

Serial Transmission Device

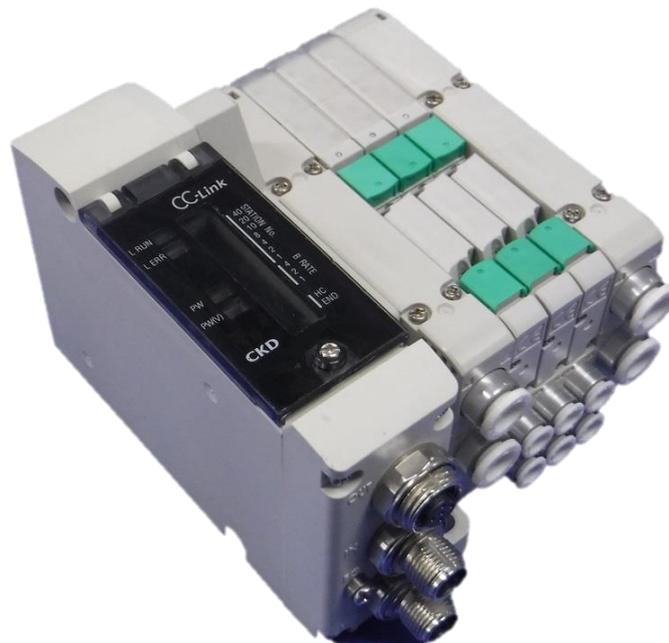
TVG Series JA2*

(OPP8-A2G / OPP8-A2G-P)

CC-Link Compatible

INSTRUCTION MANUAL

SM-A81053-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.

PREFACE

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

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

- The product, which uses control valves such as solenoid valves, motor valves, and air operated valves, is intended for users who have basic knowledge about materials, fluids, piping, and electricity. CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training with respect to control valves.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them. Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur due to fluid, piping, or other conditions. It is the responsibility of the customer to check the product specifications and decide how the product shall be used in accordance with the application and usage.

SAFETY INFORMATION

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

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

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

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.

Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

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

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

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

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

Precautions classified as "CAUTION" may still lead to serious results depending on the situation. All statements 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 and fluid from the system and use extreme care to avoid water or electric leakage.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or removing pipes and devices.
- When starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

CONTENTS

PREFACE	i
SAFETY INFORMATION	ii
Precautions on Product Use	iii
CONTENTS	iv
1. PRODUCT OVERVIEW	1
1.1 System Overview	1
1.1.1 System features	1
1.1.2 System structure	2
1.2 Part Name	3
1.2.1 Parts of the Remote station Unit	3
1.2.2 Switches and LED indicators	4
1.3 Specifications	5
1.3.1 Communication specifications	5
1.3.2 Remote station unit specifications	6
2. INSTALLATION	7
2.1 Mounting	7
2.2 Wiring	8
2.2.1 Connecting and wiring to the network connector	8
2.2.2 Connecting and wiring to the Unit/Valve power plug	10
2.2.3 FG terminal	12
3. USAGE	13
3.1 Setting the Switches	13
3.1.1 Station number/ transfer rate (Baud rate) setting	14
3.1.2 Setting other switches	14
3.2 Settings by CSP+ (Control & Communication System Profile) file	15
3.2.1 Registering the device	15
3.3 Correspondence between the Remote station Unit Output Number and PLC Address Number	16
3.3.1 PLC address correspondence table	16
3.3.2 Example of valve Number array corresponding to solenoid output Number	16
3.4 Programming	18
4. MAINTENANCE AND INSPECTION	19
4.1 Periodic Inspection.....	19
4.2 Removing and Mounting	20
4.2.1 Removing the product (Remote station unit)	21
4.2.2 Mounting the product (Remote station unit)	21
5. TROUBLESHOOTING	22
5.1 Problems, Causes, and Solutions	22
6. WARRANTY PROVISIONS	23
6.1 Warranty Conditions	23
6.2 Warranty Period	23

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 mainly describes the remote station unit OPP8-A2G-*(JA2*).
For master units and other remote station units that are connected in the same system as the product, read the instruction manuals issued by each manufacturer.
For manifold solenoid valves, make sure to read both this Instruction Manual and the instruction manual for the solenoid valve to fully understand the functions and performance in order to use the valves correctly.

■ OPP8-A2G-*(JA2*)

This is a remote station unit for TVG which can establish connection to the open field network CC-Link specified by the CC-Link Partner Association (hereinafter referred to as CLPA).

The remote station unit has the following features:

- It is connected to the PLC with only a CC-Link dedicated cable, allowing a significant reduction of man-hours in wiring.
- The unit power and the valve power are separated, ensuring easy maintenance.
- The energization status of the valve power supply can be checked on the master station via communication. (Fuse blown detection function).
- When a communication error occurs, the remote station unit output status can be set by a switch. (Hold all points output/ Clear all points output).
- The remote station unit is available in +COM or -COM specification.

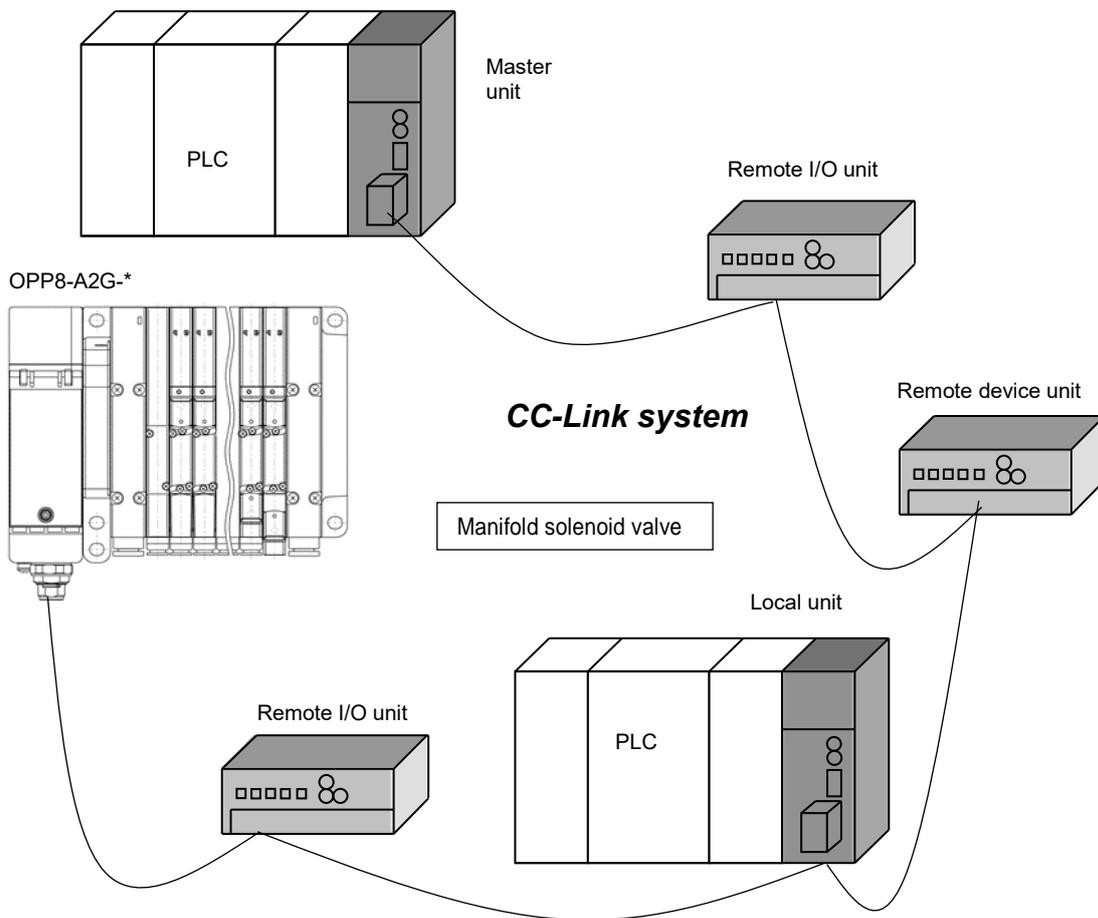
1.1.2 System structure

This system mainly consists of a PLC, master unit, OPP8-A2G-*mounted manifold solenoid valve, and peripheral equipment (CC-Link remote station units).

Examples of PLC and master unit combination

PLC manufacturer	Compatible PLC	Master unit model
Mitsubishi Electric Corporation	MELSEC-Q series	QJ61BT11
	MELSEC-R series	RJ61BT11

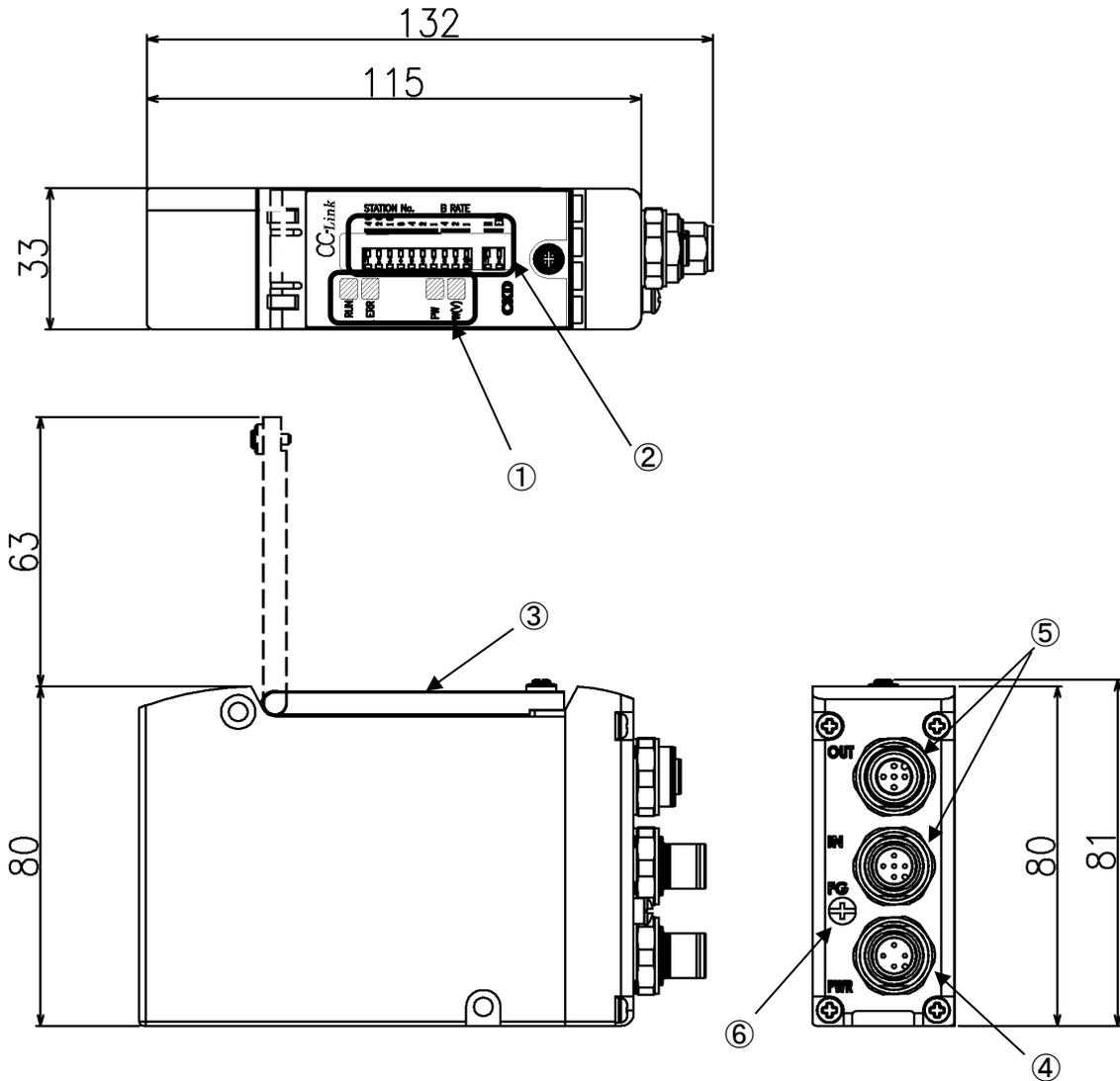
Example of basic structure of the system



- Master unit: Unit that controls remote I/O units, remote device units, and local units
- Remote I/O unit: Remote unit that handles only ON/OFF information
- Remote device unit: Remote unit that handles ON/OFF information and numerical data
- Local unit: Unit that has a CPU and communicates with the master unit and other local units

1.2 Part Name

1.2.1 Parts of the Remote station Unit



No.	Part name	Description
①	LED Indicators	Indicates the status of the remote station unit and network with L RUN, L ERR, PW, and PW(V).
②	Switches	Set the remote station unit station number, transfer rate, communication error output, and terminating resistor using DIP switches.
③	Cover	Protects the LED Indicators and the switches.
④	Unit/valve power plug (M12×1 port [PWR] 4-pin,A-cord)	Connects the unit/valve power socket (24 V).
⑤	Network connector (M12×2 ports[IN, OUT]5-pin, A-cord)	Receives CC-Link communication from the previous remote station or transmits to the next remote station. [Note] There is no functional difference between the IN and OUT ports.
⑥	FG terminal	Connects FG (frame grounding) to the terminal.

1.2.2 Switches and LED indicators

⚠ CAUTION

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

■ Switches

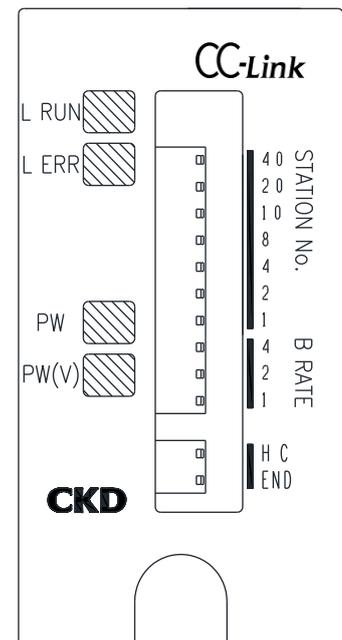
These switches set the remote station unit station number and the output in the event of communication error.

This remote station unit operates according to the switch settings when the power is turned on.

* Setting changes will not be recognized after the power is turned on.

Switches	Settings
STATION No. [Station number] 40 20 10 8 4 2 1	Set the remote station unit station number within the range of 1 to 64. The switch is weighted according to BCD code.
B RATE [Transfer rate (Baud rate)] 4 2 1	Set the transmission speed with the master unit within the range of 0 to 4. The switch is weighted according to BCD code.
[Output mode] H C	Selects hold (H) or clear (C) all points output for the output status when a communication error occurs.
[End station] END	Turns on the terminating resistor when this product is an end station. *1.

* 1. Turn it OFF when using a CC-Link dedicated high-performance cable and Tap wiring and connect a terminating resistor externally. (Refer to "3.1.2 Setting other switches".)



■ LED indicators

These LEDs indicate the status of the product and network.

Refer to the following table for the description of LED indicators.

LED indicators	Indication
PW	Red on when the unit is powered on.
PW(V)	Red on when the valve is powered on. (This indicator is disable when the unit power is OFF)
L RUN	Red on when refreshed data of CC-Link is received normally.
	Off when it is data read timeout.
L ERR	Red on when received data of CC-Link is erroneous.
	Off when communication is normal.
	Red on when there is a transmission error.
	Red on when the setting of station number or transfer rate is incorrect (This will be Off when the setting is corrected and power on again)
	Red blinking when the setting of station number or transfer rate changes during the operation. (The remote station unit will be operated according to the station number setting and transfer rate setting at power-on)

1.3 Specifications

1.3.1 Communication specifications

Item	Specifications
Transmission speed	10 M / 5 M / 2.5 M / 625 k / 156 k bps (selectable) * 1
Maximum transmission distance (total extension distance)	Depends on transmission speed * 2
Communication method	Polling method
Synchronization method	Frame synchronization method
Encoding method	NRZI method
Transmission path format	Bus (RS485)
Transmission format	HDLC compliant
Error control method	CRC ($X^{16} + X^{12} + X^5 + 1$)
Network cable	Shielded twisted pair cable (Describes at 2.2.1 Connecting and wiring to the network connector)

* 1: For the setting method, refer to 3.1.1 "Station number/ transfer rate (Baud rate) setting".

* 2: The transmission distance varies depending on the transmission speed and cable. Check with the CC-Link user's manual issued by Mitsubishi Electric Corporation, cable manufacturer, etc.

1.3.2 Remote station unit specifications

The product must be used within the following specifications.

Item		Specifications	
Model No.		OPP8-A2G (JA2C)	OPP8-A2G-P (JA2G)
Unit power voltage		21.6 VDC to 26.4 VDC (24 VDC \pm 10%)	
Unit power current consumption		50 mA or less (24.0 VDC)	
Valve power voltage		22.8 VDC to 26.4 VDC (24 VDC +10%, -5%)	
Valve power current consumption		10 mA or less (all points OFF) 15 mA or less (under no load with all points ON)	
Output type		+COM(NPN)	-COM (PNP)
Output points		32 points	
Station number setting		Sets station number by switch [1 to 64 (Dec)] Note 1	
Output setting when communication error occurs		Hold (all output points are hold) / Clear (all output points are OFF)	
Insulation resistance		Between external terminals and the case: 30 M Ω 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	
Communication protocol		CC-Link Ver1.10 Compatible	
Transfer rate (Baud rate)		10 M / 5 M / 2.5 M / 625 k / 156 k bps (selected by DIP switch)	
CC-Link connector		M12 5-pin A code	
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: 24 V, 3 A / Unit power: 24 V, 2 A (Both fuses are non-replaceable)	
Operation indicator		LED (communication status, unit power and valve power. Note 2)	
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 68.6 m/s ² , whichever smaller.	

Note 1: Remote station units follow any restrictions on the master unit. All the factory setting of DIP switch is OFF.

Note 2: Status can be monitored when the voltage within the specified range is supplied to the unit power.

- * 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 remote station unit.

2. INSTALLATION

2.1 Mounting

CAUTION

Before handling CC-Link 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 remote station unit 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 remote station unit.

2.2 Wiring

2.2.1 Connecting and wiring to the network connector

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 CC-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.

CC-Link uses a dedicated CC-Link network cable. Make sure to understand these specifications before wiring. For details, refer to the instruction manuals issued by the master unit manufacturer or CLPA (CC-Link Partner Association).

The M12 connector for network cable is not supplied with this product. Separately purchase a network connector that satisfies the specifications.

Wiring the network cable enables the connector to connect to the network connectors on the remote station unit.

Recommended cable: CC-Link Ver.1.10

Part name	Model	Manufacturer
CC-Link Ver1.10 Compatible cable	FANC-110SBH series	Kuramo Electric Corporation

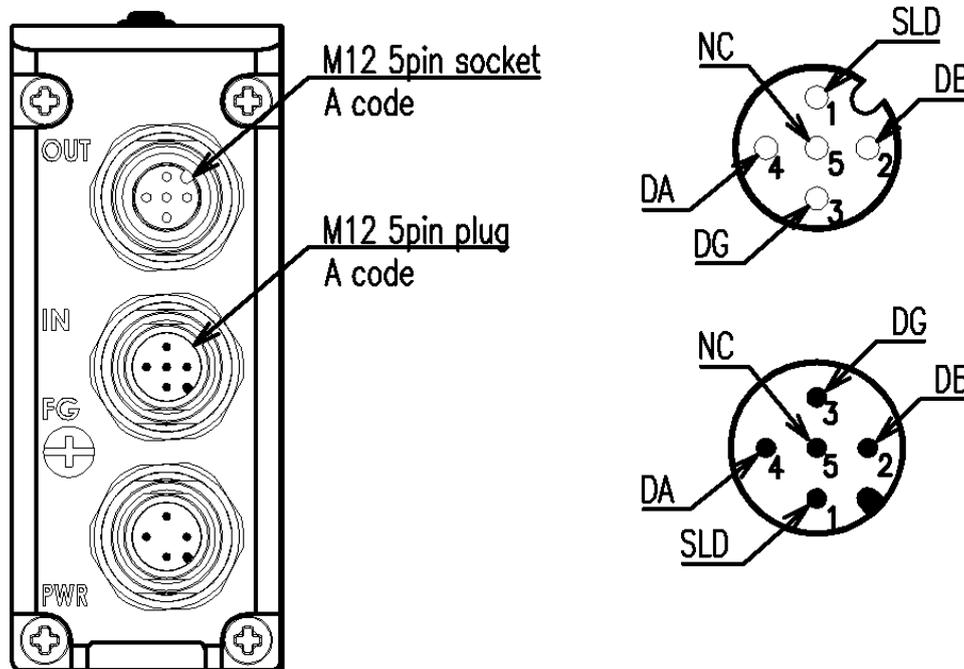
Recommended M12 assembly type connector: A code 5Pin

Part name	Model	Manufacturer
M12 assembly type connector (male)	21 03 272 1501	HARTING Co., Ltd.
M12 assembly type connector (female)	21 03 272 2501	HARTING Co., Ltd.

■ Connecting the network cable

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

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



Pin	Signal (): Cable color	Function
1	SLD (naked) Note 1	shielded
2	DB (white)	Differential signal B
3	DG (yellow)	Ground signal
4	DA (blue)	Differential signal A
5	NC	Not used

Note 1: The terminals of SLD and the FG are connected inside the remote station unit.

2.2.2 Connecting and wiring to the Unit/Valve power plug

CAUTION

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

Calculate the current consumption to select the power cable.

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

Use a terminal block when crossover wiring power cables.

Unit power

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

Valve power

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

Recommended M12 power cable with wire leads

Part name	Model	Manufacturer
M12 power cable	XS2F-D421-*8**	Omron Corporation

** differs depending on the cable specifications.

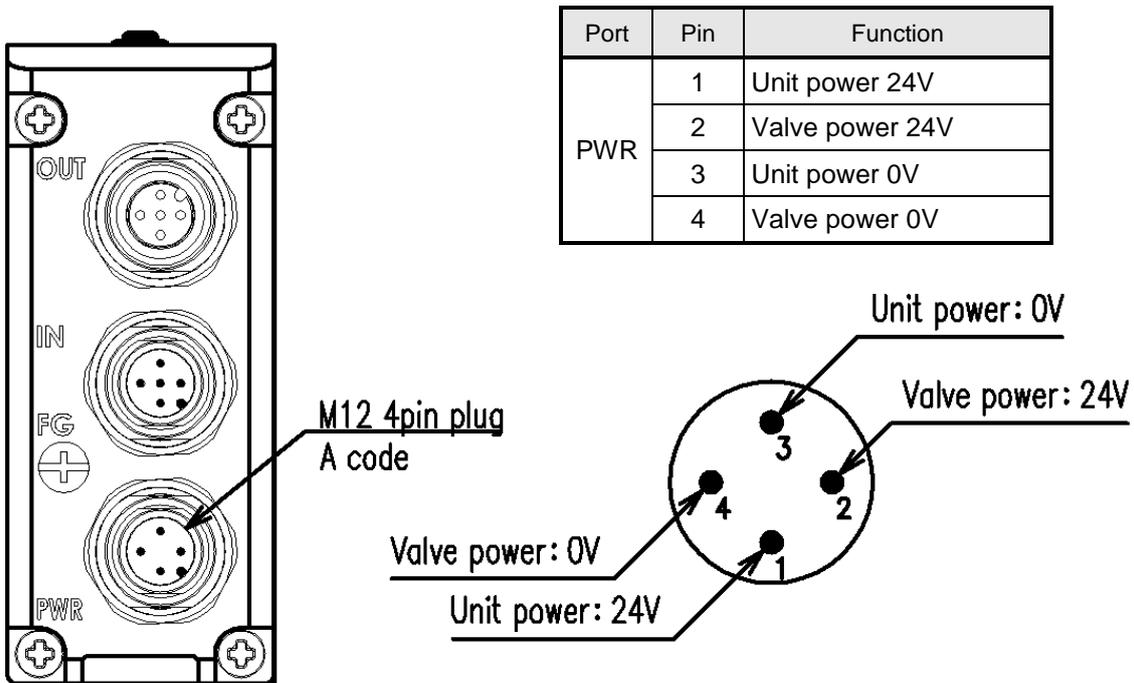
Recommended M12 connector

Part name	Model	Manufacturer
Assembly type M12 connector	21 03 212 2305	HARTING Co., Ltd.

■ Connecting the power cables

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

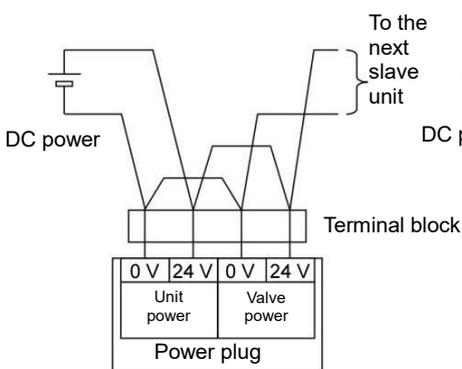
- 1** After confirming safety, turn off the power to connect to the remote station unit.
- 2** Attach a terminal such as a ferrule to the cable to be connected as necessary.
- 3** Refer to the figure below and wire the cables to the correct terminals on the power socket (24 V to 24 V, 0 V to 0 V).
- 4** After connecting the socket, secure it with the appropriate torque (0.25 N·m).



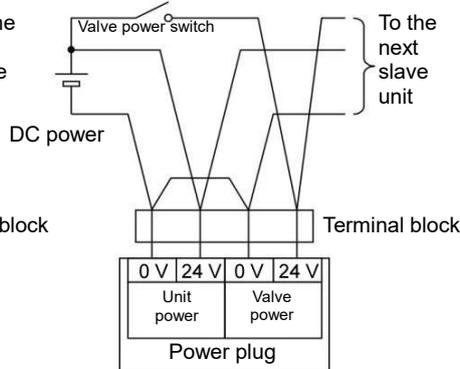
■ Wiring the power cable

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

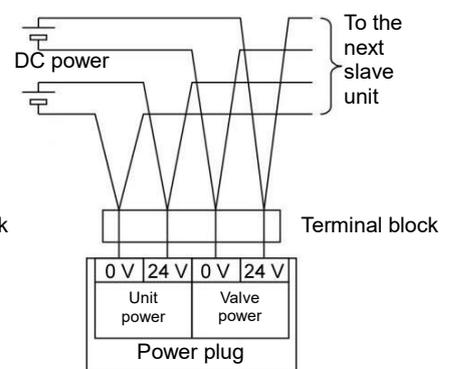
1. Common connection for unit power and valve power



2. Connection for turning on/off valve power



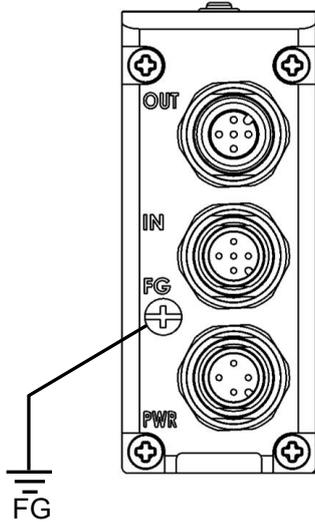
3. Separate connection for unit power and valve power



2.2.3 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 remote station unit.

Check the address setting value of serial transmission remote station unit carefully before use.

Improper address setting value may cause valves or cylinders to malfunction.

Be careful of the surroundings and ensure safety before turning on or off the power.

The system or solenoid valve (cylinder) may operate suddenly.

3.1 Setting the Switches

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.

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

Keep the cover of serial transmission remote station unit closed except when setting the switches.

The cover may become damaged or foreign matters may enter inside and cause unexpected failure.

Be careful not to allow any foreign matter to enter inside when setting the switches.

Unexpected failure may result.

Do not handle switches roughly.

Switches are precision devices and can be easily damaged.

Do not touch the internal circuit board when setting the switches.

The internal circuit board can be easily damaged.

3.1.1 Station number/ transfer rate (Baud rate) setting

Set the station number of this remote station unit.

This remote station unit operates under the conditions of station number setting and transfer rate setting when the power is turned on.

Switches	STATION No. [Station number] 40 20 10 8 4 2 1	B RATE [Transfer rate (Baud rate)] 4 2 1
Setting range	1 to 64	0 to 4

Station address and transfer rate setting is read into memory at power-up.

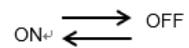
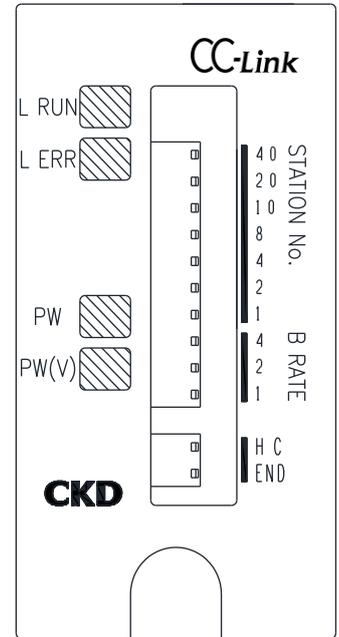
Duplicate station numbers cannot be set.

The DIP switch is weighted according to BCD codes.

The table below shows the station number and transfer rate weighting.

Station number	Switch number							Transfer rate (Baud rate)	Switch number		
	1(40)	2(20)	3(10)	4(8)	5(4)	6(2)	7(1)		8(4)	9(2)	0(1)
1	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	1	0	0	1	
3	0	0	0	0	0	0	1	1	0	0	
to											
62	1	1	0	0	0	0	1	0	0	0	
63	1	1	0	0	0	0	1	1	0	0	
64	1	1	0	0	0	1	0	0	0	0	

0: OFF / 1: ON
The numbers in brackets () indicate the numbers on the panel of the unit.



Example) To set the station number to 50

$$50 = 40 \cdot (1) + 20 \cdot (0) + 10 \cdot (1) + 8 \cdot (0) + 4 \cdot (0) + 2 \cdot (0) + 1 \cdot (0)$$

From the above formula, switch Nos. 1 and 3 are turned on, and the other switches (Nos. 2, 4 to 7) are turned off.

To set the transfer rate to 5Mbps

Switch Nos. 9 and 0 are turned ON, and other switches (No. 8) are turned OFF.

3.1.2 Setting other switches

Set the output data when a communication error occurs and the terminal station when it is connected to the position farthest from the master unit.

Switches	Settings
H C (Output mode setting)	Set the output status in the event of communication error. (Such as communication line disconnection or timeout) OFF (0) : Clear mode ON (1) : Hold mode
END (End station setting)	Set the end station. OFF (0): When an intermediate station or internal terminating resistor is not used ON (1) : When using the built-in terminating resistor at the end station (Using 110Ω cable)

* Setting end station

This product has a built-in 110 Ω terminating resistor between the DA and DB communication lines.

By setting the END switch to ON, the end station can be set without connecting a terminating resistor to the connector of this product.

Under the condition that this product is an end station and when CC-Link dedicated cable (CC-Link dedicated high-performance cable such as FANC-SBH manufactured by Kuramo Electric Co., Ltd) which requires a terminating resistor value other than 110Ω, or when the connection method of the terminating resistor differs due to the T-branch connection, make sure to turn the END switch to OFF.

In addition, connect the terminating resistor supplied with the master station or commercially available to the connector of this product according to the connection conditions (specifications) and make the unit an end station.

3.2 Settings by CSP+ (Control & Communication System Profile) file

In order for the CC-Link device to join the network, it is necessary to register the device to the network using CPS+ file which describes the device's communication specification. For registering the CSP+ file, refer to the user's manual provided by the master unit manufacturer. Also, use the latest CSP+ file for proper network configuration.

3.2.1 Registering the device

Check the specifications (model No.) of the device (remote station unit) before registering, as both the device and CSP+ file need to be matched.

Refer to the following table for the device specifications and CSP+ file.

Specifications and CSP+ file name

Item	Specifications	
Manifold Model No.	OPP8-A2G (JA2C)	OPP8-A2G-P (JA2G)
Product Name	OPP8-2G	OPP8-2G-P
Output type	+COM(NPN)	-COM (PNP)
Output points	32 points	
CSP+ file name	0x0104_OPP8-2G_1.0_en	0x0104_OPP8-2G-P_1.0_en

3.3 Correspondence between the Remote station Unit Output Number and PLC Address Number

3.3.1 PLC address correspondence table

These correspondence tables describe based on PLC manufactured by Mitsubishi Electric Corp. as a representative example. Also, it is the case that the serial transmission slave unit is set “station No.1”.

<OPP8-A2G, OPP8-A2G-P (for 32 points output)>

PLC allocated memory address	160H															161H																
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Serial Transmission Remote Station Unit 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 Number array corresponding to solenoid output Number

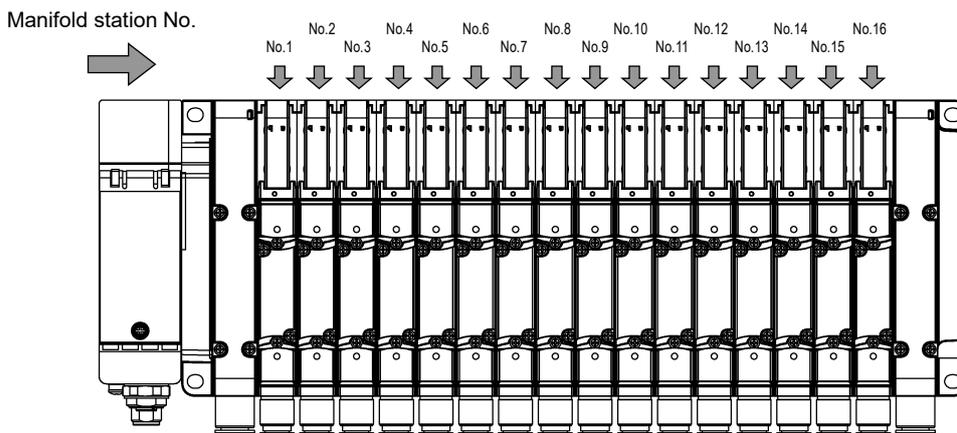
The valve No. 1a, 1b, 2a, 2b, ... indicate the station numbers such as station No.1, station No.2, and so on; while the alphabets ‘a’ and ‘b’ represent the solenoid on the a-side and the solenoid on the b-side of the “double-solenoid type” valve. Also, “E” stands for “Empty”.

Manifold stations are numbered 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-A2G, OPP8-A2G-P (for 32 points output)>

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



Standard wiring(Double wiring)

- When all valves mounted on the manifold are single solenoids:

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

- When all valves mounted on the manifold are double solenoids:

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

- When both single and double solenoid valves are mounted (mixed valves). [example]

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

Single solenoid, Double solenoid layout specification

- When all valves mounted on the manifold are single solenoids:

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	(E)							

- When all valves mounted on the manifold are double solenoids:

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

- When both single and double solenoid valves are mounted (mixed valves). [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	12b	13a	14a	14b	15a	15b	16a	(E)							

3.4 Programming

This remote station unit is handled as 32 points output unit: OPP8-A2G-*. (Occupies 1 station each)
 When creating a program, refer to the user's manual of Mitsubishi Electric Corporation (CC-Link System Master/Local Module User's Manual).

While there are two functions specific to this remote station unit, the end station setting and the setting of the output status at communication error, neither is related to the program.

In addition, this remote station unit also has a function to notify the master unit of the blown fuse status of the valve power supply.

Blown fuse or "On/Off" status of valve power supply can be seen by checking the corresponding bit of the register shown below (bit differs by the station number).

Example of MELSEC-Q series manufactured by Mitsubishi Electric Corporation

Link special register	Part name	Description																																																		
SW0088 (688H) . SW0089 (689H) . SW008A (68AH) . SW008B (68BH)	Other station I/O error status [Note 1]	<p>Stores the I/O error occurrence status (blown fuse, operation of short circuit protection function, etc.) of each station. For details of the protection function, refer to the user's manual of each remote I/O.</p> <p>0: Normal 1: I/O error occurred</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th> <th>b14</th> <th>b13</th> <th>b12</th> <th>to</th> <th>b3</th> <th>b2</th> <th>b1</th> <th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0088</td> <td>16</td> <td>15</td> <td>14</td> <td>13</td> <td>to</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> </tr> <tr> <td>SW0089</td> <td>32</td> <td>31</td> <td>30</td> <td>29</td> <td>to</td> <td>20</td> <td>19</td> <td>18</td> <td>17</td> </tr> <tr> <td>SW008A</td> <td>48</td> <td>47</td> <td>46</td> <td>45</td> <td>to</td> <td>36</td> <td>35</td> <td>34</td> <td>33</td> </tr> <tr> <td>SW008B</td> <td>64</td> <td>63</td> <td>62</td> <td>61</td> <td>to</td> <td>52</td> <td>51</td> <td>50</td> <td>49</td> </tr> </tbody> </table> <p>1 to 64 in the table indicate station numbers.</p>		b15	b14	b13	b12	to	b3	b2	b1	b0	SW0088	16	15	14	13	to	4	3	2	1	SW0089	32	31	30	29	to	20	19	18	17	SW008A	48	47	46	45	to	36	35	34	33	SW008B	64	63	62	61	to	52	51	50	49
	b15	b14	b13	b12	to	b3	b2	b1	b0																																											
SW0088	16	15	14	13	to	4	3	2	1																																											
SW0089	32	31	30	29	to	20	19	18	17																																											
SW008A	48	47	46	45	to	36	35	34	33																																											
SW008B	64	63	62	61	to	52	51	50	49																																											

[Note 1] Bits for that number of occupied stations are turned ON.

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

Regularly perform daily and periodic inspections to correctly maintain product performance.
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 remote station unit for daily maintenance and what to do when replacing the remote station unit. Conduct the periodic cleaning and inspection to use this product in the optimum condition.

■ 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, and wipe the stains again.
- 3** Objects such as rubber, vinyl, or tape may stain the remote station unit if they are left in contact with the unit for a long period. Remove such objects when cleaning if they are leaving stain on the product.

■ Inspection

Conduct 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 unit.

Inspection items	Inspection details	Criteria	Inspection method
Environment	Is the surrounding and in-panel temperature appropriate?	Refer to "1.3.2 Remote station unit specifications".	Thermometer
	Is the surrounding and in-panel humidity appropriate?	Refer to "1.3.2 Remote station unit specifications".	humidity
	Is there any accumulated dust?	There should be no dust.	Visual inspection
Mounting	Is the remote station unit fixed securely?	No looseness	Hexagonal wrench
	Is the power cable connector fully inserted?	No looseness	Visual inspection
	Is the network cable connector fully inserted?	No looseness	Visual inspection
	Is the connection cable not broken?	No abnormality in appearance	Visual inspection

■ Checking the remote station unit before/after replacing

Each unit (master and remote station) is a device that constitutes a part of a network.

If any unit fails, immediately perform recovery work to prevent the entire network from being affected. To restore the network function as fast as possible, it is recommended to prepare spare units.

<Inspection items>

If a fault is detected and the unit is replaced with a new one, check if the new unit has no abnormality. Also, confirm the remote station unit settings.

<Settings for replacement remote station unit>

For the switches on the replacement remote station unit, confirm the specifications and set the same settings as the previous remote station unit.

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 remote station unit station number and the output setting 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.

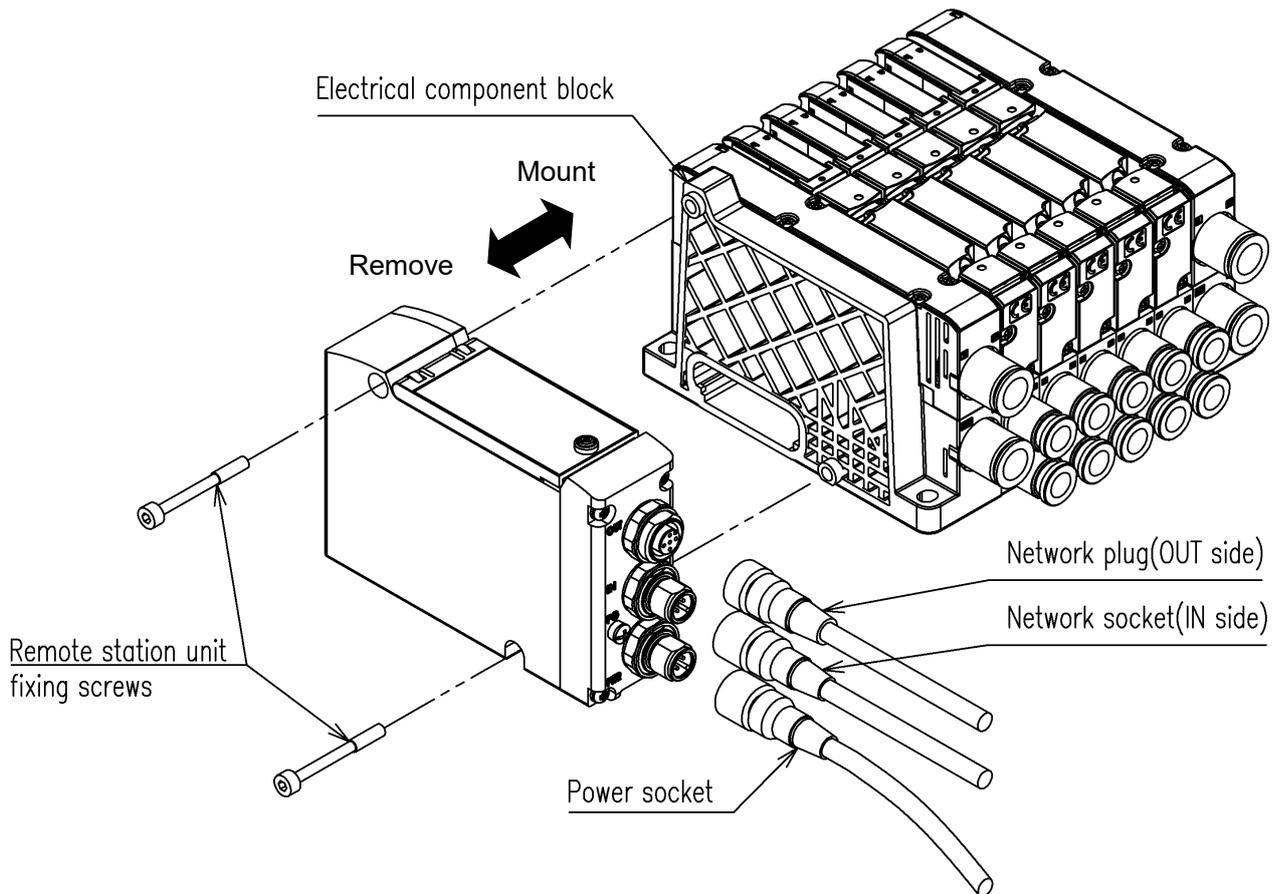
These may cause failure or malfunction.

Do not pull out the remote station unit by pulling the cable or connector.

This may cause cable disconnection or damage.

4.2.1 Removing the product (Remote station unit)

- 1 After confirming safety, stop network communication as necessary and turn off all peripheral equipment.
- 2 After confirming safety, turn off the unit power and valve power as necessary.
- 3 Remove the network connectors and power socket.
- 4 Loosen the Remote station unit fixing screws.
- 5 Hold and pull out the product slowly in the direction of the arrow.



4.2.2 Mounting the product (Remote station unit)

- 1 Set the station number of this product.
- 2 Hold the unit and insert it slowly by matching connectors of electrical component block and remote station unit's side surface.
- 3 Make sure that the remote station unit and the electrical component block are connected and firmly tighten together with fixing screws.
(Appropriate tightening torque: 1.2 N·m)
- 4 Turn off the power (for unit/valve) and connect the network connectors and power socket.
The system may operate suddenly if the connectors are installed while the power is turned on. Be careful of the surroundings and secure safety before performing work.
Network connector: Reference tightening torque is 0.6 N·m (Since it varies depending on the connector, consult the connector manufacturer.)
Power socket: Reference tightening torque is 0.45 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 remote station unit 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 or PW(V) LED is Off.

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

■ Fault 2: L ERR LED is blinking.

- Check that the power to PLC is turned on.
- Check that there are no problems (such as damage or disconnection) with the network cable or connector connection.
- Check that the network cable is compatible with CC-Link.
- Check that transmission distance is compatible with CC-Link.
- Check that there are no noise-generating devices or high-voltage lines near the communication line.
- Check the resistance value and connection status of the terminating resistor. (Only for end stations.)

■ Fault 3: L ERR LED is On.

- Check if the transfer rate and station number setting are correct.

■ Fault 4: L RUN LED is Off.

- Check that the product name in the configuration matches the product's name (polarity).
- Check that the IN and OUT cable connections are correct. Do not connect between INs or OUTs.
- Check the station number setting status (incorrect or duplicate). If the setting has been changed, turn off the power and turn on again.

■ Fault 5: The remote station unit does not perform according to the specified output mode setting when a communication error occurs.

- Set the switch and turn off the power and turn on again.

6. WARRANTY PROVISIONS

6.1 Warranty Conditions

■ Scope of warranty

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.

Note that the following failures are excluded from the warranty scope:

- 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 incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by acts of nature and disasters beyond control of CKD.

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.