

OMEGA

HH504
Digital Thermometer



OMEGAnetSM On-Line Service
<http://www.omega.com>

Internet e-mail
info@omega.com

Servicing North America:

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

Canada:
976 Bergar
Laval (Quebec) H7L5A1
Tel: (514) 856-6928
FAX: (514) 856-6886
e-mail: info@omega.com

For immediate technical or application assistance:

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

Mexico and Latin America:
Tel: (95) 800-TC-OMEGASM
FAX: (95) 203-359-7807
En Español: (203) 359-7803
e-mail: espanol@omega.com

Servicing Europe:

Benelux:
Postbus 8034, 1180 LA Amstelveen,
The Netherlands
Tel: (31) 20 6418405 FAX: (31) 20 6434643
Toll Free in Benelux: 06 0993344
e-mail: nl@omega.com

Czech Republic:
ul. Rude armady 1868, 733 01 Karvina-
Hranice, Czech Republic
Tel: 420 (69) 6311627 FAX: 420 (69) 6311114
e-mail: czech@omega.com

France:
9, rue Denis Papin, 78190 Trappes
Tel: (33) 130-621-400 FAX: (33)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 (07056) 3017 FAX: 49 (07056) 8540
Toll Free in Germany: 0800 82 66342
e-mail: germany@omega.com

United Kingdom: ISO 9002 Certified
One Omega Drive
Riverbend Technology Centre Northbank, Irlam,
Manchester, M44 5EX, England
Tel: 44 (161) 777-6611 FAX: 44 (161) 777-6622

Toll Free in England: 0800-488-488
e-mail: sales@omega.com.uk

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.

INTRODUCTION

This instrument is a 4½ digit, compact-sized portable digital thermometer designed to use external 100 ω Platinum RTD as temperature sensor. Temperature indication follows Reference Temperature/Resistance Tables (Pt385 for European Curve, Alpha=.00385 and Pt3926 for American Curve, Alpha=.003926).

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 working voltages at the measurement surface over 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.

SPECIFICATIONS

ELECTRICAL

Temperature Scale: Celsius or Fahrenheit user-selectable.

Measurement Range:

Pt385(100W) -200°C to 800°C, (-328°F to 1472°F)

Pt3926(100W) -200°C to 630°C, (-328°F to 1166°F)

Resolution: 0.1°C or 0.2°F

Accuracy: Accuracy is specified for operating temperatures over the range of 18°C to 28°C (64°F to 82°F), for 1 year, not including RTD probe error.

±(0.05% rdg + 0.2°C) on °C scale

±(0.05% rdg + 0.4°F) on °F scale

Temperature Coefficient: 0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F).

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

Maximum Differential Common Mode Voltage (Maximum Voltage between T1 and T2 during measurement): 1volt.

Reading Rate: one time per second.

Input Connector: MTP miniature RTD 3 prong connector.

ENVIRONMENTAL

Ambient Operating Ranges: 0°C to 50°C (32°F to 122°F) <80% R.H.

Storage Temperature: -20°C to 60°C (-4°F to 140°F) <70% R.H.

GENERAL

Display: 4½ digit liquid crystal display (LCD) with maximum reading of 19999.

Overload: "----.-" is display.

Battery: Standard 9V battery.

Battery Life: 100 hours typical.

Auto power off: The meter key switch inactive for more than 30 minutes, press power key to resume operation.

Dimensions: 192mm(H) x 91mm(W) x 52.5mm(D).

Weight: 365g.

OPERATING INSTRUCTIONS

① ① Power Switch

The ① key turns the thermometer on or off. In the data SET mode, can not power off, must leave data SET mode then power off.

② °C/°F Selecting the Temperature Scale (Main display)

Reading the main displayed in either degrees Celsius(°C) or degrees Fahrenheit(°F). When the thermometer is turned on, it is set to the temperature scale that was in use when the thermometer was last turned off. To change the temperature scale, press the °C/°F key.

③ HOLD Mode (only Main display)

Pressing the HOLD key to enter the Data Hold mode, the "HOLD" annunciator is displayed. When HOLD mode is selected, the thermometer held the present readings and stops all further measurements.

Pressing the HOLD key again to cancel HOLD mode causing thermometer to resume taking measurements.

In the MIN/MAX recording mode, press HOLD key to stop the recording. Press HOLD key again to resume recording. (Previously recorded reading are not erased).

④ **T1/ T2/T1-T2 Main display Input Selection**

The input selection indicates which input is selected for main display; T1 probe, T2 probe or the difference between the two probes (T1-T2), when the thermometer is turned on, it is set to T1.

When main display input selected T1, then T1 input can select alternate of probe by pressing Pt385/Pt3926 key switch.

⑤ **Pt385/Pt3926 T1 Input RTD Probe Select (Main display)**

The Pt385/Pt3926 key switch the T1 input selects the Pt385 or Pt3926 RTD probe as input, when main display input selected T1.

When the thermometer is turned on, it is set to the probe selected that was in use when the thermometer was last turned off.

⑥ **MIN MAX with Time record Mode (only Main display)**

Press MIN MAX key to enter the MIN MAX Recording mode, (displays the Maximum reading with time, Minimum reading with time and Average reading stored in record mode). In the this mode the automatic power-off feature is disabled and ① key, °C/°F key, REL key, SET key, Hi/Lo Limits key and main display T1 T2 T1-T2 key, Pt385/Pt3926 key are disabled. The beeper emits a tone when a new minimum or maximum value is recorded.

Push MIN MAX key to cycle through the MAX, MIN and AVG readings. If an overload is recorded, the averaging function is stopped and average value display"----.-".

The true average of all the reading taken over at least 22 hours period can be displayed. If 22 hours is exceeded, new averages are no longer calculated. The last calculated value is retained as the average reading, but the actual minimum and maximum reading will continue to be captured. In this mode, press HOLD key to stop the recording of readings, all values are frozen, press again to restart recording. To prevent accidental loss of MIN, MAX and AVG data, in this mode can only be cancelled by pressing and hold down the MIN MAX key for 2 seconds to exit and erased recorded readings.

⑦ REL Relative mode (only Main display)

Pressing REL key to enter the Relative mode, zero the display, and store the displayed Reading as a reference value and annunciator REL is displayed. Press REL key again to exit the relative mode. The relative value can also be entered by the user. (See "SET mode" later in this manual.)

When the desired Relative value has been entered, press REL key to enter the Relative mode, press SET key use set Relative value as a reference value. Press REL key again to exit the relative mode.

In the Relative mode, the value (can not $\geq \pm 3000.0$ counts) shown on the LCD is always the difference between the stored reference and the present reading.

⑧ °C/°F Selecting the Temperature Scale (Second display)


Readings the second displayed in either degrees Celsius(°C) or degrees Fahrenheit(°F). When the thermometer is turned on, it is set to the temperature scale that was in use when the thermometer was last turned off. To change the temperature scale, press the °C/°F key.

⑨ SET mode (Relative value set, Time set and Hi/Lo Limits value set)

1. Press SET key to enter Relative value SET mode (Press ENTER key can escape relative value set mode), REL set mode. = = = =. = is displayed in main display.

Relative value is entered via overlay numbers, then press overlay ENTER key, stored the relative value, enter Time set mode.

2. Time set mode, (Press ENTER key can escape Time set mode) =. = = = : = = is displayed in second and third display. Time (hours, minutes, seconds) value is entered via overlay numbers, then press overlay ENTER key. Time start from set time value, enter Hi/Lo Limits value set mode.

3. Hi Limit value set mode,  is displayed (Press ENTER key can escape Hi Limit value set mode), = = = =. = is displayed in main display, Hi Limit value is entered via overlay numbers, then press overlay ENTER key, stored the Hi Limit value, enter Lo Limit value set mode (Press ENTER key can escape Lo Limit value set mode). = = = =. = is displayed in main display, Lo Limit value is entered via overlay numbers, then press overlay ENTER key, stored the Lo Limit value and exit SET mode.

4. When the thermometer is turned on. The Relative set value and Hi/Lo Limits set value that was in use when thermometer was last turned off set values.

⑩ **T1/T2 /T1-T2 second display Input Selection**

The input selection indicates which input is selected for second display; T1 probe, T2 probe or the difference between the two probes (T1-T2), when the thermometer is turn on, it is set to T2 input can select alternate of probe by second display Pt385/Pt3926 key switch.

⑪ **Pt385/Pt3926 Input RTD Prob select (second display)**

The Pt385/Pt3926 key switch the T2 input selects the Pt385 or Pt3926 RTD probe as input, when second display input selected T2. When the thermometer is turned on, it is set to the RTD selected that was in use when the thermometer was last turned off.

⑫ **Hi/Lo Limits mode (only Main display)**

Press Hi/Lo LIMITS key to enter the Hi/Lo Limits comparative mode, when input temperature value exceed Hi or Lo Limits value. The beeper emits a continuity pulse tone. Press Hi/Lo LIMITS key again to exit the Hi/Lo LIMITS mode.

OPERATOR MAINTENANCE

WARNING

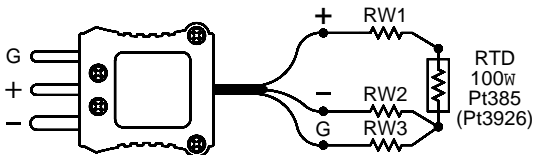
To avoid possible electrical shock, disconnect the thermocouple connectors from the rrometer before removing the cover.

Battery Replacement

Power is supplied by a 9 volt "transistor" battery. The "🔋" appears on the LCD display when replacement is needed. To replace the battery, remove the two screws from the back of the meter and lift off the battery cover. Remove the battery from battery contacts.

RTD PROBE CONNECTION

P/N : 17650-0505



RW1=RW2=RW3

RW= WIRE RESISTANCE

TEMPERATURE VS RESISTANCE TABLE(ITS90)

°C	Pt385	Pt3926
-200°C	18.521W	16.996W
-100°C	60.256W	59.479W
0°C	100.000W	100.000W
100°C	138.505W	139.272W
200°C	175.856W	177.362W
300°C	212.052W	214.275W
400°C	247.092W	250.018W
500°C	280.977W	284.591W
600°C	313.708W	317.994W
700°C	345.280W	-
800°C	375.700W	-

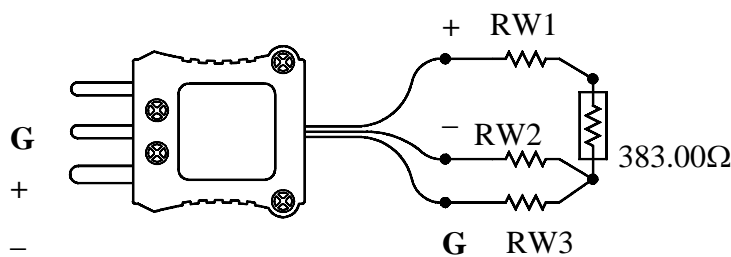
HH 504 / HH 505 CALIBRATION PROCEDURE

Note: The following calibration procedure should perform only by qualified technicians who have access to the items as following.

Equipment: The class of calibrator had better 10 times greater than the measured meter.

1. Turn off the meter then set the adjusted jumper to J1.
2. Insert the $383.00\ \Omega$ calibrator to the T1 then turn on the meter, the main display reading reads 1830.0 then press " ENTER " key.
3. The second display is stabilized (about 5sec.), then press " ENTER " key when the meter auto power off then set the jumper back to J3 position.
4. Turn on the meter then Insert the $100.00\ \Omega$ calibrator. The display reading reads 0°C if the calibration procedure is right.

383.00 Ω CALIBRATOR



RW1=RW2=RW3

RW=WIRERESISTANCE

$^{\circ}\text{C}$	Pt385	Pt3926
-200°C	$18.521\ \Omega$	$16.996\ \Omega$
-100°C	$60.256\ \Omega$	$59.479\ \Omega$
0°C	$100.000\ \Omega$	$100.000\ \Omega$
100°C	$138.505\ \Omega$	$139.272\ \Omega$
200°C	$175.856\ \Omega$	$177.362\ \Omega$
300°C	$212.052\ \Omega$	$214.275\ \Omega$
400°C	$247.092\ \Omega$	$250.018\ \Omega$
500°C	$280.977\ \Omega$	$284.591\ \Omega$
600°C	$313.708\ \Omega$	$317.994\ \Omega$
700°C	$345.280\ \Omega$	—
800°C	$375.700\ \Omega$	—

WARRANTY / DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship 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. 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 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 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 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.

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. 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.

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. © Copyright 1999 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of OMEGA ENGINEERING, INC.

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 Gauges
- Load Cells & Pressure Gauges
- 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