Dual Display Digital Pressure Sensor  For Gas

DP-100 SERIES Ver.2

Dual 3-color display makes operation easier!

Achieved further efficiency with 4 upgrades, keeping the same operability

UPGRADE 1

Superior visibility

Improved visibility in Digital Display

Improvements to the digital display deliver a wide viewing angle along with increased clarity. The display pressure range and set pressure range have also been increased.

* Ul 61010c-1 equivalent, Passed the Ul 991 Environment Test based on SEMI S2-0200. [Category applicable for semiconductor manufacturing: TWW2, Process Equipment] [Applicable standards: UL 61010C-1] [Additional test / evaluation standards as per intended use: UL 991, SEMI S2-0200]

UPGRADE 2

Long-distance transmission of analog output

Addition of analog current output capability to multifunctional models

Users can now select either voltage output or current output as analog output according to their application.
APPLICATIONS

Confirming suction of electronic component
Confirming reference pressure
Air-leak test for PET bottles

UPGRADE 3

Reduced environmental impact
14% lower power consumption (during normal operation)

Thanks to a redesign of its circuitry, power consumption of the low-power-consumption DP-100 series during normal operation has been reduced by 14%. The display is shut off entirely during ECO / FULL mode operation for power savings of up to 50% compared to normal operation, and display brightness is lowered during ECO / STD mode operation for power savings of up to 30% compared to normal operation.

Old DP-100 series
840 mW (normal operation)
New DP-100 series
720 mW (normal operation)

Up to 50% lower in ECO mode

UPGRADE 4

Enhanced power circuitry
Addition of a reverse polarity protection circuit to the transistor output circuit

To prevent from breakage due to miswiring.

“Current value” and “threshold value” can be checked at the same time!

Dual display allows direct setting of threshold value

Equipped with a 30 mm 1.181 in square compact-sized dual display. The current value and the threshold value can be set and checked smoothly without switching to another screen mode. ON / OFF operations still continue while the threshold values are being set, so setting to the same sensitivity as dial control-type sensors is possible. Key lock function is equipped as well.

Current value
Threshold value

Man-hours reduced by 3/4
3-color display (Red, Green, Orange)

The main display changes color in line with changes in the status of output ON / OFF operation, and it also changes color while setting is in progress. The sensor status can therefore be understood easily, and operating errors can be reduced.

- SET: Orange
- OFF: Green (or Red)
- ON: Red (or Green)

During normal operation

During setting

Readable digital display!

Alphanumeric indication in 12 segments is used. This improved visual checking.

BASIC PERFORMANCE

All models in the line-up are compound pressure types

No sensor settings are required to switch between positive pressure and negative pressure, so that the number of registered part numbers can be decreased.

For low pressure
- DP-101
- –100 kPa to 100 kPa
- Displays measurements in 0.1 kPa

For high pressure
- DP-102
- 1 MPa
- Ideal for applications such as suction.
- Resolution: 1/2,000
- Response time: 2.5 ms
- Temperature characteristics: ±0.5 % F.S.
- Repeatability: ±0.1 % F.S.

High performance accomplished

Low pressure type

The low pressure type displays measurements in 0.1 kPa at a resolution of 1/2,000 and has a response time of 2.5 ms (variable up to 5,000 ms), ±0.5 % F.S. temperature characteristics and ±0.1 % F.S. repeatability, giving it high performance.

Resolution: 1/2,000
Response time: 2.5 ms
Temperature characteristics: ±0.5 % F.S.
Repeatability: ±0.1 % F.S.

Displays measurements in 0.1 kPa

FUNCTIONS

Copy function reduces man-hours and human error

Sensors can be connected to a master sensor one by one, and a copy of the setting details for the master sensor can be transmitted as data to other sensors. If making the same settings for multiple sensors, this prevents setting errors among other sensors and in addition, when machinery design are changed, there would be less change in work orders.

Copy function

Details transmitted

Details received

The sensor’s setting operation mode has a 3-level configuration to suit the frequency of use

The setting levels are clearly separated into “RUN mode” for operation settings that are carried out daily, “MENU SETTING mode” for basic settings, and “PRO mode” for special and detailed setting. These make setting operations easy to understand and easy to carry out.

Simple setting

RUN mode

Menu setting

Easy

Special and detailed setting

PRO mode

RUN mode

Settings such as threshold value adjustment and key lock operation can be carried out while the sensor is operating.

MENU SETTING mode

Basic settings such as output mode setting and NO / NC switching can be carried out.

PRO mode

High-level function settings such as hysteresis adjustment and the copy function can be carried out.
**FUNCTIONS**

Equipped with independent dual output and three output modes

Equipped with two independent comparative outputs, and separate sensing modes can be selected for each of them. Since there are two comparative outputs, one of the comparative outputs can even be used for alarm output. In addition, output, which is not being used, can be disabled.

Vacuum breakdown can also be notified during suction applications!

Reference pressure alarm output is possible during reference pressure checking!

Possible to switch over analog output and external input

Multi-function type of Ver. 2 is newly equipped with analog current output, in addition to analog voltage output. Multi-function type that enables the selection of analog output (voltage / current) or external input (auto-reference / remote zero-adjustment) is available. It complies a wide range of applications.
FUNCTIONS

Equipped with auto-reference / remote zero-adjustment functions. More precise pressure management is achieved with a minimum of effort.

If the reference pressure of the device changes, two functions are selectable. One is auto-reference function, which partially shift the comparative output judgment level by the amount that the reference pressure shifts. The other is remote zero-adjustment function, which can reset the display value to zero via external input. These functions are ideal for places where the reference pressure fluctuates wildly, or where fine settings are required.

Sub display can be customized

The sub display can be set to indicate any other desired values or letters apart from the threshold value. This eliminates the need for tasks such as affixing a label to the device to indicate the normal pressure value.

Peak hold and Bottom hold functions

The peak values and bottom values for fluctuating pressures can be displayed using the dual display.

Energy-saving design! Equipped with an ECO mode

This mode lowers the display luminance to cut power consumption by approximately 30%. The displays can also be turned off completely to achieve a power saving of approximately 40%.
**Mounting**

**Tight installation to panels is possible**

An exclusive mounting bracket that is suitable for 1 to 6 mm 0.039 to 0.236 in panel thickness is available.

An exclusive mounting bracket (MS-DP1-1) that supports tight installation is available. Space savings can also be achieved even when an L-shaped mounting bracket is used.

- **MS-DP1-1**
  - Ceiling mounting
  - Floor mounting
  - Rear mounting

- **MS-DP1-5**

**Cable can be connected with one-touch**

Connector attached cable (2 m 6.562 ft), as an accessory, can be connected easily with one-touch connection.

* Connection cable

* Options: 1 m 3.281 ft / 3 m 9.843 ft / 5 m 16.404 ft types are also available.

**Types without connector attached cable are also available**

Commercially-available connectors can be used for cable connections. Cables in required length can be used, so this contributes to reduction in waste of unwanted cables.

* Refer to p. 743 for recommended commercially-available connectors.
VARIETIES

Short pressure port type is lightweight and takes up little space

Compact size with a depth of only 30 mm 1.181 in, so that it can easily fit into narrow spaces. Further, 10 g lighter than standard types. This reduces the loads on movable parts such as robot arms.

M8 plug-in connector types are also available (Only for Europe)

Flat installation on the wall by shifting the direction of the pressure port

By mounting the flat attachment to DP-10□-M(P), pressure port and cable can now be pulled out in downward, left or right directions. Flat mounting on surfaces such as the wall is made possible.

Rc1/8 conversion bushing is available. Compatible with previous model

By equipping the push-in converter with DP-10□-M(P), pressure port can be converted from M5 female thread to Rc1/8 female thread. Bore diameter conversion to the DP2 / DP3 series is possible.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Pressure port</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS-DP1-FF</td>
<td>M5 female thread</td>
</tr>
<tr>
<td>MS-DP1-FR</td>
<td>Rc1/8 female thread</td>
</tr>
<tr>
<td>MS-DP1-FN</td>
<td>NPT1/8 female thread</td>
</tr>
<tr>
<td>MS-DP1-FE</td>
<td>G1/8 female thread</td>
</tr>
</tbody>
</table>
## ORDER GUIDE

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Rated pressure range</th>
<th>Model No.</th>
<th>Pressure port</th>
<th>Comparative output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>Standard</td>
<td>For low pressure</td>
<td>-100.0 to +100.0 kPa</td>
<td>DP-101</td>
<td>M5 female thread</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For high pressure</td>
<td>-0.100 to +1.000 MPa</td>
<td>DP-102</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multi-function</td>
<td>For low pressure</td>
<td>-100.0 to +100.0 kPa</td>
<td>DP-101A</td>
<td>M5 female thread</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For high pressure</td>
<td>-0.100 to +1.000 MPa</td>
<td>DP-102A</td>
<td></td>
</tr>
</tbody>
</table>

| Europe | Standard | For low pressure | -100.0 to +100.0 kPa | DP-101-E-P | M5 female thread | NPN open-collector transistor |
|        | Multi-function | For high pressure | -0.100 to +1.000 MPa | DP-102-E-P |                  | PNP open-collector transistor |

| North America | Standard | For low pressure | -100.0 to +100.0 kPa | DP-101-N | M5 female thread | NPN open-collector transistor |
|               | Multi-function | For high pressure | -0.100 to +1.000 MPa | DP-102-N |                  | PNP open-collector transistor |

| Short pressure port type | Asia | Standard | For low pressure | -100.0 to +100.0 kPa | DP-101-M | M5 female thread | NPN open-collector transistor |
|                         |      | Multi-function | For high pressure | -0.100 to +1.000 MPa | DP-102-M |                  | PNP open-collector transistor |

### Type without connector attached cable

Type without connector attached cable CN-14A-C2 is available. When ordering this type, suffix "-J" to the end of Model No. (Excluding M8 plug-in connector type and short pressure port type.)

(e.g.) Type without connector attached cable of DP-101-N is "DP-101-N-J"

### Accessory

- **CN-14A-C2**
  (Connector attached cable 2 m 6.562 ft)
OPTIONS

<table>
<thead>
<tr>
<th>Designation</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector attached cable</td>
<td>CN-14A-C1</td>
<td>Length: 1 m 3.281 ft 0.2 mm² 4-core cable with connector on one end Cable outer diameter: ø3.7 mm ø0.146 in</td>
</tr>
<tr>
<td></td>
<td>CN-14A-C2 (Note)</td>
<td>Length: 2 m 6.562 ft 0.2 mm² 4-core flexible cable with connector on one end Cable outer diameter: ø3.7 mm ø0.146 in</td>
</tr>
<tr>
<td></td>
<td>CN-14A-C3</td>
<td>Length: 3 m 9.843 ft                                                                直接使用。</td>
</tr>
<tr>
<td></td>
<td>CN-14A-C5</td>
<td>Length: 5 m 16.404 ft                                                                直接使用。</td>
</tr>
<tr>
<td>Connector attached cable</td>
<td>CN-14A-R-C1</td>
<td>Length: 1 m 3.281 ft 0.2 mm² 4-core flexible cable with connector on one end</td>
</tr>
<tr>
<td></td>
<td>CN-14A-R-C2</td>
<td>Length: 2 m 6.562 ft 0.2 mm² 4-core flexible cable with connector on one end</td>
</tr>
<tr>
<td></td>
<td>CN-14A-R-C3</td>
<td>Length: 3 m 9.843 ft                                                                直接使用。</td>
</tr>
<tr>
<td></td>
<td>CN-14A-R-C5</td>
<td>Length: 5 m 16.404 ft                                                                直接使用。</td>
</tr>
<tr>
<td>M8 connector attached cable</td>
<td>CN-24A-C2</td>
<td>Length: 2 m 6.562 ft For M8 plug-in connector type The connector on one end Cable outer diameter: ø4 mm ø0.157 in</td>
</tr>
<tr>
<td></td>
<td>CN-24A-C5</td>
<td>Length: 5 m 16.404 ft                                                                直接使用。</td>
</tr>
<tr>
<td>Connector</td>
<td>CN-14A</td>
<td>Set of 10 housings and 40 contacts                                                                直接使用。</td>
</tr>
<tr>
<td>Sensor mounting bracket</td>
<td>MS-DP1-1</td>
<td>Allows sensors to be installed on the flooring or ceiling. Multiple sensors can also be mounted closely.</td>
</tr>
<tr>
<td></td>
<td>MS-DP1-5</td>
<td>Allows sensors to be installed on the wall. Multiple sensors can also be mounted closely.</td>
</tr>
<tr>
<td>Panel mounting bracket</td>
<td>MS-DP1-2</td>
<td>Allows installation to panels with thickness of 1 to 6 mm 0.039 to 0.236 in. Multiple sensors can also be mounted closely.</td>
</tr>
<tr>
<td></td>
<td>MS-DP1-4</td>
<td>Allows replacement from DP2 / DP3 series to DP-100 series. For newly designed set-up, please use panel mounting bracket MS-DP1-2 for panel mounting.</td>
</tr>
<tr>
<td>Front protection cover</td>
<td>MS-DP1-3</td>
<td>Protects the adjustment surfaces of sensors. (Can be attached when using the panel mounting bracket)</td>
</tr>
<tr>
<td>Conversion bushing</td>
<td>MS-DP1-7</td>
<td>By equipping with DP-10 series, pressure port can be converted to Rc 1/8 female thread. Replacement from DP2 / DP3 series is possible.</td>
</tr>
<tr>
<td>Flat attachment</td>
<td>MS-DP1-FM</td>
<td>M5 female thread                                                                 Directly used.</td>
</tr>
<tr>
<td></td>
<td>MS-DP1-FR</td>
<td>Rc 1/8 female thread                                                                 Directly used.</td>
</tr>
<tr>
<td></td>
<td>MS-DP1-FN</td>
<td>NPT 1/8 female thread                                                                 Directly used.</td>
</tr>
<tr>
<td></td>
<td>MS-DP1-FE</td>
<td>G 1/8 female thread                                                                 Directly used.</td>
</tr>
</tbody>
</table>

Note: The connector attached cable CN-14A-C2 is supplied with the DP-100 series. (Excluding M8 plug-in connector type).

Panel mounting bracket, Front protection cover

- **MS-DP1-2**
- **MS-DP1-3**

Front protection cover MS-DP1-3

Panel mounting bracket MS-DP1-2

Flat attachment

- **MS-DP1-FM**
- **MS-DP1-FR**
- **MS-DP1-FN**
- **MS-DP1-FE**

Recommended connector

Contact: SPHD-001T-P0.5, Housing: PAP-04V-S (Manufactured by J.S.T. Mfg. Co., Ltd.)

Note: Contact the manufacturer for details of the recommended products.

Recommended crimping tool

Model No.: YC-610R (Manufactured by J.S.T. Mfg. Co., Ltd.)

Note: Contact the manufacturer for details of the recommended products.
### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type</th>
<th>Standard</th>
<th>Multi-function</th>
</tr>
</thead>
<tbody>
<tr>
<td>For low pressure</td>
<td>DP-101-M(-P)</td>
<td>DP-101-M(-P)</td>
</tr>
<tr>
<td>For high pressure</td>
<td>DP-102-M(-P)</td>
<td>DP-102-M(-P)</td>
</tr>
<tr>
<td>For low pressure</td>
<td>DP-101A-M(-P)</td>
<td>DP-102A-M(-P)</td>
</tr>
<tr>
<td>For high pressure</td>
<td>DP-102A-M(-P)</td>
<td>DP-101A-M(-P)</td>
</tr>
</tbody>
</table>

#### Type of pressure

- **Rated pressure range**:
  - Dual Display Digital Pressure Sensor DP-100 SERIES Ver.2
  - Low pressure: -100.0 to +100.0 kPa
  - High pressure: -101.0 to +101.0 kPa

- **Set pressure range**:
  - Low pressure: -1.030 to +1.010 kgf/cm²
  - High pressure: -1.030 ± 0.30 kgf/cm²

- **Pressure withstandability**:
  - 500 kPa

#### Applicable fluid
- For low pressure: Kg, kgf/cm², bar, psi, mmHg, inHg, For high pressure: MPa, kgf/cm², bar, psi

#### Selectable unit
- Non-corrosive gas

#### Supply voltage
- 12 to 24 V DC ±10 %

#### Power consumption
- Normal operation: 720 mW or less
- Ripple P-P 10 % or less
- Maximum sink current: 100 mA
- Residual voltage: 2 V or less (at 100 mA sink current)

#### Comparative output
- **Output voltage**: 1 to 5 V DC
- **Zero point**: within ±0.5 F.S.
- **Span**: within 4 V ±5 % F.S.
- **Input impedance**: ≤2 kΩ
- **Input voltage**: 0.6 to 5 V
- **Zero point**: within ±0.5 V F.S.
- **Span**: within 4.4 V ±5 % F.S.
- **Input impedance**: ≤2 kΩ

#### Display
- 4 digits + 4 digits 3-color LCD display
- Display refresh rate: 250 ms, 500 ms, 1,000 ms, selectable by key operation

#### External input (Note 4)
- Auto-reference function
- Remote zero-adjustment function

#### Analog output voltage (Note 4)
- **Output current**: 4 to 20 mA
- **Zero point**: 12 mA ±5 % F.S.
- **Span**: 16 mA ±5 % F.S.
- **Linearity**: within ±1 % F.S.
- **Load resistance**: 250 Ω (max.)

#### Displayable pressure range
- -101.0 to +101.0 kPa
- -1.030 ± 0.30 kgf/cm²

#### Shock resistance
- 100 m/s² acceleration (10 G approx.) x In, Y, Z directions for three times each

#### Ambient temperature
- -10 to +50 °C (+14 °F to +122 °F)
- Storage: -10 to +60 °C (+14 °F to +140 °F)

#### Ambient humidity
- 35 to 85 % RH (No dew condensation or icing allowed).

#### Voltage withstandability
- 1,000 V AC for one min.

#### Insulation resistance
- 500 MO or more with 500 V DC megger between all supply terminals connected together and enclosure

#### Vibration resistance
- 10 to 500 Hz frequency, 3 mm, 0.156 in amplitude or maximum acceleration 196 m/s², ± Y and Z directions for two hours each
- When panel is mounted: 10 to 150 Hz frequency, 0.75 mm, 0.030 in amplitude or maximum acceleration 49 m/s², ± Y and Z directions for two hours each

#### Shock resistance
- 10.030 ± 1.010 kgf/cm²
- -1.010 ± 0.30 kgf/cm²
- -1.014 ± 0.146 psi
- -29.8 ± 29.8 inHg

#### Temperature characteristics
- Within ±1 % F.S. (at +20 °C ±8 °F)
- Within ±1 % F.S. (at +20 °C ±8 °F)
- Within ±1 % F.S. (at +20 °C ±8 °F)
- Within ±1 % F.S. (at +20 °C ±8 °F)

#### Pressure port
- Asia: M5 female thread + R (PT) 1/8
- Europe: M5 female thread + G 1/8 male thread
- North America: M5 female thread + NPT 1/8 male thread

#### Weight
- Net weight: 40 g approx.
- Gross weight: 130 g approx.

#### Accessories
- CN-14A-C2 (Connector attached cable 2 m 5.662 ft)

**Notes:**
1. Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C ±8 °F.
2. Model Nos. of Asia type having "-M" are short pressure port type. Model Nos. of Asia and North America types having the suffix "-P" are PNP output type.
3. Only standard type is equipped with comparative output 2.
4. Cannot be used at the same time.
## I/O CIRCUIT AND WIRING DIAGRAMS

### DP-10

#### I/O circuit diagram

**Standard type**

Terminal No. | Color code of connector attached cable | Designation
--- | --- | ---
1 | White | +V
2 | White | Comparative output 1
3 | Standard type: Comparative output 2
4 | PNP output type

**Terminal arrangement diagram**

![Terminal arrangement diagram for DP-10](image)

Symbols: D1 to D3: Reverse supply polarity protection diode
Zn, Zz2: Surge absorption zener diode
Tr1, Trz: PNP output transistor

### DP-10-P

#### I/O circuit diagram

**Standard type**

Terminal No. | Color code of connector attached cable | Designation
--- | --- | ---
1 | White | +V
2 | White | Comparative output 1
3 | Standard type: Comparative output 2
4 | PNP output type

**Terminal arrangement diagram**

![Terminal arrangement diagram for DP-10-P](image)

Symbols: D1 to D3: Reverse supply polarity protection diode
Zn, Zz2: Surge absorption zener diode
Tr1, Trz: PNP output transistor

### DP-11-E-P-J

#### I/O circuit diagram

**Standard type**

Terminal No. | Color code of connector attached cable | Designation
--- | --- | ---
1 | White | +V
2 | White | Comparative output 1
3 | Standard type: Comparative output 2
4 | PNP output type

**Multi-function type**

Terminal No. | Color code of connector attached cable | Designation
--- | --- | ---
5 | Brown | Analog output or External input
6 | Multi-function type: Analog output or External input
7 | Multi-function type: Analog output or External input
8 | Multi-function type: Analog output or External input

**Terminal arrangement diagram**

![Terminal arrangement diagram for DP-11-E-P-J](image)

Symbols: D1 to D3: Reverse supply polarity protection diode
Zn, Zz2: Surge absorption zener diode
Tr1, Trz: PNP output transistor

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**Notice:**

- NPN output type
- PNP output type
- Multi-function type
- Standards and options may vary. Please refer to the manual for detailed specifications.

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**Related Topics:**

- Fiber sensors
- Laser sensors
- Photoelectric sensors
- Micro photoelectric sensors
- Area sensors
- High-speed sensors
- Laser sensors
- Machine use
- UV curing systems
-*PRECAUTIONS FOR PROPER USE*

**Part description**

- Comparative Output 1 operation indicator
- Comparative Output 2 operation indicator
- Work as analog voltage output operation indicator in Multi-function type

**Wiring**

- Make sure that the power supply is off while wiring.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this sensor, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunctions due to induction.
- Incorrect wiring will cause problems with operation.

**Connection**

- Do not apply stress directly to the connection cable leader or to the connector.

**Mounting**

- **MS-DP1-1 / MS-DP1-5** sensor mounting brackets are available separately, and it should be used for mounting. When tightening the sensor to the sensor mounting bracket, use a tightening torque of 0.5 N·m or less.

- **MS-DP1-2** panel mounting bracket (optional) and the **MS-DP1-3** front protection cover (optional) are also available.

**Diagram:**

- The **MS-DP1-4** panel mounting bracket is available when switching from the **DP2 / DP3** series.

- An conversion bushing is available for when using the **DP-10-** short pressure port type. It can be used to switch between this model and the **DP2 / DP3** series. When connecting to the pressure port, use a tightening torque of 1.0 N·m or less.

- The **MS-DP1-F** flat attachment is available. If using the **MS-DP1-F** flat attachment (optional), install by following the procedures given below.

1. Decide the direction of this product to mount with the sensor.
2. Mount this product with the M3 female threads of the sensor by using the attached M3 (length 8 mm 0.315 in) screws. The tightening torque should be 0.5 N·m or less.
3. Mount this product with the mounting surface by using the attached M4 (length 20 mm 0.787 in) screws. The tightening torque should be 1.2 N·m or less.

**Note:** Take care that if the cable with connector is sticking out of the side groove of this product when mounting, the cable may be disconnected.
PRECAUTIONS FOR PROPER USE

Conditions in use for CE conformity

• The DP-100 series is a CE conformity product complying with EMC Directive. The harmonized standard with regard to immunity that applies to this product is EN 61000-8-2 and the following condition must be met to conform to that standard.

Condition

• The line to connect with this sensor should be less than 30 m 98.425 ft.

Piping

• If connecting a commercially-available coupling to the pressure port, attach a 12 mm 0.472 in spanner (14 mm 0.551 in spanner for DP-100-E type) to the hexagonal section of the pressure port to secure it, and tighten at a torque of 9.8 N·m or less. If it is tightened using excessive torque, it may damage the coupling or the pressure port. In addition, wrap sealing tape around the coupling when connecting it to prevent leaks.

• If connecting a commercially-available joint to the pressure port of the DP-100-M, hold the main unit in your hand to steady it, and tighten to a torque of 1.0 N·m or less. If it is tightened to an excessive torque, the joint or the main unit may become damaged.

• If connecting a commercially-available joint to the pressure port of the MS-DP1-F, tighten to a torque of 9.8 N·m or less.

• The tightening torque should be 1 N·m or less when connecting a coupling to the pressure port of MS-DP1-FM.

Flat attachment

• Make sure to mount MS-DP1-F with the sensor properly. If it is not mounted properly, air leakage may occur.

• Take care that the excessive mounting and dismounting of this product may cause deterioration of the O-ring.

• If you touch the O-ring of MS-DP1-F, or any scratch or dust, etc. is attached to it, air leakage may occur and the sensing performance may deteriorate.

• Take sufficient care when using and storing MS-DP1-F.

Others

• Use within the rated pressure range.

• Do not apply pressure exceeding the pressure withstandability value. The diaphragm will get damaged and correct operation shall not be maintained.

• Do not use during the initial transient time (0.5 sec. approx.) after the power supply is switched on.

• Avoid dust, dirt, and steam.

• Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.

• Do not insert wires, etc., into the pressure port. The diaphragm will get damaged and correct operation shall not be maintained.

• Do not operate the keys with pointed or sharp objects.

RUN mode

• This is the normal operating mode.

Setting item | Description
---|---
Threshold value setting | The threshold values for ON / OFF operation can be changed directly by pressing the increment key (UP) and the decrement key (DOWN).
Zero-adjustment function | This forces the pressure value display to be reset to zero when the pressure port is open on the atmospheric pressure side.
Key lock function | Stops key operations from being accepted.
Peak hold / bottom hold function | Displays the peak value and bottom value for fluctuating pressure. The peak value appears in the main display, and the bottom value appears in the sub display.

MENU SETTING mode

• If the mode selection key is pressed and held for 2 seconds in RUN mode, the mode will switch to MENU SETTING mode.

• If the mode selection key is pressed while a setting is being made, the mode will switch to RUN mode. In this case, the settings that have been changed will be entered.

Setting item | Description
---|---
Comparative output 1 output mode setting | Sets the output mode for comparative output 1.
Comparative output 2 output mode setting (standard type only) | Sets the output mode for comparative output 2.
Analog output / external input switching (multi-function type only) | Allows switching between analog voltage output / analog current output, and auto-reference input / remote zero-adjustment input.
NO / NC switching | Sets normally open (NO) or normally closed (NC).
Response time setting | Sets the response time. The response time can be selected from 2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1,000 ms and 5,000 ms.
Display color switching for main display | Allows the color for the main display to be changed. The colors can be set to ‘red’ or ‘green’ or ‘green’ / ‘red’ to correspond to ON / OFF output, or it can be fixed at ‘red’ or ‘green’ all the time.
Unit switching | Pressure unit can be changed.

Note: Do not tighten the pressure port by holding the product with the spanner. It may cause the product breakage.
PRECAUTIONS FOR PROPER USE

PRO mode
- If the mode selection key is pressed and held for 5 seconds in RUN mode, the mode will switch to PRO mode.
- If the mode selection key is pressed while a setting is being made, the mode will switch to RUN mode. In this case, the settings that have been changed will be entered.

<table>
<thead>
<tr>
<th>Setting item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub display switching</td>
<td>Changes the information in the sub display during RUN mode operation to the desired alphanumeric display.</td>
</tr>
<tr>
<td>Display refresh rate switching</td>
<td>Changes the display refresh rate for the pressure value displayed in the main display.</td>
</tr>
<tr>
<td>Hysteresis fix value switching</td>
<td>Sets the hysteresis for EASY mode and window comparator mode. (8 steps)</td>
</tr>
<tr>
<td>Linked display color switching</td>
<td>Allows the display color for the main display to be switched in line with the output operation for comparative output 1 or comparative output 2.</td>
</tr>
<tr>
<td>ECO mode setting</td>
<td>Allows power consumption to be reduced by dimming the display or turning it off.</td>
</tr>
<tr>
<td>Setting check code</td>
<td>Allows the setting details to be checked via codes.</td>
</tr>
<tr>
<td>Setting copy mode</td>
<td>Allows the setting details for the master sensor to be copied to slave sensors.</td>
</tr>
<tr>
<td>Reset setting</td>
<td>Resets the settings to the factory settings.</td>
</tr>
</tbody>
</table>

Table of codes

<table>
<thead>
<tr>
<th>Code</th>
<th>1st digit</th>
<th>2nd digit</th>
<th>3rd digit</th>
<th>4th digit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO / NC</td>
<td>Multi-step adjustment</td>
<td>Analog output</td>
<td>Display color linking</td>
</tr>
<tr>
<td>0</td>
<td>EASY</td>
<td>OFF</td>
<td>OFF</td>
<td>RED when ON</td>
</tr>
<tr>
<td>1</td>
<td>NC</td>
<td>EASY</td>
<td>NO</td>
<td>HI-1</td>
</tr>
<tr>
<td>2</td>
<td>NO</td>
<td>Hysteresis</td>
<td>NC</td>
<td>Hi-2</td>
</tr>
<tr>
<td>3</td>
<td>NC</td>
<td>EASY</td>
<td>NO</td>
<td>ADJ.</td>
</tr>
<tr>
<td>4</td>
<td>Window comparator</td>
<td>NO</td>
<td>NC</td>
<td>Always red</td>
</tr>
<tr>
<td>5</td>
<td>Window comparator</td>
<td>NC</td>
<td>NC</td>
<td>Always green</td>
</tr>
<tr>
<td>6</td>
<td>NO</td>
<td>NC</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>7</td>
<td>NO</td>
<td>NC</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>5th digit</th>
<th>6th digit</th>
<th>7th digit</th>
<th>8th digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response time</td>
<td>Unit switching</td>
<td>Display refresh rate</td>
<td>ECO mode</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>2.5 ms</td>
<td>MPa</td>
<td>250 ms</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>5.0 ms</td>
<td>kPa</td>
<td>500 ms</td>
<td>STD</td>
</tr>
<tr>
<td>2</td>
<td>10 ms</td>
<td>kgf/cm²</td>
<td>1,000 ms</td>
<td>FULL</td>
</tr>
<tr>
<td>3</td>
<td>25 ms</td>
<td>bar</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>50 ms</td>
<td>psi</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>100 ms</td>
<td>mmHg</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>250 ms</td>
<td>inchHg</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>500 ms</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>1,000 ms</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>9</td>
<td>5,000 ms</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the website.
**DIMENSIONS (Unit: mm in)**

The CAD data in the dimensions can be downloaded from the website.

### MS-1

**Assembly dimensions**
Mounting drawing with DP-10-□:

- View A
- Sensor mounting bracket (Optional)

**Sensor mounting bracket (Optional)**

Material: Cold rolled carbon steel (SPCC)

Two M3 (length 6 mm 0.236 in) screws with washers are attached.

### MS-1-5

**Assembly dimensions**
Mounting drawing with DP-10□-M

- View A
- Sensor mounting bracket (Optional)

Material: Cold rolled carbon steel (SPCC)

Two M3 (length 6 mm 0.236 in) screws with washers are attached.

### MS-1-2 MS-1-3

**Assembly dimensions**
Mounting drawing with DP-10□:

- View A
- Panel mounting bracket (Optional), Front protection cover (Optional)

Material: POM (Panel mounting bracket)

Material: Polycarbonate (Front protection cover)

### MS-2

**Panel cut-out dimensions**

When 1 unit is installed

- View A

When "n" units are installed horizontally in series

- View A

When "n" units are installed vertically in series

- View A

Note: The panel thickness should be 1 to 6 mm 0.039 to 0.236 in.
 DIMENSIONS (Unit: mm in)

MS-DP1-4
Assembly dimensions
Mounting drawing with DP-10□-

Panel mounting bracket (Optional)

Panel cut-out dimensions

Note: The panel thickness should be 1 to 32 mm 0.039 to 1.260 in.
Material: Panel mounting bracket body - Nylon 6
Panel mounting bracket - Stainless steel (SUS304)
Spacer - Cold rolled carbon steel (SPCC)/Unchromed plated

MS-DP1-FM
Assembly dimensions
Mounting drawing with DP-10□-

Flat attachment (Optional)

Material: Enclosure - Polybutylene terephthalate (PBT) (Glass fiber reinforced)
Pressure port - Stainless steel (SUS303)
O-ring - Hydrogenated Nitrile Butadiene Rubber (H-NBR)
Weight: 15 g approx. (flat attachment only)

Two M3 (length 8 mm 0.315 in) screws, two M4 (length 20 mm 0.787 in) screws are attached.

MS-DP1-7
Conversion bushing (Optional)

Material: Brass (Nickel plated)
Gasket: PVC

Panel mounting bracket

Rc1/8 female thread

Front projection cover (DPX-04)
Panel thickness dimension 1 to 3.2 mm 0.039 to 0.126 in

MS-DP1-FR/FN/FE
Assembly dimensions
Mounting drawing with DP-10□-

Flat attachment (Optional)

Panel cut-out dimensions

Material: Enclosure - Polybutylene terephthalate (PBT) (Glass fiber reinforced)
Pressure port - Stainless steel (SUS303)
O-ring - Hydrogenated Nitrile Butadiene Rubber (H-NBR)
Weight: 25 g approx. (flat attachment only)

Two M3 (length 8 mm 0.315 in) screws, two M4 (length 20 mm 0.787 in) screws are attached.

Note: MS-DP1-FR has a Rc1/8 female thread.
MS-DP1-FN has a NPT 1/8 female thread.

CN-14A(-R)-C
Connector attached cable (Optional, CN-14A-C2 is attached to the sensor)

• Length L

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Length L (mm in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN-14A(-R)-C1</td>
<td>1,000 39.370</td>
</tr>
<tr>
<td>CN-14A(-R)-C2</td>
<td>2,000 78.740</td>
</tr>
<tr>
<td>CN-14A(-R)-C3</td>
<td>3,000 118.110</td>
</tr>
<tr>
<td>CN-14A(-R)-C5</td>
<td>5,000 196.850</td>
</tr>
</tbody>
</table>

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