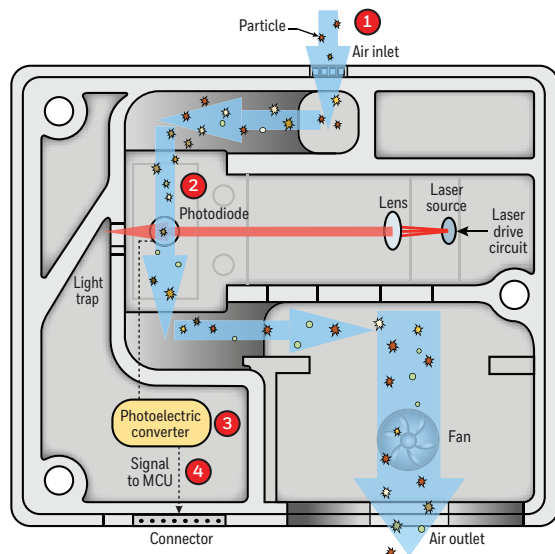


Particulate Matter Sensors

HPM Series

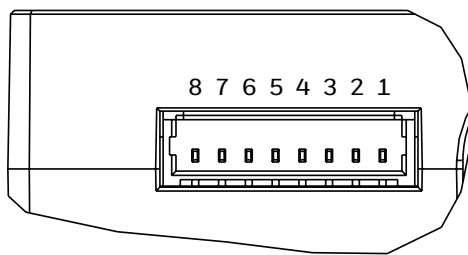
Figure 1. HPM Series Operation (standard version shown top down)



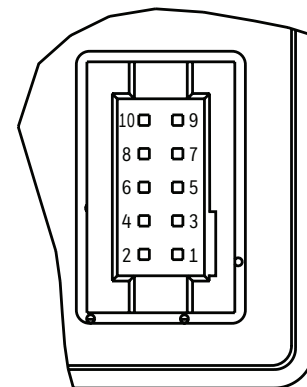
- 1 Fan draws in air through inlet.
- 2 Air passes through the laser where the light reflected off the particles is captured by the photodiode.
- 3 The photodiode passes information to the photoelectric converter. The photoelectric converter processes the signal from the particles into density.
- 4 Signal is transmitted to micro control unit where a proprietary algorithm processes the data and supplies outputs for the density of the particulate ($\mu\text{g}/\text{m}^3$).

Table 3. Standard and Compact Connector Pinout

Standard



Compact



Pin	Name	Description	Pin	Name	Description
1	V _{OUT}	power output (+3.3 V/100 mA)	1	V _{OUT}	power output (+5 V) (output max.: 300 mA)
2	V _{CC}	power input (5 V)	2	V _{CC}	power input (+5 V)
3	N/A	N/A	3	GND	ground
4	N/A	N/A	4	GND	ground
5	RES	reserved for future use	5	RES	reserved for future use
6	TX	UART TX output (0 V - 3.3 V)	6	N/A	N/A
7	RX	UART RX input (0 V - 3.3 V)	7	RX	UART RX input (0 V - 3.3 V)
8	GND	ground	8	N/A	N/A
-	—	—	9	TX	UART TX output (0 V - 3.3 V)
-	—	—	10	SET	reserved for future use

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Table 4. Standard Version Customer Use Protocol¹

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	0x01	NA	CS = MOD ((65536-(HEAD+LEN+CMD+DATA)), 256)	68 01 01 96
Response, Pos ACK	0xA5A5					
Response, Neg ACK	0x9696					
Stop Particle Measurement ²						
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 ³						
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					

¹Product life may vary depending on the specific application in which the sensor is utilized.

²Shuts down the fan, helping to extend the life of the product.

³See Table 6 for data format.