CKD

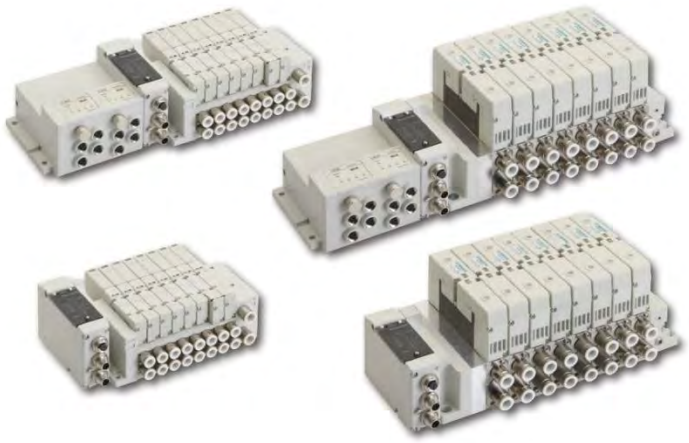
Serial Transmission Slave Unit

W4G Series T7G
(W4G-OPP8-□G)

CC-Link Ver1.10 Compatible

INSTRUCTION MANUAL

SM-A01720-A/1



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

CKD Corporation

PREFACE

Thank you for purchasing CKD's serial transmission slave unit. 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

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 slave unit T7G(W4G-OPP8-□G).
For master units and other slave 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.

■ T7G(W4G-OPP8-□G)

This is a slave unit for W4G which can establish connection to the open field network CC-Link specified by the CC-Link Partner Association (hereinafter referred to as CLPA).
The slave 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 slave unit output status can be set by a switch. (Hold all points output/ Clear all points output).
- The slave unit is available in +COM or -COM I/O types and 16 or 32 points output or 16 points I/O, allowing for use in a wide variety of applications.

■ CC-Link

CC-Link, an open field network for FA, is a system reduces the wiring of I/O devices (sensors, solenoid valves, etc.) and intelligent devices (high-speed counters, inverters, etc.) as well as enables to control communication without complicated setting.
It has the following features:
(1) It is a 10Mbps high-speed network and can support sensors which rapid response is required as well as high-capacity data communication.
(2) It simultaneously makes remote control which handles bit data and data communication which handles Word Data (analog) type possible, and its communication time is fast and stable.

If you have any questions concerning the CC-Link system, refer to the following website run by CLPA.

CLPA website: https://www.cc-link.org

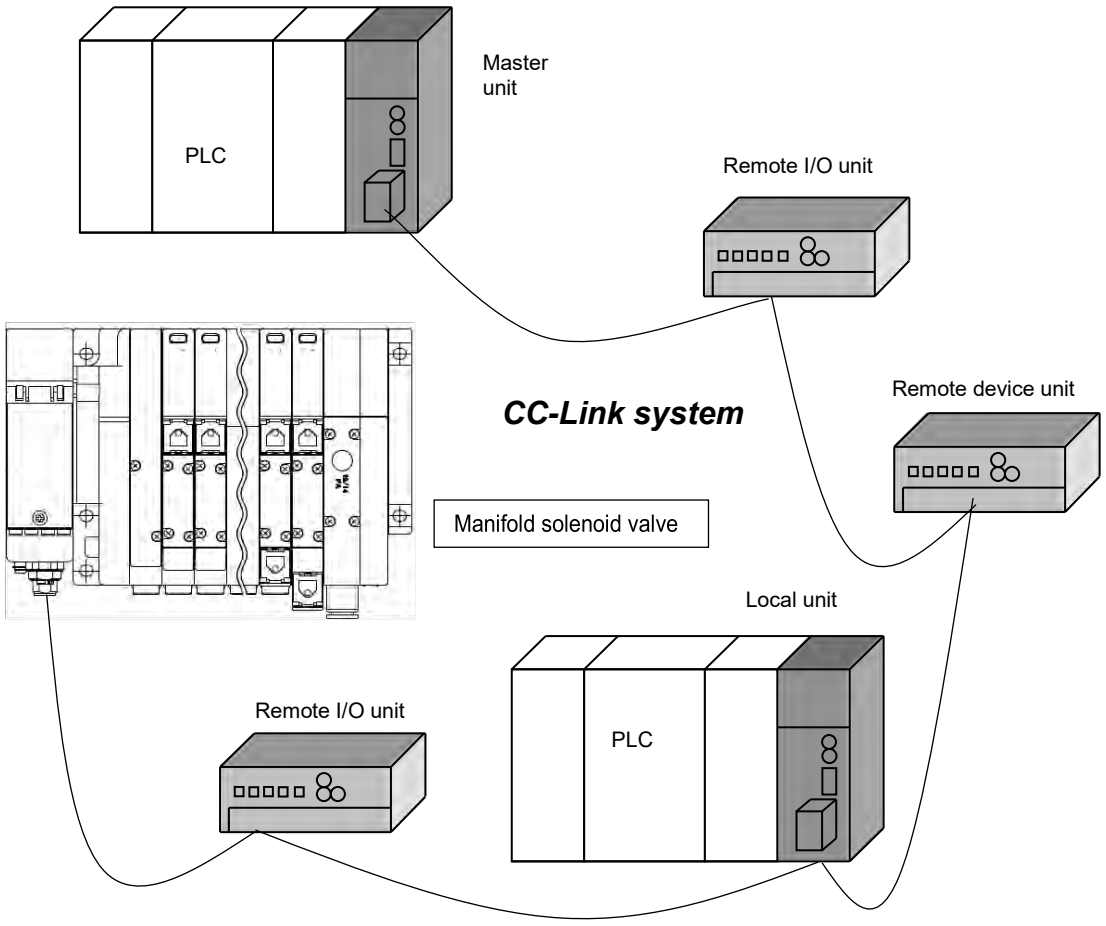
1.1.2 System structure

This system mainly consists of a PLC, master unit, T7G(W4G-OPP8-☐G) mounted manifold solenoid valve, and peripheral equipment (CC-Link slave units).

■ Examples of PLC and master unit combination

PLC manufacturer	Compatible PLC	Master unit model
Mitsubishi Electric Corporation	MELSEC-A series	AJ61QBT11
		A1SJ61QBT11
	MELSEC-Q series	QJ61BT11

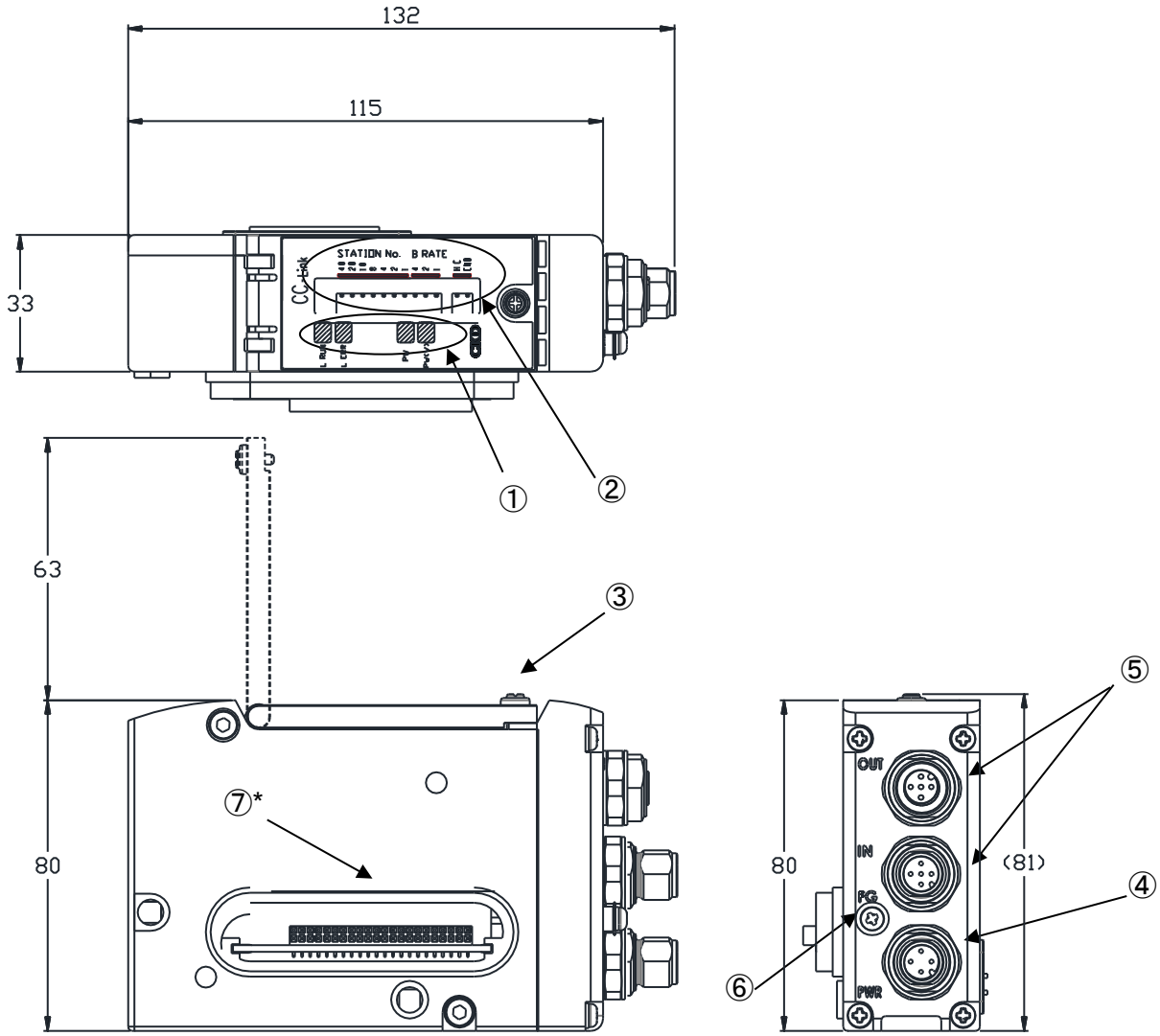
■ Example of basic structure of the system



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 Slave Unit



No.	Part name	Description
①	LED Indicators	Indicates the status of the slave unit and network with L RUN, L ERR, PW, and PW(V).
②	Switches	Set the slave unit station number, transfer rate, communication error output, and terminating resistor using DIP switches.
③	Cover	Protects the LED Indicators and the switches.
④	Power plug of the unit/valve (M12×1 port [PWR] A-cord)	Connects the unit/valve power cables (24 V).
⑤	Network connector (M12×2 ports【IN, OUT】5-pin, A-cord)	IN: I/O port for CC-Link communication. (plug) OUT: I/O port for CC-Link communication. (socket) [Note] There is no functional difference between the IN and OUT ports.
⑥	FG terminal	Connects to FG.
⑦	I/O block connector	Connects the slave unit to the I/O block. (* Compatible with T7G B7 only)

1.2.2 Switches and LED indicators

⚠ CAUTION

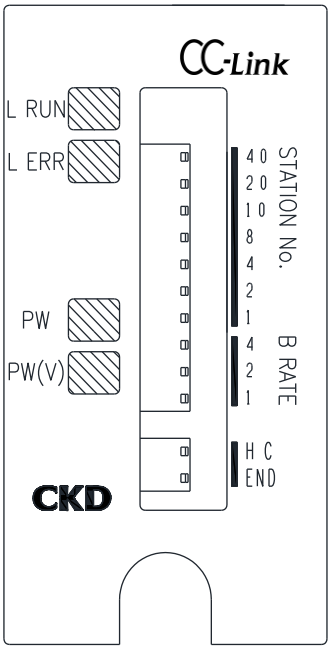
Discharge static electricity from your body before touching the product.
Static electricity may cause damage to the product.

■ Switches

These switches set the slave unit station number and the output in the event of communication error.
This slave 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 slave 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. (However, this indicator is not available when the unit is powered off)
L RUN	Red on when refreshed data of CC-Link is received normally.
	Off when it is data read timeout. (It turns on when normal data is received.)
L ERR	Red on when received data of CC-Link is erroneous.
	Off when communication is normal. (L RUN is On)
	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 slave 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	10M / 5M / 2.5M / 625k / 156k 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 Slave unit specifications

The product must be used within the following specifications.

Item		Specifications					
Model No.		T7G1 (W4G-OPP8-1G)	T7G2 (W4G-OPP8-2G)	T7GB7 (W4G-OPP8-7G-B)	T7GP1 (W4G-OPP8-1G-P)	T7GP2 (W4G-OPP8-2G-P)	T7GPB7 (W4G-OPP8-7G-PB)
Unit power voltage		21.6 VDC to 26.4 VDC (24 VDC ±10%)					
Unit power current consumption		16 points output model: 40 mA or less / 32 points & 16 points I/O model: 50 mA or less (all points ON: at 24.0 VDC)					
Valve power voltage		22.8 VDC to 26.4 VDC (24 VDC +10%, −5%)					
Valve power current consumption		15 mA or less (all points OFF) 20 mA or less (under no load with all points ON)					
Output type		NPN output (+COM)			PNP output (-COM)		
Number of input/output points		(0/16)	(0/32)	(16/16)	(0/16)	(0/32)	(16/16)
Station number setting		Sets station number by switch [1 to 64 (Dec)] Note 1					
Output setting when communication error occurs		Hold all points output (Hold)/ Clear all points output (Clear)					
Insulation resistance		Between external terminals and the case: 30 MΩ or more with 500 VDC					
Withstand voltage		Between external terminals and the case: 500 VAC for one minute					
Shock resistance		294.0 m/s^2 for 3 times in 3 directions					
Storage ambient temperature		-20℃ to 70℃					
Storage humidity		30% to 85% RH (no dew condensation)					
Ambient temperature		-5℃ to 55℃					
Ambient humidity		30% to 85% RH (no dew condensation)					
Atmosphere		No corrosive gas					
Communication protocol		CC-Link Ver1.10 Compatible					
Transfer rate (Baud rate)		10M / 5M / 2.5M / 625k / 156k 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: 24V, 3A/ Unit power: 24V, 2A (both fuses are non-replaceable)					
Operation indicator		LED (status of communication, unit power and valve power. Note 2)					
Degree of protection		IP65					
Vibration resistance	Durability	10 Hz to 150 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 150 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: Slave units follow any restrictions on the master unit. All the factory setting of DIP switch is OFF.
Note 2: This product does not have an SD/ RD indicator. 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 slave 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 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 slave 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 slave 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 slave unit.

Recommended cable: CC-Link Ver.1.10

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

Recommended M12 assembly type connector: A code 5Pin

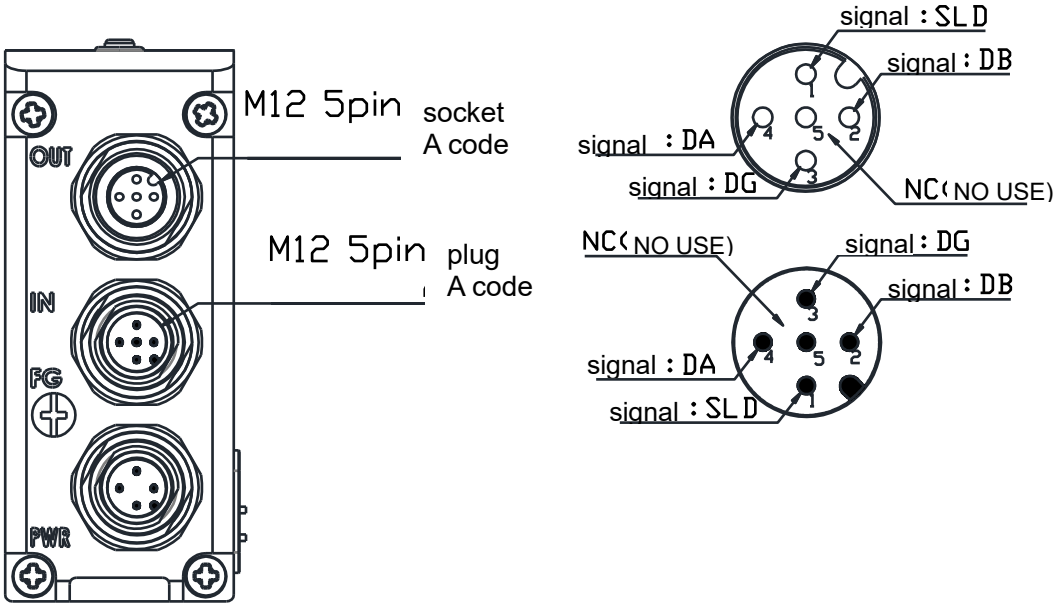
Manufacturer	Connector	Model
HARTING Co., Ltd.	M12 assembly type connector (male)	21 03 272 1501
HARTING Co., Ltd.	M12 assembly type connector (female)	21 03 272 2501

■ 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	Connect to the network cable “SLD” of the master unit or other slaves (remote I/O station, etc.).
2	DB (white)	Connect to the network cable “DB” of the master unit or other slaves (remote I/O station, etc.).
3	DG (yellow)	Connect to the network cable “DG” of the master unit or other slaves (remote I/O station, etc.).
4	DA (blue)	Connect to the network cable “DA” of the master unit or other slaves (remote I/O station, etc.).
5	NC	Not used

Note 1: The terminals of SLD and the FG are connected inside the slave 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 slave 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 slave 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 No.	Manufacturer
M12 power cable	XS2F-D421-□8□-□	Omron Corporation

Recommended M12 connector

Part name	Model No.	Manufacturer
Assembly type M12 connector	21 03 212 2305	HARTING Technology Group

■ Connecting the power cables

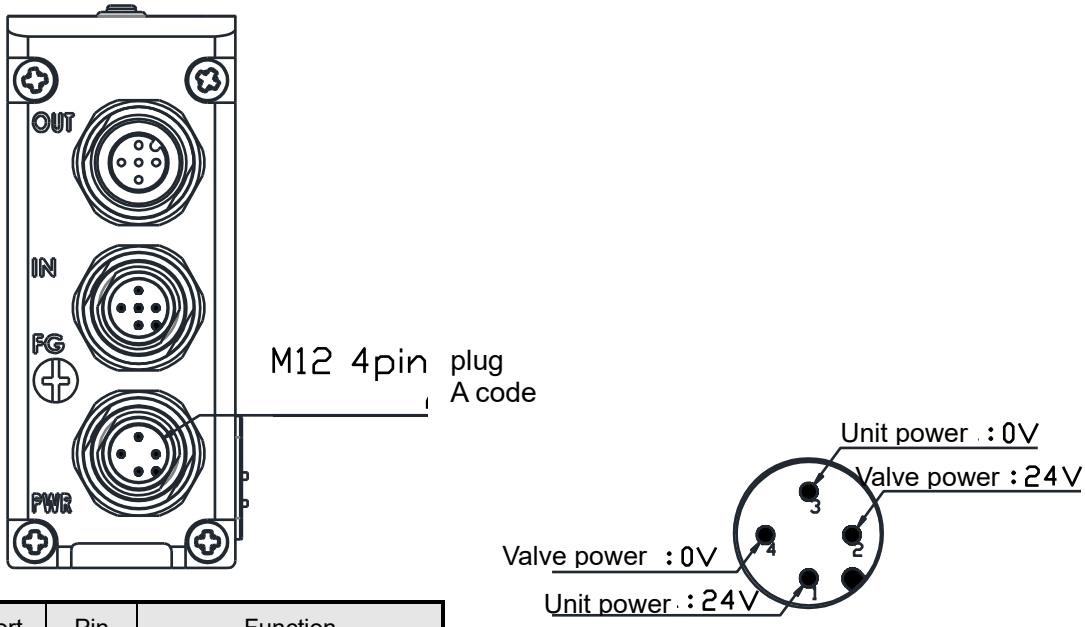
Follow the steps below to connect the unit/valve power cables to the power plug.

1 After confirming safety, turn off the power to connect to the slave 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).

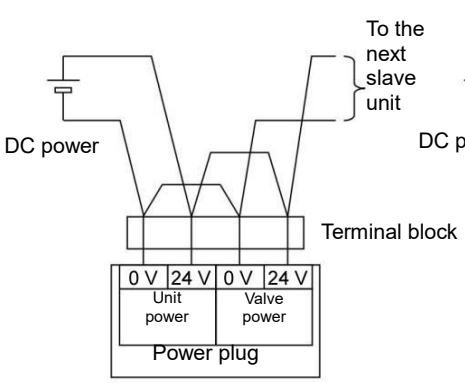


Port	Pin	Function
PWR	1	Unit power 24V
	2	Valve power 24V
	3	Unit power 0V
	4	Valve power 0V

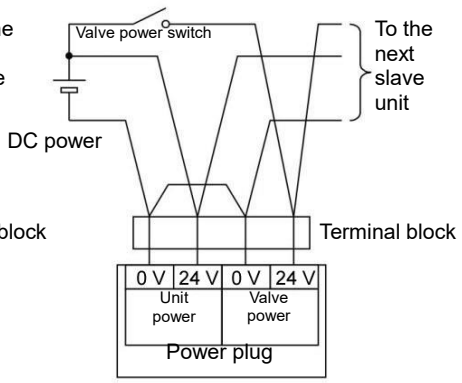
■ Wiring the power cable

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

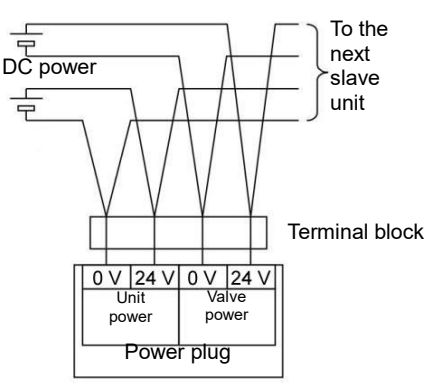
1. Common connection for unit power and valve power



2. Connection for turning on/off valve power



3. Separate connection for unit power and valve power



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 slave unit.

Check the address setting value of serial transmission slave 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 slave 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.

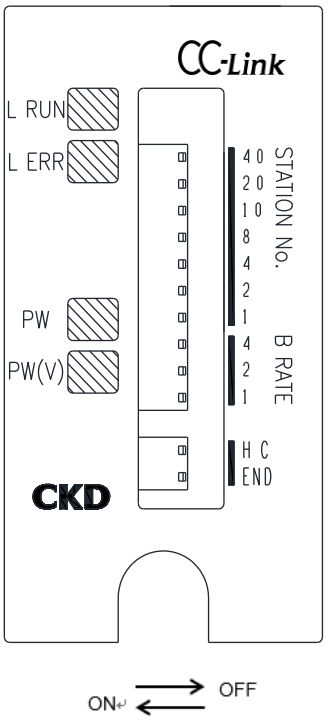
Do not handle switches roughly.
Switches are precision devices and can be easily damaged.

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 slave unit.
This slave 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						
	1(40)	2(20)	3(10)	4(8)	5(4)	6(2)	7(1)
1	0	0	0	0	0	0	1
2	0	0	0	0	0	1	0
3	0	0	0	0	0	1	1
	to						
62	1	1	0	0	0	1	0
63	1	1	0	0	0	1	1
64	1	1	0	0	1	0	0

Transfer rate (Baud rate)	Switch number		
	8(4)	9(2)	0(1)
0 [156k bps]	0	0	0
1 [625k bps]	0	0	1
2 [2.5M bps]	0	1	0
3 [5M bps]	0	1	1
4 [10M bps]	1	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･(1)＋20･(0)＋10･(1)＋8･(0)＋4･(0)＋2･(0)＋1･(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 110Ω 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, is used as a network cable, or when the connection method of the terminating resistor differs due to the T-branch connection, make sure to turn the end station setting switch(END) 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 (slave 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.	-T7G1	-T7G2	-T7GB7	-T7GP1	-T7GP2	-T7GPB7
Single unit model no.	W4G-OPP8-1G	W4G-OPP8-2G	W4G-OPP8-7G-B	W4G-OPP8-1G-P	W4G-OPP8-2G-P	W4G-OPP8-7G-PB
Output type	+COM（NPN）			-COM（PNP）		
I/O points	16 points output	32 points output	16 points output	16 points output	32 points output	16 points output
CSP+ file name	0x0104_OPP8-1G_1.0_en	0x0104_OPP8-2G_1.0_en	0x0104_OPP8-7G-B_1.0_en	0x0104_OPP8-1G-P_1.0_en	0x0104_OPP8-2G-P_1.0_en	0x0104_OPP8-7G-PB_1.0_en

3.3 Correspondence between the Slave Unit Output Number and PLC Address No.

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”.

<T7G1, T7GP1 (for 16 points output)>

PLC allocated memory address	160H															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Serial Transmission Slave Unit Output No.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Solenoid output No.	**s1**	**s2**	**s3**	**s4**	**s5**	**s6**	**s7**	**s8**	**s9**	**s10**	**s11**	**s12**	**s13**	**s14**	**s15**	**s16**

<T7G2, T7GP2 (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 Slave 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**

<T7GB7, T7GPB7 (for 16 points I/O) with 8 points solenoids, 4 input blocks, and 2 output blocks>

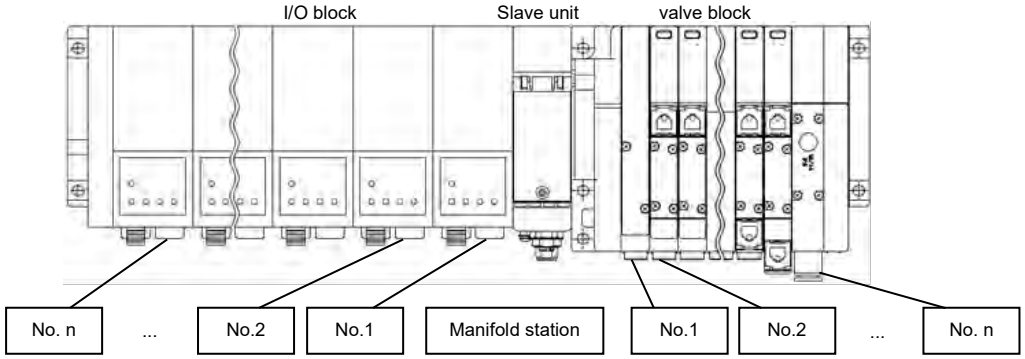
PLC allocated memory address	output																input															
	160H																E0H															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Slave unit I/O No.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Solenoid output No.	**s1**	**s2**	**s3**	**s4**	**s5**	**s6**	**s7**	**s8**																								
Input block No.																	**1-0**	**1-1**	**1-2**	**1-3**	**2-0**	**2-1**	**2-2**	**2-3**	**3-0**	**3-1**	**3-2**	**3-3**	**4-0**	**4-1**	**4-2**	**4-3**
Output block No.									**3-0**	**3-1**	**3-2**	**3-3**	**4-0**	**4-1**	**4-2**	**4-3**																

* Connect the input block first then output block to the slave unit.
* Set 3 and 4 with rotary switches of output block from the slave unit side.

<T7GB7, T7GPB7 (for 16 points I/O) with 12 points solenoids, 4 input blocks, and 1 output block>

PLC allocated memory address	output																input															
	160H																E0H															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Slave unit I/O No.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Solenoid output No.	**s1**	**s2**	**s3**	**s4**	**s5**	**s6**	**s7**	**s8**	**s9**	**s10**	**s11**	**s12**																				
Input block No.																	**1-0**	**1-1**	**1-2**	**1-3**	**2-0**	**2-1**	**2-2**	**2-3**	**3-0**	**3-1**	**3-2**	**3-3**	**4-0**	**4-1**	**4-2**	**4-3**
Output block No.													**4-0**	**4-1**	**4-2**	**4-3**																

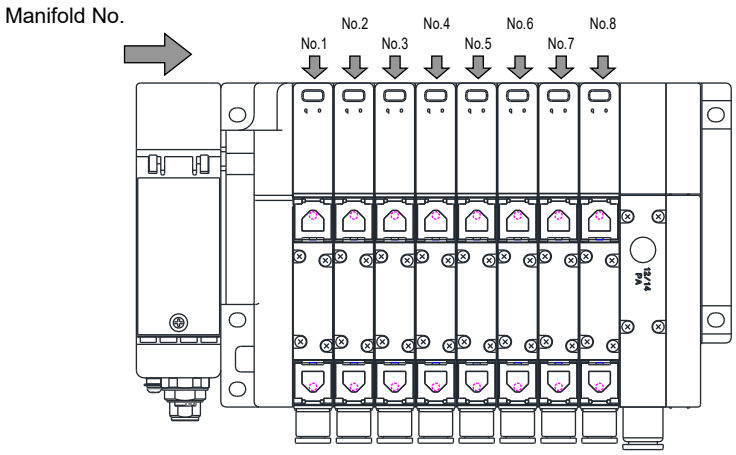
* Connect the input block first then output block to the slave unit.
* Set 4 with rotary switch of output block.



3.3.2 Example of valve No. array corresponding to T7G solenoid output No.

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.

<T7G1, T7GP1 (for 16 points output)>



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

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

- 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

- 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

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)

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

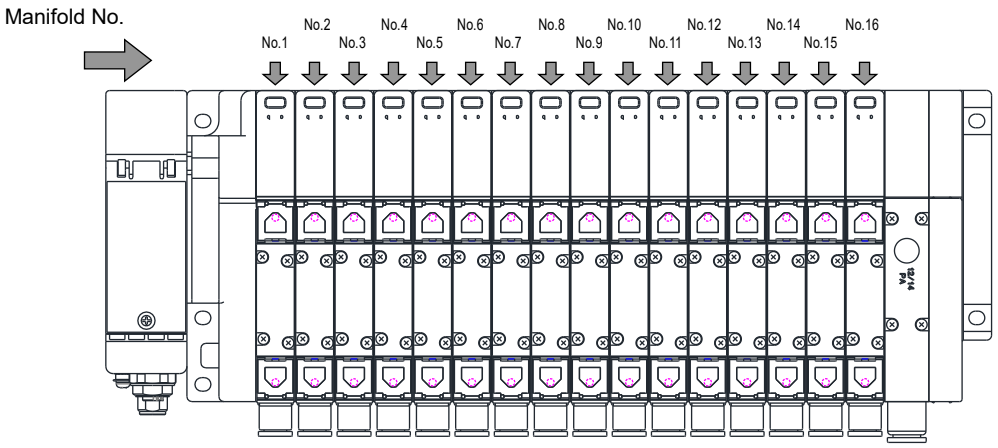
Solenoid Output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b

- 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)

<T7G2, T7GP2 (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

- 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	25a	26a	27a	28a	29a	30a	31a	32a

- 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	13a	14a	14b	15a	15b	16a									

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

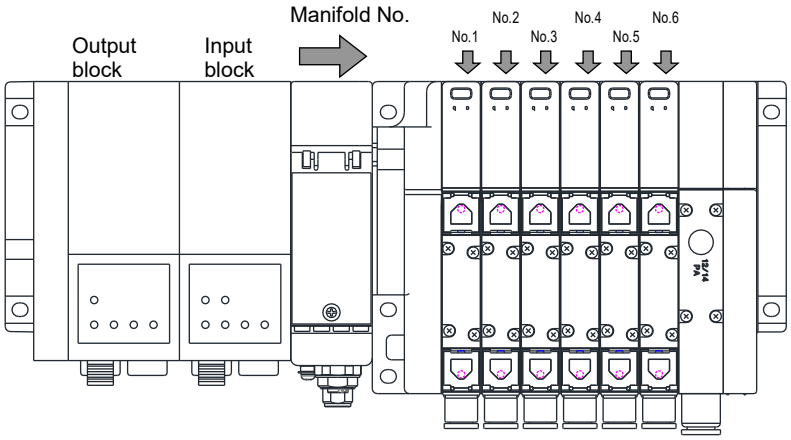
- When both single and double solenoid valves are mounted (mixed valves). [example]

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	(E)	11a	11b	12a	12b	13a	(E)	14a	(E)	15a	15b	16a	(E)

<T7GB7, T7GPB7 (for 16 points I/O, with 1 input block and 1 output block)>

The figure is an example of double-solenoid type valves mounting 6 stations on the manifold and connecting each 1 of output block and input block. There is no solenoid on the b-side for single-solenoid type.



Standard 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	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	4-0	4-1	4-2	4-3

- 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	4-0	4-1	4-2	4-3

- 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	4-0	4-1	4-2	4-3

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)	4-0	4-1	4-2	4-3

- 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	4-0	4-1	4-2	4-3

- 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)	4-0	4-1	4-2	4-3

3.4 Programming

This slave unit is handled as 16 points output unit: T7G1, 32 points output unit: T7G2, 16 points I/O unit: T7G7 of a remote I/O station. (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 slave unit, the end station setting and the setting of the output status at communication error, neither is related to the program.
In addition, this slave 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

<table>
<tr><th>Link special register</th><th>Part name</th><th>Description</th></tr>
<tr><td>SW0088
(688_H)
.
SW0089
(689_H)
.
SW008A
($68A_H$)
.
SW008B
($68B_H$)</td><td>Other station I/O error status
[Note 1]</td><td>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.

0: Normal
1: I/O error occurred

<table>
<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>
<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>
</table>
1 to 64 in the table indicate station numbers.</td></tr>
</table>

[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 slave unit for daily maintenance and what to do when replacing the slave 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 slave 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 Slave unit specifications".	Thermometer
	Is there any accumulated dust?	There should be no dust.	Visual inspection
Mounting	Is the slave 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 slave unit before/after replacing

Each unit (master and slave) 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 slave unit settings.

<Settings for replacement slave unit>
For the switches on the replacement slave unit, confirm the specifications and set the same settings as the previous slave 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

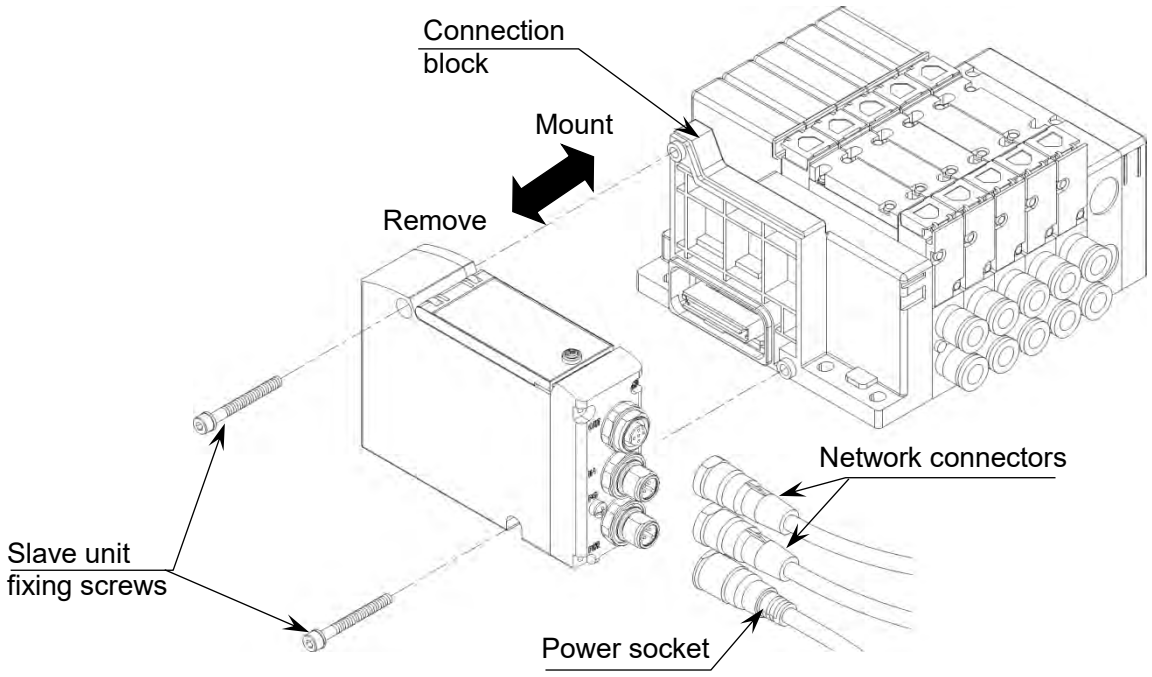
Check the slave unit station number and the output setting in the event of communication error before turning on the unit power.

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

Do not pull out the slave unit by pulling the cable or connector.
This may cause cable disconnection or damage.

4.2.1 Removing the product (slave 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. Loosen the slave unit fixing screws.
4. Hold and pull out the product slowly in the direction of the arrow.
5. Remove the network connectors and power socket.



4.2.2 Mounting the product (slave unit)

1. Set the station number of this product.
2. Hold the unit and insert it slowly by matching connectors of connection block and slave unit's side surface.
3. Make sure that the slave unit and the connection 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 slave 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 slave 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.