Operator's and Maintainer's Manual for the

WILCOX®

Fusion System™

Power Management and Control System

PN: 65900G08
***CAGEC:* 004F1**

WARNING

Wilcox strongly recommends reviewing the operational and maintenance procedures outlined in this manual prior to operating the device. Customers may obtain a copy of the Manual by contacting Wilcox Customer Service at 603-431-1331.

This product contains technical data as defined in the International Traffic in Arms Regulations ITAR 22 CRF 120.10. Export of this material is restricted by the Arms Export Control Act 22 U.S.C. 2751 et seq. and may not be exported to foreign persons without prior written approval from the U.S. Department of State.

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PREFACE

1. SCOPE. The purpose of this Operator's Manual is to assist the operator in the operation and maintenance of the *Fusion System*.

2. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATION. Wilcox requests that all errors, omissions, and discrepancies be forwarded to the Program Management Department, Wilcox Industries, Corp., One Wilcox Way, Newington, NH 03801. To submit feedback by e-mail, visit *www.wilcoxind.com*.

OPERATOR'S MANUAL TO SOFTWARE VERSION CROSS-REFERENCE

When utilizing any version of the *Fusion System* software, it is critical to reference the correct version of the Operator's Manual for the software you are using. The following table provides a cross-reference for tracking Operator's Manual release revision numbers to software revision releases.

Manual Rev.	Covers Software Rev.
A-1	1.0

SAFETY SUMMARY

WARNING and CAUTION statements have been strategically placed throughout the text to indicate operating or maintenance procedures, practices, or conditions considered essential to the protection of personnel (WARNING) or equipment and property (CAUTION). NOTES emphasize necessary and important data. CAUTIONS and NOTES appear in the text as applicable. Definitions for WARNINGS, CAUTIONS and NOTES are as follows:

WARNING

Highlights an operation or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in injury to or death of personnel.

CAUTION

Highlights an operating or maintenance procedure, practice, condition, statement, etc., 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.

WARNING

Laser Safety

- ***The Fusion System features Class 3B and 3R laser products which emit visible and infrared laser radiation from the front end of the device. Both visible and infrared laser light can be dangerous if misused. Laser light reflected or refracted off mirrored surfaces may be equally harmful.***
  - ***Never stare into a laser.***
  - ***Never point lasers at someone's eyes.***
  - ***Do not aim lasers at personnel or mirrored surfaces.***
  - ***Do not look at a laser through telescopes, binoculars, scopes, image intensifiers, etc.***
  - ***Direct eye exposure to a laser may cause permanent eye damage, including blindness. Special glasses for filtering laser light must be used if protection from laser radiation is required.***
- ***Visible and infrared laser beams are enhanced by smoke, fog and rain, making them more easily detectable by onlookers or observers. When used in these environments, prolonged activation of the lasers should be avoided.***
- ***Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.***

WARNING

Usage Safety

- *Wilcox strongly recommends reviewing the operational and maintenance procedures outlined in this manual prior to operating the device.*
- *When mounting the Fusion System to a weapon, it is necessary to properly boresight the Fusion System to the weapon to ensure aiming accuracy.*
- *When handling a primary weapon fitted with a Fusion System, ALWAYS keep the muzzle pointed down range and clear of all personnel.*
- *In the event of a detected built-in test failure, contact Wilcox Industries for repair.*
- *Ensure that the weapon is CLEAR and on SAFE before mounting or dismounting the Fusion System.*
- *Do not fire the weapon if the Fusion System displays a left or right cant indicator, as this is an indication that the Fusion System is canted left or right. Firing the weapon when the Fusion System is severely canted can cause unintended damage to surrounding targets and may result in injury or death.*

WARNING

Battery Safety

- *Refer to battery manufacturer's instructions for safety warnings.*
- *If the battery compartment becomes hot to touch and you hear a hissing sound (i.e., battery venting) or smell irritating sulfur dioxide gas, IMMEDIATELY turn off the equipment. Wait until battery has cooled before removing it, then replace with a fresh battery.*
- *DO NOT use water to extinguish lithium battery fire.*

CAUTION

Battery Safety

- *Do not store the Fusion System with battery installed.*
- *When opening or closing the battery compartment, ensure that moisture is not allowed into the compartment.*
- *It is recommended that the battery be replaced and that activation procedures for the Fusion System be conducted prior to operation to ensure proper operation prior to use (see Section 4.2).*

Laser Safety

- *It is recommended that the Visible Laser be used for boresighting the Fusion System to the target.*

NOTE

Usage Safety

- ***This Operator's and Maintainer's Manual should always accompany the product and be transferred with it upon change of ownership.***
- ***Ensure that the Mode Selection Knob is set to the 'OFF" position when not in use to avoid inadvertent battery drain.***
- ***The Fusion System features a cant indicator that faces the operator when in a firing position. The position of the cant indicator allows the operator to focus on the intended target downrange during operation. The cant indicator produces measurable increases in hit probability when properly used.***
- ***A Laser Boresight Kit is required for optimal zeroing of the weapon.***
- ***If the Lens Cover is not removed before the Fusion System is activated and the unit is configured for automatic display brightness and the display may be too dim to read.***

NOTE

Maintenance Safety

- ***Do not use harsh abrasives or chemicals such as acetone to clean the Fusion System. Any questions about appropriate chemicals should be directed to Wilcox Customer Service.***
- ***The Fusion System contains no serviceable internal parts. Adjustments or attempted repairs to the Fusion System other than those expressly described in this Operator's Manual will void the warranty.***

NOTE

Battery Safety

- ***Periodically inspect the Battery Compartment o-ring. If a Battery Compartment Cap o-ring becomes cut, nicked or torn, notify unit armorer.***

S1 Laser Radiation Output Parameters

Table S1-1 *Fusion System* Laser Safety Parameters

Fusion Worst Case Laser Safety Calculations					
Laser	**Class**	**Wavelength (nm)**	**Divergence (mrad)**	**Power**	**NOHD (m)**
VIS Aiming	**3R**	635 +/- 10	0.35	20 mW	88
IR Aiming	**3R**	850 +/- 10	0.4	0.7 mW	20
	3B			32.5 mW	164
IR Illuminator	**3R**	840 +/- 10	27	3.5 mW	< 1
	3B		27	36 mW	2.5
VIS Illuminator (V1 Vampire)	**NA**	White Light		5.0 Lumen	
	NA			250 Lumen	
IR Illuminator (V1 Vampire)	**NA**	860		5.0 mW	
	NA			100 mW	

SECTION 1

OVERVIEW

1.1 GENERAL SAFETY WARNINGS

The *Fusion System* should not be used by anyone unfamiliar with its operation.

This manual contains specific operating and maintenance instructions which the operator should become familiar with before actual field usage.

The Safety Warnings in this Operator's Manual are intended to point out the dangers that are common in handling this type of equipment. **Failure to observe any of these warnings may result in serious physical injury, blindness, or death.** You must familiarize yourself with the entire contents of this Operator's Manual before using the *Fusion System.* All general text, WARNINGS, CAUTIONS and NOTES should be strictly followed.

This Operator's Manual is intended to provide you with information relevant to the operation of the *Fusion System* and is not a substitute for the information contained in the

Operator's Manual issued by the manufacturer of the primary weapon to which it is attached. It is the responsibility of the operator to read and thoroughly understand the handling and operating procedures for both the *Fusion System* and the primary weapon to which it is installed.

Laser Radiation Danger

Lasers built into the *Fusion System* emit visible and/or infrared laser radiation from the front end of the device (see Sections S1 and 2.6 for technical data). Both visible and infrared laser light can be dangerous if misused. **Direct eye exposure may cause permanent eye damage, including blindness.** Laser light reflected or refracted off mirrored surfaces may be equally harmful.

- Never stare into a laser beam
- Never point a laser beam at someone's eyes.
- Do not point a laser beam at mirrored surfaces.
- Do not look at a laser beam through telescopes, binoculars, scopes, etc.

First Aid

Administer first aid in accordance with local procedures.

SECTION 2

INTRODUCTION

2.1 PRODUCT DESCRIPTION

The Wilcox *Fusion System* is a power management and control system with multiple devices that provides a nighttime fighting capability in visible and covert conditions. The system mounts to a primary weapon by means of a barrel surround fitting and an attachment to the 1200 position on the MIL-STD-1913 rail.

Several features integrated with the system include:

- A single integrated **Battery Module** which houses two batteries. A power switch allows the operator to toggle the system power between the two compartments, allowing for use of one battery at a time while preserving the second for later use. To deploy the second battery, the operator simply flips the switch.
- A **Target Illuminator** provides visual and IR target illumination at night. It can be operated in visible white hot mode for use with the naked eye or in the IR mode when used with NVGs.

- An **Optic Sight** allows for operation in close quarter battle and over the beach conditions and to readily change trajectories to preset trajectory settings with the flip of a button. The Sight features a Red Dot Sight for targeting. It features an OLED display screen that varies in brightness by means of a built-in light sensor or through manual adjustment by the operator.
- A **Control Pad** located on the top powered rail, provides for power management of all devices on the system. Its small design makes it easily replaceable should the need arise.
- A powered **Rail Assembly** provides nine electrical connections on the left and nine on the right, for a total of 18 slots, allowing for up to 8 possible mounting positions for the Control Pad. This allows for customization of the control position according to the operator's preference.

The system also features a **3X Multiplier** and a **Flip Mount** for mounting the 3X Multiplier to the primary weapon. The Flip Mount provides flip control to allow the operator to easily flip between operational and stowed positions when changing from OTB to CQB targeting.

2.2 LIST OF *FUSION SYSTEM* MAJOR COMPONENTS

1. Rail Assembly
2. 3X Multiplier
3. Flip Mount

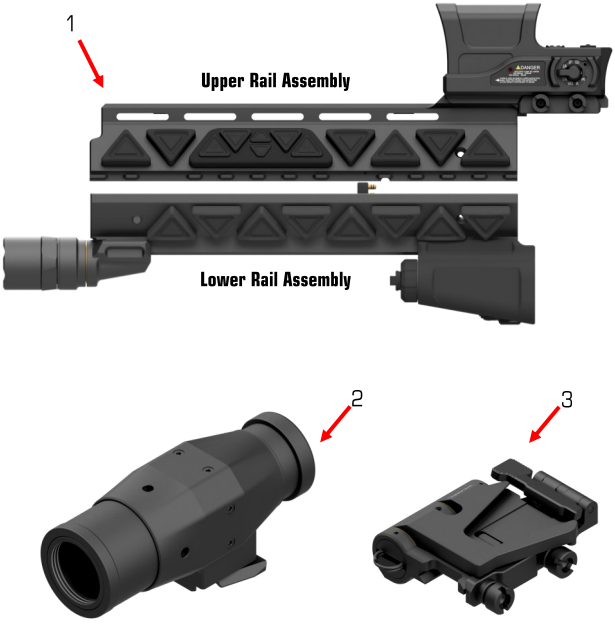


Figure 2.2–1 Major Component Identification

2.3 LIST OF *FUSION SYSTEM* SUB-COMPONENTS AND FEATURES

U-1. *Fusion System* Optic Sight
U-2. Battery Compartment
U-3. High Power VIS/IR Illuminator Port
U-4. Control Switch
U-5. Repositionable Control Pad
U-6. Flashlight Buttons
U-7. "Activate" Buttons
U-8. "+" Button
U-9. "-" Button
U-10. Battery Orientation Markings
U-11. Power Switch

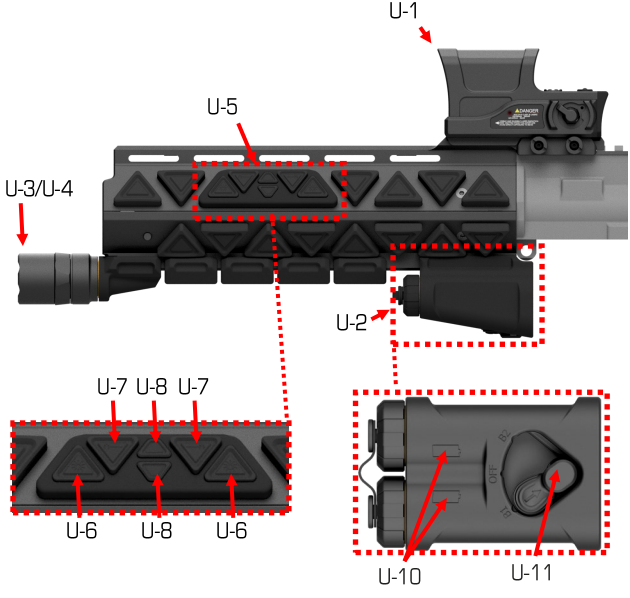
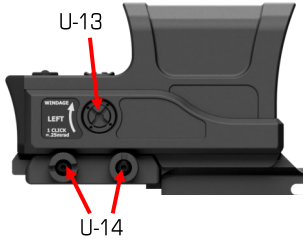


Figure 2.3–1 Sub-Component Identification - Rail Assembly *(1 of 3)*

U-12. Elevation Adjustment Knob
U-13. Windage Adjustment Knob
U-14. Thumb Screws (2)
U-15. "-" Button
U-16. Activate Button
U-17. "+" Button
U-18. Mode Selection Knob
U-19. Trajectory Adjustment Knob
U-20. OTB/CQB Switch
U-21. IR Aiming Laser Port
U-22 Visible Pointer Port
U-23. IR Illuminator Port
U-24. Iron Sights
U-25. Lock-Out Screw
U-26. Laser Warning Label



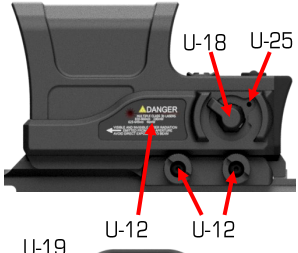


Figure 2.3–2 Sub-Component Identification - Rail Assembly (2 of 3)

U-27. Red Dot Sight
U-28. Display
U-29. Cant Indicators (Not Shown)
U-30. Battery Indicator (Not Shown)
U-31. Mode Indicator (Not Shown)

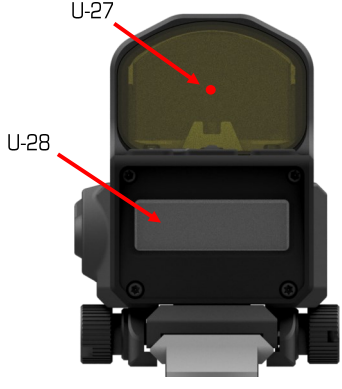


Figure 2.3–3 Sub-Component Identification - Rail Assembly (3 of 3)

U-43. Optic Release Lever
U-44. Lanyard Ring
U-32. Thumb Screws

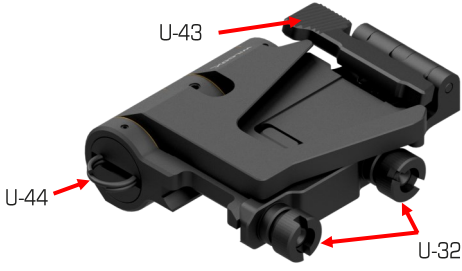


Figure 2.3–4 Sub-Component Identification - Flip Mount

Figure 2.3–5 Sub-Component Identification - *3X Multiplier*

A-1. Boresight Chart (Not Shown)
A-2. *Fusion System* Operator's Manual
A-3. *Fusion System* Quick Reference
A-4. Cleaning Brush
A-5. Cleaning Cloth
A-6. T-10 Torx Wrench (Not Shown)
A-7. Batteries (Set of 2)

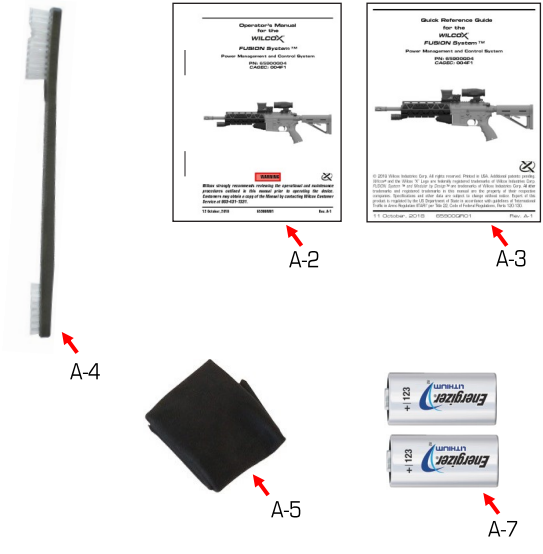


Figure 2.3–6 Sub-Component Identification - Ancillary Items

2.4 DESCRIPTION OF *FUSION SYSTEM* MAJOR COMPONENTS

1. *Fusion System* Rail Assembly

The Fusion Rail Assembly is a two-part assembly comprised of upper and lower rail portions. The Upper Rail Assembly attaches to the Lower Rail Assembly when mounted to the weapon to form the Upper Receiver.

When connected, the two assemblies function as one powered assembly for managing a number of integrated accessories, including: a Repositionable Control Pad, an Optic System and an Illuminator. An integrated battery pack powers the system and houses two (2) CR123 batteries. To preserve battery life, only one battery is used at a time, while the second is saved for use as a backup. A switch located on the battery box allows the operator to quickly switch between batteries.

2. 3X Multiplier

One 3X Multiplier is provided with the *Fusion System* for better viewing of targets at greater distances. The 3X Multiplier attaches to the Flip Mount as described later in this manual, which allows the multiplier to be flipped out of the line of sight when not in use.

3. Flip Mount

One Flip Mount is provided for mounting to the 1200 position of the primary weapon. It provides the mounting interface and the height needed for mounting the 3X Multiplier. The Flip Mount allows the operator to easily flip the multiplier into the line of view when desired for distance engagements (OTB), or out of the way when it is not desired for close quarters battle (CQB).

2.5 DESCRIPTION OF *FUSION SYSTEM* SUB-COMPONENTS

U-1. *Optic Sight*

The integrated Optic Sight is a red dot sight that provides the sighting and targeting capability for the *Fusion System*. It features an IR Pointer Laser and IR Flood Illuminator that provide invisible targeting at night, and a Red Dot Sight that accommodates daytime target acquisition. An OLED display indicates system status and operation and allows access the the built-in menu, which allows the operator to control system configuration options. A control pad located on the optic sight allow for control of laser and menu functions. These functions are mimicked on the Control Pad, as described later in this section.

U-2. Battery Compartment

Two Battery compartments located in the *Fusion* Power Module each house one CR123 battery. A threaded Battery Compartment Cap features an o-ring to prevent debris and moisture entry. Refer to Section 4.2 for battery installation instructions.

U-3. VIS/IR Illuminator Port

The *Fusion System* Flashlight features two illumination modes. Refer to Sections S1 and 2.6 for specifications.

U-4. Control Switch

A Control Switch on the Flashlight allows for selection between the three modes of operation. Changing the operation of the head is performed simply by pulling outward on the bezel and rotating

it between one of three switch positions: WH (White Hot - for use in the visible light spectrum), Off, and IR (Infrared - for use with NVGs).

U-5. Repositionable Control Pad

A Repositionable Control Pad attaches to three segments of the powered rail, allowing for positioning on three locations of the rail. It allows the operator to perform the same functions performed on the Optic Sight, to activate and deactivate the flashlight and the currently active laser (determined by mode selection)

U-6. Flashlight Buttons

The outer buttons on either side of the Control Pad activate and deactivate the flashlight with a single press of a button (see Table 2.5-2 and Figure 2.5.1 for individual mode operation).

U-7 / U-8 / U-9. Activation / + / - Buttons

The +, - and Activate Buttons on the Control Pad are multipurpose buttons that operate differently depending on the selected mode of operation. These buttons share identical functionality with the buttons of the Optic Sight. See Table 2.5-2 and Figure 2.5.1 for individual mode operation.

U-10. Battery Orientation Marking

The Battery Orientation Marking indicates the proper direction for installing batteries.

U-11. Power Selection Switch

The Power Selection Switch on the *Fusion* Power Module

Table 2.5-1. Button Operations (by Mode)

	OPERATION			
	Control Pad & Optic Sight Pad "-" Buttons	**Control Pad & Optic Sight Pad Activate Buttons**	**Control Pad & Optic Sight Pad "+" Buttons**	**Control Pad Flashlight Buttons Only**
Laser Modes: **IA IF ID VA VD**	Decreases laser power in DH mode only. *	Turns Operational Mode Laser On/Off *	Increases laser power in DH mode only. *	Activates Flashlight in Mode Indicated on the Bezel *
Red Dot Mode: **R**	Dims the red dot. *	Turns the red dot on and off. *	Brightens the red dot. *	Activates Flashlight in Mode Indicated on the Bezel *
Function Menu: **M**	**Single Press:** Scroll up through available options.	**Single Press:** Select currently highlighted option	**Single Press:** Scroll down through available options.	Activates Flashlight in Mode Indicated on the Bezel *

* Single Press temporarily activates until the button is released, while rapid double press activates until double pressed once again to turn off.

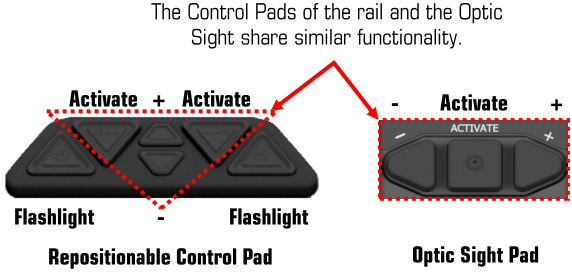


Figure 2.5–1 Control Pad Functionality

features an three switch positions. When in the "OFF" position, the system is powered off. When in the "B1" position, the system uses battery 1 and preserves battery 2 for backup use. When in "B2" position, the system uses battery 2 and preserves battery 1.

U-12. Elevation Adjustment Knob

An Elevation Adjustment Knob allows for easy elevation adjustment when boresighting or Zeroing the *Fusion System* to the weapon and maintains its setting until reset by the operator. All Lasers and the Red Dot Sight move together when adjusting elevation. For information on adjusting Elevation, refer to the Boresighting Procedure in Section 3.4.

U-13. Windage Adjustment Knob

A Windage Adjustment Knob allows for easy windage adjustment when boresighting or Zeroing the *Fusion System* to the weapon and maintains its setting until reset by the operator. All Lasers and the Red Dot Sight move together when adjusting Windage. For information on adjusting Windage, refer to the Boresighting Procedure in Section 3.4.

U-14. Thumb Screws

When the Rail Mount Assembly is attached to the *Fusion System*, a Thumb Screw allows for hand adjustment of the rail mount to eliminate the use of tools while mounting.

U-15, U-16, U-17. + / Activate / - Buttons

The +, - and Activate Buttons on the Control Pad are multipurpose buttons that operate differently depending on the

selected mode of operation. These buttons share identical functionality with five of the buttons of the Upper Rail Control Pad. See Table 2.5-2 and Figure 2.5.1 for individual mode operation.

U-18. Mode Selection Knob

A Mode Selection Knob allows the Operator to select up to six functional modes. When the Mode Selection Knob is set to a selected mode of operation, the Display indicates the selected operational mode (see Table 2.5-1).

U-19. Trajectory Adjustment Knob

The Trajectory Adjustment Knob allows the operator to adjust the distance between the OTB and CQB when switching between the OTB to CQB modes.

U-20. OTB/CQB Switch

The OTB/CQB Switch changes the trajectory of the *Fusion System* Optic Sight between two pre-set trajectories by simply switching from one to the other. This allows the operator to change operational modes. Boresight of the two trajectories is performed simultaneously when boresighting the system as described in Section 3.4.

U-21. IR Aiming Laser Port

The *Fusion System* Optic Sight features a 850nm Infrared Pointer that can be used as a covert target designator for Operators while wearing NVGs. Refer to Sections 1.1 and 2.6 for laser specifications.

Cant is indicated when the IR Pointer blinks; when the pointer displays solid, the system is ready to fire.

U-22. Visible Pointer Port

The *Fusion System* Optic Sight features a 635nm Visible Red Pointer Laser that is used as a boresighting aid. Refer to Sections S1 and 2.6 for laser specifications.

U-23. IR Illuminator Port

The *Fusion System* Optic Sight features a 840nm Infrared Fixed Flood Laser that can be used as a covert target illuminator for operators while wearing NVGs. Refer to Sections S1 and 2.6 for laser specifications.

U-24. Iron Sights

The iron sights provide the operator with a backup aiming option.

U-25. Lock-Out Screw

A removable Lock-Out Screw prevents the Mode Selection Knob from rotating to the Dual High Power Laser (DH) mode when it is desired to prevent mode access.

R-26. Laser Warning Label

A warning label identifies the laser specifications and precautions for using the *Fusion System*.

Table 2.5-2. Mode and Menu Function Options Tree

KNOB POSITION	SUBMENU OPTION	MODE / FUNCTION DESCRIPTION
ID		Dual: IR Pointer and Illuminator High Power On, Off and Power Adjustment (Can be Locked Out using Blue Lockout Screw)
IF		IR Flood Low Power On, Off and Power Adjustment
IA		IR Aiming Low Power On and Off
OFF		*Fusion System* Power Off
VA		IR Flood Low Power On, Off and Power Adjustment
VD		Dual: Visible Pointer and Visible Illuminator Low Power On, Off and Power Adjustment
R		Red Dot Sight Operation On, Off and Brightness Adjustment
M		Function Menu
	Display Bright	*Adjust Display Brightness - Automatic or M 1 (Manual, Dimmest) through M 8 (Manual, Brightest) (Dft = Automatic)*
	Shot Count	*Display the lifetime and operational shot counters and reset the operational shot counter.*
	Boresight	*Activates the Visible Red Laser for Boresighting*
	Built In Test	*Run Built In Test*
	Set Defaults	*Reset Persistent Storage to Factory Default (Dft = Do Not Change)*
	About…	*Display the Software Version, Hardware Version and Battery Percentage*
HP		Dual : IR Pointer and Illuminator High Power On, Off and Power Adjustment (Can be Locked Out using Blue Lockout Screw)

U-27. Red Dot Sight

The *Fusion System* features a Red Dot Sight with an expanded reticle design which simplifies finding the reticle and can be used for scaling objects to approximate target distances. The outer ring of the reticle is 34 MOA, which when filled corresponds to a man at 200 meters. The sight features eight (8) available

brightness settings that can be manually adjusted by pressing the Left or Right Buttons while in Red Dot Sight (RD) mode.

U-28. Display

A 126 x 32 pixel OLED Display provides feedback indicators, status and operational information based on the mode selected. The screen can be set to one of 8 brightness settings through the system Function Menu.

U-29. Cant Indicators

Two Cant indicators are located on either side of the Display to warn the operator that the *Fusion System* is canted left or right and should be brought back to level. One indicator appears on the left of the display ("►►"), informing the operator that the system is canted too far left. The other appears on the right of the display ("◄◄"), informing the operator that the system is canted too far right. The arrows point to the direction the system needs to be rotated to return the *Fusion System* to a level orientation.

Additionally, cant indication is provided on the Red Dot Sight through LEDs on the sides of the Reflex Lens. The illuminated LED indicates the "low" side. Cant is also indicated when the IR Pointer blinks; when the pointer displays solid, the system is ready to fire. For more information refer to Section 3.5.

U-30. Battery Indicator

The Battery Indicator displays approximate battery life. For a more precise indication of battery life, use the "About" menu option, found in the "Function Menu".

U-31. Mode Indicator
The Mode Indicator displays the laser operation mode, as selected on the Mode Selection Knob.

When a Red Dot Sight or Laser Mode is active the Mode Indicator displays black letters with a white background. The text colors reverse when the laser or red dot are inactive.

U-43. Optic Release Lever
The Optic Release Lever allows for quick detachment of the mounted optic when depressed.

U-44. Lanyard Ring
A lanyard ring on the Flip Mount allows attachment of a lanyard loop or clip (not included) to prevent accidental discharge of devices.

A-1. Boresight Chart
The *Fusion System* kit features a Boresight Chart for use in boresighting the *Fusion System* in the left-hand, right-hand and standalone configurations.

A-2. *Fusion System* Operator's Manual
A printed copy of the Operator's Manual outlines the use and maintenance of the *Fusion System*.

A-3. *Fusion System* Quick Reference
A printed copy of the Quick Reference summarizes *Fusion System* operation and is designed to be taken out into the field. It is printed on water resistant paper to resist environmental degradation.

A-4. Cleaning Brush

A cleaning brush is provided for removing loose dirt and debris from the mechanical components of the *Fusion System.* DO NOT use the brush for cleaning the lenses as this may scratch the lens surface. For cleaning instructions, refer to Section 4.1.

A-5. Cleaning Cloth

A cleaning cloth is provided for removing any remaining residue from the lenses after they have been blown clean of dirt and dust. For cleaning instructions, refer to Section 4.1.

A-6. T-10 Torx Wrench

One T-10 Torx Wrench is provided for attaching and detaching the rail assemblies to the primary weapon.

A-7. Batteries (Set of 2)

A set of two (2) batteries is provided with the *Fusion System.*

2.6 TECHNICAL DATA

Table 2.6-1. *Fusion* System Technical Data

WEIGHT AND DIMENSIONS	
Operational Weight:	
Top Rail Assembly:	0.97 lb (15.52 oz)
Lower Rail Assembly:	1.16 lb (18.5 oz)
Flip Mount:	0.21 lb (3.36 oz)
3X Multiplier:	0.48 lb (7.68 oz)
TOTAL Weight:	**2.82 lb (45.12 oz)**
Operational Dimensions:	
Battery Pack:	1.98" W x 3.0" D x 1.84" H (5.03 cm W x 7.62 cm D x 4.67 cm H)
Flip Mount:	1.2" W x 2.44" D x .88" H (3.05cm W x 6.2cm D x 2.24cm H)
Flashlight:	1.14" W x 3.18" D x 1.3" H (2.9cm W x 8.08cm D x 3.30cm H)
Top Rail:	2.08" W x 11.14" D x 1.87" H (5.24cm W x 28.3cm D x 4.75cm H)
Lower Rail:	2.8" W x 9.19" D x 1.61" H (7.11cm W x 23.34cm D x 4.09cm H)
Optical System:	1.55" W x 4.34" D x 2.09" H (3.94 cm W x 11.02 cm D x 5.31 cm H)
BOSS System:	1.7" W x 3.79" D x 2.15" H (4.32 cm W x 9.63 cm D x 5.46 cm H)

LASER SPECIFICATIONS	
VIS Pointer	Class 3R Visible Red Laser, 20 mw Max Output 630-640nm Collimated to <.8 mrad
IR Pointer LO	Class 3R Infrared Laser, .6 +/- .1 mw Max Output 850 nm Collimated to <.8 mrad
IR Pointer HI	Class 3B Infrared Lasers, 30 +/- 2.5 mw Max Output 850 nm Collimated to <.8 mrad
IR Fixed Flood LO	Class 3R Infrared Laser, < 3.5 mw Max Output 840 nm Collimated to 30 mrad
IR Fixed Flood HI	Class IIIb Infrared Lasers, 30 +/- 6 mw Max Output 840 nm Collimated to 30 mrad
Visible Illuminator LO	5.0 Lumen Output
Visible Illuminator HI	250 Lumen Output
IR Illuminator LO	5.0 mw Output
IR Illuminator HI	100 mw
SHOT COUNTERS	
Lifetime Shot Counter	Provides count to 65,000 max count. Automatically resets to 0 when max is reached.
Manually Resettable Shot Counter	Provides count to 65,000 max count. Automatically resets to 0 when max is reached.
ADDITIONAL SPECIFICATIONS	
Power Source	Powered with One (1) CR123 Battery. Compartment stores 2 batteries, and features power switching to allow for reserve battery deployment with the flip of a switch.
Display	128 x 32 Pixel OLED
Color	Black
Water Resistance	Waterproof to 1 Meter for 30 Minutes

SECTION 3

OPERATION

3.1 MOUNTING AND DISMOUNTING THE *FUSION SYSTEM*

The *Fusion System* features top and bottom rail assemblies that affix to the primary weapon by means of a thumb rail, a sliding interlock and two screws to prevent disassembly of the lower rail.

A Control Pad mounts to one of many powered connections on the top rail. It is advisable to first check the position of the Control Pad and reposition, if desired, before mounting the assembly to the weapon. This will prevent the need for disassembly to perform this operation at a later time.

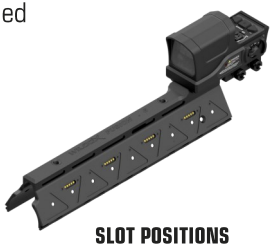
WARNING

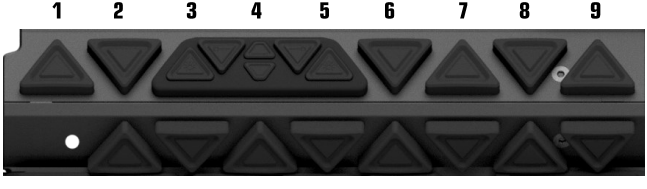
Ensure that the weapon is CLEAR and on SAFE before mounting or dismounting the Fusion System.

3.1.1 Repositioning the Control Pad

The *Fusion System* Rails feature multiple mounting slot positions for mounting the Control Pad according to the operator's preference. Each side of the rail features nine mounting slots, allowing for four separate mounting positions, for a total of 8. This allows for mounting for both left- and right-handed operators.

MOUNTING OPTIONS	POWERED POSITIONS
Position 1	Left Slots 1,2,3
Position 2*	**Left Slots 3,4,5**
Position 3	Left Slots 5,6,7
Position 4	Left Slots 7,8,9
Position 5	Right Slots 1,2,3
Position 6	Right Slots 3,4,5
Position 7	Right Slots 5,6,7
Position 8	Right Slots 7,8,9





*** Image above depicted with Control Pad Mounted to Left Side in Rail Positions 3, 4 and 5.**

Figure 3.1–1 Mounting Slot Positions

To Reposition the Control Pad:

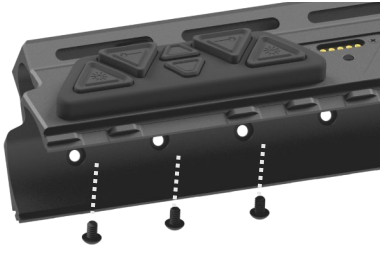
Step 1

REMOVE EACH PAD AND THE CONTROL PAD BY UNTREADING THE SCREW ON THE INSIDE OF THE UPPER RAIL, USINT THE T-10 TORX WRENCH PROVIDED.

NOTE THAT THREE PAD POSITIONS ARE REQUIRED FOR MOUNTING THE CONTROL PAD.

POSITION THE CONTROL PAD ON THE THREE-POSITION GROUPING, AND REATTACH THE THREE SCREWS FROM BEHIND, SECURING HAND TIGHT.

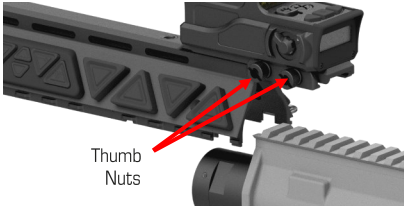
REATTACH REMAINING PADS TO ALL OPEN PORTS.



Step 2

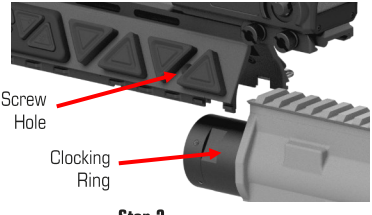
3.1.2 Mounting and Dismounting the *Rail Assembly*

To Mount the *Fusion System* Rail to the Primary Weapon:



FULLY LOOSEN ALL FOUR THUMB NUTS BY TURNING COUNTER CLOCKWISE (2 ON EACH SIDE).

Step 1



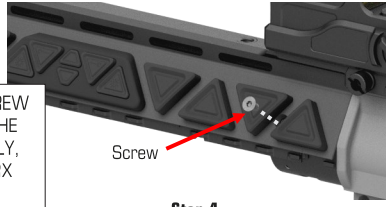
PLACE THE BACK OF THE UPPER RAIL ONTO THE CLOCKING RING, ALIGNING THE SCREW HOLES ON EITHER SIDE OF THE RAIL WITH THE MOUNTING HOLES IN THE RING.

Step 2

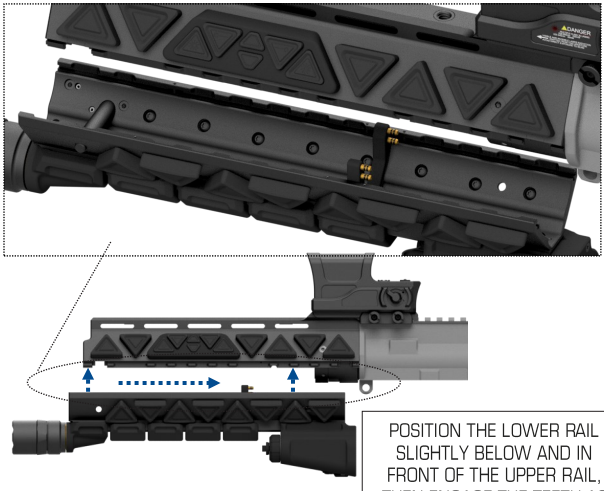
ENSURE THAT THE TOP RAIL IS FLUSH WITH THE WEAPON UPPER, THEN RESECURE ALL FOUR THUMB NUTS BY TURNING CW UNTIL HAND TIGHT.

Step 3

INSTALL ONE T-10 SCREW ON BOTH SIDES OF THE UPPER RAIL ASSEMBLY, USING THE T-10 TORX WRENCH PROVIDED.

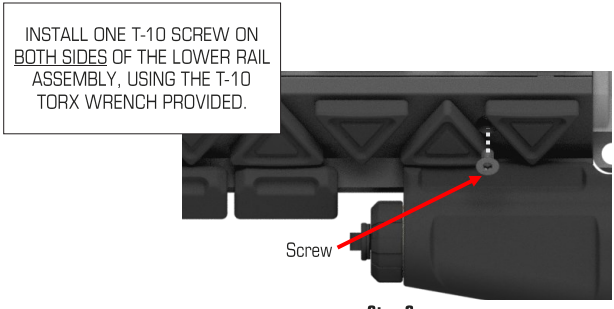


Step 4



POSITION THE LOWER RAIL SLIGHTLY BELOW AND IN FRONT OF THE UPPER RAIL, THEN ENGAGE THE TEETH AS SHOWN. PUSH UPWARD TO LOCK, THEN SLIDE BACKWARDS UNTIL IT STOPS.

Step 5



Step 6

Rail Mounting Complete

To Dismount the *Fusion System* from the Primary Weapon:

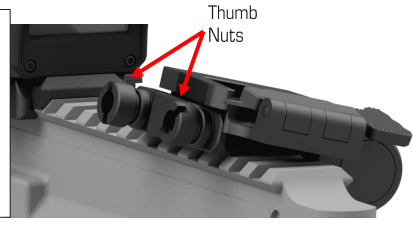
Follow mounting steps in reverse.

3.1.3 Mounting and Dismounting the *Flip Mount*

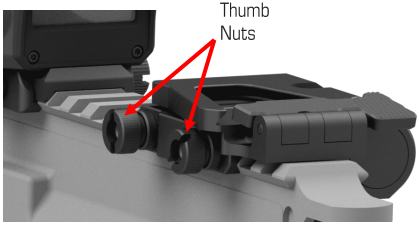
To Mount the *Flip Mount* to the Primary Weapon:

LOOSEN BOTH RAIL GRABBERS BY TURNING THE THUMB NUTS CCW.

POSITION THE MOUNT ON THE RAIL, ENSURING THAT THE RAIL GRABBERS ENGAGE.



Step 1



GENTLY PULL ON THE MOUNT TO ENSURE THAT IT IS SECURE.

Mounted

To Dismount the *Flip Mount* from the Primary Weapon:

Follow steps for mounting in reverse.

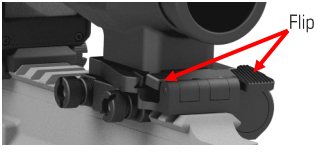
3.1.4 Mounting and Dismounting the *3X Multiplier*

To Mount the *3X Multiplier* to the Flip Mount:

INSERT THE DOVETAIL SHOE OF THE OPTIC INTO THE FLIP MOUNT, FRONT FIRST, THEN PRESS TO SECURE THE BACK END IN PLACE. THE RELEASE LEVER WILL POP UP TO SHOW THAT IT IS LOCKED.

Mounted

To Dismount the *3X Multiplier* from the Flip Mount:



WHILE HOLDING THE 3X MULTIPLIER WITH ONE HAND, PRESS DOWN ON THE RELEASE LEVER ON THE FLIP MOUNT FROM EITHER SIDE AND REMOVE THE OPTIC.

3.1.5 Flipping the 3X Multiplier

The Flip Mount uses a "Force to Overcome" mechanism to control flip. To flip, simply push to the side.

Optic In Line of Sight

Optic Out of Line of Sight

3.1.6 Changing Flashlight Operational Position

WARNING

Ensure that the weapon is CLEAR and on SAFE before changing the operational mode of the Flashlight.

MODE	OPERATION
WH	High Power White Hot Flashlight
OFF	Off
IR	High Power IR Flashlight

The Fusion Flashlight provides IR for nighttime operation with NVGs and white hot light illumination for nighttime visibility to the naked eye. Three operational modes are available: WH (white hot), OFF, and IR (Infrared). Mode selection is accomplished by pulling outward on the bezel while rotating to the selected mode.

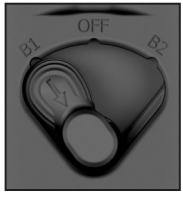
PULL OUTWARD ON THE BEZEL HEAD, AND ROTATE TO THE DESIRED OPERATIONAL POSITION, THEN RELEASE THE HEAD.

3.2 POWERING ON THE *FUSION SYSTEM*

To Power On the *Fusion System*:

Step 1.) Ensure that the *Fusion System* is securely mounted.

Step 2.) Ensure that the Battery Compartment is set to a battery operational position (B1 for Battery Compartment 1 or B2 for Battery Compartment 2).



Step 3.) Rotate the Mode Selection Knob to select the desired mode of operation. When the power is on in any mode, the Display illuminates. The active mode of the laser is displayed on the top of the screen.

If the display indicates that a low battery condition exists when powered on, replace the battery as described in Section 4.2.

3.3 CONFIGURING USER FUNCTION SETTINGS

The *Fusion System* provides a Function Menu that allows the operator to display and/or configure a variety of *Fusion System* attributes (see Table 3.3-1).

Table 3.3-1. Function Menu Options

FUNCTION	DESCRIPTION
Display Bright	*Adjust Display Brightness - Automatic or M 1 (Manual, Dimmest) through M 8 (Manual, Brightest) (Dft = Automatic)*
Boresight	*Activates the Visible Red Laser for Boresighting*
Built In Test	*Run Built In Test*
Set Defaults	*Reset Persistent Storage to Factory Default (Dft = Do Not Change)*
Update Mode	*Fusion System Update Mode Enable/Disable (Dft = Disable)*
Event Log	*Fusion System Log of System Events*
About...	*Display the Software Version, Hardware Version and Battery Percentage*

3.3.1 Setting Display Brightness

The "Display Bright" function allows the operator to set the display brightness to automatically dim and brighten in accordance with ambient light, or to a manually set value.

To Set Display Brightness:

Step 1.) Set the Mode Selection Knob to the M position. "Function Menu" appears on the display.

Step 2.) Press the Left or Right Button until "Display Bright" is highlighted, then press the Center Button to select.

Step 3.) Brightness settings are "Automatic" and "M 1" (dimmest manual setting) to "M 8" (brightest manual setting). Press the Left or Right Button until the desired option is highlighted. The default setting is "Automatic" which covers brightness levels from "M 3" to "M 8".

Step 4.) Press the Center Button to save the highlighted setting and return to the Function Menu.

Step 5.) If the display brightness is manually set and too dim to read, turn the Mode Selection Knob to the FNC position and press both left and right buttons at the same time for 5 seconds to return to automatic brightness control.

3.3.2 Resetting the Shot Counter

The Shot Counter setting in the Function Menu allows the operator to display the lifetime and operational counters and to reset the operational counter.

3.3.3 Performing a Built-In Test

The "Built In Test" function allows the operator to perform tests against the internal hardware to ensure proper operation. It consists of multiple test steps and a message is displayed at each step.

To Perform a Built-In Test:

Step 1.) Ensure that the *Fusion System* is fitted with fresh batteries.

Step 2.) Set Mode Selection Knob to the M position. "Function Menu" appears on the display.

Step 3.) Press the Left or Right Button until "Built In Test" is highlighted, then press the Center Button to select.

Step 4.) Press the Left or Right Button to step through the tests until the final screen is displayed. The final screen will display "Done Testing All Automatic Tests [Passed/Failed]". Note: if you continue to press the Left or Right button, testing will be repeated.

Step 5.) To exit the Built-In Test at any time, press the Center Button.

3.3.4 Setting Factory Defaults

The "Set Defaults" function allows the operator to restore *Fusion System* settings to those set at the factory.

To Restore Factory Defaults:

Step 1.) Set the Mode Selection Knob to the M position. "Function Menu" appears on the display.

Step 2.) Press the Left or Right Button until "Set Defaults" is highlighted, then press the Center Button to select.

Step 3.) Press the Left or Right button until either "Save Defaults" or "Do Not Change" is highlighted, as desired. Press the Center Button to select.

Step 4.) If "Save Defaults" was selected, rotate the Mode Selection Switch to the "OFF" position. The *Fusion System* is now reset and restoration is now complete.

3.3.5 Displaying the About Screen

The "About…" function allows the operator to display the software and hardware revisions along with the percentage of remaining battery life.

To Display the About Screen:

Step 1.) Set Mode Selection Knob to the M position. "Function Menu" appears on the display.

Step 2.) Press the Left or Right Button until "About…" is highlighted, then press the Center Button to select.

Step 3.) Press the Center Button to exit and return to the Function Menu.

3.4 BORESIGHT PROCEDURE (ESTABLISHING THEORETICAL ZERO WITH A LASER BORESIGHT KIT)

The laser boresight procedure uses a weapon borelight to determine the theoretical centerline of the primary weapon bore. The lasers and the Red Dot Sight are co-aligned at the factory and are all adjusted simultaneously. Whenever possible, follow with live fire to verify aiming accuracy.

WARNING

When mounting the Fusion System to a weapon, or to a new rail position, it is necessary to properly boresight the Fusion System to the weapon to ensure aiming accuracy.

CAUTION

The illuminating beam of the laser emitting from the Fusion System indicates the area of round impact, provided the boresighting procedures have been properly followed. Be aware of the direction in which the primary weapon is pointed, as well as the direction of the intended target, prior to firing a round.

NOTE

It is recommended that the Visible Laser be used for boresighting the Fusion System to the target.

Laser Boresight Procedure:

Step 1.) Ensure the weapon is stable and square to the ground. If possible, use a steady rest.

Step 2.) Enter the Boresight Mode on the Function Menu (see Section 3.3.4).

Step 3.) Rotate the *Fusion System* Sighting Module to the "0" position against the backstop.

Step 4.) Set the boresight chart level with the weapon, 10 meters from the *Fusion System* front end.

Step 5.) Install the Laser Boresight Kit for the primary weapon as instructed in its operational instructions.

Step 6.) Zero the weapon borelight in accordance with the instruction manual for the device.

Step 7.) Place the weapon borelight laser on the Bore Centerline of the chart.

Step 8.) Activate the laser on the *Fusion System* by pressing the Center Button while in the Boresight Function Menu option.

Step 9.) Adjust the *Fusion System* to the corresponding labeled position on the chart by rotating the Windage and Elevation Control Knobs. Use the cant indicators on the display while boresighting to ensure that the *Fusion System* is level.

3.5 OPERATING THE *FUSION SYSTEM*

To quickly fire the weapon, pivot the *Fusion System* Sighting Module to the range increment nearest the target range, align to the target using the *Fusion System* laser or the Red Dot Sight, verify that no cant indicators are displayed, and fire.

WARNING

Do not fire the weapon if the Fusion System displays a left or right cant indicator. Firing the weapon when the Fusion System is canted can cause unintended damage to surrounding targets and may result in injury or death.

CAUTION

It is recommended that the battery be replaced and that activation procedures for the Fusion System be conducted prior to operation to ensure proper operation prior to going on patrol (see Section 4.2).

Verify range setting after each shot as needed.

NOTE

If the Lens Cover is not removed before the Fusion System is activated and the unit is configured for automatic display brightness the display may be too dim to read.

After 10 minutes of inactivity, the Fusion System will go into sleep mode. The lasers will be deactivated when sleeping and will stay off after waking. Pressing any button, rotating the sight or moving any switch will awaken the Fusion System.

To Perform Daytime Engagement with the *Fusion System*:

Step 1.) Remove the Lens Cover.

Step 2.) Rotate the Mode Selection Knob to the Red Dot (RD) mode position.

Step 3.) Rotate the *Fusion System* Sighting Module to the desired target distance and acquire the target using the Red Dot Sight.

Step 4.) Verify that the weapon is level to the horizon (not canted) by checking for cant indication. If the *Fusion System* is not level, cant indicators will appear as displayed in Table 3.5-1. Tilt the weapon in the direction the cant indicator arrows point to correct cant.

Table 3.5-1 Cant Indicators

CANT INDICATION	CAUSE
►►	Unit Canted Left - **Do not Fire**
◄◄	Unit Canted Right - **Do not Fire**

Additionally, cant indicating LEDs on either side of the Red Dot Sight lens provide additional cant awareness by illuminating when canted. The illuminated LED indicates the "low" side. When cant is corrected, both LEDs will be off.

To minimize time to acquire the Red Dot Sight reticle, align the iron sights inside the Red Dot Sight as described in the following section "To Perform Engagements with the *Fusion System* Powered Off", and the reticle will come into view.

Step 5.) Fire the weapon.

To Perform Nighttime Engagement with the *Fusion System*:

Step 1.) Remove the Lens Cover.

Step 2.) Rotate the Mode Selection Knob to the appropriate nighttime operational mode position (IA, IF, ID, VA, or VD).

Ensure that display brightness is set appropriately to match conditions (see Section 3.3.1).

Step 3.) Press the Center Button to activate the laser(s).

WARNING

When adjusting Fusion System range, use caution to ensure that lasers are not fired in an unsafe manner.

Step 5.) Verify that the weapon is level to the horizon (not canted) by checking for cant indication. If the *Fusion System* is not level, cant indicators will appear as displayed in Table 3.5-1. Tilt the weapon in the direction the cant indicator arrows point to correct cant.

Additionally, cant indication is provided via blinking of the IR Aiming Laser in all nighttime operational modes, so the operator can engage without taking their eyes off of the target. The aiming laser will blink slowly when canted too far to the left and will blink fast when canted too far to the right. A clever way to remember this is "**Slow/Left, Tight/Right**".

Step 6.) Fire the weapon.

To Perform Engagements with the *Fusion System* Powered Off:

The *Fusion System* can still be used to accurately engage targets without being powered on through the use of the iron sights and the backup range indicator.

Step 1.) Remove the Lens Cover.

Step 2.) Look through the Red Dot Sight window and align the iron sights so that the front pin located on the optic window is centered between the two rear pins. Align all pins so that their heights match.

Step 3.) While maintaining the alignment of the Iron Sights, as described above, aim so that the top of the center pin is aimed at the target (see Figure 3.5-1).

Step 4.) Ensure that the weapon is as level to the horizon as you can estimate.

Step 5.) Fire the weapon.

Figure 3.5-1 Iron Sights (Rear View)

3.6 PERFORMING A SYSTEM TEST

The *Fusion System* is capable of operating in a diminished capacity in the event of a non-critical subsystem failure. The operator can command a test by accessing the Function Menu selection **"Built In Test"** and pressing the Center Button to enter into the test.

WARNING

In the event of a detected built-in test failure, contact Wilcox Industries for repair.

When executing the system test, follow instructions on the screen to cycle through the tests. The operator needs to visually verify proper operation of the Display. Display patterns are provided to detect pixel errors. Pass or fail is subjective, based on the operator's observations.

Following these tests, internal components are tested and pass/fail indication is given based on the results of the internal testing.

SECTION 4

MAINTENANCE

4.1 CARE OF THE *FUSION SYSTEM*

NOTE

Do not use harsh abrasives or chemicals such as acetone to clean the Fusion System. Any questions about appropriate chemicals should be directed to Wilcox Customer Service. Periodically inspect the Battery Compartment o-ring. If a Battery Compartment Cap o-ring becomes cut, nicked or torn, notify unit armorer.

Dismount the *Fusion System* from the primary weapon and inspect the unit for dirt, rust, and corrosion. If the display or lenses are broken or cloudy, notify unit armorer.

Ensure that the Battery Compartment Cap and o–ring are tightly sealed and that the area is free of sand and dirt particles. If a Battery Compartment Cap o–ring becomes cut, nicked or torn, notify unit armorer.

Dirt and other residue, like exposure to salt water, may impede the mechanical operation of the *Fusion System*. Flush with water while pivoting the Sighting Module to remove any debris. Blow any residual dirt or dust free from the lenses, then wipe with a clean Lens Cloth, provided. Do not use the brush provided for cleaning optic glass and laser port lenses. Using the brush, remove dirt and debris from the mounting rails and controls. This should be done on a regular basis.

4.2 BATTERY REPLACEMENT

The Battery Indicator on the *Fusion System* Display shows up to 4 bars, one bar for approximately each 20% of remaining battery life. If no bars appear in place of the indicator, the *Fusion System* has less than 20% of battery life remaining.

Replace the battery when the Battery Indicator becomes low (see Figure 4.2-1). For best performance, always use Lithium batteries. Alkaline batteries are acceptable, but expect diminished operating time.

A low battery banner appears on the Display when the battery level has dropped to sufficiently low levels. When this occurs, performance of the *Fusion System* will be degraded and the battery should be replaced immediately.

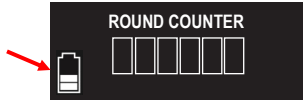
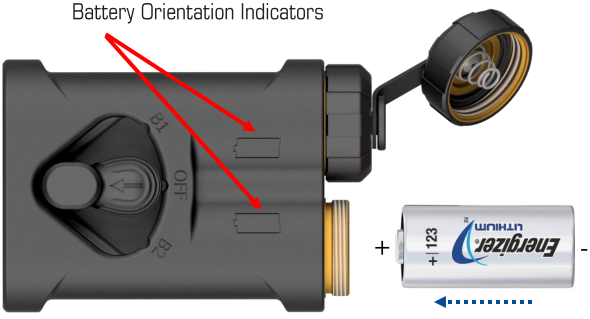


Figure 4.2-1 Battery Indicator



Remove old battery then inspect battery compartment and cover o-ring for residue or moisture. Replace O-Ring if necessary.

Install a fresh battery, observing the battery direction indicated on the case. Replace the cover, then repeat for the second battery compartment.

Perform a battery check from the Function Menu to ensure full capacity when switched to both batteries (B1 and B2).

Figure 4.2-2 Replacing the Battery in the *Fusion System*

4.3 INSPECTING AND REPLACING O-RINGS

Each Battery Compartment Cover of the *Fusion System* contains one (1) Buna O-Ring that prevents dirt and water intrusion to the Battery Compartment.

Age and temperature can wear Buna rubber, so O-Rings should be inspected periodically to maintain proper operation of the system. O-Rings are highly pliable and stretchable, and can be overstretched in the process of inspection. For this reason, it is strongly advised that they be replaced whenever they are removed, to ensure proper sealing of the compartment.

O-Ring replacements are available through Wilcox and should be purchased in advance of need to ensure continued service.

Step 1.) Gently brush any debris away from the o-rings with the cleaning brush provided.

Step 2.) Inspect the O-Rings for cracks, pinches, hardness, dryness, or tackiness of feel. If an O-Ring exhibits any of these characteristics, replace it.

Step 3a.) If the *Fusion System* O-Ring does not need replacement, but requires lubrication, lubricate the exterior surface of the O-Ring without removing it with a small amount of Silicone Grease.

Step 3b.) If replacement is required, gently remove the O-Ring using a pick tool. Gently lubricate the *Fusion System* O-Ring on both sides, with the thumb and index finger, using Silicone Grease. Using the pick tool, gently replace the lubricated O-Ring, using caution not to overstretch or damage.

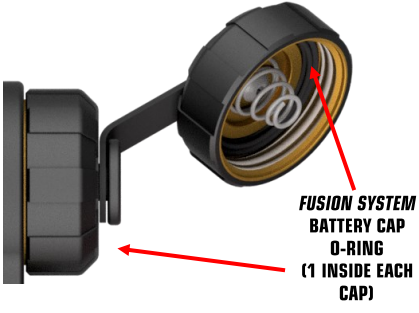


Figure 4.3-1 Inspecting and Replacing O-Rings

4.4 STORAGE

Ensure that cleaning instructions in Section 4.1 have been followed. When the *Fusion System* is dismounted for storage, place the Mode Selection Knob in the 'OFF' position. Reattach the laser cover to the *Fusion System* to prevent dust and dirt entry. Remove battery from the *Fusion System* and retain.

CAUTION

Do not store the Fusion System with battery installed.

4.5 SHIPPING

Prior to shipping the *Fusion System,* follow cleaning and storage instructions as described in Sections 4.1 and 4.4. Package all components securely in a suitable shipping container, maintaining adequate separation between components.

APPENDIX A

WARRANTY STATEMENT

A.1 WARRANTY STATEMENT

Based on the Magnuson-Moss Warranty Act, Wilcox Industries Corp. offers no express warranty on its product line. However, Wilcox Industries Corp. recognizes its obligation concerning implied warranty.

The Wilcox Industries Corp. *Fusion System* will be serviced or replaced for a period of 12 months at no cost to the purchaser for defects in materials or workmanship. Shipment will be made via UPS ground prepaid to any continental United States destination.

Wilcox Industries Corp. must be contacted to assign a **Return Merchandise Authorization (RMA) / Service Call Number** prior to return shipment.

To expedite return, repair, and/or replacement of the *Fusion System* purchased under a military contract Wilcox Industries Corp. will accept any package at the address below, clearly marked:

Wilcox Industries Corp.
RMA # _____
One Wilcox Way
Newington, NH 03801
603-431-1331

Be sure to retain your packing list as proof of delivery date when making a warranty claim. If proof of delivery acceptance is not available, the warranty period shall start from the date of manufacture that is laser engraved on the *Fusion System*. Warranty is void if date of manufacture is defaced.

The *Fusion System* should be securely packaged, accompanied by a letter including sender's name, address, daytime phone number, date of purchase, date of manufacture, lot number and a description of the problem or work to be performed.

APPENDIX B

ABBREVIATIONS

B.1 ABBREVIATIONS

CCW	Counter-Clockwise
CU IN	Cubic Inches
CW	Clockwise
ITAR	International Trafficking in Arms Regulations
lb	Pound
mm	Millimeter
mrad	Milliradian
nm	Nanometer
NVD	Night Vision Device
NVG	Night Vision Goggle
OLED	Organic Light Emitting Diode
oz	Ounce

Manufactured by:

Wilcox Industries, Corp.
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For troubleshooting service questions, contact Wilcox between 8am and 5pm EST.