IX2 AIR Series

Wireless Thermal Camera for Smart Devices

User Manual V1.0.0

Raythink Technology Co., Ltd.

Contents

1. Safety Information

WARNING

1. 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,

(2) this device must accept any interference received, including interference that may cause undesired operation.

2. Any Changes or modifications not expressly approved by Raythink Technology could void the user's authority to operate the equipment.

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.

This device complies with RF exposure requirements for general population exposure conditions.SAR test distance is 0cm

3. Before using the cleaning solution, ensure you have read all applicable Material Safety Data Sheets (MSDS) and warning labels on containers.

4. It is prohibited to place the product in high-temperature environments above 60°C and low-temperature environments below -20°C.

5. It is recommended to charge the device in room-temperature condition and power-off status. It is prohibited to charge the device in high-temperature

environments above 40°C and low-temperature environments below 0°C. The device does support operating while charging.

6. It is prohibited to operate the device in high-temperature environments above 50°C and low-temperature environments below -10°C.

7. The device must operate within a relative humidity range of 10% to 95%, non-condensing.

8. Do not disassemble or refit the thermal camera at will.

CAUTION

1. Do not use the product in conditions that exceed the specified environmental requirements. For detailed information on these requirements, refer to the product parameter table.

2. Do not apply cleaning solutions or similar liquids directly to the thermal camera, cables or other components.

3. Be careful when cleaning the infrared lenses. The lenses have a delicate coating that can be damaged by rough objects like paper towels or the application of excessive force.

4. Do not point the thermal camera at strong light sources or devices emitting laser radiation. Doing so can affect the accuracy of the thermal camera and potentially damage its detector.

5. Keep the product away from moisture, water, or dust to prevent internal circuit failures that may affect normal use.

6. Avoid contact between hard objects and the lens of the product to prevent damage to the lens.

7. Avoid mechanical impact, crushing, or throwing of the product.

8. Do not heat the product or place it in a microwave oven or pressure cooker.

(EU)2023/1542(battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this

symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: *www.recyclethis.info*

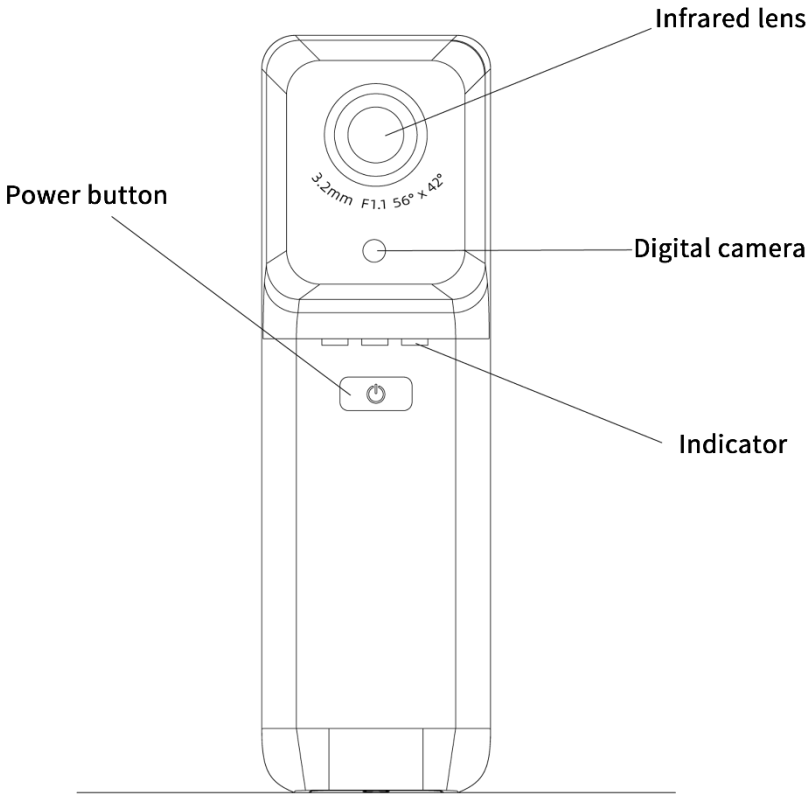
2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points.

For more information see: *www.recyclethis.info*

2. Thermal Camera Overview

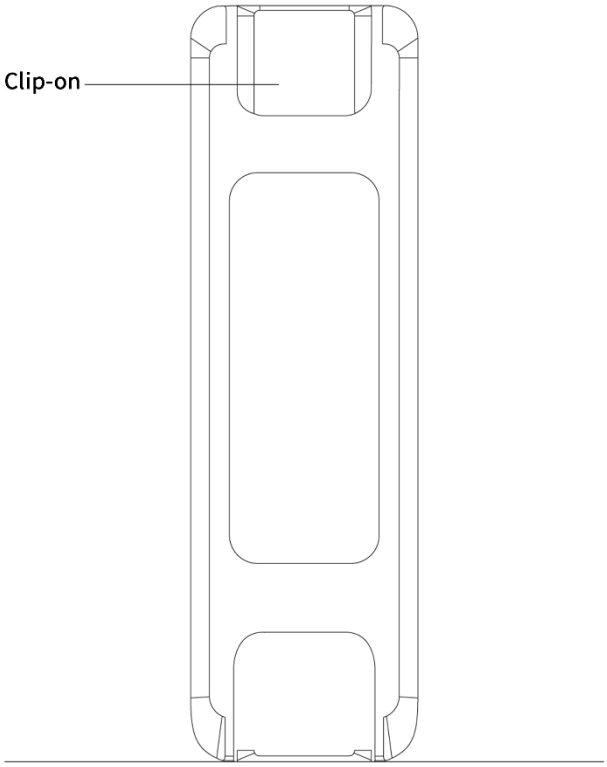
2.1. Front View

(Taking a specific model as an example)



2.2. Rear View

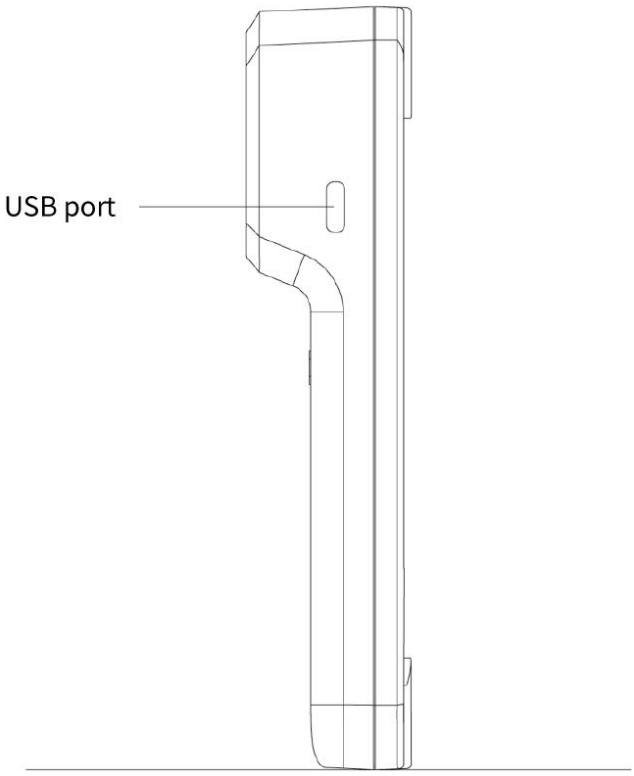
(Taking a specific model as an example)



Name	Function Description
Clip-on	Stretchable, designed to clamp the smart devices

2.3. Side View

(Taking a specific model as an example)



Name	Function Description
USB port	Connect the power adapter using a USB cable for charging

2.4. Quick Start Guide

Follow these steps:
1. Charging: ● 5V 2A power adapter and USB cable can be used to charge the device ● Please charge the device at room temperature
2. Power-on Press and hold the power button to turn on.
3. Find the target Point the thermal camera at the object of interest.
4. Capture image Use the smartphone App, click the Photo button to capture images, and click the Video button to record videos.
5. PC Software Analysis Download the thermal camera client, transfer the data to a computer, run the client, and import the data for secondary analysis.
6. App Analysis Open the supporting App of the thermal camera, click into the Gallery, and select the images for secondary analysis.

3. Description of Supporting Software

3.1. Software Introduction

The secondary analysis App for the thermal camera is fully compatible with the wireless thermal cameras. It supports various observation modes, including infrared, visible light, and dual-spectrum fusion. The App allows users to switch palettes, capture images, take videos, and perform custom point/line/box temperature analysis.

3.2. Device Connection

(1) Press and hold the power button to turn on the device, and make sure that the Bluetooth function on your smartphone is enabled.

(2) Open the App.

(3) Click the device to be connected.

(4) A pop-up box is displayed to remind the user whether they agree to join the network. Click Join to connect successfully (this step is only required for iPhone models).

3.3. Home Screen Introduction

Icon	Function Name	Function Description
	Preset template setting	1. Click to customize the drawing of points, lines, and boxes, or to delete 2. After completing the drawing, you can choose to generate a custom measurement template library.

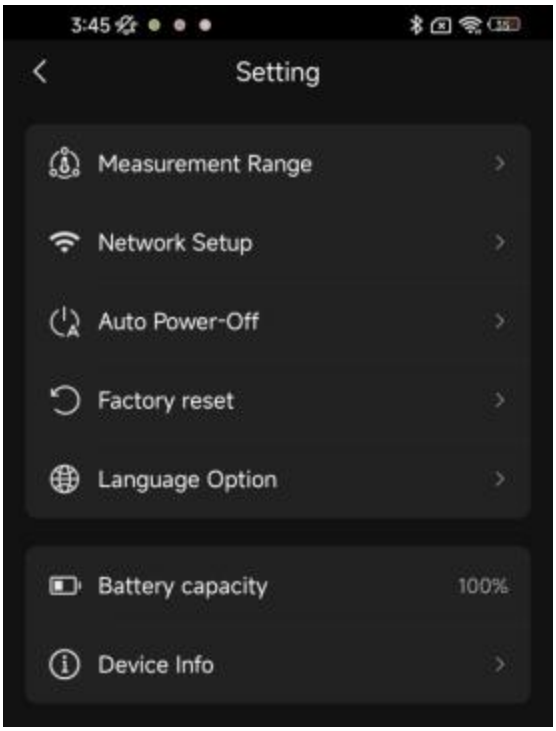
	Isotherm	Click to quickly enable or disable the isotherm function (mutually exclusive with the super-resolution function).
	Super-resolution (only supported by certain models)	Enable to achieve higher-quality imaging.
	Dual-spectrum Alignment	Click to switch between the following two functions: 1. Click the direction buttons to perform dual-spectrum image alignment, supporting both coarse and fine adjustment modes. 2. Drag the color bar to adjust the dual-spectrum fusion ratio.
	Center, highest temperature point, lowest temperature point switch	 Click to set the center, the highest and lowest temperature points displayed or closed in real time. When the corresponding temperature point is turned on, the upper left corner displays the temperature value in real time.
	Image mode switching	Support custom switching of four modes
	Palette switching	Support custom switching of iron hot, white-hot, black-hot, rainbow and other palettes

	Shutter	Click to trigger the shutter and perform non-uniformity correction once
	Digital Zoom	1×, 2×, 4×
	Level/span	Auto/Manual
	Parameter Settings	 Click to set the emissivity, ambient temperature and target distance
		 Click to set the temperature unit: Celsius, Kelvin and Fahrenheit
		 Click to set the distance unit: meter and foot
	Gallery	It supports deletion, downloading to local albums, forwarding and sharing. Image materials support secondary analysis (single-spectrum models are not supported). Click the icon  in the upper right corner to view the details of the corresponding images and videos. The report generated by secondary analysis can be viewed and shared in the PDF screen.

	Capture	Click to capture the image and automatically save the current image to the Gallery
	Video Recording	Click to start video recording, click again to stop recording and automatically save it to the Gallery

3.4. Setting

The Setting interface is as follows:



Icon	Function Name	Function Description
	Measurement range	Low temperature range and high temperature range are optional; support automatic switching of temperature ranges.

	Temperature alarm	Support high and low temperature alarm settings. Alarm linkage can be enabled at the same time. 1. When alarm snapshot is enabled, the thermal image will be automatically captured when an alarm occurs. You can set the capture interval and the number of snapshots. 2. When phone vibration is enabled, the phone will vibrate to alert you when an alarm occurs. 3. When alarm sound is enabled, the phone will play a sound alert when an alarm occurs. Changes take effect after clicking "Settings".
	Isotherm	Once enabled, high and low temperature values can be set. Click Setting to apply.
	Auto Power-Off	Support custom settings of Off, 10 minutes and 20 minutes.
	Factory reset	*Click to restore factory settings. This operation can clear all device information.
	Battery capacity	Display the remaining power.
	Device Info	View the device model, PN, SN and firmware version number. Click "Check for Updates" to upgrade the device to the latest version according to the prompts.

4. Technical Data

4.1. IX2 AIR SE

Technical Indicators		IX2 AIR SE
Thermal	Detector type	Uncooled infrared detector
	Detector resolution	256x192
	Super resolution	/
	Pixel pitch	12μm
	Spectral range	7.5 ~ 14 μm
	NETD	40mk (25℃, F1.1)
	Frame rate	25Hz
	Focal length	3.2mm
	FOV	56°×42°
	IFOV	3.75mrad
	Focus mode	Fixed
	Minimum imaging distance	0.3m
	Temperature measurement range	-20~+400℃
	Temperature measurement accuracy	±2% or ±2℃ of the reading (the larger value shall prevail)
Image Display	Digital Camera	/
	Digital zoom	1×,2×,4×
	Color palettes	7 kinds
	Image mode	Infrared
	Level/span	Auto/Manual
Measurement and Analysis	On-device analysis	Supports up to 3 movable points, lines, and boxes respectively.
	Analysis report	PDF format, report generation supported on the app.
	Supporting software	PC (infrared analysis software) or mobile (iOS/Android app).
Image Storage	Storage medium	Images are stored in the app by default and can be downloaded to the local photo album.
Video Function	Non-radiometric infrared or visible light video recording	Standard MP4 format

	Non-radiometric infrared video streaming	Transmits real-time radiometric infrared video stream via Type-C connection to PC software
	Video resolution	480 × 360
System Functions	Communication protocols	Wi-Fi, Bluetooth, USB
	Voice control	Voice assistant with quick command recognition
Others	Battery	Built-in 1050mAh lithium battery
	Charging method	USB Type-C
	Battery life	About 2h
	External interface	USB Type-C
	Charging time	About 1.5h
	Tripod Interface	UNC 1/4-20
	Operating temperature range	-10 ~ +50°C
	RH	10%~95%(non-condensing)
	Storage temperature range	-20 ~ +60°C
	Protection rating	IP54
	Shock & Vibration	Shock: 25g (IEC 60068-2-27); Vibration: 2.5g (IEC 60068-2-6)
	Weight & Dimensions	Approx. 130g, 135.6 × 41 × 29.1 mm
	Gross Weight and Package Dimensions	Approx. 360g, 118 × 187 × 55 mm
	Certification	CE/RoHS/DGM/Calibration Certificate
	Package contents	Thermal camera, Type-C cable, Quick Start Guide, Package contents, Calibration Certificate, Certificate of Conformity

4.2. IX2 AIR

Technical Indicators		IX2 AIR
Thermal	Detector type	Uncooled infrared detector
	Detector resolution	256x192
	Super resolution	/
	Pixel pitch	12μm
	Spectral range	7.5 ~ 14 μm
	NETD	40mk (25℃, F1.1)
	Frame rate	25Hz
	Focal length	3.2mm
	FOV	56°×42°
	IFOV	3.75mrad
	Focus mode	Fixed
	Minimum imaging distance	0.3m
	Temperature measurement range	-20~+550℃
	Temperature measurement accuracy	±2% or ±2℃ of the reading (the larger value shall prevail)
Image Display	Digital camera	2MP
	Digital zoom	1×,2×,4×
	Color palettes	7 kinds
	Image mode	Infrared, visible, PIP, dual-spectrum fusion
	Level/span	Auto/Manual
Measurement and Analysis	On-device analysis	Supports up to 3 movable points, lines, and boxes respectively.
	Analysis report	PDF format, report generation supported on the app.
	Supporting software	PC (infrared analysis software) or mobile (iOS/Android app).
Image Storage	Storage medium	Images are stored in the app by default and can be downloaded to the local photo album.
Video Function	Non-radiometric infrared or visible light video recording	Standard MP4 format

	Non-radiometric infrared video streaming	Transmits real-time radiometric infrared video stream via Type-C connection to PC software
	Video resolution	480 × 360
System Functions	Communication protocols	Wi-Fi, Bluetooth, USB
	Voice control	Voice assistant with quick command recognition
Others	Battery	Built-in 1050mAh lithium battery
	Charging method	USB Type-C
	Battery life	About 2h
	External interface	USB Type-C
	Charging time	About 1.5h
	Tripod Interface	UNC 1/4-20
	Operating temperature range	-10 ~ +50°C
	RH	10%~95%(non-condensing)
	Storage temperature range	-20 ~ +60°C
	Protection rating	IP54
	Shock & Vibration	Shock: 25g (IEC 60068-2-27); Vibration: 2.5g (IEC 60068-2-6)
	Weight & Dimensions	Approx. 132g, 135.6 × 41 × 29.1 mm
	Gross Weight and Package Dimensions	Approx. 362g, 118 × 187 × 55 mm
	Certification	CE/RoHS/DGM/Calibration Certificate
	Package contents	Thermal camera, Type-C cable, Quick Start Guide, Package contents, Calibration Certificate, Certificate of Conformity

4.3. IX2 AIR Pro

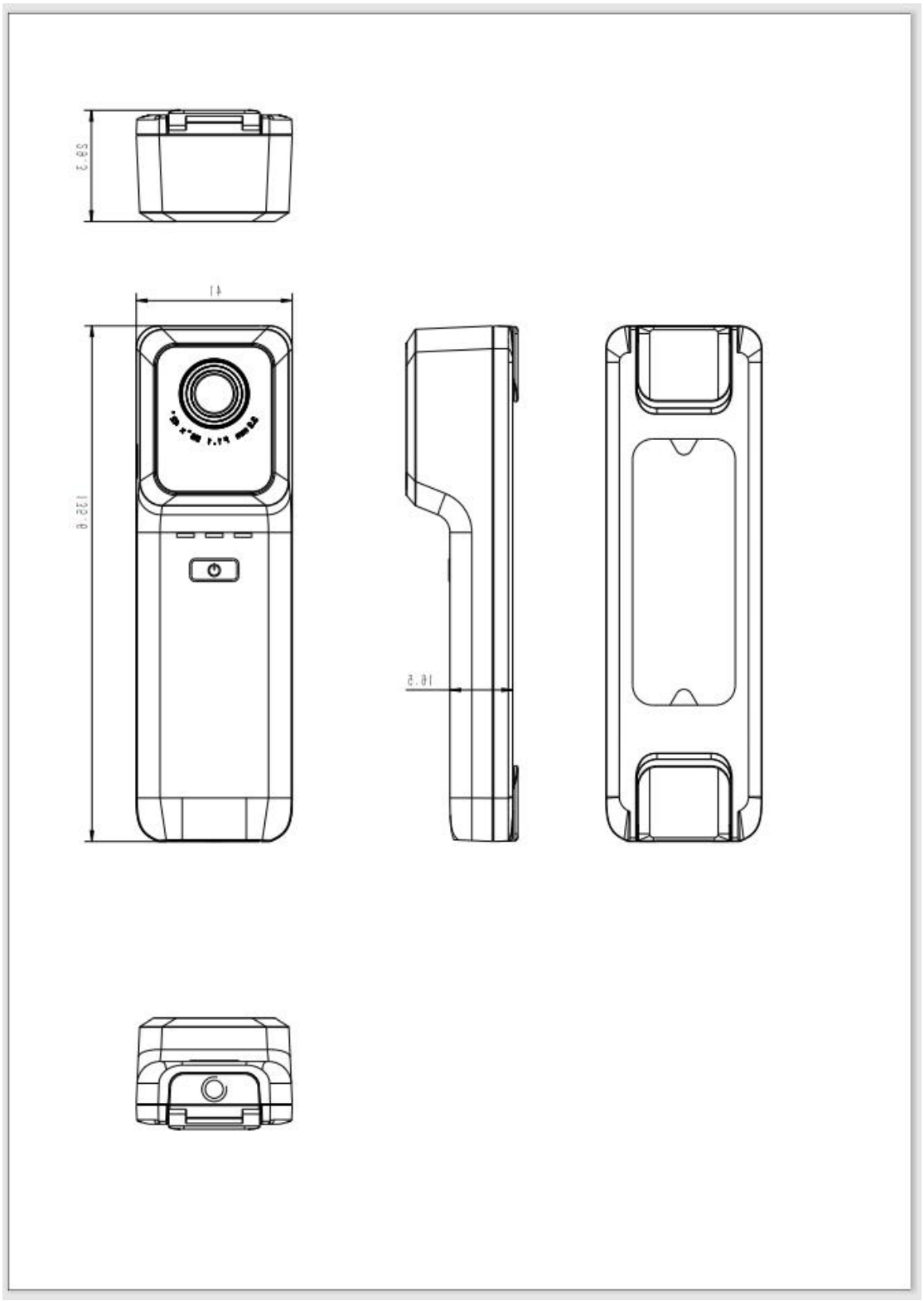
Technical Indicators		IX2 AIR Pro
Thermal	Detector type	Uncooled infrared detector
	Detector resolution	256x192
	Super resolution	512×384
	Pixel pitch	12μm
	Spectral range	7.5 ~ 14 μm
	NETD	50mk (25℃, F1.0)
	Frame rate	25Hz
	Focal length	7mm
	FOV	25°×19°
	IFOV	1.71mrad
	Focus mode	Manual focus
	Minimum imaging distance	0.1m
	Temperature measurement range	-20~+550℃
	Temperature measurement accuracy	±2% or ±2℃ of the reading (the larger value shall prevail)
Image Display	Digital camera	2MP
	Digital zoom	1×,2×,4×
	Color palettes	10 kinds
	Image mode	Infrared, visible, PIP, dual-spectrum fusion
	Level/span	Auto/Manual
Measurement and Analysis	On-device analysis	Supports up to 3 movable points, lines, and boxes respectively; Supports up to 3 preset templates.
	Analysis report	PDF format, report generation supported on the app.
	Supporting software	PC (infrared analysis software) or mobile (iOS/Android app).
Image Storage	Storage medium	Images are stored in the app by default and can be downloaded to the local photo album.
Video Function	Non-radiometric infrared or visible light video recording	Standard MP4 format

	Non-radiometric infrared video streaming	Transmits real-time radiometric infrared video stream via Type-C connection to PC software
	Video resolution	512 × 384
System Functions	Communication protocols	Wi-Fi, Bluetooth, USB
	Voice control	Voice assistant with quick command recognition
Others	Battery	Built-in 1050mAh lithium battery
	Charging method	USB Type-C
	Battery life	About 2h
	External interface	USB Type-C
	Charging time	About 1.5h
	Tripod Interface	UNC 1/4-20
	Operating temperature range	-10 ~ +50°C
	RH	10%~95%(non-condensing)
	Storage temperature range	-20 ~ +60°C
	Protection rating	IP54
	Shock & Vibration	Shock: 25g (IEC 60068-2-27); Vibration: 2.5g (IEC 60068-2-6)
	Weight & Dimensions	Approx. 142g, 136.2×41×29.3mm
	Gross Weight and Package Dimensions	Approx. 442g, 118 × 187 × 55 mm
	Certification	CE/FCC/ROHS/DGM/Calibration Certificate
	Package contents	Thermal camera, Type-C cable, Quick Start Guide, Package contents, Calibration Certificate, Certificate of Conformity, Carrying bag

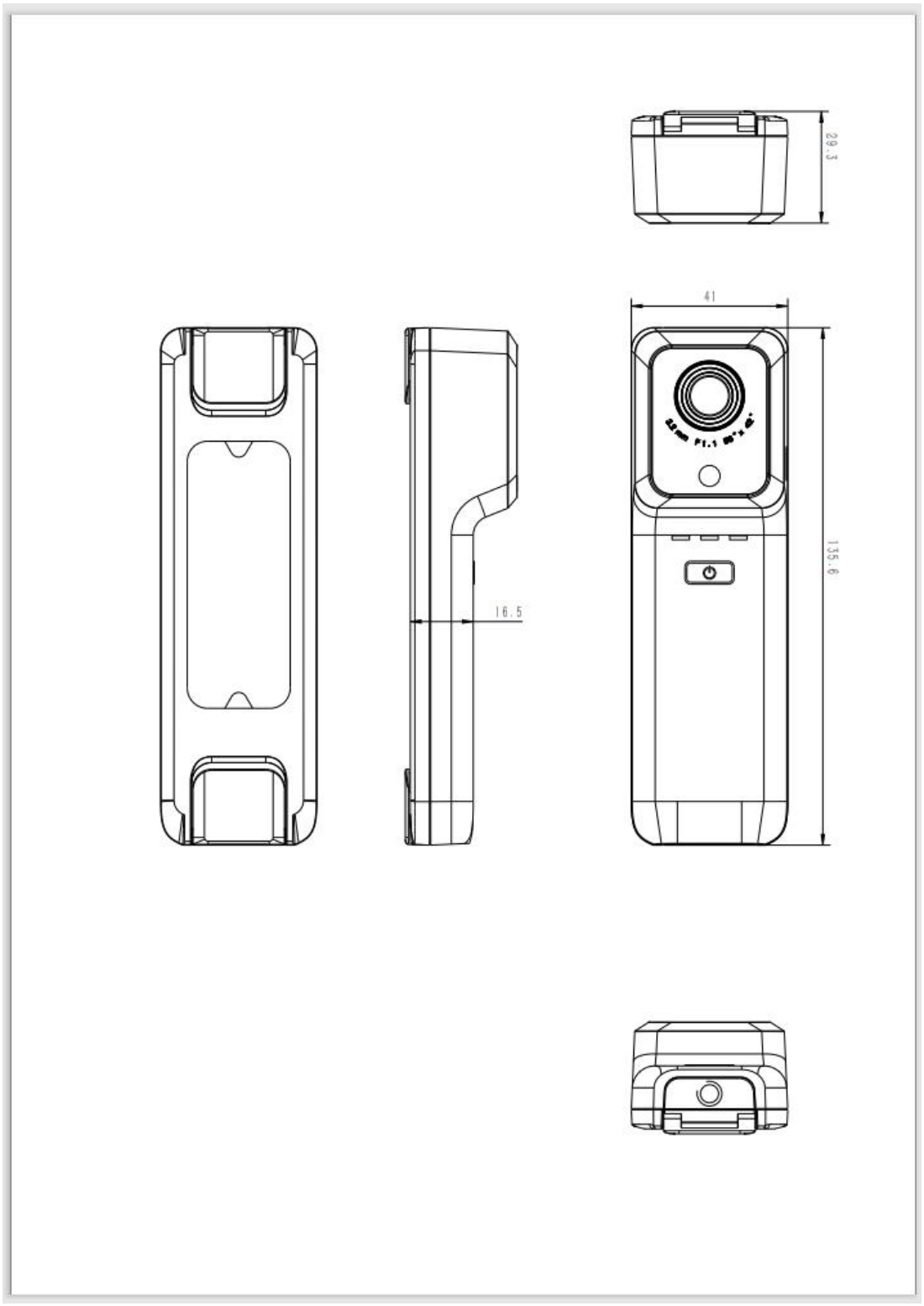
***Indicates that some models do not support this function. It is recommended to use with the latest version of the app for the best user experience.**

5. Dimensions

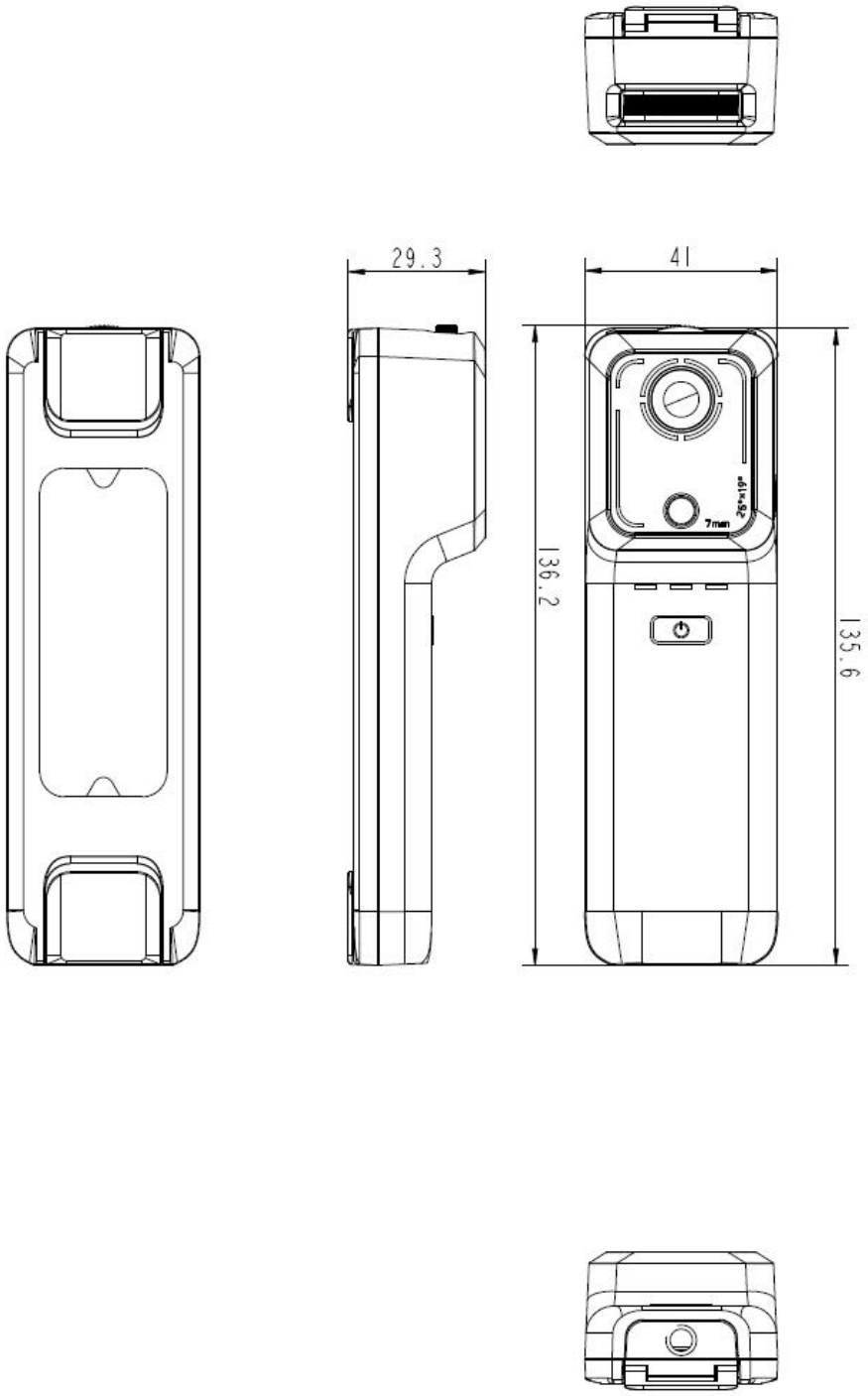
5.1. IX2 AIR SE



5.2. IX2 AIR



5.3. IX2 AIR Pro



6. Cleaning Thermal Camera

6.1. Cleaning Camera Housing, Cables and Other Items

Camera Housing, Cables and Other Items	
Liquids	One of the following liquids can be used. 1.Warm water 2.A Weak detergent solution
Cleaning Tools	A soft cloth
Cleaning Procedure	Please follow this procedure: 1.Soak a soft cloth in the liquid. 2.Twist the cloth to remove excess liquid. 3.Clean the camera parts with the cloth.

CAUTION

Do not apply solvents or similar liquids to the camera, the cables, or other items. This can cause damage.

6.2. Cleaning Infrared Lens

Cleaning Infrared Lens	
Liquids	One of the following liquids can be used. 1. Commercial lens cleaning liquid with more than 30% isopropyl alcohol. 2. 96% ethyl alcohol(C_2H_5OH).
Cleaning Tools	cotton wool
Cleaning Procedure	Please follow this procedure: 1.Soak the cotton wool in the liquid. 2.Twist the cotton wool to remove the excess liquid. 3. Clean the lens one time only and discard the cotton wool.

CAUTION

Do not clean the infrared lens too vigorously. This can damage the anti-reflective coating.

Appendix A Emissivity of Commonly Used Materials

(1) Metal

Material	Temperature (°C)	Emissivity
Aluminum		
Polished aluminum	100	0.09
Commercial aluminum foil	100	0.09
Mild aluminum oxide	25～600	0.10～0.20
Strong aluminum oxide	25～600	0.30～0.40
Brass		
Brass mirror (highly polished)	28	0.03
Brass oxide	200～600	0.59～0.61
Chromium		
Polished chromium	40～1090	0.08～0.36
Copper		
Copper mirror	100	0.05
Strong copper oxide	25	0.078
Cuprous oxide	800～1100	0.66～0.54
Molten copper	1080～1280	0.16～0.13
Gold		
Gold mirror	230～630	0.02
Iron		
Polished cast iron	200	0.21
Machined cast iron	20	44
Completely rusted surface	20	0.69
Cast iron (oxidized at 600°C)	19～600	0.64～0.78
Electrolytic iron oxide	125～520	0.78～0.82
Iron oxide	500～1200	0.85～0.89
Iron plate	925～1120	0.87～0.95
Cast iron, heavy iron oxide	25	0.8
Melted surface	22	0.94
Melted cast iron	1300～1400	0.29
Pure molten iron	1515～1680	0.42～0.45
Steel		
Steel (oxidized at 600°C)		
Steel oxide	100	0.74

Material	Temperature (°C)	Emissivity
Melted mild steel	1600～1800	0.28
Molten steel	1500～1650	0.42～0.53
Lead		
Pure lead (non-oxidized)	125～225	0.06～0.08
Mildly oxidized	25～300	0.20～0.45
Magnesium		
Magnesium oxide	275～825	0.55～0.20
Mercury		
Mercury	0～100	0.09～0.12
Nickel		
Electroplating and polishing	25	0.05
Electroplating without polishing	20	0.01
Nickel wire	185～1010	0.09～0.19
Nickel plate (oxidized)	198～600	0.37～0.48
Nickel oxide	650～1255	0.59～0.86
Nickel alloy		
Nickel-chromium (heat resistant) alloy wire (bright)	50～1000	0.65～0.79
Nickel-chromium alloy	50～1040	0.64～0.76
Nickel-chromium (heat resistant)	50～500	0.95～0.98
Silver		
Polished silver	100	0.05
Stainless steel		
18/8 stainless steel	25	0.16
304 (8Cr, 18Ni)	215～490	0.44～0.36
310 (25Cr, 20Ni)	215～520	0.90～0.97
Tin		
Commercial tin plate	100	0.07
Zinc		
Oxidation at 400°C	400	0.01
Galvanized bright iron plate	28	0.23
Grey zinc oxide	25	0.28

(2) Non-metal

Material	Temperature (°C)	Emissivity
Brick	1100	0.75
Firebrick	1100	0.75
Graphite (lamp black)	96～225	0.95
Enamel (white)	18	0.9
Asphalt	0～200	0.85
Glass (surface)	23	0.94
Heat-resistant glass	200～540	0.85～0.95
Wall plaster	20	0.9
Oak	20	0.9
Carbon sheet	-	0.85
Insulating sheet	-	0.91～0.94
Metal sheet	-	0.88～0.90
Glass tube	-	0.9
Coil type	-	0.87
Enamel product	-	0.9
Enamel pattern	-	0.83～0.95
Capacitor		
Rotary type	-	0.30～0.34
Ceramic (bottle type)	-	0.9
Film	-	0.90～0.93
Mica	-	0.94～0.95
Flume type mica	-	0.90～0.93
Glass	-	0.91～0.92
Semiconductor		
Transistor (plastic package)	-	0.80～0.90
Transistor (metal)	-	0.30～0.40
Diode	-	0.89～0.90
Transmitting coil		
Pulse transmission	-	0.91～0.92
Flat chalk layer	-	0.88～0.93
Top ring	-	0.91～0.92

Material	Temperature (°C)	Emissivity
Electronic materials		
Epoxy glass plate	-	0.86
Epoxy phenol plate	-	0.8
Gold-plated copper sheet	-	0.3
Solder-coated copper	-	0.35
Tin-coated lead wire	-	0.28
Copper wire	-	0.87～0.88

Raythink, sense difference