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MEMS Flow Sensors **D6F series**

Series Catalog

Faster and more accurate than ever before ———

MEMS flow sensor : the ideal means for mass flow measurement

Omron flow sensor
so precise
even the flap of a butterfly's
wings will not be missed.

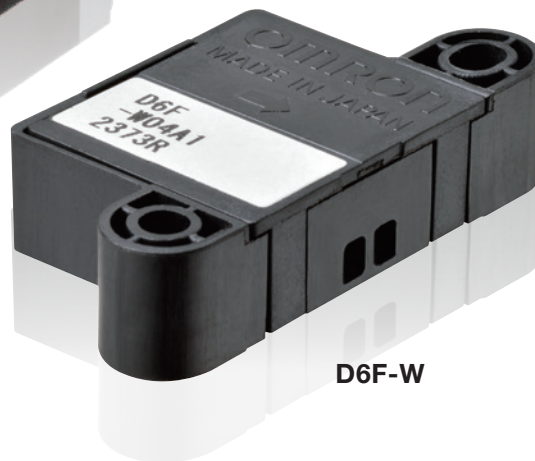


Realizing a highly accurate flow measurement,

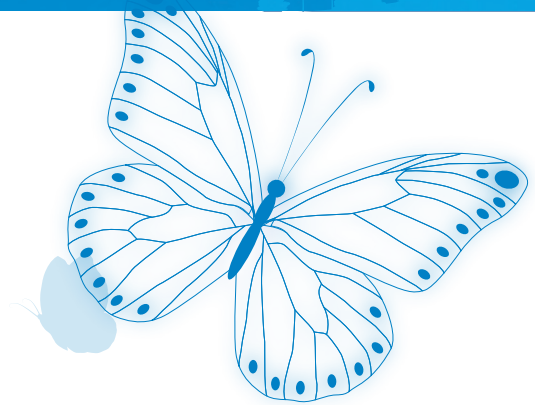
Omron's MEMS flow sensor accurately detects minute airflow so much as a single flap of a butterfly's wings. A gas flow sensor capable of "measuring mass flow" independent of temperature and pressure.



D6F-A6/-N6



D6F-W



Mass Flow Measurement

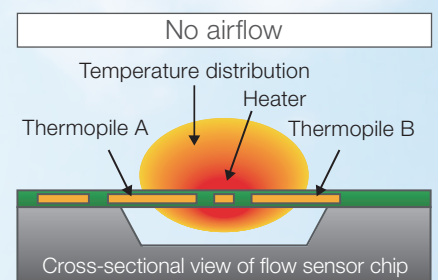
Q1 There are two balloons; each having different volumes. But these balloons have the same mass. Why is that?

A The volume increases/decreases according to the pressure and temperature changes. The mass, on the other hand, remains constant regardless of the environmental changes. The mass flow measurement allows measurement performance that is not affected by the changes in the environment.

Q2 Why is mass flow measurement required?

A An accurate measurement of the flow is required especially for combustion control. Omron's flow sensor enables measuring the gas flow based on the mass flow measurement.

Principles of MEMS Flow D6F Series



During the absence of airflow, the temperature distribution around the heater is symmetrical. When there is airflow, the temperature of the upwind side cools down and the temperature of the downwind side warms up, disrupting the symmetry of the temperature distribution.

sensing even a single flap of a butterfly's wings

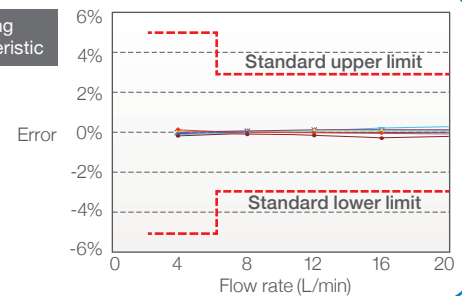


High Accuracy

$\pm 3RD$ (25-100%F.S.) is realized by linear temperature correction using ASIC technology

Ambient temperature = 25degC (Model: D6F-20A7D-000-0)

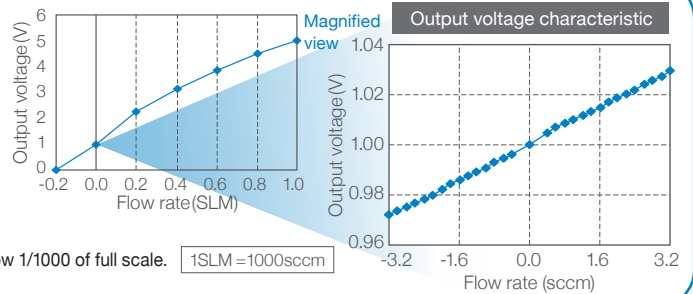
Operating characteristic



High Sensitivity

Omron's unique MEMS technology allows detection of very low air velocities

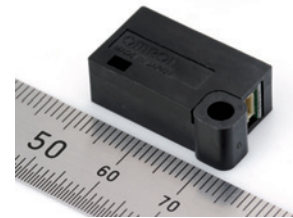
Flow rate of 1L: Output corresponding to flow rate change below 1/1000 of full scale. 1SLM = 1000sccm



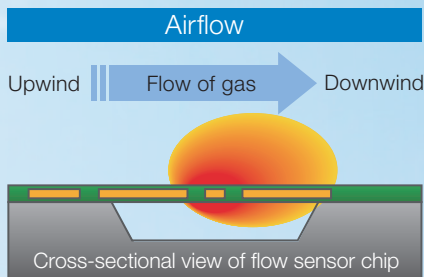
Compact

The product size is reduced by using the world-smallest class size MEMS sensor element

Dimension of D6F-V model: 24x8x14mm.



Sensor Measurement



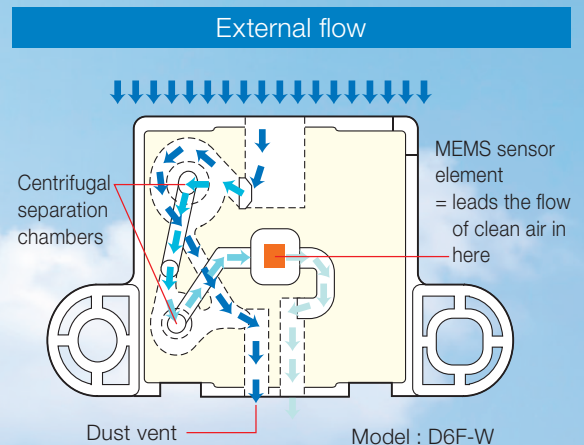
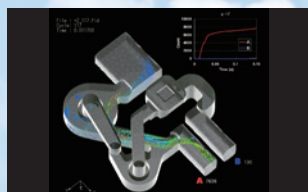
By detecting this temperature difference appearing as a difference in the electromotive forces developed by the thermopiles, it allows the mass flow rate and mass flow velocity to be measured without the influence of temperature and pressure. Since the thermopile generates the thermo-electromotive force, the power consumption is much lower than when using the resistivity method.

Highly Resistant to Dust

Patent No.4534526

Built-in Dust Segregation System (cyclonic) D6F-W/-V/-P

The sensor can be placed anywhere thanks to its dust-resistant structure. Omron's unique design of 3D flow path provides a high level of reliability by separating dust particles to reduce its effect on the sensor chip. Additionally, Omron succeeded in reducing the sensor size, allowing it to be used in wider range of applications.



Applications

Omron flow sensors cover wide range of applications and can be used for different purposes.

Application Examples

Clogging Detection

For monitoring the flow of the cooling air to optimize the cooling efficiency and avoid malfunctions.

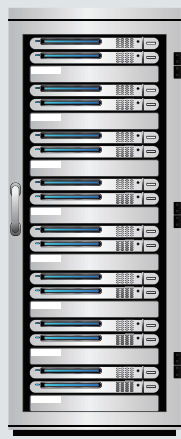
- ▶ Flow rate
- ▶ Velocity
- ▶ Differential pressure



Projector



PC



Server

Quiet, low maintenance cost

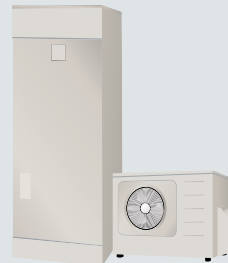
Combustion Control

For controlling the air/fuel ratio by accurately measuring the mass flow rate

- ▶ Flow rate
- ▶ Differential pressure



Fuel cell



Water heater



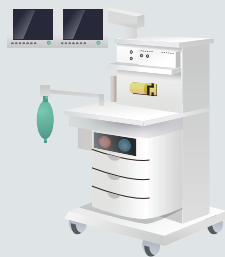
Boiler

Optimizing combustion efficiency

Flow measurement

For recording the amount of air used, detecting even the smallest leaks

- ▶ Flow rate
- ▶ Differential pressure



Anesthesia apparatus



Oxygen concentrator



Mounting machine

Flow visualization, real-time detection

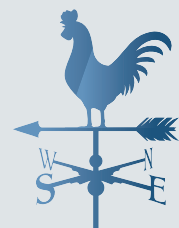
Air volume measurement

For measuring flow rate and flow velocity of a space

- ▶ Velocity
- ▶ Differential pressure



Ducts



Airflow analysis (environment)



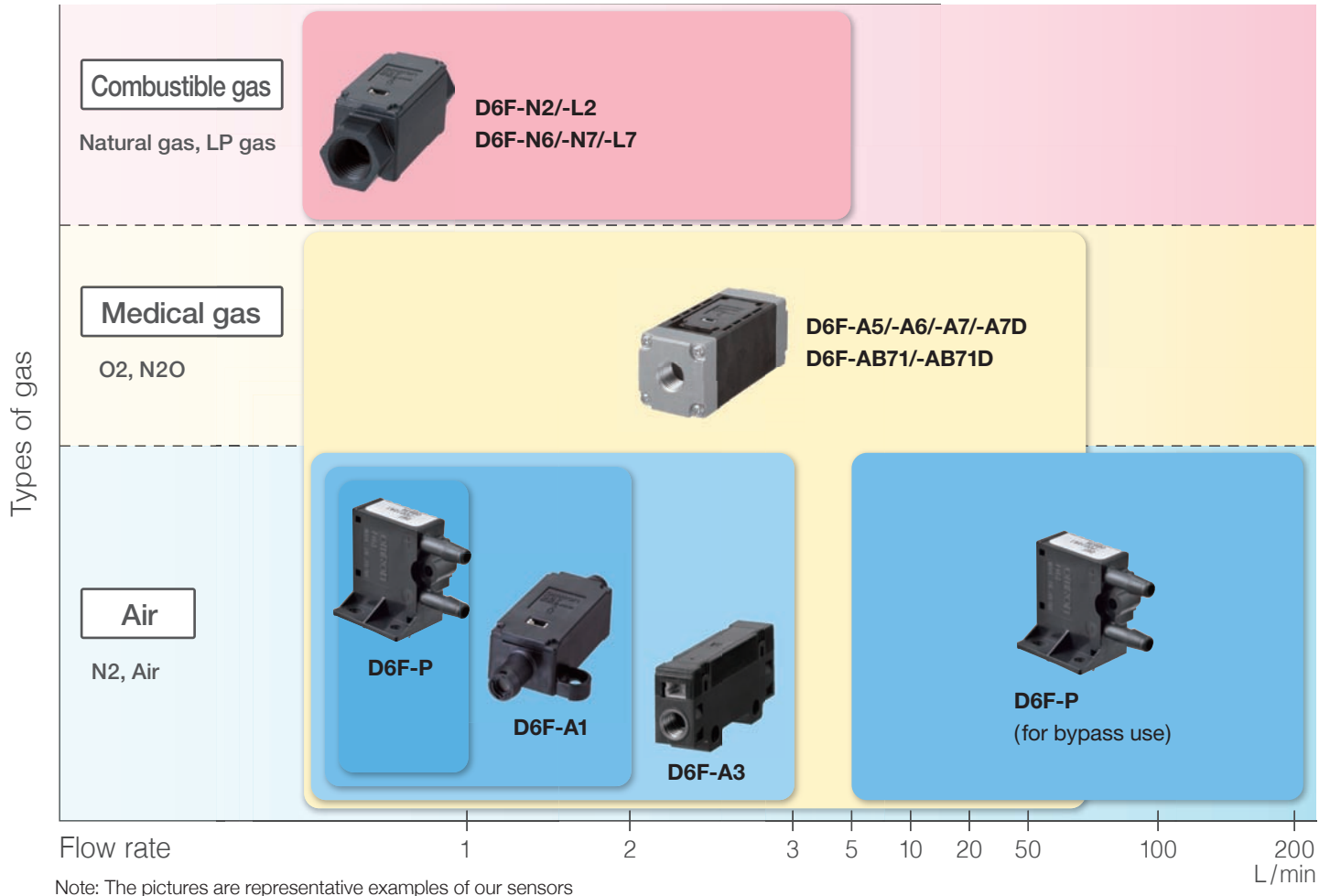
Air conditioner

Monitoring the amount of ventilation, controlling the amount of air at the required level

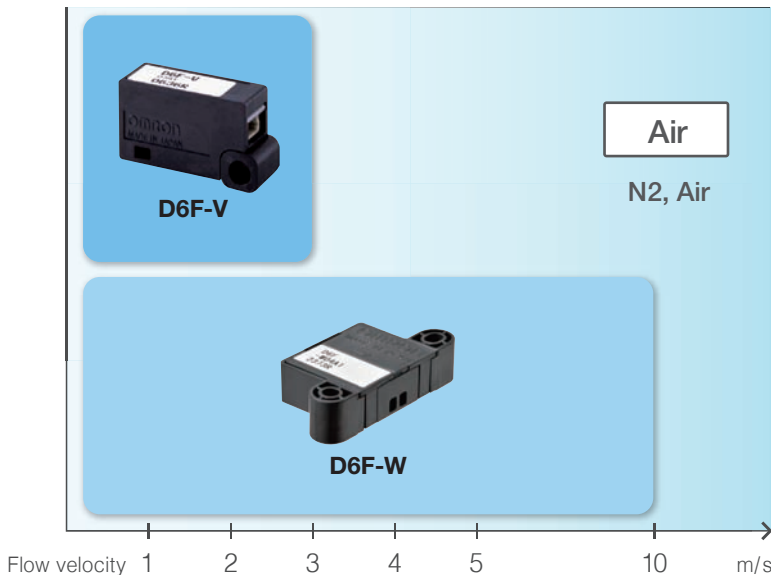
Selection of Products

Select the most suitable sensor from many variations.

► Flow rate



► Flow velocity



► Differential pressure

Delivers high sensitivity even at low flow rate, low differential pressure

MEMS differential pressure sensor

High precision
Accurate measurement

Low piping effects

High impedance to reduce the influence of piping variations

High reliability





Detect sensor anomaly







List of D6F series

MEMS Flow Sensor






Air
Minute flow
Analog

| Applicable gas | | Air | | | |
|-------------------------|-------|---|---|---|---|
| Items | Model | D6F-P0001A1 | D6F-01A1-110 D6F-P0010A□ D6F-P0010AM2 | D6F-02A1-110 | D6F-03A3-000 |
| Shape | |  |  |  |  |
| Flow rate range (L/min) | 5 | | | | |
| | 4 | | | | |
| | 3 | | | | |
| | 2 | | | 0~2L/min | |
| | 1 | 0~0.1L/min | 0~1L/min | | 0~3L/min |
| | 0 | | | | |
| Page | | 25 | 8, 25 | 8 | 12 |

Gas
Minute to middle flow
Analog







| Applicable gas | | Natural gas (13A) | | LP gas | Natural gas (13A) |
|-------------------------|-------|---|---|---|---|
| Items | Model | D6F-01N2-000 | D6F-02N2-000 | D6F-02L2-000 D6F-02L7-000 | D6F-05N2-000 D6F-05N6-000 D6F-05N7-000 |
| Shape | |  |  |  |  |
| Flow rate range (L/min) | 5 | | | | 0~5L/min |
| | 4 | | | | |
| | 3 | | | | |
| | 2 | 0~1L/min | 0~2L/min | 0~2L/min | |
| | 1 | | | | |
| | 0 | | | | |
| Page | | 10 | 10 | 10, 18 | 10, 16, 18 |

Air
Middle to high flow
Analog
Digital
Digital type only

| Applicable gas | | Air | | | | |
|-------------------------|-------|--|---|--|---|---|
| Items | Model | D6F-10A5-000 D6F-10A6-000 D6F-10A7-000 D6F-10A7D-000 D | D6F-20A5-000 D6F-20A6-000 D6F-20A7D-000 D | D6F-30A7-000 D6F-30AB71-000 | D6F-50A5-000 D6F-50A6-000 D6F-50A7D-000 D | D6F-70AB71-000 D6F-70AB71D-000 D |
| Shape | |  |  |  |  |  |
| Flow rate range (L/min) | 70 | | | | | 0~70L/min |
| | 60 | | | | | |
| | 50 | | | | 0~50L/min | |
| | 40 | | | 0~30L/min | | |
| | 30 | 0~10L/min | 0~20L/min | | | |
| | 0 | | | | | |
| Page | | 14, 16, 18, 20 | 14, 16, 20 | 18, 23 | 14, 16, 20 | 20, 23 |







MEMS 2-axis flow sensor/ MEMS flow sensor

Air
 Flow velocity
 Analog
 Digital
 Digital type only

| Items | Applicable gas Model | Air | | | | |
|------------------------------|-------------------------|---|---|---|---|---|
| | | D6F-D  | D6F-W01A1 | D6F-V03A1 | D6F-W04A1 | D6F-W10A1 |
| Shape | |  |  |  |  |  |
| Flow velocity range (m/s) | 10 | | | | | 0~10m/s |
| | 8 | | | | | |
| | 6 | | | | | |
| | 4 | | | 0~3m/s | 0~4m/s | |
| | 2 | -1~1m/s | 0~1m/s | | | |
| | 0 | | | | | |
| | -2 | | | | | |
| Page | | 35 | 31 | 33 | 31 | 31 |

MEMS differential pressure sensor

Air
 Differential pressure
 Digital
 Digital type only

| Items | Applicable gas Model | Air | | |
|-------------------------------------|-------------------------|---|---|---|
| | | D6F-PH0505AD3  | D6F-PH0025AD1  | D6F-PH5050AD3  |
| Shape | |  |  |  |
| Differential pressure range (Pa) | 500 | | | -500~500Pa |
| | 250 | | | |
| | 50 | | 0~250Pa | |
| | 0 | -50~50Pa | | |
| | -50 | | | |
| | -250 | | | |
| | -500 | | | |
| Page | | 28 | | |

D6F-A1

MEMS Flow Sensor

A Compact, High-accuracy Sensor That Measures Low Flow Rates.

Air Analog

- High accuracy of $\pm 3\%$ FS.
- Flow rates can be measured without being affected by temperature or pressure.



RoHS Compliant



Refer to the *Common Precautions for the D6F Series* on page 40.

Ordering Information

MEMS Flow Sensor

| Applicable fluid | Flow rate range | Model |
|------------------|-----------------|--------------|
| Air | 0 to 1 L/min | D6F-01A1-110 |
| | 0 to 2 L/min | D6F-02A1-110 |

Accessory (included)

| Type | Model |
|-------|------------|
| Cable | D6F-CABLE1 |

Connections

D6F-01A1-110 D6F-02A1-110

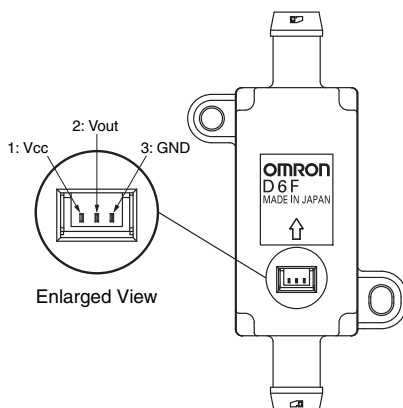
Pin No. 1: Vcc
2: Vout
3: GND

Connector 53398 (Made by Molex Japan)

Use the following connectors for connections to the D6F:

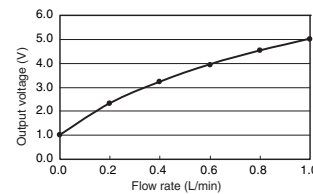
Housing 51021 (Made by Molex Japan)
Terminals 50079 (Made by Molex Japan)
Wires AWG28 to AWG26

Tubes Install tubes made of materials such as rubber or urethane so that they will not come out.
For urethane tubes, tubes with an outer diameter of 12 mm and an inner diameter of 8 mm are recommended.

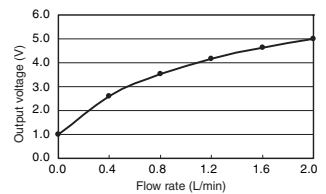


Output Voltage Characteristics

D6F-01A1-110



D6F-02A1-110



D6F-01A1-110

| Flow rate L/min (normal) | 0 | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Output voltage V | 1.00 | 2.31 | 3.21 | 3.93 | 4.51 | 5.00 |
| | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 |

D6F-02A1-110

| Flow rate L/min (normal) | 0 | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Output voltage V | 1.00 | 2.59 | 3.53 | 4.18 | 4.65 | 5.00 |
| | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 |

Measurement conditions: Power supply voltage of 12 ± 0.1 VDC, ambient temperature of $25 \pm 5^\circ\text{C}$, and ambient humidity of 35% to 75%.

Characteristics/Performance

| Model | D6F-01A1-110 | D6F-02A1-110 |
|-------------------------------------|--|---------------|
| Flow Range (See note 1.) | 0 to 1 L/min | 0 to 2 L/min. |
| Calibration Gas (See note 2.) | Air | |
| Flow Port Type | Bamboo joint Maximum outside diameter: 8.6 mm, Minimum outside diameter: 7.4 mm | |
| Electrical Connection | Three-pin connector | |
| Power Supply | 10.8 to 26.4 VDC | |
| Current Consumption | 15 mA max with no load, with a Vcc of 12 to 24 VDC, and at 25°C | |
| Output Voltage | 1 to 5 VDC (non-linear output, load resistance of 10 kΩ) | |
| Accuracy | ±3% FS (25°C characteristic) | |
| Repeatability (See note 3.) | ±0.3% FS | |
| Output Voltage (Max.) | 5.7 VDC (Load resistance: 10 kΩ) | |
| Output Voltage (Min.) | 0 VDC (Load resistance: 10 kΩ) | |
| Rated Power Supply Voltage | 26.4 VDC | |
| Rated Output Voltage | 6 VDC | |
| Case | PPS | |
| Degree of Protection | IEC IP40 (Excluding tubing sections.) | |
| Withstand Pressure | 200 kPa | |
| Pressure Drop (See note 3.) | 0.42 kPa | 1.06 kPa |
| Operating Temperature (See note 4.) | -10 to 60°C | |
| Operating Humidity (See note 4.) | 35% to 85% | |
| Storage Temperature (See note 4.) | -40 to 80°C | |
| Storage Humidity (See note 4.) | 35% to 85% | |
| Temperature Characteristics | ±3% FS for 25°C characteristic at an ambient temperature of -10 to 60°C | |
| Insulation Resistance | Between Sensor outer cover and lead terminals: 20 MΩ min. (at 500 VDC) | |
| Dielectric Strength | Between Sensor outer cover and lead terminals: 500 VAC, 50/60 Hz min. for 1 min (leakage current: 1 mA max.) | |
| Weight | 12.8 g | |

Note: 1. Volumetric flow rate at 0°C, 101.3 kPa.

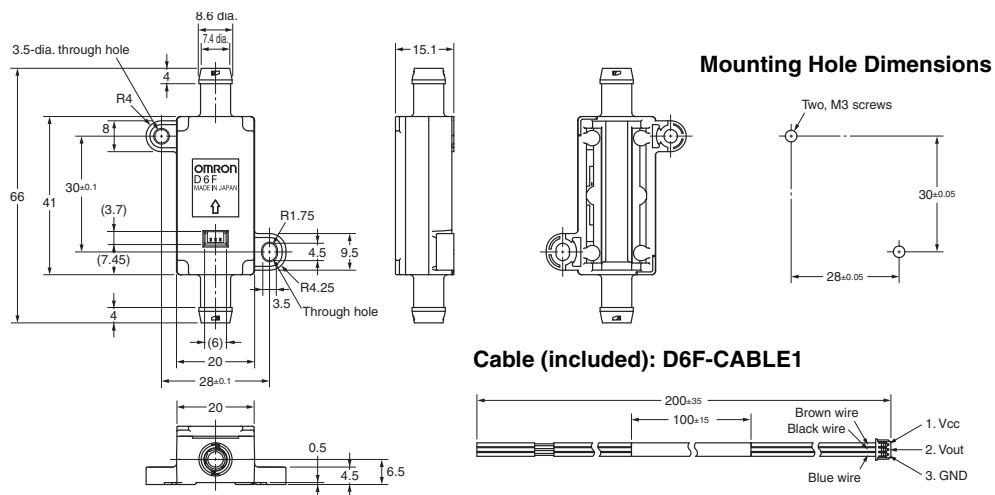
Note: 2. Dry gas. (must not contain large particles, e.g., dust, oil, or mist.)

Note: 3. Reference (typical)

Note: 4. With no condensation or icing.

Dimensions (Unit: mm)

D6F-01A1-110 D6F-02A1-110



D6F-N2/-L2

MEMS Flow Sensor

A Compact, High-accuracy Sensor That Measures Low Flow Rates.

- High accuracy of $\pm 3\%$ FS.
- Flow rates can be measured without being affected by temperature or pressure.

Gas Analog



RoHS Compliant



Refer to the *Common Precautions for the D6F Series* on page 40.

Ordering Information

MEMS Flow Sensor

| Applicable fluid | Flow rate range | Model |
|-------------------|-----------------|--------------|
| Natural gas (13A) | 0 to 1 L/min | D6F-01N2-000 |
| | 0 to 2 L/min | D6F-02N2-000 |
| | 0 to 5 L/min | D6F-05N2-000 |
| LP gas | 0 to 2 L/min | D6F-02L2-000 |

Accessory (included)

| Type | Model |
|-------|------------|
| Cable | D6F-CABLE1 |

Connections

D6F-01N2-000

D6F-02N2-000

D6F-05N2-000

D6F-02L2-000

Pin No. 1: Vcc
2: Vout
3: GND

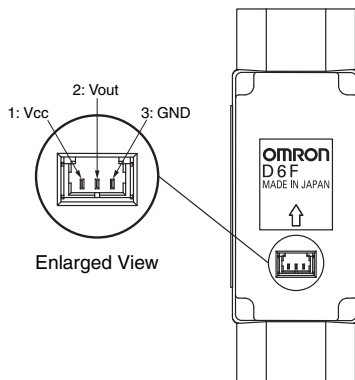
Connector 53398 (Made by Molex Japan)

Use the following connectors for connections to the D6F:

Housing 51021 (Made by Molex Japan)

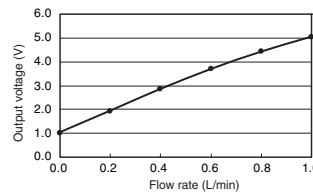
Terminals 50079 (Made by Molex Japan)

Wires AWG28 to AWG26

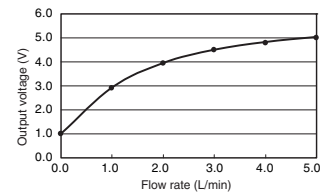


Output Voltage Characteristics

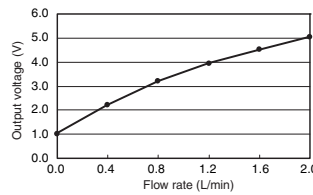
D6F-01N2-000



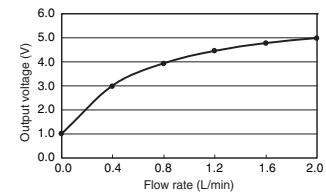
D6F-05N2-000



D6F-02N2-000



D6F-02L2-000



D6F-01N2-000

| Flow rate L/min (normal) | 0 | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Output voltage V | 1.00 | 1.90 | 2.81 | 3.64 | 4.37 | 5.00 |
| | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 |

D6F-02N2-000

| Flow rate L/min (normal) | 0 | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Output voltage V | 1.00 | 2.20 | 3.20 | 3.98 | 4.55 | 5.00 |
| | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 |

D6F-05N2-000

| Flow rate L/min (normal) | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Output voltage V | 1.00 | 2.91 | 3.92 | 4.47 | 4.79 | 5.00 |
| | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 | ± 0.12 |

D6F-02L2-000

| Flow rate L/min (normal) | 0 | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Output voltage V | 1.00 | 3.02 | 3.95 | 4.47 | 4.79 | 5.00 |
| | ± 0.30 | ± 0.08 | ± 0.08 | ± 0.08 | ± 0.08 | ± 0.12 |

Measurement conditions: Power supply voltage of 12 ± 0.1 VDC, ambient temperature of $25 \pm 5^\circ\text{C}$, and ambient humidity of 35% to 75%.

Characteristics/Performance

| Model | D6F-01N2-000 | D6F-02N2-000 | D6F-05N2-000 | D6F-02L2-000 |
|-------------------------------------|--|---------------|--------------|---|
| Flow Range (See note 1.) | 0 to 1 L/min | 0 to 2 L/min. | 0 to 5 L/min | 0 to 2 L/min. |
| Calibration Gas (See note 2.) | Natural gas (13A) | | | Propane gas |
| Flow Port Type | Rc 1/4 thread | | | |
| Electrical Connection | Three-pin connector | | | |
| Power Supply | 10.8 to 26.4 VDC | | | |
| Current Consumption | 15 mA max. with no load, with a Vcc of 12 to 24 VDC, and at 25°C | | | |
| Output Voltage | 1 to 5 VDC (non-linear output, load resistance of 10 kΩ) | | | |
| Accuracy | ±3% FS (25°C characteristic) | | | ±2% to ±7.5% F.S. (25°C characteristic) |
| Repeatability (See note 3.) | ±0.2% FS | | | ±0.3% FS |
| Output Voltage (Max.) | 5.7 VDC (Load resistance: 10 kΩ) | | | |
| Output Voltage (Min.) | 0 VDC (Load resistance: 10 kΩ) | | | |
| Rated Power Supply Voltage | 26.4 VDC | | | |
| Rated Output Voltage | 6 VDC | | | |
| Case | Aluminum alloy | | | |
| Degree of Protection | IEC IP40 (Excluding tubing sections.) | | | |
| Withstand Pressure | 200 kPa | | | |
| Pressure Drop (See note 3.) | 0.017 kPa | 0.033 kPa | 0.10 kPa | 0.14 kPa |
| Operating Temperature (See note 4.) | -10 to 60°C | | | |
| Operating Humidity (See note 4.) | 35% to 85% | | | |
| Storage Temperature (See note 4.) | -40 to 80°C | | | |
| Storage Humidity (See note 4.) | 35% to 85% | | | |
| Temperature Characteristics | ±3% FS for 25°C characteristic at -10 to 60°C | | | ±4% FS for 25°C characteristic at -10 to 60°C |
| Insulation Resistance | Between Sensor outer cover and lead terminals: 20 MΩ min. (at 500 VDC) | | | |
| Dielectric Strength | Between Sensor outer cover and lead terminals: 500 VAC, 50/60 Hz min. for 1 min (leakage current: 1 mA max.) | | | |
| Weight | 35.3 g | | | |

Note: 1. Volumetric flow rate at 0°C, 101.3 kPa.

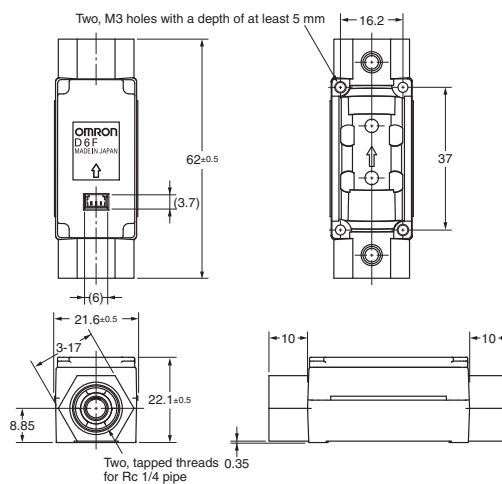
Note: 2. Dry gas. (must not contain large particles, e.g., dust, oil, or mist.)

Note: 3. Reference (typical)

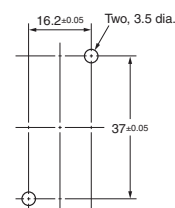
Note: 4. With no condensation or icing.

Dimensions (Unit: mm)

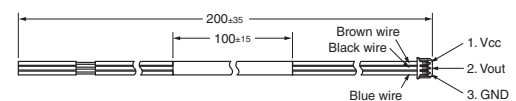
D6F-01N2-000
D6F-02N2-000
D6F-05N2-000
D6F-02L2-000



Mounting Hole Dimensions



Cable (included): D6F-CABLE1



D6F-A3

MEMS Flow Sensor

High-accuracy Sensing with a Thin, Compact Body.

- A thin, lightweight flow sensor.
- Unique flow path structure provides high precision and fast response.

Air Analog



RoHS Compliant



Refer to the *Common Precautions for the D6F Series* on page 40.

Ordering Information

MEMS Flow Sensor

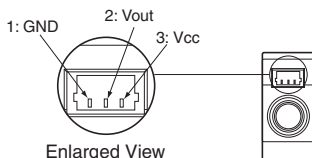
| Applicable fluid | Flow rate range | Model |
|------------------|-----------------|--------------|
| Air | 0 to 3 L/min | D6F-03A3-000 |

Accessory (Sold separately)

| Type | Model |
|-------|------------|
| Cable | D6F-CABLE2 |

Connections

D6F-03A3-000



Pin No. 1: GND
2: Vout
3: Vcc

Connector SM03B-SRSS-TB (Made by J.S.T. Mfg. Co.)

Use the following connectors made by J.S.T. Mfg. Co. for connections to the Sensor:

- Pressure-welded Connector

Socket: 03SR-3S

Wires: AWG30

Or

- Crimp Connector

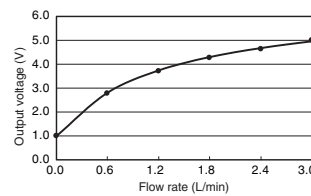
Contacts: SSH-003T-P0.2

Housing: SHR-03V-S or SHR-03V-S-B

Wires: AWG32 to AWG28

Output Voltage Characteristics

D6F-03A3-000



D6F-03A3-000

| Flow rate L/min (normal) | 0 | 0.6 | 1.2 | 1.8 | 2.4 | 3.0 |
|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Output voltage V | 1.00 ±0.2 | 2.83 ±0.2 | 3.77 ±0.2 | 4.34 ±0.2 | 4.72 ±0.2 | 5.00 ±0.2 |

Measurement conditions: Power supply voltage of 12 ± 0.1 VDC, ambient temperature of 25 ± 5 °C, and ambient humidity of 35% to 75%.

Characteristics/Performance

| | |
|-------------------------------------|--|
| Model | D6F-03A3-000 |
| Flow Range (See note 1.) | 0 to 3 L/min |
| Calibration Gas (See note 2.) | Air |
| Flow Port Type | M5 thread |
| Electrical Connection | Three-pin connector |
| Power Supply | 10.8 to 26.4 VDC |
| Current Consumption | 15 mA max. with no load, with a Vcc of 12 to 24 VDC, and at 25°C |
| Output Voltage | 1 to 5 VDC (non-linear output, load resistance of 10 kΩ) |
| Accuracy | ±5% FS (25°C characteristic) |
| Repeatability (See note 3.) | ±0.7% FS |
| Output Voltage (Max.) | 5.7 VDC (Load resistance: 10 kΩ) |
| Output Voltage (Min.) | 0 VDC (Load resistance: 10 kΩ) |
| Rated Power Supply Voltage | 26.4 VDC |
| Rated Output Voltage | 6 VDC |
| Case | PPS |
| Degree of Protection | IEC IP40 (Excluding tubing sections.) |
| Withstand Pressure | 200 kPa |
| Pressure Drop (See note 3.) | 0.45 kPa |
| Operating Temperature (See note 4.) | 0 to 50°C |
| Operating Humidity (See note 4.) | 35% to 85% |
| Storage Temperature (See note 4.) | -10 to 60°C |
| Storage Humidity (See note 4.) | 35% to 85% |
| Temperature Characteristics | ±5% FS for 25°C characteristic at an ambient temperature of 0 to 50°C |
| Insulation Resistance | Between Sensor outer cover and lead terminals: 20 MΩ min. (at 500 VDC) |
| Dielectric Strength | Between Sensor outer cover and lead terminals: 500 VAC, 50/60 Hz min. for 1 min (leakage current: 1 mA max.) |
| Weight | 5.3 g |

Note: 1. Volumetric flow rate at 0°C, 101.3 kPa.

Note: 2. Dry gas. (must not contain large particles, e.g., dust, oil, or mist.)

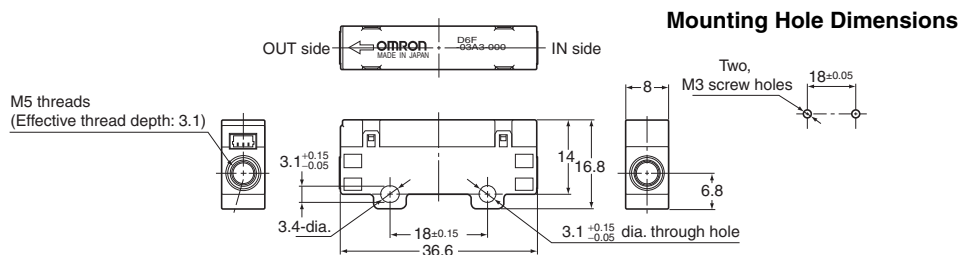
Note: 3. Reference (typical)

Note: 4. With no condensation or icing.

Dimensions (Unit: mm)

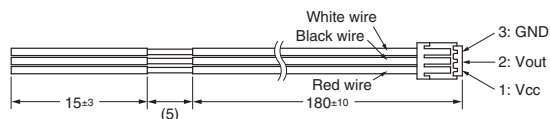
● MEMS Flow Sensors

D6F-03A3-000



● Cable (Sold separately)

D6F-CABLE2



D6F-A5

MEMS Flow Sensor

High-accuracy Sensing with a Compact Body for Flow Rates Up to 50 L/min.

- Accurately detects a mass flow rate of 10 to 50 L/min.
- A compact size of 30 × 78 × 30 mm (H × W × D).



RoHS Compliant



Refer to the *Common Precautions for the D6F Series* on page 40.

Ordering Information

MEMS Flow Sensor

| Flow Port Type | Applicable fluid | Flow rate range | Model |
|----------------|------------------|-----------------|--------------|
| Manifold | Air | 0 to 10 L/min | D6F-10A5-000 |
| | | 0 to 20 L/min | D6F-20A5-000 |
| | | 0 to 50 L/min | D6F-50A5-000 |

Accessory (Sold separately)

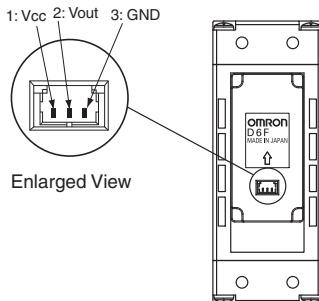
| Type | Model |
|-------|------------|
| Cable | D6F-CABLE1 |

Connections

D6F-10A5-000
D6F-20A5-000
D6F-50A5-000

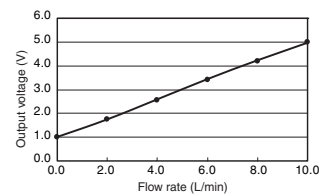
Pin No. 1: Vcc
2: Vout
3: GND
Connector 53398 (Made by Molex Japan)

Use the following connectors for connections to the D6F:
Housing 51021 (Made by Molex Japan)
Terminals 50079 (Made by Molex Japan)
Wires AWG28 to AWG26

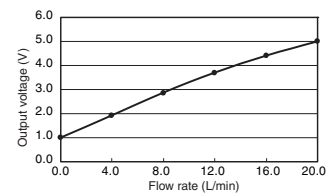


Output Voltage Characteristics

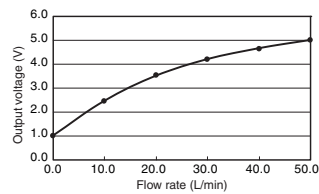
D6F-10A5-000



D6F-20A5-000



D6F-50A5-000



D6F-10A5-000

| Flow rate L/min (normal) | 0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.75 | 2.60 | 3.45 | 4.25 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

D6F-20A5-000

| Flow rate L/min (normal) | 0 | 4.0 | 8.0 | 12.0 | 16.0 | 20.0 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.93 | 2.87 | 3.70 | 4.41 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

D6F-50A5-000

| Flow rate L/min (normal) | 0 | 10 | 20 | 30 | 40 | 50 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 2.45 | 3.51 | 4.20 | 4.66 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

Measurement conditions: Power supply voltage of 12±0.1 VDC, ambient temperature of 25±5°C, and ambient humidity of 35% to 75%.

Characteristics/Performance

| Model | D6F-10A5-000 | D6F-20A5-000 | D6F-50A5-000 |
|-------------------------------------|--|---------------|---------------|
| Flow Range (See note 1.) | 0 to 10 L/min | 0 to 20 L/min | 0 to 50 L/min |
| Calibration Gas (See note 2.) | Air | | |
| Flow Port Type | Manifold | | |
| Electrical Connection | Three-pin connector | | |
| Power Supply | 10.8 to 26.4 VDC | | |
| Current Consumption | 15 mA max. with no load, with a Vcc of 12 to 24 VDC, and at 25°C | | |
| Output Voltage | 1 to 5 VDC (non-linear output, load resistance of 10 kΩ) | | |
| Accuracy | ±3% FS (25°C characteristic) | | |
| Repeatability (See note 3.) | ±0.3% FS | | |
| Output Voltage (Max.) | 5.7 VDC (Load resistance: 10 kΩ) | | |
| Output Voltage (Min.) | 0 VDC (Load resistance: 10 kΩ) | | |
| Rated Power Supply Voltage | 26.4 VDC | | |
| Rated Output Voltage | 6 VDC | | |
| Case | PPS/aluminum alloy | | |
| Degree of Protection | IEC IP40 (Excluding tubing sections.) | | |
| Withstand Pressure | 500 kPa | | |
| Pressure Drop (See note 3.) | 0.8 kPa | 2.9 kPa | 17.2 kPa |
| Operating Temperature (See note 4.) | -10 to 60°C | | |
| Operating Humidity (See note 4.) | 35% to 85% | | |
| Storage Temperature (See note 4.) | -30 to 80°C | | |
| Storage Humidity (See note 4.) | 35% to 85% | | |
| Temperature Characteristics | ±3% FS for 25°C characteristic at an ambient temperature of -10 to 60°C | | |
| Insulation Resistance | Between Sensor outer cover and lead terminals: 20 MΩ min. (at 500 VDC) | | |
| Dielectric Strength | Between Sensor outer cover and lead terminals: 500 VAC, 50/60 Hz min. for 1 min (leakage current: 1 mA max.) | | |
| Weight | 103 g | | |

Note: 1. Volumetric flow rate at 0°C, 101.3 kPa.

Note: 2. Dry gas. (must not contain large particles, e.g., dust, oil, or mist.)

Note: 3. Reference (typical)

Note: 4. With no condensation or icing.

Dimensions (Unit: mm)

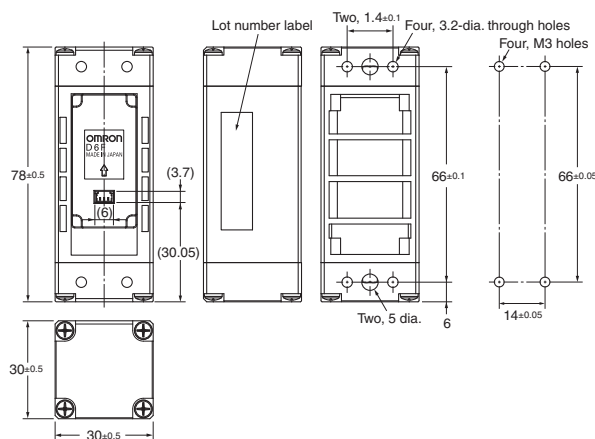
MEMS Flow Sensors

D6F-10A5-000

D6F-20A5-000

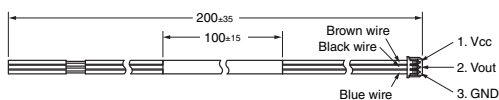
D6F-50A5-000

Mounting Hole Dimensions



Cable (Sold separately)

D6F-CABLE1



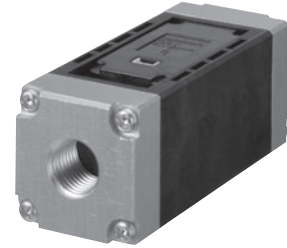
D6F-A6/-N6

MEMS Flow Sensor

High-accuracy Sensing with a Compact Body for Flow Rates up to 50 L/min.

▶ Air ▶ Gas ▶ Analog

- Accurately detects a mass flow rate of 10 to 50 L/min.
- A compact size of 30 × 78 × 30 mm (H × W × D).



RoHS Compliant



Refer to the *Common Precautions for the D6F Series* on page 40.

Ordering Information

MEMS Flow Sensor

| Flow Port Type | Applicable fluid | Flow rate range | Model |
|----------------|-------------------|-----------------|---------------|
| Rc 1/4 thread | Natural gas (13A) | 0 to 5 L/min | D6F-05N6-000 |
| | | 0 to 10 L/min | D6F-10A6-000 |
| | | 0 to 20 L/min | D6F-20A6-000 |
| | | 0 to 50 L/min | D6F-50A6-000 |
| NPT 1/8 thread | Air | 0 to 10 L/min | D6F-10A61-000 |
| | | 0 to 20 L/min | D6F-20A61-000 |
| | | 0 to 50 L/min | D6F-50A61-000 |
| | | NPT 1/2 thread | 0 to 50 L/min |

Accessory (Sold separately)

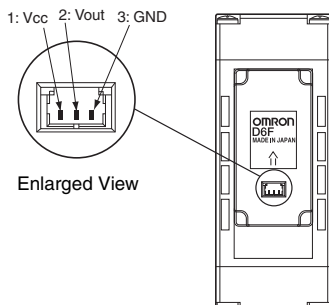
| Type | Model |
|-------|------------|
| Cable | D6F-CABLE1 |

Connections

D6F-05N6-000
 D6F-10A6-000 D6F-10A61-000
 D6F-20A6-000 D6F-20A61-000
 D6F-50A6-000 D6F-50A61-000
 D6F-50A62-000

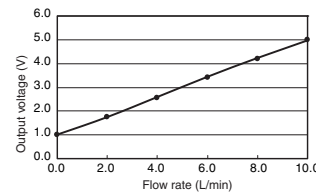
Pin No. 1: Vcc
 2: Vout
 3: GND
 Connector 53398 (Made by Molex Japan)

Use the following connectors for connections to the D6F:
 Housing 51021 (Made by Molex Japan)
 Terminals 50079 (Made by Molex Japan)
 Wires AWG28 to AWG26

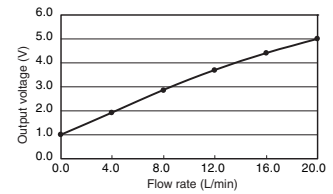


Output Voltage Characteristics

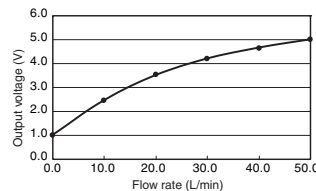
D6F-10A6-000
D6F-10A61-000



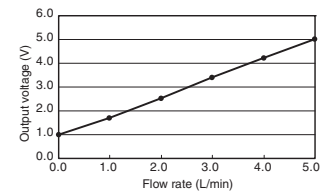
D6F-20A6-000
D6F-20A61-000



D6F-50A6-000
D6F-50A61-000
D6F-50A62-000



D6F-05N6-000



D6F-05N6-000

| Flow rate L/min (normal) | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.71 | 2.53 | 3.40 | 4.22 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

D6F-10A6-000/D6F-10A61-000

| Flow rate L/min (normal) | 0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.75 | 2.60 | 3.45 | 4.25 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

D6F-20A6-000/D6F-20A61-000

| Flow rate L/min (normal) | 0 | 4 | 8 | 12 | 16 | 20 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.93 | 2.87 | 3.70 | 4.41 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

D6F-50A6-000/D6F-50A61-000/D6F-50A62-000

| Flow rate L/min (normal) | 0 | 10 | 20 | 30 | 40 | 50 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 2.45 | 3.51 | 4.20 | 4.66 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

Measurement conditions: Power supply voltage of 12±0.1 VDC, ambient temperature of 25±5°C, and ambient humidity of 35% to 75%.

Characteristics/Performance

| Model | D6F-05N6-000 | D6F-10A6-000 | D6F-20A6-000 | D6F-50A6-000 | D6F-10A61-000 | D6F-20A61-000 | D6F-50A61-000 | D6F-50A62-000 |
|-------------------------------------|--|---------------|---------------|---------------|----------------|---------------|---------------|----------------|
| Flow Range (See note 1.) | 0 to 5 L/min | 0 to 10 L/min | 0 to 20 L/min | 0 to 50 L/min | 0 to 10 L/min | 0 to 20 L/min | 0 to 50 L/min | 0 to 50 L/min |
| Calibration Gas (See note 2.) | Natural gas (13A) | Air | | | | | | |
| Flow Port Type | Rc 1/4 thread | | | | NPT 1/8 thread | | | NPT 1/2 thread |
| Electrical Connection | Three-pin connector | | | | | | | |
| Power Supply | 10.8 to 26.4 VDC | | | | | | | |
| Current Consumption | 15 mA max. with no load, with a Vcc of 12 to 24 VDC, and at 25°C | | | | | | | |
| Output Voltage | 1 to 5 VDC (non-linear output, load resistance of 10kΩ min.) | | | | | | | |
| Accuracy | ±3% FS (25°C characteristic) | | | | | | | |
| Repeatability (See note 3.) | ±0.3% FS | | | | | | | |
| Output Voltage (Max.) | 5.7 VDC (Load resistance: 10 kΩ) | | | | | | | |
| Output Voltage (Min.) | 0 VDC (Load resistance: 10 kΩ) | | | | | | | |
| Rated Power Supply Voltage | 26.4 VDC | | | | | | | |
| Rated Output Voltage | 6 VDC | | | | | | | |
| Case | PPS/aluminum alloy | | | | | | | |
| Degree of Protection | IEC IP40 (Excluding tubing sections.) | | | | | | | |
| Withstand Pressure | 500 kPa | | | | | | | |
| Pressure Drop (See note 3.) | 0.68 kPa | 0.10 kPa | 0.28 kPa | 1.44 kPa | 0.15 kPa | 0.52 kPa | 2.31 kPa | 2.16 kPa |
| Operating Temperature (See note 4.) | -10 to 60°C | | | | | | | |
| Operating Humidity (See note 4.) | 35% to 85% | | | | | | | |
| Storage Temperature (See note 4.) | -10 to 80°C | -30 to 80°C | | | | | | |
| Storage Humidity (See note 4.) | 35% to 85% | | | | | | | |
| Temperature Characteristics | ±3% FS for 25°C characteristic at an ambient temperature of -10 to 60°C | | | | | | | |
| Insulation Resistance | Between Sensor outer cover and lead terminals: 20 MΩ min. (at 500 VDC) | | | | | | | |
| Dielectric Strength | Between Sensor outer cover and lead terminals: 500 VAC, 50/60 Hz min. for 1 min (leakage current: 1 mA max.) | | | | | | | |
| Weight | 103 g | | | | | | | |

Note: 1. Volumetric flow rate at 0°C, 101.3 kPa.

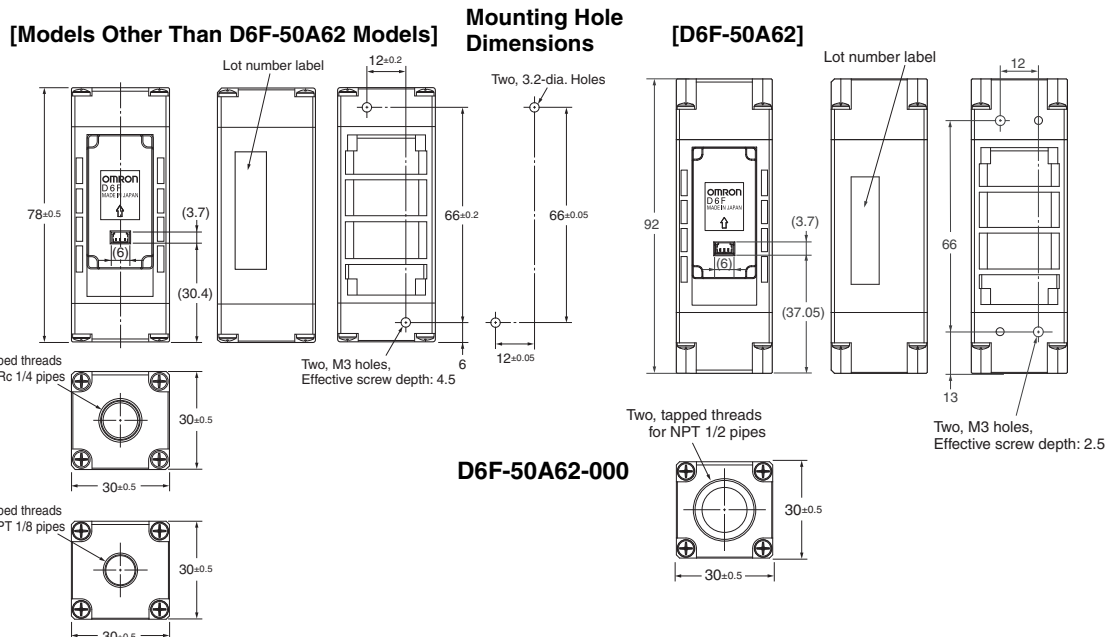
Note: 2. Dry gas. (must not contain large particles, e.g., dust, oil, or mist.)

Note: 3. Reference (typical)

Note: 4. With no condensation or icing.

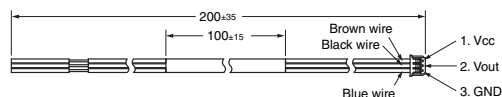
Dimensions (Unit: mm)

MEMS Flow Sensors



Cable (Sold separately)

D6F-CABLE1



D6F-A7/-L7/-N7

MEMS Flow Sensor

Reduction of Piping time by quick joint connection

Air Gas Analog

- Low-flow rate of natural gas and LP gas can be measured.
- 10 L/min and 30 L/min of Air can be measured.
- Compact size of 30 × 84.6 × 30 mm (H × W × D).



RoHS Compliant



Refer to the *Common Precautions for the D6F Series* on page 40.

Ordering Information

MEMS Flow Sensor

| Flow Port Type | Applicable fluid | Flow rate range | Model |
|-----------------|-------------------|-----------------|---------------------|
| Quick joint P10 | Natural gas (13A) | 0 to 5 L/min | D6F-05N7-000 |
| | LP gas | 0 to 2 L/min | D6F-02L7-000 |
| | Air | 0 to 10 L/min | D6F-10A7-000 |
| | | 0 to 30 L/min | D6F-30A7-000 |

Accessories (Sold separately)

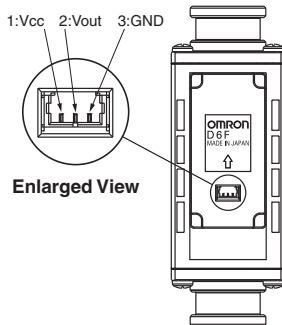
| Type | Model |
|----------------|-------------------------|
| Cable | D6F-CABLE1 |
| Quick fastener | D6F-FASTENER-P10 |

Connections

D6F-05N7-000 D6F-02L7-000
D6F-10A7-000 D6F-30A7-000

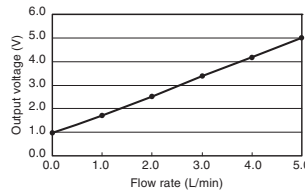
Pin No. 1: Vcc
2: Vout
3: GND
Connector 53398 (Made by Molex Japan)

Use the following connectors for connections to the D6F:
Housing 51021 (Made by Molex Japan)
Terminals 50079 (Made by Molex Japan)
Wires AWG28 to AWG26

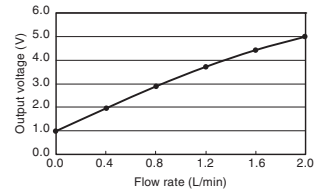


Output Voltage Characteristics

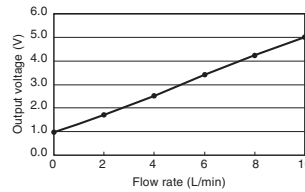
D6F-05N7-000



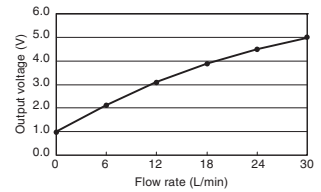
D6F-02L7-000



D6F-10A7-000



D6F-30A7-000



D6F-05N7-000

| Flow rate L/min (normal) | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.68 | 2.47 | 3.31 | 4.15 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

D6F-02L7-000

| Flow rate L/min (normal) | 0 | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.96 | 2.89 | 3.72 | 4.43 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

D6F-10A7-000

| Flow rate L/min (normal) | 0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.75 | 2.60 | 3.45 | 4.25 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

D6F-30A7-000

| Flow rate L/min (normal) | 0 | 6 | 12 | 18 | 24 | 30 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 2.11 | 3.12 | 3.91 | 4.53 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

Measurement conditions: Power-supply voltage 12±0.1 VDC, ambient temperature 25±5°C and ambient humidity 35 to 75%RH.

Characteristics/Performance

| Model | D6F-05N7-000 | D6F-02L7-000 | D6F-10A7-000 | D6F-30A7-000 |
|-------------------------------------|--|--------------|---------------|---------------|
| Flow Range (See note 1.) | 0 to 5 L/min | 0 to 2 L/min | 0 to 10 L/min | 0 to 30 L/min |
| Calibration Gas (See note 2.) | Natural gas (13A) | LP gas | Air | |
| Flow Port Type | Quick joint P10 | | | |
| Electrical Connection | Three-pin connector | | | |
| Power Supply | 10.8 to 26.4 VDC | | | |
| Current Consumption | 15 mA max. with no load and Vcc of 12 to 24 VDC, GND = 0 VDC, 25°C | | | |
| Output Voltage | 1 to 5 VDC (non-linear output, load resistance of 10 kΩ min.) | | | |
| Accuracy | ±3%F.S. (25°C characteristic) | | | |
| Repeatability (See note 3.) | ±0.3%F.S. | | | |
| Output Voltage (Max.) | 5.7 VDC (Load resistance: 10 kΩ) | | | |
| Output Voltage (Min.) | 0 VDC (Load resistance: 10 kΩ) | | | |
| Rated Power Supply Voltage | 26.4 VDC | | | |
| Rated Output Voltage | 6 VDC | | | |
| Case | PPS | | | |
| Degree of Protection | IEC IP40 (Excluding tubing sections.) | | | |
| Withstand Pressure | 500 kPa | | | |
| Pressure Drop (See note 3.) | 0.06 kPa | 0.03 kPa | 0.32 kPa | 2.19 kPa |
| Operating Temperature (See note 4.) | -10 to +60°C | | | |
| Operating Humidity (See note 4.) | 35 to 85%RH | | | |
| Storage Temperature (See note 4.) | -10 to +80°C | | -30 to +80°C | |
| Storage Humidity (See note 4.) | 35 to 85%RH | | | |
| Temperature Characteristics | ±3%F.S. for 25°C characteristic at an ambient temperature of -10 to +60°C | | | |
| Insulation Resistance | Between sensor outer cover and lead terminals: 20 MΩ min. (at 500 VDC) | | | |
| Dielectric Strength | Between sensor outer cover and lead terminals: 500 VAC, 50/60 Hz min. for 1 min (leakage current: 1 mA max.) | | | |
| Weight | 72 g | | | |

Note: 1. Volumetric flow rate at 0°C, 101.3 kPa.

Note: 2. Dry gas (must not contain large particles, e.g., dust, oil, or mist.)

Note: 3. Reference (typical)

Note: 4. With no condensation or icing.

Dimensions (Unit: mm)

MEMS Flow Sensors

D6F-05N7-000

D6F-02L7-000

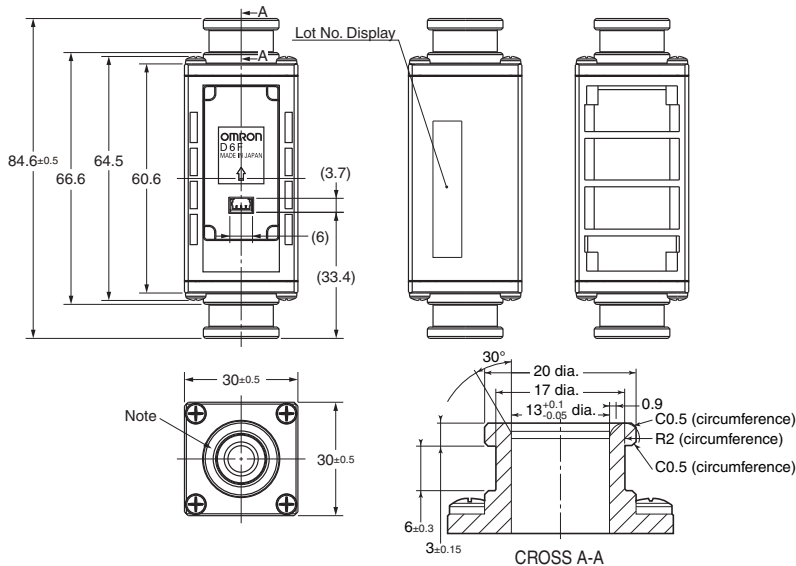
D6F-10A7-000

D6F-30A7-000

Note. The Port type of pipe fitting based on "Quick Joint P10 Type".

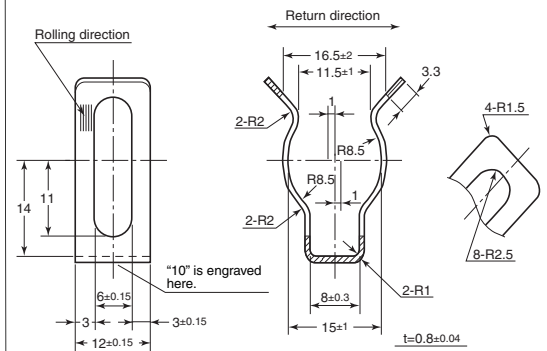
* P10 shows the name of an O-ring prescribed by JIS B 2401.

* The port of O-ring ditch is based on P10 of JIS B 2406.



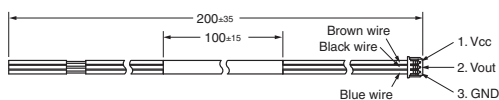
Quick fastener (Sold separately)

D6F-FASTENER-P10



Cable (Sold separately)

D6F-CABLE1



D6F-A7D/-AB71D

MEMS Flow Sensor

Digital Compensation for High Accuracy

- Temperature compensation and linear compensation produce high accuracy ($\pm 3\%$ RD (25% to 100% FS)).
- Compact models for 10 to 70 L/min.
- Reduced piping work with quick-fastening feature.

RoHS Compliant



Refer to the *Common Precautions for the D6F Series* on page 40.



Digital

NEW

Ordering Information

MEMS Flow Sensor

| Joint | Applicable fluid | Flow rate range | Model |
|-----------------|------------------|-----------------|--------------------------|
| Quick joint P10 | Air | 0 to 10 L/min | D6F-10A7D-000-0 |
| | | 0 to 20 L/min | D6F-20A7D-000-0 |
| | | 0 to 50 L/min | D6F-50A7D-000-0 |
| Quick joint P14 | | 0 to 70 L/min | D6F-70AB71D-000-0 |

Accessories (Sold separately)

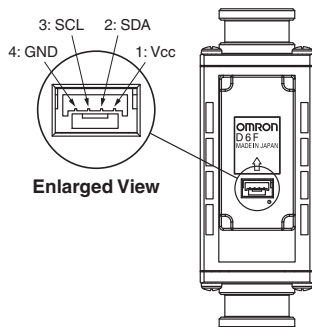
| Type | Model |
|----------------|-------------------------|
| Cable | D6F-CABLE3 |
| Quick fastener | D6F-FASTENER-P10 |

Connections

D6F-10A7D-000-0
D6F-20A7D-000-0
D6F-50A7D-000-0
D6F-70AB71D-000-0

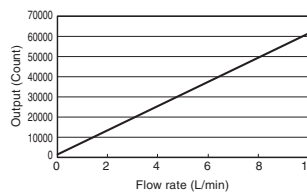
Pin No. 1: Vcc
 2: SDA
 3: SCL
 4: GND
 Connector GHR-04V-S (made by J.S.T. Mfg. Co.)

Use the following connectors for connections to the D6F:
 Housing GHR-04V-S (made by J.S.T. Mfg. Co.)
 Terminals SSSL-002T-P0.2 (made by J.S.T. Mfg. Co.)
 Wires AWG26 to AWG30

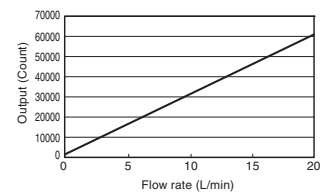


Output Characteristics

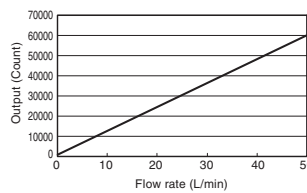
D6F-10A7D-000-0



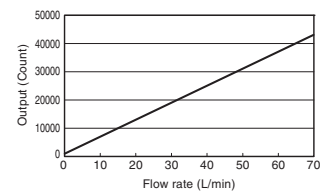
D6F-20A7D-000-0



D6F-50A7D-000-0



D6F-70AB71D-000-0



D6F-10A7D-000-0

| Flow rate L/min (normal) | 0 | 2 | 4 | 6 | 8 | 10 |
|--------------------------|-------------|--------------|--------------|--------------|--------------|--------------|
| Output voltage (HEX) | 1024 (0400) | 13024 (32E0) | 25024 (61C0) | 37024 (90A0) | 49024 (BF80) | 61024 (EE60) |

Measurement conditions: Power-supply voltage 3.3 ± 0.1 VDC, ambient temperature 25 ± 5 C and ambient humidity 35 to 75%RH.

Flow rate = (Output value - 1,024)/60,000 x 10

D6F-20A7D-000-0

| Flow rate L/min (normal) | 0 | 4 | 8 | 12 | 16 | 20 |
|--------------------------|-------------|--------------|--------------|--------------|--------------|--------------|
| Output voltage (HEX) | 1024 (0400) | 13024 (32E0) | 25024 (61C0) | 37024 (90A0) | 49024 (BF80) | 61024 (EE60) |

Measurement conditions: Power-supply voltage 3.3 ± 0.1 VDC, ambient temperature 25 ± 5 C and ambient humidity 35 to 75%RH.

Flow rate = (Output value - 1,024)/60,000 x 20

D6F-50A7D-000-0

| Flow rate L/min (normal) | 0 | 10 | 20 | 30 | 40 | 50 |
|--------------------------|-------------|--------------|--------------|--------------|--------------|--------------|
| Output voltage (HEX) | 1024 (0400) | 13024 (32E0) | 25024 (61C0) | 37024 (90A0) | 49024 (BF80) | 61024 (EE60) |

Measurement conditions: Power-supply voltage 3.3 ± 0.1 VDC, ambient temperature 25 ± 5 C and ambient humidity 35 to 75%RH.

Flow rate = (Output value - 1,024)/60,000 x 50

D6F-70AB71D-000-0

| Flow rate L/min (normal) | 0 | 20 | 40 | 60 | 70 |
|--------------------------|-------------|--------------|--------------|--------------|--------------|
| Output voltage (HEX) | 1024 (0400) | 13024 (32E0) | 25024 (61C0) | 37024 (90A0) | 43024 (A810) |

Measurement conditions: Power-supply voltage 3.3 ± 0.1 VDC, ambient temperature 25 ± 5 C and ambient humidity 35 to 75%RH.

Flow rate = (Output value - 1,024)/60,000 x 100

Characteristics/Performance

| Model | D6F-10A7D-000-0 | D6F-20A7D-000-0 | D6F-50A7D-000-0 | D6F-70AB71D-000-0 |
|-------------------------------------|--|-----------------|-----------------|--|
| Flow Range (See note 1.) | 0 to 10L/min | 0 to 20 L/min | 0 to 50 L/min | 0 to 70 L/min |
| Calibration Gas (See note 2.) | Air | | | |
| Flow Port Type | Quick joint P10 | | | Quick joint P14 |
| Electrical Connection | Four-pin connector | | | |
| Power Supply | 3.0 to 3.6 VDC | | | |
| Current Consumption | 10 mA max. with no load, Vcc = 3.3 VDC, GND = 0 VDC, 25°C | | | |
| Resolution | 15 bit | | | |
| Accuracy (See note 3.) | ±5%RD (10%F.S. ≤ Flow rate < 25%F.S.) ±3%RD (25%F.S. ≤ Flow rate ≤ 100%F.S.) | | | ±5%RD (10L/min ≤ Flow rate < 20L/min) ±3%RD (20L/min ≤ Flow rate ≤ 70L/min) |
| Response time | 90 ms max. | | | |
| Repeatability (See note 4.) | 0.3 %RD | 0.3%RD | 0.5%RD | 1.3%RD |
| Interface (See note 5.) | I2C | | | |
| Case | PPS | | | |
| Degree of Protection | IEC IP40 (Excluding tubing sections.) | | | |
| Withstand Pressure | 100 kPa | | | |
| Pressure Drop (See note 4.) | 0.034 kPa | 0.083 kPa | 0.28 kPa | 0.57 kPa |
| Operating Temperature (See note 6.) | -10 to +60°C | | | |
| Operating Humidity (See note 6.) | 35 to 85%RH | | | |
| Storage Temperature (See note 6.) | -30 to +80°C | | | |
| Storage Humidity (See note 6.) | 35 to 85%RH | | | |
| Insulation Resistance | Between sensor outer cover and lead terminals: 20 MΩ min. (at 500 VDC) | | | |
| Dielectric Strength | Between sensor outer cover and lead terminals: 500 VAC, 50/60 Hz min. for 1 min (leakage current: 1 mA max.) | | | |
| Weight | 57.3 g | | | 64.4 g |

Note: 1. Volumetric flow rate at 0°C, 101.3 kPa.

Note: 2. Dry gas (must not contain large particles, e.g., dust, oil, or mist.)

Note: 3. -10 ≤ Operating Temperature ≤ 60 C

Note: 4. Reference (typical)

Note: 5. Refer to the D6F-□□□□D-000-□ Application Notes for details.

Note: 6. With no condensation or icing.

Note: 7. The following custom options are available.

Ask your OMRON representative for details.

- Temperature measurement
- Address settings (up to four addresses)
- Fault detection
- Threshold setting

Communication

| | |
|------------------|--|
| Serial Interface | I2C |
| Master/Slave | Slave / Address: HEX : 0x6C BIN : 110_1100 (7bit) |
| Speed mode | Fast Mode 400kHz |
| Signal | |
| SCL | Serial Clock |
| SDA | Data Signal |

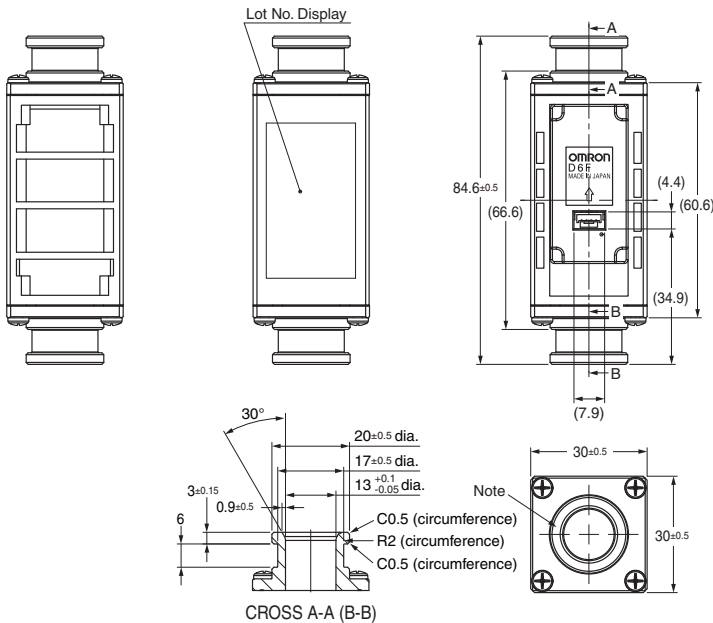
Dimensions (Unit: mm)

MEMS Flow Sensors

D6F-10A7D-000-0

D6F-20A7D-000-0

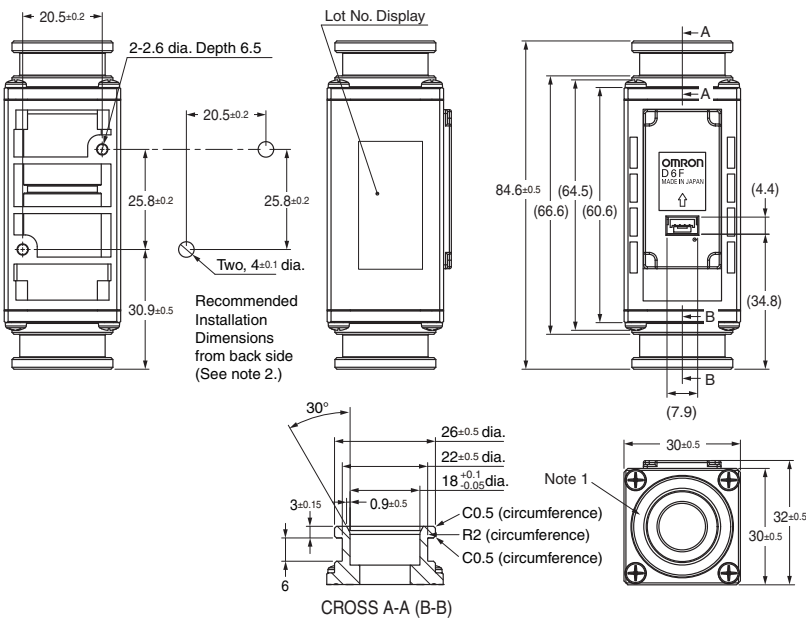
D6F-50A7D-000-0



Note 1. Note . The Port type of pipe fitting based on "Quick Joint P10 Type".
 * P10 shows the name of an O-ring prescribed by JIS B 2401.
 * The port of O-ring ditch is based on P10 of JIS B 2406.

Note 2. Use the following connectors to connect to the Sensor.
 Connector :GHR-04V-S (JST)
 Terminals :SSH-002T-P0.2 (JST)
 Wires :AWG26 to AWG30
 Circuit numbers :1.Vcc, 2.SDA, 3.SCL, 4.GND

D6F-70AB71D-000-0



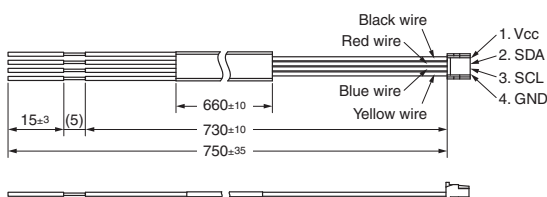
Note 1. The Port type of pipe fitting based on "Quick Joint P14 Type".
 * P14 shows the name of an O-ring prescribed by JIS B 2401.
 * The port of O-ring ditch is based on P14 of JIS B 2406.

Note 2. To mount the Sensor with 2.6-dia. holes, use P-type self-tapping screws with a nominal diameter of 3 mm and tighten them to a torque of 1.2 N·m max. The screw threads must engage for 5.5 mm min.

Note 3. Use the following connectors to connect to the Sensor.
 Connector :GHR-04V-S (JST)
 Terminals :SSH-002T-P0.2 (JST)
 Wires :AWG26 to AWG30
 Circuit numbers :1.Vcc, 2.SDA, 3.SCL, 4.GND

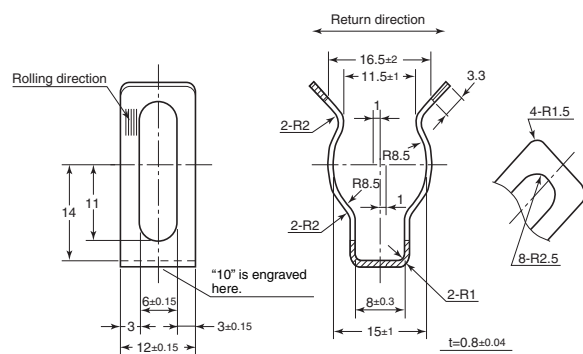
Cable (Sold separately)

D6F-CABLE3



Quick fastener (Sold separately)

D6F-FASTENER-P10



D6F-AB71

MEMS Flow Sensor

Reduction of Piping time by quick joint connection

Air Analog

- Reduce the influence of pulsation flow by bypass flow path
- 30 L/min and 70 L/min of Air can be measured.
- Compact size of 30 × 84.6 × 32 mm (H × W × D).



RoHS Compliant



Refer to the *Common Precautions for the D6F Series* on page 40.

Ordering Information

MEMS Flow Sensor

| Flow Port Type | Applicable fluid | Flow rate range | Model |
|-----------------|------------------|-----------------|-----------------------|
| Quick joint P14 | Air | 0 to 30 L/min | D6F-30AB71-000 |
| | | 0 to 70 L/min | D6F-70AB71-000 |

Accessory (Sold separately)

| Type | Model |
|-------|-------------------|
| Cable | D6F-CABLE1 |

Connections

D6F-30AB71-000

D6F-70AB71-000

Pin No. 1: Vcc
 2: Vout
 3: GND

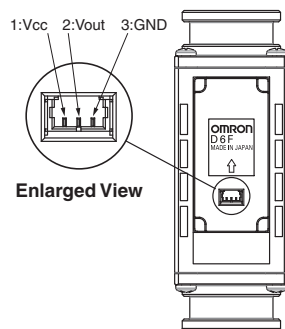
Connector 53398 (Made by Molex Japan)

Use the following connectors for connections to the D6F:

Housing 51021 (Made by Molex Japan)

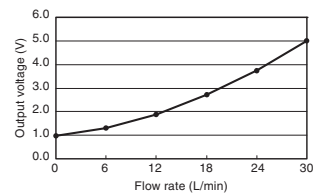
Terminals 50079 (Made by Molex Japan)

Wires AWG28 to AWG26

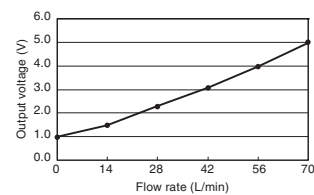


Output Voltage Characteristics

D6F-30AB71-000



D6F-70AB71-000



D6F-30AB71-000

| Flow rate L/min (normal) | 0 | 6 | 12 | 18 | 24 | 30 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.25 | 1.91 | 2.75 | 3.78 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

D6F-70AB71-000

| Flow rate L/min (normal) | 0 | 14 | 28 | 42 | 56 | 70 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Output voltage V | 1.00 | 1.43 | 2.25 | 3.14 | 4.06 | 5.00 |
| | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |

Measurement conditions: Power-supply voltage 12±0.1 VDC, ambient temperature 25±5°C and ambient humidity 35 to 75%RH.

Characteristics/Performance

| Model | D6F-30AB71-000 | D6F-70AB71-000 |
|-------------------------------------|--|----------------|
| Flow Range (See note 1.) | 0 to 30 L/min | 0 to 70 L/min |
| Calibration Gas (See note 2.) | Air | |
| Flow Port Type | Quick joint P14 | |
| Electrical Connection | Three-pin connector | |
| Power Supply | 10.8 to 26.4 VDC | |
| Current Consumption | 15 mA max. with no load and Vcc of 12 to 24 VDC, GND = 0 VDC, 25°C | |
| Output Voltage | 1 to 5 VDC (non-linear output, load resistance of 10 kΩ min.) | |
| Accuracy | ±3%F.S. (25°C characteristic) | |
| Repeatability (See note 3.) | ±0.3%F.S. | |
| Output Voltage (Max.) | 5.7 VDC (Load resistance: 10 kΩ) | |
| Output Voltage (Min.) | 0 VDC (Load resistance: 10 kΩ) | |
| Rated Power Supply Voltage | 26.4 VDC | |
| Rated Output Voltage | 6 VDC | |
| Case | PPS | |
| Degree of Protection | IEC IP40 (Excluding tubing sections.) | |
| Withstand Pressure | 100 kPa | |
| Pressure Drop (See note 3.) | 0.88 kPa | 3.49 kPa |
| Operating Temperature (See note 4.) | -10 to +60°C | |
| Operating Humidity (See note 4.) | 35 to 85%RH | |
| Storage Temperature (See note 4.) | -30 to +80°C | |
| Storage Humidity (See note 4.) | 35 to 85%RH | |
| Temperature Characteristics | ±3%F.S. for 25°C characteristic at an ambient temperature of -10 to +60°C | |
| Insulation Resistance | Between sensor outer cover and lead terminals: 20 MΩ min. (at 500 VDC) | |
| Dielectric Strength | Between sensor outer cover and lead terminals: 500 VAC, 50/60 Hz min. for 1 min (leakage current: 1 mA max.) | |
| Weight | 75 g | |

Note 1. Volumetric flow rate at 0°C, 101.3 kPa.

Note 2. Dry gas (must not contain large particles, e.g., dust, oil, or mist.)

Note 3. Reference (typical)

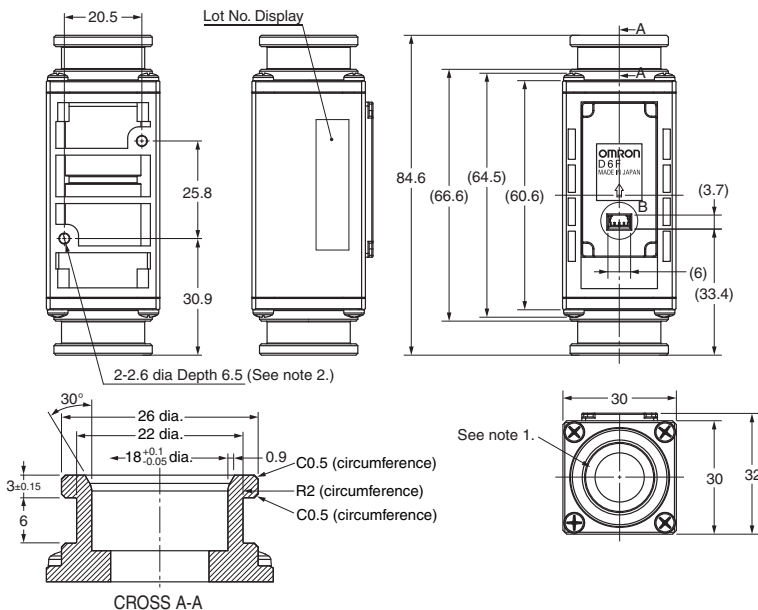
Note 4. With no condensation or icing.

Dimensions (Unit: mm)

MEMS Flow Sensors

D6F-30AB71-000

D6F-70AB71-000



Note 1. The flow path inlet and outlet ports conform to P14-type female quick-connect joints.

(The tube inlet and outlet ports have the same shape.)

* P14 is the number of an O-ring specified in JIS B 2401.

* The O-ring groove in the male joint must conform to P14 in JIS B 2406.

Note 2. To mount the Sensor with 2.6-dia. holes, use P-type self-tapping screws with a nominal diameter of 3 mm and tighten them to a torque of 1.2 N-m max. The screw threads must engage for 5.5 mm min.

Note 3. Use the following connectors to connect to the Sensor.

Connector : GHR-04V-S (JST)

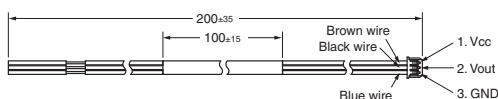
Terminals : SSHL-002T-P0.2 (JST)

Wires : AWG26 to AWG30

Circuit numbers : 1. Vcc, 2. SDA, 3. SCL, and 4. GND.

Cable (Sold separately)

D6F-CABLE1



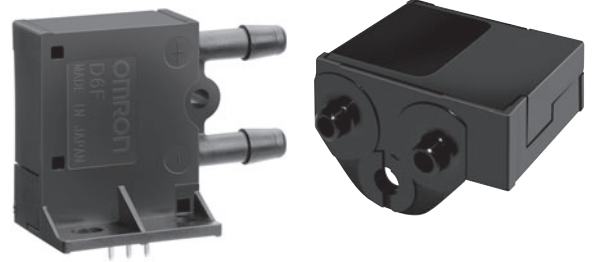
D6F-P

MEMS Flow Sensor

Air Analog

A Compact, High-accuracy Flow Sensor with Superior Resistance to Environments.

- Anti-dust performance is improved using the Cyclon method.
- A full lineup of models with different connector types: bamboo joints, lead terminals for direct mounting on-board, and manifolds.
- High accuracy of $\pm 5\%$ FS.



RoHS Compliant



Refer to the *Common Precautions for the D6F Series* on page 40.

Ordering Information

MEMS Flow Sensor

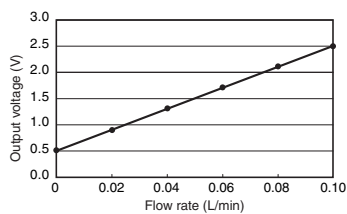
| Flow Port Type | Connection | Applicable fluid | Flow rate range | Model |
|----------------|----------------|------------------|-----------------|---------------------|
| Bamboo joint | Lead terminals | Air | 0 to 0.1 L/min | D6F-P0001A1 |
| | | | 0 to 1 L/min | D6F-P0010A1 |
| Manifold | Connector | | 0 to 1 L/min | D6F-P0010A2 |
| | | | | D6F-P0010AM2 |

Accessory (Sold separately)

| Type | Model |
|-------|-------------------|
| Cable | D6F-CABLE2 |

Output Voltage Characteristics

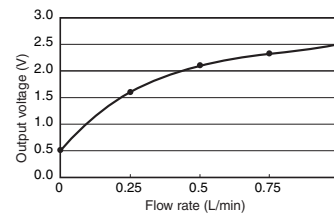
D6F-P0001A1



| Flow rate L/min (normal) | 0 | 0.02 | 0.04 | 0.06 | 0.08 | 0.10 |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Output voltage V | 0.50 | 0.90 | 1.30 | 1.70 | 2.10 | 2.50 |
| | ± 0.10 | ± 0.10 | ± 0.10 | ± 0.10 | ± 0.10 | ± 0.10 |

Measurement conditions: Power supply voltage of 5.0 ± 0.1 VDC, ambient temperature of $25 \pm 5^\circ\text{C}$, and ambient humidity of 35% to 75%.

D6F-P0010A1/-P0010A2/-P0010AM2



| Flow rate L/min (normal) | 0 | 0.25 | 0.50 | 0.75 | 1.00 |
|--------------------------|------------|------------|------------|------------|------------|
| Output voltage V | 0.50 | 1.60 | 2.10 | 2.31 | 2.50 |
| | ± 0.10 | ± 0.10 | ± 0.10 | ± 0.10 | ± 0.10 |

Measurement conditions: Power supply voltage of 5.0 ± 0.1 VDC, ambient temperature of $25 \pm 5^\circ\text{C}$, and ambient humidity of 35% to 75%.