

Federal State Unitary Enterprise Production Amalgamation  
«Novosibirsk Instrument-Making Plant»



# NIGHT VISION MONOCULAR PN-16K

Service manual  
ASCHE3.954.004 RE

**This device is a subject of continuous development and improvement, consequently there may be slight differences between the product and the information given herein.**

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## **INTRODUCTION**

The service manual is intended for studying and proper use of night vision monocular PN-16K (hereinafter referred to as the monocular). The service manual contains purpose, specifications, information about mechanism and operation of the monocular as well as troubleshooting instructions.

# **1 DESCRIPTION AND OPERATION OF MONOCULAR**

## **1.1 Purpose**

1.1.1 Night Vision Monocular PN-16K is intended for covert surveillance and ground movement, car driving, maps reading, repairing of technical equipment, as well as for aiming the weapon at the target under night conditions when completed with infrared aiming device.

1.1.2 The monocular is designed to operate in an open air environment within a temperature range of + 40 to – 30 °C and relative humidity up to 95% at temperature + 25 °C.

1.1.3 The monocular is powered by one AA battery 1,5 V.

## 1.2 Specifications

1.2.1 Recognition range of man size target (under illumination $(3-5) \times 10^{-3}$ lx), m, not less:	
with objective lens F 27	180
with objective lens F 80	300
1.2.2 Magnification, x, not less:	
with objective lens F 27	1
with objective lens F 80	3
1.2.3 Angular field of view, deg., not less:	
with objective lens F 27	36
with objective lens F 80	10
1.2.4 Focus range, m:	
with objective lens F 27	$0,25 \div \infty$
with objective lens F 80	$10 \div \infty$
1.2.5 Diopter adjustment range of eyepiece, D	$\pm 3$
1.2.6 Eye relief, mm, not less	30
1.2.7 Exit pupil diameter, mm, not less	25

1.2.8 Battery life without IR illuminator using, h at temperature from 0 to + 40°C	20
1.2.9 Supply voltage, V	1,5
1.2.10 Overall dimensions (without headmount), mm:	
with objective lens F 27	70×50×150
with objective lens F 80	80×70×220
1.2.11 Weight of monocular without battery and headmount, g, not more:	
with objective lens F 27	450
with objective lens F 80	800
1.2.12 Weight of monocular with battery, objective lens F27, headmount, g, not more	700

### 1.3 Composition of monocular

1.3.1 The composition of the monocular should be the same as indicated in table 1.

Table 1

Name	Quantity	Note
Night Vision Monocular	1	
3× objective lens	1	Optional
Headmount	1	
Bag	1	
Box	1	Optional
Service manual	1	



## **1.4 Design and operation of the monocular**

1.4.1 The night vision monocular PN-16K is an electro-optical device, the operating principle of which is based on conversion (intensifying) a low light image to visible level. The body 7 (figure A.1) includes the image intensifier tube (IIT) and power supply unit with battery compartment. The objective lens 5 (figure A.1), or interchangeable lens F80 (to increase the recognition range of objects) and the IR illuminator 6 are fastened onto the monocular body from the one side, the eyepiece 10 and the battery compartment cover 9 - on the other side. The eyeshade provides comfort and protects the eye from injury. There is a special seat for secure mounting of monocular onto the headmount in the upper part of the body. Clear image is provided by focusing the objective lens 5 and diopter adjustment of the eyepiece 10. The monocular and IR illuminator 6 are switched on by pressing the button 8 in the side panel of the body. The battery compartment is designed for AA battery 1.5V and closed with cover 9. The IR illuminator 6 (figure A.1) is located in the front of the monocular under the objective lens 5 and activates by user under insufficient illumination of the object. Light filter on the objective lens 5 of monocular provides the device operation under the twilight conditions.

1.4.2 The headmount 1 (figure A.1) is designed for placing the monocular on a head. The headmount construction consists of the rim, where the bracket for monocular mounting is located. The monocular is installed on the rail of dovetail type 4 at a comfortable distance from the eyes and clamped by screw with the help of the handwheel 11. The bracket with the device can be moved in a vertical direction along the vertical rails 13 with the help of the clamps 12 by pressing them from the two sides. The bracket with the monocular can be moved in a horizontal direction from one eye to another by pressing the latch 2. It is necessary to turn the eyeshade around 180 degrees. By pressing the button 3, it is possible to flip up the bracket with the monocular fastened on it. The straps are provided for fixation the headmount on a head.

The length of the straps is selected and regulated individually. The tight fit of the headmount to a face is provided with elastic shock absorber. Rest on the chin provides uniform load distribution on the head of observer.

## **2 PROPER USE**

### **2.1 Operational limitations**

**2.1.1 ATTENTION! The daylight can fry the switched on monocular.**

**It is prohibited to switch on the device in a daytime and under high local illumination at night without protective light filter on the objective lens as well as observe the bright illuminated object in the night time.**

### **2.2 Monocular usage**

2.2.1 Remove the cover 9 (figure A.1).

2.2.2 Load the battery into the battery compartment in accordance with designation, marked on the monocular body 7.

2.2.3 Place the cover 9 to it's place. Switch on the monocular only with light filter put on the objective lens 5 under twilight conditions.

2.2.4 Put the headmount 1 (figure A.1) on a head.

2.2.5 Adjust the length of the fastening straps of the headmount.

2.2.6 Place the monocular on keystone real 4 of the headmount 1.

2.2.7 Press the latch 2 and, moving the monocular in horizontal direction, set it in a convenient work position.

2.2.8 Release the latch 2.

2.2.9 Press the button 8 (figure A.1) less than 1.5 seconds and, observing through the eyepiece 10, assure the screen of image intensifier is shining. Adjust a sharp image of screen pattern by turning the eyepieces 10. Turn the objective lens 5 to focus on the observing object.

2.2.10 If illumination of the object is insufficient, activate the IR illuminator by pressing again the button 8 (for 1.5 seconds minimum). The red spot starts shining at the edge of the field of view. Press again the button 8 (for more than 1.5 seconds) to switch off the IR illuminator. The red spot becomes dim.

2.2.11 Brief press of the button 8 switches off the monocular (regardless of IR illuminator state).

2.2.12 A red spot starts blinking in the field of view, if the battery is discharging. This indicates the necessity of changing the battery.

2.2.13 The monocular is provided with automatic IIT screen brightness control and high-light cut-off circuit. If objects illumination exceeds maximum allowed,

the brightness of IIT screen automatically declines till its total darkening. Switch off the device by brief press on the button 8 to prevent damage of image intensifier tube.

2.2.14 After eliminating the causes of IIT disabling, the monocular can operate in usual mode.

2.2.15 Replace objective lens 5 to long-focus lens F80, while using the monocular with objective lens F80.

### **2.3 Possible malfunction**

2.3.1 In case of a trouble first check the following:

- whether the battery loaded with its polarities properly aligned;
- whether the battery charge is sufficient;
- whether the contacts of the battery and battery compartment are clean;
- whether the objective lens and the eyepiece are free of dust, dirt, oil, frost and water.

If the malfunctions, listed in the table 2 are not possible to eliminate or other malfunctions are found, appeal to repair shop.

Table 2

Malfunction	Possible cause	Method of elimination
Screen of image intensifier does not shine	Battery is improperly installed	Reload battery with its polarities properly aligned
Red spot blinks on the edge of the field of view	Battery is discharged	Replace battery
Image brightness rises to maximum and falls down fast or fluctuates disturbing the device operation	Light overload	Put light filter on the objective
Poor or blur image quality	External surfaces of eyepiece and objective lens are damp or dirty	Wipe the objective lens or the eyepiece with flannel or cotton wool

## **3 MAINTENANCE OF THE MONOCULAR**

### **3.1 Safety measures**

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

3.1.2 Ensure firm fastening of the monocular onto the headmount when using.

3.1.3 To avoid pollution of the environment it is recommended to dispose of used batteries appropriately.

### **3.2 Maintenance procedures**

3.2.1 Prevent the monocular against impacts, dirt, moisture and temperature shocks during service. After using in damp weather it is necessary to wipe and dry out the monocular. If the monocular has been brought indoors from a frost it is not recommended to open the bag or take it out within one hour. Protect the monocular against sustained direct sunlight exposition. Prevent an invasion of direct

sunlight into the monocular objective lens. The monocular should be stored in a dry heated room at temperature not less than 5 °C far from heaters. Remove the battery from battery compartment prior to storing the monocular. The contacts of battery compartment should be free of corrosion. Use a clean napkin or a cotton wool wet with alcohol to clean the optical surfaces.



#### **4 ACCEPTANCE CERTIFICATE**

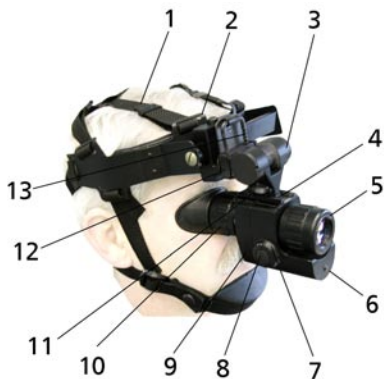
4.1 Night Vision Monocular PN-16K, serial No. \_\_\_\_\_ , is manufactured in accordance with mandatory state requirements, technical documentation and is fit for operation.

Date of issue \_\_\_\_\_

Signatures \_\_\_\_\_  
(stamp)

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## Appendix A



1 – headmount; 2 – latch; 3 – button; 4 – rail of dovetail type; 5 – objective lens;  
6 – IR illuminator; 7 – body; 8 – button ON; 9 – cover of battery department;  
10 – eyepiece; 11 – handwheel; 12 – vertical rails clamp; 13 – vertical rails

Figure A.1 – **View of monocular with headmount**