# D6F-A7D/-AB71D

## MEMS Flow Sensor

# Digital Compensation for High Accuracy

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

**RoHS Compliant**

Air Digital

NEW

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

## 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** |
| Pipe fittings | **D6F-PLG1** |

Note: Refer to *Accessories for the D6F Series* on page 39.

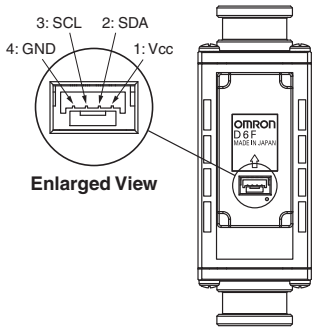
## Connections

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

| | |
|---|---|
| Pin No. | 1: Vcc<br>2: SDA<br>3: SCL<br>4: GND |
| Connector | BM04B-GHS (made by J.S.T. Mfg. Co.) |

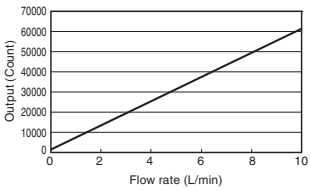
Use the following connectors for connections to the D6F:

| | |
|---|---|
| Housing | GHR-04V-S (made by J.S.T. Mfg. Co.) |
| Terminals | SSHL-002T-P0.2 (made by J.S.T. Mfg. Co.) |
| Wires | AWG26 to AWG30 |

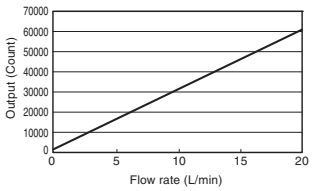



## Output Characteristics

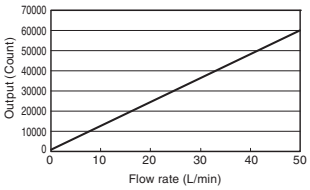
### D6F-10A7D-000-0




### D6F-20A7D-000-0




### D6F-50A7D-000-0

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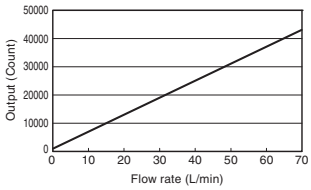



### D6F-10A7D-000-0

| Flow rate L/min (normal) | 0 | 2 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|
| Output (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 (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 (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 (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.)<br>±3%RD (25%F.S. ≤ Flow rate ≤ 100%F.S.) | | | ±5%RD (10L/min ≤ Flow rate < 20L/min)<br>±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 |

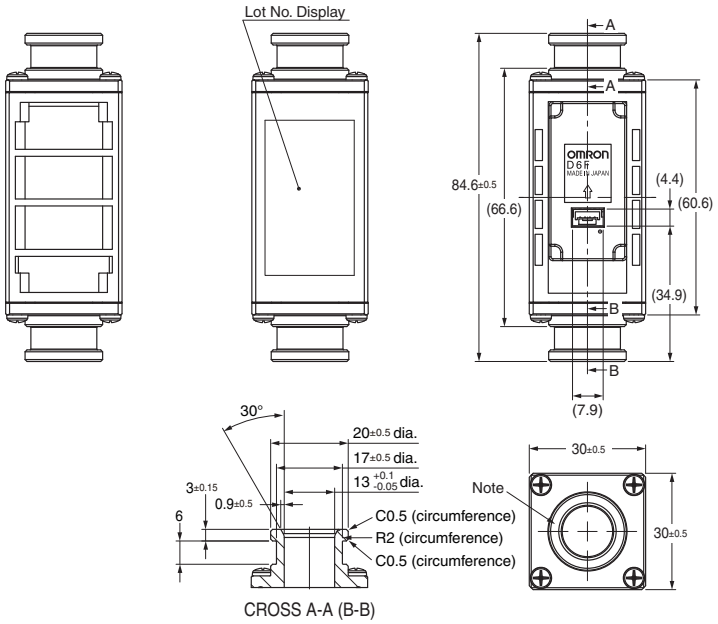
Note: 1. Volumetric flow rate at 0°C, 101.3 kPa.
Note: 2. Dry gas (must not contain large particles, e.g., dust, oil, or mist.)
Note: 3. -10 ≤ Operating Temperature ≤ 60°C
Note: 4. Reference (typical)
Note: 5. Refer to the D6F-□□□□D-000-□ Application Notes for details.
Note: 6. With no condensation or 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

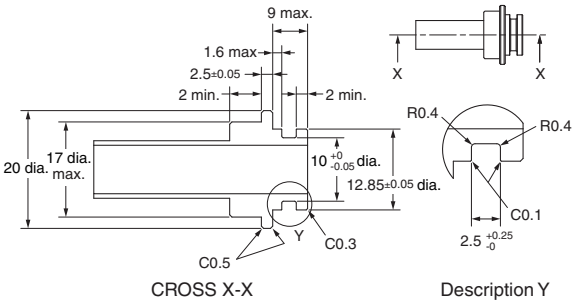
| | | |
|---|---|---|
| Serial Interface | | I2C |
| Master/Slave | | Slave / Address: HEX : 0x6C<br>BIN : 110_1100 (7bit) |
| Speed mode | | Fast Mode 400kHz |
| Signal | | |
| | SCL | Serial Clock |
| | SDA | Data Signal |

## Dimensions (Unit: mm)

### ● MEMS Flow Sensors
**D6F-10A7D-000-0**
**D6F-20A7D-000-0**
**D6F-50A7D-000-0**




**Recommended Quick joint male P10 type**

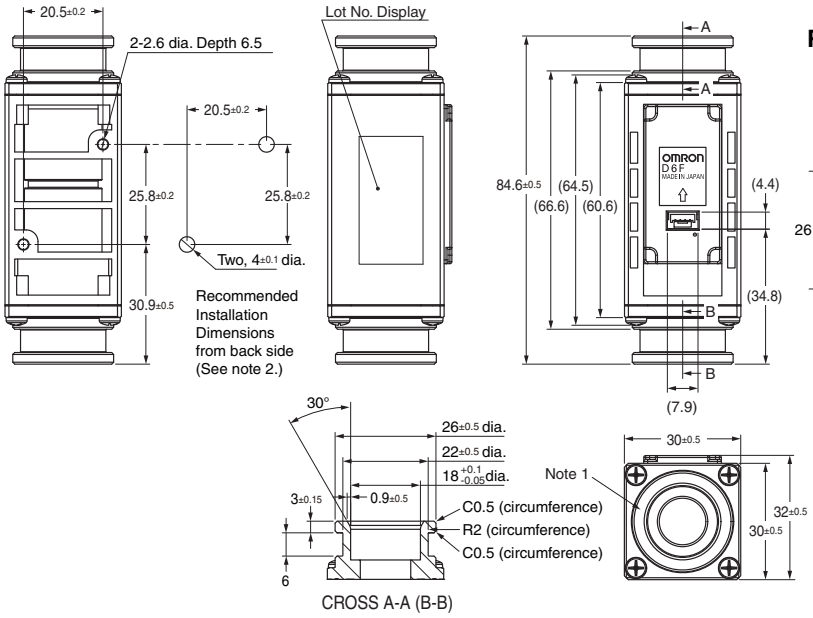



If using a Rc3/8 converter joint, the following is recommended.
REGAL JOINT CO., LTD eigyou@rgl.co.jp
Converter male joint (Rc3/8-Quick male joint): Adapter Rc3/8-QJM10
O ring: O ring P10 fluororubber (material)

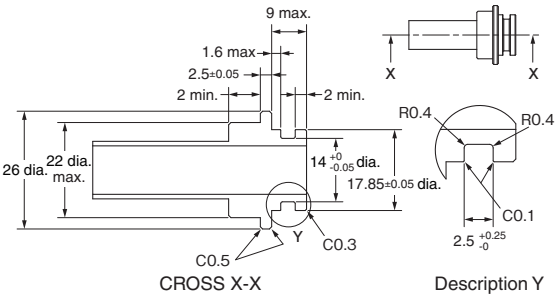
Note 1. Note . The Port type of pipe fitting based on “Quick Joint P10 Type”.
* P10 shows the name of an O-ring prescribed by JIS B 2401.
* The port of O-ring ditch is based on P10 of JIS B 2406.
* Please obtain a male joint separately.

Note 2. 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, 4.GND

### D6F-70AB71D-000-0




**Recommended Quick joint male P14 type**




If using a Rc3/8 converter joint, the following is recommended.
REGAL JOINT CO., LTD eigyou@rgl.co.jp
Converter male joint (Rc3/8-Quick male joint): Adapter Rc3/8-QJM14
O ring: O ring P14 fluororubber (material)

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.
* Please obtain a male joint separately.

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, 4.GND