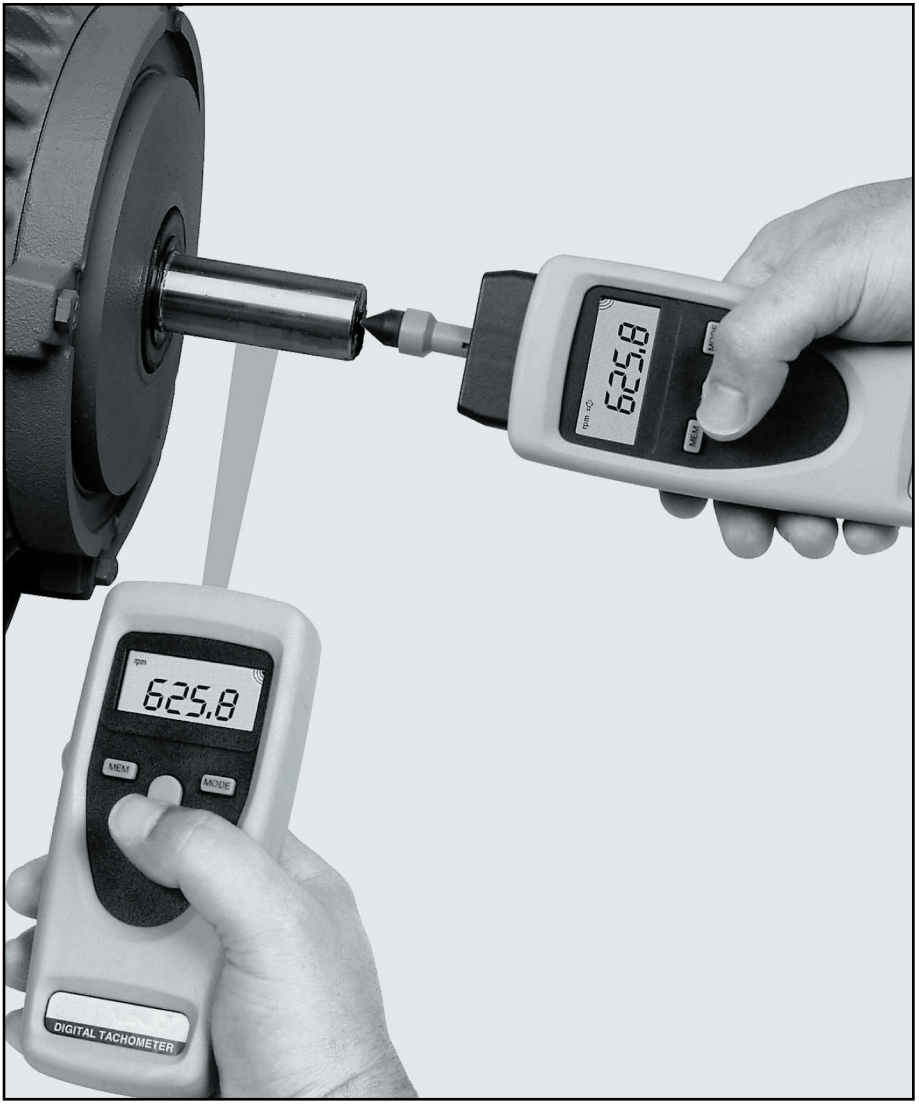
ELECTRO·SENSORS

HH100
Digital Tachometer



Operating Instructions

Table of Contents

1.0 Introduction 2
1.1 Applications

2.0 Safety Precautions 3

3.0 Contents of Complete Outfit 4

4.0 Overview of HH100 5
4.1 LCD Display
4.2 Front Panel Key Functions

5.0 Installing Batteries 6

6.0 Measuring RPM 7
6.1 Contact Operation
6.2 Non-Contact Operation

7.0 Measuring Surface Speed or Length 9

8.0 Using Optional Surface Speed Wheels 10

9.0 Memory System 11

10.0 Specifications 12

11.0 Spare Parts & Optional Accessories 13

12.0 Removing the Protective Rubber Shell 14

13.0 Warranty 15

1.0 INTRODUCTION

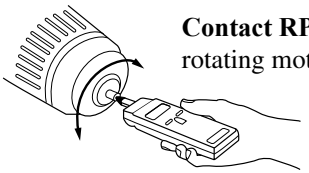
The HH100 Digital Tachometer combines the best features of contact and non-contact tachometers for measuring rotational speed, surface speed and length.

When used in the non-contact operating mode, a small piece of reflective tape is applied to the rotating element (wheel, shaft, etc.). The HH100 uses a visible LED light source to accurately measure the RPM from up to 24" (60 cm) away from the "target".
In the contact operating mode, the speed is sensed using one of the contact adapters supplied with the instrument.

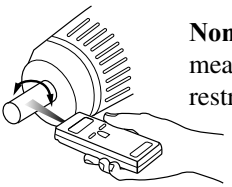
In applications where surface speed or linear speeds are to be measured, the universal wheel is used for direct readout of feet/min, meters/min, inches/min, meters/sec and feet/sec, as selected by the user.

The HH100 can also be used to measure the accumulated total of continuously running material such as paper, wire/yarn being wound on a spool, or for checking the calibration of on-line counters and totalizer devices. It will display totals in feet, meters or inches.

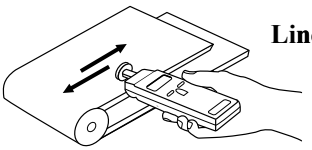
1.1 Applications



Contact RPM — Used to measure the speed of rotating motors, shafts, pulleys, gears, etc.



Non-Contact RPM — Used when contact measurement is not possible due to access space restrictions, saftey concerns, etc.



Linear Speed and Length — Used to measure the linear speed or length of moving surfaces, such as conveyor belts, printed materials, webs of fabric or paper, etc.

2.0 Saftey Precautions

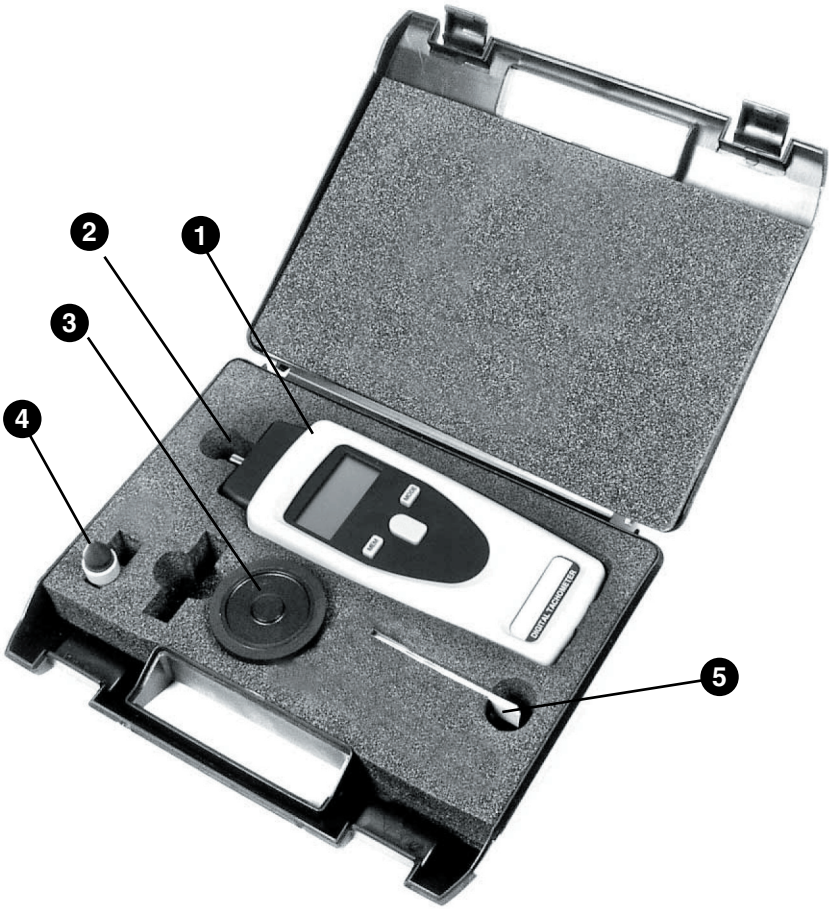
All operators should wear safety goggles when using this or any other tachometer. Failure to do so could result in serious injury!

1. Check condition of housing, slide-on Contact Adapter and split mounting hubs of push-in Contact Cone, Surface Speed Wheel and any other accessories. Replace those that are worn, loose-fitting or cracked. The Contact Adapter shaft should rotate freely.
2. When operating in the contact mode, be sure Contact Adapter fits snugly into the housing grooves.
3. When using the Surface Speed Wheel accessory, make sure it its the tachometer shaft snugly. In operation, keep the wheel perpendicular and parallel to the moving surface to prevent it from running off the tachometer shaft.
4. Do not use the standard surface speed wheel for speeds in excess of 1000 feet per minute. For higher speeds, specify the optional Heavy-Duty Surface Speed Wheel (DT12) with set-screw mounting.
5. Store the instrument in its carrying case when it is not in use

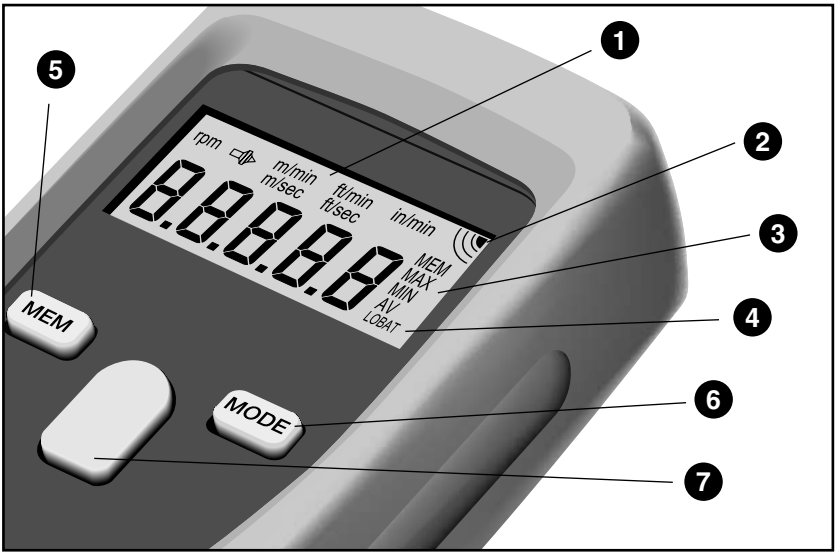
3.0 CONTENTS OF COMPLETE OUTFIT

The HH100 is supplied with the following accessories in a foam-fitted carrying case

1. Meter with molded rubber shell
2. Slide-on Contact Adapter
3. 6” Circumference Surface Speed Wheel
4. Cone Tip Measuring Adapter
5. Reflective Tape (10 strips)
6. Two AA Batteries (not shown)
7. NIST Calibration Certificate (not shown)
8. Instruction Manual (not shown)



4.0 OVERVIEW OF HH100



4.1 LCD Display

1. *Units of Measure Indicators*—Indicates which unit of measure is being shown on the display.
2. *On-Target Indicator* — Flashes to indicate that the unit is lined up correctly for an accurate non-contact measurement.
3. *Memory Indicators* — Indicates which type of measurement stored in memory (last, max., min., avg) is being displayed.
4. *Low Battery Indicator* — Indicates that batteries need replacement.

4.2 Front Panel Key Functions

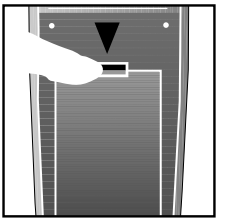
5. MEM: Access the memory. Each time the key is pressed the values stored in memory will be recalled to the display.

6. MODE: Each time the MODE key is pressed, the units of measure will change.

7. MEASURE: The MEASURE Key performs the following functions:
   • Turns on the power
   • Starts and stops the measuring period
   • Exits from the memory mode
   • Selects the displayed wheel type when using one of the optional surface speed wheels.

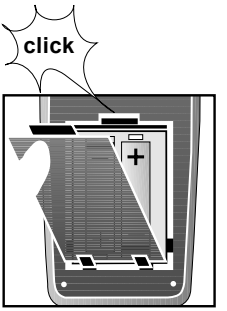
5.0 INSTALLING BATTERIES

1. Turn the gauge over and locate the battery compartment. You do not have to remove the rubber shell.



2. Open the battery compartment by pulling down on the tab located at the top of the battery cover and remove the cover. Insert two AA batteries following the orientation engraved on the inside of the battery compartment.

3. Replace the battery cover by inserting the two tabs located on the bottom edge of the cover into the matching slots in the housing.

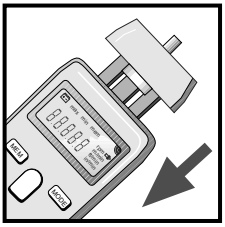


4. Push the cover closed until the tab at the top of the battery cover “clicks” into a locked position.

5. Replace the cut-out section of the protective rubber shell.

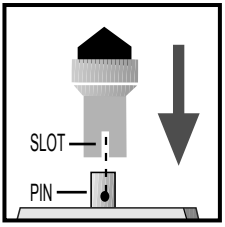
6.0 MEASURING RPM

6.1 Contact Operation - RPM

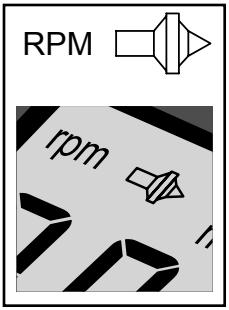


1. Install the Slide-on Contact Adapter. Push on securely

2. Slide the Cone Tip adapter over the shaft of the instrument. Be sure to align the pin on the side of the shaft with the slot in the adapter. Push on securely.



3. Select the Contact RPM mode by pressing the MODE key until the rpm symbol appears in the top left corner of the LCD display

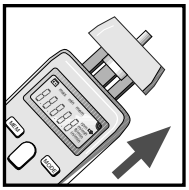


4. Position the adapter carefully so that it contacts the center of the rotating shaft. Apply enough pressure to eliminate any slip.

5. Press and hold the MEASURE key to take measurements.

6. Release the MEASURE key prior to removing the instrument from the rotating element. The LAST reading will be retained on the display.

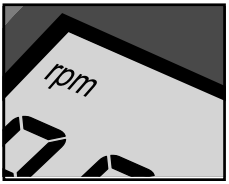
6.2 Non-Contact Operation - RPM



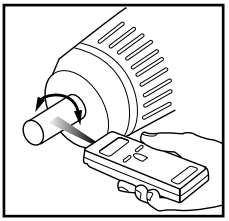
1. Remove the Contact Adapter.

2. Attach a small piece of the supplied reflective tape to the rotating element (shaft, pulley, etc.).

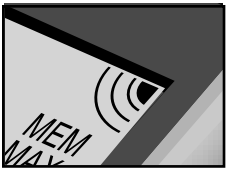
3. Select the Non-Contact RPM mode by pressing the MODE key until the rpm symbol appears in the top left corner of the LCD display



4. Aim the HH100 at the target using the red visible light beam for alignment assistance.



5. Press and hold the MEASURE key to begin taking measurements. The On-Target" indicator will be displayed on the LCD if the instrument is properly aimed at the target (reflective tape).



6. Release the Measure key prior to removing the instrument from the target. The last reading will be retained on the LCD display.

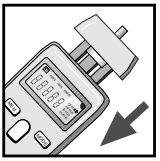
Hints for Non-Contact Measurements

1. The non-reflective area should be larger than the reflective area.

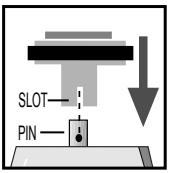
2. If the rotating element is highly reflective, cover it with black tape or paint to improve the contrast between the reflective tape and the surface of the rotating element.

7.0 MEASURING SURFACE SPEED OR LENGTH

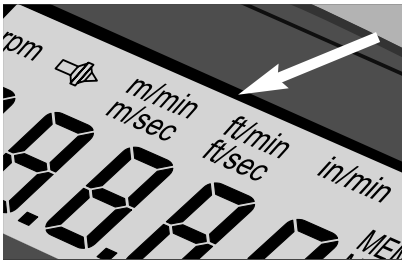
1. Install the Slide-on Contact Adapter.



2. Slide the Surface Speed Wheel over the shaft of the instrument. Be sure to align the pin on the side of the shaft with the slot in the adapter. Push on securely.



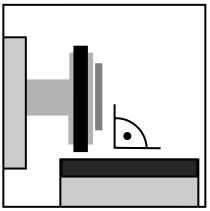
3. Select the desired units of measure for surface speed or length by pressing the MODE key until the appropriate symbol appears on the LCD Display.



   The units of measure appear in the following sequence:

   RPM➔ m/min ➔ m/sec ➔ ft/min ➔ ft/sec ➔ in/min ➔ m ➔ ft ➔ in

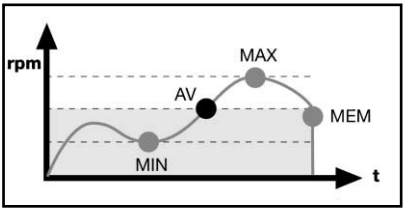
4. Position the wheel carefully so that it is perpendicular to the moving surface. Apply enough pressure to eliminate any slip.



5. **Press and hold** the MEASURE key to take measurements.

6. Release the MEASURE key prior to removing the instrument from the moving surface. The Last reading will be retained on the display.

8.0 MEMORY SYSTEM

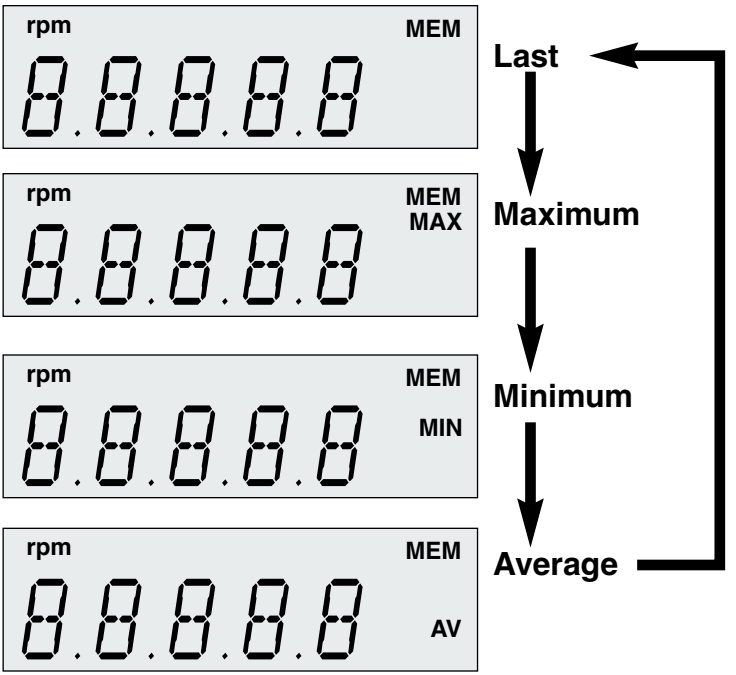


The HH100 is supplied with a built-in memory system which stores the *last* measurement, *maximum* measurement, *minimum* measurement, and the *average* measurement which occurred during a measuring period. A measuring period is the interval of time while the Measure key is depressed. The stored values are retained in memory even when the power turns off (auto power off). To recall the stored values after auto power off:

1. Press the Measure key to turn the power on
2. Press the MEM key to recall the desired value

MEM The Memory key accesses the HH100's built-in memory. Each time the MEM key is pressed the values stored in memory will be recalled to the display in the sequence listed below. The appropriate memory indicator will be shown together with the recalled value on the display.

Note: When the batteries are removed, the values stored in memory will be lost.



9.0 SPECIFICATIONS

Measuring Ranges – rpm			
Optical	1 – 99,999 rpm		
Mechanical	1 – 99,999 rpm		
Measuring Ranges – speed			
Wheel Size	**6"**	**12"**	**0.1 m**
m/min	0.10–1524	0.40–609.6	0.10–1999
ft/min	0.40–5000	0.40–2000	0.40–6550
in/min	4.0–60.00	4.00–24.000	4.00–78.700
m/min	0.10–25.40	0.10–10.16	0.10–33.30
ft/sec	0.10–83.33	0.10–33.33	0.10–109
Measuring Ranges – length			
	0 99,999 m, / 0 – 99,999 ft, / 0 – 99,999 in		

Other Specifications	
Resolution	.01 from 0 – 100 .1 from 100 – 1,000 1 from 1000 – 99,999
Accuracy	±0.02% of reading or ±1 digit
Display	5-Digit LCD, 10mm high
Decimal Point	Automatic
Memory System	Maximum, minimum, average and last reading (retained in memory for the life of batteries)
Measurement System	
Non-Contact	Visible LED light beam
Contact	Contact adapter
Engineering Units	
RPM	RPM
Surface Speed	Feet/min, inches/min and meters/min
Length	Feet, inches, meters
Sensing Distance	Up to 24 inches (*60 cm*)
Display Update Time	0.5 seconds or one measuring period
Auto Powwer Off	After 30 seconds of non-use (minimum, maximum average, and last reading retained in memory)
Battery Life	40 hours continuous use (approx.) with alkaline batteries
Battery Type	2 AA (1.5 V) or rechargeable
Weight	6 ounces (*170 grams*)
Housing Material	ABS Plastic
Operating Temperature	32 to 122° F (*0 to 50° C*)
Storage Temperature	– 4 to 158° F (*–20 to 70° C*)
Accessories Included	Contact adapter, cone tip, 6" circumference universal surface speed wheel, reflective tape, NIST-traceable calibration certificate, operating instructions and foam-fitted, hard-plastic carrying case

10.0 SPARE PARTS & OPTIONAL ACCESSORIES

Standard Spare Parts

CDT-ADAP	Slide-In Contact Adapter
DTCA	Cone Tip Adapter
DT6	6" *(152mm)* Circumference Surface Speed Wheel
DT-TAPE	10 Strips of Reflective Tape - 1/2" x 4" *(12 x 100mm)*

Optional Accessories

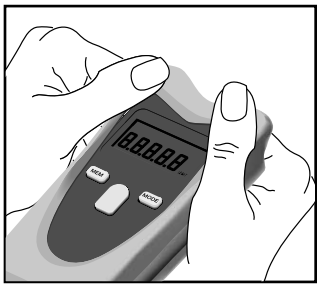
DTFA	Funnel Tip Adapter
DTSX	Shaft Extension
CDT-WHEEL	0.1 meter Circumference Surface Speed Wheel
DT12	12" Circumference Surface Speed Wheel

11.0 Removing Protective Rubber Shell

The gauge is supplied with a durable rubber shell that provides an added measure of physical and environmental protection in harsh applications.

To remove the shell, follow the procedure outlined below:

1. Using your thumbs, slide the rubber shell up and off of one corner of the gauge. Repeat for the other corner
2. Pull the shell down until it is completely off the corners of the gauge, the pull the gauge forward and out of the shell.
3. Replace the shell by sliding the gauge bottom first into the large center opening, then, one at a time, slip the corners of the shell back over the gauge.



12.0 Warranty

CONDITIONAL LIMITED WARRANTY

Electro-Sensors, Inc. warrants the products it manufactures against defects in materials and workmanship for a period of one year from the date of the shipment, provided the products have been stored, handled, installed and used under proper conditions. Electro-Sensor's liability under this limited warranty shall extend only to repair or replacement of a defective product, at Electro-Sensor's option. This warranty does not cover abuse, normal wear, or careless handling and it is void if the product has been repaired or serviced by personnel not authorized by Electro-Sensors, Inc. Electro-Sensors, Inc. disclaims all liability for any affirmation, promise, or consequential damages caused by the product and disclaims liability for all such consequential damages, including, but not limited to damage resulting from personal injury or death and property damage. No warranties, expressed or implied, are created with respect to Electro-Sensors' products except those expressly contained herein. The customer acknowledges the disclaimers and limitation contained herein, and relies on no other warranties or affirmations.

If return of the product is necessary, a Return Authorization Number must be secured from Electro-Sensors, Inc. prior to return shipment. The customer service telephone is (952) 930-0100. Call toll free outside Minnesota: 1-800-328-6170. Return the product, properly packed and all transportation charges prepaid to: Electro-Sensors, Inc. 6111 Blue Circle Drive, Minnetonka, MN, 55343-9108 USA. Include this Warranty Copy and Return Authorization Number with the product. Returns without this information will be sent back to the purchaser, transportation charges collect.

Installation of Electro-Sensors, Inc. products is the responsibility of the purchaser and is in no way guaranteed by Electro-Sensors, Inc.

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NOTES

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