Axion F

Manual

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Description

Axion FIR-matrix (microbolometer) based thermal imaging monoculars are represented by a number of models that differ in magnification and lens diameter.

These devices are designed for use both at night-time and during the day in difficult weather conditions (fog, smog, rain), as well as where obstacles are present that impede the detection of a target (branches, tall grass, dense shrubs etc.).

Unlike night-vision devices that are based on electron-optical converters, thermal vision monoculars do not require an external light source and are resistant to the effects of bright light.

Axion Fmonoculars can be used for night-time hunting, observation and terrain orientation, and carrying out rescue operations.

To get started, see the sections:

Battery Charging

Battery Installation

Powering on and Image Setting

Package Contents

- Axion F Thermal Imager
- APS 3 rechargeable battery
- Power Adapter
- USB Cable
- Carrying case
- Hand strap
- Quick User Manual
- Lens-cleaning cloth
- Warranty sheet

Features

- Microbolometer pixel size is 12 microns
- 640x400 AMOLED display resolution
- Compact size and light weight
- Functional and ergonomic design
- Eight color modes
- Three calibration modes: Manual, Semi-Automatic, Automatic
- Three levels of sensitivity enhancement: Normal, High, Ultra
- Stadiametric Rangefinder
- Display Off function
- Defective pixel repair function
- Updatable firmware
- Wide operating temperature range (-25°C to +40°C / -13°F to +104°F)
- Fully waterproof (IPX7 rated)

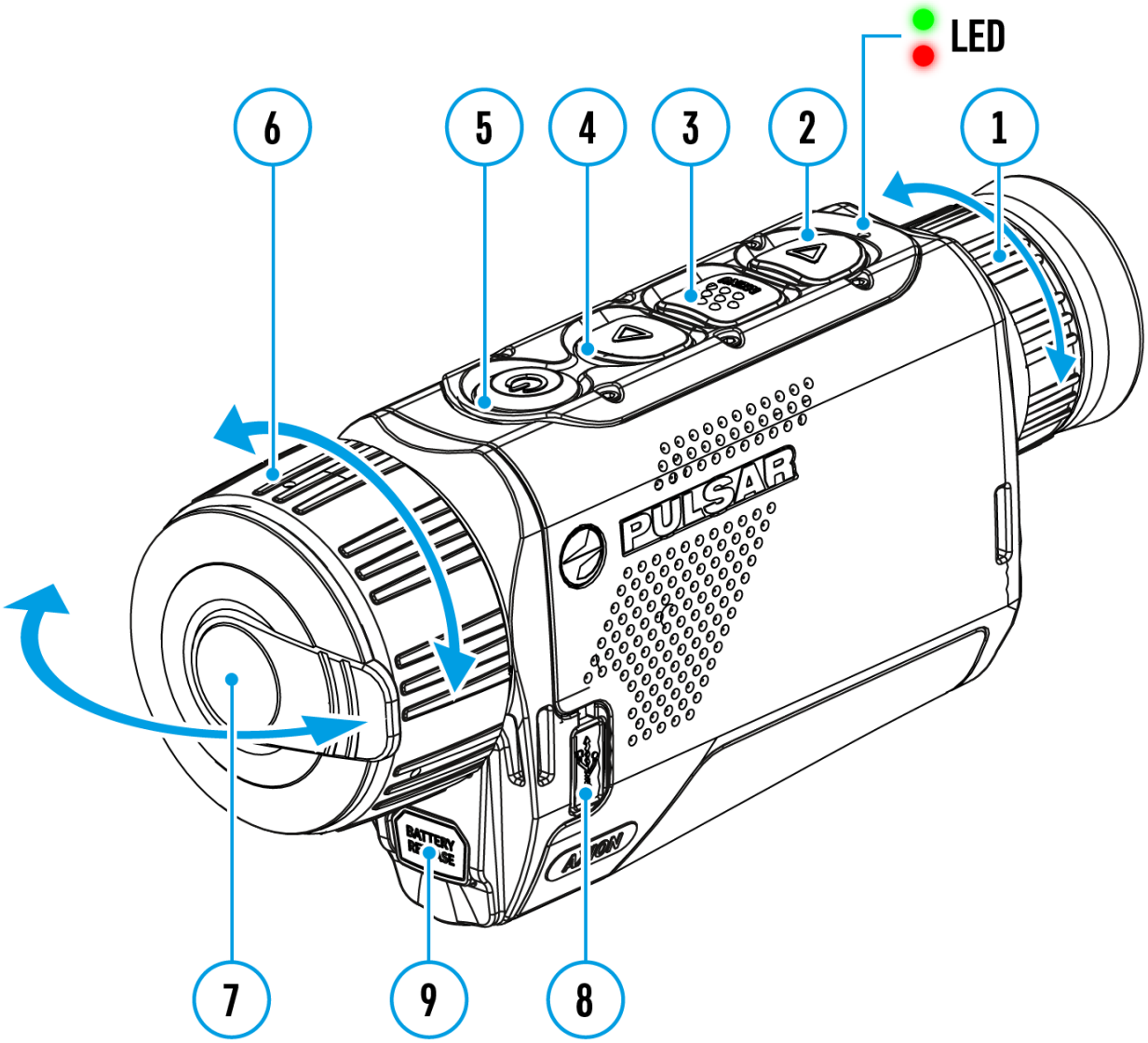
Video/Audio Recording

- Built-in video and sound recorder
- Integration with iOS and Android devices
- Wi-Fi remote control and viewing using a smartphone
- Storing photos and videos in Cloud when using the Stream Vision 2 App

Battery Pack

- Quick Change Li-Ion Battery Pack APS 3
- Charging from USB Power Bank

Components and Controls



1. Eyepiece focus ring
2. DOWN/REC button
3. MENU button
4. UP/ZOOM button
5. Power ON/OFF/CALIBRATION button
6. Lens focus ring
7. Lens cover
8. MicroUSB connector

9. Battery release button

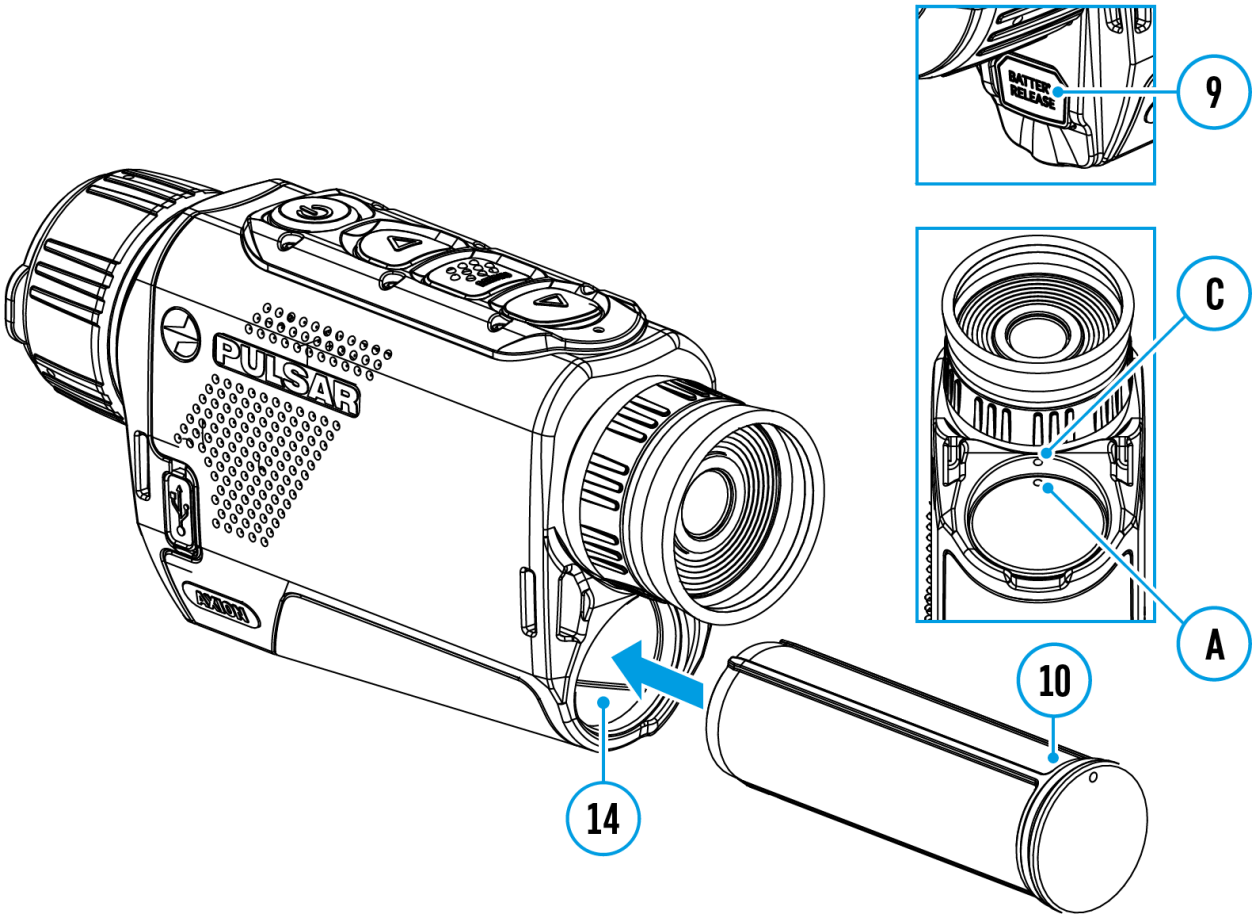
LED indicator displays the current status of the device:

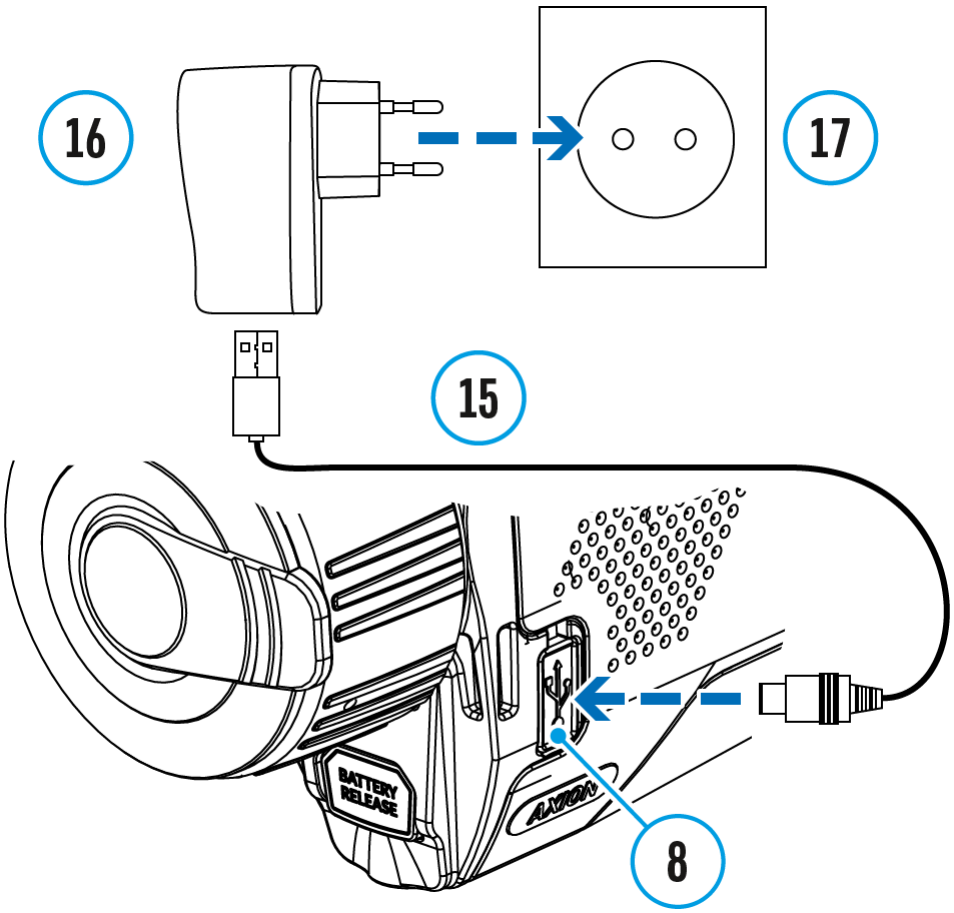
LED Indicator	Operating Mode
🟢	Device is turned on
🟢	The device is turned on/video recording
🔴	The device is turned on/battery charge < 10%
🔴	The device is turned on/video recording/battery charge < 10%

Battery Charging

The **Axion F** thermal imager comes with an APS 3 rechargeable Lithium-ion battery. Before first use, make sure the battery is fully charged.

Option 1

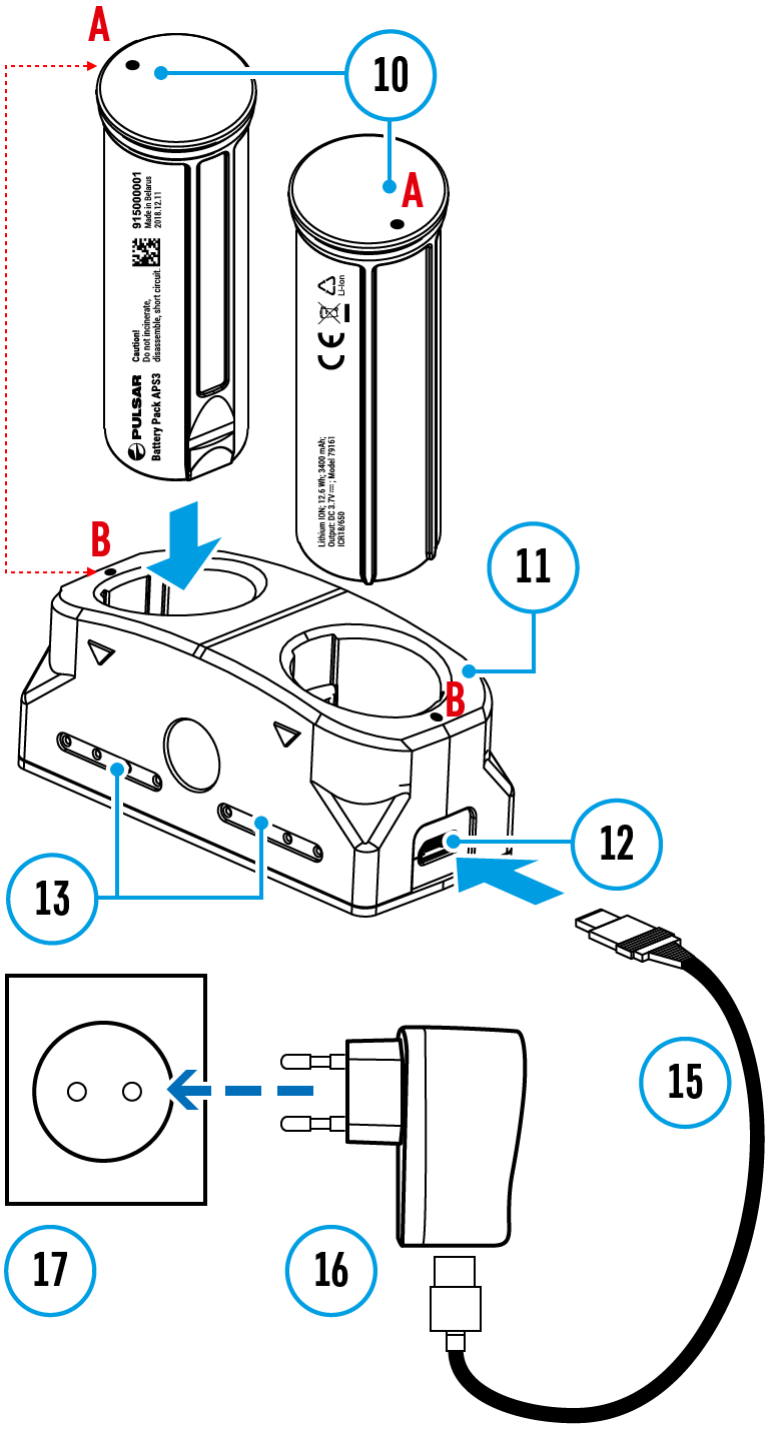




1. Install the battery **(10)** into its slot on the device case **(14)** by aligning the icons to form a ‘dot’ on the unit and the battery.
2. Attach a USB cable **(15)**to the microUSB connector **(8)** on the device.
3. Connect the other end of the USB cable **(15)** to the power adapter **(16)** or to a USB socket connected to another power sources with rated output of 5V or less.
4. Connect the power adapter **(16)** to the mains power supply **(17)**.
5. Wait until the battery is fully charged (indication in the status bar:)

Note: The PB8I Power Bank may be used as a charger.

Option 2



1. Insert the battery **(10)** fully along the guide rail into the APS* charger slot **(11)**.
2. Point **A** on the battery and Point **B** on the charger should be aligned.
3. Two batteries* can be charged at the same time – a second slot is provided for this.
4. Attach the microUSB plug on the USB cable **(15)** to the microUSB connector on the power adapter **(16)**. Plug the device into a 100–240V power outlet **(17)**.
5. Attach the second plug of the microUSB cable to the socket **(12)** of the

charger **(11)**.

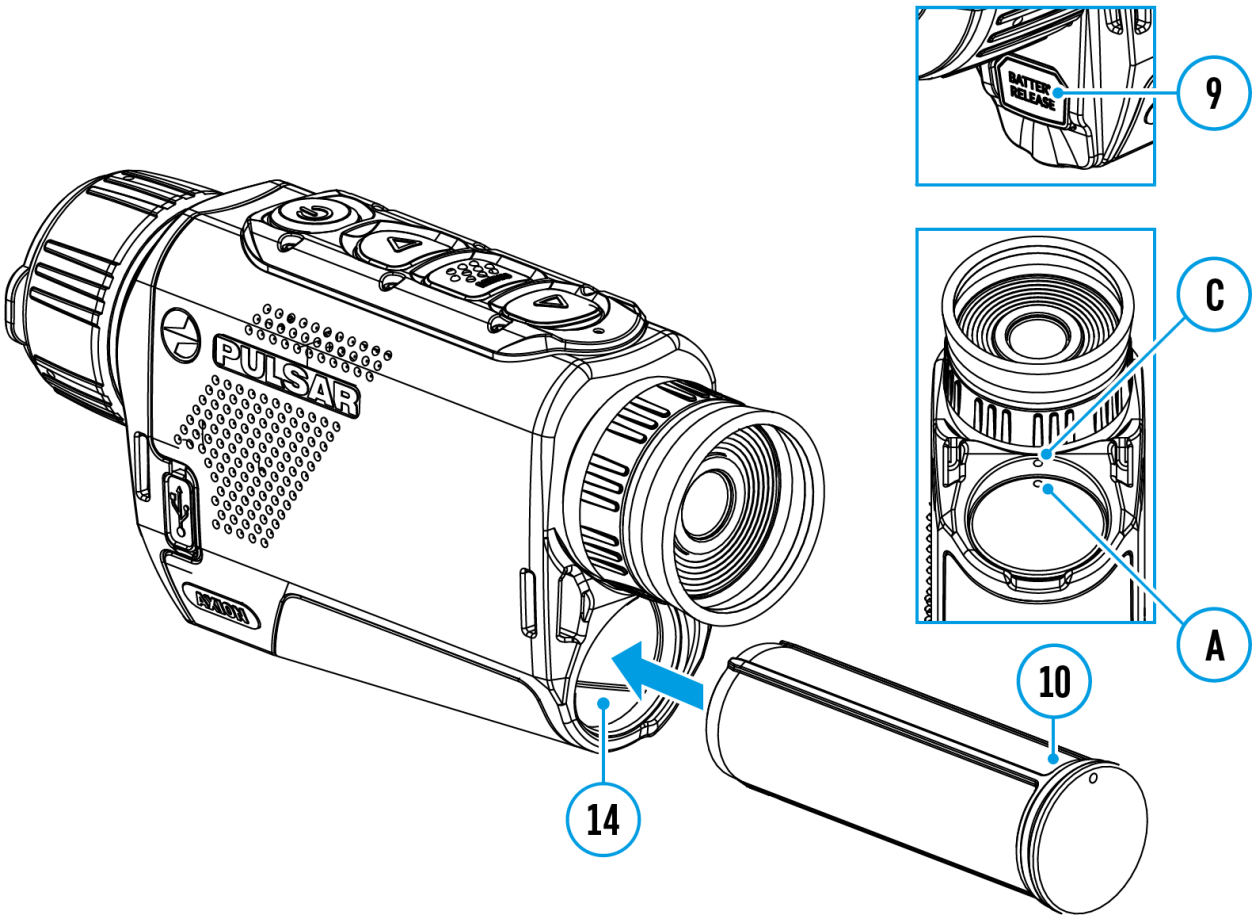
6. The LED indicator **(13)**will light up battery charge status (see table).
7. Wait until the battery is fully charged (LED indication **(13)**: ●●●●).

(13) LED Indicator**	Battery charge status
●	Battery charge from 0 to 10%. Charger not connected to the mains power supply
●	Battery charge from 0 to 10%. Charger connected to the mains power supply
●●●●	Battery defective. **Do not use the battery!**
Image not found or type unknown ●	Battery charge from 10 to 20%
●●	Battery charge from 20 to 60%
●●● Image not found or type unknown	Battery charge from 60 to 95%
●●●● Image not found or type unknown	Battery completely charged. Can be disconnected from the charger

* Available separately

**The indicator displays the current level of charge of the battery for 30 seconds when the APS charger is not plugged in. When the power is connected, the display shows the current status of the battery constantly, the LEDs additionally flickering to indicate the battery charging process.

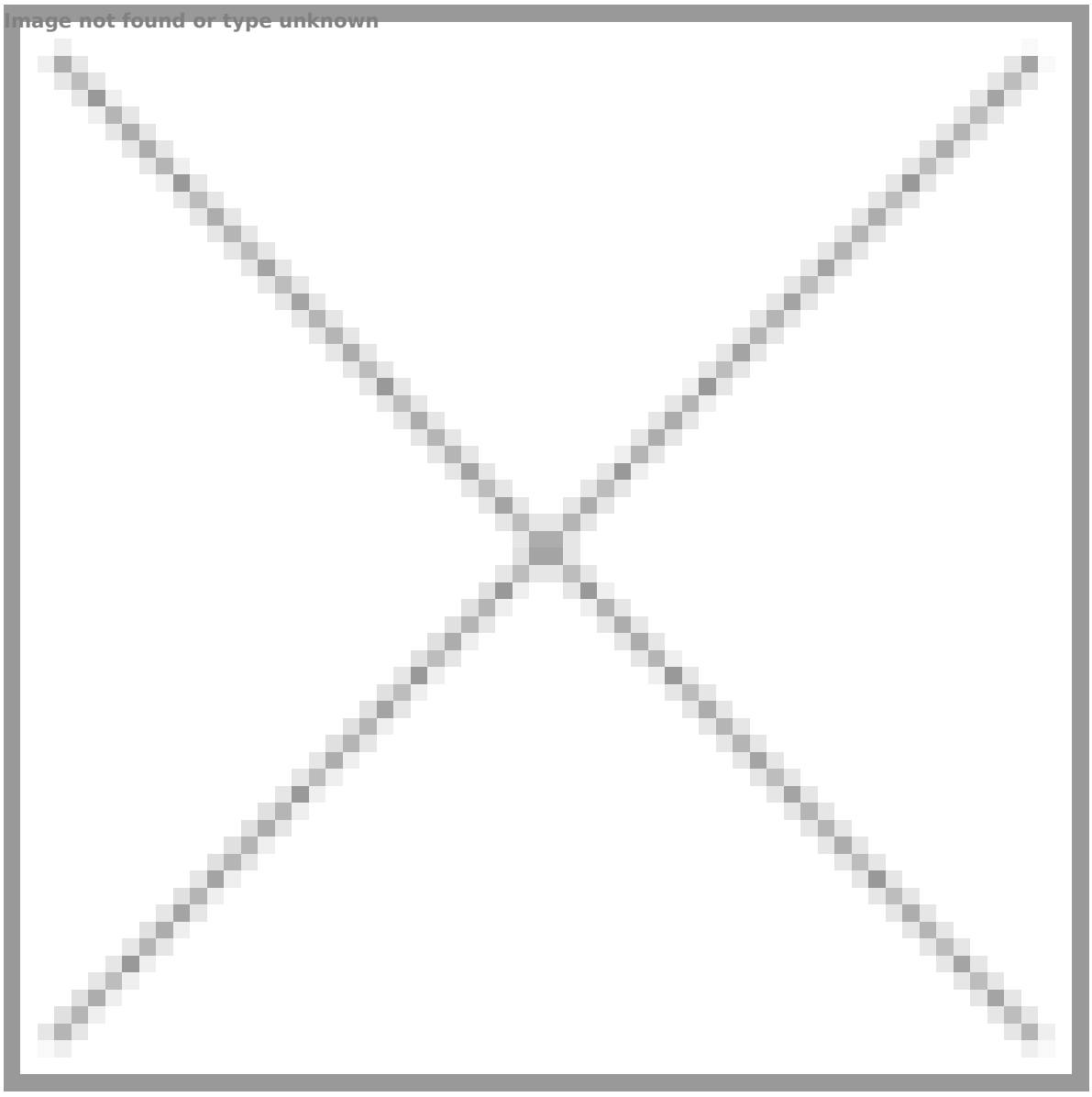
Battery Installation

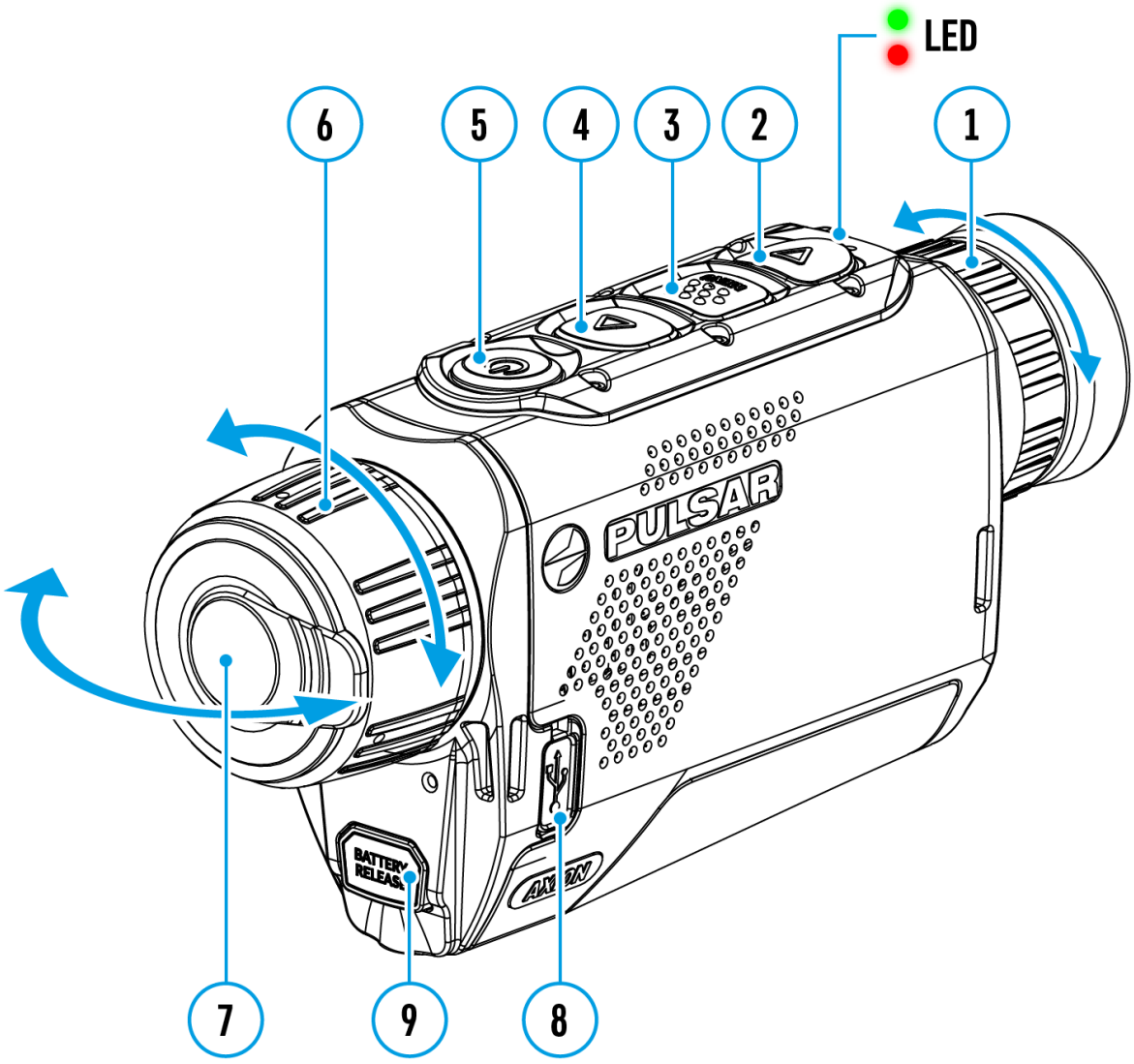


1. Insert the battery **(10)** into the assigned slot on the device’s casing **(14)**, aligning the images to form a ‘dot’ on the instrument **(C)** and the battery **(A)**.
2. When properly installed, the battery is locked into the slot with a special clip.
3. To remove the battery from the device, press the Battery Release button **(9)**.

External Power Supply

Show device diagram





External power is supplied from an external source, such as a 5V Power Bank.

1. Attach the external power source to the device's USB connector **(8)**.
2. The device will switch to operation from the external power source, while the APS3 battery will be gradually recharged.
3. An icon of a battery will appear on the display showing its charge as a percentage.
4. If the device is operated from an external power source and the APS3 battery is not connected, an icon is displayed.
5. When the external power supply is disconnected, the device switches to the internal power supply without the device powering off.

Important!Power Bank must be connected to the device with the battery

installed.

Attention! Charging Power Bank APS3 batteries at air temperatures below 0 °C can result in reduced battery life. When using external power, connect Power Bank to the switched-on riflescope, which have worked for several minutes. External power is supplied from an external source, such as a 5V Power Bank.

Precautions

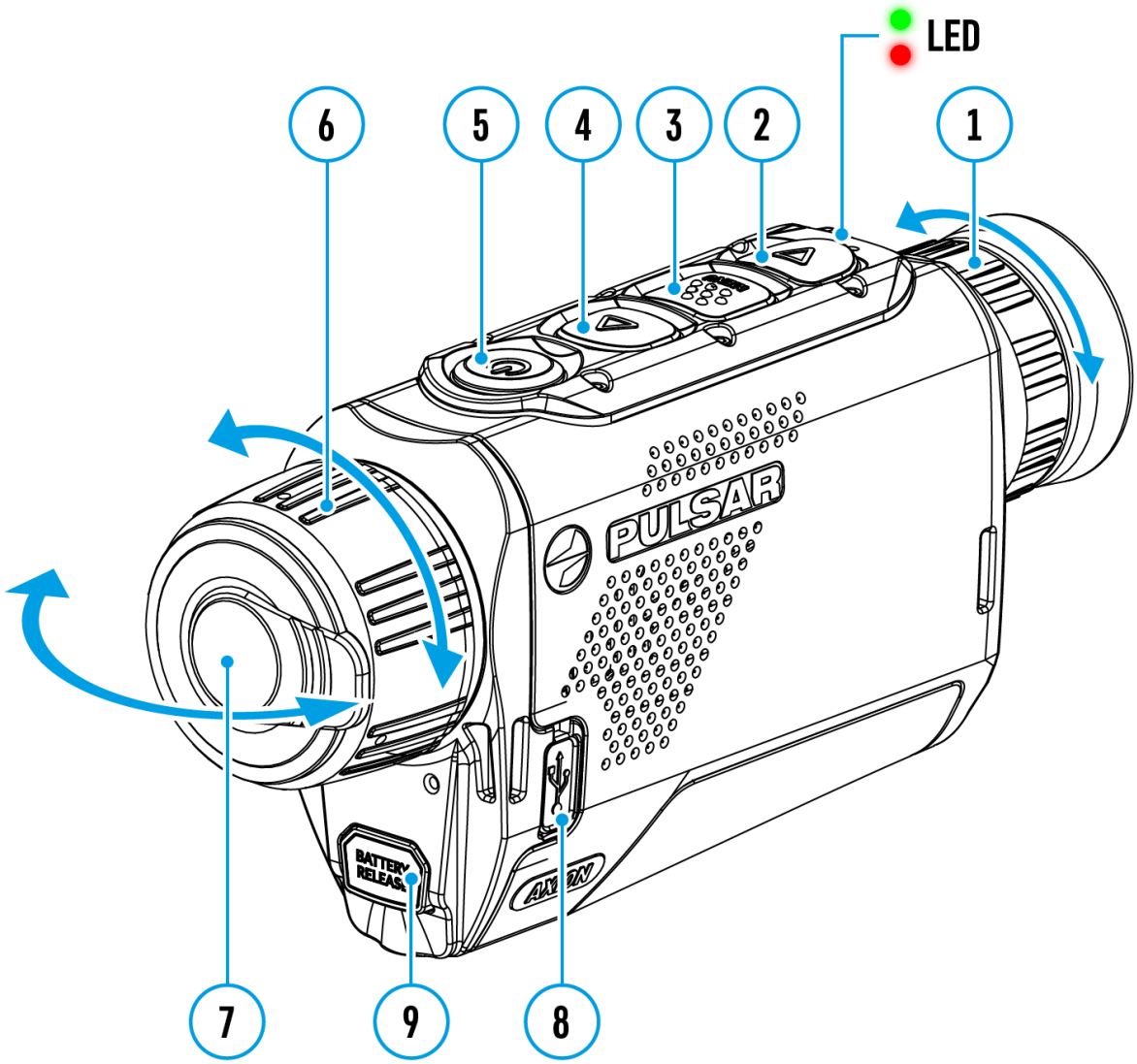
- Always use the APS charger to charge APS batteries. Using an unsuitable charger can cause irreparable damage to the battery and fire.
- Do not charge the battery immediately after bringing it from cold to warm. Wait at least 30 minutes for the battery to warm up.
- Do not leave the battery unattended while charging.
- Do not use the charger if it has been modified or damaged.
- Do not leave the battery in a charger connected to the mains after charging is complete.
- Do not expose the battery to high temperatures or naked flames.
- Do not use the battery as a power source for devices that do not support APS 5 batteries.
- Do not disassemble or deform the battery or charger.
- Do not drop or strike the battery or charger.
- The battery and charger must not be immersed in water.
- Keep the battery out of the reach of children.

Recommendations for Use

- The batteries should be partially charged (50 to 80 %) for long-term storage.
- The battery is to be charged at an ambient temperature of 0 °C to +35 °C or the lifespan of the battery will decrease significantly.
- When using the battery at sub-zero ambient temperatures, the battery capacity decreases. This is normal and not a defect.
- Do not use the battery at temperatures outside the range of -25 °C to +40 °C or it may reduce battery life.
- The battery is short circuit protected. However, any situation that may cause short-circuiting should be avoided.

Powering on and Image Setting

Show device diagram



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1. Remove the lens cover **(7)**. Secure the cover to the strap using the magnet built into the cover.
2. Turn the device on with a short press of the **ON/OFF (5)**
3. Adjust the resolution of the icons on the display by rotating the diopter adjustment ring on the eyepiece **(1)**.

4. To focus on the object under observation, rotate the lens focus ring **(6)**.
5. Select the desired **calibration mode** in the main menu: Manual **(M)**, Semi-automatic **(SA)** or Automatic **(A)**.
6. Calibrate the image with a short press of the **ON/OFF (5)** button (where calibration mode **SA** or **M** has been selected). Close the lens cap before manual calibration.
7. Select the required **amplification level** (**“Normal”**

, “High”

, “Ultra”

) by briefly pressing the **UP (4)** button.
8. Activate the quick menu by briefly pressing the **MENU (3)** button to adjust the brightness, contrast and smooth digital zoom (for more details see the **Quick Menu** section).
9. Turn the device off with a long press of the **ON/OFF (5).**

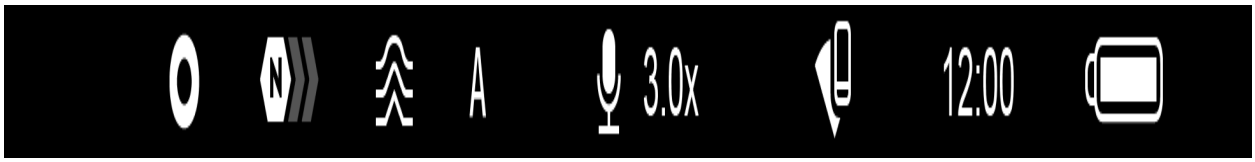
Attention! It is forbidden to point the riflescope lens at intensive energy sources, such as laser radiation emitting devices or the sun. It can disable the riflescope electronic components. Warranty does not cover damage arising from failure to comply with the operating rules.

Button Operation

Operation	Button
Power device on	⏻ short press
Power device off	⏻ long press for 3 secs
Turn display off	⏻ long press for less than 3 secs
Turn display on	⏻ short press
Calibrate the microbolometer	⏻ short press
Switching amplification levels	△ short press
Control discrete digital zoom	△ long press
Video Recorder	**Button**
Start/pause/resume video recording	▽ short press
Stop video recording	▽ long press
Switch to video / photo	▽ long press
Capture a photo	▽ short press
Main Menu	**Button**
Enter main menu	MENU long press
Navigation upwards/rightwards	△ short press
Navigation downwards/leftwards	▽ short press
Confirm selection	MENU short press
Exit submenu without confirming selection	MENU long press
Exit menu (switch to viewing mode)	MENU long press

Quick Menu	Button
Enter quick menu	MENU short press
Switch between quick menu options	MENU short press
Increase value	△ short press
Decrease value	▽ short press
Exit quick menu	MENU long press

Status Bar



The status bar is at the bottom of the display and displays information on the actual operating status of the device, including:

- Color Mode (shown only when the Black Hot color mode is selected)
- Amplification level
- Smoothing Filter (displayed when the function is on)
- Calibration Mode (in Automatic calibration mode a countdown timer 00:03 will appear instead of the calibration mode icon 3 seconds before automatic calibration begins).
- Microphone
- Magnification
- Wi-Fi Connection
- Time
- Power Indication:

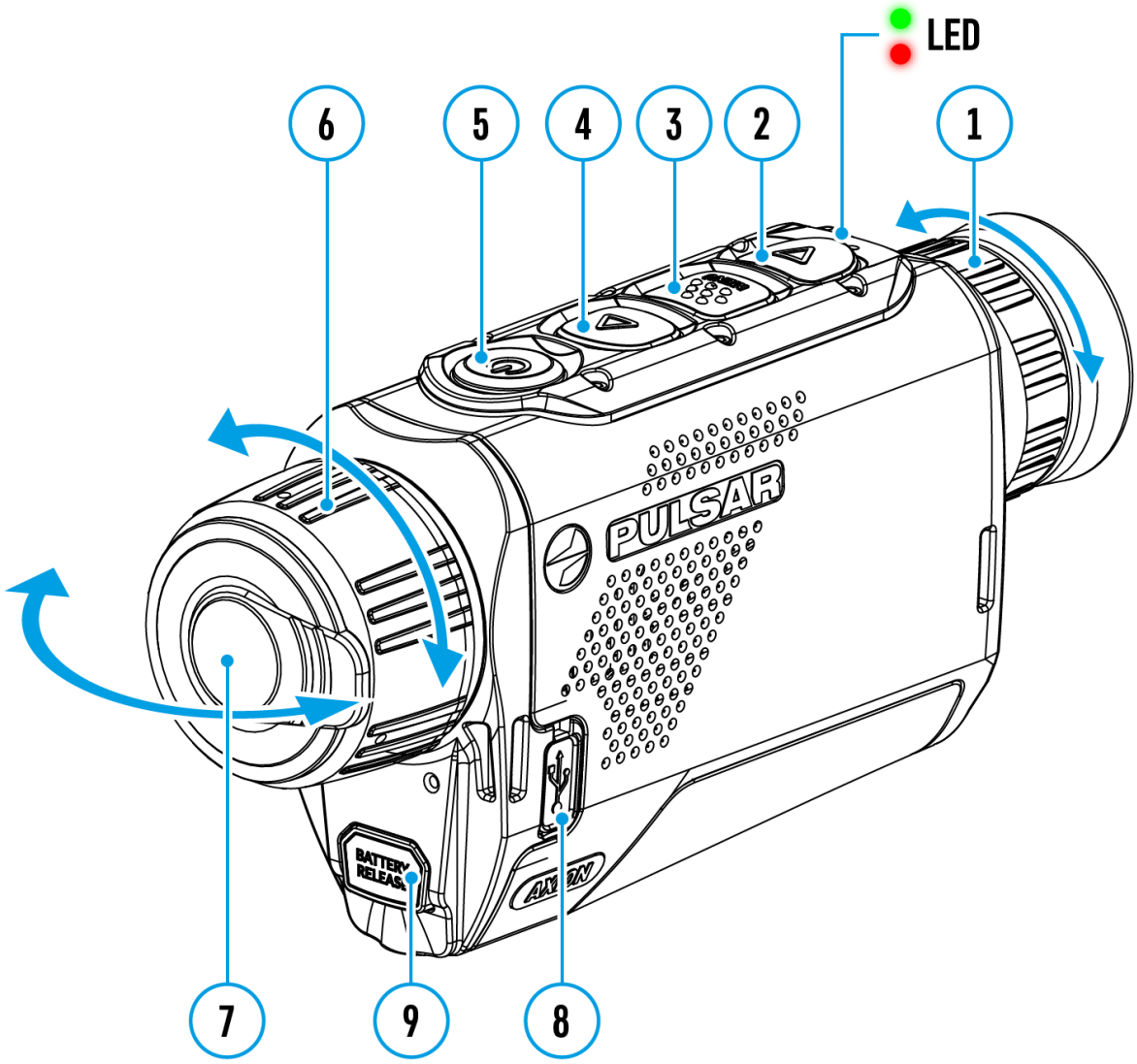
- charge level if the device is powered by a battery

- charge level if the device is charging and powered by a battery

- no battery, the device is connected to an external power supply

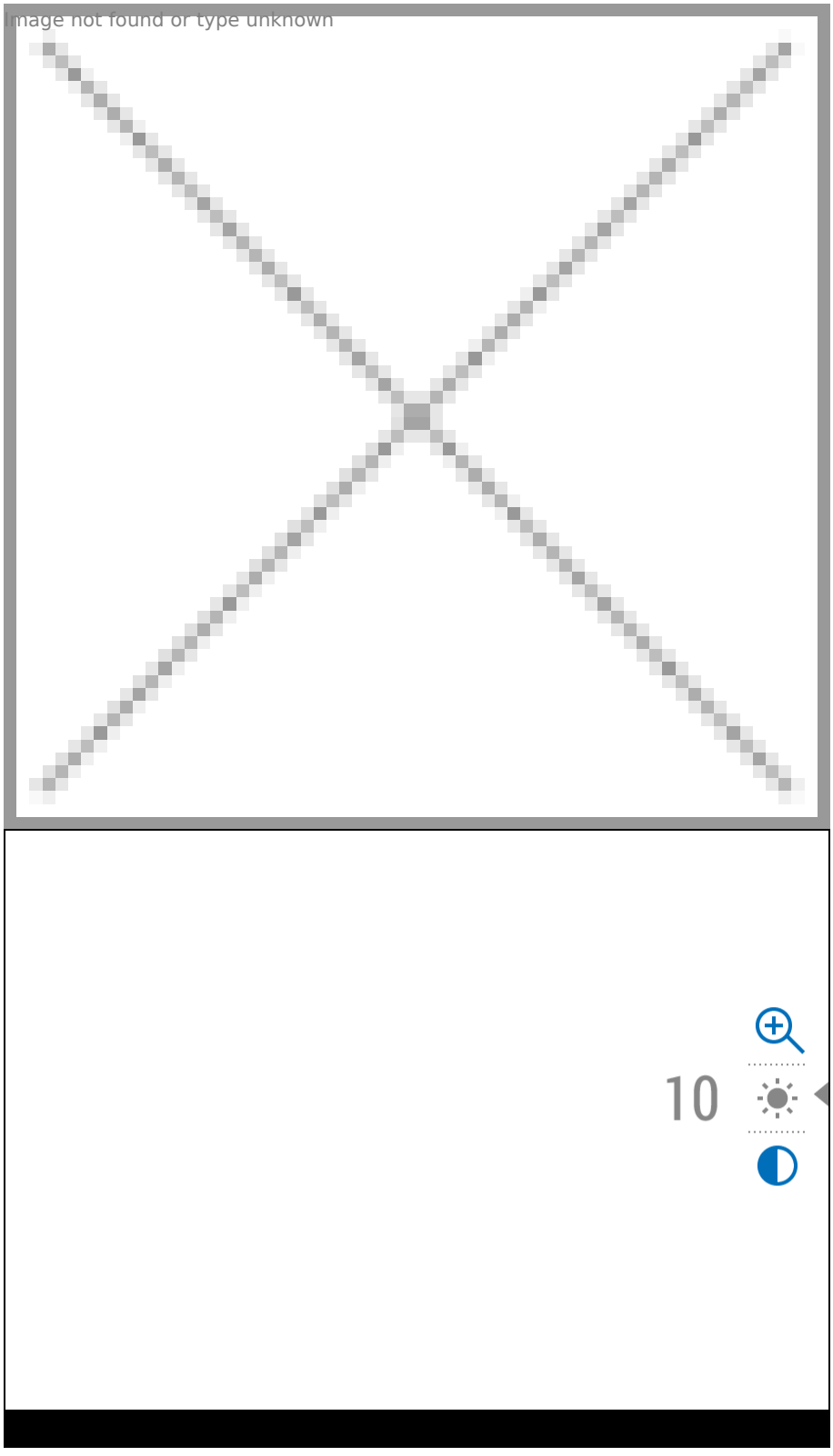
Quick Menu

Show device diagram



The basic settings (adjusting brightness and contrast, using the Stadiametric Rangefinder function) can be changed using the quick access menu.

- Enter the menu by briefly pressing the **MENU (3).**
- A short press of the **MENU (3)** button enables you to toggle between functions, as described below.



Brightness – press the **UP (4)/DOWN (2)** buttons to change display brightness from 0 to 20.

Contrast – press the **UP (4)/DOWN (2)** buttons to change image contrast from 0 to 20.

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

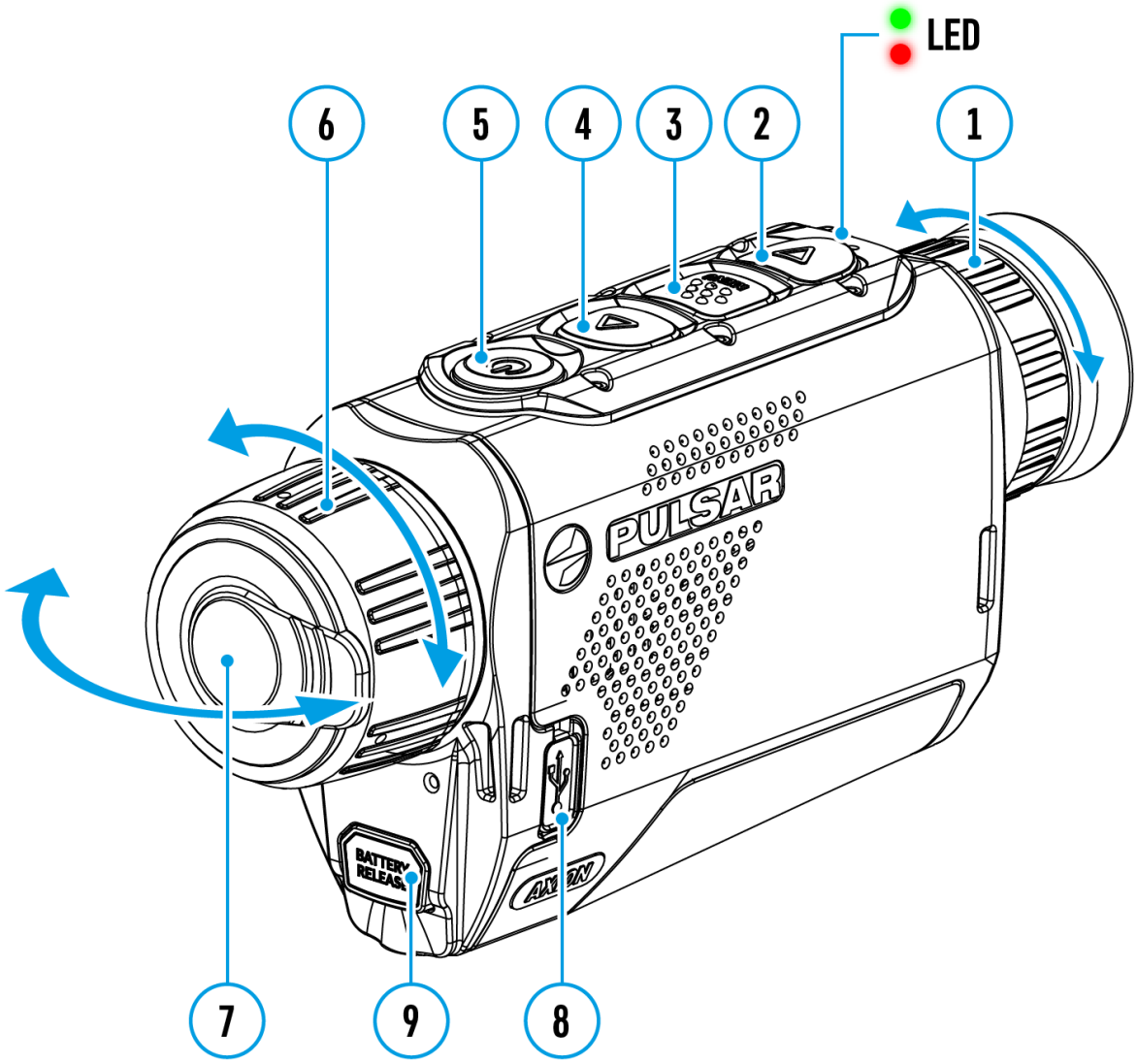
Stadiometric Rangefinder - change the position of special marker lines to determine the distance to the object being observed by pressing the **UP (4)/DOWN (2)** buttons (for more details see the **Stadiametric Rangefinder** section).

Smooth Digital Zoom – press the **UP (4)/DOWN (2)** button to change the value of the digital zoom from 3 to 12. The digital zoom changes in 0.1 increments.

- Press and hold the **MENU (3)** button to exit the menu or wait for 10 seconds to exit automatically.

Amplification Level

Show device diagram

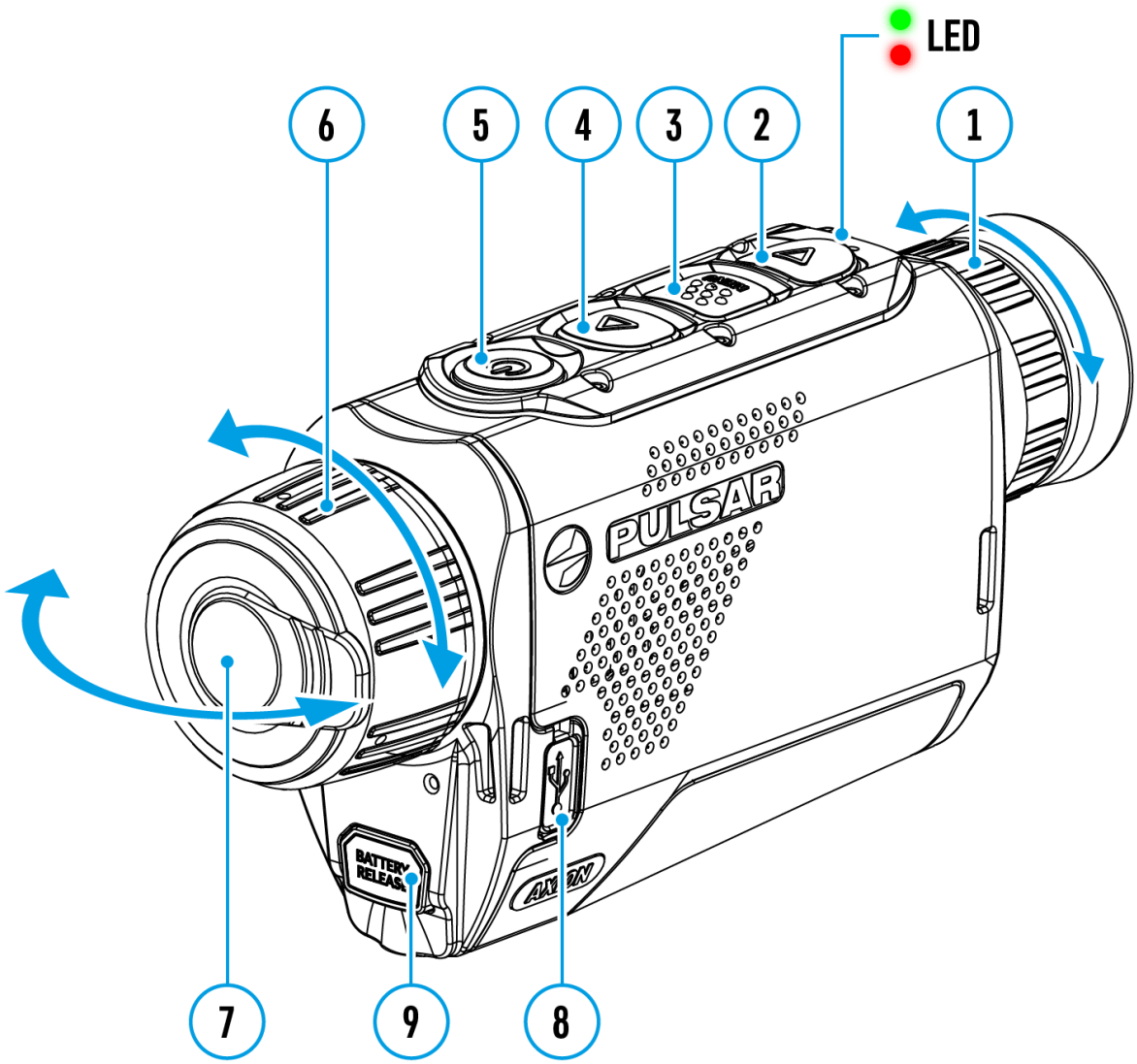


Sensitivity enhancement levels (Normal N, High H, Ultra U) are software algorithms that enhance the quality of detection and recognition in various observation conditions. When the temperature contrast decreases (fog, precipitation, high humidity), it is recommended to increase the amplification level. To optimize the image, activate the **Smoothing Filter** in the main menu.

Press the **UP**button **(4)** briefly to switch the amplification level.

Video Recording and Photography

Show device diagram

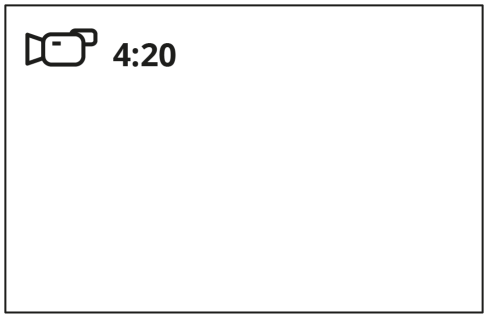


Axion Fthermal imagers feature video recording and photography of the image being observed to the internal memory card.

Before using this feature please set the **date** and **time** (see **General Settings** section).

The built-in recorder operates in two modes **– Video** and **Photo.**

Video mode. Video recording

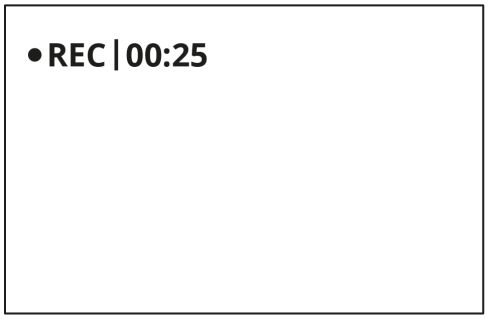


1. Switch to **Video** mode by pressing and holding the **DOWN/REC (2)** button.

2. The icon and the remaining recording time in HH:MM (Hours:Minutes) format are displayed in the upper left corner, for example 4:20.

3. Press the **DOWN/REC (2)** button briefly to start video recording.

4. When the video recording starts, the icon will disappear and the REC icon and timer in MM:SS (Minutes:Seconds) format will appear ●REC | 00:25.



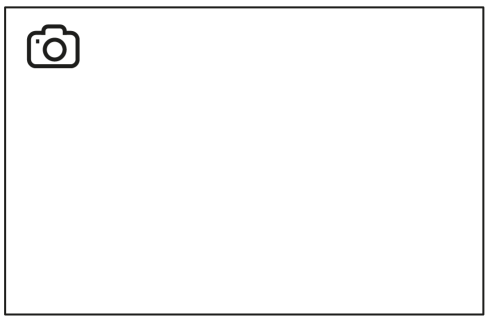
5. Pause and resume recording video with a short press of the **DOWN/REC (2)** button.

6. Stop recording video with a long press of the **DOWN/REC (2)**button.

7. Video files are saved to the built-in memory card after the video recording has been stopped.

8. Press and hold the**DOWN/REC (2)** button to switch between the **Video** and **Photo**modes (Video-> Photo-> Video…)

Photo Mode. Capturing an image



1. Switch to the **Photo**mode by pressing and holding the **DOWN/REC (2)** button.

2. Press the **DOWN/REC (2)** button briefly to take a photo. The icon flashes – the photo file is being saved to the built-in SD card.

Notes:

- You can enter and operate the menu during video recording.
- Recorded videos and photos are saved to the internal memory card in the format img_xxx.jpg (photos), video_xxx.mp4 (videos).
- The 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 the device's internal memory.
- Regularly check the free capacity of the internal memory and move recorded footage to other storage media to free up space on the internal memory card.

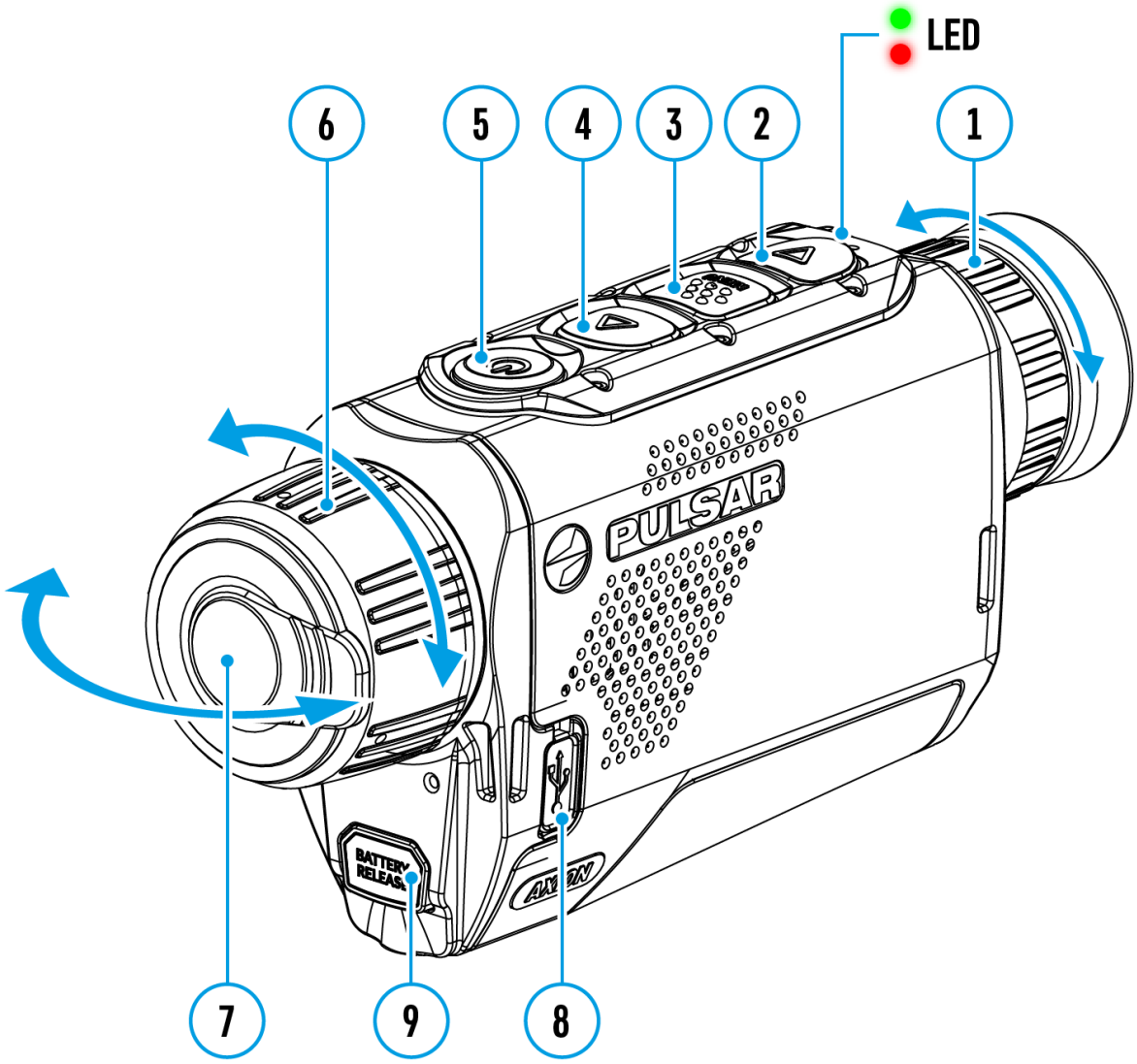
Discrete Digital Zoom

The device functionality allows you to quickly increase the base magnification (see **Optical Magnification** line in the table of **Technical Specifications**) by 2 or 4 times as well as return to the base magnification.

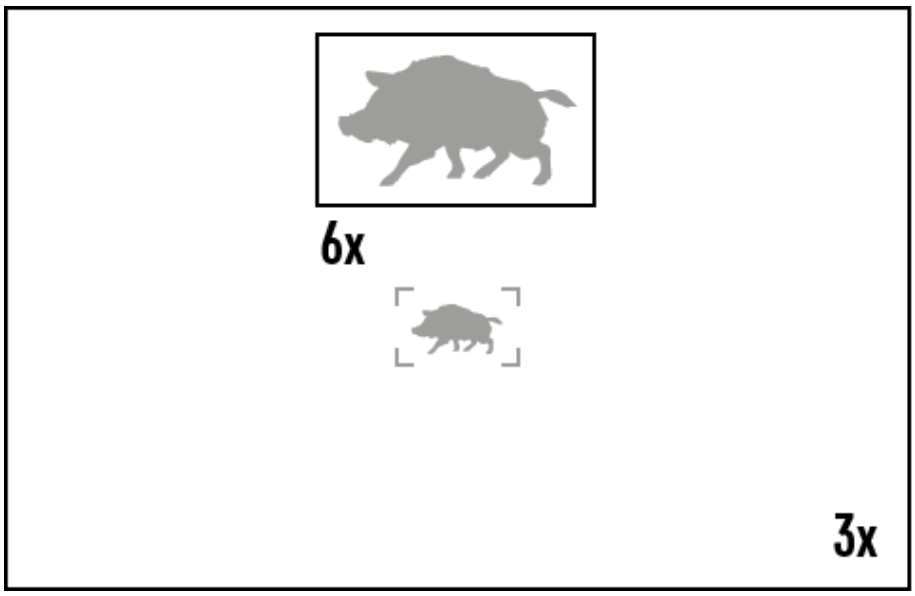
Press and hold the**UP/ZOOM (4)** button to change the digital zoom.

PiP Function

Show device diagram



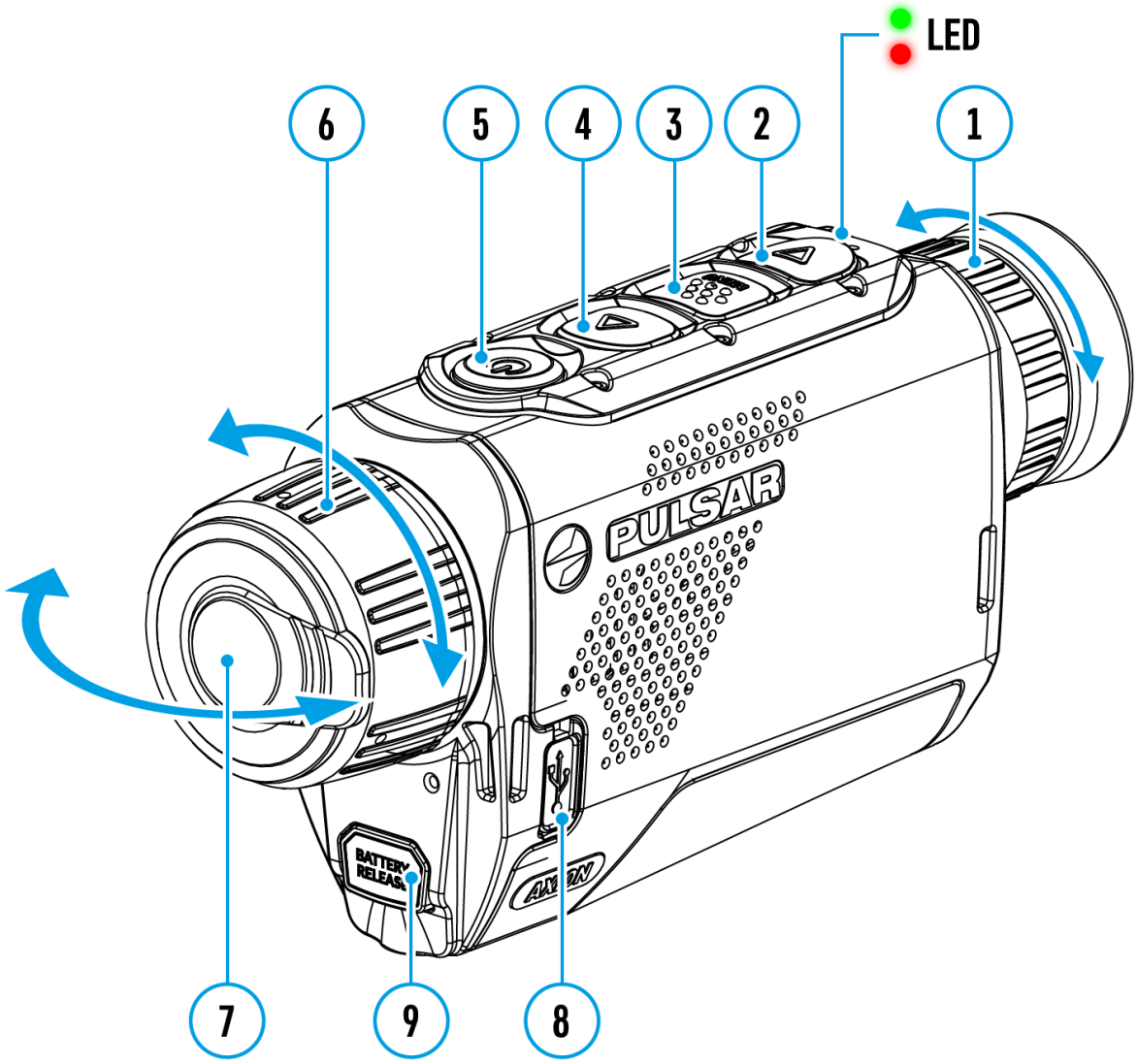
The **PiP** (Picture-in-Picture) function allows you to see both the main image and a magnified image in a dedicated window.



- To turn on and off the **PiP** function see the **PiP Mode** section.
- Press and hold the **UP (4)** button to change the magnification ratio in the **PiP**window.
- The zoomed image is displayed in a dedicated window, while the image in the rest of the screen is displayed at base magnification 3x.
- When the **PiP** is turned on you can control both the discrete and smooth digital zoom. In this case the zoom value changes only take place in the dedicated window.
- When the **PiP** function is turned off, the screen will display at the magnification that was set in **PiP**mode.

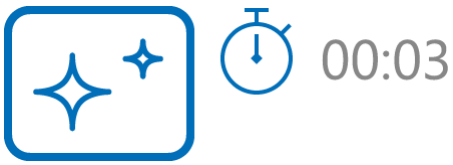
Display-Off Function

Show device diagram



This function deactivates the image transmission to the display by minimizing its brightness. This helps prevent accidental disclosure. However, the device stays on.

When this function is in use, the device switches to the standby mode, which allows it to be switched on quickly if necessary.



1. When the device is on, press and hold the **ON/OFF (5)** button. The display will turn off, the current time and the **"Display off"**icon will appear.
2. Turn the display back on with a short press of the**ON/OFF (5)** button.
3. When you press and hold the **ON/OFF (5)** button, the display shows the **"Display off"**icon with a countdown. Pressing & holding the button down for the duration of the countdown will power the device off completely.

Wi-Fi Function

The device has a function enabling wireless communication with external devices (smartphone or tablet) via Wi-Fi.

- Turn on the wireless module in the **WI-Fi Activation** menu option.

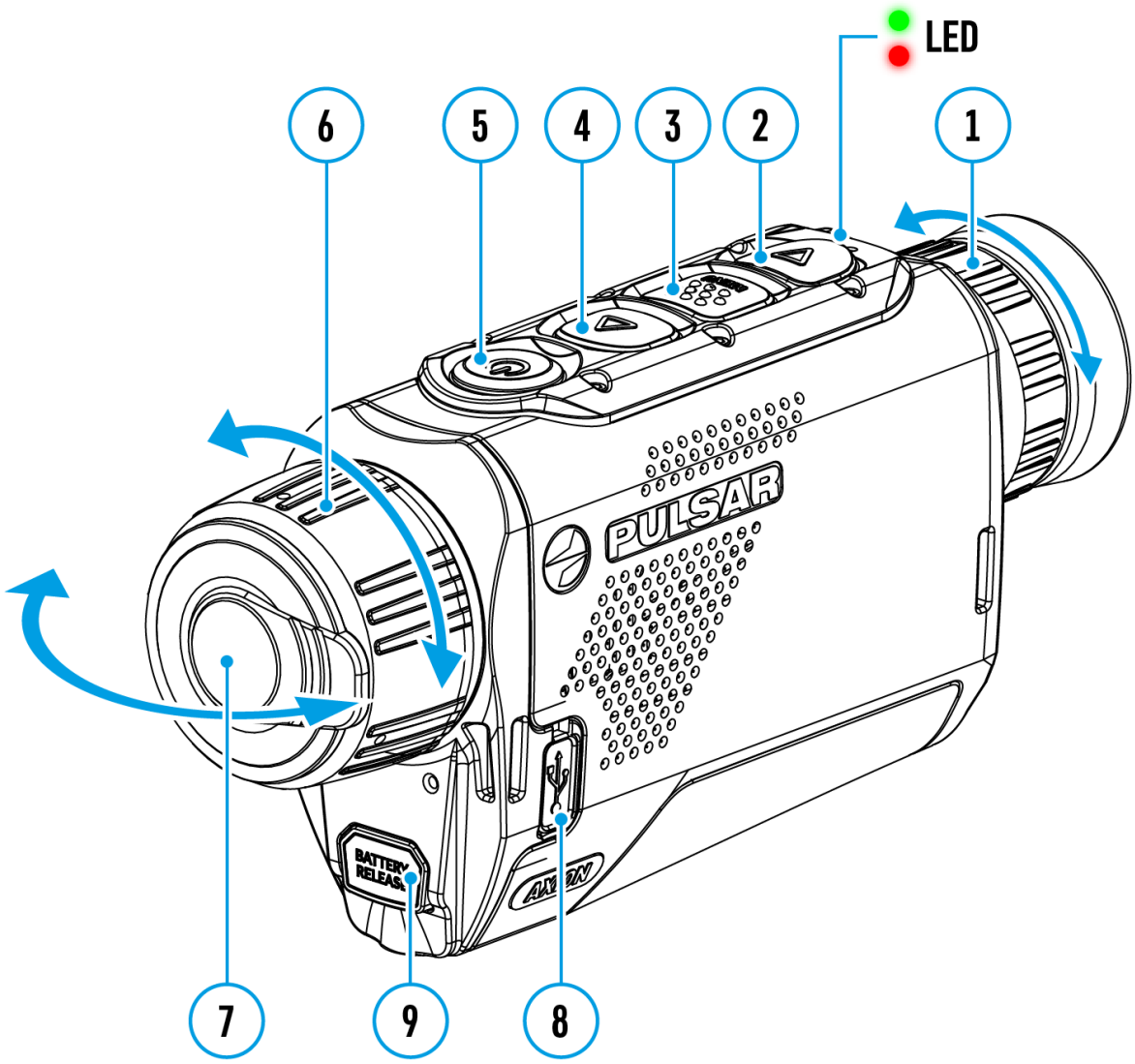
Wi-Fi is displayed in the status bar as follows:

Indication on the status bar	Connection Status
	Wi-Fi is switched off
	Wi-Fi connection is in progress
	Wi-Fi is switched on, no connection with device
	Wi-Fi is switched on, device connected

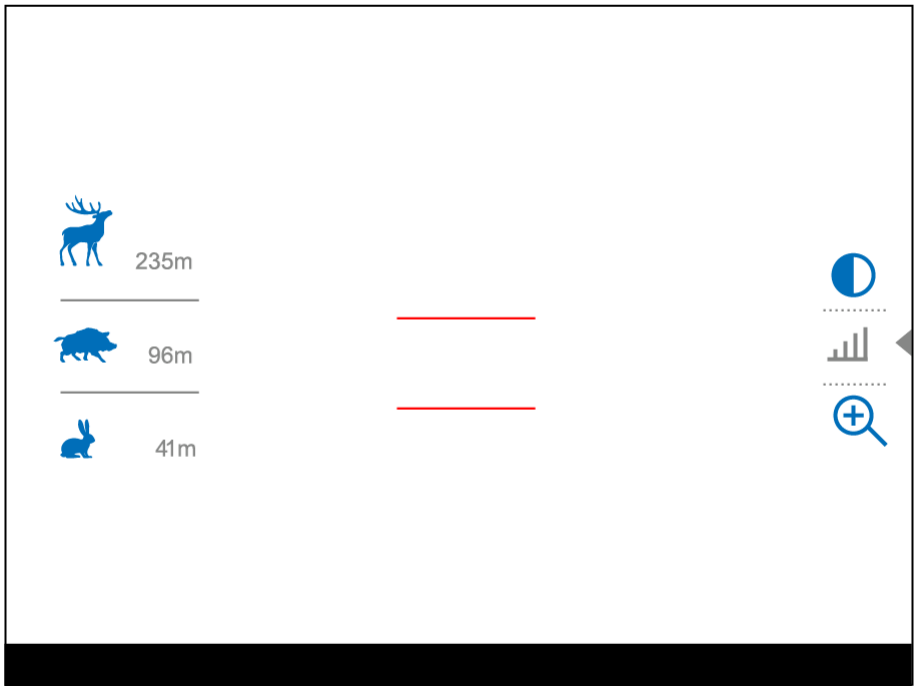
- The device is recognized by an external device as AXION_XXXX where XXXX are the four last digits of the serial number.
- After entering the password on the external device (see **Password Setup** subsection of the **Wi-Fi Settings** section for more information on setting a password) and setting up a connection, the icon in the status bar changes to .

Stadiametric Rangefinder

Show device diagram



Axion Fthermal imagers are equipped with a stadiametric rangefinder which allows the user to determine the approximate distance to an object of a known size with reasonable accuracy.



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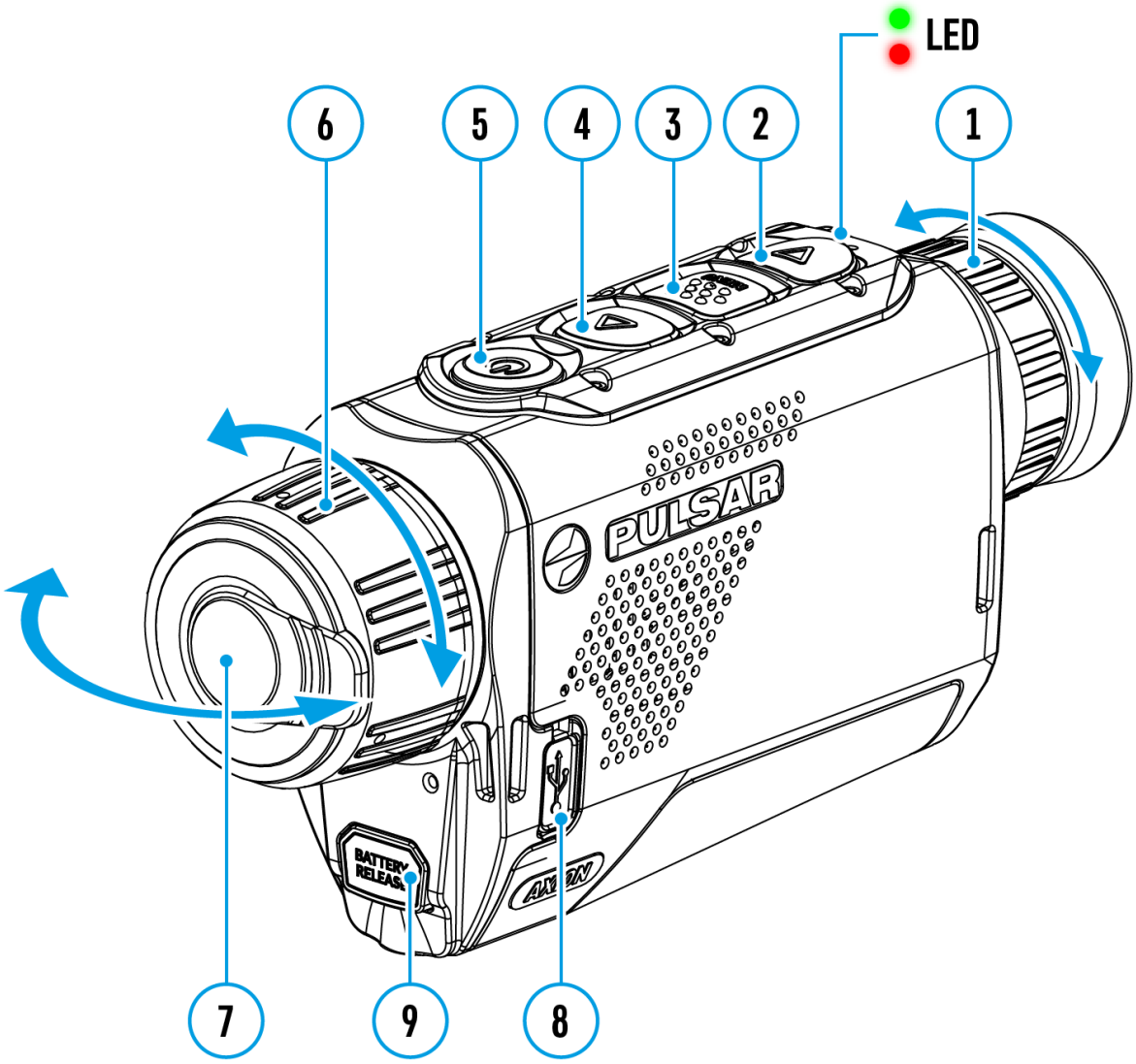
1. Select the **Stadiametric Rangefinder** function with short presses of the **MENU (3)** button until the icon is selected.
2. You will see on the display: measurement bars, icons of three reference objects and respective distances for the three objects.
3. Position the lower fixed bar under the object being ranged.
4. By pressing the **UP (4)/DOWN (2)** buttons, move the upper horizontal bar relative to the lower fixed bar until the object fits entirely between the two bars. The distance to the object is automatically recalculated as you move the upper line.
5. Exit the rangefinder mode with a long press of the **MENU (3)**button or wait 10 seconds to exit automatically.

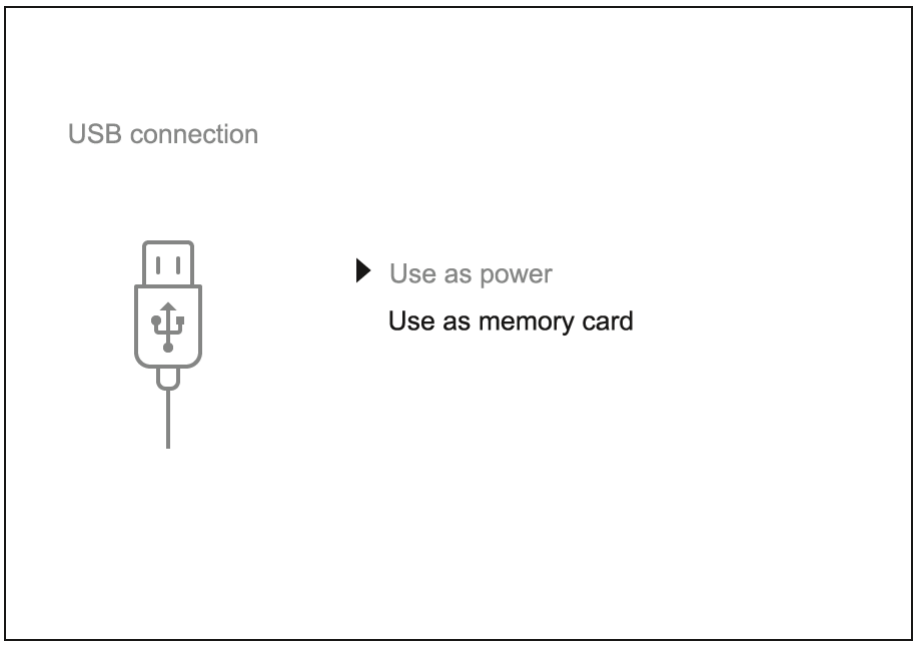
Notes:

- There are three predefined values for the reference objects: Hare - 0.3 m height, Boar - 0.7 m height, Deer - 1.7 m height.
- Before it appears on the display, a measured distance value is rounded up to 5m for larger values and rounded down to 1m for smaller values.
- To select the unit of measurement (Meters or Yards), go to the **General Settings** Image not found or type unknown menu item => **Units of Measure** submenu.

USB Connection

Show device diagram





1. Connect one end of the USB cable to the Micro-USB **(9)** port of your device and the other end to the USB port of your PC / laptop.
2. Turn the device on with a short press of the **ON/OFF(5)** button (a device that has been turned off cannot be detected by your computer).
3. Your device will be detected by the computer automatically; no drivers need to be installed.
4. Two connection modes will appear on the display: **Power** and **Memory Card**(external storage device).
5. Select the connection mode with the **UP (4)/DOWN (2)** buttons.
6. Confirm the selection with a short press of the **MENU (3)** button.

Power

- In this mode, a PC/laptop is used as an external power supply. The status bar shows the icon ▬■=. The device continues operating and all functions are available.
- The Battery Pack installed in the device is not being charged.
- When the USB is disconnected from the device when in the **Power** mode, the device keeps operating with the Battery Pack if it is available and sufficiently charged.

Memory Card

- In this mode the device is detected by the computer as a flash card. This

mode is designed for work with the files saved in the device's memory. The device's functions are not available in this mode; the device turns off automatically.

- If video recording was in progress when the connection was made, recording stops and the video is saved.
- When the USB is disconnected from the device where connection is in the **Memory Card** mode, the device remains in the Off state. Turn the device On for further operation.

Stream Vision 2

Install the Stream Vision 2 application to download files, update firmware, control the device by remote control and broadcast images from your device to a smartphone or a tablet via WiFi.

We recommend using the latest version – Stream Vision 2.

Mobile App
STREAM VISION 2

You can find further guidelines on Stream Vision 2 **here.**

Download from Google Play

Download from App Store

Find answers to frequently asked questions about using Stream Vision 2 **here**.

Firmware Update

1. Download free Stream Vision 2 App in Google Play or App Store.
2. Connect your Pulsar device to your mobile device (smartphone or tablet).
3. Launch Stream Vision 2 and go to section “Settings”.
4. Select your Pulsar device and press “Check firmware update”.
5. Wait for the update to download and install. Pulsar device will reboot and will be ready to operate.

Important:

- if your Pulsar device is connected to phone, please turn on mobile data transfer (GPRS/3G/4G) to download update;
- if your Pulsar device is not connected to your phone but is already listed in “Settings” > “My devices” section, you may use Wi-Fi to download update.

Find answers to frequently asked questions about using Stream Vision 2 **here**.

Technical Inspection

It is recommended to carry out a technical inspection before each use of the device. Check the following:

- The device appearance (there should be no cracks on the body).
- The condition of the lens and eyepiece (there should be no cracks, grease spots, dirt or other deposits).
- The state of the rechargeable battery (it should be charged) and the electric contacts (there should be no signs of salts or oxidation).
- The controls should be in working order.

Technical Maintenance and Storage

Maintenance should be carried out no less frequently than twice a year, and should consist of the following measures:

- Wipe external plastic and metal surfaces with a cotton cloth to remove dust and dirt. To avoid damage to the paint coating, do not use chemically active substances, solvents, etc.
- Clean the electric contacts of the Battery Pack and the device's battery slot using a non-greasy organic solvent.
- Check the objective and eyepiece lenses and if required, remove dust and dirt (preferably using a non-contact method). Cleaning of the exterior surfaces of the optics should only be done with products specifically designed for this purpose.
- Store the device in a carrying case. Remove the Battery Pack for long-term storage.

Troubleshooting

The device does not turn on

Possible cause

Battery Pack is discharged.

Solution

Charge the Battery Pack.

The device does not operate from an external power source

Possible cause

The USB cable is damaged.

Solution

Replace the USB cable.

Possible cause

The external power supply is discharged.

Solution

Charge the external power supply (if necessary).

The image is blurry, with vertical stripes or an uneven background

Possible cause

Calibration is required.

Solution

Perform the calibration according to **Calibration Mode** section.

Black screen after calibration

Solution

If the image does not clear after calibration, you need to recalibrate.

The image is too dark

Possible cause

Brightness or contrast level is too low.

Solution

Adjust the brightness or contrast level in the **Quick Menu.**

Poor image quality / Detection range reduced

Possible cause

These problems may occur during observation in adverse weather conditions (snow, rain, fog, etc.).

Smartphone or tablet PC cannot be connected to the device

Possible cause
Device password has been changed.

Solution

Delete the network and connect again using the password saved in the device.

Possible cause

The device is in an area with too many Wi-Fi networks that may be causing signal interference.

Solution

To ensure a stable Wi-Fi connection, relocate the device to an area with fewer or no Wi-Fi networks.

Possible cause

The device has a 5 GHz network enabled, but the smartphone only supports 2.4 GHz.

Solution

Switch the device's WiFi bandwidth to 2.4 GHz.

More information on solving problems with connection to Stream Vision 2 by following the **link**.

Wi-Fi signal is missing or interrupted

Possible cause

Smartphone or tablet is out of range of a strong Wi-Fi signal. There are obstacles between the device and the smartphone or tablet (e.g., concrete walls).

Solution

Relocate smartphone or tablet into the Wi-Fi signal line of sight.

More information on solving problems with connection to Stream Vision 2 by following the **link**.

Color bars appear on the display or the image disappears

Possible cause

The device was exposed to static electricity during operation.

Solution

After exposure to static electricity, the device may either reboot automatically or require turning off and on again.

The image quality during the device operation at below zero temperatures is worse than at positive temperatures

Possible cause

Because of variations in thermal conductivity, objects (surrounding environment, background) under observation become warm more quickly at above-zero temperatures, which allows higher temperature contrast, so the quality of the image produced by a thermal imager will be better.

At low operating temperatures, objects under observation (background) normally cool down to roughly identical temperatures, which leads to reduced temperature contrast and to image quality (precision) degradation. This is normal for thermal imaging devices.

The image of the object being observed is missing

Possible cause

You are looking through glass.

Solution

Remove the glass or change the viewing position to avoid it.

Specifications

XM30F

	Model	XM30F
	SKU	77473
	Microbolometer	
	Type	uncooled
	Resolution, Pixels	320x240
	Pixel Pitch, µm	12
	Frame Rate, Hz	50
	Optical Characteristics	
	Optical Magnification, x	3
	Smooth Digital Zoom	3-12
	Digital Zoom, x	x1, x2, x4
	Relative Aperture, D/f'	1.2
	Minimum Observation Distance, m/y	3/3.28
	Eye Relief Diameter, mm	5
	Angular Field of View (Horizontal x Vertical), degree	7.8x5.9

Linear Field of View (Horizontal x Vertical), m at 100 m	13.7x10.3
Eyepiece Focus Range, Diopter	+4 / -5
Detection Distance for Deer-Sized Objects, m/y	1300/1421.7
Display	
Type	AMOLED
Resolution, Pixels	640x400
Operational Characteristics	
Power Supply, V	3 - 4.2
Battery Type/Capacity/Nominal Output Voltage	APS 3 Li-ion Battery Pack / 3200 mAh / DC 3.7 V
External Power Supply	5 V (USB)
Battery Run Time at t=22°C, hours*	5
Degree of Protection, IP Code (IEC60529)	IPX7
Operating Temperature Range, °C / °F	-25 … +40 / -13 – +104
Dimensions, mm/inch	144x40x69 / 5.67x1.46x2.72
Weight (without battery), kg/oz	0.25/8.81

	Video Recorder	
	Photo/Video Resolution, Pixels	528x400
	Video/Photo Format	.mp4 / .jpg
	Built-in Memory	16 GB
	Wi-Fi Channel**	
	Frequency	2.4/5 GHz
	Standard	IEEE 802.11 b/g/n/ac

*Actual operating time will depend to what extent the Wi-Fi and built-in video recorder is used.

**Reception range may vary depending on various factors: obstacles, other Wi-Fi networks.

Legal Compliances and Disclaimers

Attention! A license is required for Axion Thermal Imager when exporting outside your country.

Electromagnetic compatibility. This product complies with the requirements of European standard EN 55032: 2015, Class A.

Caution!Operation of this equipment in a residential environment could cause radio interference.

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

Repair of the device is possible within 5 years.