

SW370-BS-OPI-010



**INSIGHT
TECHNOLOGY
INCORPORATED**

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OPERATOR'S MANUAL

FOR THE INSIGHT TECHNOLOGY, INC.

VLI, Visible Light Illuminator

UNIVERSAL 9 Volt Model

NSN: 5855-01-448-5464

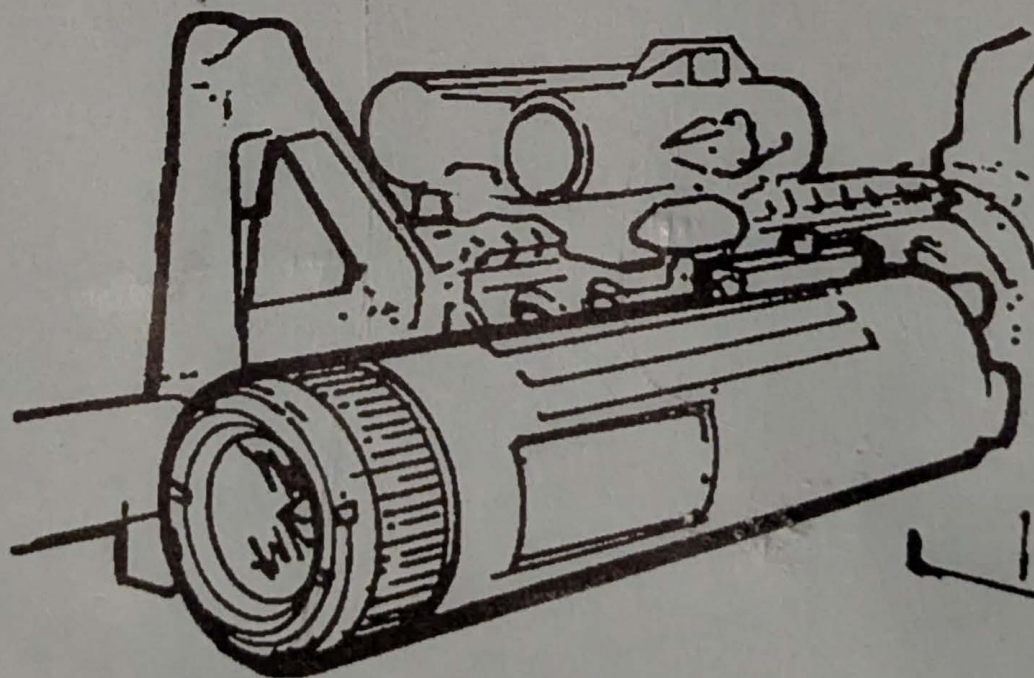


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2TH SAFETY SUMMARY

CAUTION

HIGH INTENSITY VISIBLE LIGHT

- Do not stare into the visible light for prolonged periods of time.
- Do not look into the light for prolonged periods of time through binoculars or telescopes.
- Do not point the visible light at mirror like surfaces.
- Do not shine the visible light into other individuals' eyes.

WARNING

MAKE SURE THE WEAPON IS CLEAR
AND ON SAFE BEFORE PROCEEDING.

WARNING

VLI CAN USE EITHER 6 AA (1.5V) OR 3
LITHIUM DL123A (3V) BATTERIES. DO
NOT MIX BATTERY TYPES

WARNING

RISK OF DETECTION BY ENEMY

TO REDUCE THE RISK OF DETECTION BY AN
ENEMY USING NIGHT VISION DEVICES, AVOID
PROLONGED ACTIVATION OF THE VLI.

WARNING

THE VISIBLE LIGHT IS MORE DETECTABLE TO AN
ENEMY USING NIGHT VISION DEVICES. AVOID
PROLONGED ACTIVATION OF THE VLI.

FIRST AID

First aid required should be administered in accordance
with FM 21-11, First Aid for Soldiers.

WARNING

DO NOT STORE THE VLI WITH BATTERIES
INSTALLED.

WARNING

LITHIUM BATTERIES CAN EXPLODE OR CAUSE
BURNS IF DISASSEMBLED, SHORTED,
RECHARGED OR EXPOSED TO FIRE OR HIGH
TEMPERATURES. HANDLE WITH CARE.

WARNING

DO NOT TRY TO REMOVE THE PLUG BY PULLING ON THE CABLE.

WARNING

FILTER COVER CAN BE DAMAGED IF IT IS ALLOWED TO CONTACT HOT SURFACES OF THE WEAPON

HOW TO USE THIS MANUAL

Usage

All operators should become familiar with the entire manual before operating the VLI. Read the complete maintenance task before performing maintenance and follow all **WARNINGS**, **CAUTIONS**, and **NOTES**.

Manual Overview

The manual contains sections for Operating and Maintaining the VLI. A list of Recommended Repair Items is in **Appendix A**.

List of Accessory Items is in **Appendix B**.

List of Abbreviations is in **Appendix C**.

SECTION I GENERAL INFORMATION

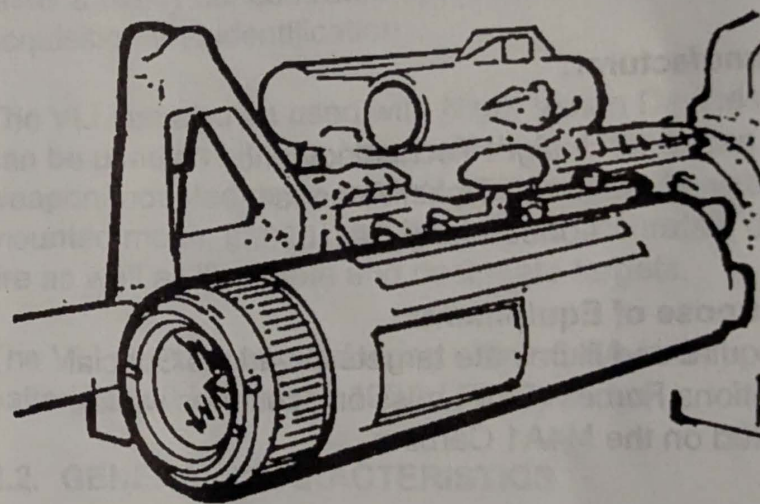


Figure 1.1-1 VLI In Use While Attached to the Rail Interface System (RIS).

1.1 GENERAL INFORMATION

a. Type of Manual:

Operator's (Including Recommended Repair Parts List).

b. Model Number and Equipment Name:

VLI-001, Visible Light Illuminator (VLI),
Universal 9 Volt.

c. Manufacturer:

Insight Technology, Inc.
10 Tinker Avenue
Londonderry, NH 03053

d. Purpose of Equipment:

To acquire and illuminate targets in various Special Operations Forces (SOF) mission scenarios while mounted on the M4A1 Carbine.

e. Warranty Information:

This item shall conform to design, manufacturing and performance requirements per contract N00164-97-D-0018 and be free from defects in material and workmanship for one (1) year from the date of acceptance. The warranty does not include replacement of bulb or batteries. If item is defective, contact your service command point of contact for warranty service instructions.

SECTION II. EQUIPMENT DESCRIPTION

2.1. SYSTEM DESCRIPTION

The VLI is an extremely powerful visible illuminator that emits a highly concentrated beam of visible light for acquisition and identification.

The VLI can also be used with Night Vision Devices and can be used as either a handheld illuminator or can be weapon mounted using the integral bracket. In weapon mounted mode, the VLI can be used to accurately direct fire as well as illuminate and designate targets.

The VLI can be operated using either 6 AA (1.5V) batteries or 3 Lithium DL123A (3V) Batteries

2.2. GENERAL CHARACTERISTICS

| | |
|----------------------------|----------------------|
| Weight (without batteries) | 7.19 ounces |
| Length | 16.23 cm. (6.39 in.) |
| Bezel Diameter | 3.78 cm. (1.49 in.) |
| Body Diameter | 3.78 cm. (1.49 in.) |
| Output Power | |
| Visible (9 Volt Lithium) | 115 lumens |
| (9 Volt Alkaline) | 90 lumens |
| Range | >100 meters |
| Waterproof | To 66 feet |

2.3 DESCRIPTION OF MAJOR COMPONENTS

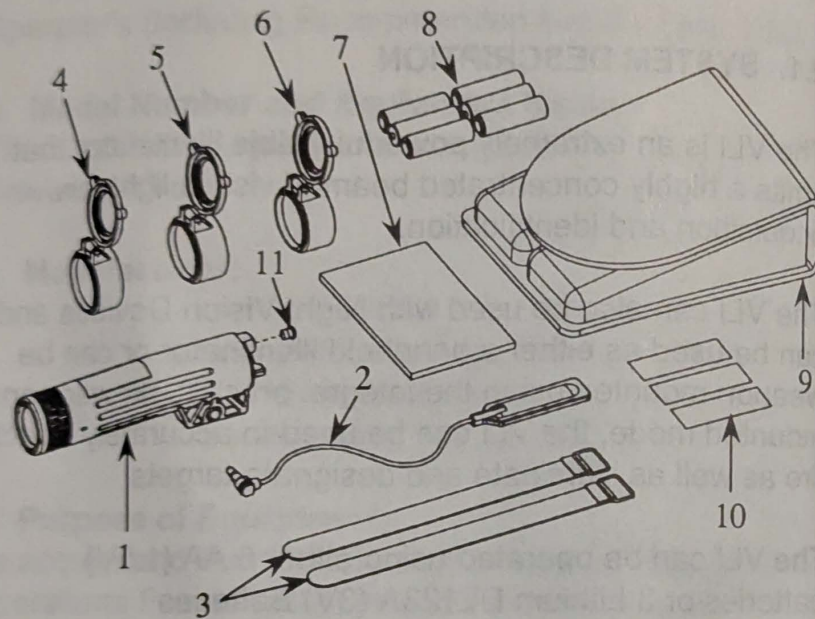


Figure 2.3-1 VLI Major Components.

1) VLI Assembly

The VLI Assembly is a compact, lightweight advanced electro-optical assembly which provides a high energy visible beam for weapon aiming and target illumination.

2) Cable Switch, Membrane

The Cable Switch provides fingertip control of the VLI using a rubber membrane style switch that is compatible with other Kit Devices such as the Carbine Visible Laser, and the AN/PEQ-2.

3) Strap, Retention

The cable retention strap provides a convenient means of attaching the cable switch to the weapon.

4) Filter, Black

An flip-up infra-red filter is provided with each system to provide maximum visibility with 2nd and 3rd GEN Night Vision Devices (NVDs).

5) Filter, Red

A flip-up red filter is provided with each system to be used for casting a red beam in order to maintain night adapted eyesight and reduce reflections off airborne particulates.

6) Filter, Opaque

A flip-up solid black cover is provided with each system for storage to block all visible light. It should be used to reduce chance of detection from inadvertent activation during covert movement when immediate activation is not required. Be sure to confirm that the switch does not become toggled on for very long or the cover can melt.

7) Manual

The manual details operation, maintenance and general information on the VLI.

8) Batteries (6 AA)

Six AA batteries are used as a power supply for operating the VLI.

Batteries (DL123A) Optional

Three Lithium DL123As can be used to power the VLI.

9) Carrying Bag

The VLI is supplied with a carrying bag. The bag holds all components and is easily attached to the web belt.

10) Fastner Tape, Loop

Fastener Tape is supplied with each unit to secure the remote cable switch to the weapon

11) Jack Plug

The jack plug once installed protects the remote jack from dirt, sand, and dust deposits. It is recommended that the jack plug be stored in the remote cable switch jack at all times except when using the remote cable switch is in use. An alternate storage location for the jack plug is provided directly above the On/Off Toggle Switch.

SECTION III MOUNTING PROCEDURES

3.1 MOUNTING BRACKET

3.1 Attachment of the Visible Light Illuminator (VLI) to an M4A1 equipped with a Rail Interface System (RIS) which provides MIL-STD-1913 mounting rails

The VLI mounts on the weapon equipped with a RIS using the VLI's Integral Rail Grabber Mounting Bracket.

WARNING

MAKE SURE THE WEAPON IS CLEAR
AND ON SAFE BEFORE PROCEEDING.

- (1) Turn the knob on the side of the VLI's Rail Grabber counter clockwise to open the moveable jaw.
- (2) Set the Rail Grabber on the RIS. Move the Rail Grabber forward or back so that the bar at the bottom of the bracket engages a notch in the rail.
- (3) Tighten the Rail Grabber by turning the knob clockwise. Tighten the screw hand tight using a coin or a blade screwdriver.

SECTION IV OPERATING INSTRUCTIONS

4.1 GENERAL

This section contains a description of battery installation, the integral toggle switch, the cable switches, and filters.

CAUTION

HIGH INTENSITY VISIBLE LIGHT

- Do not stare into the visible light for prolonged periods of time.
- Do not look into the light for prolonged periods of time through binoculars or telescopes.
- Do not point the visible light at mirror like surfaces.
- Do not shine the visible light into other individuals' eyes.

4.2 VLI CONTROLS AND INDICATORS

WARNING

DO NOT STORE THE VLI WITH BATTERIES INSTALLED.

WARNING

LITHIUM BATTERIES CAN EXPLODE OR CAUSE BURNS IF DISASSEMBLED, SHORTED, RECHARGED OR EXPOSED TO FIRE OR HIGH TEMPERATURES. HANDLE WITH CARE.

WARNING

VLI CAN USE EITHER 6 AA (1.5V) OR 3 LITHIUM DL123A (3V) BATTERIES. DO NOT MIX BATTERY TYPES.

a. Battery Installation

To replace/install:

- (1) Remove the bezel by pushing down on the bezel with the palm of your hand and rotating counterclockwise until the bezel is free of the illuminator body. (See **Figure 4.2-3**)

Note: Prior to installing lithium batteries make sure all other batteries have been removed.

- (2) Install either six (6) AA or three (3) DL123A Lithium Batteries positive (+) ends facing out. (See **Figures 4.2-1** and **4.2-2**).

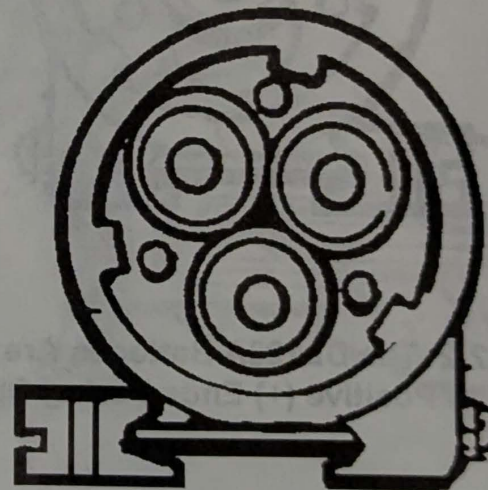
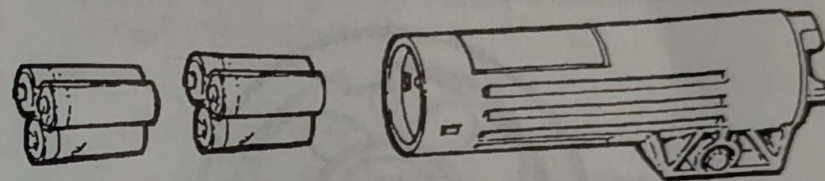


Figure 4.2-1 All 6 AA Batteries Installed With Positive (+) Ends Facing Out.

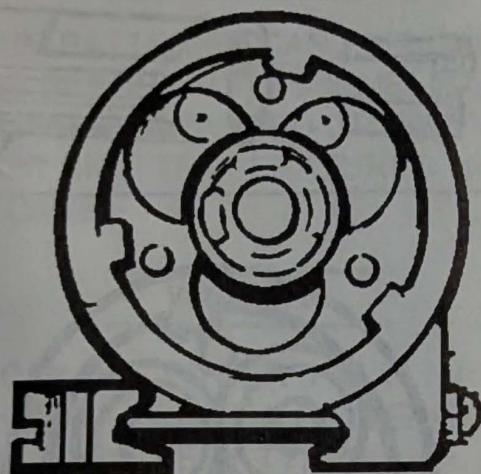
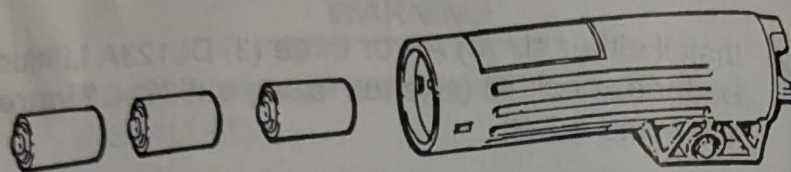


Figure 4.2-2 The DL123A Batteries Are Installed With Positive (+) Ends Facing Out.

- (3) Re-install the bezel by keying the bayonet locking tabs with the corresponding body slots. These keying tabs are intentionally offset to preclude the operator from improperly installing the bezel assembly. Matching features are provided on the bezel and VLI body to indicate proper alignment for installation. Once aligned simply apply pressure against the spring and rotate the bezel clockwise until it firmly locks in place.

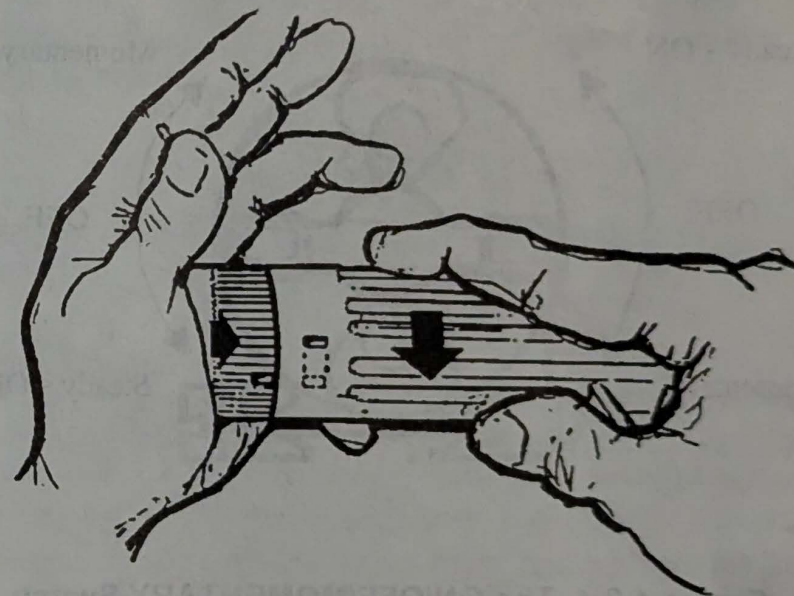


Figure 4.2-3 Bezel Removal/Installation

b. STEADY-ON/OFF/MOMENTARY Toggle Switch

The integral ON/OFF/MOMENTARY Toggle is used to operate the VLI when hand held or weapon mounted. Pressing and holding the toggle in the MOMENTARY direction will make the illuminator come on and stay on until the pressure is released.

If STEADY-ON operation of the VLI is desired, then toggle the switch to the STEADY-ON position. The illuminator will come on and remain ON until the switch is toggled to the center OFF position.

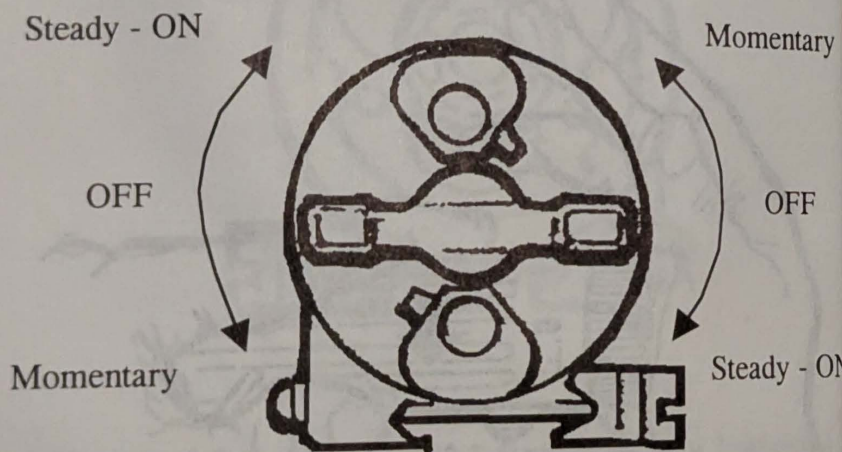


Figure 4.2-4 The ON/OFF/MOMENTARY Switch Provides Momentary Or Continuous Operation.

c. Cable Switch

The cable switch can be used to allow for remote pressure activation when weapon mounted. The velcro patches and straps can be used for securing the pressure pad in a convenient location. The cable switch plugs into the back of the VLI assembly. Pressing the button or pad at the end of the cable switch causes the VLI to turn ON and stay ON until the button is released.

When the cable switch plug is installed in the VLI, it automatically locks in place. To remove the cable switch, grasp the plastic pug and pull with a twisting motion.

WARNING

DO NOT TRY TO REMOVE THE PLUG BY PULLING ON THE CABLE.

d. Filters

When Red or Infrared illumination is desired the VLI can be fitted in seconds with the supplied flip-up filters. To install, firmly press the closed filter over the light bezel in the desired flip orientation (hinge away from barrel is recommended for weapon mounted use.) (Figure 4.2-5)

WARNING

FILTER COVER CAN BE DAMAGED IF IT IS ALLOWED TO CONTACT HOT SURFACES OF THE WEAPON

For user convenience the filters can flip out of the way when not in use and allow white light to pass.

Filter, Red: The Red Filter blocks all visible wavelengths other than red and allows the operator to maintain dark adapted vision and reduce reflections off airborne particulates.

Filter, Black: The Infra-Red Filter blocks nearly all visible radiation and provides maximum visibility with NVDs.

Filter, Opaque: The Solid Filter blocks all visible light and protects the window when the light is not in use.

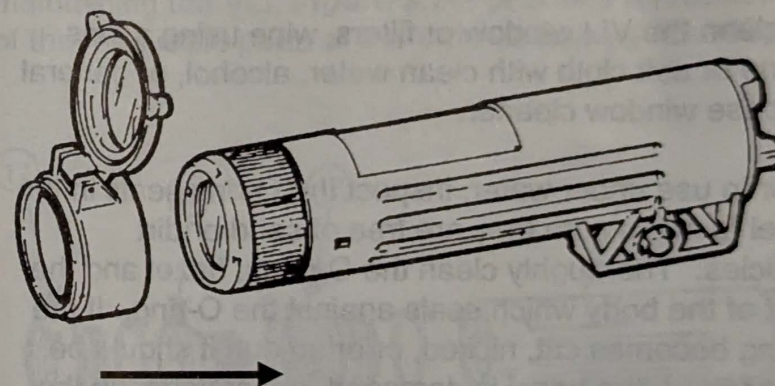


Figure 4.2-5 Flip Up Filters Press Fit Over The Front Of The VLI.

SECTION V. MAINTENANCE

5.1 Cleaning: Clean the VLI by flushing with water and wiping with a soft cloth. Such cleaning should be done whenever the VLI becomes dirty or after exposure to salt water.

To clean the VLI window or filters, wipe using a lens tissue or soft cloth with clean water, alcohol, or general purpose window cleaner.

Prior to use under water, inspect the O-ring seals in the bezel to make sure they are free of sand or dirt particles. Thoroughly clean the O-rings, bezel and the front of the body which seals against the O-ring. If the O-ring becomes cut, nicked, or dried out, it should be replaced. If the bezel is damaged, or scratched in the O-ring seating area, it should be replaced. Periodically lubricate the O-ring with fluorinated grease.

5.2 Bulb Replacement: If the bulb fails to function, simply remove the reflector bezel, remove the old bulb and replace with a new assembly. Inspect the O-ring for damage and install the reflector bezel back on.

A list of repair parts is contained in Appendix A. All repair parts can be installed at the operator or unit level. Special tools or equipment are not required for maintaining the VLI. **Figure 5.2-1** provides a breakout of the repairable parts of the VLI Assembly (VLI-002)

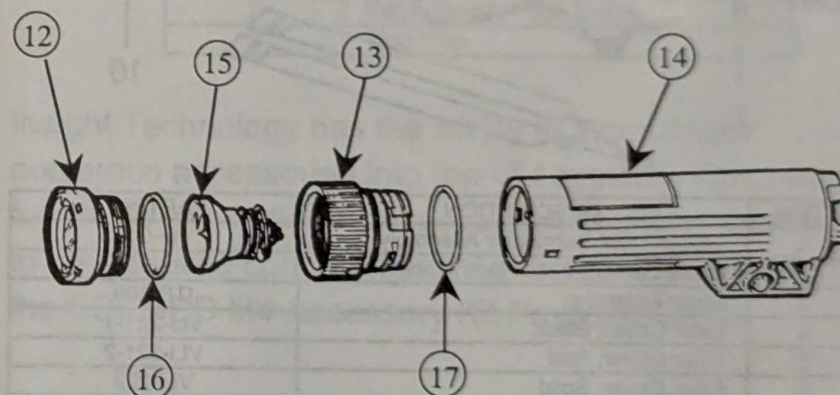
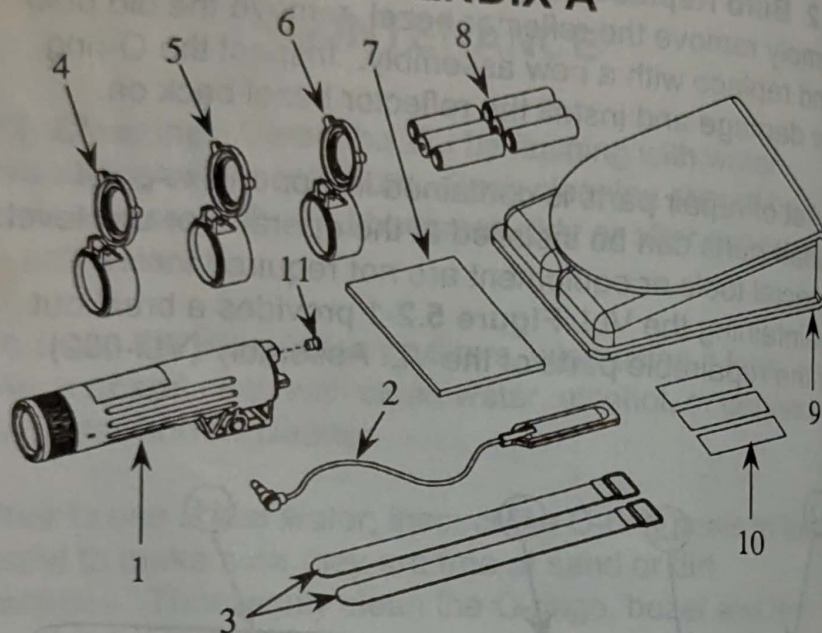


Figure 5.2-1 Repairable part of VLI Assembly

APPENDIX A



| ITEM | DESCRIPTION | PART NO. |
|------|------------------------------------|------------------|
| 1 | Visible Light Illuminator Assembly | VLI-002 |
| 2 | Cable Switch, 8 inch Membrane | VLI-053 |
| 3 | Strap Retention | ITP-809 |
| 4 | Filter Cover, Black | VLI-221-1 |
| 5 | Filter Cover, Red | VLI-221-2 |
| 6 | Filter Cover, Solid | VLI-222 |
| 7 | Operator's Manual | SW370-BS-OPI-010 |
| 8 | Battery, 6 AA | BA-3058/U |
| 9 | Bag Carrying | 4B-949 |
| 10 | Tape, Fastner, Loop | ITP-044 |
| 11 | Jack Plug | HKL-313 |
| 12 | Window Assembly | VLI-300 |
| 13 | Bezel Assembly | VLI-400 |
| 14 | Body Assembly | VLI-500 |
| 15 | Bulb Assembly | VLI-900 |
| 16 | O'Ring, Window Assembly | VLI-225 |
| 17 | O'Ring, Bezel Assembly | VLI-224 |

Figure A-1. Recommended VLI Repair Parts.

APPENDIX B

VLI Accessory Items.

| ITEM | DESCRIPTION |
|------|--------------------------------------|
| 1 | Light Shaping Diffuser, 15 Degrees |
| 2 | Light Shaping Diffuser, 30 Degrees |
| 3 | Light Shaping Diffuser, 45 Degrees |
| 4 | Light Shaping Diffuser, 90 Degrees |
| 5 | Light Shaping Diffuser, 1x50 Degrees |
| 6 | 3 Volt Lithium Battery |
| 7 | Cable Switch, Push Button |
| 8 | Blue Filter |

Insight Technology has the ability to incorporate numerous accessories into the VLI system. Any needs for these or additional accessories should be forwarded to your service command point of contact for review by the SOPMOD M4 Accessory Kit Program Office.

APPENDIX C

LIST OF ABBREVIATIONS

| | |
|------------|-----------------------|
| C..... | Celsius (Centigrade) |
| cm..... | Centimeters |
| F..... | Fahrenheit |
| in..... | Inches |
| max..... | Maximum |
| min..... | Minimum |
| MFR..... | Manufacturer |
| mrاد..... | Milliradians |
| NVG's..... | Night Vision Goggles |
| NVD's..... | Night Vision Devices |
| No..... | Number |
| Para..... | Paragraph |
| Qty..... | Quantity |
| IR..... | Infra-red |
| RIS..... | Rail Interface System |

For Technical Information

The VLI is designed and produced by:

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