OMEGA

OS643W
Infrared Thermometer

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INTRODUCTION

This instrument is a portable easy use 3½ digit, compact-sized digital thermometer designed to use infrared or K-type thermocouple as input. Meter with Backlit LCD, Auto-hold function and auto power off (15 seconds approx.) feature after releasing MEAS button to extend battery life and with analog signal output function. Temperature indication follows Reference Temperature/Voltage Tables N.I.S.T. Monograph 175 Revised to ITS-90 for K-type thermocouple.

SAFETY INFORMATION

It is recommended that you read the safety and operation instructions before using the thermometer.

WARNING

To avoid electrical shock, do not use this instrument when voltages at the measurement surface exceed 24V AC or DC.

WARNING

To avoid damage or burns, do not make temperature measurement in microwave ovens.

The ⚠ symbol on the instrument indicates that the operator must refer to an explanation in this manual.

CAUTION

- Do not use the unit near any device which generates strong electromagnetic radiation or near a static electrical charge, as these may cause errors.
- Do not point the lens at the sun or at any other source of strong light. If you do, the sensor may be damaged.
- Do not contact the lens against the object whose temperature is to be measured, or get it dirty, allow it to be scratched, or allow any foreign material to adhere to it. Doing so may cause errors.
- Do not touch or hold by the front cone. Temperature reading can be affected by heat from hand.
- Do not place the meter on or around hot objects (70°C/158°F). It may cause damage to the case.
- If the meter is exposed to significant changes in ambient temperature (hot to cold or cold to hot). Allow 20 minutes for temperature stabilization, before taking measurement.
- Condensation may form on the lens when going from a cold to hot environment-wait 10 minutes for conden sation to dissipate befor taking measurements.
- This unit is not constructed to be water proof or dustproof, so do not use it in a very dusty environment or in one where it will get wet.

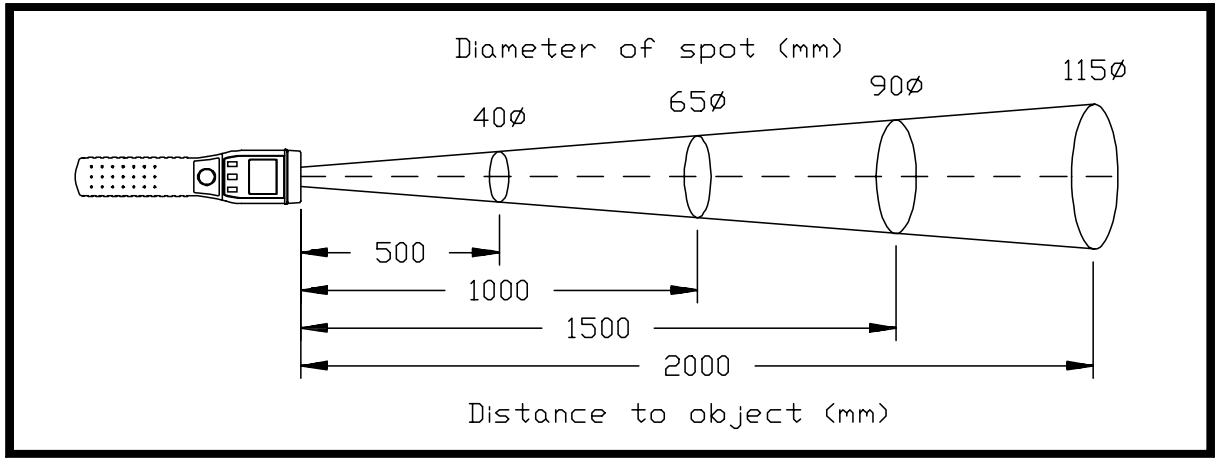
SPECIFICATIONS

GENERAL

Display: 3½ digit liquid crystal display (LCD) with maximum reading of 1999.
Overrange: (OL) or (-OL) is displayed.
Low battery indication: the "  " is displayed when the battery voltage drops below the operating level.
Measurement rate: 2.5 times per second, nominal.
Operating Environment: 32°F to 122°F (0°C to 50°C) at < 70% relative humidity.
Storage Temperature: 40°F to 140°F (-20°C to 60°C), 0 to 80% R.H. with battery removed from meter.
Auto power off: 15 seconds approx.
Standby consume current: <1μA.
Battery: 4 pcs 1.5V (AAA size).
Battery Life: 100 hours (continuity) typical (Back-Light not illuminated).
Dimensions: 170mm(H) x 44mm(W) x 40mm(D).
Weight: 160g including batteries.

Infrared Radiation ELECTRICAL

Temperature Range: 0°F to 500°F, -20°C to 260°C.
Display Resolution: 1°F / 1°C.
Accuracy: ±3% of reading or ±6°F/3°C, whichever is greater @ 64.4 to 82.4°F (@ 18 to 28°C) ambient operating temperature.
Temperature Coefficient: ±0.2% of reading or ±0.36°F/0.2°C, whichever is greater, change in accuracy per °F/°C change in ambient operating temperature above 82.4°F/28°C or below 64.4°F/18°C.
Response Time: 1 second.
Spectral Response: 6 to 14µm nominal.
Emissivity: Pre-set 0.95.
Analog Output: 1mV/°F(°C).
Detection Element: Thermopile.
Optical Lens: Fresnal Lens.
Field of View: 65mmØ at 1000mm.



Spot size increases with distance from the probe tip as shown

K-type thermocouple ELECTRICAL

Temperature Range: -58°F to 1999°F, -50°C to 1300°C.

Display Resolution: 1°F / 1°C.

Accuracy: Accuracy is specified for operating temperatures over the range of 64°F to 83°F (18°C to 28°C), for 1 year, not including thermocouple error.
±(0.3% rdg + 2°F) -58°F to 1999°F
±(0.3% rdg + 1°C) -50°C to 1000°C
±(0.5% rdg + 1°C) 1000°C to 1300°C

Temperature Coefficient: 0.1 times the applicable accuracy specification per °C from 32°F to 64°F and 83°F to 122°F (0°C to 18°C and 28°C to 50°C).

Input Protection: 24V dc or 24V ac rms maximum input voltage on any combination of input pins.

Input Connector: Accepts standard miniature thermocouple connectors (flat blades spaced 7.9mm, center to center).

Analog Output: 1mV/°F(°C).

OPERATING INSTRUCTIONS

MEAS (MEASURE) Button

Depress MEAS button to turn on the meter for measuring temperature. Releasing MEAS button to stop measuring temperature and automatically hold the display reading, the meter turns off automatically after 15 seconds.

OPERATION

Infrared Radiation Measurements

1. When the power is off, pressing the MEAS button turns on the power.
2. Use "IR / K" switch to select IR Temperature function.
3. Use "☼" switch to turn on or turn off the display Back-Light.
4. Use "°F/°C" switch to select °F or °C the Temperature Range.
5. Point the lens at the object whose temperature is to be measured.
6. Press the MEAS button. Measurement is performed as long as the MEAS button is kept pressed.
7. Referring to the spot size figure.
   NOTE: Although the field of measurement (or Field of View) and the spot almost coincide, actually the field of measurement corresponds to the diameter for 90% optical response. The object whose temperature is to be measured needs to be larger than the measurement diameter (spot of size) by an adequate margin at least 1.5 to 2 times larger.
8. Read the display.

K-type thermocouple Measurements

1. When the power is off, pressing the MEAS button turns on the power.
2. Use "IR / K" switch to select K Temperature function.
3. Use "☼" switch to turn on or turn off the display Back-Light.
4. Use "°F/°C" switch to select °F or °C the Temperature Range.
5. Connect a type K thermocouple to the jack on the instrument. Place the probe or thermocouple tip on or in the material to be measured.
6. Press the MEAS button. Measurement is performed as long as the MEAS button is kept pressed.
7. Read the display.

MEASUREMENT CONSIDERATIONS

1. Theory of Measurement
   Every object emits infrared energy in accordance with its temperature. By measuring the amount of this radiant energy, it is possible to determine the temperature of the emitting object.
2. About Infrared
   Infrared radiation is a form of energy (electromagnetic radiation), and has the property that it passes easily through air while it is easily absorbed by solid matter. With an emission thermometer, which operates by detecting infrared radiation accurate measurement is possible, irrespective of the air temperature or the measurement distance.
3. Emission Thermometer Structure
   Infrared radiation which has been emitted from the object is focused upon an infrared radiation sensor, via an optical system. This includes a lens which is transparent to infrared radiation, and a 5.3μm cut off filter. The output signal from the infrared radiation sensor is input to an electronic circuit along with the output signal from a standard temperature sensor (Thermopile).

4. Emissivity
   All objects emit invisible infrared energy. The amount of energy emitted is proportional to the object's temperature and its ability to emit IR energy. This ability, called emissivity, is based upon the material that the object is made of and its surface finish. Emissivity values range from 0.10 for a very reflective object to 1.00 for a black body. Factory set emissivity value of 0.95, which cover 90% of typical applications.
5. If the surface to the measured is covered by frost or other material, clean it to expose the surface.
6. If the surface to be measured is highly reflective, apply masking tape or matt finish black paint to the surface.
7. If the meter seems to be giving incorrect readings check the front cone. There may be condensation or debris obstructing the sensor; clean per instructions in the maintenance section.

MAINTENANCE

Battery Replacement

Power is supplied by four 1.5V (AAA size) batteries. The "  " appears on the LCD display when replacement is needed. To replace the batteries, remove the screw from the back of the meter and lift off the battery cover case. Remove the batteries from battery contacts.

Cleaning

Periodically wipe the case with a damp cloth and detergent, do not use abrasives or solvents.

Substance	Thermal emissivity	Substance	Thermal emissivity
Asphalt	0.90 to 0.98	Cloth (black)	0.98
Concrete	0.94	Human skin	0.98
Cement	0.96	Lather	0.75 to 0.80
Sand	0.90	Charcoal (powder)	0.96
Earth	0.92 to 0.96	Lacquer	0.80 to 0.95
Water	0.92 to 0.96	Lacquer (matt)	0.97
Ice	0.96 to 0.98	Rubber (black)	0.94
Snow	0.83	Plastic	0.85 to 0.95
Glass	0.90 to 0.95	Timber	0.90
Ceramic	0.90 to 0.94	Paper	0.70 to 0.94
Marble	0.94	chromium oxides	0.81
Plaster	0.80 to 0.90	Copper oxides	0.78
Mortar	0.89 to 0.91	lron oxides	0.78 to 0.82
Brick (red)	0.93 to 0.96	Textiles	0.90

WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of 13 **months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear or which are damaged by misuse are not warranted. This includes contact points, fuses, and triacs.

OMEGA is glad to offer suggestions on the of use of its various products. Nevertheless, OMEGA only warrants that the parts manufactured by it will be as specified and free of defects

OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

Every precaution for accuracy has been taken in the preparation of this manual; however, OMEGA ENGINEERING, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in the manual.

SPECIAL CONDITION: Should this equipment be used in or with any nuclear installation or activity, purchaser will indemnity OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the equipment in such a manner.

It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, patient connected application.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED.
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair.
2. Model and serial number of product , and
3. Repair instructions and/or specific problems relative to the product.

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