

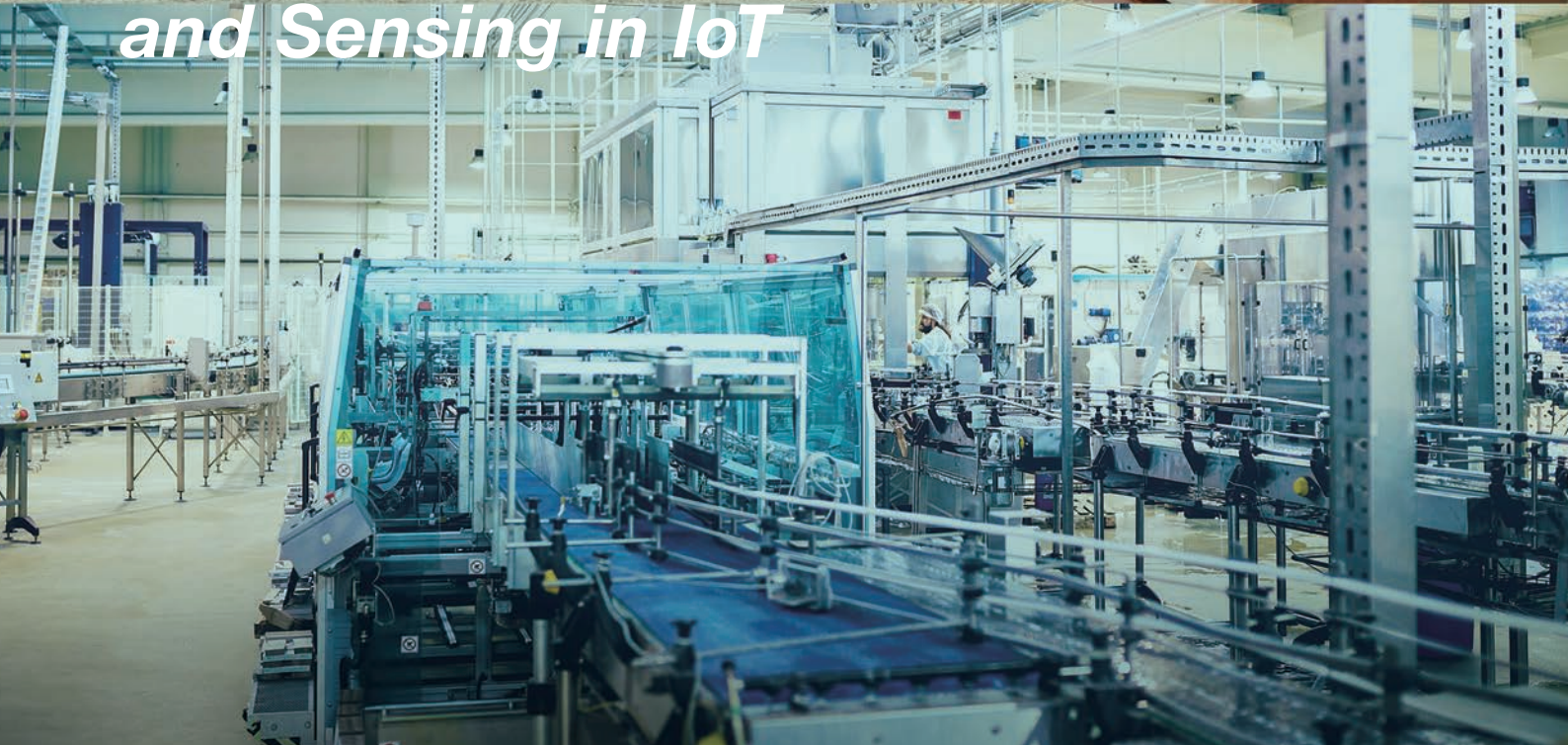
OMRON

Environment Sensor 2JCIE Series

Series Catalog



*For greater Simplicity in Connectivity
and Sensing in IoT*



Integrating various sensing capabilities into one single IoT sensor

Convenient

Combines Bluetooth® low energy technology with different sensing capabilities. Immediately available for your use.

Multitask

Multiple sensing capabilities in one package. Users can choose different locations to sense the surrounding environment.

Reliable

All sensing data is stored in the internal memory of the device. Users can access it at all times without having to worry about loss of data.



Sensor functions



Temperature



Humidity



Light



UV Index



Barometric Pressure



Noise



Acceleration



VOC

Environment Sensor

Omron's environment sensor is a multi-function sensing component capable of tracking eight different environmental factors which include: temperature, humidity, light, UV index, barometric pressure, noise, acceleration and VOC (Volatile Organic Compounds) with wireless communication functionality in an ultra-small footprint.

Applications

HOME

- Monitoring living spaces
- Heatstroke prevention
- Family safety
- For a good night's sleep



OUTSIDE

- Heatstroke and UV intensity alert
- Detection of changes in weather conditions



OFFICE

- Monitoring office environment
- Maintaining comfortable workplace environment



FACTORY

- Maintaining the quality of factory environment



Make it Simple to Connect and

Choose from three types of sensors based on your needs.

Powered from a USB port, allowing the sensor to run continuously

USB type

2JCIE-BU01



Portable battery-operated type that can be used in your choice of location

Bag-shaped type

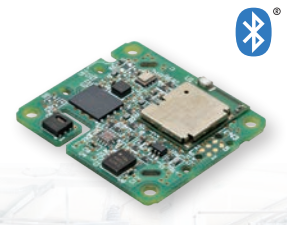
2JCIE-BL01



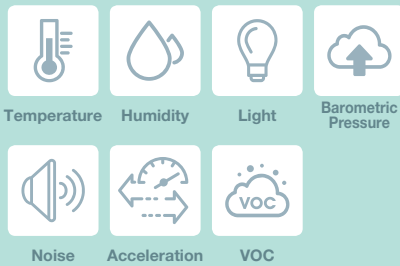
Embedded type for design optimization

PCB type

2JCIE-BL01-P1



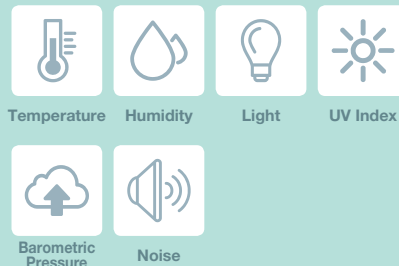
Sensor functions



Data logging

60,000 times
(Ex. Approx. 7 months of data storage with 5 minutes logging interval)

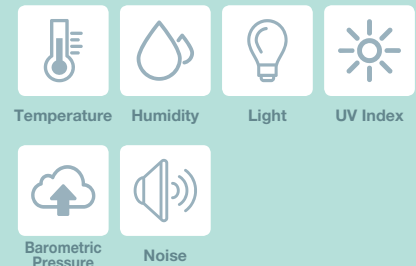
Sensor functions



Data logging

26,624 times
(Ex. Approx. 3 months of data storage with 5 minutes logging interval)

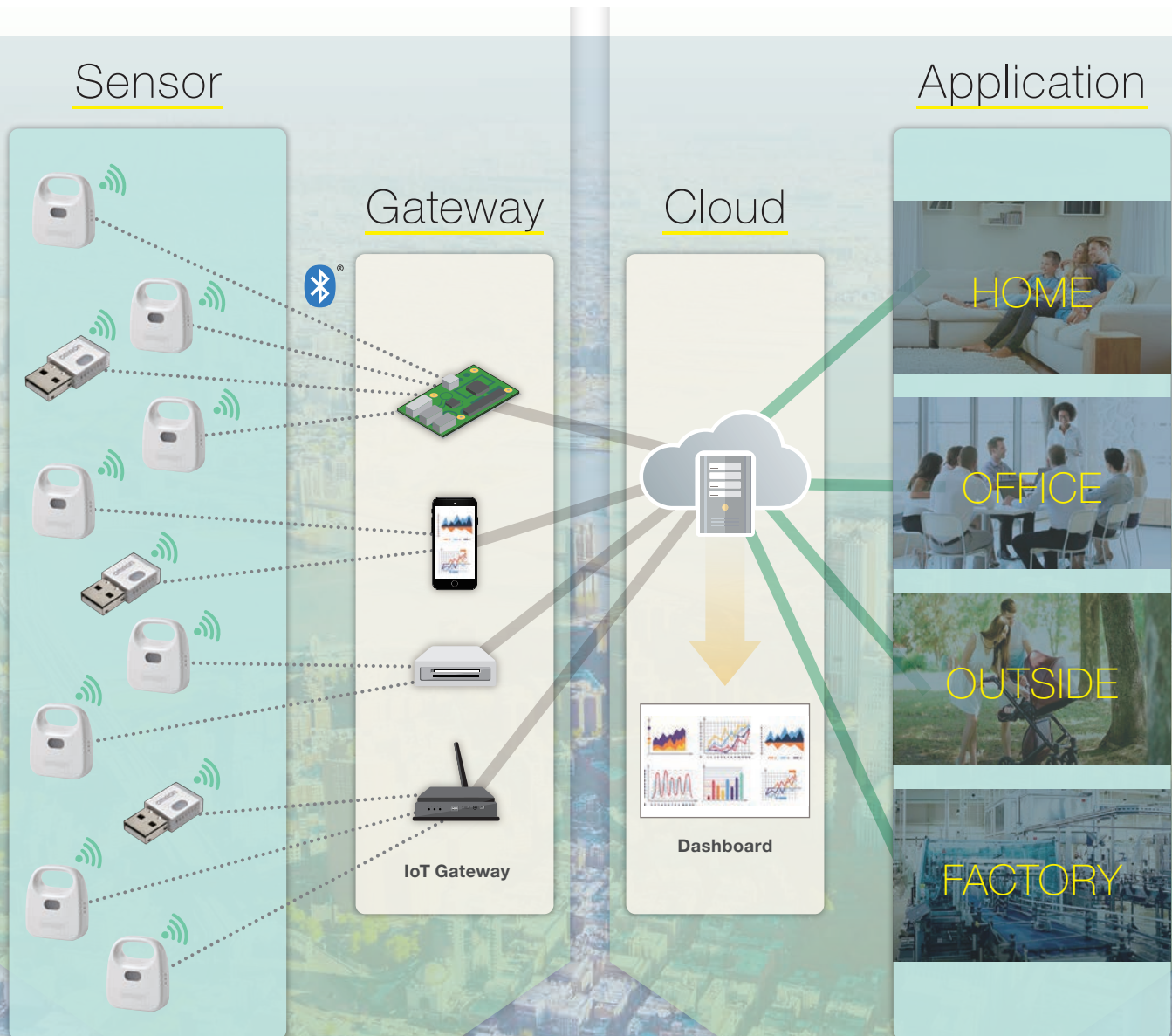
Sensor functions



Data logging

26,624 times
(Ex. Approx. 3 months of data storage with 5 minutes logging interval)

Measure in IoT



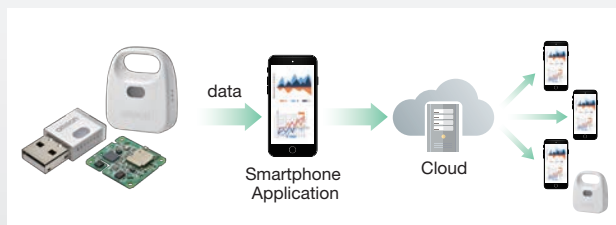
Sensor beacon mode allows sending of data to IoT gateway devices

- Beacon transmits environmental data (broadcasting).
- Users can configure their own applications.



Cloud collaboration accessible on smartphones

- The amount of data captured on smartphones can be stored in the cloud.
- Environmental data can be checked from smartphones in remote locations.



Omron's Environment Sensor assists a comfortable living environment

Heatstroke Risk Levels

Heatstroke risk level is determined by air temperature and humidity. Users can estimate the risk of heat while performing day-to-day activities.



Discomfort Index

The discomfort index is calculated from the air temperature and humidity to help users realize the importance of maintaining a comfortable environment.



[Guideline for action limits]

Excerpt from the Ministry of the Environment website Heat Illness Prevention Information about the "heat stress index (WBGT)"

Reference temperature WBGT*	Heat stress precautions	Awareness guide
Danger 31°C or above (88°F or above)	Dangerous heat for all activities.	Especially dangerous to senior citizens, even if they are just resting. Avoid going outside and stay indoors in cooler places.
Severe warning 28°C – 31°C (82°F – 88°F)		Stay out of the blazing sun and be aware of indoor ambient temperature rise.
Warning 25°C – 28°C (77°F – 82°F)	Dangerous heat for activities that involve moderate to strenuous physical exercises.	Take adequate rest periods during physical training and strenuous work.
Caution Below 25°C (Below 77°F)	Dangerous heat for activities that involve vigorous physical exercises.	Risk is low but still exists on the basis of vigorous exercises and hard labor.

*WBGT: The Wet Bulb Globe Temperature is a measure of the heat stress in direct sunlight that can be used to monitor environmental and working conditions and is the basis for an international standard (e.g. ISO)

Relative humidity (%)

	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
40	29	30	31	32	33	34	35	35	36	37	38	39	40	41	42	43	44
39	28	29	30	31	32	33	34	35	35	36	37	38	39	40	41	42	43
38	28	28	29	30	31	32	33	34	35	35	36	37	38	39	40	41	42
37	27	28	29	30	31	32	33	34	35	35	36	37	38	39	40	41	42
36	26	27	28	29	30	31	32	33	34	35	35	36	37	38	39	40	41
35	25	26	27	28	29	30	31	32	33	34	35	35	36	37	38	39	40
34	25	25	26	27	28	29	30	31	32	33	34	35	35	36	37	38	39
33	24	25	25	26	27	28	29	30	31	32	33	34	35	35	36	37	38
32	23	24	25	25	26	27	28	29	30	31	32	33	34	35	35	36	37
31	22	23	24	24	25	26	27	28	29	30	31	32	33	34	35	35	36
30	21	22	23	24	24	25	26	27	28	29	30	31	32	33	34	35	35
29	21	21	22	23	24	24	25	26	27	28	29	30	31	31	32	33	34
28	20	21	21	22	23	24	24	25	26	27	28	29	30	31	31	32	33
27	19	20	21	21	22	23	24	24	25	26	27	28	29	30	31	31	32
26	18	19	20	21	21	22	23	24	24	25	26	27	28	29	30	31	31
25	18	18	19	20	21	21	22	23	24	24	25	26	27	28	29	30	31
24	17	18	18	19	19	20	21	21	22	23	24	24	25	26	27	28	29
23	16	17	17	18	19	20	21	21	22	23	24	24	25	26	27	28	29
22	15	16	17	17	18	19	20	21	21	22	23	24	24	25	26	27	28
21	15	15	16	16	17	18	19	20	21	21	22	23	24	24	25	26	27

$$DI=0.81T+0.01H(0.99T-14.3)+46.3$$

DI: Discomfort Index T: Temperature (°C) H: Humidity (%)

Discomfort index	Thermal comfort
65 – 70	Comfortable
70 – 75	Neutral
75 – 80	Warm
80 – 85	Uncomfortably hot (sweating)
85 –	Severe heat

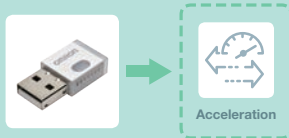
Temperature (°C)

	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
0	66	67	68	68	69	70	71	72	73	73	74	75	76	77	77	78	79	80	81	81	82
5	67	67	68	69	70	71	72	73	73	74	75	76	77	78	79	80	81	82	83	84	85
10	67	68	69	70	71	72	73	73	74	75	76	77	78	79	80	81	82	83	84	85	86
15	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
20	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
25	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
30	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
35	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
40	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
45	71	72	73	74	75	76	77	78	80	81	82	83	85	86	87	88	90	91	92	93	94
50	71	73	74	75	76	77	79	80	82	83	84	85	87	88	89	91	92	93			
55	72	73	75	76	77	79	80	81	83	84	85	87	88	89	91	92	93				
60	72	74	75	77	78	79	81	82	84	85	86	88	89	91	92	93					
65	73	74	76	77	79	80	82	83	84	86	87	89	90	92	93						
70	73	75	76	78	79	81	82	84	85	87	88	90	91	93	94						
75	74	75	77	79	80	82	83	85	86	88	89	91	93	94							
80	74	76	78	79	81	82	84	86	87	89	90	92	94								
85	75	77	78	80	82	83	85	86	88	90	91	93									
90	75	77	79	81	82	84	86	87	89	91	92	94									
95	76	78	79	81	83	85	86	88	90	92	93										
100	77	78	80	82	84	86	87	89	91	93											

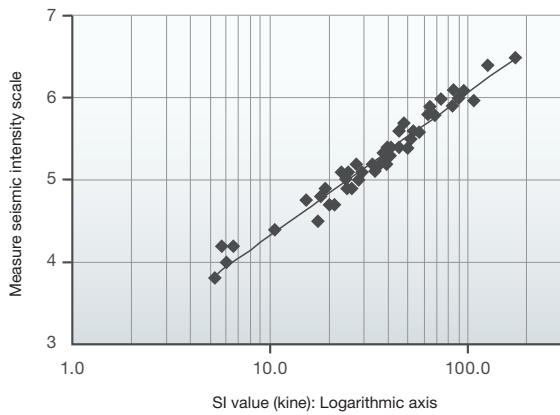


Seismic Detection

The sensor uses Omron's unique spectral intensity (SI) value calculation algorithm to distinguish between seismic activity and other movements. The sensor data can be used to map damage conditions by area.



[Correlation between SI value and measured seismic intensity scale]



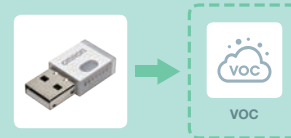
$$SI = \frac{1}{2.4} \int_{0.1}^{2.5} Sv(T,h)dT$$

*SI value (or spectral intensity) is equivalent to the magnitude of the destructive energy imposed by seismic motion on structures. SI value has a high correlation with the seismic intensity scale which helps identify seismic hazards in your vicinity.

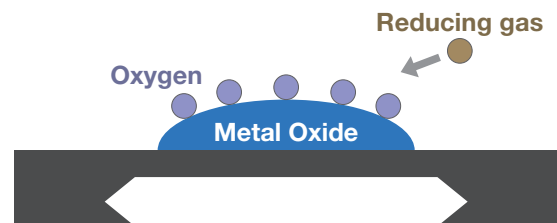


VOC*1 Detection

The sensor allows eTVOC*2 reading which refers to the total concentration of volatile organic compounds to help users realize the importance of maintaining a comfortable environment.



[Operating principle]



- Oxygen is adsorbed onto the surface of metal oxide.
- When VOCs are emitted into the atmosphere, the gases react with the adsorbed oxygen, changing its adsorbed amount on the surface.
- The change in the amount of adsorbed oxygen eventually increases or decreases the surface conductivity. This mechanism allows the sensor to detect VOC gases.

*1 VOCs (Volatile Organic Compounds) include such as alcohol consumption, cigarette smoking, and formaldehyde.

*2 eTVOC (equivalent Total Volatile Organic Compounds) refers to the total concentration of volatile organic compounds in a room environment.

Note: VOC sensor does not identify gas types. Only outputs the total concentration of VOCs.



2JCIE-BL

Environment Sensor

Sense a variety of environmental information

- Includes six sensors, wireless functionality, and built-in battery
- Adopts Bluetooth® low energy beacon technology for simple construction of a 1:n sensor network
- Embedded memory for data loss prevention
- Lineup including PCB models



RoHS compliant

⚠ Refer to *Safety Precautions* on page 11.



Model Number Structure

2JCIE-□□01-□
(1) (2)

(1) Communication interface
BL: BLE

(2) Appearance
None : BAG model
P1 : PCB model

Ordering Information

Appearance	Model	Communication interface	Output data	Minimum packing unit (Unit: pcs)
	2JCIE-BL01	Bluetooth® ¹ low energy	Temperature, Humidity, Light, UV index ² , Barometric pressure, Sound noise, Discomfort index ³ , Heat stroke warning level ³	1
	2JCIE-BL01-P1	Bluetooth® ¹ low energy	Temperature, Humidity, Light, UV index ² , Barometric pressure, Sound noise, Discomfort index ³ , Heat stroke warning level ³	1

Specifications

Ratings

Item	Model	2JCIE-BL01	2JCIE-BL01-P1
Power Supply		3 VDC (Lithium battery CR2032 × 1)	3 VDC
Sensors		Temperature, Humidity, Light, UV index ² , Barometric pressure, Sound noise	
Interface		Bluetooth® low energy ¹ : GAP advertisement/Custom GATT profile	
Communication Range		Approx. 10 m ⁴	
Operating Temperature		-10 to 60°C	
Operating Humidity		30 to 85%RH	
Dimensions		Approx. 46.0 × 39.0 × 15.0 mm	Approx. 27.2 × 24.0 × 1.0 mm
Weight		Approx. 16 g (incl. battery)	Approx. 2.5 g
Absolute maximum ratings	Power supply	-0.3 to 3.6 V	
Absolute maximum ratings	Output current	±20 mA	
Absolute maximum ratings	Temperature	-20 to 70°C	
Recommended operating condition	Power supply	2.7 to 3.3 V	
Battery Life		Approx. 6 months ⁴ (5 min. measurement interval/one time per day connection)	-

Characteristics

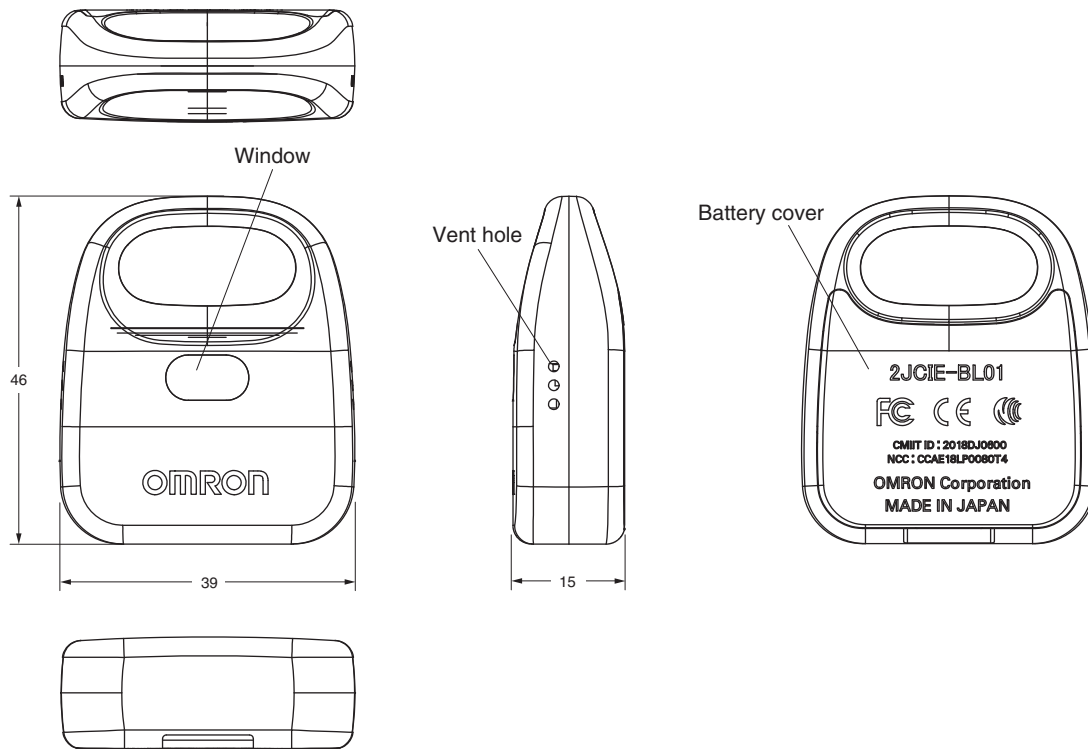
Item	Measurable range	Accuracy (Vcc = 3.0 V, Ta = 15 to 35°C if not specified) *5
Temperature	-10 to 60°C	±2°C
Humidity	30 to 85%RH	±5%RH
Light	10 to 2,000 lx	±100 lx
UV Index	0 to 11	For reference *2 *6
Barometric pressure	700 to 1,100 hPa	±4 hPa
Sound noise	37 to 89 dB	For reference *6

- *1. The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by OMRON Corporation is under license.
- *2. Information on UV Index is just for reference. And it may not be the same as that issued by public institutions.
- *3. Information for heat stroke and discomfort index are only guidelines to be used for air conditioning and physical condition management. An individual difference and physical condition will greatly affect an individual feeling. Sensor output is not to be used for determining the presence of symptoms. Use only as a guideline. Warning levels for heat stroke may not be the same as those issued by public institutions.
- *4. Communication distance and battery life may vary according to obstacles between the communication equipment, radio wave conditions.
- *5. These values are specified under standard test condition, and do not guarantee the performance under the complex conditions.
- *6. These types of output are provided for referential use only, and these values do not guarantee the normal operation within that range.

Dimensions

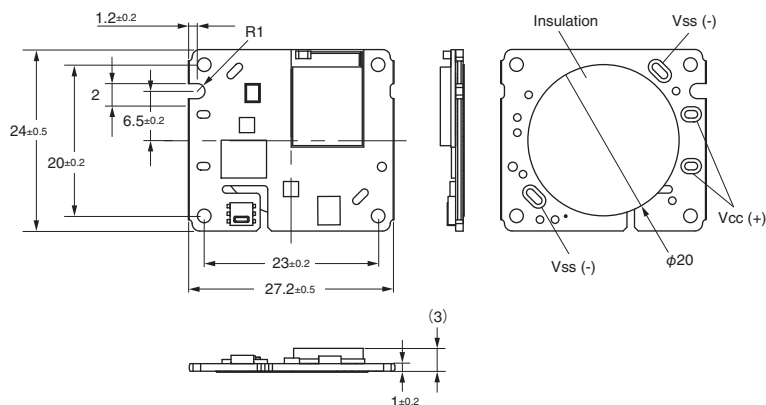
(Unit: mm)

2JCIE-BL01



CAD Data

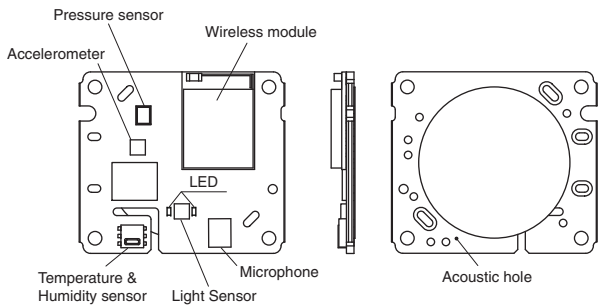
2JCIE-BL01-P1



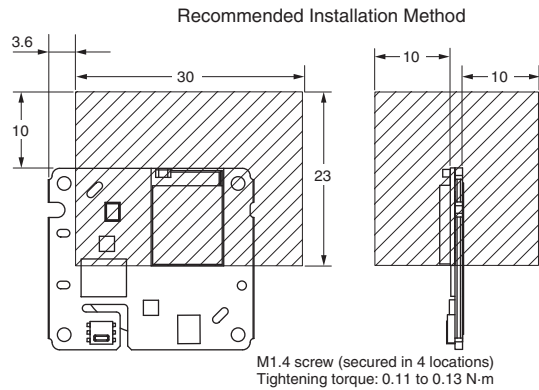
CAD Data

Embedding into Equipment

2JCIE-BL01-P1

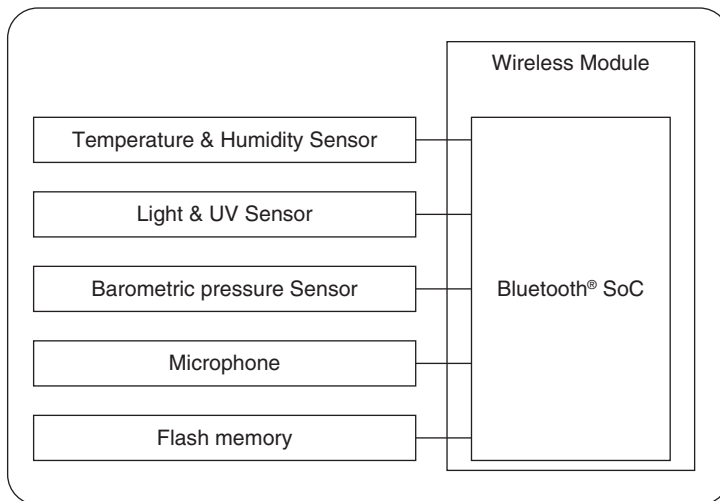


Embed the product so as to ensure adequate external ventilation based on the arrangement of the sensors. Use the fixing holes in the four corners of the PCB.



Note: Do not place any metallic components within the cross-hatched area. Wireless communication performance may be affected in some situations.

Block Diagram



Accessories

For 2JCIE-BL01

- Lithium battery (CR2032 × 1)

For 2JCIE-BL01-P1

- Battery terminal (+)
- Battery terminal (-)



Battery terminal (-)



Battery terminal (+)

Notes on Soldering

Unless otherwise specified, perform soldering under the following conditions.

Soldering temperature: 350°C or less (Reference: 30 W soldering tool, tip temperature: approx. 320°C)

Soldering time: 3 seconds or less

Soldering location: 1.5 mm or more from the element base

Note that the tip temperature can be affected by the soldering tool shape. Be sure to check the temperature using a thermometer before use.

Safety Precautions

To assure the correct use of the product basic safety measures should always be followed including the warnings and cautions listed in this document.



Warning

Warning: Improper use may result in death or serious injury.

<2JCIE-BL01>

- Keep the battery out of the reach of young children.
If young children swallow the battery, immediately consult a doctor.
- Do not throw the battery into fire.
The battery may explode.

<Common>

- In places where radio communications are prohibited, remove the battery to turn off the Bluetooth®.
- Do not place the unit closer than 22 cm (9 inches) from implantable medical devices such as pacemakers.
- Keep the unit out of the reach of young children.
If young children swallow any small piece, immediately consult a doctor.
- Please stop using the unit immediately, if there is strange smell or smoke from the unit.
- Do not subject the unit to extreme temperatures, humidity, moisture, or direct sunlight. Internal condensation due to severe change in temperature may cause malfunction.
- In high temperature or low temperature environment, battery life may be extremely short due to the characteristics of the battery used.
- Please do not leave in the car.
Prolonged exposure to the high temperature causes explosion, fire or malfunction of the internal battery.



Caution

Caution: Improper use may result in minor or moderate injury to the user or damage to the equipment.

* Property damage refers to damage related to houses and household belongings, as well as domestic animals and pets.

<2JCIE-BL01>

- Do not insert the battery with the polarities in the wrong direction.
- Always use the type of battery indicated.
- Remove the battery from this unit when you are not going to use it for a long period of time (approximately 3 months or more).
- Please read the instruction manual of your smartphone or tablet for the wireless communication.
- Do not replace the battery during the wireless communication.
- Do not swing the unit by the strap.
Swinging the unit while holding the strap may cause an injury.

<Common>

- Do not use the unit in the field of strong electromagnetic waves and static electricity.
- This unit is not a measurement instrument.
The measured values must be treated as a reference, and do not use it for the purpose of verification or diagnosis.

Precautions for Correct Use

<2JCIE-BL01>

- Do not use this product with its vent holes (both sides) and window covered. This will prevent accurate measured values from being obtained.
- Batteries are not a part of your regular household waste.
You must return batteries to your municipality's public collection or wherever batteries of the respective type are being sold.
- Dispose of the unit, battery, and components according to applicable local regulations.
Unlawful disposal may cause environmental pollution.

<Common>

- Do not disassemble or modify the unit.
- Do not subject the unit to strong shocks or vibrations, drop it, step on it.
- Do not apply a strong force, twist, deflection and mechanical stress on the ring portion.
- Do not immerse the unit or any of the components in water.
The unit is not waterproof. Do not wash it or touch it with wet hands. Be careful that water does not get into the unit.
- Depending on the surrounding environment and the mounting position, the measured characteristic may vary. The measured values must be treated as a reference.
 1. Do not subject the unit to extreme temperatures, humidity, moisture, or direct sunlight.
 2. Do not subject the unit to water, oil or chemical materials.
 3. Do not use the unit where it will be exposed to dew condensation.
 4. Do not use the unit where it will be exposed to flammable gas or corrosive vapors.
 5. Do not use the unit where it will be exposed to dust, saline matter or iron powder.
- This Product operates in the unlicensed ISM band at 2.4 GHz. In case this Product is used around the other wireless devices including microwave and wireless LAN, which operate same frequency band of this Product, there is a possibility that interference occurs between this Product and such other devices.
- If such interference occurs, please stop the operation of other devices or relocate this Product before using this Product or do not use this Product around the other wireless devices.
- Due to the use of radio waves, third parties may intercept transmissions either deliberately or accidentally. Do not use this Product for matters related to vital secrets or human lives.
- Application examples provided in this document are just for reference. In actual applications, confirm its functions, limitations and safety before using this Product.

- Firmware updates may be provided to improve product functions or to fix bugs. Visit the following URL and search the product name. Check the "Software" page for the appropriate product.

<https://www.components.omron.com/>

Acknowledgement

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Program: "Innovative Cybernic System for a ZERO Intensive Nursing-care Society" (Program Manager: Yoshiyuki Sankai)

2JCIE-BU

Environment Sensor (USB Type)

Sense a variety of environmental information

- Connects to a network via USB or Bluetooth® to enable the sending of measurement data
- Using OMRON's unique and innovative algorithm, enables highly accurate determination of earthquakes based on vibrational acceleration
- Enables continuous monitoring of room air quality using a VOC sensor



RoHS compliant



Refer to Safety Precautions on page 15.

Ordering Information

● Main unit

Model	Communication Interface	Output data	Minimum packing unit (Unit: pcs)
2JCIE-BU01	Bluetooth® low energy USB communication	Temperature, Humidity, Light, Barometric pressure, Sound noise, 3-axis acceleration *1, eTVOC *2, Discomfort index *3, Heat stroke warning level *3, Vibration information *1 (No. of earthquakes, No. of vibrations, SI value *4)	1

● Accessory (sold separately)

The filter cap protects the Environment Sensor (USB Type) from airborne dust/mist, deodorants and air fresheners used in the general household environment, and substances generated by cooking and smoking. Install the product on the body of the environment sensor.

Type	Model
Filter cap	2JCIE-BU01-FL1

Specifications

Ratings

Item	Specification	
Power Supply	5 V (USB power supply)	
Sensors	Temperature, Humidity, Light, Barometric pressure, Sound noise, 3-axis acceleration *1, eTVOC *2	
Interface	Bluetooth® low energy (Bluetooth® v5.0)*5, USB communication (USB2.0)	
Communication range	Approx. 10 m *6	
Operating Temperature	-10 to 60°C	
Operating Humidity	30 to 85%RH	
Dimensions	Approx. 29.1 × 14.9 × 7.0 mm	
Weight	Approx. 2.9 g	
Absolute maximum ratings	Power supply	-0.3 to 5.5 V
Absolute maximum ratings	Output current	Max. 100 mA
Absolute maximum ratings	Temperature	-20 to 70°C
Recommended operating condition	Power supply	4.75 to 5.25 V

Characteristics

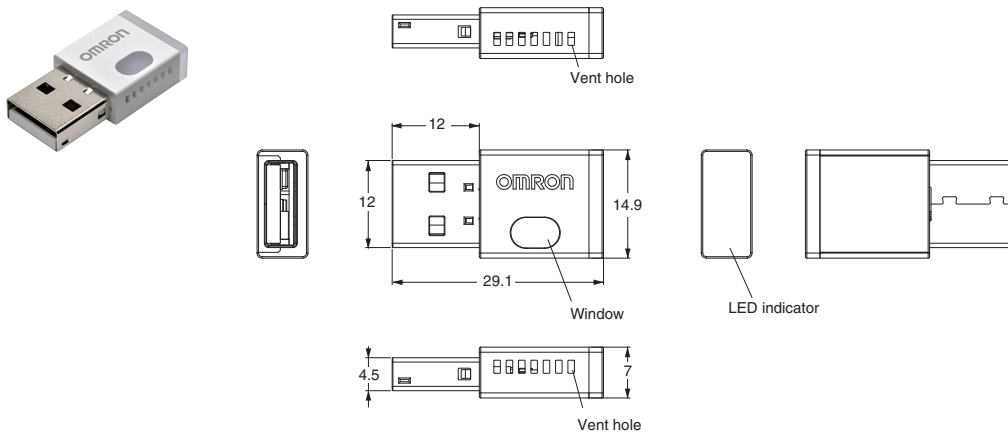
Item	Measurable range	Accuracy (Vcc = 5.0 V, Ta = 15 to 35°C if not specified) *7
Temperature	-10 to 60°C	±2°C
Humidity	30 to 85%RH	±5%RH
Light	10 to 2000 lx	±100 lx
Barometric pressure	700 to 1100 hPa	±4 hPa
Sound noise	40 to 94 dB	For reference *8
3-axis acceleration	-2000 to 2000 gal	For reference *1, *8
eTVOC	0 to 29206 ppb	For reference *2, *8, *9

- *1. 3-axis acceleration values can only be obtained in the specified operation mode. For details, refer to the User's Manual.
- *2. eTVOC (equivalent Total Volatile Organic Compounds) refers to the total concentration of volatile organic compounds in a room environment. Output TVOC values will be higher or lower depending on the type of volatile organic compound. Also, if continuously operated in high-temperature and high-humidity environments, sensitivity for eTVOC values may decrease.
- *3. Information for heat stroke and discomfort index are only guidelines to be used for air conditioning and physical condition management. An individual difference and physical condition will greatly affect an individual feeling. Sensor output is not to be used for determining the presence of symptoms. Use only as a guideline. Warning levels for heat stroke may not be the same as those issued by public institutions.
- *4. SI (Spectral Intensity) values corresponds to the destructive energy seismic motions exert on a structure.
- *5. The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by OMRON Corporation is under license.
- *6. Communication distance may vary according to obstacles between the communication equipment, radio wave conditions.
- *7. Performance values are obtained based on the various conditions of individual tests, and do not guarantee the values obtained under combined conditions for rated values and performance values.
- *8. Reference output values are provided for reference only, and do not guarantee that operation will always take place normally within that range.
- *9. In a VOC environment outside the detection range, the output values of eTVOC and eCO2 may output -32767.

Dimensions

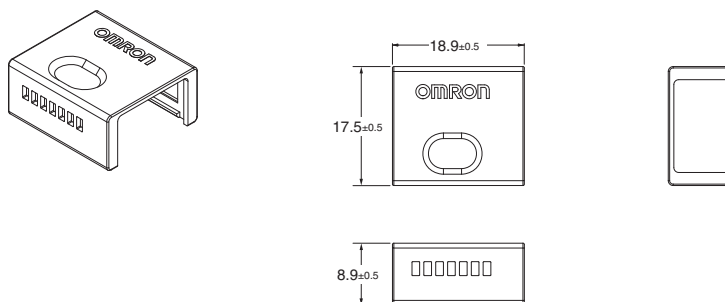
(Unit: mm)

● Main unit 2JCIE-BU01



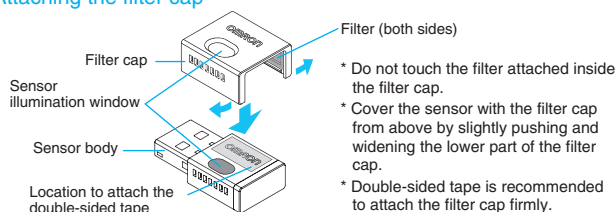
CAD Data

● Accessory (filter cap) 2JCIE-BU01-FL1

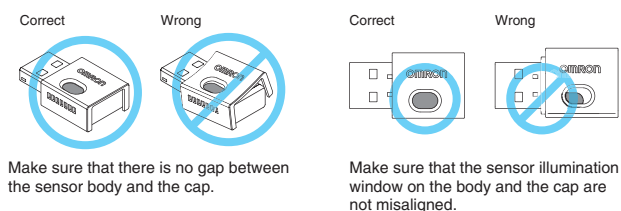


CAD Data

Attaching the filter cap



Precautions when attaching the filter cap



Safety Precautions

To assure the correct use of the product basic safety measures should always be followed including the warnings and cautions listed in this document.

Warning

<Common>

Warning: Improper use may result in death or serious injury.

- In places where radio communications are prohibited, turn off the Bluetooth®.
- Do not place the unit closer than 22cm (9 inches) from implantable medical devices such as pacemakers.
- Keep the unit out of the reach of young children.
If young children swallow any small piece, immediately consult a doctor.
- Please stop using the unit immediately, if there is strange smell or smoke from the unit.
- Do not subject the unit to extreme temperatures, humidity, moisture, or direct sunlight.
- Internal condensation due to severe change in temperature may cause malfunction.

Caution

<Common>

Caution: Improper use may result in minor or moderate injury to the user or damage to the equipment.

* Property damage refers to damage related to houses and household belongings, as well as domestic animals and pets.

- Do not use the unit in the field of strong electromagnetic waves and static electricity.
- Please read the instruction manual of your smartphone or tablet for the wireless communication.
- This unit is not a measurement instrument.
The measured values must be treated as a reference, and do not use it for the purpose of verification or diagnosis.
- Do not disconnect the unit from the connected device during USB communication. Doing so may cause failure or data loss.
- Do not forcefully grip the unit or handle it in a reckless manner. Doing so may cause the unit to be damaged or may cause injury.

Precautions for Correct Use

<Common>

- Do not use this product with its vent holes (both sides) and window covered. This will prevent accurate measured values from being obtained.
- Do not disassemble or modify the unit.
- Do not subject the unit to strong shocks or vibrations, drop it, step on it.
- As this is a precision instrument, do not pull forcefully on its mounting portion or subject it to stress such as twisting, bending, or shock. Doing so may cause failure or deterioration.
- Do not immerse the unit or any of the components in water. The unit is not waterproof. Do not wash it or touch it with wet hands. Be careful that water does not get into the unit.

- Depending on the surrounding environment and the mounting position, the measured characteristic may vary. The measured values must be treated as a reference.

- (1) Do not subject the unit to extreme temperatures, humidity, moisture, or direct sunlight.
- (2) Do not use the unit where it will be exposed to dew condensation.
- (3) Do not subject the unit to water, oil or chemical materials.
- (4) Do not use the unit where it will be exposed to flammable gas or corrosive vapors.
- (5) Do not use the unit where it will be exposed to dust, saline matter or iron powder.
- (6) Install in a location as far away from heat-generating instruments, etc., as possible.

- Firmware updates may be provided to improve product functions or to fix bugs. Visit the following URL and search the product name. Check the "Software" page for the appropriate product.

<https://www.components.omron.com/>

<Filter cap 2JCIE-BU01-FL1>

- Do not touch the inner filter when mounting the filter cap.
- Make sure that the environment sensor body and the sensor illumination window on the filter cap are not misaligned.
- Avoid storing the filter cap in a hot and humid place as it may deform the filter cap.

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