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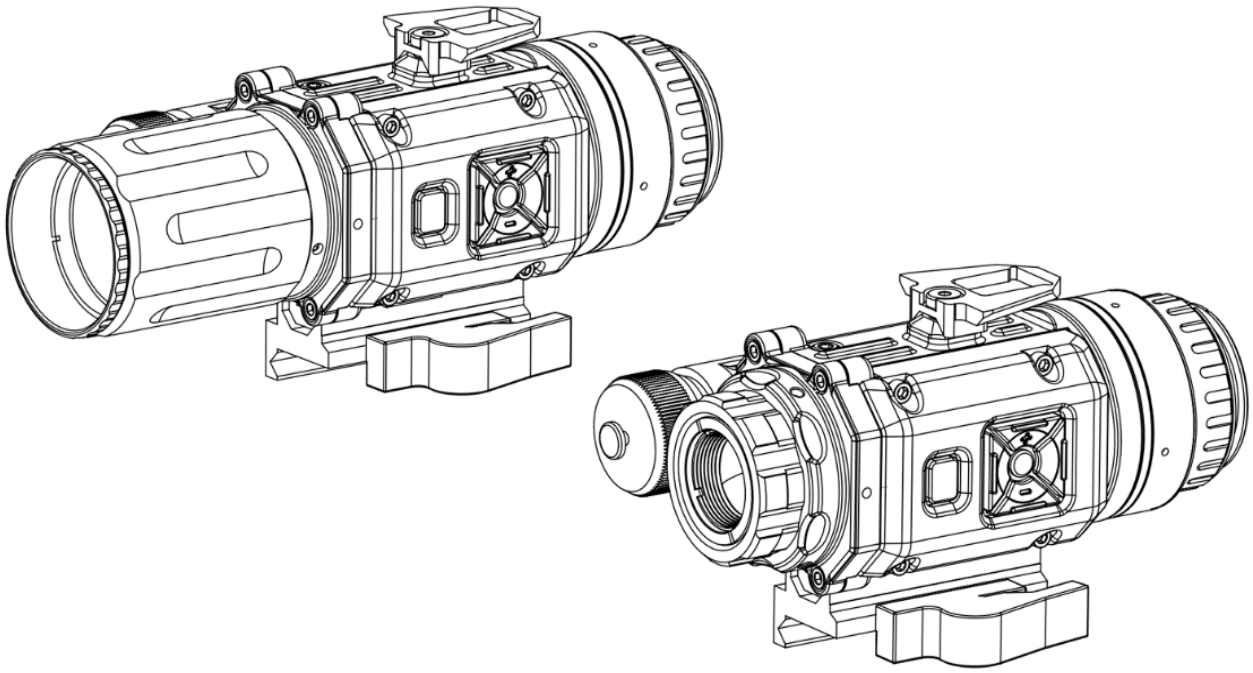
OPERATOR'S MANUAL
Thermal Imaging Weapon Sight
Models NOX18 and NOX35



Revision 1.1 December 2020

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General Information

You must familiarize yourself with the entire manual before operating the equipment. Read the complete manual and follow all **WARNINGS** and **NOTES**. Study this manual carefully and understand all related safety precautions. In this manual, the references are made to the NOX when the related information applies to both NOX18 and NOX35 models. Model-specific information contains exact model references.

Scope

This manual provides the user with information about operations, maintenance, and troubleshooting of the advanced thermal imaging weapon sights models NOX18 and NOX35.

Introduction

The NOX is an uncooled thermal imaging weapon sight detecting the long IR part of the spectrum (7.5 - 13.5 µm) and designed to meet the demands of military and security professionals, as well as recreational users. The NOX provides unsurpassed performance when used for targeting, surveillance, search and rescue operations, perimeter control, and vehicle identification, in addition to a wide variety of other applications. The NOX can be used as an advanced thermal weapon sight, or it can also be deployed as a handheld or a head-mounted monocular.

The rugged and lightweight NOX combines a high performance engineered plastics housing with high-performance optics that will satisfy the most stringent and demanding requirements. Regardless of ambient light conditions, smoke or haze, the NOX detects the slightest temperature differences that would be invisible to the naked eye of everything in the field of view and provides the user with clear "white hot" or "black hot" images. The NOX can be configured for the black or white Edge Detect mode in addition to the "black hot" and "white hot" images.

The NOX comes with a MIL-STD-1913 (Picatinny) compatible mount for attachment to any weapon that is outfitted with the appropriate rail. For head-mounted use, the NOX features AN/PVS-15 compatible dovetail mount. Both the weapon mount and dovetail mount can be removed by the user if not in use, as to lessen the weight of the optic. The dovetail mount can be installed on the weapon mount mounting rail for the left eye use.

With optional video cable, the NOX can be attached to an external video monitor or a video recorder. To maximize battery life, the user can switch video output off or configure it to be PAL or NTSC format. This can be found under System Settings, Video Output.

This document is a User Manual for the NOX thermal imaging weapon sight. Additional technical support for these units is available by phone at 781-505-8360 or via email at info@nvisionoptics.com.

Safety Summary

- NOX is a precision electro-optical instrument and must be handled carefully at all times to prevent damage.

- To protect NOX from unnecessary damage and degradation of performance, never point the unit at extremely hot objects, such as the bright sun or hot, burning fire.

- Do not scratch the lens surface.

- Be careful not to touch the lens surface. To clean, remove contamination or fingerprints, carefully use lens cleaning paper on the surface of the objective lens.

- Do not carry batteries in pockets containing metal objects such as keys, coins, sharp tools, etc. Those objects can damage batteries and short-circuit them. Shorted batteries may become very hot.

- Only use rechargeable batteries approved by N-Vision Optics and never use two CR123 batteries.

Warnings

THE THERMAL IMAGING SENSOR USED WITHIN THE NOX IS VERY SENSITIVE TO EXPOSURE OF EXTREMELY HIGH LEVELS OF RADIANT FLUX (HEAT).

NEVER EXPOSE THE NOX, EITHER TURNED ON OR NOT, DIRECTLY TO THE SUN OR ANY OTHER SOURCE OF HEAT THAT THE HUMAN EYE CANNOT TOLERATE. EXPOSURE TO THE HIGH LEVEL OF RADIATION MAY DAMAGE THE NOX SENSOR.

KEEP THE OBJECTIVE LENS COVER CLOSED OR ON AT ALL TIMES WHEN THE NOX IS NOT IN USE.

INADVERTENT SUN DAMAGE IS NOT CONSIDERED A DEFECT IN MATERIAL OR WORKMANSHIP AND IS NOT COVERED UNDER THE PRODUCT WARRANTY.

*** NEVER ATTEMPT TO POWER UP THE NOX USING TWO CR123 BATTERIES (RECHARGEABLE OR NON-RECHARGEABLE). THE CAUSED DAMAGE WILL NOT BE COVERED UNDER WARRANTY.

DO NOT USE RECHARGEABLE 18650 BATTERIES THAT ARE NOT APPROVED BY N-VISION OPTICS. USE OF UNAPPROVED RECHARGEABLE BATTERIES MAY LEAD TO DAMAGE OF NOX AND PRESENT A SAFETY RISK.

Unit Overview

Figure 1 below shows the NOX thermal imaging weapon sights.

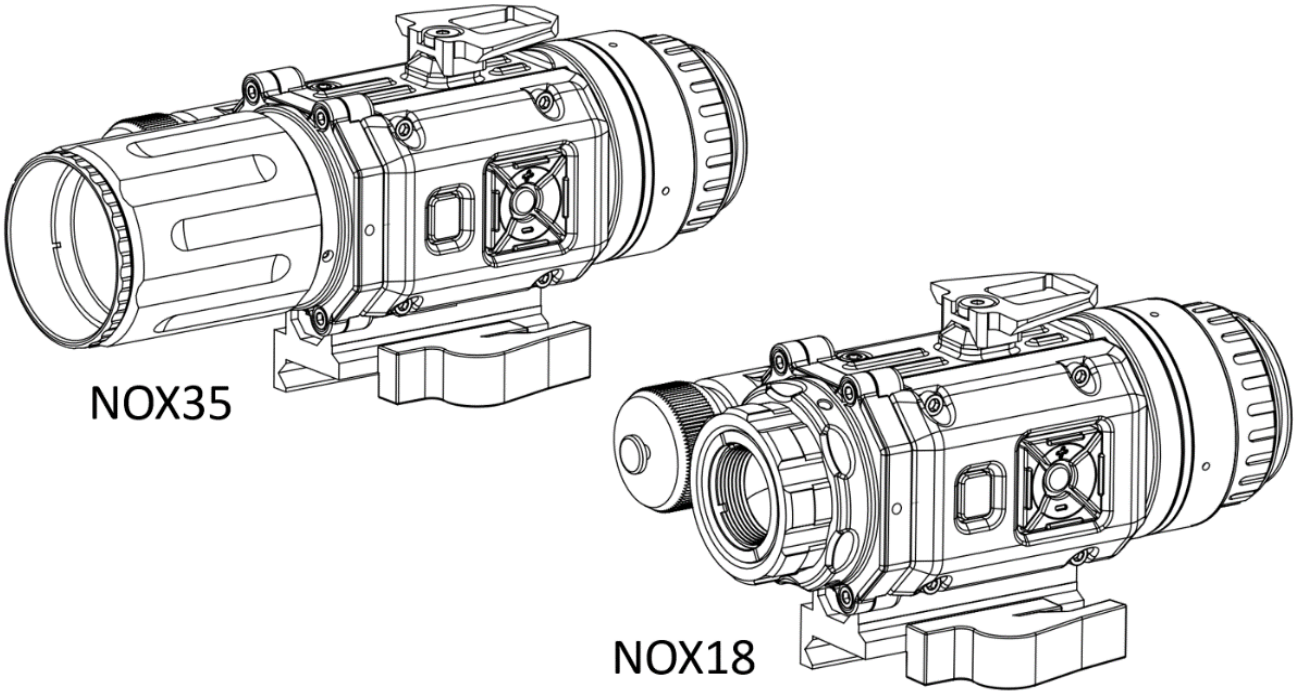

Figure 1. NOX Thermal Weapon Sights

Features

- Observation regardless of the light level
- Eight user-selectable reticles
- Electronic windage and elevation adjustments
- Focusable objective lens
- Black hot/white hot, black/white edge detect polarity selections
- Digital 2x, 4x, and 8x zoom
- High resolution throughout the entire field of view
- Standard MIL-STD-1913 (Picatinny) rail mounting system
- Dovetail (AN/PVS-15 style) head/helmet mounting interface
- Nitrogen purged to prevent internal fogging and extend the service life
- State of the art impact-resistant engineered plastics housing

Key Specifications

Key specifications are presented below in Table 1. Additional model-specific characteristics can be found on product specification sheets or by contacting N-Vision Optics.

Table 1. Key Specifications

	NOX18	NOX35
Sensor type	Uncooled vanadium oxide (VOx) microbolometer	
Detector resolution	640 x 480	
Spectral response, µm	7.5 - 13.5	
Detector pitch, µm	12	
Refresh rate, Hz	60	
Start-up time, sec	< 4	
Reticle type	8 user-selectable types	
Objective lens	Chalcogenide 18mm F1.0	Germanium 35mm F1.1
FOV, degree	18mm: 24.3(H) x 18.3(V); 30.4 (diagonal)	12.2(H) x 9.3(V); 15.1 (diagonal)
Focus	Manual	
Detection, man-size target, typical, yards	753	1,491
Recognition, man-size target, typical, yards	267	524
Identification, man-size target, typical, yards	136	270
Analog output	NTSC or PAL	
Output resolution, NTSC	640 x 480	
Output resolution, PAL	768 x 574	
Power, internal	One CR123 (DL123) battery or one 18650 battery	
Power, external	USB, 5V	
Display type	OLED, B&W	
Display resolution	640 x 480	
Diopter adjustment, diopters	-6 to +2	
Size (L x W x H), in	5.0×2.9×3.0	6.8×2.9×3.0
Weight w/CR123 battery, oz	16.0	19.3
Surface finish	Dark	
Environmental protection	IP67	
Internal Memory	60 Images	

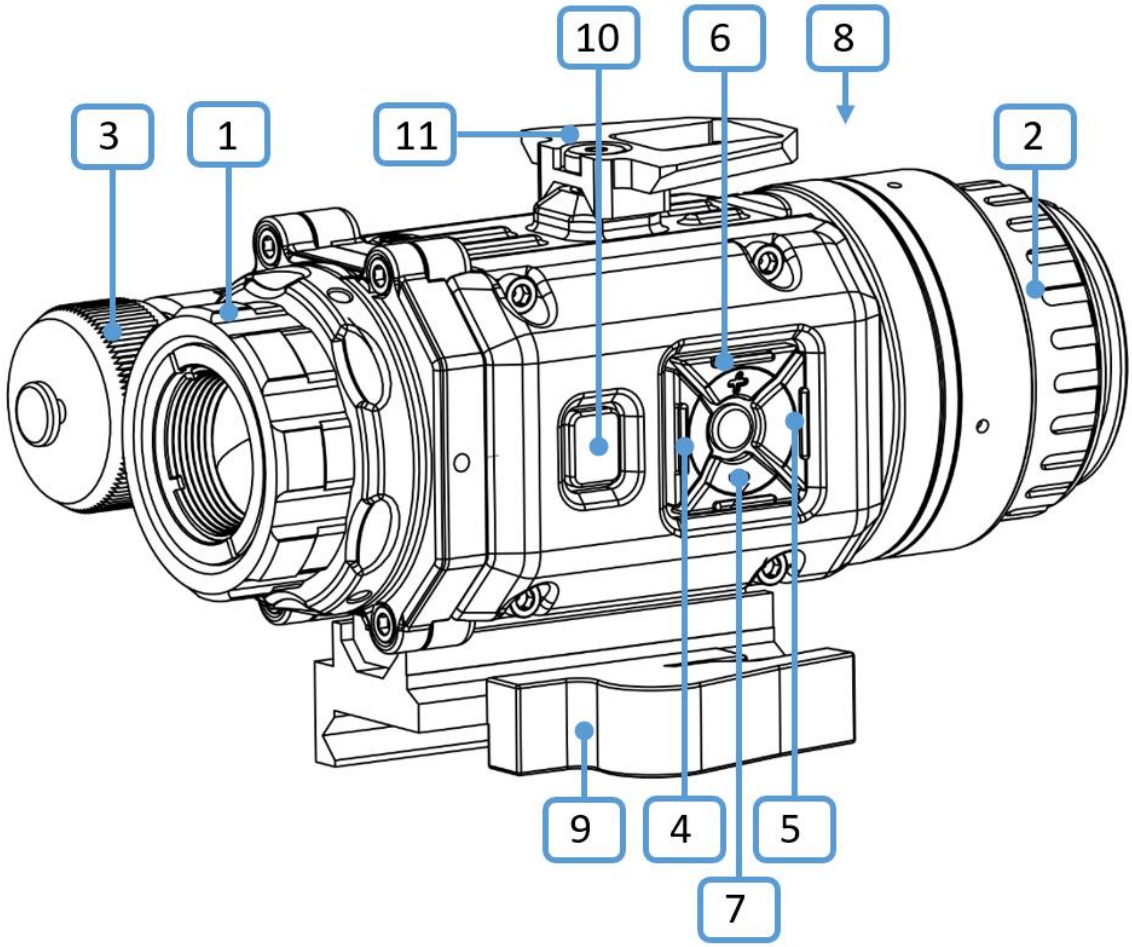

Figure 2. NOX Front Side View

Refer to Figure 2 to identify critical components.

1. Objective Lens. The lens cover is not shown for clarity
2. Ocular (eyepiece). Eye cup not shown for clarity.
3. Battery Compartment Cover.
4. **POLARITY / MENU** Button
5. **ZOOM** Digital Zoom Button
6. **PHOTO / +** Button
7. **RESET / -** Button
8. Electrical Connector (under dust cup)
9. MIL-STD-1913 (Picatinny) Rail Mount
10. **POWER / CALIBRATION** Button
11. Dovetail (AN/PVS-15 style) Mount

Standard Kit

Standard NOX kit includes unit, hard carrying/storage case, USB cable, lens-cleaning paper, quick reference guide, one CR123 (DL123) size battery, one 18650 rechargeable battery, charger for 18650 battery.

Operation

Refer to Figure 2 to identify critical components.

Installing Batteries

WARNINGS:

NEVER TRY TO RUN THE NOX WITH TWO CR123 BATTERIES. WHILE THEY ARE MECHANICALLY COMPATIBLE, ELECTRICALLY THEY WILL CAUSE SIGNIFICANT DAMAGE TO THE NOX.

INSPECT BATTERIES FOR BULGING AND DAMAGE BEFORE USE. IF THE BATTERY SHOWS SIGNS OF BULGING OR DAMAGE, DO NOT USE.

DO NOT DAMAGE, PUNCTURE, SHORT CIRCUIT, ATTEMPT TO RECHARGE NON-RECHARGEABLE BATTERIES, OR OTHERWISE TAMPER WITH BATTERIES. TURN OFF THE NOX IF THE BATTERY COMPARTMENT BECOMES TOO HOT. IF POSSIBLE, WAIT UNTIL IT COOLS DOWN BEFORE REMOVING BATTERY.

ALWAYS REMOVE BATTERY WHEN STORING OR SHIPPING THE NOX.

NEVER USE RECHARGEABLE BATTERIES THAT ARE NOT APPROVED BY N-VISION OPTICS. USE OF UNAPPROVED RECHARGEABLE BATTERIES MAY LEAD TO DAMAGE OF NOX AND PRESENT A SAFETY RISK. THE USE OF REPUTABLE BRAND NAME, HIGH-QUALITY BATTERIES IS RECOMMENDED. BATTERIES OF THE LESSER QUALITY MAY HAVE SIGNIFICANTLY SHORTER LIFE AND MAY NOT HOLD RECOIL.

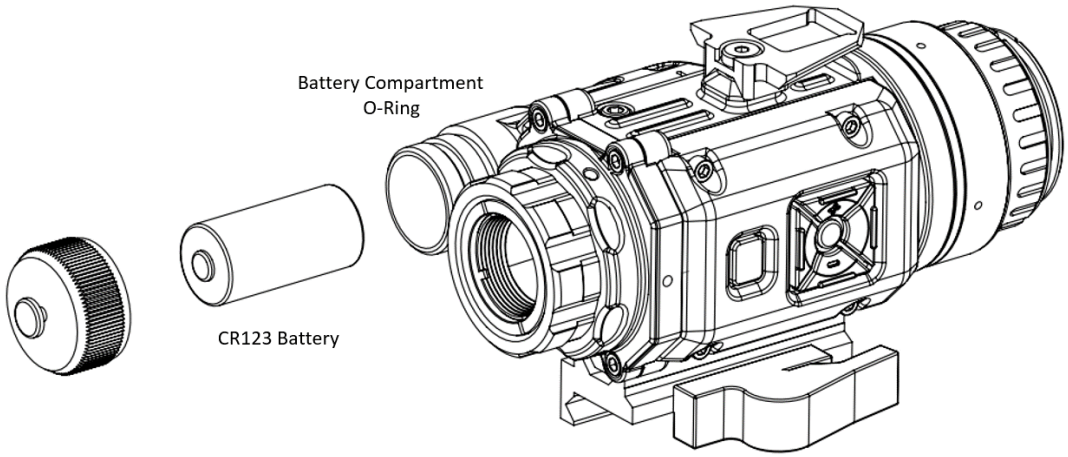

Figure 3. NOX with Removed Battery Compartment Cover

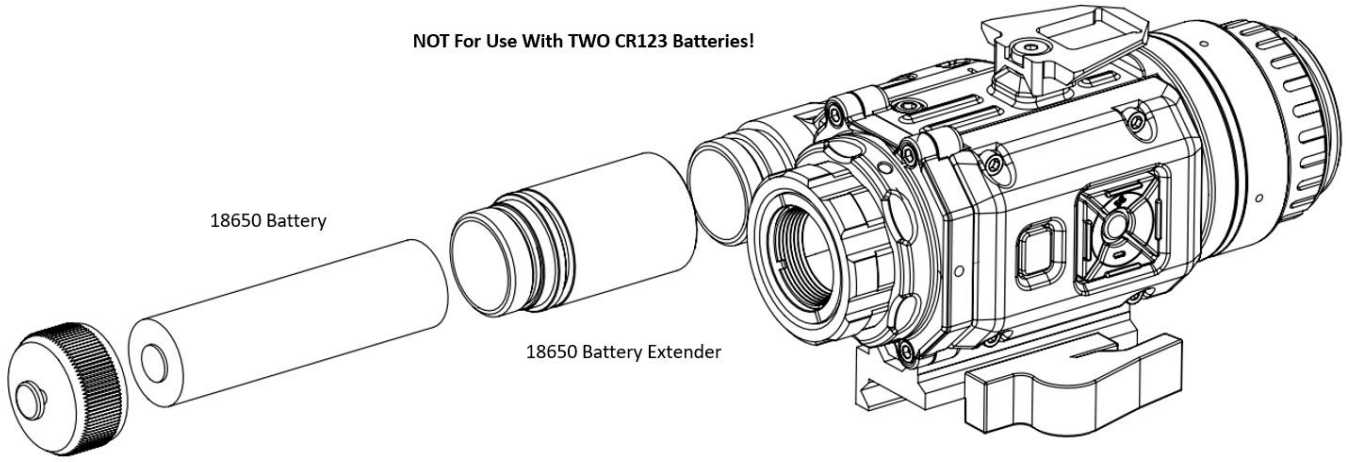

Figure 4. Installation of the Battery Extender and 18650 Rechargeable Battery

CR123 Battery

Unscrew the Battery Compartment Cover (3). Inspect the rubber O-ring outside of the battery compartment for damage. Replace and/or lubricate if necessary. Slide the CR123 battery in the battery compartment with **+** end facing out and tightly screw on the Battery Compartment Cover (3).

18650 Rechargeable Battery

Unscrew the Battery Compartment Cover (3). Inspect the rubber O-ring outside of the battery compartment for damage. Replace and/or lubricate if necessary. Inspect the rubber O-ring on the 18650 Battery Extender. Replace and/or lubricate if necessary. Tightly screw the 18650 Battery Extender to the battery compartment. Slide the 18650 battery in the battery compartment with **+** end facing out and tightly screw on the Battery Compartment Cover (3).

Switching the unit ON and OFF

Press and hold down the Power / CALIBRATION Button (10) for approximately two seconds. When the display in the Ocular (2) lights up, release the Power Button. To turn the unit off, press and hold POWER / CALIBRATION Button (10) for approximately two seconds until the image in the Ocular (2) disappears.

IMPORTANT: Thermal Calibration

NOX requires calibration before each use after powering the unit up or after a significant change in ambient temperature, etc. To calibrate the system, cover the objective lens with lens cover or hand and briefly press and release the POWER / CALIBRATION Button (10).

NOTE: Periodic calibration of the NOX as it warms up will help achieve the best image quality.

Focusing

The Objective Lens of the NOX is a manual focus lens that requires proper adjustment to ensure that imagery is sharp. To focus the Objective Lens (1), rotate it clockwise or counterclockwise until the image is perfectly sharp.

NOTE 1: Perform the Diopter Adjustment before focusing Objective Lens (1).

NOTE 2: It may be beneficial to focus at a higher digital zoom level (2x or 4x) to achieve the best possible focus.

Diopter Adjustment

Rotate the Diopter Adjustment Ring of the Eyepiece (2) clockwise or counterclockwise to focus the ocular according to your vision. Details such as reticle and battery level indicator should appear sharp and clear.

Mounting the NOX on a Weapon

The NOX comes from the factory with an installed Picatinny (MIL-STD-1913) Compatible Mount. For best results and accuracy, the NOX must be appropriately mounted on the Picatinny rail. The Picatinny rail needs to be parallel to your weapon's bore to allow for maximum elevation and windage adjustments.

Installation Steps:

1. Before attempting to install your NOX thermal weapon sight, please take the time to ensure that your firearm is **unloaded** and the muzzle pointed in a safe direction.
2. Look at the Picatinny (MIL-STD-1913) Compatible Mount and become familiar with its components.

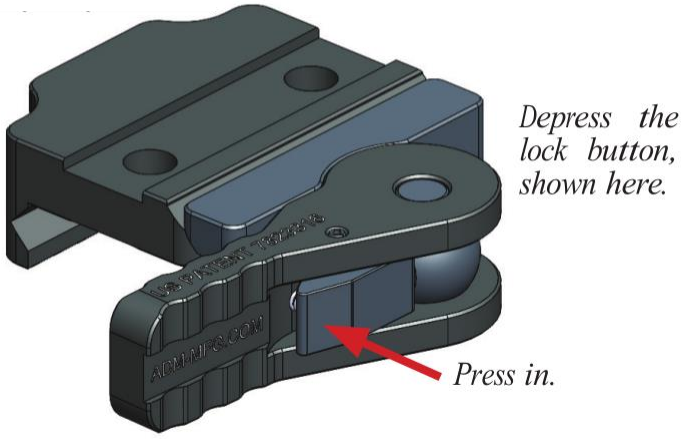

Figure 5. Unlocking Picatinny Mount

3. Unlock the mount. To do this, depress the lock button and swing the lever 180º to the open position.

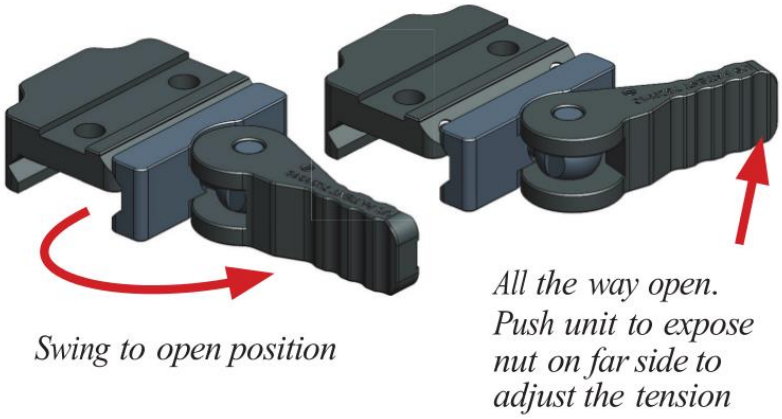

Figure 6. Moving Lever to the Fully Unlocked Position

4. Install the NOX onto the rail and move the lever to the locked position.
5. Check the tension to close. The correct amount of tension is the maximum amount to apply with one hand to move the lever to a closed position.

NOTE: How much pressure you prefer is dependent on your judgment and personal preference. Please remember, this system has a lot more surface contact than some other mounts, so you may not need to push the lever as hard to achieve the same result.

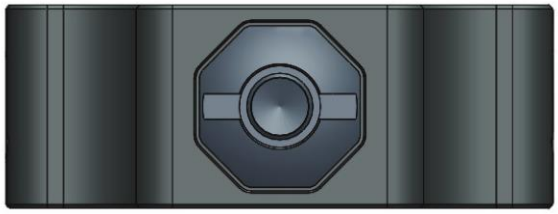

Figure 7. Tension Adjustment Nut

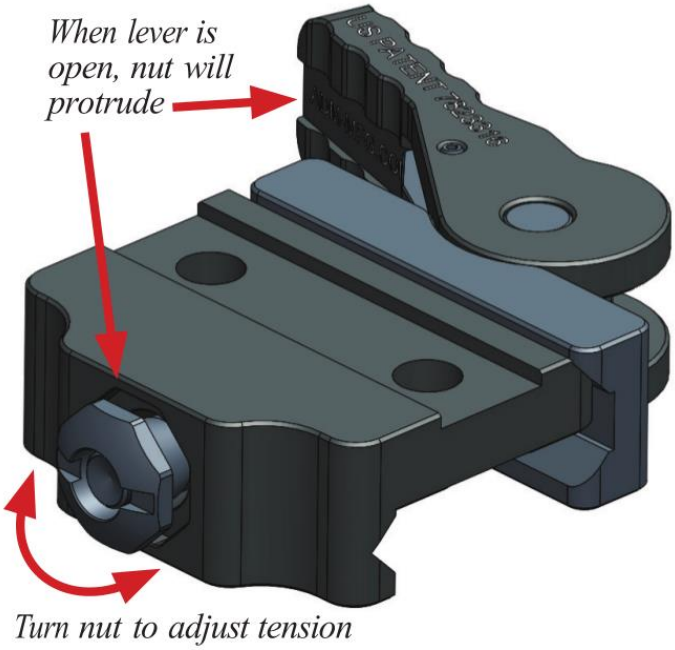

Figure 8. Adjusting Tension of the Mount

6. To adjust the tension, move the lever to the open position and push the lever towards the base. This will make the adjustment nut protrude on the opposite side of the base. With the nut protruding, it may be turned to the right or to the left to make the necessary adjustment. We recommend tightening one to two flats per time, then testing the tension. Since there are eight flats on the octagonal nut, this process may take a few tries to get it where you want it. You will need no tools for this step.

Removing the Weapon Mount

It is possible to remove the weapon mount from the NOX to reduce its weight and size if the user intends to use the NOX strictly handheld, head-mounted or desires to use the NOX on the left eye while it is head-mounted. The only tool required is a 3/32" hex key (Allen wrench). Removing the two screws that attach the weapon mount to the NOX housing will allow removing the weapon mount from the NOX.

If at a later time it is desirable to re-install the weapon mount the procedure should be reversed. Vibra-Tite VC-3 and a torque wrench are highly recommended. It is recommended to apply a small amount of the Vibra-Tite VC-3 to the mounting screws before tightening them. The recommended torque is 20 in-lb.

Mounting NOX on a Head/Helmet Mount

The NOX can be used with a compatible helmet or head mount / dual mount that is outfitted with a standard AN/PVS-15 style dovetail socket. To mount the NOX on the mount, line up the dovetail adapter with the dovetail socket of the mount and slide it in. Ensure that the release front lever of the dovetail socket assembly of the head or helmet mount is fully engaged and the NOX is securely locked in place.

To remove the NOX from a head or a helmet mount / dual mount, press on the head or helmet mount release lever and slide the NOX out.

SAFETY WARNING: Ensure the positive lock of the NOX in the head or helmet mount before use. If the NOX is not fully locked in the mount, this may lead to the NOX's detaching and cause material damage and injuries.

Configuring NOX for Left Eye Use

The NOX is shipped from the factory with the dovetail mount configured for use on the right eye. While it is possible to use the NOX in this configuration on the left eye, it may not be optimal, and the NOX may interfere with another device or another NOX if used with a dual mount.

Configuring the NOX for the left eye use involves removing the dovetail mount, removing the weapon mount, and installing the dovetail mount on the weapon mount rail. The only tool that is required is the 3/32" hex key (Allen wrench). Vibra-Tite VC-3 and a torque wrench are highly recommended but not required. It is recommended to apply a small amount of the Vibra-Tite VC-3 to the mounting screw before tightening it. The recommended torque is 20 in-lb.

Operating Modes and Menus

The NOX has the following operating modes:

Normal Mode

Normal Mode is used for observation and aiming with the NOX. When the user powers up the NOX, the Normal Mode is the default setting for the system.

Zeroing Mode

Zeroing mode is used to zero the NOX to a weapon. Zeroed settings are saved in an energy-independent memory and recalled upon startup of the unit or after changing the reticle Profile under the Reticle Menu.

Menu Mode

Menu Mode allows the user to conduct system configuration and review some of the system's parameters.

USB Mode

The NOX will enter USB Mode when connected to the USB port of a Personal Computer (PC) or any other USB power source capable of providing at least 1A of current with the USB cable. When NOX is connected to the USB, its core electronics powers up automatically, but the rest of the system remains off, and there is no image displayed through the eyepiece. In this Mode, it is possible, using appropriate software on the PC, to download images to the PC from the NOX and delete images from the NOX memory.

NOTE 1: It is possible to power up the NOX using power from the computer's USB port or any other USB power source, rated at least 1A, and start the NOX in Normal Mode. The power up / down procedure is precisely the same as when a battery powers the NOX. In this case, it is still possible to download images to the PC and delete them from the NOX.

NOTE 2: We recommend keeping the charged battery in the battery compartment even when an external USB source powers the NOX. This measure will significantly reduce the possibility of accidental shutdown under the weapon's recoil or unintended disconnect of the USB cable.

NOX Control Buttons

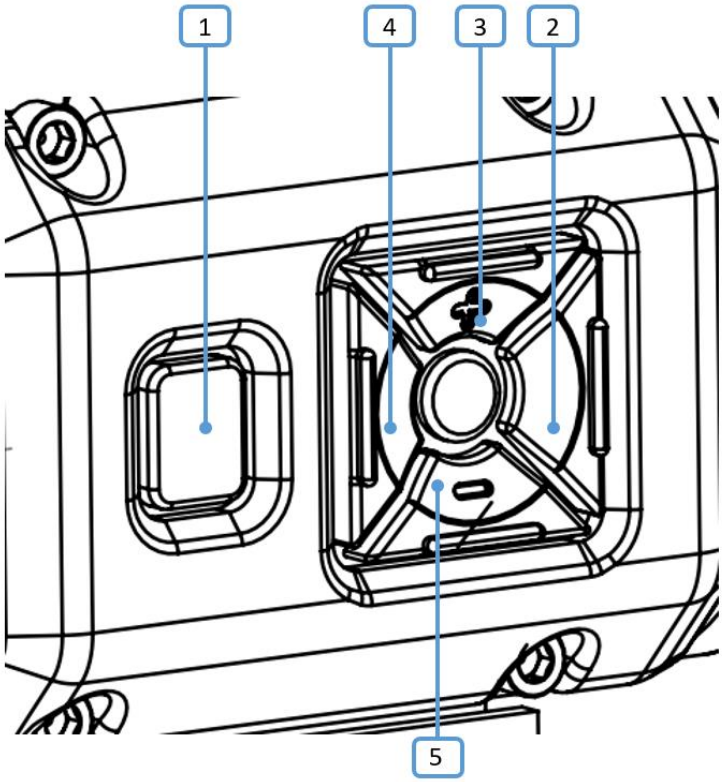

Figure 9. NOX Control Buttons

Table 2 below provides descriptions of the button functionality in different modes. Refer to Figure 9 above to identify the buttons.

Table 2. The Functionality of Buttons in Different Modes

Normal Mode		
Button	**Functions**	**Description**
1	Power / Calibration	Powers unit up if pressed and held for approximately two seconds. Powers unit down if pressed and held for approximately two seconds. Performs calibration if pressed and released quickly.
2	Digital Zoom	Cycles digital zoom settings (1X, 2X, 4X, 8X).

Note about zoom: But default, all zoom levels are available. However, it is possible to limit zoom values in the Video Settings menu to "No Zoom", "2X Only", "2X and 4X", "2X, 4X, and 8X", or "4X Only".		
3	Photo	Takes a picture if pressed and released quickly. Works only if Enable Photo is set to Yes in System Settings.
Note about taking pictures: If Enable Photo is set to **Yes** in the Systems Settings Menu, pressing and releasing Button (3) in the Normal Mode will take a picture and save it to internal memory. Set Enable Photo to **No** to prevent random picture taking in Normal Mode.		
4	Image Polarity / Menu	Changes image polarity White Hot/Black Hot, Black/White Edge Detect Mode if pressed and released. Enters Menu Mode if pressed and held down for approximately two seconds.
Note: Either of the Edge Detection modes can be enabled or disabled in the Video Settings Menu.		
5	Reset to Default Setting	Initiates reset of user-configurable settings and factory parameters to default values if pressed and held down for approximately 15 seconds (until the screen goes black).
Notes about resetting to default values: 1. This functionality is beneficial for troubleshooting. Use it if the image does not look right or goes blank. 2. Reset to default values preserves the user's zeroing settings. However, it is always advisable to write down zeroing values and save them for quick recovery in case of accidental change or loss.		
Menu Mode		
Button	**Function**	**Description**
Button 1	Not Used	
Button 2	Not Used	
Button 3	Move	Move to the previous menu item
Button 4	Select/Save	Select the menu item to move to a submenu or upper-level menu or make an item changeable. Save changed menu item.
Button 5	Move	Move to the next menu item
USB Mode		
No buttons are active in USB Mode unless the NOX was powered up connected to the USB port of a PC or any other USB power supply. If this unit is powered up, all buttons will function as in Normal Mode.		
Zeroing Mode		
Notes: 1. Zeroing Mode is accessible from Main Menu by selecting Zeroing. 2. Zeroing Mode is not available when the NOX is configured for the left eye operation, and icons are flipped.		
Button	**Function**	**Description**
Button 1	Save and Exit	Pressing the Button down will save the reticle position and exit to Normal Mode.
Button 2	Windage adjustment right	Moves reticle one **step** right

Button 3	Elevation adjustment up	Moves reticle one **step** up
Button 4	Windage adjustment left	Moves reticle one **step** left
Button 5	Elevation adjustment down	Moves reticle one **step** down
NOTE: Pressing and holding down any button 2, 3, 4, or 5 for more than two seconds will enter reticle movement into Rough Adjustment Mode. In Rough Adjustment Mode, the reticle will move in 5 pixels steps as long as the control button is pressed. Release of the control button will immediately end the Rough Adjustment Mode.		

Normal Mode Description

Normal Mode is used for observation and aiming with the NOX. When the user powers up the NOX, it always starts in Normal Mode. For controls available in Normal Mode, see Table 2 above.

The following functions are supported in Normal Mode:

Taking Photos

Pressing and quickly releasing **Photo Button** (3) captures the image and saves it in the NOX memory.

NOTE: The Image Capture function is turned off by default. It can be enabled under the System Settings Menu in the Menu Mode.

Saved pictures can be later viewed under Gallery in Menu Mode. Images can be downloaded later to a PC using USB cable and special software. The required software can be downloaded from the www.nvisionoptics.com web site.

NOTE: Image Download software is only available for Windows PCs.

Selecting Polarity

Pressing and releasing Button (4) cycles through Black Hot, White Hot, Black Edge Detect, and White Edge Detect modes (in sequence). Black Hot Mode displays the heat sources as black. The cooler objects are displayed as increasingly lighter shades of gray, while the coldest objects are white. White Hot Mode displays the heat sources as white. The cooler objects are displayed as darker shades of gray, while the coldest objects are black.

NOTE: If preferred, Edge Detect modes can be turned on and off under Video Settings Menu in Menu Mode.

Edge Detect mode darkens or lightens areas of the image that are algorithmically not important and outlines objects that produce a distinctive heat signature. This helps users stay focused for extended periods and quickly identify the object of interest when it becomes visible.

Digital Zoom

The NOX features digital zoom. Zoom is activated by pressing on the Zoom Button (2). It is used to magnify the central area of the output image. The zoom sequence allows the user to select one of the zoom factors. When the system is turned on, the sight will display images without any digital magnification. By default, when the Zoom Button (2) is pressed and released, the sight will sequence through 2X, 4X, and 8X, then return to 1X. The indicator in the upper left corner of the display shows the current zoom setting.

NOTE: It is possible to limit zoom values in the Video Settings menu to "No Zoom", "2X Only", "2X and 4X", "2X, 4X, and 8X", or "4X Only".

Reset to Factory Settings

Pressing down and holding Button (5) for approximately 15 seconds will restore the NOX to factory settings and parameters. Button (5) has to be held down until the NOX turns off. This operation may be useful if the NOX demonstrates an unexpected behavior, the image is not clear, or its response is sluggish, etc.

NOTE: Reset to Factory Settings preserves Zeroing information, but it is always prudent to write down and save zeroing numbers for fast recovery in an unlikely memory corruption event.

Menu Mode Description

Menu Mode allows the user to conduct system configuration (choice of a reticle, zeroing, brightness, etc.), review some of the system's parameters, and see saved pictures. To enter the Menu Mode, press and hold Button (4) (**IMAGE POLARITY / MENU**) for approximately three seconds.

NOTE: Menu fonts may be hard to read in Edge Detect mode. If it causes problems, enter Menu Mode while in Black Hot or White Hot mode.

Navigation in Menu Mode

To **move up** between menu items, press Button (3).

To **move down** between menu items, press Button (5).

NOTE: The indicator on the left of a menu item shows which menu item is current.

Selecting a menu item: press Button (4) (**IMAGE POLARITY / MENU**). Selecting a menu item makes it possible to change its value or leads to an immediate transition to the upper or lower-level menu.

NOTE: The indicator on the left of a menu item changes shape when an option is selected. When the indicator changed its shape, the corresponding setting can be changed.

Changing a menu item (if changeable): Use Button (3) to increase its value or Button (5) to decrease it.

To save the changed menu item, press Button (4) (**IMAGE POLARITY / MENU**).

Main Menu

Main Menu contains the following choices:

System Settings Menu

Under this submenu, a user can choose a format of the output video signal (PAL or NTSC), turn analog video output off, enable or disable taking pictures, select type of battery for more accurate battery level indication, and rotate icons for left eye head-mounted operation of the NOX.

Video Settings Menu

This submenu allows the user to change display brightness, set contrast enhancement (CE) level, image sharpness (recommended value is 2), select gamma setting for the display, turn on or off edge detection functionality, select the desired Region of Interest (ROI), and set available digital zoom levels.

Reticle Menu

The Reticle Menu allows the user to turn the reticle on or off, select the reticle Profile, choose the reticle type, and configure the adaptive color for the reticle.

System Info Menu

In the System Info Menu, a user can access the following information: software revision and unit model. There are no user-modifiable parameters in this submenu.

Gallery

Gallery submenu allows users to review images saved to the NOX memory.

Zero Menu

When Zero Menu is selected, the NOX is entering the Zeroing Mode. In this Mode, the user can adjust the reticle position for the reticle profile chosen in the Reticle Menu.

Save and Exit

Selecting Save and Exit in the Main Menu brings the user back to the Normal Mode.

System Settings Menu

Video Output

This menu item allows the user to configure the analog video output format by choosing between PAL and NTSC or turn it off completely.

NOTE: Setting Video Output to OFF when no external monitor or DVR is connected will reduce total power consumption and preserve battery life.

Enable Photo

If Enable Photo is set to Yes, pressing and releasing Button (3) in Normal Mode will take a photo and save it in the NOX memory. If Enable Photo is set to No, this functionality is disabled.

Rotate Icons

Setting Rotate Icons to Yes will immediately flip all icons, menus, and other items upside down. This option is only beneficial for the left eye head-mounted use when the dovetail (AN/PVS-15 compatible) mount is installed on the weapon mount rail.

NOTE: When icons are rotated, the reticle is automatically turned off, and the Zeroing and Reticle Menus are not available.

Battery Type

This menu option allows selecting the type of battery used to power up the NOX for more accurate battery level measurements. Available options are CR123 and 18650.

WARNING: Never use two CR123 batteries to power up the NOX. It will lead to critical damage and potentially catastrophic failure of the unit.

Save and Exit

Selecting Save and Exit in Settings Menu brings the user back to the Main Menu.

Video Settings Menu

Brightness

Adjusts display brightness between 1 and 8. Recommended setting is 5.

CE Level

Changes Contrast Enhancement Level between 0 and 6. Recommended setting is 1.

NOTE 1: Change of the CE Level allows the user to increase or decrease algorithmic contrast adjustment of the image. CE Level adjustment changes parameters in a complicated gain and contrast adjustment logic that are tailored to make object(s) of interest appear as clear as

possible. Increasing CE helps to distinguish fine image details in low thermal contrast conditions, but setting the value too high will lead to a grainy image.

NOTE 2: The contrast enhancement level represents a tradeoff between image dynamic range and contrast. A higher enhancement level makes smaller emittance differences more discernable but reduces the visible dynamic range. Setting CE level too high may lead to grainy looking image.

NOTE 3: Different CE Adjustment settings may be required for different observation conditions.

NOTE 4: CE Adjustment can be required when switching between radically different scenes, reversing the image's polarity, etc.

Sharpness

Changes image Sharpness between 0 and 4. The recommended setting is 2.

NOTE: Live imagery can be enhanced by either sharpening or introducing slight blurring. **0:** Introduces slight imagery blurring. **1:** Leaves imagery as is. **2 – 4:** Introduces a progressive level of sharpening. Setting the Sharpness level too high may lead to grainy looking image.

Gamma

This setting is changing the Gamma curve for the display. Available values and between 0 and 2. The recommended setting is 1.

NOTE: changing the Gamma setting visually changes the brightness of the display but also alters the way the image is presented on the black and white screen. The adjustment may be most effective if done in combination with an adjustment of brightness.

Edge Detection

This setting allows the user to choose which of the Edge Detect modes (Black Edge, White Edge, or neither) will be included in the rotation when switching Polarity with Button (4) (**POLARITY / MENU**) in Normal Mode.

NOTE: In Edge Detection mode, the NOX outlines regions of the image with similar infrared emittance named "edge."

ROI (Region of Interest)

Selects the appropriate Region of Interest (ROI). For scanning, recommended setting ROI to Full. ROI ½ and ROI ¼ lead to the optimization of the image based, correspondingly, on the ½ or ¼ central part of the image. It makes the part of the image closer to the center look better, but the peripheral parts of the image may suffer.

Digital Zoom

This setting allows the user to choose Digital Zoom levels that will be included in the rotation when switching the Zoom with Button (2) in the Normal Mode. Options are "No Zoom", "2X Only", "2X and 4X", "2X, 4X, and 8X", or "4X Only".

Save and Exit

Selecting Save and Exit in Video Settings Menu brings the user back to the Main Menu.

Reticle Menu

NOTE: The Reticle Menu is not available when Rotate Icons is set to Yes in Systems Settings Menu.

The Reticle Menu contains the following choices:

Show Reticle

Allows turning reticle on or off.

NOTE: Reticle is always turned off and can not be turned on when Rotate Icons set to Yes in Systems Settings Menu.

Profile

Users can save up to four reticle positions by selecting one of the Profiles. Each Profile is saved with its Reticle Type and zeroing information. This functionality allows, for example, zero the NOX on multiple weapons (up to 4) using different Profiles and move it in the future between weapons without a need to re-zero by merely selecting the appropriate Profile.

Reticle Type

There are eight user-selectable reticles numbered 1 to 8. When selected, a visual representation of each reticle is displayed instead of the previous one.

Adaptive Color

NOTE: The adaptive color setting allows the reticle's color (white or black) to be dependent upon the color of the displayed imagery. For example, if the reticle overlaid over an image is white and imagery under the reticle ends up white, the reticle would become invisible unless the Adaptive Color is turned on.

Adaptive Color settings allow the user to turn off the Adaptive Color functionality or configure the Adaptive Color algorithm's sensitivity level. Available options are Low, Medium, and High.

Save and Exit

Selecting Save and Exit in Reticle Menu brings the user back to the Main Menu.

System Info Menu

The System Info Menu does not have any user adjustable setting. It allows the user to review system information: Software Revision and NOX Model.

Exit

Exit in the System Information Menu brings the user back to the Main Menu.

Gallery

When in the Gallery, the user can review images in the NOX internal memory. The following commands are available.

To see the next image, press Button (3) (**+**)
To see the previous image, press Button 5 (**-**)
To exit from the Gallery to the Main Menu, press Button (4) (**POLARITY / MENU**)

Zero

Selecting Zero from the Main Menu brings the NOX to the Zeroing Mode, allowing zeroing of the sight.

Zeroing Mode Description

Use Zeroing Mode to zero the NOX according to the procedure described below.

Zeroing Procedure

NOTES:

1. Zeroing can be done at any digital zoom. The zoom that will be used for zeroing has to be selected before entering the Menu Mode. Change of zoom in the Menu Mode or Zeroing Mode is not possible. The precision of the reticle movement increases for higher zoom levels. At lower zooms, the reticle position is rounded up/down to the nearest available position.

2. Zeroing of thermal scopes is different from zeroing a regular day-time scope. During zeroing, the reticle should move to the Point of Impact (POI).

Zeroing of the NOX is achieved by performing the following steps:

1. Make sure the weapon sight is securely mounted on your weapon.
2. Fix a thermal target, for example, at 25 meters distance.
3. Turn on the NOX.
4. Perform Calibration.
5. Ensure that the target is visible with good contrast through the NOX before continuing.
6. Focus the objective lens, if necessary.
7. Use the digital zoom if it helps you to see the target clearer or you want to increase the precision of your zero.
8. If necessary, adjust settings in the Video Settings Menu to ensure the best possible view of the target.
9. In the Reticle Menu, select the Profile and Reticle Type.

10. Enter Zeroing Mode by choosing Zero in the Main Menu.
11. Use the reticle's center to aim the weapon at the target and fire 3-5 rounds.
12. After clearing the weapon, visually check the center of the shot group on the target.
13. Make adjustments as necessary to the windage and elevation.
    a. Buttons (2) and (4) provide movement of the reticle in the horizontal direction (windage adjustment). Button (2) moves the reticle right, Button (4) moves the reticle left.
    b. Buttons (3) and (5) provide movement of the reticle in the vertical direction (elevation adjustment). Button (3) moves the reticle up, Button (4) moves the reticle down.
    c. There is an arrow pointing up or down in the bottom left corner of the display and a number next to it. The arrow's direction shows the direction that the reticle moved relative to the center of the display and the number of steps made in this direction. For example, ↑7 in the left bottom corner of the display means that the reticle located 7 pixels above the display center.
    d. There is an arrow pointing left or right in the bottom right corner of the display and a number next to it. The arrow's direction shows the direction that the reticle moved relative to the center of the display and the number of steps made in this direction. For example, ←3 in the right bottom corner of the display means that the reticle is now located 3 pixels to the left from the center of the display.
    e. If the counter in the bottom left or right corner reads 00 it means that the reticle is located in the middle of the display in the vertical or horizontal direction (or both if both counters are at 00).
    f. To move the reticle in regular small steps (1 pixel per step), the corresponding Button has to be pressed and released within 0.4 seconds. Pressing and holding the Button down for more than 2 seconds will enter the reticle movement into the Rough Adjustment mode. In the Rough Adjustment mode, the reticle moves in 5-pixel increments as long as the Button is pressed. Release of the Button will immediately end the Rough Adjustment mode.
14. Fire and adjust the reticle until the center of the shot grouping, and the reticle converge.
15. Exit from Zeroing Mode by pressing the Button (1) (**Power / Calibration**).

TH Zero

With NOX thermal scopes, it is possible to use the "one-shot" zeroing procedure widely known as TH Zero. The TH Zero requires careful aiming at a target and placing one or more (typically three) accurate shots. If the POI is not visible on the target, the shooter may put something relatively warm or cold at the POI (aluminum foil, warm spent cartridge, etc.) When the Point of Aim (POA) and POI are clearly visible through the NOX, the user should aim at the original POA and perform the NOX calibration without covering the objective lens. After that, the target's image showing the reticle, POA, and POI will stay "imprinted" on display. To complete the TH Zero, the user needs to cover the objective lens with a lens cup, enter Zeroing Mode, and move the reticle to the POI. After exiting from the Zeroing Mode and performing calibration with a closed objective lens, the NOX should be perfectly zeroed and ready to go.

Maintenance Instructions

Introduction

The NOX is designed to be used in diverse environments and rugged conditions. It is recommended that regular and simple maintenance be performed for optimal system performance.

Preparing for Maintenance

Before performing any maintenance or cleaning of the system, remove all power sources from the NOX, including batteries and, if connected, an external USB power supply.

Cleaning the NOX

When necessary, use a moistened clean cloth to wipe the outside of the unit, EXCEPT FOR THE OPTICAL SURFACES. Be sure to wipe away excess dirt and dust that may restrict the performance or damage moving and mating parts. If needed, the use of a highly diluted detergent solution is permissible. Dry with a soft clean cloth, or allow the NOX to air-dry before storing it.

Cleaning the Optics

When cleaning the lens is required, first blow any loose dirt or grit away from the lens's surface. Use the supplied lens cleaning paper, lightly moistened with water or lens cleaning fluid, and lightly wipe the optical surfaces, using a circular motion. Discard each lens cleaning paper after one use to avoid transferring grit or foreign matter onto the lens surface. If the lens remains dirty, use a cotton swab lightly moistened with lens cleaning fluid to remove the foreign matter from the lens. Dry with clean, unused lens cleaning paper.

Checking for Damage and Corrosion

As a general guideline, inspect the NOX, accessories, and the case after every use. Look for heavy wear and cracks in rubber or plastic. Inspect for moisture or corrosion in the battery compartment. Check for scratches, condensation, and foreign matter on optical surfaces.

Electrical Interface

The NOX is equipped with a waterproof USB-C type connector located towards the eyepiece. A rubber push-in dust cup covers it. The purpose of this connector is to provide the user with the ability to:

- Power the NOX from an external USB power source.
- Conduct observation using a remote monitor.
- Record video input from the NOX.
- Download images from the NOX to a PC.

The NOX ships to the user with a USB cable that permits the use of external USB power and image download. Image Download software is available on the N-Vision Optics website at www.nvisionoptics.com.

The optional video cable is available for purchase from N-Vision Optics or one of the authorized dealers.

Troubleshooting

Refer to Table 4 below for troubleshooting instructions for the most common problems. If the equipment malfunction is not listed or actions listed do not correct the fault, notify your maintainer.

Table 3. Troubleshooting Instructions

Malfunction	Test or Inspection	Corrective Action
Unit fails to turn ON.	Visually inspect. Check for defective, missing, or improperly installed battery.	Inspect Battery Compartment for damage. Replace the battery or install it correctly. Tighten the Battery Compartment Cover.
The NOX shuts down under recoil.	Verify that the Battery Compartment Cover is tight. If using an external USB battery pack, verify a reliable USB cable connection and inspect the cable for visible damage.	Tighten the Battery Compartment Cover. Replace the battery if necessary. **NOTE:** Have a charged battery in the Battery Compartment when using an external USB power source.
The NOX is ON, but there is no thermal image on the display	Visually inspect. Check if the Lens Cover is on or something else obstructs the field of view.	Remove Lens Cover or other obstruction.
Poor image quality.	Visually inspect. Check for fogging or dirt on the Objective Lens or Ocular.	Clean optics. See the maintenance section of this manual. Cover objective lens

		and perform thermal calibration. Adjust settings under the Video Settings Menu to achieve the best possible image. Ensure the NOX objective lens and eyepiece are adequately focused.
The diopter adjustment is very hard to turn or grinding.	Visually inspect. Check for dirt or debris on Ocular.	Carefully remove the rubber Eye Cup. Clean with a soft dry cloth.
The NOX will not zero or loses zero.	Check to see if the NOX is securely fastened to the Weapon Mount. Check to see that the Weapon Mount is correctly and securely fastened to the weapon.	Tighten the weapon mount to the NOX. Recommended torque is 20 in-lb. Correctly and securely fasten weapon mount to a weapon.

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