FORTUNA



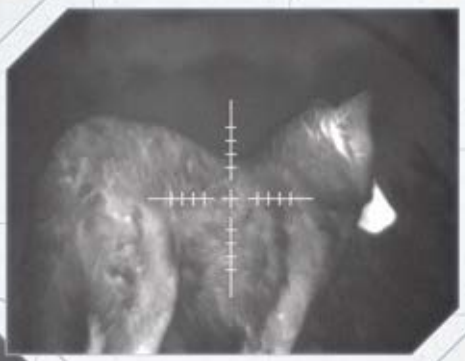
THERMAL IMAGING

FORTUNA

GENERAL CLIP-ON

40A6 | 50A3 | 50A6

USER MANUAL









USER'S MANUAL

THERMAL IMAGING
FORTUNA GENERAL CLIP-ON

CONTENT

1. General Information 4
2. Device Features and Application 5
   2.1. Application 5
   2.2. FORTUNA GENERAL CLIP-ON Features 5
3. Shipping Kit 7
4. Accessories 8
5. Device Design and Controls 9
6. Operation 12
   6.1. Unpacking 12
   6.2. Installing the Batteries 12
   6.3. Turning On and Off 13
   6.4. Focusing 13
   6.5. Calibration 13
7. Electronic Adjustment of the Device 14
   7.1. Selecting "white – hot", "black – hot" image 15
   7.2. Image Adjustment 15
   7.3. Menu 17
   7.4. Display 17
   7.5. Zeroing 19
   7.6. Pixel Correction 20
   7.7. Language 24
   7.8. Reset 24
8. Attaching the External Power Supply 26
9. Attaching Video-Recorder 27

10. Troubleshooting....28
11. Maintenance and Storage....29
11.1.Maintenance....29
11.2.Cleaning....29
11.3.Preparing for Storage....30
11.4.Storage....30
12. Warranty....31
13. Acceptance Certificatee....33

1. General Information

In this manual you can find the instructions for use, maintenance and servicing of the thermal imaging front attachment of FORTUNA series. In the further manual these devices are referred to as «device», «thermal imaging attachment» or «attachment».

2. Device Features and Application

2.1. Application

The thermal imaging front attachment is developed to be installed on weapon in front of the scope lens for shooting both in the darkness (at night) and in the daytime in the mist, light rain, snow, fog and smoke. The device detects passively the thermal radiation of objects and landscapes, is flash resistant and does not need additional source of light. Although the device limits the visibility through glass, water, heavy rain or snow.

The micro-bolometer-based device features shutterless technology enabling quick start and continuous image without stops and delays. The specially developed control electronics of the attachment works without complicated menu.

Ballistic corrections and 4 memory slots enable saving zeroing profiles for different distances and/or different types of ammunition.

The thermal imaging attachment is reliable, compact and user-friendly. All the main functions are easily controlled with separate buttons. Each attachment has passed the pre-sale impact and weather-resistance tests.

Attention!
It is absolutely forbidden to point the thermal imaging device at the high-temperature objects (the sun, welding, fire, etc.)

2.2. FORTUNA GENERAL CLIP-ON Features

- observing and aiming at any time of the day and in poor weather conditions;
- 384x288/640x480 core, 17 μm, 50/25 Hz;
- high-aperture high-quality germanium lens;
- light waterproof enclosure of aluminium alloy with rubber grips;
- impact-resistant design, standing against the recoil of large-calibre weapon;
- color high-resolution OLED display;
- electronic calibration;
- user-friendly digital menu;
- «white - hot», «black - hot» modes; color palettes;

- up to four zeroing profiles to be saved;
- up to four image settings profiles to be saved;
- PAL video output;
- possible connection to external power supply of high capacity and video-recorder to save the image on the SD card.

3. Shipping Kit

The shipping kit of the FORTUNA thermal imaging front attachment is listed in table 1.1.

Table 1.1.

FORTUNA thermal imaging front attachment	1
Power batteries CR123A	2
External power supply cable	1
User's manual	1
Pouch (case)	1

4. Accessories

Upon request, the shipping kit can include:

- Weaver/Picatinny rail mount;
- Adapter ring for mounting on the scope;
- 5V external power supply;
- Video cable;
- Video recorder to save image on the SD card;
- Hard case for carrying and storage of the device.

Table1.2. provides the information on physical, electrical, mechanical, optical and performance specifications of FORTUNA GENERAL CLIP-ON thermal imaging device.

Table 1.2.

Model	40A6	50A6	A 50A3
Thermal imaging core	640x480, 17 µm		384x288, 17 µm
Spectral range, µm	7.5 ….14		
Frequency, Hz	25		50
Sensitivity, mK	<50		
Calibration	electronic, silent		
Lens	40 mm, F/1.0	50 mm, F/1.2	
Optical zoom	x1		
Field of View, deg	15.2 x 11.5	12.3 x 9.3	6.3 x 5
Lens focus	Fixed, from 10m to ∞	Manual, from 5m to ∞	
Pace of corrections, distance 100m, cm	4.3	3.4	1.7
Display	AMOLED 800x600		
Power supply	CR123A x 2 pcs. (RCR123A x 2 pcs.)		
Minimal continuous run time at 25°, h	5		
Protection class	IP67		
Maximum impact load, g	500		
Operating temperature range, ℃	-30 … +50		
Dimensions, mm	52x72x180	60x74x183	60x74x205
Weight with batteries (CR123A x 2 pcs), g	~680	~750	~790

5. Device Design and Controls

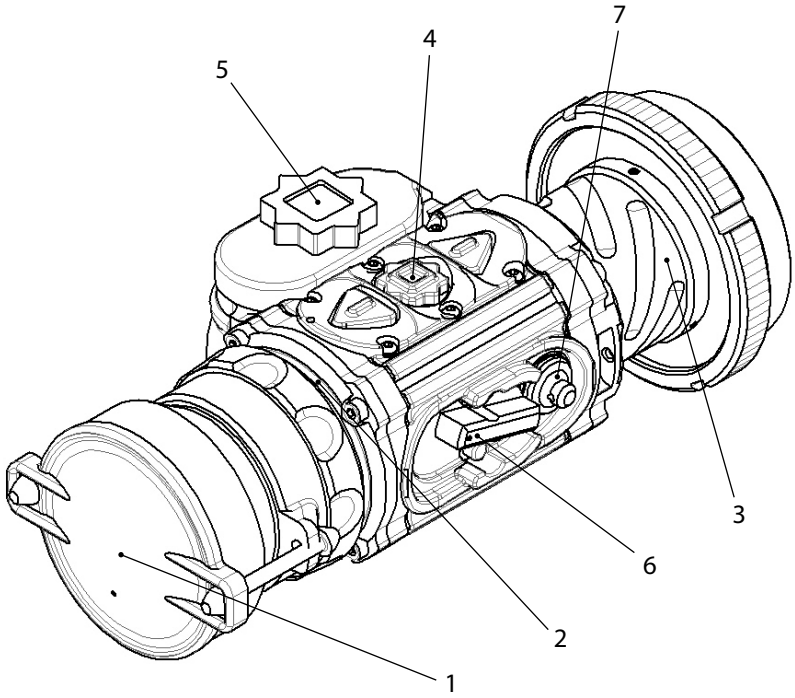


Fig.1. Fortuna General Clip-on configuration

1. **Lens**
2. **Enclosure**
3. **Eyepiece**
4. **Control buttons**
5. **Battery pack**
6. **On/Off lever**
7. **Multi-purpose socket**

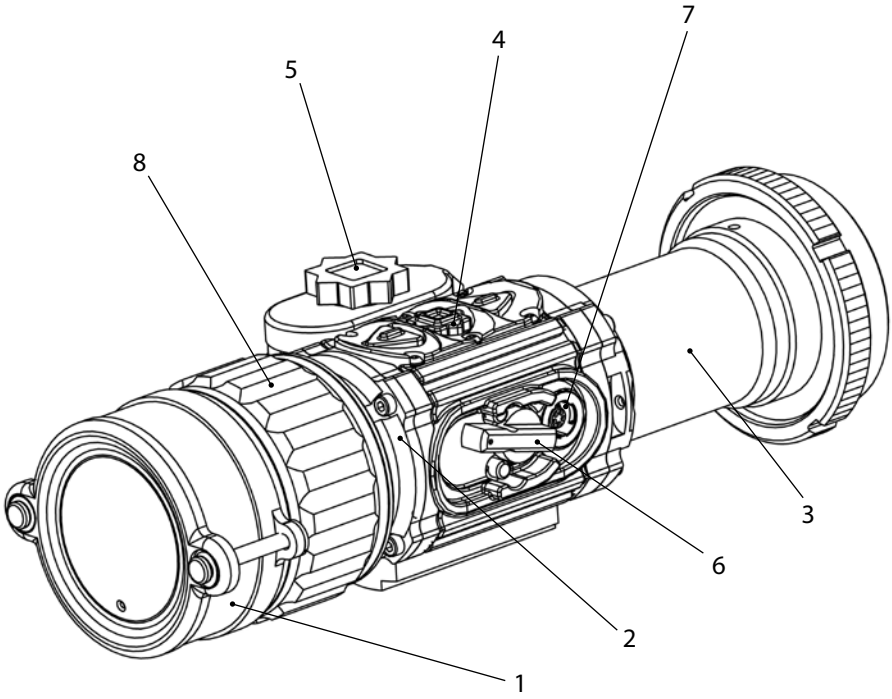
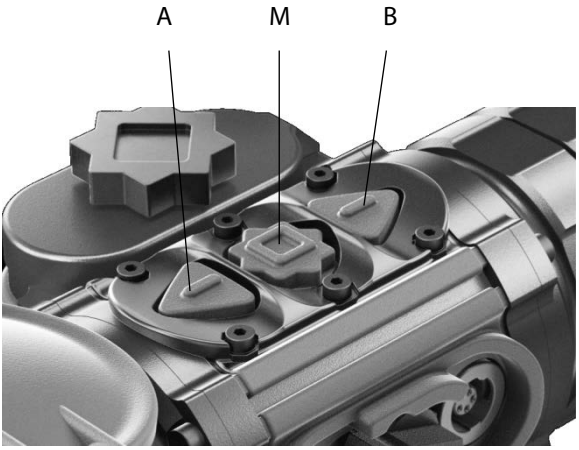


Fig.1.1 Fortuna General Clip-on configuration 50A3 and 50A6

1. **Lens**
2. **Enclosure**
3. **Eyepiece**
4. **Control buttons**
5. **Battery pack**
6. **On/Off lever**
7. **Multi-purpose socket**
8. **Focus ring**



8. **Button "A"**
9. **Button "M"**
10. **Button "B"**

Fig. 2 Control panel

This button panel controls the device menu, displayed on the screen. The buttons functions change depending on the parameters being adjusted.

The device functions as follows (see fig. 1):

High-aperture germanium lens (1) focuses thermal radiation of the object on the sensitive area of the uncooled bolometer core. When not operated the lens is closed with the protective cap.

The enclosure contains the whole electronics of the device, which transforms the detector signal into the digital image of the object shown on the color AMOLED display viewed through the eyepiece (3). On top of the device enclosure there is the panel (4) with the mode control buttons.

The device is powered with two batteries CR123A placed in the battery case (5). The door of the battery case is locked with the screw.

The device turns on and off with the lever (6). The universal socket (7) covered with the protective cap serves to connect the external power supply and to output video image on the external display or recorder.

The impact-resistant design of the device stands against the recoil of large-calibre weapon.

The device is used as a thermal imaging front attachment for scopes.

6. Operation

6.1. Unpacking

Prior to unpacking the device, make sure that all the main components listed in table 1.1. are present. If some of the items from the table are missing, please, address the Supplier.

Prior to turning on the device, visually inspect the enclosure, optical surfaces and other parts of the device. Make sure there are no fractures, scratches, caverns, cracks and other faults in the view of the device and its parts. Otherwise, address the Supplier or the Manufacturer of the device.

6.2. Installing the Batteries

Prior to inserting the batteries make sure they do not have any cracks, caverns, leaks or bubbles. Never insert defective batteries. Do not use together new and old batteries or batteries of different types (of different manufacturers).

The thermal imaging attachment FORTUNA is powered with two CR-123A batteries or rechargeable batteries of RCR-123A (16340) type.

Insert the batteries:

1. Open the battery case cover (5);
2. Insert the batteries observing the polarity marked on the outer surface of the device;
3. Close the battery case cover.

Attention!
Li-Ion battery contains SO2 (sulphur dioxide) under pressure. Do not heat, pierce, disassemble, short-circuit, recharge or in any other way put pressure on the battery. Turn the device off if the battery case is overheated. Wait until the battery cools prior to reinstall it.
Do not store or transport the device with the inserted batteries.

6.3. Turning On and Off

The device turns on and off with the lever (6). The switch has two positions: «ON» – the lever in the upper position and «OFF» – the lever in the lower position. The device turning-on takes 5 seconds. During turning-on the device does not respond to the buttons.

6.4. Focusing

Depending on the model, the device features either the athermal lens with fixed focusing – for 40A6 model, or the lens with adjusted focusing – for 50A3 and 50A60 models.

For 50A3 and 50A60 models the lens focuses by turning the focusing ring (8) in order to get the sharp image of observed objects on distance from 5 meters to infinity.

The depth of field of the athermal lens for 40A6 model provides sharp image on distance from 10 to 200 meters.

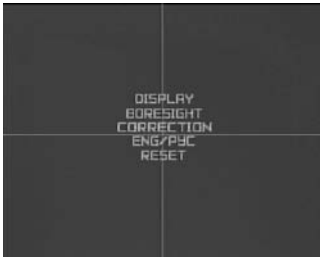
6.5. Calibration

This thermal imaging device features the electronic calibration. The user does not need to calibrate the device while operating it. The device is calibrated automatically as required.

7. Electronic Adjustment of the Device

During the turning-on process the manufacturer's logo is shown, and when the device is loaded the thermal image of the observed object is shown. Use the control panel (fig.2) for adjustment and menu navigation.

When the attachment is installed and turned on for the first time, the menu should be aligned with the center of the scope. Press and hold (for more than 10 sec) buttons A and B. The display will show the following:



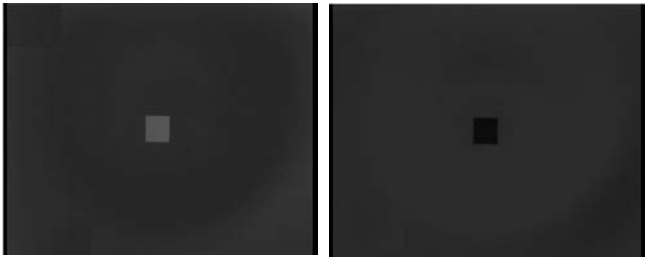
Align the reticle on the display with the scope reticle by moving the image with buttons A and B. To switch between the axis press shortly button M. Press and hold (5 sec) button M to save the alignment.

When the device is attached to a daylight scope, only the central area of the display is viewed. So when the device is in the operation mode no icons are displayed to avoid cluttering the observation area. Press shortly button A to see the selected image and zeroing profiles. The selected image and zeroing profiles indication will be displayed for a few seconds in the center of the screen.



7.1. Selecting "white – hot", "black – hot" image

The device features the adjustable image color mode. Press shortly button B to select "white – hot" or "black – hot" mode.

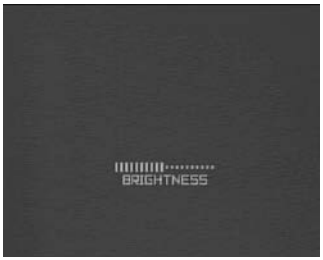


7.2. Image Adjustment

The device features manual adjustment of brightness, contrast and thermal sensitivity aimed to make the viewing conditions more comfortable. The settings can be saved in four image profiles (V1-V4).

7.2.1. Brightness Adjustment

To adjust brightness in the main menu press button M on the button control panel until the brightness adjustment menu appears. Select the required brightness level by pressing button A or B. Press and hold (more than 2 sec.) the button A to enter the main menu or continue the device adjustment and enter the contrast menu by pressing shortly button M.



7.2.2. Contrast Adjustment

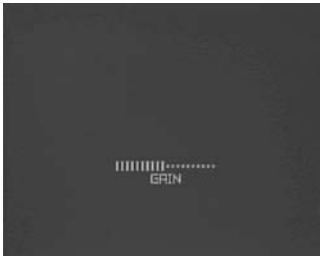
To adjust contrast in the main menu press button M on the button control panel until the contrast adjustment menu appears. Select the required contrast level by pressing button A or B. Press and hold (more than 2 s.) the button A to enter the main menu or continue the device adjustment and enter the sensitivity menu by pressing shortly button M.



7.2.3. Thermal Sensitivity Adjustment

To improve the quality of the observed image (depending on the contrast of the observed object and the background temperature) the device features the manual adjustment of the core (micro-bolometer) sensitivity.

Select the required thermal sensitivity level by pressing button A or B in the sensitivity menu. Press and hold (more than 2 s.) the button (A) to enter the main menu or exit the adjustable parameters menu by pressing shortly button (M).

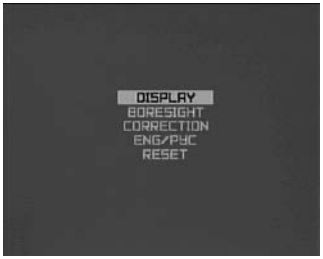


Note!
In image profile A only thermal sensitivity can be adjusted (with brightness and contrast levels preset at medium level – 50%).

7.3. Menu

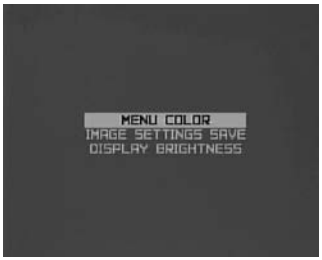
The device menu enables the following adjustments:

- Display
- Zeroing
- Correction
- Eng/Rus
- Reset



7.4. Display

The user can select the menu color and adjust the display brightness. The user's settings of brightness, contrast and thermal sensitivity can be saved into four image profiles V1, V2, V3 and V4.

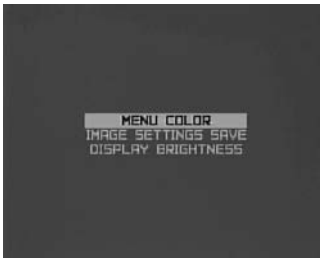






7.4.1. Menu Color

In this menu you can select the color of all the menu symbols. When the color is selected, the caption "Menu Color" takes on the selected color.



To enter the menu color menu press shortly button M. Select the color with buttons A or B and save the selected menu color by pressing and holding (more than 2 sec) button M. To exit the menu without saving press and hold (more than 2 sec) button A.





7.4.2. Saving Image Profile

In this menu, the user can save brightness, contrast and thermal sensitivity settings into image profiles. To save the image profile:

- Adjust the required level of brightness, contrast and thermal sensitivity;
- Enter the device menu with the long push of button M;
- Using buttons A or B select «ВИЗУАЛ. ПРОФИЛЬ СОХР.» [SAVE IMAGE PROFILE] and enter it by pushing shortly button M;



- Select the number of the image profile to be saved with buttons (A) and (B);
- Press and hold (more than 2s.) button (M) to save the profile. The message on the display will indicate that the profile is successfully saved.
- Press and hold (more than 2 s.) button (A) to exit the profile saving menu without saving the profile.

7.5. Zeroing

The device zeroing is the alignment of the scope reticle and the attachment median aim point. Zeroing is performed in a special equipped place using special equipment. The attachment is zeroed against the targets well detected with the thermal imaging device.

The zeroing is performed as following:

- Set the test-target at the zeroing distance (for example, 100 m). Turn on the device. Adjust the device to achieve the best target image.
- Point the weapon to the target center with the scope. If the target center does not match the reticle, make corrections. In the main menu select the Zeroing menu and press shortly button M.



Attention!
When the attachment is used with a daylight scope, the scope's reticle is used. So during zeroing it is the image that moves, not the reticle.

The image is moved by pressing buttons A and B. The axis are switched by pressing shortly button M. The active coordinate is framed. The display shows X and Y coordinates with respect to the screen center. Match the target center with the reticle center.







If the zeroing results are satisfactory, save the profile by pressing and holding (more than 2 sec.) button M, and the window of the profile selection will open.

Using buttons A and B select the profile number and press and hold (more than 2 sec.) button M to save the zeroing results, and the display will show the message confirming the profile is saved.

The device has four profiles to save the corrections (for example, for different distances, for different types of ammunition etc.).

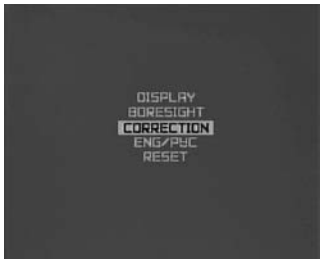
To exit the menu press and hold (more than 2 sec.) button A.

7.6. Pixel Correction

Due to the impact loads, defected or so-called "dead pixels" may appear in the micro-bolometer. A dead pixel on the display looks like a dot of constant color (black or white). The device features the correction function to correct the dead pixels.

Attention!
Correction shall be performed with the lens cap closed!

To enter the pixel correction menu press shortly button M. The reminder to close the protective lens cap appears on the screen.





Make sure the lens cap is closed and press and hold (more than 2 sec) button M. The Correction menu appears on the screen.



There are two modes of dead pixel removal – manual and automatic.

Attention!
Sometimes after the automatic correction some dead pixels may be left. In this case remove the remained pixels in manual mode. To switch between the modes press shortly button M.

To remove automatically the dead pixels press and hold button M with the option «Auto» selected. The display shows the message confirming the successful removal. If some dead pixels remained, delete them in the manual mode.



To remove manually the dead pixels press shortly button M to switch between X and Y. With X selected buttons A and B move the cursor horizontally, and with Y selected – vertically. Align the cursor center with the dead pixel and press and hold button M for more than 2 sec.





To save the dead pixel correction results press and hold button M for more than 2 sec with the option «Save» selected. The display shows the message confirming the successful saving.





To cancel the dead pixels removal press and hold button M for more than 2 sec with the option "Reset" selected. The display shows the confirmation request.





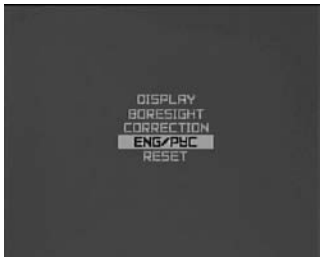
To confirm with buttons A or B select option "Yes" and press and hold button M for more than 5 sec. to cancel the correction.

To exit without cancelling the correction select option "No" and press and hold button M for more than 2 sec.

To exit the correction menu select option "Exit" and press and hold (more than 2 sec.) button M.



7.7. Language





The device features the menu in two languages (Russian/English).

To select the language:

- press shortly button (M) to enter the Language menu;
- using button A or B select the language;
- press and hold (more than 2s.) button M to save the language selection. Press and hold (more than 2 s.) button A to exit the menu without saving.

7.8. Reset

The device settings can be reset to the factory settings.

Attention!
With this function all settings will be reset, including the zeroing profiles. It is impossible to recover the information after the reset.



To reset all the settings to factory defaults:

- press shortly button M to enter the Reset menu;
- using button A or B select "Yes" to submit the selection;
- press and hold (more than 5 s.) button M to reset the settings to factory defaults.
- press and hold (more than 2 s.) button A to exit the menu without saving.







After the settings are reset, the display will show the message confirming the reset.

8. Attaching the External Power Supply

To attach the device to an external 5V power supply use the enclosed cable with a USB connector.

Take off the safety cap from socket 7 (fig. 1) and using the cable supplied with the device, connect the external power supply to the device.

The power supply with output voltage out of the operating range may damage the device.

When using the external power supply the installed batteries do not discharge. The device does nor recharge the batteries from the external power supply.

9. Attaching Video-Recorder

To record the process of aiming and observation the video-recorder of Newton CVR640 type (not included) can be attached to save the image on the SD card.

Take off the safety cap from the socket 8 and using a cable adapter (not included) connect the device to the video-recorder.

The record is performed according to the user's manual of the video-recorder used.

10. Troubleshooting

The device does not start.	1. No batteries. 2. The batteries are low. 3. Poor contact.	1. Insert the batteries. 2. Replace the batteries. 3. Clean the contact pads.
Poor image quality. Blurred image.	1. Dirty inlet objective lens or eyepiece. 2. The lens is not focused. 3. Low contrast due to rough conditions of observation; heavy rain, heavy fog, low temperature gradient of the observed objects.	1. Clean the optics with spirit - ether mixture. 2. Focus the optics.
Diagonal lines on the monitor.	The batteries are low.	Replace the batteries.
No image.	1. Contrast and brightness are not adjusted. 2. The batteries are low.	1. Adjust contrast and brightness. 2. Replace the batteries.

11. Maintenance and Storage

11.1. Maintenance

The maintenance of the device includes visual inspection of its parts, cleaning and installing standard and optional accessories.

11.2. Cleaning

A) Cleaning the device.

1. Remove carefully the dirt from the device enclosure with clean and soft cloth.
2. Wet the cloth with water and wipe thoroughly the device surface (except optics).
3. Wipe the wet and clean enclosure with dry and clean cloth.
4. Using a soft brush remove carefully dust, sand and dirt from the optical surfaces.
5. Wet soft woolen cloth with the spirit-ether mixture and clean the optical surface of the lens and eyepiece with light twisting movements from the center edgewards. Change the cloth after each wiping cycle. Repeat the actions until complete cleaning of the optics.

B) Cleaning the accessories.

Wipe the accessories with a brush or cloth wetted with soapy water (if required).

Attention!
Prior to put the device in the pouch or the case for storage, dry thoroughly each item from the device kit.

11.3. Preparing for Storage

1. Check the condition of the device.
2. Remove the batteries.
3. Clean the device and its accessories.
4. Put the device and the accessories in the case (the pouch).

11.4. Storage

After usage and maintenance the scope should be stored in the factory package. This ensures that the device is kept ready to use for the whole guarantee period of storage and usage.

12. Warranty

Guarantee service life of the device is 24 months from the delivery date. Without the note on the delivery the guarantee period begins on the manufacturing date from the factory.

The warranty is effective only with the correctly filled user's manual with the serial number, delivery date and clear stamps of the supplier and manufacturer.

The guarantee repair is performed free of charge (including the cost of work, materials, and, if required, transportation) on the manufacturing factory or in the service company.

Any complaints about the item quality are considered after the quality inspection on the manufacturing factory. The decision on replacement or repair of the item or its parts is within the competence of the specialists of the manufacturing factory or the service. The replaced parts and units become the property of the manufacturer or the service-center.

After the guarantee service the warranty period is not renewed but continues.

The liability under this warranty is limited with the liabilities specified in this document unless otherwise specified by the applicable law.

If during the usage of the item it is revealed that the parameters of the item do not correspond with the user's manual, please consult immediately with the manufacturer on the address and the phone numbers specified in the user's manual.

Within the whole guarantee period the owner has the right to free repair of the item's defaults resulting from the manufacturing faults.

The acquired item requires special installation (adaptation) on the weapon.

The items are accepted for the guarantee repair in set with the factory mount.

The manufacturer is released from all the warranty obligations in case of unassisted (unauthorized) installation of the item on the weapon or usage of self-made mounts (bars).

Remember!
The competent item adaptation on the weapon influences significantly on its following correct function and warranty service.

The manufacturer's warranty does not cover the following:

- Alterations of the user's manual text, damage and alteration of the serial number or in the manual in case of their mismatch;
- Mechanical damage, damage due to the chemicals exposure or misuse;
- Usage of the item for improper applications;
- Damage or malfunctioning due to exposure to fire, corrosive substances, actions of animals or insects;
- Defaults due to force-majeure (fire, natural disasters etc.);
- Incompetent repair, disassemble or adaptation to the weapon and other interference of unauthorized persons not provided for by the manual;
- Damage resulting from disregard of rules of usage, storage and/or transportation by the fault of the owner, the transport company, service firm, persons or firms authorized for adaptation;
- Unauthorized alteration of the item's design including the adaptation on the weapon or installation on the item of the adapters (mounts) of other design.

Warranty and post-warranty service and repair are performed at:

Fortuna Optics EOOD

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Office 1, section «G»

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Bulgaria

info@fortunaoptics.com

+359 88 2399915

+359 89 6682176

13. Acceptance Certificatee

The thermal imaging device **FORTUNA GENERAL CLIP-ON**_____

Serial number _____,

complies with the design documents of the manufacturer and is considered ready for operations.
This type of products is not under mandatory certification.

Date of sale _____

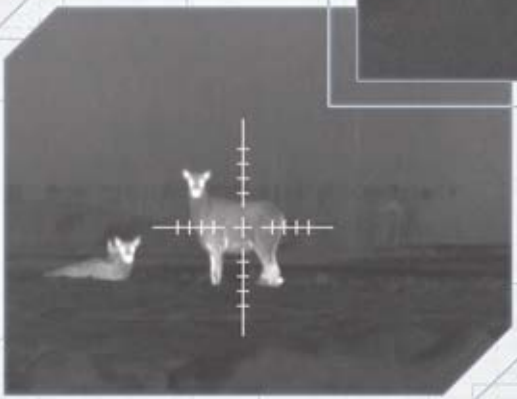
Seller _____

Seal









Manufacturer of thermal imaging devices Fortuna
Fortuna Optics EOOD

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