

HT/HG Pressure Sensor Manual

Compact pressure sensor

Operation Manual

**OPTEX
FA**

1. Checking Product

The HT/HG pressure sensor was shipped after careful inspection at the factory. However, when you receive the product, make sure the following points.

- 1-1 Check there is no apparent damage.
- 1-2 Model and serial No. are indicated on the identification plate attached to the case. Check that the model is the one you ordered.

2. Caution in Handling

2.1 Storage

- (1) Store the sensor in a place where the following conditions exist.
 - A dry location shielded from rain or other water.
 - Place where vibration or impact can be avoided.
 - Store at a temperature and humidity of approximately 25 °C/65 %RH although the specified storage temperature is -20 °C to 80 °C.
 - A location safe from corrosive gas.
- (2) Store the sensor in the original packaging if possible.
- (3) When storing the sensor after use, check there is no fluid in the pressure detecting component and clean completely before storing.

2.2 Installation

To use the HT/HG pressure sensor safely and accurately for a long period, observe the points below although the HT/HG pressure sensor is designed to operate even in severe environments.

- (1) If the sensor is placed in the direct sun or near a radiant heat source, shield it from direct sun or heat.
- (2) Avoid installing the sensor in corrosive gas environments as much as you can (If the sensor has to be used in corrosive gas, ventilate the area well).
- (3) Avoid rain as much as you can, although it is water-proof. Avoid leaving water on the wiring inlet.
- (4) Shield the sensor from vibration or impact as much as you can although the product is shock-proof.
- (5) Do not use the sensor in an explosive gas atmosphere.

2.3 To avoid damage to the diaphragm

- (1) HT/HG pressure sensor has a double diaphragm structure so that the fluid being measured does not contact the sensor chip directly. Be careful not to scratch the diaphragm when cleaning.
- (2) The diaphragm may be damaged if the fluid being measured freezes in the pressure measurement area. If there is a risk of freezing, use an insulating material.

2.4 Ventilation pipe (Reference tube)

HT/HG pressure sensor is a pressure gauge type sensor which measures a pressure based on atmospheric pressure. Be careful not to clog the ventilation pipe (reference tube) or allow water in the tube.

3. Outline

HT/HG pressure sensor is a low-cost, compact pressure sensor which transforms the measured pressure to an electrical signal of 4-20 mA (2 wire system) or 1-5 VDC (3 wire system). It contains a spread semiconductor sensor which operates over a wide temperature range and offers long-term stability as well as a double diaphragm, whereby the fluid being measured does not contact the sensor enabling a direct pressure measurement of gas and liquid.

4. Preparation for Operation

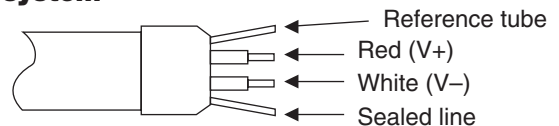
4.1 Check there is no application error, and then attach this sensor to the pressure measurement point.

- (1) Be careful not to apply sudden pressure to this sensor when starting the equipment (for example, open valves slowly). If a sudden pressure over the permissible excessive pressure is applied even for a moment, the sensor chip may be damaged.
- (2) When measuring fluid, be careful not to let air get into the fluid-contact component. If a shock wave (pressure over the permissible excessive pressure) occurs in pipes, attach a device such as damper (fitting for reducing pulsing pressure).
- (3) Make sure to tighten the hexagon nut of the pressure port with a crescent wrench or spanner to attach the sensor. Do not tighten the nut with the case.
- (4) Recommended tightening torque is 39N·m (4kgf·m)

4.2 Fix the cable terminal if necessary.

Fig. 1 and 2 show the details of cable terminals. When attaching a solderless terminal to the lead line and sealed line, cut the extra soldering part at the edge of each line, and press and attach it to the solderless terminal. Select the [type] and [nominal designation] of the solderless terminal so that they match the terminal screw and the diameter of lead line.

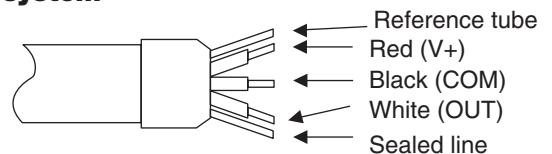
2 wire system



* Extra terminal is soldered.

Fig.1 Cable terminal of 2 wire system (code I)

3 wire system



* Extra terminal is soldered.

Fig.2 Cable terminal of 3 wire system (code V)

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5. Starting Operations

- 5.1 Confirm that the power supply voltage is within the specified range.
- 5.2 Turn on the power supply switch to start measuring.
- 5.3 Apply the pressure, which is 0 % of the measurement range, and then confirm that the indicated value on the receiving instrument is also 0 %.

[HTI/HGI 2 Wire System]

Output signal: 4 to 20 mA
 Power voltage: 12 to 28 VDC
 Load resistance: 0 to 800 Ω (Refer to the following chart for the relation of power voltage and load resistance.)

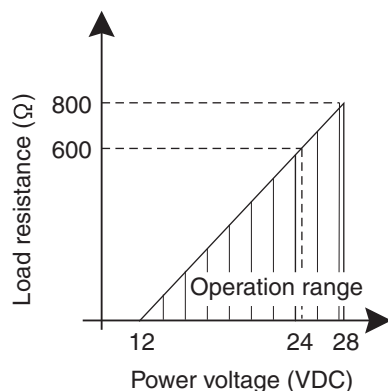


Fig.3 Power supply voltage/load resistance characteristic

[HTI/HGI HTV/HGV 3 Wire System]

Output signal: 1 to 5 VDC
 Permissible load resistance: More than 1 KΩ
 Power voltage: 12 to 28 VDC
 Consumption: Less than 8 mA (when the power voltage is 24 VDC)

(Caution 1)

When measuring fluid, make sure that air does not get into the fluid-contact component.
 If air gets into it, the measurement will not be accurate.

(Caution 2)

When attaching the pressure sensor, make sure to tighten the hexagon nut securely with a wrench.
 If a shock wave occurs inside pipes (pressure over the permissible excessive pressure), attach a damper (fitting to reduce pressure pulsing).

[Common Specification]

| | |
|-------------------------|--|
| Accuracy | ±0.5 %FS of span (including linearity, hysteresis, and reproducibility) |
| Measured fluid | gas and liquid |
| Temperature range | ±0.05 %FS/ °C (0 to 60 °C) |
| Power voltage influence | ±0.01 %/V (zero point) |
| Excessive pressure | Current output: 1.5 times of rating Voltage output: 2 times of rating |
| Used pressure range | Refer to the rating range. |

< Rating pressure range >

HTV/HTI series

| Model | Rating pressure |
|---------|-----------------|
| -020KP | 0 to 20 kPa |
| -050KP | 0 to 50 kPa |
| -100KP | 0 to 100 kPa |
| -300KP | 0 to 300 kPa |
| -500KP | 0 to 500 kPa |
| N-100KP | 0 to -100 kPa |
| C-100KP | -100 to 100 kPa |

HGV/HGI series

| Model | Rating pressure |
|--------|-----------------|
| -001MP | 0 to 1 MPa |
| -002MP | 0 to 2 MPa |

| | |
|--------------------------------|---|
| Structure | IP65 |
| Cable length | Standard: 500 mm |
| Material | Fluid-contact Diaphragm: SUS316L O-ring: Fluorine rubber or NBR Other fluid-contact part: SUS316 Case: SUS304 |
| Enclosed fluid | Silicon oil |
| Pressure connection inlet | R1/4 (Standard), R3/8, G3/8 |
| Weight | Approx. 110 g |
| Responsiveness | 5 ms or less |
| Insulation resistance | 100 MΩ or more, 500 VDC |
| Voltage resistance | 500 VAC, 1 min. |
| Shock proof | 10 G 2 hours (XYZ axis) |
| Compensation temperature range | 0 to 60 °C |
| Temperature range for use | -10 to 80 °C (if it is not frozen) |
| Humidity range for use | 35 to 85 %RH (if condensation is absent) |

When using the sensor in a vacuum, it should be more than 10 kPa abs (temperature for use: 0-60 °C)