

Serial Transmission Device

W4G4 Series T7KC**1 (W4G-OPP8-1KC-**)

IO-Link Compatible

INSTRUCTION MANUAL

SM-A20659-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.

SM-A20659-A PREFACE

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.

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SM-A20659-A SAFETY INFORMATION

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.

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SM-A20659-A SAFETY INFORMATION

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 shutoff 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 T7KC**1 (W4G-OPP8-1KC-**) for W4G4.



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.

■ T7KC**1 (W4G-OPP8-1KC-**)

This is a serial transmission device for W4G4 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.

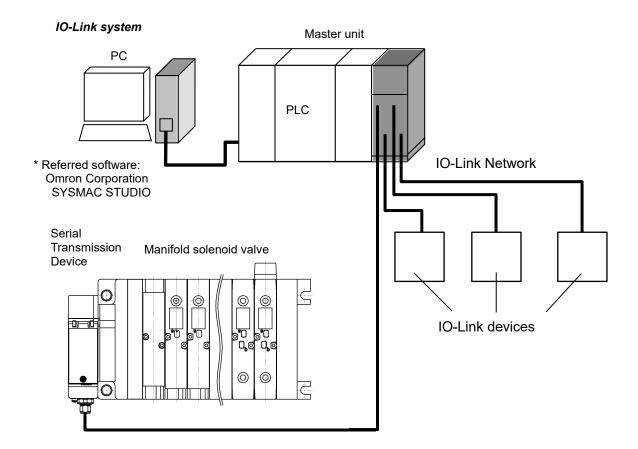
1.1.2 System structure

This system mainly consists of a PLC, master unit, W4G-OPP8-1KC-** 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 | | | |

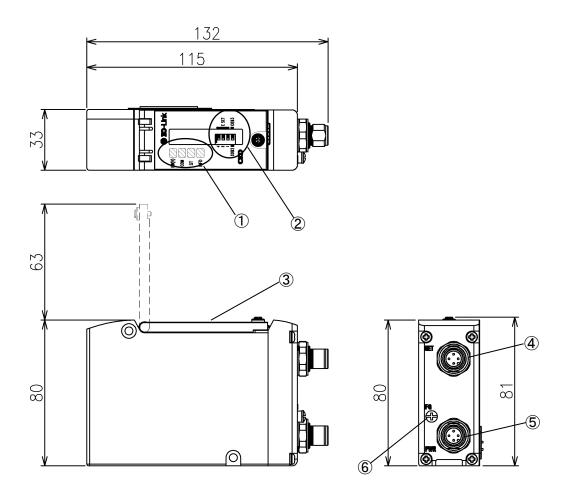
■ Example of basic structure of the system



1.2 Part Name

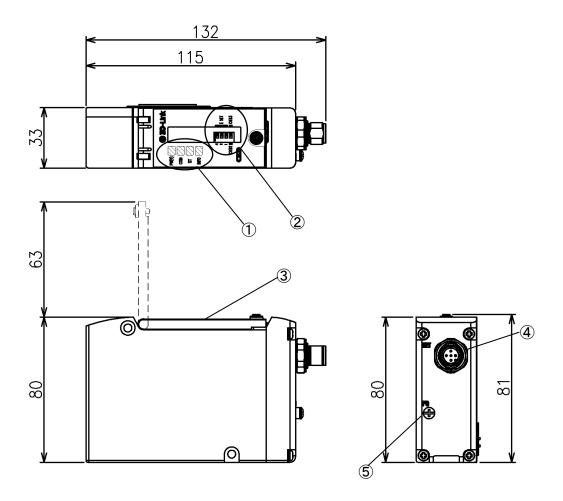
1.2.1 Parts of the device

■ 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 | Indicate the status of the serial transmission device and net 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

ACAUTION

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 | Mode | varve operation at communication error |
| | OFF | OFF | | All points OFF |
| OFF | OFF | ON | Hardware mode F | Final output data |
| OFF | 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.

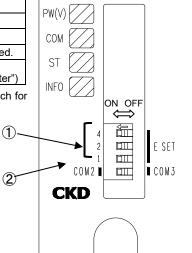
② Baud rate setting

| COM | Mode |
|-----|------|
| OFF | COM3 |
| ON | COM2 |

LED indicators

These LEDs indicate the status of the product and network.

| Part name | Function (Indication) | Status | | Status | |
|-----------|-----------------------|----------------|--|--------|--|
| PW(V) | Valve power status | OFF | Valve power OFF | | |
| FVV(V) | | Green on | Valve power ON | | |
| | | OFF | Unit power OFF | | |
| СОМ | Communication status | 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. | | |
| ST | | Red blinking | Needs maintenance | | |
| | | Red on | Hardware error (Disconnection, memory error, etc.) | | |
| INFO | Not used | - | - | | |



IO-Link

1.3 Specifications

1.3.1 Communication specifications

| ltem | 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 | | |
|-----------------------------|---------------------|---|--|--|
| ı | Model No. | W4G-OPP8-1KC-A(T7KCA1) W4G-OPP8-1KC-B(T7KCB1) | W4G-OPP8-1KC-PA(T7KCPA1) W4G-OPP8-1KC-PB(T7KCPB1) | |
| Unit power s | supply voltage | 18 VDC to | o 30 VDC | |
| Unit power c | current consumption | 50 mA or less (all po | ints ON: at 24 VDC) | |
| Valve power | supply voltage | 22.8 VDC to 26.4 VDC | C(24VDC +10%, -5%) | |
| Valve power | current consumption | 10 mA or less (with all points OFF) /15 n | nA or less (with all points ON at no load) | |
| Output type | | +COM (NPN) | -COM (PNP) | |
| Number of o | utput point | 16 p | points | |
| Insulation re | sistance | Between external terminals and the | case: 30 MΩ or more with 500 VDC | |
| Withstand vo | oltage | Between external terminals and the | ne case: 500 VAC for one minute | |
| Shock resist | ance | 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 hun | nidity | 30% to 85% RH (no dew condensation) | | |
| Atmosphere | | No corrosive gas | | |
| Output insula | ation | Photo coupler insulation | | |
| Max. load cu | ırrent | 40 mA/1 point | | |
| Leakage cur | rent | 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 | | |
| Vibration | 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/s², whichever smaller. | | |
| resistance | 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/s², 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.

SM-A20659-A 2. INSTALLATION

2. INSTALLATION

2.1 Mounting

ACAUTION

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 power for each manifold solenoid valve and wire separately.
- · 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.

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.

SM-A20659-A 2. INSTALLATION

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.

Use a dedicated network cable that complies with IO-Link 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.

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 I/O 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.

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. |

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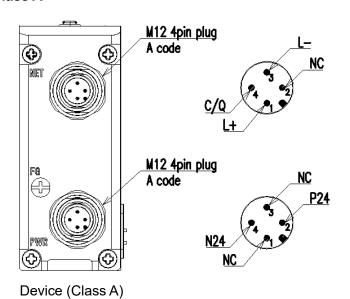
■ Connecting the cable

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



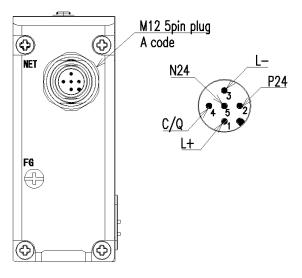
Network connector plug

| Port | Pin | Signal | Function |
|------|-----|--------|------------------|
| | 1 | L+ | Unit power (24V) |
| Net | 2 | NC | unused |
| Ž | 3 | L- | Unit power (0V) |
| | 4 | C/Q | IO-Link signal |

Valve power plug

| Port | Pin | Signal | Function |
|-------|-----|--------|-------------------|
| | 1 | NC | unused |
| power | 2 | P24 | Valve power (24V) |
| /od | 3 | NC | unused |
| | 4 | N24 | Valve power (0V) |

Class B



Network connector plug

| Port | Pin | Signal | Function |
|-------------|-----|--------|-------------------|
| ٢ | 1 | L+ | Unit power (24V) |
| we | 2 | P24 | Valve power (24V) |
| Net / Power | 3 | L- | Unit power (0V) |
| Vet , | 4 | C/Q | IO-Link signal |
| | 5 | N24 | Valve power (0V) |

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.

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3. USAGE

** MARNING**

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. | W4G-OP | P8-1KC-A | W4G-OPI | P8-1KC-B | | | | |
| Product Name | OPP8- | -1KC-A | OPP8- | -1KC-B | | | | |
| Output type | | +COM (NPN) | | | | | | |
| Number of output point | | 16 p | oints | | | | | |
| Baud rate | COM2 | COM3 | COM2 | COM3 | | | | |
| Device ID | 0x20002E | 0x20002F | 0x200030 | 0x200031 | | | | |
| IODD file name | CKD-OPP8 _1KC_A_COM2 _******* | CKD-OPP8 _1KC_A_COM3 _******* | CKD-OPP8 _1KC_B_COM2 _******* | CKD-OPP8 _1KC_B_COM3 _******* | | | | |

| Item | Specifications | | | | | | |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--|--|--|
| Model No. | W4G-OPF | P8-1KC-PA | W4G-OPF | 8-1KC-PB | | | |
| Product Name | OPP8- | 1KC-PA | OPP8- | IKC-PB | | | |
| Output type | | -COM | (PNP) | | | | |
| Number of output point | | 16 p | oints | | | | |
| Baud rate | COM2 | COM3 | COM2 | COM3 | | | |
| Device ID | 0x200032 | 0x200033 | 0x200034 | 0x200035 | | | |
| IODD file name | CKD-OPP8 _1KC_PA_COM2 _******* | CKD-OPP8 _1KC_PA_COM3 _******* | CKD-OPP8 _1KC_PB_COM2 _******* | CKD-OPP8 _1KC_PB_COM3 _******* | | | |

3.2 IO-Link communication specifications

3.2.1 General

| Model No. | W4G-OPI | P8-1KC-A | W4G-OPI | P8-1KC-B | W4G-OPP8-1KC-PA W4G-OPP8-1K | | | 8-1KC-PB |
|-------------------------------|----------|----------|----------|----------|-----------------------------|----------|----------|----------|
| Transmission rate (COM) | COM2 | СОМЗ | COM2 | СОМЗ | COM2 | СОМЗ | COM2 | СОМЗ |
| IO-Link Version ID | | ٧ | 1.1 | | V 1.1 | | | |
| Process Data Input Length | | 0 b | yte | | | 0 b | yte | |
| Process Data Output Length | | 2 b | ytes | | 2 bytes | | | |
| Min Cycle Time | 2.3ms | 1.0ms | 2.3ms | 1.0ms | 2.3ms | 1.0ms | 2.3ms | 1.0ms |
| Device ID | 0x20002E | 0x20002F | 0x200030 | 0x200031 | 0x200032 | 0x200033 | 0x200034 | 0x200035 |

3.2.2 On demand data

■ Identification

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

| Index(dec) | Sub | Item | Value | | Access | | Longth | Format |
|------------|-------|--------------------------|------------------------|---|--------|-----|----------|--------|
| index(dec) | Index | item | value | U | M | S | Length | Format |
| 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 | ı | String |
| 0x0013(19) | 0 | Product ID | Refer to Table 1. | R | R | R | ı | String |
| 0x0014(20) | 0 | Product Text | Refer to Table 1. | R | R | R | ı | 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 | 1.0 | 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. | W4G-OPP8-1KC-A | | W4G-OPP8-1KC-B | | W4G-OPP8-1KC-PA | | W4G-OPP8-1KC-PB | | |
|-------------------------|----------------|-------------|----------------|-------------|-----------------------|-------------|-----------------|-------------|--|
| Transmission rate (COM) | COM2 | СОМЗ | COM2 | СОМЗ | COM2 | СОМЗ | COM2 | СОМЗ | |
| Product Name | OPP8-1KC-A | | ODD9 | OPP8-1KC-B | | OPP8-1KC-PA | | OPP8-1KC-PB | |
| Product ID | OFF0- | · INO-A | OFF0- | · IKO-D | OFF6- | INO-FA | UPPO-INC-PB | | |
| Product Text | Outputs16 N | NPN class A | Outputs16 N | NPN class B | Outputs16 PNP class A | | Outputs16 F | PNP class B | |

■ Parameter and commands

Common specifications

| mmon opcom | | | | | | | | |
|------------|-------|---------------------------|--|---|--------|-----|----------|---------------------------|
| Index(dec) | Sub | Item | m Value | | Access | | Longth | Format |
| maex(aec) | Index | item | value | U | М | S | Length | Format |
| 0x0002(2) | 0 | System Command | Refer to Table 2 | - | - | W | 1 byte | UInteger 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 | 24 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 |

Individual specifications

| Index (dec) | sub Index | ltem | Access | Data Storage | Bit Length |
|----------------|--------------|--|--------|-----------------|---------------|
| 0x0040 | 1 | Value Setting at Communication Error (OUT0-15) | | Enable | 16 |
| (64) | 2 | Value Setting at Communication Error (OUT0-15) | R/W | Enable | 16 |
| | 1 | Output Off_On Cycles 0 | | 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 |
| 0x0044 | 8 | Output Off_On Cycles 7 | | Disable | 32 |
| (68) | 9 | Output Off_On Cycles 8 | R | 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 |
| 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 | Disable | 16 |
| 0x00A3 (163) | - | Maintenance Setting | R/W | Enable | 16 |
| 0x00A4 (164) | - | Maintenance Monitor | R | Disable | 16 |
| 0x00A5 (165) | - | Energizing Time Monitor | R | Disable | 32 |
| 0x00A6 (166) | - | Energizing Time Maintenance Threshold | R/W | Enable | 32 |
| 0x00A7 (167) | - | Communications Error Value Setting | R | Disable | 8 |
| 0x00C0 (192) | - | Cycle Output Data 0-15 | R | Disable | 16 |
| 0x00C2 (194) | - | Forced Output Setting 0-15 | R/W | Disable | 16 |
| 0x00C4 (196) | - | Forced Output Data 0-15 | R/W | Disable | 16 |
| 0x00C6 (198) | - | Output Off_On Cycles Maintenance Setting 0-15 | R/W | Enable | 16 |
| 0x00C8 (200) | - | Output Off_On Cycles Maintenance Monitor 0-15 | R | Disable | 16 |

| Index (dec) | sub Index | Item | Access | Data Storage | Bit Length |
|-----------------|--------------|----------------------------|--------|-----------------|---------------|
| | 1 | Valve name 0 | | Enable | 64 |
| | 2 | Valve name 1 | | Enable | 64 |
| | 3 | Valve name 2 | | Enable | 64 |
| | 4 | Valve name 3 | | Enable | 64 |
| | 5 | Valve name 4 | | Enable | 64 |
| | 6 | Valve name 5 | | Enable | 64 |
| | 7 | Valve name 6 | | Enable | 64 |
| 0x00CA | 8 | Valve name 7 | R/W | Enable | 64 |
| (202) | 9 | Valve name 8 | R/VV | Enable | 64 |
| | 10 | Valve name 9 | | Enable | 64 |
| | 11 | Valve name 10 | | Enable | 64 |
| | 12 | Valve name 11 | | Enable | 64 |
| | 13 | Valve name 12 | | Enable | 64 |
| | 14 | Valve name 13 | | Enable | 64 |
| | 15 | Valve name 14 | | Enable | 64 |
| | 16 | Valve name 15 | | Enable | 64 |
| 0x00CE (206) | - | Valve Power Supply Monitor | R | Disable | 8 |

■ Process data

OPP8-1KC-□

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-----------|-----|----|----|----|----|----|---|--------|---------|------|---|---|---|---|---|-----|
| Dit | MSB | | | | | | | | | | | | | | | LSB |
| Data name | | | | | | | ٧ | alve o | utput (|)-15 | | | | | | |
| Data name | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Format | | | | | | | | Во | olean | | | | | | | • |

Index 0x0000 (Direct Parameter Page 1)

| | | | | Data V4G-OPP8-1KC-A W4G-OPP8-1KC-B W4G-OPP8-1KC-PA W4G-OP COM2 COM3 COM2 COM3 COM2 0x17 0x0A 0x17 0x0A 0x17 0x2B 0x11 0x00 0x10(2bytes) 0x03 0x57 0x20 | | | | | | | | |
|----------------|-----------------------|--------|--|--|---------|----------|---------|----------|---------|----------|--|--|
| Index (dec) | Parameter name | Access | W4G-OPI | P8-1KC-A | W4G-OPI | P8-1KC-B | W4G-OPP | 8-1KC-PA | W4G-OPP | 8-1KC-PB | | |
| (400) | | | COM2 | СОМЗ | COM2 | COM3 | COM2 | СОМЗ | COM2 | СОМЗ | | |
| 0x02 | Min Cycle Time | R | 0x17 | 0x0A | 0x17 | 0x0A | 0x17 | 0x0A | 0x17 | 0x0A | | |
| 0x03 | M-sequence Capability | R | | | | 0x | 2B | | | | | |
| 0x04 | Revision ID | R | 0x11 0x00 | | | | | | | | | |
| 0x05 | Process Data In | R | | 0x2B 0x11 0x00 0x10(2bytes) 0x03 0x57 | | | | | | | | |
| 0x06 | Process Data Out | R | 0x17 0x0A 0x17 0x0A 0x17 0x0A 0x17 0x0A 0x17 0x0A 0x17 0x0A 0x17 0x0B 0x11 0x00 0x10(2bytes) 0x03 0x57 | | | | | | | | | |
| 0x07 | Vendor ID 1 | R | | | | 0× | :03 | | | | | |
| 0x08 | Vendor ID 2 | R | | | | 0x | :57 | | | | | |
| 0x09 | Device ID 1 | R | | | | 0x | 20 | | | | | |
| 0x0A(10) | Device ID 2 | R | | | | | | | | | | |
| 0x0B(11) | Device ID 3 | R | 0x0A | 0x0B | 0x0C | 0x0D | 0x0E | 0x0F | 0x10 | 0x11 | | |

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 | Stop maintenance monitor Execute maintenance monitor Sets maintenance monitor for each valve |
| 7 | - | - |
| 8 | - | - |
| 9 | Forced Output Setting | O: Cyclic output data enable 1: Forced output data enable Sets the point to output forcibly. |
| 10 | Forced Input Setting | O: Cyclic output data enable 1: Forced input data - enable Sets the point to input forcibly. |
| 11 | Forced Output Data | 0: OFF 1: ON Forcibly output using this data. |
| 12 | Valve Name | Sets the valve name. |
| 13 | - | - |
| 14 | - | - |
| 15 | - | - |
| 16 | - | - |

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.

| | Setting cation 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:

| ١ | /ISB | | | | | | | | | | | | | | | LSI | 3 |
|---|------|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|-----|---|
| | 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

| 1SB | | J | | | | | | | | | | | | | LSE | 3 |
|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|-----|---|
| 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:

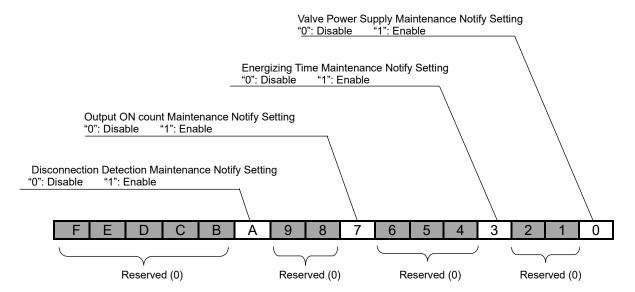
| ١ | /ISB | | | | | | | | | | | | | | | LSI | В |
|---|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| | S15 | S14 | S13 | S12 | S11 | S10 | S9 | S8 | S7 | S6 | S5 | S4 | S3 | S2 | S1 | S0 | |
| | 1 | "C" | 0 | |

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 | O: Disable 1: Enable Set whether to monitor the valve power status. |
| 1 | Reserved | 0 |
| 2 | Reserved | 0 |
| 3 | Energizing Time Maintenance Notify Setting | O: 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 | O: Disable 1: Enable Sets whether to monitor the valve's output ON count. |
| 8 | Reserved | 0 |
| 9 | Reserved | 0 |
| Α | Disconnection Detection Maintenance Notify Setting | Disable 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 |
|-----|-----------------------|---|
| 9 | Forced Output Setting | Sets the point to output forcibly. |
| 11 | 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:

| Ν | 1SB | | _ | | | | | | | | | | | | | 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:

| M | 1SB | | | | | | | | | | | | | | | 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):

| M | 1SB | | | | | | | | | | | | | | | LSE | 3 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| | S15 | S14 | S13 | S12 | S11 | S10 | S9 | S8 | S7 | S6 | S5 | S4 | S3 | S2 | S1 | S0 | l |
| | 1 | "C" | 0 | l |

^{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].

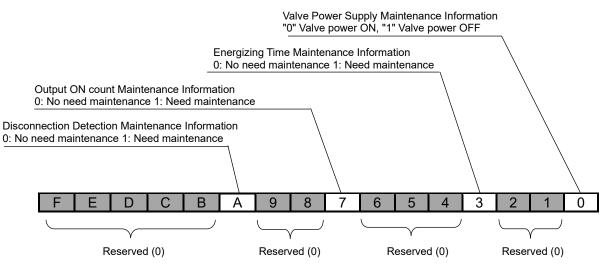
| No. | Item | Description |
|-----|---|---|
| 17 | Device Reset | Resets the device. It is treated the same as turning OFF/ON the device. |
| 18 | Application Reset | Resets the application. Initializes the valve ON count of all the valves. |
| 19 | Restore Factory Setting | Resets to the factory settings. The energizing time is not initialized. |
| 20 | Output Reset | Select and reset the valve output individually. Initializes the output ON count of the corresponding valve. |
| 21 | Output Data Monitor | Indicates the current valve output status. The forced output value is included. |
| 22 | - | - |
| 23 | Maintenance Monitor | Notifies maintenance information. |
| 24 | Energizing Time Monitor | Indicates energizing time of the device. Unit [s] Note 1 |
| 25 | 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". |
| 26 | Cyclic Output Data | Indicates the data received by cyclic communication from the master unit. |
| 27 | 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]. |
| 28 | Output Off_On Cycles | Indicates the output ON count for each valve. |
| 29 | Valve Power Supply Monitor | Valve Power ON: Valve power supply is ON. Valve Power OFF: Valve power supply is OFF Indicates valve power status. |
| 30 | - | - |
| 31 | - | - |
| 32 | - | - |
| 33 | - | - |
| 34 | - | - |
| 35 | Sensor Name | Names each sensor. |

^{| 35 |} Sensor Name | Names each sensor. |
* 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 |
|-----|---|---|
| | Valve Power Supply | 0: Valve power ON |
| 0 | Maintenance | 1: Valve power OFF |
| | Information | 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 |
| А | Disconnection Detection Maintenance Information | O: 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 | O: No need maintenance 1: Need maintenance 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. |
| 27 | 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:

| ١ | /ISB ¯ | - | | | | | | | | | | | | | | LSI | 3 |
|---|--------|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|-----|---|
| | 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:

| M | ISB _ | | | | | | | | | | | | | | | 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. Or re-set the threshold. |
| 0x1832 | Notification | Maintenance Require | The energization time of the device has reached the threshold. | Maintains the device. Or re-set the threshold. |
| 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.

< W4G-OPP8-1KC-*/ W4G-OPP8-1KC-P* (16-point output specification)>

| PLC memory assigned | | | | | | Oı | utpu | ıt Bi | t 00 |) to | 15 | | | | | |
|---|-----|-----|-----|-----|-----|-----|------|-------|------|------|----|----|----|----|----|----|
| address | 15 | 14 | 13 | 12 | 11 | 10 | 09 | 08 | 07 | 06 | 05 | 04 | 03 | 02 | 01 | 00 |
| Serial Transmission Device Output No . | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Solenoid output No. | s15 | s14 | s13 | s12 | s11 | s10 | s9 | s8 | s7 | s6 | s5 | s4 | s3 | s2 | s1 | s0 |
| | | | | | | | | | | | | | | | | フ |

1-word output data

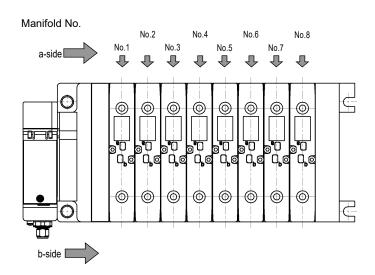
3.3.2 Example of valve No. array corresponding to solenoid output No.

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.

< W4G-OPP8-1KC-*/ W4G-OPP8-1KC-P* (16-point output specification)>



The figure on the left is an example of mounting eight stations of double-solenoid type manifold valves.

There is no solenoid on the bside for single-solenoid type.

Standard 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 | 2a | 3a | 4a | 5a | 6a | 7a | 8a | 9a | 10a | 11a | 12a | 13a | 14a | 15a | 16a |

· 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 |

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 |

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) |

· 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 |

• 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) |

3.4 Programming

This device is treated as a 16-point output module: W4G-OPP8-1KC-**, 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 | <u>Byte</u> | | | | | | | | | | | | | | | |
|-----------|---------|-------------|-----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|
| I/O point | data | | [0] | | | | | | | [1] | | | | | | | |
| 16 points | Data 01 | 15 | 14 | 13 | 12 | 11 | 10 | 09 | 08 | 07 | 06 | 05 | 04 | 03 | 02 | 01 | 00 |

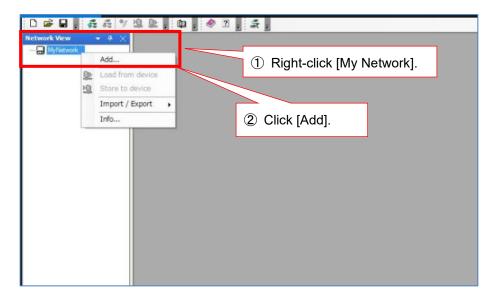
3.5 Operation

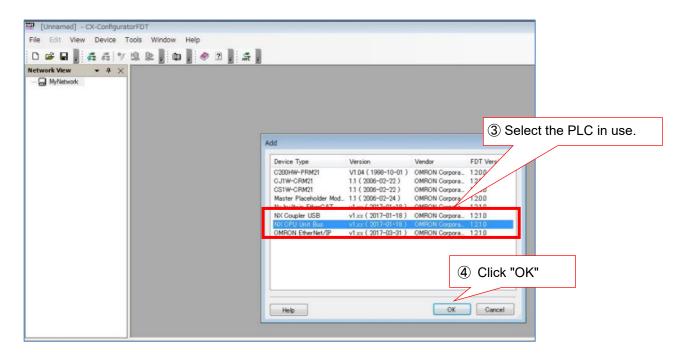
3.5.1 Displaying the set parameters

This is an operation example to display the set parameters using PLC software (OMRON: CX_Configurator FDT).

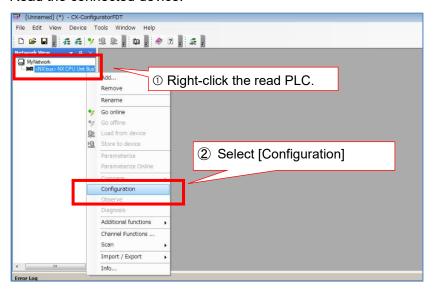
For detailed operation, refer to the operation manual of Omron Corporation.

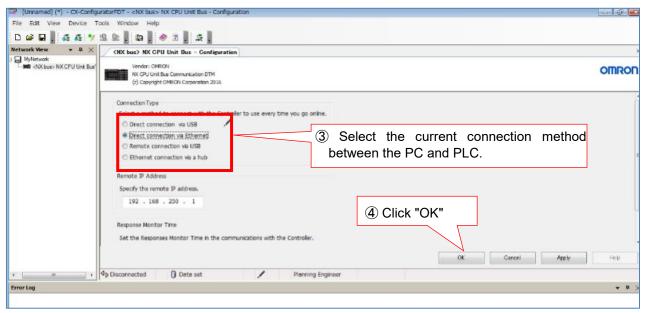
Step (1) Read the PLC into [My Network] file.

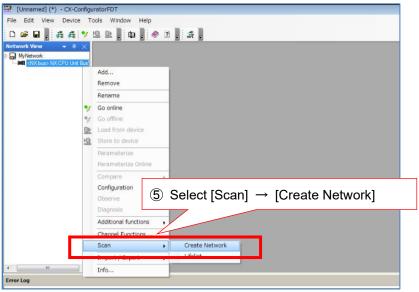


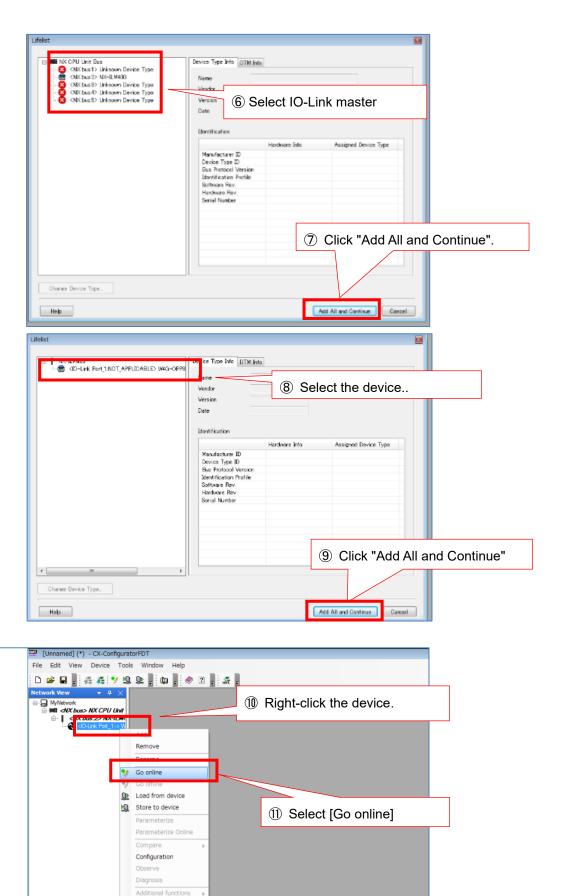


Step (2) Read the connected device.



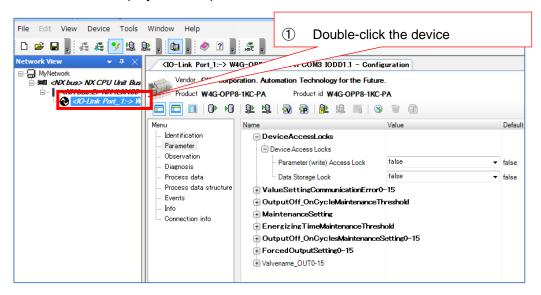


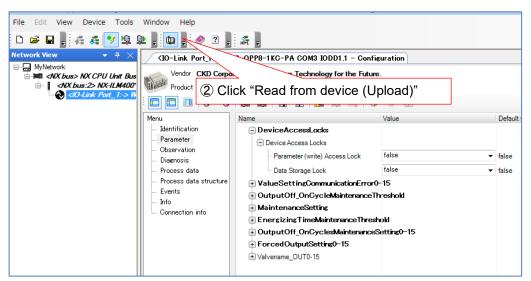




Import / Export
Info...

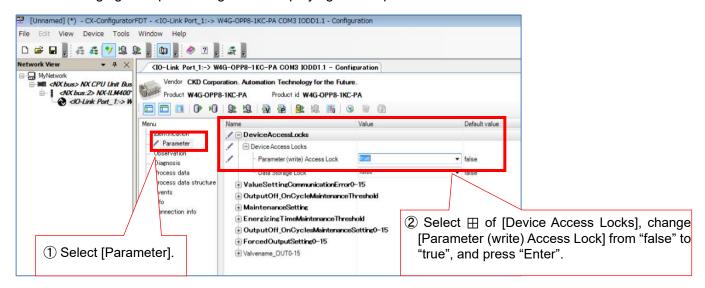
Step (3) Reads out and displays the set parameters of device.

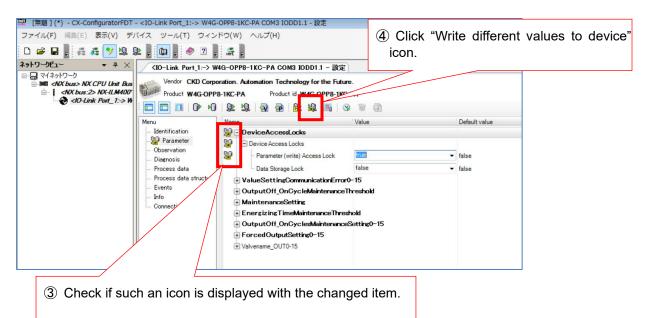




3.5.2 Changing the set parameters

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.

ACAUTION

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.
- 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 | | |
|-----------------|--|---|-------------------|--|--|
| | Is the surrounding and in-panel temperature appropriate? | Refer to "1.3.2 device specifications". | Thermometer | | |
| Environment | 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 | | |
| | Is the device fixed securely? | No looseness | Hexagon wrench | | |
| Installation | 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.

ACAUTION

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.

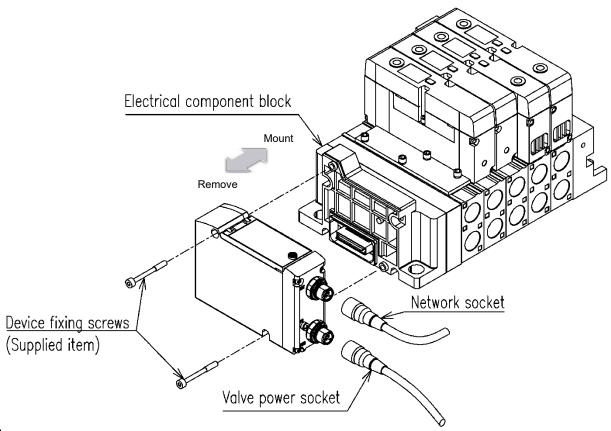
Do not attach or detach the connector while the power is turned on.

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 in the direction of the arrow.
- **5** Remove the network connector and valve power connector.



4.2.2 Mounting the product (device)

- **1** Set the switches of the product.
- **2** Hold the product and insert it slowly in the direction of the arrow.
- 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 connector and the valve power connector 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.

SM-A20659-A 5. Troubleshooting

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.

■ Fault 5: INFO LED lights up

 A system error occurred. Replace the device if the condition doesn't change even after turning the power on and off.

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.