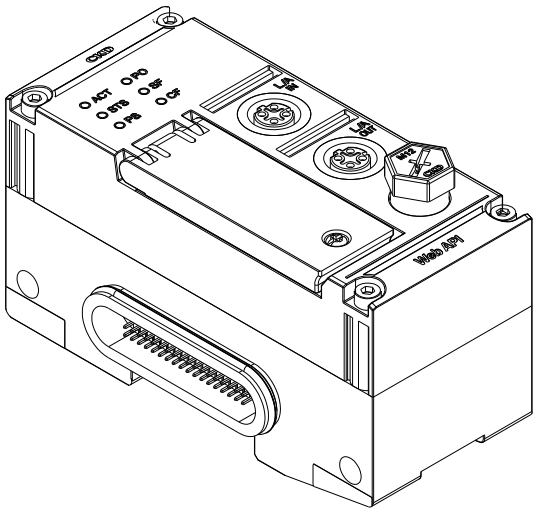
Remote I/O
RT series

WebAPI Compatible Device Unit

INSTRUCTION MANUAL

SM-A95119-A/2



- Read this Instruction Manual before using the product.
- Read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.

CKD Corporation

PREFACE

Thank you for purchasing CKD's “RT Series”. This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.
Keep this Instruction Manual in a safe place and be careful not to lose it.

Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

- This product is intended to be used by persons with sufficient knowledge and experience in the following areas.
  CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training with respect to them.
  - Electricity (qualified electrician or equivalent)
  - The industrial network communications used
  - FA systems in general
  - Each of the systems that use manifold solenoid valves, IO-Link, etc.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them.
  Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur. It is the responsibility of the customer to check the product specifications and decide how the product shall be used in accordance with the application and usage.

SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, make sure that the safety of the machine mechanism of the device, the pneumatic or water control circuit, and the electric system that controls such mechanism is ensured.

To ensure the safety of device design and control, observe organization standards, relevant laws and regulations, which include the following:

ISO4414, JIS B8370, JFPS2008 (the latest edition of each standard),
the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization standards relevant laws and regulations.

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.
Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this:

Thoroughly read and understand this Instruction Manual before using the product.

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER", "WARNING", and "CAUTION".

⚠ **DANGER**	Indicates an imminent hazard. Improper handling will cause death or serious injury to people.
⚠ **WARNING**	Indicates a potential hazard. Improper handling may cause death or serious injury to people.
⚠ **CAUTION**	Indicates a potential hazard. Improper handling may cause injury to people or damage to property.

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.
All precautions are equally important and must be observed.

Other general precautions and tips on using the product are indicated by the following icon.

	Indicates general precautions and tips on using the product.

Precautions on Product Use

⚠ DANGER

Do not use the product for the following applications.

- Medical devices involved in sustaining or managing people's lives or physical health.
- Mechanisms and mechanical devices used for the purpose of moving and transporting people
- Important safety parts for mechanical devices.

⚠ WARNING

The product must be handled by a qualified person who has extensive knowledge and experience.

The product is designed and manufactured as a device or part for general industrial machinery.

Use the product within the specifications.

The product must not be used beyond its specifications.

This product is intended for use in general industrial machinery, equipment or parts. It is not intended for use outdoors (except for products with outdoor specifications) or for use under the following conditions or environments.

- Use for applications where safety is required
- In applications for nuclear power, railroads systems, aviation, ships, vehicles, medical equipment
- In applications for equipment that directly touches beverages or food
- For safety measures for amusement equipment, emergency shut-off circuits, press machines, or brake circuits
- Use for applications where life or assets could be significantly affected, and applications where special safety measures are required

(An exception will be made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.)

Never modify or additionally machine this product.

These may cause failure or malfunction. In addition, they are not covered by our warranty.

Do not handle the product or remove pipes and devices until safety is confirmed.

The product may operate in an unexpected way, causing injury to people or damage to equipment.

- Inspect and service the machine and devices after confirming the safety of the entire system. Also, turn off the energy source (air supply or water supply) and power to the relevant facility. Release compressed air from the system and use extreme care to avoid water or electric leakage.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or removing pipes and devices.
- When starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

Observe the warnings and cautions on the following pages to prevent accidents.

⚠ CAUTION

Use the product in a specified manner.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

⚠ CAUTION

Do not use the product for transactions.
Do not use the product for commerce transactions because it does not comply with the Japanese Measurement Act and each country's laws and regulations equivalent to the Japanese Measurement Act.

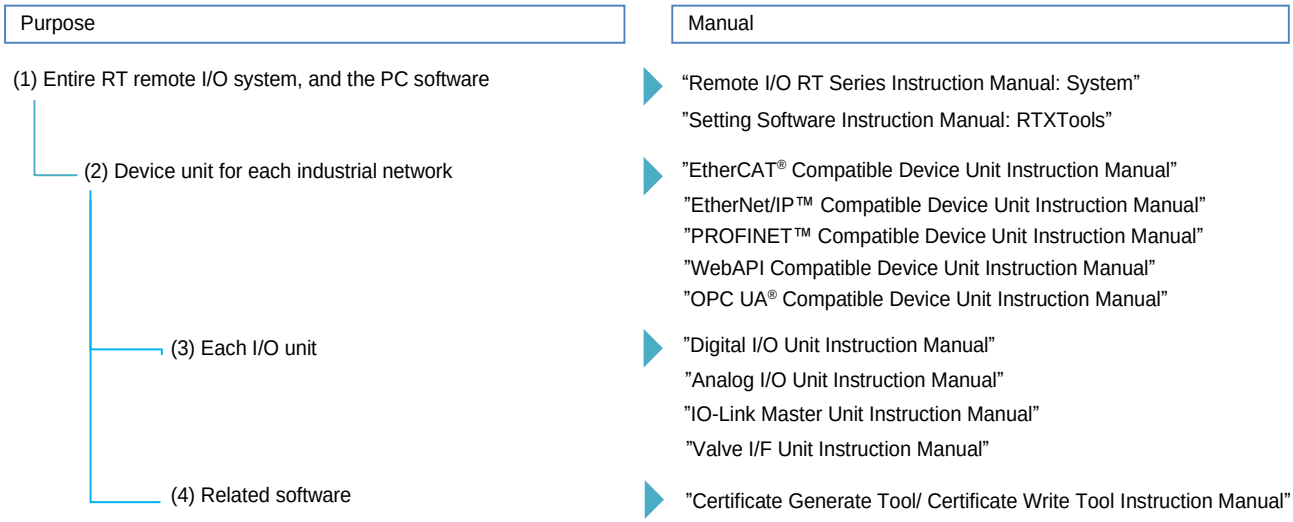
Do not use the product for precise measurements.
The product is designed as a device for general industrial machinery, so operating the product for precise measurements will not be guaranteed.
In addition, CKD cannot respond to calibration and other requests.

CONTENTS

INSTRUCTION MANUAL FOR THIS PRODUCT

The manuals related to the Remote I/O RT Series are separated by purpose as follows.
(1) Entire RT remote I/O system, and the PC software
(2) Device unit for each industrial network
(3) Each I/O unit

"Remote I/O RT Series Instruction Manual: System Construction" is mandatory. Other manuals are not mandatory but must be referred to according to the units used.



List of Related Instruction Manuals

Instruction Manual No.	Instruction Manual name	Description
SM-A46342-A	Remote I/O RT Series Instruction Manual: System Construction	Instruction manual for the entire remote I/O RT Series system. Includes explanations of the PC software RTXTools, the power supply unit RT-XP24A01N, and the End unit RT-XEE□N00N
SM-A90084-A	Setting Software Instruction Manual: RTXTools	Instruction manual for RTXTools: setting software for RT series.
SM-A46343-A	EtherCAT® Compatible Device unit Instruction Manual	Instruction manual for the EtherCAT compatible device unit RT-XTECN00N
SM-A71112-A	EtherNet/IP™ Compatible Device unit Instruction Manual	Instruction manual for the EtherNet/IP compatible device unit RT- XTENN00N
SM-A87934-A	PROFINET Compatible Device unit Instruction Manual (this manual)	Instruction manual for the PROFINET compatible device unit RT-XTEPN00N
SM-A95119-A	WebAPI Compatible Device Unit Instruction Manual	Instruction manual for the WebAPI compatible device unit RT-XTEAN00N
SM-B03355-A	OPC UA Compatible Device Unit Instruction Manual (this manual)	Instruction manual for the OPC UA compatible device unit RT-XTEUN00N
SM-A46344-A	IO-Link Master Unit Instruction Manual	Instruction manual for the IO-Link master unit RT-XLMSA08N
SM-A46345-A	Digital I/O Unit Instruction Manual	Instruction manual for the digital I/O unit RT-X□DG□□□□
SM-A46347-A	Analog I/O Unit Instruction Manual	Instruction Manual for the analog I/O unit RT-X □ AGA0 2N
SM-A46346-A	Valve I/F Unit Instruction Manual	Instruction manual for the valve I/F unit TVG□P-TB-□-KA1□
SM-B04196-A	Certificate Generate Tool/ Certificate Write Tool Instruction Manual	Instruction manual for “Certificate General Tool” and “Certificate Write Tool” for OPC UA

Always read the instruction manual for each product connected to the remote I/O RT Series.
The product types that can be connected are:
- Upper master units in each industrial network (connected to a device unit)
- IO-Link devices (connected to the IO-Link master unit)
- Manifold solenoid valves (connected to the Valve I/F unit)
- Other sensors/actuators (connected to a digital I/O unit, analog I/O unit, or IO-Link master unit)

A video is available to show how to assemble the units, install the software, and how the LEDs blink. If necessary, refer to the video at the following URL

RT product page:
https://www.ckd.co.jp/kiki/en/product/detail/1064

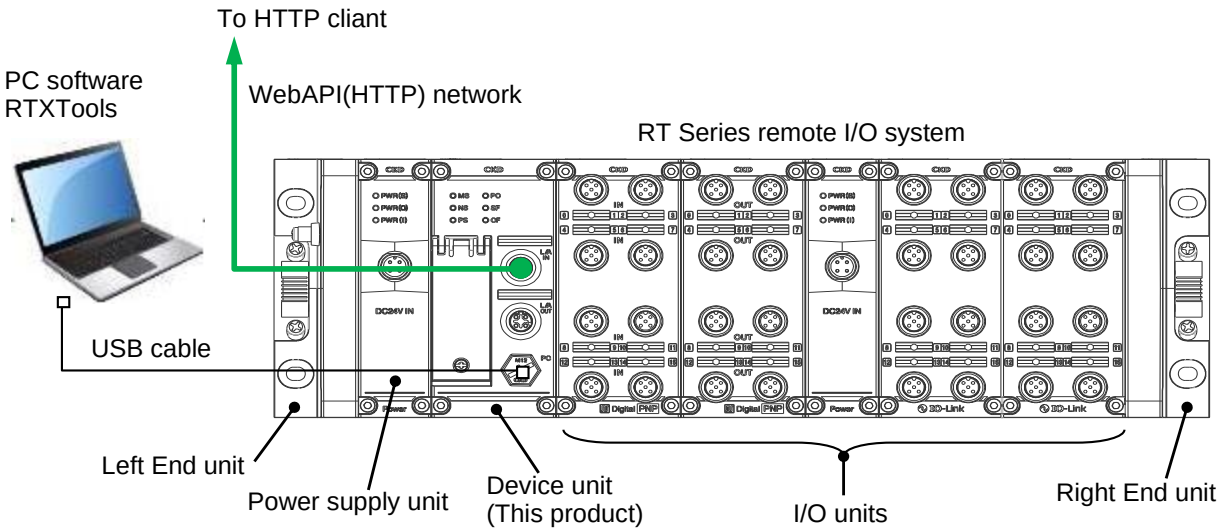
TERMS RELATED TO THE WEBAPI COMPATIBLE DEVICE UNIT

Term	Definition
REST	Representational State Transfer: A typical design concept for WebAPI
WebAPI	A mechanism that provides an interface for manipulating applications over HTTP communication.
LAN	Local Area Network A network constructed in a limited range such as an office.
V	A value or a set value that disappears when the power is turned off.
NV	A value or a set value that is retained even the power is turned off.
json	Format of a text as defined in RFC8259.

1. PRODUCT OVERVIEW

RT Series WebAPI compatible device unit is a device unit in the Remote I/O RT Series systems and compatible to WebAPI(HTTP) communication.
The device unit acts as an interface between the HTTP clients such as PC and each I/O units.

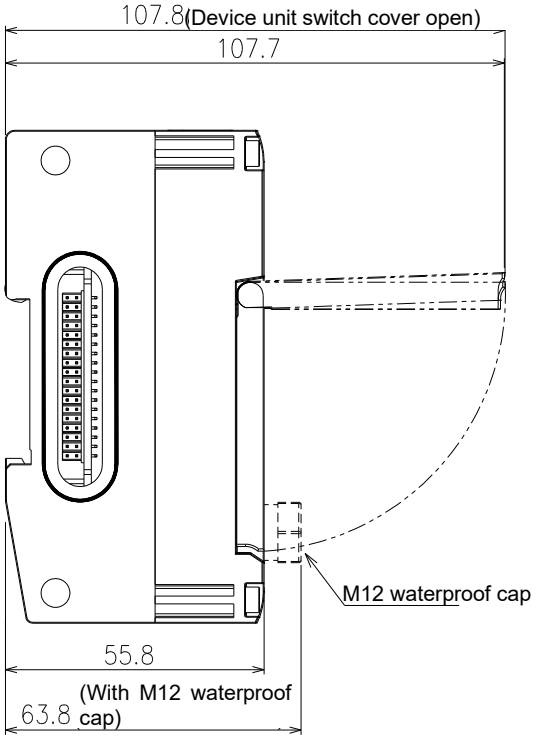
By connecting the PC software (free of charge) to the device unit via USB or LAN, it is possible to check the information and status of the entire Remote I/O RT Series system, as well as the settings/status of each unit.

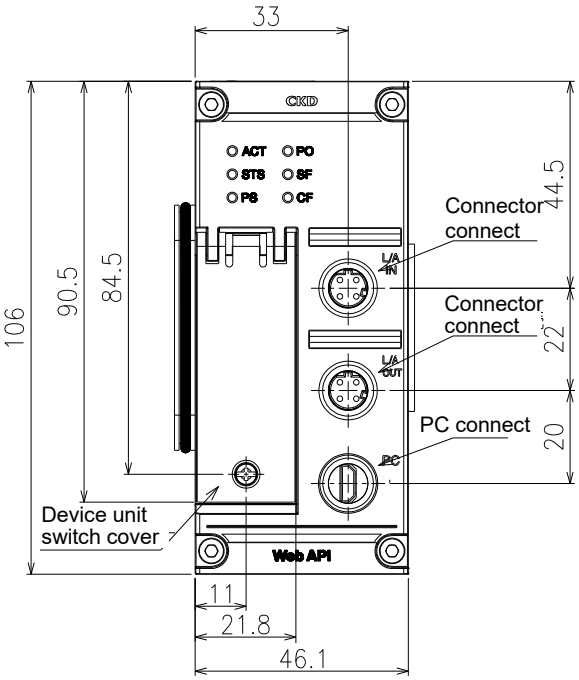


1.1 Features

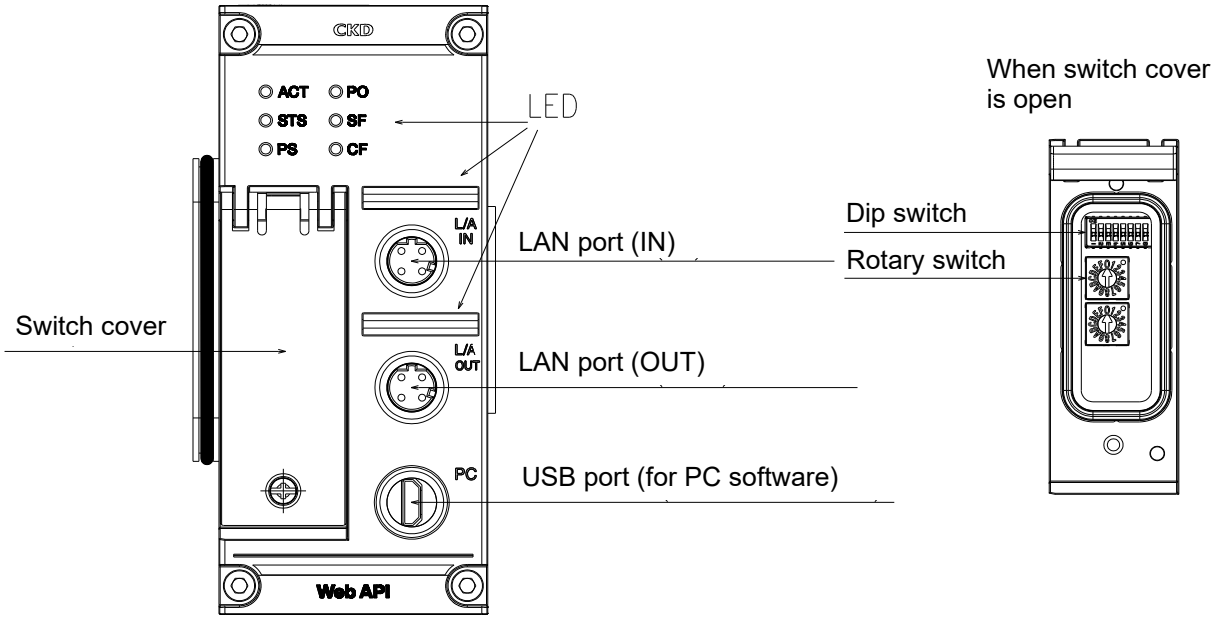
Features include:
- Supports REST format WebAPI. Data acquisition, setting and controlling each unit is possible by sending/receiving JSON data.
- Diagnostic information of the connected units can be transmitted.
- Monitors the status of the internal power supply from the power supply unit (from among the power supply units on the left side toward the device unit, the closest power supply unit to itself is monitored).
- The output operation in the event of a communication error can be specified for the entire Remote I/O system.
- The device unit can log its own or connected I/O units' errors to its own non-volatile memory. In addition, it is possible to use the PC software to save the time series data to a file.

1.2 External Dimensions





1.3 Names and Functions of Each Part



■ LED

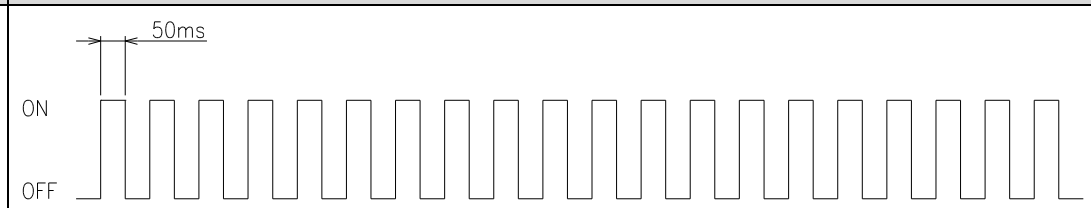
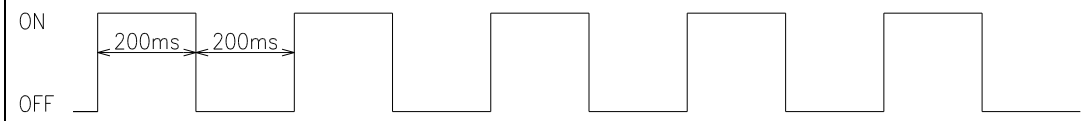
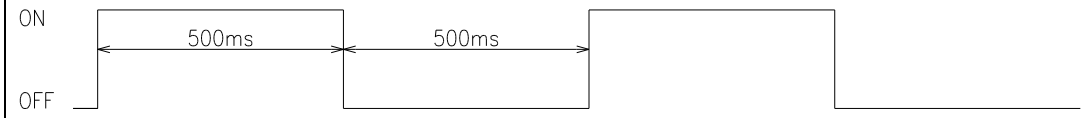
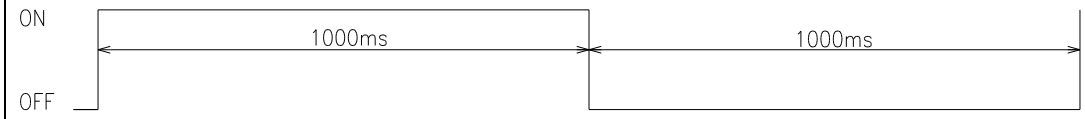
Specifications

LED	Indication
ACT	Indicates the access status to the WebAPI.
STS	Indicates the WebAPI response status
L/A IN	Indicates the link status on the IN side of the connector.
L/A OUT	Indicates the link status on the OUT side of the connector.
PS	Indicates the 24 V power status for the unit/input.
PO	Indicates the 24 V power status for the output.
SF	Indicates the status of the entire Remote I/O system.
CF	Indicates a setting change or forced input/output.

Status list

Part name	Status	Meaning
ACT	Green on	Normal operation. It has started up normally and is accessible. LED will be off if there is no access for more than 1 minute.
	Off	Power is off or not in operation Status when powered off or not accessed.
STS	Red on	WebAPI Error When the most recent WebAPI access returned something other than OK
	Green on	Normal operation. When the most recent WebAPI access returned OK.
	Off	Power off or no access When the power is off or when there has been no WebAPI access since startup
L/A IN	Green blinking (fast)	LINK、ACTIVITY
	Green on	LINK、NO ACTIVITY
	Off	NO LINK、NO ACTIVITY
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 V ± 25%
	Yellow on	Unit/input voltage restored from voltage error Note: Once it occurs, it will be latched. It must be reset by a power cycle operation or by using PC software.
	Green on	Unit/input voltage is in normal condition.
	Off	Power OFF status
PO	Red blinking (fast)	Output voltage is outside the range of 24 V ± 25%
	Yellow on	Output voltage restored from voltage error. Note: Once it occurs, it will be latched. It must be reset by a power cycle operation or by using PC software.
	Green on	Output voltage is in normal condition.
	Off	Power OFF status
SF	Red blinking (fast)	Internal bus communication error Note: Once it occurs, it will be latched. It must be reset by a power cycle operation or by using PC software.
	Red blinking (slow)	Hardware error
	Red blinking (twice)	Factory setting error (serial number of device unit)
	Yellow on	User operation waiting
	Yellow blinking (fast)	Unit configuration error
	Green blinking (fast)	Initialized set memory (starts in system reset status) Note: Once it occurs, it will be latched. It must be reset by a power cycle operation or by using PC software.
	Green blinking (slow)	Process data overflow
	Green on	Normal condition
	Off	Power OFF status
CF	Red blinking (slow)	WebAPI/PC concurrent access
	Yellow on	Being set to the forced I/O settings
	Green blinking (fast)	Being accessed to WebAPI
	Green blinking (slow)	Being accessed from PC
	Off	Power OFF status or no access status

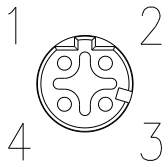
■ LED blinking statuses

Blinking status	Blinking timing
Blinking (fast)	
Blinking (slow)	
Blinking	
Blinking (1Hz)	

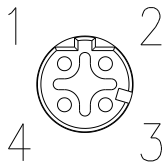
A video is available to show how the LEDs actually blink.
If necessary, refer to the video at the following URL.

RT product page:: https://www.ckd.co.jp/kiki/en/product/detail/1064

■ LAN port (IN)

M12(A) 4-pin female	Pin number	Description
	1	Transmission data, plus (TD+)
	2	Reception data, plus (RD+)
	3	Transmission data, minus (TD-)
	4	Reception data, minus (RD-)

■ LAN port (OUT)

M12(A) 4-pin female	Pin number	Description
	1	Transmission data, plus (TD+)
	2	Reception data, plus (RD+)
	3	Transmission data, minus (TD-)
	4	Reception data, minus (RD-)

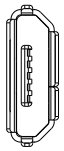
■ Waterproof cap

Always put a waterproof cap on any ports that are not in use.
The tightening torque is 0.1 ± 0.05 N･m.
In addition, proper use of waterproof caps (RT-CM12) is required to achieve protection structure IP65/IP67.
Purchase RT-CM12 separately.

■ USB port (for PC software)

⚠CAUTION

Do not leave the USB port open.
If there are no waterproof caps on the USB port, the degree of protection of the USB port is IP20. Do not allow foreign objects to get inside, and ensure that the ports are free of water, solvents, and oil during use.

Micro USB(B)	Pin number	Description
	1	VBUS
	2	DM
	3	DP
	4	ID
	5	GND

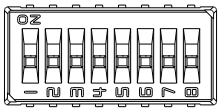
* For the unused USB port, always attach the waterproof cap that comes included as standard accessory (RT-CM12 when sold separately).

■ Dip switch

⚠WARNING

When operating each switch on the device unit, switch OFF the supplied power and set the switches with a precision screwdriver or other tool.
Not doing so can cause a failure as a result of short circuits or damage to components.

When operating a switch, make sure that only the relevant areas are in contact.
Not doing so may result in a failure.

Dip switch 8 points	SW	Part name	Description
	1	Reserved	-
	2	Reserved	-
	3	Reserved	-
	4	Reserved	-
	5	Parameter initialization at startup	If ON at start-up, all units will be restored to the factory setting. OFF: Do not initialize (factory setting) ON: Initialize (restores factory setting for all installed units)
	6	Reserved	-
	7	IP address 3rd octet selection	Selects the third octet of the IP address. OFF: 192.168.0XXX (factory setting) ON:192.168.1.XXX Note: XXX is the value specified by the below rotary switches (when 1 to 254).
	8	Remote I/O system diagnostic information ON/OFF	If ON at start-up, diagnostic information for the entire remote I/O system is added to the data transmitted to the RTXTools. OFF: Do not add Remote I/O system diagnostic information (factory setting) ON: Add Remote I/O system diagnostic information Note1: The Remote I/O system diagnostic information is in an 16-bit form consisting of the following information: -System error -Hardware error -User operation waiting -Power failure -Unit output error -Unit input error Note2: Turn the SW8 OFF when using this product with ExiaStudio. Note3: The diagnostic function remains in the “enable” status even when SW8 is OFF. Diagnostic information can be checked with RTXTools.

* The set value is read only once at start-up and confirmed.

■ (Rotary switch)

2 rotary switches	Value	Part name	Description
 16 digits (x16)  1 digit (x1)	2 digits from 0 to F	IP address setting	Set the IP address of the WebAPI compatible device. Set 0 to 255 with [x1] and [x16] switches. 0: Use the software setting value. 1 to 254: 192.168.A.1 to 192.168.A.254 * A is selected as 0 or 1 with the above dip switch SW7. 255: Use the software setting value. Factory setting: 0 The value is read only once at start-up and confirmed.

1.4 Unit Specifications

<table>
<tr><th colspan="2">Item</th><th>Description</th></tr>
<tr><td colspan="2">Type</td><td>Device unit</td></tr>
<tr><td rowspan="7">Communication specifications</td><td>Protocol</td><td>HTTP (REST format WebAPI json)</td></tr>
<tr><td>Compliance standard</td><td>IEEE802.3u</td></tr>
<tr><td>Distance between nodes</td><td>Maximum of 100 m</td></tr>
<tr><td>Cable</td><td>Standard Ethernet cable (CAT5 or higher, 100BASE-TX)</td></tr>
<tr><td>Speed</td><td>100 Mbps</td></tr>
<tr><td>System</td><td>Full duplex/half duplex</td></tr>
<tr><td>Supported functions</td><td>Refer to “6. WebAPI FUNCTION”</td></tr>
<tr><td colspan="2">Number of connectable I/O units</td><td>1 to 17 units</td></tr>
<tr><td colspan="2">Number of hardware connectable units</td><td>The width of the entire Remote I/O system must not exceed 922.5 mm
- Input: Maximum of 504 bytes
- Output: Maximum of 504 bytes
- Total I/O: maximum of 512 bytes</td></tr>
<tr><td colspan="2">Process data size limit</td><td>The process data that device unit can input/output to an upper master has the following size limitations. If exceeded, a "Process data overflow" occurs.
<table>
<tr><td>Item</td><td>Minimum size</td><td>Maximum size</td></tr>
<tr><td>input</td><td>0 bytes</td><td>504 bytes</td></tr>
<tr><td>Output</td><td>0 bytes</td><td>504 bytes</td></tr>
<tr><td>Total</td><td>1 byte</td><td>512 bytes</td></tr>
</table></td></tr>
<tr><td colspan="2">Protection function</td><td>
<table>
<tr><td rowspan="2">Protection function</td><td colspan="3">Power line</td></tr>
<tr><td>Internal power</td><td>Unit/input</td><td>Output</td></tr>
<tr><td>Low voltage protection (reset function)</td><td>Yes</td><td>No</td><td>No</td></tr>
<tr><td>Overvoltage detection</td><td>No</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Low voltage detection</td><td>No</td><td>Yes</td><td>Yes</td></tr>
</table></td></tr>
<tr><td colspan="2">Connector</td><td>M12(D) 4-pin female x 2 (BUS IN / BUS OUT), Micro USB(B) x 1 (for PC software)</td></tr>
<tr><td colspan="2">Setting switch</td><td>Dip switch x 1: Output settings in the event of a communication error/ priority to hardware, HOLD/CLEAR, Parameter initialization at startup, Remote I/O system diagnostic information ON/OFF, WebAPI ON/OFF, rotary switch x 2: for device name settings</td></tr>
<tr><td colspan="2">LED</td><td>8 pcs. (ACT, STS, L/A IN, L/A OUT, PS, PO, SF, CF)</td></tr>
<tr><td colspan="2">Working temperature range</td><td>-10°C to +55°C</td></tr>
<tr><td colspan="2">Relative humidity</td><td>30% to 85% RH</td></tr>
<tr><td colspan="2">Ambient atmosphere</td><td>No corrosive gases or heavy dust</td></tr>
<tr><td colspan="2">Installation location</td><td>Indoor</td></tr>
<tr><td colspan="2">Altitude</td><td>Up to 2000m</td></tr>
<tr><td colspan="2">Pollution degree</td><td>3</td></tr>
<tr><td colspan="2">Degree of protection</td><td>IP65/IP67 (when connected) Note[1]</td></tr>
<tr><td colspan="2">Current consumption</td><td>Unit/input power supply: 100 mA or less (24V equivalent) Output power supply 20 mA or less (24V equivalent)</td></tr>
<tr><td colspan="2">Size (W x H x D)</td><td>46.1 × 106 × 55.8 (mm)</td></tr>
</table>

Item	Description
Net weight	Approximately 230g (including 2 tie rods for device unit)
Standard accessories	Tie rod for device unit x 2 (RT-TR-1), waterproof cap for USB port x 1 (RT-CM12) Note: Waterproof caps (RT-CM12) for the L/A IN and L/A OUT ports are sold separately.

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

2. INSTRUCTIONS FOR USE

⚠CAUTION

Thoroughly read and understand the instruction manual before using the device unit.
The product may operate in an unexpected way, causing injury to people or damage to equipment.

Measures against unauthorized access to this product and such must be taken on the connected network side.
If measures are not taken, communications with this product may be intercepted or tampered with through unauthorized access.

Instructions		Reference
Prior checking	Check the Remote I/O system structure.	“Remote I/O RT Series Instruction Manual: System Construction”
	Check the power supply units' current consumption (related to: the number of power supply units used).	
	Determine whether Remote I/O system diagnostic information is used (related to dip switch SW8 of the device unit).	" 1.3 Names and Functions of Each Part "
	Check if a variable I/O unit (e.g. IO-Link master unit) is present among the I/O units.	“Remote I/O RT Series Instruction Manual: System Construction”
	If there are any variable I/O units (e.g.: IO-Link master unit), check the sizes of the parts of them that are variable. (E.g.: For IO-Link master units, check each output and input size of the IO-Link device that connects ports to be used as IO-Link mode.)	
	- Check the I/O size and assignment information of the Remote I/O system	
	Determine the authentication method when using the WebAPI	“6.1 Setting Method"
↓	↓	-
Hardware mounting, wiring, and setup	Set up PC and such to control the device unit	
	↓	-
	- Assemble the Remote I/O system. - Mount the Remote I/O system (DIN rail mounting or direct screw mounting).	“Remote I/O RT Series Instruction Manual: System Construction”
	↓	-
	Wire the LAN cable to the device unit.	"3.2Communication Wiring”
	↓	-
	- Wire the 24 V power supply to the power supply unit.	“Remote I/O RT Series Instruction Manual: System Construction”
	↓	-
	Wire each external I/O to the I/O units. Note: For an IO-Link master unit, IO-Link devices must also be connected.	“Remote I/O RT Series Instruction Manual: System Construction”
	↓	
	Set the following switches for the device unit. - Dip switches: Whether there will be diagnostic information; operation in the event of a communication error; etc. - Rotary switches: IP address (Specify the IP address using the PC/configuration software when selecting 0 or 255)	“Remote I/O RT Series Instruction Manual: System Construction” " 1.3 Names and Functions of Each Part "
↓	↓	-

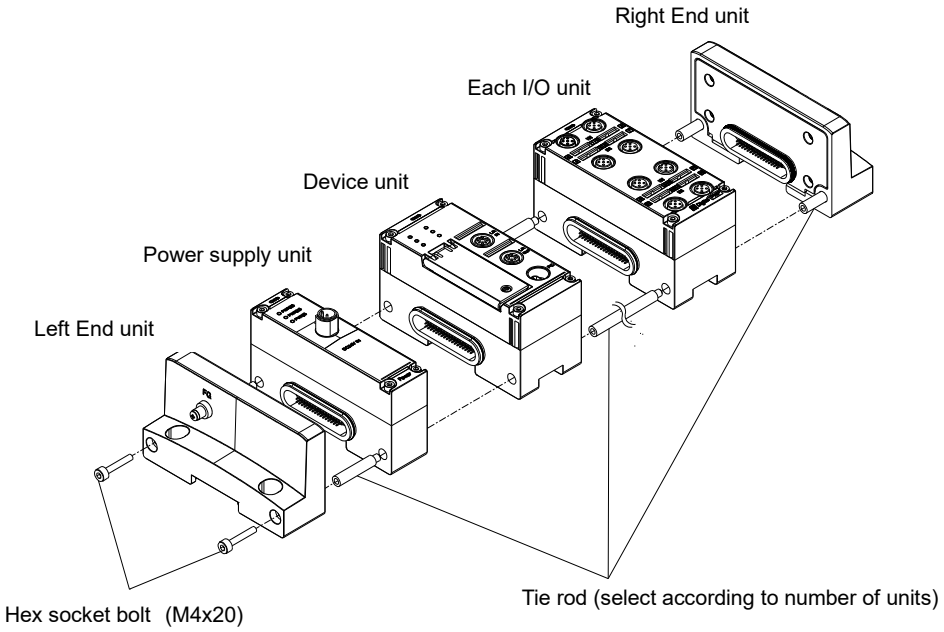
Instructions		Reference
Setting PC, etc.	Install and set up a development environment according to the desired language, etc.	Manuals for each development environment
	↓	-
	(Only if necessary) Set the followings according to the development environment. - MAC address setting of the product - IP address settings of the product - Other settings required for HTTP communication	Manuals for each development environment
	↓	-
	Create a control and communication program.	Manuals for each development environment ""6.WebAPI FUNCTION""
↓	↓	-
Checking Remote I/O system settings and status	Supply 24 V power to the power supply unit Note: If there is more than one power supply unit, power them all on within 3 seconds.	“Remote I/O RT Series Instruction Manual: System Construction”
	↓	-
	Device unit settings	“4. SETTINGS”
	● When setting from the PC software	“Remote I/O RT Series Instruction Manual: System Construction”
	Connect the PC software to the device unit with a USB cable.	
	↓	
	Check the actual Remote I/O system structure with the PC software.	
	↓	
	Set up the actual Remote I/O system structure with the PC software. Note: If the I/O unit is a variable I/O unit, set the input/output size manually or from the actual unit.	
	● When setting with WebAPI from a created program, etc.	Manuals for each development environment "6.WebAPI FUNCTION"
	From the created program, create a program that sends the WebAPI unit parameters settings to the product.	
	↓	-
	(If necessary) Check the output wiring, depending on the forced output setting from the PC software.	“Remote I/O RT Series Instruction Manual: System Construction”
	↓	-
	Note: Some settings require a power cycle.	-
↓	↓	-
Confirming communication and starting control	Check the communication. (For example, ping the product from a PC)	-
	↓	-
	Check the reading and writing of data to the Remote I/O system from the created program via WebAPI communication.	Manuals for each development environment
	↓	-
	(If necessary) Check the reading and writing of data to the Remote I/O system via WebAPI communication.	Manuals for each development environment "6.WebAPI FUNCTION""

3. INSTALLATION AND WIRING

3.1 Device Unit Installation

Connect device unit horizontally with power supply and I/O unit.

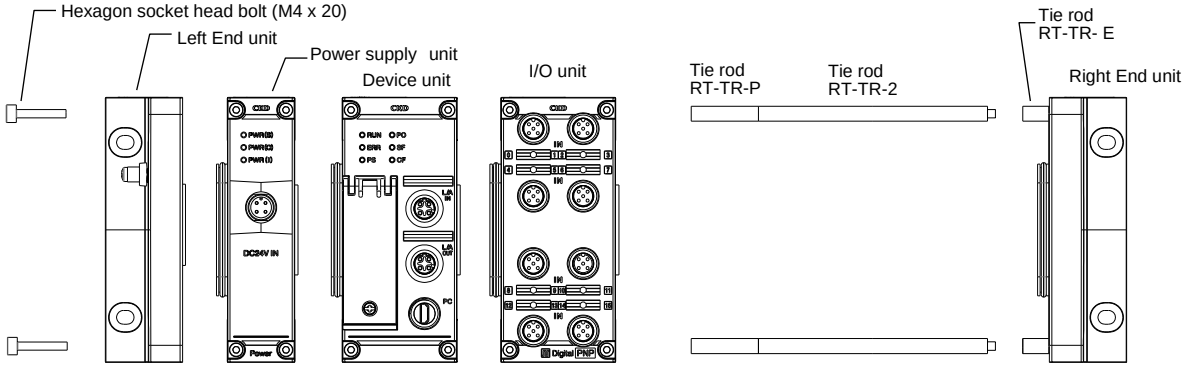
E.g.)



1 Connect the following tie rods in advance.
Select as few tie rods as possible.

Tie rod model No.	Applicable unit	Specifications
RT-TR-P	For one power supply unit	M4 x 27 mm, 2 pcs
RT-TR-1	For one device unit and one I/O unit	M4 x 46 mm, 2 pcs
RT-TR-2	For one device unit and two I/O units	M4 x 92 mm, 2 pcs
RT-TR-4	For one device unit and four I/O units	M4 x 184 mm, 2 pcs
RT-TR-8	For one device unit and eight I/O units	M4 x 368 mm, 2 pcs
RT-TR-V	For one Valve I/F unit	M4 x 32 mm, 2 pcs
RT-TR-E	For right End unit	M4 x 35 mm, 2 pcs

E.g.)



2 Connect the units together.

3 Pass the tie rods through each unit, and then push adjacent units together.

4 Tighten the left End unit with hexagon socket head bolts (M4 x 20) (tightening torque 1.2 N·m ± 0.05 N·m).

5 Check that all units are connected without any gaps.

3.2 Communication Wiring

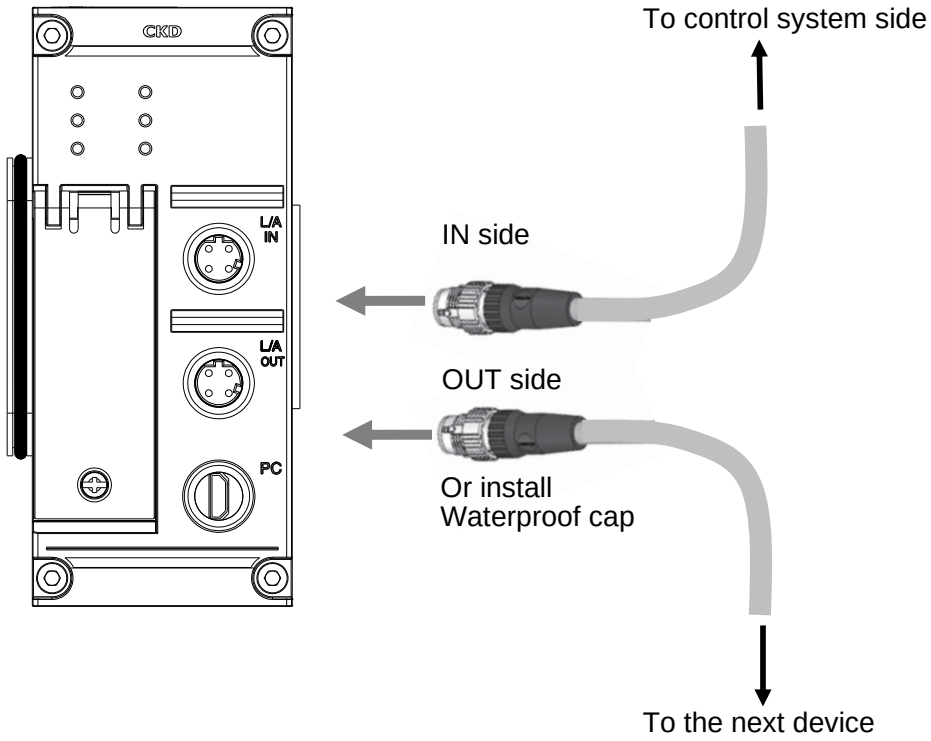
⚠WARNING

Use the specified cable for the communication cable.
Using cables other than those specified can cause communication malfunctions, and result in personal injury or damage to equipment. This may result in injury or damage to equipment.

Follow the steps below to connect the communication cable.

1 After confirming safety, stop communication with the product and power off all the peripheral equipment.

2 Refer to the following figure and wire the cable comply with the communication specifications for the product and the device unit to the IN and OUT sides.
If no remote device is connected to the OUT side, install a waterproof cap (RT-CM12), sold separately.



For device unit communication wiring, purchase cables or connectors that meet the following specifications:
[Specifications] M12 plug (male), D-coding, 4-core

■ Recommended communication cable

When connecting a device unit to a control system or remote device with an RJ45 connector type

Product name	Specifications	Number of cores	Cable extraction method	Length	Manufacturer	OMRON Corp. model No.
XS5W industrial Ethernet plug cable with connectors on both sides (M12 straight to RJ45)	M12 plug (D-coding, male) - RJ45	4 cores	Straight to RJ45	0.5 m	Omron Corporation	XS5W-T421-BMC-SS
				1 m		XS5W-T421-CMC-SS
				2 m		XS5W-T421-DMC-SS
				3 m		XS5W-T421-EMC-SS
				5 m		XS5W-T421-GMC-SS
				10 m		XS5W-T421-JMC-SS

- For a wire with one open-end side

Product name	Specifications	Number of cores	Cable extraction method	Length	Manufacturer	OMRON Corp. model No.
XS5H industrial Ethernet plug cable with a connector on one side (M12 straight to open-end-cable)	M12 plug (D-coding, male) – open-end-cable	4 cores	Straight to open-end-cable	0.5 m	Omron Corporation	XS5H-T421-BM0-K
				1 m		XS5H-T421-CM0-K
				2 m		XS5H-T421-DM0-K
				3 m		XS5H-T421-EM0-K
				5 m		XS5H-T421-GM0-K
				10 m		XS5H-T421-JM0-K
				15 m		XS5H-T421-KM0-K

4. SETTINGS

⚠WARNING

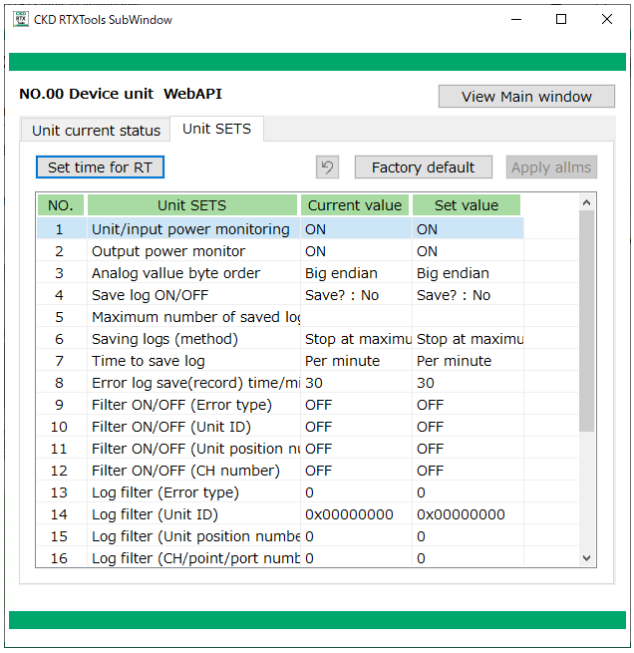
Check the settings of each unit before operating.
Setting the units incorrectly can cause malfunction. This may result in injury or damage to equipment.

4.1 Setting Method

There are two ways to configure the product: using PC software and using WebAPI.

4.1.1 Using PC software

Select the product on the [Unit Configuration] main tab and click the [Settings] button.



4.1.2 Using WebAPI

Specify the IP address instead of the COM port when connecting the PC software. Upon connection, the PC and the product must be connected on the same network.
Accessing the WebAPI using user's own applications is also possible. Refer to "6. WebAPI FUNCTION" for more information.

4.2 List of Settings

The items that can be set are as follows.

Settings	Description	Value	Factory setting Settings	Settings Setting required
Unit/input power monitor	Set whether the device unit monitors the unit/input power from the power supply unit closest to itself on the left when facing it. In the event of an error, a "Unit/input power voltage error" will occur.	0: OFF (not monitored) 1: ON (monitored)	1: ON (monitored)	-
Output power supply monitor	Set whether the device unit monitors the power supply for the output from the power supply closest to itself on the left when facing it. In the event of an error, an "Output power voltage error" will occur.	0: OFF (not monitored) 1: ON (monitored)	1: ON (monitored)	-
Analog value byte order	Sets the byte order when the device unit transmits and receives analog input or output values of the analog I/O unit in the connected I/O unit to and from the upper master.	0: Big endian 1: Little endian	0: Big endian	-
Save log ON/OFF and number of saved logs	Set whether to save logs. Set the maximum number of entries to log.	0: Do not save 1 to 255: Maximum number to save	0: Do not save	-
Saving logs (method)	Select how to save logs from the following. - Repeat (overwrite) - Stop at maximum number	0: Repeat (overwrite) 1: Stop at maximum number	1: Stop at maximum number	-
Log saving time	Select when to save logs from the following. - Save immediately when an error occurs - Save at each set value (minutes)	0: Real-time 1 to 60: Save every 1 to 60 minutes	30: Save every 30 minutes	-
	Set the save interval when the time to save logs is "save at every set value (minutes)."			-
Type of log filter	Set whether error logging filtering (logging only errors with specified conditions) is enabled. Set the type of log filter. Save logs that have passed the filtering target filter with the following bit equal to "1". Bit 7: Enable/disable log filter error type Bit 6: Enable/disable log filter unit ID Bit 5: Enable/disable log filter unit position number Bit 4: Enable/disable log filter CH/point/port number If this setting is 0x00, all logs are saved.	0x00 to 0xFF The meaning of each bit is as follows OFF: Disable ON: Enable	0x00: All disabled	-
Filter ON/OFF (Error type)	Only log errors for the specified error type. Set the error type to filter for.	0x00 to 0xFF	0x00	-
Filter ON/OFF (Unit ID)	Only log errors for the specified unit ID. Set the unit ID to filter for. However, the variable I/O unit determines a match in the top 2 bytes.	0x00000000 to 0xFFFFFFFF	0x00000000	-
Filter ON/OFF (Unit position number)	Only log errors for the unit with the specified unit position number.	0 to 17 (device unit = 0)	0	-
Filter ON/OFF (CH/point/port number)	Only log errors for the specified CH/point/port number. Set the CH/point/port number to filter for.	0 to 31	0	-

Settings	Description	Value	Factory setting Settings	Settings Setting required
IP address	Set the IP address of the product. Use this setting when starting up with the rotary switch set to 0.	000.000.000.000 to 255.255.255.255	192.168.1.10	
Subnet mask	Set the subnet mask of the product. Use this setting when starting up with the rotary switch set to 0.	000.000.000.000 to 255.255.255.255	255.255.255.0	
Default gateway	set the default gateway of the device. Use this setting when starting up with the rotary switch set to 0.	000.000.000.000 to 255.255.255.255	192.168.1.1	
WebAPI access authentication	Set the authentication method when accessing WebAPI.	0: Basic authentication 1: Digest authentication 2: No authentication	2: No authentication	
WebAPI login ID	Set the login ID when accessing WebAPI.	Half-width alphanumeric characters and symbols 1 to 16 characters	admin	
WebAPI password	Set the password when accessing WebAPI.	Half-width alphanumeric characters and symbols 1 to 16 characters	pass	

5. TROUBLESHOOTING

5.1 Unit Fault (Device unit diagnostic information)

The information can be read from the PC software or WebAPI.

■ Error codes displayed in the PC software

The CH diagnostic information can be checked in the following screen of the PC software as a hexadecimal "Error code" with the corresponding bit set to 1 (ON).

- [Codes] on the [Errors] main tab
- [Error code] (in the error log)

■ Reading diagnostic information area via WebAPI

Refer to “6.3.6 Acquiring Remote IO system diagnostic data”.

5.2 Troubleshooting from LED Display

5.2.1 LED is normal but conduct unintended operation

LED	Problem	Cause	Action
- Device unit ACT, STS: Green on SF: Off - Even number (left) LED of IO-Link master unit: Green on	When the I/O unit configuration includes an IO-Link master unit, the created program cannot read and write the process data of the IO-Link device correctly when in IO-Link mode. The value of the process data is different from the value checked on the I/O monitor tab of the PC software directly connected to the Remote I/O system, or the value of the PC software is incorrect. E.g.) When the process data (PD) of the IO-Link device on port 1 is 4 bytes, the data of port 2 are stored from halfway in the upper master side, or extra data are stored between them and the data on port 2.	The size or mode settings for each port on the IO-Link master unit is incorrect. Or the IO-Link device is operating at a different data size from what expected. * However, the actual process data size matches the process data size of the device defined in the created program.	Check the size of the process data (PD) of the IO-Link devices connected in IO-Link mode. Set the process data size or setting mode correctly for each port on the IO-Link master. If necessary, update the process data size setting of the product defined in the created program.

5.2.2 Troubleshooting from power supply unit LED Display

■ Power supply unit LED

Power supply unit			Problem	Action
PWR(S)	PWR(O)	PWR(I)		
24 V unit/input status	24 V output status	5 V internal status		
Green on	Green on	Green on	Normal condition	-
Off	Off	Off	24 V unit/input and 24 V output are not supplied correctly.	Supply 24 V unit/input and 24 V outputs correctly.
Off	Green on	Off	24 V unit/input is not correctly supplied or the power supply unit internal fuse is blown.	Check the unit/input 24 V power supply. If the problem persists, replace the power supply unit.
Green on	Off	Green on	24 V output is not correctly supplied. Or, The internal fuse of the power supply unit is blown.	Check the output 24 V power supply. If the problem persists, replace the power supply unit.
Green on	Green on	Off	The internal IC of the power supply unit has failed.	Replace the power supply unit (Note[1]).

Note 1: If replacing the power supply unit does not fix it, it may be due to a faulty I/O unit. If such is the case, contact CKD.

5.2.3 Troubleshooting from the device unit LED display

■ Power monitoring LED on the device unit

Device unit PS	Problem	Cause	Action
Red blinking (fast)	Unit/input power supply voltage error	When the "Unit/input power monitor" setting is "monitored", the device unit has detected that the 24 VDC unit/input voltage is outside the range of 24 VDC ± 25%.	Verify that the 24 V unit/input voltage to the power supply unit is within the range of ± 10%.
Yellow on	Unit/input voltage restored from voltage error	It is latched after recovering from a voltage error in the unit/input 24 V.	Reset it using power cycle operation or PC software operation.
Off	Power OFF state	24 V for unit/input to the power supply unit is OFF or not correctly supplied.	Verify that there is 24 V for the unit/input to the power supply unit.

Device unit PO	Problem	Cause	Action
Red blinking (fast)	Output power voltage error	When the "Output power supply monitor" setting is "monitored", the device unit has detected that the 24 VDC output voltage is outside the range of 24 VDC ± 25%.	Verify that the 24 V output voltage to the power supply unit is within the range of -5 to +10%.
Yellow on	Output voltage restored from voltage error.	It is latched after recovering from a voltage error in the output 24 V.	Reset it using power cycle operation or PC software operation.
Off	Power OFF state	24 V output to the power supply unit is OFF or not correctly supplied.	Verify that there is 24 V output to the power supply unit.

■ Basic LED of the device unit

Normal condition

Device unit								Problem
ACT	STS	SF	CF	PS	PO	L/A IN	L/A OUT	
WebAPI communication status	WebAPI communication response status	Status of the entire Remote I/O system	Setting change or forced input/output.	Status of the 24 V power supply for unit/input	Status of the 24 V power supply for output	Link status on the IN side of the connector	Link status on the OUT side of the connector	
Green on	Green on	Green on	Off	Green on	Green on	Green blinking (fast)	Green blinking (fast)	Normal condition

Error condition

Device unit				Problem	Diagnostic information for the device unit	Cause	Action
ACT	STS	SF	CF				
WebAPI communication status	WebAPI communication response status	Status of the entire Remote I/O system	Setting change or forced input/output				
Off	Off	Undefined	Undefined	Cannot connect to IO controller.	-	IP address has not been set.	Set the IP address appropriately.
						There is an error in the communication path or PC.	Check that there is no disconnection or misconnection in the communication path. Check whether the network on the PC is set correctly and it is operating properly.
Off	Off	Undefined	Undefined		-	Power is on but not in the initialization sequence.	Turn the power off and on again. If the problem persists, contact CKD.
Off	Off	Yellow blinking (fast)	Undefined	A "Unit configuration error" has occurred.	Unit configuration error	The device unit does not automatically recognize the connected I/O units correctly when it is powered on, or it has detected a change in the number of I/O units connected during operation.	- If the actual I/O unit configuration is correct, leave the configuration as is and turn the power off and on again. - If the actual I/O unit configuration is not correct, turn OFF the power, change the I/O unit configuration, and then turn on the power. - Check the connection between the units.
						When using multiple power supply units, the power-up timing between the power supply units has shifted by 3 seconds or more.	Cycle the power by making the power-up timing to the multiple power supply units at the same time (within 3 seconds).
Off	Off	Off	Off	It does not work at all	-	The power is not supplied properly.	- Check that the 24V is supplied to the power supply unit. - Check that all LEDs on the power supply unit are lit.

Device unit				Problem	Diagnostic information for the device unit	Cause	Action
ACT	STS	SF	CF				
WebAPI communication status	WebAPI communication response status	Status of the entire Remote I/O system	Setting change or forced input/output				
Undefined	Undefined	Red blinking (fast)	Undefined	An internal bus communication error has occurred.	Internal bus communication error	There is a physical connection problem between the units, or there is a strong noise around the area.	Disconnect, reconnect, and then power on the Remote I/O system units. If it still occurs, check the connection, improve the noise condition, or implement a workaround. If the condition still persists even after making improvements, contact CKD.
Undefined	Undefined	Red blinking (slow)	Undefined	A hardware error has occurred in the device unit.	Hardware error	There is a possible hardware error.	Turn the power off and on again. If the problem persists, replace the device unit.
Undefined	Undefined	Red blinking (slow)	Undefined	- Cannot read/write various memories. - Settings are initialized. - Cannot communicate. - Automatic recognition fails. - Cannot read log data from the PC software.	Memory read/write error	There is a possible hardware failure.	Turn the power off and on again after writing new data, or do so while the dip switch SW5 is ON. If the problem persists, contact CKD.
Undefined	Undefined	Red blinking (Twice)	Undefined	Factory setting error has occurred.	Factory setting error	The serial number or MAC address of the device unit is the initial value (the serial number is always written at manufacturing). There is a possible failure.	Contact CKD.
Undefined	Undefined	Yellow on	Undefined	Process data is fixed.	-	- Disconnection detected in digital input unit or analog input unit. - The digital	Turn the power off and on again.

Device unit				Problem	Diagnostic information for the device unit	Cause	Action
ACT	STS	SF	CF				
WebAPI communication status	WebAPI communication response status	Status of the entire Remote I/O system	Setting change or forced input/output				
						output unit or analog output unit is in “Manual output” status. - Valve I/F unit is in “Manual output” status - Changed the settings that change the process data size on the variable I/O unit.	

Device unit				Problem	Diagnostic information for the device unit	Cause	Action
ACT	STS	SF	CF				
WebAPI communication status	WebAPI communication response status	Status of the entire Remote I/O system	Setting change or forced input/output.				
Undefined	Undefined	Green blinking (fast)	Undefined	The I/O unit setting is initialized and started.	Initialized set memory	The setting memory was initialized and started up while the device unit's dip switch SW5 (Parameter initialization at startup) was OFF. - Changed connected I/O unit (when the device unit started up, the unit ID and connection position number of the connected I/O unit did not match ones at the last start-up). - The checksum of the setting memory in the analog I/O unit and IO-Link master unit did not match the one stored in the device unit.	Check if the configuration of the I/O unit has changed. And turn the power off and on again. If the problem persists, contact CKD. Note: To clear the error, turn the power off and on again, or perform a latch reset from the PC software.

Device unit				Problem	Diagnostic information for the device unit	Cause	Action
ACT	STS	SF	CF				
WebAPI communication status	WebAPI communication response status	Status of the entire Remote I/O system	Setting change or forced input/output.				
Undefined	Undefined	Green blinking (slow)	Undefined	The process data size of some I/O units is different than expected. Some I/O units have an internal bus communication error.	Process data overflow	The process data size with the upper master as a device unit exceeds the maximum size below. - Input: Up to 504 bytes - Output: Up to 504 bytes. - Total I/O: Up to 512 bytes	Make the process data size the maximum size or lower, for example by reducing the number of I/O units or changing the I/O unit type. And turn the power off and on again.
Defined	Undefined	Undefined	Yellow on	Cannot control process data from the created program.	-	There is a unit with a forced I/O setting.	Cancel the forced I/O setting from the PC software, or turn the power off and on again.
Undefined	Undefined	Undefined	Red blinking (slow) Yellow on One of the above.	Cannot control process data from the created program.	WebAPI/PC concurrent access	At the same time, settings are also changed from the PC software LAN connected.	Check whether the settings are also changed from the PC software LAN connected.
Undefined	Undefined	Undefined	Red blinking (slow) Green blinking (fast) Green blinking (slow) One of the above.	Cannot change settings by acyclic parameter communication.	WebAPI/PC concurrent access	At the same time, settings are also changed from the LAN connected PC software or USB connected PC software.	Check whether the settings are also changed from the LAN connected PC software or USB connected PC software.
Undefined	Undefined	Undefined	Green blinking (slow)	Cannot change settings by acyclic parameter communication.		At the same time, settings are also changed from the PC software.	Check whether the settings are also changed from the PC software.
Undefined	Undefined	Undefined	Off	Cannot be controlled from the PC software.	-	There is no access from the PC software (USB connected) for 60 seconds or more.	Check that the COM port specified is correct.
Undefined	Undefined	Undefined	Off	Cannot be controlled from the PC software or WebAPI.	-	There is no access from the PC software (LAN connected) or WebAPI for 60 seconds or more.	Check that the IP address and URL specified are correct.

Device unit				Problem	Diagnostic information for the device unit	Cause	Action
ACT	STS	SF	CF				
WebAPI communication status	WebAPI communication response status	Status of the entire Remote I/O system	Setting change or forced input/output.				
Green on	Red on	Undefined	Undefined	Returned a response other than OK to a WebAPI request.	-	The WebAPI request is invalid. URL, method, or json data when posting is incorrect.	Check that there are no errors in the URL, method, or json data when posting.

Note 1: Turn the power off and on again when the switch settings have been changed.

■ LED in data transmission/reception status of the device unit

Device unit	Problem	Cause	Action
L/A IN L/A OUT			
Off	No Ethernet communication.	The Ethernet cable is not connected properly.	Check the Ethernet cable connection.

6. WebAPI FUNCTION

This product supports WebAPI function.

WebAPI function is used mainly for the application below.
・Data collection, output control, or setting changes from user-specific applications, etc.
・ Periodic data collection from system monitoring applications, etc.
・RTXTools LAN connection

Note 1: RTXTools is intended to be used for confirmation before operation. Connecting with RTXTools during operation may affect communication with applications. If it occurs, stop using the WebAPI connection with RTXTools.
Note 2: Intensive access from multiple clients via WebAPI during operation may affect communication. If it occurs, reduce the load by increasing the communication cycle intervals, etc.

6.1 Setting Method

Although the WebAPI function is initially freely accessible by anyone, access to the WebAPI can be restricted by authentication. It is recommended to set up user ID and password following the instructions below.

1. Connect the product to the PC using a USB cable.
2. Start RTXTools and click the appearance of the product.
3. Set "Authentication Function" to "Digest Authentication".
4. Change the "Login ID (Web access)".
5. Change the "Password (Web access)".
6. Click the [Apply] button to reflect the settings to the product.

* This setting will reflect in real-time.

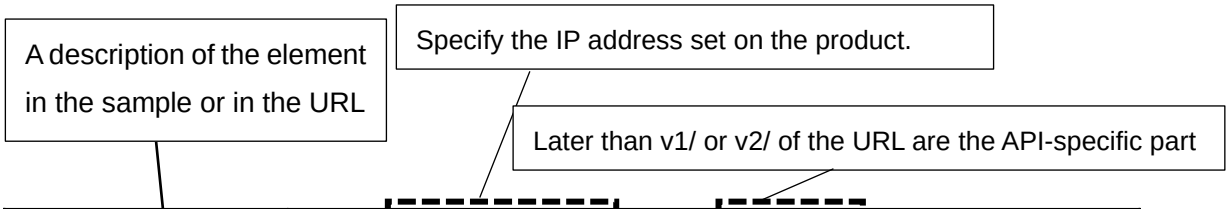
6.2 Access Method

Some WebAPIs acquire data using general web browsers. Follow the instructions below to acquire the data.

1. Change the login ID and password appropriately.
2. Start a web browser.
3. Check the IP address of the product (the IP address set in “2. INSTRUCTIONS FOR USE”).
4. Access the URL using a web browser with "http://192.168.1.10/api/v2/dipsw". (* Replace "192.168.1.10" with the IP address checked in instruction 4.)
5. Check that the dip switch and rotary switch statuses are responded in the JSON format. (* In case of no response, check that the entered URL is correct.)

6.3 Description of Each API

Each API is described in the following format:



URL	http://aaa.bbb.ccc.ddd/api/v2/keepalive		
Send			
Data name	Data type	Value/ Range	Remarks
ymd	Hexadecimal	0 to 65535	January 1, 2000 to June 6, 2179
hour	Hexadecimal	0 to 23	
minute	Hexadecimal	0 to 59	
second	Hexadecimal	0 to 59	

Sample	{
	"ymd":0,
	"hour":0,
	"minute":0,
	"second":0
	}
		Send data from the product.
		Send in JSON-format.
		The sample is formatted, but the actual data does not include blank and etc.	

Method	POST		
Remarks	Members cannot be omitted		
Response			
Data name	Data type	Value/ Range	Remarks
Response status and status string			

*The last member in the object specified in the json data will not have a comma (,).

6.3.1 Keepalive

It is used to maintain a connect status with the product. Send once every 30 seconds.

URL	http://aaa.bbb.ccc.ddd/api/v2/keepalive		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
ymd	Decimal	0 to 65535	January 1, 2000 to June 6, 2179
hour	Decimal	0 to 23	
minute	Decimal	0 to 59	
second	Decimal	0 to 59	
Sample	{ "ymd":0, "hour":0, "minute":0, "second":0 }		
Methods	POST		
Remarks	Members cannot be omitted		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
Response status and status string			

6.3.2 Acquiring device unit switch status

It acquires the status of the setting switches (dip switches, rotary switches) of the device unit.

URL	http://aaa.bbb.ccc.ddd/api/v2/dipsw		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
Sample	No		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
sw1	String	on or off	reserve
sw2	String	on or off	reserve
sw3	String	on or off	reserve
sw4	String	on or off	reserve
init	String	on or off	Refer to "1.3 Names and Functions of Each Part".
sw6	String	on or off	reserve
ipaddr3	String	on or off	Refer to "1.3 Names and Functions of Each Part".
diag	String	on or off	Refer to "1.3 Names and Functions of Each Part".
rotarysw	Decimal	0 to 255	Refer to "1.3 Names and Functions of Each Part".

Sample	<pre>{
	"dipsw":{
	"sw1":"on",
	"sw2":"on",
	"sw3":"on",
	"sw4":"on",
	"init":"on",
	"sw6":"on",
	"ipaddr3":"off",
	"diag":"on"
	},
	"rotarysw":0
	}</pre>		

6.3.3 Acquiring version

It acquires the software and hardware versions of the unit.

URL	http://aaa.bbb.ccc.ddd/api/v2/version/[unit]		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
[unit]	Decimal	0 to 17	Specifies the unit position. 0 is the position of the product and 1 to 17 is the position of the other units excluding the product, counted from the left to the right end. Specify in the URL.
Sample	No		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
unit	Decimal	0 to 17	Same as above unit position
hwver swver option ver1 ver2 ver3	4 hexadecimal digits	0x0000 to 0xFFFF	The response will vary depending on the unit type and version acquireed.

Sample
(For the device unit)
	{
	"unit":0,
	"hwver":"0000",
	"swver":"0000",
	"option":"0000"
	}		

Sample
(Other than device unit)
	{
	"unit":1,
	"ver1":"0102",
	"ver2":"0101",
	"ver3":"0101"
	}		

6.3.4 Setting date and time

It adjusts the internal time of the product to the specified time. It is only held while the power is ON.

URL	http://aaa.bbb.ccc.ddd/api/v2/datetime		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
ymd	Decimal Value	0 to 65535	January 1, 2000 to June 6, 2179
hour	Decimal Value	0 to 23	
minute	Decimal Value	0 to 59	
second	Decimal Value	0 to 59	
msecond	Decimal Value	0 to 99	10 msec=1
Sample	{ "ymd":0, "hour":0, "minute":0, "second":0, "msecond":0 }		
Methods	POST		
Remarks	Members cannot be omitted		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
ymd	Decimal Value	0 to 65535	January 1, 2000 to June 6, 2179
hour	Decimal Value	0 to 23	
minute	Decimal Value	0 to 59	
second	Decimal Value	0 to 59	
msecond	Decimal Value	0 to 99	10 msec=1
Sample	{ "ymd":0, "hour":0, "minute":0, "second":0, "msecond":0 }		
Remarks	If successful, the same date and time as the sent data will be responded.		

6.3.5 Latch reset

It releases the latch of the LED lighting status at the time specified by the user.

URL	http://aaa.bbb.ccc.ddd/api/v1/latchreset		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
No			
Sample	No		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
Response status and status string			

6.3.6 Acquiring Remote IO system diagnostic data

It acquires diagnostic data for the Remote IO system. This diagnostic data is identical to the diagnostic data contained in the process data.

URL	http://aaa.bbb.ccc.ddd/api/v2/diag		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
No			
Sample	No		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
input	bool	“true” or “false”	Input-related errors
output	bool	“true” or “false”	Output-related errors
power	bool	“true” or “false”	Output/unit/input power voltage out of range, short circuit, etc.
control	bool	“true” or “false”	When user’s operation is necessary
hardware	bool	“true” or “false”	Errors possibly hardware failure
system	bool	“true” or “false”	Internal communication/system related errors

Sample	<pre>{
	"diag":{
	"input":true,
	"output":true,
	"power":true,
	"control":true,
	"hardware":true,
	"system":true
	}
	}</pre>		

6.3.7 Acquiring unit diagnostic data

It acquires diagnostic information for the specified unit.

URL	http://aaa.bbb.ccc.ddd/api/v2/diag/[unit]		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
[unit]	Decimal	0 to 17	Specifies the unit position. 0 is the position of the product and 1 to 17 is the position of the other units excluding the product, counted from the left to the right end. Specify in the URL.
Sample	Header only, no payload		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
It varies depending on the unit type. Refer to the following for details.	bool	“true” or “false”	Indicates whether an error has occurred. The content varies depending on the unit type. For details, refer to the sample below and the instruction manual for each unit.
Sample	**Digital input**		

	{
	"diag":{
	"PowerLineErr":true,
	"ONCountErr":true,
	"HardwareErr":true,
	"HoldForceOff":true
	}
	}		

Sample	**Digital output**		

	{
	"diag":{
	"SignalLineErr":true,
	"ONCountErr":true,
	"HardwareErr":true,
	"OutputtingManually":true
	}
	}		

Sample	**Analog input**		

	{
	"diag":{
	"PowerLineErr":true,
	"MaxRangeErr":true,
	"MinRangeErr":true,
	"UserUpperLimitErr":true,
	"UserLowerLimitErr":true,
	"SetParameterCheck":true,
	"HardwareErr":true,
	"HoldForceOFF":true
	}
	}		

Sample	**Analog output**
	{ "diag":{

	"PowerLineErr":true, "MaxRangeErr":true, "MinRangeErr":true, "UseUpperLimitErr":true, "UserLowerLimitErr":true, "SetParameterCheck":true, "HardwareErr":true, "OutputtingManually":true } }

Sample	**Valve IF**
	{
	"diag":{
	"SignalLineErr":true,
	"ONCountErr":true,
	"HardwareErr":true,
	"OutputtingManually":true
	}
	}

Sample	**IO-Link Master**
	{
	"diag":{
	"PowerLineErr":true,
	"SignalLineErr":true,
	"MemoryErr":true,
	"IO-LinkCOMMErr":true,
	"PD-SizeErr":true,
	"DataMappingErr":true,
	"DeviceMismatch":true,
	"ReflectSettingWaiting":true,
	"AllocationErr":true,
	"OutputtingManually":true
	}
	}

Sample	**Device unit (this product)**
	{
	"diag":{
	"MemoryRWErr":true,
	"FactorySettingErr":true,
	"UnitConfigurationErr":true,
	"ProcessDataOverflow":true,
	"UnitInputPowerVoltageErr":true,
	"OutputPowerVoltageErr":true,
	"InternalBusCommErr":true,
	"InitializedSetMemory":true,
	"WebAPIPCConcurrentAccess":true,
	"HardwareError":true
	}
	}

6.3.8 Acquiring point/CH/port diagnostic data

It acquires diagnostic information by point/CH/port for the specified unit.

URL	http://aaa.bbb.ccc.ddd/api/v2/diag/[unit]/ch		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
[unit]	Decimal	0 to 17	Specifies the unit position. 0 is the position of the product and 1 to 17 is the position of the other units excluding the product, counted from the left to the right end. Specify in the URL.
Sample	Header only, no payload		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
unit	Decimal	0 to 17	Same as above unit position
p0,p1,p2…	-	-	Indicates the target point, CH, and port number of the diagnostic information
data	bool	“true” or “false”	Indicates whether an error has occurred. The name varies depending on the unit type. For details, refer to the sample below, “6.3.11 Acquiring unit setting data”, and the instruction manual for each unit.
Sample	{ "diag":{ "p0":{ "data":true, … }, "p1":{ "detail":false, … }, … } }		

6.3.9 Acquiring unit order/number/type

It acquires the order and number/type of units connected to the product.

URL	http://aaa.bbb.ccc.ddd/api/v2/order/id		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
Sample	Header only, no payload		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
id	Hexadecimal 8-digit array	-	The unit IDs are returned in order from the left to the right end. The number of elements in the array is the same as the number of units.

Sample	{
	"id":[
	"07070000",
	"89ABCDEF"
	]
	}		

URL	http://aaa.bbb.ccc.ddd/api/v2/order/model		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
Sample	Header only, no payload		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
model	String Array	-	The unit model numbers are returned in order from the left to the right end. The number of elements in the array is the same as the number of units.

Sample	{
	"model":[
	"RT-XTEAN00N",
	"RT-XADGA16A"
	]
	}		

6.3.10 Acquiring the checksum of the setting value

It acquires the checksum of the unit set value recorded in the product. Use the checksum to detect changes to the setting data.

URL	http://aaa.bbb.ccc.ddd/api/v2/memsum		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
Sample	Header only, no payload		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
sum	Hexadecimal 8-digit array	-	The checksums are returned in order from the left to the right end. The number of elements in the array is the same as the number of units.

Sample	{
	"sum":[
	"00000000",
	"00000000"
	]
	}		

6.3.11 Acquiring unit parameters

It acquires the setting data for each unit.

URL	http://aaa.bbb.ccc.ddd/api/v2/param/[unit]		
Send			
Data name	**Data type**	**Values/range**	**Remarks**
[unit]	Decimal	0 to 17	Specifies the unit position. 0 is the position of the product and 1 to 17 is the position of the other units excluding the product, counted from the left to the right end. Specify in the URL.
Sample	Header only, no payload		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Values/range**	**Remarks**
The content varies depending on the type of the target unit. For details, refer to the following table and the instruction manual for each unit.			

■ Device unit (this product)

Sample	Access	Data type	Values/range	Remarks
{				
"ControlPowerMon":true,	Get/Set	bool	true, false	Unit/input power monitor
"OutputPowerMon":true,	Get/Set	bool	true, false	Output power monitor
"AnalogByteOrder":"big",	Get/Set	String	"big","little"	Byte order Specify from the string list on the left
"MaxNumbOfSaveLog":100,	Get/Set	Decimal Value	0 to 255	Number of saved logs
"SavingLogMethod":"over",	Get/Set		-"over", “stop"	Saving logs (method) Specify from the string list on the left
"TimeToSaveLog":0,	Get/Set	Decimal Value	0 to 60	Log saving time (min)
"LogFilter":{		-	-	Save log filter settings
"Err":true,	Get/Set	bool	true, false	Log filter Error Enabled
"Unit":true,	Get/Set	bool	true, false	Log filter U type Enabled
"Pos":true,	Get/Set	bool	true, false	Log filter U number Enabled
"Ch":true	Get/Set	bool	true, false	Log filter CH number Enabled
},				
"LogFilter_ErrCode":0,	Get/Set	Decimal Value	0 to 255	Log F Error
"LogFilter_Unit":"00000000",	Get/Set	8-digit hexadecimal string	-	Log F U type
"LogFilter_Pos":0,	Get/Set	Decimal Value	0 to 17	Log filter U number
"LogFilter_Ch":0,	Get/Set	Decimal Value	0 to 255	Log filter CH number
"OutputPowerONTime":0	Get	Decimal Value	0 to 4294967295	Output power ON time
}				

* When acquiring settings using WebAPI, IP address related settings and WebAPI related settings cannot be acquireed.

■ Digital input unit (M12)

Sample	Access	Data type	Values/range	Remarks
{				
"PowerLineErrDetect":{		-	-	Power line error detection
"C0":true,	Get/Set	bool	true, false	
(omitted)				C1 to C7 are the same members as C0
},				
"ONCountThreshold":{			-	Counter threshold
"P0":0,	Get/Set	Decimal Value	0 to 16777215	
(omitted)				P1 to P15 are the same members as P0
},				
"OnOperatingCycle":{			-	Counter value
"P0":0,	Get	Decimal Value	0 to 16777215	
(omitted)				P1 to P15 are the same members as P0
},				
"InputFilterTime":{				Input filter time
"P0":"0.1",	Get/Set	String	"0.1","1","5","10","20"	Specify from the string list on the left
(omitted)				P1 to P15 are the same members as P0
},				
"InputHoldTime":{				Input hold time
"P0":"1",	Get/Set	String	"1","15","100","200"	Specify from the string list on the left
(omitted)				P1 to P15 are the same members as P0
}				
}				

■ Digital input unit (M8)

Sample	Access	Data type	Values/range	Remarks
{				
"PowerLineErrDetect":{		-	-	Power line error detection
"C0":true,	Get/Set	bool	true, false	
(omitted)				C1 to C7 are the same members as C0
},				
"ONCountThreshold":{			-	Counter threshold
"P0":0,	Get/Set	Decimal Value	0 to 16777215	
(omitted)				P1 to P7 are the same members as P0
},				
"OnOperatingCycle":{			-	Counter value
"P0":0,	Get	Decimal Value	0 to 16777215	
(omitted)				P1 to P7 are the same members as P0
},				
"InputFilterTime":{				Input filter time
"P0":"0.1",	Get/Set	String	"0.1","1","5","10","20"	Specify from the string list on the left
(omitted)				P1 to P7 are the same members as P0
},				
"InputHoldTime":{				Input hold time
"P0":"1",	Get/Set	String	"1","15","100","200"	Specify from the string list on the left
(omitted)				P1 to P7 are the same members as P0
}				
}				

■ Digital input unit (terminal block type)

Sample	Access	Data type	Values/range	Remarks
{				
"PowerLineErrDetect":{		-	-	Power line error detection
"B0":"on",	Get/Set	String	"off","wu","on"	off: Error detection OFF wu: Detects only at startup on: Always detect Specify from the string list on the left
(omitted)				B1 to B7 are the same members as B0
},				
"ONCountThreshold":{			-	Counter threshold
"P0":0,	Get/Set	Decimal Value	0 to 16777215	
(omitted)				P1 to P31 are the same members as P0
},				
"OnOperatingCycle":{			-	Counter value
"P0":0,	Get	Decimal Value	0 to 16777215	
(omitted)				P1 to P31 are the same members as P0
},				
"InputFilterTime":{				Input filter time
"P0":"0.1",	Get/Set	String	"0.1","1","5","10","20"	Specify from the string list on the left
(omitted)				P1 to P31 are the same members as P0
},				
"InputHoldTime":{				Input hold time
"P0":"1",	Get/Set	String	"1","15","100","200" * Only "100" and "200" can be specified from P16 onwards	Specify from the string list on the left
(omitted)				P1 to P31 are the same members as P0
}				
}				

■ Digital output unit (M12)

Sample	Access	Data type	Values/range	Remarks
{				
"SignalLineErrDetect":{				Signal line error detection
"P0":true,	Get/Set	bool	true, false	
(omitted)				P1 to P15 are the same members as P0
},				
"SignalLineErrRecoveryOpe":{				Signal line error recovery operation
"P0":"auto",	Get/Set	String	"auto", "manual"	Specify from the string list on the left
(omitted)				P1 to P15 are the same members as P0
},				
"ONCountThreshold":{			-	Counter threshold
"P0":0x0,	Get/Set	Decimal Value	0 to 16777215	
(omitted)				P1 to P15 are the same members as P0
},				
"OnOperatingCycle":{			-	Counter value
"P0":0xF,	Get	Decimal Value	0 to 16777215	
(omitted)				P1 to P15 are the same members as P0
},				
"CommErrOpe":{				Communication error operation
"P0":"off",	Get/Set	String	"off", "on", "hold"	Specify from the string list on the left
(omitted)				P1 to P15 are the same members as P0
},				
}				

■ Digital output unit (terminal block type)

Sample	Access	Data type	Values/range	Remarks
{				
"SignalLineErrDetect":{				Signal line error detection
"P0":true,	Get/Set	bool	true, false	
(omitted)				P1 to P31 are the same members as P0
},				
"SignalLineErrRecoveryOpe":{				Signal line error recovery operation
"P0":"auto",	Get/Set	String	"auto”," manual"	Specify from the string list on the left
(omitted)				P1 to P31 are the same members as P0
},				
"ONCountThreshold":{			-	Counter threshold
"P0":0x0,	Get/Set	Decimal Value	0 to 16777215	
(omitted)				P1 to P31 are the same members as P0
},				
"OnOperatingCycle":{			-	Counter value
"P0":0xF,	Get	Decimal Value	0 to 16777215	
(omitted)				P1 to P31 are the same members as P0
},				
"CommErrOpe":{				Communication error operation
"P0":"off",	Get/Set	String	"off", "on", "hold"	Specify from the string list on the left
(omitted)				P1 to P31 are the same members as P0
},				
}				

■ Analog input unit

Sample	Access	Data type	Values/range	Remarks
{				
"PowerLineErrDetect":{				Power line error detection setting
"C0":true,	Get/Set	bool	true, false	
"C1":true,	Get/Set	bool	true, false	
},				
"AveSampleCount":"2",	Get/Set	String	"2","4","8","16"	Filter count/ setting Specify from the string list on the left
"SamplingPeriod":1,	Get/Set	Decimal Value	1 to 65535	Sampling cycle
"DataFmt":{				Data format setting
"C0":"12bit",	Get/Set	String	"12bit","16bit","A","B","C","D","E","2cm"	Specify from the string list on the left
"C1":"12bit",	Get/Set	String	"12bit","16bit","A","B","C","D","E","2cm"	Specify from the string list on the left
},				
"Range":{				Switching range settings
"C0":"+-10V",	Get/Set	String	"+-10V","+-5V","0-10V","0-5V","1-5V", "+-20mA","4-20mA","0-20mA"	Specify from the string list on the left
"C1":"+-10V",	Get/Set	String	"+-10V","+-5V","0-10V","0-5V","1-5V", "+-20mA","4-20mA","0-20mA"	Specify from the string list on the left
},				
"MaxRangeErr":{				Max range error
"C0":true,	Get/Set	bool	true, false	
"C1":true,	Get/Set	bool	true, false	
},				
"MinRangeErr":{				Min range error
"C0":false,	Get/Set	bool	true, false	
"C1":false,	Get/Set	bool	true, false	
},				
"UserUpperLimitErr":{				User set value upper limit error
"C0":false,	Get/Set	bool	true, false	
"C1":false,	Get/Set	bool	true, false	
},				
"UserLowerLimitErr":{				User set value lower limit error

"C0":false,	Get/Set	bool	true, false	
"C1":false,	Get/Set	bool	true, false	
},				
"UserUpperLimitErrTh":{				User set value upper limit error threshold
"C0":"8000",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
"C1":"8000",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
},				
"UserLowerLimitErrTh":{				User set value lower limit error threshold
"C0":"FFFF",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
"C1":"FFFF",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
},				
"SensorPower":{				Input power supply
"C0":true,	Get/Set	bool	true, false	
"C1":false,	Get/Set	bool	true, false	
},				
"Hysteresis":{				Measured hysteresis
"C0":false,	Get/Set	bool	true, false	
"C1":false,	Get/Set	bool	true, false	
},				
"EnableCH":{				CH disable setting
"C0":false,	Get/Set	bool	true, false	
"C1":false,	Get/Set	bool	true, false	
}				
}				

■ Analog output unit

Sample	Access	Data type	Values/range	Remarks
{				
"PowerLineErrDetect":{				Power line error detection setting
"C0":true,	Get/Set	bool	true, false	
"C1":true,	Get/Set	bool	true, false	
},				
"SignalLineErrRecoveryOpe":{				Signal line error recovery operation
"C0":"auto",	Get/Set	String	"auto", "manual"	Specify from the string list on the left
"C1":"auto",	Get/Set	String	"auto"," manual"	Specify from the string list on the left
},				
"DataFmt":{				Data format setting
"C0":"16",	Get/Set	String	"12bit","16bit","A","B","C","E","2cm"	Specify from the string list on the left
"C1":"16",	Get/Set	String	"12bit","16bit","A","B","C","E","2cm"	Specify from the string list on the left
},				
"Range":{				Switching range settings
"C0":"0-10V",	Get/Set	String	"0-10V","0-5V","1-5V", "4-20mA","0-20mA"	Specify from the string list on the left
"C1":"0-10V",	Get/Set	String	"0-10V","0-5V","1-5V", "4-20mA","0-20mA"	Specify from the string list on the left
},				
"MaxRangeErr":{				Max range error
"C0":false,	Get/Set	bool	true, false	
"C1":false,	Get/Set	bool	true, false	
},				
"MinRangeErr":{				Min range error
"C0":true,	Get/Set	bool	true, false	
"C1":true,	Get/Set	bool	true, false	
},				

"UserUpperLimitErr":{				User set value upper limit error
"C0":true,	Get/Set	bool	true, false	
"C1":true,	Get/Set	bool	true, false	
},				
"UserLowerLimitErr":{				User set value lower limit error
"C0":false,	Get/Set	bool	true, false	
"C1":false,	Get/Set	bool	true, false	
},				
"UserUpperLimitErrTh":{				User set value upper limit error threshold
"C0":"FFFF",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
"C1":"FFFF",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
},				
"UserLowerLimitErrTh":{				User set value lower limit error threshold
"C0":"0000",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
"C1":"0000",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
},				
"LoadPower":{				Input power supply
"C0":true,	Get/Set	bool	true, false	
"C1":true,	Get/Set	bool	true, false	
},				
"CustomOutAtCommErr":{				Customized output value at communication error
"C0":"0000",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
"C1":"0000",	Get/Set	4 hexadecimal digits String	0x0000-0xFFFF	
},				
"CommErrOpe":{				Communication error operation
"C0":"off",	Get/Set	String	"off", "custom", "hold"	Specify from the string list on the left
"C0":"hold",	Get/Set	String	"off", "custom", "hold"	Specify from the string list on the left
},				
"EnableCH":{				CH disable setting
"C0":true,	Get/Set	bool	true, false	
"C1":true,	Get/Set	bool	true, false	
},				
}				

■ Valve I/F unit

Sample	Access	Data type	Values/range	Remarks
{				
"SignalLineErrDetect":{				Signal line error detection
"P0":true,	Get/Set	bool	true, false	
(omitted)				P1 to P31 are the same members as P0
},				
"SignalLineErrRecoveryOpe":{				Signal line error recovery operation
"P0":"auto",	Get/Set	String	"auto", “manual"	Specify from the string list on the left
(omitted)				P1 to P31 are the same members as P0
},				
"ONCountThreshold":{			-	Counter threshold

"P0":0x0,	Get/Set	Decimal Value	0 to 16777215	
(omitted)				P1 to P31 are the same members as P0
},				
"OnOperatingCycle":{			-	Counter value
"P0":0xF,	Get	Decimal Value	0 to 16777215	
(omitted)				P1 to P31 are the same members as P0
},				
"CommErrOpe":{				Communication error operation
"P0":"off",	Get/Set	String	"off", "on", "hold"	Specify from the string list on the left
(omitted)				P1 to P31 are the same members as P0
},				
}				

■ IO-Link master unit:

Sample	Access	Data type	Values/range	Remarks
{				
"P0":{				
"DevID":0,	Get/Set	Decimal Value	0 to 16777215	Device ID
"VID":0,	Get/Set	Decimal Value	0 to 65535	Vendor ID
"Rev":0,	Get/Set	Decimal Value	0 to 255	Revision
"InSize":4,	Get/Set	Decimal Value	0 to 32	IN size
"OutSize":4,	Get/Set	Decimal Value	0 to 32	OUT size
"SN":"abcd1234"	Get/Set	String Up to 16 characters	Only half-width alphanumeric characters	Serial number
"SignalLineErrRecoveryOpe":"auto",	Get/Set	String	"auto”," manual"	Signal line error recovery operation Specify from the string list on the left
"SignalLineErrDetect":true,	Get/Set	bool	true, false	Signal line error detection
"PowerLineErrDetect":true,	Get/Set	bool	true, false	Power line error detection
"CommErrOpe":"off",	Get/Set	String	"off", "on", "hold"	Communication error operation Specify from the string list on the left
"Cycle":"free"	Get/Set	String	"free", "sync"	Port cycle Specify from the string list on the left
"Backup":true,	Get/Set	bool	true, false	Backup settings
"Restore":true,	Get/Set	bool	true, false	Restore settings
"DeviceVerifcation":"no",	Get/Set	String	"no","3types","4types"	Device verification Specify from the string list on the left
"Mode":"io-link",	Get/Set	String	"disable", “Io-link", "dipnp", "dinpn", "dopnp", "donpn"	Operation mode settings Specify from the string list on the left
"CycleTime":10,	Get/Set	Decimal Value	0,10-255	Cycle time
"InputFilterTime":"0.1",	Get/Set	String	"0.1","1","5","10","20"	Input filter time Specify from the string list on the left
"InputHoldTime":"1"	Get/Set	String	"1","15","100","200"	Input hold time Specify from the string list on the left
},				
"P1":{				
(omitted)				Same settings as P0
}				
"P2":{				
(omitted)				Same settings as P0
}				
"P3":{				
(omitted)				Same settings as P0
}				
"P4":{				
(omitted)				Same settings as P0
}				
"P5":{				
(omitted)				Same settings as P0
}				
"P6":{				
(omitted)				Same settings as P0
}				
"P7":{				
(omitted)				Same settings as P0
}				
}				

6.3.12 Setting unit parameters

It changes the setting data for each unit.

<table>
<tr><td>URL</td><td colspan="3">http://aaa.bbb.ccc.ddd/api/v2/param/[unit]</td></tr>
<tr><td colspan="4">Send</td></tr>
<tr><td>Data name</td><td>Data type</td><td>Value</td><td>Remarks</td></tr>
<tr><td colspan="4">The content varies depending on the type of the target unit. The data structure is the same as when acquiring the unit parameters. For details, refer to “6.3.11 Acquiring unit parameters”, the following table and the instruction manual for each unit.</td></tr>
<tr><td>Methods</td><td colspan="3">POST</td></tr>
<tr><td rowspan="2">Remarks</td><td colspan="3">Only some of the items can be specified to change the settings.
E.g.) When turning off the "Power line error detection" for only connectors 0 and 4 of the digital input unit(M12 type), post the following JSON data.
{
"PowerLineErrDetect":{
"C0":false,
"C4":false
}
}</td></tr>
<tr><td colspan="3">If specifying a member with only Get access type (read-only), no error will occur and charges to the member will be ignored.
E.g.) “OnOperatingCycle” of Digital input unit (M12 type)</td></tr>
<tr><td colspan="4">Response</td></tr>
<tr><td>Data name</td><td>Data type</td><td>Value</td><td>Remarks</td></tr>
<tr><td colspan="4">Response status and status string</td></tr>
</table>

6.3.13 Acquiring log data

It reads the log data stored inside the product.

URL	http://aaa.bbb.ccc.ddd/api/v2/log/[pos]		
Send			
Data name	**Data type**	**Value**	**Remarks**
pos	Decimal	0 to 255	Specified in the URL.
Sample	Header only, no payload		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Value**	**Remarks**
L0,L1…	-	-	Represents the log index
ymd	Decimal Value	0 to 65535	Hours when the device unit received the error information. The milliseconds are in 10 ms units. Date range: January 1, 2000 to June 6, 2179
hour	Decimal Value	0 to 23	
minute	Decimal Value	0 to 59	
second	Decimal Value	0 to 59	
msecond	Decimal Value	0 to 99	
code	4 hexadecimal digits		16-bit data determined per unit. Refer to the Instruction Manual for each unit.
unit	8 hexadecimal digits		Unit ID
pos	Decimal Value	0 to 17	0 is this product. 1 to 17 is the position of the other units excluding the product, counted from the left to the right end.
ch	Decimal Value	0-63,255	The number of CH where the error occurred. If the CH is not identified because of a unit level error etc., 255 is used.

Sample	<pre>{
	  "L0":{
	  "ymd":0,
	  "hour":0,
	  "minute":0,
	  "second":0,
	  "msecond":0,
	  "code":"12AB",
	  "unit":"1234ABCD",
	  "pos":0,
	  "ch":0
	  },
	  "L1":{
	  …
	  }
	}</pre>		

Remarks	A maximum of 32 responses can be made. If retrieving more than 32 items, make successive requests by changing the pos. If the specified log does not exist, 404 will be returned.		

6.3.14 Clearing log data

It deletes the log data stored inside the product.

URL	http://aaa.bbb.ccc.ddd/api/v1/log/clear		
Send			
Data name	**Data type**	**Value**	**Remarks**
Sample	No		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Value**	**Remarks**
Response status and status string			

6.3.15 Acquiring process data

It acquires the process data covered by the product.

■ When acquiring data by unit

URL	http://aaa.bbb.ccc.ddd/api/v2/proc/[unit]		
Send			
Data name	**Data type**	**Value**	**Remarks**
[unit]	Decimal	0 to 17	Specifies the unit position. 0 is the position of the product and 1 to 17 is the position of the other units excluding the product, counted from the left to the right end. Specify in the URL.
Sample	Header only, no payload		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Value**	**Remarks**
The content varies depending on the type of the target unit. For details, refer to the following table and the instruction manual for each unit.			

■ When acquiring data by point, CH, or port

URL	http://aaa.bbb.ccc.ddd/api/v2/proc/[unit]/[pt]		
Send			
Data name	**Data type**	**Value**	**Remarks**
[unit]	Decimal	0 to 17	Specifies the unit position. 0 is the position of the product and 1 to 17 is the position of the other units excluding the product, counted from the left to the right end. Specify in the URL.
[pt]	Decimal	0 to 31	Specify the target point, CH, or port number. The specify possible maximum value varies depending on the unit.
Sample	Header only, no payload		
Methods	GET (no query string)		
Response			
Data name	**Data type**	**Value**	**Remarks**
The content varies depending on the type of the target unit. For details, refer to the following table and the instruction manual for each unit.			

■ Device unit (this product)

Sample	Access	Data type	Values/range	Remarks
{				
"SystemErr":true,	Get	bool	true, false	System error
"HardwareErr":true,	Get	bool	true, false	Hardware error
"OperationWaiting":false,	Get	bool	true, false	Waiting for operation
"PowerFailure":false,	Get	bool	true, false	Power failure
"UnitOutputErr":false,	Get	bool	true, false	Unit output error
"UnitInputErr":false	Get	bool	true, false	Unit input error
}		-	-	

■ Digital input unit

Sample	Access	Data type	Values/range	Remarks
{				
"pt0":true,	Get	bool	true, false	Point 0 input state ON：true、OFF：false
(omitted)				P0 to PN, the number of units N=7 or 15 or 31
}				

■ Digital output unit

Sample	Access	Data type	Values/range	Remarks
{				
"pt0":true,	Get/Set	bool	true, false	Point 0 output state ON：true、OFF：false
(omitted)				P0 to PN, the number of units N=15 or 31
}				

■ Analog input unit

Sample	Access	Data type	Values/range	Remarks
{				
"ch0":0x0000,	Get	4-digit hexadecimal string	0x0000 to 0xFFFF	CH0 input state Contents vary depending on range and format settings
"ch1":0xFFFF	Get	4-digit hexadecimal string	0x0000 to 0xFFFF	CH1 input state Contents vary depending on range and format settings
}				

■ Analog output unit

Sample	Access	Data type	Values/range	Remarks
{				
"ch0":0x0000,	Get/Set	4-digit hexadecimal string	0x0000 to 0xFFFF	CH0 output state Contents vary depending on range and format settings
"ch1":0xFFFF	Get/Set	4-digit hexadecimal string	0x0000 to 0xFFFF	CH1 output state Contents vary depending on range and format settings
}				

■ Valve I/F unit

Sample	Access	Data type	Values/range	Remarks
{				
"pt0":true,	Get/Set	bool	true, false	Point 0 output state ON：true、OFF：false
(omitted)				P0 to P31, the number of units
}				

■ IO-Link master unit:

Sample	Access	Data type	Values/range	Remarks
{				
"P0":{				Port 0 state
"di1":true,	Get	bool	true, false	Digital input 1
"di2":false,	Get	bool	true, false	Digital input 2
"do1":false,	Get/Set	bool	true, false	Digital output 1
"PortErr":false,	Get	bool	true, false	Port Error
"CommErr":false,	Get	bool	true, false	IO-Link communication error
"IOLErr":false,	Get	bool	true, false	IO-Link Errors
"IOLEnbl":false,	Get	bool	true, false	Process data enabled
"EveClr":false,	Get/Set	bool	true, false	Event clear
"PDIn":"0011AABB",	Get	Hex Binary String	Depends on the data size of the IO-Link device	Process data (Input)
"PDOut":"2233CCDD"	Get/Set	Hex Binary String	Depends on the data size of the IO-Link device	Process data (Output)
},				
"P1":{				Port 1 state
(omitted)				Same as P0
},				
"P2":{				Port 2 state
(omitted)				Same as P0
},				
"P3":{				Port 3 state
(omitted)				Same as P0
},				
"P4":{				Port 4 state
(omitted)				Same as P0
},				
"P5":{				Port 5 state
(omitted)				Same as P0
},				
"P6":{				Port 6 state
(omitted)				Same as P0
},				
"P7":{				Port 7 state
(omitted)				Same as P0
}				
}				

6.3.16 Process Data Settings

It sets the process data covered by the product.

■ When setting data on a unit basis

URL	http://aaa.bbb.ccc.ddd/api/v2/proc/[unit]		
Send			
Data name	**Data type**	**Value**	**Remarks**
[unit]	Decimal	0 to 17	Specifies the unit position. 0 is the position of the product and 1 to 17 is the position of the other units excluding the product, counted from the left to the right end. Specify in the URL.
The content varies depending on the type of the target unit. The data structure is the same as when acquiring the process data. For details, refer to “6.3.15 Acquiring process data”, the following table and the instruction manual for each unit.			
Methods	POST		

Remarks	Only some items can be specified for process data settings.
	E.g.) When turning on only points 1 and 6 of the digital output unit, post the following JSON data.
	{
	"pt1":true,
	"pt6":true
	}		

	If specifying a member with only Get access type (read-only) in the IO-Link master settings, no error will occur and charges to the member will be ignored.		
Response			
Data name	**Data type**	**Value**	**Remarks**
Response status and status string			

■ When setting data by point, CH, or port

URL	http://aaa.bbb.ccc.ddd/api/v2/proc/[unit]/[pt]		
Send			
Data name	**Data type**	**Value**	**Remarks**
[unit]	Decimal	0 to 17	Specifies the unit position. 0 is the position of the product and 1 to 17 is the position of the other units excluding the product, counted from the left to the right end. Specify in the URL.
[pt]	Decimal	0 to 31	Specify the target point, CH, or port number. The specify possible maximum value varies depending on the unit.
The content varies depending on the type of the target unit. The data structure is the same as when acquiring the process data. For details, refer to “6.3.15 Acquiring process data”, the following table and the instruction manual for each unit.			
Methods	POST		
Remarks	If specifying a member with only Get access type (read-only) in the IO-Link master settings, no error will occur and charges to the member will be ignored.		
Response			
Data name	**Data type**	**Value**	**Remarks**
Response status and status string			

6.3.17 Acquiring specific data

Acquire data specific to the product.

URL	http://aaa.bbb.ccc.ddd/api/v2/ids		
Transmission specifications			
Data name	**Data type**	**Value**	**Remarks**
Sample	No		
Methods	GET (no query string)		
Response specifications			
Data name	**Data type**	**Value**	**Remarks**
sn	8 hexadecimal digits		Serial number
mac	String		MAC address The XX part of the sample below is the specified value.
Sample	{ "sn":"1234ABCD", "mac":"3C:83:1E:0E:XX:XX" }		

6.3.18 Sends/receive ISDU of IO-Link master

Performs ISDU communication with IO-Link devices connected to the IO-Link master.

URL	http://aaa.bbb.ccc.ddd/api/v2/isdu/[iolm]/[port]		
Transmission specifications			
Data name	**Data type**	**Value**	**Remarks**
[iolm]	Decimal	0 to 17	Specifies the location of the IO-Link master unit. 0 is the position of the product and 1 to 17 is the position of the other units excluding the product, counted from the left to the right end. Specify in the URL.
[port]	Decimal	0 to 7	Specify the port number to which the target IO-Link device is connected.
rw	String	"read”,” write"	Select from the string list on the left
index	Decimal Value	0 to 65535	ISDU communication target index
subindex	Decimal Value	0 to 255	Target sub-index for ISDU communication
data	Hexadecimal Binary Strings	Maximum 232 bytes 464 characters	Transmission data for ISDU communication. Specify only when rw is "write"

Sample	{
	"rw":"write",
	"index":16,
	"subindex":0,
	"data":"11AA22BB33CC44DD"
	}		

Methods	POST		
Response specifications			
Data name	**Data type**	**Value**	**Remarks**
status	String	"complete”,” error"	Indicates whether ISDU communication was successful or failed.
errcode	2-digit hexadecimal string	0x00 to 0xFF	Error code. For details, refer to the IO-Link specification.
addcode	2-digit hexadecimal string	0x00 to 0xFF	Additional code. For details, refer to the IO-Link specification.
data	Hexadecimal Binary Strings	Maximum 232 bytes 464 characters	Reception data for ISDU communication. Only when rw is "read"

Sample	{
	"status":"complete",
	"errcode":"00",
	"addcode":"00",
	"data":"11AA22BB33CC44DD"
	}		

6.4 HTTP Response Status Code

The product supports the following status codes.

Number	Meaning	Conditions
200	OK	When the request was succeeded.
400	Bad Request	When the syntax of the request is disabled
401	Unauthorized	When the request requires authentication
404	Not Found	When the requested resource (URL) does not exist
405	Method Not Allowed	When a request is made with an unauthorized method
408	Request Timeout	When response cannot be made within a predefined time
413	Payload too Large	When the payload of the request is long
414	URI too Large	When the URI is long
500	Internal server Error	When any operation that is not defined by the product has occurred
501	Not Implemented	When accessed by anything other than GET, HEAD, or POST
505	HTTP Version Not Supported	When a request is made with an unsupported HTTP version

When the response is made with the above status code, it responds including JSON data as follows.

Response Sample	{
	"status": {
	"code":401,
	"title": "401 Not Authorized"
	}
	}

7. APPENDIX DIAGNOSTIC INFORMATION LIST FOR THE PRODUCT

This section lists the operations performed by the WebAPI compatible device unit in the event of an error and when recovering from one.

7.1 Device Unit Diagnostic Information

The lists of diagnostic information are as follows.

Error name	When	LED	LED status	State and countermeasures
Memory read/write error	On occurrence	SF (Device)	Red blinking (slow)	No WebAPI communication. No automatic recognition.
Memory read/write error	On recovery	SF (Device)	Green on	May recover by turning the power off and on again. If the problem persists, contact CKD.
Factory setting error	On occurrence	SF (Device)	Red blinking (twice)	(No specific behavior.)
Factory setting error	On recovery	SF (Device)	Green on	Factory setting is written and restored after turning the power off and on again. Contact CKD.
Unit configuration error	On occurrence	LED of all units	Red on	Automatic recognition failed. If the LEDs do not light up red, the assignment size of the variable I/O unit is recognized as 0. The SF LED on the device unit blinks yellow (fast).
		SF (Device)	Yellow blinking (fast)	Does not start WebAPI communication if it occurs at power-up. Stops WebAPI communication if it occurs during WebAPI communication.
Unit configuration error	On recovery	SF (Device)	Green on	May recover by reviewing the unit configuration and connections between units.
Process data overflow	On occurrence	SF (Device)	Green blinking (slow)	WebAPI communication does not start.
Process data overflow	On recovery	SF (Device)	Green on	Will recover by reviewing the unit configuration and making the process data size 512 bytes or less in the total IN/OUT.
Unit/input power voltage error	On occurrence	PS (Device)	Red blinking (fast)	The behavior of each unit becomes unstable or the power turns OFF. It will recover when the supply voltage is within normal range.
Unit/input power voltage error	On recovery	PS (Device)	Yellow on	After "latch reset" using the PC software, the PS LED on the device unit will be Green on (normal status).
Output power voltage error	On occurrence	PO (Device)	Red blinking (fast)	Will recover when the supply voltage is within normal range.
Output power voltage error	On occurrence	Output unit, except IO-Link master unit	Yellow on	Will recover when the supply voltage is within normal range.
Output power voltage error	On recovery	PO (Device)	Yellow on	After "latch reset" using the PC software, the PO LED on the device unit will be Green on (normal status).
Internal bus communication error	On occurrence	SF (Device)	Red blinking (fast)	(No specific behavior.) Communication is unstable due to electromagnetic waves or other influences.

Internal bus communication error	On recovery	SF (Device)	Green on	May recover by reviewing the connections between the units or eliminating external influences.
Initialized set memory	On occurrence	SF (Device)	Green blinking (fast)	WebAPI communication does not start. Each I/O unit may operate unintentionally.
Initialized set memory	On recovery	SF (Device)	Green on	Will recover by turning the power off and on again. It starts with the settings initialized.
Hardware error	On occurrence	SF (Device)	Red blinking (slow)	(No specific behavior.) Contact CKD.
Hardware error	On recovery	SF (Device)	Red blinking (slow)	If there are no other errors, the SF LED on the device unit will be Green on

8. WARRANTY PROVISIONS

8.1 Warranty Conditions

■ Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

- Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or this Instruction Manual.
- Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts. (Note[1])
- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by acts of nature and disasters beyond control of CKD.

Note 1: For details on the durability and consumable parts, contact your nearest CKD sales office.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or equipment used by the customer.

■ Others

The terms and conditions of this warranty stipulate basic matters.
When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

8.2 Warranty period

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.