

# MEMS Airflow Sensor

## D6F-10A, -20A, -50A

**Compact, intelligent sensor featuring MEMS technology for precision mass airflow measurement**

- Precision mass airflow up to 50 slpm
- Stable output across full scale
- Horizontal mounting feature with \*NBR 'O' ring option
- Compact size 78 (L) x 30 (W) x 30 (H) mm
- Low power consumption

\* NBR material recommended for all applications including medical and food processing



## Application Examples

- Industrial processes
- Medical Respirators and Ventilators
- MiG and TiG welding systems
- Anesthesia Delivery
- Mass flow controllers
- Scientific / test equipment
- Fuel cell controls

## Ordering Information

Model	Case	Applicable Gas	Flow Range	Notes
D6F-10A5	Thermoplastic resin / Aluminum alloy	Air, N <sub>2</sub> O, O <sub>2</sub>	0 – 10 LPM	Built-in orifice, Right-angle Connect
D6F-20A5	Thermoplastic resin / Aluminum alloy	Air, N <sub>2</sub> O, O <sub>2</sub>	0 – 20 LPM	Built-in orifice, Right-angle Connect
D6F-50A5	Thermoplastic resin / Aluminum alloy	Air, N <sub>2</sub> O, O <sub>2</sub>	0 – 50 LPM	Built-in orifice, Right-angle Connect
D6F-10A6	Thermoplastic resin / Aluminum alloy	Air, N <sub>2</sub> O, O <sub>2</sub>	0 – 10 LPM	Built-in orifice, Straight Connect
D6F-20A6	Thermoplastic resin / Aluminum alloy	Air, N <sub>2</sub> O, O <sub>2</sub>	0 – 20 LPM	Built-in orifice, Straight Connect
D6F-50A6	Thermoplastic resin / Aluminum alloy	Air, N <sub>2</sub> O, O <sub>2</sub>	0 – 50 LPM	Built-in orifice, Straight Connect
D6F-Cable1				Optional (recommended)

## Rating

Absolute maximum rating

Item	Term	Ratings	Unit
Power-supply voltage	V <sub>CC</sub>	26.4	VDC
Output voltage	V <sub>OUT</sub>	6	VDC

## ■ Electrical Performance

Recommended operation condition and DC characteristic

Item	Term	Condition	MIN	TYP	MAX	Unit
Power-supply voltage	$V_{CC}$	—	10.8	—	26.4	VDC
Operating temperature	$T_{OPR}$	—	-10	—	60	°C
Maximum output voltage	$V_{OH}$	$V_{CC} = 12\text{VDC to } 24\text{VDC}$ $I_{OH} = 0.5\text{mA}$	5	—	5.7	VDC
Minimum output voltage	$V_{OL}$	$V_{CC} = 12\text{VDC to } 24\text{VDC}$ $I_{OL} = -0.5\text{mA}$	0	—	1	VDC

## ■ Basic Performance

0 to 50 min. (Normal). L/min (Normal) volumetric flow rate at 0°C, 101 3kPa.

Measurement condition: Power-supply voltage  $12 \pm 0.1\text{VDC}$ , ambient temperature  $25 \pm 2^\circ\text{C}$  and ambient air humidity 25 to 75% RH.

### D6F-10A

Flow Rate L/min (normal)	0	2	4	6	8	10
Output Voltage (VDC)	$1.00 \pm 0.12$	$1.75 \pm 0.12$	$2.60 \pm 0.12$	$3.45 \pm 0.12$	$4.25 \pm 0.12$	$5.00 \pm 0.12$

### D6F-20A

Flow Rate L/min (normal)	0	4	8	12	16	20
Output Voltage (VDC)	$1.00 \pm 0.12$	$1.93 \pm 0.12$	$2.87 \pm 0.12$	$3.70 \pm 0.12$	$4.41 \pm 0.12$	$5.00 \pm 0.12$

### D6F-50A

Flow Rate L/min (normal)	0	10	20	30	40	50
Output Voltage (VDC)	$1.00 \pm 0.12$	$2.45 \pm 0.12$	$3.51 \pm 0.12$	$4.20 \pm 0.12$	$4.66 \pm 0.12$	$5.00 \pm 0.12$

## ■ Characteristics

Degree of Protection	IP40
Applicable Gas	Air
Electrical Connection	Connector (3 wire)
Output Signal	Analog, 1-5VDC (load resistance 10kohm min)
Current Consumption	Max 15mA (no load, $V_{CC} = 12$ to $24$ VDC, $V_{SS} = \text{GND} = 0\text{V}$ , $25^\circ\text{C}$ )
Repeat Accuracy	+/- 3% FSD max, $25^\circ\text{C}$
Insulation Resistance	20Mohm min. (500VDC between lead terminals and case)
Dielectric Strength	500VAC, 50/60Hz for 1 minute (leakage current typ. <1mA) between lead terminals
Withstand Pressure	500 kPa
Operating Temperature	-10 to $+60^\circ\text{C}$ (with no ice or dew condensation)
Operating Humidity	85%RH max. (with no ice or dew condensation)
Storage Temperature	-40 to $+80^\circ\text{C}$ (with no ice or dew condensation)
Storage Humidity	85%RH max. (with no ice or dew condensation)
Weight	About 103 grams

Optional: Versions for  $\text{N}_2\text{O}$  and  $\text{O}_2$  also available. For Ar +  $\text{CO}_2$ , He, and He +  $\text{O}_2$ , please consult factory.

# Installation: D6F-10A5-000, D6F-20A5-000, D6F-50A5-000

## Recommendation for right-angle connection

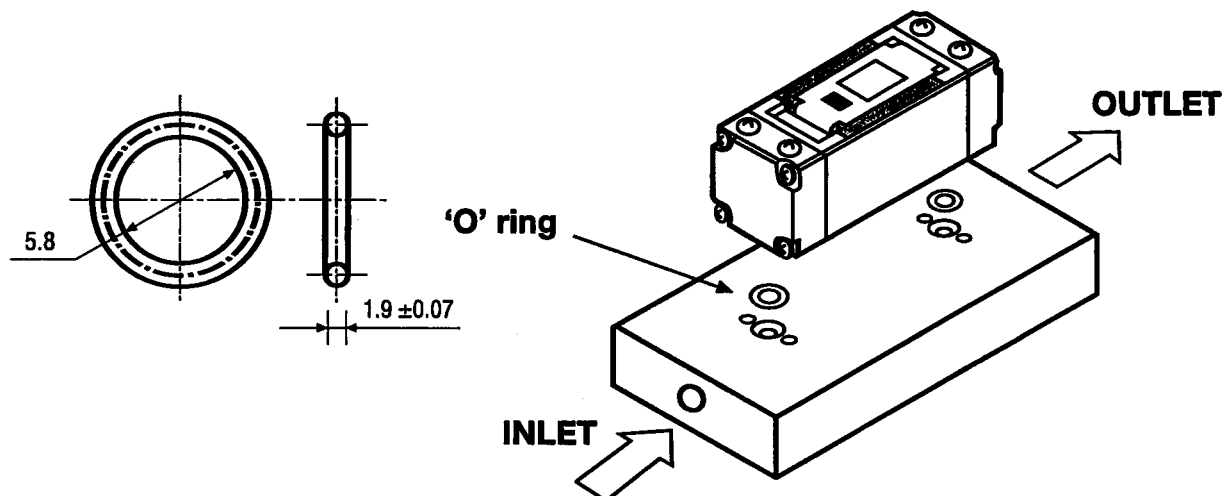
Tighten screw with 0.59Nm or less torque. Use M3 pan head screw. Please seal to INLET and OUTLET with the 'O' ring etc. Please install the product as shown below.

Recommended 'O' ring for sealing inlet and outlet orifice

Material: NBR70 (recommended)

Example part number: JASO part number: CO 0003

Alternative manufacturers with similar DO and W dimensions may be used



## ■ Precautions

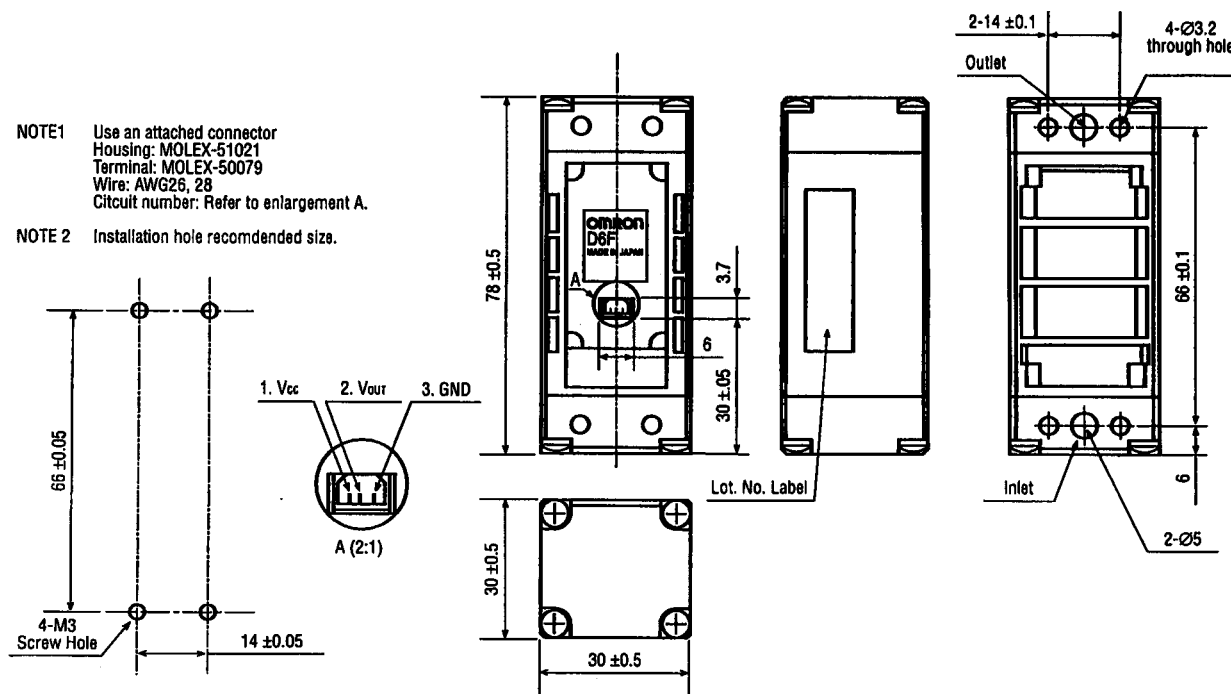
1. Avoid use in excessively dirty, wet environments
2. Do not use in the presence of flammable gases (e.g. hydrogen, methane, ethane) and liquefied petroleum gas. In addition, do not use with corrosive gases (e.g. chlorine, sulphur, acids, alkalis, etc.).
3. Install in the direction of the arrow indicated.
4. For best results (optimum accuracy), mount horizontally.
5. Use four suitable M3 screws for mounting. Do not exceed a fixing torque of 0.59 Nm.
6. Do not modify D6F- in any way.
7. Do not place any object in or close to the inlet and outlet orifices.
8. Do not use the sensor in any of the following environments:
  - a location that receives radiant heat from the sun or apparatus
  - a place where intense light may radiate down
  - places where corrosive gas, especially sulphur and ammonia gases are present
  - where fast changing temperatures occur
  - locations prone to freezing, high humidity, condensation
  - places where large magnitudes of vibration or shock could occur
9. Noise countermeasures: VERY IMPORTANT: Take suitable precautions to minimize the effects and potential for induced electrical noise. Install away from apparatus that generates strong high frequencies, surges and spikes. Take particular care to install away from AC power transformers, live mains power lines and high power magnetic circuits. Attach a surge suppressor and a noise filter to the peripheral equipment.
10. 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.
11. Do not make a direct solder connection to the integral terminals. It is recommended you use the optional cable 'D6F-CABLE1' for attachment and to ensure correct connection.
12. D6F- is a precision component. Keep in 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.
13. Immediately following installation, a qualified person should perform checks to ensure safe, satisfactory operation.

# Dimensions: D6F-10A5-000, D6F-20A5-000, D6F-50A5-000

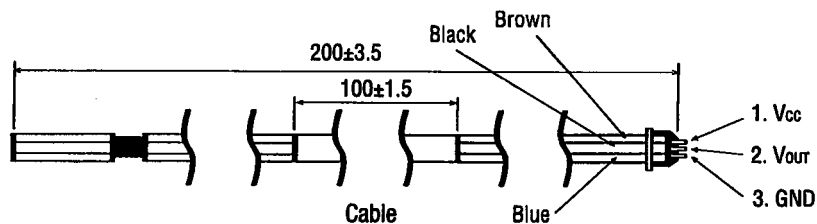
All dimensions are shown in millimeters.

NOTE1 Use an attached connector  
 Housing: MOLEX-51021  
 Terminal: MOLEX-50079  
 Wire: AWG26, 28  
 Citcuit number: Refer to enlargement A.

NOTE2 Installation hole recommended size.



## ■ D6F-Cable1 (Optional)



■ D6F-10A6-000, D6F-20A6-000, and D6F-50A6-000

NOTE1 Bind tight with 0.59N·m or less torque.

Use M3 pan head screw.

NOTE2 Use an attached connector.

Housing : MOLEX-51021

Terminal : MOLEX-50079

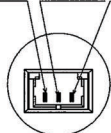
Wire : AWG26, 28

Circuit number: Refer to enlargement A.

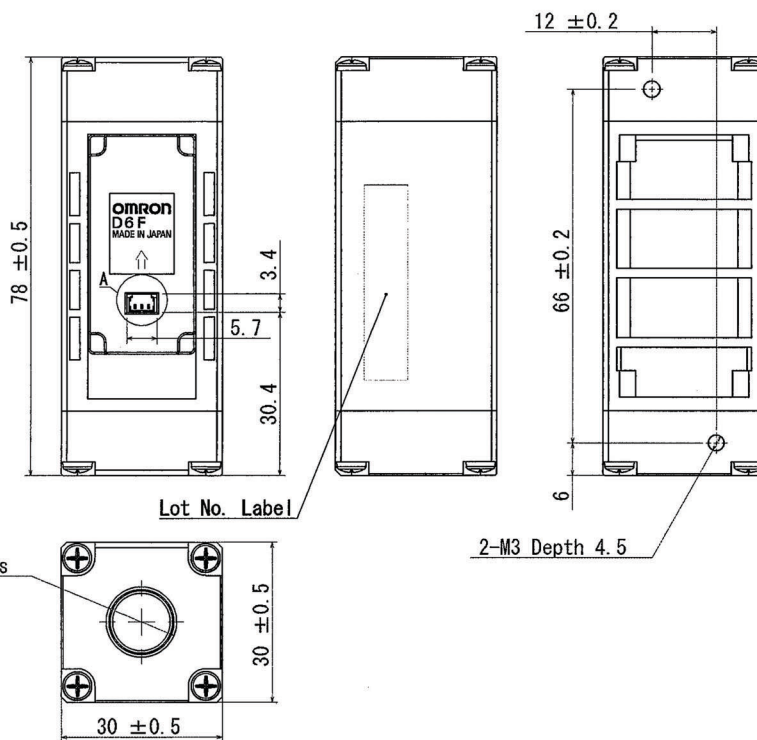
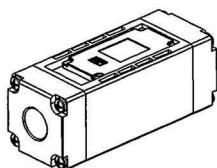
NOTE3 The connection must use taper pipe thread R1/4.

Moreover, please give the tightening torque as 5N·m or less.

1:Vcc 2:Vout 3:GND



A(2:1)



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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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