Hand-held Infrared Radiation Thermometer

IRT-100-TA

Instruction Manual

Read this manual before using the instrument.

SHINKO TECHNOS CO., LTD.

CE Marking: Conforms to EMC directive(89/336/EEC, 92/31/EEC amendment,93/68/EEC amendment) EN55011 Group 1, Class B, EN50082-1

■Specifications

Measuring range	-40 to 500℃
Detecting element	Thermopile
Measuring wavelength	8 to 14 μm
Measuring diameter	φ45/500mm (Optical sensitivity: 90%)
Measuring accuracy	Within ±1% of measured value or within ±2℃, whichever is greater. However, -30 to 0℃: Within±3℃, Lower than -30℃: Within±5℃ (At 25℃ ambient temperature)
Repeatability	Within ±1℃
Stability	±5℃ (under EMC test)
Response time	0.8 seconds (90% response)
Collimation	Laser beam marks the center of the area measured
Beam diameter	Approx. 5mm (at a distance of 1m)
Beam output	Less than 1mW , 670nm (IEC, class Ⅱ)
Display indications	Current reading, Maximum reading, Minimum reading, Reading hold, Emissivity, Alarm value, Low battery
Auto power off	Automatically shuts power off in 30 seconds after Reading hold
Alarm	High limit alarm (with a beeper)
Emissivity correction	Selectable from DARK (0.95), BRIGHT (0.80), FREE (variable from 0.30 to 1.90, Initial value: 1.00)
Display illumination	Automatic back-light
Operating temperature	0 to 50℃
Storage temperature	-20 to 55℃
Power source	Alkaline battery, AA (UM-3) type, 2 pieces
Battery life	Approx. 50 hours for continuous measurement
Dimension	81 (W) x 142 (H) x 32 (D) mm
Weight	Approx. 180g
Accessories	Alkaline battery AA (UM-3) type, 2 pieces Instruction manual, 1 copy Vinyl case, 1 piece

CAUTION – Laser Light
Do not aim laser beam toward faces.
Do not stare into beam or into reflections of the beam off mirror-like surfaces.
Do not attempt to open the housing, other than to change the batteries. There are no other user-serviceable parts inside.

CAUTION
LASER RADIATION
DO NOT STARE
INTO BEAM
Max. 1.0mW 670nm
CLASS 2 LASER PRODUCT
PER IEC 825-1(1993)

■Safety Precautions

●Do not touch the instrument on an object being tested. A contact with an object at a high temperature can cause irreparable damage to the instrument or inaccurate readings.

●Do not touch the measuring window of the instrument with hard objects. Do not let foreign objects penetrate the measuring window or a hard object drop on the window.

●Always put the cap back on the measuring window after measurement to prevent foreign objects from penetrating the window.

Cap
Measuring window
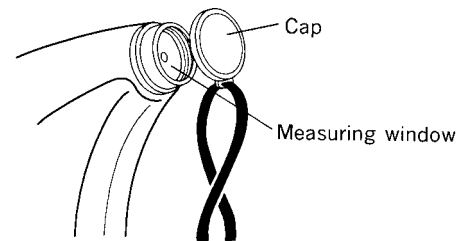
●In order to protect the optical system of the instrument, do not subject the instrument to extreme shocks and vibration.
●Keep the instrument away from objects with built up static charges.
●Select the proper emissivity value for accurate readings.
●When there is a rapid change to the ambient temperature, wait a while to let the temperature of instrument stabilize for accurate readings.
●When the instrument is put in storage or not in use for a long period of time, remove the batteries from the instrument.

●Do not use or store the instrument at a location where;
temperature and/or humidity are high,
the instrument is exposed to the direct sunlight,
there is a lot of dust.,
there are greasy fumes or corrosive gasses,
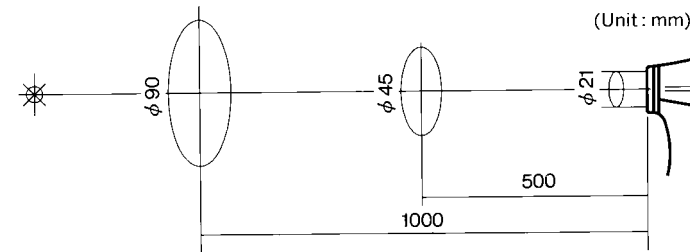as the measuring window may become deteriorated or soiled, causing inaccurate readings.

Rain
Dust
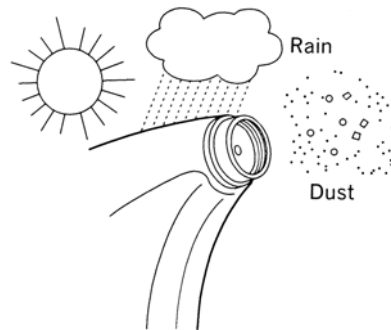
●Do not use the instrument in water or other fluids. Do not store the instrument where it can come into contact with water.
●Keep the instrument away from objects which produce a strong magnetic field.

■Relation of Distance and Measuring Diameter

The figure below shows the required minimum area (optical sensitivity: 90%) on an object being tested at a distance of 500mm and 1000mm.
The measured area increases with distance.
When measuring, the distance should be as short as possible.

(Unit: mm)
φ90 φ45 φ21
500
1000

■Troubleshooting

Symptoms	Causes	Countermeasures
No display appears.	Batteries have been used up or they have not been inserted correctly.	Replace or insert them correctly.
Laser beam is not emitted or is weak.	Battery voltage is low.	Measurement is possible. Replace batteries when the laser maker is necessary.
Abnormal reading.	Cap is not removed.	Check if the cap has been removed.
	Measuring window is dirty.	Clean the measuring window, referring to the "Maintenance" section.
	Measurement was done with maximum or minimum reading.	Check the measuring condition. Switch it to current reading.
	Heat source nearby affects the measurement.	Shield the heat source with a shielding plate.
	Emissivity is not selected properly.	If emissivity is unknown, refer to "Reference". Or measure temperature with a contact type thermometer and obtain adequate emissivity by changing it to have same temperature as measured on condition of emissivity selection at FREE.
	Target area is too small.	Check the target area and keep a sufficient area for measurement.
Unstable reading	Unit is affected by rapid temperature change.	Leave unit alone to stabilize its temperature, then measure.
No reading appears but display is 【---】.	Out of measuring temperature range.	Check the target to be measured.
	Emissivity selection setting is not matched.	Same as above countermeasure.
Reading is blinking.	Ambient temperature is out of specified range.	Check operation environment.

■Maintenance

Measuring Window

Dust, stains and flaws on the measuring window cause inaccurate readings. Wipe stains off with a soft cloth used for lenses of camera. Use absorbent cotton dipped into neutral detergent diluted with water to remove tough stains.

Note

Use of other substance other than neutral detergent can damage the window to cause the laser beam to scatter.

Other Parts of the Instrument

Clean the instrument with a dry cloth. To remove tough stains, use a damp cloth from which water-diluted neutral detergent has been rinsed out. Use of paint thinner, benzine, alcohol and other chemicals may blur the display window, erase markings or cause the enclosures to crack. It is preferable to keep the instrument in the carrying case.
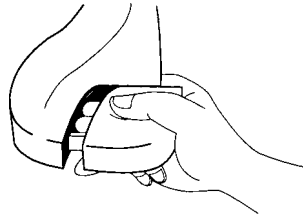
Battery

(1) Installing Batteries

Press the battery compartment cover on its top and bottom as shown below to remove it. Install batteries in correct polarity as shown inside the battery compartment.

(2) Replacing Batteries

Replace the batteries when the low battery symbol appears on the display or the display blinks.

| Note | Always replace both batteries.

Settings

(1) Emissivity

Emissivity of an object being tested can be selected from DARK (0.95), BRIGHT (0.8) or FREE (variable from 0.3 to 1.90).

When the instrument is turned on, emissivity is set to DARK. A bar appears under DARK, BRIGHT or FREE on the display to indicate which one is selected. Press ▲ key to change selection. When FREE is selected, emissivity is set to 1.00. To change this value;

① Press MEASURE key to turn on the instrument.

② While pressing ENT key, push MODE key. ALARM is shown on the display.

③ Press MODE key. 1.00 or the value set previously is shown on the display, with the least significant digit blinking.

Press ▲ or ▼ key to change the blinking number and press ENT key. Repeat the same step on the other digits.

④ Press MODE key to switch the instrument to measuring mode.

(2) Alarm

If readings exceed a certain value, the beeper sounds and ALARM blinks on the display. To set the alarm value;

① Press MEASURE key to turn on the instrument.

② While pressing ENT key, push MODE key.

699 or the value set previously is shown on the display, with the least significant digit blinking.

③ Press ▲ and ▼ key to change the blinking number and press ENT key. Repeat the same step on the other digits.

To set 2-digit value, display "0" on the most significant digit.

To set a negative value, display "—"on the most significant digit.

④ Press MODE key to switch the instrument to measuring mode.

Measurement Display

While pressing MEASURE key, aim the laser beam at an object being tested. MEAS is shown on the display to indicate that the instrument is in measuring mode. Release MEASURE key to stop measurement. The display reading is automatically frozen, with HOLD shown on the display.

To display maximum or minimum reading;

In the HOLD mode, press MODE key to display the maximum reading. MAX is shown on the display. Press MODE key again to display the minimum reading. MIN is shown on the display.

To display only the maximum or minimum reading during measurement;

With MAX or MIN shown on the display, press MEASURE key. Updated maximum or minimum reading is shown on the display.

If no key is pressed for 30 seconds after the reading is frozen, the instrument automatically turns itself off. Pressing MEASURE key to turn on the instrument cancels stored maximum or minimum reading. When the batteries wear out, stored maximum or minimum reading is canceled as well.

Display

Emissivity
DARK :0.95
BRIGHT:0.80
FREE :0.3 to 1.90 variable

Displays temperature readings, emissivity value or alarm value
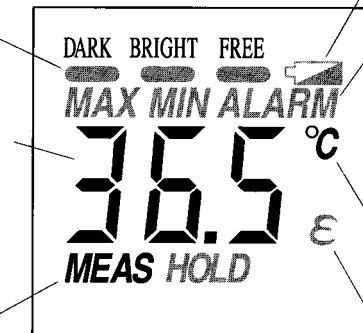
Low Battery Symbol
Blinks when batteries wear out

MAX : Displayed when the maximum reading is shown

MIN : Displayed when the minimum reading is shown

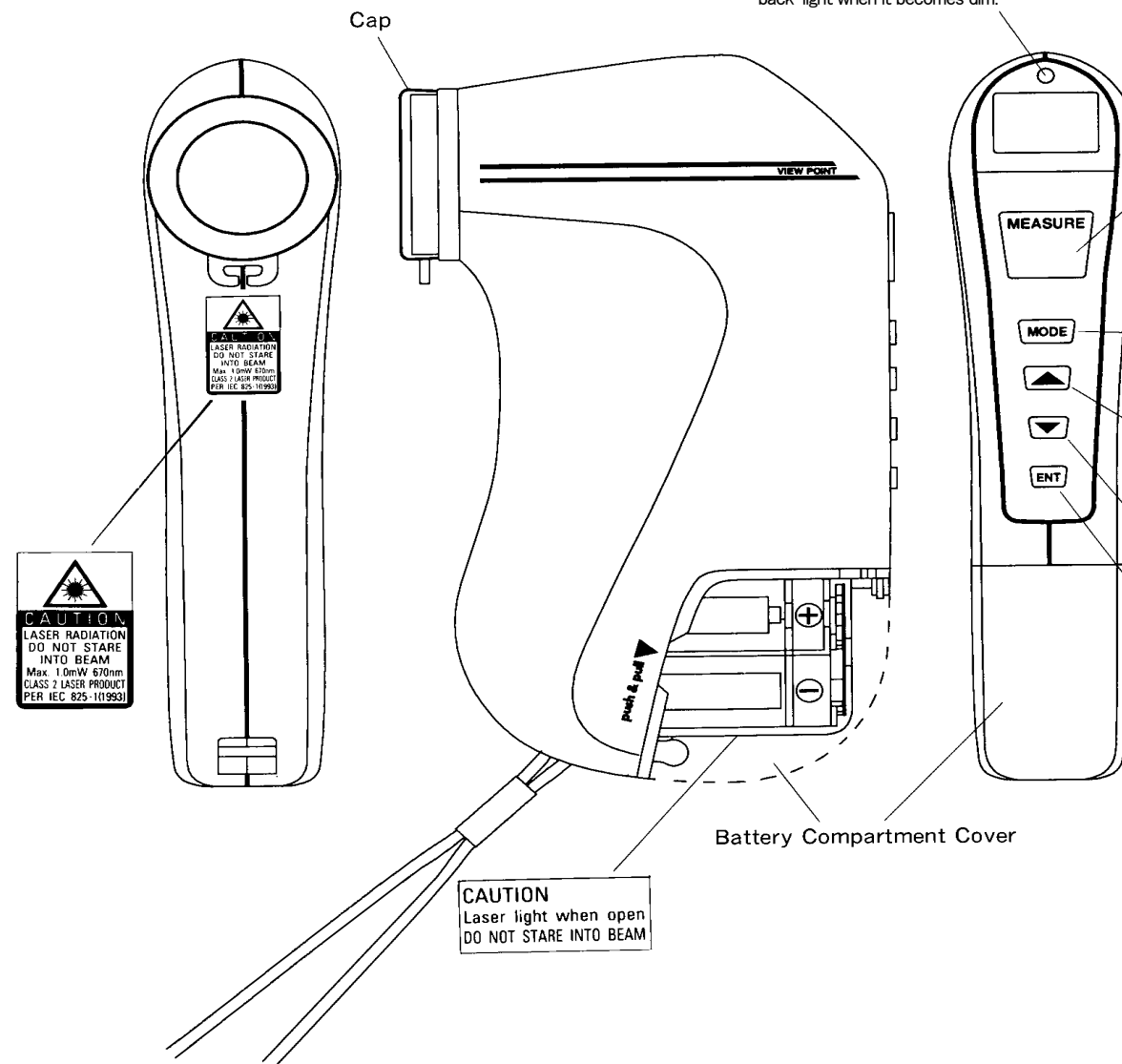ALARM : Displayed during alarm setting and blinks during alarm

Displayed when temperature readings are shown

Displayed when emissivity value is shown

MEAS : Displayed during measurement
HOLD : Displayed during hold mode

DARK BRIGHT FREE
MAX MIN ALARM
36.5 °C
ε
MEAS HOLD

Device labels and parts

Cap

Brightness Sensor
Automatically lights up the display back-light when it becomes dim.

VIEW POINT

CAUTION
LASER RADIATION
DO NOT STARE INTO BEAM
Max. 1.0mW 670nm
CLASS 2 LASER PRODUCT
PER IEC 825-1(1993)

CAUTION
Laser light when open
DO NOT STARE INTO BEAM

Battery Compartment Cover

push & pull

Measure Key
Measurements are taken while this key is pressed. Releasing this key freezes the last reading and automatically turns the instrument off in 30 seconds, if no key is pressed.

Mode Key
Display the current, the maximum or the minimum reading, and selects setting mode.

Up Key
Selects DARK, BRIGHT or FREE, and sets emissivity and alarm value.

Down Key
Sets emissivity and alarm value.

Entry Key
Registers set values and switches the instrument setting mode.

■Setting Emissivity (reference)

The table below shows emissivity for some materials. Please note that these values are just for reference and only apply to IRT-100-TA. Infrared radiation depends on materials, condition of the surface and ambient temperature.

Material	Emissivity	Material	Emissivity
Water, Ice	0.98	Cloth, Fabric (colored)	0.95
Soil	0.92 to 0.96	Leather, Fur	0.96
Concrete (wet)	0.96 to 0.98	Human skin	0.99
Concrete (dry)	0.91 to 0.95	Vegetable, Fruit	0.98
Ceramic	0.85 to 0.95	Dough	0.98
Plaster, asbestos	0.92	Meat	0.98
Plastic	0.90 to 0.95	Copper oxide	0.5 to 0.6
Rubber (black)	0.95	Ferro-oxide	0.7 to 0.8
Wood	0.98	Painted surface	0.8
Paper	0.92	Tile	0.8

Estimating emissivity using the Black Body Tape

Place a piece of the black body tape (emissivity: 0.94) on an object. Set emissivity to 0.94 in FREE mode and measure the temperature of the object. Then remove the tape from the object. Measure its temperature again and adjust emissivity value so that readings match the temperature measured with the black body tape attached on the object. The adjusted value is the emissivity of the object. The black body tape is available as an option.