

Air Quality Sensor

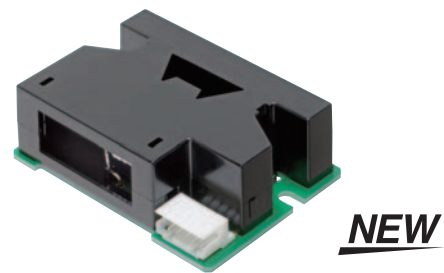
B5W-LD0101-1/2

Highly Sensitive and Compact Air Quality Sensor

- Detection of particles down to 0.5 μm in diameter is possible while using an LED light source
- Features a unique flow path structure that efficiently sucks in air
- Small in size thanks to its compact optical system

RoHS Compliant

 Be sure to read Safety Precautions on page 4.



Model Number Structure

B5W-

L

D

01

01

-

(1)

(2)

(3)

(4)

(5)

- (1) Standard type

L: Optical sensor

(2) Sensor type

D: Air Quality sensor
- (3) Structure

01: Basic structure

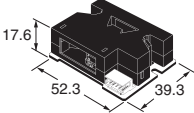
(4) Function

01: Basic function
- (5) Packing state

1: 1

2: 300

Ordering Information

Appearance	Sensing method	Connecting method	Output type	Model	Packing state
	Light scattering	Connector	Pulse output (Built-in pull-up resistor 3 k)	B5W-LD0101-1	1
				B5W-LD0101-2	300

Ratings, Characteristics and Exterior Specifications

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Ratings	Unit
Supply voltage	V _{CC}	5.5	V
Input threshold voltage	V _{th}	5.5	V
Operating temperature	T _{opr}	0 to 45	°C
Storage temperature	T _{stg}	-25 to 65	°C

Exterior Specifications

Connecting method	Weight (g)	Material	
		Case	Lens
Connector	20	PC	PMMA

Electrical Characteristics (Ta=25°C, V_{CC}=5 V, 0 Lx)

Parameter	Characteristics value			Unit	Remarks
	MIN	TYP	MAX		
V _{CC}	4.5	5	5.5	V	Ripple voltage range 30 mV or less (*) is recommended
V _{th}	0	---	3.5	V	
V (OUT1)/ V (OUT2) Hi level output	4.5	---	---	V	Pulse output when particles are detected
V (OUT1)/ V (OUT2) Low level output	---	---	0.7	V	Pulse output when particles are not detected
Supply current	---	---	90	mA	LED-ON

* Ensure there is no noise below 300 Hz.

Confirm the allowable ripple voltage value using an actual machine.

Detection Characteristics (Ta=25°C, V_{CC}=5 V, 0 Lx)

Parameter		Characteristics value			Unit	Remarks
		MIN	TYP	MAX		
V (OUT1) Number of detections	PN1	---	300	---	count	Model of dust monitor: TSI DUSTTRAK II MODEL8530 Impactor: 1.0 μm Dust concentration = 100 μg/m ³ Measurement time: 20 sec Threshold voltage: V _{th} =0.5 V
V (OUT2) Number of detections	PN2	0	---	---	count	Detection object: 0.5 μm Polystyrene latex particles

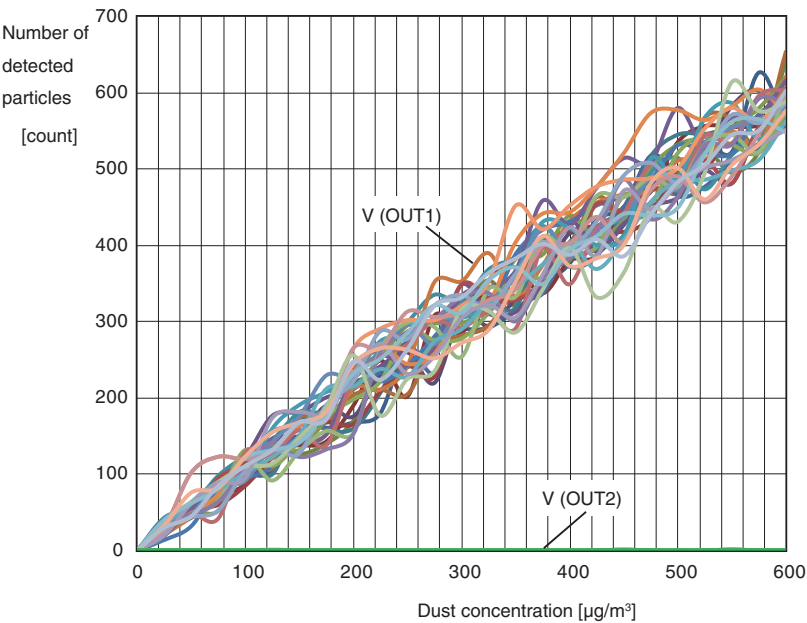
Minimum detectable particle

V (OUT1): Approx. 0.5 μm or larger

V (OUT2): Approx. 2.5 μm or larger

Engineering Data (Reference value)

Dust concentration - Number of Detected Particles Correlation Graph



Measurement environment

Dust monitor Model: TSI DUSTTRAK II MODEL8530
Impactor: 1.0 µm, Calibration factor=1
Air Quality Sensor Threshold voltage: 0.5 V
Measurement time: 20 sec
Detection object: Smoke of incense
Conditions: Ta=25°C, Vcc=5 V, 0 Lx
Note: The above figure shows reference information from 30 pcs measurement.

Output Signals

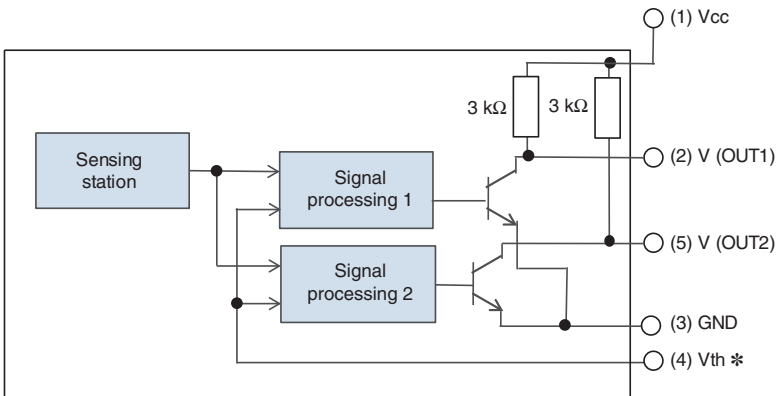
High

V (OUT1), V (OUT2)

Low

- A positive pulse of 0 V is output when particles are not detected and 5 V when particles are detected
- Count the number of pulses within the measurement time and take this number to be the sensor count.
- The minimum pulse width is 0.5 msec.
- Use a sampling frequency of 4 kHz or more.

Internal Block Diagram



* For operation, the input threshold voltage Vth must be set to between 0.5 and 3.0 V. The recommended threshold voltage Vth is 0.5 V, which is same detection characteristics for ratings, characteristics and exterior specifications.

Safety Precautions

To ensure safe operation, be sure to read and follow the Instruction Manual provided with the Sensor.

CAUTION

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.



Precautions for Safe Use

Do not use the product with a voltage or current that exceeds the rated range.

Applying a voltage or current that is higher than the rated range may result in explosion or fire.

Do not miswire such as the polarity of the power supply voltage.

Otherwise the product may be damaged or it may burn.

This product does not resist water. Do not use the product in places where water or oil may be sprayed onto the product.

When installing, arrange so that the heater portion cannot be accessed by the end user.

Precautions for Correct Use

Do not use the product in atmospheres or environments that exceed product ratings.

Treat this product as industrial waste when disposing.

Mounting posture: Use this product standing vertically (within $\pm 3^\circ$).

Install with the suction inlet facing downwards and the exhaust outlet facing upwards. Ensure that a space that is the same as that specified on the following page is secured in order to prevent the suction inlet and exhaust outlet from becoming clogged with dust.

So that the detection area will be completely dark, place a cap over the lens cleaning window.

Stable measurements can be performed approximately 1 minute after the power supply is turned on.

Remove any debris adhered to the lens using a dry cotton swab.

When installing, arrange so that the heater portion cannot be accessed by the end user.

Do not use organic solvents as they may alter lens properties.

Elements of this product may be damaged or its reliability may decrease due to surges in voltage caused by static electricity, etc. When handling, take measures to prevent static electricity, such as using wristbands or static electricity preventing gloves.

Never insert or remove connectors while the power supply is on.

Do not touch the pre-set resistors for adjusting sensor sensitivity.

Do not apply mechanical stress to this product. Doing so could result in damage to the product or defective sensor properties. Also, sufficiently confirm that no such defects have occurred when using while mounted to your products.

Be aware that injuries may occur if sharp portions such as the lead of the soldered surface or the edge of the circuit board are touched when handling this product. When handling this product, take care to prevent the lens surface from being scratched or becoming dirty. Failure to do so may result in changes to sensor properties. Also, ensure that there is no freezing or condensation.

When inserting or removing connectors, do so in a level and perpendicular manner. Never insert or remove connectors by twisting vertically, horizontally, or in a slanted manner. When inserting connectors, ensure that they are fully inserted.

Do not use products that have been dropped. Doing so could result in damage to the product or defective sensor properties.

Only use after determining that usage is possible by sufficiently evaluating for the following changes in properties.

- (a) Temperature properties (if there are changes in ambient temperature when using this product, changes in output from that sensor)
- (b) Response properties (sensor output changes due to sampling timing when using this product)
- (c) Freezing/condensation conditions (if freezing or condensation occur when using this product, changes in output from that sensor)

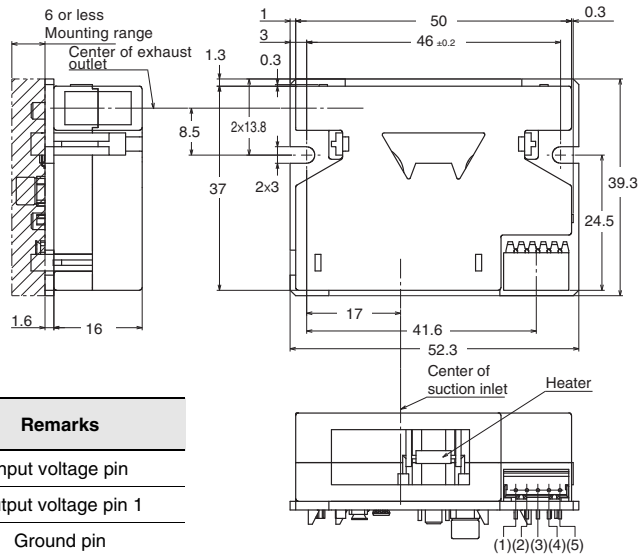
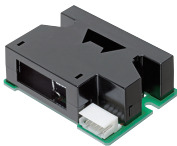
Defects and damage caused by these changes in properties shall not be covered by warranty.

Dimensions

(Unit: mm)

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Unless otherwise specified, the tolerances are as shown below.

Dimensions	Tolerance
3 mm max.	±0.20
3 < mm 6	±0.24
6 < mm 10	±0.29
10 < mm 18	±0.35
18 < mm 30	±0.42
30 < mm 50	±0.50
50 < mm 80	±0.60

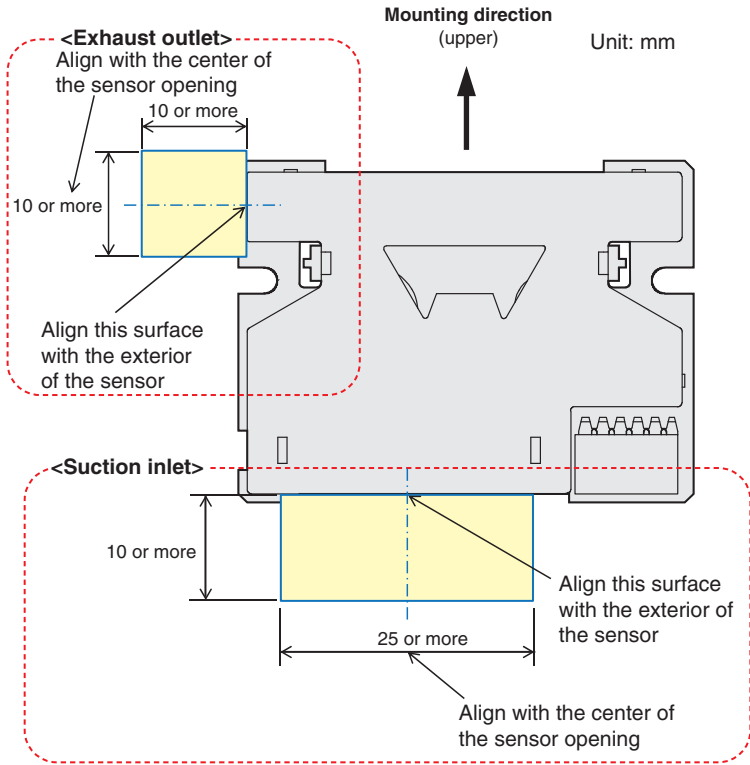
Note: Dimensions in parentheses are for reference only.

Pin	Terminal name	Remarks
(1)	V _{CC}	Input voltage pin
(2)	V (OUT1)	Output voltage pin 1
(3)	GND	Ground pin
(4)	V _{th}	Input threshold voltage pin
(5)	V (OUT2)	Output voltage pin 2

Connector on circuit board side: AMP 292164-5
Number of terminals: 5 pin
Recommended mating connectors: AMP173977-5

Mounting Conditions

The recommended dimensions for the suction inlet and exhaust outlet of the Air Quality Sensor are as follows.
Mount the Sensor with the suction inlet down and the exhaust outlet up as shown in the figure below.
Secure the spaces shown in the figure.



Note1: Ensure that the suction inlet and exhaust outlet are as close to the sensor case in the forward and rear directions as possible
Note2: Install to the flat part using an M3 screw with a tightening torque of 0.54 N·m or less.

Application examples provided in this document are for reference only. In actual applications, confirm equipment functions and safety before using the product. Consult your OMRON representative before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems or equipment that may have a serious influence on lives and property if used improperly. Make sure that the ratings and performance characteristics of the product provide a margin of safety for the system or equipment, and be sure to provide the system or equipment with double safety mechanisms.

Note: Do not use this document to operate the Unit.