# MITSUBISHI Electric Corporation

# MELSEC A Series

# Ethernet Driver

Supported version TOP Design Studio V1.0 or higher

## CONTENTS

We would like to thank our customers for using M2I's "Touch Operation Panel (M2I TOP) Series". Read this manual and familiarize yourself with the connection method and procedures of the “TOP and external device”.

# 1. System configuration

The system configuration of TOP and "MITSUBISHI Electric Corporation - MELSEC A Series Ethernet" is as follows.

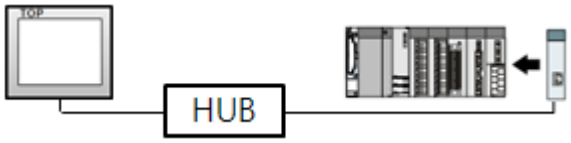
| Series | CPU | Link I/F | Communication method | Communication setting | Cable |
|---|---|---|---|---|---|
| MELSEC-A | A1N<br>A2N<br>A0J2H | AJ71E71<br>AJ71E71-S3 | Ethernet (TCP/UDP) | 3. TOP communication setting<br>4. External device setting | Twisted pair cable*Note 1) |
| | A1S<br>A1S-C24<br>A1SJ<br>A2S<br>A2S-S1 | A1SJ71E71-B2<br>A1SJ71E71-B5 | | | |
| | A1S<br>A1SH<br>A1SJ<br>A2S<br>A2SH<br>A2SJH | A1SJ71E71-B2-S3<br>A1SJ71E71-B5-S3 | | | |

*Note 1) Twisted pair cable

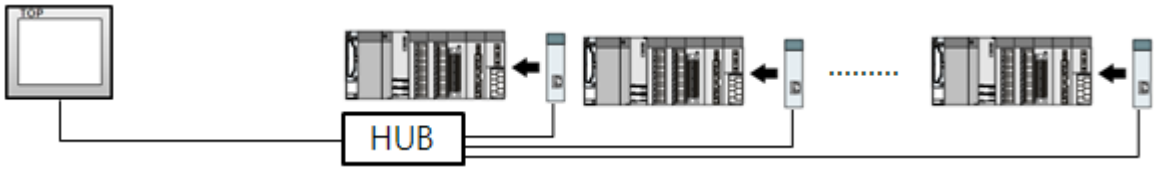
- Refer to STP (Shielded Twisted Pair Cable) or UTP (Unshielded Twisted Pair Cable) Category 3, 4, 5.
- Depending on the network configuration, you can connect to components such as the hub and transceiver, and in this case, use a direct cable.

■ Connectable configuration

• 1:1 connection (one TOP and one external device) connection

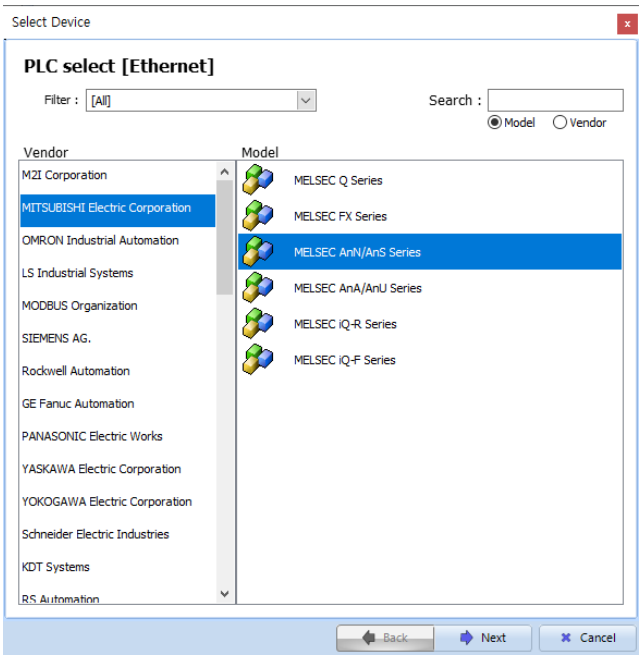


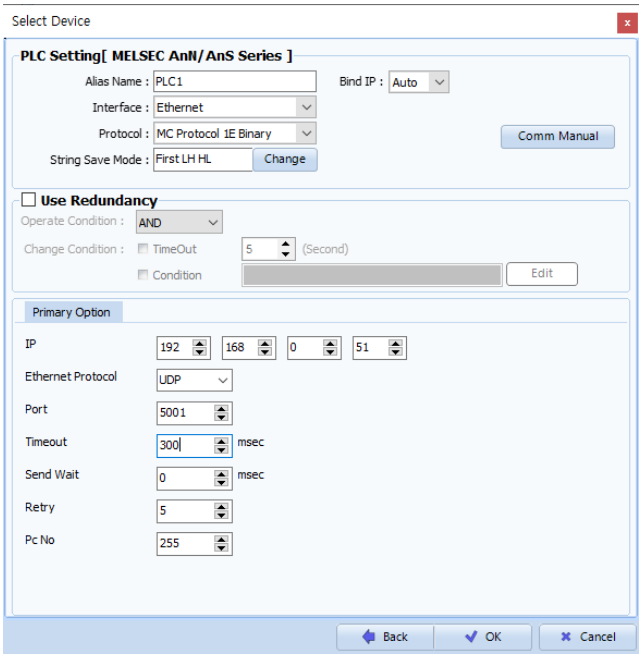

• 1:N connection (one TOP and multiple external devices) connection



# 2. External device selection

■ Select a TOP model and a port, and then select an external device.




| Settings | | Contents |
|---|---|---|
| TOP | Model | Check the TOP display and process to select the touch model. |
| External device | Vendor | Select the vendor of the external device to be connected to TOP.<br>Please select “MITSUBISHI Electric Corporation”. |
| | PLC | Select the external device to be connected to the TOP. |

| Model | Interface | Protocol |
|---|---|---|
| MELSEC A Series | Ethernet | MC Protocol 1E Binary |

| Supported Protocol |
|---|
| MC Protocol 1E (BINARY) |

Please check the system configuration in Chapter 1 to see if the external device you want to connect is a model whose system can be configured.

# 3. TOP communication setting

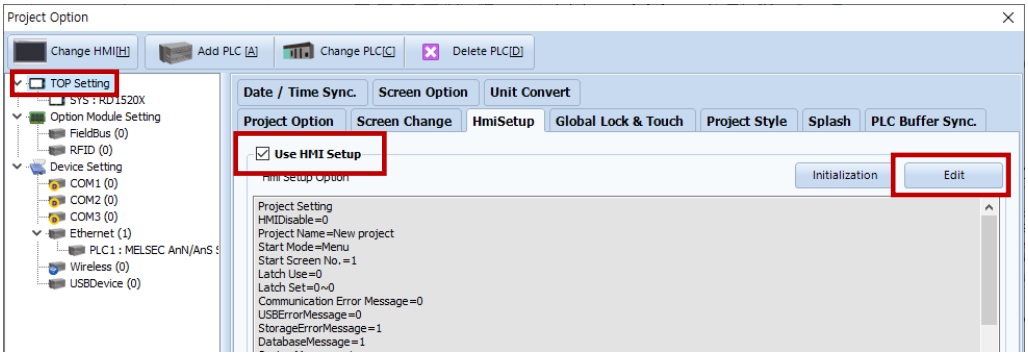
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

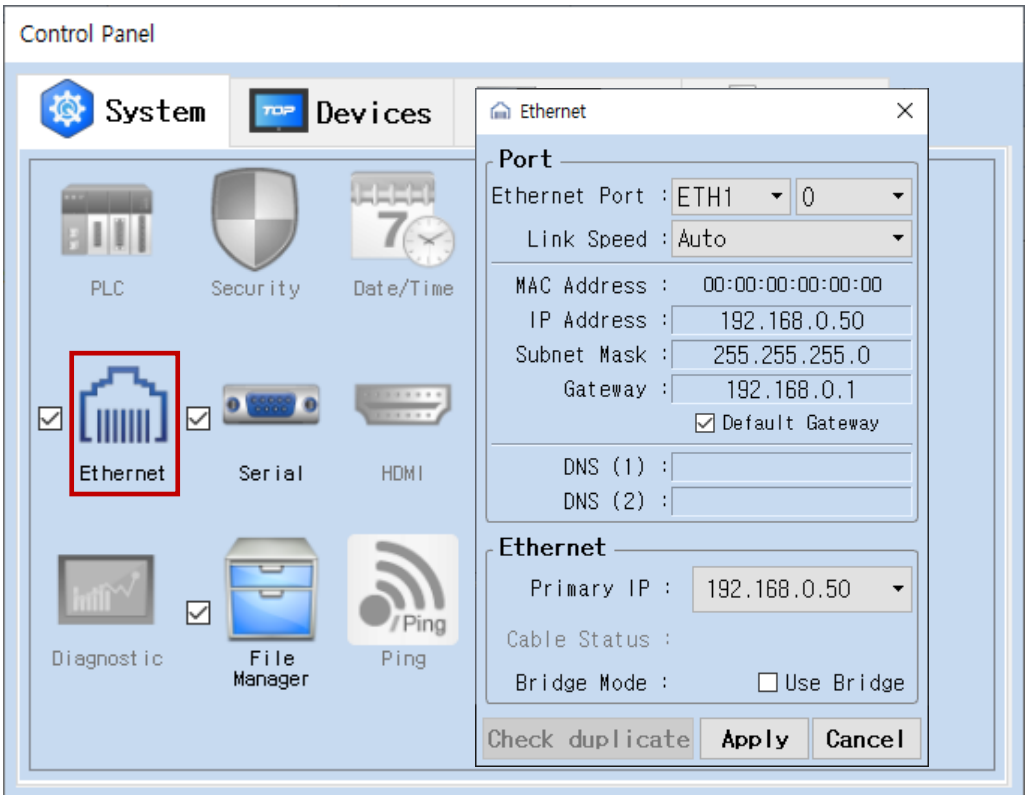
## 3.1 Communication setting in TOP Design Studio

### (1) Communication interface setting

■ [ Project > Project properties > TOP settings] → [Project option > Check "Use HMI settings" > Edit > Ethernet ]

– Set the TOP communication interface in TOP Design Studio.




| Items | TOP | External device | Remarks |
|---|---|---|---|
| IP Address*Note 1) Note 2) | 192.168.0.50 | 192.168.0.51 | |
| Subnet Mask | 255.255.255.0 | 255.255.255.0 | |
| Gateway | 192.168.0.1 | 192.168.0.1 | |

*Note 1) The network addresses of the TOP and the external device (the first three digits of the IP, 192 . 168 . 0 . 0) should match.

*Note 2) Do not use duplicate IP addresses over the same network.

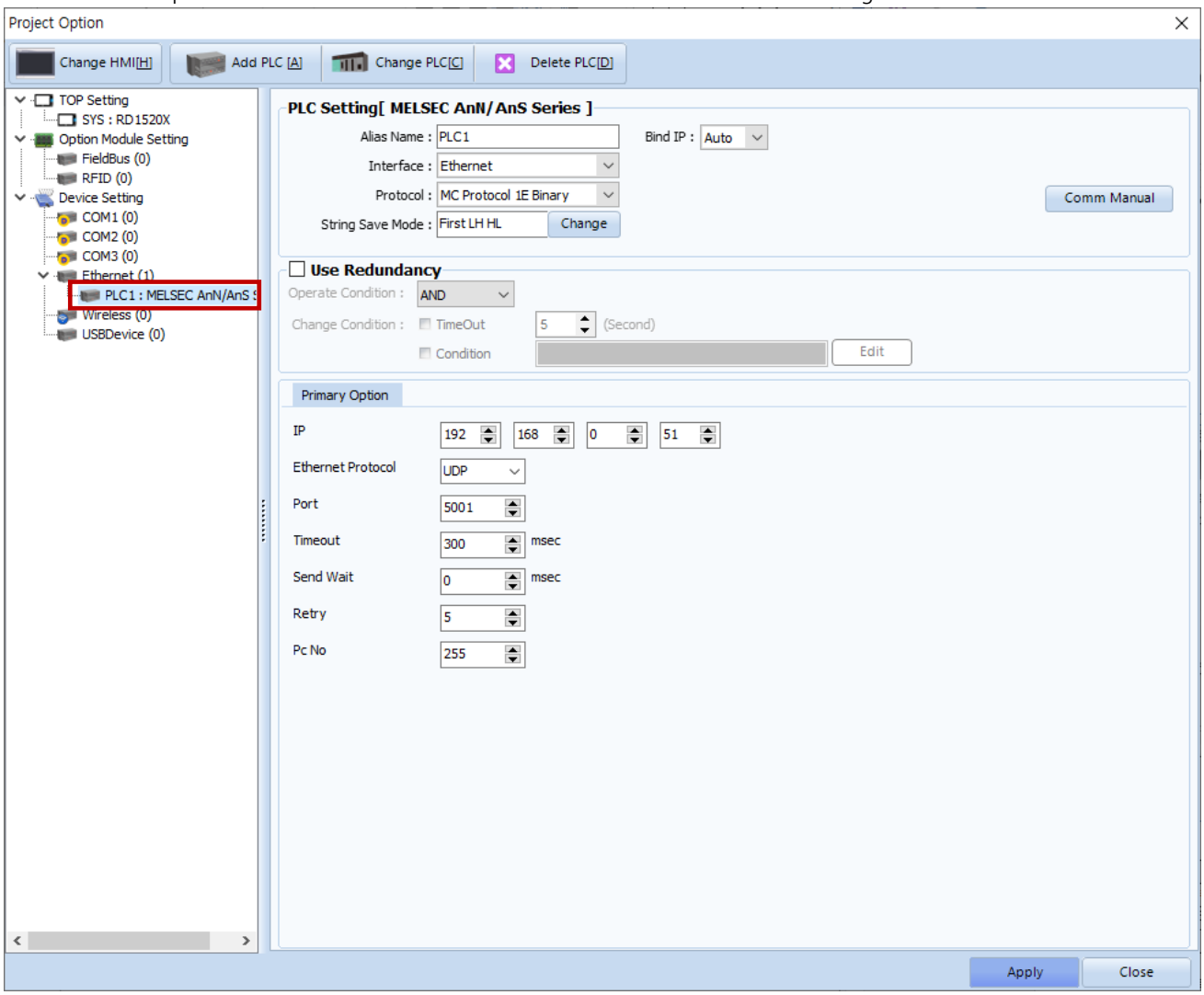
* The above settings are examples recommended by the company.

| Items | Description |
|---|---|
| IP Address | Set an IP address to be used by the TOP to use over the network. |
| Subnet Mask | Enter the subnet mask of the network. |
| Gateway | Enter the gateway of the network. |

### (2) Communication option setting

■ [ Project > Project properties > PLC setting > ETHERNET > "PLC1 : MELSEC-A Series"]

– Set the options of the communication driver of MELSEC A Series Ethernet in TOP Design Studio.

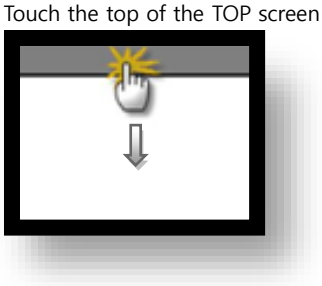



| Items | Settings | Remarks |
|---|---|---|
| Interface | Select "Ethernet". | Refer to "2. External device selection". |
| Protocol | Select "MC Protocol 1E Binary". | |
| IP | Enter the IP address of the external device. | |
| Ethernet Protocol | Select the Ethernet protocol between the TOP and an external device. | |
| Port | Enter the Ethernet communication port number of an external device. | |
| TimeOut (ms) | Set the time for the TOP to wait for a response from an external device. | |
| SendWait (ms) | Set the waiting time between TOP's receiving a response from an external device and sending the next command request. | |
| PC No | Set the prefix of TOP. | |

## 3.2. Communication setting in TOP

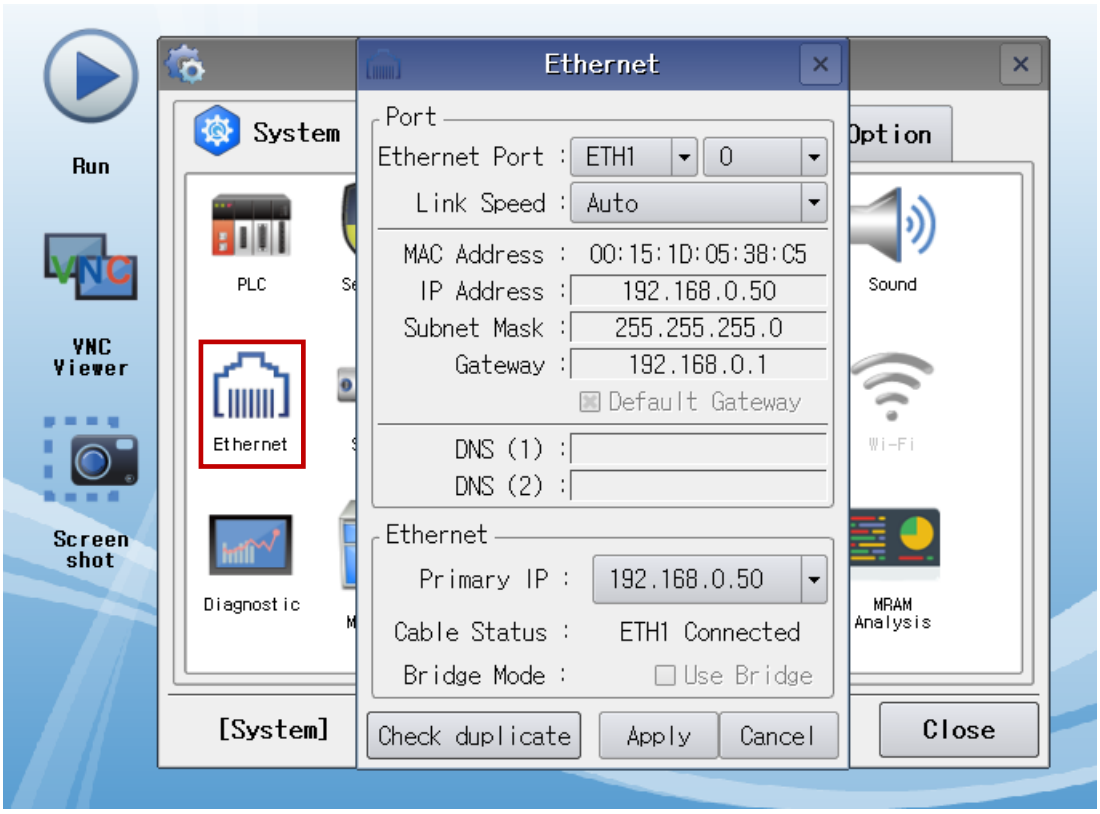
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.



### (1) Communication interface setting

■ [ Main screen > Control panel > Ethernet ]




| Items | TOP | External device | Remarks |
|---|---|---|---|
| IP Address*Note 1) Note 2) | 192.168.0.50 | 192.168.0.51 | |
| Subnet Mask | 255.255.255.0 | 255.255.255.0 | |
| Gateway | 192.168.0.1 | 192.168.0.1 | |

*Note 1) The network addresses of the TOP and the external device (the first three digits of the IP, 192 . 168 . 0 . 0) should match.

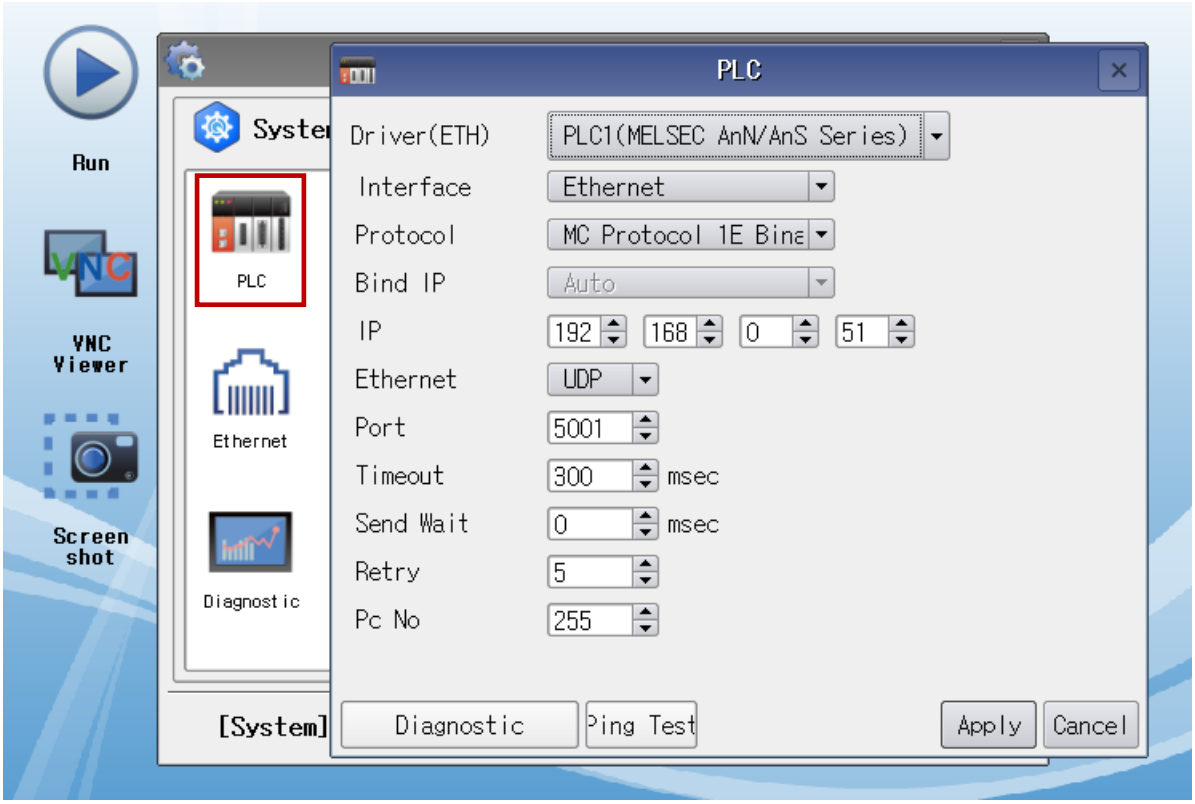
*Note 2) Do not use duplicate IP addresses over the same network.

* The above settings are examples recommended by the company.

| Items | Description |
|---|---|
| IP Address | Set an IP address to be used by the TOP to use over the network. |
| Subnet Mask | Enter the subnet mask of the network. |
| Gateway | Enter the gateway of the network. |

### (2) Communication option setting

■ [ Main screen > Control panel > PLC ]




| Items | Settings | Remarks |
|---|---|---|
| Interface | Select “Ethernet”. | Refer to “2. External device selection”. |
| Protocol | Select “MC Protocol 1E Binary”. | |
| IP | Enter the IP address of the external device. | |
| Ethernet Protocol | Select the Ethernet protocol between the TOP and an external device. | |
| Port | Enter the Ethernet communication port number of an external device. | |
| TimeOut (ms) | Set the time for the TOP to wait for a response from an external device. | |
| SendWait (ms) | Set the waiting time between TOP’s receiving a response from an external device and sending the next command request. | |
| PC No | Set the prefix of TOP. | |

## 3.3 Communication diagnostics

■ Check the interface setting status between the TOP and an external device.

- Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.
- Check whether the port (ETH1/ETH2) settings you want to use are the same as those of the external device in [Control panel > Ethernet].

■ Diagnosis of whether the port communication is normal or not

- Touch "Communication diagnostics" in [Control Panel > PLC ].
- The Diagnostics dialog box pops up on the screen and determines the diagnostic status.

| | |
|---|---|
| **OK** | **Communication setting normal** |
| **Time Out Error** | **Communication setting abnormal**<br>- Check the cable, TOP, and external device setting status. **(Reference: Communication diagnostics sheet)** |

■ Communication diagnostics sheet

- If there is a problem with the communication connection with an external terminal, please check the settings in the sheet below.

| Item | Content | | Confirm | | Remarks |
|---|---|---|---|---|---|
| System configuration | How to connect the system | | OK | NG | 1. System configuration |
| | Connection cable name | | OK | NG | |
| TOP | Version information | | OK | NG | 2. External device selection<br>3. Communication setting |
| | Port in use | | OK | NG | |
| | Driver name | | OK | NG | |
| | Other detailed settings | | OK | NG | |
| | Relative prefix | Project setting | OK | NG | |
| | | Communication diagnostics | OK | NG | |
| | Ethernet port setting | IP Address | OK | NG | |
| | | Subnet Mask | OK | NG | |
| | | Gateway | OK | NG | |
| External device | CPU name | | OK | NG | 4. External device setting |
| | Communication port name (module name) | | OK | NG | |
| | Protocol (mode) | | OK | NG | |
| | Setup Prefix | | OK | NG | |
| | Other detailed settings | | OK | NG | |
| | Ethernet port setting | IP Address | OK | NG | |
| | | Subnet Mask | OK | NG | |
| | | Gateway | OK | NG | |
| | Check address range | | OK | NG | 5. Supported addresses<br>(For details, please refer to the PLC vendor's manual.) |

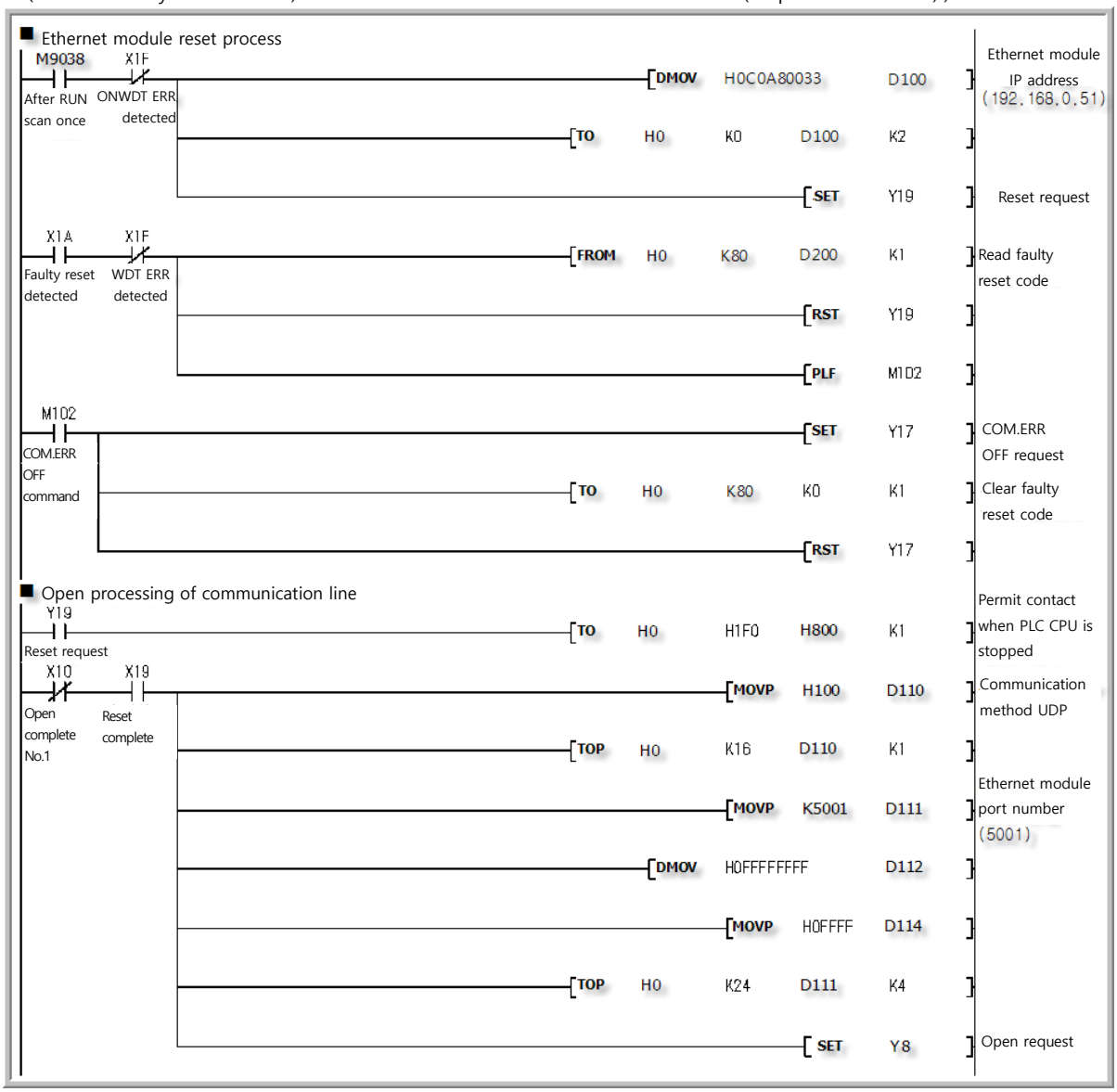
# 4. External device setting

In order to set up the communication settings of the MELSEC-A Series Ethernet communication module, configure the Ladder Software and DIP Switch inside the device as shown below. For a more detailed setting method than that described in this example, refer to the PLC user manual

Do not use duplicate IP addresses over the same network.

**Step 1.** Write the sequence program shown in the example below and download it as PLC.

(The following example depicts the Ethernet reset program for when the Ethernet card is installed in slot 0. If the Ethernet card's slot position changes, the addresses for X and Y shown in the example above must also change. For example, if a card takes up 32 points in slot 0 and an Ethernet card is installed in slot 1, the X1F used in the line 0 of the above example becomes X3F (+32 points). The H0 (buffer memory start address) of TO and FROM commands is converted to H2 (32 points = 2 words).)




| Buffer memory settings | | | Custom device | |
|---|---|---|---|---|
| Address | Settings | Setting (range) | Address | Settings |
| 0~1 | Ethernet card IP address | C0A80033H (192.168.0.51) | M102 | COM.ERR OFF command |
| 16 | Intended use settings | 100H (fixed) | D100 | Ethernet card IP address |
| 24 | Ethernet card port number | 5001 | D110 | Intended use settings |
| 25~26 | Counterpart device (TOP) IP address | FFFFFFFFH (fixed) | D111 | Ethernet card port number |
| 27 | Counterpart device (TOP) port number | FFFFH (fixed) | D112 ~D113 | Counterpart device (TOP) IP Address |
| 80 | Reset error code | - | D114 | Counterpart device (TOP) port number |
| | | | D200 | Reset error code |

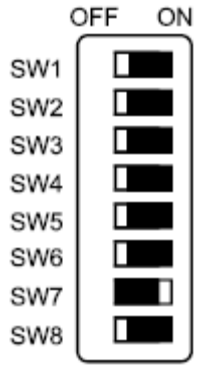
**Step 2.** Configure the Dip Switch settings for the entire module, once sequence program transmission is completed.

(1) Operation Mode Switch

| Operation Mode Switch | Contents | Setting Value |
|---|---|---|
|  | Online | 0 (fixed) |

(2) Conditional Contact Switch

◆ **Configure the AJ71E71 / AJ71E71-S3 as shown in the table below.**

| Conditional Contact Switch | DIP Switch | Contents | Setting Value |
|---|---|---|---|
|  | SW1 | Line processing for TCP timeout error | OFF |
| | SW2 | Data code settings (Binary code) | OFF |
| | SW3 | Not used | OFF |
| | SW4 | | OFF |
| | SW5 | | OFF |
| | SW6 | | OFF |
| | SW7 | CPU contact timing settings (Permit WRITE during RUN) | ON |
| | SW8 | Reset time settings | OFF |

◆ **Configure the A1SJ71E71-B2 / A1SJ71E71-B5 / A1SJ71E71-B2-S3 / A1SJ71E71-B2 –S3 as shown in the table below.**

| Conditional Contact Switch | DIP Switch | Contents | Setting Value |
|---|---|---|---|
|  | SW1 | Line processing for TCP timeout error | OFF |
| | SW2 | Data code settings (Binary code) | OFF |
| | SW3 | CPU contact timing settings (Permit WRITE during RUN) | ON |
| | SW4 | Reset time settings | OFF |

**Step 3.** Restart the power after configuring the Dip Switch.

# 5. Supported addresses

The devices available in TOP are as follows:

The device range (address) may differ depending on the CPU module series/type. The TOP series supports the maximum address range used by the external device series. Please refer to each CPU module user manual and be take caution to not deviate from the address range supported by the device you want to use.

| Type | Remarks | Bit-designated address | Word-designated address |
|---|---|---|---|
| Input | Bit | X0000 - X07FF | X0000 - X07F0 |
| Output | Bit | Y0000 - Y07FF | Y0000 - Y07F0 |
| LINK relay | Bit | B0000 - B03FF | |
| LINK register | Word | | W0000 - W03F0 |
| Special relay | Bit | F0000 - F0255 | F0000 - F0240 |
| LATCH relay | Bit | L0000 - L2047 | L0000 - L2032 |
| Internal relay | Bit | M0000 - M2047 | M0000 - M2032 |
| Special relay | Bit | M9000 - M9255 | M9000 - M9240 |
| Timer - Coil | Bit | TC000 - TC255 | |
| Timer - Contact | Bit | TS000 - TS255 | |
| Timer-Current value | Word | | TN000 - TN255 |
| Counter - Coil | Bit | CC000 - CC255 | |
| Counter - Contact | Bit | CS000 - CS255 | |
| Counter-Current value | Word | | CN000 - CN255 |
| Data register | Word | D0000.0 – D1023.15 | D0000 - D1023 |
| File register | Word | R0000.0 – R8191.15 | R0000 – R8191 |