CKD

Serial Transmission Device

TVG Series JA8*
(OPP8-A2TG／OPP8-A2TG-P)

CC-Link IE TSN Compatible

INSTRUCTION MANUAL

SM-A76006-A

- 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株式会社

PREFACE

Thank you for purchasing **CKD's serial transmission device**. 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.

- The product, which uses control valves such as solenoid valves, motor valves, and air operated valves, is intended for users who have basic knowledge about materials, fluids, piping, and electricity. CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training with respect to control valves.
- 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 due to fluid, piping, or other conditions. 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 fluid 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

⚠ 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. In addition, never modify or additionally machine this product.

The product is intended for use in devices or parts for general industrial machinery. It is not intended for use outdoors or in the conditions or environment listed below.

(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.)

- In applications for nuclear power, railroad system, aviation, ship, vehicle, medical equipment, and equipment that directly touches beverage or food.
- For special applications that require safety including amusement equipment, emergency shut-off circuit, press machine, brake circuit, and safety measures.
- For applications where life or properties may be adversely affected and special safety measures are required.

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

- 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.

CONTENTS

1. PRODUCT OVERVIEW

1.1 System Overview

1.1.1 System features

Make sure to read the instruction manual for each product.
This Instruction Manual describes the device OPP8-A2TG-*(JA8*) for TVG.
For the master unit and other remote units that are connected in the same system, refer to the instruction manuals issued by each manufacturer.
For manifold solenoid valves, make sure to read both this instruction manual and the solenoid valve's instruction manual to fully understand the functions and performance in order to use them correctly.

■ OPP8-A2TG-*(JA8*)

This is a device for TVG which can connect to the open field network CC-Link IE TSN specified by the CC-Link Partner Association (hereinafter referred to as CLPA).
It has the following features:

- The device is connected to PLC with only a network cable (Category 5e or higher), allowing significant reduction in wiring man-hours.
- The unit power and the valve power are separated, ensuring easy maintenance.
- The IP address of the device can be set with hard switching.
- The valve output status in the event of a communication error can be set by switches. (Hold all points output/ Clear all points output).
- The device is available in +COM or -COM specification.

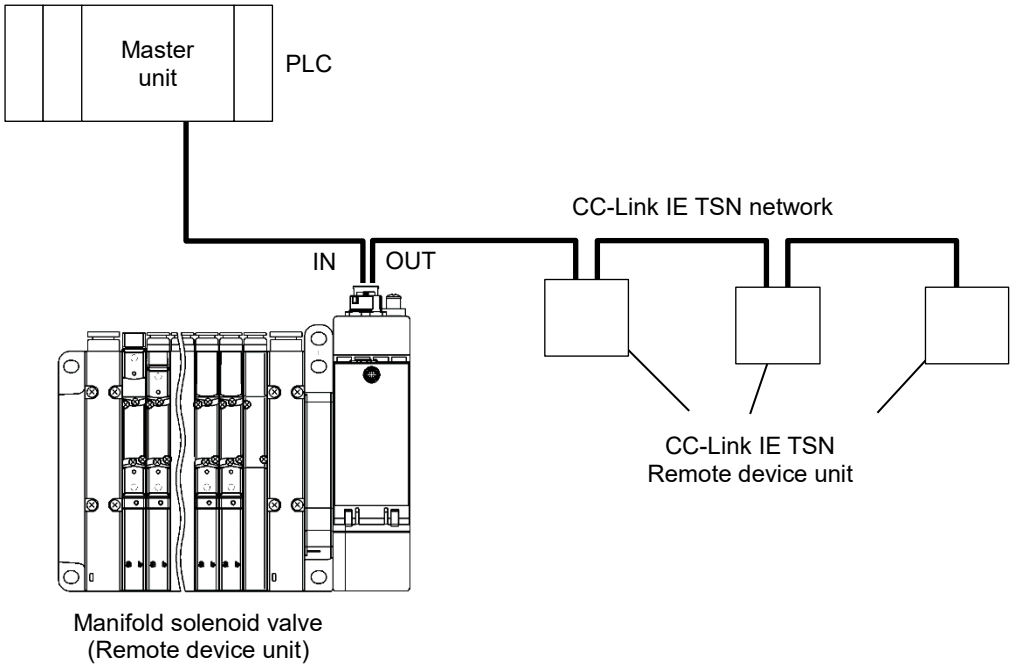
1.1.2 System structure

This system mainly consists of a PLC, master unit, OPP8-A2TG-* mounted manifold solenoid valve, and peripheral equipment (CC-Link IE TSN Remote device units).

■ Examples of PLC and master unit combination

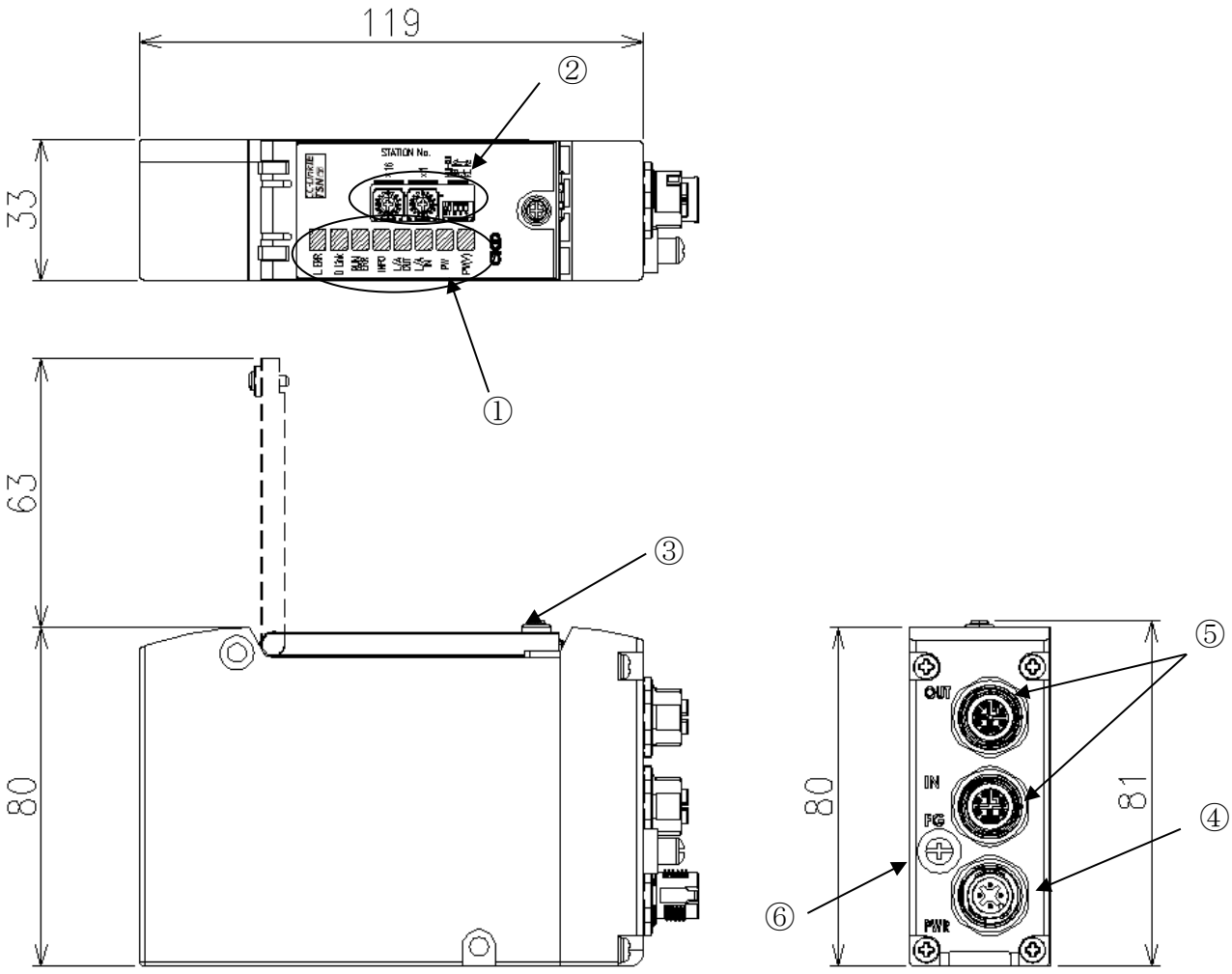
PLC manufacturer	Compatible PLC	Master unit model
Mitsubishi Electric Corporation	MELSEC-R Series	RJ71GN11-T2

■ Example of basic structure of the system



1.2 Part Name

1.2.1 Parts of the device



No.	Name	Description
①	LED indicators	Indicates the status of the device and network with D Link, RUN/ERR, LINK/ACT OUT, LINK/ACT IN, INFO, PW, and PW (V).
②	Rotary switches	Set the IP address of the device.
	Slide switches	Set the operation at communication error and baud rate.
③	Cover	Protects the LEDs and setting switches.
④	Unit/valve power plug [PWR] M12 A code	Connects unit/valve power socket.
⑤	Network connector sockets [IN, OUT] M12-X code	Ports transmit CC-Link IE TSN communication to the next device or receive(IN) it from the previous device. Note: There is no difference in the function between input(IN) and output(OUT) ports which only named to distinguish each port. (Except when the Fast Link-up function is ON).
⑥	FG terminal	Connects FG(frame grounding) to the terminal.

1.2.2 Switches and LED indicators

⚠CAUTION

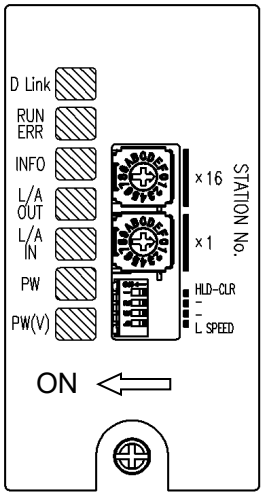
Discharge static electricity from your body before touching the product.
Static electricity may cause damage to the product.

■ Switches

These switches set the output in the event of a communication error and the device station number. Set the switches with the power turned off.

Switches		Settings
STATION No.	IP address setting switch (x16)	Set the IP address of the device. Refer to 3.1.1 for the settings.
	IP address setting switch (x1)	
HLD–CLR	Communication error output setting switch	Sets the output status in the event of a communication error. Refer to 3.1.2 for the settings.
L.SPEED	Baud rate setting switch	Sets baud rate. Refer to 3.1.3 for the settings.

*In the right figure, the slide switch is [ON] when it is in the left position.

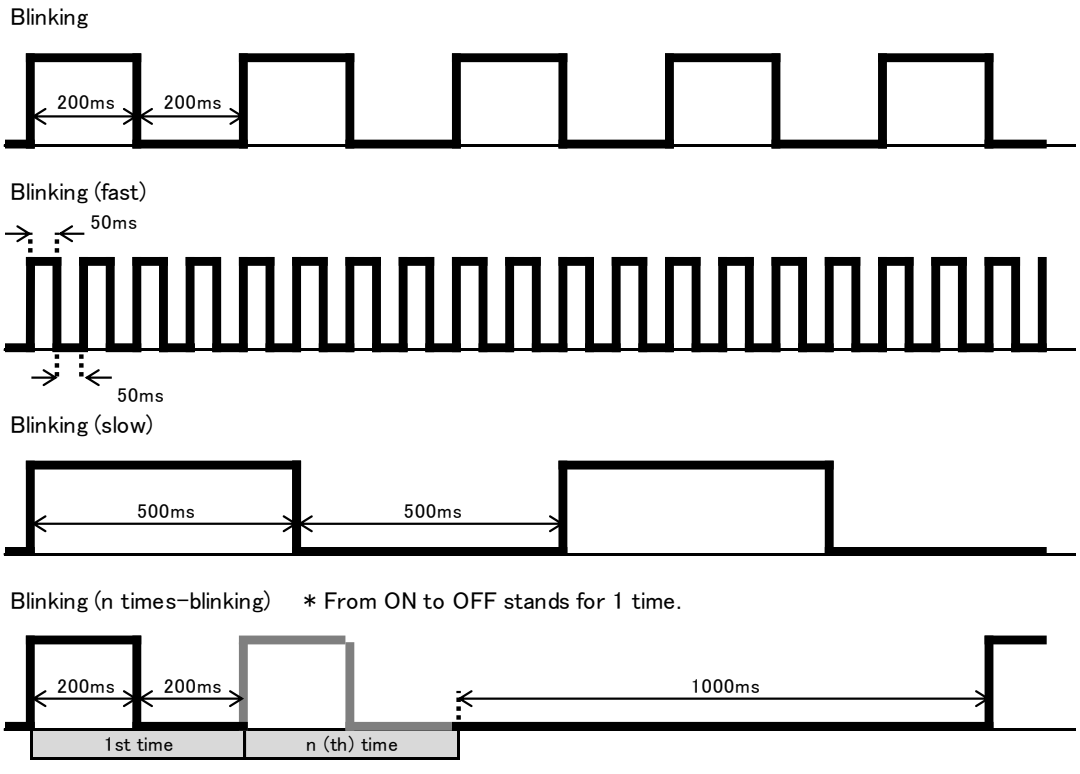


■ LED indicators

These LEDs indicate the status of the product and network.

LED	Function	Status	
D Link	Data link	Off	Data link has not connected yet.
		Green on	Data link is in process.
		Green blinking	Data link is stopped.
RUN/ERR	Operating status	Off	In initializing
		Red blinking	IP address error or IP address duplication occurred.
		Red on	In parallel off.
		Green on	Operating normally.
INFO	Notification	Off	There is no notification.
		Red blinking	Forced output setting is in process.
		Red blinking (slow)	Maintenance notice
		Red blinking (fast)	Moderate error (EEPROM error, MAC address error, Industrial Ethernet identification code error) occurred.
		Red flashing (twice)	Minor error occurred (Detected switch operation).
		Red on	Error related to industrial Ethernet communication (network synchronization error) occurred.
LINK/ACT OUT,IN	OUT(P1), IN(P2) Link status	Off	Neither link nor activity
		Green on	Link OK
		Yellow blinking	Activity OK
PW	Unit power status	Off	Unit power is OFF
		Green on	Unit power is ON
PW(V)	Valve power status	Off	Valve power is OFF
		Green on	Valve power is ON

Followings are the blinking pattern of the LED.



1.3 Specifications

1.3.1 Communication specifications

Item	Specifications
Communication protocol	CC-Link IE TSN (Conformance Class B)
Unit type	Remote station
Baud rate	1Gbps / 100Mbps
Communication media	Ethernet cable (Category 5e or higher) Shielded twisted pair cable
Network topology	Line, star, or ring type
Distance between nodes	Up to 100m

1.3.2 Device specifications

The product must be used within the following specifications.

Item		Specifications	
Model		**OPP8-A2TG (JA8C)**	**OPP8-A2TG-P (JA8D)**
Unit power voltage		21.6 VDC to 26.4 VDC (24 VDC ±10%)	
Unit power current consumption		100 mA or less (all points ON at 24.0 VDC)	
Valve power voltage		22.8 VDC to 26.4 VDC (24 VDC +10%, -5%)	
Valve power current consumption		10 mA or less (when all points OFF) /15 mA or less (when all points ON at no load)	
Output type		+COM (NPN)	-COM（PNP）
Number of output point		32 points	
Insulation resistance		Between external terminals and the case: 30 MΩ or more with 500 VDC	
Withstand voltage		Between external terminals and case: 500 VAC for 1 minute	
Shock resistance		294.0 m/s^2 for 3 times in 3 directions	
Storage ambient temperature		-20°C to 70°C	
Storage humidity		30% to 85% RH (no dew condensation)	
Ambient temperature		-5°C to 55°C	
Ambient humidity		30% to 85% RH (no dew condensation)	
Atmosphere		No corrosive gas	
Output insulation		Photo coupler insulation	
Max. load current		40 mA/1 point	
Leakage current		0.1 mA or less	
Residual voltage		0.5 V or less	
Fuse		Valve power: 24V, 3A / Unit power 24V, 2A (Both fuses are non-replaceable)	
Degree of protection		IP65 / IP67	
Vibration resistance	Durability	10 Hz to 55 Hz to 10 Hz, 1 octave/min., 15 sweeps each in X, Y, Z directions with 0.75 mm half-amplitude or 98.0 m/s^2, whichever smaller.	
	Malfunction	10 Hz to 55 Hz to 10 Hz, 1 octave/min., 4 sweeps each in X, Y, Z directions with 0.5 mm half-amplitude or 73.5 m/s^2, whichever smaller.	

* For the delay time, refer to the instruction manual for the master unit. Transmission delay as a system varies depending on the PLC scan time and other devices connected to the same network.
* For the response time of the solenoid valve, check the solenoid valve specifications.
* Solenoid valve Off time is delayed by approximately 20 msec due to the surge absorbing circuit integrated in the device.

2. INSTALLATION

2.1 Mounting

⚠CAUTION

Before handling the device, touch a grounded metal part to discharge static electricity from your body.
Static electricity may cause damage to the product.

Do not apply tension or shocks to the power cable or network cable.
If the wiring is long, the cable weight or shocks may cause an unexpected force and result in damage to the connector or device.
Take appropriate measures; for example, secure the wiring to the machine or device midway.

When wiring, be careful of the following points to prevent problems caused by noise.

- If noise could have an effect, prepare power for each manifold solenoid valve and wire independently.
- Wire the power cable as short as possible.
- Wire the power cables for the product separately from the power cables for noise-generating devices such as inverter motors.
- Wire the power cable and network cable away from other power lines as much as possible.

Wire the power cable and network cable properly within its specifications.
Incorrect wiring may cause the device to malfunction or break.

Check that cables and connectors are securely connected before turning on the power.

1 Connect the network cable and power cable.
Check both this Instruction Manual and instruction manuals for PLC and each unit in the system and connect them properly.
Incorrect connection may cause not only a system failure but also serious fault to the other devices.

2 Keep 200 mm or more away from high-voltage lines and power lines or wire the high-voltage lines and power lines in metal tubing and ground it before mounting this device.

2.2 Wiring

2.2.1 Connecting and wiring to the network connector socket

⚠WARNING

Turn off the power before wiring.
An electric shock may occur by touching the electrical wiring connection (bare live part).

Do not touch live parts with bare hands.
An electric shock may occur.

Thoroughly read and understand this Instruction Manual before working on electrical wiring.

⚠CAUTION

Check the working voltage and polarity before wiring and energizing.

Take measures against lightning surges on the device side.
The product has no resistance to lightning surges.

Use a dedicated network cable that complies with CC-Link IE TSN specifications.

Provide sufficient bending radius for the network cable and do not bend it forcibly.

Separate the network cable from power lines and high-voltage lines.

Although the CC-Link IE TSN network uses a standard Ethernet cable and has flexible wiring methods, there are limits depending on the wiring material and equipment (master unit, hub, and other devices) used. Always understand their specifications thoroughly before wiring. For more information, refer to the instruction manual issued by the master unit manufacturer or CLPA(CC-Link Partner Association).

The network plug is not supplied with the product. Separately purchase a network plug that satisfies the specifications.
By wiring the network cable to a network plug, that plug can be connected to the network connector socket on the device.

Recommended cable with plug: Cat.5e

Manufacturer	Cable	Model
Mitsubishi Electric System & Service Co., Ltd.	Industrial Ethernet cable (double shielded)	SC-E5EW-□
* □ differs depending on the cable specifications.		

Recommended assembly type M12 connector

Manufacturer	Connector	Model
Phoenix Contact KK	Assembly type M12 connector (SPEEDCON mating method)	1411043(SACC-MSX-8QO)

■ Connecting the network cable

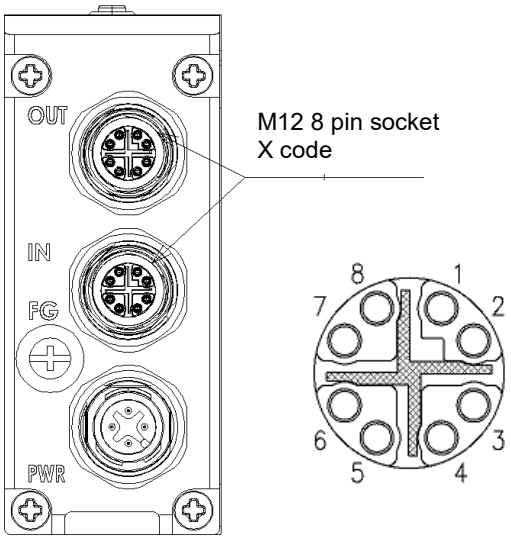
Follow the steps below to connect the network cable to the network socket.

1 After confirming safety, stop network communication and turn off all peripheral equipment.

2 Refer to the following figure and wire the CC-LINK TSN compliant cable to the M12 connector.

Note: There is no difference in the function between input(IN) and output(OUT) ports which only named to distinguish each port.

Note: The communication of the device turns OFF when the previous device is OFF.



Port	Pin	Signal	Function
IN/ OUT	1	BI_DA+	Bi-directional pair A +
	2	BI_DA-	Bi-directional pair A -
	3	BI_DB+	Bi-directional pair B +
	4	BI_DC+	Bi-directional pair C +
	5	BI_DC-	Bi-directional pair C -
	6	BI_DB-	Bi-directional pair B -
	7	BI_DD+	Bi-directional pair D +
	8	BI_DD-	Bi-directional pair D -

2.2.2 Connecting and wiring to the unit/valve power plug

⚠CAUTION

Always check the polarity and rated voltage thoroughly before connecting cables.

Calculate the current consumption to select the power cable.

Consider the voltage drop due to cables when selecting and wiring the cables if power is supplied to more than one device (remote device unit) from one power supply.

Take measures to secure the specified power supply voltage if voltage drop cannot be avoided.

For example, wire the power cables in multiple systems or install other power supplies to secure the specified power supply voltage.

Install a terminal block if multi-drop wiring of the power cables is needed.

In this product, the unit power supply and the valve power supply are separated. In addition, each power supply is connected by an M12 connector (socket).
Note: Power connector is not supplied. Separately purchase a power supply connector that satisfies the specifications.

Unit power

This electrical power is for operating the device. Use 21.6 VDC to 26.4 VDC power with the least noise.

Valve power

This electrical power is for operating the solenoid valve. Use 22.8 VDC to 26.4 VDC power supply with the least noise.

Recommended M12 connector (socket) loose wire type power cable

Manufacturer	Name	Model
Omron Corporation	Straight type	XS2F-D421-□8-□
* □ differs depending on the cable specifications.		

Recommended M12 connector and power cable

Manufacturer	Name	Model
Phoenix Contact KK	Assembly type connector (SPEEDCON mating method)	1424655(SACC-M12FS-4PL M)
Cable size : AWG26 to 18, outside diameter of compatible cable : 4 to 8 dia.		

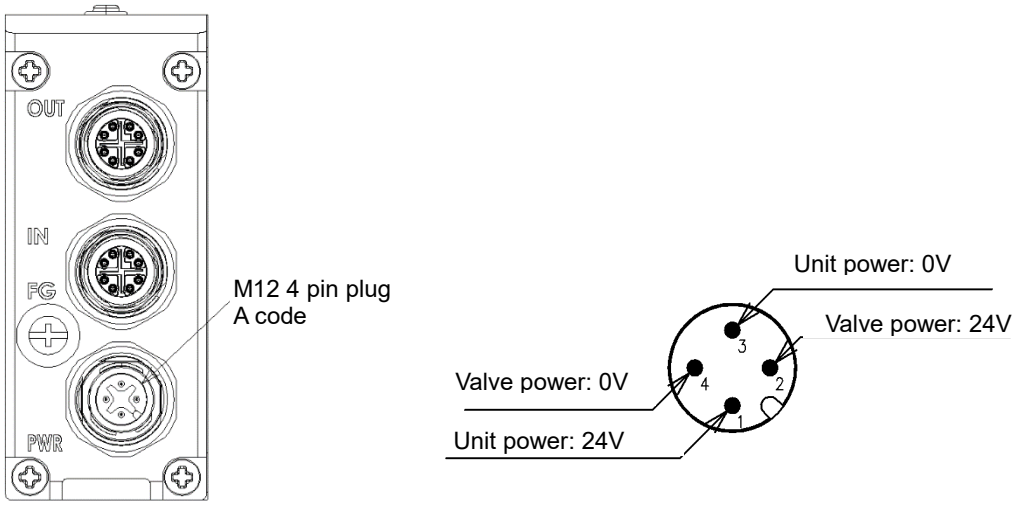
■ Connecting the power cables

Follow the steps below to connect the unit/valve power cables to the power plug.

1 After confirming safety, stop network communication and turn off all the peripheral equipment.

2 Refer to the figure below and wire the cable to the M12 connector.

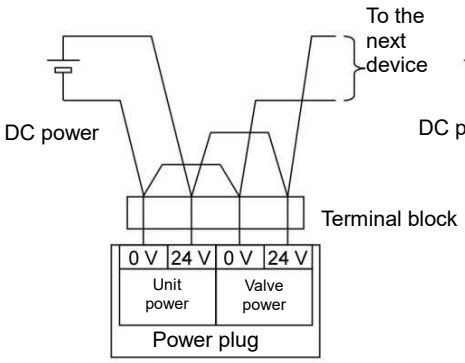
3 Connect it to the unit/valve power plug and fix with the appropriate tightening torque (0.4 N · m).



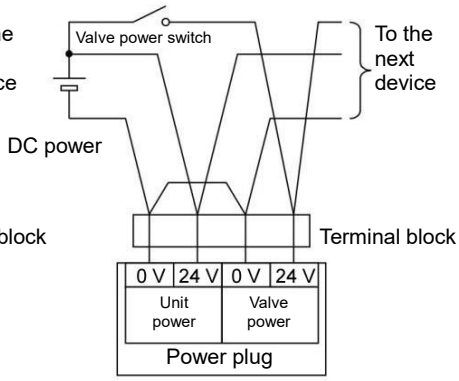
■ Wiring the power cable

Figures 1 to 3 are examples of the wiring for the power plug.
Change the circuit configuration as necessary.

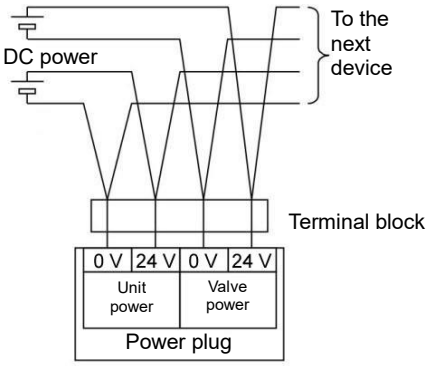
1. Common connection for unit power and valve power



2. Connection for turning on/off valve power



3. Separate connection for unit power and valve power



3. USAGE

⚠WARNING

Consult CKD about the specifications before using the product outside the designated specifications or for special applications.

⚠CAUTION

Thoroughly read and understand the instruction manual for the network system to be used before using the serial transmission device.

Check the hard switching setting value of serial transmission device carefully before use.
Improper setting value may cause valves or cylinders to malfunction.

Be careful of the surroundings and ensure safety before turning on or off the power.
The system or solenoid valve (cylinder) may operate suddenly.

3.1 Switch settings

⚠CAUTION

Discharge static electricity from your body before touching the product.
Static electricity may cause damage to the product.

Set switches while the unit power is turned off.
Since switch settings are read when the power is turned on, changes made to the settings after turning on the power are not recognized.

Keep the cover of serial transmission device closed except when setting the switches.
The cover may become damaged or foreign matters may enter inside and cause unexpected failure.

Be careful not to allow any foreign matter to enter inside when setting the switches.
Unexpected failure may result.

Do not handle switches roughly.
Switches are precision devices and can be easily damaged.

Do not touch the internal circuit board when setting the switches.
The internal circuit board can be easily damaged.

When the rotary switch is set to [00], [3.1.1 IP address setting] and [3.1.2 Output setting in the event of a communication error] become disable and the setting using engineering tool becomes enable.
Refer to [3.2 Setting by CSP+ system profile+] for the setting using engineering tool.

3.1.1 IP address settings

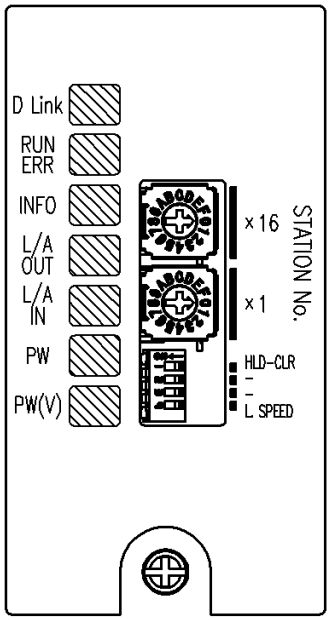
Set the IP address of the device. The IP address will be 192.168.3.[set value by rotary switch].
The 1st to 3rd octets of the IP address will be automatically set to the same value as the master unit when communicating with it.
Set the rotary switch to "00" when setting the IP address with an engineering tool.

Settings are in hexadecimal.
Refer to the following table for converting the value.

Switches	STATION No. x16, x1
Setting range	01 to FE (hexadecimal) [1 to 254 (decimal)]

x16 Switch		
Setting value (hexadecimal)	⇔	Decimal
0	⇔	0
1	⇔	16
2	⇔	32
3	⇔	48
4	⇔	64
5	⇔	80
6	⇔	96
7	⇔	112
8	⇔	128
9	⇔	144
A	⇔	160
B	⇔	176
C	⇔	192
D	⇔	208
E	⇔	224
F	⇔	240

x1 Switch		
Setting value (hexadecimal)	⇔	Decimal
0	⇔	0
1	⇔	1
2	⇔	2
3	⇔	3
4	⇔	4
5	⇔	5
6	⇔	6
7	⇔	7
8	⇔	8
9	⇔	9
A	⇔	10
B	⇔	11
C	⇔	12
D	⇔	13
E	⇔	14
F	⇔	15



Example: To set the address to 71 (decimal)
Since 71 = 64 + 7, set the [x16 switch] to 4 and the [x1 switch] to 7.

IP address settings with engineering tool.

1. Make the device being communicable with the master unit.
   (The factory setting IP address is [192.168.3.100])
2. Execute the parameter processing with the engineering tool and change the IP address to the desired value.
   Note: Refer to the manual of the engineering tool for specific operation.
3. Turn off then on the power. The product will be restarted with the changed IP address.

3.1.2 Output settings in the event of a communication error

Sets the output status in the event of a communication error.
When setting the output in the event of a communication error using engineering tool, set the rotary switch to "00".
The factory setting is all points OFF(clear)mode when the rotary switch is set to “00”.

Switches	Settings
HLD – CLR (Output mode settings)	Sets the output status when a communication error occurs. (such as disconnection and timeout) ON : Hold mode (hold the output) OFF : Clear mode (output OFF)

Output settings in the event of a communication error with engineering tool.

1. Set the rotary switch for IP address setting to [00] so that the device can communicate with the master unit.
   Note: Refer to [IP address settings with engineering tool] of "3.1.1 IP address settings".
2. Execute the parameter processing with engineering tool and change OutputCommFaultEnable and OutputCommFaultValue to the desired value.
   Note: Refer to the manual of the engineering tool for specific operation.
   Note: Changes made with the engineering tool will be reflected immediately.

3.1.3 Baud rate setting

Sets baud rate.
Set the baud rate to the same as the master unit.

Switches	Settings
L. SPEED. (Baud rate setting)	Set baud rate. ON : 100Mbps OFF : 1Gbps

3.2 Settings by CSP+ system profile

Using the CSP+ file makes the product setting easy with engineering tool.
Refer to the manual of the engineering tool for handling CSP+ file.

CSP+ file name: 0x0104_OPP8(CC-Link IE TSN)series.zip

The above file includes the following models.
- OPP8-A2TG
- OPP8-A2TG-P

Refer to the following table for selecting the model.

Item	Model name in CSP+ file	
Model	OPP8-A2TG（JA8C）	OPP8-A2TG-P（JA8D）
Model name	OPP8-2TG	OPP8-2TG-P
Output type	+COM（NPN）	－COM（PNP）
Number of output point	32 points	
CSP+ file name	0x0104_OPP8-2TG_1_en	0x0104_OPP8-2TG-P_1_en

3.2.1 Parameter acquisition/settings

Using the CSP+ file enables acquiring and setting parameters with engineering tool.
Refer to the manual of the engineering tool for operation.

Following parameters are available for setting and acquisition..
Only some parameters correspond to the parameter setting. “Y” in the setting column indicates the corresponding parameters.

Product Information

Parameters	Description	Setting
ModelCode	Indicates product code.	
SoftwareVersion	Indicates software version.	

Network Information

Parameters	Description	Setting
IpMode	Indicates the current operating mode. Hardware switch :Switch setting Software settings : Value set in parameter setting	
IpAddress	Indicates the IP address of the device. The value is shown when it is changed in the parameter setting.	Y
SubnetMask	Indicates the subnet mask of the device. The value is shown when it is changed in the parameter setting.	Y
DefaultGateway	Indicates the default gateway of the device. The value is shown when it is changed in the parameter setting.	Y
Speed	Indicates baud rate. 1Gbps : 1 Gbps 100Mbps : 100 Mbps	
Sync	Indicates the network synchronization status. Asynchronous: Network synchronization function disabled Synchronous: Network synchronization function enabled	

Product Status

Parameters	Description	Setting
MaintenanceEnable	Sets the maintenance monitoring item (Note 1). Enable : Monitoring Disable : Not monitoring	Y
MaintenanceDetect	Indicates the status of the maintenance monitoring item (Note 1). Detecting : Monitoring conditions are satisfied Undetected : Monitoring conditions are not satisfied	
EnergizationTime	Indicates the total time (energization time) when the power of the product was ON. (in seconds)	
EnergizationTimeThershold	Sets the value for determining the Energization time monitoring. (in seconds)	Y
ValvePower	Indicates the valve power status.	

Note 1: Following table indicates each item of maintenance monitoring and monitoring conditions.

Parameters	Description	Monitoring condition
Valve power supply error	Valve power failure	When the valve power is OFF.
Error	Moderate error	When an internal hardware error is detected.
Warning	Minor error	When the switch is operated.
Energization time monitoring	Energization time monitoring	When “EnergizationTime” exceeds ”EnergizationTimeThreshold.”
Output count/time monitoring	Output monitoring	When any of “OutputOnCountDetect” or “OutputOnTimeDetect” becomes “Detecting.”

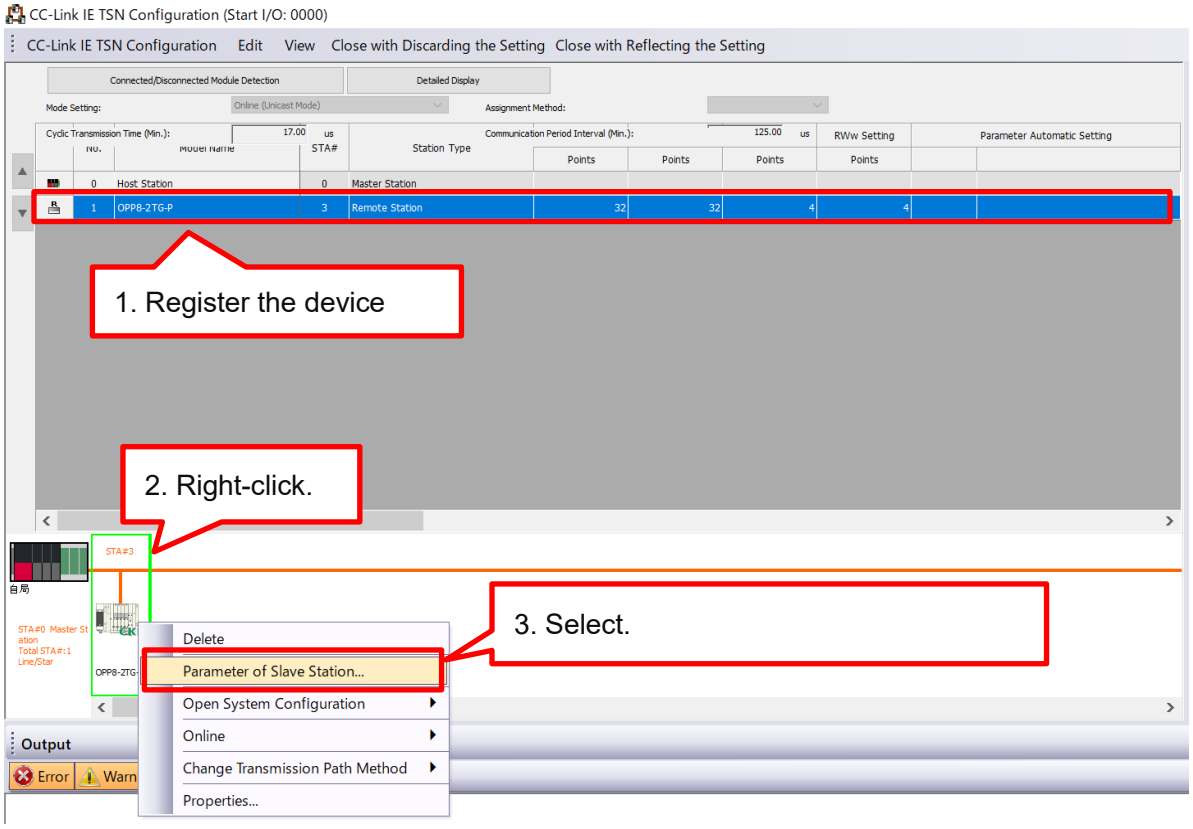
Output

Parameters	Description	Setting
OutputIO	Indicates the status of each output.	
OutputCyclic	Indicates the output status notified by the master unit.	
OutputForcedEnable	Sets the forced output of each output. Enable : Outputs the value set in ”OutputForcedValue”.) Disable :Do not output the value.	Y
OutputForcedValue	Sets the output value when the forced output of each output is enabled.	Y
OutputCommFaultMode	Indicates the output setting mode when communication with the master unit becomes abnormal. Hardware switch :Switch setting Software settings : Value set in parameter setting	
OutputCommFaultEnable	Sets output pattern of each output when communication with the master unit becomes abnormal. Output value at communication error : OutputCommFaultValue Hold : Hold	Y Note 2
OutputCommFaultValue	Sets output if “Output value at communication error” is selected for the output pattern of each output when communication with the master unit becomes abnormal.	Y Note 2
OutputOnCountEnable	Sets whether to monitor the ON counts of each output. Enable : Monitor the ON counts Disable :Do not output the value.	Y
OutputOnCountDetect	Indicates the ON counts monitoring status of each output. Detecting : ”OutputOnCount” exceeds ”OutputOnCountThreshold” Undetected : Other than the above.	
OutputOnCountThreshold	Sets the value for determining the ON counts monitoring of each output. Note: Value is common to all outputs. No individual setting.	Y
OutputOnCount_No00~No31	Indicates the number of times each output has turned on.	Y
OutputOnTimeEnable	Sets whether to monitor the ON time of each output. Enable : Monitor the ON time. Disable :Do not monitor the ON time.	Y
OutputOnTimeDetect	Indicates the ON time monitoring status of each output Detecting : “OutputOnTime” exceeds “OutputOnTimeThreshold” Undetected : Other than the above.	
OutputOnTimeThreshold	Sets the value for determining the ON time monitoring of each output. (in seconds) Note: Value is common to all outputs. No individual setting.	Y
OutputOnTime_No00~No31	Indicates the total time that each output was ON. (in seconds)	Y

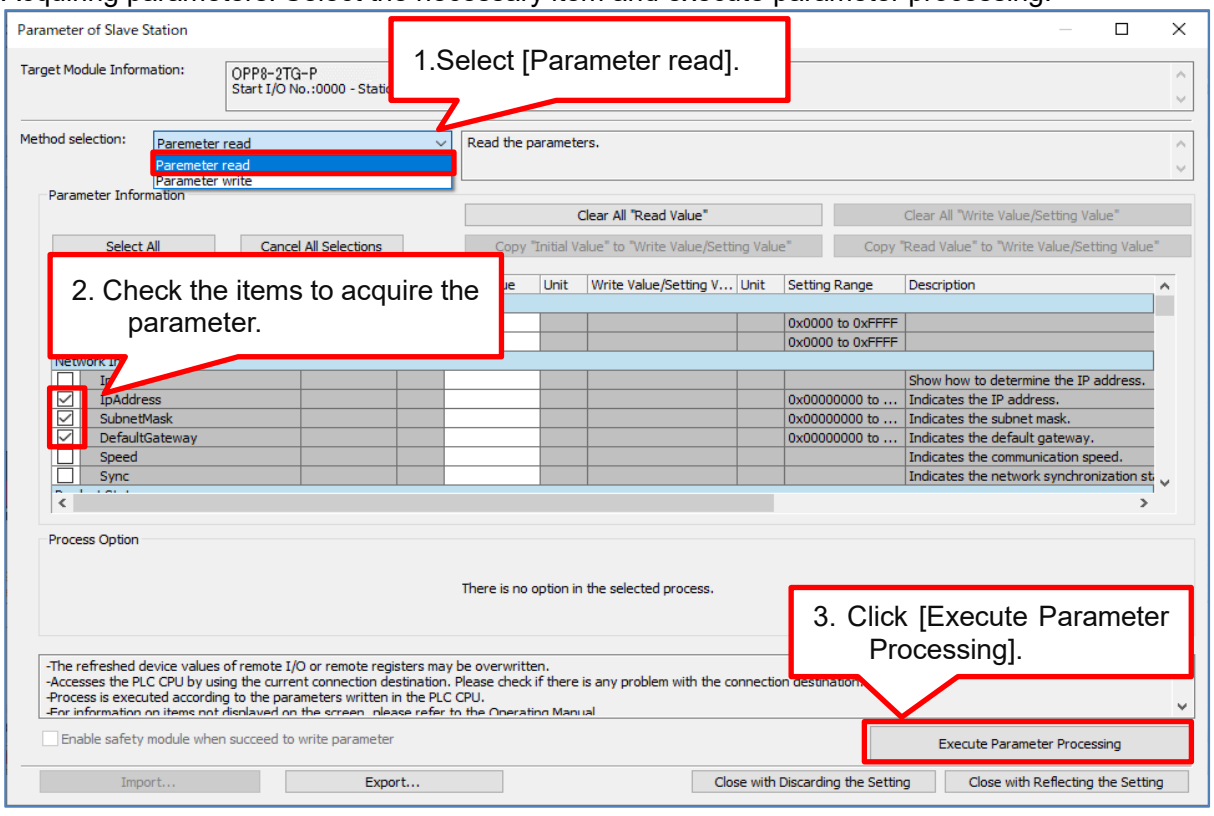
Note 2: Setting is available only when ”OutputCommFaultMode” is set to [Software settings].

Described is an example of the setting method using GX Works3 manufactured by Mitsubishi Electric Corporation.
Refer to the manual of the engineering tool for operation.

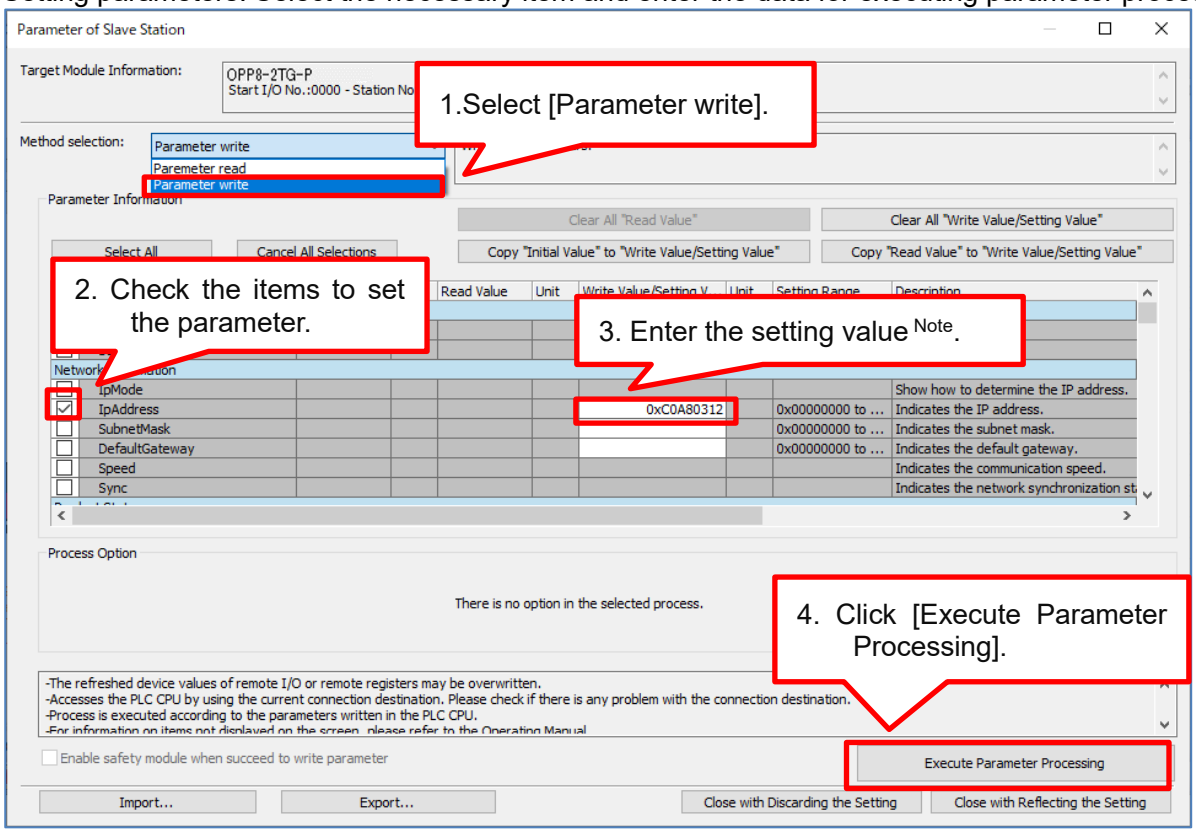
Preparation: At the [CC-Link IE TSN Configuration], register the setting device and open the parameters of the remote unit.



Acquiring parameters: Select the necessary item and execute parameter processing.

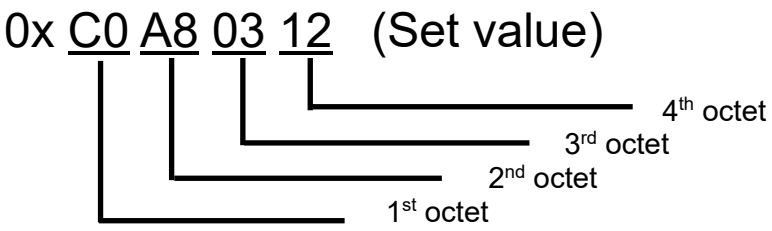


Setting parameters: Select the necessary item and enter the data for executing parameter processing.



Note: Enter the set value in hexadecimal.

Refer to the following for the correspondence between the set value and the IP address. Following example shows the IP address as 192.168.3.18.



3.3 Remote setting

3.3.1 Remote I/O

Following table is an example of allocation from RY0. There is no remote input (RX).

Remote I/O	Solenoid output no.
RY0	s1
RY1	s2
RY2	s3
RY3	s4
RY4	s5
RY5	s6
RY6	s7
RY7	s8
RY8	s9
RY9	s10
RYA	s11
RYB	s12
RYC	s13
RYD	s14
RYE	s15
RYF	s16
RY10	s17
RY11	s18
RY12	s19
RY13	s20
RY14	s21
RY15	s22
RY16	s23
RY17	s24
RY18	s25
RY19	s26
RY1A	s27
RY1B	s28
RY1C	s29
RY1D	s30
RY1E	s31
RY1F	s32

3.3.2 Remote register

Following table is an example of allocation from RWr0. There is no remote register (RWw) from the master unit to the product.

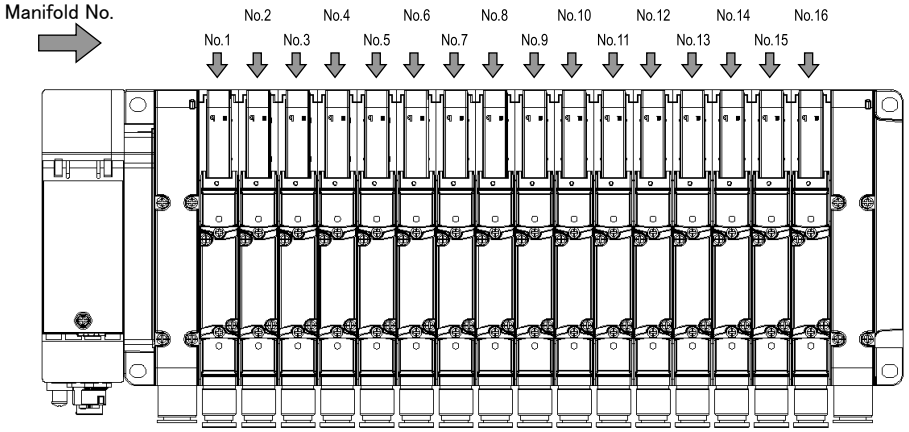
<table>
<tr><th>Remote register</th><th>Parameters</th></tr>
<tr><td>RWr0</td><td>Indicates the status of the maintenance monitoring item.
<table>
<tr><th>Bit</th><th>15 to 8</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>Item</td><td>0</td><td>Output monitoring</td><td>0</td><td>Energization time monitoring</td><td>0</td><td>Minor error</td><td>Moderate error</td><td>0</td><td>Valve Power failure</td></tr>
</table>
Note: Each bit becomes 1 when monitoring condition is satisfied.
Note: Refer to the product status of “3.2.1 Parameter acquisition/setting” for monitoring conditions.</td></tr>
<tr><td>RWr1</td><td>Watchdog counter (when network synchronization is enable)</td></tr>
<tr><td>RWr2,3</td><td>(Reserve)</td></tr>
</table>

3.3.3 Example of valve number array corresponding to solenoid output number

In the table below, each valve number consists of a number (the station number) and an alphabet (a for a-side solenoid and b for b-side solenoid). For example, “1a” refers to 1st station a-side solenoid. Also, “V” stands for “Vacant.”
Manifold stations are numbered in order from left to right with the piping port towards the user (refer to the figure below).
As appearance and maximum number of stations differ depending on the solenoid valve model, check individual specifications.

<OPP8-A2EC, OPP8-A2EC-P (32-point output)>

The figure below is an example of mounting sixteen stations of double-solenoid type manifold valves.
There is no solenoid on the b-side for single-solenoid type.



Standard wiring (Double wiring)

- Single solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	(V)	2a	(V)	3a	(V)	4a	(V)	5a	(V)	6a	(V)	7a	(V)	8a	(V)

Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	9a	(V)	10a	(V)	11a	(V)	12a	(V)	13a	(V)	14a	(V)	15a	(V)	16a	(V)

- Double solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b

Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	9a	9b	10a	10b	11a	11b	12a	12b	13a	13b	14a	14b	15a	15b	16a	16b

- Mixed (both single and double solenoid valves are mounted) [example]

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	(V)	2a	(V)	3a	3b	4a	4b	5a	(V)	6a	(V)	7a	7b	8a	(V)

Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	9a	(V)	10a	(V)	11a	11b	12a	(V)	13a	(V)	14a	14b	15a	15b	16a	(V)

Designation of Single Solenoid and Double Solenoid Arrangement

- Single solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	13a	14a	15a	16a
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	17a	18a	19a	20a	21a	22a	23a	24a	(V)	(V)	(V)	(V)	(V)	(V)	(V)	(V)

- Double solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	9a	9b	10a	10b	11a	11b	12a	12b	13a	13b	14a	14b	15a	15b	16a	16b

- Mixed (both single and double solenoid valves are mounted) [example]

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	2a	3a	3b	4a	4b	5a	6a	7a	7b	8a	9a	10a	10b	11a	11b
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	12a	13a	14a	14b	15a	15b	16a	(V)	(V)	(V)	(V)	(V)	(V)	(V)	(V)	(V)

3.4 Programming

This product is treated as a remote station from the master unit.

There are two types of I/O data: RY (remote output) data sent from the master unit to the remote station (this product) and RX (remote input) data sent from the remote station to the master unit.
This product is an output device that receives remote output data from the master unit and output to the valve.
(There is no remote input).

Refer to the instruction manual issued by the PLC manufacturer when programming.
Refer to the following table to program the I/O mapping.
The setting made to specify which action to take on the output in the event of an error is a unique function of this device. This output status setting does not affect the program.

Mapping for RY data

Output points		RY☐																RY☐+1													
32 points	4 Bytes	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

4. MAINTENANCE AND INSPECTION

⚠WARNING

Turn off the power, stop the supply of compressed air and make sure that there is no residual pressure before conducting maintenance.

Do not disassemble, modify, or repair the product.
These may cause failure or malfunction.

⚠CAUTION

Plan and perform daily and periodic inspections so that maintenance can be managed properly.
If maintenance is not properly managed, the product's functions may deteriorate significantly. This may lead to faults (such as short service life, damage, and malfunctions) or accidents.

Do not drop or apply excessive vibrations or shocks to the product.
These may cause damage since the product inside is made with precision.

4.1 Periodic Inspection

This section describes the cleaning and inspection of the device for daily maintenance and what to do when replacing the device. In order to use the product under optimum conditions, clean and inspect the product periodically.

■ Cleaning

1. For daily cleaning, wipe the product with a soft dry cloth.
2. When stains cannot be removed by wiping with a dry cloth, moisten the cloth with diluted neutral detergent (2%), wring it out well, and wipe off the stains.
3. Objects such as rubber, vinyl, or tape may stain the device if they are left in contact with the device for a long period. Remove such objects when cleaning if they are leaving stain on the product.

■ Inspection

Perform inspection once or twice a year.
Perform inspections at shorter intervals if using the product in an environment with extremely high temperatures, high humidity, a lot of dust, etc.

<Inspection item>
Inspect the following items to make sure that each item satisfies the criteria.
If any item does not meet the criteria, improve the surrounding environment or adjust the device.

Inspection item	Description	Criteria	Inspection method
Environment	Is the surrounding and in-panel temperature appropriate?	Refer to "1.3.2 Device specifications".	Thermometer
	Is the surrounding and in-panel humidity appropriate?	Refer to "1.3.2 Device specifications".	Hygrometer
	Is there any accumulated dust?	No dust	Visual inspection
Installation	Is the device fixed securely?	No looseness	Hexagonal wrench
	Is the power cable connector fully inserted?	No looseness	Visual inspection
	Is the network cable connector fully inserted?	No looseness	Visual inspection
	Is the connection cable not broken?	No abnormality in appearance	Visual inspection

■ Handlings when replacing the device.

Each unit (master and device) is a component that constitutes a part of a network.
If any unit fails, immediately perform recovery work to prevent the entire network from being affected. To restore the network function as fast as possible, it is recommended to prepare spare devices.

<Inspection item>
If a fault is detected and the device is replaced with a new one, check if the new device has no abnormality. Also, confirm the device settings.

<Settings for replacement device>
For the switches on the replacement device, confirm the specifications and set the same settings as the previous one.

4.2 Removing and Mounting

⚠WARNING

Turn off the power and completely release the pressure before removing or adding a manifold solenoid valve.

Thoroughly read and understand this Instruction Manual before removing and adding the manifold solenoid valve.

Do not touch the electrical wiring connection (bare live part).
An electric shock may occur.

Do not touch live parts with bare hands.
An electric shock may occur.

⚠CAUTION

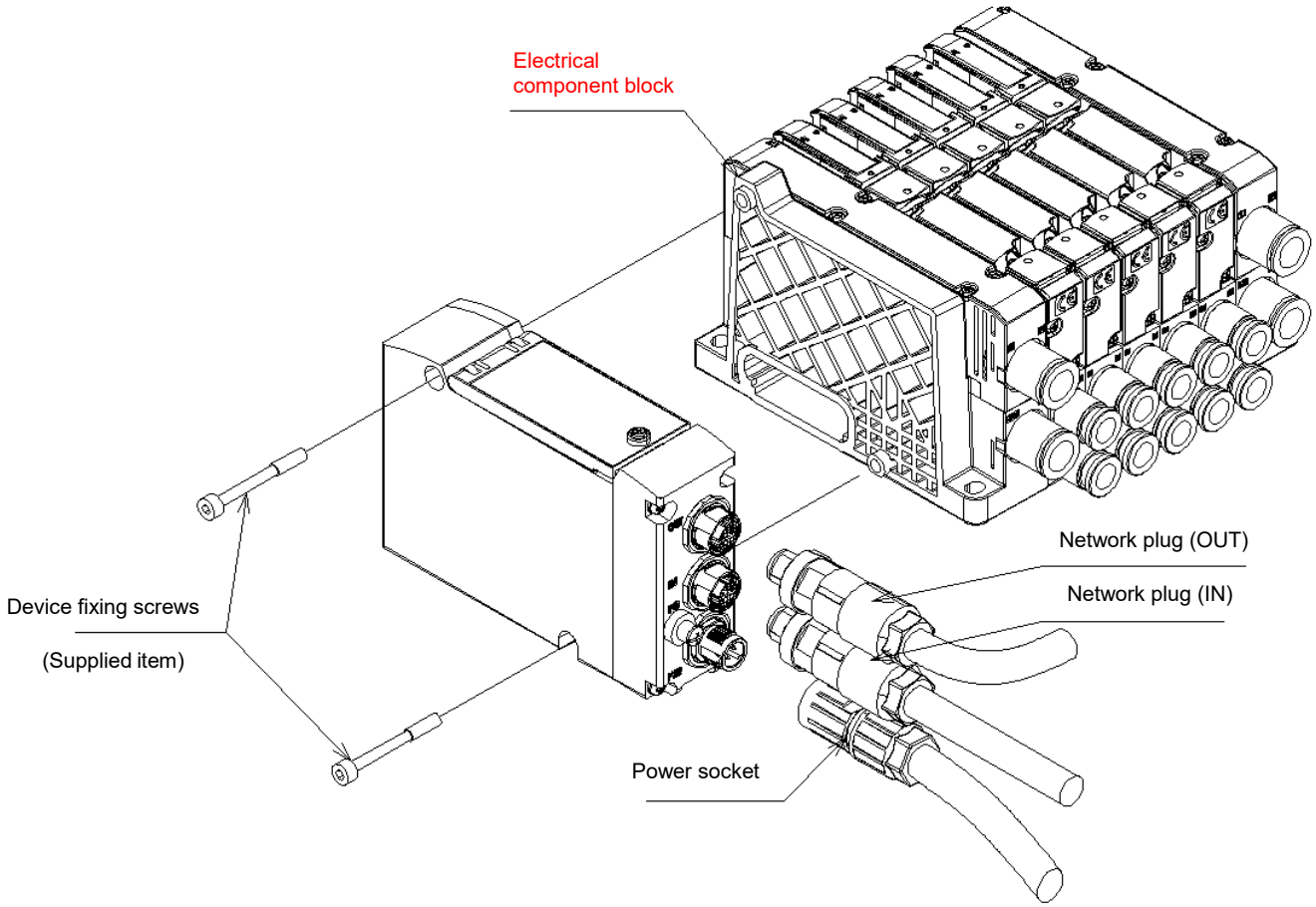
Check the device station number and the setting made to specify which action to take on the output in the event of communication error, before turning on the unit power.

Do not attach or detach the plug while the power is turned on.
A failure or malfunction may occur.

Do not pull out the device by pulling the cable or connector.
A cable disconnection or damage may occur.

4.2.1 Removing the product (device)

1. After confirming safety, stop network communication as necessary and turn off all peripheral equipment.
2. After confirming safety, turn off the unit power and valve power as necessary.
   (Note that following unit next to this device may stop communication.)
3. Remove the device mounting screw and slowly remove it from the electrical component block.



4.2.2 Mounting the product (device)

1. Set the IP address of the product.
2. Turn off the power (for unit/valve) and connect the network plug and power plug.
   The system may start operating suddenly if the plug is connected while the power is turned on. Be careful of the surroundings and secure safety before connecting the plug. Hold the product and insert it slowly by matching the connectors on the electrical component block and the side of the device.
3. Check that the product and electrical component block are properly connected, and tighten the device fixing screw firmly.
   (Appropriate tightening torque: 0.5 N·m)
4. Confirm safety and turn on each power.

5. Troubleshooting

5.1 Problems, Causes, and Solutions

Troubleshooting for this device must be performed not only for the single unit but for the entire system. The system may start operating suddenly depending on the communication state. Use extreme care and ensure safety during maintenance.

■ Fault 1: PW, PW(V) does not light up.

- Check that the power cable is properly connected and in good condition.
- Check that the supplied power voltage is used within the specified range.

■ Fault 2: ERR LED lights up.

- Check that the power to the master unit is turned on.
- Check that there are no problems (such as damage or disconnection) with the network cable or connector connection.
- Check that the network cable is compatible with CC-Link IE TSN network.
- Check that transmission distance is compatible with CC-Link IE TSN network.
- Check that there are no noise-generating devices or high-voltage lines near the communication line.

■ Fault 3: ERR LED is blinking.

- Check if the IP address and baud rate are set correctly.

■ Fault 4: D Link LED does not light up.

- Check that the power to the master unit is turned on.
- Check that the data link from the master unit has been stopped.

■ Fault 5: INFO LED is blinking

<Blinking>

- Check the status of the device enabled in the maintenance monitoring settings.

<Repeat twice-blinking>

- In case the switch has been operated, return the switch to the original state or turn the power off and on.

<Blinking (fast)>

- Internal hardware is malfunctioning. Replace the device if the condition doesn't change even after turning the power off and on again.

Note: Refer to the LED indicators of [1.2.2 Switches and LED indicators] for the blinking pattern.

6. WARRANTY PROVISIONS

6.1 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.
- 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 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.
- Failure caused by incorrect use such as careless handling or improper management.
- 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.

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.

6.2 Warranty period

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