ROTHENBERGER

RO THERMAL IMAGING CAMERA

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EN Instructions for use

rothenberger.com

Part No. 1000003350
MAN00150 REV 1.00321

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1 Introduction

Thank you for purchasing our instrument. Use according to these instructions and maintain properly for optimal performance.

IMPORTANT: Please read these instructions carefully. Note the safe operational requirements, warnings & cautions. Use the product correctly and with care for the purpose for which it is intended. Failure to do so may cause damage and/or personal injury and will invalidate the warranty. Keep these instructions safe for future use.

2 General saftey

Ensure that you have read & understood the safety precautions described in the following text before using the product.

⚠ Safety warning

When using this product you must adhere to relevant practice regulations – such as Health & Safety, general workshop and local authority.

- DO familiarise yourself with the applications, limitations and potential hazards of the Thermal Imaging Camera.
- DO use the correct charging adapter that is supplied with the Thermal Imaging Camera.
- DO keep the Thermal Imaging Camera Clean and in good condition.
- DO protect the Thermal Imaging Camera from thermal shock - caused by large and/or fluctuations in temperature and high temperatures.
- DO NOT assemble or dismantle the Thermal Imaging Camera.
- DO NOT use the Thermal Imaging Camera if it is damaged.
- DO NOT get the Thermal Imaging Camera wet or use in damp or wet conditions or areas where there is condensation.
- DO NOT use the Thermal Imaging Camera for any purpose other than that for which it is designed.
- DO NOT allow untrained persons (particularly children) to operate the Thermal Camera.

- DO NOT operate the Thermal Imaging Camera when you are tired or under the influence of alcohol, drugs or intoxicating medication.

⚠ Safety warning

The warnings, cautions and instructions in this manual do not cover all possible conditions and situations that may occur. Logic and attention must be applied by the operator.

3 RO thermal imaging camera overview

The RO Thermal imaging camera Thermal Imaging Camera combines surface temperature measurement & real-time thermal imaging.

The large colour display screen provides the user with visual information based on the current activity including an on-screen curser to accurately locate temperature hotspots.

The RO Thermal imaging camera uses a data storage system allowing the user to store images on the device. These can be extracted through USB to generate reports.

Suitable for many industries including plumbing & heating (radiators, underfloor heating, energy auditing or water damage), automotive (heated seats and windows, high resistance in wiring, overheating wiring or components).

4 Maintenance

4.1 Cleaning

Use a damp cloth and light soap to clean the outer casing of the device. Don't use abradant, isopropanol or solvent to clean. The lens & screen should be cleaned with cleaning agents for professional optical glasses.

4.2 Lens maintenance

To prevent damage of the refined anti-reflective coating:

- Don't clean with force.
- Use a cleaning solution for lens maintenance, such as an alcohol-based

commercial lens cleaner & a lint-free cloth or paper towel.

- Wipe the lens surface by making circular motion. Then discard the cloth.
- If it is necessary to repeat above step, please use new cloth to dip with the cleaning solution to wipe.
- Compressed air tanks can be used to remove loose particles.

5 Batteries

5.1 How to charge batteries

- Use Micro USB cable to charge.
- The product has built-in chargeable 18650 lithium-ion batteries.
- When the battery level is low, the top right of the screen will display " ▭ ".
- Ensure that the product is turned off before charging.
- Remove the Micro USB cable after fully charging.

5.2 Optimal battery performance

- Don't charge the battery for more than 24 hours.
- To extend the battery life, charge the product for two hours at least every three months.
- Don't try to charge the battery in extremely cold conditions.

5.3 Battery disposal

This Product contains lithium-ion batteries. Always dispose of depleted batteries using approved disposal methods that protect the environment.

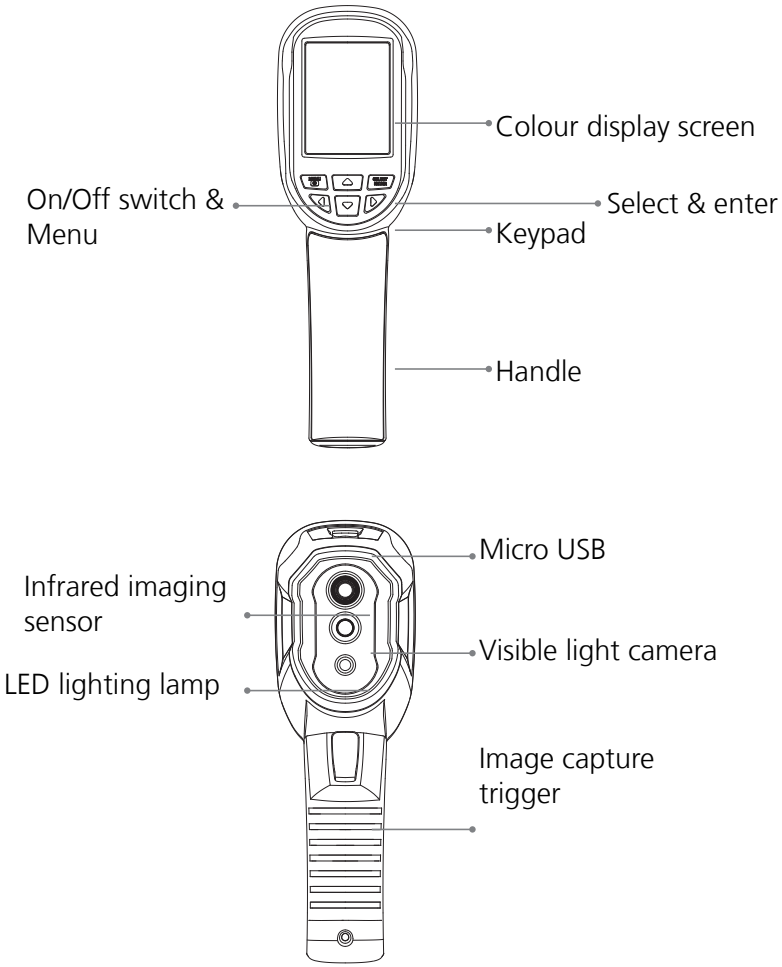
6 Specifications

Model	RO Thermal imaging camera
Display screen	2.8-inch full-view TFT display
Temperature measurement range	-20°C to 300°C (-4°F to 572°F)
Measurement accuracy	±2°C/±2% (whichever is greater)
Infrared image resolution	220×160
Visible image resolution	35200 pixel
LCD resolution	320×240
Field angle	35°×26°
Focal distance (shortest)	0.15m
Thermal sensitivity	0.07°C
Frame rate of thermal images	9Hz
Focus mode	Fixed
Wavelength coverage	8-14um
Emissivity	Adjustable from 0.01 to 1.00
Colour palette	Rainbow, iron oxide red, cold colour, black & white, white & black
Storage capacity	Built-in memory 3GB
File format	JPG
USB	Micro USB 2.0
Power supply	Built-in chargeable 18650 battery Detachable
Working time	2-3 hours
Setting command	Unit, language, date, time, information
Language	English & French
Automatic power-off time	Selectable: 5 minutes/20 minutes/ not power off automatically
Product size	96mm×72mm×226mm
Product weight	389g

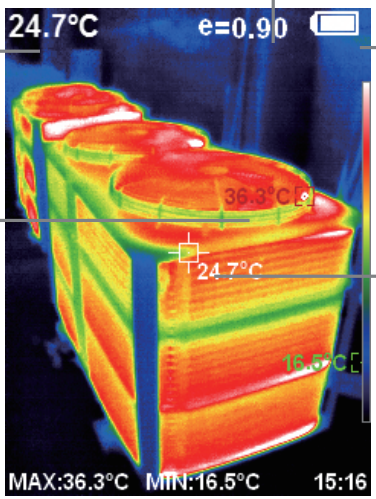
Work temperature	0°Cto 45°C
Storage temperature	-20°C to 60°C
Relative humidity	< 85%RH

This product has been tested for compliance with the following EMC Directive 2014/30/EU.

7 Layout



8 Display



8.1 Colour code

Marks the colour corresponding to the relative temperature from low to high. (See colour palette menu for more details).

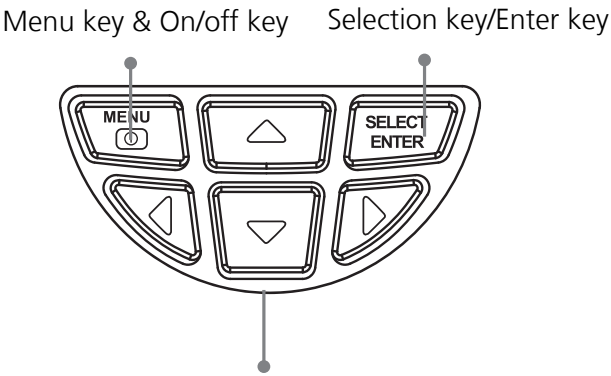
8.2 Central point temperature cursor

Indicates the central position of the screen. The temperature value is also displayed in the top left corner of the screen.

8.3 Highest point temperature cursor

Indicates the highest temperature position in the screen area. The temperature value is also displayed in the bottom left corner of the screen.

9 Keypad buttons



10 Operation

10.1 Power on/off

Press & hold the ⏻ key for 3 seconds to turn the Thermal Imaging Camera on or off.

10.2 LCD screen display

After turning on, the screen shows the thermal imaging status.

Note: Time adjustment may be required when you move the camera between environments with varying ambient temperatures.

10.3 LED light

Hold down the "image capture trigger" for 5 seconds to power on/off the LED light.

10.4 Switching between image types

Press the " ◄ " or " ► " key to switch the degree of fusion between infrared thermal images & visible images (the degree of fusion is 0%, 25%, 50%, 75% & 100%).

10.5 Image capture

Press the image capture trigger. When the capture is successful, the screen will display "store photo?". If "yes" is selected, press the "MENU/ ⓘ " key to save the image. If "no" is selected, press the " SELECT/ENTER " key to delete the image.

10.6 Hide highest & lowest temperature

Press the " ▲ " key to switch between displaying or hiding the highest & lowest temperature.

10.7 Image output

Saved images can be downloaded by connecting a computer through a Micro USB lead.

*Supported operating systems: all USB 2.0 compliant OS.

11 Menu

Press the "MENU/ ⓘ " key to access the menu bar.

11.1 Image overlapping sub menu

Image overlapping makes it easier for users to understand the infrared images by using aligned visible images & infrared images. The use of image overlapping can capture the visible image of every infrared image so as to display the temperature distribution in the target region correctly & share with other people more effectively.

11.2 Image overlapping application

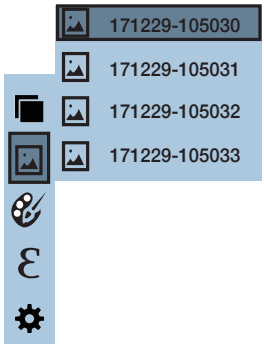
Press the "MENU/ ⓘ " key to enter the main menu, & select "▀" image registration.

Press the "SELECT/ENTER" key to enter into image overlap adjustment mode. Press the navigation keys (up, down, left & right to perform the visible image shift operation.

Press the "SELECT/ENTER" key to exit the image overlapping mode (Note: If there is no operation for more than 6 seconds, the image overlapping mode will be automatically exited).

11.3 Image submenu – view image

Press the "MENU/ ⓘ " key to enter the main menu, & select " 🖼 " image.



Press the " ▶ " key to enter image list. Then press the " ▲ " or " ▼ " key to navigate to the image you want to select. To view the image press the "SELECT/ENTER" key.

When viewing the images, press the " ◀ " key to view the previous image, Press the " ▶ " key to view the next image.

Press the "SELECT/ENTER" key to return to the previous menu and to exit the menu altogether press the "MENU/ ⓘ " key.

11.4 Deleting images

Select the image you would like to delete, the screen will show a "delete photo prompt". You can scroll through yes or no options by pressing

the " ▲ " key. To delete the image press the "MENU/ ⓘ " key when yes is selected.

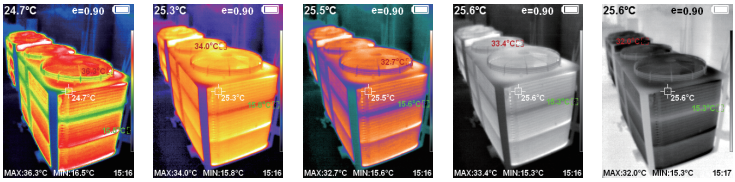
11.5 Colour palatte sub menu - description

The palette can be used to change the pseudo-colour display of the infrared image on the display. Some tune swatches are better suited for specific applications & can be set up as needed.
The palette is divided into five colour sections: rainbow, iron red, cool, white hot & black hot. These palettes work best with high thermal contrast & provide additional colour contrast between high & low temperatures.

For high heat applications the rainbow, iron oxide red & cold colour palettes are better suited as they are easy to see the contrast between high & low temperature.

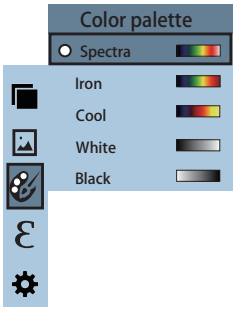
Black & white, and white & black colour palettes provide even linear colour.

The following is an image of the same object with different colour palettes.



Rainbow | Iron oxide red | Cold colour | White heat | Black heat

11.6 Application of colour palatte



Select "&" (colour palette) option & press the " ▶ " key to enter the colour palette list. Press the " ▲ " & " ▼ " keys to navigate once in the colour pallete menu. Then press the "SELECT/ENTER" key to select the colour palette you desire. Press the " ◀ " key to return.

11.7 Emissivity sub menu - description

The emissivity of the product can be adjusted from 0.01 to 1.00 with the default value of 0.95. Many common objects & materials (such as timber, water, skin & textile fabric) can reflect the heat energy effectively. So it is easy to obtain relatively correct measurement values.

The emissivity of a course surface is usually set as 0.95. For semi-matte surfaces that give out less energy, the emissivity is usually about 0.85 & the emissivity of semi-gloss surfaces is 0.6. Shiny surfaces are divided into materials with low radiation coefficient. The emissivity is usually set as 0.3 at the time of measurement.

Setting the correct value of emissivity is very important for accurate temperature measurement.
The surface emissivity will impact the surface temperature measured by the product. Understanding the surface emissivity will enable you to obtain correct the temperature measurement.

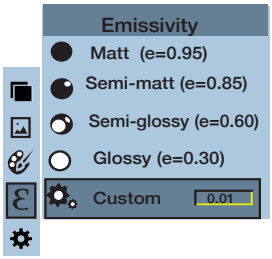
11.8 Emissivity setting

The product has four types of surface measurement modes:

- Coarse surface (0.95)
- Semi-matte surface (0.85)
- Semi-shiny surface (0.60)
- Shiny surface (0.30)

Depending on the characteristics of the measured surfaces, users may set the emissivity value through the "self-define" option (please refer to the table of "emissivity of common materials").

11.9 Application of emissivity mesurement



As shown in the figure, press "MENU/ ⓘ " key to enter the main menu & select " ε "(emissivity) option & press " ▶ " key to enter the emissivity list.
Press the "MENU/ ⓘ " key to enter the main menu & select " ε "(emissivity) option then press the " ▶ " key to enter the emissivity list.

Press the " ▲ " & " ▼ " keys to navigate the emissivity. Then press the "SELECT/ENTER" key to determine selection of the emissivity. Press the " ◀ " key to return.

If you select "self-defined" emissivity, press the "SELECT/ENTER" key to enter the editing state.

Press the " ◀ "/" ▶ " keys to change the number & press the " ▲ "/ " ▼ " keys to change the value.

After the modification is complete, press the "SELECT/ENTER" key to confirm, then press the " ◀ " to return. The "MENU/ ⓘ " button exits the menu.

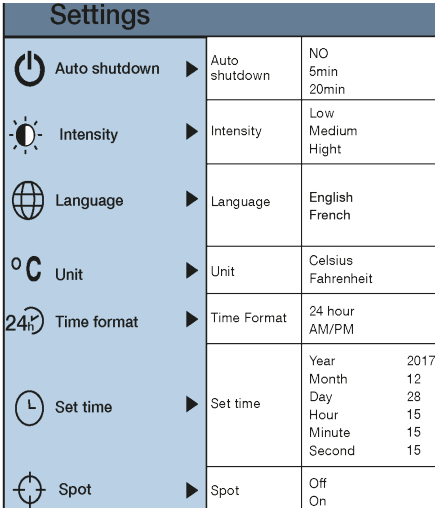
11.10 Emissivity value of common materials

Substance	Thermal radiation	Substance	Thermal radiation
Bitumen	0.90~0.98	Black cloth	0.98
Concrete	0.94	Human skin	0.98
Cement	0.96	Foam	0.75~0.80
Sand	0.90	Charcoal dust	0.96
Earth	0.92~0.96	Paint	0.80~0.95
Water	0.92~0.96	Matte paint	0.97
Ice	0.96~0.98	Black rubber	0.94

Snow	0.83	Plastic	0.85~0.95
Glass	0.90~0.95	Timber	0.90
Ceramics	0.90~0.94	Paper	0.70~0.94
Marble	0.94	Chromium hemitrioxide	0.81
Gypsum	0.80~0.90	Copper oxide	0.78
Mortar	0.89~0.91	Ferric oxide	0.78~0.82
Brick	0.93~0.96	Textile	0.90

12 Settings

Press the "MENU/ ⓘ " key to select the "⚙"(setting) option in the main menu. Press the " ▶ " key again to enter the settings sub-menu.



12.1 Auto shutdown setting

After selecting " ⓘ " automatic shutdown, press the " ▶ " key to enter the auto power shutdown setting. Can be set how long you want it to be before the Thermal Imaging Camera automatically shuts down.

12.2 Intensity setting

After selecting " ⓘ " automatic shutdown, press the " ▶ " key to enter the

auto power shutdown setting. Can be set how long you want it to be before the Thermal Imaging Camera automatically shuts down.

12.3 Language setting

After selecting " ⊕ " (Language, press the " ▶ " key to edit the language setting. Available in 2 languages: English & French.

12.4 Unit setting

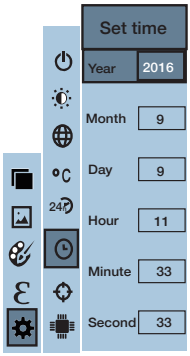
After selecting " °C " unit, press the " ▶ " key to enter the temperature unit setting. Can be set to Celsius or Fahrenheit.

12.5 Time format setting

After you select " 24h " Time format, press the " ▶ " key to enter the time format setting. Can be set to 24 hours or 12 hours.

12.6 Time & date setting

In the Set Time menu " ⏲ " you can set the time and date.



Press the " ▲ " / " ▼ " key to navigate between the year/month/day/hour/minute.

Press the "SELECT/ENTER" key to enter editing mode.

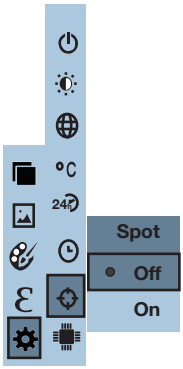
Press the " ◀ " & " ▶ " keys to select the parameter to be changed. Press "

▲ " & " ▼ " key to change the value. After completing the change, press the " SELECT/ENTER" key to enter.

After setting, press the " ◀ " key to exit.

12.7 Enable/disable hotspot cursor

In the cold hotspot menu " ⌖ " you can toggle the hotspot on or off.



Press the " ▲ " / " ▼ " keys to either enable or disable the option. Then press the " SELECT/ENTER " key to determine selection.

After setting, press the " ◀ " key to exit.

13 Troubleshooting

If you encounter any problems when using the thermal imaging camera please use the following table for repair. If the problems are not solved, please cut off the power supply & contact with the manufacturer.

Failure type	Failure cause	Solution
The thermal imaging camera will not power on	The battery is not installed	Install the battery correctly
	The battery is flat	Replace with new battery or charge
The thermal imaging device powers off automatically	The battery is flat	Replace with new battery or charge
	The product is set to power off automatically	Check the Auto Shutdown setting (refer to section 5.1)

14 EU declaraton of conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer:-

Kane International Ltd.
Kane House, 11 Bessemer Road, Welwyn Garden City, Hertfordshire. AL7 1GF, UK.

Tel: +44 1707 375550 Web: www.kane.co.uk

The KANE T-CAM is in conformity with the relevant Union harmonization legislation below:

DIRECTIVE	TITLE
201430EU	Electromagnetic Compatibility (EMC)
201165EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

The following harmonised standards and technical specifications have been applied:

CERTIFICATION
The KANE T-CAM is tested to the following standards

EMC
EN61326-1:2013

SAFETY
EN61010-1:2010 + A1:2019

ROHS
IEC62321-2:2013, IEC62321-1:2013, IEC62321-3-1:2013, IEC62321-5:2013, IEC62321-4:2013, IEC62321-7-2:2017, IEC62321-7-1:2015, IEC62321-6:2015

Signed for on behalf of:- Kane International Ltd.
11 August 2020

Paul Morrison
Engineering Manager

4 Register your RO TCAM

Register your RO TCAM to create your KAM dashboard:

- ★ Simple online booking on www.kane.co.uk
- ★ Automatic reminder when due for recertification
- ★ **FREE POSTAGE** returning your Rothenberger analyser
- ★ **SAME DAY** annual FGA recertification **OR YOUR MONEY BACK***

Please register your RO TCAM at www.kane.co.uk

PLEASE READ ALL SAFETY WARNINGS IN THE MANUAL

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