ONO SOKKI

Handheld Digital Tachometer

HT-6200

Instruction Manual (Basic Operations)

Thank you for your selection of the HT-6200 Handheld Digital Tachometer.

To ensure the performance of the HT-6200, please read this manual thoroughly.

Warnings and Cautions

In this document precautions are classified into two categories: WARNING and CAUTION. This depends on the degree of danger or damage possible if the precaution is ignored and the product is used incorrectly.

⚠WARNING	This symbol is used to indicate precautions where there is a risk of death or serious personal injury to the operator if the product is handled incorrectly.
⚠CAUTION	This symbol is used to indicate precautions where there is a risk of some personal injury to the operator or only material damage to the product if the product is handled incorrectly.

■ ***Omission of Issuance of Certificate***

This product has been tested under strict inspections for correct operation before shipment. Please note that the issuance of certificate is omitted.

■ ***Warranty***

1. *This product is covered by a warranty for a period of one year from the date of delivery.*
2. *This warranty covers free-of-charge repair during the warranty period for defects occurred while the product is used under correct operating conditions according to descriptions in this manual and notices on the unit label.*
3. *For free-of-charge repair during the warranty period, contact your dealer or your nearest Ono Sokki sales office nearby.*
4. *Even during the warranty period, the following failures will be handled on a fee basis.*
   - *(a) Failures or damages occurring through misuse, misoperation, repairing without ONO SOKKI's approval.*
   - *(b) Failures or damages occurring through mishandling (dropping) during transportation after purchase.*
   - *(c) Failures or damages occurring by an Act of God (fires, earthquakes, flooding, and lightening), environmental disruption, or abnormal voltage.*
   - *(d) Replenishment of expendable supplies, spare parts, and accessories.*

This guarantee covers only the performance of the product itself only.

All inconvenience by the trouble of this product is not included.

**Outer appearance and specifications are subject to change without prior notice.*

HOME PAGE: http://www.onosokki.co.jp/English/english.htm

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Observe the Following Points before Use

■*General Notes*

- ***Be sure to read this Instruction Manual.***

  To ensure the excellent performance of this product and use it safely, be sure to read this Instruction Manual thoroughly.

- ***Avoid rapid temperature change.***

  Do not move the product rapidly from a hot place to a cold one or vice versa.

  Condensation can form inside the unit and can cause trouble.

- ***Be careful not to get water, dust, or foreign materials inside the unit.***

  Do not use the product in places where you may get water or places which are humid or dusty.

- ***Do not drop the product or apply excessive shock to it.***

  Since this product incorporates high-precision electronic parts, be careful not to drop it or apply strong shock.

- ***Wipe dirt off using a dry cloth or a cloth dampened with neutral detergent and squeezed firmly.***

  Do not use volatile oils (thinner or benzine) or alcohols.

- ***When you do not use the product for a prolonged period of time, remove the battery from the unit.***

  Leaving the product unused for a prolonged period of time or consumed battery may cause liquid leak.

- ***Do not apply external voltage to the analog and pulse output terminals.***

- ***Do not use AC adapters other than our exclusive specified one (PB-7090).***

⚠ WARNING

- ***Perform measurement using enough care with the rotating section of the engine.***

  When the supplied external sensor or dedicated AC adapter (option) is used, be careful not to get the cable caught by the rotating section of the engine.

- ***Be careful not to drop the sensor while vehicle running measurement is performed.***

  It may cause not only damage to a sensor but a serious accident. Please check the safety and take effective measures to prevent sensor dropping.

⚠ CAUTION

- ***Perform measurement using enough care with the high temperature section of the engine.***

- ***Do not get the HT-6200 in contact with the ignition coil.***

  Getting the HT-6200 in contact with the ignition coil may cause malfunction or failure.

- ***Exact measurement may be disturbed with an engine whose ignition system (distributor, high tension cord, spark plug, etc.) is defective.***

- ***Do not get the HT-6200 in contact with the high temperature section of the engine.***

  Be careful not to get the HT-6200 in contact with the high temperature section (exhaust pipe, etc.) of the engine because the HT-6200 does not have enough heat resistance.

Overview

1. Overview

The HT-6200 is a handy tachometer which is used to measure the rotation speed of a gasoline engine using optional IP-292, IP-296, IP-3000A, IP-3100, OM-1200, OM-200, VP-1220, VP-202 and MP-9000 series detectors and perform rotation measurement using detectors with TTL signal output.

2. Features

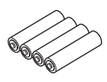
- *Use of various sensors (IP-292, IP-296, IP-3000A, IP-3100, OM-1200, OM-200, VP-1220, VP-202, MP-9000 series or other detectors with TTL signal output)*
  **Magnetoelectric detector cannot be used*
- *Measurement unit selectable from r/min, r/s, m/min, COUNT, or ms (Fixed to "r/min" when the engine measurement is selected)*
- *Direct-read measurement of the circumferential speed*
- *MAX and MIN modes for displaying the maximum and minimum values (except for COUNT)*
- *Convenient memory function (up to 20 items can be memorized) for confirmation of measurement results*
- *Over mark function for indicating measurement values exceeding a specified value*
- *Analog output, sensor signal monitor output, and pulse output*
- *Type AAA battery, AC adapter (PB-7090) commonly used*
- *Back light function which is convenient for use in dark places*

3. Unpacking

When you unpack the unit, make sure that you have all the following:

① *Main unit (HT-6200)*	*x1*
② *Type AAA alkaline battery*	*x4*
③ *Instruction manual*	*x2 (2 different manuals)*
④ *Carrying case*	*x1*

① HT-6200 main unit



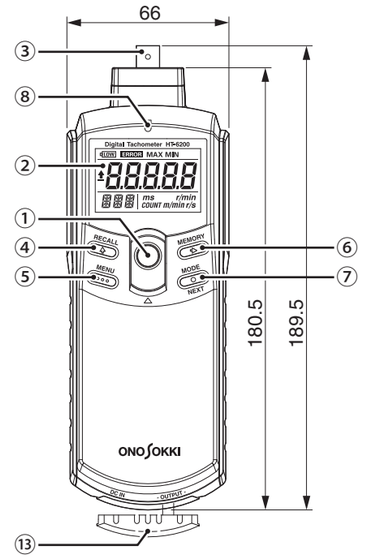
② Type AAA alkaline dry battery

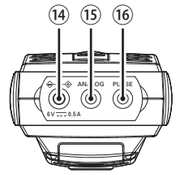
③ Instruction manual

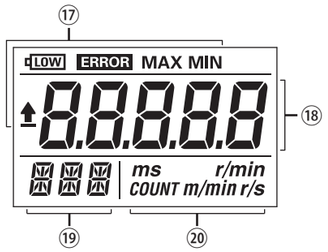
④ Carrying case

Note: Each detector is an option.

Name and Function of Each Section







① ***Power switch***
Turns the power ON or OFF.

② ***Display***
Displays the measurement value and various settings.

③ ***Input connector***
Used to connect various sensors.

④ ***RECALL & ↑ switch***
Used for memory recall during measurement and numerical input in the setup mode.

⑤ ***MENU switch***
Used to switch between the measurement mode and the parameter setup mode.

⑥ ***MEMORY & → switch***
Used for memory storing during measurement and numerical digit shift in the setup mode.

⑦ ***MODE & NEXT switch***
Used for mode change during measurement and item selection in the setup mode.

⑧ ***Indicator (input signal indicator)***
When the detecting element detects the reflected light, this LED indicator lights up.

⑨ ***Sensor selector switch***
Select the engine measurement or other measurement.

⑩ ***Trigger level adjustment volume***
Volume for adjusting the trigger level

⑪ ***Tripod mounting hole***
Used to mount a tripod.

⑫ ***Battery cover***

⑬ ***Connector cover***
Cover for the power inlet and output connectors.

⑭ ***DC power input***
Input terminal for connecting the dedicated AC adapter

⑮ ***Analog output***
Terminal for connection with a recorder, etc. through the optional AX-501 cord

⑯ ***Pulse output***
Terminal for connection with an FFT analyzer, etc. through the optional AX-501 cord

⑰ ***CONDITION display***
Displays the measurement mode, LOW battery, and errors.

⑱ ***MAIN display***
Displays measurement values, selections, settings, etc.

⑲ ***SUB display***
Displays memory addresses, settings, etc.

⑳ ***UNIT display***
Displays various measurement units.

Before Use

1. Power Supply

The HT-6200 operates on four Type AAA batteries or optional dedicated AC adapter (PB-7090).

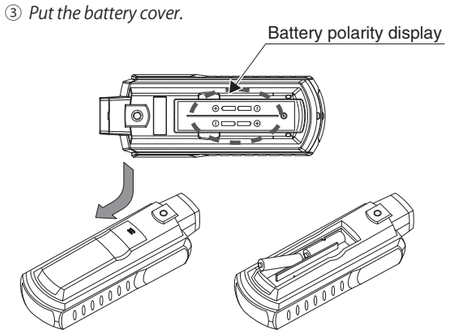
If the batteries are consumed and the low alarm mark " LOW " appears, replace them with new ones. Be sure to replace all the four batteries at the same time.

Battery replacement procedure

① While pushing lightly the two (anti-slip) slots of the battery cover with your finger, slide it to remove.

② Put the batteries properly in the battery compartment with the correct polarity (+/-).

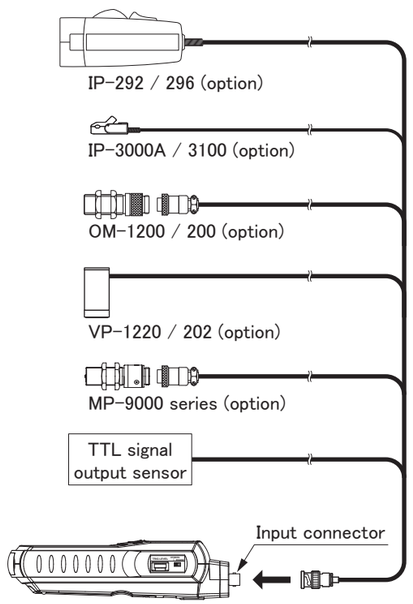
③ Put the battery cover.



2. Measurement

① When you use the HT-6200 for the first time, make setting for the sensor to be used before connecting it.
Once you have made setting, the settings are retained even if you turn OFF the power. (Perform the procedure in " (3) Selecting a connected sensor" in Section 3, "Setup Mode" in block "Functions and Operations" in Instruction Manual (Function Reference).

② Connect securely the connector of the detector to be used into the input connector of the HT-6200.



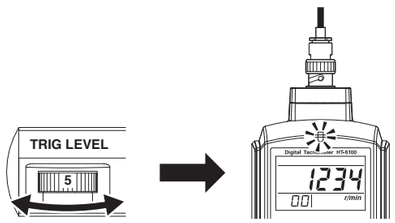
③ Slide the power switch to turn it ON.

④ Set the measurement unit (refer to "(4) Setting the measurement unit" in Section 2, "Function of Each Switch" in block "Functions and Operations" in Instruction Manual (Function Reference)). The unit is fixed to "r/min" when the engine measurement is selected

⑤ When measuring the circumferential speed (m/min), set a diameter (mm) of the body of revolution (refer to "(6) Setting the diameter of the body of revolution" in Section 2, "Function of Each Switch" in block "Functions and Operations" in Instruction Manual (Function Reference)).

⑥ Set the number of pulses per rotation (P/R) according to the object under measurement.

⑦ During measurement, turn the trigger level adjustment volume so that the indicator blinks stably and the rotation speed be displayed. Since the center value of the trigger level adjustment volume is 5, gradually increase or decrease the trigger level from 5 for adjustment.



⑧ If the trigger level cannot be adjusted only with the trigger level adjustment volume, set the gain of the sensor amplifier to Hi or Lo in the setup mode and then adjust the trigger level again (refer to "(5) Setting the gain of the sensor amplifier" in Section 2, "Function of Each Switch" in block "Functions and Operations" in Instruction Manual (Function Reference)).

⑨ Perform measurement.

3. Notes on Measurement

● **Perform measurement being careful not to get the HT-6200 in contact with the ignition coil.**

If you accidentally get it in contact with the ignition coil resulting in irregular display, turn the power OFF and then back ON.

● **Incorrect sensor selection disturbs exact measurement.**

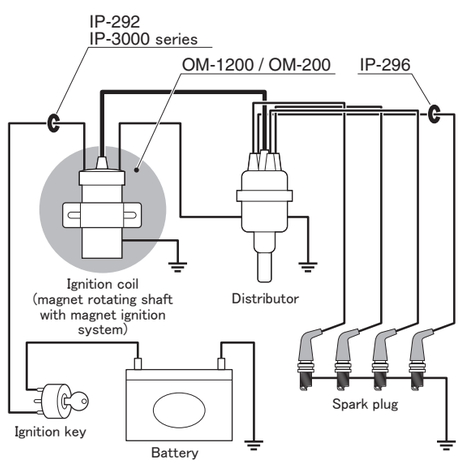
Select a sensor to be used using the setup menu or sensor selector switch.

● **When beginning the measurement of the integration count value, measure after clearing a memory (the count value) with the setting menu.**

4. Connecting Section of Each Sensor

4.1 Engine rotation measurement

The installation position is uniquely predetermined for each sensor.
Install each sensor at a correct position with reference to the instruction manual supplied with it.

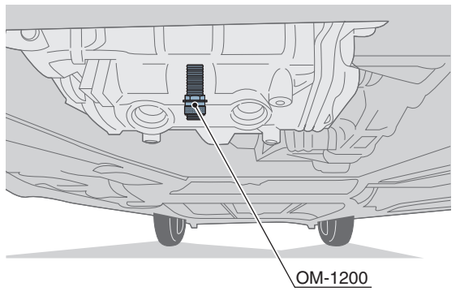


● If there is influence from another cylinder, keep the product away from its secondary cable.

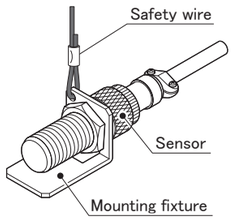
● If there is influence from another cylinder, protect against it by shielding, etc.

4.2 Motor rotation measurement

The rotation speed of a motor can be measured by detecting the magnetic flux leakage from the motor. Install the OM-1200 as close as possible to the motor in a direction perpendicular to the rotating shaft. Set the number of motor poles to "PLS".
There is a possibility magnetic flux leakage cannot be detected depending on the motor type or sensor installation position. For more details, please contact your nearest distributor or send us an e-mail. (overseas@onosokki.co.jp)



Note:) Fix a sensor securely using the mounting fixture with safety measures to prevent sensor dropping. Sensor dropping during vehicle running measurement may cause not only damage to a sensor but a serious accident.
When install a sensor with double-sided tape or duct tape, wash the surface with a degreasing agent before installation.



※) Recommended duct tape: Recycled PET bottle cloth tape 168
(Teraoka Seisakusho Co., Ltd.)

Option

① Output cord :AX-501
② AC adapter :PB-7090
(IN; 100 to 240 VAC 50/60 Hz, OUT; 5.9 VDC 3.5A)
③ Sensor :IP-292, IP-296, IP-3000A, IP-3100, OM-1220, OM-200, VP-1220, VP-202 and MP-9000 series

Storage

The storage temperature range of the HT-6200 is -10℃ to +50℃. When you store it, avoid locations where the temperature is extremely high or low or the humidity is high. Store it in a place which is well-ventilated and not exposed to direct sunlight. If you do not use it for a prolonged period of time, be sure to remove the batteries to prevent accident caused by battery leakage, etc.

Specifications

1. Measurement Section

Object under measurement : Gasoline engines or other general bodies of revolution
Operation method : Periodic operation method
Measuring time : 1 s + Input signal one-period time or less

【Engine rotation speed measurement】
(IP-292/296/3000A/3100, OM-1200/200, VP-1220/202)
Input frequency range ; 1 Hz to 1666.67 Hz
Measurement unit ; r/min (rotation speed)
Example measurement range ; 20000 r/min max. (*1)
(*1) Regardless of the setting of the number of pulses, the maximum rotation speed is 20000 r/min.

【When a non-engine rotation speed measurement】
Signal waveform (TTL) ; Square waveform
Voltage level (TTL) ; Hi=4.5 to 5.5 VDC
Lo=0 to 0.5 VDC
Input frequency range ; 3.33 Hz to 1666.67 Hz
Measurement unit ; r/min, r/s (rotation speed)
m/min (circumferential speed)
ms (period)
COUNT (integration count)
Example measurement range ; 99999 r/min max.
999.99 r/s max.
(Number of pulses set to 1 P/R)
9999.9 m/min
(Diameter value set to 100 mm)
0 to 99999 COUNT
0.6 to 300.0 ms

Note: The measurement range and measurement frequency may be narrowed depending on the settings of the number of pulses and diameter value.

Measurement accuracy : Display value* ×(±0.02 %) ±1 count
*) Display value is a count value excluding the decimal point.
*) However, the accuracy of the circumferential speed depends on the accuracy of the rotation speed (r/min).
Over range function : If the measurement value exceeds the display range, over range " ERROR " appears.
Upper limit revolution warning function : If the rotation speed exceeds the upper limit setting, the upper limit warning " ▲ " appears.
Trigger adjustment volume : Can be adjusted using the rotary volume on the right-hand side of the main unit.

2. Detecting Element

Detection system :
【Engine rotation speed measurement】
IP-292/296/3000A/3100 (option)
Detects current change caused by the ignition of the ignition coil of a gasoline engine.
OM-1200/200 (option)
Note on detection and measurement of leakage flux from the ignition coil of a gasoline engine or a magnet rotating shaft with magnet ignition system, using an electromagnetic induction system.
【When a non-engine rotation speed measurement】
OM-1200/200 (option)
Detect a leak magnetic flux of the motor
MP-9000 series (option)
Rotation detection using electromagnetic gear

Note: Leakage flux may not be normally detected depending on the type of the engine and the body of revolution.

3. Display Section

Number of display digits : 5 digits
Character height : 10.2 mm
Display : 7-segment LCD with back light
Refresh time : 1±0.2 s

4. Measurement Mode

MAX (peak hold) : Displays the maximum value during measurement.
MIN (peak hold) : Displays the minimum value during measurement.
Normal : Displays the current measurement value.
Memory function : Up to 20 measurement values can be memorized each time the memory switch is pressed. Since these values are stored in non-volatile memory, they are retained even after you turn OFF the power.

5. Analog Output Section

【REVO】
Output contents : Output to the display value of rotation speed.
Voltage range : 0 to F.S./0 to 1 V
Conversion method : 10-bit D/A conversion method
Linearity : ±1 % of F.S.
Output refresh time : 50 ms + Input signal one-period time or less
Temperature stability: ±0.05 % of F.S./℃ (ZERO & SPAN)
Setting error : ±0.5 % of F.S. (adjustment setup error at the time of shipment, ZERO & SPAN)
Load resistance : 100 kΩ or more
Output connector : Super mini jack (ø2.5)
【SIG】
Output contents : Analog output for monitoring after wave-form shaping of the sensor signal (be-fore pulse waveform conversion)
Load resistance : 100 kΩ or more
Output connector : Super mini jack (ø2.5/Used commonly with REVO output)

6. Pulse Output Section

Output timing : Outputs one pulse for each signal detection.
Output voltage : Hi level=4.5 V or higher
Lo level=0.5 V or lower
Output logic : Positive logic pulse
Load resistance : 100 kΩ or more
Output connector : Super mini jack (ø2.5)

7. General Specifications

Power supply : Type AAA dry battery (×4) or dedicated AC adapter (PB-7090)
Continuous operating time : About 16 hours (back light OFF)
About 8 hours (back light ON)(When alkaline batteries are used at 20 ° C)
* Depending on temperature change, the battery LOW may lights up even if voltage of the battery cells is more than 4.5 V.
Battery LOW display : Lights up at about 4.5 V
Operating temperature range : 0 ° C to +40 ° C
Storage temperature range : -10 ° C to +50 ° C
Operating humidity range : 35 to 85 %RH (without condensation)
Storage humidity range : 35 to 85 %RH (without condensation)
Mass : About 230 g (main unit only, batteries not included)
Dimensions : 189.5 × 66.0 × 47.5 mm (main unit only)

8. Applicable Standards

CE Marking
EMC Directive (2004/108/EC)
EN61326-1: 2006