D6F-PH

MEMS Differential pressure Sensor

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

- High accuracy of ±3% RD
- Linearized and temperature compensated
- Digital output (I2C communication)
- High flow impedance to reduce the influence of bypass configuration

RoHS Compliant



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

Ordering Information

	Applicable fluid (See note 1.)	Measurement range (See note 3.)	Model
		0 to 250 Pa (0 to 1 in. H ₂ O)	D6F-PH0025AD1
	Air (See note 2.)	-50 to +50 Pa (±0.2 in. H ₂ O)	D6F-PH0505AD3
		-500 to +500 Pa (±2 in. H ₂ O)	D6F-PH5050AD3

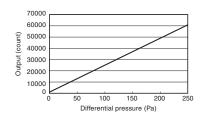
Note: 1. The Sensor be calibrated for different gas types. Consult your Omron representative.

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

Note: 3. At standard atmospheric pressure (1013.25 hPa)

Output Characteristics

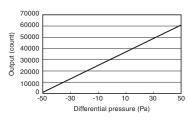
D6F-PH0025AD1



Differential pressure (Pa)	0	50	100	150	200	250
Output	1024	13024	25024	37024	49024	61024
(HEX)	(0400)	(32E0)	(61C0)	(90A0)	(BF80)	(EE60)

Measurement conditions: Power supply voltage of 3.3 \pm 0.1 VDC, ambient temperature of 25 \pm 5°C, and ambient humidity of 35% to 75%. Differential pressure conversion formula: Dp = (Op - 1024) / 60000 \times 250 Dp = Differential pressure, Op = Output

D6F-PH0505AD3

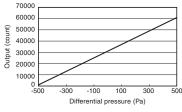


Differential pressure (Pa)	-50	-30	-10	0	10	30	50
Output (HEX)	1024 (0400)	13024 (32E0)		31024 (7930)			61024 (EE60)

Measurement conditions: Power supply voltage of 3.3 \pm 0.1 VDC, ambient temperature of 25 \pm 5°C, and ambient humidity of 35% to 75%. Differential pressure conversion formula: Dp = (Op - 1024) / 60000 \times 100 - 50

Dp = Differential pressure, Op = Output

D6F-PH5050AD3



Differential pressure (Pa)	-500	-300	-100	0	100	300	500
Output	1024	13024	25024	31024	37024	49024	61024
(HEX)	(0400)	(32E0)	(61C0)	(7930)	(90A0)	(BF80)	(EE60)

Measurement conditions: Power supply voltage of 3.3 \pm 0.1 VDC, ambient temperature of 25 \pm 5 $^{\circ}$ C, and ambient humidity of 35% to 75%.

Differential pressure conversion formula: $Dp = (Op - 1024) / 60000 \times 1000 - 500$ Dp = Differential pressure, Op = Output Note. Change of gas density affects the sensor output.

Change of atmospheric pressure is compensated by the following formula.

 $\mathsf{Dpeff} = \mathsf{Dp} \times (\mathsf{Pstd} \, / \, \mathsf{Pamb})$

Dpeff: Effective differential pressure

Dp: Differential pressure of the sensor output Pstd: Standard atmospheric pressure (1013.25 hPa)

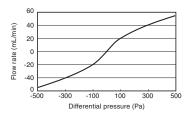
Pamb: Actual ambient atmospheric pressure (hPa)

Characteristics/Performance

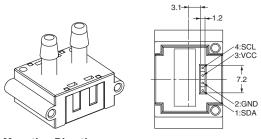
Model	D6F-PH0025AD1	D6F-PH0505AD3	D6F-PH5050AD3			
Differential pressure range (See note 1)	0 to 250 Pa	±50 Pa	±500 Pa			
Calibration Gas (See note 2.)	Air					
Port Type	Bamboo joint, Maximum outside diamete	er: 4.9 mm, minimum outside diameter: 4	.0 mm			
Power Supply	2.3 to 3.6 VDC					
Current Consumption	6 mA max. with no load and Vcc of 3.3 \	/DC, GND = 0 VDC, 25°C				
Resolution	12 bit					
Zero point tolerance (See note 4.)	±0.2 Pa					
Span tolerance (See note 4.)	±3% RD					
Span shift due to temperature variation	< 0.5% RD per 10°C					
Response time	33 ms typical at 12 bit resolution (50 ms max.)					
riesponse time	The processing time is 6 ms typical at 12 bit resolution.					
Gas flow through sensor (See note 3.)	63 mL/min	23 mL/min	100 mL/min			
Interface	12C					
Case material	PPS					
Degree of Protection	IEC IP40 (Excluding tubing sections.)					
Withstand Pressure	10 kPa					
Operating temperature (See note 5.)	-20 to +80°C					
Operating humidity (See note 5.)	35 to 85 %RH					
Storage temperature (See note 5.)	-40 to +80°C					
Storage humidity (See note 5.)	35 to 85 %RH					
Insulation Resistance	Between Sensor outer cover and lead terminals: 20 M Ω min. (at 500 VDC)					
Dielectric Strength	Between Sensor outer cover and lead te	nsor outer cover and lead terminals: 500 VAC, 50/60 Hz min. for 1 min (leakage current: 1 mA max.)				
Weight	5.2 g					

- Note: 1. At standard atmospheric pressure (1013.25 hPa)
- Note: 2. Dry gas must not contain large particles, e.g., dust, oil, or mist.
- Note: 3. Type D6F-PH is based on thermal flow principle. Air flow is needed to measure the differential pressure.
 - Typical characteristic of air flow by differential pressure is below.
- Note: 4. The zero point tolerance and span tolerance are independent uncertainties and add according to the principles of error propagation.
- Note: 5. With no condensation or icing.
- Note: 6. Please call us about functions, such as fault detection, temperature check, Vdd check, threshold value setup.

Relation between pressure and flow rate

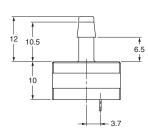


Connections/Dimensions (Unit: mm)

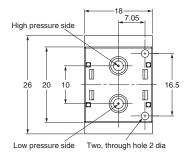


Mounting Direction Install the Sensor so

Install the Sensor so that the joints are facing upward.



Two, 4 dia. Two, through hole 2.2 dia. Two, through hole 2 dia.



Tubes

-Three, 2

Four, 0.48 dia.

Install tubes made of materials such as rubber or urethane so that they will not come out.

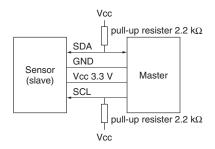
Four, through hole 0.8 dia.

For urethane tubes, tubes with an outer diameter of 6 mm and an inner diameter of 4 mm are recommended.

Soldering Conditions

Use a soldering iron for 5 s at 350°C with a pressure of 100 gf max.

Electrical connection



Communication

Serial Interface		12C			
Master/Slave		Slave / Address: HEX : 0x6C BIN : 110_1100 (7bit)			
Speed mode		Fast Mode 400kHz			
Signal					
SCL		Serial Clock			
	SDA	Data Signal			