Honeywell

HPM Series
Particulate Matter Sensors

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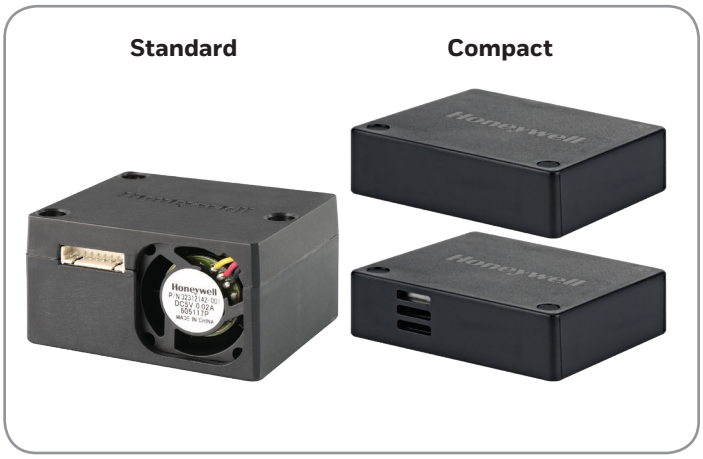
Issue F

Datasheet



DESCRIPTION

The Honeywell HPM Series Particulate Matter Sensor is a laser-based sensor which detects and counts particles using light scattering. The detection concentration range is 0 µg/m^3 to 1,000 µg/m^3. A laser light source illuminates a particle as it is pulled through the detection chamber. As particles pass through the laser beam, the light reflects off the particles and is recorded on the photo or light detector. The light is then analyzed and converted to an electrical signal to calculate particle concentration. The Honeywell particle sensor provides information on the particle concentration for given particle concentration range.

VALUE TO CUSTOMERS

- Enables the ability to more accurately and cost-competitively monitor or control environmental particulate
- Industry-leading long life of 10 years of continuous use
- Proven EMC performance enables the ability to perform more accurately in a variety of tough industrial environments
- Faster response time of <6 s allows the HPM Series to respond to environmental conditions in real time
- Enhanced reliability allows for use in harsh environments

FEATURES

- Laser-based light scattering particle sensing
- Concentration range: 0 µg/m^3 to 1,000 µg/m^3
- 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, PM10 output (standard); PM1.0, PM2.5, PM4.0, PM10 output (compact)
- RoHS compliant
- REACH compliant

DIFFERENTIATION

- Long life of 10 years offers a more stable operation for continuous usage
- Proven EMC performance, based on IEC61000 stable operation, ±15% accuracy (PM2.5)

POTENTIAL APPLICATIONS

- HVAC (commercial and residential)
- Indoor air quality monitors
- Handheld air quality monitors
- Air purifiers (commercial and residential)
- Automotive cabin air purifiers

Particulate Matter Sensors
HPM Series

Table 1. Specifications

Characteristic	Standard HPMA115S0-XXX 	Compact HPMA115C0-003 HPMA115C0-004
Operating principle	laser scattering	
Detection[1,2]	PM2.5, PM10	PM1.0, PM2.5, PM4.0, PM10
Output data[1, 2]	PM2.5 in µg/m³, PM10 in µg/m³	PM1.0 in µg/m³, PM2.5 in µg/m³, PM4.0 in µg/m³, PM10 in µg/m³
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**	**PM2.5:** ±15 µg/m³ **PM2.5:** ±15 %	**PM2.5:** ±15 µg/m³; **PM1.0, PM4.0, PM10:** ±25 µg/m³ **PM2.5:** ±15 %; **PM1.0, PM4.0, PM10:** ±25%;
Response time	<6 s	
Supply voltage[3]	5 V ±0.2 V	
Switching frequency max.	100 kHz	
Ripple amplitude max.	20 mV	
R.M.S noise max.	1 mV (noise bandwidth 10 MHz)	
Standby current (at 25°C ±5°C)	<20 mA	
Supply current (at 25°C ±5°C)	<80 mA	
Inrush current max. (at 25°C ±5°C)	600 mA	
Temperature: **operating** **storage**	-20°C to 50°C [-4°F to 122°F] -30°C to 65°C [-22°F to 149°F]	-20°C to 70°C [-4°F to 158°F] -40°C to 85°C [-40°F to 185°F]
Humidity (operating and storage)	0 %RH to 95 %RH non-condensing	
Output protocol[4]	UART; baud rate: 9600, databits: 8, stopbits: 1, parity: no	
Operating time: **continuous mode** **intermittent mode**	10 years depends on duty cycle	
Laser class	Laser Class 1: IEC/EN 60825-1: 650 nm	
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	
Dimensions (L X W X H)	43 mm x 36,00 mm x 23,7 mm [1.69 in x 1.42 in x 0.93 in]	44 mm x 36 mm x 12 mm [1.73 in x 1.42 in x 0.48 in]

[1] PM2.5 is particulate matter ≤2.5 µm in diameter; PM10 is particulate matter ≤10 µm in diameter.
[2] PM1.0 in µg/m³, PM4.0 in µg/m³, and PM10 in µg/m³ are calculated from PM 2.5 readings.
[3] Power supply output should contain one de-coupling capacitor (22 µF), and two ceramic capacitors (100 nF, 10 nF), if ripple amplitude max. or R.M.S. noise max. exceeds specifications.
[4] Contact Honeywell for other output options.

CLASS 1
LASER PRODUCT

Table 2. Order Guide

Catalog Listing	Description
HPMA115S0-XXX	HPM Series PM2.5 Particulate Matter Sensor, standard size, UART output
HPMA115C0-003	HPM Series PM2.5 Particulate Matter Sensor, compact size, UART output, air inlet and air outlet on same side
HPMA115C0-004	HPM Series PM2.5 Particulate Matter Sensor, compact size, UART output, air inlet and air outlet on opposite sides