TRACEABLE® INFRARED THERMOMETER WITH TRIGGER GRIP INSTRUCTIONS

SPECIFICATIONS
Range: –76° to 932°F / –60° to 500°C
Resolution: 0.1° (–9.9° to 199.9°) 1° (otherwise)

OPERATION
Press and continue to hold down the trigger to take temperature readings. The unit will take temperature readings while the trigger is pressed and held (SCAN appearing on the display indicates measurements are being taken).

After the trigger is released, the last temperature measured will be displayed for approximately 60 seconds, the display will then turn off automatically. HOLD will appear on the display when the trigger has been released to indicate that the unit is no longer taking temperature measurements.

SELECTING UNITS OF MEASURE
Press and release the trigger to turn on the display. Once the display is on (and the trigger has been released), each press of the °C/°F button will toggle between °C and °F. *(If the trigger is being held when the °C/°F button is pressed, this will laser targeting on/off.)*

LASER TARGETING
While pressing and holding the trigger, each press the °C/°F button toggles laser targeting on and off. With laser targeting on, each time the trigger is pressed and held, the laser beam will be emitted.

CAUTION: Eye damage may result from direct exposure to laser light.

DISTANCE SPOT/RATIO
There are other factors that may affect measurement accuracy. The target must completely fill the spot diameter seen by the infrared sensor; otherwise readings will be influenced by the surface surrounding the target. The ratio of the distance to the size of the spot being measured is 11:1. For example, an object's diameter of 100mm can be measured from 1100mm.

BACKLIGHT
While pressing and holding the trigger, each press the LOCK button toggles the LCD backlight on and off. With the backlight on, each time the trigger is pressed and held, the LCD will be illuminated by the backlight.

VALUES RECORDED
With each press of the trigger, five values are recorded:
1. MAX – Highest temperature measured.
2. MIN – Lowest temperature measured.
3. DIF – Difference between MAX and MIN.
4. AVG – Time-weighted average temperature.
5. The value last displayed before releasing the trigger. (Appears at the bottom of the display.)

DISPLAY MODES
Each press of the MODE button will select one of the 8 display modes. You can cycle through the modes in this order:

"E" – Emissivity value display (See the Emissivity section).

"MAX" (Maximum temperature) – Press the MODE button until MAX appears on the display. In the MAX mode, the highest temperature measurement taken is displayed to the right of MAX. This value will update each time a higher temperature is measured.

"MIN" (Minimum temperature) - Press the MODE button until MIN appears on the display. In MIN mode, the lowest temperature measurement taken is displayed to the right of MIN. This value will update each time a new lower temperature is measured.

"DIF" (Temperature differential between MAX and MIN) – Press the MODE button until DIF appears on the display. The difference between the MAX and MIN reading is displayed to the right of DIF. This value is updated as new MAX and MIN temperatures are measured.

"AVG" (Calculated (time weighted) average temperature] – Press the MODE button until AVG appears on the display. The time weighted average temperature reading is displayed to the right of AVG. This value is updated continuously while the trigger is being pressed.

The term "time", in reference to the averaging mode, means all temperature measurements are averaged together from the first press of the trigger.

Example: If the temperature was 72° for one minute, then 20° for ½ second, no significant change in average temperature would be displayed.

"HAL" (High Temperature Alarm) – Press the MODE button until HAL appears on the display. The high temperature alarm value that has been set is displayed to the left of HAL. (See High/Low Alarms section.)

"LAL" (Low Temperature Alarm) – Press the MODE button until LAL appears on the display. The low temperature alarm value that has been set is displayed to the left of LAL. (See High/Low Alarms section.)

"PRB" (Probe Temperature) – Press the MODE button until PRB appears on the display. The external probe temperature is displayed to the left of PRB. If no probe is connected, NOP will appear to the right of PRB.

With a probe connected, the unit will display the probe temperature without pressing the trigger. While in PRB mode, the unit will turn off automatically after 12 minutes if no buttons are pressed. ***Only Type-K thermocouple probes may be used with this unit.***

NOTE: The last mode selected will remain selected the next time the trigger is pressed.

MEMORY RECALL
With each press of the trigger, five values are recorded:
1. MAX – Highest temperature measured.
2. MIN – Lowest temperature measured.
3. DIF – Difference between MAX and MIN.
4. AVG – Time-weighted average temperature.
5. The value last displayed before releasing the trigger.

To cycle through each of the values recorded during the last measurement, press the MODE button. (See the "Display Modes" section for an explanation of the values displayed.)

HI/LOW Alarms
An audible alarm will sound at both an upper and a lower temperature limit. To adjust the alarm temperature set points:
1. Press the MODE button until "HAL" (High Temperature Alarm) or "LAL" (Low Temperature Alarm) is displayed.
2. To adjust the temperature alarm set point, press the ↑ or ↓ button. *(Do not press the trigger while adjusting the alarm set points).* Press and hold to advance the display rapidly.
3. Once the desired temperature alarm set point appears on the display, press the trigger to confirm the value.

While taking temperature measurements, an alarm will sound when the temperature measured is above or below High and Low alarm set points that have been entered. If the temperature is above the High Alarm set point, (((HI))) will appear at the top right corner of the display. If the temperature is below the Low Alarm set point, (((LO))) will appear at the top right corner of the display.

The alarm will sound regardless of the Display Mode if the temperature measured is above or below High and Low alarm set points that have been entered.

LOCK FUNCTION
The lock function allows the thermometer to take measurements without having to press and hold the trigger. When the lock function is activated, the unit will take continuous temperature measurements for 60 minutes and will then turn off automatically to preserve battery life.

To activate the lock mode, while in the E, MAX, MIN, DIF, or AVG mode, press the LOCK button. LOCK and SCAN will appear on the display to indicate that the unit is in the lock mode and is taking measurements. *(Do not press and hold the trigger while activating the lock mode.)*

To deactivate the lock mode, while in the E, MAX, MIN, DIF, or AVG mode, press the LOCK button. HOLD will appear on the display to indicate that the unit is no longer taking measurements. *(Do not press and hold the trigger while deactivating the lock mode.)*

EMISSIVITY

Emissivity adjustment is optional. Emissivity adjustments are used to provide a truer temperature reading. Different materials radiate infrared energy at slightly different temperatures. The emissivity adjustment is used to compensate for different types of materials. The default emissivity of 0.95 will cover 90% of typical applications.

The emissivity table provides a guide of different emissivity values for different materials.

METALS (Typical Emissivity Values)

SURFACE	EMISSIVITY
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
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 (oxide)	0.6
Copper	
Copper (polished)	0.05*
Copper (oxide)	0.8
Molten copper	0.15
Lead	
Lead (polished)	0.1*
Lead (oxide at 25°C)	0.3
Lead (oxide)	0.6
Nickel and Its Alloys	
Nickel (pure)	0.1*
Nickel plate (oxide)	0.4 to 0.5
Nichrome	0.7
Nichrome (oxide)	0.95
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*

NON-METALS (Typical Emissivity Values)

SURFACE	EMISSIVITY
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 (0.05 mm thick)	0.5 to 0.95
Polythene film (0.03 mm thick)	0.2 to 0.3
Rubber (smooth)	0.9
Rubber (rough)	0.98
Plastics (various, solid)	0.8 to 0.95
Plastic films (0.05 mm thick)	0.5 to 0.95
Polythene film (0.03 mm thick)	0.2 to 0.3
Paper and cardboard	0.9
Silicone polish	0.7

*Emissivity varies with purity

When the emissivity of an object is unknown use a non-infrared thermometer, such as a thermometer with a surface probe to measure the object's surface temperature. Adjust the emissivity until the temperature of the infrared thermometer matches the temperature of the surface probe. The emissivity value arrived at by this method may be used to measure similar materials.

To adjust the emissivity (optional):

1. Press and release the trigger to turn on the display.
2. With a pointed object, press the EMIS. button, until ▲ E▼ appears on the display.
3. To adjust the emissivity value, press the ↑ and ↓ buttons. *(Do not press the trigger while adjusting the emissivity value).* Press and hold to advance the display rapidly. The emissivity can be set from 0.10 to 1.00.
4. Once the desired emissivity value appears on the display, press MODE button to confirm the value. (▲ E▼ will no longer appear on the display.)

This emissivity value will be used for all temperature measurements until the value is reset.

DISPLAY MESSAGES

"ER2" will appear on the display when the unit is exposed to rapid changes in ambient temperature.

"ER3" will appear on the display when the ambient temperature is below 32° F (0° C) or above 122° F (50° C).

"ER" will appear on the display when the unit needs to be reset. To reset the unit, remove the batteries, wait 2 minutes and then reinstall the batteries.

ALL OPERATIONAL DIFFICULTIES

If this thermometer does not function properly for any reason, replace the batteries with new high-quality batteries (see Battery Replacement section). Low battery power can occasionally cause any number of "apparent" operational difficulties. Replacing the batteries with new fresh batteries will solve most difficulties.

BATTERY REPLACEMENT

Erratic readings, faint readings, no display, or  appearing on the display are all indications that the batteries must be replaced. Open the battery compartment by sliding the battery cover in the direction indicated by the arrow and then lift the battery cover. Remove the exhausted batteries and replace them with two (2) new AAA alkaline batteries. Make certain to install the new batteries in the directions indicated in the battery compartment. Close the battery cover.