

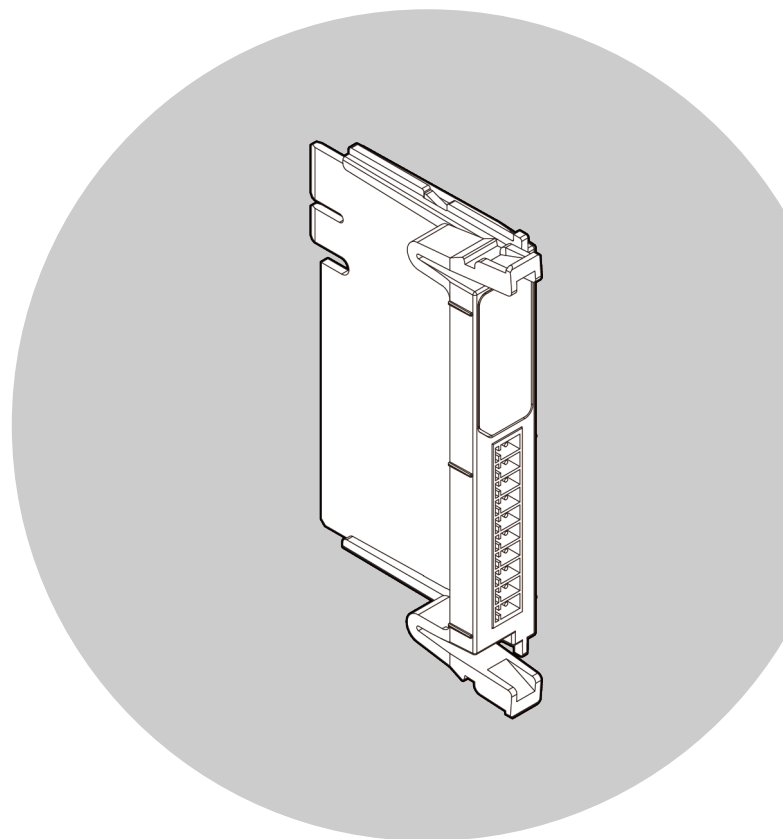
# Reference Manual

## (Hardware)

Serial I/O Module RS-422A/485

# CPSN-COM-1PD

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# Introduction




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

# 1. Related Manuals

The manuals related to the product are listed below.  
Read them as necessary along with this document.

## ◆ Must Read the Following Manuals.

Name	Purpose	Contents	How to get
Product Guide	Must read this after opening the package.	This lists the product configuration and describes the precautions.	Included in the package (Printed matter)
Reference Manual for I/O Module (Hardware)	Read this when operating the I/O module with CPU Unit.	This describes the hardware aspects such as functions and settings of the I/O module.	 Download from the Contec website (PDF)
CPU Unit 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)
CPU Unit Reference Manual (Software)	Read this when setting up the "CONPROSYS nano WEB Setting"	This describes how to set each function of "CONPROSYS nano 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 you start using the product, visit our website to check the firmware version of the CPU unit 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 expansion I/O module that adds a COM port complied with RS-422A/485 to the CPU unit of the CONPROSYS nano series.

One channel of RS-422A/485 communication port is supplied.

## 4.Features

### ■ **RS-422A/485 serial communication and support maximum of 921,600bps**

This product has one channel of a serial port complied with RS-422A/485.  
The baud rate can be set from 4 to 921,600bps.

### ■ **Easy installation and removal**

This product can be installed in and removed from the CPU unit without any tools.

### ■ **Adaptable to a wide range of temperature 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.

### ■ **Equipped with the LED for an operation check**

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

### ■ **No electrolytic capacitor**

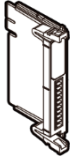
Without an electrolytic capacitor, which has a limited life, we are creating the product with a longer life.

## 5. Product Configuration List

The product consists of the items listed below.

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

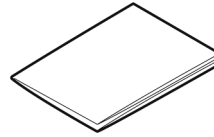
If you discover damaged or missing items, contact your retailer.



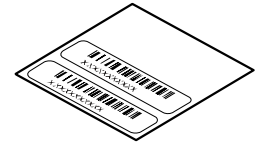
Product...1



10-pin Connector  
(attached to the  
product)...1



Product Guide & Warranty  
Certificate...1



Serial Number Label...1



# Safety Precautions

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

Never fail to read them before using the product.

# 1. Safety Information

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

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

 <b>DANGER</b>	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	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 2When 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 =  $60[^\circ\text{C}] - 0.005 \times \text{altitude [m]}$An Example)  
The product is used at 3000 meters  
 $60^\circ\text{C} - (0.005 \times 3000\text{m}) = 45^\circ\text{C}$  (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).
- 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 of the CPU unit first, 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 of the CPU unit immediately and contact your retailer.
- When using the product in an overly noisy environment, use a grounded, shielded cable to connect with peripherals.
- 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 connectors, 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 front panels 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 (Signal line, Power line, Earth). Consult with the specialist regarding selecting, purchasing, and setting the surge protection device.

- 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.
  - Do not strike or bend this product. Otherwise, this product may malfunction, overheat, cause a failure or breakage.
  - Do not touch this products metal plated terminals (edge connector) with your hands. Otherwise, this product may malfunction, overheat, or cause a failure.  
If the terminals are touched by someones hands, clean the terminals with industrial alcohol.
  - When disposing of the product, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.
  - 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.
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## 1. FCC PART15 Subpart B Class A Notice

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### NOTE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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 users authority to operate the equipment.

## 2. CE EMC Directive Class A Notice

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EN55032 Class A Notice

Warning:

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

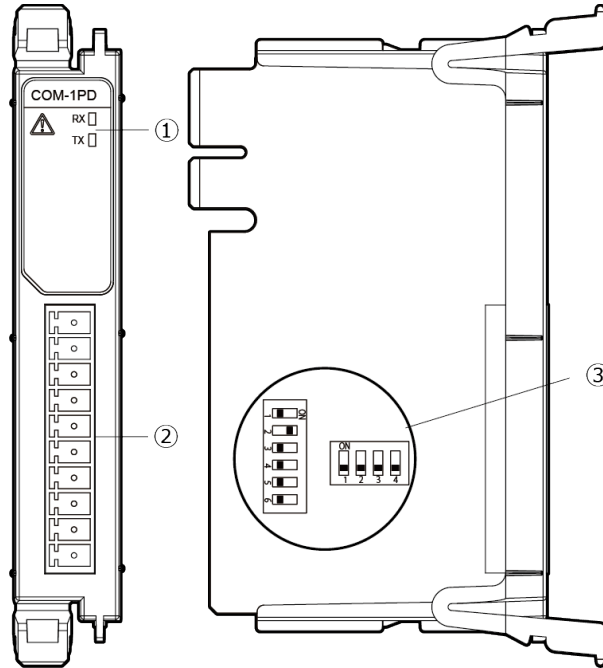
# Product Nomenclature and Function

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This section describes product component names and their functions, and 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	LED Indicator	This indicates status of the product.
2	Interface Connector	It is a connector for RS-422A/485 communication. Use the 10-pin connector included in the package.
3	DIP Switch	Used for RS-422A/485 setup



## 2. Description of Product Components

Components such as connectors, switches are described.

### 1. LED Indicator





Status of the product is indicated by ON/OFF and flashing of LED.

The meaning of each LED is described below.

RX 

TX 

Color and Description

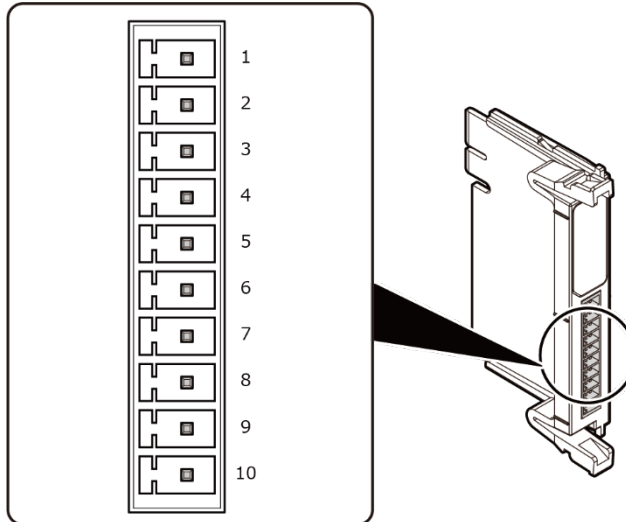
LED	Color	Display	Description
COM A -RX	Green	Flashing 	It will flash when receiving data by the RS-422A/485
		OFF 	It indicates data has not been received by the RS-422A/485
COM A -TX	Green	Flashing 	It will flash when sending data by the RS-422A/485
		OFF 	It indicates data has not been sent by the RS-422A/485.

## 2. Interface Connector

This Product has 1 channel of RS-422A/485 communication.

Use the 10-pin connector included in the package.

Connector type: DEGSON 15EDGKC-3.81-10P-13 (or equivalent)



### Pin Assignment

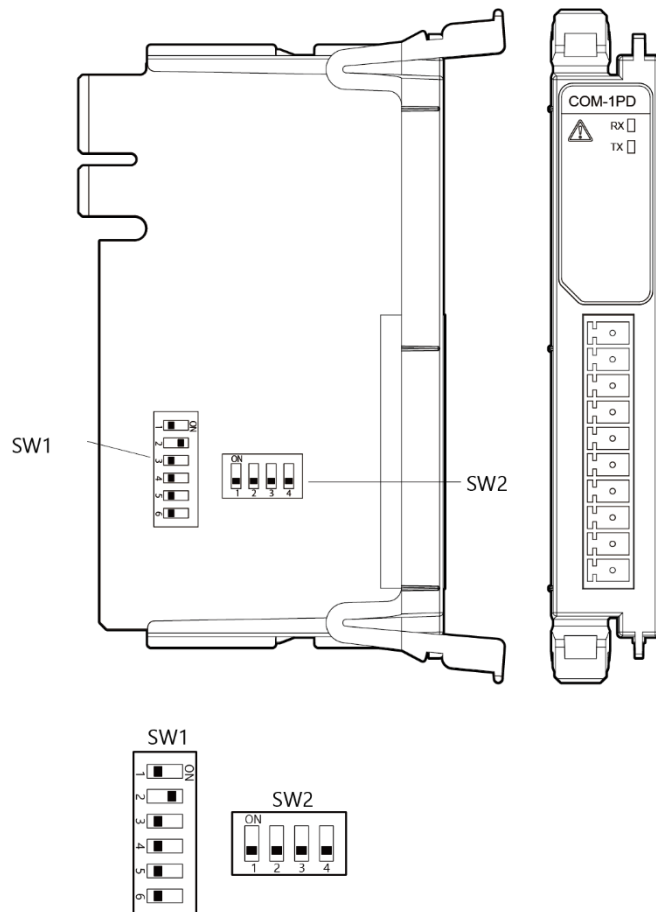
Pin No.	Signal Name	Description
1	SG	Signal ground
2	RxD +	Received data (+)
3	RxD -	Received data (-)
4	TxD +	Transmitted data (+)
5	TxD -	Transmitted data (-)
6	CTS +	Clear to send (+)
7	CTS -	Clear to send (-)
8	RTS +	Request to send (+)
9	RTS -	Request to send (-)
10	FG	Frame ground

### 3. DIP Switch

DIP switch for RS-422A/485 setup. This Product has SW1 and SW2.

SW1 is a switch used for data transmission mode. It is used to switch between full duplex and half duplex as well as to switch RTS and CTS in the full duplex.



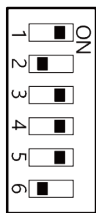
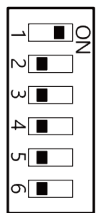

SW2 is a switch used to set up terminators. Set the terminators in accordance with the devices with which you are communicating.



## ◆ Setting Transmission Mode

The data transmission mode setting switch is used to switch between full duplex and half duplex. Set the appropriate data transmitting mode for the device with which you are communicating. Bits 1. - 5 are used to set the data transmission mode. Always set bit 6 to OFF.

### Setting Procedure

Transmission mode	Half duplex [Half]	Full duplex [Full]	
		When there are no RTS and CTS 	When there are RTS and CTS 
Setting method (SW1)	<p style="text-align: center;">SW1</p>  <p>TXD is only used for data transmission; the sending and receiving modes should be switched over using the modem control register.</p>	<p style="text-align: center;">SW1</p>  <p>With above setting, RTS and CTS are connected in the board. Communication is available without wiring of RTS and CTS.</p>	<p style="text-align: center;">SW1</p>  <p>To connect RTS and CTS to the other unit, communication is available.</p>

## ⚠ CAUTION

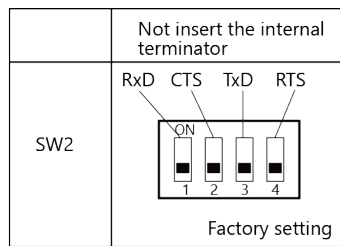
Do not set both bit 1 and bit 2 to TURN ON simultaneously as this may result in damage to the board.

## ◆ Terminator Setup

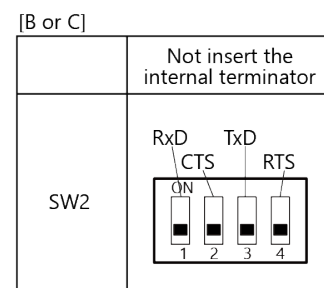
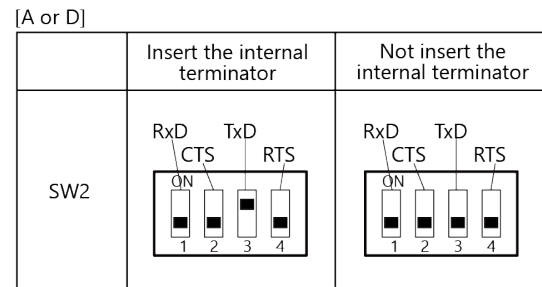
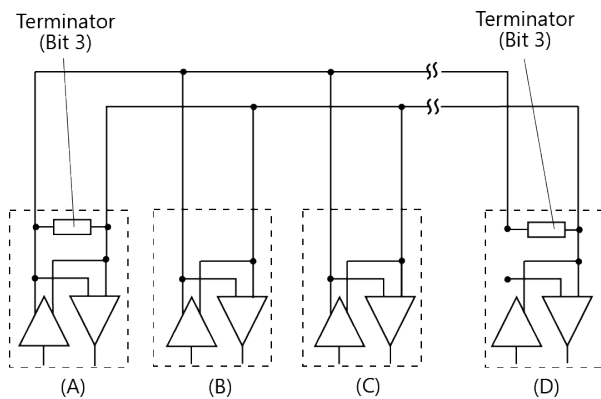
The terminator setting switch controls whether or not a terminator is inserted into each signal line. Set the terminators on or off in accordance with the devices with which you are communicating. The terminators on the board are 100Ω resistors.

### Setting Procedure

If you wish to use a terminator of other than 100Ω, set the terminator switch OFF and insert an external terminator. See the examples of terminator installation below for half and full duplex setting.

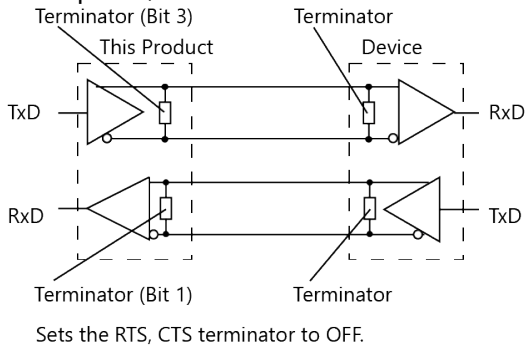


### Half-duplex



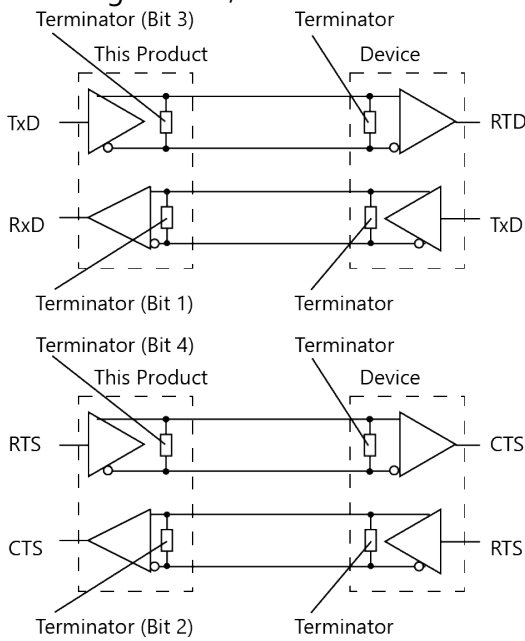
## Full-duplex

- Self-loop RTS, CTS



	Insert the internal terminator	Not insert the internal terminator
SW2		

- Connecting the RTS, CTS to the remote device



	Insert the internal terminator	Not insert the internal terminator
SW2		

# Installation

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

# 1. Install the Product

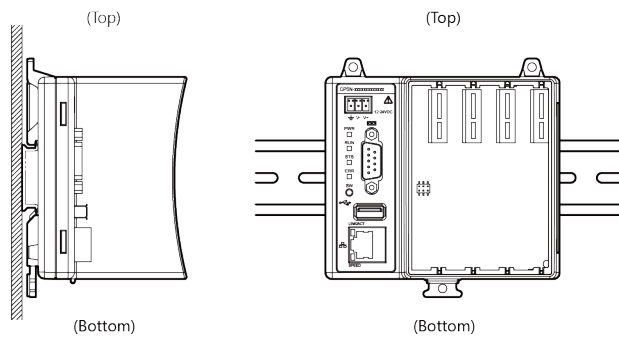
## 1. Installation Conditions

### ◆ Installation Orientation

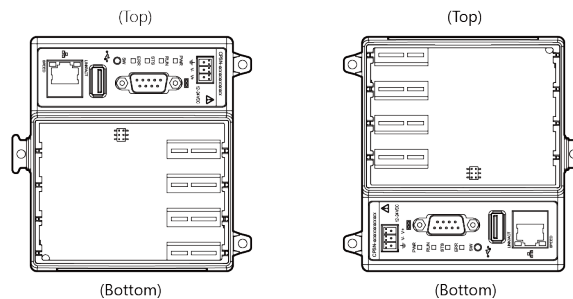
You can position the CPU unit in the orientation shown below.

Other orientations could cause problems such as malfunction due to inadequate heat dissipation.

#### Vertical installation (Installation angle 0°)



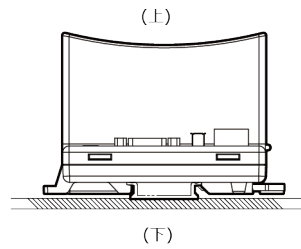
#### Vertical installation with an angle of 90° to the left/right (Installation angle: 90° to the left/right; only installations in which the product is screwed in are supported)



\* Installation with screws needs three M3 screws additionally.



## Horizontal installation



Make sure to gain proper space between the product and devices that generate heat or exhaust air so that the ambient temperature stays in the range specified in the environment requirement. Also, the temperature range in the environment requirements varies depending on the installation orientation, so check the operating temperature range in "**Specifications(Page 34)**".

### ◆ Recommended installation angle

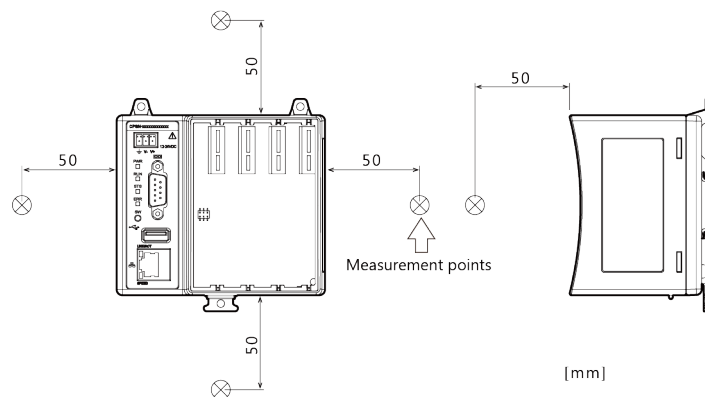
The recommended installation angle for this product is 0°. The temperature specifications of the product vary between the case when the installation angle is 90° to the left/right and the case when a plane installation is used, so check the operating temperature range in "**Specifications(Page 34)**".

### ◆ Ambient Temperature

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

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)

\*As for the vertical installation with an angle of 90° to the left/right or the horizontal Installation, the ambient temperature should be -20 - +55°C.



 **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 shortened. Perform the forced air cooling to counteract.
-

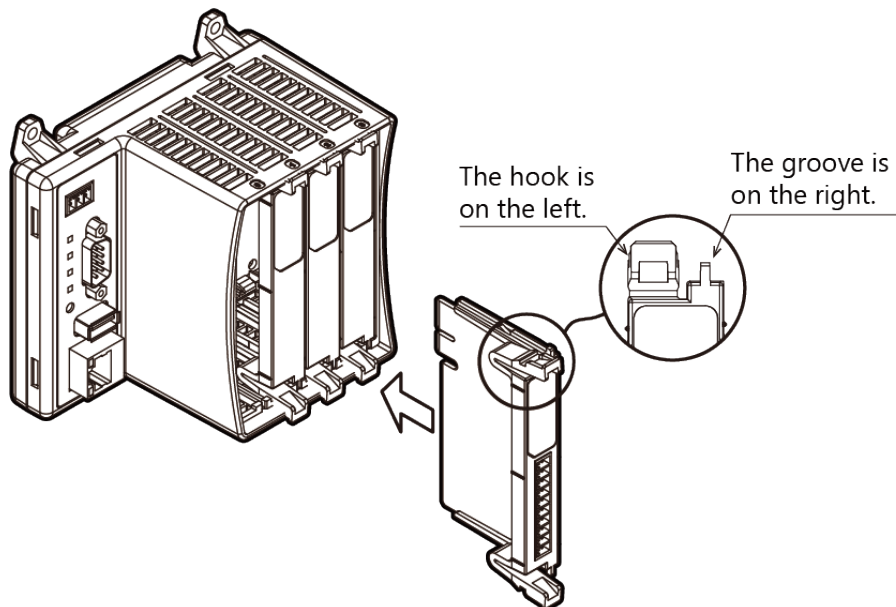
## 2. Installation and Removal of I/O Module and Blank Panels

### ⚠ CAUTION

Always confirm the PWR-LED of the CPU unit is turned off before installing or removing the module.

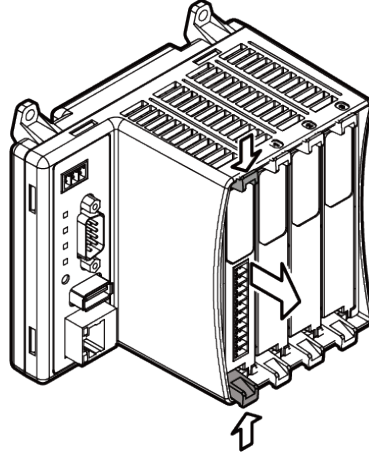
### ◆ Installation procedure

- 1 Paying attention to the horizontal orientation of the I/O module, insert the resin groove into the rail of the CPU unit that has been installed on a DIN rail or that has been screwed into place, and then push the I/O module in until it clicks.



## ◆ Removal procedure

- 1 Press in the hooks at the top and bottom of the I/O module, and then pull it toward you and out of the CPU unit that has been installed on a DIN rail or screwed into place.



## 2. Connecting to an External Device

When connecting the product to an external device, use the supplied connector.

When wiring the connector, strip off  $8 \text{ mm} \pm 0.5 \text{ mm}$  of the wires covering, and then insert this stripped part into the connectors opening.

While pushing the orange part in the center of the connector with a precision screwdriver or a similar tool, insert the cable into the round connection hole. After that, release the pushed part to fix the cable in place.

You can also insert cables without pushing on the orange part of the connector by using a ferrule terminal.

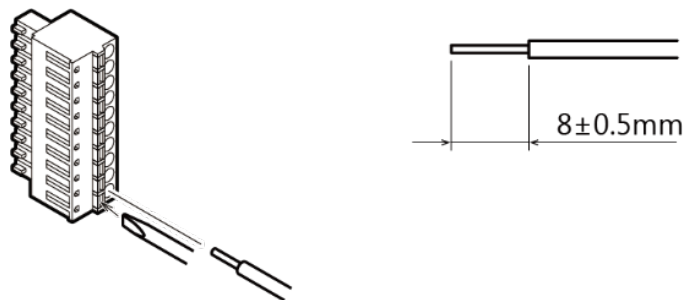
### CAUTION

Removing the connector plug by grasping the cable can break the wire.

About a caution mark  on the product:

Please use copper wires that withstand the temperature of 75 degrees Celsius and higher.

---



## 3. Cable Connection

### 1. RS-422A/485

#### ◆ RS-422A/485 Cable

Use the RS-422A/485 cable described below.

<b>Cable</b>	Twisted pair cable with the shield
<b>Applicable wire</b>	AWG28 - 16 (0.08mm <sup>2</sup> - 1.25mm <sup>2</sup> )
<b>Cable Length</b>	Affected by the communication speed (baud rate) between the product and the external device. The cable should not exceed the length indicated in the table below. Even the length is within the indicated one, as the amount of attenuation differs by the material of the cables, communication abnormality may occur. The cable lengths in the table are not guaranteed for the communication speed.

#### ◆ Estimated cable length and the communication speed

Cable Length (m)	Communication speed (bps)
300	115,200
600	57,600
900	19,200
1,200	9,600

The table below lists the maximum communication distances of the terminator resistor value and individual cable diameters.

The terminators on the product (100Ω) and the terminators generally used with RS-422A/485 (120Ω) are listed.

#### ◆ Maximum communication distances of the terminator resistor value (100Ω) and cable diameter

Terminator Resistor (Ω)	Cable Diameter	Maximum Communication Distance (m)
100	AWG28	400
	AWG26	700
	AWG24	1,100
	AWG22	1,200

## ◆ Maximum communication distances of the terminator resistor value (120Ω) and cable diameter

Terminator Resistor (Ω)	Cable Diameter	Maximum Communication Distance (m)
120	AWG28	500
	AWG26	800
	AWG24	1,200
	AWG22	1,200

## ◆ Setting the Baud Rate

The baud rate range that can be set on this hardware is from 4 to 921,600 bps.

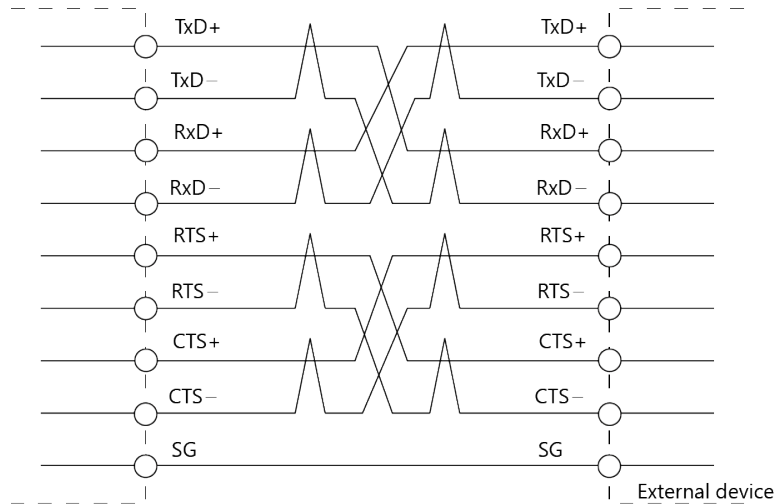
- \* The actual setting range varies depending on the virtual driver. See the reference manual (Software) for details.

## ◆ Types of Cable and Example Connections

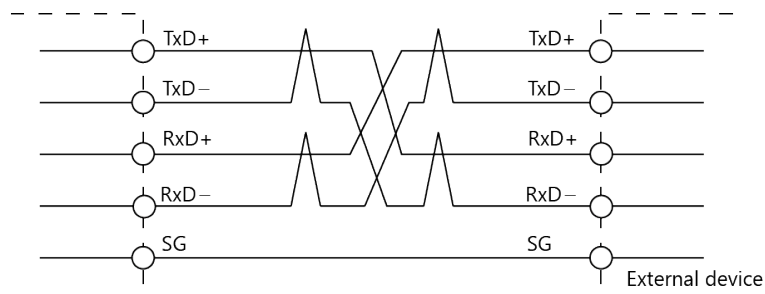
The figures below show examples of how to connect the cable for the board.

The RS-422A/485 interface works based on a differential signal whereby the signal is carried by the potential difference between two lines (+ and -). Using twisted pair cable is recommended to improve immunity to noise.

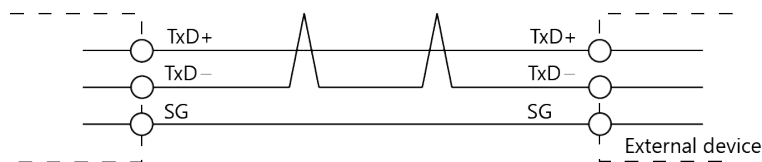
### Example Connection RTS and CTS to an External Device in Full Duplex



### Example Connection Self-loop to RTS and CTS in Full Duplex



### Example Connection in Half Duplex



## ⚠ CAUTION

If the cables are incorrectly wire-connected, it may harm the connections devices or the product.



# Appendix

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

# 1. Specifications

## Function Specifications

Item	CPSN-COM-1PD
Number of channels	1ch
Transmission scheme	Asynchronous Serial Transmission (Full Duplex/Half Duplex)
Interface type	RS-422A/485
Isolation	Bus Isolation
Voltage Resistance	500VAC
Baud Rate	The setting range differs by the software program.
Data length	See the reference manual (Software) for details.*1*2 *3
Parity check	Even, Odd, Non-parity *1
Buffers	It has 64-byte receive and 64-byte transmit FIFO buffers.
Connector	2-piece 3.81mm pitch 10-pin terminal
Applicable wire	AWG28 - 16
Switch	6-pole switch (Full Duplex / Half Duplex), 4-pole switch (Terminator (ON/OFF))
Surge protection element each signal - SG	Interactive TVS Diode Stand off voltage : ±13V, Peak pulse power : 400W(1ms)
Surge protection element SG - FG	Gas discharge tube arrester Discharge voltage : ±300V, Impulse current tolerance : 2000A(8/20us, 10 times)
LED	Transmission (Green), Reception (Green)
Electricity consumption	5V 250mA (Max.) 3.3V 20mA (Max.)
Physical dimensions (mm)	15.6(W)×52.6(D)×84(H) (No projection included)
Weight	50g

\*1 These items can be set by software.

\*2 The baud rate range that can be set on this hardware is from 4 to 921,600 bps.

The data lengths are "5, 6, 7, 8 bit, 1, 1.5, 2 stop bit".

\*3 Sending data with high-speed might be effected by the environment such as external devices or cable length.

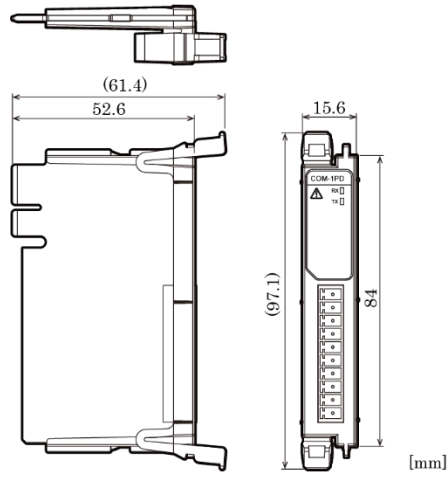
## Installation Environment Requirements

Item		CPSN-COM-1PD
Operating ambient temperature*1		-20 - +60°C (Wall installation) -20°C to +55°C with a vertical installation at an angle of 90° to the left/right or with a plane installation
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	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 *4/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)
Standard		VCCI Class A, FCC Class A, CE Marking (EMC Directive Class A, RoHS Directive)

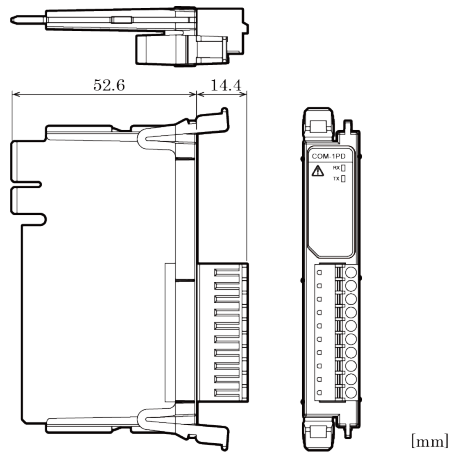
\*4 With the optional DIN rail fitting power supply: 10 - 55Hz (for details, see the user's guide of the optional power supply)

## 2. Physical Dimensions

### Physical dimensions of CPSN-COM-1PD

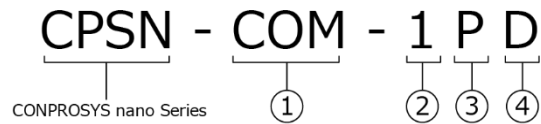


### Physical dimensions of CPSN-COM-1PD (with connector attached)



## 3.The Details of Model Name

Details of the model name are described below.



No.	Item	Description	
1	Interface	<b>COM</b>	Serial Communication
2	Channel	<b>1</b>	1 Channels
3	Isolation	<b>P</b>	Isolation Type
4	Communication Type	<b>D</b>	RS-422A/RS-485

# Optional Products

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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
CPU unit	CPSN-MCB271-S1-041	Remote I/O CPU unit
	CPSN-MCB271-1-041	Remote I/O CPU unit LAN 2-channel model
	CPSN-PCB271-S1-041	CODESYS Modbus Master CPU unit
DIN rail fitting power supply	CPS-PWD-30AW24-01	Fitting power supply 30W (Input: 100 - 240VAC, Output: 24VDC 1.3 A)

Visit the Contec website for the latest optional products.

**Website**

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

# Customer Support and Inquiry

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



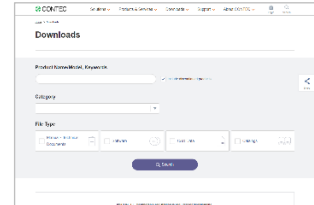
# 1.Services

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

## Download

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

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



# Revision History

MONTH YEAR	Summary of Changes
February 2018	The First Edition
September 2018	Additional information was listed due to some parts change.
August 2019	Modified images and changed the layout of the manual.

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

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