

Diesel Engine Tachometer

**GE-2500**



DIESEL ENGINE  
TACHOMETER

**ONOSOKKI**

# Diesel Engine Tachometer GE-2500

The GE-2500 diesel engine tachometer uses rotation speed of an alternator to measure engine rotation speed. With FFT calculation, this new tachometer achieves reliable and stable measurement for both diesel and gasoline engines.

Because the vehicles with multiple injection by common rail system have increased, measuring engine rotation is becoming more difficult in recent years. With the conventional method, which uses engine vibration or pulsation of injection pipes, some engines cannot be measured depending on engine type or number of cylinders. By making use of an alternator, the GE-2500 can detect rotation speed of engines regardless of engine types and cylinder numbers.

## Feature

- 1** Rotation of both gasoline and diesel engines can be measured.
- 2** Auto calibration function is provided. The rotation speed ratio of the alternator and engine is calibrated automatically.
- 3** Easy setup. The sensor can be set on any place of an alternator.



## Application

- Measurement of diesel engine rotation speed in construction machine
- Measurement of engine rotation speed at safety inspection
- Measurement of engine rotation speed at pass-by noise testing (noise outside vehicle)

## Specification

|  |  |   |  |
|--|--|---|--|
| <b>Measurement section</b>               |  | <b>Analog output section</b><br>[ SIG ] |  |
| Measurement object                       | Diesel engine, gasoline engine with an alternator                    | Output information                      | Output of sensor signal connected to MAIN<br>(can be used switching from analog output )                           |
| Calculation method                       | FFT calculation  | Load resistance                         | 100 kΩ or more   |
| Input frequency range                    | 1, 2, 5 kHz(Measurement mode MAIN)<br>/ 500 Hz(Calibration mode REF) | Output connector                        | BNC  |
| Measurement accuracy                     | ±2 × rotation speed resolution(r/min) ± 1 count                      | <b>Pulse output section</b>             |  |
| Rotation speed resolution                | Frequency range(Hz) ÷ 12800 × 60 ÷ rotation ratio                    | Output information                      | Outputs frequency of displaying rotation speed.<br>[100 Hz Duty1 : 1 at 6,000 r/min]                               |
| <b>Display section</b>                   |  | Output voltage                          | Lo:0.5 V or less, Hi:4.5 V or more(at no load)   |
| Display                                  | Fluorescent display tube   | Output update cycle                     | 200 ms or less   |
| Display update cycle                     | Selectable from 0.2, 0.5, 1 or 2(second)                             | Load resistance                         | 100 kΩ or more   |
| Display resolution                       | 1 r/min, 1 Hz  | Output connector                        | BNC  |
| Measurement display range                | 20,000 r/min   | <b>General specification</b>            |  |
| <b>Input section</b>                     |  | Power supply                            | DC 12 to 24 V  |
| Input                                    | 2-ch MAIN(for measurement) REF(for calibration)                      | Power consumption                       | 8 VA or less   |
| Input voltage range                      | ±5 V, ±0.5 V, ±0.05 V  | Operating temperature range             | 0 to +40 °C  |
| Input connector                          | BNC  | Operating humidity range                | +20 to +80 %RH(with no condensation)   |
| Input coupling                           | AC coupling  | Storage temperature range               | -10 to +55 °C  |
| Constant drive power supply              | 2.2 to 3.2 mA(REF only)  | Storage humidity range                  | +20 to +80 %RH(with no condensation)   |
| <b>Analog output section</b><br>[ REVO ] |  | Outer dimensions                        | Approx.144(D)×72(H)×180(D)mm(not including protruded section)  |
| Output information                       | Outputs for rotation speed display values.                           | Weight                                  | 2 kg or less   |
| Voltage range                            | 0 to F.S. / 0 to 10 V(Value of F.S can be specified.)                | Standard                                | CE marking, RoHs   |
| Conversion method                        | 12 bit D/A conversion method   | Accessories                             | Instruction manual x 3 kinds, rubber support pad x 4,<br>GE-0102 power cable for cigarette lighter plug(1.5 m) x 1 |
| Linearity                                | ±0.3 %/ F.S.   |   |  |
| Output update cycle                      | 200 ms or less   |   |  |
| Load resistance                          | 100 kΩ or more   |   |  |
| Output connector                         | BNC  |   |  |

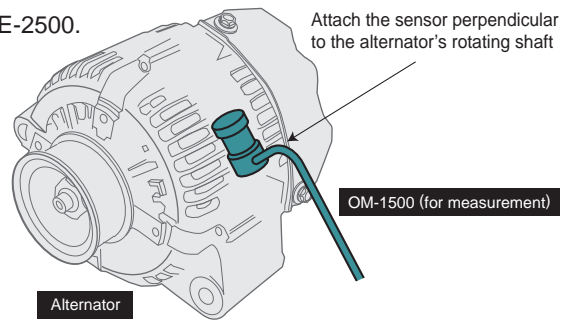
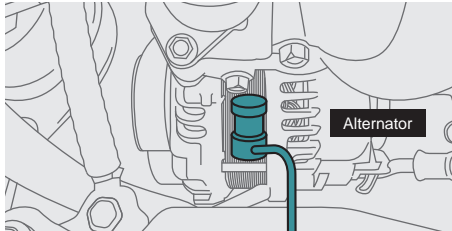
■ It may not measure depending on the engine and motor type. For more details, please contact your nearest distributor or send us an e-mail: [overseas@onosokki.co.jp](mailto:overseas@onosokki.co.jp)  
 ■ To use the GE-2500, the alternator and engine must be running in synch with each other. The measurement error may become large when the special kind of alternator is used or the belt between an alternator and engine is loose.

# Measurement procedure

- 1 Attach the sensor to the alternator. →
- 2 Execute the calibration to find the rotation speed ratio between the alternator and engine. →
- 3 Start measurement.

## STEP 1 Attach the sensor (OM-1500 or OM-1200) to the alternator.

- 1 Attach the OM-1500 or OM-1200 perpendicular to the alternator's rotating shaft.
- 2 Connect the sensor to 「MAIN」 in the rear panel of the GE-2500.

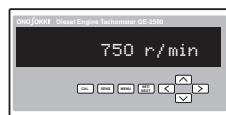


## STEP 2 Execute the calibration to find the rotation speed ratio between the alternator and engine. Set the rotation speed ratio at the GE-2500.

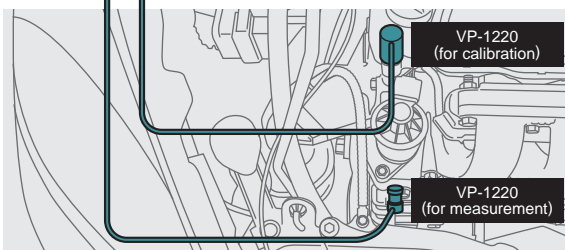
- Setting up using the sensor for calibration
- Setting up manually (three selections)

### When using the sensor for calibration

Measure rotation speed of the alternator and engine at the same time, and calculate the rotation speed ratio between them automatically.



Calibration example



### When setting up manually (select one from 3 methods)

- Input the pulley ratio, number of alternator's poles.

|     |        |     |
|-----|--------|-----|
| CAL | PULLEY | 2.5 |
|     | POLE   | 6.0 |

- Input the rotation ratio (rotation speed ratio of the alternator and engine)

|     |       |            |
|-----|-------|------------|
| CAL | ALT   | 160 Hz     |
|     | RATIO | 0.12.00000 |

- Input the engine rotation speed at idling

|     |     |           |
|-----|-----|-----------|
| CAL | ALT | 160 Hz    |
|     | ENG | 750 r/min |

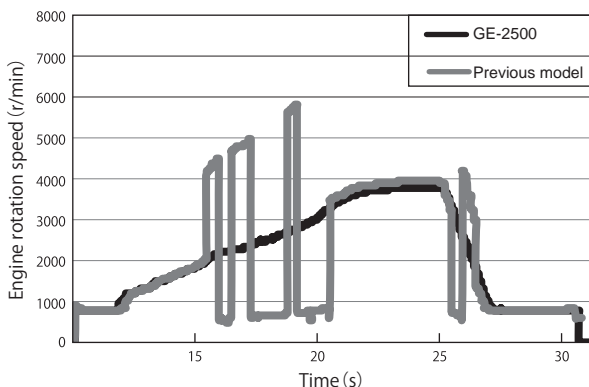
## STEP 3 Remove the sensor for calibration and start measurement by the sensor for measurement (OM-1500 or OM-1200).

The rotation speed ratio calibrated is stored to the GE-2500 automatically. Up to 5 conditions can be saved to the main unit.

# The GE-2500 can find solutions for engine rotation measurement

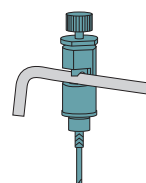
## Comparison of the GE-2500 and the previous model (6-cylinder engine)

The GE-2500 enables stable measurement in entire range even when the engine rotation speed is increased.



## Difficulties with previous models

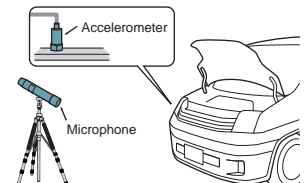
### Detected by pulsation of fuel injection pipe



Weakness

- The measurement value is varied affected by multiple injections.
- Not easy mounting

### Detected by sound or vibration



Weakness

- Difficult to measure while driving.
- Difficult to measure low vibration associated with increasing rotation speed

The GE-2500 can perform all these tasks

## Options

### ■ Sensor for measurement: Sensor for detecting alternator rotation

|  |  |  |                                 |         |         |
|--|--|--|---------------------------------|---------|---------|
| OM-1200 (sensor)<br>OM-0102 (mounting fixture) |  | OM-1500  |                                 |         |         |
|  |  |  |                                 | OM-1200 | OM-1500 |
| Detection method                               |  | Electromagnetic induction                              |                                 |         |         |
| Cable length                                   |  | sold separately  | 4.9 m                           |         |         |
| Operating temperature range                    |  | 0 °C to +80 °C   | -10 °C to +100 °C               |         |         |
| Weight   |  | approx. 65 g   | approx. 130 g (including cable) |         |         |
| Outer dimensions                               |  | φ16×54 (sensor only)<br>φ16×80 (when connecting cable) | φ16×30                          |         |         |

### ■ Sensor for calibration: Sensor for detecting engine rotation (rotation ratio between the alternator and engine)

|                                   |                         |                                     |   |   |   |                                |                               |
|-----------------------------------|-------------------------|-------------------------------------|---|---|---|--------------------------------|-------------------------------|
| Engine vibration detector VP-1220 | Accelerometer NP series | Microphone & preamplifier MI series | Cigarette lighter socket sensor FT-0801 | Ignition pulse sensor (Primary side) IP-292 | Ignition pulse sensor (Secondary side) IP-296 | Ignition pulse sensor IP-3000A | Ignition pulse sensor IP-3100 |
|-----------------------------------|-------------------------|-------------------------------------|---|---|---|--------------------------------|-------------------------------|

## Outer Dimensions

**GE-2500**  
Diesel engine tachometer (with rubber support pads)

(Unit : mm)

Dimensions: 144 (width), 80 (height), 180 (depth).

## Product List

### Main unit

**GE-2500** Diesel engine tachometer

### Sensors

#### [For measurement (alternator)]

- OM-1200 Motor/engine rotation detector
- OM-1500 Motor/engine rotation detector (cable attached, 4.9 m)

#### [For calibration (engine)]

- VP-1220 Engine vibration detector
- NP series Accelerometer
- MI series Microphone & preamplifier
- FT-0801 Cigarette lighter socket sensor
- IP-292 Ignition pulse sensor
- IP-296 Ignition pulse sensor
- IP-3000A Ignition pulse sensor
- IP-3100 Ignition pulse sensor

### Accessory (sold separately)

**Signal cable (connects OM-1200 and GE-2500) HS12P2--BNC**  
 MX-005 signal cable (5 m)  
 MX-010 signal cable (10 m)

**Signal cable (analog and pulse output of GE-2500) BNC--BNC**  
 MX-101 signal cable (1.5 m)  
 MX-105 signal cable (5 m)

#### Others

- OM-0102 Mounting fixture for OM-1200 (with 3 adhesive sheets)
- GE-0102 Power cable for cigarette lighter socket 1.5 m (standard accessory of GE-2500)

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\* Outer appearance and specifications are subject to change without prior notice.  
**URL : <http://www.onosokki.co.jp/English/english.htm>**

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