1071-4860-122

MONARCH INSTRUMENT

Instruction Manual

Phasar-Tach
Phasar-Tach-R

Portable Tachometers

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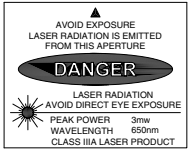
Safeguards and Precautions

1. **Read and follow all instructions in this manual carefully, and retain this manual for future reference.**
2. **Do not use this instrument in any manner inconsistent with these operating instructions or under any conditions that exceed the environmental specifications stated.**
3. **Making measurements in close proximity to rotating equipment can be dangerous. Keep all loose clothiing and hair away from exposed moving machinery. Properly replace all machinery guards after completing measurement.**
4. **The socket on the front of the instrument is for use with a remote charger. Only use model R-5 (115 Vac) or R-6 (230 Vac) rechargers to charge the instrument.**
5. **The Phasar-Laser has a laser beam light source. Do not view the laser beam directly as it could be hazardous to the eyes. Do not point the laser beam into another person's eyes. Do not view the laser beam with telescopic devices.**



6. **With exception of replacing the batteries, this instrument is not user serviceable. For technical assistance, contact the sales organization from which you purchased the product or Monarch Instrument directly.**

LIMITED WARRANTY

SELLER warrants hardware products to be free from any defect in materials or workmanship for a period of one (1) year from date of shipment to BUYER. SELLER's entire liability and BUYER's sole and exclusive remedy resulting from any defect in workmanship or material in the hardware product covered by this limited warranty shall be limited to and fully discharged by the SELLER's option of replacement or repair of such item without charge. The limited warranty provided in this clause is in lieu of all other warranties, expressed or implied, arising by law or otherwise. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. This limited warranty shall not be modified except by an arrangement signed by both parties specifically referencing this clause.

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IN NO EVENT SHALL SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE LOSSES OR DAMAGES (INCLUDING, BUT NOT LIMITED TO, LOSSES OR DAMAGES FOR ANY LOST PROFITS OR LOST DATA) AS THE RESULT OF ANY BREACH OR DEFAULT BY SELLER WITH RESPECT TO THE HARDWARE OR SOFTWARE, EVEN IF SELLER HAS BEEN ADVISED OR MADE AWARE OF THE POSSIBILITY OF ANY SUCH LOSSES OR DAMAGES AND REGARDLESS OF WHETHER THE CLAIM IS BASED ON CONTRACT, TORT, STRICT LIABILITY, OR OTHER THEORY OF LIABILITY.

This limited warranty does not extend or apply to consumables (including, but not limited to, lamps and batteries, if applicable) or equipment, instruments or accessories which are warranted separately by the original manufacturer of these items.

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:

Name: **Hand Held Tachometer**
Model: **Phasar-Tach**

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

EMC: **EN50082-2:1995, Heavy Industrial**
EN55011:1991 Group 1, Class B

and therefore conforms with the requirements of Council Directive 89/336/EEC relating to electromagnetic compatibility. The testing of this product was performed by Curtis Straus Laboratories, MA in November of 1997. (File 970573-2).

17th November 1997
Manufacturer (Amherst,NH)

Alan Woolfson, VP Engineering (Authorized Signature)

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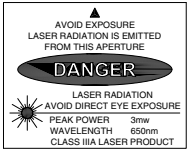
SPECIFICATIONS

This product is designed for indoor or outdoor use under the following conditions (per IEC1010-1):

Speed Range: 5 RPM to 100,000 RPM
Accuracy: ± 1 RPM or .01% of reading
Resolution: 1 RPM
Display: 6-digit 0.45" high liquid crystal
Display Update: Twice per second
On-Target Indication: Target (Bullseye) on lower left of display
Operating Distance: Range: 1 inch [25.4 mm] to 3 feet [0.9 m] for LCD models and up to 15 feet [4.6 m] for Laser equipped models from leading edge of reflective tape
Angle: Up to 45° from perpendicular to leading edge of reflective tape
Power-On Switch: Pistol grip trigger - may be locked on with latching push-button for longer duration measurements
Auto hold of last measurement for 90 seconds
Optical System: Visible light source - incandescent lamp or laser



WARNING: Do not view the laser beam directly as it could be hazardous to the eyes. Do not point the laser beam into another person's eyes. Do not view the laser beam with telescopic devices.

Time Base: Crystal controlled
Power Source: 4 "AA" batteries; Recharger socket provided for optional rechargeable batteries
Recharger Input: Max input 7.8 Vdc @ 50mA
Temperature: 41 °F [5 °C] to 104 °F [40 °C]

OPTIONS AND ACCESSORIES

ROS-5P*	Remote Optical Sensor with 8 foot [2.4 m] cable and mounting bracket
EC-25P	25 foot [7.6 m] extension cable for remote sensors with male/female 1/8 inch [3.2 mm] phone plug connectors
R-5B	Recharger, 115 Vac - 50-60 Hz, with 4 "AA" NiCad batteries
R-6B	Recharger, 230 Vac - 50-60 Hz, with 4 "AA" NiCad batteries
B-4	Four "AA" rechargeable NiCad batteries
CC-1	Nylon Padded Carrying Case
CC-2	Plastic Latching Carrying Case
T-5	Reflective Tape - 5 foot [1.5 m] roll, ½ inch [12.7 mm] wide
CAL-NIST	N.I.S.T. Traceable Certificate of Calibration

***NOTE:** Sensors are available with other cable lengths of 15, 30, 50 or 100 feet [4.6, 9.1, 15.2 or 30.5 m]

BATTERIES

The Tachometer operates from four 'AA' size batteries which are located under the hinged top of the instrument. To access these batteries, grip the tapered cover at the optical lens end of the instrument and pull up. The cover is hinged at the display end of the instrument and pivots fully out of the way. It may also be convenient to keep a spare supply of reflective tape in the free area underneath this cover.

The instrument will provide six to eight hours of continuous operation on a single set of batteries, depending on the type used. The instrument is provided with a built-in charging network, which works in conjunction with the optional NiCad batteries. The optional recharger plugs into the single jack located next to the optical lens at the front end of the instrument. Fourteen to sixteen hours is required for a complete recharge. When the battery voltage in the Phasar-Tach is getting low, the display will blink "LO BAT" to indicate that the batteries need to be replaced.

NOTE: Only use model R-5B (115 Vac) or R-6B (230 Vac) rechargers with NiCad batteries. Do not attempt to charge non-rechargeable batteries.

ALWAYS DISPOSE OF BATTERIES IN A SAFE AND RESPONSIBLE MANNER.

CLEANING

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

Humidity: Maximum relative humidity 80% for temperature up to 88 °F [31 °C] decreasing linearly to 50% relative humidity at 104 °F [40 °C]

Dimensions (LxWxH): 6.13" x 3.25" x 1.75 " plus 4.75" handle [155.7 mm x 82.6 mm x 44.5 mm x 120.7 mm]

Weight: 1.25 lbs [0.57 kg]

OVERVIEW

Each Phasar-Tach model combines the accuracy and safety of a non-contact optical tachometer with the convenience and ease of operation of a pistol grip instrument. The instrument provides non-contact measurement of rotational speed to an accuracy of .01% of reading. It reads RPM directly to the nearest RPM, and a 'on-target' indicator is provided to verify the instrument is properly aligned on a target and receiving valid information.

OPERATION

The Tachometer measures rotational speed from a single pulse per revolution. This pulse is supplied by marking the rotating shaft with reflective tape in an easily accessible location. The Tachometer is equipped with a built-in incandescent or laser light source providing a beam which is aimed at the reflective tape located on the rotating shaft. The pulse from the reflective tape is received back through a single lens reflex optical system and detected by a photocell inside the instrument. The Tachometer then computes the rotational speed and displays it to a resolution of 1 RPM.

To operate the Phasar-Tach, simply aim it at the reflective tape while holding it at a distance of 1 inch [25.4 mm] to 3 feet [0.9 m] for incandescent lamp units or up to 15 feet [4.6 m] for laser units (observe laser safety precautions). Squeeze the pistol grip trigger, and read the indicated speed. The on-target indicator must be on. The display is updated twice per second.

For longer duration measurements, the trigger latch on the side of the pistol grip handle can be depressed after pulling the trigger, and the instrument may be mounted on the 1/4-20 threaded bushing at the base of the handle.

When the trigger is released, the Tachometer will hold the last measurement taken and display it for up 90 seconds.

On very small shafts, the Phasar-Tach will work down to a reflective tape size of approximately 1/8 inch [3.2 mm] square. However, with this small tape size, it would be necessary to operate the instrument very close to the rotating shaft and insure it is held steady. For normal operation, a tape size of approximately 1/2 inch [12.7 mm] square or larger is recommended, and on very large diameter shafts or for very high-speed applications, a larger size piece of tape may be required. It is also recommended that the reflective tape be viewed just slightly off the perpendicular. The Tachometer will operate at angles from 0 to 45 degrees, but best results are obtained by aiming the instrument at the reflective tape at approximately a 10 to 20 degree angle. This insures that only pulses from the reflective tape are received by the tachometer and minimizes the problem of interference from a highly polished surface or varying ambient lighting.

USING THE PHASAR-TACH WITH AN REMOTE OPTICAL SENSOR (ROS-5P)

The -R version of the tachometer has a provision for using the optional ROS-5P Remote Optical Sensor. In addition to the standard built-in optics, a 1/8 inch [3.5 mm] phone plug is provided on the front panel to accept an ROS-5P Remote Optical Sensor. A toggle switch on the optics panel selects internal or remote operation.

For applications requiring the ROS-5P Remote Optical Sensor, move the Remote/Internal switch to the remote position to disable the internal optics of the Tachometer. When the trigger is pulled or latched, the ROS-5P Remote Optical Sensor can be used for measurements. The ROS-5P operates 3 feet [0.9 m] and ±45° from the reflective tape.

NOTE: The standard ROS-5P cable length is 8 feet [2.4 m]. Longer cables up to 100 feet [30.5 m] are available.

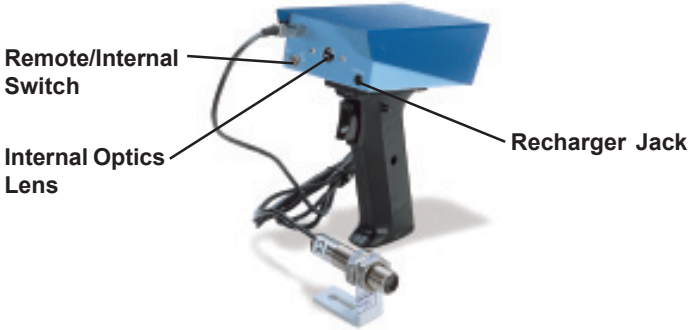


Figure 1 Phasar-Tach LCD-R with Optional Remote Sensor (ROS-5P)

CALIBRATION AND SELF-TEST

The Tachometer is a crystal controlled digital instrument that requires no calibration. However, the accuracy of the instrument can be checked at any time by aiming it at an old style fluorescent light and observing 7200 ±2 RPM. In countries with 50 Hz. power line frequency, the display will read 6000 ±2 RPM.

NOTE: The Tachometer will not read on energy-efficient fluorescent lights.