

Handling Precautions

Remote I/O RT series

EtherCAT compatible device unit RT-XTECN00N

Thank you for purchasing CKD product.
Please review the precautions in this Handling Precautions thoroughly for safe operation of this product.
Incorrect usage may result in malfunction and dangers.
Keep this Precautions in a safe and convenient place for future reference.
For further information, refer to the instruction manual and product catalog.

Refer to the Handling Precautions of End unit for assembling and installing devices, and the Handling Precautions of Power supply unit for wiring power supply.

CAUTION

- Thoroughly read and understand the instruction manual for the industrial network communication system used before using the device unit.
- If using a variable I/O unit, set the size of the PDO on the upper MDevice side in accordance with the size of the external device connected (to the variable I/O unit), even when the MDP matching results are consistent. If using a variable I/O unit, set the size of the PDO on the upper MDevice side in accordance with the size of the external device connected (to the variable I/O unit), even when the MDP matching results are consistent.
- Do not leave the USB port open.
- Fully understand the contents of other units connected to the product before use.
- For details on the entire remote IO system including the product, refer to the "Remote I/O RT Series Instruction Manual: System Construction".
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Accessories	QR label, tie rod (2 pieces)
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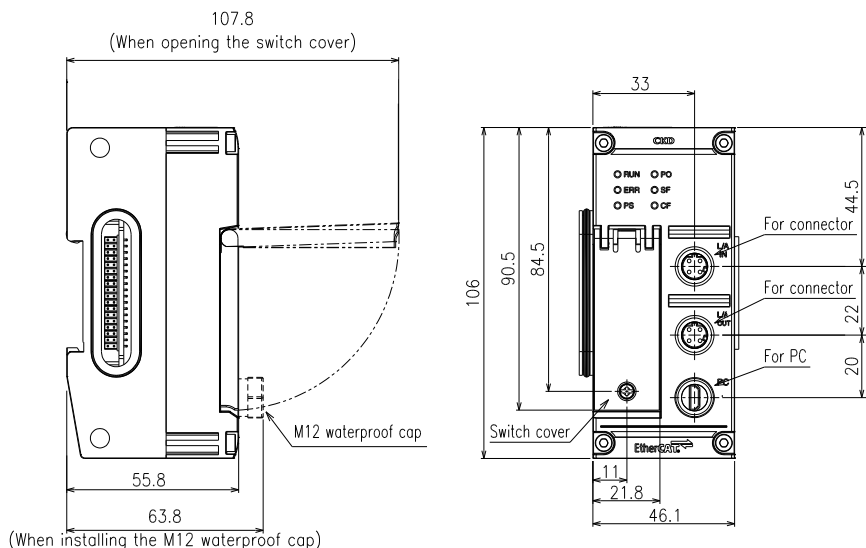
1 Specifications

Always use the product within its specifications.

Item	Specifications
Model No.	RT-XTECN00N
Size (W x H x D)	mm 46.1×106×55.8
Net weight	g Approx. 230
Degree of protection	IP65 / IP67 (when connected) ^{Note 1}
Working temperature range	°C -10 to +55
Relative humidity	%RH 30 to 85
Ambient atmosphere	No corrosive gases or heavy dust
Installation location	Indoor use
Altitude	m Up to 2000
Pollution degree	3
Network communication	EtherCAT® DC mode compatible: Use up to 513 bytes
Network connector	M12 (D) 4pin female x 2
Maximum number of points	Up to 4096 points (512 bytes) for input and output combined
Internal current consumption (For Unit/input)	mA 100 or less
Internal current consumption (for output)	mA 20 or less
LED	For indicating device and communication status / 8 pieces
Number of I/O units that can be connected	units 17
Unit automatic recognition	Type / order recognition and monitoring
PC software	Connect to PC via USB
Data synchronization interval between	ms Approx. 0.5 (minimum)

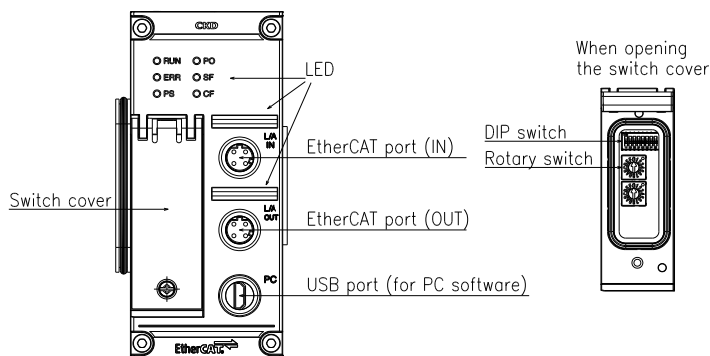
Note 1 IP65/IP67 is not part of the UL certification.

2 External dimensions



Dimensional unit: mm

3 Names and functions of each part



Name	Function
LED	Eight LEDs indicate the status of communication and system.
Switch cover	A cover protects the switch inside the unit. Tighten the screw to the specified torque (0.10 ± 0.02 N/m) after setting the switches.
EtherCAT port (IN/OUT)	A port input from EtherCAT MDevice or another SubDevice. Or a port output from the product to another SubDevice.
USB port	A port connects to RTXTools, a PC software dedicated to the RT series. Download the software from CKD website (https://www.ckd.co.jp/kiki/jp/). (Free of charge)
Dip switches	Set the operation of the product and the remote I/O system.
Rotary switches	Set the node address of the product as an EtherCAT SubDevice.

4 LED indicators and Switch settings

4.1 LED indicators

These LEDs indicate the status of the product and network.

Name	Status	Meaning
RUN	OFF	Initializing
	Green blinking (fast)	Power is on but not in the initialization sequence.
	Green blinking (slow)	Pre-operational
	Green blinking (once)	Safe operational
	Green on	Operational
ERR	OFF	Normal condition
	Red blinking (slow)	Setting error (including MDP matching error, PDO size error)
	Red blinking (once)	Status changed by SubDevice
	Red blinking (twice)	Communication error (application watchdog timeout)
L/A IN L/A OUT	Green blinking (fast)	Link, Activity
	Green on	Link, No activity
	OFF	No link, No activity
PS	Red blinking (fast)	Unit/input voltage is outside the range of $24\text{ V} \pm 25\%$.
	Yellow on	Unit/input voltage restored from voltage error.
	Green on	Unit/input voltage is normal
	OFF	Power OFF status
PO	Red blinking (fast)	Output voltage is outside the range of $24\text{ V} \pm 25\%$.
	Yellow on	Output voltage restored from voltage error.
	Green on	Output voltage is normal.
	OFF	Power OFF status
SF	Red blinking (fast)	Internal bus communication error
	Red blinking (slow)	Hardware error
	Red blinking (twice)	Factory setting error
	Yellow on	Operation waiting
	Yellow blinking (fast)	Unit configuration error
	Green blinking (fast)	Start with initialized set memory status.
	Green blinking (slow)	Process data overflow
	Green on	Normal condition
	OFF	Power OFF status
CF	Yellow on	Force I/O setting present
	Green blinking (slow)	Access from a PC possible
	OFF	Power OFF status or no access status

4.2 Switch settings

Conduct the operation settings of remote I/O system including the product and the node address settings as an EtherCAT SubDevice. The setting is read at power-up. Refer to the following table for the settings of each switch.



DIP switch



Rotary switch

Upper digit (x16)

Lower digit (x1)

Dip switch settings

No.	Name	Settings	Setting range
1	Reserved	Not used	OFF
2	Reserved	Not used	OFF
3	Output settings in the event of a communication error/ priority to hardware	Selects whether the operation of all connected I/O units is specified at once by using No.4 or individually by unit. OFF: Set individually by unit (factory setting) ON: Specified all units at once (specified by Dip switch 4)	ON/OFF
4	HOLD/CLEAR	Selects the output operation (Note 2) in the event of a communication error (Note 1). OFF: CLEARED (Refer to the instruction manual of each unit for details. Factory setting) ON: HELD at the last value Note 1: Refers to a communication error of industrial network or internal bus. Note 2: For units with output function.	ON/OFF
5	Parameter initialization at startup	Restores all the units to the factory setting. OFF: Does not initialize (factory setting) ON: All units will be restored to the factory setting.	ON/OFF
6	Reserved	Not used	OFF
7	Reserved	Not used	OFF
8	Remote I/O system diagnostic information ON/OFF	OFF: Does not add diagnostic information (factory setting) ON: Diagnostic information for the entire remote I/O system is added to the data transmitted to the MDevice via PDO communication.	ON/OFF

Rotary switch settings

Name	Settings	Setting range
×16	Set the node address as an EtherCAT SubDevice. Set with x1 and x16 switches. 0x00: Set the node address of the product on the upper MDevice side	0x0 to 0xF
×1	0x01 to 0xFF: Set the node address on the product side Factory setting: 0x00	0x0 to 0xF

CAUTION

- Make sure to set the switches with the power off.
- Keep the cover closed and tighten the screw to the specified torque, except when setting the switches.
- Be careful not to allow any foreign object to get inside when setting the switches.
- Be careful when changing the settings, as the setting switch may be damaged.
- Never touch the internal circuit board other than switch when setting the switches.

5 Wiring

Function description and connection of the terminals are as following.

CAUTION

- An electric shock may occur by touching the electrical wiring connection (bare live part). Make sure to power off before wiring. Also, do not touch the live parts with bare hands.
- Do not apply tension or impact to the network cable. Long cables can exert unexpected momentum and impact due to its weight, and this can consequently damage the connectors and devices. Take appropriate measures such as secure the wiring to the machine or device midway.
- Do not wire the network cable and the power line in parallel to prevent problems caused by noise.
- Discharge static electricity that has built up on your body by touching a grounded metal object before handling the device. Static electricity may cause damage to the product.

5.1 Communication distance and wiring

Although the product accepts a standard Ethernet cable and supports flexible wiring methods, there are limits depending on the wiring material, devices, MDevice, hub etc. Make sure to understand these specifications before wiring. (For details, refer to the instruction manual of the MDevice manufacturer or ETG.)

5.2 Unit/input power supply and output power supply

The power supply from the power supply unit (RT-XP24A01N) operates the product. The power supply unit that supplies power to the product needs to be located on the left side of the product. For details, refer to the "Remote I/O RT Series Instruction Manual: System Construction".

5.3 Connecting and wiring to EtherCAT port (M12 connector)

The network plug is not supplied with the product. Separately purchase a network plug that satisfies the specifications. Wiring the network cable to the network plug enables the plug to connect to the network connector socket on the product.

Refer to the following network connector pin arrangement and wiring example of network cable for the wiring. Use a network cable of CAT5 or higher.

Recommended network cable with connector M12-RJ45

- XS5W-T421-□MC-K (M12 straight)
- 0945 700 50□□ (M12 straight)

Mfd by Omron Corporation
Mfd by HARTING K.K.

Recommended network plug and network cable

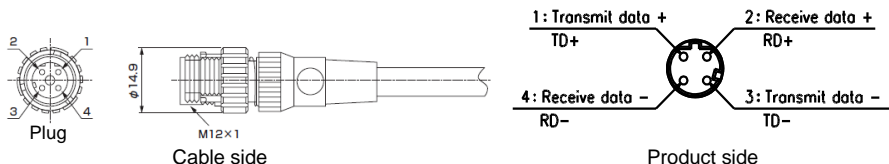
- 0945 600 01□□ (cable only)
- 2103 281 1405 (assembly type M12 connector)
- 0945 151 1100 (assembly type RJ-45 connector)

Mfd by HARTING K.K.
Mfd by HARTING K.K.
Mfd by HARTING K.K.

Follow the steps below to connect the network cable to the network plug.

<Network cable>

- (1) After confirming safety, stop network communication and turn off all peripheral equipment.
- (2) Refer to the figure below and connect the EtherCAT compliant cable to M12 connector.



Port	Pin	Signal	Function
IN / OUT	1	TD+	Transmission data, plus
	2	RD+	Reception data, plus
	3	TD-	Transmission data, minus
	4	RD-	Reception data, minus

! CAUTION

- Use a dedicated network cable that complies with EtherCAT specifications.
- Provide sufficient bending radius for the network cable and do not bend it forcibly.

6 Maintenance

Refer to the "Remote I/O RT Series Instruction Manual: System Construction" for installing and removing the product(device).

CAUTION

- Do not remove the device by pulling cable or connector that may cause cable disconnection or damage.
- Touching the electrical wiring (bare live part) or the connector connected between units may cause an electric shock or malfunction.
- Do not install the unit with dirt or dust on the unit opening, gasket, O-ring, etc.

7 Setting by ESI file

In order for an EtherCAT SubDevice to participate in a network, registering to the EtherCAT aster is necessary using the ESI file containing the device's communication specifications. For the registration, refer to the instruction manual of EtherCAT MDevice. Use the latest ESI file for proper network configuration.

7.1 Registering the device

The registration procedure may differ depending on the type, number of connected units, and diagnostic information ON/OFF.

Check the connected units and Dip switch settings before starting work.

Settings in the EtherCAT MDevice may be necessary when using the MDP matching function (function to match the type and order of units). Refer to the instruction manual of EtherCAT MDevice and the product for details.

7.2 When a variable I/O unit is connected

If the product is connected to a variable I/O unit, it is necessary to set the size of the PDO on the EtherCAT MDevice in accordance with the size of the external device connected (to the variable I/O unit), even when the MDP matching results are consistent. The target unit is the IO-Link master unit. Refer to the instruction manual of EtherCAT MDevice and the product for details.

7.3 Input mapping

The input of each unit is placed as follows: Index XX contain the unit position (00 to 11).

The product

Index	Sub-index	Data name	Description
0x6XX0	0	Diagnostic information	Number of diagnostic information entries
	1	Unit input error	Unit input error
	2	Unit output error	Unit output error
	3	Reserve	Reserved
	4	Power failure	Power failure
	5	Reserve	Reserved
	6	Operation waiting	Operation waiting
	7	Hardware abnormal	Hardware error
	8	System error	System error

Analog input unit

Index	Sub-index	Data name	Description
0x6XX0	0	Analog input	Number of analog input entries
	1	Channel 0	Analog input CH0
	2	Channel 1	Analog input CH1

Digital input unit (M 8 x 8 type / M 12 x 8 type / Push-in terminal block type)

Index	Sub-index	Data name	Description
0x6XX0	0	Digital input	Number of digital input entries
	1 to N	Point (N-1)	Digital input Point (N-1)

Note: N=8 for M8x8 type, N=16 for M12x8 type and N=32 for Push-in terminal block type.

IO-Link master unit (input)

Index	Sub-index	Data name	Description
0x6XX0	0	IO-Link Digital input 1	Number of digital input 1 entries
	1 to 8	Port 0 to 7 Digital IN 1	Port 0-7 Digital input 1
0x6XX1	0	IO-Link Digital input 2	Number of digital input 2 entries
	1 to 8	Port 0 to 7 Digital IN 2	Port 0-7 Digital input 2
0x6XX2	0	IO-Link Port error flag	Number of port error flag entries
	1 to 8	Port 0 to 7 Error flag	Port 0-7 Port error flag
0x6XX3	0	IO-Link COMM error flag	Number of IO-Link error flag entries
	1 to 8	Port 0 to 7 COMM error flag	Port 0-7 IO-Link error flag
0x6XX4	0	IO-Link Error log update flag	Number of error log update flag entries
	1 to 8	Port 0-7 Error log update flag	Port 0 to 7 Error log update flag
0x6XX5	0	IO-Link Input data enable flag	Number of IO-Link input data enable flag entries
	1 to 8	Port 0-7 Input data enable flag	Port 0 to 7 enable flag
0x6XX6	0	Port 0 IO-Link input data	Port 0 Number of input byte entries
	1 to 32	Port 0 byte 0 to 31 input data	Port 0 Input byte 0 to 31
0x6XX7	0	Port 1 IO-Link input data	Port 1 Number of input byte entries
	1 to 32	Port 1 byte 0 to 31 input data	Port 1 Input byte 0 to 31
0x6XX8	0	Port 2 IO-Link input data	Port 2 Number of input byte entries
	1 to 32	Port 2 byte 0 to 31 input data	Port 2 Input byte 0 to 31
0x6XX9	0	Port 3 IO-Link input data	Port 3 Number of input byte entries
	1 to 32	Port 3 byte 0 to 31 input data	Port 3 Input byte 0 to 31
0x6XXA	0	Port 4 IO-Link input data	Port 4 Number of input byte entries
	1 to 32	Port 4 byte 0 to 31 input data	Port 4 Input byte 0 to 31
0x6XXB	0	Port 5 IO-Link input data	Port 5 Number of input byte entries
	1 to 32	Port 5 byte 0 to 31 input data	Port 5 Input byte 0 to 31
0x6XXC	0	Port 6 IO-Link input data	Port 6 Number of input byte entries
	1 to 32	Port 6 byte 0 to 31 input data	Port 6 Input byte 0 to 31
0x6XXD	0	Port 7 IO-Link input data	Port 7 Number of input byte entries
	1 to 32	Port 7 byte 0 to 31 input data	Port 7 Input byte 0 to 31

7.4 Output mapping

The output of each unit is placed as follows: Index XX contain the unit position (00 to 11).

Analog output unit

Index	Sub-index	Data name	Description
0x7XX0	0	Analog output	Number of analog output entries
	1	Channel 0	Analog output CH0
	2	Channel 1	Analog output CH1

Digital output unit (M 12 x 8 type / Push-in terminal block type)

Index	Sub-index	Data name	Description
0x7XX0	0	Digital output	Number of digital output entries
	1 to N	Point (N-1)	Digital output Point (N-1)

Note: N=16 for M12x8 type and N=32 for Push-in terminal block type.

Valve I/F unit (32 points)

Index	Sub-index	Data name	Description
0x7XX0	0	Valve output	Number of valve output entries
	1 to 32	Point (N-1)	Valve output CH (N-1)

IO-Link master unit (output)

Index	Sub-index	Data name	Description
0x7XX0	0	IO-Link Digital output 1	Number of digital output 1 entries
	1 to 8	Port 0 to 7 Digital OUT 1	Port 0 to 7 Digital output 1
0x7XX1	0	IO-Link Event clear flag	Number of error log clear flag entries
	1 to 8	Port 0 to 7 Event clear flag	Port 0 to 7 Error log clear flag
0x7XX2	0	Port 0 IO-Link output data	Port 0 number of output entries
	1 to 32	Port 0 byte 0 to 31 output data	Port 0 output byte 0 to 31
0x7XX3	0	Port 1 IO-Link output data	Port 1 number of output entries
	1 to 32	Port 1 byte 0 to 31 output data	Port 1 output byte 0 to 31
0x7XX4	0	Port 2 IO-Link output data	Port 2 number of output entries
	1 to 32	Port 2 byte 0 to 31 output data	Port 2 output byte 0 to 31
0x7XX5	0	Port 3 IO-Link output data	Port 3 number of output entries
	1 to 32	Port 3 byte 0 to 31 output data	Port 3 output byte 0 to 31
0x7XX6	0	Port 4 IO-Link output data	Port 4 number of output entries
	1 to 32	Port 4 byte 0 to 31 output data	Port 4 output byte 0 to 31
0x7XX7	0	Port 5 IO-Link output data	Port 5 number of output entries
	1 to 32	Port 5 byte 0 to 31 output data	Port 5 output byte 0 to 31
0x7XX8	0	Port 6 IO-Link output data	Port 6 number of output entries
	1 to 32	Port 6 byte 0 to 31 output data	Port 6 output byte 0 to 31
0x7XX9	0	Port 7 IO-Link output data	Port 7 number of output entries
	1 to 32	Port 7 byte 0 to 31 output data	Port 7 output byte 0 to 31

PRECAUTIONS

- For the delay time, refer to the instruction manual for the EtherCAT MDevice.
Transmission delay as a system varies depending on the PLC scan time and other devices connected to the same network.
- Make sure that cables and connectors are securely connected before turning on the power.
- Do not disassemble, modify, or repair the product as that may cause failure or malfunction.
- Do not drop or apply excessive vibrations or shocks to the product as the part inside are made precisely.
- Do not attach or detach the connector while the power is ON as that may cause a failure or malfunction.
- Mold and rust may develop on the product if it is exposed to high humidity during transportation. Include moisture absorbers and tightly seal the package.

For inquiries regarding the product, please contact the following or the nearest sales office.

CKD Corporation

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Please check global distributors with our catalog or the website below.

<https://www.ckd.co.jp/en/>