KUSAM-MECO®
An ISO 9001:2008 Company

DIGITAL INFRARED THERMOMETER

Model - IRL-900

APPLICATION :

Infra Red Thermometer can be used in places where it is difficult for a normal temperature probe to reach or places where it is dangerous such as Heat Treatment Furnance, High Voltage Operating Plants, Molten Metal Temperature Monitoring, Kiln Temperature, Bearing Temperature, Energy Conservation, Scientific Experiment, Research & Development, Air conditioning, Petrochemicals, Automobile repair & Maintenance.

It can be used for purposes where safety is involved such as Gas pipelines, Automotive Industry, Clinical use, Electrical Panel etc.

SPECIFICATIONS

FUNCTIONS	
Distance to Spot Ratio	10 : 1
Temperature Range	-30 ~ 550°C (-22 ~ 1022°F)
Accuracy	± (2°C / 4°F) : 30°C to 100°C (-22°F ~ 212°F) ± 2%rdg : 100°C ~ 550°C
Thermopile	6 ~ 14 µm
Laser wave length	Red 630 ~ 670nm
Laser power out	≤1mW, Class 2 Laser product
Repeatability	±1°C (±2°F)
Resolution	0.5°C / 1°C / 1°F
Response Time	250 ms
Auto Power OFF	10 sec
Emissivity	0.1~ 1.0
°C / °F Selectable	Yes
Backlight	Yes
Laser Sight Switchable	Yes
Max / Min / Avg / T	Yes
High / Low Alarm	Yes
Power Supply	9V battery
Dimensions in mm	148 x 105 x 42 mm
Weight Approx.	157 gms. Approx.

All Specifications are subject to change without prior notice

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INFRA RED THERMOMETERS

What is an Infrared Thermometer?

An infrared thermometer is a non-contact temperature measurement device. Infrared Thermometers detect the infrared energy emitted by all materials -- at temperatures above absolute zero, (0°Kelvin)-- and converts the energy factor into a temperature reading.

How do infrared Thermometers work?

The most basic design consists of a lens to focus the infrared (IR) energy on to a detector, which converts the energy to an electrical signal that can be displayed in units of temperature after being compensated for ambient temperature variation. This configuration facilitates temperature measurement from a distance without contact with the object to be measured. As such, the infrared thermometer is useful for measuring temperature under circumstances where thermocouples or other probe type sensors cannot be used or do not produce accurate data for a variety of reasons. Some typical circumstances are where the object to be measured is moving; where the object is surrounded by an EM field, as in induction heating; where the object is contained in a vacuum or other controlled atmosphere; or in applications where a fast response is required.

Common Questions When Using an Infrared Thermometer :

Why should I use an infrared thermometer to measure temperature in my application ?

Infrared pyrometers allow users to measure temperature in applications where conventional sensors cannot be employed. Specifically, in cases dealing with moving objects (i.e., Rollers, moving machinery, or a conveyor belt), or where non-contact measurements are required because of contamination or hazardous reasons (such as high voltage), where distances are too great, or where the temperatures to be measured are too high for thermocouples or other contact sensors.

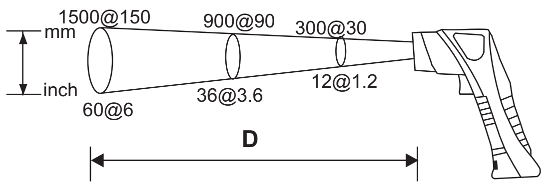
What should I consider about my application when selecting an infrared thermometer ?

The critical considerations for any infrared pyrometer include field of view (target size and distance), type of surface being measured (emissivity considerations), spectral response (for atmospheric effects or transmission through surfaces), temperature range and mounting (handheld portable or fixed mount). Other considerations include response time, environment, mounting limitations, viewing port or window applications, and desired signal processing.

What is meant by Field of View, and why is it important ?

The field of view is the angle of vision at which the instrument operates, and is determined by the optics of the unit. To obtain an accurate temperature reading, the target being measured should completely fill the field of view of the instrument. Since the infrared device determines the average temperature of all surfaces within the field of view, if the background temperature is different from the object temperature, a measurement error can occur. KUSAM-MECO offers a unique solution to this problem. Many KUSAM-MECO infrared Thermometers feature a laser dot. A single laser dot marks the center of the measurement area.

Field of View



Working with an Infrared Thermometer

Infrared Thermometers are ideal for paranormal investigations because they respond to temperature changes instantly. The key to successfully using an infrared thermometer is to understand exactly what it is that you are measuring.

Most infrared thermometers contain a built in laser pointer to help the user determine which direction the thermometer is pointed. Many people incorrectly assume that when they are using an infrared thermometer, they are measuring the temperature of whatever the dot happens to be touching.

While an infrared thermometer does measure the temperature of the object that it is pointed at, the accuracy of the measurement varies with distance. If you measure an object’s temperature at point blank range, then for all practical purposes the temperature that is being displayed is the object’s temperature.

If you measure the same object’s temperature from 20 feet away, you will likely get a very different measurement. The reason why this occurs is because the size of the cone that is being measured increases with distance. Therefore, you aren’t just measuring the object that the thermometer is pointed at. The thermopile is also collecting infrared energy from the air between itself and the object. You may also be collecting infrared energy from other nearby objects. In these types of situations, the thermometer may report an average temperature or a dominant temperature.

When using an infrared thermometer on an investigation, paranormal investigators should try to take measurements from as close to the target object as possible in order to ensure accuracy. It is also important to realize that an infrared thermometer is not usually capable of measuring a floating cold spot. Pointing the thermometer at a cold spot will yield the aggregate temperature of the cold spot, it is not actually displaying the cold spot’s temperature, but rather what you are seeing is the cold spot’s influence on the aggregate temperatures of nearby objects.

What is emissivity, and how is it related to infrared Temperature measurements ?

Emissivity is defined as the ratio of the energy radiated by an object at a given temperature to the energy emitted by a perfect radiator, or blackbody, at the same temperature. The emissivity of a blackbody is 1.0. All values of emissivity fall between 0.0 and 1.0. Most infrared thermometers have the ability to compensate for different emissivity values, for different materials. In general, the higher the emissivity of an object, the easier it is to obtain an accurate temperature measurement using infrared. Objects with very low emissivities (below 0.2) can be difficult applications. Some polished, shiny metallic surfaces, such as aluminum, are so reflective in the infrared that accurate temperature measurements are not always possible.

Five Ways to Determine Emissivity

There are five ways to determine the emissivity of the material, to ensure accurate temperature measurements. :

1. Heat a sample of the material to a known temperature, using a precise sensor, and measure the temperature using the IR instrument. Then adjust the emissivity value to force the indicator to display the correct temperature.
2. For relatively low temperatures (up to 500°F) , a piece of masking tape, with an emissivity of 0.95, can be measured. Then adjust the emissivity value to force the indicator to display the correct temperature of the material.
3. For high temperature measurements, a hole (depth of which is at least 6 times the diameter) can be drilled into the object. This hole acts as a blackbody with emissivity of 1.0. Measure the temperature in the hole, then adjust the emissivity to force the indicator to display the correct temperature of the material.
4. If the material, or a portion of it, can be coated, a dull black paint will have an emissivity of approx. 1.0. Measure the temperature of the paint, then adjust the emissivity to force the indicator to display the correct temperature.
5. Standardized emissivity values for most materials are available. These can be entered into the instrument to estimate the material's emissivity value.

EMISSIVITY VALUES TABLE

TYPICAL EMISSIVITY VALUES-METALS		TYPICAL EMISSIVITY VALUES-NON-METALS REFRACTORY & BUILDING MATERIALS	
SURFACE	EMISSIVITY	SURFACE	EMISSIVITY
Iron and Steel		Red brick (rough)	0.75 to 0.9
Cast Iron (polished)	0.2	Fire clay	0.75
Cast iron (tumed at 100℃)	0.45	Asbestos	0.95
Cast iron (tumed at 1000℃)	0.6 to 0.7	Concrete	0.7
Steel (ground sheet)	0.6	Marble	0.9
Mild steel	0.3 to 0.5	Carborundum	0.85
Steel plate (oxidized	0.9	Plaster	0.9
Iron plate (rusted)	0.7 to 0.85	Alumina (fine grain)	0.25
Cast iron (rough)rusted	0.95	Alumina (coarse grain)	0.45
Rough ingot iron	0.9	Silica (fine grain)	0.4
Molten cast iron	0.3	Silica (coarse grain)	0.55
Molten mide steel	0.3 to 0.4	Zirconium Silicate up to 500℃	0.85
Stainless steel (polished)	0.1	Zirconium Silicate at 850℃	0.6
Stainless steel (Various)	0.2 to 0.6	Quartz (rough)	0.9
Aluminum		Carbon (graphite)	0.75
Polished aluminum	0.1*	Carbon (soot)	0.95
Aluminum (heavily oxidized)	0.25	Timber (various)	0.8 to 0.9
Aluminum oxide at 260℃	0.6	Plastics films (.05 mm thick)	0.5 to 0.95
Aluminum oxide at 800℃	0.3	Polythene film (.03 mm thick)	0.2 to 0.3
Aluminum Alloys, various	0.1 to 0.25	Rubber (smooth)	0.9
Brass		Rubber (rough)	0.98
Brass (polished)	0.1*	Plastics (various, solid)	0.8 to 0.95
Brass (roughened surface)	0.2	Plastics films (.05 mm thick)	0.5 to 0.95
Brass (oxide)	0.6	Polythene film (.03 mm thick)	0.2 to 0.3
Copper		Paper and cardboard	0.9
Copper (polished)	0.05*	Silicone polish	0.7
Copper (oxide)	0.8	**Miscellaneous**	
Molten copper	0.15	Enamel (any color)	0.9
Lead		Oil paint (any color)	0.95
Leadr (polished)	0.1*	Lacquer	0.9
Leadr (oxide at 25℃)	0.3	Matte black paint	0.95 to 0.98
Leadr (oxide)	0.6	Aluminum lacquer	0.5
Nickel and its alloys		Water	0.98
Nickel (pure)	0.1*	Rubber (smooth)	0.9
Nickel plate (oxide)	0.4 to 0.5	Rubber (rough)	0.98
Nichrome	0.7	Plastics (varous, solid)	0.8 to 0.95
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*		

* Emissivity varies with purity