



MONARCH INSTRUMENT

*Instruction Manual*



**POCKET-TACH 100**

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**1071-4834-001**  
Rev 1.4

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## WARNINGS



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

**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.**

**Do not use this instrument for contact measurements that exceed 20,000 RPM or 20,000 IPM.**

**Properly replace all machinery guards after completing measurement.**

**For technical assistance, contact the sales organization from which you purchased the product. If they cannot assist you, they will refer you to the manufacturer.**

## DECLARATION OF CONFORMITY

As Manufacturer:

### **Monarch Instrument**

Division of Monarch International Inc.

15 Columbia Drive, Amherst NH 03031 USA

declares under Monarch's sole responsibility that the product:

**Product: Hand Held Tachometer  
Model: POCKET-TACH 100**

to which this declaration relates is in conformity with the following standards:

**Low Voltage Directive:  
IEC 1010-1 (EN 61010-1) Safety Requirements for Electrical  
Equipment for Measurement, Control, and  
Laboratory Use.**

and therefore conforms with the requirements of Council Directive 73/23/EEC and 93/68/EEC relating to the low voltage directive with amendments.

1<sup>st</sup> March 1997  
Manufacturer (Amherst, NH)

Alan Woolfson, VP Engineering (Authorized Signature)

## OPTIONS AND ACCESSORIES

CC-5	Latching Carrying Case for POCKET-TACH and accessories
CC-6	Padded Nylon Carrying Case (supplied with POCKET-TACH 100)
CTA-1	Contact Tip Assembly with convex and concave tips for POCKET-TACH 100 <u>only</u>
CT-TIPS	One CT-2P convex tip, one CT-3C concave tip and 1 set of Nylatch® fasteners
T-5	Reflective Tape - 5-foot (1.5M) roll, 0.5 inch (10mm) wide
CAL-N.I.S.T	N.I.S.T. Traceable Certificate of Calibration (for non-contact measurements only)

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## SPECIFICATIONS

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

<b>Temperature:</b>	5°C to 40°C (0°F to 100°F)
<b>Humidity:</b>	Maximum relative humidity of 80% for temperatures up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (100°F)
<b>Pollution Degree:</b>	2 per IEC 664
<b>Power:</b>	9VDC @ 70mA max; Battery Type IEC-6LR61, NEDA Type 1604 (PM9)
<b>Ranges:</b>	<b>Non-contact:</b> 5 to 100,000 RPM <b>Contact:</b> 5 to 20,000 RPM (rotational speed) 5 to 20,000 IPM (surface speed)
<b>Accuracy:</b>	<b>Non-contact:</b> ±0.01% of reading <b>Contact:</b> ±0.5% of reading typical
<b>Display:</b>	6-digit numeric LCD display with 0.3" digits, on-target indicator ("bull's eye")
<b>Resolution:</b>	1 RPM

## INTRODUCTION

POCKET-TACH 100 is a precision instrument designed to make non-contact measurements of rotational speeds from 5 to 100,000 RPM, at a distance of up to 30 inches (0.75m) from a reflective target and at an angle of up to 30° off perpendicular. POCKET-TACH is supplied with a CC-6 padded carrying case, 9-Volt alkaline battery and 12" of T-5 reflective tape. N.I.S.T. traceable calibration is provided for non-contact operation.

The optional CTA-1 Contact Tip Assembly enables POCKET-TACH to make contact measurements of rotational speeds in the range of 5 to 20,000 RPM or surface speeds in the range of 5 to 20,000 inches per minute (IPM). CTA-1 is supplied with convex and concave tips for rotational speed measurements of various shaft diameters. The concave tip is one inch in circumference and is used to measure and display linear speeds directly in inches per minute.

## BATTERY

POCKET-TACH is powered from a single IEC Type 6LR61, NEDA 1604 (PM9) nine-volt dc alkaline battery (supplied). 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.

The display flashing on and off indicates low battery, at which time POCKET-TACH should operate for another fifteen minutes.

**NOTE:** Readings taken while the display is flashing are still accurate as long as the "bull's eye" is flashing at the same rate.

## CLEANING

To clean the instrument, wipe with a damp cloth using a mild soapy solution.

## CALIBRATION

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

**NOTE:** An N.I.S.T. traceable Certificate of Calibration, applicable to non-contact measurements only and valid for a period of one (1) year, is provided with the instrument.

Please contact Monarch Instrument to have your POCKET-TACH re-calibrated.

For **surface speed** measurements, gently contact the *side* of the concave tip **flat** against the surface of the object to be measured.

**NOTE:** Only a moderate amount of pressure is required to keep the contact tip in contact with the moving object. Undue pressure can cause erroneous readings and excessive wear to the Contact Tip Assembly.

3. Hold the instrument in position, and press the power button until the reading is complete. A steady illumination of the “bull’s eye” symbol in the instrument display will indicate proper alignment of the contact tip with the moving object.

**NOTE:** **Rotational speed** measurements read directly in RPM. **Surface speed** measurements read directly in inches per minute (IPM). (The display will not actually say IPM.)

4. When the measurement is complete, release the power button while still in contact with the equipment.
5. Remove the instrument from contact with the equipment. POCKET-TACH will continue to display the last reading for approximately 90 seconds and then automatically shut off.

### Detaching the Contact Tip Assembly

To detach the Contact Tip Assembly, pull the grip of each of the Nylatch® fasteners to release them from the back of POCKET-TACH. Remove the Contact Tip Assembly by gently pulling it from the back of the instrument.

## NON-CONTACT MEASUREMENTS

### Preparation

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 the T-5 reflective tape supplied. Additional T-5 tape is available in five-foot (1.5M) rolls (see section 8.0 Options and Accessories).

### Aiming

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

### Measuring

To measure, press and hold the power button on the front panel and aim the instrument at the reflective tape on the shaft until a steady illumination of the “bull’s eye” symbol in the instrument display indicates you are on target. For speeds 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. POCKET-TACH will continue to display the last reading for approximately 90 seconds and then automatically shut off.

## CONTACT MEASUREMENTS

### (Rotational Speed or Surface Speed)

POCKET-TACH can measure rotational speed by directly contacting a rotating shaft or surface speed such as a moving belt or web. Contact measurements require the use of the CTA-1 Contact Tip Assembly. CTA-1 is attached to the lower side of POCKET-TACH with two Nylatch® fasteners which lock into mounting holes in the bottom of the instrument.

#### Attaching the Contact Tip Assembly (see Figure 1)

To assemble:

1. Pull back on the grips on the two Nylatch® fasteners on the Contact Tip Assembly to insure they are in the released (pulled out) position.

**CAUTION:** Do not attempt to pull them beyond the unlocked position (loose feel).

2. Insert the sight bars on POCKET-TACH into the corresponding notch in the top of the Contact Tip Assembly (above the window exposing the shaft).

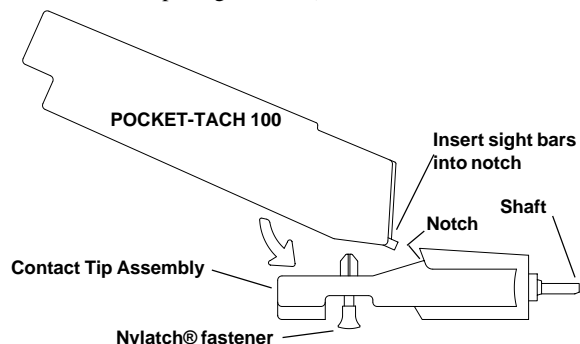


Figure 1 Attaching the Contact Tip Assembly

3. Push the Contact Tip Assembly flush against POCKET-TACH so that the fasteners fit into the two mounting holes on the underside of POCKET-TACH.
4. Secure the tip assembly by firmly pushing both Nylatch® fasteners until they snap securely in place.
5. Select either a convex or concave tip appropriate for the measurement to be made and install it firmly on the shaft extension of the CTA-1.

**NOTE:** The rubber tips are keyed to mate with the shaft. Ensure the surfaces mate correctly.

#### Contact Tip Selection

For **rotational speed** measurements, use the convex (conical) tip for shafts equipped with a turned center. Use the concave (inverted conical) tip for smaller diameter shafts.

For **surface speed** measurements, use only the concave tip.

#### Making Contact Measurements

**WARNINGS:** Making measurements in direct contact with rotating equipment can be dangerous. Keep the hand holding the instrument well behind the back edge of the Contact Tip Assembly. Do not use this instrument for contact measurements that exceed 20,000 RPM or 20,000 IPM.

To make a measurement:

1. Start the moving object to be measured.
2. For **rotational speed** measurements, carefully contact the appropriate tip (convex or concave, see section 4.2 Tip Selection) against the axial *end* of the rotating shaft.