CKD

INSTRUCTION MANUAL

Block Manifold
MN4G Series

Serial Transmission Type
N4G※-T7S※1

Compatible with CompoNet

- Please read this instruction manual thoroughly before using the product.

- In particular, carefully read the contents related to safety.

- Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.
It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

⚠ WARNING

1. **This product is designed and manufactured as a general industrial machine part.**
   It must be handled by an operator having sufficient knowledge and experience in handling.

2. **Use this product in accordance of specifications.**
   This product must be used within its stated specifications. It must not be modified or machined.
   This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.

   (Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

   (1) Use for special applications including nuclear energy, railway, aircraft, marine vessel, vehicle, medicinal devices, devices or applications coming into contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.

   (2) Use for applications where life or assets could be adversely affected, and special safety measures are required.

3. **Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.**
   ISO4414, JIS B 8370 (pneumatic system rules)
   JFPS2008 (principles for pneumatic cylinder selection and use)
   Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.

4. **Do not handle, pipe, or remove devices before confirming safety.**
   (1) Inspect and service the machine and devices after confirming safety of the entire system related to this product.

   (2) Note that there may be hot or charged sections even after operation is stopped.

   (3) When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.

   (4) When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5. **Observe warnings and cautions on the pages below to prevent accidents.**

■**The precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.**

⚠ **DANGER** : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.

⚠ **WARNING** : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

⚠ **CAUTION** : When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation.
In any case, important information that must be observed is explained.

Precautions with regard to guarantee

● **Guarantee period**

The guarantee period of our product shall be one (1) year after it is delivered to the place specified by the customer.

● **Guarantee coverage**

If any failure for which CKD is recognized to be responsible occurs within the above warranty period, a substitute or necessary replacement parts shall be provided free of charge, or the product shall be repaired free of charge at the plant of CKD.

However, the guarantee excludes following cases:

(1) Defects resulting from operation under conditions beyond those stated in the catalogue or specifications.

(2) Failure resulting from malfunction of the equipment and/or machine manufactured by other companies.

(3) Failure resulting from wrong use of the product.

(4) Failure resulting from modification or repairing that CKD is not involved in.

(5) Failure resulting from causes that could not be foreseen by the technology available at the time of delivery.

(6) Failure resulting from disaster that CKD is not responsible of.

Guarantee stated here covers only the delivered products.
Any other damage resulting from failure of the delivered products is not covered by this guarantee.

● **Confirmation of product compatibility**

Our customer shall be responsible of confirming compatibility of our product used in our customer's system, machinery or device.

[MSV-452472-A]

⚠ WARNING

● If you have to use the product under conditions that are different from the specified conditions or if you intend to use the product for a special application, be sure to consult us about the product specifications before using the product.

● Before performing maintenance, turn off the power, cut off the compressed air supply, and make sure there is no residual pressure.

● Before increasing or decreasing the number of stations (valves) on the manifold, turn off the power and release pressure.

● Before disassembling or assembling the manifold, read this manual carefully and with full understanding of its contents.

● Before performing electrical wiring, read this manual carefully and with full understanding of its contents.

⚠ CAUTION

● Regularly perform the daily and periodic inspections to correctly maintain product performance.

● Confirm working voltage and polarity before wiring and turning on the power.

● Do not touch electric wiring connections (exposed live parts); this will cause an electric shock. During wiring, keep the power off. Also, do not touch these live parts with wet hands.

● This product does not meet the surge immunity requirements specified in EN61000-4-5 for CE marking. Please provide appropriate protective measures against lightning surges on the device side.

● When the valve power is turned on (i.e., at power-up), the valve lamp may light up momentarily. However, the valve itself is not turned on or off as a result of this.

TABLE OF CONTENTS

N4G※-T7S※1

Serial Transmission Type

Instruction Manual No. MSV-452472-A

        January.08.2016

1. PRODUCT

1.1 Overview of the Product and CompoNet

1) N4G※-T7S※1

Slave Unit for solenoid valves which can be connected to CompoNet, an open field network, or any network that is in conformity with CompoNet.

Characteristics are as follow:

(1) It helps reduce wiring man-hours since only the network cable is required to connect it with PLC

(2) The power supply for the network is separated from that for the valve, ensuring easy maintenance work.

(3) The Slave Unit output status at the occurrence of a communication error can be set using the CX-Integrator (OMRON Corporation).

(4) The baud rate is automatically identified and set to one of the four rates: 4Mbps, 3Mbps, 1.5Mbps, or 93.75Kbps.

(5) Output format offers the NPN output type and PNP output type.
(NPN output：N4G※-T7S1、PNP outputN4G※-T7SP1)

2) CompoNet

CompoNet features easy operation and installation in a component-level network connecting PLCs and I/O (Input / Output) devices. The PLC and CompoNet slave units cyclically exchange I/O information through a CompoNet master unit, refreshing I/O data in sync with the PLC execution cycle. Message communications can also be used to read and write CompoNet slave unit data from the CPU unit of the PLC.

CompoNet is maintained and controlled by ODVA (Open DeviceNet Vendor Association).

NOTE :　Be sure to read all applicable users' manuals.
This manual mainly describes the Slave Unit N4G※-T7S※1.
Be sure to read the manuals provided by the manufacturer of the master unit and other slave units to be connected to this CompoNet system as well.
In addition, regarding the manifold solenoid valve, please read this manual along with the manual for the solenoid valve carefully to fully understand the functions and performance of the Slave Unit to be able to use it properly.
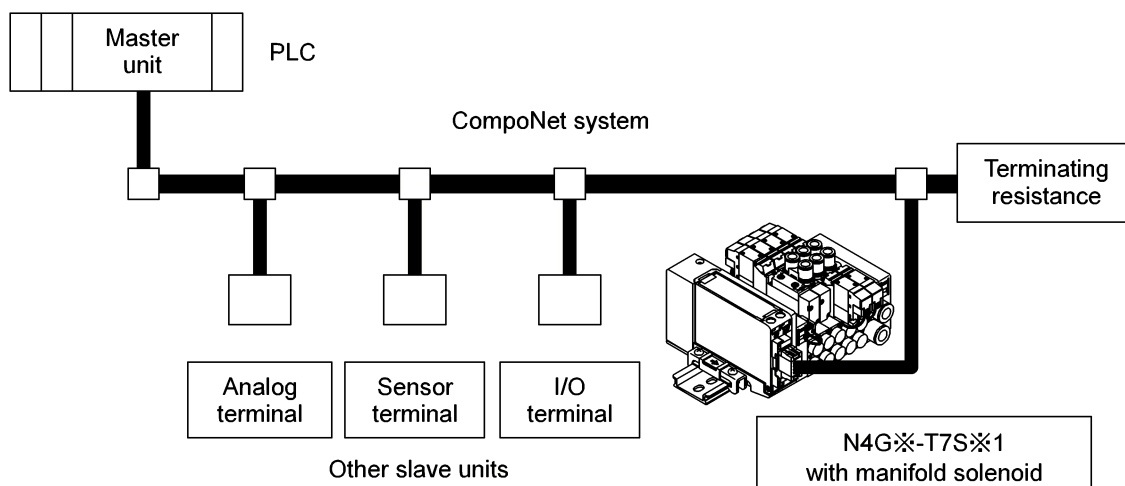
1.2 Network structure

This system mainly consists of a PLC, a master unit, Slave Unit N4G※-T7S1※ with manifold solenoid valve, other slave units, and peripheral equipments.

● Examples of PLC and master unit combination

Manufacturer	Compatible PLC	Master unit model
OMRON Corporation	SYSMAC CS series SYSMAC CJ series Others	CS1W-CRM21 CJ1W-CRM21
Other equipments compatible with CompoNet		

● Fundamental structure of the system

Master unit

PLC

CompoNet system

Terminating resistance

Analog terminal

Sensor terminal

I/O terminal

Other slave units

N4G※-T7S※1 with manifold solenoid

1.3 Specifications

1) Communication specifications

Item	Specification
Communication Protocol	CompoNet
Baud rate	4Mbps, 3Mbps, 1.5Mbps, 93.75Kbps (Automatic baud rate detection)
Communication medium [*1]	The following network cable can be used. Round cable I (2-conductor, JIS C3306) Round cable II (4-conductor, JIS C3306) Flat cable I (unsheathed) Flat cable II (sheathed)
Network power supply	14.0 to 26.4 VDC

Note*1: Please refer to the manuals provided by the master unit manufacturer and ODVA when cables of different types are to coexist.

With CompoNet, communication maximum distance varies by baud rate, network cable type, etc. Representative examples are shown in the table below.

Baud rate	Network cable type	Trunk line and sub-trunk line maximum length	Branch line maximum length	Total branch line maximum length
4M bps	Round cable I / II, Flat cable I / II	30m	T-branch connections not possible from trunk lines and sub-trunk lines (Multi-drop connection only)	
3M bps	Round cable I / II, Flat cable I / II	30m	0.5m	8m
1.5M bps	Round cable I (without branches)	100m	T-branch connections not possible from trunk lines and sub-trunk lines (Multi-drop connection only)	
	Round cable I Flat cable I / II	30m	2.5m	25m
93.75k bps	Round cable I	500m	6m	120m
	Round cable I Flat cable I / II	200m	Free wiring	

(For details, refer to the manuals provided by the master unit manufacturer and ODVA)

Discontinue

2) Specification of slave
Always operate this product within its product specifications.

● N4G※-T7S※1 Specification　　　　ODVA　CompoNet compatible

Item	Specification	
Model No.	N4G※-T7S1	N4G※-T7SP1
Network power supply	14.0 to 26.4 VDC	
Network-side current consumption	65mA or lower（While all points are ON, DC24.0V） 95mA or lower（While all points are ON, DC14.0V）	
power supply (Valve side)	22.8 to 26.4V DC (DC24V +10%, -5%)	
Electric consumption (Valve side)	15mA or lower (While all points are OFF.) 40mA or lower（While all points are ON,no load）	
Number of　I／O	Word slave : 16 points	
Insulation resistance	30MΩ or more at 500VDC between external terminals and body.	
Withstand voltage	500VAC applied between external terminals and body for 1 minute.	
Vibration proof	Durability	10Hz to 150Hz to 10Hz, 1 octave/min., 15 sweeps each in X, Y, Z directions with 0.75mm half-amplitude or 98.0m/ S^2, whichever smaller
	Malfunction	10Hz to 150Hz to 10Hz, 1 octave/min., 4 sweeps each in X, Y, Z directions with 0.5mm half-amplitude or 68.6m/ S^2, whichever smaller
Shock resistance	294.0m/S^2 for 3 times in each direction of X, Y, Z	
Storage 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)	
Ambient atmosphere	No corrosive gas	
Communication object	In conformity with CompoNet	
Baud rates	Automatic baud rate detection (4Mbps, 3Mbps, 1.5Mbps, 93.75kbps)	
Output insulation type	Photo coupler insulation	
Leakage current	0.1mA or less	
Residual voltage	0.5V or less	
Output type	NPN (+common output)	PNP (-common output)
Fuse rating	1A (For both Unit- and Valve-side power circuits. Both fuses not replaceable)	
Display	LED indicators are used to show Slave Unit status	
Number of nodes occupied by Slave Unit	1 node	

Discontinue

1.4 Parts of the Slave Unit
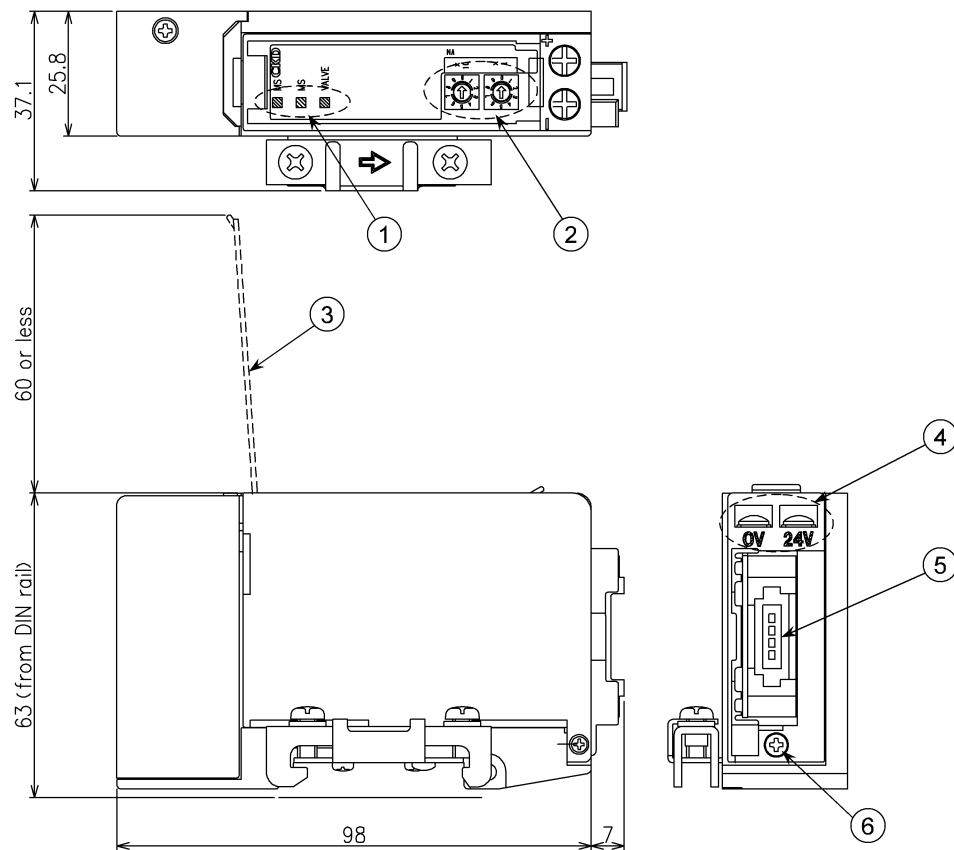
① Status monitoring lights
These LED indicators display statuses of the valve power supply and the CompoNet system.

② Switches
These rotary switches are used for setting the Slave Unit addresses.

③ Cover
This clear cover protects the monitoring lights and the switches.

④ Terminal block for valve power supply
These are the terminals for connecting the valve power cables.

⑤ Network connector socket
This is the connector socket for connecting the network cable, which allows the Slave Unit to be connected to CompoNet. (Network connector plug is not included.)

⑥ Mounting screw (M2.5 tapping screw)
This screw is used to secure the Slave Unit to the connecting block.

1.5 Switches and LED indicators

1) Address setting switches.
   These switches are used to set the node address of the Slave Unit.
   (Maximum of 64 slave units, including the Slave Unit,
   can be connected to the master unit in a single network.)

Switches	NA ×10, ×1 (Node address setting switches)
Setting Method	Node address of the Slave Unit is a number between 0 and 63. Tens place is set using the top rotary switch, and ones place is set using the bottom rotary switch.

Turning the network power ON will load the rotary switch settings.
(Duplicate node addresses cannot be assigned.)
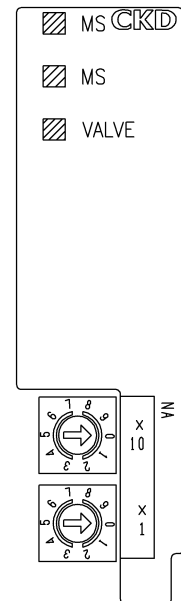
⚠ **CAUTION :**

- Setting the Slave Unit address to an improper value can cause a solenoid valve, a cylinder, or such to malfunction. Before using the Slave Unit, make sure the address is set correctly before use.

- Make sure the network power supply is turned OFF when setting the switches.
  (Turning the network power ON will load the rotary switch settings.)

- The cover on the Slave Unit can be easily opened by flipping it up with a finger.
  Keep the cover closed at all times except when setting the switches. Otherwise, foreign matter may enter into the internal circuit from the cover and cause unexpected failure, or the cover itself may get damaged. Be extremely careful not to allow any foreign matter to enter the Slave Unit when setting the switches.

- Setting switches are precisely built and can be damaged if mishandled. Make sure not to touch the internal circuit board when setting the switches.

- Discharge static electricity that has built up on your body before touching the Slave Unit. Otherwise, static electricity can cause damages to the Slave Unit.

Discontinue

2) MS (Module Status) and NS (Network Status) LED indicators
The table below explains some statuses given by the LED indicators.
A "flashing" indicator means that it flashes every half-second (lights on for 0.5 sec and off for 0.5 sec).

MS/NS LED		Description		Remarks
MS Green NS Green		Running Slave Unit communication or message communication	Running Slave Unit communication	Running Slave Unit communication, message communication, or both. Operating normally.
MS Green NS Off		Synchronizing baud rates	Waiting for connection with master unit	If only a certain Slave Unit is in this condition, check that the rates are same and restart the Slave Unit.
MS Green NS Flashing Green		Waiting for connection	Waiting for master unit to establish connection	
MS Red NS Off		Watch-dog timer error	Watch-dog timer error with the Slave Unit	Replace the Slave Unit.
MS Flashing Red NS Off		EEP-ROM sum error	EEP-ROM data error	Replace the Slave Unit.
MS Green NS Red		Configuration error	·Duplicate node address ·Repeater unit configuration error	Make sure there are no duplicate node addresses and check the repeater unit configuration. Then, restart the Slave Unit.
MS Green NS Flashing Red		Communication timeout		Check the following and restart the Slave Unit: ·Same master unit and Slave Unit baud rates ·Appropriate cable length (trunk/branch) ·No breaking or loosening of cables ·Termination resistors attached at only both ends of the trunk ·No excessive noise
MS Flashing Red NS Red		Address mistake setting	Node address is outside the setting range	Check that the node address is within the setting range and restart the Slave Unit.

3) VALVE LED indicator
The valve LED indicator will not light up if there is no power to the Slave Unit. If this LED is not lit but others are, then check the supply voltage to the valve power.

VALVE LED		Status
Green		Valve power is ON
Off		Valve power is OFF

1.6 Terminals

Functions and connections of the terminals are described below.

	Terminal	Purpose	Connection	Cable Color
①	BS+	Network power supply (＋)	Use low-noise 14 to 26.4V DC power supply.	Red
②	BDH	Communication terminal (H)	Connect BDH network cable of the master unit or other slave unit	White
③	BDL	Communication terminal (L)	Connect BDL network cable of the master unit or other slave unit	Blue
④	BS－	Network power supply (－)	Use low-noise 14 to 26.4VDC power supply	Black
⑤	Terminal block for valve power supply	Valve power supply	DC24V ＋10%,－5%	24V
				0V
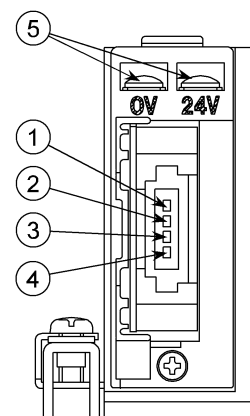
⚠ **CAUTION :**

● Make sure the valve power cable and network cables are connected according to the specifications to avoid any incorrect wiring. Incorrect wiring can cause the Slave Unit to malfunction or to be damaged.

● Before turning ON the power, make sure that all network cables and connector plug s are connected firmly.

● Do not touch electric-wiring connections (exposed live parts): this will cause an electric shock. During wiring, keep the power off. Also, do not touch these live parts with wet hands.

● Do not subject the valve power cables and network cables to tension and impact. Long cables can exert unexpected power due to its weight and impact, and this can consequently damage the connectors and devices.Take preventative measures such as securing the cables to the equipment.

2. CAUTION

- To comply with the EC Directive, use AC/DC power supply adapters (for example, switching power supplies) that comply with EMC standards for the power supplies used as communication power supply and unit power supply.

- Before turning the power supply ON or OFF take a good look around and make sure it is safe to do so as the equipment and the valve (cylinder) may move unexpectedly.

- Refer to User's manual for the master station concerning to transmission delay time. The transmission delay within the entire system depends on the scan time achieved by the PLC unit and on other devices included in the network.

- Solenoid valve responding time, of course, varies depending on model.
  It is advisable of referring to valve specification.

- As for OFF time, there is another delay factor of approx. 20ms due to flywheel diode being used for surge absorbing circuit to valve slave station.

- Connect the power supply cable and signal cable correctly within the specifications so that any incorrect wiring is not performed.

- Pay special attention so that any tensile force or impact is not applied to the power supply cable and signal cable.

- Before turning ON the power, make sure that the various connection cables and connectors are connected firmly.

- Disassembly, modification, and/or repair made by the customer may cause a trouble or malfunction. Never attempt to disassembly, modify, and/or repair the unit.

- Many precision devices are mounted inside the unit. Do not drop the unit or apply vibration or impact to the unit.

- If any connector is disconnected or connected with the electric power supplied, this may cause a trouble or malfunction. Do not disconnect or connect any connector with the electric power supplied.

- If the environment during transport is high humidity, there is a generation of mold and rust. Please put a moisture absorbent with sealed packing.

3. OPERATION

3.1 Settings using the CX-Integrator

Various settings, monitoring, etc. can be done with the Slave Unit using the CX-Integrator from OMRON Corporation.

[Preparation]

Make sure that CX-Integrator is installed in your computer. Connect your computer and the PLC with a cable, and start the CX-Integrator on your computer.

1) Fault Action Setting (Setting the communication error output)
   Default setting is "Clear Data": clear data when communication error occurs.
   Follow the procedure described below for Fault Action Setting.
   (In the following example, I/O No.0 is set to "Hold Last State": maintain last state before occurrence of a communication error.)

   (1) Install the EDS file of the Slave Unit by opening the "Tools" menu, selecting "EDS file", and clicking "Install". (Please inquire the CKD sales office about obtaining the EDS file.)

   【Screen shot of EDS file installation】
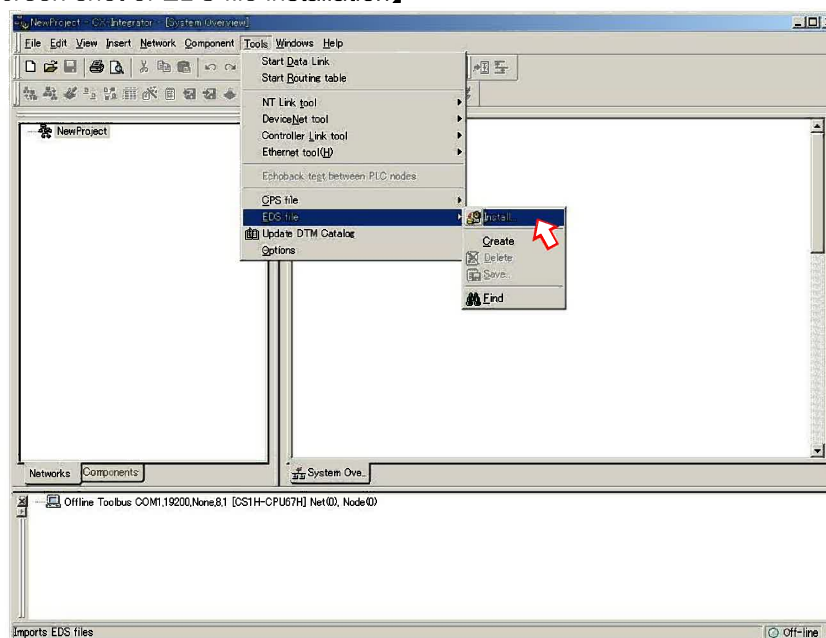
   (2) Confirm that the Slave Unit is displayed in the CKD Corporation folder by opening the "View" menu, selecting "Window", and clicking "Component list", and then by selecting "DTM (CompoNet)" in the part list space.

   (3) Switch to online status by clicking "Work Online" from the "Network" menu.

(4) From the "Network" menu, click and execute "Transfer [Network to PC]".

【Screen shot after executing "Transfer [Network to PC]"】
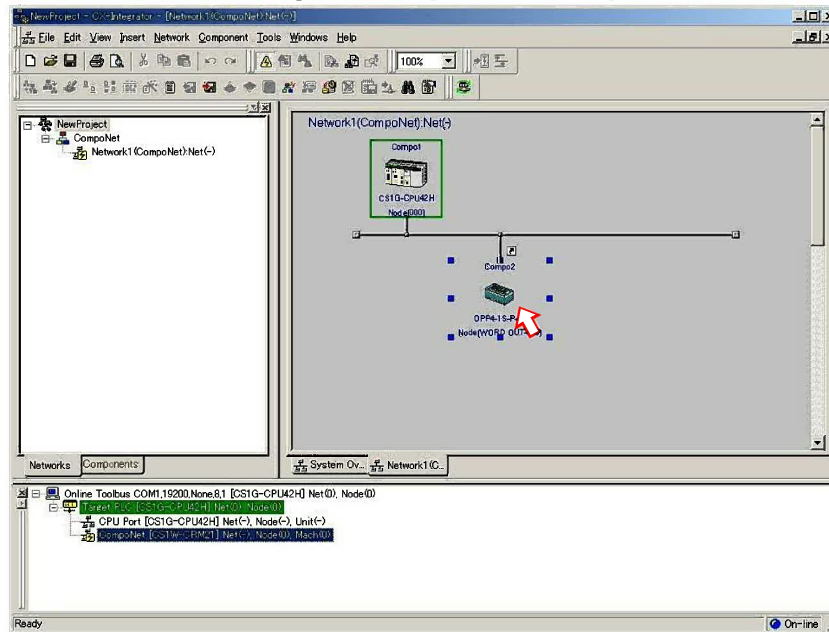
(5) Double-click on the icon of the Slave Unit in the network as shown above and call up the parameter editing screen.

(6) Choose "Fault Action Setting" from the "Displayed Parameter Group" drop-down list.

【Screen shot after selecting [Fault Action Setting]】
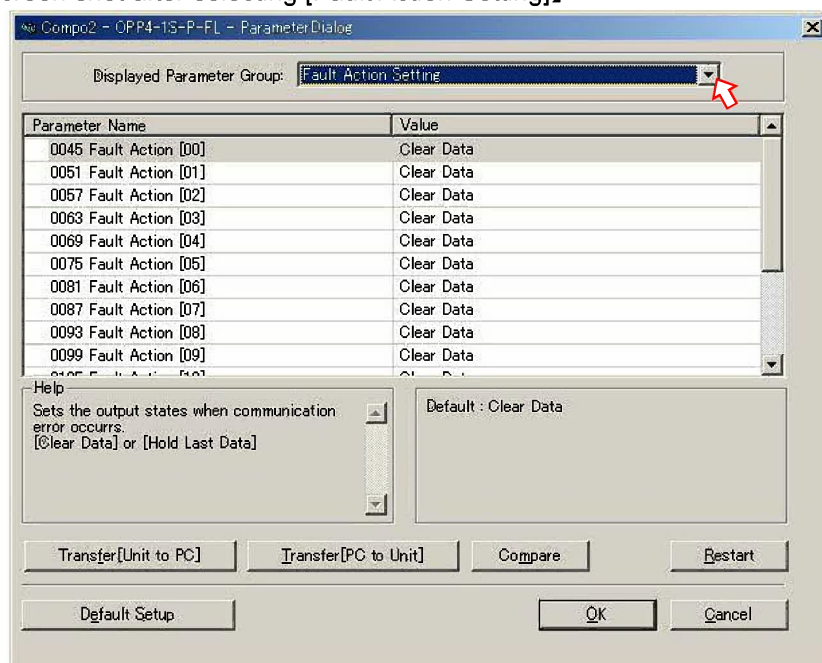
(7) Double click on the Value for the Parameter Name to set, and select either "Clear Data" or "Hold Last State" from the drop.

【"Hold Screen shot of Fault Action Setting drop-down list】
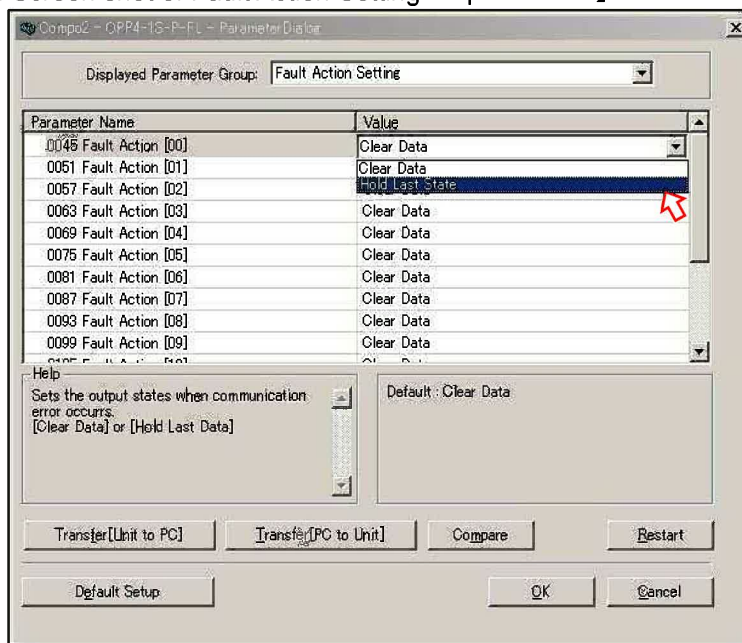
(8) Click "Transfer [PC to Unit]" to transfer the setting to the Slave Unit.

【Screen shot of "Transfer [PC to Unit]"】
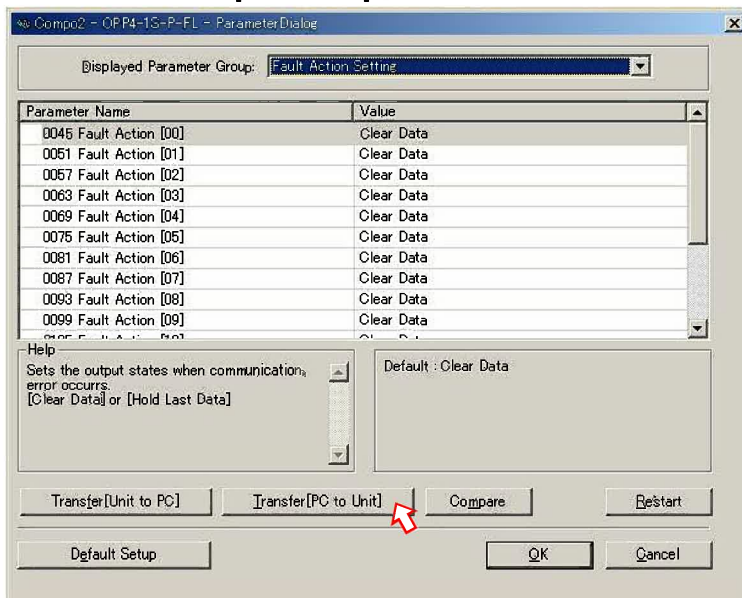
2) Other settings

For other settings, choose the function and change its value by following the same procedure as (5) through (8) above. For details, refer to the information concerning Parameters in the EDS file.
In using the CX-Integrator, although the devices can be set easily, it can also cause the valve (cylinder) to make sudden movements. Make sure you have a good understanding of the entire equipment and CompoNet system before using it.

[MSV-452472-A]

Discontinue

3.2 Correspondence between slave station input/output No. and PLC address No.

1) PLC address correspondence table

This correspondence table describes an example based on Omron's PLC "CS,CJ"-series used as typical model.
Additionally, the table shows the conditions when the serial transmission slave station is set at "node address 0" and the
MACH No. of the master unit is set to 0

Occupied channel in the PLC internal memory	2000H															
	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

2) Example of Valve No. assignments corresponding to T7S※1 Solenoid Output No.

The numbers in the valve solenoid 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' mean, respectively, the solenoid
on the a-side and the solenoid on the b-side of the "double-solenoid type" valve.

※The figure above is an example of
mounting 8 stations of double-solenoid
type valves on the manifold.
There is no solenoid on the b-side for
single-solenoid types. Depending on
the valve model selected by the
customer, the appearance and the
maximum number of stations will

< Standard wiring>

● When all valves mounted on the manifold are single-solenoid types :

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

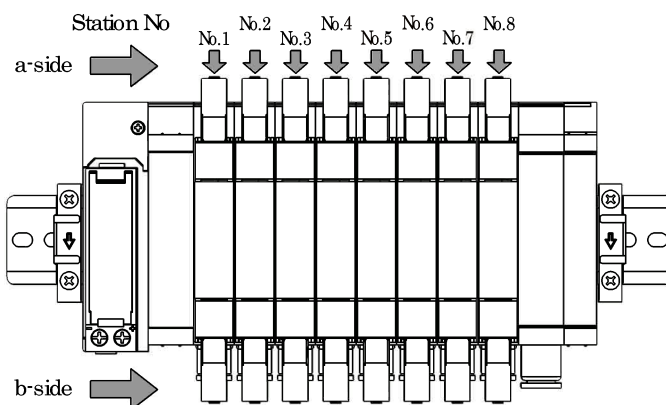● When all valves mounted on the manifold are double-solenoid types:

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

● When both single- and double-solenoid type valves are mounted on the manifold(example) :

Solenoid Output No	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve solenoid 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-solenoid types :

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

● When all valves mounted on the manifold are double-solenoid types :

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

● When both single- and double-solenoid type valves are mounted on the manifold(example) :

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

3.3 Programming

The Slave Unit occupies one node and is treated as a word slave unit with 16 output points.
When creating an operating program, refer to the section on creating programs described in the user's manual provided by the PLC manufacturer.

3.4 Device profile

If the Slave Unit is to be connected to a master unit other than that manufactured by OMRON Corporation, make sure you understand the following device profile before using it.

Device Profile

	Conforms to CompoNet specification	Volume One (CIP) Volume Six (CompoNet)	Edition 3.5 Edition 1.4
General Data	Vendor name	CKD Corporation	Vendor ID = 201
	Device profile name	Word slave: Generic	Profile No. = 0
	Product revision	1.1	
Physical Conformance Data	Network power consumption current	65mA max. at 24.0V DC	
	Connector type	Open plug type	
	Supported LEDs	Module, Network	
	MAC ID setting	Rotary dip switch	
	Default MAC ID	0	
	Baud rate setting	Automatic tracking	
	Supported baud rates	4M,3M,1.5M,93.75K【bit/s】	

Discontinue

Required Object Implementation

● Identity Object (0x01)

Object Class	Attributes	None supported
	Services	None supported

Object Instance	Attributes	ID Description		Get	Set	Value	
						OPP4-1S	OPP4-1S-P
		0x01	Vendor	○	×	201	
		0x02	Device type	○	×	0	
		0x03	Product code	○	×	640	643
		0x04	Revision	○	×	1.1	
		0x05	Status(bits supported)	○	×	bit 0 Only	
		0x06	Serial number	○	×	Per unit	
		0x07	Product name	○	×	OPP4-1S	OPP4-1S-P
		0x08	State	×	×		
	Services	Code and Description		Parameter Options			
		0x05	Reset	None			
		0x0E	Get_Attribute_Single	None			

● Message Router Object (0x02)

Object Class	Attributes	None supported
	Services	None supported

Object Instance	Attributes	None supported
	Services	None supported

Vendor Specific Additions	None

● Assembly Object (0x04)

Object Class	Attributes	None supported
	Services	None supported

Object Instance	Attributes	ID Description		Get	Set	Value
		0x01	Number of members in list	×	×	
		0x02	Member list	×	×	
		0x03	Data	○	○	
	Services	CompoNet Services		Parameter Options		
		0x0E	Get_Attribute_Single	None		
		0x10	Set_Attribute_Single	None		

Instance No.	Type	Bit layout							
		Bit7							Bit0
Assembly Instance 35 (Output 16 points)	Output	7	6	5	4	3	2	1	0
		15	14	13	12	11	10	9	8

● Connection Object (0x05)

Object Class	Attributes	ID Description		Get	Set	Value
		0x01 Revision		○	×	0x0001
	Services	Code and Description		Parameter Options		
		0x0E Get_Attribute_Single		None		

Object Instance 1	Section		Information	Number of Maximum Instance		
	Instance type		Poll	1		
	Production trigger		Cyclic			
	Transport type		Server			
	Transport class		0			
	Attributes	ID Description		Get	Set	Value
		0x01 State		○	×	
		0x02 Instance type		○	×	0x01
		0x03 Transport class trigger		○	×	0x80
		0x04 Produced connection ID		○	×	
		0x05 Consumed connection ID		○	×	
		0x06 Initial comm. Characteristics		○	×	0x21
		0x07 Produced connection size		○	×	0x0000
		0x08 Consumed connection size		○	×	0x0002
		0x09 Expected packet rate		○	○	
		0x0C Watchdog time-out action		○	○	One of 00,01
		0x0D Produced connection path length		○	×	00
		0x0E Produced connection path		○	×	
		0x0F Consumed connection path length		○	×	0x0006
		0x10 Consumed connection path		○	×	20_04_24_23_30_03
	Services	Code and Description		Parameter Options		
		0x05 Reset		None		
		0x0E Get_Attribute_Single		None		
		0x10 Set_Attribute_Single		None		

Discontinue

● CompoNet Link Object (0xF7)

Object Class	Attributes	ID Description		Get	Set	Value
		0x01 Revision		○	×	0x0001
	Services	Code and Description		Parameter Options		
		0x0E Get_Attribute_Single		None		

Object Instance	Attributes	ID Description		Get	Set	Value
		0x01 MAC ID		○	×	
		0x02 Data Rate		○	×	
		0x05 Allocation choice		○	×	
		0x10 Explicit message timer		○	○	
	Services	Code and Description		Parameter Options		
		0x0E Get_Attribute_Single		None		
		0x10 Set_Attribute_Single		None		
		0x4B Allocate		Allocation choice、EPR Explicit message timer		
		0x4C Release		Release choice		

● Discrete Output Point Object (0x09)

Object Class	Attributes	ID Description		Get	Set	Value
		0x01　Revision		O	×	0x0001
		0x02　Max Instance		O	×	0x0F
	Services	Code and Description		Parameter Options		
		0x0E　Get_Attribute_Single		None		

Object Instances 1 to 16	Attributes	ID Description		Get	Set	Value
		0x03　Value		O	O	Terminal output status [*1] 　0 : OFF 　1 : ON
		0x05　Fault Action		O	O	Output status when a communication error occurs [*1] 　0 : Clear data (All output off) 　1 : Hold last state
		0x07　Idle Action		O	O	Output status when a control error occurs [*1] 　0 : Clear data (All output off) 　1 : Hold last state
		0x64　Terminal name		O	O	Terminal name, max 32 characters [*1]
		0x65　Maintenance Counter Mode Choice		O	O	Maintenance counter mode choice setting [*1] 　0 : Total ON time mode 　1 : Contact operation counter mode
		0x66　Maintenance Counter		O	O	Current value of maintenance counter. 　(0x00000000 to 0xFFFFFFFF)
		0x67　Maintenance Counter Exceed		O	×	Flag for indicating whether maintenance counter exceeds threshold or not 　0 : Within threshold range 　1 : Outside of threshold range
		0x68　Threshold Maintenance Counter		O	O	Threshold of maintenance counter [*1] 　(0x00000000 to 0xFFFFFFFF)
	Services	Code and Description		Parameter Options		
		0x05　Reset		Attribute 0x66 only		
		0x0E　Get_Attribute_Single		None		
		0x10　Set_Attribute_Single		None		

Note *1: The set value is instantly reflected.

Discontinue

● Unit Manager Object (0x95)

Object Class	Attributes	ID Description		Get	Set	Value
		0x01 Revision		○	×	0x0001
	Services	Code and Description		Parameter Options		
		0x0E Get_Attribute_Single		None		

Object Instance 1	Attributes	ID Description		Get	Set	Value
		0x64 Unit Name		○	○	Unit Name, max 32 characters [*1]
		0x65 Generic Status		○	×	Generic Status [*2]
		0x66 Last Maintenance Date		○	○	Last Maintenance Date [*1]
		0x6B Network Power Voltage		○	×	Network power supply voltage in 100mV (BIN data)
		0x6C Max Network Power Voltage		○	×	Maximum network power supply voltage
		0x6D Min Network Power Voltage		○	×	Minimum network power supply voltage
		0x6E Threshold Network Power Voltage		○	○	Threshold of network power voltage [*1] (If voltage falls under threshold, flag in generic status turns ON.)
		0x71 Run Hours		○	×	Time Unit has been energized in hours (0x00000000 to 0xFFFFFFFF)
		0x72 Run Hours Exceed		○	×	Flag for indicating Unit Run Hours exceeds threshold
		0x73 Threshold Run Hours		○	○	Threshold of Run Hours [*1]
	Services	Code and Description		Parameter Options		
		0x05 Reset		Attributes 0x6C and 0x6D only		
		0x0E Get_Attribute_Single		None		
		0x10 Set_Attribute_Single		None		

Note *1: The set value is instantly reflected.
Note *2: Generic Status

Bit	Name	Explanation
0		
1		
2	Network Power Warning	Flag for monitoring network power. (ON: Network power voltage falls under threshold.)
3	UNIT Total time Warning	Flag for monitoring total time Unit is energized. (ON: Total time Unit is energized exceeds threshold.)
4		
5		
6	Response Time Warning	Flag for monitoring operation times. (ON: There is an out-of-range operation time.)
7	Maintenance Counter Warning	Flag for monitoring maintenance counters. (ON: There is an out-of-range maintenance counter.)

● Communication Error Log Object (0x96)

Object Class	Attributes	ID Description		Get	Set	Value
		0x01 Revision		○	×	0x0003
		0x02 Max Instance		○	×	0x0004
	Services	Code and Description			Parameter Options	
		0x05 Reset			(Reset all history of communication errors)	
		0x0E Get_Attribute_Single			None	

Object Instances 1 to 4	Attributes	ID Description		Get	Set	Value

		0x64 Error Code		○	×	Error code
						0 : No abnormality
						1 : Connection Timeout
						3 : MAC ID duplication,
						    Repeater unit structure
						    abnormality

		0x67 Network Power Voltage		○	×	Network Power Voltage at the occurrence of an error
		0x68 Run Hours		○	×	Time Unit has been energized at the occurrence of an error
		0x69 Manchester Error Rate		○	×	Error code
	Services	Code and Description			Parameter Options	
		0x0E Get_Attribute_Single			None	

Discontinue

● Equipment Manager Object (0x97)

Object Class	Attributes	ID Description		Get	Set	Value
		0x01 Revision		○	×	0x0001
		0x02 Max Instance		○	×	Max Instance No. *2
		0x64 All Response time exceed		○	×	"Exceeded or not" information of all thresholds (Bits 00 to 07) 0 : Thresholds not exceeded. 1 : Threshold(s) exceeded.
		0x65 All Response time exceed hold		○	×	Exceeded or not" information of all thresholds (Bits 00 to 07) 0 : Thresholds not exceeded in the past. 1 : Threshold(s) exceeded in the past.
	Services	Code and Description			Parameter Options	
		0x05 Reset			Reset (0x68) of all instances	
		0x0E Get_Attribute_Single			None	

Object Instances 1 to 4	Attributes	ID Description	Get	Set	Value
		0x64 Equipment Name	○	○	Equipment Name (Max 16 characters *1)
		0x65 Response time	○	×	Response time of equipment in ms
		0x66 Response time exceed	○	×	Flag for indicating whether or not Response time exceeds threshold. 0 : Threshold is notexceeded. 1 : Threshold is exceeded.
		0x67 Threshold Response time			Threshold of equipment response time *1, in ms
		0x68 Response time peak	○	×	Peak of equipment response time
	Services	Code and Description		Parameter Options	
		0x05 Reset		Attribute 0x68 only	
		0x0E Get_Attribute_Single		None	
		0x10 Set_Attribute_Single		None	

Note *1: The set value is instantly reflected.

Note *2: Path of start/end points for measuring time, maximum instance

	Instance							
	1	2	3	4	5	6	7	8
Output points to be measured	OUT0 and 8 are the targets.	OUT1 and 9 are the targets.	OUT2 and 10 are the targets	OUT3 and 11 are the targets	OUT4 and 12 are the targets.	OUT5 and 13 are the targets.	OUT6 and 14 are the targets.	OUT7 and 15 are the targets

4. INSTALLATION

4.1 Wiring

In order for the N4G※-T7S※1 to function, a network cable and a valve power cable must be connected to the Slave Unit. If these lines are not properly connected, the N4G※-T7S1※1 may not only function improperly but may also cause serious problems to other devices being used at the same time. Read all manuals, including this manual and the user's manuals for the PLC and other units, before use and make sure all connections are secure and correct.

⚠️ **CAUTION :**

● Of power lines and communication lines wiring, please correctly carried out in a specification so that there is no faulty wiring range. When the wrong wiring, there is a possibility that the slave station to malfunction or damage.

● Please make sure that the various connection cables and connectors are firmly seated before energizing.

● Do not touch electric-wiring connections (exposed live parts): this will cause an electric shock. During wiring, keep the power off. Also, do not touch these live parts with wet hands.

● Do not subject the valve power cables and network cables to tension and impact. Long cables can exert unexpected power due to its weight and impact, and this can consequently damage the connectors and devices.Take preventative measures such as securing the cables to the equipment.

---

1) Network Cable

For CompoNet network, it is necessary to use a network cable that meets the specifications specified in the CompoNet Specification. Following types of cables are recommended.

Type	Specification
Round cable I	Nominal cross-section: 0.75mm^2 per conductor (2-conductor, JIS C3306) For network cables, use dedicated cables that comply with CompoNet specifications.
Round cable II	Nominal cross-section: 0.75mm^2 per conductor (4-conductor, JIS C3306) For network cables, use dedicated cables that comply with CompoNet specifications.
Flat cable I (unsheathed)	Standard Flat Cable (4-conductor) Nominal cross-section: 0.75mm^2×2, 0.5mm^2×2 For network cables, use dedicated cables that comply with CompoNet specifications.
Flat cable II (sheathed)	Sheathed Flat Cable (4-conductor) Nominal cross-section: 0.75mm^2×2, 0.5mm^2×2 For network cables, use dedicated cables that comply with CompoNet specifications.

Discontinue

Discontinue

2) Wiring the network cable
Connect the network cable to the Slave Unit according to the following procedure.
(Please note that network connector plug is not included with the Slave Unit.)

   (1) Be aware of your surroundings and ensure safety before turning the network power supply OFF.
   (2) Connect the network cable to a recommended network connector plug making sure their polarities match.
   (3) Check the polarity of the recommended network connector plug and attach it to the Slave Unit.

< Recommended network connector plugs: >
DCN4-BR4	Flat connector plug (unsheathed)	OMRON Corporation
DCN4-TB4	Open type connector (terminal block type)	OMRON Corporation
HCN-TB4LMZG+	Open type connector (terminal block type)	Honda Tsushin Kogyo
HCN-A4SMUG+	Connector plug (VCTF, flat)	Honda Tsushin Kogyo

< Recommended multi-drop type network connector plugs: >
DCN4-MD4	Multi-drop connector	OMRON Corporation
HCN-MD4SAG+	Multi-drop connector	Honda Tsushin Kogyo

3) Wiring the valve power cable
Connect the valve power cable to the Slave Unit according to the following procedure.

<Valve Power Supply>
   (1) Be aware of your surroundings and ensure safety before turning the valve power supply OFF.
   (2) Attach an M3 solder less terminal that is not more than 6mm in width to the valve power cable.
   (3) Secure the valve power cable to the valve power supply terminal by matching the polarities, that is, 24V cable to 24V terminal (+ terminal) and 0V cable to 0V terminal (− terminal), and using the appropriate tightening torque of 0.5N·m.

⚠ **CAUTION :**

- For network cables, use dedicated cables that comply with CompoNet specifications.
- Route the network cable away from power cables and high-voltage cables.
- Route the network cable 200mm away from power cables and high-voltage cables.
- For connectors not provided with fixing screws, make sure the hooks are engaged securely.
- Make sure the network cable has sufficient bending radius, and do not bend it forcibly.
- It will be the cause of the fire when you connect the only wire directly to the terminal block was twisted, please use the crimp terminals sure
- .Always check the polarities and rated voltage carefully before making any connections.
- Calculate the current consumption before selecting an appropriate power cable.
- If power is to be supplied to more than one slave unit from one power supply, voltage drop due to cables should be considered when selecting and wiring the cables.
- If voltage drop cannot be avoided, take measures to secure the specified power supply voltage such as wiring the power cables in multiple systems or installing other power supplies.
- To prevent problems caused by noise, keep the following in mind when wiring.
    (1) If noise is likely to have an influence, provide a power supply for each manifold solenoid valve when possible and wire them independently.
    (2) Do not use power cables that are longer than necessary and wire them in the shortest distance possible.
    (3) Do not share power with noise generating devices such as an inverter motor.
    (4) Do not lay valve power cables, network cables, and other power cables in parallel.

[MSV-452472-A]

5. MAINTENANCE

5.1 Removing the Slave Unit

(1) After confirming safety, turn OFF the valve power and network power.

(2) Remove the Slave Unit mounting screw. Since this mounting screw is a fall-prevention type, stop loosening it as soon as it detaches from the Slave Unit connecting block.

(3) Hold the Slave Unit and slowly pull it out in the direction of the network connector plug.

(4) Disconnect the valve power cable and the network connector plug.

5.2 Mounting the Slave Unit

(1) Set the node address of the Slave Unit.

(2) After confirming safety, turn OFF the valve power and network power.
Do not connect the network connector plug while the network power is turned on; doing so may cause the equipment to move suddenly.

(3) Connect the valve power cable and network connector plug.

(4) Holding the Slave Unit, insert it into the Slave Unit connecting block slowly from the front along the guide.

(5) Make sure the Slave Unit and the connecting block are connected and tighten the Slave Unit mounting screw firmly. (Adequate tightening torque: 0.5 N·m)

(6) After confirming safety, turn ON the valve power and network power.


⚠ **CAUTION :**
- Before turning the network power on, check the Slave Unit address.
- Touching the electrical wiring connection part (bare live part) may cause an electric shock.

Connecting block

Guide

Mounting

Removing
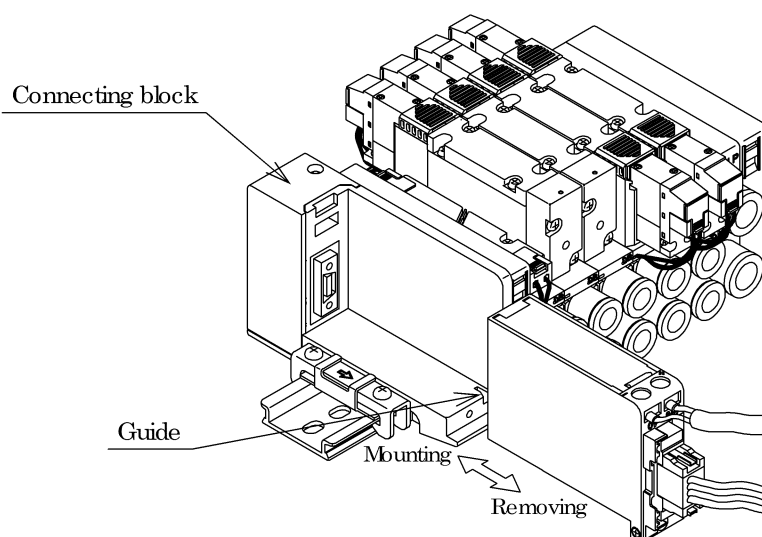
5.3 Troubleshooting

When there are problems with the Slave Unit, troubleshoot the Slave Unit, not individually, but as a part of the entire CompoNet system. The LED indicators of the Slave Unit display the status in conformity with the CompoNet specifications. If an error occurs, determine the error according to the LED indications of the Slave Unit and the display of the master unit and take appropriate corrective actions. In addition, VALVE LED is an LED indicator unique to the Slave Unit.

1) Abnormalities and corrective actions related to the Slave Unit are shown below.

MS/NS LED		Status		Corrective actions
MS	Green	Running Slave Unit communication or message communication	Running Slave Unit communication	
NS	Green			
MS	Green	Synchronizing baud rates	Waiting for connection with master unit	In case only specific station is in this state, check that the transmission line and the state of master is the same, and restart the slave station.
NS	Off			
MS	Green	Waiting for connection	Waiting for master unit to establish connection	
NS	Flashing Green			
MS	Red	Watch-dog timer error	Watch-dog timer error with the Slave Unit	Please replace the Slave Unit.
NS	Off			
MS	Flashing Red	EEP-ROM sum error	EEP-ROM data error	Please replace the Slave Unit.
NS	Off			
MS	Green	Configuration error	·Duplicate node address ·Repeater unit configuration error	Make sure there are no duplicate node addresses and check the repeater unit configuration. Then, restart the Slave Unit.
NS	Red			
MS	Green	Communication timeout		Check the following and restart the Slave Unit: ·Same master unit and Slave Unit baud rates ·Appropriate cable length (trunk/branch) ·No breaking or loosening of cables ·Termination resistors attached at only both ends of the trunk ·No excessive noise
NS	Flashing Red			
MS	Flashing Red	Address mistake setting	Node address is outside the setting range	Check that the node address is within the setting range and restart the Slave Unit.
NS	Red			

2) VALVE LED indicator

VALVE LED		Status	Corrective actions
	Green	Valve power is ON	
	Off	Valve power is OFF	Check the valve power, please turn on the 24V

3) Troubleshooting Errors Indicated by LEDs

■ Indicators are Red or Flashing Red

Problem	Cause and possible corrections
MS indicator is lit red.	・The Slave Unit is malfunctioning. Please replace the Slave Unit.
MS indicator is Flashing Red.	・The DIP switch or other setting is illegal. Check the switch settings, and then restart the Slave Unit. ・There is an error in the Slave Unit's EEP-ROM data. Please replace the slave unit.

The NS indicator lights red without lighting green	Check the following items, and then restart the Slave Unit with the error:
	  ・There is an out of range or duplicated node address, or there is a configuration
	    error with the repeater unit. Check all node addresses and the repeater unit
	    configuration and change the settings if necessary.
	  ・Refer to the next item "The NS indicator lights green momentarily and then changes
	    to red".
	  ・If the NS indicator of a particular Slave Unit is always lit red, replace it.

The NS indicator lights green momentarily and then changes to red.
OR
The NS indicator lights green momentarily and then changes to flashing red.
	Check the following items, and then restart the Slave Unit with the error:
	  ・Check that the terminating resistance is in the correct place. Please connect the
	    terminating resistance correctly.
	  ・Check that all Slave Units are set correctly.
	  ・Check that the network cable is wired correctly.
	  ・Check that the power cable and power supply are wired correctly and that the
	    settings are correct.
	  ・Check connector wiring for all nodes to make sure that the network cable and valve
	    power cables are not disconnected.
	  ・Check that the network power is supplied correctly.
	  ・If there are devices in the vicinity that generate noise, implement noise
	    countermeasures for the master unit and Slave Units and the network cable.
	  ・If the NS indicator of a particular Slave Unit is always lit red, replace it.

■ Cannot Participate in Network

Problem	Cause and possible corrections
NS indicator remains unlit and does not change.	・Check that all Slave Unit connectors are connected correctly. ・Check that the master unit is operating correctly. ・Check that the network cable is wired correctly. ・Check that the power cable and power supply are wired correctly. ・Check connector wiring to make sure that the network cable and valve power cables are not disconnected.

NS indicator is flashing green and status does not change.	Check the following items and take corrective measures based on the master unit
	  indicator display.
	  ・Check that the master unit is operating correctly. Refer to the manual for the master
	    unit.
	  ・Check that the Slave Unit is registered in the master unit registration table.
	  ・Re-register the registration table.
	  ・Check that the Slave Unit I/O area is not outside the area permitted by the master
	    unit. Change the node address if the I/O area is outside the permitted area.

4) Other troubleshooting

Problem	Cause	Measure
I/O comment or Unit comment cannot be set.	The name (comment) exceeds 32 characters.	Set a name within 32 characters.
The status for Slave Unit Maintenance Date and Connected Device Maintenance Date do not turn ON.	If the monitor value is set to 0, the status will always be OFF (function not executed).	Set the monitor value to a value other than 0.
The Maintenance Counter returned to 0.	The Maintenance Counter will return to 0 if the Slave Unit is reset. The Maintenance Counter will always return to 0 when the setting is switched between the Total ON Time Monitor Function and the Contact Operation Monitor Function.	
Some functions do not change even after parameters have been edited or set.	The functions that were changed are those that are enabled only after restarting the Slave Unit.	Restart the Slave Unit by turning it off and back on.
Cannot hold outputs when communication errors occur.	The Slave Unit is set to clear outputs when communication errors occur.	Change the setting to hold outputs when communication errors occur.
Cannot clear outputs when communication errors occur.	The Slave Unit is set to hold outputs when communication errors occur.	Change the setting to clear outputs when communication errors occur.

5.4 Maintenance of Slave Unit

This section describes everyday maintenance of Slave Unit, particularly the methods of cleaning, inspecting, and replacing the Slave Unit.

1) CLEANING

Regularly clean the physical components of the network as follows to ensure that the network is kept in the best condition possible.

(1) For daily cleaning, use a soft, dry cloth to wipe over the components.

(2) If dirt remains even after wiping with a soft, dry cloth, wipe with a cloth wrung out in a sufficiently diluted detergent (2%).

(3) Slave Unit will become stained if items such as rubber or vinyl products and tape are left on the Slave Unit for long periods. Remove such items during regular cleaning.

2) INSPECTING

Always perform periodic inspections to ensure that the network is kept in the best possible condition. Periodic inspections should be carried out at least once every 6 to 12 months; however, for Slave Unit used in environments subject to high temperature and humidity or excessive dust, periodic inspections should be carried out more frequently.

■ Points of Inspection

Periodically inspect the following items to ensure that they do not deviate from the criteria.
If the items deviate from the criteria, adjust the environment so the criteria are met or adjust the Slave Unit itself.

Inspection item	Inspection details	Criteria	Inspection method
Environment	Are the ambient and in-panel temperatures appropriate?	Refer to the specifications for each Slave Unit.	Thermometer
	Is the ambient and in panel humidity appropriate?	Refer to the specifications for each Slave Unit.	Hygrometer
	Is there any dust accumulation?	No dust	Visual inspection
Installation	Is the Slave Unit securely mounted?	No looseness	Phillips screwdriver
	Are the network connector plugs inserted properly?	No looseness	Phillips screwdriver
	Are there any loose external wiring screw?	No looseness	Phillips screwdriver
	Are there any damages to the connection cables?	No visible damage	Visual inspection

3) REPLACING
The network consists of a master unit and one or several slave units. Malfunctioning of any slave unit can affect the entire network, so such slave unit must be replaced immediately. To restore network functions as quickly as possible, it is recommended that spare slave units be kept on hand at all times to replace malfunctioning slave unit.

■ Precaution
When replacing slave unit after periodic inspection has revealed a problem, check that the new slave unit does not have errors after replacement.

■ Setting the new Slave Unit after replacement
After replacing a Slave Unit, make necessary changes to the switches and other settings so that they are the same as before the Slave Unit was replaced.

[MSV-452472-A]