CKD

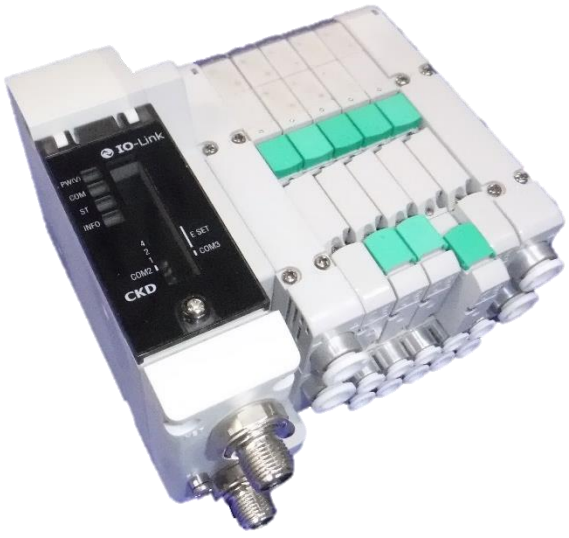
Serial Transmission Device

TVG Series JA9*
(OPP8-A2KC-*)

IO-Link Compatible

INSTRUCTION MANUAL

SM-A70537-A/1



- 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 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 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

⚠ 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.

(Exception is 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.

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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-A2KC-*(JA9*) for TVG.
For the master unit and other devices 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-A2KC-*(JA9*)

This is a serial transmission device for TVG that can communicate with the master unit of IO-Link: the technology maintained and managed by the IO-Link Community.
Features include the following:

- The device is connected to the IO-Link master with a cable only, allowing a significant reduction of wiring man-hours.
- When a communication error occurs, the device output status can be set by a switch. (All points ON/ All points OFF)
- The device is available in +COM or -COM specification.
- Connection to the device can be selected from Class A, which allows to separate the wirings of the valve power supply and the communication system easily and Class B, which allows to connect to the PLC with a single cable.

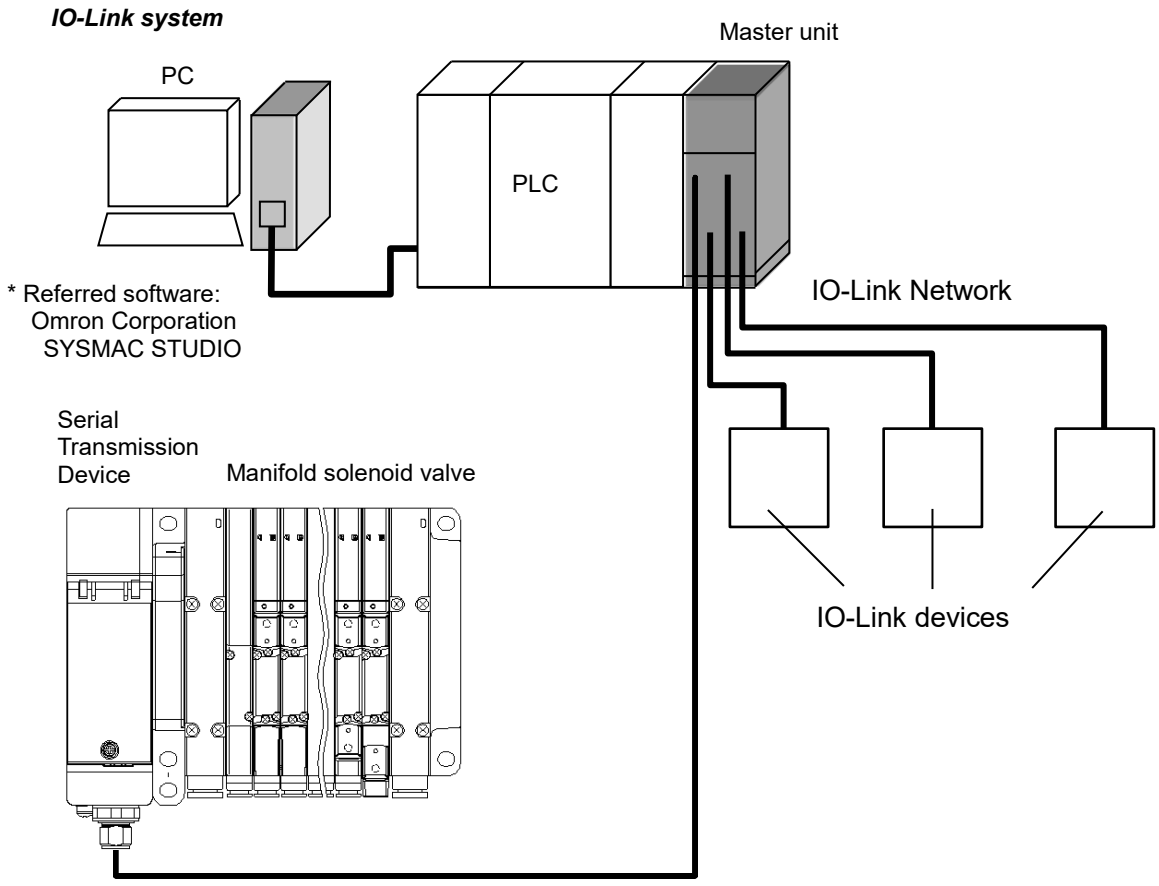
1.1.2 System structure

This system mainly consists of a PLC, master unit, OPP8-A2KC-* mounted manifold solenoid valve, and peripheral equipment.

■ Examples of PLC and master unit combination

PLC manufacturer	Compatible PLC	Master unit model
Omron Corporation	NX Series	NX-ILM400
BALLUFF Corporation	BNI Series	BNI007C
Other IO-Link compatible master unit		

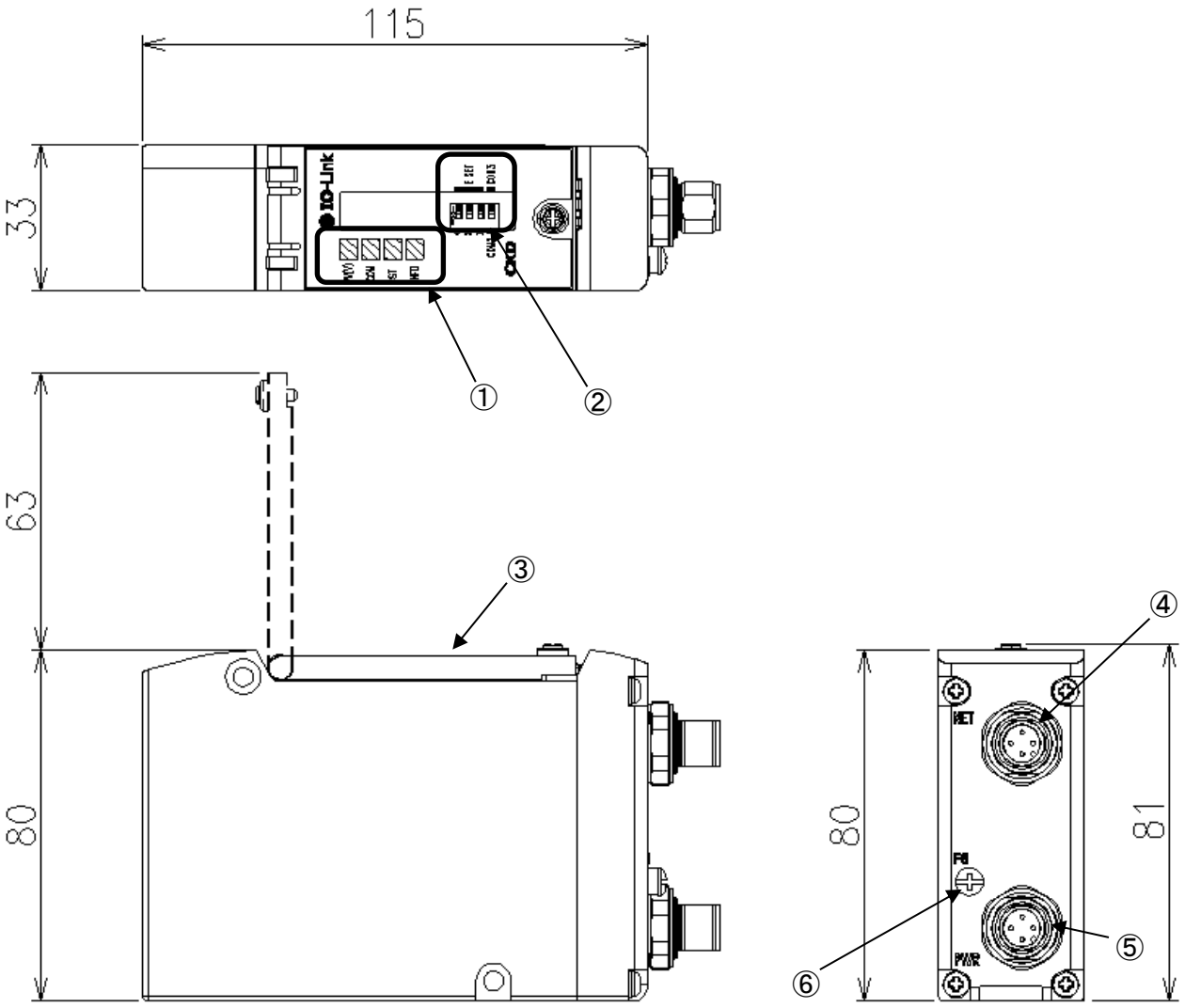
■ Example of basic structure of the system



1.2 Part Name

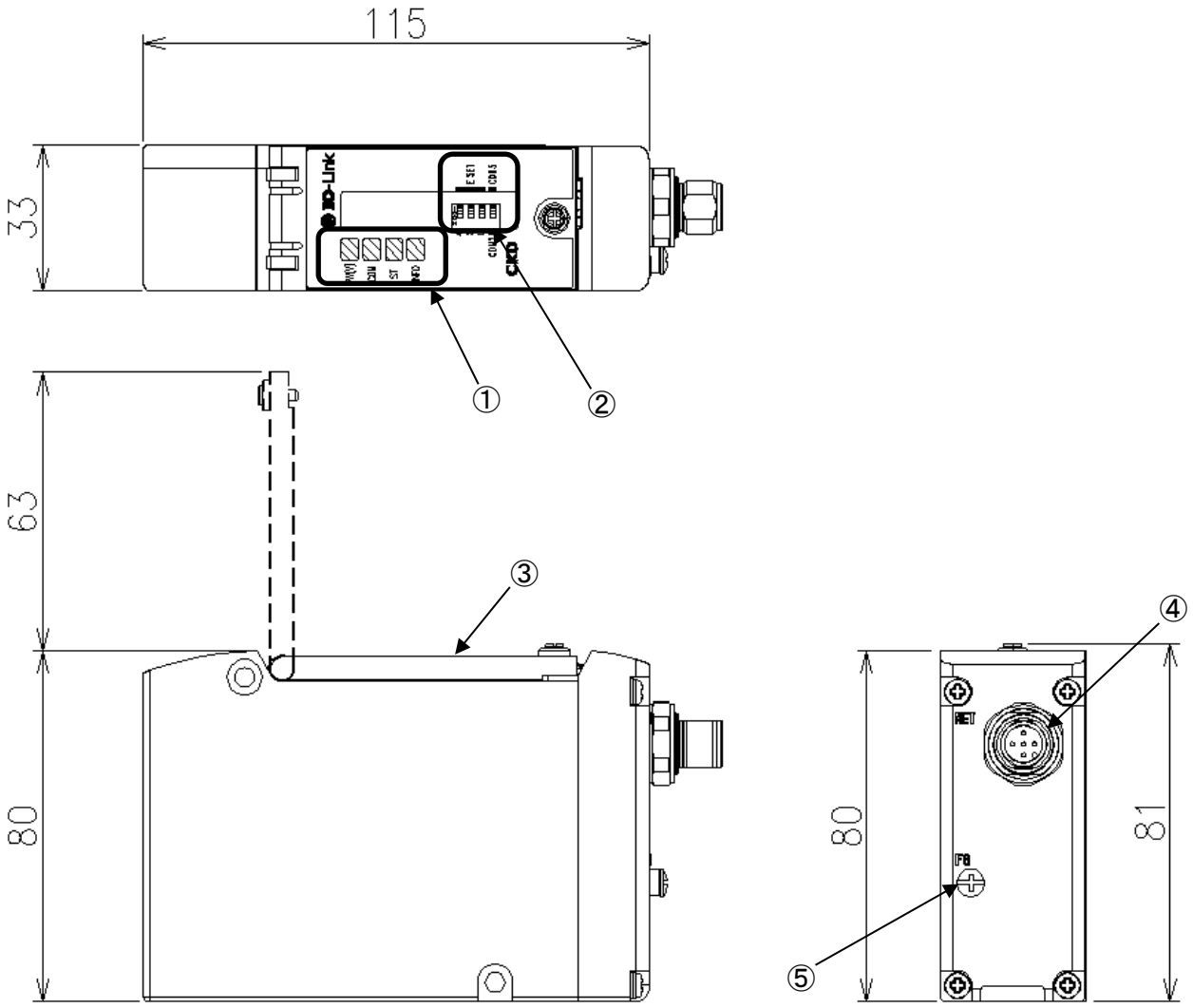
1.2.1 Parts of the device

■ Class A



No.	Part name	Description
①	LED	Indicate the status of the serial transmission device and network with INFO, COM, ST and PW(V).
②	Setting switches	Set the valve operation at communication error and the baud rate by slide switches.
③	Cover	Protects the LEDs and setting switches.
④	Network connector plug (M12 x 4 pin)	Connect the IO-Link network cable and unit power cable to the plug.
⑤	Valve power plug [M12 x 4 pin)	]onnects valve power cable (24 V) to the plug.
⑥	FG terminal	Connects FG (frame grounding) to the terminal.

■ Class B



No.	Part name	Description
①	LED	Indicate the status of the serial transmission device and network with INFO, COM, ST and PW(V).
②	Setting switches	Set the valve operation at communication error and the baud rate by slide switches.
③	Cover	Protects the LEDs and setting switches.
④	Network connector plug (including valve power supply) [M12 x 5 pin]	Connect the IO-Link network cable and unit/ valve power(24V) cable to this plug.
⑤	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.

Set switches while unit power is turned off.
Make sure the unit power turned off as the switch setting is read into the device at power-up.

Always close the cover except when setting the switches.
The cover may become damaged or foreign matters may enter inside and cause unexpected failure.
Be extremely careful not to allow any foreign matter to enter the device when setting the switches.

Do not handle switches roughly.
Switches are precision devices and can be easily damaged. Never touch the internal circuit board when setting the switches.

■ Switches

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

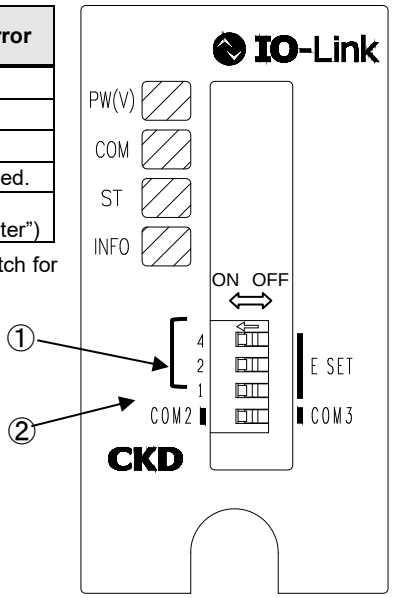
① Output setting in the event of communication error

E SET			Mode	Valve operation at communication error
4	2	1		
OFF	OFF	OFF	Hardware mode	All points OFF
	OFF	ON		Final output data
	ON	OFF		All points ON
	ON	ON		The value of Process Data Out last received.
ON	Reserved	Reserved	Software mode	The Value set in Value Setting Communication Error (see 3.2.3 “Parameter”)

* Since IO-Link is a one-to-one communication between master and device, there is no switch for address setting.

② Baud rate setting

COM	Mode
OFF	COM3
ON	COM2



■ LED indicators

These LEDs indicate the status of the product and network.

Part name	Function (Indication)	Status	
PW(V)	Valve power status	OFF	Valve power OFF
		Green on	Valve power ON
COM	Communication status	OFF	Unit power OFF
		Green on	Unit power ON (IO-Link communication has not started)
		Green blinking	Unit power ON (In IO-Link communication)
ST	Device status	OFF	Operating normally.
		Red blinking	Needs maintenance
		Red on	Hardware error (Disconnection, memory error, etc.)
INFO	Not used	-	-

1.3 Specifications

1.3.1 Communication specifications

Item	Specifications
Communication protocol	IO-Link
Protocol version	1.1
Class	A / B
Transmission rate (Baud rate)	By switch setting (COM2/ COM3)
Supporting SIO mode	None
Data storage	330 bytes
Distance between nodes	Up to 20m

1.3.2 Device unit specifications

The product must be used within the following specifications.

Item		Specifications	
Model No.		OPP8-A2KC-A(JA9C) OPP8-A2KC-B(JA9G)	OPP8-A2KC-PA(JA9D) OPP8-A2KC-PB(JA9H)
Unit power supply voltage		18 VDC to 30 VDC	
Unit power current consumption		50 mA or less (all points ON: at 24 VDC)	
Valve power supply voltage		22.8 VDC to 26.4 VDC（24VDC +10%, -5%）	
Valve power current consumption		10 mA or less (with all points OFF) /15 mA or less (with 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 the case: 500 VAC for one 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 such as secure the wiring to the machine or device midway.

To prevent noise problems, keep the following in mind when wiring:

- If noise could have an effect, prepare a separate power supply for each manifold solenoid valve wherever possible, wire them individually, and install a noise filter on the power cable.
- 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.
- If communication could become unstable, install a ferrite core on the network cable near the device as a countermeasure.
- In environments at altitudes exceeding 2,000 m, reduced air pressure may affect the withstand voltage performance and noise immunity (such as lightning surge noise and static electricity). Use the product with caution under such conditions.

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

Make sure 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, the instruction manuals for PLC and each unit, and connect the cable 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 plug

⚠WARNING

Carry out wiring with the power turned off.
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.

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.

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 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.

Separately purchase a network connector that satisfies the specifications.

Recommended M12 assembly type connector
Class A

Port	Part name	Model No.	Manufacturer
NET、PWR	M12 assembly type connector (female 4 pin)	21 03 212 2305	HARTING Co., Ltd.

Class B

Port	Part name	Model No.	Manufacturer
NET	M12 assembly type connector (female 5 pin)	21 03 272 2505	HARTING Co., Ltd.

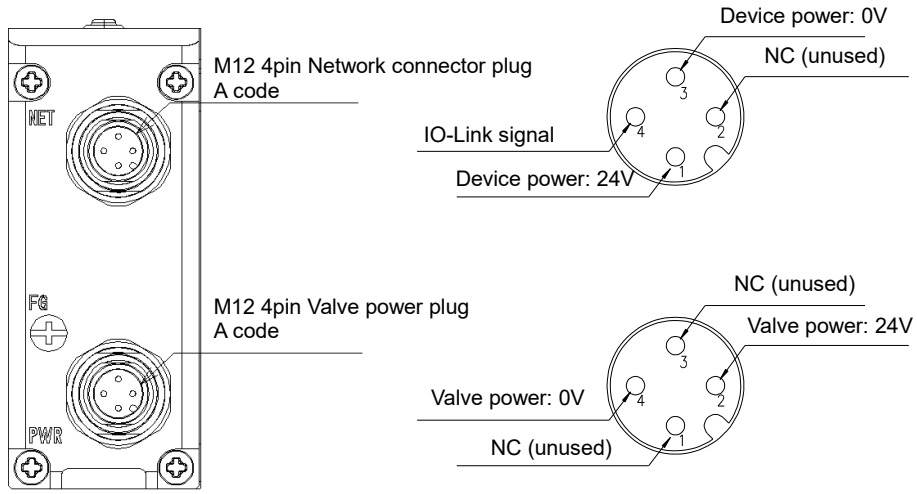
■ Connecting the cable

Follow the steps below to connect the network cable to the M12 connector.

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

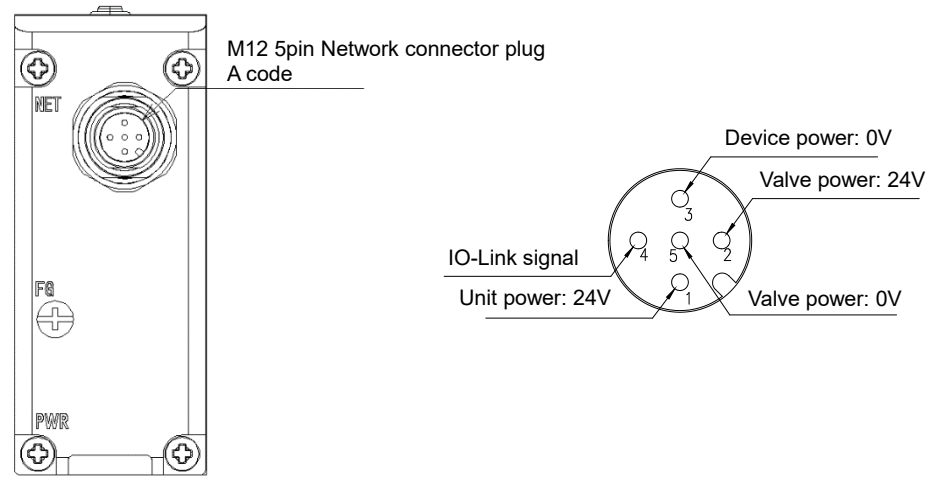
2 Refer to the figure below and wire the cable to the M12 connector.

Class A



Device (Class A)

Class B

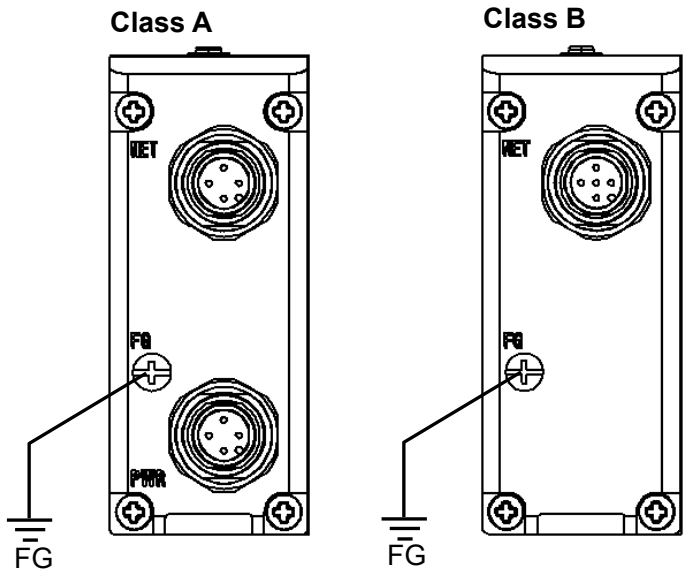


Device (Class B)

Make sure to understand these specifications before wiring IO-Link.
For details, refer to the instruction manual of the master unit manufacturer or IO-Link Community.

2.2.2 FG terminal

If the noise from the communication or power line could have an effect, providing the product with ground may improve the condition.
Ground the frame ground (F.G.) terminal so that the grounding resistance is 100 Ω or less, as necessary.



<Recommended crimp terminal>
Use the crimp terminal for M3 and fix with the tightening torque 0.3 to 0.5 N·m when grounding FG terminal.

3. USAGE

⚠WARNING

Consult CKD about the specifications before using the product under conditions not specified for the product 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.

Carefully check the hard switch settings of serial transmission device before use.
Setting improper 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 IODD (IO Device Description) file

The IODD file describes the communication specifications of the device. Registering the IODD file may be necessary for connecting the device to the master unit. Refer to the instruction manual issued by the master unit manufacturer for registering the IODD file. Use the latest IODD file for proper network configuration.

Download the IODD file from the CKD website. (https://www.ckd.co.jp/kiki/jp/).

3.1.1 List of IODD files

Check the specifications (model name) of the device and transmission (baud) rate before registering, as both the device and IODD file need to be matched. Refer to the following table for the device specifications and IODD file.

Item	Specifications			
Model No.	OPP8-A2KC-A(JA9C)		OPP8-A2KC-B(JA9G)	
Product Name	OPP8-2KC-A		OPP8-2KC-B	
Output type	+COM (NPN)			
Number of output point	32 points			
Baud rate	COM2	COM3	COM2	COM3
Device ID	0x200036	0x200037	0x200038	0x200039
IODD file name	CKD-OPP8 _2KC_A_COM2 -********	CKD-OPP8 _2KC_A_COM3 -********	CKD-OPP8 _2KC_B_COM2 -********	CKD-OPP8 _2KC_B_COM3 -********

Item	Specifications			
Model No.	OPP8-A2KC-PA(JA9D)		OPP8-A2KC-PB(JA9H)	
Product Name	OPP8-2KC-PA		OPP8-2KC-PB	
Output type	-COM (PNP)			
Number of output point	32 points			
Baud rate	COM2	COM3	COM2	COM3
Device ID	0x20003A	0x20003B	0x20003C	0x20003D
IODD file name	CKD-OPP8 _2KC_PA_COM2 -********	CKD-OPP8 _2KC_PA_COM3 -********	CKD-OPP8 _2KC_PB_COM2 -********	CKD-OPP8 _2KC_PB_COM3 -********

3.2 IO-Link communication specifications

3.2.1 General

Item	Specifications							
Model No.	OPP8-A2KC-A		OPP8-A2KC-B		OPP8-A2KC-PA		OPP8-A2KC-PB	
Transmission rate (COM)	COM2	COM3	COM2	COM3	COM2	COM3	COM2	COM3
IO-Link Version ID	V1.1							
Process Data Input Length	0 byte							
Process Data Output Length	4 bytes							
Min Cycle Time	3.4ms	1.0ms	3.4ms	1.0ms	3.4ms	1.0ms	3.4ms	1.0ms
Device ID	0x200036	0x200037	0x200038	0x200039	0x20003A	0x20003B	0x20003C	0x20003D

3.2.2 On demand data

■ Identification

● Vendor ID: 855 (decimal) / 0x357 (hexadecimal)

Index(dec)	Sub Index	Item	Value	Access			Length	Format
				U	M	S		
0x0010(16)	0	Vendor Name	CKD Corporation	R	R	R	-	String
0x0011(17)	0	Vendor Text	https://www.ckd.co.jp/	R	R	R	-	String
0x0012(18)	0	Product Name	Refer to **Table 1**	R	R	R	-	String
0x0013(19)	0	Product ID	Refer to **Table 1**	R	R	R	-	String
0x0014(20)	0	Product Text	Refer to **Table 1**	R	R	R	-	String
0x0015(21)	0	Serial Number	Unique for each unit	R	R	R	8 bytes	String
0x0016(22)	0	Hardware Revision	1.0	R	R	R	-	String
0x0017(23)	0	Firmware Revision	1.1	R	R	R	-	String
0x0018(24)	0	Application Specific Tag	**********	R	R/W	R/W	32 bytes	String

Table 1 : Product Name, Product ID and Product Text

Model No.	OPP8-A2KC-A	OPP8-A2KC-B	OPP8-A2KC-PA	OPP8-A2KC-PB
Product Name	OPP8-2KC-A	OPP8-2KC-B	OPP8-2KC-PA	OPP8-2KC-PB
Product ID				
Product Text	Outputs32 NPN class A	Outputs32 NPN class B	Outputs32 PNP class A	Outputs32 PNP class B

■ Parameter and commands

Common specifications

Index(dec)	Sub Index	Item	Value	Access			Length	Format
				U	M	S		
0x0002(2)	0	System Command	Refer to Table 2	-	-	W	1 byte	Ulnteger 8
0x000C(12)	0	Device Access Locks	0x0000: Parameter lock 0x0001: Data storage lock	R	R/W	R/W	2 bytes	Record
0x0020(32)	0	Error Count	0	R	R	R	2 bytes	Ulnteger 16
0x0024(36)	0	Device Status	0	R	R	R	1 byte	Ulnteger 8
0x0025(37)	0	Detailed Device Status	All octets 0x00: No error/ warning Octet 1: EventQualifier Octet 2,3; EventCode	R	R	R	60 bytes	Array of 3 Octetstring

Table 2 : System Command

Command(dec)	Command name
0x80(128)	Device reset
0x81(129)	Application reset
0x82(130)	Restore factory settings
0xA0(160)	Output Off_On Cycles Reset 0
0xA1(161)	Output Off_On Cycles Reset 1
0xA2(162)	Output Off_On Cycles Reset 2
0xA3(163)	Output Off_On Cycles Reset 3
0xA4(164)	Output Off_On Cycles Reset 4
0xA5(165)	Output Off_On Cycles Reset 5
0xA6(166)	Output Off_On Cycles Reset 6
0xA7(167)	Output Off_On Cycles Reset 7
0xA8(168)	Output Off_On Cycles Reset 8
0xA9(169)	Output Off_On Cycles Reset 9
0xAA(170)	Output Off_On Cycles Reset 10
0xAB(171)	Output Off_On Cycles Reset 11
0xAC(172)	Output Off_On Cycles Reset 12
0xAD(173)	Output Off_On Cycles Reset 13
0xAE(174)	Output Off_On Cycles Reset 14
0xAF(175)	Output Off_On Cycles Reset 15
0xB0(176)	Output Off_On Cycles Reset 16
0xB1(177)	Output Off_On Cycles Reset 17
0xB2(178)	Output Off_On Cycles Reset 18
0xB3 (179)	Output Off_On Cycles Reset 19
0xB4 (180)	Output Off_On Cycles Reset 20
0xB5 (181)	Output Off_On Cycles Reset 21
0xB6 (182)	Output Off_On Cycles Reset 22
0xB7 (183)	Output Off_On Cycles Reset 23
0xB8 (184)	Output Off_On Cycles Reset 24
0xB9 (185)	Output Off_On Cycles Reset 25
0xBA (186)	Output Off_On Cycles Reset 26
0xBB (187)	Output Off_On Cycles Reset 27
0xBC (188)	Output Off_On Cycles Reset 28
0xBD (189)	Output Off_On Cycles Reset 29
0xBE (190)	Output Off_On Cycles Reset 30
0xBF (191)	Output Off_On Cycles Reset 31

Individual specifications

Index (dec)	Sub Index	Item	Access	Data Storage	Bit Length
0x0040 (64)	1	Value Setting at Communication Error (OUT0-15)	R/W	Enable	16
	2	Value Setting at Communication Error (OUT0-15)		Enable	16
0x0041 (65)	1	Value Setting at Communication Error (OUT16-31)	R/W	Enable	16
	2	Value Setting at Communication Error (OUT16-31)		Enable	16
0x0044 (68)	1	Output Off_On Cycles 0	R	Disable	32
	2	Output Off_On Cycles 1		Disable	32
	3	Output Off_On Cycles 2		Disable	32
	4	Output Off_On Cycles 3		Disable	32
	5	Output Off_On Cycles 4		Disable	32
	6	Output Off_On Cycles 5		Disable	32
	7	Output Off_On Cycles 6		Disable	32
	8	Output Off_On Cycles 7		Disable	32
	9	Output Off_On Cycles 8		Disable	32
	10	Output Off_On Cycles 9		Disable	32
	11	Output Off_On Cycles 10		Disable	32
	12	Output Off_On Cycles 11		Disable	32
	13	Output Off_On Cycles 12		Disable	32
	14	Output Off_On Cycles 13		Disable	32
	15	Output Off_On Cycles 14		Disable	32
	16	Output Off_On Cycles 15		Disable	32
	17	Output Off_On Cycles 16		Disable	32
	18	Output Off_On Cycles 17		Disable	32
	19	Output Off_On Cycles 18		Disable	32
	20	Output Off_On Cycles 19		Disable	32
	21	Output Off_On Cycles 20		Disable	32
	22	Output Off_On Cycles 21		Disable	32
	23	Output Off_On Cycles 22		Disable	32
	24	Output Off_On Cycles 23		Disable	32
	25	Output Off_On Cycles 24		Disable	32
	26	Output Off_On Cycles 25		Disable	32
	27	Output Off_On Cycles 26		Disable	32
	28	Output Off_On Cycles 27		Disable	32
	29	Output Off_On Cycles 28		Disable	32
	30	Output Off_On Cycles 29		Disable	32
	31	Output Off_On Cycles 30		Disable	32
	32	Output Off_On Cycles 31		Disable	32
0x004B (75)	-	Output Off_On Cycles Maintenance Threshold	R/W	Enable	32

Index (dec)	Sub Index	Item	Access	Data Storage	Bit Length
0x00A0 (160)	-	Output Data Monitor 0-15	R	×	16
0x00A1 (161)	-	Output Data Monitor 16-31	R	×	16
0x00A3 (163)	-	Maintenance Setting	R/W	○	16
0x00A4 (164)	-	Maintenance Monitor	R	×	16
0x00A5 (165)	-	Energizing Time Monitor	R	×	32
0x00A6 (166)	-	Energizing Time Maintenance Threshold	R/W	○	32
0x00A7 (167)	-	Communications Error Value Setting	R	×	8
0x00C0 (192)	-	Cycle Output Data 0-15	R	×	16
0x00C1 (193)	-	Cycle Output Data 16-31	R	×	16
0x00C2 (194)	-	Forced Output Setting 0-15	R/W	×	16
0x00C3 (195)	-	Forced Output Setting 16-31	R/W	×	16
0x00C4 (196)	-	Forced Output Data 0-15	R/W	×	16
0x00C5 (197)	-	Forced Output Data 16-31	R/W	×	16
0x00C6 (198)	-	Output Off_On Cycles Maintenance Setting 0-15	R/W	○	16
0x00C7 (199)	-	Output Off_On Cycles Maintenance Setting 16-31	R/W	○	16
0x00C8 (200)	-	Output Off_On Cycles Maintenance Monitor 0-15	R	×	16
0x00C9 (201)	-	Output Off_On Cycles Maintenance Monitor 16-31	R	×	16

Index (dec)	sub Index	Item	Access	Data Storage	Bit Length
0x00CA (202)	1	Valve name 0	R/W	○	64
	2	Valve name 1		○	64
	3	Valve name 2		○	64
	4	Valve name 3		○	64
	5	Valve name 4		○	64
	6	Valve name 5		○	64
	7	Valve name 6		○	64
	8	Valve name 7		○	64
	9	Valve name 8		○	64
	10	Valve name 9		○	64
	11	Valve name 10		○	64
	12	Valve name 11		○	64
	13	Valve name 12		○	64
	14	Valve name 13		○	64
	15	Valve name 14		○	64
	16	Valve name 15		○	64
0x00CB (203)	1	Valve name 16	R/W	○	64
	2	Valve name 17		○	64
	3	Valve name 18		○	64
	4	Valve name 19		○	64
	5	Valve name 20		○	64
	6	Valve name 21		○	64
	7	Valve name 22		○	64
	8	Valve name 23		○	64
	9	Valve name 24		○	64
	10	Valve name 25		○	64
	11	Valve name 26		○	64
	12	Valve name 27		○	64
	13	Valve name 28		○	64
	14	Valve name 29		○	64
	15	Valve name 30		○	64
	16	Valve name 31		○	64
0x00CE (206)	-	Valve Power Supply Monitor	R	×	8

■ Process data

Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MSB																															LSB
Data name	Valve output 0-31																															
	31	30	29	28	27	26	25	24	23	22	21	20	19	16	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Format	Boolean																															

Index 0x0000 (Direct Parameter Page 1)

Index (dec)	Parameter name	Access	Data							
			OPP8-A2KC-A		OPP8-A2KC-B		OPP8-A2KC-PA		OPP8-A2KC-PB	
			COM2	COM3	COM2	COM3	COM2	COM3	COM2	COM3
0x02	Min Cycle Time	R	0x22	0x0A	0x22	0x0A	0x22	0x0A	0x22	0x0A
0x03	M-sequence Capability	R	0x2B							
0x04	Revision ID	R	0x11							
0x05	Process Data In	R	0x00							
0x06	Process Data Out	R	0x83 (4 bytes)							
0x07	Vendor ID 1	R	0x03							
0x08	Vendor ID 2	R	0x57							
0x09	Device ID 1	R	0x20							
0x0A(10)	Device ID 2	R	0x00							
0x0B(11)	Device ID 3	R	0x36	0x37	0x38	0x39	0x3A	0x3B	0x3C	0x3D

3.2.3 Parameter

Parameters can be written for the following contents.

No.	Item	Description
1	Device Access Lock [Note 1]	Parameter(write) Access Lock: Parameters of the device is write protected. Data Storage Lock: Data storage is write protected.
2	Value Setting Communication Error	Sets output value of the valve in the event of communication error.
3	Output Off_On Cycles Maintenance Threshold	Sets the valve cycle count for notifying maintenance information to Maintenance Monitor. Sets this threshold to use the maintenance function. (Initial value 0 disables maintenance function)
4	Maintenance Setting	Sets the maintenance items which to inform. (Initial value: 0x0000 (no maintenance information notice))
5	Energizing Time Maintenance Threshold	Sets the energizing time to the device for notifying maintenance information to Energizing Time Monitor. Unit: seconds (Initial value 0 disables maintenance function)
6	Output Off_On Cycles Maintenance Setting	0: Stop maintenance monitor 1: Execute maintenance monitor Sets maintenance monitor for each valve
7	Forced Output Setting [Note 1]	0: Cyclic output data enable 1: Forced output data enable Sets the point to output forcibly.
8	Forced Output Data [Note 1]	0: OFF 1: ON Forcibly output using this data.
9	Valve Name	Sets the valve name.

Note 1: Reconfigure the setting as it is cleared when the device is powered OFF.

Output Off_On Cycles and Energizing Time are written into the device every 3 minutes.

■ Valve output setting at communication error

In software mode, valve output with arbitrary setting is enable in the event of communication error.

Value Setting Communication Error		Description
1	2	
0	0	All point output OFF
0	1	Final output data
1	0	All point output ON
1	1	Cyclic output data last received

Example) Following tables show the case when the solenoid output S00 is set to OFF, the output S15 is to ON, and the rest S01 to S14 are held the last value in the event of communication error. (for 16 output point)

Setting of Value Setting Communication Error1:

MSB LSB

S15	S14	S13	S12	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

Setting of Value Setting Communication Error2

MSB LSB

S15	S14	S13	S12	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

Valve output in the event of communication error:

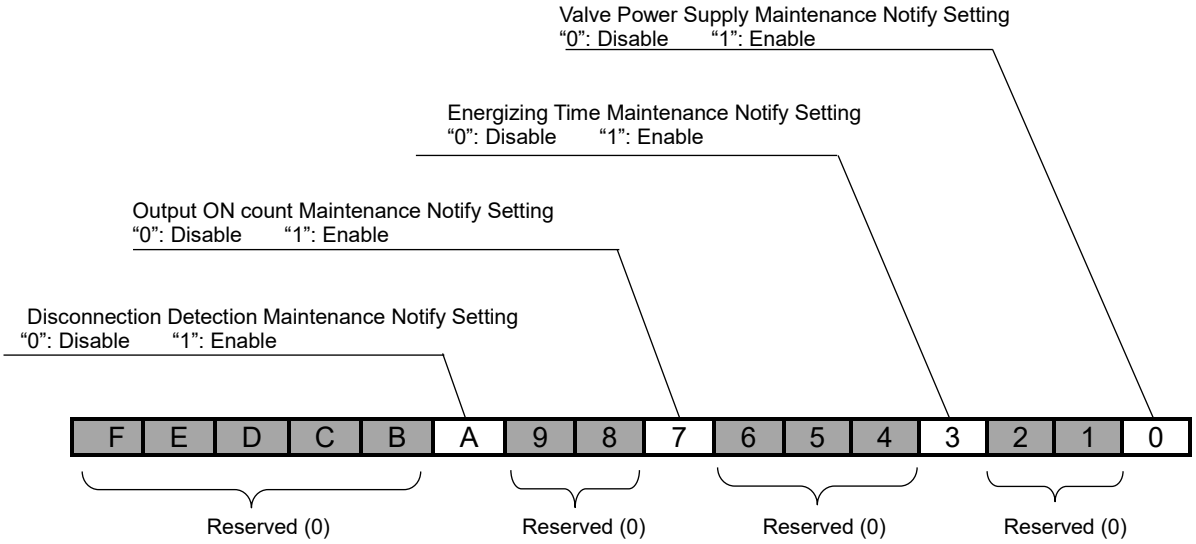
MSB LSB

S15	S14	S13	S12	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
1	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	0

0: OFF, 1: ON, ““C””: Cyclic output data last received

■ Maintenance settings

Maintenance monitor is 2 bytes data.
Use the function by changing the bit of the maintenance item from “0”: Disable to “1”: Enable.



Bit	Item	Description
0	Valve Power Supply Maintenance Notify Setting	0: Disable 1: Enable Set whether to monitor the valve power status.
1	Reserved	0
2	Reserved	0
3	Energizing Time Maintenance Notify Setting	0: Disable 1: Enable Sets whether to monitor energizing time
4	Reserved	0
5	Reserved	0
6	Reserved	0
7	Output ON count Maintenance Notify Setting	0: Disable 1: Enable Sets whether to monitor the valve’s output ON count.
8	Reserved	0
9	Reserved	0
A	Disconnection Detection Maintenance Notify Setting	0: Disable 1: Enable Sets whether to monitor communication status.
B-F	Reserved	0

■ Forced output setting

This function can be used when valve output needs to be changed temporary, or the equipment is installed. It outputs the specified valve in arbitrary state, not with the valve state being sent by the master unit cyclically.
* The valve output set by this function is cleared in the event of communication error, depending on the selected status of the switch setting. (Set the output again as the setting will be cleared when [Value Setting Communication Error], No.2 of the table in "3.2.3 Parameter" is set or the Unit power is turned off.)

No.	Item	Description
7	Forced Output Setting	Sets the point to output forcibly.
8	Forced Output Data	Sets the output status of the point to output forcibly.

Example) Following tables show the case when the solenoid output S0 is set to OFF, the output S15 is set to ON, and the rest output S01 to S14 are set to the value of cyclic data. (for 16-point output)

Forced Output Setting:

MSB LSB

S15	S14	S13	S12	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

0: Cyclic output data - Enable, 1: Forced output data - Enable

Forced Output Data:

MSB LSB

S15	S14	S13	S12	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

0: OFF 1: ON –: Optional (both 0 and 1 are acceptable)

Valve output (output data monitor):

MSB LSB

S15	S14	S13	S12	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
1	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	“C“	0

0: OFF, 1: ON, ““C””: Cyclic output data

Because of the "Forced output data-Enable" setting, the forced output data value is output only for the solenoid S0 and S15, and the cyclic output data value is output for the other solenoid outputs.

3.2.4 Observation

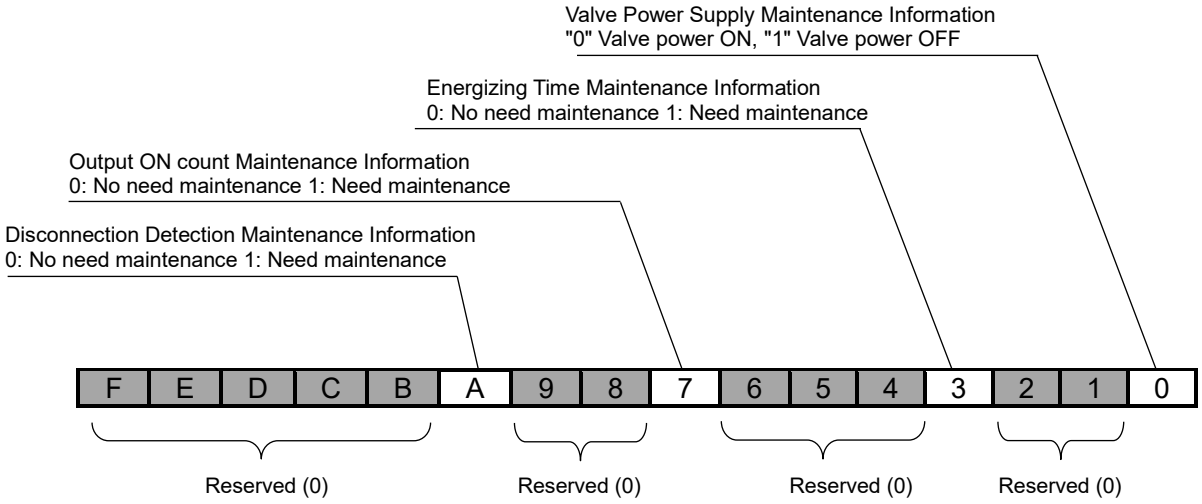
Following items can be re-set and monitored.
Use maintenance function after enabling [Maintenance setting].

No.	Item	Description
10	Device Reset	Resets the device. It is treated the same as turning OFF/ON the device.
11	Application Reset	Resets the application. Initializes the valve ON count of all the valves.
12	Restore Factory Setting	Resets to the factory settings. The energizing time is not initialized.
13	Output Reset	Select and reset the valve output individually. Initializes the output ON count of the corresponding valve.
14	Output Data Monitor	Indicates the current valve output status. The forced output value is included.
15	Maintenance Monitor	Notifies maintenance information.
16	Energizing Time Monitor	Indicates energizing time of the device. Unit [s] Note 1
17	Communications Error Value Setting	Indicates the valve output setting at communication error. 0: All points OFF 1: Final output data 2: All points ON 3: Cyclic output data last received 4: Output the value set in [No2: Value Setting Communications Error] of “3.2.3 Parameter”.
18	Cyclic Output Data	Indicates the data received by cyclic communication from the master unit.
19	Output Off_On Cycles Maintenance Monitor	0: No need maintenance 1: Need maintenance Becomes “1: Need maintenance” when [Output Off_On Cycles] ≥ [Output Off_On Cycles Maintenance Threshold] in [Output Off_On Cycles Maintenance Setting].
20	Output Off_On Cycles	Indicates the output ON count for each valve.
21	Valve Power Supply Monitor	Valve Power ON: Valve power supply is ON. Valve Power OFF: Valve power supply is OFF Indicates valve power status.

* Note1: As initial status, energization time of factory delivery inspection may add.

■ Maintenance monitor

Maintenance monitor is 2 bytes data.
Check the maintenance status of each device when maintenance monitor indicates “1: Need maintenance”.



Bit	Item	Description
0	Valve Power Supply Maintenance Information	0: Valve power ON 1: Valve power OFF Indicates valve power status.
1	Reserved	0
2	Reserved	0
3	Energizing Time Maintenance Information	0: No need maintenance ([Energizing Time Maintenance Threshold] > [Energizing Time Monitor]) 1: Need maintenance ([Energizing Time Maintenance Threshold] ≤ [Energizing Time Monitor]) Notifies [Energizing Time Maintenance Information] by comparing energizing time ([Energizing Time Monitor] value) and [Energizing Time Maintenance Threshold].
4	Reserved	0
5	Reserved	0
6	Reserved	0
7	Output ON count Maintenance Information	0: No need maintenance ([Output Off_On Cycles Maintenance Threshold] > [Output Off_On Cycles] (minimum)) 1: Need maintenance ([Output Off_On Cycles Maintenance Threshold] ≤ [Output Off_On Cycles] (minimum value)) Notifies [Output Off_On Cycles Maintenance Information] by comparing [Output Off_On Cycles] and [Output Off_On Cycles Maintenance Threshold] of each valve. Setting with each valve is needed to notify maintenance information. Set [Output Off_On Cycles Maintenance Setting] to “1: Execute maintenance monitor”. When plural valves are set to “1: Execute maintenance monitor”, and if there is a valve with [Output Off_On Cycles] ≤ [Output Off_On Cycles Maintenance Threshold] condition, [Output Off_On Cycles Maintenance Information] becomes 1: Need maintenance.
8	Reserved	0
9	Reserved	0
A	Disconnection Detection Maintenance Information	0: No need maintenance 1: Need maintenance Indicates the status of the network cable. If the network cable is broken, the maintenance information will be "1".
B-F	Reserved	0

■ Output ON Count Maintenance Monitor

No.	Item	Description
3	Output Off_On Cycles Maintenance Threshold	Sets the valve cycle count for notifying maintenance information to Maintenance Monitor. Sets this threshold to use the maintenance function. (Initial value 0 disables maintenance function)
4	Maintenance Setting	Sets the maintenance items which to inform. (Initial value: 0x0000 (no maintenance information notice))
6	Output Off_On Cycles Maintenance Setting	0: Stop maintenance monitor 1: Execute maintenance monitor By setting [Output Off_On Cycles Maintenance Setting] to "1: Execute maintenance monitor", each valve can be checked altogether whether it is the time for maintenance. Note that [Output Off_On Cycles Maintenance Monitor] becomes "0: No need maintenance" when [Output Off_On Cycles Maintenance Setting] is OFF.
19	Output Off_On Cycles Maintenance Monitor	0: No need maintenance 1: Need maintenance Becomes "1: Need maintenance" when [Output Off_On Cycles] ≥ [Output Off_On Cycles Maintenance Threshold] in [Output Off_On Cycles Maintenance Setting].

Example:
To notify the maintenance when the output ON count of any solenoid valve among S0 to S7 becomes 100000 or more, refer to the following table.

Output Off_On Cycles Maintenance Setting:

MSB LSB

S15	S14	S13	S12	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

0: Stop maintenance monitor 1: Execute maintenance monitor

[Output Off_On Cycles Maintenance Threshold] ---100000 (Common to all valves)

The output bit of each valve is described in following table when the output ON count of solenoid S0 and S8 becomes 100000 or more.
When the output ON count of solenoid S0 and S8 are 100000 or more, the bit that requires maintenance is output only for S0 since S8 is not in the maintenance monitoring status.

Output Off_On Cycles Maintenance Monitor:

MSB LSB

S15	S14	S13	S12	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

0: No need maintenance 1: Need maintenance

3.2.5 Diagnosis

Following items can be diagnosed.
Investigate the cause by referring to the event code and take measures.

Event code	Variation	Device status	Cause	Measures
0x1830	Notification	Maintenance Require	The number of times the valve output is turned on has reached the threshold.	Maintains the valve.
0x1832	Notification	Maintenance Require	The energization time of the device has reached the threshold.	Maintains the device.
0x1835	Notification	Out of specification	Valve power is not supplied.	Check the valve power supply.
0x4000	Error	Failure	The IO-Link driver temperature is rising.	Check the connection of the IO-Link wiring and turn the unit power off and on again.
0x4210	Warning	Out of specification	The excessive heat of IO-Link driver has been detected	Check the connection of the IO-Link wiring.
0x5000	Error	Failure	Read/Write error of EEPRPM has been occurred.	Turn the unit power off and then on again. If the error reoccurs even after turning the unit power off and then on again, contact CKD.
0x5111	Warning	Out of specification	The IO-Link communication voltage has dropped.	Check the communication (power supply) voltage.
0x7710	Error	Failure	A short circuit error has occurred in the network cable.	Check the connection of the IO-Link wiring and turn the unit power off and on again.

3.3 Correspondence between the device output No. and PLC address No.

3.3.1 PLC address correspondence table

This correspondence table uses OMRON PLC as an example.

<OPP8-A2KC-* (32-point output specification)>

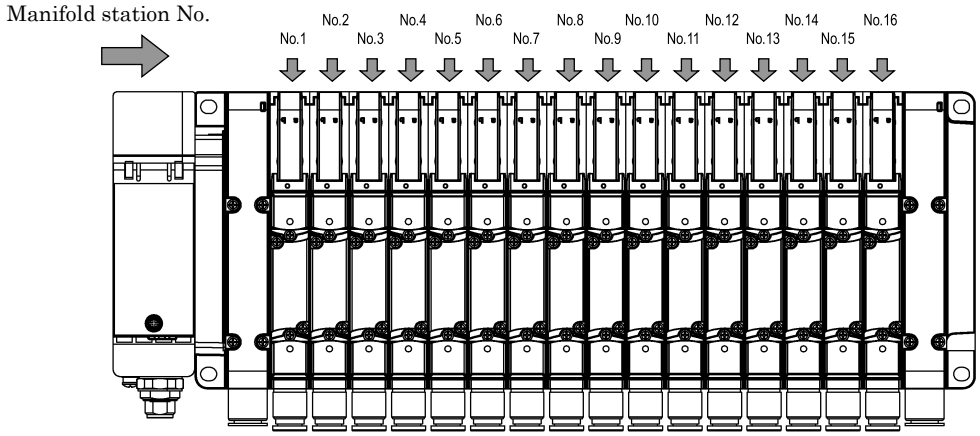
PLC memory assigned address	Octet[3]								Octet[2]								Octet[1]								Octet[0]							
	00	01	02	03	04	05	06	07	00	01	02	03	04	05	06	07	00	01	02	03	04	05	06	07	00	01	02	03	04	05	06	07
Serial Transmission Device **Output No.**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Solenoid output No.	**s1**	**s2**	**s3**	**s4**	**s5**	**s6**	**s7**	**s8**	**s9**	**s10**	**s11**	**s12**	**s13**	**s14**	**s15**	**s16**	**s17**	**s18**	**s19**	**s20**	**s21**	**s22**	**s23**	**s24**	**s25**	**s26**	**s27**	**s28**	**s29**	**s30**	**s31**	**s32**

3.3.2 Example of valve No. array corresponding to solenoid output No.

In the table below, each valve number (Valve No.) 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-A2KC-* (32-point output)>

The figure below is an example of mounting sixteen stations of double-solenoid type manifold valves.



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	10b	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 device is treated as a 32-point output module: OPP8-A2KC-* from the master unit.

There is output data (set to Process Data Out) transmitted from the master unit to the device.
This device acts as an output device which transmits the output data to valves after receiving it from the master unit.

Refer to the instruction manual issued by the PLC manufacturer when programming.
Refer to the following table to program the I/O mapping.

Output data mapping

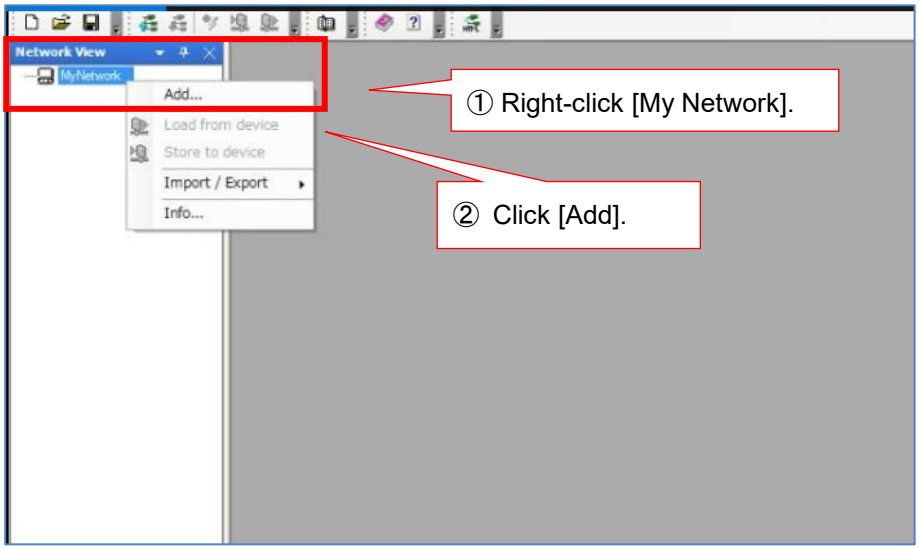
Output point		Process Data OUT (bit)							
		bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
32 points	Octet 3	07	06	05	04	03	02	01	00
	Octet 2	15	14	13	12	11	10	09	08
	Octet 1	23	22	21	20	19	18	17	16
	Octet 0	31	30	29	28	27	26	25	24

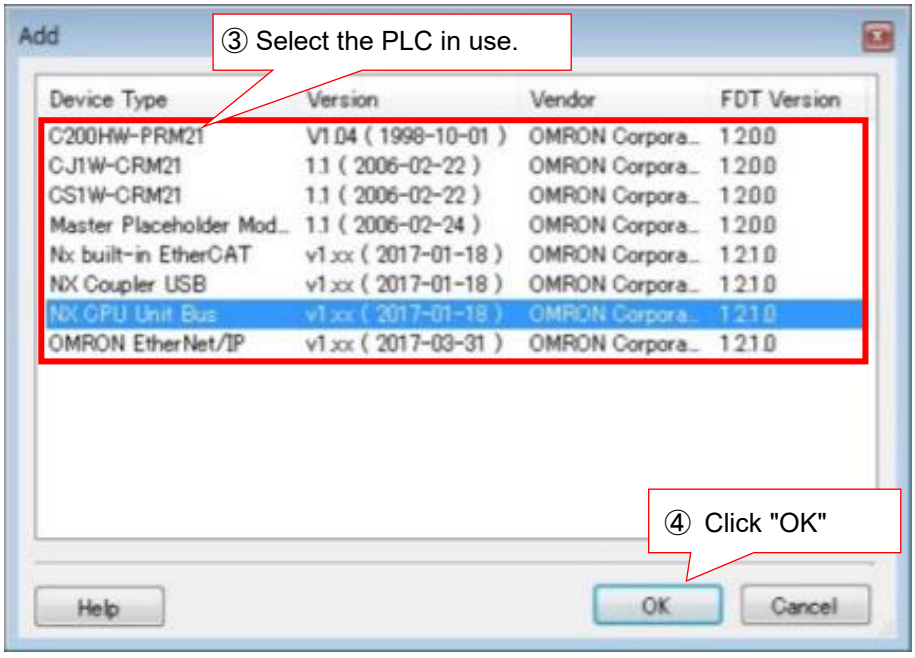
3.5 Operation

3.5.1 Displaying the set parameters

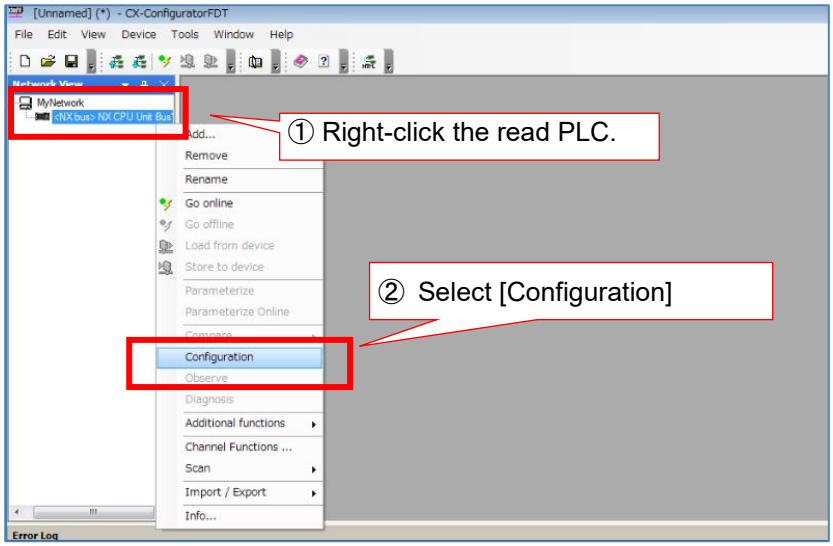
This is an operation example to display the set parameters using PLC software (OMRON: CX_Configurator FDT).
For detailed operation, refer to the operation manual of Omron Corporation.

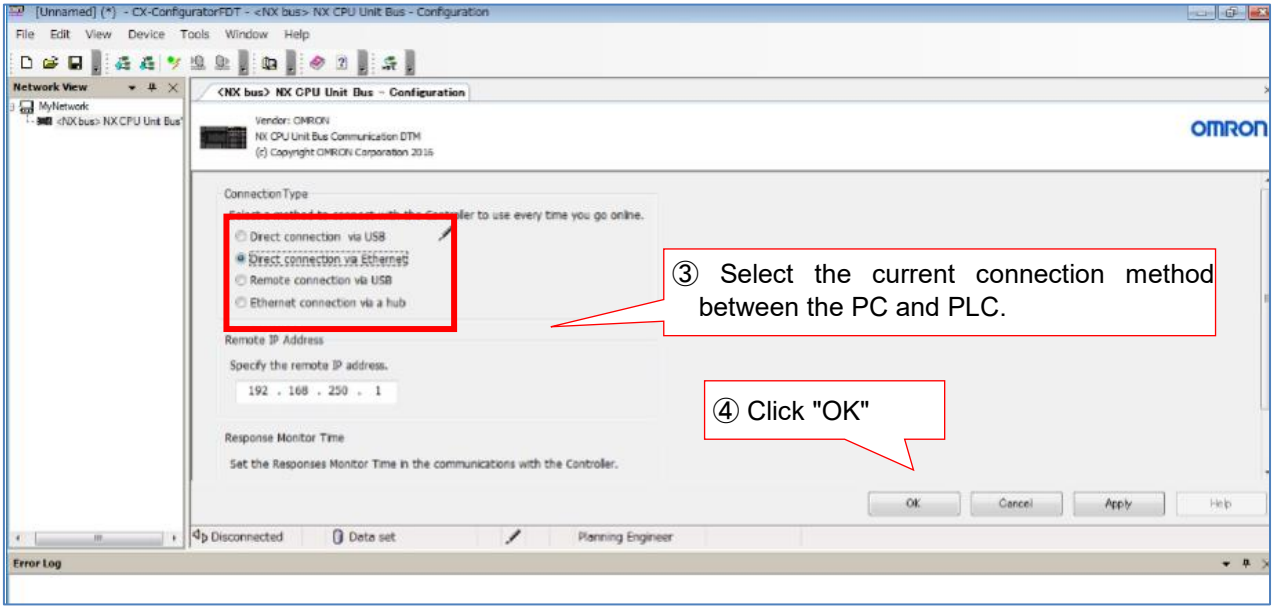
Step (1)
Read the PLC into [My Network] file.

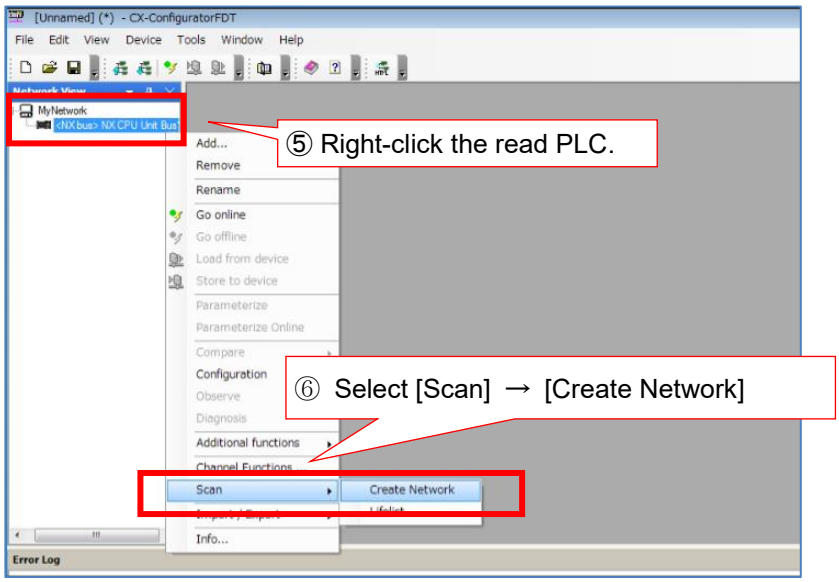


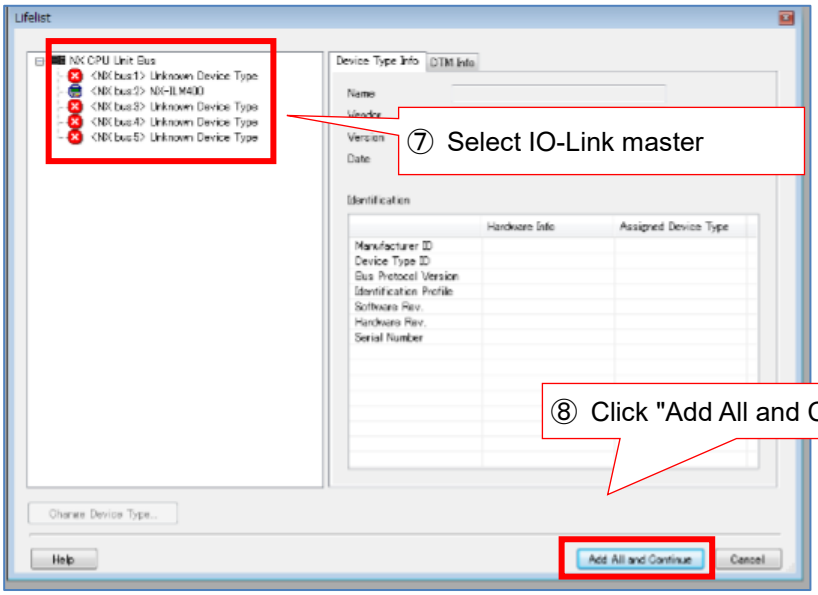


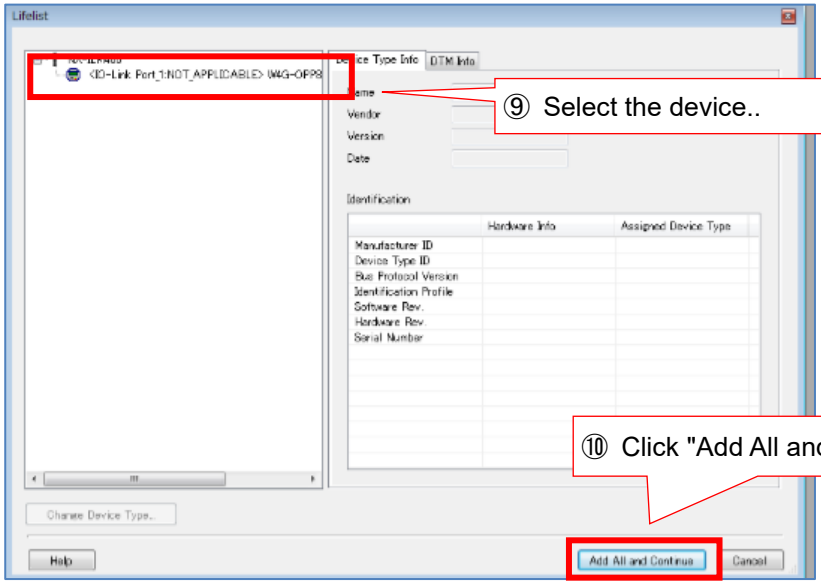
Step (2)
Read the connected device.

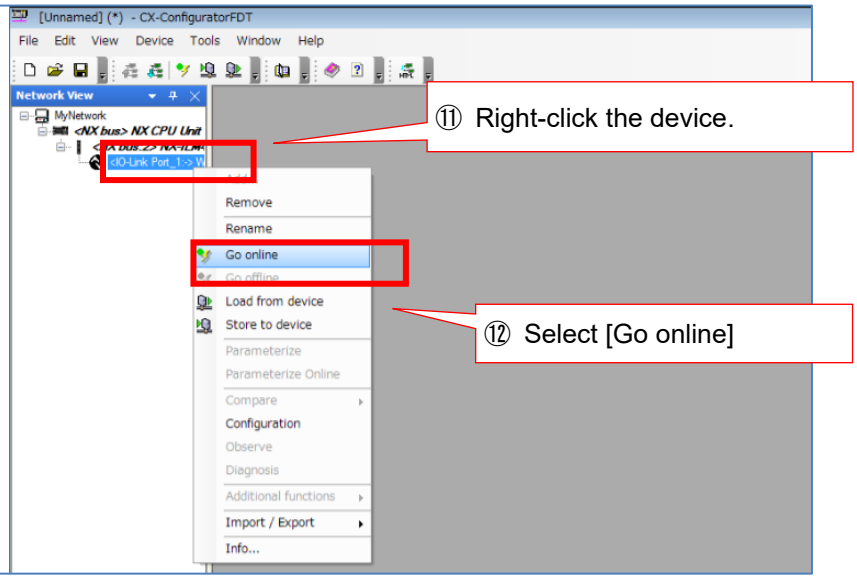




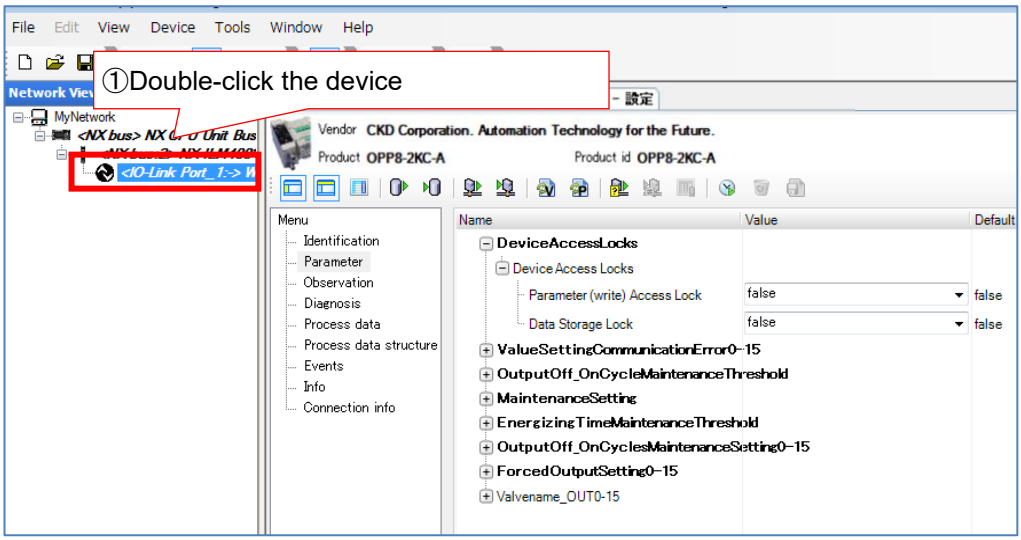


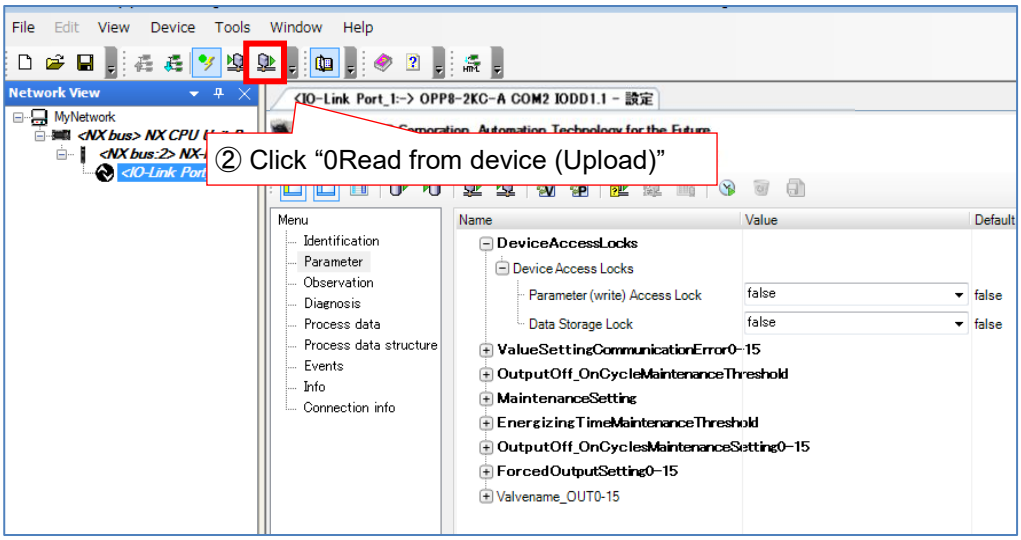

Lifelist
⑦ Select IO-Link master
⑧ Click "Add All and Continue".
Add All and Continue
Cancel
Help


Lifelist
⑨ Select the device..
⑩ Click "Add All and Continue"
Add All and Continue
Cancel
Help


[Unnamed] (*) - CX-ConfiguratorFDT
File Edit View Device Tools Window Help
Network View
MyNetwork
⑪ Right-click the device.
Remove
Rename
Go online
Load from device
Store to device
⑫ Select [Go online]
Parameterize
Parameterize Online
Compare
Configuration
Observe
Diagnosis
Additional functions
Import / Export
Info...

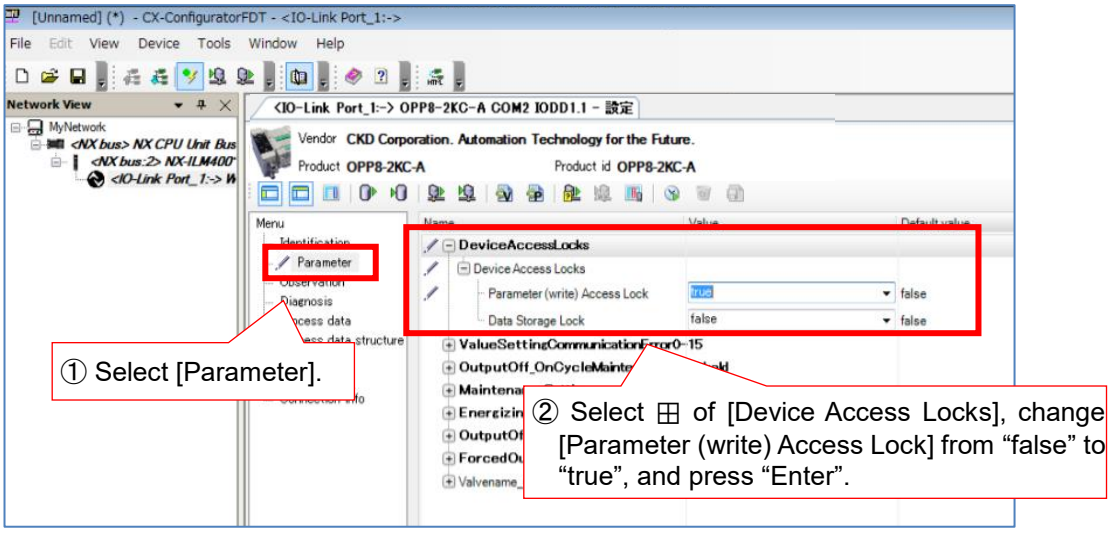
Step (3)
Reads out and displays the set parameters of device.

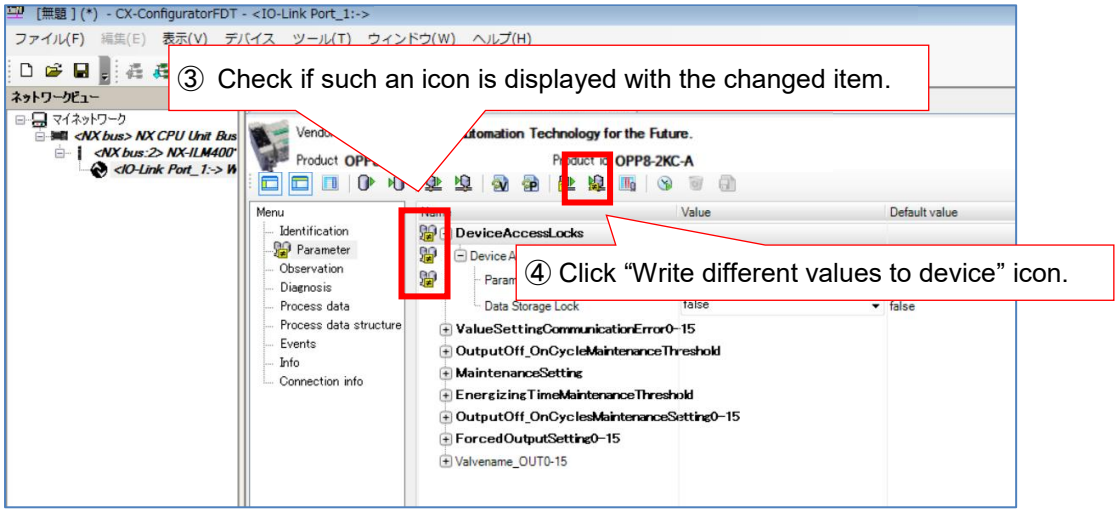




3.5.2 Changing the set parameters

This subsection describes how to enable Device Access Locks function as an example.
Run the changing after performing 3.5.1 "Displaying the set parameters".





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 and this may lead to faults (such as short service life, damage, and malfunction) or accidents.

Do not drop or apply excessive vibrations or shocks to the product.
These may cause damage because parts inside the product are made to precise specifications.

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.
If using the product in an environment where temperature or humidity is extremely high or in a dusty environment, conduct inspections at a shorter interval.

<Inspection items>
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 hygrometer 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	Hexagon 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

■ Checking the device before/after replacing

The network is constituted by each unit (master and device).
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 units.

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

<Settings for replacement device>
For the switches on the replacement devicet, 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 (bare live part).
An electric shock may occur.

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

⚠CAUTION

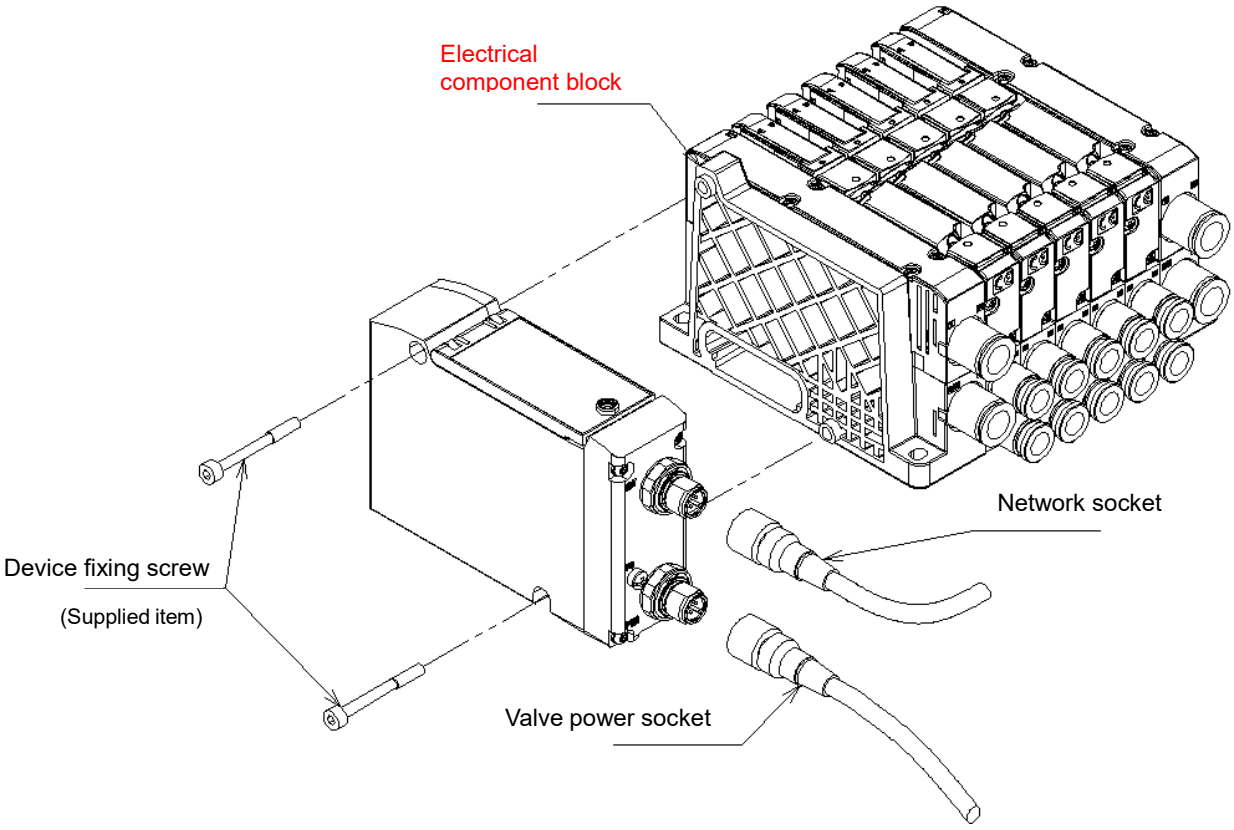
Check the device station number and the setting made to specify which action to take on the output in the event of communication error before turning on the unit power.

Do not attach or detach the connector while the power is turned on.
These may cause failure or malfunction.

4.2.1 Removing the product (device)

Follow the steps below when connecting the device to the manifold solenoid valve.
This part describes Class A as an example.

1. After confirming safety, stop network communication as necessary and turn off all peripheral equipment.
2. After confirming safety, turn off the power of the master and the valve as necessary.
3. Loosen the device fixing screw.
4. Hold and pull out the product slowly.
5. Remove the network socket and valve power socket.



4.2.2 Mounting the product (device)

1. Set the switches of the product.
2. 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. Connect the network socket and the valve power socket with the power (for the master/valve) turned off.
   The system may operate suddenly if the connector is connected while the power is turned on.
   Be careful of the surroundings and secure safety before performing work.
   Reference tightening torque: 0.4 N·m (Since it varies depending on the connector, consult the connector manufacturer.)
5. Confirm safety and turn on each power.

5. Troubleshooting

5.1 Problems, Causes, and Solutions

Troubleshooting for this device must be carried out 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(V) LED does not light up

- Check that the valve power cable is properly connected and not broken.
- Check if the power supply voltage is within the specified range.

■ Fault 2: COM LED does not light up

- Check that the power to PLC is turned on.
- Check that the network cable is compatible with IO-Link.
- Check that the transmission distance is compatible with IO-Link.
- Check that there are no noise-generating devices or high-voltage lines near the network cable.

■ Fault 3: ST LED lights up

- Check that there is any problem (such as damage or disconnection) with the connection of the network cable and connector.
- Contact to CKD if the condition doesn't change even after turning the power on and off.

■ Fault 4: ST LED is blinking

- Check the maintenance status by maintenance monitor function.

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 device 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.