GENERAL®

50:1 ULTRA WIDE-RANGE DATA LOGGING IR THERMOMETER WITH "K" PORT

USER'S MANUAL

IRT855DL

Please read this manual carefully and thoroughly before using this product.

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INTRODUCTION

Thank you for purchasing General Tools & Instruments' IRT855DL 50:1 Ultra Wide-Range Data Logging IR Thermometer with "K" Port. Please read this user's manual carefully and thoroughly before using the instrument.

The IRT855DL measures surface temperature using either of two methods: non-contact (using an IR thermometer with a laser pointer) or contact (using a "K" type thermocouple). A "K" type bead thermocouple with a measurement range of -40° to 500°F (-40° to 260°C) is included in the package. Non-contact measurements made by the IRT can be adjusted for the emissivity of the surface, increasing the accuracy of readings.

The instrument automatically stores (records) up to 100 temperature readings in nonvolatile memory for later recall. During a single scanning session, the IRT855DL can simultaneously display real-time measurements on a primary (larger) readout and the maximum, minimum or average measurement, or the largest difference between measurements, during that session on a secondary (smaller) readout. Its range and D:S ratio make this IRT suitable for use in superheated and subcooled applications.

KEY FEATURES

- Extremely wide measurement range   • Adjustable emissivity   • Laser pointer
- Includes "K" port and "K" type bead thermocouple for making contact surface temperature measurements
- Includes USB port and cable and PC interface-data logging software on mini-disc
- Releasing trigger holds measurement
- Can store and recall up to 100 temperature readings
- Min/Max/Avg/Dif displays   • Adjustable Hi and Lo temperature alarm setpoints
- Large backlit LCD w/dual 4-digit readouts
- Auto power off (can be disabled for data logging and is automatically disabled in measurement lock mode)
- °C/°F and laser on/off buttons   • Low battery indicator

SAFETY INSTRUCTIONS

WARNING!

The IRT855DL is a Class 2 laser product that emits less than 1mW of radiation at a wavelength between 630 and 670nm. Avoid looking directly at the laser pointer. U.S. law prohibits pointing a laser beam at aircraft; doing so is punishable by a fine of up to $10,000 and imprisonment.

The laser may cause discomfort if viewed directly. Your eyes' natural aversion reflex will prevent you from looking at the beam long enough to cause harm. As a precaution, keep the IRT855DL out of the hands of children, especially if you have pets.

Never stare at the laser beam through binoculars or a magnifying glass.

Do not operate the IRT in the presence of flammable or explosive gases or in environments full of dust or static electricity.

Do not operate the unit near a source of a strong electromagnetic field, such as an arc welder or an induction heater.

Be careful not to burn yourself when attaching the bead thermocouple probe to a hot surface.

WHAT'S IN THE PACKAGE

The IRT855DL comes in a custom metal carrying case inside a cardboard box. Also in the case are:

- A "K" type bead thermocouple with a range of -40° to 500°F (-40° to 260°C)
- A cable with a full-size USB plug at one end and a micro-USB plug at the other
- PC interface-data logging software on a mini-disc
- (1) "9V" battery   • This user's manual   • A 9V AC adaptor

PRODUCT OVERVIEW

Fig. 1 shows all of the controls, indicators and physical structures of the IRT855DL. Fig. 2 shows all possible indications on the LCD. Familiarize yourself with the position and meaning of all buttons, indicators, physical structures and display indications before moving on to the Setup Instructions and Operating Instructions.

A. LCD

B. ☀/▲. Used to turn laser pointer on and off. Also used to increment number of selected memory storage location and value of High and Low alarm setpoint.

C. **MODE** button. Used to choose Min, Max, Dif or Avg value for display on secondary readout. Also used to save emissivity setting.

D. ☼/▼. Used to turn backlight on and off. Also used to decrement number of selected memory storage location and value of High and Low alarm setpoint.

E. **°C/°F** button. Toggles between two measurement units.

F. **SEL** button. Enables display of temperature value measured by "K" type probe on primary readout. Also used to view and adjust values of ε (emissivity setting) and **HAL** and **LAL** (Hi and Low temperature alarm setpoints)

G. **MEM** button. Used to store measurements in on-board memory. Also used to save /settings of ε, **HAL** and **LAL**.

H. **RCL** button. Used to recall and delete stored readings.

Fig. 1. The IRT855DL's controls, indicators and physical structures

I. **USB** button. Used to enter Measurement Lock mode and to enable PC interface

J. Measurement trigger   K. Laser pointer aperture   L. Battery compartment

M. Micro-USB jack   N. Jack for 9VDC adaptor output   O. Tripod mount

P. Jack for "K" type thermocouple with spade lugs

Q. Laser Identification/Certification/Warning/Safety labels
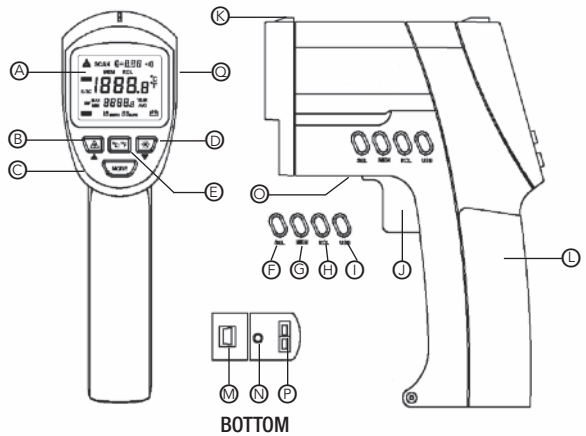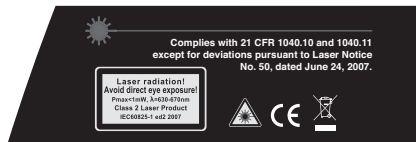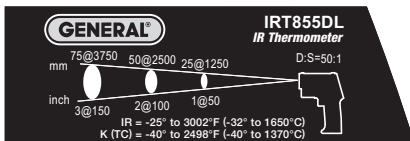
1. Emissivity readout

2. °C/°F unit

3. Primary display

4. **HAL** and **LAL**: Indicate that secondary readout is showing High or Low alarm setpoint. **HIB** and **LOB**: Indicate that High and Low alarms are armed.
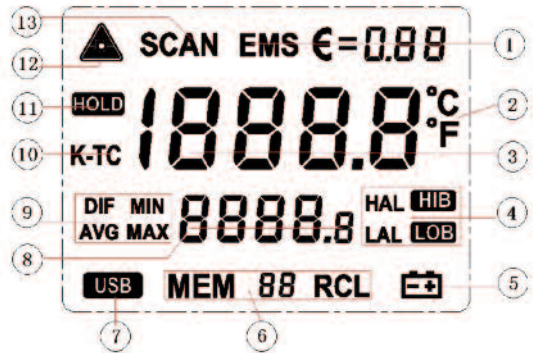
5. Low battery indication

6. **MEM**: Indicates measured value on primary readout is being stored. **RCL**: Indicates measured value is being recalled for display on primary readout. Two-digit number indicates number of selected memory location.

Fig. 2. All possible indications on the IRT855DL's LCD

7. Indicates USB cable is plugged into instrument

8. Secondary readout

9. Indicate that secondary readout is displaying a Minimum, Maximum, Difference or Average value

10. Indicates that primary readout is showing value measured by "K" type thermocouple

11. Indicates measurement is being held

12. Laser pointer "on" indication

13. Measurement mode indication (flashing **SCAN** for normal operation, constant **SCAN** for Measurement Lock mode)

SETUP INSTRUCTIONS

INSTALL BATTERY

To open the battery compartment (Fig. 1, Callout L):

1) Grab the battery compartment cover between your thumb and forefinger and slide it down on its track to expose the wired battery socket.

2) Plug the included "9V" battery into the socket. The terminals of the battery and the socket mate in only one way, with the smaller male terminal plugging into the larger female terminal.

3) Slide the battery compartment up on its track until it latches shut.

OPERATING INSTRUCTIONS

MAKING BASIC TEMPERATURE MEASUREMENTS

Point the IRT855DL "gun" at various objects within view, including those not at ambient temperature (for example, a light bulb or an air-conditioner or heating register) while squeezing and holding the measurement trigger (Fig. 1, Callout J). Note that in this mode, called "SCAN" mode, the temperature shown on the primary readout tracks the surface temperatures of the objects scanned, with a fast response time of 0.5 seconds. Also note that when you release the trigger, the primary readout automatically holds the last scanned temperature. To view max, min, avg, or differential temperatures captured over a measurement session (the time interval between the IRT powering on and off), press the **MODE** button on the panel to toggle through the options. The figure at right shows the position of each of the four session display options in the sequence of **MODE** button presses.
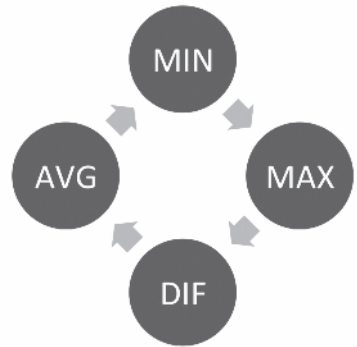
The measurement session display options available via the MODE button

Repeat this procedure while looking closely at the display. Note that when you squeeze and hold the trigger:

- The IRT855DL sounds two beeps.
- The display backlight comes on.
- **SCAN** illuminates and blinks.
- A temperature reading is displayed in the IRT's default measurement unit of °C. (To convert the reading to °F, press the **°C/°F** button below the display).

To hold a temperature reading, release the measurement trigger. Note that when you do so, **HOLD** appears on the left side of the LCD at the level of the primary readout.

To turn on the laser pointer, press the ▼ button.

USING THE "K" TYPE TEMPERATURE PROBE

To prepare to use the "K" type probe to measure the temperature of a surface, insert its spade lugs into the two-slot jack at the bottom of the IRT (Fig. 1, Callout P). Then attach the beaded end of the probe to the surface. If the surface is extremely hot, take care not to burn yourself when attaching the probe.

To make the measurement, squeeze the trigger to power on the instrument and press the **SEL** button (Fig. 1, Callout F) once to switch the IRT855DL to "K" type probe measurement mode. The temperature measured by the probe will appear on the primary readout, with the term **K-TC** at its left to indicate the source of the reading.

!WARNING!

Never attach a thermocouple probe to any component of an energized electrical or electronic circuit.
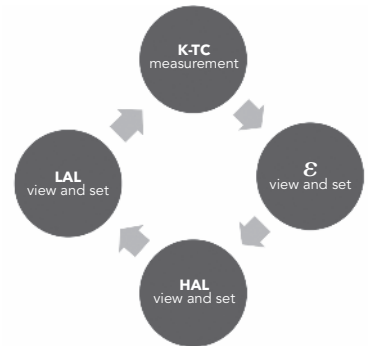
Note that there may be a difference between the temperatures of a surface measured using the IRT and through the "K" type thermocouple. Often, the reason is that the IRT measurement may have failed to account for the emissivity of the target surface.

ACCOUNTING FOR EMISSIVITY

The emissivity of a material is a measure of its ability to radiate thermal energy. A dimensionless quantity between 0 and 1, it represents the ratio of how much energy an object can radiate, compared to an ideal "black" body radiator with an emissivity of 1.

Most organic materials and painted or oxidized surfaces have an emissivity of 0.95. For this reason, the factory preset emissivity of the IRT855DL's temperature sensor is 0.95. The readings might not be accurate when measuring shiny metal surfaces. To correct the readings, you can use opaque photo paper or black paint to cover the target. Wait until the temperature of the photo paper or paint is the same as that of the target. Then, measure the temperature of the photo paper or the surface of the paint. Squeeze the measurement trigger to power on the IRT and press the **SEL** button twice to enter emissivity viewing and setting mode, as shown in the figure at the right.

The functions available via the SEL button

The emissivity symbol ε and the term **EMS** will appear at the top right of the LCD, at the left of the factory-default value of ε: 0.95. Press the ▲ or ▼ button to change the emissivity value to the value for the material shown in the table below. Once you have adjusted the value, press the **MODE** button to save the setting.

Material	Emissivity	Material	Emissivity
Aluminum	0.30	Glass	0.90 to 0.95
Asphalt	0.95	Iron Oxides	0.78 to 0.82
Concrete	0.95	Paint	0.80 to 0.95
Asbestos	0.95	Plastic	0.85 to 0.95
Ceramics	0.95	Paper	0.70 to 0.94
Brass	0.50	Plaster	0.80 to 0.90
Brick	0.90	Rubber	0.95
Carbon	0.85	Wood	0.90
Sludge	0.94	Textile	0.94

Frozen Food	0.90	Lead	0.50
Hot Food	0.93	Marble	0.94
Ice	0.98	Cloth (black)	0.98
Snow	0.90	Sand	0.90
Human Skin	0.98	Water	0.93

SETTING & ARMING TEMPERATURE ALARMS

To set the high alarm level (HAL), squeeze the trigger to power the IRT on and press the **SEL** button three times. **HAL** and the current value of the HAL setpoint will appear on the secondary display. Press the ▼ or ▲ button to change the setpoint to the desired value. The new setting will be saved automatically, with no need to press an additional button.

To arm the high-temperature alarm, press the **MEM** button (Fig. 1, Callout G) while the secondary display is showing **HAL** and the high alarm setpoint. Doing so causes the term **HIB** to appear at the right of **HAL**. To disarm the alarm and make HIB disappear, press the **MEM** button again.

To set the low alarm level (LAL), squeeze the trigger to power on the IRT and press the **SEL** button four times. **LAL** and the current value of the LAL setpoint will appear on the secondary display. To change the LAL setpoint, press the ▼ or ▲ button until the new setting is on-screen. The new setting will be saved automatically, with no need to press an additional button.

To arm the low-temperature alarm, press the **MEM** button while the secondary display is showing **LAL** and the low alarm setpoint. Doing so causes the term **LIB** to appear at the right of **LAL**. To disarm the alarm and make LIB disappear, press the **MEM** button again.

Whenever a temperature measured by the IRT is higher or lower than an armed high- or low-temperature alarm, the beeper will sound repeatedly and **HAL** or **LAL** will flash.

Note: A high or low alarm cannot be set for surface temperatures measured by the "K" type probe.

STORING & RECALLING RECORDS

The IRT855DL has enough on-board memory to store 100 temperature measurements. Although emissivity values cannot be stored in the IRT855DL's on-board memory, they can be displayed by the Temperature Test program (see screen shot on p. 10) as adjuncts to real-time temperature measurements.

To save a record, press the **MEM** button with a temperature reading on the primary display and the current emissivity setting in the upper right corner of the LCD. Doing so will cause **MEM** to appear briefly on the bottom line, at the left of the number of the memory location that will store the record.

Each subsequent press of the **MEM** button will increment the memory location counter by one.

When all locations are occupied, the memory location counter will read 99 and pressing the **MEM** button will not store on-screen data. It is then time to clear the memory. Although individual memory locations cannot be cleared, the entire memory can be cleared by pressing and holding the **SEL** button with the unit operating in Recall mode.

To operate in Recall mode (for the purpose of recalling stored records), squeeze the trigger to power on the instrument and press the **RCL** button (Fig. 1, Callout H). The record that was most recently accessed will appear on-screen, along with its memory location number. To view the contents of other locations, navigate to them by pressing the ▼ and ▲ buttons.

MEASUREMENT LOCK MODE

Operating in this mode makes it unnecessary to keep squeezing the trigger to make measurements.

To enter Measurement Lock mode, squeeze the trigger to power on the instrument and press the **USB** button (Fig. 1, Callout I). **USB** will appear in the bottom left corner of the LCD. Within 10 seconds, press and hold the **SEL** button for at least three seconds. Doing so will cause **SCAN** to appear on the top line of the LCD, just as it does when making normal measurements. However, note that releasing the trigger does not cause **SCAN** to be replaced by HOLD, as in normal operation.

In Measurement Lock mode, you can make multiple measurements without squeezing the trigger simply by pointing the IRT at different targets over time. The 10-second Auto Power Off function is disabled in Measurement Lock mode, as is your ability to store and recall readings. But you can still use the **MODE** button to view Min/Max/Avg and Dif values since the beginning of the measurement session.

Although Measurement Lock mode extends the length of measurement sessions beyond the 10-second APO interval, this convenience comes with a downside. If you forget to exit Measurement Lock mode and leave the IRT unattended, continuous operation will quickly discharge the battery—especially if the laser pointer is left on. For this reason, it is important that you remember to exit Measurement Lock mode before leaving the IRT unattended. To do so, press the **USB** button. Note that doing so causes **SCAN** to be replaced by **HOLD** with the trigger released—just as in normal operation.

DATA LOGGING

To configure the IRT855DL for data logging:

1) Begin powering the IRT through the included 9V AC adaptor. To connect the adaptor, insert its round plug into the DC9V jack on the bottom of the unit (Fig. 1, Callout N) and its twin AC plugs into a 110/220V receptacle.

2) Attach the IRT to a tripod via the threaded tripod mount (Fig. 1, Callout O) on the gun in front of the measurement trigger.

3) Connect the IRT to your PC by inserting the micro-USB plug end of the included USB cable into the USB jack (Fig. 1, Callout M) on the bottom of the IRT, and the full-size USB plug at the other end into a USB port of the PC.

4) Install the software driver and temperature data logging program on the included mini-disc on your PC. Begin by placing the disc in your PC's CD tray. Then open the <Release> folder and double-click on the <Temperature.exe> file. The program will install automatically.

5) Begin operating the IRT855DL in Measurement Lock mode by squeezing the trigger, pressing the **USB** button, and pressing and holding the **SEL** button for at least three seconds.

The real-time temperature measurements made continuously by the IRT855DL will automatically be visible in graphical and tabular form on the Temperature Test program (see screen shot below). One dashboard at the left of the screen keeps track of Max, Min and Avg temperature values as they change, while a second dashboard lets you adjust the values of **HAL** and **LAL**.

The Temperature Test data logging program included with the IRT855DL
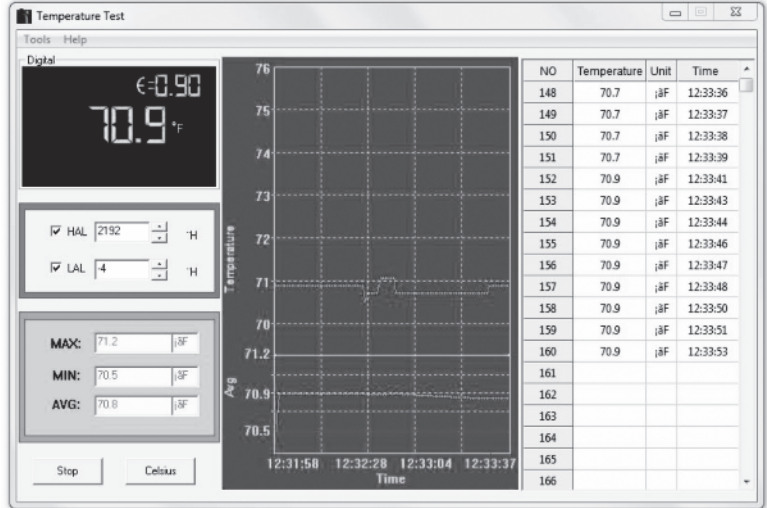
SPECIFICATIONS

IR Temperature Measurement Range: -25° to 3002°F (-32° to 1650°C)

IRT Measurement Accuracy: ±5.4°F (3°C) from -25° to 59°F (-32° to 15ºC);
±(1.5% of reading + 3.6°F/2°C) from 59° to 122°F (15° to 50°C);
±(1.5% of reading + 1.8°F/1.0°C) from 122° to 950°F (50° to 510°C);
±1.5% of reading above 950°F (510°C)

Repeatability: < ±0.5% of the reading, or 0.9°F (0.5°C)

"K" Port Measurement Range: -40° to 2498°F (-40° to 1370°C)

"K" Port Measurement Accuracy: ±1.5% of reading + 1.8°F (1°C)

Distance-to-Spot (D:S) Ratio: 50:1

Display Resolution: 0.1°

Response Time: 0.5 sec

Optical Response: 8 μm to 14 μm

Operating Temperature: 14° to 122°F (-10° to 50°C) from 10 to 90%RH

Dimensions: 5.5 x 2.2 x 7.5 in. (140 x 56 x 190mm)

Weight: 17.64 oz. (500g)

Power Source: "9V" battery

OPERATING & MAINTENANCE TIPS

All IR thermometers, including the IRT855DL, take the average temperature of all objects within a circular target area defined by the distance-to-spot ratio (field of view) of the IR sensor and lens. Depending on the distance to the target, the target area may include both the target and background objects in the thermometer's field of view. If background objects in the field of view are cooler than the target, the measured temperature will be lower than the target's actual temperature. If background objects are hotter than the target, the measured temperature will be higher than the target's actual temperature. The IRT855DL's large D:S ratio of 50:1 enables narrow measurement of high-temperature objects (up to 3000ºF/1650ºC) from a safe distance.

To eliminate measurement error, move the IRT855DL close enough to the target so the circle created by the targeting laser falls just within the boundary of the object being measured.

Clean the lens often—but never use a solvent. Abrupt temperature changes will cause condensation and possible vapor penetration. Clean after vapor evaporates. Blow off loose particles with clean, compressed air. Gently brush remaining debris away with a lens hair brush. Carefully wipe the surface with a moist cotton swab.

Avoid water, moisture and corrosive gas or liquids. The housing can be cleaned with a wet sponge.

Remove the battery when storing this product for an extended period of time.

Do not drop or disassemble the instrument or immerse in water.

WARRANTY INFORMATION

General Tools & Instruments' (General's) IRT855DL Ultra Wide-Range Data Logging IR Thermometer with "K" Port is warranted to the original purchaser to be free from defects in material and workmanship for a period of three years. Subject to certain restrictions, General will repair or replace this instrument if, after examination, the company determines it to be defective in material or workmanship. The warranty period begins on the date of purchase. You are encouraged to register your product online. General will extend your warranty an additional 60 days if you register at www.generaltools.com/ProductRegistry.

This warranty does not apply to damages that General determines to be from an attempted repair by non-authorized personnel or misuse, alterations, normal wear and tear, or accidental

damage—including dropping the unit. The defective unit must be returned to General Tools & Instruments or to a General-authorized service center, freight prepaid and insured.

Acceptance of the exclusive repair and replacement remedies described herein is a condition of the contract for purchase of this product. In no event shall General be liable for any incidental, special, consequential or punitive damages, or for any cost, attorneys' fees, expenses, or losses alleged to be a consequence of damage due to failure of, or defect in any product including, but not limited to, any claims for loss of profits.

Register now at www.generaltools.com/ProductRegistry to receive a 60-day extension to your warranty.

RETURN FOR REPAIR POLICY

Every effort has been made to provide you with a reliable product of superior quality. However, in the event your instrument requires repair, please contact our Customer Service to obtain an RGA (Return Goods Authorization) number before forwarding the unit via prepaid freight to the attention of our Service Center at this address:

General Tools & Instruments
75 Seaview Drive   Secaucus, NJ 07094-1806   212-431-6100

Remember to include a copy of your proof of purchase, your return address, and your phone number and/or e-mail address.

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