Advanced Handheld Tachometer

FT-7200

Measure engine rotation speed via cigarette lighter socket sensor!

Cigarette lighter socket sensor FT-0801
FT-7200 Advanced Handheld Tachometer

Rotation pulse not needed. Rotation speed measured via light, magnetism, vibration, sound, etc.

Rotation speed measured via sound and vibration! Measures engine rotation speed via cigarette lighter socket sensor!

Overview
The FT-7200 is a handheld tachometer that measures rotation speed by performing frequency analysis using FFT calculations. It can perform non-contact measurement using sound, vibration, and others, without modifying the rotating shaft.

Features
- Differences from a previous model
  - A new measurement mode has been added, making measurements possible that were before infeasible.
  - Improved following up performance of acceleration and deceleration.
  - Pulse output function available in addition to analog output function.
- Effective for measuring engine rotation of cars, etc.
- A wide range of sensors can be used, including cigarette lighter socket sensor.
- Provided with averaging function and filtering function.

Pulse Counting Method
- FT Series Method
Because FFT calculation is used, measurement is not influenced by noise or changes in signal amplitude.

Analog output waveform
Frequency (Hz)
Stable display values

Fluctuated display values
Measurement is not possible with low signal amplitude.

Analog output waveform
Measurement is not possible with low signal amplitude.

Pulses are missed when the signal amplitude is not constant.
Malfunctions caused by noise

Analog output waveform
Stable display values
Comparison of new Mode C of the FT-7200 with a previous model

Mode C can be used to measure rotating object that a previous model was unable to measure (see left).
The FT-7200 also has improved follow up performance of rapid accelerated and decelerated rotation (see right).
(compared analog outputs by oscilloscope)
Examples of Application

Rotation Speed Measurement of DC Motor

The FT-0501 detects the magnetic flux leakage of a DC motor, and calculates the frequency signal in proportion to rotation speed. This is able to measure the rotation speeds of built-in DC motors.

Rotation Speed Measurement of Finished Product

This product can measure the rotation speeds of motors in finished products where the motors are not visible, such as power drills and vacuum cleaners. Measurement is performed with a microphone, making it possible to perform measurement without modifying the measurement object.

Rotation Speed Measurement of Fans and Compressors

The vibration of a rotating object depends on the rotation movement. The rotation speed of a rotating object can be measured by measuring the vibration frequency.
The rotation speed of engine can be measured from noise and vibration caused by the movement of pistons.

The rotation speed of engine can be measured from the noise of intake and exhaust from a muffler.

The rotation speed of engine can be measured by clamping sensors to an automobile’s primary low-voltage and secondary high-voltage conductors.

**Rotation Speed Measurement of Automobile, Construction Machinery, and Other Engines**

- Clamp the secondary conductor (IP-296, IP-3100)
- Clamp the primary conductor (IP-292/IP-3000A, IP-3100)
- Take care with the direction
- OM-1200 Electromagnetic detector (Mount it parallel to the ignition coil)
- Ignition coil

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**Engine Measurement via the FT-0801 Cigarette Lighter Socket Sensor**

Connect the FT-0801 to a power outlet equipped on an automobile or construction machinery. It is possible to measure the rotation speed of engine using the FT-7200 by detecting the ignition noise in the voltage from the power outlet. Supports 12VDC and 24VDC batteries.
System Configuration

Rotation measurement from noise
- Cigarette lighter socket sensor
  - FT-0801

Rotation measurement from sound
- Microphone preamplifier
  - MI series
    - MI-3111
    - MI-1432

Rotation measurement from vibration
- Accelerometer
  - NP-2000/3000 series
- Engine rotation detector (vibration sensor)
  - VP-202/1220

Rotation measurement from ignition pulse of engine
- Ignition pulse detector
  - Ignition pulse detector (electromagnetic type)
  - IP-292/296
  - IP-3000A/3100

Rotation measurement from magnetism
- DC motor rotation detector
  - OM-1200
  - FT-0501

- Directly-attached cable (3m)
- Directly-attached cable (2.9m)

Note: MI series and NP series brochures are available separately.

Note: All the peripheral equipments described on this page are sold separately as options.

FT-7200 Advanced Handheld Tachometer

Note: All the peripheral equipments described on this page are sold separately as options.

- AC adapter
  - PB-7090
- Recorder
- FFT Analyzer
- External display device

Rotation measurement from noise
- Cigarette lighter socket sensor
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  - Ignition pulse detector (electromagnetic type)
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  - IP-3000A/3100

Rotation measurement from magnetism
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  - FT-0501

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- AC adapter
  - PB-7090
- Recorder
- FFT Analyzer
- External display device
**FT-7200 Specification**

### Measurement section

<table>
<thead>
<tr>
<th>Measurement objects</th>
<th>DC motors, compressors, engines, and general rotating objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculation method</td>
<td>FFT calculation</td>
</tr>
<tr>
<td>Measurement time</td>
<td>250ms or less</td>
</tr>
</tbody>
</table>
| Input frequency range | 2000Hz range: 30 to 2000Hz (18,000 to 99,999r/min) \*1  
                         500Hz range: 7.5 to 500Hz (450 to 30,000r/min) \*1  
                         250Hz range: 3.75 to 250Hz (225 to 15,000r/min) \*1  
                         \*1 r/min figures above are for 1P/R.          |
| Measurement unit    | r/min (rotation speed)                                     |
| Rotation speed resolution | Frequency range (Hz) ÷ 6,400 x 60 = the number of set pulses  
                           Frequency range: 250, 500, 2000 (Hz)  
                           Set pulse count: 0.5, 1, 1.5, etc. (P/R)  
                           6400: FFT resolution  
                           Resolution drops when rotation speed is accelerating or decelerating. |
| Measurement accuracy | ±2 x rotation speed resolution (r/min) ±1  
                        Note: The measurement accuracy depends on the frequency range. |
| Filter function     | Limits the target frequency range (rotation speed range) within the selected frequency ranges. |
| Averaging function  | Moving average processing Number of averages: OFF, 2, 4, 8, 16 |
| Sensor amplifier sensitivity adjustment dial | The sensor amplifier’s sensitivity can be adjusted via the rotary dial on the right side of the main unit. |

### Detection section

                      | For rotating objects: IP-296, IP-3000A, IP-3100          |
|----------------------|-----------------------------------------------------------------|
| Input voltage level  | 5V: Max.±5V, 0.5V: Max.±0.5V, 0.05V: Max. ±0.05V               |
| Input coupling       | AC coupling                                                      |
| Power supply for the NP sensor | Constant current power supply (2.4 ±0.5mA)                 |

\* Note for measurement: Correct detection may not be possible depending on the type of engine or object under measurement.

### Display

<table>
<thead>
<tr>
<th>Number of display digits</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character height</td>
<td>10.2mm</td>
</tr>
<tr>
<td>Display device</td>
<td>7-segment LCD with backlight</td>
</tr>
<tr>
<td>Display update time</td>
<td>0.5 ±0.2s</td>
</tr>
<tr>
<td>Display resolution</td>
<td>1/min</td>
</tr>
</tbody>
</table>

### Measurement Mode

<table>
<thead>
<tr>
<th>CNS (Constant)</th>
<th>Use when there is low fluctuation in the rotation speed of the measurement object. (when measuring rated rotation speed or similar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT (Active)</td>
<td>Use when the rotation speed of the measurement object accelerates and decelerates. (However, it may not be possible to measure correctly if the changes are sudden.)</td>
</tr>
</tbody>
</table>

### Output section

#### [REVO] Analog output

<table>
<thead>
<tr>
<th>Signal output</th>
<th>Outputs the rotation speed displayed value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage range</td>
<td>0 to 1 V / 0 to F.S (F.S. can be specified optionally)</td>
</tr>
<tr>
<td>Conversion method</td>
<td>10-bit D/A conversion</td>
</tr>
<tr>
<td>Linearity</td>
<td>±1% of F.S.</td>
</tr>
<tr>
<td>Output update time</td>
<td>250ms or less</td>
</tr>
<tr>
<td>Temperature stability</td>
<td>±0.05% of F.S. /ºC (ZERO &amp; SPAN)</td>
</tr>
<tr>
<td>Setting error</td>
<td>±0.5% of F.S (Factory default of setting error; ZERO &amp; SPAN)</td>
</tr>
<tr>
<td>Load resistance</td>
<td>100kΩ or more</td>
</tr>
<tr>
<td>Output connector</td>
<td>Ultra-mini jack (ø2.5)</td>
</tr>
</tbody>
</table>

#### [SIG] Analog output

<table>
<thead>
<tr>
<th>Signal output</th>
<th>Analog output for monitor after waveform shaping of the sensor signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load resistance</td>
<td>100 kΩ or more</td>
</tr>
<tr>
<td>Output connector</td>
<td>Ultra-mini jack (ø2.5 / common to REVO output)</td>
</tr>
</tbody>
</table>

### General Specification

<table>
<thead>
<tr>
<th>Applicable standard</th>
<th>CE Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>Four type AAA batteries or exclusive AC adapter (PB-7090, sold separately)</td>
</tr>
</tbody>
</table>
| Continuous operating time | Approx. 6 hours (with backlight OFF)  
                           Approx. 5 hours (with backlight ON)  
                           (Using alkaline batteries at 20ºC; excludes when an NP sensor is in use)_2)  
                           _2) Using an NP sensor increases the current consumption because of constant-current power drive. We therefore recommend using the exclusive AC adapter when an NP sensor is used. |
| Battery LOW display | The “LOW” mark lights up at approx. 4.2V. |
| Operating temperature range | 0 to +40ºC |
| Storage temperature range | −10 to +50ºC |
| Operating humidity range | +35 to +85% RH (with no condensation) |
| Storage humidity range | +35 to +85% RH (with no condensation) |
| Weight              | Approx. 230g (main unit only); not including batteries |
| Outer dimensions     | 189.5(L) x 66.0(W) x 47.5 (D) mm (main unit only) |
| Accessories         | Four type AAA alkaline batteries, three kinds of instruction manuals (one copy each), carrying case |

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**FT-0801 Specification**

### Input section

<table>
<thead>
<tr>
<th>Connector shape</th>
<th>Cigarette lighter socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>12/24 VDC (battery voltage)</td>
</tr>
</tbody>
</table>

### Output section

<table>
<thead>
<tr>
<th>Connector shape</th>
<th>BNC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter</td>
<td>High-pass filter</td>
</tr>
</tbody>
</table>

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* The FT-0801 performs AC coupling processing, protecting the FT-7200 from overvoltage.
### Applicable sensors and options (sold separately)

| Main unit | Advanced Handheld Tachometer
|---|---
| **Detectors** |  
| FT-0801 | Cigarette lighter socket sensor  
| IP-292 | Ignition pulse detector (primary side)  
| IP-296 | Ignition pulse detector (secondary side)  
| IP-3000A | Ignition pulse detector  
| OM-1200 | Ignition pulse detector (electromagnetic type)  
| VP-0501 | DC motor rotation detector  
| VP-202 | Engine rotation detector  
| VP-1220 | Engine rotation detector (high-sensitive type)  
| NP-2000 | Accelerometer  
| NP-3000 series |  
| **Accessories** |  
| HT-0522 | Magnetic stand  
| HT-0521A | Stand jig  
| LA-0203C*1 | Tripod for sound level meter  
| PB-7090*2 | AC adapter  
| AX-501 | Signal cable (2m)  
|  | (Can be used for analog and pulse outputs.)  
|  | ø2.5 pin plug – CO2 (BNC)  

*1: Made by Slik Corporation (splint PRO II GM)  
*2: Made by Adapter Technology

### Outer Dimensions

<table>
<thead>
<tr>
<th>Outer Dimensions</th>
<th>Unit (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>66</td>
</tr>
<tr>
<td>Height</td>
<td>63.5</td>
</tr>
<tr>
<td>Depth</td>
<td>47.5</td>
</tr>
<tr>
<td>Length</td>
<td>180.5</td>
</tr>
<tr>
<td>Width</td>
<td>111</td>
</tr>
<tr>
<td>Height</td>
<td>189.5</td>
</tr>
<tr>
<td>Length</td>
<td>180.5</td>
</tr>
</tbody>
</table>

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**URL:** http://www.onosokki.co.jp/English/english.htm

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