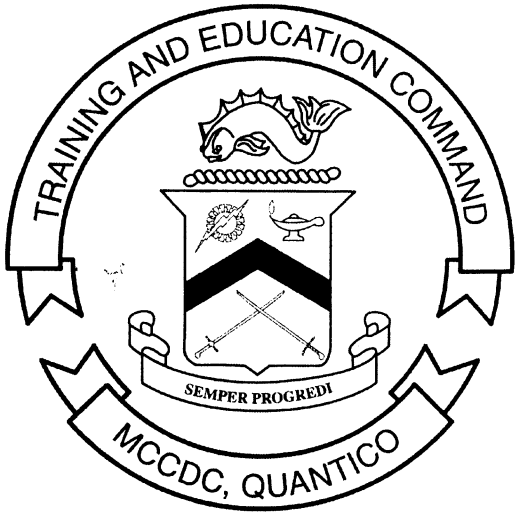
MCI 0355B

MARINE CORPS INSTITUTE



THE TOW 2 WEAPON SYSTEM CREWMAN

MARINE BARRACKS
WASHINGTON, DC

UNITED STATES MARINE CORPS
MARINE CORPS INSTITUTE, MARINE BARRACKS
BOX 1775
ARLINGTON, VA. 22222

03.55b
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1. ORIGIN

MCI course 03.55b, The Tow 2 Weapon System Crewman, has been prepared by the Marine Corps Institute.

2. APPLICABILITY

This course is for instructional purposes only.

J. M. D. HOLLADAY
Lieutenant Colonel, U. S. Marine Corps
Deputy Director

ERRATUM CHANGE PAGE TO COURSE MATERIAL

REVIEW LESSON

1. Purpose. The purpose of this change is to give the student current instructions regarding the instructions for the Review Lesson Examination page.

2. Action. Change the instructions found on page R-1 of this book to read as follows:

"The purpose of the review lesson examination is to prepare you for your final examination. We recommend that you try to complete your review lesson examination without referring to the text, but for those items (questions) you are unsure of, restudy the text. When you finish your review lesson and are satisfied with your responses, check your responses against the answers provided at the end of this review lesson examination.

Select the ONE answer that BEST completes the statement or that answers the item. For multiple choice items, circle your response. For matching items, place the letter of your response in the space provided."

3. This page is to be filed directly behind the Promulgation Letter of this course.

Table of Contents

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Student Information

Number and Title	MCI 0355B THE TOW 2 WEAPON SYSTEM CREWMAN
Study Hours	19
Course Materials	Text
Review Agency	Supporting Arms Group The Basic School
Reserve Retirement Credits (RRC)	6
ACE	Not applicable to civilian training/education
Assistance	For administrative assistance, have your training officer or NCO log on to the MCI home page at www.mci.usmc.mil. Marines CONUS may call toll free 1-800-MCI-USMC. Marines worldwide may call commercial (202) 685-7596 or DSN 325-7596.

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Study Guide

Congratulations

Congratulations on your enrollment in a distance education course from the Distance Learning and Technologies Department (DLTD) of the Marine Corps Institute (MCI). Since 1920, the Marine Corps Institute has been helping tens of thousands of hard-charging Marines, like you, improve their technical job performance skills through distance learning. By enrolling in this course, you have shown a desire to improve the skills you have and master new skills to enhance your job performance. The distance learning course you have chosen, MCI 0355B, *The TOW 2 Weapons System Crewman,* provides the TOW missile crewman with a basic knowledge of the TOW 2 system. The course emphasizes identification of major components, assembly, system checkout procedure, loading, and target engagement. This course will also provide instruction concerning immediate action procedures, operator maintenance, constructing and camouflaging a TOW fighting position, and preparing an anti-armor range card (TOW).

Your Personal Characteristics

- **YOU ARE PROPERLY MOTIVATED.** You have made a positive decision to get training on your own. Self-motivation is perhaps the most important force in learning or achieving anything. Doing whatever is necessary to learn is motivation. You have it!

- **YOU SEEK TO IMPROVE YOURSELF.** You are enrolled to improve those skills you already possess, and to learn new skills. When you improve yourself, you improve the Corps!

- **YOU HAVE THE INITIATIVE TO ACT.** By acting on your own, you have shown you are a self-starter, willing to reach out for opportunities to learn and grow.

- **YOU ACCEPT CHALLENGES.** You have self-confidence and believe in your ability to acquire knowledge and skills. You have the self-confidence to set goals and the ability to achieve them, enabling you to meet every challenge.

- **YOU ARE ABLE TO SET AND ACCOMPLISH PRACTICAL GOALS.** You are willing to commit time, effort, and the resources necessary to set and accomplish your goals. These professional traits will help you successfully complete this distance learning course.

Continued on next page

Study Guide, Continued

Beginning Your Course

Before you actually begin this course of study, read the student information page. If you find any course materials missing, notify your training officer or training NCO. If you have all the required materials, you are ready to begin.

To begin your course of study, familiarize yourself with the structure of the course text. One way to do this is to read the table of contents. Notice the table of contents covers specific areas of study and the order in which they are presented. You will find the text divided into several study units. Each study unit is comprised of two or more lessons, lesson exercises.

Leafing Through the Text

Leaf through the text and look at the course. Read a few lesson exercise questions to get an idea of the type of material in the course. If the course has additional study aids, such as a handbook or plotting board, familiarize yourself with them.

The First Study Unit

Turn to the first page of study unit 1. On this page, you will find an introduction to the study unit and generally the first study unit lesson. Study unit lessons contain learning objectives, lesson text, and exercises.

Reading the Learning Objectives

Learning objectives describe in concise terms what the successful learner, you, will be able to do as a result of mastering the content of the lesson text. Read the objectives for each lesson and then read the lesson text. As you read the lesson text, make notes on the points you feel are important.

Completing the Exercises

To determine your mastery of the learning objectives and text, complete the exercises developed for you. Exercises are located at the end of each lesson, and at the end of each study unit. Without referring to the text, complete the exercise questions and then check your responses against those provided.

Continued on next page

Continuing to March

Continue on to the next lesson, repeating the above process until you have completed all lessons in the study unit. Follow the same procedures for each study unit in the course.

Preparing for the Final Exam

To prepare for your final exam, you must review what you learned in the course. The following suggestions will help make the review interesting and challenging.

- **CHALLENGE YOURSELF.** Try to recall the entire learning sequence without referring to the text. Can you do it? Now look back at the text to see if you have left anything out. This review should be interesting. Undoubtedly, you'll find you were not able to recall everything. But with a little effort, you'll be able to recall a great deal of the information.

- **USE UNUSED MINUTES.** Use your spare moments to review. Read your notes or a part of a study unit, rework exercise items, review again; you can do many of these things during the unused minutes of every day.

- **APPLY WHAT YOU HAVE LEARNED.** It is always best to use the skill or knowledge you've learned as soon as possible. If it isn't possible to actually use the skill or knowledge, at least try to imagine a situation in which you would apply this learning. For example make up and solve your own problems. Or, better still, make up and solve problems that use most of the elements of a study unit.

- **USE THE "SHAKEDOWN CRUISE" TECHNIQUE.** Ask another Marine to lend a hand by asking you questions about the course. Choose a particular study unit and let your buddy "fire away." This technique can be interesting and challenging for both of you!

- **MAKE REVIEWS FUN AND BENEFICIAL.** Reviews are good habits that enhance learning. They don't have to be long and tedious. In fact, some learners find short reviews conducted more often prove more beneficial.

Continued on next page

Study Guide, Continued

Tackling the Final Exam

When you have completed your study of the course material and are confident with the results attained on your study unit exercises, take the sealed envelope marked **"FINAL EXAM"** to your unit training NCO or training officer. Your training NCO or officer will administer the final examination and return the examination and the answer sheet to MCI for grading. Before taking your final examination, read the directions on the DP-37 answer sheet carefully.

Completing Your Course

The sooner you complete your course, the sooner you can better yourself by applying what you've learned! HOWEVER--you do have 2 years from the date of enrollment to complete this course.

Graduating!

As a graduate of this distance education course and as a dedicated Marine, your job performance skills will improve, benefiting you, your unit, and the Marine Corps.

Semper Fidelis!

STUDY UNIT 1

INTRODUCTION TO THE TOW 2 SYSTEM

STUDY UNIT OBJECTIVE: TO IDENTIFY THE COMPONENTS OF THE TOW 2 SYSTEM AND THEIR PURPOSES.

The TOW 2 weapon system (fig 1-1) is a heavy antitank weapon designed to attack and defeat armored vehicles and other hard targets such as field fortifications. The system is operated by a gunner and assistant gunner.

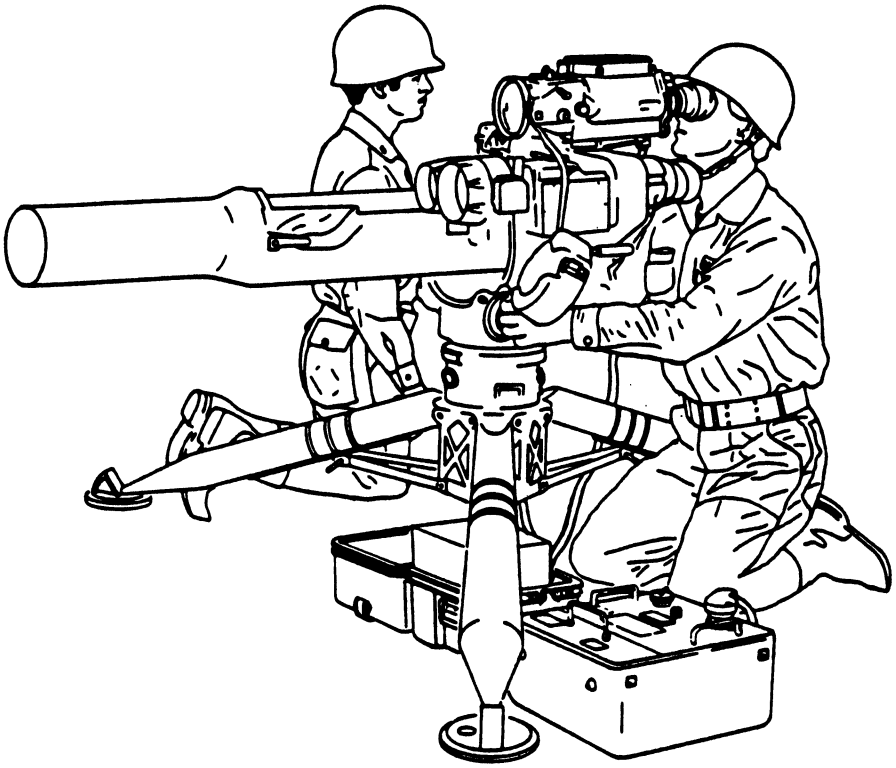


Fig 1-1. TOW 2 weapon system.

The TOW 2 weapon system has the following capabilities and features:

- Operates in all weather and battlefield conditions, day or night.
- Operates in temperatures of -25 degrees to +140 degrees Fahrenheit.
- Operates at altitudes up to 3,050 meters (10,000 feet).
- High first-round-hit chance against moving or stationary targets.
- Rapid displacement to avoid being seen or to engage targets not within range.
- Mounting kits allow mounting on several different vehicles.
- Easily installed or removed without tools.
- Weapon system can be checked out by self-test without the use of test equipment.
- Failed components can be replaced at the operating site.
- Minimum and maximum effective ranges of 65 and 3,750 meters.

Work Unit 1-1. TOW 2 MAJOR COMPONENTS

TERMINAL LEARNING OBJECTIVE: Identify the major components of the TOW 2 and the purpose of each component.

ENABLING LEARNING OBJECTIVE:

A. Identify the major components of the TOW 2.

B. State the correct purpose of each component.

The TOW 2 weapon system consists of a launcher and encased missile. The launcher consists of a launch tube, traversing unit, missile guidance set, two battery assemblies (one spare), day sight tracker, tripod, power conditioner, and a night sight (fig 1-2).

Components of TOW 2 Weapon System

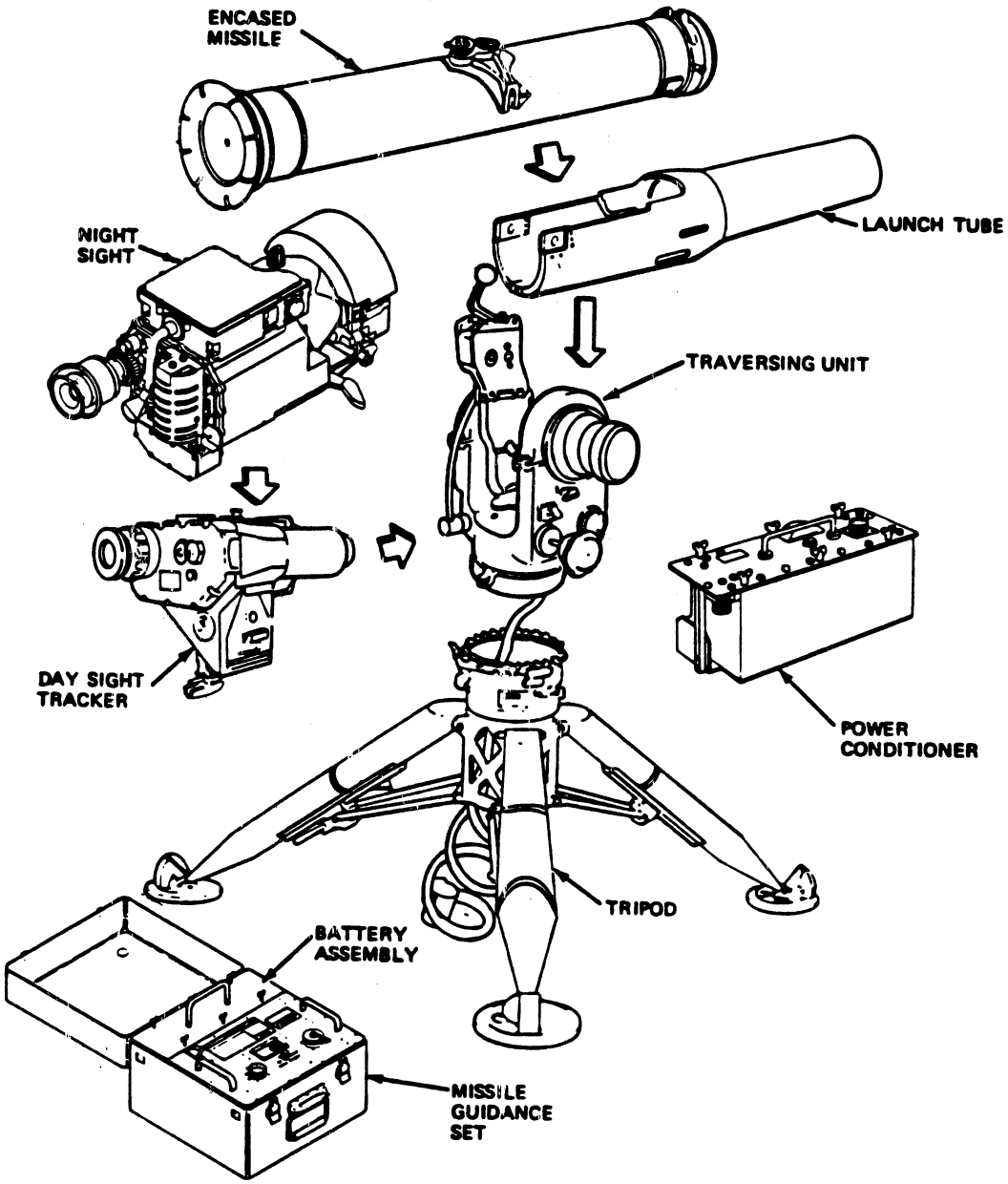


Fig 1-2. TOW 2 major components.

The launch tube (fig 1-3):

- Holds the nose end of the encased missile.
- Provides mechanical guidance for the first part of missile flight.
- Protects the missile crew from the missile launch motor blast.

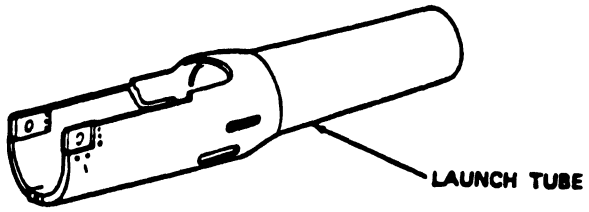


Fig 1-3. Launch tube.

The traversing unit (fig 1-4):

- Allows the gunner to track a target 360 degrees in azimuth.
- Allows the gunner to track from +30 degrees (above horizontal) to -20 degrees (below horizontal) in elevation.
- Contains the trigger used to fire the missiles.
- Contains the arming lever and electrical connector between the launcher and the encased missile.

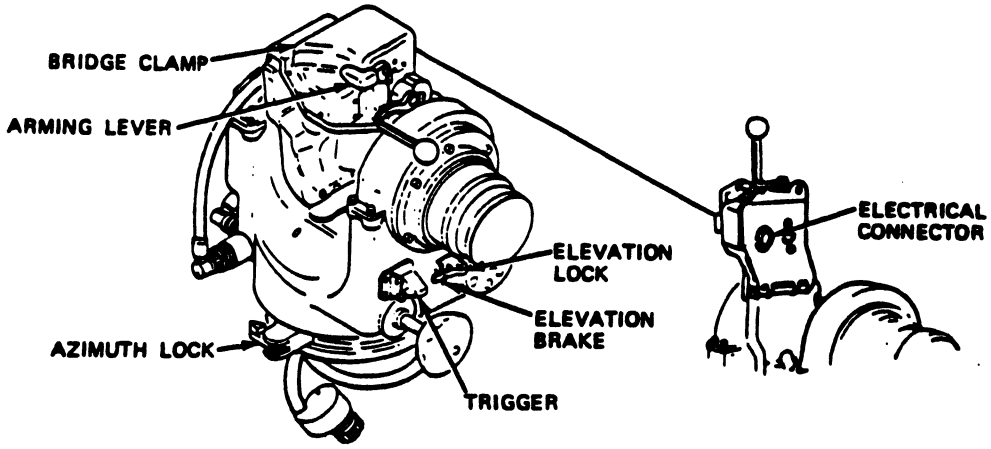


Fig 1-4. Traversing unit.

The missile guidance set (MGS) (fig 1-5):

- Contains electronic circuits required for missile control and launcher checkout purposes.
- Contains controls on the front panel to let the operator select the following modes of operation:

Tactical operation

System checkout

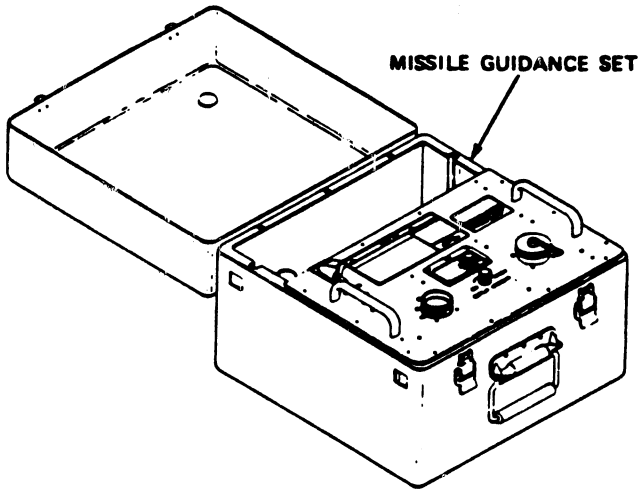


Fig 1-5. Missile guidance set.

The battery assembly (fig 1-6):

- Has enough energy for at least 50 missile firings or training exercises when fully charged.
- Is easily removed from and installed in the missile guidance set.
- Is long-lasting because they can be charged repeatedly on the TOW battery charger.
- Has two battery assemblies issued with each TOW launcher. One is installed in the missile guidance set and one is a spare.

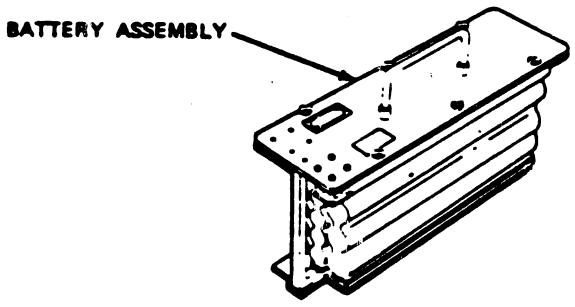


Fig 1-6. Battery assembly.

The day sight tracker(fig 1-7):

- o Enables the operator to track the target.
- o Has a 13 power objective lens for enlargement of distant targets.
- o Has crosshairs for accurate sighting.
- o Has an internal light to brighten crosshairs.
- o Contains eyepiece focus control to adjust the eyepiece until the crosshairs can be seen clearly.
- o Has a protective window in front of each lens assembly to seal out dirt and water.
- o Has boresight adjustment knobs to align the visual system(Line of Sight)(LOS) with the infrared system.
- o Has a bracket for mounting the thermal night sight.
- o Has a latch assembly for easy installation on or removal from the traversing unit.
- o Contains a dehumidifier container for holding dessicant to help keep water from forming on the optical surfaces inside the day sight tracker.

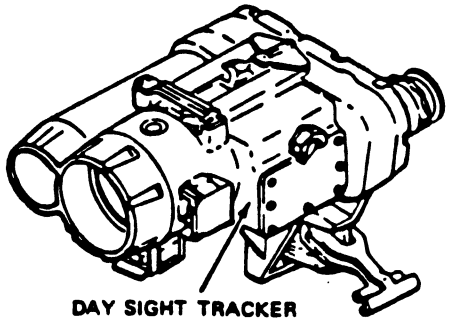


Fig 1-7. Day sight tracker.

The tripod (fig 1-8):

- o The tripod holds the traversing unit, day sight tracker, launch tube, and encased missile.
- o Tripod legs can be adjusted so the tripod is level.
- o Two level vials (bubble level indicators) tell you when the tripod is level.
- o Tripod anchor feet have anchor claws to secure the tripod to the ground.
- o Tripod anchor feet have holes so that pegs can be added for additional stability.
- o Quick release coupling clamp allows for easy installation or removal of the traversing unit.

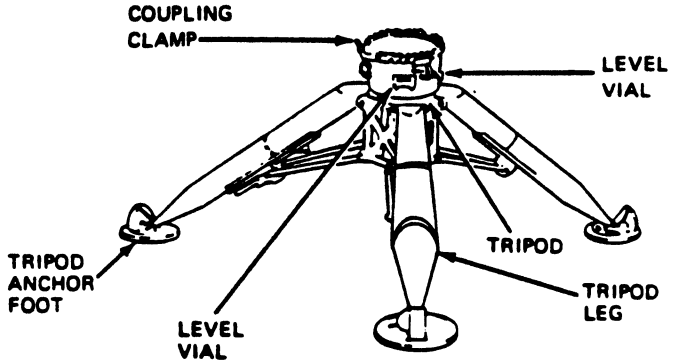


Fig 1-8. Tripod.

The thermal night sight (TNS)(fig 1-9):

- o Enables the gunner to view targets in darkness, heavy fog, and smoke.
- o Is lightweight and easy to move.
- o Runs off the night sight battery power conditioner or vehicle power.
- o Has two fields-of-view:
  - Narrow field-of-view (NFOV)(12 power)
  - Wide field-of-view (WFOV)(4 power)
- o Has adjustments to align the thermal night sight with the day sight tracker.

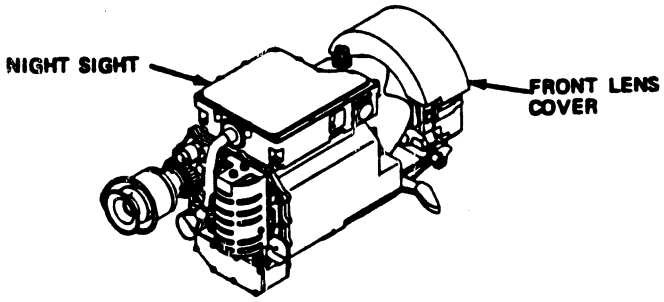


Fig 1-9. Thermal night sight.

The power conditioner (fig 1-10):

- o Replaces the battery assembly for the missile guidance set in the vehicle mounted TOW 2 weapon system.
- o Changes vehicle power to power needed to operate the missile guidance set.

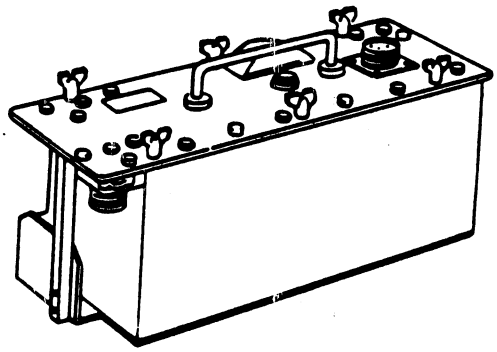


Fig 1-10. Power conditioner.

The encased missile (fig 1-11):

- o Is the ammunition fired from the TOW 2 launcher.
- o Has forward and rear handling rings for easy handling and missile protection.
- o Has a humidity indicator in the rear to show if the missile has moisture in it.
- o Is easy to load in the launch tube.

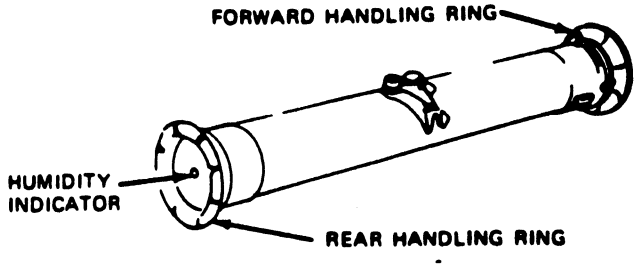
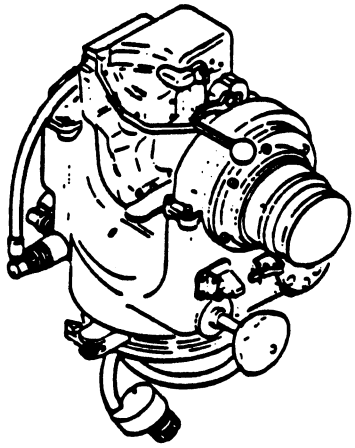


Fig 1-11. Encased missile.

EXERCISE: Answer the following questions and check your responses against those listed at the end of this study unit.

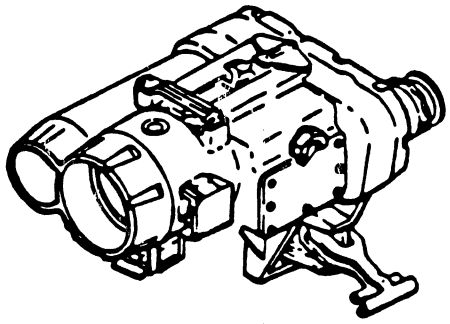
1. Identify the component illustrated below:



2. What is the purpose of the component illustrated above?

   a. Holds the nose end of the encased missile.
   b. Required for missile control and system checkout.
   c. Allows the gunner to track a target 360 degrees in azimuth.
   d. Changes vehicle power to power needed in the missile guidance set.

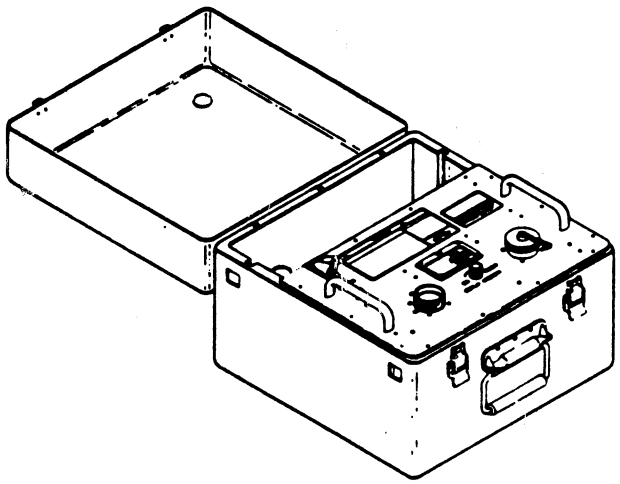
3. Identify the component illustrated below:



4. What is the purpose of the component illustrated above?

   a. Has enough energy for at least 50 missile firings.
   b. Enables the gunner to track the target.
   c. Allows the gunner to track from +30 to -20 degrees in elevation.
   d. Provides mechanical guidance for the first part of missile flight.

5. Identify the component illustrated below:



6. What is the purpose of the component illustrated above?

   a. Allows the gunner to track a target 360 degrees in azimuth.
   b. Has enough energy for at least 50 missile firings.
   c. Changes vehicle power to power needed in the thermal night sight.
   d. Contains electronic circuits required for missile control and system checkout.

Work Unit 1-2. TOW 2 THERMAL NIGHT SIGHT ASSOCIATED COMPONENTS

TERMINAL LEARNING OBJECTIVE: Identify the associated components of the thermal night sight and the purpose of each component.

ENABLING LEARNING OBJECTIVE:

A. Identify the associated components of the thermal night sight.

B. State the correct purpose of each component.

The thermal night sight has associated components needed to complete or upgrade its effectiveness. These include the boresight collimator, night sight vehicle power conditioner, night sight battery power conditioner, night sight spare battery pack, power cables, carrying cases, and an equipment cover.

The boresight collimator (fig 1-12):

- Aligns the thermal night sight to the day sight tracker.
- Latches to the front of the night sight.
- Operates off the power of the night sight.

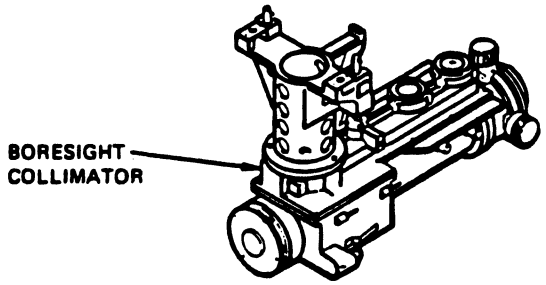


Fig 1-12. Boresight collimator.

The night sight vehicle power conditioner (fig 1-13):

- Enables the thermal night sight to operate from vehicle power instead of the portable battery.

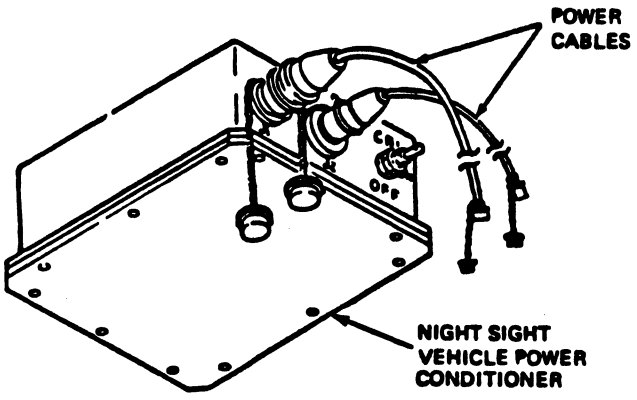


Fig 1-13. Night sight vehicle power conditioner.

The night sight battery power conditioner (fig 1-14):

- Powers the thermal night sight when a vehicle power conditioner is not available. It also powers the boresight collimator through the thermal night sight junction box.
- Has an operating time of 2.0 hours between -5 and +125 degrees F and contains two night sight batteries.
- Holds the power cables 2W1 and 2W2.

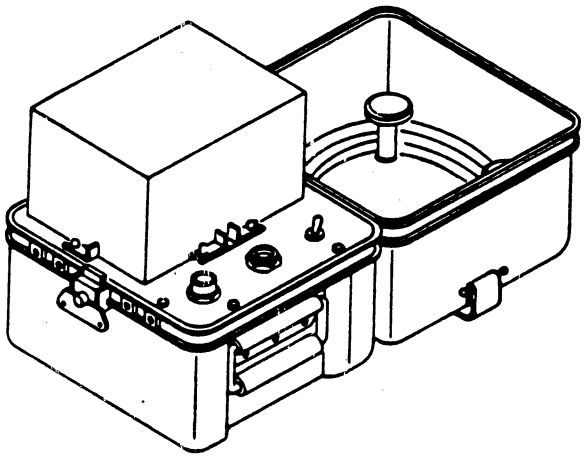


Fig 1-14. Night sight battery power conditioner.

The night sight spare battery pack (fig 1-15):

- Houses two spare lithium batteries for the night sight battery power conditioner.

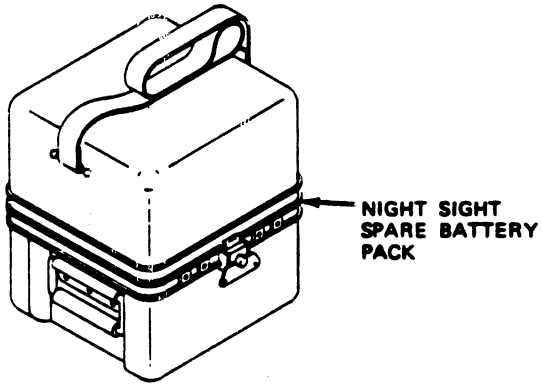


Fig 1-15. Night sight spare battery pack.

The power cables (fig 1-16):

- o Cable 2W1 allows electrical interconnection between the night sight vehicle power conditioner and the 24-volt vehicle power conditioner.
- o Cable 2W2 allows electrical interconnection between the night sight vehicle power conditioner and the night sight.
- o Boresight collimator power cable connects between the boresight collimator and the thermal night sight.

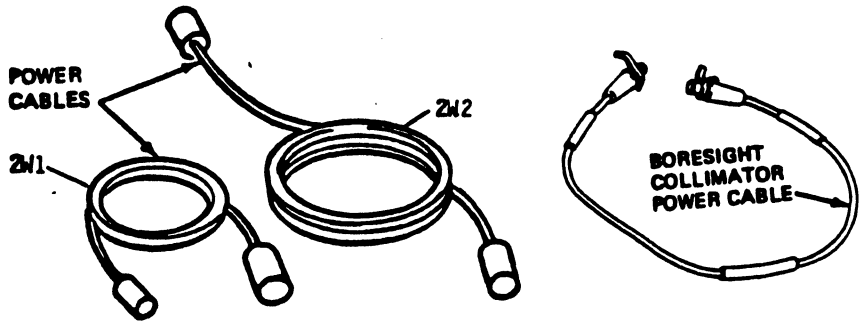


Fig 1-16. Power cables.

The night sight field handling case (fig 1-17):

- o Used for storing the thermal night sight.
- o Stores the boresight collimator power cable.

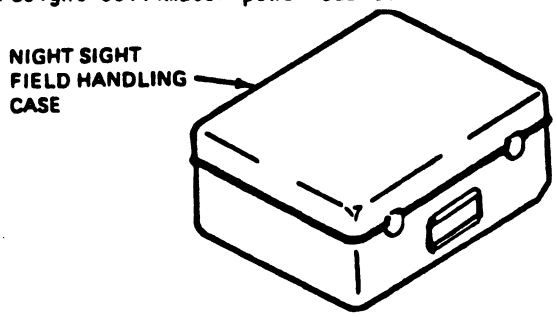


Fig 1-17. Night sight field handling case.

The boresight collimator carrying case (fig 1-18):

- o Stores the boresight collimator.

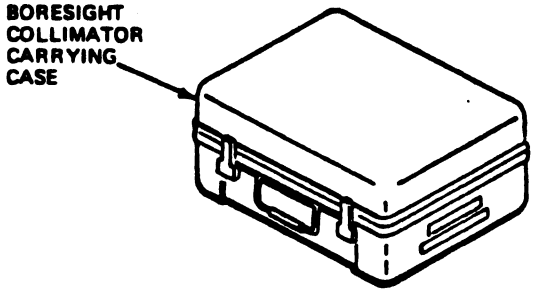


Fig 1-18. Boresight collimator carrying case.

The equipment cover (fig 1-19):

- o Protects the thermal night sight during limited travel and bad weather.
- o Is a canvas bag secured over the thermal night sight with drawstrings.

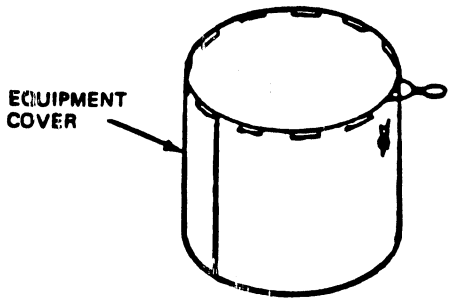


Fig 1-19. Equipment cover.

The lens cleaning materials (fig 1-20):

- o Used to clean the lens on the night sight and day sight tracker.

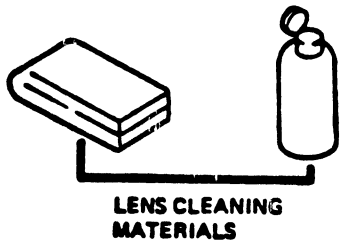


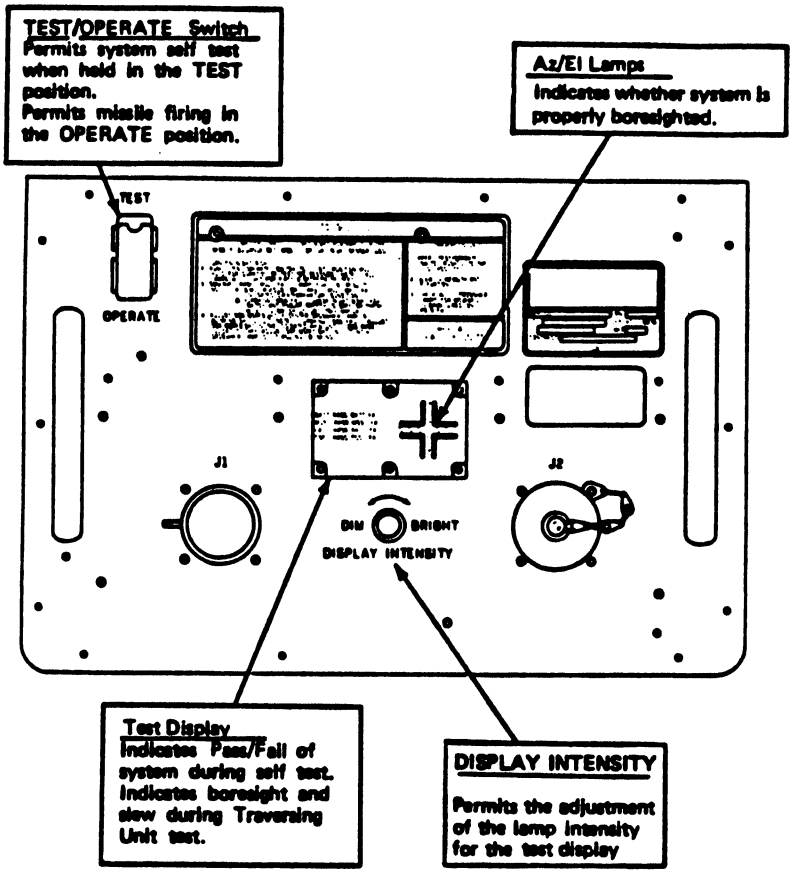
Fig 1-20. Lens cleaning materials.

Description and use of controls and indicators.

This section will identify the controls and indicators of some of the components shown in this study unit. Listed next to each control or indicator is the name, or name and brief description.

Note: You will not be tested on this section. It is important that you recognize the controls and indicators. You will find that this information will assist you as you continue this course.

Missile guidance set (MGS) panel (fig 1-21)



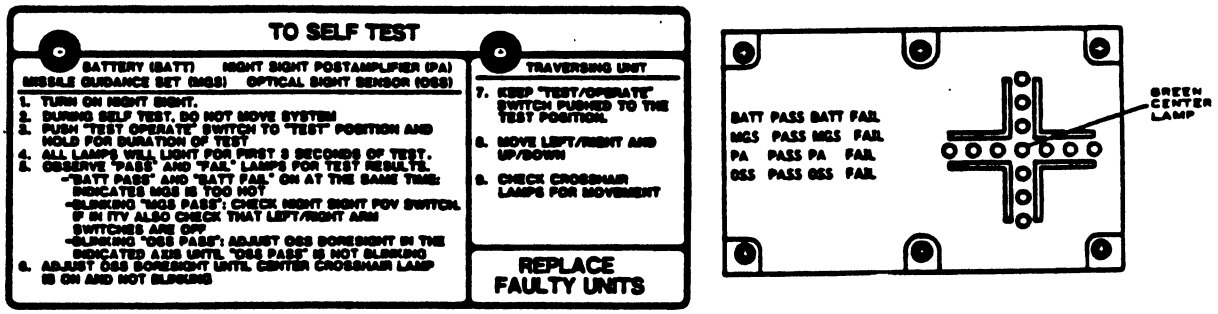


Fig 1-21. Missile guidance set (MGS) panel.

Day sight tracker (fig 1-22)

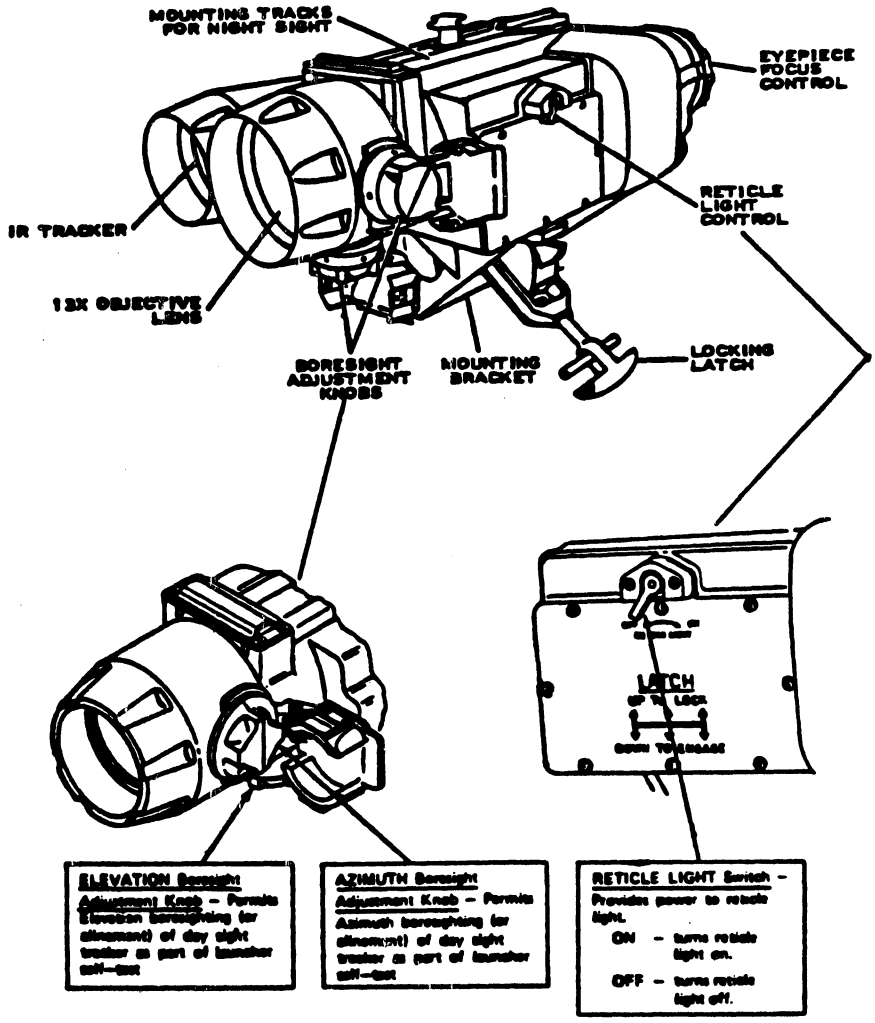


Fig 1-22. Day sight tracker.

Traversing unit (fig 1-23)

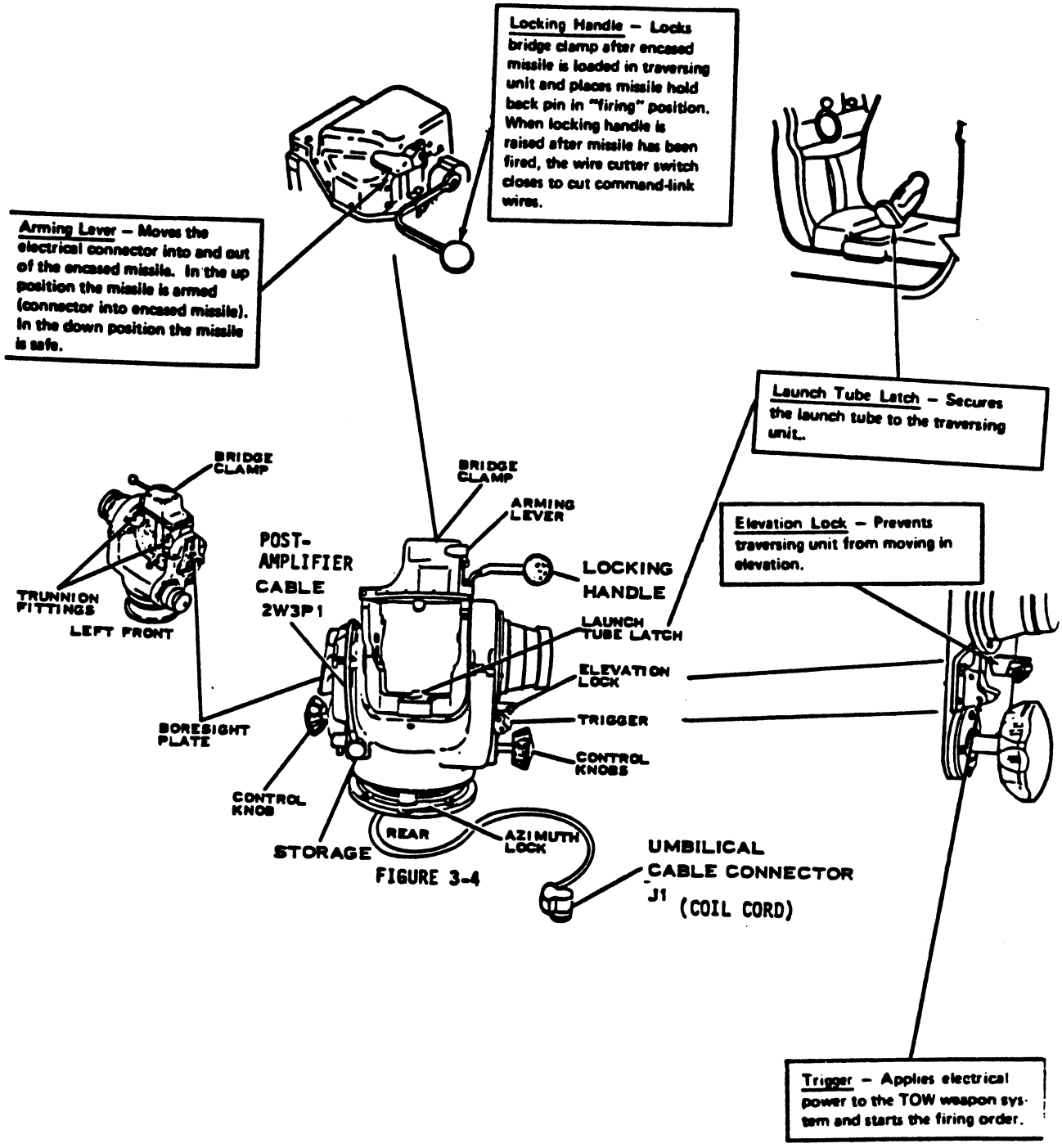


Fig 1-23. Traversing unit.

Tripod controls (fig 1-24, and 1-24A)

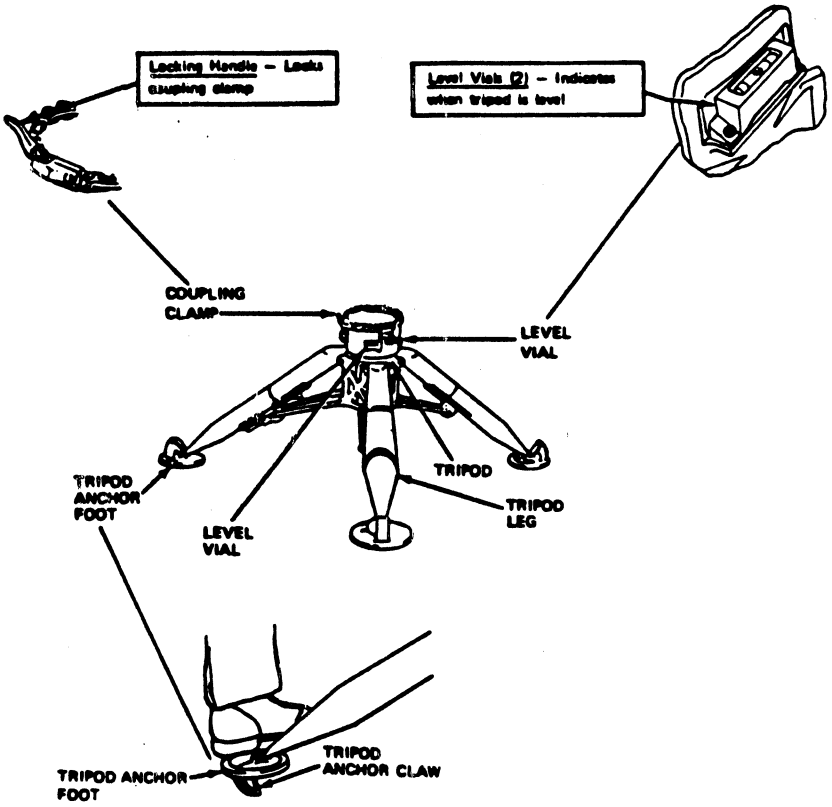


Fig 1-24. Tripod controls.

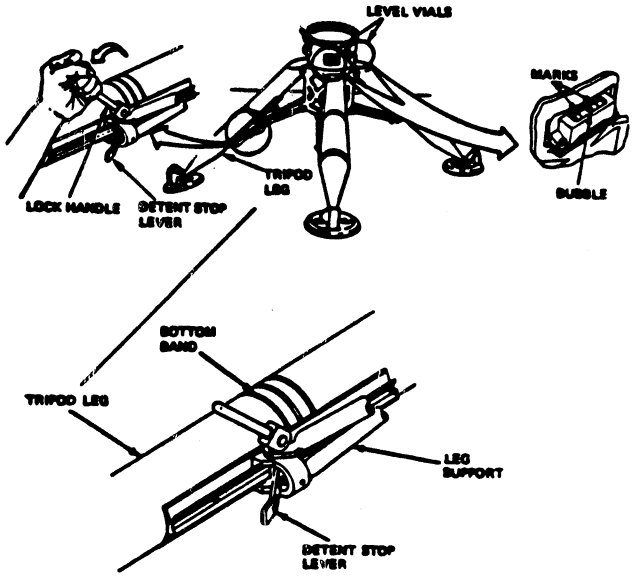
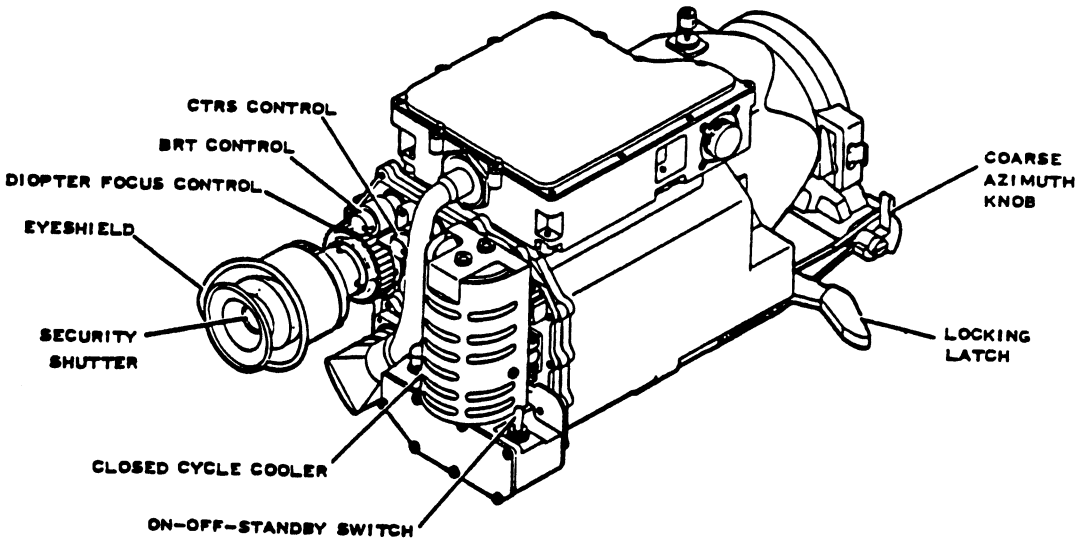
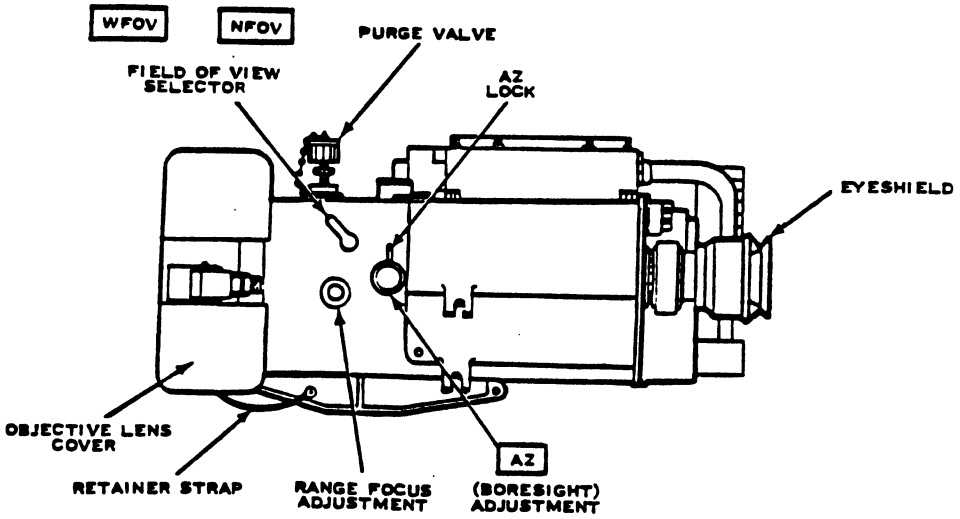


Fig 1-24A. Tripod controls--continued.

Night sight (fig 1-25, 1-25A, 1-25B, 1-25C, and 1-25D)



Top view



Side view

Fig 1-25. Night sight.

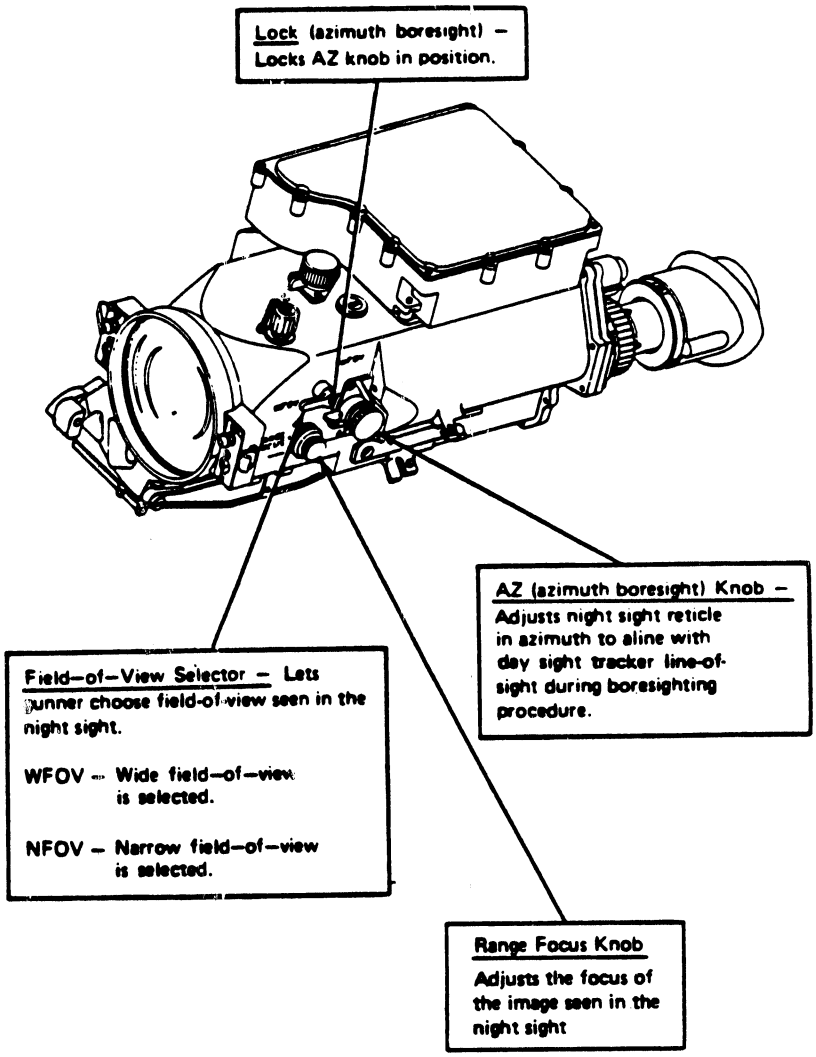


Fig 1-25A. Night sight--continued.

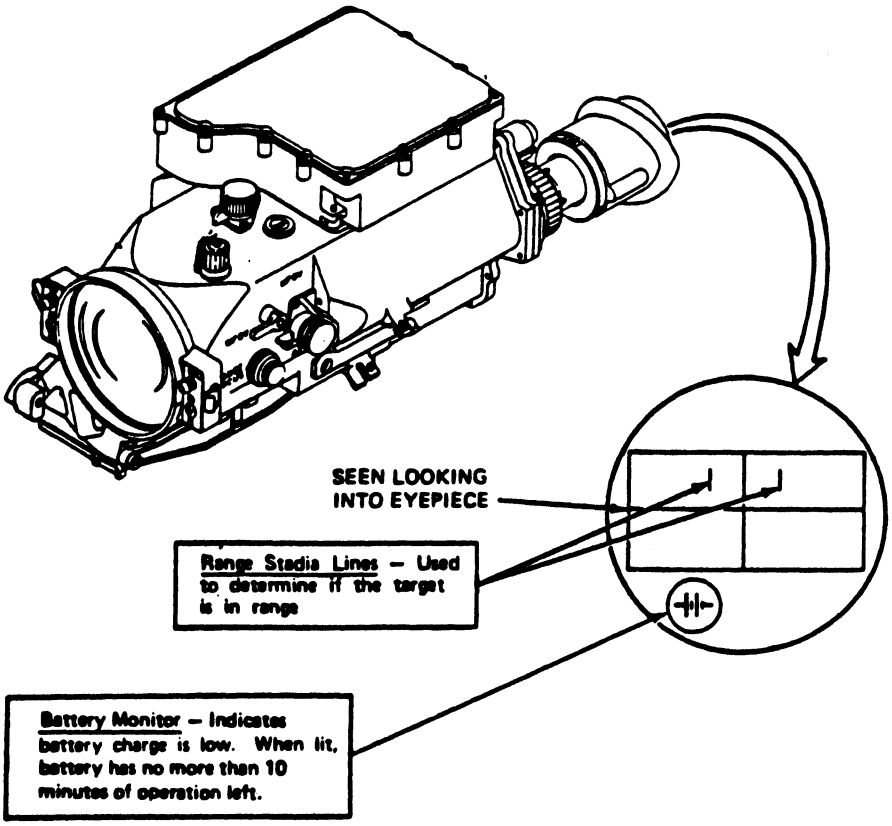


Fig 1-25B. Night sight--continued.

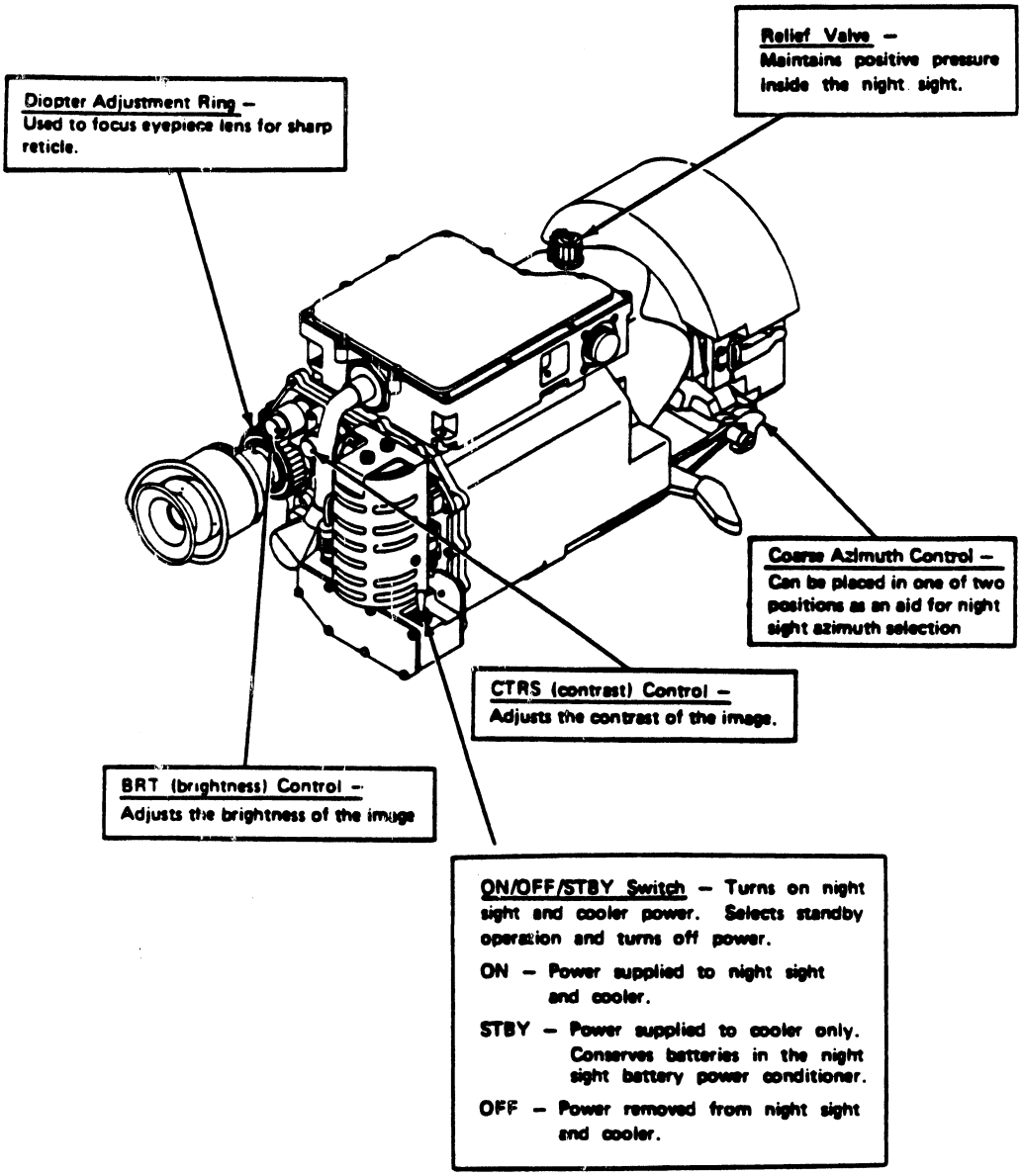


Fig 1-25C. Night sight--continued.

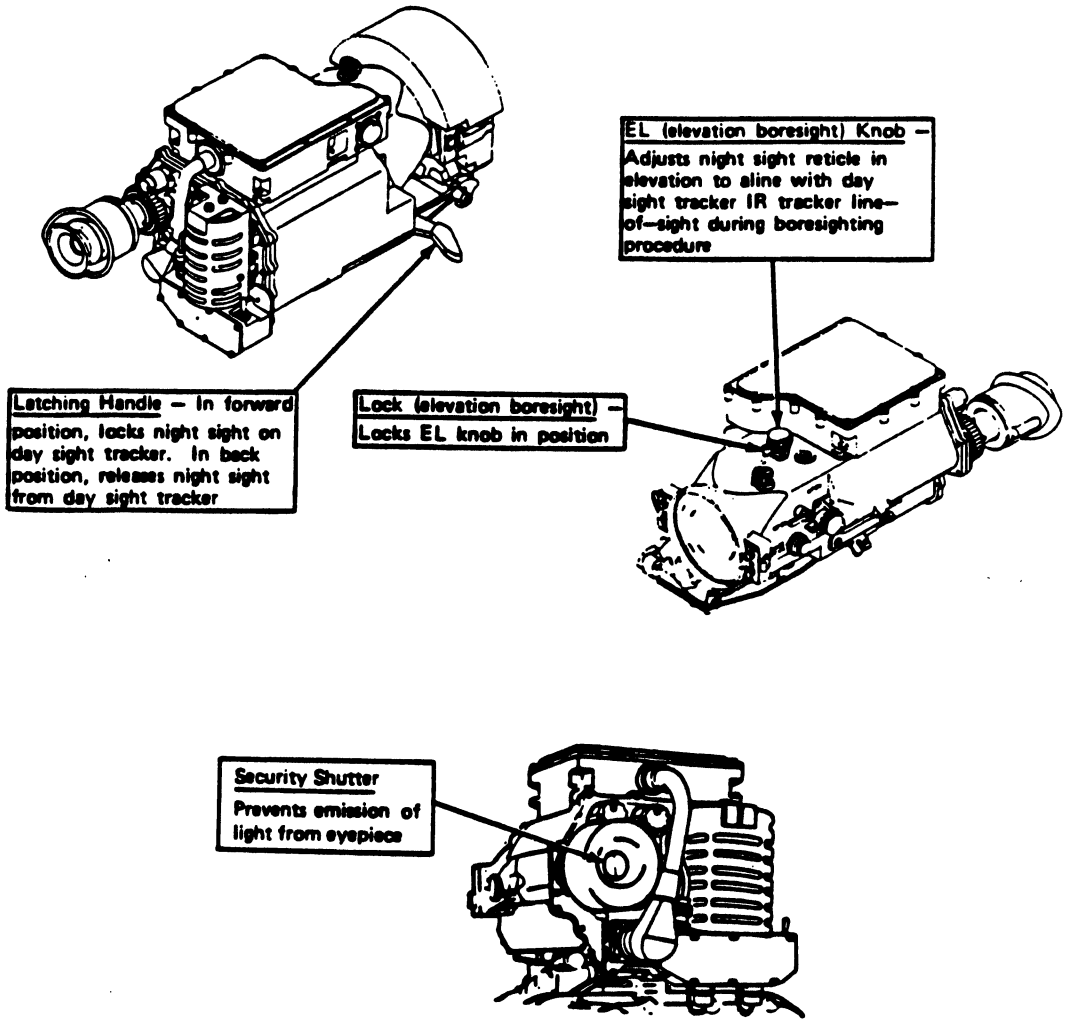


Fig 1-25D. Night sight--continued.

Boresight collimator (fig 1-26)

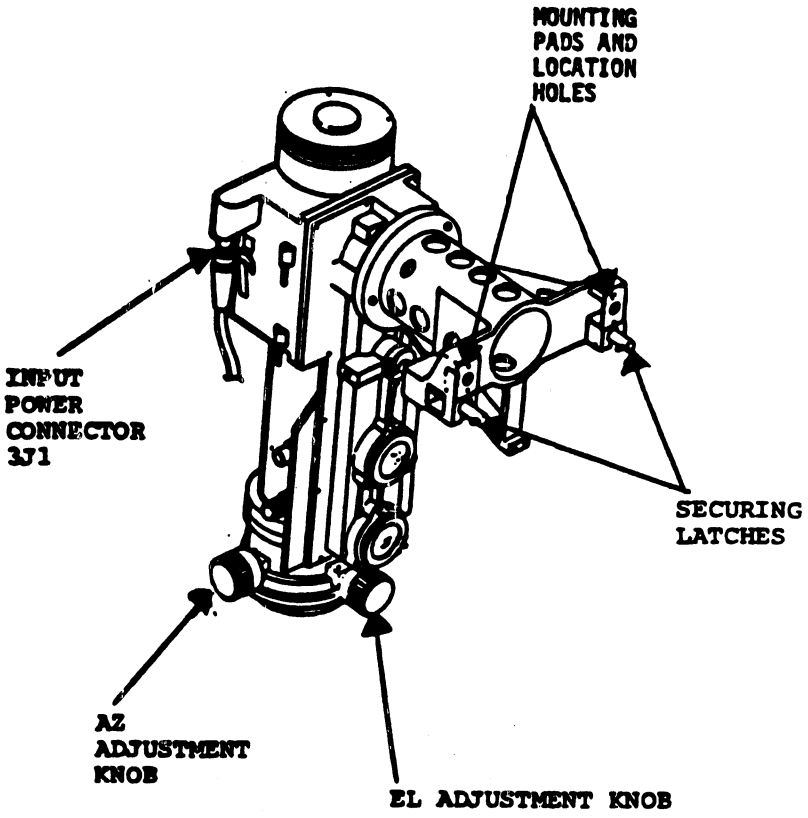


Fig 1-26. Boresight collimator.

Night sight vehicle power conditioner (fig 1-27)

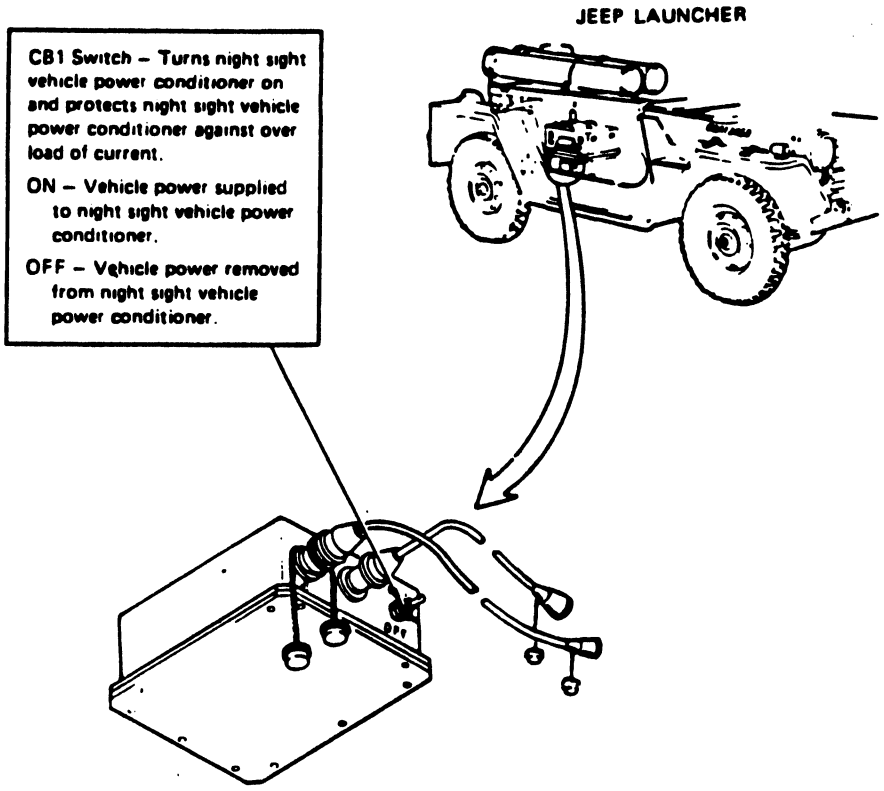
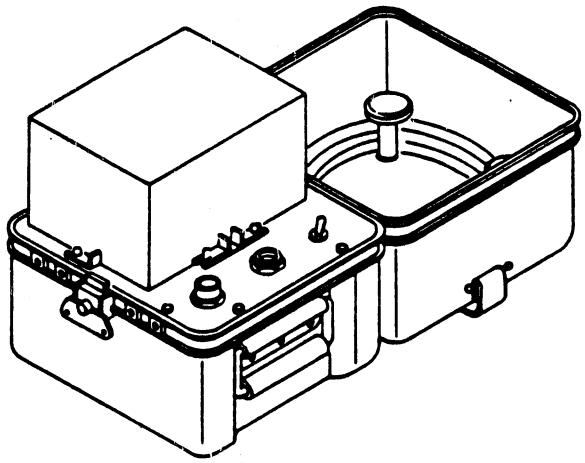


Fig 1-27. Night sight vehicle power conditioner.

Night sight battery power conditioner (fig 1-28)



CB1 Circuit Breaker – Turns night sight battery power conditioner on and protects it against current overload

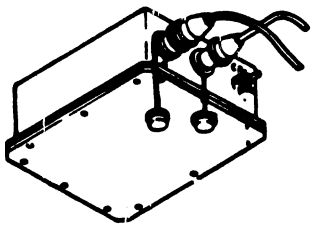
ON– Battery power supplied to night sight battery power conditioner

OFF– Battery power removed from night sight battery power conditioner

Fig 1-28. Night sight battery power conditioner.

EXERCISE: Answer the following questions and check your responses against those listed at the end of the study unit.

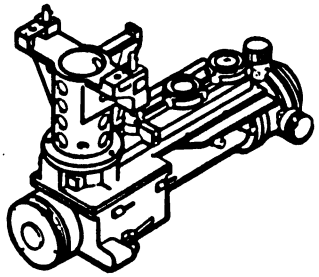
1. Identify the component illustrated below:



2. What is the purpose of the component illustrated above?

   a. Aligns the thermal night sight to the day sight tracker.
   b. Operates off the power of the thermal night sight.
   c. Has an operating time of 2.0 hours between -5 and +125 degrees F and contains two night sight batteries.
   d. Enables the thermal night sight to operate from vehicle power instead of the portable battery.

3. Identify the component illustrated below:



4. What is the purpose of the component illustrated above?

   a. Aligns the thermal night sight to the day sight tracker.
   b. Enables the thermal night sight to operate from vehicle power instead of the portable battery.
   c. Powers the thermal night sight when a vehicle power conditioner is not available.
   d. Has an operating time of 2.0 hours between -5 and +125 degrees F and contains two night sight batteries.

5. What has an operating time of 2.0 hours between -5 and +125 degrees F?

   a. Night sight vehicle power conditioner
   b. Boresight collimator
   c. Night sight battery power conditioner
   d. Thermal night sight

Answers to Study Unit #1 Exercises

Work Unit 1-1.

1. Traversing unit
2. c
3. Day sight tracker
4. b
5. Missile guidance set
6. d

Work Unit 1-2.

1. Night sight vehicle power conditioner
2. d
3. Boresight collimator
4. a
5. c

STUDY UNIT 2

TOW 2 ASSEMBLY

STUDY UNIT GOALS: TO RECOGNIZE AND GAIN AN UNDERSTANDING OF ASSEMBLY PROCEDURES FOR THE TOW 2 MISSILE SYSTEM IN THE GROUND MOUNTED AND JEEP LAUNCHER CONFIGURATION.

Work Unit 2-1. TOW 2 ASSEMBLY (GROUND MOUNTED)

TERMINAL LEARNING OBJECTIVE: Identify the procedures for assembling the TOW 2 in the ground mounted configuration.

ENABLING LEARNING OBJECTIVES:

A. List in order the steps for setting up the tripod.

B. Identify the steps for installing the traversing unit.

C. Given a list of steps for installing the launch tube, arrange them in proper sequence.

D. State the procedures for installing the day sight tracker.

E. Identify the proper procedures for installing the night sight.

F. List the steps for installing the missile guidance set.

* *

DANGER
MINEFIELD
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
YOU WILL BE TESTED ON THE STEPS AS THEY ARE LISTED IN THE FOLLOWING STUDY UNITS. TRY TO LEARN THE STEPS IN THE ORDER LISTED.
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

A. Assembly of the TOW 2 system begins with setting up the tripod. Here is the sequence for setting up the tripod:

Step 1. Lift the three lock handles up all the way to the release position (fig 2-1).

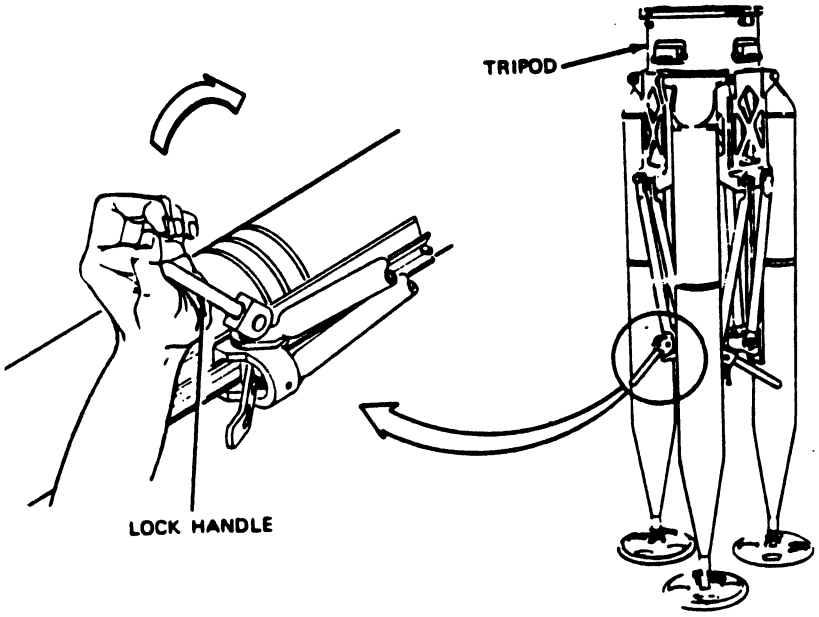


Fig 2-1. Lifting lock handles to release position.

Step 2. Press one detent stop lever down and release. Pull one leg of the tripod out until the leg support reaches the bottom band on the leg (fig 2-2).

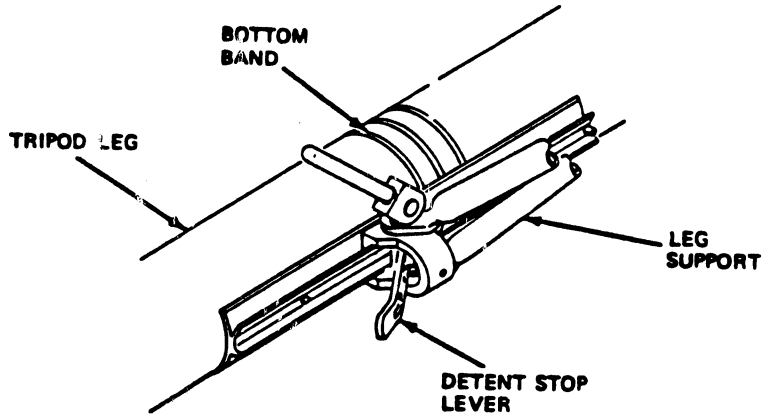


Fig 2-2. Extending the tripod leg.

Note: Repeat Step 2 for the other two legs.

Step 3. Position the tripod with the coupling clamp handle facing the direction of fire. Using the detent stop lever, adjust the tripod legs until the bubble in each level vial is between the two marks shown (fig 2-3).

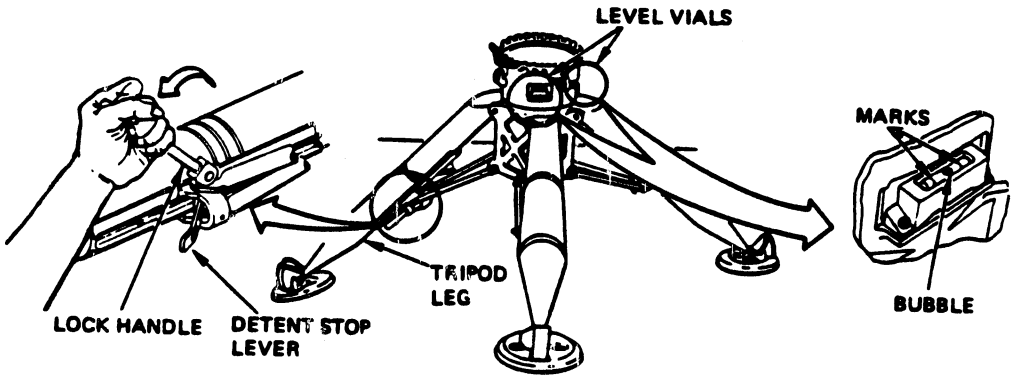


Fig 2-3. Adjusting the tripod legs/level vials.

Lower the lock handle on each leg all the way to the locked position.

Using the heel of your boot, force all three tripod anchor claws into the ground if the ground is soft (fig 2-4).

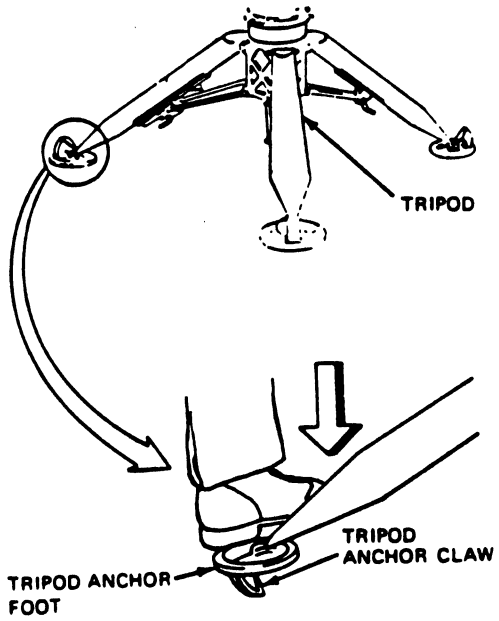


Fig 2-4. Driving the tripod anchor claws into the ground.

If additional support is needed, drive stakes into the ground through the holes in the tripod anchor foot.

Step 4. Open the coupling clamp by pulling the coupling locking clamp handle out (fig 2-5).

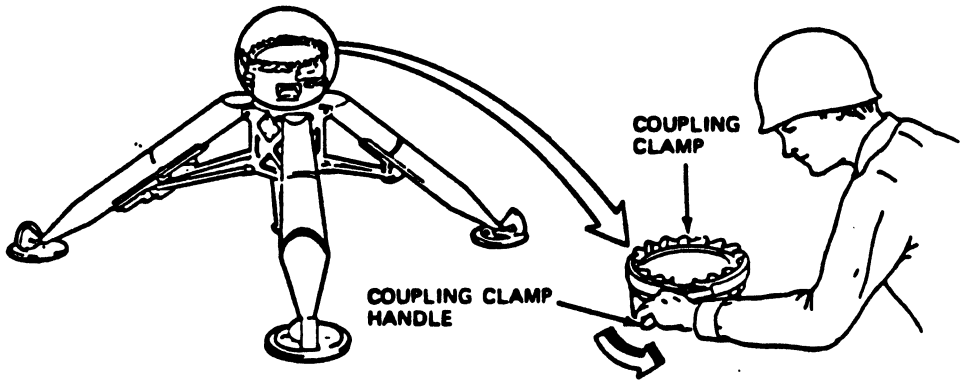


Fig 2-5. Opening the coupling clamp.

EXERCISE A: Answer the following question and check your response against the one listed at the end of this study unit.

1. List, in order, the steps for setting up the tripod.

B. Once you have properly set up the tripod, the next procedure to perform is the installation of the traversing unit.

Step 1. Hold the traversing unit over the tripod and pass the coil cable through the body of the tripod (fig 2-6).

Note: You have to pull the coil cord from inside the traversing unit and extend it.

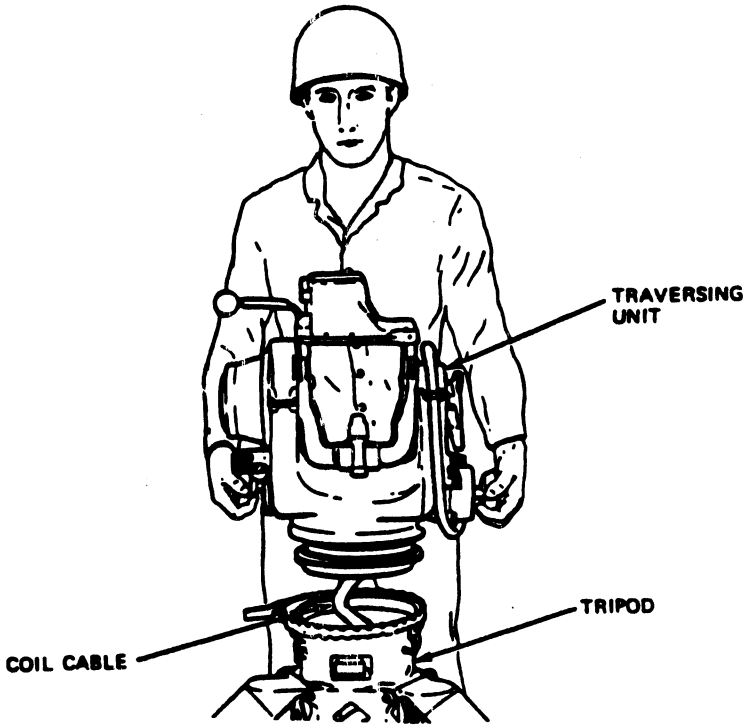


Fig 2-5. Traversing unit held over tripod.

Step 2. Center the traversing unit over the tripod with the azimuth lock positioned opposite the direction of fire and lower it onto the tripod (fig 2-7).

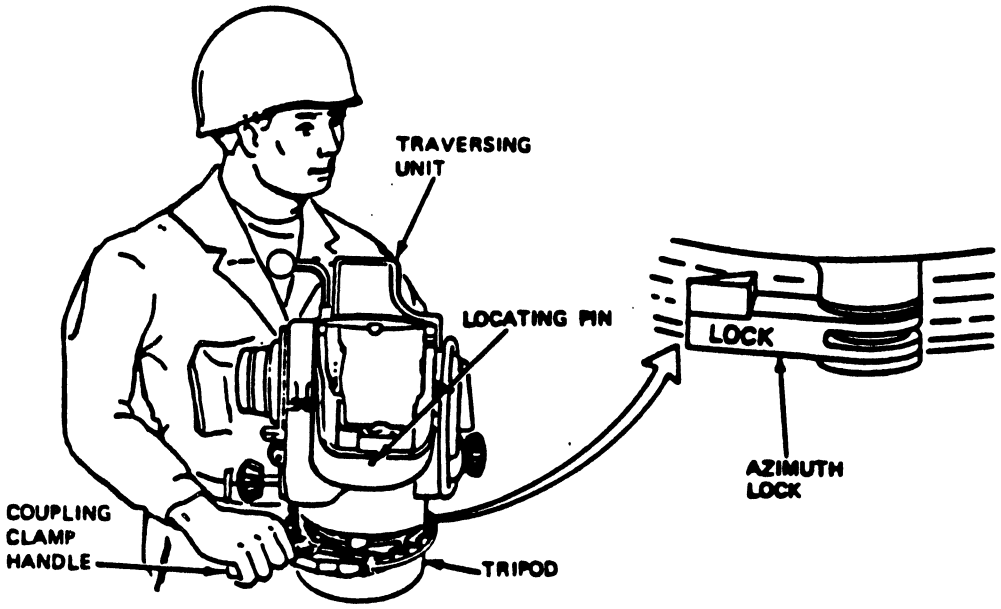


Fig 2-7. Installing the traversing unit.

Step 3. Push the coupling clamp locking handle in to fasten the traversing unit to the tripod. Turn the traversing unit from side to side until it locks in place (fig 2-7).

Ensure that the coupling clamp is fastened and correctly adjusted by attempting to turn the traversing unit.

EXERCISE B: Answer the following question and check your response against the one listed at the end of this study unit.

1. Step 1 for installing the traversing unit is to "hold the traversing unit over the tripod and pass the coil cable through the body of the tripod." What are the next two steps?

a. _____

_____

_____

b. _____

_____

_____

* *

C. After you have installed the traversing unit onto the tripod, your next procedure is to install the launch tube.

Step 1. Lift the launch tube latch (fig 2-8).

Step 2. Place the two launch tube pins in the launch tube brackets (fig 2-8) so that the launch tube is pointed in the direction of fire.

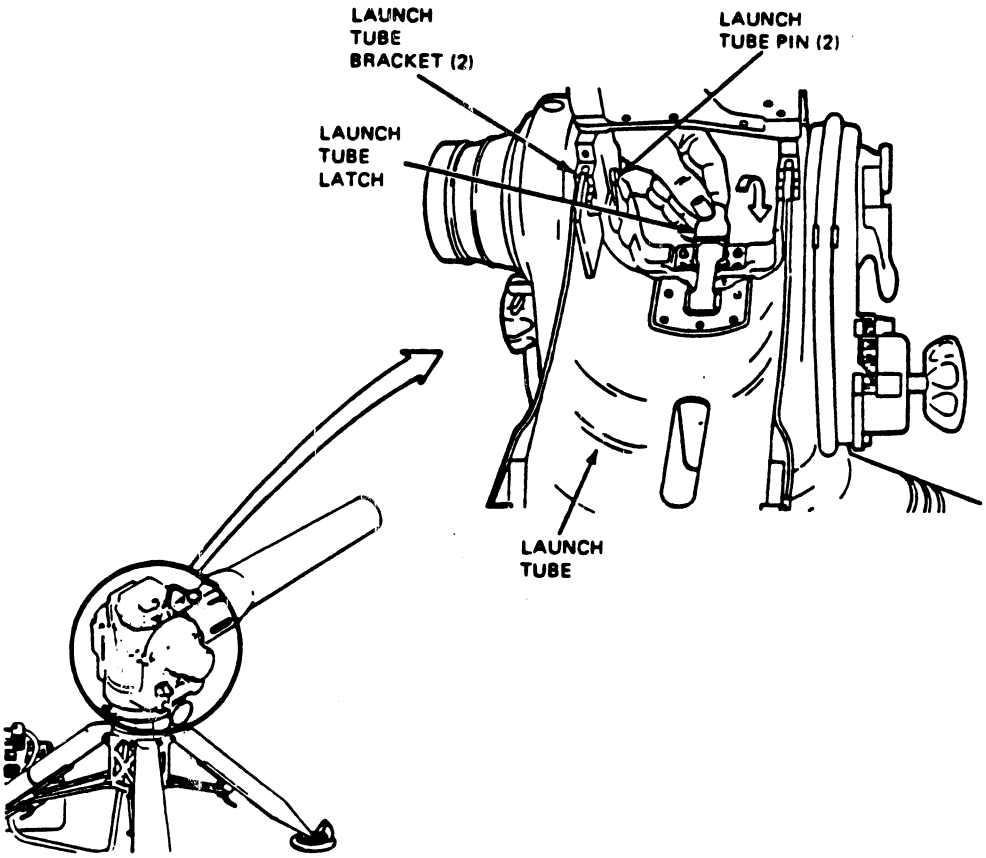


Fig 2-8. Location of launch tube latch, pins, and brackets.

Step 3. Line up the locating pin with the mating hole in the launch tube (fig 2-9).

Step 4. Place the launch tube latch in the launch tube catch and press down on the launch tube latch until it locks (fig 2-9).

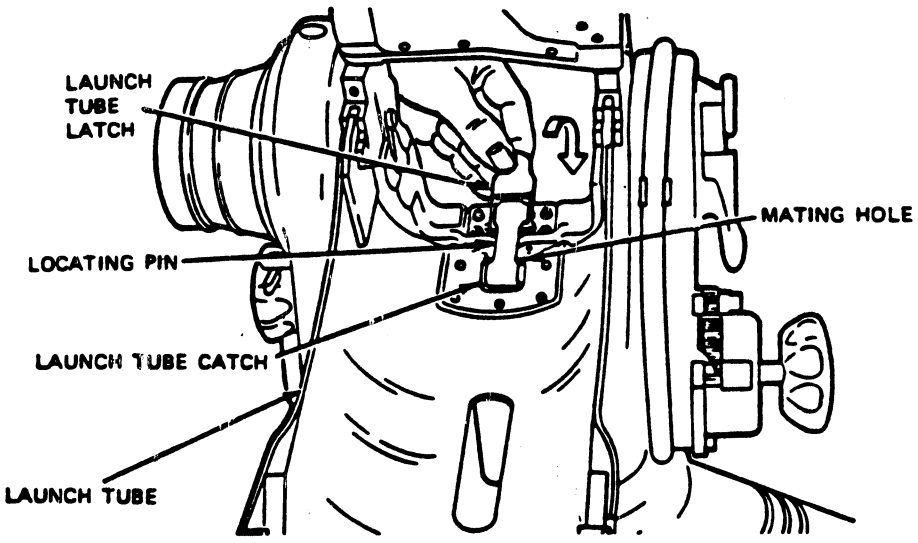


Fig 2-9. Launch tube latch being locked.

EXERCISE C: Answer the following question and check your response against the one listed at the end of this study unit.

1. Listed below, in scrambled order, are the steps for installing the launch tube.

   (1) Line up the locating pin with the mating hole in the launch tube.

   (2) Press down on the launch tube latch until it latches.

   (3) Place the two launch tube pins in the launch tube brackets so that the launch tube is pointed in the direction of fire.

   (4) Lift up the launch tube latch.

   (5) Place the launch tube latch in the launch tube catch.

Which of the following is the proper sequence?

a. 3, 1, 2, 5, 4
b. 5, 2, 3, 4, 1
c. 1, 4, 5, 2, 3
d. 4, 3, 1, 5, 2

* *

D. Now that you have installed the launch tube, you can now install the day sight tracker. But, before you begin, there are some things that you should be aware of:

Handle the day sight tracker very carefully. The day sight tracker is very fragile and can be easily damaged.

Ensure that the day sight tracker is well supported until it is tightly attached to the traversing unit.

DO NOT carry or lift the day sight tracker by the latch handle.

(Remove the day sight tracker with the tracker hook mount facing the traversing unit boresight plate (fig 2-10)).

Step 1. Hold the day sight tracker with the tracker hook mount facing the traversing unit boresight plate (fig 2-10).

Step 2. Press and hold the latch in towards the latch handle, push the latch handle all the way down, and release (fig 2-10).

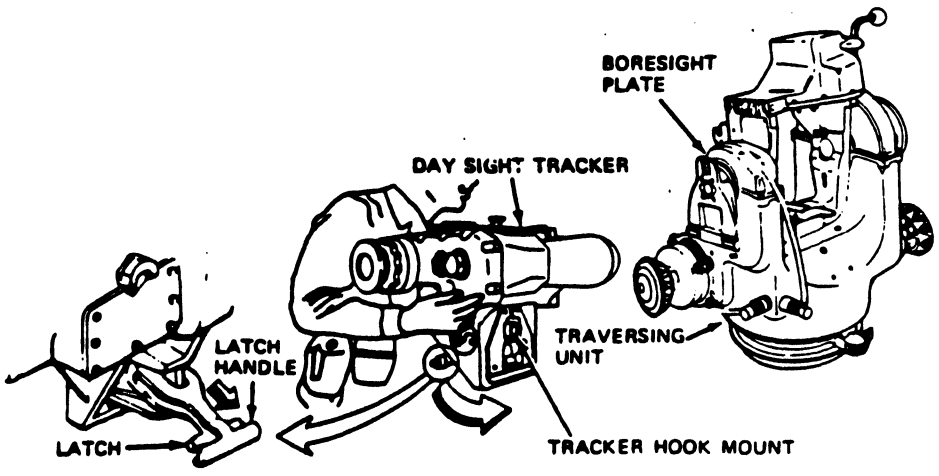


Fig 2-10. Installing the day sight tracker.

Step 3. Tilt the top of the day sight tracker slightly toward the traversing unit, and place the tracker hook mount over the top of the boresight plate (fig 2-11).

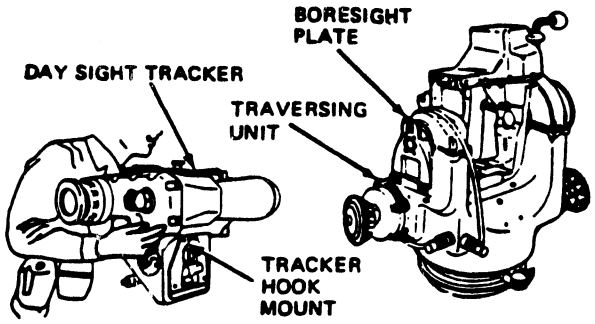


Fig 2-11. Installing the day sight tracker--continued.

Step 4. Join the day sight tracker index plate groove with the traversing unit boresight guide, hold the tracker flush, and pull the latch handle all the way up until the latch releases (fig 2-12).

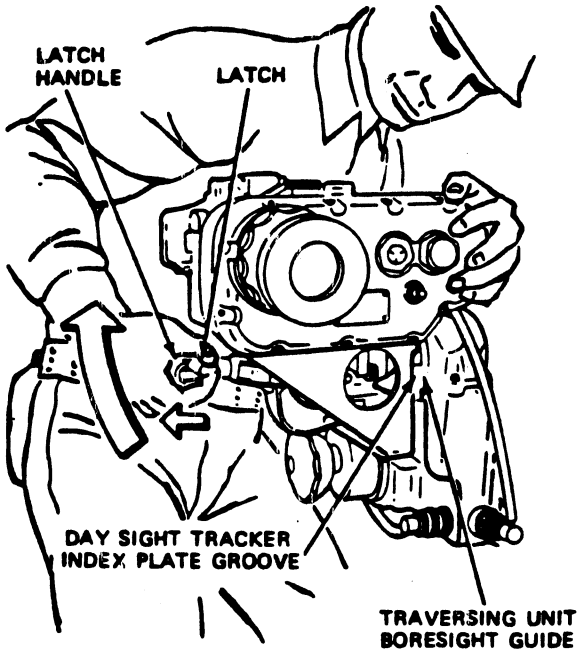


Fig 2-12. Installing the day sight tracker--continued.

Ensure that the day sight tracker is securely mounted BEFORE letting go.

Step 5. Ensure that the RETICLE LIGHT switch is set to OFF, and the 30-percent section of the humidity indicator is blue (fig 2-13).

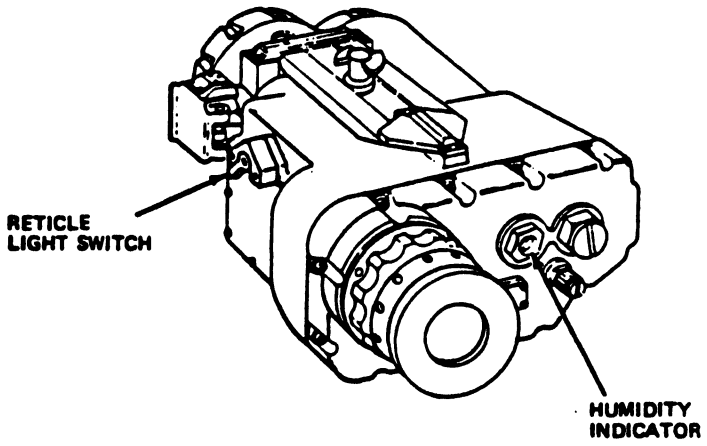


Fig 2-13. Location of reticle light switch and humidity indicator.

If the 30-percent section is pink or white, notify support maintenance to replace the desiccant.

EXERCISE D: Answer the following questions and check your response against those listed at the end of this study unit.

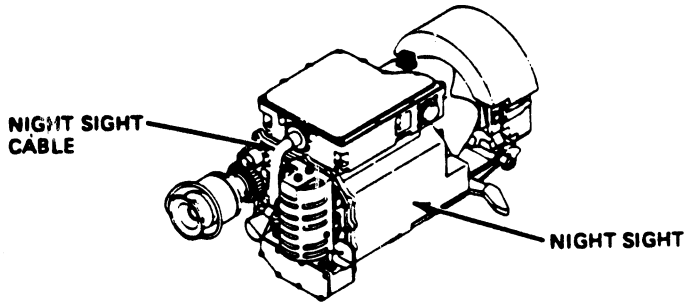
Matching: Match the procedure for installing the day sight tracker in column 1 to its appropriate step in column 2. Place your answers in the spaces provided.

Column 1 Procedure	Column 2 Step
_____ 1. Tilt the top of the day sight tracker slightly toward the traversing unit, and place the tracker hook mount over the tip of the boresight plate.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5
_____ 2. Press and hold the latch handle, push the latch handle all the way down, and release.	
_____ 3. Ensure that the RETICLE LIGHT switch is set to OFF, and the 30-percent section of the humidity indicator is blue.	
_____ 4. Hold the day sight tracker with the tracker hook mount facing the traversing unit boresight plate.	

_____ 5. Join the day sight tracker index plate groove with the traversing unit boresight guide, hold the tracker flush, and pull the latch handle all the way up until the latch releases.

* * * * * * * * * * * * * * * * * * * *

E. Your next procedure, after installing the day sight tracker, is installing the night sight. STOP!! DO NOT LIFT THE NIGHT SIGHT BY THE NIGHT SIGHT CABLE!



Once you have opened the night sight field handling case and removed the night sight, you can begin.

Step 1. Place the coarse azimuth knob in position No. 1 (forward position) (fig 2-14).

Step 2. Move the latch handle toward the rear of the night sight (in direction of arrow) (fig 2-14).

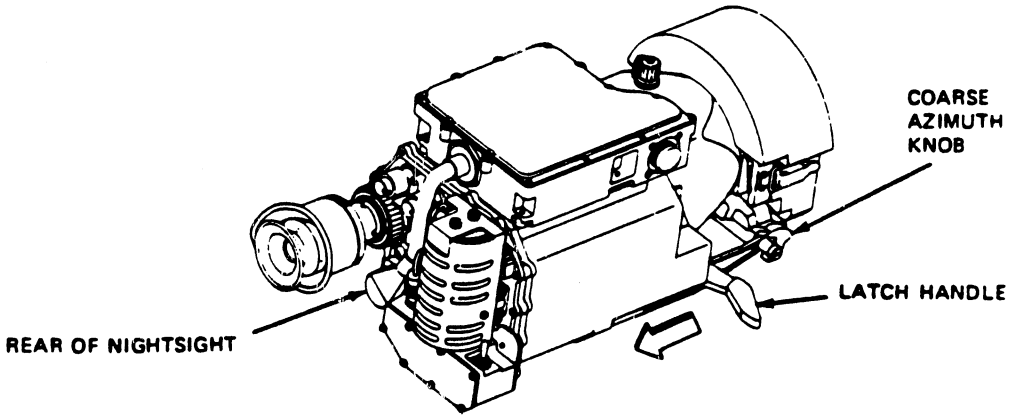


Fig 2-14. Night sight.

Check the locating "Vee Ways" on the night sight and day sight tracker for foreign material and clean them, if necessary (fig 2-15).

Step 3. Line up the keyed hole on the night sight with the campost on the day sight tracker (fig 2-15).

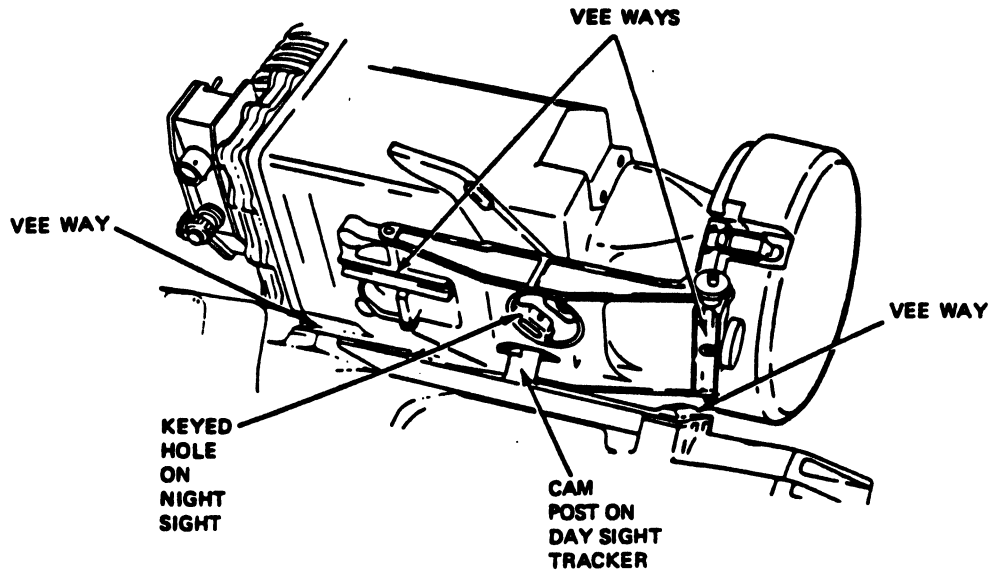


Fig 2-15. Installing night sight.

Step 4. Place the night sight on the day sight tracker (night sight lens should be facing forward) and ensure that night sight is seated securely.

Step 5. Move the latch handle toward the front of the night sight (in direction of arrow) to lock it in place. Ensure that the night sight is securely mounted to the day sight tracker before you let go (fig 2-16).

Step 6. Remove the postamplifier cable connector from the cable retainer on the traversing unit (fig 2-16).

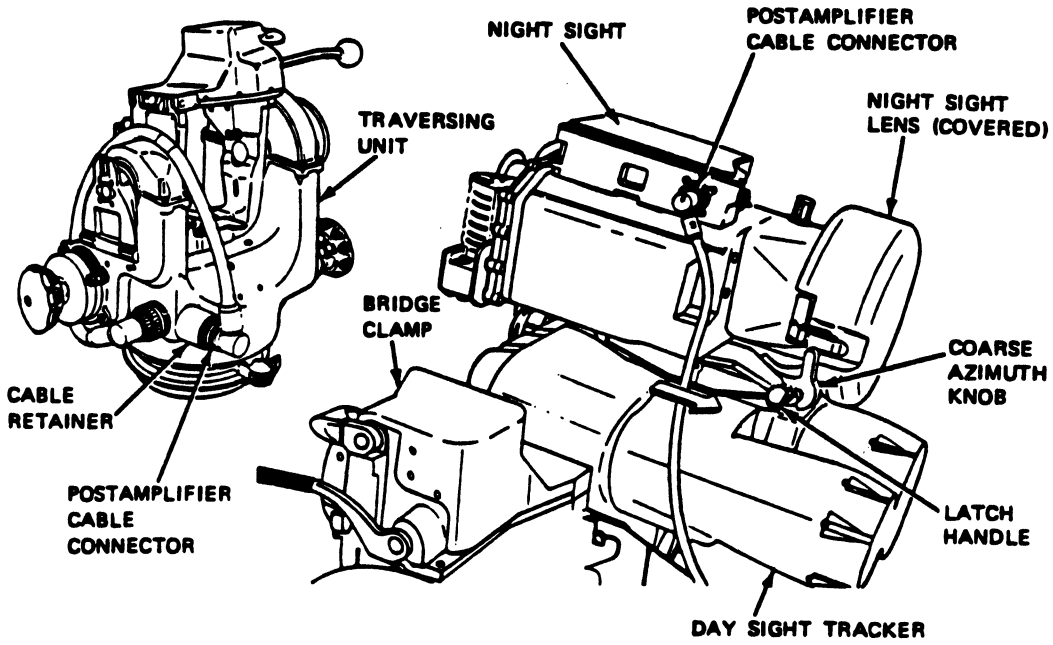


Fig 2-16. Installing night sight--continued.

Caution: KEEP THE POSTAMPLIFIER CABLE CLEAR OF THE BRIDGE CLAMP.

Step 7. Aline the yellow mark on the postamplifier cable connector with the yellow mark on the night sight. Push in on the postamplifier cable connector and turn it to the right until the connector stops.

Step 8. Open the lid of the night sight battery power conditioner and connect the output cable connector 8W1P2 (8J1) to the connector on the battery power conditioner. Also connect the battery power conditioner output cable connector 8W1P1 (1J3) to the night sight input power connector J1. Set the circuit breaker to ON (fig 2-17).

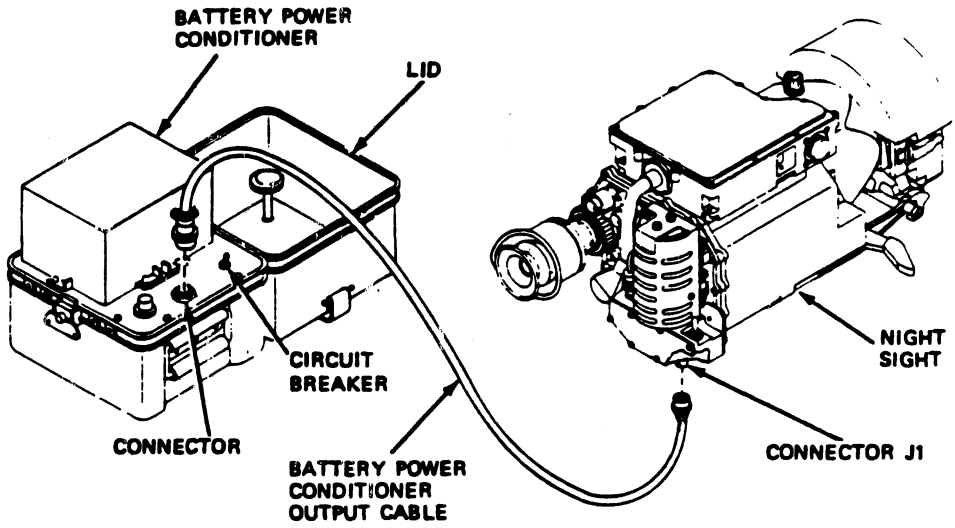


Fig 2-17. Installing night sight--continued.

Step 9. Release the two latches and remove the front lens cover and set the night sight field-of-view switch to NFOV.

EXERCISE E: Answer the following questions and check your responses against those listed at the end of this study unit.

1. During night sight installation, the nightsight should not be lifted by the

_____.

2. List the steps in the procedure for installing the night sight.

a. _____.

b. _____.

c. _____.

d. _____.

e. _____.

f. _____.

g. _____.

h. _____.

i. _____.

* *

F. The last procedure to perform during ground mounting is installing the missile guidance set (MGS).

Step 1. Open the cover by unlatching the two latches at the front of the MGS (fig 2-18). Remove the cover and place it out of the way of personnel.

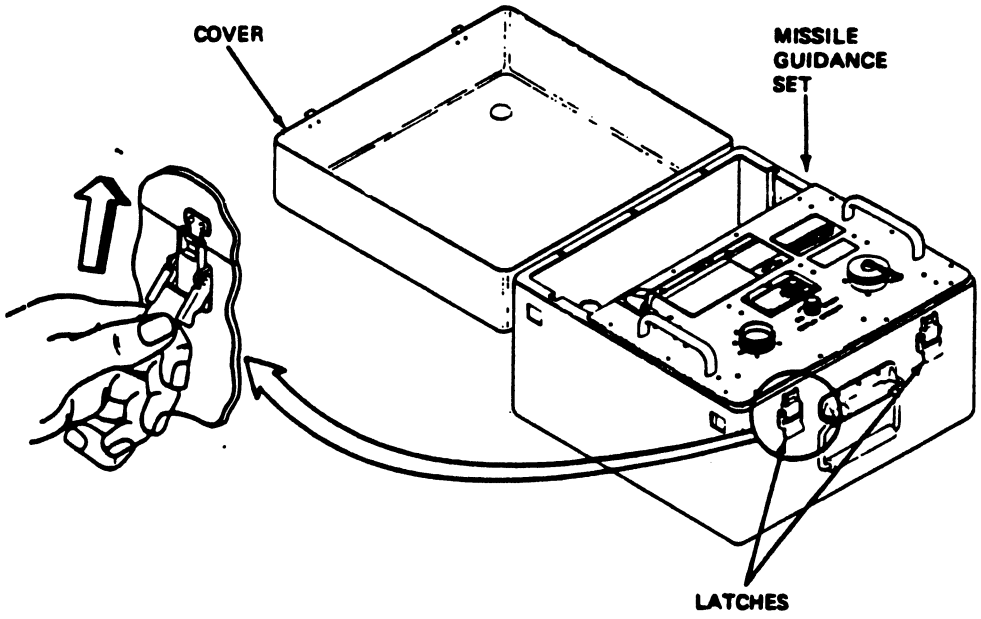


Fig 2-18. Removing cover from missile guidance set (MGS).

Note: If the battery assembly is not in the MGS, install a battery assembly at this time.

Step 2. Place the MGS close to the rear of the tripod and clear of loading and firing operations (fig 2-19).

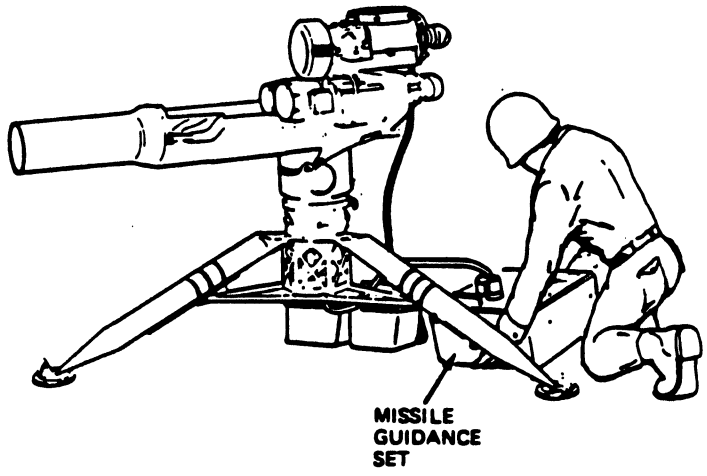


Fig 2-19. Positioning the missile guidance set (MGS).

Before you continue--

--Be sure there is no dirt in the end of the coil cable connector. Dirt can prevent the connector from making good contact with the MGS. If this occurs, poor system operation can result.

Step 3. Line up the yellow colored index line on the coil cable connector with the yellow colored mating line next to connector J1 on the MGS (fig 2-20).

Step 4. Push straight down on the coil cable connector and turn the locking nut clockwise until the red mark on the J1 connector cannot be seen (fig 2-20).

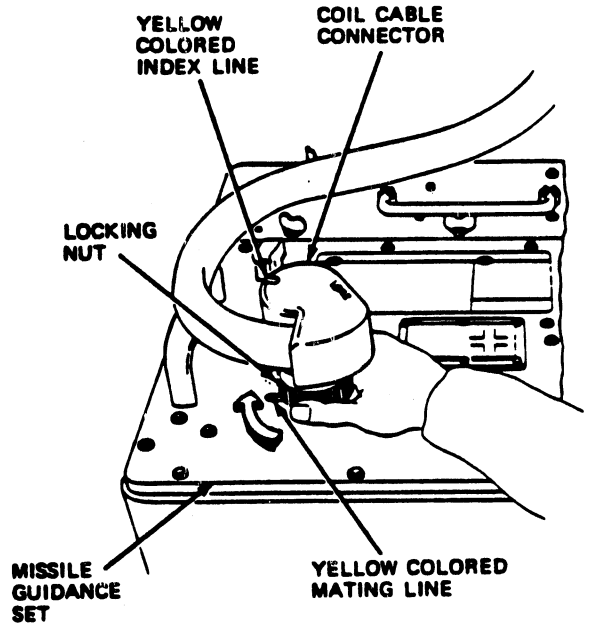


Fig 2-20. Installing the missile guidance set (MGS).

Move the MGS near the base of the tripod and forward of loading and firing operations. Place the night sight battery power conditioner next to the MGS (fig 2-21).

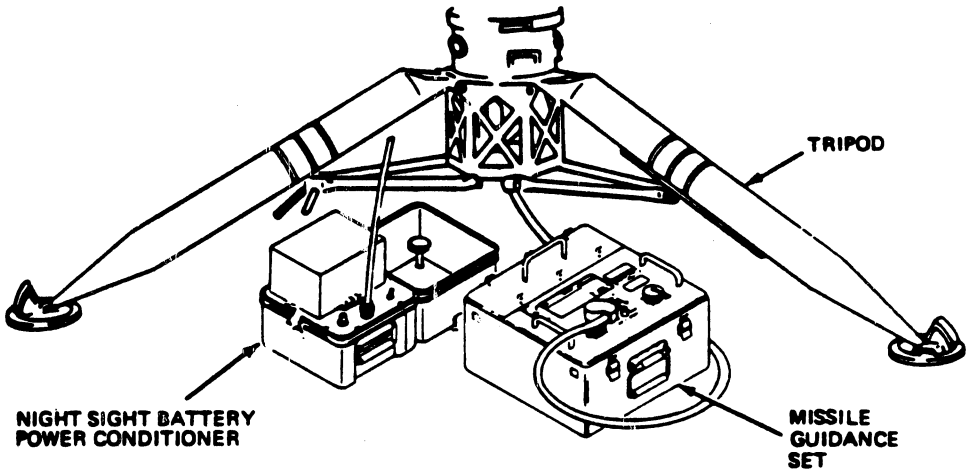


Fig 2-21. Position of MGS/night sight battery power conditioner.

EXERCISE F: Answer the following questions and check your responses against those listed at the end of this study unit.

1. List, in proper order, the steps for installing the missile guidance set (MGS).

   a. _____

   _____

   _____

   b. _____

   _____

   _____

   c. _____

   _____

   _____

   d. _____

   _____

   _____

Work Unit 2-2. TOW 2 ASSEMBLY (JEEP LAUNCHER)

TERMINAL LEARNING OBJECTIVE: Identify the procedures for installing the TOW 2 system in the jeep launcher.

ENABLING LEARNING OBJECTIVES:

A. List the procedures for installing the traversing unit.

B. State the procedures for installing the day sight tracker.

C. List the steps for installing the night sight.

D. State the procedures for installing the missile guidance set.

E. Given a list of procedures for installing the launch tube, arrange them in proper sequence.

* *

A. Assembly of the TOW 2 system in the jeep launcher begins with installing the traversing unit.

Step 1. Open the coupling clamp and hold the traversing unit near the launcher mount. Feed the coil cable through the hole in front of the launcher mount and lower the traversing unit onto the mount. Ensure that the azimuth lock points to the rear of the jeep (fig 2-22).

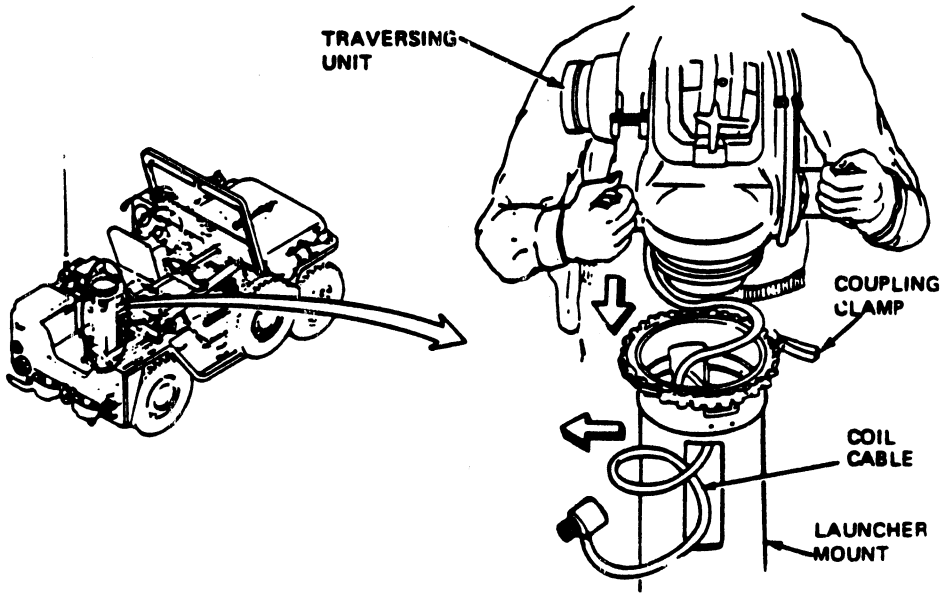


Fig 2-22. Installing traversing unit.

Step 2. Fasten the traversing unit to the launcher mount by closing the coupling clamp locking handle. Turn the traversing unit from side to side until it locks in place (fig 2-23).

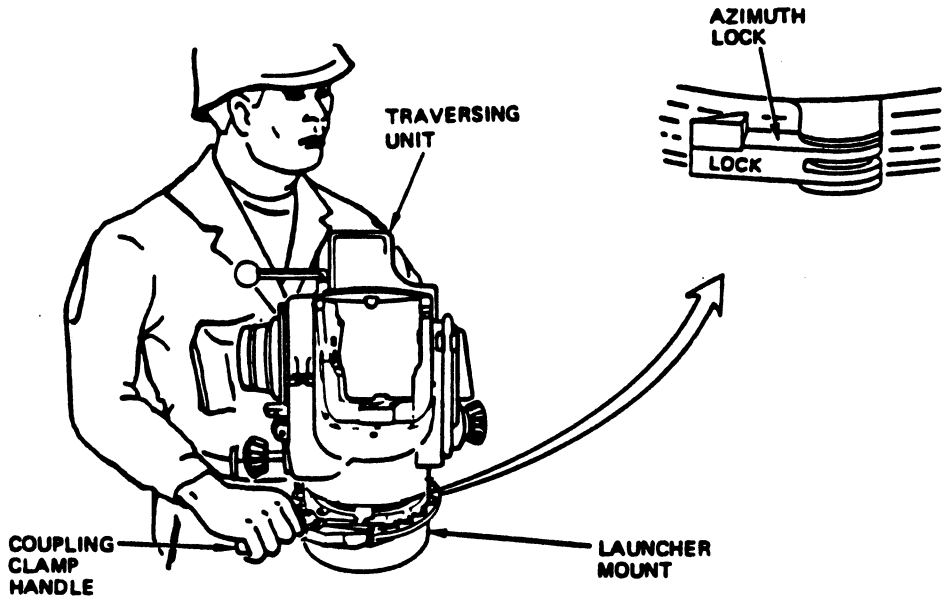


Fig 2-23. Installing traversing unit--continued.

Ensure the coupling clamp is correctly fastened and adjusted by attempting to turn the traversing unit.

Step 3. Ensure that the elevation lock is in the LOCKED position. If not, turn the control knobs forward until the trunnion clicks and locks in place (fig 2-24).

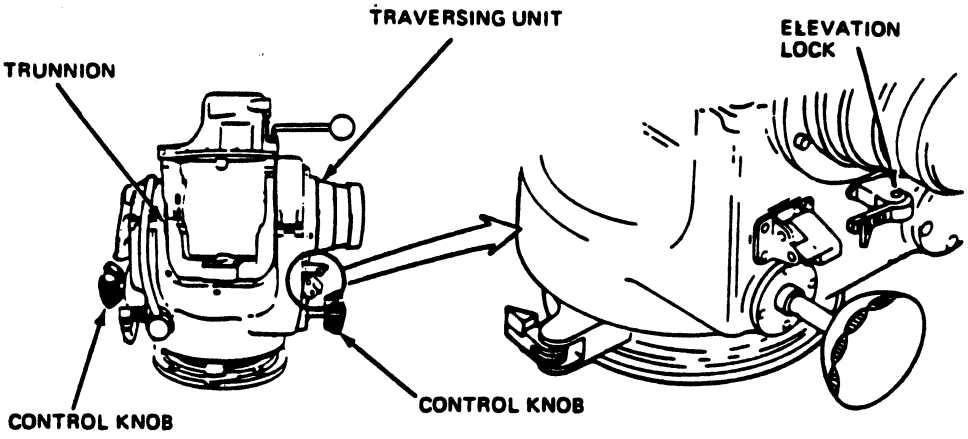


Fig 2-24. Installing traversing unit--continued.

Step 4. Set the azimuth lock to the UNLOCK position (fig 2-25). Using the control knobs, turn the traversing unit counterclockwise 45 degrees.

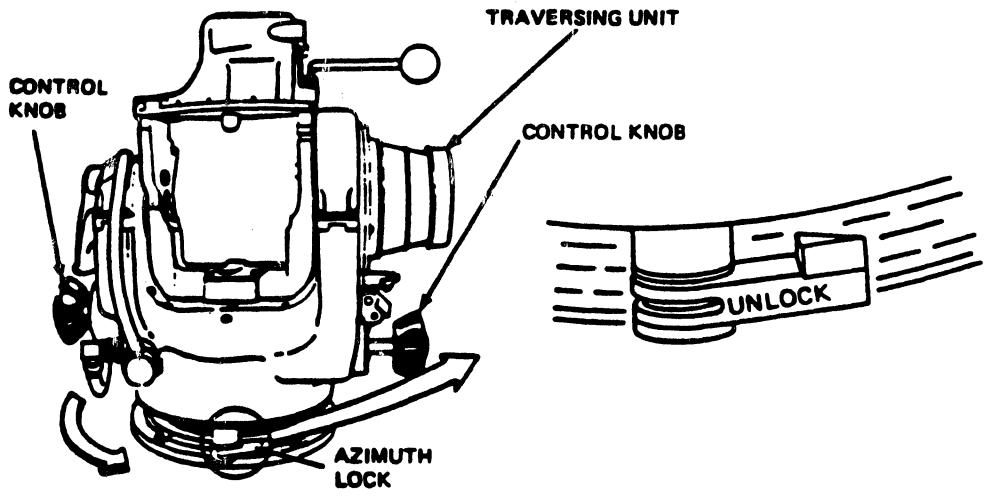


Fig 2-25. Installing traversing unit--continued.

EXERCISE A: Answer the following question and check your response against the one listed at the end of this study unit.

1. List the procedures for installing the traversing unit.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

3. During the FOURTH step for installing the traversing unit, the azimuth lock should be in the _____ position.

* *

B. The day sight tracker is the next component to be installed. After removing the day sight tracker from the bag:

Step 1. Hold the tracker with the tracker hook mount in line with the traversing unit boresight plate. Press and hold the latch in toward the latch handle· push the latch handle all the way down and release (fig 2-26).

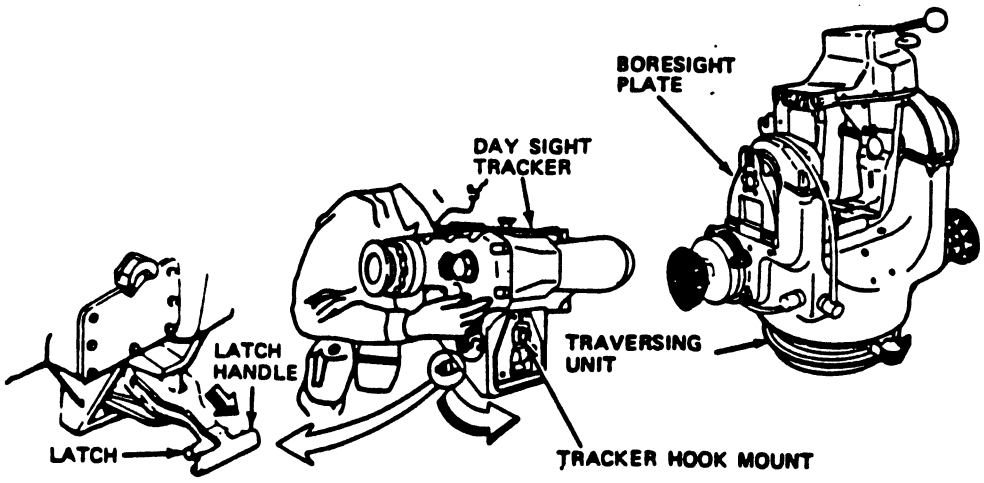


Fig 2-26. Installing day sight tracker.

Step 2. Tilt the top of the tracker slightly toward the traversing unit. Guide the tracker hook mount of day sight tracker over the tip of the traversing unit boresight plate (fig 2-27).

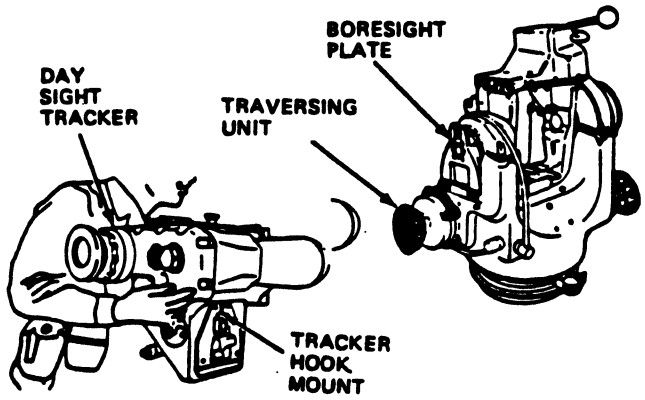


Fig 2-27. Installing day sight tracker--continued.

Step 3. Join the day sight tracker index plate groove with the traversing unit boresight guide and pull the latch handle all the way up until the latch releases (fig 2-28).

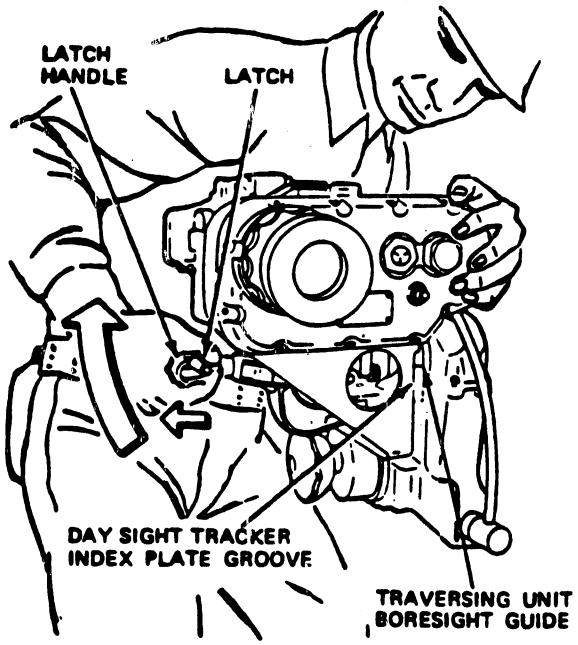


Fig 2-28. Installing day sight tracker--continued.

Note: Once you have completed Step 3, set the azimuth lock on the traversing unit to the LOCK position, and then use the control knobs to turn the traversing unit until it locks in place.

Step 4. Ensure that the RETICLE LIGHT switch on the day sight tracker is set to OFF. Ensure that the 30-percent section of the humidity indicator is blue. (If the 30-percent section is pink or white, notify support maintenance) (fig 2-29).

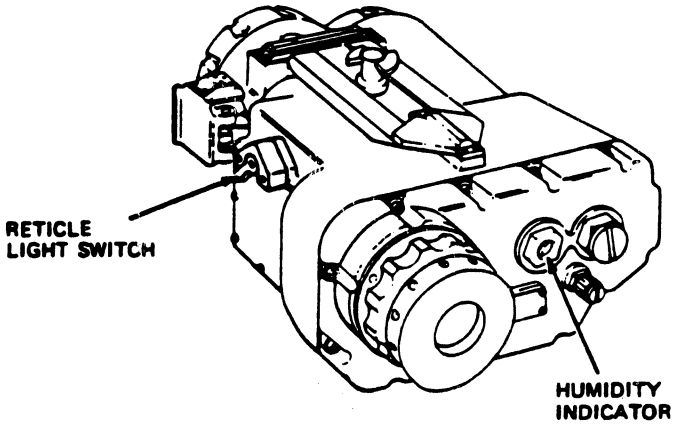


Fig 2-29. Day sight tracker (reticle light switch/humidity indicator).

EXERCISE B: Answer the following questions and check your responses against those listed at the end of this study unit.

1. What is Step 1 for installing the day sight tracker?

_____

_____

_____

2. What is Step 2 for installing the day sight tracker?

_____

_____

_____

3. What is Step 3 for installing the day sight tracker?

_____

_____

_____

4. The RETICLE LIGHT switch on the tracker should be set to _____ .

5. True or False. The 30-percent section of the humidity indicator should be white._____

* *

C. Your next procedure is to install the night sight. Remember, when you remove the night sight from the field handling case or while you are attempting to install this component - DO NOT LIFT THE NIGHT SIGHT BY THE NIGHT SIGHT CABLE.

Step 1. Place the coarse azimuth knob in position No. 1 (forward position). Move the latch handle toward the rear of the night sight to the unlock position (direction of arrow) (fig 2-30).

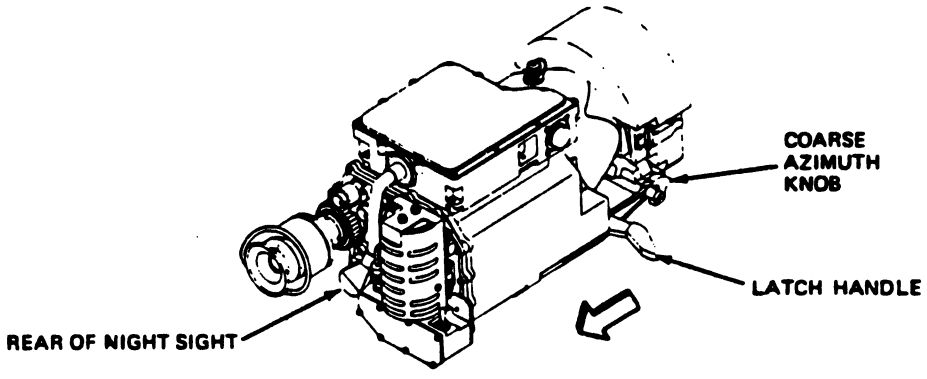


Fig 2-30. Night sight.

Step 2. Check the locating "VEE WAYS" on the night sight and day sight tracker for foreign material. Line up the keyed hole on the night sight with the campost on the day sight tracker (fig 2-31).

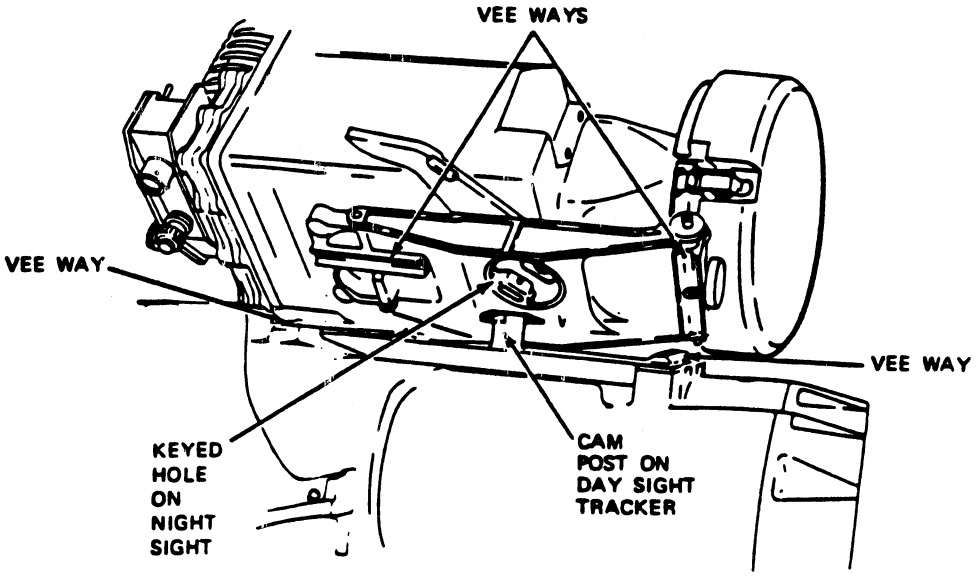


Fig 2-31. Installing night sight.

Step 3. Place the night sight on the day sight tracker with the night sight lens facing forward making sure that it is seated securely. Move the latch handle toward the front of the night sight to lock it in place (fig 2-32). Make sure that it is secure before you let go.

Step 4. Remove the postamplifier cable connector from the cable retainer on the traversing unit (fig 2-32).

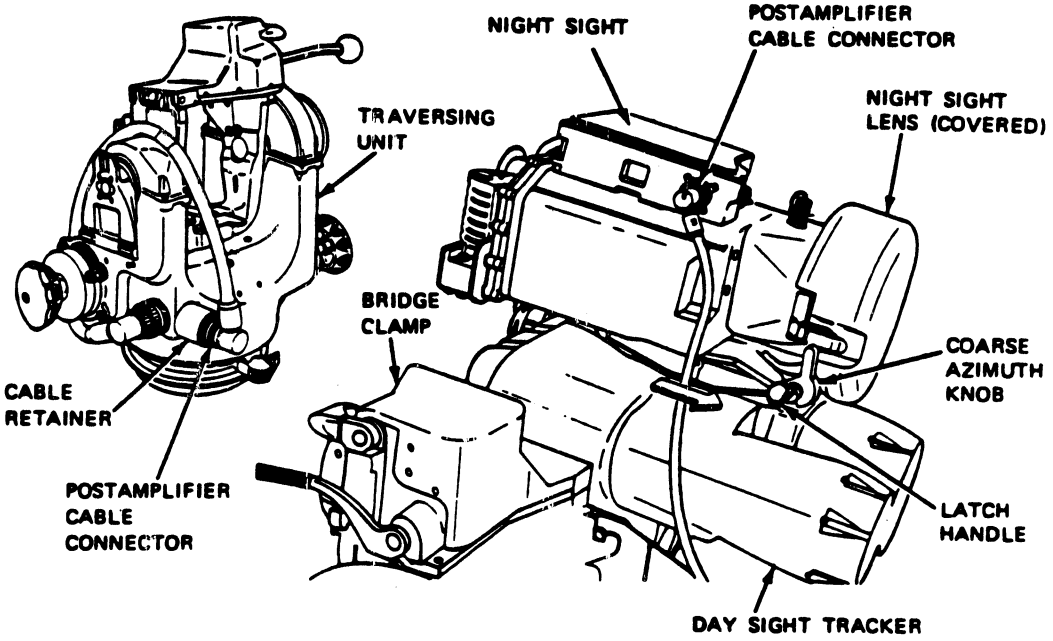


Fig 2-32. Installing night sight--continued.

Caution: KEEP THE POSTAMPLIFIER CABLE CLEAR OF THE BRIDGE CLAMP.

Step 5. Aline the yellow mark on the postamplifier cable connector with the yellow mark on the night sight and push in on the cable connector and turn it to the right until it stops.

Step 6. Ensure that cable 2W1 is connected to the night sight vehicle power conditioner connector J1 (fig 2-33).

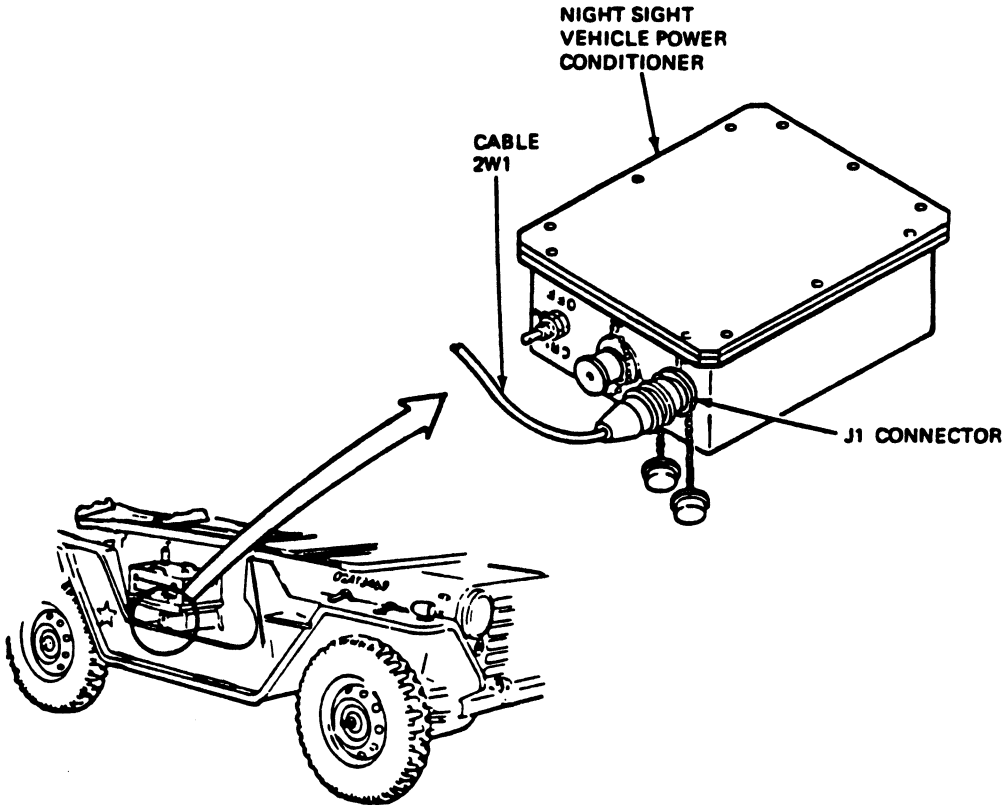


Fig 2-33. Night sight vehicle power conditioner.

Step 7. Stow and secure the night sight spare battery pack at the left rear of the jeep (fig 2-34).

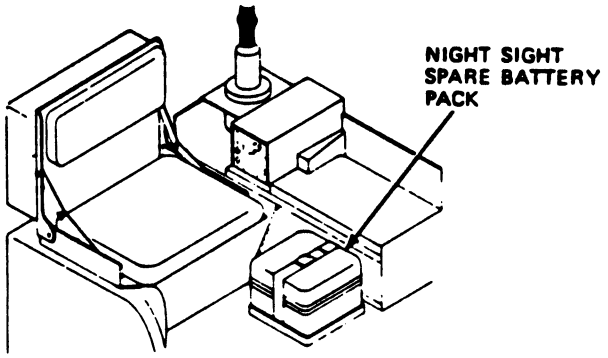


Fig 2-34. Storage of night sight spare battery pack.

Step 8. Connect cable 2W1 to the 24-volt vehicle power connector (fig 2-35).

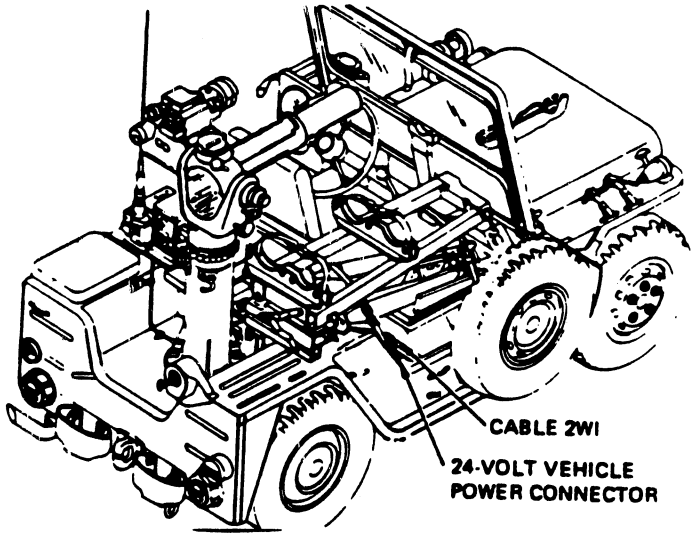


Fig 2-35. Cable 2W1/24 volt-vehicle power connector.

Step 9. Connect Cable 2W2 to the night sight vehicle power conditioner connector J2 (fig 2-36).

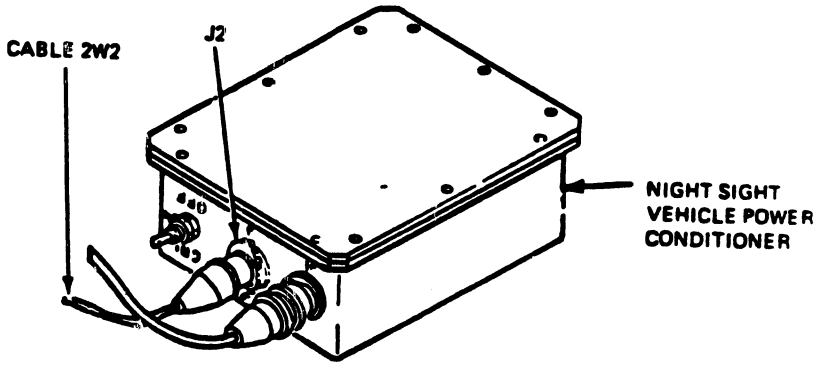


Fig 2-36. Cable 2W2/Connector J2
(night sight vehicle power conditioner).

Step 10. Connect Cable 2W2 to the night sight input power connector J1 (fig 2-37).

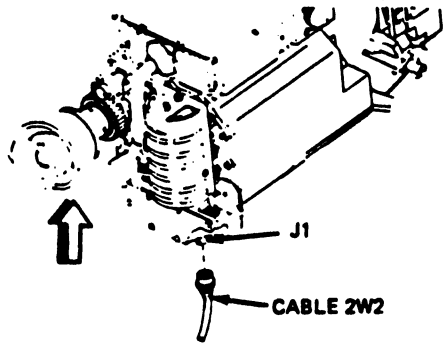


Fig 2-37. Connecting Cable 2W2 to connector J1.

Step 11. Set the night sight vehicle power conditioner CB1 switch to ON (fig 2-38).

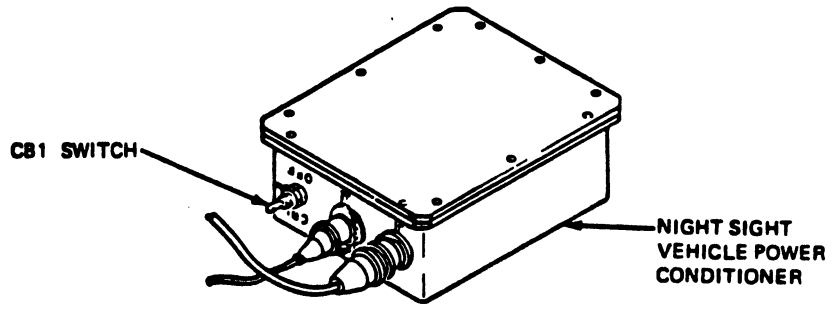


Fig 2-38. Setting CB1 switch.

Step 12. Set the ON/OFF/STBY switch to OFF (fig 2-39).

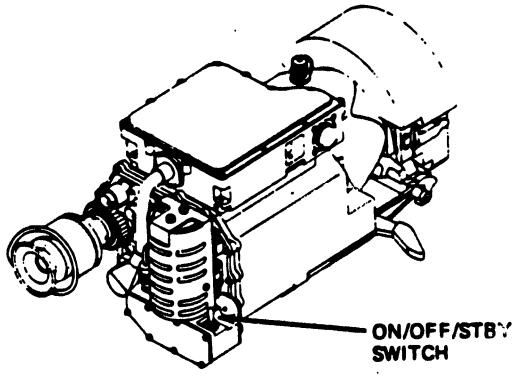


Fig 2-39. ON/OFF/STBY switch.

EXERCISE C: Answer the following question and check your response against the one listed at the end of this study unit.

1. List the steps for installing the night sight.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

e. _____

_____

f. _____

_____

g. _____

_____

h. _____

_____

i. _____

_____

j. _____

_____

k. _____

_____

l. _____

_____

* *

D. Now that you have installed the night sight, the next component is the missile guidance set (MGS).

Step 1. Open the cover by unlatching the two latches at the front of the MGS (fig 2-40). Remove the cover and stow it in a safe place in the jeep.

Note: If the power conditioner is not in the MGS, install it at this time.

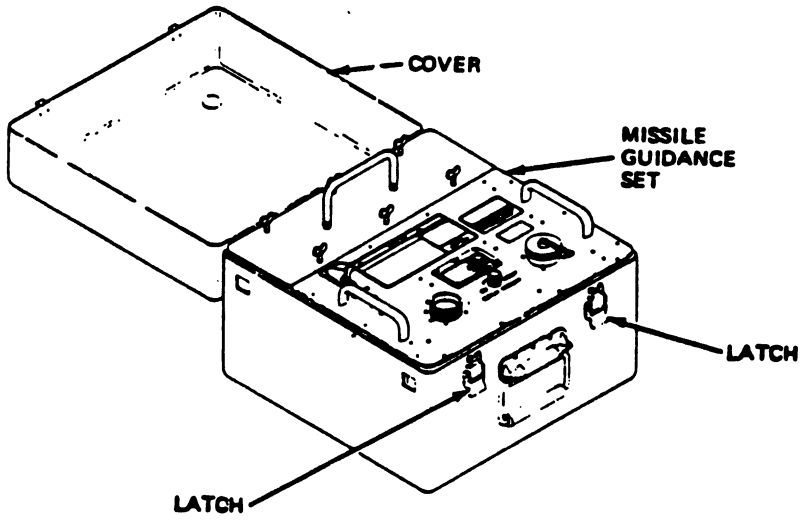


Fig 2-40. Missile guidance set (MGS).

Step 2. Place the missile guidance set (MGS) in the MGS bracket and secure the MGS with straps (fig 2-41).

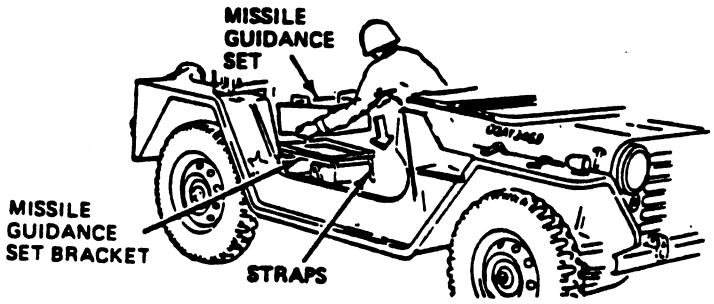


Fig 2-41. Securing missile guidance set.

Step 3. Line up the yellow colored index line on the coil cable connector with the yellow colored mating line next to connector J1. Push straight down on the cable connector and turn the locking nut clockwise until the red mark on the J1 connector cannot be seen (fig 2-42).

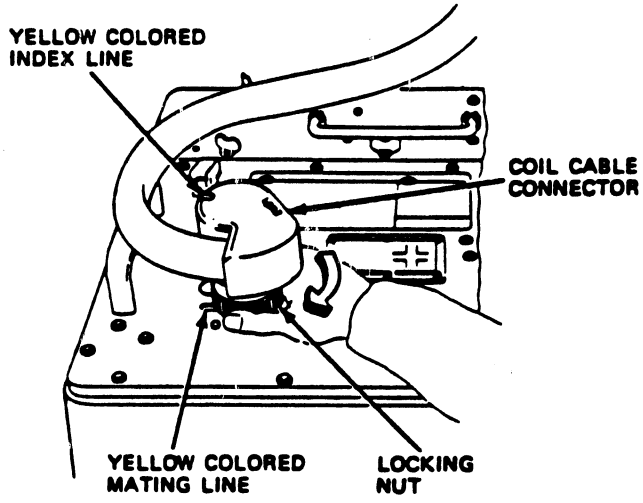


Fig 2-42. Installing missile guidance set.

Step 4. Line up the power conditioner cable connector with connector J1 on the power conditioner. Push down on the power conditioner cable connector and turn the locking nut clockwise (fig 2-43).

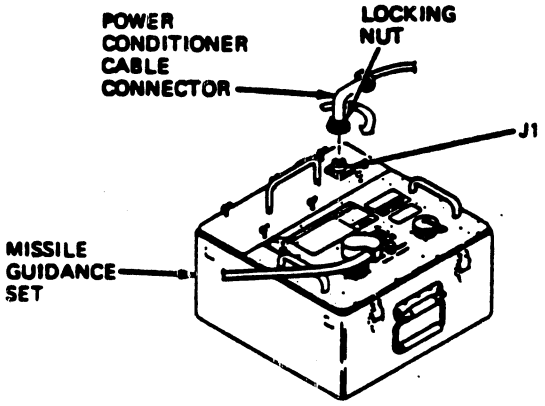


Fig 2-43. Connecting the power conditioner cable.

EXERCISE D: Answer the following questions and check your responses against those listed at the end of this study unit.

1. Once the cover of the MGS is removed, where do you stow the missile guidance set?

_____

2. What is Step 4 for installing the MGS?

_____

_____

_____

3. The yellow colored index line on the coil cable connector should be alined with

_____

_____

* *

E. The last component to be installed on the jeep launcher is the launch tube.

Step 1. Ensure that the opening in the launch tube is up and lift up the launch tube latch (fig 2-44).

Step 2. Place the launch tube on the traversing unit by sliding the index pins into the brackets in the traversing unit (fig 2-44).

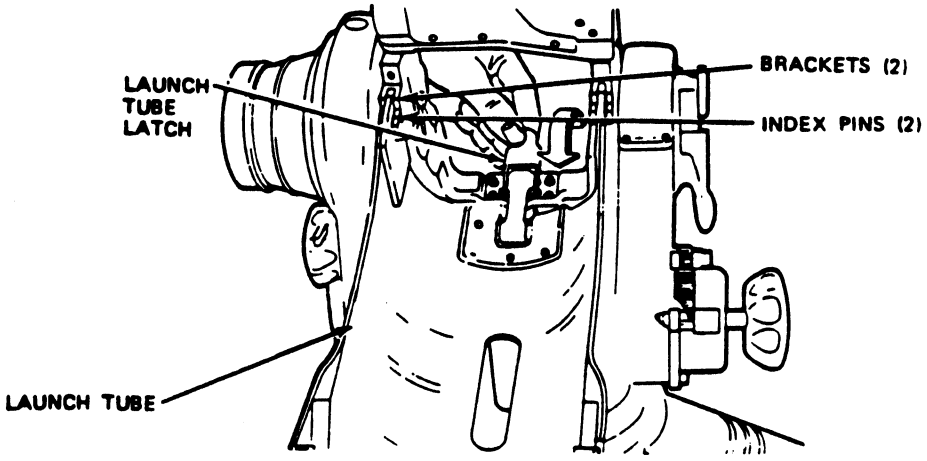


Fig 2-44. Installing the launch tube.

Step 3. Line up the locating pin on the traversing unit with the mating hole in the launch tube (fig 2-45).

Step 4. Place the launch tube latch in the launch tube catch and press down on the latch until it latches (fig 2-45).

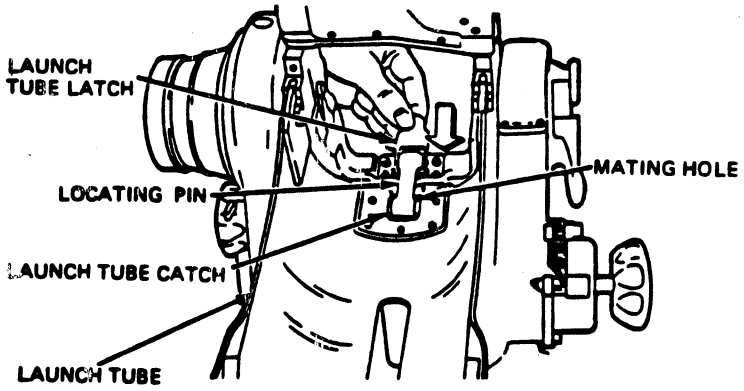


Fig 2-45. Installing the launch tube--continued.

EXERCISE E: Answer the following question and check your response against the one listed at the end of this study unit.

1. Listed below, in scrambled order, are the steps for installing the launch tube.

   (1) Line up the locating pin on the traversing unit with the mating hole in the launch tube.

   (2) Ensure that the opening in the launch tube is up and lift up the launch tube latch.

   (3) Place the launch tube latch in the launch tube catch and press down on the latch until it latches.

   (4) Place the launch tube on the traversing unit by sliding the index pins into the brackets in the traversing unit.

In what sequence should they be performed?

a. 1, 2, 3, 4,
b. 2, 4, 1, 3
c. 4, 2, 1, 3
d. 3, 1, 4, 2

SUMMARY REVIEW

Answers to Study Unit #2 Exercises

Work Unit 2-1.

Exercise A.

1. -Lift the three lock handles up all the way to the release position.
   -Press one detent stop lever down and release. Pull one leg of the tripod out until the leg support reaches the bottom band on the leg.
   -Position the tripod with the coupling clamp handle facing the direction of fire. Using the detent stop lever, adjust the tripod legs until the bubble in each level vial is between the two marks shown.
   -Open the coupling clamp by pulling the coupling clamp handle out.

Exercise B.

-Hold the traversing unit over the tripod and pass the coil cable through the body of the tripod
-Carefully place the traversing unit on the tripod, push the coupling clamp handle in to fasten the traversing unit to the tripod, and place the azimuth lock in the LOCK position.
-Pull the coupling clamp handle out, turn the traversing unit so the locating pin is in the direction of fire, and push the coupling clamp handle in.

Exercise C.

1. d.

Exercise D.

1. c.
2. b.
3. e.
4. a.
5. d.

Exercise E.

1. Night sight cable
2. a. Place the course azimuth knob in position No. 1.
   b. Move the latch handle toward the rear of the night sight.
   c. Line up the keyed hole on the night sight with the campost on the day sight tracker.
   d. Place the night sight on the day sight tracker.
   e. Move the latch handle toward the front of the night sight.
   f. Remove the post amplifier cable connector from the cable retainer on the traversing unit.
   g. Aline the yellow mark on the postamplifier cable connecter with the yellow mark on the night sight.
   h. Open the lid of the battery power conditioner and connect the output cable connector 8W1P2(8J1) to the connector on the battery power conditioner. Connect the output cable connector 9W1P1(1J3) to connector J1.
   i. Release the two latches and remove the front lens cover and set the night sight field-of-view switch to NFOV.

Exercise F.

a. Open the cover by unlatching the two latches at the front of the MGS. Remove the cover and place it out of the way of personnel.
b. Place the MGS close to the rear of the tripod and clear of loading and firing operations.
c. Line up the yellow colored index line on the coil cable connector with the yellow colored mating line next to connector J1 on the MGS.
d. Push straight down on the coil cable connector and turn the locking nut clockwise until the red mark on the J1 connector cannot be seen.

Work Unit 2-2.

Exercise A.

1. a. Open the coupling clamp and hold the traversing unit near the launcher mount and feed the coil cable through the hole in front of the launcher mount and lower the traversing unit onto the mount.
   b. Fasten the traversing unit to the launcher mount by closing the coupling clamp. Place the azimuth lock in the LOCK position and turn the traversing unit from side to side until it locks in place.
   c. Ensure that the elevation lock is in the LOCKED position. If not, turn the control knobs forward until the trunnion clicks and locks in place.
   d. Set the azimuth lock to unlock. Turn the traversing unit counterclockwise 45°.

Exercise B.

1. Hold the tracker with the tracker hook mount in line with the traversing unit boresight plate. Press and hold the latch in toward the latch handle; push the latch handle all the way down and release.
2. Tilt the top of the tracker slightly toward the traversing unit. Guide the tracker hook mount of the day sight tracker over the tip of the traversing unit boresight plate.
3. Join the day sight tracker index plate groove with the traversing unit boresight guide and pull the latch handle all the way up until the latch releases.
4. OFF
5. False

Exercise C.

a. Place the coarse azimuth knob in position No. 1
b. Line up the keyed hole on the insight sight with the campost on the day sight tracker. Check Vee Ways for foreign material.
c. Place the night sight on the day sight tracker.
d. Remove the post amplifier cable connector from the cable retainer.
e. Aline the cable connector on the night sight, push in and turn.
f. Ensure that cable 2W1 is connected to the nignt sight vehicle power conditioner connector J1.
g. Stow and secure the night sight spare battery pack at the left rear of the jeep.
h. Connect cable 2W1 to the 24-volt power connector.
i. Connect cable 2W2 to the night sight vehicle power conditioner J2.
j. Connect cable 2W2 to the night sight input power connector J1.
k. Set the night sight vehicles power conditioner CB1 switch to ON.
l. Set the ON/OFF/STBY switch to OFF.

Exercise D.

1. The MGS bracket and secure with the straps.
2. Line up the power conditioner cable connector with connector J1 on the power conditioner. Push down and turn the locking nut.
3. The yellow colored mating line next to connector J1.

Exercise E.

1. b.

STUDY UNIT 3

SYSTEM CHECKOUT

STUDY UNIT GOALS: TO RECOGNIZE AND GAIN AN UNDERSTANDING OF SYSTEM CHECKOUT PROCEDURES FOR THE TOW 2 MISSILE SYSTEM AS WELL AS THE PROCEDURES FOR PERFORMING THE SYSTEM'S SELF TEST IN CONJUNCTION WITH SYSTEM CHECKOUT. (PROCEDURE IS THE SAME FOR GROUND MOUNT OR JEEP LAUNCHER).

Before beginning system checkout - DO NOT PERFORM THIS PROCEDURE WITH AN ENCASED MISSILE LOADED IN THE LAUNCH TUBE. (The missile can be accidentally fired during system checkout). Perform the system checkout quickly, but don't sacrifice speed for accuracy. If too much time is taken during system checkout, the battery assembly may not have enough power to fire the missile(s).

Note: Within this study unit, you will find that after most of the performance steps, there will be one or more subsequent actions to perform if the desired effect is not attained. If you are following these steps as a guide to perform system checkout on your TOW 2 system, and a problem is found, do the next corrective action and repeat the test. If problems still exist, continue on with any additional corrective action which may be listed.)

Work Unit 3-1. SYSTEM CHECKOUT PROCEDURE PART I

TERMINAL LEARNING OBJECTIVE: Identify the procedures for conducting system check out Part I.

ENABLING LEARNING OBJECTIVES:

Provided with a list of procedures to conduct system checkout Part I, match each with its appropriate step.

* * * * * * * * * * * * * * * * * * *

Now that you have assembled the TOW 2, in either the ground-mounted or jeep-launcher configuration, you can begin the first part of the system checkout.

Step 1. Lift the trigger cover on the traversing unit, press in on the trigger and release (fig 3-1).

Did you hear a "click" when you pressed and released the trigger? Did the trigger spring back properly? If not, remove and replace the traversing unit.

Step 2. Lower the trigger cover on the traversing unit and check the launch tube latch (fig 3-1).

Is the launch tube attached securely to the trunnion of the traversing unit? If not, remove and replace the launch tube and traversing unit.

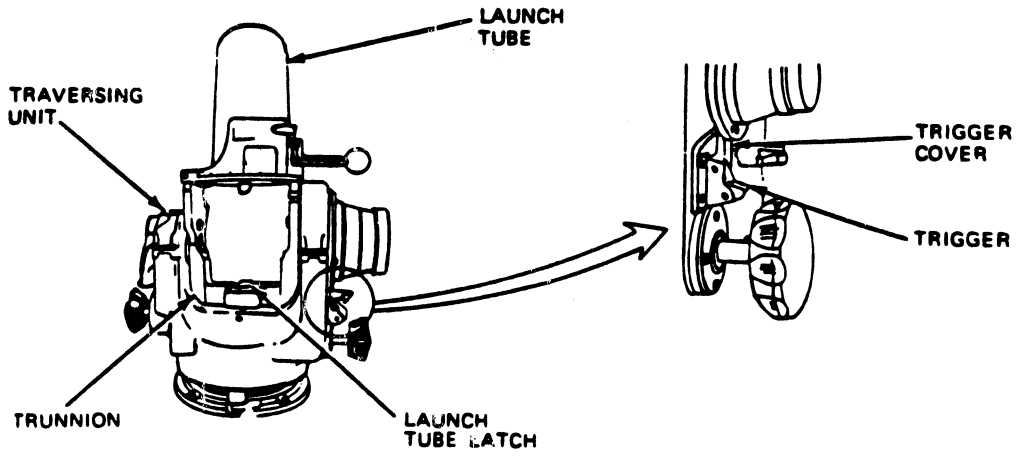


Fig 3-1. Traversing unit.

Step 3. Check the breech and inside of the launch tube for dirt, command-link wires, and foreign matter (fig 3-2).

Is the inside of the launch tube clear of dirt, missile wires, and foreign matter? If not, clear the breech and/or inside of launch tube.

Before you continue - Keep the postamplifier cable clear of the bridge clamp. The bridge clamp can damage the post amplifier cable.

Step 4. Raise the bridge clamp locking handle and open the bridge clamp (fig 3-2).

Did the bridge clamp unlock and open without trouble? If not, remove and replace the traversing unit.

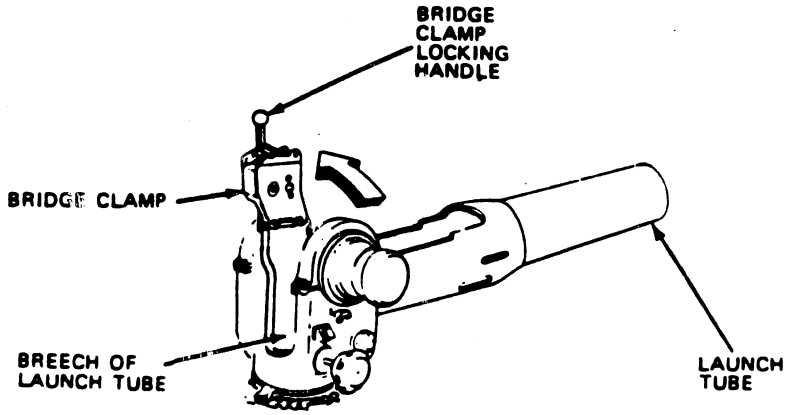


Fig 3-2. Traversing unit--continued

Step 5. Check the electrical connector on the traversing unit (fig 3-3).

Is the electrical connector free of foreign matter? If not, clean the connector.

Is the electrical connector completely inside the bridge clamp? If not, remove and replace the traversing unit.

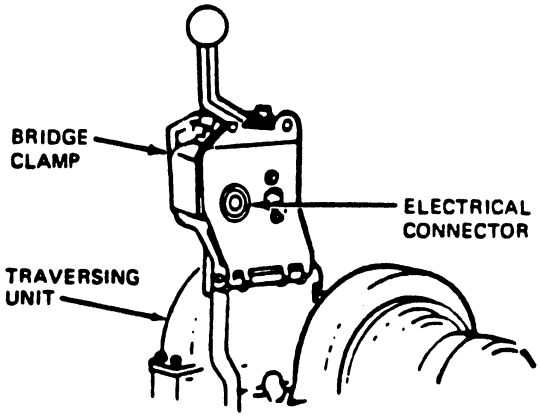


Fig 3-3. Traversing unit--continued.

Step 6. Lower the bridge clamp and the bridge clamp locking handle fully, then slowly raise the bridge clamp locking handle (fig 3-4).

Did you hear a "click" while the bridge clamp locking handle was being raised? If not, remove and replace the traversing unit.

Step 7. Lower the bridge clamp locking handle slowly (fig 3-4).

Did you hear a "click" while the bridge clamp locking handle was being lowered? If not, remove and replace the traversing unit.

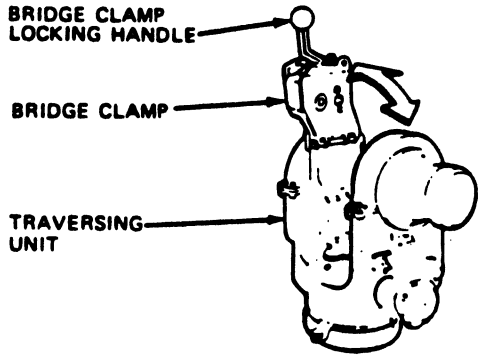


Fig 3-4. Traversing unit--continued.

Step 8. Raise the arming lever to ensure that the electrical connector extends approximately 1 inch, and lower the arming lever (fig 3-5).

Does the connector extend approximately 1 inch? If not, remove and replace the traversing unit.

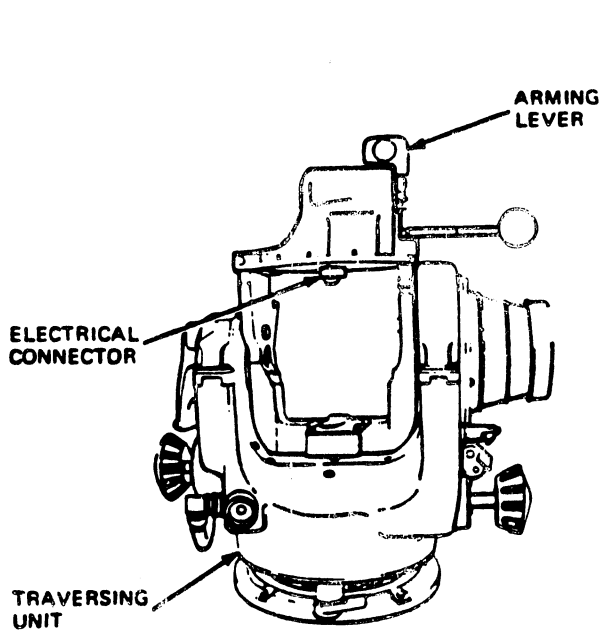


Fig 3-5. Traversing unit--continued.

Step 9. Set the ON/OFF/STBY switch to ON on the night sight and set the focus control on the day sight tracker to the +3 position (fig 3-6).

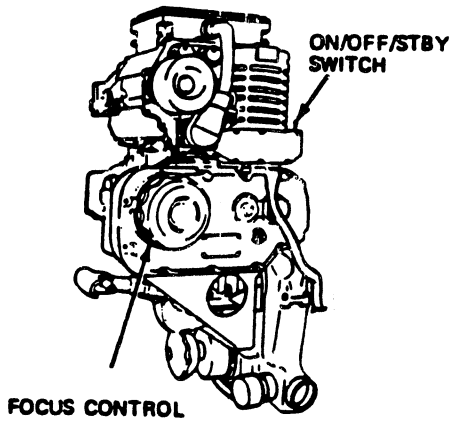


Fig 3-6. Night sight/day sight tracker

Did the cooler run on the night sight when the switch was placed on? If not -

- Remove and replace the night sight battery power conditioner cable. Still doesn't work? Then
- Remove and replace night sight battery power conditioner batteries. If there is no change, then
- Remove and replace the night sight battery power conditioner. Still no change? Then
- Remove and replace the night sight. (If all of the above corrective actions fail, contact the next higher level of maintenance.)

EXERCISE : Answer the following questions and check your responses against those listed at the end of this study unit.

Matching: The procedure for conducting system checkout Part I in column 1 with its appropriate step in column 2. Place your answers in the spaces provided.

	Column 1 Procedure	Column 2 Step
___	1. Raise the bridge clamp locking handle and open the bridge clamp.	a. Step 1
___	2. Lower the bridge clamp locking handle slowly.	b. Step 2
___	3. Check the electrical connector on the traversing unit.	c. Step 3
___	4. Lift the trigger cover on the traversing unit, press in on the trigger and release.	d. Step 4
___	5. Set the ON/OFF/STBY switch to ON on the night sight and set the focus control on the day sight tracker to the +3 position.	e. Step 5
___	6. Check the breech and inside of the launch tube for dirt, command link wires, and foreign matter.	f. Step 6
___	7. Raise the arming lever and check to ensure that the electrical connector extends approximately 1 inch, and lower the arming lever.	g. Step 7
___	8. Lower the trigger cover on the traversing unit and check the launch tube latch.	h. Step 8
___	9. Lower the bridge clamp and the bridge clamp locking handle fully, then slowly raise the bridge clamp locking handle.	i. Step 9

Work Unit 3-2. SYSTEM CHECKOUT PROCEDURE PART II (SYSTEM SELF TEST)

TERMINAL LEARNING OBJECTIVE: Identify the procedures for conducting system checkout Part II (system self test).

ENABLING LEARNING OBJECTIVE:

Provided with a list of procedures for conducting system checkout Part II (system self test), arrange them in their proper sequence.

* * * * * * * * * * * * * * * * * * *

If all of the parts of your TOW are in proper working order up to this point, you can now begin with Part II of the system checkout.

Step 1. Lift the cover over the TEST/OPERATE switch on the missile guidance set (MGS). Press the switch to "TEST" and hold (fig 3-7).

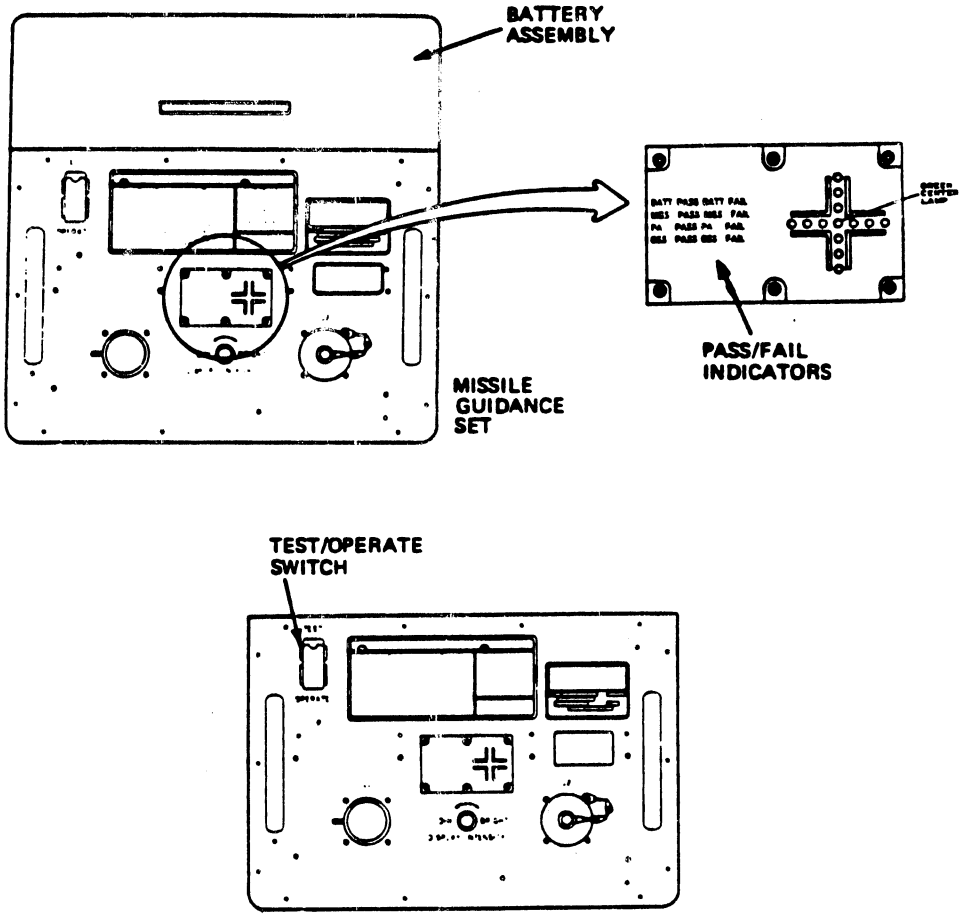


Fig 3-7. Missile guidance set (MGS).

(Note: To save time and prevent excessive wear on the TEST/OPERATE switch, the switch should be set to the TEST position and held until the completion of the self test. If the TEST/OPERATE switch is released during the self test, allow at least 3 seconds before restarting the test.)

Do any pass/fail indicators on the display light up? If not, remove and replace the battery assembly and try the battery for recharging- OR -

Remove and replace the missile guidance set.

Does the green center lamp in the AZIMUTH/ELEVATION cross light and glow steadily? If not, continue to hold the TEST/OPERATE switch to TEST.

Step 2. Turn the elevation lock on the traversing unit to the UNLOCKED position (fig 3-8). Hold the launch tube and move it up and down.

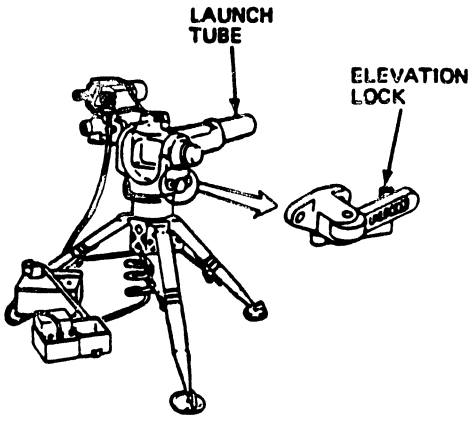


Fig 3-8. Launch tube/elevation lock.

. Do the lights on the AZIMUTH/ELEVATION cross (fig 3-11) move up when the launch tube moves up and move down when the launch tube is moved down?

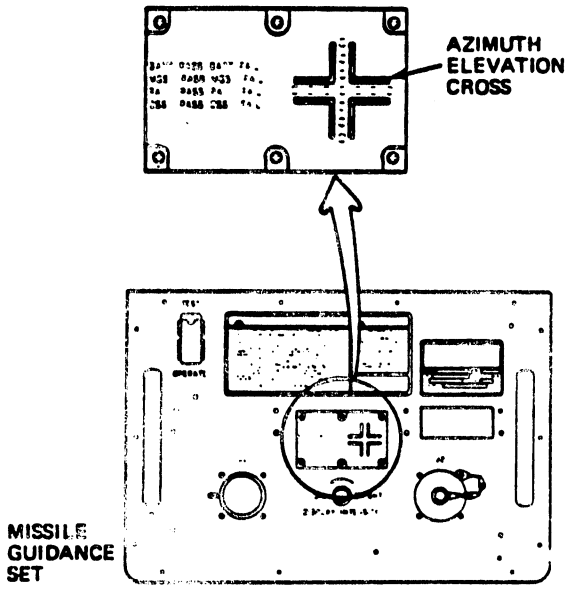


Fig 3-9. AZIMUTH/ELEVATION cross (MGS).

If not, remove and replace the traversing unit,- OR - contact the next higher echelon of maintenance.

Step 3. Turn the elevation lock to the LOCKED position (fig 3-10). Use the control knobs and turn the launch tube up and down until it locks. Turn the azimuth lock to the UNLOCK position (fig 3-10). Hold the launch tube and turn it to the right then left, and back to the center.

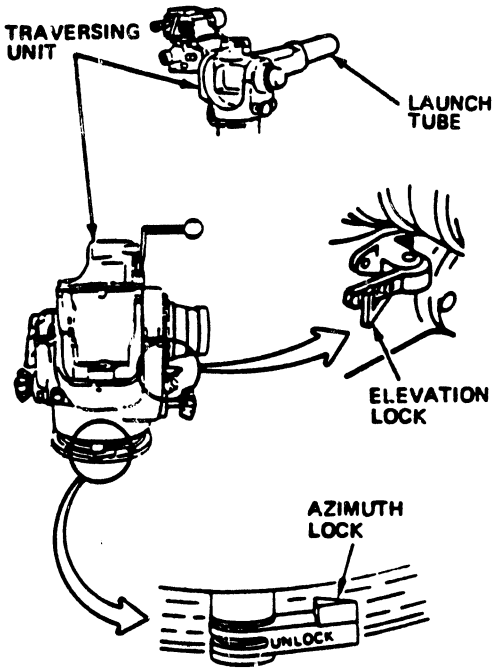


Fig 3-10. Location of Azimuth/Elevation Locks.

Did all pass/fail indicators on the display remain lit for 3 seconds? If not, remove and replace the missile guidance set.

Does the BATT PASS indicator light up? If not, remove and replace the battery assembly. OR -

- Remove and replace the missile guidance set.

Does the BATT FAIL indicator remain off? If so, allow the missile guidance set to cool off - OR -

- Remove and replace the missile guidance set.

Does the MGS pass indicator light up? If not, remove and replace the missile guidance set.

Does the MGS PASS indicator glow steadily? If not, set the night sight field-of-view switch to NFOV (fig 3-11), and set the ON/OFF/STBY switch to ON.

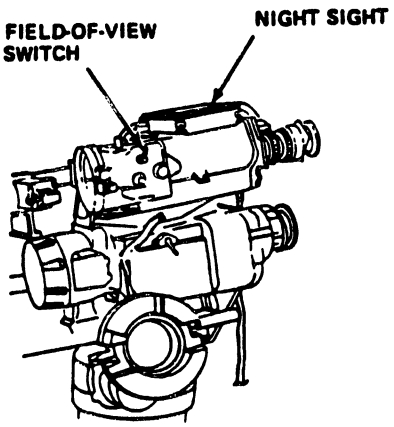


Fig 3-11. Field-of-view switch (night sight).

OR -

- Remove and replace the night sight.

Does the PA PASS indicator light up? If not, continue to hold the TEST/OPERATE switch to TEST.

Does the OSS PASS indicator light up? If not, remove and replace the day sight tracker.

Does the OSS PASS indicator glow steadily? If not, set the focus control on the day sight tracker to the +3 position and continue to hold the TEST/OPERATE switch to TEST (fig 3-12).

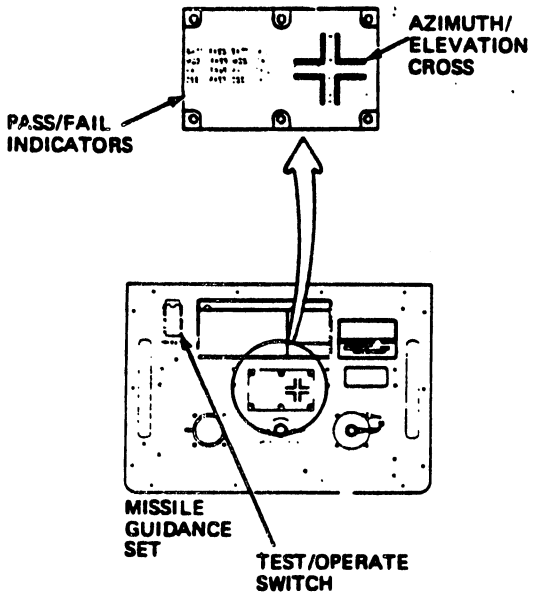


Fig 3-12. MGS--exploded view.

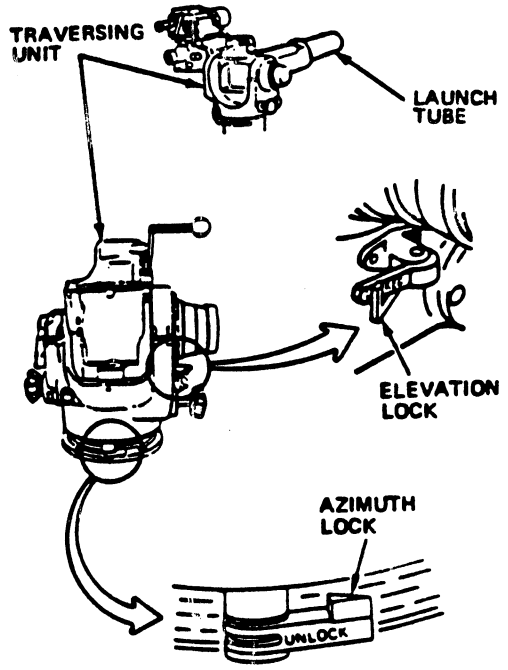


Fig 3-13. Traversing Unit (elevation/azimuth locks)/launch tube.

Do the lights on the AZIMUTH/ELEVATION cross move right and left when the launch tube is moved right and left? If not, contact the next higher echelon of maintenance.

Step 4. Turn the azimuth lock on the traversing unit to LOCK. Use the control knobs and turn the traversing unit until it locks.

Step 5. Release the TEST/OPERATE switch on the missile guidance set (fig 3-14) and close the cover over the switch.

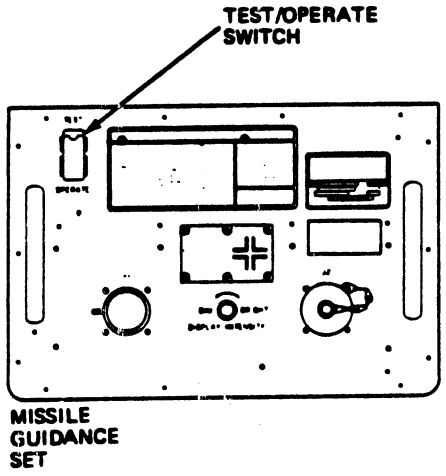


Fig 3-14. TEST/OPERATE switch (MGS).

This completes your system checkout Part II (self test).

EXERCISE: Answer the following question and check your response against the one listed at the end of this study unit.

Listed below, in scrambled order, are the steps for performing system checkout procedure Part II (self test).

(1) Turn the elevation lock to the LOCKED position. Use the control knobs and turn the launch tube up and down until it locks. Turn the azimuth lock to the UNLOCK position, hold the launch tube, and turn it to the right, then left, and back to center.

(2) Release the TEST/OPERATE switch on the MGS and close the cover over the switch.

(3) Lift the cover over the TEST/OPERATE switch to "TEST" and hold.

(4) Turn the azimuth lock on the traversing unit to LOCK. Use the control knobs and turn the traversing unit until it locks.

(5) Turn the elevation lock on the traversing unit to the UNLOCKED position, hold the launcher, and move it up and down.

Which of the following is the proper sequence?

a. 1, 5, 3, 4, 2
b. 3, 5, 1, 4, 2
c. 2, 4, 5, 3, 1
d. 4, 1, 5, 2, 3

Work Unit 3-3. SYSTEM CHECKOUT PROCEDURE PART III

TERMINAL LEARNING OBJECTIVE: Identify the procedures for conducting system checkout Part III.

ENABLING LEARNING OBJECTIVE:

Provided with a list of procedures for conducting system checkout Part III, match each with its appropriate step.

* * * * * * * * * * * * * * * * * * *

After completion of the self test, you can now perform the third part of the system checkout.

Step 1. Set the focus control to - 0+ and the RETICLE LIGHT switch to ON on the day sight tracker and adjust the focus control while looking into the eyepiece for sharp crosshairs (fig 3-15).

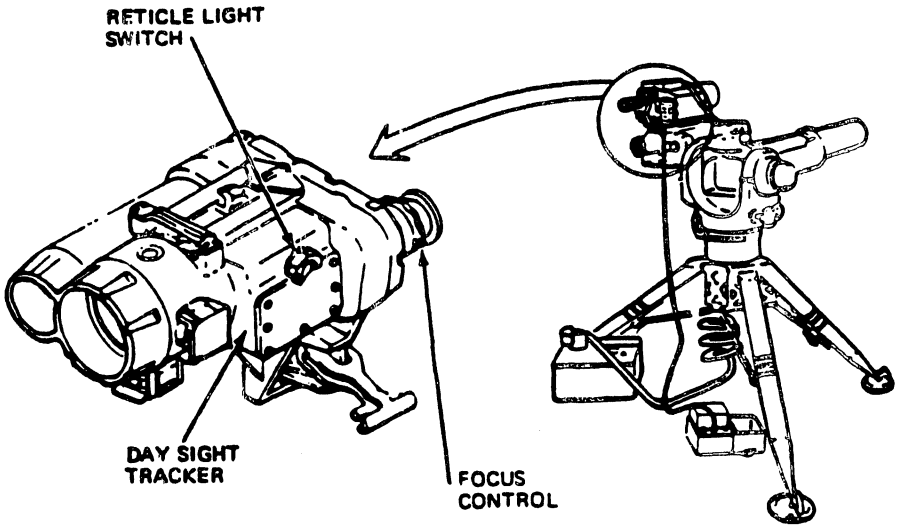


Fig 3-15. Day sight tracker (mounted).

(Note: It may be necessary to cover the day sight tracker lens during daylight hours to see if the reticle is lit).

Is the reticle lit with a red glow? If not, remove and replace the day sight tracker.

Step 2. Set the RETICLE LIGHT switch to OFF on the day sight tracker.

Step 3. Press your eye against the eye cup on the night sight and look into the eyepiece.

(Note: A security shutter is molded into the eyeshield of the night sight. The shutter will open when the eye is pressed against the eye cup (fig 3-16)).

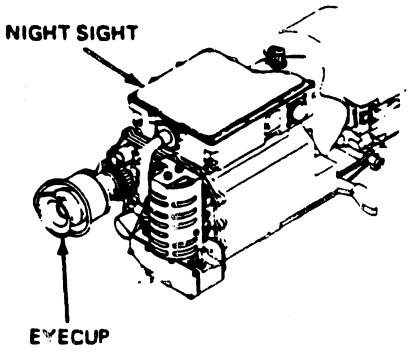


Fig 3-16. Night sight (eyecup).

Is the reticle lit and battery monitor light off (fig 3-16)?

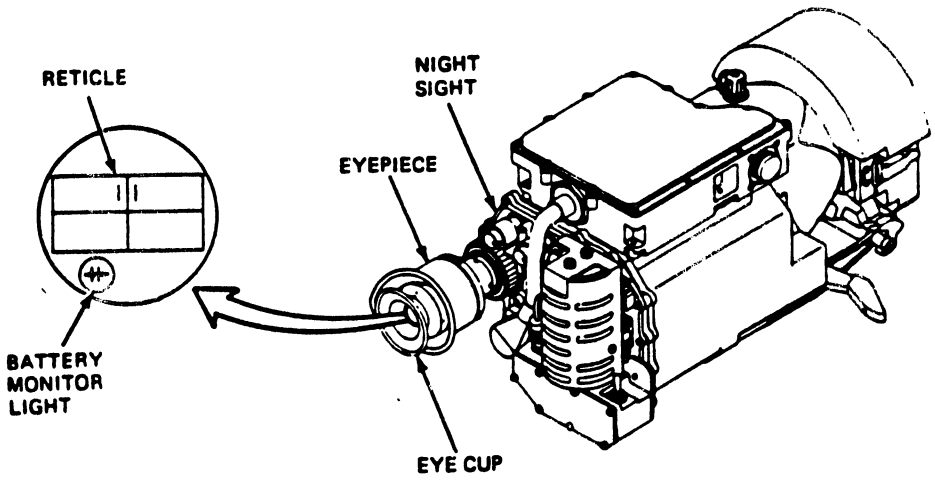


Fig 3-17. Night sight (reticle/battery monitor light).

If not, replace the battery assemblies and repeat Step 3. - OR - Replace the night sight battery power conditioner and repeat Step 3.

Step 4. Set the ON/OFF/STBY switch to STBY on the night sight (fig 3-18).

Does the cooler run continuously for 160 seconds (2 minutes, 40 seconds) and then shut off? Does the cooler cycle shut off for 100 seconds and then cut on for 20 seconds in the standby mode? If not, the night sight can still be operated in the ON position if the standby mode does not work. Continue the checkout procedure by setting the ON/OFF/STBY switch to ON and have the night sight checked by maintenance personnel at the earliest opportunity.

Step 5. Adjust the diopter adjustment ring for the best focus of the reticle (fig 3-17).

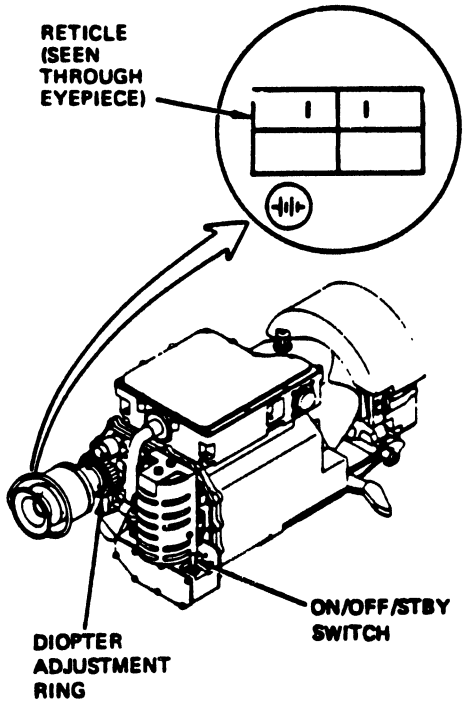


Fig 3-18. Diopter adjustment ring/ON/OFF/STBY switch.

Is the night sight reticle sharp and clear? If not, remove and replace the night sight.

This ends Part III of the system checkout.

EXERCISE: Answer the following questions and check your responses against those listed at the end of this study unit.

Matching: Match the procedure for conducting system checkout Part III in column 1 with its appropriate step in column 2. Place your answers in the spaces provided.

	Column 1 Procedure	Column 2 Step
___	1. Press your eye against the eye cup on the night sight and look into the eyepiece.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5
___	2. Set the focus control to - 0+ and the RETICLE LIGHT switch to ON on the day sight tracker and adjust the focus control while looking into the eyepiece for sharp crosshairs.	
___	3. Set the ON/OFF/STBY switch to STBY on the night sight.	
___	4. Adjust the diopter adjustment ring for the best focus of the recticle.	
___	5. Set the RETICLE LIGHT switch to OFF on the day sight tracker.	

Work Unit 3-4. SYSTEM CHECKOUT PROCEDURE PART IV

TERMINAL LEARNING OBJECTIVE: Describe the procedures for conducting system check- out Part IV.

ENABLING LEARNING OBJECTIVE:

Provided with a list of procedures in scrambled order for conducting system checkout Part IV, arrange them in their proper sequence.

Part IV of the system checkout begins as follows:

Step 1. Adjust the BRT, CTRS, and RANGE FOCUS knobs on the night sight for the best focus of the displayed image (fig 3-19).

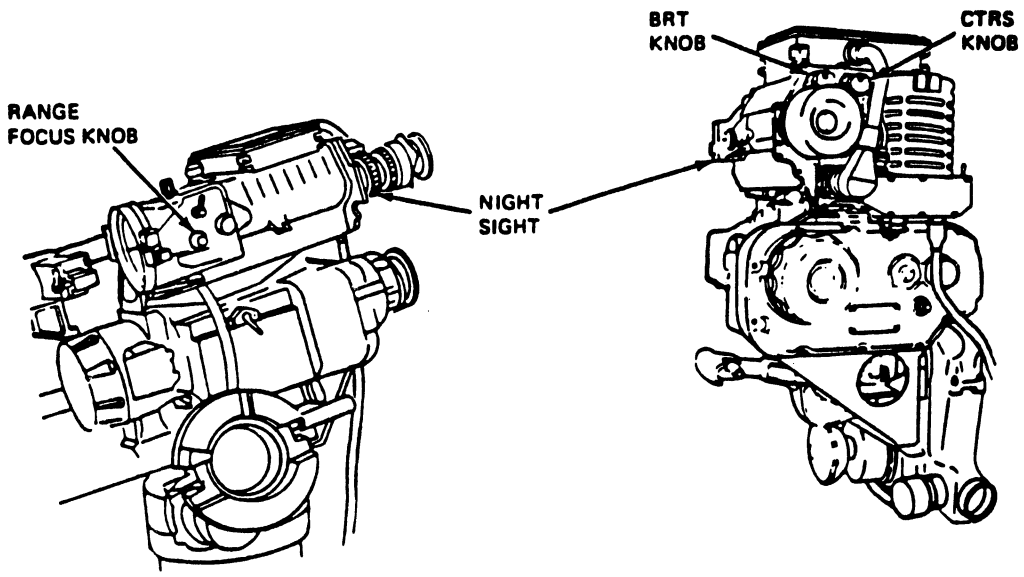


Fig 3-19. Range Focus Knob/BRT, CTRS knobs (Night sight).

Is the displayed image in the night sight sharp and clear, and does the adjustment of the controls affect the scene? If not, remove and replace the night sight.

Step 2. Set the field-of-view selector to WFOV (fig 3-20).

(Note: When changing the field-of-view selector do not disturb the RANGE FOCUS knob. If the range focus knob is accidentally moved, the system will lose focus and the night sight might needlessly be replaced by way of a subsequent corrective action.)

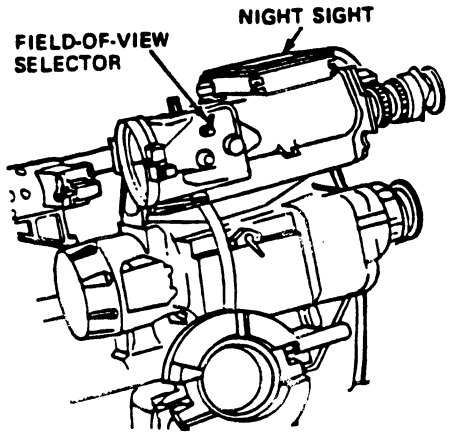


Fig 3-20. Field-of-view selector (night sight).

Does the focus of the displayed image stay the same, and does the field-of-view change to see more area? If not, remove and replace the night sight.

Caution: Latches on the boresight collimator case snap open roughly. Be careful when opening the case, so you do not injure your fingers. Use care when handling the boresight collimator. The collimator is a precision electro-optical instrument. Rough handling could damage this device.

Step 3. Open the boresight collimator case by releasing the two latches (fig 3-21) and remove the boresight collimator from the case.

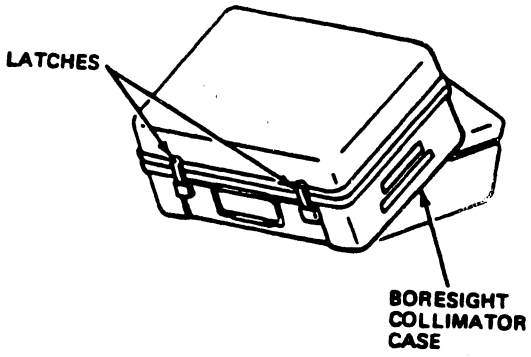


Fig 3-21. Boresight collimator case.

Step 4. Inspect and clean the mating surfaces of the night sight and boresight collimator (fig 3-22) if necessary, to make sure of proper mating for boresight accuracy.

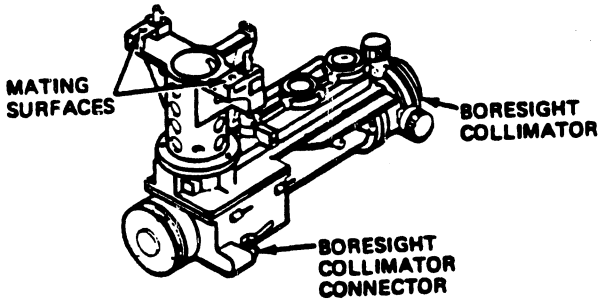


Fig 3-22. Boresight collimator

Step 5. Position the boresight collimator over the locating pins and pads of the night sight and fit boresight collimator onto the night sight (fig 3-23).

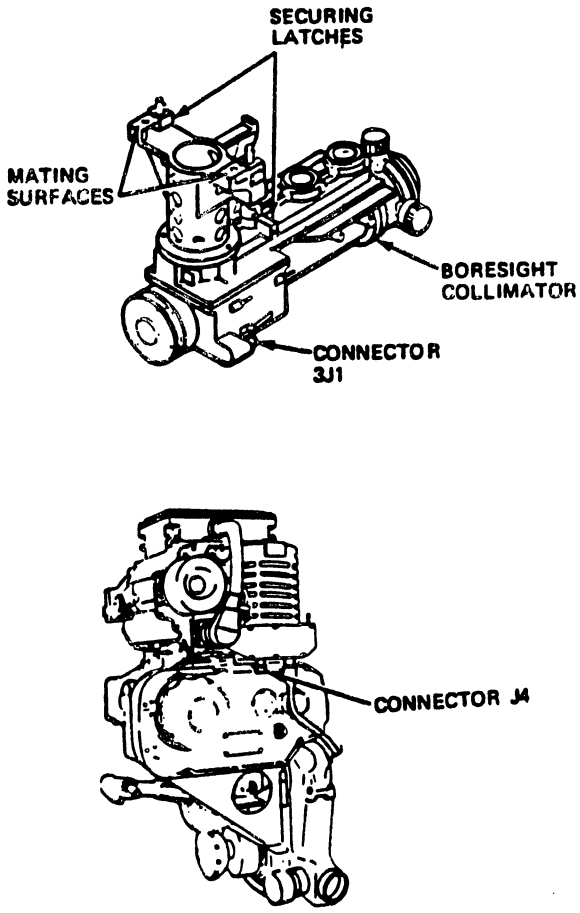


Fig 3-23. Boresight collimator and connector J4.

Push in and turn the securing latches to lock the boresight collimator to the night sight.

To properly install the boresight collimator -

a. Remove the boresight collimator power cable from the night case.
b. Remove the dust covers from the ends of the boresight collimator power cable.
c. Connect the boresight collimator power cable to the boresight collimator connector 3J1 (as shown in fig 3-23).
d. Connect the other end of the boresight collimator power cable to the night sight connector J4 (fig 3-24).

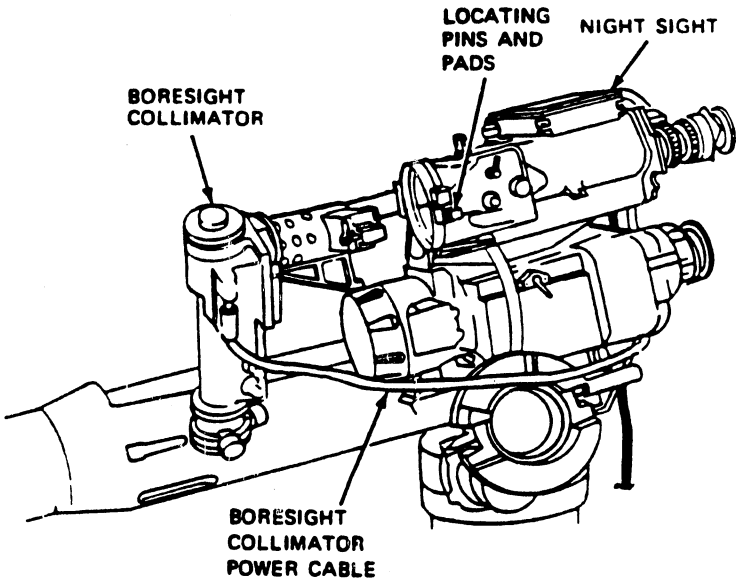


Fig 3-24. Installing boresight collimator.

EXERCISE: Answer the following question and check your response against the one listed at the end of this study unit.

Listed below in scrambled order are the steps for performing system checkout procedure Part IV.

(1) Position the boresight collimator over the locating pins and pads of the night sight and fit the boresight collimator onto the night sight.

(2) Set the field-of-view selector to WFOV.

(3) Inspect and clean the mating surfaces of the night sight and boresight collimator, if necessary, to make sure of proper mating for boresight accuracy.

(4) Adjust the BRT, CTRS, and RANGE FOCUS knobs on the night sight for the best focus of the displayed image.

(5) Open the boresight collimator case by releasing the two latches and remove the boresight collimator from the case.

Which of the following is the proper sequence?

a. 2,5,1,3,4
b. 4,2,5,3,1
c. 3,1,4,5,2
d. 5,1,2,4,3

Work Unit 3-5. SYSTEM CHECKOUT PROCEDURE PART V

TERMINAL LEARNING OBJECTIVE: Select the procedures for conducting system checkout Part V.

ENABLING LEARNING OBJECTIVE:

Given a list of procedures for conducting system checkout Part V, match each with its appropriate step.

Now that you have properly installed the boresight collimator, you can begin system checkout Part V.

Step 1. Look into the eyepiece of the day sight tracker.

Do the day sight tracker crosshairs and boresight collimator reticle appear (fig 3-24)?

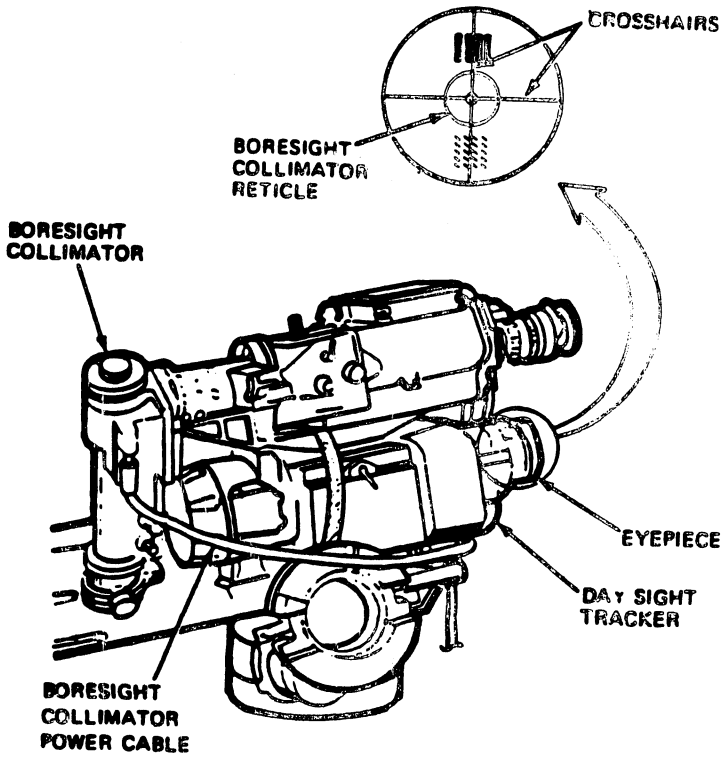


Fig 3-25. Sight picture (as seen through day sight tracker).

If not, remove and replace the boresight collimator power cable - OR - remove and replace the boresight collimator - OR - remove and replace the day sight tracker.

Step 2. Adjust the boresight collimator EL and AZ adjustment knobs to aline the boresight collimator reticle with the day sight tracker crosshairs (fig 3-26).

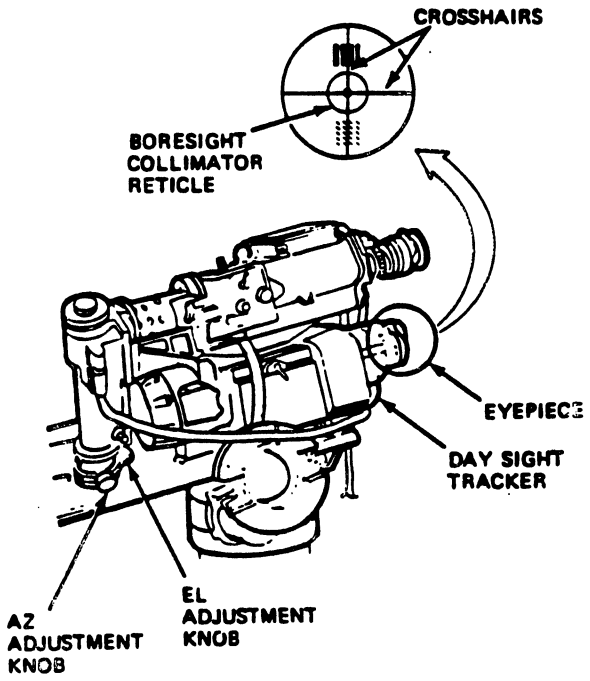


Fig 3-26. Adjustment knobs/sight picture.

Does the boresight collimator reticle center on the day sight tracker crosshairs? If not, release the night sight by moving the latch handle to the rear position and move the coarse azimuth knob to the No. 2 position (fig 3-27).

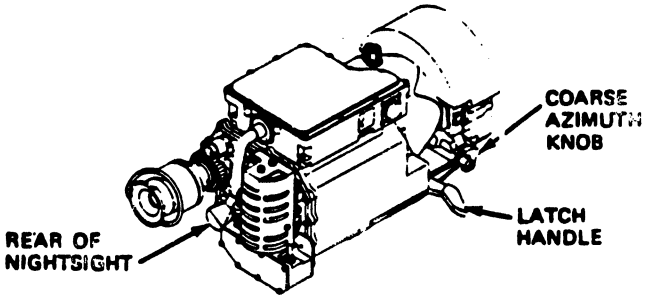


Fig 3-27. Night sight (coarse azimuth knob/latch handle).

Check to see that the night sight is alined and engaged on the day sight tracker with the coarse azimuth knob in the No. 2 position. Move the latch handle forward to lock the night sight into position. Ensure that the night sight is securely mounted to the day sight tracker before letting go.

Adjust the boresight collimator EL and AZ adjustment knobs to aline the boresight collimator reticle with the day sight tracker crosshairs. If the boresight collimator is still not centered on the day sight tracker crosshairs, remove and replace the boresight collimator.

Step 3. Set the field-of-view selector to NFOV (fig 3-27a).

Step 4. Adjust the DRT, CTRS, and RANGE FOCUS knobs for the best focus of the collimator reticle (fig 3-27b).

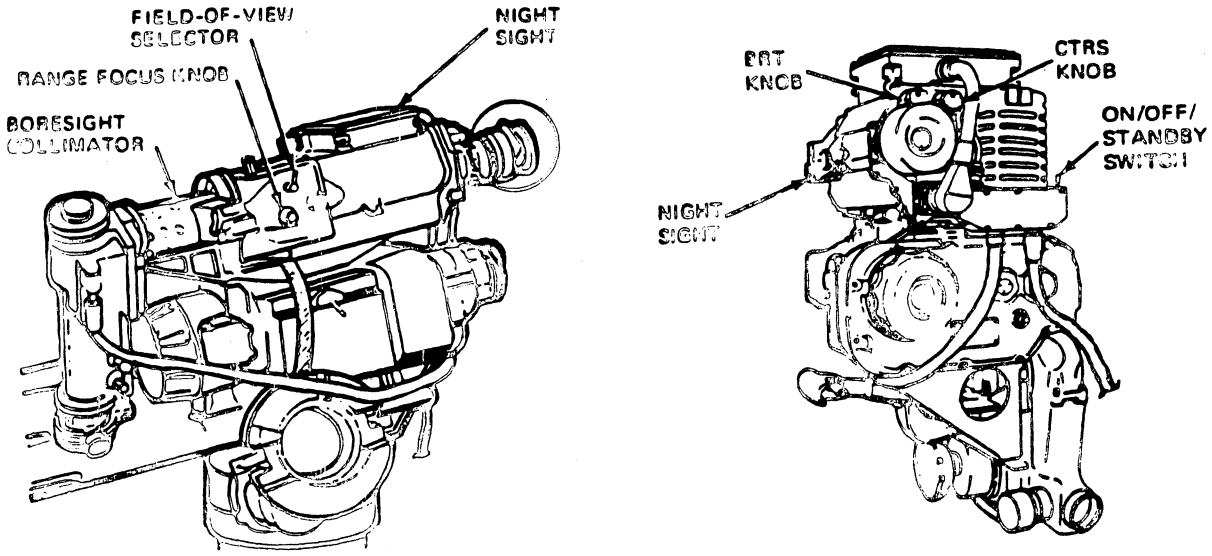
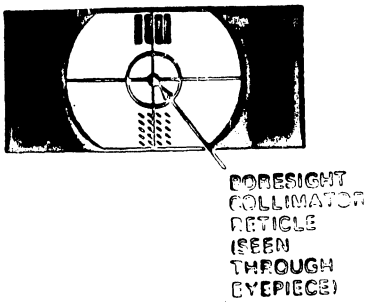


Fig 3-27a/b. Night sight/boresight collimator.

Is the boresight collimator reticle sharp and clear (as shown in the figure below)?



If not, remove and replace the boresight collimator power cable - OR - remove and replace the boresight collimator - OR - remove and replace the night sight

Step 5. Move the AZ and EL locking levers fully counterclockwise. Look into the eyepiece and adjust the AZ and EL boresight knobs on the night sight until the reticles are alined (Fig 3-28).

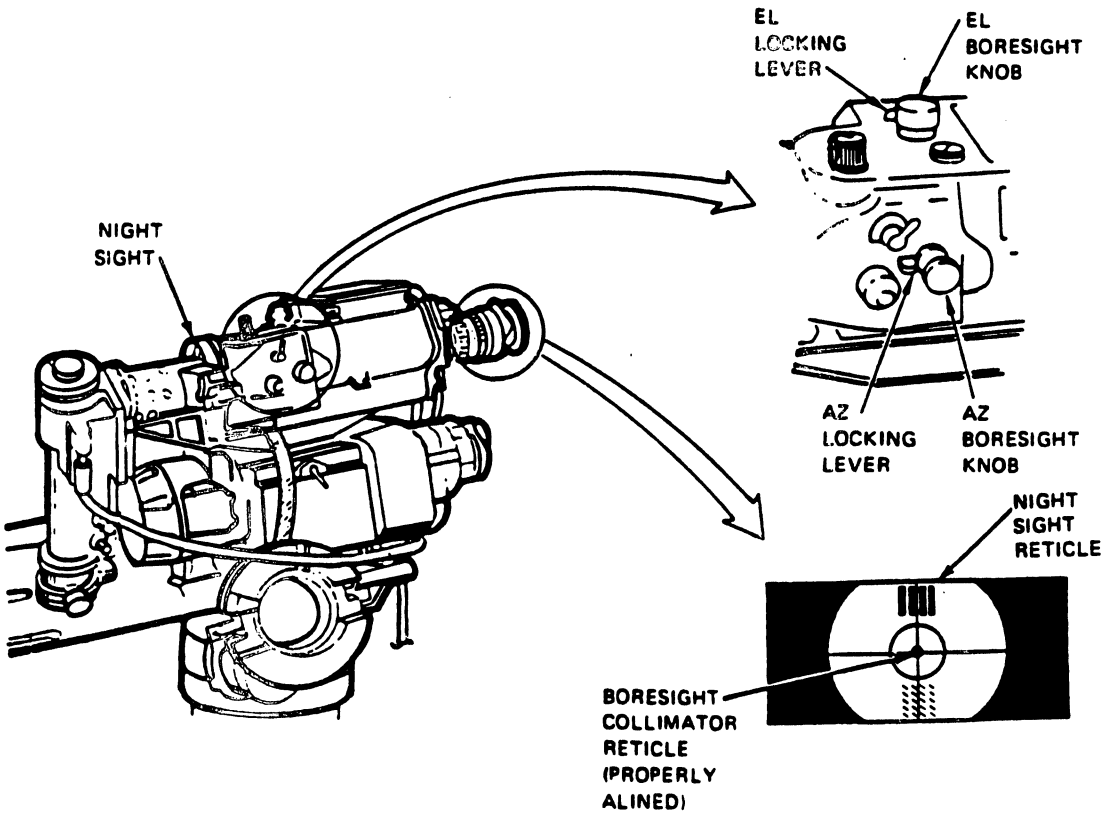


Fig 3-28. Night sight, AZ/EL Adjustment knobs boresight collimator reticle.

Is the night sight reticle alined with the boresight collimator reticle? If not, remount the night sight - OR - remove and replace the night sight.

This completes your system checkout procedure Part V.

EXERCISE: Answer the following questions and check your responses against those listed at the end of this study unit.

Provided with a list of procedures for performing system checkout procedure Part V in column 1, match each with its appropriate step in column 2. Place your answers in the spaces provided.

Column 1	Column 2
Procedure	**Step**
1. Set the field-of-view selector to NFOV	a. Step 1
2. Move the AZ and EL locking levers fully counterclockwise. Look into the eyepiece and adjust the AZ and EL boresight knobs on the night sight until the reticles are alined.	b. Step 2 c. Step 3 d. Step 4 e. Step 5
3. Adjust the boresight collimator EL and AZ adjustment knobs to aline the boresight collimator reticle with the day sight tracker crosshairs.	
4. Look into the eyepiece of the day sight tracker.	
5. Adjust the BRT, CTRS, and RANGE FOCUS knobs for the best focus of the collimator reticle.	

Work Unit 3-6. SYSTEM CHECKOUT PROCEDURE PART VI

TERMINAL LEARNING OBJECTIVE: Identify the procedures for conducting system checkout procedure Part VI.

ENABLING LEARNING OBJECTIVE:

Provided with a list of procedures for conducting system checkout Part VI, match each with its appropriate step.

* * * * * * * * * * * * * * * * * * * *

Part VI of system checkout is as follows:

Step 1. Move the AZ and EL locking levers fully clockwise on the night sight, look into the eyepiece and check the alinement of the boresight collimator reticle (fig 3-29).

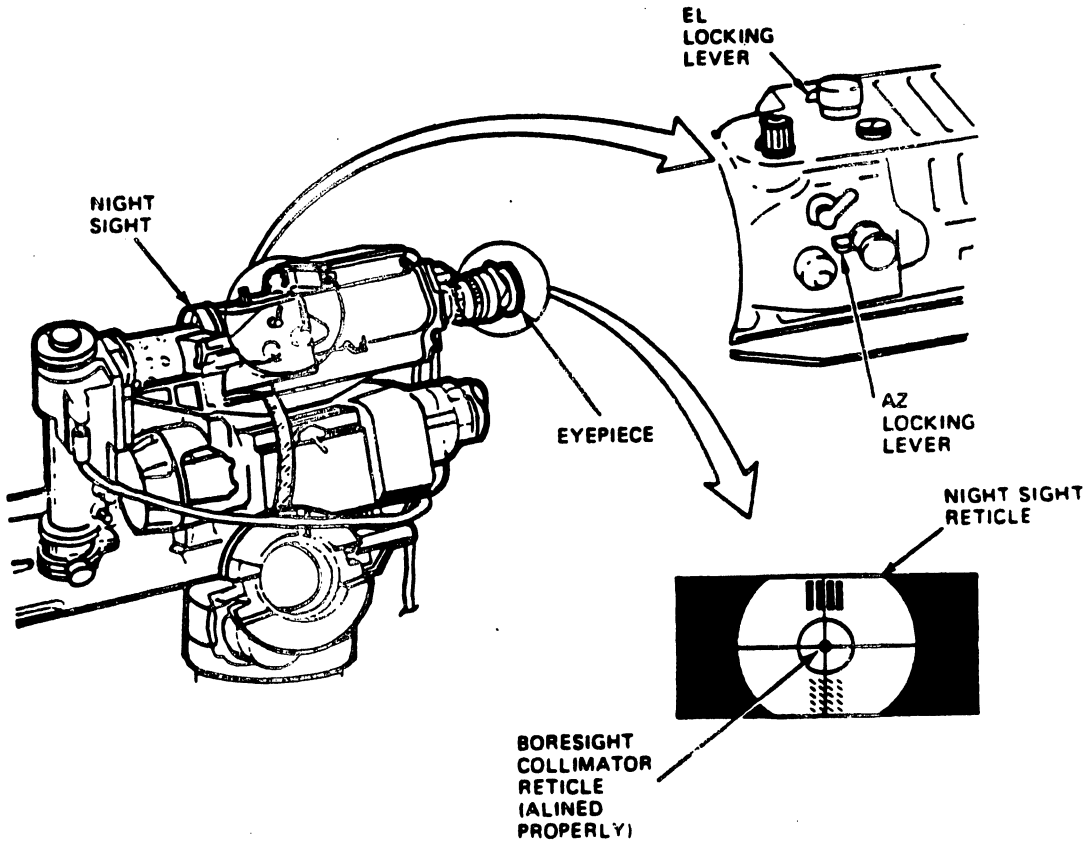


Fig 3-29. Night sight, locking levers and collimator reticle.

Is the night sight reticle alined with the boresight collimator reticle? If not, repeat Step 5 of system checkout Part V.

Step 2. Look into the eyepiece of the day sight tracker and check the alinement of the boresight collimator reticle (fig 3-30).

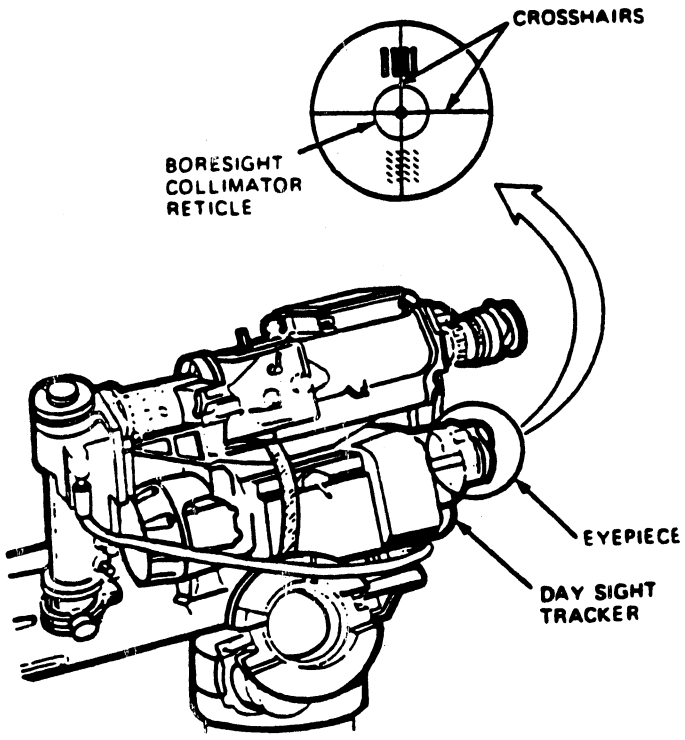


Fig 3-30. Day sight/collimator reticle.

Are the day sight tracker crosshairs alined with the boresight collimator reticle? If not, repeat Steps 1 through 5 of system checkout Part V and steps 1 and 2 of system checkout part VI.

Step 3. Set field-of-view selector to WFOV on the night sight, look into the eyepiece, and adjust BRT and CTRS controls for the best image of the boresight collimator reticle (fig 3-31).

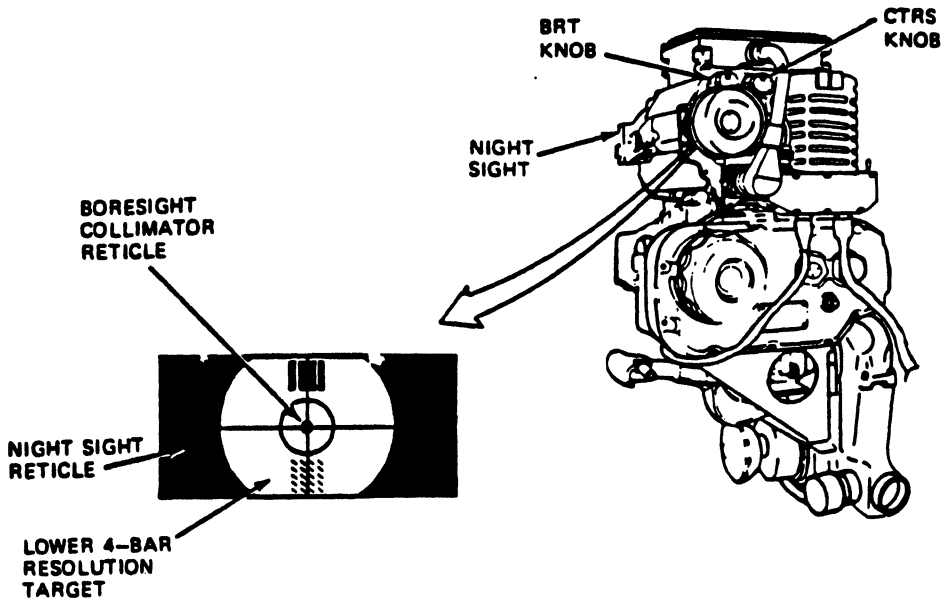


Fig 3-31. Night sight controls, night sight reticle, collimator reticle, lower 4-bar resolution target.

Is the center dot of the boresight collimator reticle less than one diameter from the center of the night sight reticle crosshairs and can the lower 4-bar resolution target be seen (as shown in the above illustration)? If not, remove and replace the night sight.

Step 4. Remove the boresight collimator and all associated equipment. Removal and stowage is as follows:

a. Remove boresight collimator power cable from the night sight connector J4 (fig 3-32).

b. Remove the boresight collimator power cable from the connector 3J1, put dust covers on the cables, and stow in the night sight carrying case (fig 3-32).

c. Release the securing latches while holding the boresight collimator.

d. Slide the boresight collimator off of the night sight and place it into the boresight collimator case.

e. Close, latch, and stow the collimator case (fig 3-32).

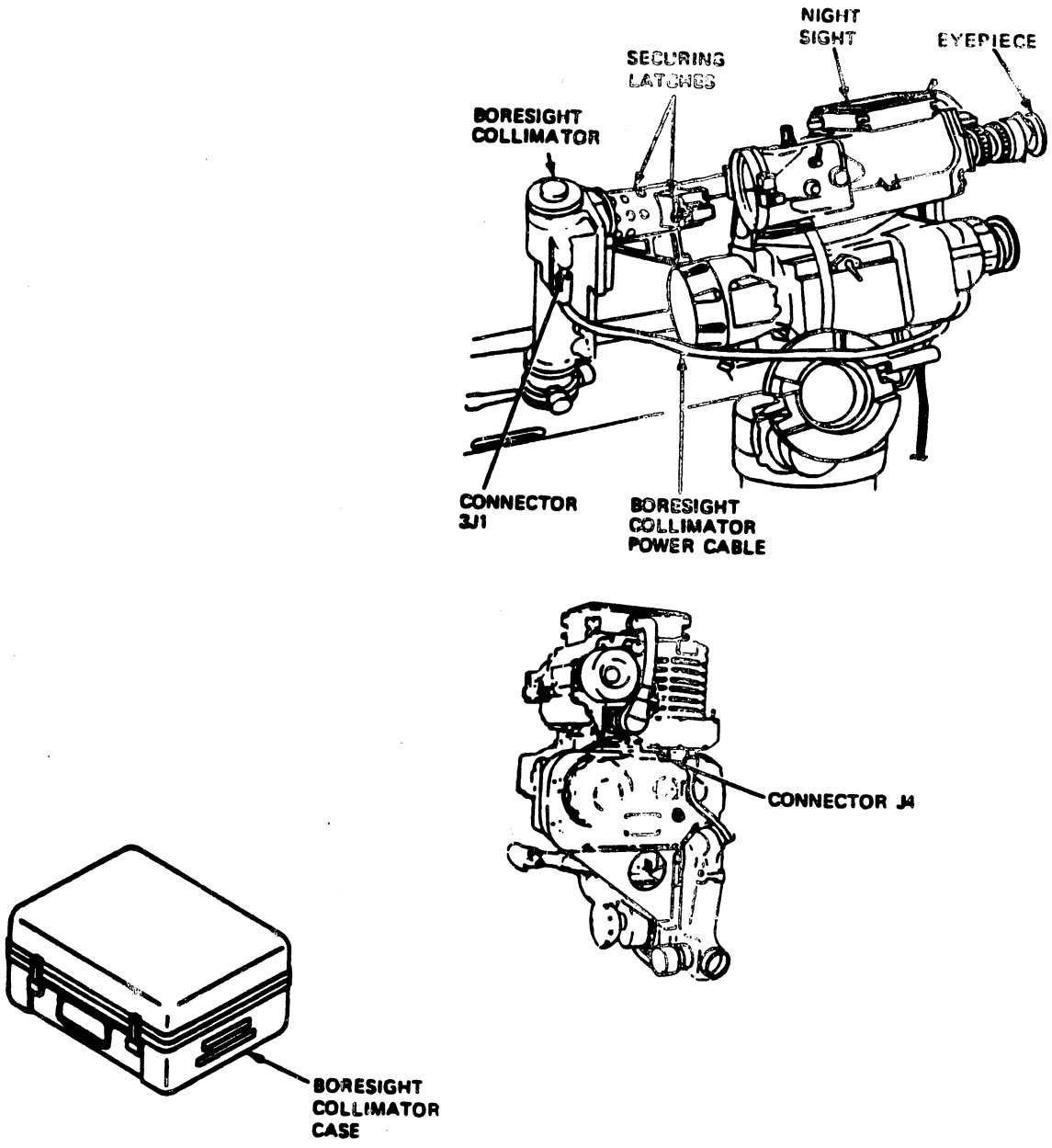


Fig 3-32. Boresight collimator and associated equipment.

Step 5. Look into the eyepiece of the night sight (fig 3-33).

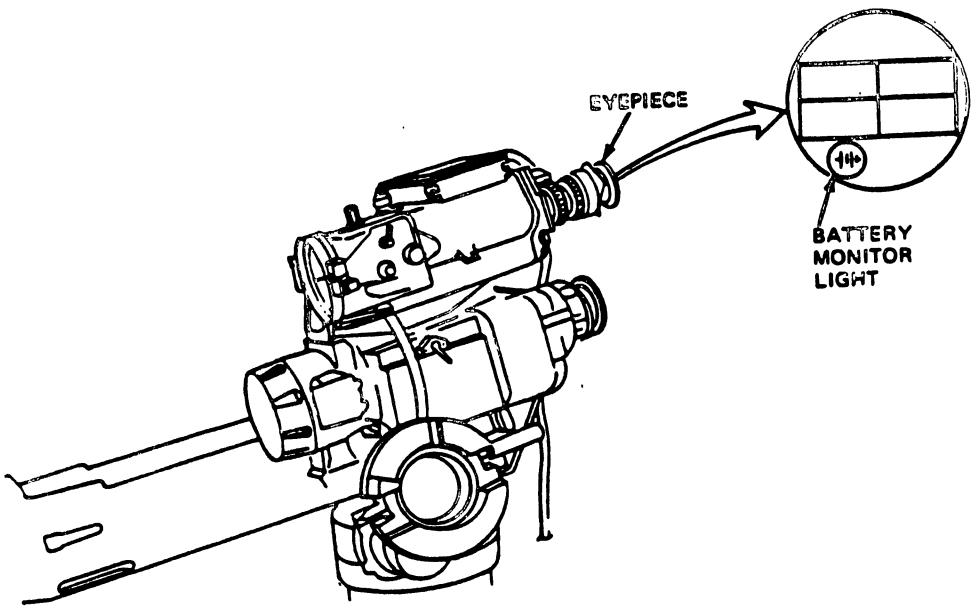


Fig 3-33. Battery monitor light (night sight).

Is the battery monitor light off? If not, remove and replace the night sight battery power conditioner batteries.

Step 6. Set the ON/OFF/STBY switch on the night sight to OFF.

This completes your sixth and final part of the system checkout. At this point, you can be certain that all component parts of your TOW 2 are operational and that you have a complete upgraded system.

EXERCISE: Answer the following questions and check your responses against those listed at the end of this study unit.

Given a list of procedures to conduct system checkout Part VI in column 1, match each with its appropriate step in column 2. Place your answers in the spaces provided.

Column 1 Procedure	Column 2 Step
___ 1. Look into the eyepiece of the day sight tracker and check the alinement of the boresight collimator reticle.	a. Step 1
___ 2. Remove the boresight collimator and all associated equipment.	b. Step 2
___ 3. Move the AZ and EL locking levers fully clockwise on the night sight, look into the eyepiece and check the alinement of the boresight collimator reticle.	c. Step 3
___ 4. Look into the eyepiece of the night sight.	d. Step 4
___ 5. Set the field-of-view selector to WFOV on the night sight, look into the eyepiece and adjust BRT and CTRS controls for the best image of the boresight collimator reticle.	e. Step 5
___ 6. Set the ON/OFF/STBY switch on the night sight to OFF.	f. Step 6

Answers to Study Unit #3 Exercises

Work Unit 3-1.

1. d
2. g
3. e
4. a
5. i
6. c
7. h
8. b
9. f

Work Unit 3-2.

1. b

Work Unit 3-3.

1. c
2. a
3. d
4. e
5. b

Work Unit 3-4.

1. b

Work Unit 3-5.

1. c
2. e
3. b
4. a
5. d

Work Unit 3-6.

1. b
2. d
3. a
4. e
5. c
6. f

STUDY UNIT 4

TOW 2 OPERATION

STUDY UNIT GOALS: TO RECOGNIZE AND GAIN AN UNDERSTANDING OF TOW 2 OPERATION CONCERNING LOADING AND REMOVING AN ENCASED MISSILE IN THE GROUND MOUNTED AND JEEP LAUNCHER MODES, TARGET ENGAGEMENT, AND IMMEDIATE ACTION PROCEDURES.

Work Unit 4-1. MISSILE LOADING (GROUND MOUNTED MODE)

TERMINAL LEARNING OBJECTIVE: Identify the steps for loading an encased missile into the launch tube for a ground mounted TOW 2.

ENABLING LEARNING OBJECTIVES:

Given a list of procedures for loading an encased missile into the tube for a ground mounted TOW 2, match each with its appropriate step.

★ ★ ★ ★ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ★ ☆

After performing system checkout, you are now ready to load your missile launcher.

(NOTE: As in other areas of this course, these procedures/steps are performed by the gunner with the assistance of the A-gunner in some cases.

Step 1. Stand on the left side of the launcher (fig 4-1).

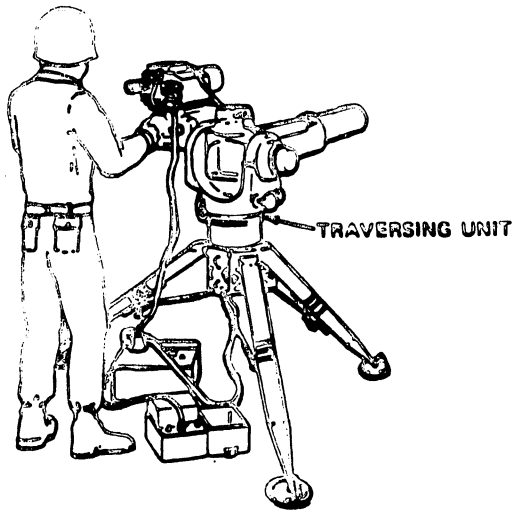


Fig 4-1. Correct position behind the launcher.

Step 2. Ensure that the azimuth lock and elevation lock on the traversing unit are in the LOCK/LOCKED position (fig 4-2).

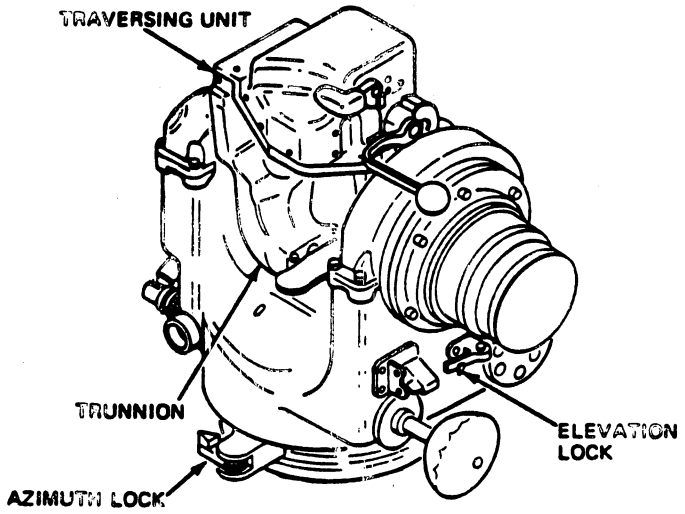


Fig 4-2. Traversing unit.

Step 3. Push the bridge clamp locking handle on the traversing unit upward and forward and open the bridge clamp (fig 4-3).

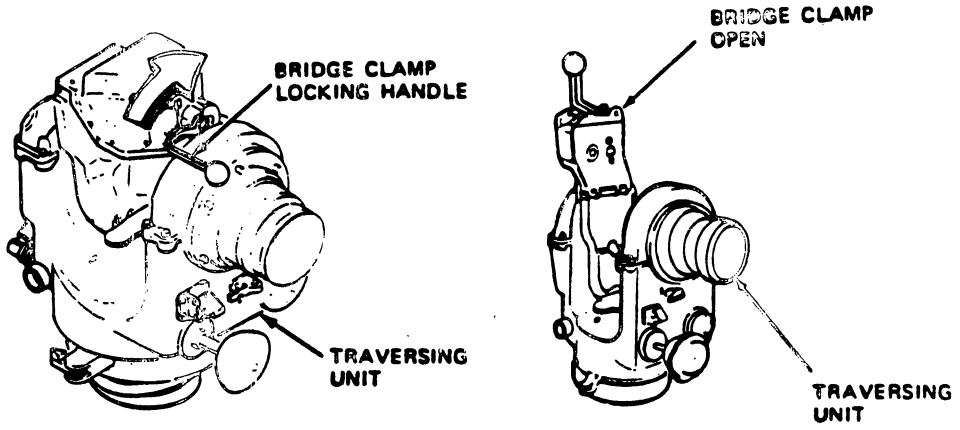


Fig 4-3. Bridge clamp locking handle/bridge clamp (traversing unit).

Step 4. Carry the encased missile to the TOW 2 weapon system (fig 4-4) and check the diaphragm for breaks.

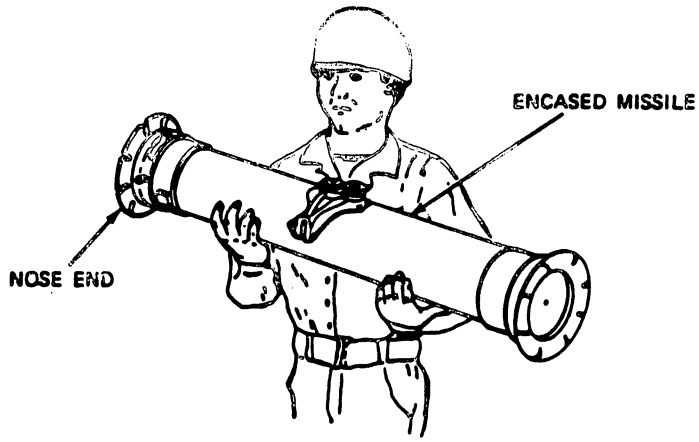


Fig 4-4. Carrying the missile.

Caution: DO NOT break the rear diaphragm on the end of the encased missile (fig 4-5).

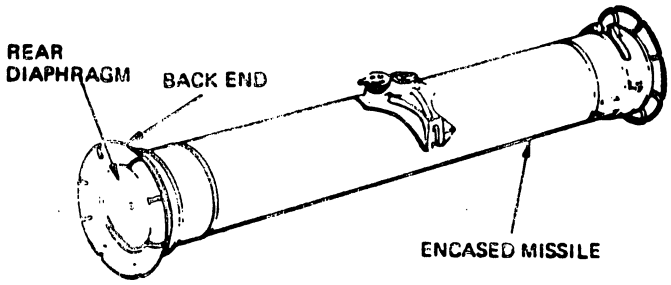


Fig 4-5. Rear diaphragm of missile.

If water gets into the launch container, the missile can be damaged.

Step 5. Pull up on the quick release clamp at the forward handling ring and remove both from the encased missile (fig 4-6).

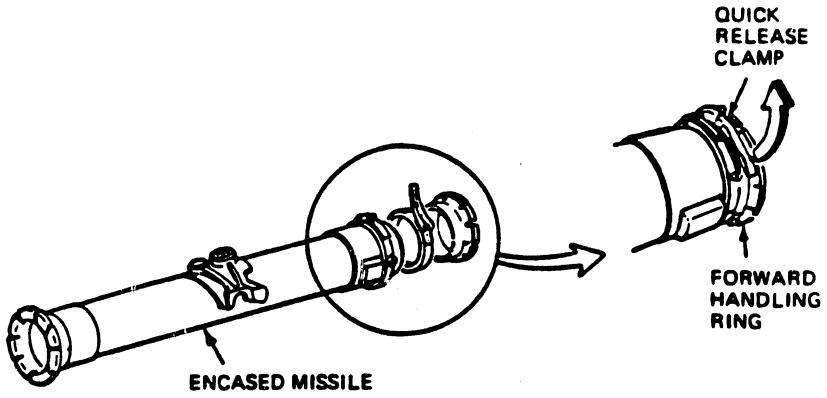


Fig 4-6. Quick release clamp and forward handling ring (encased missile).

Save the forward handling ring and the quick release clamp to be used again if the missile is not fired.

(CAUTION: Use care not to punch a hole in the encased missile diaphragm when the forward handling ring is removed (fig 4-7).

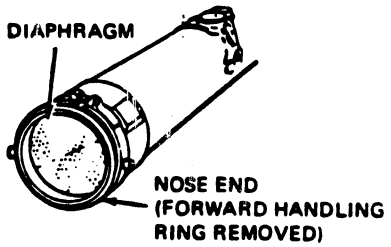


Fig 4-7. Encased missile diaphragm.

Warning: Ensure that all personnel are clear of firing danger zones (fig 4-8) before continuing with missile loading procedures.

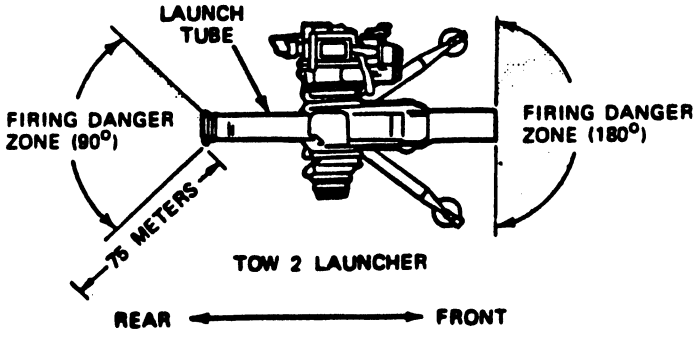


Fig 4-8. Danger zones.

Step 6. Turn the inside portion of the protective cover two complete turns counterclockwise and turn the protective cover counterclockwise and remove it from the electrical connector (fig 4-9).

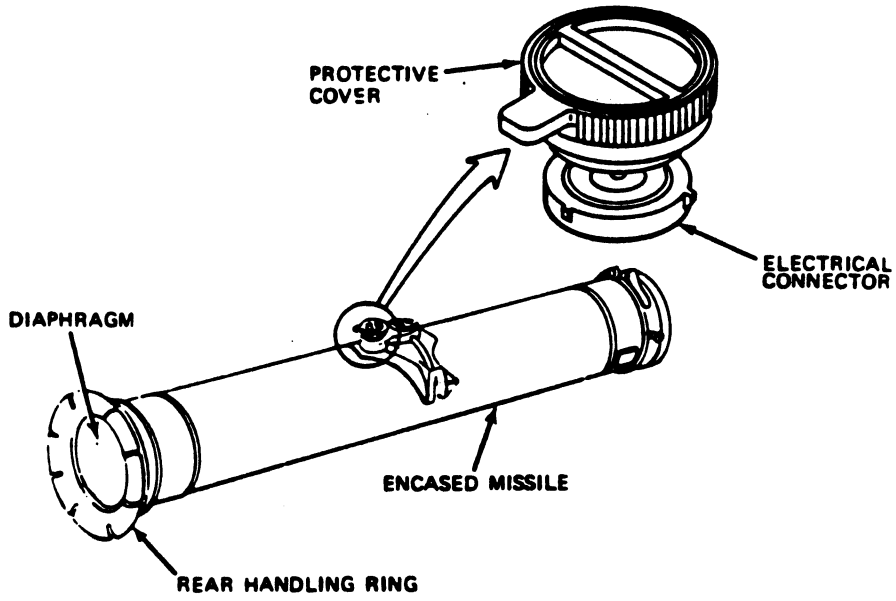


Fig 4-9. Protective cover/electrical connector.

Step 7. Turn the encased missile so that the electrical connector is on top, slide the indexing lugs on the encased missile into the indexing slots on the launch tube, and slide the encased missile forward and down into the launch tube until the indexing lugs are firmly in place (fig 4-10).

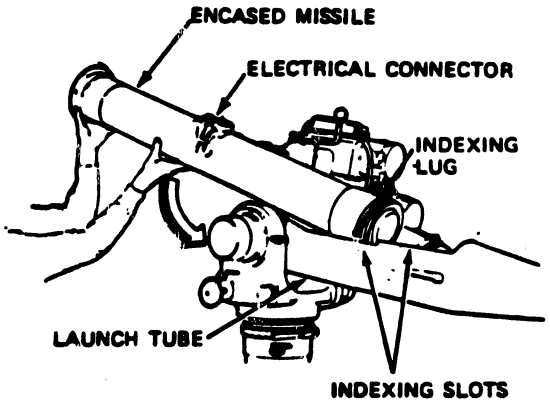


Fig 4-10. Installing encased missile.

Step 8. Lower the back end of the encased missile and ensure that it is placed so that the electrical connector will join with the bridge clamp. Push down on the bridge clamp and pull the bridge clamp locking handle backward and down to lock the encased missile in the launch tube (fig 4-11).

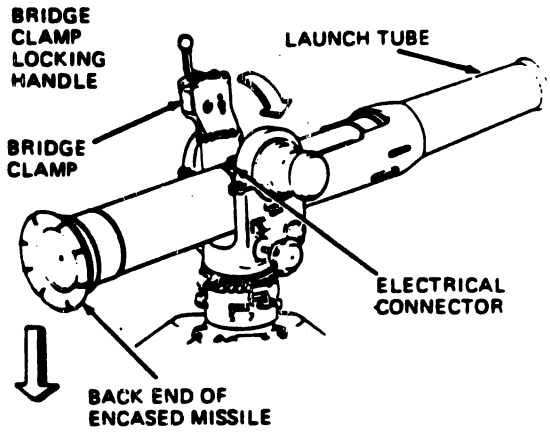


Fig 4-11. Securing encased missile into launch tube.

Warning: Do not raise the arming lever until ready to fire at a selected target (fig 4-12).

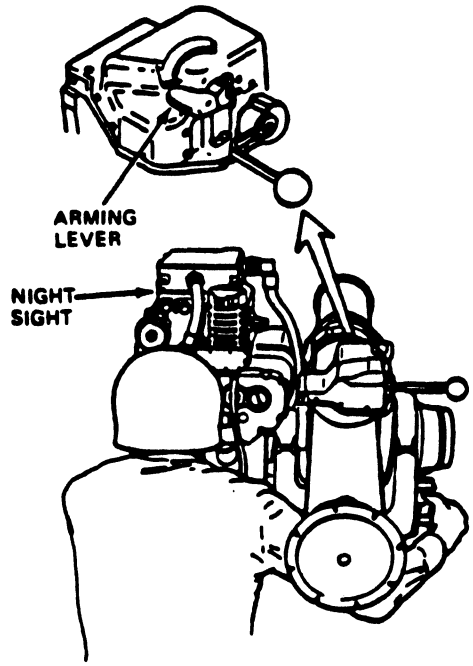


Fig 4-12. Arming lever.

EXERCISE: Answer the following questions and check your responses against those listed at the end of this study unit.

Provided with a list of procedures for loading an encased missile for a ground mounted TOW 2 in Column 1, match each with its appropriate step in Column 2. Place your answers in the spaces provided.

Column 1 Procedure	Column 2 Step
___ 1. Lower the back end of the encased missile and ensure that it is placed so that the electrical connector will join with the bridge clamp. Push down on the bridge clamp locking handle backward and down to lock the encased missile in the launch tube.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5 f. Step 6 g. Step 7 h. Step 8
___ 2. Pull upon the quick release clamp at the forward handling ring and remove both from the encased missile.	

___ 3. Ensure that the azimuth lock and elevation lock on the traversing unit is in the LOCK/ LOCKED position.

___ 4. Turn the encased missile so that the electrical connector is on top, slide the indexing slots on the launch tube, and slide the encased missile forward and down into the launch tube until the indexing lugs are firmly in place.

___ 5. Stand on the left side of the launcher.

___ 6. Push the bridge clamp locking handle on the traversing unit upward and forward, and and open the bridge clamp.

___ 7. Carry the encased missile to the TOW 2 weapon system and check the diaphragm for breaks.

___ 8. Turn the inside portion of the protective cover two complete turns counterclockwise and turn the protective cover counterclockwise and remove it from the electrical connector.

Work Unit 4-2. MISSILE LOADING (JEEP LAUNCHER)

TERMINAL LEARNING OBJECTIVE: State the procedures for loading an encased missile into the launch tube on the jeep launcher.

ENABLING LEARNING OBJECTIVE:

Provided with a list of procedures for loading an encased missile on the jeep launcher, match each with its appropriate step.

* *

After your jeep launcher is assembled and system checkout is complete, you can load the encased missile.

Step 1. Stand on the right side of the vehicle next to the TOW 2 weapon system (fig 4-13).

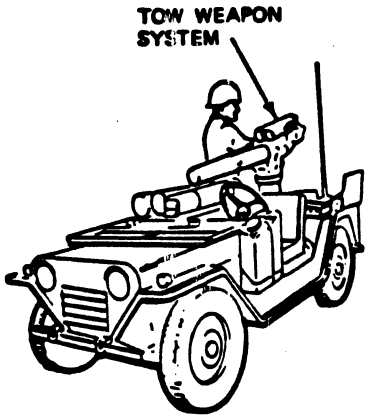


Fig 4-13. Correct position behind jeep launcher.

Step 2. Ensure the azimuth lock and the elevation lock on the traversing unit are in the LOCK/LOCKED position (fig 4-14).

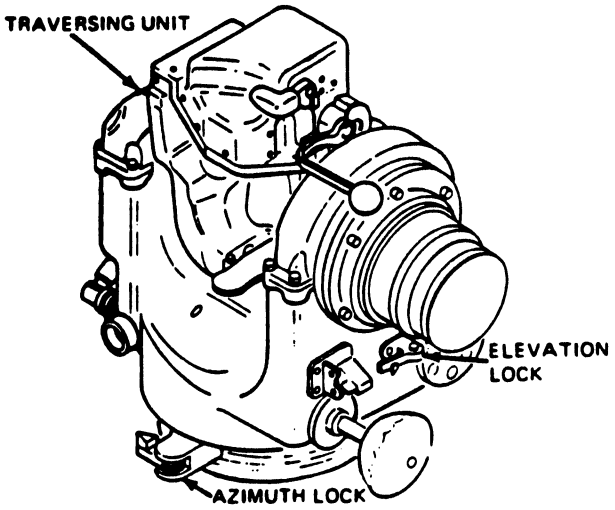


Fig 4-14. Elevation lock/azimuth lock (traversing unit).

Step 3. Turn the traversing unit from side to side until it locks in place, and turn the control knobs forward until the trunnion locks in place (fig 4-15).

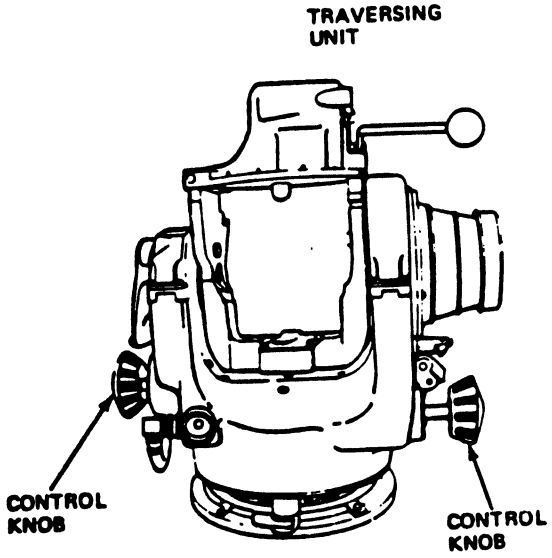


Fig 4-15. Control knobs (traversing unit).

Step 4. Push the locking handle forward, then up and open the bridge clamp (fig 4-16).

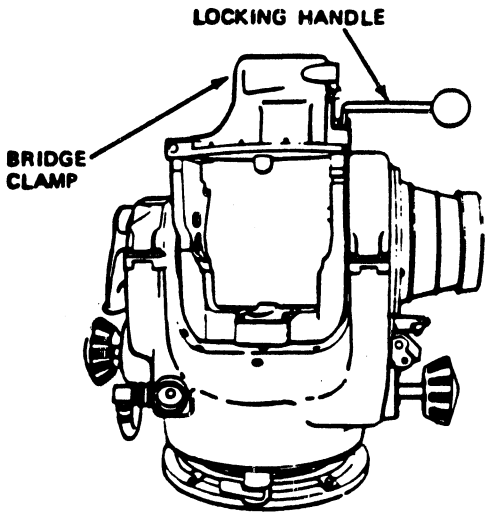


Fig 4-16. Locking handle/bridge clamp.

Caution: DO NOT break the rear diaphragm on the end of the encased missile (fig 4-17).

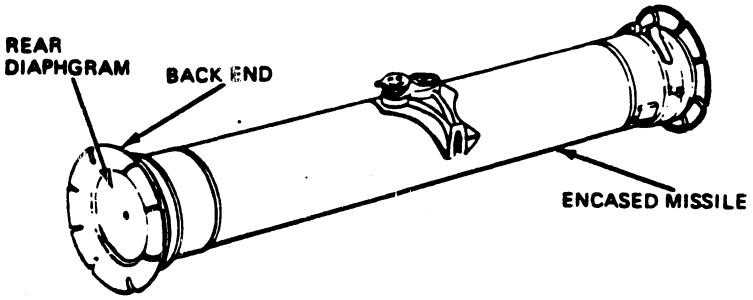


Fig 4-17. Rear diaphragm of encased missile.

If water gets into the launch container, the missile can be damaged. Also, use care not to punch a hole in the encased missile diaphragm when the forward handling ring is removed, but save the forward handling ring, preformed packing, and quick release clamp to use again if the missile is not fired.

Step 5. Pull up on the quick release clamp at the forward handling ring and remove it from the encased missile (fig 4-18).

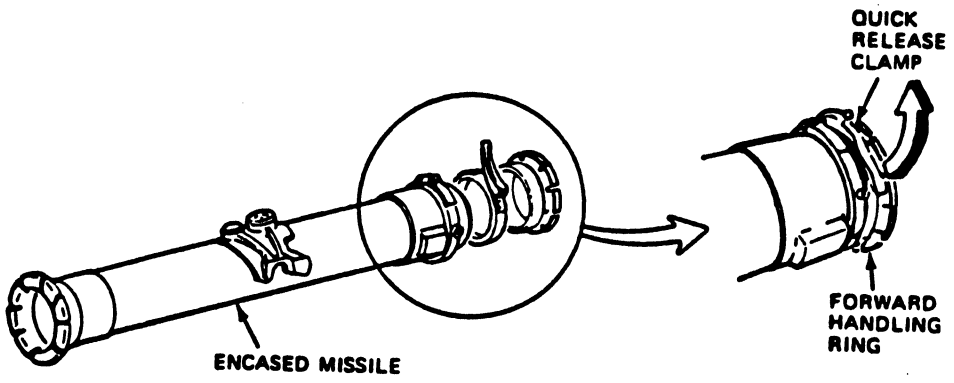


Fig 4-18. Quick release clamp and forward handling ring.

Ensure that all personnel are clear of firing danger zones (fig 4-19) before going ahead with missile loading procedures.

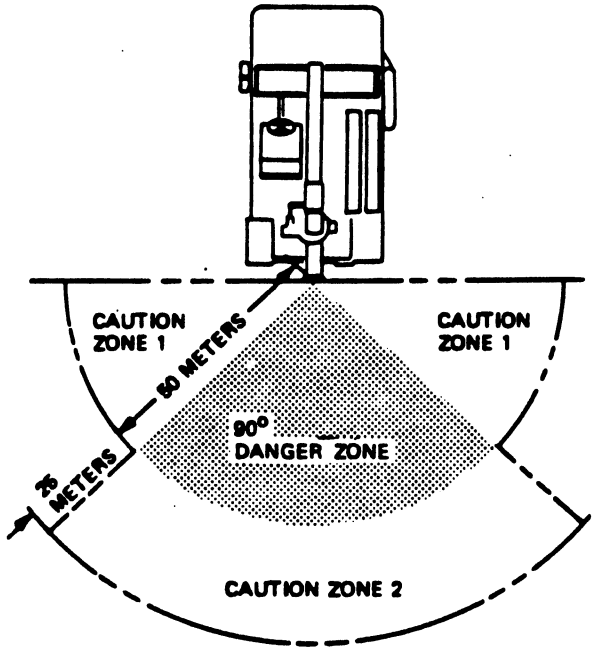


Fig 4-19. Firing danger zones.

Step 6. Turn the inside portion of the protective cover two complete turns counterclockwise and turn the protective cover counterclockwise and remove it from the electrical connector (fig 4-20).

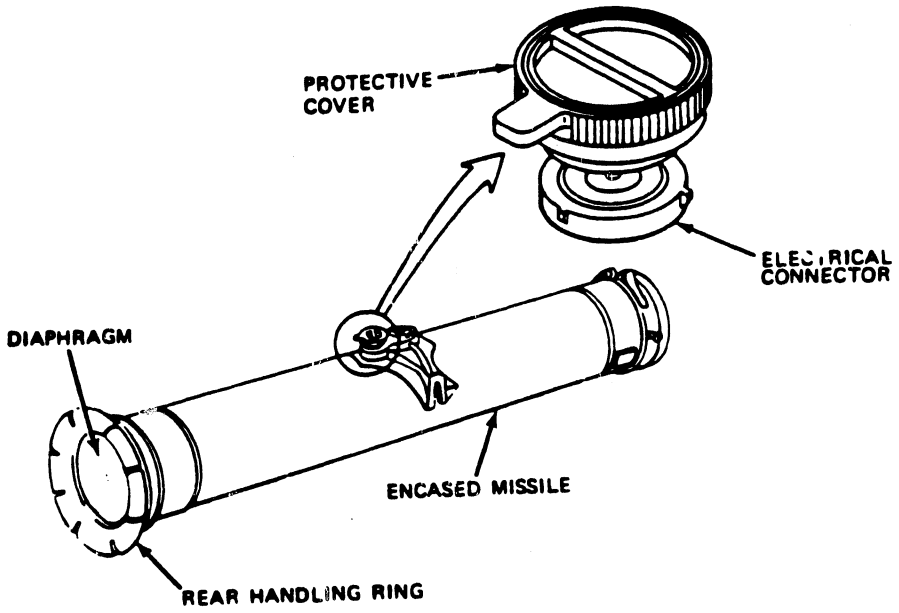


Fig 4-20. Protective cover/electrical connector.

Step 7. Turn the encased missile so that the electrical connector is on the top, slide the indexing lugs on the encased missile into the indexing slots on the launch tube, and slide the encased missile forward and down into the launch tube until the indexing lugs are firmly in place (fig 4-21).

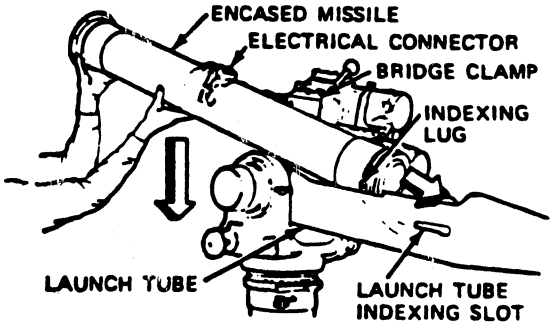


Fig 4-21. Installing the encased missile.

(The back end of the missile must be lowered and ensure that the electrical connector will join with the bridge clamp).

Step 8. Lower the bridge clamp and lock the missile by pushing down on top of the bridge clamp and pulling the bridge clamp locking handle down and backward (fig 4-22).

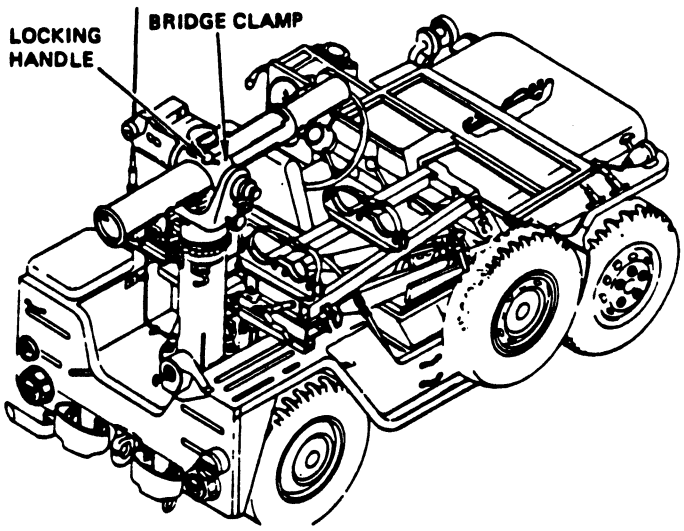


Fig 4-22. Locking encased missile.

Remember: DO NOT RAISE THE ARMING LEVER UNTIL YOU ARE READY TO FIRE (fig 4-23).

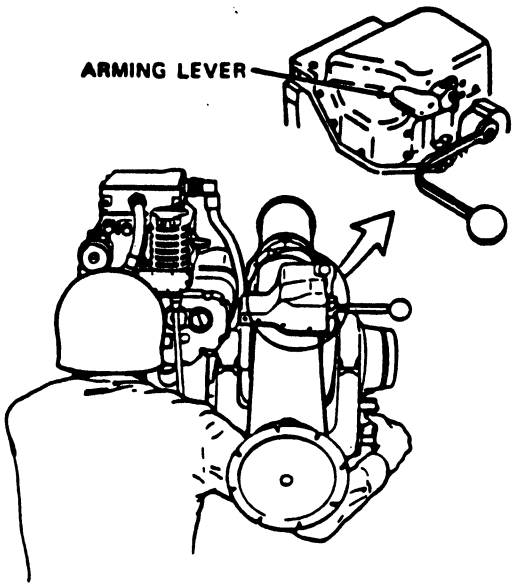


Fig 4-23. Arming lever.

EXERCISE: Answer the following questions and check your responses against those listed at the end of this study unit.

Provided with a list of procedures for loading encased missile on the jeep launcher in column 1, match each with its appropriate step in Column 2. Place your answers in the spaces provided.

Column 1 Procedure	Column 2 Step
___ 1. Put the azimuth lock and elevation lock in the LOCK/LOCKED position.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5 f. Step 5 g. Step 7 h. Step 8
___ 2. Push the locking handle forward then up, and open the bridge clamp.	
___ 3. Turn the traversing unit from side to side until it locks in place and turn the control knobs forward until the trunnion locks in place.	
___ 4. Turn the encased missile so that the electrical connector is on the top, slide the indexing lugs on the encased missile into the indexing slots on the launch tube, and slide the encased missile forward and down into the launch tube until the indexing lugs are firmly in place.	
___ 5. Pull up on the quick release clamp at the forward handling ring and remove it from the encased missile.	
___ 5. Turn the inside portion of the protective cover two complete turns counterclockwise and turn the protective cover counterclockwise and remove it from the electrical connector.	
___ 7. Lower the bridge clamp and lock the missile by pushing down on top of the bridge clamp and pulling the bridge clamp locking handle down and backward.	
___ 8. Stand on the right side of the vehicle next to the TOW 2 launcher.	

Work Unit 4-3. TARGET ENGAGEMENT

TERMINAL LEARNING OBJECTIVE: Identify the steps for preparing and firing the TOW 2 missile.

ENABLING LEARNING OBJECTIVES:

A. Provided with a list of procedures for preparing the TOW 2 for firing, match each with its appropriate step.

B. Given a list of procedures for firing the TOW 2 in scrambled order, arrange them in their proper sequence.

* * * * * * * * * * * * * * * * * * *

A. Before you begin to prepare your TOW 2 for firing, you should observe the following information if your TOW 2 is mounted on the jeep launcher. Prepare the jeep launcher by:

Step 1. Lower the vehicle windshield and secure it to the hood with the pins (fig 4-24).

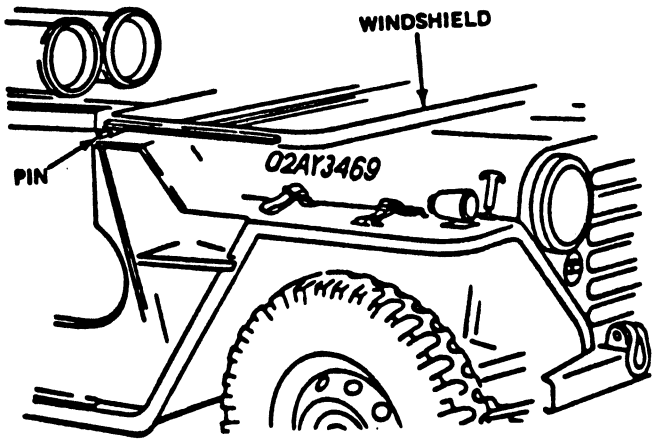


Fig 4-24. Securing vehicle windshield.

Step 2. Release the radio antenna from the tie-down hook (fig 4-25).

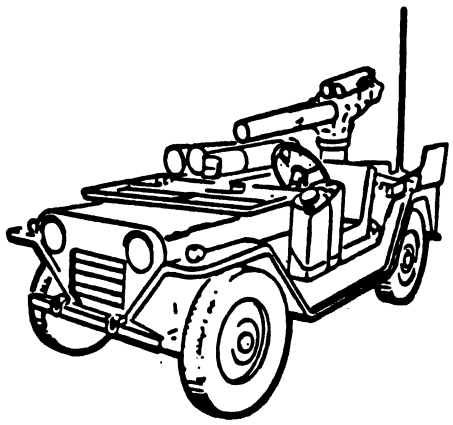


Fig 4-25. Antenna released from the tie-down hook

Preparation to fire the missile is the same for the ground mounted system as it is for the jeep launcher. Once the encased missile is loaded, begin with:

Step 1. Visually select the target without using the day sight tracker or night sight, and place the elevation and azimuth lock in the UNLOCKED position (fig 4-26).

Note: If you are going to be firing during darkness or through smoke, the ON/OFF/STBY switch on the night sight should be on standby.

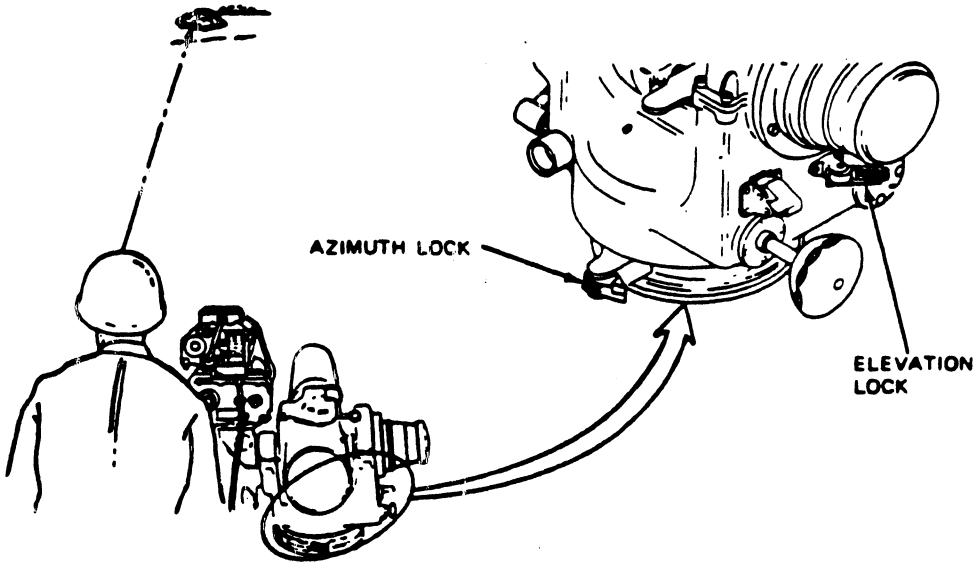


Fig 4-26. Selecting the target/location of azimuth and elevation locks.

Warning: Remove glasses (if worn) before locking into the day sight tracker or night sight. Do not look at the sun or extremely bright lights through the day sight tracker. (Serious eye damage can occur if too much light is seen through the day sight tracker. If the this does occur, get medical help immediately.)

Step 2. Look through the day sight tracker or night sight and turn the control knobs to point the day sight tracker/night sight in the general direction of the selected target (fig 4-27).

Note: It is best to locate the target with the day sight tracker and fire using the night sight. The battlefield can be obscured by smoke, dust, etc. during daylight. The night sight allows continuous observation of the target. The night sight should be used for target location and engagement during limited visability.

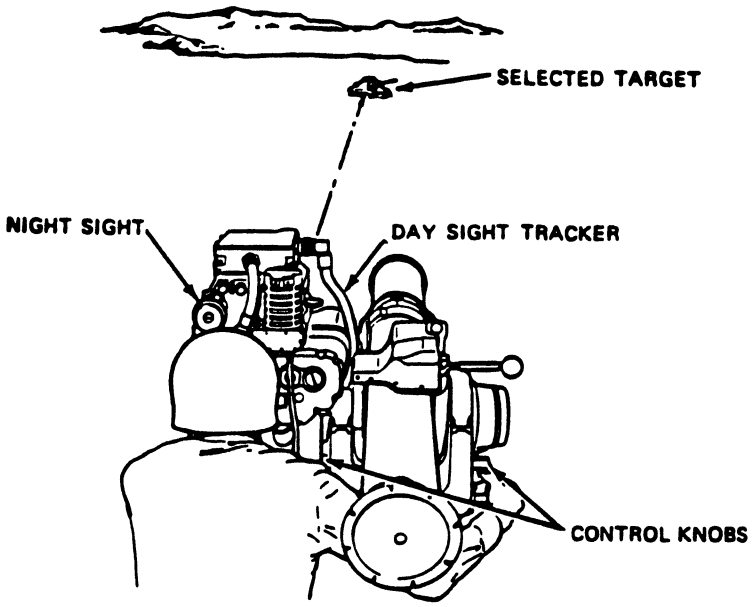


Fig 4-27. Sighting in on target.

Step 3. Adjust the focus control on the day sight tracker until the crosshairs are in focus and set the RETICLE LIGHT switch to ON if you need to see the crosshairs more clearly (fig 4-28).

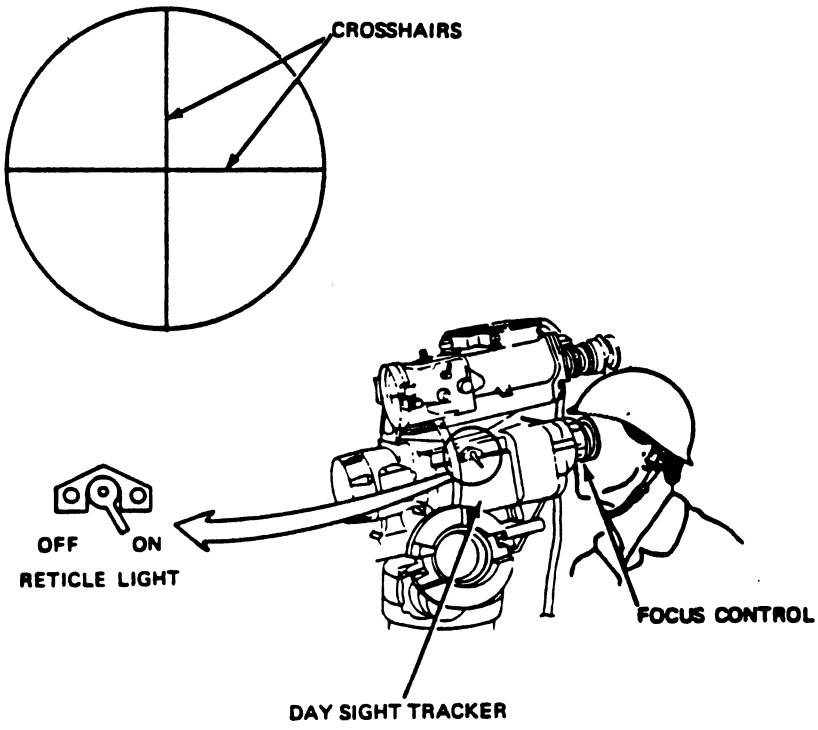


Fig 4-28. Crosshairs/focus control, reticle light switch (day sight tracker).

Step 4. Turn the control knobs until the crosshairs are positioned on the target (fig 4-29).

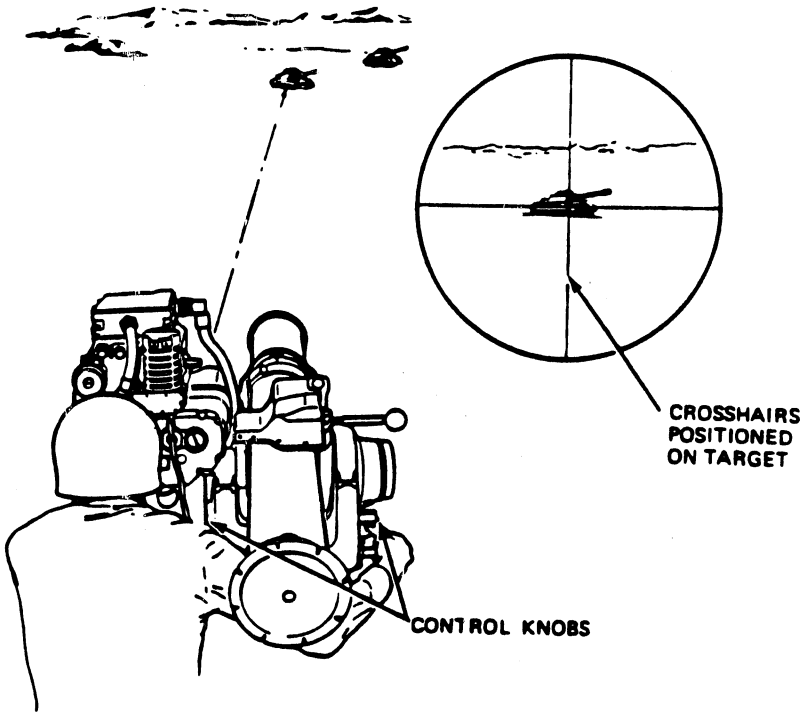


Fig 4-29. Centering crosshairs on target.

Step 5. Set the ON/OFF/STBY switch on the night sight to ON (fig 4-30).

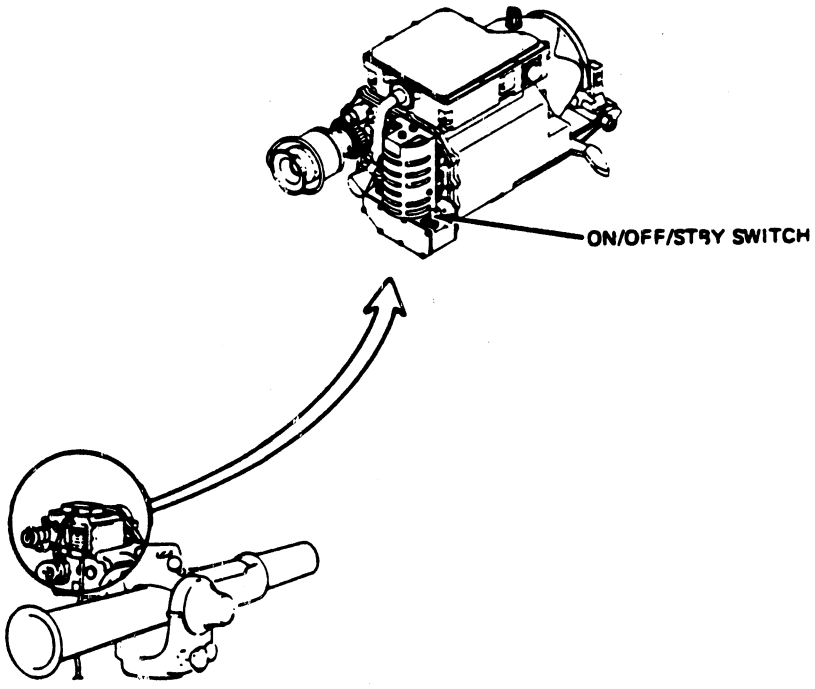


Fig 4-30. ON/OFF/STBY switch (night sight).

Step 6. Look through the eyepiece of the night sight, turn the DIOPTER ADJUSTMENT RING to focus the reticle, and check to see that the battery monitor light is off (fig 4-31).

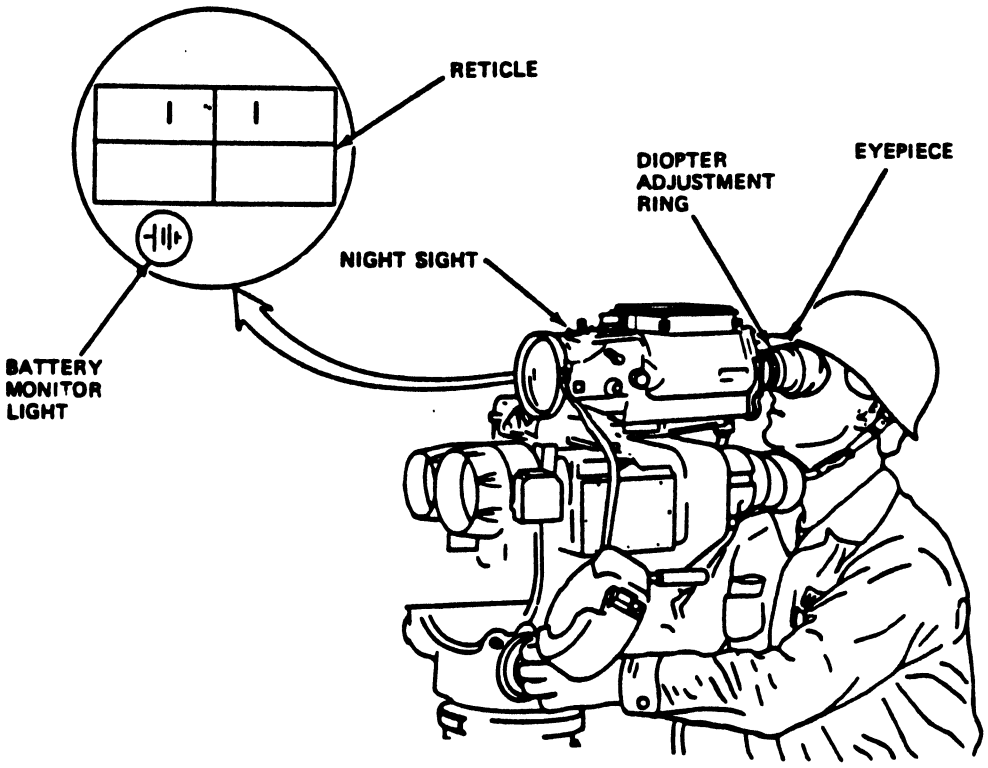


Fig 4-31. Viewing night sight reticle and checking battery monitor light.

Step 7. Set the FIELD-OF-VIEW selector to WFOV and adjust the RANGE FOCUS, CTRS, and BRT controls as necessary, set the FIELD-OF-VIEW selector to NFOV and adjust the RANGE FOCUS, CTRS, and BRT controls as necessary.

Step 8. Select the day sight tracker or night sight (whichever gives you the better target image, depending upon battlefield visibility) and turn the control knobs to keep the crosshairs on the center of the target (fig 4-32).

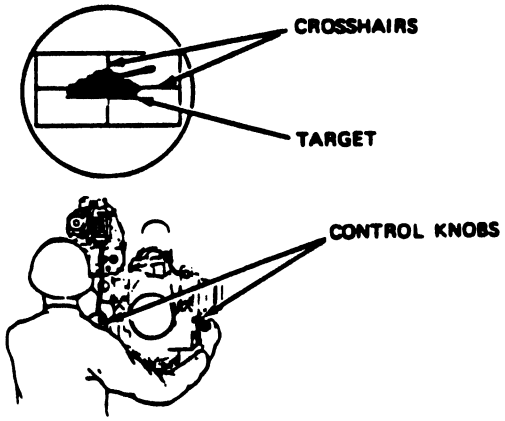


Fig 4-32. Centering crosshairs on target.

Before actually firing the missile, it would be to your physical as well as your equipments' well being to pay attention to the following:

- o ALWAYS wear ear plugs when firing the TOW missile. Ear damage can occur without ear protection. (If it does occur, get medical help immediately after the missile has ended flight.)

- o SERIOUS INJURY to the gunner, other personnel, and damage to equipment can occur when the elevation of the launch tube is greater than 20 DEGREES above the horizon due to the pressure waves caused by the back blast. Training at angles greater than 20 DEGREES should ALWAYS be avoided.

- o There are restrictions to the angle in which a missile may be fired from a jeep launcher. The graph below shows the restricted firing angles in relation to the direction in which TOW launcher is pointing. The jeep launcher (and maybe the gunner) will either be blown up by the missile or severly damaged by the backblast of the launcher if pointed in a restricted position while being fired (fig 4-33).

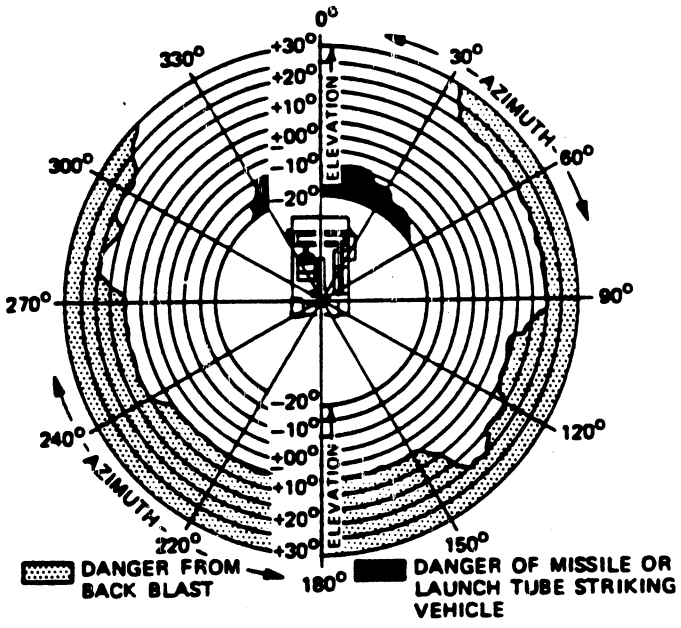


Fig 4-33. Restricted firing angles (jeep launcher).

The following two examples show how the firing angle is limited by the danger of the missile or launch tube striking the jeep.

a. If the launcher is pointed directly FORWARD, then the gunner MUST NOT allow the elevation of the launcher to go below -10 DEGREES (fig 4-34).

b. If the launcher is pointed over the RIGHT FRONT TIRE, then the gunner MUST NOT allow the elevation of the launcher to go below -13 DEGREES (fig 4-34).

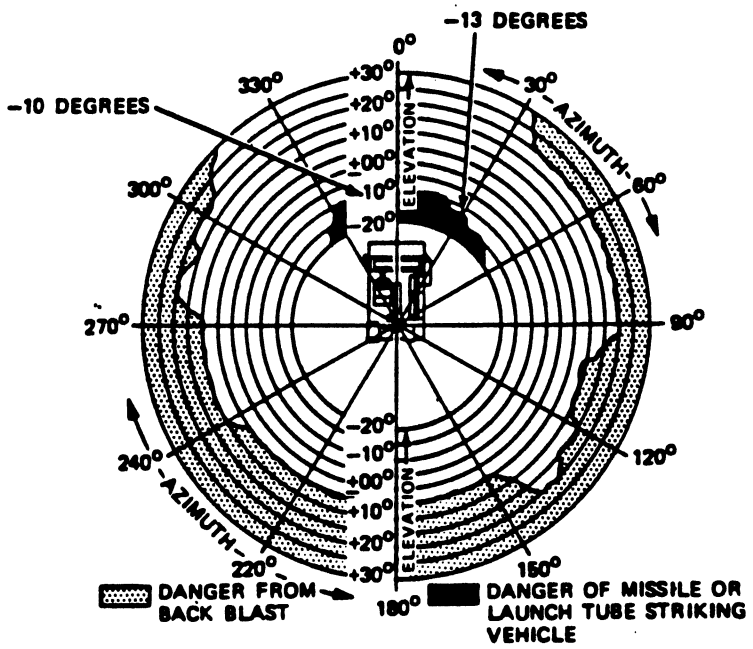


Fig 4-34. Restricted firing angles--continued.

The following three examples show how the firing angle is limited by the effects of backblast.

a. If the launcher is pointed over the LEFT REAR TIRE of the jeep, then the gunner MUST NOT allow the elevation of the launcher to go above + 10 DEGREES (fig 4-35).

b. If the launcher is pointed directly REAR of the jeep, then the gunner MUST NOT allow the elevation of the launcher to go above +5 DEGREES (fig 4-35).

c. If the launcher is pointed to the RIGHT SIDE of the jeep, then the gunner MUST NOT allow the elevation of the launcher to go above +20 DEGREES (fig 4-35).

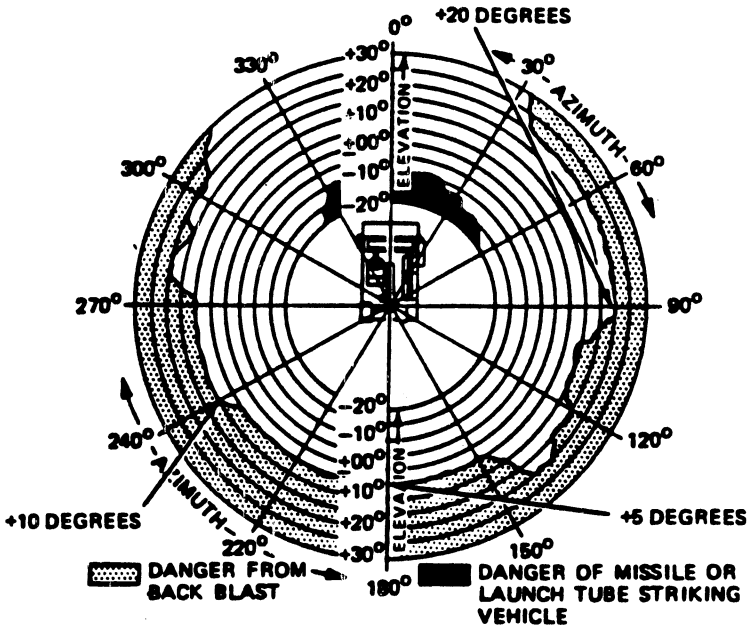


Fig 4-35. Restricted firing angles---continued.

- Ensure that the bridge clamp locking handle is fully DOWN and LOCKED before firing. The command-link wires may be cut at firing if the locking handle is not fully locked (fig 4-36).

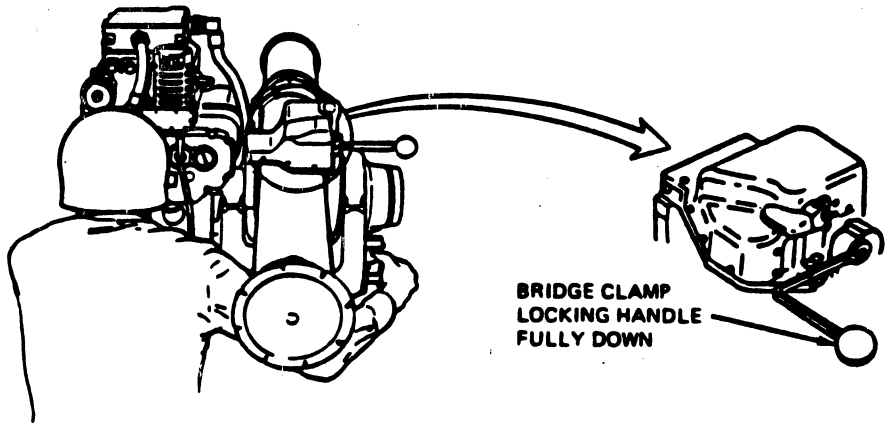


Fig 4-35. Bridge clamp locking handle.

- DO NOT fire the missile over or in the direction of electrical wires. If the command-link wires contact a live high voltage power line, injury to personnel and damage to equipment may occur.

The following procedures for firing the missile are the same when using the day sight tracker or night sight.

Step 1. Line up the crosshairs on the center of the visible mass of the target.

Step 2. Raise the arming lever

(Note: When the arming lever is raised, the encased missile is electrically connected to the launcher) (fig 4-37).

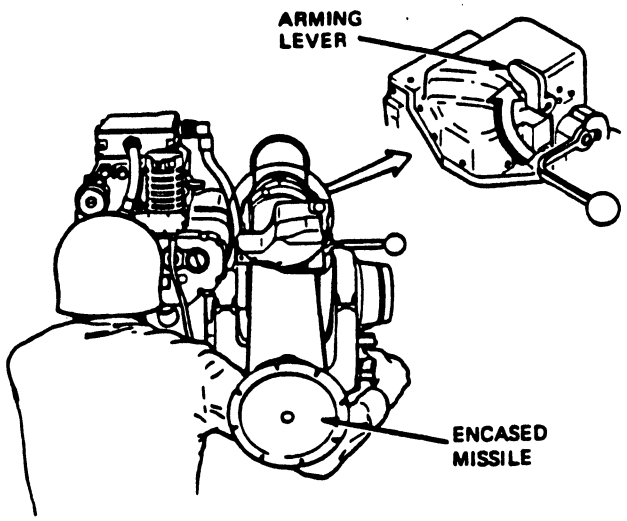


Fig 4-37. Arming lever.

Step 3. Raise the trigger cover to expose the trigger (fig 4-38).

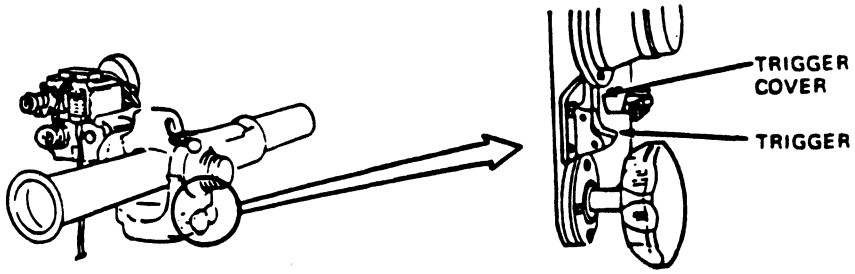


Fig 4-38. Exposed trigger.

Before firing, you should be aware of the following:

A moving target may be able to find a covered position protecting it from the missile. You must be able to judge if your missile can successfully hit the target after launch. If there is no obstruction or covered area along the expected path of the target and the target is moving 35 mph or less, you can successfully launch the missile and destroy the target. The day sight tracker can help you make this determination. Look at figure 4-39 for the proper/improper view of the target through the night sight and day sight tracker.

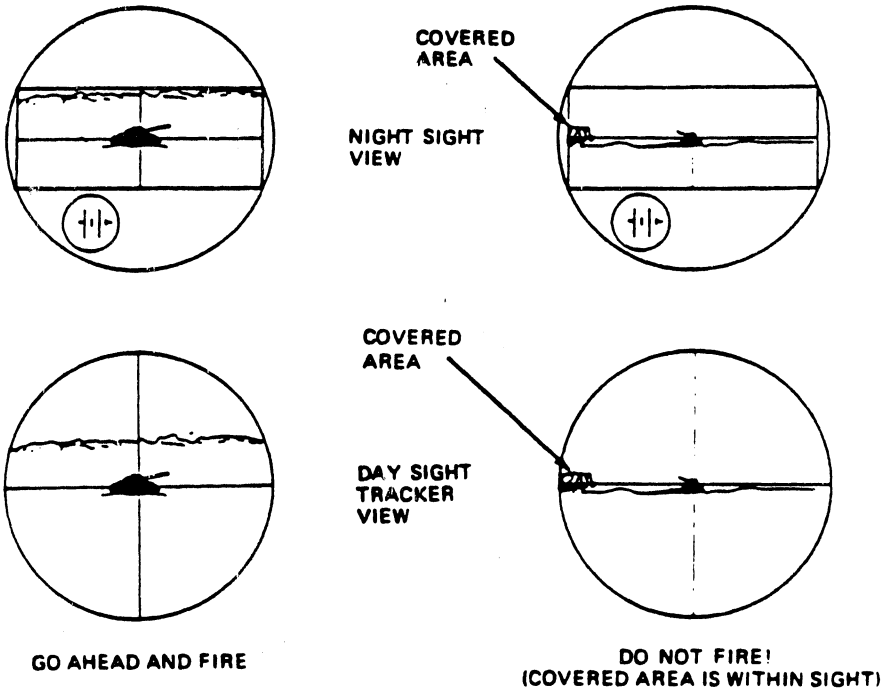


Fig 4-39. Target view (night sight/day sight tracker).

Ensure that all personnel are out of the firing danger zones (fig 4-40) before pressing the trigger.

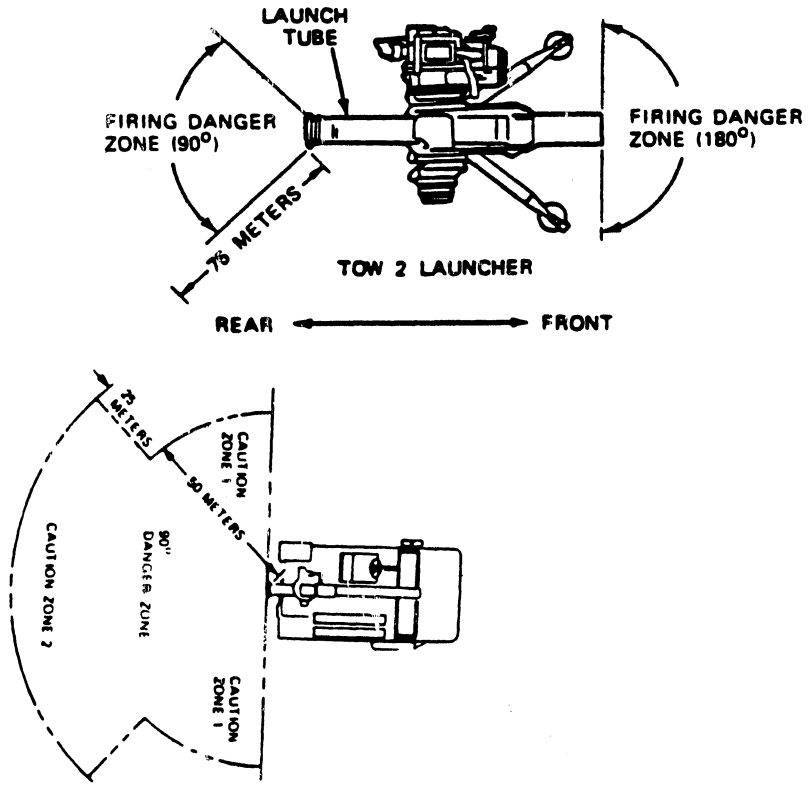


Fig 4-40. Firing danger zones (ground mounted/jeep launcher).

All crew members must stay in their firing positions until the missile impacts. Serious injury to personnel can result if crew members are in the danger zones.

Step 4. Push the trigger in to fire the missile (fig 4-41).

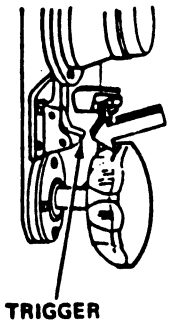


Fig 4-41. Trigger.

Step 5. Turn the control knobs to track the target, keeping the crosshairs on the center of the target (fig 4-42).

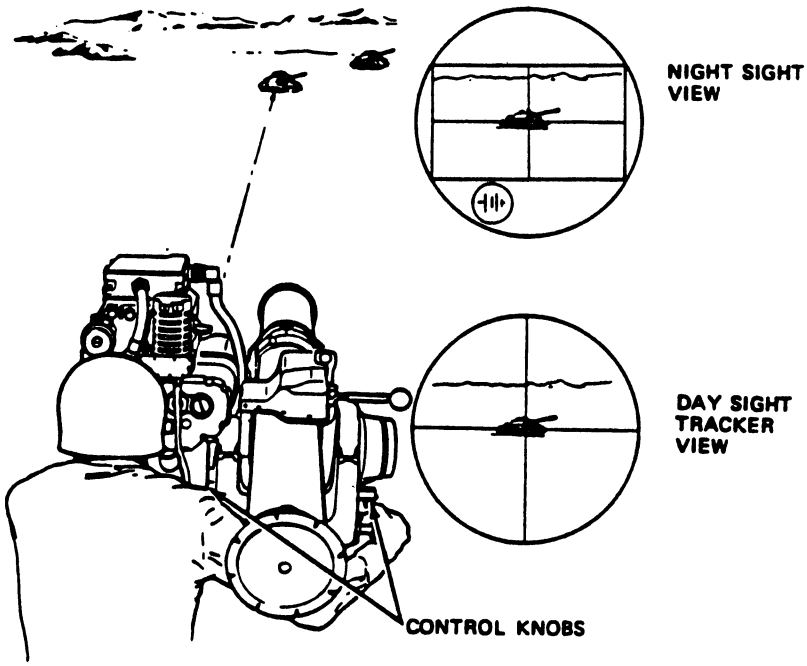


Fig 4-42. Tracking the target.

Note: Track with smooth motions on the control knobs. Do not make jerky movements. Do not allow the missile case to rest on your shoulder. Breathing will cause your body to raise and lower the launch tube making tracking procedures erratic. The target may be hidden for a short time during tracking due to the initial blast of the launch motor. Continue tracking at the same rate as you did before you lost sight of the target. When the target reappears, it should be close to the aiming point. Do not change from the night sight to the day sight tracker or vice versa after the missile has been fired. If two unsuccessful firings occur in a row, the launcher should not be fired again. It should first be checked by maintenance personnel. There is a normal time lapse of 1.5 seconds between when the trigger is pushed and the missile launch motor is engaged. If the launch motor does not fire within 1.5 seconds, warn the weapon crew of a misfire and continue to track the target. Misfire procedures are outlined in Work Unit 4-5.

TO THE GUNNER: Some operators have a tendency to compensate while tracking--in other words, to "make up" the lateral distance between the sight and the launch tube by aiming low of the target. If this is done, you will find that you will be temporarily tracking the missile instead of tracking the target and probably be short of the target. Remember the "O" in "TOW" stands for "OPTICALLY-TRACKED." If you keep the crosshairs on the center of visible mass, the missile will respond to your optical command.

EXERCISE Answer the following questions and check your responses against those listed at the end of this study unit.

A. Provided with a list of procedures for preparing the TOW 2 for firing in column 1, match each with its appropriate step in column 2. Place your answers in the spaces provided.

Column 1 Procedure	Column 2 Step
___ 1. Turn the control knobs until the crosshairs are positioned on the target.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5 f. Step 6 g. Step 7 h. Step 8
___ 2. Set the FIELD-OF-VIEW selector to WFOV and adjust the RANGE FOCUS, CTRS, and BRT control as necessary. Set the FIELD-OF-VIEW selector to NFOV and adjust the RANGE FOCUS, CTRS, and BRT controls as necessary.	
___ 3. Set the ON/OFF/STBY switch on the night sight to ON and allow approximately 3 to 5 minutes for cool down.	
___ 4. Look through the eyepiece of the night sight turn the DIOPTER ADJUSTMENT RING to focus the reticle, and check to see that the battery monitor light is off.	
___ 5. Look through the day sight tracker or night sight and turn the control knobs to point the day sight tracker/night sight in the general direction of the selected target.	
___ 6. Select the day sight tracker or night sight and turn the control knobs to keep the crosshairs on the center of the target.	
___ 7. Visually select the target without using the day sight tracker or night sight, and place the elevation and azimuth lock in the unlocked position.	
___ 8. Adjust the focus control on the day sight tracker until the crosshairs are in focus and set the reticle light switch to ON if you need to see the crosshairs more clearly.	

B. Listed below in scrambled order are the steps for firing the TOW 2 missile.

(1) Raise the trigger cover to expose the trigger.
(2) Turn the control knobs to track the target, keeping the crosshairs on the center of the target.
(3) Line up the crosshairs on the center of the visible mass of the target.
(4) Raise the arming lever.
(5) Push the trigger in to fire the missile.

In which order should the above steps be performed?

a. 1, 5, 4, 2, 3
b. 3, 4, 1, 5, 2
c. 2, 4, 1, 3, 5
d. 4, 5, 2, 3, 1

Work Unit 4-4. REMOVAL OF ENCASED MISSILE OR EMPTY MISSILE CASE

TERMINAL LEARNING OBJECTIVE: Select the proper steps for removing an encased missile or empty missile case.

ENABLING LEARNING OBJECTIVE:

Given a list of procedures for removing an encased missile or empty missile case in scrambled order, arrange them in their proper sequence.

* * * * * * * * * * * * * * * * * * *

Before attempting to begin this task -

DO NOT press the trigger with an empty missile case in the launch tube. Possible shorts can result which will damage the prefire, fire, and wirecutter circuits.

Step 1. Lower the trigger cover over the trigger (after the missile has ended flight or if missile has not been fired) (fig 4-43).

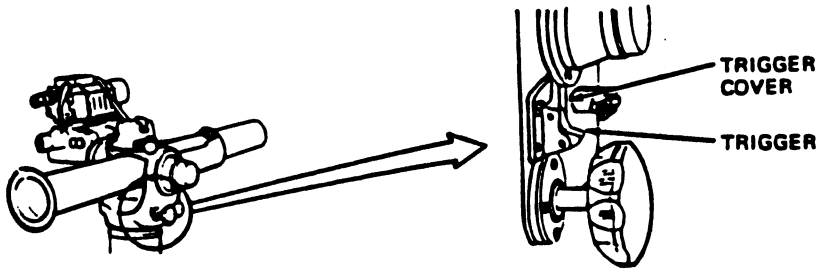


Fig 4-43. Trigger/trigger cover.

Step 2. Put the azimuth lock on the traversing unit in the LOCK position and turn the traversing unit from side to side until it locks in place. Put the elevation lock in the LOCKED position and tilt the trunnion until the launch tube is locked down (fig 4-44).

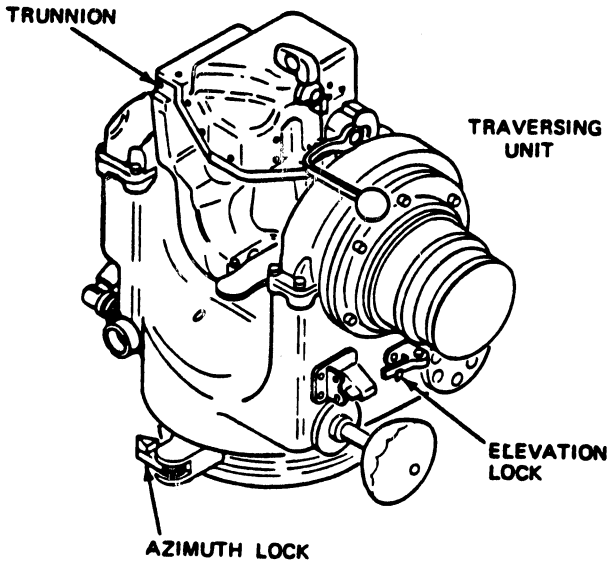


Fig 4-44. Traversing unit.

Step 3. Lower the arming lever (if the missile was not fired) (fig 4-45).

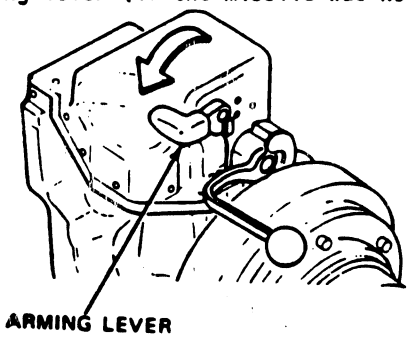


Fig 4-45. Arming lever.

Caution: If the missile was not fired, lower the arming lever before opening the bridge clamp. The command-link wires will be cut if the arming lever is not lowered. If the missile was fired, do not lower the arming lever to the safe position before opening the bridge clamp. The command-link wires will not be cut if the arming lever is lowered before the bridge clamp is opened, because the open bridge clamp does the following:

- Cuts the command-link wires.
- Forces the arming lever down to electrically disconnect the launcher from the empty missile case.
- Turns the launcher off.

Step 4. Pull up on the bridge clamp locking handle and open the bridge clamp (fig 4-46).

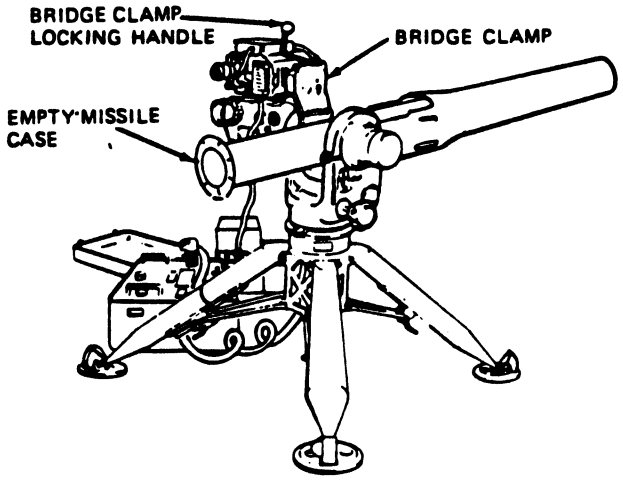


Fig 4-45. Bridge clamp/bridge clamp locking handle.

Step 5. Remove the encased missile or empty missile case from the launch tube. (If the missile case is empty, dispose of it in accordance with unit SOP.) (fig 4-47).

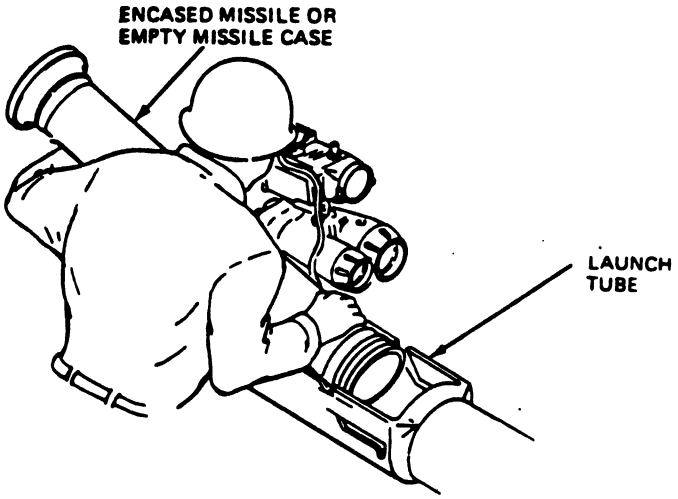


Fig 4-47. Removing encased missile/empty missile case.

Step 6. Secure the protective cover on an encased missile by turning the cover clockwise, then the inside portion of the cover fully clockwise (fig 4-48).

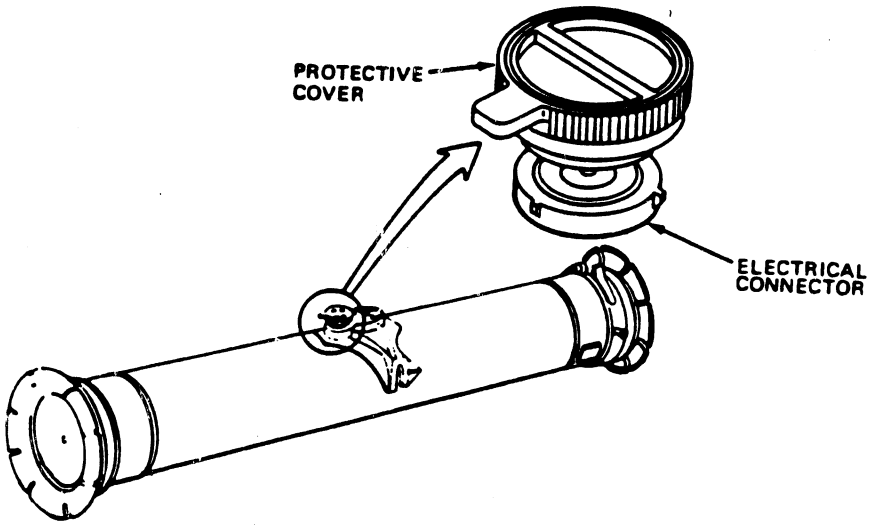


Fig 4-48. Replacing protective cover.

Step 7. Replace the quick release clamp, preformed packing, and forward handling ring on the encased missile and stow it either in the jeep launcher or missile carrier (fig 4-49).

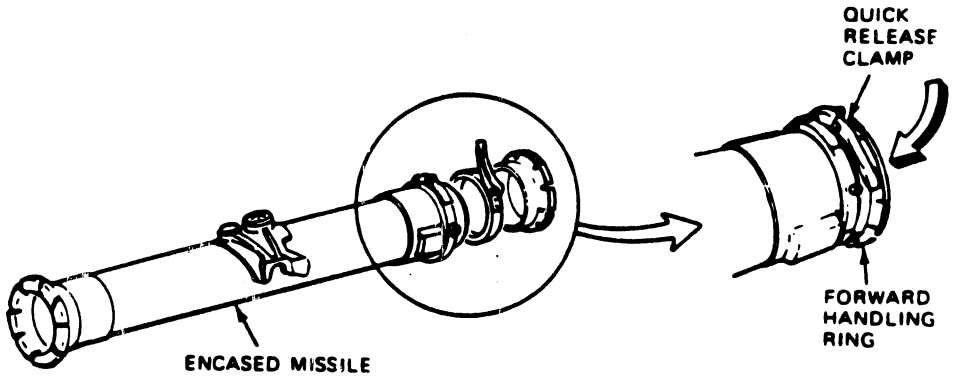


Fig 4-49. Replacing quick release clamp/forward handling ring.

(If the missile will not be fired within a short time, tag the missile with the date it was initially prepared for firing).

(The next step applies only to empty missile cases).

Step 8. Pull the command-link wires out from the front of the launch tube, check the inside rear of the launch tube for dirt, and clean with a cloth, if necessary (fig 4-50).

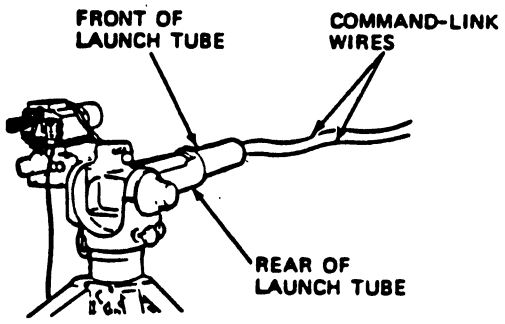


Fig 4-50. Command-link wires (front/rear of launch tube).

Caution: The command-link wires are small and very strong and can cause injury if handled wrong.

EXERCISE: Answer the following question and check your responses against the one listed at the end of this study unit.

Listed below, in scrambled order are the steps for removing an encased missile or empty missile case.

(1) Pull up on the bridge clamp locking handle and open the bridge clamp.

(2) Replace the quick release clamp, preformed packing, and forward handling ring on the encased missile and stow it either in the jeep launcher or missile carrier.

(3) Pull the command-link wires out from the front of the launch tube, check the inside rear of the launch tube for dirt, and clean with a cloth, if necessary.

(4) Lower the trigger cover over the trigger.

(5) Put the azimuth lock on the traversing unit in the LOCK position and turn the traversing unit from side to side until it locks in place. Put the elevation lock in the LOCKED position and tilt the trunnion until the launch tube is locked down.

(6) Remove the encased missile or empty missile case from the launch tube.

(7) Secure the protective cover on the encased missile by turning the cover, then inside portion fully clockwise.

(8) Lower the arming lever.

In what sequence should they be performed?

a. 8, 1, 5, 3, 7, 2, 4, 6
b. 4, 5, 8, 1, 6, 7, 2, 3
c. 2, 8, 6, 3, 7, 4, 1, 5
d. 7, 4, 2, 6, 1, 5, 3, 8

Work Unit 4-5. IMMEDIATE ACTION

TERMINAL LEARNING OBJECTIVE: Identify the steps for performing immediate action procedures.

ENABLING LEARNING OBJECTIVE:

Given a list of procedures for performing immediate action, match each with its appropriate step.

* * * * * * * * * * * * * * * * * * *

Before discussing immediate action procedures, let's see what causes you to perform immediate action in the first place.

Malfunctions

Four types of malfunctions can occur on firing a TOW missile. These malfunctions are listed below:

a. Hangfire. A hangfire is an unexpected delay of missile launch exceeding the normal 1.5 seconds after the trigger is pressed. Any such delay should be considered a potential hangfire until this possibility can be completely ruled out.

b. Misfire. A misfire is a failure of the missile to launch after repeated attempts to fire. Any delaying launch exceeding the normal 1.5 seconds should be considered a potential hangfire.

c. Dud. A dud occurs when a missile has been fired and the warhead fails to explode. The warheads of all duds should be noted and reported to EOD personnel for disposal.

d. Irregular flight. An irregular or uncontrolled flight of a missile may occur as a result of any of the following conditions:

Defective missile
Very poor operator tracking
Defective launcher

Hangfire - (see WARNING below)

The crew must exercise extreme care to avoid injury from a delayed missile launch. This delay could be as much as one minute after pressing the trigger. The following waiting periods are required to rule out a hangfire before any attempt is made to unload the encased missile:

Training	-	30 minutes minimum
Testing (live firing)	-	30 minutes minimum
Combat	-	1 minute minimum

Keep all personnel out of forward and aft danger zones.

WARNING

Audible prefire functions occur immediately after the trigger is pressed. These functions are signalled by a distinctive impulse sound that occurs when squibs within the missile fire to activate the missile batteries and gyro. The gyro spin noise can also be heard. If the prefire sounds are heard, the missile is HOT in the launcher.

a. If prefire functions occur, continue to track the target for at least one minute. Do not attempt to fire the missile a second time.

b. After waiting for a specified period (see WARNING above), unload the encased missile. Notify explosive ordnance disposal (EOD) personnel.

c. If prefire functions did not occur or it is not certain that they occurred, continue to track the target for at least one minute. After waiting for the specified period (see WARNING above), perform the misfire procedures.

Immediate action procedures are:

Step 1. Continue tracking the target, lower then raise the arming lever (fig 4-51), and attempt to fire the missile again.

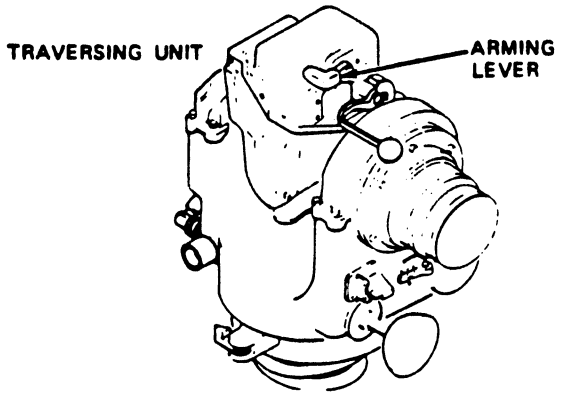


Fig 4-51. Arming lever.

Step 2. Remove the missile from the launch tube if the missile did not fire and load another missile.

In a training situation, wait 30 minutes before removing a misfire from the launch tube. Notify explosive ordnance disposal (EOD) personnel of the misfire.

Step 3. If the second missile fails to fire, unload the missile and perform system self test.

Step 4. Destroy both (if applicable) missiles in accordance with unit SOP if self test checks are good.

Step 5. Save both missiles for re-use if the self test fails, and perform corrective action for the indicated failure.

Dud

. If the warhead fails to explode, then the missile is a dud.
. All duds must be thought of as armed and very dangerous.
. Report the location of all duds to explosive ordnance disposal (EOD) personnel.

EXERCISE: Answer the following question and check your responses against those listed at the end of this study unit.

Matching: Given a list of procedures for immediate action in column 1, match each with its appropriate step in column 2. Place your answers in the spaces provided.

Column 1 Procedure		Column 2 Step
___1.	Save both missiles for re-use if the self test fails, and perform corrective action for the indicative failure.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5
___ 2.	Unload the missile and perform system self test, if the second missile fails to fire.	
___ 3.	Destroy both missiles in accordance with unit SOP if system self-test checks good.	
___ 4.	Remove the missile from the launch tube if the missile did not fire and load another missile.	

___ 5. Continue tracking the target, lower then raise the arming level, and attempt to fire the missile again.

Answers to Study Unit #4 Exercises

Work Unit 4-1.

1. h
2. e
3. b
4. g
5. a
6. c
7. d
8. f

Work Unit 4-2.

1. b
2. d
3. c
4. g
5. e
6. f
7. h
8. a

Work Unit 4-3.

A.

1. d
2. g
3. e
4. f
5. b
6. h
7. a
8. c

B.

1. b

Work Unit 4-4.

1. b

Work Unit 4-5.

1. e
2. c
3. d
4. b
5. a

STUDY UNIT 5

OPERATOR MAINTENANCE

STUDY UNIT GOALS: TO RECOGNIZE AND GAIN AN UNDERSTANDING OF CARE AND CLEANING TECHNIQUES FOR THE TOW 2 SYSTEM AND ALL ASSOCIATED EQUIPMENT.

For general cleaning of metal parts of the TOW 2 the materials you'll need are:

- Scrub brush
- Toluene (solvent)
- Wiping rags

Before using the solvent (toluene), you should be aware that TOLUENE WILL BURN AND CAN HARM EYES and SKIN - so,

. Keep it away from open flame.
. Use only in an area where there is plenty of fresh air.
. If personnel get burned, get medical help right away.
. Try not to get solvent on your bare skin.
. If solvent gets in your eyes, wash them with plenty of water and get medical help right away.
. After using solvent, wash carefully so that there is no solvent on your bare skin.

General cleaning can be accomplished by:

1. Wiping the area to be cleaned with wiping rags.
2. Brushing the area to be cleaned with a scrub brush for stubborn dirt.
3. Wetting a wiping rag with toluene for grease or dirt that the scrub brush cannot remove.
4. Wiping the area to be cleaned with the wet wiping rag.
5. Cleaning off any toluene left with a clean dry wiping rag.

Work Unit 5-1. PROPER CLEANING OF RUBBER PARTS, BATTERY ASSEMBLY AND CONNECTORS

TERMINAL LEARNING OBJECTIVE: Identify the procedures for cleaning the rubber parts of the battery assembly and connectors of the TOW 2.

ENABLING LEARNING OBJECTIVE:

A. List the procedures for cleaning the rubber parts.

B. Given a list of procedures for cleaning the battery assembly, match each with its appropriate step.

C. List the steps for cleaning the connectors.

* * * * * * * * * * * * * * * * * * *

A. To clean the rubber parts of your weapon system you'll need

- detergent
- wiping rags
- glycerol (if needed)

(Do not use alcohol or toluene on rubber parts or sealant. Alcohol or toluene can cause rubber parts to crack and sealants to melt).

Steps for cleaning the rubber parts are:

1. Wipe the rubber parts with wiping rags to clean off loose dirt and dust (fig 5-1).

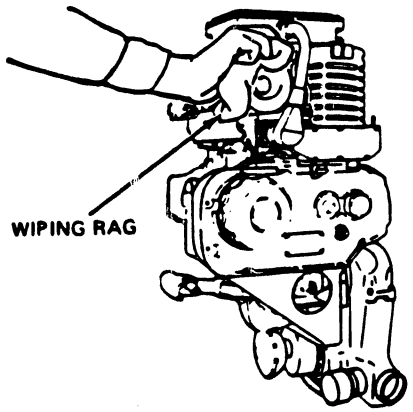


Fig 5-1. Wiping rubber parts.

2. Mix detergent with water for removing grease or if a dry wiping rag cannot remove the dirt. (Note: If detergent is not available, plain water can be used to clean rubber parts.)

3. Wet a clean wiping rag with detergent and water mixture.

4. Wipe the rubber parts with the wet wiping rag. (Note: For cold weather operation, temp. below 0 degrees C or +32 degrees F, add glycerol to cleaning water. Glycerol prevents water from freezing during use.).

5. Wipe any excess detergent and water mixture from rubber parts by using a clean wiping rag wet with water only.

5. Dry the rubber parts using clean, dry wiping rag.

EXERCISE A: Answer the following question and check your responses against those listed at the end of this study unit.

1. What are the procedures for cleaning rubber parts?

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

e. _____

_____

f. _____

_____

* * * * * * * * * * * * * * * * * * * *

B. To clean the battery assembly, you'll need

- scrub brush
- wiping rag
- glycerol

Before attempting to clean the battery assembly, you should be aware that BATTERY CORROSION POWDER WILL BURN - so,

- do not let battery corrosion powder get on your skin or clothing. It will burn the skin and destroy your clothes.

- if the powder gets on the skin or clothes, wash right away.

- destroy all wiping rags after use.

To clean the battery assembly:

1. Wet a wiping rag with water.

2. Wipe the battery assembly with the wet wiping rag (fig 5-2).

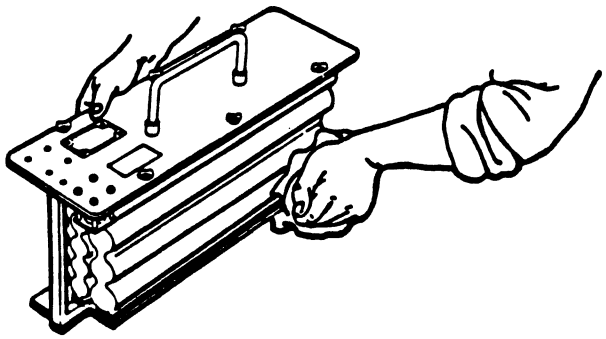


Fig 5-2. Wiping battery assembly.

3. Ensure there is no dust or deposit of white, powdery substance on the battery surface.

4. Clean the battery assembly with a scrub brush for stubborn dirt.

5. Dry the battery assembly with a clean, dry cloth.

EXERCISE B. Answer the following questions and check your responses at the end of the study unit.

From the list of procedures (Items 1-5 below) for cleaning the battery assembly in Column 1, match each with its appropriate step in Column 2. Place your answers in the spaces provided.

Column 1	Column 2
Procedure	Step
___ 1. Wipe the battery assembly with the wet wiping rag.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5
___ 2. Dry the battery assembly with a clean, dry cloth.	
___ 3. Wet a wiping rag with water.	
___ 4. Ensure there is no dust or deposit of white, powdery substance on the battery surface.	
___ 5. Clean the battery assembly with a scrub brush for stubborn dirt.	

* * * * * * * * * * * * * * * * * *

To clean the connectors, the materials you'll need are

- alcohol
- orangewood sticks
- wiping rag

(ALCOHOL WILL BURN. OBSERVE THE SAME PRECAUTIONARY MEASURES AS WITH TOLUENE)

C. To clean the connectors:

1. Wrap a clean wiping rag around the stick to form a swab (fig 5-3).

2. Wet the swab with alcohol.

3. Clean the contact of the connector with a wet swab (fig 5-3).

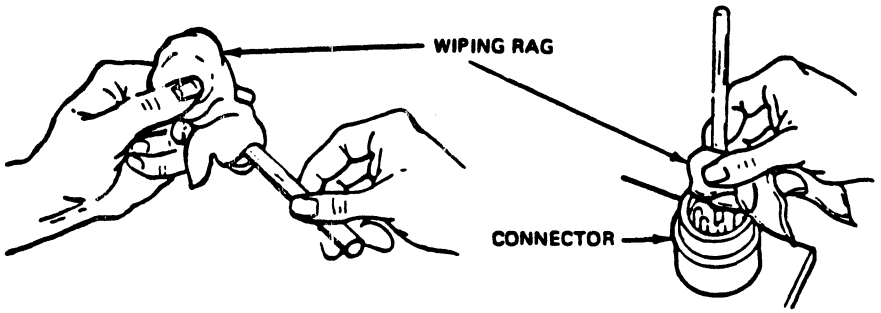


Fig 5-3. Cleaning the connector with swab.

EXERCISE C.

1. What are the steps for cleaning the connectors?

Work Unit 5-2. PROPER CLEANING OF DAY SIGHT TRACKER/NIGHT SIGHT LENS

TERMINAL LEARNING OBJECTIVE: Identify the procedures for cleaning the lens of the day sight tracker and night sight.

ENABLING LEARNING OBJECTIVE:

A. List the procedures for cleaning the day sight tracker lens.

B. List the procedures for cleaning the night sight lens.

* * * * * * * * * * * * * * * * * * *

A. To clean the lens of the daysight tracker, you'll need the following items:

- Alcohol
- Camel's-hair brush
- Lens paper
- Rubber syringe
- De-icer
- Wiping rag

The following procedure is applicable to the day sight tracker ONLY. While cleaning the lens, avoid touching the lens surface with your fingers.

The steps for cleaning the day sight tracker lens are as follows:

1. Blow the loose dust off of the lens surface using the rubber syringe and lightly brush the glass surfaces with a camel's-hair brush for dust sticking to the lens surface, if needed.

2. Lightly wipe the lens surface with a folded lens paper starting at the center of the lens using circular motions slowly moving outward (fig 5-4).

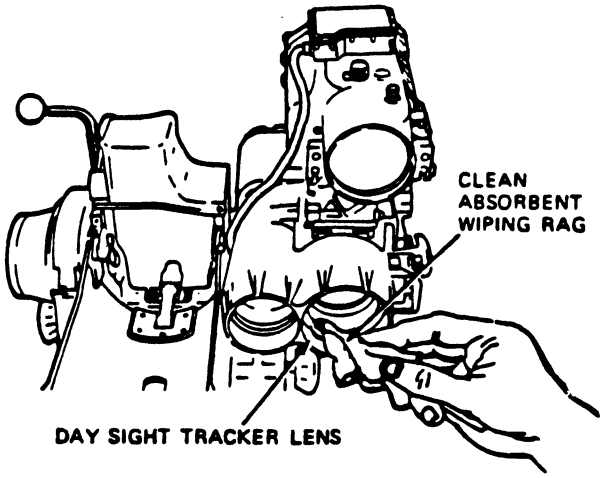


Fig 5-4. Wiping day sight tracker lens.

Wet a clean lens tissue with alcohol to remove grease or stubborn dirt, if needed, and repeat the above step.

SPECIAL CONDITIONS

If moisture has frozen on the lens surface:

1. Apply the de-icer to the lens surface or place the glass part in a warm area until the ice melts.

2. Pat the lens surface with a clean absorbent wiping rag (fig 5-5). DO NOT RUB THE LENS.

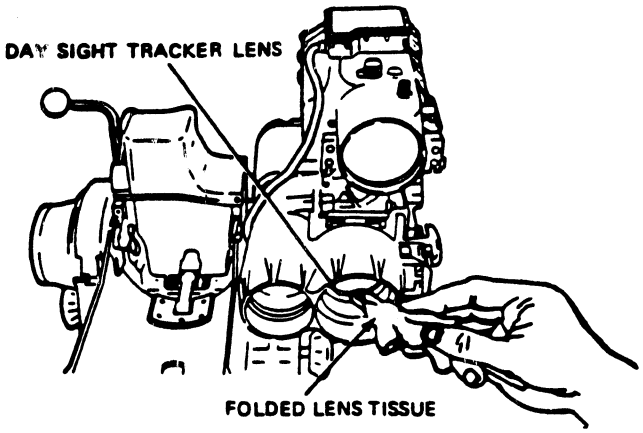


Fig 5-5. Cleaning day sight tracker (under special conditions).

3. Once the lens surface is dry, continue with normal cleaning procedures.

EXERCISE A: Answer the following question and check your responses against these listed at the end at this study unit.

1. What are the procedures for cleaning the lens of the day sight tracker under normal conditions?

* * * * * * * * * * * * * * * * * * * *

B. To clean the night sight you'll need the following material:

- cotton pad
- lens cleaning solution

Note: DO NOT CLEAN THE NIGHT SIGHT WITH ANYTHING OTHER THAN THE MATERIALS LISTED (Damage to the night sight could occur).

During cold weather, use warm water and lens cleaning solution. Make sure these liquids are not HOT, just warm enough not to freeze on the night sight lens.

To clean the night sight:

1. Rinse the night sight lens by pouring clean drinking water over the lens surface and wet a cotton pad with lens cleaning solution.

2. Lightly dab (DO NOT RUB) the pad with the lens cleaning solution on the lens surface, covering the surface completely (fig 5-6).

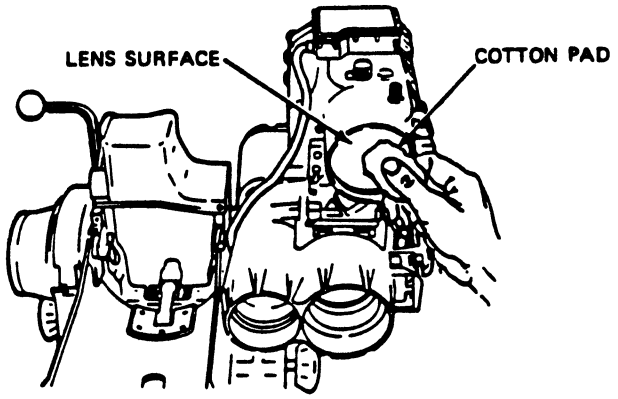


Fig 5-6. Lens surface/cotton pad.

DO NOT LET THE LENS CLEANING SOLUTION DRY ON THE NIGHT SIGHT LENS.

3. Wait 1 to 3 minutes for the cleaning solution to loosen heavy dirt, then rinse the solution off of the night sight by pouring clean water over the lens.

4. Wipe the lens surface with cleaning solution applied to a clean cotton pad in a clockwise motion, rinse with clean water, and dry with clean, dry cotton pads. (DO NOT RE-USE COTTON PAD).

PAINTING

You, as the operator, are authorized to spot paint the TOW 2 weapon system equipment. Detailed procedures of this are found in TM 43-0139. For spot painting, use quick drying semi-gloss enamel No. 24087 for all olive drab surfaces and No. 27038 for all black front panels. Surfaces must cleaned before you proceed with any or all painting. You are also authorized to remove the yellow markings from the tripod legs (fig 5-7) and repaint using lusterless black ink No. 37038.

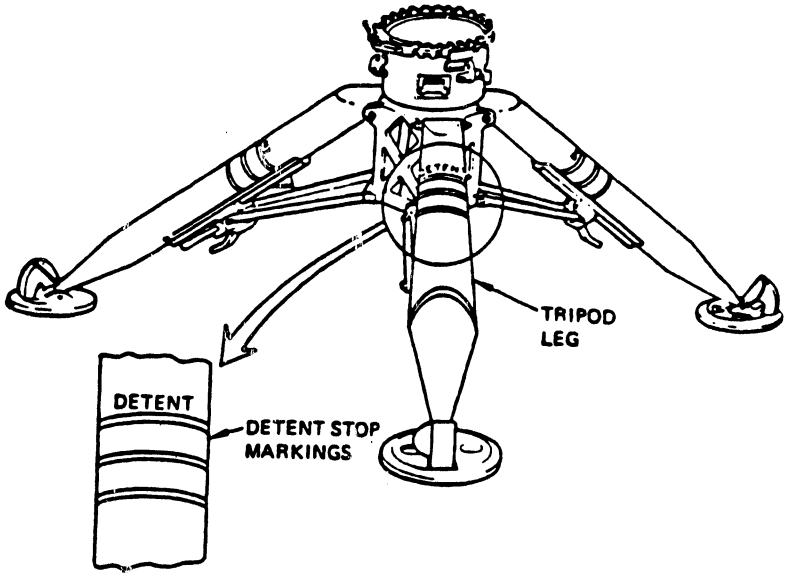


Fig 5-7. Tripod/detent stop markings.

EXERCISE B: Answer the following question and check your responses against those listed at the end of this study unit.

1. The steps for cleaning the night sight are:

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

Answers to Study Unit #5 Exercises

Work Unit 5-1.

Exercise A.

1. a. Wipe the rubber parts with wiping rags to clean off loose dirt.
   b. Mix detergent with water for grease or if dry wiping rags cannot remove the dirt.
   c. Wet a clean wiping rag with detergent and water mixture.
   d. Wipe the rubber parts with the next wiping rag.
   e. Wipe any excess detergent and water mixture from rubber parts using a clean rag wet with water only.

Exercise B.

1. b
2. e
3. a
4. c
5. d

Exercise C.

1. Wrap a clean wiping rag around the stick to form a swab.
   Wet the swab with alcohol.
   Clean the contact of the connector with a wet swab.

Work Unit 5-2.

EXERCISE A.

1. Blow the loose dirt off of the lens surface using the rubber syringe and lightly brush the surface with a camel's-hair brush for dirt sticking to the lens surface; if needed, lightly wipe the lens surface with folded tissue lens paper starting at the center of the lens using circular motions slowly moving outward.

Exercise B.

1. a. Rinse the night sight lens by pouring clean drinking water over the lens surface and wet a cotton pad with lens cleaning solution.
   b. Lightly dab the pad with the cleaning solution on the lens surface, covering the surface completely.
   c. Wait 1 to 3 minutes for the cleaning solution to loosen heavy dirt, then rinse the solution off of the night sight by pouring clean water over the lens.
   d. Wipe the lens surface with cleaning solution applied to a clean cotton pad in a clock- wise motion, rinse with clean water, and dry with clean, dry cotton pads.

STUDY UNIT 6

FIGHTING POSITIONS AND RANGE CARDS

STUDY UNIT GOALS: TO RECOGNIZE THE PROCEDURE FOR CONSTRUCTING AND CAMOUFLAGING A TOW 2 FIGHTING POSITION, AND TO GAIN AN UNDERSTANDING OF ITEMS NEEDED TO PROPERLY PREPARE AN ANTIARMOR RANGE CARD (TOW 2).

An ideal TOW position is one that allows for a flank engagement, offers concealment of the flash and weapon signature, has the weapon defiladed from the direction of approaching vehicles and offers concealment to the front. An advancing tank's firepower and observation are generally oriented to the front, making it difficult to detect and retrace a TOW missile launched from its flank.

Work Unit 6-1. CONSTRUCT/CAMOUFLAGE A TOW 2 FIGHTING POSITION

TERMINAL LEARNING OBJECTIVE: Identify the procedures for constructing/camouflaging a TOW 2 position.

ENABLING LEARNING OBJECTIVES:

A. Select the proper depth of a fighting position.

B. State the height of the parapet.

C. Identify when camouflage foliage should be replaced.

D. State from which direction should you approach your camouflaged position.

* * * * * * * * * * * * * * * * * * *

A. When constructing your position you should, first, clear fields of fire, ensuring that the sector is observed, and, second, outline your position.

Dig the weapon's position first and add overhead protection for the crew and missiles as time allows. Dig a position 24 inches deep (fig 6-1).

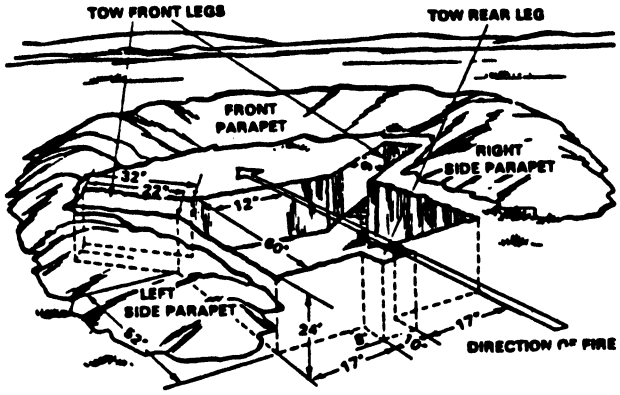


Fig 6-1. Dimensions of fighting position.

* * * * * * * * * * * * * * * * * * *

EXERCISE A: Answer the following questions and check your response against that listed at the end of this study unit.

1. Your fighting position should be dug _____ inches deep.

B. Build a parapet to the front and flanks. Provide protection from small arms fire and fragments from mortar and artillery rounds with at least 18 inches of dirt. Leave at least 9 inches of clearance under the muzzle of the launch tube. DO NOT PLACE DIRT OR EQUIPMENT IN THE BACK BLAST AREA. Scoop out a place for the missile guidance set (MGS) either to the front or under the tripod.

Disconnect the MGS and put it in the place made for it. Then place the launcher into the position. Re-connect the MGS and check the boresight.

Improve the position by adding overhead cover for the crew and missiles. Dig to the flank (90 degrees from the principal direction of fire) and use the strongest material available for the roof. If sand bags are used, cover them with canvas or plastic. (Wet sand bags are heavy, and may cave in). Place at least 20 inches of dirt on top of the storage/protective area (fig 6-2).

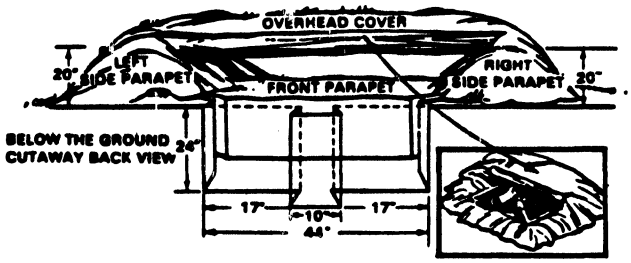


Fig 6-2. Overhead cover and parapet.

EXERCISE B: Answer the following question and check your responses against the one listed at the end of theis study unit.

1. How high should you build the parapet? _____.

* * * * * * * * * * * * * * * * * * *

C. CAMOUFLAGE

When camouflaging the position, place sod from the position on the parapet so that it looks natural and will have a good chance to grow. Cover all fresh dirt with leaves or brush so that it blends with the ground around the position.

If additional vegetation must be used to break up the outline of the parapet, it MUST be similar to that found near the position. If the position is covered, camouflage it in the same manner as the parapet.

Replace foliage if it begins to change color. Attempt to get sod, small trees, plants, etc., used as camouflage to grow, so that the position will improve as time passes.

Approach the position from the rear ONLY ensuring that a visible trail is not left. Cover all footprints around and leading into and out of the position so they don't point out the position.

Do not litter the area or make unnecessary noise while constructing your position. Do not disturb vegetation not used in constructing or camouflaging the position. The surrounding area should look as natural as possible.

EXERCISE C: Answer the following questions and check your responses against those listed at the end of this study unit.

1. You should replace camouflage foliage when _____

_____

2. You should approach your position from _____.

Work Unit 6-2. PREPARING THE ANTIARMOR RANGE CARD (TOW 2)

TERMINAL LEARNING OBJECTIVE: Identify the proper procedures for preparing the range card.

ENABLING LEARNING OBJECTIVES:

A. Name the item used to indicate your firing position.

B. State the method used to show, on the range card, those areas that you cannot engage.

C. Name three items which compose the identification data.

* * * * * * * * * * * * * * * * * * *

Before preparing your range card, let's first see what a range card is and its purpose. A range card is a sketch of the terrain that a weapon has been assigned to cover by fire. It contains information which assists in the planning and controlling of fire, the rapid detection and engagement of targets, and the orientation of replacement personnel or units.

The procedure for preparing the range card is as follows:

1. In the lower center of your range card, indicate your firing position by drawing the symbol of your TOW. Then, draw and label your sector sketch. Draw roads, bridges, buildings, streams, hills, woods, etc. Be as accurate as you can (fig 6-3).

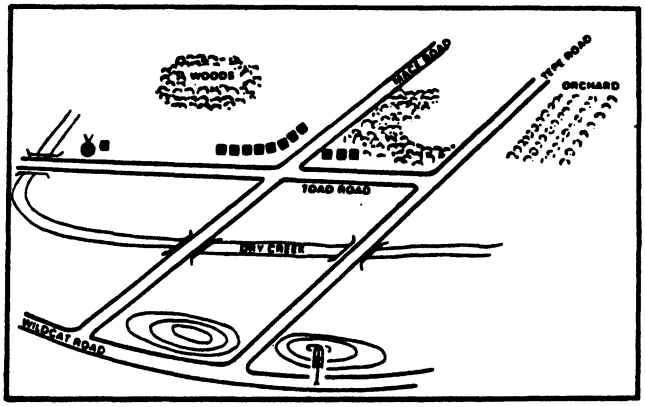


Fig 6-3. Sector sketch.

2. Show the location of your firing position by drawing an arrow from a nearby recognizable terrain feature and add distance and azimuth from the terrain feature to your firing position (fig 6-4).

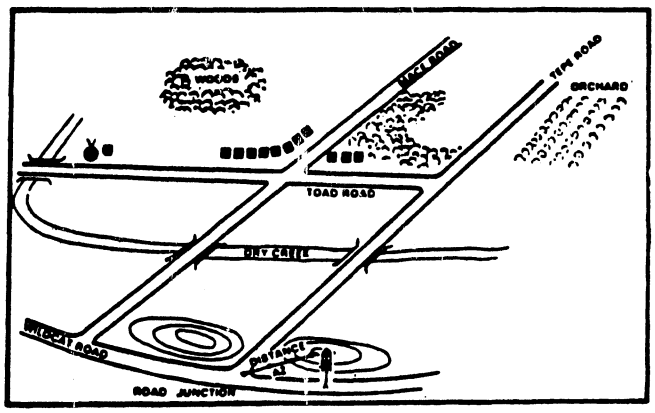


Fig 6-4. Location of firing position.

3. Now, draw in your sector. This is an enclosed line that outlines your sector of fire. The maximum engagement line is a segment of the sector line and indicates the maximum range at which targets may be engaged (fig 6-5).

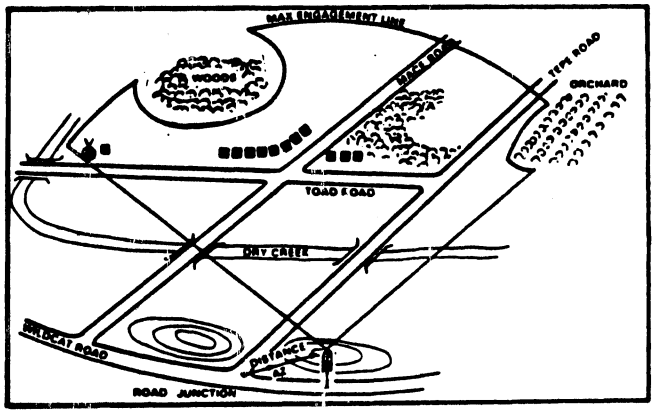


Fig 6-5. Sector of fire/ maximum engagement line.

4. Orient the range card with the terrain and determine the direction of magnetic north with a compass. Draw a magnetic north arrow properly oriented. Draw the TRP'S (target reference points) in your sector and label them. Then draw in the range and azimuth to the TRP's (fig 6-6).

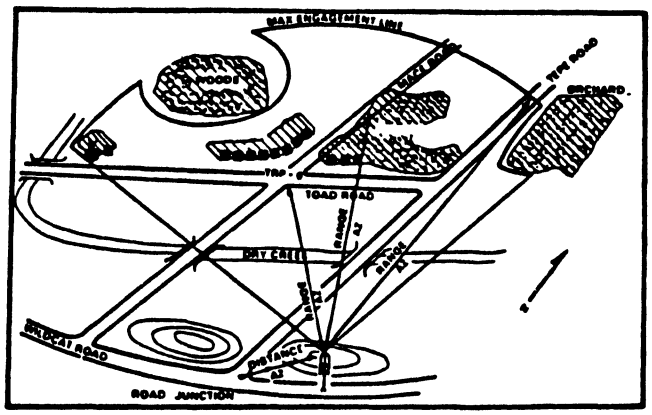


Fig 6-6. Indicating range/azimuth (TRP's).

EXERCISE A: Answer the following question and check your response against the one listed at the end of this study unit.

1. What is placed on the range card to indicate your position?

_____

* * * * * * * * * * * * * * * * * * *

B. Draw in the deadspace in your sector. Be sure and indicate the word DEADSPACE along those areas that you cannot engage (fig 6-7).

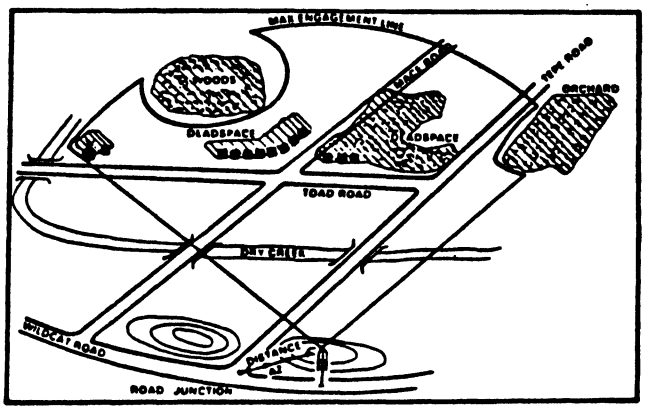


Fig 6-7. Indicating dead space.

EXERCISE B. Answer the following question and check your answer against the one listed at the end of this study unit.

1. How do you show areas on the range card that you cannot engage?

_____

* * * * * * * * * * * * * * * * * * *

c. In a corner of your range card, place the following identification data:

a) Type of position (primary, alternate, supplementary).
b) Unit description (never indicate your unit higher than company--if your card is found by the enemy they will not learn any important military information).
c) Date/time group (actual time you completed the range card).

You are now finished with your range cards. Make two copies--one for yourself and the other for your squad/section leader for preparation of fire plans. Your card should look something like this (fig 6-8). Although these are professional drawings, all information, basically, will be the same.

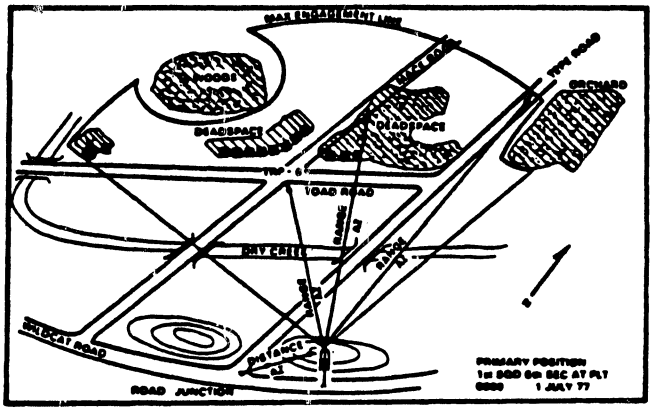


Fig 6-8. Completed range card.

EXERCISE C: Answer the following question and check your responses against the one listed at the end of this study unit.

1. List the three items which compose identification data.

_____

_____

_____

Answer to Study Unit #6 Exercises

Work Unit 6-1.

Exercise A.

1. 24 inches

Exercise B.

1. At least 18 inches

Exercise C.

1. if it begins to change color
2. the rear, only

Work Unit 6-2.

Exercise A.

1. TOW symbol

Exercise B.

1. Write the word "DEADSPACE."

Exercise C.

1. Type of position
   Unit description
   Date/time group

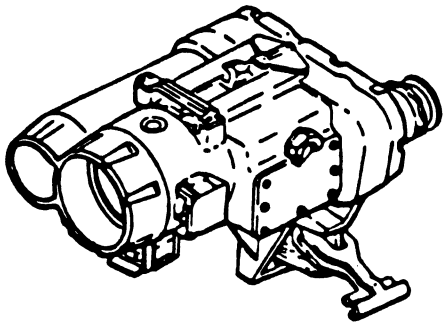
TOW 2 WEAPONS SYSTEM CREWMAN

Review Lesson

Instructions: This review lesson is designed to aid you in preparing for your final examination. You should try to complete this lesson without referring to the course text or other materials, but if you find that you must use the materials to answer some of the questions, do so. The enclosed answer sheet must be filled out according to the instructions on the back of the sheet and mailed to MCI using the envelope provided. If you answer any questions incorrectly, they will be listed with the appropriate reference on a feedback sheet which will be mailed to your commanding officer with your final exam. You should study the reference material for the questions you missed before taking the final exam.

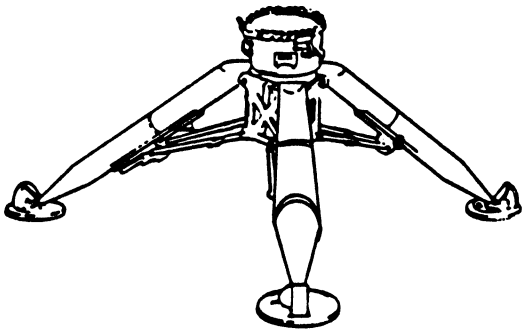
A. Multiple Choice: Select the ONE answer which BEST completes the statement or answers the question. After the corresponding number on the answer sheet, blacken the appropriate circle.

Value: 1 point each



1. What is the purpose of the above illustration?

   a. Holds the nose end of the encased missile
   b. Enables the operator to track the target
   c. Allows the gunner to select two modes of operation
   d. Protects the crew from missile launch motor blast



2. What is the purpose of the above illustration?

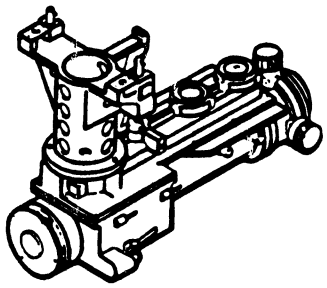
   a. To hold the traversing unit, day sight tracker, launch tube, and encased missile
   b. Changes vehicle power to power needed in the missile guidance set
   c. Holds the nose end of the encased missile
   d. Allows the operator to select two modes of operation

3. The major component that has enough energy for at least 50 missile firings or training exercises when fully charged is the

   a. missile guidance set.
   b. battery assembly.
   c. night sight vehicle power conditioner.
   d. launch tube.

4. The component that contains electronic circuits required for missile and launcher self-test purposes is the

   a. traversing unit.
   b. day sight tracker.
   c. missile guidance set.
   d. power conditioner.



5. What is the name of the above illustration?

   a. boresight collimator
   b. vehicle power conditioner
   c. spare battery pack

6. The component that enables the nightsight to operate from vehicular power in place of the portable battery is the

   a. night sight spare battery pack.
   b. night sight battery power conditioner.
   c. night sight vehicle power conditioner.

7. After using the detent stop lever and adjusting the legs until all bubbles are level, and lower the three lock handles all the way, your next step is to

   a. if additional support is needed, drive stakes through the tripod anchor foot into the ground.
   b. release each tripod leg until the support reaches the bottom band.
   c. open the coupling clamp by pulling the coupling clamp handle out.

8. After placing the traversing unit on the tripod and passing the coil cable through the tripod body, your next step is to

   a. install the launch tube.
   b. push the coupling clamp locking handle in to fasten the traversing unit to the tripod.
   c. install the boresight collimator.
   d. install the day sight.

9. Listed below, in scrambled order, are the steps for installing the launch tube.

   (1) Line up the locating pin with the mating hole in the launch tube.
   (2) Press down on the launch tube latch until it latches
   (3) Place the two launch tube pins in the launch tube brackets so that the launch tube is pointed in the direction of fire
   (4) Lift up the launch tube latch
   (5) Place the launch tube latch in the launch tube catch

   Which of the following is the proper sequence?

   a. 3, 1, 2, 5, 4
   b. 5, 2, 3, 4, 1
   c. 1, 4, 5, 2, 3
   d. 4, 3, 1, 5, 2

Match the procedure for installing the day sight tracker in Column 1 to its appropriate step in Column 2.

	Column 1 Procedure	Column 2 Step
10.	Tilt the top of the day sight tracker slightly toward the traversing unit, and place the tracker hook mount over the tip of the boresight plate.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5
11.	Press and hold the latch in towards the latch handle, push the latch handle all the way down and release.	
12.	Ensure that the RETICLE LIGHT switch is set to OFF, and the 30 percent section of the humidity indicator is blue.	
13.	Hold the day sight tracker with the tracker hook mount facing the traversing unit boresight plate.	
14.	Join the day sight tracker index plate groove with the traversing unit boresight guide hold the tracker flush, and pull the latch handle all the way up until the latch releases.	

15. When installing the night sight, the coarse azimuth knob should be placed in

a. the locked position.
b. position No. 3
c. position No. 1 (forward position).
d. the ready position.

16. What section of the night sight should be checked for foreign material?

a. Campost
b. Locking latch
c. Keyed holes
d. Vee Ways

17. During installation of the missile guidance set, the yellow colored index line on the coil cable connector should be mated with the yellow colored mating line next to connector

a. J1.
b. J2.
c. J3.
d. J4.

18. During installation of the traversing unit on the jeep launcher in step No 2, the azimuth lock should be in the _____ position.

a. lock
b. unlock
c. not ready
d. ready

19. During the third step of installing the traversing unit on the jeep launcher the elevation lock should be in the _____ position.

a. ready
b. armed
c. unlock
d. lock

20. During step No. 4 of installing the traversing unit on the jeep launcher, the azimuth lock should be placed in the _____ position.

a. lock
b. unlock
c. arm
d. unarm

21. During the installation of the day sight tracker the reticle light switch is set to

a. OFF.
b. ON.
c. TEST.
d. OPERATE.

22. The 30-percent section of the humidity indicator should be

a. white.
b. pink.
c. blue.
d. green.

23. After installing the post amplifier cable connector to the night sight, the cable 2W1 is connected to the

a. J2 cable.
b. traversing unit.
c. vehicle power conditioner connector J1.
d. spare battery pack.

24. After connecting cable 2W1 to the 24-volt vehicle power connector, the night sight vehicle power conditioner connector J2 is connected by the

a. J1 cable.
b. 1W2 cable.
c. spare battery pack.
d. cable 2W2.

25. After connecting the night sight vehicle power conditioner, the CB1 switch should be set to

a. ON
b. OFF
c. READY

26. The missile guidance set should be placed in the _____ of the jeep launcher.

a. front seat
b. MGS bracket
c. trunk
d. rear seat

Match the procedure for installing the launch tube on the jeep launcher in Column 1 with its appropriate step in Column 2

Column 1 Procedure	Column 2 Step
27. Line up the locating pin on the traversing unit with the mating hole in the launch tube.	a. Step 1
28. Lift the launch tube latch.	b. Step 2
29. Place the launch tube latch in the launch tube catch and press down on the latch until it latches.	c. Step 3
30. Place the launch tube pins in the launch tube brackets in the traversing unit.	d. Step 4

31. The first step in system checkout part I is to

a. check the electrical connector on the traversing unit.
b. lift the trigger cover on the traversing unit, press in on the trigger and release.
c. raise the bridge clamp locking handle and open the bridge clamp.
d. lower the bridge clamp locking handle.

With a list of procedures for conducting system checkout part II in Column A, match each with its appropriate step in Column B.

Column A Procedure	Column B Step
32. Turn the elevation lock to the LOCKED position. Use the control knobs and turn the launch tube up and down until it locks.	a. Step 1
33. Release the TEST/OPERATE switch on the MGS and close the cover over the switch.	b. Step 2
34. Lift the cover over the TEST/OPERATE switch to "TEST" and hold.	c. Step 3
35. Turn the azimuth lock on the traversing unit to LOCK. Use the control knobs and turn the traversing unit until it locks.	d. Step 4
36. Turn the elevation lock on the traversing unit to the UNLOCKED position, hold the launch tube, and move it up and down.	e. Step 5

With a list of procedures for conducting system checkout part ... each with its appropriate step in Column B.

	Column A Procedure	Column B Step
37.	Press your eye against the eye cup on the night sight and look into the eyepiece	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5
38.	Set the focus control to -O+ and the RETICLE LIGHT switch to ON on the day sight tracker and adjust the focus control while looking into the eyepiece for sharp crosshairs.	
39.	Set the ON/OFF/STBY switch to STBY on the night sight	
40.	Adjust the diopter adjustment ring for the best focus of the reticle	
41.	Set the RETICLE LIGHT switch to OFF on the day sight tracker.	

42. Listed below, in scrambled order, are the steps for performance system checkout procedure part IV.

    (1) Position the boresight - collimater over the locating pins and post of the night sight and fit the boresight collimator onto the night sight.
    (2) Set the field-of-view selector to WFOV.
    (3) Inspect and clean the mating surfaces of the night sight and boresight collimater, if necessary, to make sure of proper mating for boresight accurracy.
    (4) Adjust the BRT, CTRS, and range focus knobs on the night sight for the best focus of the displayed image.
    (5) Open the boresight collimator case by releasing the two latches and remove the boresight collameter from the case.

    Which of the following is the proper sequence?

    a. 2,5,1,3,4
    b. 4,2,5,3,1
    c. 3,1,4,5,2
    d. 5,1,2,4,3

43. During system checkout part V, you have just set the field-of-view selector to NFOV. What should your NEXT step be?

    a. Adjust the BRT, CTRS, and RANGE FOCUS knobs.
    b. Move the AZ and EL locking levers counterclockwise.
    c. Adjust the boresight collimator
    d. Look into the eyepiece

Given a list of procedures to conduct system checkout part VI in column A, match each with its appropriate step in column B.

	Column A Procedure	Column B Step
44.	Look into the eyepiece of the day sight tracker and check the alinement of the boresight collimator reticle.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5
45.	Remove the boresight collimator and all associated equipment.	
46.	Move the AZ and EL locking levers fully clockwise on the nightsight, look into the eyepiece and check the alinement of the boresight collimator reticle.	
47.	Look into the eyepiece of the night sight and set the ON/OFF/STBY switch on the night sight to OFF.	
48.	Set the field-of-view selector to WFOV on the night sight, look into the eyepiece and adjust BRT and CTRS controls for the best image of the boresight collimator reticle.	

49. Step 3 for loading the TOW missile in the ground mounted mode is to

a. carry the encased missile to the TOW weapon system and check the diaphragm for breaks.
b. stand on the left side of the launcher.
c. ensure that the azimuth and elevation lock on the traversing unit is in the LOCK/UNLOCKED position.
d. push the bridge clamp locking handle on the traversing unit upward and forward and open the bridge clamp.

50. During missile loading procedures (ground mounted), the azimuth and elevation lock on the traversing unit should be in the _____ position.

a. LOCK
b. ARMED
c. READY
d. UP

Provided with a list of procedures for loading the missile on the jeep launcher in Column A, match each with its appropriate step in Column B.

Column A Procedure	Column B Step
51. Push the locking handle forward, then up and open the bridge clamp	a. Step 1
52. Ensure the azimuth lock and the elevation lock on the traversing unit are in the LOCK/LOCKED position.	b. Step 2
53. Turn the traversing unit from side to side until it locks in place and turn the control knobs forward until the trunnion locks in place.	c. Step 3
54. Stand on the right side of the vehicle next to the TOW weapon system.	d. Step 4

55. Listed below, in scrambled order, are steps 5, 6, 7, and 8 for loading the missile on the jeep launcher.

(1) Turn the encased missile so that the electrical connector is on the top, slide the indexing lugs on the encased missile into the indexing slots on the launch tube, and slide the encased missile forward and down into the launch tube until the indexing lugs are firmly in place.
(2) Pull up on the quick release clamp of the forward handling ring and remove it from the encased missile.
(3) Lower the bridge clamp and lock the missile by pushing down on top of the bridge clamp and pulling the bridge clamp locking handle down and backward.
(4) Turn the inside portion of the protective cover 2 complete turns counterclockwise and turn the protective cover counterclockwise and remove it from the electrical connector.

In which order should they be performed?

a. 2, 4, 1, 3
b. 1, 3, 2, 4
c. 3, 4, 1, 2
d. 4, 3, 2, 1

56. During firing preparation, after loading the missile, the first step you should perform is to

a. adjust the focus control on the day sight tracker.
b. set the ON/OFF/STBY switch to OFF.
c. visually select the target without using the day sight tracker or night sight.
d. turn the control knobs until the crosshairs are positioned on the target.

57. While preparing the TOW for firing, the ON/OFF/STBY switch on the night sight should be placed to _____ and allowed 3 to 5 minutes for cool down.

a. OFF
b. ON
c. STBY

58. Listed below in scrambled order, are the steps for firing the TOW 2 missile.

(1) Raise the trigger cover to expose the trigger.
(2) Turn the control knobs to track the target, keeping the crosshairs on the center of the target.
(3) Line up the crosshairs on the center of the visible mass of the target.
(4) Raise the arming lever
(5) Push the trigger in to fire the missile.

In which order should the above steps be performed?

a. 1, 5, 4, 2, 3
b. 3, 4, 1, 5, 2
c. 2, 3, 1, 5, 4
d. 5, 3, 1, 2, 4

59. Listed below, in scrambled order, are the steps for removing an encased missile or empty missile case.

(1) Pull up on the bridge clamp locking handle and open the bridge clamp.
(2) Replace the quick release clamp, preformed packing and forward handling ring on the encased missile and stow it either in jeep launcher or missile carrier.
(3) Pull the command link wires out from the front of the launch tube, check the inside rear of the launch tube for dirt, and clean with a cloth, if necessary.
(4) Lower the trigger cover over the trigger.
(5) Put the azimuth lock on the traversing unit on the LOCK position and then turn the traversing unit form side to side until it locks in place. Put the elevation lock in the LOCKED position and tilt the trunsion until the launch tube is locked down.
(6) Remove the encased missile or empty missle case from the launch tube.
(7) Secure the protective cover on an encased missile by turning the cover, then inside portion fully clockwise.
(8) Lower the arming lever.

In what sequence should they be performed?

a. 8, 1, 5, 3, 7, 2, 4, 6
b. 4, 5, 8, 1, 6, 7, 2, 3
c. 2, 8, 6, 3, 7, 4, 1, 5
d. 7, 4, 2, 6, 1, 5, 3, 8

Given a list of procedures for immediate action in Column A, match each with its appropriate step in Column B.

Column A Procedure	Column B Step
60. Save both missiles for reuse if the self test fails, and perform corrective action for the indicative failure.	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5
61. Unload the missile and perform system self-test, if the second missile fails to fire.	
62. Destroy both missiles in accordance with unit SOP if system self-test checks good	
63. Remove the missile from the launch tube if the missile did not fire and load another missile.	
64. Continue tracking the target, lower then raise the arming level, and attempt to fire the missile again.	

65. What would you probably use to prevent water from freezing while cleaning rubber parts?

a. Gasoline
b. Dry Cleaning Fluid
c. Glycesol
d. Detergent

Provided with a list of procedures for cleaning the battery assembly in Column A, match each with its appropriate step in Column B.

Column A Procedure	Column B Step
66. Wipe the battery assembly with the wet wiping rag	a. Step 1 b. Step 2 c. Step 3 d. Step 4 e. Step 5
67. Dry the battery assembly with a clean dry cloth	
68. Wet a wiping rag with water	
69. Ensure there is no dust or deposit of white, powdery substance on the battery surface.	
70. Clean the battery assembly with a scrub brush for stubborn dirt.	

71. Before using the camel's-hair brush on the lens of the day sight, blow loose dust off of the surface with

a. a rubber syringe.
b. your mouth.
c. a fan.

72. A TOW fighting position should be dug _____ inches in depth.

a. 6
b. 18
c. 24
d. 48

73. You should change the camouflage around your position

a. during day light hours only.
b. on order of the section leader.
c. if it begins to change color
d. at night

74. What word(s) indicate the areas that you cannot engage on your range card?

a. CANNOT ENGAGE
b. NO GO
c. DEADSPACE

Review Lesson, Continued

Answers

The table below lists the answers to the review lesson examination items.

Item Number	Answer
1	b
2	a
3	b
4	c
5	a
6	c
7	c
8	b
9	d
10	c
11	b
12	e
13	a
14	d
15	c
16	d
17	a
18	a
19	d
20	b
21	a
22	c
23	c
24	d
25	a
26	b
27	c
28	a
29	d
30	b
31	b

Continued on next page

Answers, continued

Item Number	Answer
32	c
32	e
34	a
35	d
36	b
37	c
38	a
39	d
40	e
41	b
42	b
43	a
44	b
45	d
46	a
47	e
48	c
49	d
50	a
51	d
52	b
53	c
54	a
55	a
56	c
57	b
58	b
59	b
60	e
61	c
62	d
63	b
64	a

Continued on next page

Answers, continued

Item Number	Answer
65	c
66	b
67	e
68	a
69	b
70	d
71	a
72	c
73	c
74	c

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