

D6F-PH

MEMS Differential pressure Sensor

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

 Air  Digital



- High accuracy of $\pm 3\%$ RD
- Linearized and temperature compensated
- Digital output (I2C communication)
- High flow impedance to reduce the influence of bypass configuration
- Lineup of 4 types of slave address models

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.)	slave address (7 bit)	Model
Air (See note 2.)	0 to 250 Pa	0b110_1100, 0x6C	D6F-PH0025AD1
		0b110_1101, 0x6D	D6F-PH0025AD1-1
		0b110_1110, 0x6E	D6F-PH0025AD1-2
		0b110_1111, 0x6F	D6F-PH0025AD1-3
	-50 to 50 Pa	0b110_1100, 0x6C	D6F-PH0505AD3
		0b110_1101, 0x6D	D6F-PH0505AD3-1
		0b110_1110, 0x6E	D6F-PH0505AD3-2
		0b110_1111, 0x6F	D6F-PH0505AD3-3
	-500 to 500 Pa	0b110_1100, 0x6C	D6F-PH5050AD3
		0b110_1101, 0x6D	D6F-PH5050AD3-1
		0b110_1110, 0x6E	D6F-PH5050AD3-2
		0b110_1111, 0x6F	D6F-PH5050AD3-3

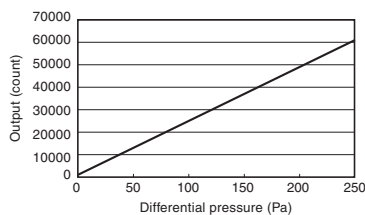
Note: 1. The Sensor be calibrated for different gas types. Consult your Omron representative.

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-□



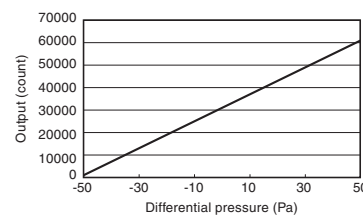
Differential pressure (Pa)	0	50	100	150	200	250
Output (HEX)	1024 (0400)	13024 (32E0)	25024 (61C0)	37024 (90A0)	49024 (BF80)	61024 (EE60)

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

Differential pressure conversion formula: $Dp = (Op - 1024) / 60000 \times 250$

Dp = Differential pressure, Op = Output

D6F-PH0505AD3-□



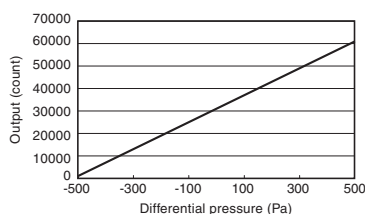
Differential pressure (Pa)	-50	-30	-10	0	10	30	50
Output (HEX)	1024 (0400)	13024 (32E0)	25024 (61C0)	31024 (7930)	37024 (90A0)	49024 (BF80)	61024 (EE60)

Measurement conditions: Power supply voltage of 3.3 ± 0.1 VDC, ambient temperature of $25 \pm 5^\circ\text{C}$, 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 (HEX)	1024 (0400)	13024 (32E0)	25024 (61C0)	31024 (7930)	37024 (90A0)	49024 (BF80)	61024 (EE60)

Measurement conditions: Power supply voltage of 3.3 ± 0.1 VDC, ambient temperature of $25 \pm 5^\circ\text{C}$, 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.
 $Dpeff = Dp \times (Pstd / Pamb)$
 $Dpeff$: 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 diameter: 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 VDC, GND = 0 VDC, 25°C		
Resolution	12 bit		
Zero point tolerance (See note 3.)	±0.2 Pa		
Span tolerance (See note 3.)	±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.) The processing time is 6 ms typical at 12 bit resolution.		
Gas flow through sensor (See note 5.)	63 mL/min	23 mL/min	100 mL/min
Interface	I2C		
Case material	PPS		
Degree of Protection	IEC IP40 (Excluding tubing sections.)		
Withstand Pressure	10 kPa		
Operating temperature (See note 4.)	-20 to +80°C		
Operating humidity (See note 4.)	35 to 85 %RH		
Storage temperature (See note 4.)	-40 to +80°C		
Storage humidity (See note 4.)	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	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.

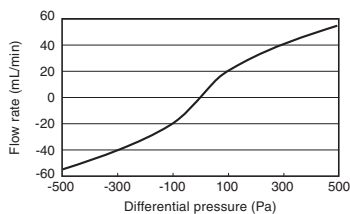
Note: 3. The zero point tolerance and span tolerance are independent uncertainties and add according to the principles of error propagation.

Note: 4. With no condensation or icing.

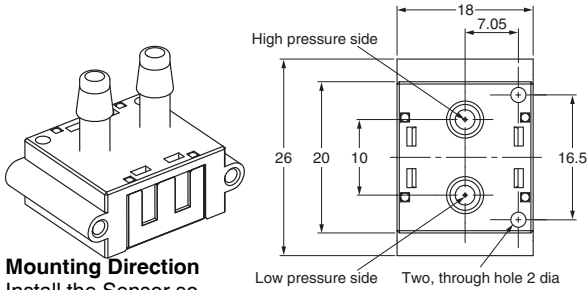
Note: 5. Type D6F-PH is based on thermal flow principle. Air flow is needed to measure the differential pressure.

Typical characteristic of air flow by differential pressure is below.

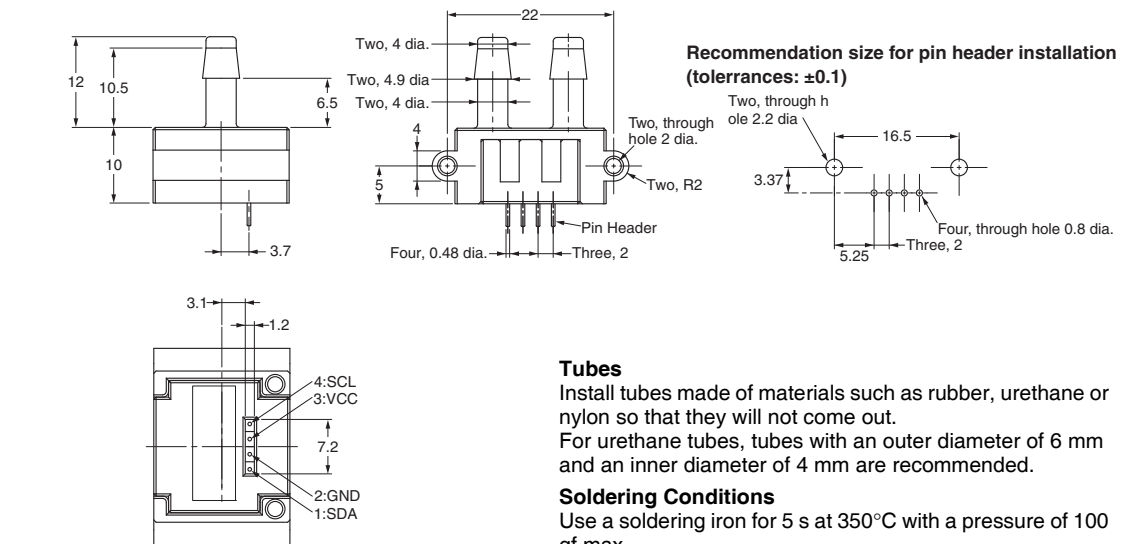
Relation between pressure and flow rate



Connections/Dimensions (Unit: mm)



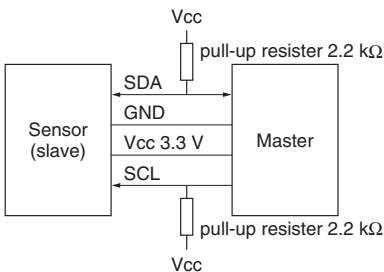
Mounting Direction
Install the Sensor so that the joints are facing upward.



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

		D6F-PH0025AD1 D6F-PH0505AD3 D6F-PH5050AD3	D6F-PH0025AD1-1 D6F-PH0505AD3-1 D6F-PH5050AD3-1	D6F-PH0025AD1-2 D6F-PH0505AD3-2 D6F-PH5050AD3-2	D6F-PH0025AD1-3 D6F-PH0505AD3-3 D6F-PH5050AD3-3
Serial Interface		I2C			
Master/Slave	HEX	0x6C	0x6D	0x6E	0x6F
	BIN (7bit)	0b110_1100	0b110_1101	0b110_1110	0b110_1111
Speed mode		Max. 400kHz (Fast Mode)			
Signal	SCL	Serial Clock			
	SDA	Data Signal			