

# Installation Instructions for the HPM Series Particle Sensors

**32322552**  
Issue A

## General Information

The Honeywell HPM Series Particle Sensor is a laser-based sensor which uses the light scattering method to detect and count particles in the concentration range of 0  $\mu\text{g}/\text{m}^3$  to 1,000  $\mu\text{g}/\text{m}^3$  in a given environment. A laser light source illuminates a particle as it is pulled through the detection

chamber. As particles pass through the laser beam, the light source becomes obscured and is recorded on the photo or light detector. The light is then analyzed and converted to an electrical signal providing particulate size and quantity to calculate concentrations in real time. The Honeywell particle sensor provides information on the particle concentration for given particle concentration range.

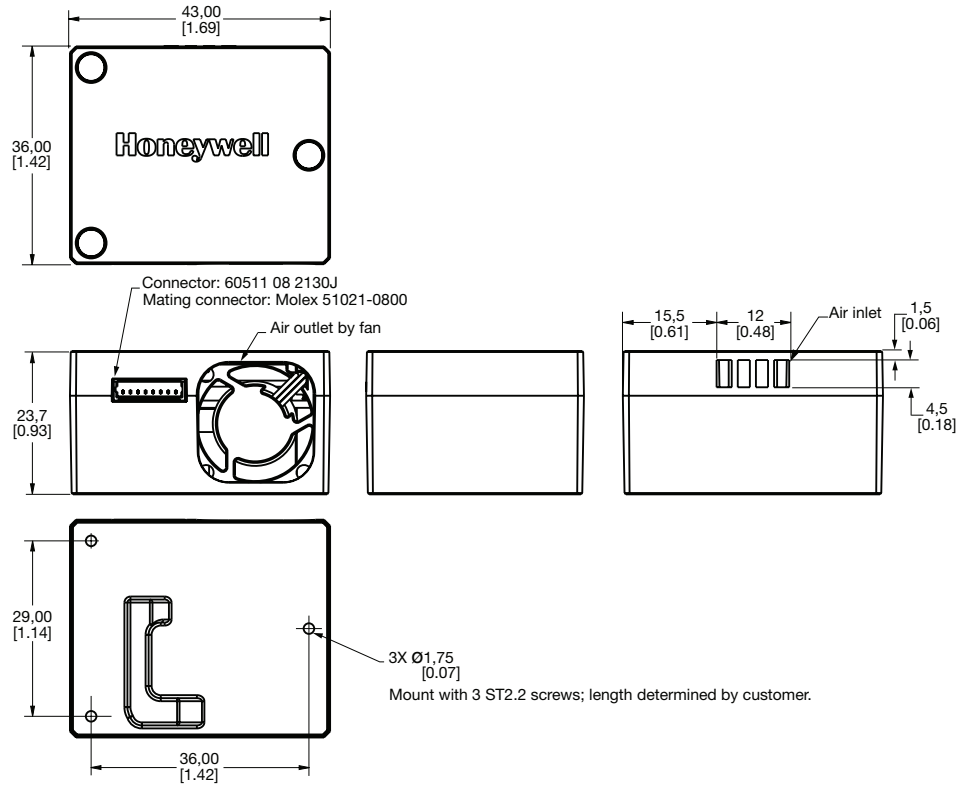
**Table 1. Specifications**

Characteristic	Parameter
Operating principle	laser scattering
Detection <sup>1</sup>	PM2.5 or PM10
Output data <sup>1</sup>	PM2.5 in $\mu\text{g}/\text{m}^3$ (PM10 in $\mu\text{g}/\text{m}^3$ with additional programming)
Concentration range	0 $\mu\text{g}/\text{m}^3$ to 1,000 $\mu\text{g}/\text{m}^3$
Accuracy (at 25°C $\pm$ 5°C): 0 $\mu\text{g}/\text{m}^3$ to 100 $\mu\text{g}/\text{m}^3$ 100 $\mu\text{g}/\text{m}^3$ to 1000 $\mu\text{g}/\text{m}^3$	$\pm$ 15 $\mu\text{g}/\text{m}^3$ $\pm$ 15 %
Response time	6 s
Supply voltage	5 V $\pm$ 0.2 V
Standby current (at 25°C $\pm$ 5°C)	<20 mA
Supply current (at 25°C $\pm$ 5°C)	<80 mA
Temperature: operating storage	-10°C to 50°C [-14°F to 122°F] -30°C to 65°C [-22°F to 149°F]
Humidity (operating and storage)	0 %RH to 95 %RH non-condensing
Output protocol <sup>2</sup>	UART; baud rate: 9600, databits: 8, stopbits: 1, parity: no
Operating time: continuous mode intermittent mode	20,000 hr depends on duty cycle
ESD	$\pm$ 4 kV contact, $\pm$ 8 kV air per IEC 61000-4-2
Radiated immunity	1 V/m (80 MHz to 1000 MHz) per IEC 61000-4-3
Fast transient burst	$\pm$ 0.5 kV per IEC61000-4-4
Immunity to conducted disturbances radiated emissions	3 V per IEC61000-4-6
Radiated emissions	40 dB 30 MHz to 230 MHz; 47 dB 230 MHz to 1000 MHz per CISPR 14
Conducted emissions	0.15 MHz to 30 MHz in compliance with CISPR 14

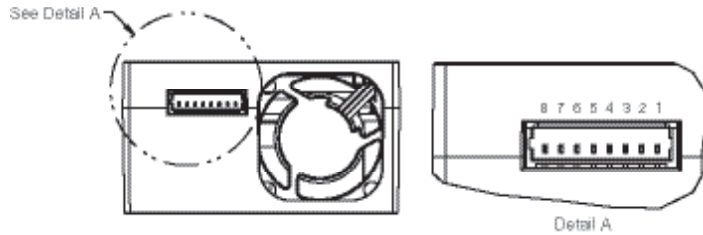
<sup>1</sup> PM2.5 is particulate matter  $\leq$ 2.5  $\mu\text{m}$  in diameter; PM10 is particulate matter  $\leq$ 10  $\mu\text{m}$  in diameter.

<sup>2</sup> Contact Honeywell for other output options.

**Figure 1. Mounting Dimensions (mm /[in] For reference only.)**



**Table 2. Connector Pinout**



Pin	Name	Description
1	+3.3 V	power output (+3.3 V/100 mA)
2	5 V	power input (5 V)
3	N/A	N/A
4	N/A	N/A
5	TEST	used for testing (NA)
6	TX	UART TX output (0 - 3.3 V)
7	RX	UART RX input (0 - 3.3 V)
8	GND	power input (ground terminal)

# Particle Sensors

## HPM Series

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### Product Installation

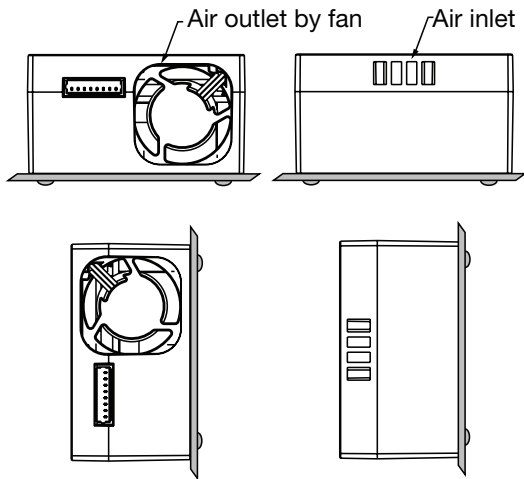
Install the product to the desired surface using the screws shown in Figure 2.

#### **NOTICE** **IMPROPER INSTALLATION**

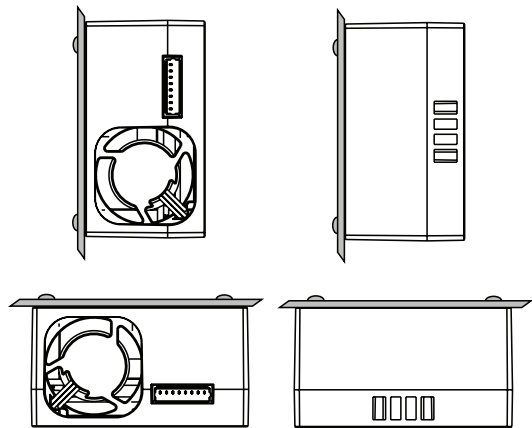
Particulate settling or accumulation at the air outlet or air inlet may affect product sensitivity. Ensure the HPM Series Particle Sensor is installed correctly according to Figure 2.

**Figure 2. Installation Orientation**

**Correct**



**Incorrect**



**Table 3. Customer Use Protocol**

Command Length (Bytes)	HEAD	LEN	CMD	Data	CS	Example
<b>Read Particle Measuring Results</b>						
Send	0x68	0x01	0x04	NA	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	68 01 04 93
Response, Pos ACK	0x40	0x05	0x04	“DF1, DF2, DF3, DF4 PM2.5 = DF1 * 256 + DF2 PM10 = DF3 * 256 + DF4”	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	40 05 04 00 30 00 31 56
Response, Neg ACK						0x9696
<b>Start Particle Measurement</b>						
Send	0x68	0x01	0x04	NA	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	68 01 01 96
Response, Pos ACK						0xA5A5
Response, Neg ACK						0x9696
<b>Stop Particle Measurement</b>						
Send	0x68	0x01	0x02	NA	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	68 01 02 95
Response, Pos ACK						0xA5A5
Response, Neg ACK						0x9696
<b>Set Customer Adjustment Coefficient</b>						
Send	0x68	0x02	0x08	DF1: 30 ~ 200 (Default, 100)	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	68 02 08 64 2A
Response, Pos ACK						0xA5A5
Response, Neg ACK						0x9696
<b>Read Customer Adjustment Coefficient</b>						
Send	0x68	0x01	0x10	NA	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	68 01 10 87
Response, Pos ACK	0x40	0x02	0x10	DF1: 30 ~ 200 (Default, 100)	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	40 02 10 64 4A
Response, Neg ACK						0x9696
<b>Stop Auto Send</b>						
Send	0x68	0x01	0x20	NA	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	68 01 20 77
Response, Pos ACK						0xA5A5
Response, Neg ACK						0x9696
<b>Enable Auto Send</b>						
Send	0x68	0x01	0x40	NA	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	68 01 40 57
Response, Pos ACK						0xA5A5
Response, Neg ACK						0x9696

<sup>1</sup>Life may vary depending on the specific application in which the sensor is utilized.

**⚠ WARNING  
PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

**Warranty/Remedy**

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