CKD

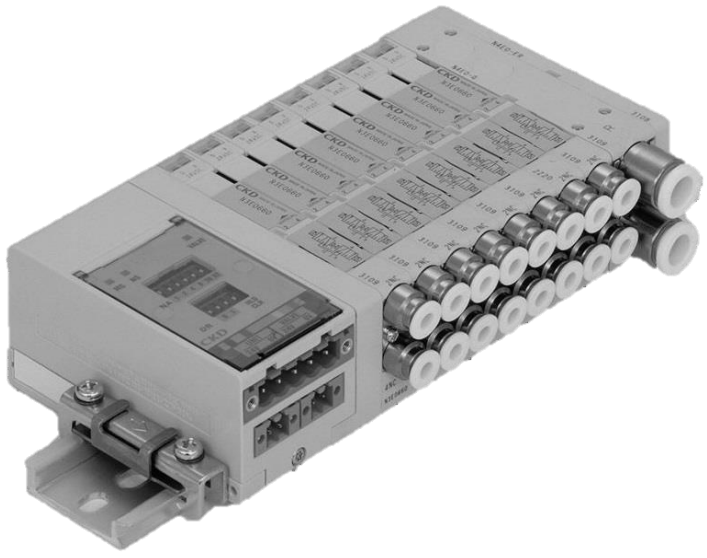
# Serial Transmission Device Unit

## MN4E0 Series T7D
## (N4E0-T7D)

### DeviceNet Compatible

# INSTRUCTION MANUAL

SM-A41038-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 device 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 device unit (N4E0-T7D) for MN4E0.
For controller unit and other device 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.

#### ■ N4E0-T7D

N4E0-T7D is a device unit for MN4E0 that can be connected to DeviceNet, an open field network defined by ODVA.
Features include the following:

- The device unit is connected to PLC with only a network cable (DeviceNet dedicated), allowing significant reduction in wiring man-hours.
- When a communication error occurs, the device unit output status can be set by a switch. (Hold all point output/ Clear all points output).
- The number of output points is 16, and up to 63 units can be connected to one controller unit. (When using Configurator).

#### ■ 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/

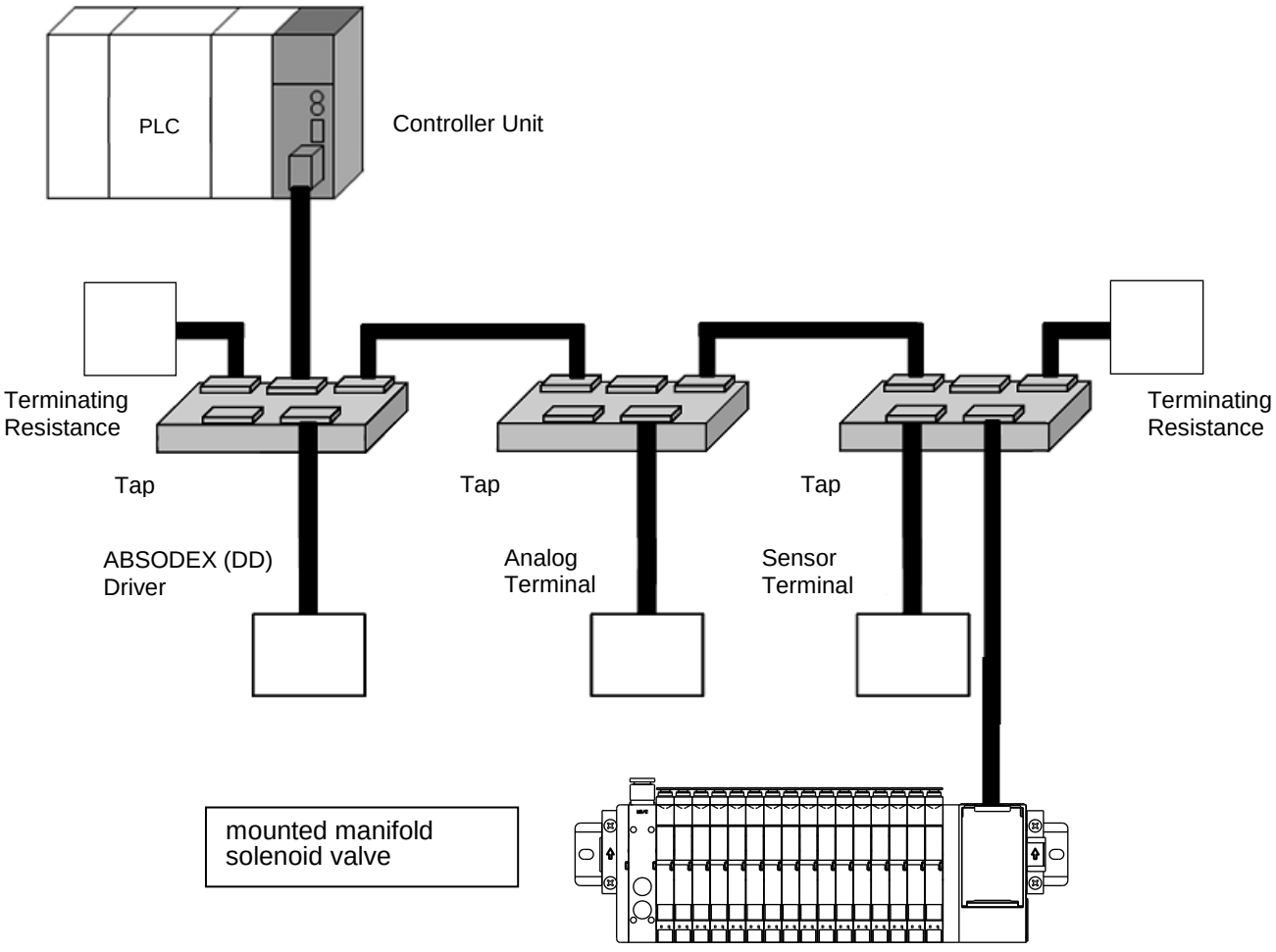
## 1.1.2 System structure

This system mainly consists of a PLC, controller unit, N4E0-T7D mounted manifold solenoid valve, and peripheral equipment.

### ■ Examples of PLC and cotroller unit combination

| PLC manufacturer | Compatible PLC | Controller unit model |
|---|---|---|
| Omron Corporation | NJ Series | CJ1W-DRM21 |
| | CJ Series | |
| | CS1 Series | CS1W-DRM21 |
| Other DeviceNet compatible controller units | | |

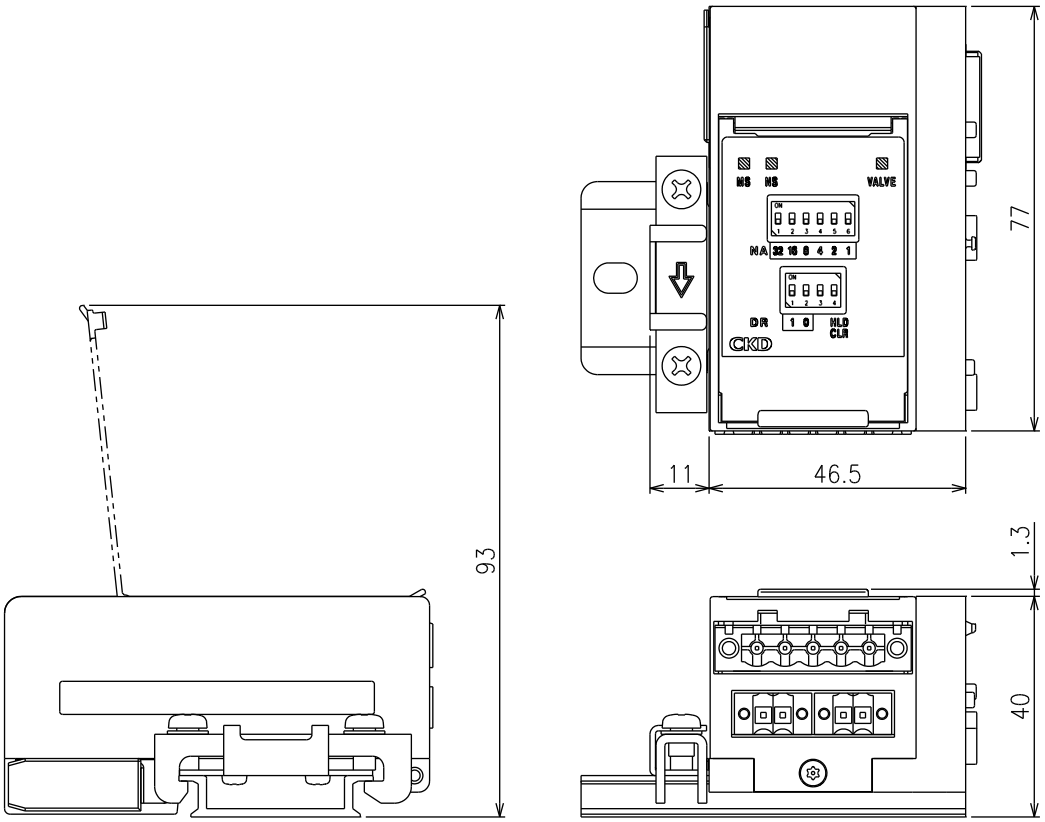
### ■ Example of basic structure of the system




Controller unit : A unit which controls device 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 device unit

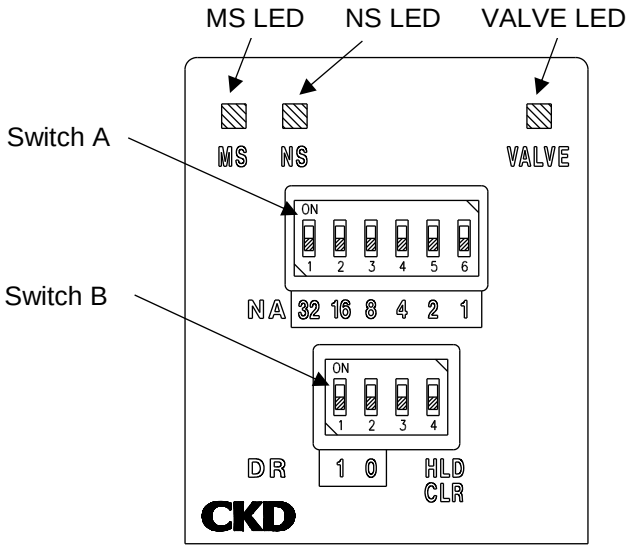



| No. | Part name | Description |
|---|---|---|
| ① | LED indicators | Indicate the status of the Device Unit and network. |
| ② | Switches | The setting switches are used to set three kinds of functions, node address, baud rate, and output mode if the communication error occurs. |
| ③ | Cover | Protects the LEDs and setting switches. |
| ④ | Unit power supply connector | Here the unit power supply is connected. |
| ⑤ | Valve power supply connector | Here the valve power supply is connected. |
| ⑥ | Communication connector | Here the communication connector of network is connected. |

## 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 node address, baud rate, and output mode in the event of a communication error.
This Device 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.

| Switch | | Content of Setting |
|---|---|---|
| A or B | Type | |
| A | NA No.1 to 6<br>(Node address setting) | Sets the Device Unit node address between 0 to 63. |
| B | DR No.1, 2<br>(Baud rate setting) | Sets the baud rate for the Controller unit. |
| | HLD/CLR No.4<br>(Output mode setting) | Selects whether to hold (HLD) or clear (CLR) the output status when a communication error occurs. |

Note) Switch B No.3 be the unused.

## ■ LED indicators

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

● Module status (MS) / Network status (NS) LED

| MS LED | NS LED | Description | | Note |
|---|---|---|---|---|
| Green ☼ | Green ☼ | I/O communication in progress | I/O data is being communicated between the controller and device unit. | Operating normally. |
| Green ☼ | ● | Node address duplication checking | Waiting for node address duplication checking to be completed at the controller. | In case only the certain device unit is in this condition, restart the unit after checking if the baud rate is the same as the controller. |
| Green ☼ | Green ◐ | Connection waiting | Waiting for connection establishment from the controller. | |
| Red ☼ | ● | Watchdog timer error | Watchdog timer error occurred in the Device Unit. | Replace the Device Unit. |
| Red ◐ | ● | Improper switch setting | Switch setting is not correct. | Restart the Device Unit after checking the switch setting. |
| Green ☼ | Red ☼ | Duplicate node address | Node address is duplicated. | After re-setting the node address to avoid duplicate, restart the Device Unit. |
| Green ☼ | Red ☼ | Bus-off detection | Bus-off | Check the following and restart the Device Unit:<br>• Matching controller and device baud rates<br>• Proper cable lengths (trunk and branch lines)<br>• Broken or loose cables<br>• Installation of terminators at both ends of the trunk line<br>• Excessive noise |
| Green ☼ | Red ◐ | Communication time out | | |
| ● | ● | No main power supply | | After checking both node address and baud rate are set properly, supply the main power supply. |

☼: ON ◐: Flashing ●: OFF

● VALVE LED display

※VALVE LED can operate as a monitor only while unit power supply is ON.

| VALVE LED | Description |
|---|---|
| Green ☼ | Valve power supply is ON |
| ● | Valve power supply is OFF |

☼: ON ●: OFF

# 1.3 Specifications

## 1.3.1 Communication specifications

| Item | Specifications | | | |
|---|---|---|---|---|
| Transfer rate (Baud rate) | Chooseable (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 Device unit specifications

The product must be used within the following specifications.

| Item | | Specifications | |
|---|---|---|---|
| | | T7D1 | T7D2 |
| Unit power supply voltage | | 21.6 VDC to 26.4 VDC (24 VDC ±10%) | |
| Unit power supply current consumption | | 60 mA or less (with all points ON) | 85 mA or less (with all points ON) |
| Communication power supply voltage | | 11.0 VDC to 25.0 VDC | |
| Communication power supply current consumption | | 50 mA or less | |
| Valve power voltage | | 22.8 VDC to 26.4 VDC (24 VDC +10%, −5%) | |
| Valve power current consumption | | 15 mA or less (with all points OFF) | |
| Output type | | NPN output (+COM) | |
| Number of output point | | 16 | 32 |
| Node address setting | | Node address setting by switch [0-63] | |
| Output setting when communication error occurs | | Hold all points output (Hold)/ Clear all points output (Clear) | |
| Insulation resistance | | Between external terminals and the case: 30 MΩ or more with 500 VDC | |
| Withstand voltage | | Between external terminals and the case: 500 VAC for one minute | |
| Shock resistance | | 294.0 $m/s^2$ for 3 times in 3 directions | |
| Storage ambient temperature | | −20°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 | |
| 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 | | 1 A for 24 V unit supply; 2 A for 24 V valve supply; 1 A for 24 V communication power supply (non-replaceable) | |
| Operation indicator | | LED (unit power supply / valve power supply / communication status) | |
| Number of node | | 1 node | |
| 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. | |

# 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 device unit to malfunction or break.

**Make sure that cables and connectors are securely connected before turning on the power.**

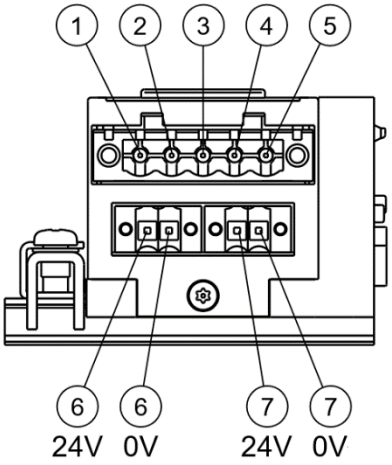
***1*** Connect the network cable and power cable.
Check all this Instruction Manual, the instruction manuals for PLC and each unit, and connect the cable properly.
Incorrect connection may cause not only a system failure but also serious fault to the other devices.

***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 device unit.

# 2.2 Wiring

The function explanation and the connection destinations of the terminal are shown.

| No | Symbol | Function | Objects to be connected | Indicated Cable Color |
|---|---|---|---|---|
| ① | V- | Network power supply (-) | Use low-noise 11.0 VDC to 25.0 VDC power supply | Black |
| ② | CAN_L | Communications data lines (low) | Connect CAN-L network cable of the controller unit or other device. | Blue |
| ③ | Shield | Shield terminal | Cable shielding | — |
| ④ | CAN_H | Communications data lines (high) | Connect CAN-H network cable of the controller unit or other device. | White |
| ⑤ | V+ | Network power supply (+) | Use low-noise 11.0 VDC to 25.0 VDC power supply | Red |
| ⑥ | Power supply connector | Connect to unit power source | 24 VDC ±10% | 0V |
| | | | | 24V |
| ⑦ | | Connect to valve power source | 24 VDC +10%, −5% | 0V |
| | | | | 24V |




## 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 controller unit manufacturer or ODVA.

Recommended network cable: DeviceNet dedicated cable

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

Recommended connector

| Manufacturer | Connector | Remark |
|---|---|---|
| Phoenix contact | TMSTBP2,5/5-STF-5.08 AUM | Supplied connector with connector fixing screw |
| Phoenix contact | TMSTBP2,5/5-ST-5.08 AUM | Similar connector without connector fixing screw |

## ■ Connecting the network cables

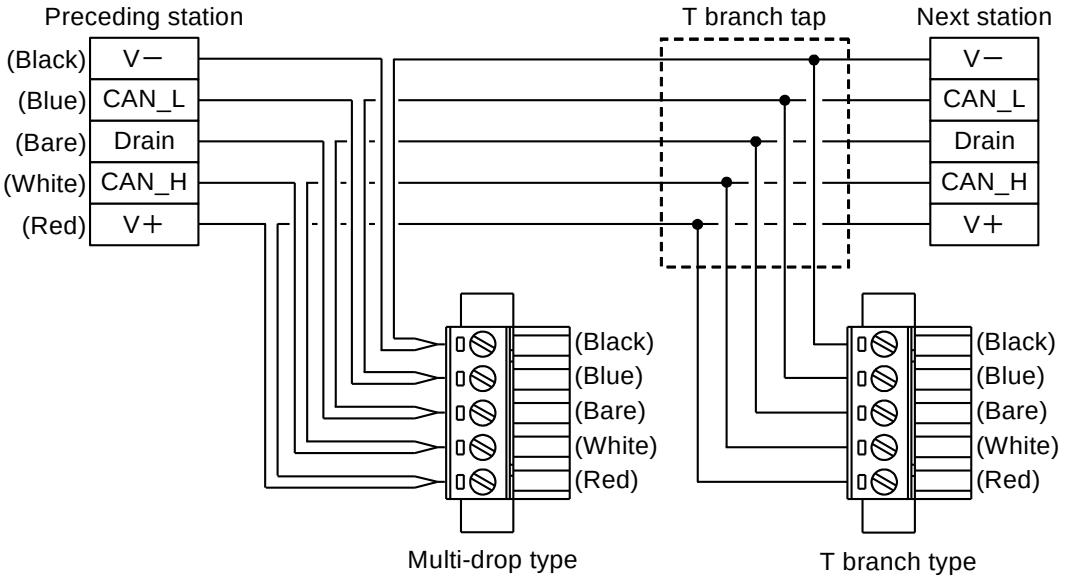
When connecting the DeviceNet cable to this product, follow the steps below

***1*** After confirming safety, turn off the unit power, the valve power and the network power.

***2*** Insert each of the DeviceNet cable wires, CAN H (white), CAN L (blue), V+(red), V-(black), and Drain into relevant hole(CAN H ,CAN L ,V+ , V- , and Drain) while carefully referring to the orientation of the attached connection connector (TMSTBP2,5/5-STF-5.08 AUM). (Refer to the figure below)

***3*** Firmly tighten each cable, using the cable fixing screw of connecting connector. (Adequate tightening torque : 0.5N·m )

***4*** Make sure the color of the connector cable and supplied connector are the same color, the connector plugged into the product, please tighten the screws firmly. (Adequate tightening torque : 0.3N·m )



## 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 device 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.**

Recommended connector

| Manufacturer | Connector | Remark |
|---|---|---|
| WEIDMULLER | BL3,5/2F(Part No.: 160664) | Supplied connector |

### ■ Connecting the power cables

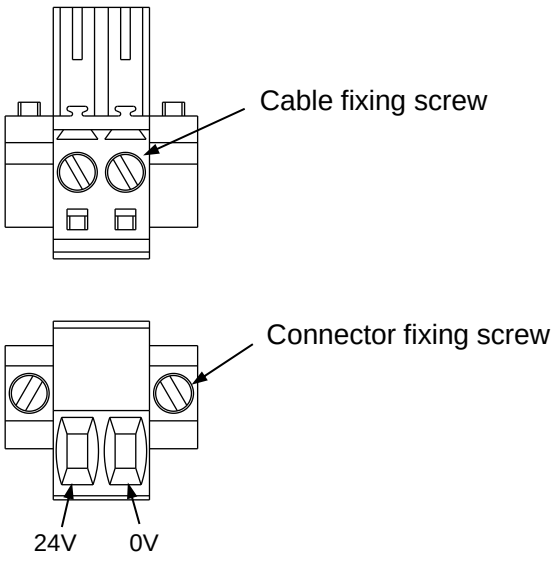
When connecting the power cable to the Device Unit, follow the procedure described below.

***1*** After confirming safety, turn off the unit power supply and valve power supply.

***2*** Insert the power cable into each hole, paying attention to the polarity of the attached connector (see the figure below).

***3*** Tighten each wire firmly with the cable fixing screw of the connector.
(Appropriate tightening torque 0.25 N·m).

***4*** If the unit power supply and valve power supply are different, insert the connector into this product while paying attention to the mounting position.
Tighten the connector fixing screw firmly.
(Appropriate tightening torque 0.25 N·m)



# 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 device unit.**

**Carefully check the address setting value of serial transmission device 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 device 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.

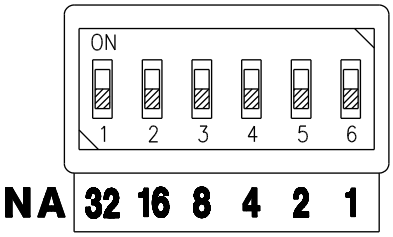
**Do not touch the internal circuit board when setting the switches.**
The internal circuit board can be easily damaged.

## 3.1.1 Node address setting

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

| Node address | Switch A No. | | | | | |
|---|---|---|---|---|---|---|
| | 1 (32) | 2 (16) | 3 (8) | 4 (4) | 5 (2) | 6 (1) |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 0 | 0 | 1 | 1 |
| ≀ | ≀ | | | | | |
| 60 | 1 | 1 | 1 | 1 | 0 | 0 |
| 61 | 1 | 1 | 1 | 1 | 0 | 1 |
| 62 | 1 | 1 | 1 | 1 | 1 | 0 |
| 63 | 1 | 1 | 1 | 1 | 1 | 1 |

0 : OFF 1 : ON Value in ( ) is indicated on the sheet.




Switch A

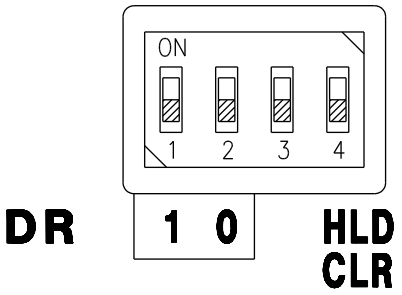
※Example to set the node address to “50”:
50 = 32·(SW1 ON) + 16·(SW2 ON) + 8·(SW3 OFF) + 4·(SW4 OFF) + 2·(SW5 ON) + 1·(SW6 OFF)
According to the above formula, turn ON the switch Nos.1, 2, and 5, and turn OFF other switches (Nos.3, 4, and 6).

## 3.1.2 Baud rate setting

Set the baud rate for the controller unit.

| baud rate | Switch B No. | |
|---|---|---|
| | 1 (0) | 2 (1) |
| 125 kbps | 0 | 0 |
| 250 kbps | 0 | 1 |
| 500 kbps | 1 | 0 |
| Cannot be set | 1 | 1 |

0 : OFF 1 : ON




Switch B

## 3.1.3 Output mode setting

The output data status if the communication error occurs in this product is set as shown below.

| Output mode | Switch B No. | Content of Setting |
|---|---|---|
| | 4 (HLD/CLR) | |
| CLEAR | OFF | Used to clear to “0” all the output data from the controller unit in case of a communication error. |
| HOLD | ON | Used to hold the output data in the status immediately before the data is output from the controller unit in case of a communication error. |

# 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 controller 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 |
| Single unit model No. | N4E0-T7D1 | N4E0-T7D2 |
| Output type | +COM (NPN) | |
| Output points | 16 points output | 32 points output |
| Name of EDS file | OPP6-1D _v20.05.eds | OPP6-2D _v20.05.eds |

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

## 3.3.1 PLC address correspondence table

This correspondence table uses OMRON PLC as an example.

**<T7D1 (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 |
| Device 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** |

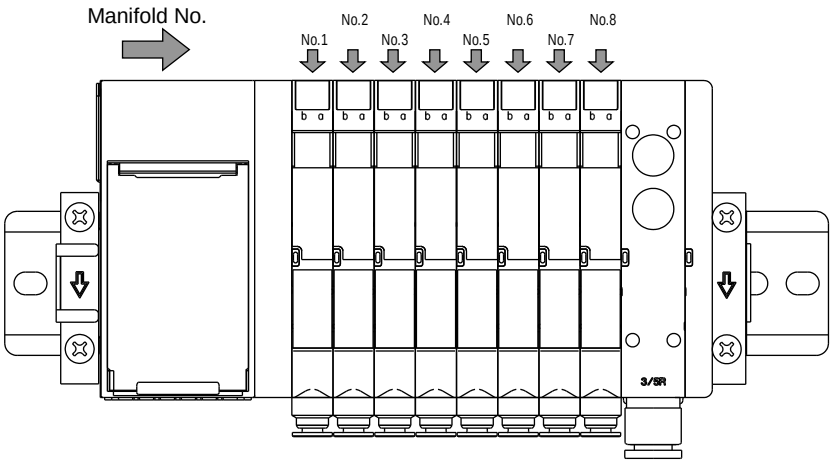
**<T7D2 (32 points output)>**

| Assigned address to the PLC memory | Output Bit 00-15 | | | | | | | | | | | | | | | | Output Bit 16-31 | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 |
| Device unit output No. | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **25** | **26** | **27** | **28** | **29** | **30** | **31** |
| Solenoid output No. | **s1** | **s2** | **s3** | **s4** | **s5** | **s6** | **s7** | **s8** | **s9** | **s10** | **s11** | **s12** | **s13** | **s14** | **s15** | **s16** | **s17** | **s18** | **s19** | **s20** | **s21** | **s22** | **s23** | **s24** | **s25** | **s26** | **s27** | **s28** | **s29** | **s30** | **s31** | **s32** |

## 3.3.2 Examples of valve No. assignments corresponding to the device 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 (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

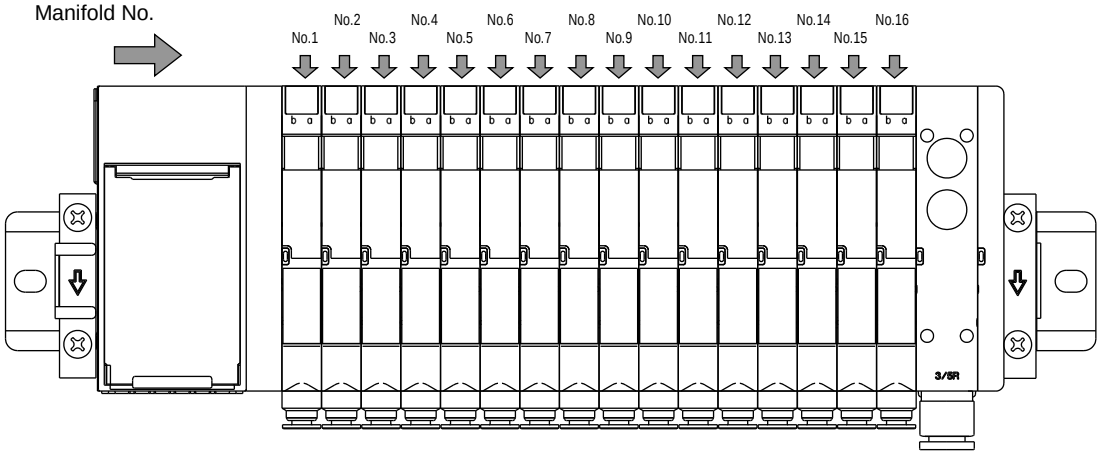
| Solenoid output No. | s1 | s2 | s3 | s4 | s5 | s6 | s7 | s8 | s9 | s10 | s11 | s12 | s13 | s14 | s15 | s16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Valve no. | 1a | 1b | 2a | 2b | 3a | 3b | 4a | 4b | 5a | 5b | 6a | 6b | 7a | 7b | 8a | 8b |

- 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 (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) |

# 3.4 Programming

## 3.4.1 Programming

This device unit is treated as a device unit device with 16 points output: T7D1, 32 points output: T7D2.

This device unit acts as an output device which transmits output data to valves after receiving it from the controller unit.

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 device 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 | ビット | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T7D2 | T7D1 | データ | 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 |

## 3.4.3 Device profile

| | | |
|---|---|---|
| General device data | Compatible DeviceNet Specifications | Volume One – Edition 3.26<br>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<br>16 points output : 40 mA or less<br>32 points output : 50 mA or less |
| | Connector style | Open plug |
| | Insulation at physical layer | None |
| | Supported indicators | Module, Network |
| | MAC ID setting | Dip switch |
| | Default MAC ID | 1 |
| | Setting baud rate | Dip switch |
| | Supported baud rate | 125kbps/250kbps/500kbps |
| Communications data | Predefined Controller/<br>Device 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 |
| 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 |
| | 4 | 0x04 | Revision | Enable | Disable | 20.05 | |
| | 5 | 0x05 | Status | Enable | Disable | bit 0 only | |
| | 6 | 0x06 | Serial Number | Enable | Disable | Unique for each Unit | |
| | 7 | 0x07 | Product Name | Enable | Disable | OPP6-1D | OPP6-2D |
| 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 | Disable |
| | 2 | 0x02 | Baud rate | Enable | Disable |
| | 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 | |

- 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 | | T7D2 | |
| | | | | Get | Set | Get | Set |
| 35 (0x23) | 3 | 0x03 | Data | 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 | T7D2 |
| 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 | 0x0000 |
| | 8 | 0x08 | Consumed connection size | Enable | Disable | 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 | 0x0000 |
| | 14 | 0x0E | Produced connection path | Enable | Disable | - | - |
| | 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) |
| | 17 | 0x11 | Production inhibit time | Enable | Disable | 0x0000 | |
| Services | DeviceNet Services | | | Parameter options | | | |
| | 0x0E | | Get_Attribute_Single | Yes | | | |
| | 0x10 | | Set_Attribute_Single | Yes | | | |

# 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 device 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 device 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 Device unit specifications". | Thermometer |
| | Is there any accumulated dust? | No dust | Visual inspection |
| Installation | Is the device 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 device unit before/after replacing

Each unit 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 device unit settings.

**<Settings for replacement device unit>**
For the switches on the replacement device 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**

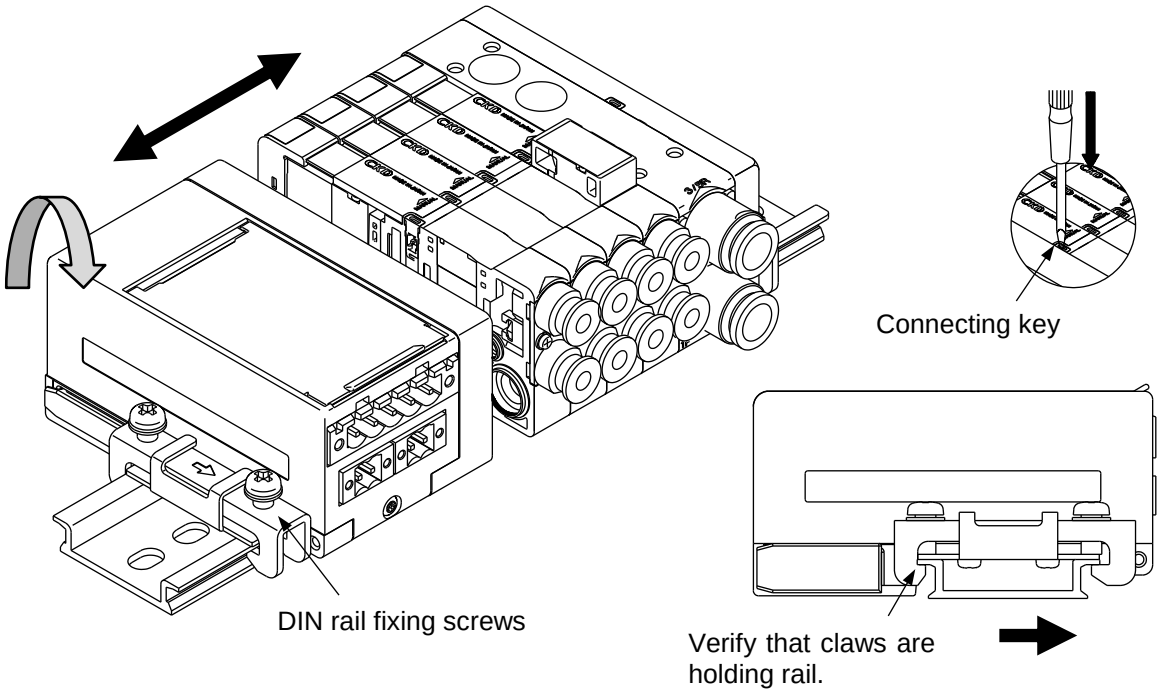
**Check the device unit node address and the setting made to specify which action to take on the output in the event of communication error before turning on the communication power.**

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

**Do not pull out the device unit by pulling the cable or connector.**
This may cause cable disconnectionodeamage.

## 4.2.1 Removing the product (device unit)

1. After confirming safety, stop network communication as necessary and turn off all peripheral equipment.
2. After confirming safety, turn off the main power and network power as necessary.
3. Loosen DIN rail fixing screws. Using a needle-nosed tool, press and hold the connecting key spanning the serial transmission unit block and adjacent blocks.
4. While pressing and holding the connecting key, slide the serial transmission unit block along the DIN rail in the direction so that block link port and connector are isolated.
5. Turn up the block toward the piping port and remove the serial transmission unit block.
   Verify that the power is turned off and then disconnect the power supply connector and communication connector.




## 4.2.2 Mounting the product (device unit)

1. Set the node address of the product.
2. Verify that power is turned off. Install the power supply connector and communication connector to the serial transmission unit block. and secure them.
3. Slide the serial transmission unit block along the DIN rail in the direction so that adjacent blocks are linked without leaving gap between them. Verify that the wiring connector is pinch-free.
   Verify that the connecting key returns back to the groove on the block upper surface
4. Slide the retainer toward piping port until the claws catch the DIN rail and tighten the clamping screws. (Recommended screw torque: 1.4 N·m.)
5. After confirming safety, turn on each power.

# 5. TROUBLESHOOTING

## 5.1 Problems, Causes, and Solutions

Troubleshooting for this device 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: MS LED 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 [1.2.2 Switches and LED indicators].

### ■ Fault 3: Values of NA switches and DR switch and HC switch are not applied.

- Power on the switch again after setting.

# 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