NANO2
Thermal Clip-on Device

User Manual

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About

This manual is a guide through functions and features of your device.

- Before using your device, read this manual thoroughly to ensure safe and proper use.
- Images and screen shots used in this manual may vary from images on the screen of your device.
- Features available for devices and software depend on a specific device model.
- A product, accessories or software may differ from the description given herein and can be modified without prior notice.

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Important

You have purchased a sophisticated electronic and optical device. For the proper use of your product, please read this manual thoroughly.

- Do not point the IR receiver (a thermal core in both activated and deactivated status) towards high-intensity IR sources of over 800°C in temperature such as the sun, a laser beam, an incandescent filament, an electric arc, etc. It can cause a thermal core damage.
- Do not direct a rangefinder laser at a human or animal eye (if a device is equipped with a laser rangefinder).
- Do not aim directly at the sun or bright light sources.
- Do not subject the product to a mechanical impact.
- Do not transport the unit without a protective case.
- Do not disassemble the product, to prevent high voltage shock hazard.
- Do not leave the device within the reach of small children.
- Store the product in a dry place.

> **VISIBLE AND INVISIBLE LASER RADIATION AVOID DIRECT EYE EXPOSURE CLASS 3R LASER PRODUCT**

Manual Release History

Version	Date	Description
1.0	30/01/2020	First edition

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Buttons

On/Off/Parameter Selection+

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Range +

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*When entering a menu, keypad button functions can vary depending on the custom parameters as described below.

Description of the button functions is given in the following table:

Button	Functions
On/Off/ Parameter Selection+	• Press and hold for 2 seconds to turn on or off the device. • Press to select a parameter.
Zoom/ Menu/ Navigation	• Press to zoom by 2-fold value (for sight and surveillance device modes only). • Press and hold for 2 seconds to enter the device menu. • Press twice to enter a navigation mode.

| Button	Functions
Video recording/ Parameter Adjustment -	• Press and hold for 2 seconds to turn video recording on/off. • Press to select a parameter.
Range-	• Press to decrease a parameter by one value in an adjustment mode (a distance by default); press and hold for fast selected parameter changing.
Range+	• Press to increase a parameter by one value in an adjustment mode (a distance by default); press and hold for fast selected parameter changing.

Keypad keys features for a menu are described in the picture.

To exit the menu, select the Exit menu item or keep pressing the Exit button until it succeeds.

To return a previous menu item, press the Exit button.

Forward

Down

Range-

Up

Back/Exit
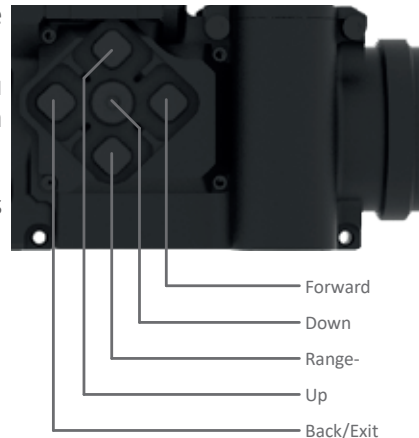
Power Supply

The device can be powered in different ways as follows:

- • By two CR123A batteries (or Li-Ion rechargeable batteries of 16340 type, RCR123A) installed in the battery compartment which serve as a main power supply.

- • By a lithium rechargeable battery of 18650 type installed in a quick-detachable compartment which serves as an auxiliary power supply.

The device supports a priority powering feature. The highest priority belongs to the powering via the rechargeable battery installed in the quick-detachable compartment. So, the device uses a power supply of this rechargeable battery if the quick-detachable compartment is attached. If high priority power supply (quick-detachable battery compartment) is

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run out or disconnected, the device switches automatically to CR123A batteries, and vice versa.

Attention!

- Do not use batteries other than those described above. Using of incompatible batteries may cause damage to the unit.

- Observe the polarity during battery installation.

Note:

- Unprotected 18650 rechargeable batteries may be used.

- The device cannot charge rechargeable batteries.

- Use of functions which require connection to the other devices via Wi-Fi drains batteries faster.

You can check the battery status by an indicator on the device screen.

Attention!

- Select a battery type (CR123A or RCR123A) in Menu for displaying the charge level correctly.

Power On/Off

Press and hold the power button for 2 seconds to turn the unit on or off.

The system booting starts after device activation. The device does not respond to any button press while booting. A thermal image will be display on the screen during booting process.

Attention!

- Follow warning signs and instructions of personnel in public places if use of wireless devices is prohibited. Disable Wi-Fi, Bluetooth, and telemetry radio interfaces via Menu if the device functions requiring a wireless network connection are not used.

Power saving

To extend a battery life, follow recommendations listed below:

- disable Wi-Fi and Bluetooth if you don't use them;

- set a sensor speed at 30Hz as an alternative to 60Hz;

- setup the power saving sensors such as: an Off-timer, a Standby timer.

Connection to PC

Use a supplied USB cable to connect to a PC. You can playback video and photo archives of the device using the PC.

Connection to smartphone

The device supports a wireless connection (Wi-Fi) to iOS and Android smartphones. The user can playback video and photo archives or update an integrated firmware via the IR&D Operator application.

General information

Screen

The screen displays screen trays, status icons, sight and rangefinder reticles, widgets, etc., as well as thermal core videos.

The device has several modes of the screen:

- **standard clip-on** (to be used with scopes - the screen displays trays, reticles, and custom widgets in this mode);

- **standard sight** (to be used without scopes - the screen displays trays, reticles, and custom widgets in this mode);

- **standard surveillance device** (the screen displays trays, reticles, and custom widgets in this mode)

- **navigation** (applied for navigation and target search).

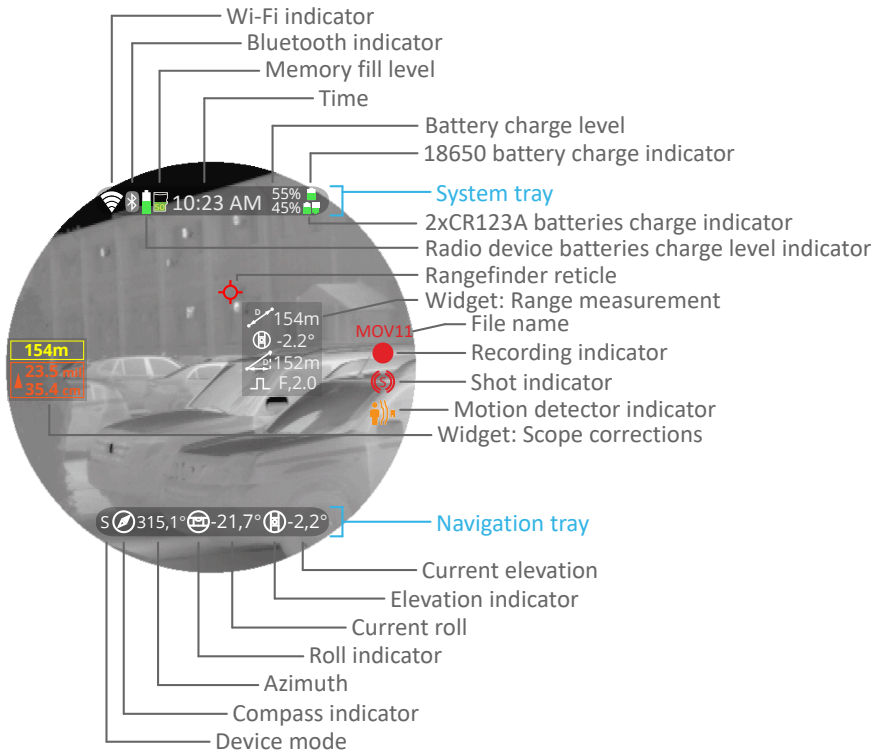Use the Menu to switch over screen modes.

Note:

- **Widgets** are mini-applications that display certain information on the screen.

- Various icons can be displayed depending on a selected mode and preset parameters including different from the specified herein.

Attention!

- The device doesn't have a diopter adjustment option.

Standard Clip-on Mode:

Wi-Fi indicator
Bluetooth indicator
Memory fill level
Time
Battery charge level
18650 battery charge indicator
System tray
2xCR123A batteries charge indicator
Radio device batteries charge level indicator
Rangefinder reticle
Widget: Range measurement
File name
Recording indicator
Shot indicator
Motion detector indicator
Widget: Scope corrections

Navigation tray
Current elevation
Elevation indicator
Current roll
Roll indicator
Azimuth
Compass indicator
Device mode

10:23 AM   55% 45%

154m
-2.2°
152m
F,2.0

MOV11

154m
23.5 m
35.4 cm

S 315,1° -21,7° -2,2°

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Standard Sight Mode:

Range scale
GPS indicator
Compass indicator
Azimuth
Compass direction (North-East)
Current profile (up to 10 characters)
Motion detector indicator
Radio device indicator
MicroSD fill level
Bluetooth indicator
Recording indicator
Wi-Fi indicator
File name
Time
Battery charge level
Rechargeable battery charge indicator
System tray

315,1°NE   ● MOV21   10:23 AM   DAY   -32k 55%   Batteries charge indicator
56% 45%

Low Rangefinder Battery!

Rangefinder reticle

154m
-2.2°   Widget: Range measurement
152m
FAR
TI_234

Sight reticle

20
15
10
5
152m
20 15 10 5 0   Target size gauge

↓3.56cm
154m -21.7° -2.2° ×1.5 BLASER 308 / ORYX 10 997mbar 25°C   Shooter tray

Rifle /Ammo
(10 characters each)
Ambient temperature (manual input or received from an external sensor)
Zoom
Shot sensor
Current elevation
Elevation indicator
Ambient air pressure (manual input or received from an external sensor)
Current roll
Roll indicator
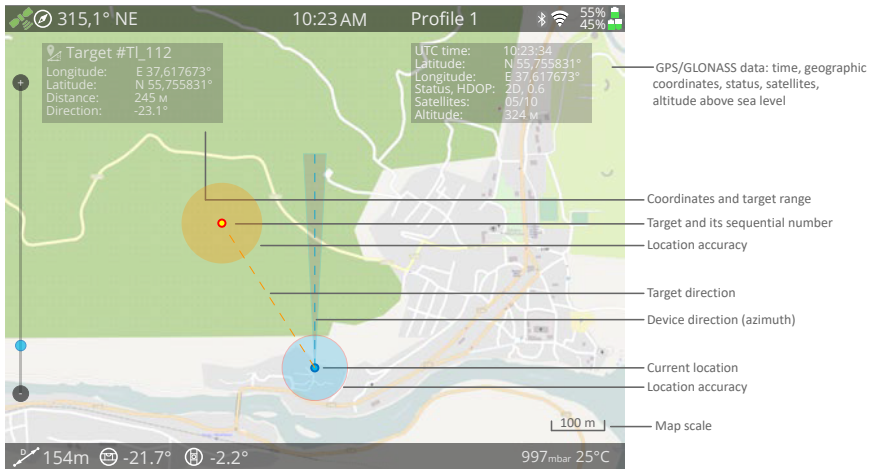Range
Range indicator
Center of impact

Device status icons are displayed in the System tray located at the top of the screen.

The Shooter tray located at the bottom of the screen displays all necessary shooting data.

The screen also shows sight and rangefinder reticles.

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Navigation Screen:

Navigation screen supports current own location identification on the map, as well as target location.

Icons

Icons at the top of the screen – **the System Tray** – display a current status of the device.

Icon	Description
	Navigation enabled, coordinates searching
	Navigation enabled, coordinates identified
	Compass enabled, North-East direction
	Compass enabled, North direction
	Compass enabled, North-West direction
	Compass enabled, West direction

Icon	Description
	Compass enabled, South-West direction
	Compass enabled, South direction
	Compass enabled, South-East direction
	Compass enabled, East direction
	Video recording by shot sensor
	Continuous video recording
	Video archive file playback
	Fast video archive file playback
	Reverse video archive file playback
	Video archive file playback stop
	Video archive file playback pause
	Motion detector enabled, no motion
	Motion detector enabled, motion detected
	Motion detector disabled
	Bluetooth enabled, no connection
	Bluetooth connected to other device
	Wi-Fi connection and Wi-Fi signal level (more bars, stronger signal)
	Battery charge level
	Battery charge level less than 10%

Icon	Description
	Battery charge level, external power plugged
	Memory filling more than 90%
	Memory filling 50%
	Memory filling 5%
	No Memory

The System Tray also displays the memory filling level (in percentage), a recorded video/played video/photo file name, a current device time (preset format), a current profile, and a battery charge level (in percentage and its estimated duration), an integrated motion detector status.

Icons at the bottom of the screen– **Shooter Tray** – display the shooting data.

Icon	Description
	Range (by rangefinder)
	Manually preset range
	Maximum roll angle ±1°
	Roll angle more than +1° (leftward)
	Roll angle more than-1° (rightward)
	Maximum elevation angle ±1°
	Elevation angle more than +1° (backward)
	Elevation angle more than-1° (forward)
	Shot sensor

The Shooter Tray also displays the range (measured by the rangefinder or preset manually), current roll and elevation angles, a current rifle and ammo (selected in the database), ambient temperature and air pressure (input manually or received from an optional external weather station).

Screen Control
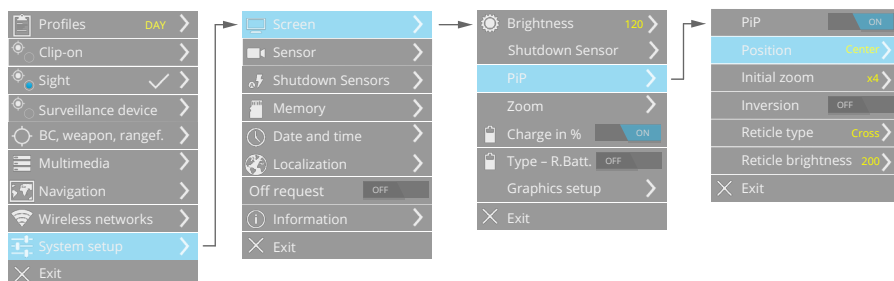
Adjust **brightness** to provide comfortable on-screen information display.

Battery charge level data will be displayed in percents if the **Charge in %** mode activated. Otherwise, device operation time estimated for these batteries is displayed. The **Type – Rechargeable Battery** feature shall be enabled if the device is powered by rechargeable batteries contrary to CR123A batteries (to display a charge level correctly).

The **PiP** allows to adjust various options of the picture-in-picture mode. Three locations of the panoramic window are available such as: an upper left part, an upper center, and an upper right part of the screen. Initial Zoom parameter presets PiP window opening zoom. When an inversion mode is activated, a part of the image can be enlarged in the PiP window; otherwise the PiP window serves as a panoramic view window. Reticle Type and Brightness can adjust the PiP window reticle. The Zoomed reticle type is a magnified standard reticle displayed in the PiP window.

Menu diagram (first tray):

Profiles — DAY	Screen	Brightness — 120	By angle — ON
Clip-on	Sensor	Shutdown Sensor	Set
Sight ✓	Shutdown Sensors	PiP	By cap — ON
Surveillance device	Memory	Zoom	Exit
BC, weapon, rangef.	Date and time	Charge in % — ON	Threshold — 30°
Multimedia	Localization	Type – R.Batt. — OFF	Elevation — ON
Navigation	Off request — OFF	Graphics setup	Roll — ON
Wireless networks	Information	Exit	SmartZoom — ON
System setup	Exit		Fixed Zoom
Exit			Exit

The device screen can be deactivated by angle sensors and by closing the cap. The user can preset shutdown angles (elevation and roll) and their values likewise.

The device allows to adjust the image flexible zooming options (in the sight and surveillance device modes only; not available in the clip-on mode). **SmartZoom** is a gradual zoom controlled via the shortcut menu (Press the Left button for the gradual zoom and change it smoothly by the Up/Down buttons. Both holding and short press of the button can be used. The gradual zoom interval is 0.1). **FixedZoom** selects fixed magnification values and provides switching between them by the Zoom button press.

The user can change positions of upper and bottom trays as well as the menu size via the Graphics setup item (for the Clip-on mode only).

Profiles

Profiles — DAY	NIGHT ✓	Save current setting
Clip-on	DAY	Rename
Sight ✓	RAIN	Reset to default
Surveillance device	FOG	Exit
BC, weapon, rangef.	LINEAR	
Multimedia	Exit	
Navigation		
Wireless networks		
System setup		
Exit		
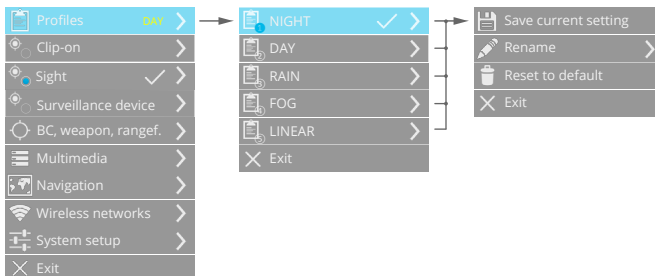
Five user profiles are available to apply quickly a range of settings required for various conditions.

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Adjust parameters and then choose **Save Current Settings** to customize the selected profile. You can reset all customized parameters to **defaults**. Profile can be **renamed** via the device menu.

Note:

- • The profile name length is limited to 10 characters.

- • All changes are saved in memory and applied after power on, but not saved in profile parameters.

All device settings including profiles can be saved as a backup copy created in System Menu/Memory.

Thermal Sensor Setup

The thermal imaging sensor provides the temperature distribution monitoring of investigated surface or object. Ability to see objects depends on the settings of the thermal imaging sensor.

Carefully explore all possible sensor parameters for more accurate adjustment for selected mission, or use profiles for fast and simple adjustment of the device.

Profiles	DAY
Clip-on	
Sight	
Surveillance device	
BC, weapon, rangef.	
Multimedia	
Navigation	
Wireless networks	
System setup	
Exit	

Screen	
Sensor	
Shutdown Sensors	
Memory	
Date and time	
Localization	
Off request	OFF
Information	
Exit	

Cap calibration	ON
Sensor Rate	60Hz
Linearity	50%
Max. gain	32
AGC speed	32
Average brightness	50%
Colour palette	White Hot
Detail enhancement	10
Defective pixel delete	
Hardware reset	
Exit	

● 60Hz
○ 30Hz

Defective pixel auto delete
Def.pix. del. thresh. Normal
Def. pix. auto del. cancell.
Exit

Attention!

- • No often cap calibration of the integrated thermal sensor is required during service. You can calibrate the sensor (by lens cap) via an appropriate menu item or enable an automatic calibration by closing the lens cap if necessary.

The sensor can operate with both 60Hz and 30Hz frame rates. If the 60Hz frame rate is preset, the device power consumption will be increased by 30% as compared with the 30Hz frame rate.

The **Linearity** parameter determines a conversion rate of a sensor thermal image into the on-screen image. The less the value is, the closer the image is to a linear conversion, and the larger the value is, the higher the equalization is.

The **Max gain** (maximum gain) serves to reduce excess contrast enhancement of the image. This parameter should be increased for a low-contrast scene and decreased to reduce contrast for a high-contrast scene.

AGC speed determines the image change speed by the AGC in case of a quick scene changing.

Average brightness allows making a thermal image lighter or darker.

Detail Enhancement is a parameter that defines detail and edge enhancement of an object. The higher the value of this parameter is, the sharper the image is and the more detailed the small objects are; but this makes image spatial noise more visible.

User can set the **color palette** to change the color of the thermal image. White Hot palette set by default. In this mode 256 values of brightness represented by grey undertones, and 0 is relevant to pure white, and 255 is pure black, that's why hot objects appears brighter. For the Black Hot palette the distribution of middle tones is opposite - hotter objects appear darker than the cooler ones. There is also a number of color palettes that make the image colored.

Warning!

- Defective pixels (bright and dark dots) can appear on a thermal image that cannot be considered as a device malfunction.

To remove dead pixels automatically, choose **Auto Delete** in the menu, close the lens cap, and select Delete. You can cancel dead pixel deleting via the device menu.

Lens focus

A lens has the 35 mm focal length; it is athermal and has no adjustment option.

Attention!

- Close the lens cap to avoid scratches and dust penetration if the device is not used.

Optical system basic parameters:

Parameter	NANO2
Field of view	10,7° x 8,0°
100 m field of view, m	18,7 x 14,0
Initial click value (clip-on), cm, for 100m	2,17
Minimum click value (clip-on), cm, for 100m	0,27
Initial click value (sight), cm, for 100m	2,33
Minimum click value (sight), cm, for 100m	0,29
Initial optical zoom (sight)	0,93

- Lens focal ratio- f/1.1;

- Focal length – 35 mm;

- Human detection range – 1029 m;

- Human recognition range – 257 m;

- Human identification range – 128 m.

Note:

- Human detection, recognition, and identification criterion corresponds to Johnson criterion. For example, detection requires 2 pixels, recognition – 8 pixels, and identification – 16 pixels under the object height.

Quick setup options

A user can configure settings quickly by the shortcut buttons.

Parameter+/- button adjusts a range by default. Press to select and then adjust a required parameter by Parameter+/- buttons.

Shortcut button functions are changed in the Navigation Screen mode. They allow to configure and display the required navigation data.

315° NE   10:23 AM   NIGHT

403m

Brightness

403m   -21.7°   -2.2°   x1.5   BLASER 308 / ORYX 10 997mbar 25°C

Rangefinder profile selection
Profile selection
Screen brightness adjustment
SmartZoom
Range setup
Temperature setup
Wind forecast On/Off
Wind azimuth
Wind speed

Operation Modes

Three device operation modes are available that are clip-on, sight or surveillance device modes. Use Menu to select a mode.

The thermal image has no reticle in the surveillance device mode.

10:23 AM   10%

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Profile
Display Brightness
Range
Temperature
Profile

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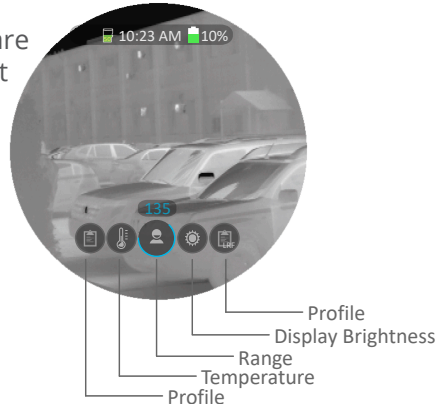
Clip-on Features

With the Clip-on mode, not only can you shoot the thermal image target through the scope reticle without a miss, but you can also enjoy some innovative functions that make your life easier with them used together at the same time.

The following device clip-on options are available:

- **S - Simple Clip-On** – a standard clip-on. This mode requires the use of the scope reticle as well as scope knobs to make corrections. Such mode is standard for all the clip-ons on the market.

Scope Reticle

- **B - Ballistic Calculation.** Unlike the standard mode, the extra feature of this mode is to *display a correction ballistic calculation* for a measured or preset target range; a shooter must make corrections by turning knobs or aiming-off under the scope reticle;
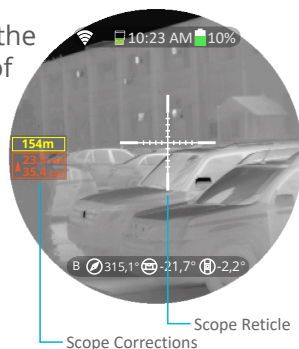
Scope Reticle
Scope Corrections

- **C - Shoot The Center.** In this mode not the reticle is supposed to move but the thermal image relative to the scope reticle. As a result, the image center will always coincide with the mean aiming point for manually preset or measured range according to an automatic ballistic calculation. Always use the center of the scope reticle to make a shot.
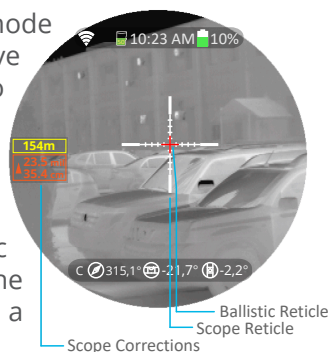
Ballistic Reticle
Scope Reticle
Scope Corrections

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Profiles	DAY ›
Clip-on	✓ ›
Sight	›
Surveillance device	›
BC, weapon, rangef.	›
Multimedia	›
Navigation	›
Wireless networks	›
System setup	›
Exit	

Clip-on mode	C ›
Virt. reticle type	Cross ›
Virt. reticle brightn.	120 ›
Virt. reticle adjustment	›
Virtual reticle	ON
Fixed zoom	ON
Reticle type	Dot ›
Reticle brightness	120 ›
Exit	

Simple Clip-On	
Ballistic Calculation	
Shoot The Center	✓
Exit	
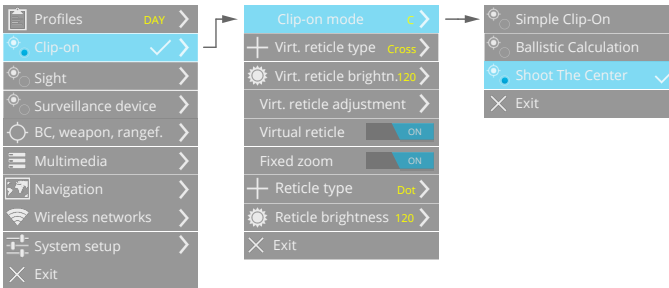
The user can set up virtual reticle type and brightness via Menu in the Clip-on item. This reticle serves for positioning the scope mean aiming point relative to the clip-on mean aiming point. Adjust or check its position every time you mount the device to the scope in order to have a recorded impact point aligned with a scope reticle true position.

Warning!

- For correct running of automatic ballistics, the required rifle and ammo must be selected, as well as the user should setup properly the automatic ballistic calculator. See the Bal.Computer, Weapon, Rangefinder section.

- Make sure the proper rifle and ammo are selected before operation.

- The device is supplied with the factory preset night zero feature. This feature can be adjusted via the service menu if required.

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Sight Features

If the device is used without a scope (using the clip-on eyepiece or magnifier to view), the Sight mode can be applied.

This mode employs the integrated automatic ballistics.

Warning!

- For correct device operation with the selected rifle/ammo, the zeroing is required, as well as the user should setup the integrated ballistic calculator.

- Make sure the proper rifle and ammo are selected before operation.

Zeroing

Zeroing should be done at the selected range (from 10 up to 300 meters) after the rifle and ammo selection. Virtual knobs of elevation and windage corrections are located in upper left part of the screen determining the reticle position on the screen. Least count of the knob is equal to 1 pixel at initial zoom and it decreases with each zoom fold respectively. So, the high zoom values for accurate zeroing are recommended. The device screen is arranged in the following way:

Elevation correction + offset to the yellow reticle in cm/in
Windage correction + offset to the yellow reticle in cm/in

10:23 AM   NIGHT

21 1/8 px
10.34 cm

-19 1/2 px
12.42 cm

Last reticle

123 meters Zeroing

123m -0.1° 0.2° x2 BLASER 308 / ORYX 10 997mbar 25°C

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Attention!

- Zeroing shall be done when a true distance to the target is equal to the selected zeroing distance. Otherwise, ballistic calculator correctness cannot be guaranteed.

- In the zeroing mode, the zeroing range REMAINS UNCHANGED during distance measuring by a rangefinder. The zeroing range can be changed via the device menu.

- To improve zeroing accuracy, use digital zoom, since a click value for them is less.

The device supports **one shot zeroing**. User should perform the following actions:

- select a rifle, ammo, and then a zeroing mode;

- make a shot (superimposing the reticle with the center of the target) at a selected zeroing distance;

- move the reticle to align a yellow crosshair (previous position of the reticle) with the center of the target and to bring the reticle in line with the center of impact;

- press the OK button to finish zeroing or make a shot (superimposing the reticle with the center of the target) to check zeroing. In this case the shot sensor removes the last reticle, that allows to adjust zeroing by the method described in a previous paragraph if required.

1. Make a shot to the center of the target
2. The yellow crosshair is at the center of the target, the reticle is at the impact point
3. Press OK to finish or make a shot for accuracy check
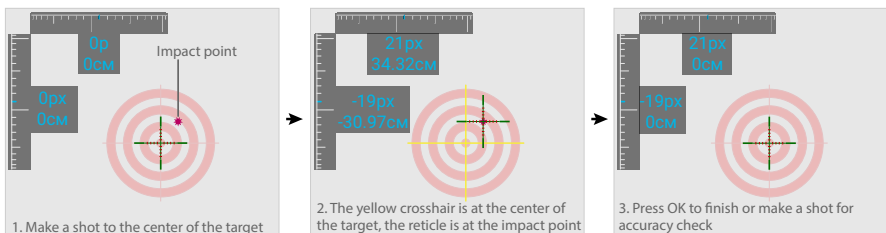
To make the zeroing setup easy, you can use the Freeze mode (holding an image still in case of crosshair offset). In this mode, act as follows:

- select a required rifle and ammo, then enter the zeroing;

- shoot a target (aligning the reticle with the center of the target) located at a selected zeroing range;

- superimpose the impact point with the reticle and press any of reticle offset buttons. The image "freezes". So, no need to fix the rifle position. Move the reticle to align the yellow crosshair (last reticle position) with the center of the target and to bring the reticle in line with the center of impact;

- press the OK button to deactivate the Freeze mode and once again to finish zeroing or make a shot (aligning the reticle with the center of the target) to check zeroing. In this case the shot sensor removes the last reticle, that allows to adjust zeroing by the method described in a previous paragraph if required.

The zeroed reticle position for a particular rifle and ammo is stored in memory when the device is off and after reflashing.

Note:

- Wide-spread chemical hand warmers made as a square pads are very suitable as test targets. They ensure a high-contrast thermal image even after several impacts. For a good picture in sunny weather, you can use targets with a black square or circle (10x10 cm or larger), as well as plastic or glass bottles filled in with warm water.

Reticle
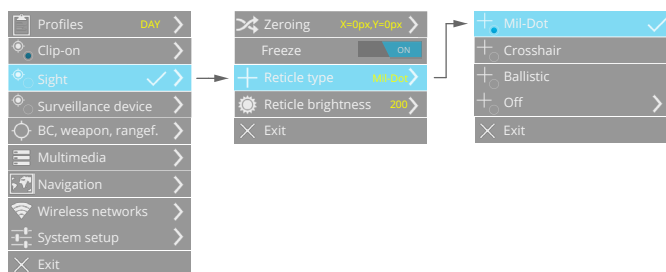
User can select a standard (Mil-Dot, Crosshair, etc.) or a ballistic reticle.

Standard reticle is a crosshair which center fits to a ballistic correction for this type of rifle/ammo under the selected parameters of atmosphere and distance (related to the zeroing distance). In case of changing the atmosphere and/or distance parameters, the reticle automatically moves according to ballistic correction tables or calculations of the integrated ballistic computer.

Ballistic reticle is calculated for a selected type of the rifle/ammo and created automatically under calculations of the integrated ballistic computer. Opposed to the standard reticle, not the ballistic reticle offsets in case of atmosphere parameters change but its parts – horizontal serifs of 200m, 250m, etc. distances.

The user can adjust the reticle brightness within 0 to 255 range.

Use the Calibration menu to calibrate a roll angle. Place the device on a calibrated horizontal surface and calibrate the angle following the instructions on the screen.

When a digital zoom is enabled, the reticle changes in proportion and moves to the center of the screen, and a thermal image is always centered on the reticle.

Ballistic Computer, Weapon, Rangefinder

Weapon Database

A user can choose one of 8 rifles and 3 ammo per each of them.
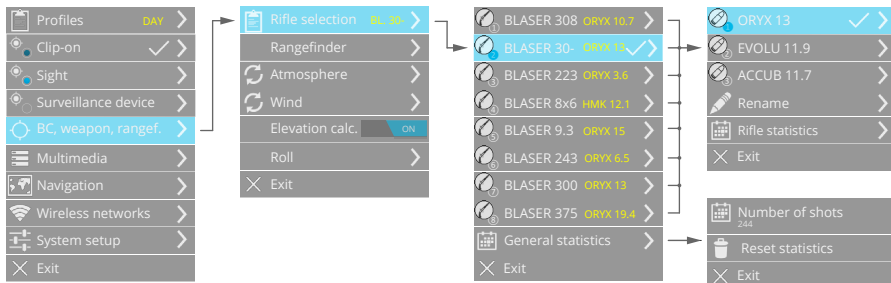
The user can change the weapon database (add rifle/ammo, name, preset ballistic calculator parameters) if required. The selected rifle/ammo is displayed in the Shooter Tray.

Warning!

- For correct device operation with the selected rifle/ammo, the zeroing is required, as well as the user should set up the integrated ballistic computer.

- Make sure the proper rifle and ammo are selected before operation.

The device maintains statistics on each rifle, ammo, and the general statistics of the device. The user can view the number of shots in statistics. Statistics can be reset if required.

Range
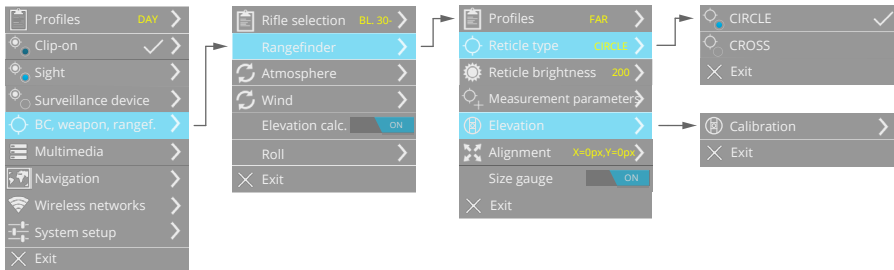
The range can be set both manually (from 10 up to 2000m) and by a radio rangefinder (in case a measured distance is over 2000 meters, the range sets as 2000 meters).

Use shortcut buttons to input a distance manually. 📷 indicator in the Shooter Tray displays the manually inputted distance. A current elevation is included in the elevation correction calculation made by the integrated ballistic computer if the Elevation Calculation mode is enabled and the range is inputted manually.

Reset distance is a distance selected by a user (preset via Menu for a selected rifle/ammo) when the "direct shot" is the most effective. The Reset Distance is set when the device is on and by double press of the Menu button.

Note:

- The Reset Distance feature allows to make an accurate and fast shot at short distances without using of the sight rangefinder and ballistic calculator due to the limited time to prepare and usually lack of fixed rests (that affects correct range measurement and the reticle position on the screen respectively) that improves the system usage efficiency in the above-mentioned conditions.

- To use this option correctly, the user must apply reset to optimal distance after each use of the rangefinder (double press of the Menu button). While performing this operation, the reticle will be returned by the user selection to the reset distance (optimal distance for a direct shot). Use the Sight section of Menu to set up the Reset Distance. The optimal reset distance is determined by the user (based on ballistic parameters of the selected ammo and a sight height) with any ballistic calculator that allows the user to display the bullet trajectory data as a table.

- An example of optimal Reset Distance selection: Sight height is 64 mm, BC - 0.475, Muzzle velocity - 830 m/s (at the temperature +20C). The Reset Distance for the optimal «direct shot» is 190 m. Applying these parameters, in the range 10 - 220 m the bullet will not rise and will not drop more than 5 cm relative to the optical axis of the sight, so the user can shoot with specified ammos in these intervals without using of the rangefinder and the ballistic calculator, that means "as fast as possible". When the user wants to increase\decrease the over/beyond «corridor» limits of a trajectory relative to the optical axis - Reset Distance decreases or increases.

- Example of influence of the Reset Distance to the size of the over/beyond «corridor» limits of a trajectory relative to the optical axis of the sight: the sight height is 64 mm, BC - 0.475, Muzzle velocity - 830 m/s (at the temperature +20C). The reset distance of the optimal «direct shot» is 190 m. Using these parameters, in the range 10 - 220 m the bullet will not rise and will not drop more than 5 cm with relative to the optical axis of the sight. Reducing the reset distance to 150 m, in the range of 30 - 170 meters the bullet will not rise and will not drop more than 2 cm relative to the optical axis of the sight, however, usage of the «direct shot» farther than 190 m in this case is not recommended. By adjustment of this parameter the user chooses the «size of a corridor» according to hunting targets and tactics.

To measure a distance to the target by the **rangefinder**, press and hold the Rangefinder button, when the rangefinder reticle appears on the screen, point it at the target, and then release the button. The rangefinder will calculate the target distance and displays a result in the Shooter Tray and/or in the widget, and in the range scale. In case of ranging failure, dashes will be displayed.

A remote control can be used to measure a distance by the rangefinder; see a related section.

When digital zoom is on, the thermal image is always centered relative to the rangefinder reticle during ranging.

User can calibrate an elevation angle if required. To perform calibration, place the device on a calibrated horizontal surface and calibrate the angle following instructions on the screen.

User can select a type of the rangefinder reticle and set its brightness in the range from 0 to 255 in Menu. Preset reticle types (by default) are the following: ◇ , ✛ .

Note:

- The device is supplied with an adjusted rangefinder. User can adjust it manually, if required.

- Accuracy of manual and rangefinder measurements is 1 meter.

User can set up the rangefinder parameters, if required:

- **Number of pulses** (in the range from 100 to 5000, step 500). By increasing this parameter provides measurement of longer distances, but at the same time extends the ranging time.

- **Target detection** - choosing of a target detection algorithm. First response, second response, and last response options can be applied.

- **Range correction** - a constant component for presetting a deviation of the measured distance with respect to the distance to the target.

The number of the rangefinder parameters such as, number of pulses and the target detection algorithm are saved in the rangefinder **profiles**. These profiles can be quickly selected from the Quick Menu.

Size gauge - automatically builds a scale on the screen that can be used to calculate dimensions of a target. This scale is based on a current target range. In case of thermal-contrast target ranging, its size (width and height) will be displayed.

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Ballistic Computer

ORYX 13	✓ ›
EVOLU 11.9	›
ACCUB 11.7	›
Rifle statistics	›
Exit	

Ballistic calculator	BUILT-IN ›
Zeroing range	100m ›
Zeroing elevation	0° ›
Zeroing environment	›
Sight height	65mm ›
Bullet velocity	Depend. input ›
Drag function	G1 ›
Ballistic coefficient	0.338 ›
Spin drift	OFF
Coriolis	OFF
Rename ammo	›
Ammo statistics	›

Integrated BC (E)	✓
Table BC (T)	
Exit	

Temperature	15°
Air pressure	747mmHg.
Relative humidity	80%
Powder t calc.	ON
Powder temper.	15°

Ballistic calculator	BUILT-IN ›
Zeroing range	100m ›
Zeroing elevation	0° ›
Zeroing environment	›
Sight height	65mm ›
Bullet velocity	Depend. input ›
Drag function	G1 ›
Ballistic coefficient	0.338 ›
Spin drift	ON
Spin drift parameters	›
Coriolis	ON
Coriolis parameters	›
Rename ammo	›
Ammo statistics	›

| Depend. input | ✓ › |
| Point input | › |

Bullet diameter	0.3inch ›
Bullet weight	168 grains ›
Barrel length	1.1inch ›
Barrel twist	12inch ›
Twist direction	Right-hand ›
GSF: 2.05661	

AUTO latitude	OFF
Latitude	44° ›
AUTO azimuth	OFF
Azimuth	23° ›

Muzzle velocity	800m/s ›
T. dur. vel. meas.	15° ›
T. dep.bullet vel.	1.5 m/s/°›

1 POINT 1 15°C 800m/s	›
2 POINT 2 17°C 820m/s	›
Add point	›

The device can calculate ballistics by downloaded tables or by the integrated ballistic calculator. Selection between Table BC/ Built-in BC is performed in Ammo parameters via Menu. User can select the type of the ballistic calculator for each type of the ammo.

Table ballistic calculator (T) (NON RECOMMENDED) – tables of ballistic reticle corrections by range and ambient temperature for each type of a rifle and ammo can be input in the in device. The reticle will automatically move when a user changes distance and ambient temperature according to ballistic correction tables. Ambient temperature can be set manually in the Atmosphere/Wind in Menu, if required. Value of elevation correction in cm for a current distance and ambient temperature will be displayed in the bottom left part of the screen.

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Integrated ballistic calculator (E) - allows calculating ballistics directly for each type of the rifle and the ammo, via the device. Opposite to the table BC, this one calculates range and temperature, as well as such parameters as air pressure, humidity, wind speed and direction, and elevation (if this feature enabled).

User must configure the basic parameters of the weapon after choosing the rifle, ammo, and the integrated ballistic computer.

Settings of the integrated ballistic computer are given in the following table:

Parameter	Range	Interval	Defaults
Zeroing range, m	10...300	1	100
Zeroing elevation, °	-40...+45	0.5	0
Zeroing temperature, °C	-40...+65	1	+15
Zeroing air pressure, mmHg.	600...900	1	747
Zeroing rel. humidity, %	0...100	1	80
Powder temperature calculation	On/Off		Off
Powder temperature, °C	-40...+65	1	+15
Sight height, mm	0...300	1	100
Bullet speed input type	Depend/ Acc.		Depend
Muzzle velocity, m/s	250...1350	1	500
Temperature during velocity measurement, °C	-40...+65	1	+15
Temperature dependence of bullet velocity, m/s / °C	0.1...10	0.1	0
Drag function	G1 or G7	-	G1
Ballistic coefficient	0.01...2	0.001	0.500
Spin drift	On/Off		Off
Bullet diameter, inch	0.1...1.0	0.001	
Bullet weight, grain	5...1500	1	
Barrel length, inch	0.2...3.5	0.001	
Barrel twist, inch	0.35...37.0	0.01	
Twist direction	Right/Left		Right
Coriolis	On/Off		Off

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Parameter	Range	Interval	Defaults
AUTO latitude	On/Off		Off
Latitude	-90...90	1	
AUTO azimuth	On/Off		Off
Azimuth	0...359	1	

Atmosphere - atmospheric parameters (environmental parameters). By going to this Menu item, user can enter the atmospheric parameters manually. The user can set up ambient temperature, air pressure, and relative humidity. Only ambient temperature can be adjusted when the table ballistic calculator selected.
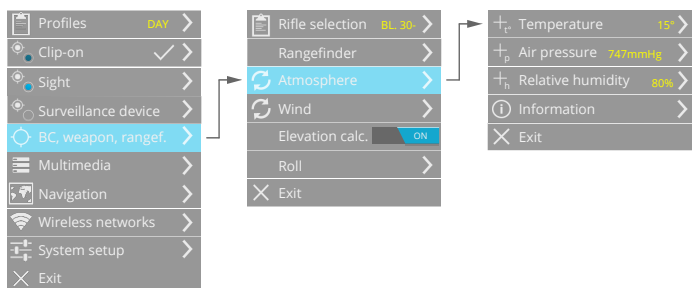
Adjustable atmospheric parameters are given in the following table:

Parameter	Range	Interval	Defaults
Temperature, °C	-40...+65	1	+20
Air pressure, mmHg.	600...900	1	747
Relative humidity, %	0...100	1	80

Menu "Atmosphere/Information" displays current atmosphere settings.

The device is compatible with external weather stations (WindMaster, Kestrel) for precise metering of environment parameters.

Wind. The device allows taking into account wind parameters (direction and speed) preset by the user both manually by means of shortcut buttons or via the menu and automatically - received from the IR&D external weather station. Wind parameters are not taken into account when the table ballistic calculator selected.

The user can input the direction of the wind relative to the device, for example, 0 degrees value meets a following direction, 180 degrees – a contrary direction, 90 degrees - from left to right side of the device, 270 degrees- from right to left.

Profiles	DAY
Clip-on	
Sight	
Surveillance device	
BC, weapon, rangef.	
Multimedia	
Navigation	
Wireless networks	
System setup	

Rifle selection	BL 30-
Rangefinder	
Atmosphere	
Wind	
Elevation calc.	ON
Roll	
Exit	

Wind	ON
Wind direction	15°
Wind speed	1.2m/s
Wind calculation	ON
Wind widget	ON
Exit	
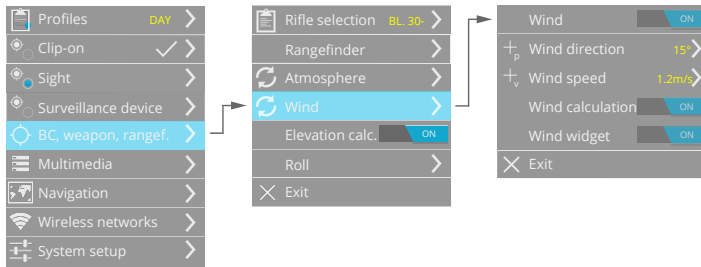
Adjustable wind parameters are given in the following table:

Parameter	Range	Interval	Defaults
Wind speed, m/s	0...30	1	0
Wind azimuth, °	0...359	1	0

When the wind calculation feature is enabled, the reticle indicates a wind forecast (vertical bars) of impact point for a current range. For easy use, 3 reticle bars are added to display: the current range wind forecast; the wind speed forecast for 1 m/s more; the wind speed forecast for 1 m/s less.

The weather station wind forecast is displayed optionally if connected.

Wind widget is an extra window in the left upper part of the screen which displays wind parameters in graphics. This widget can be disabled.

Having the wind calculation enabled, a wind vertical component is added to a basic correction vertical component, so the reticle will be moved up/down according to wind.

315,1° NE   10:23 AM   NIGHT
15m/s   23°
H: 0.56cm = 12 ₀
V: 25.10cm = 2.2 ₀
+2m/s
154m
7m/s   3:00
↓3.56cm→0.16cm
154m   -21.7°   -2.2°   x3   BLASER 308 / ORYX 10   997mbar 25°C

Multimedia

Video Recording Settings

Profiles DAY	Video archive	Video recording type
Clip-on	Photo archive	Exit
Sight	Video recording sett.	By shot ON
Surveillance device	Photo recording sett.	By motion ON
BC, weapon, rangef.	Motion detector	Pre-event Interval 10s
Multimedia	Shot sensor	Post-event Interval 10s
Navigation	Exit	Exit
Wireless networks		
System setup		
Exit		
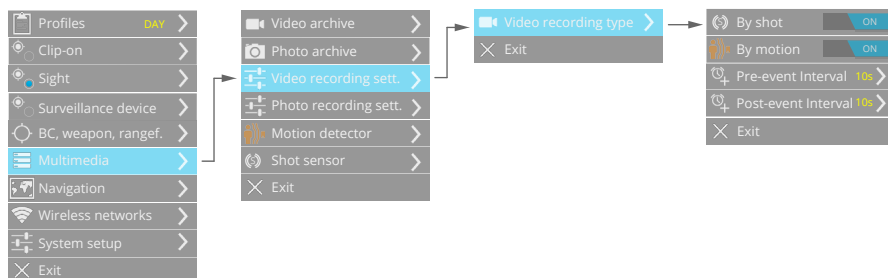
The device can record video. Video can be recorded manually – press the Left button for 2 seconds or automatically - by a shot sensor and/or a motion detector.

Attention!

- Video and photo are recorded to the built-in memory. Recording will not be accomplished in case of its 100% fill.

Recording is controlled via Menu. Record will be produced until it is stopped or the memory card is filled. Also this menu item controls **recording by the shot sensor and the motion detector.** This recording will be automatically made on event, and pre-event actions (the interval is set in the Pre-event Interval menu item) and post-event actions (Post-event Interval) will be recorded likewise.

Name of the recorded file shall be displayed on the screen of the device. Memory filling level shall also be displayed.

Note:

- Video shall be recorded by using of H. 264 codec, container - MP4. Photo recording is performed by using of JPEG codec.

Video Archive

Profiles	DAY		
Clip-on			
Sight			
Surveillance device			
BC, weapon, rangef.			
Multimedia			
Navigation			
Wireless networks			
System setup			
Exit			

Video archive
Photo archive
Video record. settings
Photo record. settings
Motion detector
Shot sensor
Exit

By button
By shot
By Motion detector
Exit

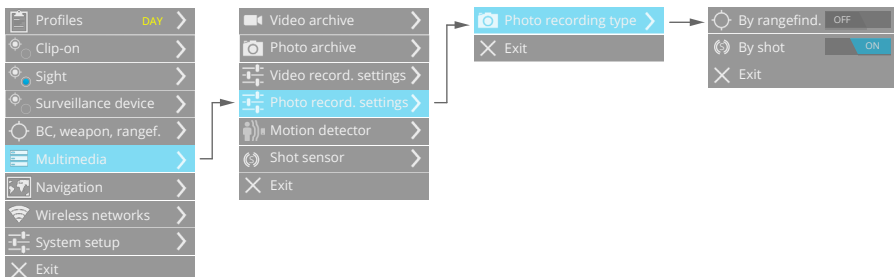|		
Up...		
1 MOV20	12:56 PM 21/05/2013	
2 MOV21	13:06 PM 21/05/2013	
3 MOV252	12:55 AM 24/05/2013	
Down...		
Delete all		
Exit		

User can playback recorded files from the archive. The video archive is divided to directories - files recorded by the button; files recorded by the shot sensor, and the files recorded by the motion detector. All directory files are sorted under a creation date. To playback a file, select an archive file from the list.

▶ MOV21   13:23 PM   57%
315° NE   65% ● MOV21 10:23 AM   Profile1   45%
652m
154m
154m -21.7° -2.2°   x12   Rifle1 / Ammo1 +25°C

Archive files can be deleted in the playback mode, freeing the space on the memory card. User can delete all video archive files, if required.

Photo Recording Settings

Profiles	DAY
Clip-on	
Sight	
Surveillance device	
BC, weapon, rangef.	
Multimedia	
Navigation	
Wireless networks	
System setup	
Exit	

Video archive
Photo archive
Video record. settings
Photo record. settings
Motion detector
Shot sensor
Exit

Photo recording type
Exit

By rangefind.	OFF
By shot	ON
Exit	

The device can make photos. Photo can be taken manually by press and hold over 2 seconds of the Right button or automatically - by the shot sensor during ranging.

If the photo was made by the rangefinder, a location map with specified navigation parameters of the device and the target is referenced to a captured image (if the device coordinates defined).
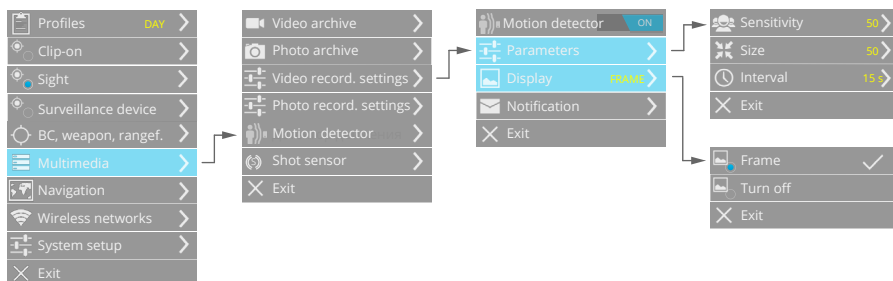
Photo Archive
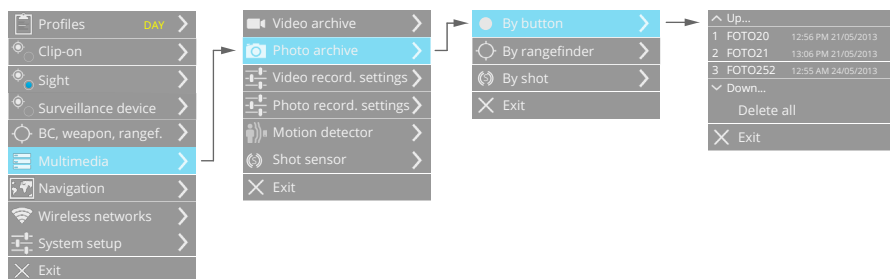
The user can view recorded files from the photo archive. The archive divided into directories - files recorded by the button; files recorded by the rangefinder, and files recorded by the shot. All directory files are sorted under a creation date. To view a file, select an archive file from the list.

Photo archive files can be deleted in the view mode, freeing the space in the memory. The user can delete all photo archive files of the directory, if required. Button functions in the view mode are shown on the picture.

Motion detector

The device has an integrated software-based motion detector which allows detecting a motion of thermal contrast object within the device field of view.

Profiles DAY	Video archive	Motion detector ON	Sensitivity 50
Clip-on	Photo archive	Parameters	Size 50
Sight	Video record. settings	Display FRAME	Interval 15 s
Surveillance device	Photo record. settings	Notification	Exit
BC, weapon, rangef.	Motion detector	Exit	
Multimedia	Shot sensor		Frame ✓
Navigation	Exit		Turn off
Wireless networks			Exit
System setup			
Exit			

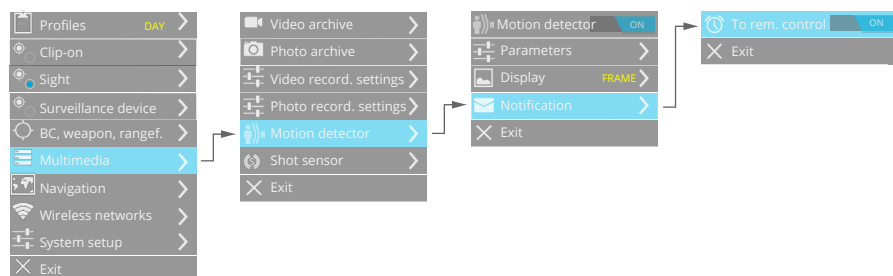User can set up the following parameters of the motion detector:

Sensitivity. The parameter determines the sensitivity of the motion detector. The higher the percentage is, the more sensitive the motion detector is.

Size. The parameter determines the percentage of image change rate required for motion detector activation.

Interval. It is the time interval during which only one motion is detected in a frame (the other motions are ignored). Increasing of this interval reduces the number of alarm messages/records from the recorder.

The user can enable selection of a moving object on the screen (by frame).

The device can activate video recording to the video archive when a motion is detected (see video recording setup parameters), and send alarm messages to a wireless remote control/wristband.

Profiles DAY	Video archive	Motion detector ON	To rem. control ON
Clip-on	Photo archive	Parameters	Exit
Sight	Video record. settings	Display FRAME	
Surveillance device	Photo record. settings	Notification	
BC, weapon, rangef.	Motion detector	Exit	
Multimedia	Shot sensor		
Navigation	Exit		
Wireless networks			
System setup			
Exit			

An alert for a remote control/wristband is transmitted via 2.4 GHz radio channel. The remote control/wristband must be enabled and registered in the list of the device.

Note:

- The motion detector will be disabled automatically to prevent a false response during movement of the device (determined by integrated sensors).

- The motion detector turns on after the activation 15 seconds timeout.

Shot sensor

The device comprises an integrated shot sensor that allows determining the fact of the shot.

The user can configure an activation threshold of the shot sensor via Menu (1-127, interval 1). Threshold exceeding time is non-variable and equal to 1 msec.

Each shot has a unique number. The device can record video and photo (with a map indicating the device position and target location) during shot detection.

Wireless networks

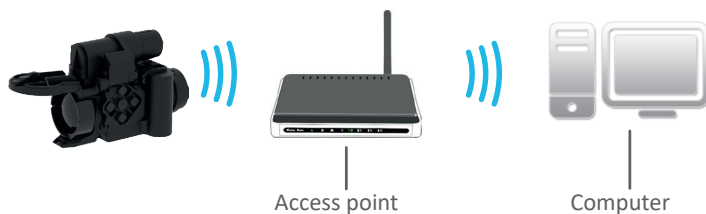## Wi-Fi network configuration

Wi-Fi functions of the device provide wireless transmission of the video stream, files and configuration of the device parameters, eliminating a cable connection.

The device supports wireless connection to a Wi-Fi network in two modes:

- connection to an existing Wi-Fi network (using an access point);

- create your network (for direct connection, for example, to iPad with the iOS) without using of an access point.

General schemes of each type of Wi-Fi network connection are given below:

Mode «Connect to Network». Option 1.

Access point   Computer

Mode «Connect to Network». Option 2.

Local network cable

Access point   Computer
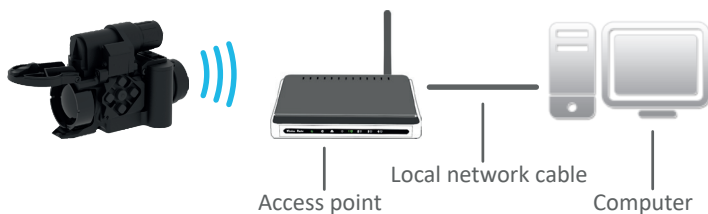
The user can select a connection option in the Connect to Network mode; it does not affect the device operation and its configuration, as described below.

The user can use any device instead of PC.
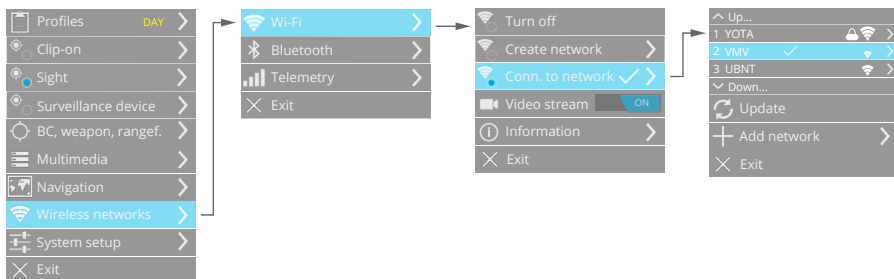
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«Create Network» mode

The device Wi-Fi standard provides support of IEEE standard 802.11b/g/n in the 2.4 GHz frequency band. The maximum data transmission speed is 54 Mbps for IEEE 802.11 g and 150 Mbps for IEEE 802.11 n.

iOS device

Theoretical values of the speed may differ from the actual ones.

Wi-Fi network connection

Enable the "Connect to Network" mode for a Wi-Fi network connection, select a network you want to connect to from the list of networks, press the Menu button to connect to the selected network. Protected networks are indicated by a lock icon, when the user connects to a secured network, a password is required. Enter the password using on-screen keyboard.

Profiles	DAY
Clip-on	
Sight	
Surveillance device	
BC, weapon, rangef.	
Multimedia	
Navigation	
Wireless networks	
System setup	
Exit	

Wi-Fi	
Bluetooth	
Telemetry	
Exit	

Turn off	
Create network	
Conn. to network	
Video stream	ON
Information	
Exit	

| Up...	
1 YOTA	
2 VMV	
3 UBNT	
Down...	
Update	
Add network	
Exit	

Once connected, the device will connect automatically afterwards whenever the network is available.

If the desired network is not listed, select the Add Network menu item.

Enter the network name (SSID) in this item, select a security (no security, WEP, WPA, WPA2), and enter a password. Then select Connect to. If connection is successful, the network will appear in the list of networks, otherwise a failure message will be displayed.

The network settings can be deleted any time to deactivate automatic connection of the devices. For this, select the required network in the list, press Right button and select Forget item.
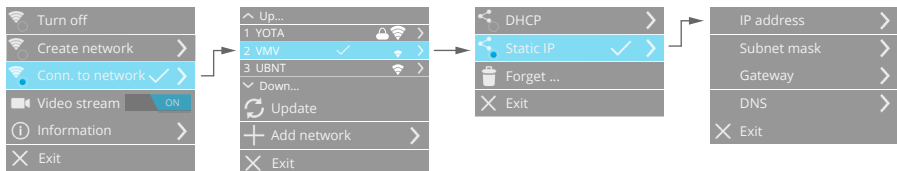
Select a network and press the Right button to change network connection settings.
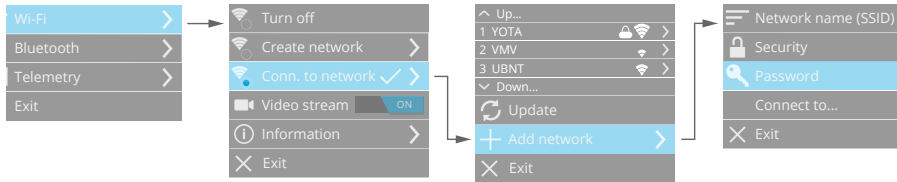
DHCP menu item displays current network settings (DHCP server) and the user can renew the lease by pressing a relevant button if required.
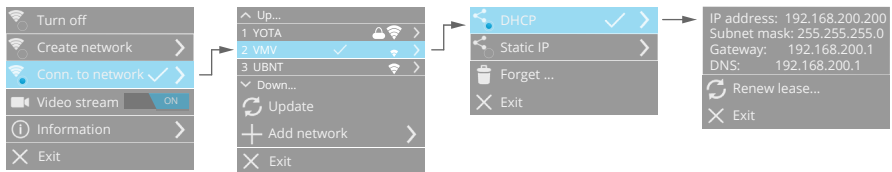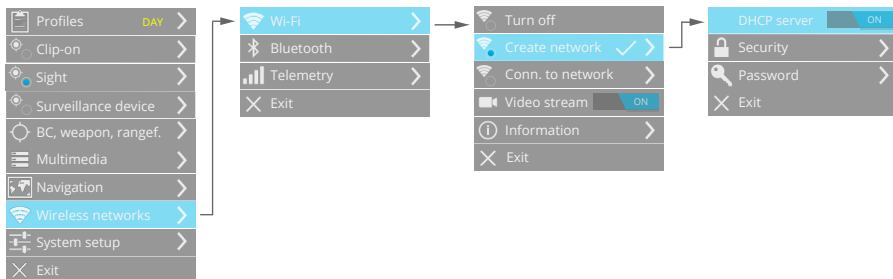

User can preset the Wi-Fi network connection parameters in the Static IP menu item such as: IP address, Subnet mask, Gateway, DNS.

Wi-Fi Network Creation

By applying the Network Creation item, the user can connect mobile phones, smart phones, tablets, etc. directly to the device without using an access point.

Select a relevant item to create a network.

Profiles	DAY	>
Clip-on	>
Sight	>
Surveillance device	>
BC, weapon, rangef.	>
Multimedia	>
Navigation	>
Wireless networks	>
System setup	>
Exit

Wi-Fi	>
Bluetooth	>
Telemetry	>
Exit

| Turn off |
| Create network ✓ > |
Conn. to network	>
Video stream	ON
Information	>
Exit

DHCP server	ON
Security	>
Password	>
Exit

The device will create a corresponding Wi-Fi network, name format IR&DXXXX, where XXXX are last four MAC-address hexadecimal digits of the built-in Wi-Fi network adapter.

User can change created network settings.

- • Built-in DHCP server will automatically allocate IP addresses to connected devices without additional settings in a mobile phone, smart phone, etc. IP addresses range 192.168.200.1 - 192.168.200.199, subnet mask 255.255.255.0. IP address of the device is always static - 192.168.200.200.

- • Security activation (no security, WEP, WPA, WPA2) and password entry are required for secured connection.

Video Streaming via Wi-Fi

The device is equipped with a built-in video streaming server that can transmit video over Wi-Fi to a mobile phone, a smartphone, a tablet, etc. with iOS and Android operating systems in a real time mode. A remote control mode is also available.

Install the IR&D Operator app on your iOS or Android device (available on AppStore or Google Play) to receive streaming video and remote management. Follow instructions of the IR&D application for device connection.

Video streaming is also possible to any computer.

Video streaming protocol is RTSP. Name for streaming video reception (for example, via VLC) is rtsp://192.168.200.200/media.h264.
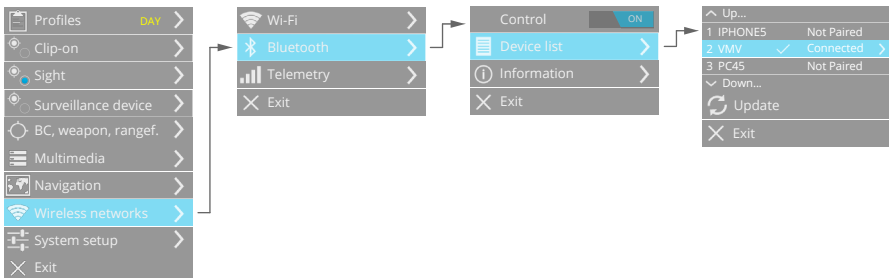
Wi-Fi Information

This menu item displays current Wi-Fi network settings and MAC-address of the integrated Wi-Fi network adapter.

Bluetooth

Bluetooth provides an opportunity of the short-distance direct connection between two devices (e.g. your device and the Kestrel meter).

Enable a relevant interface in the device menu for Bluetooth connection.

Then select the device you want to connect from the list of networks and press the Menu button to connect to the network. Follow the instructions for Bluetooth connection displayed on the screen of the device. Once connected, the devices will connect automatically afterwards. The connection settings can be deleted any time to deactivate automatic connection of the devices. For this, select the required network in the list, press the Right button and select the Forget item.

Telemetry radio interface 2.4 GHz

Various devices such as a radio rangefinder, a two-key remote control, the IR&D wristband remote control, etc., can be connected to the device via telemetry radio interface. All devices have an address and a unique ID.

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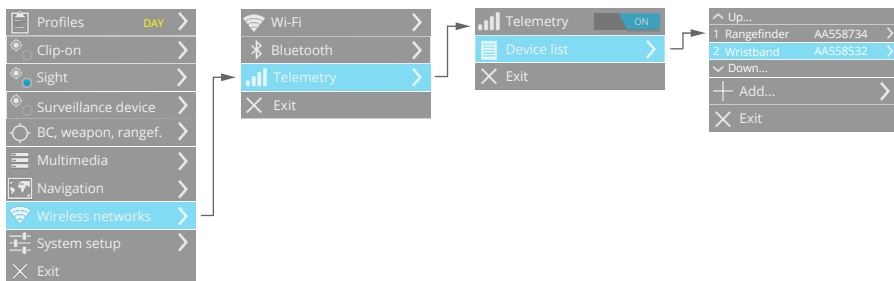
You can find registered radio devices in the list of the devices. Any radio device can be disabled if required. Enter the settings of the radio device and select Forget.
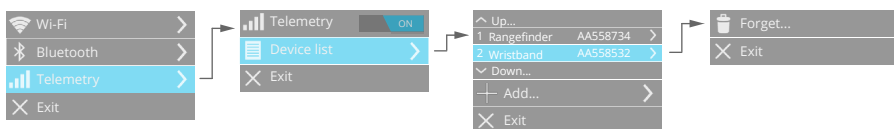
You can also add new radio devices by entering the radio device list and selecting "Add". The device will be switched into the radio device search mode. The screen will display a window with the "Scanning devices" message.
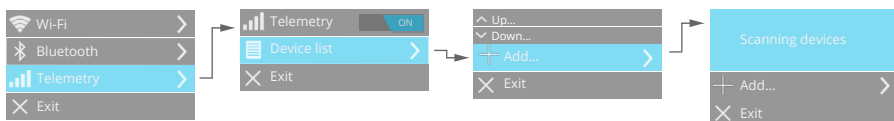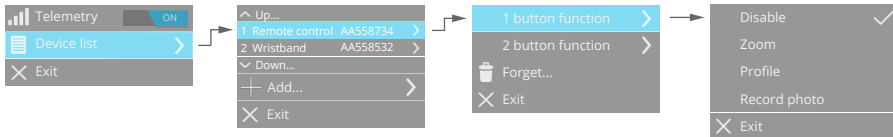

Turn on the radio device you want to add and press any of its buttons. On the screen, you will see the type and the address of the found radio device.
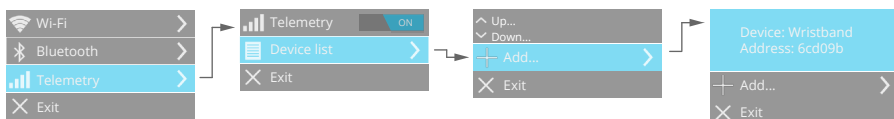
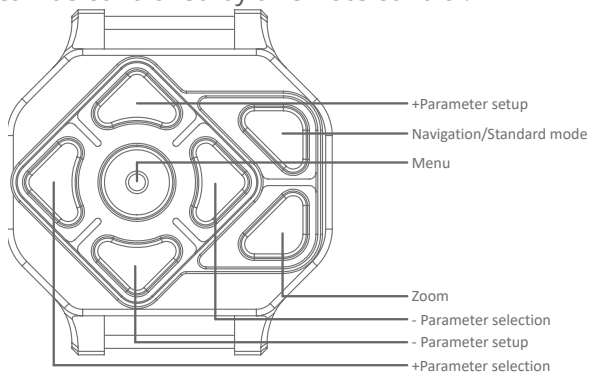Select "+Add" to have the available radio device added to the list of your radio devices.

Additional options can be applied for some radio devices. For example, button functions can be preset for the 2-button remote control.

Remote Control (Wristband) - Optional

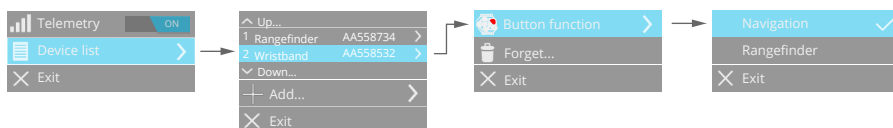Thermal sight features can be controlled by a remote control.

Remote control (wristband) buttons options are listed in the table below:

Button	Function
Parameter selection+/-	• Press for parameter selection.
Parameter adjustment+	• Press to increase the selected parameter by 1 unit in an adjustment mode, press and hold for fast increase of the selected parameter. • Distance+ (by default).
Parameter adjustment -	• Press to decrease selected parameter by 1 unit in the adjustment mode, press and hold for fast decrease of the selected parameter. • Distance - (by default).
Zoom	• Press to change magnification.

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Button	Function
Menu	• Press to enter the Menu. • For the remote control on/off, press and hold the button for 7 seconds (until long vibration). In disabled mode, the remote control will enter ultra-low power consumption mode - will not respond to key presses and will not receive alarm messages from the device.
Navigation/ Standard mode*	• Press to select the Navigation/Standard mode.

*This button functions can be preset via menu. Optionally, the user can include a distance measuring feature by the rangefinder (the first press enables the rangefinder, the second press activates range measurement if the second press is made not later than 15 seconds after the first press).

Telemetry ON	Up...
Device list	1 Rangefinder AA558734
Exit	2 Wristband AA558532
	Down...
	Add...
	Exit

|	
Button function	Navigation
Forget...	Rangefinder
Exit	Exit

Options of remote control buttons can be changed depending on a current operation mode (see the paragraph below).

The remote control is powered by a CR2450 battery. Low battery status icon is displayed on the thermal sight screen if discharged.

WindMaster Weather Station - Optional

The device can be connected to the IR&D weather station via a radio channel. In a real-time mode the weather station transmits temperature, air pressure, relative humidity, wind speed and direction data which can be included in the integrated ballistic computer and a wind forecast.

To connect to the weather station, add it to the list of the registered devices.
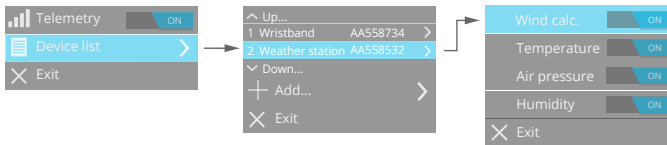
The device calculates weather station data automatically if Wind Calculation is enabled.

Attention!

• For a proper operation of the weather station, its integrated magnetic compass must be calibrated.

To turn the Weather station on, press and hold the button over 2 seconds till the green LED is on. This is followed by initiation of the sensors and reading of the compass calibration data. If the compass has been calibrated, the green LED blinks, otherwise the red one (compass calibration is required).

Press and hold the button app. 2 seconds to turn the device off. As the button is pressed, the red LED will light up to indicate deactivation of the device after the LED is off.

Navigation Service

General Information

Use the navigation service to determine your location and target search.

The navigation service is provided by an integrated GPS receiver and an electronic compass.

To view the device location, select the Navigation mode. The device current location is displayed as a dot on the map.

Navigation service parameters are controlled via menu. The user can optionally disable the navigation service, in this case the GPS receiver will be disabled (if the GPS time synchronization is enabled, the GPS receiver will be turned off after timing over).
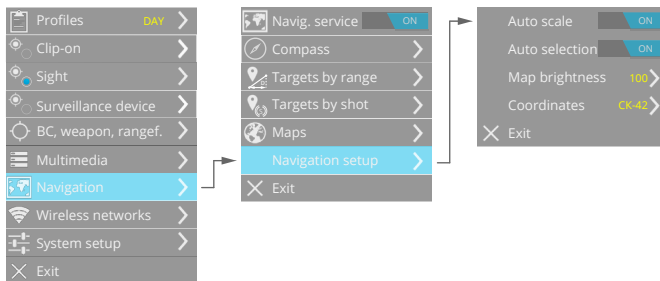
The user can adjust image brightness in the Navigation mode.

If Auto Scale is enabled and target is selected, the map scale changes automatically to view device location and target location respectively.

Auto Selection activates the last target automatic selection by range or by shot. Otherwise, the user target shall always be displayed in the Navigation mode.

Coordinate determination time depends upon a lot of factors and the most significant is satellite visibility conditions. First coordinate determination (**cold start**) may take more time in an urban area with limited sky view than in the field. The **cold start** time takes about 60 seconds in perfect conditions.

In case of the **warm start** (providing that the device is activated after 4 hours maximum since the last coordinate determination) the GPS receiver may not calculatethe satellite ephemerides, so the coordinate

determination takes 25 seconds approximately for the perfect conditions of the sky visibility.
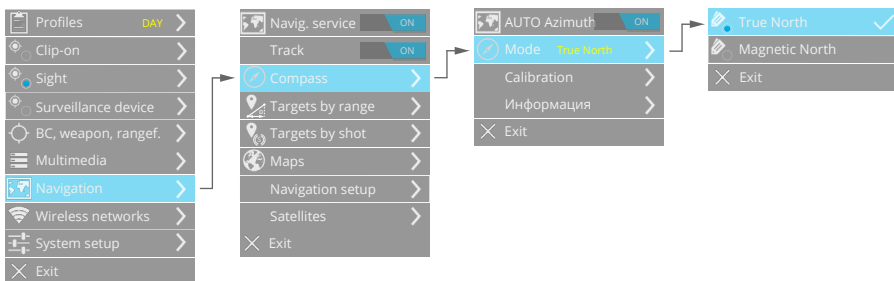
If the power saving mode is enabled, the GPS receiver activates its low power consumption mode with all GPS data saved in RAM. By exiting the low power consumption mode, the **hot start** of the GPS receiver is carried out (providing that coordinates were determined before turning on the power saving mode) that results in approximately 15 second coordinate determining for the perfect conditions of the sky visibility.

Note:

- A GPS receiver antenna is located on the top of the device. Make sure that the GPS receiver antenna has the maximum sky visibility to reduce the **cold start** time.

Compass

The integrated magnetic compass must be calibrated via Menu for a proper operation of the navigation service. If the compass is not calibrated, its indicator in the System Tray will be red.

Profiles	DAY	
Clip-on		
Sight		
Surveillance device		
BC, weapon, rangef.		
Multimedia		
Navigation		
Wireless networks		
System setup		
Exit		

Navig. service	ON
Track	ON
Compass	
Targets by range	
Targets by shot	
Maps	
Navigation setup	
Satellites	
Exit	

AUTO Azimuth	ON
Mode	True North
Calibration	
Информация	
Exit	

True North
Magnetic North
Exit

| Azimuth digits colour	Compass	Actions required
White	Calibrated	-
Yellow	Calibrated, Low accuracy	Low azimuth accuracy i.e. significant error may appear while target locating. Compass can be calibrated via Menu.
Red	Non-calibrated	Compass must be calibrated via Menu.

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Select the magnetic or true north mode for the compass.

Note:

- In the Magnetic North mode the compass will indicate the direction to the magnetic pole, in the True North mode - to the geographical North of the Earth. The location of the true geographical North does not coincide with the location of the magnetic pole. The device automatically corrects declination during the True North calculation depending on the own location.

Maps

The user can update or install maps of any region, if required.
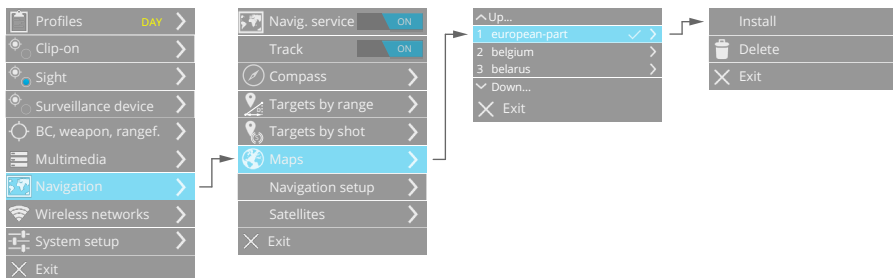
Map installation:

- download a map from the irnd.be website;

- turn the device on;

- connect the device to your computer via USB - open a removable IR&D disk ;

- copy the map file in the root directory of the removable IR&D disk;

- disconnect the device from the computer USB;

- select map files and select Install in the Navigation/Maps menu. Map installation procedure will be displayed. The device is ready for operation with a new map after 100% installation

Note:

- To view the map in the navigation mode, the device must determine coordinates by using of the integrated GPS receiver.

- Only one map can be installed into the device. To install a new map, delete the pre-installed one.

Attention!

- Navigation service uses maps from the OpenStreetMap project, which works like Wikipedia, allowing users from all over the world to create and edit maps. If you want to add anything, or make corrections of the map, you can correct it directly on the website http://openstreetmap.org, and your changes will appears at the next update time of maps on the IR&D website.

Targets by Range
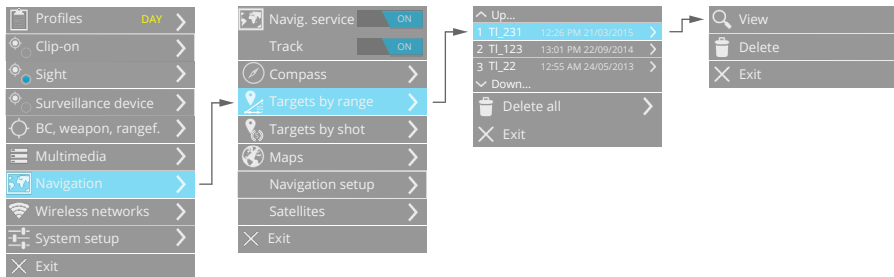
The device determines the target geographical coordinates and its altitude above ground automatically for each ranging. Also the photo is recorded automatically including a thermal image and a mapped target location.
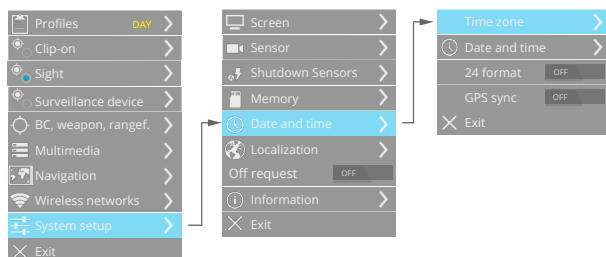
Targets by Shot
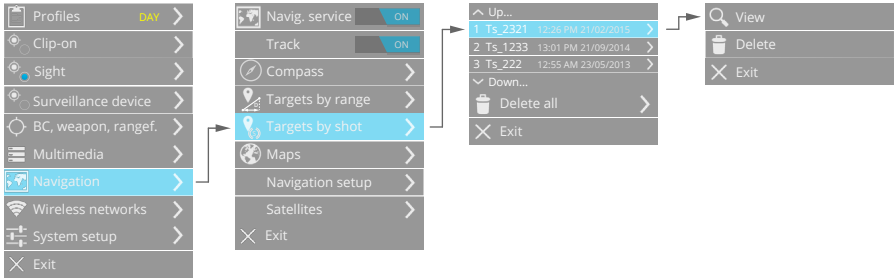
The device determines the target geographical coordinates and its altitude above ground automatically for each shot. Also the photo is recorded automatically including a thermal image and a mapped target location.
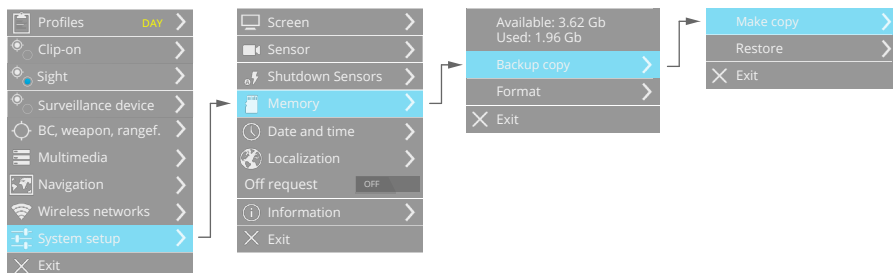
Settings

Time and date

| Profiles | DAY |
| Clip-on |
| Sight |
| Surveillance device |
| BC, weapon, rangef. |
| Multimedia |
| Navigation |
| Wireless networks |
| System setup |
| Exit |

| Screen |
| Sensor |
| Shutdown Sensors |
| Memory |
| Date and time |
| Localization |
| Off request | OFF |
| Information |
| Exit |

| Time zone |
| Date and time |
| 24 format | OFF |
| GPS sync | OFF |
| Exit |

Use the Date and Time menu item for setup of a date and time, a time zone, a current date and time, and a time format.

When the Sync by GPS mode is enabled, date and time will be set by signals of the satellite navigation unit based on the selected time zone. If the Sync by GPS is enabled and the Navigation is disabled, the device will ac¬tivate a GPS/GLONASS receiver after booting, then determine time, and deactivate the GPS/GLONASS receiver afterwards.

Memory card, backup

| Profiles | DAY |
| Clip-on |
| Sight |
| Surveillance device |
| BC, weapon, rangef. |
| Multimedia |
| Navigation |
| Wireless networks |
| System setup |
| Exit |

| Screen |
| Sensor |
| Shutdown Sensors |
| Memory |
| Date and time |
| Localization |
| Off request | OFF |
| Information |
| Exit |

| Available: 3.62 Gb Used: 1.96 Gb |
| Backup copy |
| Format |
| Exit |

| Make copy |
| Restore |
| Exit |

The device comprises a 4 GB built-in flash memory. This memory is available to the user.

The user can view the memory information via Menu if required. Also the indicator of the memory and its filling level is displayed in the System Tray. The user can format the memory via Menu. All data of the memory will be deleted.

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The device can backup settings and a weapon database. The user can restore the pre-backup device condition afterwards if required. To make a backup copy of settings and the weapon database to the memory, select Make Copy. A new backup copy will be created. To restore all data of the memory backup copy, press Restore.

Automatic shutdown sensors
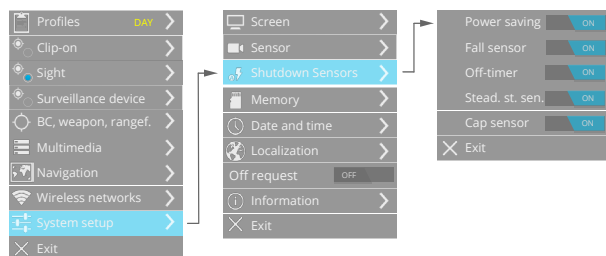
Enable sensors via Menu for automatic shutdown of the device.

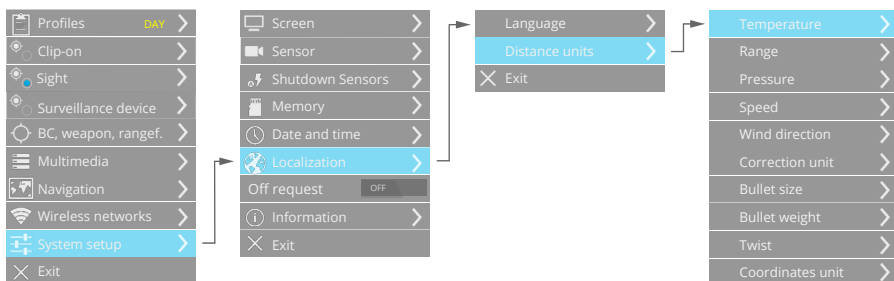**Free fall sensor** will shut down the device automatically in case of free fall sensing and reduce its damage risk.

Off-timer will shut down the device if the user forgot to turn it off – no buttons are pressed within 15 minutes.

Steady state sensor will shut down the device if the user forgot to turn it off – it doesn't move within 15 minutes.

Cap sensor will shut down the device if the lens cap is closed over 10 minutes.
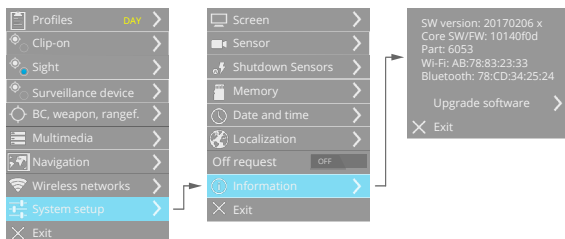
Power saving – this mode is used to save power consumption of the device when you need quick power on. When this mode is enabled, and the lens cap is closed for more than 5 seconds, the device enters low power consumption mode. To exit the power saving mode, open the lens cap. To turn off the device in power saving mode, press the power button for 2 seconds. The transition time from power saving mode to the operation mode is 3-4 seconds.

Localization

Profiles **DAY**	Screen	Language	Temperature
Clip-on	Sensor	Distance units	Range
Sight	Shutdown Sensors	Exit	Pressure
Surveillance device	Memory		Speed
BC, weapon, rangef.	Date and time		Wind direction
Multimedia	Localization		Correction unit
Navigation	Off request **OFF**		Bullet size
Wireless networks	Information		Bullet weight
System setup	Exit		Twist
Exit			Coordinates unit

In this Menu item the user can select the language (English/German/ Spanish/French/Arabic), as well as units of a distance, temperature (C/F), air pressure, wind speed and direction, corrections, bullet size, bullet weight, twist, and navigation coordinates.

Information and Software Update

Profiles **DAY**	Screen	SW version: 20170206 x
Clip-on	Sensor	Core SW/FW: 10140f0d
Sight	Shutdown Sensors	Part: 6053
Surveillance device	Memory	Wi-Fi: AB:78:83:23:33
BC, weapon, rangef.	Date and time	Bluetooth: 78:CD:34:25:24
Multimedia	Localization	Upgrade software
Navigation	Off request **OFF**	Exit
Wireless networks	Information	
System setup	Exit	
Exit		

This Menu item displays system information and the firmware version. The user can also update the device software.

How to update software:

- download a new firmware from the irnd.be website;

- turn the device on; check that the battery operating time is 1 hour minimum;

- connect the device to your computer via USB - open the removable IR&D disk;

- copy the firmware file in the root directory of the removable IR&D disk;

- disconnect the device from the computer USB;

- in the System settings/Info/Software Update menu item - select the downloaded firmware file and select Update;

- the device will start the firmware update and turn off automatically afterwards. Turn on the device - updating will take 2 minutes. After full booting, the device is ready to operate with the new software.

Operation

Night zero adjustment
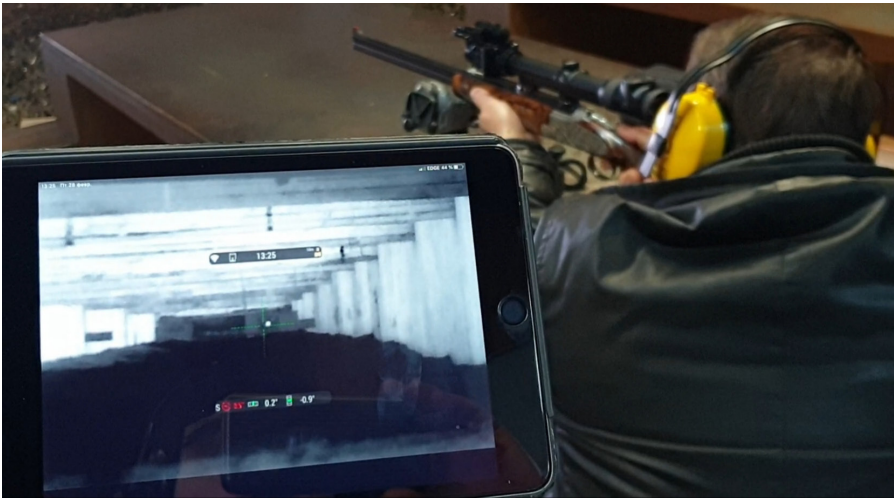
The night zero adjustment is required if a mean point of impact has been changed during clip-on installation.
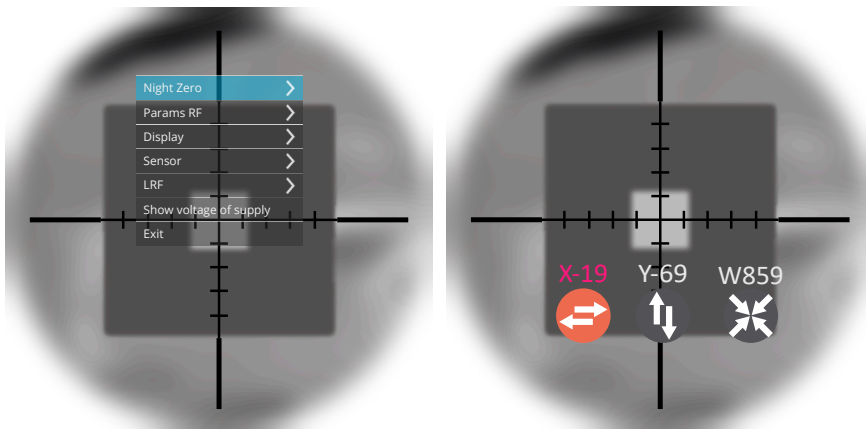
Attention!

• Adjust a scope parallax, if any, during shooting.

For this, enter the Service Menu – press and hold the central button. The Standard Menu appears first. Keep holding the button until a "Conform Service Menu entering" message pops up. Press a tick to confirm.

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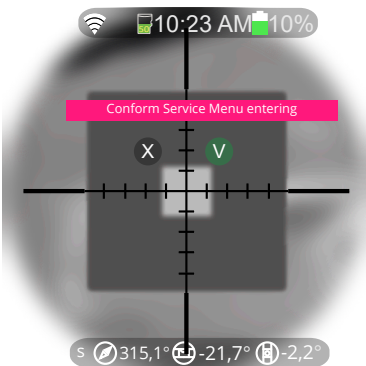
Select the Night Zero item. Default screen values of X and Y axes will appear at the bottom of the screen.

To adjust the Night Zero, i.e. to superimpose a scope impact point and a clip-on impact point, we will change a clip-on screen position, but the user will see it as scope reticle moving off.

- To make X-axis adjustment, press the LEFT button. We move the screen leftwards and can see that the reticle is moving RIGHTWARDS and vice versa.

- To make Y-axis adjustment, press the UP button. The reticle is being moved DOWNWARDS and vice versa.
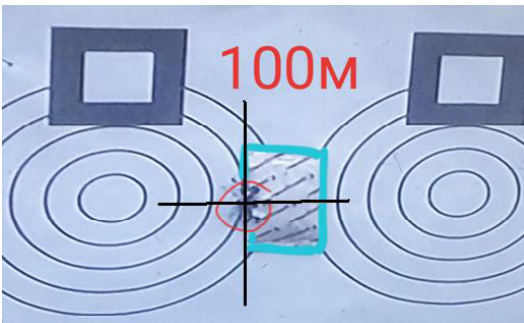
Example:

Let's check a rifle zeroing for 100 m using a scope.

Install the clip-on and make a 100m shot using a thermal target. The impact point moved off 2.5 cm to the left.
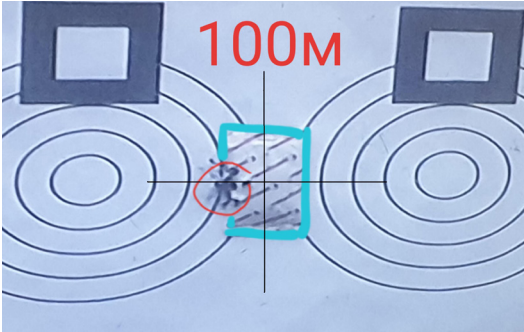
Enter Service Menu – Night Zero. X value is -19, Y value is -69. We should move the reticle for 1 pixel (1 pixel = 2.17 cm) to the left. Press the RIGHT button and X value changes to -18, so the reticle moves leftwards.

Make one more shot and the bullet hits the center of the target.

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