CKD

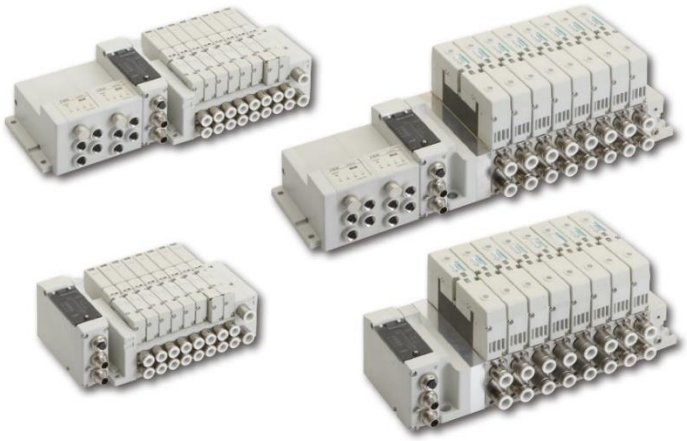
Serial Transmission Slave Unit

W4G Series T7D
(W4G-OPP8-□D)

DeviceNet Compatible

INSTRUCTION MANUAL

SM-A32305-A



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

CKD Corporation

PREFACE

Thank you for purchasing CKD's serial transmission slave unit. This Instruction Manual contains basic matters such as installation and usage instructions inodeer 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.

Inodeer to use our products safely, it is important to select, use, handle, and maintain the products properly.
Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

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

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

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

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

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.
All precautions are equally important and must be observed.

Other general precautions and tips on using the product are indicated by the following icon.

	Indicates general precautions and tips on using the product.

Precautions on Product Use

⚠ WARNING

The product must be handled by a qualified person who has extensive knowledge and experience.

The product is designed and manufactured as a device or part for general industrial machinery.

Use the product within the specifications.

The product must not be used beyond its specifications. In addition, never modify or additionally machine this product.

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

(Exception is made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.)

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

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

- Inspect and service the machine and devices after confirming the safety of the entire system. Also, turn off the energy source (air supply or water supply) and power to the relevant facility. Release compressed air from the system and use extreme care to avoid water or electric leakage.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or removing pipes and devices.
- When starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

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 (W4G-OPP8-□D) for W4G.
For master unit 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 inodeer to use the valves correctly.

■ T7D(W4G-OPP8-□D)

T7D(W4G-OPP8-□D) is a slave unit for W4G that can be connected to DeviceNet, an open field network defined by ODVA.
Features include the following:

- The slave unit is connected to PLC with only a network cable (DeviceNet dedicated), allowing significant reduction in wiring man-hours.
- The communication power and the valve power are separated, ensuring easy maintenance.
- When a communication error occurs, the slave unit output status can be set by a switch. (Hold all point output/ Clear all points output).
- The slave unit is available in +COM or -COM specification and 16 or 32 points output or 16 points I/O, allowing for use in a wide variety of applications.

■ DeviceNet

DeviceNet is a multi-bit, multi-vendor network that combines controls and data on a machine/line-control level.
DeviceNet is maintained and managed by ODVA (Open DeviceNet Vendor Association, Inc).

If you have any questions concerning the DeviceNet system, refer to the following website run by ODVA:

ODVA
Website address is, https://www.odva.org/

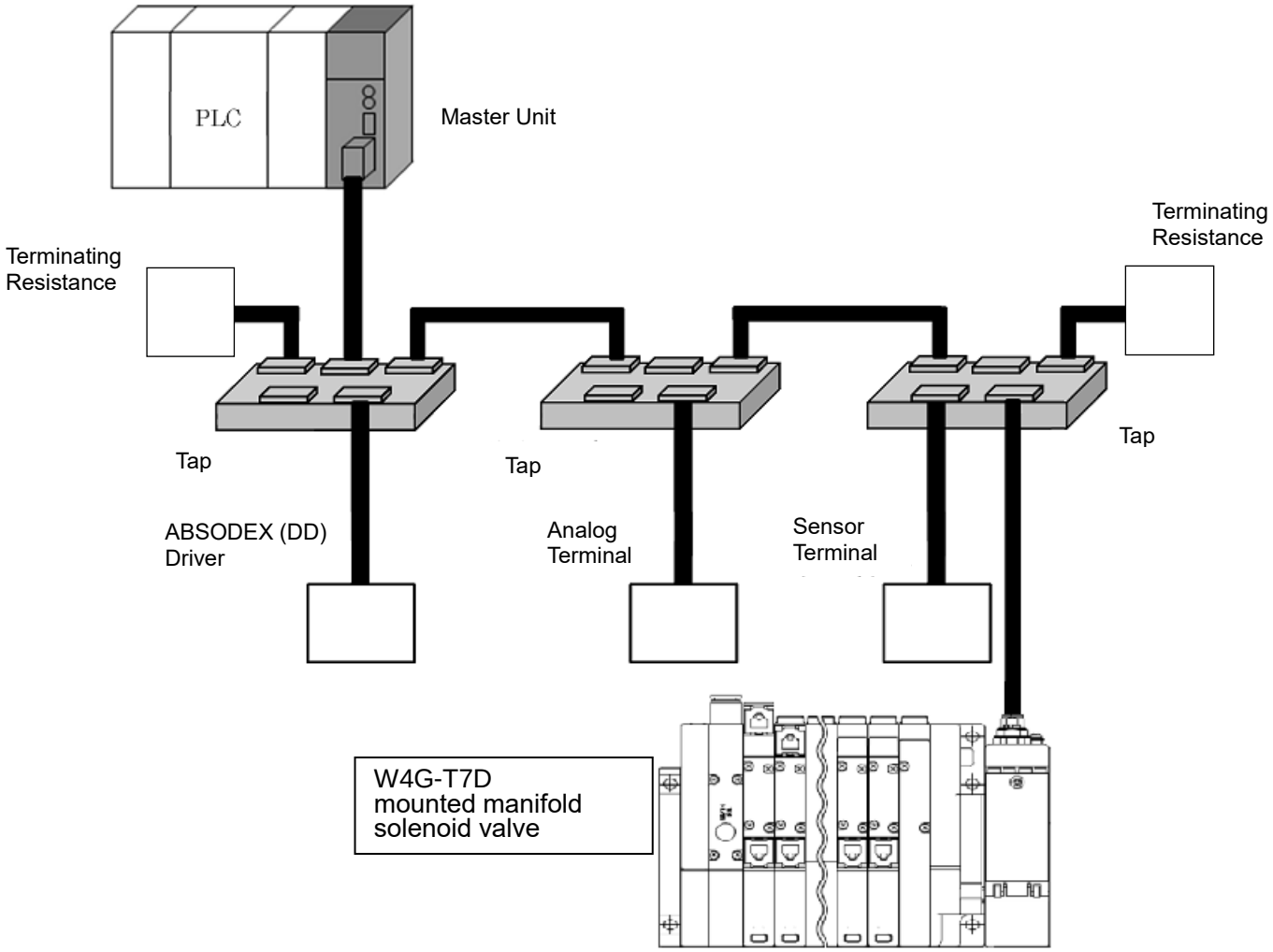
1.1.2 System structure

This system mainly consists of a PLC, master unit, T7D(W4G-OPP8-□D) mounted manifold solenoid valve, and peripheral equipment (DeviceNet slaves).

■ Examples of PLC and master unit combination

PLC manufacturer	Compatible PLC	Master unit model
Omron Corporation	NJ Series	CJ1W-DRM21
	CJ Series	
	CS1 Series	CS1W-DRM21
Rockwell Automation Japan Co., Ltd.	1756-L75	1756-DNB
Other DeviceNet compatible master units		

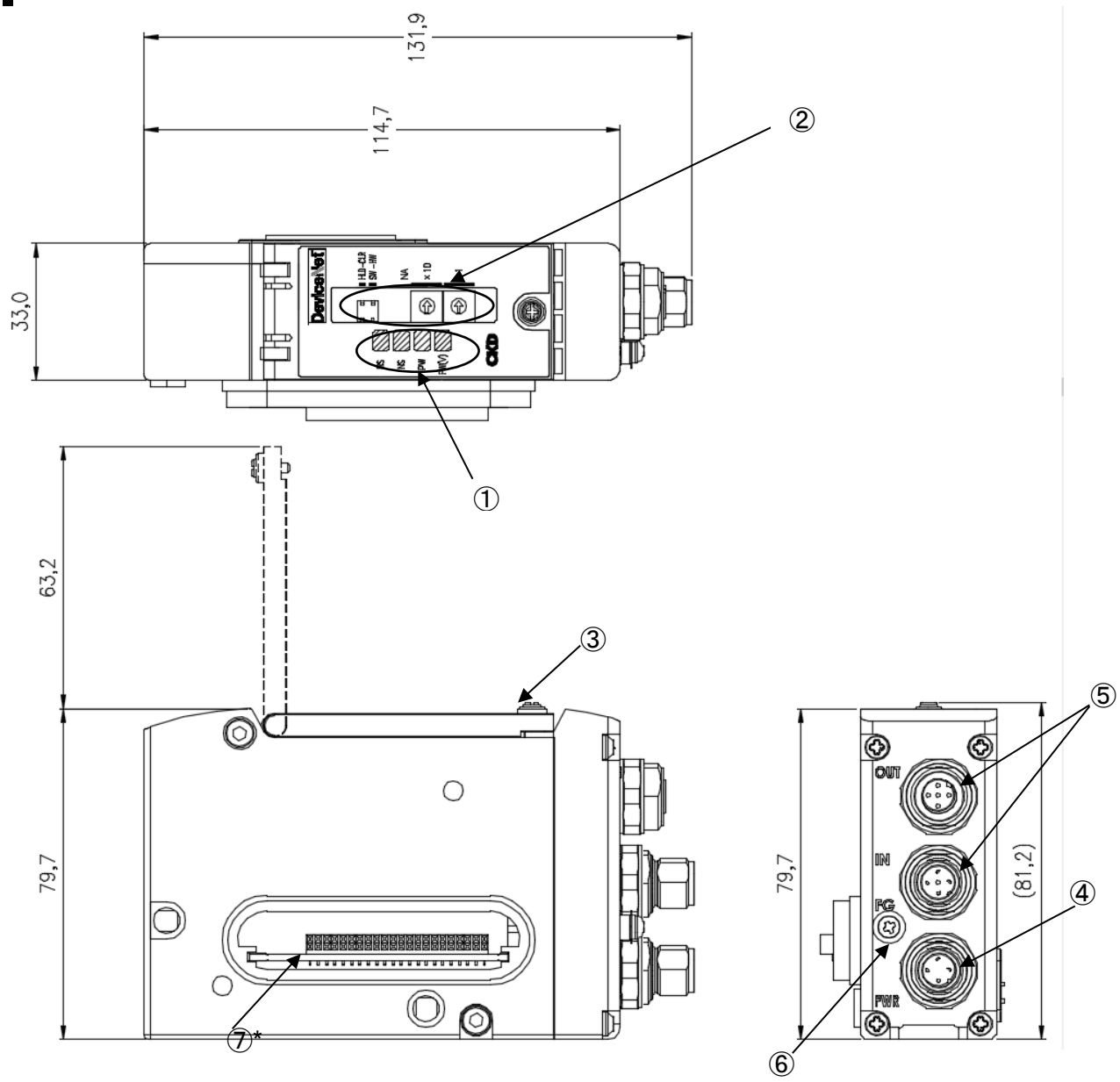
■ Example of basic structure of the system



Master unit: A unit which controls slave units and requests to open connection.
Tap: A device which is used for branch connection.

1.2 Part Name

1.2.1 Parts of the slave unit

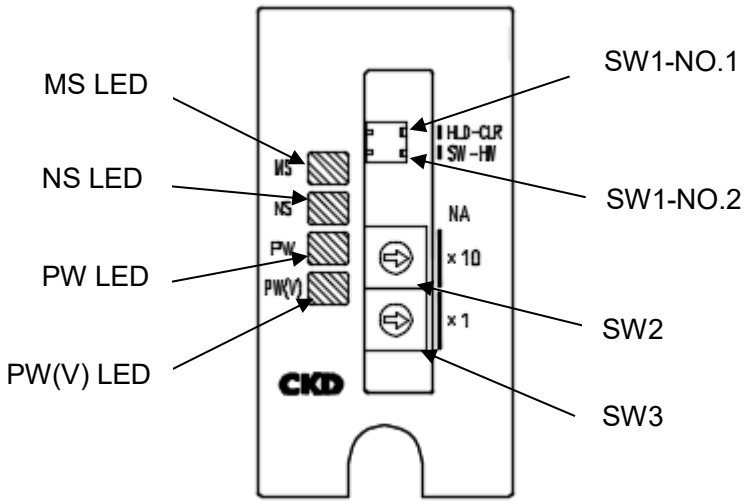


No.	Part name	Description
①	LED indicators	Indicate the status of the slave unit and network with MS, NS, PW, and PW(V).
②	Switches	Rotary switches: Set the node address of the slave unit. DIP switches: Set the output when a communication error occurs and the operation mode.
③	Cover	Protects the LEDs and setting switches.
④	Valve power plug (M12×1 port【PWR】A-cord)	Connects valve power cable (24 V).
⑤	Network connector (M12×2 ports【IN, OUT】5-pin, A-cord)	IN: Input port for DeviceNet communication (plug) OUT: Output port for DeviceNet communication (socket)
⑥	FG terminal	Connects to FG.
⑦	I/O block connector	Connects the slave unit to the I/O block. (* Compatible with T7D□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

The switches are used to set the slave unit operation mode, output mode in the event of a communication error, and node address.
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.

Marking	Switches	Settings
SW1-NO.1 (DIP switch)	HLD-CLR (Output mode setting)	Selects whether to hold (HLD) or clear (CLR) the output status when a communication error occurs.
SW1-NO.2 (DIP switch)	SW-HW (Operation mode setting)	Selects software mode (SW) or hardware mode (HW) for the operation mode.
SW2, SW3 (rotary switch)	NA ×10, ×1 (Node address setting)	Sets the slave unit node address between 0 to 63. SW2 sets in the tens place and SW3 sets in the ones place.

■ LED indicators

These LEDs indicate the status of the product and network.
Refer to the following table for the description of LED indicators.

1) <Module status (MS) / Network status (NS) LED>

MS LED	NS LED	Indication		Comments
Green ON	Green ON	I/O communication in progress	I/O data is being communicated between the master and slave unit.	Operating normally.
Green ON	OFF	Node address duplication checking	Waiting for node address duplication checking to be completed at the master.	In case only the certain slave unit is in this condition, restart the unit after checking if the baud rate is the same as the master.
Green ON	Green Flashing	Connection waiting	Waiting for connection establishment from the master.	
Red ON	OFF	Watchdog timer error	Watchdog timer error occurred in the slave unit.	Replace the slave unit.
Red Flashing	Green ON	Switch setting change during I/O communication	The status in which Rotary and DIP switch settings during I/O communication had been changed.	The switch settings had been changed during I/O communication. Red blinking of MS LED will become green (light) by putting back the switch to the former position or restarting and updating the slave unit settings.
Red Flashing	OFF	Improper switch setting	Rotary switch setting is not correct.	Restart the slave unit after checking the switch setting.
Green ON	Red ON	Duplicate node address	Node address is duplicated.	After re-setting the node address to avoid duplicate, restart the slave unit.
Green ON	Red ON	Bus-off detection	Bus-off (communication stop status by multiple data errors)	Check the following and restart the slave unit. *Matching master and slave baud rates *Proper cable lengths (trunk and branch lines) *Broken or loose cables *Installation of terminators at both ends of the trunk line *Excessive noise
Green ON	Red Flashing	Communication time out		
OFF	OFF	No communication power supply		After checking both node address and baud rate are set properly, supply the communication power supply.

2) <POWER LED (PW)>

POWER LED (PW)	Indication
Green ON	Communication power supply is ON.
OFF	Communication power supply is OFF.

3) <VALVE LED (PW (V)>

* Effective when the communication power is ON.

VALVE LED (PW(V))	Indication
Green ON	Valve power supply is ON.
OFF	Valve power supply is OFF.

1.3 Specifications

1.3.1 Communication specifications

Item	Specifications			
Transfer rate (Baud rate)	Auto setting (125kbps /250kbps /500kbps)			
Communication media (Network cable)	DeviceNet dedicated 5-wire cable signal lines, (2 signal lines, 2 power lines, 1 shielded line）			
Communication distances	Transfer rate (Baud rate)	Network length	Branch line length	Total branch line length
	125kbps	500m max.*1	6m max.	156m max.
	250kbps	250m max. *1	6m max.	78m max.
	500kbps	100m max.	6m max.	39m max.
Communication power supply	11.0 VDC to 25.0 VDC			
Error control method	CRC error check			

*1: These are for Thick cables. Keep the maximum length to 100m or less when using Thin cables.

1.3.2 Slave unit specifications

The product must be used within the following specifications.

Item		Specifications					
Model No.		T7D1 (W4G-OPP8-1D)	T7D2 (W4G-OPP8-2D)	T7DB7 (W4G-OPP8-7D-B)	T7DP1 (W4G-OPP8-1D-P)	T7DP2 (W4G-OPP8-2D-P)	T7DPB7 (W4G-OPP8-7D-PB)
Communication power supply voltage		11.0 VDC to 25.0 VDC					
Communication power supply current consumption		40 mA or less	50 mA or less	50 mA or less	40 mA or less	50 mA or less	50 mA or less
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) 20 mA or less (under no load with all points ON)					
Output type		NPN output (+COM)			PNP output (-COM)		
Number of input/output point		(0/16)	(0/32)	(16/16)	(0/16)	(0/32)	(16/16)
Node address setting		Node address setting by switch [0-63 (Dec)] or software setting					
Output setting when communication error occurs		Hold all points output (Hold)/ Clear all points output (Clear)*1					
Insulation resistance		Between external terminals and the case: 30 MΩ or more with 500 VDC					
Withstand voltage		Between external terminals and the case: 500 VAC for one minute					
Shock resistance		294.0 m/s^2 for 3 times in 3 directions					
Storage ambient temperature		−20°C to 70°C					
Storage humidity		30% to 85% RH (no dew condensation)					
Ambient temperature		−5°C to 55°C					
Ambient humidity		30% to 85% RH (no dew condensation)					
Atmosphere		No corrosive gas					
Communication protocol		DeviceNet compliant					
Transfer rate (Baud rate)		Auto setting (125kbps /250kbps /500kbps)					
DeviceNet 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		Communication power supply: 24V, 2A / Valve power supply 24V, 3A (Both fuses are non-replaceable)					
Operation indicator		LED (communication status, communication power and valve power supply *2)					
Degree of protection		IP65					
Number of occupied stations		1 station					
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.					

*1 In software setting mode, output setting can be made for each output point.
*2 Power status can be monitored only when the voltage within the specified range is supplied to communication power supply.

2. INSTALLATION

2.1 Mounting

⚠CAUTION

Before handling a DeviceNet 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 all 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 connectors

⚠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 DeviceNet 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.

Use a DeviceNet dedicated network cable, and make sure to understand these specifications before wiring. For details, refer to the instruction manual of the master unit manufacturer or ODVA.

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 connector on the slave unit.

Recommended network cable: DeviceNet dedicated cable

Manufacturer	Cable	Model
Omron Corporation	DeviceNet Compatible cable	DCA2-5CN series

Recommended M12 assembly type connector: A code 5Pin

Manufacturer	Connector	Model
HARTING Co., Ltd.	M12 assembly type connector (male)	2103 319 1501
HARTING Co., Ltd.	M12 assembly type connector (female)	2103 319 2501

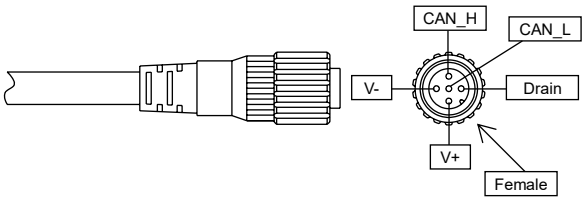
■ Connecting the network cable

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

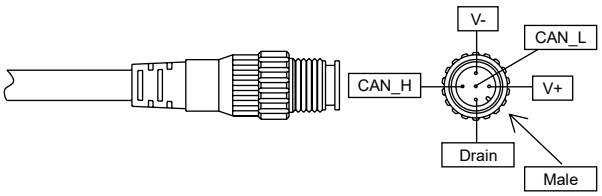
1 After confirming safety, stop network communication and turn off all peripheral equipment.

2 Refer to the figure below and connect the DeviceNet compliant cable to M12 connector.

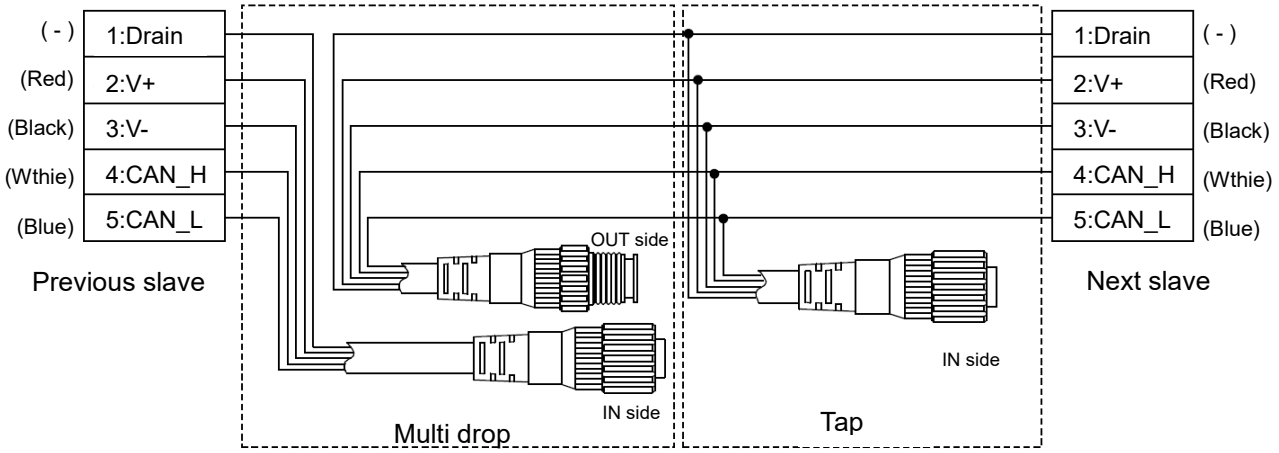
IN side



OUT side



Pin	Signal (): Cable color	Function
1	Drain (none / bare wire)	Connect to the network cable “Drain” of the master unit or other slaves.
2	V+ (red)	Use 11 VDC to 25 VDC power with the least noise.
3	V- (black)	Use 11 VDC to 25 VDC power with the least noise.
4	CAN_H (white)	Connect to the network cable “CAN_H” of the master unit or other slaves.
5	CAN_L (blue)	Connect to the network cable “CAN_L” of the master unit or other slaves.



2.2.2 Connecting and wiring to the 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 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.

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 unterminated type power cable

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

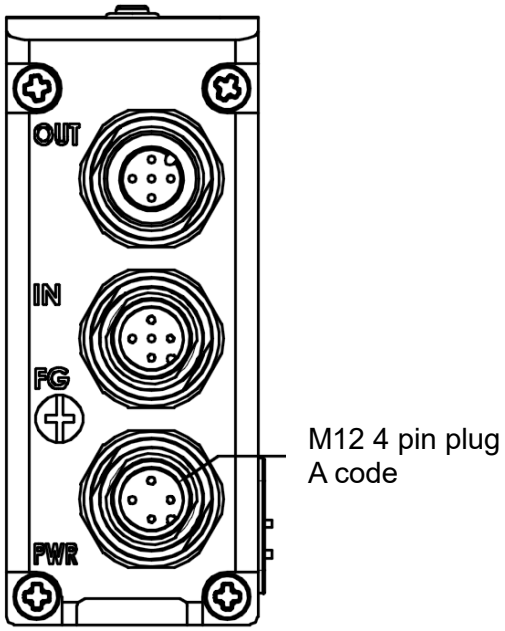
■ Connecting the power cables

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

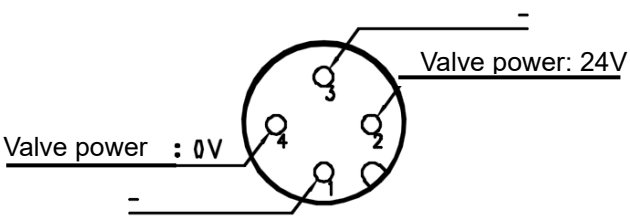
1 After confirming safety, turn off the power to be connected to the slave unit.

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).



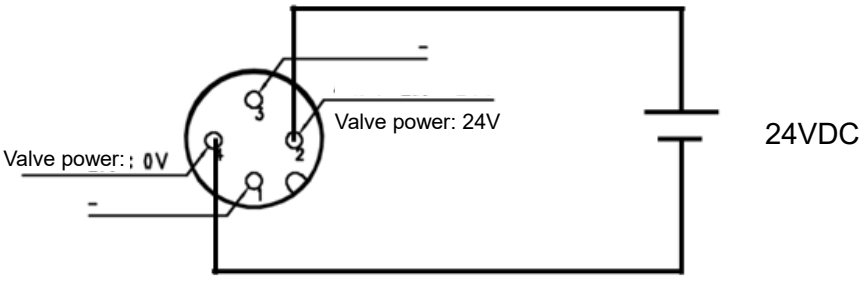
M12 4 pin plug
A code



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

■ Wiring the power cable

Wire 24VDC to pins 2 and 4 of the power plug.
* Pins 1 and 3 are not used.



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.

Carefully check the address setting value of serial transmission slave unit 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 communication 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.

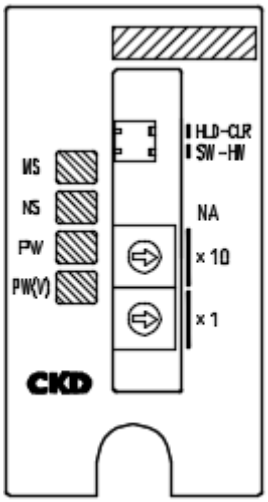
Be careful not to allow any foreign matter to enter inside when setting the switches.
Unexpected failure may result.

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

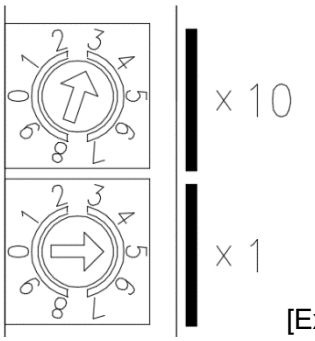
Do not touch the internal circuit board when setting the switches.
The internal circuit board can be easily damaged.

3.1.1 Node address setting

Set the slave unit node address.
The slave unit functions according to the node address setting at power-up.
Duplicate node address cannot be assigned.



Switches	NA [Node address] ×10 : Sets tens place digit of the address ×1 : Sets ones place digit of the address
Setting range	0 to 63 (in decimal)



[Example] Node address: 35

3.1.2 Other switch settings

Set output mode and operation mode when communication error occurs.
The setting is read into memory at power-up.

Switches	Settings
HLD-CLR (Output mode setting)	Set the output mode when a communication error occurs (such as communication disconnection with PLC or timeout). CLR: Clear mode HOD: Hold mode
SW-HW (Operation mode setting)	Sets the operation mode. HW: Operates in hardware mode SW: Operates in software mode

3.1.3 Software mode

Node address and output mode can be set by software.
However, when setting the node address with software, set the NA switch value to 64 or higher.
* The node address at start-up will be the one that was last established for communication.
The factory default node address value is 1.

Switch settings by software mode

Switches	Description
NA	0 to 63: Switch settings-Enable 64 or more: Switch settings-Disable (software settings-Enable)
HLD-CLR	Switch settings-Disable (software settings-Enable)

3.2 Network configuration with EDS (Electric Data Sheet) file

Inodeer for the DeviceNet device to join the network, it is necessary to register the communication specification of the device to the network using the EDS file. Refer to the instruction manual issued by the master unit manufacturer for registering the EDS file. Also, to ensure a suitable network configuration, use the latest EDS file complying with the model or product version.

3.2.1 Registering the device

Check the address and specifications (model name) of the device before registering, as both the device and EDS file will need to be matched first.
Refer to the following table for the device specifications and EDS file.

Specifications and the EDS files

Item	Specifications					
Manifold Model No.	-T7D1	-T7D2	-T7DB7	-T7DP1	-T7DP2	-T7DPB7
Single unit model no.	W4G-OPP8-1D	W4G-OPP8-2D	W4G-OPP8-7D-B	W4G-OPP8-1D-P	W4G-OPP8-2D-P	W4G-OPP8-7D-PB
Output type	+COM (NPN)			-COM (PNP)		
I/O points	16 points output	32 points output	16 points I/O	16 points output	32 points output	16 points I/O
Name of EDS file	CKD_W4G_OPP8_1D_v2101.eds	CKD_W4G_OPP8_2D_v2101.eds	CKD_W4G_OPP8_7D_v2101.eds	CKD_W4G_OPP8_1D_P_v2101.eds	CKD_W4G_OPP8_2D_P_v2101.eds	CKD_W4G_OPP8_7D_P_v2101.eds

3.3 Correspondence between the slave unit output number and PLC address No.

3.3.1 PLC address correspondence table

This correspondence table uses OMRON PLC as an example.

<T7D1, T7DP1 (16 points output)>

Assigned address to the PLC memory	Output Bit 00-15															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
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**

<T7D2, T7DP2 (32 points output)>

Assigned address to the PLC memory	Output Bit 00-15																Output Bit 16 to 31															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
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**

<T7DB7, T7DBP7 (for 16 points I/O), with 8 points solenoids, 4 input blocks, and 2 output blocks.>

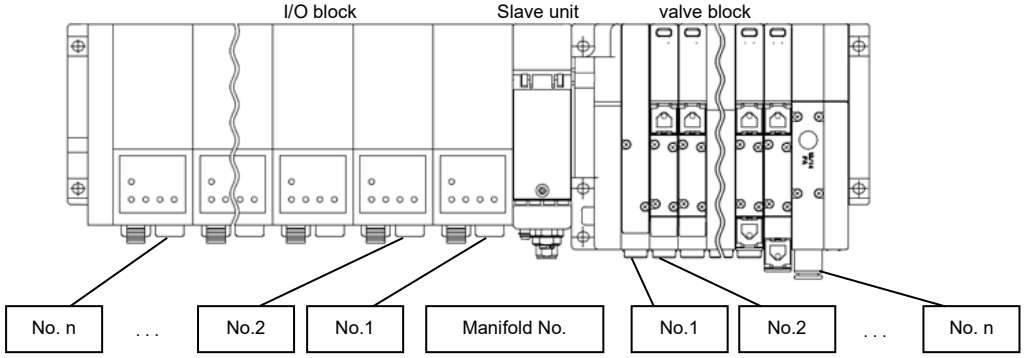
Assigned address to the PLC memory	output																input															
	Output Bit 00-15																Input Bit 00-15															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Slave unit I/O No.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**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 the output block from the side of slave unit.

<T7DB7, T7DBP7 (for 16 points I/O), with 12 points solenoids, 4 input blocks, and 1 output block>

Assigned address to the PLC memory	output																input															
	Output Bit 00-15																Input Bit 00-15															
	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**	**s12**	**s13**																				
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**																

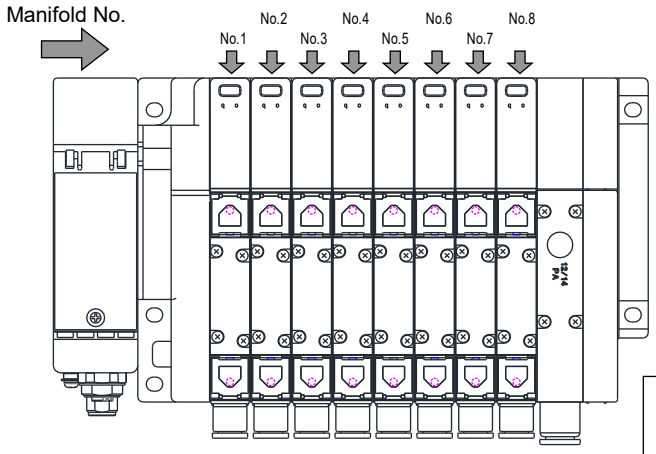
* Connect the input block first then output block to the slave unit.
* Set 4 with rotary switch of the output block.



3.3.2 Examples of valve No. assignments corresponding to the slave unit T7D* solenoid output No.

In the table below, each valve number consists of a number (the station number) and an alphabet (the a-side solenoid or the b-side solenoid). For example, “1a” refers to 1st station a-side solenoid. 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.

<T7D1, T7DP1 (16 points output)>



The figure 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

- Single solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve no.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	13a	14a	15a	16a

- Double solenoid valve

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

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

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve no.	1a	2a	3a	3b	4a	4b	5a	6a	7a	7b	8a	9a	10a	10b	11a	11b

Double wiring

- Single solenoid valve

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

- Double solenoid valve

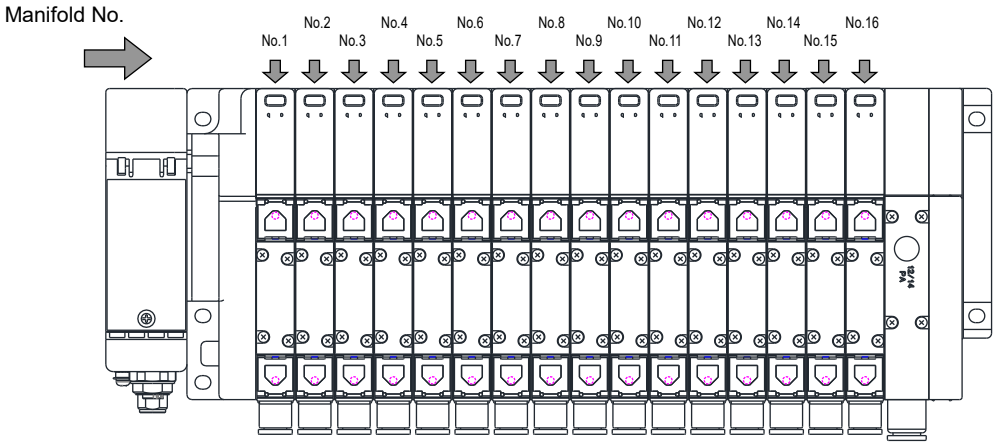
Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve no.	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b

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

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

<T7D2, T7DP2 (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

- Single solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	13a	14a	15a	16a
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No	17a	18a	19a	20a	21a	22a	23a	24a	25a	26a	27a	28a	29a	30a	31a	32a

- Double solenoid valve

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

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

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

Double wiring

- Single solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No	1a	(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)

- Double solenoid valve

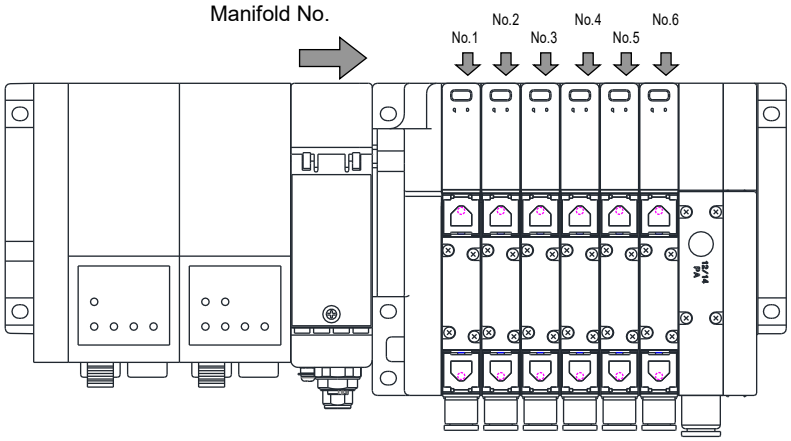
Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No	9a	9b	10a	10b	11a	11b	12a	12b	13a	13b	14a	14b	15a	15b	16a	16b

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

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No	1a	(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)

<T7DB7, T7DPB7 (16 points I/O)>

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



Standard wiring

- Single solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	4-0	4-1	4-2	4-3

- Double solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	4-0	4-1	4-2	4-3

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

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No	1a	2a	3a	3b	4a	4b	5a	6a	7a	7b	8a	9a	4-0	4-1	4-2	4-3

Double wiring

- Single solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No	1a	(E)	2a	(E)	3a	(E)	4a	(E)	5a	(E)	6a	(E)	4-0	4-1	4-2	4-3

- Double solenoid valve

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	4-0	4-1	4-2	4-3

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

Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No	1a	(E)	2a	(E)	3a	3b	4a	4b	5a	(E)	6a	(E)	4-0	4-1	4-2	4-3

3.4 Programming

3.4.1 Programming

This slave unit is treated as a slave unit device with 16 points output: T7D□1, 32 points output: T7D□2 and 16 points I/O: T7D□B7.
There are 2 types of I/O data: output data transmitted from the master unit to the slave unit and input data transmitted from the slave unit to the master unit.

This slave unit acts as an output device which transmits output data to valves after receiving it from the master unit.
OnlyT7D□7 sends 2bytes data to the master unit for input data.

Refer to the manual provided by the PLC manufacturer when programing.
Execute the programing by referring to the following table for I/O mapping.
The characteristics of this slave unit such as output status setting when an error occurs, and the +COM/-COM output specifications, have no relevance to the programming.

3.4.2 Data mapping

Output data mapping

I/O points		Output data	Bit															
T7D□2	**T7D□1/ T7D□7**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
32 points	16 points	**2bytes**	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	-	**4bytes**	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Input data mapping <T7D□7>

Input data	Bit															
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
2bytes	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15

3.4.3 Device profile

General device data	Compatible DeviceNet Specifications	Volume One – Edition 3.26 Volume Three – Edition 1.15
	Vendor name	CKD Corporation (ID=0xC9)
	Device type	Pneumatic Valve(s)
Physical conformance data	Communication power supply current consumption	24 VDC 16 points output: 40 mA or less 32 points output / 16 points I/O: 50mA or less
	Connector style	Sealed micro connector
	Insulation at physical layer	None
	Supported indicators	Module, Network
	MAC ID setting	Rotary switch
	Default MAC ID	1
	Setting baud rate	Auto setting
	Supported baud rate	125kbps/250kbps/500kbps
Communications data	Predefined Master/ Slave connection set	Group 2 Only Server
	Dynamic connections support (UCMM)	None
	Explicit message fragmentation support	Yes

3.4.4 Object implementation

- Identity Object (0x01)

Object class	Attribute	Not supported
	Services	Not supported

	Attribute		ID content	Explicit Message transmission		Value					
	Decimal (Dec)	Hexadecimal (Hex)	-	Get	Set	T7D1	T7D2	T7DB7	T7DP1	T7DP2	T7DPB7
Object instance 1 (0x01)	1	0x01	Vender ID	Enable	Disable	201 (0xC9)					
	2	0x02	Device Type	Enable	Disable	27(0x1B) Pneumatic Valve(s)					
	3	0x03	Product Code	Enable	Disable	80	81	82	83	84	85
	4	0x04	Revision	Enable	Disable	21.01					
	5	0x05	Status	Enable	Disable	bit 0 only					
	6	0x06	Serial Number	Enable	Disable	Unique for each Unit					
	7	0x07	Product Name	Enable	Disable	W4G-OPP8-1D	W4G-OPP8-2D	W4G-OPP8-7D-B	W4G-OPP8-1D-P	W4G-OPP8-2D-P	W4G-OPP8-7D-PB
Services	DeviceNet Services			Parameter options							
	0x05		Reset	None							
	0x0E		Get_Attribute_Single	Yes							

- Message Router Object (0x02)

Object class	Attribute	Not supported
	Services	Not supported
Object instance	Attribute	Not supported
	Services	Not supported
Vendor specific additions		None

- DeviceNet object (0x03)

Object class	Attribute		ID content	Explicit Message transmission		Value
	Decimal (Dec)	Hexadecimal (Hex)	-	Get	Set	
	1	0x01	Revision	Enable	Disable	2
Services	DeviceNet Services			Parameter options		
	0x0E		Get_Attribute_Single	Yes		

Object instance 1 (0x01)	Attribute		ID content	Explicit Message transmission	
	Decimal (Dec)	Hexadecimal (Hex)	-	Get	Set
	1	0x01	MAC ID	Enable	Enable*1
	2	0x02	Baud rate	Enable	Enable *2
	3	0x03	BOI	Disable	Disable
	4	0x04	Bus-off Counter	Enable	Disable
	5	0x05	Allocation information	Enable	Disable
	6	0x06	MAC ID Switch Changed	Enable	Disable
	8	0x08	MAC ID Switch Value	Enable	Disable
	10	0x0A	Quick Connected	Enable	Enable
Services	DeviceNet Services			Parameter options	
	0x0E		Get_Attribute_Single	Yes	
	0x10		Set_Attribute_Single	Yes	

* 1 "Set" is enable only when software mode and NA switch is set to 64 or more (see "3.1.3 Software mode")
* 2 “Set” is enable only at software mode.

- Assembly Object (0x04)

Object class	Attribute		ID content	Explicit Message transmission		Value
	Decimal (Dec)	Hexadecimal (Hex)	-	Get	Set	
	1	0x01	Revision	Enable	Disable	2
Services	DeviceNet Services			Parameter options		
	0x0E		Get_Attribute_Single	Yes		
	0x10		Set_Attribute_Single	Yes		

Object instance	Attribute		ID content	Explicit Message transmission					
	Decimal (Dec)	Hexadecimal (Hex)	-	T7D1/T7DP1		T7D2/T7DP2		T7DB7/T7DPB7	
				Get	Set	Get	Set	Get	Set
15 (0x0F)	3	0x03	Data	-	-	-	-	Enable	Disable
35 (0x23)	3	0x03	Data	Enable	Enable	-	-	Enable	Enable
37 (0x25)	3	0x03	Data	-	-	Enable	Enable	-	-
Services	DeviceNet Services			Parameter options					
	0x0E		Get_Attribute_Single	Yes					
	0x10		Set_Attribute_Single	Yes					

- Connection object (0x05)

Object class	Attribute	Not supported
	Services	Not supported

	Attribute		ID content	Explicit Message transmission		Value
	Decimal (Dec)	Hexadecimal (Hex)	-	Get	Set	
Object instance 1 (0x01) Explicit	1	0x01	State	Enable	Disable	-
	2	0x02	Instance Type	Enable	Disable	0x00
	3	0x03	Transport class trigger	Enable	Disable	0x83
	4	0x04	Produced connection ID	Enable	Disable	Unique for each Unit
	5	0x05	Consumed connection ID	Enable	Disable	Unique for each Unit
	6	0x06	Initial comm characteristics	Enable	Disable	0x21
	7	0x07	Produced connection size	Enable	Disable	0x0C00
	8	0x08	Consumed connection size	Enable	Disable	0x1300
	9	0x09	Expected packed rate	Enable	Enable	0xC409
	12	0x0C	Watchdog time-out action	Enable	Disable	1
	13	0x0D	Produced connection path length	Enable	Disable	0
	15	0x0F	Consumed connection path length	Enable	Disable	0
	17	0x11	Production inhibit time	Enable	Disable	0
	18	0x12	Connection_timeout_multiplier	Enable	Disable	0
Services		DeviceNet Services		Parameter options		
		0x0E	Get_Attribute_Single	Yes		
		0x10	Set_Attribute_Single	Yes		

	Attribute		ID content	Explicit Message transmission		Value			
	Decimal (Dec)	Hexadecimal (Hex)	-	Get	Set	T7D1/ T7DB7	T7D2	T7DP1/ T7DPB7	T7DP2
Object instance 2 (0x02) Poll	1	0x01	State	Enable	Disable	-			
	2	0x02	Instance Type	Enable	Disable	0x01			
	3	0x03	Transport class trigger	Enable	Disable	0x82			
	4	0x04	Produced connection ID	Enable	Disable	Unique for each Unit			
	5	0x05	Consumed connection ID	Enable	Disable	Unique for each Unit			
	6	0x06	Initial comm characteristics	Enable	Disable	0x01			
	7	0x07	Produced connection size	Enable	Disable	0x0000			
	8	0x08	Consumed connection size	Enable	Disable	0x0002	0x0004	0x0002	0x0004
	9	0x09	Expected packed rate	Enable	Enable	0x0000			
	12	0x0C	Watchdog time-out action	Enable	Enable	0x0000			
	13	0x0D	Produced connection path length	Enable	Disable	0x0000			
	15	0x0F	Consumed Connection path length	Enable	Disable	0x06			
	16	0x10	Consumed connection path	Enable	Disable	20_04_24 _23_30_03 (Hex)	20_04_24 _25_30_03 (Hex)	20_04_24 _23_30_03 (Hex)	20_04_24 _25_30_03 (Hex)
	17	0x11	Production inhibit time	Enable	Disable	0x0000			

Services	DeviceNet Services		Parameter options
	0x0E	Get_Attribute_Single	Yes
	0x10	Set_Attribute_Single	Yes

	Attribute		ID content	Explicit Message transmission		Value			
	Decimal (Dec)	Hexadecimal (Hex)	-	Get	Set	T7D1/ T7D2	T7DB7	T7DP1/ T7DP2	T7DPB7
Object instance 3 (0x03) Bit Strobed	1	0x01	State	Enable	Disable	-			
	2	0x02	Instance Type	Enable	Disable	0x01			
	3	0x03	Transport class trigger	Enable	Disable	0x82			
	4	0x04	Produced connection ID	Enable	Disable	Unique for each Unit			
	5	0x05	Consumed connection ID	Enable	Disable	Unique for each Unit			
	6	0x06	Initial comm characteristics	Enable	Disable	0x02			
	7	0x07	Produced connection size	Enable	Disable	0x0000	0x0008	0x0000	0x0008
	8	0x08	Consumed connection size	Enable	Disable	0x0008			
	9	0x09	Expected packed rate	Enable	Enable	0x0000			
	12	0x0C	Watchdog time-out action	Enable	Enable	0x0000			
	13	0x0D	Produced connection path length	Enable	Disable	0x0000	0x0006	0x0000	0x0006
	14	0x0E	Consumed connection path	Enable	Disable	-	20_04_24 _0F_30_03 (Hex)	-	20_04_24 _25_30_03 (Hex)
	15	0x0F	Consumed Connection path length	Enable	Disable	0x0000			
	17	0x11	Production inhibit time	Enable	Disable	0x0000			
	18	0x12	Connection_timeout_multiplier	Enable	Enable	0x00			

Services	DeviceNet Services		Parameter options
	0x0E	Get_Attribute_Single	Yes
	0x10	Set_Attribute_Single	Yes

- Discrete Input Point Object (0x08)

Object class	Attribute	Not supported
	Services	Not supported

Object instance	Attribute		ID content	Explicit Message transmission		Value
	Decimal (Dec)	Hexadecimal (Hex)	-	Get	Set	
1 (0x01) to 16 (0x10)	3	0x03	Value	Enable	Disable	
Services	DeviceNet Services		Parameter options			
	0x0E		Get_Attribute_Single	Yes		

- Discrete Output Point Object (0x09)

Object class	Attribute	Not supported
	Services	Not supported

Object instance	Attribute		ID content	Explicit Message transmission		Value
	Decimal (Dec)	Hexadecimal (Hex)	-	Get	Set	
1 (0x01) to 32 (0x20)	3	0x03	Value	Enable	Enable	
	5	0x05	Fault Action:	Enable	Enable*	
	6	0x06	Fault Value	Enable	Enable*	
Services	DeviceNet Services		Parameter options			
	0x0E		Get_Attribute_Single	Yes		
	0x10		Set_Attribute_Single	Yes		

* “Set” is enable only at software mode.

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 unit. Conduct the periodic cleaning and inspection to use the 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?	No dust	Visual inspection
Installation	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 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

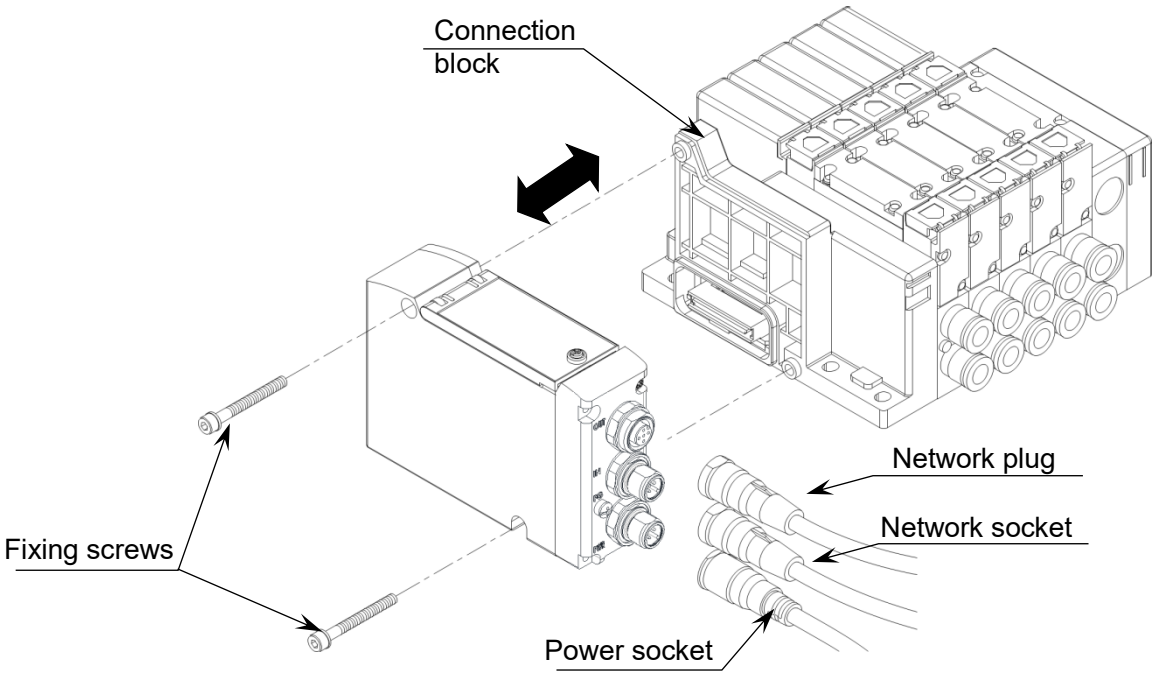
Check the slave unit node address and the setting made to specify which action to take on the output in the event of communication error before turning on the communication power.

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 disconnectionodeamage.

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 communication 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 node address of the 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 the slave unit fixing screws.
   (Appropriate tightening torque: 1.2 N·m)
4. Turn off the power (for communication/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 connectors: 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. After confirming safety, 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, PW(V) does not light up.

- 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: MS and NS LEDs are not green (IO communication is not running)

- Refer to the [1.5 Switches and LED indicators].

■ Fault 3: Values of NA switches (x 10, x 1) and HC switch are not applied.

- Power on the switch again after setting.
- Some switch settings become disable in the case of software setting. (Refer to “3.1.3 Software mode”)

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.s