White Paper
Environment Sensor

Utilized as an IoT edge device sensing a variety of environmental information around you

Introduction

The OMRON environment sensor is an ultra-compact multifunction sensing component with the sensing function, measuring temperature, humidity, barometric pressure, light intensity, sound noise, acceleration, eTVOC, and other environmental information, and the wireless communications function. The sensor not only outputs sensing data but also detects earthquakes by its original algorithm, calculates the heatstroke alert level, and makes a judgment by some thresholds.

Since the environment sensor can easily sense a variety of environmental information around you without having to install wiring, you can install it in your house, buildings, factories, cars, and public facilities, carry it with you, or utilize it in many other scenes.

The user can obtain the environmental information easily from any IoT gateway or mobile device. And the data can be transmitted to and accumulated in any cloud server. Therefore, you can utilize them in your own way to develop new solutions and services based on the IoT.

Since the environment sensor can store the measured environmental information in its built-in flash memory, you can utilize it as an environmental data logger and, even if wireless communications are not established, collect a sequence of data.

It is available in a mobile type driven by a lithium battery, USB-powered type requiring no battery replacement, and board type which can be built in your own package.

In recent years, there has been a growing trend to collect and analyze data using various sensors installed in wearables, automobiles, etc. so as to make use of them in business. The keyword is utilizing the IoT. However, just collecting them by means of the existing sensors had not succeeded in securing enough quality and quantity of data to create new solutions and services. So OMRON has developed an "environment sensor" based on the MEMS device technology and power-saving technology which have been cultivated for years. The "environment sensor" makes it easy to sense the environmental information in various places where data have not been obtained so far, and allows customer companies to develop new solutions and services based on the IoT.

OMRON will continue to make full use of the MEMS device technology, expand the IoT market where new solutions and services are created by means of big data, and accelerate the cycle to create the optimum sensor on our own.

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Sensing Function and Output Data

● 2JCIE-BL01/2JCIE-BL01-P1

2JCIE-BL01   *2JCIE-BL01-P1*

Temperature   Humidity

Pressure   Light

UV   Sound Noise

Temperature, humidity, barometric pressure, light intensity, UV Index, and sound noise are sensed and output at desired intervals, ranging from 1 s to 3600 s. Moreover, environmental indicators, such as the heatstroke alert level and the discomfort index, are calculated and output on the basis of the temperature and humidity, by the MCU installed in the sensor.
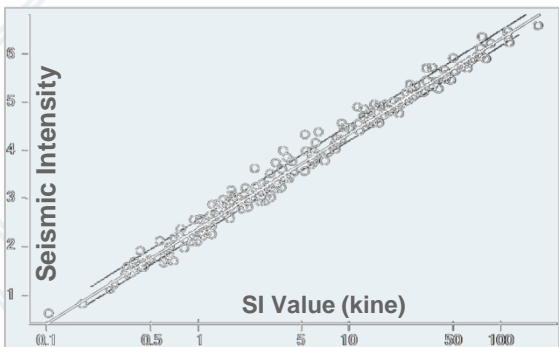
● 2JCIE-BU01

2JCIE-BU01

Temperature   Humidity

Pressure   Light

Acceleration   Sound Noise

VOC eTVOC

Temperature, humidity, barometric pressure, light intensity, sound noise, eTVOC, and 3-axis acceleration are measured and output every second. Moreover, environmental indicators, such as the heatstroke alert level and the discomfort index, and seismic information, such as the earthquake count, vibration count, and SI value, are calculated and output respectively on the basis of the temperature and humidity information and the 3-axis acceleration information, by the MCU installed in the sensor.

- SI value

The SI value (Spectral Intensity) is equivalent to the magnitude of the breaking energy of earthquake motion against structures, and correlates with seismic intensity.

Relation between SI value and instrumental seismic intensity

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Data Communications System

The sensor has adopted a communications method compliant with BLE (Bluetooth® low energy). It connects to a variety of devices, such as gateways, mobile terminals, and PCs, and transmits measurement data. According to the purpose, you can also change its communications mode into Broadcast mode before transmitting the measurement data. Moreover, the data have access to any cloud server. Therefore, you can utilize them in your own way to develop new solutions and services.

For 2JCIE-BU01, you can select either BLE or USB communications according to the purpose.

Note: 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.
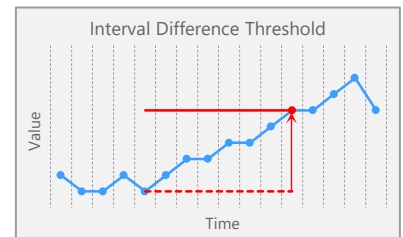
Event Notification Function

You can set both the upper-limit and the lower-limit threshold to every output data, and a beacon can notify you of any event detection. The sensor can make a judgment not only by a simple threshold but also by a change threshold (comparison with previous data, comparison between periods, etc.).
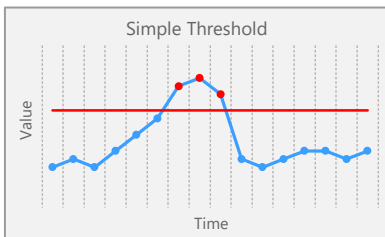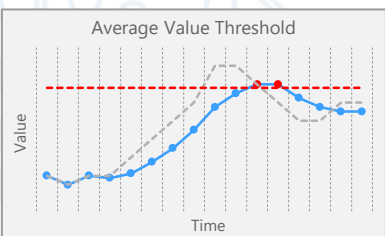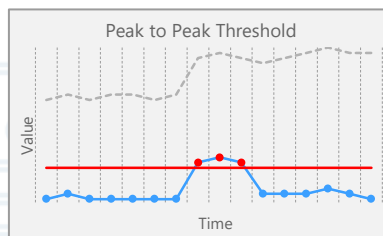
Simple Threshold
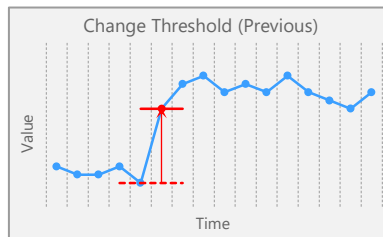
Change Threshold

Interval Difference Threshold

Average value Threshold

Peak to Peak Threshold

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Memory Function

- 2JCIE-BL01/2JCIE-BL01-P1

2JCIE-BL01   *2JCIE-BL01-P1*

By writing time information in the sensor, about 26,000 measurements of data will be saved to its flash memory. If a measurement is made every 5 minutes, it can store about three months' measurement data.
The stored data can be read any number of times; however, if the memory has become full, older data will be overwritten.

- 2JCIE-BL01/2JCIE-BL01-P1

2JCIE-BU01

By writing time information in the sensor, 60,000 measurements of data will be saved to its flash memory. Although an interval between measurements is fixed at 1 s, that between saves can be changed between 1 s and 3600 s. The stored data can be read any number of times; however, if the memory has become full, older data will be overwritten.

Power Supply

- 2JCIE-BL01/2JCIE-BL01-P1

2JCIE-BL01   *2JCIE-BL01-P1*

The sensor is driven for about six consecutive months by a single lithium battery CR2032. When a low battery voltage is detected, its BLE beacon and blinking LED will notify the user to replace the battery. 2JCIE-BL01-P1 uses 3 VDC power supply.

- 2JCIE-BU01

2JCIE-BU01

The sensor connects to a USB port and uses 5 VDC power supply.

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Example Applications

The environment sensor with various sensing and smart functions is a general-purpose sensor which can realize the IoT in many fields. You will be able to use your own innovative idea to develop new services leading your competitors. We propose the suitable applications based on usage scenes.

Smart house

Obtains living environment information and controls lighting fixtures and household appliances via the smart speaker etc. to support a comfortable life.

Notifies the indoor environment to the smart phone in a distant place, so people can watch the living conditions of the elderly and pets.

Analyzes damage to the house on the basis of the vibration data obtained during earthquakes, and proposes repair to the owner.

Monitors the indoor air quality by means of eTVOC, and urges people to ventilate the room in case of high concentrations.

Forecasts the worsening weather conditions due to a sharp drop in barometric pressure, and notifies them to the resident.

Hotel

Monitors the indoor air quality by means of eTVOC, and notifies the timing of ventilation to people.

Adjusts the air conditioner on the basis of the temperature and humidity around the bed to support a comfortable sleep.

Monitors the sound noise in a guest room to prevent complaints from neighbors.

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Example Applications

Office

Monitors the temperature in an office to visualize the variations.

Cooperates with air conditioners and blinds to realize automatically controlled comfortable space.

Meeting Room

Simply predicts the use of a meeting room on the basis of light intensity and sound noise data, without having to install wiring or do installation work.
This will visualize the room availability search and the difference between reservations and results so that the meeting room can be used effectively, contributing to the improvement in productivity.
Monitors the indoor air quality by means of TVOC, and urges people to ventilate the room in case of high concentrations.

Factory

Easily grasps the operating status of a line just by monitoring the sound noise made by production equipment, light intensity, etc. without having to install wiring or change the layout.

Detects abnormalities by the vibration and sound noise of production equipment and its accompanying equipment, and notifies them to the administrator. Replacing or inspecting parts before a failure occurs will help maintain the equipment.

Monitors the heatstroke alert level, sound noise, etc. to prevent any health hazards to workers in the factory.

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Example Applications

Kindergarten

Monitors the indoor environment to reduce the risk of heatstroke.

Disclosing the indoor environment to the parents will allow them to take their children to kindergarten with no worries.

Warehouse / Logistics

Monitors the temperature and humidity distributions in a warehouse, and feeds them back to air conditioners.

Records the temperature, vibration, and other conditions when products delivered are transported.

Monitors the eTVOC and the heatstroke alert level to prevent any health hazards to workers in the warehouse.

Commercial Facility

Monitors the temperature and humidity distributions on a floor, and feeds them back to air conditioners.

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