Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!

TEMPERATURE

- Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

- Transducers & Strain Gages
- Load Cells & Pressure Gages
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL

- Rotameters, Gas Mass Flowmeters & Flow Computers
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY

- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION

- Data Acquisition & Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Datalogging Systems
- Recorders, Printers & Plotters

HEATERS

- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

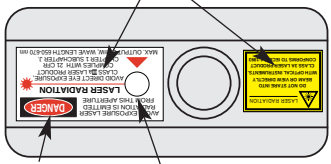
ENVIRONMENTAL MONITORING AND CONTROL

- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments

M2885A/1299

User's Guide

Danger and Certification Labels

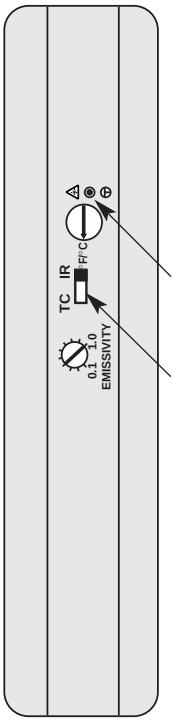


*Laser Door

Laser Beam Aperture

Function (Selector) Switch

Laser Power Indicator LED



Laser Momentary Switch

Slide Switch†

† After IR temperature measurement, set the slide switch back to "TC" to save battery life.

omega.com™

OMEGA®

www.omega.com

e-mail: info@omega.com

ISO 9001 CERTIFIED CORPORATE QUALITY — STAMFORD, CT

ISO 9002 CERTIFIED CORPORATE QUALITY — MANCHESTER, UK

ADDENDUM - HHM29-IR Supermeter™ Infrared Thermometer

* Patent Pending

omega.com™

OMEGA®

OMEGAnet® On-Line Service www.omega.com	Internet e-mail info@omega.com

Servicing North America:

USA:
ISO 9001 Certified
One Omega Drive, P.O. Box 4047
Stamford CT 06907-0047
TEL: (203) 359-1660 FAX: (203) 359-7700
e-mail: info@omega.com

Canada:
976 Bergar
Laval (Quebec) H7L 5A1
TEL: (514) 856-6928 FAX: (514) 856-6886
e-mail: info@omega.ca

For immediate technical or application assistance:

USA and Canada: Sales Service: 1-800-826-6342 / 1-800-TC-OMEGA®
Customer Service: 1-800-622-2378 / 1-800-622-BEST®
Engineering Service: 1-800-872-9436 / 1-800-USA-WHEN®
TELEX: 996404 EASYLINK: 62968934 CABLE: OMEGA

Mexico
TEL: (001) 800-826-6342 FAX: (001) 203-359-7807
En Español: (001) 203-359-7803 e-mail: espanol@omega.com
info@omega.com.mx

Servicing Europe:

Benelux:
Postbus 8034, 1180 LA Amstelveen, The Netherlands
TEL: +31 (0)20 6418405 FAX: +31 (0)20 6434643
Toll Free in Benelux: 0800 0993344
e-mail: nl@omega.com

Czech Republic:
Rudé armády 1868, 733 01 Karviná 8
TEL: +420 (0)69 6311899 FAX: +420 (0)69 6311114
Toll Free in Czech Republic: 0800-1-66342 e-mail: czech@omega.com

France:
9, rue Denis Papin, 78190 Trappes
TEL: +33 (0)130 621 400 FAX: +33 (0)130 699 120
Toll Free in France: 0800-4-06342
e-mail: france@omega.com

Germany/Austria:
Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
TEL: +49 (0)7056 3017 FAX: +49 (0)7056 8540
Toll Free in Germany: 0800 TC-OMEGA℠
e-mail: germany@omega.com

United Kingdom:
ISO 9002 Certified
One Omega Drive, Riverbend Technology Centre
Northbank, Irlam, Manchester
M44 5EX United Kingdom
TEL: +44 (0)161 777 6611 FAX: +44 (0)161 777 6622
Toll Free in United Kingdom: 0800 488 488
e-mail: sales@omega.co.uk

MADE IN USA

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 12 months from date of purchase. OMEGA's Warranty adds an additional one (1) month grace period to the normal product warranty to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon telephone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been 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 are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTY OR REPRESENTATION OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR 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.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

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. Purchase Order 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. Purchase Order 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.

PATENT NOTICE: This product is covered by one or more of the following patents: U.S. PAT. B1 5,368,392; 5,524,984; 5,727,880; 5,465,838; 5,823,678; 5,823,679/Other U. S. and International Patents Pending.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

Standard IR Measurement

Open the Laser Door by Rotating

↓

Set the Function Switch to °F/°C

↓

Set the Slide Switch to IR

↓

Press and Hold the Momentary Switch

Long Term IR Measurement

Open the Battery Door

↓

Set the Inside Slide Switch to the Right

↓

Open the Laser Door by Rotating

↓

Set the Function Switch to °F/°C

↓

Set the Slide Switch to IR

Operational Flow Chart

ADDENDUM - HHM29-IR INFRARED MULTI-METER

HHM29-IR is a handheld portable infrared multi-meter. Besides measuring voltage, current, resistance, capacitance, inductance, and frequency it can also measure temperature in two ways:

1. Contact / K type thermocouple input
2. Noncontact / Infrared temperature measurement

Set the Function (Selector) switch to °F /°C to make temperature measurement (Either Contact or Non-contact). In order to make contact temperature measurement:

1. There is a slide switch on the right side of the multi-meter. Set the slide switch to TC.
2. Plug a K type thermocouple probe (SMP connection) to the multi-meter and measure the temperature.

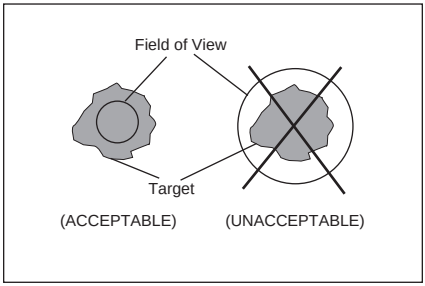


Figure 1 - Field of View Positions

In order to make infrared temperature measurement:

1. Disconnect any thermo-couple probe from the meter.
2. Set the slide switch to IR.
3. There is a rectangular door in front of the multi-meter that covers the laser beam aperture. Open the door by rotating it.
4. The field of view of the multi-meter should fall within the area of the target being measured (Fig. 1). Refer to the field of view vs. distance chart (Fig. 3).
5. There is a single turn potentiometer on the right side of the meter for emissivity adjustment. Set the Emissivity accordingly.
6. There is a momentary switch on the right side of the multi-meter. Press and hold momentary switch to turn on the laser and infrared measurement. A red LED in front of the meter turns on to indicate the laser is on. A red laser dot indicates the center of the multi-meter's field of view. Using the laser sighting, aim at the target and measure the temperature.

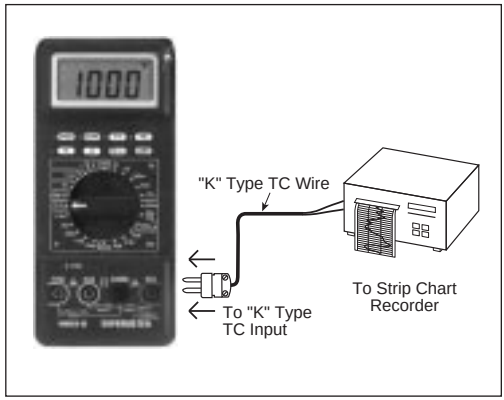


Figure 2 - Recorder Connections

While measuring temperature via. Infrared, the thermocouple input becomes thermocouple output proportional to the temperature measured.

This thermocouple output (K type) can go to a strip chart recorder for temperature profiling. See Figure 2.

The line of sight of the multi-meter does not coincide with that of the laser sighting. There is a fixed distance of 0.610" (15.5 mm) between the two lines of sights as shown in Fig. 3. When aiming at targets using the laser sighting, the 0.610" distance should be taken into account.

The main multi-meter uses a 9 volts battery to operate. The infrared measuring circuit is powered by two Lithium AA (1.5 VDC) size batteries. When the lithium batteries go low, the multi-meter beeps. This audible beep indicates that the lithium batteries have to be replaced.

In order to determine an unknown target Emissivity:

1. Set the slide switch to TC.
2. Plug in a K type surface thermocouple probe to the meter.
3. Measure the target temperature using the surface probe.
4. Unplug the surface probe from the meter
5. Set the slide switch to IR.
6. Open the laser door. Press and hold the momentary switch and aim at the target.
7. Adjust the Emissivity potentiometer until the meter reads the same temperature measured via the thermocouple probe. Read the new Emissivity setting.

TEMPERATURE MONITORING OVER TIME

The multi-meter can be set up for unattended temperature monitoring. Open the battery door. There is a slide switch with a red actuator on the right side of inside PC board. Set the switch to the right. Now as long as the multi-meter is on and the selector switch is set to °F/°C, and the outside slide switch is set to IR, the unit will continue to measure temperature unattanded. The momentary switch only turns on the laser in this mode.

⚠ CAUTION

- USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HERE MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.
- DO NOT LOOK AT THE LASER BEAM COMING OUT OF THE LENS OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS. EYE DAMAGE CAN RESULT.
- USE EXTREME CAUTION WHEN OPERATING THE LASER SIGHTING.
- NEVER POINT THE LASER BEAM AT A PERSON.
- KEEP OUT OF REACH OF ALL CHILDREN.
- DO NOT ATTEMPT TO OPEN THE MULTI-METER OR LASER SIGHTING. THERE ARE NO USER-SERVICEABLE PARTS.
- DO NOT OPEN BATTERIES, DISPOSE OF IN FIRE, HEAT ABOVE 100 °C (212 °F), EXPOSE CONTENTS TO WATER, RECHARGE, PUT IN BACKWARDS, MIX WITH USED OR OTHER BATTERY TYPES. IT MAY EXPLODE OR LEAK AND CAUSE PERSONAL INJURY.
- AFTER IR TEMPERATURE MEASUREMENT, SET THE SLIDE SWITCH BACK TO “TC” TO SAVE BATTERY LIFE.

SPECIFICATIONS (INFRARED)

GENERAL

Temperature Range	0 to 1000 °F (-18 to 538 °C)
Accuracy (@ 72°F ambient temp & emmissivity of 0.95 and greater)	3% of Reading + 3 digits (>200°F or 93°C) 4°F + 3 digits (<200°F or 93°C)
Resolution	1 °F or 1 °C
Field of view	20 to 1
Spectral Response	8 to 14 micron
Emissivity	0.1 to 1.0 Adjustable
Response time	200 msec (0 to 63% of final value)
Analog output	K type thermocouple, SMP connection
Power	2 AA size 1.5 VDC Lithium batteries
Battery Type	Lithium, Eveready Energizer, model L91
Battery life (Lithium) @ 72°F	200 hours , with no Laser sighting
Ambient temperature	7 hours , with Laser sighting
Operating Temperature	0 to 40 °C (32 to 104 °F)
Operating Relative Humidity	less than 70% without condensation
Dimensions	7.9" x 3.5" x 2.3" (200 x 90 x 59 mm)
Weight	1.3 lbs (600 g)

LASER SIGHTING

Laser sighting	A Laser Dot
Wavelength (Color)	650-670 nm (Red)
Operating distance	2 to 75 feet
Maximum Optical Power output	< 5mW at 75 °F ambient temperature Class IIIa Laser Product
Safety Classification	Class 3A
FDA Classification	Complies with 21 CFR Chapter 1, Subchapter J

Beam diameter	5 mm
Beam Divergence	< 1mrad
Power Switch	Momentary switch
Power Indicator	Red LED in front of the multi-meter
Identification label	Located on the bottom of the multi-meter
Danger & Certification label	Located in front of the multi-meter
Laser Door	Located in front of the multi-meter Rotate to open.

For additional specifications and general information regarding the multi-meter, refer to the User's Guide HHM29.

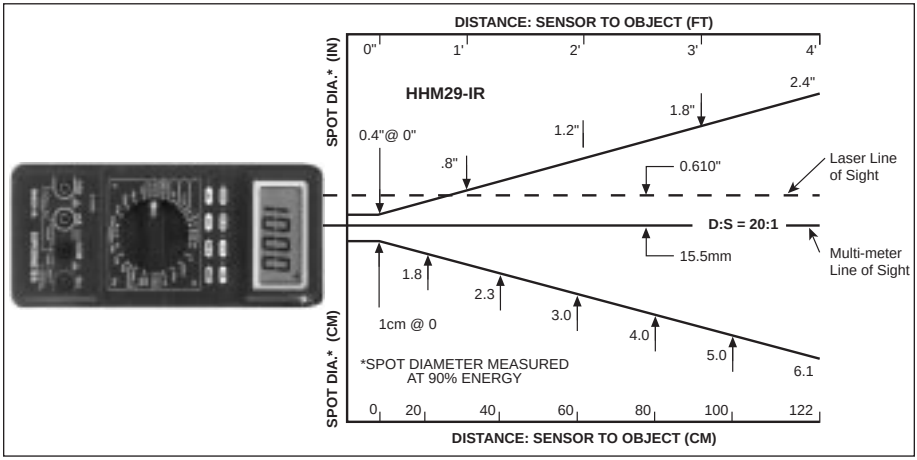
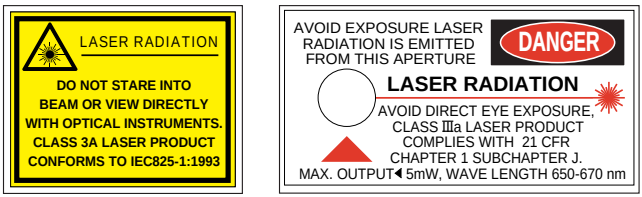


Figure 3 - HHM29-IR Field of View



Danger & Certification Label

EMISSIVITY TABLE

METALS

Material	Emissivity (e)
Aluminum – pure highly polished plate	0.04 – 0.06
Aluminum – heavily oxidized	0.20 – 0.31
Aluminum – commercial sheet	0.09
Brass – dull plate	0.22
Brass – highly polished, 73.2% Cu, 26.7% Zn	0.03
Chromium – polished	0.08 – 0.36
Copper – polished	0.05
Copper – heated at 1110°F (600°C)	0.57
Gold – pure, highly polished or liquid	0.02 – 0.04
Iron and steel (excluding stainless) – polished iron	0.14 – 0.38
Iron and steel (excluding stainless) – polished cast iron	0.21
Iron and steel (excluding stainless) – polished wrought iron	0.28
Iron and steel (excluding stainless) – oxidized dull wrought iron	0.94
Iron and steel (excluding stainless) – rusted iron plate	0.69
Iron and steel (excluding stainless) – polished steel	0.07
Iron and steel (excluding stainless) – polished steel oxidized at 1110°F (600°C)	0.79
Iron and steel (excluding stainless) – rolled sheet steel	0.66
Iron and steel (excluding stainless) – rough steel plate	0.94 – 0.97
Lead – gray and oxidized	0.28
Mercury	0.09 – 0.12
Molybdenum filament	0.10 – 0.20
Nickel – polished	0.07
Nickel – oxidized at 1200°F – 2290°F	0.59 – 0.86
Platinum – pure polished plate	0.05 – 0.10
Platinum – wire	0.07 – 0.18
Silver – pure and polished	0.02 – 0.03
Stainless steel – polished	0.07
Stainless steel – Type 301 at 450°F – 1725°F	0.54 – 0.63
Tin – bright	0.06
Tungsten – filament	0.39
Zinc – polished commercial pure	0.05
Zinc – galvanized sheet	0.23

NONMETALS

Material	Emissivity (e)
Asbestos Board	0.96
Asphalt, tar, pitch	0.95 – 1.00
Brick – red and rough	0.93
Brick – fireclay	0.75
Carbon – filament	0.53
Carbon – lampblack - rough deposit	0.78 – 0.84
Glass - Pyrex, lead, soda	0.85 – 0.95
Marble – polished light gray	0.93
Paints, lacquers, and varnishes – Black matte shellac	0.91
Paints, lacquers, and varnishes – aluminum paints	0.27 – 0.67
Paints, lacquers, and varnishes – flat black lacquer	0.96 – 0.98
Paints, lacquers, and varnishes – white enamel varnish	0.91
Porcelain – glazed	0.92
Quartz – opaque	0.68 – 0.92
Roofing Paper	0.91
Tape – Masking	0.95
Water	0.95 – 0.96
Wood – planed oak	0.90