Public JSC
Production Association
"Novosibirsk Instrument-Making Plant"

Night Vision Device
PN-14K

Service manual

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1 PURPOSE

Pseudobinocular night vision device PN-14K can be used as:

a) goggles in complete set with 1^x objective and mask;

b) binocular, if the 1^x objective is changed to long-focus one (4^x, 5^x or 8^x).

Night Vision Goggles are intended for covert observation, orientation, travel, driving, map reading and repair tasks in starlight or moonlight illumination conditions. The built – in infrared illuminator provides operation of the device in total darkness.

The binocular provides observation at the distance up to 400m and more, depending on the used objective (4^x, 5^x or 8^x) and on the illumination level.

The device can be used under the ambient temperature from -50 to +50°C and relative humidity not more than 95% at temperature 25°C.

The device is powered with one AA battery 1.5 V. If the operation is carried out at the temperature 0°C, use frost-resistant power supply.

2 SPECIFICATIONS

Table 1

	PN-14K-1^{x} goggles	PN-14K-4^{x} binocular	PN-14K-5^{x} binocular	PN-14K-8^{x} binocular
Magnification, not less, x	1	4	5	8
Human figure recognition range under the illumination $(3\text{-}5)\times10^{-3}$ lux, not less, m	180	400	400	800
Field of view, not less, deg	40	9	8	5
Entrance pupil, mm	24	66	71	123
Focal range, mm	27	100	135	216
Relative aperture	f/1.25	f/1.5	f/2.25	f/2.3
Minimal focus range, m	0.25	5	10	10
Diopter adjustment, D	±5			

Continuation of the table 1

	PN-14K-1[x] goggles	PN-14K-4[x] binocular	PN-14K-5[x] binocular	PN-14K-8[x] binocular
Eye relief, not less, mm	15			
Exit pupil, not less, mm	16			
Interpupillary distance, mm	53-77			
Battery life with IR illuminator off, h				
at temperature from 0 to +50°C	24			
at temperature from -50 to 0°C	2-3			
Supply voltage, V	1.5			
Overal dimensions, mm	172x102x62	220x102x71	225x102x80	230x130x140
Weight, g, not more:	500	850	960	1700
Weight (with facial mask), g, not more:				
without counterweights	800			
with counterweights	1000			
Weight (with head mount), g, not more	770			

3 INVENTORY LIST

Night vision device	1
1^{x} objective lens F27	1*
4^{x} objective lens F100	1*
5^{x} objective lens F135	1*
8^{x} objective lens F216	1*
Facial mask	1*
Head mount	1*
Mechanism of mounting	1*
Strap	1
Napkin	1*
Bag	1
Service manual	1

* Optional

4 DESIGN AND OPERATION PRINCIPLE

Pseudobinocular night vision device PN-14K is an optoelectronic instrument intensifying a low light image to visible level. The body 2 (Figure 1) includes the image intensifier, power supply unit with battery compartment 3, desiccation cartridge 7 and infrared illuminator 7 (Figure 2). Outer parts of the device are changeable objective lens 1 (Figure 1) and eyepieces 5 with the eyeshields 4. Clear image is provided by focusing the objective lens 1 and diopter adjustment of the eyepieces 5.

Changing the objective lens 1 for the long-focus one allows using the device as a binocular (Figure 5, 6). The slots 2 (Figure 5) on both sides are intended for fastening the strap. Bracket 8 on top fastens the goggles to the head mount. The battery compartment is designed for AA battery 1.5 V and closed with cap 6.

The button ON 6 (Figure 2) activates the device or infrared illuminator depending on duration of pressing . The light filters ensure daytime and twilight operation.

The mask holds the goggles on a head; mask can be facial or head mount. The eye relief can be adjusted on the dovetail rail 5 and locked by means of the screw 4.

Vertical position of the goggles is adjusted on the rail 2 by pressing fixators 1. Pressing of the cramp 3, it is possible to flip up the goggles by more than 90°. For fixation of the mask on a head, straps are provided. The straps are adjusted individually by stretching them in special band slots. Flexible shock-absorber provides firm mask adjustment to face. For comfortable work during the long period removable counterweights are provided.

5 OPERATION

WARNING! Daylight can damage switched on device.

Do not switch on the device under daylight illumination or high local illumination without protective light filter. Do not observe bright objects in dark time.

1 Insert the battery into the battery compartment according to designated polarity AA 1.5 V +. At daylight and in twilight switch on the goggles (binocular) only when the light filter is put on.

2 Put the head mount on the head. Adjust the straps of the head mount.

3 Mount the goggles on dovetail rail 5 (Figure 5) of the head mount, adjust comfortable eye relief and lock the position with the screw 4.

4 Press both fixators 1 and, moving the goggles up, adjust vertical position of the goggles. Release the fixators 1.

5 Press the button ON 6 (Figure 2) less than 1.5 seconds. Check if the screen of image intensifier shines. Turn the eyepieces to adjust sharp image of screen pattern.

Turn the objective lens to focus on the object viewed.

6 Press the button ON for 1.5 seconds minimum to activate the infrared illuminator if illumination of the object is insufficient. The red spot starts shining at the field of view border. Press the button ON for more than 1.5 seconds again to switch off the IR illuminator. The red spot becomes dim.

7 Brief press of the button ON switches off the device regardless of IR illuminator state.

8 For binocular mode of observation replace the F27 lens 1 (Figure1) with the long-focus one F100, F135 or F216. Device with 8^x objective F216 is set on the tripod with thread 1/4" located on the bracket 2. To set the device in horizontal position you need to loosen the ring 3. Once the device is set turn the ring 3 up to the stop.

9 Insert the strap into slots 2 (Figure 5) and fasten with buckles.

10 Use the device as a binocular according to the paragraphs 1, 5-7.

Red spot starts blinking in the field of view if the battery is low. This points out that the battery needs to be changed.

The device is provided with automatic screen brightness control and high-light cut-off circuit. If objects illumination exceeds maximum allowed, brightness of image intensifier's screen is automatically cutting down. Switch off the device by brief pressing on the button ON to prevent damage of image intensifier. When the cause of light overload is removed, the device can operate in usual mode.

While working keep an eye on the colour of silica gel in the desiccation cartridge 7 (Figure 1). If colour changes from blue to pink, remove the desiccation cartridge, pour out silica gel and anneal it till the colour becomes blue.

6 MOUNTING THE PN-14K ON THE HELMET

Mechanism of mounting of the device consists of front mount and a hook (Figure 7) connected with the strap 3.

The device is fixed on the dovetail rail 5 with the lever. And once you push the button 4 device is ready for operation.

7 TROUBLESHOOTING

Table 2

Fault	Possible cause	Method of elimination
Screen of image intensifier does not shine	Battery is installed improperly	Insert battery correctly, check the polarity
Red spot is blinking on the edge of the field of view	The battery is low	Change the battery
Image brightness rises to the maximum and then falls to the extremely low level; or the image has the oscillating brightness that obstructs device operation	Light overload	Put light filter on the objective
Image is poor or smeared	Formation of dew or dirtying on the external surfaces of the objective lens, eyepieces	Wipe the eyepieces or objective lenses with the napkin

In the case of a device's malfunction first check the following:

- correctness of the battery insertion;
- whether the battery charge is sufficient;
- whether the contacts of the battery and battery compartment are clear;
- whether the optical surfaces are free of dust, dirtying, grease, frost and water.

If the faults, listed in the table 2 are not possible to eliminate or other faults are found, send the device to repair shop.

8 SAFETY MEASURES

The device is safe according to its principle of operation, design, components and materials used.

While using the device ensure secure fastening of it on the head mount.

To avoid the pollution of the environment it is recommended to throw out the spent batteries only in the places dedicated for their disposal.

9 MAINTENANCE AND STORAGE

Keep the device clean, prevent it against impacts, moisture and temperature shocks during service. After using in the conditions of damp weather, wipe and dry out the device.

If the device has been brought indoors from a frost, it is not recommended to open the bag or take out the device within one hour. Protect the device against sustained direct sun light exposure and its objective lens against sunlight invasion.

The device should be stored in a dry heated room at temperature not less than 5° far from heaters. Contacts of battery compartment must be free of corrosion.

Do not store the device with battery inside.

The optical surfaces are to be cleaned by means of dry napkin or cotton wool wetted with alcohol.

10 ACCEPTANCE CERTIFICATE

PN-14K night vision device with serial number_____ meets the specifications and state standards and is accepted for service.

Date of issue_____

Signatures_____
(stamp)

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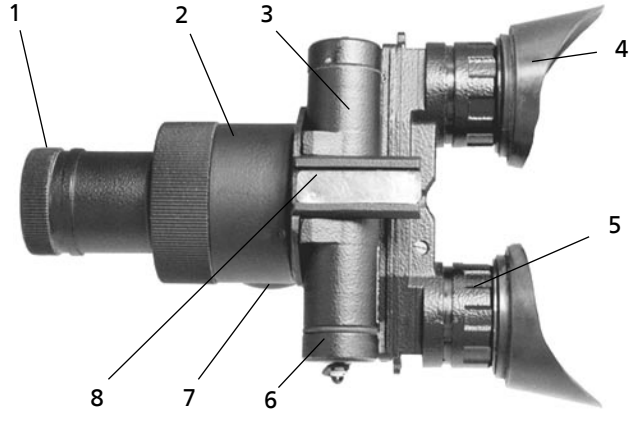
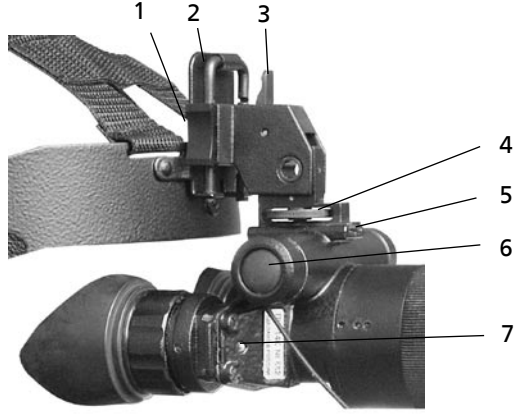


1 – objective lens F27; 2 – body; 3 – battery compartment; 4 – eyeshield; 5 – eyepiece; 6 – cap; 7 – desiccation cartridge; 8 – bracket

Figure 1 – **PN-14K Pseudobinocular Night Vision Goggles**



1 – fixator; 2 – rail; 3 – cramp; 4 – screw;
5 – rail; 6 – button; 7 – IR illuminator

Figure 2 – **Bracket**

Figure 3 – **The goggles with facial mask**

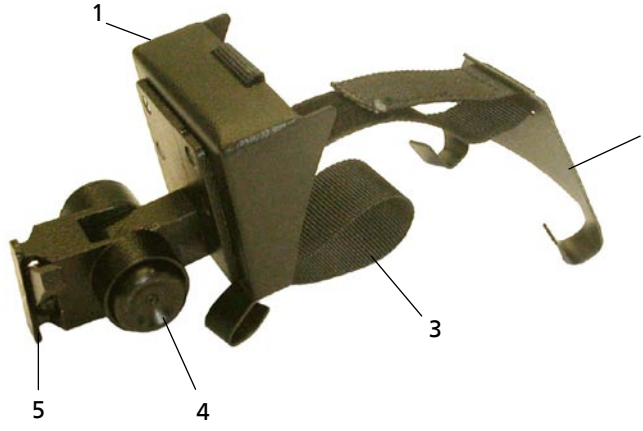
Figure 4 – **The goggles with head mount**

1 – objective lens F100; 2 – slot for strap

Figure 5 – **4ˣ binocular**

1 – objective; 2 – bracket; 3 – ring

Figure 6 – **8ˣ binocular**



1 – front mount; 2 – back hook; 3 – strap;
4 – button; 5 – dovetail rail

Figure 7 – **Mounting the PN-14K on the helmet**