



OPERATING MANUAL

**NON-CONTACT INFRARED
THERMOMETER**

DIT-130



Version 1.5

Main features of the DIT-130 device are the following:

- Precise non-contact temperature measurement.
- Type K temperature Measurement.
- Modern housing design.
- Built-in laser pointer.
- Automatic Data Hold.
- Automatic Power Off.
- °C/°F switch.
- Emissivity Digitally adjustable from 0,10 to 1,00.
- MAX,MIN,DIF, AVG rekord.
- LCD with Backlight.
- Automatic range selection.
- Resolution 0,1°C (0,1°F).
- Trigger lock.
- High and Low alarm.
- Obtain Emissivity.

WIDE RANGE APPLICATION:

Temperature measurements of electric devices, food preparation, safety and fire inspectors, plastic molding, asphalt, marine and screen printing, measure ink and dryer temperature, Diesel and fleet maintenance.

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1 Introduction

Thank you for purchase of the IR Thermometer. This is capable of non-contact (infrared) temperature measurements at the touch of a button. The built-in laser pointer increases target accuracy while the backlight LCD and handy push-buttons combine for convenient, ergonomic operation.

The Non-contact Infrared Thermometers can be used to measure the temperature of objects' surface that is improper to be measured by traditional (contact) thermometer (such as moving object, the surface with electricity current or the objects which are uneasy to be touched.)

Proper use and care of this meter will provide years of reliable service.

In the present manual we apply three kinds of warnings. These are texts in frames, which describe possible dangers both for the user and the meter itself. The messages starting from the word '**WARNING:**' describe situations which imply a risk for life or health should the recommendations presented in the present manual not be observed. The word '**ATTENTION!**' introduces a description of a situation where non-observance of the recommendations presented in the present manual may imply damage for the meter. Indications of possible problems are preceded by the word '**Attention:**'.

WARNING:

Before using the instrument acquaint yourself with the present manual and observe the safety regulations and recommendations specified by the manufacturer.

2 Safety

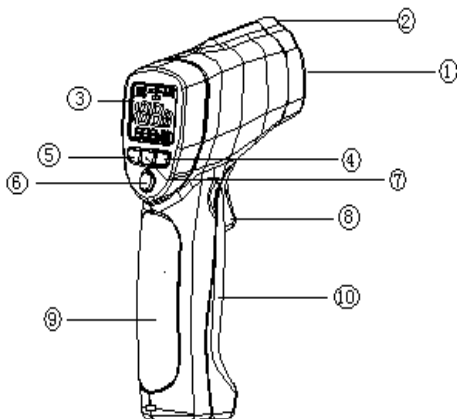
In order to guarantee proper operation and correctness of the obtained results it is necessary to observe the following recommendations:

- Use extreme caution when the laser beam is turned on.
- Do not let the beam enter your eye, another person's eye or the eye of an animal.
- Be careful no to let the beam on a reflective surface strike your eye.
- Do not allow the laser light beam impinge on any gas which can explode
- It is prohibited to operated the meter:
 - ⇒ If it is damaged and completely or partially out of order
 - ⇒ If it has been stored for an excessive period of time in inadequate conditions (e.g. if it is humid)
- Before commencing a measurement make sure the correct measurement function has been selected,
- Repairs must be realised solely by an authorised service workshop



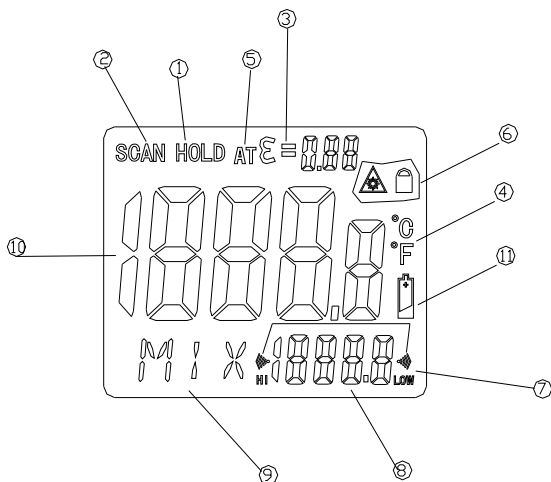
3 Functional description

3.1 Devices description



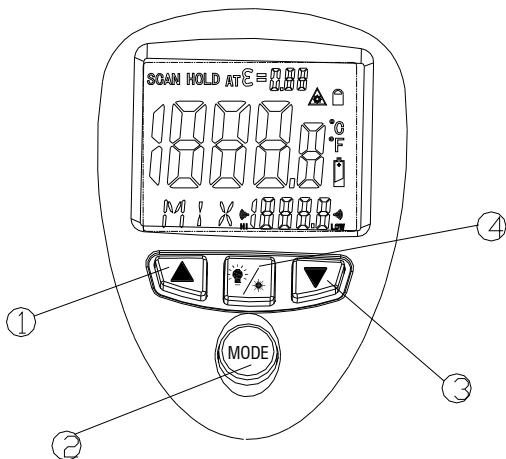
- ① IR sensor
- ② Laser pointer beam
- ③ LCD Display
- ④ DOWN BUTTON
- ⑤ UP BUTTON
- ⑥ MODE BUTTON
- ⑦ laser/backlight button
- ⑧ Measurement Trigger
- ⑨ Handle Grip
- ⑩ Battery Cover

3.2 Indicator



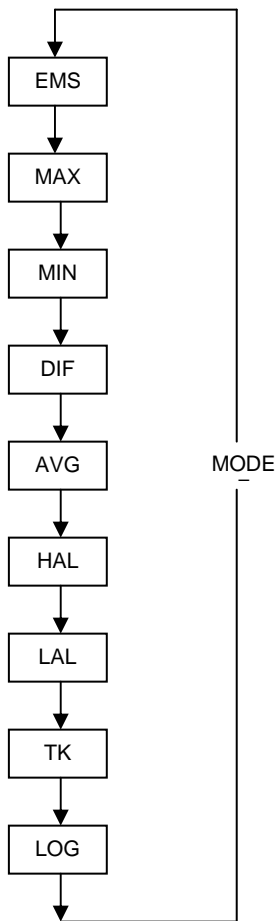
- ① Data hold
- ② Measuring indication
- ③ Emissivity symbol and value
- ④ °C/°F symbol
- ⑤ Auto obtain Emissivity
- ⑥ lock and laser" on" symbols
- ⑦ High alarm and low alarm symbol
- ⑧ Temperature values for the MAX, MIN, DIF, AVG HAL, LAL. And TK
- ⑨ Symbols for EMS MAX, MIN, DIF, AVG, HAL, LAL and TK
- ⑩ Current temperature value
- ⑪ Low battery

3.3 Buttons



- ① Up button (for EMS,HAL,LAL)
- ② MODE button (for cycling through the mode loop)
- ③ Down button (for EMS,HAL,LAL)
- ④ Laser/Backlight on/off button

3.4 *MODE Button Function*



The infrared thermometer measures Maximum (MAX), Minimum (MIN), Differential (DIF), and Average (AVG) Temp. Each time you take a reading. This data is stored and can be recalled with the MODE button until a new measurement is taken. When the trigger is pulled again, the unit will begin measuring in the last mode selected.

Pressing the MODE button also allows you to access the High Alarm (HAL), Low Alarm (LAL), Emissivity (EMS). Each time you Press MODE, you advance through the mode cycle.

Pressing the MODE button also allows you to access the Type K Temp. measurement and memory mode (LOG).

The diagram shows the sequence of functions in the MODE cycle.

4 Distance & Spot Size

As the distance (D) from the object increases, the spot size (S) of the area measured by the unit becomes larger. The relationship between distance and spot size for each unit is listed below. The focal point for each unit is 914mm (36"). The spot sizes indicate 90% encircled energy.

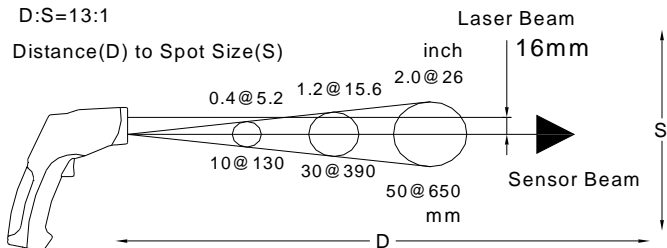
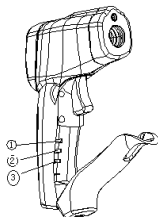


Fig: 1

5 Switching C/F , LOCK ON/OFF and SET ALARM

- ① °C/°F
- ② LOCK ON/OFF
- ③ SET ALARM



Select the temperature units (°C or °F) by using the °C/°F switch.

To lock the unit on for continuous measurement, slide the middle switch **LOCK ON/OFF** right. If the trigger is pulled while the unit is locked on, the laser and backlight will be turned on if they have been activated. When the unit is locked on, the backlight and laser will remain on unless it is turned off using the **Laser/Backlight** button on the keypad.

To activate the alarms, please slide the bottom switch **SET ALARM** right.

To set values for the High Alarm (**HAL**), Low Alarm (**LAL**) and Emissivity (**EMS**), firstly active the display by pulling the trigger or pressing the **MODE** button, then press the **MODE** button until the appropriate code appears in the lower left corner of the display, press the **UP** and **DOWN** buttons to adjust the desired values.

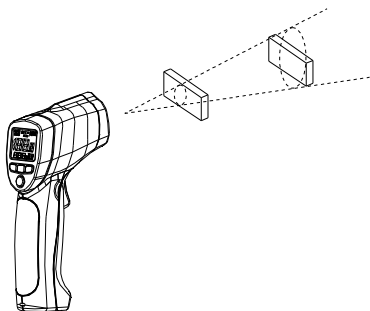
6 How it Works

- ***How it Works***

Infrared thermometers measure the surface temperature of an object. The unit's optics sense emitted, reflected, and transmitted energy, which is collected and focused onto a detector. The unit's electronics translate the information into a temperature reading, which is display on the unit. In units with a laser, the laser is used for aiming purposes only.

- ***Field of View***

Make sure that the target is larger than the unit's spot size. The smaller the target, the closer you should be to it. When accuracy is critical, make sure the target is at least twice as large as the spot size.



- **Distance & Spot Size**

As the distance (D) from the object increases, the spot size (S) of the area measured by the unit becomes larger. See: **Fig: 1**.

- **Locating a hot Spot**

To find a hot spot aim the thermometer outside the area of interest, then scan across with an up and down motion until you locate hot spot.

- **Reminders**

- ① Not recommended for use in measuring shiny or polished metal surfaces (stainless steel, aluminum, etc.). See **Emissivity**.
- ② The unit cannot measure through transparent surfaces such as glass. It will measure the surface temperature of the glass instead.
- ③ Steam, dust, smoke, etc., Can prevent accurate measurement by obstructing the unit's optics.

- **Emissivity**

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 (pre-set in the unit). 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.

Emissivity Values

Substance	Thermal emissivity	Substance	Thermal emissivity
Asphalt	0,90 to 0,98	Cloth (black)	0,98
Concrete	0,94	Human skin	0,98
Cement	0,96	Leather	0,75 to 0,80
Sand	0,90	Charcoal (powder)	0,96
Earth	0,92 to 0,96	Lacquer	0,80 to 0,95
Water	0,92 to 0,96	Lacquer (matt)	0,97
Ice	0,96 to 0,98	Rubber (black)	0,94
Snow	0,83	Plastic	0,85 to 0,95
Glass	0,90 to 0,95	Timber	0,90
Ceramic	0,90 to 0,94	Paper	0,70 to 0,94
Marble	0,94	Chromium oxides	0,81
Plaster	0,80 to 0,90	Copper oxides	0,78
Mortar	0,89 to 0,91	Iron oxides	0,78 to 0,82
Brick	0,93 to 0,96	Textiles	0,90

7 Measurement operation

- Hold the meter by its **Handle Grip** and point it toward the surface to be measured.
- Pull and hold the **Trigger** to turn the meter on and begin testing. The display will light if the battery is good. Replace the battery if the display does not light.
- While measuring, the **SCAN** display icon will appear in the upper left corner of the LCD.
- Release the **Trigger** and the **HOLD** display icon will appear on the LCD indicating that the reading is being held. In HOLD status, press the Laser/Backlight button to turn on or off the laser and the backlight.
- The meter will automatically power down after approximately 7 seconds after the **Trigger** is released. (Unless the unit is locked on.)

How to obtain Emissivity?

In the EMS mode, press and hold the **Trigger** and in the same time press the Laser/Backlight button twice: once short and second one longer until the **EMS** icon on the left side of LCD blinking. At this time, " $\epsilon = --$ " will appear at the upper side of the LCD; IR temperature value will be in the middle of LCD; and Type K temperature value is at the lower side of the LCD.

Contact the Type K probe to the object surface and test the temperature of same point with IR measurement. After both values are stable, press **UP** or **DOWN** button for confirmation. Then, emissivity of the object will be shown at the upper side of the LCD. Press **MODE** button or trigger to enter normal measurement.

Note:

1. When the IR value is not corresponding to the TK value, or IR and TK tested the different points, no emissivity will be obtainable or a wrong emissivity will be obtained.
2. The temperature of the target should be higher than the envi-

ronment temperature. Normally, 100°C is suitable for obtaining a higher accuracy emissivity.

After obtaining the emissivity, if the difference between IR value (in the middle of LCD) and TK value (at the lower side of LCD) is too big, the obtained emissivity will be incorrect. It's necessary to obtain a new emissivity.

Note: Measurement considerations

Holding the meter by its handle, point the IR Sensor toward the object whose temperature is to be measured. The meter automatically compensates for temperature deviations from ambient temperature. Keep in mind that it will take up to 30 minutes to adjust to wide ambient temperatures are to be measured followed by high temperature measurements, some time (several minutes) is required after the low (and before the high) temperature measurements are made. This is a result of the cooling process, which must take place for the IR sensor.

8 Data Logger

8.1 Storing Data

Your thermometer is capable of storing up to 20 data locations. The infrared temperature and temperature scale (°C or °F) are also stored.

To store data from an infrared reading, pull the trigger. While holding the trigger, press the **MODE** button until **LOG** appears in the lower left corner of the display; a log location number will be shown. If no temperature has been recorded in the shown LOG location, 4 dashes will appear in the lower right corner. Aim the unit at the target area you want to record, and press the laser/backlight button. The recorded temperature will appear in the lower right corner. To select another log location, press the up and down keys.

8.2 *Recalling Data*

To recall stored data after the unit shuts off, press the **MODE** button until **LOG** appears in the lower left corner. A LOG location number will be shown below **LOG**, and the stored temperature for that location will be display. To move to another LOG location, press the **UP** and **DOWN** keys.

8.3 *Log Clear Function*

The “Log clear” function allows you to quickly clear all logged data points. This function can only be used when the unit is in LOG mode. It can be used when the user has any number of LOG locations stored.


You should only use the LOG clear function if you want to clear all the Log location data that is stored in unit’s memory. The “LOG clear” function works as follows:

(1) While in LOG mode, press the **Trigger**, and then press the **DOWN** button until you reach LOG location “0”.

Note: This can only be done when the **Trigger** is pulled. LOG location “0” cannot be accessed, by using the **UP** button.

(2) When LOG location “0” shows in the display, press the **Laser/Backlight** button. A tones will sound, and the LOG location will automatically change to “1”, signifying that all data locations have been cleared.

9 Battery Replacement

- ① As battery power is not sufficient, LCD will display “ ” replacement with one new 9V battery is required.



Attention:

When making measurements with a battery's mnemonic on, one must take into account additional indefinite measurement uncertainty or unstable working of the meter.

- ② Open battery cover, then take out the battery from instrument and replace with a new 9-Volt battery and place the battery cover back.

10 Cleaning and maintenance

- Repairs or service are not covered in this manual and should only be carried out by qualified trained technician.
- Periodically, wipe the body with a dry cloth. Do not use abrasives or solvents on this instrument.
- For service, use only manufacturer's specified parts.

11 Storage

In the case of storage of the device, the following recommendations must be observed:

- Make sure the meter and its accessories are dry
- In the case the meter is to be stored for a prolonged period of time, the batteries must be removed from the device.

12 Dismantling and utilization

Worn-out electric and electronic equipment should be gathered selectively, i.e. it must not be placed with waste of another kind.

Worn-out electronic equipment should be sent to a collection point in accordance with the law of worn-out electric and electronic equipment.

Before the equipment is sent to a collection point, do not dismantle any elements.

Observe the local regulations concerning disposal of packages, worn-out batteries and accumulators.

13 Technical data

- The „m.v.“ means the measured value of standard.

Type K temperature range

Temperature range	Resolution	Basic accuracy
-50,0...999,9°C -58,0...999,9°F	0,1°C 0,1°F	$\pm(1,5\% \text{ m.v.} + 3^{\circ}\text{C})$ $\pm(1,5\% \text{ m.v.} + 5^{\circ}\text{F})$
1000...1370°C 1000...2498°F	1°C 1°F	$\pm(1,5\% \text{ m.v.} + 2^{\circ}\text{C})$ $\pm(1,5\% \text{ m.v.} + 3,6^{\circ}\text{F})$

IR measurement

IR temperature range	D:S	Resolution	Basic accuracy	
-32...380°C -25,6...716°F	13:1	0,1°C 0,1°F	-32...-20°C	$\pm 5^{\circ}\text{C}$
			-25,6...-4°F	$\pm 9^{\circ}\text{F}$
			-20...200°C	$\pm(1,5\% \text{ m.v.} + 2^{\circ}\text{C})$
			-4...392°F	$\pm(1,5\% \text{ m.v.} + 3,6^{\circ}\text{F})$
			200...380°C	$\pm(2,0\% \text{ m.v.} + 2^{\circ}\text{C})$
			392...716°F	$\pm(2,0\% \text{ m.v.} + 3,6^{\circ}\text{F})$

Other technical data

- response time less than 1 second
- spectral response 8~14μm
- emissivity.....digitally adjustable from 0,10 to 1,0
- over range indication..... LCD will show “-0L”, “0L”
- polarity.....automatic (no indication for positive polarity); minus (-) sign for negative polarity
- diode laser.....output <1mW, Wavelength 630~670nm, class 2 laser product

- g) operating temp.....0 to 50°C (32 to 122°F)
- h) storage temp.....-20 to 60°C (4 to 140°F)
- i) relative humidity.....10%~90%RH operating, <80%RH storage
- j) memory.....20 cells
- k) power supply.....9V battery, NEDA 1604A or IEC 6LR61, or equivalent
- l) weight290g (10,2 oz.)
- m) size 190 x 111 x 48mm
- n) safety.....“ CE ” Comply with EMC

Note:

- **Accuracy:** Given at 18 to 28 °C (64 to 82 °F), less than 80 % RH.
- **Field of View:** Make sure that the target is larger than the unit's spot size. The smaller the target, the closer you should be to it. When accuracy is critical, make sure the target is at least twice as large as the spot size.

14 Standard equipment

The standard set provided by the manufacturer includes the following components:

- The DIT-130 meter,
- 9V battery,
- Operating manual,
- Carrying case,
- K type probe,
- Guarantee card.

15 Manufacturer

The manufacturer of the device, which also provides guarantee and post-guarantee service is the following company:

SONEL S. A.

ul. Wokulskiego 11

58-100 Świdnica

Tel: +48 74 858 38 60

Fax: +48 74 858 38 09

E-mail: export@sonel.pl

Web page: www.sonel.pl

Note:

Service repairs must be realised solely by the manufacturer.

Made in China for SONEL S.A.