

Measures the Input and Output Response Performance

Measurement Environment

Testing environment (CPU,Memory)	Core i7-2600K 3.4GHz, MEM: 12GByte	Driver version	API-AIO (WDM) Ver. 6.00, API-DIO (WDM) Ver.6.90
OS	Windows 10 1903		

Example Configuration 1 Controls 1 I/O module with 1 coupler unit.

I/O Module	Model	No. of I/O Module	Measurement Result (msec)
Analog input 8ch	CPSN-AI-1208LI	1	4.21
Digital input 8ch	CPSN-DI-08L	1	3.65
Digital output 8ch	CPSN-DO-08L	1	3.96

Example Configuration 2 Controls 4 same type of I/O modules with 1 coupler unit.

I/O Module	Model	No. of I/O Module	Measurement Result (msec)
Analog input 8ch	CPSN-AI-1208LI	4	16.89
Digital input 8ch	CPSN-DI-08L	4	14.9
Digital output 8ch	CPSN-DO-08L	4	16.29

Example Configuration 3 Controls 12 same type of I/O modules with 3 coupler units. (4 modules per coupler unit)

I/O Module	Model	No. of I/O Module (sum)	Measurement Result (msec)
Analog input 8ch	CPSN-AI-1208LI	12	50.5
Digital input 8ch	CPSN-DI-08L	12	44.01
Digital output 8ch	CPSN-DO-08L	12	47.82

The measurement results are measured values in the environment prepared by us. That are not the guaranteed specification data.

Embedded Switching HUB

Product Name	Model	Specification	Dimensions (mm/in)
PoE switching HUB (8 ports)	SH-9008AT-POE2 SH-8008AT-POE	•Supports 1000BASE-T (SH-9008AT-POE2) •Supports 100BASE-TX •IEEE802.3af / IEEE802.3at-based PoE power •Operating temperature from -40 to 70°C (-31 to 158°F) •Mountable on the 35mm DIN rails or walls	41/1.61(W) x 95/3.74(D) x 144/5.67(H)
Embedded switching HUB (5 ports)	SH-9005F	•Supports 1000BASE-T (SH-9005F) •Supports 100BASE-TX •Operating temperature from -20 to 60°C (-4 to 140°F)	30/1.18(W) x 64/2.52(D) x 100/3.94(H)
Embedded switching HUB (8 ports)	SH-8008F	•Supports 1000BASE-T (SH-9005F) •Supports 100BASE-TX •Operating temperature from -20 to 60°C (-4 to 140°F)	40/1.57(W) x 60/2.36(D) x 90/3.54(H)
Embedded switching HUB (8 ports)	SH-8008F-2	•Power supply redundant, power supply reverse wiring countermeasure circuit built-in •Mountable on the 35mm DIN rail	40/1.57(W) x 70/2.76(D) x 90/3.54(H)
Embedded switching HUB (5 ports)	CPS-HBL-8005F		25.2/0.99(W) x 94.7/3.73(D) x 124.8/4.91(H)

An external power supply is required. Contec offers an AC adapter product (model: POA201-10-2) (sold separately). Please check Contec website for details.



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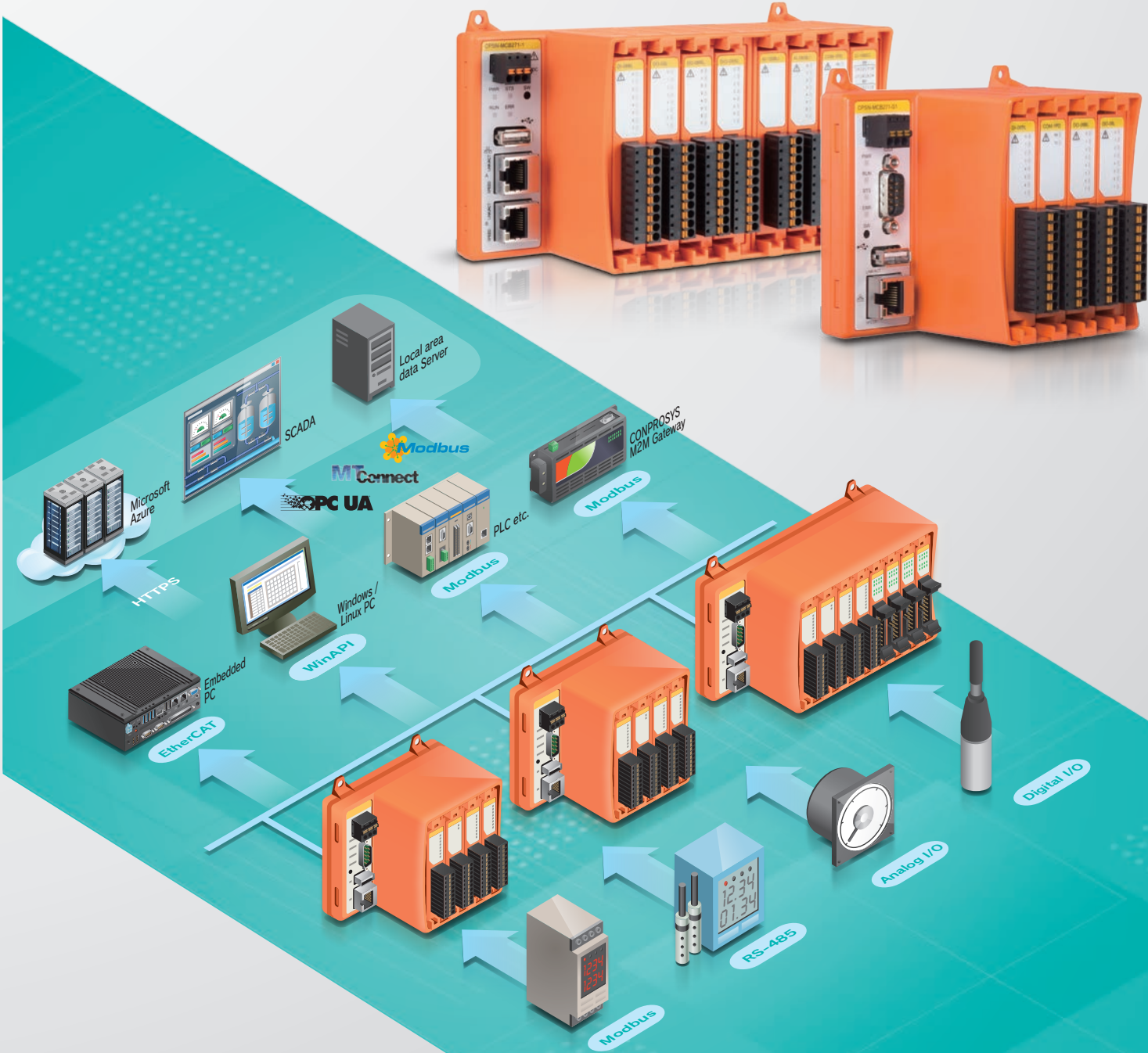
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Technology for a better life

Ethernet Based Remote I/O System for IoT

CONPROSYS™
nano
Series



www.contec.com

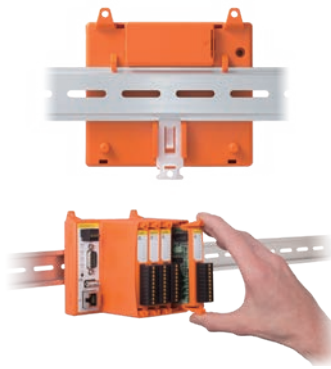
Remote I/O System for IoT

CONPROSYS™ nano Series

Remote I/O devices for digitizing interspersed local devices.
CONPROSYS nano is easy to use and excellent cost performance, which accelerates digital transformation for industrial systems.



35mm DIN rail mountable.
Tool-free to insert /
remove an I/O modules



Abundant I/O modules

Various signals supported

Abundant I/O modules
for computerizing various signals



Voltage input and output
Current input and output
Temperature input
Accumulating counter
Digital input and output
Relay output
RS-485 communication

Keep
adding
new
modules

Excellent cost performance

Helps reducing equipment costs

Low-cost Ethernet-based remote I/O focused on required
functions with the ease of use



Coupler Unit

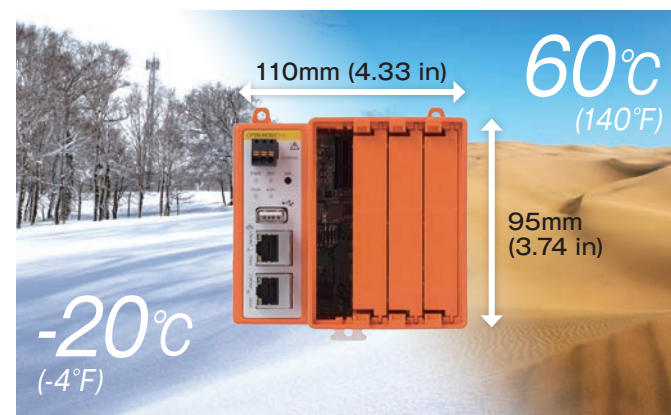


I/O Module

-20 to 60 °C (-4 to 140°F) Wide temperature range
and compact design

Suitable for various fields

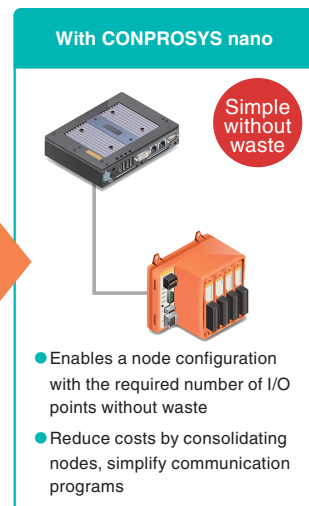
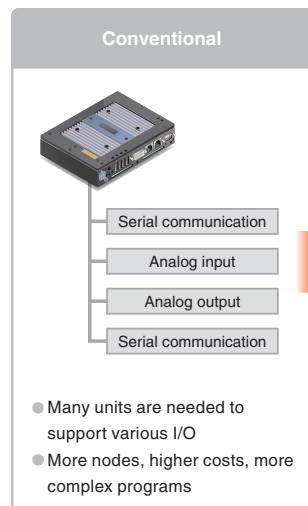
Environment resistant design that can be installed anywhere
Space-saving design allows installation in narrow spaces



Flexible modular method

Unit configuration without waste

Modular method can configure the unit with only the required
functions and I/O points
App development becomes easier



Simple
without
waste

Two types of coupler units available for different usages
and system configurations

For PC-based (Windows / Linux) / PLC-based centralized control

Remote I/O coupler units

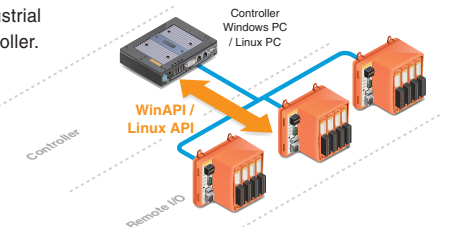
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Remote I/O type CPSN-MCB271



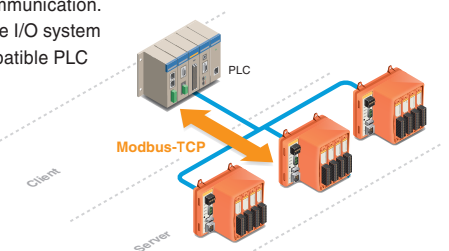
Control from host PC with Windows / Linux API

Windows / Linux driver available.
You can build a remote I/O
system with an industrial
computer as the controller.



Control from host PLC with Modbus-TCP/RTU

Supports Modbus communication.
You can build a remote I/O system
using a Modbus-compatible PLC
as a client.



New

Supports EtherCAT

CPSN-EOB471EC-41/CPSN-EOB471EC-81

Supports industrial networks that provide high-speed, high-precision communications.
You can freely combine I/O modules to construct an EtherCAT SubDevice.

For distributed control

Programmable remote I/O coupler unit

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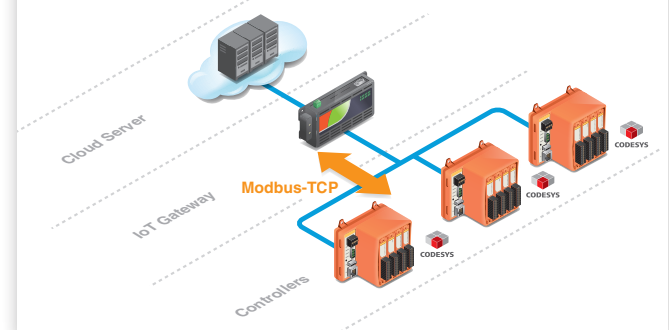
Software PLC type CPSN-PCB271



Equipped with CODESYS runtime system.
Executable of IEC 61131-3 compliant PLC
program developed in CODESYS integrated
development environment.



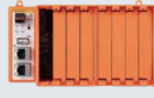
Distributed autonomous control using PLC language. Cooperated with host computer through Modbus.

PLC program can be written into a software PLC type coupler unit.
It responds to the host system as a Modbus server device while
functioning as an autonomous controller.



Remote I/O

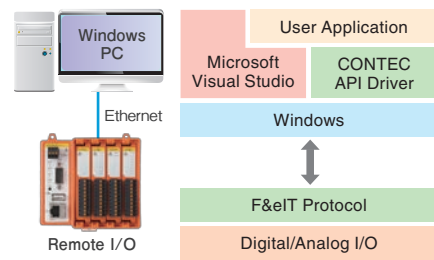
Coupler Units As a remote I/O of a communication device that supports Modbus client function, various I/O modules can be used.

Type of remote I/O coupler units							
Type / Model	Function	Power Supply	Power Consumption (Max.)		Dimensions (WxDxH)	Installation Method	Operating Temperature
			Coupler Itself	Includes the I/O modules & USB connected device			
 4 slots RS-232C model	Windows / Linux dedicated driver 1 x LAN 1 x RS-232C 4 x I/O module slots	12 to 24VDC	24VDC 2.4W 12VDC 2.4W	24VDC 36W 12VDC 24W	110 x 74.8 x 95 mm / 4.33 x 2.95 x 3.74 in (Excluding protrusions)	35mm DIN Rail Screw	-20 to 60°C / -4 to 140°F ^{*1}
 4 slots 2 LAN-equipped model	Windows / Linux dedicated driver 2 x LAN (switch built-in) 4 x I/O module slots						
 8 slots 2 LAN-equipped model	Windows / Linux dedicated driver 2 x LAN (switch built-in) 8 x I/O module slots						

*1 Depending on the installation direction, there may be derating. For details, refer to the product manual.

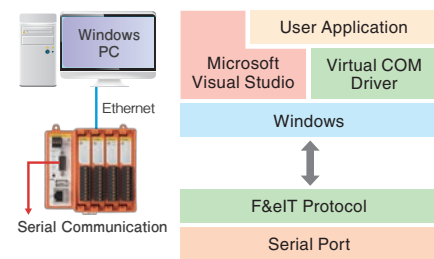
Windows Driver Windows API

By using a driver library that can be downloaded free of charge from Contec website, it is possible to create control programs to input / output digital and analog signals. Windows API is same as for Contec's expansion cards.





Virtual COM Function

By using the virtual COM driver that can be downloaded free of charge from Contec website, the serial port of the remote I/O can be accessed as a Windows COM port.




As a EtherCAT SubDevice, various I/O modules can be used.

Type of EtherCAT I/O coupler units							
Type / Model	Function	Power Supply	Power Consumption (Max.)		Dimensions (WxDxH)	Installation Method	Operating Temperature
			Coupler Itself	Includes the I/O modules & USB connected device			
CPSN-EOB471EC-41  4 slots 2 EtherCAT equipped model	EtherCAT SubDevice 2 x EtherCAT 4 x I/O module slots	12 to 24VDC	24VDC 1.7W 12VDC 1.5W	24VDC 31.2W 12VDC 20.4W	110 x 74.8 x 95 mm / 4.33 x 2.95 x 3.74 in (Excluding protrusions)	35mm DIN Rail Screw	-20 to 60°C / -4 to 140°F ^{*1}
CPSN-EOB471EC-81  8 slots 2 EtherCAT equipped model	EtherCAT SubDevice 2 x EtherCAT 8 x I/O module slots			24VDC 43.2W 12VDC 31.2W	179 x 74.8 x 95 mm / 7.05 x 2.95 x 3.74 in (Excluding protrusions)		

*1 Depending on the installation direction, there may be derating. For details, refer to the product manual.

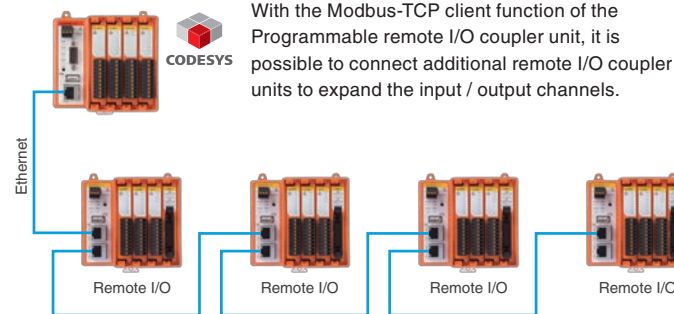
Programmable Remote I/O

Coupler Units Equipped with a CODESYS runtime system conforming to IEC61131-3, enabling use of various I/O modulesbe used.

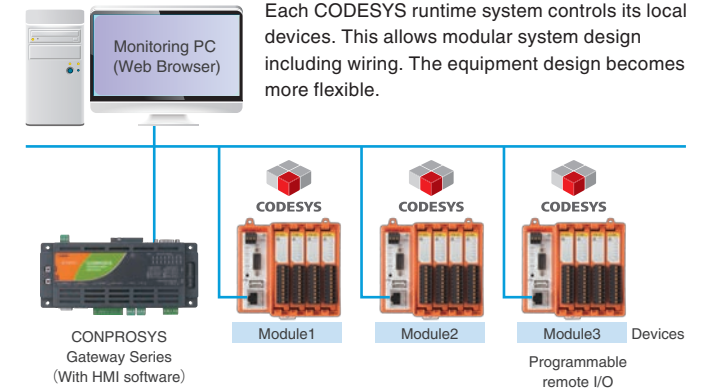
Type of remote I/O coupler unit											
Type / Model			Function		Power Supply	Dimensions (WxDxH)	Installation Method		Operating Temperature		
<div> CODESYS-equipped model</div>			IEC 61131-3 compliant programming 1 x LAN 1 x RS-232C 4 x I/O module slots		12 to 24VDC	110 x 74.8 x 95 mm / 4.33 x 2.95 x 3.74 in (Excluding protrusions)	35mm DIN Rail Screw		-20 to 60℃ / -4 to 140°F *2		
*2 The operating temperature is from -20°C to 55°C (-4°F to 131°F) when the unit is wall mounted by rolling left/right 90° or when the unit put on placed flat on the table.											
No. of I/O Module Slots	Power Consumption (Max.)		Supported Modbus protocols				IEC61131-3 supported languages				
	Coupler Itself	Includes the I/O modules & USB connected device	Modbus TCP Client	Modbus TCP Server	Modbus RTU Client	Modbus RTU Server	LD	FBD	ST	IL	SFC
4 Slot	24VDC 2.4W 12VDC 2.4W	24VDC 36W 12VDC 24W	○	○	○	○	○	○	○	○	○
Supported Codesys version		Program size (stored in ROM area)	Maximum steps	Basic instruction processing speed (LD)		Application instruction execution speed (ST)		Scan time (in 20000 steps)			
V3.5 SP12 Patch 2 or later		1MB	250K steps	98.4ns		105.6ns		2757.3μs			

* To use Modbus-RTU (RS-422A/485 (multi-drop possible)), additional CPSN-COM-1PD module is required.

Expands input and output channels

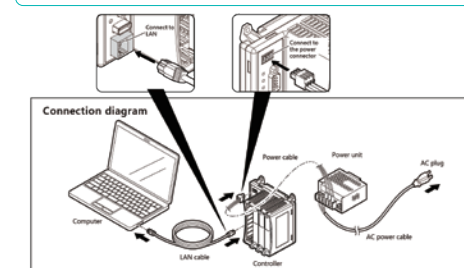


Modularization of equipment by distributed control

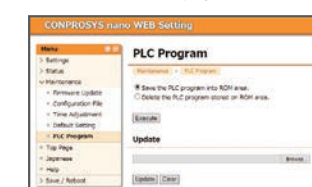


Method of creating a program under the CODESYS development environment

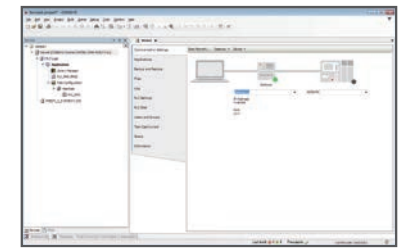
- Downloads and install the CODESYS development environment from "CODESYS Store" (free of charge)
- Downloads the CODESYS package of the nano series from Contec website (free of charge)
- Start "CODESYS Installer" in the CODESYS development environment, and install the CODESYS package of nano series
- Connects the PC of the CODESYS development environment and CONPROSYS nano coupler unit with an Ethernet cable
- Checks each IP address in network settings. (For example, the IP of Coupler unit is "10.1.1.101" or not, the IP of PC is "10.1.1.200" or not.)
- Writes programs under CODESYS development environment



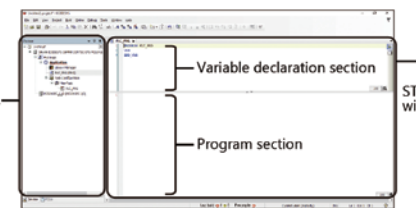
- A) Creates a new project
B) Adds I/O module configuration
C) Defines input and output variables of the I/O modules
D) Creates PLC program using IEC-61131-3 compliant language
E) Executes "Build" action from the menu of the development environment
F) Downloads target program
G) Checks program operations by debugging
H) Saves the finished PLC program into ROM of the coupler unit



ROM save screen (Web setting screen)



Device window



ST editor window

Analog Input Modules							
Model	Input Format ^{*1}	No. of Input Channels	Resolution	Input Voltage Range ^{*2}	Input Current Range ^{*1*2}	Power Consumption	Connector
CPSN-AI-1208LI	Single-end input or differential input	8ch (single-end input) / bus isolation,	12bit	±10V, ±5V, ±2.5V, 0 to 10V	±20mA	1.4W	Screw terminal block (3.81mm/0.15" pitch 10 pins)
CPSN-AI-2408LI		4ch (differential input) / bus isolation	24bit	±10V, ±5V, ±2.5V, 0 to 10V, 0 to 5V	±20mA, 0~20mA	1W	

*1 All input channels are assigned for the same input format and input range. *2 Current input is only for differential input.

Analog Output Module							
Model	Output Format	No. of Output Channels / Isolation	Resolution	Output Range	Output Current Range	Power Consumption	Connector
CPSN-AO-1602LC	Voltage / current output	2ch / Channel isolated	16bit	±10V, ±5V, 0 to 10V, 0 to 5V	0~20mA	2.1W	Screw terminal block (3.81mm/0.15" pitch 10 pins)

* Each channel can be set for different output format and output range independently.

Sensor Module					
Model	Input Format	No. of CH / Isolation	Supported Sensors	Power Consumption	Connector
CPSN-SSI-4C	Thermocouple input (differential input)	4ch / Bus isolated	Thermocouple types (J, K, E,N, R, S, T)	1.1W	Screw terminal block (3.81mm/0.15" pitch 10 pins)

Digital Input and Output Modules				
Model	Input	Output	Power Consumption	Connector
CPSN-DI-08L	8ch Opto-isolated open collector output Current sink type (negative logic)	—	0.3W	Screw terminal block (3.81mm/0.15" pitch 10 pins)
CPSN-DI-08BL (Built-in 12V DC power supply)	8ch Opto-isolated open collector output Current sink type (negative logic)	—	0.9W	
CPSN-DI-16BCL (External 12 to 24 VDC power supply / Built-in 12V DC power supply)	16ch Opto-isolated input Supports current sink (negative logic) or source (positive logic) output With simple counter function	—	1.3W	MILconnector (20pin)
CPSN-DO-08L	—	8ch Opto-isolated open collector output Current sink type (negative logic)	0.4W	Screw terminal block (3.81mm/0.15" pitch 10 pins)
CPSN-DO-08BL (Built-in 12V DC power supply)	—	8ch Opto-isolated open collector output Current sink type (negative logic)	1.2W	
CPSN-DO-08RL	—	8ch Opto-isolated output Current source type (positive logic)	0.3W	
CPSN-DO-08BRL (Built-in 12V DC power supply)	—	8ch Opto-isolated output Current source type (positive logic)	1.2W	
CPSN-DO-16L	—	16ch Opto-isolated open collector output Current sink type (negative logic)	0.7W	MILconnector (20pin)
CPSN-DO-16BL (Built-in 12V DC power supply)	—	16ch Opto-isolated open collector output Current sink type (negative logic)	1.2W	
CPSN-DIO-08SL	Bidirectional: 8ch (Each channel can be used as input channel or output channel) For input: Opto-isolated input. Supports current sink (negative logic) output. For output: Opto-isolated open collector output. Current sink type (negative logic)		0.3W	Screw terminal block (3.81mm/0.15" pitch 10 pins)

Relay Module				
Model	Input	Output	Power Consumption	Connector
CPSN-RRY-4PCA	—	4ch relay contact (form a contact) output	1.2W	Screw terminal block (3.81mm/0.15" pitch 10 pins)

Counter Module				
Model	Input	Output	Power Consumption	Connector
CPSN-CNT-3201I	Phase-A/UP 1-ch Phase-B/DOWN 1-ch Phase-Z/CLR 1-ch General input 1-ch Opto-isolated inputs	Match signal output 1-ch Opto-isolated open collector output	0.4W	Screw terminal block (3.81mm/0.15" pitch 10 pins)

Serial Communication Module				
Model	Transmission Scheme	No. of Channel / Isolation	Power Consumption	Connector
CPSN-COM-1PD	RS-422A/485 Asynchronous serial transmission (Full duplex / Half duplex)	1ch / Bus isolated	1.7W	Screw terminal block (3.81mm/0.15" pitch 10 pins)

Options

Embedded power supply units that can be mounted on a DIN rail				
Model	Rated Voltage Input Range	Rated Output Voltage	Rated Output Current	Rated Power
CPS-PWD-30AW24-01	100 to 240V (50~60Hz)	24VDC	1.3A (Max)	30W
CPS-PWD-90AW24-01	100 to 240V (50~60Hz)	24VDC	3.8A (Max)	90W

* A DC cable and a 3-pin I/O connector are included. * AC power cable is not included. An optional AC power is available from Contec (IPC-ACCODE3).

AC Power Cable			
Model	Rated Voltage and Current	Cable	Terminals
IPC-ACCODE3	125VAC 7A	2m	3-pole round terminal



Suitable Power Supply Unit is available at Contec



CPSN-PCB271-S1-041

+



CPSN-COM-1PD × 4

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CPS-PWD-30AW24-01

Power consumption: 2.4W + 1.7W x 4 = 9.2W

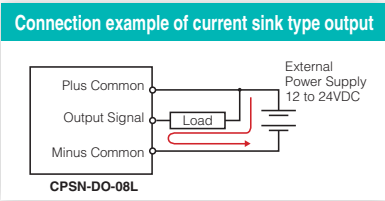
Rated power : 30W

The power consumption is the sum of the power consumption of the coupler unit and the I/O modules.
Please prepare a Contec power supply unit or a commercially available product that can supply the required power.
* If the power supply unit also supplies power to other devices, select a power supply that matches the total power consumption amount.

Digital Output

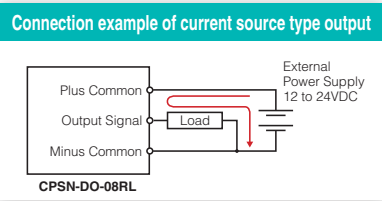
Opto-isolated open collector output (current sink type)

Generally, this is an output type called NPN transistor output or minus common type. Connect the load between the positive terminal of the external power supply and the output terminal. It is widely used in Japan. The built-in power supply module has a built-in 12VDC power supply that can drive the opto-coupler of the output circuit. This is useful when an external power supply is not available.



Opto-isolated output (current source type)

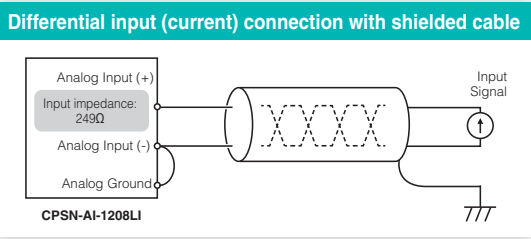
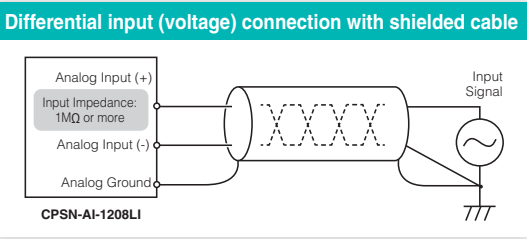
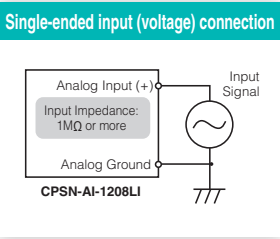
Generally, it is an output type called PNP transistor output, plus common type. Connect the load between the negative terminal of the external power supply and the output terminal. Since the load does not operate even if it is short-circuited to 0V, it is widely used in Europe for safety reasons. The built-in power supply module has a built-in 12VDC power supply that can drive the opto-coupler of the output circuit. This is useful when an external power supply is not available.



Analog Input

Single-end Input

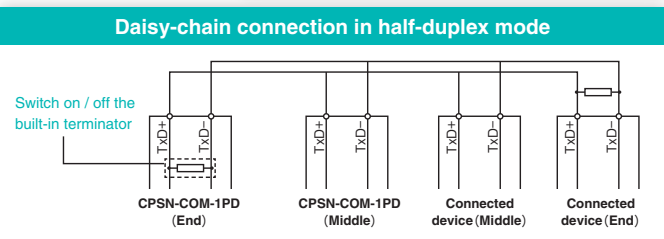
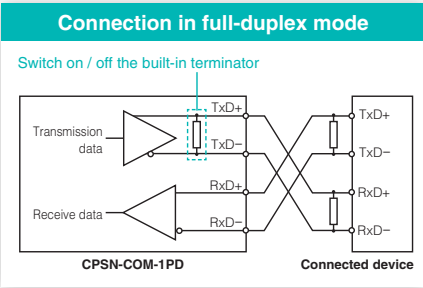
This method uses two wires, a signal wire and a ground wire, and measures the voltage of the signal source based on the potential difference from the ground. The advantage is that only two wires are required for each signal source. The disadvantage is that it is more susceptible to noise than differential inputs.



Serial Communication

RS-442A / 485 communication (full duplex / half duplex)

Supports RS-422A and RS-485 communications that are well used for sensor connection. It is possible to connect a full-duplex communication with a 4-wire cable, or daisy-chain (multidrop) connection in half-duplex mode with 2-wire cables.



Thermocouple Sensor Input

A cold junction sensor is built into the module and performs cold junction compensation (reference junction compensation), so the plus terminal and the minus terminal of the thermocouple or the compensating lead wire (used to extend the thermocouple) can be connected as they are. When connecting a shielded thermocouple, connect the shield to the analog ground terminal.

Supported Thermocouple Type	Measurement Temperature Range
K	-100 to 1372°C (-148 to 2502°F)
J	-100 to 1200°C (-148 to 2192°F)
E	-100 to 1000°C (-148 to 1832°F)
N	-100 to 1300°C (-148 to 2372°F)
T	-100 to 400°C (-148 to 752°F)
R,S	0 to 1768°C (32 to 3214°F)

