NON-CONTACT INFRARED THERMOMETER
Instruction Manual

Contents

. General
.1. Equipment supplied
Infra-Red Thermometer base unit
4 button cells (already fitted in unit)

.2. Additional note for newly purchased thermometer
The newly purchased thermometer comes with 4 x L1154 alkaline cells already inserted inside the battery compartment. For the first time using the thermometer, gently remove the insulated piece by slowly pulling it out from the battery compartment.

Test the thermometer by pressing the operating button, the LCD display and back light will light up briefly. If it is not the case, remove the cells. Wait for 30 seconds, and re-insert the cells again. Make sure the cells are at the positive (+) pole up into the battery compartment.

Your thermometer is now operational!

.3. Description of measuring principle
When making a temperature measurement, the surface radiation of the object to be measured is evaluated using the principle of radiation thermometry. This is a purely passive process, i.e. no radiation is transmitted, but instead, use is only made of the natural electromagnetic radiation energy (heat radiation) that every body above a temperature of absolute zero (-273 °C) has. The temperature can be determined very accurately from this radiation energy if the emission factor of the object being measured is known.

.4. Technical information
.4.1. Technical data
The important technical data are summarised in the adjacent table.

.4.2. Notes on technical data
. Accuracy: The larger of the two values given is applicable in each case.
. Distance to measuring spot size: The parameter D : S characterises the size of the measuring spot in proportion to the distance between the object to be measured and the Infra-Red Thermometer. For example, with a ratio of 6 :1 and a distance of 60 cm, the monitoring area will have a diameter of 10 cm.

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Range	:	-20 °C to 300 °C
Resolution	:	0.1 °C
Accuracy	:	
Below 200ºC	:	±2°C or ±2% (the larger amount applies)
Above 200ºC	:	-4% to +2%
Unit	:	ºC or ºF
Distance to measuring spot size D:S	:	6:1
Ambient temperature range	:	0 °C to 40 °C
Emission factor	:	0.95
Power supply	:	4 x L1154 button cells
Batterylife approx.	:	2000 measurements (depending on the usage)
Dimensions (L x W x H)	:	56 x 23 x 102 mm
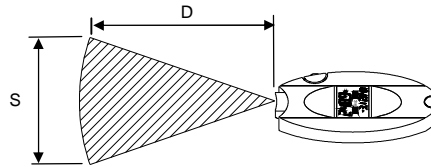
3. Emission factor: The physical quantity known as the emission factor describes to what extent the infrared heat radiation that is emitted from an object is determined by its own temperature. Accordingly, a value of 1 tells us that the infrared heat radiation from the object is based only on its own temperature. A value of less than 1 means that the radiation emitted from the object is not only deter mined by its own temperature but also by reflections from neighbouring bodies or due to the transmission, i.e. the diathermancy, of the object. The emission factor thus has an effect on the result of the measurement. The Infra-Red Thermometer works with an emission factor of 0.95, i.e. the measuring unit assumes that the object being monitored has a factor of 0.95. If this is not the case, there will be inaccuracies in the measurement (see Section 2.5 "Measuring inaccuracies").

2. Operation
2.1. Display and operator controls
All the functions of the measuring unit are controlled and monitored using the operating button 7 and the back-lit display.

1 Temperature display - currently measured value
2 Hold indicator
3 Temperature display - minimum value
4 Temperature display - maximum value
5 Battery symbol – (low battery indicator)
6 Temperature units – °C or °F
7 Operating button
8 Lens
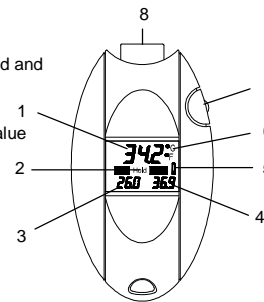
2.2. Making a measurement
The unit is switched on by pressing the operating button. The display will show horizontal bars until the first measurement is available. The current temperature will then be displayed in the upper main part of the display. The button must be pressed for the duration of the measurement, where by the display of the measured value will be continuously updated. The lens must be focussed on the object while the measurement is being made. At the same time, the object being measured must be larger than the area monitored by the Infra-Red Thermometer (see 2.5. "Measuring inaccuracies"). The measurement will be finished by releasing the button. The "Hold" indication signals that measuring has stopped. The last measurement will be shown in the upper main part of the display.
The display back light will go out 4 seconds after the button has been released. The unit will switch itself off automatically 8 seconds after the last measurement. It will be necessary to replace the batteries as soon as the battery symbol appears in the display.

2.3. Minimum and maximum temperature indication
The minimum and maximum value memories are cleared at the start of a measurement by pressing the operating button. The temperature will be measured and the minimum and maximum temperatures will be determined for as long as the button is pressed. The minimum temperature is shown in the lower left hand part of the display and the maximum temperature can be seen in the lower right hand part. These values each apply to the current measuring cycle and are cleared as soon as the button is pressed again.

2.4. Changeover °C / °F
The units for the temperature display can be switched between degrees Centigrade (°C) and degrees Fahrenheit (°F) by pressing the button briefly twice (double click).

2.5. Back-light
The LCD back-light is constantly switched ON when the Operating button is pressed. When releasing the Operating button, the back-light will be ON for approximately 4 seconds before automatically switching OFF.

2.6. Measurement inaccuracies
The following points should be observed in order to avoid measurement errors:

1. It must be ensured that the object to be measured completely fills the Infra-Red Thermometer monitoring area. Errors can occur when measuring small objects, as the non-contact thermometer also monitors the temperature of the surroundings as well as the object to be measured. The temperature of the whole of the monitoring area is determined.
2. The principle of measurement requires the ambient temperature to be determined. This takes place at 1-minute intervals or each time the unit is switched on. Changes in the ambient temperature, which can occur when the user holds the unit in his hand, are not monitored within this time period and therefore neither of them are taken into account when determining the indicated temperature. A gradual warming of the unit (the lens) between ambient temperature measurements can, for example, lead to the indicated temperature slowly falling.
3. If the emission factor for the object does not correspond to the preset value of 0.95, the temperature will not be calculated correctly. Most surfaces have an emission factor in the range of 0.8 to 0.98. In general, the darker and more matt the surface is, the larger its emission factor. If the factor is greater than 0.95, the temperature indicated will be greater than the actual temperature of the object being measured. If the factor is less than 0.95, the temperature indicated will be less than the surface temperature.
Polished metals have a very low emission factor and are therefore not suitable for measuring with a non-contact thermometer. On the other hand, affixing adhesive tape to or painting the surface will increase the emission factor and reduce the inaccuracy of the measurement.
4. It is not possible to take measurements through transparent materials (glass, plexiglas etc.).
5. It is not possible to measure air temperatures.
6. Measurement errors can occur due to air contaminated with dust, steam, smoke, etc.

2.7. Fault finding
- Display shows **-.-**
The operating button has not been pressed for long enough. This must be pressed for at least the duration of one measurement, i.e. for at least 1.5 seconds.
- Display shows **Err.1**
The ambient temperature is outside the permitted range.
- Display shows **1 .**
The measured value is outside the permitted range.
- Battery symbol illuminates.
The batteries are flat. See 3.1 Changing the batteries.

3. Maintenance
3.1. Changing the batteries
If the battery symbol appears in the display, the batteries must be changed. The four button cells are accessible after opening the battery compartment at the rear of the unit. The used batteries must be removed from the battery holders and replaced by new button cells of the same type. Only L1154 type batteries may be used. Care must be taken to ensure that the polarity is correct when inserting. The plus terminal of all four batteries should point upwards. The batteries must be checked to see that they are properly seated before closing the battery compartment.

Note: **Used batteries should not be disposed of in the household waste. Old batteries and batteries that no longer work can be handed in to the local collection point free of charge.**

3.2. Cleaning
Clean the unit using only a dry cloth. If the unit is very dirty, the cloth may be slightly dampened. Do not use cleaners containing solvents. Make sure that no moisture enters the interior of the unit. When cleaning the lens, loose particles must be removed using compressed air. Any remaining dirt can then be removed with a soft brush or with a cotton-wool bud moistened with water. **CAUTION!** Do not use cleaners containing solvents.

4. Fastening the Infra-Red Thermometer
The carry necklace is supplied with the thermometer.

To fasten, simply insert the clip of the necklace into the buckle end of the thermometer until it clicks into place.

To unfasten, simply press both sides of the clip and pull until it can be removed from the buckle.