

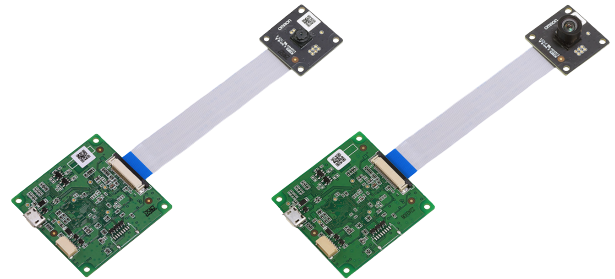
# B5T-007003

## Human Vision Components (HVC-P2)


A specialized module capable of detecting people wearing clean suits and compact format to provide image sensing capability to various devices.

- Choice of wide-angle type and long-distance type depending of detection distance or range needs.

**Note: 1.** "HVC" stands for "Human Vision Components"  
**Note: 2.** This model is specialized for detecting people. It differs from B5T-007001.



Make sure to read the Terms of Use before using the Product. Omron will see any use of the Product as an indication that you agree and will comply with the contents of these Terms of Use.

 Refer to the *Safety Precautions* on page 11.

### Model Number Legend

B5T-007003 - 0    
 (1) (2)

**(1) Lens angle**

- 1: 50° horizontal
- 2: 90° horizontal

**(2) General purpose/Custom**

- 0: General purpose
- 1: Custom

### Model

Lens angle	Model	Packaging	Minimum contents per box
Approximately 50 deg. (long-distance type)	<b>B5T-007003-010</b>	Individual box	1 unit
Approximately 90 deg. (wide-angle type)	<b>B5T-007003-020</b>	Individual box	1 unit

For detailed interface specifications for the Product, refer to the Command Specifications document (provided separately).

Information concerning the following items related to the Product can be downloaded from the website below:

- Americas <https://components.omron.com/us-en/products/sensors/B5T-007003>
- Asia-Pacific <https://components.omron.com/sg-en/products/sensors/B5T-007003>
- Europe <https://components.omron.com/eu-en/products/sensors/B5T-007003>
- Korea <https://components.omron.com/kr-en/products/sensors/B5T-007003>

- Datasheet
- Command Specifications document
- USB drivers
- Evaluation software
- Sample codes
- Other development related documentation

#### Term Definitions

- The "Product" indicates the B5T-007003 models. It consists of the "Device" and the "SDK". In this instruction sheet, the word "Product" refers to the whole or a part of them.
- The "Device" indicates the hardware component that consist of the main board, the camera board and the flexible flat cable (FFC).
- The "SDK" consists of the evaluation software, the command specifications, sample codes and other documentations concerning the "Device" or the "SDK."

# B5T-007003

## Ratings / Specifications / Functions

### ■ Ratings

Item	Rated values (standards)
Supply voltage	5 VDC $\pm$ 10%
Consumption current	Below 0.25 A
Operating temperature	0 to +50°C (no condensation or freezing)
Operating humidity	Below 90% RH (no condensation or freezing)
Storage temperature	-30 to +70°C (no condensation or freezing)
Storage humidity	Below 90% RH (no condensation or freezing)

### ■ Specifications & Functions

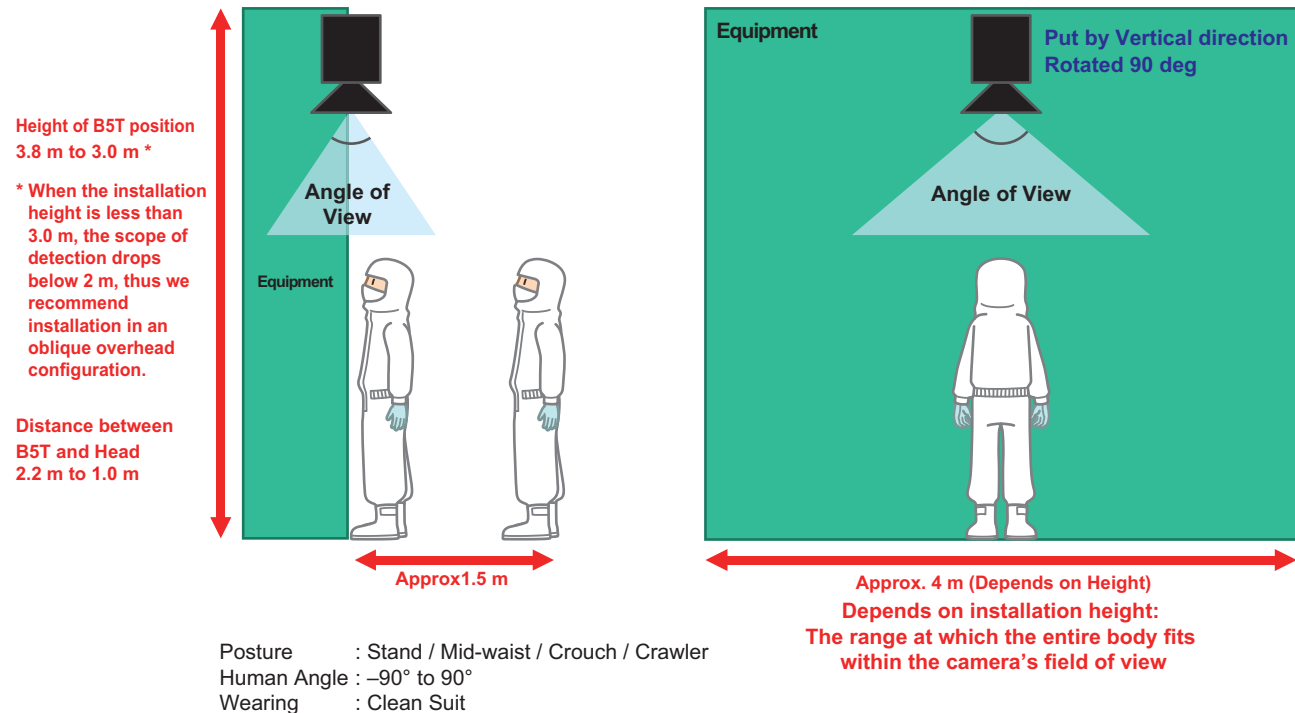
Item	Specifications	
	B5T-007003-010 model	B5T-007003-020 model
Detection resolution	1600 × 1200 pixels	1600 × 1200 pixels
Horizontal detection range (angle of view)	54° $\pm$ 3°	94° $\pm$ 5°
Vertical detection range (angle of view)	41° $\pm$ 3°	76° $\pm$ 5°
Optical axis inclination	$\pm$ 4°	$\pm$ 7°
Rotation alignment	$\pm$ 2°	$\pm$ 2°

### Image Output Specifications

Item	Specifications
Output image	No output / 160 × 120 pixels / 320 × 240 pixels (choose one)
Image format	RAW (8-bit, Y data)

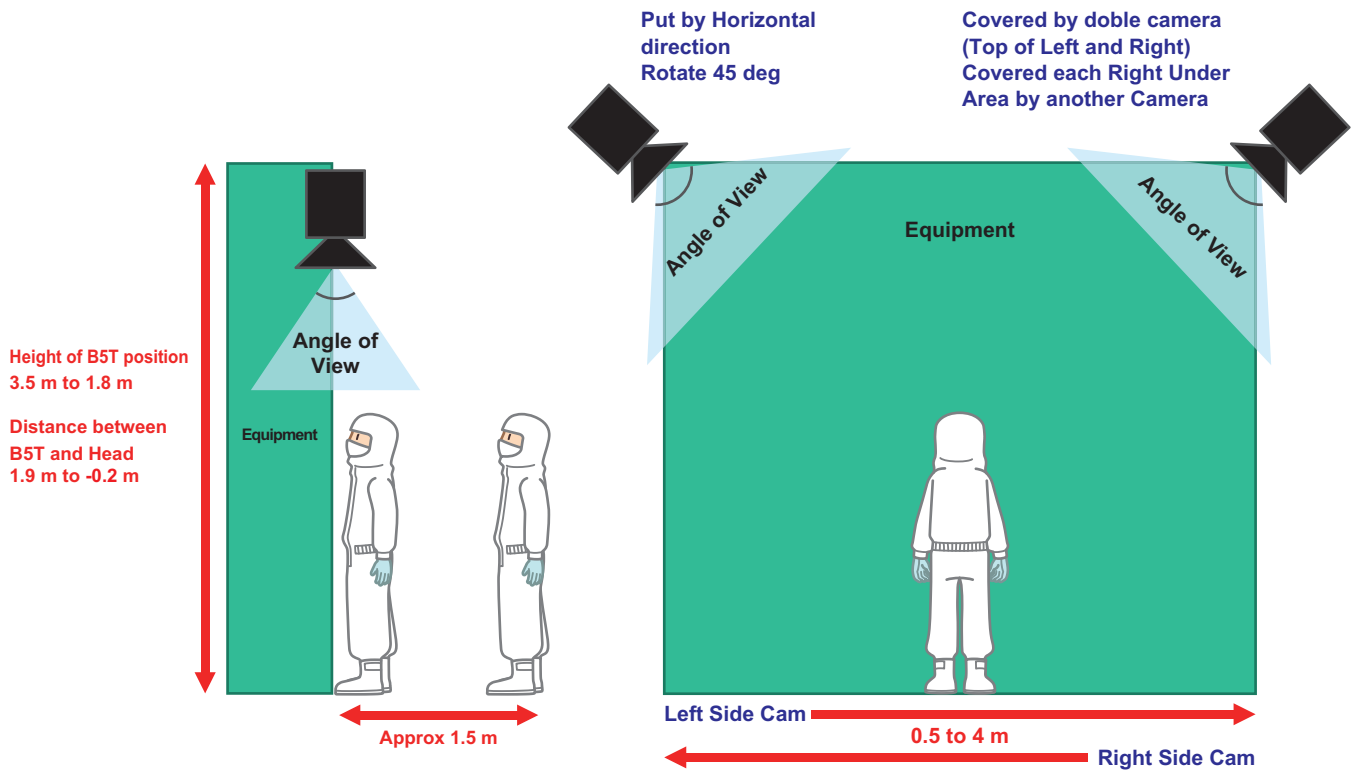
### Supported detection range

#### Overhead model \*1



\*1. The model is specified by commands.

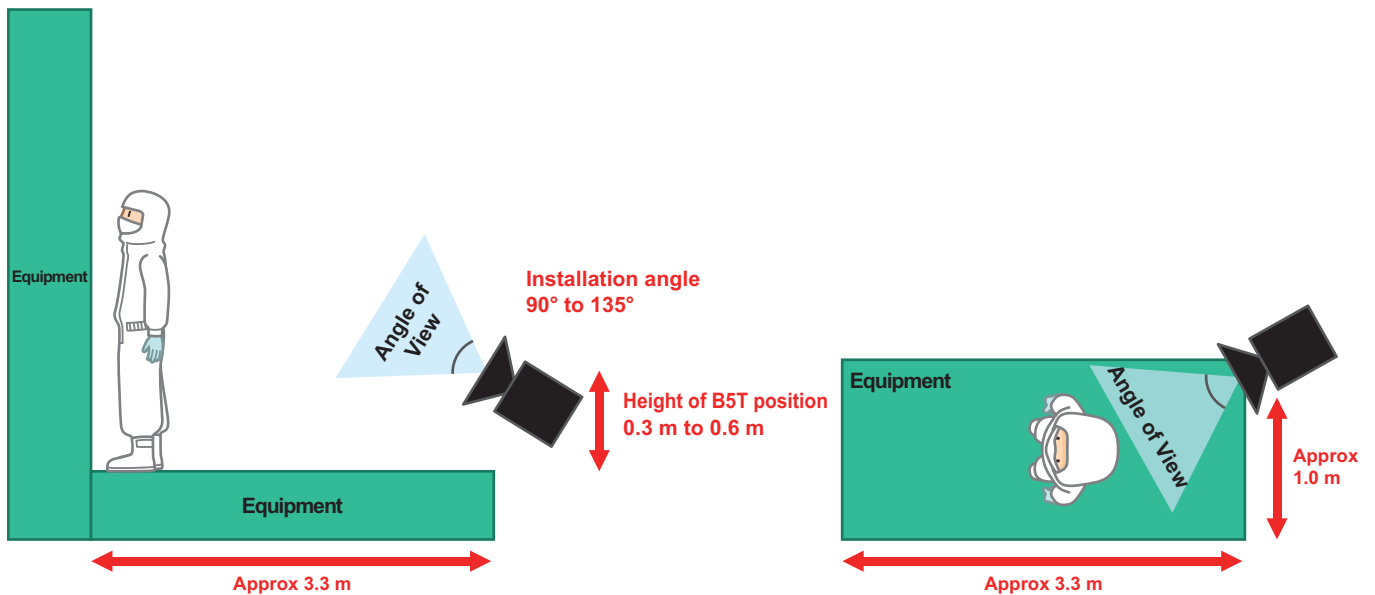
**Oblique overhead model**



Posture : Stand / Mid-waist / Crouch / Crawler  
 Human Angle : All angle  
 Wearing : Clean Suit \*

\*Although not recommended, detection is possible with normal clothes other than clean suits

**Look-up model**



Posture : Stand / Mid-waist / Crouch / Crawler  
 Human Angle: All angle  
 Wearing : Clean Suit

## Host Communication Specifications

### UART

Item	Specifications
<b>Feature</b>	Receives the command controlling the module from the host and sends back the detection result info
<b>System</b>	Full duplex bidirectional system
<b>Protocol</b>	Non-procedural
<b>Sync</b>	Asynchronous method
<b>Data format</b>	Start: 1 bit, Data: 8 bit, Stop: 1 bit, no parity
<b>Transmission code</b>	NRZ method, Logic low: 0V & logic high: 3.3 V
<b>Transmission rate</b>	9600/38400/115200 (Default value)/230400/460800 bps, can be changed through commands

### USB

Item	Specifications
<b>Feature</b>	Receives the command controlling the module from the host and sends back the detection result info
<b>System</b>	USB 2.0 (CDC class used)
<b>Protocol</b>	Non-procedural
<b>Data format</b>	Start: 1 bit, Data: 8 bit, Stop: 1 bit, no parity

### Functions I/O

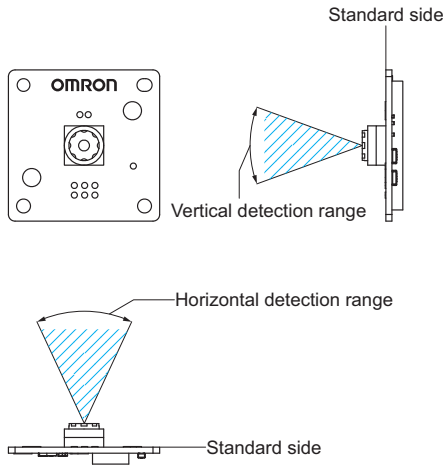
Function	Output	Details
<b>Human Body Detection</b>	Number of people detected	Maximum number of people detected 16
	Position (center coordinates)	Coordinates of the upper left and lower right corners, respectively
	Degree of confidence	Confidence in the detection result (0 to 1000), a higher value indicates a higher confidence
	Decision result flag	Three types: Inside/outside detection subject range, inside/outside rectangle size range, erroneous detection present

## Image Input Specification Item Definitions

### Horizontal and Vertical Detection Range (angles of view)

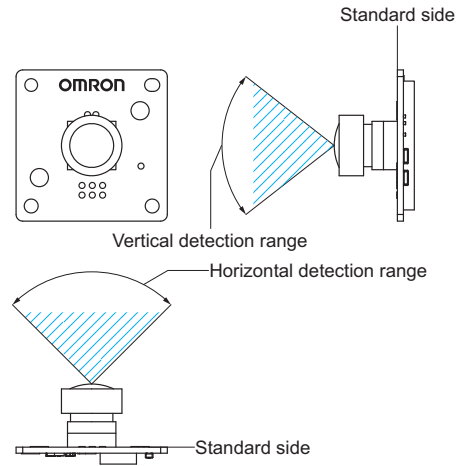
#### Horizontal angle of view 50°

B5T-007003-010



#### Horizontal angle of view 90°

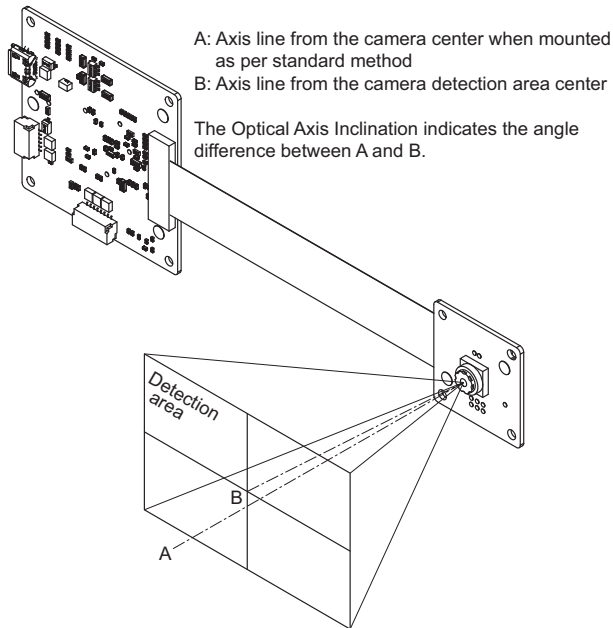
B5T-007003-020



### Optical Axis Inclination

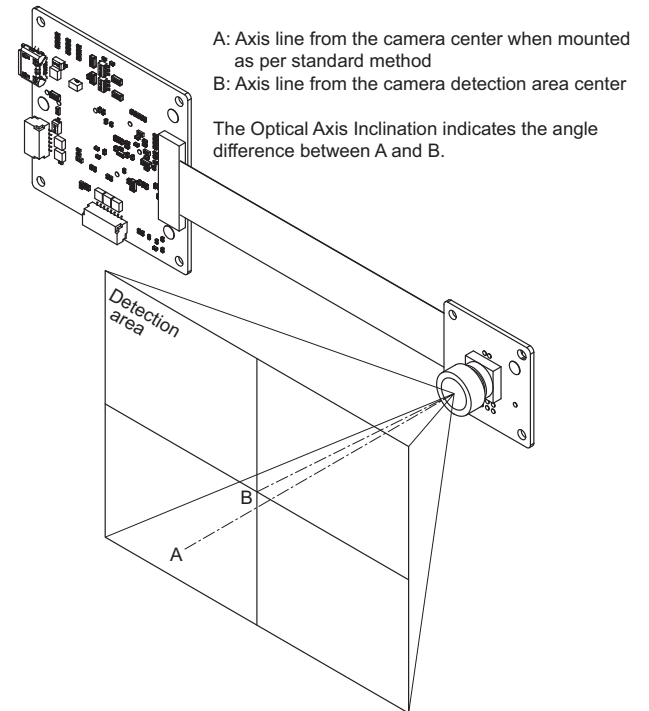
#### Horizontal angle of view 50°

B5T-007003-010



#### Horizontal angle of view 90°

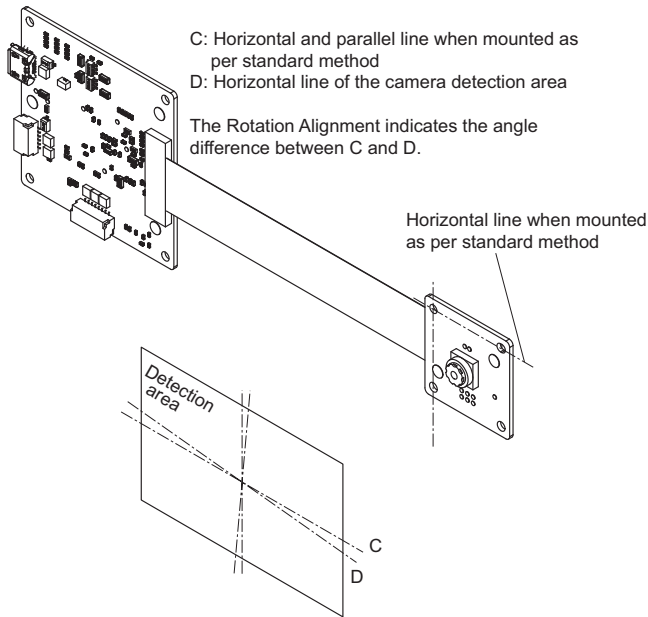
B5T-007003-020



## Rotation Alignment

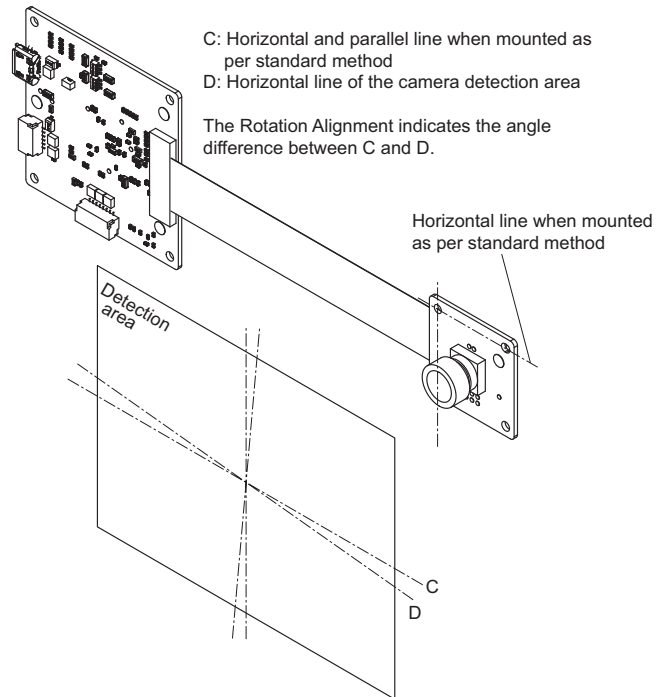
Horizontal angle of view 50°

B5T-007003-010



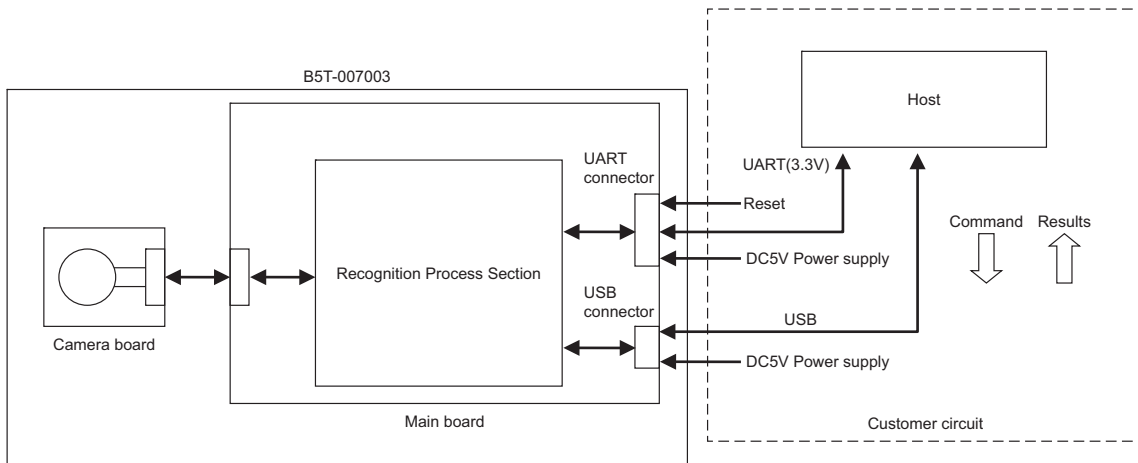
Horizontal angle of view 90°

B5T-007003-020



## Connection

### ■Block Diagram



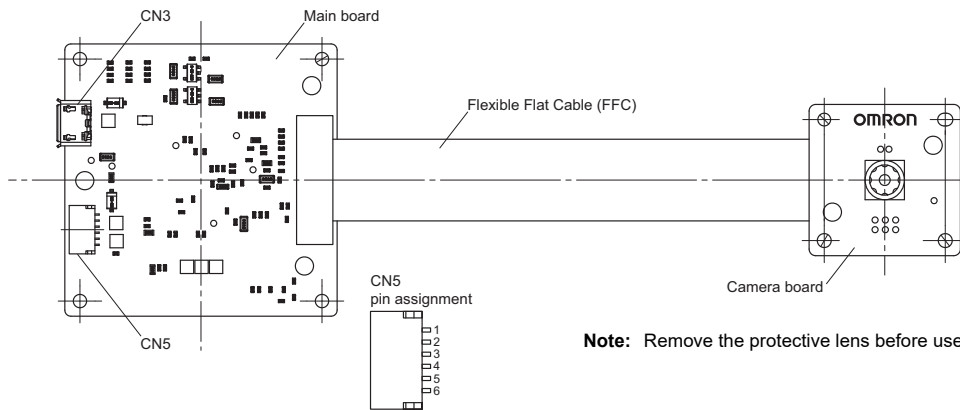
**Note:** Do not use the USB and UART connection simultaneously.

# Parts & Functions

## Front

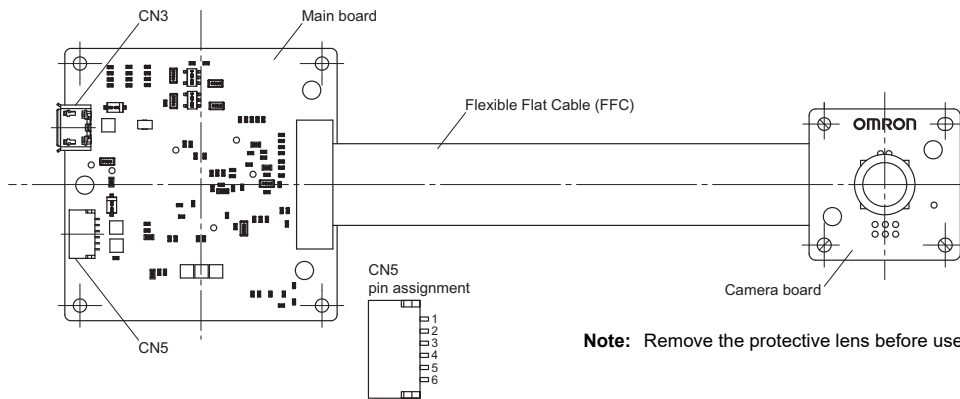
Horizontal angle of view 50°

B5T-007003-010



Horizontal angle of view 90°

B5T-007003-020



Symbol	Description	Function
CN3	USB connector (MicroUSB Type B)	USB communication, power supply
CN5	UART connector	UART communication, power supply, reset input

**Note:** Do not use the USB and UART connection simultaneously.  
Do not change the main board and camera board configuration.  
Try to limit the number of times CN3 and CN5 are connected/disconnected below 10.

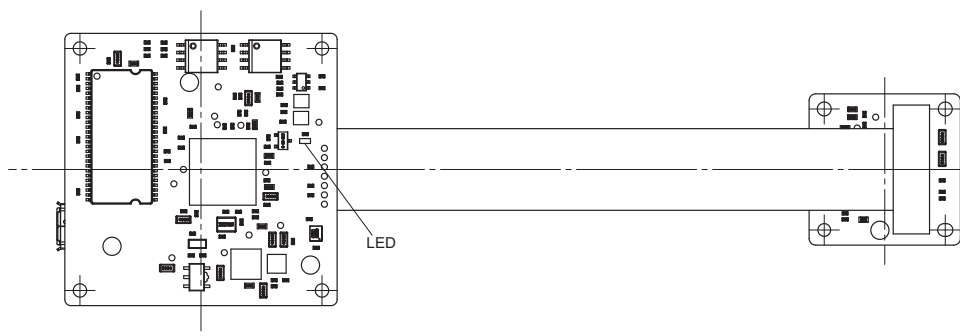
## Back

Horizontal angle of view 50°

B5T-007003-010

Horizontal angle of view 90°

B5T-007003-020



Symbol	Description	Function
LED	LED display light	Lit when power is ON Off when proceeding commands from Host

# B5T-007003

## Dimensions

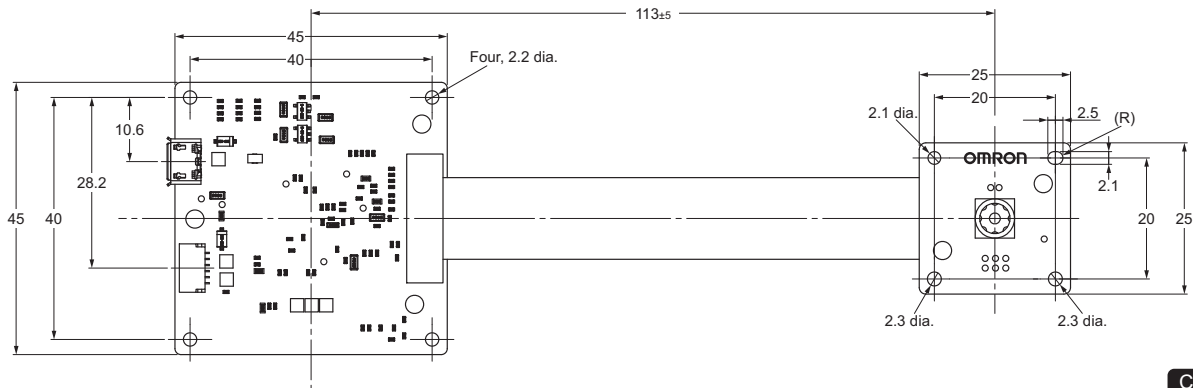
**CAD Data** marked products, 2D drawings and 3D CAD models are available. For CAD information, please visit our website, which is noted on the last page.

(Units: mm / unspecified dimension tolerance: tolerance class IT16)

### Front

Horizontal angle of view 50°

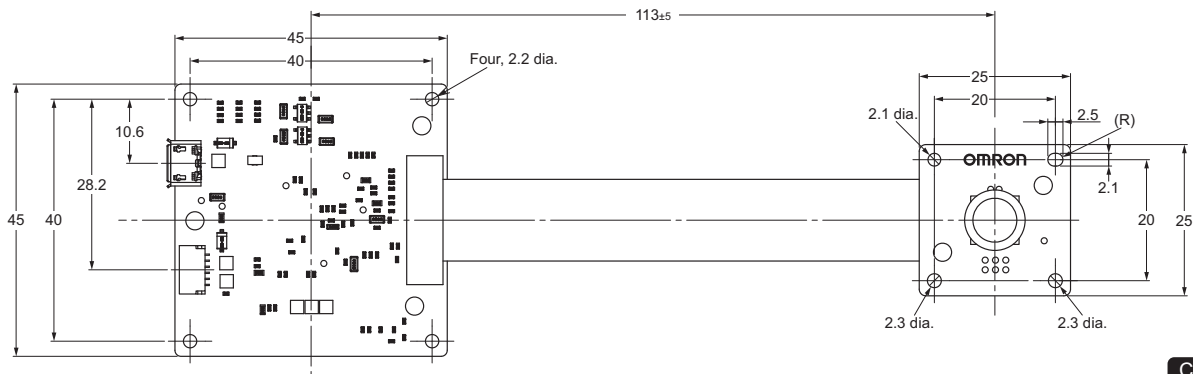
B5T-007003-010



**CAD Data**

Horizontal angle of view 90°

B5T-007003-020

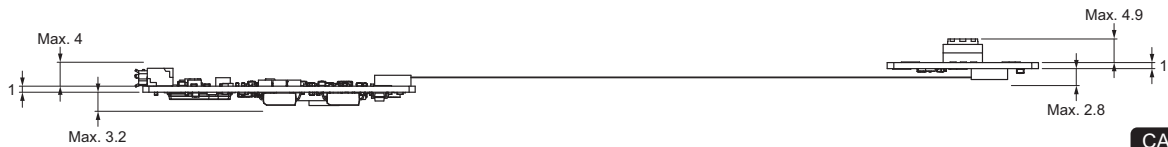


**CAD Data**

### Back

Horizontal angle of view 50°

B5T-007003-010



**CAD Data**

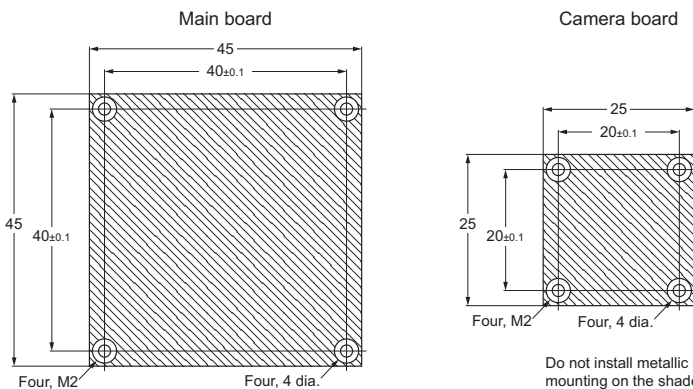
Horizontal angle of view 90°

B5T-007003-020



**CAD Data**

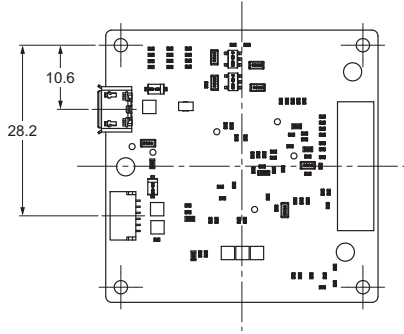
### Dimensions when mounted



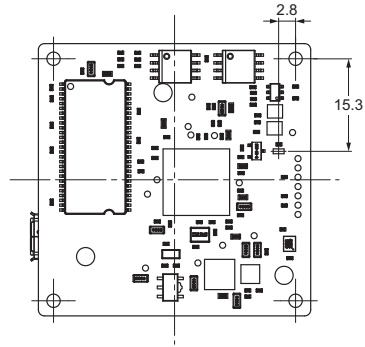
Do not install metallic parts for mounting on the shaded areas.

**Note:** Do not install metallic parts for mounting on the shaded areas

Main Board Front

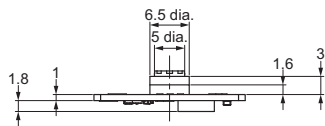
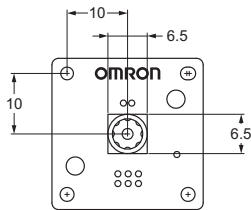


Main Board Back



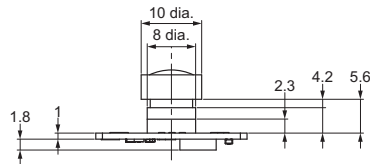
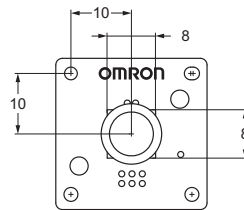
CAD Data

Camera Board  
Horizontal angle of view 50°  
B5T-007003-010



CAD Data

Horizontal angle of view 90°  
B5T-007003-020



CAD Data

# B5T-007003

## Connector Pin Assignment

CN5: Provides power and the UART communication interface.

Board-side connector: SM06B-SRSS-G-TB (made by J.S.T. Connectors, recommended for use)

Housing: SHR-06V-S-B or SHR-06V-S (made by J.S.T. Connectors)

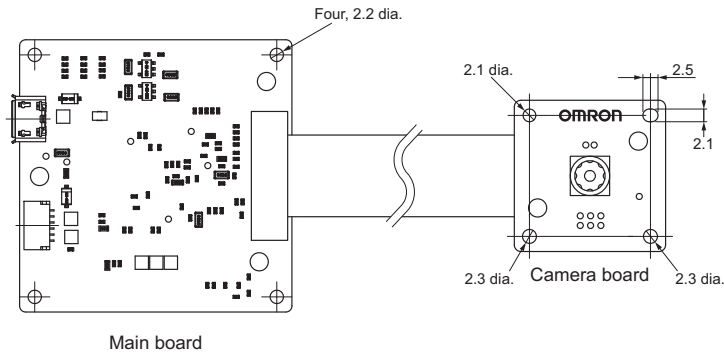
Contact: SSH-003GA-P0.2 (made by J.S.T. Connectors)

Pin number	Signal	I/O	Description
1	Vcc	-	Power supply 5.0 V $\pm$ 10%
2	UART RX *	Input	UART [receive] (Device $\leftarrow$ Host) Logic 0: 0 V    Logic 1: 3.3 V
3	UART TX	Output	UART [send] (Host $\leftarrow$ Device) Logic 0: 0 V    Logic 1: 3.3 V
4	GND	-	Ground
5	RESET	Input	Reset signal (Device $\leftarrow$ Host) Logic 0: 0 V    Logic 1: 3.3 V Reset is active on logic 0
6	RESERVED	-	Do not connect to this

**Note:** Do not make the RX terminal floating when applying power to the Device.

\* Do not use CN3 and CN5 simultaneously.

## Mounting Method





- Note: 1.** This figure is for a frontal mounting direction (0°) of the module. Settings need to be changed through commands when mounting the Device at a clockwise rotation angle of 90°, 180° or 270° from the front.
- Note: 2.** Fix each board with the M2 screws in the four board corner holes. Make sure not to bend or break the board when fastening the screws. Apply torque appropriately for the screws used.
- Note: 3.** Make sure to fix the board so that it is not warped, bent or any under unreasonable stress.
- Note: 4.** Make sure that the board is sufficiently distanced from any electrically-conductive part.
- Note: 5.** Take proper measures against static electricity.

## Safety Precautions

Make sure to read these precautions for a safe use of the Product.



- The contents included is to ensure proper use of the Product and prevent harm and/or property damage to the user or other people.
- Warnings and cautions are defined as follows.

### •Definition of Warning and Caution

 <b>Warning</b>	Denotes a potentially hazardous situation which, if not avoided, may result in minor, moderate or serious injury, or death. It may also result in serious damage.
 <b>Caution</b>	Denotes a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or damage.


"Damage" indicates property damage to a building, production line, household goods, other products, livestock, pets, etc.

### •Examples of indications

	Indicates forbidden actions.
	Indicates required actions.


### **Warning**

#### Regarding use:

Do not use the Product for safety of life or crime prevention purposes. 

Do not use the Device on automobiles or other vehicles, including bikes as it may result in accidents.

The following will result in fire, electric shock, injury or damage if ignored.

Do not touch the Device or any connected cable during a lightning storm. 

Do not use the Device if it is cracked or damaged.


Do not insert foreign objects in the connector or in the holes on the various parts of the Device.

Do not use the Device in bathrooms or any other place where it may get in contact with water.

Do not touch the Device or any connected cable with wet hands.


Do not install the Device in a location subjected to animal or human body fluids.

Do not disassemble, repair, or modify the Device.

Turn the power off and stop using the Product if you notice any anomaly, including foul odor, distortion or discoloration to the Device during use. 

Install the cables in a way that would not put strong force on them, including making sure they are not crushed in a door.

The following will result in accident or injury if ignored.

Install the Device and the cables out of reach of infants. 


Store the Device out of reach of infants when not using it.

Contact emergency services at once if small parts are ingested.


Do not touch sharp parts or the exposed interior of the Device that was damaged.

### **Caution**

#### Regarding the use or handling of the Product:


Make sure to follow the warnings and cautions indicated in this document when using the Product. 

The following will result in accident, injury or damage if ignored.


Do not install the Device in an unstable location, where it could fall down, or where it can be subject to vibrations. 

Install the cables in a safe way, out of the way of hands or feet.

The following will result in burns or damage due to heating if ignored.

Do not wrap the Device in a blanket or sheets, etc. when it is powered on. 

Do not use or store the Device next to fire, heating equipment, in direct sunlight, in cars or in any other location subject to high temperature.

The Device may produce heat. Do not touch it when transmitting or shortly after powering it off. 

## Precautions for Safe Use

Check the Product for physical damage upon opening its package. It is recommended to wear gloves when opening the package.

Follow the indications listed below for a safe use of the Product.

### (1) Installation Environment

- There is potential internal deterioration and damage of internal parts of the Device. Do not use the Product in conditions exceeding the ratings for temperature and humidity.
- Do not use the Product in an environment where condensation occurs.
- Do not use the Product in an environment subjected to water, oil or chemicals spills.
- Do not use the Product in an environment subjected to corrosive, combustible or explosive gas.
- Do not use the Product in an environment where dust, salt or iron powder are present.

### (2) Power Supply and Wiring

- Make sure there is no faulty wiring of I/O terminals, etc. as this may result in fire.
- Do not connect the DC power supply terminal to AC power.
- Do not connect the Product to DC voltage above the rated capacity.
- Do not reverse-connect the DC power supply.
- Make sure to turn the Device off before removing cables.
- Do not connect the UART connector (CN5) to asynchronous method non-compliant devices.
- Make sure to check the Device and the connector pins for distortion or physical damage before connecting or removing cables.
- Connect a commercially available Micro USB Cable (TypeB) cable to the USB connector (CN3). Make sure the cable is not damaged and do not modify it.

### (3) Others

- Do not disassemble, repair or otherwise remodel the Device.
- Treat the Product as industrial waste when disposing of it.
- Use the M2 screws on the fixing holes on the Device when fixing it. Make sure not to bend or break the board when fastening the screws. Apply torque appropriately for the screws used.
- Do not apply stress on the Device, e.g. twists, deflections or impacts, as it may result in causing defects or degradation.
- Do not apply stress on the connector or display implementation parts when installing the Device, as it may result in causing defects or degradation.

## Precautions for Safe Use

Observe the following precautions to prevent failure to operate and malfunctions, and to prevent adversely affecting the performance and function of the Product.

- Store the Device at a temperature between -30 and +70°C and a humidity level below 90%.
- Do not touch the board mounted parts with bare hands. Discharge any static electricity from the user before use.
- Take proper measures against static electricity by using an antistatic wrist strap, etc. before handling the Product.
- Make sure to properly ground the connector's earth terminal in order to prevent malfunction due to noise.
- Do not use the Product in places where the surrounding temperature goes above the rating range.

- Do not use the Product in a location where it would be subjected to direct sunlight.
- Do not use the Product in a location subject to excessive inductive or power supply noise, such as in strong magnetic or electric fields.
- Do not use the Product in a location where it would be subjected to strong UV light.
- Do not use the Product in a location where it would be subjected to radiation.
- Sufficiently evaluate the electrical characteristics of any connection to the Device.
- Make sure to properly align the connectors when connecting them.
- Avoid desorption of power supplied connectors as it will result in accidents.
- Refer to the B5T-007003 Command Specifications document separately provided by OMRON for details on the interface specifications.
- Never use benzene, paint thinner, or any other volatile cleaning solution, detergent, bleach or chemical washcloth for cleaning the Device.
- Take in consideration heat dissipation from the Device when installing it in order to improve its long term reliability.
- Install the Device sufficiently far away from any other surrounding charged parts.
- Install the Device making sure not to obstruct the camera detection range.
- Use transparent materials to cover and protect the front of the lens should it be in contact with hands or objects.
- Remove the lens protective seal before use (B5T-007003-010).
- Remove the lens protective cover before use (B5T-007003-020).
- Do not touch the camera module.
- The Product performs detection on images. As such, note that it may sometimes detect objects other than living bodies, such as photographs or posters.
- Note that since the Product uses a camera for detection, successful detection may not be possible due to light orientation, brightness or exposure issues.
- Make sure to reset the Product before using it again following a power interruption or failure.
- Restart or reset the Device if data is received improperly.
- Cutting or losing power to the Device while saving the Album/Parameter data, etc. on the flash ROM may destroy the data saved on it. Make sure to take a backup of the Album/Parameter data, etc., on the Host device. Refer to the B5T-007003 Command Specifications document for details.
- Do not use the USB and UART connection method simultaneously.
- Do not remove the FFC connection between the main board and the camera board, and do not alter the configuration of the combination.
- When using the USB connector, note that the bus power may not be properly powering the Device depending on the computer USB port used. In such case, use a device like a self-powered hub with an AC adaptor.

Please check each region's Terms & Conditions by region website.

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## **OMRON Corporation**

**Device & Module Solutions Company**

### **Regional Contact**

#### **Americas**

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

#### **Asia-Pacific**

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

#### **Korea**

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

#### **Europe**

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

#### **China**

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

#### **Japan**

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