

**FLUKE**®

# 562/563

Infrared Thermometers

## Users Manual

PN 4456849

September 2014

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Fluke Corporation  
P.O. Box 9090  
Everett, WA 98206-9090  
U.S.A.  
11/99

Fluke Europe B.V.  
P.O. Box 1186  
5602 BD Eindhoven  
The Netherlands

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## ***Introduction***

The Fluke 562/563 Infrared Thermometers (the Product) are for non-contact temperature measurement. The Product determines the surface temperature of an object by measuring the amount of infrared energy radiated by the object surface. The Product also uses a K-type thermocouple for contact temperature measurement.

## ***Contact Fluke***

To contact Fluke, call one of the following telephone numbers:

- Technical Support USA: 1-800-44-FLUKE  
(1-800-443-5853)
- Calibration/Repair USA: 1-888-99-FLUKE  
(1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31 402-675-200
- Japan: +81-03-6714-3114
- Singapore: +65-738-5566
- Anywhere in the world: +1-425-446-5500

Or, visit Fluke's website at [www.fluke.com](http://www.fluke.com).

To register your product, visit <http://register.fluke.com>.

To see, print, or download the latest manual supplement, visit <http://us.fluke.com/usen/support/manuals>.

## Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

Figure 1 shows the safety label of the Product. Symbols used on the Product and in this manual are explained in Table 1.

### **Warning**

**To prevent possible electrical shock, fire, eye damage, and personal injury:**

- **Read all safety information before you use the Product.**
- **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.**
- **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.**

- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **The battery door must be closed and locked before you operate the Product.**
- **Do not use the Product if it operates incorrectly.**
- **Do not use the Product around explosive gas, vapor, or in damp or wet environments.**
- **Do not connect the optional external probe to live electrical circuits.**
- **See emissivity information for actual temperatures. Reflective objects result in lower than actual temperature measurements. These objects pose a burn hazard.**
- **Do not leave the thermometer on or near objects of high temperature.**
- **Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**

## ⚠ Caution

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
- Thermal shock (caused by large or abrupt ambient temperature changes. For highest accuracy, allow 30 minutes for Thermometer to become stable before use).

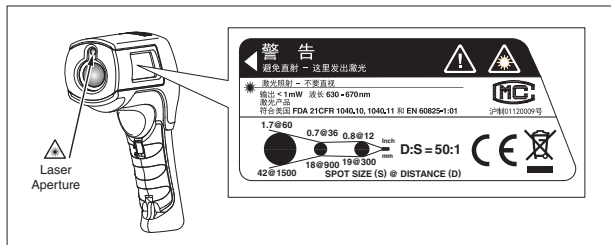









Figure 1. Laser Safety Markings



**Table 1. Symbols**

Symbol	Explanation
	Hazardous voltage. Risk of electrical shock.
	Risk of danger. Important information. See manual.
	Warning. Laser.
CE	Conforms to European Union directives.
°C	Celsius
°F	Fahrenheit
	Battery
	This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you 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" product. Do not dispose of this product as unsorted municipal waste. Go to Fluke's website for recycling information.
	Battery
 沪制01120009号	Conforms to China Metrology Certification.

## **Features**

- Single-spot laser sighting
- Backlight display
- Current Temperature plus MAX, MIN, DIF, AVG temperature displays
- Two AA batteries
- Hard case
- 80PK-1 K-type thermocouple probe
- Adjustable emissivity and predefined emissivity table
- Infrared and thermocouple temperature display
- Celsius or Fahrenheit temperature display
- Tripod mount
- Auto off
- Standard miniature K-type thermocouple connector input
- Printed 562/563 Users Manual
- 12 or 24 hour clock
- Last reading Hold (20 seconds)
- Multi-language interface
- High and low alarm
- Data storage and review
- Trigger lock

## Display

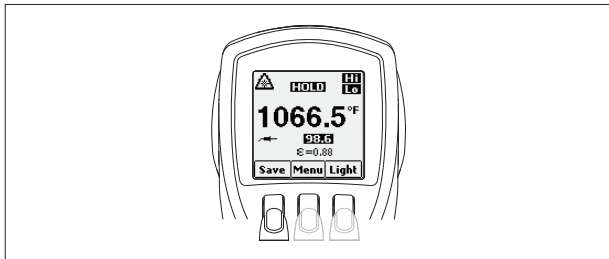
The Product display can show data in these languages:

- English
- Spanish
- German
- French
- Portuguese
- Simplified Chinese

To change the displayed language, refer to “Setup”.

## Menu Overview

Figure 2 shows the LCD and menu interface. Table 2 is a top-level description of the menu.



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Figure 2. Menu Navigation

Table 2. Top-Level Menu Description

Level	Softkey		Description
1	Left	<b>Save</b>	Save reading to memory
2	Left	<b>Mem</b>	Review/delete memory entries
3	Left	<b>MnMx</b>	Enable Min/Max
4	Left	<b>°C/°F</b>	Toggle between °C and °F
5	Left	<b>🔒 (Lock)</b>	Lock the trigger
6	Left	<b>Setup</b>	Turn off/on backlight
1	Right	<b>Light</b>	Adjust backlight brightness
2	Right	<b>ε</b>	Set emissivity
3	Right	<b>Avg</b>	Enable Avg/Diff
4	Right	<b>Alarm</b>	Set and enable alarms
5	Right	<b>Laser</b>	Toggle the laser on/off
All	Center	<b>Menu</b>	Advance the menu to the next

Each menu item and function is explained in greater detail in the following sections.

## Save

To save readings:

1. Pull the trigger to take a measurement.
2. Release the trigger to stop taking the measurement.
3. Push the **Save** softkey to enter the Save menu.
4. Push the **Yes** softkey to save the reading.

The reading is assigned a memory location and a time and date stamp.

The reading includes:

- IR temperature
- Thermocouple temperature (if connected)
- Emissivity
- Min/Max/Avg/Dif (if Min/Max or Avg/Dif is enabled)
- Date/Time

You can push the **Cancel** softkey to stop saving the reading.

### ***Light***

The Product has a backlight display with two brightness levels.

To toggle the backlight brightness, push the **Light** softkey.

To disable the backlight, use the Setup menu.

### ***Memory***

The Product can store measurement records including time, date, emissivity, and measurement record numbers (see “Save” for more information). The 562 can store 20 records and the 563 can store 99.

To access records stored in memory:

1. Push the Menu softkey until **Mem** shows as the left softkey function.
2. Push the **Mem** softkey to access the Memory menu. Saved readings can be read.

## Emissivity Menu

The Emissivity menu includes a list of pre-defined materials and lists their typical emissivity values. See Table for further information.

### Note

*Default emissivity is 0.95.*

**Table 3. Nominal Surface Emissivity**

Material	Value	Material	Value
Default****	0.95	Glass	0.85
Aluminum*	0.30	Iron*	0.70
Asbestos	0.95	Lead*	0.50
Asphalt	0.95	Oil	0.94
Brass*	0.50	Paint	0.93
Ceramic	0.95	Plastic**	0.95
Concrete	0.95	Rubber	0.95
Copper*	0.60	Sand	0.90
Food -	0.90	Steel*	0.80
Food - Hot	0.93	Water	0.93
		Wood ***	0.94

\* Oxidized

\*\* Opaque, over 20 mils

\*\*\* Natural

\*\*\*\* Factory Setting

Highlighted items may also be found in the emissivity table built into the Product.

To access the Emissivity menu:

1. Push the **Menu** softkey until **E** shows as the right softkey.
2. Push the **E** softkey.

To access the Emissivity list:

1. Push the **Table** softkey. The display shows a list of materials and their suggested emissivity.
2. Use the down arrow to navigate through the list.
3. Push the **Enter** softkey to choose the necessary material.

To manually type the typical emissivity of a material:

1. Push the **No.** softkey.
2. Use the down or up arrow softkey to change the entry. Hold down the arrow softkeys to increase the rate of change.
3. Push the **Done** softkey to return to the main menu.

### **°C and °F**

To toggle between °C and °F measurements, push the **Menu** softkey until **°C** or **°F** shows as the left softkey, and then push the necessary softkey.

### **Min, Max, Avg, Differential**

The Product can measure minimum (MIN), maximum (MAX), average (AVG), or differential ( $\Delta$ ) temperatures each time a reading is taken. These values are not shown if a thermocouple is plugged into the Product.

To turn on the Min Max mode:

1. Push the **Menu** softkey until **MnMx** (Min Max) shows as the left softkey function.
2. Push the **MnMx** softkey.

The display shows the present reading, maximum and minimum readings, and the emissivity setting.

To turn on the Avg/Dif mode:

1. Push the **Menu** softkey until **Avg** shows as the right softkey function.
2. Push the **Avg** softkey.

The display shows the present reading, average reading, the differential reading between max and min (designated by  $\Delta$ ), and the emissivity setting.

*Note*

*Min, Max, Avg, and Differential readings are saved as part of the saved data when either Min/Max or Avg/Dif mode is enabled.*

## **Alarm**

The Product has a programmable high and low temperature alarm to assign high or low readings. When the alarm level is reached, an alarm sounds and the display flashes orange and white.

To set the high or low alarm:

1. Push the **Menu** softkey until **Alarm** shows as the right softkey.
2. Push the **Alarm** softkey to access the Alarm menu.
3. Push the **Hi** or **Lo** softkey as necessary.
4. Push the **ON** or **OFF** softkey to turn the alarm on or off.
5. Use the **Set** softkey to access the Hi or Lo Alarm Set menu.
6. Use the down or up softkeys to change the alarm setting.
7. After the settings are completed, push the **Done** softkey.



## Trigger Lock

The Product trigger can be locked on for continuous measurement.

To lock the trigger:

1. Push the **Menu** softkey until the lock symbol (🔒) shows as the left softkey.
2. Push the 🔒 softkey to lock the trigger. The lock symbol shows on the display. When the trigger is locked, the 🔒 softkey changes to 🔓. Push this softkey to unlock the trigger.

## Laser

### **Warning**


**To prevent eye damage and personal injury:**

- **Do not look into the laser.**
- **Do not point laser directly at persons or animals or indirectly off reflective surfaces.**

The Product has a laser for aiming purposes only. The laser turns off when the trigger is released.

To enable or disable the laser:

1. Push the **Menu** softkey until **Laser** shows as the right softkey.
2. Push the **Laser** softkey to enable or disable the laser.

 shows on the display when the laser is enabled.

## Setup

From the Setup menu, the display language, backlight, and time/date can be changed.

### Language

To change the display language:

1. From the main menu, push the **Menu** softkey until **Setup** shows as the left softkey.
2. Push the **Setup** softkey.
3. Use the down arrow softkey to move the indicator to **Language**, and push the **Enter** softkey.
4. Use the down arrow to move the indicator to the correct language.
5. Push the **Enter** softkey to complete the language selection, or push the **Back** softkey to return to the Setup menu.

### Backlight

The backlight is on by default. Turn the backlight off to conserve battery power.

1. Push the **Menu** softkey until **Setup** shows as the left softkey.
2. Push the **Setup** softkey.
3. Push the **Enter** softkey to enter the Backlight menu.
4. Push the **OFF** softkey to turn the backlight off, or push the **ON** softkey to turn it on.
5. Push the **Back** softkey to return to the Setup menu.

## *Time/Date*

To change the time:

1. Push the **Menu** softkey until **Setup** shows as the left softkey.
2. Push the **Setup** softkey to enter the Setup menu.
3. Push the down arrow softkey to select **Time/Date**.
4. Push the **Enter** softkey.
5. Push the **Time** softkey to set time.
  - a. Push the necessary time format (**24hr** or **12hr**).
  - b. Use the up and down arrow keys to select the correct hour.
  - c. Push **Next** to select the minutes.
  - d. Use the up and down softkeys to select the minute.
  - e. When in 12-hour mode, push the **Next** softkey to highlight the **am/pm** parameter.
  - f. Use the up and down softkey to change to **am** or **pm**.
6. Push the **Done** softkey.

To change the date:

1. From the Time/Date menu, push the **Date** softkey.
2. Select the date format: Day/Month/Year (**dmy**) or Month/Day/Year (**mdy**).
3. Use the up and down softkeys to select the correct parameter.
4. Push the **Next** softkey and the arrow softkeys to select the month, date, or year parameters.

5. Use the up and down arrow keys to set the necessary parameter.
6. Push the **Next** softkey to move through each parameter.
7. Push the **Done** softkey.

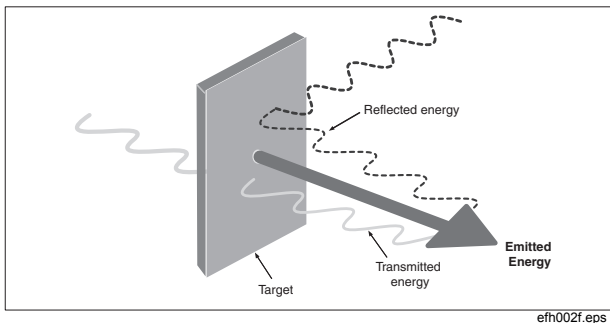
### **Delete Data**

To delete stored data from the Product, from the main menu, push the **Menu** softkey until **Mem** shows as the left softkey function. The last memory location shows on the display.

- To access the Delete menu, push the **Delete** softkey.
- To delete all records, push the **All** softkey. At the confirmation screen, push the **Yes** softkey.
- To delete individual records, push the **View** softkey and then use the down and up arrow softkeys to access the necessary record. When the correct record is shown, push the **Yes** softkey to delete the record.
- To cancel data deletion, pull the trigger.

### **How the Product Works**

The Product measures the surface temperature of an object. The Product optics sense emitted, reflected, and transmitted energy, which is collected and focused onto a detector. The Product electronics translate the signal into a temperature measurement which the Product shows on the display (see Figure ).



**Figure 3. How the Product Works**

## **Product Operation**

### **Temperature Measurement**

To measure temperature, point the Product at an object and pull the trigger. Use the laser pointer to aim the sensor. You can also insert the KTC probe for contact measurement. Be sure to consider distance-to-spot size ratio and field of view (see “Distance and Spot Size” and “Field of View”).

#### *Note*

*The laser is used for aiming purposes only and is not related to temperature measurement.*

The Product automatically powers down after 20 seconds of inactivity. To turn the Product on, pull the trigger.

## Find a Hot or Cold Spot

To find a hot or cold spot, aim the Product outside the necessary area. Then, slowly scan across the area with an up and down motion until the hot or cold spot is found.

## Distance and Spot Size

As the distance (D) from the object under measurement increases, the spot size (S) of the area measured by the Product becomes larger. The relationship between distance and spot size (D:S) is shown in Figure . The spot sizes indicate 90 % encircled energy.

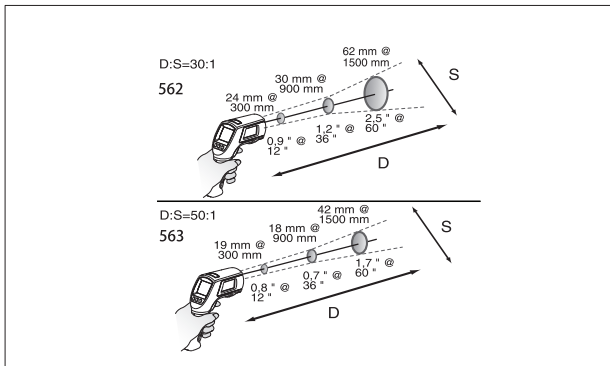
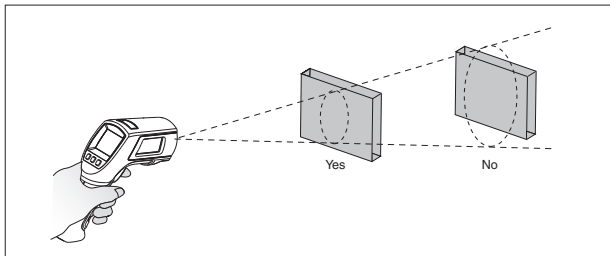


Figure 4. Distance and Spot Size

## **Field of View**

When making measurements, make sure that the target is larger than the Product spot size. The smaller the target, the closer you should be to it (see Figure ). For accurate measurement, it is strongly recommended that the target size is at least twice as large as the spot size.



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**Figure 5. Field of View**

## **Emissivity**

Emissivity describes the energy-emitting characteristics of materials. Most organic materials and painted or oxidized surfaces have an emissivity of approximately 0.95, the default setting for the Product.

To compensate for inaccurate readings that may result from measuring shiny metal surfaces, you can cover the surface to be measured with electrical tape or flat black paint (<148 °C/300 °F) with emissivity set to 0.95. Allow time for the tape or paint to reach the same temperature as the surface beneath it. Measure the temperature of the tape or painted surface.

If you cannot paint or use tape, then you can improve the accuracy of your measurements by either numerically adjusting emissivity or by using the Emissivity Menu to access a table of some common materials. The Product has numerically adjustable emissivity from 0.10 to 1.00 that can be used in conjunction with the emissivity in Table . Also, the Product has a built-in table of the most common materials that can be set from the Emissivity menu. The built-in values are indicated in Table .

## **HOLD**

After the trigger is released, the display retains its last infrared measurement for 20 seconds. At the same time, **HOLD** shows on the display. With the probe inserted, the Product stays on. To freeze the infrared temperature when a probe is not inserted, release the trigger until **HOLD** shows on the display.

## **Data Storage**

The 562 can store up to 20 data records. The 563 can store up to 99 data records. Each record includes:

- Record number
- IR and probe temperature in °F or °C
- Date/Time
- Emissivity
- Max/Min/Avg/Dif Temperature (if enabled)

For more information, see “Save”.




## **External Contact Probe**

### **Warning**

**To avoid electrical shock or personal injury, do not connect the external contact probe to live electrical circuits.**


The Product has a bead K-type thermocouple probe. The probe attaches to the Product via the probe input located on the top of the Product.

With the probe installed, the probe symbol (  ) shows on the display. The probe can be used simultaneously when the Product is making non-contact measurements. The probe measurements are shown below the non-contact measurements. The Product stays on when a probe is inserted.

## Troubleshooting

See Table for solutions to possible problems during Product operation.

**Table 4. Troubleshooting**

Symptom	Cause	Action
--- (on display)	Target temperature is over or under range.	Select target within specifications.
	Low batteries	Replace batteries*
Blank display	Product is asleep Possible dead batteries	Pull trigger Replace batteries*
Laser does not work	Low or dead batteries Ambient temperature is above 40 °C (104 °F).	Replace batteries* Use in area with lower ambient temperature.
Inaccuracy	Possible incorrect emissivity setting, field of view, or spot size.	See "Emissivity", "Field of View" and "Distance and Spot Size" sections.
Settings such as emissivity, date/time, F/C, and saved data lost	Battery dead or not replaced in <1 minute of removal.	Reset settings. Replace batteries as soon as low battery indicated. Exchange the batteries within one minute of removal.*
*For details about battery replacement, please refer to page 23.		

## Maintenance

### Battery Charge

Use the battery charge symbols to gauge the approximate level of charge left on the batteries.

#### Note

*When in low battery mode, the Product does not store values. "Err" shows on the display if attempted.*



*Batteries are at 5 %. Before taking further readings, the batteries must be changed.*

### Battery Replacement

#### Warning

To prevent possible electrical shock, fire, eye damage, and personal injury, do not open the Product. The laser beam is dangerous to eyes. Have the Product repaired only through an approved technical site.

For safe operation and maintenance of the Product:

- Repair the Product before use if the batteries leak.
- Be sure that the battery polarity is correct to prevent battery leakage.

### **⚠ Caution**


To prevent damage to the Product:

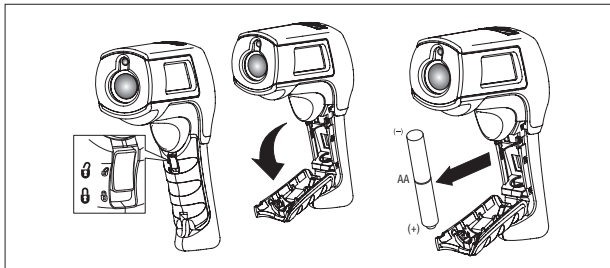
- Do not short the battery terminals together.
- Do not keep cells or batteries in a container where the terminals can be shorted.
- Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.

#### *Note*

*The batteries should be replaced in less than one minute after removal to avoid manually re-initializing the Product clock and date.*

To install or change the two AA batteries (see Figure 6):

1. Slide the locking tab on the battery door to the  position and then open the handle.
2. Insert the batteries noting their correct polarity.
3. Close and lock the handle.



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**Figure 6. Battery Replacement**

### ***Clean the Lens***

Use clean compressed air to blow off loose particles. Carefully clean the surface with a water-moistened cotton swab.

### ***Clean the Case***

Use mild soap and water on a moist sponge or soft cloth.

#### **Caution**

**To prevent damage to the Product, do NOT submerge the Product in water. Do not use abrasive cleaners, they will damage the case.**

## Replacement Parts

See Table for a list of replacement parts.

**Table 5. Replacement Parts**

Description	Qty.	Fluke Part Number
FLUKE 562/563 Users Manual	1	4456849

## Accessories

Optional accessories:

- Soft Carrying Case (H6)
- Calibration Certification
- All K-type thermocouple probes with standard mini-connector. See Table 6 for more information.

## Recommended Temperature Probes

### Warning

**To avoid electrical shock or personal injury, do not connect the external contact probe to live electrical circuits.**

See Table for a list of recommended temperature probes.

**Table 6. Recommended Temperature Probes**

<b>Probe</b>	<b>Usage</b>
<b>80PK-1</b>	General purpose bead probe for measurement of surface temperatures and air temperatures within ducts and for vent temperatures
<b>80PK-8</b>	Pipe clamp probes for track of temperature differentials on hydronic tubing and pipe loops, and for refrigerant temperatures
<b>80PK-9</b>	Insulation piercing probe for good surface thermal contact, air temperatures within ducts, and vent temperatures
<b>80PK-11</b>	Flexible cuff thermocouple temperature probe that attaches a thermocouple to a pipe
<b>80PK-25</b>	Piercing probe for checking air temperature in ducts, surface temperature under carpets/pads, liquids, thermometer wells, vent temperatures, and for penetrating pipe insulation
<b>80PK-26</b>	General-purpose gas and surface probe that reacts fast to surface and air temperatures

## Specifications


### General Specifications

Feature	562	563
IR Temperature Range	-32 °C to 600°C	-32 °C to 760 °C
Accuracy	$<0\text{ °C}: \pm(1.0\text{ °C} + 0.1\text{ °C}/1\text{ °C})$ $>0\text{ °C}: \pm 1\text{ \% or } \pm 1.0\text{ °C, whichever is greater}$	
Repeatability	$\pm 0.5\text{ \% of reading or } \pm 0.5\text{ °C, whichever is greater}$	$\pm 0.5\text{ \% of reading or } \pm 0.5\text{ °C, whichever is greater}$
Display Resolution	0.1 °C	
Spectral Response	8 to 14 $\mu\text{m}$	
Response Time (95 %)	<500 ms	
K-Type Thermocouple Input Temperature Range	-270 °C to 1372 °C	



## **Infrared Thermometers** **Specifications**

K-Type Thermocouple Input Accuracy	Input accuracy $\pm 2.2\text{ }^{\circ}\text{C}$	-270 $^{\circ}\text{C}$ to -40 $^{\circ}\text{C}$ : $\pm(1\text{ }^{\circ}\text{C} + 0.2\text{ }^{\circ}/1\text{ }^{\circ}\text{C})$ -40 $^{\circ}\text{C}$ to 1372 $^{\circ}\text{C}$ : $\pm 1\%$ or 1 $^{\circ}\text{C}$ , whichever is greater
K-Type Thermocouple Resolution	0.1 $^{\circ}\text{C}$	
Distance:Spot (90 % energy)	30:1	50:1
Laser sighting	Single laser, output <1 mW Class II, wavelength 630 to 670 nm	
Emissivity	Digitally adjustable from 0.10 to 1.00 by 0.01 or via built-in table of common materials	
Data storage	20 points	99 points
Communication	none	USB 2.0
Operating Altitude	3000 meters above mean sea level	
Storage Altitude	12,000 meters above mean sea level	
Relative Humidity	10 % to 90 % RH non-condensing up to 30 $^{\circ}\text{C}$	
Operating Temperature	0 $^{\circ}\text{C}$ to 50 $^{\circ}\text{C}$	
Storage Temperature	-20 $^{\circ}\text{C}$ to 60 $^{\circ}\text{C}$	
Weight	0.322 kg	

Dimensions	17.69 cm (6.965 in) H x 16.36 cm (6.441 in) L x 5.18 cm (2.039 in) W	
Power	2 AA /LR6 Batteries (alkaline or NiCD)	2 AA /LR6 Batteries or USB connection when used with a PC
Battery Life	12 hours with laser and backlight on; 100 hours with laser and backlight off, at 100 % duty cycle (thermometer continuously on)	
Standards and Agency Approval	EMC: meets EN61326-1: Portable Safety Compliance: EN61010-1, IEC 60825-1, Class 2  沪制01120009号  CE	

***KTC Specifications***

<b>Measurement Range</b>	-40 °C to 260 °C
<b>Accuracy</b>	±1.1 °C from 0 °C to 260 °C. Typically within 1.1 °C from -40 °C to 0 °C
<b>Cable Length</b>	1 m K-type thermocouple cable with standard miniature thermocouple connector and bead termination

