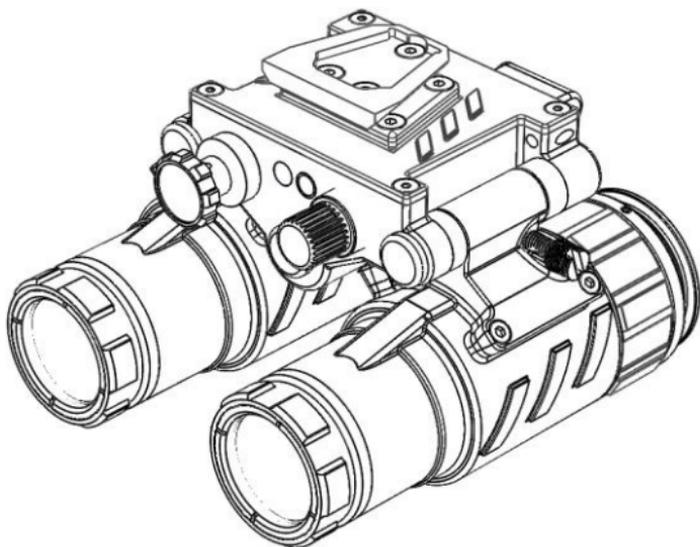

NORTIS-BNVS-31
Night Vision Binocular



Operator's Manual

Table of Contents

Section

1. **General Information**
- 1.1 Scope
- 1.2 Equipment Characteristics, Capabilities & Features
- 1.3 Location and Description of Major Components
- 1.4 Equipment Data
- 1.5 Mechanical Functions
- 1.6 Optical Functions
- 1.7 Electronic Circuit Functions
- 1.8 Corrosion Prevention & Control
- 1.9 Reporting Equipment Improvement Recommendations

2. **Operation Instructions**
- 2.1 Binocular Controls and Indicators
- 2.2 Preparation for Use
- 2.3 Installation of Helmet Mount to Helmet Binocular
- 2.4 Operating Procedures – Night Vision
- 2.5 Operation as a Hand-held Viewer
- 2.6 Operation with Compass

- 2.7 Operation with 3X Magnifier
- 2.8 Operation in Dusty or Sandy Conditions
- 2.9 Operation in Rainy or Humid Conditions
- 2.10 Operation in Salt Water Areas
- 2.11 Operation in NBC Environments
- 2.12 Stowage of NORTIS-BNVS-31

3. **Maintenance Instructions**

- 3.1 Preventative Maintenance Checks and Services Table (PMCS)

WARNING

The sequence of steps in the instructions may be important for preventing personal injury and equipment damage. Do not alter sequence of procedural steps.

WARNING

The IR source is an active device that can be detected at great distances by other night vision devices. Exercise extreme caution when activating the illuminator.

WARNING

Use only Flip-Up helmet mount equipped with magnet. The NORTIS-BNVS-31 is equipped with magnet switch. Turn the power switch to the "ON" position, when Flip-Up mount with magnet is in use. The NORTIS-BNVS-31 will be automatically turned OFF in the stowed position. Failure to use other mounts without magnet will greatly increase the risk of detection by the enemy, when mount is flipped to the stow position

WARNING

The "ON" and "IR" position of the switch are very dangerous when used in the field, since you will be visible to the enemy. To prevent accidental switching of the knob to either position, the knob must be pulled.

WARNING

When the unit is turned ON the light shines out of the eyepiece and will be visible to the enemy, if not covered.

CAUTION

If you continue to turn the eyepiece focus ring clockwise after sharpest focus is achieved, the image may seem clear initially but you could experience eyestrain or headache after prolonged use.

CAUTION

Never store the NORTIS-BNVS-31 with the battery installed. Battery leakage can cause severe equipment damage.

CAUTION

Read and understand the information in all chapters. They are written to augment each other. Information may not be repeated.

CAUTION

The NORTIS-BNVS-31 is a precision optical instrument and must be handled carefully at all times to prevent damage.

CAUTION

Operating the NORTIS-BNVS-31 in dusty or sandy conditions can pit and scratch the optical elements and damage the mechanical components. (See Paragraph 2.16)

CAUTION

When cleaning any of the lenses, be careful not to scratch them.

CAUTION

Be careful not to touch the glass surfaces. If you put fingerprints or contamination on the glass surfaces, use lens paper to clean. If moisture is needed, dampen the lens with clean water.

Equipment Limitations

To avoid physical and equipment damage when using the NORTIS-BNVS-31, carefully read and understand the following safety precautions.

- The equipment requires some night light (moonlight, starlight, etc.) to operate. The level of performance depends upon the level of light.
- Night light is reduced by passing cloud cover, while operation under trees, in building shadows, etc.
- The equipment is less effective viewing into shadows and other darkened areas.
- The equipment is less effective through rain, fog, sleet, snow, or smoke.
- The equipment will not “see” through dense smoke.
- Adjust vehicular speed to prevent over-driving the range of view when conditions of possible reduction or loss of vision exist.
- Vehicles should require a night-vision-device-equipment assistant driver when conditions are between last and first quarters of moon or during operations requiring the use of a protective mask or any combination of these conditions.

Section 1

Introduction & General Information

1.1 Scope

This manual provides instruction for the operator to use and maintain the NORTIS-BNVS-31 (see figure 1-1). The NORTIS-BNVS-31 is a self-contained night vision device that enables improved night vision using ambient light from the night sky (moon, stars, skyglow, etc.)

The NORTIS-BNVS-31 is primarily used as a binocular, but each monocular housing/arm can swing up separately. This allows the user to choose a preferred side for monocular use or both arms raised in the stowed position when not in use. (see Figure 1-2)

1.2 Equipment Characteristics, Capabilities & Features

The NORTIS-BNVS-31 is a hand-held or helmet-mounted passive binocular that provides the capability for operators to see at night. The system amplifies ambient light from sources such as the moon, stars and skyglow so the viewed scene becomes clearly visible to the operator. The NORTIS-BNVS-31 has the following important features:

- Powered by a single “AA” battery.

- If the battery voltage becomes low, a light-emitting diode (LED) is visible in the left eyepiece before the image intensifier tubes shut down.
- Adjusts for eye-pan, dioptre and objective focus.
- Each arm can swing upwards for monocular use or stow position.
- Helmet mount adjusts for vertical distance and eye relief, and may be flipped up.

The NORTIS-BNVS-31 is an effective night vision system designed for night operations, but does have the following limitations:

- The equipment requires some night light (moonlight, starlight, etc.) to operate. Night light is reduced by such factors as passing cloud cover and objects that produce shadows.
- The equipment is less effective viewing through rain, fog, sleet, snow, smoke and other reflective materials as well as into shadows and darkened areas.
- Under starlight conditions, low-contrast environments (such as snow-covered territory, sandy deserts, large bodies of water or grassy hills) degrades visibility, thereby disguising or masking changes in the terrain.

- Under low-light conditions, the goggles lose some of the resolution that they have under high-light conditions.
- Some goggles may experience a measurable loss of performance at temperatures above 38°C (100°F). This is caused by ambient heat beginning to increase thermionic emissions of the photocathode. If this begins to occur, it will appear as though you are looking through eyeglasses that are starting to fog or develop a slight haze.

1.3 Location & Description of Major Components

- a. Binocular Assembly.** The binocular assembly (see Figure 1-1) consists of two identical monocular goggles mounted to a body assembly. The monocular goggles may be pivoted sideways (eye span) or individually raised for monocular use or both raised for stowed position. Each monocular is comprised of three identical primary subassemblies: objective lens assembly, monocular housing with image intensifier assembly, and an eyepiece lens assembly. The binocular assembly can be used hand-held or attached to a helmet or head mount by means of dovetail or bayonet style mounting adapter.

b.

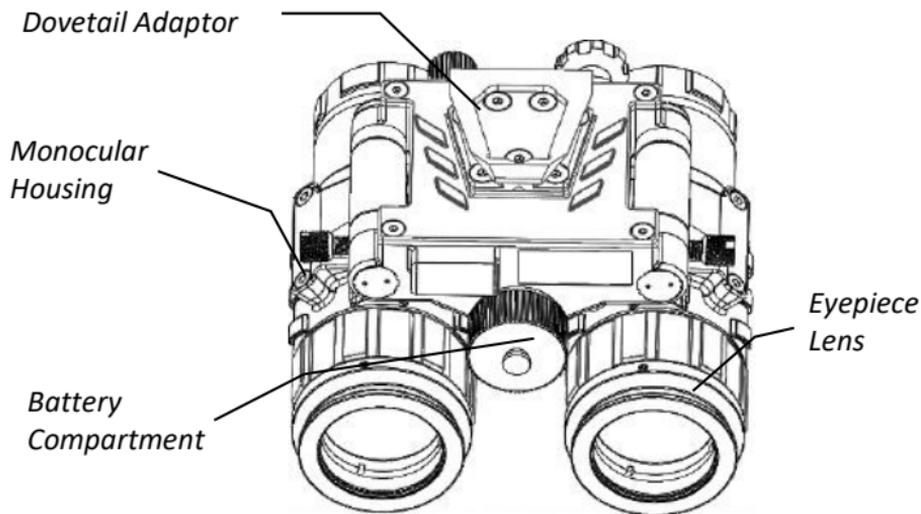
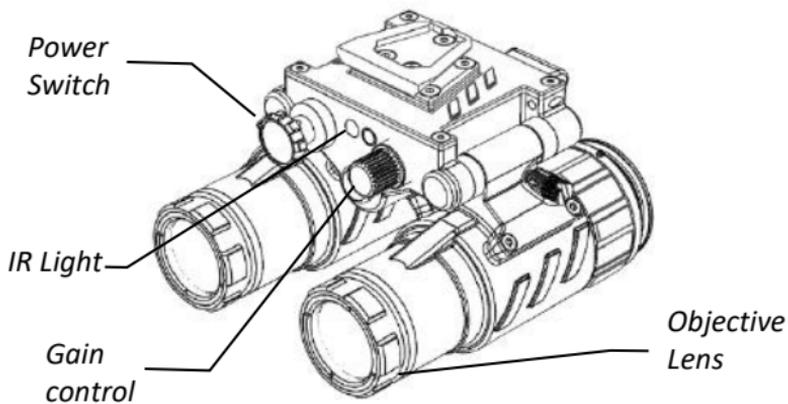


Figure 1-1. NORTIS-BNVS-31 Assembly



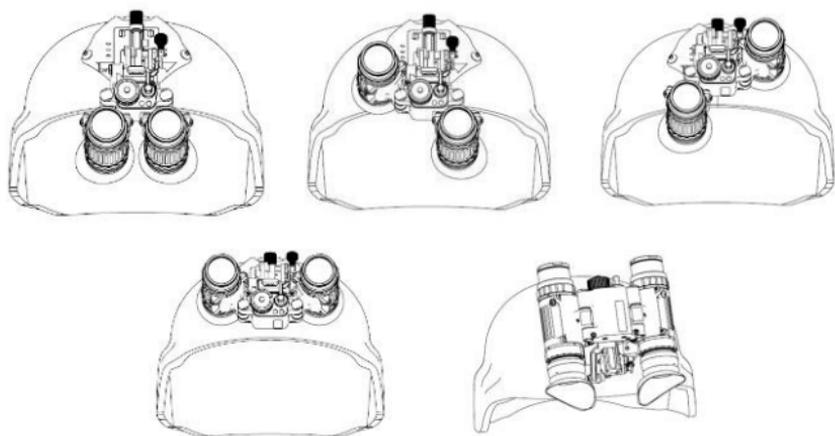


Figure 1-2. Monocular Use or Raised/Stowed Use

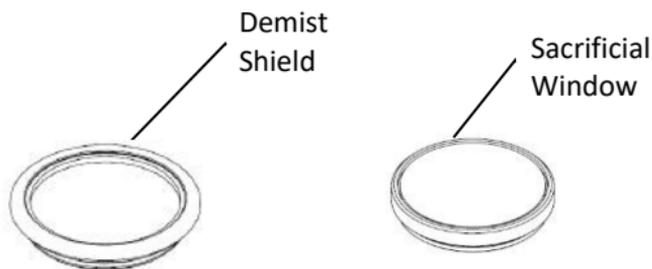


Figure 1-3. Binocular Accessories

a. Demist Shield. The demist shield (Figure 1-4) is used to prevent the eyepiece lenses from becoming fogged.

b. Sacrificial Windows. Replaceable sacrificial windows (Figure 1-4) are supplied to protect the objective lens during operation in adverse conditions.

1.4 Equipment Data

The following tables provide information pertaining to the operational, electrical, mechanical, optical and environmental characteristics of the NORTIS-BNVS-31.

Table 1-1. Operator Adjustment Limits

<u>ITEM</u>	<u>LIMITS</u>
Eyepiece Focus:	-6 to +2 diopter
Objective Focus	25 cm to Infinity

Table 1-2. Mechanical Data

<u>ITEM</u>	<u>DATA</u>
Weight (exclude Batt.)	590 gr.

Table 1-3. Electrical Data

<u>ITEM</u>	<u>DATA</u>
Voltage Requirements	1.5 vdc-3 vdc
Operation Time (without IR)	40 hrs

Table 1-4. Optical Data

<u>ITEM</u>	<u>DATA</u>
Objective Focus Range	25 cm to Infinity
Eyepiece Focus Range	+2 to 6 Dioptres
Magnification	Unity
Field of View	40°

Table 1-5. Environmental Data

<u>ITEM</u>	<u>DATA</u>
Operating Temperature	C(-51 ⁰ C to +49 ⁰ C)
Storage Temperature	C(-51 ⁰ C to +85 ⁰ C)
Illumination Required	Overcast Starlight to Moonlight

1.5 Mechanical Functions

The mechanical functions of the NORTIS-BNVS-31 (Figure 1-5) allow for differences in the physical features of individual operators and provide for operating the system. These functions include the power switch, dioptre adjustment, objective focus and interpupillary distance locking. The mechanical controls are identified below.

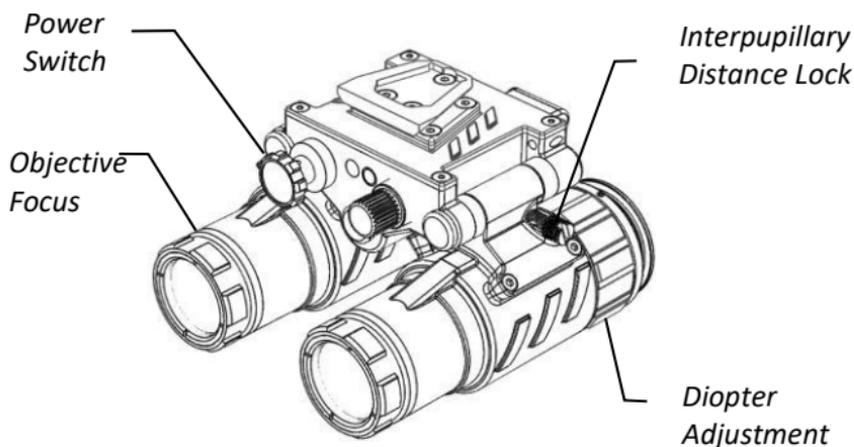


Figure 1-4. Mechanical Functions of the NORTIS-BNVS-31

1.6 Optical Functions

The NORTIS-BNVS-31 is an electro-optical system consisting of two monocular goggles with identical optical trains and functions (Figure 1-6). Each monocular has an objective lens, an image intensifier assembly, and an eyepiece lens. The objective lens collects the ambient light reflected from the scene by the moon, stars or night sky, and forms an inverted image which is focussed on the image intensifier. Inside the image intensifier, a photocathode converts the light into electrons, a microchannel plate amplifies the electron image, and the electrons then strike a phosphor screen. The phosphor screen creates a visible image which is, in turn, re-inverted by fibre optics. The operator can view the intensified image through the eyepiece in its proper 1:1 perspective (unity magnification).

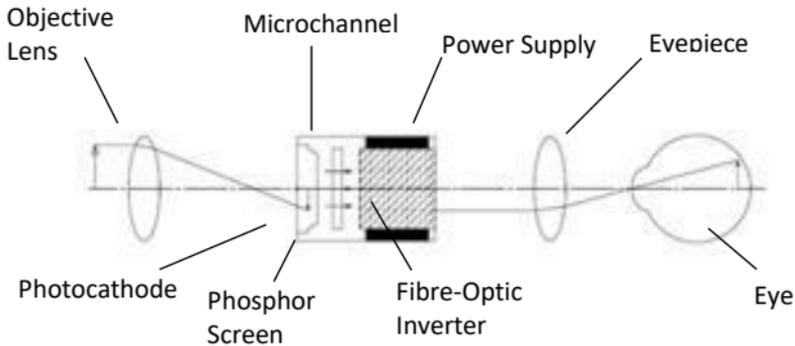


IMAGE INTENSIFIER

Figure 1-6. Optical Function Diagram

1.7 Electronic Circuit Function

The electronic circuit function regulates the direct-current voltage from the battery to the image intensifier assemblies as required. It also monitors the output voltage of the batteries and turns on a low-battery indicator when the battery life is approximately 20 ± 10 minutes (2.2 vdc).

a. Power Source. The electronic circuit is powered by an “AA” battery. The NORTIS-BNVS-31 will accept any “AA” size battery.

b. Electrical Function. Power from the battery is supplied to the components through the 4-position function switch as follow:

OFF Position:	Power supply to the NORTIS-BNVS-31 is disconnected and the unit is not operating.
ON Position:	Power supply to the NORTIS-BNVS-31 is connected and the unit is operating.

CAUTION

When the switch is in this position, light will shine out of the eyepieces if they are not covered.

IR Position: The unit operates and the built-in IR light source is activated. To set the operation switch to this position, the knob must first be pulled out and then rotated. A red LED is illuminated in the right eyepiece when the IR LED is activated.

CAUTION

When the IR light is activated, the emitted light can be detected by other image intensifying equipment.

a. Image Intensifier Power Supply Function. The power supply inside the image intensifier assembly (refer to Figure 1-7) converts the 1.5- 3.0 volts from the power pack to the voltages required by the photocathode, microchannel plate (MCP), and phosphor screen. The power supply also provides automatic brightness control (ABC) and bright-source protection (BSP). Under high-light conditions, the ABC automatically reduces the voltages to the MCP to keep the image intensifier's brightness within a set limit. The effect of this function may be seen when rapidly

changing from low-light to high-light conditions; the image momentarily brightens and then dims slightly to a constant level.

b. High light Sensor. The NORTIS-BNVS-31 is equipped with a built-in high light sensor, which automatically shuts the image intensifier tube off when the ambient light intensity exceeds high level, in order to prevent damage to the image intensifier. The binocular will automatically cut off after 70 ± 10 seconds of operation in daylight or bright room light. Individual bright lights (headlights, flashlights, or other concentrated light sources) will not actuate the high light detector located on the front of the binocular.

c. Low-Battery Indicator. When the battery voltage falls below 1.0 vdc (or 2.2vdc), a red LED is illuminated in the right eyepiece of the binocular. This tells the operator the battery shall be changed as soon as the mission permits.

d. Infrared LED Indicator. A red LED is illuminated in the right eyepiece whenever the IR LED is illuminated.

CAUTION

The IR illuminator is an active device that can be detected at great distances by other night vision devices. Exercise extreme caution when activating the illuminator.

Section 2

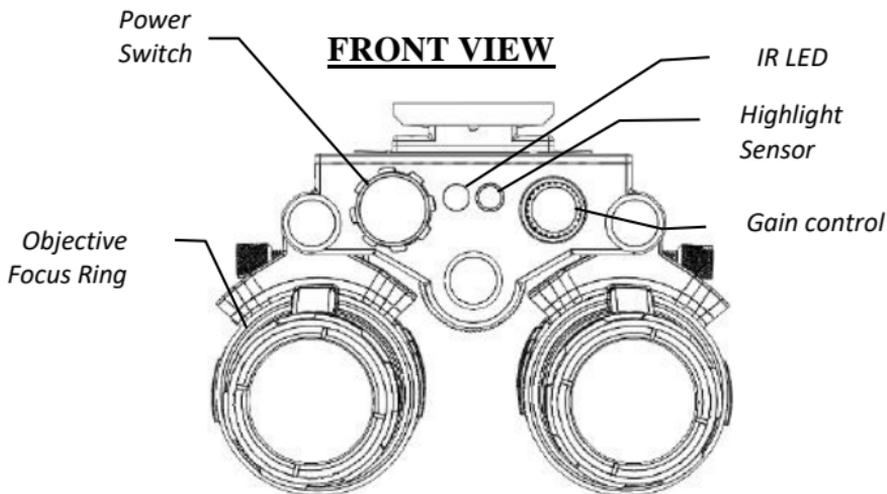
Operating Instructions

The NORTIS-BNVS-31 is a precision electro-optical instrument, so handle it carefully.

2.1 NORTIS-BNVS-31 Controls and Indicators

The NORTIS-BNVS-31 is designed to adjust for differences in head shape and most differences in eyesight. Figure 2-1 and Table 2-1 describe the controls and indicators.

Figure 1-2 for full range of Eye Span.



REAR VIEW

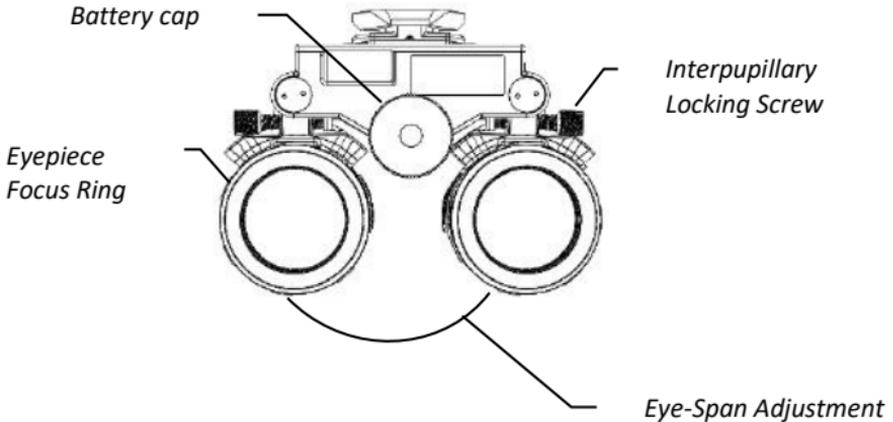


Figure 2-1. NORTIS-BNVS-31 Controls and Indicators

Controls & Indicators

Function

Power Switch

Controls binocular and IR source, ON or OFF.

RESET/OFF - Same as system OFF.

Also resets Binocular after high light cut-off.

ON - Binocular activated

IR/PULL Turn the knob clockwise

to momentarily activate the IR source. Pull and turn the knob clockwise from the ON position to continuously activate the IR source.

Low-Battery Indicator	When blinking it indicates a low battery (red light) with less than 30 ± 10 minutes of battery life remaining. It is visible through the left eyepiece on the top just outside the intensified field-of-view.
IR Source ON Indicator	When illuminated it indicates that the IR source (red light) is ON. It is visible through the right eyepiece on the top just outside the intensified field-of-view.
Gain Control	Adjusts the system gain from a Minimum value 25 to a maximum value 3000.
Objective Focus	Focuses the objective lenses. Adjust for sharpest view of scene. The focus rings with grips are located on the objectives and adjust focus from 25cm to infinity.

Eye Relief Adjustment Adjusts the distance between your eyes and the Binocular.

Diopter Adjustment Focuses eyepiece lens for use without need for glasses. Adjust for sharpest image of intensifier screen. The NORTIS-BNVS-31 eyepieces enable diopter adjustment to suit different user eyesight, by means of diopter rings with grips. They are assembled on the eyepieces and provide continuous adjustment from -6 to +2 dioptres.

2.2 Preparation for Use

NOTE

The NORTIS-BNVS-31 is a precision optical device and must be handled carefully at all times to prevent damage.

a. Battery Installation

CAUTION

To protect the image intensifier, keep the objective lens caps on when the binocular is not in use or when using the binocular in daylight conditions.

The NORTIS-BNVS-31 operates with one “AA” battery.

CAUTION

Make certain the power switch is in the OFF position before installing the battery.

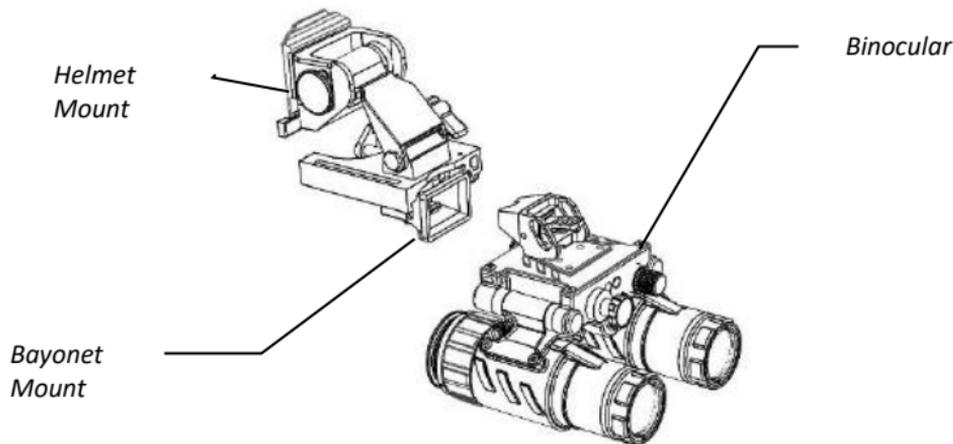
- (1) Remove the battery cap.
- (2) Insert one “AA” battery so that the raised contact (+) is facing as shown on the battery compartment.
- (3) Replace battery cap and hand-tighten, making sure of a good electrical contact and battery compartment seal.

NOTE

If a red light appears in the left eyepiece, the battery is low and needs to be replaced.

b. Attaching the NORTIS-BNVS-31 to Helmet Mounts

- (1) Make sure the power switch is turned OFF and place the neck cord around the neck.
- (2) Hold the NORTIS-BNVS-31 with left hand approximately level, with the eyepieces facing the mount and slide Bayonet/dovetail onto the bottom of the mount into the channels of the Bayonet/dovetail interface on the top of the NORTIS-BNVS-31 assembly until it locks in place (see Figure 2-2)



**Figure 2-2. Attaching the NORTIS-BNVS-31 to
Helmet Mount**

2.3 Installation of Helmet Mount to Helmet

Insert the top edge of the mount under the keeper on the helmet shroud (mount bracket) and rotate downward until the latch engages (see Figure 2-3). To release the mount from the shroud (mount bracket), press the release button and pull forward and down

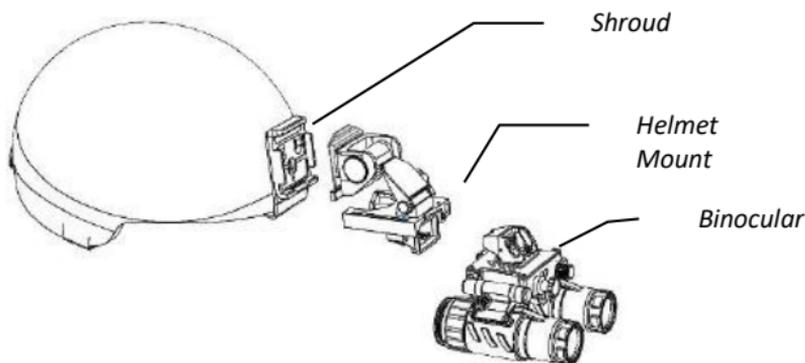


Figure 2-3. Installation of Helmet Mount to Helmet

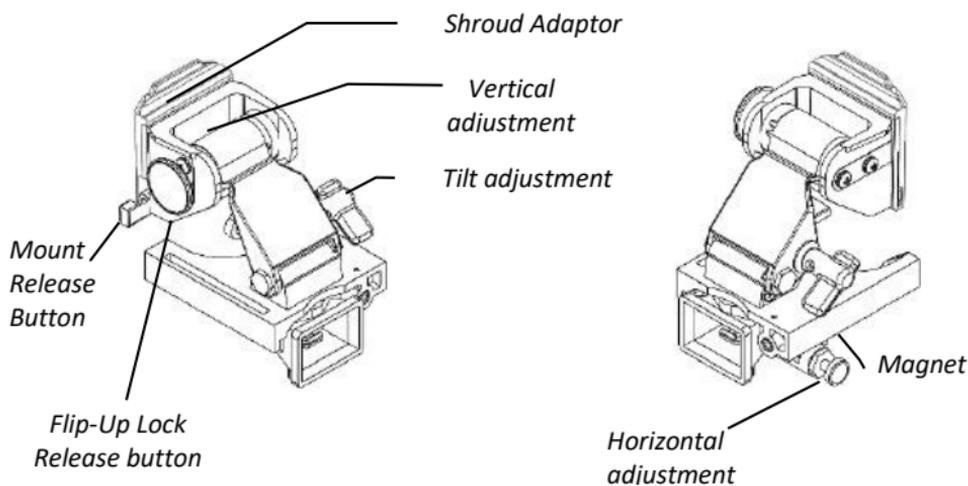


Figure 2-4. Helmet Mounts

2.4 Operating Procedures – NORTIS-BNVS-31

a. Setting the Controls & Adjustments. The NORTIS-BNVS-31 is designed to adjust to differences in head shape and correct most differences in eyesight.

NOTE

Although the NORTIS-BNVS-31 is designed to be used without eyeglasses, if eyeglasses are needed and the eyeglass lenses will fit within the eye-relief distance of the NORTIS-BNVS-31 eyepieces, eyeglasses can and should be worn.

- (1) Make sure the battery is installed as indicated by the sign on battery compartment. Remove the lens caps.

NOTE

If the NORTIS-BNVS-31 eyepieces are not properly aligned with the eyes, optimal resolution will not be achieved. Proper alignment of the eyepieces is achieved when the distance between the binoculars matches the distance between your pupils and the line of sight is the same as the vertical angle of the binocular. When all the NORTIS-BNVS-31 adjustments (eye span, vertical and tilt) are properly set, the edges of the images in both binoculars will appear clear and overlapping.

- (2) Turn the power switch to the ON position.

- (3) Squeeze or turn the fore/aft adjustment knobs on the helmet mount to move the binoculars away from the eye as far as possible without losing the field of view. This maximizes peripheral vision around the NORTIS-BNVS-31.
- (4) Move the monocular goggles closer together or farther apart to adjust the eye-span distance for the proper spacing between your eyes (see Figure 2-1). When properly adjusted, the edges of the images in both monocular goggles will be clear and the resultant binocular view will appear as a single circle or as two circles, overlapped and slightly displaced laterally. Secure the distance by using the screws (see Figure 2-1).
- (5) Squeeze or turn the fore/aft adjustment knobs to move binoculars closer to the eyes as desired for individual preference without your eyelashes touching the eyepiece lenses. A 25-mm eye-relief distance provides the optimal field of view for the 25-mm eyepieces.

b. Optimal Sight Adjustment Point Procedure. The optimal sight picture occurs when the optical axes of the goggles are aligned with your visual line of sight and the goggle's eyepieces are at the maximum distance from your eyes that still allows you to see the full field of view

(FOV). To achieve the Optimal Sight Adjustment Point (OSAP), use the following procedure.

- (1) Use a light level condition that is above starlight, either actual or simulated – preferably $\frac{1}{4}$ to $\frac{1}{2}$ moon. The background should be relatively uniform to produce a viewed image of reasonably uniform brightness without very dark or light areas. Do not permit any light sources in the field of view.

NOTE

If the available background is not reasonably uniform, turn the objective focus ring clockwise to blur the image to obtain a relatively uniform brightness.

- (2) Initially, reset all the mechanical adjustments (except focus settings and eye-span) to approximately a middle position.
- (3) If the goggles are in the flip-up stow position, use the lock-release button and pull the goggles to the down position. Turn the power switch to ON position. You should see a green glow in each eyepiece. Do not worry about focusing at this time. It is actually better to have the objective lens out of focus for this procedure.
- (4) Use the fore/aft adjustment to move the goggles so the image appears.

- (5) Vertical and eye-span adjustments should be performed together. Look at the edges in one of the binoculars and lightly close the other eye. Centre the binocular vertically using the vertical adjustment knob. If the edges are blurred all the way around, use the fore/aft adjustment to move the goggles closer to your eyes. Now, adjust the eye-span to move the binocular in the direction of the blurred edge. If the outside edge is blurred, widen the separation between the binoculars; if the inside edge is blurred, reduce the separation. Use vertical adjustment to keep the top and bottom edges clear in the same manner.

When both the edges are clear use the fore/aft adjustment to move the goggles slowly away from your eyes until all the edges just begin to blur. At this fore/aft position you will be able to detect very small deviations of the goggles' optical axis from your visual axis.

By making fine eye-span and vertical adjustments, move the binocular toward the blurred edges until you get a clear circular image. Lock the interpapillary position, by using the screws (see Figure 2-1). .

NOTE

If the goggles are at the maximum aft position and you still see blurred edges, try focusing the eyepiece lens. If the edges are still blurred, change the eye-span distance.

c. Indoor Binocular Focus Adjustment Procedure. To achieve a clear and relaxed binocular focus, use the following sequence:

CAUTION

When setting the eyepiece focus, you may achieve a clear image for each eye (monocular) and yet have a blurred image or develop eyestrain when viewing with both eyes (binocular). This occurs when the eyepiece focus is set for one eye while the eye is closed or covered. In this situation, your eyes tend to accommodate to a nearer distance than infinity, typically 1 to 3 feet. Over-accommodation or focus imbalance can cause eyestrain and periodic blurred vision.

NOTE

Perform the binocular focusing procedure in a dark area, but with significant light so the NORTIS-BNVS-31 operates without appreciable visual noise (scintillations).

- (1) Turn both objective focus rings (see Figure 2-5) fully counter clockwise and then turn both eyepieces focus rings approximately to the centre of travel.

- (2) Cover your left eye or cup your hand over the left objective lens. Do not close your left eye. Be careful not to touch the lenses.
- (3) Look at a target that is 20 feet away indoors and 100-200 feet outdoors (a vision chart or high contrast object that has lettering or fine detail). Use the maximum distance possible to see the best detail.
- (4) Slowly turn the right objective focus ring *clockwise*. When you achieve the sharpest image, stop.
- (5) Turn the right eyepiece focus ring *counter clockwise* until the image blurs slightly. Now turn the eyepiece focus ring slowly clockwise until you first obtain a clear image, the stop.
- (6) Repeat steps (2) through (5) above for the left binocular.

CAUTION

If you continue to turn the eyepiece focus ring clockwise after sharpest focus is achieved, the image may seem clear initially but you could experience eyestrain or headaches after prolonged use.

- (7) After adjusting both binoculars for best focus, cover the objective of the left binocular and view the right binocular checking to see if the image is still clear. If either binocular is not clear, repeat steps (2) through (5) for the unclear side.

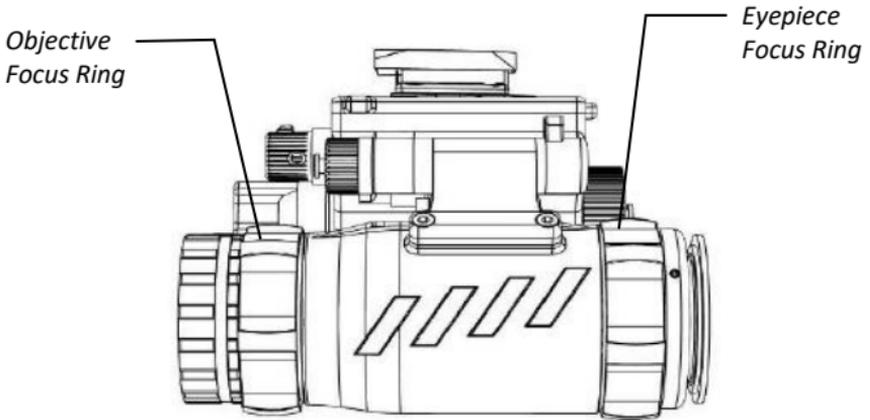


Figure 2-5. Objective Focus & Eyepiece Focus Ring

- (8) Turn OFF the NORTIS-BNVS-31.

d. Flip-up/Flip-Down Procedure.

WARNING

Use mount adaptor with magnet only. If helmet mount is not equipped with magnet turn OFF the OE-BNVS-

31 prior to flipping to the stow position. Failure to do so greatly increases the risk of detection by the enemy.

<h2>CAUTION</h2>

Do not attempt to flip-up or flip-down the binocular without using the lock-release button. Damage to the binocular or mount could result.

NOTE

The flip-up feature can be used when you do not need to use the binocular for short periods of time. For longer periods of non-use, remove binocular from mount and flip mount to UP position.

- (1) Turn the power switch of NORTIS-BNVS-31 to "ON" position or turn OFF the NORTIS-BNVS-31 Binocular, if helmet mount without magnet is in use.
- (2) Grasp the binocular with your hand then press in the lock-release button.
- (3) Smoothly, but firmly, push the binocular upward toward the top of the helmet until it stops.
- (4) Release the lock-release button. Make sure the binocular is locked in the up (stowed) position before releasing your hold on the binocular.

- (5) To flip the binocular back to the operating position, grasp the binocular with your hand.
- (6) Press in the lock-release button.
- (7) Smoothly, but firmly, pull the binocular downward until it stops.
- (8) Release the lock-release button. Make sure the binocular locks into the operation position.
- (9) Turn the NORTIS-BNVS-31 back to ON.

e. Use of the Infrared (IR) Illuminator.

To activate the IR Illuminator, pull the switch knob and turn one position IR. A red LED will illuminate in the right eyepiece and will remain on while IR illuminator is in use.

WARNING

The IR Illuminator is an active device that can be detected at great distance by other night vision devices. Exercise extreme caution when activating the illuminator.

f. Goggle Shutdown.

- (1) Turn the function switch to the OFF position. The green glow will disappear,
- (2) To remove the binocular from the carriage, grasp the binocular, push the carriage release button with your index finger, and the binocular will drop away from the carriage.

NOTE

Before returning the binocular or any component to the carrying case, make sure it and the carrying case are free of dirt, dust and moisture.

- (3) Remove the battery cap and take out the battery. Replace the battery cap. Do not store the NORTIS-BNVS-31 with the battery still in it.

2.5 Operation as a Hand-Held Viewer

- (1) If the goggle is to be used as a hand-held viewer, follow all the general procedures except that it will not be mounted on the helmet.
- (2) Place the neck cord or other strap around your neck.
- (3) Remove the objective lens caps.
- (4) Turn the switch one position to the ON position.

- (5) Adjust the eye-span distance for circular field of view.
- (6) Adjust the objective focus ring for the sharpest view. For most operational situations, the objective lens will be focused at or near infinity (all the way counter-clockwise).
- (7) Turn the eyepiece focus ring on each eyepiece for the sharpest view.

WARNING

The IR source is a light that is invisible to the unaided eye for use during conditions of extreme darkness. The IR illuminator can be detected at great distances by night vision devices. Exercise caution when using the illuminator.

2.7 Operation with 3X Magnifier

- (1) Install the 3X magnifier on the objective.

NOTE

The mated 3X magnifier and objective lens will turn as a unit to allow focusing.

- (2) Grasp the 3X magnifier and focus while observing an object until the sharpest image is obtained.

2.8 Operation in Dusty or Sandy Conditions

CAUTION

Operating the NORTIS-BNVS-31 in dusty or sandy conditions can pit and scratch the optical elements and damage the mechanical components.

When using the NORTIS-BNVS-31 in dusty and sandy environments, follow these precautions:

- (1) Install sacrificial filters and demist shields.
- (2) Avoid pointing the NORTIS-BNVS-31 into the wind unless it is necessary.
- (3) Keep the carrying case closed unless removing or replacing the contents.

CAUTION

When cleaning any of the lenses, be careful not to scratch them.

Make sure all dust and sand is removed from the NORTIS-BNVS-31, ancillary equipment and carrying case after operation.

2.9 Operation in Rainy or Humid Conditions

<h3>CAUTION</h3>

Operating the NORTIS-BNVS-31 in rainy or humid conditions can corrode and deteriorate the system unless specific precautions are followed.

When using the NORTIS-BNVS-31 in rainy or humid environments, follow these precautions:

- (1) Keep the carrying case (and storage case, if applicable) closed unless removing items.
- (2) Dry all parts that have been exposed to high levels of moisture. Do not put any parts of the NORTIS-BNVS-31 away wet or store them in a wet carrying case or storage case.

2.10 Operation in Salt Water Areas

Observe the following precautions when using the NORTIS-BNVS-31 in salt water areas:

- (1) After exposure to salt water, separate all the components and clean them with a soft cloth dampened with fresh water. Immerse the NORTIS-BNVS-31 if necessary.

- (2) Dry the components. Use lens tissue to clean the optical surfaces. Do not attempt to disassemble the binoculars. Do not put the NORTIS-BNVS-31 away wet or store in a wet carrying case.

2.11 Operation in NBC Environments

The NORTIS-BNVS-31 may be used while wearing a protective mask. Observe the following precautions when using the NORTIS-BNVS-31 in nuclear, biological and chemical (NBC) environments or when undergoing decontamination.

- (1) Do not use DS-2 to decontaminate the components. Instead, decontaminate with a 5-percent solution of sodium hypochlorite and clean with a cloth dampened with hot soapy water followed by immersion in fresh, clean water.
- (2) Dry the components. Use lens tissue to clean the optical surfaces. Do not attempt to disassemble the binoculars. Do not put the NORTIS-BNVS-31 away wet or store in a wet carrying case.

2.12 Stowage of NORTIS-BNVS-31

- (1) For proper stowage of the NORTIS-BNVS-31, ensure the unit and all accessories are clean and dry before returning to carrying case for extended storage. If items are stowed temporarily in a high humidity environment, clean and dry as soon as the mission permits.
- (2) Make sure the equipment and accessories are stored in the appropriate locations in the carrying case and close the cover.
- (3) Replace the lens cap on the objectives and eyepieces. Use the eye-span adjustment to adjust the eye-span distance to allow the binocular to fit into the case. Do not force it.

Section 3

Maintenance Instructions

3.1 Preventative Maintenance Checks and Services Table (PMCS)

a. General. To ensure the readiness of the NORTIS-BNVS-31, perform the preventative maintenance procedures prior to each mission. Preventative maintenance procedures include inspection, cleaning, and performance of the checkout procedures.

b. Warnings and Cautions. Always observe the WARNINGS and CAUTIONS appearing in the table. Warning and cautions appear before applicable procedures. You must observe the warnings and cautions to prevent serious injury to yourself and others, or to prevent your equipment from being damaged.

c. Explanation of Table Entries.

(1) Item Number Column. Numbers in this column are for reference. When completing Equipment and Maintenance Worksheet, include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must do checks and services for the intervals listed.

(2) Interval Column. This column tells you when you must do the procedure in the procedure column. BEFORE procedures must be done before you operate or use the equipment for its intended mission. DURING procedures must be done during the time you are operating or using the equipment for its intended mission. AFTER procedures must be done immediately after you have operated or used the equipment.

(3) Location, Check/Service Column. This column provides the location and the item to be checked or serviced. The item location is underlined.

(4) Procedure Column. This column gives the procedure you must do to check or service the item listed in the Check/Service column to know if the equipment is ready or available for its intended mission or operation. You must do the procedure at the time stated in the interval column.

(5) Not Fully Capable If: Column. Information in this column tells you what faults will keep your equipment from the being capable of performing its primary mission. If you make check and service procedures that show faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

NOTE

Damaged accessory items (sacrificial window, demist shield, compass) do not cause the entire end item to be “not fully mission capable”. However, the damaged item should be replaced as soon as practical to restore full capability of the system.

d. Other Table Entries. Be sure to observe all special information and notes that appear in your table.

Table 3-1. Preventative Maintenance Checks and Services for the NORTIS-BNVS-31

		Location		
Item No.	Interval	Check/ Service	Procedure	Not Fully Mission Capable If:
1.	Before	Maintenance Forms and Records	Open carrying case, inventory items and check for: <ul style="list-style-type: none">• Previously recorded faults on maintenance records.	Fault not corrected.
<u>OE-BNVS-</u> <u>31</u>				

2.	Before/ After	Optical Surfaces	Inspect all lenses (objective, eyepiece, IR lens and high light cut-off window) for dirt, fingerprint residue, chips or cracks. If necessary, clean and dry lenses with water and lens tissue.	Scratches or heavy scratches that hinder vision with binocular turned ON, or if cracks are present.
3.	Before/ After	Binocular Housing	Inspect external surfaces for cracks or damage. Scratches, cracks or gouges are OK if operation is not affected.	Cracks or damage in the battery housing.
			Inspect battery cap. Check to make sure battery cartridge is present. Remove battery cap and inspect for moisture, cracks, corroded or defective spring contacts, and o-ring present in cap	Cap is missing contacts damaged or corroded, o-ring is missing.
			Inspect monocular arms rotate full range.	Arms do not move.
			Remove battery and turn the power switch from OFF to ON. The position has to have a definite stopping point. Then pull and turn it to ON and IR positions. Each position should have a definite	Power switch has no definite stopping points or knob is broken or missing.

			stopping point. Inspect for broken or missing knob.	
			Install battery per paragraph 2.2 and check IR source.	IR source does not work.
			Check the high light cut-off with daylight or bright room light (3000Lux) by placing the lens cap on the objective lens. Turn binocular ON and observe that the system cuts OFF within 20 seconds.	If damaged, refer to higher level of maintenance.
4.	Before/ After	Goggle	Inspect for cracks or damage. Scratches, cracks, chips, and gouges are OK if operation is not affected.	Cracks or damage in the goggle.
5.	Before/ After	Eyepiece Lens	Rotate dioptre adjustments to make sure the eyepiece lens moves freely and is loose. Range is approximately ½ turn.	Binding, not moving freely or too loose.
6.	Before/ After	Eyecups	Inspect for dirt, dust, cracked or torn eyecups. Inspect for bent, broken, or improperly fitting eyepiece lens. If necessary, clean with water.	Chips and cracks are permitted on the eyecup retaining rings as long as they do not interfere with installation of eyecups.

7.	Before/ After	Objective Lens	Rotate focus rings to ensure free movement (range is approximately $\frac{3}{4}$ turn). Check objective lens for chips, cracks and dents.	Focus rings are binding or not able to move. Chips, cracks, or dents prevent full field-of-view or the ability to focus.
			Check the infinity focus locking ring for tightness. Check for cracks.	Cracked or loose.
8.	Before/ After	Neck Cord and Objective Lens Caps	Inspect for cracked, torn, or missing objective lens caps. Inspect neck cord for cut, damage, or loose ends. Re-tie ends if necessary.	Damaged.
9.	Before/ After	Viewed Image	Refer to paragraph 3.2 to inspect for operational defects.	Flickering, flashing, edge glow, or shading is observed.

NOTE

If any of the above items are damaged it may not cause the entire end item to be “not fully mission capable.” However, the damaged item should be replaced as soon as practical to restore full capability of the system.

