



**NIGHT VISION  
MONOCULAR / GOGGLES  
NVS 14-3GCS**

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105 Sparks Ave., Toronto, ON, M2H 2S5, Canada

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# IMPORTANT INFORMATION

Read prior to activation.

You have purchased a sophisticated electronic device. To operate it properly, please read this manual carefully.

**Ignoring operation procedures described in this manual will void your warranty.**

- **NEVER** disassemble the unit. This device contains a source of high voltage, which may be hazardous to your health.
- **NEVER** expose objective lens of an active unit to bright light, including daylight. In the daytime objective lens must be covered by cap. A tiny hole in lens cap provides enough light for daytime testing.
- **NEVER** aim an active unit at intense light sources, such as lights, headlamps, campfires, the Moon, etc.
- **NEVER** reverse the polarity of a battery.
- **NEVER** connect the unit to the external power supplies.
- **ALWAYS** remove battery when not in use for a long period.
- **ALWAYS** keep the objective lenses covered when not in use.
- **ALWAYS** store the unit in a warm dry place.

## **Precautions**

NVS 14-3GCS is a sophisticated precise optical instrument equipped with electronics. It should be handled with due care:

- Do not touch the optical surfaces other than for cleaning. Doing so may damage the anti-reflection coating.
- Clean optical surfaces with professional lens cleaning supplies.
- Use only a soft clean cloth to clean the exterior of the device.
- Keep the unit away from sources of heat, such as heating appliances, sunlight or central heating.
- Switch off the unit and remove the battery during the extended periods of non-operation.
- Do not apply an excessive force or pressure to the lens assembly, movable parts and thread connections.
- Small dark and/or light spots may be seen in the field of view due to considerable optical magnification of the eyepiece. This does not affect the operational capabilities of the device.

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# 1. OVERVIEW

NVS 14-3GCS (the unit) is an optoelectronic monocular, intended for observation of objects and orientation at night or under dark conditions. The unit is equipped with a generation 3 image intensifier tube, which amplifies low light, such as moonlight, starlight or man-made light. The unit is waterproof to the depth of 20 meters.

An add-on lens can be attached to the unit to increase magnification.

Two units can be combined to form a two-eye optical system with the help of an optional bridge.

Unit can be mounted on a helmet (headgear) or used as a standalone monocular.

## **Some typical activities where NVS 14-3GCS can be useful:**

- Law enforcement
- Wildlife observation
- Security
- Search and rescue
- Hunting
- Dark room photography (connected to a camera)

## **Features**

- Flip/flop mechanism provides for unobstructed vision when the unit is mounted on headgear or helmet
- Built-in infrared illuminator enables observation in total darkness (i.e. basement, cave or dark room);

- Optional helmet mount allows combatant operations
- Optional weapon mount allows night shooting or also be used in conjunction with halosight
- Optional bridge allows combining two monoculars into a binocular configuration
- Supreme waterproof design (20 meter deep immersion for 30 minutes)
- Soft rubber eyecup makes viewing comfortable
- Unit can be connected to photo or video camera

Please read all the instructions carefully before using it.

Manufacturer reserves the right to introduce minor design changes without notice.



## 2. DELIVERY SET

Standard\* Delivery Set includes:

	<i>Quantity</i>
NVS 14-3GCS unit	1
Arm mount	1
Headgear set	1
Lens cap / Battery cover	1
Manual	1
Lens cleaning kit	2
Carrying bag (soft)	1
AA Battery	1
Warranty card	1

### 2.1 Optional accessories

US clip mount	NVS Bridge
Demist shield	Hard case
Sacrificial window	Lens brush
3x add-on lens	Camera / video adapter
5x add-on lens	Helmet mount
Weapon mount	

\*Exact Delivery Set is subject to the specific contract terms.

### 3. SPECIFICATIONS

	NVS 14-3GCS 1x lens	NVS 14-3GCS 3x lens
Magnification	1x	3x
Field of view	40°	13°
Focus range, m	0.25-∞	3-∞
Exit pupil diameter, mm	20	
Eye relief, mm	25	
Dioptric correction	± 5	
Power supply	3V CR-123 Lithium battery, 1 pc. or 1.5 V AA Alkaline battery, 1 pc.	
Battery life, hours	20 hours with I/R 40 hours without I/R	
Size, mm	118x48x69	198x60x69
Weight, monocular only, g	300	540

**NOTE:** Due to continuous design improvements parameters may vary from those given above.

## 4. UNIT DESIGN



**FIGURE 1**

- |                                       |  |
|---------------------------------------|--|
| 1. On / Off and IR illuminator switch | 6. Battery compartment cover with battery type adapter |
| 2. Objective lens cap                 | 7. Battery compartment                                 |
| 3. Objective lens                     | 8. Dovetail platform                                   |
| 4. Eyepiece with eyecup               | 9. Manual gain adjustment knob                         |
| 5. NVS 14-3GCS housing                |  |

## **5. IMAGE INTENSIFIER TUBE SPECIFICATIONS**

The unit utilizes a small size inverting image intensifier with direct image transfer. The tube contains a microchannel plate, GaAs photocathode, yellow-green screen and built-in electronic high voltage DC to DC converter. The input window is made of flat surface glass. The output window is a concave fibre optics element with 180° image rotation.

SEE THE NEXT PAGE FOR DETAILS

## 5.1 Main parameters

Generation	3
ITT Model	N3XT3631IC
ITT Resolution, min	64 lp/mm
Photocathode operating diameter, mm	17.5
Photocathode type	GaAs
Photocathode sensitivity, min: Integral, $\mu\text{A}/\text{lm}$ , min	1800
Spectral at $\lambda = 850 \text{ nm}$ , mA/W, min	180
Tube light amplification, fl/fc, min	50,000
Image magnification	1
EBI, $\mu\text{lx}$ , max	0.25
Signal-to-noise ratio (SNR), min	23
Current consumption, mA, max	25
Manual gain adjustment range, %	20-100
Voltage, V	$2.8 \pm 0.8$
Length, mm	31.1
Diameter, mm	36.7
Tube life until parameters degrade, hrs	10,000
Operating temperature range, $^{\circ}\text{C}$	-50...+55

## 5.2 Spatial frequency-contrast characteristics (MTF)

Frequency, lp/mm		
2.5		0.88
7.5		0.72
15.0		0.50

## 5.3 Field of view cleanness

<b>SPOTS DIAMETER IN MICRONS</b>	<b>ZONE 1 Ø5.6MM</b>	<b>ZONE 2 Ø5.6-Ø14.7MM</b>	<b>ZONE 3 Ø14.7-Ø17.5MM</b>
> 230	0	0	0
150 - 230	0	1	1
75 - 150	0	1	2

## 6. OPERATION INSTRUCTIONS

### 6.1 Installing battery

Unit is supplied with uninstalled battery.

Prior to installing the battery, make sure the switch (1, Fig.1) is in the OFF position and the lens cap is on.

The unit can operate on either AA Alkaline or CR-123 Lithium battery. Lithium battery durability is doubled against the service time of conventional battery and provides better performance at low temperatures.

To install battery unscrew the battery compartment cover (6, Fig.1). When using CR-123 Lithium type battery, remove the battery type adapter. Observe the polarity indicated on the housing. Put the battery in and screw the battery cover back on.

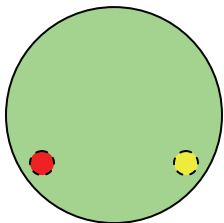
### 6.2 Switching the unit on

**In the daytime put on the lens cap with the daylight filter prior to switching the unit on.**

To check if the unit is operational switch it ON (rotate switch (1, Fig.1) clockwise) and look through the eyepiece (4, Fig.1). You should see greenish-lit screen. If the screen is not lit check the battery.

When the unit is ON user may see either one or two circular indicators through the eyepiece (Fig. 2). When inactive they are hardly noticeable. Bright yellow or flashing red spot indicates low battery voltage. For an uninterrupted operation keep a fresh

battery ready and replace it on time. Bright red indicator reminds the user that the IR illuminator is on (for more details on illuminator see 6.9).



**FIGURE 2**

IR illuminator indicator (red, left), Low battery indicator (yellow, right)

In the daytime with lens cap on it is normal to observe a fuzzy image. Switching on the night vision device in the daytime is intended for testing purposes only.

The rotating switch has four positions: “Off”, “Auto”, “On”, “IR”. In Auto mode the monocular will switch off automatically when turned upright. This mode saves battery life and allows avoiding greenish shadow on the face, which may disclose the user.

### **6.3 Switching the unit off**

After you have finished using the device, turn it off by rotating switch (1, Fig.1) to OFF position. Put a protective lens cap on the lens. Remove the battery from the battery compartment to avoid any damage of the device in case of electrolyte leakage.

### **6.4 Adjusting to individual vision**

Turn on the device. Direct the device at an object placed within 8-15m from the viewer. Obtain the sharpest image possible on the eyepiece screen by focusing the eyepiece lens (4, Fig. 1) and then the objective lens (3, Fig. 1).



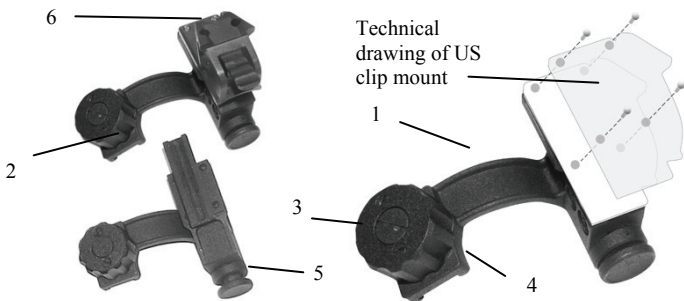
## **6.5 Focusing**

To obtain a sharp image at some other distances adjust the lens focus (3, Fig. 1) leaving the eyepiece setting intact. You should be able to obtain a sharp image for distances from 2-10m to infinity.

If you wear eyeglasses or NBC protective mask, you may like to fold the rubber eyecup.

## **6.6 Manual gain adjustment**

NVS 14-3GCS monocular is equipped with the manual gain adjustment handle. The light gain of the Image Intensifier Tube is set to the level, at which it allows viewing in the darkest conditions. While outside illumination increases at dusk, dawn, full moon or in the environment with artificial lights, the tube enters the Automatic Brightness Control (ABC) mode that automatically decreases gain to keep the screen brightness on the same level thus protecting both the tube and the observer's vision. It leads to situation when the contrast of the image (relation between the brightest and darkest patterns on the screen) becomes lower, and detection/recognition ranges become shorter. In order to prevent deterioration of device performance under higher illumination the user can rotate the manual brightness control knob counter clockwise to restore full functionality. The brightness control can be adjusted in the range of 20-100% .



### 6.7 Auto shut OFF at bright light

The NVS 14-3GCS monocular has a built-in high light sensor located near the IR illuminator (2, Fig. 1). This sensor shuts the monocular off after about 45 second exposure to light exceeding  $10^{-1}$  lux.

To reset the monocular switch it off and then back on as described in 6.3 and 6.2.

High-light shut-off feature does not mean that the unit will react to occasional flashes or bright spots. It protects the tube against excessive light exposure only.

### 6.8 Using the unit with headgear or helmet

The unit is supplied with headgear (5, Fig. 1). Prior to using the headgear adjust its straps so that the headgear fits the head comfortably but firmly and does not slide off when you are moving.

## FIGURE 3

1. “Swing arm” mount
2. Grooved pad
3. Locking knob
4. Unit groove
5. Flip button
6. US clip mount

The unit is attached to the headgear with a swing arm mount (1, Fig. 3). To attach the arm mount to the headgear loosen the tightening screw (8, Fig. 1) on headgear, slide helmet groove (2, Fig. 3) onto the rail, and then tighten the screw.

To attach monocular to the arm turn the knob (3, Fig. 3), slide the arm groove (4, Fig.3) along the dovetail platform of the monocular (10, Fig. 1), and then release the knob.

To set comfortable eye-relief (the distance between your eye and the eyepiece), loosen tightening screw (8, Fig. 1) on the headgear and move the unit, then tighten the locking screw.

To use the unit with PASGT head and helmet mount unscrew the grooved pad (2, Fig. 3) from the swing arm mount and screw on the US type clip (6, Fig. 3) using four screws (Fig. 3) instead. US type helmet clip is optional and must be ordered specially.

To switch between left and right eye, press the flip button (5, Fig. 3) on the mount and rotate it respectively until click.

### **6.9 Swinging head mounted unit for unobstructed view**

When the head mounted unit is not in use you can raise it to clear the view without taking the headgear off by using the “flip/flop” feature. To swing the unit from the view press the button (5, Fig. 3) and raise the device until you hear a click.

In “Auto” position of the switch, the monocular will turn off automatically. Reverse the operation to return the unit to working position.

### **6.10 Using IR illuminator**

In case of insufficient light when observing a close object turn on the IR illuminator by turning the switch (1, Fig.1).

Red indicator visible through the eyepiece will warn you when the IR illuminator is on.

*Note: The IR illuminator is visible to anybody equipped with a night vision device and can disclose the user’s presence.*

### **6.11 Installation of add-on lenses.**

**Always make sure that the monocular is switched off when you put on or take off the add-on lens.**

*Note: The following procedure is identical for 3x or 5x lenses*



**FIGURE 4**

· NVS 14-3GCS with attached 3x

*(or any other add-on lenses).*

Turn off the monocular. Remove the lens cap. Press the lens firmly towards the eyepiece. Do not apply excessive pressure. Make sure that the lens is fixed well on the monocular. To return the monocular back to 1x magnification, pull off the lens.

## **6.12 Demist shield and sacrificial window**

*Note: Demist Shield and Sacrificial Window are optional.*

Sacrificial window protects the objective lens from the abrasive influence of sand and dust in the night time. It should be put on the objective lens like an objective cap with the daylight filter.

Demist shield filter protects the eyepiece against fogging. To install it fold the eyecup to the very bottom to get the full access to the thread, and screw the filter gently onto the eyepiece.

## **6.13 Using the camera / video adapter**

Before using the (optional) adapters, remove the rubber eyepiece carefully.

The adapter (Fig. 5) consists of 2 rings:

- Camera adapter is 52x0.75mm. It fits the filter lens thread of various cameras, e.g. Nikon.
- Video adapter is 37x0.75mm. It fits Sony cameras and some others.

If our adapter does not fit your camera obtain a proper step up / step down rings.



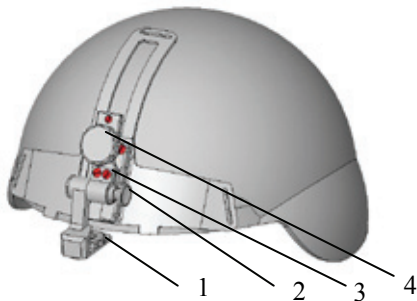
**FIGURE 5**

Camera / Video adapter

## 6.14 Using the helmet mount

The unit can be equipped with an optional helmet mount. This mount can be customized to fit a wide range of existing helmet models.

The mount is attached to a helmet with straps.



**FIGURE 6.** Helmet mount

- |                     |                               |
|---------------------|-------------------------------|
| 1. Locking screw    | 3. Flip-flop adjusting screws |
| 2. Flip/flop button | 4. Mount binding screw        |

The unit is fixed to the mount by the locking screw (1, Fig. 6). To adjust the position of the unit to your eye level use the screw (4, Fig. 6). To adjust the eye relief first loosen the locking screw (1, Fig.6) and set a comfortable distance between the eyes and the eyepiece; then tighten the locking screw back.

You can fixate the unit in three predetermined positions: vertical, horizontal, and 15-20 degrees above horizontal. Although the

relative angles between these positions cannot be changed, the starting point can be adjusted by screws (3, Fig.6). If you loosen them, you can rotate the flip-flop mechanism to find the suitable starting point. Tighten the screws (3, Fig.6) after the adjustment.

You can raise the unit for unobstructed view without taking the helmet off. To do so press (and hold) the button (2, Fig.6) and rotate the unit until you hear a click.

All other operations with the unit mounted on a helmet are identical to those with the headgear.

## 6.15 Mounting on a rifle

The unit can be mounted on a rifle with Picatinny mount adapter (MIL-STD-1913). The optical axle of the monocular coincides with the rifle's Picatinny rail.



**FIGURE 7.** NVS 14-3GCS with Picatinny

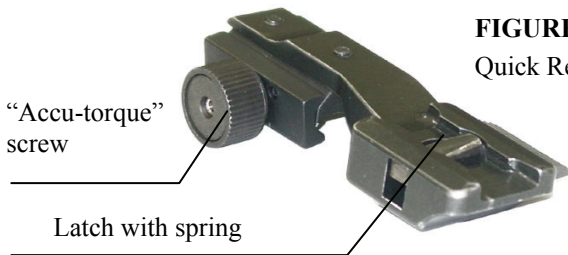
Two types of weapon mount adapters are available – Fig.7 and Fig. 8. Either adapter enables mounting the unit to the Picatinny rail. The type shown on Fig. 7 has two screws with large grooved heads for convenient tightening.

**Note:** *Over tightening the screws may damage the thread.*

The ‘Quick Release’ model (Fig. 8) utilizes a latch with a spring and patented accu-torque screw. You can attach and detach your monocular within a few seconds. The accu-torque screw fixes the mount with predefined torque thus protecting the thread from accidental damage caused by over tightening.

The advantages of the ‘Quick Release’ mount are:

- Quick removal and installation of the device;
- Foolproof design;



**FIGURE 8**

Quick Release adapter

- Increased reliability.

## 6.16 Using with a daytime rifle scope



Although the unit does not contain a reticle and thus cannot be used as a rifle scope, being mounted on a daytime rifle scope or red-dot sight, it enables aiming at night.

In this configuration the objective lens of the unit is mounted on an eyepiece of the

**FIGURE 9.**  
NVS Coupler



daytime scope with the help of an optional NVS Coupler.

### 6.17 Binocular configuration

Two units can be combined into dual channel goggles/binoculars with the help of an optional bridge. Optional lens can be attached to form a binocular 3x system.



**Figure 10.** Bridge

To form a double-unit system use the dovetail platform (10, Fig.1) located on both sides of the unit. These platforms are identical.

The tightening screw (8, Fig. 1) locks monocular to the bridge. In this configuration the unit can be used in a goggle (mounted on a headgear) or handheld.



**FIGURE 11.** Goggles configuration



**FIGURE 12.** Binoculars configuration

In the dual configuration the interpupillary distance can be adjusted between 58 and 72 mm right on a bridge.

## **7. TROUBLESHOOTING**

### **7.1 No green light through eyepieces**

Check that the batteries are installed properly.

Check the charge of the batteries. Replace them if they are weak.

### **7.2 Image is unclear**

Check if the lenses are foggy or dusty. Clean them if necessary.

If the image is still unfocused – adjust the eyepieces; see 5.5 and 5.6 for details.

### **7.3 Image flashes**

Image may flash during the first two minutes after activation. It may continue flashing if exposed to bright light (even with the lens cap on!).

### **7.4 Condensation accumulates on the parts**

When the unit is brought from the cold into a warm environment internal condensation may appear. The unit has to be warmed up for up to two hours to regain full operational capacity.

### **7.5 Visibility decreased or disappeared**

Bright light sources (the Moon, projectors or headlights) may cause visibility to degrade or even completely disappear. Move the device away from the light source immediately. The image will be restored within two minutes. Adverse atmospheric conditions such as fog, haze or extremely dark environments decrease visibility.

## 8. WARRANTY

NEWCON warrants this product against defects in materials and workmanship for one year from the date of the original purchase. Longer warranty is available, subject to the terms of the specific sales contract. Should your Newcon product prove to be defective during this period, please deliver the product securely packaged in its original container or an equivalent, along with the proof of the original purchase date, to your Newcon Dealer.

Newcon will repair (or, at its option, replace with the same or comparable model), the product or part thereof, which, on inspection by Newcon, is found to be defective in materials or workmanship.

### *What This Warranty Does Not Cover:*

NEWCON is not responsible for warranty service should the product fail as a result of improper maintenance, misuse, abuse, improper installation, neglect, damage caused by disasters such as fire, flooding, lightning, improper power supply, or service other than by a NEWCON Authorized Service.

Postage, insurance and shipping costs incurred while presenting your NEWCON product for warranty service are your responsibility.

## 9. CUSTOMER SUPPORT

Should you experience any difficulties with your Newcon Optik product, consult this manual first. If the problem remains, contact our Customer Support Department at +1(416) 663-6963 or toll free at 1-877-368-6666 (North America only). Our operating hours are 9am-5pm, Monday - Friday, Eastern Standard Time.

**Under no circumstances should the equipment be sent to Newcon without authorisation from our technical support department. Newcon accepts no responsibility for unauthorized returns.**

To locate NEWCON Authorized Dealer call:

+1(416) 663-6963 or fax: +1(416) 663-9065

Email: [newconsales@newcon-optik.com](mailto:newconsales@newcon-optik.com)

Web: [www.newcon-optik.com](http://www.newcon-optik.com)

The defective products should be shipped to:

**US Customers:**

2498 Superior Ave. Cleveland, OH 44114, USA

**From all other countries:**

105 Sparks Ave., Toronto, ON M2H 2S5, CANADA

# 10. ACCEPTANCE CERTIFICATE

Image Intensifier Tube serial number: \_\_\_\_\_

	Minimum	Measured
Resolution, lp/mm	64	
Photocathode sensitivity, integral, $\mu\text{A}/\text{lm}$	1800	
Light amplification	50,000	
Signal-to-noise ratio	23	

Date of production: \_\_\_\_\_

Quality Inspector: \_\_\_\_\_

NIGHT VISION DEVICE

**NVS 14-3GCS**

Unit serial number: \_\_\_\_\_

The unit complies with all technical specifications and has passed the inspection.

Date of production: \_\_\_\_\_

Quality Inspector: \_\_\_\_\_

Quality Assurance Seal

R1.GCS-10.11

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