CONTEC

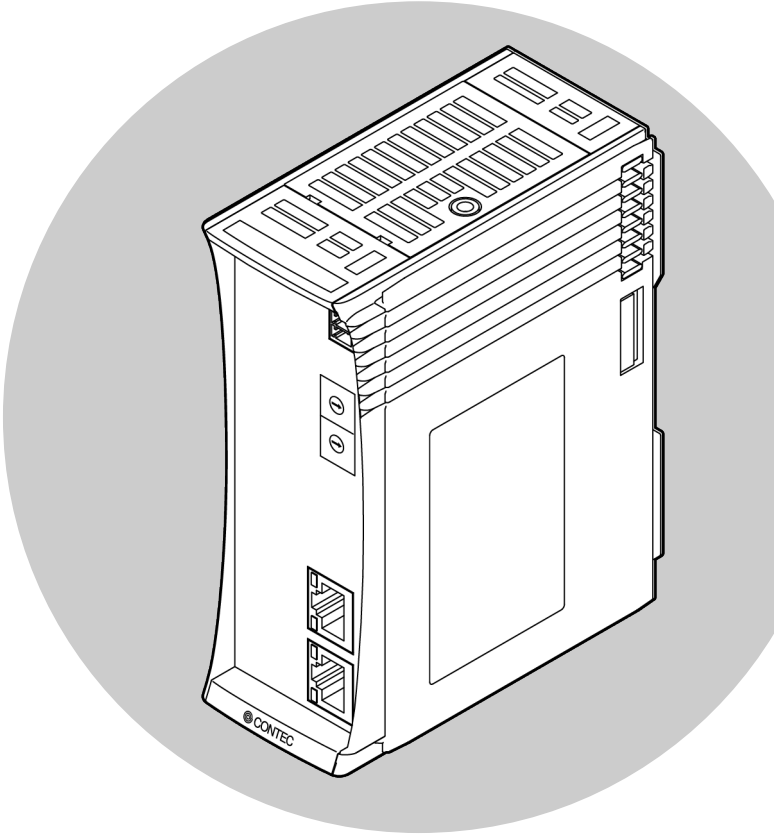
CONPROSYS

Reference Manual

(Hardware)

CODESYS EtherCAT master

CPS-PCS341EC-DS1-1201



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CONTEC CO., LTD.

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Table of Contents

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)
Setup Manual	Read this when setting up the product.	This describes the required items for setup and configuration procedure.	Download from the Contec website (PDF)
Reference Manual (Hardware)	Read this when operating the product.	This describes the hardware aspects such as functions and settings.	Download from the Contec website (PDF)
Reference Manual (Software)	Read this when setting up the "CONPROSYS WEB Setting"	This describes how to set each function of "CONPROSYS WEB Setting".	Download from the Contec website (PDF)

◆ Download Manuals

Download the manuals accordingly from the following URL.

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

2.Check the Firmware Version

Before start using the product, visit our website to check the firmware version and update to the latest one if necessary.

Updating firmware to the latest version will resolve troubles and stabilize the operation.

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

*Refer to the **"Reference Manual (Software)"** for the details of the firmware updating.

3.About the Product

This product is an EtherCAT Master controller with isolated digital input and output (Input: 4ch, Output: 4ch), RS-232C, and LAN interface.

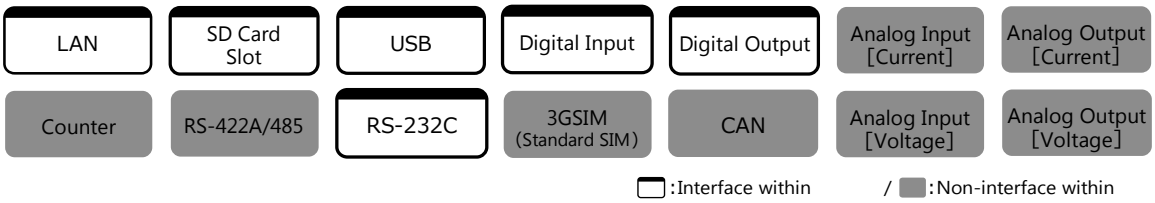
As you desire, add the configurable type modules of our CONPROSYS series.

This product contains the CODESYS* Soft PLC. You can create your own PLC program and run with the CODESYS software.

*CODESYS is a device-independent PLC-programming system that is complied with the IEC 61131-3 standard and supports all standard programming languages such as ST or LD.

4.Interface Within

This product is a M2M controller with the following interfaces.



With the CONPROSYS series, data collected from various types of facilities can be managed centrally.

5.Features

1. Hardware features

■ Add configurable modules

This product allows you to install modules from a wide variety of types to suit the needs of the user.
* Up to 16 modules can be set and the total current consumption should be less than 3.3A.

■ No base board required

As the product requires no base board for installation, it helps add modules easily and smoothly.
Installed modules can be removed from any set positions on DIN rail.

■ Compact design

Compact design, 44.7(W)×94.7(D)×124.8 (H), features flexibility in installation.

■ 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.

■ A powerful running platform without fan

The product contains the ARM® Cortex®-A8 processor (600MHz) and the DDR3 512MB system memory.

■ Decrease damages by bus isolation and surge protection. (digital input/output)

Electrical isolation between the digital input/output and CPU can block electrical noise flow. Moreover, the surge protection elements are adopted

■ Opto-coupler Isolation input and semiconductor relay output

The product has the switchable four channels of opto-coupler isolation input (compatible with current sink output) and semiconductor relay output. It is usable for external switch inputting or LED lighting.

■ Max. 115,200bps RS-232C serial communication

The Product has one RS-232C-standard serial port. Baud rates from 300 to 115,200 bps can be set.

■ Installation easy with two pieces of terminal support and DIN rail

You can install and remove a terminal connector without a screwdriver so that it can shorten the time of the replacement. As the product can be mounted on a DIN rail, removing and replacing are easy as well.

■ Equipped with LED for an operation check

The product has LED for an operation check, which helps you visually confirm the communication status of each interface.

■ No electrolytic capacitor battery

No electrolytic capacitor is used. The Contec is creating the product with a longer life.

2. Software Features

■ Feature the CODESYS SoftPLC

CODESYS is a device-independent-PLC-programming system that is compliant with the IEC 61131-3 standard and supports all standard programming languages such as ST or LD.

■ Harmonize with EtherCAT Master

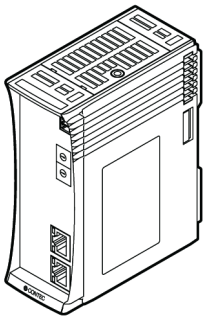
EtherCAT is a strong, efficient real-time Ethernet field bus system with an open protocol. Various EtherCAT slave devices from differing makers can be performed together with EtherCATMaster of this product.

■ Together with OPC UA Server

OPC UA (Unified Architecture) is an advanced model of OPC specifications, which presents refined capability of communicating with higher-order system in addition to transferring and receiving data of devices or plants. OPC UA is a platform independent standard based on TCP. The product can be operated with HMI and SCADA software that support OPC UA clients from various makers.

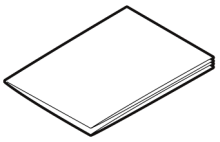
6.Product Configuration List

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.

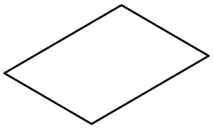


Product...1

End Cover...1

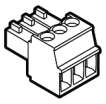


Product Guide...1

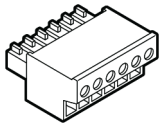


Warranty Certificate...1

Serial Number Label...1



3-pin Connector...1



6-pin Connector...1

CODESYS Runtime license...1
(attached on the side of the product)

- 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 fulfil certification requirements. Please see the Contec website regarding power supply recommendation (https://www.contec.com/).

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.

⚠ **DANGER**	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ **WARNING**	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ **CAUTION**	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

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

- 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)
- 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 or cables, 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.
- 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 is an open-type device (a device designed to be housed inside other equipment) and must always be mounted inside a mechanical enclosure having enough strength.
- 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 20 minutes, then start the works.
- About a caution mark on the product : Touching the product may cause a burn as the surface becomes extremely hot during the operation.
- Disconnection between the product and the module during the operation may result in damage. To prevent the disconnection, always mount both of them on DIN rail for operations.
- 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.

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. Display marking

Display of power (Input Rating Label)

DC power supply

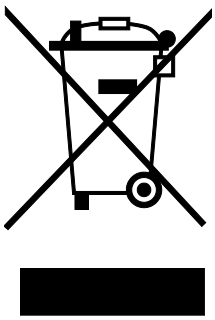
Display of functional earth terminal

Functional earth terminal

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

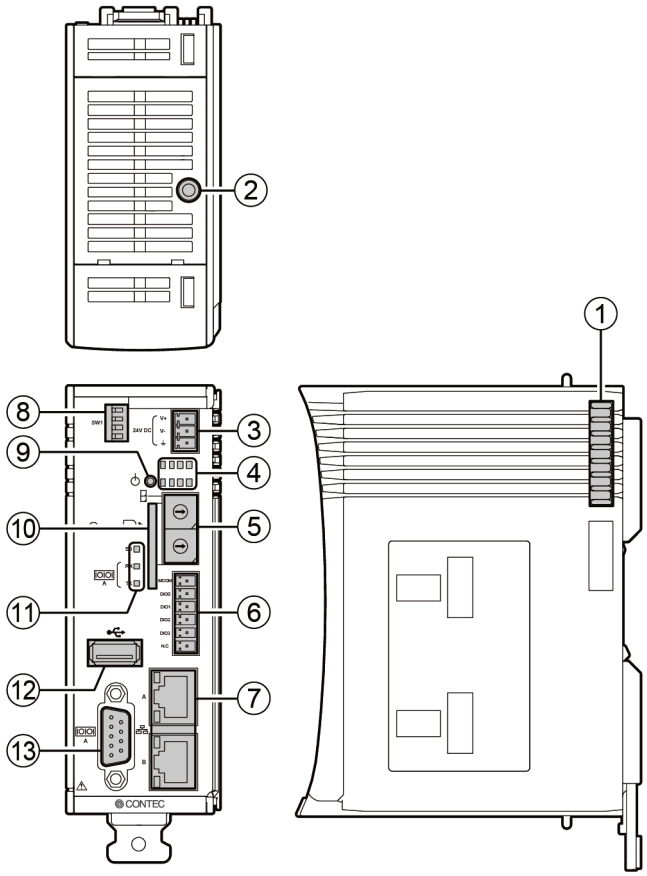
Refer to the appendix for the specification as well as how to remove and dispose of the battery.

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	Used for power supply and communication with the configurable type module.
2	Maintenance Connector	Do not use it.
3	Power Connector	Use the 3-pin connector, included in the package.
4	LED Indicator 1	This indicates status of the product.
5	Rotary Switch	Used for user setup.
6	Digital I/O Connector	This is a connector for digital I/O. (Use the 6-pin connector, included in the package)
7	LAN Port	This is a connector for LAN.
8	DIP Switch	This is used for user setup.
9	Power Switch	This is used for controlling of the power supply.
10	SD Card Slot	This is for data storage.
11	LED Indicator 2	This indicates the status of the product.
12	USB Port	This is a USB port of type-A.
13	RS-232C Serial Port	This is a RS-232C serial ports (male).

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

- Never set or remove the product while power is active.
- Always confirm the PWR-LED is turned off before setting or removing the devices.

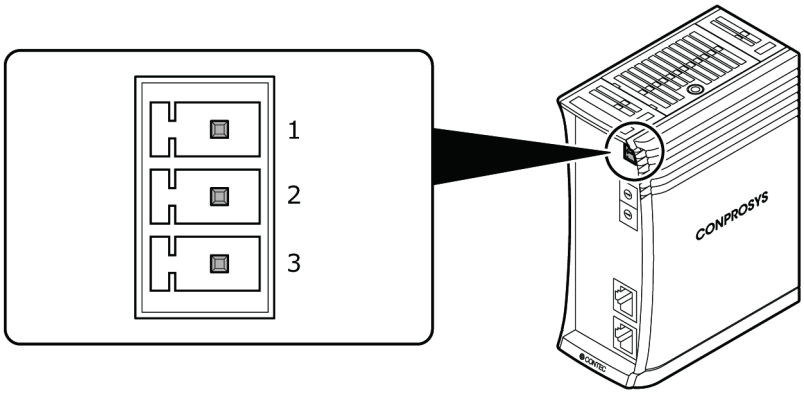
2. Maintenance Connector

Do not use this. (Maintenance purpose only)

3. 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

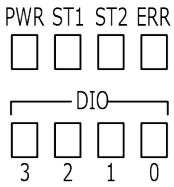
Pin No.	Signal Name	Description
1	V+(24VDC)	24VDC
2	V- (GND)	Ground
3	FG	Frame Ground

4. 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 1



Color and Description

LED	Color	Display	Description
PWR	Green	ON	Power has been supplied.
		OFF	Power has not been supplied.
ST1	Green	-	Refer to the Reference Manual (Software).
ST2	Red	-	Refer to the Reference Manual (Software).
ERR	Red	ON	It lights up when error occurs.
		OFF	It indicates the system runs normally.
DIO0 - DIO3	Green	ON	It lights up at the time of I/O.
		OFF	It indicates there is no I/O.

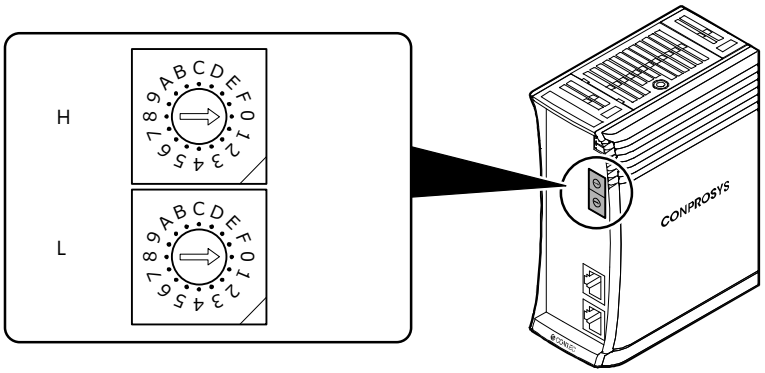
◆ LED Indicator 2

Color and Description

LED	Color	Display	Description
SD	Green	Flashing	It flashes at the SD access.
		OFF	It indicates there is no SD access.
COM-RX	Green	Flashing	It flashes when receiving data by the RS-232C.
		OFF	It indicates data has not been received by the RS-232C.
COM-TX	Green	Flashing	It flashes upon transmitting data by the RS-232C.
		OFF	It indicates there is no data transmission by the RS-232C.

5. Rotary Switch

For both H and L of ID, use with the setting [00].



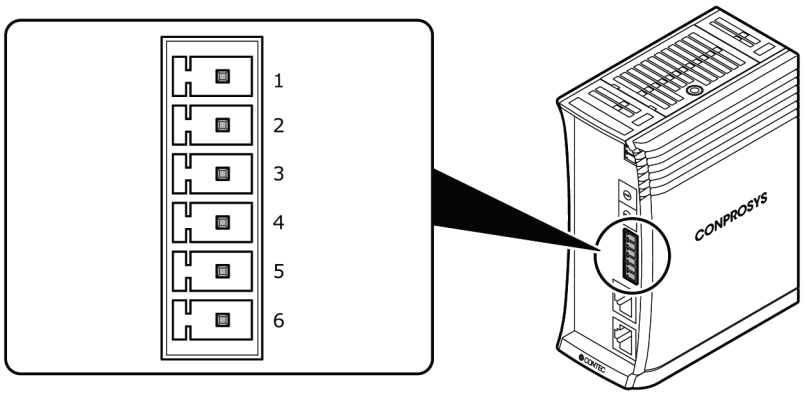
6. Digital Input/Digital Output Connector

This product has 4 channels of digital input and 4 channels of digital output.

You can switch them as digital input or digital output.

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

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



Pin Assignment

Pin No.	Signal Name	Description
1	MCOM	This connects the negative-side of the external power and shares with 4 channels of I/O signals.
2	DIO0	I/O signal It connects output signals as digital input, and connects input signals as digital output from other devices.
3	DIO1	I/O signal It connects output signals as digital input, and connects input signals as digital output from other devices.
4	DIO2	I/O signal It connects output signals as digital input, and connects input signals as digital output from other devices.

Pin No.	Signal Name	Description
5	DIO3	I/O signal It connects output signals as digital input, and connects input signals as digital output from other devices.
6	N.C.	This pin is left unconnected.

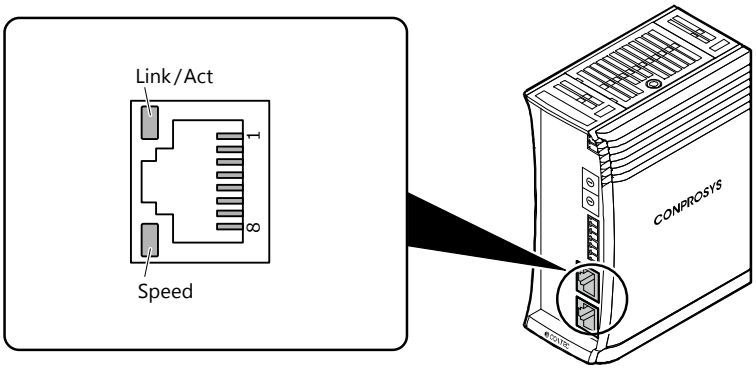
7. LAN Port

This product has 2 ports of Ethernet LAN Port.

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

Transmission speed: 100M/10Mbps

Maximum network path length: 100m/segment



Pin Assignment

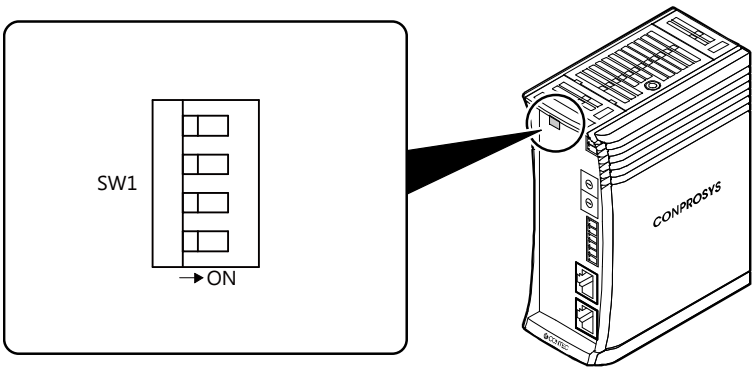
Pin No.	Signal Name	Description
1	TX+	Transmission data (+) output
2	TX-	Transmission data (-) output
3	RX+	Reception data (+) input
4	N.C.	This pin is left unconnected.
5	N.C.	This pin is left unconnected.
6	RX-	Reception data (-) input
7	N.C.	This pin is left unconnected.
8	N.C.	This pin is left unconnected.

Color and Description

LED	Color	Display	Description
Link/Act	Green	ON	It indicate 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	ON	It indicates that LAN port is connected at 100Mbps.
		OFF	It indicates that LAN port is connected at 10Mbps or not connected.

8. DIP switch

It is used for user setup.

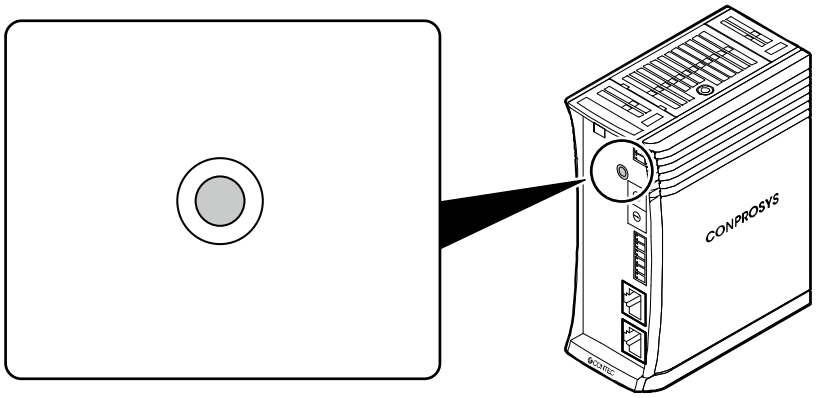


*The factory default of all switches are set to “OFF”.

*Refer to the Reference Manual (Software) for switch setting.

9. Power Switch

It controls the power supply.



Pin Assignment

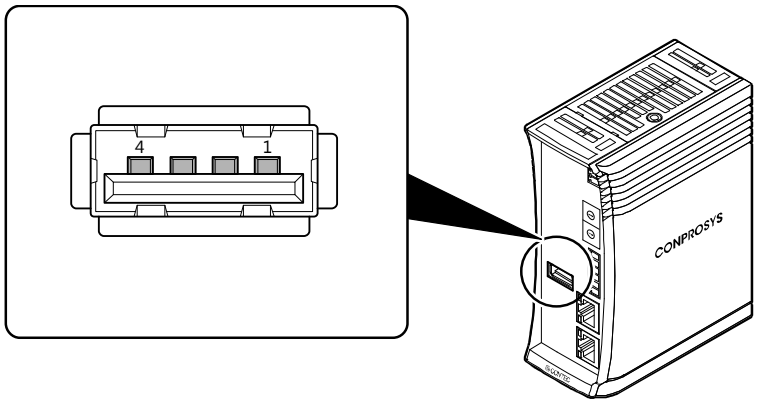
Operation	Description
Press it for a short time:	To turn off the power.
Press it for a while:	To restart the product.

10. SD Card Slot

Insert the SD card to store such as data.

11. USB Port

The product has 1 port of USB interface of TYPE-A.



Pin Assignment

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

⚠ CAUTION

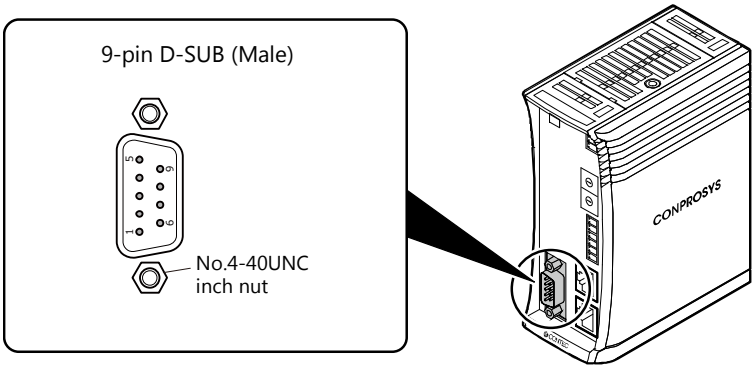
If you use the USB device with bus power, the ambient temperature should be 55 °C or lower.

12. 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

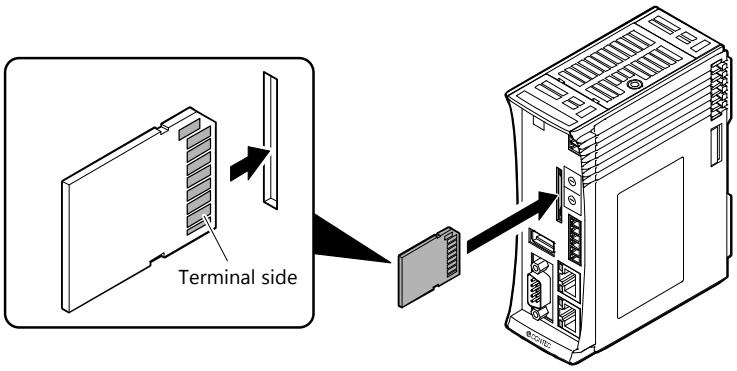
Pin No.	Signal Name	Direction	Description
1	CD	Input	Carrier detection
2	RD	Input	Reception data
3	TD	Output	Transmission data
4	DTR	Output	Data terminal ready
5	GND	-	Signal ground
6	DSR	Input	Data set ready
7	RTS	Output	Request to send
8	CTS	Input	Clear to send
9	RI	Input	Ring Indicate

Setup

This section describes how to set a SD card that is necessary to operate the product.

1.Insert SD Card

1 With the terminal side is in the position shown below (see the figure), insert the SD card all the way into the slot.



*Reverse the procedure described in the "Insert SD card "to remove the card.

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

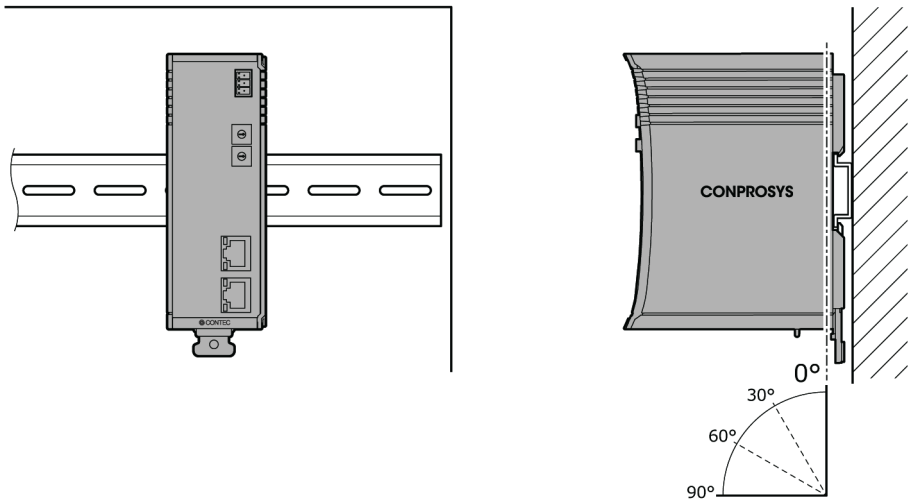
1. Installation Conditions

◆ 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



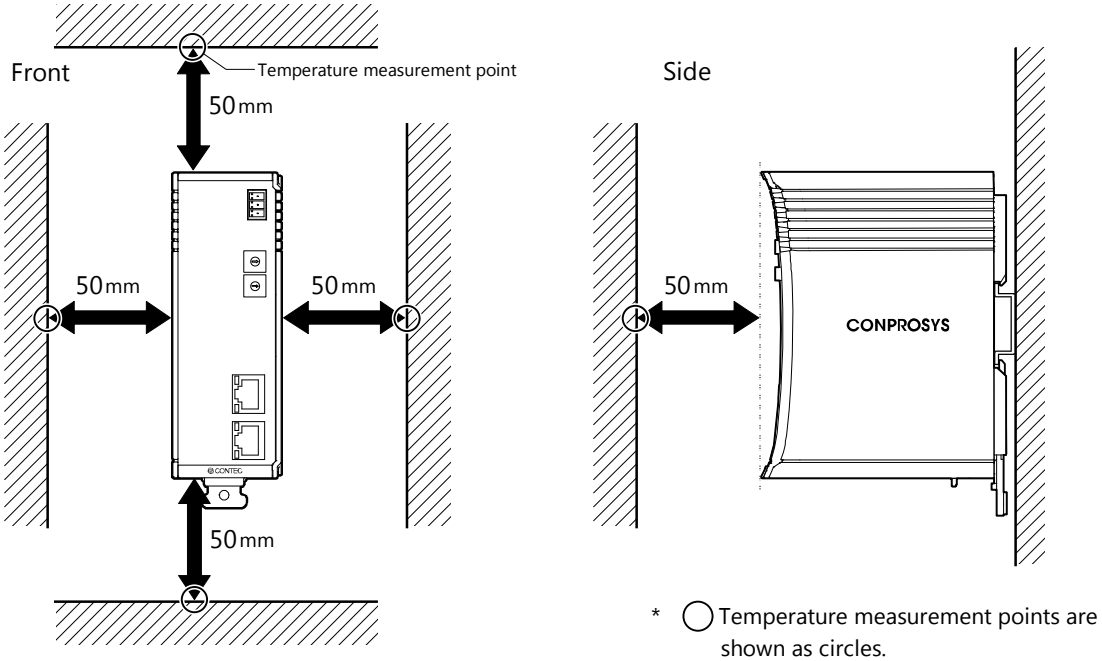
◆ Ambient Temperature

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)

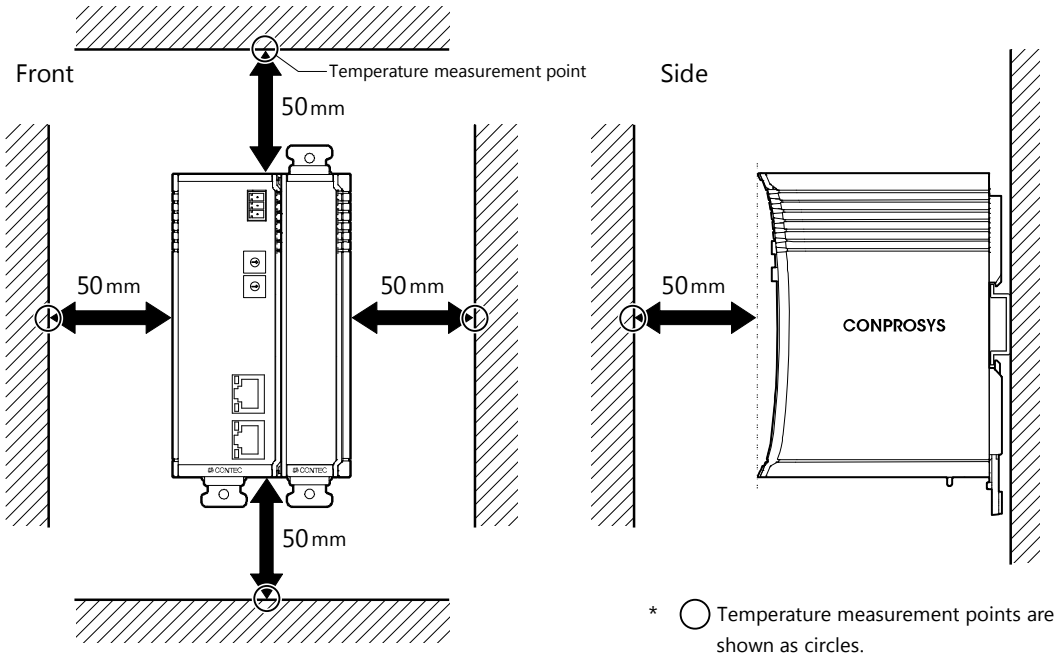
If you use the USB device with bus power, the ambient temperature should be -20 - +55°C.

Configurable controller alone



* ◯ Temperature measurement points are shown as circles.

Configurable controller and module(s)



* ◯ Temperature measurement points are shown as circles.

⚠ CAUTION

- The product is an open-type device (a device designed to be housed inside other equipment) and must always be mounted inside a mechanical enclosure having enough strength.
- 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 shorten. Perform the forced air cooling to counteract.

2. Mounting on/Removing from a DIN Rail

This product should be set on DIN rail for operation.

⚠ CAUTION

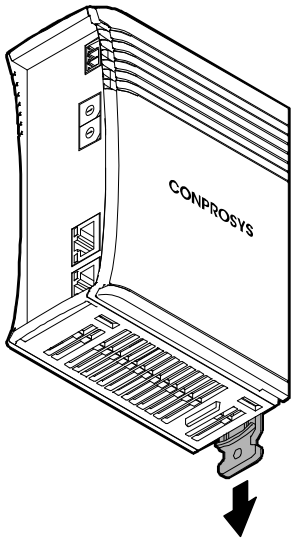
The connection connector of the controller or modules have no locking mechanisms. Therefore, they might be moved over when inserting or removing cables, using the switches, or transferring the products.

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

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

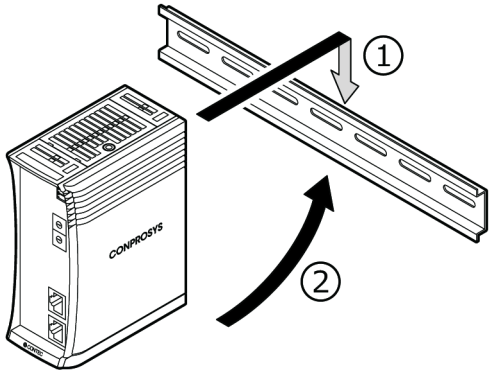
◆ How to Mount

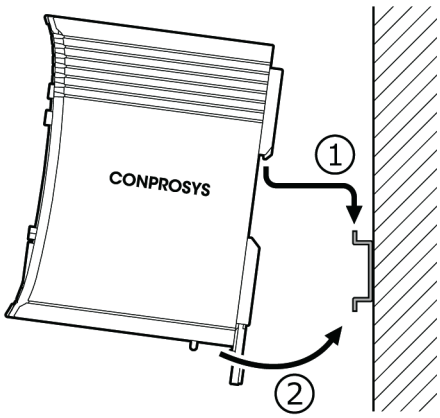
1 Pull down the hook to unlock.
If the hook is stuck, use a slotted screwdriver to unlock.



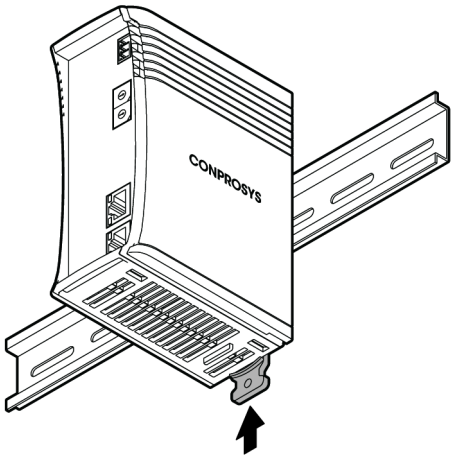
Fixed hook

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



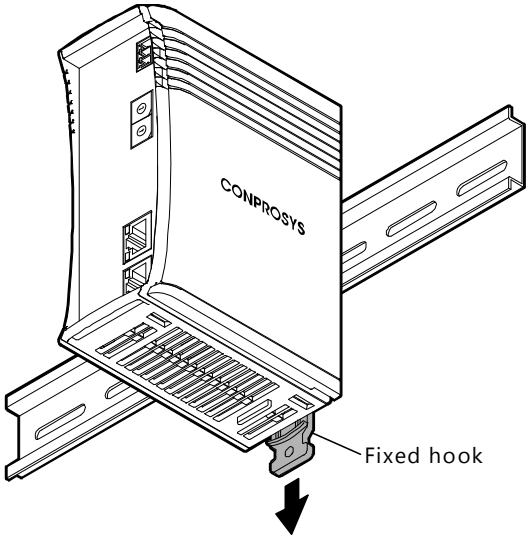


3 Push the hook up to lock the product on the DIN rail.



◆ 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

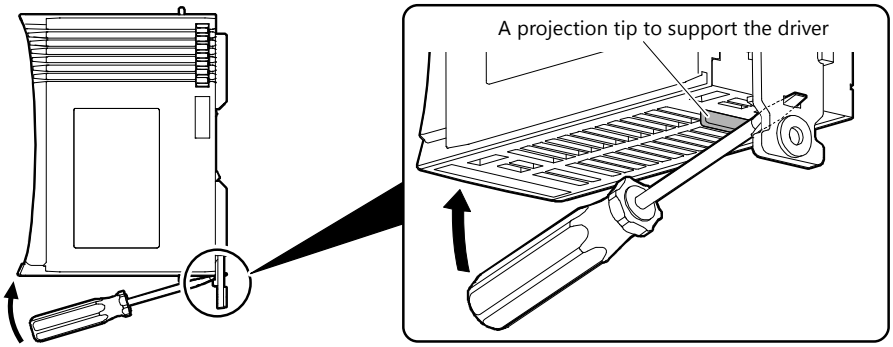
There are two ways to unlock the hook using a slotted screwdriver.

Unlock it by one of the following.

- Using the screwdriver as leverage

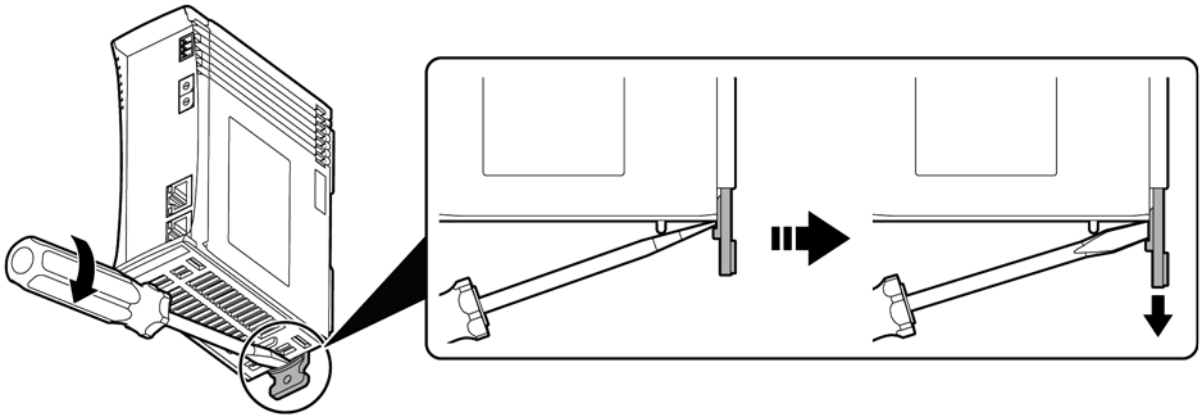
  Insert a slotted screwdriver (the point should be smaller than 4.5mm) into a hole.
  (see the figure below)

  By using the screwdriver as leverage, move it upward in the direction of the arrow to unlock.

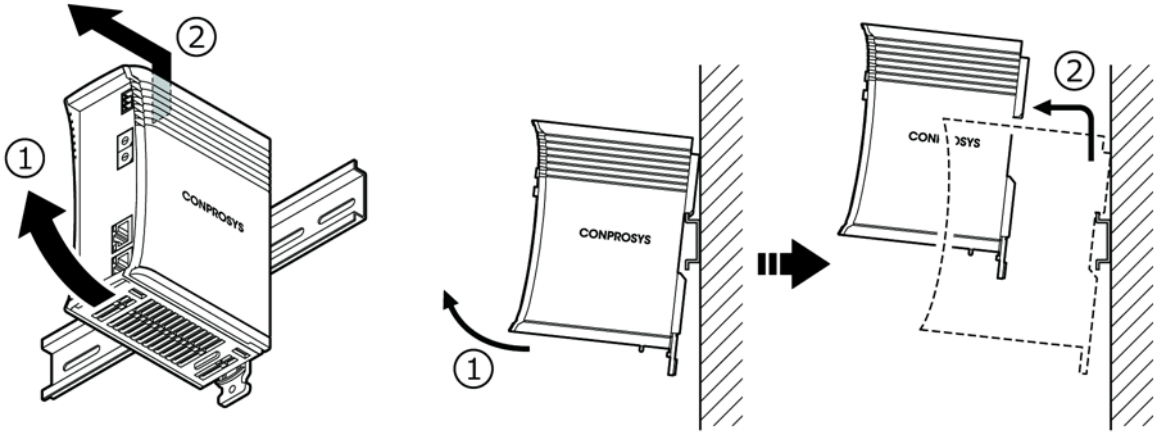


- By rotating the screwdriver

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



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



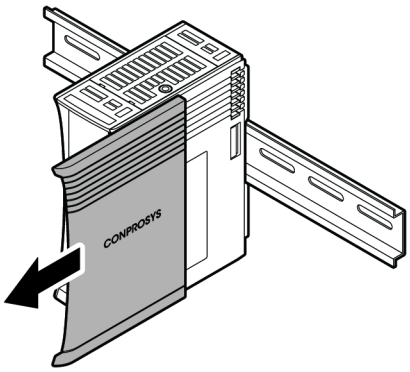
3. Setting the Configurable Type Module

⚠ CAUTION

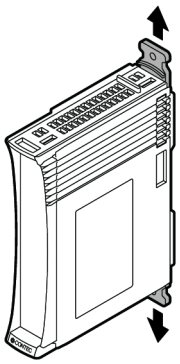
- Always confirm the PWR-LED is turned off before setting or removing the modules
- Always check the module is firmly fixed on DIN rail with hooks when setting the product.

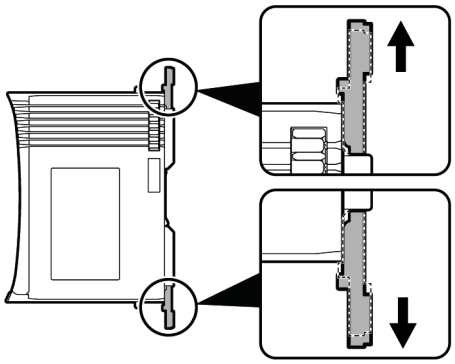
◆ How to Set

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

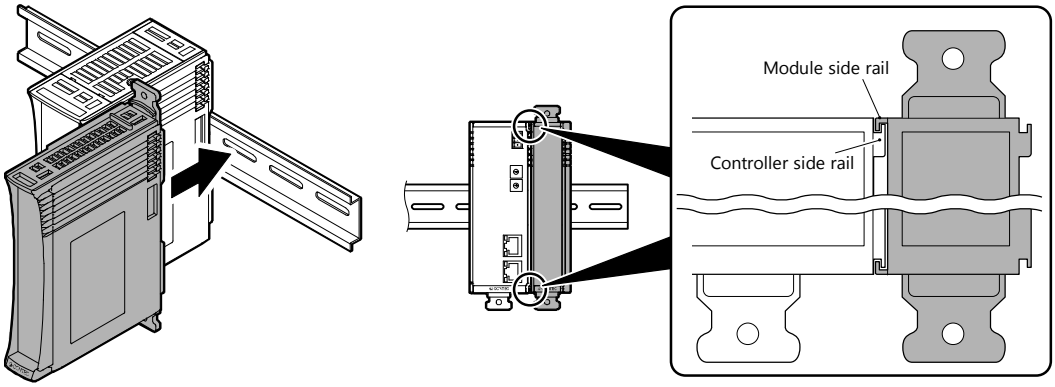


2 Unlock the hooks of the module.
If the hooks are stuck, use a slotted screwdriver to unlock.

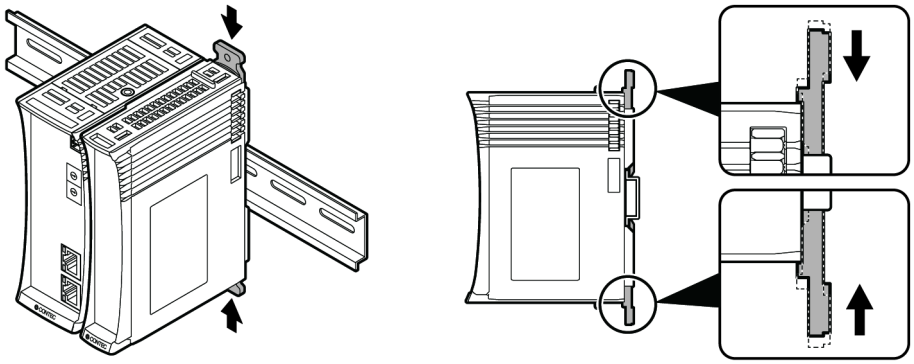




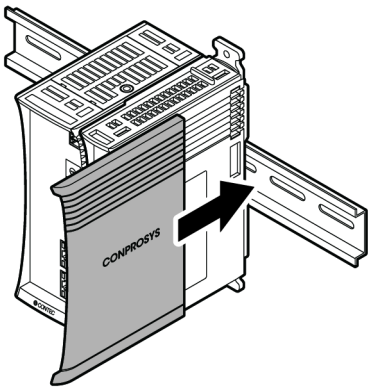
3 Engage the side rail of the setting module to the side rail of the controller (or another module) that is already mounted.
When the rails fit, slide the setting module all the way toward the DIN rail.



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

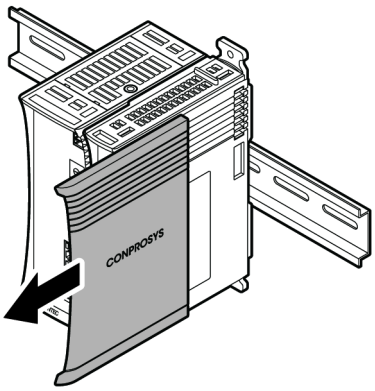


5 Put back and slide the end cover to the module.

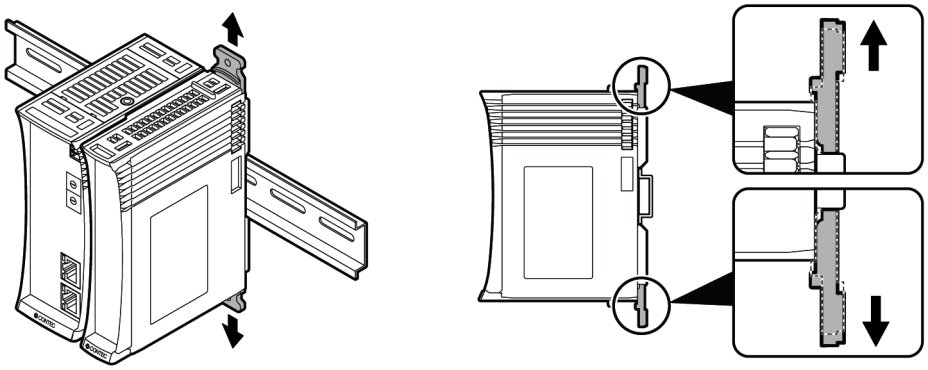


◆ How to Remove

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



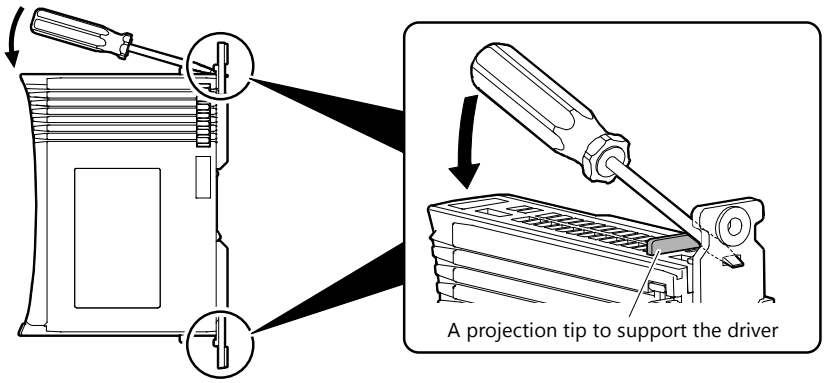
2 Unlock the hooks of the module.
If the hooks are stuck, use a slotted screwdriver to unlock.



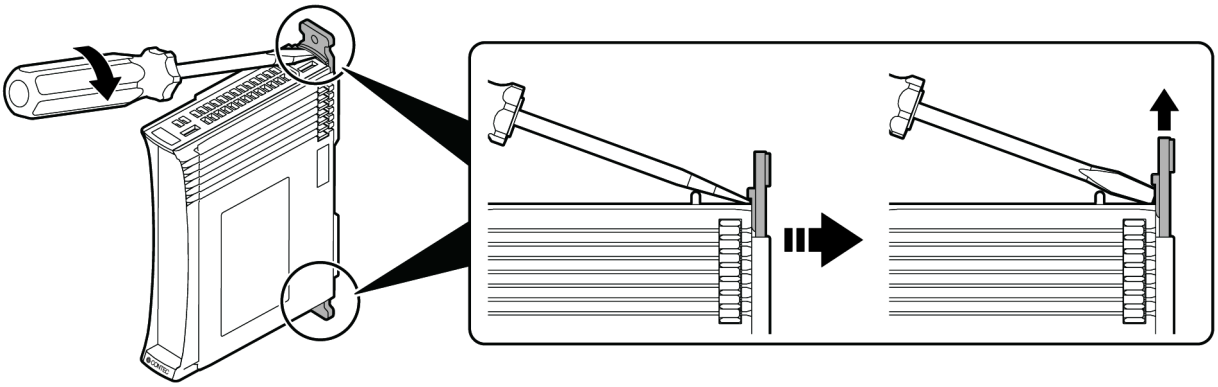
Unlock the hook with a slotted screwdriver

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

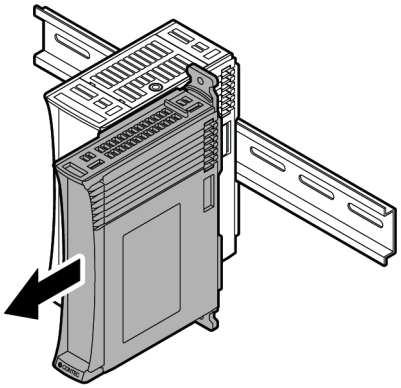
- Using the screwdriver as leverage
  Insert a slotted screwdriver (the point should be smaller than 4.5mm) into a hole.
  (see the figure below)
  By using the screwdriver as leverage, move it upward in the direction of the arrow to unlock.



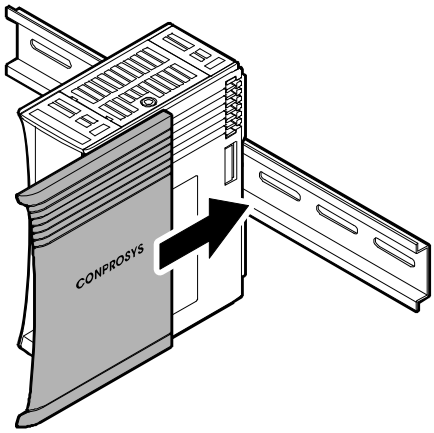
- By rotating the screwdriver
  Place the slotted screwdriver (the point should be smaller than 8mm) as shown in the figure.
  Rotate the screwdriver 90-degree in either direction.



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

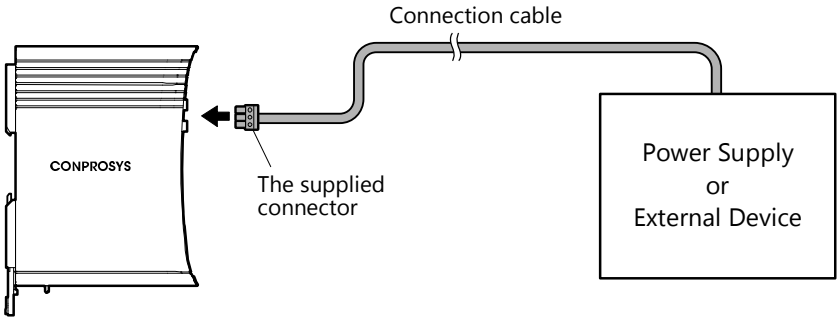


4 Put back the end cover to the controller.



2.Connecting to an External Device

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

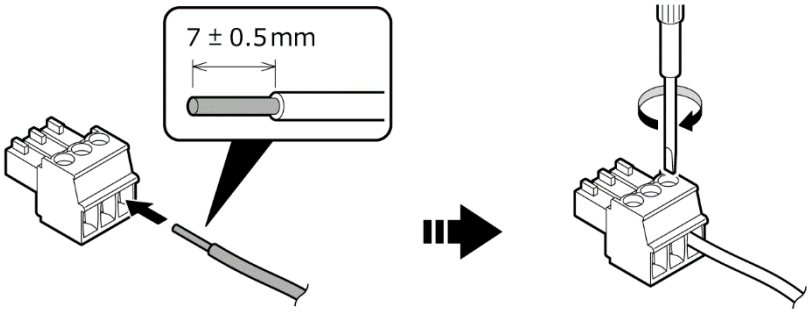


The following example describes how to make the connecting cable with a supplied connector.

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

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

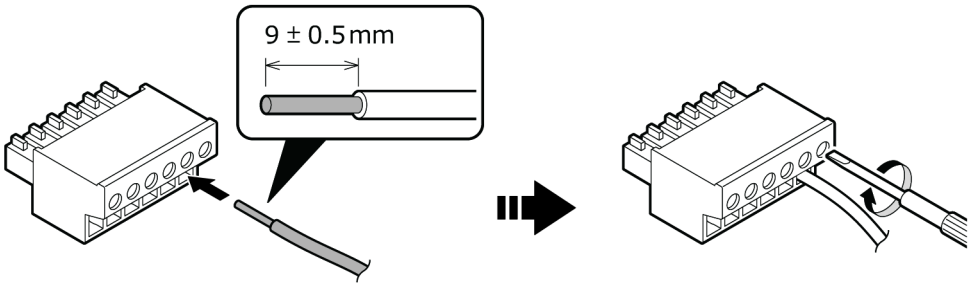
- Removing the connector plug by grasping the cable can break the wire. Always grasp the connector to remove it.
- Tightening torque of the supplied connector is 0.19N·m.
- Strip off approximately 7mm (plus or minus 0.5mm) of the covered part of a cable to connect with the connector.

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 21** 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 30 - 90 watt power supply.

In addition, 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 products of the CPS-PWD-30AW24-01 or CPS-PWD-90AW24-01(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 better
Cable Length	Within 100 meters

Refer to **"LAN** Port**"** in the **page 24** 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.

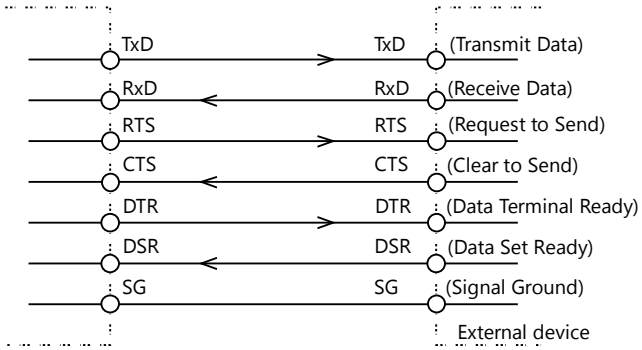
If special treatment of the signal lines in the connector is required, ensure that this is done in accordance with the specifications.

Refer to **"RS-232C Serial Port"** in the **page 27** for details of the RS-232C serial port and pin assignment.

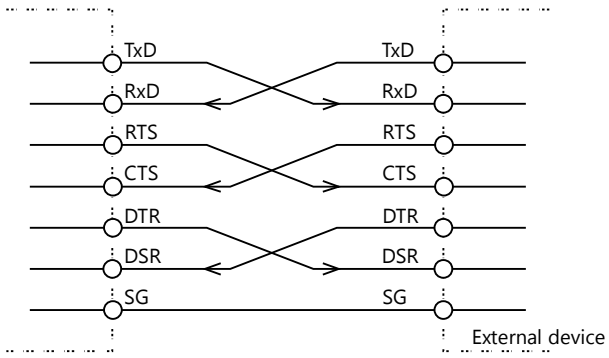
Connecting to an external device

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

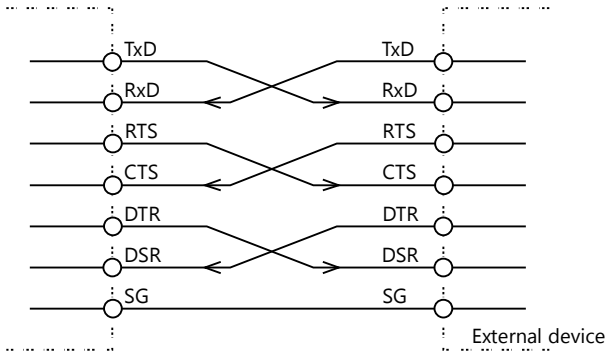
Example Connection to a Modem



Example Connection to a PC



Example Connection to a Device



◆ Baud Rate

See the table below for the baud rate that can be set with the product.

Error rate differs depending on the set baud rate.

Baud Rate (bps)	Error (%)
300	0.00
600	0.00
900	0.00
1,200	0.00
2,400	0.00
4,800	0.00
9,600	0.16
14,400	0.16
19,200	0.16
28,800	0.16
38,400	0.16
57,600	0.16
115,200	0.16

*Baud rate setting can be set on Web browser menu.
Refer to the Reference Manual (Software) for setting procedure.

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.

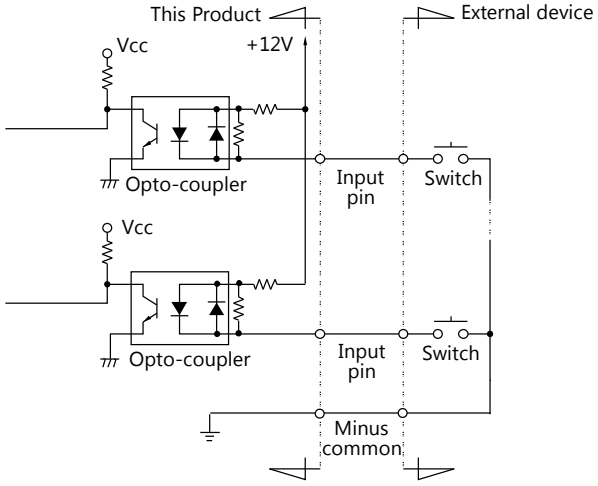
*Refer to **"Digital Input/Digital Output Connector"** in the **page 23** for details of the digital input connector and pin assignment.

Input equivalent circuit

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

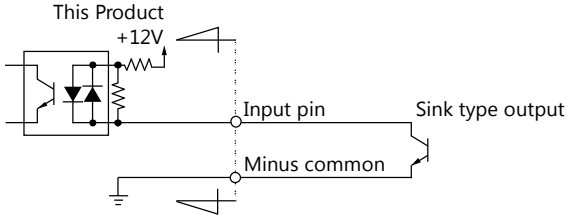
DI connects to a device which can be current-driven such as switch or transistor output device.

Input the ON / OFF state of a device which can be current-driven as digital value. The signal input unit is opto-coupler isolated input. (Corresponded to current sink output)



◆ Connecting to an external device

Connecting the Input to the sink type output



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 **"Digital Input/Digital Output Connector"** in the **page 23** for details of the digital input/output connector and pin assignment.

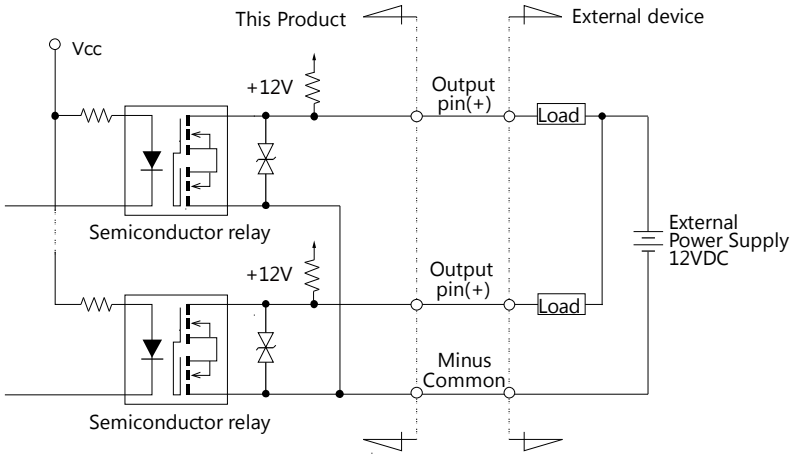
Digital Output Circuit

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

The connection requires an external power supply to deliver current.

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

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



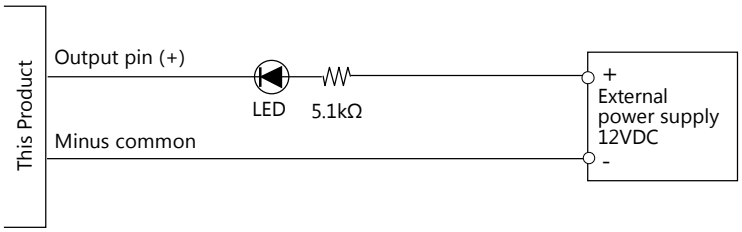
⚠ CAUTION

When supplying power, all output will be OFF.

Example of connecting to the LED

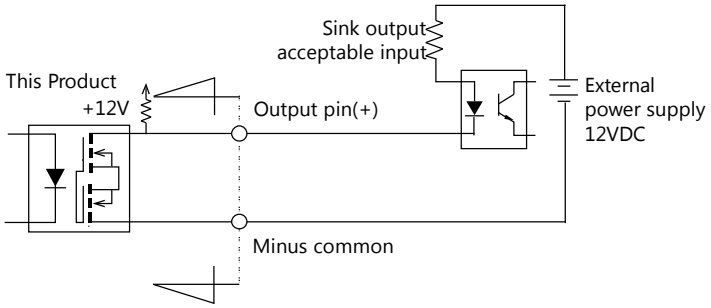
The corresponding LED lights up when you output "1" into the appropriate bit.

The corresponding LED turns off when you output "0" into the appropriate bit.



Connecting to an external device

Connecting the output to the sink output acceptable input



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		CPS-PCS341EC-DS1-1201
CODESYS Compatible Function	Version	V3.5 SP7 Patch2 or any later version
	Language	LD, SFC, FBD, ST, IL, CFC (IEC61131-3 compliant)
	Field Bus	EtherCAT Master, Modbus TCP Slave
	Communication Protocol	OPC UA Server
Program Size	ROM Size	1MB
	The Number of Maximum Steps	250K steps
CPU Basic Performance	Basic Command Operation Speed (LD)	1.6 nsec
	Applied Command Operation Speed (ST)	5.8 nsec
	Jitter	Maximum 300 µsec approx.
	Scan Time	74 µsec (at 20000 Steps)
EtherCAT Performance	Input Process Time (LD)	144 nsec
	Output Process Time (ST)	138 nsec
	Scan Time	166 µsec (at 64 point-input, 64 point-output)

Hardware Specifications

Item		CPS-PCS341EC-DS1-1201
CPU		ARM Cortex-A8 600MHz
Memory		On Board 512MB DDR3 SDRAM
ROM		On-Board 32MB NOR Flash for OS
LAN	Transmission standard	10BASE-T/100BASE-TX
	The number of channels	2
	Connector	RJ-45 Connector
	LED	Speed (Yellow), Link/Act (Green)
USB	Transmission standard	USB2.0 standard follow
	The number of channels	1
	Connector	TYPE-A
SD card slot	Standard	SD standard follow
	Connector	SD memory card slot
	LED	Read/Write (Green)

Item		CPS-PCS341EC-DS1-1201
RS-232C	Baud Rate	300bps - 115.2kbps
	Data length	5, 6, 7, 8 bit 1, 1.5, 2 stopbit
	Parity check	Even, Odd, Non-parity
	Isolation/Resistance	Non-isolated
	The number of channels	1
	Connector	9-pin D-SUB connector (Male)
	LED	Transmission (Green), Reception (Green)
Digital input and Output	Input type	Opto-coupler isolation input (Compatible with current sink output) (negative logic) *1
	Input isolation	Opto-coupler isolation
	Input voltage resistance	1000V
	The number of input signal channels	4
	Open-circuit impedance	10kΩ or more
	Short-circuit impedance	500Ω or less
	Response time (digital input)	Within 200μsec
	Interrupt (digital input)	4 interrupt input signals are arranged into a single output of interrupt signal. An interrupt is generated at the falling edge (HIGH-to-LOW transition) or rising edge (LOW-to-HIGH transition). (setting can be done by software)
	Output type	Semiconductor relay output
	Output isolation	Semiconductor relay isolation
	Output voltage resistance	1000V
	The number of output signal channels	4 *usable as digital input or digital output
	Maximum output voltage/current	13.2V/100mA
	Response time	Within 2msec
	ON resistance	8Ω or less (at 25 °C)
	OFF leakage current	4μA or less (at 25 °C)
	Surge protection element	Interactive TVS Diode Stand off voltage : ±30V, Peak pulse power : 400W (1ms)
	LED	DIO0 - DIO3 (Green)
	Connector	2 pieces 3.81mm pitch 6-pin Terminal (N.C., DIO3, DIO2, DIO1, DIO0, MCOM)
	Applicable wire	AWG28 - 16
Stack Bus	The maximum number of stack buses	16 *2
LED		Power (Green)/Status 1 (Green)/Status 2 (Red) /Error (Red)
Switch		Power SW, Rotary SW, DIP SW

Item		CPS-PCS341EC-DS1-1201
RTC		RTC built-in (battery within)
Power supply *3	Rated input voltage	24VDC
	Input voltage range	21.6 - 26.4VDC
	Power consumption	Controller alone: 24V 0.3A (Max.) With module(s): 24V 3.6A (Max.)
	Connector	2-piece 3.5mm pitch 3-pin terminal (V+, V-, FG)
	Applicable wire	AWG20 - 16
	Surge protection element V+ - V-, V- - FG	Interactive TVS diode Stand off voltage : ±30V, Peak pulse power : 400W (1msec)
Physical dimensions (mm)		44.7(W) x 94.7(D) x 124.8(H) (No projection included)
Weight		300g
Installation method		Quick mounting on the 35mm DIN rail
OS		Linux kernel 3.2

*1 Data 0 corresponds to High level and Data 1 corresponds to Low level.

*2 The total current consumption of the devices should be less than 3.3A

*3 Use power cable within 3meters.

Installation Environment Requirements

Item		CPS-PCS341EC-DS1-1201
Operating ambient temperature		-20 - +60°C *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 *6 /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), UL

*4 If you use the USB with bus power, operate the product at between -20 and +55°C.

*5 When you use an optional power product

*6 When you use an optional power product: 10 - 55Hz (See the manual of optional power product for details)

⚠ CAUTION

You can set the modules as you desire to the configurable controller up to 16 modules.

The total current consumption of the modules should be less than 3.3A.

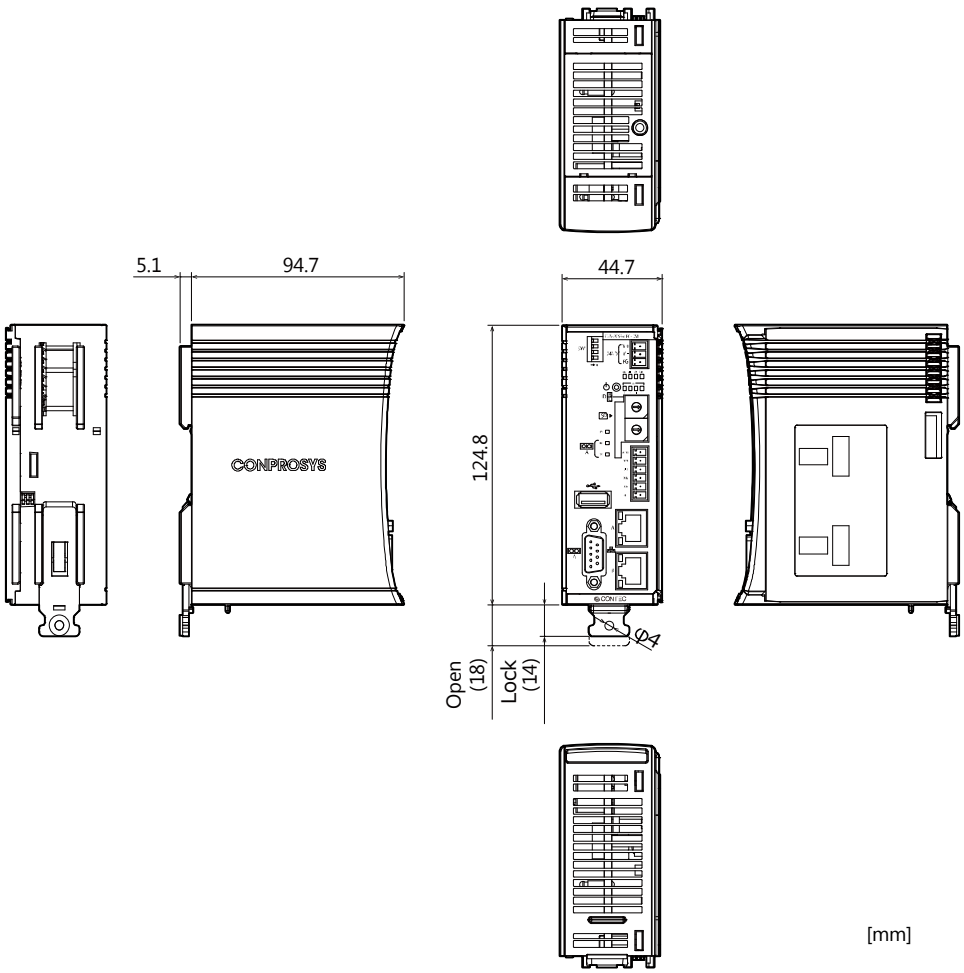
2. Power Requirements

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.

⚠ CAUTION

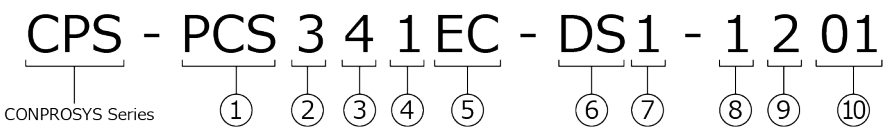
- If the fluctuation of power supply voltage is beyond the product specifications, connect a constant voltage transformer.
- If the noise is large, connect an isolation transformer (a noise cut transformer).
- Never bundle, place nearby or in parallel the power supply cable and the input /output signal lines.
- If lightning surge protection is required, connect the surge protective device (SPD).
- Place the surge protective device (SPD) and the product away from each other to ground.
- Select appropriate surge protection devices for all of the route.
- When you restart the power, give the product for at least one second (or longer) of the power OFF time.
- When you use with the CPS-PWD-90AW24-01 (by CONTEC), instantaneous voltage drop allowed time is 20 milliseconds or less

2.Physical Dimensions



3.The Details of Model Name

Details of the model name are described below.



No.	Item	Description	
1	Model	**PCS**	SOFTPLC Stack Model
2	CPU	**3**	ARM Cortex A8
3	Memory	**4**	512M Byte
4	Version	**1**	The 1st Model
5	Function	**EC**	EtherCAT Master
6	Interface	**D**	Digital I/O
		S	Serial (RS-232C)
7	Numbering of the Interface	**1**	The 1st Model
8	OS	**1**	Linux OS
9	ROM	**2**	32MB
10	Application	**01**	Original Version

4.Battery Disposal

1. Battery Specification

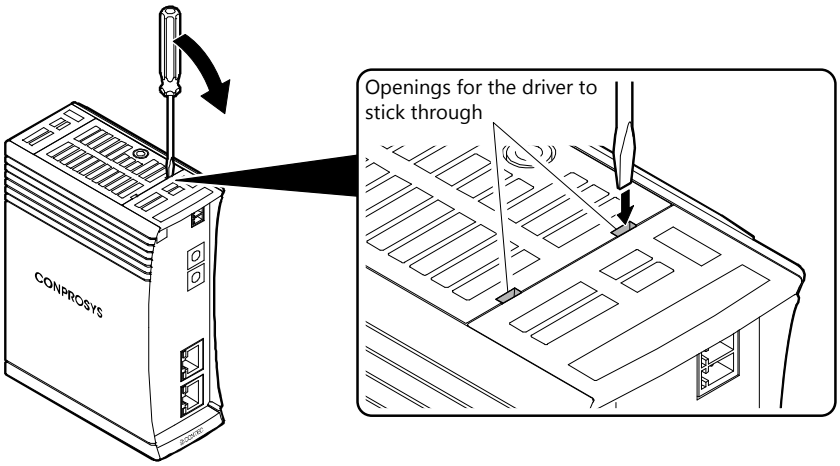
The product contains one battery and the details are as follows:

Item	Description
Type	Lithium primary battery
Model	BR2330A/HD
Maker	Panasonic
Nominal Voltage	3V
Nominal Volume	255mAh

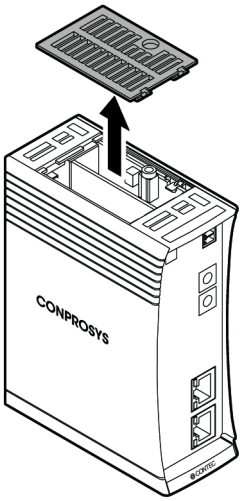
2. How to remove the battery

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

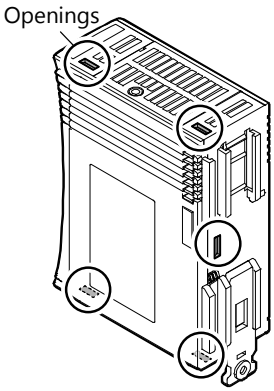
1 Stick a slotted driver through one of the openings, and unhook the tabs of the top cover.

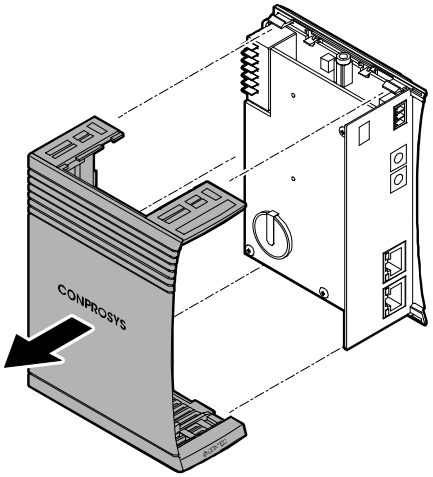


2 Lift off the top cover.

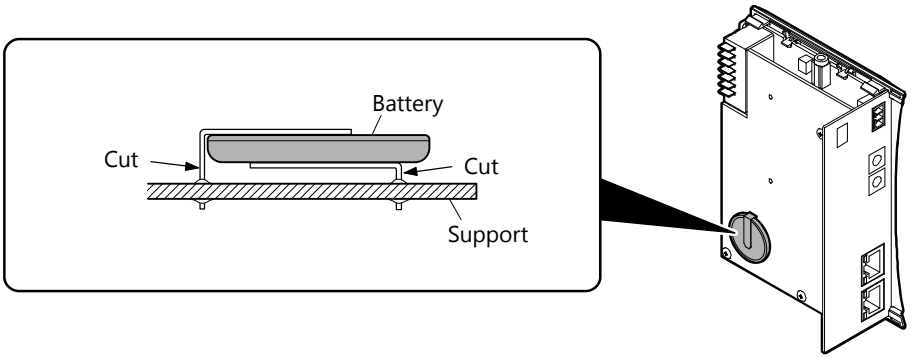


3 Unhook the five tabs of the product to remove the body cover.





4 Cut the two holding metals with nippers and take off the battery.



⚠ CAUTION

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

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)
	CPS-PWD-30AW24-01	Fitting power supply 30W (Input: 100 - 240VDC, Output: 24VDC 1.3 A)
SD Card	SD-2GB-B	SD card (2GB)
	SD-4GB-A	SD card (4GB)
Configurable Type Module	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-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-RRY-4PCC	with relay output
	CPS-SSI-4P	with temperature sensor 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)

Visit the Contec website for the latest optional products.

Website https://www.contec.com/

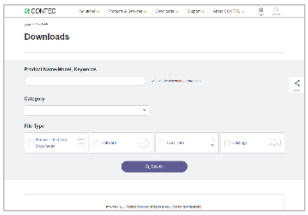
Customer Support and Inquiry

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

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Revision History

MONTH YEAR	Summary of Changes
October 2016	The First Edition
June 2018	Changed the layout of the manual.

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

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CPS-PCS341EC-DS1-1201 Reference Manual (Hardware)

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