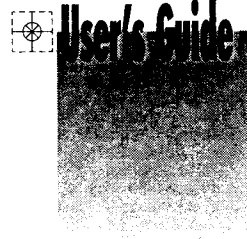


CE



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# HHT11 Pocket Tachometer



OMEGA

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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 applications.

**USE OF THIS EQUIPMENT IN A MANNER THAT IS INCONSISTENT WITH IT'S INTENDED PURPOSE, OR IN AN ENVIRONMENT THAT EXCEEDS THE RATED SPECIFICATIONS BY THE MANUFACTURER, MAY IMPAIR THE PROTECTION PROVIDED BY THE EQUIPMENT.**

**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 CONTACT TIP ASSEMBLY. PROPERLY REPLACE ALL MACHINERY GUARDS AFTER COMPLETING MEASUREMENT. DO NOT USE FOR ROTATION GREATER THAN 20,000 RPM.**

## 1. SPECIFICATIONS

This product is designed to be safe for indoor use under the following conditions (per IEC1010-1)

Temperature:	5°C to 40°C.
Humidity:	Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 40°C.
Pollution Degree:	2 per IEC 664.
Power:	9VDC @ 70mA MAX. Battery Type IEC-6LR61.
RPM Range	5 to 100,000 Non Contact . 5 to 20,000 Contact
Accuracy	Non Contact $\pm 0.01\%$ Contact $\pm 0.5\%$ typical
Display:	6-digit Alphanumeric LCD.
Resolution:	$\pm 1$ RPM.

## 2. INTRODUCTION

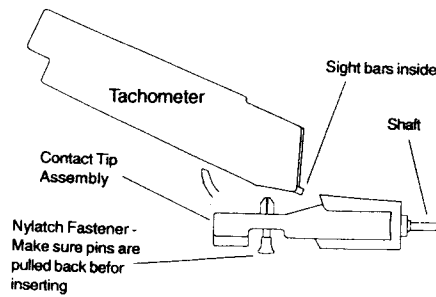
HHT11 is designed to make non-contact measurements of rotational speeds from 5 RPM to 100,000 RPM, at a distance of up to 30 inches (0.75m) from the reflective target and at an angle of up to 30° from perpendicular. When equipped with the optional HHT10-CTA-1 Contact Tip Assembly, HHT11 can make contact measurements of rotational speeds in the range of 5 RPM to 20,000 RPM. Both convex and concave tips are provided with HHT10-CTA-1 for measuring various size shafts. The concave tip is one inch in circumference and may also be used for measurement of linear surface speeds directly in inches per minute.

## 2. NON-CONTACT MEASUREMENTS

To prepare a shaft for non-contact measurement of speed, carefully clean an area of the shaft of all grease and dirt and apply a piece of Reflective Tape to the cleaned surface. Typically, a half inch square of Reflective Tape is convenient. For smaller shafts, smaller pieces of tape down to approximately 1/8 inch (3mm) in length may be used. Always use Reflective Tape supplied. Additional tape is available in five foot rolls, part number HHT-RT-5.

The ergonomic design of HHT11 makes the non-contact measurement of speed extremely simple. Aim HHT11 at the reflective target using the sight bars on the top surface of the instrument as an aid in locating the target. A light emanates

from the underside of HHT11 parallel to the top surface and in line with the sight bars. This design allows you to view the target on the rotating shaft and the display on the instrument simultaneously. To measure, press and hold the power button on the front panel and aim the instrument until a steady illumination of the "bull's eye" on target symbol indicates you are receiving valid data. Above 200 RPM wait for three updates of the display for the instrument to stabilize. At lower speeds, a few additional updates may be required for the instrument to initially "lock on". Once a measurement is complete, release the power button while still viewing the target. The last reading will be held on the display for approximately 90 seconds and then the instrument automatically times out and shuts off.



### 3. CONTACT MEASUREMENTS

To measure rotational speed by directly contacting a shaft, HHT11 must be equipped with the HHT10-CTA-1 Contact Tip Assembly, speed range is 5 to 20,000 RPM. This accessory is attached to the bottom of the instrument with two Nylatch® fasteners which install in the holes provided for attachment. To assemble, first pull back on the grips on the two Nylatch® fasteners to insure they are in the released (pulled out) position. DO NOT ATTEMPT TO PULL THEM BEYOND THE UNLOCKED POSITION (loose feel). Install the Contact Tip Assembly onto HHT11 by sliding the sight bars on HHT11 into the corresponding notch in the top of the Contact Tip Assembly (above the window exposing the shaft). Push the Contact Tip Assembly flush against HHT11 so that the fasteners fit into the two locating holes on the underside of HHT11. Secure the tip assembly by pushing firmly on both of the Nylatch® fasteners

until they snap securely in place. Select either a convex or concave tip appropriate for the measurement to be made and install it firmly on the shaft extension of the HHT10-CTA-1. Note that the shaft has a flat surface on it which must align with the flat in the rubber tips. The convex (conical) tip is used for moderate to larger diameter shafts that are equipped with a turned center, while the concave (inverted conical) tip is used on smaller diameter shafts. To make a measurement, start the equipment and carefully move the contact tip against the end of the rotating shaft. **KEEP THE HAND HOLDING THE INSTRUMENT WELL BEHIND THE BACK EDGE OF THE CONTACT TIP ASSEMBLY.** Only a moderate amount of pressure is required to keep the rubber tip in contact with the rotating shaft. Depress the power button and hold the instrument in position until the reading is complete. Once again, the on-target indicator or "bull's eye" symbol will be your indication of reliable data being received. When the measurement is complete, release the power button while still in contact with the shaft, remove the instrument from contact with the shaft, and HHT11 will retain the last reading for approximately 90 seconds, then automatically shut off. To disassemble the Contact Tip Assembly, pull the grip of each of the Nylatch® fasteners to release them from the back of HHT11, and remove the Contact Tip Assembly by gently pulling it from the back of the instrument.

#### **4. SURFACE SPEED MEASUREMENTS**

Surface speed measurements are made with the HHT10-CTA-1 Contact Tip Assembly and the side of the concave tip. Install the HHT10-CTA-1 and concave tip on HHT11 as described above. To measure a linear surface speed such as a moving belt or web, gently contact the side of the rubber tip against the top surface of the object to be measured. For accurate results, be sure that the tip is held flat against the moving object. Only a very moderate amount of pressure is required. Excess pressure can load the HHT10-CTA-1 shaft and distort the rubber tip causing an erroneous reading and eventual wear in the bearings of the Contact Tip Assembly. Linear speeds are read out directly in inches per minute over the range of 5 to 20,000 IPM. Feet per minute equals inches per minute divided by 12.



**PLEASE READ AND HEED WARNINGS FOR CONTACT MEASUREMENTS ABOVE, AND ON COVER PAGE.**

## 5. BATTERY

HHT11 is powered from a single IEC Type 6LR61 nine volt dc alkaline battery. The battery is installed by removing the sliding cover from the back of the instrument, connecting the battery to the battery snap, and installing the battery into the compartment with leads arranged so that they will not be damaged when replacing the battery compartment cover.

When the battery voltage in HHT11 is getting low, the display will blink on and off to indicate this condition. At the time the low battery indication comes on, HHT11 should operate for another fifteen minutes.

## 6. CALIBRATION

HHT11 is a microprocessor-controlled digital instrument which requires no calibration. However, the accuracy of HHT11 can be checked at any time by aiming it at a fluorescent light and observing  $7200 \pm$  two counts. (NOTE: In countries with a 50 Hz. power line frequency, HHT11 will read  $6000 \pm 2$ .)

## 7. OPTIONAL ACCESSORIES

- |             |   |
|-------------|---|
| HHT10-CTA-1 | Contact Tip Assembly with convex and concave tips for |
| HHT-RT-5    | Reflective Tape, 5 foot roll, 1/2 inch wide           |



## 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.

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## 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.

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