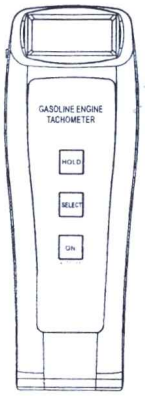
DIGITAL ENGINE TACHOMETER

Instruction Manual

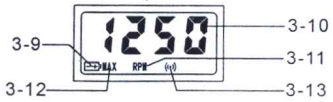


Thank you for your selection of this Digital Engine Tachometer. To ensure that you get the most out of the instrument, we strongly recommend ycu read and follow the instructions in this manual carefully.

General operation precautions

⚠WARNING

1. Care should be taken not to touch the rotating parts and heated parts of the engine when making measurements.
2. Do not ever bring this engine tachometer in contact with high-tension wires. Particularly, in the vicinity of the ignition plugs, the high voltage may cause malfunctions or damages.
3. Do not bring this tachometer in contact with heated parts such as exhaust pipes.
4. Be sure to remove batteries when not using this tachometer for an extended period of time. If this tachometer left with discharged batteries or unused for a long time with batteries inside, it may be damaged by battery leakage.
5. If the outer case becomes soiled, wipe it with a dry soft cloth or with a cloth slightly dampened with a neutral detergent. Avoid volatile organic solvents such as thinners, benzine and alcohol.



3-9 Battery indicator
3-10 Reading
3-11 Measurement unit
3-12 Hold indicator
3-13 Signal indicator

3.1 Power switch
Depress this key to power the meter on. The tachometer will power itself off if no signal is detected for about 2 minutes.

3.2 Detection head (built-in antenna)
The part detects the rotational signal (ignition pulse) when placed close to the high-tension wire (ignition cord) of engines.

3.3 Signal indicator
This blinks when the sensor circuit detects the rotation signal (ignition pulses).

3.4 Select key
This is a switch to select the engine type only when the engine type shows on display.

1. GENERAL DESCRIPTIONS

1.1 OUTLINE
The hand-held engine tachometer displays rotational speed of gasoline engines in r/min unit. It is a non-contacting type tachometer which easily measures the rotational speed just by bringing the detection head close to the high-tension wires of gasoline engines. Its one unit construction containing the detector, the counter and the display as well as batteries are convenient for use at any places.

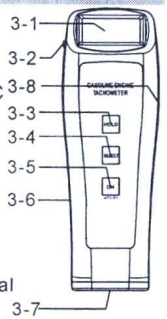
1.2 FEATURES
- Non-contacting detection enables an easy and safe measurement.
- It assures an accurate measurement because the signal indicator shows how the signal is captured.
- Accurate rotational speed can be obtained in 0.1 or 1 r/min unit.
- When the battery runs out or the voltage drops, the mark '▭' at the lower left corner of the display panel lights up.
- The four-digit LCD is suitable for out-door measurement.
- Compact, light weight and easy-to-carry, enabling one-hand measurement.

1.3 STANDARD ACCESSORIES
Your package should contain the following materials. Please make sure that you have received all these items upon unpacking.
Digital Engine Tachometer....1
Instruction Manual.....1
External Antenna.....1
Leather bag.....1

2.SPECIFICATIONS

Display : 4 digits, 10 mm LCD
Application engine type:
Gasoline engine
2-cycle (1, 2, 3, 4-cylinder)
4-cycle (1, 2, 3, 4, 5, 6, 8 cylinder)
Detection method :
Ignition spark noise detection
Detecting object
High-tension wire (ignition cord)
Detection distance : 30 ~ 200mm
Range: 50.0-9999 r/min
Resolution :
0.1 RPM (50.0~999.9RPM)
1 RPM (over 1000RPM)
Accuracy : ±(0.05%n+1d)
Power supply :
2x1.5v AAA (UM-4) battery
With RS232C interface
Operating condition:
Temp. 0~50℃, Humidity <85%
Weight :
about 65g(including batteries)

3. FRONT PANEL DESCRIPTIONS



3-1 Display
3-2 Jack for RS-232C interface
3-3 Max hold key
3-4 Select key
3-5 Power key
3-6 Battery compartment
3-7 Detection head (built in antenna or jack for external antenna)
3-8 Outlet for buzzer signal

3.5 LCD Display
This indicates a 4-digit measure-ment value associated with the measurement unit of "r/min".

3.6 "Max" indicator
"Max" indicator is controlled by depressing the HOLD key.

3.7 "▭" mark
"▭" mark appears on the display when the batteries have been discharged. Replace the batteries as soon as possible.

3.8 External antenna (not use)
External antenna is only used in the cases where the external antenna has to be used. The effect of built-in antenna is much better than that of the external antenna.

3.9 RS232C interface
Used to communicate with the PC computer for recording, analyzing and printing.

4.MEASURING METHOD

4.1 Set the engine type
The engine type set will be displayed on the Display only when the tachometer is powered on or no signal is detected for about 2 seconds. The engine type consists of 2 parts, partitioned by a colon. The left part is for 2-circle engines and the right part is for 4-circle engines as follow.

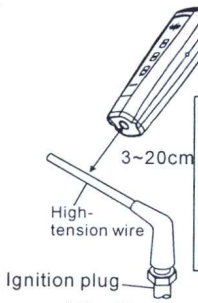
2 X : 4 Y

2 means 2-circle engine
X-cylinder number for 2 circle
4 means 4-circle engine
Y-cylinder number for 4 circle

The engine type can be reset by depressing the Select key only when the engine type 2 X : 4 Y appear on the display.

NOTE:
① For engines of extra ignition type (twice as much ignitions), double the number of the "engine type" already set. As an example, for a 2-cycle 2-cylinder extra ignition type engine which is normally of 22:44, should reset to 24:48 .
② Some engines may have dead sparks resulting in twice number of sparks as usual. In such cases, the engine type value selected should be set to two times also.

4.2 MEASURING METHOD
4.2.1 1-cylinder gasoline engine



(Fig. A)

NOTE:
Do not bring the engine tachometer in contact with high-tension wires which may result in erroneous measurement.

Bring the head closer until the blinking frequency becomes constant. (At high rotational speed the lamp looks as if glowing without blinking).

- When the detection head is placed close to the high-tension wire (ignition cord) of the engine , the indicator starts blinking.

• When you bring the detection head closer to the high-tension wire, the indicator lamp blinks at a constant frequency corresponding to the rotational frequency. (At high rotational speed the lamp looks as if glowing without blinking). This is the correct measuring position.

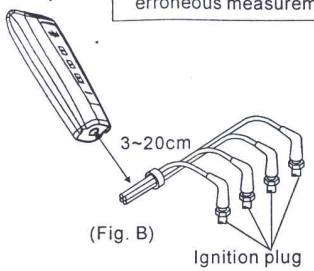
• The distance between the high-tension wire and the measuring position varies depending on engines but it normally is 3~20cm.

4.2.2 Distributor type multi-cylinder gasoline engine

• As shown in the figure B.C, bring the detection head close to the high-tension wire that connect the distributor and the ignition coil, or to the place where all the high-tension wires of the cylinders are bundled together.

• Just as in the case of 1-cylinder engines, make the measurement at the position where the indicator blinks corresponding to the rotational speed. The blinking frequency decreases when the detection head is placed too far from the tension wire connecting the distributor and the ignition coil, or close to the singled (not bundled) tension wire. In this case, the ignition pulse of each cylinder cannot be detected uniformly.

NOTE:
Do not bring the engine tachometer in contact with high-tension wires which may result in erroneous measurement.



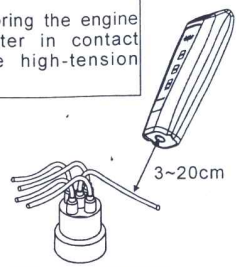
(Fig. B)

Ignition plug

Where all the high-tension wires of cylinders are bundled together.

Bring the head closer until the blinking frequency becomes constant. (At high rotational speed the lamp looks as if glowing without blinking).

NOTE:
Do not bring the engine tachometer in contact with the high-tension wires.



(Fig. C)

High-tension wire connecting distributor and ignition coil.

Bring the head closer until the blinking frequency becomes constant. (At high rotational speed the lamp looks as if glowing without blinking).

4.2.3 Multi-cylinder gasoline engine without distributor

• Bring the detection head close to the place where the high-tension wire of each cylinder is bundled together.

• The measurement is impossible if all the high-tension wires are not bundled together since the distance between the detection head and each high-tension wire differs.

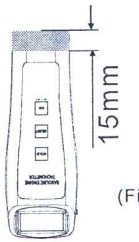
4.2.4 Measurement precaution

• Do not put any obstacle between the engine tachometer and high-tension wires. The accurate measurement is impossible if there is any abstract between them since the rotation signal (ignition pulse) is cut off.

• Do not put a finger on the oblique line of the figure D and the head of the engine tachometer. The accurate measurement may be impossible since the finger lowers the sensitivity of the engine tachometer.

• The accurate measurement is impossible if the gasolineengine has any defect of the ignition system such as the distributors, high-tension wires and the ignition plugs.

• The maximum rotational speed that can be measured by the engine tachometer is 9,999 r/min. Never use it for an object rotating at a speed over 9999 r/min.



(Fig. D)

TROUBLESHOOTING

Symplom	Check item	Counter measure
No indication	① Batteries are inserted? ② Battery polarity reversed? ③ Batteries are discharged?	① Insert batteries. ② Insert batteries in correct polarity. ③ Replace batteries with new ones.
Unstable indication	① Is the measuring distance correct? ② Isn't the high-tension wire contacting to the engine tachometer? ③ Is there any obstacle between the engine tachometer and high-tension wires? ④ Aren't you putting your finger on the oblique lines area or on the top of the engine tachometer?	① The distance at which measurement can be executed is 30-200mm from high-ension wires. Use the engine tachometer within this extent. ② Do not let the high-tension wire contact to the engine tachometer. ③ Do not put an obstacle between the engine tachometer and high-tension wires. ④ Do not put your finger on the oblique lines area or on the top of the engine tachometer.
Different indication from the actual rotation speed. Even though indication is OK, but can't measure (Indication remains as 0 r/min)	① Is the set value of the engine type set correct? ② Is the measuring distance correct?	① Set the correct engine type by select key ② Measurable distance is 30-200mm from high-tension wires. Use the engine tachometer in this range.

Warranty

1. This product is covered by a warranty for a period of one year from the date of purchase.
2. This warranty covers free-of-charge repair for defects judged to be the responsibility of the manufacturer, i.e., defects occurred while the product is used under normal operating conditions according to descriptions in this manual and notices on the unit label.
3. For free-of-charge repair, contact either your sales representative or our sales office nearby.
4. The following failures will be handled on a fee basiseven during the warranty period.
   (a) Failures occurring through misuse, mis-operation, or modification
   (b) Failures occurring through mishandling (dropping)or transportation
   (c)Failures occurring through natural calamities (fires,earthquakes, flooding, and lightening), environmental disruption, or abnormal voltage.

* For repairs after the warranty period expired, contact your sales representative or our sales office nearby.