



Finder series

Thermal imaging monocular

Operating Instructions

V1.0



THERMFOX

1. Contents of the package

- 1) Finder Series Thermal Imager
- 2) USB cable
- 3) Power adapter
- 4) Hand strap
- 5) Neck strap
- 6) Optics cleaning cloth
- 7) Warranty Card
- 8) User manual

2. Product description

The Finder range is lightweight and easy to carry and can be operated with one hand. Thanks to its compact size and light weight, it can be stored in your pocket at any time. The built-in laser rangefinder can quickly locate the distance of the target. The ergonomic design and powerful features make the Finder series the best choice for outdoor exploration.

3. Units and controls

- 1. Lens cap
- 2. Lens focus ring
- 3. Laser indicator
- 4. Laser rangefinder
- 5. Type C connector
- 6. Eyepiece diopter adjustment
- 7. Eyepiece
- 8. Infrared sensor switch
- 9. LED indicator
- 10. Down/photo button
- 11. Up/Up/distance button
- 12. Menu button
- 13. Power button



LED indicator showing device status





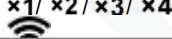
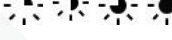


LED Indicator	LED Stat	Operating mode
●	Normal	On/fully charged
	Flashing	Standby Charging
●	Normal	Charge less than 10%
	Flashing	

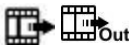















4. Functions of the buttons

Button	Equipment status/ current operating mode	First short press	Another short press	Long press
Power button (13)	The device is switched off			Turns on the device
	The device is switched on	Standby mode	Cancel operation	Shuts down the device
	Defective Pixel Calibration Interface	Add defective pixel	Delete defective pixel	Cancel step
	Quick menu/ Main menu	Return to your home screen		Shuts down the device
	Laser rangefinder mode	Exit laser rangefinder mode		
Menu button (12)	The device is switched off	Opens quick menu 1	Opens the quick menu 2	Opens the main menu
	Quick menu 1	Opens the quick menu 2	He'll leave from the quick menu	He'll leave from the quick menu
	Quick menu 2	He'll leave from the quick menu		He'll leave from the quick menu
	Main menu	Confirm value, insert menu option		He'll leave from menu option, main menu
	Laser Cursor Calibration Interface/Flawed Pixel Calibration Interface	Switches the direction of cursor movement		He'll leave from calibration
	Laser rangefinder mode	Toggles one-time/continuous measurement		
Up/distance button (11)	The device is switched on	Turns the laser on/off		Turns on laser distance measurement

	Laser rangefinder mode	Single measurement	He's going to leave the regime laser rangefinder
	Quick menu 1	E-zoom switching	
	Quick menu 2	Switching image tuning	
	Main menu	Navigation to the top	
	Laser Cursor Calibration Interface/Flawed Pixel Calibration Interface	Shift one pixel up/right	Shift 10 pixels up/right
Down/photo button (10)	The device is switched on	Photography	Start shooting video
	Video recording	Photography	Stop and save a recorded video
	Quick menu 1	Setting the screen brightness	
	Quick menu 2	Sharpness setting	
	Main menu	Navigation down	
	Laser Cursor Calibration Interface/Flawed Pixel Calibration Interface	Shift one pixel down/left	Shift 10 pixels down/left
Up button (11) + Down button (10)	The device is switched on	Shutter Correction	Background correction

5. Menu icons/status bars

	Picture mode: white hot
	Image mode: Black hot
	Image mode: red hot
	Image mode: Color
	E-zoom
	Display brightness
	Image sharpness
	Calibration mode: automatic calibration
	Calibration mode: manual calibration

	Video output
	PIP
	Digital compass
	Motion sensor
	Automatic shutdown of the display
	Calibration mode
	Read more
	Laser cursor calibration
	Defective pixel calibration
	Calibrating the compass
	System information
	To return to factory settings
	Return to the main menu
	Single measurement
	Continuous measurement
	Battery charge indicator

6. Batteries and safety

The Finder series comes with a rechargeable Li-ion battery that allows you to use the thermal imager for up to 6 hours. The battery needs to be charged before first use.

- > Connect the USB cable to the Type-C connector on the device;
- > Connect the other end of the USB cable to a power adapter or USB socket connected to another power source rated at 5V or less.
- > Connect the power adapter to the power source.
- > The LED indicator glows red when charging and turns green when charging is complete.
- > When the battery icon appears during use, the battery is low. Please charge in a timely manner to avoid loss of life caused by excessive battery drainage.

Security measures

- > After an extended period of storage, the device should be partially charged, not fully charged or fully discharged.
- > Do not charge the device immediately after taking it from cold to warm. Wait 30-40 minutes for it to warm up.
- > Do not use the charger if it has been modified or damaged in any way.
- > The device should be charged at a temperature between 0 °C and +40 °C, otherwise the battery life will be significantly reduced.
- > It is not recommended to connect third-party devices that consume more power than allowed.

- > The device is equipped with a short-circuit protection system. However, situations that may lead to a short circuit must be avoided.
- > The recommended operating temperature of the device is between -10 °C and +50 °C. Do not use the product outside this temperature range -- battery life may be reduced.
- > When using the device at temperatures below freezing, the battery capacity decreases. This is normal and does not constitute a fault.

7. Operation

ATTENTION! The lens of the instrument must not be pointed at any intense energy sources such as laser or sun emitting devices. Damage to the electronic components of the device could result. Damage caused by failure to follow the operating instructions is not covered by the warranty.

Switching on and setting the picture

- > Remove the lens cap.
- > Long press the power button for 2 seconds to turn on the camera. Wait 3 seconds to enter the main interface.
- > Adjust the resolution of the icons on the display by turning the diopter adjustment ring on the eyepiece.
- > Rotate the focus ring of the lens to focus on the subject.
- > Setting the display brightness, image mode and sharpness, and enabling continuous digital zoom are described in part of the QUICK MENU FUNCTION.
- > After use, switch off the device by long pressing the power button.



- > During use, the device can be put to sleep (display screen off, main chip in standby mode) by briefly pressing the ON button (13), which allows it to be switched off quickly if necessary. And pressing the ON button (13) again will wake up the device.

8. Home screen

When you start the device, the home screen appears. The page displays some general information. The details are as follows:

In the upper left corner - color palette, magnification, calibration mode, Wi-Fi (on), automatic screen shutdown (on);

Top right corner - battery charge level;

Bottom left corner - Time and date;

Bottom right corner - Video output icon (on).



The colour of the battery icon represents the current battery level. If the battery icon is displayed red, the battery is low. Charge it in time.

Icon	Colour	Charge level
	Blue	30%-100%
	Yellow	20%-30%
	Red	Less than 10%, must be charged
	–	Charging

9. Sensor calibration

If the image is degraded or uneven, it can be improved by calibration. Calibration allows the temperature background of the detector to be balanced and image defects to be corrected.

There are two calibration modes: manual (M) and automatic (A). Select the desired mode in the CALIBRATION section of the MAIN MENU.

- > **M mode (manual).** The instrument must be calibrated manually. From the home screen, short press the UP (11) and DOWN (10) buttons to calibrate the shutter and long press the UP (11) and DOWN (10) to calibrate the background. The lens hood should be closed for background calibration. Remove the lens cap when calibration is complete.
 - > **Mode A (automatic).** The instrument calibrates autonomously, in accordance with a software algorithm. The lens hood does not need to be secured (the sensor is sealed by an internal shutter).
- NOTE!** Manual shutter calibration and manual background calibration are also possible in A mode.

10. Photography and video recording

The Finder series thermal imager is equipped with the function of recording video and photographing the observed image on a built-in memory card. The image and video files will be named by time, so it is recommended to synchronize the system time and date in the application settings before using the camera and video function. For specific operation, you can download the application manual from the company's website.

Photography

- > Short press the down/photo button (10) on the home screen to take a photo. The image freezes for 0.5 seconds and the shooting icon appears in the middle of the display.
- > The image file is saved to the built-in memory card.

Video recording

- > From the home screen, press and hold the Down/Photo button (10) to start recording video.
- > A tooltip with the recording time (in MM:SS (minutes:seconds) format) appears in the upper right corner of the display.
- > The red dot in the help flashes while recording.
- > During recording, you can also take a photo by briefly pressing the Down/Photo button (10).
- > Press and hold the Down/Photo button (10) to stop video recording.
- > Video and photo files are saved to the built-in memory card when video recording is turned off.

Note!

- 1) You can enter and work with the menu while the video is being recorded.
- 2) If the video recording time exceeds 1 hour, i.e. 59:59 is displayed in the help, the next second automatically jumps to 00:01 and the next hour starts.
- 3) The maximum duration of a video file is five minutes. After this time, the video is uploaded to a new file.
- 4) The number of files is limited by the capacity of the device's built-in memory. Regularly monitor the amount of free memory on the built-in memory card and transfer footage and photos to other media to free up space on the memory card.

Memory access

When you turn on the device and connect it to your computer, the computer recognizes it as a memory card that can be used to access the device's memory and make copies of images and videos.

- > Turn on the device and connect it to your computer using a USB cable.
- > Double-click on "my computer" on the desktop - double-click to open a device named



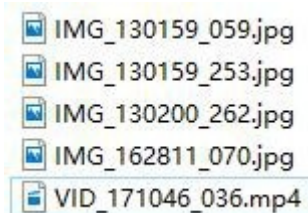
Infray

-then click and open the device named "Internal Storage"



to access the memory.


- > There are different components named according to the time 20191218 ;
- > These folders store uploaded videos and photos in the following formats: jpg (for photos) and VID_HHMMSS_XXX.mp4 (for video). HHMMSS - hour minute second; XXX - three-digit common File counter (for photos and video). The counter used when naming multimedia files is NOT reset.



11. Laser and laser distance measurement function

The Finder series has a built-in laser function for laser marking and laser distance measurement.




Laser marking function

- > Switch on the laser by briefly pressing the UP/Distance button (11) on the home screen.
- > When the laser is switched on, a red laser cursor appears synchronously on the screen  , which

indicates the position marked by the laser.

- Press the UP/Distance button (11) briefly again to switch off the laser marking function.

Laser distance measurement

- Press and hold the UP/Distance button (11) on the home screen to activate the laser rangefinder function.
- laser cursor automatically opens and  bottom of the screen displays the current rangefinder mode and the target distance indicated by the cursor.
- There are two kinds of rangefinder modes: single rangefinder  and continuous range . Press the Menu button (12) briefly to switch between the two modes.
- In the single rangefinder mode, the UP/pointing button (11) must be pressed briefly to use the rangefinder.
- In continuous rangefinder mode, the distance of the target marked with the cursor is automatically refreshed every 1 second without pressing a key.
- The range and accuracy of the rangefinder is 600 m ± 1 m and will be affected by fog and heavy rain and other weather conditions;
- When the distance measurement is complete, long press the UP/Distance Measure button (11) to exit the laser rangefinder.

Note!

- 1) The laser is not automatically switched on in distance measurement mode!
- 2) In laser rangefinder mode, briefly press the power button(13) to exit rangefinder mode and return to the home screen.



12. Quick menu function

Basic settings (using the continuous digital zoom function, adjusting the display brightness, image mode and sharpness settings) are changed via a quick menu.

- From the home screen, press the MENU button (12) to enter quick menu 1 - quick menu 2 - exit the menu accordingly.
- After entering the menu, press the UP button (11) to set the parameters at the top of the screen and press the DOWN button (10) to set the parameters at the bottom of the screen.

Continuous Digital Zoom - Press the UP button (11) to change the digital zoom value from ×1.0 to ×4.0 in Quick Menu 1.

Display brightness - press the DOWN button (10) and change the display brightness level from 1 to 4 in the quick menu

1.

Picture mode- Press the UP button (11) to change the picture mode in the context menu 2. The icons from left to right are white hot, black hot, red hot, color.





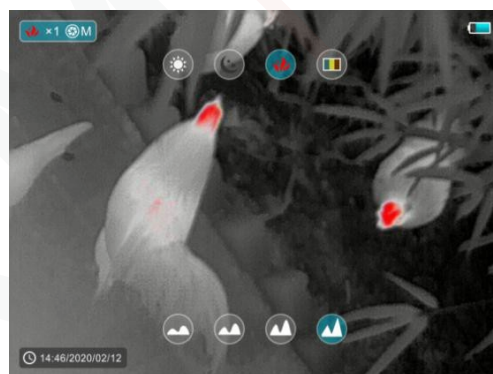
White hot 	Black and white palette (cold temperature corresponds to black and warm temperature corresponds to white).
Black hot 	Black and white palette (cold temperature corresponds to white and warm temperature corresponds to black).
Red 	
Color 	

Image sharpness by pressing the DOWN button (10) and changing the image sharpness level from 1 to 4 in the quick menu 2.

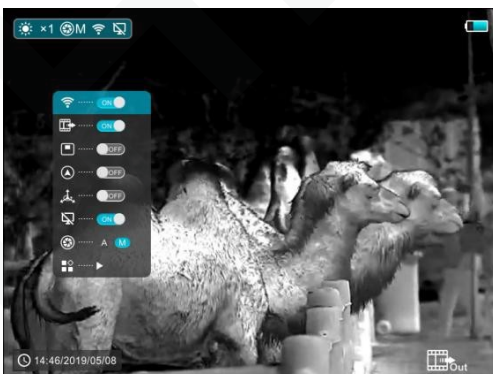


Quick menu



1Quick menu 2

13. Main menu functions




Main



menuSubmenu in more

- > Long press the Menu button (12) on the home screen to enter the menu.
- > Press the UP (11) / DOWN (10) buttons to scroll through the menu functions and the selection background will simultaneously turn blue.

- > Press the Menu button (12) to set the parameters of the current option or to open a menu item.
- > For the option  short press the Menu button (12) to enter the submenu for further settings.
- > The control of the submenu buttons is the same as for the main menu.
- > To exit the menu, press and hold the Menu button (12).
- > The menu is automatically exited after 10 seconds of inactivity.

Composition and description of the main menu

Wi-Fi




WiFi feature selection

- Press and hold the Menu button (12) to enter the menu.
- Select "Wi-Fi".
- Press the Menu button (12) briefly to switch Wi-Fi on/off.
- When Wi-Fi is on, the Wi-Fi icon appears in the top left status bar.

Video output



Selecting the video output function

- Press and hold the Menu button (12) to enter the menu.
- Select "Video out".
- Press the Menu button (12) briefly to switch the video output on/off.
- The Video Output  Out icon appears in the bottom right corner when it is turned on.

PIP mode



Select Picture in Picture mode

- Press and hold the Menu button (12) to enter the menu.
- Select "PIP Mode".
- Press the Menu button (12) briefly to switch the mode on/off.
- At the same time as the main image, a 2x magnified image is displayed in a separate "window" at the top of the display.

Digital compass



Choosing a digital compass

- Press and hold the Menu button (12) to enter the menu.
- Select "Digital Compass".
- Press the Menu button (12) briefly to switch the compass on/off.
- The compass direction is displayed at the top centre of the image.

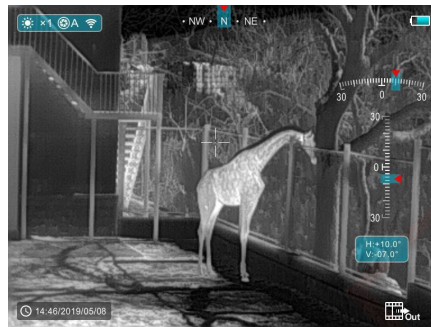


Motion sensor



Choosing a motion sensor

- Press and hold the Menu button (12) to enter the menu.
- Select "Motion sensor".
- Press the Menu button (12) briefly to switch the motion sensor on/off.
- If enabled, the relevant functions will be displayed on the left side of the panel.



Automatic shutdown of the display



Selecting to turn off the display automatically

- Press and hold the Menu button (12) to enter the menu.
- Select "Automatic Display-off".
- Press the Menu button (12) briefly to switch on/off.
- When enabled, an icon will appear in the top left status bar.

Calibration mode



Calibration mode selection. There are two calibration modes: automatic (A) and manual (M).

- Press and hold the Menu button (12) to enter the menu.
- Select "Calibration Mode".
- Press the Menu button (12) briefly to select A or M.

Automatic (A)

The requirements for calibration in automatic mode are determined by a software algorithm, and the calibration process starts automatically.

Manual (M)

The user independently sets the calibration requirements according to the image being monitored.

More settings

- Press and hold the Menu button (12) to enter the menu.

Read more



- Select "More".
 - Press the Menu button (12) briefly to enter the submenu for further settings.
-

Laser cursor calibration



If the position of the laser-target does not match the crosshair position on the display, this function can be used to correct the crosshair position.

- Press the Menu button (12) to open the submenu.
- Select "Laser Cursor Calibration".
- Press the Menu button (12) briefly to enter the Laser Cursor Calibration interface.
- A white cross cursor appears on the display and the laser is automatically switched on.
- A tooltip appears at the bottom of the display showing the direction of movement (↔ and vertical ↔ directional arrows) and the position of the cursor.
- Horizontal and vertical directional arrows indicate that the cursor is to be moved using coordinates along the X and Y axes.
- Press the Menu button (12) briefly to switch the cursor direction from horizontal to vertical and vice versa. When this direction is activated, the icon and text will change from white to blue.
- Use the UP (11)/DOWN (10) buttons to move the cursor so that its center coincides with the position indicated by the laser. This is always done by short pressing to move 1 pixel and long pressing to move 10 pixels.
- To exit and save the "Laser Sight Calibration" function, press and hold the Menu button (12).
- The absence of an operation within 30s will terminate the interface without saving the data.



Defective pixel calibration



When using the device, defective (damaged) pixels may appear on the sensor: i.e., bright or dark spots of constant brightness that are visible in the image. The Finder series offers the possibility to remove defective pixels on the sensor and also to cancel any removal.

- Press the Menu button (12) to open the submenu.
- Select Defective Pixels Calibration.
- Press the Menu button (12) briefly to enter the Defective Pixel Calibration interface.
- A white cross appears on the display.
- A 2x magnified image of the crosshair area (PIP) appears in the bottom left corner of the display - this is necessary to help locate the defective pixel and align the mark with it.
- A tooltip appears at the bottom of the display that shows the current number of calibrated defective pixels, the direction of movement (horizontal↔ and vertical↕ directional arrows), and the cursor position.
- Horizontal and vertical directional arrows indicate cursor movement with coordinates along the X and Y axes.
- Press the Menu button (12) briefly to switch the cursor direction from horizontal to vertical and vice versa. When this direction is activated, the icon and text will change from white to blue.
- Use the UP (11)/DOWN (10) buttons to move the cursor so that its center is aligned with the defective pixel. This is always done by short pressing to move 1 pixel and long pressing to move 10 pixels.
- After the cursor aligns with the defective pixel, erase the defective pixel by briefly pressing the Power button (13).
- You can then move the cursor around the display to erase the next defective pixel.
- Press the Power button (13) again briefly in the same place to cancel the calibration.
- Each time you add or reduce a blank pixel, the number of calibrated faulty pixels in the help will change accordingly.
- Long press the On button (13) to cancel all calibrations made by this operation.
- When the cursor moves near the PIP and Help fields, the PIP and Help fields automatically move to the top of the display.
- To exit and save the "Defective Pixel Calibration" function, press and hold the Menu button (12).
- The absence of an operation within 30 s does not terminate the interface without saving data.



Calibrating the



compass

Digital compass calibration

- Press the Menu button (12) to open the submenu.
- Use the UP (11) / DOWN (10) buttons to select "Compass Calibration".
- Press the Menu button (12) briefly to enter the compass calibration interface.
- The icon appears on the screen as a three-axis coordinate system.
- To complete the compass calibration, rotate the instrument in three axial directions for 30 seconds in the direction shown as an icon.
- Each axis completes at least one 360° rotation.



View information about this device

System information



n

- Press the Menu button (12) to open the submenu.
- Select "System Information"
- Press the Menu button (12) briefly to open the System Information window.

Restore factory settings

- Press the Menu button (12) to open the submenu.

Factory settings



- Select "Factory Reset"
- Press the Menu button (12) briefly to enter the "Factory Reset" submenu.
- Use the UP (11) / DOWN (10) buttons to select ✓ to restore factory settings or ✗ to cancel.
- Confirm the selection by briefly pressing the Menu button (12).

The following settings will be restored to the factory state before they are set by the user:

Image mode - white hot

Digital zoom - x1

Display brightness - level 3

Image sharpness - level 1

Calibration mode - automatic

Wi-Fi - off

Video output - off

PIP - off

Compass - off

Motion sensor - off

Automatic display shutdown - off

Return to the main menu

Return to the main menu

- Press the Menu button (12) to open the submenu.
 - Select "Return to Main Menu"
 - To return to the main menu, briefly press the Menu button (12).
-


14. Wi-Fi features

The device is equipped with wireless communication with external devices (computer, smartphone) via Wi-Fi.

- > Press and hold the Menu button (12) to enter the menu.
- > Select "Wi-Fi".
- > Press the Menu button (12) briefly to switch on Wi-Fi.
- > The device is recognized by the external device as 'Finder_XXXXXX', where XXXXXX is six digits.
- > Enter the password on the external device and establish the connection. The initial password is 12345678.
- > And then the device can be controlled via the app.

Set a Wi-Fi name and password

The Wi-Fi device name and password can be set in the app!

- > Click on "settings"  in the application to enter the settings interface.
- > Enter and submit the name (ssid) and password of the new Wi-Fi in the text box.
- > You need to restart the device for the new name and password to take effect.

Note! Restoring the factory settings will also reset the Wi-Fi name and password to the factory default settings.

15. PIP function

The PIP (Picture in Picture) function allows you to view the enlarged digital zoom image in a separate "window" at the same time as the main image.

- Press and hold the Menu button (12) to enter the menu.
- Select "PIP Mode".
- Press the Menu button (12) briefly to switch the mode on/off.
- A separate "window" appears at the top of the display at the same time as the main image.
- The image in a separate window is scanned from the central area of the main image and then magnified 2 times.

16. Application technology

The Finder thermal imaging cameras support app technology that allows real-time image transmission from the thermal imager to a smartphone or tablet via Wi-Fi.

Detailed instructions on how to use the application technology can be found in a separate brochure or on the [www. xinfrared.com](http://www.xinfrared.com) website.

Note! The design of the device allows for software updates. Updating is possible via the app.

17. Technical inspection

It is recommended to carry out a technical check of the instrument before each use. Check:

- > External appearance of the device (there should be no cracks on the cover).
- > Condition of the lens and eyepiece (no cracks, grease spots, dirt or other deposits).
- > Battery condition (should be charged) and electrical contacts (no salt or oxidation should be present).

18. Maintenance

Maintenance should be carried out at least twice a year and should include the following activities.

- > Wipe the outer surfaces of metal and plastic parts with a cotton cloth to remove dust and dirt. Silicone lubricant can be used for this.
- > Clean the electrical contacts of the battery and the battery hole on the instrument with a non-greasy organic solvent.
- > Check the glass surfaces of the eyepiece and lens. If necessary, remove dust and sand from the lenses (preferably by non-contact method). Cleaning of the external surfaces of the optics should be carried out with substances specifically designed for this purpose.

19. Troubleshooting

This table lists all the problems that can occur during operation of the device. Perform the recommended checks and repairs in the order listed in the table. If a fault occurs that is not listed in the table, or if the fault cannot be repaired by yourself, the equipment must be returned for repair.

	FaultPossible cause	Remedy
Thermal imager does not turn on	battery is fully discharged.	Charge the battery.
It does not turn on when connected to external power source: Source: discharged.	Damaged USB cable. The external power supply is discharged.	USB cable Charge the external power supply (if necessary).
The image is unclear, with vertical lines and by uneven background.	Calibration is required.	Perform image calibration according to section 9 "Calibration" instructions.
The picture is too dark.	Low brightness setting or contrast.	Adjust the brightness of the image.
The display will show colored lines appeared or the image disappeared. Poor image quality / reduced detection distance.	The device was in operation exposed to static electricity. These problems can occur when observing in difficult weather conditions (snow, rain, fog, etc.).	After exposure to static electricity, the device can either restart automatically, or may require switching off and on again.

<p>You cannot connect a smartphone or tablet to the device.</p>	<p>The device password has been changed.</p>	<p>Delete the network and reconnect using the device password.</p>
	<p>The device is located in an area with a large number of Wi-Fi networks that may cause interference.</p>	<p>To ensure stable Wi-Fi traffic, move the device to an area with fewer Wi-Fi networks or to an area where there are no Wi-Fi networks.</p>
<p>Non-existent or intermittent Wi-Fi signal.</p>	<p>The device is outside the Wi-Fi coverage area. There are obstacles (e.g. concrete walls) between the device and the receiver.</p>	<p>Move the device into line of sight of the Wi-Fi signal.</p>
<p>When used at low temperatures, the image quality of the surroundings is worse than at favourable temperatures.</p>	<p>At a favourable temperature, the observed objects (surroundings and background) heat up differently due to thermal conductivity, resulting in a high temperature contrast. Accordingly, the quality of the image produced by the device will be higher.</p> <p>At low temperatures, the observed objects (background) usually cool down to about the same temperature, resulting in significantly reduced thermal contrast and poorer image quality (detail). This is a common feature of thermal imaging instruments.</p>	

20. Specifications

Model	FL25R	FH25R
Microbolometer		
Type	Unrefrigerated	Unrefrigerated
Resolution, Pixels	384x288	640x512
Pixel size, um	12	12
Frame rate, Hz	50	50
Optical specifications		
Lens lens, mm	25	25
Field of view (H x D), degrees	10.5x7.9	17.5x14.0
Optical magnification, x	2.5~10.0	1.5~6.0
Digital zoom, x	x1 x2 x3 x4	x1 x2 x3 x4
Minimum focusing distance, m	1	1
Output pupil diameter, mm	20	20
Eyepiece focus range (diopters)	-4D~+5D	-4D~+5D
Detection distance, m (Target size:1.7m×0.5m, P(n)=99%)	1298	1298
Display		
Type	LCOS	LCOS
Resolution, Pixels	1280x960	1280x960
Operating specifications		
Battery type	Li-ion	Li-ion
Max. battery life (t=25°C) , h [★]	6	6
Laser rangefinder range	Max 600m ±1m	Max 600m ±1m
Compatibility with the app	Yes	Yes
Dimensions, mm	70x52x130	70x52x130
Weight, g	320	320
Built-in memory size, GB	16	16

★ Actual runtime depends on the intensity of Wi-Fi usage and the built-in VCR.

* Improvements may be made to the design and software of this product to enhance its user experience.

* The technical parameters of the equipment may be improved without prior notice to the customer.