Omron sensors

Omron - sensing tomorrow

It is almost impossible to imagine a modern world without sensors. These high-performing devices keep homes, workplaces and healthcare facilities working smoothly and safely. They are essential components in smartphones, cars and entertainment equipment. Thanks to them, we enjoy higher standards of energy-efficiency, security, comfort and convenience in our daily lives.

Omron has always been a pioneer in sensing technology. Our MEMS-based components are the result of long experience and proven technical know-how. Over many decades, we have developed in-house expertise that covers 4-inch bulk micro-machining, electro chemical etch (ECE), silicon processes such as thin film deposition, wet and dry etching, electrode formation and fine plastic replication and glass wafer processes. We are a world leader in face recognition technology, opening up an exciting new future in which human-machine interaction is more intelligent and intuitive than ever before. Our innovations are at the forefront of the ongoing digital revolution, contributing to better environmental control and greater efficiency in office automation, industrial equipment and home appliances.

Omron products always meet the highest quality requirements and are accompanied by reliable customer care and technical support. Working alongside designers and installers, we combine the latest technologies with forward-thinking designs that open up new possibilities every day.

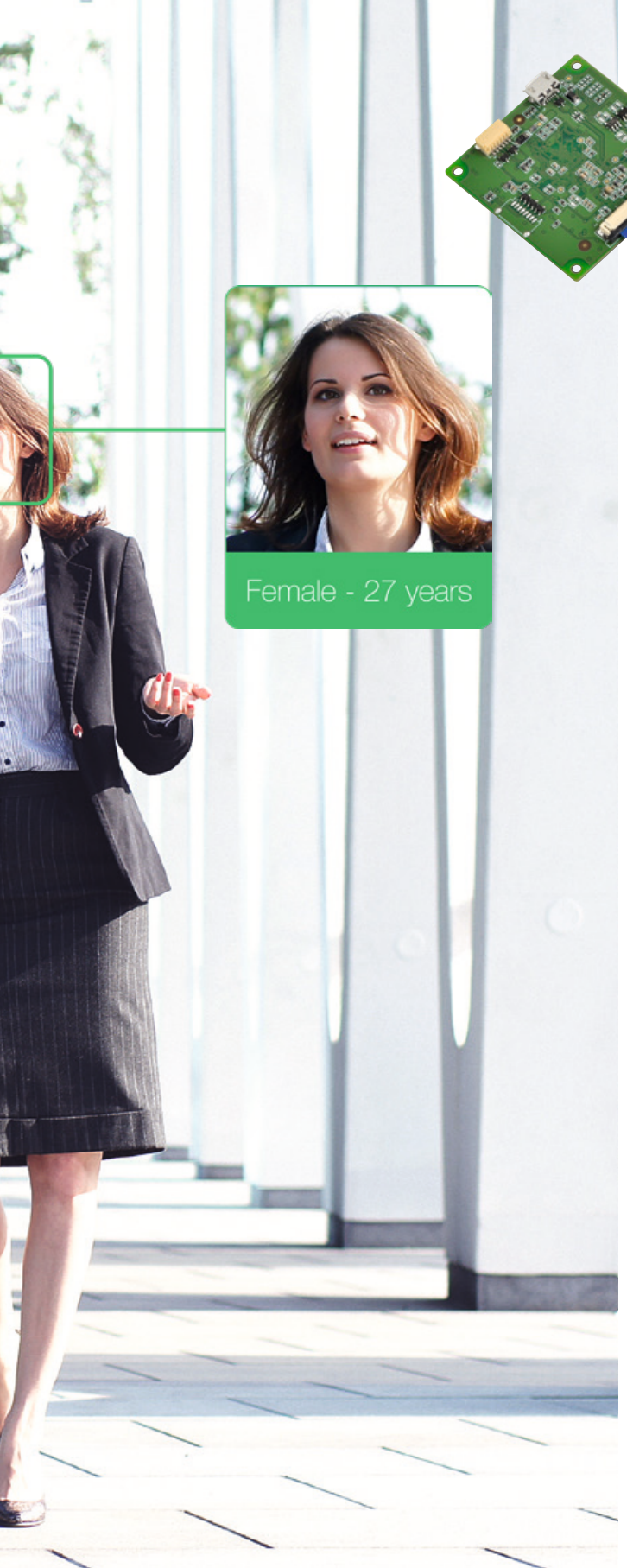
FURTHER INFORMATION
to find more about Omron's products,
visit avnet-abacus.eu/omron

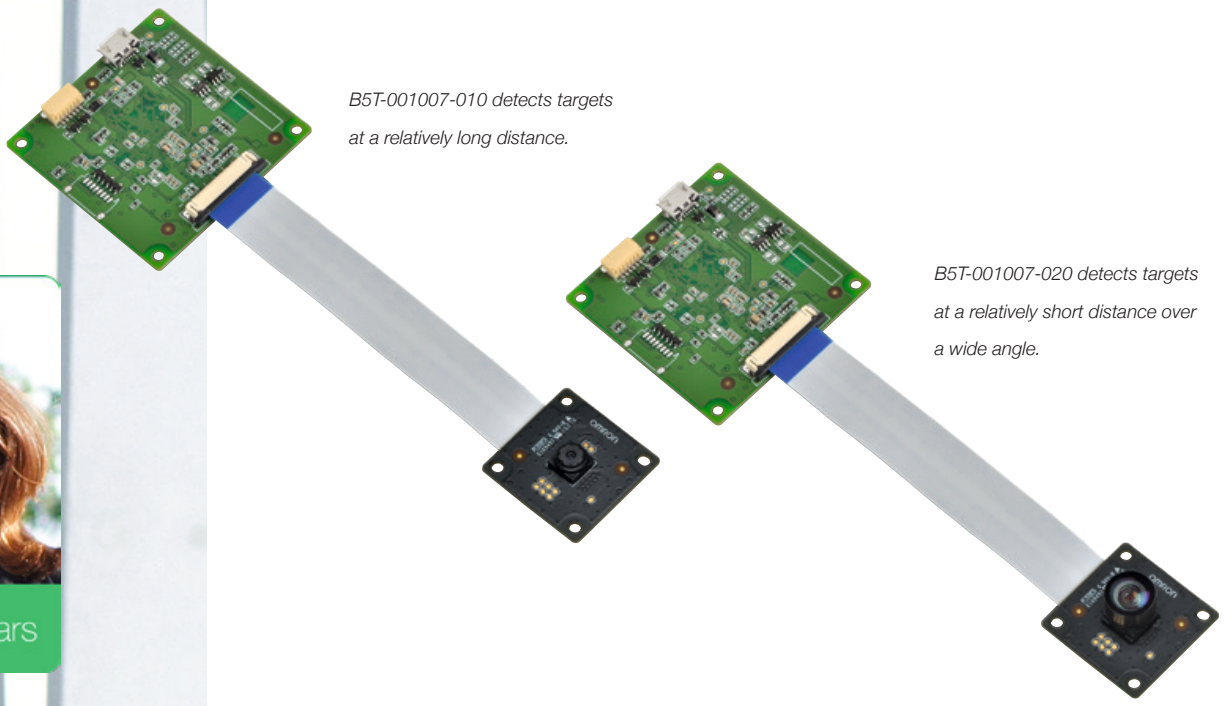
Content

Human vision components – innovation for a new era

In 2004, Omron introduced the world's first face recognition technology for mobile phones. Since then, we have continued to lead the way in sensing and control innovations that break down boundaries between humans and machines. Thanks to such technologies, we are entering an era in which machines adapt their behaviour to humans, rather than the other way around.

Our Human Vision Components (HVC) feature OKAO: our proprietary software. Its success has been proven repeatedly in a wide range of equipment, including cameras, mobile phones, surveillance robots and many home appliances. They apply ten different sensing technologies: body, face and hand detection; face direction, gaze, blink, age, gender and expression estimation, and face recognition. The image sensing technology is built on data from more than a million faces.





B5T-001007-010 detects targets at a relatively long distance.

B5T-001007-020 detects targets at a relatively short distance over a wide angle.

HVC-P2 – a vision of the future

Our next-generation HVC-P2 module is the result of our renowned excellence in Image Sensing Technology and Optical Design. Compared to previous versions, it is smaller and offers higher image resolution, better detection distance and up to ten times faster processing. IoT ready, it enables information sharing between different HVC modules via the cloud.

It applies ten different sensing technologies: body, face and hand detection; face direction, gaze, blink, age, gender and expression estimation, and face recognition. The image sensing technology is built on data from more than a million faces.

Where is it used?

HVC-P2 modules are used in vending and ticketing machines, retail outlets and digital signage. They enable collection and analysis of customer data, such as age, gender, expression and even level of interest in a particular product, so that marketing can be more accurately targeted.

Many amusement machines are already controlled using gestures. This module can transform their performance, functioning as ‘robot eyes’ that help the machine to identify and communicate with players. It can also be used in nursing homes and other facilities to monitor the movement of patients or detect intruders. By enabling personalised control over specific devices such as office equipment and automatic doors, it contributes to better security.

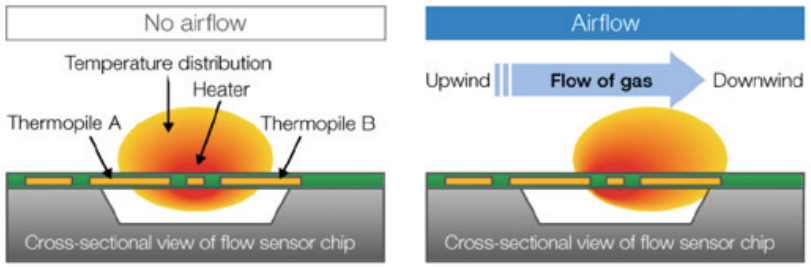
MEMS flow sensors – setting new standards in accuracy

Omron was the first sensor manufacturer to apply thermopile technology to measure flow rate. This technology, which is at the core of our D6F MEMS flow sensors, achieves a vast range of measurement, from the flutter of a butterfly's wing to the blast of a typhoon. When it was introduced, it delivered several unprecedented advantages, including low-cost operation, low power consumption and high sensitivity.

D6F-10A7D: temperature compensation and linear compensation deliver high accuracy (approximately 3% RD / 25-100% FS).

D6F-V: patented Dust Segregation System ensures long-term accuracy and repeatability, even in contaminated air.

Thermopile technology: the heart of Omron's MEMS flow sensor



The D6F MEMS sensor chip features two sets of thermopiles located on either side of a tiny heater element. They measure the deviations in heat symmetry caused by gas flowing in either direction. A thin layer of insulating film protects the sensor chip from exposure to the gas.

The sensor's tiny size (1.5 mm x 1.5 mm x 0.4 mm) makes it easy to install in any system. It is highly reliable, giving stable results even when exposed to wind turbulence, pressure drop, pulsation and temperature variations.

Digital flow sensors: precision through compensation

Our digital flow sensors are developed for differential pressure measurement with extremely high accuracy and repeatability. They use temperature compensation to ensure stable measurement over a wide temperature range (-20°C to 80°C). Sensing is bi-directional and output is via ASIC algorithms and a digital I2C interface. Their high flow impedance reduces the influence of bypass configuration, and the flow path is designed to allow a compact size. They can be provided with a range of additional functions, including temperature measurement, failure detection and sensor address setting.

Where are they used?

Digital flow sensors are designed for applications where stability and high precision are essential requirements. These include industrial machines like air compressors and HVAC systems, where they are used for variable air valve control, heat recovery systems, clogged filter monitoring and air pressure control. They are also used in fuel cells, where fuel (natural gas) and air quantities must be accurately measured for optimal efficiency and system durability.

Dust Segregation System

Our D6F air velocity sensors feature a patented Dust Segregation System that separates up to 99.5% of dry airborne particles. Its unique design ensures long-term accuracy and repeatability, regardless of any contamination in the sensed air. This feature is extremely valuable for air conditioning systems, air purifiers, dehumidifiers and fan assisted heaters. Dust filtering is also essential for trouble-free performance of many electronic devices, including PCs, LCD projectors, AV equipment and cooling solutions for server racks.

Pressure sensors – precision in any environment

From wearables used in the highest altitudes to everyday essentials like your smartphone or tablet, pressure sensors have found their way into almost every area of life. These little devices are equipped with a pressure-sensitive element that measures the pressure of a gas or liquid against a diaphragm and outputs the measured value as an electrical signal. Pressure measurements can be used to confirm suction, verify mounting, manage source pressures and test for leaks.

Omron produces a wide range of pressure sensors for different measurement targets. Our MEMS pressure sensors are also found in car HVAC systems, airbags and tyre pressure monitors, and have numerous applications in metering and hydraulic systems.

Absolute Pressure Sensor

This world-leading sensor measures absolute pressure and temperature and atmospheric pressure with the highest precision. It can be used as an altimeter in position detection, making it ideal for weather stations, barometers, water depth indicators, GPS navigation and sports monitoring equipment. Its tiny size makes it perfect for wearable devices. It is also used in escalators, portable games, smartphones and tablets.

2SMPB Absolute Pressure Sensor

Miniature monitoring

Measuring only 6.1 mm × 4.7 mm × 8.2 mm, our tiny 2SMPP pressure sensor combines low temperature influence, small offset and span voltage variation and low power consumption. As it accurately controls air movement, leaks and levels, the 2SMPP is also widely used in industrial and environmental control systems.

2SMPP super miniature high accuracy sensor

Photomicrosensors – reliable and easy to install

Omron was the first company in the world to release proximity sensors in 1960 and has been a pioneer in photomicrosensor (PMS) development since 1975. Our photomicrosensors are manufactured in our own high-end production facility by skilled specialists in optical technology. Developed for demanding applications that exceed the physical limitations of basic electromechanical switches, they offer high speed, high frequency, an almost infinite product lifespan and non-contact operation.

Where are they used?

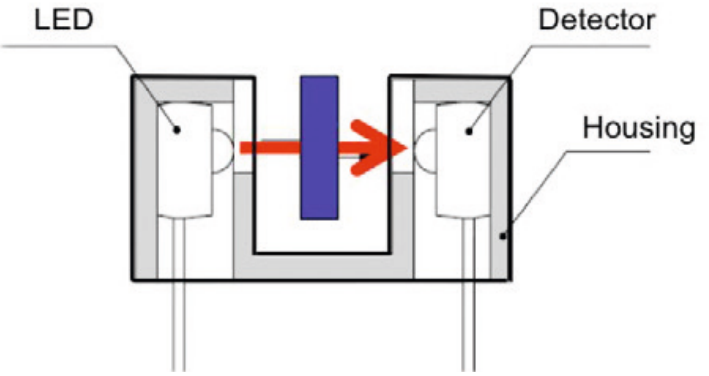
Omron PMS products have many uses throughout the energy, consumer, entertainment and industrial sectors. They are found in mini printers that issue public transport tickets and in cash counting mechanisms for bill counters and money changers. In 3D printers, they detect movement and enable filament feeding and speed measurement. They are used to detect the piston position in water pumps, rotating disc speeds in gas and water meters and in healthcare devices such as dialysers. You can also find these little sensors in security and video conferencing cameras and in industrial sewing machines.

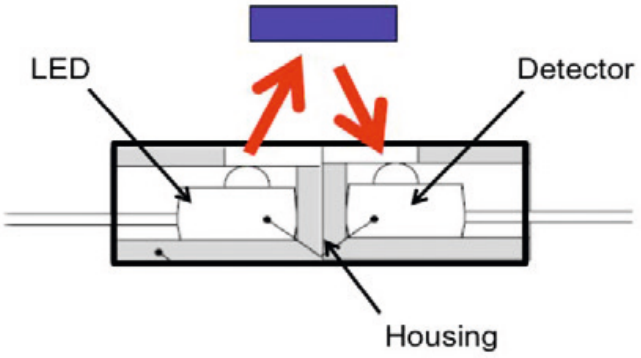
How do photomicrosensors work?

Photomicrosensors use LED beams to detect the presence, absence, speed or direction of an object. They do this by sensing a change in the state of detected light.

Transmissive / Slotted / Photointerrupter types

These have a long sensing distance and detection is not influenced by the surface texture or colour of the object to be detected. They have limited success in detecting transparent objects (e.g. OHP paper or glass) and sensing is restricted by the size of the object and the width of the slot.



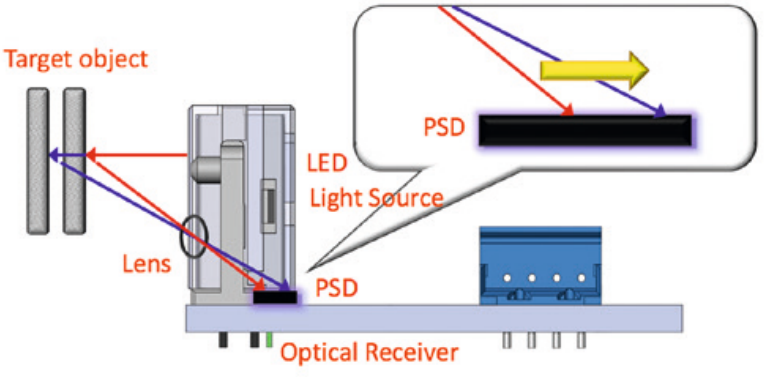


Reflective types

These have a short sensing distance and detection is influenced by the surface texture and reflective colour of the object. They are better at detecting smooth objects such as white paper and sensing is not limited by the object's size.

Micro displacement types

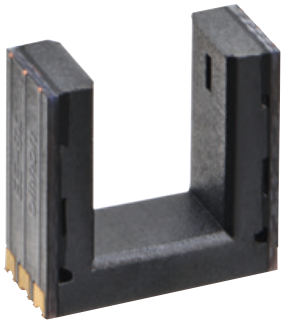
Micro displacement sensors like the Omron Z4D have an integrated position sensing device that enables them to detect minute changes in the position of a target object.



Omron SMD photomicrosensors

Our new SMD photomicrosensors reduce assembly time by eliminating a separate soldering step. Instead, the SMD can be mounted by reflow soldering with other components. As the terminal is not needed, there is no need to allow space for circuit and installation parts. This can reduce the volume by 65% compared to terminal type products. PIC output makes circuit design easy and enables output with high-speed reply.

The tiny size of this PMS makes it ideal in devices where space is limited, like label printers and sewing machines. It is also used in smart meters, slot machines, rice cookers, coffee-makers and various healthcare devices.



The EE-SX1350 PMS measures only 8.8mm x 4mm x 9mm.

Omron prewired photomicrosensors

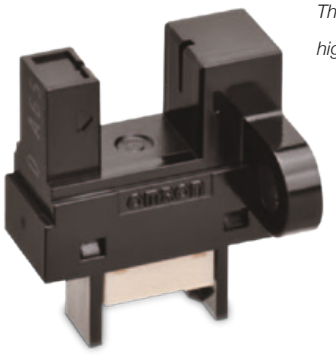
Prewired photomicrosensors reduce the total cost of production by making wiring easier. A wide variety of prewired products is available to fit many different sensing distance, output configuration and aperture design requirements. For example, the EE-SX1096 series is designed to fit horizontal apertures, while the EE-SX1161 series is dustproof.

EE-SX prewired sensors are used in office photocopiers and printers. They are also found in amusement and gaming machines, massage chairs, security cameras, air cleaners, vending machines and ATMs.

EE-SX prewired photomicrosensors offer flexibility and reliability.

Omron connector-type photomicrosensors

Omron's connector-type PMS eliminates the need to design a PC board. As there is only one part, costs and assembly time are reduced. Quality is higher with no risk of malfunction due to soldering failure, and maintenance is easier as the PMS can be easily changed after wiring. Omron's original connector system ensures high connection reliability.



The EE-SX3157-P1 PMS offers high quality at a reduced cost.

Light convergent reflective sensors - pushing the limits of detection

Omron B5W reflective sensors use advanced optical simulation technology to combine the functions of a cylindrical and a non-spherical lens. They can detect various colours and patterns in the detection area, including specular and diffuse reflecting objects, and only receive reflected light from a limited area. When used in office equipment like photocopiers, this means that they can detect black paper or clear film. It eliminates the problem of accidental background detection which can occur with general-purpose reflective sensors.

B5W-LB LCR sensor: reliable detection of black, mirrored and transparent surfaces

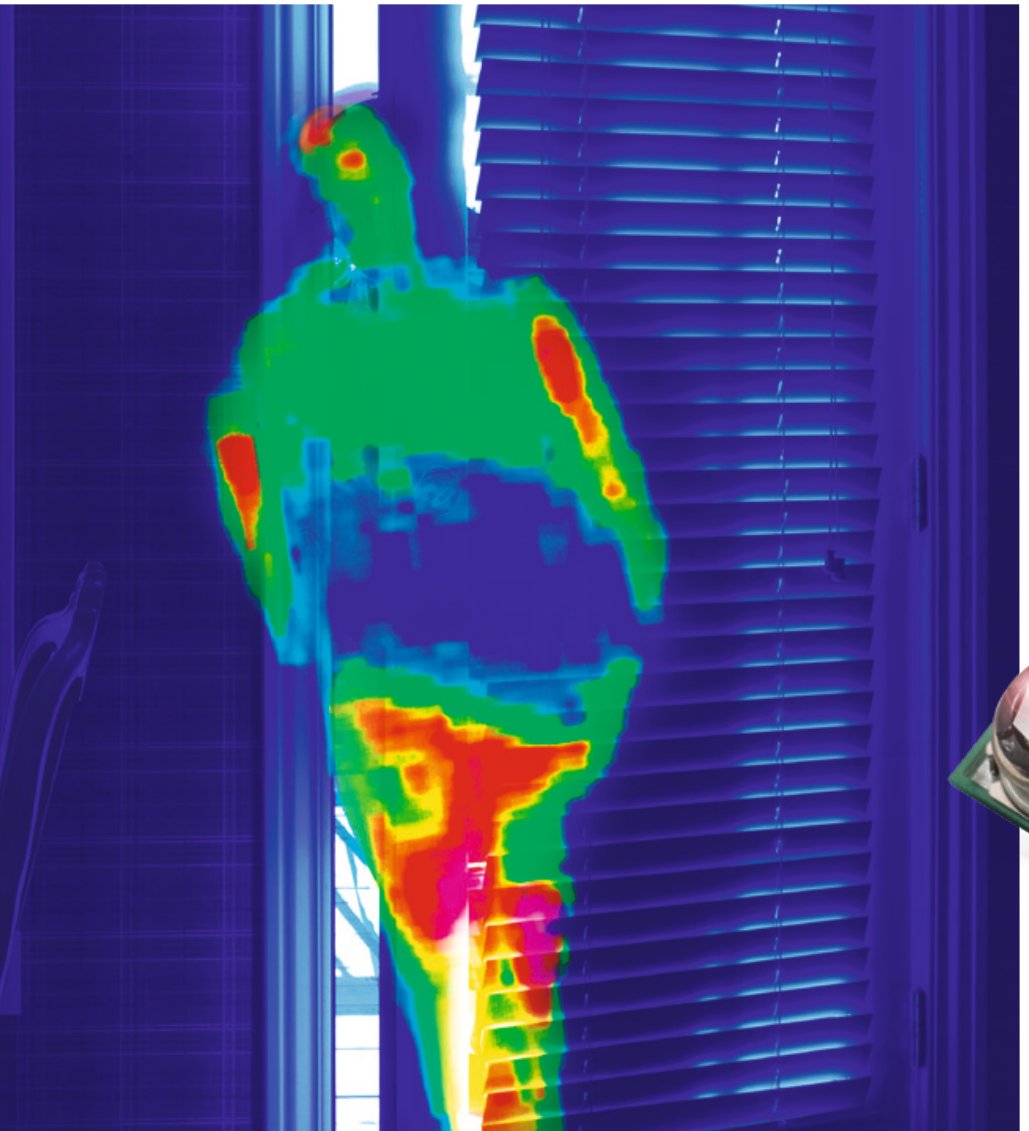
B5W-LB LCR sensors are designed to detect target items of various colours. They are available in miniature and super-miniature formats with a choice of analogue or digital outputs. All digital versions are offered in light-on and light-off forms and sealed to IP50. B5W-LB sensors are typically used to detect black, white and even transparent cups and glasses in vending machines; coffee bean levels in drinks machines; surfaces that scatter or absorb light; and other objects that are often a challenge for traditional sensors.

B5W-DB diffuse reflector sensor: ideal for COVID-safe user interfaces.

The latest additions to our light convergent/ diffuse reflective sensor family feature a longer range and enhanced performance. The new **B5W-DB diffuse reflector sensor** has a sensing distance of 550 mm and is suitable for touch-free applications in washrooms, sterilisation equipment and entry control systems.

Thermal sensor – heat and people detection for smart energy control

From individual consumers to manufacturing companies and governments, everyone recognises the importance of reducing energy wastage and cutting costs. Simply by detecting body heat, Omron's D6T heat-detecting sensor is making a huge contribution to energy-saving efforts. This super-sensitive infrared D6T temperature sensor can detect human presence in a room, even if the person isn't moving. That information can be used in homes and offices to switch lights, heating and air conditioning on and off as needed. The sensor can also be used to count people, helping to optimise control in smart energy systems and offering reliable intruder detection. The D6T is available in the following configurations: 1x1, 1x8, 4x4 array, 32x32 and high temperature versions of 1x8 and 4x4.



Industrial productivity and safety are also enhanced by thermal sensing. By instantly detecting any unusual changes, the D6T can help to prevent factory line stoppages and overheating.

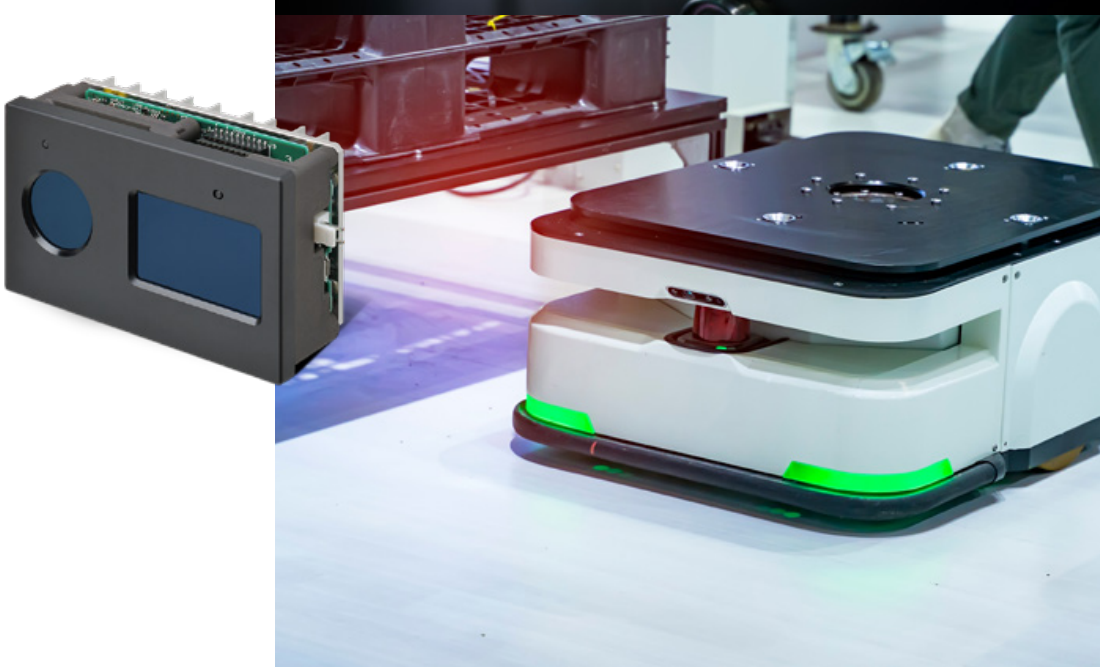
The D6T miniature non-contact sensor is created entirely from Omron's own ASICSs and MEMS technology along with other application-specific parts to ensure high sensitivity. It measures temperature by receiving energy radiated from target objects on thermopile elements.

TOF (Time of Flight) and touch sensors - precision technology for an automated future

Based on the flight time of light, TOF sensors measure distances to objects at a speed of 20 frames per second, track movement three-dimensionally and turn captured data into 3D images. Omron's B5L TOF sensor features ambient light immunity, ensuring stable detection performance even in bright places. It achieves high output accuracy and, thanks to OMRON's unique circuit design and heat emission design, a long lifetime. The B5L is suitable for applications requiring the use of up to 17 devices at the same time.

Touch sensors provide reliable operation with only a light touch. Our versatile and time-saving W7ED touch sensor can be embedded in equipment to create any configuration that suits your application. There's no need to adjust sensitivity or design circuits and touch electrodes can be simply fastened with screws. It is typically used in lights, elevators, vending machines and water faucets. Models equipped with anti-static FG terminals are also available.

W7ED touch sensor: simple installation and reliable performance



B5L: the 'mechanical eye' bringing robots into everyday life

Environment sensor – enhancing comfort and safety

The ability to easily monitor conditions in our surrounding environment can greatly increase our comfort and quality of life. For example, we can use information about changes in the weather to plan activities, prevent heat attacks or create a comfortable sleeping environment.

Omron's environment sensor provides reliable tracking of seven environmental factors: temperature, light, UV Index, humidity, barometric pressure, noise and acceleration. This information can be uploaded to a smartphone app using the Bluetooth low energy interface, recorded and used to create status updates and alerts. The module features a sensor beacon for easy use and has an embedded memory for secure data logging.

Temperature
Humidity
UVI
Seismic
Pressure
Light
Noise
VOC

Where is it used?

The environment sensor has many applications in remote care provision, including room condition monitoring for infants, elderly people and pets. It can also be used to create more comfortable and healthy home and work environments.

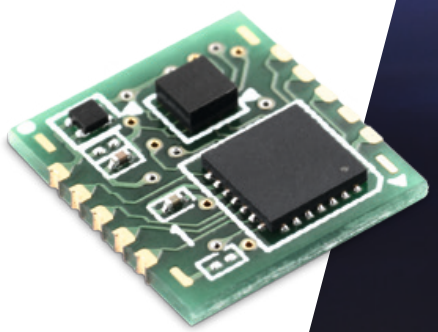
The Omron 2JCIE environment sensor device is compact, accurate and easy to use.

Tilt and vibration sensors – enabling better disaster support

Seismic intensity data is vital in areas affected by earthquakes. It can be used for accurate mapping of risk levels and damage in order to plan disaster support efficiently, save more lives and restore vital services as quickly as possible. It can also be used to optimise asset evaluation and provide accurate land and insurance prices by area or property.

How are seismic sensors used?

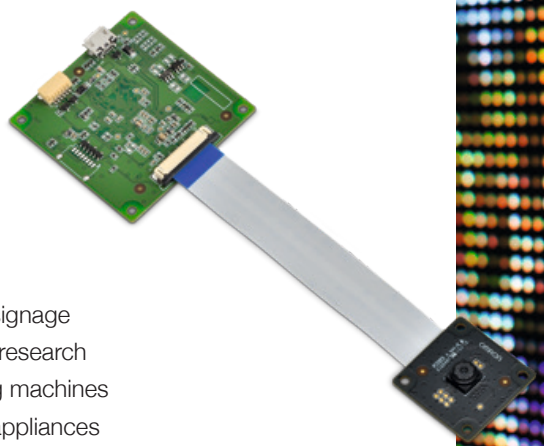
Tilt and vibration sensors can be installed in smart electricity meters to facilitate shut-down in the event of an emergency, thus preventing electrical fires. Similarly, in smart gas meters they can activate shut-down to prevent gas leaks and explosions. The data they collect can be shared throughout a Seismic Index (SI) network to aid understanding of disaster situations and help determine when evacuation is necessary for safety.

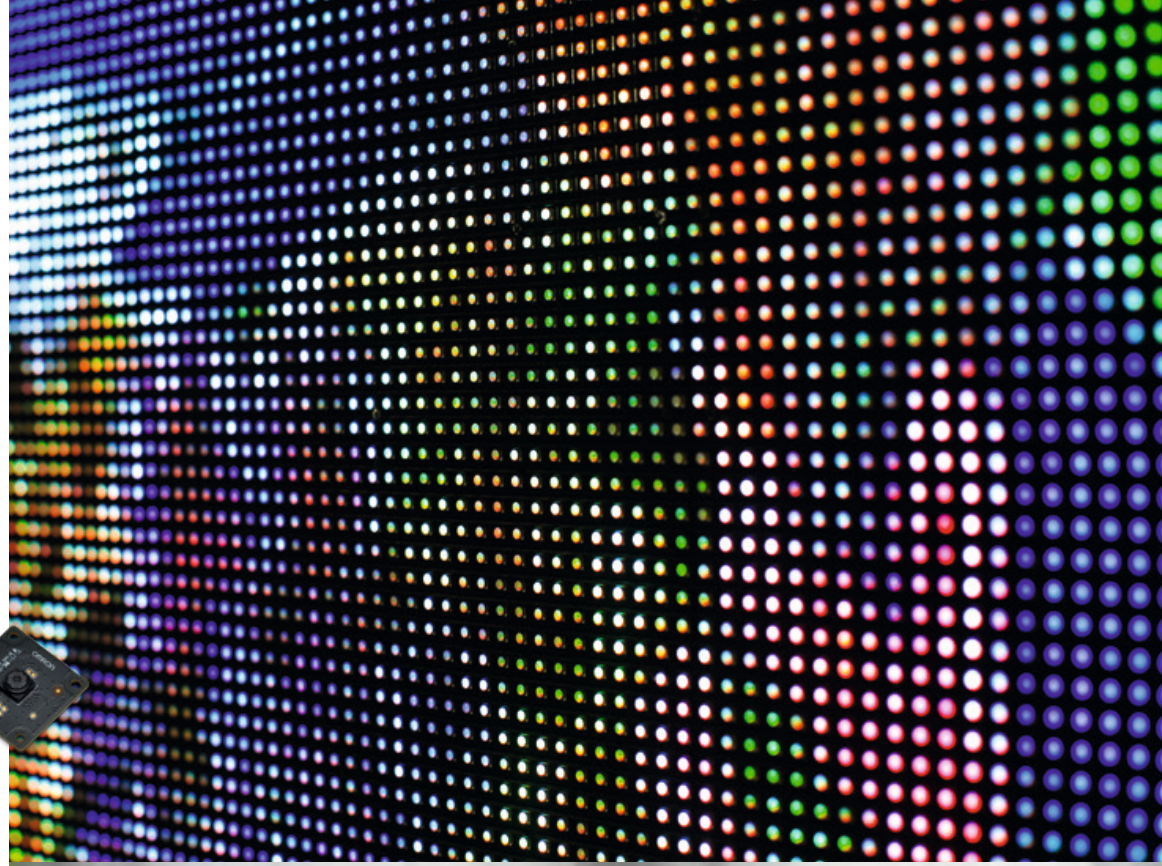


D7S vibration sensor

The Omron D7S is the world's smallest seismic sensor. It was developed specifically to help prevent fires and other secondary disasters after an earthquake. This ultra-compact, surface-mountable device analyses spectral intensity and rejects impulse vibration noise to provide extremely precise assessment of seismic intensity scales. Its INT1 output terminal operates in the same way as that of a conventional mechanical vibration sensor, ensuring full compatibility. It is available with an I2C interface to enable communication with external devices. Its algorithm, developed by Omron, is patented worldwide.

The Omron sensor line-up





HVC

- Digital signage
- Market research
- Vending machines
- Smart appliances
- Building automation
- Security
- Register / pos
- Communication robots
- Industrial equipment
- Energy saving
- Amusement

TOF sensor

- Factory automation
- Logistics and conveyance
- Autonomous mobile robots (AMR)
- Automated guided vehicles (AGV)
- Patient monitoring and observation
- Automatic doors/elevators

Touch sensor

- Lights
- Elevators
- Vending machines
- Water faucets

PMS

- IP camera
- Factory automation (sewing machine)
- Building automation
  - Vending machines
  - Ticket machines
  - Garage doors
  - Atm
  - Coin mechanisms
  - Cash counter
- Amusement and entertainment
  - Gaming machines
  - Slot machines
  - Crane games
  - Joysticks
  - Card machines
- Industrial automation
  - Automation system
  - Drives control
  - Non-contact switch
- Energy
  - Water meters
  - Electricity meter
  - Gas meters
  - Cash counter
  - Wind power generator
  - Fuel cells
- Home appliance / consumer
  - Hvac
  - Household tools
  - Home appliances
  - Sewing machine
  - Endless control button
- Digital image
  - Printers, copiers, scanners
  - Post machines
  - Ticket machines
  - Plotters
  - Mouse
  - Digital cameras

D6F

- Combustion control
  - Fuel cell
  - Water heater
  - Boiler
- Electronics
  - Projector
  - PC, server
  - Other AV electronics
- Ventilation
  - HVAC
  - VAV controller
  - Air cleaner
  - Clogging detection
  - Air conditioners
  - Ducts

D6T

- Security systems
- Building automation
- Energy management
- Human detection

D7S

- Earthquake detection
- Preventing secondary damage
- Determining damage
- Disaster map creation
- Prevention

B5W

- Robot cleaner
- Coffee machine
- Vending machine

Environment sensor

- Building automation
- Room monitoring
- Office environment monitoring
- Weather change alert

Tilt sensor

- Vending machines
- Cash machines
- Alarm systems
- Fork lifts
- Cranes, material handling equipment
- Standalone oil heaters

Pressure sensor

- Altitude
- Water depth
- Atmosphere
- Building automation
- Smartphone/Tablet
- Pedometer
- Drone
- Watch/Wearable indoor navigation

About Omron

Omron Corporation is a global leader in the field of automation. It provides a variety of products and services in the fields of industrial automation, electronic component industries and healthcare.

Based in Kyoto, Japan, Omron has head offices in Kyoto, Singapore, Hong Kong, Amsterdam and Chicago. It employs more than 37,000 people in 36 countries. The European division has its own development and manufacturing facilities. Local customer support is provided in all European countries.

Omron seeks to anticipate the needs of future generations. This is the inspiration for all our products and services. We engage with customers to advance not just products, but also the way they are created and used. From the birth of an idea to the production line and right through R&D, shipping and aftersales, we are continually exploring new possibilities. Our aim is to create maximum value for you.

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