

**Operation Manual**



**NIGHT VISION BINOCULARS/GOGGLES**

**NVS 7**

**NSN: 5855-20-000-8284**

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

# IMPORTANT INFORMATION

**Read prior to activation.**

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

**Ignoring the 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** open the objective lens of an active unit in bright light, including daylight. In the daytime the objective lens must be covered by cap. A tiny hole in the 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 any 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 device in a warm dry place.

## **Precautions**

NVS 7 is a sophisticated precise optical instrument equipped with electronics. It should be handled with due care:

- Unit contains fragile components. Avoid impacts, dust, moisture and sharp changes of temperature.
- 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 device 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 7 (the unit) is optoelectronic goggles intended for observation of objects and orientation at night or under dark conditions. The unit is equipped with a generation 2+ or 3 image intensifier tube, which amplifies low light, such as moonlight, starlight or man-made light.

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

Unit can be mounted on a helmet or headgear or used as night vision binoculars.

## **Some typical activities where NVS 7 can be useful:**

- Law enforcement
- Wildlife observation
- Security
- Search and rescue
- Hunting

## **Features**

- Built-in infrared illuminator allows observation in total darkness (i.e. cave or dark room);
- Helmet mount (optional) allows combatant operations
- Flip/flop mechanism provides for unobstructed vision when the unit is mounted on headgear or helmet
- Waterproof design (1 meter deep immersion for 30 minutes)
- Soft rubber eyecup makes viewing comfortable

Please read all the instructions carefully prior to using the unit.  
Manufacturer reserves the right to introduce minor design  
changes without notice.

## 2. DELIVERY SET

### Standard delivery set

	QUANTITY
<b>In goggles configuration:</b> NVS 7 unit with 1x lens and headgear	1
<b>In binocular configuration:</b> NVS 7 unit with 4x or 8x lens	1
Lens cap	1
Neck strap	1
Soft case	1
Manual	1
Warranty card	1
AA battery	2

### Optional accessories

3x afocal lens

Hard case

5x afocal lens

Helmet mount

Lens cleaning kit

Exact Delivery Set is subject to the specific contract terms.

### 3. SPECIFICATIONS

#### Unit specifications

Model	2HD, 2XT	3HD, 3XT
Image Intensifier Tube (IIT)	18 mm Gen. 2+	18 mm Gen. 3
Apparent field of view	40°	40°
Eye relief	25 mm	25 mm
1x Objective focal length / F-number	27.5 mm / F1.2	27.5 mm / F1.2
4x , 8x Objective focal length, mm / F number	100 / F1.5, 216.4 / F2.0	
Interpupillary distance	58-72 mm	
Focus range (1x)	0.25 m - ∞	
Dioptic correction	±5	
Battery type	2 standard AA batteries	
Battery life	Over 80 hours without IR; over 30 hours with IR	
Low battery indicator	√	
IR ON indicator	√	
Momentary IR button	-	√
Waterproof	1 m, 30 minutes	
Size, 1x / 4x / 8x	150x120x55 mm / 165x120x70 mm / 240x130x130 mm	
Weight, 1x / 4x / 8x	0.480 kg / 0.690 kg / 1.470 kg	

NOTE: As the design is being continuously improved the actual specifications may be better than those given above.

## Main tube parameters

IIT grade	HD	XT
Gen. 2+	NC064322	NCXT4322
Gen. 3	N3064322	N3XT4322
IIT , lp/mm	51-54	54-64

Image Intensifier Type (Generation/Grade)	2+ SD/ HD / XT	3 HD/ XT
Photocathode operating diameter	18 mm	
Photocathode type	S-25	GaAs
Photocathode sensitivity: Integral Spectral at $\lambda = 850$ nm	500 $\mu\text{A}/\text{lm}$ 45 mA/W	1,200 $\mu\text{A}/\text{lm}$ 120 mA/W
Light amplification	>35,000 fl/fc	
Image magnification	1x	
Max dark background brightness	$1 \cdot 10^{-3}$ cd/m <sup>2</sup>	
Signal-to-noise ratio	18-25	18-24
Current consumption, max	20 mA	25 mA
Voltage	2.8±0.8 V	
MTBF, hours	7K/10K/10K/15K	10K
Operating temperature range	-50°C ... +55°C	

### Spatial frequency-contrast characteristic

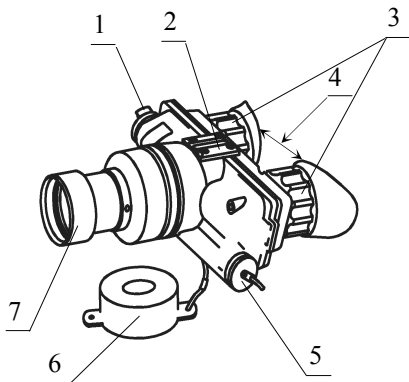
Frequency, lines/mm	Contrast transfer coefficient (HD)	Contrast transfer coefficient (XT)
2.5	0.89	0.92
7.5	0.68	0.80
15.0	0.40	0.58

### Field of view cleanness

Zone #	Zone diameter,  mm	Maximum diameter of defects			Accepted area of defects, total, mm <sup>2</sup>
		Neglected	Accepted		
			Ø, mm	Qty	
1	0 – 9.0	0.06	0.12	1	0.10
2	9.0 - 14.4	0.08	0.25	2	0.20
3	14.4 -18.0	0.10	0.20	2	0.35

## 4. UNIT DESIGN

1. On-Off, IR switch
2. Mounting socket
3. Eyepiece adjustment ring
4. Eyepieces
5. Battery compartment cover
6. Objective lens cover
7. Objective lens



**Figure 1.** NVS7 goggles



**Figure 2.** Headgear

8. Tightening screw
9. Lever

## 5. OPERATION INSTRUCTIONS

### Installing battery

Unpack the device. Unit is supplied with battery not installed.

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

Unscrew the battery compartment cover (5, Fig.1), and install 2 fresh AA batteries. Observe the correct polarity indicated on the housing. Screw in the battery compartment cover back.

### Switching the unit on

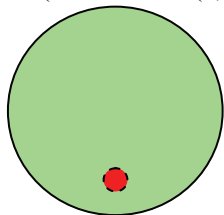
**In daylight put on the lens cap prior to switching the unit on.**

To check if the unit is operational switch it ON (rotate switch (1, Fig.1) clockwise) and look through 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 a circular indicator through the eyepiece (Fig. 3). It is hardly noticeable when not active.

**Flashing indicates low battery.** For uninterrupted operation keep fresh batteries ready and replace them on time.

**Solid red dot** indicates that the IR illuminator is on.



**FIGURE 3**

Low battery indicator

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

### **Switching the unit off**

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

### **Operating at night**

Take off the lens cover (6, Fig.1) from the lens (7, Fig.1). Turn on the device using switch (1, Fig.1). If lighting is insufficient, turn on the IR illuminator by turning switch (1, Fig.1). The red indicator (Fig. 3) will go on. IR illuminator is effective when observing an object located not far from the viewer.

The IR illuminator is visible to anybody with a night vision device.
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You can raise the unit up for unobstructed vision without taking the headgear off by using the “flip/flop” feature (Fig. 2). To do so: press the lever (9) and raise the device into vertical position, until you hear a click.

Reverse the operation for a working position.

### **Adjusting to individual vision**

Turn on the device. Direct the device at an object placed within 8-15 m from the viewer. Obtain the sharpest image possible on

the eyepiece screen by focusing the eyepiece lens (3) and then the objective lens (7, Fig.2).

### **Focusing**

To obtain sharp image at other distance adjust the lens focus (7, Fig.1) leaving eyepiece setting intact. You should be able to obtain a sharp image for distances from 2-10 m to infinity. If you wear eyeglasses or NBC protective mask, you may like to fold the rubber eyecup.

### **Using Unit with headgear**

Prior to using the unit with the headgear adjust all the straps to the head size.

When wearing the unit the eye-relief (the distance between your eyes and the eyepieces) should be 15-22 mm. In order to achieve this, loosen the locking screw (8, Fig.1) and set a comfortable distance between the eyes and the eyepieces; then tighten the locking screw (8, Fig.1).

### **Interpupillary distance**

The unit is designed to accommodate interpupillary distance of 58-72 mm without any additional adjustment and should be comfortable for 99% of adults.

### **Installation of interchangeable lenses**

Do not apply an excessive force when changing the lenses.
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The following procedure is identical for 1x, 4x, 5x or 8x lenses.

1. Make sure the unit is off.
2. Remove the lens cap (6, Fig.1).
3. Detach the current lens: hold the lens by its base (1, Fig.1) and rotate it counter-clockwise. Once the lens has been removed, store it in a safe, clean space.
4. Screw in (clockwise) new lens.

The threads are very fine (to prevent humidity penetration) and can be damaged easily. Do not apply force to the lens rotation. If lens does not screw in smoothly make sure that the threads match.

Unit is ready for operation immediately after the lens change.

**Warning: Forcing installation of the lens may damage the thread and cause costly repairs to both the goggles and the lens that are not covered by warranty.**



**Figure 5**

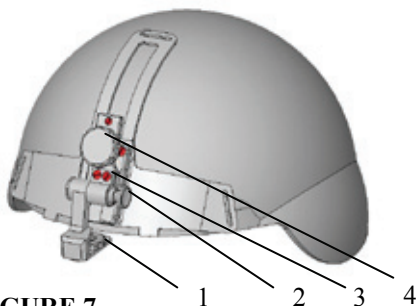
NVS 7 with 4x lens



**Figure 6**

NVS 7 with 8x lens

## Using helmet mount



**FIGURE 7**

- |                     |                               |
|---------------------|-------------------------------|
| 1. locking screw    | 3. flip-flop adjusting screws |
| 2. flip/flop button | 4. mount binding screw        |

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

The mount is attached to a helmet with straps.

The unit is fixed to the mount by a locking screw (1, Fig. 7). To adjust the position of the unit to your eye level use the screw (4, Fig. 7). To adjust the eye relief first loosen locking screw (1, Fig. 7) 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. 7). If you loosen them, you can rotate the flip-flop mechanism to find the suitable starting point. Tighten the screws (3, Fig. 7) 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. 7) 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. TROUBLESHOOTING

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

Check that the batteries are installed properly.

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

### **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.

### **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!).

### **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.

### **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 will decrease visibility.

## **7. WARRANTY**

**NEWCON** warrants this product against defects in materials and workmanship for one year from the date of the original purchase, but no more than 18 months from the date of manufacturing.

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.

If shipping from North America please include a cheque or money order payable to NEWCON OPTIK for the amount of \$15.00 to cover handling and return shipping.

## **8. 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:

**From USA only:**

2331 Superior Ave. Cleveland, OH 44114, USA

**From all other countries:**

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

## 9. ACCEPTANCE CERTIFICATE

Image intensifier tube serial number: \_\_\_\_\_

	Minimum	Measured
Resolution, lp/mm	51	
Photocathode sensitivity, integral, $\mu\text{A}/\text{lm}$	500	
Light amplification	35000	

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

Quality Inspector's signature: \_\_\_\_\_

## NIGHT VISION DEVICE

NVS 7-2HD  NVS 7-2XT

NVS 7-3HD  NVS 7-3XT

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

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

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

Quality Inspector's signature: \_\_\_\_\_

Quality Assurance Seal

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