CONTEC

CONPROSYS

Reference Manual

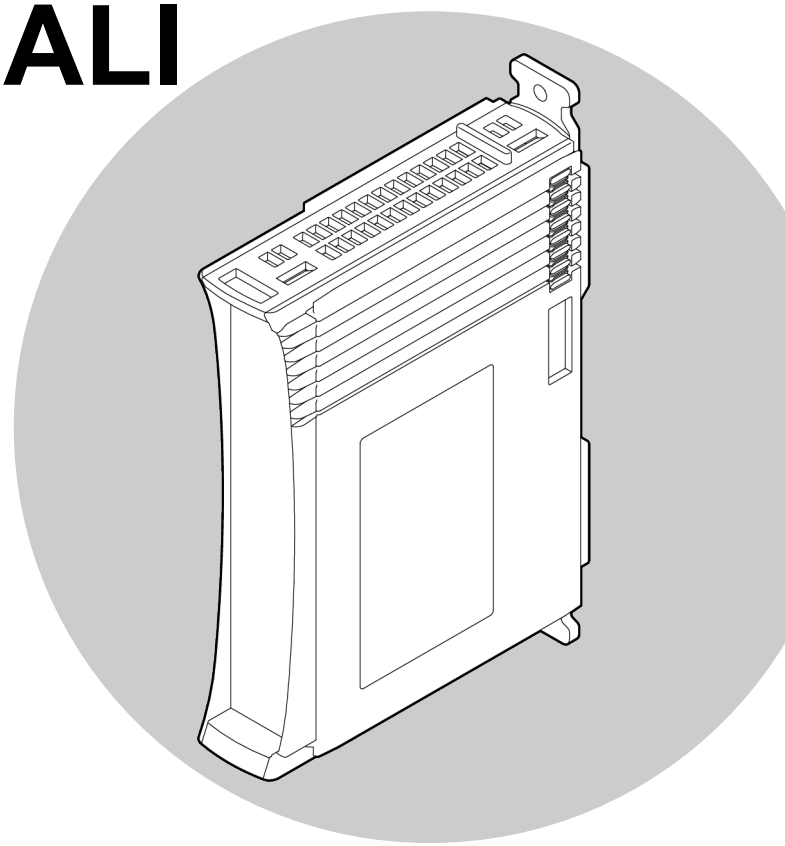
(Hardware)

Analog Input Module ±10V Input

CPS-AI-1608LI

Analog Input Module 0 – 20mA Input

CPS-AI-1608ALI



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CONTEC CO., LTD.

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Introduction

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

1.Related Manuals

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

◆ Must Read the Followings.

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

◆ Download Manuals

Download the manuals accordingly from the following URL.

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

2.Check the Firmware Version

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

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

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

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

3.About the Product

This product is a configurable module to provide analog input interface and operates along with the configurable type CPU module controller of CONPROSYS series.　It has 8channels of analog input per module and provides high accuracy.

4.Features

1. Hardware features

■ Bus-isolated analog input module providing highly accurate measurement

This product contains bus-isolated analog input (16bit, 8ch) that measures with a high degree of accuracy. It supports differential input and is capable of precise measurement of voltage with potential differences.
We are offering the series of two product types to meet the needs of customers.
CPS-AI-1608LI features the function of the analog voltage input (16bit, 8ch).
CPS-AI-1608ALI features the function of the analog current input (16bit, 8ch).

■ Compact design

Compact design, 25.2 (W)×94.7(D)×124.8 (H), features flexibility in installation.

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

The product is capable of operating in the temperature between -20 and + 60°C. It can be installed in the various environments.

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

You can install and remove a terminal connector without a screwdriver so that it can shorten the time of the replacement. As the product can be not only mounted on DIN rail, but also is removable along the side rails, replacing is simple and easy as well.

■ Equipped with LED for an operation check

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

■ No electrolytic capacitor battery

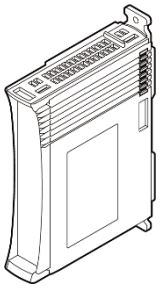
No electrolytic capacitor is used. The Contec is creating the product with a longer life.

5.Product Configuration List

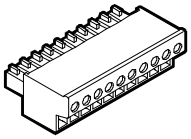
The product consists of the items listed below.

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

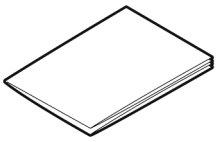
If you discover damaged or missing items, contact your retailer.



Product...1



10-pin Connector...2



Please read the following...1

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.

Informations de sécurité

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

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

2.Handling Precautions

⚠ DANGER

- Do not use the product in locations exposed to a flammable or corrosive gas. It may cause explosion, fire, electrical shock, or malfunction.
- Do not allow the device to come into contact with foreign substances (metal particles, flammable substances, liquids, etc.) Otherwise, it can cause fire or electrical shock.
- Do not place the product in an unstable location or use incomplete mountings. Otherwise, it may cause the device to fall.
- Be sure to connect the product to the stipulated power supply voltage. Connecting to a different voltage might cause a fire or electrical shock.
- If the product is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- The product is not intended for use in aerospace, space, nuclear power, medical equipment, or other applications that require a very high level of reliability. Do not use the product in such applications.
- If using the product in applications where safety is critical such as in railways, automotive, or disaster prevention or security systems, please contact your retailer.

⚠ CAUTION

- 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 (signal line 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.

- Regarding the power supply of the product and digital I/O. For UL-certified, connecting to both SELV and Limited Energy Circuit is required. Note that Class 2 power supply can also be used in the U.S.
- Always attach the end cover while power is active (the cover comes with the configurable type controller).
- The product is an open-type device (a device designed to be housed inside other equipment) and must always be mounted inside a mechanical enclosure having enough strength.
- The product can become extremely hot during the operation. When you intend to touch the product for the maintenance work, turn off the power first, and leave it to cool off for 20 minutes, then start the works.
- About a caution mark on the product : Touching the product may cause a burn as the surface becomes extremely hot during the operation.
- 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.

Précautions d'emploi

⚠ DANGER

- Ne pas utiliser le produit dans des endroits exposés à des gaz inflammables ou corrosifs. L'exposition peut provoquer une explosion, un choc électrique ou une défaillance.
- Ne pas mettre le dispositif en contact avec des substances étrangères (particules métalliques, substances inflammables, liquides, etc.) Faute de quoi, le contact peut provoquer un incendie ou un choc électrique.
- Ne pas installer le produit à un endroit instable ou sans un montage complet. Faute de quoi, le dispositif risque de tomber.
- S'assurer de raccorder le produit à la tension d'alimentation électrique indiquée. Une tension différente peut provoquer un incendie ou un choc électrique.
- Veuillez utiliser le produit selon les spécifications du fabricants, sinon la protection offerte par l'équipement pourrait être compromise.
- Le produit n'est pas conçu pour une utilisation dans équipement à usage aérospatial, spatial, nucléaire ou médical ou toute autre application qui exige un niveau de fiabilité très élevé. Ne pas utiliser le produit pour de telles applications.
- Veuillez communiquer avec le détaillant si le produit est utilisé pour des applications où la sécurité est critique notamment dans les secteurs ferroviaire ou automobile, pour la prévention des catastrophes ou les systèmes de sécurité.

⚠ ATTENTION

- S'assurer de respecter les exigences qui suivent pour le produit utilisé :
  - à l'extérieur ;
  - à une altitude d'au plus 5 000 m ;
  - dans un environnement de POLLUTION DE TYPE 2.

  Lors d'une utilisation du produit à altitude élevée, consulter les données relationnelles ci-dessous pour déterminer la température ambiante adéquate. La capacité de dissipation de chaleur s'amenuise en raison de la chute de pression atmosphérique et pourrait endommager le produit ou réduire sa durée de vie.
  - Température ambiante : 60 [°C] - (0,005 x altitude [m])

    Par exemple) Le produit est utilisé à 3 000 m.

    60 °C - (0,005 x 3 000 m) = 45 °C (température ambiante)
- Ne pas utiliser ou ranger le produit à un endroit exposé à des températures très élevées ou très froides hors de la plage de températures spécifiées ou susceptibles à des variations très rapides de température.

  par ex. : - Exposition directe au soleil

  - À proximité d'une source de chaleur
- Ne pas utiliser le produit dans des endroits extrêmement humides ou poussiéreux. Il est extrêmement dangereux d'utiliser le produit lorsque de l'eau, ou un autre liquide, ou de la poussière conductrice a pénétré le produit. Pour une utilisation dans un tel environnement, installer par exemple un panneau de contrôle à l'épreuve de la poussière.
- Éviter d'utiliser le produit dans des endroits susceptibles aux chocs ou aux vibrations hors de la plage précisée ou de le ranger dans ces endroits.
- Lors du transport du produit, prendre les mesures qui s'imposent pour éviter tout choc ou toute vibration directement sur le produit.

  Résistance aux impacts : 15 G (11 ms) ci-dessous.
- Utiliser le produit dans les conditions de fonctionnement spécifiées (température, humidité, vibration et impact).
- Éviter d'installer le produit dans des endroits où la ventilation du produit pourrait être compromise. Une aération insuffisante peut faire chauffer le produit et risque de l'endommager ou d'entraîner une défaillance.
- Ne pas utiliser le produit à proximité de dispositifs qui génèrent une intense force magnétique ou beaucoup d'interférences. De tels produits pourront provoquer une défaillance (arrêt, réinitialisation).
- Ne pas utiliser le produit en présence de produits chimiques ni le ranger dans ces conditions.
- Lors du dépôt de connecteurs ou de câbles, toujours débrancher les câbles d'alimentation de l'unité centrale et confirmer la mise hors tension des DEL.
- Ne pas modifier le produit. CONTEC ne pourra être tenue responsable de tout problème, etc., issu de la modification du produit.
- En cas de défaillance ou d'anomalie (odeur nauséabonde ou génération excessive de chaleur), débrancher immédiatement les câbles d'alimentation et communiquer avec le détaillant.

- Pour un raccordement à des périphériques, utiliser un câble blindé mis à la terre.
- Pour nettoyer le produit, l'essuyer délicatement avec un chiffon doux humecté d'eau ou d'un détergent doux. Pour préserver la peinture et la couleur, ne pas utiliser un produit chimique ou un solvant volatil comme du benzène ou un diluant.
- En raccordant les câbles, vérifier d'abord la forme du connecteur puis insérer suivant l'orientation nécessaire. Une fois raccordé, ne pas mettre trop de poids sur la partie raccordée. Cela risque de provoquer un piètre contact ou d'endommager le produit et la section raccordée.
- Lorsque le produit fonctionne, ne pas toucher les pièces ou les bornes métalliques avec les mains. Faute de quoi, le produit risque de mal fonctionner ou de présenter une défaillance.
- Ne pas toucher le produit ou ses connecteurs avec les mains mouillées pour éviter un choc électrique.
- Les caractéristiques du produit sont sous réserve de modification sans préavis pour bonification et amélioration de la qualité. Lors d'un fonctionnement du produit sans interruption, s'assurer de lire le manuel du site Web CONTEC et d'assimiler le contenu.
- Lorsque le produit est utilisé à un endroit influencé par une surintensité ou une surtension (coup de foudre), sélectionner le bon dispositif de protection contre les surtensions pour tous les voies d'accès (câble de signal etc.). Consulter un spécialiste pour la sélection, l'achat et l'installation d'un dispositif contre les surtensions.
- Respecter les procédures d'élimination précisées dans les lois et les ordonnances municipales pertinentes lors de l'élimination du produit.
- Alimentation électrique du produit et E/S numérique. Pour une certification UL, il est obligatoire de raccorder les circuits de basse tension de sécurité et d'énergie limitée. Remarquez que l'alimentation électrique de classe 2 peut également être utilisée aux États-Unis.
- Toujours fixer le couvercle d'extrémité lorsque l'alimentation est active. (le couvercle est livré avec le contrôleur de type configurable).
- Le produit est un appareil ouvert (dispositif conçu pour être logé à l'intérieur d'une autre pièce d'équipement) et doit toujours être monté à l'intérieur d'un boîtier mécanique suffisamment solide.
- Le produit peut devenir extrêmement chaud en cours de fonctionnement. Si vous prévoyez toucher au produit pour en faire l'entretien, coupez d'abord l'alimentation puis laissez-le refroidir pendant 20 minutes. Commencez les travaux par la suite.
- Signal de mise en garde sur le produit : Toucher le produit peut entraîner des brûlures. La surface devient extrêmement chaude en cours de fonctionnement.
- Sans égard aux déclarations aux présentes, CONTEC ne peut être tenue responsable de dommages, peu importe la nature, (comprend les dommages comme la perte de profits d'entreprise) découlant de l'utilisation de ce produit CONTEC, ou de l'incapacité à utiliser le produit ou des informations aux présentes.

1. FCC PART15 Class A Notice

NOTE

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

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

FCC WARNING

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

2. EN55032Class A Notice

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

3. Display marking

Display of power (Input Rating Label)

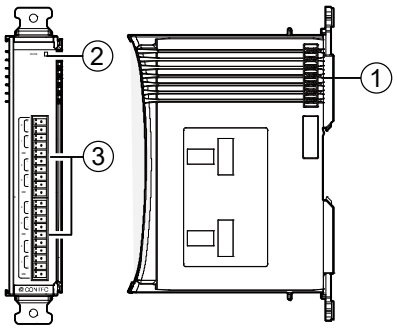
DC power supply

Product Nomenclature and Function

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

1.Nomenclature of Product Components

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



No.	Name	Function
1	Stack Bus	Used for power supply and communication with the configurable type module.
2	LED Indicator	This indicates status of the product.
3	Analog Input	This is a connector for analog input. (Use the 10-pin connector, included in the package)

2.Description of Product Components

Components such as connectors, switches are described.

1. Stack Bus

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

⚠ CAUTION

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

⚠ ATTENTION

- N'installez jamais, ni ne déposez le produit alors qu'il est sous tension (alimentation active).
- Confirmez toujours que la DEL PWR est éteinte avant de fixer ou de déposer les appareils.

2. LED Indicator

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

The meaning of each LED is described below.

STATUS

Color and Description

LED	Color	Display	Description
STATUS	Green	ON	It indicates the system runs normally.
	Red	ON	It lights up when the error occurs.
	Green	Flashing	It flashes upon initializing.
	-	OFF	Power has not been supplied. *1

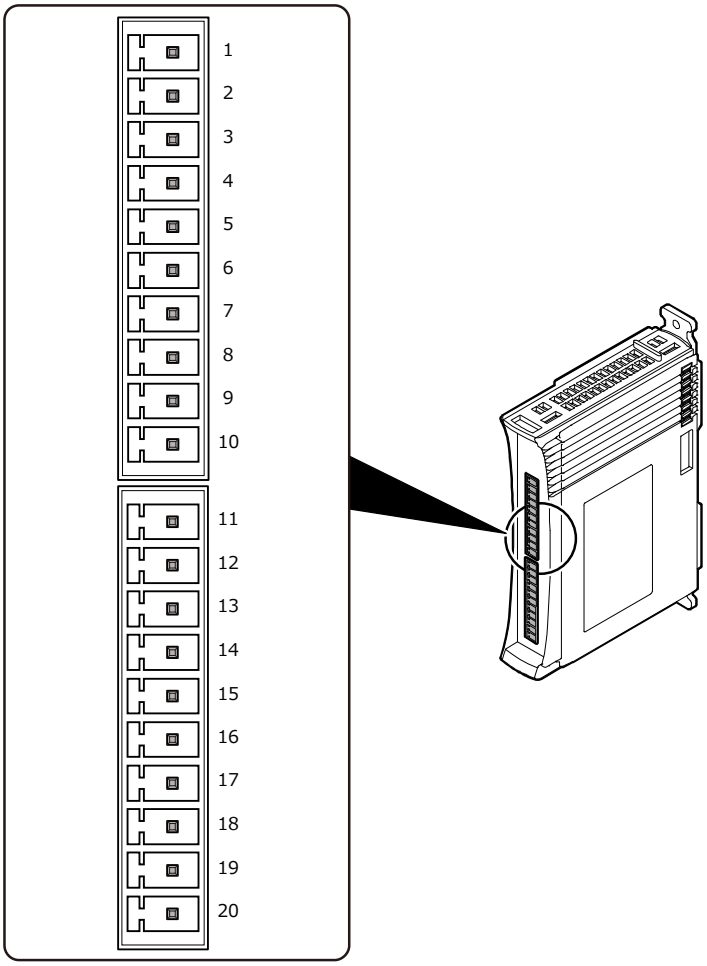
*1 The module is inactive during the booting of the controller. Power will be supplied from the controller after the completion

3. Analog Input Connector

This product has 8 channels of analog input.

Use the 10-pin connector, included in the package to connect to external power.

Connector type: DEGSON 15EDGKC-3.81-10P-13-00AH (or equivalent)



Pin Assignment

Pin No.	Signal Name	Description
1	AI0(+)	This indicates the analog input signals of AI0 (+)
2	AI0(-)	This indicates the analog input signals of AI0 (-)
3	AI1(+)	This indicates the analog input signals of AI1 (+)
4	AI1(-)	This indicates the analog input signals of AI1 (-)
5	GND	Analog ground shares with 8 channels of analog input signals.
6	AI2(+)	This indicates the analog input signals of AI2 (+)
7	AI2(-)	This indicates the analog input signals of AI2 (-)
8	AI3(+)	This indicates the analog input signals of A13 (+)
9	AI3(-)	This indicates the analog input signals of A13 (-)
10	GND	Analog ground shares with 8 channels of analog input signals
11	AI4(+)	This indicates the analog input signals of AI4 (+)
12	AI4(-)	This indicates the analog input signals of AI4 (-)
13	AI5(+)	This indicates the analog input signals of AI5 (+)
14	AI5(-)	This indicates the analog input signals of AI5 (-)
15	GND	Analog ground shares with 8 channels of analog input signals
16	AI6(+)	This indicates the analog input signals of AI6 (+)
17	AI6(-)	This indicates the analog input signals of AI6 (-)
18	AI7(+)	This indicates the analog input signals of AI7 (+)
19	AI7(-)	This indicates the analog input signals of AI7 (-)
20	GND	Analog ground shares with 8 channels of analog input signals

Installation

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

1.Install the Product

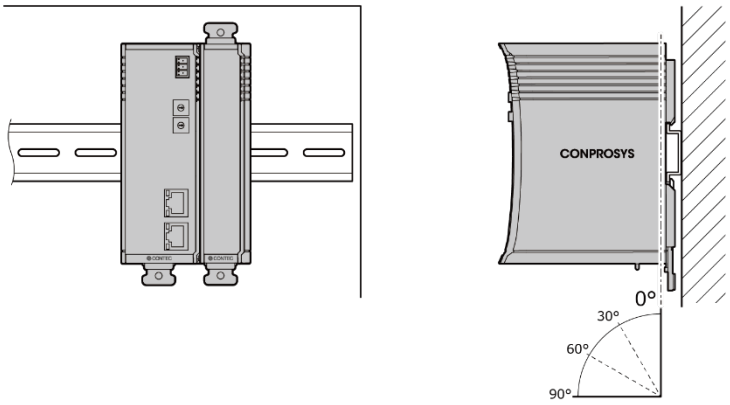
1. Installation Conditions

◆ Installation Orientation

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

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

Orientation for DIN rail Mounting

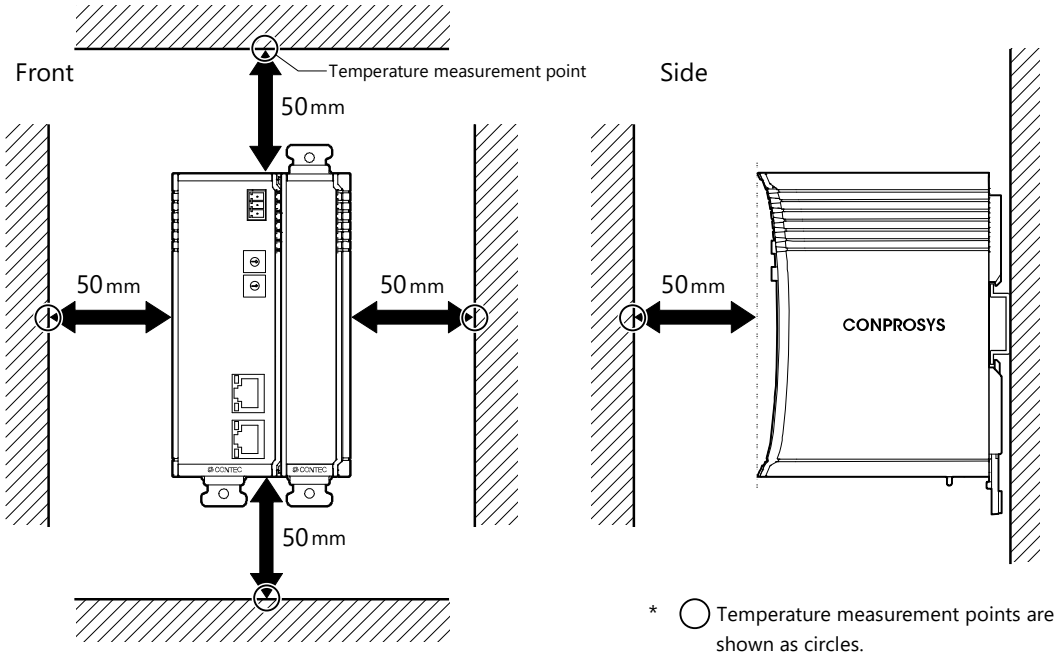


◆ Ambient Temperature

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

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

Configurable controller and module(s)



⚠ 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.

⚠ ATTENTION

- Remarquez que même si la température ambiante se situe dans la plage de température spécifiée, une défaillance opérationnelle peut survenir si un autre appareil à proximité émet beaucoup de chaleur. Le rayonnement influence la hausse de température du produit.
- N'installez pas le produit dans un espace entièrement scellé sauf dans les cas où la température interne est réglée par un appareil comme un climatiseur.
  Une utilisation sur une période prolongée peut accroître la température et mener à une défaillance ou à d'autres problèmes.
- Lors de l'utilisation du produit dans un environnement à température élevée, la durée de vie du produit sera réduite. Pour contrebalancer la température élevée, procédez à un refroidissement par air pulsé.

2. Setting the Configurable Type Module

⚠ CAUTION

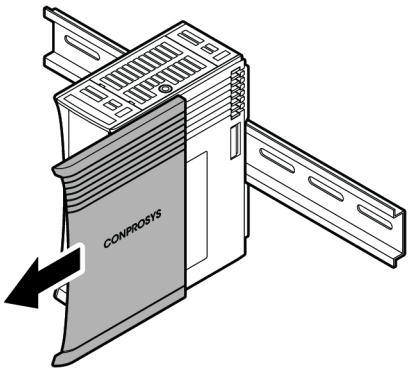
- If the modules set side-by side are disconnected during the operation, it can cause damage to the product. Set the controller on DIN rail in order to avoid the trouble.
- Always confirm the PWR-LED is turned off before setting or removing the modules.
- Always check the module is firmly fixed on DIN rail with hooks when setting the product.

⚠ ATTENTION

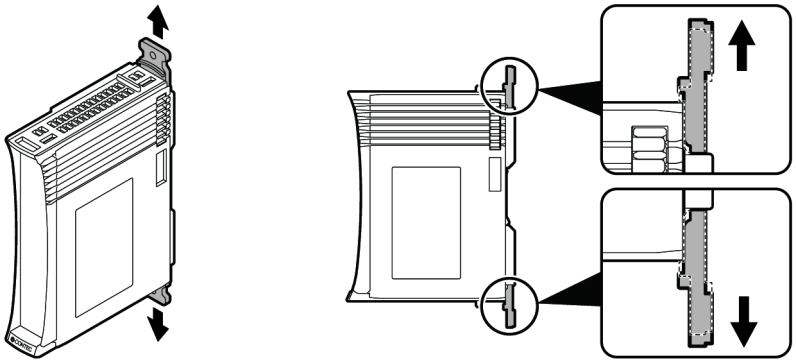
- Si les modules côte-à-côte sont débranchés au cours du fonctionnement, cela risque d'endommager le produit. Réglez le contrôleur sur le rail DIN pour éviter tout débranchement.
- Confirmez toujours que la DEL PWR est éteinte avant de fixer ou de déposer les modules.
- Vérifiez toujours si le module est solidement fixé sur le rail DIN avec les crochets lors de l'insertion du produit.

◆ How to Set

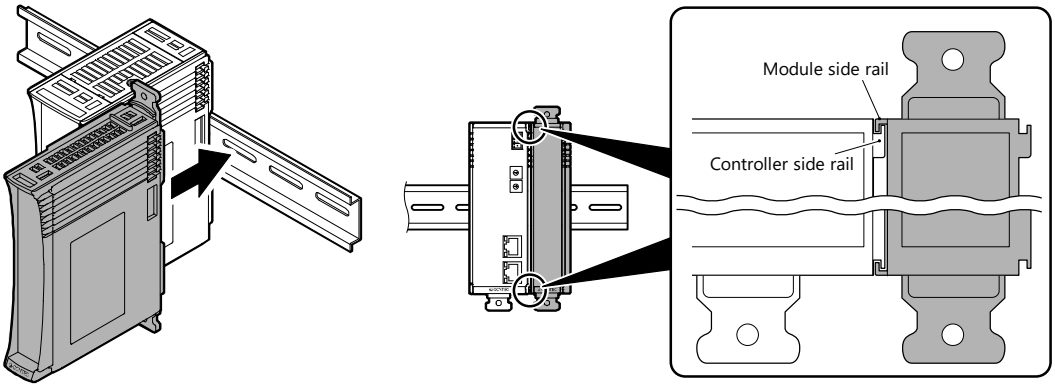
1 First, slide the attached end cover to remove it from the product that is mounted on the DIN Rail.



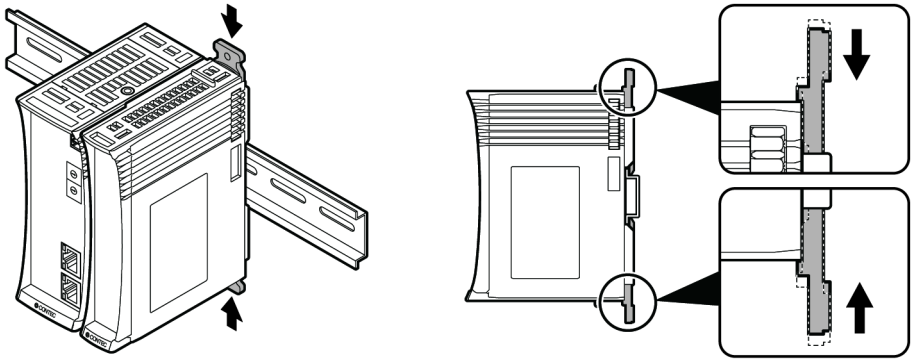
2 Unlock the hooks of the module.
If the hooks are stuck, use a slotted screwdriver to unlock.



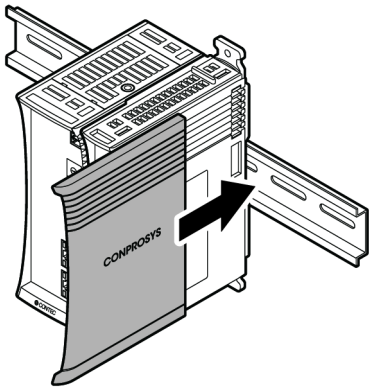
3 Engage the side rail of the setting module to the side rail of the controller (or another module) that is already mounted.
When the rails fit, slide the setting module all the way toward the DIN rail.



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

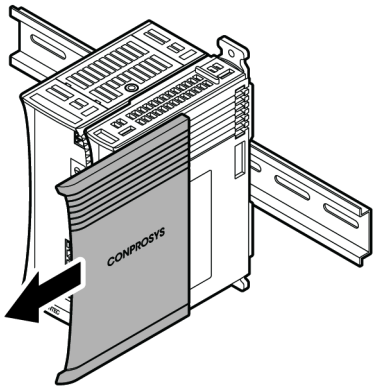


5 Put back and slide the end cover to the module.

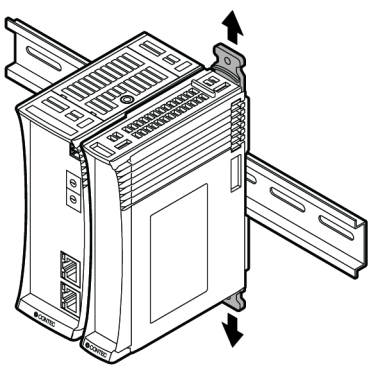


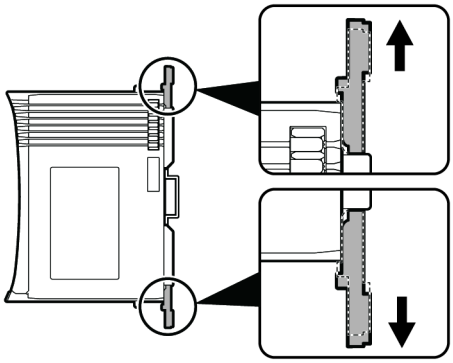
◆ How to Remove

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



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



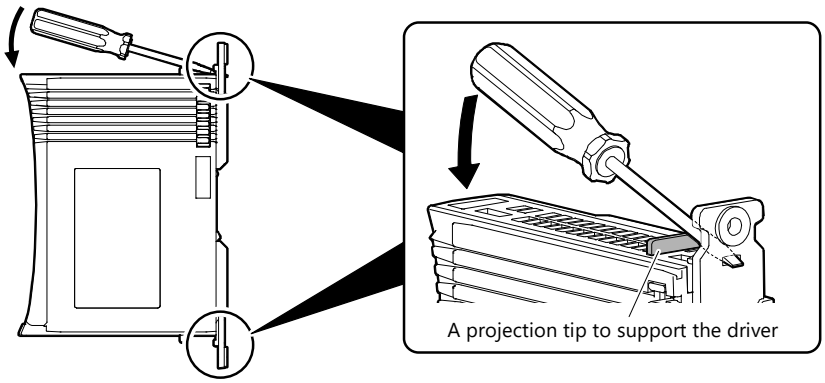


Unlock the hook with a slotted screwdriver

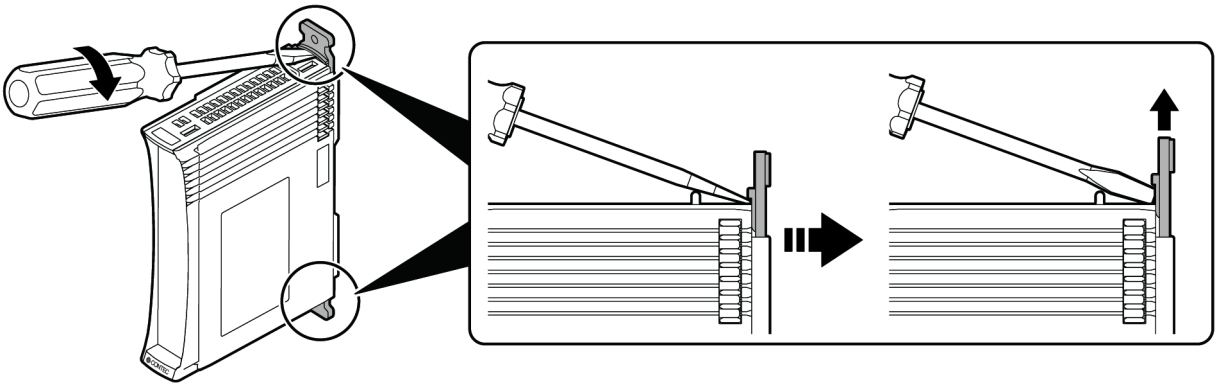
There are two ways to unlock the hook using a slotted screwdriver.

Unlock it by one of the following.

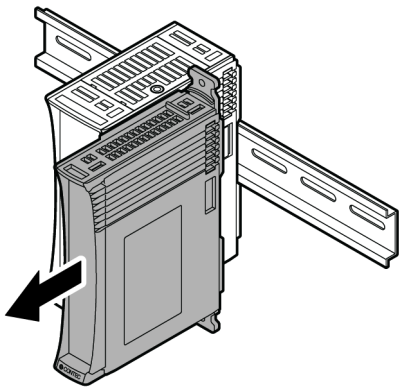
- Using the screwdriver as leverage
  Insert a slotted screwdriver (the point should be smaller than 4.5mm) into a hole.
  (see the figure below)
  By using the screwdriver as leverage, move it downward in the direction of the arrow to unlock.



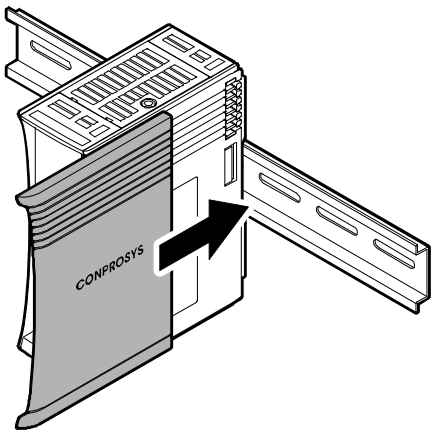
- By rotating the screwdriver
  Place the slotted screwdriver (the point should be smaller than 8mm) as shown in the figure.
  Rotate the screwdriver 90-degree in either direction.



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

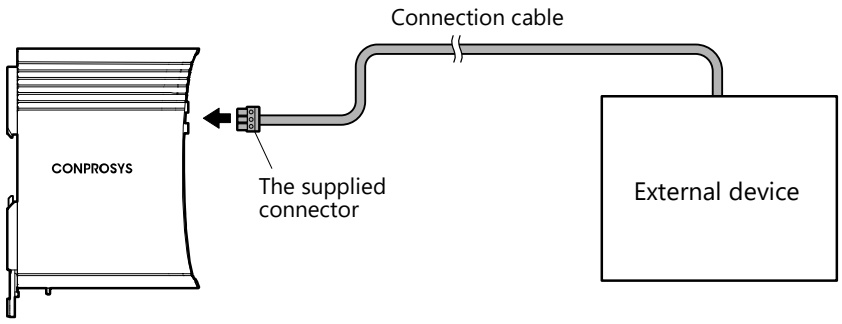


4 Put back the end cover to the controller.



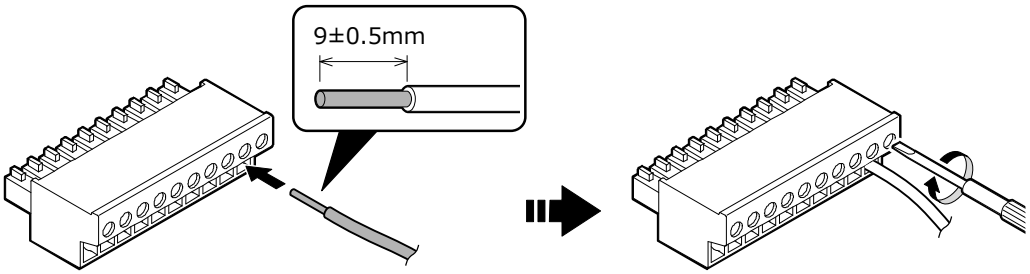
2.Connecting to an External Device

Use the supplied connector plug to connect the product to an external device.
The following example describes how to make the connecting cable with a 10-pin connector.



1 Strip off approximately 9 mm (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 0.19 N·m.
- Strip off approximately 9 mm (plus or minus 0.5mm) of the covered part of a cable to connect with the connector.
- Use copper wires that tolerate the temperature of 75 °C and higher.

⚠ ATTENTION

- Ne tirez pas sur le câble de la fiche du connecteur pour retirer la fiche, vous risquez de briser le fil. Saisissez toujours le connecteur pour le retirer.
- Utilisez un couple de 0,19 N·m pour le connecteur présent.
- Dénudez environ 9 mm (plus ou moins 0,5 mm) de la section gainée du câble pour le raccorder au connecteur.
- Veuillez utiliser des fils de cuivre qui résistent à une température de 75 degrés Celsius et plus.

3.Cable Connection

1. Analog Input (CPS-AI-1608LI)

The CPS-AI-1608LI has 8 channels of AI that supports differential voltage input.

◆ Analog Input Cable

Use the analog input cable described below.

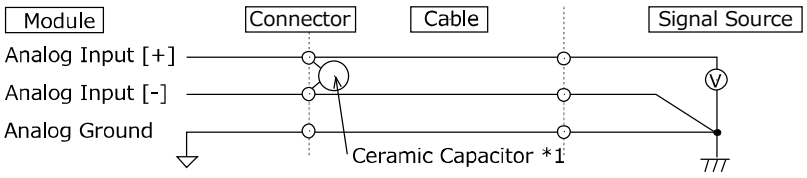
Cable	Use copper wires that tolerate the temperature of 75 °C and higher.
Applicable wire	AWG28 - 16
Cable Length	Within 1.5 meters

*Refer to **"Analog Input Connector"** in the **page 21** for details of the analog input connector and pin assignment.

◆ Connecting to an external device

Example of flat cable connection

Connect the [+] analog input channel of the module to the signal source,
and the [-] to ground of the signal source respectively.
Also, connect the analog ground of the module to the ground of the signal source.



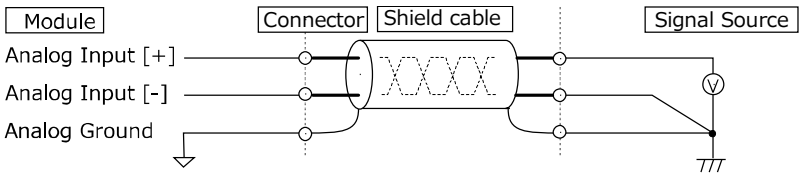
*1 If the connecting cable is affected by noise, accurate analog input may not be made. To secure the accuracy, place the connecting cable far from the source of the noise and put a laminated ceramic capacitor on the connector of the module (when using a ceramic capacitor, make the lead as short as possible).

Example of two-conductor cable connection

Use this type of cable if the signal source is located at a distance from the module or if the connection requires higher noise immunity.

Connect the [+] analog input channel of the module to the signal source, and the [-] to the signal source ground respectively.

Also, connect the analog ground of the module to the ground of signal source using the shield braid.



⚠ CAUTION

- If the signal source contains over 1MHz signals, the signal may affect the cross-talk noise between channels.
- Converted data is undefined with the analog ground unconnected.
- The connection cable may fail to input accurate analog signals if it is long. The connection cable should therefore be within 1.5 meters.
- The analog signal input to the [+] and [-] inputs must not exceed the maximum input voltage with reference to the analog ground of the module. Exceeding the input voltage can damage the module.
- Converted data is undefined when either of the [+] and [-] input terminals is left unconnected.
- Connect both of the [+] and [-] input terminals of the channel that are not connected to the signal source to the analog ground.

⚠ ATTENTION

- Si le signal source renferme plus de 1 MHz, le signal peut nuire aux signaux parasites intermodulaires entre les canaux.
- Les données converties sont indéfinies avec la masse analogique non raccordée.
- Si le câble de connexion est trop long, il pourrait ne pas transmettre de façon précise les signaux analogiques. Veuillez limiter la longueur du câble de connexion à 1,5 mètre au moins.
- L'entrée du signal analogique vers les entrées [+] et [-] ne doit pas excéder la tension maximum d'entrée à l'égard de la masse analogique du module. Un excès de la tension d'entrée peut endommager le module.
- Les données de conversion sont indéfinies si une des bornes d'entrée [+] et [-] n'est pas raccordé.
- Raccordez les deux bornes d'entrée [+] et [-] du canal non reliées au signal source et la masse analogique.

2. Analog Input (CPS-AI-1608ALI)

The CPS-AI-1608ALI has 8 channels of AI that supports current input.

◆ Analog Input Cable

Use the analog input cable described below.

Cable	Use copper wires that tolerate the temperature of 75 °C and higher.
Applicable wire	AWG28 - 16
Cable Length	The recommended length is 20 meters or shorter. * It is varied according to the environment where the product is used.

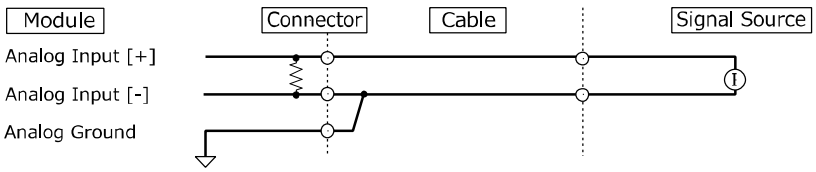
*Refer to **"Analog Input Connector"** in the **page 21** for details of the analog input connector and pin assignment.

◆ Connecting to an external device

Connecting with two-terminal current output (Flat Cable)

Connect the [+] analog input channel of the module to the positive side of the current source, and the [-] to the negative side of the current source respectively.

Also, connect the analog ground of the module to the [-] of the signal source.

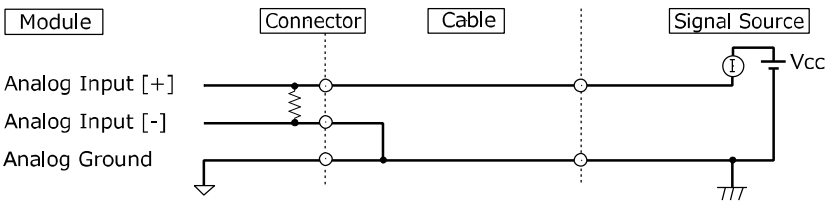


Connecting with current source output (Flat Cable)

Connect the [+] analog input channel of the module to the output terminal, and the [-] to the negative side of the current source respectively

Also, connect the analog ground of the module to the ground of signal source.

*When connecting the [-] input of the module and the analog ground on the external device side, make sure the potential difference between the [-] input of the module and the analog ground is 0.5 V or less.

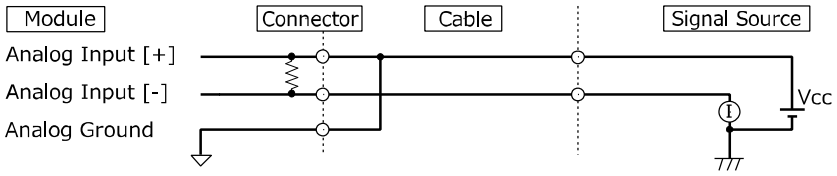


Connecting with current sink output (Flat Cable)

Connect the [+] analog input channel of the module to the positive side of the current source, and the [-] to the output terminal of the current source respectively.

Also, connect the analog ground of the module to the ground of signal source.

*When connecting the [+] input of the module and the analog ground on the external device side, make sure the potential difference between the [+] input of the module and the analog ground is 0.5 V or less.



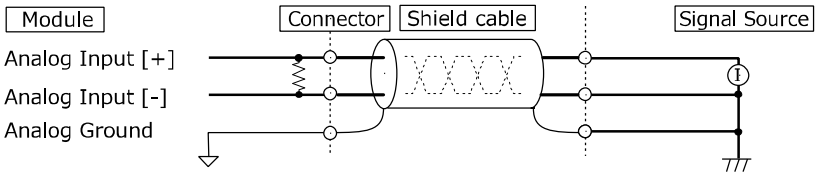
Connecting with current input (Shielded two-conductor cable)

Use this type of cable if the signal source is located at a distance from the module or if the connection requires higher noise immunity.

Connect the [+] analog input channel of the module to the positive side of the current source, and the [-] to the negative side of the current source ground respectively.

Also, connect the analog ground of the module to the ground of signal source using the shield braid.

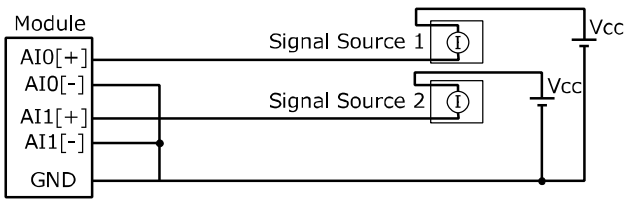
*At this time, make sure the potential difference between the [-] input of the module and the analog ground is 0.5 V or less.



Connecting with several current source output

Connect the [+] analog input channel of the module to the output terminal of the current source, and the [-] to the negative side of the current source respectively.

Also, connect the analog ground of the module to the ground of signal source.



⚠ CAUTION

- If the signal source contains over 1MHz signals, the signal may affect the cross-talk noise between channels.
- Converted data is undefined with the analog ground unconnected.
- If the connecting cable is affected by noise, accurate analog input may not be made. To secure the accuracy, place the connecting cable far from the source of the noise and put a laminated ceramic capacitor on the connector of the module (when using a ceramic capacitor, make the lead as short as possible).
- The analog ground is shared since analog input channels are not isolated among all. If inter-channels suffer from potential differences, isolate them with such as an isolated converter.
- The analog signal input to the [+] and [-] inputs must not exceed the maximum input voltage with reference to the analog ground of the module. Exceeding the input voltage can damage the module.
- Converted data is undefined when either of the [+] and [-] input terminals is left unconnected.
- Connect both of the [+] and [-] input terminals of the channel that are not connected to the signal source to the analog ground.

⚠ ATTENTION

- Si le signal source renferme plus de 1 MHz, le signal peut nuire aux signaux parasites intermodulaires entre les canaux.
- Les données converties sont indéfinies avec la masse analogique non raccordée.
- Si le câble raccordé est influencé par des signaux parasites, l'entrée analogique pourrait être imprécise. Pour assurer la précision, placez le câble de connexion loin de la source d'interférences et placez un condensateur céramique laminé sur le connecteur du module (lorsque vous utilisez un condenseur de céramique, utilisez un fil le plus court possible).
- La masse analogique est partagée puisque les canaux analogiques d'entrée ne sont pas isolés. Si les différents canaux démontrent des différences de potentiel, isolez-les avec un onduleur isolé.
- L'entrée du signal analogique vers les entrées [+] et [-] ne doit pas excéder la tension maximum d'entrée à l'égard de la masse analogique du module. Un excès de la tension d'entrée peut endommager le module.
- Les données de conversion sont indéfinies si une des bornes d'entrée [+] et [-] n'est pas raccordé.
- Raccordez les deux bornes d'entrée [+] et [-] du canal non reliées au signal source et la masse analogique.

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 <CPS-AI-1608LI>

Item	CPS-AI-1608LI
Input type	Bus-isolated voltage input
Input range	±10V
Maximum input rating	±11V
Input impedance	10kΩ or more
Input channel	Differential Input 8 channels
Resolution	16bit
Non-Linearity error *1	±20LSB (at 25°C)
Channel switching rate *2	10μsec/ch
Conversion rate	10μsec/ch
Isolation	Bus Isolation
Voltage resistance	500VDC
Connector	2 pieces 3.81mm pitch 10-pin terminal
Applicable wire	AWG28 - 16
LED	Status (Green, Red)
Supply voltage	24VDC ±10%
Current consumption	0.1A (Max.)
Physical dimensions (mm)	25.2(W)×94.7(D)×124.8(H) (No projection included)
Weight	200g
Installation method	Quick mounting on the 35mm DIN rail

*1 The non-linearity error means an error of approximately 0.18% occurs over the maximum range at -20°C and 60°C ambient temperature.

*2 The fastest sampling clock (sampling interval) that can be set is "10μsec/ch × the number of channels to be obtained".

Function Specifications <CPS-AI-1608ALI>

Item	CPS-AI-1608ALI
Input type	Bus-isolated current input
Input range	0 - 20mA *3
Maximum input rating	30mA
Input impedance	250Ω (TYP.)
Input channel	Differential Input 8 channels
Resolution	16bit
Non-Linearity error *4*5	±20LSB (at 25℃)
Channel switching rate *6	20μsec/ch
Conversion rate	20μsec/ch
Isolation	Bus Isolation
Voltage resistance	500VDC
Connector	2 pieces 3.81mm pitch 10-pin terminal
Applicable wire	AWG28 - 16
LED	Status (Green, Red)
Supply voltage	24VDC ±10%
Current consumption	0.1A (Max.)
Physical dimensions (mm)	25.2(W)×94.7(D)×124.8(H) (No projection included)
Weight	200g
Installation method	Quick mounting on the 35mm DIN rail

*3 With the analog ground as a benchmark, the voltage of terminal (+) each should stay between -0.5V and +7V, and the voltage of terminal (-) each should stay between -5.5V and +5.0V. (See connecting examples)

*4 The non-linearity error means an error of approximately 0.19% occurs over the maximum range at -20°C and 60°C ambient temperature or if analog terminal (-) is not an analog ground voltage.

*5 When the1.5-meter or shorter cable is used.

*6 The fastest sampling clock (sampling interval) that can be set is "20μsec/ch × the number of channels to be obtained".

⚠ CAUTION

You can set the modules as you desire to the configurable controller up to 16 modules.
The total current consumption of the modules should be less than 3.3A.

⚠ ATTENTION

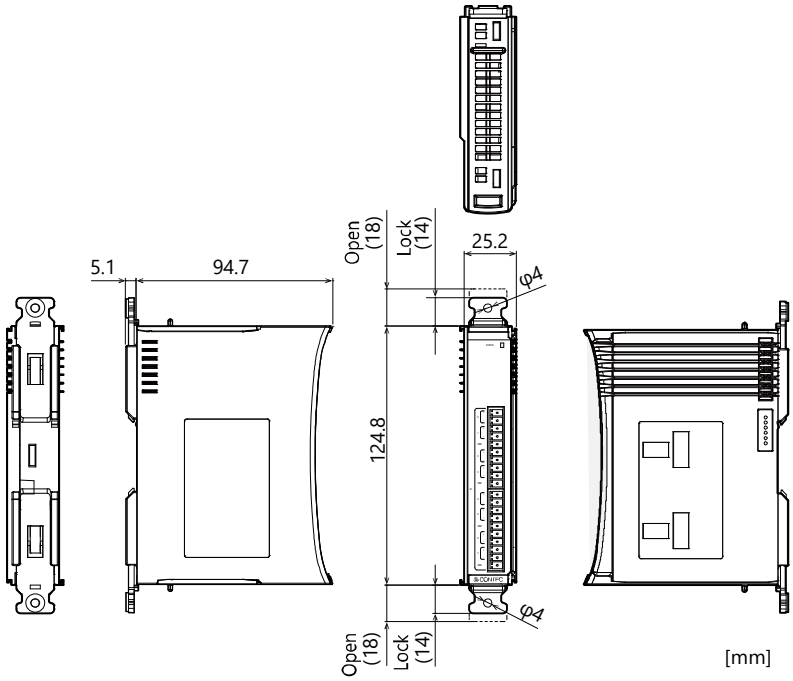
Le nombre maximum de modules empilés en fonctionnement avec le contrôleur de type empilable est de 16. La consommation totale de courant des modules doit être de moins de 3,3 A.

Installation Environment Requirements

Item		CPS-AI-1608LI	CPS-AI-1608ALI
Operating ambient temperature		-20 - +60°C	
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 *7 /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), UL, UKCA	

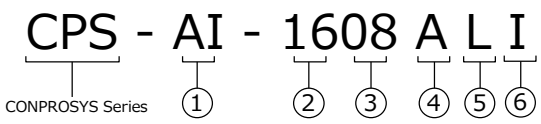
*7 When you use an optional power product: 10-55Hz (See the manual of optional power product for details)

2.Physical Dimensions



3.The Details of Model Name

Details of the model name are described below.



No.	Item	Description	
1	Interface	**AI**	Analog Input
2	Resolution	**16**	16 bit
3	Channel	**08**	8 Channels
4	Input Specification	**A**	Current Input
		-	Standard Model (Voltage Input)
5	Model Type	**L**	Low Cost Model
6	Isolation	**I**	Bus Isolation

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
Configurable Type Controller	CPS-MCS341-DS1-111	Configurable Type CPU module
	CPS-MCS341-DS1-131	Configurable Type CPU module + OPC UA server + MTConnect
	CPS-MCS341G-DS1-130	Configurable Type CPU module +3GWAN
	CPS-MCS341Q-DS1-131	Configurable Type CPU module +920MHz LAN
	CPS-ECS341-1-011	Ether CAT Slave module
DIN rail fitting power supply	CPS-PWD-90AW24-01	Fitting power supply 90W (Input: 100 - 240VAC, Output: 24VDC 3.8 A)
	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/

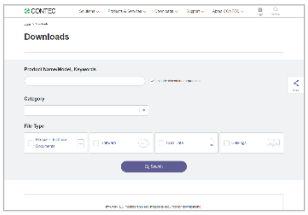
Customer Support and Inquiry

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

1.Services

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

Download



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

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

Index

Revision History

MONTH YEAR	Summary of Changes
October 2016	The First Edition
June 2018	Changed the layout of the manual.
April 2024	Corrections due to changes in the bundle

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

https://www.contec.com/

CPS-AI-1608LI, CPS-AI-1608ALI Reference Manual (Hardware)

NA04659 (LYTM526) 04262024_rev6 [01222016] April 2024 Edition