CONTEC

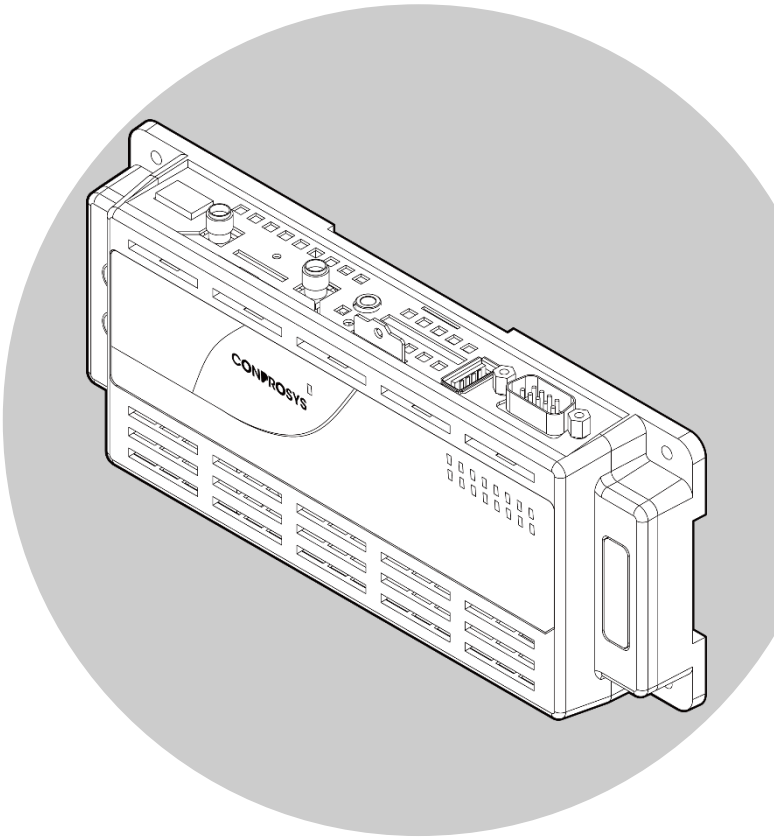
CONPROSYS

Reference Manual

(Hardware)

Compact CPU Module 4G Module

CPS-MG341G5-ADSC1-931



CONTENTS

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 Following Manuals.

Name	Purpose	Contents	How to get
Product Guide	Must read this after opening the package.	This lists the product configuration and describes the precautions.	Included in the package (Printed matter)
Reference Manual (Hardware)	Read this when operating the product.	This describes the hardware aspects such as functions and settings.	Download from the Contec website (PDF)
Reference Manual (Software)	Read this when setting up the "CONPROSYS WEB Setting"	This describes how to set each function of "CONPROSYS WEB Setting".	Download from the Contec website (PDF)

◆ Read the Following Manuals as Necessary.

Name	Purpose	Contents	How to get
CONPROSYS Cloud Data Service 2 (CDS2) Manual	Read this to understand the outline of the CONPROSYS Cloud Data Service 2.	This describes the outline and specification of the CONPROSYS Cloud Data Service 2 as well as how to operate the product.	Download from the Contec website (PDF)
CONPROSYS Cloud Data Service 2 Concise Manual	Read this when using the CONPROSYS Cloud Data Service 2.	This describes the procedure to start monitoring measured data in Cloud Data Service 2.	Download from the Contec website (PDF)
CONPROSYS Java Applet Application Guide (For firmware version 2.00 or earlier)	Read this when using the system setting function of Java Applet application version.	This describes how to create a monitoring page and processing task with the system setting function in Java Applet application version.	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 a M2M controller with isolated RS-422A/485, isolated digital input/output, isolated input counter, inter-channel isolated analog input, RS-232C, LAN interface, and 4G LTE Cat.4 network communication module.

It is equipped with the ARM® Cortex®-A8 processor (600MHz) and the 512MB DDR3-SDRAM system memory. On-board NOR-FLASH is utilized for a booting device.

CPS-MG341G-ADSC1-930 contains OPC UA server function within and can communicate directly with HMI and SCADA software that support OPC UA clients from various makers.

The product is the data collector "M2M Gateway for PLC" that supports respective PLCs as well as various Modbus devices. For equipment with PLC control, data will be collected by "M2M Gateway for PLC". For the one without PLC control, data can be collected by "M2M controller" that supports sensor input.

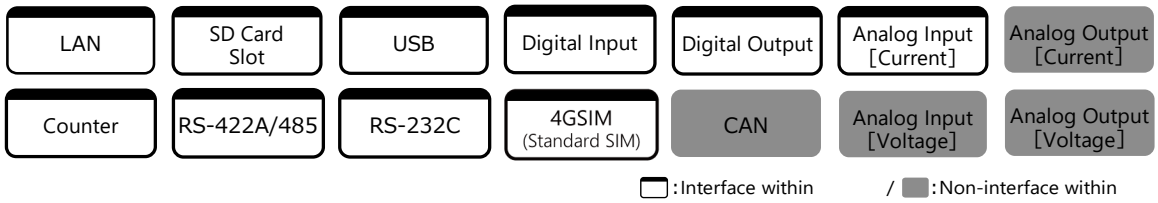
M2M Gateway for PLC" can connect up to 10 Ethernet/calculating links with differing makers PLCs simultaneously.

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

You can perform all processes on a web browser from the development to the operation. The functions such as Web monitoring of I/O information, alarm processing by I/O information, task divergence enable you to create a Cloud System at low cost and in a short time.

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

■ 4G LTE Cat. 4 communication

This product is equipped with an LTE SIM-free communication module, enabling 4G LTE Cat. 4 communication.

■ The product contains I/O interface such as digital I/O, analog input, counter, and serial communication.

RS-232C: 1-channel, RS-422A/485: 1-channel, Opto-coupler isolation input (compatible with current sink output): 4-channel, Semiconductor relay output: 2-channel, Bus isolation analog input (current input): 2-channel. Counter input performs up-counting: equipped with two channels of up counters.

* Two of four digital-input can be used as the counter-input.

■ 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.

■ Compact design

Compact design, 188.0(W) x 78.0(D) x 30.5(H), features flexibility in installation.

■ Capable of adapting a wide-range power (12- 24VDC)

The product is capable of dealing with a wide range of power in the differing environments.
Power connector also has a FG terminal.

■ Easy installation with screws or on DIN rail

This product can be installed on the wall with screws or on DIN rail with simple mounting.

■ Installation with two pieces of terminal support

The terminal connector can be removed without a screwdriver. Even when a malfunction occurs, this product can be replaced in a short length of time.

■ A powerful running platform without fan

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

■ Decrease malfunctions or damages by bus isolation and surge protection. (the RS-422A/485, digital/counter input)

Electrical isolation between the RS-422A/485 and the CPU, as well as between the digital/counter input and CPU can block electrical noise flow.
Moreover, the surge protection elements are used for signal line and on top of that, the RS-422A/485 is protected with the communication IC that can withstand ±70 V input voltage, which reduces malfunctions or damages by surge.

■ Decrease malfunctions or damages by bus isolation, inter-channel isolation and surge protection. (Analog input)

As analog inputs and channel, along with analog inputs and CPU, are electrically isolated, connecting an input signal with different grand level to each channel is possible. In addition, the surge protection elements are used for signal lines, which reduces malfunctions or damages by surge.

■ 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

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

2. Software Features

■ OPC UA Server function within

OPC UA (Unified Architecture) is an advanced protocol 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 TCP-based platform independent protocol. This product can be operated with HMI and SCADA software that support OPC UA clients from various makers.

■ Promoting a multi-vendor system that supports a varied lineup of PLCs and Modbus devices

The product connects and supports every PLC and each Modbus device simultaneously. *Visit our website regarding the details of supportive information.

■ Connect up to 10 links and collect data from 100 group registers

Up to 10 Ethernet/calculating links can be connected. Data collection from 30 PLCs and 100 group registers can be carried out.
Up to 1000 data mapping for Modbus is possible.

■ Measurement and Upload

CPS-MG341G-ADSC1-930 uploads measured data of a sensor and also collected data from PLC to the Cloud server.

■ Web Monitoring

The product contains a web server function. Even with the PC located remotely, I/O information can be monitored and updated through a Web browser

On the monitoring screen, the standard GUI parts (graphic, slider, button, etc.) can be freely arranged.

All operations including monitoring layout, making relations with I/O information, can be achieved through a Web browser.

■ Web Task Script

By combining icons such as arithmetic operations, conditional branching, data outputting, you can set up the executions or its processes like drawing them in the flowchart. All operations can be completed through a Web browser.

■ Message Communication Function

With the RS232C, the RS-422A/RS-485 or the Ethernet device (TCP/UDP), up to 10 links can be set to send or receive messages.

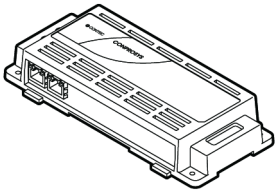
Message communication can be accomplished from Web task script.

■ Support a communication protocol MTConnect for machine tools

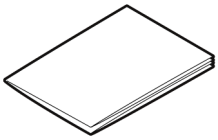
MTConnect is a communication protocol for machine tools and standardized by MTConnect Institution. CONPROSYS has MTConnect Adapter and Agent built-in and can be operated with client software that supports MTConnect.

6.Product Configuration List

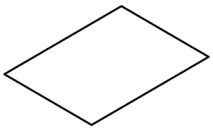
The product consists of the items listed below.
Check, with the following list, that your package is complete.
If you discover damaged or missing items, contact your retailer.



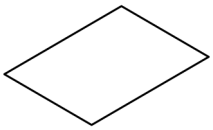
Product...1



Product Guide...1

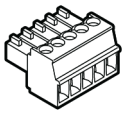


Warranty Certificate...1

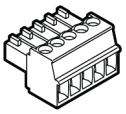


Cautions for setting the SIM card...1

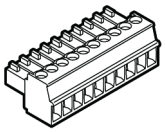
Serial Number Label...1



3-pin Connector...3
(Power/Analog)



5-pin Connector...1
(RS-422A/485)



10-pin Connector...1
(Digital)

Antenna...2

*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	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.

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, LAN, RS-232C, RS-422A/485, AI, DIO, 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.

- Adjust the air current to dissipate heat from the product.
- Do not touch the antenna with your hands when the product is in operation. Otherwise, the product may malfunction or cause failure.
- To follow the regulation by the Radio Act, use only the supplied antenna or the one listed in chapter regarding optional products.
- In ambient temperature above 45 °C, never touch the metal parts (card cover, top panel, and connector) of the product with your hand as they may cause a burn during the operation since they become extremely hot.
- 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

FCC CAUTION

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

2. FCC PART15 Subpart B Class A

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.

3. FCC PART 22/24/27/90 subpart C

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency(RF)Exposure Guidelines. This equipment should be installed and operated keeping the radiator at least 20cm or more away from person's body.

4. EU Declaration of Conformity

Hereby, CONTEC declares that the radio equipment type "M2M Gateway for PLC Multi-Function Module 4G/LTE" is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: https://www.contec.com/download/

[BG] Bulgarian	С настоящото CONTEC декларира, че този тип радиосъоръжение "M2M шлюз за PLC многофункционален модул 4G / LTE" е в съответствие с Директива 2014/53/ЕС. Цялостният текст на ЕС декларацията за съответствие може да се намери на следния интернет адрес: https://www.contec.com/download/
[CS] Czech	Tímto CONTEC prohlašuje, že typ rádiového zařízení "Brána M2M pro PLC multifunkční modul 4G / LTE" je v souladu se směrnicí 2014/53/EU. Úplné znění EU prohlášení o shodě je k dispozici na této internetové adrese: https://www.contec.com/download/
[DA] Danish	Hermed erklærer CONTEC, at radioudstyrstypen "M2M Gateway til PLC multifunktionsmodul 4G / LTE" er I overensstemmelse med direktiv 2014/53/EU. EU-overensstemmelseserklæringens fulde tekst kan findes på følgende internetadresse: https://www.contec.com/download/
[DE] German	Hiermit erklärt CONTEC, dass der Funkanlagentyp "M2M-Gateway für SPS-Multifunktionsmodul 4G / LTE" der Richtlinie 2014/53/EU entspricht. Der vollständige Text der EU-Konformitätserklärung ist unter der folgenden Internetadresse verfügbar: https://www.contec.com/download/
[ET] Estonian	Käesolevaga deklareerib CONTEC, et käesolev raadioseadme tüüp "M2M lüüs PLC mitmefunktsioonilise mooduli 4G / LTE" jaoks" vastab direktiivi 2014/53/EL nõuetele. ELi vastavusdeklaratsiooni täielik tekst on kättesaadav järgmisel internetiaadressil: https://www.contec.com/download/
[EL] Greek	Με την παρούσα ο/η CONTEC, δηλώνει ότι ο ραδιοεξοπλισμός "M2M Gateway για μονάδα πολλαπλών λειτουργιών PLC 4G/LTE" πληροί την οδηγία 2014/53/ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρφωσης ΕΕ διατίθεται στην ακόλουθη ιστοσελίδα στο διαδίκτυο: https://www.contec.com/download/
[ES] Spanish	Por la presente, CONTEC declara que el tipo de equipo radioeléctrico "Gateway M2M para módulo multifunción PLC 4G / LTE" es conforme con la Directiva 2014/53/UE. El texto completo de la declaración UE de conformidad está disponible en la dirección Internet siguiente: https://www.contec.com/download/
[FR] French	Le soussigné, CONTEC, déclare que l'équipement radioélectrique du type "Passerelle M2M pour module multi-fonctions PLC 4G/LTE" est conforme à la directive 2014/53/UE. Le texte complet de la déclaration UE de conformité est disponible à l'adresse internet suivante: https://www.contec.com/download/
[IT] Italian	Il fabbricante, CONTEC, dichiara che il tipo di apparecchiatura radio "Gateway M2M per modulo multifunzione PLC 4G/LTE" è conforme alla direttiva 2014/53/UE. Il testo completo della dichiarazione di conformità UE è disponibile al seguente indirizzo Internet: https://www.contec.com/download/

[LV] Latvian	Ar šo CONTEC deklarē, ka radioiekārta "M2M vārteja PLC daudzfunkciju modulim 4G/LTE" atbilst Direktīvai 2014/53/ES. Pilns ES atbilstības deklarācijas teksts ir pieejams šādā interneta vietnē: https://www.contec.com/download/
[LT] Lithuanian	Aš, CONTEC, patvirtinu, kad radijo įrenginių tipas “M2M vartai PLC daugiafunkciniam moduliui 4G/LTE“ atitinka Direktyvą 2014/53/ES. Visas ES atitikties deklaracijos tekstas prieinamas šiuo interneto adresu: https://www.contec.com/download/
[HR] Croatian	CONTEC ovime izjavljuje da je radijska oprema tipa "M2M pristupnik za PLC višenamjenski modul 4G/LTE" u skladu s Direktivom 2014/53/EU. Cjeloviti tekst EU izjave o sukladnosti dostupan je na sljedećoj internetskoj adresi: https://www.contec.com/download/
[HU] Hungarian	CONTEC igazolja, hogy a "M2M átjáró PLC többfunkciós 4G/LTE” modulhoz" típusú rádióberendezés megfelel a 2014/53/EU irányelvnek. Az EU-megfelelőségi nyilatkozat teljes szövege elérhető a következő internetes címen: https://www.contec.com/download/
[MT] Maltese	B'dan, CONTEC, niddikjara li dan it-tip ta' tagħmir tar-radju “M2M Gateway for PLC Multi-Function Module 4G/LTE” huwa konformi mad-Direttiva 2014/53/UE. It-test kollu tad-dikjarazzjoni ta' konformità tal-UE huwa disponibbli f'dan l-indirizz tal-Internet li ġej: https://www.contec.com/download/
[NL] Dutch	Hierbij verklaar ik, CONTEC, dat het type radioapparatuur "M2M Gateway voor PLC Multifunctionele Module 4G/LTE" conform is met Richtlijn 2014/53/EU. De volledige tekst van de EU-conformiteitsverklaring kan worden geraadpleegd op het volgende internetadres: https://www.contec.com/download/
[PL] Polish	CONTEC niniejszym oświadcza, że typ urządzenia radiowego “Brama M2M dla wielofunkcyjnego modułu PLC 4G/LTE” jest zgodny z dyrektywą 2014/53/UE. Pełny tekst deklaracji zgodności UE jest dostępny pod następującym adresem internetowym: https://www.contec.com/download/
[PT] Portuguese	O(a) abaixo assinado(a) CONTEC declara que o presente tipo de equipamento de rádio “Gateway M2M para Módulo Multifuncional PLC 4G/LTE” está em conformidade com a Diretiva 2014/53/UE. O texto integral da declaração de conformidade está disponível no seguinte endereço de Internet: https://www.contec.com/download/
[RO] Romanian	Prin prezenta, CONTEC declară că tipul de echipamente radio “Gateway M2M pentru modul multifuncțional PLC 4G/LTE” este în conformitate cu Directiva 2014/53/UE. Textul integral al declarației UE de conformitate este disponibil la următoarea adresă internet: https://www.contec.com/download/
[SK] Slovak	CONTEC týmto vyhlasuje, že rádiové zariadenie typu “Brána M2M pre PLC multifunkčný modul 4G/LTE“ je v súlade so smernicou 2014/53/EÚ. Úplné EÚ vyhlásenie o zhode je k dispozícii na tejto internetovej adrese: https://www.contec.com/download/
[SL] Slovenian	CONTEC potrjuje, da je tip radijske opreme "M2M prehod za večnamenski modul PLC 4G/LTE" skladen z Direktivo 2014/53/EU. Celotno besedilo izjave EU o skladnosti je na voljo na naslednjem spletnem naslovu: https://www.contec.com/download/

[FI] Finnish	CONTEC vakuuttaa, että radiolaitetyyppi “M2M-yhdyskäytävä PLC-monitoimimoduulille 4G/LTE” on direktiivin 2014/53/EU mukainen. EU-vaatimustenmukaisuusvakuutuksen täysimittainen teksti on saatavilla seuraavassa internetosoitteessa: https://www.contec.com/download/
[SV] Swedish	Härmed försäkrar CONTEC att denna typ av radioutrustning “M2M Gateway för PLC multifunktionsmodul 4G/LTE” överensstämmer med direktiv 2014/53/EU. Den fullständiga texten till EU-försäkran om överensstämmelse finns på följande webbadress: https://www.contec.com/download/

5. NCC

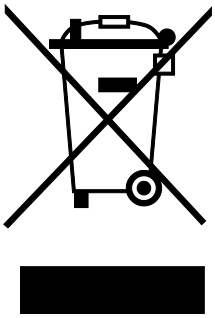
NCC CAUTION

・減少電磁波影響，請妥適使用
・警告使用者：此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。
・「本產品電磁波曝露量(MPE)標準值1mW/cm2，送測產品實測值為0.105 mW/cm2，建議使用時至少距離人體20cm」

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

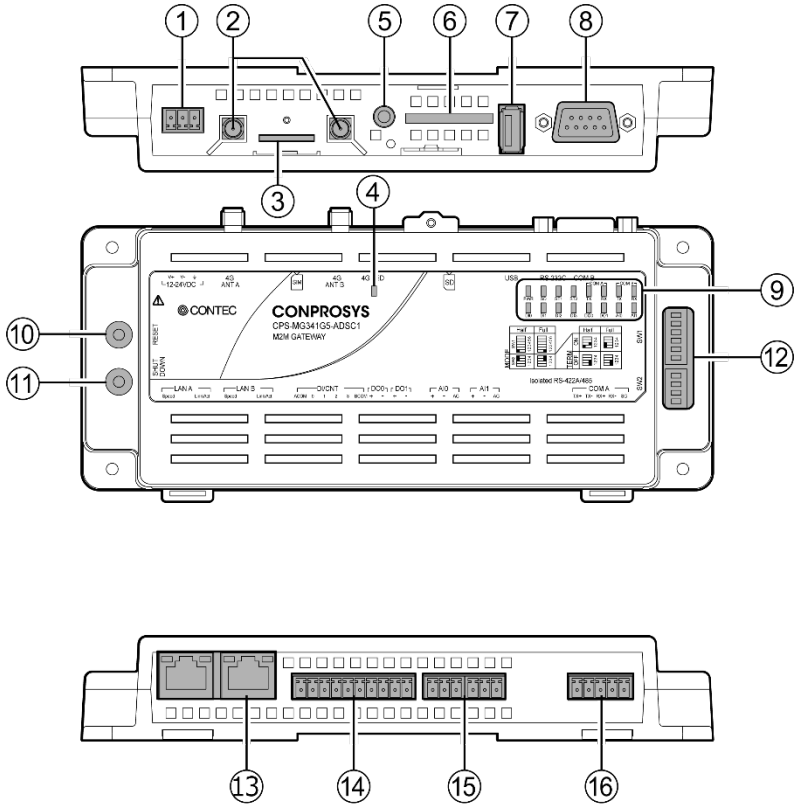
Refer to the appendix for the specification as well as how to remove and dispose of the battery.

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	Power Connector	This is a connector for power. Use the 3-pin connector included in the package.
2	Antenna Connector	This is a connector to connect an antenna. Use the supplied connector or optional one.
3	SIM Card Slot	This is a slot for inserting SIM card.
4	4G LTE LED	This displays the intensity of the signal reception.
5	Debug Connector	Do not use this.
6	SD Card Slot	This a slot for inserting SD card to store data.
7	USB Port	This is a TYPE-A USB port.
8	RS-232C Serial Port	This is a RS-232C serial port. (male)
9	LED Indicator	This indicates status of the product.
10	Reset Switch	This resets the product.
11	Shut-Down Switch	This shuts down the product.
12	DIP Switch	This is used for system setup and RS-422A/485 setup.
13	LAN Port	This is a connector for LAN.
14	Digital Input/Counter Input/Digital Output Connector	This is a connector for digital input/counter input/digital output. (Use the 10-pin connector included in the package)

No.	Name	Function
15	Analog Input Connector	This is a connector for analog input. (Use the 3-pin connector included in the package)
16	RS-422A/485 Connector	This is a connector for RS-422A/485 communication. (Use the 5-pin connector included in the package)

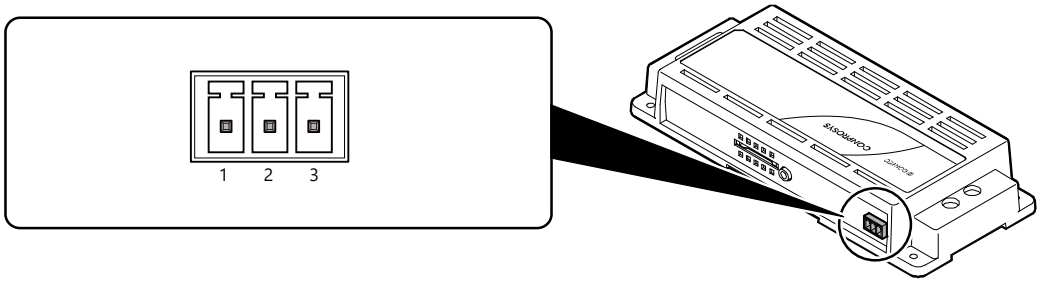
2.Description of Product Components

Components such as connectors, switches are described.

1. Power Connector

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

Connector type: PHOENIX CONTACT MC 1,5/3-ST-3,5 (or equivalent)

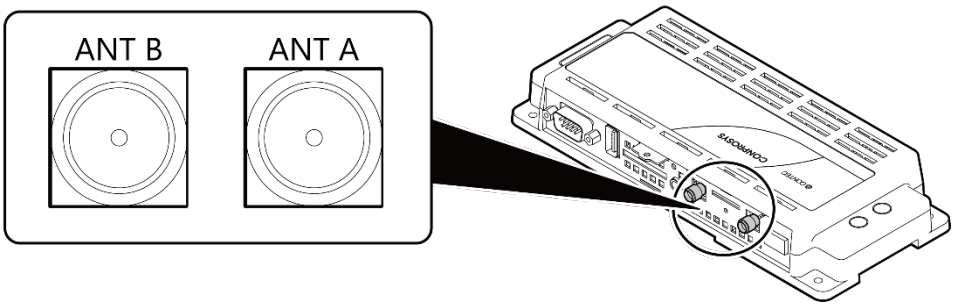


Pin Assignment

Pin No.	Signal Name
1	FG
2	V-(GND)
3	V+(12-24VDC)

2. Antenna Connector

This is a connector to connect a 4G antenna included in the package. ANT A is the Main antenna, and ANT B is the Div antenna.



⚠ CAUTION

To follow the regulation by the Radio Act, use the supplied antenna or optional one listed in the following page.

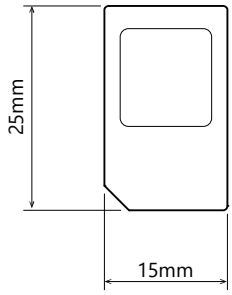
Do not use other antennae.

3. SIM Card Slot

It is a slot for inserting SIM card that is necessary for 4G LTE communication.

Use a standard size (miniSIM) SIM card.

Standard SIM size : 25 x 15(mm)



4. 4G LTE LED

The LED displays the intensity of the signal reception.

The higher RSRP and RSSI indicates the more intensified signal reception.

Color and Description

LED color	Display	RSRP (dBm) (4G LTE connection)	RSSI (3G W-CDMA connection)
Green	ON	-108 and above	22 - 31
Green	Flashing	-118 to -109	15 - 21
Red	ON	-128 to -119	10 - 14
Red	Flashing	-129 or less	0 - 9
-	OFF	Disconnected	Disconnected

5. Debug Connector

Do not use this.

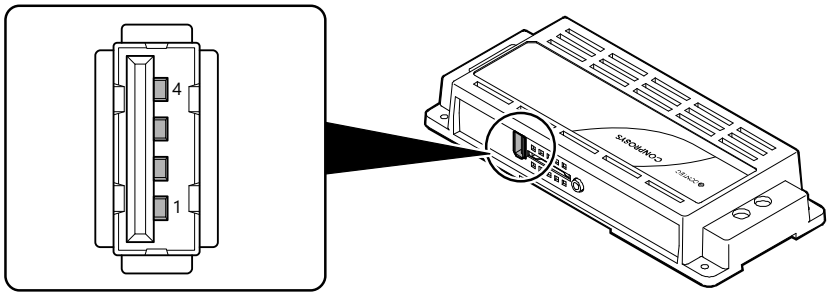
6. SD Card Slot

Insert the SD card to store such as data.

*Use the Contec SD card "SD-4GB-A (4GB)".

7. 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

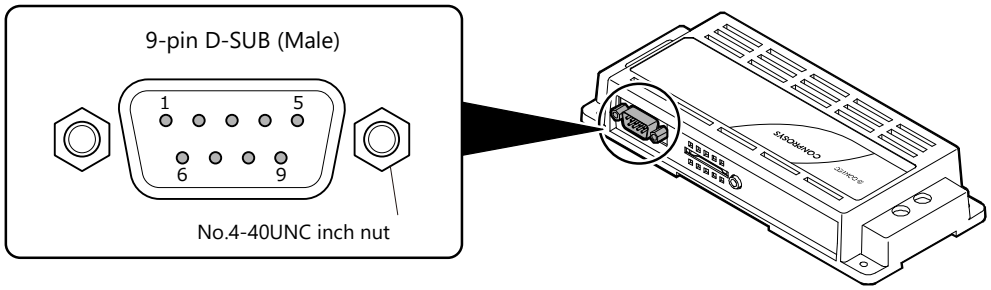
⚠ CAUTION

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

8. RS-232C Serial Port

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

The baud rate is 115,200bp (Max)



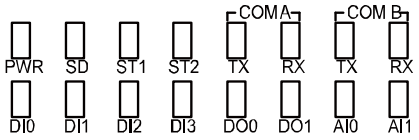
Pin Assignment

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

9. LED Indicator

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

The meaning of each LED is described below.



Color and Description

LED	Color	Display	Description
PWR	Green	ON	Power has been supplied.
		OFF	Power has not been supplied.
SD	Yellow	Flashing	It flashes at the SD access.
		OFF	It indicates there is no SD access.
ST1	Green	-	Refer to the Reference Manual (Software).
ST2	Red	-	Refer to the Reference Manual (Software).
TX(COM A)	Yellow	Flashing	It flashes upon transmitting data by the RS-422A/485.
		OFF	It indicates there is no data transmission by RS-422A/485.
RX(COM A)	Yellow	Flashing	It flashes upon receiving data by the RS-422A/485.
		OFF	It indicates there is no data reception by RS-422A/485.
TX(COM B)	Yellow	Flashing	It flashes upon transmitting data by the RS-232C.
		OFF	It indicates there is no data transmission by the RS-232C.
RX(COM B)	Yellow	Flashing	It flashes upon transmitting data by the RS-232C.
		OFF	It indicates there is no data transmission by the RS-232C.
DI0 - DI3	Yellow	ON	It lights up when there is inputting.
		OFF	It indicates there is no inputting.
DO0 - DO1	Yellow	ON	It lights up when there is outputting.
		OFF	It indicates there is no outputting.
AI0 - AI1	Yellow	ON	It lights up upon measuring.
		OFF	It indicates there is no measuring.

10. Resets switch

This resets the product.

11. Shutdown switch

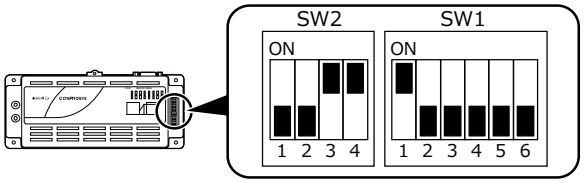
This shuts down OS of the product.

12. DIP switch

SW1, SW2

DIP switch for system setup and RS-422A/485 setup of COM A.

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



DIP Switch

SW	Bit No.	ON/OFF	Description
SW2	1	ON	Enable the TX Terminator
		OFF	Disable the TX Terminator
	2	ON	Enable the RX Terminator
		OFF	Disable the RX Terminator
	3	ON	Internal connection state of TX+ and RX+: Short (Half Duplex)
		OFF	Internal connection state of TX+ and RX+: Open (Full Duplex)
	4	ON	Internal connection state of TX- and RX-: Short (Half Duplex)
		OFF	Internal connection state of TX- and RX-: Open (Full Duplex)
SW1	1	ON	RTS Communication Mode: Half Duplex
		OFF	RTS Communication Mode: Full Duplex
	2	-	System Reservation: Always OFF
	3	-	System Reservation: Always OFF
	4	-	System Reservation: Always OFF
	5	-	System Reservation: Always OFF
	6	-	System Reservation: Always OFF

13. LAN Port

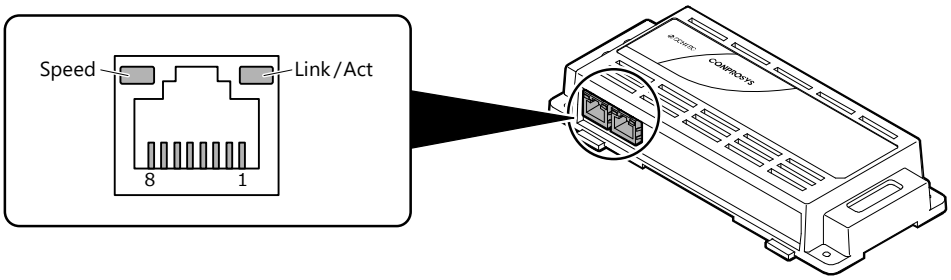
This product has 2 ports of Ethernet LAN Port.

The LAN ports are independent, which makes it possible to split the network segment.

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
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.
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.

⚠CAUTION

- Using the product in hub mode may result in reduced speed, throughput, etc. compared with a regular switching hub.
- If a large amount of data or high-speed response is requested, an external switching HUB will be required.

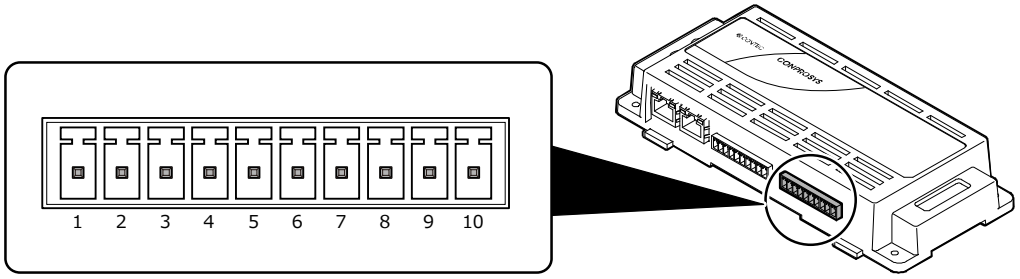
14. Digital Input / Counter Input / Digital Output Connecter

This product has 4 channels of digital Input and 2 channels of digital output.

You can switch DI2 and DI3 to counter input and operate them.

Use the 10-pin connector included in the package.

Connector type: PTR MESSTECHNIK AK1550/10-3.5-GREEN (or equivalent)



Pin Assignment

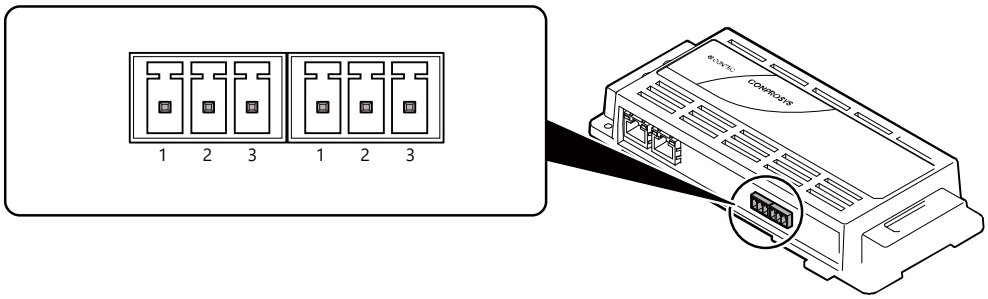
Pin No.	Signal Name	Description
1	DI_ACOM	This pin is left unconnected.
2	DI0	This indicates the input signals of channel 0. It connects the output signals from the other devices.
3	DI1	This indicates the input signals of channel 1. It connects the output signals from the other devices.
4	DI2/CNT0	This indicates digital input signals of channel 2 and counter signals of channel 0. It connects the output signals from the other devices.
5	DI3/CNT1	This indicates digital input signals of channel 3 and counter signals of channel 1. It connects the output signals from the other devices.
6	DI_BCOM	Digital ground. It shares with 4 channels of input signal.
7	DO0+	This indicates the output signals (+) of channel 0. It connects the input signals (+) from the other devices.
8	DO0-	This indicates the output signals (-) of channel 0. It connects the input signals (-) from the other devices.
9	DO1+	This indicates the output signals (+) of channel 1. It connects the input signals (+) from the other devices.
10	DO1-	This indicates the output signals (-) of channel 1. It connects the input signals (-) from the other devices.

15. Analog Input Connecter

This product has 2 channels of analog input that supports isolated inter-channel.

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

Connector type: PHOENIX CONTACT MC 1,5/3-ST-3,5 (or equivalent)



Pin Assignment

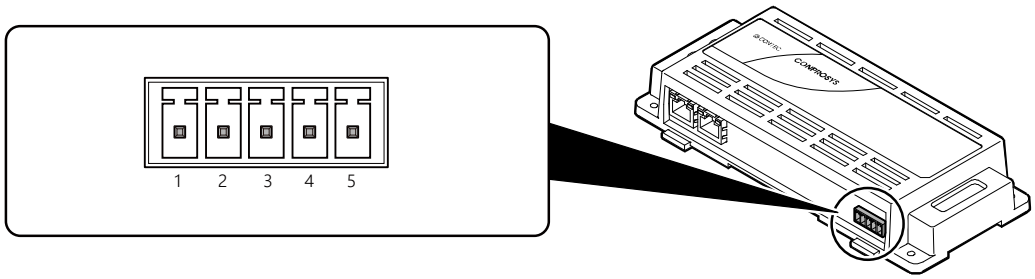
Pin No.	Signal Name	Description
1	AI+	Analog input signals (+).
2	AI-	Analog input signals (-).
3	AGND	Analog ground.

16. RS-422A/485 Connector

This product has 1 port of RS-422A/485 communication.

Use the 5-pin connector, included in the package, to connect to external power.

Connector type: PTR MESSTECHNIK AK1550/5-3.5-GREEN (or equivalent)



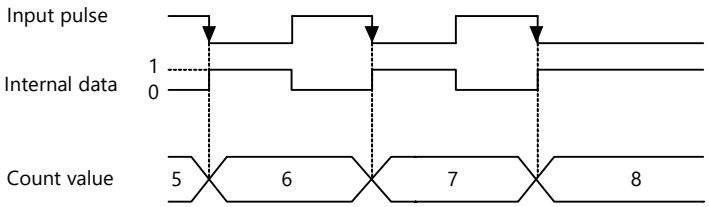
Pin Assignment

Pin No.	Signal Name	Description
1	TX+	Transmission data (+)
2	TX-	Transmission data (-)
3	RX+	Receptions data (+)
4	RX-	Receptions data (-)
5	SG	Signal ground

3.Other Functions

1. Counter function

When a pulse is input, the product performs incremental counting at the falling edges of input pulse.



◆ Compare Register

Compare the count value of a corresponding channel with the compare register value. If these two values match, an interrupt is generated.

This register can be set to any value from 0h to FFFFFFh.

2. Digital Filter

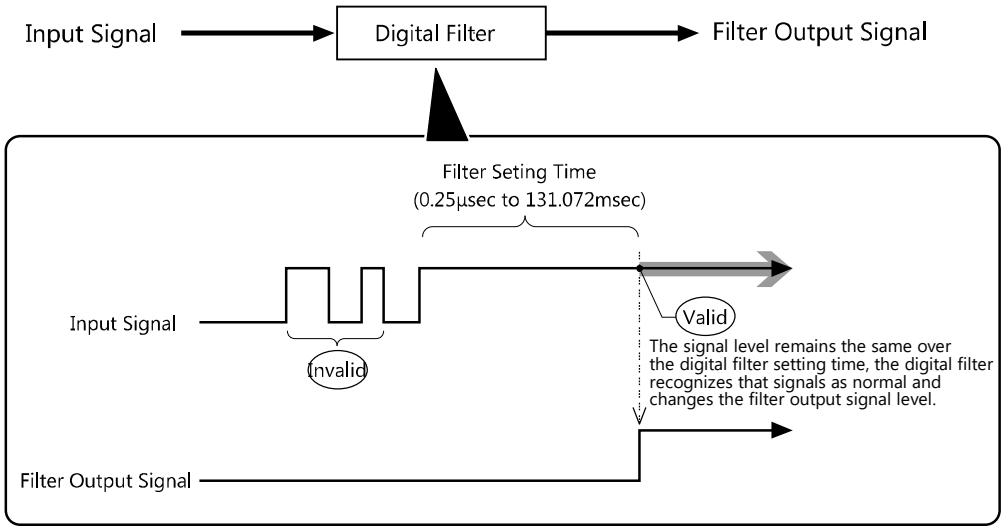
This product can apply a digital filter to every input pin, thereby preventing wrong recognition of input signals from being affected by noise or chattering.

◆ Operation Principle

The digital filter checks the input signal level during the sampling time of 1/4 cycles of digital filter setting time. When the signal level remains the same over the digital filter setting time (sampling four times), the digital filter recognizes that signals as normal and changes the filter output signal level.

When there is a change in the signal within the digital filter setting time (sampling four times), the input signals till then are disregarded and the level check continues again

If the signal level changes at a frequency shorter than the set time, therefore, the level change is ignored.



Digital Filter Setting Time

Set the digital filter time to 0 - 20 (14h).

Setting the digital filter time to 0 disables the function of filtering (0 is set as default and upon turning on the power)

Setting Data (n)	Digital Filter Time
0(00h) Default setting	The filter function is unused.
1(01h)	0.25µsec
2(02h)	0.5µsec
3(03h)	1µsec
4(04h)	2µsec
5(05h)	4µsec
6(06h)	8µsec
7(07h)	16µsec
8(08h)	32µsec
9(09h)	64µsec
10(0Ah)	128µsec

Setting Data (n)	Digital Filter Time
11(0Bh)	256µsec
12(0Ch)	512µsec
13(0Dh)	1.024msec
14(0Eh)	2.048msec
15(0Fh)	4.096msec
16(10h)	8.192msec
17(11h)	16.384msec
18(12h)	32.768msec
19(13h)	65.536msec
20(14h)	131.072msec
-	-

The table below lists the relation between digital filter time and setting data.

Digital Filter Time [sec] = $2^n/(8x10^6)$ n: Setting Data (0 - 20)

⚠CAUTION

- The digital filter applies to all input channels; it cannot apply to only specific input pins.
- To pass input signal without fail, the pulse width should be twice or larger than setting filter time.
- A digital filter doesn't work effectively if the filter time is set (setting data: 1-10) shorter than the opto-coupler response time.

Setup

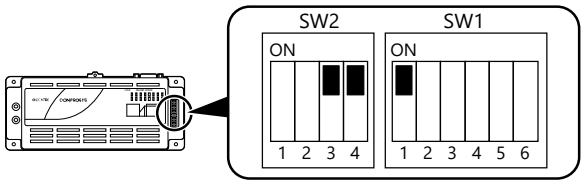
This section describes how to set switches and an antenna that are necessary to operate the product.

1.Set Data Transfer Mode

With the DIP switch (SW1, SW2), data transfer mode can be changed (half-duplex or full-duplex).
Set the data transfer mode in accordance with a device which you are connecting to.

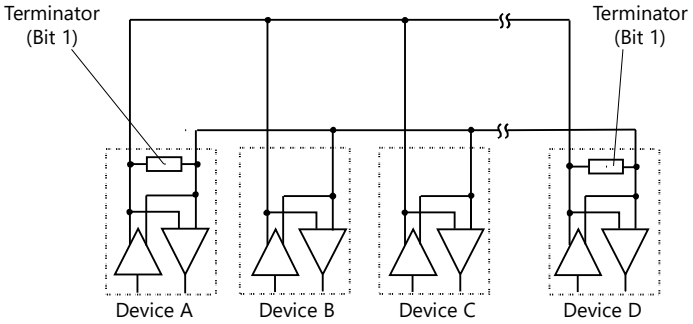
1. RS-422A/485

◆ Half-Duplex Switch Setup

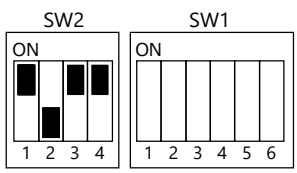
Data transfer mode	Setup method
Half-duplex [Half]	TX is used to transfer data; the sending and receiving modes should be switched over using RTS. 

Terminator setup

Set the terminators on or off in accordance with the device which you are communicating with.
The DIP switch (SW2) sets the terminator.
The terminators on the product are 100Ω resistors.
If you intend to use a terminator of other than 100Ω, set the terminator switch OFF first, and insert an external terminator.



(A) or (D)

Use the terminator inside	Set the terminator outside
	

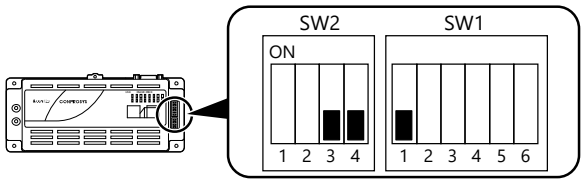
(B) or (C)

When using the terminator neither inside nor outside


DIP Switch

SW	Bit No.	ON/OFF	Description
SW2	1	ON	Enable the TX Terminator
		OFF	Disable the TX Terminator
	2	ON	Enable the RX Terminator
		OFF	Disable the RX Terminator
	3	ON	Internal connection state of TX+ and RX+: Short (Half Duplex)
		OFF	Internal connection state of TX+ and RX+: Open (Full Duplex)
	4	ON	Internal connection state of TX- and RX-: Short (Half Duplex)
		OFF	Internal connection state of TX- and RX-: Open (Full Duplex)
SW1	1	ON	RTS Communication Mode: Half Duplex
		OFF	RTS Communication Mode: Full Duplex
	2	-	System Reservation: Always OFF
	3	-	System Reservation: Always OFF
	4	-	System Reservation: Always OFF
	5	-	System Reservation: Always OFF
	6	-	System Reservation: Always OFF

◆ Full-Duplex Switch Setup

Data transfer mode	Setup method
Full-duplex [Full]	Activating RTS signal of this product activates CTS signal. 

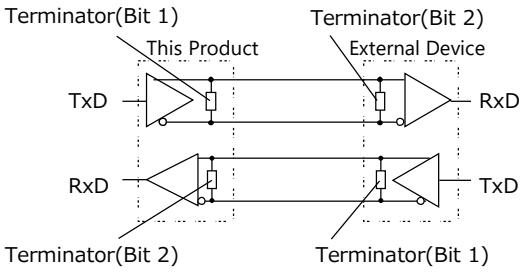
Terminator setup

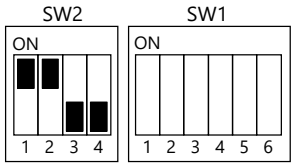
Set the terminators on or off in accordance with the device which you are communicating with.

The DIP switch (SW2) sets the terminator.

The terminators on the product are 100Ω resistors.

If you intend to use a terminator of other than 100Ω, set the terminator switch OFF first, and insert an external terminator.



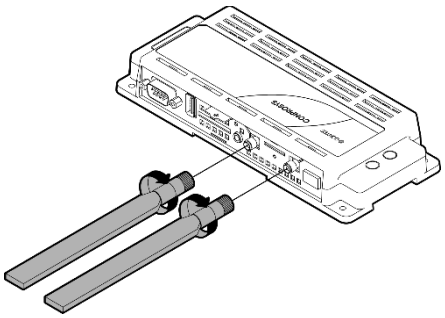
Use the terminator inside	Set the terminator outside
	

DIP Switch

SW	Bit No.	ON/OFF	Description
SW2	1	ON	Internal connection state of TX+ and RX+: Short (Half Duplex)
		OFF	Internal connection state of TX+ and RX+: Open (Full Duplex)
	2	ON	Internal connection state of TX- and RX-: Short (Half Duplex)
		OFF	Internal connection state of TX- and RX-: Open (Full Duplex)
	3	ON	RTS Communication Mode: Half Duplex
		OFF	RTS Communication Mode: Full Duplex
	4	ON	System Reservation: Always OFF
		OFF	System Reservation: Always OFF
SW1	1	ON	System Reservation: Always OFF
		OFF	System Reservation: Always OFF
	2	-	System Reservation: Always OFF
	3	-	Internal connection state of TX+ and RX+: Short (Half Duplex)
	4	-	Internal connection state of TX+ and RX+: Open (Full Duplex)
	5	-	Internal connection state of TX- and RX-: Short (Half Duplex)
	6	-	Internal connection state of TX- and RX-: Open (Full Duplex)

2.Set Antenna

Set the supplied antenna to the antenna connector. Turn the antenna in the direction of the arrow shown to fasten.

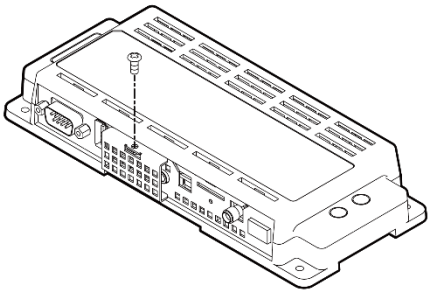


⚠CAUTION

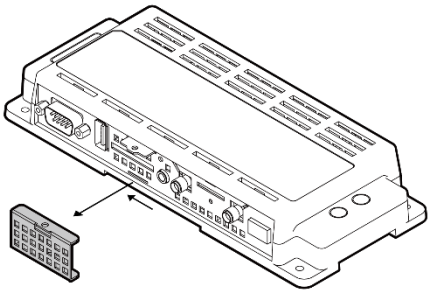
- Double-check whether the antenna has been securely fastened and connected.
- Make sure both antennas are connected when using the product.
- The recommended tightening torque for the SMA terminal of the included antenna is about 1.0 N•m (10.2 kgf•cm).

3.Insert SD Card

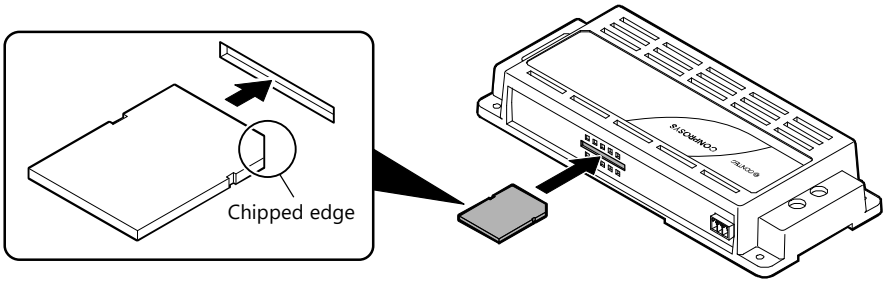
1 Unfasten the screw of the cover.
(Card cover is attached to the product upon shipping).



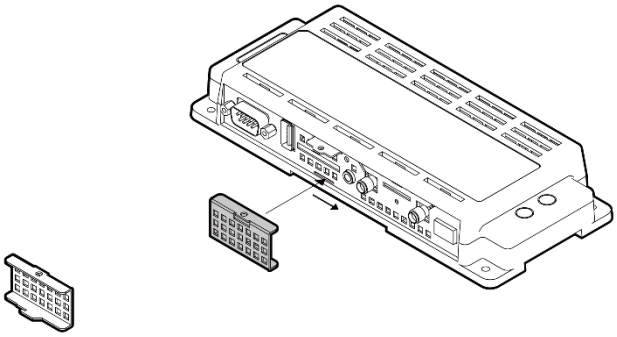
2 Slide the card cover to remove it.



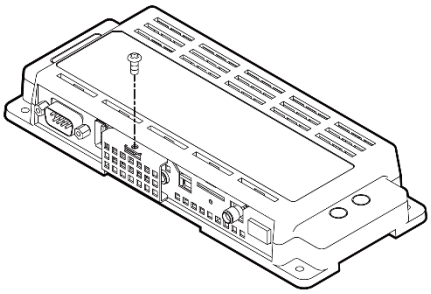
3 With the chipped edge of the SD card is in the position shown below, insert the card all the way into the slot.



4 Insert the catch of the card cover into the opening shown in the figure below.



5 Fasten with a screw.



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

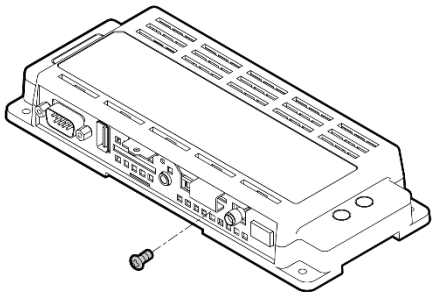
4.Inset SIM Card

SIM card is required individually.

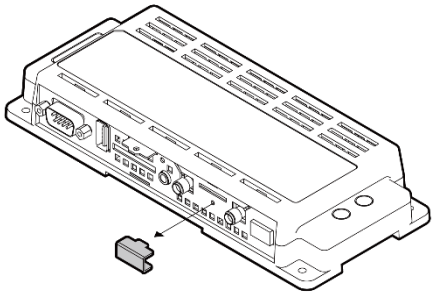
Visit the Contec website to find the compatible card with the product.

Website https://www.contec.com/

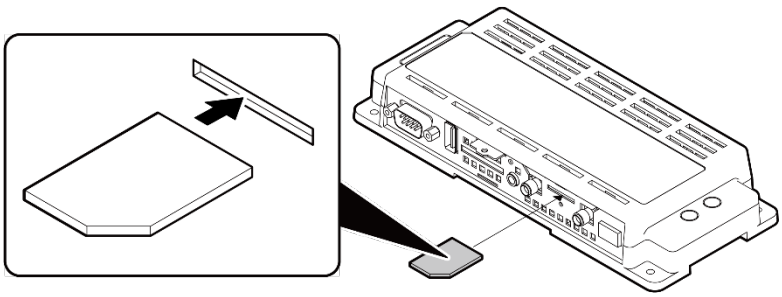
1 Unfasten the screw of the cover.
(Card cover is attached to the product upon shipping).



2 Slide the card cover to remove it.



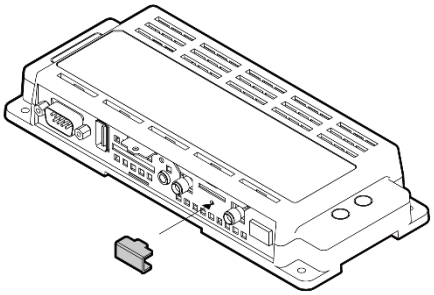
3 With the chipped edge of the SIM card is in the position shown below, insert the card all the way into the slot.



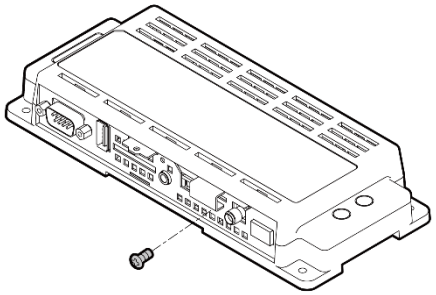
⚠CAUTION

- Use a standard size (miniSIM) SIM card.
  Standard SIM size : 25x15(mm)
- Do not use a Micro or Nano size SIM card with an adapter to make it as a Standard SIM card.

4 Insert the catch of the card cover into the opening shown in the figure below.



5 Fasten with a screw.



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

Installation

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

1.Install the Product

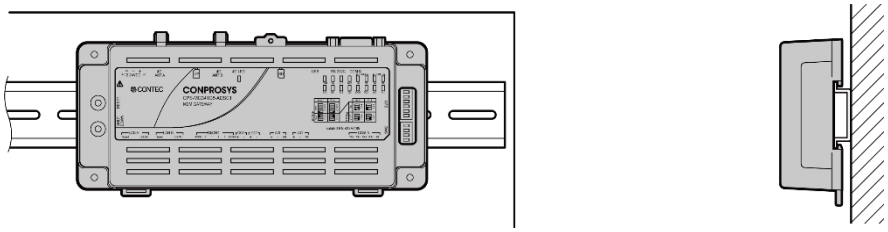
2. Installation Conditions

◆ Installation Orientation

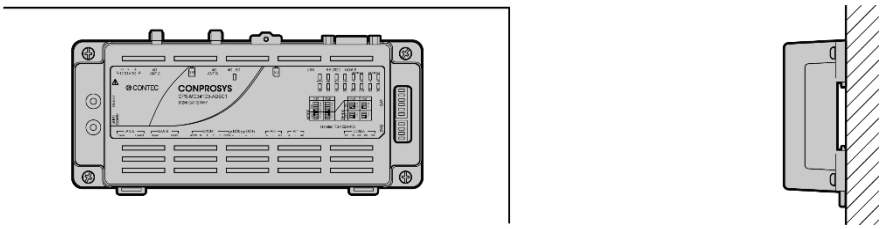
Install the product in the orientations shown below (0 °C).

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

DIN rail Mounting

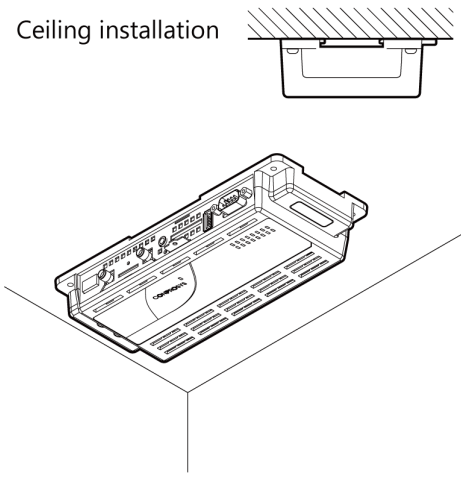


Wall Mounting

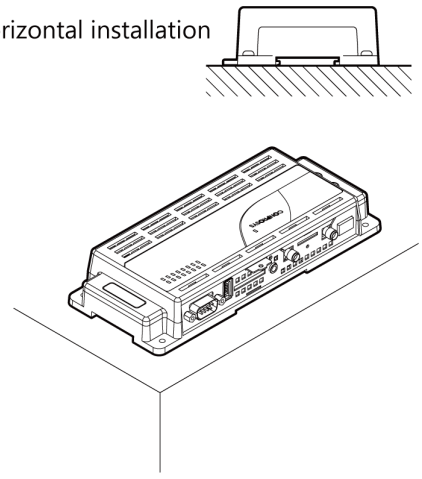


Operating ambient temperature should be between -20 °C and +55 °C when the product is installed on the ceiling or horizontally.

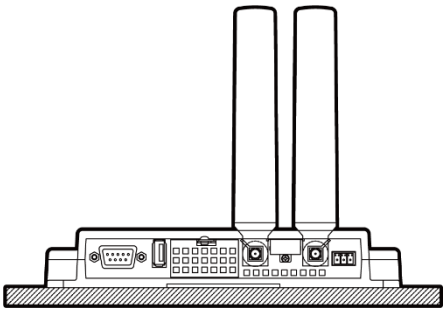
Ceiling installation



Horizontal installation

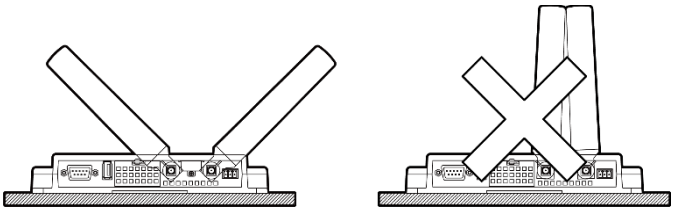


The antennas should be positioned perpendicularly to the ground.



⚠ CAUTION

If the reception sensitivity is poor for the installation environment, changing the antenna direction may improve sensitivity. Note that reception sensitivity will be decreased if the two antennas are angled inward.

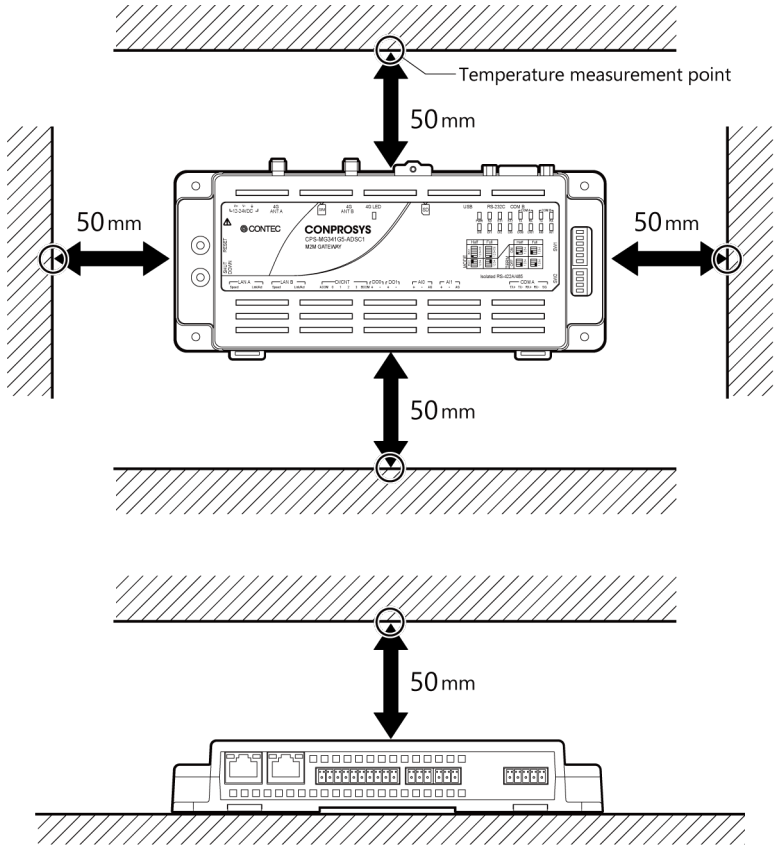


◆ Ambient Temperature

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.



* ◯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 shorten. Perform the forced air cooling to counteract.

◆ Installation Place

Improper installation place could cause communication failures or quality deterioration.

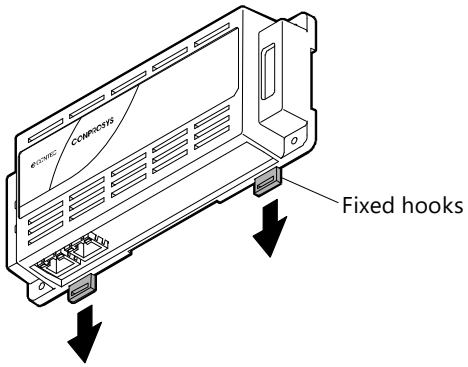
Follow the instructions listed below.

- Do not place the product too close to the metal or concrete walls (including steel-frame).
- Do not leave any metal pieces around the antenna.
- Do not install the product outside of the communication area of the carrier.

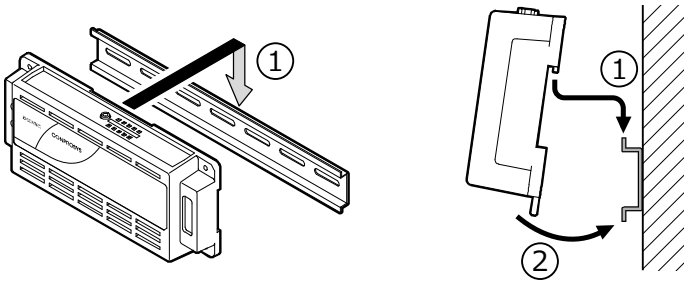
3. Mounting on/Removing from a DIN Rail

◆ How to Mount

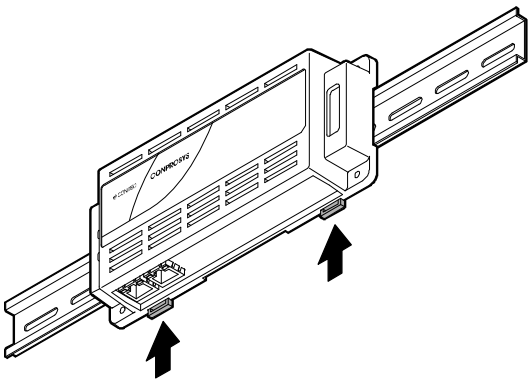
1 Pull down the hooks to unlock.
If the hooks are stuck, use a slotted screwdriver to unlock.



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

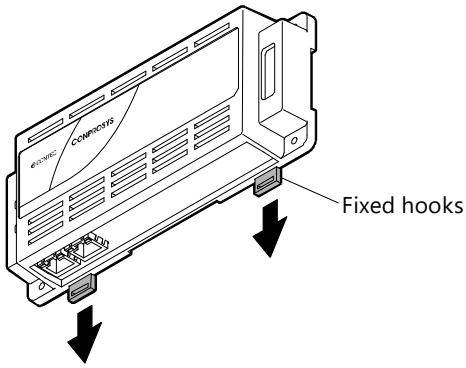


3 Push the hooks up to lock the product on the DIN rail.

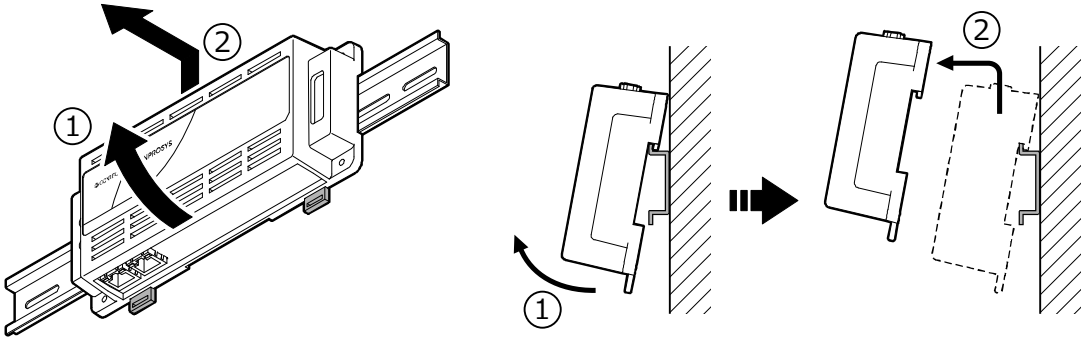


◆ How to Remove

1 Pull down the hooks to unlock.
If the hooks are stuck, use a slotted screwdriver to unlock.



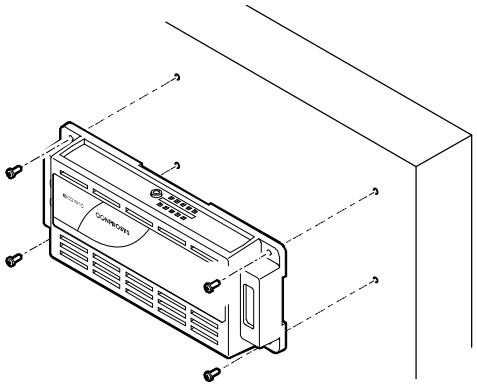
2 (1). With the hooks unlocked, pull the lower part of the product toward you.
(2). By lifting the product, you can easily remove it from the DIN rail.



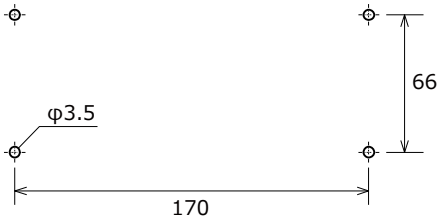
4. Mounting on the Wall

Appropriate screws (fit into φ3.5 hole) are required to install the product on the wall.

The commercial screws can be purchased individually. Get the screws fit into φ3.5 hole and set the product. The tightening torque should be appropriate for the wall to which the product is being mounted.



Screw installation positions



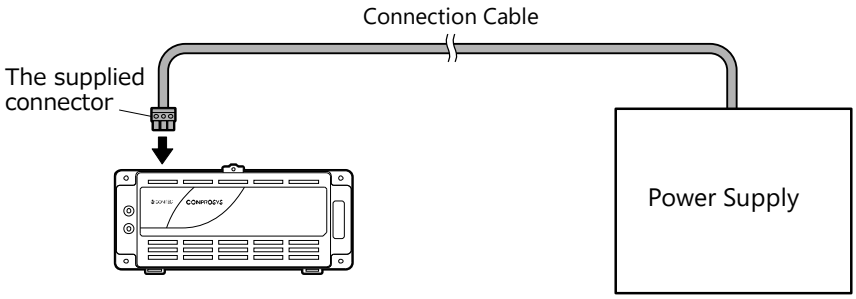
⚠ CAUTION

Tightening torque should be carefully controlled according to the wall on which you are installing to.

2.Connecting to an External Device

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

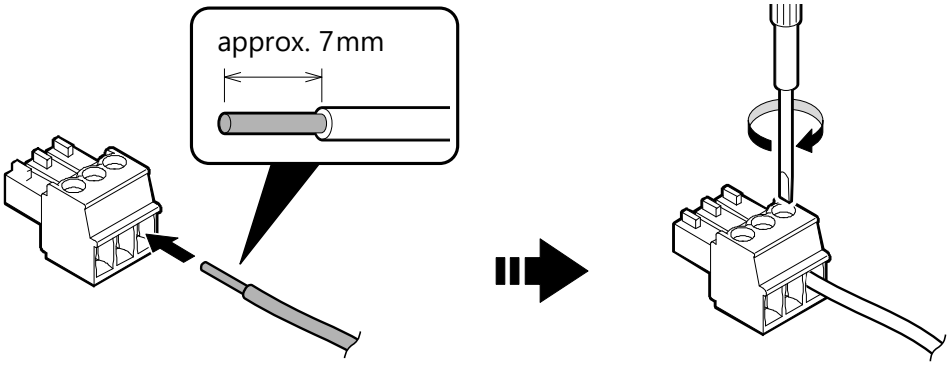
The following example describes how to make the connecting cable with a 3-pin connector.



Applicable wire : AWG24 - 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.

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)
Cable Diameter	AWG24 - 16 (0.2mm^2 - 1.25mm^2)
Cable Length	Within 3 meters

◆ FG Cable

Use the FG cable described below.

Cable Diameter	AWG18 - 16 (0.75mm^2 - 1.25mm^2)

* Refer to **"Power Connector"** in the **page 26** for details of the power connector and pin assignment.

◆ Specification of External Power Supply

This product is designed to operate at least with 15watt power supply.

In addition, the power supply must fulfill the following requirements.

Rising time for up to 12 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-15AW12-01.

⚠ CAUTION

- 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.
- 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 more
Cable Length	Within 100 meters

Refer to **"LAN Port"** in the **page 32** for details of the LAN port and pin assignment.

3. RS-422A/485

◆ RS-422A/485 Cable

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

Cable	Twisted pair cable with the shield
Cable Diameter	AWG28 - 16 (0.08mm^2 - 1.25mm^2)
Cable Length	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. 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 cable lengths in the table are not guaranteed for the communication speed.

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	1100
	AWG22	1200

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	1200
	AWG22	1200

* Refer to **"RS-422A/485 Connector"** in the **page 36** for details of the RS-422A/485 Connector and pin assignment.

◆ 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.

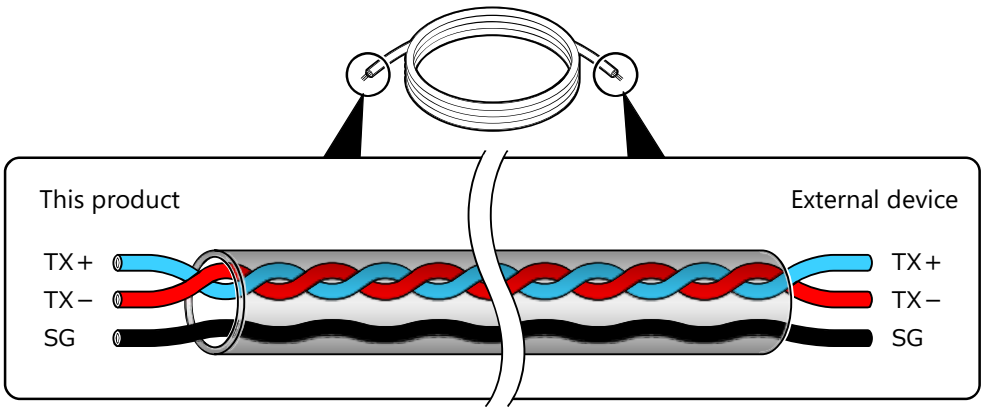
Baud Rate (bps)	Error (%)
300	0.00
600	0.00
900	0.00
1,200	0.00
2,400	0.00
4,800	0.00
9,600	0.16
14,400	0.16
19,200	0.16
28,800	0.16
38,400	0.16
57,600	0.16
115,200	0.16

◆ Half Duplex

Half duplex needs two or more sets of twisted-pair.

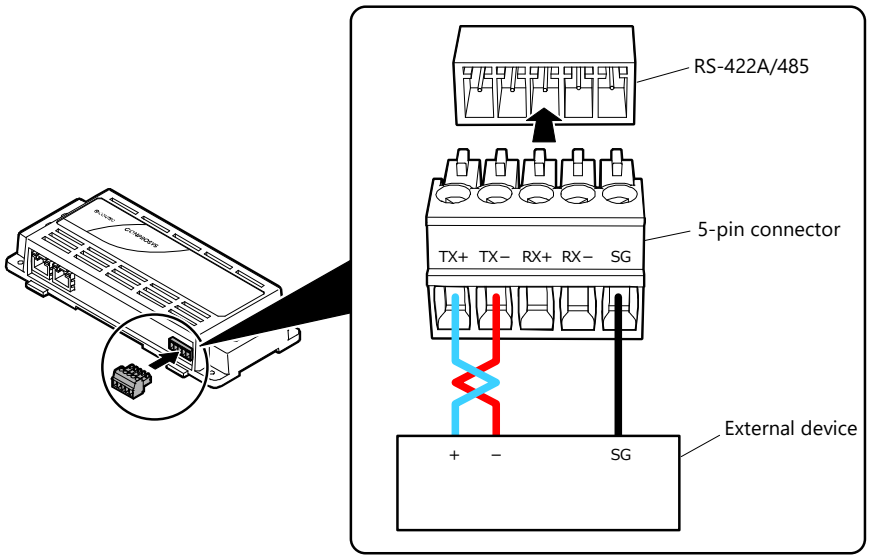
One set is for a signal line, other free line(s) is (are) for the signal ground (SG).

Connect TX + and TX- to make them as a set of twisted pair wire.



Connecting to an external device

Connect the product in accordance with the specification of the external device.

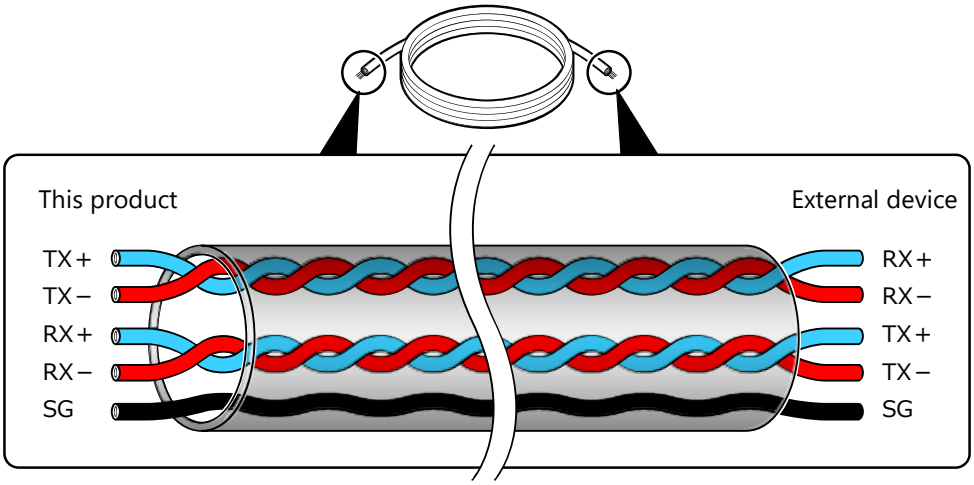


◆ Full Duplex

Full duplex needs three or more sets of twisted-pair.

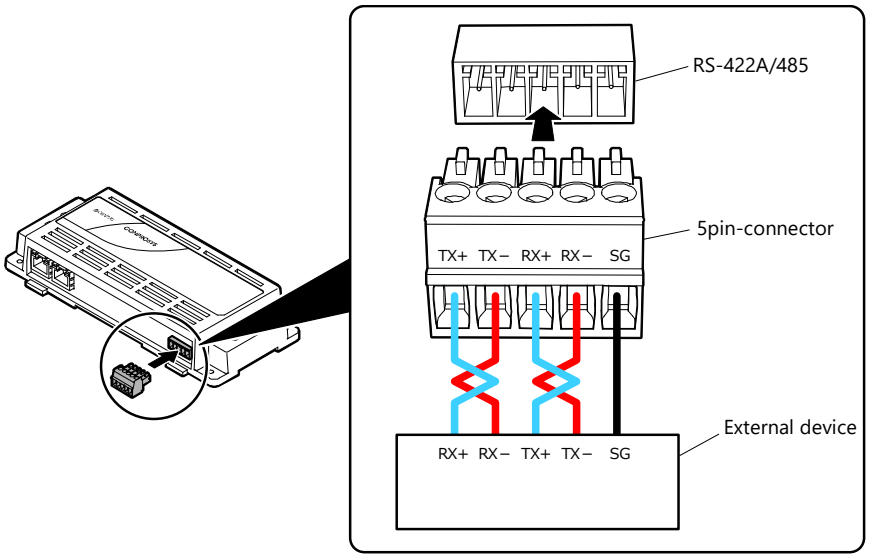
Two sets are for a signal line, other free line(s) is (are) for the signal ground (SG).

Connect [TX + and TX-] [RX+ and RX-] to make them as a set of twisted pair wire.



Connecting to an external device

Connect the product in accordance with the specification of the external device.



◆ Notes on the Shield Connection

- Ground the shield to the frame ground (FG) of the external device.
- Use an unshielded cable if there is no terminal or/and place for grounding.
- Do not ground to Power GND.
- Shield should not be used as the signal ground (SG).

⚠ CAUTION

- 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.
- If the shielded cables are incorrectly wire-connected to the ground, the shield might become an antenna picking up noises or become a source of noise.
- If you find the problems, remove the grounding of the shield.

4. 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.).

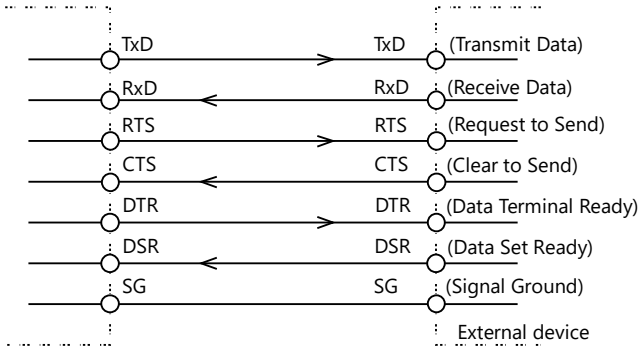
Check the requirements of the external device and select either a straight-through or crossed (null modem) cable as appropriate.

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

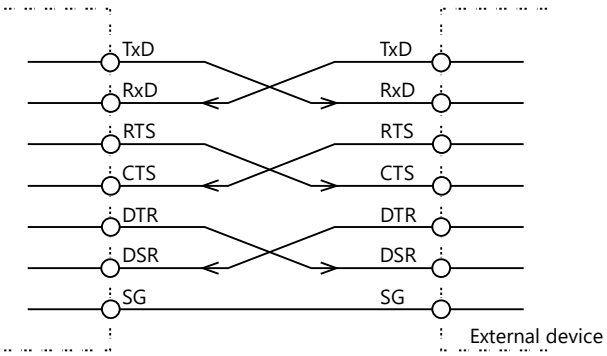
* Refer to **"RS-232C Serial Port"** in the **page 29** for details of the RS-232C serial port and pin assignment.

Connecting to an external device

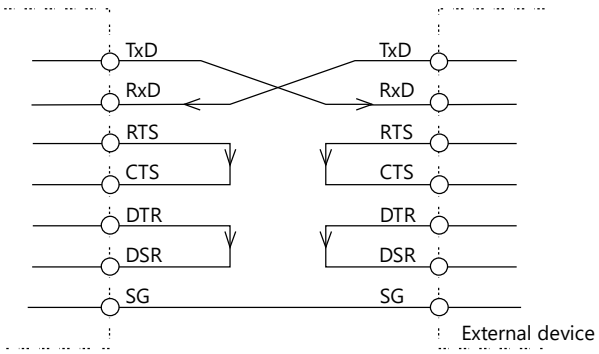
Example Connection to a Modem



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

5. Analog Input

◆ Analog Input Cable

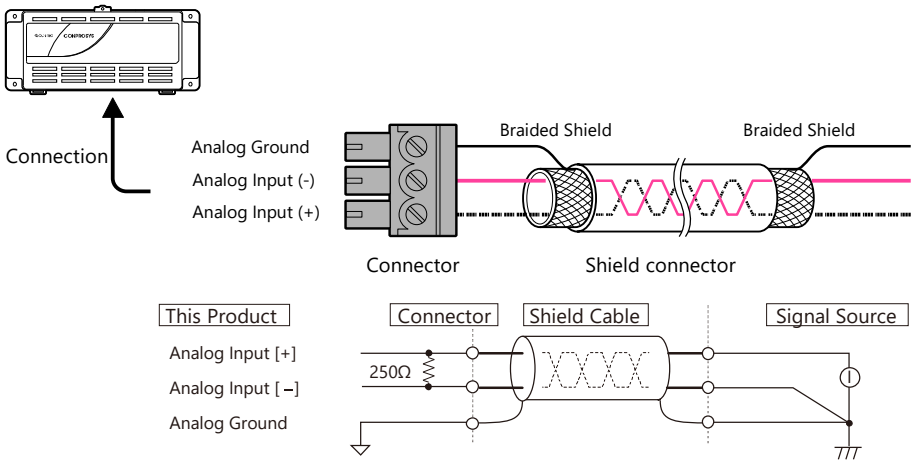
Use the Analog Input cable described below

Cable	Use copper wires that tolerate the temperature of 75 °C and higher.
Cable Diameter	AWG28 - 16
Cable Length	Within 20 meters.

*Refer to **"Analog Input Connecter"** in the **page 35** for details of the analog input connector and pin assignment.

Connecting to an external device

Connect the input [+] of each analog input channel of the interface connector with the signal, and connect the input [-] with the signal source ground. In addition, connect the analog ground of this product with ground of signal source by braided shield.



⚠ CAUTION

- 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.
- When the analog ground is not connected, the conversion data will be undefined.
- Analog signal which input [+] Input, and [-] input does not exceed the maximum input rating of the analog input current. If it exceeds the maximum, this product may be damaged.
- When the terminal of [+] input or [-] input is not connected, conversion data is undefined.
- Connect both the [+] input and the [-] input terminals that are not connected to signal source to the analog ground.

6. Digital Input/Counter Input

◆ Digital Input/Counter Input Cable

Use the Digital Input/Counter Input cable described below.

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

*Refer to **"Digital Input / Counter Input / Digital Output Connecter"** in the **page 34** for details of the digital input/counter input connector and pin assignment.

Input equivalent circuit of digital / counter input interface unit is shown in Figures below.

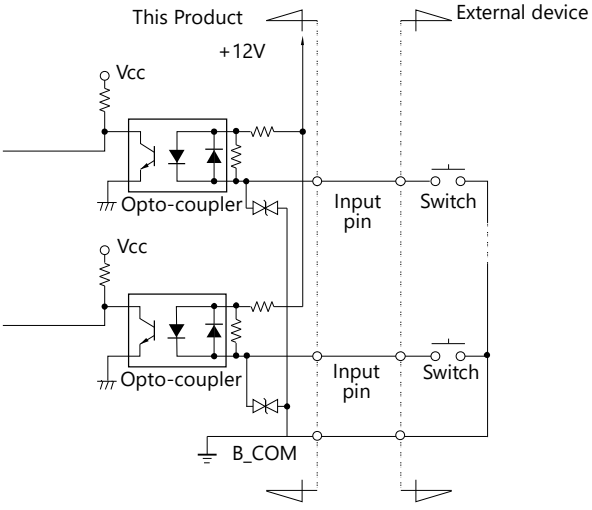
DI connects to a device which can be current-driven such as switch or transistor output device.

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 (Compatible with current sink output).

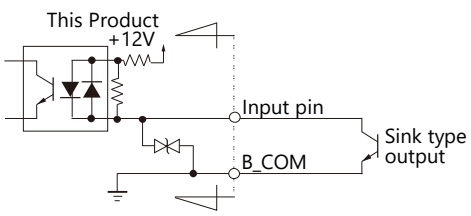
Input equivalent circuit

Corresponded to current sink output

Connecting Switch



Connecting the Input to the sink type output (Connecting the product to an external device)



7. 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.
Cable Diameter	AWG28 - 16
Cable Length	The length differs depending on the actual use environment.

*Refer to **"Digital Input / Counter Input / Digital Output Connecter"** in the **page 34** for details of the digital output connector and pin assignment.

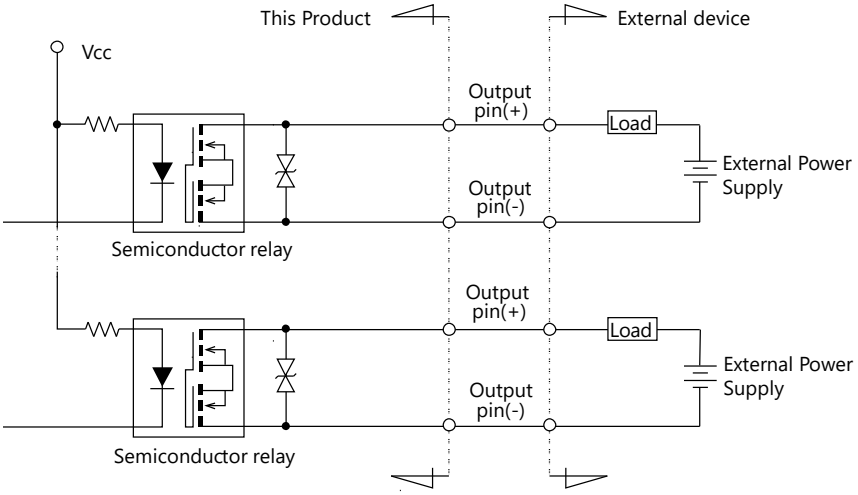
Digital Output Circuit

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.



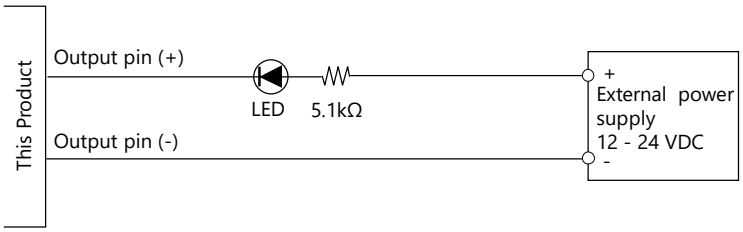
⚠ CAUTION

When supplying power, all output will be OFF.

Example of connecting to the LED

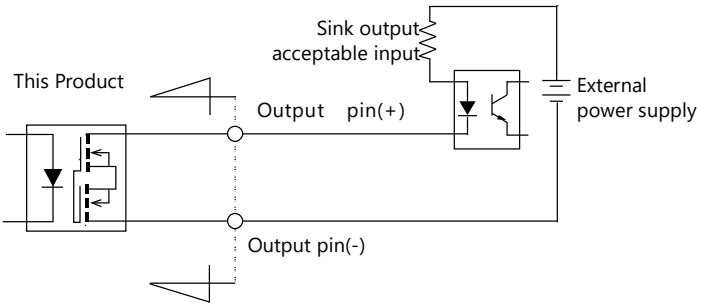
The corresponding LED lights up when you output "1" into the appropriate bit.

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

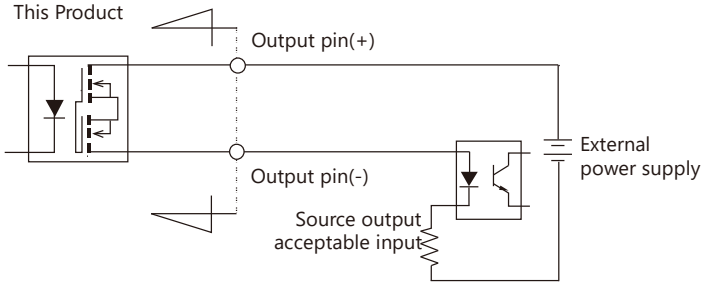


Connecting to an external device

Connecting the output to the sink output acceptable input



Connecting the output to the source acceptable input



⚠ CAUTION

- 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.

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		ARM Cortex-A8 600MHz
Memory		On Board 512MB DDR3 SDRAM
ROM		On-Board 64MB NOR Flash for OS
LAN	Transmission standard	10BASE-T/100BASE-TX
	The number of channels	2 *1
	Connector	RJ-45 Connector
	LED	Speed (Yellow), Link/Act (Green)
RS-422A/485	Transmission scheme	Asynchronous serial transmission (Full Duplex/Half Duplex)
	The number of channels	1
	Isolation	Bus Isolation/500VDC(when surge protected parts between SG-FG are unimplemented)
	Baud Rate	300bps - 115.2kbps
	Data length	5, 6, 7, 8bit 1, 1.5, 2stopbit
	Parity check	Even, Odd, Non-parity
	Connector	2-piece 3.5mm pitch 5-pin terminal (TX+, TX-, RX+, RX-, SG)
	Applicable wire	AWG28 - 16
	LED	Transmission (Yellow), Reception (Yellow)
	Switch	DIP Switch (Full Duplex /Half Duplex, Terminator (ON/OFF))
	Surge protection element each signal - SG	Stand off voltage : ±13V, Peak pulse power : 400W(1msec)
	Surge protection element SG - FG	Gas discharge tube arrester Discharge voltage : ±300V, impulse current tolerance : 2000A(8/20μsec, 10 times)
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 (Yellow)
RS-232C	Baud Rate	300bps - 115.2kbps
	Isolation/Resistance	Non-isolated
	Data length	5, 6, 7, 8bit 1, 1.5, 2stopbit
	Parity check	Even, Odd, Non-parity
	The number of channels	1

Item		Description
	Connector	9-pin D-SUB connector (Male)
	LED	Transmission (Yellow), Reception (Yellow)
Digital input Counter input	Input type	Opto-coupler Isolation Input (Compatible with current sink output) (negative logic) *1
	Isolation/Resistance	Bus Isolation /500VDC, Inter Channel Isolation /1000V
	Built-in power supply	12VDC
	Input Resistance	3.6kΩ
	Input ON current	1.6mA or more
	Input OFF current	0.16mA or less
	Response time	Within 200μsec *2
	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)
	The number of channels	4 (It is possible to allocate 2channels to counter input)
	Count Type	Up count
	Max. count	FFFFFFH (binary data)
	Counter response speed	1kHz (Max.), Duty : 50% (Max.)
	Interrupt (Counter input)	One interrupt caused upon channel count match
	Timer	None
	LED	DI0 - DI3 (Yellow)
Digital output	Output type	Semiconductor relay output
	Isolation	Semiconductor relay isolation/1000V
	Maximum Output Voltage / Current	26.4VAC/VDC/100mA
	Response time	Within 2msec
	ON resistance	8Ω or less (at 25℃)
	OFF leakage current	4μA or less (at 25℃)
	The number of channels	2
	LED	DO0 - DO1 (Yellow)
	Surge protection element + to -	Interactive TVS diode Stand off voltage : ±30V, Peak pulse power : 400W(1msec)
Digital input / Counter input / Digital output	Connector	2-piece 3.5mm pitch 10-pin terminal (DI_ACOM, DI0, DI1, DI2, DI3, DI_BCOM, DO0+, DO0-, DO1+, DO1-)
	Applicable wire	AWG28 - 16
Analog input	Input type	Current Input
	Input range	0 - 20mA
	Maximum input rating	30mA
	Input impedance	250Ω
	The number of channels	Current Input 2ch

Item		Description
	Channel switching rate	3msec/ch (Max.) *3
	Conversion rate	The sampling interval differs by the software programmed by the user.
	Data buffer	None
	Resolution	12bit
	Non-Linearity error *4	±10LSB
	Isolation/Resistance	Bus Isolation /500VDC, Inter Channel Isolation /200V
	Connector	2-piece 3.5mm pitch 3-pin terminal (AI+, AI-, SG)
	Applicable wire	AWG28 - 16
	LED	AI0 - AI1 (Yellow)
LED		Power (Green)/Status 1 (Green)/Status 2 (Red)
Switch		Reset SW, Shut Down SW, Full Duplex/Half Duplex Switching SW
RTC		RTC built-in
Power supply *5	Rated input voltage	12 - 24VDC
	Input voltage range	10.8 - 30VDC
	Power consumption	12V 0.7A (Max.), 24V 0.4A (Max.)
	Connector	2-piece 3.5mm pitch 3-pin terminal (V+, V-, FG)
	Applicable wire	AWG24 - 16
	Surge protection element V+ - V-, V- - FG	Interactive TVS diode Stand off voltage : ±30V, Peak pulse power : 400W (1msec)
Physical Dimensions (mm)		188.0(W)×78.0(D)×30.5(H) (No projection included)
Weight		350g
Installation method		Quick mounting on the 35mm DIN rail, Mounting on the wall using the screws *6
OS		Linux kernel 3.2.0

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

*2 Response time of opto-coupler

*3 Switching time of Inter Channel

*4 The non-linearity error means an error of approximately 0.07% occurs over the maximum range at -20 °C and +60 °C ambient temperature.

*5 Use power cable within 3meters.

*6 Commercial screws are required (fit into φ3.5 hole).

Wireless Specification

Item		Description
Support SIM		MVNO SIM
Communication method		4G LTE (Cat.4) 3G W-CDMA
Wireless frequency*7		4G LTE Band LTE-FDD… B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/B25/B26/B28 LTE-TDD… B38/B41 3G W-CDMA Band B1/B2/B4/B5/B6/B8/B19
Communication speed *8	4G LTE-FDD	Upload : Up to 50MBit/sec, Download : Up to 150MBit/sec
	4G LTE-TDD	Upload : Up to 30MBit/sec, Download : Up to 130MBit/sec
	3G W-CDMA	Upload : Up to 384KBit/sec, Download : Up to 384KBit/sec Upload (With HSUPA) : Up to 5.76MBit/sec
Attached Antenna		FMM800W-SMAP-L

*7 NCC Wireless frequency : 3G W-CDMA Band [B1/B8] ,4G LTE BAND[B1/B3/B7/B8/B28/B38/B41]

*8 These are theoretical communication standard values and do not indicate actual data transfer speeds.

Installation Environment Requirements

Item		Description
Operating Temperature		-20 - +60°C *9
Storage Temperature		-20 - +60°C
Humidity		10 - 90%RH (No condensation)
Floating dust particles		Not to be excessive
Corrosive gases		None
Line-noise resistance	Line noise	AC Line/±2kV *10 Signal Line /±1kV(IEC61000-4-4 Level 3, EN61000-4-4 Level 3)
	Static electricity resistance	Contact discharge /±4kV(IEC61000-4-2 Level 2, EN61000-4-2 Level 2) Air discharge /±8kV(IEC61000-4-2 Level 3, EN61000-4-2 Level 3)
Vibration resistance	Sweep resistance	10 - 57Hz *11 / 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, TELEC, FCC Class A, CE Marking (RE Directive Class A, RoHS Directive), NCC

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

*10 When you use the CPS-PWD15AW12-01 (optional product)

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

2. Power Requirements

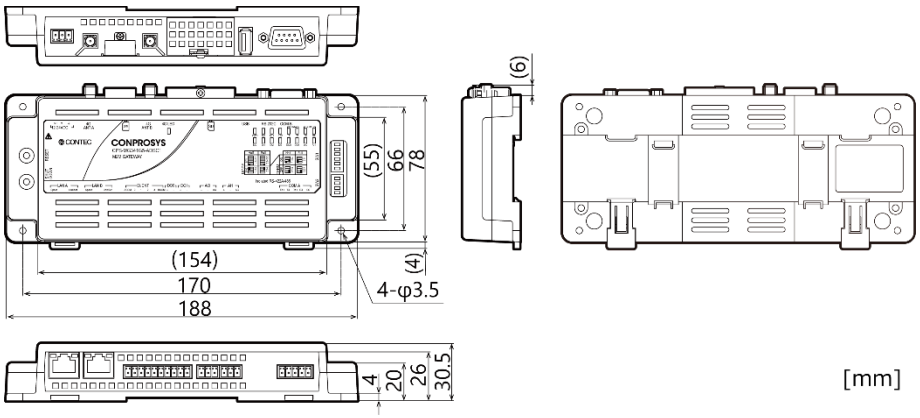
System requires a clean, steady power source for reliable performance of the high frequency CPU on the product, the quality of the power supply is even more important.

⚠ CAUTION

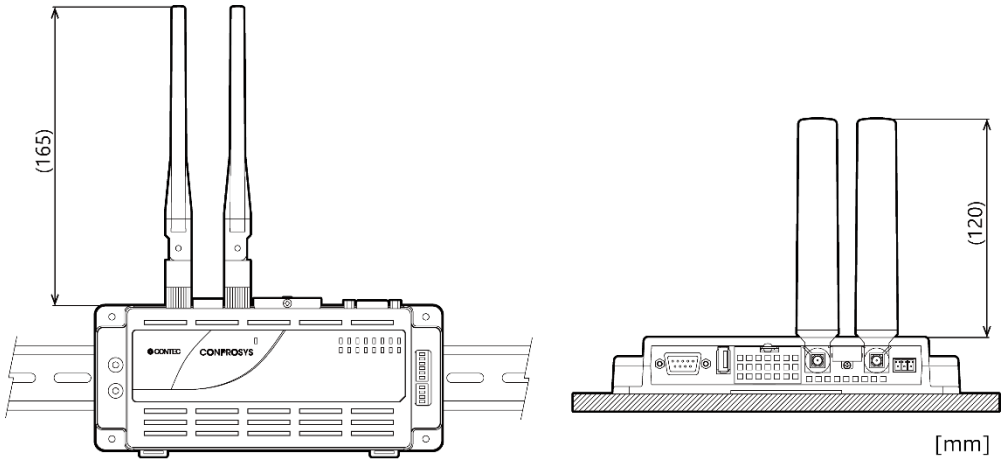
- If the fluctuation of power supply voltage is beyond the product specifications, connect a constant voltage transformer.
- If the noise is large, connect an isolation transformer (a noise cut transformer).
- Never bundle, place nearby or in parallel the power supply cable and the input /output signal 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.
- Select and use surge protection devices (SPD) that are appropriate for all the entry paths.
- 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-15AW12-01 (by CONTEC), instantaneous voltage drop allowed time is 20 milliseconds or less

2.Physical Dimensions

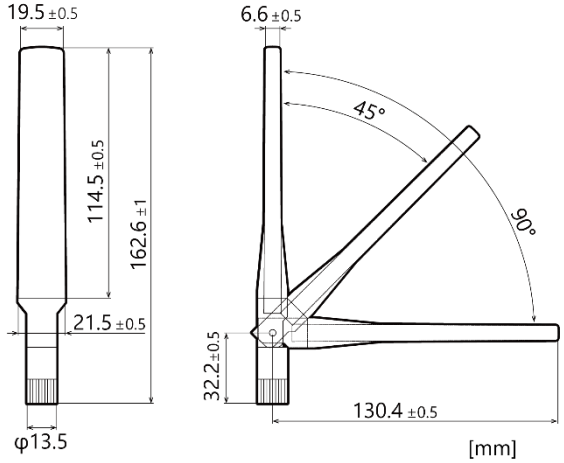
1. Product



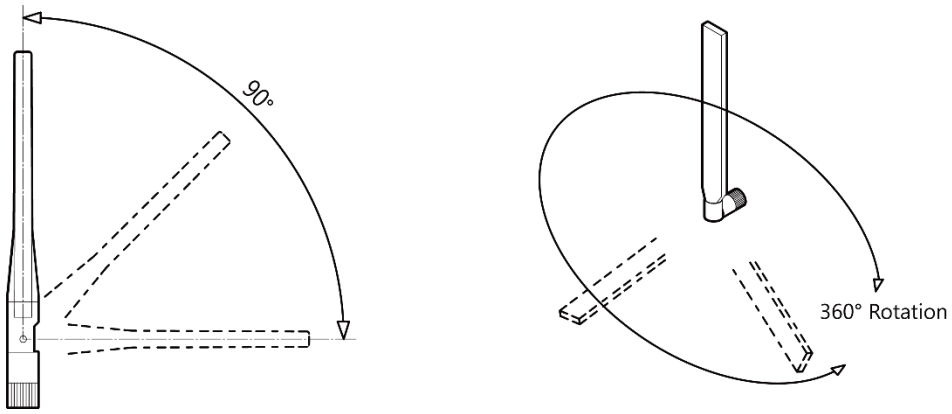
2. With Antennas Attached



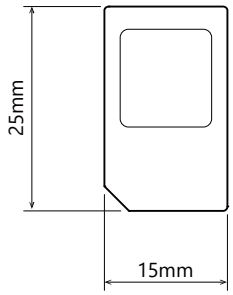
3. Antenna



4. Antenna Steerable Range

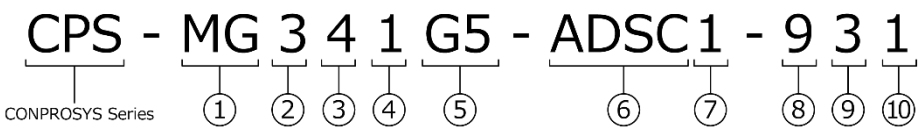


5. Standard SIM size



3.The Details of Model Name

Details of the model name are described below.



No.	Item	Description	
1	Model	**MG**	Gateway Integrated Type Model
2	CPU	**3**	ARM Cortex A8
3	Memory	**4**	512M Byte
4	Version	**1**	The 1st Model
5	Function	**G5**	LTE Cat. 4 support
6	Interface	**A**	Analog I/O
		D	Digital I/O
		S	Serial (RS-232C/RS-422A/485)
		C	Counter
7	Numbering of the Interface	**1**	The 1st Model
8	OS	**9**	Linux OS, Built-in battery
9	ROM	**3**	64MB
10	Application	**1**	Original version

4.Battery Disposal

1. Battery Specification

The battery details are as follows:

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

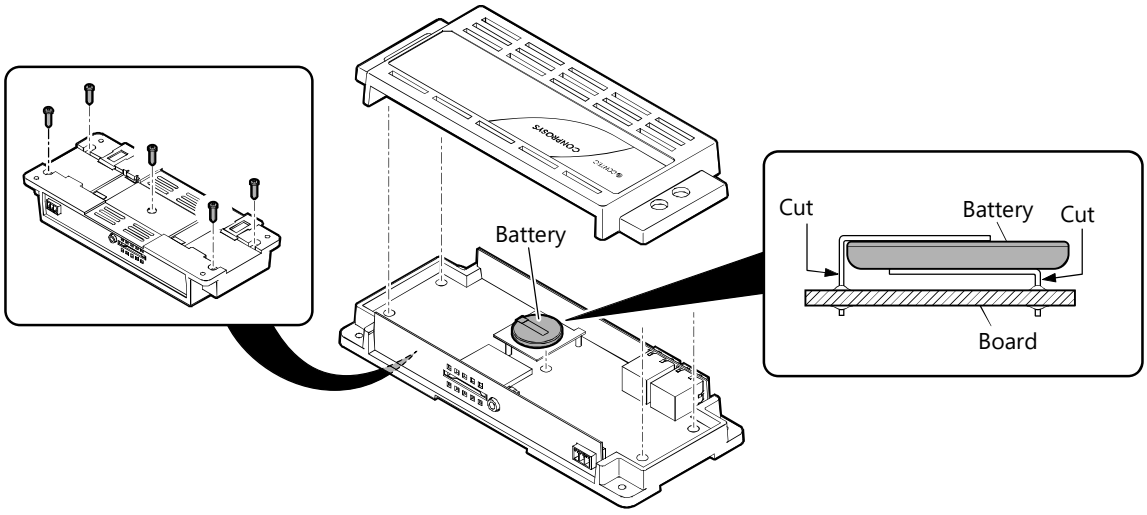
2. How to remove the battery

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

1 Remove the five screws from bottom of the product to remove the cover. (See the figure below)

2 Remove the cover.

3 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-15AW12-01	Fitting power supply 15W (Input: 100-240VDC, Output: 12VDC 1.3A)
FANUC CNC connection cable	CPS-CAB-S01-1	CNC connection cable 1m
FANUC CNC connection cable	CPS-CAB-S01-3	CNC connection cable 3m
FANUC CNC connection cable	CPS-CAB-S01-5	CNC connection cable 5m
MITSUBISHI CNC connection cable	CPS-CAB-S02-1	CNC connection cable 1m
SD Card	SD-4GB-A	SD card (4GB)
Magnet	CPS-MAG01-4	Magnet (Four Piece Set)
4G Antenna	CPS-ANT-R5-01	Antenna (Cable length: 5 meters)

Visit the Contec website for the latest optional products.

Website https://www.contec.com/

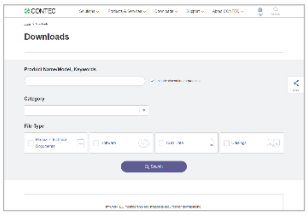
Customer Support and Inquiry

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.

Revision History

MONTH YEAR	Summary of Changes
December 2021	The First Edition

- All relevant issues have been considered in the preparation of this document.
- Should you notice an omission or any questionable item in this document, please feel free to notify your retailer.
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CPS-MG341G5-ADSC1-931 Reference Manual (Hardware)

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