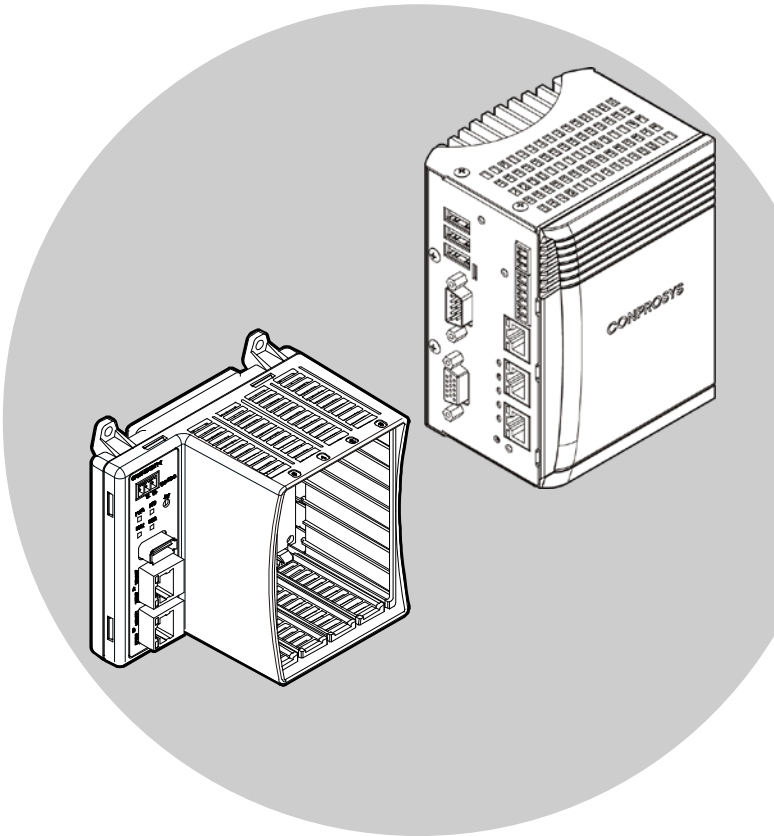
CONTEC

Reference Manual

CONTEC Data Collector for Counter



CONTENTS

CONTEC CO., LTD.

Table of Contents

Overview

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

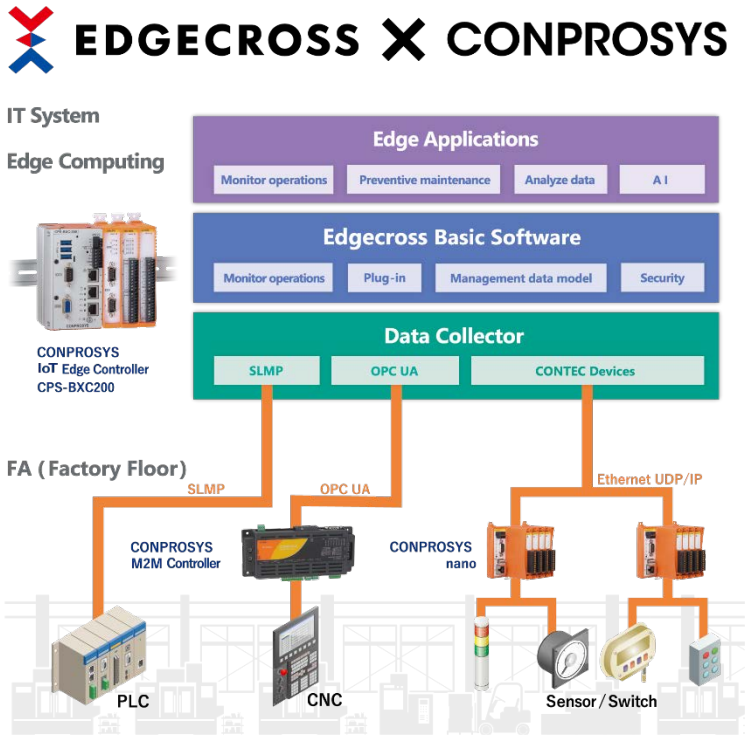
1.Product Overview

1. About Edgecross

Edgecross 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 "Edgecross 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 Edgecross platform, and collect data from sensors or switch circuits that are incompatible with industrial networks. This software enhances the application range of the Edgecross platform, and contributes to the development for various industries as well as the manufacturing industry.



2. About “CONTEC Data Collector for Counter"

[CONTEC Data Collector for Counter] is software that implements cooperation between the Edgecross basic software platform and the data of our counter 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 counter 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	UDINT
Read Function	Data Type	UDINT
Write Function	Data Type	UDINT
Support Device	CPS-BXC200 + Support I/O Module	CPS-CNT-3202I
	CPSN-MCB271-S1-041, CPSN-MCB271-1-041 + Support I/O Module	CPSN-CNT-3201I

2. Device Support Function

Device	Collection Function	Read Function	Write Function
CPS-CNT-3202I	Yes	Yes	Yes
CPSN-CNT-3201I	Yes	Yes	Yes

3. Digital filter coefficient

The digital filter coefficient that can be set for each device is as follows.

Coefficient	Filter Time
0h	0.1 μsec
1h	6.5 μsec
2h	25.7 μsec
3h	32.1 μsec
4h	204.9 μsec
5h	211.3 μsec
6h	230.5 μsec
7h	236.9 μsec
8h	819.3 μsec
9h	825.7 μsec
Ah	844.9 μsec
Bh	851.3 μsec
Ch	1024.1 μsec
Dh	1030.5 μsec
Eh	1049.7 μsec
Fh	1056.1 μsec

4. External Signal Source

The external signal sources that can be set for each device is as follows.

Device	External Signal Source
CPS-CNT-3202I	Photocoupler
CPSN-CNT-3201I	Photocoupler

3.Function

1. Collection Function

Input the count value from the specified channel of the device at the set time interval.

Counter operation mode, Z-phase settings and digital filter can be selected.

Counting will start automatically when collection starts.

2. Read Function

Input the count value from the specified channel of the device at the timing requested by the Edgecross basic software.

Counter operation mode, Z-phase settings and digital filter can be selected.

3. Write Function

Start or stop counting

Start or stop counting on the specified channel of the device at the timing requested by the Edgecross Basic Software.

Value	Function
0	Count stop
1	Count start

*This is the same as the location parameter used in the read function.

Count value preset

Preset the count value to the specified channel of the device at the timing requested by the Edgecross basic software.

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 counter devices before using [CONTEC Data Collector for Counter]. 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-CNT(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¥CNT¥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 Counter] from [Programs and Features] in [Control Panel] and uninstall it.

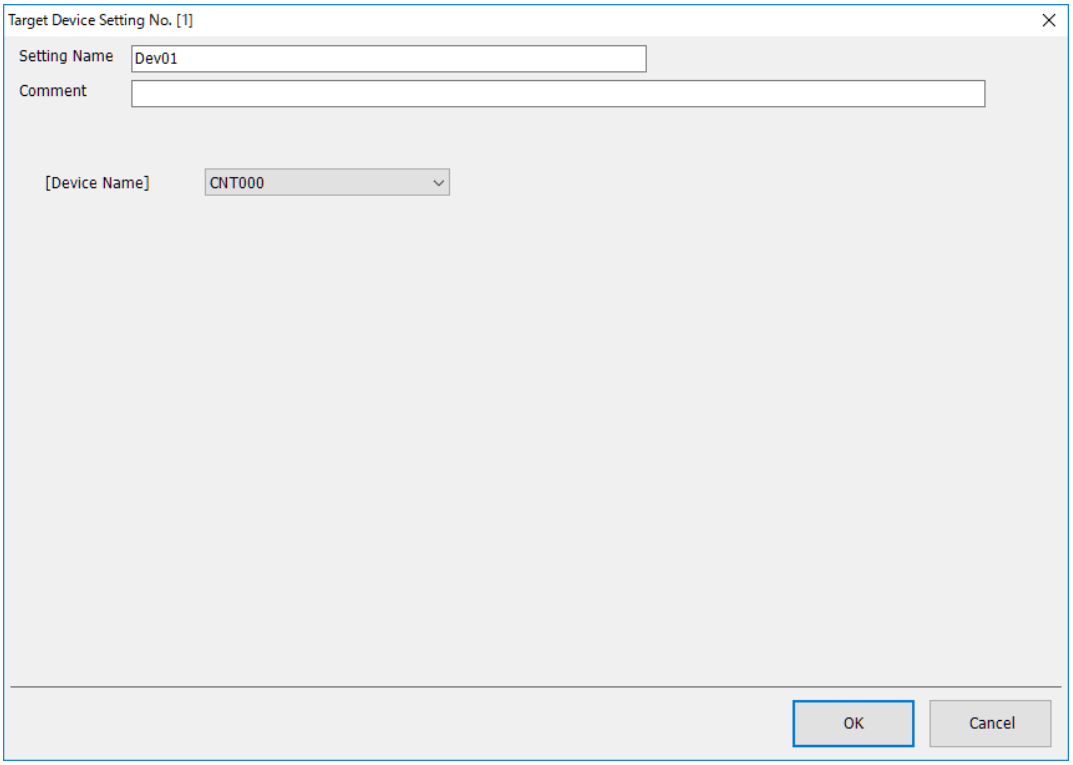
2.About Data Collector

The data collector settings are described here.

1. Parameter Setting

◆ Communication Parameters

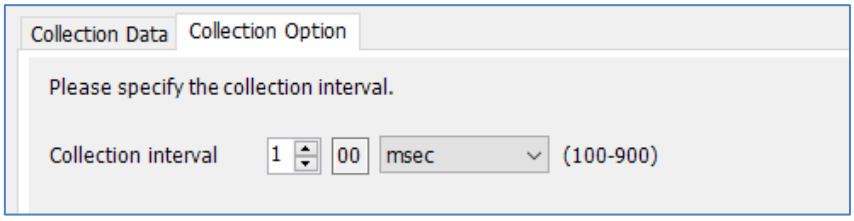
Select and set the device which is to be used with this Data Collector.



Setting Item	Description
Device Name	Select the device you want to use from the list of device names set in the driver.

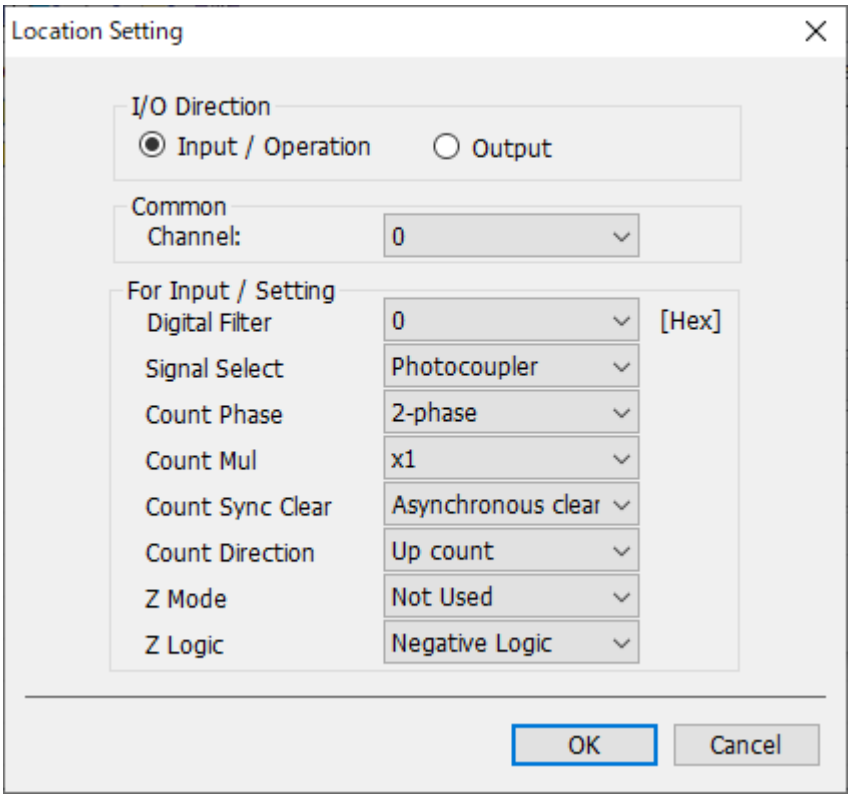
◆ Collection Parameters

Set the data collection interval.



◆ Location Parameters

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



Setting Item	Description
I/O Direction	To input the count value and start/stop counting, select [Input / Operation]. To preset the count value, select [Output]. If only one of them can be used depending on the function you are using, the setting value is fixed.
Channel	Select the target channel.
Digital Filter	Select the digital filter value by coefficient.
Signal Select	Select the external signal source. [TTL / Photocoupler / Differential] *1
Count Phase	Select the number of phases. [1-phase(Mono-phase) / 2-phase / Gate control]
Count Mul	Select the multiplier. [x1(1X) / x2(2X) / x4(4X)]
Count Sync Clear	Select Synchronous clear/Asynchronous clear. [Asynchronous clear / Synchronous clear]
Count Direction	Select the count direction. [Up count / Down count]
Z Mode	Select the Z-phase mode. [Not Used / Next One Time / Every Time]
Z Logic	Select the Z-phase logic. [Positive Logic / Negative Logic]

*1 The choices you can make depend on the functions installed in your device

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]
CntInit()

[Driver API error]
10000: The devicename which wasn't registered by a device manager or a setup-tool 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	Normality completion
1	Failed in the acquisition of the resource. The used Device was not registered in the device manager normally, please make sure about that.
2	Failed in the registration of the interruption routine. The IRQ duplicates with another device, please make sure about that.
3	Failed in the allocation of the memory. Please extend the memory.
4	Failed in the access of registry. Please make sure if the property pages can be set. When this error occurred, please reinstall the device.
7	Execute the function CntResetDevice to return from the standby mode.
8	Because the ccnt.sys file is not found, it is not possible to initialize it.
9	Because the version information on the ccnt.dll file cannot be retrieved, it is not possible to initialize it.
10	Because the version information on the ccnt.sys file cannot be retrieved, it is not possible to initialize it.
11	Because the version information of ccnt.dll is not corresponding to the version information of ccnt.sys, it is not possible to initialize it.
10000	The device name which wasn't registered by a device manager was specified. Please make sure about the settings of property pages.
10001	Invalid ID was specified. Please make sure if the initialization function could complete normally. And make sure about the scope of variable containing ID.
10002	CNT driver can't be called (Failed in the device I/O control). Please make sure if the initialization function could complete normally. And make sure about the scope of variable containing ID.
10003	Failed in the creation of the file (Failed in CreateFile). Please use the device manager to make sure if the device driver could activate normally. When the device driver cannot activate normally, please delete the device and reinstall it.
10004	Failed in the closing of the file (Failed in CloseFile). It is possible that you have executed the exit processing of the device which wasn't initialized. Even if the error is ignored, you needn't to mind it.
10005	Failed in the creation of the thread (Failed in CreateThread). This error would hardly occur. If this error occurred, please make sure about the number of threads activated by the application.
10050	The specified device name is not found. Please check spelling. Please make sure of the device name used in the application and the device name set in the device manager.
10051	No more device. Please make sure that the device was registered in the device manager.
10052	Information type is invalid. Error occurred in the information acquisition functions. Please make sure about the parameters.

Value [Dec]	Description
10100	Invalid mode setting. Please set mode to the defined value.
10101	Invalid data buffer address. The buffer address is NULL(0). Please make sure of the application's source code.
10200	Window handle is invalid. Error occurred in the message notice function. It is possible that the window handle is not valid when the function is executing. adjust the timing for function calling.
20000	It failed in memory allocation for the object preparation. This error would hardly occur. If this error occurred, please extend the memory.
20001	This function can't be used by this device.
20002	Cannot use while by another device works. When the device is accessing in background and a foreground processing is executed, the error occurs.
20003	Cannot use because another process is using the device. Please make sure of the restrictions when using multiple processes. For the USB device, when executing count match function, only one process could be executed. When the same device is accessed from the multiple processes, the count match function couldn't be used.
20020	The final data packet received from the endpoint have CRC error.
20021	The final data packet received from the endpoint have infract of bit stuff error.
20022	The final data packet received from the endpoint mismatch with the expected data toggle packet.
20023	The STALL packet id returned from the endpoint.
20024	The device is marked with unresponsive token (IN). Or it cannot support handshake.
20025	The device is marked with unresponsive token (IN). Or it cannot support handshake.
20026	Received packet id is invalid or undefined.
20027	The size of the data returned from the endpoint is over the permitted maximum length of data packet or buffer remain.
20028	The size of the data returned from the endpoint is not up to the expectation.
20029	When doing IN transfer, the specified buffer is too small to store all the data received from the device.
20030	When doing OUT transfer, the specified buffer cannot store all the data transferred to the device.
20031	The status of the endpoint is STALL, transfer failed.
20032	The device information is not found.
20033	The access to hardware was refused.
20034	The specified handle is invalid.
20100	Invalid mode setting. The selected mode on the specified device is can't be used. Please refer to the device's manual.
20201	Channel number is out of range. Please make sure about the channel number.
20202	Number of channels is out of range. Please make sure about the number of channels.

Value [Dec]	Description
20203	Counter value is out of range.
20204	Compare register number is out of range.
20300	Timer value is out of range.
20301	The output logic of the control output signal is out of range.
20302	The kind of hardware event is out of range.
20303	The coefficient of one-shot pulse width is out of range.
20304	The input logic of control input signal is out of range.
20305	The output data is out of range.
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.
Others	Spare error code not currently in use.

Appendix

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

1.Glossary

◆ A-phase/B-phase/Z-phase

A-phase, B-phase and Z-phase refer respectively to counter board input signals.

A-phase and B-phase are the names of signals counted on the counter board.

The counter board counts these signals in terms of rising and falling, and the mode setting determines which change in the signal is counted.

Z-phase is the signal that clears the count value to zero.

◆ Digital Filter

The digital filter is a function that does not count the counter input signal when it changes in a little time.

It works to prevent the counter from malfunctioning due to noise etc.

For more information about this function, please refer to the manual of your device.

◆ Mono-phase/2-phase/Gate Control

Mono-phase/2-phase/Gate control indicates the usage of the signals of A-phase and B-phase.

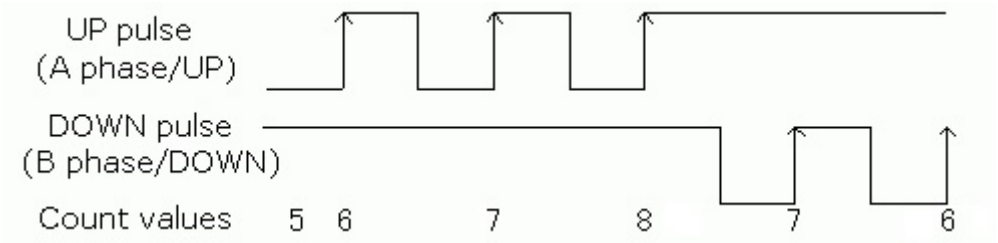
It's necessary to set the software by the usage of the following input signals.

Mono-phase

A-phase is UP pulse, B-phase is DOWN pulse. It's the using mode that the system counts UP and counts DOWN at the rising edge of the two signals.

During mono-phase input, only 1X is valid.

If UP pulse and DOWN pulse occur at the same time, or if the both pulses change to LOW, it can't be count normally.

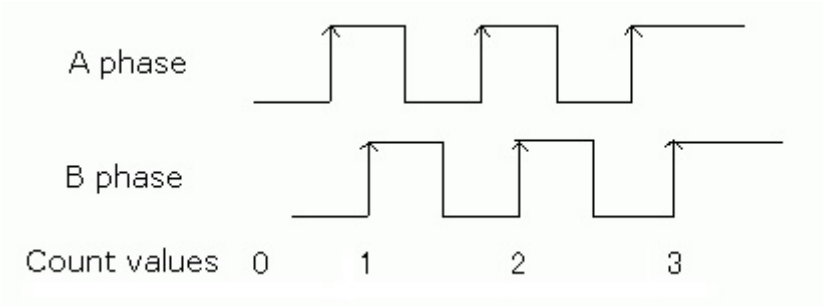


The settings of count direction determine whether A-phase is UP or B-phase is UP.

The figure illustrates the case of DIR=1 (CW direction).

2-phase

It's the using mode of two pulses input, A-phase (fast signal) and B-phase (slow signal), which differ in phase by 90º. During 2-phase input, 1X/2X/4X is valid.



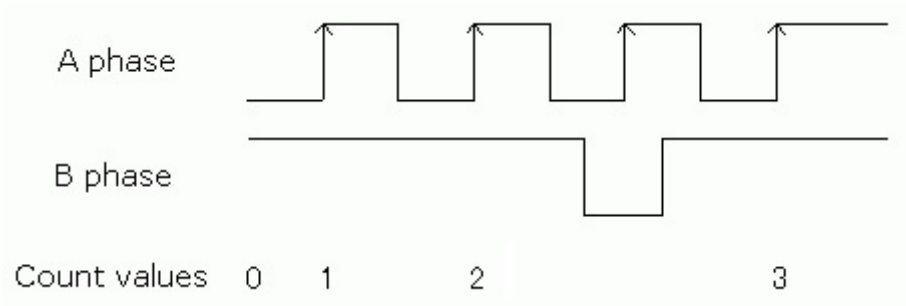
The settings of count direction determine to UP count or DOWN count at the rising edge of A-phase. The figure illustrates the case of DIR=1 (CW direction).

Gate Control

Mono-phase input with gate control.

Counts with A-phase, B-phase is regarded as gate signal. When B-phase is being LOW, the rising edge of A-phase is not counted.

During mono-phase input with gate control, 1X/2X is valid.



The settings of count direction determine to UP count or DOWN count at the rising edge of A-phase. The figure illustrates the case of DIR=1 (CW direction).

◆ Multiplier

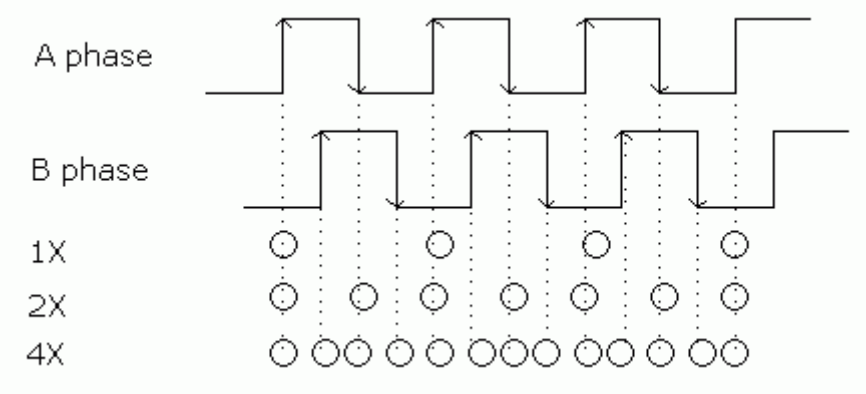
By setting the count input multiplier to 2X or 4X, more detailed control can be effected.

Mono-phase input

There is only 1X.

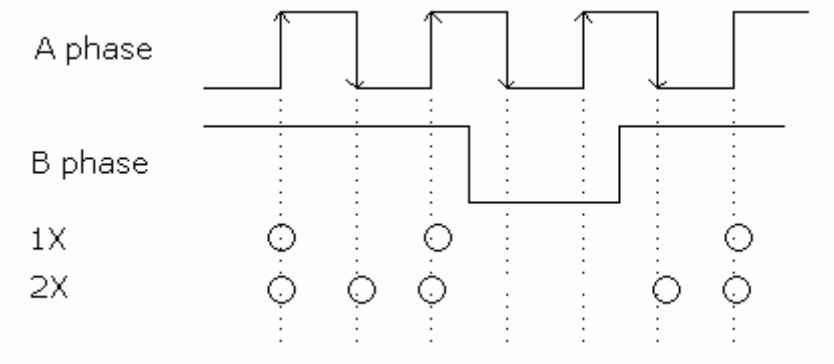
2-phase input

The O signal in the following figure are counted.



Mono-phase input with gate control

The O signal in the following figure are counted.



◆ Synchronous Clear/Asynchronous Clear

Synchronous clear/ Asynchronous clear is the usage of Z-phase.

The difference is whether to consider the state of A-phase and B-phase or to perform only by changing the Z-phase as the timing to clear the counter to zero.

Synchronous clear exists only when the mode is 2-phase.

Asynchronous clear is the clear method when the mode is 2-phase, mono-phase or gate control.

Synchronous clear

Synchronous clear is, which the counter is zero-cleared when A-phase rises with B-phase being LOW and Z-phase being valid.

When the logic of Z-phase is set to Positive Logic, it is cleared with Z-phase being HIGH. When the logic of Z-phase is set to Negative Logic, it is cleared with Z-phase being Low.

Asynchronous clear

Asynchronous is, which the counter is zero-cleared when Z-phase becomes valid, irrespective of the state of A-phase or B-phase.

When the logic of Z-phase is set to Positive Logic, it is cleared at the rising edge of the Z-phase. When the logic of Z-phase is set to Negative Logic, it is cleared at the falling edge of the Z-phase.

◆ Preset

The operation of setting an arbitrary value to the counter is called preset or load preset value.

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.

3.Open Source Software

This software consists of multiple software components. Each of them is copyrighted by this company and/or third parties.

This software contains the following open source software.
Software copyrighted by third parties and distributed as free software
In addition, source codes are not distributed for the software that this company and/or third parties have copyrights to.
Please refrain from inquiring about the source codes of this open source.

1. RapidJSON

This product uses RapidJSON licensed under the MIT License.
The copyright and permission notices of RapidJSON are described below.
Tencent is pleased to support the open source community by making RapidJSON available.

Copyright (C) 2015 THL A29 Limited, a Tencent company, and Milo Yip. All rights reserved.
If you have downloaded a copy of the RapidJSON binary from Tencent, please note that the RapidJSON binary is licensed under the MIT License.
If you have downloaded a copy of the RapidJSON source code from Tencent, please note that RapidJSON source code is licensed under the MIT License, except for the third-party components listed below which are subject to different license terms. Your integration of RapidJSON into your own projects may require compliance with the MIT License, as well as the other licenses applicable to the third-party components included within RapidJSON. To avoid the problematic JSON license in your own projects, it's sufficient to exclude the bin/jsonchecker/ directory, as it's the only code under the JSON license.
A copy of the MIT License is included in this file.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A

PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

2. msinttypes

This product uses msinttypes licensed under the BSD License.

The copyright and permission notices of msinttypes are described below.

The msinttypes r29

Copyright (c) 2006-2013 Alexander Chemeris

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

* Neither the name of copyright holder nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS AND CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

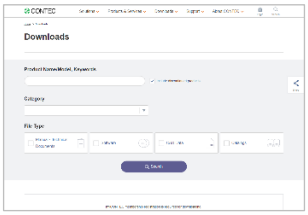
Customer Support and Inquiry

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
January 2021	The First Edition

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

https://www.contec.com/

CONTEC Data Collector for Counter Reference Manual

NA07923 (LYZC771) [01152021] January 2021 Edition