

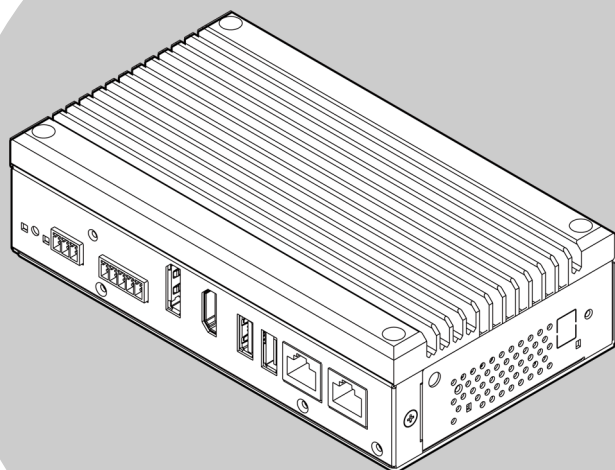
# Reference Manual Hardware

Industrial Edge AI Computers

## DX-U1200 Series

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# Introduction



This section provides necessary information of the product such as the outline, bundled items and manuals before actual use.

# 1.Related Manuals

The manuals related to the product are listed below.

Read them as necessary along with this document.

## ◆ Must Read the Following Manuals.

Name	Purpose	Contents	How to get
Product Guide	Must read this after opening the package.	This lists the product configuration and describes the precautions.	Included in the package (Printed matter)
Reference Manual (Hardware)	Read this when operating the product.	This describes the hardware aspects such as functions and settings.	 Download from the CONTEC website (PDF)
Reference Manual (Software)	Read this when operating the product.	This describes the software aspects such as functions and settings.	 Download from the CONTEC website (PDF)

## ◆ Download Manuals

Download the manuals accordingly from the following URL.

**Download**

<https://www.contec.com/download/>

## 2.About the Product

This product is an industrial computer suitable for AI inference processing equipped with the NVIDIA® Jetson Xavier NX™ module.

The product contains Gigabit LAN×2, HDMI, embedded DisplayPort(DP), USB×2, general-purpose I/O, and RTC. It features installation flexibility and environmental resistance so that practical applications can be realized with confidence.

Similar to the developer kit for the software environment, Ubuntu is pre-installed and JetPack SDK is available to run applications created with the developer kit.

Simple dustproof models include sheet metal (pre-attached) and connector caps to prevent dust and dirt from entering the product vents.

Expansion slot models include a low-profile PCI Express slot x1 for expanded functionality by means of CONTEC's rich variety of low-profile PCI Express cards.

## 3.Features

### ■ Edge AI accelerator equipped with NVIDIA® Jetson Jetson Xavier NX™

Equipped with NVIDIA® Jetson Xavier NX™, the DX-U1200 series can be used in fields requiring on-site AI inference processing, such as image inspection and predictive maintenance.

### ■ Long-term supply and maintenance

Long-term product supply is provided, as well as repair and maintenance services. This can significantly reduce life cycle costs, including verification and modification man-hours that were needed with every model change.

### ■ Highly reliable and long-life components

The high-reliability long-life design utilizes accumulated knowledge about BOX-PC embedded computers. The DX-U1200 can be reliably used for high-availability systems.

### ■ Two Gigabit LAN ports for alternating connections between different network layers

This product is equipped with two Gigabit LAN ports. This makes it ideal for edge computing that alternates connections between different network layers such as between video acquisition from a camera and higher-order information system networks.

### ■ Flexible installation

With the L-shaped mounting bracket (included as standard), the product can be installed on a wall or on the back of a VESA (100 mm) mount-compatible LCD monitor. It can also be mounted on a 35-mm DIN rail with a DIN rail adapter (included as standard).

### ■ Supports ambient temperatures from -20°C to 60°C

This product achieves stable operation in a wide temperature range of -20 to +60°C (an airflow of 0.7m/s) and it can be used in the various environment. (Note that the temperature range is between -20°C and 50°C when the product is used with the PCI Express Low Profile card). \* Derating occurs due to the load conditions. See the "Installation Requirements" in this manual for details.

## 4. Included Items

The product consists of the items listed below.

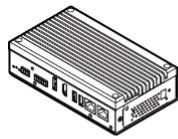
Check, with the following list, that your package is complete.

If you discover damaged or missing items, contact your retailer.

	<b>DX-U1200-3E02xx [Base Model]</b>	<b>DX-U1210-3E02xx [Simple dustproof models]</b>	<b>DX-U1200P1-3E02xx [Expansion Slot Model]</b>
<b>Name</b>	<b>Pcs.</b>	<b>Pcs.</b>	<b>Pcs.</b>
Product	1	1	1
Power Connector	1	1	1
DIO Connector	1	1	1
Power/DIO Connector Removal Prevention Fitting	1	1	1
L-Shape Fitting	2	2	2
DIN-Rail Mounting Bracket	2	2	2
Fillister Head Screw (M2.6x4, black)	3	3	3
Countersunk Screw (M3x5, black)	4	4	4
Washer Assembled Screw (M3x6, Ni)	3	3	3
Hexagon Head Screw with Captive Washer (M4x10, black)	4	4	4
Cable Tie	1	1	1
LAN connector cap	0	2	0
USB connector cap	0	2	0
HDMI connector cap	0	1	0
DP Connector Cap	0	1	0
Product Guide	1	1	1
Warranty Certificate	1	1	1
Serial Number Label	1	1	1



## Production Configuration Drawings



Product



L-Shape  
Fitting



DIN-Rail  
Mounting Bracket



Power/DIO Connector  
Removal Prevention Fitting



Power  
Connector



DIO  
Connector



Fillister Head Screw  
(M2.6x4, black)



Countersunk Screw  
(M3x5, black)



Hexagon Head  
Screw with  
Captive Washer  
(M4x10, black)



Washer Assembled  
Screw  
(M3x6, Ni)



DP  
Connector Cap



HDMI  
Connector Cap



USB  
Connector Cap



LAN  
Connector Cap



Cable Tie



Product Guide



Warranty Certificate



Serial Number  
Label

# Safety Precautions




Understand the following definitions and precautions to use the product safely.

Never fail to read them before using the product.

# 1. Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources.

Understand the meanings of these labels to operate the equipment safely.

 <b>DANGER</b>	Signal word used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

## 2. Handling Precautions

### **WARNING**

- Do not use the product in locations exposed to a flammable or corrosive gas. It may cause explosion, fire, electrical shock, or malfunction.
- Do not allow the device to come into contact with foreign substances (metal particles, flammable substances, liquids, etc.) Otherwise, it can cause fire or electrical shock.
- Do not place the product in an unstable location or use incomplete mountings. Otherwise, it may cause the device to fall.
- Be sure to connect the product to the stipulated power supply voltage. Connecting to a different voltage might cause a fire or electrical shock.
- Use the product in accordance with the described installing method, conditions, and specifications. If the product is used outside the specified range, the protection performance of this product will be impaired.
- Users should not attempt to disassemble or modify the product, or to replace components. It will cause electrical shock, fire, or malfunction. CONTEC will bear no responsibility for any problems, etc., resulting from disassembling or modifying the product.
- Always turn off the power first, then, plug or unplug the cables.
- For battery replacement, contact your retailer as it must be performed as a process of repair.
- The product is not intended for use in aerospace, space, nuclear power, medical equipment, or other applications that require a very high level of reliability. Do not use the product in such applications.
- If using the product in applications where safety is critical such as in railways, automotive, or disaster prevention or security systems, please contact your retailer.

### **CAUTION**

- Do not use or store this product in a location exposed to high or low temperature that exceeds range of specification or susceptible to rapid temperature changes.  
Example: Exposure to direct sun    In the vicinity of a heat source
- Do not use this product in extremely humid or dusty locations. It is extremely dangerous to use this product with its interior penetrated by water or any other fluid or conductive dust. If this product must be used in such an environment, install it on a dust-proof control panel, for example.
- Avoid using or storing the product in locations subject to shock or vibration that exceeds range of specification.
- When transporting the product, take suitable measures to avoid applying shock or vibration directly to the product. Shock resistance: 10G (11ms) below.
- Use the product in the specified operating condition (temperature, humidity, vibration, and shock).

- The product should always be grounded (earth).
  - Avoid installing in the place where ventilation of the product may compromise. Insufficient aeration could heat up the product and lead to malfunctions or damages.
  - Do not use this product in the vicinity of devices that generate strong magnetic force or noise. Such products will cause this product to malfunction.
  - Do not use or store the product in the presence of chemicals.
  - To clean the product, wipe it gently with a soft cloth dampened with either water or mild detergent. Do not use chemicals or a volatile solvent, such as benzene or thinner, to prevent the paint to be scraped or discolored.
  - This product's case may become hot. To avoid being burned, do not touch that section while this product is in operation or immediately after turning off the power. Avoid installation in a location where people may come into contact with that section.
  - When connecting cables, first check the shapes of connectors, and then insert them in the correct orientation. After they are connected, do not put too much load on the connected part. Doing so may result in poor contact or damage to the product and the connected part.
  - When the product is used in a place that is affected by overcurrent or overvoltage (lightning surge), select appropriate surge protection device for all of the route (Power line, Signal line, earth, etc.). Consult with the specialist regarding selecting, purchasing, and setting the surge protection device.
  - To connect with peripherals, use a grounded, shielded cable.
  - Do not touch metal parts or terminals with your hands when the product is in operation. Otherwise, the product may malfunction, or cause failure.
  - CONTEC does not provide any guarantee for the integrity of data on storage device.
  - To prevent corruption of files, always shutdown the OS before turning off this product.
  - CONTEC reserves the right to refuse to service a product modified by the user.
  - Regardless of the foregoing statements, CONTEC is not liable for any damages whatsoever (Including damages for loss of business profits) arising out of the use or inability to use this CONTEC product or the information contained herein.
  - In the event of failure or abnormality (foul smells or excessive heat generation), un-plug the power cord immediately and contact your retailer.
  - When disposing of the product, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.
  - Component Life:
    - (1) Lithium primary battery...A lithium primary battery is used to back up the internal calendar clock. The backup time at a temperature of 25°C with the power disconnected is 10 years or longer.
    - \* Replacement of expendables is handled as a repair (there will be a charge).
    - \* The service life for consumable parts are reference values and are not guaranteed values.
-

# 1. FCC PART 15 Class A Notice

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC WARNING




Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

# 2. EN55032 Class A Notice

Warning:

Operation of this equipment in a residential environment could cause radio interference.

# 3. Display marking

Display of power (Input Rating Label)	Display of functional earth terminal	Display of Hot surface
		
DC power supply	Functional earth terminal	Hot surface

## 3.Security Warning

When connecting to the network, be aware of security-related problems. See the examples of Security measures below and set up the product properly along with the network devices.

### 1. Information Security Risks

- Unauthorized access from the outside through a network could cause the system halt, data damage, or exposure to malware. \*1
- Invaded and used as a stepping stone, a device might attack the others through networks. (a victim becomes an assailant)
- Information might leak without realizing due to the connection to the network.
- Secondary damages such as harmful rumors, liability in damages, social credibility fall, and opportunity loss are expected led by the troubles described above.

\*1: Malware (Malicious Software) is software that brings harm to a computer system and performs unintended operations.

### 2. Security Measures – e.g.

- Do not keep using the default password. (Refer to the product manual for the password setting).
- Set a strong password.

Combined with upper and lowercase letters, and numbers so that it cannot be easily analogized by others.

- Change the password periodically.
- Disable unnecessary network services and functions.
- Restrict access to the network with network devices. \*2
- Restrict ports to be released on the network with network devices. \*2
- Create a closed network connection using such as dedicated network or VPN\*3

\*2: Inquire for setting procedure to manufacturers.

\*3: VPN (Virtual Private Network) a secured network that wards off unauthorized access by protecting the communication path with authentication and encryption.

Unfortunately, there are no perfect ways to avert unauthorized access or close a security hole that are endlessly found day and night.

Please understand that risks are always involved with the Internet connection, and we strongly recommend a user should constantly update information security measures.

# Product Nomenclature and Function

This section describes product component names and their functions, pin assignment of each connector.

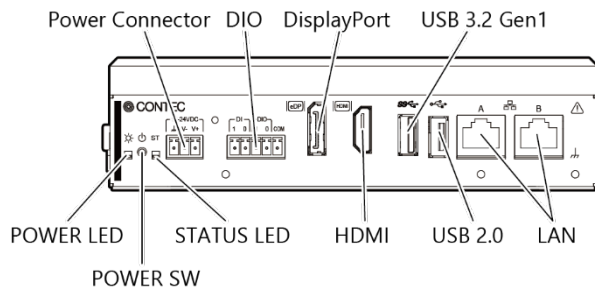


# 1.Nomenclature of Product Components

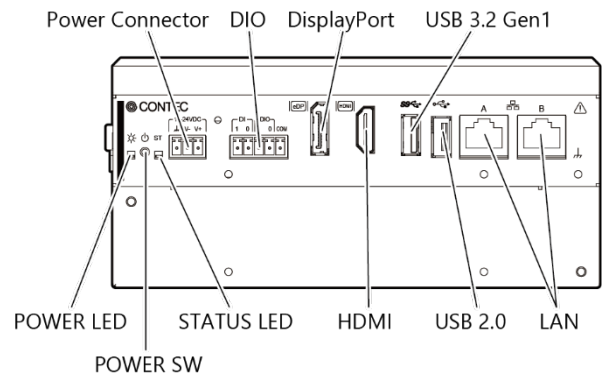
Component names of the product are shown in the figure below.

## ◆ Front

### DX-U1200-3E02xx, DX-U1210-3E02xx

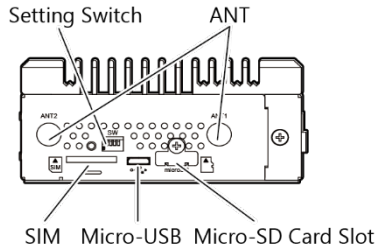


### DX-U1200P1-3E02xx

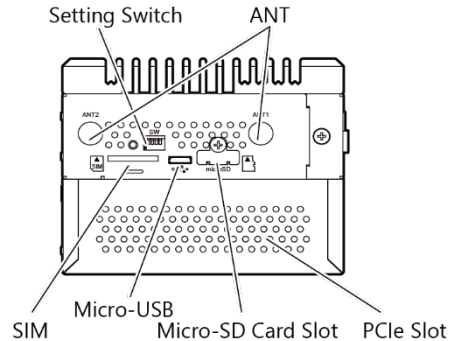


## ◆ Side

### DX-U1200-3E02xx, DX-U1210-3E02xx

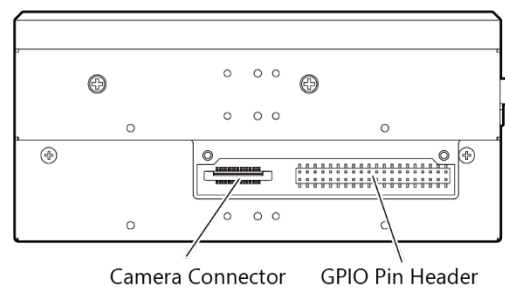


### DX-U1200P1-3E02xx



## ◆ Rear

### DX-U1200P1-3E02xx



Name	Function
<b>Front</b>	
POWER SW	This controls the power of the product.
POWER LED	This LED indicates the product is switched on or off.
STATUS LED	This LED indicates the status of the product.
Power Connector	This connector is used to supply the power.
DIO	This is a connector for digital inputs and outputs.
HDMI	Display (19-pin, Receptacle)
DisplayPort (DP)	Display (20-pin, Receptacle)
USB 3.2 Gen2	USB 3.2 Gen2 (USB3.1) TYPE-A Connector
USB 2.0	USB 2.0 TYPE-A Connector
LAN Port	This is a connector port for LAN.
<b>Side</b>	
Setting Switch	This switch is used for settings.
Micro-USB	This is a connector port for USB 2.0 Micro-B. It is used for OS writing.
Micro-SD Card Slot	This slot is used to insert a micro-SD card.
ANT	Unused
SIM	Unused
PCIe Slot	This slot is used to insert a PCIe Low Profile card.
<b>Rear (Only available for the model with an expansion slot)</b>	
Camera Connector	This is a connector port for MIPI-CSI camera interface (Evaluation purposes).
GPIO Pin Header	This is used for GPIO interface (Evaluation purposes).

## 2. Description of Product Components

Components such as connectors, switches are described.

### 1. Power Switch

The power switch is provided. The power of the product can be turned on or turned off with this switch.

While the power is on, hold down this switch to turn the power off.

While the power is off, press this button to turn the power on.

### 2. LED

There are two LEDs on the front of this product.

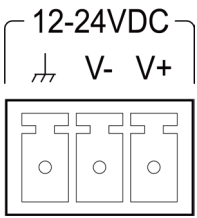

LED name	State (Display color)	Description
POWER LED	OFF	Indicates that this product is switched off.
	ON (Green)	Indicates that this product is switched on.
	FLASHING (Red)	Indicates that the watchdog timer has been activated.
STATUS LED	FLASHING (Green)	Indicates that the kernel has started up properly.
	OFF	Indicates that the kernel is not started yet or when a product error has occurred.

### 3. Power Input Connector

The DC power input connector is provided.

- Rated input voltage : 12 - 24VDC
- Input voltage range: 10.6 - 26.4VDC
- Power capacity : 12V 4.2A or more, 24V 2.1A or more

#### DC Power Connector

Connector type	15EDGRC-THR-3.5-03P-13-00AH (mfd. by DEGSON)	
	Pin mark	Signal name
	V+	12 - 24V
	V-	GND
		FG (GND) *1

\*1 The connection of this product is FG-SG conductive.

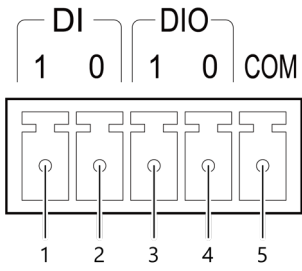
#### Connection plug

- Model : 15EDGK-3.5-03P-13-1000AH
- Applicable wire size : 28 – 16 (AWG)

## 4. DIO Connector

This product is equipped with four ports for isolated digital input and two ports for digital output. Two ports of digital input can be used for digital outputs.

### DIO connector

Connector used on the product		15EDGRC-THR-3.5-05P-13-00AH (mfd. by DEGSON)
		
Pin No.	Signal Name	Description
1	DI1	Digital input signals These connect the output signals from the other devices.
2	DI0	
3	DIO0	Digital I/O signals These connect output signals as digital input from other devices, and connect input signals as digital output from other devices.
4	DIO1	
5	COM	This is a common terminal for DI, DIO signals.

### Connection plug

- Model : 15EDGK-3.5-05P-13-1000AH
- Applicable wire size : 28 - 16 (AWG)

### CAUTION

To meet CE's requirements, DIO cable should be 30 meters or shorter.

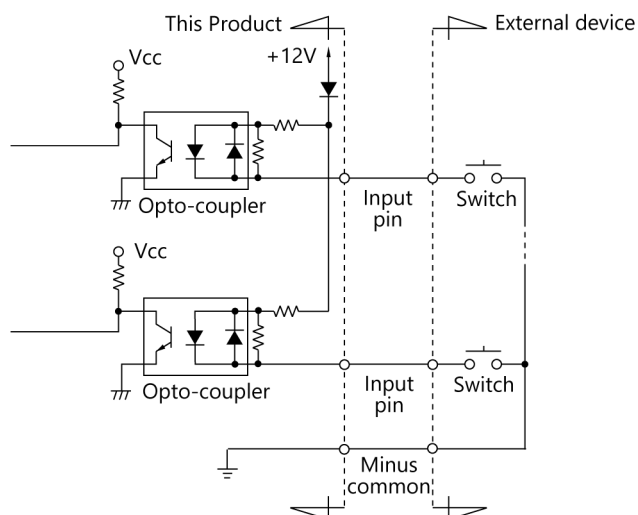
## ◆ Input equivalent circuit

The input equivalent circuit of digital input interface unit is shown in the figures below.

DI connects to a device which can be current-driven such as a switch or a transistor output device.

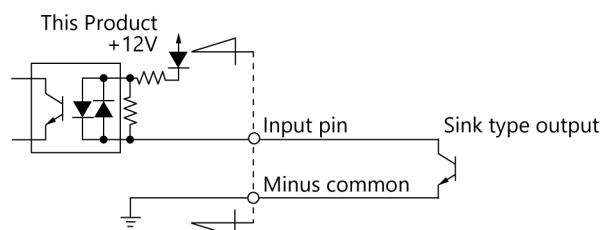
Input the ON / OFF state of a device which can be current-driven as digital values.

The signal input unit is opto-coupler isolated input (Corresponded to current sink output).



## ◆ A structure example of the input circuit

Connecting the input to the sink type output



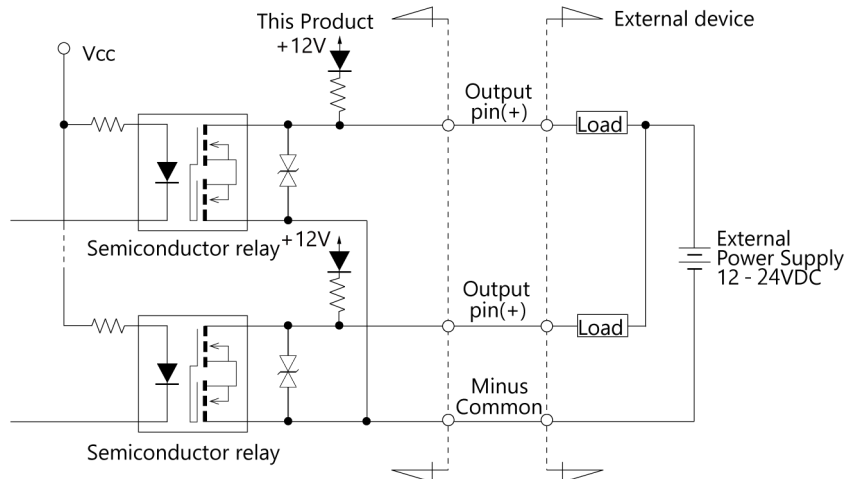
## ◆ Output equivalent circuit

DO connects to the device controlled by the current drive, such as relay controlling or LED.

The connection requires an external power supply to deliver current.

ON/OFF of the device controlled by the current drive is controlled by digital value.

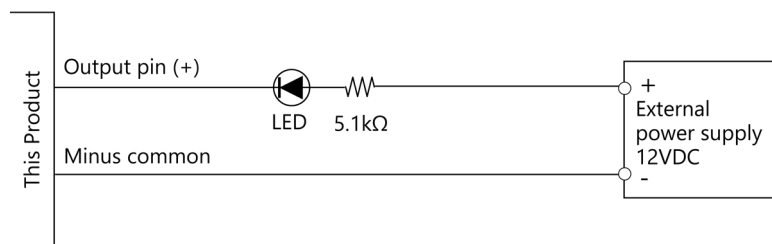
The rated of output current is up to 100mA per point.



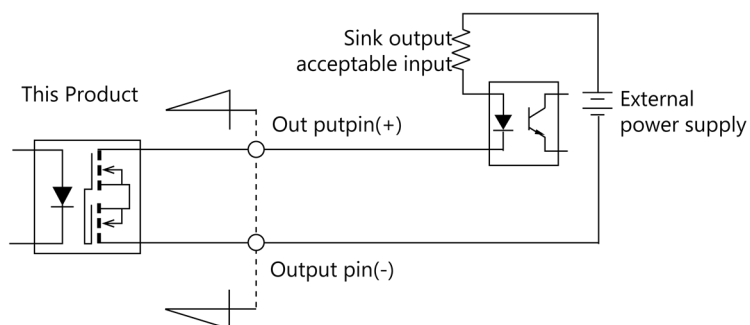
## ◆ A structure example of the output circuit

The corresponding LED lights up when you output "0" into the appropriate bit.

The corresponding LED turns off when you output "1" into the appropriate bit.



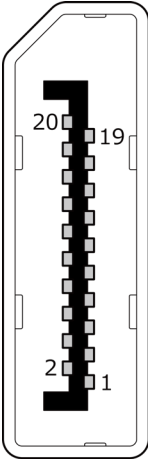
Connecting the output to the sink output acceptable input



## 5. DisplayPort Interface

The product is equipped with a connector for DisplayPort interface.

### DisplayPort connector

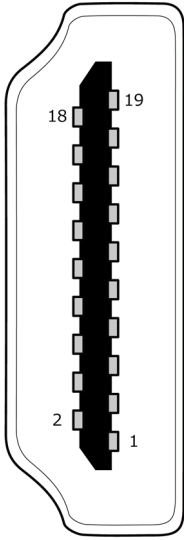
Connector used on the product		Display Port 20-Pin (Receptacle)	
			
Pin No.	Signal name	Pin No.	Signal name
1	Lane0+	2	GND
3	Lane0-	4	Lane1+
5	GND	6	Lane1-
7	Lane2+	8	GND
9	Lane2-	10	Lane3+
11	GND	12	Lane3-
13	N.C	14	N.C
15	Aux+	16	GND
17	Aux-	18	HotPlug
19	GND	20	3.3V



## 6. HDMI Interface

The product is equipped with a connector for HDMI interface.

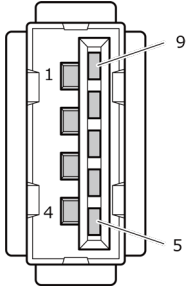
### HDMI connector

Connector used on the product		19-Pin HDMI Type A (Receptacle)	
			
Pin No.	Signal name	Pin No.	Signal name
1	TMDS Data2+	2	GND
3	TMDS Data2–	4	TMDS Data1+
5	GND	6	TMDS Data1–
7	TMDS Data0+	8	GND
9	TMDS Data0–	10	TMDS Clock+
11	GND	12	TMDS Clock–
13	CEC	14	Reserved (N.C.)
15	SCL	16	SDA
17	DDC/CEC Ground	18	+5V Power
19	Hot Plug Detect		

## 7. USB 3.2 Gen2 Ports

This product is equipped with one port for USB 3.2 Gen2 (USB3.1) TYPE-A interface.

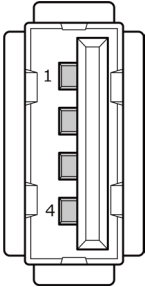
### USB3.2 Gen2 (USB3.1) Connector

	Pin No.	Signal Name
	1	USB_VCC
	2	DATA-
	3	DATA+
	4	USB_GND
	5	SSRX-
	6	SSRX+
	7	USB_GND
	8	SSTX-
	9	SSTX+

## 8. USB 2.0 Ports

This product is equipped with one port for USB 2.0 TYPE-A interface.

### USB2.0 Connector

	Pin No.	Signal Name
	1	USB_VCC
	2	DATA-
	3	DATA+
	4	USB_GND

## 9. Giga bit-Ethernet

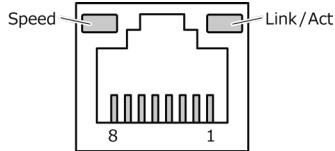
This product is equipped with two ports for giga bit-Ethernet.

- Network type : 1000BASE-T/100BASE-TX/10BASE-T
- Transmission speed \* : 1000M/100M/10M bps
- Max. network path length : 100m/segment

\* Operation at 1000Mbps requires a category 5e or greater cable.

### Giga bit-Ethernet Connector

Pin No.	Signal Name	
	100BASE-TX	1000BASE-T
1	TX+	TRD+(0)
2	TX-	TRD-(0)
3	RX+	TRD+(1)
4	N.C.	TRD+(2)
5	N.C.	TRD-(2)
6	RX-	TRD-(1)
7	N.C.	TRD+(3)
8	N.C.	TRD-(3)

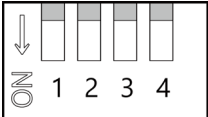


### LEDs for display of network statuses

LED	Description
Speed	Speed LED 10Mbps: OFF 100Mbps: Green ON 1000Mbps : Orange ON
Link/Act	Link/Act LED Normal connection : Green ON Operation : Green Flashing

## 10. Setting Switch

This switch is used for settings.

	Bit No.	ON/OFF	Description
	1	ON OFF	Turn this on for OS writing. Turn this off for a startup.
	2	ON	Setting this ON starts up from the SD card. *1
		OFF	Setting this OFF starts up from the embedded Multi Media Card (eMMC).
	3	System Reservation: Always OFF	
	4	Used for setup and OS writing. For details, please refer to the Software section of the Reference Manual. Always set to OFF during normal operation.	

\*1 Read starts from the eMMC, then from the SD card thereafter.

### CAUTION

Switching these settings should be done while the power of the main unit is off.

## 11. Micro-SD Card Slot

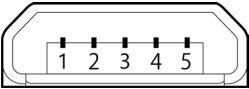
This slot is used to insert a micro-SD card.

## 12. Micro-USB

This product is equipped with one port for USB 2.0 USB micro-B interface.

This port is used for OS writing.

### USB2.0 micro-B connector

	Pin No.	Signal Name
	1	USB_VCC
	2	DATA-
	3	DATA+
	4	N.C.
	5	USB_GND

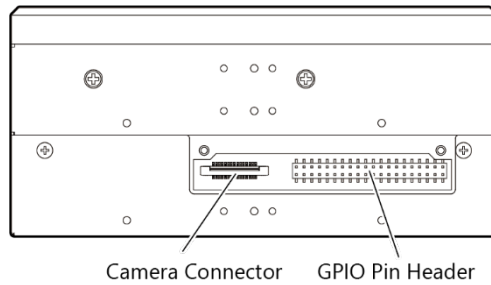
## 13. PCIe Slot

The product model with an expansion slot has one slot for a PCIe Low Profile card.

## 3.Interface for Evaluation Purposes

The product model with an expansion slot has a camera connector and a GPIO pin header for evaluation interfaces.

### 1. Name



Name	Function
<b>Rear (Only available for the model with an expansion slot)</b>	
Camera Connector	This is a connector port for MIPI-CSI camera interface (Evaluation purposes).
GPIO Pin Header	This is used for GPIO interface (Evaluation purposes).

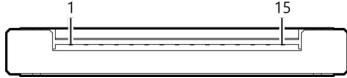
### CAUTION

The camera connector and the GPIO pin header are used for evaluation purposes. They are aimed for evaluation in the office environment and not intended for use in actual operations (such as operation in low or high temperature environments).

## 2. Camera Connector

The connector port for MIPI-CSI-2 camera is located on the back of the product model with an expansion slot.

### Camera Connector

Connector used on the product		52610-1572 (mfd. by molex)
		
Pin No.	Signal Name	
1	3.3V	
2	I2C_SDA	
3	I2C_SCL	
4	MCLK	
5	PWDN	
6	GND	
7	CSI_CLK_P	
8	CSI_CLK_N	
9	GND	
10	CSI_D0_P	
11	CSI_D0_N	
12	GND	
13	CSI_D1_P	
14	CSI_D1_N	
15	GND	

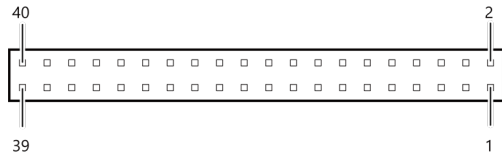
### CAUTION

As for the function specifications of MIPI CSI-2, refer to the data sheet of Jetson Nano module.

### 3. GPIO Pin Header

The 40-pin GPIO pin header is located on the back of the product model with an expansion slot.

#### GPIO Pin Header

Connector used on the product		2.54mm Pitch Pin Header	
			
Pin No.	Signal name	Pin No.	Signal name
2	3.3V	1	5.0V
4	I2C_SDA *2	3	5.0V
6	I2C_SCL *2	5	GND
8	GPA00 *1	7	UART_TXD
10	GND	9	UART_RXD
12	UART_RTS	11	GPB00 *1
14	GPA01 *1	13	GND
16	GPA02 *1	15	GPB01 *1
18	3.3V	17	GPB02 *1
20	SPI_MOSI	19	GND
22	SPI_MISO	21	GPB03 *1
24	SPI_SCK	23	SPI_CS0
26	GND	25	SPI_CS1
28	I2C_SDA *2	27	I2C_SCL *2
30	GPA03 *1	29	GND
32	GPA04 *1	31	GPB04 *1
34	GPA05 *1	33	GND
36	GPA06 *1	35	UART_CTS
38	GPA07 *1	37	GPB05 *1
40	GND *1	39	GPB06 *1

\*1 GPIOs are indicated with the signal names GPA0x and GPB0x.

\*2 The two channels of I2C pins are on the same bus.

## GPIO specification

- CMOS - 3.3V
- Output current Max.±10mA

## I2C specification

- Open Drain - 3.3V
- 2.2kΩ pull-up to 3.3V

## SPI specification

- CMOS - 3.3V

## UART specification

- CMOS - 3.3V

**CAUTION**

- As for the function specifications of I2C, SPI, UART, refer to the data sheet of Jetson Nano module.
  - The camera connector and the GPIO pin header are used for evaluation purposes. They are aimed for evaluation in the office environment and not intended for use in actual operations (such as operation in low or high temperature environments).
-



# Hardware Setup

This section describes how to install, connect, and set up the product.

# 1. Before Using the Product for the First Time

Follow the next steps to set up this product:

- STEP1      By referring to the information in this section, install, connect and set up this product.
- STEP2      Connect cables.  
              Connect the cable of necessary external devices, such as keyboard and a display, to this product using appropriate cables.
- STEP3      Turn on the power.  
              After verifying that you have correctly followed steps 1 and 2, turn on the power.  
              If you find any abnormality after turning on the power, turn it off and check to see if the setup has been performed properly.

## CAUTION

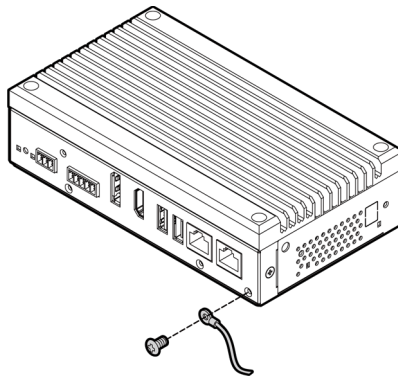
- Be sure to connect the keyboard and mouse to it before turning the power on for the first time.
- Be sure to connect the display before turning the power on. Connecting the display after turning the power on may prevent it from being displayed properly.

## 2. Hardware Setup

- Before you start, be sure that the power is turned off.
- Remove only those screws that are explained. Do not move any other screws.

### 1. Attaching the FG

- 1 Use screws to attach the FG.



#### CAUTION

- The FG pin of this product is connected to the GND signal.  
Note that the connection cannot be cut off.
- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 6 kgf·cm.

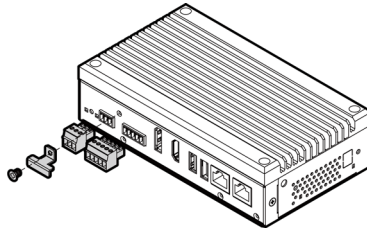
## 2. Setting the Connectors and Cables

This product comes with the power/DIO connector removal prevention fitting.

Also, the cable tie is provided to prevent USB cable or Display cable from becoming disconnected.

### Power/DIO Connector

- 1 Set the connectors to the product.



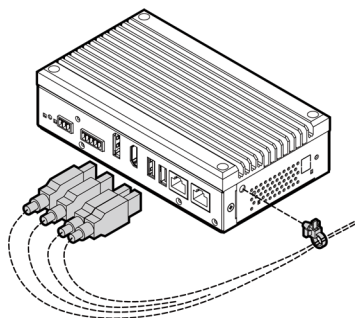
- 2 Attach the removal prevention fitting to the connectors, and secure them with the supplied fillister-head screw (M2.6x4, black).

### CAUTION

The appropriate tightening torque for the screw to attach the removal prevention fitting should be less than 4kgf·cm.

### USB Cable, Display Cable

- 1 Plug the cables to the product and tie them with the supplied cable tie.



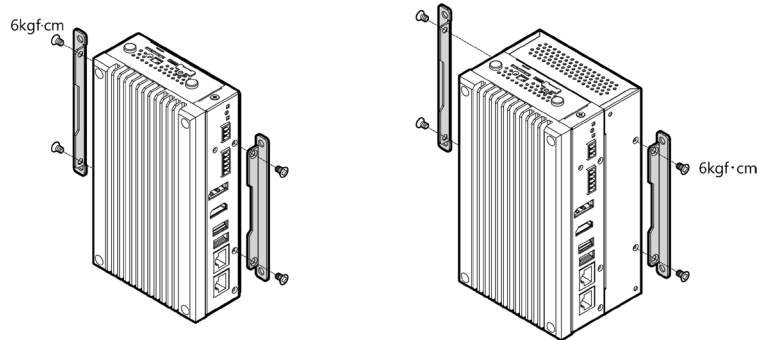
- 2 Set the cable tie into the fixing hole.

### 3. Wall Installation

Using the supplied L-Shape Fittings, this product can be installed on the wall.

Also, as conforming to the VESA standard (100 x 100), the product can be installed on the back of, for instance, the LCD display.

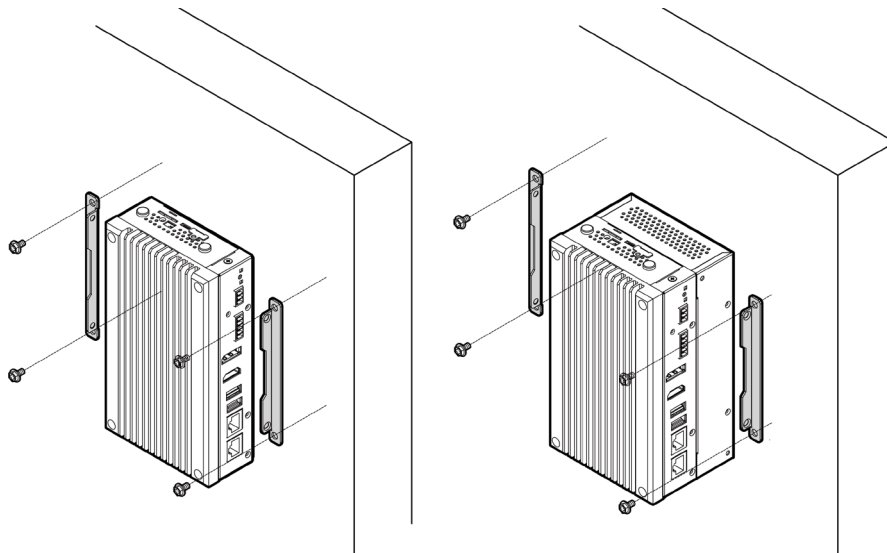
- 1 Use the bundled screws (countersunk screw (M3x5, black)) to attach the L-shape fittings to the product.



#### ! CAUTION

The appropriate tightening torque for the screws to attach the L-shape fittings should be less than 6kgf·cm.

- 2 Use the bundled screws (hexagon head screw with captive washer (M4x10, black)) to install the product on the wall.



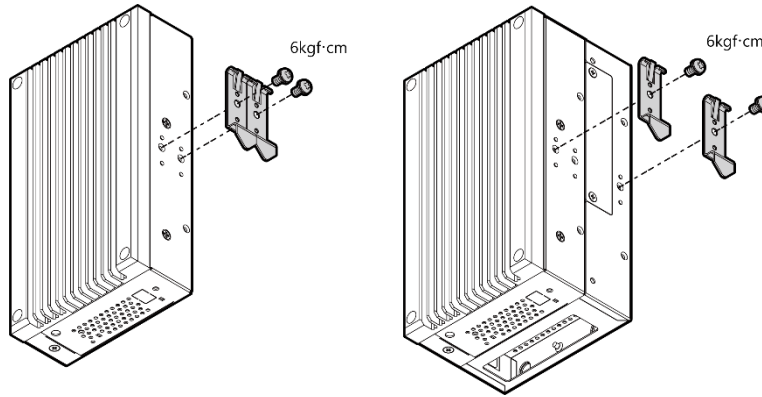
#### ! CAUTION

The appropriate tightening torque for the screws should be decided according to the installing wall conditions.

## 4. DIN-Rail Mounting

Using the supplied DIN-Rail Mounting Bracket, this product can be mounted on the DIN-rail.

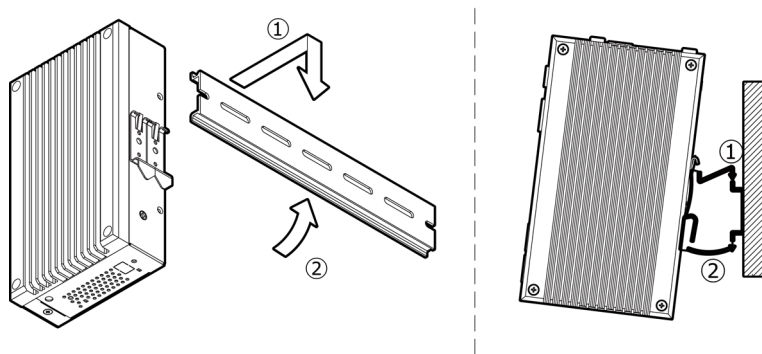
- 1 Use the supplied screws (washer assembled screw (M3x6, Ni)) to attach the DIN-rail mounting bracket to the product.



### CAUTION

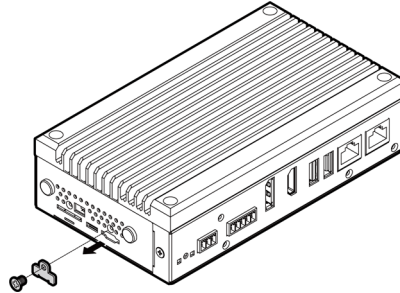
The appropriate tightening torque for the screws to attach the DIN-rail mounting bracket should be less than 6kgf·cm.

- 2 Hang the catch of the bracket on the upper part of the DIN-rail. Then, press the lower side of the product to the DIN-rail.

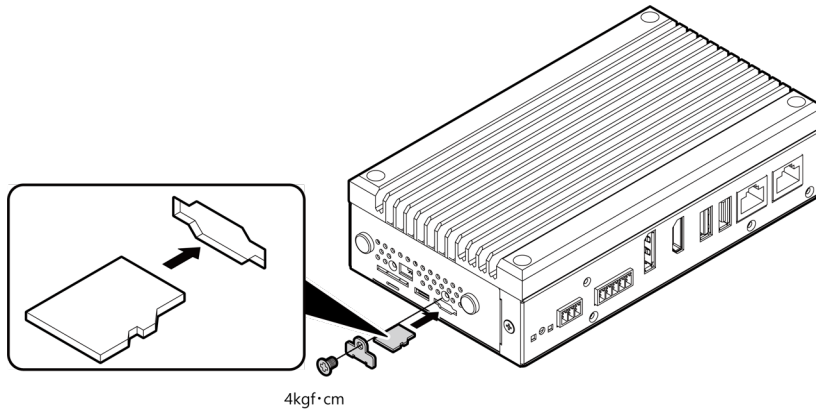


## 5. Inserting the Micro SD Card

- 1 Remove the screw and the card cover.  
(The card cover is attached to the product upon shipment.)



- 2 With the chipped edge of the Micro SD card in the position shown below, insert the card all the way into the slot.

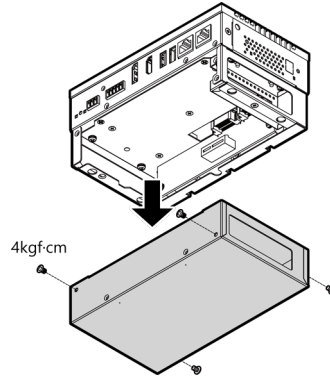


### CAUTION

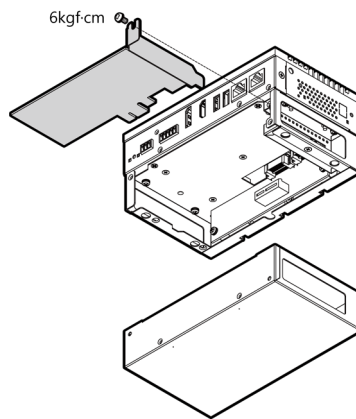
The appropriate tightening torque for the screws to attach the card cover should be less than 4kgf·cm.

## 6. Setting the Expansion Card

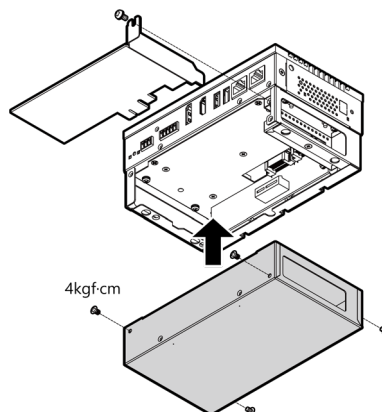
- 1 Remove the screws of the expansion slot cover to remove the cover.



- 2 Set the expansion card in the slot and secure it with the supplied screw (washer assembled screw (M3x6, Ni)).



- 3 Put back the expansion slot cover.





## CAUTION

Make certain that the expansion card is securely set.

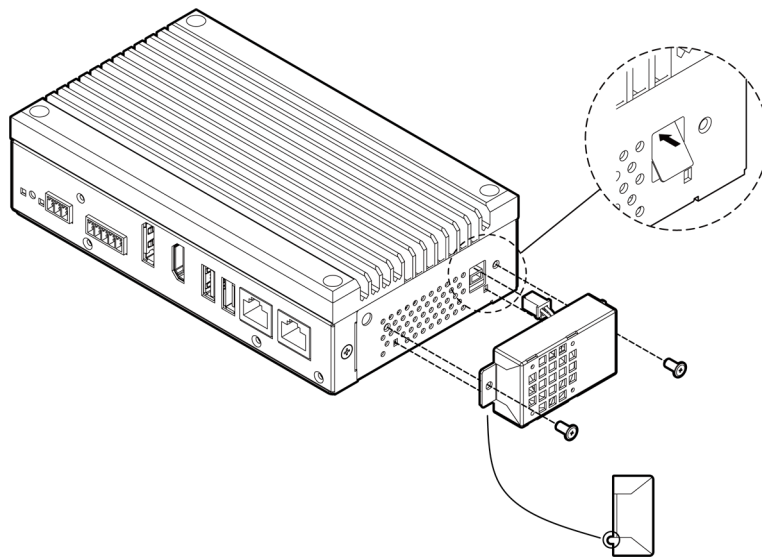
The appropriate tightening torque for the screw to set the expansion card should be less than 6kgf·cm.

The appropriate tightening torque for the screws to set the expansion slot cover should be less than 4kgf·cm.

## 7. Setting the Fan Unit

With the optional Fan Unit [BX-FAN-05], this product can be used at higher ambient temperatures in the zero-wind environment.

- 1** Twist and cut off the metal part that is covering the connector for the fan on the product.
- 2** Insert the connector of the fan unit into the product and secure the BX-FAN-05 with the supplied screws (Fillister head screw (M2.6x4, black)).



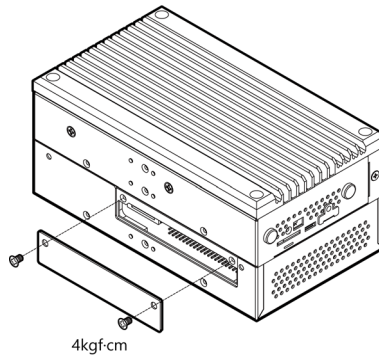
## CAUTION

The appropriate tightening torque for the screws to set the BX-FAN-05 should be less than 4kgf·cm.

## 8. Connecting Evaluation Interfaces

### Camera Connector

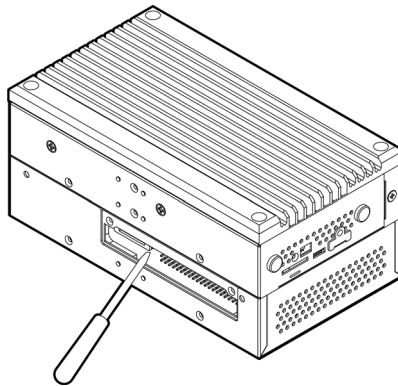
- 1 Remove the panel from the back side of the product.



### CAUTION

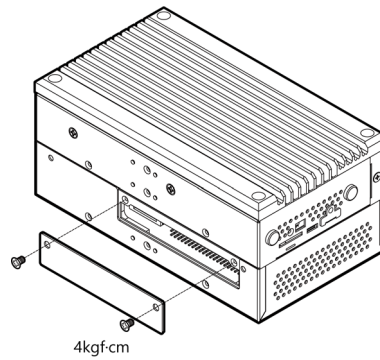
When putting back the removed panel, the appropriate tightening torque for the screws should be less than 4kgf·cm.

- 2 Using a precision screwdriver or similar one, open the connector cover and plug the cable into the camera connector.

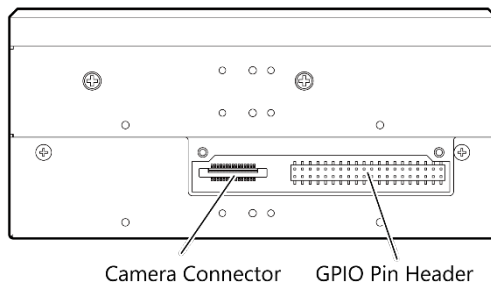


## GPIO Pin Header

- 1 Remove the panel from the back side of the product.



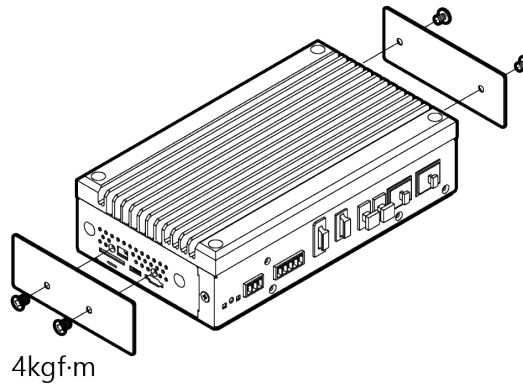
- 2 Plug the cable into the GPIO in header.



## 9. How to install the side sheet metal

On simple dustproof models, the side sheet metal must be removed to use the setting switch, microSD slot, and Micro USB port. (The side sheet metal comes pre-attached to the product.)

- 1 Remove the side sheet metal while referring to the following figure to use the various interfaces.



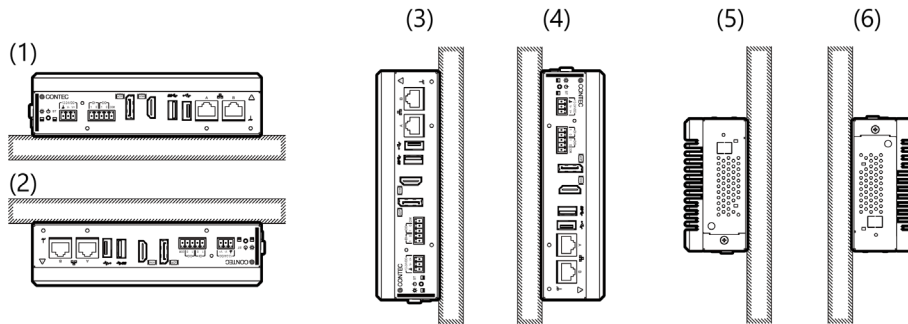
### CAUTION

The tightening torque for attaching the side sheet metal is 4 kgf·cm or less.

## 10. Installation Requirements

Take measures such as increasing the distance from the devices that generate high heat or emission so that the ambient temperature of the product can fall within the specified range of installation environment.

### Installation Orientation



### ⚠ CAUTION

Note that even though the ambient temperature is within the specified range, an operational malfunction may occur if there is other device generating high heat; the radiation will influence the product to increase its temperature.

### Ambient temperature derating

The ambient temperature will vary depending on the setting environment and load usage.

#### [In the airflow environment of 0.7m/s]

DX-U1200-3E02xx, DX-U1210-3E02xx, DX-U1200P1-3E02xx

- -20°C - +60°C : CPU/GPU average load factor 50% (with the PCIe card : Max. 50°C)
- -20°C - +55°C : CPU/GPU average load factor 90% (with the PCIe card : Max. 50°C)

#### [In the zero-wind]

DX-U1200-3E02xx, DX-U1210-3E02xx, DX-U1200P1-3E02xx

- -20°C - +45°C : CPU/GPU average load factor 50% (with the PCIe card : Max. 35°C)
- -20°C - +50°C : CPU/GPU average load factor 90% (with the PCIe card : Max. 30°C)

DX-U1210-3E02xx

- -20°C - +40°C : CPU/GPU average load factor 50%
- -20°C - +35°C : CPU/GPU average load factor 90%

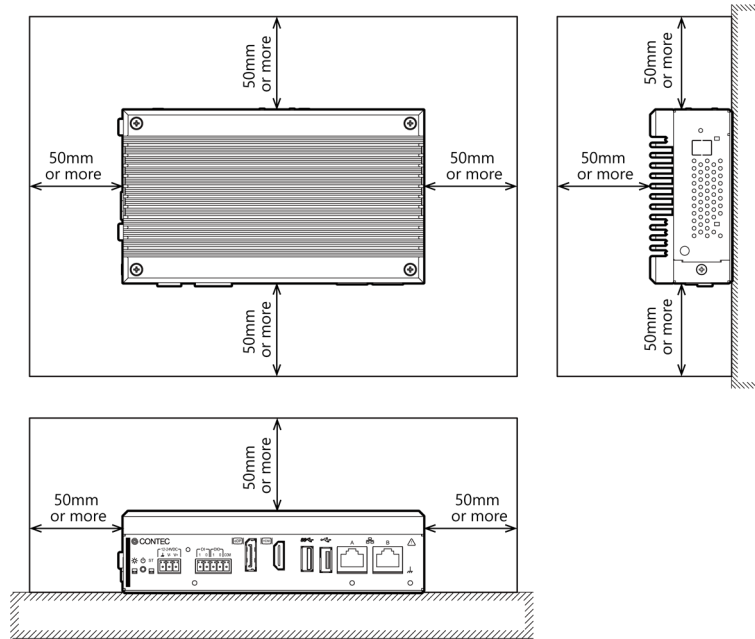
**[In the zero-wind environment with the optional FAN BX-FAN-05 unit]**

DX-U1200-3E0211, DX-U1200P1-3E02xx

- -20°C - +55°C : CPU/GPU average load factor 50% (with the PCIe card : Max. 45°C)
- -20°C - +50°C : CPU/GPU average load factor 90% (with the PCIe card : Max. 40°C)

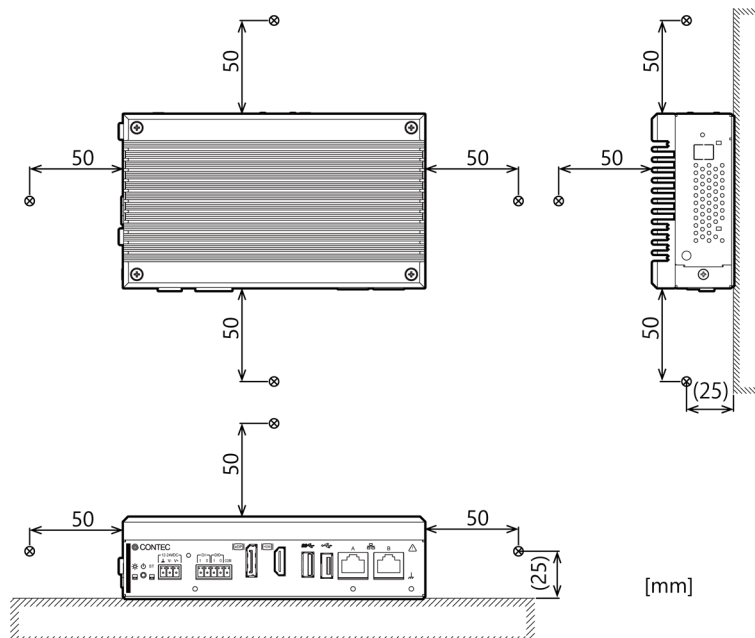
\* With the PCIe card : indicates an estimated maximum load (3.3V 800mA 12V 430mA) when the product is used with the CONTEC Low Profile PCI Express card.

## Distances between the BOX-PC and its vicinity (Exemplar)



## Ambient temperature

In this product, the ambient temperature is decided from the multiple measurement points as shown below. When making use of the product, the air current should be adjusted to prevent that all the temperatures measured at the measurement points exceed the specified temperature.



# Appendix

This section lists the specifications and the physical dimensions of the product, and the details of model name.



# 1. System Reference

## 1. Specifications

### Function Specifications

Item		Description	
		DX-U1200-3E02xx DX-U1210-3E02xx	DX-U1200P1-3E02xx
Jetson Module	Module	NVIDIA® Jetson Xavier NX™	
	CPU	ARMv8.2 (64-bit) heterogeneous multi-processing (HMP) CPU	
	GPU	384 NVIDIA® Volta™ cores, 48 Tensor cores	
	DL Accelerator	2 x NVDLA (NVIDIA Deep Learning Accelerator) engine	
	Memory	8GB 128-bit LPDDR4	
	Storage	16 GB eMMC	
Interface	Display	HDMI x 1, DisplayPort (DP) x 1	
	USB	USB 3.2 Gen2 (USB3.1) Type A x 1, USB 2.0 Type A x 1, USB 2.0 microB x 1 (for OS writing)	
	LAN	1000BASE-T/100BASE-TX/10BASE-T x 2	
	microSD	microSD memory card slot, SDHC/SDXC support	
	Digital Input	Opto-coupler isolation input (Compatible with current sink output)	
		Input voltage resistance	1000V
		The number of input signal ports	4 (2 ports of DI can be used for DO)
		Open-circuit impedance	10kΩ or more
		Short-circuit impedance	500Ω or less
		Response time (DI)	within 200μsec
	Digital Output	Solid State Relay output	
		Output voltage resistance	1000V
		The number of output signal channels	2 (switchable with DI)
		External power supply	12 - 24 VDC
		Maximum output voltage/current	26.4V/100mA
		Response time	within 2msec
		ON resistance	8Ω or less (at 25°C)
		OFF leakage current	4μA or less (at 25°C)
	M.2 Slot *1	M.2 Key E, M.2 Key B M.2 Key E can be equipped with Wi-Fi or Bluetooth, and M.2 Key B can be equipped with 4G LTE.	
	PCIe Slot	–	Low Profile PCI Express(x1) x 1
	Switch	Power switch, Setting switch	
	LED	Power LED, Status LED	
Real Time Clock		Lithium backup battery life : 10 years or more The real-time clock is accurate within ±3 minutes (at 25°C) per month.	
Power Supply	Rated Input Voltage	12 - 24VDC	

Item		Description	
		DX-U1200-3E02xx DX-U1210-3E02xx	DX-U1200P1-3E02xx
	Input Voltage Range	10.8 - 26.4VDC	
	Current Consumption (Max.)	12VDC 2.5A, 24VDC 1.3A	12VDC 4.5A, 24VDC 2.2A
	Connector	2-piece 3.5mm pitch 3-pin terminal (V+, V-, FG)	
Physical Dimensions (mm)		160(W)×92(D)×43(H) (No bracket or projection included)	160(W)×92(D)×75(H) (No bracket or projection included)
Weight		0.9kg approx. (No bracket included)	1.2kg approx. (No bracket included)
Installation Method		DIN-rail mounting, Wall/VESA installation	
Software	OS	DX-U12x0-3E0211, DX-U1200P1-3E0211 : Ubuntu 18.04.5 DX-U12x0-3E0223, DX-U1200P1-3E0223 : Ubuntu 20.04.6	
	SDK	DX-U12x0-3E0211, DX-U1200P1-3E0211 : JetPack 4.4.1 DX-U12x0-3E0223, DX-U1200P1-3E0223 : JetPack 5.1.3	

\*1 The product is equipped with M.2 Key E and M.2 Key B slots. Please contact your retailer when considering installation of an M.2 module.

## Environment Requirements

Item		Description
Operating Temperature *2		-20 - +60°C, airflow 0.7m/s, Environment: 50% of average load (With PCIe board attached : -20 - +50°C)
Storage Temperature		-20 - +60°C
Humidity		10 - 90%RH (No condensation)
Floating dust particles		Not to be excessive
Corrosive gases		None
Line-noise resistance	Line noise	AC Line /±2kV (IEC61000-4-4 Level 3, EN61000-4-4 Level 3)
	Static electricity resistance	Contact discharge /±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2) Air discharge /±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)
Vibration resistance	Sweep resistance	10 - 57Hz /semi-amplitude vibration 0.15mm, 57 - 500Hz/5.0G 60minutes each in X, Y, and Z directions (JIS C60068-2-6-compliant, IEC60068-2-6-compliant)
Impact resistance		15G half-sine shock for 11ms in X, Y, and Z directions (JIS C 60068-2-27-compliant, IEC 60068-2-27-compliant)
Grounding		Class D grounding, SG-FG / continuity
Standard		VCCI Class A, FCC Class A, CE Marking (EMC Directive Class A, RoHS Directive) *3, UKCA

\*2 Derating occurs due to the load conditions. For more details on this, refer to "Installation Requirements".

\*3 To meet CE's requirements, DIO cable should be 30 meters or shorter.

## 2. Power Requirements

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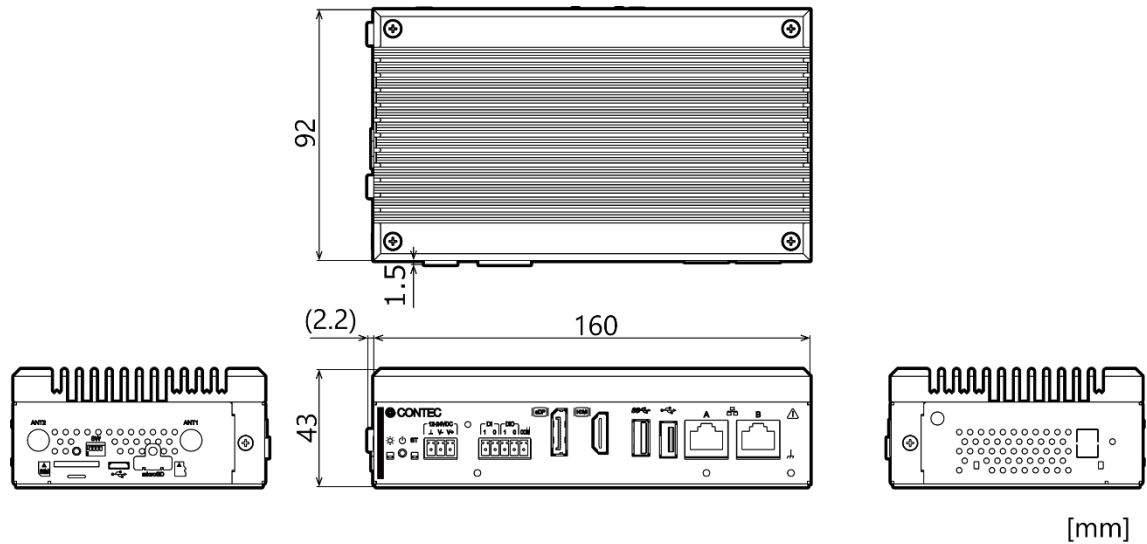
System requires a clean, steady power source for reliable performance of the high frequency CPU on the product, the quality of the power supply is even more important.

### CAUTION

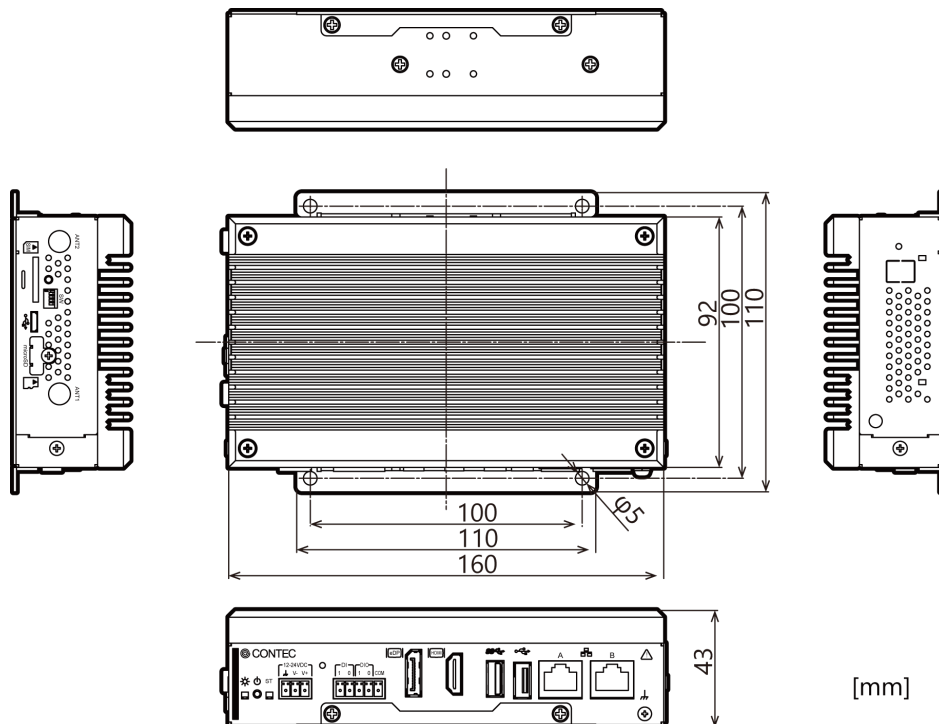
- If the fluctuation of power supply voltage is beyond the product specifications, connect a constant voltage transformer.
  - If the noise is large, connect an isolation transformer (a noise cut transformer).
  - Never bundle, place nearby or in parallel the power supply cable and the input /output signal lines.
  - If lightning surge protection is required, connect the surge protective device (SPD).
  - Place the surge protective device (SPD) and the product away from each other to ground.
  - Select appropriate surge protection devices for all of the route.
  - When you restart the power, give the product for at least four seconds (or longer) of the power OFF time.
  - When you use the product with the AC-DC power unit (an optional item by CONTEC), instantaneous voltage drop allowed time is 20 milliseconds or less.
-

## 2. Physical Dimensions

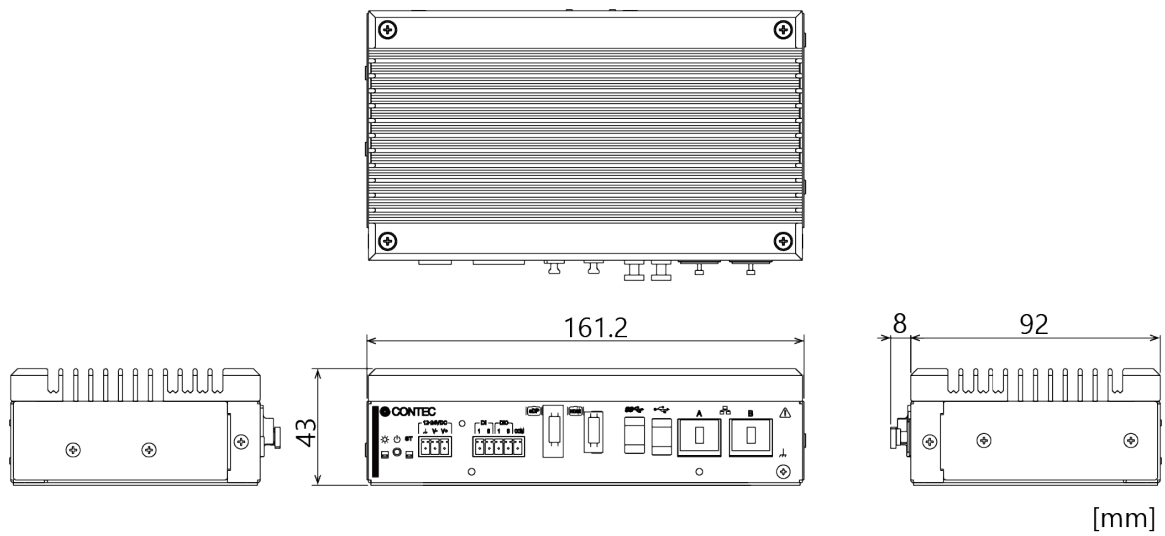
### DX-U1200-2E02xx, DX-U1210-3E02xx (Cap and side sheet metal removal)



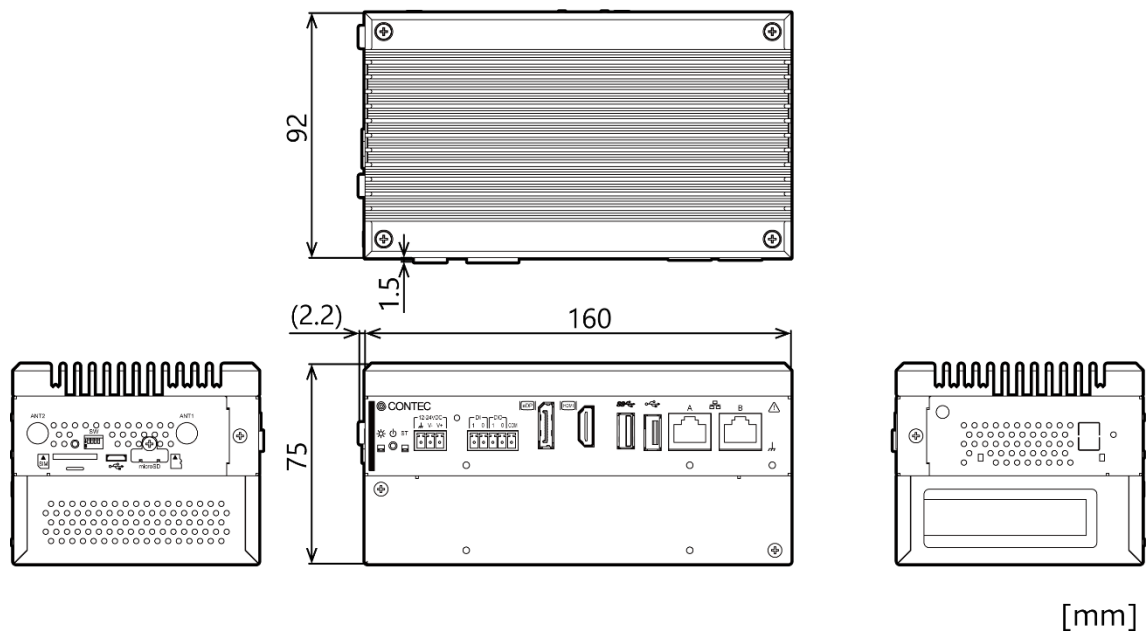
### DX-U1200-2E02xx, DX-U1210-3E02xx (Cap and side sheet metal removal and mounting the L-shape fitting)



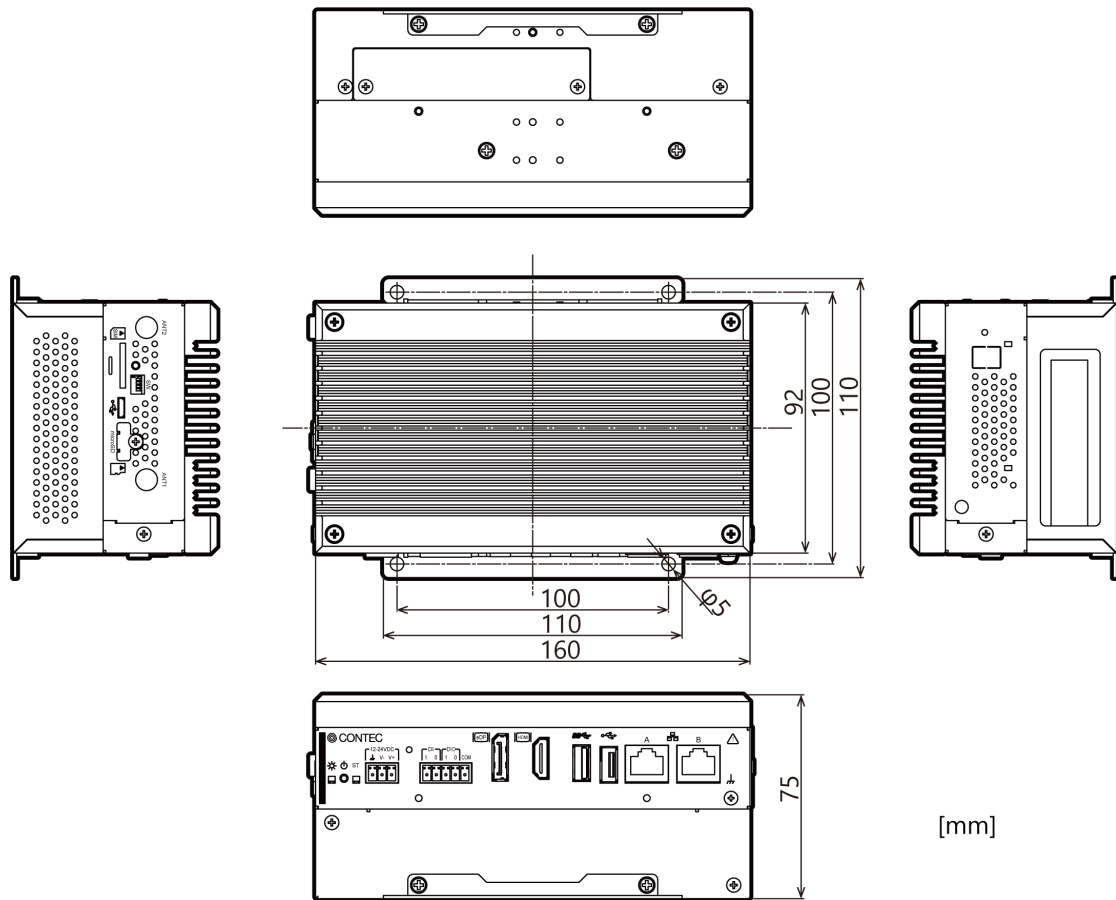
## DX-U1210-3E02xx (Attachment of cap and side sheet metal)



## DX-U1200P1-3E02xx



## DX-U1200P1-3E02xx (When mounting the L-shape fitting)



## 3. Battery Disposal

### 1. Battery Specification

The product contains one battery, and the details are as follows:

Item	Description
Type	Lithium primary battery
Model	CR2450HR WK
Maker	Maxell
Nominal Voltage	3V
Nominal capacity	550mAh



## 2. Dispose of the Battery

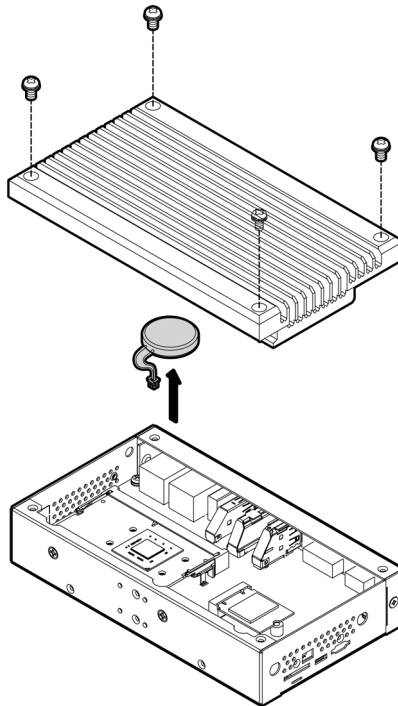
### WARNING

- For battery replacement, contact your retailer as it must be performed as a process of repair.
- Do not attempt to replace the battery as inappropriate battery replacement poses a risk of explosion.
- When disposing of a used battery, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

### Removing the battery

Follow the steps described below to remove the battery.

- 1** Remove the screws from the cover of the main unit, and then remove the unit cover.
- 2** Remove the battery secured with adhesive tape, and disconnect the connector to remove the battery.



## 4.RAS function

This product is equipped with RAS functionality for improved reliability, availability, and serviceability. If a problem is detected in the dedicated software or hardware, the product automatically shuts down and restarts to minimize system downtime. The dedicated software also monitors various statuses.

The following items are controlled through the RAS function.

For details, refer to the RAS-API documentation.

Item	Description
General I/O	Enables acquisition of the input/output status of the DI port and output control of the DO port.
Watchdog Timer	Configures the settings for monitoring with the watchdog timer and time-up operations.
LED Control	Enables control of the power LED.

# List of Optional Products

This section lists optional items that can be used along with the product.

# 1.Optional Products

Optional product items are as follows:

Acquire them as required.

Item	Model	Description
AC-DC power unit	CPS-PWD-90AW24-01	DIN rail fitting power supply AC-DC power unit 24V 3.8A
AC adapter	PWA-65AWD9	Switching AC adapter 19VDC 3.42A
Fan unit	BX-FAN-05	External fan for forced air cooling

## CAUTION

If you use an item other than our optional ones, the normal operation may be impaired or the functions may be limited.

Visit the CONTEC website for the latest optional products.

**Download** <https://www.contec.com/>

# Customer Support and Inquiry

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

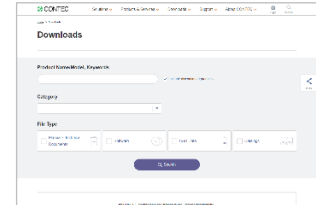
# 1.Services

CONTEC offers the useful information including product manuals that can be downloaded through the CONTEC website.

## Download

<https://www.contec.com/download/>

You can download updated driver software, firmware, and differential manuals in several languages. Membership registration (myCONTEC) is required to use the services.



## Revision History

MONTH YEAR	Summary of Changes
July 2021	The First Edition
June 2022	Change of DIO specification Change of DIO equivalent circuit
November 2024	Compatible with DX-U1200-2E0223, DX-U1210-2E0223 and DX-U1200P1-2E0223

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