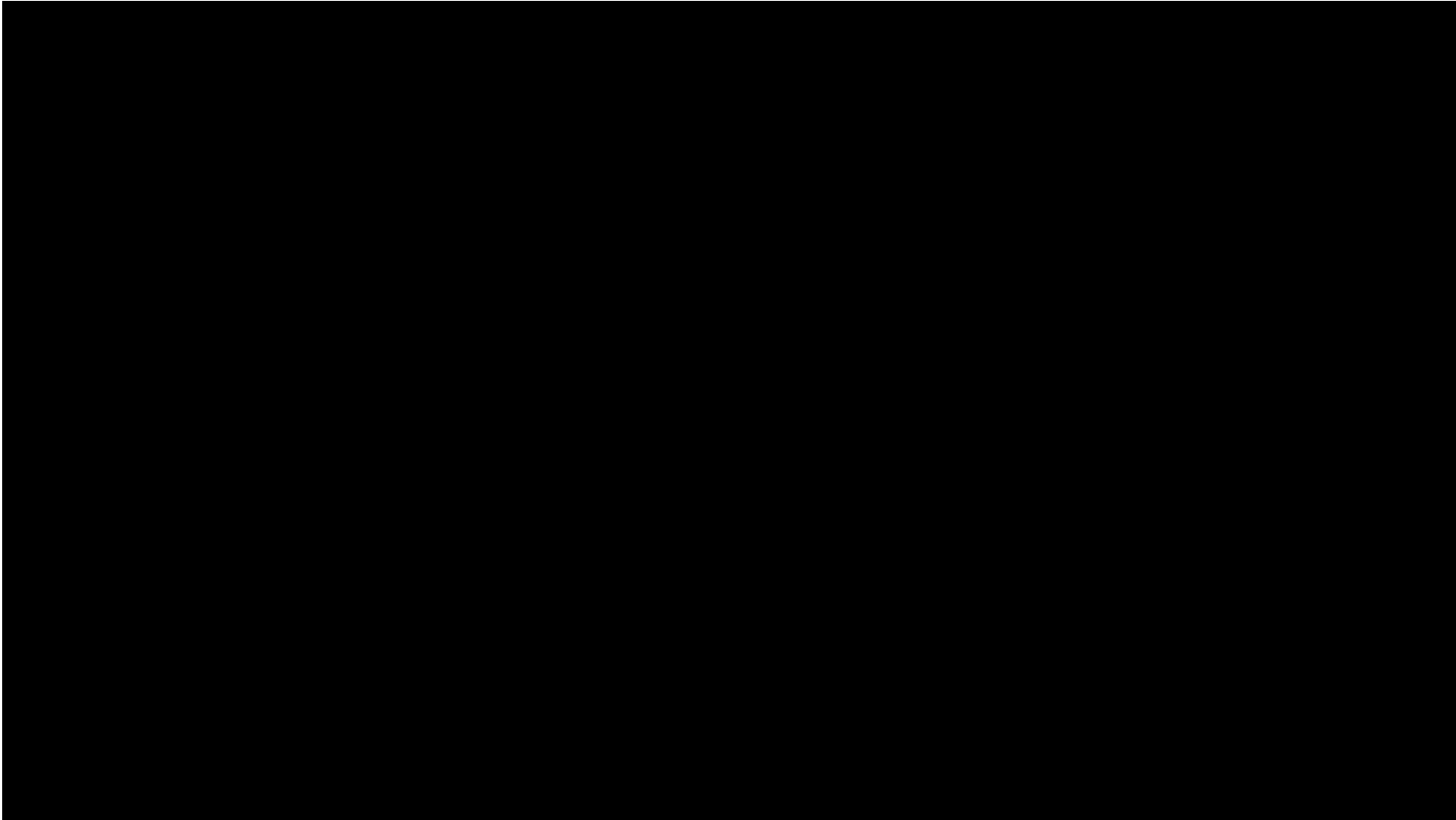


GABRIELE FULCO
TSM N&S

ROBOTICS

OMRON SENSORS

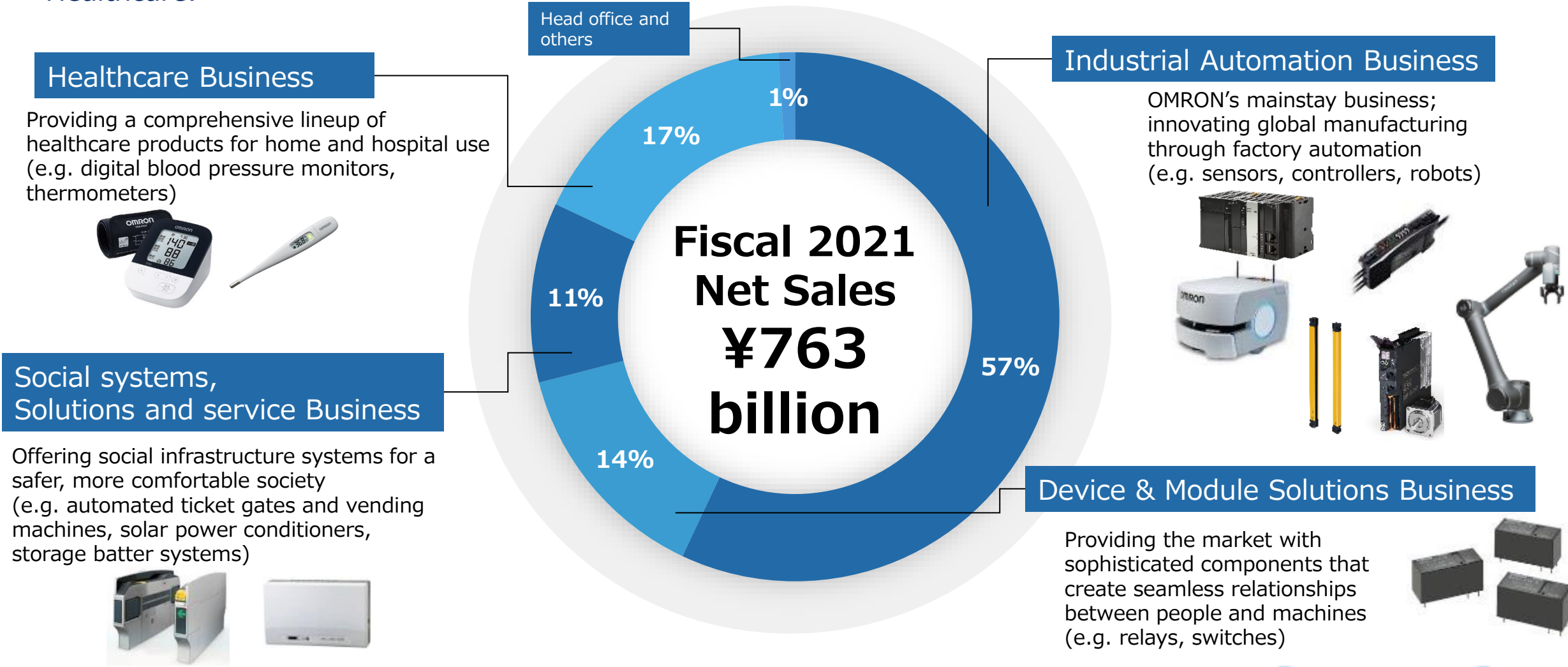
FORPHEUS TABLE TENNIS ROBOT



OMRON

Cooperate Overview

Omron has been pursuing innovation driven by social needs for creating a better society. Omron's four main businesses are Industrial Automation, Device & Module Solutions, Social Systems, Solutions and Service, and Healthcare.



DMS SENSORS LINE UP



HVC

Digital signage
Market research
Vending machines
Smart appliances
Building automation
Security
Register / pos
Communication robots

D6T

Security systems
Building automation
Energy management
Human detection

TOF sensor

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

Touch sensor

Lights
Elevators
Vending machines
Water faucets

D6F

Combustion control
Fuel cell
Water heater
Boiler
Electronics
Projector
PC, server
Other AV electronics

Pressure sensor

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



Environment sensor

Building automation
Room monitoring
Office environment monitoring
Weather change alert

D7S

Earthquake detection
Preventing secondary damage
Determining damage
Disaster map creation
Prevention

Tilt sensor

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

PMS

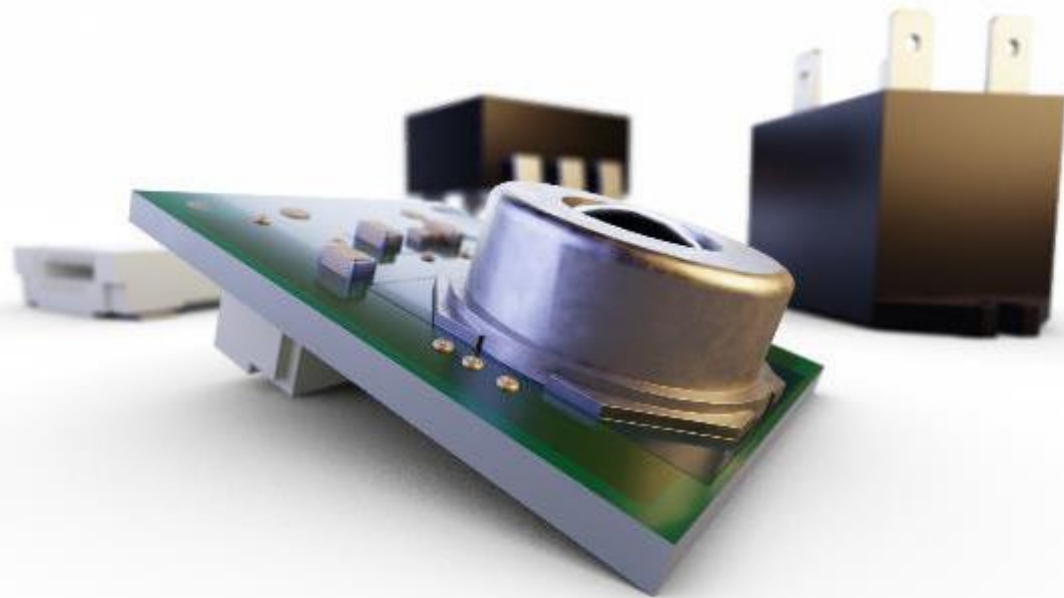
IP camera
Factory automation
AGV
Service robots
Encoders
Building automation

Industrial automation
Automation system
Drives control
Non-contact switch
Energy
Water meters

Digital image
Printers, copiers, scanners
Post machines
Ticket machines
Plotters
Mouse

B5W

Robot cleaners
Coffee machines
Vending machines



AGENDA

1.B5L 3D TOF SENSOR

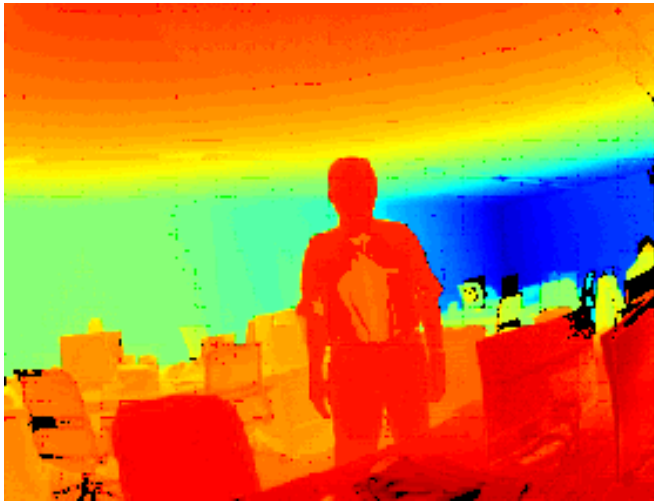
2.B5T HVC HUMAN VISION COMPONENT

3.OKAO FACE RECOGNITION V9

4.D6T THERMAL SENSOR

5.B5W-LB/DB LCR/LDR SENSORS

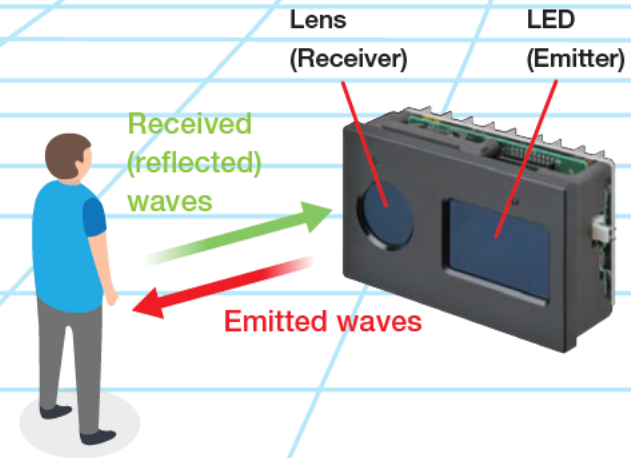
3D TOF Sensor Module B5L series



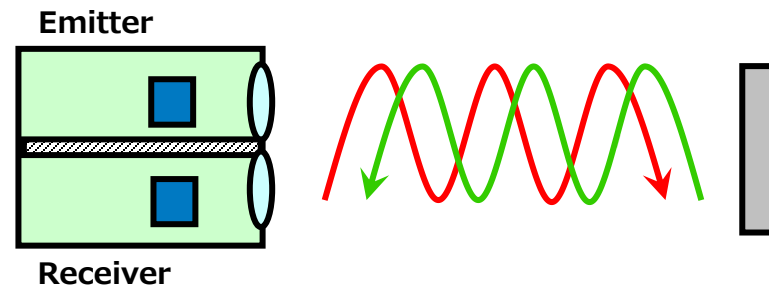
WHAT IS A TOF SENSOR?

What is a TOF Sensor?

A TOF (Time of Flight) sensor uses the flight time of light to measure distances to objects. As well as being able to turn captured images into 3D images, it can also measure at a speed of 20 frames per second, allowing it to track the movement of objects three-dimensionally.

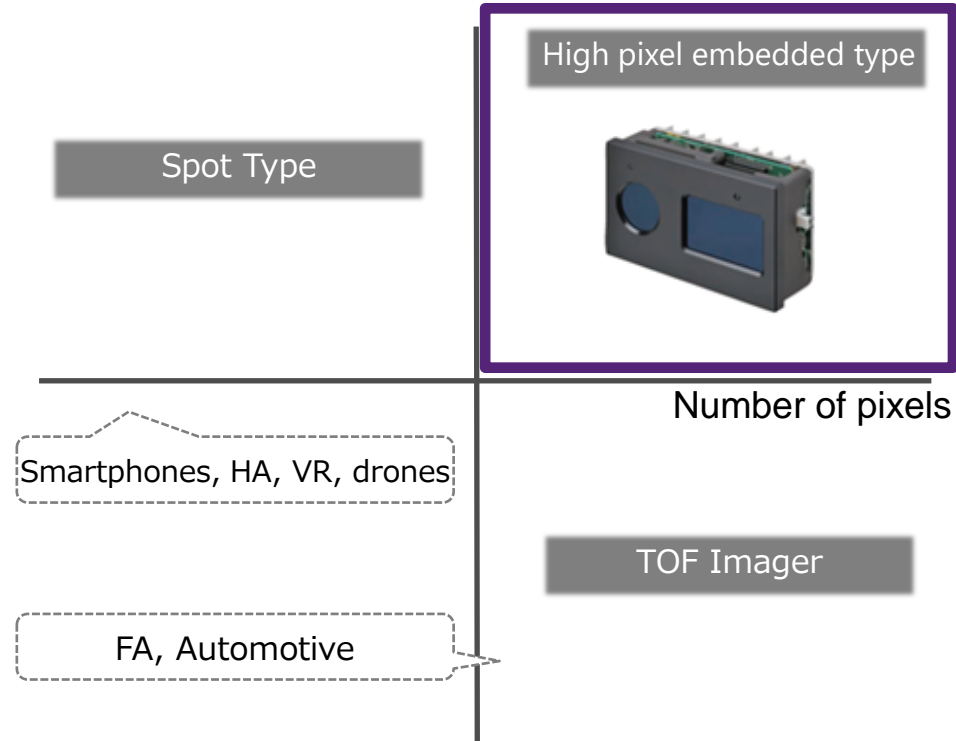


The principle of OMRON products is "Indirect TOF"



DIFFERENT CATEGORIES OF TOF SENSOR

High usability (easy to design and correct)



Omron

Direct TOF

Indirect TOF



OUTPUT EXAMPLE

BY COMBINING MULTIPLE DISTANCE INFORMATION, IT IS POSSIBLE TO RECOGNIZE A WIDE RANGE OF SURROUNDING ENVIRONMENTS.

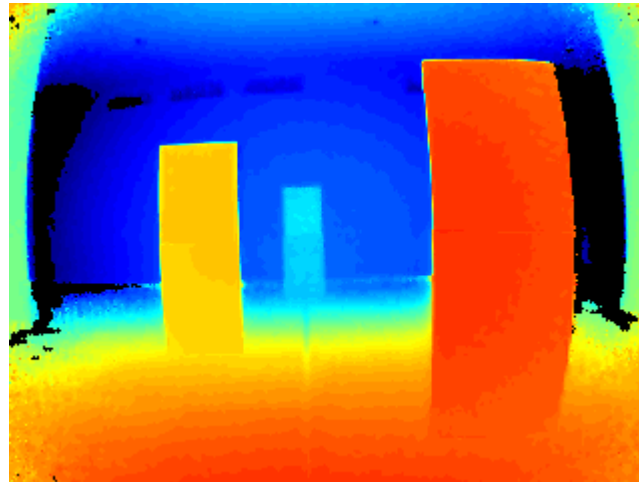
RGB Camera

Outputs RGB color shades for each pixel



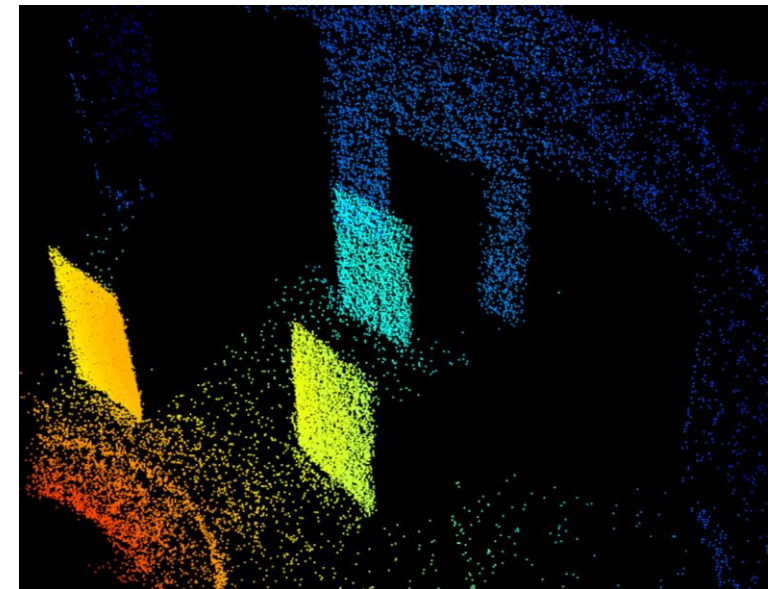
3D TOF Sensor

Outputs the distance value for each pixel



☞ Display distance in color
Near: Red ~ Far: Blue

Output X, Y, Z coordinates for each pixel



Three-dimensional data

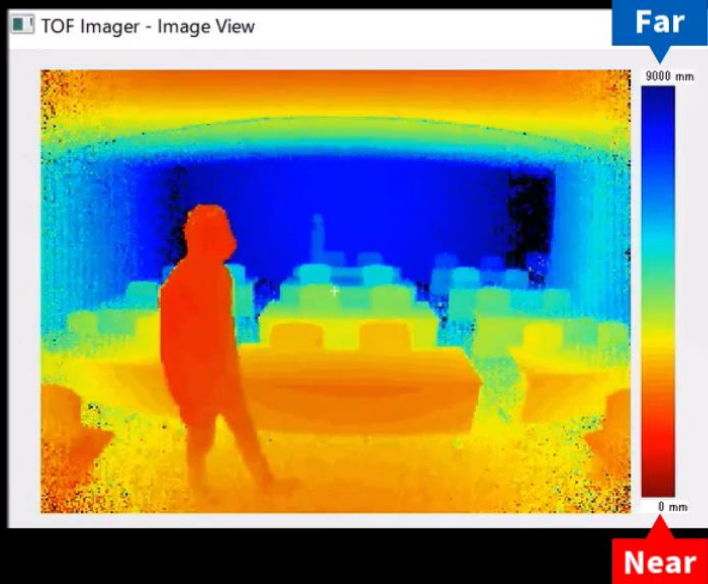
DEMONSTRATION VIDEO



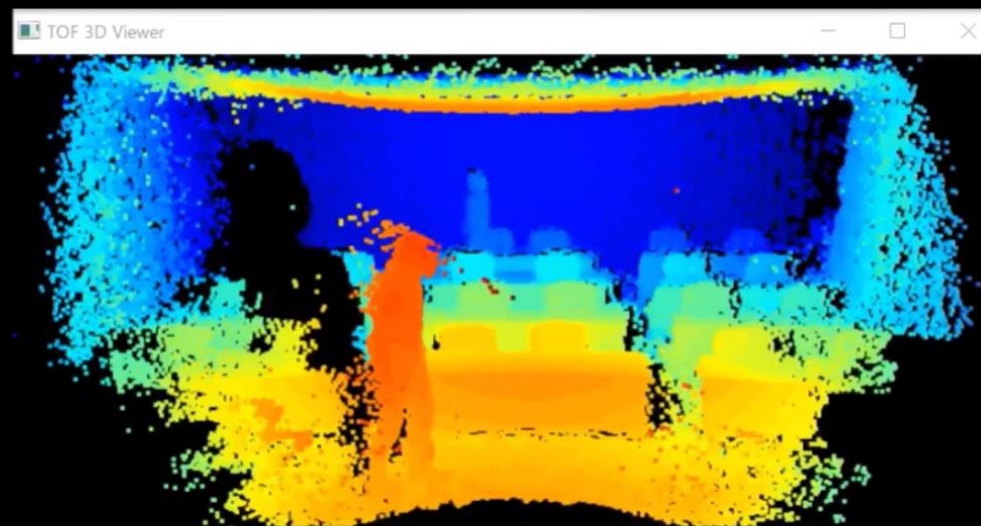
3D TOF Sensor Module B5L Sample Movie



2D viewer



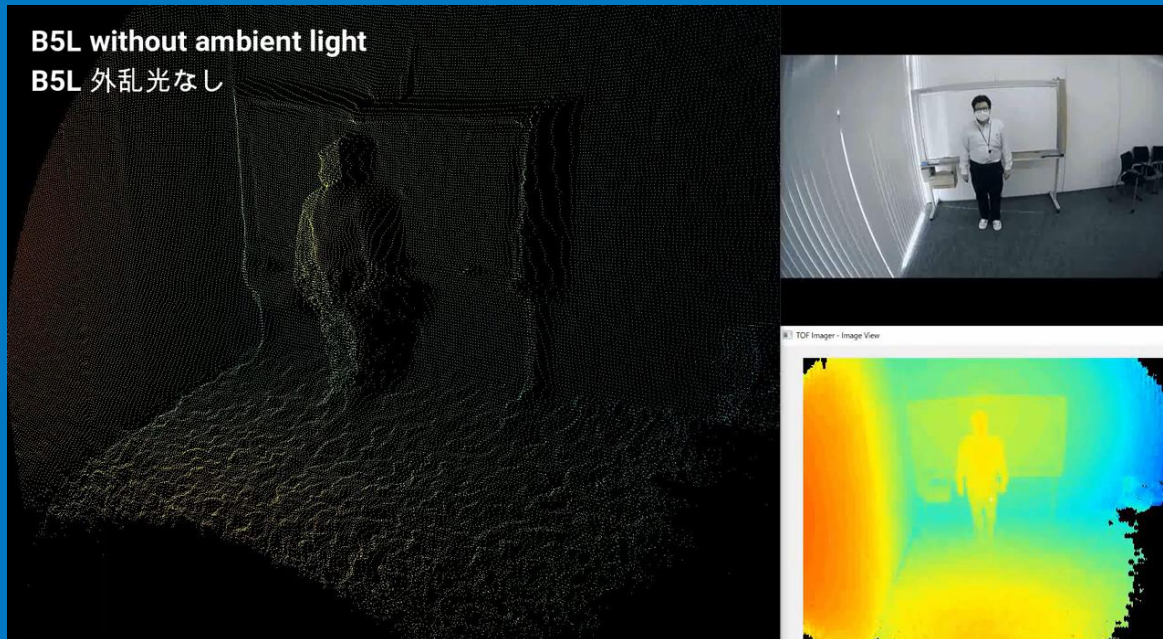
3D viewer



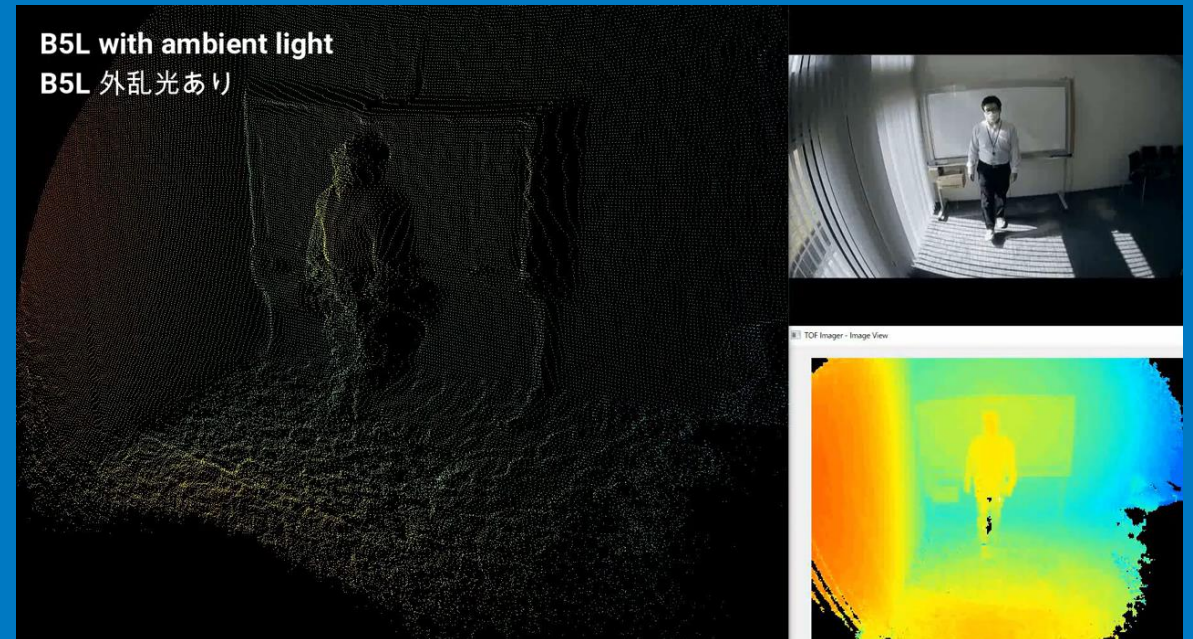
FEATURES: INTERFERING LIGHT IMMUNITY

OUTPUT EVEN IN AN ENVIRONMENT WHERE AMBIENT LIGHT IS GENERATED

Without ambient



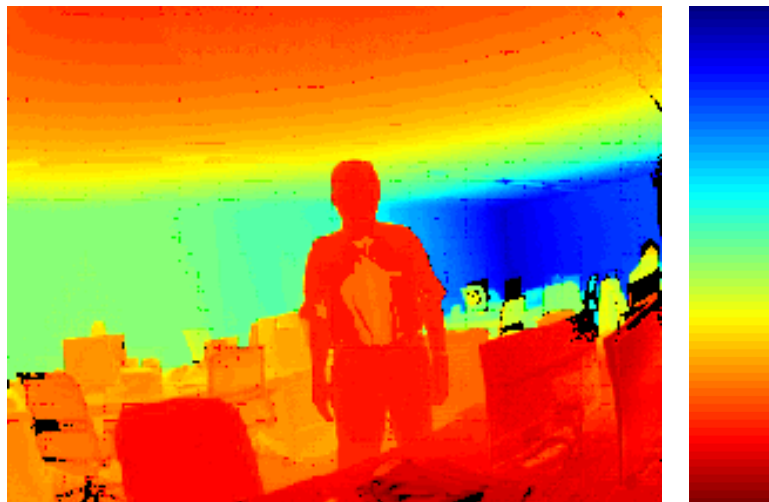
With ambient



Without ambient : <https://youtu.be/cUphHe2kkVc>

With ambient : <https://youtu.be/bjGOGxrvDfo>

PRODUCT FEATURES & BENEFITS



12m

0m

Interfering light immunity	Ambient light immunity equivalent to 100,000 lx! Its powerful ambient light immunity ensures stable detection performance free from saturation even in bright places.
High precision	±2% (2 m) Achieves high output accuracy for compensated signals.
Long life	Long life equivalent to 5 years under continuous driving. <small>According to OMRON's research in March, 2020 *</small> Long life thanks to OMRON's unique circuit design and heat emission design.
Interference prevention	With interference prevention function (up to 17 units <small>Industry's top class</small>) <small>According to OMRON's research in March, 2020 *</small> Ideal for applications that require the use of multiple devices such as robots at the same time.

T rising, good for MP!

You can change up to 17 different frequencies!

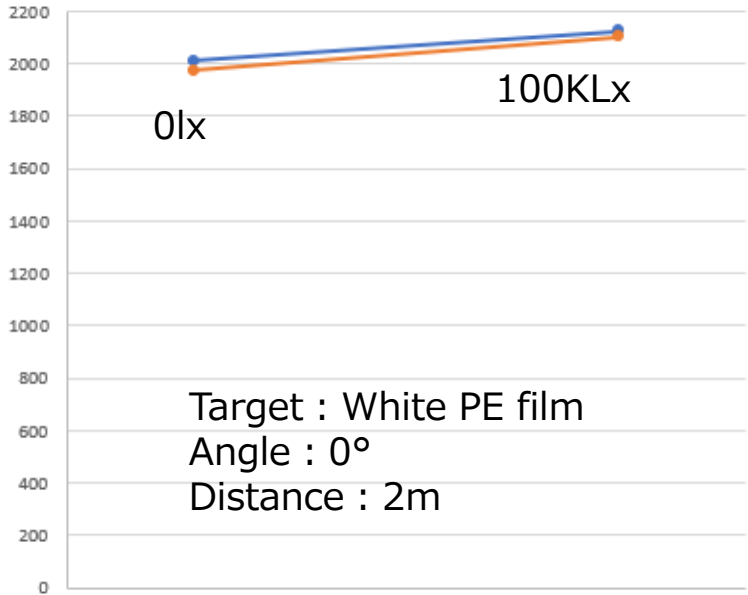
Up to 12m!
Not less than 0.3m

Item	Specifications
Pixel	320×240
FOV	H90×V70
Measurement distance	0.5m~4.0m
Fps	10fps (Normal mode)
Ambient light immunity	100,000lx
Power supply	DC24V

PRODUCT TECHNOLOGY

AMBIENT LIGHT IMMUNITY EQUIVALENT TO **100,000LUX**

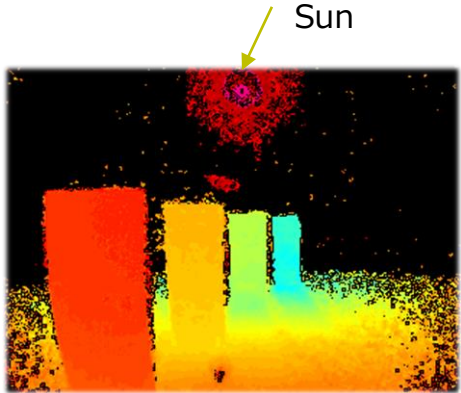
Test Data



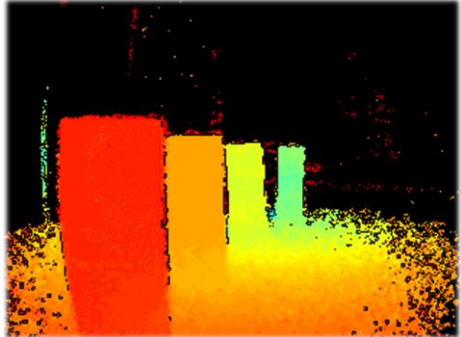
Optical design technology

- *Lens design that corresponds to the wavelength of the emitter LEDs
- *Arrangement of emitters and receivers minimizing the effect of suspended particles of dust
- *Optical simulation technology

■ Back light

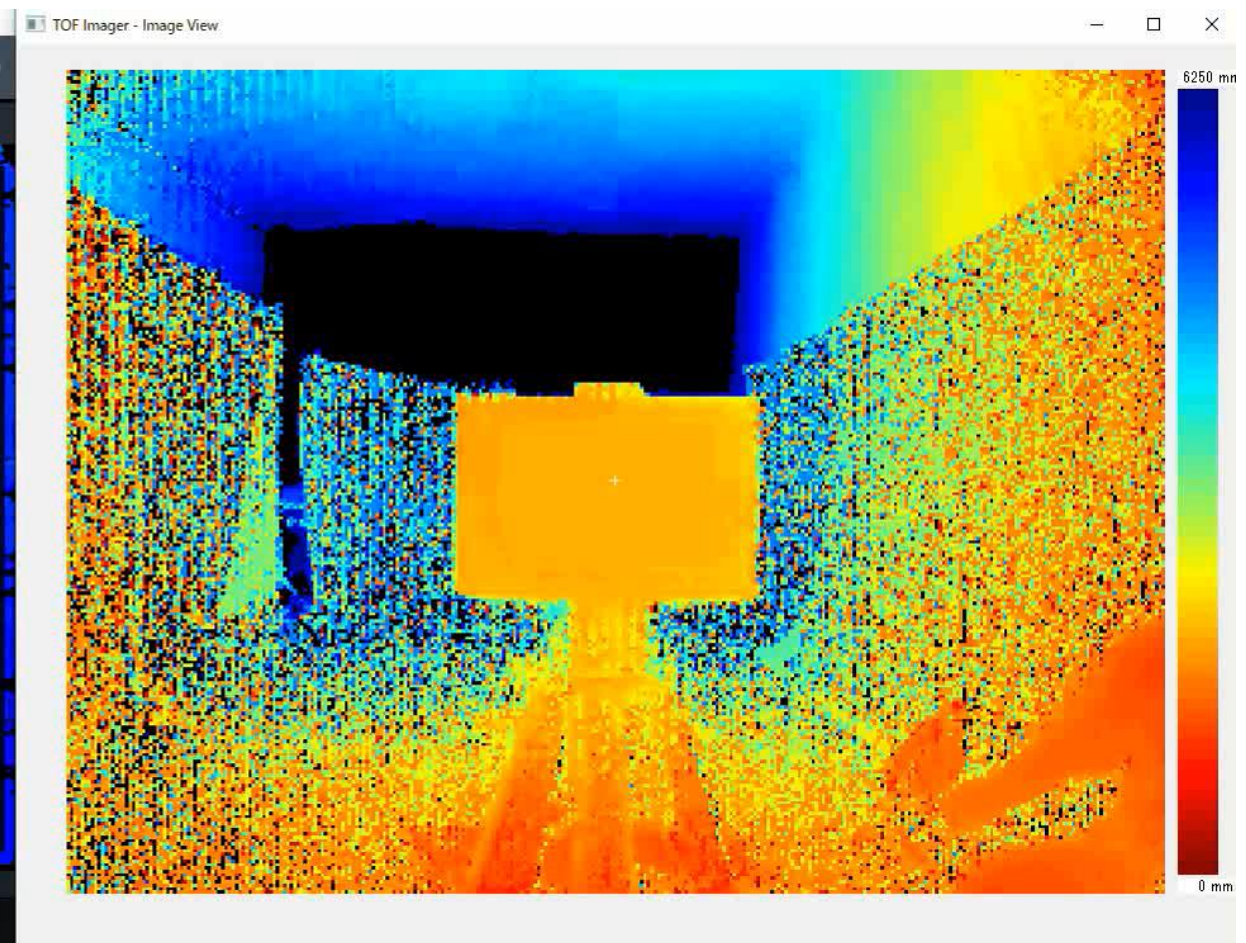
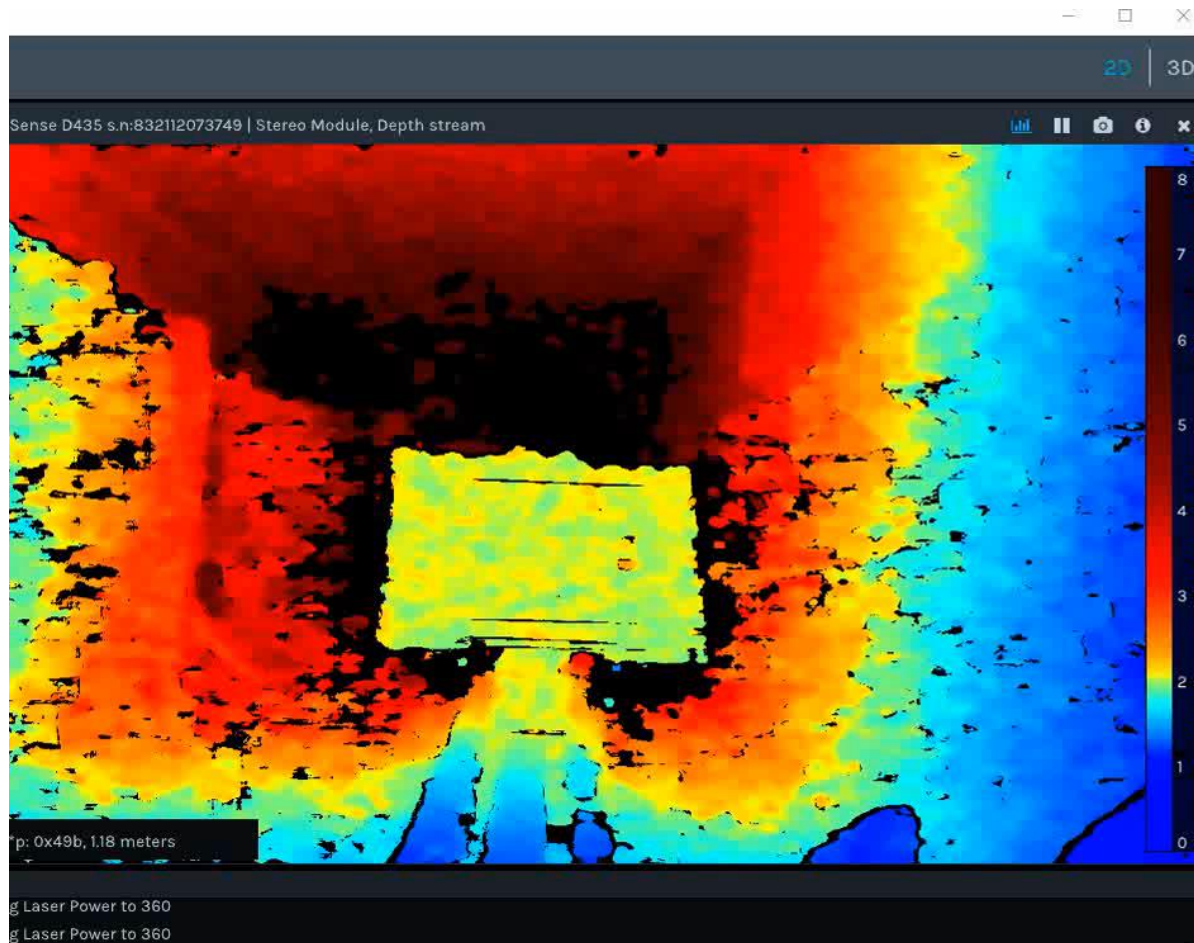


■ Normal light

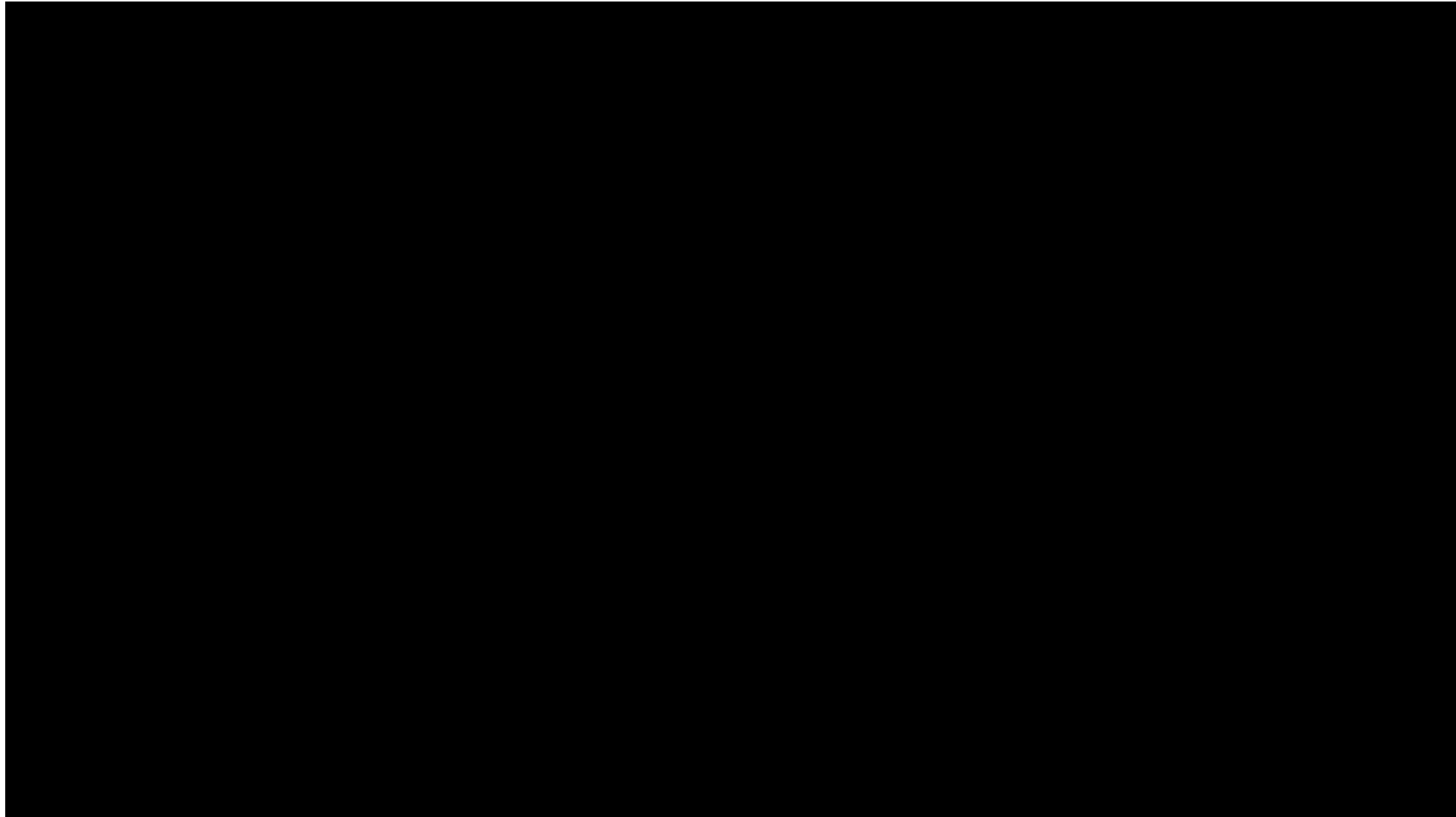


COMPARISON VIDEO

COMPARISON TEST WITH ONLY 1000LUX LIGHT!!



B5L SUMMARY VIDEO



MAIN APPLICATIONS

Differences from a conventional camera sensor

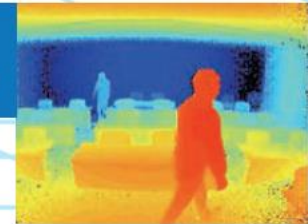
The use of extensive distance information enables the sensor to identify its peripheral environment



Watch a demonstration video here



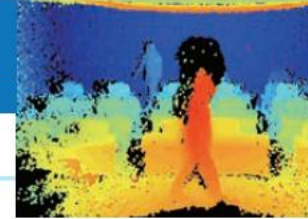
2D image



Far

Near

3D image

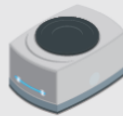


Peripheral recognition application, volume / shape recognition, lead wire tracking / behavior grasp

Technology that is expected to expand the market as the "eye" of equipment

AMR/ Service robots

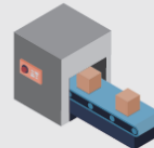
Logistics and conveyance



Drop detection/
Environment recognition



Periphery recognition/
Human recognition



Volume and shape
measurement



Empty space detection

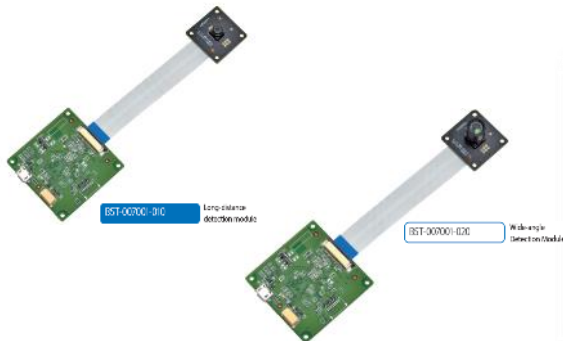


OMRON



B5T

Human Vision Components



ID:mary
AGE:5
Gender:female

expressions:result
Happiness
90%

OMRON's Image Sensing technology is the answer.



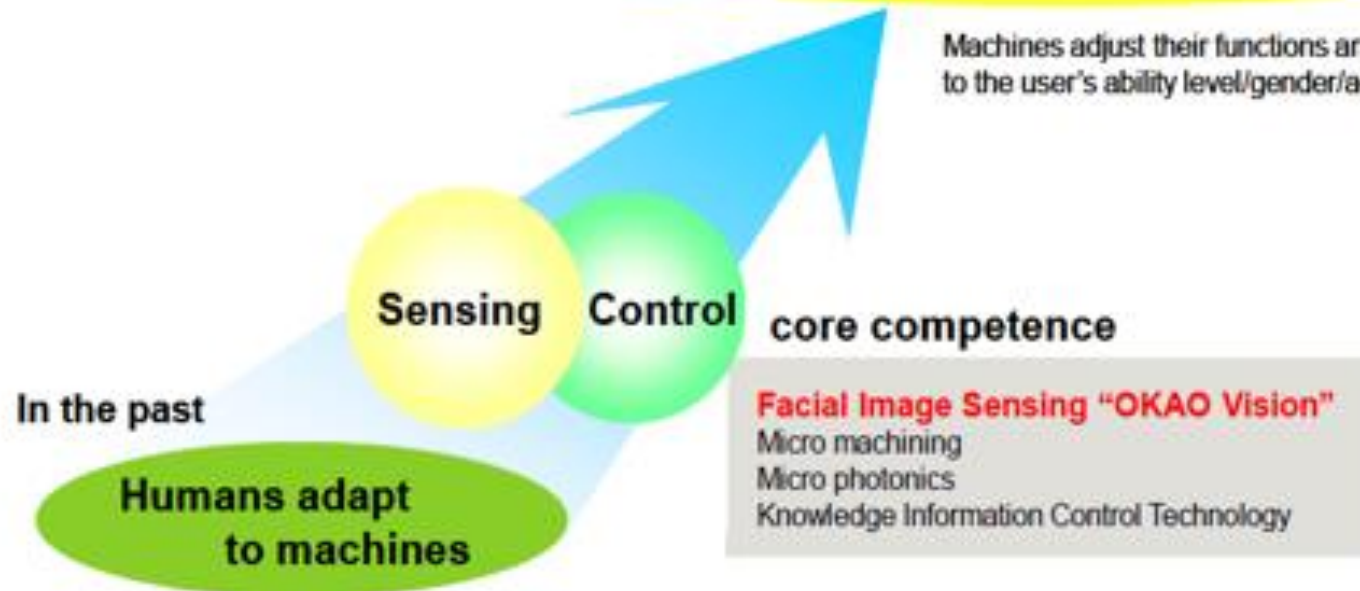
Market Trend



In the near future

Machines adapt to humans

Machines adjust their functions and performance to the user's ability level/gender/age



OKAO VISION SOFTWARE

Digital camera/DVC

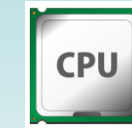


- Face Auto Focus
- Face Auto Red-Eye Correction
- Face Auto Framing etc.



Home Electronics, Printers etc.

- Individual Recognition
- Facial brightness Adjustment
- Beautiful Skin
- Red-Eye Reduction etc.



Mobile Devices

- Face Auto Focus
- Face Auto Iris
- Individual Recognition
- Face Editing Tools etc.



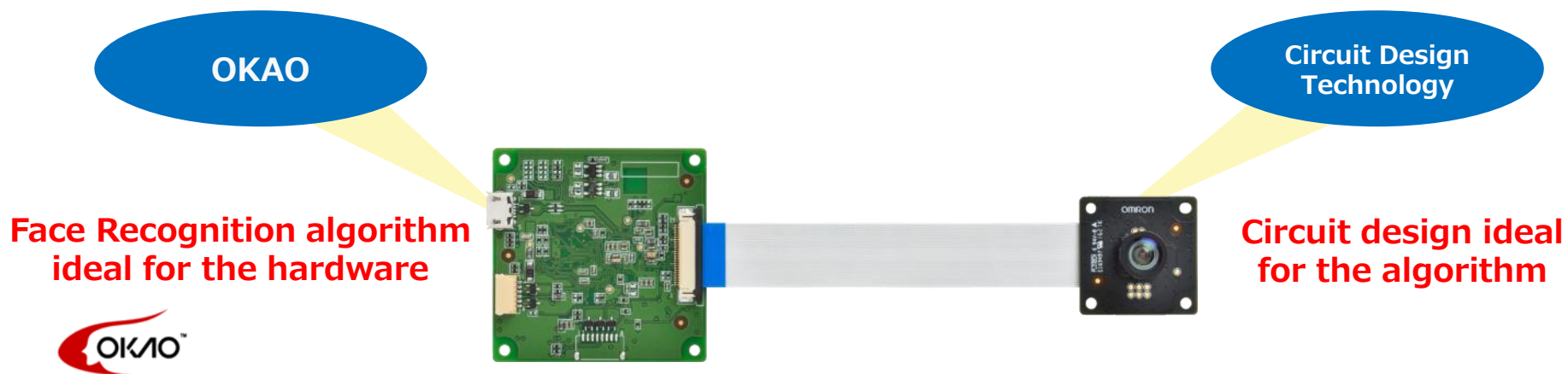
- Face Detection
- Attribute Estimation
- Smile Degree Estimation etc.



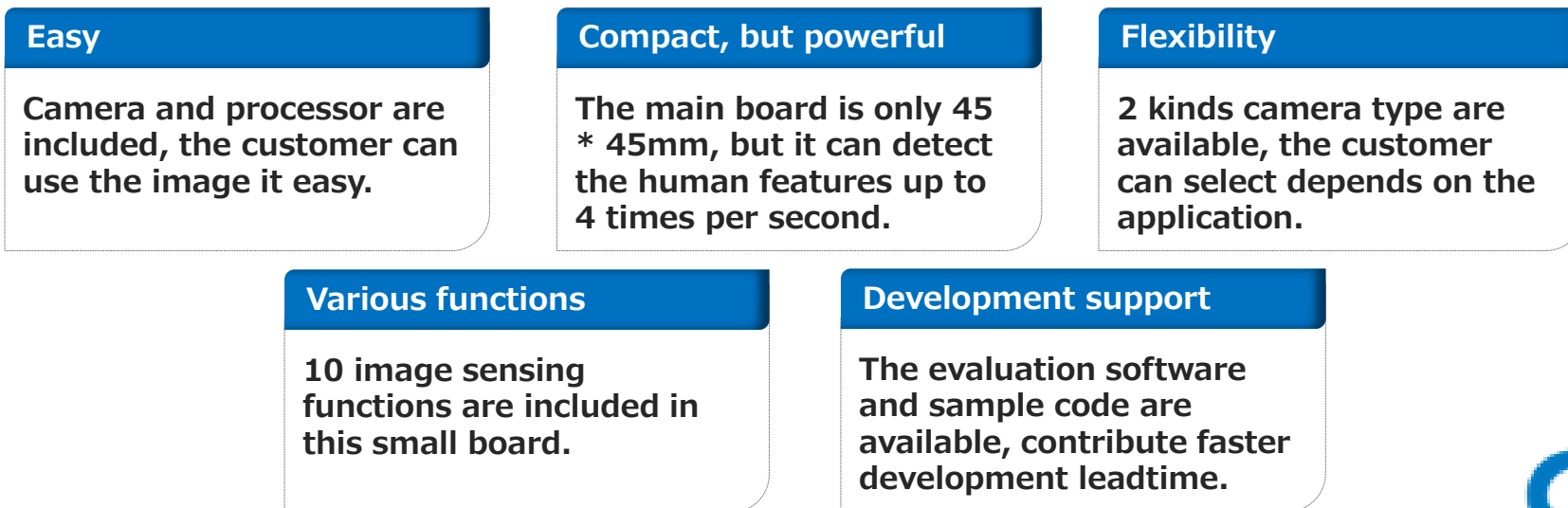
Products for Public works

What is Human Vision Components?

Embedded device integrating OKAO technology on a board with camera and CPU













Human Vision Components (HVC)



Which features does HVC-P2 include?

GDPR
Friendly

10 image sensing functions included, which can be activated together

Face Detection 	Face Recognition 	Gender Estimation 	Age Estimation 	Expression Estimation 
Facial Pose Estimation 	Gaze Estimation 	Blink Estimation 	Hand Detection 	Human Body Detection 

HVC is not storing full images,
just only raw data

Impossible to re-produce full image

No privacy issue

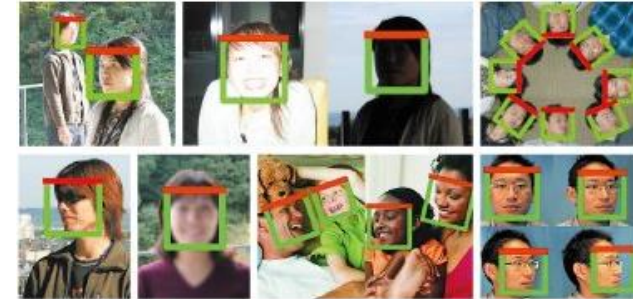


- Face Detection -

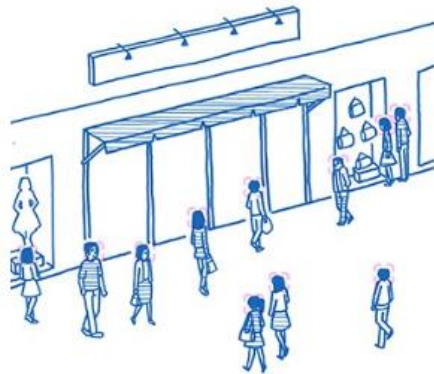
Detect with high accuracy and speed multiple faces of various size through the use of a unique algorithm

Features

- Can detect faces in all 360 degrees roll angle.
- Can detect and track faces partially occluded.

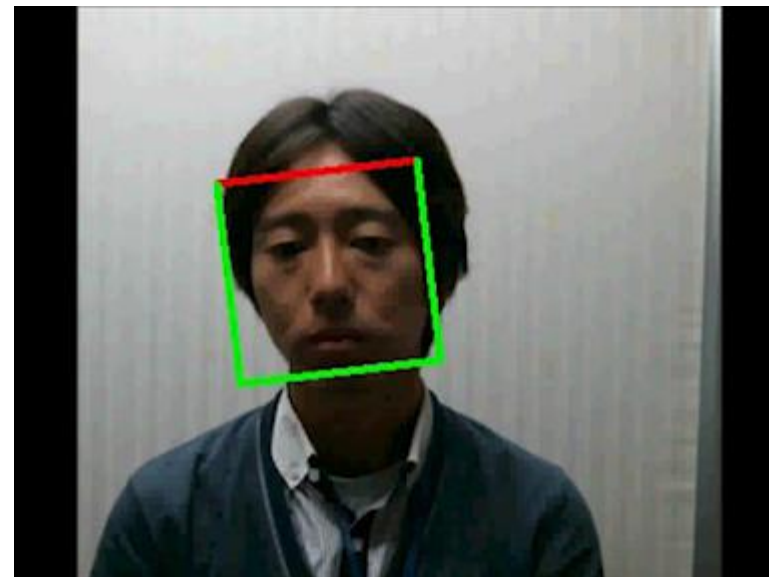


Application example



Count number of visitor in the shopping mall or super market

Count number of visitor automatically, it can reduce labor costs



- Face Recognition -

Recognition can be done in various conditions

Features

- Can recognize person with high accuracy under various conditions (face orientation, expressions, lighting conditions and skin tones).
- Can be used for face search or login features.
- Can be used for real time recognition in various devices.

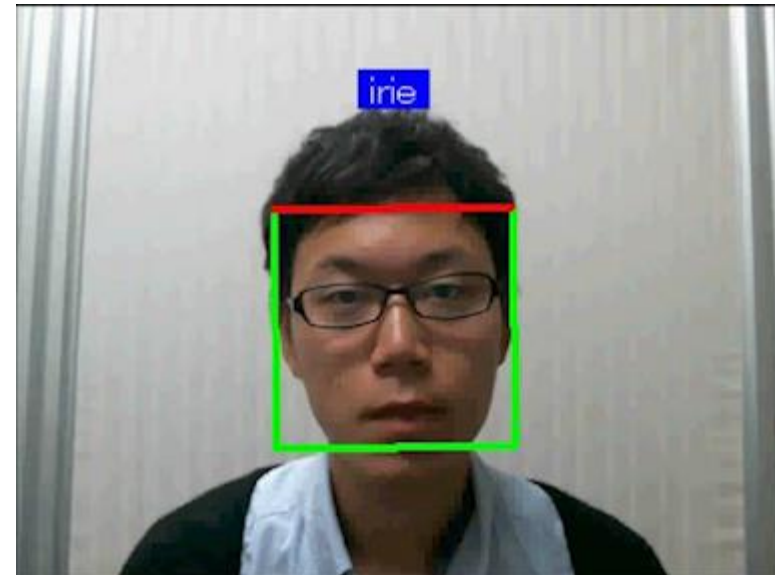


Application example



- Access control
- Security gate

Limit access to restricted areas by recognizing people and improve security



Modifications Notices

Human Image Sensing Technology

Issue Date
February 1, 2022

No. 2022028AE(ON)

Firmware design changes for addition of functions of Human Vision Components HVC-P2 (model B5T) of Modification Notice.

[Effective Date]

Effective as of our production in February 2022.

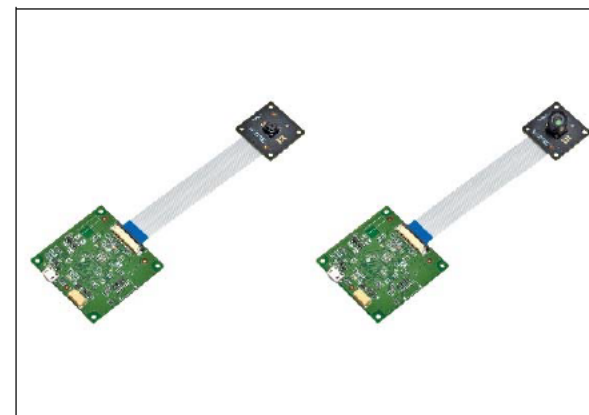
[Applicable Model]

Model B5T-007001 series

< Refer to the " [Details of applicable model] " . >

[Reason for change]

For upgrading to the new firmware with the addition of the commands for "1:1 verification" and "changing maximum number of registered people in Album" for face recognition.



[Details of applicable model]

Models
B5T-007001-010
B5T-007001-010-H
B5T-007001-020
B5T-007001-020-H

CHANGES

[Changes]

Before the change			After the change		
Image Sensing Functions			Image Sensing Functions		
Function	Output	Details	Function	Output	Details
Face Recognition	• Individual identification result	<ul style="list-style-type: none"> • Displays either the registered User ID, or “non-registered” for non-registered individuals Maximum number of users: 100 Maximum number of data per use: 10 Registration is done with the Product. 	Face Recognition	• Individual identification /verification result	<ul style="list-style-type: none"> • Identify whether the face image that was taken matches the registered user in the Album. As a result of identification, the ID for the user with the highest degree of matching is output. If the degree of matching with all users is less than the threshold, “Not registered” is output (1:n recognition = identification). • It is possible to change to the mode that verify that whether the face image matches a specific user in all registered users (1:1 recognition = verification) by a command. • Maximum number of User ID: 100 / Maximum number of data per User ID : 10 (Default value). This numbers can be changed to 500 User IDs x 2 data or 1000 User IDs x 1 data by commands. • The image data that is taken with other than this product can not be registered.
	• Score	<ul style="list-style-type: none"> • Matching degree (0 to 1000) The result of the user with the highest matching degree is output. A degree closer to 1000 indicates a higher likelihood of being that user. 		• Score	<ul style="list-style-type: none"> • Matching degree is 0 to 1000. The closer the degree is 1000, the closer the User ID is to the detected person. • Identification (1:n) : The output is the result of user with the highest matching degree. • Verification (1:1) : The output is the result of matching degree of specified ID's user. • The threshold value is can be set by command.

After FW Ver. 1.2.3.16451

- Human body detection -

Detect human bodies that cannot be detected through face detection

Features

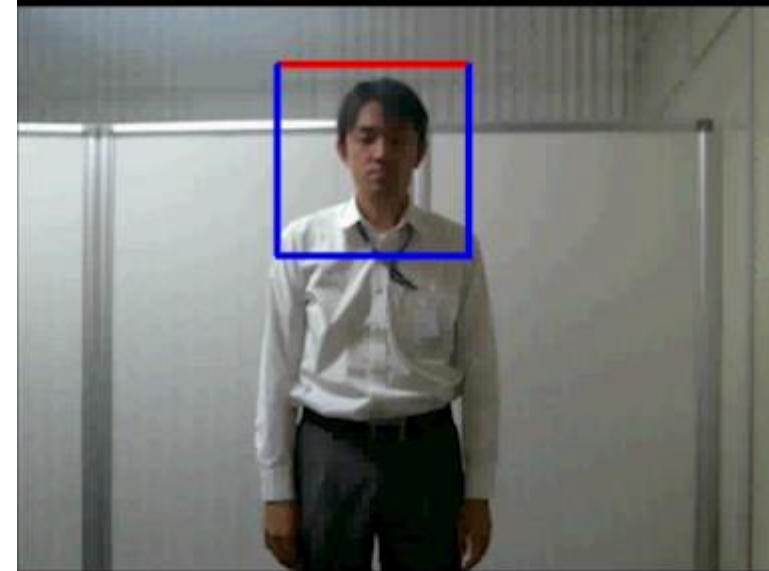
- Can detect small, back-facing or backlit bodies
- Can detect squatting bodies.
- Can detect bodies in real time on embedded devices.
- Can be implemented in various equipment.

Application example



- Air conditioner
- Lighting control
- Elevator

Detect people's location to optimize comfort and energy saving

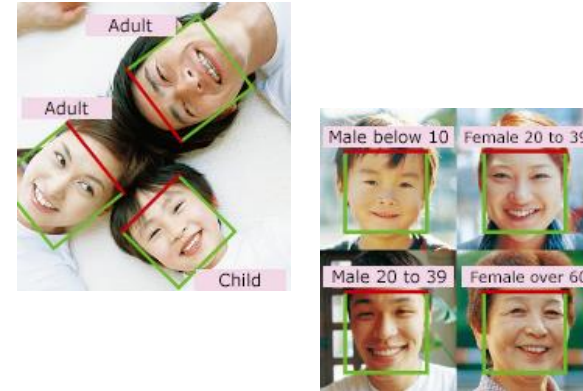


- Age/Gender estimation -

Estimate the gender and age from the facial image

Features

- Can estimate the gender and age of a face with high estimation regardless of skin tones.
- Age and gender counting for customer analysis
- Can be used for real time estimation in various devices.

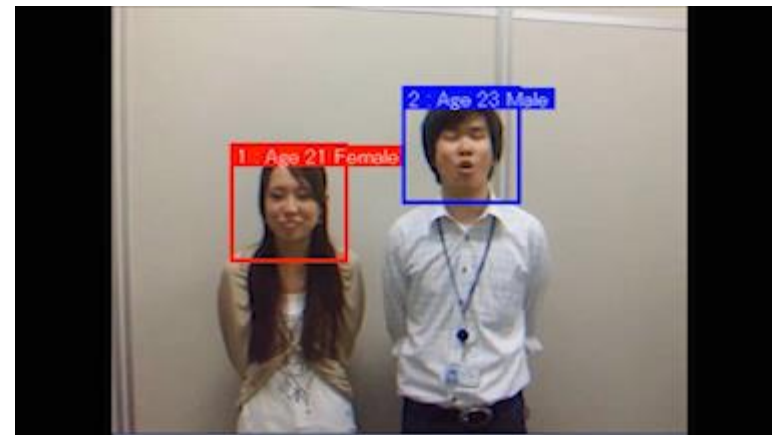


Application example



- Digital signage
- Vending machine

Change advertisement based on user's age/gender, increase the appeal of products

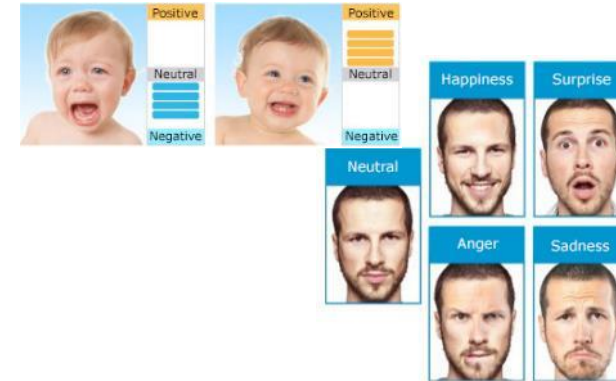


- Expression estimation -

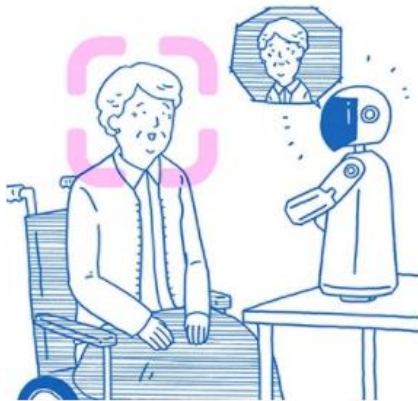
Estimate the facial expression from the facial image

Features

- Can estimate 5 expressions (neutral, happiness, surprise, anger and sadness).
- Can estimate the expression degree based on positive expressions (happiness) and negative expressions (anger and sadness).

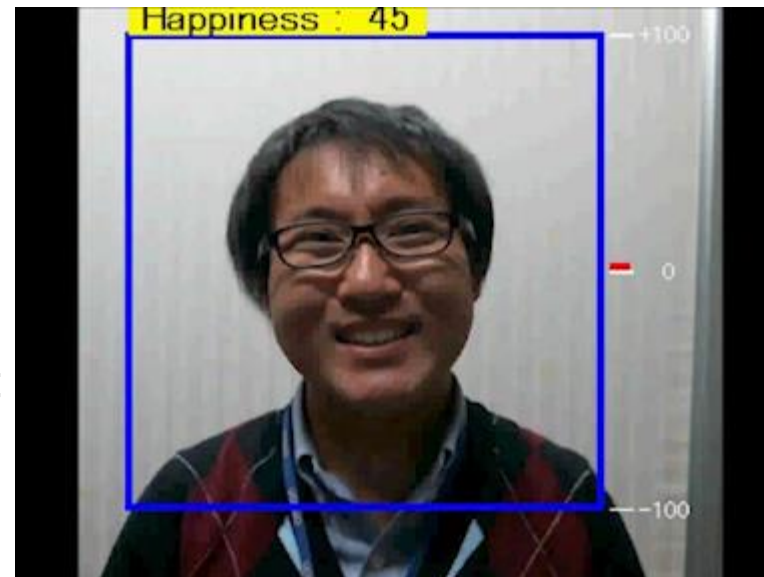


Application example



- Communication robot
- Training tool

Enjoy a new lifestyle with robots that can identify and support people



- Gaze/Blink estimation -

Can detect the position of the eyes and mouth with OMRON's model fitting technology and estimate the gaze direction and blink degree of the eyes.

Features

- Can estimate the gaze direction on both horizontal and vertical axis.
- Can quantify the blink degree of the eyes.
- Can be used for real time estimation in various devices.



Application example



- Digital signage
- Home appliance

Detect how long the people is looking at the screen and where is the most attractive for him/her



- Face Direction Estimation -

Will estimate the direction of detected face

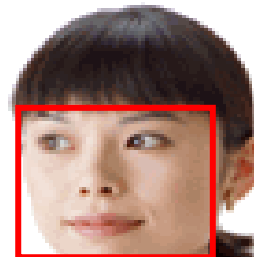
Features

Output is

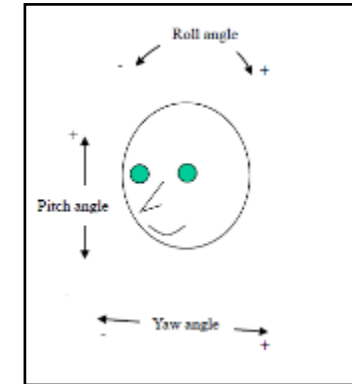
- yaw angle
- pitch angle
- roll angle
- confidence level

Application example

- Digital Signage
- Retail
- Interactive Displays



Right 30°



Face Direction Estimation	Yaw angle	Positive to the right (in degrees)
	Pitch angle	Positive upwards (in degrees)
	Roll angle	Positive clockwise (in degrees)
	Degree of confidence	Confidence in the estimation result (0 to 1000), a higher value indicates a higher confidence

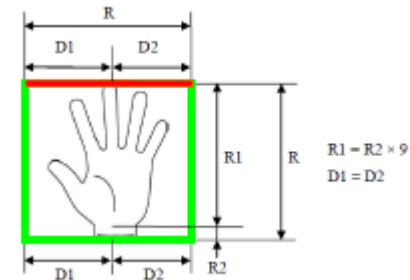
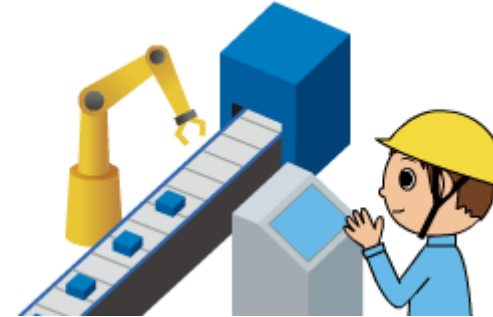
- Hand Detection -

Detect hands in the image data

Features

Only frontal hands (hands with the palm facing the camera) will be detected.

The result info will include the number of hands detected., position, size and degree of confidence





Application example

- Harmful machinery
- Non-touch applications
- People with handicap

Function	Output	Details
Human Body Detection, Hand Detection, Face Detection	Number of detected objects	Maximum of 35 per object type
	Position (center coordinates)	Coordinates on the screen from the top-left corner of the screen (in pixels)
	Size	Pixel size on the input image
	Degree of confidence	Confidence in the detection result (0 to 1000), a higher value indicates a higher confidence

Lineup and Main Specifications

Item	Long-distance type B5T-007001-010	Wide-angle type B5T-007001-020
Appearance		
Horizontal detection range (angle of view)	Approximately 54 deg.	Approximately 94 deg.
Vertical detection range (angle of view)	Approximately 41 deg.	Approximately 76 deg.
Input resolution	1600x1200 pixel	
Output resolution	Selectable (no image output, 160 × 120 pixels, or 320 × 240 pixels)	
Dark location use	200 lx or above	
Supply voltage	DC 5 V ±0.5 V	
Consumption current	Below 0.4 A	
Power consumption	Below 2 W	
Operating temperature	0 to +50°C (no condensation or freezing)	
System	(1) UART 3.3 V (2) USB CDC-class device	

Additional explanation of specification

- Response time / distance

3 times faster

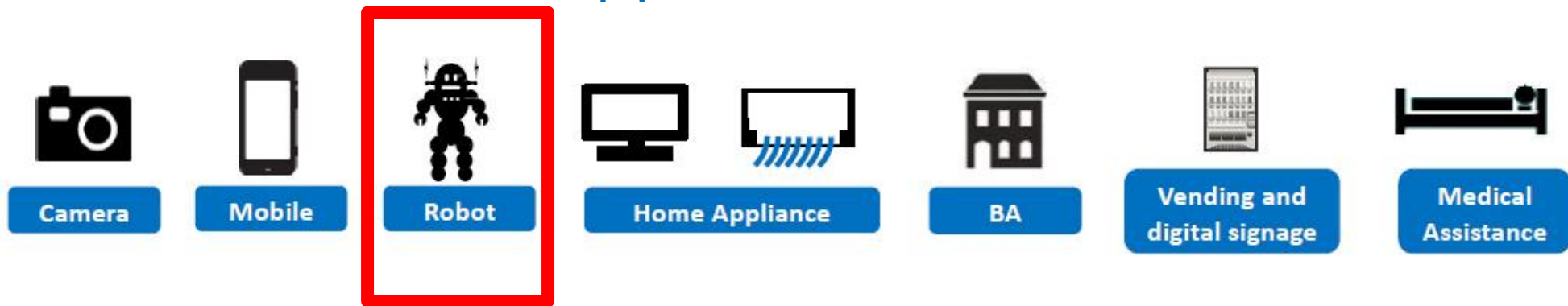
Functions	Distance	HVC-P2 (50° type)		HVC-P2 (90° type)	
		B5T-007001-010		B5T-007001-020	
		The smallest detection size	Response time (average)	The smallest detection size	Response time (average)
Face Detection	1.3m	157pix	35ms	76pix	125ms
Face Recognition			59ms		149ms
Age / Gender Estimation			75ms		165ms
Expression Estimation			75ms		165ms
Human Body Detection	2.8m	183pix	35ms	88pix	110ms

Functions	The smallest detection size	HVC-P2 (50° type)		HVC-P2 (90° type)	
		B5T-007001-010		B5T-007001-020	
		Distance	Response time (average)	Distance	Response time (average)
Face Detection	64pix	3m	140ms	1.5m	140ms
Human Body Detection	30pix	17m	970ms	8m	970ms

Even if 90deg, it is possible to estimate 6times/sec, it is enough for signage application.

2 times longer

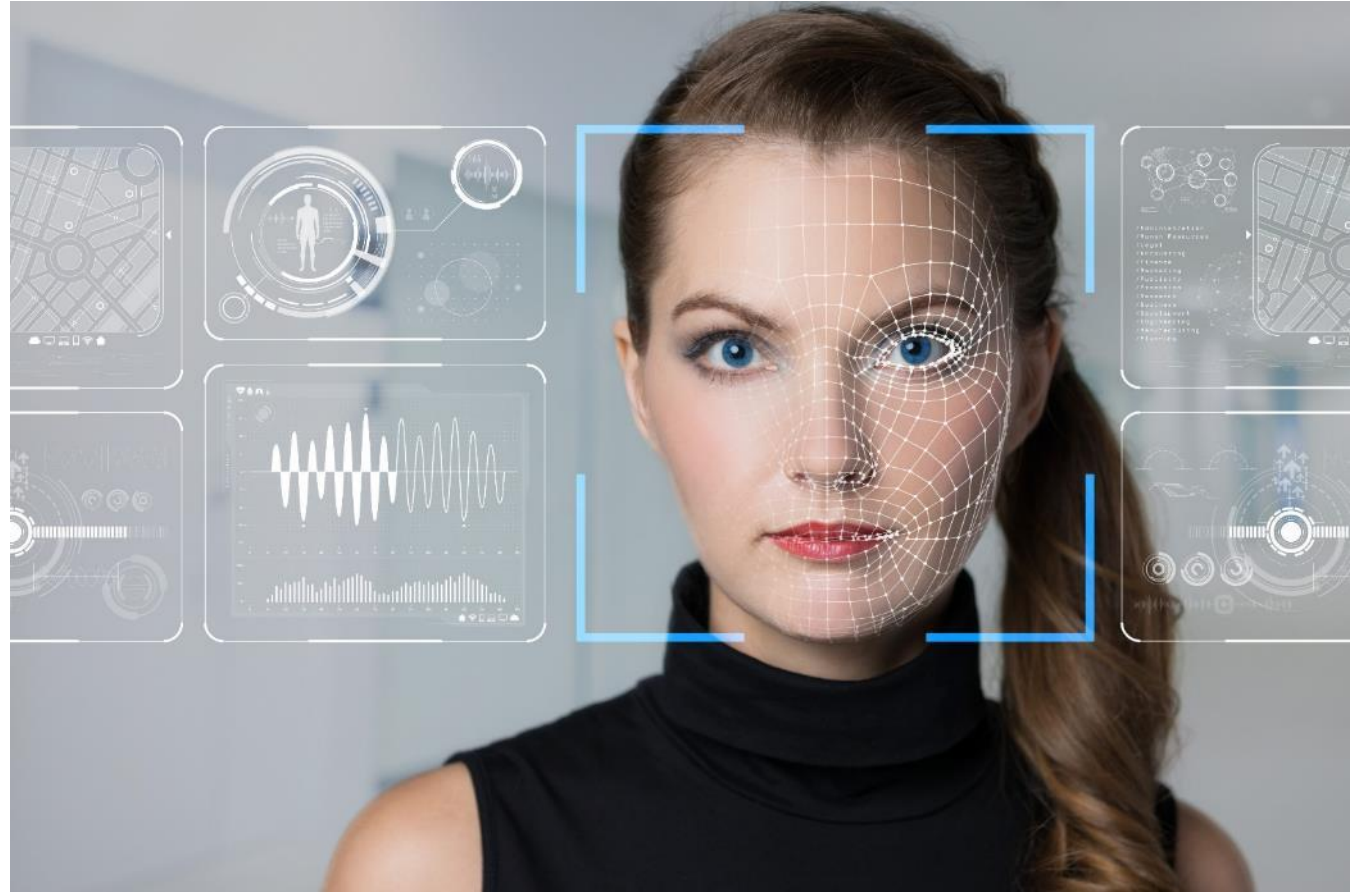
Applications



- Human Body Detection
- Face Detection
- Face Recognition
- Facial Pose and Gaze Estimation
- Facial Characteristics

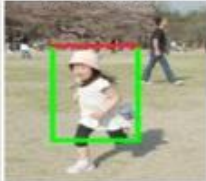









Image Sensing Technology
OKAO™ Vision

Face Recognition V9.0



OKAO Software

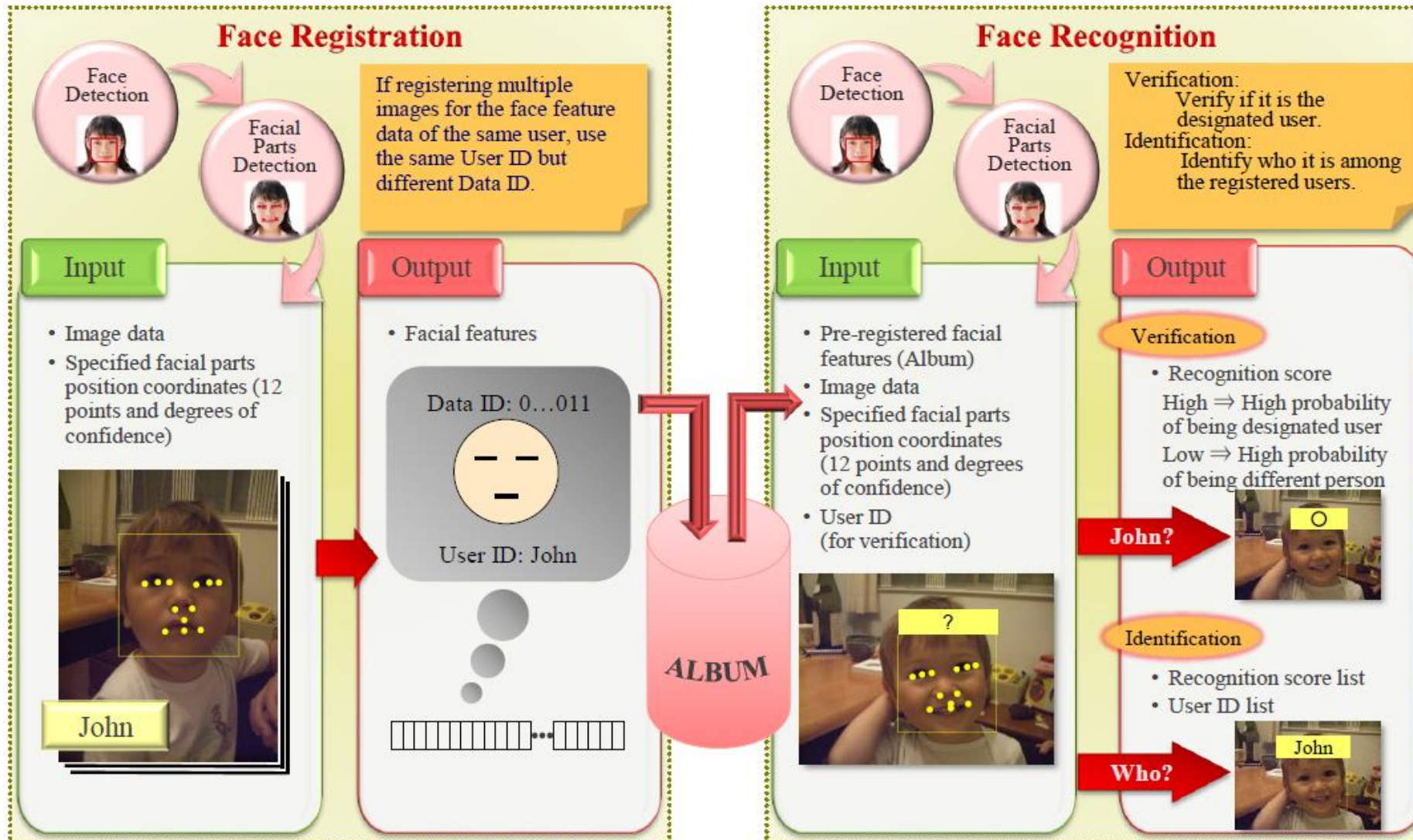
It is a software library* with image sensing functions for understanding humans.

Detect	Face Detection	Human Body Detection	Hand Detection	Eye Detection	Pet Detection	
						
Detect in details	Facial Part/Contour Detection	Blink Estimation	Gaze Estimation	Human Body Silhouette Detection		
						
Recognize / Estimate	Face Recognition	Age/Gender Estimation	Smile Degree Estimation	Expression Estimation	Imposter Prevention	Scene Recognition
						
Adjust	Red-Eye Reduction	OKAO Beauty				
						

* This product is available in a portable condition according to your specified developing environment.

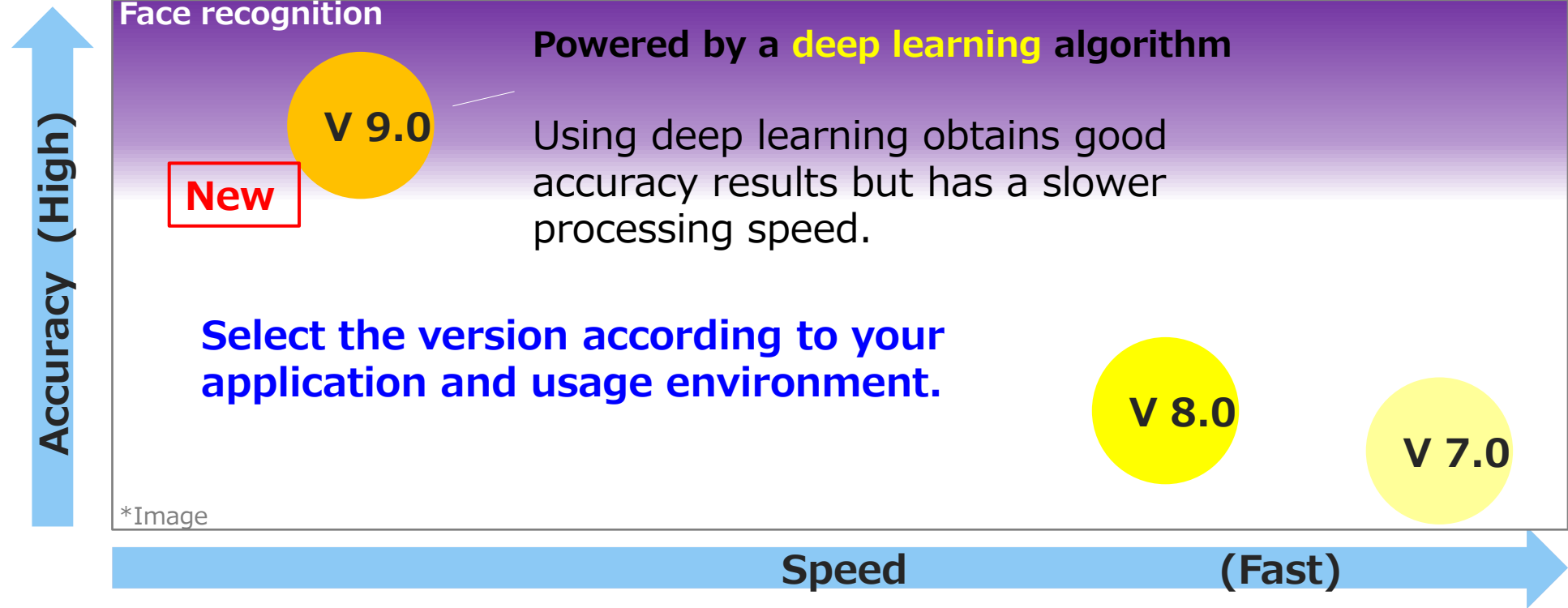
OKAO Face Recognition

Differentiate a user from other people with high efficiency through OMRON's unique verification technology.



Face Recognition requires obtaining the facial parts position coordinates and degree of confidence information of a face to be used (Facial Parts Detection)
The facial parts position info requires obtaining the face position info to be used (Face Detection).

Line-up and Main performance of each version



Moreover, You can combine other features. It will create new value and have an advantage.

<For example>



Face recognition



Imposter Prevention



Gender / Age



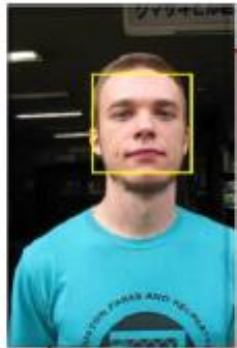
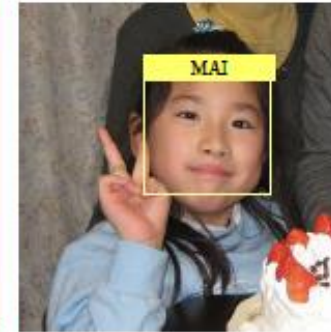
Expression estimation

etc.

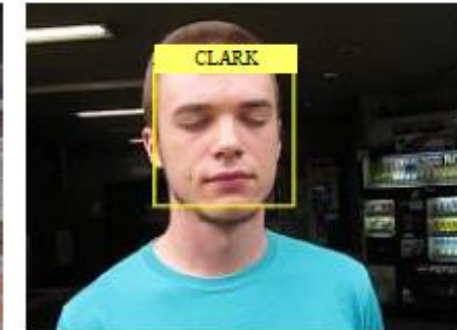
OKAO Face Recognition Features



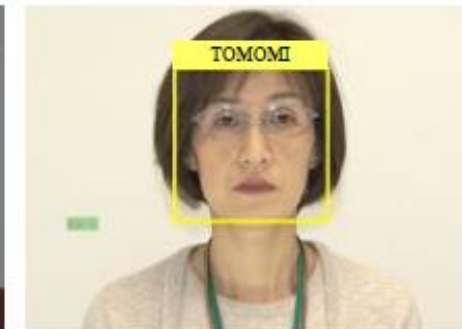
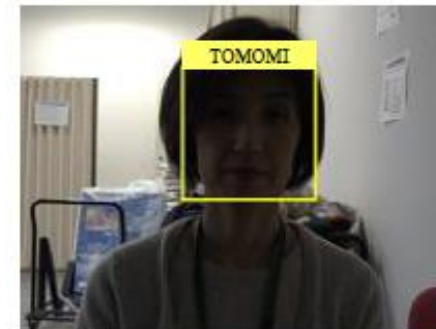
High accuracy rate for specified users due to verification and identification features



High accuracy in various directions or lighting conditions, regardless of facial expressions or skin tones

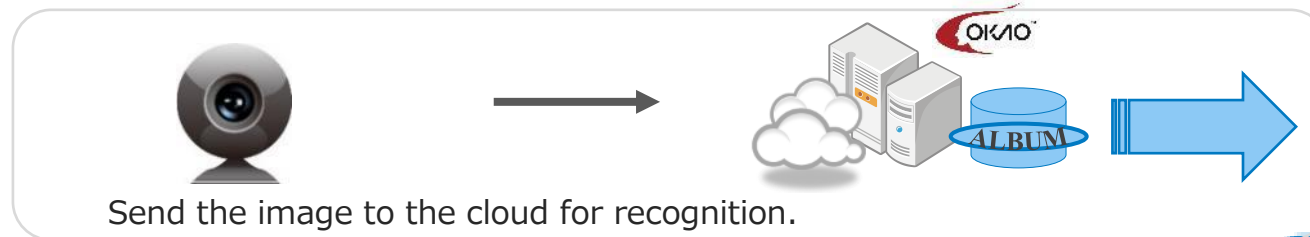
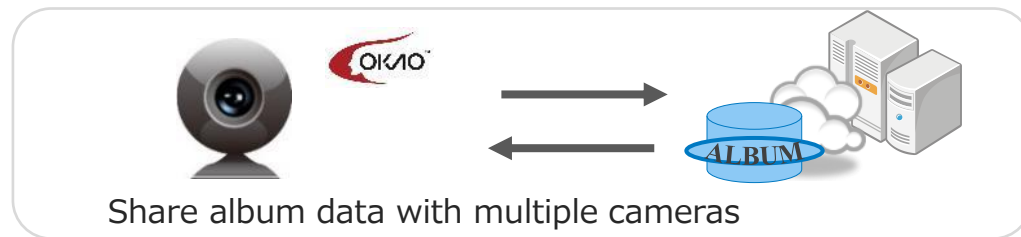
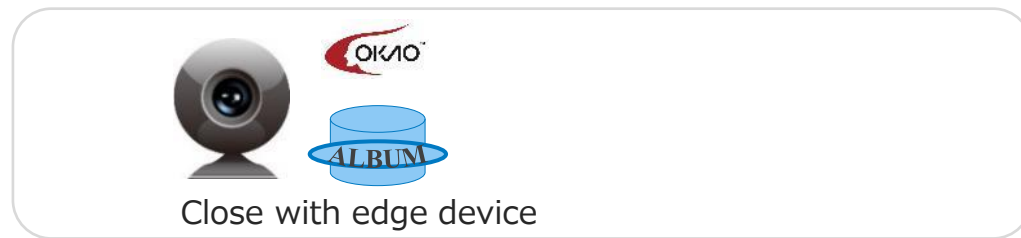


Real time recognition available on various embedded devices



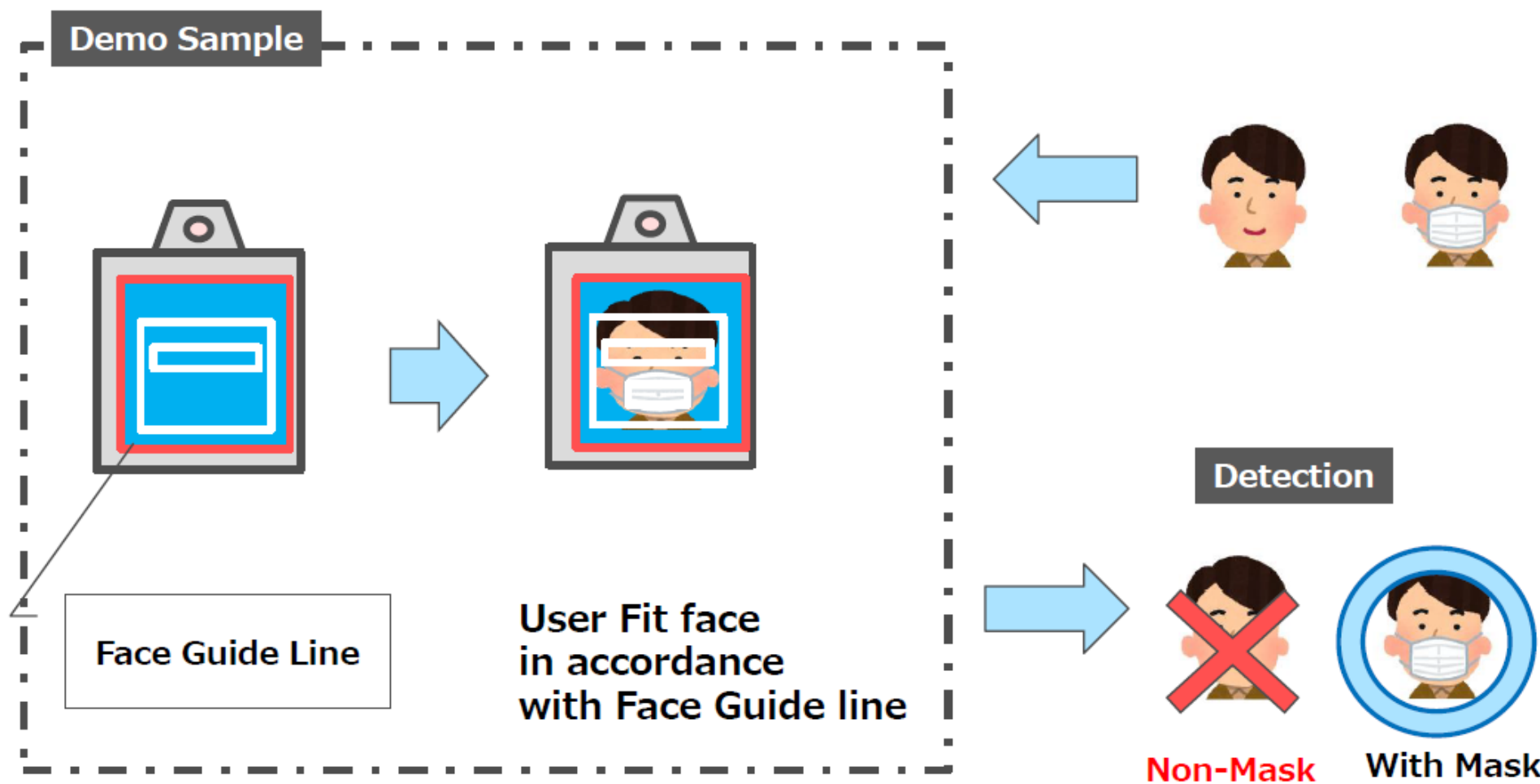
System Design with Face Recognition

Configure the system according to your environment and purpose.
If using OKAO, Applicable for own System Design.



Mask Detection

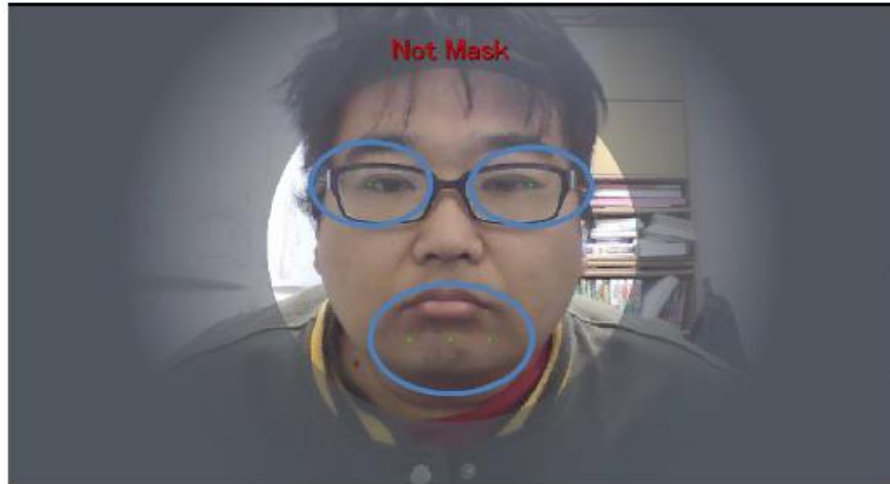
Distinguish with Mask or Non-Mask



Non-Mask

With Mask

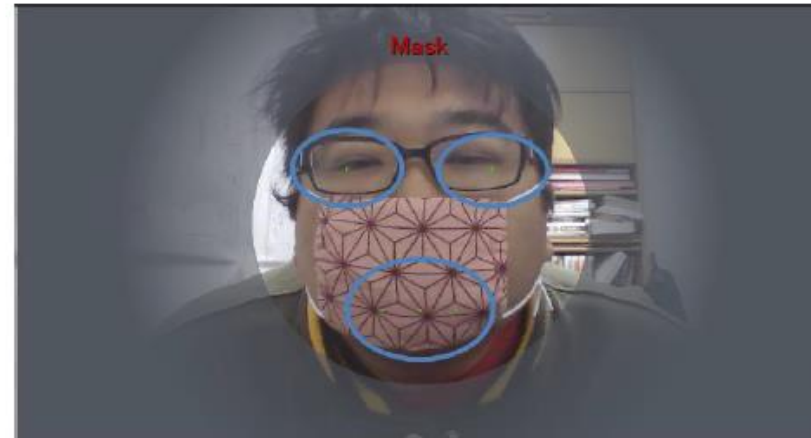
Non-Mask



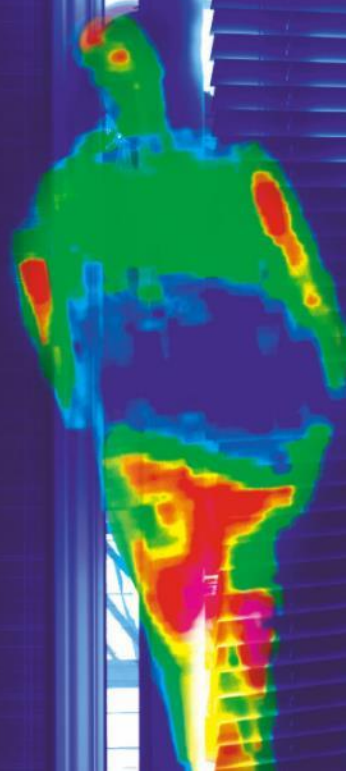
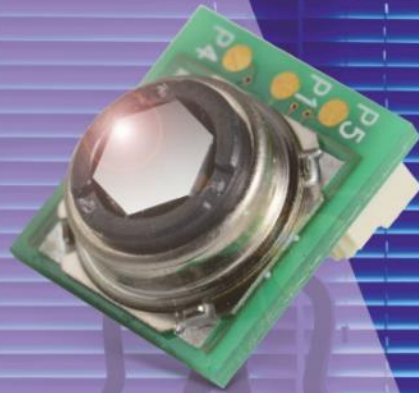
With Normal Mask



With Colorful Mask

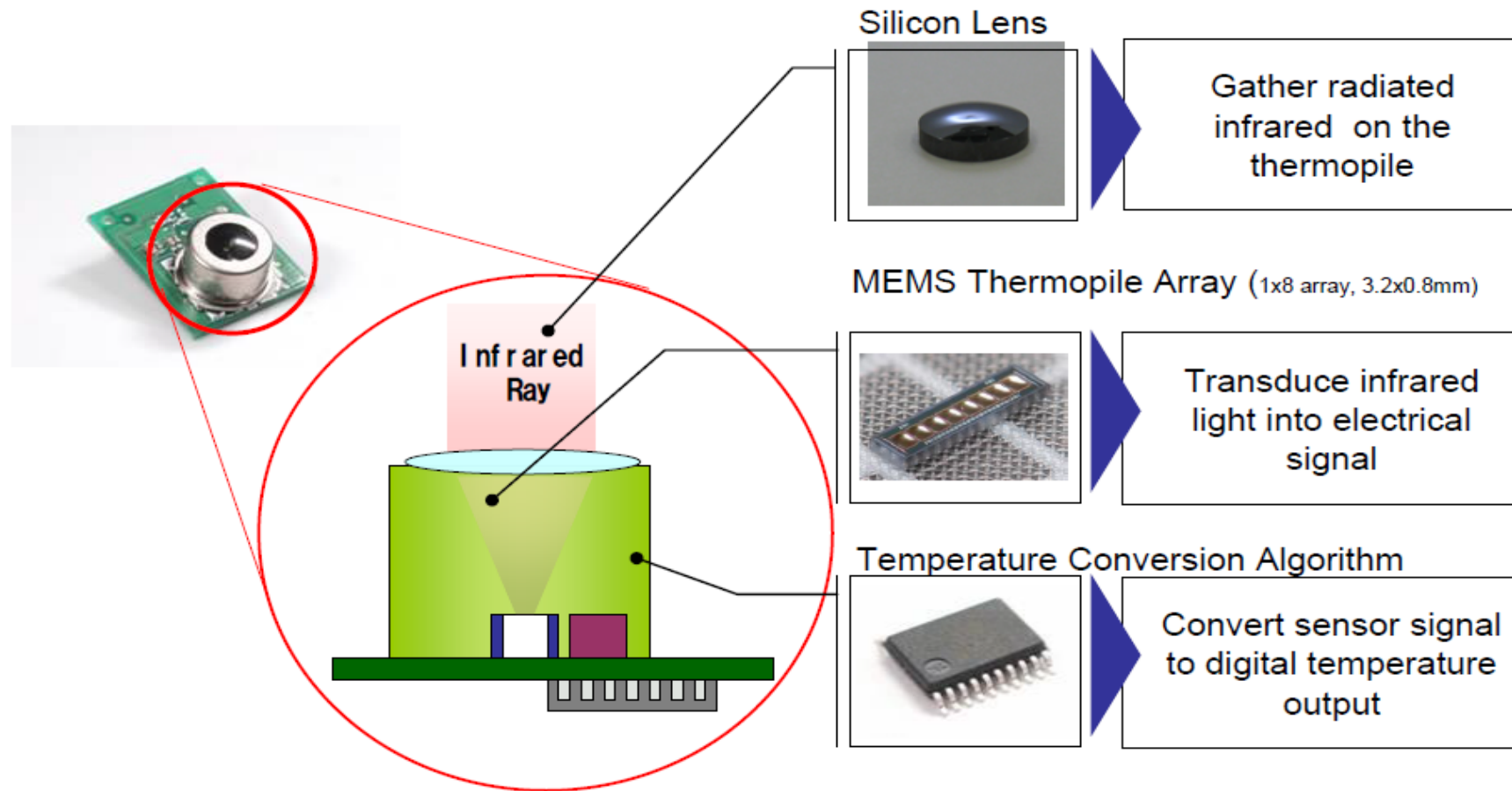


Thermal Sensor D6T Series



Introduction of thermal sensor

D6T Operation principle



Achieve High SNR and fast response speed by MEMS, IC and optical design

How to use Data

Thermal sensor



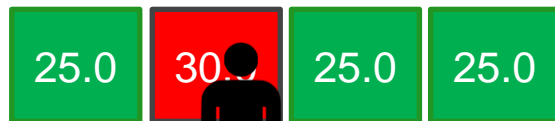
20.0	21.4	22.8	27.2
21.3	25.3	28.3	29.6
23.5	25.1	29.5	29.9
23.4	23.7	27.4	27.1

Output:
Temperature(degC)
of 16 places

Customer's system

Using temperature information, convert it to the following information on customer's system.

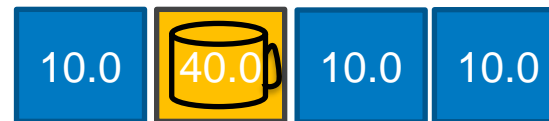
Human detection



- Air Conditioning
- Lighting Control

The system judges that a human is present from the temperature difference.

Object detection



- Refrigerator

The system judges that an object is present from the temperature difference.

Temperature detection



- Machine in FA

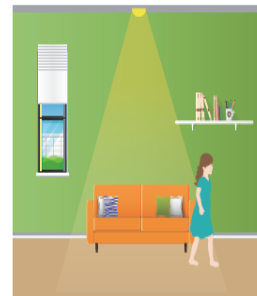
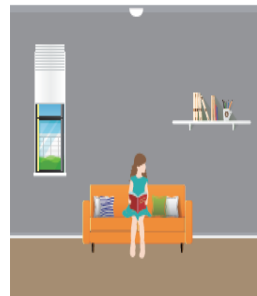
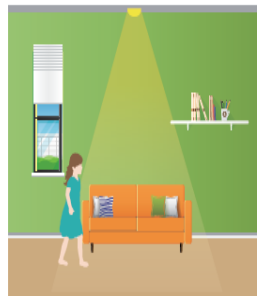
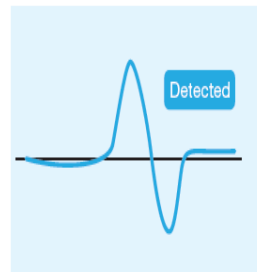
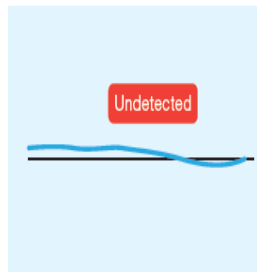
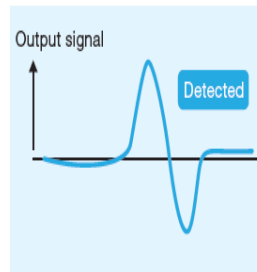
The system can detect that a certain place is abnormal temperature.

Pyro sensor vs MEMS thermal sensor

Pyro-electric sensor relies on motion detection, while non-contact MEMS thermal sensor is able to detect the presence of stationary humans or objects.

Pyroelectric sensor

Converts temperature readings only when detecting “temperature changes in the radiant energy” in its field of view.



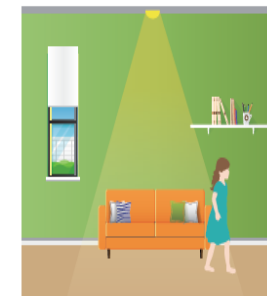
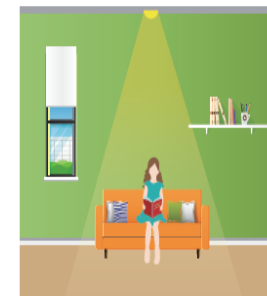
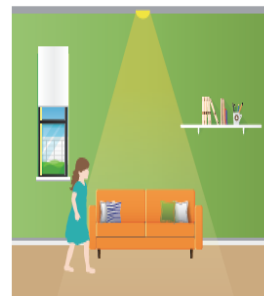
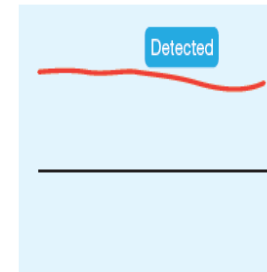
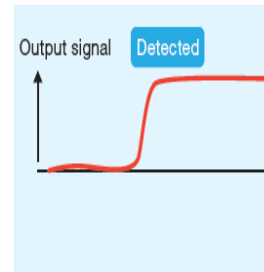
Able to detect human (object) motion

Unable to detect stationary human (object) presence

Able to detect human (object) motion

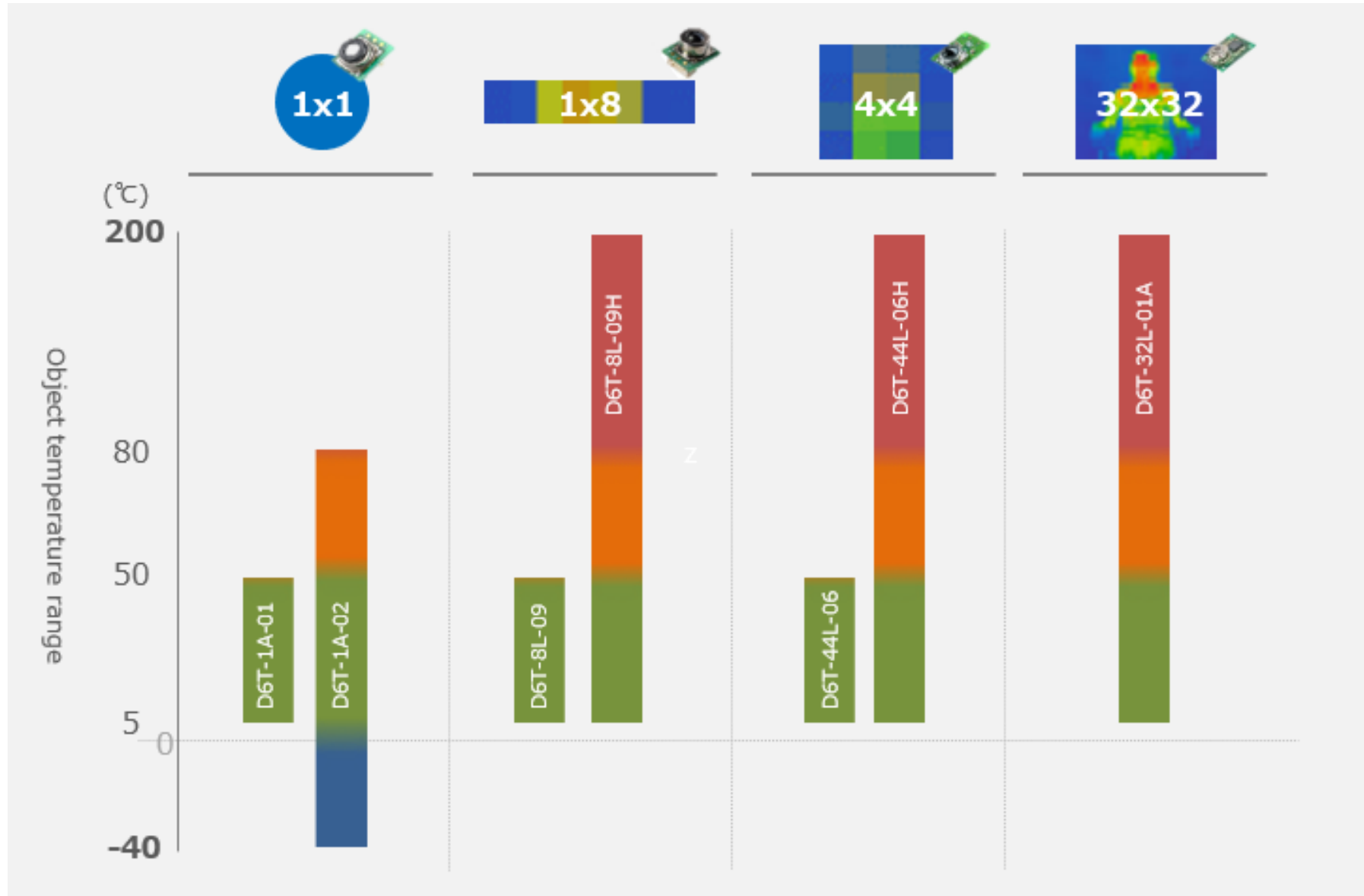
MEMS thermal sensor (thermopile)

Converts temperature readings by “continuously detecting the temperature of radiant energy” in its field of view



Able to detect both stationary and motion state of humans (objects).

Product Range

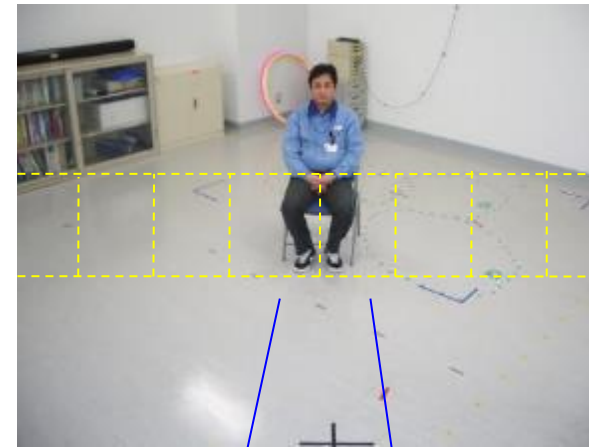
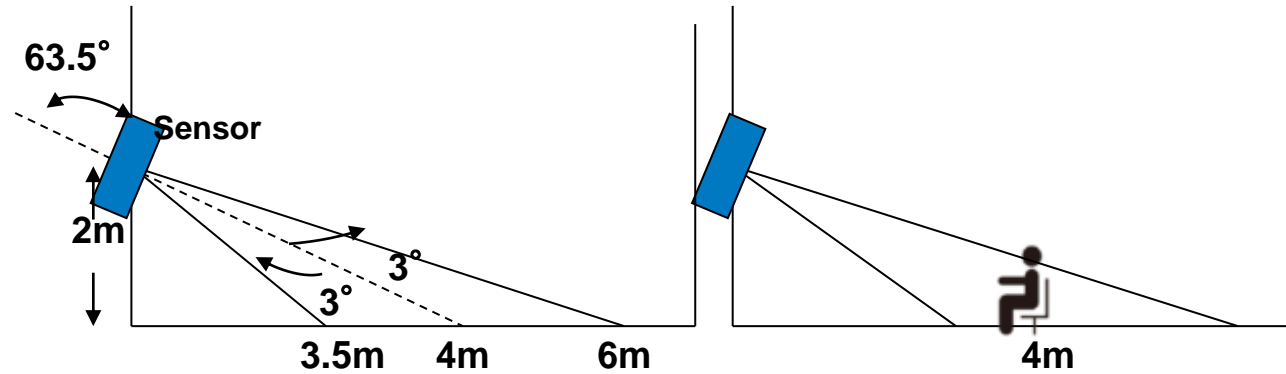


IR MEMS 1 x 8 Array Sensor

Accurate detection - Floor temperature and detect Human detection.

Even if there is no Human, Floor temperature can be measured correctly.

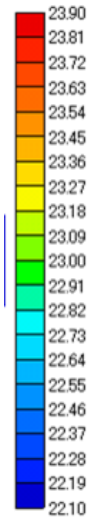
Condition



Measurement performance



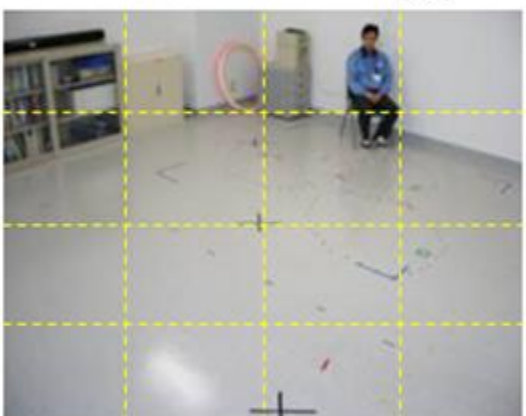
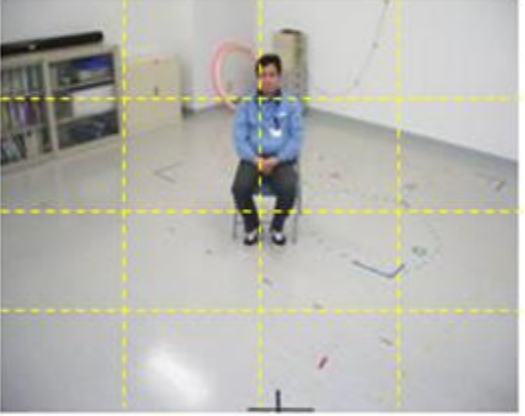
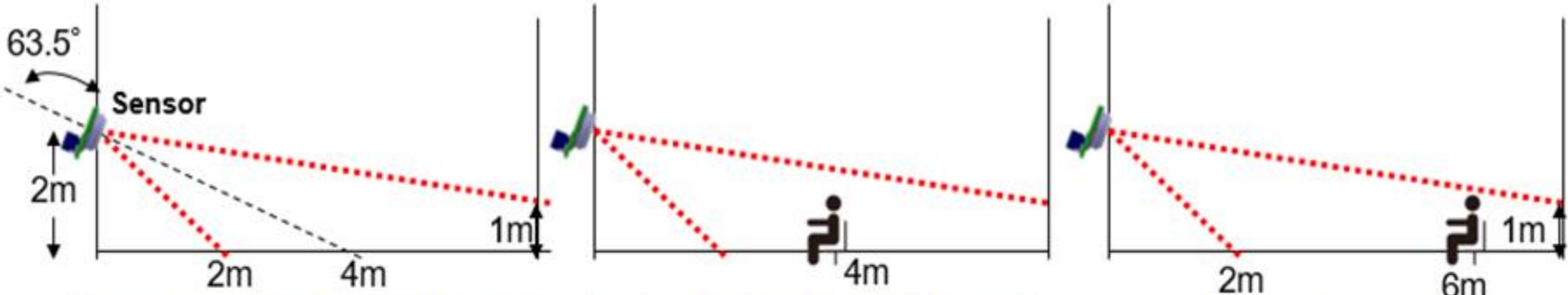
[°C]



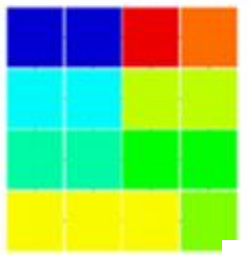
IR MEMS 4 x 4 Array Sensor

Test condition

Model : D6T-44L-06



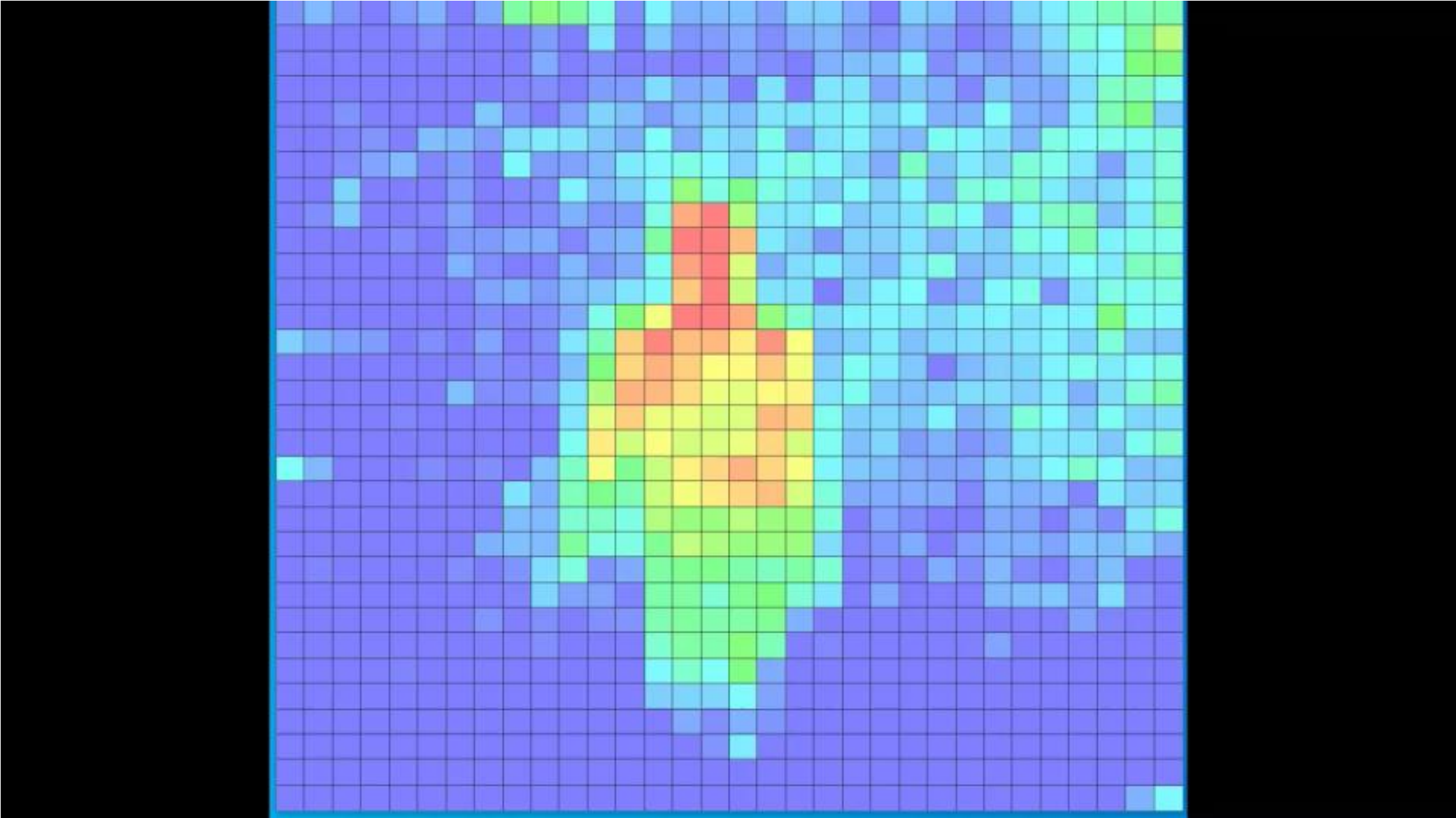
Sensor output Image



High resolution temperature monitoring



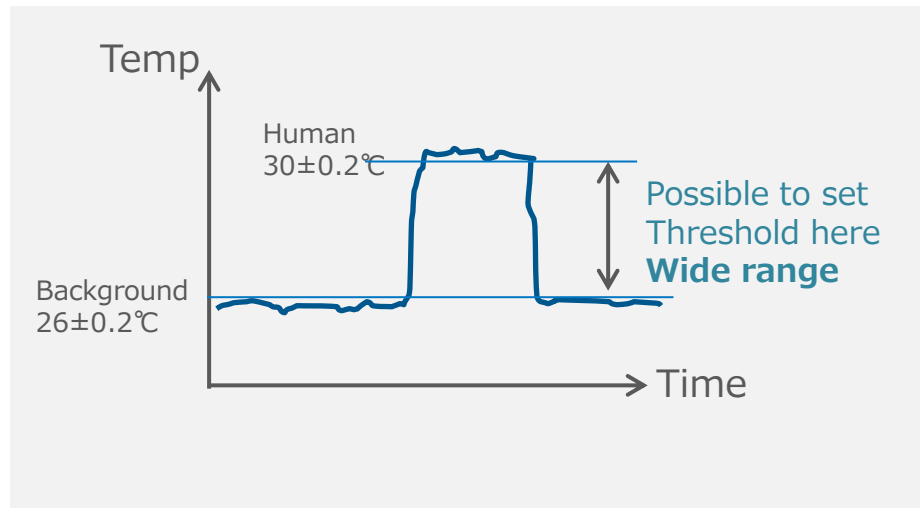
Demo Movie 32x32



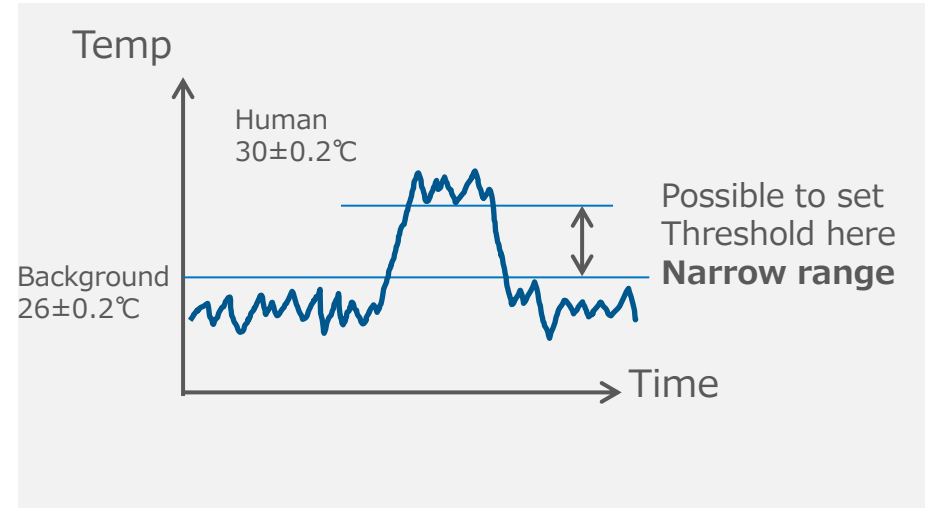
D6T Advantage #1 – Noise Immunity (NETD)

- Human detection is judged based on **temperature difference**.
- Therefore, **NETD is key for human detection**.
- Omron IR sensor has **World best class stability**, based on self-manufactured **low noise MEMS&ASIC**.

If NETD is good



If NETD is worse



Omron advantage for human detection

- Human detection is judged based on **temperature difference**.
- Therefore, **NETD** is key for human detection.
- Omron IR sensor have **good performance for NETD**.

Chart : Comparison test

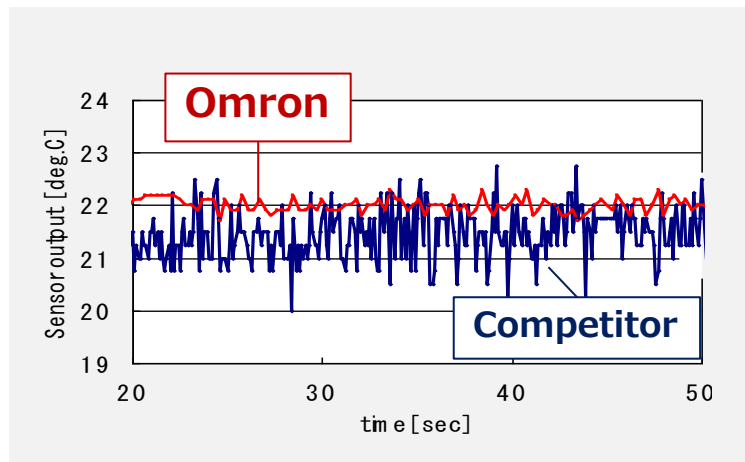


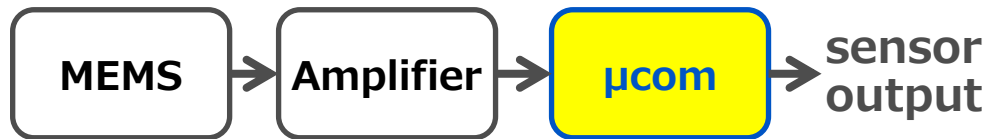
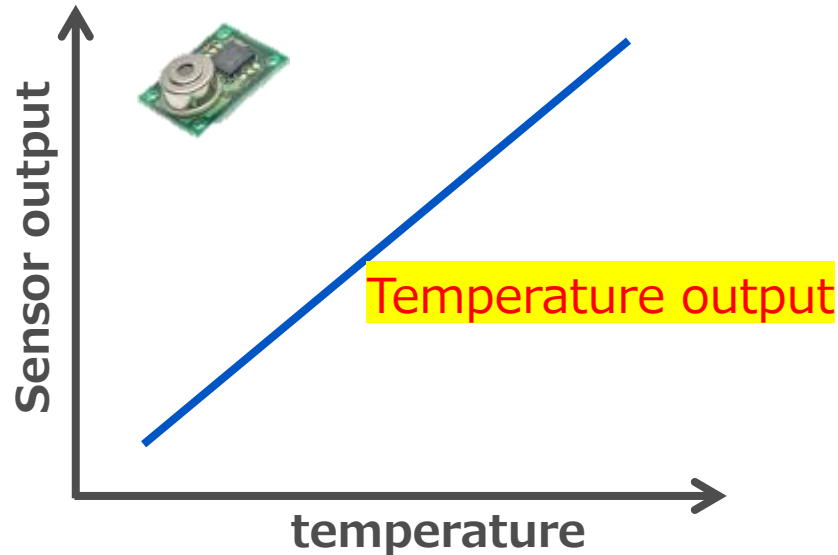
Chart : Specification comparison

	Omron D6T-44L-06	Competitor A	Competitor B
Pixel number	4x4 (16pixel)	8x8 (64pixel)	8x8 (64pixel)
FOV (Field of view)	X : 44.2° Y : 45.7°	X : 48° Y : 48°	X : 60° Y : 60°
Object temp	5 to 50°C	-20 to 120°C	0 to 80°C
Operating temp	0 to 50°C	-20 to 85°C	0 to 80°C
Temp resolution (NETD)	0.06°C	0.18°C 2fps	Normal type : 0.26°C 10fps High spec type : 0.16°C 10fps
Object temp accuracy	±1.5°C	±2°C	±2.5°C
Consumption	3.5mA typ	2.4mA	4.5mA typ
Comm interface	I2C	I2C	I2C
Supply voltage	4.5 to 5.5V	4.5 to 5.5V	3 to 3.6V / 4.5 to 5.5V

D6T Advantage #2 – Direct Temperature Output

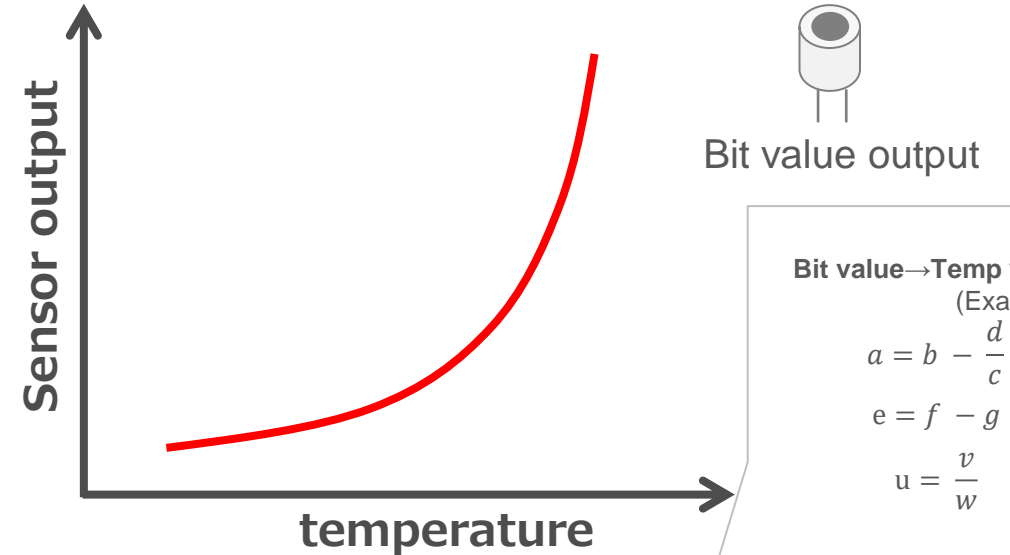
- In the case of some competitors, customer need to do complicated calculation to get temperature conversion information from the thermal sensor.

[OMRON] linear



OMRON sensor calculate temperature conversion in μ com.

[can package type th.sensor] not linear



D6T Advantages #3 – Complete Module

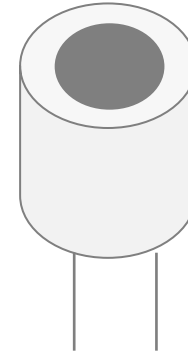
- With some competitors the customer has to design PCB/circuit which calculate sensor chip output data to temperature.
- Omron sells Sensor Module, while some competitors only Sensor element/chip.

[OMRON]



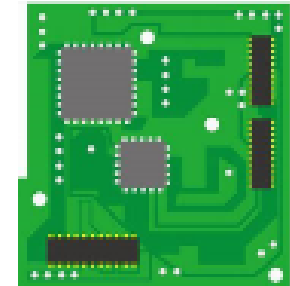
Sensor Module

[competitor]



Sensor Chip

+

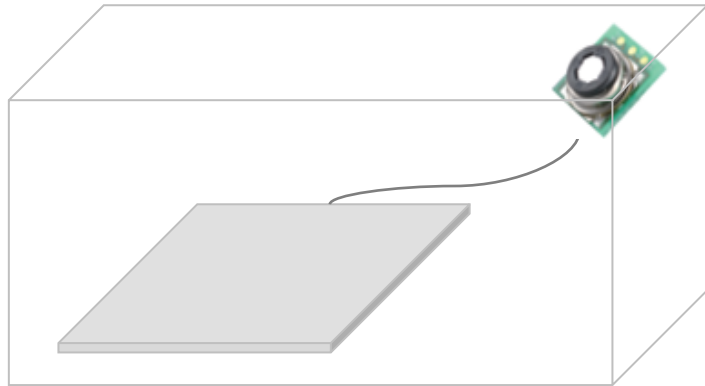


PCB

D6T Advantages #4 – Easy Connection

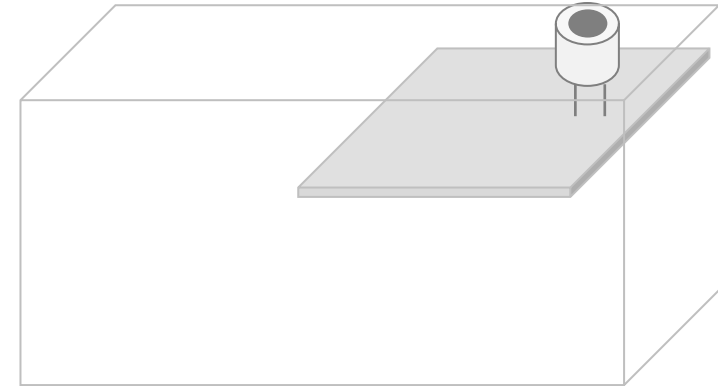
OMRON D6T

Flexible position setting



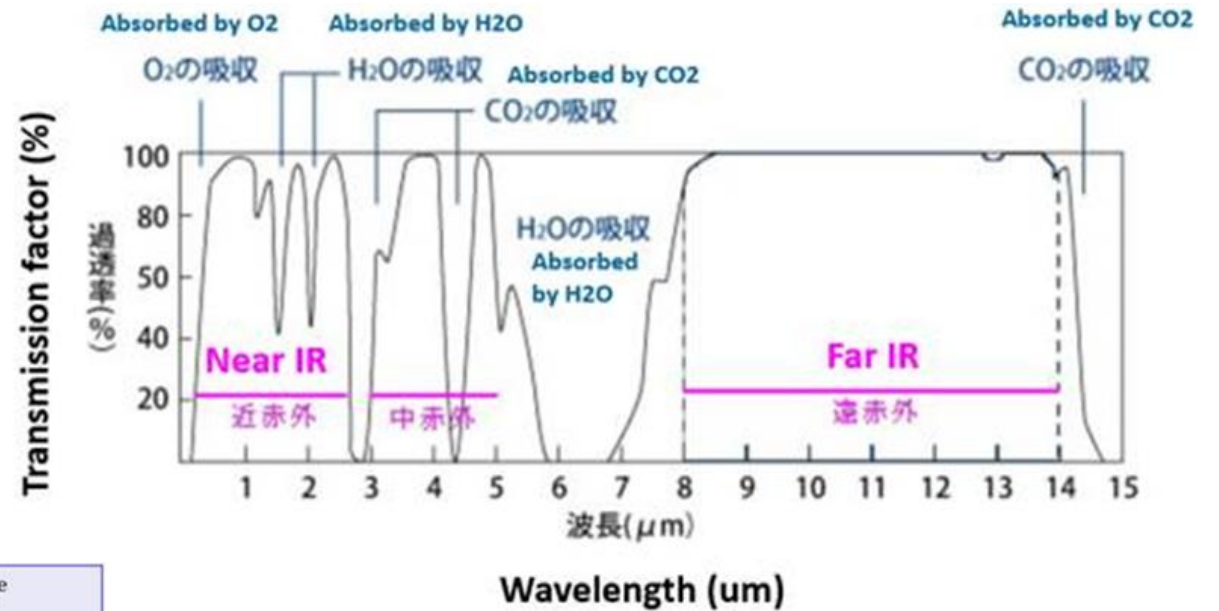
Can package type thermal sensor

Not flexible

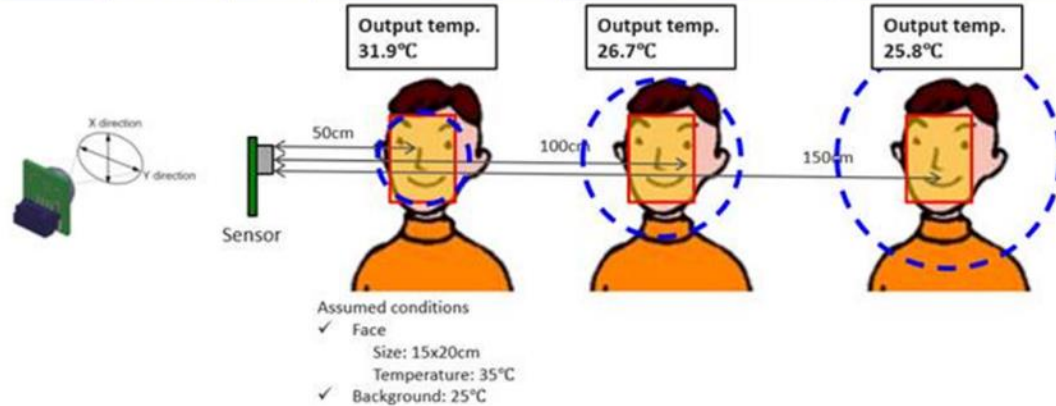


Infrared Transmission

Atmosphere absorption only for Near IR



Model	Direction	FOV	Distance 50cm	Distance 100cm	Distance 150cm
			Detection area	Detection area	Detection area
D6T-1A-02	X	26.5°	23.5cm	47.1cm	70.6cm
	Y	26.5°	23.5cm	47.1cm	70.6cm



The focus is on the FOV!!

Applications

-40°C





200°C

Temp monitoring

Home appliances

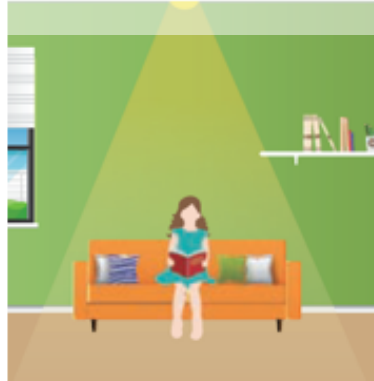


Recommendation





-  1x1
-  1x8
-  4x4
-  32x32

Human detection

Building automation
and robotics



Recommendation





-  1x1
-  1x8
-  4x4
-  32x32

Fever screening

Gate access control



Recommendation



-  1x1
-  1x8
-  4x4
-  32x32

Overheat detection

Transformer/Power cabinet



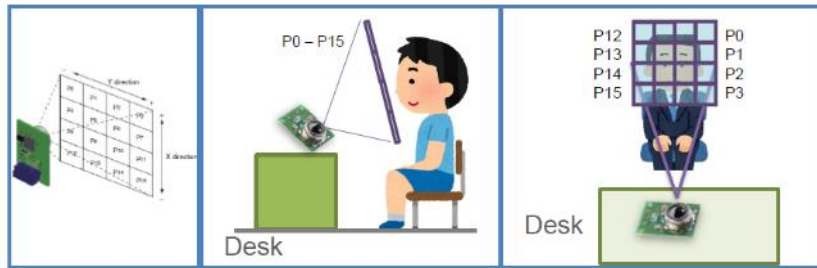
Recommendation

-  1x1
-  1x8
-  4x4
-  32x32

D6T 1x1, 1x8, 4x4 + Sample Codes

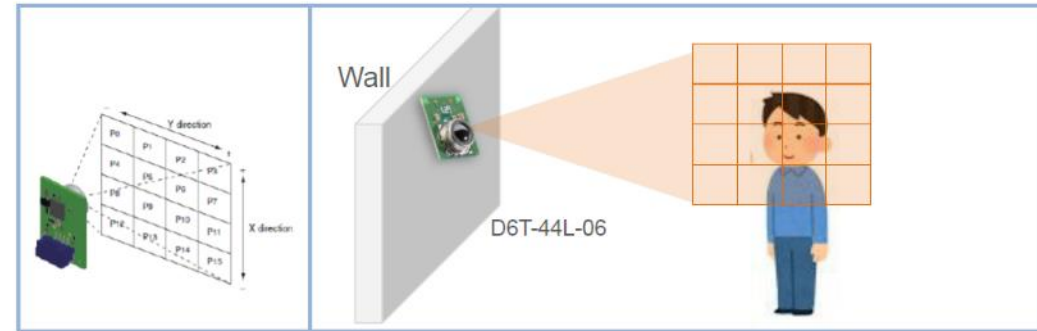
We don't have "D6T 4x4 with algorithm" but we can propose "D6T 4x4 + sample code for human detection".
We can propose the sample code for human detection (Sample code should be implemented in customer's MCU) .

This sample code can use a D6T(4x4) installed on a desk to judge whether a person is on a seat or not.



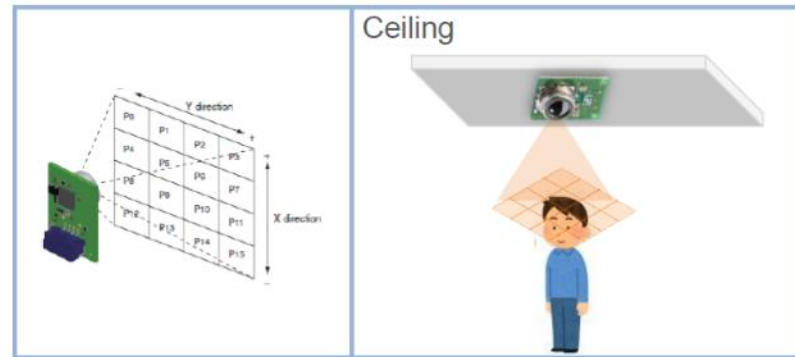
- Install D6T on the desk
- Install D6T so that the human face is within the field of view of D6T.

This sample code can use a D6T(4x4) installed on wall to judge whether a person is in room or not.



- Install D6T on the wall
- Install D6T so that the human face is within the field of view of D6T.

This sample code can use a D6T(4x4) installed on ceiling to judge whether a person is in room or not.



- Install D6T on the Ceiling
- Install D6T so that the human face is within the field of view of D6T.

B5W-LB series

Light Convergent Reflective Sensor (LCR)



Product Overview

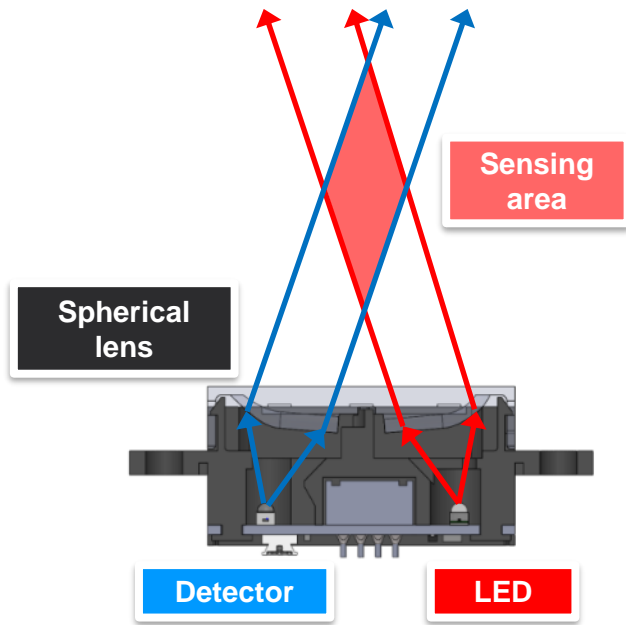
Sensing Stability

Sensing capability of the product is **unaffected by surface color, material, or reflectiveness.**

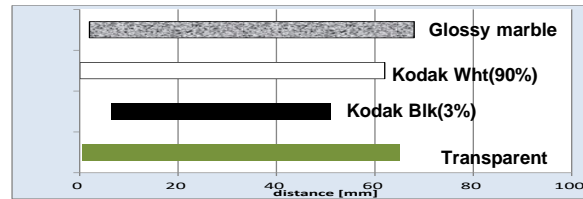
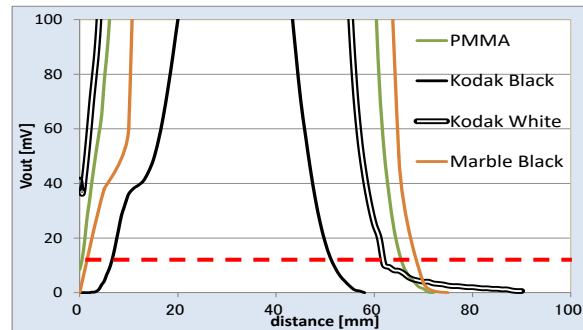
High Performance

Sensor is capable of detecting any object from **black opaque to transparent.**

Sensing Principle

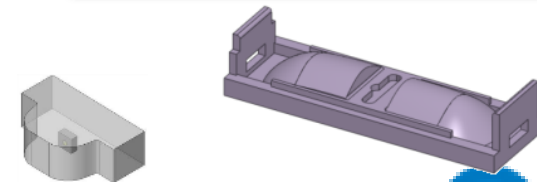
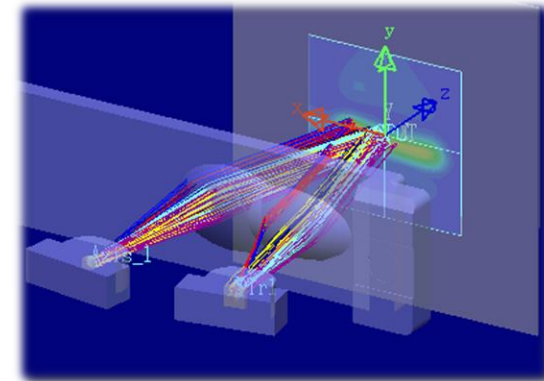


Sensing Distance Characteristics



Capable of detecting black, white, and transparent objects

Optical Lens Design Technology



Product Features & Benefits

Features

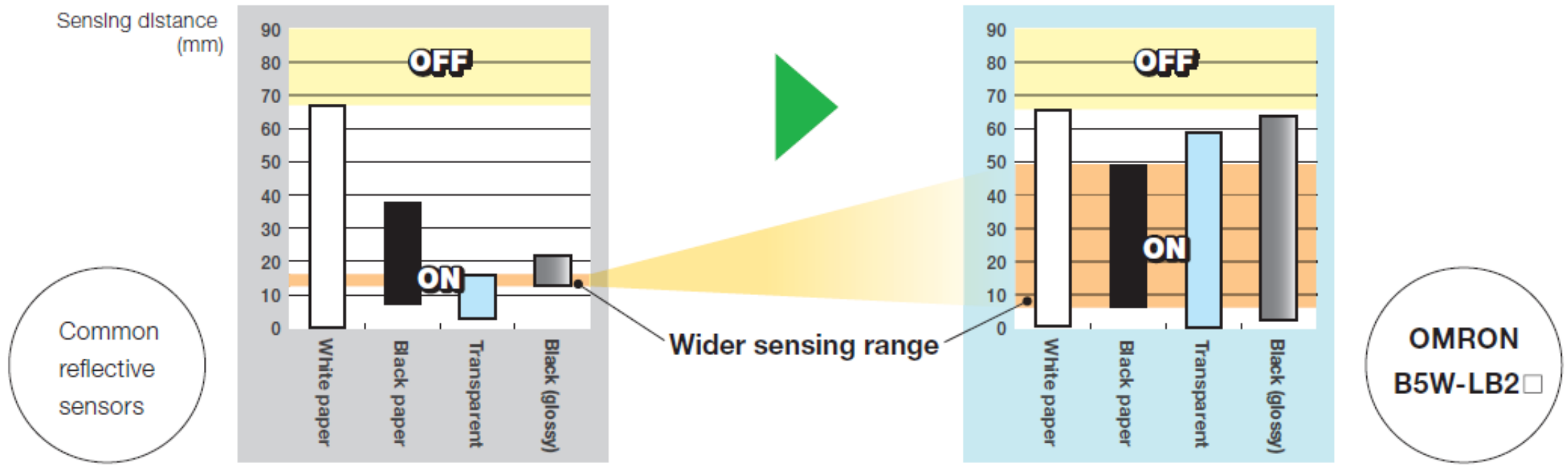
Sensing distance between works in LCR sensors is smaller than that of general reflective sensors.

Benefits

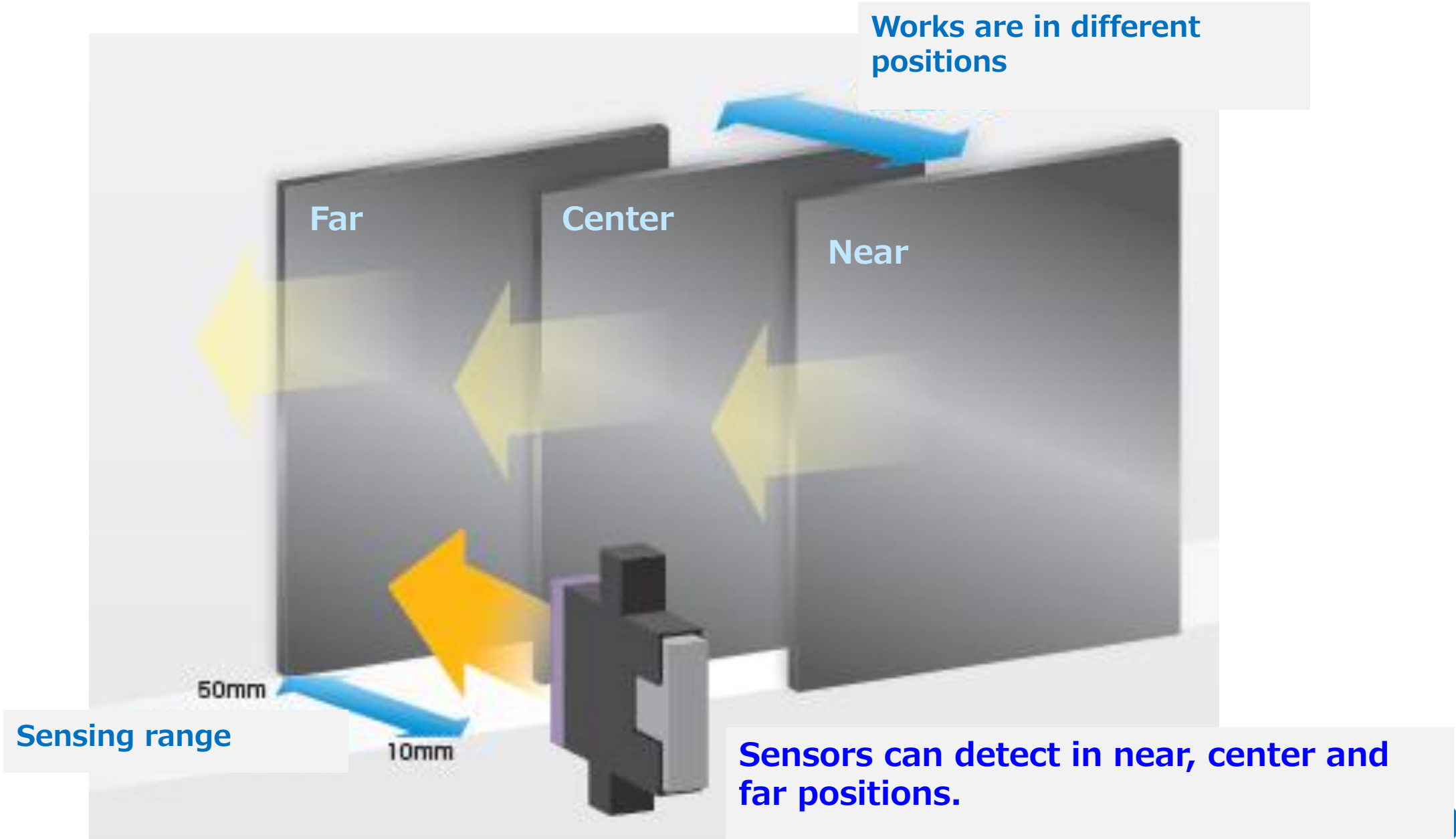
Robust to colors

LCR sensors have stable sensing performance to various colors of works and can contribute more added value in machines.

Capable of sensing workpieces of various colors over a wide sensing range

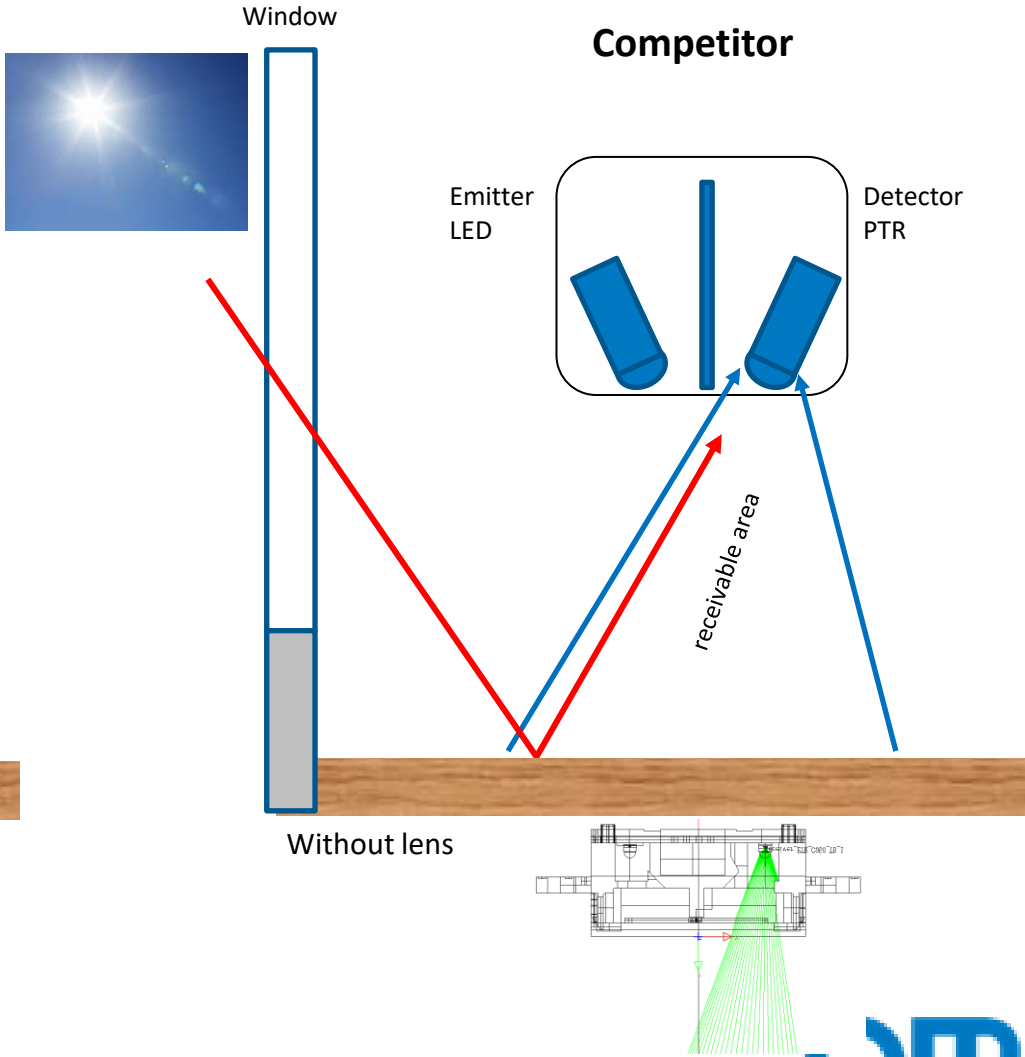
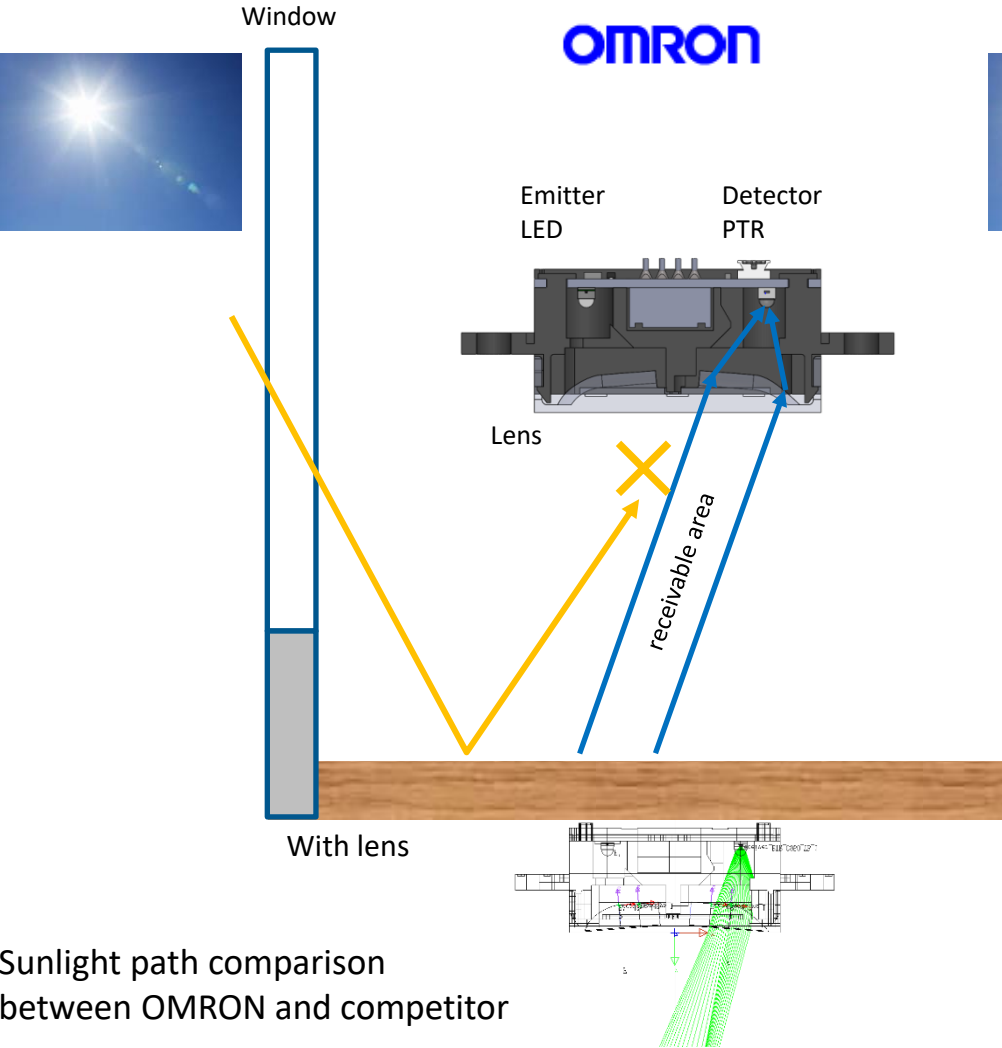


Product Features & Benefits



Robustness against sunlight

OMRON's original optical technology enables the limited receivable area, it contributes to reduce the influence of sunlight disturbance.



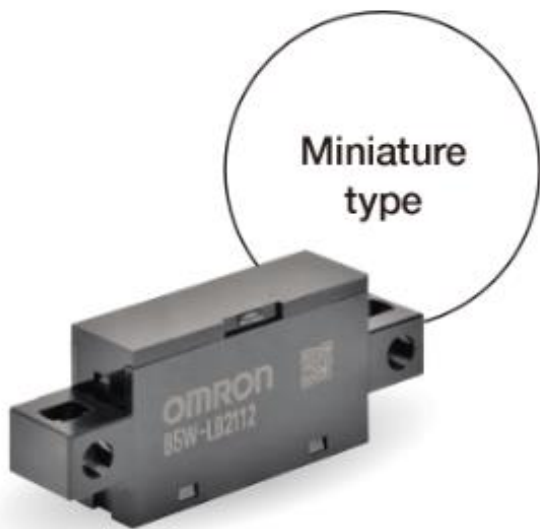
Sunlight path comparison between OMRON and competitor



Product Overview

Reliable Detection of Shiny, Black or Transparent objects

Light Convergent Reflective sensor for embedding in 24 VDC equipment



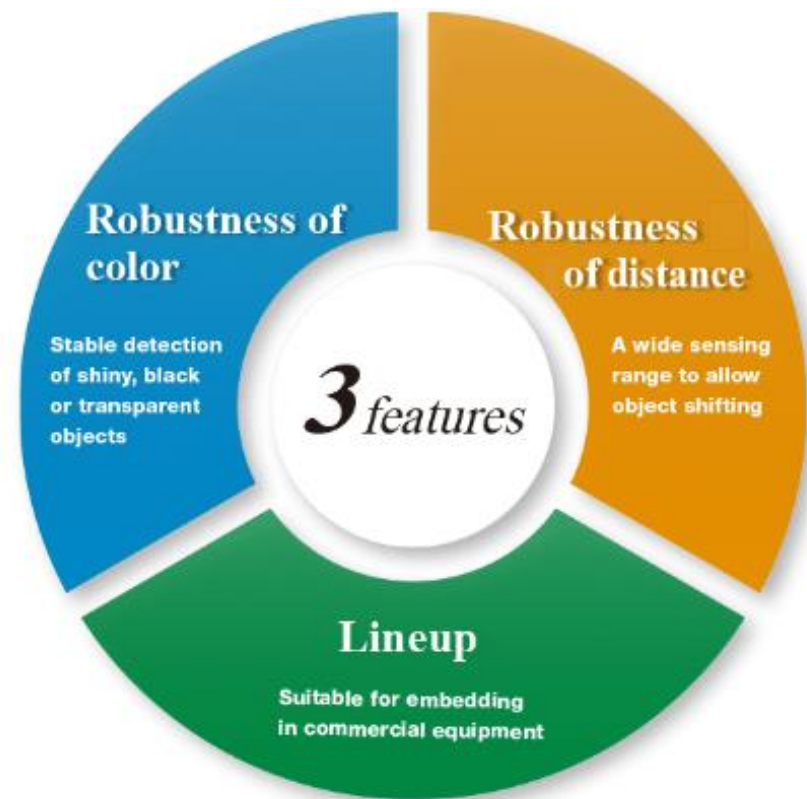
B5W-LB2 □




Sensing distance
10 to 55 mm



B5W-LB1 □

Sensing distance
2 to 10 mm



	B5W-LB11series		B5W-LB21 series	
Output method	Digital output		Digital output	Analog output
	Super miniature type		Miniature type	Miniature type
Figure				
Sensing distance (White paper)	2 to 10 mm		10 to 55 mm	10 to 55 mm
Supply voltage	24 VDC +/- 10%		24 VDC +/- 10%	5 VDC +/- 10%
Output configuration	Light ON	Dark ON	Light ON	Dark ON
				-

Not Only Robot Cleaners!

OMRON's sensor can detect steps correctly,
less influence of the color and material.

OMRON



Competitor

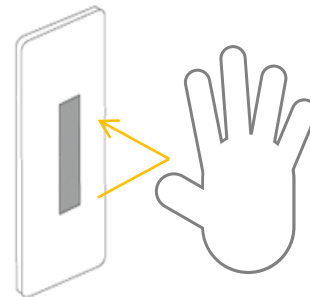


Hand detection



Body detection

Non-contact switch



Not only robot cleaners!

Can be used in ROBOTICS for **hand/body/objects** detection

OMRON

New Type with Indicator

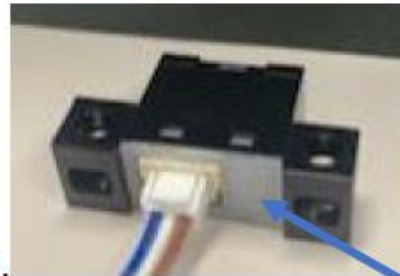


Feature;

- The indicator lights up at the same time as the output transistor operation
- Users can understand when sensors can detect sensing objects by seeing the indicator.
- The same as B5W-LB1112-1 except for the indicator

Model type description; B5W-LB1114-1

Launch; Oct. 1st, 2020



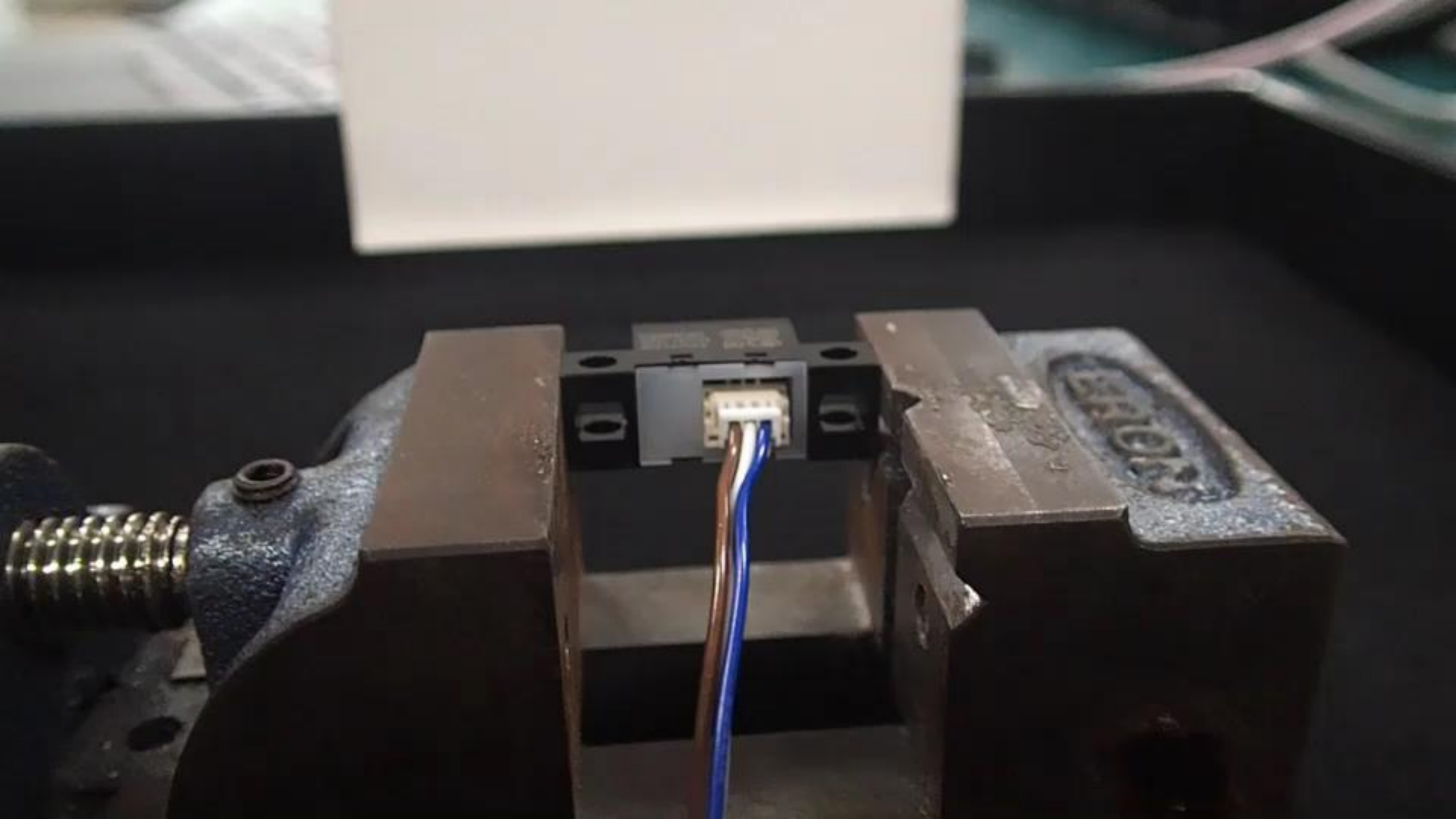
When no objects,
the indicator does not lights up.



<Indicator operation>
When detecting objects,
the indicator lights up.

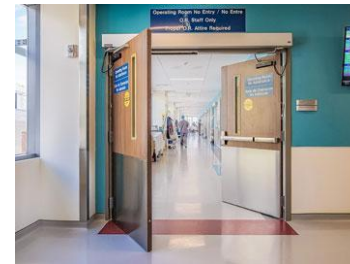


View from the above



B5W-DB series

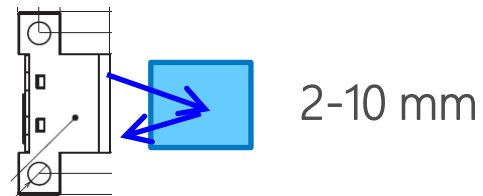
Light Diffuse Reflective Sensor (LDR)



Background of Development

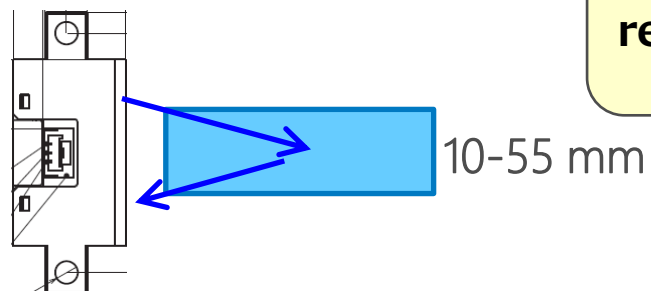
B5W-LB Series

B5W-LB1112-1
B5W-LB1122-1



***B5W-LB series cannot meet applications requiring a mid-to-long sensing distance.**

B5W-LB2101-1
B5W-LB2112-1
B5W-LB2122-1

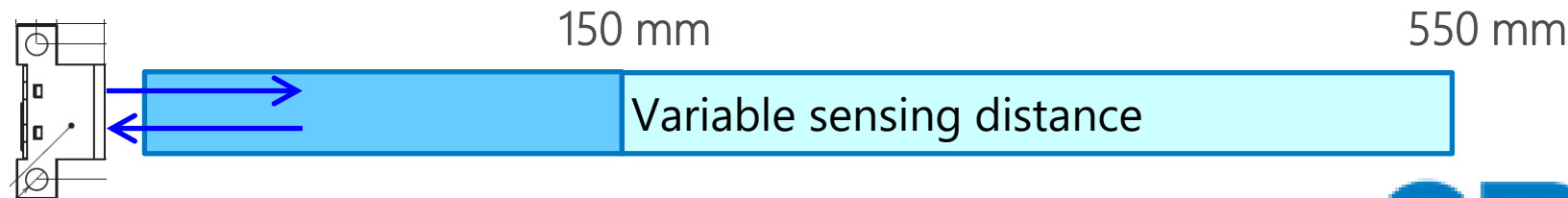


B5W-DB Series

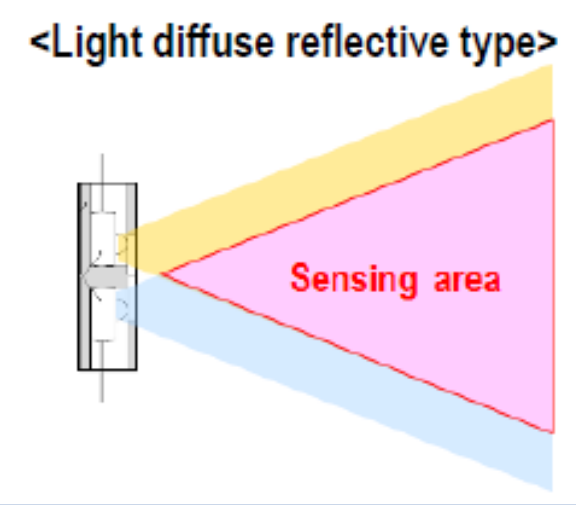
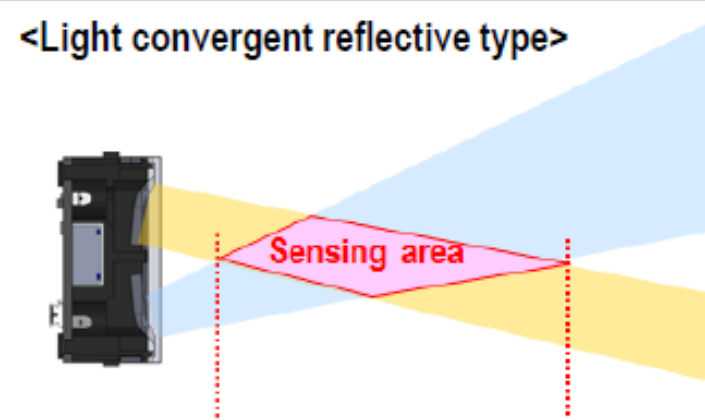
B5W-DB1452-1
B5W-DB1452-2



B5W-DB11A1-A-1



LDR vs LCR

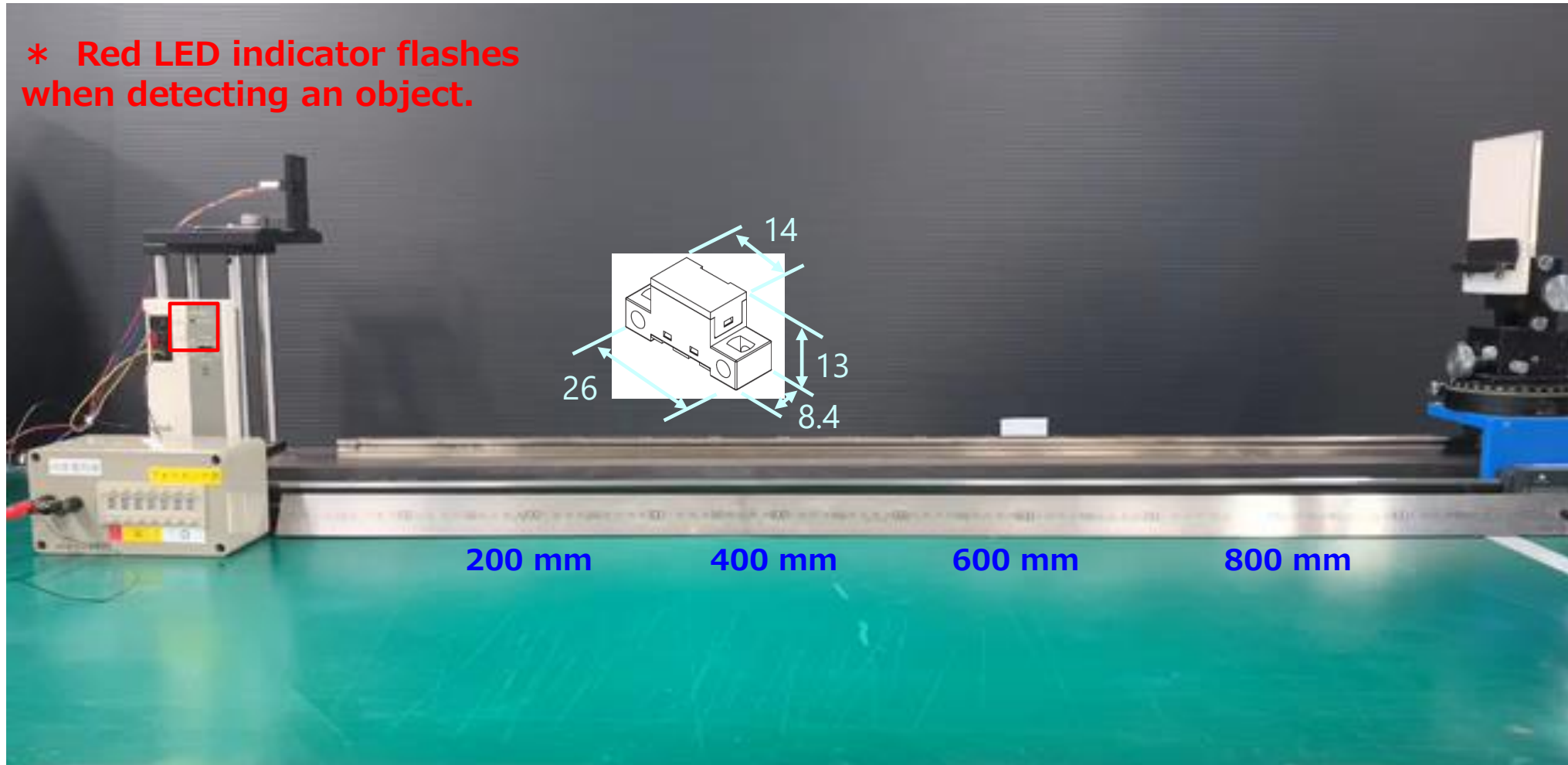
	Diffuse reflective sensor	Light convergent sensor
Optical system	<p>A sensor emits the light to front and the sensing area is in pink.</p>  <p><Light diffuse reflective type></p>	<p>Sensing area is limited in pink.</p>  <p><Light convergent reflective type></p>

This info is from https://omronfs.omron.com/en_US/ecb/products/pdf/en-b5w_lb_series_users_manual.pdf

Features of B5W-DB1452-1

- Small-sized and long sensing distance
 - Despite the equivalent size to B5W-LB1112-1, the sensing distance of B5W-DB1452-1 is 862 mm as the average reference value, and 550 mm of guaranteed sensing distance.

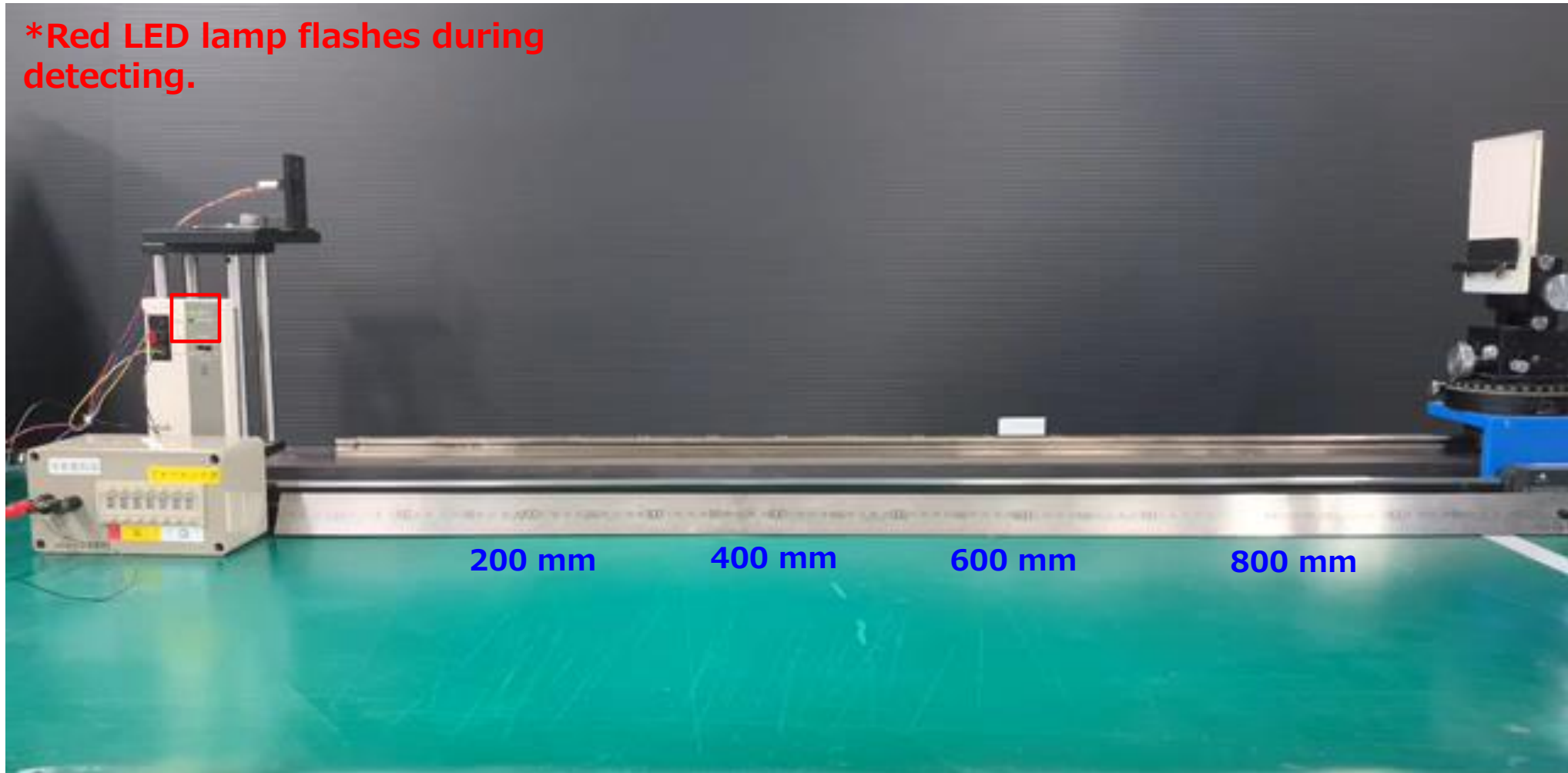
* **Red LED indicator flashes when detecting an object.**



Features of B5W-DB11A1-A-1

- When 0 Ω , 100 Ω , 680 Ω , 5100 Ω of external limiting resistance value (R2) is applied, the sensing distance changes to 775 mm, 615 mm, 345 mm, 125 mm, accordingly.

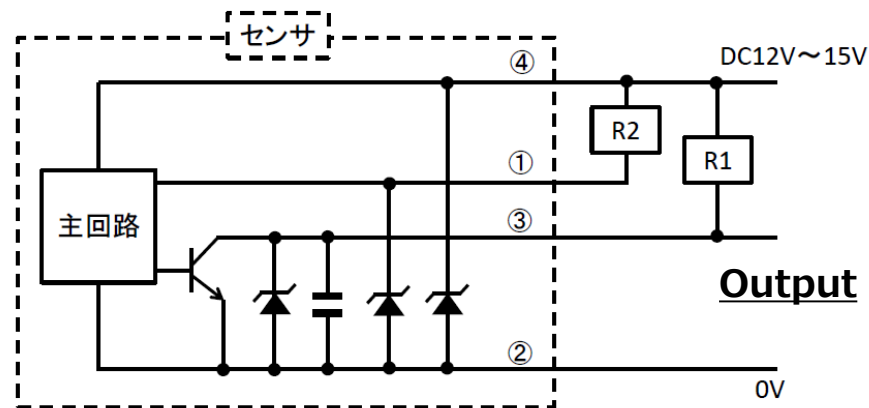
***Red LED lamp flashes during detecting.**



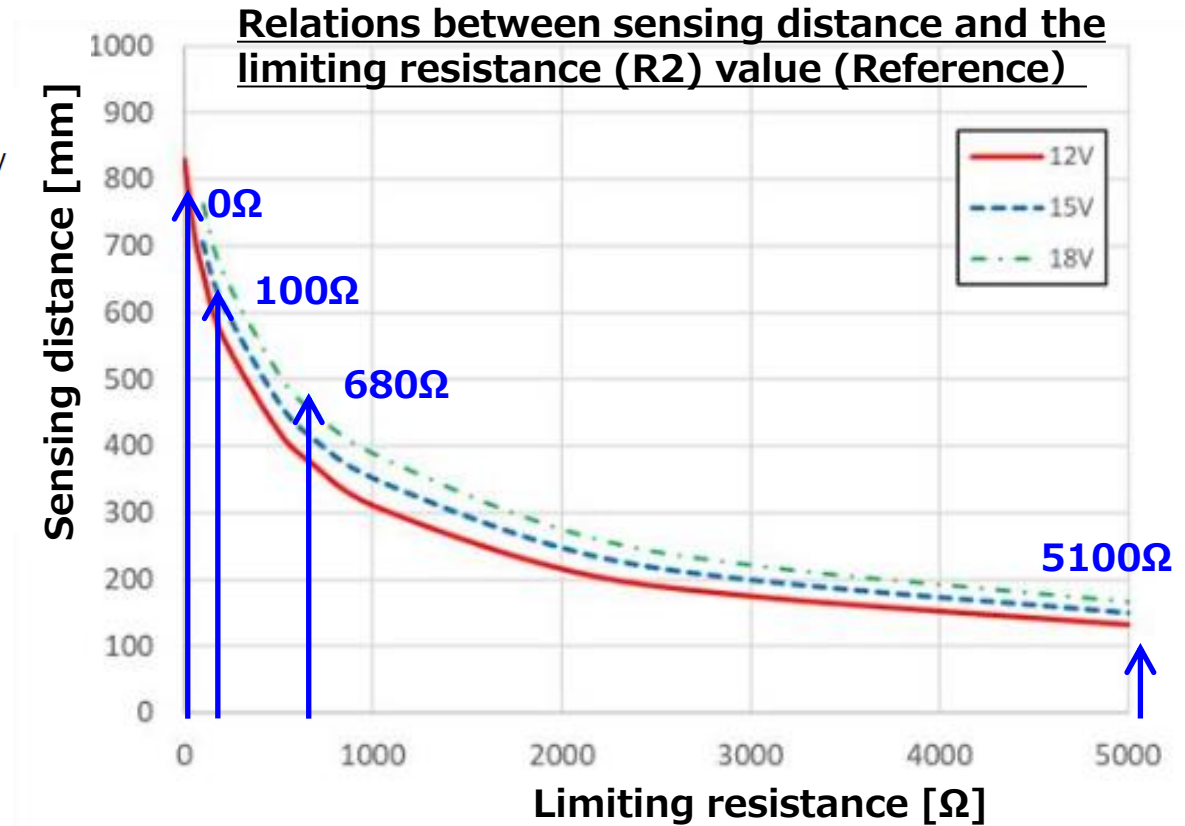
Features of B5W-DB11A1-A-1

- Possible to change the sensing distance between 150 mm to 550 mm.
- When the external limiting resistance (R2) value increases, the current applied to LED decreases; consequently, the sensing distance becomes short. On the other hand, when the R2 value decreases, the current applied to LED increases; consequently, the sensing distance becomes long.

Output Circuit



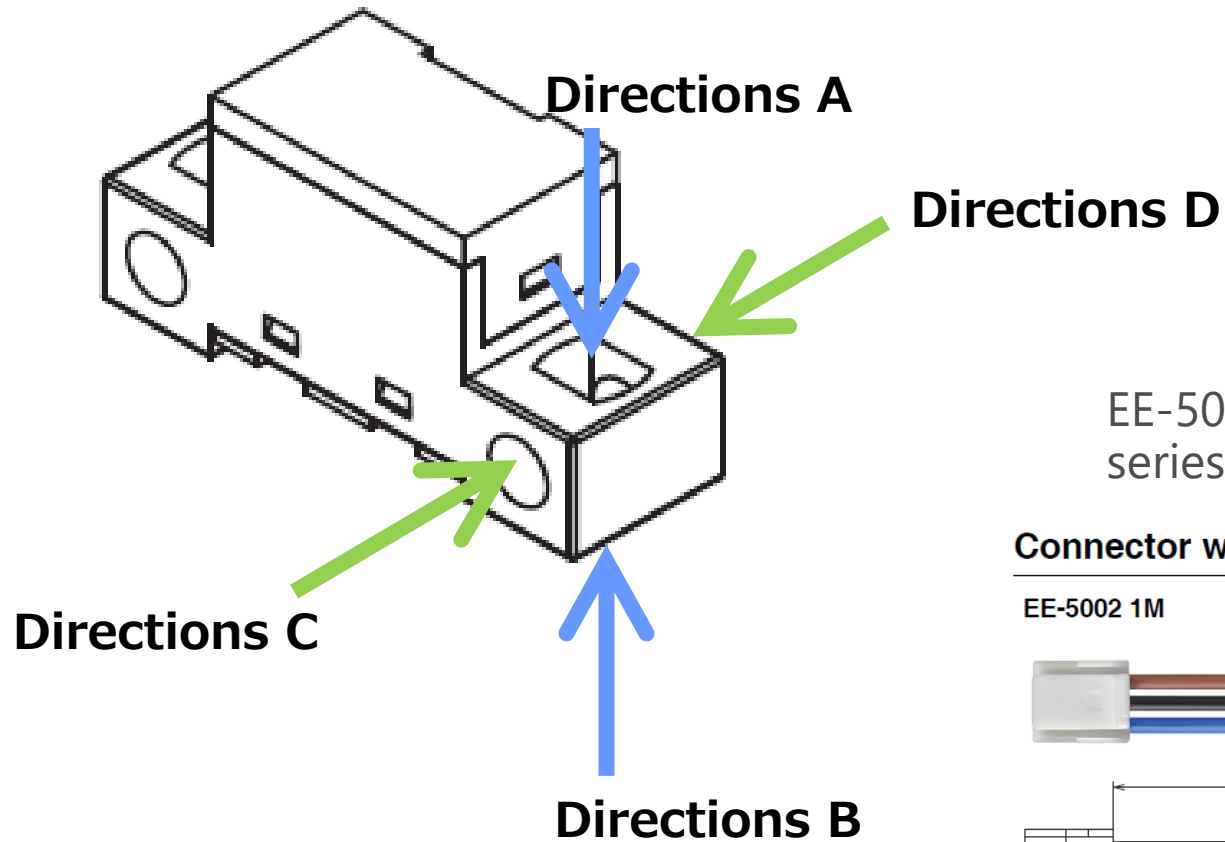
- *Power Supply Voltage of B5W-DB11A1-A-1 is 12VDC/15VDC. 18VDC is out of specification.
- *DC 18V is, as a reference, applied in demonstration with E39-VA.



Object: White paper

Mounting method

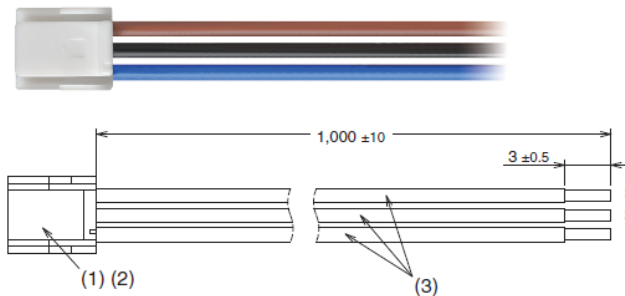
Mounted in M3 screws from 4 directions



EE-5002 is a connector with cable on sale suitable for B5W-DB series and separately ordered.

Connector with cable (Order Separately)

EE-5002 1M



No.	Name	Model/ Specifications	Quantity	Manufacturer
(1)	Connector, HS for 101-150 harness	GHR-03V-S	1	JST
(2)	Connector, CT for 101-150 harness	SSHL-002TP0.2	3	JST
(3)	Lead wires	UL1061 AWG26	3	—

Wiring

Connector circuit number	Lead-wire color
1	Blue
2	Black
3	Brown

OMRON Electronic Components Product Lineup

Relays

PCB Power Relays



Surface Mount Detection Signal Relays



Surface Mount Detection High-frequency Relays



Solid-state Relays



General-purpose Relays



DC Power Relays



Power Latching Relays



Automotive Relays



Switches

Ultra-small Tactile Switches



Surface Mount Detection Switches



General-purpose Basic Switches



Sealed Ultra-subminiature Basic Switches



Pushbutton Switches



Rocker Switches



Thumbwheel Rotary Switches



Connectors

MIL Flat Cable Connectors



D-sub Connectors



Simple Connectors for Industrial Equipment



FPC Connectors



Battery Connectors



Sensor I/O Connectors



Sensors & Components

OKAO Vision Image Sensing



Human Vision Components (HVC)



MEMS Flow Sensors



Photomicrosensors



Sensors and Units designed to meet various needs in the industry



Omron products for Robot controller

- Relay
- Switch
- Connector
- MEMS sensor
- Micro sensing device
- Image sensing

Control PCBs, Control Panel

Settings, input

DIP Switches

[A6□](#)

Tactile Switches

[B3F/B3FS](#)

Long-stroke
Tactile Switch [B3AL](#)



Control PCBs

Signal switching

Signal Relay

[G6S/G6K](#)

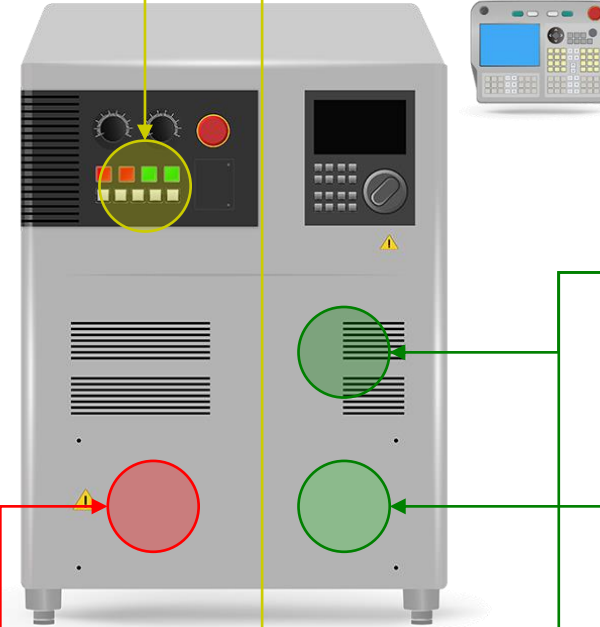
MOS FET Relay

[G3VM](#)

External output

Power Relay

[G6DN](#)



Interface

Serial communication (i.e.RS232C)

D-sub Connectors

[XM2/3](#)

USB Connector

[XM7](#)

LAN Modular Jack

Connectors

[XM9B](#)

Push-in Terminal Block
PCB Connector

[XM4M/XW4N](#)

Under development



Board-to-Cable Connection

Signal and power supply connection

MIL Connectors

[XG2/4/5](#)

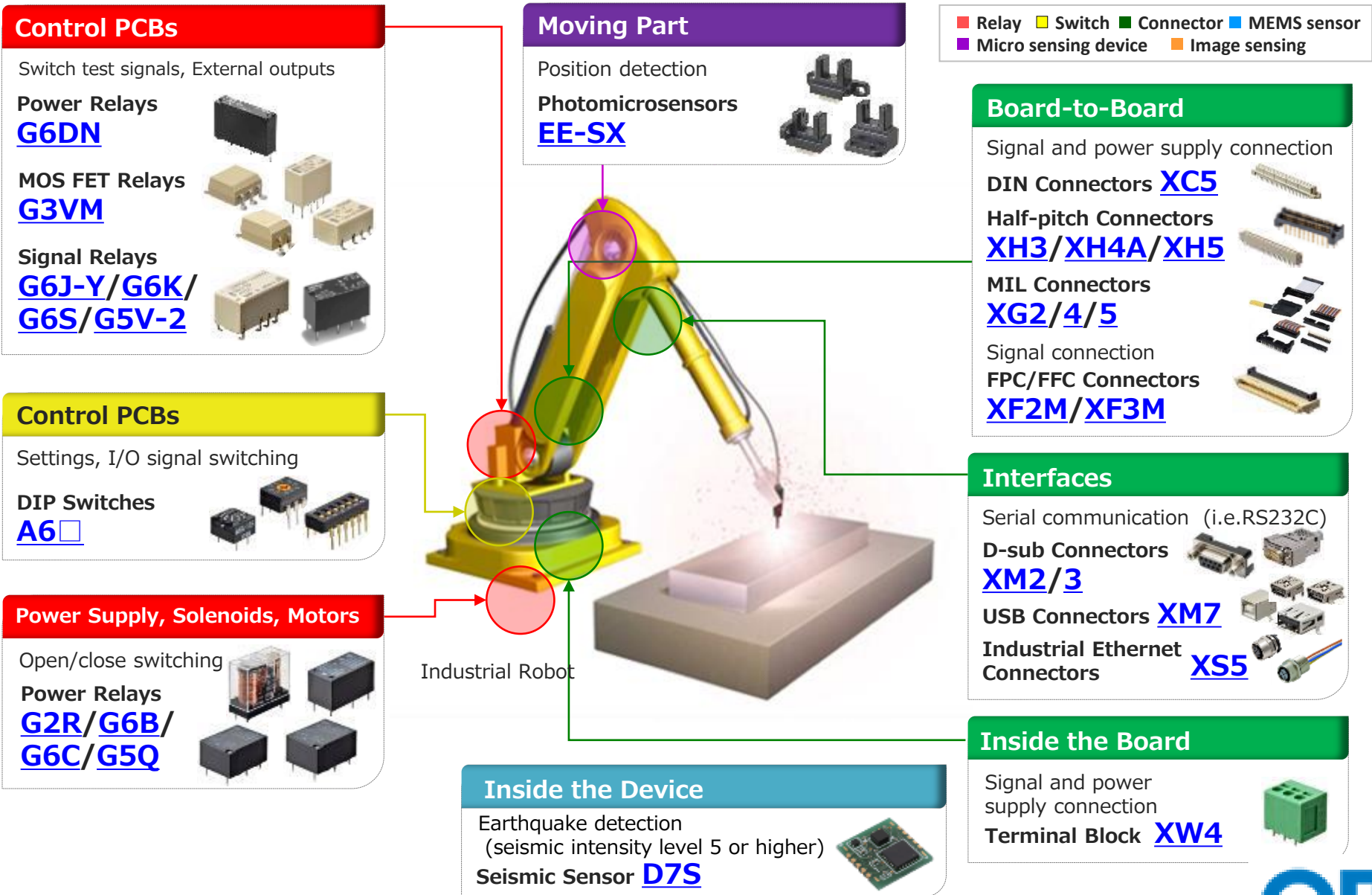
FPC/FFC Connectors

[XF2M/XF3M](#)

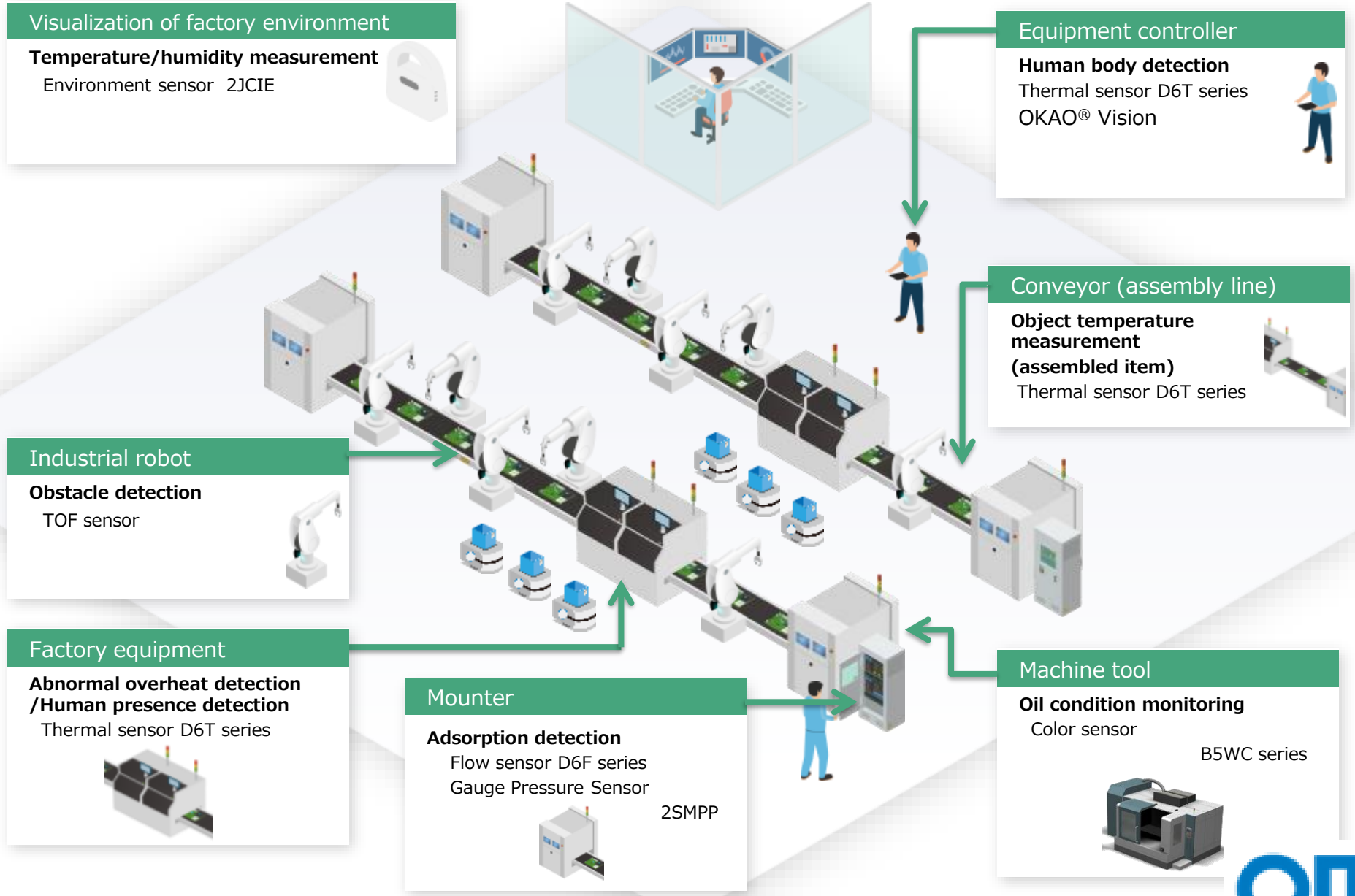


Robot Controller

Omron products for Industrial Robot



Omron products for manufacturing site





GRAZIE!

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