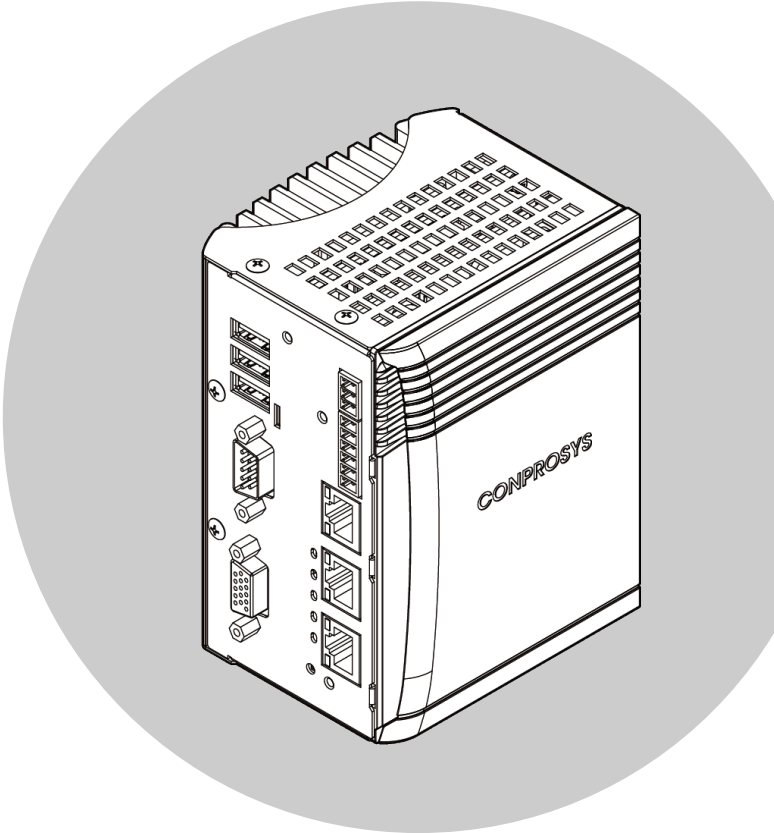
CONTEC

CONPROSYS

Reference Manual

IoT Edge Controller

CPS-BXC200



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CONTEC CO., LTD.

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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 Followings.

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 (This Document)	Read this when operating the product.	This describes the hardware aspects such as functions and settings.	Download from the Contec website (PDF)
CONTEC Data Collector for Digital I/O Reference Manual	Read this when using the Edgecress basic software.	This describes the functions and specifications of "CONTEC Data Collector for Digital I/O".	Download from the Contec website (PDF)
MICROSOFT SOFTWARE LICENSE TERMS *1	Must read this after opening the package.	This describes the rights and conditions of user when using Windows software.	Download from the Contec website (PDF)
Trellix END USER LICENSE AGREEMENT & SOFTWARE LICENSE AGREEMENT *2	Must read this after opening the package.	This describes the rights and conditions of user when using software.	Download from the Contec website (PDF)
Manual for OS Pre-installed Model *1	Must read this after opening the package.	This describes the basic information of OS, and the procedures of setup and recovery.	Download from the Contec website (PDF)

*1 Reference for OS pre-installed models only.

*2 Reference for Trellix pre-installed types only.

CPS-BXC200 Series

- CPS-BXC200-NAxxx ... Base model
- CPS-BXC200-Wxxxx ... OS installed model

◆ Download End-user License Agreements

Download it from the following URL.

Download https://www.contec.com/support/useterms/

◆ Download Manuals

Download the manuals accordingly from the following URL.

Download https://www.contec.com/download/

2.About the Product

This product is an IoT Edge Controller with an Intel Atom processor E3950 and can be mounted on 35mmDIN rail. Connect a CONPROSYS series configurable I/O module with the controller to provide such function as analog I/O.

The use of readily available parts ensures the product to be applied easily. In addition, Contec-customized BIOS allows support to be provided at the BIOS level.

A space-saving design that can be installed in spaces with roughly the same area as a palm-size.

It has extension interfaces such as Analog RGB, DisplayPort, 1000BASE-T, USB 3.0, and serial.
It employs a M.2/CFast card for storage and is fan-less to ensure a totally spindle-less design that simplifies maintenance.

Moreover, this product is equipped with a RAS*1 function independent of the main computer functions. This feature provides various functions to increase system reliability by automatically restarting the system when detecting errors such as frozen programs, and a rise in internal temperature, and by saving detailed logs of the occurrence of errors, which can be useful in failure analysis.

*1 Reliability Availability and Serviceability: Support functions for stable system operation.

Regarding Edgecross basic software (Trial version)

The CPS-BXC200-WxxxxA contains the Edgecross basic software (trial version).

The shortcut menu is provided on the desktop.

In order to use the product, accept the Software License Agreement (ECD-CO4-0007-03-xx.pdf) and read the Installation Instructions (ECD-MA1-0003-01-xx.pdf).

Please contact the Edgecross Consortium for details on purchasing product licenses or licensed technical support.

https://www.edgecross.org/

As for the CPS-BXC200-WxxxxA, CONTEC will grant the Customer the right to install CONTEC data collector (software) when purchasing this particular product. Contact your retailer for details.

3.Features

■ Secured IoT device for edge computing

As for the product with an OS model, Windows 10 IoT Enterprise 64bit version supporting four languages (Japanese, English, Chinese, and Korean), and McAfee Whitelist type anti-virus software are pre-installed. The CPS-BXC200 already has all the equipment required for an Internet-connected device.

■ Three Gigabit LAN ports alternating connections between different network layers

This product is equipped with three Gigabit LAN ports. This makes it the optimal device for IoT gateway applications that alternate connections between different network layers such as between field busses and controllers within a factory and higher-order information system networks.

■ I/O extension modules with the same API functions as PCI Express, PCI, USB bus product

Development performed with a Windows PC and CONTEC's wide array of expansion cards is made even more efficiently thanks to the fact that applications can be directly ported to product and I/O modules in the execution environment. Stacking of up to eight I/O modules is possible. (The total current consumption of configurable modules shall be 3.3A or less)

■ Contributing to reduction of running cost and promotion of energy efficiency

Adopting the low-power platform of Intel® Atom(TM) Processor E3950 achieves lower power consumption while still ensuring sufficient performance.

■ Adaptable to a temperature range between -20 and +60°C

The product is capable of operating in the temperature between -20 and + 60°C. It can be installed in the various environments. (when using1000BASE-T: -20 to +55°C)

■ Fan-less design that reduces maintenance and inspection work

This product's spindle-less design eliminates CPU fan, and adopts SSD for the storage. The using parts that degrade over time is minimized to facilitate maintenance.

■ "Power failure protection system" features power-off without OS shutdown

Equipped with the "Power failure protection system" function that protects data and prohibits writing to storage in the event of power failure. *1 Along with the lockdown (disk writing suppression) function of Windows IoT Enterprise, power can be safely turned off without a shutdown process. Moreover, file system damage or data damage caused by sudden power failure can be avoided.

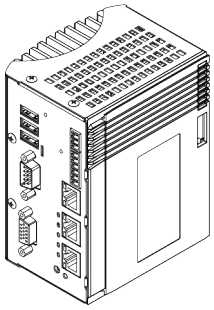
■ CONTEC-customized BIOS provides useful utility

Useful utility of BIOS*2 customized by CONTEC is provided. The "Disk Copy" function provides secure disk backup at the BIOS level, and also supports backup in file format or compressed file format. We also offer the CONTEC tools “BIOS update tool” for updating BIOS.*3

*1 Only available when using CPS-BXC200-xx0xM05x or CPS-BXC200-xx0xL07x.
*2 For details, see each setting in the [BIOS Setup] section.
*3 Contact your retailer for more information.

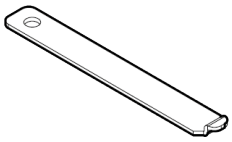
4.Product Configuration List

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.

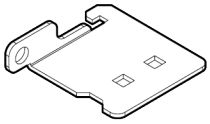


Product...1

End Cover...1
(attached to the product)



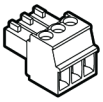
CFast card removal prevention fitting...1



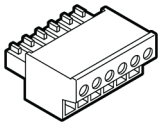
USB removal prevention fitting...1

Cable Tie...1

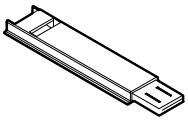
Washer assembled screw (M3 x 6) ...2



3-pin Connector...1

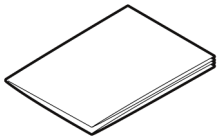


6-pin Connector...1



DIN rail...1

Trellix Licensing Label...1 *1



Product Guide...1

*1 Refer to Trellix pre-installed type only.

- This product is verified in conformity with our recommended power supply. In case you use other power supplies, thus, it may not be able to fulfill certification requirements. Information about recommended power supply, see the CONTEC website.
- Use the supplied plastic DIN rail when connecting this product and a module on a desk top for system development or validation. If you use the supplied plastic DIN rail in the field, it cannot be covered by warranty. Therefore, when you set the product and module in the field, use the commercially available DIN rail.

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.

Understand the following definitions and precautions to use the product safely.
The caution mark "⚠" on the face of the product indicates that you should always check the meanings of the symbol described in the “2. Handling Precautions”.

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

Informations de sécurité

Ce document contient des informations relatives à la sécurité, sous utilisation des symboles suivant, afin d’éviter tout accident risquant d’entraîner des blessures ou la mort et la destruction de l’équipement et des ressources. Veillez à comprendre les significations de ces mots signalétiques pour utiliser l’équipement en toute sécurité.

⚠ **DANGER**	Indique une situation de danger imminent qui, si elle n’est pas évitée, entraînera la mort ou des blessures graves.
⚠ **AVERTISSEMENT**	Indique une situation potentiellement dangereuse qui, si elle n’est pas évitée, pourrait entraîner la mort ou des blessures graves.
⚠ **ATTENTION**	Indique une situation potentiellement dangereuse qui, si elle n’est pas évitée, pourrait entraîner des blessures ou des dommages matériels.

2.Handling Precautions

⚠ DANGER

- 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.
- If the product is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- 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 the product in a location exposed to extremely high or low temperature that exceeds range of specification or susceptible to rapid temperature changes.
  e.g. - Exposure to direct sun
  - In the vicinity of a heat source
- Do not use the product in extremely humid or dusty locations. It is extremely dangerous to use the product with its interior penetrated by water or any other fluid or conductive dust. If the 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.
  Impact resistance: 15G (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 the product in the vicinity of devices that generate strong magnetic force or noise. Such products will cause the product to malfunction (stop, reboot).
- Do not use or store the product in the presence of chemicals.
- When removing connectors, cables, and modules, always unplug the power cables and confirm the LEDs are turned off.
  Do not modify the product. CONTEC will bear no responsibility for any problems, etc., resulting from modifying the product.
- In the event of failure or abnormality (foul smells or excessive heat generation), unplug the power cables immediately and contact your retailer.
- To connect with peripherals, use a grounded, shielded cable.
- 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.
- 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.
- Do not touch metal parts or terminals with your hands when the product is in operation. Otherwise, the product may malfunction, or cause failure.
- As for the product with a D-SUB connector, the appropriate tightening torque for the cable connector is less than 2 kgf·cm.
- Do not touch the product or connectors with a wet hand to avoid electric shock.

- The specifications of the product are subject to change without notice for enhancement and quality improvement. Even when using the product continuously, be sure to read the manual in the CONTEC's website and understand the contents.
- 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.
- When disposing of the product, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.
- Always attach the end cover while power is active.
- Regarding the power supply of the product and digital I/O. For UL-certified, connecting to both SELV and Limited Energy Circuit is required. Note that Class 2 power supply can also be used in the U.S.
- The product can become extremely hot during the operation. When you intend to touch the product for the maintenance work, turn off the power first, and leave it to cool off for enough time, then start the works.
- Disconnection between the product and the module, or between the modules during the operation may lead to damages. To prevent the disconnection, always mount both of them on DIN rail for operations.
- 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.
- CONTEC does not provide any guarantee for the integrity of data on a storage device.
- To prevent corruption of files, always shutdown the OS before turning off this product.
- CONTEC shall not be responsibility for damages caused by malfunctions due to combining the product with other devices.
- The CFast card connector doesn't support hot plug. The pulling out opening of the CFast card cannot be done in the state of power supply ON. Please neither pulling out opening of CFast in the state of power supply ON of this product nor come in contact with CFast. This product may malfunction or cause a failure.
- If you use any other CFast card than the ones listed in the optional products, we cannot guarantee this product's specification. Select CFast card listed in the optional products if you wish to run this product within the specification. Refer to the section regarding "Optional Products".

- Component Life:
  (1) Battery---The internal calendar clock and CMOS RAM are backed by a Lithium primary battery. The backup time at a temperature of 25°C with the power disconnected is 10 years or longer.
  (2) M.2 ---M.2 card is equipped. The assumed life is about 20,000 times for pSLC type and about 3,000 times for MLC/TCL type. For details on the life estimation, refer to the "Life of M.2" in Appendix.
  * 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.
- This product's specifications allow the device to be rebooted from the BIOS screen during startup. This has no effect on operation after the OS boots
- Regarding “CE EMC Directive Notice”
  The shielded cable must be used in connecting LAN and General-purpose input/output/RAS connectors so that the product may suit the above-mentioned standard.
- 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.
  Be certain the following requirements are satisfied when using the product.
  - Indoor use
  - Altitude up to 5000m
  - Applicable POLLUTION DEGREE 2
  When using the product at high altitudes, refer to the relational expression below to find an appropriate ambient temperature. The heat dissipation decreases due to air pressure drop and could lead to damages or a shorter product life.
  - Ambient temperature = 60[°C] - 0.005 x altitude [m]
    An Example)
    The product is used at 3000 meters
    60°C - (0.005 x 3000m) = 45°C (Ambient temperature)

1. FCC PART15 Subpart B 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.

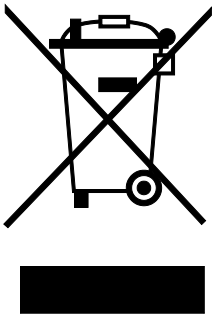
3. Display marking

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

3.Battery handling and the storage in EU signatory

This symbol mark is for EU countries only.

This symbol mark is according to the directive 2006/66/EC Article 20 Information for end-users and Annex II.



This symbol mark means that batteries and/or accumulators, at their end-of-life, should be disposed separately from the household waste.

If a chemical symbol is printed beneath the symbol mark shown above, it indicates that the battery or accumulator contains a heavy metal at a certain concentration.

The concentration standard is indicated below:

Hg: mercury (0.0005%), Cd: cadmium (0.002%), Pb: lead (0.004%)

These ingredients may cause hazardous conditions for human and the global

Refer to the appendix for the specification as well as how to remove and dispose of the battery.

4.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.

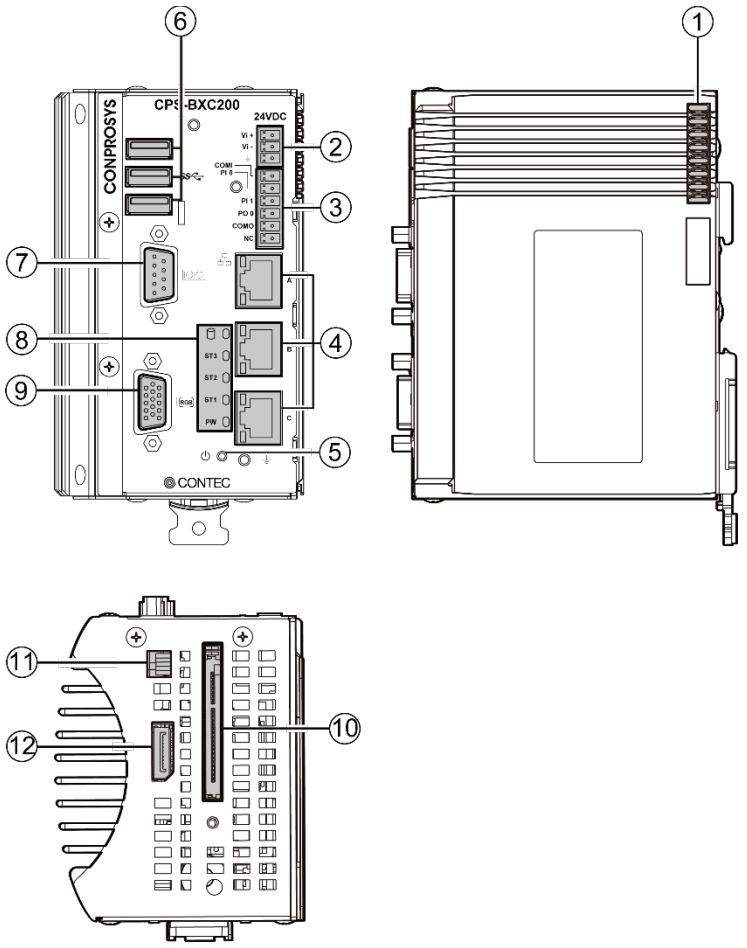
Please understand that risks are always involved with the Internet connection, and we strongly recommend a user should constantly update information security measures.

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.



No.	Name	Function
1	Stack Bus	This is used for power supply and communication with the configurable type module.
2	Power Connector	This is a connector for the 3-pin connector included in the package.
3	General-purpose Input/Output/RAS	This is a connector for the 6-pin connector included in the package.
4	LAN Port	This is a connector for LAN.
5	Power Switch	This is used for controlling of the power supply.
6	USB Port	This is a USB3.0 port of type-A.
7	RS-232C Serial Port	This is a RS-232C serial ports (male).
8	LED Indicator	This indicates the status of the product.
9	Analog RGB	This is an analog RGB connector (female) to connect a display monitor.
10	CFast Card slot	This is a connector for CFast CARD Type I.
11	ROM Clear SW	This is used to return the BIOS settings to the default values.
12	DisplayPort	This is a DisplayPort connector to connect to the display monitor.

2.Description of Product Components

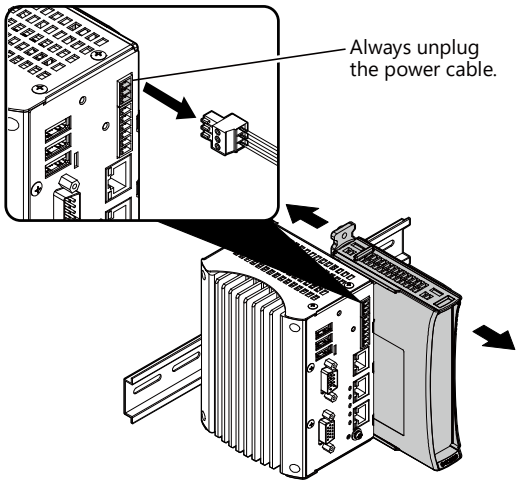
Components such as connectors, switches are described.

1. Stack Bus

It is used for power supply and communication to the configurable type module.

⚠ CAUTION

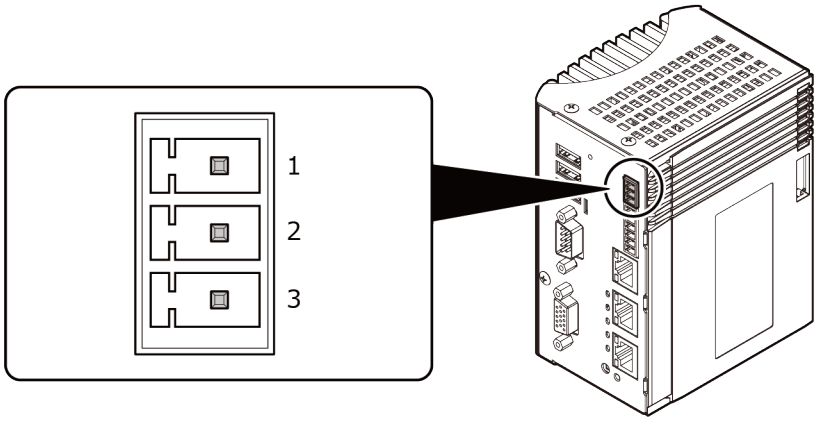
- Unplug the power cable from the product first, then set or remove the modules.
- Always confirm the PWR-LEDs of the product and modules are turned off, then set or remove the modules.



2. Power Connector

Use the 3-pin connector, included in the package, to connect to external power.

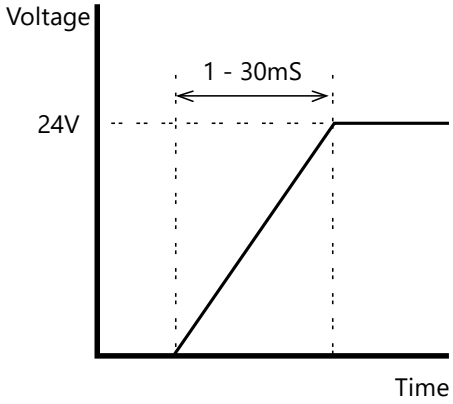
[Connector type]: DEGSON 15EDGK-3.5-03P-13-1000AH (or equivalent)



Pin Assignment

Pin No.	Signal Name	Description
1	V+ (24VDC)	24VDC
2	V- (GND)	Ground
3	FG	Frame Ground

Power rising time

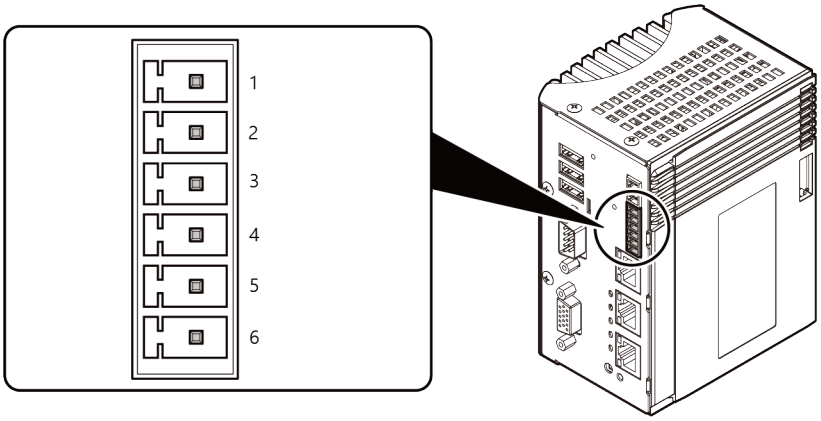


3. General-purpose Input/Output/RAS connector

This product has one port of general-purpose I/O/RAS

Use 6-pin connector included in the package, to connect to external power.

[Connector type]: DEGSON 15EDGKC-3.81-06P-13-00A (or equivalent)



Pin Assignment

Pin No.	Signal Name	Description
1	COMI	General-purpose plus common
2	PI0	General-purpose input
3	PI1	General-purpose input, remote reset or remote power-on
4	PO0	General-purpose output, or watch dog timer alarm output
5	COM0	General-purpose minus common
6	N.C.	This is left unconnected

◆ General-purpose Input /Output and Remote power-on/Reset

This product has three general purpose insolation-type inputs and outputs (RAS function included *1). Inputs can also be used as general-purpose inputs, remote reset inputs, and remote power-on inputs.

Output can be used as general-purpose outputs or watch dog timer alarm outputs.

It is necessary to configure BIOS settings to use input signals as a remote reset or remote power-on signal.

Refer to “RAS Configuration” in **“BIOS Setup (page 65)”**.

* CONTEC Manager is necessary to use the RAS. (It is already installed for the product OS pre-installed type when shipped from the factory.)
CONTEC Manager can be downloaded through the CONTEC's Web site. For more detailed information, contact your retailer.

Specifications

[Input]

-Input specifications : Current-driven input by opto-coupler isolation

-Input resistance : 4.7kΩ

-Input signal count : 2 [One of them can be used for remote power-on or remote reset. (bit1<fixed>)

-Input protection circuit: Equipped with a reverse-connection protection diode

-Input response time : Less than 100μsec

-External circuit power supply: 12 - 24VDC (±10%)

[Output]

-Output specifications : Open-collector output by opto-coupler isolation

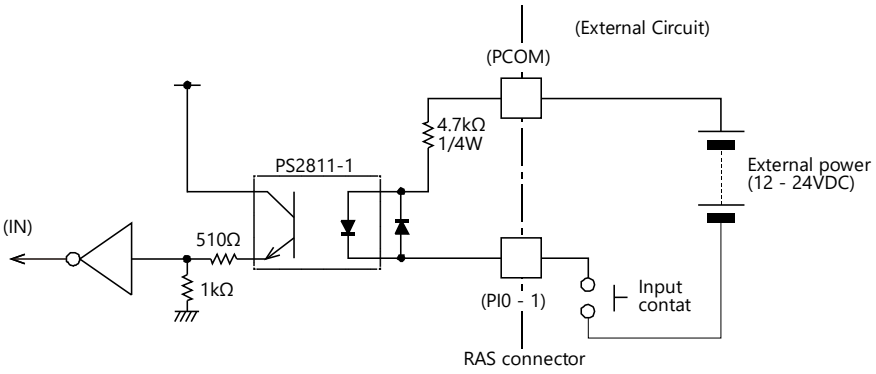
-Output rating : Max. 30VDC, 40mA

-Output signal count : 1 [One of them can be used for WDT alarm output.]

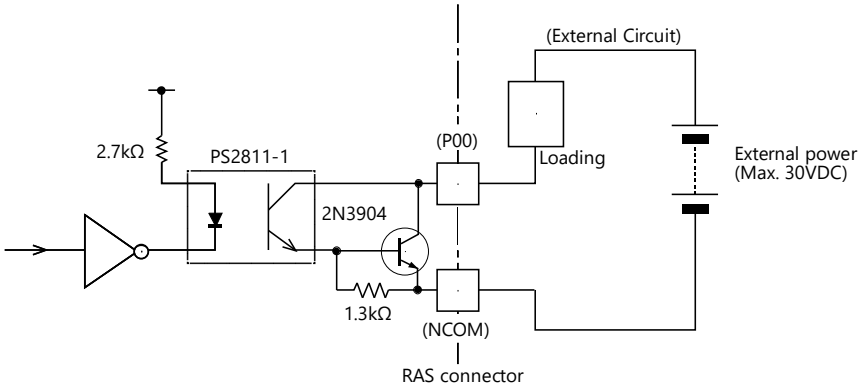
-Output response time : Less than 300μsec

External I/O Circuit

Input Circuit



Output Circuit



4. LAN Port

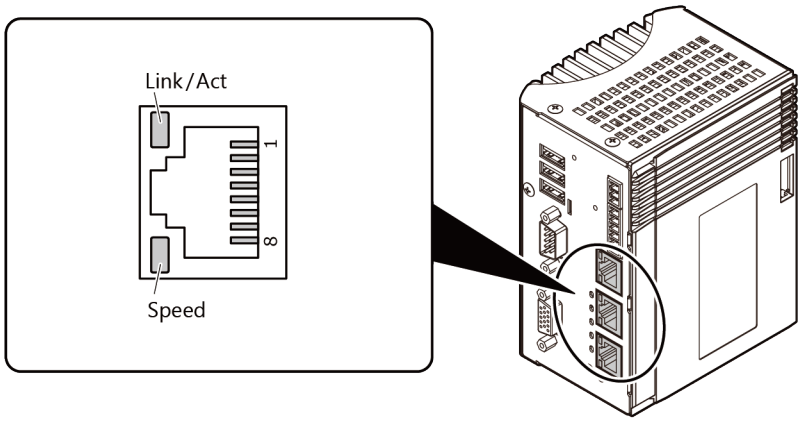
This product has 3 ports of Ethernet LAN Port.

Network type: 1000BASE-T/100BASE-TX/10BASE-T

Transmission speed: 1000M*/100M/10Mbps

Maximum network path length: 100m/segment

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



Pin Assignment

Pin No.	Signal Name 100BASE-TX / 1000BASE-T	Description
1	TX+ / TRD+(0)	Transmission data (+) output /transmission and reception data0 (+)
2	TX- / TRD-(0)	Transmission data (-) output /transmission and reception data0 (-)
3	RX+ / TRD+(1)	Reception data (+) input /transmission and reception data1 (+)
4	N.C. / TRD+(2)	This pin is left unconnected. /transmission and reception data2 (+)
5	N.C. / TRD-(2)	This pin is left unconnected. /transmission and reception data2 (-)
6	RX- / TRD-(1)	Reception data (-) input /transmission and reception data1 (-)
7	N.C. / TRD+(3)	This pin is left unconnected. /transmission and reception data3 (+)
8	N.C. / TRD-(3)	This pin is left unconnected. /transmission and reception data3 (-)

Color and Description

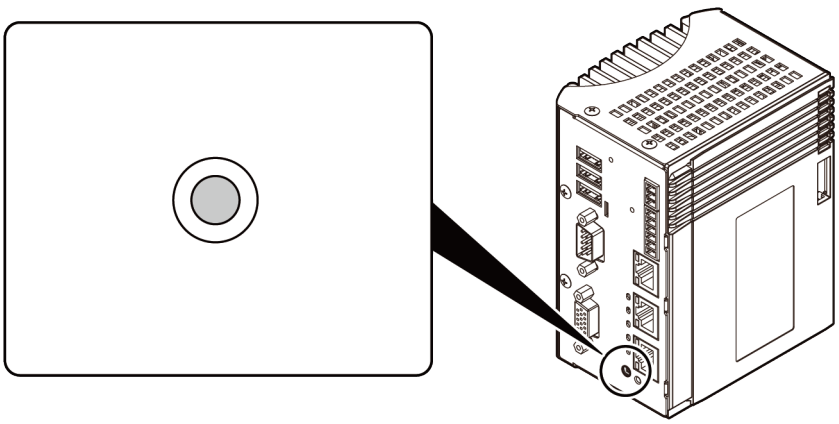
LED	Color	Display	Description
Link/Act	Green	ON	It indicates that LAN port is a connecting state
		Flashing	It indicates that LAN port transmitting and receiving data with the connected external device
		OFF	It indicates that LAN port is not connected.
Speed	Orange/ Green	ON	It indicates that LAN port is connected at 1000Mbps.
		ON	It indicates that LAN port is connected at 100Mbps.
		OFF	It indicates that LAN port is connected at 10Mbps or not connected.

⚠ CAUTION

If you use a different OS from the one in the OS pre-installed model, LAN - 1, LAN - 2, LAN - 3 might not be assigned to silk printing "LAN - A", "LAN - B", "LAN - C".
Pay attention to the guaranteed operating ambient temperature when operating 1000BASE-T. Refer to Installation Environment Requirements for details.

5. Power Switch

It controls the power supply.

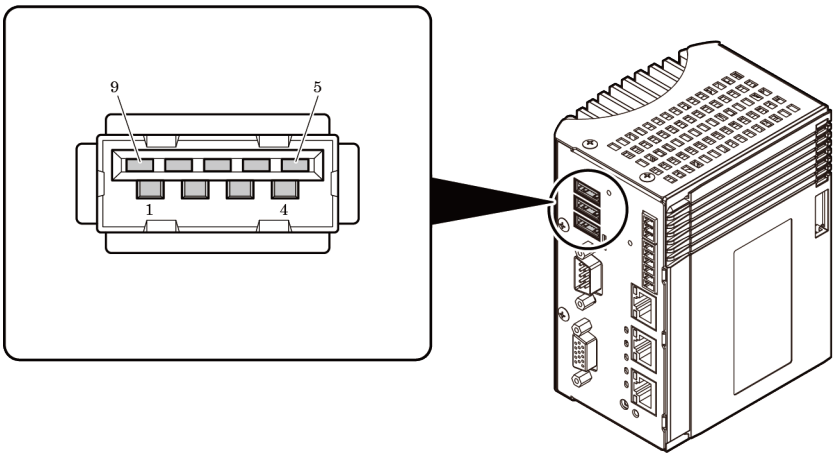


Pin Assignment

Operation	Description
Press it for a short time	To turn on, or shut down (by means of settings).
Press it for a while (Four seconds or longer)	To force termination

6. USB Port

The product has 3 ports of USB 3.0 interface of TYPE-A.



Pin Assignment

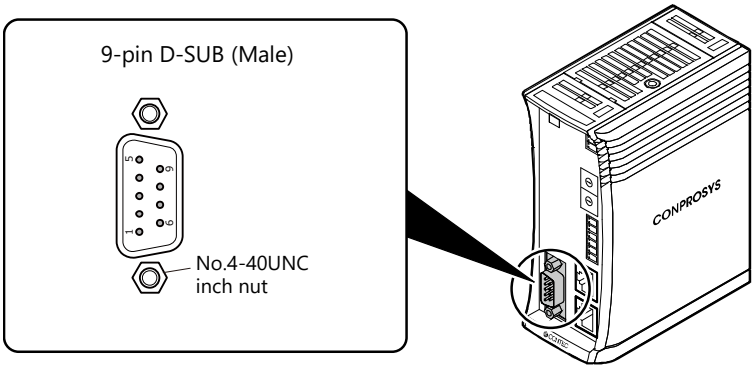
Pin No.	Signal Name
1	USB_VCC
2	DATA-
3	DATA+
4	USB_GND
5	SSRX-
6	SSRX+
7	USB_GND
8	SSTX-
9	SSTX+

7. RS-232C Serial Port

This product has 1port of RS-232C compliant serial interface.

9-pin D-SUB (MALE) is used for this product.

The baud rate is 115,200bp (Max)



Pin Assignment

Pin No.	Signal Name	Direction	Description
1	CD	Input	Carrier detection
2	RD	Input	Reception data
3	TD	Output	Transmission data
4	DTR	Output	Data terminal ready
5	GND	-	Signal ground
6	DSR	Input	Data set ready
7	RTS	Output	Request to send
8	CTS	Input	Clear to send
9	RI	Input	Ring Indicate

8. LED Indicator

Status of the product is indicated by ON/OFF and flashing of LED.
The meaning of each LED is described below.

◆ LED Indicator

Color and Description

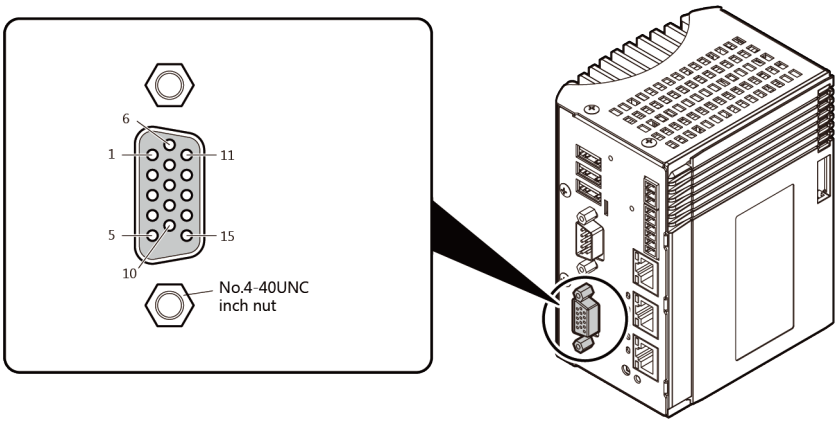
LED	Color	Display	Description
	Orange	ON	It indicates that the SATA device is being accessed.
ST3	Red	ON	You can control the behavior of LED from the user application. *2
		OFF	You can control the behavior of LED from the user application. *2
ST2	Red	ON	You can control the behavior of LED from the user application. *2
		OFF	You can control the behavior of LED from the user application. *2
ST1	Green	ON	You can control the behavior of LED from the user application. *2
		OFF	You can control the behavior of LED from the user application. *2
PW *1	Green/ Red	ON	It indicates the system runs normally.
		ON	Stack bus is initializing. It turns off upon completion of the initialization.
			It lights up when error occurs in stack bus.
		OFF	It indicates power has not been supplied or the system has been shut down.

*1 Upon turning on the power, this lights up in orange. (Both of the green and red are on).

*2 CONTEC Manager that controls STATUS LED is available. (It is already installed for the product OS pre-installed type when shipped from the factory)
CONTEC Manager can be downloaded through the CONTEC's Web site. For more detailed information, contact your retailer.

9. Analog RGB Connector

This product has one port of analog RGB connector for a display monitor.



Pin Assignment

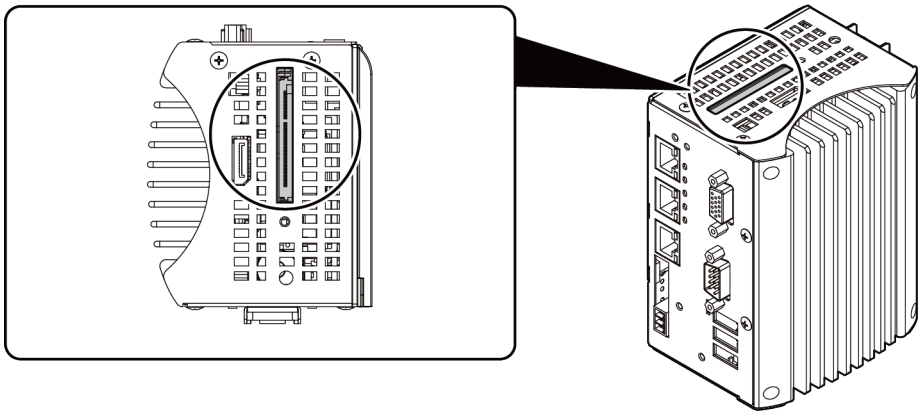
Pin No.	Signal Name	Pin No.	Signal Name
1	RED	9	+5V
2	GREEN	10	GND
3	BLUE	11	N.C.
4	N.C.	12	DDCDATA
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDCCLK
8	GND		

⚠ CAUTION

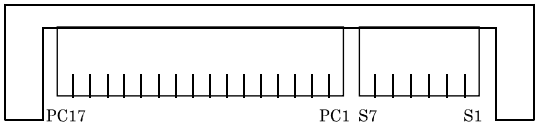
For analog RGB interface, if the OS is booted without connecting the display cable, and then the display is connected after the OS boots, the display may not be shown properly.

10. CFast Card slot

This product has a connector for CFast CARD. CFast CARD (Type I) can be embedded.



Pin Assignment



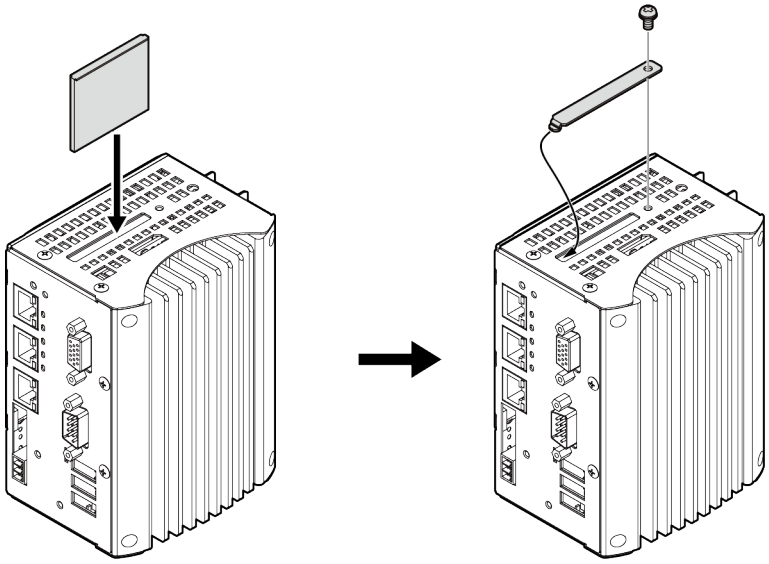
Pin No.	Signal Name	Pin No.	Signal Name
PC1	CDI	S1	GND
PC2	GND	S2	TX+
PC3	N.C.	S3	TX-
PC4	N.C.	S4	GND
PC5	N.C.	S5	RX-
PC6	N.C.	S6	RX+
PC7	GND	S7	GND
PC8	LED		
PC9	N.C.		
PC10	N.C.		
PC11	N.C.		
PC12	N.C.		
PC13	+3.3V		
PC14	+3.3V		
PC15	GND		
PC16	GND		
PC17	GND		

⚠ CAUTION

The CFast card is not hot-pluggable. While this product is turned on, do not insert or remove the CFast card or touch the CFast card connector on the product. Doing so may lead to a malfunction or failure.

◆ Insert CFast card

1 With the terminal side in the position shown below, insert a CFast card all the way into the slot.



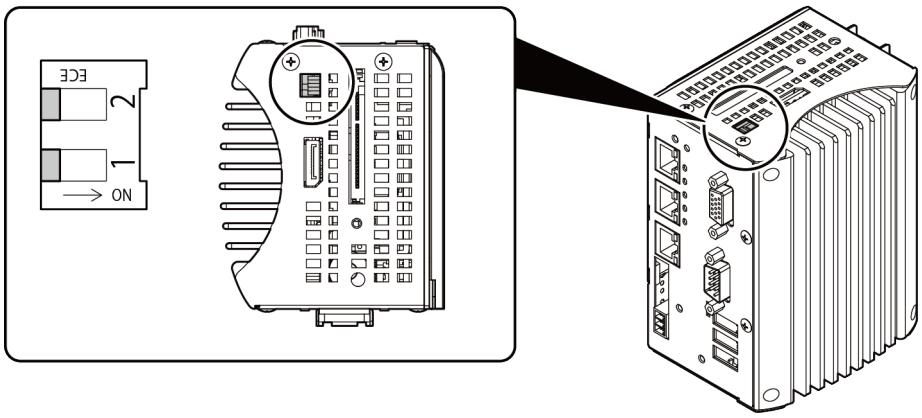
2 After inserting the CFast Card, fasten the supplied card removal prevention fitting with a screw. Reverse the procedure described in the "Insert CFast card" to remove the card.

⚠ CAUTION

- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 5 - 6kgf·cm.
- If you use any other CFast card than the ones listed in the optional products, we cannot guarantee this product's specification. To use the product within its specifications, be sure to select the card listed in the optional products.
- To prevent potential damage caused by static electricity, take appropriate anti-static measures (for example, wearing an anti-static wristband) when inserting or removing the CFast card.
- Do not touch the electronic board components when inserting or removing the CFast card.
- Do not touch the terminals on the CFast card. Doing so may damage the card.
- Be careful not to mistake the orientation of the CFast card when inserting it. Also, do not use excessive force when inserting the CFast card. Doing so may damage the connector.
- Do not drop or otherwise subject the CFast card to strong impacts before insertion. Doing so may damage the card.

11. ROM Clear SW

The BIOS settings can be restored to default value by means of “Load Optimal Default” described in Setup menu. Also, default value can be restored by turning on the ROM Clear SW.



Pin Assignment

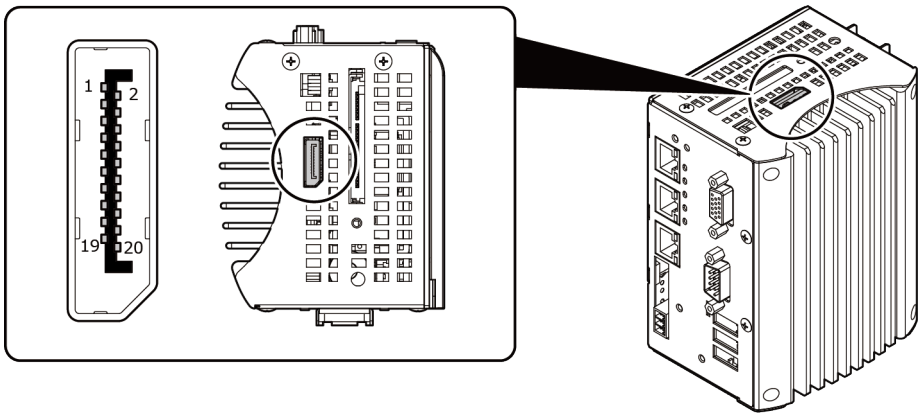
Pin No.	Signal Name	Description
1	ROM Clear	ROM Clear is performed by tuning on this.
2	Not in use	Not in use

◆ Setting procedure

1. With the power of the product remains off, switch the ROM Clear SW to ON.
2. Power on the product, and after the message of BIOS menu appears, power off the product.
3. Switch back the ROM Clear SW to OFF. Power on the product again, press Delete key to boot BIOS setup screen.
4. As BIOS settings are restored to default value, change the settings manually as necessary.
5. Execute the “Save Changes and Exit” to save the settings and reboot the product.

12. DisplayPort

This product has a DisplayPort interface. A display monitor contains a DisplayPort can be set.



Pin Assignment

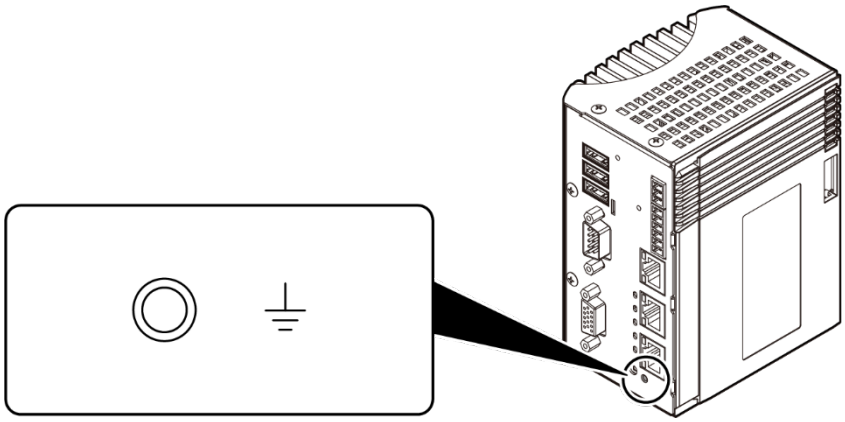
Pin No.	Signal Name	Pin No.	Signal Name
1	Lane0+	2	GND
3	Lane0-	4	Lane1+
5	GND	6	Lane1-
7	Lane2+	8	GND
9	Lane2-	10	Lane3+
11	GND	12	Lane3-
13	GND	14	GND
15	Aux+	16	GND
17	Aux-	18	HotPlug
19	GND	20	3.3V

⚠ CAUTION

- When using a digital display, an analog display may be detected even though no analog display is connected. This will not affect how the digital display appears. However, change the multi-display settings as necessary.
- To change the settings from digital output to analog output, change the settings from the standard Windows properties screen.

13. Attaching the FG

Use screws to attach the FG.



⚠ CAUTION

Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 5 - 6kgf·cm.

Setup

This section describes how to set up the product.

1.Setup

1. Installing the Software.

This section explains how to install the driver library

Before connecting a configurable module with this product, install "Driver Library".

For the installation details, see the Help in the folder of the installed development environment package that can be downloaded from the Contec website.

◆ Starting the Install Program

(1) Download the API-xxx(WDM) from the Contec website.

(2) Extract the downloaded file.

(3) Execute the installer found in the extracted file.

(Extracted file) ¥INF¥WDM¥xxx_ForWin10¥Setup.exe

2. Setting the Hardware

Refer to the Reference Manual of the configurable module to set the hardware.

3. Installing the Hardware

The product needs to identify the module. This is called hardware installation.

When using more than one modules, set the modules one at a time. Do not install the next one until the previous setup is completed.

◆ Setting the module

Refer to **"Setting the Configurable Type Module (page 52)"** to set the module.

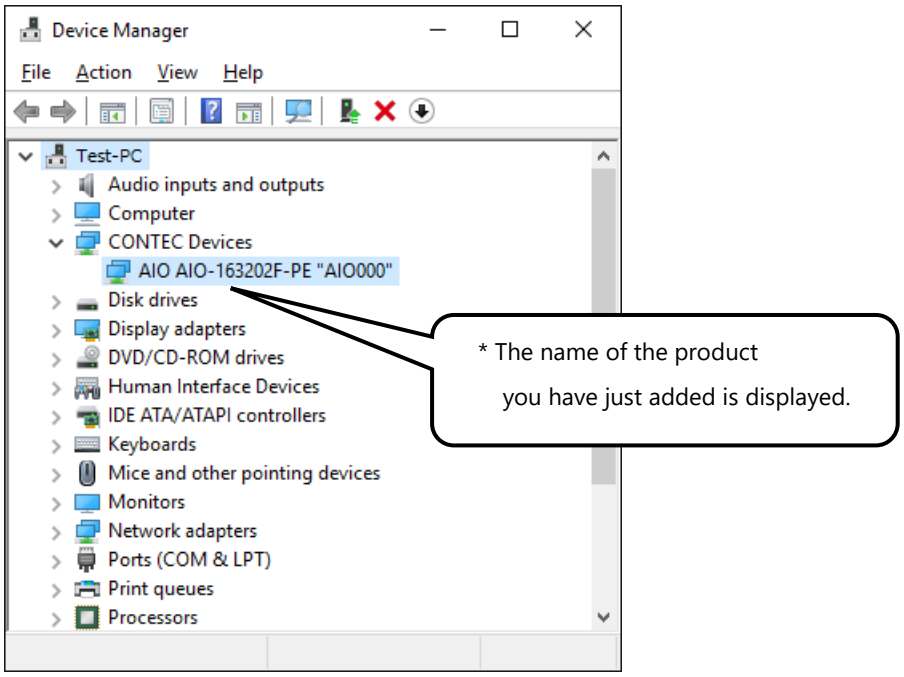
Always turn off the power of the product before setting the module.

4. Initializing the Software

The driver library requires initial settings to determine the execution environment. This is called driver library initialization.

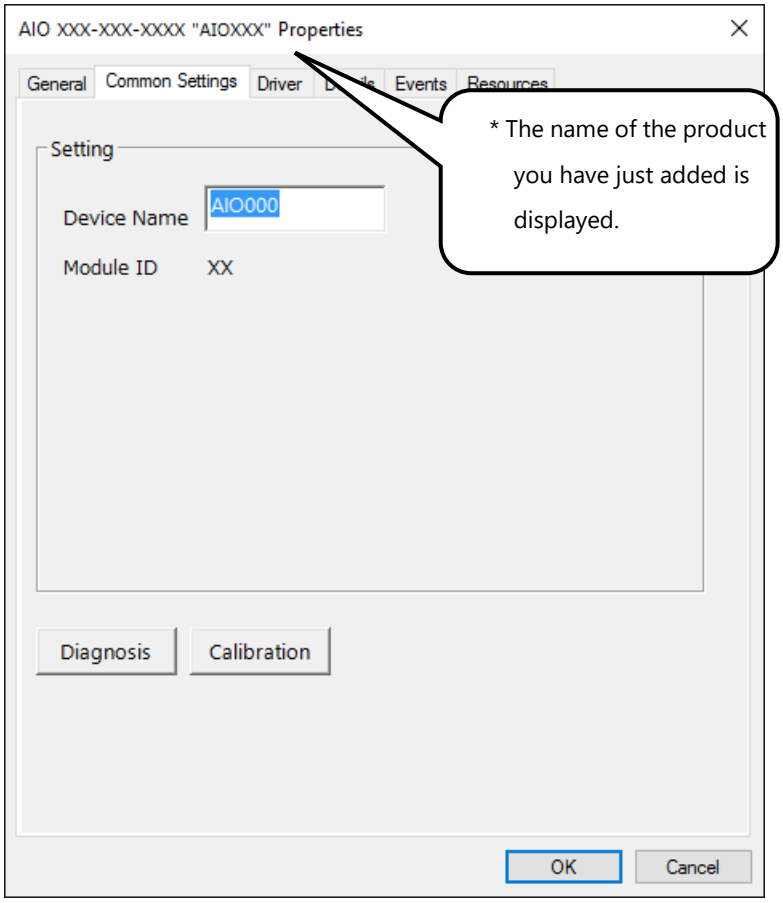
API-xxx (WDM) is initialized automatically during hardware installation. Therefore, if you want to use it with its initial settings, you can skip the setting procedure described in Step 4. To change the device name, follow the setting procedure shown below.

1 Run Device Manager.
For Windows 10, open Device Manager by right-clicking on Windows icon located on the lower-left side of the screen (Start button).
For other Windows, from [Control Panel], select [Hardware and Sound] or [System] and then select the [Device Manager] tab.



2 The installed hardware appears under the CONTEC Devices tree. Open the Devices tree and select the device you want to setup (the device name should appear highlighted).
Click the [Properties].

3 The property page for the device opens.
Enter the device name in the common settings tab page and then click [OK].
The device name you set here is used later when programming.



*The initial device name that appears is a default value. You can use this default name if you wish.
*Make sure that you do not use the same name for more than one device.

4 You have now finished installing the initial setting of Software.

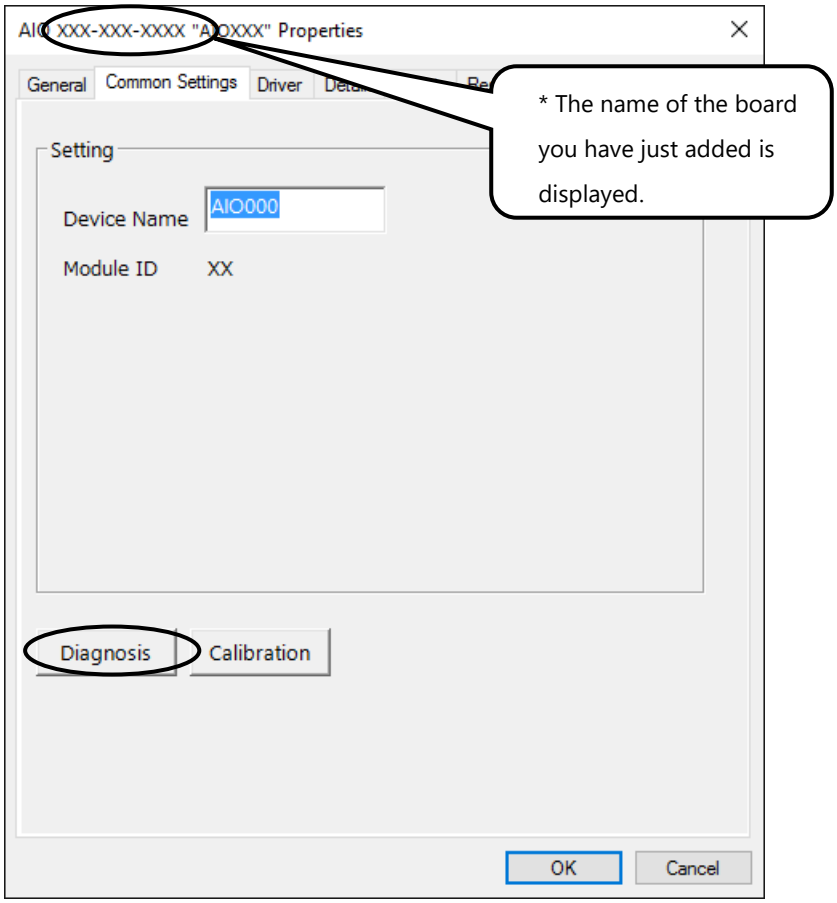
5. Checking Operations

Check that the module and driver software work properly, thereby you can confirm that they have been set up correctly.

◆ Check Method

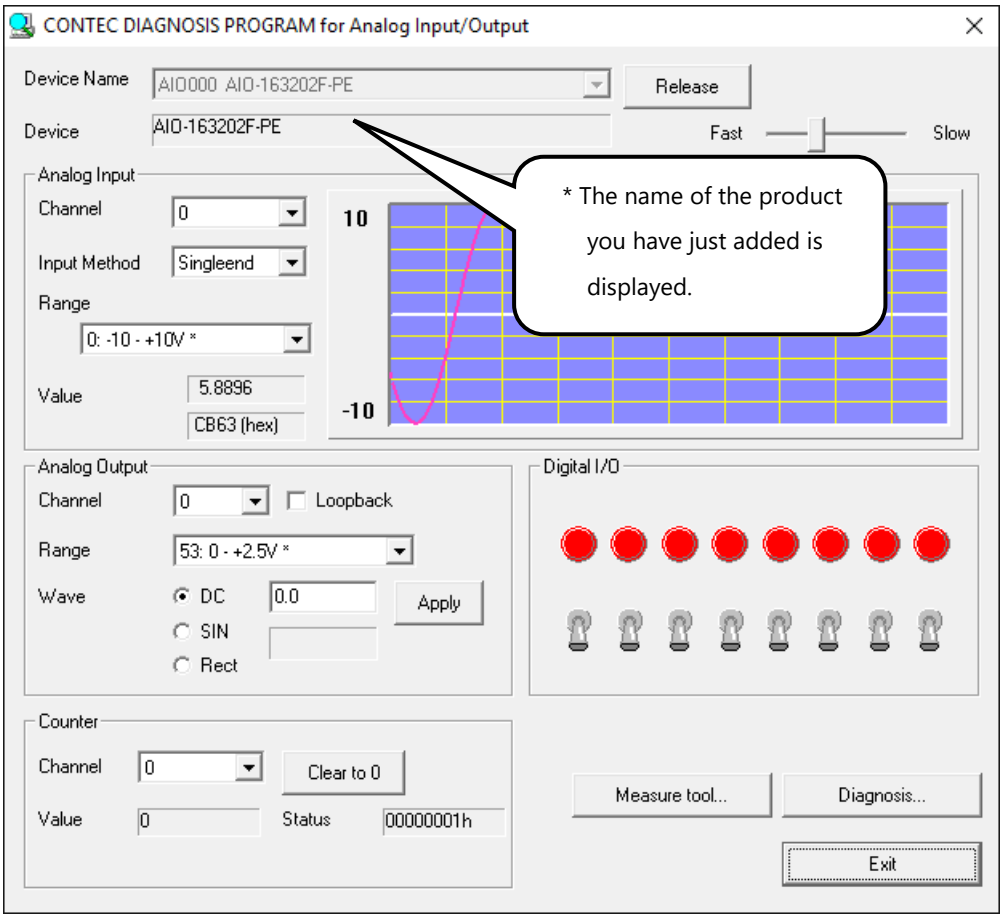
Connect with an external device to check I/O tests or operations in the actual environment.
Refer to the Reference Manual of the configurable module for installation.

Use the Diagnosis Program ready to be used in each driver software for operation check.
Click the [Diagnosis] button on the Device Property page to start the diagnosis program.



This program can also be used as a simple checker for devices.

The figure below shows the Diagnosis Program example of Analog I/O device.



2.Setup Troubleshooting

1. Symptoms and Actions

◆ The diagnostic program works correctly but the application program does not.

The diagnostic program uses the API-xxx(WDM) functions. If the diagnostic program works correctly, other applications should also work correctly. If you have a problem, recheck your program taking note of the following points.

- Check the return values of the API functions.
- Refer to the source code for the sample programs.

2. If your problem cannot be resolved

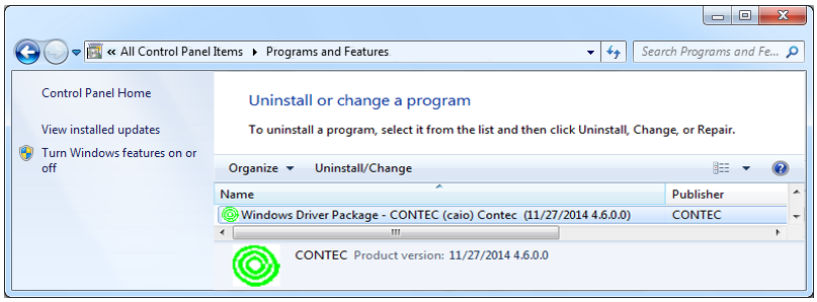
Contact your retailer.

3.Uninstalling the Driver Libraries

For uninstalling details, check the Help file

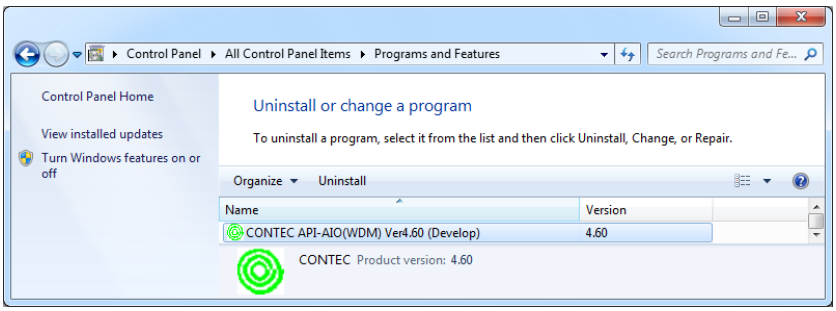
1. Uninstalling the device driver

From [Control Panel], go to [Programs and Features] to uninstall the device driver.
Select [Windows Driver Package - CONTEC (****) Contec], and then click [Uninstall/Change].



2. Uninstall the development environment

From [Control Panel], go to [Programs and Features] to uninstall the development environment.
Select [CONTEC API-***(WDM) X.XX (Develop)] and then click [Uninstall].



Installation

This section describes how to mount the product on a DIN rail, and to connect to an external device with a cable.

1.Install the Product

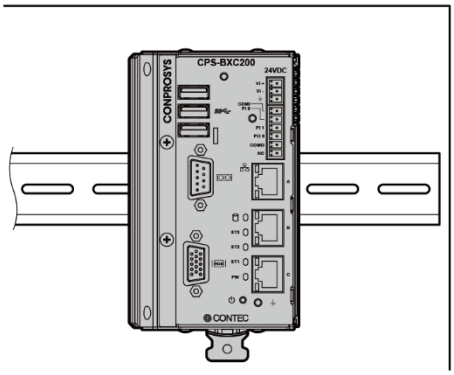
1. Installation Conditions

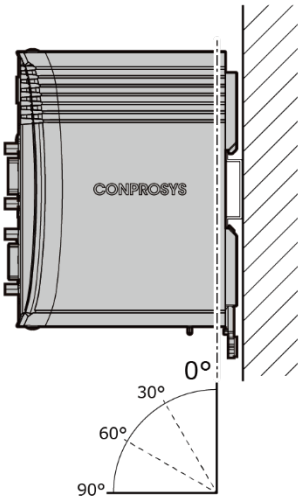
◆ Installation Orientation

Install the product in the orientations shown below (0 °C).

Other orientations may cause problems such as malfunctions due to inadequate heat dissipation.

Orientation for DIN rail Mounting



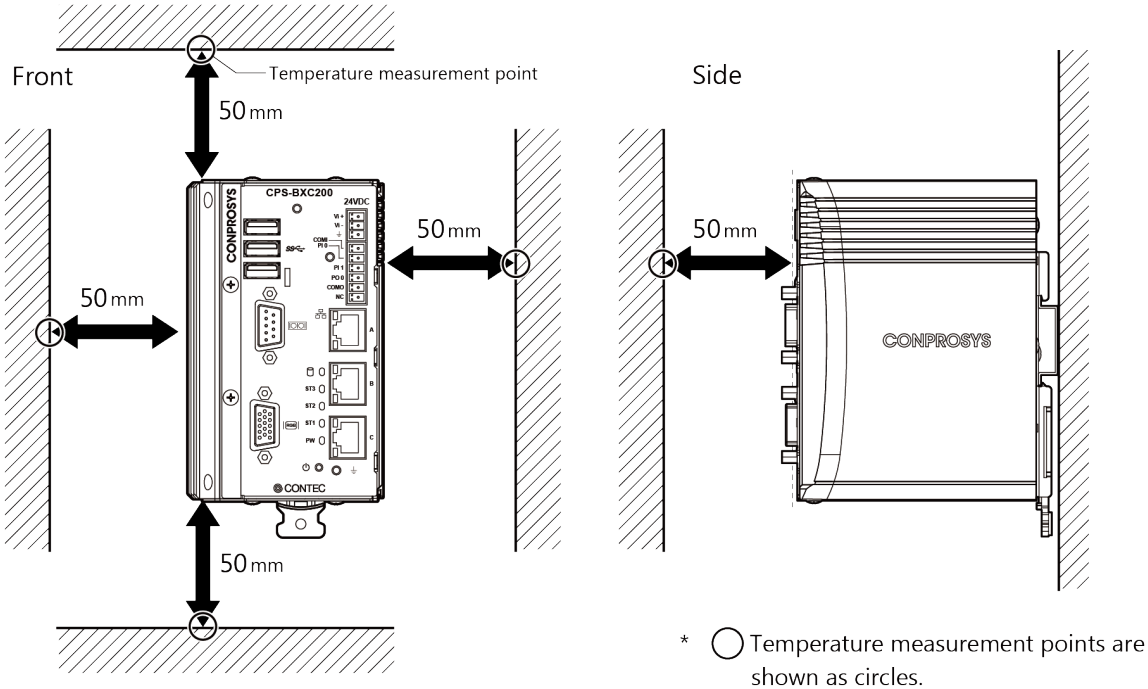


◆ Ambient Temperature

The ambient temperature is decided from the multiple measurement points which are a 50mm-distance from the product.

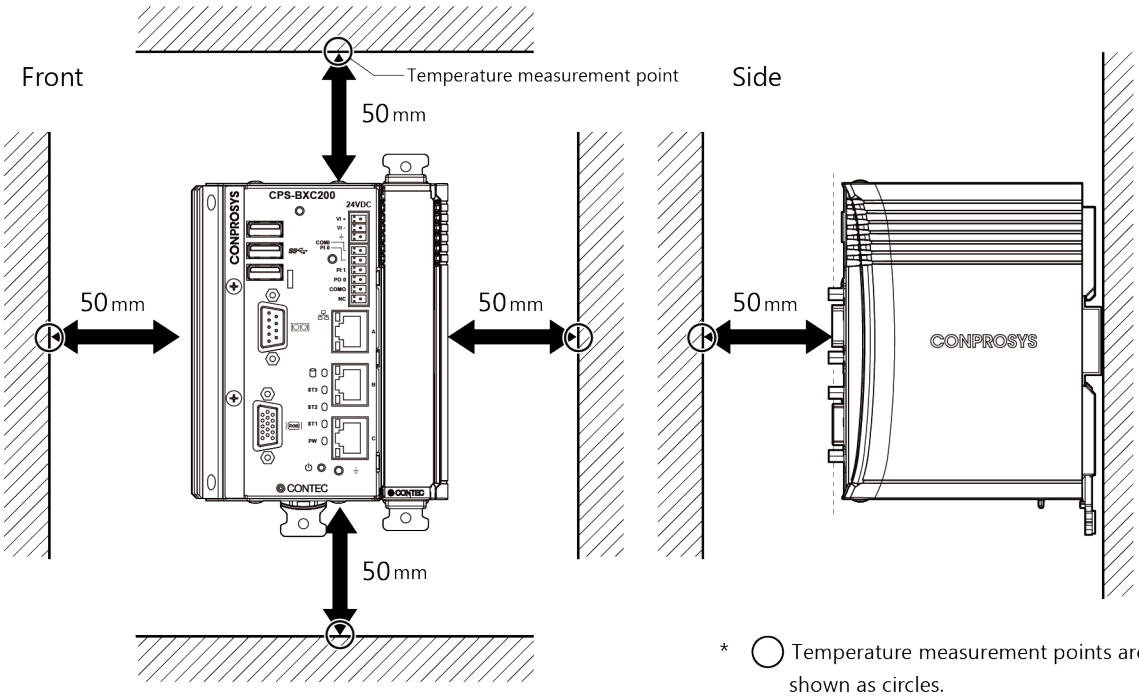
During the operation, adjust the air current to make certain that the temperatures measured in the points stay within the specified temperature. (-20 - +60°C)

Configurable controller alone



* ◯ Temperature measurement points are shown as circles.

Configurable controller and module(s)



* ◯ Temperature measurement points are shown as circles.

⚠ CAUTION

- Note that although 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.
- Do not install this product into the fully-sealed space except the case in which the internal temperature is adjustable by equipment such as air conditioner. Long-term usage might increase the temperature of the product and lead to malfunctions or other troubles.
- When using the product in a high temperature environment, its life time will be shortened. Perform the forced air cooling to counteract.

Regarding Operating Ambient Temperature Derating

Ambient temperature differs depending on the load of the operating environment.

-20 - +60 °C (-20 - +55 °C when operating 1000BASE-T): USB load limitation Total amount of 3 ports should be 900mA or smaller.
Without modules

-20 - +55 °C (-20 - +50 °C when operating 1000BASE-T): Without modules

-20 - +55 °C (-20 - +50 °C when operating 1000BASE-T): USB load limitation Total amount of 3 ports should be 900mA or smaller.
With modules

2. Mounting on/Removing from DIN Rail

This product should be set on DIN rail for operation.

⚠ CAUTION

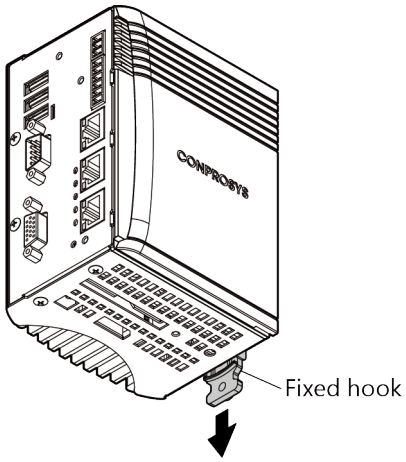
The connection connector of the controller or modules have no locking mechanisms. Therefore, they might be moved over when plugging or unplugging cables, using the switches, or transferring the products.

Disconnection between the product and the module, or between the modules during the operation can result in damages.

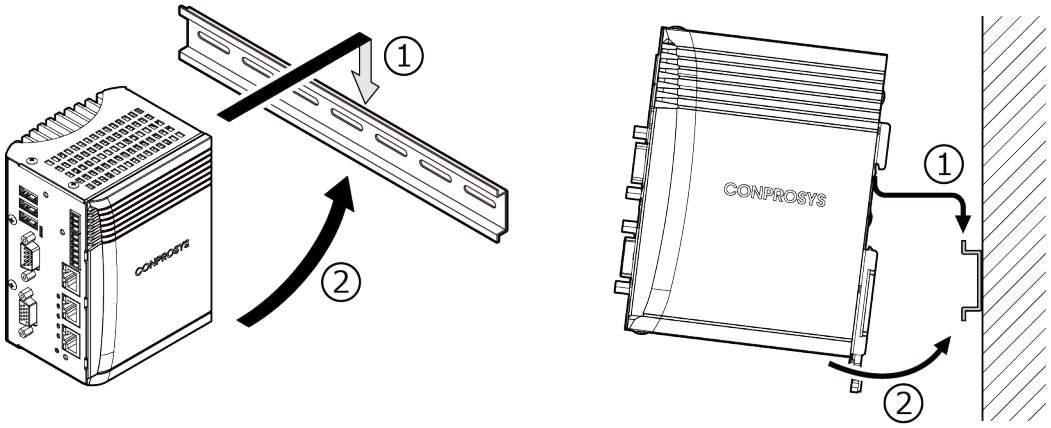
To prevent the disconnection, always mount both of them on DIN rail for operations.

◆ How to Mount

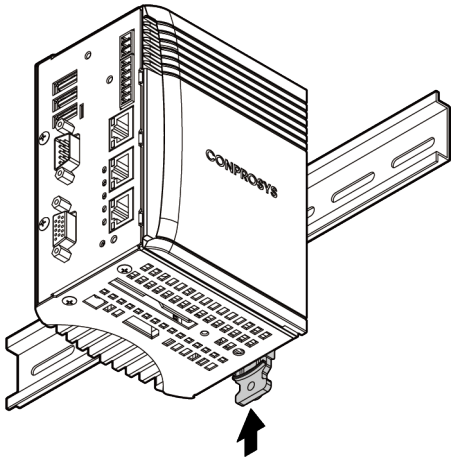
1 Pull down the hook to unlock.
If the hook is stuck, use a slotted screwdriver to unlock.



2 (1). Hang the product on the upper part of the DIN rail.
(2). Press it to the lower side of the DIN rail.

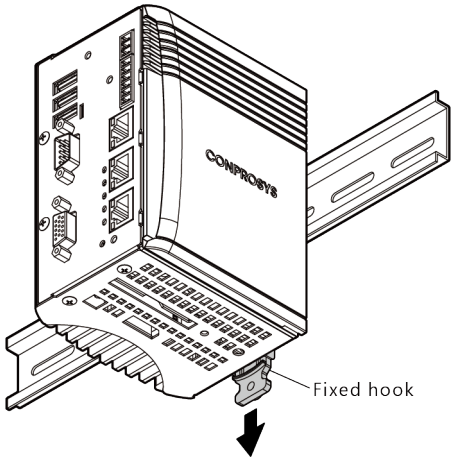


3 Push the hook up to lock the product on the DIN rail.



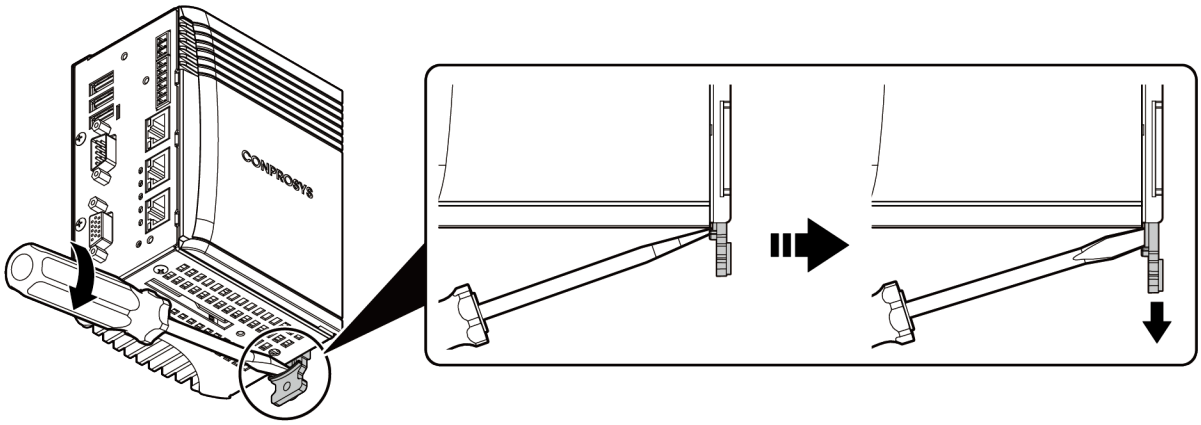
◆ How to Remove

1 Pull down the hook to unlock.
If the hook is stuck, use a slotted screwdriver to unlock.

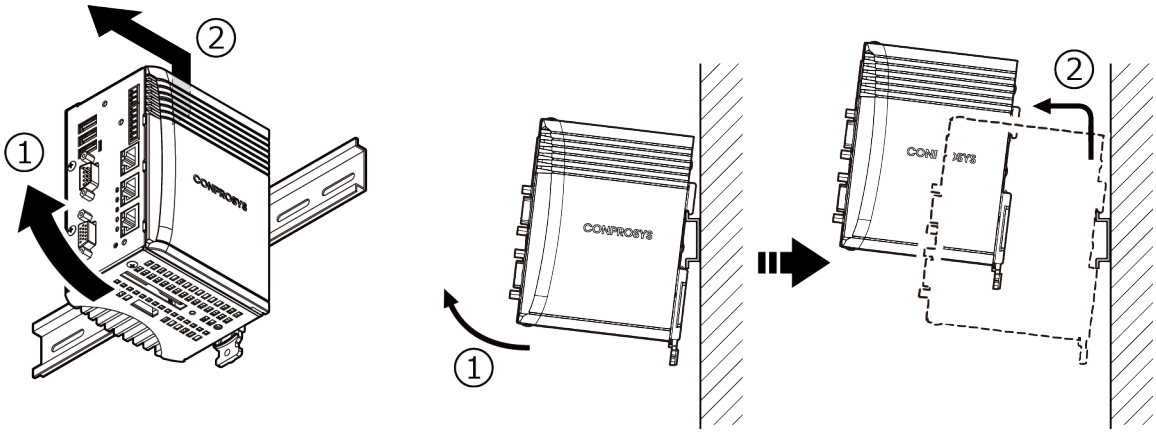


Unlock the hook with a slotted screwdriver

By rotating the screwdriver
Place the slotted screwdriver (the point should be smaller than 8mm) as shown in the figure.
Rotate the screwdriver 90-degree in either direction.



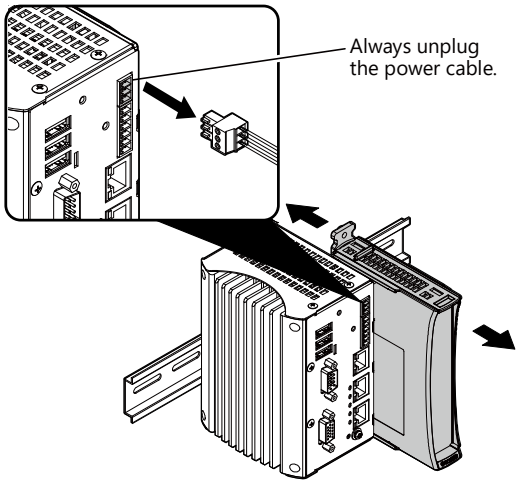
2 (1). With the hook unlocked, pull the lower part of the product toward you.
(2). By lifting the product, you can easily remove it from the DIN rail.



3. Setting the Configurable Type Module

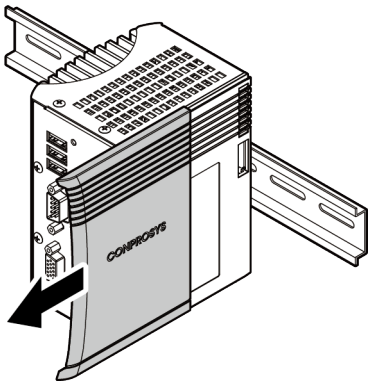
⚠ CAUTION

- Unplug the power cable from the product first, then set or remove the modules.
- Always confirm the PWR-LEDs of the product and modules are turned off, then set or remove the modules.
- Always check the module is firmly fixed on DIN rail with hooks when setting the product.

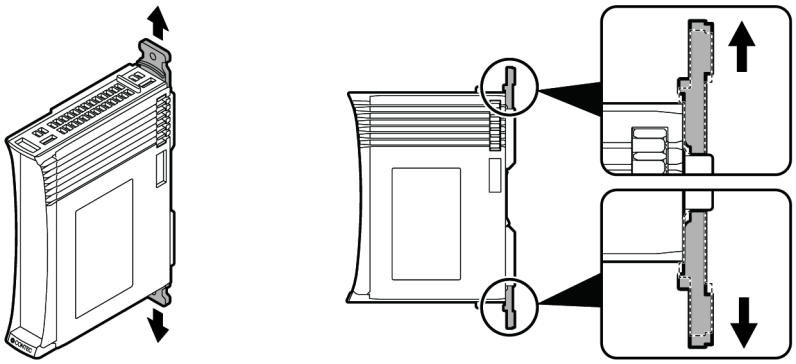


◆ How to Set

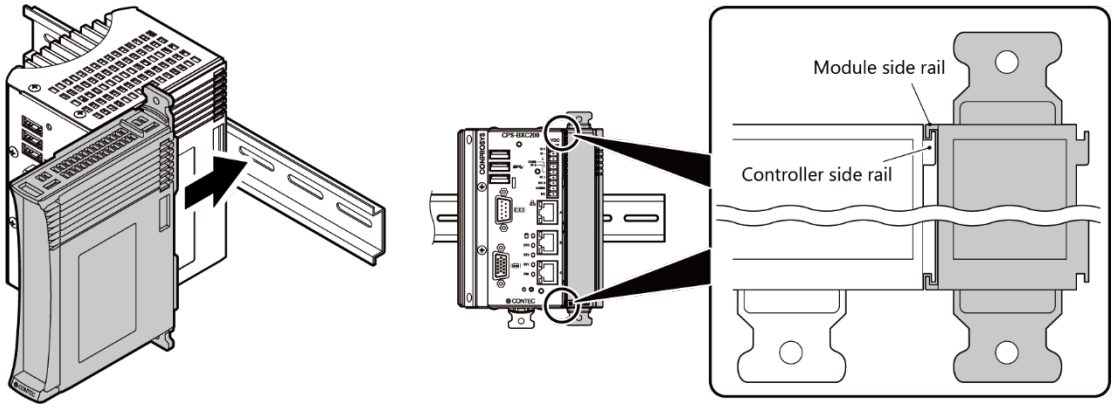
1 First, slide the attached end cover to remove it from the product that is mounted on the DIN Rail.



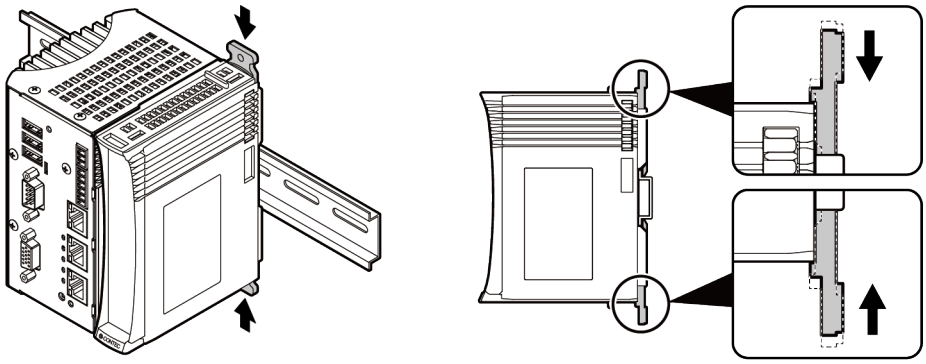
2 Unlock the hooks of the module.
If the hooks are stuck, use a slotted screwdriver to unlock.



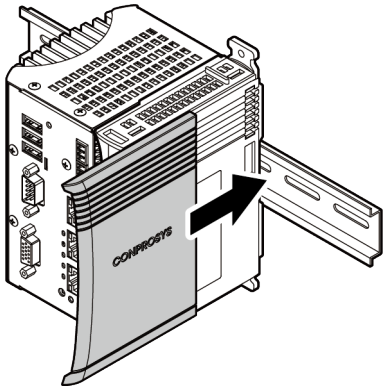
3 Engage the side rail of the setting module to the side rail of the controller (or another module) that is already mounted.
When the rails fit, slide the setting module all the way toward the DIN rail.



4 Fix and secure the module on the DIN rail by locking the hooks.

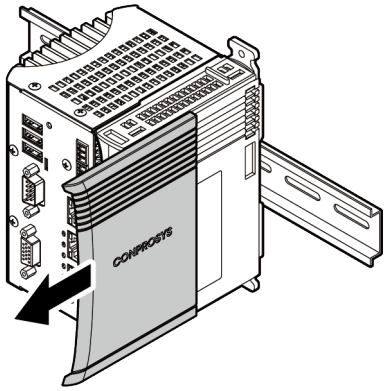


5 Put back and slide the end cover to the module.

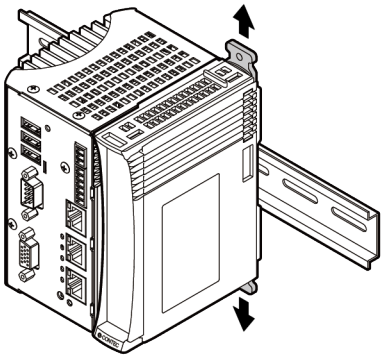


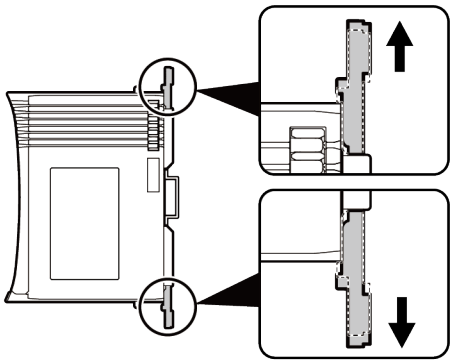
◆ How to Remove

1 First, slide the attached end cover from the configurable type module to remove it.



2 Unlock the hooks of the module.
If the hooks are stuck, use a slotted screwdriver to unlock.

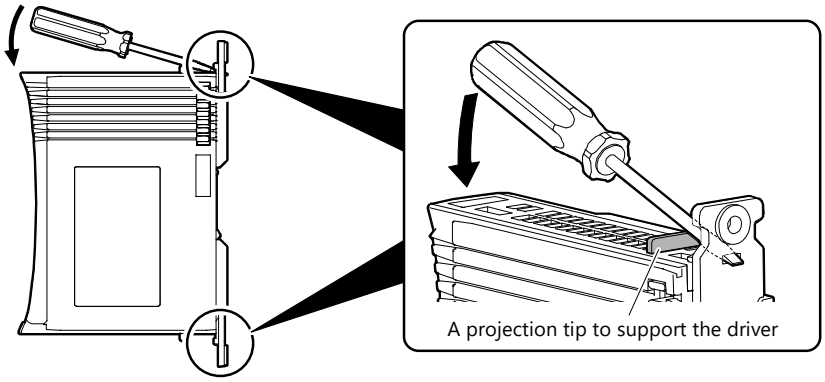




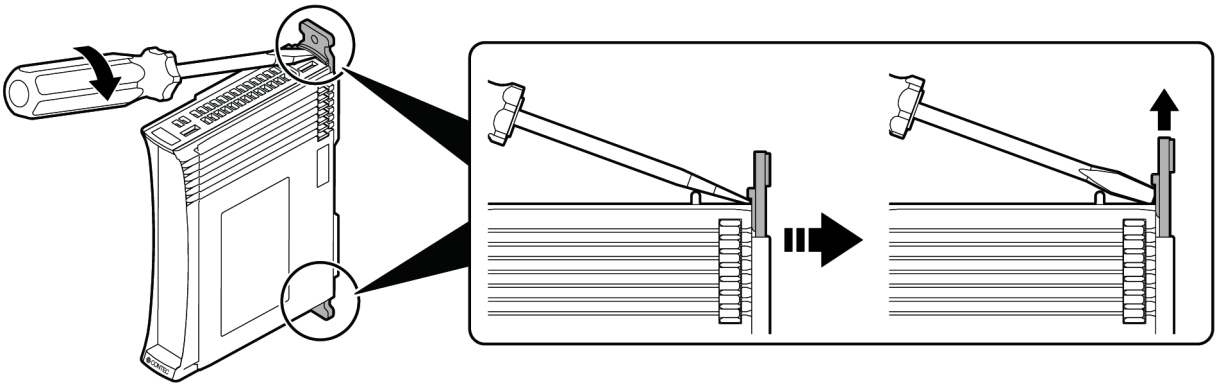
Unlock the hook with a slotted screwdriver

There are two ways to unlock the hook using a slotted screwdriver.
Unlock it by one of the following methods.

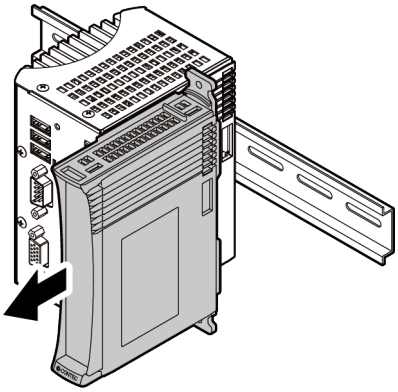
- Using the screwdriver as leverage
  Insert a slotted screwdriver (the point should be smaller than 4.5mm) into a hole.
  (see the figure below)
  By using the screwdriver as leverage, move it downward in the direction of the arrow to unlock.



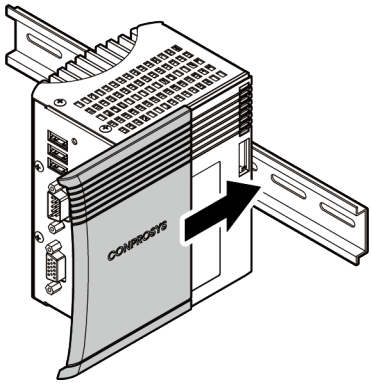
- By rotating the screwdriver
  Place the slotted screwdriver (the point should be smaller than 8mm) as shown in the figure.
  Rotate the screwdriver 90-degree in either direction.



3 With the hooks unlocked, pull the module toward you.

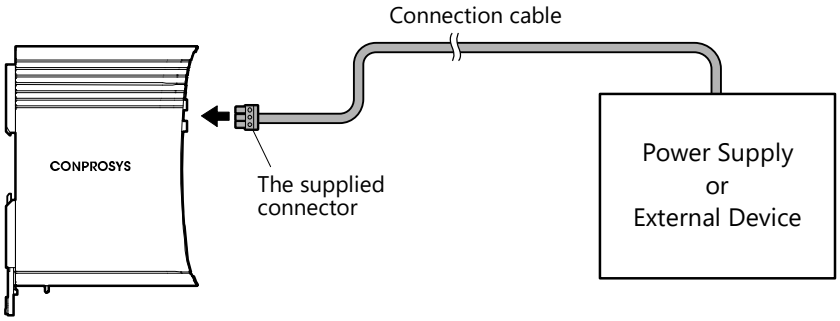


4 Put back the end cover to the controller.



2.Connecting to an External Device

Use the supplied connector plug to connect the product to an external device.



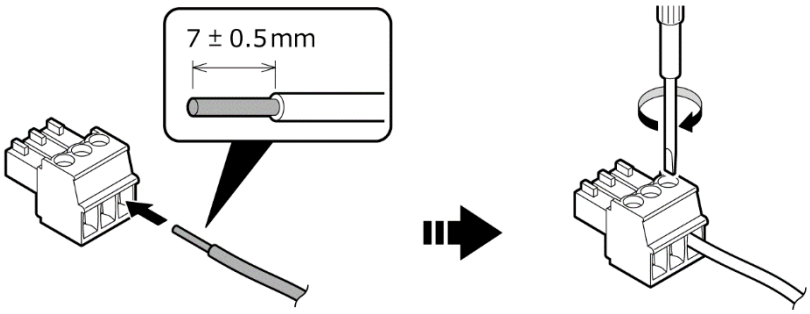
The following example describes how to make the connecting cable with a supplied connector.

Example of making the connecting cable with a 3-pin connector

Applicable wires: AWG20 - 16

1 Strip off approximately 7mm (plus or minus 0.5mm) of the covered part of a cable and insert it to the opening.

2 After the insertion, secure the stripped part by turning screws with a slotted driver to prevent it from disconnecting.



⚠ CAUTION

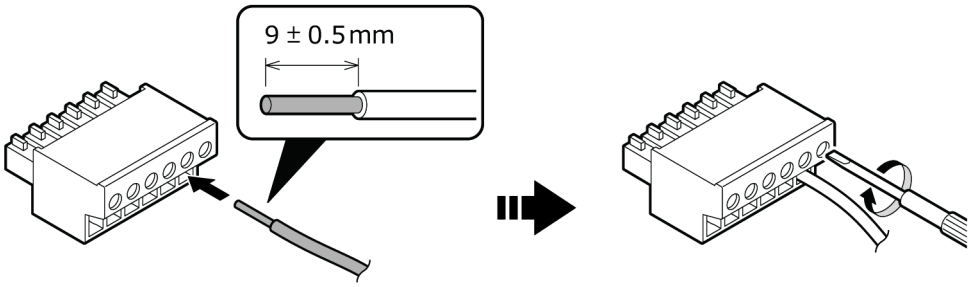
- Removing the connector plug by grasping the cable can break the wire. Always grasp the connector to remove it.
- Tightening torque of the supplied connector is 0.19N·m.
- Strip off approximately 7mm (plus or minus 0.5mm) of the covered part of a cable to connect with the connector.

Example of making the connecting cable with a 6-pin connector

Applicable wires: AWG28 - 16

1 Strip off approximately 9mm (plus or minus 0.5mm) of the covered part of cable and insert it to the opening.

2 After the insertion, secure the stripped part by turning screws with a slotted driver to prevent it from disconnecting.



⚠ CAUTION

- Removing the connector plug by grasping the cable can break the wire. Always grasp the connector to remove it.
- Tightening torque of the supplied connector is 0.19N·m.
- Strip off approximately 9mm (plus or minus 0.5mm) of the covered part of a cable to connect with the connector.

3.Cable Connection

1. Power

◆ Power Cable

Use the power cable described below.

Cable	Twisted pair cable (when using a single wire, twist V+ wire and V- wire)
Applicable wire	AWG20 - 16(0.5mm^2 - 1.25mm^2)
Cable Length	Within 3 meters

*Refer to **"Power Connector"** in the **page 23** for details of the power connector and pin assignment.

◆ FG Cable

Use the FG cable described below.

Applicable wire	AWG18 - 16(0.75mm^2 - 1.25mm^2)

◆ Specification of External Power Supply

This product is designed to operate at least with 40 - 120watt power supply. (Watt varies according to the number of modules). The power supply must fulfill the following requirements.

Rising time for up to 24 voltage	2 milliseconds up to 30 milliseconds

Cable	Use copper wires that tolerate a temperature of 75 °C or higher.

Recommended power supply is the optional product of the CPS-PWD-90AW24-01 (by CONTEC).

⚠ CAUTION

If the maximum output current of the external power supply is smaller than the maximum consumption current of the product, the abnormal operations might occur due to the inrush current at the start-up time or the load fluctuation. The aging external power supply could cause a start-up failure

2. LAN

◆ LAN Cable

Use the LAN cable described below.

Category	Category 5 or greater, Category 5e or greater for 1000Mbps
Cable Length	Within 100 meters

Refer to **"LAN Port"** in the **page 26** for details of the LAN port and pin assignment.

3. RS-232C

◆ RS-232C Cable

When using an RS-232C interface, different cables are required depending on the type of device to which you are connecting (computer or modem, etc.).

Check the requirements of the external device and select either a straight-through or crossed (null modem) cable as appropriate.

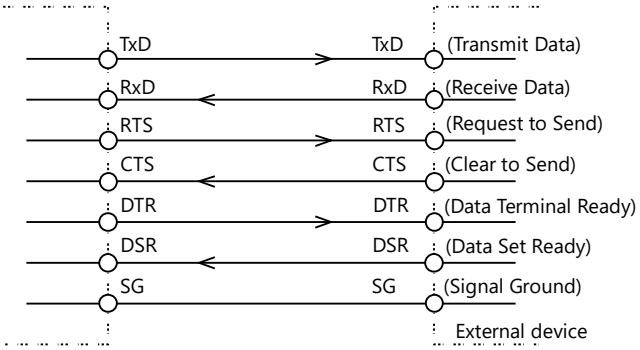
If special treatment of the signal lines in the connector is required, ensure that this is done in accordance with the specifications.

Refer to **"RS-232C Serial Port"** in the **page 29** for details of the RS-232C serial port and pin assignment.

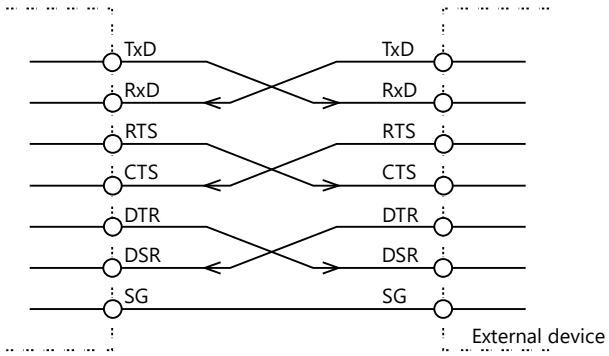
◆ Connecting to an external device

Example RS-232C cable connection to an external device is described below.

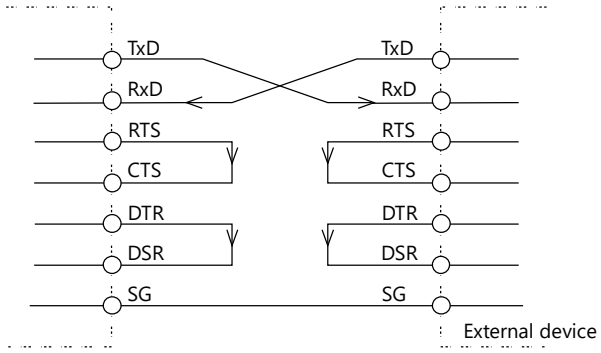
Example Connection to a Modem



Example Connection to a PC



Example Connection to a Device



4. Digital Input

◆ Digital Input Cable

Use the digital input cable described below.

Cable	Use copper wires that tolerate the temperature of 75 °C and higher.
Applicable wire	AWG28 - 16
Cable Length	The length differs depending on the actual use environment.

*Refer to **"General-purpose Input/Output/RAS connector"** in the **page 24** for details of the digital input connector and pin assignment.

5. Digital Output

◆ Digital Output Cable

Use the digital output cable described below.

Cable	Use copper wires that tolerate the temperature of 75 °C and higher.
Applicable wire	AWG28 - 16
Cable Length	The length differs depending on the actual use environment.

*Refer to **"General-purpose Input/Output/RAS connector"** in the **page 24** for details of the digital input/output connector and pin assignment.

4. USB removal prevention fitting

USB removal prevention fitting for fixing USB cables comes with this product.

1. Fastening the USB Cable

1 This product has a hole for attaching a cable tie to USB removal prevention fitting. Using a cable tie for USB cable that has no lock, prevents the connector from being unplugged. Use the cable tie and the fittings appropriately according to the connecting states.

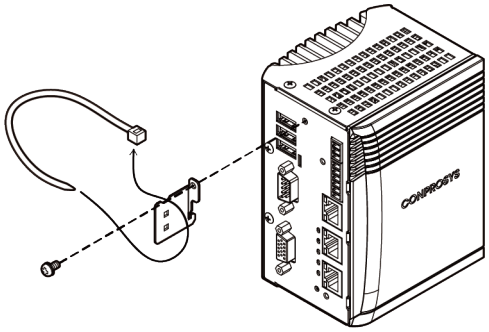
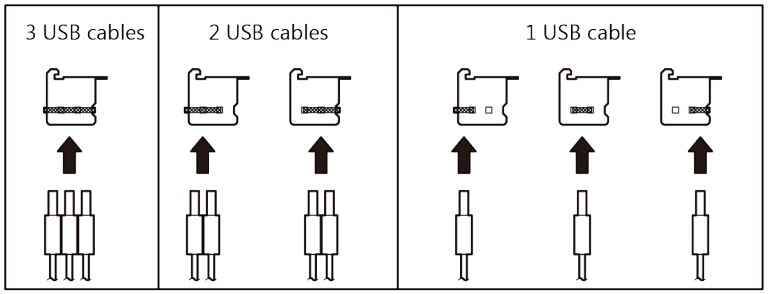


Image from heat sink side



2 The photo below shows an example of using a cable tie. Secure the cable with the fitting without applying stress to the connector.

BIOS Setup

This section describes American Megatrends' (AMI) Setup program built into the FLASH ROM BIOS.

1.Introduction

This section discusses AMI's Setup program built into the FLASH ROM BIOS. The Setup program allows users to modify the basic system configuration. This special information is then stored in FLASH ROM so that it retains the Setup information even when the product power is turned off.

The rest of this section is intended to guide you through the process of configuring your system using Setup.

1. Starting Setup

The BIOS is immediately activated when you first power on the product. The AMI BIOS reads the system information contained in the CMOS ROM and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

- By pressing <Del> or <ESC> immediately after switching the system on, or
- By pressing the <Del> or <ESC> key when the following message appears briefly at the bottom of the screen during the POST (Power On Self-Test).

  Press <DEL> or <ESC> to enter setup.

If the message disappears before you respond and you still wish to enter Setup, turn OFF the power of the product, then power ON. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

2. Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the "+" and "-" keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Key	Function
Up Arrow	Move to the previous item
Down Arrow	Move to the next item
Left Arrow	Move to the item on the left (menu bar)
Right Arrow	Move to the item on the right (menu bar)
ESC	Main Menu: Quit without saving changes Submenus: Exit Current page to the next higher-level menu
Move Enter	Move to the item you desired
+	Increase the numeric value or make changes
-	Decrease the numeric value or make changes
F1	General help on Setup navigation keys
F2	Load previous number from CMOS.
F3	Load the optimized defaults
F4	Save all settings changes to the FLASH ROM and exit

3. Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc>.

4. In Case of Problems

If it is not possible to boot the product after system settings have been changed and saved during setup, this product will need to be repaired.

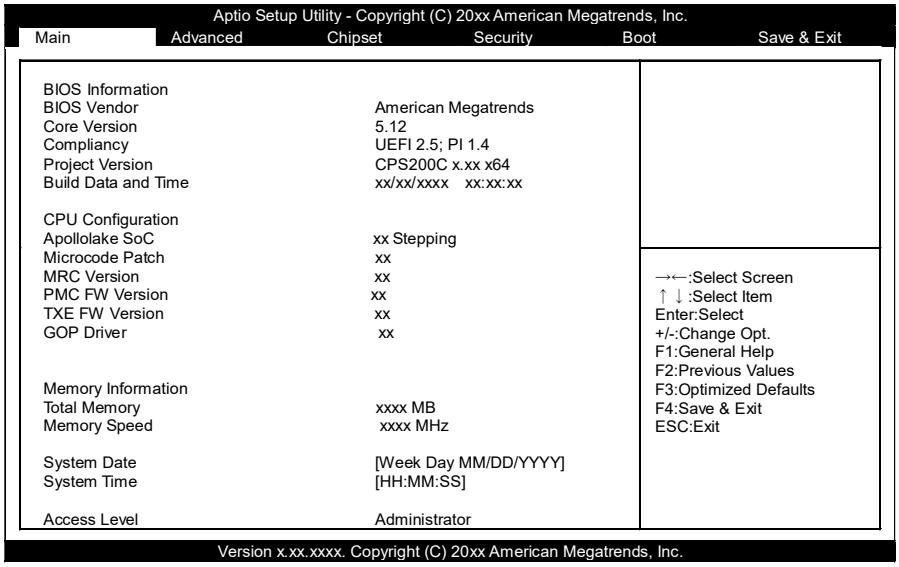
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your systems manufacturer to provide the absolute maximum performance and reliability. If chipset settings are changed even slightly, it may become necessary to repair the unit.

5. A Final Note About Setup

The information in this section is subject to change without notice.

2.Main Menu

Once the setup program (Aptio Startup Utility) is started, the main menu will be displayed. Navigate through the various tabs by pressing the right and left arrow keys.



(Actual Display May Vary)

1. Setup Items

The selectable tabs are as follows.

Main

View the basic system structure, as well as configure the settings of the language, the date and time.

Advanced

Specify the detailed functions that can be set on the system used.

Chipset

Specify the detailed functions that can be set on the system used.

Security

Set the password to be used to protect the security of the system.

Boot

Configure the settings related to how the system will boot.

Save & Exit

Load/Save the setup items and exit the setup menu.

3.Main

View the basic system structure. The following items are displayed.

Display item in the main menu

Item	Display example	Description
BIOS Vendor	American Megatrends	This item displays the BIOS manufacturer.
Core Version	5.12	This item displays the BIOS core version.
Compliancy	UEFI 2.5; PI 1.4	This item displays the UEFI version.
Project Version	CPS200 x.xx x64	This item displays the BIOS version.
Build Data and Time	xx/xx/xxxx xx:xx:xx	This item displays the BIOS creation date and time.
Access Level	Administrator	This item displays the access rights level.

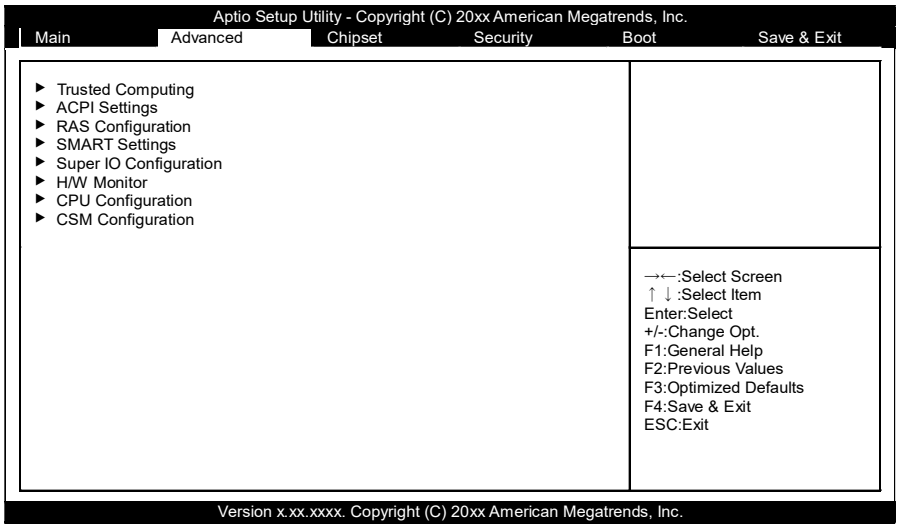
The table below shows the selections that you can make on the Main Menu.

Main Menu Selections

Item	Options	Description
System Date	Week Day Month / Day / Year	Set the system date. Note that the 'Day' automatically changes when you set the date.
System Time	Hour : Minute : Second	Set the system time.

4.Advanced

Specify the detailed functions that can be set on the system used. The following items are available.



Trusted Computing

Configure the TPM2.0 settings.

ACPI Settings

Configure the ACPI settings.

RAS Configuration

Configure the RAS settings.

SMART Settings

Do not change this setting.

Super IO Configuration

Configure the Super IO settings.

H/W Monitor

View such information as the CPU temperature.

CPU Configuration

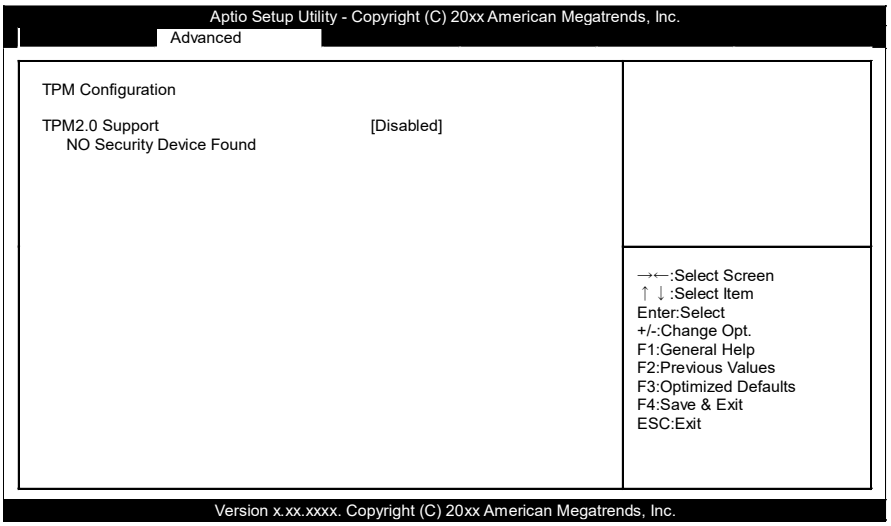
Do not change this setting.

CSM Configuration

Do not change this setting.

1. Trusted Computing

Configure the settings for TPM2.0.



Trusted Computing

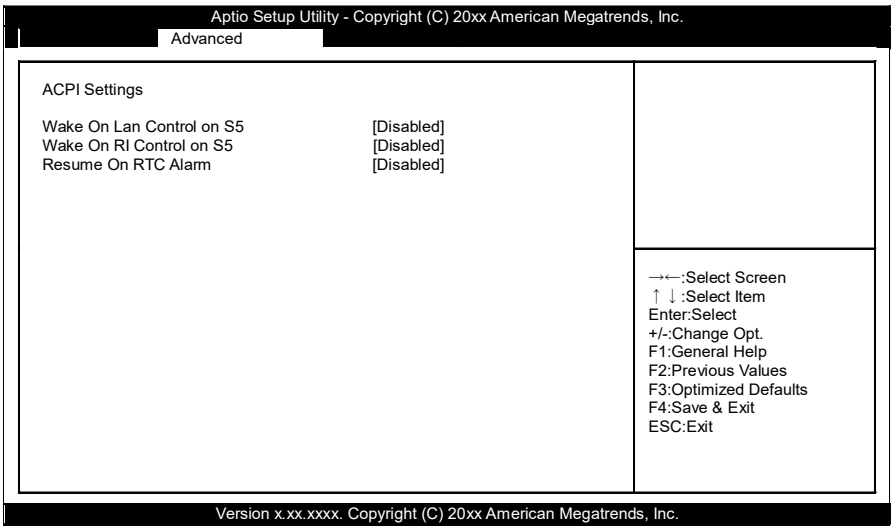
Item	Options	Description
TPM2.0 Support	[Disabled] Enabled	Configure the TPM2.0 settings. Save the settings. The TPM2.0 device will be in enabled after rebooting.

TPM2.0 Support (Only Available When "Enabled" Is Selected)

Item	Options	Description
SHA-1 PCR Bank	Disabled [Enabled]	Do not change this setting.
SHA256 PCR Bank	Disabled [Enabled]	Do not change this setting.
Pending operation	TPM Clear [None]	Do not change this setting.
Platform Hierarchy	Disabled [Enabled]	Do not change this setting.
Storage Hierarchy	Disabled [Enabled]	Do not change this setting.
Endorsement Hierarchy	Disabled [Enabled]	Do not change this setting.
TPM2.0 UEFI Spec Version	TCG_1_2 [TCG_2]	Do not change this setting.
Physical Presence Spec Version	1.2 [1.3]	Do not change this setting.

2. ACPI Settings

Configure the settings for ACPI power management.



ACPI Settings

Item	Options	Description
Wake on Lan Control on S5	Disabled Enabled	Configure the Wake on LAN settings.
Wake on RI Control on S5	Disabled Enabled	Configure the Resume on Ring settings.
Resume on RTC Alarm	Disabled Fixed Time Dynamic Time	Enable or disable the function for automatically turning on the system at the specified date and time. When enabled, use the following items to set the date and time the system will automatically turn on.

Resume On RTC Alarm (Only Available When "Fixed Time" Is Selected)

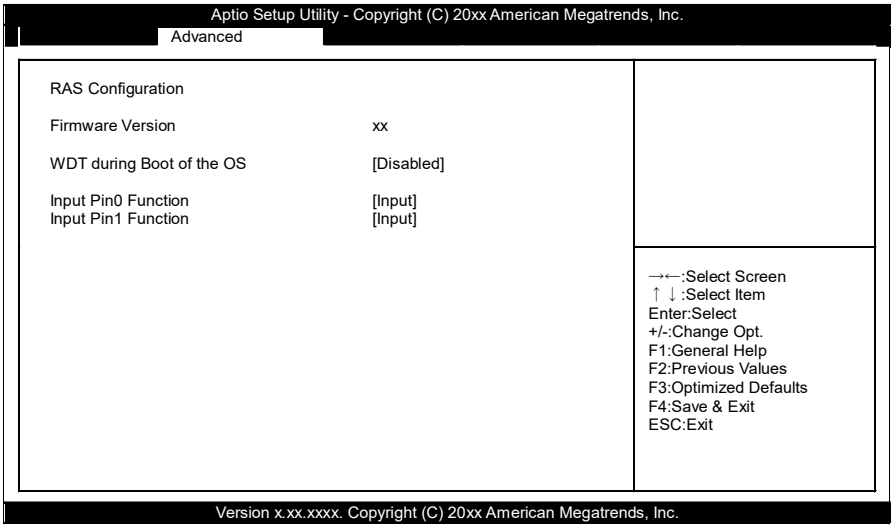
Item	Options	Description
RTC Wake up Hour	0 - 23	Sets the time the system will automatically turn on.
RTC Wake up Minute	0 - 59	Sets the minute the system will automatically turn on.
RTC Wake up Second	0 - 59	Sets the second the system will automatically turn on.

Resume On RTC Alarm (Only Available When "Dynamic Time" Is Selected)

Item	Options	Description
Wake up minute increase	1 - 5	Sets when the system will automatically turn on in minutes.

3. RAS Configuration

Configure such settings as the RAS.



(Actual Display May Vary)

RAS Configuration

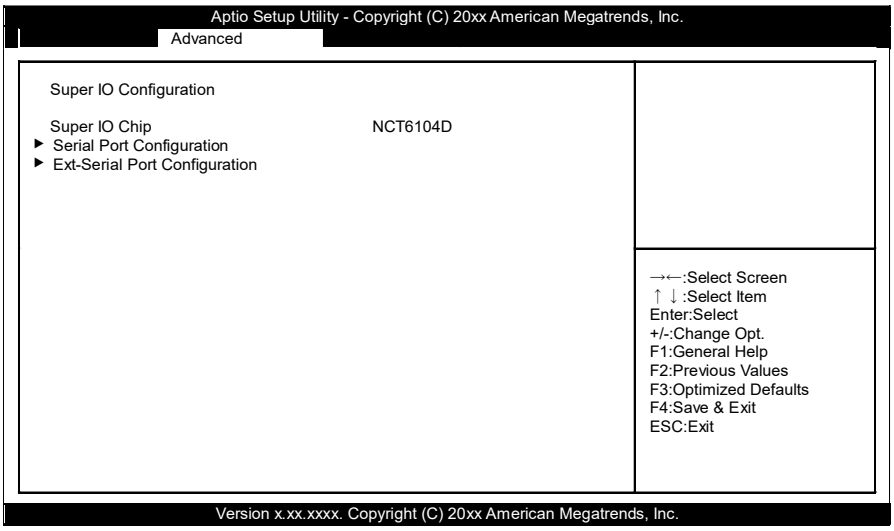
Item	Options	Description
WDT during Boot of the OS	[Disabled] Enabled	Configure the WDT function settings while the OS is booting.
Input Pin0 Function	[Input]	Configure the functions assigned to Input Pin0.
Input Pin1 Function	[Input] Reset Button Power Button	Configure the functions assigned to Input Pin1.

WDT during Boot of the OS (Only Available When "Enabled" Is Selected)

Item	Options	Description
WDT Value (Seconds)	0 - 254	Sets the timeout time of WDT functions
WDT Timeup Function	None [Reset] Shutdown Output High Output Low	Sets the timeout behavior of WDT functions None : None Reset : Reset system Shutdown : Shut down system Output High : Output High Output Low : Output Low

4. Super IO Configuration

Configure the operation settings for Super IO.

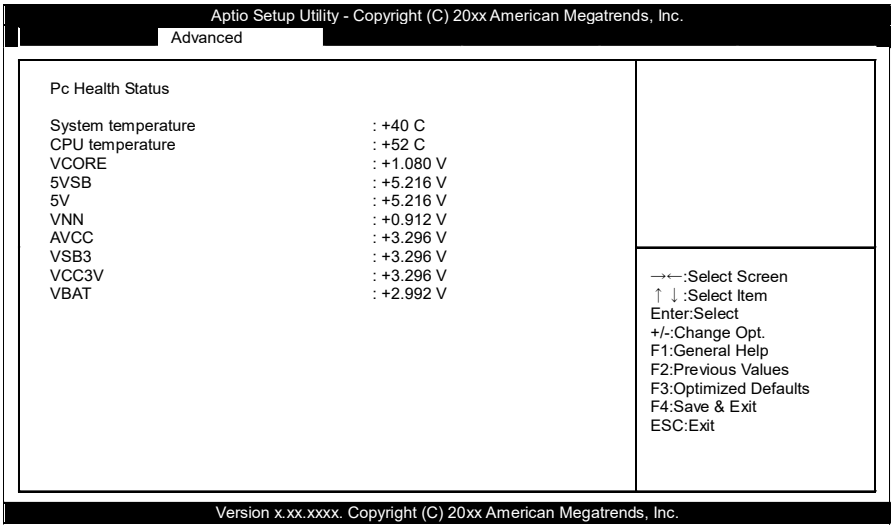


Super IO Configuration

Item	Options	Description
Serial Port Configuration	Disabled Enabled	Configure the operation settings for serial port A.
Ext-Serial Port Configuration	-	Do not change this setting.

5. H/W Monitor

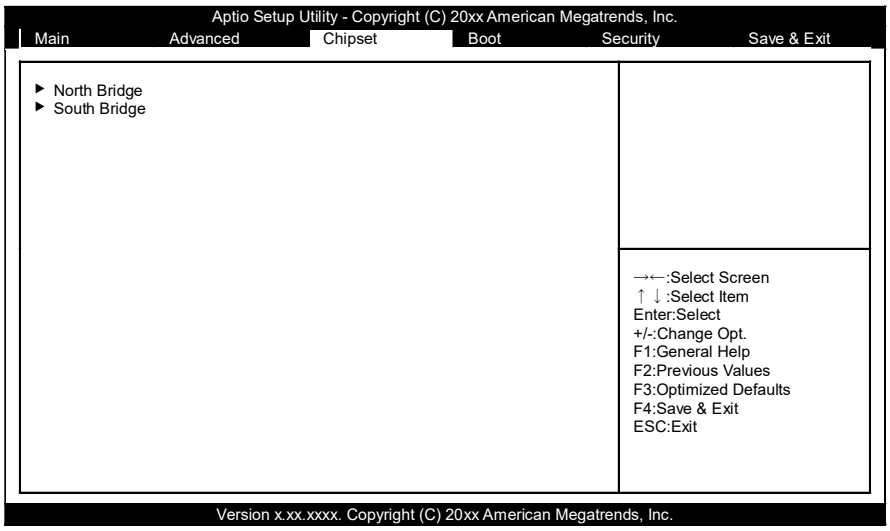
View hardware monitor information such as the CPU temperature.



(Actual Display May Vary)

5.Chipset

Specify the detailed chipset functions.



The following items are available.

North Bridge

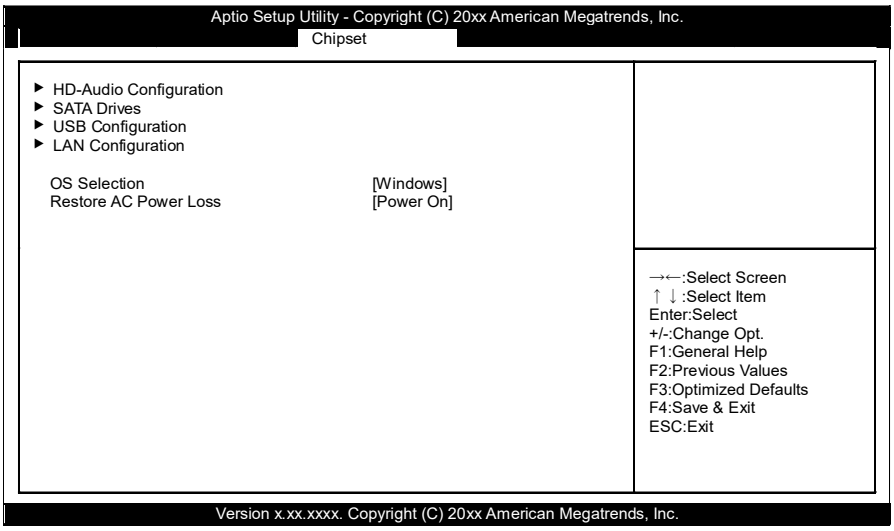
Do not change this setting.

South Bridge

Configure the operation settings for South Bridge.

1. South Bridge

Configure the South Bridge settings.

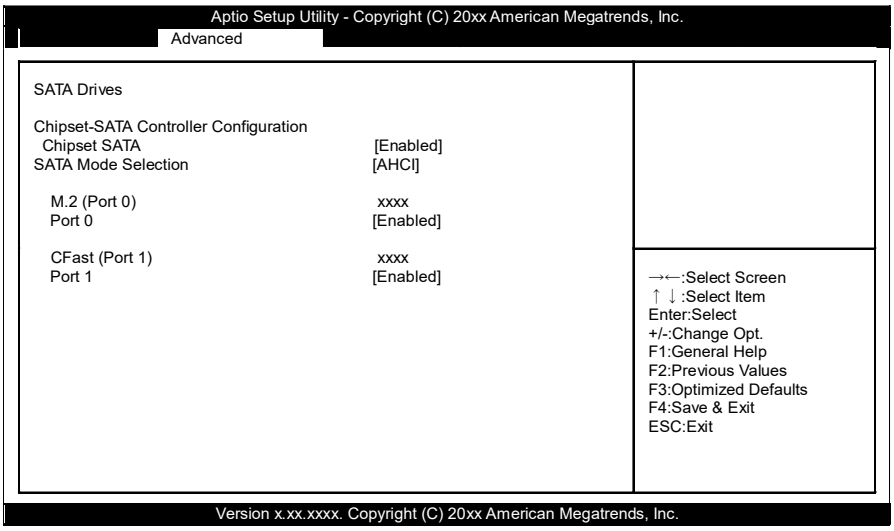


South Bridge

Item	Options	Description
HD-Audio Configuration	[Enabled] Disabled	Configure the HD-Audio settings.
SATA Drives	Refer to 2. SATA Drives.	-
USB Configuration	Refer to 3. USB Configuration.	-
LAN Configuration	[Enabled] Disabled	Configure LAN settings.
OS Selection	-	Do not change this setting.
Restore AC Power Loss	Power Off [Power On] Last State	Set whether to start the system at the same time the power supply starts. **Power OFF:** Press the power button to start the system. The system does not start at the same time the power supply starts. **Power ON:** The system will start at the same time the power supply starts. **Last State:** If the power is turned off while the system is on, the system will start the next time the power supply starts.

2. SATA Drives

Configure the SATA controller settings.

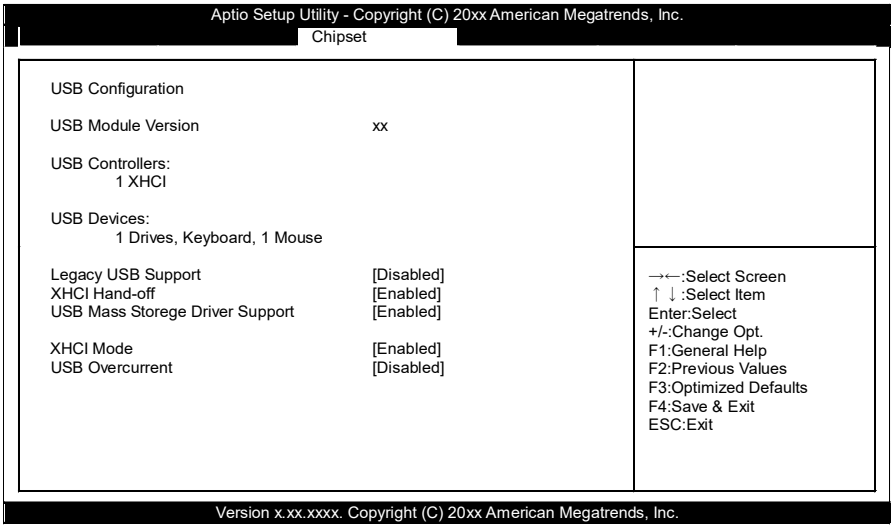


Chipset-SATA Controller Configuration

Item	Options	Description
Chipset SATA	Enabled Disabled	Configure the SATA controller operation settings
SATA Mode Selection	AHCI	View the SATA device mode.
Port 0	Enabled Disabled	Configure the settings for SATA Port0.
Port 1	Enabled Disabled	Configure the settings for SATA Port1.
Write Protect	Disabled / Enabled	Hardware write protect can be respectively applied to SSD in each port. This is only available when using CPS-BXC200-xx0xM05x or CPS-BXC200-xx0xL07x.

3. USB Configuration

Configure the USB settings.

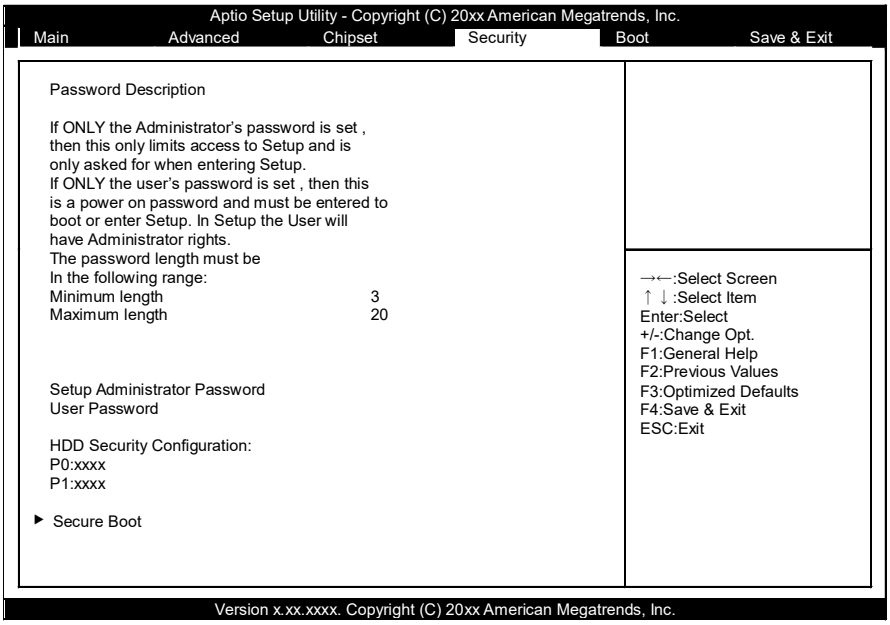


USB Configuration

Item	Options	Description
Legacy USB Support	[Disabled] Enabled	Do not change this setting.
XHCI Hand-off	[Enabled] Disabled	Do not change this setting.
USB Mass Storage Driver Support	Disabled [Enabled]	Configure the USB storage support settings with BIOS.
USB Overcurrent	Enabled [Disabled]	Do not change this setting.

6.Security

Configure the security of the system settings.



Administrator Password

Set the Administrator Password.

Press Enter to display the following screen for entering the password.

Administrator Password		
Create New Password	[****	]
Confirm New Password	[****	]

Enter a password at least 3 characters long twice.

To disable the password, enter the Administrator Password entry screen again.

User Password

Set the user password.

Press Enter to display the following screen for entering the password.

User Password		
Create New Password	[****	]
Confirm New Password	[****	]

Enter a password at least 3 characters long twice.

To disable the password, enter the Administrator Password entry screen again.

HDD Security Configuration

This is viewed when SATA Device is connected.

Leave these settings as configured before shipment.

Secure Boot menu

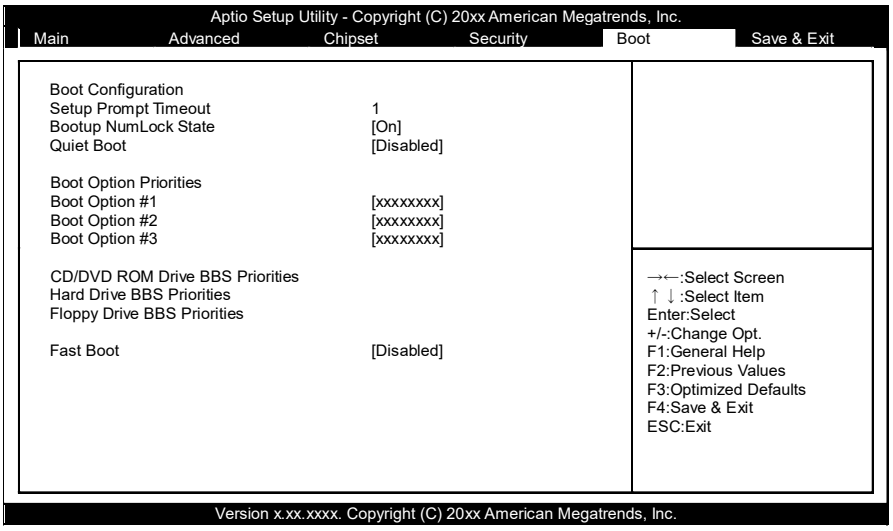
Leave these settings as configured before shipment.

⚠ CAUTION

Be careful to not forget the password. If you forget the password, the product will have to be repaired at an extra cost.

7.Boot Configuration

Configure the settings of boot devices and other devices.



Boot Configuration

Item	Options	Description
Setup Prompt Timeout	1	Set the standby time for BIOS Setup <DEL> or <F2> input. Unit : [second]
Bootup NumLock State	On Off	Set the NumLock status when the system starts.
Quiet Boot	Disabled Enabled	Do not change this setting.
Fast Boot	Disabled Enabled	Do not change this setting.
Boot Option #x	xxxxx (Specify any device)	Set the start order of the connected devices. *1
CD/DVD ROM Drive BBS Priorities	xxxxx (Specify any device)	Set the start order of the connected CD/DVD drives. *1
Hard Drive BBS Priorities	xxxxx (Specify any device)	Set the start order of the connected HDD/CFast/USB removable drives. *1
Floppy Drive BBS Priorities	xxxxx (Specify any device)	Set the start order of the connected USB floppy drives. *1

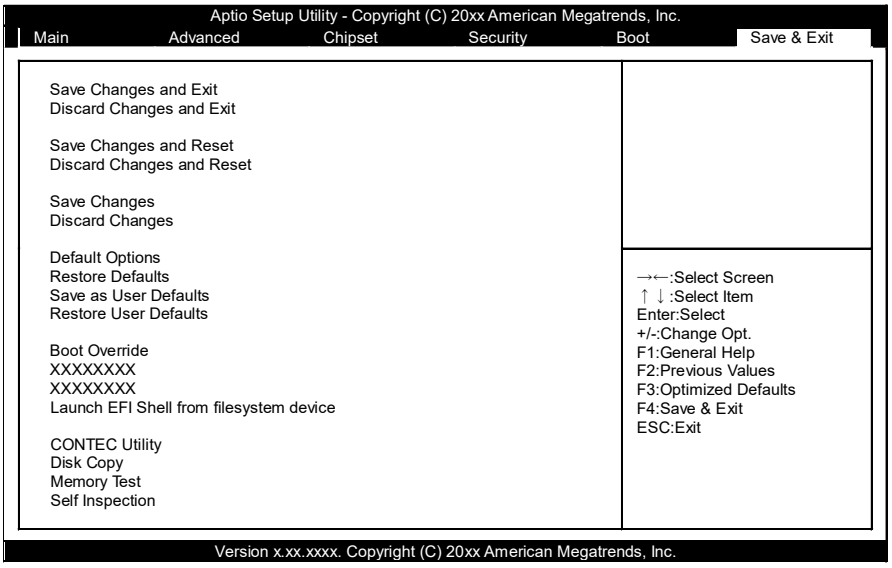
*1 Appears when the device is connected.

⚠ CAUTION

Only devices set as the highest in individual settings like CD/DVD ROM Drive BBS Priorities are listed as selectable under Boot Option #x.

8.Save & Exit

Load/save setup items and exit the setup menu.



Save Changes and Exit

Save the changed settings and exit.

Discard Changes and Exit

Exit without saving the changed settings.

Save Changes and Reset

Save the changed settings and restart.

Discard Changes and Reset

Restart without saving the changed settings.

Save Changes

Save the changed settings.

Discard Changes

Discard the changed settings.

Restore Defaults

Return the settings to the default values.

Save as User Defaults

Save the settings as the user default values.

Restore User Defaults

Return the settings to the user default values.

Boot Override

Configure the settings for temporary booting from a connected device other than that set in Boot Configuration. The bootable devices will be displayed in place of XXXX.

CONTEC Utility

Utility that runs on the UEFI environment can be used. Refer to the following page on the utility details and usage.

9.CONTEC Utility

Utility that runs on the UEFI environment can be used.

The following items are available.

Disk Copy

Copy the disk and perform such functions as backup and restore.

Memory Test

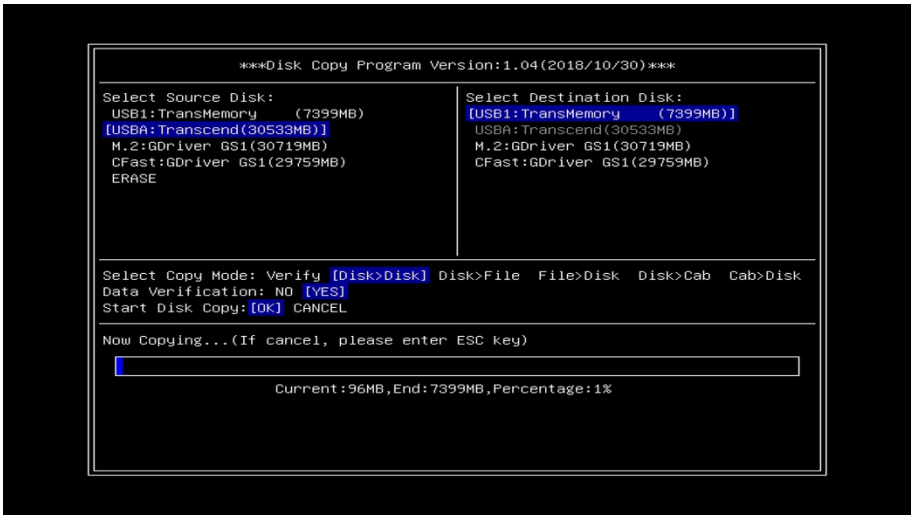
Execute the Memory Test of the PASSMARK.

Self Inspection

Execute the Self Inspection.

1. Disk Copy

Copy the disk and perform such functions as backup and restore.



Disk Copy

Item	Options	Description
Select Source Disk	USBx: xxx M.2:xxx CFast:xxx Erase	Display a connected USB or SATA disk. Select the disk you wish to copy from. When the Erase is selected, fill the entire area of the selected disk to copy with 0x00.
Select Destination Disk	USBx: xxx M.2:xxx CFast:xxx	Display a connected USB or SATA disk. Select the disk you wish to copy to.
Select Copy Mode	Verify Disk to Disk Disk to File File to Disk Disk to Cab Cab to Disk	Select copy mode. **Verify:** This solely performs disk verification. **Disk to Disk:** Physics copy the data of source disk to destination disk. The smaller disk size is used to be copied. **Disk to File:** File copy the data of source disk to destination disk. File should be saved with the name of conback_x (x indicates serial number). Destination disk should be formatted as FAT32. Even copying is not yet completed, coping ends when the data is filled to the maximum size of the destination disk. **File to Disk:** Physics copy the data of source disk to

Item	Options	Description
		destination disk. File is saved with the name of conback_x (x indicates serial number). Source disk should be formatted as FAT32. Even copying is not yet completed, coping ends when the data is filled to the maximum size of the destination disk. **Disk to Cab:** Compress file copy the data of source disk to destination disk. File should be saved with the name of concab_x (x indicates serial number). Destination disk should be formatted as FAT32. Even copying is not yet completed, coping ends when the data is filled to the maximum size of the destination disk. **Cab to Disk:** Compress and physics copy the compressed file data of source disk to destination disk. File should be saved with the name of concab_x (x indicates serial number). Source disk should be formatted as FAT32. Even copying is not yet completed, coping ends when the data is filled to the maximum size of the destination disk.
Data Verification	No Yes	When Yes is selected, data verification is performed to check whether copy has done properly every time a unit block is copied. This ends out in error if discrepancy is found. This function is unavailable when [Disk to Cab] and [Cab to Disk] are selected.

⚠ CAUTION

- When performing Disk to Disk between the disks with the different capacities, booting OS cannot be guaranteed since the smaller disk size is used to be copied. If you intend to boot OS after performing Disk to Disk, either copy with the same capacity disks or copy to the larger size disk first, then write back to the original disk.
- When a backup has been completed, turn off the power and remove the storage from the product.

2. Self Inspection

Execute the Self Inspection.

Self Inspection

Item	Options	Description
PCI Device Activity	PASS FAIL	Check the existence of PCI devices which should be existed. [PASS] appears when all the devices are found. [FAIL] appears when even one of the devices cannot be found.
Host	ACTIVE INACTV	Check the existence of PCI devices which should be existed. [Active] appears when devices exist appropriately. [INACTIV] appears when they do not.
Graphic		
Sideband		
PMC		
Fast SPI		
SharedSRAM		
HD Audio		
CSE-HECI1		
CSE-HECI2		
CSE-HECI3		
AHCI		
PCIe -A 0		
PCIe -A 1		
PCIe -A 2		
PCIe -A 3		
xHCI		
LPC		
SMBus		

Item	Options	Description
I210 LAN 1,2,3		
CON FPGA		
Pci Brige		
LPC Device Activity	PASS FAIL	Check the existence of LPC devices which should be existed. [PASS] appears when all the devices are found. [FAIL] appears when even one of the devices cannot be found.
KBC	ACTIVE INACTV	Check the existence of LPC devices which should be existed. [Active] appears when devices exist appropriately. [INACTIV] appears when they do not.
HWM		
UARTB		
COM Resource	PASS FAIL	Check whether the address :0x3F8, IRQ:4(Edge / Active High) for COM resource is set correctly.
SSD Life	Display only	Life time information of SATA Drive is displayed. The information will be displayed only with the M.2 SATA Drive containing this product as standard.
LAN EEPROM Check	PASS FAIL	Check whether LAN EEPROM is correct data. If LAN device cannot be found, that device cannot be determined.
CONTEC MAC	PASS FAIL	Check whether CONTEC's MAC data is written.
Unique MAC	PASS FAIL	Check whether the MAC data is unique within the operation device.
Same CS	PASS FAIL	Check whether check sums except MAC data are the same.
I210(B/D/F=x/x/x)		
MAC	xxxxxxxxxxxx	Display the MAC data of each port.
CS	xxxx	Display the check sums except MAC data of each port.
Temperature	MIN NOW MAX	Display the lowest, the highest, and the current temperature of CPU and system while the self-inspection program is running.
Voltage	MIN NOW MAX	Display the lowest, the highest, and the current voltage while the self-inspection program is running.
Time	Now Elapsed	Display the elapsed time since the self-inspection program was run as well as the current time.
GPIO Info		Display the GPIO Information.
DI(0-1)	00	Display the signal level of input pin 0 and 1.
ROMCLR	OFF ON	Display the state of ROM clear switch.
LED Test		3 LEDs flash together on a certain cycle while the self-inspection program is running.
BEEP Test	A-K keys	Pressing any keys of A,S,D,F,G,H,J, or K makes the corresponding beep sound respectively.

Item	Options	Description
The overall Pass or Fail	PASS FAIL	PASS appears when all the tests of PCI Device Activity, LPC Device Activity, COM Resource, and LAN EEPROM Check have been passed. FAIL appears when even one out of all the tests has been failed.

Appendix

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

1.Specifications

1. Specifications

Function Specifications

Item		Description	
CPU		Intel® Atom™ Processor x7-E3950 1.6 GHz	
BIOS		BIOS (mfd. by AMI)	
Memory		204pin SO-DIMM socket x 1, PC3L-10600(DDR3L 1333) ECC	
		4GB	8GB
Graphic controller		Intel® HD Graphics 505 (built into CPU)	
System resolution	Analog RGB	1920 x 1200 @ 60Hz	
	DisplayPort	3840 x 2160 @ 60Hz	
Display		Analog RGB x1 (15-pinHD-SUB connector), DisplayPort×1	
M.2 card slot		1 slot, M.2 2242, SATAIII CPS-BXC200-xx0xP03: M.2 card (pSLC, 32GB) *1 CPS-BXC200-xx0xP05: M.2 card (pSLC, 64GB) *1 CPS-BXC200-xx0xM03: M.2 card (MLC, 32GB) *1 CPS-BXC200-xx0xM05: M.2 card (MLC, 64GB) *1 CPS-BXC200-xx0xL07: M.2 card (TLC, 128GB) *1	
CFast card slot		1 slot, CFast card Type I, bootable	
LAN *2		Intel I210IT controller	
		1000BASE-T/100BASE-TX/10BASE-T 3 ports (RJ-45 connector) (Wake On LAN support)	
USB		USB 3.0 standard follow 3ports (TYPE-A connector×3)	
Serial I/F		RS-232C (General-purpose) : 1port (SERIAL PORT A), 9pin D-SUB connector (male)	
		Baud rate : 50 - 115,200bps	
Watch Dog Timer		WDT: Software programmable, 1sec - 255sec (Time up allows reset or shutdown).	
Security (TPM)		TCG TPM2.0	
General-purpose I/O		Isolation: Input 2 (One input switchable between remote reset or remote power on.) Isolation: Output 1 (One output switchable for WDT external output)	
Hardware monitoring		Monitor CPU temperature and power voltage	
RTC/CMOS		Lithium battery backup Battery life: 10 years or longer. The real-time clock is accurate within ±3 minutes (at 25°C) per month (CPU built-in RTC).	
Power Management		Power management setup via BIOS, Power On by Ring / Wake On LAN function, PC98/PC99 ACPI Power management support	
Stack Bus		The maximum number of stack buses: 8 (The total current consumption of the modules should be less than 3.3A)	
RAS		1 port (3.81mm pitch 6-pin)	

Item		Description
Power supply	Rated input voltage	24VDC
	Input voltage range	24V±10%
	Power consumption (Max)	24V 1.5A (USB I/F, without stack bus power) 24V 4.8A (USB I/F, with stack bus power)
	External device power supply capacity	CFast card slot: +3.3V 0.5A (500mA x 1), USB3.0 I/F: +5V 2.7A (900mA x 3) Stack bus I/F: 24V 3.3A
Physical dimensions (mm)		76 (W)×94(D)×124.8(H) (No projection included)
Weight		1.1kg
Installation method		Quick mounting on the 35mm DIN rail
OS (For the models with OS installation)		CPS-BXC200-W10M0xxxxx : Windows 10 IoT Enterprise LTSB 2016 64bit (Japanese, English, Chinese, and Korean) CPS-BXC200-W19M0xxxxx : Windows 10 IoT Enterprise 2019 LTSC 64bit (Japanese, English, Chinese, and Korean)

*1 The capacity of memory is a value when 1GB is calculated by 1 billion bytes. The capacity that can be recognized from OS might be displayed fewer than an actual value.

*2 Pay attention to the ambient temperature when operating 1000BASE-T.

Installation Environment Requirements

Item		Description
Operating ambient temperature *3		-20 - +70°C (With 1000BASE-T : -20 - 65°C) , airflow 0.7m/s -20 - +60°C (With 1000BASE-T : -20 - 55°C) , no airflow *4
Operating ambient humidity		10 - 90%RH (No condensation)
Non-operating ambient temperature		-20 - +60°C
Non-operating ambient humidity		10 - 90%RH (No condensation)
Floating dust particles		Not to be excessive
Corrosive gases		None
Line-noise resistance	Line noise	AC Line/±2kV *5 Signal Line /±1kV (IEC61000-4-4 Level 3, EN61000-4-4 Level 3)
	Static electricity resistance	Touch /±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2) Air /±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)
Vibration resistance	Sweep resistance	10 - 57Hz /semi-amplitude vibration 0.15mm, 57 - 150Hz/2.0G 40minutes each in X, Y, and Z directions (JIS C60068-2-6-compliant, IEC60068-2-6-compliant)
Shock 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 (previous class 3 grounding), SG-FG/ non-conduction
Standard		VCCI Class A, FCC Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA, UL/cUL

*3 Derating occurs due to the way of installation and the load conditions.

*4 Operation ambient temperature for UL/cUL certificate is "-20 - +60°C (With 1000BASE-T : -20 - +55°C), no airflow only.

*5 When you use an optional power product (CPS-PWD-90AW24-01).

2. Power Management Features

Support both ACPI (Advanced Configuration and Power Interface).

- ACPI v2.0 compliant
- Hardware automatic wake-up

3. Power Requirements

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. For the best performance, make sure your power supply provides DC power source of a range between 21.6 V minimum and 26.4 V maximum.

◆ Power Consumption

For typical configurations, this product is designed to operate at least with 40 - 120watt power supply. (Watt varies according to the number of modules). The power supply must fulfill the following requirements.

Rising time for power supply: 2 ms - 30 ms

The table below lists the power supply's acceptable tolerances for DC voltages:

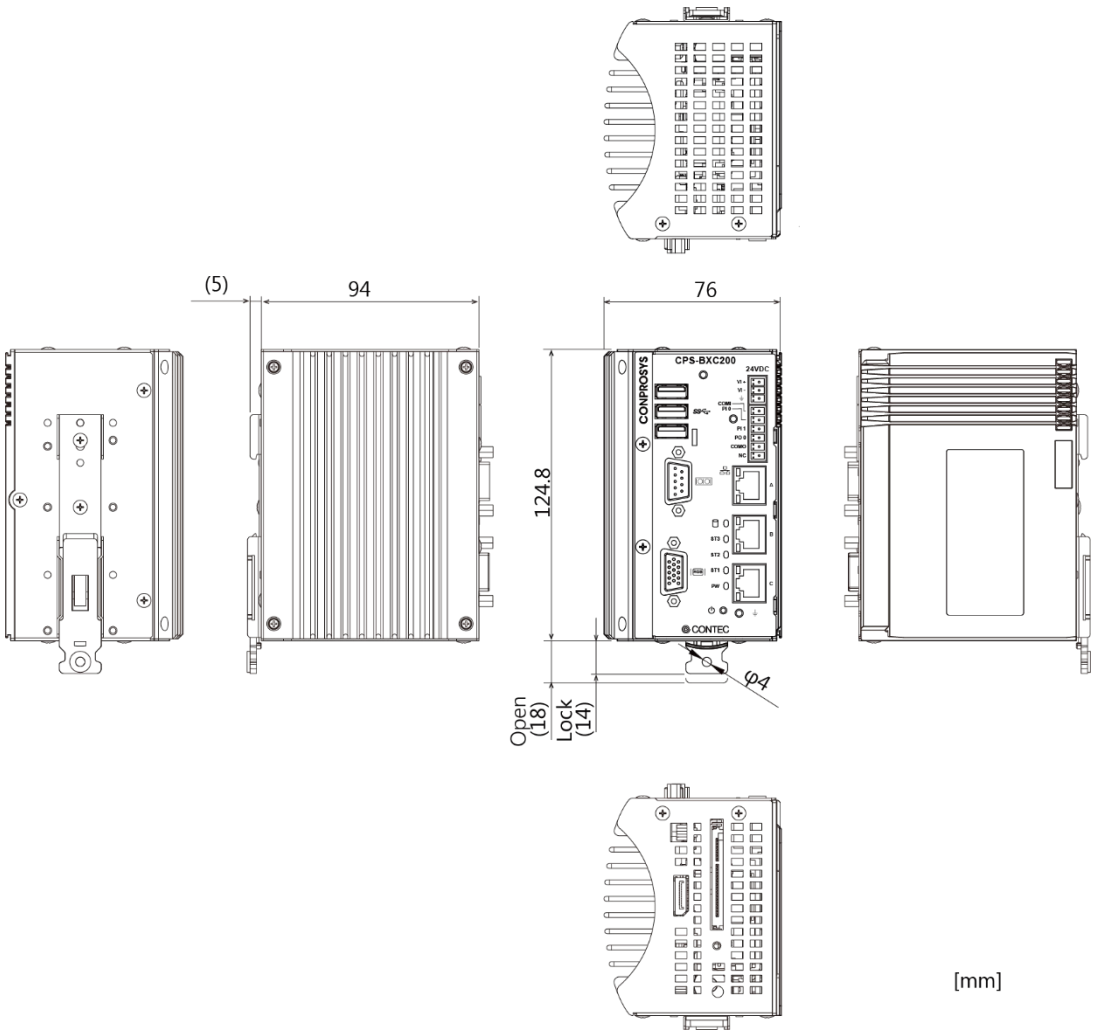
DC Voltage	Acceptable Tolerance
+ 24V	+ 21.6V – 26.4V

⚠ 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 plugging or unplugging power cables, always confirm the power has not been supplied beforehand.
- When you restart the power, give the product for at least five seconds (or longer) of the power OFF time after PWR-LED has been turned off.
- When power is applied to the connected display monitor, the screen might not display images properly depending on the timing. First, apply power to the display monitor before turning on the product.

- With some USB devices, power might flow in the reverse direction to the host PC via connected cable when turning off the product. If you connect this type of device, the product might not be able to boot since 5V power supply cannot be turned off appropriately.
  In this case, remove the USB device once, turn on the product power, then set back the USB. (When using USB device as a boot device, connect it before device detection.)
- When you use with the CPS-PWD-90AW24-01 (by CONTEC), instantaneous voltage drop allowed time is 20 milliseconds or less

2.Physical Dimensions



[mm]

3.POST Codes

POST (hex)	Description
< Security (SEC) phase >	
1h	Power ON. The detection of the reset kind (Hard/Soft)
2h	Initialize the microcode load previous AP
3h	Initialize the microcode load previous North Bridge
4h	Initialize the microcode load previous South Bridge
5h	Initialize the microcode load previous OEM
6h	Microcode load
7h	Initialize the microcode load previous AP
8h	Initialize the microcode load previous North Bridge
9h	Initialize the microcode load previous South
Ah	Initialize the microcode load previous OEM
Bh	Cache initialization
< Pre-EFI Initialization (PEI) phase >	
10h	Start of the PEIcore
11h	PRI memory CPU initialization starts
12h - 14h	PRI memory CPU initialization (Specific CPU module)
15h	PRI memory, North Bridge initialization starts
16h - 18h	PRI memory, North Bridge initialization (Specific North Bridge module)
19h	PRI memory, South Bridge initialization starts
1Ah - 1Ch	PRI memory, South Bridge initialization (Specific South Bridge module)
1Dh	Wait for completion of configurable type module initialization (4 sec max.)
1Eh - 2Ah	OEM, PRI memory initialization code
2Bh	Memory initialization : Serial Presence Detect(SPD) Data loading
2Ch	Memory initialization : Memory detection
2Dh	Memory initialization : Programming of the memory timing information
2Eh	Memory initialization : Memory configuration
2Fh	Memory initialization : Others
30h	ASL for reserved (Refer to ACPI/ASL Checkpoints)
31h	Memory installed
32h	CPU post memory initialization starts
33h	CPU post memory initialization : Cache initialization
34h	CPU post memory initialization : Application Processor(s)(AP) initialization
35h	CPU post memory initialization : Boot strap processor(BSP) selection
37h	CPU post memory initialization : System Management Mode(SMM) initialization

POST (hex)	Description
38h	Post memory, North Bridge initialization starts
39h - 3Ah	Post memory, North Bridge initialization (Specific North Bridge module)
3Bh	Post memory, South Bridge initialization starts
3Ch - 3Eh	Post memory, South Bridge initialization (Specific South Bridge module)
3Fh - 4Eh	OEM post memory initialization code
4Fh	DXE IPL startup
< Driver Execution Environment (DXE) phase >	
60h	DXE core startup
61h	NVRAM initialization
62h	South Bridge runtime services installation
63h	CPU DXE installation start
64h - 67h	CPU DXE installation start (Specific CPU module)
68h	PCI host bridge installation
69h	North Bridge DXE initialization starts
6Ah	North Bridge DXE SMM initialization starts
6Bh - 6Fh	North Bridge DXE initialization (Specific North Bridge module)
70h	South Bridge DXE initialization starts
71h	South Bridge DXE SMM initialization starts
72h	South Bridge device initialization
73h - 77h	South Bridge DXE initialization (Specific South Bridge module)
78h	ACPI module initialization
79h	CSM initialization
7Ah - 7Fh	For future AMI DXE codes reserved
80h - 8Fh	OEM DXE initialization code
90h	Boot Device Selection(BDS) Phase
91h	Driver connection start
92h	PCI bus initialization starts
93h	PCI bus hot plug controller initialization
94h	Enumerate PCI bus number
95h	PCI bus resource requests
96h	PCI bus resource allocation
97h	Console output device connection
98h	Console input device connection
99h	Super IO initialization
9Ah	USB installation start
9Bh	USB reset
9Ch	USB detection
9Dh	USB enabling
9Eh - 9Fh	For future AMI codes reserved

POST (hex)	Description
A0h	IDE initialization starts
A1h	IDE reset
A2h	IDE detection
A3h	IDE enabling
A4h	SCSI initialization starts
A5h	SCSI reset
A6h	SCSI detection
A7h	SCSI enabling
A8h	Confirm Password Setup
A9h	Starting of a setup
AAh	ASL for reserved (Refer to ACPI/ASL Checkpoints)
ABh	Setup input wait
ACh	ASL for reserved (Refer to ACPI/ASL Checkpoints)
ADh	Boot preparation events
AEh	Legacy boot event
AFh	Boot Service event ends
B0h	Virtual address maps run-time settings begin.
B1h	Virtual address maps of runtime configuration exit
B2h	Legacy option ROM initialization
B3h	System reset
B4h	USB hotplug
B5h	PCI bus hot plug
B6h	NVRAM cleanup
B7h	Configuration reset (Reset the NVRAM settings)
B8h - BFh	For future AMI codes reserved
C0h - CFh	OEM BDS initialization code
ACPI/ASL Checkpoints	
01h	System is entering S1 sleep state
02h	System is entering S2 sleep state
03h	System is entering S3 sleep state
04h	System is entering S4 sleep state
05h	System is entering S5 sleep state
10h	System is waking up from the S1 sleep state
20h	System is waking up from the S2 sleep state
30h	System is waking up from the S3 sleep state
40h	System is waking up from the S4 sleep state
ACh	Move to system ACPI mode. The interrupt controller PIC mode.
AAh	Move to system ACPI mode. The interrupt controller APIC mode.

4.SERIAL I/O Address and Register Function

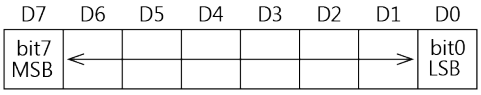
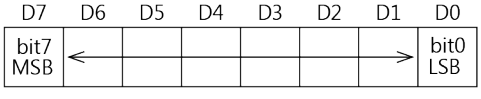
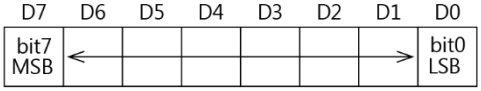
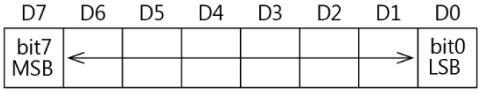
◆ I/O address

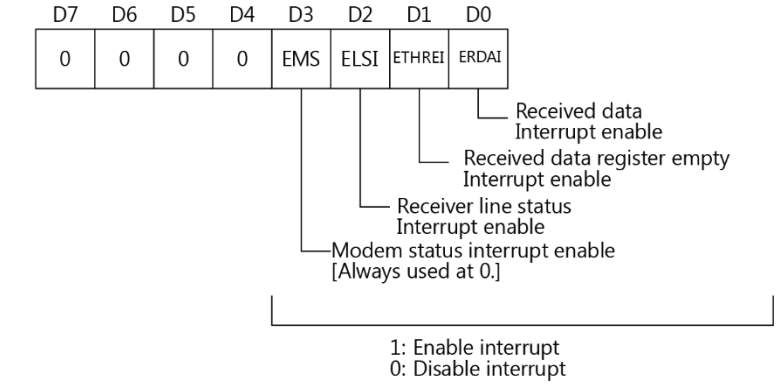
The following table lists the I/O addresses of SERIAL A.

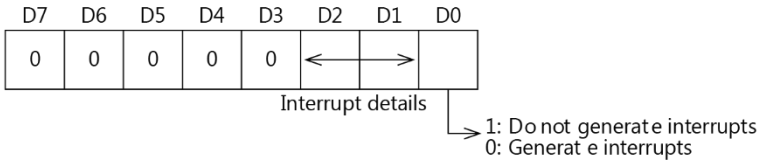
I/O address	DLAB	Read/Write	Register	
03F8H	0	W	Transmitter holding register	THR
		R	Receive buffer register	RBR
	1	W	Divisor latch register (LSB)	DLL
03F9H	1	W	Divisor latch register (MSB)	DLM
	0	W	Interrupt enable register	IER
03FAH	X	R	Interrupt ID register	IIR
03FBH	X	W	Line control register	LCR
03FCH	X	W	Modem control register	MCR
03FDH	X	R	Line status register	LSR
03FEH	X	R	Modem status register	MSR
03FFH	X	R/W	Scratch register	SCR

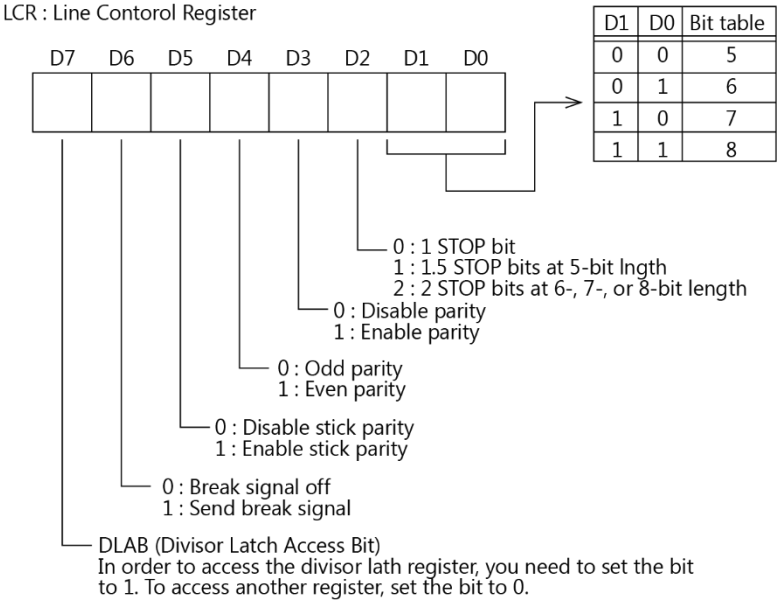
*DLAB (Divisor Latch Access Bit) : The value in bit 7 of the line control register.

◆ Function of Each Register

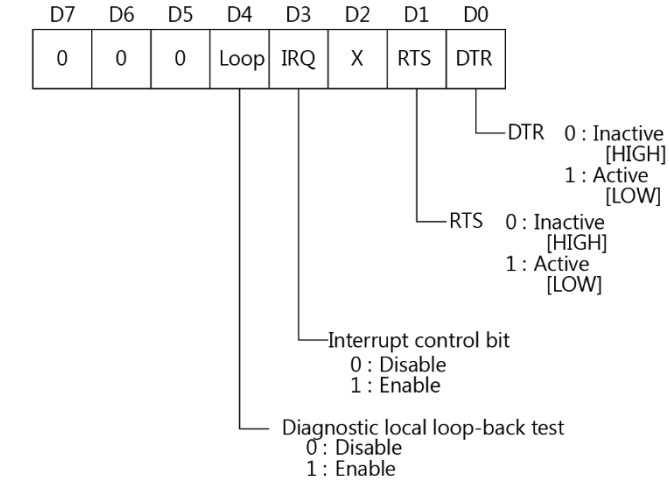
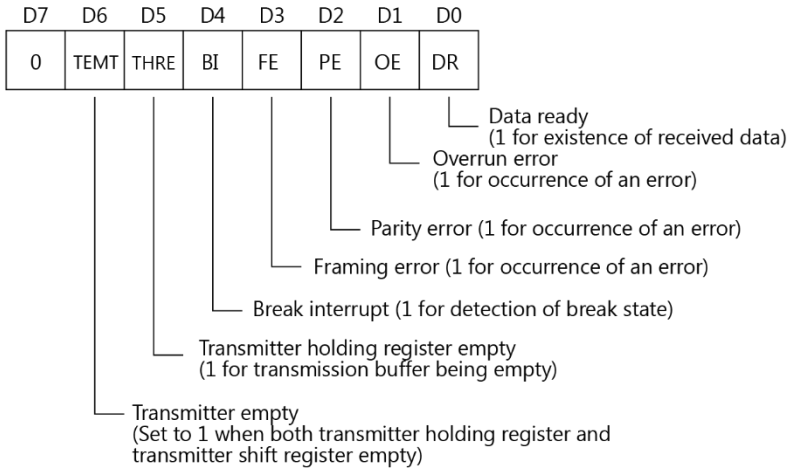
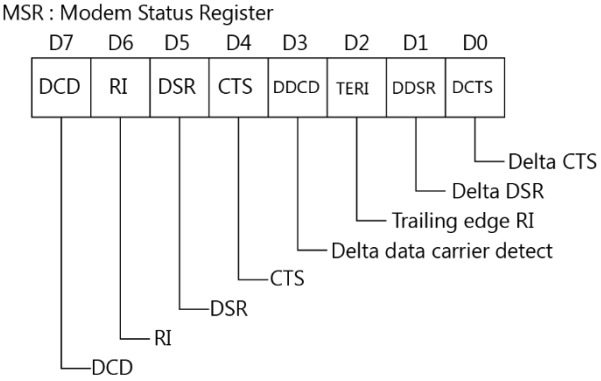
I/O address	Description
03F8H	THR : Transmitter Holding Register [DLAB=0]  Register dedicated to write transmitted data to
03F8H	RBR : Reciever Buffer Register [DLAB=O]  Register dedicated to read recceived data from
03F8H	DLL : Divisor Latch (LSB) [DLAB=1]  Baud rate setting register (LSB)
03F9H	DLH : Divisor Latch (MSB) [DLAB=1]  Baud rate setting register (MSB)

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03F9H</td><td>
IER : Interrupt Enable Register DLAB=0]


</td></tr>
<tr><td>03FAH</td><td>
II R : Interrupt Identification Register


<table>
<tr><th>bit2</th><th>bit1</th><th>bit0</th><th>Priority</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>——</td><td>Interrupts are not generated.</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1 (high)</td><td>Generated by overun, parity, framing error or break interrupt.
Cleared when the line status register is read.</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>2</td><td>Generated when the receive buffer register is ready.
Cleared when the receiving buffer is read.</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>3</td><td>Generated when the transmitter holding register is empty. Cleared when the IIR is read or when transmitted data is written to THR.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>4 (low)</td><td>Modem status interrupt is generated.
(CTS, DSR, RI, CD)
Cleared when the modem status register is read.</td></tr>
</table>
</td></tr>
<tr><td>03FBH</td><td>
LCR : Line Contorol Register


</td></tr>
</table>

I/O address	Description
03FCH	MCR : Modem Controll Register 
03FDH	LSR : Line Status Register 
03FEH	MSR : Modem Status Register 
03FFH	SCR : Scratchpad Register This is an 8-bit, readable/writable register which is available to the user to allow data to be saved temporarily.

Baud Rate Settings

A baud rate is set with software by dividing the clock input (1.8432MHz). The baud rate in terms of hardware can be set to a maximum of 115,200 bps for SERIAL. The baud rates available in practice depend on the operating environment (cable, software, etc.). The table below lists typical baud rates and their respective values to be written to the divisor latch register (LSB, MSB).

Baud rate to be set	SERIAL Clock input (1.8432MHz)	
	Value to be set in the divisor register (Decimal)	Setting error (%)
50	2304	---
75	1536	---
110	1047	0.18
134.5	857	0.099
150	768	---
300	384	---
600	192	---
1200	96	---
1800	64	---
2000	58	0.53
2400	48	---
3600	32	---
4800	24	---
7200	16	---
9600	12	---
14400	8	---
19200	6	---
28800	4	---
38400	3	---
57600	2	---
76800	---	---
115200	1	---
153600	---	---
230400	---	---

Example : To set 9,600 bps, write "00" to the divisor latch register (MSB) and "12 (decimal)" to the divisor latch register(LSB).

5.Battery Disposal

1. Battery Specification

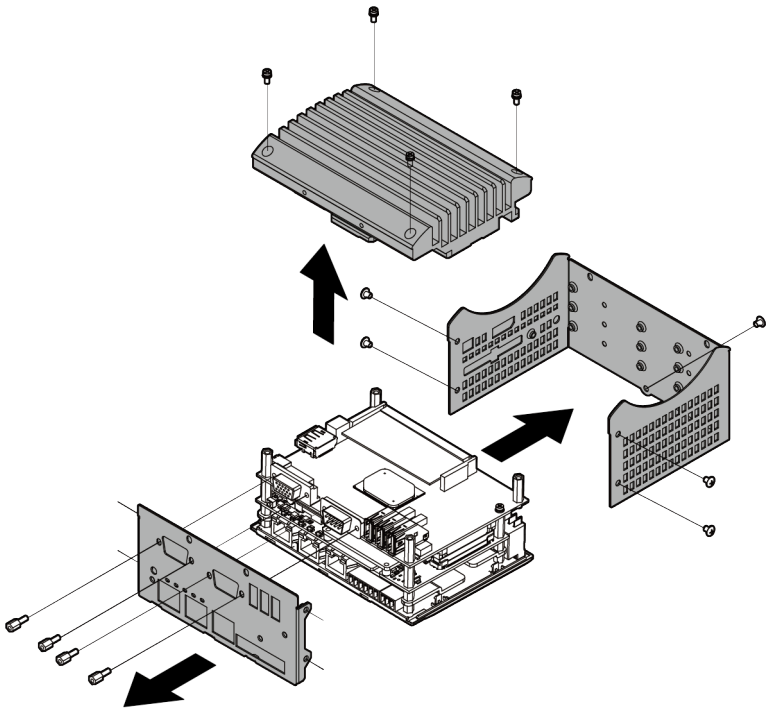
The product contains one battery and the details are as follows:

Item	Description
Type	Lithium primary battery
Model	BR-1/2A
Maker	Panasonic
Nominal Voltage	3V
Nominal capacity	1000mAh
Lithium content	1g or less

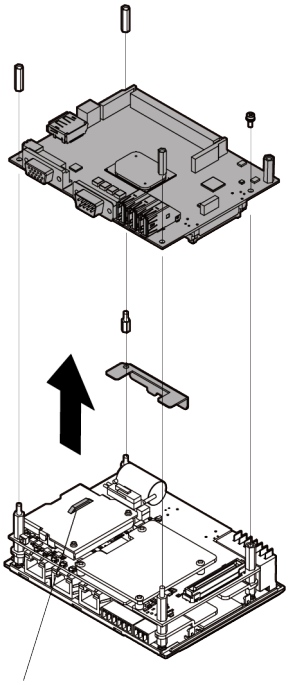
2. How to remove the battery

When disposing of the product, follow the instruction below and remove the battery.

1 Unscrew 13 screws and remove the body cover.

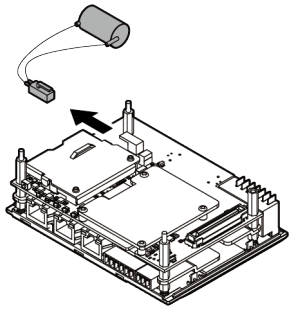


2 Remove the cover securing the screw and the battery. Cut the cable tie that is securing the power cable with nippers.



Cut the cable tie that is securing the power cable with nippers.

3 Take off the battery.



⚠ CAUTION

When disposing of the battery, please comply with your local municipal regulations and ordinances.

6.Life of M.2

1. About Write Endurance

M.2 Card (pSLC, MLC, TLC) contained in product has a write endurance which limits the number of times each memory may be written, due to the characteristic of the memory that is used.

M.2 Card (pSLC)

For the write endurance, use the calculations below to obtain an estimated value.

Write endurance (cycles) =

((Total capacity (KB) / Management page size (KB)) × NAND Flash memory life span (cycles))

/ The number of management page to be rewritten per 1 cycle

Management page size (KB) 16K×8=128K

Capacity (KB) 62,914,560(sector)/2 = 31,457,280 *1

NAND Flash memory life span (cycles) 20,000 cycles

Example

When the file of 4MB is made, and it rewrites it once per 10 minutes.

Write endurance = ((31,457,280 / 128) × 20,000) /32 = 153,600,000 (cycles)

Life = 153,600,000 / ((60 / 10) x 60 x 24 x 365) ≈ 48.7 (years).

*1 This is when using the 32GB model (pSLC). For the 64GB model(pSLC), calculate by doubling the capacity value (62,914,560).

M.2 Card (MLC, 32GB)

For the write endurance, use the calculations below to obtain an estimated value.

Write endurance (cycles)= ((capacity (KB) x NAND Flash memory life span (cycles)) / Writing data size (KB)

Capacity (KB) = 32,017,047

NAND Flash memory life span (cycles) 30,000 cycles

Example

When the file of 4MB is made, and it rewrites it once per 10 minutes.

Write endurance = (32,017,047 x 3,000) / 4,096 = 23,449,986 (cycles)

Life = 23,449,986 / ((60 / 10) x 60 x 24 x 365) ≈ 7.4 (years)

M.2 Card (MLC, 64GB)

Write endurance can be calculated by the following formula as a reference value:

Write endurance (years) =

Total capacity (cycles) / (The number of annual consumed blocks / The total number of blocks)

Example

When the file of 4MB is made, and it rewrites it once per 10 seconds.

The number of annual consumed blocks = 1 x ((60 / 10) x 60 x 24 x 365)) = 3,153,600 (blocks)

Life = 3,000 / (3,153,600 / 16,000) ≠ 15.2 (years)

M.2 Card (TLC, 128GB)

Write endurance can be calculated by the following formula as a reference value:

Write endurance (years) =

Total capacity (cycles) / (The number of annual consumed blocks / The total number of blocks)

Example

When the file of 4MB is made, and it rewrites it once per 10 seconds.

The number of annual consumed blocks = (4 x (60 / 10) x 60 x 24 x 365) / 18 = 700,800 (blocks)

Life = 3,000 / (700,800 / 7,200) ≠ 30.8 (years)

Bear in mind that these are reference values, confirm its life span by S.M.A.R.T.

When writing data smaller than 128K of the management page size, the write endurance could be smaller than the calculated life.

2. About S.M.A.R.T.

Life expectancy can be obtained by installing the self- diagnosis program that acquires S.M.A.R.T. information of SSD.

* For more information, visit the CONTEC's Web site.

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.

Product Name	Model type	Description
DIN rail fitting power supply	CPS-PWD-90AW24-01	Fitting power supply 90W (Input: 100 - 240VDC, Output: 24VDC 3.8 A)
CFast Card(SLC)	CFS-4GB-A	CFast Card 4GB
	CFS-8GB-A	CFast Card 8GB
	CFS-16GB-A	CFast Card 16GB
CFast Card(MLC)	CFS-32GBM-A	CFast Card 32GB
	CFS-128GBM2-A	CFast Card 128GB
CFast Card(Q-MLC)	CFS-16GBQ-A	CFast Card 16GB
	CFS-32GBQ-B	CFast Card 32GB (Higher environmental resistance type)
Configurable Type Model	CPS-DIO-0808L	with digital input/output (No built-in power supply)
	CPS-DIO-0808BL	with digital input/output (built-in power supply)
	CPS-DIO-0808RL	with digital input/output (current source)
	CPS-DI-16L	with digital input (current sink)
	CPS-DI-16RL	with digital input (current source)
	CPS-DO-16L	with digital output (current sink)
	CPS-DO-16RL	with digital output (current source)
	CPS-RRY-4PCC	with relay output
	CPS-AI-1608LI	with analog input (voltage input 8 channels)
	CPS-AI-1608ALI	with analog input (current input 8 channels)
	CPS-AO-1604LI	with analog output (current output 4 channels)
	CPS-AO-1604VLI	with analog output (voltage output 4 channels)
	CPS-CNT-32021	with counter input
	CPS-COM-1PC	with RS-232C (contains 1port)
	CPS-COM-2PC	with RS-232C (contains 2 ports)
	CPS-COM-1PD	with RS-422A/485 (1channel)
	CPS-COM-2PD	with RS-422A/485 (2 channels)

⚠ CAUTION

The normal operation may be impaired or the functions may be limited if a product other than our optional ones are used.

Visit the Contec website for the latest optional products.

Website https://www.contec.com/

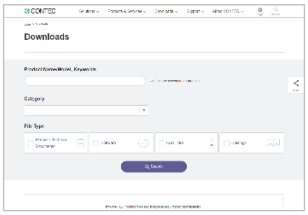
Customer Support and Inquiry

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 device driver, firmware, and differential manuals in several languages. Membership registration (myCONTEC) is required to use the services.

Revision History

MONTH YEAR	Summary of Changes
November 2018	The First Edition
June 2019	The lineup of memory 8GB type was added.
December 2019	Additional information was listed due to some parts change.
October 2022	Changes due to reduction of bundled products
February 2024	The lineup of M.2 card (TLC, 128GB) type was added.

CONTEC CO., LTD. 3-9-31, Himesato, Nishiyodogawa-ku, Osaka 555-0025, Japan

https://www.contec.com/

CPS-BXC200 Reference Manual

NA09960 (LXDH412) 06042024_rev11 [11292018] June 2024 Edition