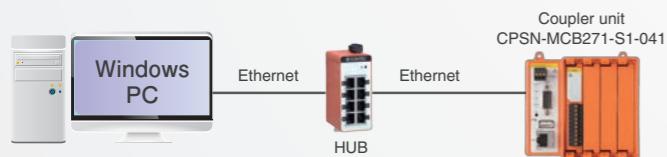


Measurement Environment

Testing environment (CPU,Memory)	Core i7-2600K 3.4GHz, MEM: 12GByte
OS	Windows 10 1903

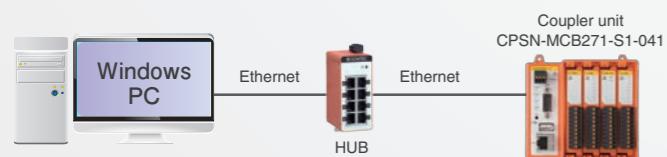
Driver version API-AIO (WDM) Ver. 6.00, API-DIO (WDM) Ver.6.90

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



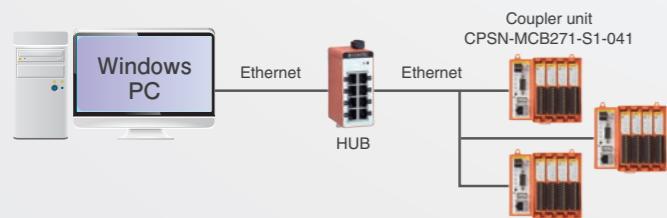
I/O Module	Model	No. of I/O Module	Measurement Result (msec)
Analog input 8ch	CPSN-AI-1208LI	1	4.21
Digital input 8ch	CPSN-DI-08L	1	3.65
Digital output 8ch	CPSN-DO-08L	1	3.96

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	30/1.18(W) x 64/2.52(D) x 100/3.94(H)
Embedded switching HUB (8 ports)	SH-8008F	•Operating temperature from -20 to 60°C (-4 to 140°F) •Power supply redundant, power supply reverse wiring countermeasure circuit built-in •Mountable on the 35mm DIN rail	40/1.57(W) x 60/2.36(D) x 90/3.54(H)
Embedded switching HUB (8 ports)	SH-8008F-2		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.



Contec Global Network

U.S.A.

CONTEC AMERICAS INC.  
3991 Sarno Road, Melbourne, FL 32934 U.S.A.  
Tel. : +1-321-728-0172  
e-mail : sales@us.contec.com

TAIWAN

TAIWAN CONTEC CO., LTD.  
9FL, No. 738, Zhongzheng Road,  
Zhonghe District, Xinbei 23511 TAIWAN  
Tel. : +886-2-8227-8669

CHINA

CONTEC (SHANGHAI) CO., LTD  
Room 1002, Qilai Building, No. 889,  
Yishan Road, Xuhui District, Shanghai  
200233 CHINA  
Tel. : +86-21-5401-2288

SINGAPORE

SINGAPORE CONTEC PTE. LTD.  
Blk 4010, Ang Mo Kio Ave. 10 #07-01  
Techplace I, 569626 SINGAPORE  
Tel. : +65-6459-1667

KOREA

CONTEC CO., LTD. KOREA BRANCH  
19, Cheongmyeong-ro 21beon-gil,  
Yeongtong-gu, Suwon-si, Gyeonggi-do,  
16705 KOREA

INDIA

CONTEC CO., LTD. India Liaison Office  
Unit No. DPT-134, First Floor,  
DLF Prime Towers , Okhla Phase- 1,  
New Delhi -110020, INDIA  
Tel. : +91-11-40541327

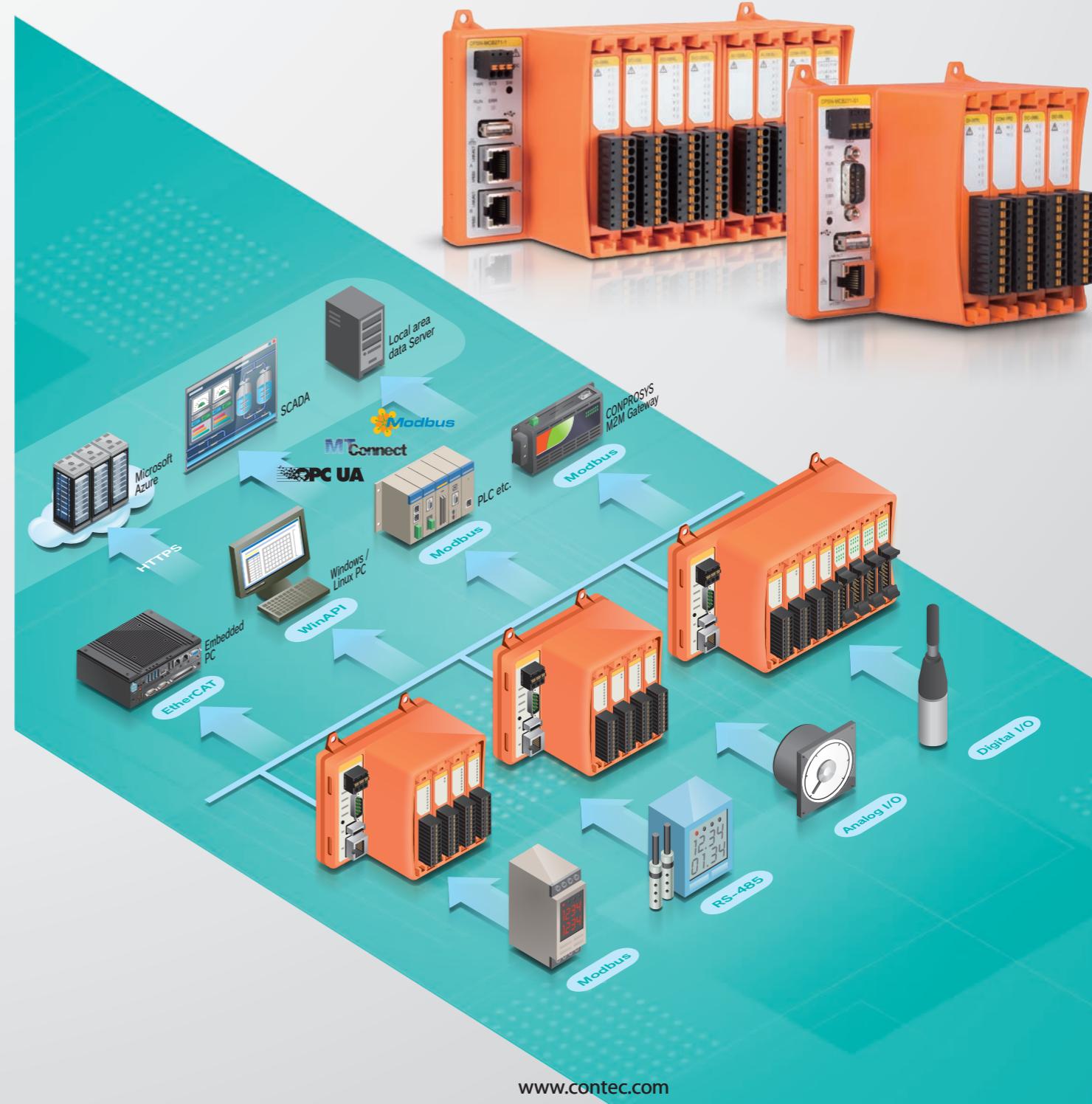
<https://www.contec.com/>

Headquarters: CONTEC CO., LTD. (Japan)  
3-9-31, Himesato, Nishiyodogawa-ku, Osaka 555-0025, Japan  
Tel:+81-6-6477-5219 e-mail:intsales@jp.contec.com

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Ethernet Based Remote I/O System for IoT

**CONPROSYS™  
nano  
Series**



[www.contec.com](http://www.contec.com)

## Remote I/O System for IoT

# CONPROSYS™ nano

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.



### 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



Couple Unit

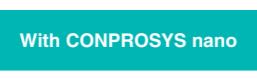
I/O Module

### 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



- Many units are needed to support various I/O
- More nodes, higher costs, more complex programs

- Enables a node configuration with the required number of I/O points without waste
- Reduce costs by consolidating nodes, simplify communication programs

### -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



# Series

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

#### Remote I/O type CPSN-MCB271



P4-→

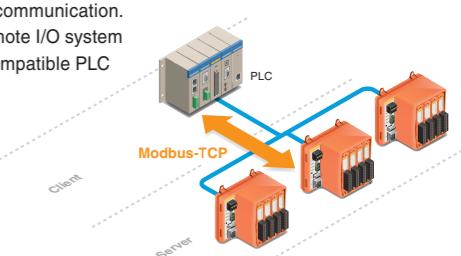
#### Control from host PC with Windows / Linux API

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

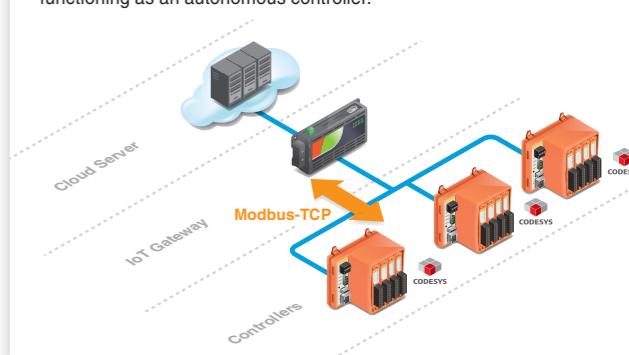
#### Software PLC type CPSN-PCB271



P5-→

#### 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

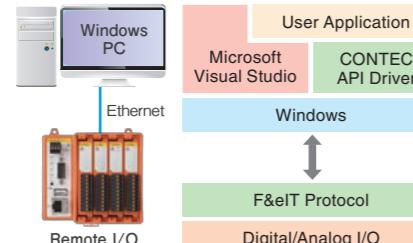
As a remote I/O of a communication device that supports Modbus client function, various I/O modules can be used.

Type of remote I/O coupler units		Power Supply	Power Consumption (Max.)		Dimensions (WxDxH)	Installation Method	Operating Temperature
Type / Model	Function		Coupler Itself	Includes the I/O modules & USB connected device			
<b>CPSN-MCB271-S1-041</b> 	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 <sup>1</sup>
<b>CPSN-MCB271-1-041</b> 	Windows / Linux dedicated driver 2 x LAN (switch built-in) 4 x I/O module slots				179 x 74.8 x 95 mm / 7.05 x 2.95 x 3.74 in (Excluding protrusions)		
<b>CPSN-MCB271-1-081</b> 	Windows / Linux dedicated driver 2 x LAN (switch built-in) 8 x I/O module slots				179 x 74.8 x 95 mm / 7.05 x 2.95 x 3.74 in (Excluding protrusions)		

<sup>1</sup> Depending on the installation direction, there may be derating. For details, refer to the product manual.

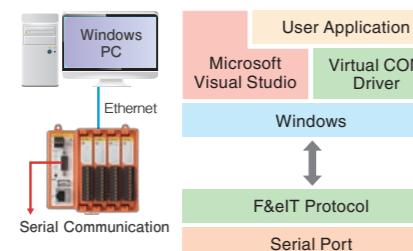
## Windows Driver Windows API

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		Power Supply	Power Consumption (Max.)		Dimensions (WxDxH)	Installation Method	Operating Temperature
Type / Model	Function		Coupler Itself	Includes the I/O modules & USB connected device			
<b>CPSN-EOB471EC-41</b> 	EtherCAT SubDevice 2 x EtherCAT 4 x I/O module slots	12 to 24VDC	24VDC 31.2W 12VDC 20.4W	24VDC 1.7W 12VDC 1.5W	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 <sup>1</sup>
<b>CPSN-EOB471EC-81</b> 	EtherCAT SubDevice 2 x EtherCAT 8 x I/O module slots				179 x 74.8 x 95 mm / 7.05 x 2.95 x 3.74 in (Excluding protrusions)		

<sup>1</sup> 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 modules be used.

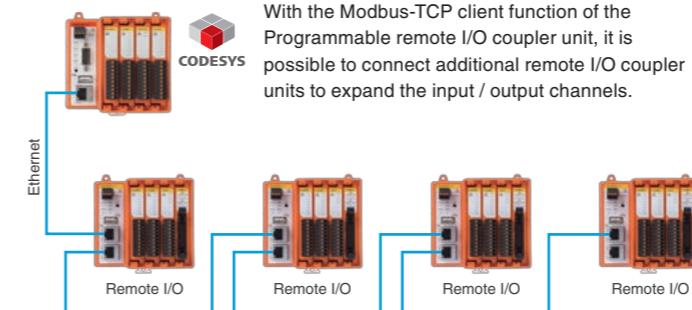
Type of remote I/O coupler unit	Type / Model	Function	Power Supply	Dimensions (WxDxH)	Installation Method	Operating Temperature
<b>CPSN-PCB271-S1-041</b> 	CODESYS-equipped model	IEC 61131-3 compliant programming 1 x LAN 1 x RS-232C 4 x I/O module slots	12 to 24VDC	110 x 74.8 x 95 mm / 4.33 x 2.95 x 3.74 in (Excluding protrusions)	35mm DIN Rail Screw	-20 to 60°C /-4 to 140°F <sup>2</sup>

<sup>2</sup> 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
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	

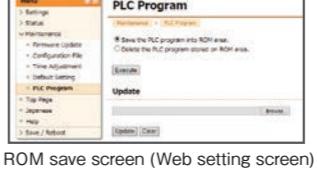
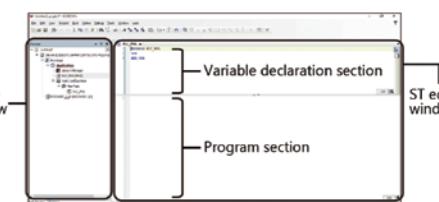
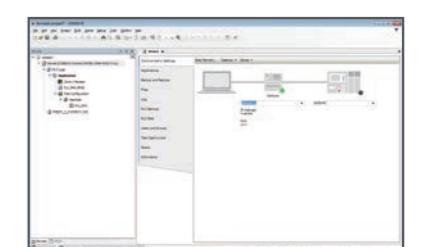
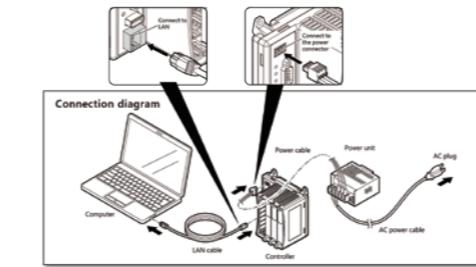
\* To use Modbus-RTU (RS-422A/485 (multi-drop possible)), additional CPSN-COM-1PD module is required.

## Expands input and output channels



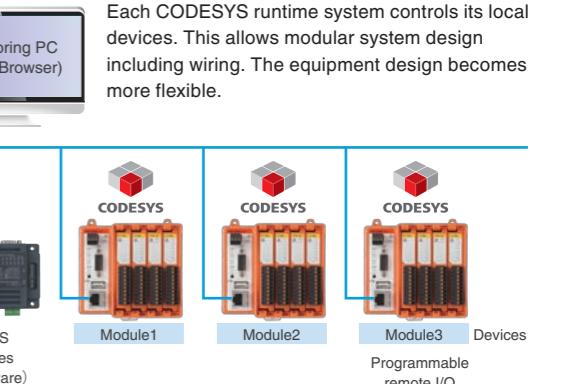
## Method of creating a program under the CODESYS development environment

- 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



Modularization of equipment by distributed control

Each CODESYS runtime system controls its local devices. This allows modular system design including wiring. The equipment design becomes more flexible.



## I/O Modules

### Analog Input Modules

Model	Input Format <sup>1</sup>	No. of Input Channels	Resolution	Input Voltage Range <sup>2</sup>	Input Current Range <sup>1,2</sup>	Power Consumption	Connector
CPSN-AI-1208LI	Single-end input or differential input	8ch (single-end input) / bus isolation, 4ch (differential 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			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	—
CPSN-DO-08BL (Built-in 12V DC power supply)	—	8ch Opto-isolated open collector output Current sink type (negative logic)	1.2W	Screw terminal block (3.81mm/0.15" pitch 10 pins)
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 x 4



CPS-PWD-30AW24-01

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

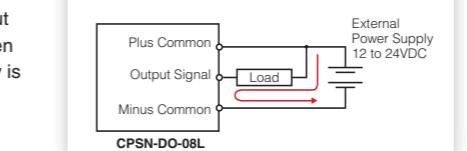
Rated power : 30W

## 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.

#### Connection example of current sink type output

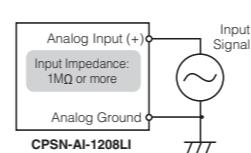


## Analog Input

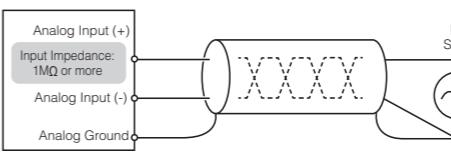
### Single-end Input

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.

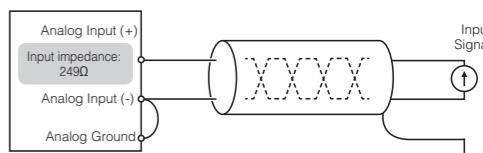
#### Single-ended input (voltage) connection



#### Differential input (voltage) connection with shielded cable



#### Differential input (current) connection with shielded cable

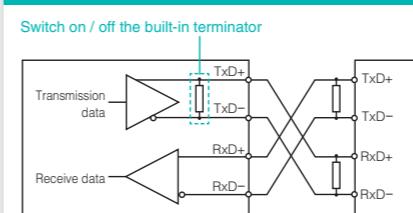


## Serial Communication

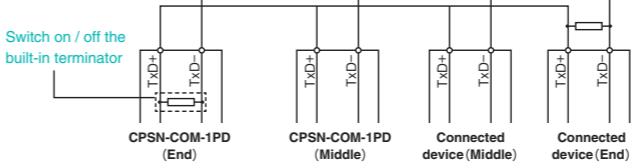
### RS-422A / 485 communication (full duplex / half duplex)

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.

#### Connection in full-duplex mode



#### Daisy-chain connection in half-duplex mode



## Thermocouple Sensor Input

Supported Thermocouple Type	Measurement Temperature Range





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