Heavy Duty Industrial Pressure Sensor

RUGGED, VERSATILE, AND HIGHLY VISIBLE

For Hydraulic and Pneumatic Applications

Actual size

Easy to See

Easy to Mount
OIL, WATER, and AIR…
One sensor with the ability to solve a wide variety of applications

Easy to program
Easy to mount
Easy to monitor
Resistant to damage

Fluid temperature range
-20 to +100°C
-4 to +212°F

Vibration resistance
20G

Shock resistance
50G
New Standard in user-friendly operation
to solve a wide range of applications

**1 Easy to use**

New features include the easy to clean, clog resistant structure and a highly visible indicator and display. In combination with its intuitive operation, the GP-M provides the next level of ease-of-use functionality.

**2 Easy to install**

Its hex-shaped design, rotatable display, and user-friendly setup simplify the installation.

**3 Easy to select**

With six different models available, the GP-M can be used for almost any pressure application. Its standard footprint for all models simplifies integration.
Highly Visible Indicators & Display
Easy to see operation status from any viewing direction
Advantage of using digital pressure sensor

Conventional: Bourdon tube & Mechanical type

- Values are difficult to understand
- Require more space due to large size
- More potential for leaks and damage
- No outputs provided

GP-M Series

- Anyone can understand the large numerical display
- Outputs can easily be seen at a glance from any direction
- Space-saving design
- Includes an adjustable range analog function.

Clog resistant. No disassembly required for cleaning.

STEP FLUSH DIAPHRAGM DESIGN

The GP-M features a step flush diaphragm design that prevents foreign materials from clogging the unit.

Easy Maintenance

Clogging inside of the sensor may lead to a delayed response or errors in detection values. The GP-M can be removed and cleaned when couplings or other connecting parts become clogged. The step flush diaphragm design simplifies debris removal.

Prevent unauthorized changes

Key Lock and Password Protection settings are available to prevent unauthorized changes from being made.
The sensor display can be rotated after mounting the sensor.

3 SIMPLE STEPS FOR INSTALLATION

1. Mount the sensor to the coupling
2. Adjust the display orientation
3. Attach the cable

Rotating head = No union required

Installation does not require a union in order to adjust the display orientation. Therefore, the number of parts can be reduced by eliminating the need for this adapter.

Additional part added

Space saving is possible because the union is unnecessary.
3 Easy to select

Simple lineup

1. Sensor

2. Cable
   - Straight type
   - L-shaped type

3. Adapter

- NPT R
- Tee Rc

NPN/PNP selectable

Selectable between [2 outputs] or [1 output + analog output]

Various cables and adapter accessories are available

Range Selection

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Range Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-M001</td>
<td>-14.50 to +14.50 PSI (-100 to +100 kPa)</td>
</tr>
<tr>
<td>GP-M010</td>
<td>-14.5 to +145.0 PSI (-0.1 to +1 MPa)</td>
</tr>
<tr>
<td>GP-M025</td>
<td>-14.5 to +362.6 PSI (-0.1 to +2.5 MPa)</td>
</tr>
<tr>
<td>GP-M100</td>
<td>0 to +1450 PSI (0 to +10 MPa)</td>
</tr>
<tr>
<td>GP-M250</td>
<td>0 to +3626 PSI (0 to +25 MPa)</td>
</tr>
<tr>
<td>GP-M400</td>
<td>0 to +5892 PSI (0 to +40 MPa)</td>
</tr>
</tbody>
</table>

Rugged durability and environmental resistance

- Vibration resistance: 20G
- Shock resistance: 50G
- Light weight: 150g
- Fluid temperature range: -20 to +100°C* (-4 to +212°F)
- High chemical resistance and hardness: Ceramic diaphragm: Alumina

* No freezing or condensation

TOUGH & HEAVY-DUTY

SUSXM7

Al2O3 (Alumina)
APPLICATIONS

With its wide pressure range, from -14.5 to +5802 PSI (−0.1 to +40 MPa), and ceramic (alumina) diaphragm with high oil resistance, the GP-M Series can inspect pressure in a variety of applications.

**OIL PRESSURE**

With its wide pressure range, from -14.5 to +5802 PSI (−0.1 to +40 MPa), and ceramic (alumina) diaphragm with high oil resistance, the GP-M Series can inspect pressure in a variety of applications.

**Machine tools**
- Work clamp pressure
- Coolant discharge pressure
- Checking workpiece setting
- Monitoring clogging of waste liquid containing contaminants

**Thick fluid, fluid-containing powders and foreign materials**

The step flush diaphragm, with its small indentation inside of the sensor, prevents liquid and bubbles from easily clogging the pipe. In addition, it is easy to remove this sensor for cleaning. Users should consider the GP-M Series for fluids that commonly result in clogging.

**Fluid examples**
- Grease
- Coating material
- Adhesive
- Flux
- Sealant

**Fluid between -20 and +100°C -4 and +212°F**

The GP-M Series can monitor fluids between -20 and +100°C (-4 and +212°F) and can therefore be used in a wide variety of applications ranging from cooling, heat retention, and sterilization. (Ensure that the environment is free from freezing or condensation.)

**Applications at high temperatures**
- Clogging of a strainer
- Checking back pressure of a steam trap
- Water pressure for antiseptic wash

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SELECTABLE FUNCTIONS ACCORDING TO THE APPLICATION

Initial setting of the hysteresis mode (Hno/Hnc)

Pressure is likely to fluctuate from factors such as pressure spikes. This mode allows for free adjustment of hysteresis in order to prevent chattering due to fluctuating pressure.

Assume that $SP - rP = \text{Hysteresis}$

- The mode turns ON when a measurement value rises above $SP$. ① ②
- The mode turns OFF when a measurement value falls below $rP$. ③ ④

* The “hysteresis mode” and “window mode” can be selected for control outputs 1 and 2 respectively.

Free range analog

The data is output within the range of 4 to 20 mA in correspondence with the upper and lower limit values of the required pressure range. The pressure range can be adjusted as desired to maximize resolution.

Response speed (chattering prevention)

This function ignores rapid changes due to such factors as pressure spikes by increasing the response time. The time can be adjusted from 3 to 5000 ms.

Window mode (Fno/Fnc)

This mode is used to judge whether or not a measurement value is inside or outside of a specified zone.

- The mode turns ON when a measurement value rises above $FH$. ① ②
- The mode turns OFF when a measurement value rises above $FH$. ③ ④
- The mode turns ON when a measurement value falls below $FH$. ⑤
- The mode turns OFF when a measurement value falls below $FL$. ⑥

Hold function

This function displays the peak value and bottom value measured since the GP-M Series was turned on. Users can check the peak and bottom values easily by quickly pressing the ▲ or ▼ button while pressing the MODE button.
## 1 Sensor

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Material</th>
<th>Connector type</th>
<th>Cable termination</th>
<th>Length (m ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OP-8001</td>
<td>PVC (Vinyl chloride)</td>
<td>M12 4 pins Straight</td>
<td>M12 4 pins</td>
<td>2 6.56'</td>
</tr>
<tr>
<td></td>
<td>OP-8010</td>
<td>PVC</td>
<td>M12 4 pins L-shape</td>
<td>M12 4 pins</td>
<td>5 16.40'</td>
</tr>
<tr>
<td></td>
<td>OP-8025</td>
<td>PVC</td>
<td></td>
<td>Loose wire</td>
<td>10 32.81'</td>
</tr>
</tbody>
</table>

## 2 Cable

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Material</th>
<th>Connector type</th>
<th>Cable termination</th>
<th>Length (m ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OP-75721</td>
<td>PVC (Vinyl chloride)</td>
<td>M12 4 pins Straight</td>
<td>M12 4 pins</td>
<td>2 6.56'</td>
</tr>
<tr>
<td></td>
<td>OP-87272</td>
<td>PVC (Vinyl chloride)</td>
<td>M12 4 pins L-shape</td>
<td>M12 4 pins</td>
<td>5 16.40'</td>
</tr>
<tr>
<td></td>
<td>OP-85502</td>
<td>PVC (Vinyl chloride)</td>
<td></td>
<td>Loose wire</td>
<td>10 32.81'</td>
</tr>
</tbody>
</table>

## 3 Adapter (Select from the following adapters.)

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OP-87281</td>
<td>R male 1/8</td>
</tr>
<tr>
<td></td>
<td>OP-87282</td>
<td>R male 1/4</td>
</tr>
<tr>
<td></td>
<td>OP-87283</td>
<td>R male 3/8</td>
</tr>
<tr>
<td></td>
<td>OP-87284</td>
<td>G female 1/4</td>
</tr>
<tr>
<td></td>
<td>OP-87285</td>
<td>NPT male 1/8</td>
</tr>
<tr>
<td></td>
<td>OP-87286</td>
<td>Rc female 1/2</td>
</tr>
</tbody>
</table>

## Display protection cover

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OP-87289</td>
<td>Polysulfone</td>
</tr>
</tbody>
</table>

## Replacement parts

(Available for the following model numbers. Sold separately.)

### O-ring (for GP-M001/M010/M025)

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OP-87287</td>
<td>FKM</td>
</tr>
</tbody>
</table>

### O-ring set (for GP-M100/M250/M400)

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OP-87288</td>
<td>O-ring: FKM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Backup ring: PTFE</td>
</tr>
</tbody>
</table>

### O-ring (for OP-87283)

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OP-87310</td>
<td>FKM</td>
</tr>
</tbody>
</table>

Do not use unauthorized items. Refer to Page 14 "PIPING/INSTALLATION" for details.

**Throttle** (Attach to the adapter before use.)

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Material</th>
<th>Applicable adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OP-87311</td>
<td>SUS303</td>
<td>OP-87280/OP-87281</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OP-87282/OP-87284</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OP-87285</td>
</tr>
</tbody>
</table>

It is recommended to attach a throttle to the GP-M100/M250/M400. For other models, use it when excessive pulses or surge pressure is expected.
### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>GP-M001</th>
<th>GP-M010</th>
<th>GP-M025</th>
<th>GP-M100</th>
<th>GP-M250</th>
<th>GP-M400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure</td>
<td>-14.50 to +14.50 PSI (-100 to +100 kPa)</td>
<td>-14.5 to +145.0 PSI (-1 to +10 MPa)</td>
<td>-14.5 to +362.6 PSI (-0.1 to +2.5 MPa)</td>
<td>0 to +1450 PSI (0 to +10 MPa)</td>
<td>0 to +3626 PSI (0 to +25 MPa)</td>
<td>0 to +5802 PSI (0 to +40 MPa)</td>
</tr>
<tr>
<td>Possible display range</td>
<td>-17.40 to +17.40 PSI (-120 to +120 kPa)</td>
<td>-30.5 to +161.0 PSI (-0.210 to +1.110 MPa)</td>
<td>-52.2 to +400.3 PSI (-0.360 to +2.760 MPa)</td>
<td>-145 to +1595 PSI (-1.00 to +11.00 MPa)</td>
<td>-363 to +3989 PSI (-2.50 to +27.50 MPa)</td>
<td>-580 to +6382 PSI (-4.00 to +44.00 MPa)</td>
</tr>
<tr>
<td>Zero-cut pressure value</td>
<td>±0.5% of F.S.</td>
<td>0.1</td>
<td>1</td>
<td>1</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Allowable pressure</td>
<td>58 PSI (400 kPa)</td>
<td>580 PSI (4 MPa)</td>
<td>1440 PSI (10 MPa)</td>
<td>4351 PSI (30 MPa)</td>
<td>7252 PSI (50 MPa)</td>
<td>7252 PSI (50 MPa)</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>217.5 PSI (1500 kPa)</td>
<td>217.5 PSI (15 MPa)</td>
<td>5075 PSI (35 MPa)</td>
<td>14504 PSI (100 MPa)</td>
<td>14504 PSI (100 MPa)</td>
<td>14504 PSI (100 MPa)</td>
</tr>
<tr>
<td>Display resolution</td>
<td>kPa 0.1</td>
<td>1</td>
<td>1</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Fluid type</td>
<td>Gas or liquid that will not corrode the liquid contact part</td>
<td>Liquid that will not corrode the liquid contact part</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of pressure</td>
<td>Gage pressure</td>
<td>Gage pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precision*</td>
<td>±0.1% of F.S. or less</td>
<td>±0.1% of F.S. or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability**</td>
<td>±0.3% of F.S. or less</td>
<td>±0.3% of F.S. or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±0.6% of F.S./10°C</td>
<td>±0.6% of F.S./10°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection port</td>
<td>G3/4 (Changes to the R male 1/8, R male 1/4, R male 3/8, G female 1/4, NPT male 1/8, and NPT male 1/4 option adapters are available.)</td>
<td>G3/4 (Changes to the R male 1/8, R male 1/4, R male 3/8, G female 1/4, NPT male 1/8, and NPT male 1/4 option adapters are available.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Box rotation angle</td>
<td>Maximum 330°</td>
<td>Maximum 330°</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium temperature</td>
<td>-20 to +100°C (4°F to +212°F) (no freezing/condensation)***</td>
<td>-20 to +100°C (4°F to +212°F) (no freezing/condensation)***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>50 mA or less (when 24 V: 32 mA or less, when 12 V: 48 mA or less. Not including load)**</td>
<td>50 mA or less (when 24 V: 32 mA or less, when 12 V: 48 mA or less. Not including load)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display method</td>
<td>4 column, digital LED, red</td>
<td>Vertical inversion display possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation display light</td>
<td>Operation indicator (output 1) (orange), Operation indicator (output 2) (orange)</td>
<td>Operation indicator (output 1) (orange), Operation indicator (output 2) (orange)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>During hysteresis mode: variable (Difference between switch-on point and switch-off point is hysteresis)</td>
<td>During window mode: fixed (0.5% of F.S.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>Control output</td>
<td>Selectable from 3 to 5000 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analog output</td>
<td>As above ± 2 ms (90% response)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output 1 control output</td>
<td>NPN/PNP open collector (Selectable). Max. 250 mA (30 V max)</td>
<td>Max. 250 mA (30 V max)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Main unit residual voltage 1 V max, N.O./N.C. selectable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output 2 replacement type</td>
<td>Analog output</td>
<td>4-20 mA, maximum load resistance 500 Ω (When the electric voltage is more than 20 V)***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental resistance</td>
<td>Ambient temperature</td>
<td>-20 to +80°C (-4°F to +176°F) (no freezing/condensation)****</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relative humidity</td>
<td>35 to 85% RH (no condensation)****</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vibration</td>
<td>IEC60068-2-6 20 G (10 to 2000 Hz, 2 hours each in the X, Y, and Z axis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shock</td>
<td>IEC60068-2-27 50 G (11 ms, 3 times for each of X, Y and Z axis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enclosure rating</td>
<td>IP67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material properties</td>
<td>Wetted part</td>
<td>Pressure port: SUSXM7, Diaphragm pressure port: Al2O3(Alumina), O ring: FKM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other parts</td>
<td>Housing metal portion: SUS304, SUS303, Housing plastic portion: PPSU, Air hole*: PTFE, nickel-plated brass.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable cable</td>
<td>M12 connector 4 pin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>M12 connector 4 pin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WIRING, OUTPUT DIAGRAM

When selecting an NPN output

![Diagram](attachment:image1.png)

When selecting an PNP output

![Diagram](attachment:image2.png)

Analog output diagram

![Diagram](attachment:image3.png)

* When selecting "Out"(control output) of the function of output 2 only.

11
Sensor
GP-M001/M010/M025/M100/M250/M400

Adapter - male
OP-87280/87281/87282/87284/87285

Adapter - female
OP-87283

Material: SUSXM7 (adapter)

Sensor + adapter
OP-87283

Material: SUS303

Dedicated throttle (optional)
OP-87311

Material: SUS303

O-ring* for GP-M001/M010/M025 use (OP-87287)

Material: FKM

O-ring set* for GP-M100/M250/M400 use (OP-87288)

Material: FKM (O-ring)/PTFE (backup ring)

* O-ring/O-ring set is included with the sensor.
They are available as OP-87287/87288 when purchasing separately for replacement.

Model | OP-87281 | OP-87282 | OP-87283 | OP-87284 | OP-87285
---|---|---|---|---|---
A | 43.3 | 47.1 | 47.6 | 47.1 | 47.1
B | 21.1 | 21.1 | 21.1 | 21.1 | 21.1
C | 13 | 13 | 13 | 13 | 13
D | 9.2 | 13 | 13 | 13 | 13
E | 34 | 34 | 34 | 34 | 34
F | 3.7 | 3.7 | 3.7 | 3.7 | 3.7
G | 17 | 17 | 17 | 17 | 17
R | 115.7 | 119.5 | 119.5 | 119.5 | 119.5

Model | OP-87312
---|---
Screw | M6×P0.75
A | 6.05
B | 0.06
C | 0.05
D | 0.05
E | 0.05
F | 0.05
G | 0.05

Material: SUS303

O-ring (included)*

Material: FKM

* When replacing the O-ring for OP-87283, it is available as OP-87310.
**SAFETY INFORMATION FOR GP-M SERIES**

**General precautions**

1. Do not use this product for the purpose of protecting a human body or a part of human body.
2. This product is not intended for use as an explosion-proof product. Do not use this product in hazardous locations and/or potentially explosive atmospheres.
3. The GP-M Series is not designed to sanitary specifications. Do not use the GP-M Series for applications requiring safety measures, such as any nuclear, railroad, aircraft, vehicle, or playground equipment.

**Other precautions**

1. When using our product in combination with another product, based on such factors as conditions of use and surrounding environment, sometimes functions and performance may not be fully realized. In such a case, use after adequate examination.

**Caution when handling**

1. When detecting the temperature of the fluid, the housing of the product will be hot, and there is the danger of a burn injury. Do not touch the metal housing while the product is in operation.
2. The screw part of the main unit is sharp, take care to avoid injury.

**NOTICE**

1. Do not drop or hit the device, and avoid any other large shock to the device.
2. Do not use a sharply pointed object to press the setting keys.
3. If the detection portion is pushed with a sharp object, damage may occur to the detection surface. Also, for devices where the measuring range is low, the detection portion is thin and easy to break. Touch as little as possible.

**Precautions when installing**

**Attaching the coupling**

The recommended tightening torque when installing the adapter to the main body of the sensor is 20 N•m. It is recommended to apply grease to the G3/4 threaded part in order to avoid thread damage.

**Grounding of metal parts**

The metal parts of the main body and the internal circuits are 0 V insulated.

**Other precautions**

- Regardless of whether the power of the device is ON or OFF, do not touch the main part of the pressure detector. If the pressure detector is touched, damage may occur due to static electricity.
- If using a non-conductive liquid such as oil with plastic piping, the risk of an offset change will become greater. In such a case, it is recommended to ground the metal housing.
- In the case that noise causes malfunction, grounding the metal housing may improve performance.
- After installation, conduct an atmospheric correction by making the applied pressure the same as regular room pressure.
- When condensation occurs on piping, place the cooling pipe away from the sensor by 30 cm or more using a connecting pipe.

**Diagram**

- Use the adapter to match the diameter of the piping.
- When using the adapter, fit the O ring attached to the main body to the screw threads of the Adapter G3/4. (Refer to the diagram below.)
- When using a self-made adapter instead of the optional adaptor, or when attaching the main body directly to piping or the tank, specific steps are needed in order to fit the GP-M Series and O ring to the screw threads of the Adapter G3/4. (Refer to the diagram below.)
- The body may be rotated horizontally to 330°. When rotating, hold the clasp in place with a wrench.

**Diagram**

- Adapter
- O Ring
- Other precautions
- Notice the ambient temperature and relative humidities are within the highlighted area of the graph below.

**Graph**

- The recommended ambient temperatures and relative humidities for the GP-M Series are as follows:

**Diagram**

- Adapter (Example when using OP-87281)
KEYENCE OFFERS VARIOUS OTHER MODELS FOR PRESSURE DETECTION

For water flow

**New flow sensor with free flowing pipe**

FD-M Series

**LOWERS MAINTENANCE**

Dramatically reduces clogging

Unlike general floating element and paddle wheel flow meters, the FD-M Series has a "free flowing structure" that is completely free of moving parts and obstructions. There is no trouble with dirt and rust clogging the mechanical parts, greatly reducing maintenance.

**LONG LIFESPAN**

No damage from moving parts

Due to the absence of moving parts, it does not experience axial wear or other types of mechanical wear. Through its "free flowing structure" the FD-M Series has achieved a significantly longer lifespan.

**ENERGY SAVING**

Dramatically reduces pressure loss

Due to its "free flowing structure", the FD-M Series has almost no pressure loss. Does not apply a large load on pumps and thus saves energy.

**LINEUP**

<table>
<thead>
<tr>
<th>Model</th>
<th>Applicable fluid</th>
<th>Detecting range</th>
<th>Rated range</th>
<th>Bare diameter</th>
<th>Pipe direction</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD-M210ATK</td>
<td>Water, noncorrosive liquid (electrical conductivity: 5 µS/cm or more)</td>
<td>0.14 - 7.50 G/min (0.50 - 30 L/min)</td>
<td>0.14 - 2.60 G/min (0.50 - 10 L/min)</td>
<td>NPT3/8 (10A)</td>
<td>Vertical</td>
<td>NPN</td>
</tr>
<tr>
<td>FD-M210ATKP</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>FD-M210AYK</td>
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<td></td>
</tr>
<tr>
<td>FD-M210AYKP</td>
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<td></td>
</tr>
<tr>
<td>FD-M220ATK</td>
<td></td>
<td>0.7 - 26.4 G/min (2.5 - 100 L/min)</td>
<td>0.7 - 13.0 G/min (2.5 - 50 L/min)</td>
<td>NPT3/4 (20A)</td>
<td>Vertical</td>
<td>NPN</td>
</tr>
<tr>
<td>FD-M220ATKP</td>
<td></td>
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<tr>
<td>FD-M220AYKP</td>
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</tr>
<tr>
<td>FD-M230ATK</td>
<td></td>
<td>1.4 - 52.8 G/min (5.0 - 200 L/min)</td>
<td>1.4 - 26.0 G/min (5.0 - 100 L/min)</td>
<td>NPT1 (25A)</td>
<td>Vertical</td>
<td>NPN</td>
</tr>
<tr>
<td>FD-M230ATKP</td>
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<tr>
<td>FD-M230AYK</td>
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<tr>
<td>FD-M230AYKP</td>
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</tr>
</tbody>
</table>

*1 Twice the rated flow range can be displayed.

For oil, water, and air (Separate amplifier type)

**Environmental resistance pressure sensor**

AP-V80W Series

**VARIATION**

Differential pressure type amplifiers are used with two sensor heads of the same model in order to detect differences in the pressures measured by the two sensor heads.

*2 outputs for ON/OFF

Switchable between analog output (4 – 20 mA) and zero shift input

**Environmental resistance pressure sensor**

AP-V80W Series

**Detected a variety of fluids, including water, oil, and air.**

**Stainless steel pressure element (diaphragm)**

2 types of displays are available

Can detect up to 7250 PSI.
KEYENCE OFFERS VARIOUS OTHER MODELS FOR PRESSURE DETECTION

Gas

Built-in amplifier pressure sensor

AP-C30K Series

Compact gas pressure sensor

Separate amplifier pressure sensor

AP-C/V40W Series

VARIATION

Sensor (cable length: 2 m 6.56")

<table>
<thead>
<tr>
<th>Rated pressure range</th>
<th>Display resolution (factory setting)</th>
<th>Proof pressure</th>
<th>NPN output</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>-29.9 to -29.9 inchHg (+101.3 to -101.3 kPa)*</td>
<td>0.1 inchHg (0.2 kPa)</td>
<td>72.5 PSI (500 kPa)</td>
<td>AP-C30K</td>
<td>-</td>
</tr>
<tr>
<td>0 to -29.9 inchHg (0 to -101.3 kPa)</td>
<td>0.1 inchHg (Normal mode) (0.1 kPa)</td>
<td>-</td>
<td>AP-C31K</td>
<td>AP-C31KP</td>
</tr>
<tr>
<td>0 to +145 PSI (0 to +1000 MPa)</td>
<td>0.2 PSI (Normal mode) (0.001 MPa)</td>
<td>217.5 PSI (1.5 MPa)</td>
<td>AP-C33K</td>
<td>AP-C33KP</td>
</tr>
</tbody>
</table>

* Switchable between the negative pressure mode -29.9 inchHg (−101.3 kPa) and positive pressure mode -29.9 to 0 inchHg (0 to +100 kPa)

VARIATION

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIY rail mount type</td>
<td>Main unit AP-V41AW</td>
</tr>
<tr>
<td>CUBE</td>
<td>AP-V42AW</td>
</tr>
<tr>
<td>NPN output</td>
<td>PNP output</td>
</tr>
<tr>
<td>AP-C40W</td>
<td>AP-C40WP</td>
</tr>
</tbody>
</table>

* 2 outputs for ON/OFF. Switchable between analog output (1 ~ 5V) and zero shift input

<table>
<thead>
<tr>
<th>Rated pressure range</th>
<th>Display resolution (factory setting)</th>
<th>Proof pressure</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative pressure</td>
<td>0 to -29.9 inchHg (0 to -101.3 kPa)</td>
<td>0.1 inchHg (0.1 kPa)</td>
<td>500 kPa</td>
</tr>
<tr>
<td>Compound pressure</td>
<td>+29.9 to -29.9 inchHg (+101.3 to -101.3 kPa)</td>
<td>-</td>
<td>AP-41</td>
</tr>
<tr>
<td>Positive pressure</td>
<td>0 to +145 PSI (0 to +1.00 MPa)</td>
<td>0.01 kgf/cm² (0.001 MPa)</td>
<td>1.5 MPa</td>
</tr>
</tbody>
</table>

Compact

Display can be installed in easily viewable locations

Faster response than the built-in amplifier type

Gas

2 color LED

Connecting to the connector

Rotating pressure port

2 color LED

Build-in amplifier pressure sensor

Compact gas pressure sensor

Separate amplifier pressure sensor

Gas

SAFETY INFORMATION

Please read the instruction manual carefully in order to safely operate any KEYENCE product.

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GPM-KA-C-E 1043 611551

Printed in Japan