



# TRAIL 2 LRF

Thermal Imaging  
Riflescopes

# OPERATING INSTRUCTIONS

ENGLISH / FRANÇAIS / DEUTSCH / ESPAÑOL / ITALIANO / РУССКИЙ

**CLASS 1**  
**LASER PRODUCT**  
BS / EN 60825-1: 2014

Thermal Riflescope TRAIL 2 LRF	1-13	ENGLISH	▶
Viseurs thermiques TRAIL 2 LRF	14-27	FRANÇAIS	▶
Wärmebild-Zielfernrohr TRAIL 2 LRF	28-41	DEUTSCH	▶
Visores térmicos TRAIL 2 LRF	42-55	ESPAÑOL	▶
Cannocchiali termici TRAIL 2 LRF	56-69	ITALIANO	▶
Тепловизионные прицелы TRAIL 2 LRF	70-83	РУССКИЙ	▶

Caution - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Attention - l'emploi de commandes, réglages ou performances de procédure autres que ceux spécifiés dans ce manuel peut entraîner une exposition à des rayonnements dangereux.

Vorsicht – wenn andere als die hier angegebenen Bedienungs- oder Justiereinrichtungen benutzt oder andere Verfahrensweisen ausgeführt werden, kann dies zu gefährlicher Strahlungsexposition führen.

Atención! La utilización de controles, ajustes o parámetros de procedimiento distintos de los aquí indicados puede provocar una exposición a radiaciones peligrosas.

Attenzione – in caso di utilizzo di dispositivi di comando o di regolazione di natura diversa da quelli riportati in questa sede oppure qualora si seguano procedure diverse vi è il pericolo di provocare un'esposizione alle radiazioni particolarmente pericolosa.

Внимание – использование других не упомянутых здесь элементов управления и настройки или других методов эксплуатации может подвергнуть Вас опасному для здоровья излучению.



v.0720



## Technical Specifications

MODEL TRAIL 2 LRF	XQ50	XP50
SKU	76518	76519
MICROBOLOMETER		
Type	uncooled	
Resolution, Pixels	384x288	640x480
Frame Rate, Hz	50	
Pixel Pitch, μm	17	
OPTICAL CHARACTERISTICS		
Objective Lens	F50 mm, F/1.2	
Magnification, x	3.5	2
Digital Zoom, x	3.5-14	2-16
Discrete Digital Zoom	x2/x4	x2/x4/x8
Eye Relief, mm	50	
Field of View (H), °	7.5	12.4
m@100m	13.1	21.8
Diopter Adjustment, D	+3/-5	
Range of Detection, (Deer Type Object), m/y	1800/1968	
Minimum Focusing Distance, m / y	5 / 5.5	
RETICLE		
Click Value, mm@100 m (H/V)	13/13	21/21
Click Range, mm@100 m (H/V)	2600/2600	4200/4200
DISPLAY		
Type	AMOLED	
Resolution, Pixels	1024x768	
POWER SUPPLY		
Battery Type / Capacity / Output Voltage	Li-Ion Battery Pack IPS7 / 6400 mAh / DC 3.7 V	
Power Supply	3-4.2 V	
External Power Supply	5 V (USB)	
OPERATIONAL CHARACTERISTICS		
Max. Operating Time on Battery Pack (at t=22°C), Hours*	8	
Max. Recoil Power on Rifled Weapon, Joules	6000	
Max. Recoil Power on Smooth-Bore Weapon, Caliber	12	
Level of Protection (acc. to IEC 60529)	IPX7	
Operating Temperature, °C / °F	-25...+50 / -13...+122	
Dimensions (LxWxH), mm	347x102x74	351x102x74
inch	13.66x4.02x2.91	13.82x4.02x2.91
Weight (w/o Batteries, Mount), kg	0.8	
oz	28.22	
VIDEO RECORDER		
Video / Photo Resolution, Pixels	1024x768	
Video / Photo Format	.mp4 / .jpg	
Built-In Memory	16 GB	
Built-In Memory Capacity	About 5 h video or > 100 000 pictures	

MODEL TRAIL 2 LRF	XQ50	XP50
WI-FI CHANNEL		
Frequency	2.4 GHz	
Standard	802.11 b/g	
Line-of-Sight Reception Range, m	15	
CHARACTERISTICS OF THE RANGEFINDER		
Wavelength, nm	905	
Measurement Range, m/y**	1000/1094	
Measurement Accuracy, m	+/-1	

\* The actual operating time depends on the intensity of using Wi-Fi, video recorder, laser rangefinder.

\*\* Depends on the characteristics of the object under observation and environmental conditions.

## 1. Package Contents

- Thermal Imaging Riflescope
- IPS7 Battery Pack
- Battery charger with mains charger
- Carrying case
- MicroUSB cable
- Mount (with screws and hex-nut wrench(-es))\*
- Quick start guide
- Lens cloth
- Warranty card

\* The mount may not be included in certain orders.

This product is subject to change in line with improvements to its design.

The latest edition of this user manual is available online at [www.pulsar-vision.com](http://www.pulsar-vision.com)

## 2. Description

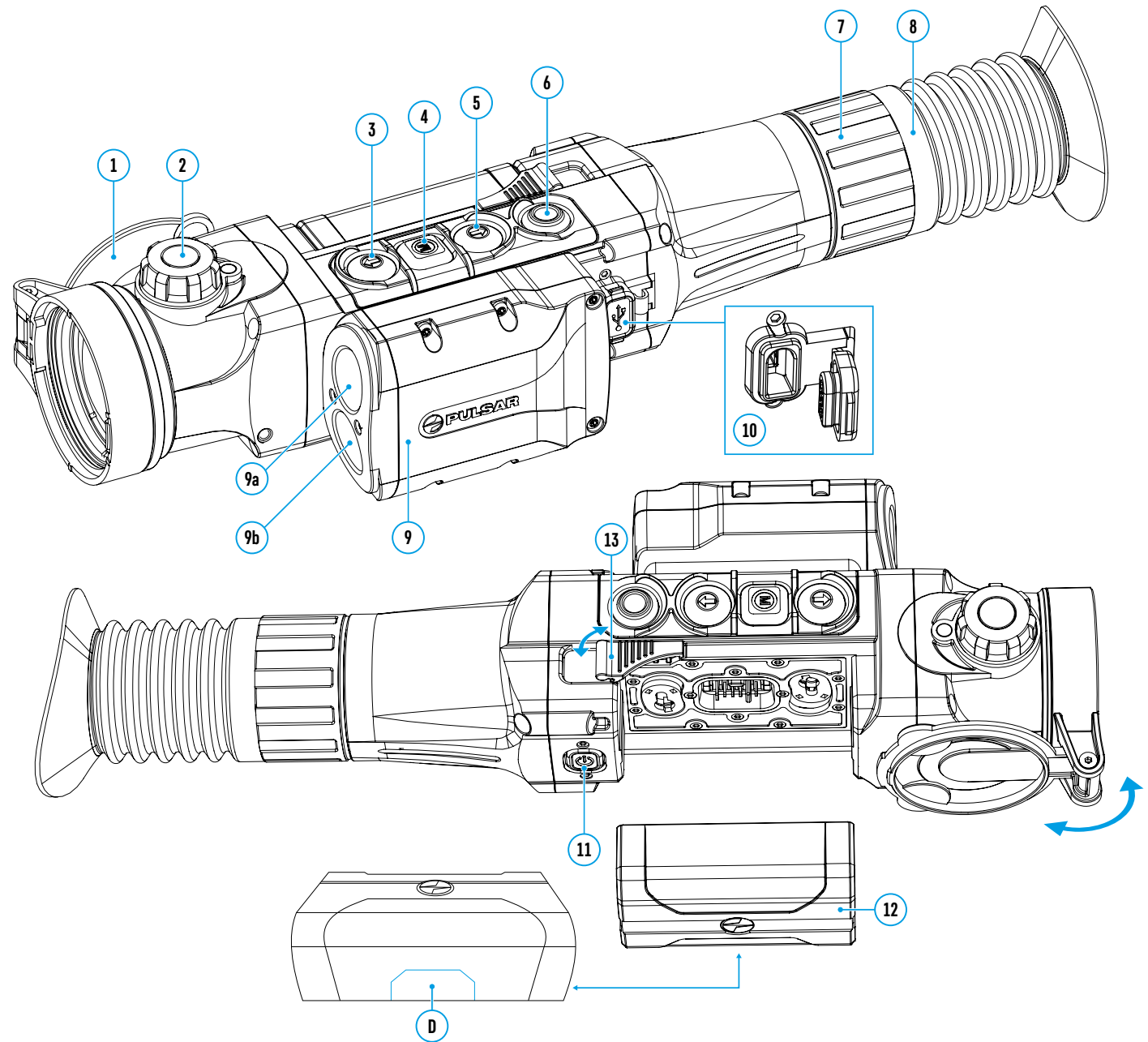
Thermal imaging riflescopes **TRAIL 2 LRF** are designed for the use on hunting rifles, both in the nighttime, and in the daylight in inclement weather conditions (fog, smog, rain) to see through obstacles hindering detection of targets (branches, tall grass, thick bushes etc.). Unlike the image intensifier tube based night vision riflescopes, thermal imaging riflescopes do not require an external source of light and are not affected by bright light exposure. **TRAIL 2 LRF** riflescopes are equipped with a high precision built-in laser rangefinder which allows distance measurement up to 1000 meters. The **TRAIL 2 LRF** riflescopes have a wide range of applications including night hunting, observation and terrain orientation, search and rescue operations.

### 3. Features






- Built-in precise laser rangefinder
- High resolution thermal imaging microbolometer
- Rugged and light-weight magnesium alloy housing
- Long detection distance up to 1800 m
- Smooth and discrete digital zoom
- High caliber recoil resistance 12 gauge, 9.3x64, .375 H&H
- High refresh rate 50 Hz
- Zeroing profiles memorization
- Frost resistant AMOLED display
- Built-in video recorder
- Built-in Wi-Fi module
- Quick-change long-life rechargeable battery packs
- "Image Detail Boost" function
- "Picture-in-Picture" mode
- Manual contrast and brightness adjustment
- Variable electronic reticles
- Four operating modes: Forest, Rocks, Identification, User.
- Three calibration modes

### 4. External View and Controls

1. Lens cover
2. Lens focusing knob
3. Button **UP**
4. Button **MENU (M)**
5. Button **DOWN**
6. Button **REC**
7. Diopter adjustment ring
8. Eyeshade
9. Laser rangefinder
- 9a. Laser rangefinder's emitter
- 9b. Laser rangefinder's receiver
10. MicroUSB port
11. Button **ON**
12. Battery Pack
13. Lever for Battery Pack



## 5. Description of Controls

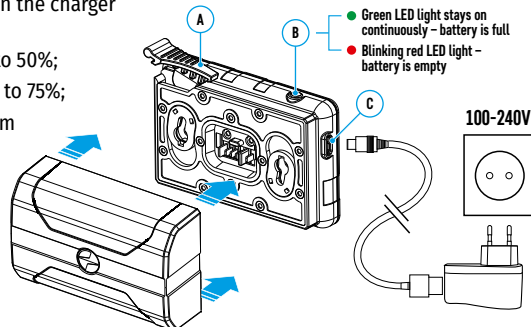
Button	Current operating mode	First short press	Other short presses	Long press
ON (11) 	Riflescope is off	Power riflescope on	Calibrate the microbolometer	Turn display off/ Power riflescope off
	Display is off	Turn display on	Calibrate the microbolometer	
	Riflescope is on	Calibrate the microbolometer		
UP (3) 	Regular (observation)	Activate rangefinder		Switch color palettes
	Rangefinder	Distance measurement		SCAN mode ON/OFF
	Menu navigation	Navigation upwards/rightwards		-
MENU (4) 	Regular (observation)	Enter quick menu		Enter main menu
	Main menu	Confirm selection		Exit submenu without confirming selection / Exit menu (switch to viewing mode)
	Quick menu	Switch between quick menu options		
DOWN (5) 	Regular (observation)	Control discrete digital zoom		PiP on/off
	Menu navigation	Navigation downwards/leftwards		-
REC (6) 	Video mode	Start video recording	Pause / resume video recording	Stop video recording / Switch to photo mode
	Photo mode	Take a photograph		Switch to video mode

## 6. Using the Battery Pack

Thermal imaging riflescopes are supplied with a rechargeable Li-Ion Battery Pack IPS7 which allows operation for up to 8 hours. Please remember to charge the Battery Pack before first use.

### Charging:

- Lift lever (A) of the charger.
- Remove protective cover from the Battery Pack.
- Insert the battery into the charger, as shown in the figure, push the lever to full stop (A).
- Upon installation, a **green** LED indicator (B) on the charger will start to glow and begin flashing:
  - **once** if the battery charge ranges from 0% to 50%;
  - **twice** if the battery charge ranges from 51% to 75%;
  - **three times** if the battery charge ranges from 75% to 100%;
- If the indicator lights **green continuously**, the battery is fully charged. You can remove the battery from the charger by lifting the lever.
- To charge the battery, connect the Micro-USB plug of the USB cable to port (C) of the charger.
- Connect the plug of the USB cable to the mains adapter.
- Plug the mains adapter into a 100 - 240 V socket – the battery charging process will start.



**Attention!** If the indicator of the charger lights up **red continuously** upon battery installation, probably the battery's charge level is lower than acceptable (the battery has been long in deep discharge). In that case:

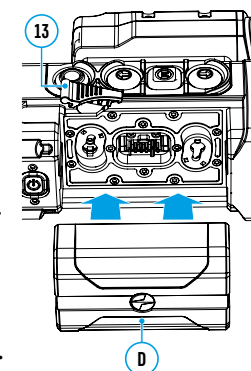
- keep the battery in the charger for a long time (up to several hours), then remove and re-insert it;
- if the indicator starts **blinking green**, the battery is good;
- if it keeps lighting **red** it's defective. **Do not use the battery!**

### Installation:

- Remove protective cover from the Battery Pack.
- Lift the lever (13).
- Install the battery into dedicated slot in the riflescope's housing so that element D is located below.
- Lock the battery by pushing the lever down.



### Precautions:

- Only use the charger supplied with the Battery Pack. The use of any other charger may irreparably damage the Battery Pack or the charger and may cause fire.
- **When keeping battery for a long period, the battery should not be fully charged or fully discharged.**
- **Do not charge battery immediately after bringing the battery from cold environment to a warm one. Wait for 30-40 minutes for the battery to get warm.**
- Do not leave battery unattended while charging. Never use a modified or damaged charger.
- Charge Battery Pack at a temperature from 0 °C to +45 °C. Otherwise, battery's life will decrease significantly.
- Do not leave Battery Pack with a charger connected to the mains longer than 24 hours after full charge.
- Do not expose battery pack to high temperature or to a naked flame.
- Do not submerge battery in water.
- Do not connect external device with a current consumption that exceeds permitted levels.
- Battery Pack is short circuit protected. However, any situation that may cause short-circuiting should be avoided.
- Do not dismantle or deform Battery Pack. Do not drop or hit the battery.
- When using battery at negative temperatures, battery's capacity decreases, this is normal and is not a defect.
- Do not use battery at temperatures above those shown in the table – this may decrease the battery's life.
- Keep battery out of reach of children.



## 7. External Power Supply

The riflescope can be powered with an external power supply such as Power Bank (5V).

- Connect external power supply to USB port (10) of the riflescope.
- The riflescope switches to operation from external power supply, and the IPS7 Battery Pack will begin charging slowly.
- Display will show a battery icon  with charge level as a percentage.
- If the riflescope operates on external power supply but the Battery Pack is not installed, an icon  is shown.
- When external power supply is disconnected, the riflescope switches to the internal IPS7 battery pack without powering off.

**Attention!** Charging IPS7 batteries from Power Bank at air temperatures below 0 °C may result in reduced battery life. When using external power, connect Power Bank to the switched-on riflescope, which has worked for several minutes.

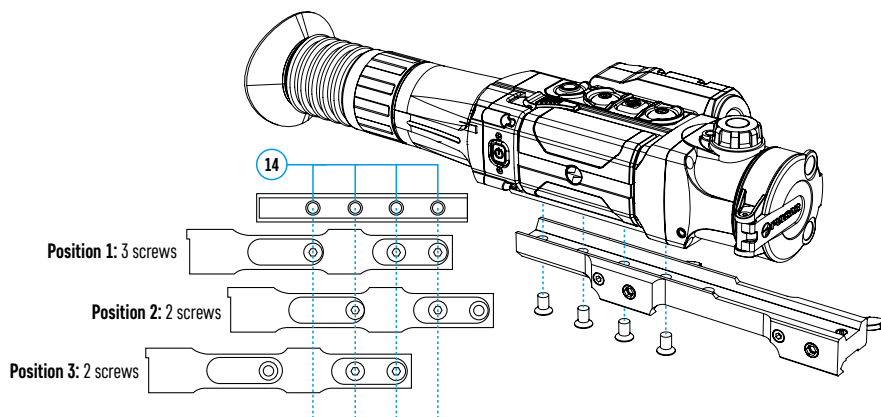
## 8. Operation

### Installation of mount

Before using the riflescope you need to install a mount (may not be included).

Mounting holes (14) in the base of the riflescope enable the mount to be installed in one of the multiple positions. The choice of the mounting position helps the user to ensure correct eye relief depending on rifle type.





- Attach the mount to the base of the riflescope using a hex-nut wrench and screws.
- Install the riflescope on the rifle and check if the position is suitable for you.
- If you are happy with its position, remove the riflescope, unscrew the screws halfway, apply some thread sealant onto the thread of the screws and tighten them fully (do not overtighten). Let the sealant dry for a while.
- The riflescope is ready to be installed on the rifle and to be zeroed.
- After first installation of your riflescope on a rifle, please follow instructions in section **Zeroing** below.

**WARNING!** Do not point objective lens of unit at intensive sources of light such as riflescope emitting laser radiation or the sun. This may render electronic components inoperative. Warranty does not cover damage caused by improper operation.

#### Powering on and image setup

- Open lens cover (1).
- Turn the unit on with a short press of **ON (11)** button.
- To obtain a crisp image of icons on display, rotate diopter adjustment ring (7). After this there is no need to rotate the diopter adjustment ring for distance or any other conditions.
- To focus on an object being observed rotate lens focusing knob (2).
- To set up display brightness and contrast and smooth zoom, please refer to the section **Quick Menu Functions**.
- After use, hold down **ON (11)** button to turn the riflescope off.

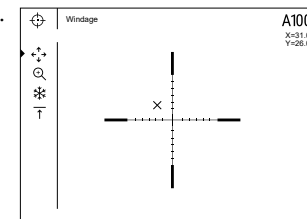
## 9. Zeroing

The riflescope features two zeroing methods – “one shot” zeroing and using FREEZE function.

Zeroing should be done at operating temperatures, by following these steps:

- Mount your rifle with the riflescope installed on a bench rest.
- Set a target at a certain distance.
- Adjust the riflescope according to the instructions of section **Powering on and image setup**.
- Select zeroing profile (see option **Zeroing Profile** in section **Main Menu Functions**)
- Aim the firearm at the target and take a shot.
- If the point of impact does not match the aiming point (center of the riflescope's reticle), hold down **M (4)** button to enter the main menu.
- Enter submenu **Zeroing** with a short press of **M (4)** button.
- Add a new zeroing distance at which you are zeroing (see option **Zeroing** => submenu **Add New Distance** in section **Main Menu Functions**).

- Additional menu for zeroing parameters setup appears on the display
- An auxiliary cross  $\times$  appears in the center of display, and coordinates of the auxiliary cross X and Y appear in the top right corner.
- Enter **Windage/Elevation** submenu with a short press of **M (4)** button.
- Holding the reticle at the aiming point, move the auxiliary cross horizontally or vertically with **UP (3)** / **DOWN (5)** buttons until the auxiliary cross matches the point of impact. Switch between movement directions of the auxiliary cross from horizontal to vertical with a short press of **M (4)** button.
- Attention!** Not to hold the reticle at the aiming point, you can use the **FREEZE** function – freezing the zeroing screen (see option **Zeroing** => submenu **Operating the Distances** => submenu **Zeroing Parameters Settings** => submenu **Freeze** in section **Main Menu Functions**).
- Exit **Windage/Elevation** submenu with a long press of **M (4)** button.
- Save the new position of the reticle with a long press of **M (4)** button. A message “Zeroing coordinates saved” confirms successful operation. The reticle will now move to the point of impact.
- Exit the submenu, take another shot – the point of impact should now match the aiming point.



**Note:** To re-zero at any distance select the desired distance, press **M (4)** button briefly and enter **Zeroing Parameters Settings** submenu with another short press of **M (4)** button.

## 10. Microbolometer Calibration

Calibration allows levelling of the background temperature of microbolometer and eliminates image flaws such as frozen image, vertical stripes etc.).

There are three calibration modes: manual (**M**), semi-automatic (**SA**) and automatic (**A**).

Select the desired mode in the main menu option **Calibration** .

- **Mode M (manual).** Close lens cover and press **ON (11)** button briefly. Having finished calibration, open the lens cover.
- **Mode SA (semi-automatic).** Calibration is activated with a short press of **ON (11)** button. You do not have to close lens cover (microbolometer is closed with internal shutter automatically).
- **Mode A (automatic).** The riflescope calibrates by itself according to the software algorithm. You do not have to close lens cover (microbolometer is closed with internal shutter automatically). User assisted calibration with **ON (11)** button is allowed in this mode (as in semi-automatic mode).

## 11. Discrete Digital Zoom

The riflescope allows you to quickly increase base magnification (please refer to **Magnification** line in the **Technical Specifications** table) by two times or four times (8 times in XP models), as well as to return to the base magnification. To operate the discrete digital zoom, press successively **DOWN (5)** button.

## 12. Image Detail Boost

The **Image Detail Boost** function increases sharpness of the contours of heated objects, which increases their detail. The result of the function depends on the selected mode and observation conditions: the higher the contrast of objects, the more noticeable the effect. This option is enabled by default, but can be disabled in the main menu.

## 13. Quick Menu Functions

The Quick menu allows to change the basic settings (display brightness and contrast, discrete digital zoom and zeroing distance).

- Enter the menu with a short press of **M (4)** button.
- To select the functions below, press successively **M (4)** button.
  - **Brightness** – press **UP (3)** / **DOWN (5)** buttons to change display brightness from 0 to 20.
  - **Contrast** – press **UP (3)** / **DOWN (5)** buttons to change display contrast from 0 to 20.
  - **Smooth digital zoom** – press **UP (3)** / **DOWN (5)** buttons to change digital zoom in 0.1x increments.
  - **A100** – information on the actual profile and zeroing distance, at which zeroing was done in this profile (for example, profile A, zeroing distance 100 m). Select zeroing distances with **UP (3)** / **DOWN (5)** buttons. This option is available when more than one distance is saved.
  - **Base mode** – it allows you to select one of the three modes as a base for the **User mode**.
- Exit the quick menu with a long press of **M (4)** button or wait 10 seconds to exit automatically.

**Note:** display brightness and contrast settings are saved in the memory when the unit is turned off.

## 14. Main Menu Functions

- Enter the main menu with a long press of **M (4)** button.
- Press **UP (3)** / **DOWN (5)** buttons to select main menu options.
- Main menu navigation is cyclical: as soon as the last menu option of the first tab is reached, first menu option of the second tab starts.
- Enter a submenu of the main menu with a short press of **M (4)** button.
- Exit a submenu with a long press of **M (4)** button.
- Automatic exit takes place in 10 sec of inactivity.

**Menu contents:**

**Tab 1**






















Menu	Mode
	A
	>
	10
	Automatic
	>

**Tab 2**

Menu	Microphone
	White hot
	>
	>
	>
	>
	>

## Menu Contents and Description


<b>Mode</b> 	<p>The device has four operating modes of the thermal imager: <b>Forest</b> (observation mode of objects within low thermal contrast conditions), <b>Rocks</b> (observation mode of objects within high thermal contrast conditions), <b>Identification</b> (high detalization mode), <b>User</b> (individual brightness and contrast settings).</p> <ul style="list-style-type: none"> <li>• Enter <b>Mode</b> submenu with a short press of <b>M (4)</b> button.</li> <li>• Select one of the settings described below with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>• A short press of the <b>M (4)</b> button confirms the selection.</li> </ul>
<b>Rocks</b> 	This is the best mode when observing objects after a sunny day or within urban conditions.
<b>Forest</b> 	This is the best mode when searching and observing within field conditions, against the background of leaves, bushes and grass. The mode is highly informative about an object being observed as well as landscape details.
<b>Identification</b> 	This is the best mode when observing objects within adverse weather conditions (fog, mist, rain and snow). It allows you to recognize the characteristics of an object being observed more clearly. Zoom increase may be accompanied by insignificant image graininess.
<b>User</b> 	It allows you to configure and save custom brightness and contrast settings, as well as one of the three modes as a base.
<b>Image Detail Boost</b> 	<p><b>Turn on/off IMAGE DETAIL BOOST.</b></p> <ul style="list-style-type: none"> <li>• Select the <b>Image Detail Boost</b> menu option with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>• Turn <b>Image Detail Boost</b> on/off with a short press of <b>M (4)</b> button.</li> </ul>
<b>Zeroing Profile</b> 	<p><b>This main menu option allows you to select one of five profiles.</b> Each profile includes the following:</p> <ol style="list-style-type: none"> <li>1. A set of zeroed distances;</li> <li>2. Reticle color</li> <li>3. Reticle type</li> </ol> <p>Various profiles can be used when employing the riflescope on different rifles and when shooting different cartridges.</p> <ul style="list-style-type: none"> <li>• Enter submenu <b>Zeroing Profile</b> with a short press of <b>M (4)</b> button.</li> <li>• Select one of the zeroing profiles (shown with letters A; B; C; D; E) with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>• Confirm your selection with a short press of <b>M (4)</b> button.</li> </ul> <p>Name of the selected profile is displayed in the status bar.</p>
<b>Reticle Setup</b> 	<p><b>This main menu option allows you to select reticle shape, color and brightness.</b></p> <p><b>Reticle Type</b> <b>Selection of reticle shapes.</b></p> <ul style="list-style-type: none"> <li>• Enter submenu <b>Reticle Setup</b> with a short press of <b>M (4)</b> button.</li> <li>• Enter submenu <b>Reticle Type</b> with a short press of <b>M (4)</b> button.</li> <li>• Select the desired reticle shape with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>• Reticle type changes as the cursor goes down the reticle list.</li> <li>• Confirm your selection with a short press of <b>M (4)</b> button.</li> </ul> <p><b>Reticle Color</b> <b>Selection of reticle color.</b></p> <ul style="list-style-type: none"> <li>• Enter submenu <b>Reticle Setup</b> with a short press of <b>M (4)</b> button.</li> <li>• Enter submenu <b>Reticle Color</b> with a short press of <b>M (4)</b> button.</li> <li>• Select the desired reticle color with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>• Confirm your selection with a short press of <b>M (4)</b> button.</li> </ul> <p><b>Reticle Brightness</b> <b>Reticle brightness setup.</b></p> <ul style="list-style-type: none"> <li>• Enter submenu <b>Reticle Setup</b> with a short press of <b>M (4)</b> button.</li> <li>• Enter submenu <b>Reticle Brightness</b> with a short press of <b>M (4)</b> button.</li> <li>• Set desired reticle brightness from 0 to 10 with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>• Confirm your selection with a short press of <b>M (4)</b> button.</li> </ul>
<b>Icon Brightness</b> 	<p><b>Adjust brightness level of the icons and screensavers (Pulsar, Display off) on the display.</b></p> <ul style="list-style-type: none"> <li>• Enter <b>Icon Brightness</b> submenu with a short press of <b>M (4)</b> button.</li> <li>• Set desired graphics brightness from 0 to 10 with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>• Confirm your selection with a short press of the <b>M (4)</b> button.</li> </ul>

	<b>Turn Wi-Fi on/off</b> <ul style="list-style-type: none"> <li>Select <b>Wi-Fi</b> submenu with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>Turn <b>Wi-Fi</b> on/off with a short press of <b>M (4)</b> button.</li> </ul>
<b>Calibration Mode</b> 	<b>Select calibration mode.</b> There are three calibration modes: manual ( <b>M</b> ), semi-automatic ( <b>SA</b> ) and automatic ( <b>A</b> ). <ul style="list-style-type: none"> <li>Enter <b>Calibration</b> submenu with a short press of <b>M (4)</b> button.</li> <li>Select one of the below calibration modes with <b>UP (3)</b> / <b>DOWN (5)</b> buttons. <ul style="list-style-type: none"> <li><b>(A) Automatic.</b> In the automatic mode the need for calibration is based on software algorithm. Calibration starts automatically.</li> <li><b>(SA) Semi-automatic.</b> The user determines for himself the need for calibration based on the actual image status.</li> <li><b>(M) Manual (silent)</b> calibration. Close lens cover before calibration.</li> </ul> </li> <li>Confirm selection with a short press of <b>M (4)</b> button.</li> </ul>
<b>Zeroing</b> 	<b>Add New Distance</b>  <p><b>To zero your rifle, you need to set a zeroing distance first.</b>  You can zero your weapon at any distance ranging from 1 to 910m (1 to 955 yards).</p> <ul style="list-style-type: none"> <li>Enter submenu <b>Zeroing</b> with a short press of <b>M (4)</b> button.</li> <li>Enter submenu <b>Add New Distance</b> with a short press of <b>M (4)</b> button.</li> <li>Set values for each digit with <b>UP (3)</b> / <b>DOWN (5)</b> buttons. Switch between the digits with a short press of <b>M (4)</b> button.</li> <li>Having set the desired distance value, hold down <b>M (4)</b> button to save it.</li> <li>The distance you set first becomes a primary distance – shown with an icon  on the right to the distance value.</li> </ul> <p><b>Note:</b> max. number of zeroing distances is 10 for each profile.</p>
<b>Operating the Distances</b> 100m  200m  +7.0	<ul style="list-style-type: none"> <li>Enter submenu <b>Zeroing</b> with a short press of <b>M (4)</b> button – the zeroed distances are displayed.</li> </ul> <p>The value to the right of the distance name (e.g., +7.0) means the number of clicks on the Y axis by which the reticle is shifted relative to the primary distance.</p> <p><b>Zeroing Parameters Settings</b>   <ul style="list-style-type: none"> <li>To re-zero at any distance, select the desired distance and press briefly <b>M (4)</b> button.</li> <li>Select submenu option <b>Zeroing Parameters Settings</b>  and enter it with a short press of <b>M (4)</b> button. Zeroing screen, which allows the change of zeroing coordinates, will appear.</li> </ul> </p> <p><b>Windage/Elevation</b>   The <b>Windage/Elevation</b> additional menu item allows you to adjust reticle position. For a detailed description of reticle adjusting, refer to the section <a href="#">Zeroing</a>.</p>
	<p><b>Magnification</b>   <p><b>MAGNIFICATION allows you to use a digital zoom of the riflescope when zeroing, which reduces the minute of angle click for zeroing accuracy improving.</b></p> <ul style="list-style-type: none"> <li>Enter submenu <b>Magnification</b> with a short press of <b>M (4)</b> button.</li> <li>Select a discrete digital zoom value (i.e. 4x) with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>Confirm your selection with a short press of <b>M (4)</b> button.</li> </ul> </p>
	<p><b>Freeze</b>   <p><b>The feature of the function is that there is no need to constantly keep the riflescope at the point of aiming.</b></p> <ul style="list-style-type: none"> <li>Move the cursor to the <b>Freeze</b> function with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>Align the reticle with the point of aiming and press <b>M (4)</b> or <b>ON (11)</b> button briefly. A screenshot will be taken, an icon  will appear.</li> <li>Go to <b>Windage/Elevation</b> submenu and adjust the position of the reticle (please refer to section 9 <b>Zeroing</b>).</li> <li>Select <b>Freeze</b> submenu item again and briefly press <b>M (4)</b> or <b>ON (11)</b> button - the image will “unfreeze”.</li> </ul> </p>
	<p><b>Name Distance</b>   <ul style="list-style-type: none"> <li>Enter submenu <b>Name Distance</b>  with a short press of <b>M (4)</b> button.</li> <li>Select values for each digit with <b>UP (3)</b> / <b>DOWN (5)</b> buttons. Switch between the digits with a short press of <b>M (4)</b> button.</li> <li>Confirm your selection with a long press of the <b>M (4)</b> button.</li> </ul> </p>
	<p><b>Change Primary Distance</b>   <ul style="list-style-type: none"> <li>Select a <b>non-primary distance</b> and enter the submenu for operating the distance with a short press of <b>M (4)</b> button.</li> <li>Select <b>Change Primary Distance</b> item .</li> <li>Press <b>M (4)</b> button briefly.</li> <li>Icon  next to the selected distance confirms the change of primary distance.</li> </ul> <p>The differences of other distances from the new primary distance are recalculated as per clicks.</p> </p>
	<p><b>Delete Distance</b>   <ul style="list-style-type: none"> <li>Select the distance you wish to delete and enter the submenu for operating the distances with a short press of <b>M (4)</b> button.</li> <li>Select <b>Delete Distance</b>  item and press <b>M (4)</b> button briefly.</li> <li>Select “Yes” in the appeared dialog box to delete a distance. “No” – to cancel deletion.</li> </ul> <p><b>Attention!</b> If the primary distance is deleted, the first distance on the list automatically becomes the new primary distance.</p> </p>
<b>Microphone</b> 	<p><b>With the microphone on, you will have audio track in your video.</b> Microphone is off by default.</p> <ul style="list-style-type: none"> <li>Select submenu <b>Microphone</b> with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li> <li>Turn the microphone on/off with a short press of <b>M (4)</b> button.</li> </ul>



Color Modes

Color mode selection. **White hot** is a default display mode for an observed image. The **Color Modes** menu item allows you to select an alternative palette:

• Enter submenu **Color Modes**  with a short press of **M (4)** button.

• Select one of the palettes described below with the **UP (3)** / **DOWN (5)** buttons.

- **White hot** – a black and white palette (cold temperature corresponds to black, and hot temperature to white).

- **Black hot** – a black and white palette (cold temperature corresponds to white, and hot temperature to black).

- **Red hot**

- **Red monochrome**

- **Rainbow**

- **Ultramarine**

- **Violet**

- **Sepia**

• A short press of the **M (4)** button confirms the selection.

Note: you can also switch from the mode chosen in the main menu to the **White Hot** mode with a long press of **UP (3)** button, subsequent long press of **UP (3)** button switches back to the mode chosen in the main menu.

Range-finder

Menu item RANGEFINDER allows you to set up built-in rangefinder's parameters.

Reticle Type

Selection of rangefinding reticle












• Enter submenu **Rangefinder** with a short press of **M (4)** button.

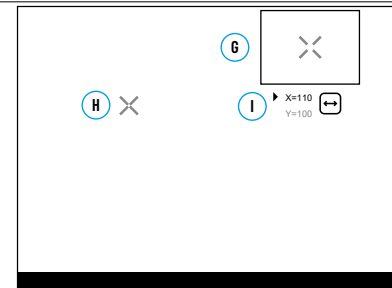
• Enter submenu **Reticle Type** with a short press of **M (4)** button.

• Select one of the three reticles with **UP (3)** / **DOWN (5)** buttons.

• Confirm selection with a brief press of **M (4)** button.

<div>General Settings</div> <div></div>	<div>Units of Measure</div> <div></div>	<div>Selection of units of measure.</div> <ul style="list-style-type: none"><li>• Enter submenu <b>General Settings</b> with a short press of <b>M (4)</b> button.</li><li>• Enter submenu <b>Units of Measure</b> with a short press of <b>M (4)</b> button.</li><li>• Select desired units of measurement with a short press of <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li><li>• Confirm selection with a brief press of <b>M (4)</b> button.</li></ul>																						
	<div>Default Settings</div> <div></div>	<div>Restore default settings.</div> <ul style="list-style-type: none"><li>• Enter submenu <b>General Settings</b> with a short press of <b>M (4)</b> button.</li><li>• Enter submenu <b>Default Settings</b> with a short press of <b>M (4)</b> button.</li><li>• With a short press of <b>UP (3)</b> / <b>DOWN (5)</b> buttons select “Yes” to restore default settings or “No” to abort.</li><li>• Confirm selection with a short press of <b>M (4)</b> button.</li><li>• If “Yes” is selected, display will show “Return default settings?” and “Yes” and “No” options. Select "Yes" to restore default settings.</li><li>• If “No” is selected, action is aborted and exit to the submenu takes place.</li></ul> <div>The following settings will be returned to their defaults:</div> <table><tr><td>Image boost - on</td><td>Rangefinder’s reticle – □□</td><td>Reticle selection – M56Fi*</td><td>Side incline – on</td><td>Wi-Fi – off (default password)</td></tr><tr><td>PiP – off</td><td>Digital zoom – initial optical zoom.</td><td>Language – English</td><td>Calibration mode – automatic</td><td>Microphone – off</td></tr><tr><td>Zeroing profile – A</td><td>Operating mode of video recorder – video</td><td>“THD” – on</td><td>Reticle color – black/red*</td><td>Auto shutdown – off</td></tr><tr><td>Reticle brightness – 10*</td><td>Observation mode of the riflescope – “Forest”</td><td>“TPA” – on</td><td>Color palette – White Hot</td><td>Units of measurement – meters</td></tr></table> <div>* These values are set for all zeroing profiles (A, B, C, D and E).</div> <div><b>Warning:</b> date and time settings, default pixel map and all zeroed distances are saved.</div>				Image boost - on	Rangefinder’s reticle – □□	Reticle selection – M56Fi*	Side incline – on	Wi-Fi – off (default password)	PiP – off	Digital zoom – initial optical zoom.	Language – English	Calibration mode – automatic	Microphone – off	Zeroing profile – A	Operating mode of video recorder – video	“THD” – on	Reticle color – black/red*	Auto shutdown – off	Reticle brightness – 10*	Observation mode of the riflescope – “Forest”	“TPA” – on	Color palette – White Hot
Image boost - on	Rangefinder’s reticle – □□	Reticle selection – M56Fi*	Side incline – on	Wi-Fi – off (default password)																				
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Reticle brightness – 10*	Observation mode of the riflescope – “Forest”	“TPA” – on	Color palette – White Hot	Units of measurement – meters																				
<div>Format</div> <div></div>	<div><b>This menu option allows you to format your riflescope's memory card (erase all files from its memory).</b></div> <ul style="list-style-type: none"><li>• Enter submenu <b>General Settings</b> with a short press of the <b>M (4)</b> button.</li><li>• Enter submenu <b>Format</b> with a short press of <b>M (4)</b> button.</li><li>• With a short press of <b>UP (3)</b> / <b>DOWN (5)</b> buttons select "Yes" to format the memory card or "No" to return to the submenu.</li><li>• Confirm selection with a short press of <b>M (4)</b> button.</li><li>• If "Yes" is selected, display will show “Do you want to format memory card?” and “Yes” and “No” options. Select “Yes” to format the memory card.</li><li>• A message “Memory card formatting” appears indicating the progress.</li><li>• Upon completion of formatting a message “Memory format complete” is shown.</li><li>• If “No” is selected, formatting is aborted and exit to the submenu takes place.</li></ul>																							
<div>Wi-Fi Settings</div> <div></div>	<div><b>Wi-Fi setup. This menu option allows you to set up your riflescope for operation in a Wi-Fi network.</b></div>																							
	<div>Password Setup</div> <div></div>	<div><b>This submenu allows you to set a password to access your thermal riflescope from a mobile device.</b></div> <div>The password is used to connect a smartphone or a tablet to your thermal riflescope.</div> <ul style="list-style-type: none"><li>• Enter submenu <b>Wi-Fi Settings</b> with a short press of <b>M (4)</b> button.</li><li>• Enter submenu <b>Password Setup</b> with a short press of <b>M (4)</b> button.</li><li>• Default password 12345678 will appear on the screen.</li><li>• Set a desired password with <b>UP (3)</b> / <b>DOWN (5)</b> buttons (button <b>UP (3)</b> to increase value; button <b>DOWN (5)</b> to reduce). Switch between digits with a short press of <b>M (4)</b> button.</li><li>• Save the password and exit the submenu with a long press of <b>M (4)</b> button.</li></ul>																						
	<div>Access Level Setup</div> <div></div>	<div><b>This submenu allows you to set access levels of STREAM VISION application to your riflescope.</b></div> <div>Access level <b>Owner</b>. <b>Stream Vision</b> user has complete access to all riflescope's functions.</div> <div>Access level <b>Guest</b>. <b>Stream Vision</b> user has access only to real time video stream from the riflescope.</div> <ul style="list-style-type: none"><li>• Enter submenu <b>Wi-Fi Settings</b> with a short press of <b>M (4)</b> button.</li><li>• Enter <b>Access Level Setup</b> submenu with a short press of <b>M (4)</b> button.</li><li>• Select desired access level with <b>UP (3)</b> / <b>DOWN (5)</b> buttons.</li><li>• Confirm selection with a brief press of <b>M (4)</b> button.</li></ul>																						

<b>Accelerometer</b> 	<b>Side Incline</b> 	<p><b>This function indicates horizontal (side) incline of the weapon.</b> Side incline is indicated by “sector” arrows to the right and left of the reticle. Arrows show the direction in which you should move your rifle to eliminate incline.</p> <p>There are three levels of incline:</p> <ul style="list-style-type: none"> <li>- 5°-10° – one sector arrow;</li> <li>- 10°-20° – two sector arrow;</li> <li>- &gt; 20° – three sector arrow.</li> </ul> <p>A side incline of less than 5° is not displayed.</p> <ul style="list-style-type: none"> <li>• Enter submenu <b>Accelerometer</b> with a short press of <b>M (4)</b> button.</li> <li>• Select submenu <b>Side Incline</b> with <b>UP (3) / DOWN (5)</b> buttons.</li> <li>• Turn <b>Side Incline</b> on/off with a short press of <b>M (4)</b> button.</li> </ul>
	<b>Auto Shutdown</b>	<p><b>This function allows you to activate auto shutdown of the riflescope in a non-operating position (tilt up or down at an angle of more than 70°, right or left - at an angle of more than 30°).</b></p> <ul style="list-style-type: none"> <li>• Enter submenu <b>Accelerometer</b> with a short press of <b>M (4)</b> button.</li> <li>• Enter submenu <b>Auto Shutdown</b> with a short press of <b>M (4)</b> button.</li> <li>• With the <b>UP (3) / DOWN (5)</b> buttons select time period (1 min, 3 min, 5 min) upon expiry of which the riflescope will automatically shut down. Select “Off” if you wish to deactivate <b>Auto Shutdown</b>.</li> <li>• Confirm your selection with a short press of <b>M (4)</b> button.</li> </ul> <p><b>Note:</b> if <b>Auto Shutdown</b> is active, the status bar shows the respective icon and selected time period as  1 min.</p>
<b>Defective Pixel Repair</b> 	<b>Defective Pixel Repair</b> 	<p>When operating a thermal riflescope, defective (dead) pixels (bright or dark dots with constant brightness) may become visible on the microbolometer. <b>Thermal riflescopes offer the possibility of removing any defective pixels on the microbolometer using software, as well as to cancel any deletion.</b></p> <ul style="list-style-type: none"> <li>• Enter submenu <b>Defective Pixel Repair</b> with a short press of <b>M (4)</b> button.</li> <li>• Activate the function with a short press of <b>M (4)</b> button.</li> <li>• A marker  (<b>H</b>) appears on the left side of the display.</li> <li>• A “magnifying glass” (<b>G</b>) will appear on the right side of the display – a rectangle with an enlarged view of the marker  for precise pixel selection – and marker coordinates (<b>I</b>) under the “magnifying glass”</li> <li>• Move the marker with a short press of <b>UP (3) / DOWN (5)</b> buttons to match it with a defective pixel – the pixel should disappear. Switch direction of the marker from horizontal to vertical and vice versa with a short press of <b>M (4)</b> button.</li> <li>• Delete the defective pixel with a short press of <b>REC (6)</b> button.</li> <li>• A brief message “OK” appears in case of success.</li> <li>• Then you can delete another defective pixel by moving the marker along the display.</li> <li>• Exit <b>Defective Pixel Repair</b> function with a long press of <b>M (4)</b> button.</li> </ul>
	<b>Restore default pixel map</b>	<p><b>This option allows you to cancel deletion of all defective pixels and return them to the original state.</b></p> <ul style="list-style-type: none"> <li>• Enter submenu <b>Defective Pixel Repair</b> with a short press of <b>M (4)</b> button.</li> <li>• Select icon  and press <b>M (4)</b> button.</li> <li>• Select “Yes” if you wish to return to default defective pixel map, or “No” if you do not.</li> <li>• Confirm selection with a short press of <b>M (4)</b> button.</li> </ul>
<b>Device Information</b> 	<b>Device Information</b>	<p><b>This option allows the user to view the following information about the riflescope:</b></p> <ul style="list-style-type: none"> <li>- Full name</li> <li>- SKU number</li> <li>- Serial number</li> <li>- Software version</li> <li>- Hardware version</li> <li>- Service information</li> </ul> <ul style="list-style-type: none"> <li>• Enter submenu <b>Device Information</b> with a short press of <b>M (4)</b> button.</li> </ul>



## 15. Status Bar



The status bar is located in the lower part of the display and shows current operating status of the riflescope, including:

1. Image inversion mode (only Black Hot)
2. Current zeroing profile (for example A)
3. Zeroing distance (for example, 300 m)
4. Operating mode (for example Forest)
5. Calibration mode (in the automatic calibration mode, three seconds before automatic calibration a countdown timer 00:03 is shown in place of the calibration mode icon)
6. Current full magnification (for example x12.8)
7. Microphone
8. Wi-Fi connection status
9. Function "Auto shutdown" (for example 1 min)
10. Current time
11. Battery charge level if the riflescope is powered by the Battery Pack, or External battery power indicator — — if the riflescope is powered by an external power supply.

## 16. Built-In Laser Rangefinder

The riflescope is equipped with a built-in rangefinder (9), allowing you to measure distance to objects up to 1000m away.

### How the rangefinder works:

- Turn on the riflescope, adjust image according to section **Powering on and image setup**, press **UP (3)** button — rangefinding reticle appears (and aiming reticle disappears), dashes of distance values with unit of measurement appear in the top right corner of the display , i.e. the rangefinder enters stand-by mode.
- If PiP mode is on, the aiming reticle disappears upon activation of the rangefinder, but in the PiP window remains active.
- If PiP mode is off, the activation of the rangefinder automatically turns on the PiP window with the last digital magnification set for it and a reticle in it.
- Point the rangefinding reticle at an object and press **UP (3)** button.
- In the top right corner of the display you will see distance in meters (or yards depending on settings).

### Notes:

- If the rangefinder is idle longer than three seconds, it turns off automatically and aiming reticle appears.
- The point of aiming of the rangefinding reticle and the aiming reticle in the PiP window might not coincide due to aiming reticle shift after zeroing.

### Operation in SCAN mode:

- Turn on the rangefinder by briefly pressing the **UP (3)** button.
- Hold down **UP (3)** button for longer than two seconds. Measurement readings will be changing in real time as you point the riflescope at different objects. In the top right corner a message "SCAN" appears.
- In case of unsuccessful measurement dashes will appear on the display.
- To exit SCAN mode and to return to stand-by mode, press **UP (3)** button briefly.
- To turn off the rangefinder hold the **UP (3)** button.

### Notes:

- To select a rangefinding reticle, please go to submenu **Rangefinder** in the main menu.
- To select units of measurement (meters or yards) go to submenu **General Settings** in the main menu.
- While you measure the distance in the Scan mode you can use the reticle of the PiP window to make a shot.

### Peculiarities of operation

- Accuracy of measurement and maximum range depend on the reflection ratio of the target surface, the angle at which the emitting beam falls on the target surface and environmental conditions. Reflectivity is also affected by surface texture, color, size and shape of the target. A shiny or brightly colored surface is normally more reflective than a dark surface.
- Accuracy of measurement can also be affected by light conditions, fog, haze, rain, snow etc. Ranging performance can degrade in bright conditions or when ranging towards the sun.
- Measuring range to a small sized target is more difficult than to a large sized target.

## 17. Video Recording and Photography

**TRAIL 2 LRF** thermal riflescopes feature video recording and photography of an image, which are saved to an internal memory card.

Before using this feature please read the menu options **Date setup**, **Time setup** of the section **Main Menu Functions**.

### The built-in recorder operates in two modes: VIDEO and PHOTO

#### Video mode. Video recording

- The device is in the VIDEO mode by default.
- In the top left corner you will see icon and remaining recording time in the format HH:MM (hours: minutes) 5:12.
- Start video recording with a short press of **REC (6)** button.
- Upon start of video recording icon disappears, and icon **REC** and recording timer in the format MM:SS (minutes : seconds) appear instead: .
- Pause and resume recording video with a short press of **REC (6)** button.
- Stop recording video with a long press of the **REC (6)** button.
- Video files are saved to memory card after stopping the video.
- Switch between modes (Video-> Photo-> Video) with a long press of **REC (6)** button.

#### Photo mode. Photography

- Switch to Photo mode with a long press of **REC (6)** button.
- Take a picture with a short press of **REC (6)** button. The image freezes for 0.5 sec and a photo is saved to memory card.

### Notes:

- you can enter and operate the menu during video recording;
- recorded videos and photos are saved to built-in memory card in the format img\_XXX.jpg (photos); video\_XXX.mp4 (videos). XXX – three-digit counter for videos and photos;
- the counter for multimedia files cannot be reset;





### Attention!



- Maximum duration of a recorded file is five minutes. After this time expires a video is recorded into a new file. The number of recorded files is limited by the capacity of unit's internal memory.
- check regularly free capacity of the internal memory, move recorded footage to other storage media to free up space on the internal memory card;

## 18. Wi-Fi Function

Your thermal riflescope features wireless connection option (Wi-Fi) which links it with external appliances (tablet, smartphone).

- Turn on the wireless module as described in the option **Wi-Fi** in the section **Main Menu Functions**. Wi-Fi operation is shown in the status bar as follows:

CONNECTION STATUS	STATUS BAR INDICATION
Wi-Fi is off	
Wi-Fi in the riflescope is being activated	
Wi-Fi is on, no connection with mobile device	
Wi-Fi is on, mobile device connected	

- Your riflescope is detected by external appliance as "Trail\_XXXX", where XXXX — is the last four digits of riflescope's serial number.
- After a password is entered in external appliance (please refer to the menu option **Wi-Fi Settings** of the section **Main Menu Functions**) and connection is established, the icon  in the status bar changes to .

## 19. Function Display Off

The **Display Off** function deactivates transmission of image to the display by minimizing its brightness. This prevents accidental disclosure by light in the dark. In this mode the device is in stand-by and keeps running.

- To activate the **Display Off** function press and hold **ON (11)** button when the device is switched on. The **Display off** message with 3 sec countdown will appear on the screen. Before the end of the countdown release the **ON (11)** button, otherwise if the countdown ends the device will be switched off.

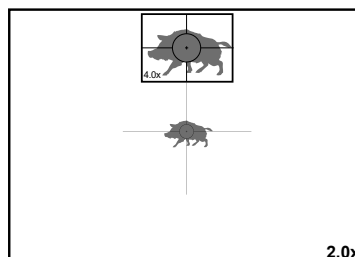


- To activate the display, press briefly **ON (11)** button.

## 20. Function PiP

**PiP (Picture in Picture)** allows you to see a zoomed image in a dedicated window simultaneously with the main image.

- Turn on/off the **PiP** function with a long press of **DOWN (5)** button.
- Change zoom ratio in the **PiP** window with a short press of **DOWN (5)** button.
- The dedicated small window shows zoomed image with magnification value being shown in the bottom left corner of the window. The main image is shown with base optical magnification.
- When **PiP** is turned on, you can operate the discrete and smooth digital zoom. The magnification will take place only in the dedicated window.
- When **PiP** is turned off, the main image retains the magnification set for the **PiP** window.



## 21. Scalable Reticles

This function is designed to preserve ballistic properties of the scalable reticles for all magnifications.

- Enter the main menu with a long press of **M (4)** button.
- Enter submenu **Reticle Setup** with a short press of **M (4)** button.
- Enter submenu **Reticle type** with a short press of **M (4)** button, select the reticle (please check available Scalable reticles in the Reticles catalogue in Downloads section on our web page <https://www.pulsar-nv.com/glo/products/33/thermal-imaging-riflescopes/trail-lrf-version-2/> ).
- When zooming in and out the image, the selected reticle on the display and in the recorded video changes its geometrical size according to the magnification selected.
- The reticle scale changes both on the main display and in the PiP mode.

## 22. Stream Vision

**TRAIL 2 LRF** thermal riflescopes support **Stream Vision** technology which allows you to stream an image from the display of your thermal riflescope to a smartphone or a tablet via Wi-Fi in real time.

Further guidelines are available online: [www.pulsar-vision.com](http://www.pulsar-vision.com)

**Note:** **Stream Vision** application allows you to update firmware features of your thermal imager.

**How to update instructions are as below:**

- Download free of charge **Stream Vision** App on **Google Play** or **App Store**. Scan the QR codes or follow the links to download **Stream Vision** free of charge:



- Connect your Pulsar device to your mobile device (smartphone or tablet).
- Launch **Stream Vision** and go to section **My Devices**.
- Select your Pulsar device and press **Check Updates**.

**Important:**

- if your Pulsar device is connected to the phone, please turn on mobile data (GPRS/3G/4G) on your mobile device to download an update;
  - if your Pulsar device is not connected to your phone, but it's already in the **My Devices** section, you may use Wi-Fi to download an update.
- Wait for the update to download and install. Pulsar device will reboot and will be ready to operate.