R2020

REED INSTRUMENTS

Video Infrared Thermometer

Instruction Manual

REED Instruments
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Introduction

Thank you for purchasing your REED R2020 Video Infrared Thermometer. Please read the following instructions carefully before using your instrument. By following the steps outlined in this manual your meter will provide years of reliable service.

Product Quality

This product has been manufactured in an ISO9001 facility and has been calibrated during the manufacturing process to meet the stated product specifications. If a certificate of calibration is required please contact the nearest authorized REED distributor or authorized Service Center. Please note an additional fee for this service will apply.

Safety

Never attempt to repair or modify your instrument. Dismantling your product, other than for the purpose of replacing batteries, may cause damage that will not be covered under the manufacturer's warranty. Servicing should only be provided by an authorized service center.

Features

- Dual lasers assist with target area identification
- 50:1 distance to spot size ratio
- Take photos and record video with built-in camera
- Datalogging capabilities include on-screen graphing with time and date stamp
- Digitally adjustable emissivity
- Type K thermocouple input for contact measurement
- Ambient air temperature, humidity, dew point and wet bulb temperature measurement
- Max, min, avg and differential readings
- High and low alarms
- Trigger lock feature for continuous monitoring
- Export data to PC with included USB cable (no software required)

Specifications

IR Temperature

Range:	-58 to 3992°F (-50 to 2200°C)
Accuracy:	-58 to 68°F (-50 to -20°C): ± 6.3°F(3.5°C) 68 to 932°F (20 to 500°C): ±1% rdg. +1.8°F (1.0°C) 932 to 1832°F (500 to 1000°C): ±1.5% rdg. 1832 to 3992°F (1000 to 2200°C): ±2.0% rdg.
Resolution:	0.1°F (0.1°C)

Contact Type K T/C Temperature

Range:	-58 to 2498°F (-50 to 1370°C)
Accuracy:	-58 to 32°F (-50 to 0°C): ±4. 5°F (2.5°C) 32 to 2498°F (0 to 1370°C): ±0.5% rdg. + 2.7°F (1.5°C)
Resolution:	0.1°F (0.1°C)

Ambient Temperature

Range:	32 to 122°F (0 to 50°C)
Accuracy:	50 to 104°F (10 to 40°C): ±0.9°F (0.5°C) >104°F (40°C): ±1.8°F (1.0°C)

Dewpoint and Wet Bulb Temperature

Range:	32 to 122°F (0 to 50°C)
Accuracy:	<40°C: ±0.9°F (0.5°C) >40°C: ± 1.8°F (1.0°C)

Relative Humidity

Range:	0 to 100% RH
Accuracy:	0 to 20%: ±5% 20 to 40%: ±3.5% 40 to 60%: ±3% 60 to 80%: ±3.5% 80 to 100%: ±5%

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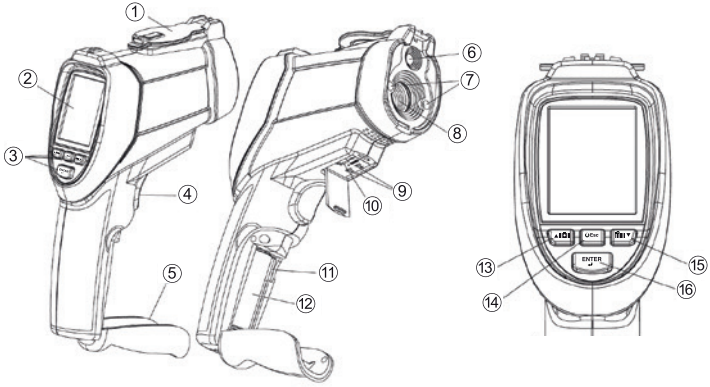
General Specifications

Optical Resolution (D:S):	50:1
Dual Laser:	Yes
Spectral Response:	8 to 14µm
Emissivity:	0.1 to 1.0 (Adjustable)
Response Time:	150ms
Display Size/Type:	2.2" TFT Color LCD
Backlit Display:	Yes
Display Hold:	Yes
High/Low Alarms:	Yes (Audible (beep) and visual (on-screen))
Max/Min:	Yes
Average and Differential:	Yes
Datalogging Capabilities:	Yes
F/C Switchable:	Yes
Trigger Lock:	Yes
Autoshut off:	Yes (adjustable 3,15,60 minutes)
Internal Memory:	Yes (72mb), Expandable with micro SD card
Thermocouple Input:	Yes
Tripod Mountable:	Yes
Laser Class:	Class II
Low Battery Indicator:	Yes
Power Supply:	Li-Ion rechargeable battery
Battery Life:	Approx. 4 hours continuous use
Battery Charge Time:	Approx. 2 hours
Product Certifications:	CE, RoHS
Operating Temperature:	32 to 122°F (0 to 50°C)
Storage Temperature:	-4 to 140°F (-20 to 60°C)
Operating Humidity Range:	10 to 90%
Dimensions:	8.1 x 2.4 x 6.1" (205 x 62 x 155mm)
Weight:	14.5oz (410g)

Included

- Type K Thermocouple Probe
- AC Adapter
- USB Adapter
- Mini-Tripod
- Hard Carrying Case
- Li-ion Rechargeable Battery

Instrument Description



1. Lens Cover
2. LCD Display
3. Front Panel
4. Trigger
5. Battery Cover
6. Camera
7. Laser
8. IR Sensor
9. Type-K Thermocouple Jack
10. USB Computer Interface Jack
11. Micro SD Memory Card Slot
12. Battery
13. Up/Picture Button
14. Power/ESC Button
15. Down/Video Button
16. Enter Button

Operating Instructions

Main Menu

1. When you turn the meter on you will enter the main menu screen by default.
2. Press the ▲ and ▼ buttons to scroll through the following parameters.

IR Camera Mode	Data Logger Mode
IR Measurement Mode	Media Gallery
Dew Point Measurement Mode	Settings

3. Once the appropriate parameter has been selected follow the associated instructions below.

IR Camera Mode

The IR Camera mode measures IR temperature, air temperature, relative humidity, dew point, temperature, and wet bulb temperature while having the video camera on.

1. Press the **ENTER** button when "IR Camera" is highlighted to enter IR camera mode.
2. Once the measurement settings are configured (see *Measurement Settings* section for details), press and hold the trigger to take a measurement.

Note: This mode allows a user to take pictures and videos.

3. Press the picture button to take a picture of the current image and readings displayed on the screen.
4. Save the picture by pressing the ▲ button or delete the picture by pressing the ▼ button.
5. To take a video, press the VIDEO button to begin recording.
6. The meter will record video while continuously taking readings.
7. When complete, press the VIDEO button again to stop recording.
8. Press the **ESC** button to exit IR camera mode and return to the main menu screen.

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IR Measurement Mode

The IR Measurement mode measures IR temperature, air temperature, relative humidity, Dew point temperature, and wet bulb temperature without the video camera capabilities.

1. Press the **ENTER** button when "IR Measure" is highlighted to enter IR measurement mode.
2. Once the measurement settings are configured (see *Measurement Settings* section for details), press and hold the trigger to take a measurement.

Note: This function is best suited for quick measurements.

Dew Point Measurement Mode

The Dew Point Measurement mode measures IR temperature, air temperature, relative humidity, Dew point temperature, and wet bulb temperature. The bottom gradient bar displays the current temperature/ dew point percentage ratio.

1. Press the **ENTER** button when "DEWPOINT" is highlighted to dew point measurement mode.
2. Once the measurement settings are configured (see *Measurement Settings* section for details), press and hold the trigger to take a measurement.

Data Logger Mode

The data logger mode automatically records IR Temperature readings and high/low alarms to memory at user programmable intervals (see *Measurement Settings* section for details).

1. Press the **ENTER** button when "DATALOGGER" is highlighted to enter data logger mode.
2. Once the measurement settings are configured, press the trigger to start logging at the set interval (see *Measurement Settings* section for details).
3. When completed, press the **ESC** button to exit the data logger mode which will automatically save the data to a file.

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Media Gallery

The media gallery mode allows a user to view the saved pictures, videos or logs.

1. Press the **ENTER** button when "GALLERY" is highlighted to enter the saved media gallery.
2. Press the ▲ and ▼ buttons to scroll through the media gallery folders (Video, Picture or logs).
3. Once the appropriate folder has been selected follow the associated instructions below.

Viewing Saved Pictures

1. Press the **ENTER** button when "Picture" is highlighted to enter the saved pictures gallery.
2. Press **ENTER** again to view the picture thumbnails.
3. Press the ▲ and ▼ buttons to scroll through the picture thumbnails.
4. Press the **ENTER** button to view the selected picture in full screen

Note: A user can also scroll through the pictures by pressing the ▲ or ▼ buttons when viewing a picture in full screen.

5. To delete a picture, press the **ENTER** button twice when viewing a picture in full screen.
6. Press the ▲ and ▼ buttons to select between "Yes" or "No" and press the **ENTER** button to confirm selection.
7. Press the **ESC** button twice to exit the picture thumbnails and return to the media gallery folders.

Viewing Videos

1. Press the **ENTER** button when "Video" is highlighted to enter the saved videos gallery.
2. Press **ENTER** again to view the video thumbnails.
3. Press the ▲ and ▼ buttons to scroll through the video thumbnails.
4. Press the **ENTER** button to play the selected video.

Note: A user can also scroll through the saved videos by pressing the ▲ or ▼ buttons twice when playing a video.

5. To delete a selected video, press and hold the **ENTER** button while in video thumbnails.

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6. Press the ▲ and ▼ buttons to select between "Yes" or "No" and press the **ENTER** button to confirm selection
7. Press the **ESC** button twice to exit the video thumbnails and return to the media gallery folders.

Viewing Logs

1. Press the **ENTER** button when "Logs" is highlighted to enter the saved logs gallery.
2. Press the ▲ and ▼ buttons to scroll through the logs thumbnails.
3. Press the **ENTER** button to display the selected log in graphical form.
4. To delete a log, press and hold the **ENTER** button while in the logs thumbnails.
5. Press the ▲ and ▼ buttons to select between "Yes" or "No" and press the **ENTER** button to confirm selection.
6. Press the **ESC** button to exit the logs thumbnails and return to the media gallery folders.

Transfer files to a PC

You can save data directly on to the meter (Flash) or on a micro SD card (see *Setting the Memory to Flash or Micro SD* in system settings for details). To transfer the information to a PC you can do so by the included USB cable or you can insert the optional micro SD card into a computer. If the USB cable is used, the USB symbol will appear in the display and the computer will recognize the unit as a removable drive.

Once installed, open the drive to view the three folders:

1. LOGS: Logs will be saved as *.txt files
2. PICTURE: Pictures will be saved as *.jpg files
3. VIDEO: Videos will be save as *.MP4 files

Note: No software is necessary to view the saved data, simply click and drag your data from the device on to your desktop or open directly from any of the folders.

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System Settings

1. While in the main menu screen, press the **ENTER** button when "Settings" is highlighted to enter system settings.
2. Press the ▲ and ▼ buttons to scroll through the following parameters.

Parameter	Description
Languages	Set the language
Date/Format	Setting the date and date format
Time/Format	Setting the time and time format
Units	Selecting the temperature unit of measure
Memory	Setting the memory to Flash or micro SD
Beeper	Enable or Disable the audible beep
Auto screen-off	Enable or disable the auto-screen off function
Auto power-off	Enable or disable the auto-power off function
System Default Setting	Restores the R2020 to its default settings

3. Once the appropriate parameter has been selected follow the associated instructions below.

Setting the Language

1. Press the **ENTER** button when "Languages" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to scroll through the list of languages.
3. Press the **ENTER** button to confirm selection.
4. Press the **ESC** button to exit the Languages function and return to system settings.

Setting the Date and Date Format

1. Press the **ENTER** button when "Date/Format" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to select the desired format for the date.
3. Press the **ENTER** button to confirm selection.

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4. Once the format has been chosen, press the ▲ and ▼ buttons to select the day, month and year while pressing the **ENTER** button to confirm each entry.
5. Press the **ESC** button to exit the date/format function and return to system settings.

Setting the Time and Time Format

1. Press the **ENTER** button when "Time/Format" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to select the desired format for the time.
3. Press the **ENTER** button to confirm selection.
4. Once the format has been chosen, press the ▲ and ▼ buttons to select the minute, hour, and AM/PM (if applicable) while pressing the **ENTER** button to confirm each entry.
5. Press the **ESC** button to exit the date/format function and return to system settings.

Selecting the Temperature Unit of Measure

1. Press the **ENTER** button when "Units" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to select between °C and °F.
3. Press the **ENTER** button to confirm selection.
4. Press the **ESC** button to exit the temperature unit of measure function and return to system settings.

Setting the Memory to Flash or Micro SD

1. Press the **ENTER** button when "Memory" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to select between Flash and SD Card.
3. Press the **ENTER** button to confirm selection.
4. Press the **ESC** button to exit the memory function and return to system settings.

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Enable or Disable the Audible Beep

1. Press the **ENTER** button when "Beeper" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to select between "On" or "Off".
3. Press the **ENTER** button to confirm selection.
4. Press the **ESC** button to exit the audible beep function and return to system settings.

Enable or Disable the Auto-Screen off Function

1. Press the **ENTER** button when "Auto Screen-Off" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to select between "Disable", "20 seconds", "1 minute" or "3 minutes".
3. Press the **ENTER** button to confirm selection.
4. Press the **ESC** button to exit the auto screen-off function and return to system settings.

Enable or Disable the Auto-Power off Function

1. Press the **ENTER** button when "Auto Power-Off" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to select between "Disable", "3 minutes", "15 minutes", or "60 minutes".
3. Press the **ENTER** button to confirm selection.
4. Press the **ESC** button to exit the auto power-off function and return to system settings.

Restoring Default Settings

1. Press the **ENTER** button when "System Default Settings" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to select between "Yes" or "No".
3. Press the **ENTER** button to confirm selection.
4. Press the **ESC** button to exit the restoring default settings function and return to system settings.

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Measurement Settings

1. While taking a measurement, press the **ENTER** button to open the "Measurement Settings" menu.
2. Press the ▲ and ▼ buttons to scroll through the following parameters.

Parameter	Description
Emissivity	Adjusting the emissivity value
Alarm High	Setting high temperature alarm
Alarm Low	Setting low temperature alarm
Laser	Enable or Disable the laser indicator
Auto Mode	Enable or disable automatic measurement mode
Max/Min	Enable or disable Max/Min Temperature values
Average Dif	Display air temperature and relative humidity values
Ambient Temp	Display the dew point and wet bulb temperature values
Type k	Enable or disable the type K thermocouple input
Color	Setting the font color
Logs Time	Set the logs time sampling rate

3. Once the appropriate parameter has been selected, follow the associated instructions below.

Adjusting Emissivity

1. Press the **ENTER** button when "Emissivity" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to scroll through the pre-set list of emissivity matching the material being measured or select ε=0.94 to set the emissivity manually using the ▲ and ▼ buttons (refer to *Emissivity Chart* section details).
3. Press the **ENTER** button to confirm your pre-set selection value or press the **ESC** button to exit and save the manual emissivity value (if applicable).
4. Press the **ESC** button to exit the emissivity function and return to measurement settings.

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Setting the High Alarm Value

1. Press the **ENTER** button when "Alarm High" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to enable, disable or set the alarm value.
3. Press the **ENTER** button to confirm selection.
4. Press the ▲ and ▼ buttons to adjust the value (if applicable).
5. Press the **ESC** button to save and exit the high alarm value (if applicable).
6. Press the **ESC** button to exit the high alarm function and return to measurement settings.

Setting the Low Alarm Value

1. Press the **ENTER** button when "Alarm Low" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to enable, disable or set the alarm value.
3. Press the Enter button to confirm selection.
4. Press the ▲ and ▼ buttons to adjust the value (if applicable).
5. Press the **ESC** button to save and exit the low alarm value (if applicable).
6. Press the **ESC** button to exit the low alarm function and return to measurement settings.

Laser Indicator

While "Laser" is highlighted in measurement settings, press the **ENTER** button to enable or disable the laser.

Automatic Measurement Mode

While "Auto Mode" is highlighted in measurement settings, press the **ENTER** button to enable or disable automatic measurement mode.

Max/Min Temperature Values

While "Max/Min" is highlighted in measurement settings, press the **ENTER** button to set the MAX/MIN mode ON or OFF. The MAX/MIN mode displays the highest (MAX) and lowest (MIN) IR temperature values.

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Average/Differential IR Temperature Values

While "Average/Dif" is highlighted in measurement settings, press the **ENTER** button to set the average and differential IR temperature values ON or OFF.

Dew-point/Wet Bulb Temperature Values

While "Ambient Temp/%RH" is highlighted in measurement settings, press the **ENTER** button to set the dew point and wet bulb temperature values ON or OFF.

Type K Input

While "Type K" is highlighted in measurement settings, press the **ENTER** button to enable or disable the Type k contact thermocouple input.

Color

1. Press the **ENTER** button when "Color" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons choose a font color.
3. Press the **ESC** button to save the selection and return to measurement settings.

Logs Time

1. Press the **ENTER** button when "Logs Time" is highlighted to enter the appropriate function.
2. Press the ▲ and ▼ buttons to adjust the logs time sampling rate from 1 to 60s.
3. Press the **ESC** button to save the selection and return to measurement settings.

Battery Charging and Replacement

When the battery is empty, recharge the Lithium ion 3.7V/1400mAh rechargeable battery. Connect the USB battery cable to the mini USB jack located above the measurement trigger and then connect the other end of the cable to an AC source or computer.

Applications

- Verify mechanical (bearings, motors) or electrical (circuit breaker boxes) equipment
- Calibration and control of heater and oven temperatures
- Monitoring materials in processes involving heating and/or cooling
- Quality control monitoring
- Research and development applications
- Automotive diagnostics
- Conduct HVAC energy audits to determine leaks, infiltration

Appendix: Emissivity Chart

Emissivity is a term used to describe the energy-emitting characteristics of materials. Most (90% of typical applications) organic materials and painted or oxidized surfaces have an emissivity of 0.95.

Inaccurate readings will result from measuring shiny or polished metal surfaces. To compensate, cover the surface to be measured with masking tape or flat black paint. Allow time for the tape to reach the same temperature as the material underneath it. Measure the temperature of the tape or painted surface.

Measured Surfaces	Emissivity
Metal	
Aluminum: Oxidization	0.2-0.4
A3003 Alloy: Oxidization, Rough	0.3, 0.1-0.3
Brass: Burnishing, Oxidization	0.3, 0.5
Copper: Oxidization, Electric Temrinal Board	0.4-0.8, 0.6
Hastelloy: Alloy	0.3-0.8
Inconel: Oxidization, Sand-Blasting, Electro Burnishing	0.7-0.95, 0.3-0.6, 0.15

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Iron: Oxidization, Rusting	0.5-0.9, 0.5-0.7
Iron (Casting): Oxidization, Non-Oxidization, Casting	0.6-0.95, 0.2, 0.2-0.3
Iron (Forging): Passivation	0.9
Lead: Rough, Oxidization	0.4, 0.2-0.6
Molybdenum: Oxidization	0.2-0.6
Nickel: Oxidization	0.2-0.5
Platinum: Black	0.9
Measured Surfaces	**Emissivity**
Steel: Cold Rolling, Steel Plate Burnishing, Steel Plate Rubbing	0.7-0.9, 0.4-0.6, 0.1
Zinc: Oxidization	0.1
Non-Metal	
Asbestos	0.95
Asphalt	0.95
Basalt	0.7
Carbon: Non-Oxidization, Graphite, Silicone Carbide	0.8-0.9, 0.7-0.8, 0.9
Ceramics	0.95
Clay	0.95
Concrete	0.95
Cloth	0.9
Glass: Convex, Smooth, Lead-Boron	0.76-0.8, 0.92-0.94, 0.78-0.82
Plates	0.96
Stone Products	0.93

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Plaster	0.8-0.95
Ice	0.98
Limestone	0.98
Paper	0.95
Plastics	0.95
Water	0.93
Soil	0.9-0.98
Wood	0.9-0.95

Accessories and Replacement Parts

R8888 Deluxe Hard Carrying Case

R1500 Lightweight Tripod

SD-MINI(8GB) Micro SD Memory Card

TP-01 Beaded Thermocouple Wire Probe

R2920 Surface Thermocouple Probe

R2930 Right Angle Thermocouple Surface Probe

R2940 Air/Gas Thermocouple Probe

R2950 Immersion Thermocouple Probe

R2960 Needle Tip Thermocouple Probe

Don't see your part listed here? For a complete list of all accessories and replacement parts visit your product page on www.reedinstruments.com.

Product Care

To keep your instrument in good working order we recommend the following:

- Store your product in a clean, dry place.
- Change the battery as needed.
- If your instrument isn't being used for a period of one month or longer please remove the battery.
- Clean your product and accessories with biodegradable cleaner. Do not spray the cleaner directly on the instrument. Use on external parts only.

Product Warranty

REED Instruments guarantees this instrument to be free of defects in material or workmanship for a period of one (1) year from date of shipment. During the warranty period, REED Instruments will repair or replace, at no charge, products or parts of a product that proves to be defective because of improper material or workmanship, under normal use and maintenance. REED Instruments total liability is limited to repair or replacement of the product. REED Instruments shall not be liable for damages to goods, property, or persons due to improper use or through attempts to utilize the instrument under conditions which exceed the designed capabilities. In order to begin the warranty service process, please contact us by phone at 1-877-849-2127 or by email at info@reedinstruments.com to discuss the claim and determine the appropriate steps to process the warranty.

Product Disposal and Recycling

Please follow local laws and regulations when disposing or recycling your instrument. Your product contains electronic components and must be disposed of separately from standard waste products.

Product Support

If you have any questions on your product, please contact your authorized REED distributor or REED Instruments Customer Service by phone at 1-877-849-2127 or by email at info@reedinstruments.com.

Please visit **www.REEDINSTRUMENTS.com** for the most up-to-date manuals, datasheets, product guides and software.

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