

State Unitary Enterprise  
Production Amalgamation  
“Novosibirsk Instrument-Making Plant”



**PN-9K**  
**TWIN TUBE**  
**NIGHT VISION GOGGLES**  
**GENERATION 2+ AND 3**

Service Manual

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## **Introduction**

The Service Manual gives an information about PN-9K twin tube Night Vision Goggles (hereinafter referred to as the Goggles) and service rules. The Service Manual describes the Goggles designation, specifications, principle of operation and possible troubles.

# 1 Description of the Night Vision Goggles

## 1.1 Designation

1.1.1 The PN-9K twin tube Night Vision Goggles is designed for terrestrial observation and reconnaissance in natural night starlight or moonlight illumination and in total darkness with the aid of built-in infrared illuminator.

1.1.2 Operating temperature, °C -35...+35

Relative humidity at temperature 25°C 80%

1.1.3 The Goggles is powered with one AA battery.

## 1.2 Specifications

1.2.1 Identification range for man-sized target, m 180

1.2.2 Magnification of each branch, x: 1

1.2.3 Field of view for each branch, deg: 36

1.2.4 Range of focus, m 0.25...∞

1.2.5 Diopter adjustment range of eyepieces, d 3

1.2.6 Eye relief, mm 30

1.2.7 Exit pupil, mm 25

1.2.8 Image intensifier gain (for generation 2+ II tube)	20000
1.2.9 Battery life without illuminator using, h	
at temperature from 0 to 35°C	10
at temperature from -35 to 0°C	2
1.2.10 Supply voltage, V	1.5
1.2.11 Overall dimensions without head-mount, mm	127x105x50
1.2.12 Weight without head-mount, g	500
1.2.13 Weight with head-mount without counterweights, g	750
1.2.14 Weight with head-mount and counterweights, g	950

### 1.3 Package

Night Vision Goggles	1
Diaphragm	2
Head-mount	1
Bag	1
Soft Cover for Goggles	1
Soft Cover for head-mount	1
Service Manual	1

## 1.4 Design

1.4.1 The PN-9K Night Vision Goggles consist of two identical electro-optical branches intensifying weak image up to visible level.

The Goggles (fig. A1) consist of body 1, objective lenses 2, eyepieces 3 and infrared illuminator 7. The body 1 comprises two image intensifiers 8 and power supply with battery compartment 5. The body has the slot for attaching to the head-mount. The lenses 2 and the eyepieces 3 are provided with the rings for focus and diopter adjustment.

The handwheel 4 ensures the range focusing from 0.25 m to  $\infty$ . The removable diaphragms on the lenses are intended for operation in twilight and daytime conditions.

The binocular and infrared illuminator are activated by pressing of button ON atop. The infrared illuminator is placed between the lenses and engaged when natural object illumination is insufficient.

1.4.2 The head-mount 1 (fig. A.2) attaches the Goggles to a head. It provided with the holder having dovetail rail 3. The screw 2 locks the Goggles after setting and adjusting in most convenient position.

The holder can slide on guides 4 for vertical position adjustment. It is released by pressing on lockers 5 on both sides. Besides the holder with Goggles can be 6

flipped-up for unaided vision with pressing the clamp 8.

The head-mount is provided with adjustable straps and flexible shock-absorber 6 ensuring tight adjacency to the face. For proper head balancing there are removable counterweights 7.

## 2 Operation

**WARNING: Daylight can damage the Goggles switched on. It is strictly prohibited to switch on the Night Vision Goggles in daylight or local highlight conditions without the protective diaphragms on the lenses! Do not aim the Goggles at bright illuminated objects in dark time!**

2.1.1 Remove the cover 6 (fig. A.1).

2.1.2 Insert a battery into the battery compartment 5 according to polarity designated on the cover 6.

2.1.3 Set the cover 6. Remember that the diaphragms must be put on in daylight and twilight conditions.

2.1.4 Put the head-mount 1 (fig. A.2) on the head and adjust the straps.

2.1.5 Set the Goggles in the dovetail rail of head-mount 1, adjust the most convenient distance and lock the screw 2.

2.1.6 Press the lockers 5 on both sides and adjust the most convenient height.

2.1.7 Release the lockers 5.

2.1.8 Press the button ON (fig.1A) for 1.5 second at most to switch on the Goggles. When the image intensifier will shine adjust the eyepieces focus. In best position the honeycomb patterns of image intensifier screen is viewed. Adjust the lenses focus with the range focusing handwheel 4.

2.1.9 If illumination of object is insufficient press again the button ON for 1.5 second at least to switch on the infrared illuminator. The red spot within the user's field of view indicates the infrared illuminator operation. To switch off the IR illuminator press the button ON again (for 1.5 sec at least). The red spot will disappear.

2.1.10 Short pressing on the button ON switches off the Goggles totally regardless of illuminator's mode. If the battery is discharged the red spot will blink, indicating the need of battery replacement.

2.1.11 The Goggles is provided with the automatic brightness control and highlight cut-off circuits. If a viewed object illumination exceeds the admissible level the image intensifier gain is reduced up to total switching off. In last case



switch off the Goggles in order to avoid a damage of image intensifiers.

2.1.12 The Goggles operation can be continued when illumination conditions become tolerable.

## 2.2 Troubleshooting

2.2.1 In the case of a trouble check the follows:

- whether the polarity of the battery is proper;
- whether the battery is operable;
- whether the contacts of battery and battery compartment are clean;
- whether the lenses and eyepieces free of dirty, dust, oil, hoarfrost and water.

The table lists the possible troubles and methods of their elimination. If the mentioned methods do not eliminate a problem send the Goggles to local repair shop.

Table

Trouble	Possible cause	Method of elimination
The screens of image intensifiers do not shine or shine weak. The red spot blinks in the field of view	Battery is discharged. Incorrect polarity of battery	Replace the battery. Insert the battery properly
The image brightness rises to maximum and falls down or fluctuates disturbing the viewing. No image at all	Light overload	Put the protective diaphragms on the objective lenses
Image is degraded and blurred	Outer optical surfaces of lenses or eyepieces are sweated or dirtied	Wipe the lenses and eyepieces with flannel or cotton wool

## **3 Maintenance**

### **3.1 Safety precautions**

3.1.1 The Goggles is safe to handle due to its principle of operation, design, components and materials used.

3.1.2 The Goggles must be reliable attached to the head-mount during operation.

3.1.3 To avoid a pollution of environment it is recommended to refuse all used supply cells only in the places assigned for waste utilization.

### **3.2 Maintenance rules**

3.2.1 Prevent the Goggles against dirty, impacts and temperature shocks. After operation in dirty weather the Goggles should be cleaned and dried out. If the Goggles have been brought indoor from frost air do not open the bag or take out the Goggles within one hour. Protect the Goggles against sustained exposition of direct sunlight. Prevent an invasion of direct sunlight into the lenses.

The Goggles should be stored in a dry heated room at temperature no less than 5° far from heaters. The battery contacts must be free of corrosion for the storage period. The optical surfaces can be cleaned by means of dry napkin or cotton wool wetted with alcohol.

## 4 Acceptance certificate

4.1 PN-9K Night Vision Goggles, serial № \_\_\_\_\_, is in compliance with the specifications and found fit for service.

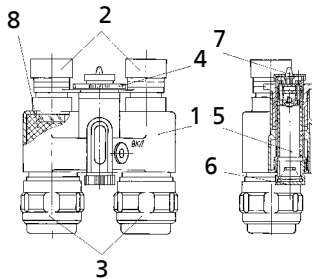
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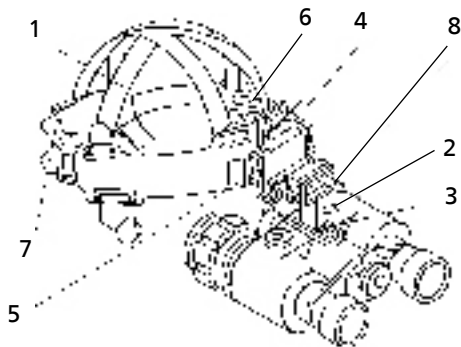
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# Figures



1 – body; 2 – lenses; 3 – eyepieces; 4 – handwheel; 5 – battery compartment;  
6 – cover; 7 – infrared illuminator; 8 – image intensifier

**Figure A.1 The Night Vision Goggles**



1 – head-mount; 2 – lock screw; 3 – dovetail rail; 4 – guides; 5 – lockers;  
6 – shock-absorber; 7 – counterweight; 8 – clamp

**Figure A.2 The Night Vision Goggles with head-mount**