DNS-TM-ARMY

INSIGHT TECHNOLOGY

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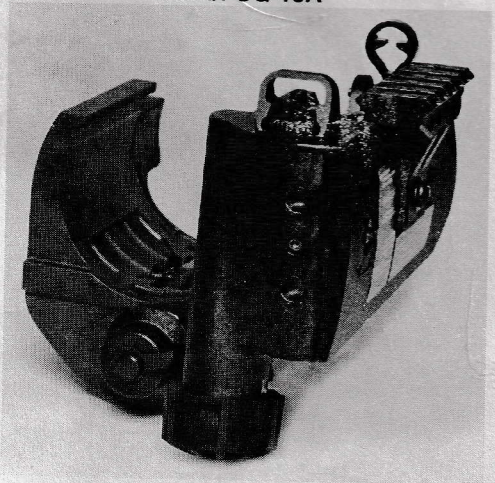
OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS LIST)

Day / Night Sight (DNS) for the M203 Grenade Launcher

AN/PSQ-18A



Rev 6

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SAFETY SUMMARY

1. GENERAL SAFETY INSTRUCTIONS

This manual contains operating instructions and maintenance procedures which may cause injury or death to personnel, or damage to equipment if not properly followed. Prior to performing any task, the WARNINGs, CAUTIONs and NOTEs included in that task shall be reviewed and understood.

2. WARNINGS, CAUTIONS AND NOTES

Safety headings used in this manual and their respective definitions are as follows:

WARNING

Highlights an essential operating or maintenance procedure, practice, condition or statement, which, if not strictly observed, could result in injury to, or death of, personnel or long term health hazards.

CAUTION

Highlights an essential operating or maintenance procedure, practice, condition or statement, which, if not strictly observed, could result in damage to, or destruction of, equipment or loss of mission effectiveness.

NOTE

Highlights an essential operating or maintenance procedure, condition or statement.

3. SAFETY PRECAUTIONS

The following general safety precautions supplement the specific WARNINGs, CAUTIONs and NOTEs that appear elsewhere in this manual.

3.1 Laser Radiation. The Day / Night Sight (DNS) for the M203 Grenade Launcher emits invisible laser radiation. Nominal Ocular Hazard Distances for safe operation (NOHD) are listed in Table i-1.

WARNING

Laser modes designated as Safety Class 1 or 3a may be used for force-on-force training only if the opposing soldiers are beyond the NOHD values shown in Table i-1.

WARNING

Laser modes designated as Safety Class 3b shall not be used for force-on-force training.

WARNING

When operating in the DUAL LOW laser setting, personnel within 3 meters of the laser must use laser eye protection with a minimum optical density of 0.5 at the laser wavelength of 820-850 nm. When operating in the DUAL HIGH laser setting, personnel within 32 meters (190 meters when using binoculars) of the laser must use laser eye protection with a minimum optical density of 1.5 at the laser wavelength of 820-850 nm.

Refer to TB MED 524, Occupational and Environmental Health: Control of Hazards to Health from Laser Radiation.

The following general safety precautions apply at all times:

- Do not stare into the laser beams.
- Do not look into the laser beams through binoculars or telescopes.
- Do not point the laser beams at mirror-like surfaces.
- Do not shine the laser beams into other individual's eyes.

3.2 Risk of Detection by Enemy.

WARNING

To reduce the risk of detection by an enemy using night vision devices, avoid prolonged activation of the DNS laser(s).

WARNING

Infrared (IR) lasers are more detectable to an enemy using night vision devices when used in smoke, fog, and rain. Avoid prolonged activation of the IR lasers in these conditions.

3.3 Weapons Safety. The DNS is designed to be used with destructive weapon systems. Improper operation or misuse of the DNS with these weapon systems could lead to personal injury or death of either the operator or other persons within weapons range. Safe firearms handling procedures must be practiced at all times.

3.4 Batteries. Do not store the DNS with battery installed.

3.5 Tritium Sights. The DNS is equipped with integral Iron Sights that contain tritium inserts. If a tritium light is not illuminated or appears broken or cracked, inform personnel not to touch the sight. Any individual who may have handled a cracked or broken tritium sight should wash as soon as possible with non-abrasive soap and cold water. Immediately notify the local Radiation Safety / Protection Officer (RSO/RPO) of the potential breakage, and if directed by the RPO, carry out the following procedures:

WARNING

Personnel handling broken / damaged tritium devices shall wear rubber or latex gloves.

a. Place the broken device and gloves worn during handling in a double-wrapped clear plastic bag.
b. Place the plastic bag in a storage container and label: "**BROKEN TRITIUM DEVICE: DO NOT OPEN**".
c. Turn the broken device in to the unit / installation RSO/RPO for collection and subsequent transfer to Trijicon, Inc. The RSO/RPO shall contact Trijicon, Inc. for shipping instructions:

Trijicon, Inc.
49385 Shafer Ave.
P.O. Box 930059
Wixom, MI 48393
Phone: 1-800-388-0563 (0900 – 1700 EST)

WARNING

Keep oil away from tritium inserts!

Personnel who may have handled a broken tritium device may be directed by the unit / installation RSO to submit a urine bioassay sample for medical evaluation of potential tritium uptake.

Table i-1 Nominal Ocular Hazard Distances for Safe Operation (NOHD)

Laser/Mode	Safety Class	NOHD w/o[1]	NOHD mag[2]
Infrared (IR) Aim Low	1	0	0
Dual Low	3a	40cm	3m
Dual High	3b	32m	190m

[1] Nominal Ocular Hazard Distance **without** magnifying optics.
[2] Nominal Ocular Hazard Distance **with 7x** magnifying optics.

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HOW TO USE THIS MANUAL

1. OVERVIEW

This manual provides information necessary for the safe operation and maintenance of the Day / Night Sight (DNS). The Table of Contents sets forth the organizational layout of the manual and allows for rapid identification of subject matter.

2. ABBREVIATIONS AND ACRONYMS

Abbreviations and acronyms used in this manual are spelled out the first time they appear in each chapter, section or appendix. For reference purposes, they are also listed as follows:

ACOG	Advanced Combat Optical Gunsight
AL	Aim Low
CCO	Close Combat Optic
CCW	Counterclockwise
CVL	Carbine Visible Laser
CW	Clockwise
DH	Dual High
DL	Dual Low
DNS	Day / Night Sight
IR	Infrared
KE	Kinetic Energy
LBS	Laser Borelight System
LCD	Liquid Crystal Display
LED	Light Emitting Diode
mm	Millimeter
mrad	Milliradians
mW	Milliwatts
nm	Nanometer
NOHD	Nominal Ocular Hazard Distance
NVG	Night Vision Goggles

CHAPTER 1
INTRODUCTION

SECTION I
GENERAL INFORMATION

Figure 1-1 DNS in Use

1.1 SCOPE

This manual is for use by operator / crew and unit maintenance personnel. It applies to the AN/PSQ-18A Day / Night Sight (DNS) for the M203 Grenade Launcher. Complete familiarization with this manual prior to using the equipment, will ensure safe operation and maximum effectiveness of the DNS.

1.1.1 Type of Manual. Operator and Unit Maintenance Manual (including Repair Parts and Special Tools List).

1.1.2 Model Number and Equipment Name. AN/PSQ-18A Day / Night Sight (DNS) for the M203 Grenade Launcher.

1.1.3 Manufacturer.

Insight Technology, Inc.
9 Akira Way
Londonderry, NH 03053 USA

1.1.4 Purpose of Equipment. To provide for rapid and precise firing of the M203 Grenade Launcher in any lighting condition.

1.2 WARRANTY INFORMATION

This item shall conform to design, manufacturing, and performance requirements and be free from defects in material and workmanship for a period of one (1) year, or for a period of three (3) years from the date of acceptance with purchase of the optional extended warranty. If item is defective, notify your Service Command Technical point of contact.

1.3 TECHNICAL INFORMATION

For technical information contact Insight Technology at (603) 626-4800, or techinfo@insight-tek.com, or your Service Command Technical point of contact.

SECTION II
EQUIPMENT DESCRIPTION

1.4 SYSTEM DESCRIPTION

The AN/PSQ-18A Day / Night Sight (DNS) for the M203 Grenade Launcher is a weapon-mounted, battery operated gunsight with integrated infrared (IR) Aim and Illumination Lasers. The DNS provides for increased firing accuracy over quadrant and leaf sight systems, for both point and area targets from 40 meters (safe fire range) to 400 meters.

The integral Iron Sights contain tritium inserts that allow for effective aiming of the Grenade Launcher in any lighting condition.

When used in conjunction with night vision devices, the integral IR Aim and Illumination Lasers provide for active, covert target acquisition at night.

The DNS is a ruggedized system designed for operation in battlefield environments.

1.5 TECHNICAL SPECIFICATIONS

Table 1-1 Technical Specifications

WEIGHT AND DIMENSIONS	
Weight (with AA battery)	18.5 ounces (maximum)
Length	6.5 inches
Width	4.5 inches
Height	4.0 inches
POWER / PERFORMANCE	
Range	40 to 400 meters
Accuracy	± 5 meters
Battery	One AA lithium or alkaline
LASERS	
IR Aim Laser	
Output Power LOW	500 – 700 µW
Output Power HIGH	2.7 – 3.3 mW
Beam Divergence	0.8 mrad (max)
Wavelength	820 – 850 nm
IR Illuminator	
Low Power	2.9 – 3.4 mW
High Power	22.5 – 27.5 mW
Beam Divergence	48 mrad (max)
Wavelength	820 – 850 nm

1.6 LIST OF MAJOR COMPONENTS

The DNS system includes the components identified in Figure 1-2 and Table 1-2. Section 1.7 provides a brief description of each item.

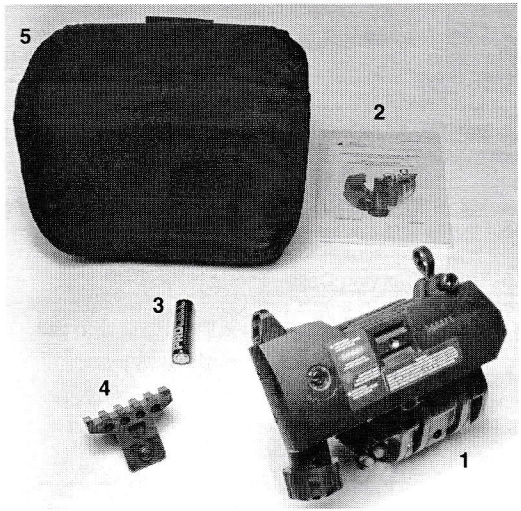

Figure 1-2 DNS Major Components

Table 1-2 DNS Major Components

Item	Description
1	DNS Assembly
2	Operator and Unit Maintenance Manual
3	Battery, AA
4	MIL-STD-1913 Rail Assembly
5	Textile Carrying Case

1.7 DESCRIPTION OF MAJOR COMPONENTS

1.7.1 DNS Assembly. A weapon-mounted, battery operated sight with integrated IR Aim and Illumination Lasers.

1.7.2 Operator and Unit Maintenance Manual. Provides detailed operating and maintenance procedures specific to the DNS.

1.7.3 Battery, AA. One AA lithium or alkaline battery used to power the DNS.

1.7.4 MIL-STD-1913 Rail Assembly. Used to mount various optical sights and / or laser aiming devices to the DNS.

1.7.5 Textile Carrying Case. Protects the DNS and accessories while in a field environment. The case includes belt clips for attachment to the standard issue web belt.

1.8 DNS FEATURES AND CONTROLS

Table 1-3 provides a list of DNS features and controls that correspond to the labels contained in Figures 1-3 and 1-4. A brief functional description of each item is provided in paragraphs 1.8.1 through 1.8.15.

Table 1-3 DNS Features and Controls

Label	Description
1	Iron Sights
2	Anti-Cant Indicator
3	Mechanical Range Scale
4	Mounting Bracket
5	Laser Activation Switch
6	Mounting Knob
7	Mode Select Switch
8	Laser ON LED
9	Liquid Crystal Display (LCD)
10	MIL-STD-1913 Mounting Rail Attachment Points
11	Azimuth and Elevation Adjusters
12	Range Adjustment Knob
13	IR Illuminator
14	IR Aim Laser
15	Battery Cap / Compartment

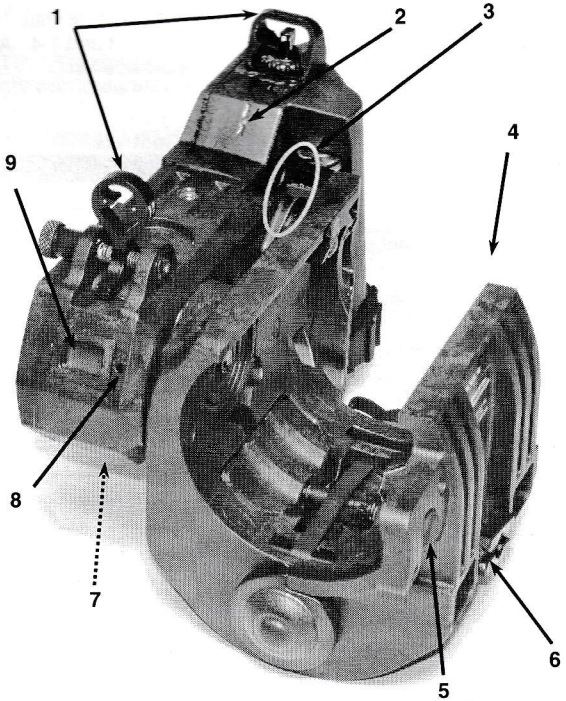

Figure 1-3 DNS Features and Controls

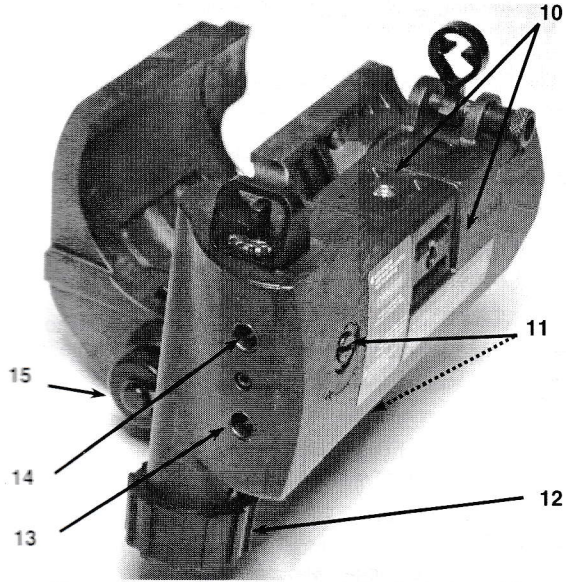

Figure 1-4 DNS Features and Controls (cont'd)

1.8.1 Iron Sights. Equipped with tritium inserts, provides for effective aiming of the Grenade Launcher in any lighting condition.

1.8.2 Anti-Cant Indicator. A bi-colored Light Emitting Diode (LED) that displays steady green when the DNS is properly oriented and flashes red when the DNS is canted.

1.8.3 Mechanical Range Scale. Allows the user to manually adjust for range to the target (in 20-meter increments) without battery power.

1.8.4 Mounting Bracket. Allows for mounting the DNS to the M203 Grenade Launcher.

1.8.5 Laser Activation Switch. Activates the IR laser(s) that corresponds with the position of the Mode Select Switch.

1.8.6 Mounting Knob. Provides for secure attachment of the Mounting Bracket to the M203 Grenade Launcher without the use of tools.

1.8.7 Mode Select Switch. Allows the user to select the desired mode of operation for the DNS. When switched to the OFF or DAYMODE positions, the DNS will not emit laser energy.

1.8.8 Laser ON LED. An LED used to indicate when the DNS is emitting laser energy.

1.8.9. LCD. Displays distance in meters, canting information, and battery status in a real-time Liquid Crystal Display (LCD). Designed with a backlight that illuminates the display when adjusting range and remains lit for a period of 6 seconds after adjustment.

1.8.10 MIL-STD-1913 Mounting Rail Attachment Points. Allows for attachment of the removable MIL-STD-1913 Mounting Rail Assembly (top or side) to the DNS.

1.8.11 Azimuth and Elevation Adjusters. Used to bring the IR Aim and Illumination Lasers into azimuth and elevation alignment with the barrel of the Grenade Launcher.

1.8.12 Range Adjustment Knob. Allows for rapid and accurate adjustment of range in 5-meter increments.

1.8.13 IR Illuminator. Used with night vision devices to provide IR illumination of the intended target area out to 400 meters. Emits a cone of IR light approximately 10 meters wide at 200 meters.

1.8.14 IR Aim Laser. Used with night vision devices to provide a precision aim point or to mark targets.

1.8.15 Battery Cap / Compartment. Provides secure housing for the AA battery that powers the DNS.

CHAPTER 2
OPERATING INSTRUCTIONS

SECTION I
PREPARATION FOR USE AND INSTALLATION

2.1 PREPARATION FOR USE

2.1.1 Unpacking the Equipment. Before unpacking the equipment, verify that all major components listed in Table 1-2 are present. Check the Day / Night Sight (DNS) to ensure the following additional items are included:

a. Battery Cap
b. Safety Block

If any of the major components or items listed above are missing, seek guidance from the equipment issuing authority.

2.1.2 Inspection of the Equipment. Before use, inspect all pieces of equipment for any damage such as cracks, loose parts, or other visible defects. If any damage or defects are noted, seek guidance from the equipment issuing authority.

2.2 BATTERY HANDLING

2.2.1 Battery Inspection. Before installation, inspect the AA battery for any cracks, leakage, or bulging. Never install a defective battery in the DNS.

WARNING

Ensure the Mode Selector is turned to the OFF position before attempting to install, remove, or replace the battery.

2.2.2 Battery Installation. Unscrew the Battery Cap and install one AA lithium or alkaline battery, with the positive end facing the Battery Cap as shown in Figure 2-1. Replace and screw in the Battery Cap.

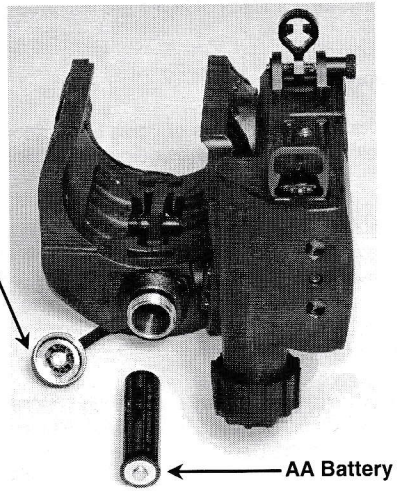

Figure 2-1 Battery Installation

WARNING

Do not store the DNS with battery installed.

2.2.3 Battery Operation. A single AA lithium battery provides power for over eight (8) hours of normal operation.

2.2.3.1 When the range has not been adjusted in over three (3) minutes, the DNS enters a low-power sleep mode. While in sleep mode, the indicator **SLP** will appear on the LCD.

2.2.3.2 When battery power is low, the indicator **bAt** will appear on the LCD at system startup for a period of three (3) seconds and every 15 seconds during operation. In the event battery power is lost, range to the target may be set with the Mechanical Range Scale as described in paragraph 2.9.1.2.

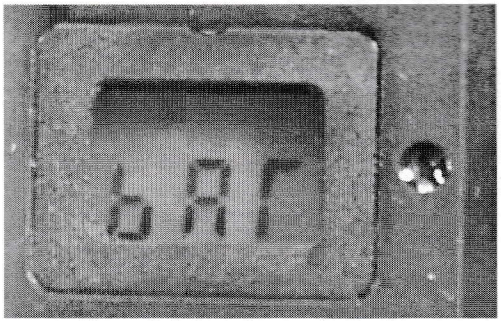

Figure 2-2 Low Battery Indication

2.3 MOUNTING PROCEDURES

The DNS mounts directly to either the standard 12-inch or short 9-inch M203 barrels without impacting space on the MIL-STD-1913 rail of the host weapon.

WARNING

Be sure the Grenade Launcher and host weapon are CLEAR and SAFE before proceeding.

a. Loosen the Mounting Knob by rotating counterclockwise to the full open position.
b. Slide the Mounting Bracket over the end of the Grenade Launcher tube until it stops.
c. Rotate the Mounting Knob clockwise until it is tight.
d. To ensure that the DNS is properly seated on the Grenade Launcher tube, cycle the M203 breech five (5) times.
e. Retighten by using a coin or similar flat object in the slot of the Mounting Knob to fully secure the DNS to the Grenade Launcher.

NOTE

The DNS will maintain a pointing accuracy of ± 5 mrad (approximately 25cm diameter circle at 25 meters) with repeated mount / dismount operations on the same weapon. If the DNS is installed on a different launcher, it should be re-zeroed.

NOTE

Failure to properly secure and tighten the DNS to the Grenade Launcher may lead to boresight repeatability and zeroing issues.

2.4 MIL-STD-1913 RAIL ASSEMBLY

The DNS is supplied with a MIL-STD-1913 Rail Assembly for hosting various optical sights and / or laser aiming devices. The Rail Assembly can be attached to the DNS to allow for either top or side mounting of peripheral devices. The top mounting position is recommended when hosting optical sights such as the Advanced Combat Optical Gunsight (ACOG) or M68 Close Combat Optic (CCO). The side mounting position should be used when hosting laser aiming devices such as the AN/PEQ-5, AN/PAQ-4C, or AN/PEQ-2A.

2.4.1 Mounting. The MIL-STD-1913 Rail Assembly is attached to the DNS with two screws (captive to the Assembly). To ensure accurate mounting of the Rail Assembly, loosely install both screws, then tighten the top screw before tightening the side screw

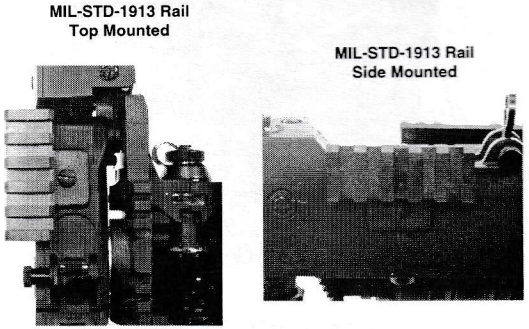

Figure 2-3 Mounting of MIL-STD-1913 Rail Assembly

2.5 BORESIGHT ADJUSTERS

The Boresight Adjusters are used to bring both the IR Aim and Illumination Lasers into azimuth and elevation alignment with the barrel of the Grenade Launcher. The Boresight Adjusters can be turned using the base of a 7.62mm or 5.56mm round, a coin, or screwdriver. Table 2-1 shows the direction of adjuster rotation and resulting beam and shot group movement when the DNS is properly mounted. Table 2-2 shows the shot group movement per adjuster click at 10, 25, and 200 meters.

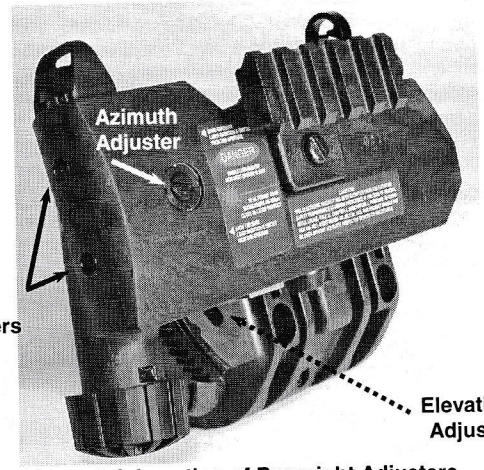

Figure 2-4 Location of Boresight Adjusters

CAUTION

Do not force adjusters beyond their end of travel.

Table 2-1 Adjuster Rotation and Relative Beam / Shot Group Movement

Adjuster	Rotation	Beam Movement	Shot Group Movement
Elevation Adjuster (Bottom)	CCW CW	Down Up	Up Down
Azimuth Adjuster (Side)	CW CCW	Left Right	Right Left

Table 2-2 Beam / Shot Group Movement per Adjuster Click

Range (m)	Distance Change Per Click (cm)
10	0.7
25	1.8
200	14.0

2.6 ZEROING PROCEDURES

The DNS may be zeroed to the M203 Grenade Launcher using any of the three methods described below.

2.6.1 Zeroing by Firing 40mm Training Grenades. This method of zeroing can be the most accurate but requires an extended range and must be conducted at night. For maximum accuracy, the procedure should be conducted with a target 200 meters downrange in atmospheric conditions as close to actual mission conditions as possible.

a. Place a target downrange at a known distance.
b. With the DNS properly mounted to the M203 Grenade Launcher, turn the Mode Select Switch to the DAYMODE position and rotate the Range Adjustment Knob so that the known range to the target is displayed on the LCD.

c. Put on a night vision device. Adjust focus and diopter settings for best image.
d. Turn the DNS Mode Select Switch to the AIM LO position. Double-tap the Laser Activation Switch to activate the IR Aim Laser in continuous mode.
e. Direct the IR Aim Laser at the target and fire one 40mm M781 training round. Note where the round strikes the ground relative to the target.
f. Rotate the DNS Azimuth and Elevation Adjusters as shown in Table 2-1 to move the grenade strike point to the laser aiming point.
g. Repeat steps e. and f. until two rounds in a row land within two meters of the target.
h. The DNS is now zeroed to the M203 Grenade Launcher.

NOTE

The DNS' integral Iron Sights may also be zeroed by following the above procedures except that adjustments to azimuth and elevation shall be made with the front and rear sight adjusters. Similarly, an ACOG or M68 CCO that is mounted to the DNS may also be zeroed in this manner, except that adjustments to azimuth and elevation shall be made with the azimuth and elevation adjusters of those devices.

2.6.2 Zeroing with a Laser Borelight. This procedure is accomplished using a standard U.S. Military Laser Borelight System (AN/PEM-1), a 40mm Mandrel Adapter, a 5.56 mandrel, and a full size copy of the target shown in Figure 2-5.

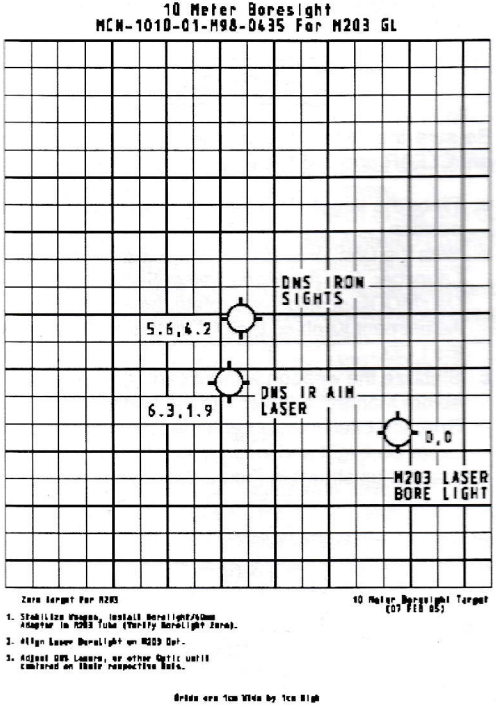

Figure 2-5 10-Meter Boresight Target

NOTE

The target shown in Figure 2-5 is a reduced copy and shall not be used for zeroing.

WARNING

Be sure the Grenade Launcher and host weapon are CLEAR and SAFE before proceeding.

a. Place the target at 10 meters oriented in a vertical position.
b. With the DNS properly mounted to the Grenade Launcher, turn the Mode Select Switch to the DAYMODE position and rotate the Range Adjustment Knob so that "0" meters is displayed on the LCD.
c. Stabilize the weapon without cant, and insert the 40mm Mandrel Adapter into the barrel of the Grenade Launcher. Attach the 5.56 mandrel to the Laser Borelight and insert it into the 40mm Mandrel Adapter as shown in Figure 2-6.

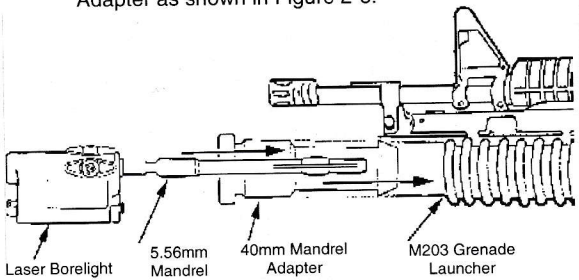

Figure 2-6 Attachment of the LBS, Mandrel, and 40mm Mandrel Adapter

d. Zero the Laser Borelight System (LBS) in accordance with LBS-TM-L804 (AN/PEM-1 LBS-300 Operator's Manual).
e. Put on a night vision device. Adjust focus and diopter settings for best image.
f. Turn the LBS Mode Select Switch to the LOW position.
g. Adjust the target as required to place the LBS laser dot on the designated target location.
h. Turn the DNS Mode Select Switch to the AIM LO position. Double-tap the Laser Activation Switch to activate the IR Aim Laser in continuous mode.
i. Rotate the DNS Azimuth and Elevation Adjusters as shown in Table 2-1 to move the DNS laser beam onto the designated target location.
j. The DNS is now zeroed to the M203 Grenade Launcher.

NOTE

The DNS' integral Iron Sights may also be zeroed by following the above procedures except that in step i., azimuth and elevation adjustments shall be made with the front and rear sight adjusters to move the DNS laser beam onto the "Iron Sights" target designation.

WARNING

Be sure to remove the Borelight and Mandrel Adapter from the weapon prior to firing 5.56mm or 40mm grenade rounds.

2.6.3 Zeroing on a 25-Meter Range. This method is accomplished by firing 5.56mm rounds and using a full size copy of the target shown in Figure 2-7. This is the least accurate of the three methods.

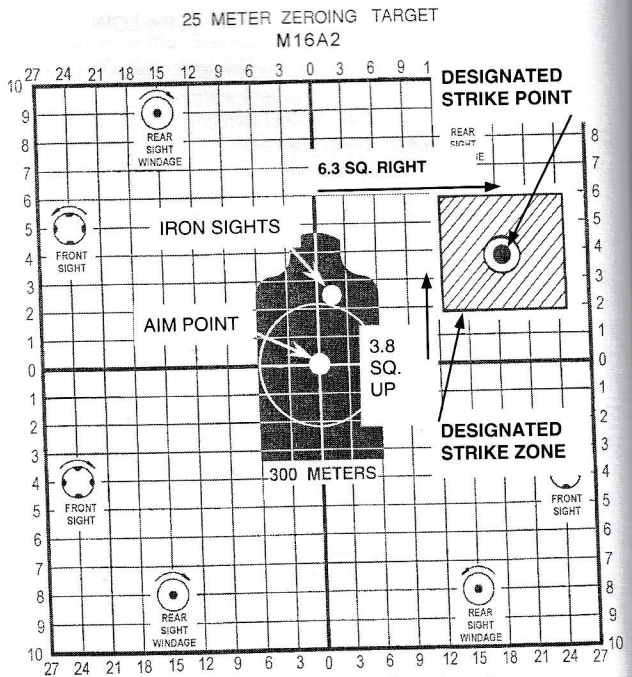

Figure 2-7 25-Meter Zeroing Target

NOTE

The target shown in Figure 2-7 is a reduced copy and shall not be used for zeroing.

a. On a 25-meter Zeroing Target, mark the designated strike point and designated strike zone as shown in Figure 2-7.
b. Mount the target on an "E" silhouette or other suitable surface at 25 meters.
c. With the DNS properly mounted to the Grenade Launcher, turn the Mode Select Switch to the DAYMODE position and rotate the Range Adjustment Knob so that "0" meters is displayed on the LCD.
d. Put on a night vision device. Adjust focus and diopter settings for best image.
e. Turn the DNS Mode Select Switch to the AIM LO position. Double-tap the Laser Activation Switch to activate the IR Aim Laser in continuous mode.
f. Direct the IR Aim Laser at the center of the target aiming point and fire three rounds.
g. Note the center of the shot group relative to the intended strike point. Rotate the DNS Azimuth and Elevation Adjusters as shown in Table 2-1 to move the center of the shot group to the designated strike point.
h. Repeat steps f. and g. until 2 out of 3 rounds are in the designated strike zone.
i. The DNS is now zeroed to the M203 Grenade Launcher.

NOTE

The DNS' integral Iron Sights may also be zeroed by following the above procedures using the "Iron Sights" aim point and making adjustments to azimuth and elevation with the front and rear sight adjusters.

2.7 FIRING M4/M16 5.56MM KE ROUNDS

The IR Aim Laser is capable of directing fire of 5.56mm kinetic energy (KE) rounds of the host M4/M16 weapon out to greater than 200 meters without additional boresighting or adjustments.

NOTE

The accuracy of 5.56mm targeting will depend on the quality of the Grenade Launcher interface with the host weapon.

a. If not already complete, boresight the DNS to the Grenade Launcher per section 2.6.
b. Turn the Range Adjust Knob fully counterclockwise until the mechanical stop is engaged (ZERO range setting). The DNS can now be used to direct 5.56mm fire on targets at distances from 0 to greater than 200 meters.
c. Set the Mode Select Switch to the desired aiming laser mode.
d. Press the Laser Activation Switch to turn the laser(s) on.

SECTION II
OPERATING INSTRUCTIONS

2.8 MODES OF OPERATION

Table 2-2 describes the modes of operation for the Day / Night Sight (DNS). The LCD will display the operational mode for approximately six (6) seconds after the mode is selected.

Table 2-3 Modes of Operation

Position	Display Indication	Remarks
OFF	---	The DNS is off. Prevents inadvertent emission of laser energy. The DNS can be used with the Mechanical Range Scale, integral Iron Sights and/or other electro-optical devices.
DAYMODE	dAY	The LCD and all LEDs and backlights are functional but the infrared (IR) lasers will not operate.
AIM LOW	AL	**Class 1** IR Aim Laser is selected at low power. Visible with the use of night vision devices.
DUAL LOW	dL	**Class 3a** IR Aim Laser and IR Illuminator are selected at low power. Visible with the use of night vision devices.
DUAL HIGH	dH	**Class 3b** IR Aim Laser and IR Illuminator are selected at high power. Visible with the use of night vision devices.

WARNING

The Class 1 and 3a lasers described in Table 2-2 may be used in force-on-force training only if the opposing soldiers are beyond the NOHD values shown in Table a-1.

WARNING

The Class 3b lasers described in Table 2-2 shall not be used in force-on-force training.

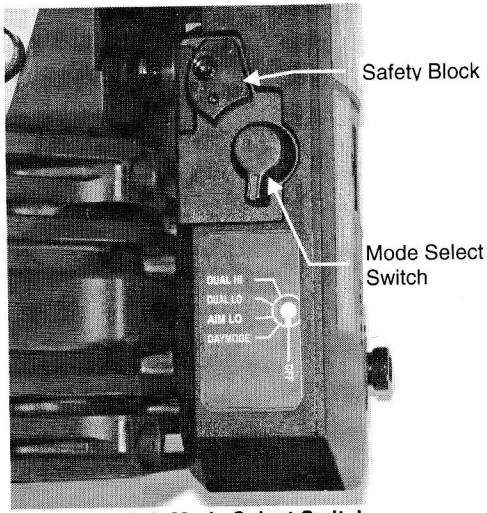

Figure 2-8 Mode Select Switch

2.8.1 Mode Selection. Modes of operation for the DNS are accessed by turning the Mode Select Switch to the desired position.

WARNING

To prevent inadvertent activation of the lasers, the Mode Select Switch should be in the OFF position when not in use.

2.8.1.1 When installed in Training Mode (blue side up), the Safety Block prevents the Mode Select Switch from being turned to the DUAL HIGH position. To access the DUAL HIGH position, a .050 hex head Allen wrench may be used to unscrew the Safety Block and reinstall it in Tactical Mode (black side up).

2.8.2 Mode Activation. Once the mode of operation has been selected, the DNS may be used in that mode by activating the system with the Laser Activation Switch.

2.8.2.1 Momentary Operation. Pressing and holding the Laser Activation Switch operates the DNS in the operational mode set by the Mode Selection Switch. When the button is released, the laser(s) turn off.

2.8.2.2 Continuous Operation. Pressing the Laser Activation Switch twice in rapid succession (double-tap) will turn the DNS laser(s) on. The laser(s) will remain on for three (3) minutes or until the switch is pressed a third time (single-tap).

2.9 USING THE DNS

Accurate firing of the Grenade Launcher is accomplished by adjusting for range to the target, sighting the DNS, and maintaining proper cant of the weapon / DNS.

2.9.1 Range Adjustment. Adjusting for range to the target ensures a proper firing angle and is accomplished primarily by means of the Range Adjustment Knob. The integral Mechanical Range Scale provides an alternate means of accomplishing this even if battery power is lost to the DNS.

2.9.1.1 Range Adjustment Knob. Turning the Range Adjustment Knob CW or CCW alters the vertical orientation of the DNS with respect to the Grenade Launcher. Adjusting for the proper firing angle is accomplished by turning the Range Adjustment Knob until the range to target is displayed on the LCD. Range is displayed on the LCD in 5-meter increments. The LCD is backlit while making range-adjustments. The backlight automatically shuts off six (6) seconds after the range has been set.

WARNING

The range setting displayed on the LCD will flash when set to less than 40 meters (safe firing range).

2.9.1.2 Mechanical Range Scale. The Mechanical Range Scale is graduated from 0 to 400 meters in 20-meter increments. An LED illuminates the Mechanical Range Scale during adjustment and automatically shuts off six (6) seconds after the range has been set.

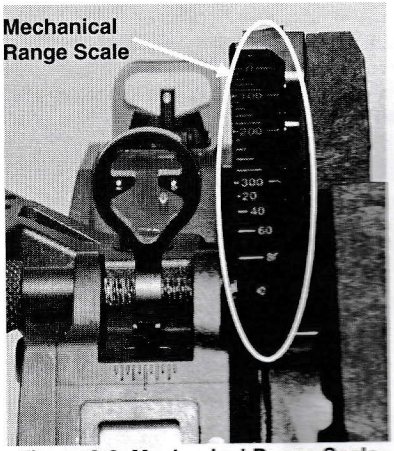

Figure 2-9 Mechanical Range Scale

2.9.2 Sighting the DNS. Once proper adjustment for range to the target has been made, sighting the DNS may be accomplished using either the integral Iron Sights, the IR laser(s), or other sighting devices mounted to the MIL-STD-1913 Rail Assembly.

2.9.2.1 Sighting with Iron Sights. The integral Iron Sights contain tritium inserts that allow for sighting of the DNS in any lighting condition. The front Iron Sight is adjustable in elevation (+19 / -9.5 meters at a 400 meter target range). The rear Iron Sight is adjustable in azimuth up to ± 17.9 meters at a 400 meter target range. Table 2-4 shows the resulting movement in elevation and azimuth per one (1) full rotation of the Iron Sight Adjustment Knobs.

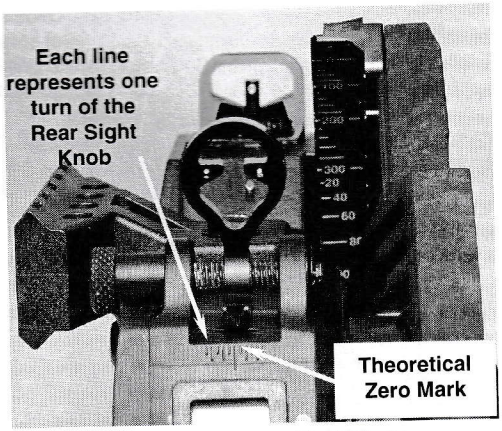

Figure 2-10 Rear Iron Sight Markings

Table 2-4 Elevation and Azimuth Adjustment

Range (m)	Front Sight Elevation Movement per Turn of Adjustment Knob (m)	Rear Sight Azimuth Movement per Turn of Adjustment Knob (m)
50	0.3	0.4
100	0.6	0.8
150	1.0	1.2
200	1.3	1.6
250	1.6	2.0
300	1.9	2.4
350	2.2	2.8
400	2.6	3.2

2.9.2.2 Sighting with the IR Laser(s). Selection and activation of the desired laser is described in section 2.9. The Laser On LED will illuminate when a laser is activated.

2.9.2.3 Sighting with Other Devices. Proper sighting may be achieved through the use of separate devices attached to the MIL-STD-1913 Rail Assembly as described in paragraph 2.4. Devices such as the M68 CCO or the ACOG can provide enhanced sighting capability during daylight hours and at greater ranges. In low light conditions when night vision devices are not available or desired, other items such as the AN/PEQ-5 Carbine Visible Laser (CVL) may be used.

2.9.3 Maintaining Proper Cant. Maintaining proper cant of the weapon / DNS is required for accurate firing of the Grenade Launcher. The DNS incorporates several features to ensure proper cant is maintained.

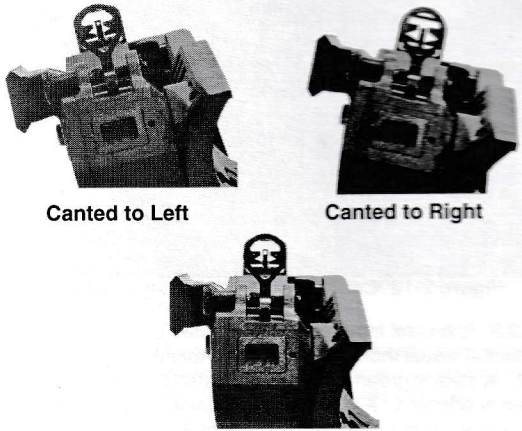

Figure 2-11 Maintaining Proper Cant

2.9.3.1 Cant Status Bar. The LCD displays a solid Status Bar above the target range setting. When the weapon is properly oriented (within 3 degrees of vertical), the Status Bar will appear steady. If the weapon is canted, the Status Bar will blink until proper orientation is achieved.

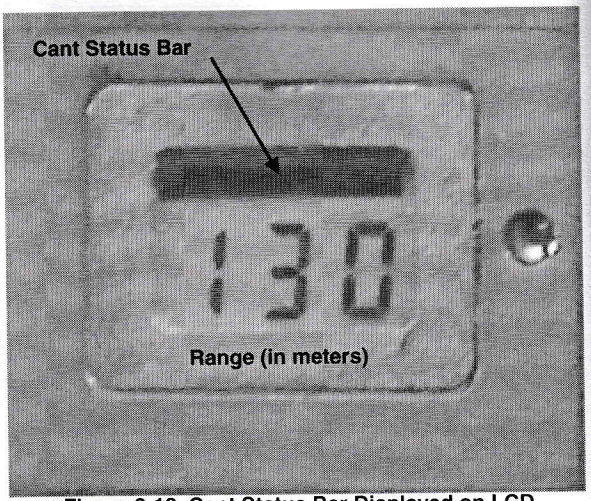

Figure 2-12 Cant Status Bar Displayed on LCD

2.9.3.2 Anti-Cant Indicator. A bi-colored LED provides an additional visual indicator to assist in maintaining proper cant. A steady green emission indicates that the weapon is properly oriented. A flashing red emission indicates that the weapon is canted. For visual security, the LED operates at full intensity in DAYMODE and at reduced intensity in any of the laser modes (i.e., AIM LO, DUAL LO, DUAL HI).

2.9.3.3 IR Aim Laser. To provide the operator with cant information during operations conducted with night vision devices, the IR Aim Laser will pulsate when the weapon is canted and will become steady when the weapon is properly oriented.

2.10 OPERATIONAL SUMMARY

Table 2-5 provides an operational summary of the DNS that is designed to serve as a quick reference guide for the operator.

Table 2-5 DNS Operational Summary

Mode Select Switch Position	Operational Summary
OFF	• Unit is OFF. • DNS can be used with Mechanical Range Scale, integral Iron Sights and/or auxiliary devices.
DAYMODE (dAY)	• LCD and all LEDs and backlights are functional but the IR lasers will not operate. • The Cant Status Bar (top of the LCD) will blink when the weapon is canted and will appear steady when the weapon is properly oriented. • The Anti-Cant Indicator (base of front sight post) will flash red when the weapon is canted and will appear steady green when the weapon is properly oriented. • The LCD will be backlit and the Mechanical Range Scale will be illuminated during range adjustment and will automatically shut off six seconds after the range has been set.

Mode Select Switch Position	Operational Summary
AIM LOW (AL)	• IR Aim Laser is selected at low power and will turn on when the Laser Activation Switch is pressed. The Laser ON LED (adjacent to the LCD) is illuminated when the DNS is emitting laser energy. • When the laser is activated, the Aim Laser will pulsate when the weapon is canted and will become steady when the weapon is properly oriented. • LCD displays range and cant information. • The Cant Status Bar (top of the LCD) will blink when the weapon is canted and will appear steady when the weapon is properly oriented. • The Anti-Cant Indicator (base of front sight post) will flash red when the weapon is canted and will appear steady green when the weapon is properly oriented. It operates at reduced intensity and will turn off when the Laser Activation Switch is pressed. • The LCD will be backlit and the Mechanical Range Scale will be illuminated during range adjustment and will automatically shut off six seconds after the range has been set.

Mode Select Switch Position	Operational Summary
DUAL LOW (dL)	• IR Aim Laser and IR Illuminator are selected at low power and will turn on when the Laser Activation Switch is pressed. The Laser ON LED (adjacent to the LCD) is illuminated when the DNS is emitting laser energy. • When the lasers are activated, the Aim Laser will pulsate when the weapon is canted and will become steady when the weapon is properly oriented. • LCD displays range and cant information. • The Cant Status Bar (top of the LCD) will blink when the weapon is canted and will appear steady when the weapon is properly oriented. • The Anti-Cant Indicator (base of front sight post) will flash red when the weapon is canted and will appear steady green when the weapon is properly oriented. It operates at reduced intensity and will turn off when the Laser Activation Switch is pressed. • The LCD will be backlit and the Mechanical Range Scale will be illuminated during range adjustment and will automatically shut off six seconds after the range has been set.

Mode Select Switch Position	Operational Summary
DUAL HIGH (dH)	• THE SAFETY BLOCK MUST BE REMOVED TO ACCESS THIS TACTICAL MODE. • IR Aim Laser and IR Illuminator are selected at high power and will turn on when the Laser Activation Switch is pressed. The Laser ON LED (adjacent to the LCD) is illuminated when the DNS is emitting laser energy. • When the lasers are activated, the Aim Laser will pulsate when the weapon is canted and will become steady when the weapon is properly oriented. • LCD displays range and cant information. • The Cant Status Bar (top of the LCD) will blink when the weapon is canted and will appear steady when the weapon is properly oriented. • The Anti-Cant Indicator (base of front sight post) will flash red when the weapon is canted and will appear steady green when the weapon is properly oriented. It operates at reduced intensity and will turn off when the Laser Activation Switch is pressed. • The LCD will be backlit and the Mechanical Range Scale will be illuminated during range adjustment and will automatically shut off six seconds after the range has been set.

CHAPTER 3
MAINTENANCE

SECTION I
OPERATOR MAINTENANCE

3.1 INSPECTION

The operator should inspect the Day / Night Sight (DNS) before each use. The DNS should also be inspected after it has been in extreme conditions, such as prolonged exposure to intense temperatures.

NOTE

Each of the three tritium lights on the DNS will be checked for illumination or evidence of damage prior to removal from the storage area, twice during each exercise, and immediately prior to placement back into the storage area.

- The battery should be inspected for bulging. If a battery shows signs of bulging, remove and dispose of properly. Replace battery as required per paragraph 2.2.2.

- The Battery Compartment should be inspected for dirt, dust, or corrosion. Clean as required per paragraph 3.2.1.

- The Battery Cap O-ring should be inspected to ensure it is free of sand or dirt particles and is not dried out. Maintain as required per paragraph 3.2.2. If the Battery Cap O-ring becomes cut, nicked, or dried out, the Battery Cap should be replaced per paragraph 3.4.1.

- The Liquid Crystal Display (LCD) and laser apertures should be inspected for dirt, dust, and grime. Clean as required per paragraph 3.2.3.
- The integral Iron Sights should be inspected to ensure proper operation of the sight adjustment knobs. Oil as required per paragraph 3.2.4.
- The DNS housing should be inspected for any signs of damage including cracks, missing parts, and any other visible defects. Clean as required per paragraph 3.2.5.

3.2 MAINTENANCE PROCEDURES

3.2.1 Battery Compartment. Clean the Battery Compartment by flushing with water and wiping with a soft cloth or cotton swab.

3.2.2 Battery Cap / O-Ring. Thoroughly clean the Battery Cap and O-ring by flushing with water and wiping with a cotton swab. Periodically lubricate the O-ring with fluorinated grease.

3.2.3 LCD / Laser Apertures. Clean the LCD and laser apertures using a soft cloth or cotton swab with water, alcohol, or general purpose window cleaner.

3.2.4 Iron Sights. Oil front and rear sight using standard, medium grade weapons oil, clean lubrication protector, or equivalent.

WARNING

Keep oil away from the tritium inserts!

3.2.5 DNS Housing. Clean the DNS housing by rinsing with water and wiping with a soft cloth.

3.3 OPERATOR TROUBLESHOOTING PROCEDURES

Table 3-1 lists basic malfunctions that may occur with the DNS. When troubleshooting a particular malfunction, perform the tests, inspections, and corrective actions in the order in which they appear.

If an equipment malfunction occurs that is not listed, or the tests, inspections, and corrective actions do not resolve the problem, notify unit supervisor.

Table 3-1 Operator Troubleshooting

Malfunction	Test or Inspection	Corrective Action
Infrared (IR) Aim or Illumination Laser beams appear weak or do not operate	a. Check battery.	a. Replace battery per paragraph 2.2.2.
	b. Verify Mode Select Switch is not in OFF or DAYMODE position.	b. Turn Mode Select Switch to AIM LO. Activate per paragraph 2.8.2.
	c. Ensure laser apertures are not obscured by dirt, dust, or grime.	c. Clean laser apertures per paragraph 3.2.3.
LCD does not operate	a. Check battery.	a. Replace battery per paragraph 2.2.2.
	b. Verify Mode Select Switch is not in OFF position.	b. Turn Mode Select Switch to any position other than OFF.
LCD is not backlit illuminated	a. Verify DNS is not in Sleep Mode.	a. Rotate Range Adjustment Knob.
DNS cannot be zeroed to the weapon	a. Ensure proper mounting procedures are being followed.	a. Review mounting procedures in paragraph 2.3.
	b. Ensure proper boresighting / zeroing procedures are being followed.	b. Review boresighting / zeroing procedures in section 2.7.

SECTION II
UNIT MAINTENANCE

3.4 UNIT MAINTENANCE PROCEDURES

In addition to Operator Maintenance Procedures, unit personnel may perform the following maintenance / repair actions to the Day / Night Sight (DNS). If additional service / repairs are needed to resolve a malfunction or to bring the DNS into "Mission Capable" status, notify unit supervisor.

3.4.1 Replace Battery Cap.

a. Unscrew Battery Cap.
b. Remove Retaining Strap from Battery Cap by stretching the small end of the Retaining Strap over the Battery Cap stud.
c. Screw on replacement Battery Cap and reinstall Retaining Strap.

3.4.2 Replace Battery Cap Retaining Strap.

a. Unscrew Battery Cap.
b. Stretch the small end of the Retaining Strap over the Battery Cap stud.
c. Stretch the large end of the Retaining Strap over the Battery Compartment threads.
d. Install replacement Retaining Strap.

3.4.3 Replace Safety Block.

a. Remove damaged Safety Block per paragraph 2.8.1.1.
b. Install replacement Safety Block per paragraph 2.8.1.1.

3.4.4 Replace MIL-STD-1913 Rail Assembly.

a. Remove damaged Rail Assembly per paragraph 2.4.1.
b. Install replacement Rail Assembly per paragraph 2.4.1.

3.4.5 Replace Rear Iron Sight. Refer to Figure 3-1 and Table 3-2 before performing this maintenance action.

a. Remove Retaining Ring followed by Flat Washer and Nylatron® Washer from Rear Sight Screw.
b. Unscrew Rear Sight Screw from housing by rotating counterclockwise.
c. Remove Rear Sight and Rear Sight Spring from housing.
d. Clean all parts as required.
e. Install the Rear Sight Spring into the cutout in the housing. Place the Rear Sight on top of the Rear Sight Spring. Lubricate the threads of the Rear Sight Screw with fluorinated grease and thread into housing from the left when viewed from the rear.
f. Place Nylatron® Washer followed by Flat Washer over the threaded end of the Rear Sight Screw.
g. Install the Retaining Ring into the groove at the end of the Rear Sight Screw.
h. Rotate Rear Sight Screw to center the Rear Sight and verify smooth operation. Fold Rear Sight down to stowed position.

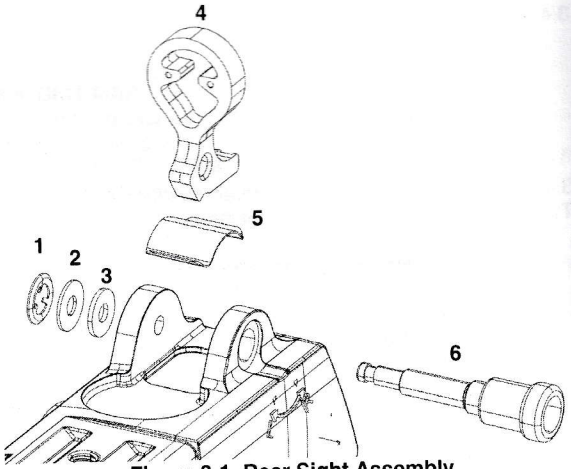

Figure 3-1 Rear Sight Assembly

Table 3-2 Rear Sight Assembly Spare Parts

Item	Description
1	Retaining Ring
2	Flat Washer
3	Nylatron® Washer
4	Rear Sight
5	Rear Sight Spring
6	Rear Sight Screw

APPENDIX A
COMPONENTS OF THE END ITEM

A.1 Scope

This Appendix lists integral components of the Day / Night Sight (DNS) to help inventory items for safe and efficient operation. These items must accompany the DNS whenever it is transferred or turned in.

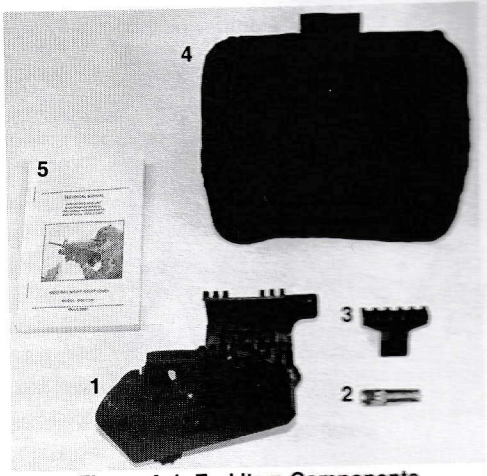

Figure A-1 End Item Components

Table A-1 End Item Components

Item	Description	Part No.
1	DNS Assembly	DNS-001
2	AA Lithium Battery	EVRL91V9
3	MIL-STD-1913 Mounting Rail	DNS-360
4	Textile Carrying Case	DNS-125
5	Operator and Unit Maintenance Manual	DNS-TM-ARMY

APPENDIX B
REPAIR PARTS LIST

B.1 Scope

This Appendix lists spares and repair parts authorized and required for performance of Unit Maintenance on the Day / Night Sight (DNS).

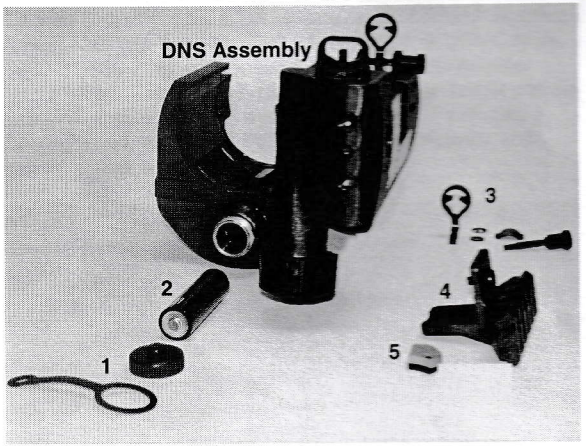

Figure B-1 Repair Items

Table B-1 DNS Repair Parts List

Item	Description	Part No.
1	Battery Cap Assembly	DNS-330
2	AA Lithium Battery OR	EVRL91V9
	AA Alkaline Battery	M30-044
3	Rear Iron Sight Assy (with hardware)	DNS-320
4	MIL-STD-1913 Mounting Rail Assembly (Includes Mounting Hardware)	DNS-360
5	Safety Block	ITP-022

APPENDIX C
ADDITIONAL ITEMS LIST

C.1 Scope

This Appendix lists additional items authorized for support of the Day / Night Sight (DNS).

C.2 Laser Borelight System (LBS)

To aid in boresighting, a US Military Laser Borelight System (LBS), AN/PEM-1, NSN: 5860-01-471-2091 or USMC NSN: 5860-01-466-2087 with optional 40mm Mandrel Adapter (Insight Part Number LBS-131), and Boresight Target can be used. The standard LBS system shown below contains a Borelight unit, three mandrels, bore-sighting targets, soft carrying case, and 10-meter string.

Figure C-1 Standard Laser Borelight Kit

The available 40mm Mandrel Adapter (Insight P/N LBS-135-A1) for use in zeroing the DNS to the M203 barrel is shown below.

NOTE

A special offset target is required for use with the DNS when used in conjunction with the Laser Borelight System (LBS) Target, Part Number LBS-023.

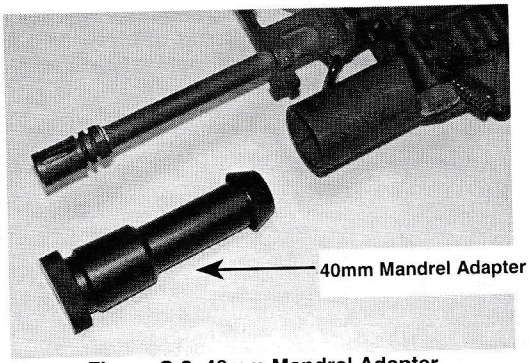

Figure C-2 40mm Mandrel Adapter

INDEX

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