

## D6F Flow Sensors

# Technical Information

## ■ Precautions for Correct Use

### All D6F Models

D6F- is a precision component. Keep in the original packaging and remove only when ready for installation. Damage may occur if subjected to excessive force (e.g. dropped or kicked). Any item suspected to be damaged should be discarded. Immediately following installation, a qualified person should perform checks to ensure safe, satisfactory operation.

### Operating Environment

Do not use the Sensor in the following locations:

- Locations subject to direct radiant heat from heating equipment
- Locations subject to water or oil
- Locations subject to direct sunlight
- Locations subject to dust and dirt, or to corrosive or combustible gas
- Locations subject to sudden temperature changes
- Locations where there is a possibility of icing or condensation
- Locations subject to strong vibration or shock

### Countermeasures Against Noise

Noise may make it impossible to obtain correct measurements. Consider the following countermeasures.

- Install the Sensor as far as possible from devices that generate surges or strong high frequencies (such as high-frequency welders and machines).
- Attach surge absorbers or noise filters to noise-generating devices that are near the Sensor (in particular, equipment with inductance, such as motors, transformers, solenoids, and magnetic coils). (It also helps to separate pipes and ducts, and to use shielded cables.)

### Power Supply

Use the applicable connectors. Directly soldering the connection terminals will cause product failure.

Check the terminal names and polarity and wire the power supply correctly. Incorrect wiring will cause failure of internal components.

When using a commercially available switching regulator, ground the FG (frame ground) and G (ground) terminals.

## ■ RoHS Compliant

The "RoHS Compliant" designation indicates that the listed models do not contain the six hazardous substances covered by the RoHS Directive.

### Reference:

The following standards are used to determine compliance for the six substances.

Lead:	1,000 ppm max.
Mercury:	1,000 ppm max.
Cadmium:	100 ppm max.
Hexavalent chromium:	1,000 ppm max.
PBB:	1,000 ppm max.
PBDE:	1,000 ppm max.

## ■ Precautions for Safe Use

### ⚠ CAUTION

The D6F is built for use with general-purpose devices. When using the D6F for applications with the safety requirements described below, take steps to ensure system and device safety through measures such as fail-safe designs, redundant designs, and regular inspections.

- Safety devices for ensuring safety for persons
- Transportation equipment control (such as applications to stop operation)
- Aviation and space equipment
- Nuclear power equipment

Do not use the D6F for applications in which D6F operation would directly affect human life.

### All D6F Models

1. Use clean fluids. Install a filter or mist separator on the inflow pipe. Failure to do so may result in malfunction or changes in characteristics due to dust or mist. This does not apply to the D6F-W□A1.
2. The specified performance may not be obtained if the D6F is used for fluids other than the specified applicable fluids.
3. Do not use corrosive gases (such as chlorine, sulfur, acid, or alkali). Doing so may cause product failure.
4. After removing the Sensor from the package, do not allow foreign particles to enter the piping. Foreign particles in the piping may cause product failure.
5. Install the Sensor so that the fluid flows in the direction indicated by the arrow on the Sensor. Correct measurements cannot be obtained if the fluid flows in the wrong direction.
6. It is recommended that the Sensor (except for the D6F-03A3) be mounted horizontally. If it is not mounted horizontally, an error of  $\pm 1\%$  FS or higher may result.
7. Always check operation after installation.
8. Do not drop the Sensor or disassemble the cover.

### D6F-01A1/02A1

1. Use dry air for the fluid. Condensation and icing can change characteristics and cause product failure. Take measures such as installing an air dryer on the inflow pipe to remove moisture.
2. Do not use combustible gas (such as hydrogen, methane, ethane, or propane). Doing so may cause product failure.
3. Make sure that pipes with barb joints are airtight. Correct measurements cannot be obtained if there is leakage from joints.
4. Mount the Sensor to a flat surface, use M3 panhead screws, and tighten the screws to a torque of 0.59 N·m maximum. Incorrect mounting may cause product failure and make it impossible to obtain correct measurements.

### D6F-01N2/05N2/02L2

1. Confirm that the specified applicable fluid (combustible gas) is used.
2. Do not use combustible gas (such as hydrogen) or corrosive gas (such as chlorine, sulfur, acid, or alkali) other than the specified applicable fluids. Doing so may cause product failure.
3. Use Rc1/4 taper pipe thread for the piping to the hexagonal section. Tighten to a torque of 5 N·m maximum. Tightening to a torque higher than this may cause cracking and possible leakage.
4. Mount the Sensor to a flat surface, use M3 panhead screws, and tighten the screws to a torque of 0.59 N·m maximum. Incorrect mounting may cause product failure and make it impossible to obtain correct measurements.

### D6F-03A3 and D6F-10A□ /-20A□ /- 50A□

1. When installing the pipes to the D6F-03A3, use M5 screws for the joints and tighten to a torque of 1.5 N·m maximum.
2. Connect D6F-□A6-000 sensors using 1/4" British Standard Pipes, Threaded.
3. Use sealing tape on pipes to make the joints airtight. Incorrect installation may make it impossible to obtain correct measurements.
4. Use 'O' Rings to seal the Inlet and Outlet of D6F-□A5-000 right-angle manifold mount sensors.
5. It is recommended that the D6F-03A3 Sensor be mounted either horizontally or vertically. Mounting the Sensor at an angle may make it impossible to obtain correct measurements.
6. Mount the Sensor to a flat surface, use M3 panhead screws, and tighten the screws to a torque of 0.59 N·m maximum. Incorrect mounting may cause product failure and make it impossible to obtain correct measurements.
7. Do not use in the presence of flammable gases (e.g. hydrogen, methane, ethane) and liquefied petroleum gas.
8. Ensure good grounding is achieved by grounding the GND terminal to the peripheral equipment's main ground frame connection and its associated regulated power supply.
9. Do not make a direct solder connection to the integral terminals. It is recommended you use the appropriate cable, for attachment to ensure correct connection.

### D6F-W01A1/W04A1

1. Depending on the ambient temperature and the mounting position, foreign objects, such as dust or dirt, may enter into the Sensor and partially or completely block the flow path. If this occurs, the Sensor may not be able to sufficiently perform as described above. Make sure that you understand how to use the Sensor, and test it in advance with the actual equipment with which it is to be used.
2. Installation
  - Turn OFF the power to the equipment before installing the Sensor. Leaving the power ON during installation may cause electric shock and malfunctioning.
  - Mount the Sensor to a flat surface, use M3 panhead screws, and tighten the screws to a torque of 0.59 N·m maximum. Incorrect mounting may cause product failure and make it impossible to obtain correct measurements.
  - Always check operation after installation.
3. Do not use combustible gas (such as hydrogen), other than the specified applicable fluids. Doing so may cause product failure.

### D6F-P0010A1/P0010A2

1. Depending on the environment and the mounting position, foreign objects, such as dust or dirt, may enter into the Sensor and partially or completely block the flow path. If this occurs, the Sensor may not be able to sufficiently perform as described above. Make sure that you understand how to use the Sensor and test it in advance with the actual equipment with which it is to be used.
2. For fluids other than the specified applicable fluids, it is the user's responsibility to confirm performance and safety. In any case, do not use combustible gas, such as hydrogen, methane, ethane, or propane, and do not use corrosive gases, such as chlorine, sulfurized gas, or ammonia gas.
3. Installation
  - Turn OFF the power to the equipment before installing the Sensor. Leaving the power ON during installation may cause electric shock and malfunctioning.
  - Use M2.6 panhead screws or tapping screws of the same diameter, and tighten them to a torque of 0.59 N·m maximum.
  - Mount the Sensor on a flat surface. If the surface is uneven, the Sensor will be affected and will not be able to obtain correct measurements.
  - Set up the piping so that the fluid flows in the direction from plus (+) to minus (-).
  - Always check operation after installation.

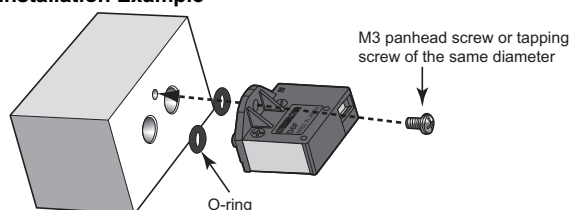
### D6F-P0010A1

Solder the terminals after securing the Sensor to the PCB.

### D6F-0010AM2

1. Mount the Sensor to a flat surface. Use M3 panhead screws or tapping screws of the same diameter, and tighten the screws to a torque of 0.59 N·m maximum. Incorrect mounting may cause product failure and make it impossible to obtain correct measurements.
2. Use O-rings to seal the fluid inlet and outlet sections. (Recommended O-ring: JIS B2401 bearing number P4 or ISO 3601-1 Designation: A0037G. O-rings are not included and must be purchased separately.)

#### Installation Example



### D6F-05N7/02L7

Use male P10 quick couplings for the piping, and secure them with the applicable quick fasteners. Do not apply excessive force to the adapter section when connecting the pipes. If strong force is applied to the connected pipes, or if strong force is applied directly to the adapter section while holding the Sensor, it may damage the Sensor or cause leakage.

**Note:** With the pipes connected, applying a static load of 40 N or greater at a point 300 mm from the center of the Sensor with the Sensor as the fulcrum may cause damage or leakage.

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**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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**OMRON ELECTRONIC  
COMPONENTS LLC**

55 E. Commerce Drive, Suite B  
Schaumburg, IL 60173

**847-882-2288**

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