

# Raynger® Series 3i Plus

Handheld Infrared Thermometer













## Operating Instructions





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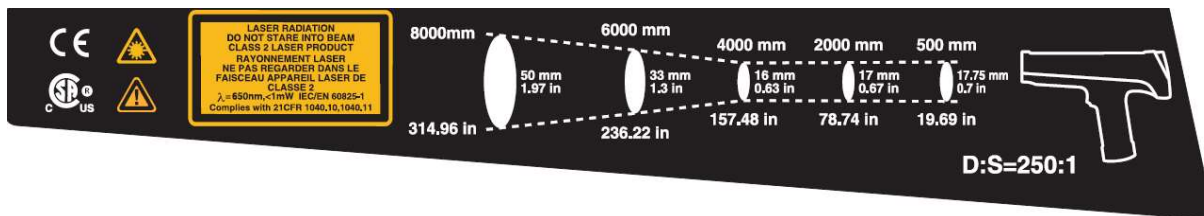
## Safety Symbols

	Risk of danger. Important information. See manual.
	Hazardous voltage. Risk of electrical shock.
	Warning Laser.
	Helpful information regarding the optimal use of the instrument.
°C	Celsius
°F	Fahrenheit
 Li-Ion	Lithium-Ion Battery
	This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that user must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as Category 9 "Monitoring and Control Instrumentation." Do not dispose of this product as unsorted municipal waste. Go to Fluke's website for recycling information.
<b>RoHS</b>	Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment
	Conforms to European Union directive.
 沪制01120009号	Conforms to China Metrology Certification CMC mark with Implement standard Q/SXAV 16
	Conforms to Canadian Standards Association Certification.
	Electromagnetic Compatibility Applies to use in Korea only. Class A Equipment (Industrial Broadcasting & Communication Equipment) This product meets requirements for industrial (Class A) electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and is not to be used in homes.

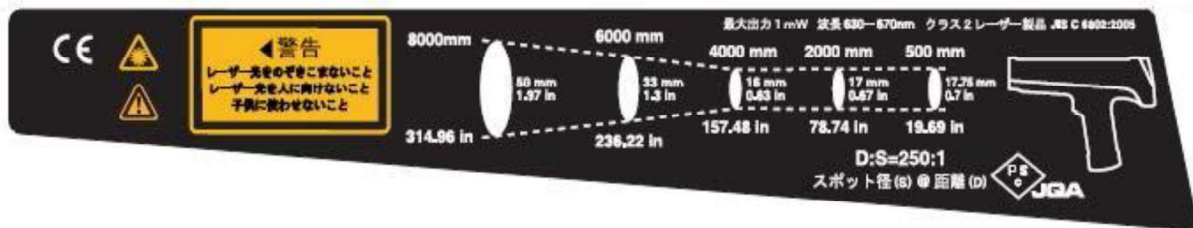
## Safety Instructions

	<p>Class A digital device: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.</p>
	<p>Conforms to the Appliance Efficiency Regulation (California Code of Regulations, Title 20, Sections 1601 through 1608) for small battery charging systems</p>

See figure below for the safety markings.



For Japanese versions:



Model	Temperature	Optics	Spectral	Sighting	Bluetooth
RAYR3IPLUSNBT1MLJP	700 to 3000°C (1292 to 5432°F)	250:1	1 µm	Dual laser	No
RAYR3IPLUSNBT1MSCLJP	700 to 3000°C (1292 to 5432°F)	250:1	1 µm	Dual laser + scope	No
RAYR3IPLUSNBT2MLJP	400 to 2000°C (752 to 3632°F)	250:1	1.6 µm	Dual laser	No
RAYR3IPLUSNBT2MSCLJP	400 to 2000°C (752 to 3632°F)	250:1	1.6 µm	Dual laser + scope	No



## Warnings

A warning identifies conditions and procedures that are dangerous to the user.

To prevent possible electrical shock, fire, or personal injury follow these guidelines:

- Read all safety information before you use the product.
- Use the product only as specified, or the protection supplied by the product can be compromised.
- Do not use the product around explosive gas, vapor, or in damp or wet environments.
- Do not use the product if it operates incorrectly.
- See emissivity information for actual temperatures. Reflective objects result in lower than actual temperature measurements. These objects pose a burn hazard.
- Do not look directly into the laser with optical tools (for example, binoculars, telescopes, microscopes). Optical tools can focus the laser and be dangerous to the eye.
- Do not look into the laser. Do not point laser directly at persons or animals, or indirectly off reflective surfaces.
- Use the product only as specified, or hazardous laser radiation exposure can occur.
- Do not use laser viewing glasses as laser protection glasses. Laser viewing glasses are used only for better visibility of the laser in bright light.
- Do not open the product. The laser beam is dangerous to eyes. Have the product repaired only through an approved technical site.
- Have an approved technician repair the product.

## Cautions

A caution identifies conditions and procedures that can cause damage to the instrument or the equipment under test.

For safe operation and maintenance of the product:

- Remove the batteries if the product is not used for an extended period of time, or if stored in temperatures above 50°C (122°F). If the batteries are not removed, battery leakage can damage the product.
- Recharge the batteries when the low battery indicator appears to prevent incorrect measurements.
- Have the product repaired before use if the batteries leak.
- Do not short the battery terminals.
- Do not keep cells or batteries in a container where the terminals can be shorted.
- Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.

To avoid damage to the product or the equipment under test, protect them from:

- EMF (electro-magnetic fields) from arc welders, induction heaters, etc.
- Static electricity

# Safety Instructions

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## Battery Warning

The battery is a safety device. Do not attempt to disassemble or alter the battery. Always observe the following precautions:

- Do not short-circuit the battery by directly connecting the negative terminals with positive terminal.
- Do not heat the battery or discard it in a fire.
- Do not expose the battery to temperatures over 50°C (122°F). Keep the battery away from fire and other heat sources.
- Do not charge the battery near a heat source, such as, a fire or heater.
- Do not leave the battery in direct sunlight.
- Do not pierce the battery with a sharp object, hit or step on it.
- Do not use a damaged battery.
- Do not apply solder to a battery.
- Do not connect the battery to an electrical power outlet.

To prevent the battery bursting, igniting, or fumes from the battery causing equipment damage, always observe the following precautions:

- Do not immerse the battery in water or allow it to get wet.
- Do not place the battery in a microwave oven or pressurized container.
- If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, immediately remove and stop using it.



## Instrument

- If the unit is exposed to significant changes in ambient temperature (hot to cold or cold to hot), allow 30 minutes for temperature stabilization before taking measurements.
- Do not operate the unit near large electrical or magnetic fields such as arc welders and induction heaters. These fields can cause measurement errors.
- For the short wavelength units (e.g., 1.0  $\mu\text{m}$  and 1.6  $\mu\text{m}$ ) — avoid taking temperature measurements in bright sunlight. High levels of ambient light may produce apparently valid high-temperature readings when no target is in the thermometer's field-of-view.

## 3.4 Electrical Specifications

<b>Power Supply</b>	Battery or USB
<b>Battery</b>	Lithium-ion, single cell, 3.6 V, 2500 mAh
<b>Battery Life<sup>1</sup></b>	24 h
<b>USB</b>	Version 2.0, Mini USB (type B)
<b>Bluetooth</b>	Version 4.0 (for Bluetooth models only) using Fluke 521-4006 module specified as following:

Item	Specifications
Frequency	2402 MHz in 2 MHz steps
Data Rate and Modulation	1Mbps, GFSK
Number of Channels	40:37 data / 3 advertising (0,12,39)
Receive Sensitivity (w/ chip antenna)	-95 / -89 dBm
Output Power	-23 to 4 dBm
Link Budget	Up to 99 dB
RX/TX Turnaround	150 $\mu$ s



Figure 3: Bluetooth Specification

<sup>1</sup> Laser: off, Bluetooth: off

# Appendix

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## 10.3 Compliance Standards

**IEC 61010-1** Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use -- Part1: General Requirements

**IEC 60529** Degrees of Protection Provided by Enclosures (IP Code)

**EN 61326-1** Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements --- Part1 : General Requirements

**EN 61326-2-2** Electrical Equipment for Measurement, Control and Laboratory Use --EMC Requirements – Part 2-2 : Particular Requirements – Test Configurations, Operational Conditions and Performance Criteria for Portable Test, Measuring and Monitoring Equipment Used in Low-Voltage Distribution Systems

**CISPR 11** Industrial, Scientific and Medical Equipment –Radio-Frequency Disturbance Characteristics –Limits and Methods of Measurement

**EN 60825-1** Safety of Laser Products – Part 1 : Equipment Classification and Requirements

**FDA 21 CFR 1040.10, 1040.11 with Laser Notice 50** Performance Standards for Light-Emitting Products ---Laser Products

**IEC 62133** Secondary Cells and Batteries Containing Alkaline or other non-acid Electrolytes — Safety Requirements for Portable Sealed Secondary Cell, and for Batteries Made from Them, for Use in Portable Applications

**UN 38.3** Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria –Lithium Batteries

**EN 300328** Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Wideband Transmission System; Data Transmission Equipment Operating in the 2.4 GHz ISM Band and Using Wide Band Modulation Techniques; Harmonized EN Covering Essential Requirements under Article 3.2 of the R&TTE Directive