

# NIGHT HAWK<sup>™</sup> 4X

Night Vision Weapon Sight



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### OPERATOR MANUAL for

# NIGHT HAWK<sup>™</sup> 4X

Night Vision Weapon Sight

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#### ADVISORY OVERVIEW

The following description categorizes the level of risk associated with each cautionary statement displayed throughout the manual.

#### WARNING

HIGHLIGHTS AN OPERATION OR PROCEDURE WHICH, IF NOT STRICTLY OBSERVED, COULD RESULTININJURY TO OR DEATH OF PERSONNEL.

#### **CAUTION**

HIGHLIGHTS AN OPERATION OR PROCEDURE WHICH, IF NOT STRICTLY OBSERVED, COULD RESULT IN DAMAGE TO OR DESTRUCTION OF EQUIPMENT OR LOSS OF MISSION EFFECTIVENESS.

#### NOTE

HIGHLIGHTS AN ESSENTIAL OPERATION, PROCEDURE, CONDITION OR STATEMENT.

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# CHAPTER 1: GENERAL INFORMATION

#### 1.1 Introduction:

This manual provides operation and maintenance instructions for the NIGHT HAWK 4X. It also provides specifications and data on the performance of the weapon sight. To ensure the safety of the operator and the correct operation of the weapon sight it is recommended that this manual is read carefully in its entirety before any deployment or field application.

#### 1.2 Equipment Description:

The NIGHT HAWK 4X (Night Vision Weapon Sight) represents the latest in military night vision technology for medium and heavy weapon applications. Using either GEN II or GEN III image intensified technology, the NIGHT HAWK 4X is extremely rugged and reliable.

Due to the simplified reticle projection and parallax control, the NIGHT HAWK 4X is the most accurate night imaging device currently available in mass production. Designed to meet military requirements for long-range accuracy, the NIGHT HAWK 4X can be mounted on a wide variety of individual and crew-served weapons.

The weapon sight has a variable brightness reticle that can be boresighted to the weapon using the independent windage and elevation adjusters.

#### 1.3 Standard Kit Parts List:

The standard NIGHT HAWK 4X kit comes with the items listed in the following table.

| Item | Part No.                            | Description  | Qty. |
|------|-------------------------------------|--|------|
| 1    | NH4-32150<br>NH4-31600<br>NH4-31601 | NH 4X, GEN III, FOM 1250<br>NH 4X, GEN III, FOM 1600<br>NH 4X, GEN III, FOM 1601 | 1    |
| 2    | NH4-600                             | Soft Carrying Case   | 1    |
| 3    | 580-0001-0                          | AA Battery Alkaline  | 2    |
| 4    | 830-0044-0                          | Operator Manual  | 1    |
| 5    | 830-0048-0                          | Quick Reference Guide  | 1    |
| 6    | 170-12                              | Lens Cleaning Kit  | 1    |
| 7    | 830-0003-0                          | Sniper Data Book   | 1    |
| 8    | 7B257-2F                            | Shipping/Storage Case  | 1    |

Table 1-1 Standard Kit Parts List

#### 1.4 Standard Kit Parts Illustration:

The illustration below is provided for quick identification of the standard parts of the NIGHT HAWK 4X kit.

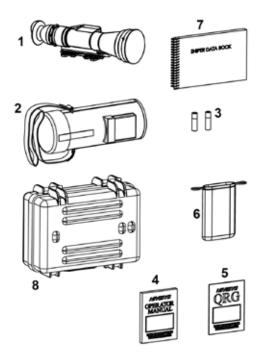


Figure 1-1 Standard Kit Parts Illustration

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#### 1.5 System Performance and Data:

The table below lists the technical specifications and data of the NIGHT HAWK 4X system. The data contained herein is subject to change without notice.

| ITEM                              | SPECIFICATIONS                            |  |
|-----------------------------------|---|--|
| Electrical Data                   |   |  |
| Power Source                      | Battery (3V DC max.)                      |  |
| Battery Requirements              | 1.5V AA Alkaline or Lithium (2ea)         |  |
| Battery Life                      | 60 hrs @ 23°C (73°F)                      |  |
| I                                 | Physical Data                             |  |
| Overall Dimensions<br>(L x W x H) | 309 x 98 x 91 mm<br>(12.6 x 3.9 x 3.6 in) |  |
| Weight with Mounts                | 1.5 kg (53 oz)                            |  |
|                                   | Optical Data                              |  |
| Magnification                     | 4.0 X                                     |  |
| Field of View                     | 8.3°                                      |  |
| Diopter Adjustment                | +2 to -5 diopters                         |  |
| Focus Range                       | 25 m (82ft) to ∞                          |  |
| Eye Relief                        | 30 mm (minimum)                           |  |
| F-Number 1.8                      |   |  |
| T-Number                          | 2.1                                       |  |
| Objective Lens                    | 125mm (4.9in)                             |  |
| Resolution                        | 57-64 lp/mm (typical)                     |  |

Table 1-3 System Performance and Data

| Environmental Data    |                                    |
|-----------------------|------------------------------------|
| Operating Temperature | -45° C to 85° C (-49° F to 185° F) |
| Storage Temperature   | -51° C to 85° C (-60° F to 185° F) |
| Environmental         | MIL-STD-810                        |
| Immersion             | 1m for 1 hour                      |
| Illumination Required | Overcast starlight to moonlight    |

Table 1-3 System Performance and Data, (cont.)

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# CHAPTER 2: PREPARATION FOR USE

#### 2.1 Introduction:

This section contains instructions for installing and attaching various components and accessories to the NIGHT HAWK 4X for operation under normal conditions.

#### 2.2 Battery Precautions:

#### WARNING

DO NOT MIX ALKALINE AND LITHIUM
BATTERIES. DO NOT MIX OLD AND NEW
BATTERIES. DO NOT MIX BRANDS OF
BATTERIES. DO NOT MIX DISPOSABLE AND
RECHARGEABLE BATTERIES. FAILURE TO
FOLLOWTHESEINSTRUCTIONS COULD RESULT
IN DEATH, INJURY OR IMPOSITION OF LONGTERM HEALTH HAZARDS.

#### WARNING

INSPECT BATTERIES FOR BULGING PRIOR TO USE. IF THE BATTERY SHOWS SIGNS OF BULGING, DO NOT USE.

#### WARNING

DO NOT HEAT, PUNCTURE, DISASSEMBLE, SHORT CIRCUIT, INCINERATE, ATTEMPT TO RECHARGE OR OTHERWISE TAMPER WITH THE BATTERIES. TURN OFF THE NIGHT HAWK 4X IF THE BATTERY COMPARTMENT BECOMES UNDULY HOT.

IF POSSIBLE, WAIT UNTIL THE BATTERIES HAVE COOLED BEFORE REMOVING THEM.

#### WARNING

DO NOT REPLACE BATTERIES IN A
POTENTIALLY EXPLOSIVE ATMOSPHERE.
CONTACT SPARKING MAY OCCUR WHILE
INSTALLINGORREMOVINGBATTERIESAND
CAUSEANEXPLOSION.FAILURETOFOLLOW
THESE INSTRUCTIONS COULD RESULT IN
DEATH, INJURY OR IMPOSITION OF LONGTERM HEALTH HAZARDS.

#### CAUTION

OBEY THE BATTERY MANUFACTURER'S DIRECTIONS FOR BATTERY DISPOSAL.

#### 2.3 Battery Installation:

Install two (2) AA batteries as follows:

- Remove the battery cap by turning the battery retainer knob in a counter-clockwise direction until a stop occurs.
- 2. Lift the battery cap from the battery compartment.
- 3. Observe the battery polarity symbology embossed on the side of the battery compartment.
- 4. Insert the batteries into the battery compartment.
- 5. Replace the battery cap by aligning the cap with the battery compartment and pressing closed.
- Securely tighten the battery cap to the battery compartment by turning the battery retainer knob in a clockwise direction

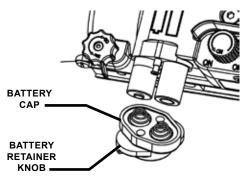


Figure 2-1 Battery Installation

#### 2.4 Attaching to a Weapon:

Perform the following procedure to install the NIGHT HAWK 4X onto a MIL-STD-1913 rail system:

#### WARNING

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

 Ensure that the NIGHT HAWK 4X is securely attached to the ARMS-#19A mount and mount interface.

#### NOTE

# WHEN THE ARMS-#19A IS MOUNTED CORRECTLY TO THE NIGHT HAWK 4X, THE LEVERS ARE LOCATED ON THE SIDE WITHOUT THE CONTROLS.

- 2. Open the levers of the ARMS-#19A mount perpendicular to the length of the weapon sight.
- 3. Place the NIGHT HAWK 4X on the MIL-STD-1913 rail system of the weapon.
- 4. Ensure that the mount is seated squarely on the rail.
- Close the levers of the ARMS-#19A mount towards each other.
- Ensure weapon sight is securely fastened to the weapon before firing.

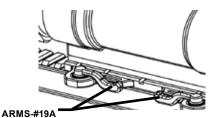


Figure 2-2 Weapon Mounted

LEVERS

#### 2.5 Eyecup Installation:

The NIGHT HAWK 4X is shipped with the eyecup attached. If the eyecup disengages from the NIGHT HAWK 4X during operation, use the following procedure to reinstall it:

- 1. Check for damage to the eyecup.
- 2. If it is damaged, replace it.
- 3. Check that the eyecup retaining clip is installed correctly. Ensure the following:
  - A. The retaining clip should be seated within the eyecup retaining clip groove.
  - B. The retaining clip should be stretched around the eyecup retaining clip groove and not threaded through it.

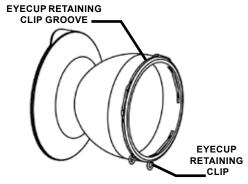


Figure 2-3 Correct Eyecup Retaining Clip Installation

- 4. Align the eyecup concentrically with the NIGHT HAWK 4X eyepiece.
- Press the eyecup onto the eyepiece so that the eyecup retaining clip fastens the eyecup to the eyepiece.
- 6. Ensure the eyecup is securely fastened to the NIGHT HAWK 4X.

#### NOTE

THE EYECUPRETAINING CLIPMAY HAVE TO BE SLIGHTLY ADJUSTED BY HAND IN ORDER TO INSTALL AND/OR ENSURE A SECURE INSTALLATION.

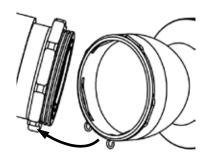


Figure 2-4 Eyecup Installation

# CHAPTER 3: OPERATING INSTRUCTIONS

#### 3.1 Introduction:

This chapter contains instructions for the safe operation of the NIGHT HAWK 4X under normal circumstances and environments

#### 3.2 Operational Precautions:

#### **CAUTION**

THE NIGHT HAWK 4X REQUIRES SOME AMBIENT LIGHT (MOONLIGHT, STARLIGHT, OR ARTIFICIAL LIGHT, ETC.) TO OPERATE. THE LEVEL OF PERFORMANCE DEPENDS ON THE LEVEL OF LIGHT.

#### NOTE

NIGHT LIGHT IS REDUCED BY PASSING CLOUD COVER, WHILE OPERATING UNDER TREES, IN BUILDING SHADOWS, ETC.

#### CAUTION

THE NIGHT HAWK 4X IS LESS EFFECTIVE VIEWING INTO SHADOWS AND OTHER DARKENED AREAS.

#### NOTE

THE NIGHT HAWK 4X IS LESS EFFECTIVE THROUGH RAIN, FOG, SLEET, SNOW, SMOKE, AND OTHER REFLECTIVE MATERIAL.

#### 3.3 Controls and Indicators:

The NIGHT HAWK 4X is designed to adjust for different users and corrects for most differences in eyesight. The controls and indicators are shown in Table 3-1 and described in Figure 3-1.

| Control and<br>Indicators       | Functions  |
|---------------------------------|--|
| Power Switch                    | Turns power on or off to the image tube and reticle.   |
| Range Focus<br>Knob             | This is used to focus the NIGHT HAWK 4X for viewing scenes on the range.   |
| Elevation and<br>Windage Screws | Controls reticle position (elevation and windage) so the sight can be zeroed to the weapon.                                |
| Eyepiece Focus<br>Ring          | Rotation of this ring adjusts eyepiece focus from +2 to -5 diopters.   |
| Reticle<br>Brightness Knob      | Adjusts the brightness of the reticle within the weapon sight.   |
| Battery Symbols                 | Symbology located on the side of the battery compartment to indicate the correct polarity of the batteries when installed. |

Table 3-1 Controls and Indicators

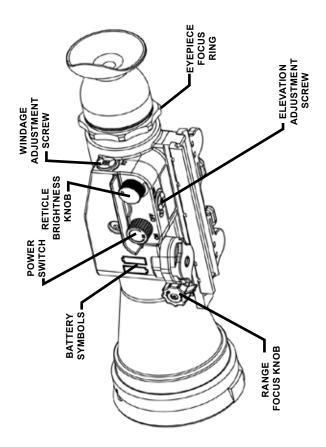


Figure 3-1 Controls and Indicators

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#### 3.4 Activating the NIGHT HAWK 4X:

To activate the NIGHT HAWK 4X perform the following procedure:

- Set the power knob to the "ON" position by turning it counter-clockwise until a "click" is sounded.
- 2. Visually check that unit has power by viewing a scene through the eyepiece.

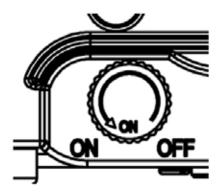


Figure 3-2 Power Switch Knob

#### 3.5 Adjusting the Reticle Brightness:

To adjust the reticle brightness perform the following procedure:

- 1. Turn the NIGHT HAWK 4X to the "ON" position.
- 2. Look through the eyepiece to verify the scene is visible.
- 3. Turn the reticle brightness knob in a counter-clockwise direction to increase the brightness.

#### NOTE

TURNING THE RETICLE BRIGHTNESS KNOB CLOCKWISE UNTIL A STOP OCCURS WILL NOT ENTIRELY REMOVE THE RETICLE FROM VIEW.

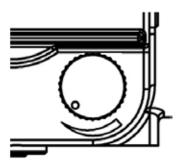


Figure 3-3 Reticle Brightness Knob

#### 3.6 Adjusting the Eyepiece Focus Ring:

The NIGHT HAWK 4X has an adjustable eyepiece with a range of +2 to -5 diopters and a 30mm eye relief to accommodate various users. To focus the eyepiece, perform the following:

- Turn on the NIGHT HAWK 4X and verify the scene is visible.
- 2. Increase the reticle brightness to maximum brightness.
- 3. Rotate the eyepiece ring clockwise or counter-clockwise to sharpen the reticle in the display.

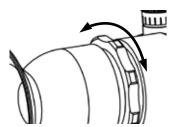


Figure 3-4 Eyepiece Focus Ring

#### NOTE

A DIOPTER IS A UNIT OF MEASURE INDICATING THE AMOUNT OF EYE CORRECTION FROM OPTICAL ZERO.

#### 3.7 Adjusting the Range Focus Knob:

The optics of the NIGHTHAWK 4X can be adjusted to view scenes at a range of distances. By turning the range focus knob clockwise or counter-clockwise the lens can be adjusted to focus distant objects from 82 ft (25 m) to infinity.

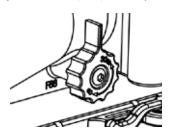


Figure 3-5 Range Focus Knob

#### 3.8 Reticle Patterns:

The NIGHT HAWK 4X incorporates a red DUPLEX reticle (using a standard MIL-formula design). The reticle can be zeroed with separate windage and elevation adjustments. The NIGHT HAWK 4X also has variable brightness control.



Figure 3-6 Reticle Pattern

#### 3.9 Windage Adjustment Screw:

The screw is marked "RT" (for Right) with an arrow pointing counter-clockwise. Turning the screw counter-clockwise (in the "RT" direction) moves the POI right and turning the adjustment screw clockwise moves the POI left. Each click (0.2 mR) of adjustment moves the point of impact (POI) 0.688 minutes of angle (MOA).

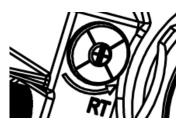


Figure 3-7 Windage Adjustment Screw

#### 3.10 Elevation Adjustment Screw:

The screw is marked "DN" (for Down) with an arrow pointing clockwise. Turning the screw counter-clockwise (in the "DN" direction) moves the POI down and turning the adjustment screw clockwise moves the POI up. Each click (0.2 mR) of adjustment moves the point of impact 0.688 MOA.

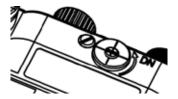


Figure 3-8 Elevation Adjustment Screw

#### 3.11 Shutting Down the NIGHT HAWK 4X:

To deactivate the NIGHT HAWK 4X perform the following procedure:

- Turn the power switch knob in a clockwise direction until a stop occurs.
- 2. Visually check that no scene is displayed, ensuring the unit is properly powered down.

#### 3.12 Preparation for Storage:

- Remove batteries from the NIGHT HAWK 4X.
- Inspect the battery housing for corrosion or moisture. Clean and dry if necessary.
- 3. Replace the battery cap.
- 4. Install objective lens cap.

#### NOTE

# PRIOR TO PLACING NIGHT HAWK 4X INTO CARRYING CASE, ENSURE THE NIGHT HAWK 4X AND CASE ARE FREE OF DIRT, DUST, AND MOISTURE.

- Place the NIGHT HAWK 4X and all other accessories in the soft carrying case. It is best to place the items in their original locations to prevent any possible damage to the unit and/or accessories
- 6. Return to storage area.

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# CHAPTER 4: MAINTENANCE INSTRUCTIONS

#### 4.1 Introduction:

The NIGHT HAWK 4X is designed to be used in diverse environments and rugged conditions. However, it is recommended that regular and simple maintenance is preformed for optimal system performance.

#### CAUTION

THE NIGHT HAWK 4X IS A PRECISION ELECTRO-OPTICALINSTRUMENTANDMUST BE HANDLED CAREFULLY.

# DO NOT TOUCH OR SCRATCH THE EXTERNAL LENS SURFACES.

#### 4.2 Deactivation:

Power down the system by turning the power switch knob to OFF.

#### 4.3 Battery Removal:

Open battery compartment, remove batteries and store in carrying case. Close the battery compartment before cleaning.

#### 4.4 Cleaning the NIGHT HAWK 4X:

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 very diluted detergent solution is permissible. Dry with a soft clean cloth, or allow unit to air-dry before storing it.

#### 4.5 Cleaning the Optics:

When cleaning of the lens is required, first blow any loose dirt or grit away from the surface of the lens. Use the supplied lens tissue lightly moistened with water or lens cleaning fluid to lightly wipe the optical surfaces, using a circular motion. Discard each lens tissue after one use to avoid transferring grit or foreign matter onto the lens surfaces. 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 a clean unused lens tissue.

#### 4.6 Checking for Damage and Corrosion:

As a general guideline, conduct an inspection of the NIGHT HAWK 4X, 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. Report missing or damaged items, for replacement.

# CHAPTER 5: TROUBLESHOOTING

#### 5.1 Troubleshooting Procedures:

Table 5-1 lists common malfunctions that may occur with the NIGHT HAWK 4X. Perform the tests, inspections and corrective actions in the order they appear in the table.

This table cannot list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or actions listed do not correct the fault, notify your maintainer.

| Malfunction                           | Test for Inspection             | Corrective Action   |
|---------------------------------------|---------------------------------|---|
| Weapon<br>sight fails to<br>activate. | Dirty battery box contacts      | Clean battery contacts  |
|                                       | Batteries installed incorrectly | Reinstall install batteries<br>in accordance with polarity<br>guide |
|                                       | Corroded or dead batteries      | Replace batteries   |
|                                       | Bad switch                      | Turn in for replacement   |
| Intermittent operation of reticle     | Weak batteries                  | Replace batteries   |

Table 5-1 Troubleshooting

| NIGHT<br>HAWK 4X<br>will not hold<br>zero | Loose mount hardware        | Re-tighten mount<br>screws and re-check the<br>zero |
|---|-----------------------------|---|
| Poor image quality.                       | Dirty lenses Improper focus | Clean lenses  Re-check eyepiece and range focus     |

Table 5-1 Troubleshooting, (cont.)

### APPENDIX A: SPARE AND REPAIR PARTS LIST

#### A.1 Introduction:

This section provides information needed to identify, contact and order spare and/or repair parts for the NIGHT HAWK 4X.

#### A.2 Contact Information:

To order spare or repair parts for the NIGHT HAWK 4X or any night vision products contact:

Nivisys, LLC 400 S. Clark Drive, Suite #105 Tempe, Arizona 85281 USA

Phone: 1-480-970-3222 Fax: 1-480-970-3555

#### A.3 Spare Part List:

The following is a list of parts that may be ordered for spare parts for the NIGHT HAWK 4X.

| Part No. | Description             | Qty. |
|----------|-------------------------|------|
| NH4-200  | Shuttered Eyeguard      | 1 ea |
| NH4-013  | Battery Cap Assembly    | 1 ea |
| NH4-500  | Objective Lens Cap/DLTF | 1 ea |
| NH-001   | Windage Knob            | 1 ea |

Table A-1 Spare and Repair Parts List

| NH-002     | O-Ring, Elevation Knob  | 1 ea |
|------------|---|------|
| NH-003     | Elevation Knob  | 1 ea |
| NH4-010    | Objective Focus Knob  | 1 ea |
| NH4-011    | Center Screw, Objective Focus Knob                              | 1 ea |
| NH4-012    | Set Screw, Objective Focus Knob                                 | 1 ea |
| NH-004     | ON/OFF Knob   | 1 ea |
| 731-0027-A | Set Screw (For Elevation Knob,<br>Windage Knob and ON/OFF Knob) | 1 ea |
| ARMS-#19A  | Dual Throw Lever Mount  | 1ea  |
| ARMS-#11   | Mount Interface   | 1ea  |
| NH4-502    | Eyecup Clip   | 1ea  |

Table A-1 Spare and Repair Parts List, (cont.)

# APPENDIX B: WARRANTY INFORMATION

#### **Equipment Warranties And Remedy:**

Seller warrants that each newly manufactured item sold hereunder and such portion of a repaired/refurbished item as has been repaired or replaced by Seller under this warranty, shall be free from defects in material or workmanship at the time of shipment and shall perform during the warranty period in accordance with the specifications incorporated herein. Should any failure to conform to these warranties be discovered and brought to Seller's attention during the warranty period and be substantiated by examination at Seller's factory or by authorized field personnel, then at its own cost, Seller shall correct such failure by, at Seller's option, repair or replacement of the nonconforming item or portion thereof, or return the unit purchase price of the non-conforming item or component. Buyer agrees that this remedy shall be its sole and exclusive remedy against Seller and that no other remedy shall be available or pursued by Buyer against Seller. In no event shall the Seller be liable for any cost or expense in excess of those described in this paragraph and expressly excluding any liability or damages for special, incidental or consequential damages.

The warranty period for newly-manufactured items shall extend 12 months from the date of shipment by Seller unless a different warranty period is agreed in writing to by Seller. The warranty period for repaired/refurbished electronic components shall extend for the unexpired warranty period or 90 days, whichever is longer, of the item repaired or replaced.

This warranty shall not extend to any item that upon examination by Seller is found to have been subject to:

A. Mishandling, misuse, negligence or accident.

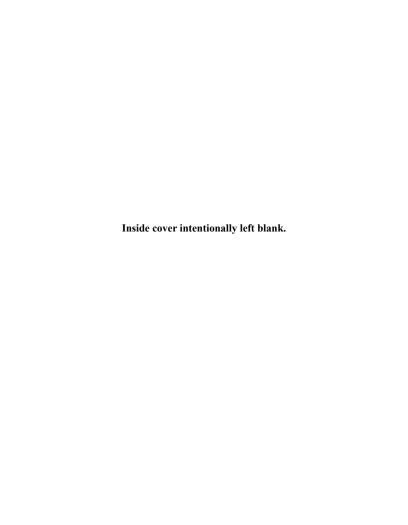
- B. Installation, operation or maintenance that either was not in accordance with Seller's specifications and instructions, or otherwise improper.
- Tampering, as evidenced, for example, by broken seals, damaged packaging containers, etc.
- D. Repair or alteration by anyone other than Seller without Seller's express advance written approval.

Failure to promptly notify Seller in writing upon discovery of any nonconforming item during the warranty period shall void the warranty as to such item. Buyer shall describe any such non-conformity in detail, expressing its position as to return of any article under the remedy provided herein. No returns shall be accepted without prior approval by Seller.

#### Return Material Authorization Number (RMA#):

Warranty and non-warranty items returned to Nivisys for repair or replacement require a RMA#. Email support@nivisys.com, call 1-480-970-3222 or fax 1-480-970-3555 with a serial number and detailed information to obtain a RMA#.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.





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nivisys.com