

# Honeywell Laser Particle Sensor Module HPM-Series

Datasheet



## DESCRIPTION

The Honeywell HPM-Series Particle Sensor is a laser-based sensor which detects and counts particles with the concentration range between 0-1,000µg/m<sup>3</sup> in a given environment based on the light scattering method. The 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 realtime.

The Honeywell particle sensor will provide information on the particle concentration for given particle detect range.

## VALUE TO CUSTOMERS

- Enable products to monitor or control environmental particulate contaminates accurately and cost effectively.
- Market-leading life expectancy of 20,000 hours of continuous use results in a 7 year quality guarantee (based on 8hr operating day) leading to longer product life.
- Proven EMC performance gives products the ability to perform accurately through a variety of heavy industrial environments, ensure product capability.

## DIFFERENTIATION

- Market-leading operating lifetime, stable work for over 20000 hours of continuous use
- Proved EMC performance based on IEC61000 Stable operation performance, max 15% error band compared to reference
- High Reliability, strictly test in different harsh environment

- Functionality includes options for both PM2.5 and PM10 Output.

## KEY FEATURES

- Laser scatter based sensing
- Sensing Range: 0~1000ug/m<sup>3</sup>
- Fully calibrated
- EMC: Heavy Industrial Level IEC61000
- Response time: <6ms
- Supply Current: Max 80mA
- Output Signal: UART, PM10 output as optional.
- RoHS, REACH compliant

## POTENTIAL APPLICATIONS

- Air Cleaner
- Air Conditioner
- Car Air Cleaner
- Air Quality Monitor
- Environmental Monitoring
- Handhold Air Quality Detector

## Table1 .SPECIFICATIONS

Honeywell PM2.5 Sensor Spec	
Working principle	Laser scattering
Detect range	PM2.5, PM10(Optional)
Concentration Range(max)	<1000ug/m <sup>3</sup>
Accuracy (Consistency)	>100ug/m <sup>3</sup> , ±15% <100ug/m <sup>3</sup> , ±15ug/m <sup>3</sup>
Response time	Ambient Room Conditions 6s
Supply voltage	5V±0.2V
Standby current	<20mA Ambient Room Conditions
Supply curent	<80mA Ambient Room Conditions
Operate temp&humidity	-10~50°C,0~95%RH
Storage temp&humidity	-30~65°C,0~95%RH
Output data	PM2.5 (default), PM10(Optional), concentration(unit ug/m <sup>3</sup> )
Output protocol	UART(default)
Operating time	Continuous mode: 20000H Intermittent mode: depend on duty cycle
Dimension	43*36*23.7mm

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EMC Rating	
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	0.15M-30M in compliance with CISPR 14

Table2 . Complete protocol

## Customer Use

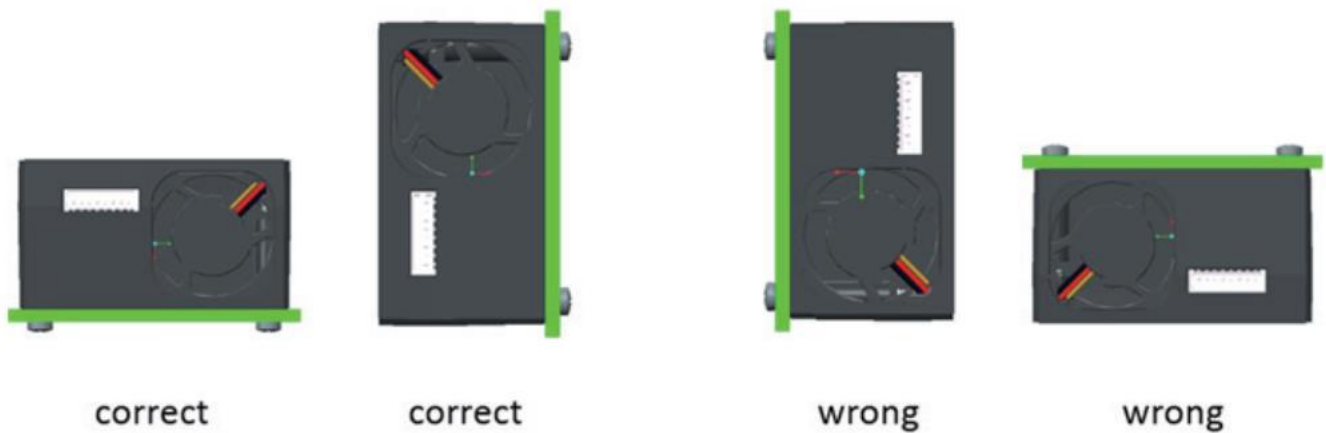
Command Length (Bytes)	HEAD	LEN	CMD	Data	CS	Example
<b>Read Particle Measuring Results</b>						
Send	0x68	0x01	0x04	NA	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256 )	68 01 04 93
Response, Pos ACK	0x40	0x05	0x04	"DF1, DF2, DF3, DF4 PM2.5 = DF1 * 256 + DF2 PM10 = DF3 * 256 + DF4"	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256 )	40 05 04 00 30 00 31 56
Response, Neg ACK	0x9696					
<b>Start Particle Measurement</b>						
Send	0x68	0x01	0x01	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					

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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					

Figure 1. Installation Guideline

When installing the product used in the system should ensure that the inlet, the outlet does not have a larger unobstructed airflow is on; and its two faces (2 kinds correct direction as shown below) can't be placed toward the installation, in order to avoid prolonged use of particle to accumulate in sensitive area affect test accuracy



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Figure 2. Mounting Dimension

Mounting Dimension shown as below

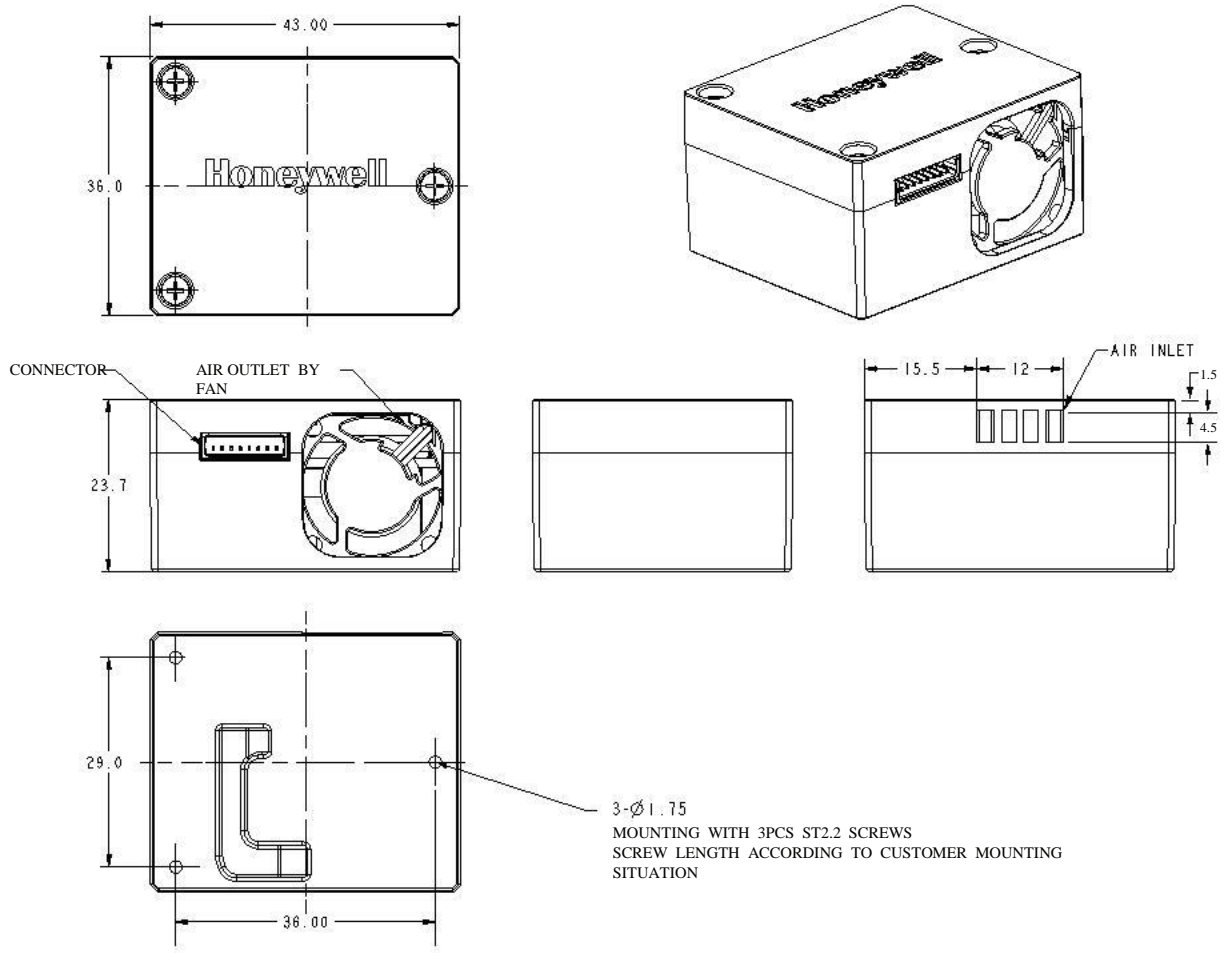


Figure 3. Nomenclature and Order Guide

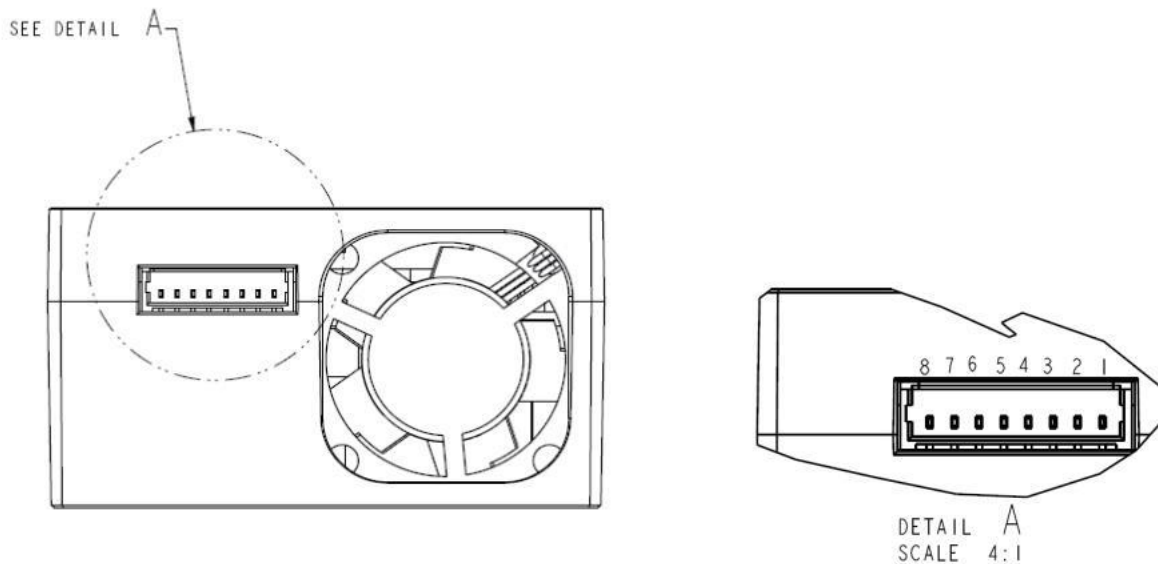
Proposed Nomenclature – Particle Sensor

Series	Vertical	Output Type	Accuracy	Power	Housing	Additional Features	Custom
HPM	A Appliance	1 UART	1 ±15%	3 3.3V	S Standard	0 None	XXX = general sales 001 = customized
	H HVT	2 I <sup>2</sup> C	2 ±10%	5 5V	C Compact	T Temperature and Humidity	
	D Heavy Industrial			A 12V		E Economic	

Example:

HPM A 1 1 5 S 0 XXX  
= HPM A115S0-XXX

Figure 4. Pin definitions



Connector P/N : 60511 08 2130J

Pin Table

No.	Item	Description
1	+3.3V	Power output(+3.3v/100mA)
2	5V	Power input(5V)
3	NA	NA
4	NA	NA
5	TEST	For testing (NA)
6	TX	UART-TX output(0-3.3V)
7	RX	UART-RX input(0-3.3V)
8	GND	Power input(ground terminal)

## ADDITIONAL INFORMATION

The following associated literature is available on the Honeywell web site at [sensing.honeywell.com](http://sensing.honeywell.com):

- Product Range Guide
- Product Line Guide
- Product Installation Instructions
- Technical Information

## **⚠**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.

## **⚠**WARNING

### MISUSE OF DOCUMENTATION

- The information presented in this datasheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

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

### Safety Alarm

The metal part of this product is connected to the internal circuit through DC GND. If anyone directly touches the DC GND of the machine, a safety issue will arise. Therefore, the sensor is required to be installed in a location where any human body cannot establish any direct contact, and can contact the sensor only after power is disconnected.

Product should not work in the condensation environment

### Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective.

The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

### Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors.

For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

To learn more about Honeywell Sensing and Productivity Solutions' products, call +1-815-235-6847 or 1-800-537-6945, visit [sensing.honeywell.com](http://sensing.honeywell.com), or e-mail inquiries to [info.sc@honeywell.com](mailto:info.sc@honeywell.com)

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