

Manual Tachometer PCE-T237




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MULTIFUNCTIONAL TACHOMETER

PCE-T237

This TACHOMETER is small in size, light in weight, easy to carry. Although complex and advanced, it is convenient to use and operate. Its ruggedness will allow many years of use if proper operating techniques are followed. Please read the following instructions carefully and always keep this manual within easy reach.

1. FEATURES

- * In accordance with verification regulation JJG105-2000 for tachometer.
- * With the most complete functions for rotating speed measurement
- * Multifunctional, one instrument combines PHOTO TACH. (Rotating speed, Cycle, Frequency) & CONTACT TACH. (Rotation speed, Cycle, Frequency, Surface speed, Moving distance, Custom circumference moving distance).
- * Can also measure the number of pulse signals.
- * Wide measuring range & high resolution.
- * The last Value / max. Value / min. Value will be automatically stored in memory and can be obtained by pressing Memory Key.
- * LCD display gives exact rpm with no guessing or errors and saves battery energy.
- * This tachometer used the exclusive one chip of MICROCOMPUTER LSI-circuit and crystal time base to accurately offer the high accuracy measurement.

2. SPECIFICATIONS

Display : LCD (Liquid Crystal Display)

Measurement range :

- PHOTO TACH. : 2.5~99,999 RPM
- CONTACT TACH. : 0.5~19,999 RPM
- SURFACE SPEED: 0.05~1,999.9 m/min
0.2~6,560 ft/min

Frequency: 0.04~1666.65Hz
Resolution:
 TACHOMETER: 0.1 RPM (0.5 ~ 999.9 RPM)
 1RPM (over 1,000 RPM)

SURFACE SPEED:
 0.01m/min. (over 10 m/min.)
 0.1 m/min. (over 100 m/min.)
 0.1 ft/min. (0.1 ~ 999.9 ft/min.)
 1 ft/min. (over 1,000 ft/min.)

Accuracy : TACH.: (0.05%+1 RPM)
 SURFACE SPEED: (0.05%+0.03m/min.)

Sampling Time:
 PHOTO TACH. (1 sec. over 60 RPM).
 CONTACT TACH. (1 sec. over 15 RPM)
 Photo Tach. Detecting distance :
 50 to 250mm / 2 to 10 inch.
 (typical max. 600mm/24 inch).

Battery: 4x1.5AAA(UM-4)battery
 Operation temp. : 0-50°C (32-122°F)
 Size: Main Unit: 185x72x28 mm

Weight : 130g (not including batteries)

Accessories :

- Carrying case1pc.
- Reflective tape marks (350mm).....2pc.
- RPM adapter (CONE).....1pc.
- RPM adapter (FUNNEL).....1pc.
- Surface speed test wheel.....1pc.
- Operation manual.....1pc.

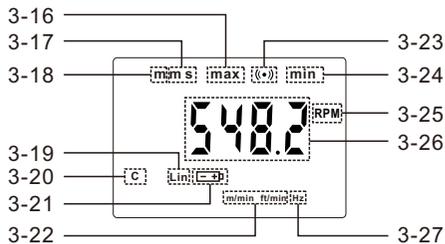
3. PANEL DESCRIPTIONS

3.1 Front Panel Descriptions



- 3-1 Reflective Mark
- 3-2 Signal Light Beam
- 3-3 PHOTO TACH. Sensor
- 3-4 Display
- 3-5 Backlit Key
- 3-6 CONTACT TACH. Key
- 3-7 Plus/Function Key
- 3-8 Minus/Memory Key
- 3-9 RPM adapter (CONE)
- 3-10 RPM adapter (FUNNEL)
- 3-11 Surface speed test wheel
- 3-12 Key Battery Cover On The Back
- 3-13 PHOTO TACH. Key
- 3-14 Power/Measurement
- 3-15 CONTACT TACH. Sensor

3.2 Display Descriptions



4

- 3-16 Maximum Value Indicator
- 3-17 Cycle Unit
- 3-18 Moving Distance Unit
- 3-19 Moving Distance Indicator
- 3-20 Custom Circumference Indicator (Pulse Signal Number Indicator)
- 3-21 Battery Indicator
- 3-22 Surface Speed Unit
- 3-23 Monitor Indicator
- 3-24 Minimum Indicator
- 3-25 Rotation Speed Unit
- 3-26 Measurement Value
- 3-27 Frequency Unit

4. MEASUREMENT MODE SELECTION

The Tachometer can be either PHOTO TACH. and CONTACT TACH. The PHOTO TACH. can measure Rotating speed, Cycle, Frequency. The CONTACT TACH. can measure not only Rotating speed, Cycle, Frequency, Surface speed, Moving distance, Custom circumference moving distance. Select the intended measurement mode according to the requirement.

4.1 PHOTO TACH. MEASUREMENT

- 4.1.1 Apply a reflective mark to the object being measured. If the test RPM less than 50 RPM, suggest to attach more Reflective Marks averagely. Then divided the reading shown by the number of Reflective Marks

5

is the real RPM to get high resolution & stability on display reading.

4.1.2 REFLECTIVE MARK

Cut and peel adhesive tape provided into approx. 12mm (0.5) square sand apply one square to each rotation shaft.

- a. The non-reflective area must always be greater than the reflective area.
- b. If the shaft is normally reflective, it must be covered with black tape or black paint before attaching reflective tape.
- 4.1.3 Press the Power/Measurement Key (3-14) to turn on the meter.
- 4.1.4 Press the Plus/Function Key (3-7) to select the intended parameter. Each time pressing the Plus/Function Key (3-7), the measuring parameter is converted once. Corresponding unit or indicator of the parameter will be displayed.
 - A. When the Rotation Speed Unit (3-25) is displayed, rotation speed can be measured.
 - B. When the Cycle Unit (3-17) is displayed, cycle can be measured.
 - C. When the Frequency Unit (3-27) is displayed, frequency can be measured.
- 4.1.5 Press the PHOTO TACH. Key (3-13), the PHOTO TACH. Sensor emits a visible light beam. Align the visible light beam with the

6

applied target. Verify that the Monitor Indicator (3-23) is displayed when the target passes through the light beam. When the reading stabilizes, press the PHOTO TACH. Key (3-13) again.

- 4.1.6 During measuring, the last Value, max. Value, min. Value are automatically memorized. The data can be find by pressing Minus/Memory Key(3-8). For details see 7. MEMORY CALL OPERATION.
- 4.2 CONTACT TACH. MEASURE ROTATION SPEED, CYCLE, FREQUENCY
 - 4.2.1 Install the RPM adapter (CONE) (3-9) or the RPM adapter (FUNNEL) (3-10) onto the CONTACT TACH. Sensor (3-15).
 - 4.2.2 Press the Power/Measurement Key (3-14) to turn on the meter.
 - 4.2.3 Press the Plus/Function Key (3-7) to select the intended parameter. Each time pressing the Plus/Function Key (3-7), the measuring parameter is converted once. Corresponding unit or indicator of the parameter will be displayed.
 - A. When the Rotation Speed Unit (3-25) is displayed, rotation speed can be measured.
 - B. When the Cycle Unit (3-17) is displayed, cycle can be measured.

7

- C. When the Frequency Unit (3-27) is displayed, frequency can be measured.
- 4.2.4 Press the CONTACT TACH. Key(3-6), simply attaching the adapter to the center of the rotating object. Verify that the Monitor Indicator (3-23) is displayed. When the reading stabilizes, press the CONTACT TACH. Key (3-6) again.
- 4.2.5 During measuring, the last Value, max. Value, min. Value are automatically memorized. The data can be find by pressing Minus/Memory Key(3-8). For details see 7. MEMORY CALL OPERATION.

4.3 CONTACT TACH. MEASURE RELATED PARAMETERS OF CONTACT SURFACE

- 4.3.1 The definition for related parameters of contact surface
The related parameters of contact surface, include Surface speed, Moving distance, Custom circumference moving distance. The definitions are as follows,
A. Surface Speed
The speed of tested surface.
B. Moving Distance
The moving distance of tested surface. Moving distance, defined as s, is the product of C_0 (the circumference of surface speed wheel) and n (the number

of rotation).
The calculation formula is as follows,
 $s = C_0 n$

- C. Custom circumference moving distance
When using surface speed wheel with custom circumference, moving distance equals to the product of C (the custom circumference) and n (the number of rotation). Custom circumference can be defined by user, for details, see 5. CUSTOM CIRCUMFERENCE SETTING.

The calculation formula is as follows,
 $s = C n$

4.3.2 CONTACT TACH. MEASURE SURFACE SPEED

- 4.3.2.1 Install the Surface speed test wheel (3-11) onto the CONTACT TACH. Sensor (3-15).
- 4.3.2.2 Press the Power/Measurement Key (3-14) to turn on the meter.
- 4.3.2.3 Press the Plus/Function Key (3-7) to select the intended parameter. Each time pressing the Plus/Function Key (3-7), the measuring parameter is converted once. Corresponding unit or indicator of the parameter will be displayed.
- 4.3.2.4 When the Surface Speed Unit (3-21) is

displayed, surface speed can be measured.

- 4.3.2.5 Press the CONTACT TACH. Key(3-6), simply attaching the adapter to the center of the rotating object. Verify that the Monitor Indicator (3-23) is displayed. When the reading stabilizes, press the CONTACT TACH. Key (3-6) again.
- 4.3.2.6 During measuring, the last Value, max. Value, min. Value are automatically memorized. The data can be find by pressing Minus/Memory Key(3-8). For details see 7. MEMORY CALL OPERATION.
- 4.3.3 CONTACT TACH. MEASURE MOVING DISTANCE CUSTOM CIRCUMFERENCE SPEED MOVING DISTANCE
- 4.3.3.1 Install either the Surface speed test wheel (3-11), or Surface speed test wheel with custom circumference onto the CONTACT TACH. Sensor (3-15).
- 4.3.3.2 Press the Power/Measurement Key (3-14) to turn on the meter.
- 4.3.3.3 If a custom surface speed wheel is installed. Set the custom circumference of the surface speed test wheel. For details, see 5. CUSTOM CIRCUMFERENCE SETTING. If the standard configured surface speed

test wheel (3-11) is installed, skip this step.

- 4.3.3.4 Press the Plus/Function Key (3-7) to select the intended parameter. Each time pressing the Plus/Function Key (3-7), the measuring parameter is converted once. Corresponding unit or indicator of the parameter will be displayed.
A. When the Moving Distance Unit (3-17) and the Moving Distance Indicator (3-18) are displayed, moving distance can be measured.
B. When the Moving Distance Unit (3-17), Moving Distance Indicator (3-18), and the Custom Circumference Indicator (3-19) are displayed, custom circumference moving distance can be measured.
- 4.3.3.5 Press the CONTACT TACH. Key(3-6), Verify that the Monitor Indicator (3-23) is displayed. Simply attaching the test wheel to the tested object. The moving distance is displayed.
- 4.4 MEASURE THE PULSE SIGNAL NUMBER
The number of pulse signal, is the number of times when the reflective marks passes thru the light beam in PHOTO TACH. Mode, or the number of times when the CONTACT

TACH. Sensor rotates in CONTACT TACH. Mode. No matter it is in PHOTO TACH. Mode, or CONTACT TACH. Mode, number of pulse signal can be measured.

- 4.4.1 Press the Power/Measurement Key (3-14) to turn on the meter.
- 4.4.2 Press the Plus/Function Key (3-7) to select the intended parameter. Each time pressing the Plus/Function Key (3-7), the measuring parameter is converted once. When the Pulse Signal Number Indicator (3-20) is displayed, rotation speed can be measured.
A. Press the PHOTO TACH. Key (3-13), the PHOTO TACH. Sensor emits a visible light beam. Verify that the Monitor Indicator (3-6) is displayed. Align the visible light beam with the applied target. The number of pulse signal is displayed when the target passes thru the light beam.
B. Press the CONTACT TACH. Key(3-6), Verify that the Monitor Indicator (3-23) is displayed. Simply attaching the adapter to the center of the rotating object. The number of pulse signal is displayed when the sensor rotates.

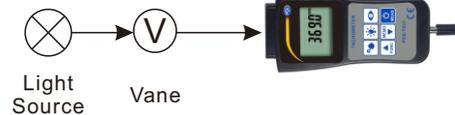
5. CUSTOM CIRCUMFERENCE SETTING

- 5.1 Press and hold the Power/Measurement

Key (3-14) for about 6 seconds, 'LEN' signal is shown on the display. Release the Key for adjustment of Custom Circumference.

- 5.2 Press Plus/Function Key (3-7) or Minus/Send/Memory Key (3-8) to adjust Custom Circumference.
The Custom Circumference can be set from 1~99999mm.
- 5.3 Press Power/Measurement Key (3-14) to save the settings and quit.
- 6. VANE NUMBER SETTING**
- 6.1 When measuring the rotation rate of vane in PHOTO TACH. Mode, vane number can be amended. Press and hold the Power/Measurement Key (3-14) for about 9 seconds, 'No' signal is shown on the display. Release the Key for vane number adjustment.
- 6.2 Press Plus/Function Key (3-7) or Minus/Send/Memory Key (3-8) to adjust vane number. The Vane Number can be set in any integer in 1~9.
- 6.3 Press the Power/Measurement Key (3-14) to save and quit.
- 6.4 When vane number set is more than 1, the PHOTO TACH. Sensor (3-3) does not emit light beam when measuring. External light source is required during measurement. Align the light source to pass through the

vane, irradiating the PHOTO TACH. Sensor (3-3), see as below, press the Power/Measurement Key (3-14), Verify that the Monitor Indicator (3-23) lights. Measurement starts.



- 6.5 During measuring, the last Value, max. Value, min. Value are automatically memorized.
- 6.6 The data can be find by pressing Minus/Memory Key(3-8). For details see 7. MEMORY CALL OPERATION.
- 7. MEMORY CALL OPERATION**
During measuring, the Last Value, max. Value, min. Value are automatically memorized. The data can be find by pressing Minus/Memory Key(3-8). Firstly the Maximum Value Indicator (3-16) and the Maximum Value is displayed. And then the Minimum Value Indicator (3-24) and the Minimum Value is displayed. Finally, the Last Value is displayed. These 3 values are displayed cycle.

8. BATTERY REPLACEMENT

- 8.1 When it is necessary to replace the battery, i.e. battery voltage less than approx. 5v, symbol " " will appear on the Display.
- 8.2 Slide the battery cover (3-12) away from the instrument and remove the batteries.
- 8.3 Install the batteries (4x1.5VAAA / UM-4) correctly into the case.
- 8.4 If the instrument is not to be used for any extended period, remove batteries.
- 9. Backlit Function**
The LCD display has backlit function. Press Backlit Key (3-5) to operate.