For immediate technical or application assistance:

USA and Canada: Sale Service: 1-800-826-6342 / 1-440-TO-CM®GA®
Customer Service: 1-800-422-3799 / 1-800-622-8215
Engineering Service: 1-800-474-4946 / 1-800-USA-INTERN®
Tel: 984-941 EA-51 LIN® 2004-941 CABLE CM®

Mexico:
En Español: (011) 215-359-7030 e-mail: info@omega.com
Fax: (011) 215-359-7037

For warranty and repair requests/inquiries to the OMEGA Customer Service Department, BEFORE RETURNING ANY PRODUCT(S) 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 COVER HANDLING AND SHIPPING TIME. This ensures that OMEGA's customers receive maximum coverage on each product.

It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. 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, and should not be used for human application.

REPAIRS, consult OMEGA for current repair charges.

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.

OMEGA's warranty policy is to make running changes, not model changes, whenever improvement is possible. This affords our customers the latest in technology and engineering. OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

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SAFEGUARDS AND PRECAUTIONS

WARNING - This product emits a visible beam of laser light. Avoid exposure to the laser radiation. The use of optical viewing aids (binoculars, for example) may increase the ocular hazard.

CAUTION - The laser beam should not be intentionally aimed at people or animals.

CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Read and follow all instructions in this manual carefully, and retain this manual for future reference.

Do not use this instrument in any manner inconsistent with these operating instructions or under any conditions that exceed the environmental specifications stated.

This instrument is not user serviceable. For technical assistance, contact the sales organization from which you purchased the product.

In order to comply with EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE): This product may contain material which could be hazardous to human health and the environment. DO NOT DISPOSE of this product as unsorted municipal waste. This product needs to be RECYCLED in accordance with local regulations, contact your local authorities for more information. This product may be returnable to your distributor for recycling - contact the distributor for details.

14.0 OPTIONS / ACCESSORIES

HHT-RT-5  Reflective Tape, 5 foot [1.5 m] roll, ½ inch [13 mm] wide

HHT13-RCA  Remote Contact Assembly with 10 cm wheel, concave and convex tips

HHT13-CTE  Concave/convex contact tips and 10 cm linear contact wheel

HHT13-LCW  12 inch circumference wheel for use with HHT13-RCA

HHT20-ROS  Remote Optical Sensor

HHT-ROS-CABLE  25 foot extension cable for all sensors

HHT13-CC10  Padded Nylon Carrying Case
12.0 BATTERIES
When displayed, replace batteries.

13.0 CLEANING
To clean the instrument, wipe with a damp cloth using mild soapy solution.
1.0 OVERVIEW

The HHT13 is a precision hand-held multifunction Tachometer, Ratemeter, Totalizer and Timer. It is programmable to display directly in Revs, Inches, Feet, Yards, Miles, Centimeters and Meters or function as a stopwatch or interval timer. Input / output sockets allow for remote sensing and pulse output to external indicating devices. For ease of use, the instrument can be “Locked-on” for continuous operation.

2.0 FEATURE LOCATIONS

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11.0 INPUT / OUTPUT

Input: Accepts remote sensor or Remote Contact Assembly (HHT13-RCA). 1/8” (3.5mm) stereo phone plug.

Output: 1 pulse per revolution TTL output on internal operation. Pulse repeater with external sensors. 1/8” (3.5mm) mono phone plug.

\[\text{Signal Input} \quad +3V \text{ Out to Sensor} \quad \text{Common (GND)}\]
\[\text{Signal Input} \quad +3V \text{ Out to Sensor} \quad \text{Common (GND)}\]

\[\text{Input Connector Detail (Stereo plug)}\]

\[\text{Output Connector Detail (Mono plug)}\]

\[\text{AVOID EXPOSURE - LASER RADIATION IS Emitted FROM THIS APERTURE}\]
10.0 MAKING MEASUREMENTS

10.1 Non-Contact Measurements

10.2 Direct Contact Measurements

ONLY USE MODERATE PRESSURE

WARNING: Making measurements in direct contact with rotating equipment can be dangerous. Keep all loose clothing and hair away from exposed moving machinery. Keep the hand holding the instrument well behind the back end of the Remote Contact Assembly. Properly replace all machinery guards after completing measurement. Do not use for rotation greater than 20,000 RPM.

3.0 LCD DISPLAY SYMBOLS

- **On Target Indicator.** Blinks on whenever there is an input signal. Will appear to be solid on at higher frequencies.
- **Low Battery icon.** Indicates that the batteries are low and need to be replaced.
- **Times Ten icon.** Indicates that the value shown is ten times that which is displayed.
- **Laser Indicator.** Red laser is on when this indicator is illuminated.
- **Lock icon.** Indicates that the unit is “Locked” on and making continuous measurements (Lock mode).
4.0 HHT13 SPECIFICATIONS

Laser Specifications:

Classification: Class 2 (per IEC 60825-1 Ed 1.2 2001-8)

Maximum Laser Output: 1mW
Pulse Duration: Continuous
Laser Wavelength: 650 nm
Beam Divergence: < 1.5 mrad
Beam Diameter: 4 x 7 mm typical at 2 meters
Laser Diode Life: 8,000 operating hours MTBF (1 year warranty)

Non-Contact Specifications:

Ranges: RPM 5 – 200,000
RPS 0.084 – 3,333.3
RPH 300-999,990

Resolution: Fixed: 1 (10 above 99,999)
Auto-ranging: 0.001 to 1.0 (10 above 99,999)

Accuracy: ±0.01% of reading or resolution limit

Operating Range: up to 25 feet (7.62 m) or up to 70 degrees off perpendicular to reflective tape target

Contact Specifications using optional Remote Contact Assembly:

Range: Contact Tips: 0.5 to 20,000 RPM
10 cm / 12-inch Wheel: 0.5 to 12,000 RPM

Resolution: Fixed: 1 (10 above 99,999)
Auto-ranging: 0.001 to 1.0 (10 above 99,999)

9. Exit Setup – Ready to measure

Unit will remember these settings (including lock on/off) even if turned off and back on.

9.2 TIMER Operation

Measure:

- Manual Each press toggles Start and Stop
- Auto OR Start and Stop triggered by Remote Optical Sensor (HHT20-ROS)

Reset

With Timer stopped - Resets time to 00:00.0

Lap

With Timer running - Stops at elapsed time to date. To continue, press again.

Power Off

OR Automatic after 90 seconds if unit not Locked on
9.0 TIMER Mode

9.1 TIMER Setup

1. Turn Power ON

2. Enter Setup Mode

3. Enter selection of Mode

4. Select TIMER Mode

5. Save and advance

6. Enter selection of Timer function

7. Select Timer function

Contact Measurements Ranges:

**TACHOMETER:**
- Revolutions per Minute (RPM) 0.5 to 20,000 RPM
- Revolutions per Second (RPS) 0.0833 to 333.33 RPS
- Revolution per Hour (RPH) 30 to 999,990 RPH

**RATES:**
- Wheel Circumference:
  - Inches per Second: 0.033 to 1312.3 IPS
  - Feet per Second: 0.003 to 109.36 FT/S

- Inches per Minute: 1.969 to 78,740 IPM
  - Feet per Minute: 0.009 to 200.00 FT/S

- Inches per Hour: 118.11 to 999,990 IPH
  - Feet per Hour: 0.164 to 6,561.7 FT/M

- Yards per Second: 0.001 to 36.453 YPS
  - Yards per Minute: 0.055 to 2,187.2 YPM

**Contact Specifications (continued):**

- **Accuracy:**
  - Revs: ±0.05% of reading (RPM) or resolution limit (with no slippage)
  - Linear: ±0.5% of reading or resolution limit (with no slippage)

1a. To toggle Lock On/Off

Press and Hold

Locked On
Contact Measurements Ranges (continued):

**RATES:**

<table>
<thead>
<tr>
<th>Measures</th>
<th>10cm:</th>
<th>12 in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yards per Hour</td>
<td>3.281 to 131,233 YPH</td>
<td>10.000 to 240,000 YPH</td>
</tr>
<tr>
<td>Miles per Hour</td>
<td>0.002 to 74.564 MPH</td>
<td>0.006 to 136.36 MPH</td>
</tr>
<tr>
<td>Centimeters per Second</td>
<td>0.084 to 3,333.3 CM/S</td>
<td>0.21 to 3,048.0 CM/S</td>
</tr>
<tr>
<td>Centimeters per Minute</td>
<td>5.000 to 200,000 CM/M</td>
<td>15.240 to 365,760 CM/M</td>
</tr>
<tr>
<td>Centimeters per Hour</td>
<td>300.00 to 999,990 CM/H</td>
<td>914.40 to 999,990 CM/H</td>
</tr>
<tr>
<td>Meters per Second</td>
<td>0.001 to 33.333 M/SEC</td>
<td>0.003 to 60.960 M/SEC</td>
</tr>
<tr>
<td>Meters per Minute</td>
<td>0.050 to 2,000.0 M/MIN</td>
<td>0.153 to 3,657.6 M/MIN</td>
</tr>
<tr>
<td>Meters per Hour</td>
<td>3.000 to 120,000 M/H</td>
<td>9.144 to 219,460 M/H</td>
</tr>
</tbody>
</table>

**TOTALIZER:**

- Counts: 0 to 999,999
- Scale Totals in Inches, Feet, Yards, Centimeters or Meters
- Input: Internal or External optics or linear contact wheel

8.2 TOTALizer Operation

- Measure
- Recall Max or Min
- Recall Time in seconds
- Recall Max or Min Speed (in last selected Tach or Rate mode units)
- If unit is Locked on: Resets Max/Min, Total and Measurement Time
- Power Off

NOTE: Pressing once before 90 seconds will keep measurements in memory and the display turned on longer.
TOTALizer Setup (continued):

9. Enter selection of number of decimal places

10. Select decimal places

11. Save and advance

12. Exit Setup – Ready to measure

Unit will remember these settings (including lock on/off) even if turned off and back on.

Display: 5 x 0.5” (12.7mm) numeric digits plus 5 Alpha-numeric LCD

Batteries: 2 “AA” 1.5 V (DC) alkaline included (Note: Batteries are NOT rechargeable.)

Battery Life: 30 hours continuous typical with batteries provided

External Input:

Absolute max: -0.3 V to 5 V (DC)

Minimum: low below 1.2 V and high above 2 V (TTL compatible)

Edge: Triggers on Positive edge

Power Out: 3.0 V nominal, approx. 2.8 V @ 20 mA max

Pulse Output: 0 V to 3.3 V (DC) pulse
Same shape as External Input signal or high when internal optics sees a reflection

Dimensions: 6.92” (17.58 cm) H x 2.4” (6.10 cm) W x 1.6” (4.06 cm) D

Weight: Approx. 7 oz. (210 g)

This product is designed to be safe for indoor use under the following conditions (per IEC61010-1).

Installation Category II per IEC 664

Pollution Degree Level II per IEC 664

Temperature: 40 °F to 105 °F (5 °C to 40 °C)

Humidity: Maximum relative humidity of 80% for temperatures up to 88 °F (31 °C) decreasing linearly to 50% relative humidity at 100 °F (40 °C). Humidity non-condensing.

Specifications subject to change without notice.
5.0 PREPARATION FOR MEASUREMENT

5.1 Non-Contact Preparation

For Internal operation (Red laser) or External operation using optional Remote Optical Sensor (ROS-Red LED).

1. Clean Shaft
2. Apply 1/2” square T-5 Reflective tape

For Small Shafts:

As small as 1/8” wide on side or radius edge

5.2 Direct Contact Preparation

For External operation ONLY using optional Remote Contact Assembly (HHT13-RCA).

Select and install contact option:

1. Contact Tip (Convex tip shown. Use Concave tip for small shafts.)
2. Clean Shaft
3. Apply 1/2” square T-5 Reflective tape

6. Enter selection of Units
7. Select Units
8. Save and advance

Different options displayed for Internal or External operation.

Internal or External ROS: \(\text{COUNT} \quad \text{Only}\)
External RCA:

Rotational: REV
Linear: INCH, FEET, YARDS, CM, METER

Repeat until desired Units displayed

Only for Linear Units:
8a. Enter selection of Wheel
8b. Select Wheel
8c. Save and Advance

Last Wheel selected is displayed

Toggles between 10CM and 12IN
8.0 TOTALizer Mode

8.1 TOTALizer Setup

1. Turn Power ON

   Internal or External ROS:
   Last Units selected

   External RCA:
   EXTRN, then scrolling message, then last Units selected

   1a. To toggle Lock On/Off
   Press and Hold
   Locked On

2. Enter Setup Mode

3. Enter selection of Mode

4. Select TOTAL Mode

   Repeat until TOTAL displayed.

5. Save and advance

---

2. 10 cm Wheel

   OR

3. 12 inch Wheel

   Install with pin in shaft fully seated in slot. Tighten screw.

5.3 Connecting External Sensors

Remote Optical Sensor (HHT20-ROS)

Remote Contact Assembly (HHT13-RCA)
(shown with optional 12 inch wheel)
6.0 TACHometer Mode

6.1 TACHometer Setup

1. Turn Power ON

2. Enter Setup Mode

3. Enter selection of Mode

4. Select TACH Mode

5. Save and advance

6. Enter selection of Units

1a. To toggle Lock On/Off

Press and Hold

Locked On

Last Units selected are displayed

Last Mode selected is displayed

Repeat until TACH displayed

RPS, RPM or RPH

Unit will remember these settings (including lock on/off) even if turned off and back on.

11. Save and advance

12. Exit Setup – Ready to measure

DONE

USE CONTACT TIP or [wheel selected], then Units selected

Measure

OR

Recall Max

Press and hold

Lock on

Max Speed

Recall Min

Min Speed

If unit Locked on:

Resets Max/Min

Power Off

OR

Automatic after 90 seconds if unit not Locked on

7.2 RATE Operation
RATE Setup (continued):

6. Enter selection of Units
   Rotational: CRPS, CRPM or CRPH
   Linear: IPS, IPN, IPH, FT/S, FT/M, FT/H, YPS, YPM, YPH, MPH, CM/S, CM/M, CM/H

7. Select Units
   Repeat until desired Units displayed

8. Save and advance

Only for Linear Units:
8a. Enter selection of Wheel
   Last Wheel selected is displayed

8b. Select Wheel

8c. Save and Advance

9. Enter selection of number of decimal places

10. Select decimal places
   Repeat until desired decimal places displayed

13. Exit Setup – Ready to measure

Unit will remember these settings (including lock on/off) even if turned off and back on.
6.2 TACHometer Operation

Measure OR

Press and hold Lock on

Recall Max

Max Speed

Recall Min

Min Speed

If unit Locked on:

Resets Max/Min

Power OFF OR

Automatic after 90 seconds if unit not Locked on

7.0 RATE Mode

NOTE: External Remote Contact Assembly (HHT13-RCA) must be inserted into input socket.

7.1 RATE Setup

1. Turn Power ON

2. Enter Setup Mode

3. Enter selection of Mode

4. Select RATE Mode

5. Save and advance

OR

Toggles between RATE and TOTAL. Select RATE.