THERMAL IMAGING DEVICE

DBH SERIES

User Manual V1.0

WARNING

PLEASE   READ   BEFORE   USE

Please inspect your batteries for any external damage before charging.

Please make sure you fully charge your batteries before use.

Do not point at the sun and/or high heat sources.

We appreciate you choosing RIX.

Please read the instruction manual carefully before using the product.

Please visit the RIX official website or the RIX mobile APP to view the latest product manuals.

PRODUCT OVERVIEW

Introducing the DBH series, featuring advanced thermal imaging technology and high-sensitivity infrared detectors for night vision capabilities. With the ability to perform in adverse weather conditions, such as rain, snow, fog and haze, the DBH series is perfect for, observation, and geographic positioning. It offers a range of functions including, photography, video recording, LRF, laser pointer, digital zoom, PIP, and recoil activated video.

PRODUCT FEATURES

High resolution 2560×2560 display	Frame Rate : 60Hz
Zoom: 3x-18x	Built-in LRF & Laser pointer
Replaceable 18650 battery, long battery life	High image quality
Scene mode	Wi-Fi module, supporting app connection

PRODUCT DESCRIPTION

Model	DBH 660
Sensor Specifications	
Type	Vox Uncooled
Resolution, pixels	640×512
Pixel Pitch, μm	12
NETD, mk	< 20
Frame rate, Hz	60
Optical Specifications	
Objective Lens, mm	60 F1.0
Optical Zoom, x	3
Field of view, degrees	7.3×5.8
Digital zoom, x	1 to 6,stepped
Eye relief, mm	60
Diopter Range, D	-5 to +2
Detection range, yd	1531yd
Display Specifications	
Type	OLED
Resolution, pixels	2560 x 2560
Wi-Fi	
Wireless protocol	Wi-Fi
Frequency, GHz	2.4
BT	
Frequency, MHz	2402~2480
Video Recorder	
Video/Photo resolution, pixels	1280×1280
Video/Photo format	.mp4/.bmp
Built-in memory, GB	64
LRF	
Wave length, nm	905

Max measuring distance, yd	1200
Physical Specifications	
Degree of protection, IP code	IP67
Operating temperature range, ℉	-13 to +122
Weight, lb	2.9
Dimensions, inch	10.3×3.3×3.8
Connections and Compatibilities	
Battery type	18650×2
Capacity, mAh	3200
Operating time on battery pack(at t=72℉), h	7
External power supply, V	5 (Type C USB 3.0)
Max.recoil, g/Joules	1000/6000

IN THE BOX

The DBH series thermal imaging device   设备
Picatinny Mount 皮轨
Dust cover 携行包
Eyepiece hood 短眼罩
Battery door 电池盖
Thermal target × 5   靶纸
Battery charger 充电器
USB type c cable USB 线
Battery ×4 电池
Lens cloth 镜头布
Hex key 内六角扳手
Screw × 6 螺丝

PRODUCT APPEARANCE

POWER SUPPLY
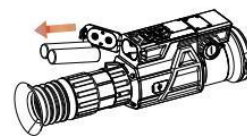
The DBH 660 is powered by two 18650 replaceable batteries.

▶ Press the lock and open the battery compartment cover.
▶ Install the battery into the compartment, both positive (+) poles inward and negative (-) poles outward.
▶ After inserting the battery, keep the hook on the clasp, and press the battery compartment cover until locking it.
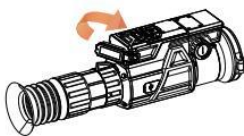
Step 1   Step 2   Step 3

Note
➢ The batteries can be inserted into the battery compartment in any direction, we recommend that the positive(+) poles inward.
➢ Remove the battery if the device is not in use for extended periods of time.
➢ Do not power the device with a modified or damaged battery.
➢ Make sure the device is completely turned off before removing the batteries.
➢ The decrease in battery capacity under sub-zero temperatures is normal and not a factory defect.
➢ Do not use the battery at a temperature above $122℉$ above, as it may reduce the life of the

battery

➢ If the device is not used for a long time , the RTC will reset. When you power the device, the battery of RTC will be recharged.

BUTTONS OPERATION

Current State	Button	Short Press	Press and hold
Powered off	Right	-	Power on the device
Standby	Right	Wake up the device	Wake up the device
Power on	Right	Standby	Shut down
Home interface	Up	Start/Stop distance measurement	Power on/off the LRF
	Left	Open the quick menu	Open the main menu
	Down	Start/Stop video recording	Take a photo
	Up+Left	Power on/off laser pointer	-
	Up+Down	Shutter	-
Quick menu interface	Up	Switch options	-
	Left	Adjust parameters	-
	Right	Return to the home interface	Shut down
	Down	Switch options	-
Main menu interface	Up	Switch options	-
	Left	Enter/Confirm	-
	Right	Return to the home interface	Shut down
	Down	Switch options	-
Playback interface	Up	Rewind the video	Rewind the video continuously
	Left	Start/pause playback	Exit playback interface
	Right	Return to the home interface	Shut down
	Down	Fast-forward the video	Fast-forward the video continuously
Bad pixel correction interface	Up	Move cross up/left	Move cross up/left continuously
	Left	Fix/Auto/Save bad pixel	
	Right	Return to the home interface	Shut down
	Down	Move cross down/right	Move cross down/right continuously

POWER ON/OFF

Power On/Starting

1. Open the objective lens cap.
2. Press and hold the Power button for 3 seconds to turn on the device. The RIX logo will appear.

Powering Off/Stopping

1. Press and hold the Power button. The power-off interface will open, showing a 3-second countdown.
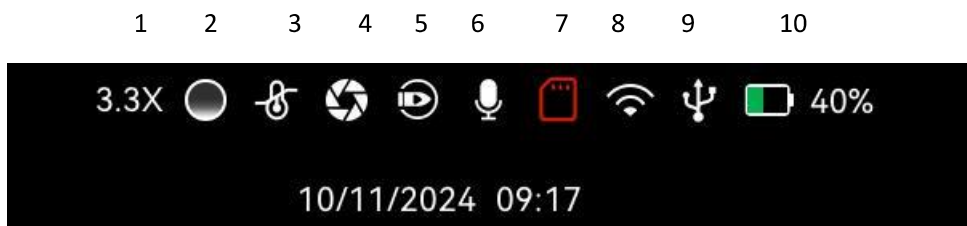2. When the 3-second countdown completes, the device complete shutdown.

Warning

➢ If using an external power supply, do not disconnect the power supply when saving data, otherwise the data may not be saved.

STATUS BAR

The status bar is located at the bottom of the screen and displays the status of the device, from left to right:

1. Current magnification(e.g.,3.3x)
2. Colormap(e.g., black hot)
3. Temperature area, need to operate shutter
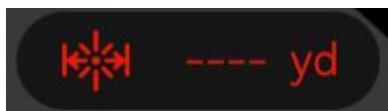4. Shutter
5. Recoil activated video
6. Mic

7. SD card full, capacity less than 500M
8. Wi-Fi
9. USB
10. Battery,≥30% green,≥10% yellow,<10% red
11. RTC

SHORTCUT FUNCTION

Zoom(Ring)

The rotating ring can be used for zoom. The range of zoom is 3x(Left limit) to 18x(Right limit).

LRF(Press Up button)

1. On the home interface, press and hold Up button to power on LRF.
2. Simply press the Up button to start measuring.
Warning
Please do not look directly at the laser emission window.

Image Correction(Press Up+Down button)

Calibration is an effective solution for enhancing degraded or uneven images. By balancing the background temperature of the detector, calibration can eliminate image defects and improve overall quality.

Laser pointer(Press Up+Left button)

Enable/disable the laser pointer. The screen will show a green box to point the target.
Warning
Please do not look directly at the laser emission window.

Photo/Video(Down button)

Photo Taking

On the home interface, press and hold the Down button to take a photo and the screen will show a camera icon upper left corner.

Video Recording

On the home interface, press the Down button to start recording, and a prompt box showing the recording time appears in the upper left corner of the interface, with a time format of HH:MM:SS(hour:minute:second). Press the Down button again to stop and save the video recording.

Note

➢ The photos and videos will save on the built-in memory card in the format of YYYYMMDD_HHMMSS.bmp(photos) and YYYYMMDD_HHMMSS.mp4(videos). It is recommended to synchronize the device time and date through the app before using photo/video mode.

➢ The maximum duration of a single video is 30 minutes. When the duration of a recorded video exceeds 30 minutes, the device will automatically start recording a new video file of the remainder of time.

➢ To download photos and videos, turn on the device, and connect it to a computer with the

data cable. On your computer, Double-click MY COMPUTER on the Desktop Screen, find the device named "Media".

➢ You can easily free up storage space by either deleting or moving the media files to an external storage device.

➢ To avoid damaged or corrupted video footage, please turn off the device properly.

QUICK MENU

On the home interface, press the Left button to open the quick menu. Press Up or Down to switch the options, and press Left button to change the setting.
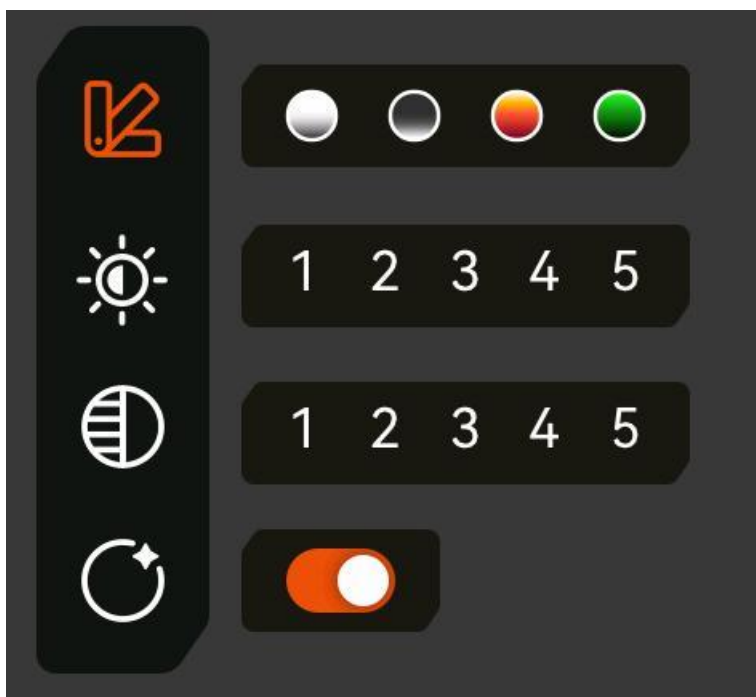
Colormap Settings

Press the Left button to switch colormap, and choose from white hot, black hot, red hot and green hot. White hot is as the default.

Brightness Settings

Press the Left button to switch image brightness, with a range of 1-5 and 3 as the default.

Contrast Settings

Press the Left button to switch image contrast, with a range of 1-5 and 3 as the default.

Enhance

Press the Left button to switch on/off enhance function.

MAIN MENU

On the home interface, press and hold the Left button to open the main menu. The main menu has

two pages, which can be switched by press the Up or Down button.

Page 1 of the Main Menu

Scene

Press the Left button to switch scene mode, with a range of 1-4 and 1 as the default.

PIP

Press the Left button to enable or disable the PIP function. When the PIP function is enabled it, the digital zoom returns to 1x, and the digital zoom of PIP will change by the ring.
When the PIP function is enabled, a small window appears on the upper part of the display, magnifying the selected area. This allows users to easily observe target details.

Wi-Fi

Press the Left button to enable or disable Wi-Fi function. The device can connect to mobile phone via Wi-Fi. Search for the Wi-Fi named as "DBH660-xxx"on the phone, where "xxx" is the serial number of the device.

Select the Wi-Fi and enter the password to connect. The initial password is 12345678.

After a successful connection to Wi-Fi, the device can be controlled via the mobile phone.

Note

➢ The DBH series allows you to change the name and password of the Wi-Fi in the app.

➢ In the app, find the setting icon on the upper right corner, and click it to enter the interface for Settings.

➢ In the text box, enter and submit the new Wi-Fi name (SSID) and password.

➢ Submit the changes and reconnect.

File
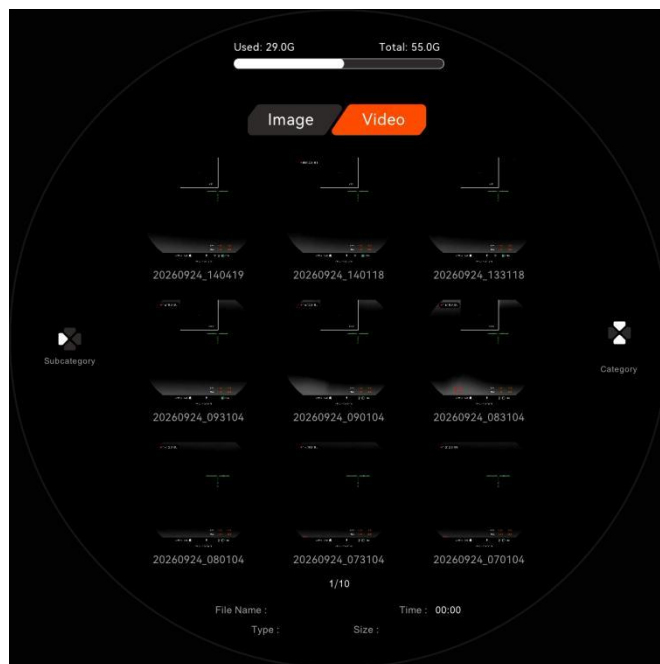
In this interface, users can view photos and video files stored on the device.

Image: Users can view the entire image and delete it.

Video: Users can play, pause, fast forward, fast back, and delete it.

LRF

Press the Left button to switch Single mode and Continuous mode.

Single mode:Each time the Up button is pressed, the device takes a distance measurement.

Continuous mode:Press the Up button, the device start measuring continuously. Press the Up
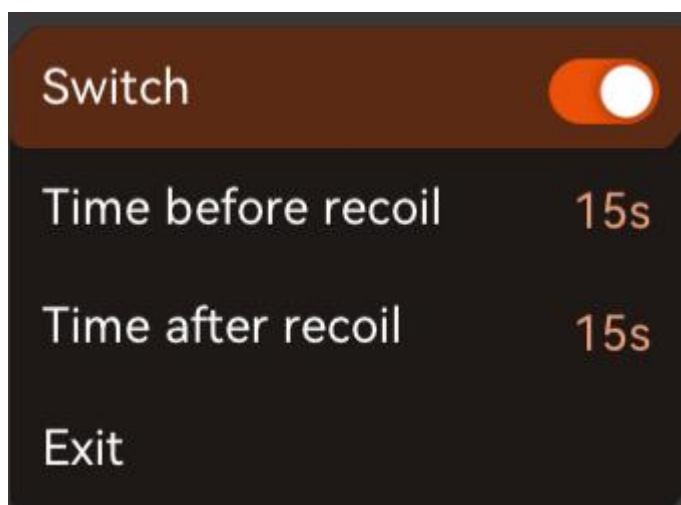
button again, the device stop measuring.

Page 2 of the Main Menu
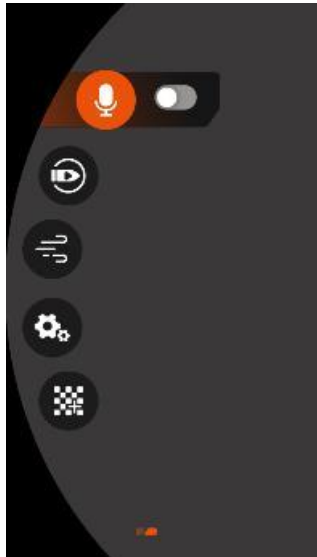
Microphone

Press the Left button to enable or disable. When the microphone is enabled, the device records ambient sound when recording.

Recoil Activated Video

1. Switch:Press the Left button to enable or disable. When the RAV is enabled , the device automatically records video before and after the recoil, helping the user to snap a quick shot
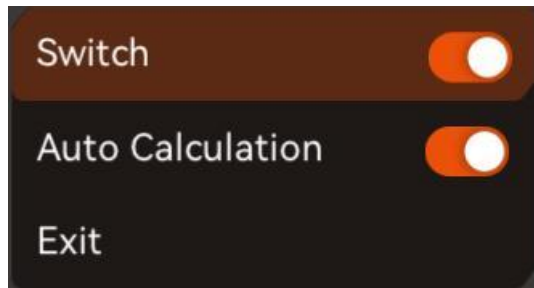
2. Time before recoil: Press the Left button to switch the record time, and choose from 5s(default),10s,15s.

3. Time after recoil:Press the Left button to switch the record time, and choose from 5s(default),10s,15s.

Note

➢ To avoid damaged video footage, please turn off the device properly.

Anemometer

1. Switch:Press the Left button to enable or disable. When the anemometer is enabled, the screen will show the wind speed on the upper right corner.

2. Auto calculation:Press the Left button to enable or disable. When the switch is enabled, the screen will show a small "A" next to the wind speed.


Note

➢ The anemometer is connected via Bluetooth signal.

1. When the anemometer is turned on, the device automatically searches for nearby anemometer via Bluetooth while the icon flashes.

2. At this time, turn on the Bluetooth switch of the anemometer, and the system will automatically connect.

3. When the connection is successful, the icon on the screen stops blinking and the wind speed value begins to be obtained.

Settings
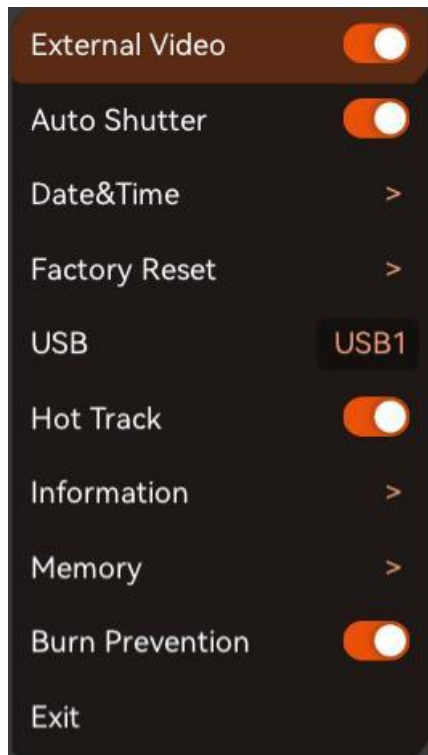
1. External Video:When it is enabled, users can watch the image on the computer.
2. Auto Shutter: When it is enabled, the device automatically releases the shutter every 20 minutes.
3. Date&Time:Users can modify the system time, and the generation time of photos and videos will refer to the system time.
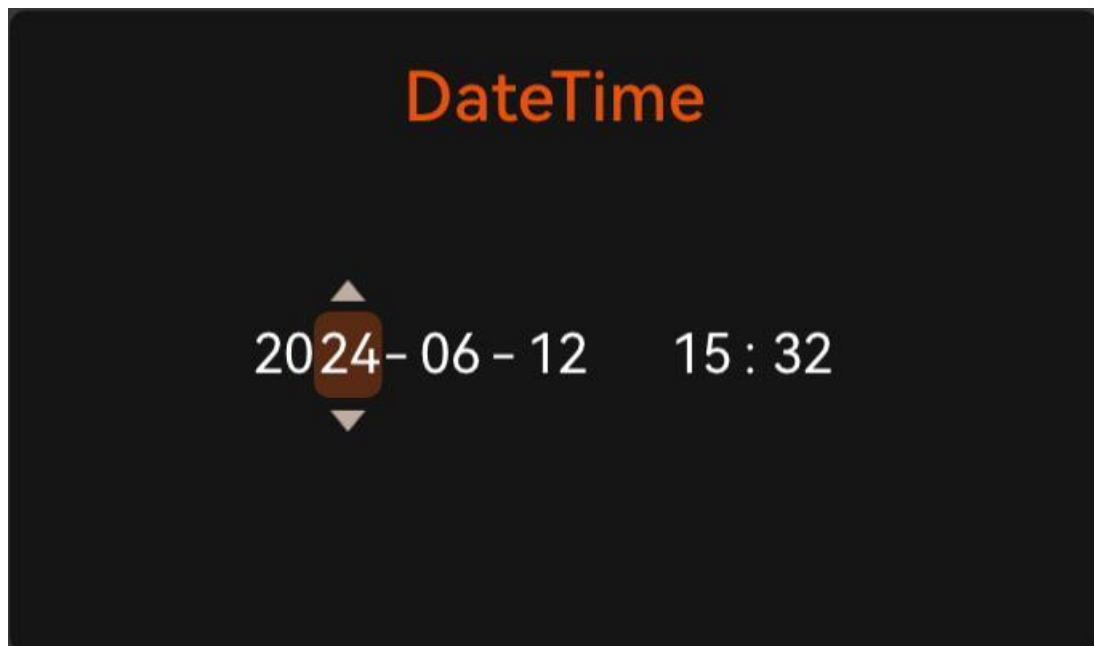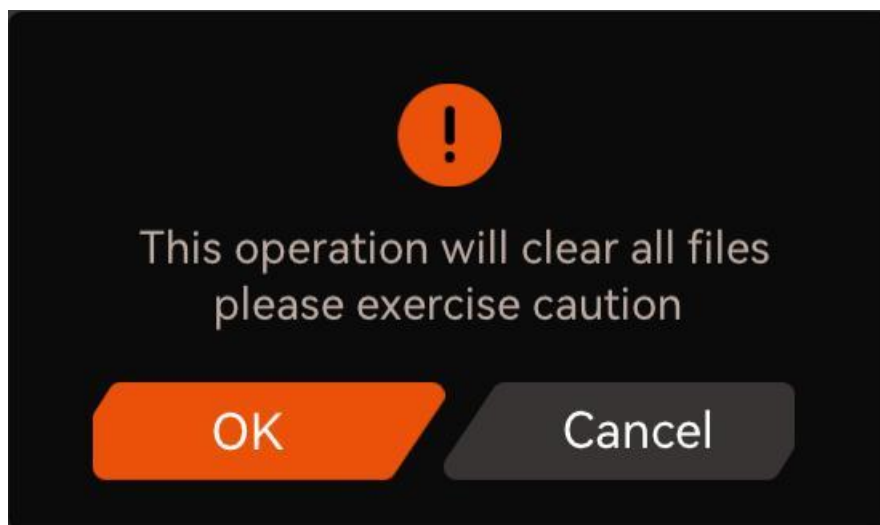

4. Factory Reset:The device will reset all parameters and settings, and auto reboot.
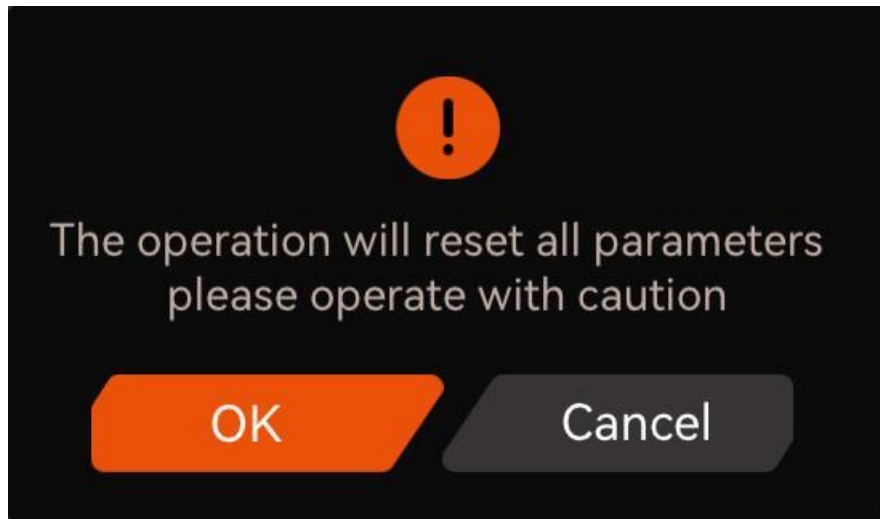
5. USB:Developer debugging interface
6. Hot Track:When it is enabled, the screen will show a small box to track the hottest area.
7. Information:Show the device information, such like PN, SN, Software.

8. Memory:Show the remaining capacity. Users can format and auto reboot.

9. Burn Prevention:When it is enabled, the device will close the shutter to avoid damage if the

target temperature is too high.

Warning
When factory resetting or device formatting, do not connect the computer, and use more than 50% of the battery power for power supply. Do not press buttons or shut down the device until the device reboots automatically.
Note

➢ When the device need to correct by auto shutter, the icon will flash 5 times. After flashing, the the device will correct.

Bad Pixel Correction

When using the device, you may see pixel defects, such as visible light spots or dark spots with stable brightness. To address this problem, the bad pixel correction function can be used to remove the pixel defects.
On the bad pixel correction interface, press the Up and Down button to move the cross. Press and hold Left button to switch the direction. Press the Left button to operate.


1. Fix:Press Left button to fix the pointed pixel.
2. Auto:The device automatically searches for bad pixels and automatically fixes them.
3. Save:Press Left button to save the result and exit the interface.
4. Exit:Press Left button to not save the result and exit the interface.

APP DESCRIPTION

The DBH series comes with a dedicated app. By connecting the device to the app on a mobile phone, you can enjoy real-time image transmission. Download instructions for using the app from the official website(www.rixoptics.com).
Users have the option to update the firmware of the DBH product by utilizing the app or downloading the latest version from www.rixoptics.com.

You can download and install the app from the official website (www.rixoptics.com) or by searching RIX+ in an app store.
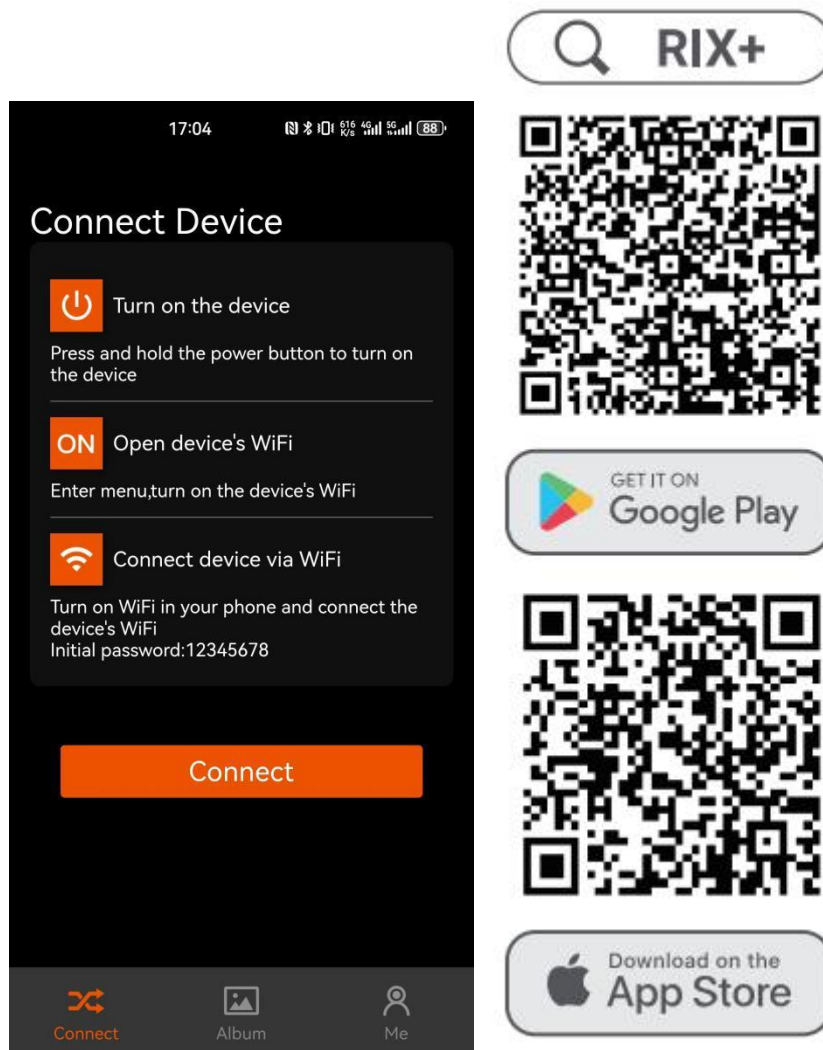
PRODUCT MAINTENCE

Prior to using the device, it is important to conduct a thorough technical inspection to ensure the following items are in proper working condition.

To remove dust and dirt from the metal and plastic parts, use a cotton cloth and gently wipe the surface clean.

Make sure that the 18650 battery being used is free from any bulges or deformities and that the plastic cover is undamaged.

PRODUCT TROUBLE SHOOTING

Refer to the table below, which outlines potential issues that may arise during operation. For any product issues that cannot be remedied or are not listed below, please contact the RIX Optics customer support by visiting our website at www.rixoptics.com or call+1(800) 580-5281.

Fault	Possible Causes	Solutions
The device cannot be started.	The battery is out of charge	Charging
The device cannot be powered by an external power supply.	The USB cable is damaged	Replace the USB cable.
	The external power supply is insufficient.	If necessary, check the external power supply.
The image is too dark	The screen brightness is set too low.	Adjust the brightness
The image quality is poor or the detection range shortens.	These problems are likely to occur when you use the device in harsh weather such as snow, rain and fog.	
The device cannot connect to a mobile phone.	The Wi-Fi password is incorrect.	Enter the correct password
	There are too many Wi-Fi networks in the range of the device, which may cause interference.	For a stable network connection, it is recommended to relocate the device to an area with a lower number of Wi-Fi networks
Wi-Fi signals are lost or interrupted.	The device is beyond Wi-Fi coverage. There is blocking (such as concrete walls)between the device and the receiver	Move the device to a place where you can receive Wi-Fi signals.
When the device is used at a low temperature, the imaging quality is poorer than that at a normal temperature.	At temperatures above $0^{\circ}C$ with the temperature rise varies with the observed objects (environment and background)due to different heat conductivity coefficients. As a result, high-temperature contrast occurs and the image quality it better. At low temperatures, the observed targets (background)usually cool down to a similar temperature because of reduced temperature contrast. Therefore, the image quality(details in particular)is poor which is a characteristic of thermal imaging devices.	

LEGAL AND REGULATORY INFORMATION

Wireless Transmitter Module Frequency Range

Frequency Range	802.11b/g/n-20MHz: 2.412GHz-2.462GHz
Channel Number	802.11b/g/n-20MHz: 11
Transfer Rate	802.11b: 11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6 Mbps 802.11n : up to 72.2Mbps
Modulation Type	DSSS (802.11b),OFDM(802.11g/n)
Wireless transmitter module power	<20dBm

BT

Frequency Range	2402MHz~2480MHz
Channel Number	79
Bit Rate of Transmitter	1/2/3Mbps
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Antenna Type	Internal Antenna
Antenna Gain	0.83dBi

BLE

Frequency Range	2402MHz~2480MHz
Channel Number	40
Bit Rate of Transmitter	1Mbps
Modulation Type	GFSK
Antenna Type	Internal Antenna
Antenna Gain	0.83dBi

FCC Statement

FCC ID:2A7ZZ-DBH-03

Labeling Requirements

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)This device may not cause harmful interference, and (2)this device must accept any interference received, including interference that may cause undesired operation.

Information To The User

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

EMC Class B

Note:This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

To comply with RF exposure requirements, a minimum separation distance of 0.00 cm must be maintained between the user's body and the handset, including the antenna.

Laser Label

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