

# IR- CelsiMeter® new model CMI-056V

## Nonecontact Digital-Thermometer with Optimal Price- / Performance- and Quality Ratio

### Principle of nonecontact measurement

All object surfaces emit in all directions a linear temperature dependant heat radiation. That's sort of like sensation felt either comfortable or stinging when moving one's palm without touching towards a more or less heated surface.

This heat energy radiation also depends on the surface condition of the emitting surface. A dull black surface is a good and effective emitter, glossy and shiny metallic surfaces have less radiation efficiency. This physical behavior is termed as emission or emissivity factor and describes the surface thermal characteristic. The opposite is the absorption factor for heat radiation. A black painted car heats up quicker and higher than a white painted car.

Fabrics, woods, concrete, stone, skin, plants or other none-metallic surfaces all have an emissivity between 0,90 .. 0,98. The IR-CelsiMeter® CMI-056V features an adjustable emissivity factor, adjustable from 0.10 to 1.00.

Shiny, none-oxidized or polished metallic surfaces have a much lower emissivity factor. Correction tables can be created.

### Design of nonecontact measurement gear

Today's advanced technologies in electronics, sensors, chips and microprocessors, LED's, LCD-displays, but also of plastic processing (lenses, reflectors,..) permit almost any measurement applications.

The IR sensor in the IR-CelsiMeter, the radiation eye, can pick up within a small viewing angle the radiation from a surface, almost like a binocular selects the view of a remote scenery. The "IR blind" operator uses the **internal laser target marker** (see picture) to view the area which sends the radiation and of which the surface temperature is to be taken.

On a measuring distance of 1 meter the measuring spot has a diameter of 80 mm, a ratio of about 1:12.

**Point & Click ...  
the use of an IR-CelsiMeter®  
as a thermometer could not be easier.**

With the pistol like trigger continuously pulled there will be a measurement cycle displayed every 0,5 seconds. The last value taken will be on HOLD on display for 5 seconds before the CelsiMeter® automatically shuts down for battery energy conservation. A new triggered cycle will be started and displayed within 0,8 seconds.

**Point & Order!  
The promotion price is time limited.**



IR-CelsiMeter®	Model CMI-056V	part #16658
Range	-30 °C ... +530 °C (-25 °F ... +990 °F)	°C / °F switchable
Resolution	0,1 °C of display	
Repeatability	± 1 °C	
Accuracy ambient @ +25°C	± 3 °C ( -30 ... - 15°C) ± 2 °C ( -15 ... +110°C) ± 2 % (+ 110 ... +530°C)	worst case worst case worst case
Distance / spot	12 : 1	spot ø 80 mm on 1 meter
EM-factor	adjustable, 0.10 to 1.00	
IR-wavelength	5 ... 13 µm processed	
Cycle time	continuous sampling / HOLD of last value	
Sampling	0,5 second	
LED-display	4-digit, 23 x 27 mm, back illumination	
Laser marker	intensive, bundled red spot, switchable	
Activation	pistol like grip with pull trigger, deactivates after approx 5 seconds	
Ambient	0 ... +50 °C / 10 - 90 %rH	
Battery	9 Volt / MN1604 / 6LR61	
Dimensions	185 x 95 x 46 mm	
Weight	230 gramm	
Shipping	CelsiMeter®, Battery, Carry bag, User manual	

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## Use of the CelsiMeter® CMI-056cn and CMI-056V

**Never point a laser marker on persons.**

**These IR CelsiMeter® are not for medical applications.**

Install the 9-Volt battery.

Select on / off for laser pointer, select °C / °F display in the battery compartment.

### SCAN - Measuring

Permanent pressed trigger initiates a flow of repetitive measurements and temperature level displays.

The mark SCAN blinks in display.

### Oneshot - Measuring

Point target and press trigger and release immediately.

HOLD with the temperature value shows for about 5 seconds on display.

Ratio measuring distance to measuring spot on target is

**12 : 1**

### Non-contact Infrared Thermometry

Thermal energy is radiated by every object. A portion of this energy radiated is in the invisible infrared wavelengths. The heat sensation felt on skin from an oven is such a radiated infrared energy. The CelsiMeter® IR is an electronic passive non-contact heat sensing / measuring device. The heat sensed is calculated and displayed in degrees °C or °F.

Measuring the heat radiation allows non-physical contact temperature measurements.

Noncontact measurement has several advantages over contact thermometry:

- > No heat is removed from or applied to test object.
- > The test surface is not contaminated by a mechanical contact.
- > Measurements can be made very fast (in parts of a second), therefore catching also fast changes not accessible to contact thermometry,
- > Measurements can be made over surfaces by moving the sensitive area over the surface, or by using a "thermo camera" a complete temperature map of a surface can be displayed.
- > Test objects might be of a "dangerous nature", eg. high-voltages, moving, ..

An IR thermometer is usually made up of the electronic box and the infrared radiation sensor head. The IR sensed is an electric signal, converted into digital values and then expressed as °C or °F values on the display. The resolution can reach 0,1 °C. The IR radiation is filtered by optical means and limits the sensitivity of the instrument to wavelengths of 8 - 14 micron. This spectrum is relatively undisturbed by invisible and visible ir emitting sources like lights and other emitters. This wavelength range is also minimally damped by the ir absorption through atmospheric water vapors and carbon-dioxyde.

IR-meter models are available either with a fixed or an adjustable <E> = emissivity setting.



Install the 9-Volt battery.  
Select on / off for laser pointer,  
select °C / °F display in the battery compartment.

### Emittance <E>

The surface condition of the target defines its emissivity or radiation efficiency compared to an ideal "blackbody" radiation source with an emissivity of 100% or 1.

This is the value of most organic substances such as wood, cloth, plastics and most paints. Its also valid for corroded or heavily oxidized metal surfaces.

Metals with smooth polished surfaces have emissivity values *much lower* than 1.0 and the use of an emissivity adjustable IR meter is requested. An emissivity table for various materials follows later.

The CelsiMeter® model CMI-056cn is a fixed, none-adjustable factory preset **E = 0,95** version. The CelsiMeter® model CMI-056V features an adjustable E from 0.10 to 1.00. To set up the E-factor just press the <F> button till the EMS shows up on the LED-display. Changing the factor just by pressing the arrows up respectively down.

For measuring purposes on a metallic surface a black paper target with an emissivity value of close to 1.0 could be used, eg a soft black blotting paper would be fixed to target. Allow to warmup, then read temperature of the black paper surface with the fixed <E>=0,95 setting instrument. For higher temperature levels on metals also so called black paints or car exhaust paints are available.

### Application

The sensor front (instrument) should never be pointed too long towards very hot surfaces. Point and shoot to limit the heat exposure of the ir sensitive receiving surface.

Measurement can be made at any distance from the target. The diameter of the measured area depends on the distance.

**With model CMI-056.. the measured target diameter is roughly 1/12 of the distance between head and target.**

If distance between head and target is a close-up of only 60 mm then the measuring spot will be a circle with approximately  $\varnothing$  5 mm.

The target center can be identified by a switchable red dot laser pointer.

To not falsify measurement do not hold the IR-meter at head body.

### Maintenance

There is no general maintenance needed. The battery might have to be replaced at some time.

KEEP instrument clean.

DO NOT insert parts into the open sensing area of probe head.



The CMI-056V has an adjustable E-Factor (0.10 to 1.00). The chosen value will be automatically saved.