Night-Vision Device
KONV-614

Operating manual

CONTENT

Operating manual (OM) worked out to provide correct and safe operation of night-vision device KONV-614 (further in the text “device” or “instrument”) and to carry out the evaluation of the Instrument technical condition with the goal to make decision whether it should be sent for repair. No additional training of the operator is required.

1. DESCRIPTION AND PRINCIPLE OF OPERATION

1.1 Area of application.

1.1.1. KONV-614 night-vision device is intended to observe objects from near and medium distances at low light conditions, as well as to protect objects, conduct rescue operations, ensure navigation safety, while operating in moderate climate conditions both outdoors and indoors.

1.2. Technical parameters.

1.2.1. Maximum observation range of the device in the direct line of sight without obstacles using standard lens to identify figure of a man of medium build in low light conditions (3-5)x10^{-3} lx is at least 200 meters.
1.2.2. Minimum distance up to 1 meter.
1.2.3. Angular field of vision with standard lens 40º. Direct zoom level 1.
1.2.4. Electro-optical converter (EOC) of 2+ generation, 18 mm MCP.
1.2.5. Image color - black and white. Photocathode sensitivity 550 uA/lm. Brightness amplification 25000. Resolution 57 lp/mm.
1.2.6. Range of eyepiece diopter adjustment ± 4 diopters.
1.2.7. Dominant wavelength of highlighting 850 nm. Maximum highlighting power 25 mW.
1.2.8. Three modes of operation: **EOC** without highlighting from the built-in illuminator, standard IR highlighting **IR1**, intense IR highlighting **IR2**.
1.2.9. Power supply from one CR123 battery. Supply voltage 3 V.
1.2.10. Continuous operation under standard climatic conditions from a new battery at least 48 hours.
1.2.11. Time to enable operation mode of the device and removable laser illuminator after switching, no more than 5 seconds.
1.2.12. Overall dimensions of the product no more than 125x57x75 mm, product in standard packaging, no more than 250x240x70 mm.
1.2.13. Weight of the device (without headband) no more than 0.35 kg.
1.2.14. Climatic conditions:
- Relative humidity no more than 95% at temperature 25 °C;
- operating temperature range from -10 °C to + 50 °C.

1.3. Delivery Set.

1.3.1. Product Delivery Set is specified in Table 1.

Table 1

Name	Pcs	Note
KONV-614	1	

Headband (full face mask)	1	
Additional (optional) lens -x5*	1	
CR123 battery	1	
Cloth for cleaning optics	1	
Operation Manual	1	
Data sheet	1	
Standard package (bag)	1	

Note: The positions marked * are supplied by the agreement with the client.

1.4. Principal of operation.

1.4.1. The main components of the device are shown in Figure 1 and 2.

Figure 1

Figure 2

1. Battery compartment lid	7. Fix position screw
2. Modes Switch	8. Fix position screw
3. Lens	9. Guide
4. Eyepiece	10. Lock-on button
5. Headband (full face mask)	11. Built-in IR illuminator
6. 'Dovetail' guide	

1.4.2. Structurally, the device is designed as a monocular containing brightness amplifier (electro-optical converter - EOC) with black-and-white glow of the screen, lens, eyepiece and a built-in infrared (IR) illuminator.
1.4.3. The case of the device is shock-resistant, airtight and made of IP67 aluminum alloy.
1.4.4. When storing, transporting and testing the device, the lens must be shut by a protective lid.
1.4.5. The eyepiece has a ring of diopter adjustment of sharpness according to the vision of the operator. There is a removable rubber eyecup on the ring.
1.4.6. EOC provides brightness amplification in the visible and close IR ranges.
1.4.7. The device has a built-in IR illuminator. Built-in IR illuminator is designed for operation at full darkness at a distance of up to 50 m.
1.4.8. Both the device and the illuminator are powered from a CR123 battery. The battery is located in the battery compartment and covered by the lid.
1.4.9. Modes Switch has three positions with the following settings:
- switched off (marked with a white dot);
- enabled (marked with a red dot);
- IR illumination enabled (marked with two red dots).
1.4.10. The device has a low battery indication shown as a green flashing LED in the eyepiece, as well as the indication of the infrared illuminator enabled as a red flashing LED in the eyepiece.
1.4.11. The device can be carried in a bag.

1.5. Marking.
1.5.1. Marking of products, which includes short name of the manufacturer or a trademark of the manufacturer, part number, individual serial number (consecutive numbering throughout the year) and year of manufacture marked on the code plate on the case of the device and on the package (bag). Bag with the device is packaged in a cardboard box. The markings on the cardboard package of the product may contain, in addition to the above markings, other information specified in the supply contract.
1.5.2. The product is sealed on a standard package (bag). The product itself is not sealed.

16. Packaging.
1.6.1. The product is packed in a standard package (bag).

1.6.2. The product in a standard package is packed in a matched transport packaging (cardboard box). Sealing and unsealing of the product is carried out by the representative of the QC department.

2. PROPER USE

2.1. Operational restrictions

2.1.1. Before starting, carefully read this Operation Manual
2.1.2. **It is prohibited** to assemble or disassemble the device or its parts, connect or disconnect cables, adjust lens in the conditions of high humidity (over 90%), condensate, or the possibility of water penetration into the interior content of the product and its parts.
2.1.3 **It is prohibited** to immerse the product into water, do not turn on the product in the case of water ingress, or operate the product at temperatures beyond the limits specified in p.1.2.14.
2.1.4. Do not direct the lens at the pin-hole light sources (lamps, lights, etc.) for more than 10 seconds, as long-term exposure to high intensity radiation can cause permanent damage of the photocathode of EOC receiver.
2.1.5. When testing the functionality of the device at high levels of ambient light, enable EOC only with protective lens lid on.
2.1.6. **It is prohibited** to use batteries with traces of corrosion.
2.1.7. **It is prohibited** to turn on the device with the lid removed during the day and at light above the allowable limits (0.5 lux and above).
2.1.8. **It is prohibited** to look into the output window of IR illuminator when it is being enabled.

2.2. Getting Started.

2.2.1. Before using the device, make sure there is no violation of operational restrictions.
2.2.2. Remove the unit off the standard package (bag).
2.2.3. Make sure there is no mechanical damage of the device.
2.2.4 Make sure the lens is shut by the lid, and the Modes' Switch is in off position
2.2.5. Open battery compartment lid, install the battery according to the marking and close the lid.
2.2.6. When using the device with a headband (full face mask), do the following:
- mount the monocular on the headband (5);
- using 'dovetail' guide (6), hold the instrument with the screw (7);
- place the headband on the head;
- adjust the straps tight to the comfortable position;
- release the screw (7) and move the monocular close to the eyes;
- adjust the position of the monocular relative to the eye in a parallel plane, to do this release the screw (8) and moving the guide (9) to the right or to the left, set the most comfortable position, and tighten the screw (8);
- when pressing the button (10), the device can be switched to the upper position relative to the head;

- the mount mechanism provides additional rotation of the monocular, to do this this press (10), shift the monocular to the top position and pressing with little effort on the monocular, tighten it to the head radially. In this case, when shifting the monocular back to the operating position before button fixing (10), press the monocular further down to the convenient position for the eye.
2.2.7. The device is ready to start operating

2.3. Product Use
2.3.1. Enable the device. To do this, set the Modes' Switch to on position. Looking through the eyepiece, make sure there is a black-and-white light of EOC output screen.
2.3.2. Direct the device to the object and focus the image using lens focus control ring, if necessary, adjust the sharpness of the image by rotating the eyepiece diopter ring.
2.3.3. Conduct observations, if necessary, use IR illumination.
2.3.4. After the end of operation, turn off the device and remove the battery.

2.4. Safety measures.
2.4.1. In case of fire on the device, power it off and take measures to put out fire.
2.4.2. In case of emergency operating conditions (high temperature, humidity, vibration, etc.), take measures to reduce the impact of emergency factors on the product.

3. MAINTENANCE SERVICE
3.1. Product maintenance does not require special training of staff.
3.2. Optical surfaces of the device (eyepiece, output window) when dirty should be cleaned only with a clean cloth made of genuine or microfiber suede, designed for cleaning optical parts (eg glasses). Before that blow away the grains of sand and dust. To remove heavy grease, use a cotton swab moistened in ethanol, having preliminary removed solids from the optics with a soft brush, then immediately wipe with a dry cotton wool. If you notice dirt on the internal optical surfaces of the lens, eyepiece, photocathode and EOC output screen, remove the lens and eyepiece and carry out the above operations..
3.3. Product functional testing and its technical inspection is controlled by checking paragraphs 1.2.1., 1.2.2.
3.4. Preservation (degreasing, reconservation) of the product is carried out by packing it in its standard package (bag).

4. REPAIR
4.1. Current repair of the product is carried in accordance with Table 2.

Table 2

Failure and damage consequences	**Possible Reasons**	**Troubleshooting**
No light on the output screen of EOC.	Battery depleted	Replace the battery
	Contact in battery compartment failed	Check and clean contacts if necessary
Low image quality. Blurred image	Dirty input lens or eyepiece Lens or eyepiece not focused	Use spirits to clean the optics Focus the optics.
Black dots in the vision field	Small amount of black dots is allowed by the manufactures of EOCs	Allowable. Does not affect image quality.

4.2. In case of malfunction of the device after operations listed in Table 2, and in case of failure or damage of the EOC, please contact the manufacturer.

5. STORAGE

5.1. Storage conditions.

5.1.1. The device should be stored packed on the shelves in the capital heated rooms at temperature from 5 °C to + 40 °C and a relative humidity of 80% at temperature of +25 °C at no vapors of acids, alkalis, current-conducting dust and other chemically active substances, gases that cause corrosion and destroy insulation. It can be stored in a standard package when stacked (horizontally) on the shelves with up to 4 products. Stacking in a vertical position is not allowed.

5.2. Storage life

5.2.1. Storage life of the product in a standard package is 1 year in heated ventilated premises at ambient temperature from + 50 °C to + 400 °C and a relative humidity of up to 80% at temperature of 25 °C.

5.3. Terms of placing the product in storage and withdrawing it from storage.

5.3.1. When placing the product for storage, its components must be carefully packed in a standard package. When withdrawing it from storage, the components of the product should be removed from the package and kept under standard climatic conditions for at least 12 hours.

6. TRANSPORTATION

6.1. Requirements for transportation and transportation conditions.

6.1.1. Transportation of the device is carried out in a transport container by all kinds of goods and passenger transport at a height of no more than 12,000 meters at ambient temperatures from -50 °C to + 60 °C and protected against direct exposure of precipitation and reactive components. When carried in railway wagons, the shipment should be small low-tonnage. After transportation and before using, keep the product in standard climatic conditions for at least 12 hours.

6.2. The procedure to prepare the product for transportation and methods of attachment during transportation.

6.2.1. Before transporting the product in a standard package, it can be packed into an extra matched shipping container (carton or plywood box). Products in transport containers should be secured in such a way as to ensure the stability of their position, excluding mutual displacement and strokes. During loading, unloading and transporting, the requirements of handling marks on the shipping container must be strictly observed.

6.3. Transport characteristics of the product.

6.3.1. Dimensions of the product in standard package (bag) without headband no more than 250x240x70 mm.

6.3.2. Product weight in standard package (bag) without headband no more than 1 kg.