Digital Engine
Tachometer

CT-6700

Compact and portable design

ONO SOKKI
Compact Tachometer for various engine measurement

The CT-6700 is a digital engine tachometer to measure rotation speed of gasoline/diesel engines, motors equipped on electric vehicles/hybrid electric vehicles, and general rotating bodies. Compact, space-saving design provides good operability and portability not only measurement on an engine test bench but also an actual vehicle.

1. High response measurement

The CT-6700 captures transitional phenomenon of engine rotation speed with high response. The analog output follows the acceleration/deceleration behavior within the conversion time of 1 cycle=8 µs of input signal. The signal is output as a wave-shaped pulse, which enables the engine rotation speed to be sent without delay. High speed digital output is also possible with CAN output function.

2. Wide variety of detectors can be used

By adding the ECU’s crank angle signal output function, it becomes possible to measure not only 10 kinds of detectors but also the rotation speed of various engines that could not be detected so far.

3. Automatic setting of trigger level with the Trigger assist function

The trigger assist function speeds up the trigger level setting. This function automatically makes an adjustment of trigger level for stable engine or motor rotation measurement. Manual adjustment such as elimination of noise which might be included in an ignition pulse signals is not required anymore.

4. Measurement of unequal interval pulses by ECU crank pulse signal (option: CT-0672)

The CT-6700 uses the ECU crank pulse signal to measure engine rotation. These signals have output with unequal intervals because the gear teeth are arranged at unequal intervals at a particular point for detection of the top dead center. With the ECU crank pulse signal input function (CT-0672:option), the CT-6700 ensures reliable engien rotation speed measurement through learning pulse patterns of irregular output.

5. Compact and easy to use

Compact, portable, and flexible design (170:W × 49:H × 120:D). Easy to see with large display, and easy to set functions by selecting menu. Also you can easily set frequently-used items, such as sensor type, pulse count and trigger level, with direct keys including a volume dial.

Various functions to help measurement

Pulse output function for tracking analysis

Tracking analysis can be performed by reading DIRECT pulse output of the CT-6700 (signal for rotation synchronzation) with DS-3000 series of Ono Sokki. Outputs rotation speed data by CAN communication. The output update cycle is 1 kHz at maximum. Any CAN-communicated devices, such as a CAN logger, can be used to record rotation speed data.

Deceleration calculation function supports the measurement in engine stop

When an engine stops suddenly, no pulse signal is generated, making it difficult to determine whether the engine tachometer stopped or not. This issue is solved by performing precalculation using deceleration calculation function. The signal predicted from the last detected signal period is output, or rotation speed analog signal at 0 r/min is output after the set time is elapsed.

Comparator function for monitoring engine measurement status

The CT-6700 recognizes that the engine has started when exceeding the engine run set value. When exceeding the over run set value, it is regarded as an engine failure and the contact point is output. The following graph shows an example when the engine run is set to 500 r/min and the over run is set to 6000 r/min.

Application 1 Measurement on an Engine Bench

Compact design allows easy installation at anywhere, including on an operation desk or into a control panel. For installing into an engine bench control panel, not only being able to use standard size panel mount fitting, also exclusive mounting (jig according to the size of the previous model) are available. Smooth and easy replacement from conventional models is supported.

Application 2 Measurement on an Actual Vehicle

Compact design makes it useful for measurement on an actual vehicle.
Wide variety of engine rotation measurement

**For Gasoline Engine**

- **IP-3000A Ignition pulse detector**
  - Applicable engine: 2/4 cycle gasoline engine
  - Detection point: Conductor of ignition coil primary side, current cable of electronic distributor
  - Code diameter: max. φ5 mm
  - Output code length: 4.9 m (direct-attached with BNC)
  - Operating temperature range: -40 to 120 ºC
  - Outer dimensions: 13 (W) x 33 (H) x 40 (D) mm
  - Weight: approx. 130 g (cable included)

- **IP-3100 Ignition pulse detector**
  - Applicable engine: 2/4 cycle gasoline engine
  - Detection point: Conductor of ignition coil primary side / secondary side, current cable of electronic distributor
  - Code diameter: max. φ10 mm
  - Output code length: 4.9 m (direct-attached with BNC)
  - Operating temperature range: -40 to 120 ºC
  - Outer dimensions: 13 (W) x 48 (H) x 30 (D) mm
  - Weight: approx. 280 g

- **IP-292/296 Ignition pulse detector**
  - Applicable engine: 2/4 cycle gasoline engine
  - Detection point: Conductor of ignition coil primary side (IP-292), Conductor of ignition coil primary side / secondary side (IP-296)
  - Code diameter: φ10 mm
  - Output code length: 4.9 m (direct-attached with BNC)
  - Operating temperature range: -40 to 120 ºC
  - Outer dimensions: 16 × 80 mm (sensor with cable included)
  - Weight: approx. 110 g (VP-202)

**For Motor and Gasoline Engine**

- **OM-1200 Motor / gasoline engine RPM detector**
  - Applicable engine: 2/4 cycle gasoline engine, EV/HEV motor
  - Detection method: Electromagnetic induction type
  - Signal cable: SW-005, SW-015, SW-020 (sold separately)
  - Operating temperature range: 0 to 80 ºC
  - Outer dimensions: φ16 x 54 mm (sensor)
  - Outer dimensions: φ16 x 80 mm (sensor with connection cable)
  - Weight: approx. 65 g

- **OM-1500 Motor / gasoline engine RPM detector**
  - Applicable engine: 2/4 cycle gasoline engine, EV/HEV motor
  - Detection method: Electromagnetic induction type
  - Output code length: 4.9 m (direct-attached)
  - Operating temperature range: -40 to 120 ºC
  - Outer dimensions: φ16 x 30 mm
  - Weight: approx. 130 g (cable included)

**For Gasoline/Diesel Engine**

- **VP-202/1220 Engine vibration detector**
  - Applicable engine: 4-cylinder diesel engine, 4-cylinder gasoline engine
  - Detection point: Bolt on an engine/cylinder head part, engine fixing bolt
  - Detection method: Electromagnetic vibration detection type
  - Output signal: Pulse signal
  - Output code length: 2.8 m (direct-attached)
  - Operating temperature range: 0 to 100 ºC
  - Outer dimensions: φ25 x 50 mm
  - Weight: approx. 110 g (VP-202)
  - approx. 130 g (VP-1220)

- **MP-9100/911 Electromagnetic rotation detector**
  - Output voltage: 2.0 Vp-p or more (1 kHz, load 10 kΩ, 10 mm / 20 mm)
  - Rotation speed: 200 to 35,000 min⁻¹ (80 P/R)
  - Detection range: ±0.5 to ±1 mm
  - Outer dimensions: 20 × 64 (L) mm
  - Weight: MP-9100 approx. 90 g
  - MP-911 approx. 110 g
  - Others: MP-930 Oil proof type
  - MP-935 Oil proof & heat resistant type
  - MP-9120 Low impedance type

- **MP-988/9820 Magneto-electric rotation detector**
  - Output waveform: Square
  - Measurement range: ±0.05 V or less
  - Detection gear: Ferromagnet, gear width 3 mm or more, modulus 0.3 to 3
  - Outer dimensions: φ22 × 75 mm (length)
  - Weight: approx. 150 g

- **LG-9200 Optical rotation detector**
  - Detection method: Photoelectric reflection using visible light
  - Detection distance: 20 to 40 mm (when using 12 mm square reflection mark)
  - Light source: Light emitting diode (red visible light)
  - Max. response speed: 10,000 rpm (circumferential speed conversion of rotating shaft)
  - Output waveform: Rectangular
  - Output impedance: 10 kΩ or less
  - Power requirement: 12±2 VDC, approx. 40 mA (at 12V)

* The above is an example of measurement. The setting location may be different depending on a vehicle type.
* Measurement may not be performed or measurement range may be changed depending on an engine type.
### Specification

#### Input Section

<table>
<thead>
<tr>
<th>Applicable detectors</th>
<th>IP-292/296/3000A/3100, OM-1200/1500, VP-202/1202, LG-9200, MP-900/9000 series/981, EX(T/PULSE), ECU crank pulse signal (option)</th>
</tr>
</thead>
</table>

#### Measurement range

<table>
<thead>
<tr>
<th>IP-292/296/3000A/3100</th>
<th>120 to 20000 r/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM-1200/1500</td>
<td>VP-202/1202 CRANK PULSE</td>
</tr>
<tr>
<td>MP-900/9000 series</td>
<td>30 to 99999 r/min</td>
</tr>
<tr>
<td>MP-981, LG-9200, EXT (PULSE)</td>
<td>0 to 99999 r/min</td>
</tr>
</tbody>
</table>

#### Input frequency range

0.1 Hz to 120 kHz∧¹

### Display

- **Type (size)**: Fluorescent display tube (52.5 × 11.5 mm)
- **Display range**: 0 to 99999 r/min∧¹
- **Accuracy**: ±0.01 % F.S. (±1 count) or less

### Analog Output

- **Output range**: 0 to 10 V
- **Range setting**: 1 to 99999 r/min (set in steps of 1 r/min)
- **Response**: Updates in less than 8 μs after cycle becomes stable
- **Resolution**: 16 bit

### Pulse Output

- **Output item (selectable)**: DIRECT : Wave-shaped output 0.5 [P/R]: Output r/min value to obtain 0.5 P/R 1 [P/R]: Output r/min value to obtain 1 P/R 60 [P/R]: Output r/min value to obtain 60 P/R
- **Signal level**: 0 to 5 V logic signal (Lo: 0.4 V or lower, Hi: 4.5 V or higher)
- **Load resistance**: 100 kΩ or higher

### Contact Output

- **Setting range**: 1 to 99999 r/min
- **Contact capacity**: 30 VDC/0.1 A
- **Connector (cable side)**: Phoenix Contact MVSTBR2, 5/4-ST-5, 08

### Digital Interface

- **Moving average**: 2 to 720 times
- **Deceleration calculation**: Selection of time or cycle Time : 1 to 1200 ms Cycle : ×1 / ×5 / ×8 / ×16
- **Trigger assist**: Automatic setting of trigger level employed until pulse detection
- **Resume**: Preserving condition values even while power is off.
- **Condition memory**: Maximum of five types of condition memory can be saved.

### General Specification

- **Power requirement**: 9 to 28 VDC, 12 VA or less
- **Input cable with fuse clips on both ends (option)**
- **Outer dimensions (weight)**: 170 (W) × 49 (H) × 120 (D) mm (approx. 700 g)
- **Operating temperature range**: 0 to +50 °C²
- **Operating humidity range**: 5 to 85 % (with no condensation)

### Product List

<table>
<thead>
<tr>
<th>Model name</th>
<th>Product name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT-6700</td>
<td>Digital Engine Tachometer (main unit)</td>
</tr>
<tr>
<td>CT-0671</td>
<td>CAN output function</td>
</tr>
<tr>
<td>CT-0672</td>
<td>ECU crank pulse signal input function³</td>
</tr>
<tr>
<td>CT-0673</td>
<td>Panel mounting fitting</td>
</tr>
<tr>
<td>CT-0674</td>
<td>Panel mounting jig (assisting jig for replacement from CT-6520 (B), option)⁴</td>
</tr>
<tr>
<td>CT-0675</td>
<td>Protection handles</td>
</tr>
<tr>
<td>CT-0676</td>
<td>Light shielding hood</td>
</tr>
</tbody>
</table>

### Other Function

- **Moving average**: 2 to 720 times
- **Deceleration calculation**: Selection of time or cycle Time : 1 to 1200 ms Cycle : ×1 / ×5 / ×8 / ×16
- **Trigger assist**: Automatic setting of trigger level employed until pulse detection
- **Resume**: Preserving condition values even while power is off.
- **Condition memory**: Maximum of five types of condition memory can be saved.

### Outer Dimensions

<table>
<thead>
<tr>
<th>Model name</th>
<th>Dimension (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT-6700</td>
<td>208 x 120 x 18</td>
</tr>
<tr>
<td>CT-0671</td>
<td>208 x 120 x 61</td>
</tr>
<tr>
<td>CT-0672</td>
<td>208 x 120 x 61</td>
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</tr>
</tbody>
</table>

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∧¹ When EXT (PULSE) is used.
∧² AC adapter operating temperature range: 0 to +40 °C.
³ The function enables to measure the engine rotation speed from the ECU crank pulse signal.
⁴ For using the CT-0674, the CT-0673 is necessary.

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