

MITSUBISHI Electric Corporation

MELSEC Q Series

Ethernet Driver

Supported version

TOP Design Studio

V1.0 or higher



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We want to thank our customers who use the Touch Operation Panel.

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Describes how to set up communication for external devices.

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Refer to this section to check the data addresses which can communicate with an external device.

1. System configuration

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

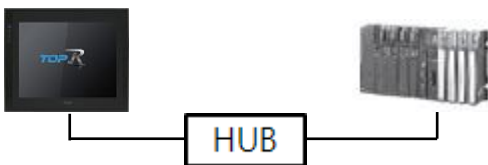
Series	CPU	Link I/F	Communication method	Communication setting	Cable
MELSEC-Q	Q00CPU Q00JCPU Q01CPU Q02CPU Q02HCPU Q06HCPU Q12HCPU Q25HCPU	QJ71E71	Ethernet (TCP/UDP)	3. TOP communication setting 4. External device setting	Twisted pair cable ^{*Note 1)}
	Q03UDECPU Q04UDEHCPU Q06UDEHCPU Q13UDEHCPU Q26UDEHCPU	QJ71E71-B2			
		QJ71E71-B5			
		QJ71E71-100			
	Q02UCPU Q03UDCPU Q04UDHCPU Q06UDHCPU Q13UDHCPU Q26UDHCPU	QJ71E71-B2			
		QJ71E71-B5			
		QJ71E71-100			

^{*Note 1)} Twisted pair cable

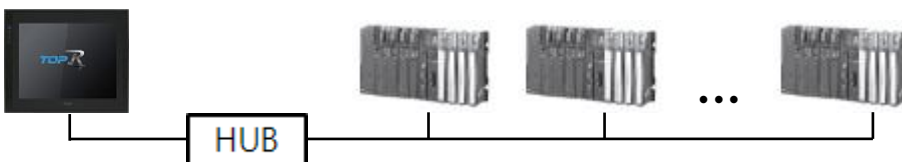
- Refer to STP (Shielded Twisted Pair Cable) or UTP (Unshielded Twisted Pair Cable) Category 3, 4, 5.
- Depending on the network configuration, you can connect to components such as the hub and transceiver, and in this case, use a direct cable.

■ Connectable configuration

- 1:1 connection

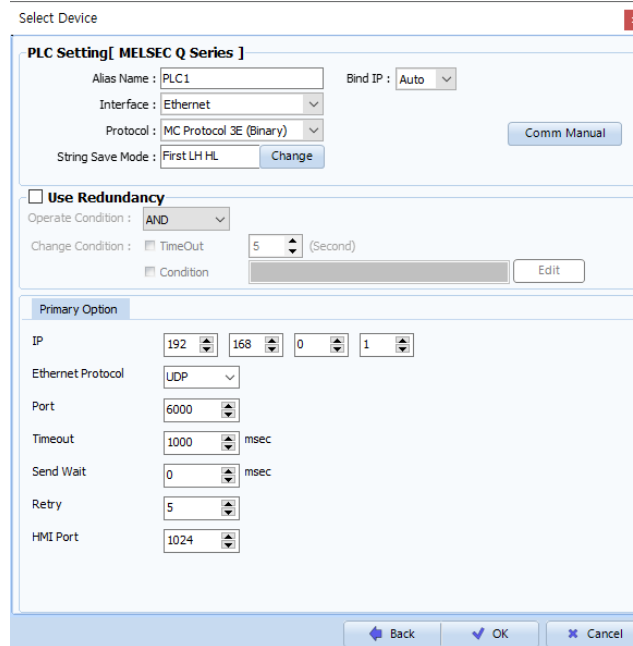
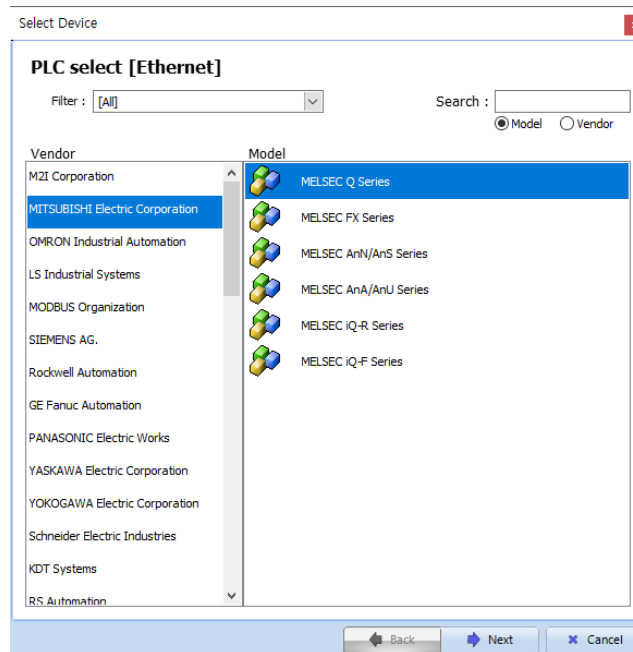


- 1:N connection



2. External device selection

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



Settings		Contents										
TOP	Model	Check the display and process of TOP to select the touch model.										
External device	Vendor	Select the vendor of the external device to be connected to TOP. Please select "MITSUBISHI Electric Corporation".										
	PLC	Select the external device to be connected to the TOP.										
		<table border="1"> <thead> <tr> <th>Model</th> <th>Interface</th> <th>Protocol</th> </tr> </thead> <tbody> <tr> <td>MELSEC Q Series</td> <td>Ethernet</td> <td>Set Users</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="3">Supported Protocol</th> </tr> </thead> <tbody> <tr> <td>MC Protocol 3E (Binary)</td> <td>MC Protocol 3E (ASCII)</td> <td>MELSOFT Connection</td> </tr> </tbody> </table>	Model	Interface	Protocol	MELSEC Q Series	Ethernet	Set Users	Supported Protocol			MC Protocol 3E (Binary)
Model	Interface	Protocol										
MELSEC Q Series	Ethernet	Set Users										
Supported Protocol												
MC Protocol 3E (Binary)	MC Protocol 3E (ASCII)	MELSOFT Connection										
		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.										

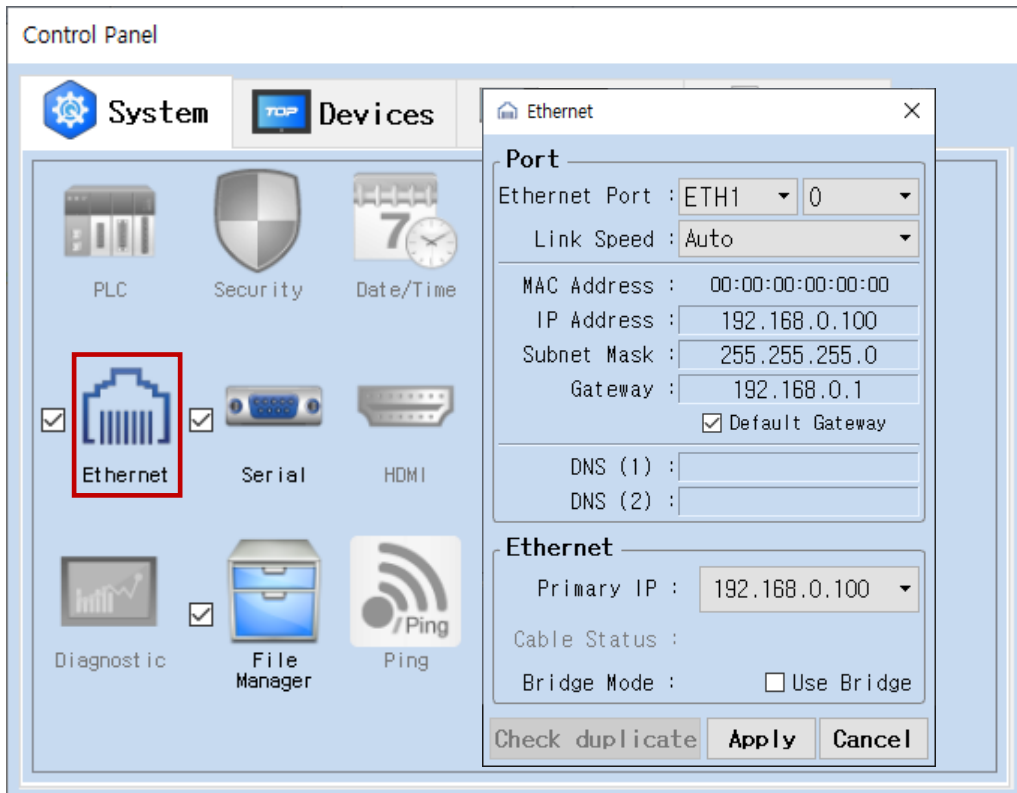
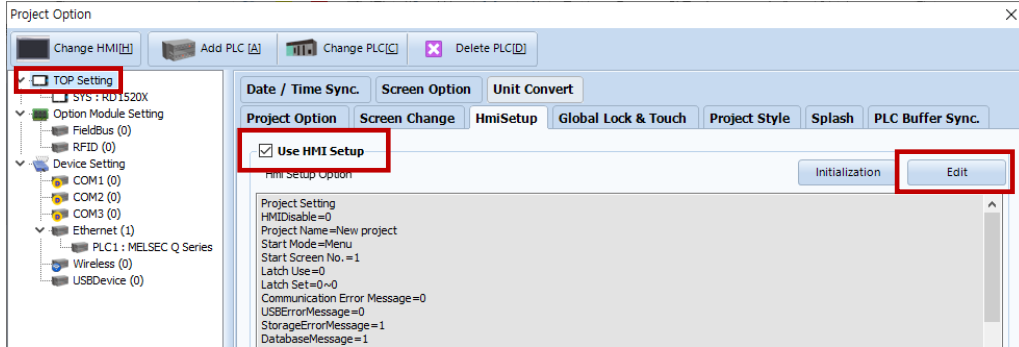
3. TOP communication setting

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] → [Property] → [TOP Setting] → [HMI Setup] → [Use HMI Setup Check] → [Edit] → [Ethernet]
- Set the TOP communication interface in TOP Design Studio.



Items	TOP	External device	Remarks
IP Address	192.168.0.100	192.168.0.51	
Subnet Mask	255.255.255.0	255.255.255.0	
Gateway	192.168.0.1	192.168.0.1	

* The above settings are examples recommended by the company.

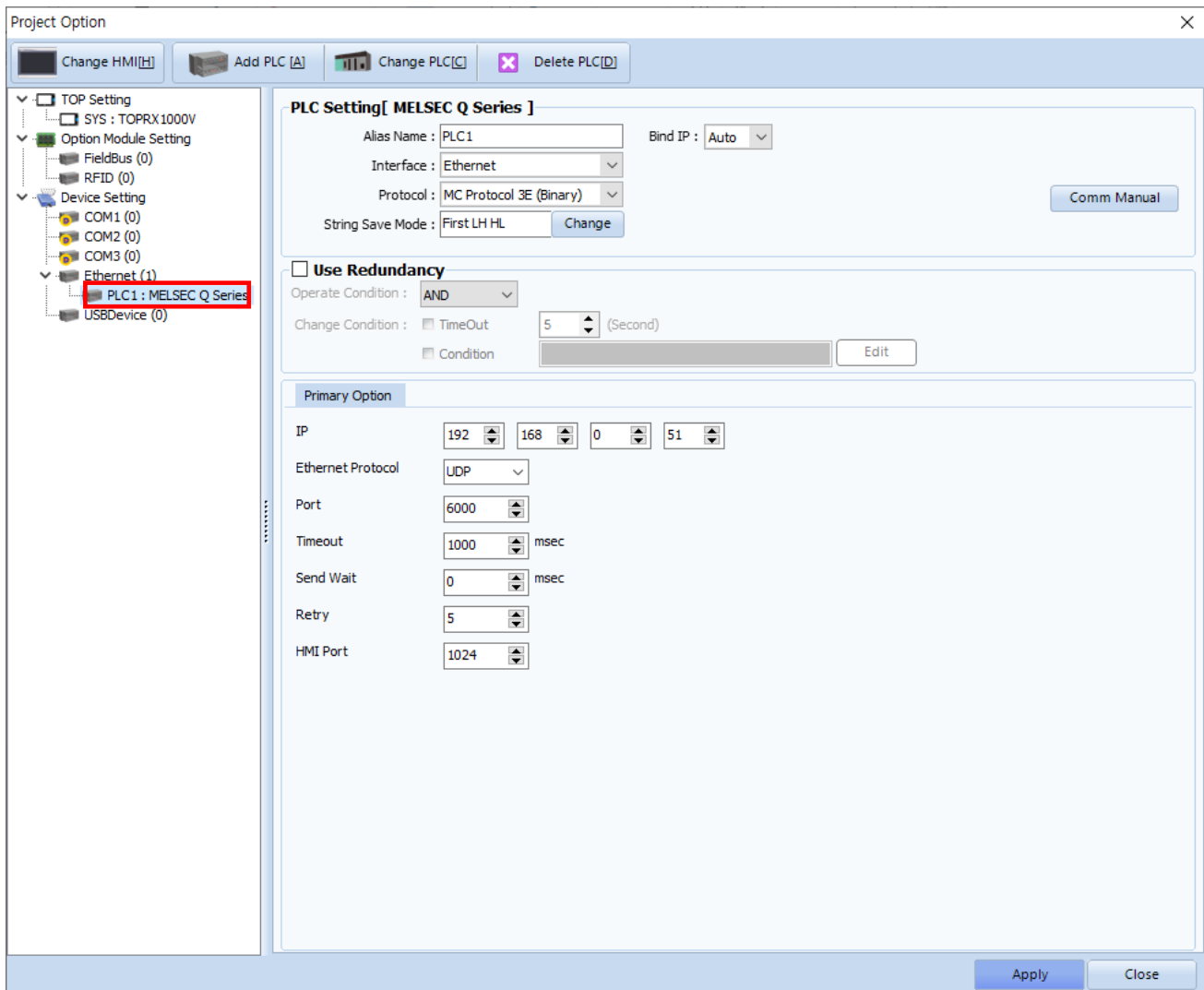
Items	Description
IP Address	Set the IP address of the TOP.
Subnet Mask	Enter the subnet mask of the network.
Gateway	Enter the gateway of the network.

(2) Communication option setting

The "Ethernet" interface of the MELSEC Q Series communication driver supports 3 protocols. Refer to the following to proceed with the settings for the protocol to be used.

① MC Protocol 3E Binary

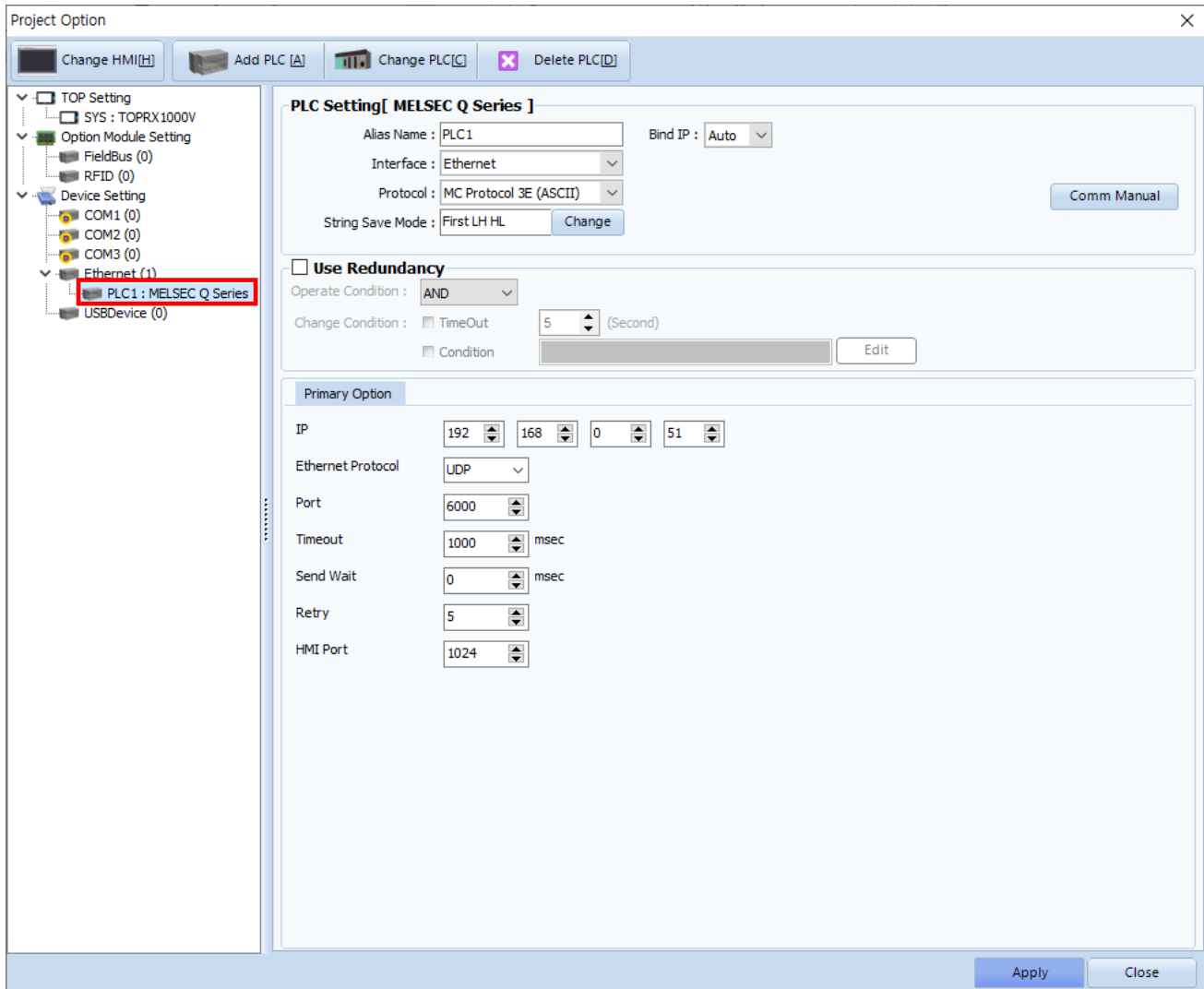
- [Project] → [Project properties] → [PLC settings > Ethernet > PLC1 : MELSEC Q Series]
 - Set the options for MC Protocol 3E Binary in TOP Design Studio.



Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection".
Protocol	Select the communication protocol between the TOP and an external device.	
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 the external device.	
Timeout	Set the time for the TOP to wait for a response from an external device.	
Send Wait	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
HMI Port	Enter the Ethernet communication port number of the TOP.	
Open System	Select Open System when using TCP.	

② MC Protocol 3E ASCII

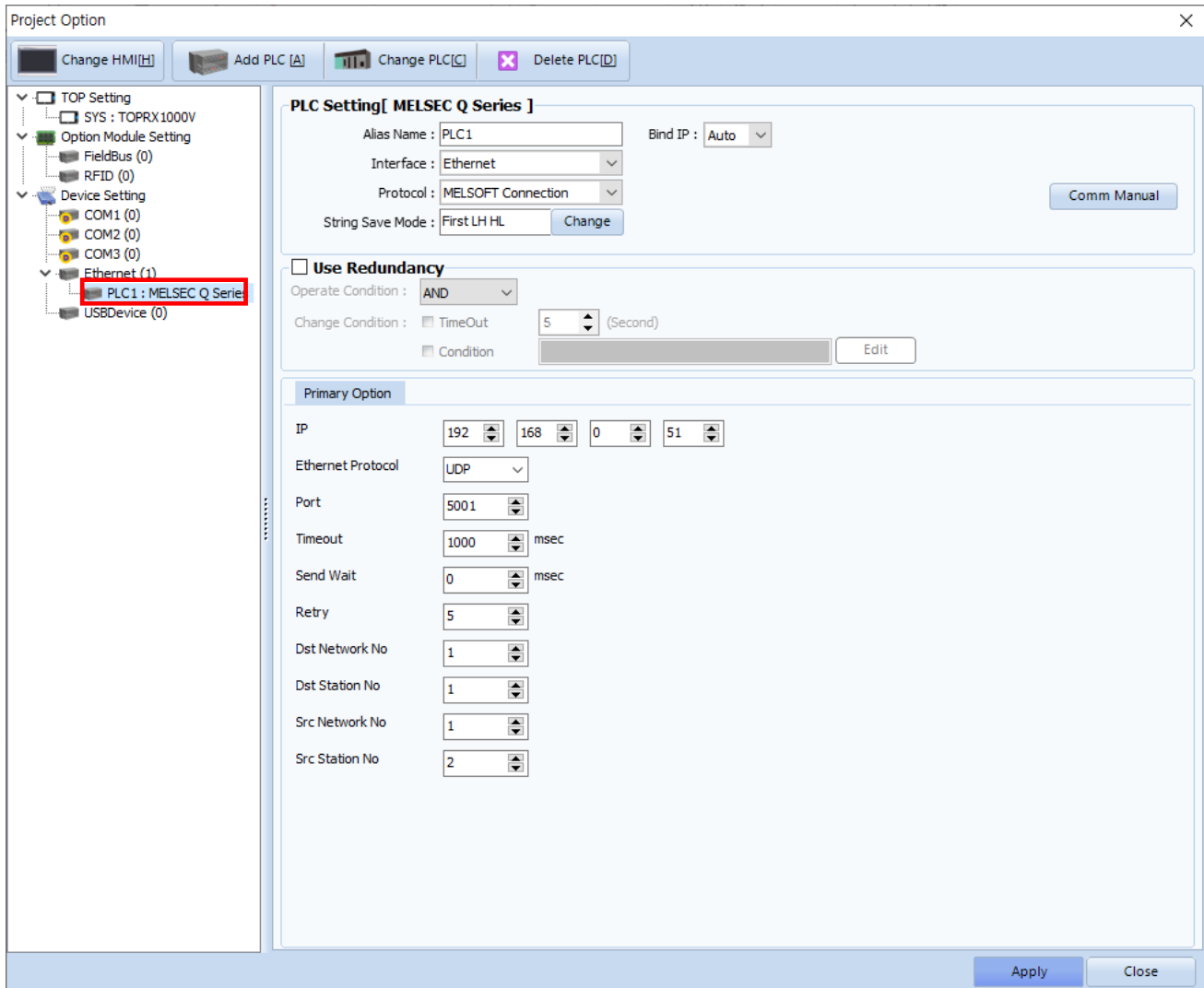
- [Project] → [Project properties] → [PLC settings > Ethernet > PLC1 : MELSEC Q Series]
- Set the options for MC Protocol 3E ASCII in TOP Design Studio.



Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection" .
Protocol	Select the communication protocol between the TOP and an external device.	device selection" .
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 the external device.	
Timeout	Set the time for the TOP to wait for a response from an external device.	
Send Wait	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
HMI Port	Enter the Ethernet communication port number of the TOP.	
Open System	Select Open System when using TCP.	

③ MELSOFT Connection

- [Project] → [Project properties] → [PLC settings > Ethernet > PLC1 : MELSEC Q Series]
- Set the options for MELSOFT Connection in TOP Design Studio.



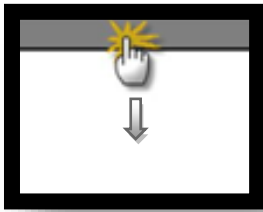
Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection" .
Protocol	Select the communication protocol between the TOP and an external device.	device selection" .
IP	Enter the IP address of the external device.	
Ethernet Protocol	Select the Ethernet protocol between the TOP and an external device.	
Port	Enter the Ethernet communication port number of an external device.	*Note 1)
Timeout	Set the time for the TOP to wait for a response from an external device.	
Send Wait	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Dst Network No	Enter the PLC network number.	
Dst Station No	Enter the prefix of PLC.	
Src Network No	Set the TOP network number.	
Src Station No	Set the prefix of TOP.	

***Note 1)** UDP : 5001, TCP : 5002

3.2. Communication setting in TOP

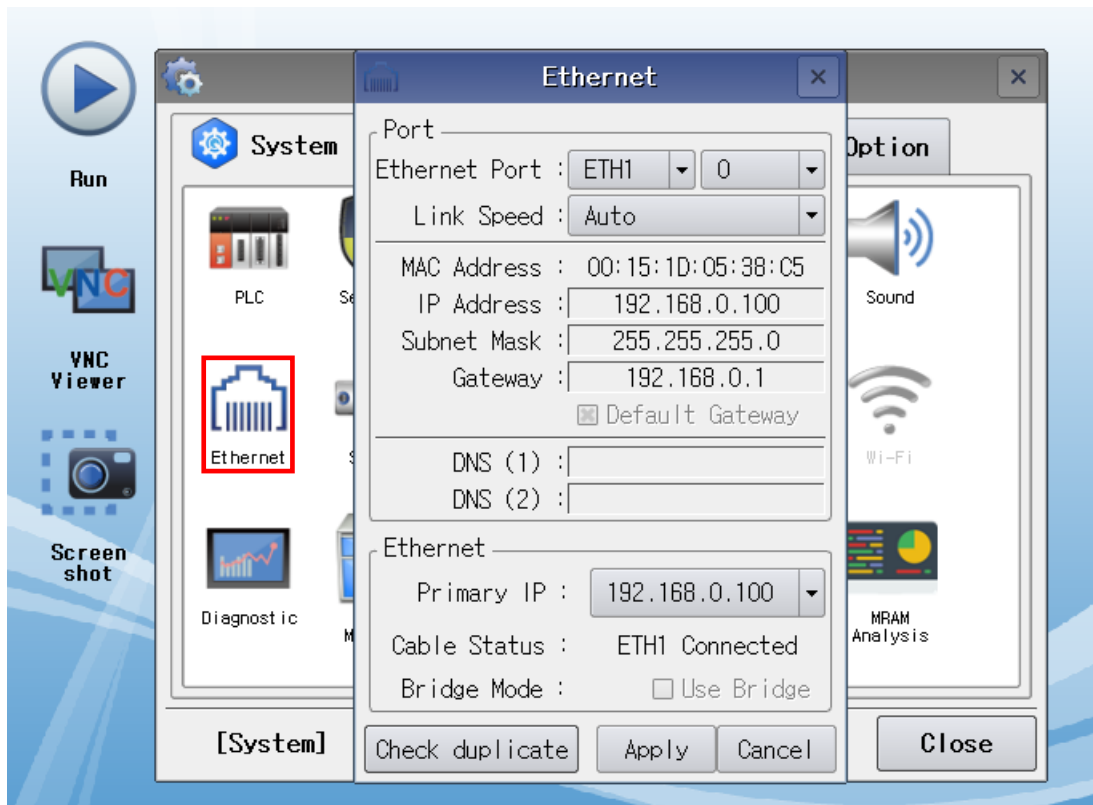
※ This is the setting method when "Use HMI settings" in "3.1 Communication setting in TOP Design Studio" is not checked.

■ 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

■ [Control Panel] → [Ethernet]



Items	TOP	External device	Remarks
IP Address	192.168.0.100	192.168.0.50	
Subnet Mask	255.255.255.0	255.255.255.0	
Gateway	192.168.0.1	192.168.0.1	

* The above settings are examples recommended by the company.

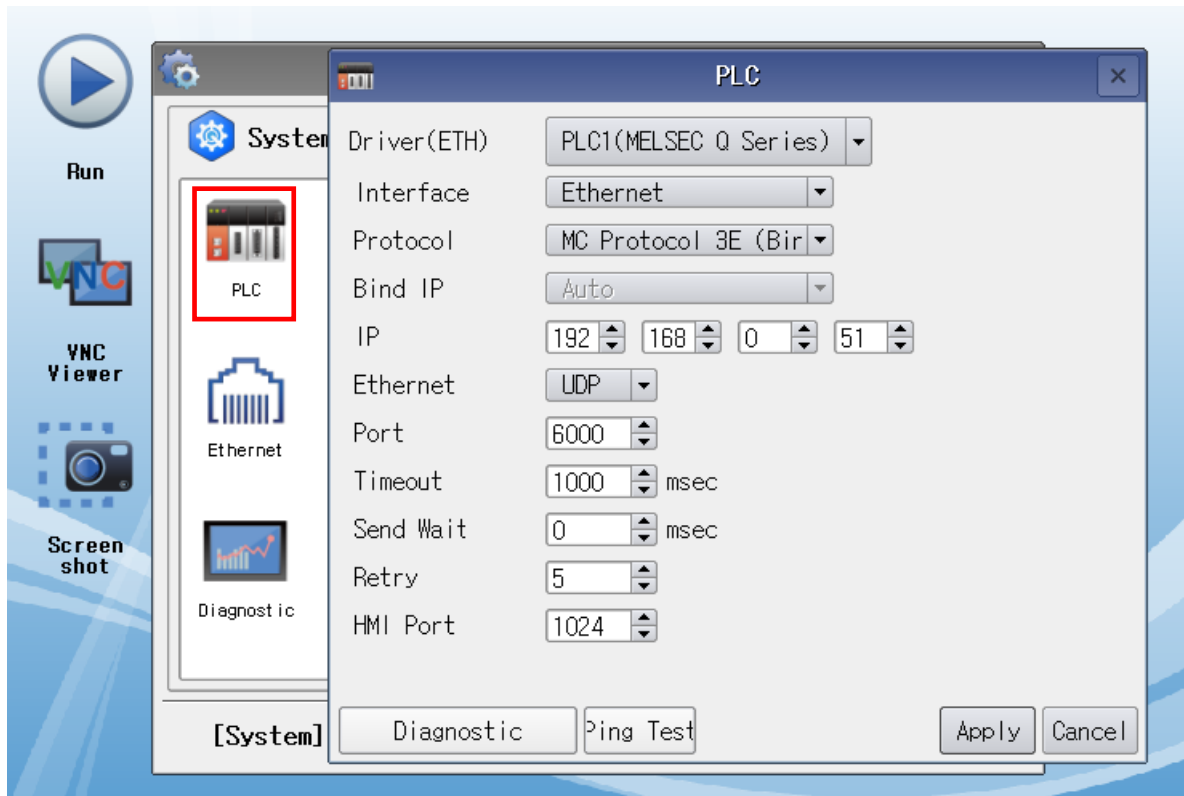
Items	Description
IP Address	Set the IP address of the TOP.
Subnet Mask	Enter the subnet mask of the network.
Gateway	Enter the gateway of the network.

(2) Communication option setting

The "Ethernet" interface of the MELSEC Q Series communication driver supports 3 protocols. Refer to the following to proceed with the settings for the protocol to be used.

① MC Protocol 3E Binary

- [Control panel] → [PLC]

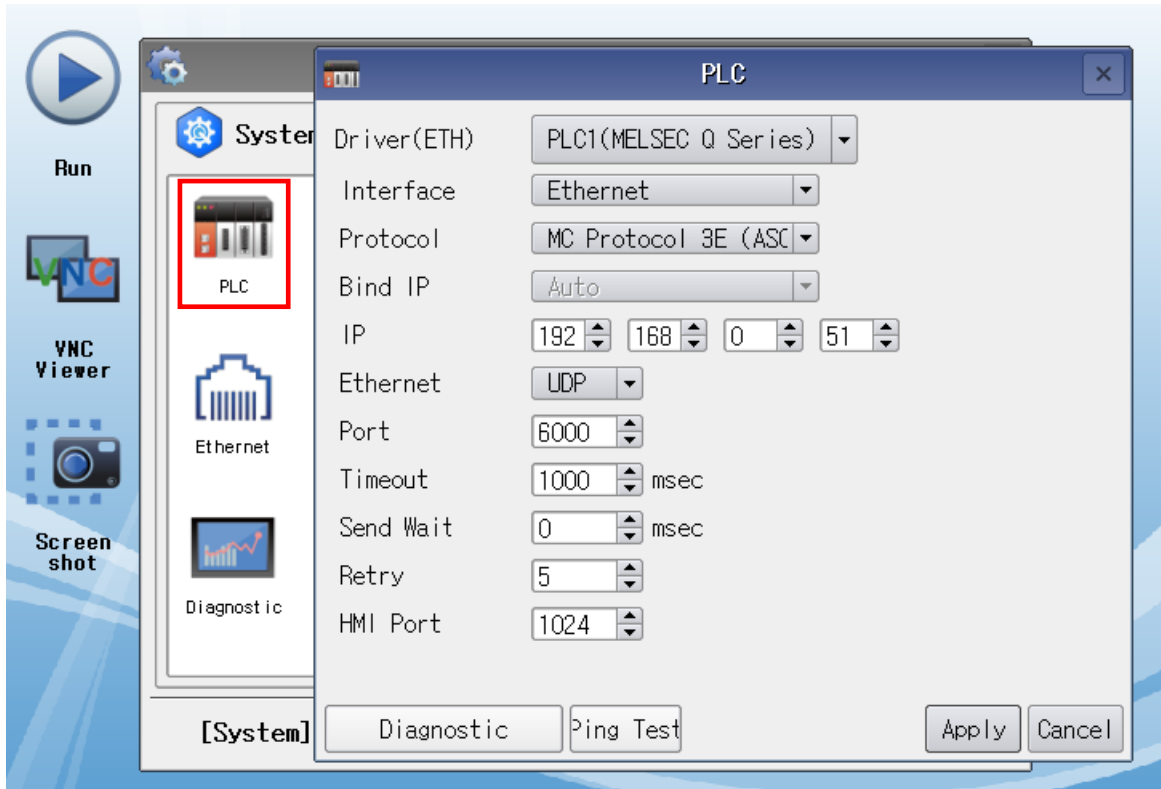


* The above settings are examples recommended by the company.

Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection" .
Protocol	Select the communication protocol between the TOP and an external device.	device selection" .
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 the external device.	
Timeout	Set the time for the TOP to wait for a response from an external device.	
Send Wait	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
HMI Port	Enter the Ethernet communication port number of the TOP.	
Open System	Select Open System when using TCP.	

② MC Protocol 3E ASCII

- [Control panel] → [PLC]

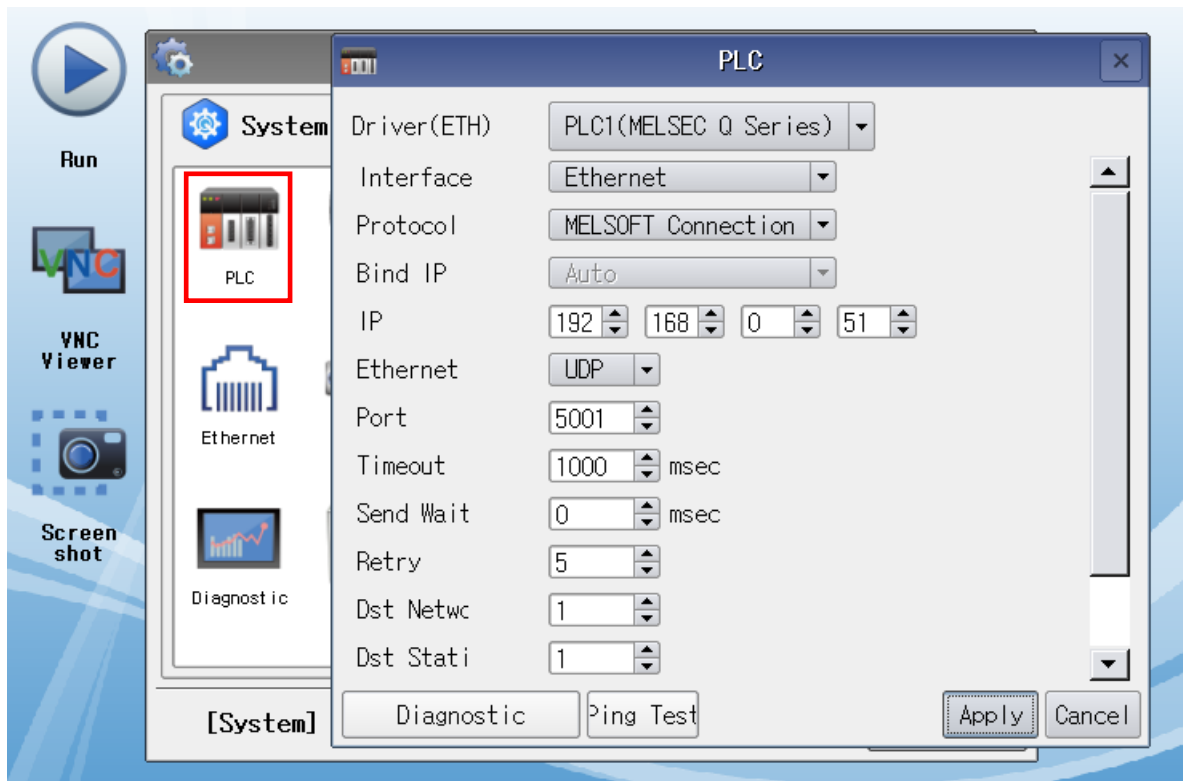


* The above settings are examples recommended by the company.

Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection" .
Protocol	Select the communication protocol between the TOP and an external device.	
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 the external device.	
Timeout	Set the time for the TOP to wait for a response from an external device.	
Send Wait	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
HMI Port	Enter the Ethernet communication port number of the TOP.	
Open System	Select Open System when using TCP.	

③ MELSOFT Connection

- [Control panel] → [PLC]



* The above settings are examples recommended by the company.

Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection".
Protocol	Select the communication protocol between the TOP and an external device.	Refer to "2. External device selection".
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.	*Note 1)
Timeout	Set the time for the TOP to wait for a response from an external device.	
Send Wait	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Dst Network No	Enter the PLC network number.	
Dst Station No	Enter the prefix of PLC.	
Src Network No	Set the TOP network number.	
Src Station No	Set the prefix of TOP.	

*Note 1) UDP : 5001, TCP : 5002

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 that the settings of the connected ports in [Control Panel] → [Ethernet] are the same as the settings of the external device.

- Diagnosis of whether the port communication is normal or not
 - Touch "Communication diagnostics" in [Control Panel] → [PLC].
 - Check whether communication is connected or not.

Communication diagnostics succeeded	Communication setting normal
Error message	Communication setting abnormal
	- Check the cable, TOP, and external device settings. (Refer to Communication diagnostics sheet.)

■ Communication diagnostics sheet

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

Items	Contents	Check		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 3. TOP 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	

4. External device setting

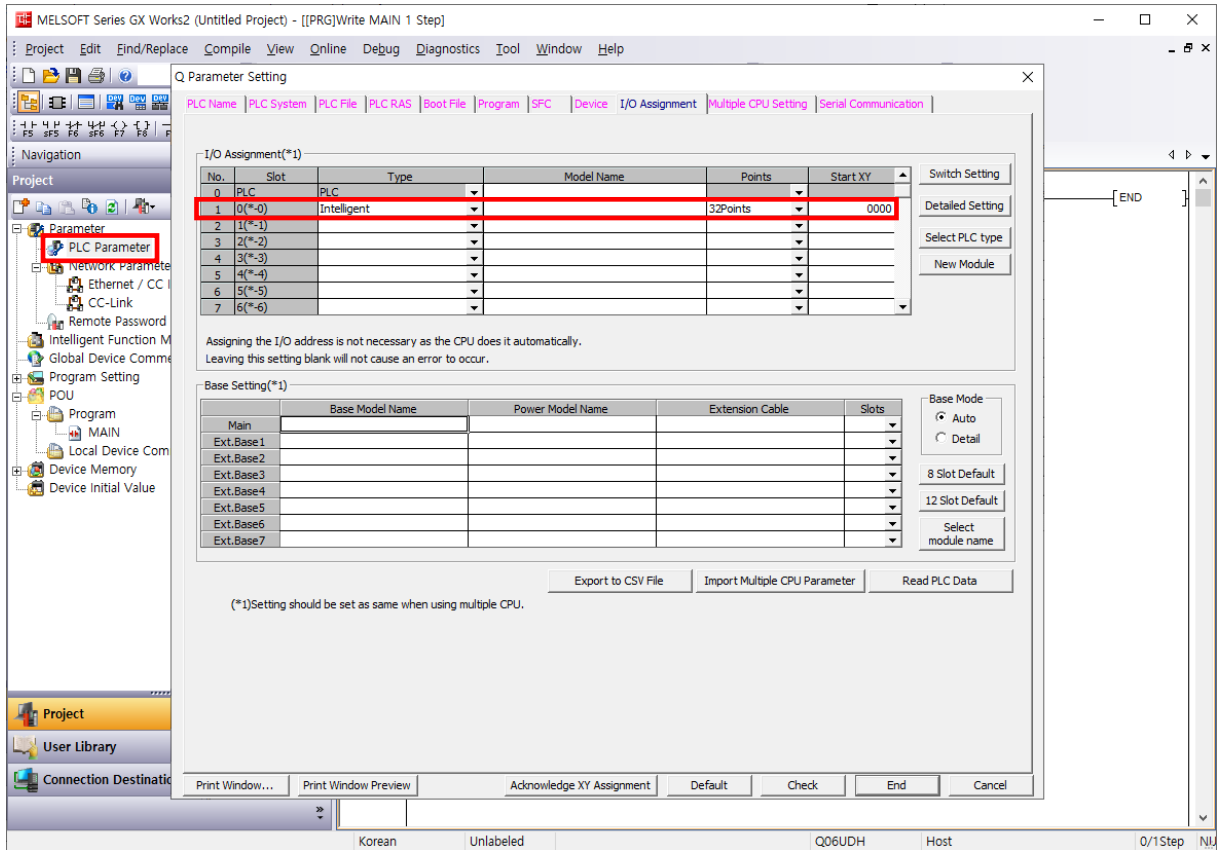
Use MELSOFT Engineering Software to set as follows.

This example is a setting method using GX Works2. For more details, refer to the manufacturer's user manual.

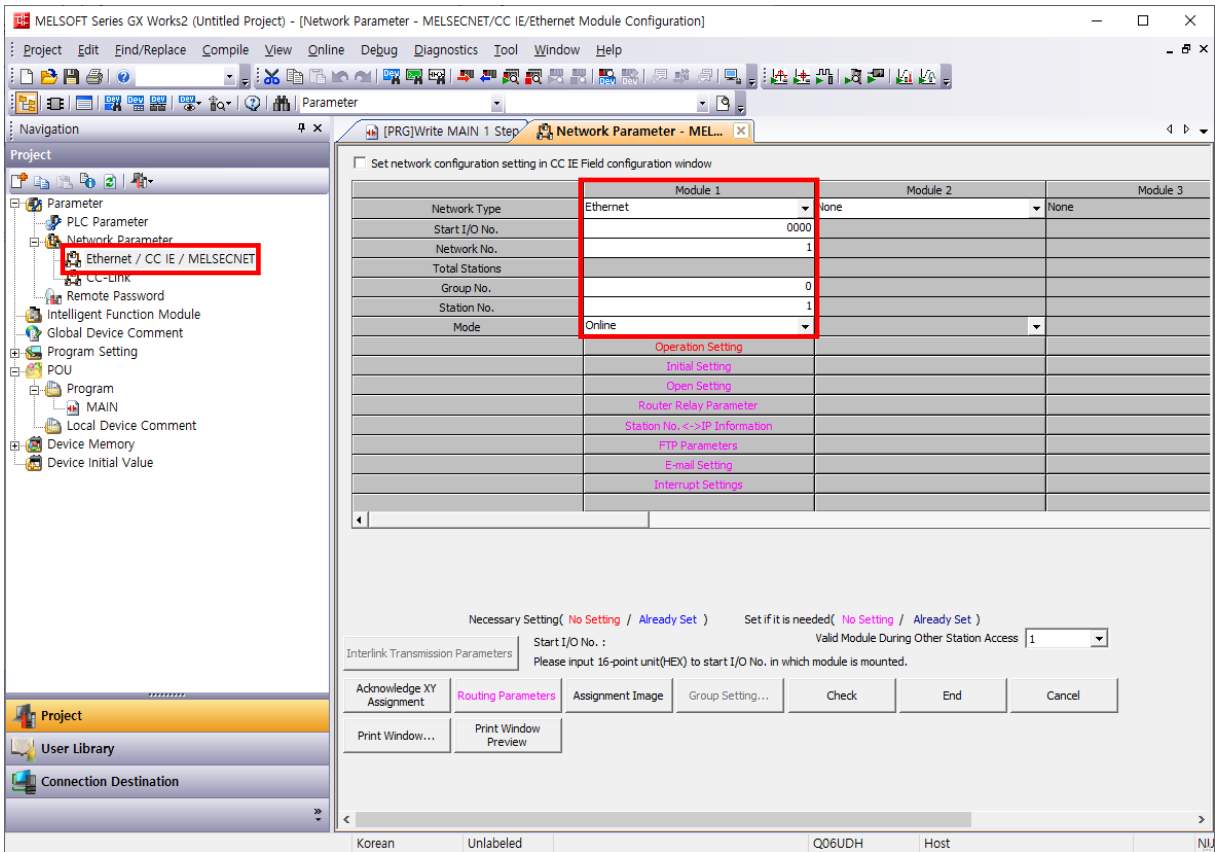
※ Set it to the same protocol as TOP.

4.1 MC Protocol 3E Binary

Step1. Register the Ethernet communication module in the [Parameter] → [I/O Assignment] window.

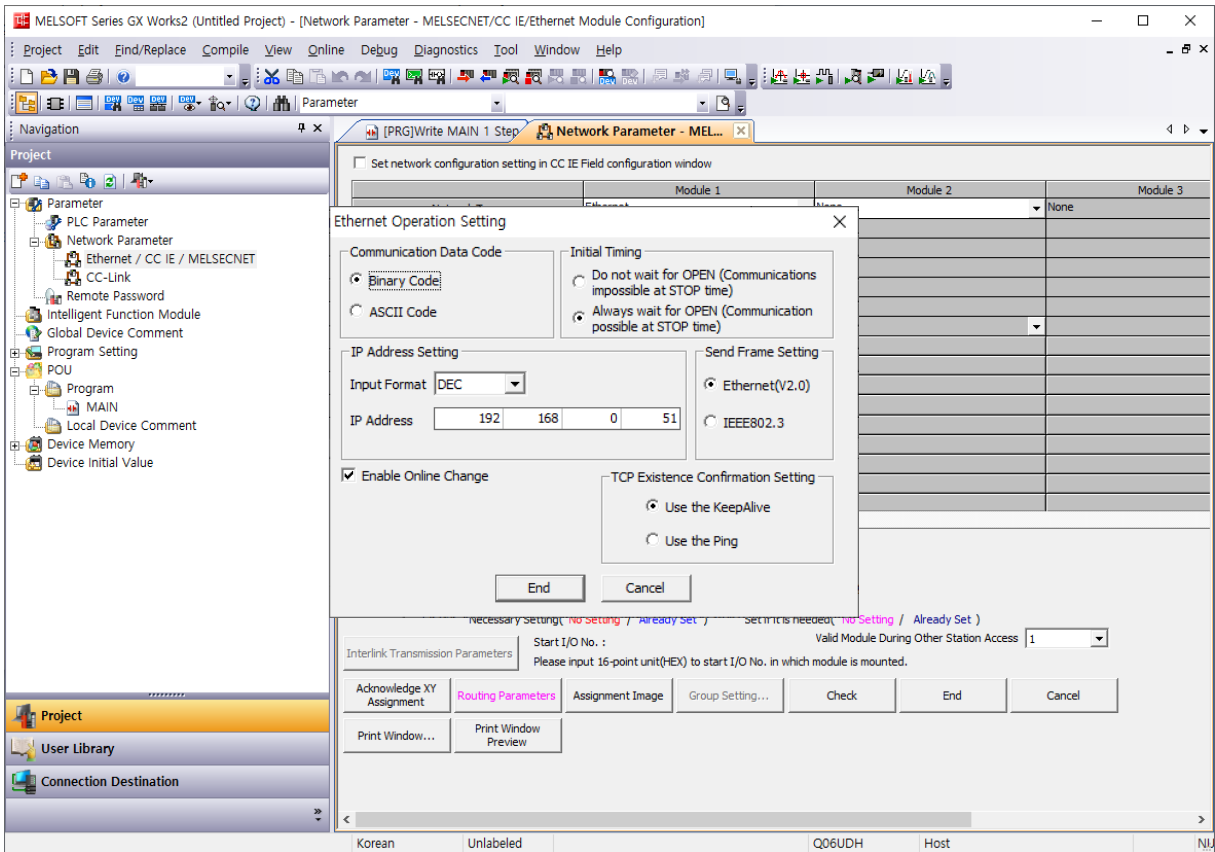


Step2. Set the Ethernet network in the [Network Parameter] → [Ethernet / CC IE / MELSECNET] window.



Items	Contents	Setting value	Remarks
Network Type	Network	Ethernet	
Start I/O No.	I/O number of the Ethernet communication module	0000	
Network No.	PLC network number	1	
Station No.	PLC station number	1	

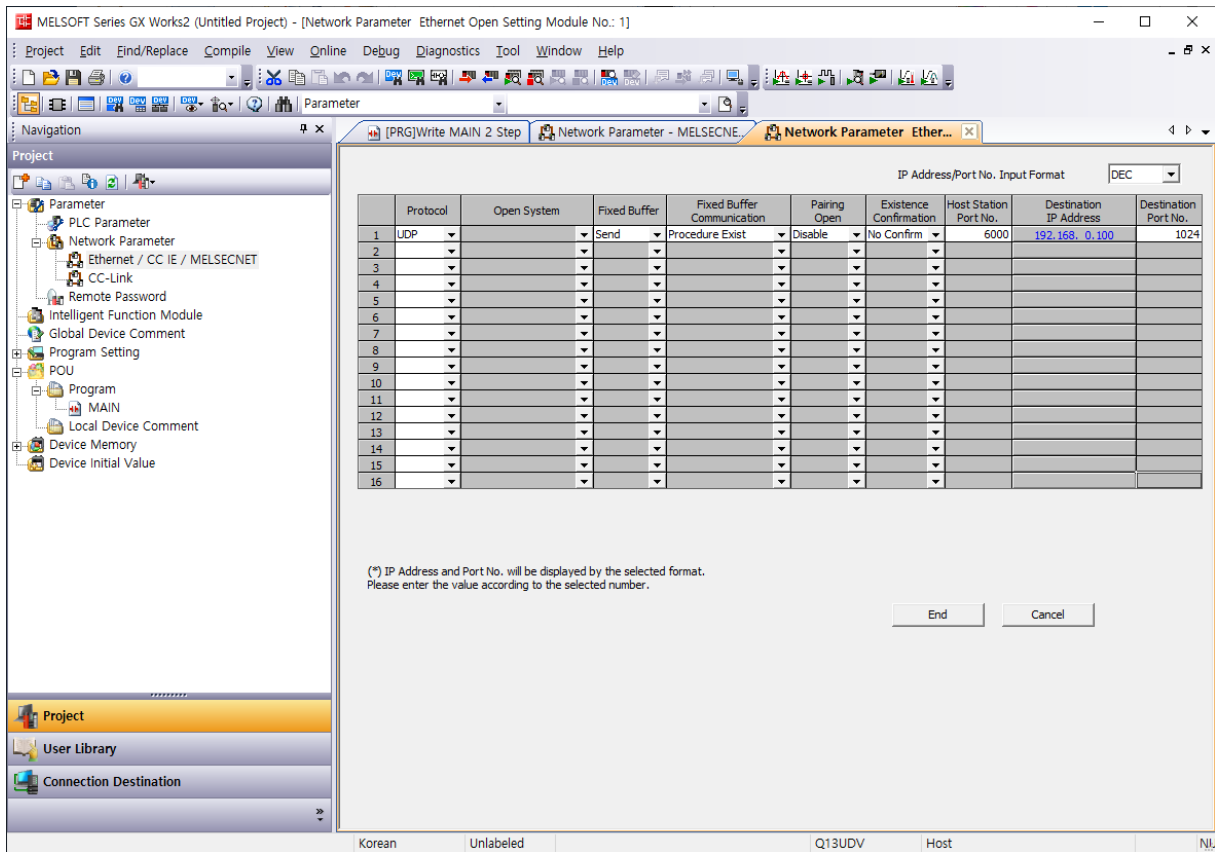
Step3. Set the Ethernet network in the [Network Parameter] → [Ethernet / CC IE / MELSECNET] → [Operation Setting] window.



Items	Contents	Setting value	Remarks
Communication Data Code	Data code	Binary	
Initial Timing	Communication module initialization time	Always wait for OPEN	
IP Address Setting	IP setting	192.168.0.51	
Send Frame Setting	Send frame setting	Ethernet	
Enable Online Change	Enable online change	Enable	
TCP Existence Confirmation Setting	TCP Existence Confirmation Setting	Use the KeepAlive	

Step4. Set the Ethernet network in the [Network Parameter] → [Ethernet / CC IE / MELSECNET] → [Open Setting] window.

Case1. When set to UDP (recommended)

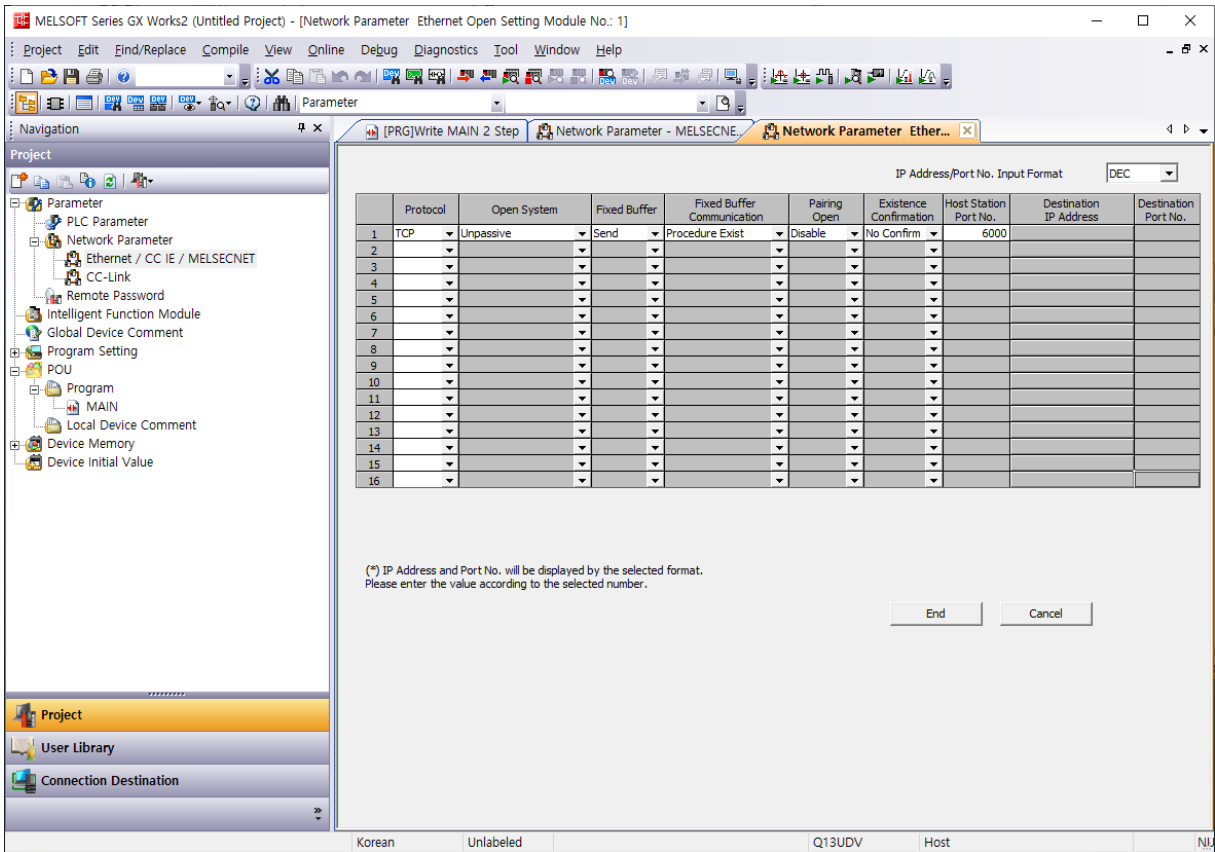


Items	Contents	Setting value	Remarks
Protocol	Ethernet protocol	UDP	
Host Station Port No.	PLC Ethernet port No.	6000	
Destination IP Address	TOP Ethernet IP	192.168.0.100	
Destination Port No.	TOP Ethernet port No.	1024	

- ※ UDP setting is recommended for wireless TOP or in a noisy environment.
- ※ When connecting N TOP(s) to one PLC, set it up using the following method.

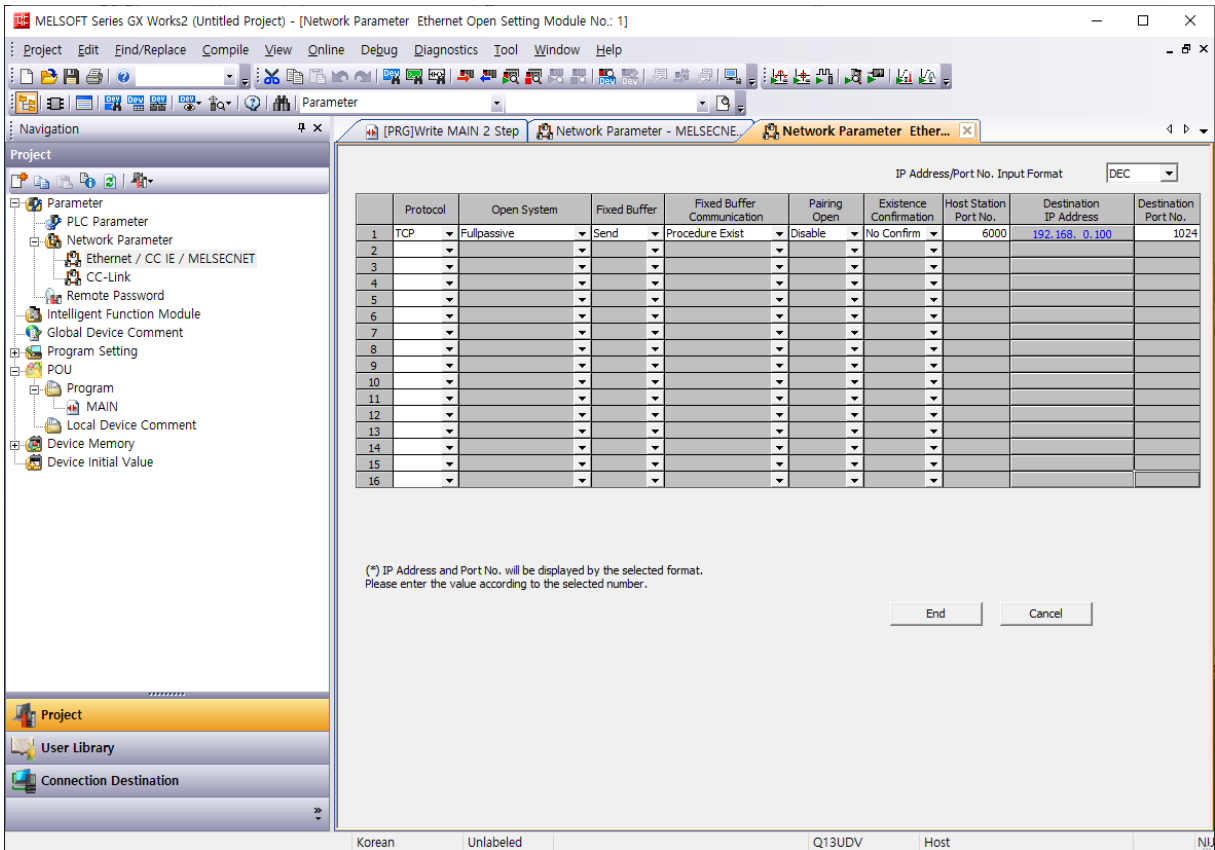
	Protocol	Open System	Fixed Buffer	Fixed Buffer Communication	Pairing Open	Existence Confirmation	Host Station Port No.	Destination IP Address	Destination Port No.
1	UDP	Send	Procedure Exist	Disable	No Confirm	6000	192.168.0.100	1024	
2	UDP	Send	Procedure Exist	Disable	No Confirm	6001	192.168.0.101	1024	
3	UDP	Send	Procedure Exist	Disable	No Confirm	6002	192.168.0.102	1024	
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

Case2. When setting to TCP 1



Items	Contents	Setting value	Remarks
Protocol	Ethernet protocol	TCP	
Host Station Port No.	PLC Ethernet port No.	6000	

Case3. When setting to TCP 2



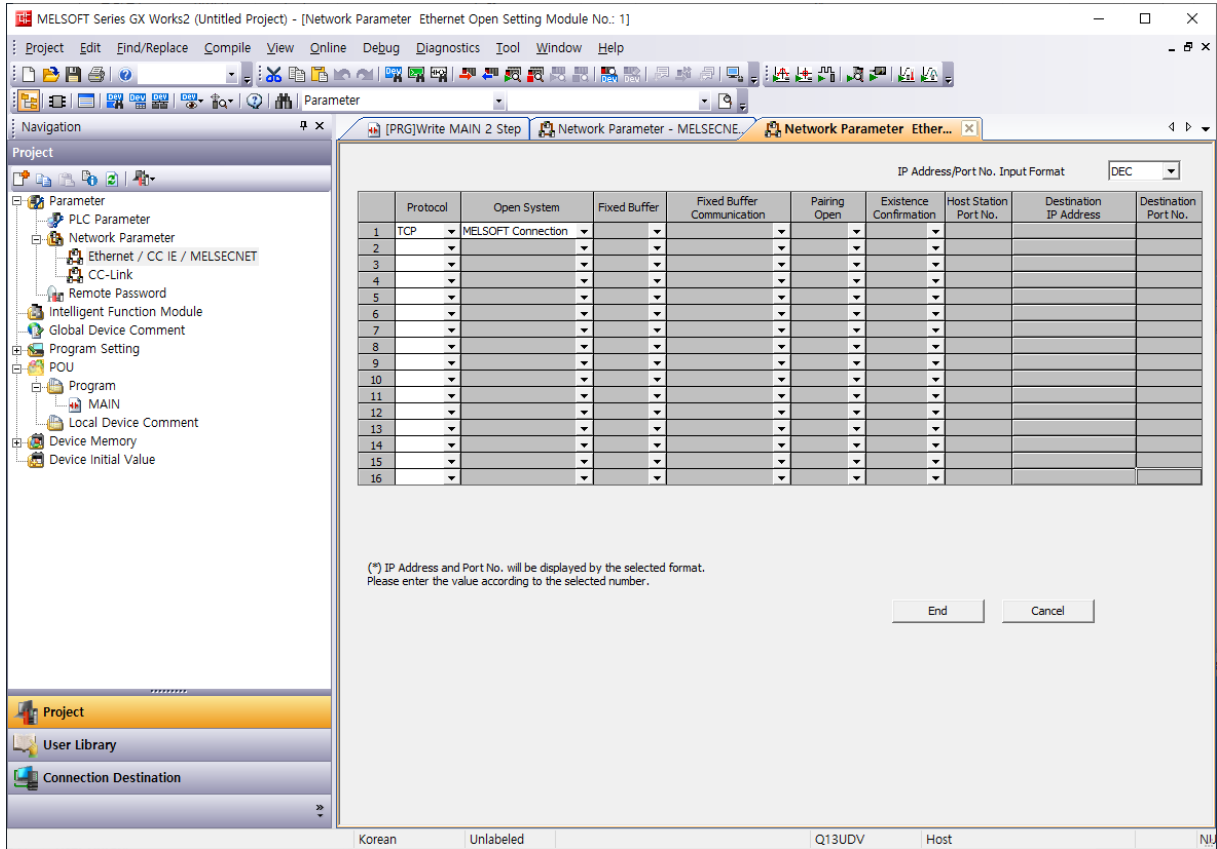
Items	Contents	Setting value	Remarks
Protocol	Ethernet protocol	TCP	
Host Station Port No.	PLC Ethernet port No.	6000	
Destination IP Address	TOP Ethernet IP	192.168.0.100	
Destination Port No.	TOP Ethernet port No.	1024	

4.2 MC Protocol 3E ASCII

Set the Communication Data Code in the [Network Parameter] → [Ethernet / CC IE / MELSECNET] → [Operation Setting] window to ASCII. The rest of the setting method is the same as MC Protocol 3E Binary.

4.3 MELSOFT Connection

Refer to MC Protocol 3E Binary setting method to proceed Step 1~3, and then set as follows in the [Network Parameter] → [Ethernet / CC IE / MELSECNET] → [Open Setting] window.



Items	Contents	Setting value	Remarks
Protocol	Ethernet protocol	TCP	
Open System	Open way	MELSOFT Connection	

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.

Address	Bit	Word	Remarks	32 BIT
Input Relay	X0000 ~ X1FFF (HEX)	X0000 ~ X1FF0 (HEX)	X***0 *Note 1)	L/H *Note 3)
Output Relay	Y0000 ~ Y1FFF (HEX)	Y0000 ~ Y1FF0 (HEX)	Y***0 *Note 1)	
Internal Relay	M0000 ~ M61439	M0000 ~ M61424	M0000 + 16*n *Note 2)	
Special Relay	SM0000 ~ SM2047	SM0000 ~ SM2032	SM0000 + 16*n *Note 2)	
Latch Relay	L0000 ~ L32767	L0000 ~ L32752	L0000 + 16*n *Note 2)	
Annunciator	F0000 ~ F32767	F0000 ~ F32752	F0000 + 16*n *Note 2)	
Edge Relay	V0000 ~ V32767	V0000 ~ V32752	V0000 + 16*n *Note 2)	
Step Relay	S0000 ~ S8191	S0000 ~ S8176	S0000 + 16*n *Note 2)	
Link Relay	B0000 ~ BEFFF (HEX)	B0000 ~ BEFF0 (HEX)	B***0 *Note 1)	
Special Link Relay	SB0000 ~ SB7FF0 (HEX)	SB0000 ~ SB7FF0 (HEX)	SB***0 *Note 1)	
Timer (contact)	TS00000 ~ TS25471	TS00000 ~ TS25456		
Timer (coil)	TC00000 ~ TC25471	TC00000 ~ TC25456		
Aggregate Timer (contact)	SS00000 ~ SS25471	SS00000 ~ SS25456		
Aggregate Timer (coil)	SC00000 ~ SC25471	SC00000 ~ SC25456		
Counter (contact)	CS00000 ~ CS25471	CS00000 ~ CS25456		
Counter (coil)	CC00000 ~ CC25471	CC00000 ~ CC25456		
Timer (current value)	TN00000.0 ~ TN25471.15	TN00000 ~ TN25471		
Aggregate Timer (current value)	SN00000.0 ~ SN25471.15	SN00000 ~ SN25471		
Counter (current value)	CN00000.0 ~ CN25471.15	CN00000 ~ CN25471		
Data Register	D0000000.0 ~ D4212223.15	D0000000 ~ D4212223	Binary Protocol	
	D000000.0 ~ D999999.15	D000000 ~ D999999	ASCII Protocol	
Special Data Register	SD0000.0 ~ SD2255.15	SD0000 ~ SD2255		
Link Register	W000000.0 ~ W4045FF.F	W000000 ~ W4045FF		
Link Special	SW0000.0 ~ SW7FFF.F	SW0000 ~ SW7FFF		
Index	Z00.0 ~ Z19.15	Z00 ~ Z19		
File Register		Custom range		

*Note 1) For bit addresses with hexadecimal "0~F" notations, use the initial 0 bit as the word address

*Note 2) When using a bit address that uses decimals, use a word address in units of "16"

*Note 3) The lower 16 BIT data of 32 BIT data is saved in the address whose screen has been registered, and the upper 16 BIT data is saved in the address next to the address whose screen has been registered.

Ex. When saving 32BIT data hexadecimal data 12345678 in address D00100, it is saved to 16BIT device address as follows:

Items	32BIT		16BIT	
	Address	D00100	D00100	D00101
Input data (hexadecimal)		12345678	5678	1234