Honeywell

HPM Series
Particle Sensor

32322550
Issue B

Datasheet

FEATURES

- Laser-based light scattering particle sensing
- Concentration range: 0 µg/m³ to 1,000 µg/m³
- Fully calibrated
- EMC: Heavy industrial level IEC61000
- Response time: <6 s
- Supply current: 80 mA max.
- Output signal: UART (Universal Asynchronous Receiver/Transmitter)
- PM2.5 output (PM10 output optional with additional programming)
- RoHS compliant
- REACH compliant
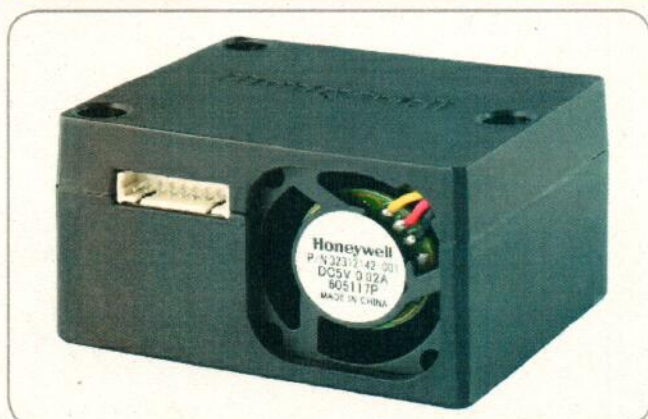
DESCRIPTION

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 µg/m³ to 1,000 µg/m³ 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.

POTENTIAL INDUSTRIAL APPLICATIONS

- HVAC:
  - Air conditioners
  - Air quality monitors
  - Environmental monitoring
- Consumer products:
  - Air cleaners
  - Air conditioners
  - Air purifiers
  - Car air cleaners
  - Handheld air quality detectors

VALUE TO CUSTOMERS

- Enables the ability to more accurately and cost-effectively monitor or control environmental particulate contaminates
- Industry-leading long life of 20,000 hours of continuous use essentially equates to seven years of product life (based on eight hours of operation per day)
- Proven EMC performance enables the ability to perform more accurately in a variety of tough industrial environments
- Enhanced reliability allows for use in harsh environments

DIFFERENTIATION

- Industry-leading long life of 20,000 hours provides stable operation and continuous use
- Proven EMC performance, based on IEC61000 stable operation, ±15% accuracy

Sensing and Internet of Things

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Particle Sensor
HPM Series

Table 1. Specifications

Characteristic	Parameter
Operating principle	laser scattering
Detection[1]	PM2.5 or PM10
Output data[1]	PM2.5 in µg/m³ (PM10 in µg/m³ with additional programming)
Concentration range	0 µg/m³ to 1,000 µg/m³

Accuracy (at 25°C ±5°C):
  0 µg/m³ to 100 µg/m³
  100 µg/m³ to 1000 µg/m³
	
	±15 µg/m³
	±15 %

Response time	6 s
Supply voltage	5 V ±0.2V
Standby current (at 25°C ±5°C)	<20 mA
Supply current (at 25°C ±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[2]	UART; baud rate: 9600, databits: 8, stopbits: 1, parity: no

Operating time:
  continuous mode
  intermittent mode
	
	20,000 hr
	depends on duty cycle

ESD	±4 kV contact, ±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	±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

[1] PM2.5 is particulate matter ≤2.5 µm in diameter; PM10 is particulate matter ≤10 µm in diameter.

[2] Contact Honeywell for other output options.

Figure 1. HPM Series Operation

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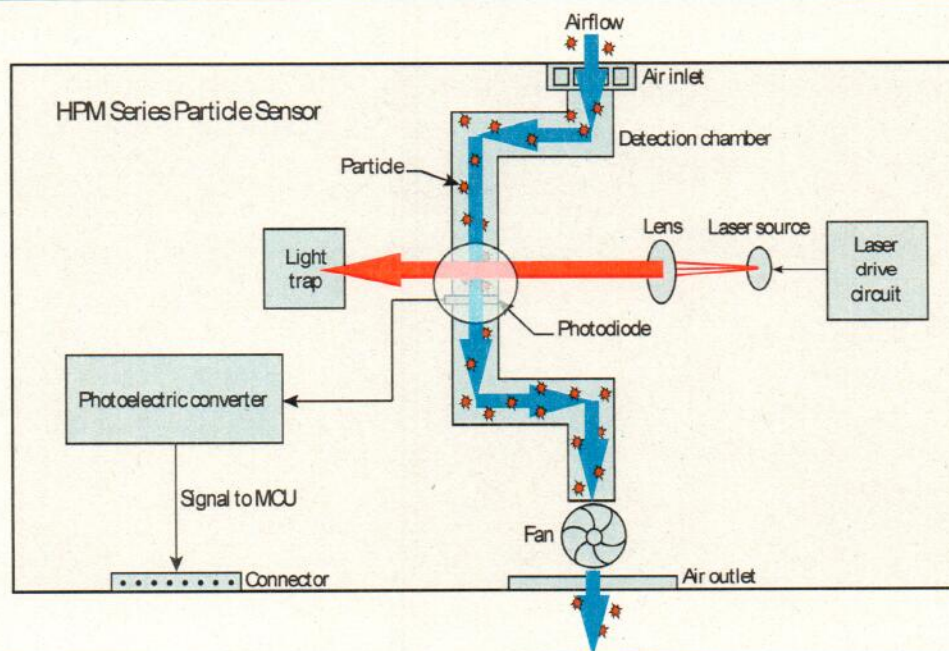
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Figure 2. Mounting Dimensions (mm/ [in] For reference only.)

Connector: 60511 08 2130J
Mating connector: Molex 51021-0800

Air outlet by fan

Air inlet

3X Ø1,75 [0.07]
Mount with 3 ST2.2 screws; length determined by customer.
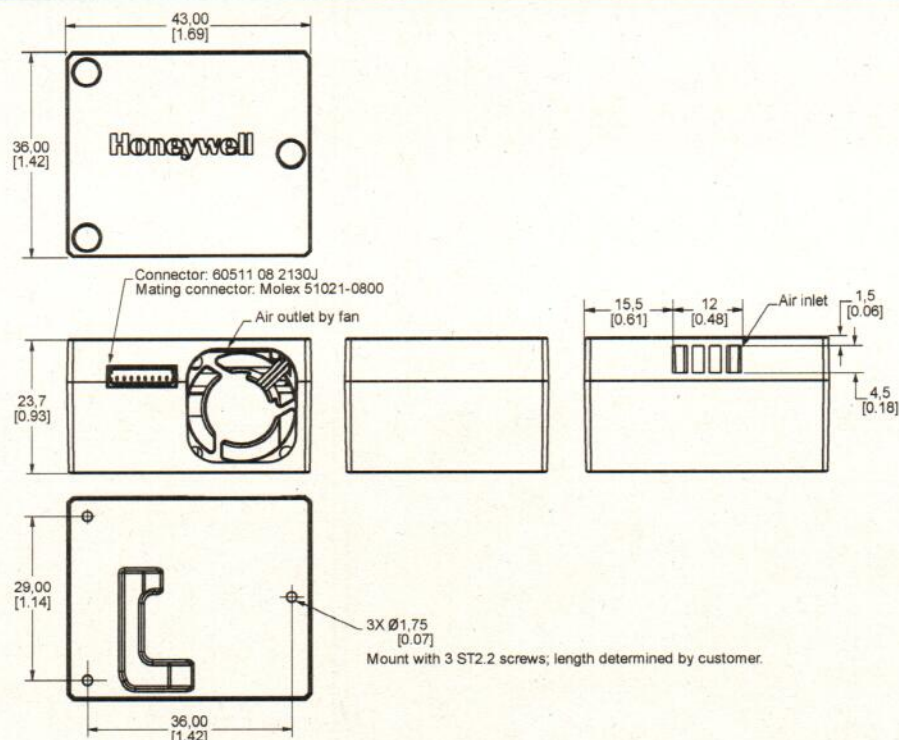
Table 2. Connector Pinout

See Detail A

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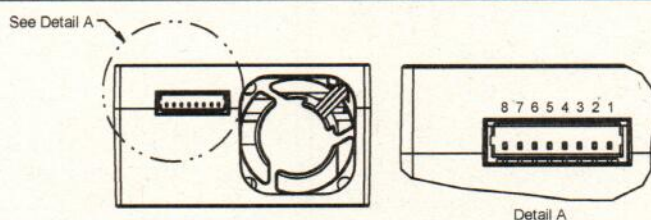
Pin	Name	Description
1	+3.3 V	power output (+3.3 V/ 100 mA)
2	5 V	power input (5 V)
3	N/A	N/A
4	N/A	N/A
5	TEST	used for testing (NA)
6	TX	UART TX output (0 🔲 3.3 V)
7	RX	UART RX input (0 🔲 3.3 V)
8	GND	power input (ground terminal)

Table 3. Order Guide

Catalog Listing	Description
HPMA115S0-XXX	HPM Series PM2.5 Particle Sensor with UART output

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Table 4. Customer Use Protocol

Command Length (Bytes)	HEAD	LEN	CMD	Data	CS	Example
Read Particle Measuring Results						
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	
Start Particle Measurement						
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	
Stop Particle Measurement						
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	
Set Customer Adjustment Coefficient						
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	
Read Customer Adjustment Coefficient						
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	
Stop Auto Send						
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	
Enable Auto Send						
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	

[1]Life may vary depending on the specific application in which the sensor is utilized.

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ADDITIONAL INFORMATION

The following associated literature is available on the Honeywell web site at sensing.honeywell.com:

- Installation instructions

Find out more

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

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