INSTRUCTION MANUAL

MT691

Infrared Thermometer with Dual Laser

Index

1. Introduction

- Thank you for purchasing the MT691 IR Thermometer. This instrument 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 MT691 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 not possible to be touched).
- Proper use and care of this meter will provide years of reliable service.

2. Features

- Rapid detection function
- Precise non-contact measurements
- Dual laser sighting
- Unique flat surface, modern housing design
- IP54 rated for dust/waterproof
- 2 meter drop tested
- Automatic Data Hold
- Emissivity Digitally adjustable from 0.10 to 1.0
- MAX, MIN, AVG, DIF temperature displays
- Backlight LCD display
- Automatic selection range and Display Resolution 0.1°C (0.1°F)
- Set high and low alarms

3. Wide Range Application

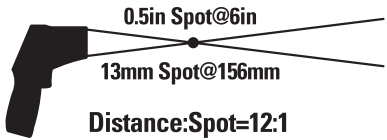
Food preparation. Safety and Fire inspectors. Plastic molding, Asphalt. Marine and Screen printing, measure ink and Dryer temperature, HVAC/R, Electrical, Diesel and, Fleet maintenance.

4. ⚠ Safety

- 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 not 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.

5. 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.



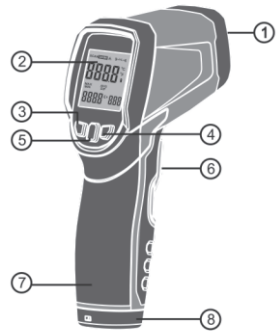
6. Specifications

Temperature Range	-50 to 650°C (-58°F ~ 1202°F)
D:S	12:1
Display Resolution	0.1 °C (0.1 °F) <1000 1°F >1000
Accuracy	**for targets** Assumes ambient operating temperature of 23 to 25°C (73 to 77°F) -50 - 20°C (-58°F - 68°F) ±3.5°C (6.3°F) 20°C -300°C (68°F-572°F) ±1.0% ±1.0°C (1.8°F) 300°C -650°C (572°F -1202°F) ±1.5%
Repeatability	-50-20°C (-31-68°F): ±1.8°C (3.2°F) 20-650°C (68-1202°F): ±0.5% or ±0.5°C (0.9°F)
Response Time	150ms
Spectral Response	8~14um
Emissivity	Digitally adjustable from 0.10 to 1.0
Over Range Indication	LCD will show "____"
Polarity	Automatic (no indication for positive polarity); Minus (-)sign for negative polarity
Diode Laser	Output <1 mW, Wavelength 630~670nm, Class 2 laser product
Operating Temp.	0 to 50°C (32 to 122°F)
Storage Temp.	-10 to 60°C (14 to 140°F)
Relative Humidity	10%-90%RH operating, <80%RH storage
Power Supply	2x1 .5V AAA batteries
Safety	"CE" Comply with EMC

Note: 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.

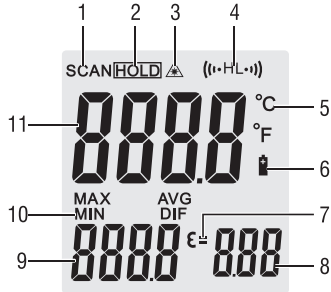
7. Front Panel Description

1 - DIR sensor
2 - LCD Display
3 - up button
4 - down button
5 - mode button
6 - Measurement Trigger
7 - Handle Grip
8 - Battery Cover



7-1. Indicator

1 - Scan symbol
2 - Data hold
3 - Laser "on" symbols
4 - High alarm and low alarm symbol
5 - °C/°F symbol
6 - Low power symbols
7 - Emissivity symbol
8 - Emissivity value
9 - Temperature values for the MAX/ MIN/DIF/AVG
10 - Symbols for MAX/MIN/DIF/AVG
11 - Current temperature value



7-2. Buttons

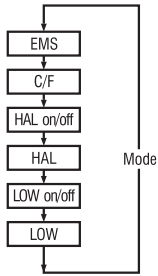
1 - Up button (for EMS, HAL, LAL)
2 - Down button (for EMS, HAL, LAL)
3 - MODE button (for cycling through the mode loop)

8. Functional Design

1 - Press the up and down keys to adjust the Emissivity.
2 - Press the up key to turn the laser on or off and the down key to turn the backlight on or off.
3 - Press the MODE button to change MAX/MIN/DIF/AVG
4 - To set values for the High Alarm (HAL), Low Alarm (LAL) and Emissivity (EMS), press and hold the MODE button until the appropriate code appears in the display, press the UP and down buttons to adjust the desired values.)

9. MODE Button Function

Pressing the mode button also allows you to access the set state, Emissivity(EMS), °C/F, HAL on/off, HAL adjustment, LAL on/off, LAL adjustment. Each time you press the set key you advance through the mode cycle.
The diagram shows the sequence of functions in the mode cycle.
EMS adjustment. **The Emissivity(EMS) digitally adjustable from 0.10 to 1.0.**



°**C/F.**
Press the up/down button to change the temperature unit (°C or °F)

HAL/LAL on/off. Press the up button or down button to turn on or off. Press the Measurement Trigger to confirm the High/Low alarm mode. **HAL/LAL adjustment**, the High/Low alarm adjustable from -50 to 650°C (-58°F- 1202°F).

MAX MIN DIF AVG indicates the **MAX MIN DIF AVG** which is recorded by pressing and releasing the "ON/OFF" button each time.

MAX MIN DIF AVG display

MAX = maximum .Maximum value of measurement.
MIN = minimum. Minimum value of measurement.
DIF = difference. Difference value of measurement.
AVG = average. Average value of measurement.

10. Measurement Operation

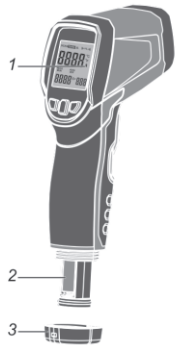
1. Hold the meter by its Handle Grip and point it toward the surface needing to be measured.
2. Pull and hold the Trigger to turn the meter on and begin testing. The display will light up if the battery is good. Replace the battery if the display does not light up.
3. Release the Trigger and the HOLD display icon will appear on the LCD indicating that the reading is being held. In HOLD status, press the UP button to turn on or off the laser. And press the DOWN button to turn on or off the backlight.
4. The meter will automatically power down after approximately 10 seconds after the trigger is released. (Unless the unit is locked on).

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 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.

11. Battery Replacement

1. If the battery power is not sufficient the LCD will display "🔋" replace with 2xAAAbatteries.
2. Open the battery cover to replace the batteries in the instrument. Close the cover to carry on using the instrument.



12. Notes

- **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 displayed 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.

- **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 shinny 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 shinny 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.

13. Emissivity Values

Substance	Thermal Emissivity
Asphalt	0.90 to 0.98
Concrete	0.94
Cement	0.96
Sand	0.90
Earth	0.92 to 0.96
Water	0.92 to 0.96
Ice	0.96 to 0.98
Snow	0.83
Glass	0.90 to 0.95
Ceramic	0.90 to 0.94
Marble	0.94
Plaster	0.80 to 0. 90
Mortar	0.89 to 0. 91
Brick	0.93 to 0.96
Cloth (black)	0.98
Human skin	0.98
Lather	0.75 to 0.80
Charcoal (powder)	0.96
Lacquer	0.80 to 0. 95
Lacquer (matt)	0.97
Rubber (black)	0.94
Plastic	0.85 to 0. 95
Timber	0.90
Paper	0.70 to 0. 94
Chromium oxides	0.81
Copper oxides	0.78
Iron oxides	0.78 to 0.82
Textiles	0.90

14. Maintenance

- Repairs or service are not covered in this manual and should only be carried out by a qualified 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.

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