



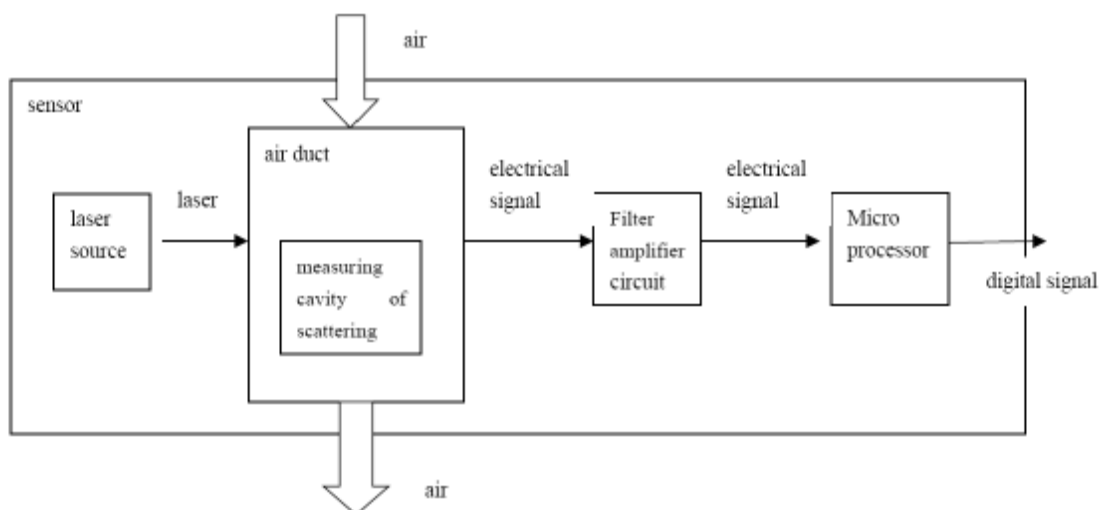
## DL0003-000

# SPECIFICATIONS

■ **Model: DL03-F05H-01**

■ **Introduction**

The Laser Dust Sensor is used to measure the concentration of suspended particles in the air with different sizes (including PM2.5). It uses a laser diode as the light source to illuminate the sampling air boosted by the blower. When the small particles in the air enter the illuminated area, the laser beam is scattered. The scattered light is received by a photodetector and converted into current signal which is amplified and processed then to indicate the concentration of particles. A built-in microprocessor converts it into mass concentration ( $\mu\text{g}/\text{m}^3$ ) and outputs the signal via universal digital interface

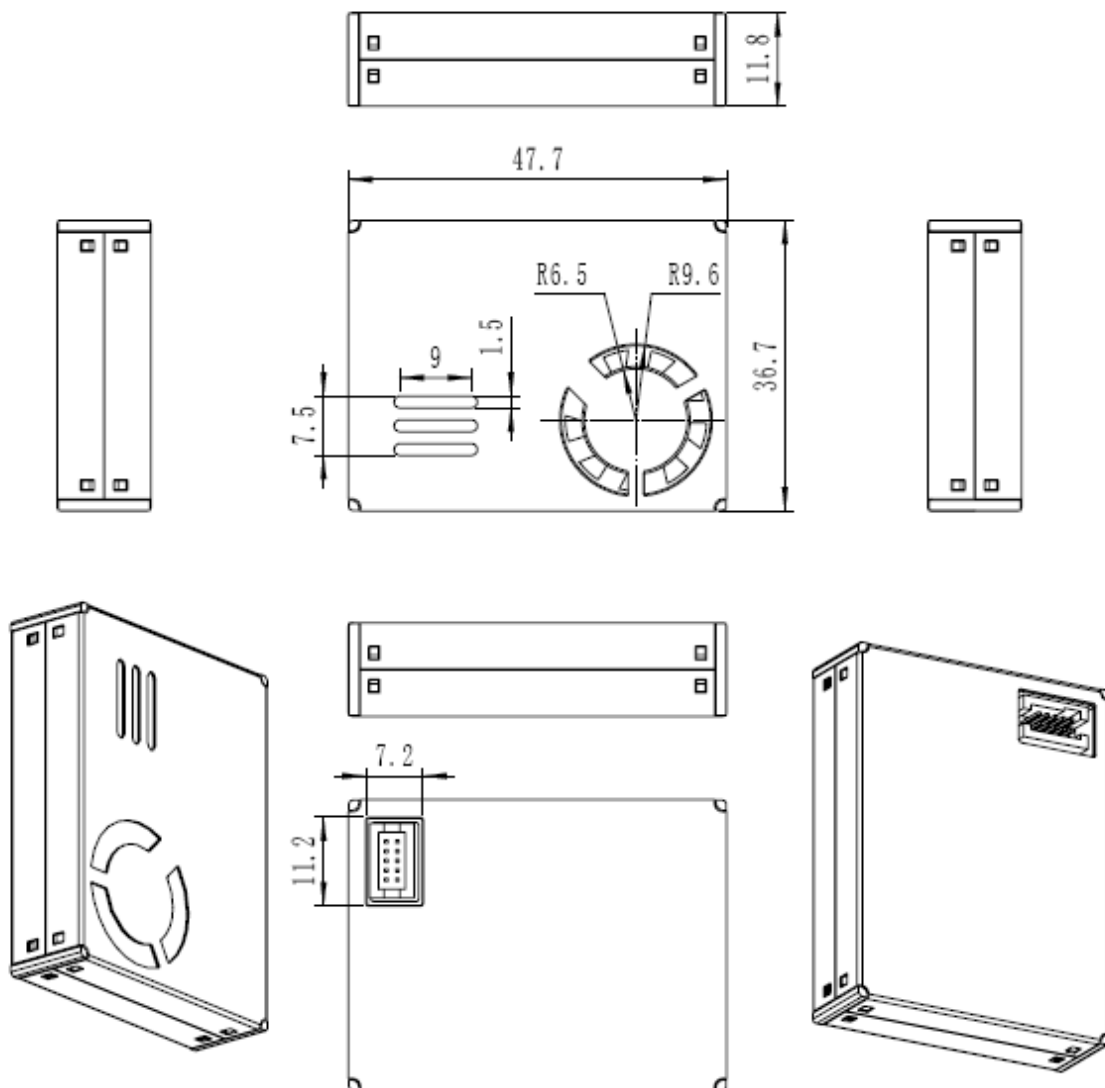


Product Function Block Diagram

■ Applications

- Ventilation system
- Air purifier
- Air quality monitor
- Automotive air purification
- Air conditioner
- Other home appliances

■ Appearance & Dimensions (Unit: mm)



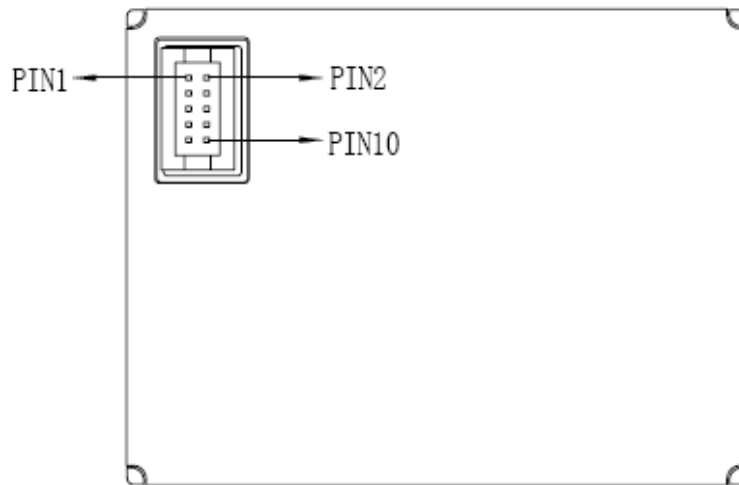
■ Technical Parameters

Item	Parameter	Unit	Test conditions(T=25° C)
Measuring range of particles	0.3~1.0; 1.0~2.5; 2.5~10	µm	
Effective range of particle mass concentration	0~500	µg/m <sup>3</sup>	Audiowell Laser Sensor Test System(25±5°C, 50±10%RH)
Maximum range of particle mass concentration	999	µg/m <sup>3</sup>	Audiowell Laser Sensor Test System(25±5°C, 50±10%RH)
Resolution	1	µg/m <sup>3</sup>	
Consistency (PM2.5 standard value)	0 ~ 100 µg/m <sup>3</sup> : ± 10 100 ~ 500 µg/m <sup>3</sup> : ± 10%		Audiowell Laser Sensor Test System(25±5°C, 50±10%RH)
Single measurement response time	1	s	Audiowell Laser Sensor Test System(25±5°C, 50±10%RH)
Total response time	≤10	s	
DC power supply voltage	5.0	V	DC regulated power supply
Working current	≤100	mA	DC regulated power supply
Data interface level	L <0.8 @3.3 H >2.7@3.3	V	
Working temperature range	-10~+50		Test chamber of constant temperature and humidity
Working humidity range	35~85%		Test chamber of constant temperature and humidity
Storage temperature range	-40~+80		
Mean time to failure	≥3 years		
Maximum size	48×37×12	mm	Vernier caliper

Remark: Effective range is the measurement range to ensure product consistency.

Maximum range is the maximum value of the product output data.

■ **Wiring Diagram**



Pin No.	Function Symbol	Illustration
PIN1	VCC	Positive power supply
PIN2	VCC	Positive power supply
PIN3	GND	Negative power supply
PIN4	GND	Negative power supply
PIN5	RESET	Reset signal/TTL level@3.3V low to reset
PIN6	NC	
PIN7	RX	Serial port receive/TTL level@3.3V
PIN8	NC	
PIN9	TX	Serial port transmit/TTL level@3.3V
PIN10	SET	Set the pin / TTL level @3.3V, high level or no connection for normal working state, low level for resting state

■ **Precautions**

1. The metal case should be connected with the internal power ground. Be careful not to short it with other external board circuits or the cases of chassis.
2. The optimal installation method is to place the plane where the air intake and outlet are located close to the air vent which connects the inner wall of the machine and outside. If this condition can

not be achieved, make sure there is no obstruction within 2cm around the air outlet. There should be a structure between the inlet and outlet to isolate the air flow in order to prevent the air flow from flowing back directly from the outlet to the inlet in the user machine.

3. The size of the vent opened in the inner wall of the user machine for the air inlet should not be smaller than the air inlet of the sensor .
4. When applying the sensor to air purifiers, avoid mounting it in the purifier’s air duct directly. If this condition cannot be achieved, the sensor should be installed in a separate structure to be isolated from the air duct of the purifier.
5. When applying the sensor to purifiers and fixed test equipment, the sensor should be placed 20cm or higher above the ground, otherwise it may be polluted by the large dust particles and even floc near the ground. In this case, which may cause the fan to stop rotating.
6. When the sensor is applied in outdoor fixed equipment, the equipment itself should have the function of defending sandstorm, rain and snow weather and catkins.
7. Do not dismantle the sensor, including the metal shield shell,in case of irreversible damage.
8. The data tends to be stable 10s after the sensor is powered up. If an intermittent operation mode is used for longer working life or other purposes, in order to ensure the accuracy of data, the working duration is recommended to be longer than 10s.

**■ Appendix**

Annex A: DL0001-000 Active transmission protocol

<b>Serial port protocol</b>	
Baud rate	9600
Data bit	8
Check bit	None
Stop bit	1
Data output mode	One transmission per second

start symbol 1	0x42	
start symbol 2	0x4d	
Frame length of high eight bits	.....	Frame length = 2 x 13 + 2 ( data + check bit )
Frame length of low eight bits	.....	
Data 1 high eight bits	.....	reserve interfaces
Data 1 low eight bits	.....	
Data 2 high eight bits	.....	reserve interfaces
Data 2 low eight bits	.....	
Data 3 high eight bits	.....	reserve interfaces
Data 3 low eight bits	.....	
Data 4 high eight bits	.....	Data 4 indicates PM1.0 concentration (in the atmosphere environment) unit: $\mu\text{g}/\text{m}^3$
Data 4 low eight bits	.....	
Data 5 high eight bits	.....	Data 5 indicates PM2.5 concentration (in the atmosphere environment) unit: $\mu\text{g}/\text{m}^3$
Data 5 low eight bits	.....	
Data 6 high eight bits	.....	Data 6 indicates PM10 concentration (in the atmosphere environment) unit: $\mu\text{g}/\text{m}^3$
Data 6 low eight bits	.....	
Data 7 high eight bits	.....	reserve interfaces
Data 7 low eight bits	.....	
Data 8 high eight bits	.....	reserve interfaces
Data 8 low eight bits	.....	
Data 9 high eight bits	.....	reserve interfaces

Data 9 low eight bits	.....	
Data 10 high eight bits	.....	reserve interfaces
Data 10 low eight bits	.....	
Data 11 high eight bits	.....	reserve interfaces
Data 11 low eight bits	.....	
Data 12 high eight bits	.....	reserve interfaces
Data 12 low eight bits	.....	
Data 13 high eight bits	.....	Version number
Data 13 low eight bits	.....	Error code, see Annex B for details
Check sum of high eight bits	.....	Check sum=Start symbole1+Start symbole2+...+Data 13 low eight bits
Check sum of low eight bits	.....	

Annex B: Error Code:

Error code value	The state of sensor
0x00	Sensor is in normal operation
0x01	The module is initializing
0x02	The fan stops working

**Annex B:Sensor Slave machine Extension Command Protocol**

**1. Host communication protocol format**

Feature byte 1	Feature byte2	Instruction byte	Status byte1	Status byte2	Verify byte1	Verify byte2
0x42	0x4d	CMD	DATAH	DATAL	LRCH	LRCL

**2.Destination of the instruction byte and feature byte**

CMD	DATAH	DATAL	Remark
0xe2	X	X	Passive reading

0xe1	X	00H-Passive 01H-Active	State switching
0xe4	X	00H-Standby mode 01H-Normal mode	Standby control

**3.Instruction response**

0xe2:response 32 byte,same as the sensors specification protocol;

**4.The generation of Verify byte.**

All bytes are accumulate summed from the feature word (without the check word).