

Reference Manual

CONTEC Data Collector for Digital I/O

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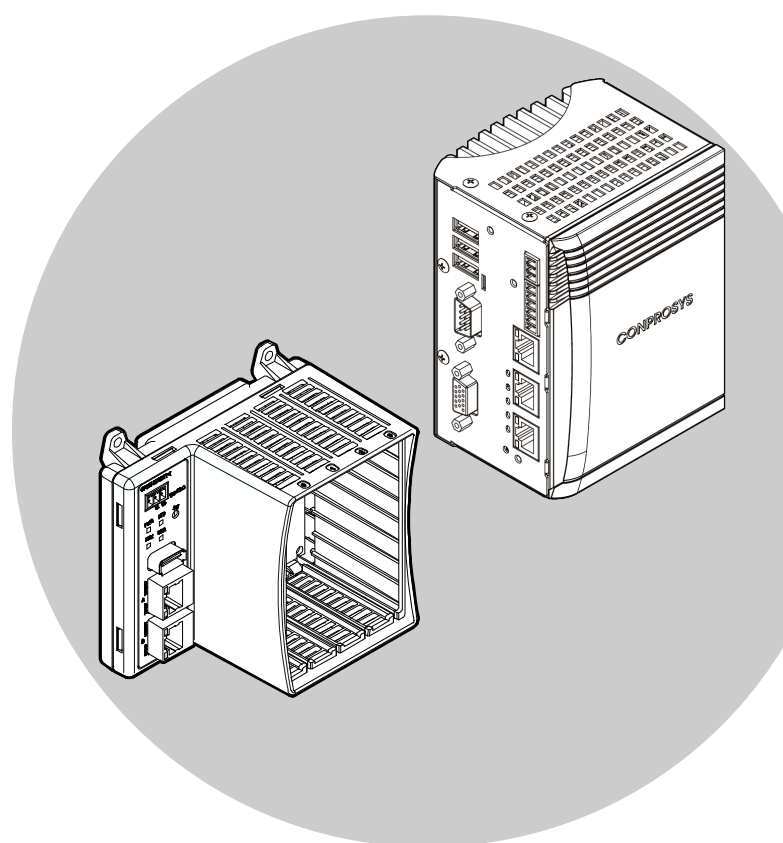


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Overview

This manual provides the information and specifications of the product. Make sure you read this before actual use.

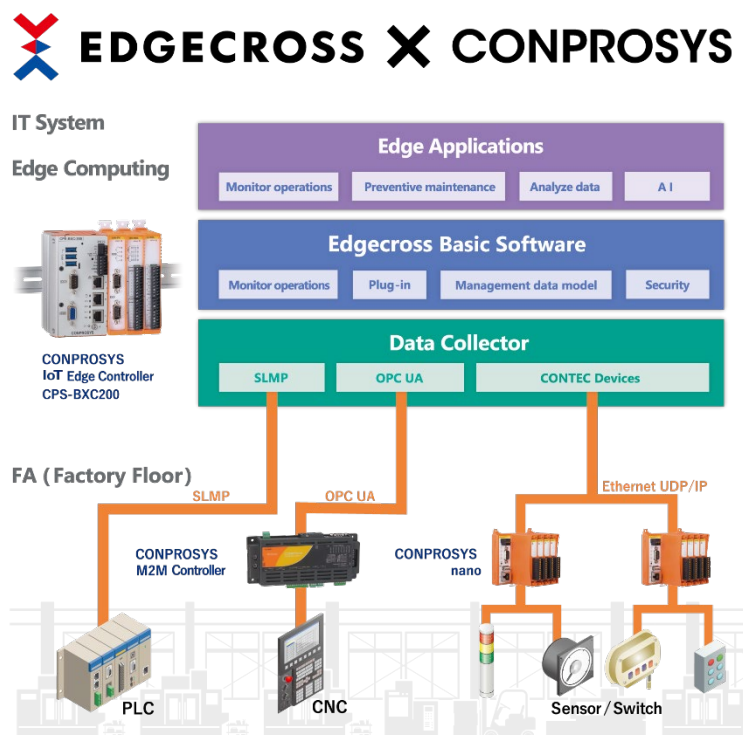
1. Product Overview

1. About Edgexcross

Edgexcross is a standard open edge computing software platform going beyond the bounds of companies and industries that promote the use of IoT at manufacturing sites. It connects the edge computing area between FA and IT systems and realizes seamless data coordination, which is independent from hardware.

Since 2017, which is when “Edgexcross Consortium” was establishment, operation monitoring, preventive maintenance and data analysis software, or supporting industrial computers have been released, and the applications for those have expanded in the field of edge applications. On the other hand, while data were collected from industrial networks such as OPC UA in the area of FA field, it was difficult to collect the data from sensors or switch circuits that were incompatible with industrial networks due to the lack of supporting devices or software.

With the “CONTEC Data Collector” software, you can utilize our extensive measuring controllers and remote I/O devices on the Edgexcross platform, and collect data from sensors or switch circuits that are incompatible with industrial networks. This software enhances the application range of the Edgexcross platform, and contributes to the development for various industries as well as the manufacturing industry.



2. About “CONTEC Data Collector for Digital I/O”

[CONTEC Data Collector for Digital I/O] is software that implements cooperation between the Edgecross basic software platform and the data of our digital I/O measurement control and remote I/O devices.

By using this Data Collector, the collection function, read function, and write function can be used for compatible digital I/O devices.

2.Data Collector Specifications

1. Common Specifications

Item		Specification
Support Language		English
Collection Function	Collection Interval	100 msec to 900 msec 1 sec to 3600 sec
	Data Type	BOOL, UINT
Read Function	Collection Interval	100 msec to 900 msec 1 sec to 3600 sec
	Data Type	BOOL, UINT
Write Function	Collection Interval	100 msec to 900 msec 1 sec to 3600 sec
	Data Type	BOOL, UINT
Support Device	CPS-BXC200 + Support I/O Module	CPS-DI-16L CPS-DI-16RL CPS-DIO-0808BL CPS-DIO-0808L CPS-DIO-0808RL CPS-DO-16L CPS-DO-16RL CPS-RRY-4PCC
	CPSN-MCB271-S1-041 CPSN-MCB271-1-041 + Support I/O Module	CPSN-DI-08BL CPSN-DI-08L CPSN-DI-16BCL CPSN-DO-08BL CPSN-DO-08BRL CPSN-DO-08L CPSN-DO-08RL

2. Device Support Function

Device	Collection Function	Read Function	Write Function
CPS-DI-16L	Yes	Yes	No
CPS-DI-16RL	Yes	Yes	No
CPS-DIO-0808BL	Yes	Yes	Yes
CPS-DIO-0808L	Yes	Yes	Yes
CPS-DIO-0808RL	Yes	Yes	Yes
CPS-DO-16L	No	No	Yes
CPS-DO-16RL	No	No	Yes
CPS-RRY-4PCC	No	No	Yes
CPSN-DI-08BL	Yes	Yes	No
CPSN-DI-08L	Yes	Yes	No
CPSN-DI-16BCL	Yes	Yes	No
CPSN-DO-08BL	No	No	Yes
CPSN-DO-08BRL	No	No	Yes
CPSN-DO-08L	No	No	Yes
CPSN-DO-08RL	No	No	Yes

3. Digital Filter Function

The relation between the digital filter setting value and setting time is as follows.

Device	Setting Value	Setting Time
CPS-DIO-0808L CPS-DIO-0808BL CPS-DIO-0808RL CPS-DI-16L CPS-DI-16RL	0	Digital filter unused
	1	0.25 [μsec]
	2	0.5 [μsec]
	3	1 [μsec]
	4	2 [μsec]
	5	4 [μsec]
	6	8 [μsec]
	7	16 [μsec]
	8	32 [μsec]
	9	64 [μsec]
	10	128 [μsec]
	11	256 [μsec]
	12	512 [μsec]
	13	1024 [μsec]
	14	2.048 [msec]
	15	4.096 [msec]
	16	8.192 [msec]
	17	16.384 [msec]
	18	32.768 [msec]
	19	65.536 [msec]
	20	131.072 [msec]
CPSN-DI-08L CPSN-DI-08BL	0	Digital filter unused
	1	Digital filter
CPSN-DI-16BCL	0	Digital filter unused
	4 - 1000	Setting Value [msec]

3.Function

1. Collection Function

Input from the specified port or bit of the device at the set time interval. *1

The access unit can be selected from bit and byte.

You can set the digital filter function. *2

2. Read Function

Input from the specified port or bit of the device at the timing requested by the Edgecross basic software.

The access unit can be selected from bit and byte.

You can set the digital filter function. *2

3. Write Function

Output the specified data to the specified port or bit of the device at the timing requested by the Edgecross basic software. *3

The access unit can be selected from bit and byte.

*1 The device must have input function.

*2 The device must have digital filter function.

*3 The device must have output function.

Software

This section provides the information on the device driver and the data collector software.

1.About Device Driver

1. Installation for Device Driver

It is necessary to install device driver for digital I/O devices before using [CONTEC Data Collector for Digital I/O]. If device driver has been already installed and enabled, please proceed to the next item.

◆ Download Device Driver

Please download device driver from following URL.

- 1** Access to <https://www.contec.com/download/list/driver-software/apipac/>.
Please download [Run-Time Environment (Run-Time only)] of API-DIO(WDM).
- 2** Expand the downloaded file to a suitable place.
- 3** For details on how to install device driver, please refer to the reference manual for each device.

2. Installation for Data Collector

- 1** Expand the downloaded Data Collector package to a suitable place.
- 2** Execute the following expanded file.
¥Installer¥DIO¥setup.exe
- 3** Follow the instructions to install.
When the installation is complete, [CONTEC Data Collector] will be added to the start menu and this Reference Manual will be stored in the folder.

3. Uninstall

Select [CONTEC Data Collector for Digital I/O] from [Programs and Features] in [Control Panel] and uninstall it.

2.About Data Collector

The data collector settings are described here.

1. Parameter Setting

◆ Communication Parameters

Select and set the device which is to be used with this Data Collector.

Target Device Setting No. [1]

Setting Name: Dev01

Comment:

[Device Name]: DIO000

[Digital Filter]: 0 [dec]

OK Cancel

Setting Item	Description
Device Name	Select the device you want to use from the list of device names set in the driver.
Digital Filter	Specify the digital filter value to be set. You should not enter it, if the device doesn't support digital filter.

◆ Collection Parameters

Set the data collection interval.

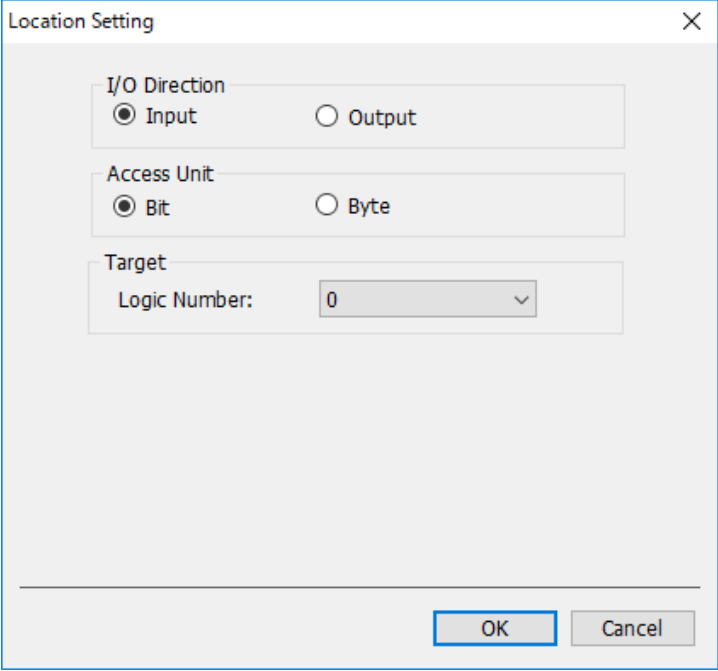
Collection Data Collection Option

Please specify the collection interval.

Collection interval: 1 00 msec (100-900)

◆ Location Parameters

Set the actual I/O target for the selected device.



The dialog box titled "Location Setting" contains three sections:

- I/O Direction:** Radio buttons for "Input" (selected) and "Output".
- Access Unit:** Radio buttons for "Bit" (selected) and "Byte".
- Target:** A label "Logic Number:" followed by a dropdown menu showing the value "0".

At the bottom right are "OK" and "Cancel" buttons.

Setting Item	Description
I/O Direction	Select the I/O direction from Input or Output. If only one of these functions can be used depending on the function and device used, the setting value is fixed.
Access Unit	Select the I/O unit from Bit or Byte.
Target	This item selects the I/O target. If the Access Unit is Bit, select the logical bit number. If the Access Unit is Byte, select the logical port number. Refer to the " Glossary " (page21)for details on Logic bit and Logic port.

2. Error Handling

◆ Supplement on Error Code

If an error occurs in the device driver, as detailed information, [Driver API name] and [Driver API error] items are displayed, and the API name, error code, and error code description of the device driver in which the error occurred are displayed.

When you make an inquiry, please provide this information together to make it easier to understand the details of the phenomenon.

Display contents example

1 Overview
Connection Processing error

2 Event code
2200

3 Detailed information
[Process Flow information]
Source function :Data Collection Process Flow type :Data logging flow Data logging/diagnosis flow No. :1 Process No. :1 Target device setting No. :1

[Driver API name]
Diolnit()

[Driver API error]
10000: The devicename which wasnt registered by a device manager was specified

4 Cause
An error occurred in the driver.

3. Details of Error Code [Data Collector]

Error code [Hex]	Description (Overview / Cause)
1001	Driver initialization error
	Read data No. is incorrect.
1002	Collection data No. error
	Collection data No. is incorrect.
1003	Read data No. error
	Read data No. is incorrect.
1004	Write data No. error
	Write data No. is incorrect.
1005	Collection parameter error
	Collection parameter is incorrect.
1006	Connection status notification error
	Connection status notification failed.
1007	Event notification function registration error
	Error occurred in communication driver.
1008	Communication parameter acquisition failure
	Failed to get the communication parameter.
1009	Data parameter acquisition failure
	Failed to get the data parameter.
1300	Collection processing error
	Parameter is incorrect.
1400	Read processing error
	Parameter is incorrect.
1500	Write processing error
	Parameter is incorrect.
2200	Connection processing error
	An error occurred in the driver.
2300	Disconnection processing error
	An error occurred in the driver.
2400	Collection processing error
	An error occurred in the driver.
2500	Read processing error
	An error occurred in the driver.
2600	Write processing error
	An error occurred in the driver.

4. Details of Error Code [Driver]

Value [Dec]	Description
0	Normal completed
1	Invalid resource reference specified. Please confirm whether the used device has been registered in Device Manager normally.
2	Invalid interrupt routine registered. Please confirm whether the IRQ duplicates with another device.
3	Invalid memory allocated. This error would hardly occur. If this error occurred, please extend the memory.
4	Invalid registry access. Please confirm whether the setting is available in property page. If this error still occurred, please reinstall the device.
7	Execute DioResetDevice function because the device has recovered from standby mode.
8	Because the Cdio.sys file is not found, it is not possible to initialize it.
9	Because version information on the Cdio.dll file cannot be acquired, it is not possible to initialize it.
10	Because version information on the Cdio.sys file cannot be acquired, it is not possible to initialize it.
11	Because version information on Cdio.dll and Cdio.sys is different, it is not possible to initialize it.
10000	Invalid device name specified. Please confirm the property page settings.
10001	Invalid ID specified. Please confirm whether the initialization function has completed normally. And confirm the scope of variable that stores ID.
10002	Not call the driver (Failure on DEVICE I/O CONTROL). Please confirm whether the initialization function has completed normally. And confirm the scope of variable that stores ID.
10003	Not create the file (Failure on CreateFile). Please confirm whether the device driver can activate normally using Device Manager. When the device driver cannot activate normally, please delete the device and reinstall it.
10004	Not close the file (Failure on CloseFile). It is possible that you have executed the termination processing for the device which was not initialized. It does not matter even if this error is ignored.
10005	Not create the thread (Failure on CreateThread). This error would hardly occur. If this error occurred, please confirm the number of threads activated by the application.
10050	Invalid device information specified. Please check the spell. Please confirm the device name used in the application and the device name set in Device Manager.
10051	Not find the available device. Please confirm whether the device has been registered in Device Manager.
10052	Specified device information type beyond the limit. Error occurred in the information acquisition function. Please confirm the parameters.

Value [Dec]	Description
10100	Invalid data buffer address. The buffer address is NULL(0). Please confirm the source code of the application.
10200	Window handle beyond the limit. Error occurred in message notification function. It is possible that the window handle is invalid when the function is executing. Please adjust the timing for calling the function.
10300	Trigger kind beyond the limit. It is an error in the parameters of the trigger function. Please use the definition values.
20000	Not secure memory. This error would hardly occur. If this error occurred, please extend the memory.
20001	This board couldnt use this function. Errors will occur when an input function is executed on a device without input port, or an output function or an echo back function is executed on a device without output port.
20002	Board is behaving, not execute. When a device is accessed in the background, then the error will occur as the processing in the foreground cannot be executed.
20003	Other process is using the device, not execute. Please confirm the restrictions on using more than one process. For USB device, when executing the trigger function, only one process can be executed. The trigger function cannot be executed by two or more processes on the same device.
20004	Process information is not found.
20020	The last data packet received from end point has CRC error.
20021	The last data packet received from end point has bit stuffing violation error.
20022	The last data packet received from end point has data toggle packet that does not match the expected value.
20023	End point return STALL packet identifier.
20024	Device dont respond to token(IN) ,dont support handshake.
20025	Device dont respond to token(IN) ,dont support handshake.
20026	Invalid packet identifier received.
20027	End point return data quantity overrun.
20028	End point return data quantity underrun.
20029	IN transmit specified buffer overrun.
20030	OUT transmit specified buffer underrun.
20031	End point status is STALL, not transmit.
20032	Not found device information.
20100	Port No. beyond the limit. Please confirm the number of I/O ports of the device and the parameters being used by the program.
20101	Port number beyond the limit. The available maximum number of I/O ports is 256.
20102	Bit No. beyond the limit. Please confirm the number of I/O bits of the device and the parameters being used by the program.
20103	Bit number beyond the limit. The available maximum number of I/O bits is 256.

Value [Dec]	Description
20104	Bit data beyond the limit of 0 to 1. It is an error in bit output. Please confirm the parameters being used by the program.
20105	Channel No. is outside the setting range.
20106	Channel number is outside the setting range.
20200	Interrupt bit beyond the limit. For USB device, only the first four bits of a module can use interrupt.
20201	Interrupt logic beyond the limit. The interrupt logic is either rising edge or falling edge. Please use the definition values.
20300	Timer value beyond the limit.
20400	Filter number beyond the limit.
20500	Direction value is out of range.
20600	8255 chip number is outside of the range.
20700	Count edge is outside the setting range.
20800	Comparison register No. is outside the setting range.
20801	Comparison register value is outside the setting range.
20810	Count value is outside the setting range.
21000	Signal is outside the setting range.
21001	Start conditions are outside the setting range.
21002	Clock conditions are outside the setting range.
21003	Clock value is outside the setting range.
21004	Clock value unit is outside the setting range.
21005	Stop conditions are outside the setting range.
21006	Stop number is outside the setting range.
21007	Contents of reset are outside the setting range.
21008	Data number is outside the setting range.
21009	Buffer repetition use setup is outside the setting range.
21010	Data transmission number is outside the setting range.
21100	Buffer was too large and has not secured. Because the buffer size is too large, it is not possible to set it to the board. Please reduce the buffer size.
21101	Memory has not been locked. Please extend the mounting memory or reduce buffer size.
21102	Parameter error. One of the function parameters is out of the available range. Please confirm the values of the parameters.
21103	Procedure error of execution. The execution procedure of the function is wrong. When the bus master transfer starts without setting the buffer, or the buffer is set during bus master transfer, or the general-purpose I/O function is called during bus master transfer, the error will occur. Please review the program referring to the sample.

Value [Dec]	Description
22000	Access error.
22001	Access right violation.
22002	Area error.
22003	Access size error.
22004	Parameter error.
22005	Length error.
22006	Resource insufficient.
22016	Communication timeout occurred.
22017	Handle error.
22018	Close error.
22064	Wireless communication timeout occurred.

Appendix

This section describes words and terms used in this manual, software details, and inquiries.

1. Glossary

◆ Logic Port

The I/O port arrangement which is used for input/output is different for each device.

e.g.) Physics port

PIO-32/32L(PCI)H: Input: +Port 0 to +Port 3, Output: +Port 4 to +Port 7

PIO-64/64L(PCI)H: Input: +Port 0 to +Port 7, Output: +Port 8 to +Port 15

Logic port is the number that I/O ports are numbered beginning from port 0, in order to program. It needn't to care about the physics port arrangement is different for each device.

When input and output, use the logic port.

The above example is converted to logic port as follows.

e.g.) Logic port

PIO-32/32L(PCI)H: Input: Port 0 to Port 3, Output: Port 0 to Port 3

PIO-64/64L(PCI)H: Input: Port 0 to Port 7, Output: Port 0 to Port 7

◆ Logic Bit

The I/O bit romanization which is used for input/output is different for each device.

e.g.) Bit romanization

PIO-32/32L(PCI)H: Input: I00 to I37, Output: O40 to O77

PIO-64/64L(PCI)H: Input: I00 to I77, Output: O80 to OF7

Logic bit is the number that I/O bits are numbered beginning from bit 0, in order to program. It needn't to care about the bit arrangement is different for each device.

When input and output, use the logic bit.

The above example is converted to logic bit as follows.

e.g.) Logic bit

PIO-32/32L(PCI)H: Input: 0 to 31, Output: 0 to 31

PIO-64/64L(PCI)H: Input: 0 to 63, Output: 0 to 63

◆ Digital Filter

With this function, you can filter the input signal.

This allows you to prevent wrong recognition of input signal due to noise or chattering.

2. Inquiries

Contact your retailer about the matter which is not described by this reference manual or unusual operation.

Moreover, because the contents of question are hard to grasp as being oral, please inquire it in E-mail or Web form. We will contact you back.

When it is thought that operation is unusual, please write down the version of driver, Edgecross basic software, Data Collector and the hardware environment of PC or other using devices in detail.

Please note that we cannot answer general questions such as how to use the Edgecross basic software.

Before inquiry

The retailer first checks whether the hardware is not working properly or the software is not working, and responds according to each situation.

If you suspect an abnormal operation, please let us know in detail as much as possible after confirming the reproduction procedure and the location where the problem occurred.

Inquiry Contact to

Please refer to the contact information and templates for making inquiries on our website.

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

FAQ library is also available.

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2. msinttypes

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The msinttypes r29

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Customer Support and Inquiry

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

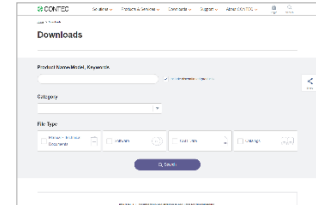
1.Services

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

Download

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

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



Revision History

MONTH YEAR	Summary of Changes
December 2019	The First Edition

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

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CONTEC Data Collector for Digital I/O Reference Manual

NA07197 (LYXX771) [12062019]

December 2019 Edition