

RS Infrared / K Thermometer
Remote Temperature Measurement
(Non-Contact)

1327K

INSTRUCTION MANUAL

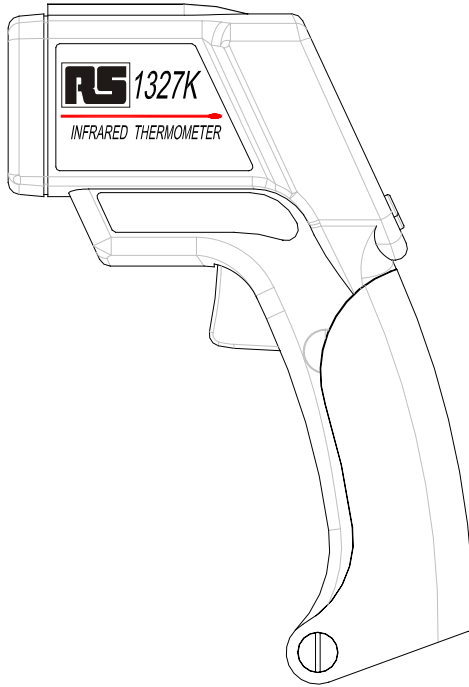


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INTRODUCTION

The RS 1327K hand-held thermometer is a convenient and easy to use instrument, allowing temperature measurement either by an Infrared non-contact method, or by using a plug-in type-K thermocouple probe.

The thermometer has an integral laser to assist sighting the Infrared sensor for making non-contact measurements of items that are inaccessible or hazardous to touch such as rotating machinery, high-voltage bus-bars, or inaccessible objects. The Infrared mode does not rely on physical contact with the object whose temperature is to be taken, but measures the radiated infrared energy from the object.

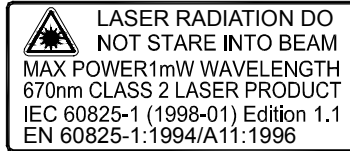
The thermocouple connector will accept a standard liquid, air or surface thermocouple probe as required to suit the particular application.


The Liquid Crystal Display has a backlight function which may be enabled to assist measurements made in a dark place. Other features include reading auto-hold, auto power-off, maximum and minimum readings, alarm levels and adjustable emissivity, all of which can be selected for maximum operating convenience.

. SAFETY INFORMATION

1. Read the following safety information carefully before attempting to operate or service the meter.

Laser Safety Warning




If the **MEAS** button is pressed while the  symbol is shown on the LCD, the meter will radiate the laser. To prevent injury, do not look or stare into the beam. Do not point the laser directly at eyes or indirectly off reflective surfaces.

- If the target object has a smooth surface, the laser may be reflected and create a hazard.
- Do not radiate the laser at flammable gasses or other possible sources of ignition.

2. Precautions:

- a). Do not operate the thermometer in the presence of strong electrical or magnetic fields, as this may prevent correct operation.
- b). Use and store the thermometer away from direct sunlight or other strong source of light, high temperatures, high humidity or dust.
- c). If the thermometer has been kept in area of high or low temperature, wait until it has reached a stable temperature before use.

- d). Condensation may form on the focal lens if the thermometer is moved quickly from a cold to a hot environment. Before taking measurements, wait for the condensation to dissipate.
 - e). Do not touch the focal lens.
3. Environmental conditions:
- a). Altitude up to 2000 meters.
 - b). Relatively humidity: 80% max.
 - c). Operating ambient temperature: 0 to 50 °C
4. Maintenance & Clearing:
- a). Repairs or servicing should only be carried out by competent persons using the correct parts, test equipment and procedures. If repair or servicing is required, contact the supplier or RS Components. The address is given at the end of these instructions.
 - b). Periodically clean the case with a dry cloth. Do not use abrasives or solvents.
5. Safety symbols:


 Complies with the EMC Directive 89/336/EEC

. FEATURES

- °C/ °F Selectable.
- Backlit LCD display.
- Sighting laser.
- Auto-hold function.
- Maximum/minimum reading recorder function.
- Auto power-off.
- Type K thermocouple thermometer.

. SPECIFICATIONS

3-1 General Information:

Display:	Backlit LCD display.
Auto power-off time:	Approx. 15 sec.
Data memory capacity:	99 set. (Direct reading on LCD display)
Over-range indication:	"OL" or "-OL".
Low battery indication:	The  symbol is displayed on LCD when the battery voltage drops below the operating voltage.
Power supply:	Single 9V battery 006P 9V, IEC6F22, or NEDA1604.
Battery life:	Approx. 100 hours (with laser pointer and backlight off)
Operating temperature:	0°C to 50°C (32°F to 122°F),
Operating humidity:	Below 80%RH.

Storage temperature Humidity:	-10°C to 60°C (14°F to 140°F), Below 70%RH.
Dimensions:	172(L)×118(W)×46(H) mm 6.8(L)×4.6(W)×1.8(H) inches.
Weight:	Approx. 220g with battery.
Accessories:	Instruction manual, carrying case, battery.

3-2 Electrical specifications:

Measuring range:	-35°C to 500°C (-31°F to 932°F)
Resolution:	0.1°C, 0.2°F
Accuracy:	± 2% of reading or ± 2°C or 4°F (whichever is greater).
Temperature coefficient:	0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F).
Measurement rate:	2 times per second.
Spectral Response:	6 to 14µm.
Field of view:	12:1; optics ratio with a 1" min target.
Emissivity:	0.17 ~ 1.00 (adjustable, preset at 0.95)
Sighting:	Laser marker < 1mw (class 2).
Sensor:	Thermopile.

□ Type K

Measuring range : -150°C to 1350°C (-238°F to 1999°F).

Resolution : 0.1°C , 1°C , 0.1°F , 1°F

Measurement rate : Once per second.

Basic accuracy : (@ 23±5°C calibration) accuracy are ± (...% of reading + degree) at 18°C to 28°C with relative humidity up 80%.

Function	Resolution	Range	Accuracy
°C	0.1°C	-150°C~0°C	±(0.2%rdg + 1.0°C)
		0°C~200°C	±(0.1%rdg + 1.0°C)
	1°C	200°C~1350°C	±(0.2%rdg + 2°C)
°F	0.1°F	-238°F~32°F	±(0.2%rdg + 2°F)
		32°F~200°F	±(0.1%rdg + 2°F)
	1°F	200°F~1999°F	±(0.2%rdg + 4°F)

Temperature Coefficient:

0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F).

Note :

The basic accuracy specification does not include the error of the probe. Please refer to the probe accuracy specification for additional details.

. GENERAL LAYOUT AND OPERATING CONTROLS



CAUTION

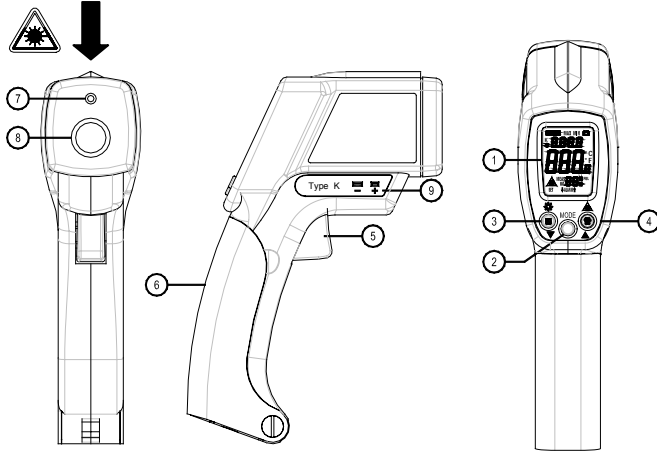
AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE

LASER RADIATION - DO NOT STARE INTO BEAM







OUTPUT < 1mW WAVELENGTH 630-670nm
CLASS (II) LASER PRODUCT

Complies with IEC 60825-1:(1998-01) Edition 1.1,
EN 60825-1:1994/A1:1996




1. Display.

Button	Press once	Press and hold for 3 seconds
2. MODE	Enter MAX/MIN recording mode. MAX→MIN→Current reading (MAX/MIN) ↑	①From MAX/MIN mode will exit this mode and return to normal operation. ②From normal mode will enter setting mode.
3.  	①From normal mode will turn the backlight on or off ②From Read mode, decrements the memory location number. ③From SET mode decreases the value of the selected parameter.	Store the displayed reading.
4.  	①From normal mode will enable or disable the laser. ②From Read mode increments the memory location number. ③From SET mode increases the value of the selected parameter.	Read the stored data from memory.

5. Measuring trigger :

- ① Trigger for turning the thermometer on.
Pull the trigger to turn on the thermometer and make a measurement.
- ② In SET mode, pull the trigger to store the required value and exit SET mode.
- ③ Press and hold the **MODE** button, then pull the trigger to enter continuous measurement mode.
- ④ In continuous measurement mode, pull the trigger to turn the meter off.

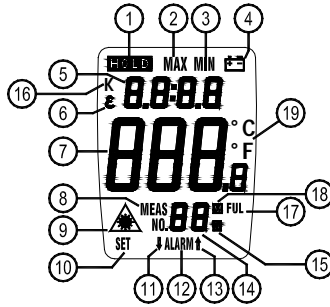
6. Battery cover.

7.  Laser aperture.

8. Focal lens.

9. Type K thermocouple input socket.

. LCD DISPLAY DESCRIPTION



1. Hold function	11. Lo alarm
2. Maximum reading	12. Alarm function
3. Minimum reading	13. Hi alarm
4. Low battery indicator	14. Memory and Read address number
5. Maximum/minimum value	15. Read memory data
6. Emissivity value setting	16. Type K measuring indicator
7. Measured value	17. Memory full indication
8. Measure indication	18. Store data to memory
9. Laser enabled indicator	19. Units "°C, °F"
10. SET symbol	

. Emissivity Adjustment

1. Emissivity: Emissivity is a value between 0.17 and 1 which indicates an object's ability to emit infrared energy. Emissivity is determined primarily by the objects' composition and surface finish.

The thermometers' sensitivity to emissivity "ε" is preset at 0.95, because this setting will be applicable to 90% of surfaces encountered, but can be adjusted as required.

2. Emissivity adjustment

- ① Apply black tape, matt-black paint or black magic marker to the object if it is safe to do so.
- ② “ ε ” is set at 0.95 to indicate correctly from a dark surface.
- ③ Aim the sensor at the black surface, pull the trigger and note the reading as T1.
- ④ Remove the black tape or matt-black paint and aim the sensor at the same area again. Pull the trigger and note the reading as (T2).
- ⑤ Change the emissivity value “ ε ” until T2 and T1 are equal as follows:
 - a). Enter setting mode (refer to **MODE** button above).
 - b). Press **MODE** button to select the ε value setting.
 - c). Press or buttons to set desired value.
 - d). Pull the trigger to store the setting value and exit set mode.

The following table gives typical emissivity values for common materials

Emissivity VALUES

Typical Emissivity Values; Metals	
SURFACE	EMISSIVITY
Zinc (oxidized)	0.1*
Galvanized iron	0.3
Tin-plated steel	0.1*
Gold (polished)	0.1*
Silver (polished)	0.1*
Chromium (polished)	0.1*
Iron and Steel	
Cast iron (polished)	0.2
Cast iron (turned at 100°C)	0.45
Cast iron (turned at 1000°C)	0.6 to 0.7
Steel (ground sheet)	0.6
Mild steel	0.3 to 0.5

Steel plate (oxidized)	0.9
Iron plate (rusted)	0.7 to 0.85
Cast iron (rough) rusted	0.95
Rough ingot iron	0.9
EMISSION VALUES	
Typical Emissivity Values; Metals	
SURFACE	EMISSION
Molten cast iron	0.3
Molten mild steel	0.3 to 0.4
Stainless steel (polished)	0.1
Stainless steel (various)	0.2 to 0.6
Aluminum	
Polished aluminum	0.1*
Aluminum (heavily oxidized)	0.25
Aluminum oxide at 260°C	0.6
Aluminum oxide at 800°C	0.3
Aluminum Alloys various	0.1 to 0.25
Brass	
Brass (polished)	0.1*
Brass (roughened surface)	0.2
Brass (oxidized)	0.6
Copper	
Copper (polished)	0.05*
Copper plate (oxidized)	0.8
Molten copper	0.15
Lead	
Lead (pure)	0.1*
Lead (oxidized at 25°C)	0.3
Lead (oxidized , reated to 200°C)	0.6
Nickel and its alloys	
Nickel (pure)	0.1*
Nickel plate (oxidized)	0.4 to 0.5
Nichrome	0.7
Nichrome (oxidized)	0.95

Emissivity Values; Non-metals - Refractory & Building materials	
Red brick (rough)	0.75 to 0.9
Fire clay	0.75
Asbestos	0.95
Concrete	0.7
Marble	0.9
Carborundum	0.85
Plaster	0.9
Alumina (fine grain)	0.25
Alumina (coarse grain)	0.45
Silica (fine grain)	0.4
Silica (coarse grain)	0.55
Zirconium silicate up to 500°C	0.85
Zirconium silicate at 850°C	0.6
Quartz (rough)	0.9
Carbon (graphite)	0.75
Carbon (soot)	0.95
Timber (various)	0.8 to 0.9
Miscellaneous	
Enamel (any color)	0.9
Oil paint (any color)	0.95
Lacquer	0.9
Matte black paint	0.95 to 0.98
Aluminum lacquer	0.5
Water	0.98
Rubber (smooth)	0.9
Rubber (rough)	0.98
Plastics (various, solid)	0.8 to 0.95
Plastic films (05 mm thick)	0.5 to 0.95
Polythene film (03 mm thick)	0.2 to 0.3
Paper and cardboard	0.9
Silicone polish (03 mm thick)	0.7
* Emissivity value varies with purity	

. TEMPERATURE MEASUREMENT

1. *Non-contact measurement :*

- ① Point the instrument at the target and pull the trigger to turn it on and start measuring (use the laser to select the target if required). Release the trigger to stop measuring and auto-hold the reading. The meter will turn off automatically after 15 seconds.
- ② Auto detection type K thermocouple plug-in or pull-out.
If a type K thermocouple is connected to the instrument, the emissivity symbol ϵ will automatically change to K and the temperature measured by the thermocouple will be displayed. The Infrared sensor is disabled when a thermocouple is detected by the instrument.

2. *MAX/MIN hold function :*

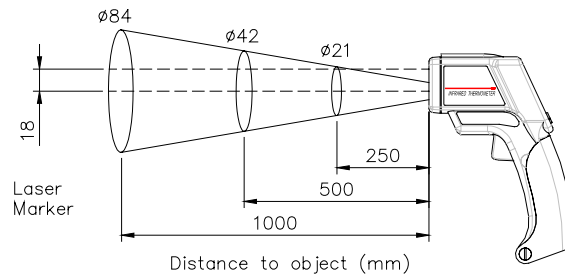
Pull & hold the trigger, then press **MODE** once to cycle through maximum (MAX), minimum (MIN) and current reading (MAX/MIN) modes.

Press and hold the **MODE** button for 3 seconds to exit this mode.

3. *Continuous measurement :*

Start with the instrument turned off. Press and hold the **MODE** button and then pull the trigger to turn the meter on. Release the **MODE** button and the instrument will enter continuous measurement mode. The **H** symbol will not be visible in the LCD, indicating the Hold function is disabled

- ① To exit continuous measurement mode: Pull the trigger to stop continuous measurement and turn the meter off.
- ② MAX/MIN reading: When in continuous measurement mode, press the **MODE** button once to cycle through maximum (MAX), minimum (MIN) and current reading (MAX/MIN) modes.
Press and hold the **MODE** button for 3 seconds to exit this mode.



Note:

- ❑ **Laser offset:** The laser beam is offset 18mm(0.71in) from the focal lens. Choose a sampling spot that is large enough to include the laser offset.
- ❑ **Surface Temperature:** The thermometer will measure the temperature of the first surface it detects, e.g. a glass cover, dust or fog. Ensure the object whose temperature is to be measured is not obstructed.

4. Selecting °C/°F units:

When the instrument is turned on, the units that appear in the LCD are the last units measured. To change the temperature units, pull the trigger to turn the meter on, then press and hold **MODE** for 3 seconds until the “SET” mark appears on the LCD. Press **←** or **→** to select the desired °C or °F units and then pull trigger to store the setting.

5. Data memory store and read procedure :

- ① To clear the data from the memory:
With the instrument turned off, press and hold the **[M]** button, then pull trigger until “CLR” appears on the LCD.
- ② Data memory: Press and hold the **[M]** button for 3 seconds to store the current set of readings into memory.

- ③ Reading the memory data: Press and hold the **[R]** button for 3 seconds to enter READ mode. Press the **[←]** or **[→]** buttons to select to desired memory data location. Press the **MODE** button to exit READ mode.

. SETTING MODE

Pull trigger to turn the meter on. Press & hold the **MODE** button for 3 seconds until "SET" appears on the LCD.

1. Parameter settings for measuring:

Under the infrared parameter setting mode, the LCD will show **[SET]**. Press the **MODE** button to select setting of "°C / °F", "ALM ON/OFF", "↓ALM" "ALM↑" and emissivity "ε". Pull the trigger to exit setting mode and return to normal measurement mode.

2. Parameter settings:

- ① "°C / °F": Temperature unit / °F, press **[←]** or **[→]** to select units °C or °F.
- ② ALM (Alarm function ON/OFF): Press **[←]** or **[→]** to select alarm function on or off.
- ③ ↓ALM (Lo Alarm Function): Press **[←]** or **[→]** to set a value as an alarm value. When this Lo alarm value is exceeded, the beeper will sound and the "↓ALM" symbol will appear on the LCD.
- ④ ALM↑ (Hi Alarm Function): Press **[←]** or **[→]** to set up a value as an alarm value. When this Hi alarm value is exceeded, the beeper will sound and the "ALM↑" symbol will appear on the LCD.

Example:

To sound the alarm if the temperature exceeds 100°C or falls below 0°C, set the Hi Alarm point to 100°C and the Lo Alarm point to 0°C.


Setting procedure:

- a). Press and hold the **MODE** key for 3 seconds until the LCD displays the “SET” mark.
 - b). Press “ ” button to select °C unit.
 - c). Press the **MODE** button once to enter ALARM ON/OFF setting mode, then press the or key to select “ON” mode.
 - d). Press the **MODE** button once to enter ↓ALARM (Lo Alarm point) setting mode.
Press the or button until the display reads 0.0°C.
 - e). Press the **MODE** button once to enter ↑ALARM (Hi Alarm point) setting mode.
Press the or button until the display reads 100.0°C.
 - f). Pull the trigger to store the setting and exit the setting mode.
- ⑤ ε (Emissivity): Press or to adjust the value.
- ⑥ : Button for increasing the value. Hold down to increase the parameter value rapidly.
- ⑦ : Button for decreasing the value. Hold down to decrease the parameter value rapidly.

Note:

- After the setting procedure is terminated, the parameter will be stored until changed.
- Under setting mode, the backlight, laser, memory store and read functions are disabled.
- Pull the trigger to exit setting mode.

BATTERY REPLACEMENT

When the symbol  appears on the LCD screen, there is insufficient power in the battery to provide an accurate measurement. Replace the battery with a fresh one as follows:

- a) Ensure the instrument is turned off
- b) Open battery compartment cover on the rear of the grip.
- c) Remove the exhausted battery from the compartment.
- d) Fit a new battery of the type given in the specifications .
- e) Close the battery cover.
- f) Turn the instrument on and check for correct operation.

