MITSUBISHI Electric Corporation

MELSEC Q Series

CPU 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 Q CPU Ethernet" is as follows.

Series	CPU	Link I/F	Communication method	Communication setting	Cable
MELSEC-Q	QUDE QUDEH QUDV	CPU Built-in Ethernet	Ethernet (TCP/UDP)	3. TOP communication setting 4. External device setting	Twisted pair cable*Note 1)

*Note 1) Twisted pair cable

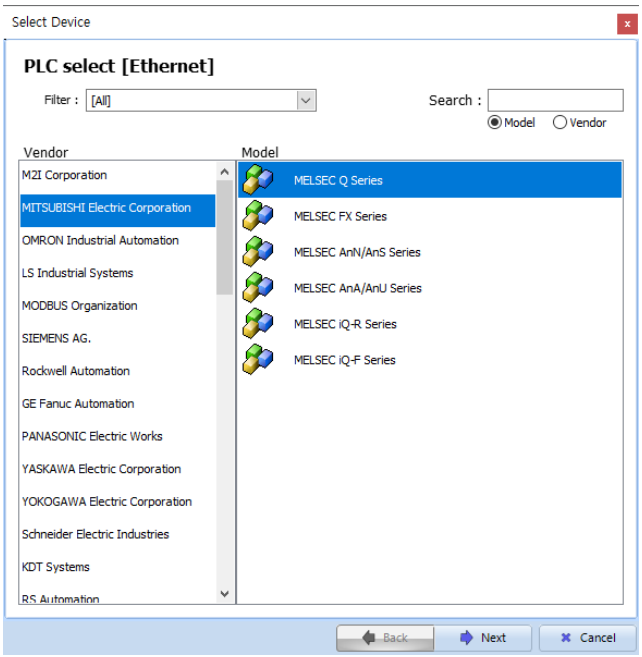
- Refer to STP (Shielded Twisted Pair Cable) or UTP (Unshielded Twisted Pair Cable) Category 3, 4, 5.
- Depending on the network configuration, you can connect to components such as the hub and transceiver, and in this case, use a direct cable.

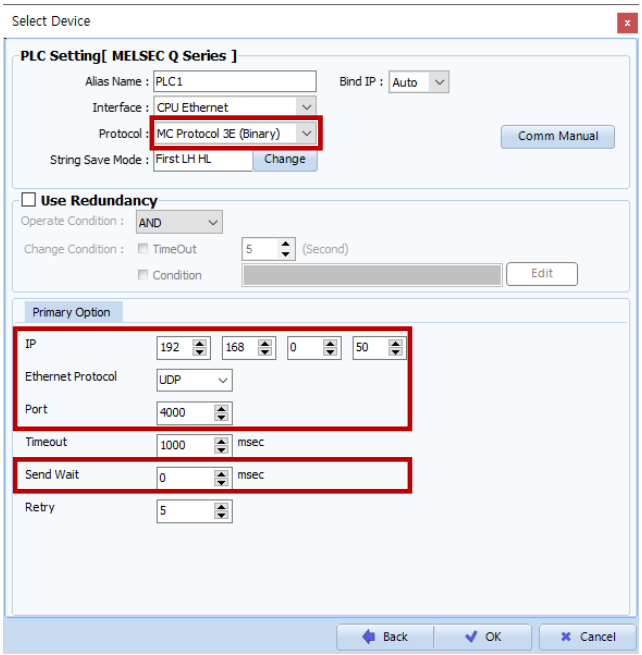
■ Connection configuration

・1:1 (one TOP and one external device) 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. Please select "MITSUBISHI Electric Corporation".
	PLC	Select the external device to be connected to the TOP.

Model	Interface	Protocol
MELSEC Q Series	CPU 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

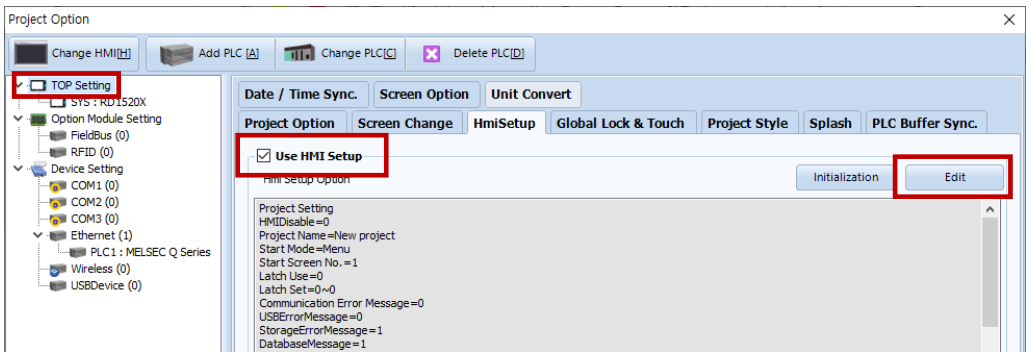
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

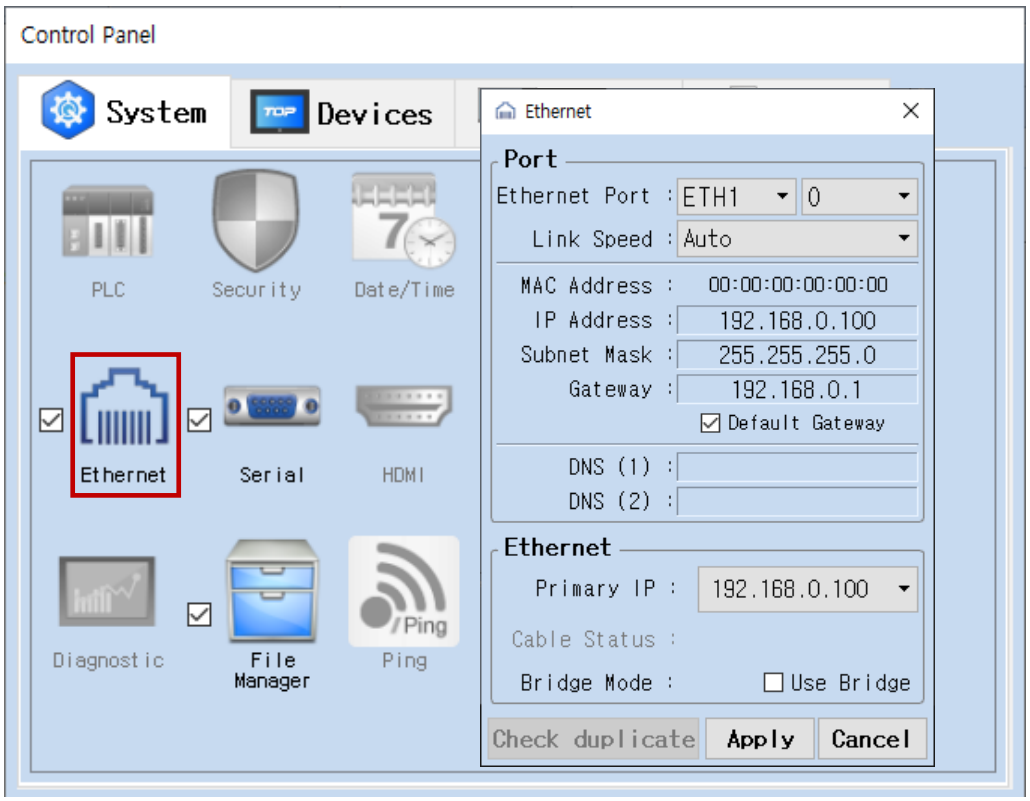
3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project > 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)	192.168.0.100	192.168.0.50	
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.

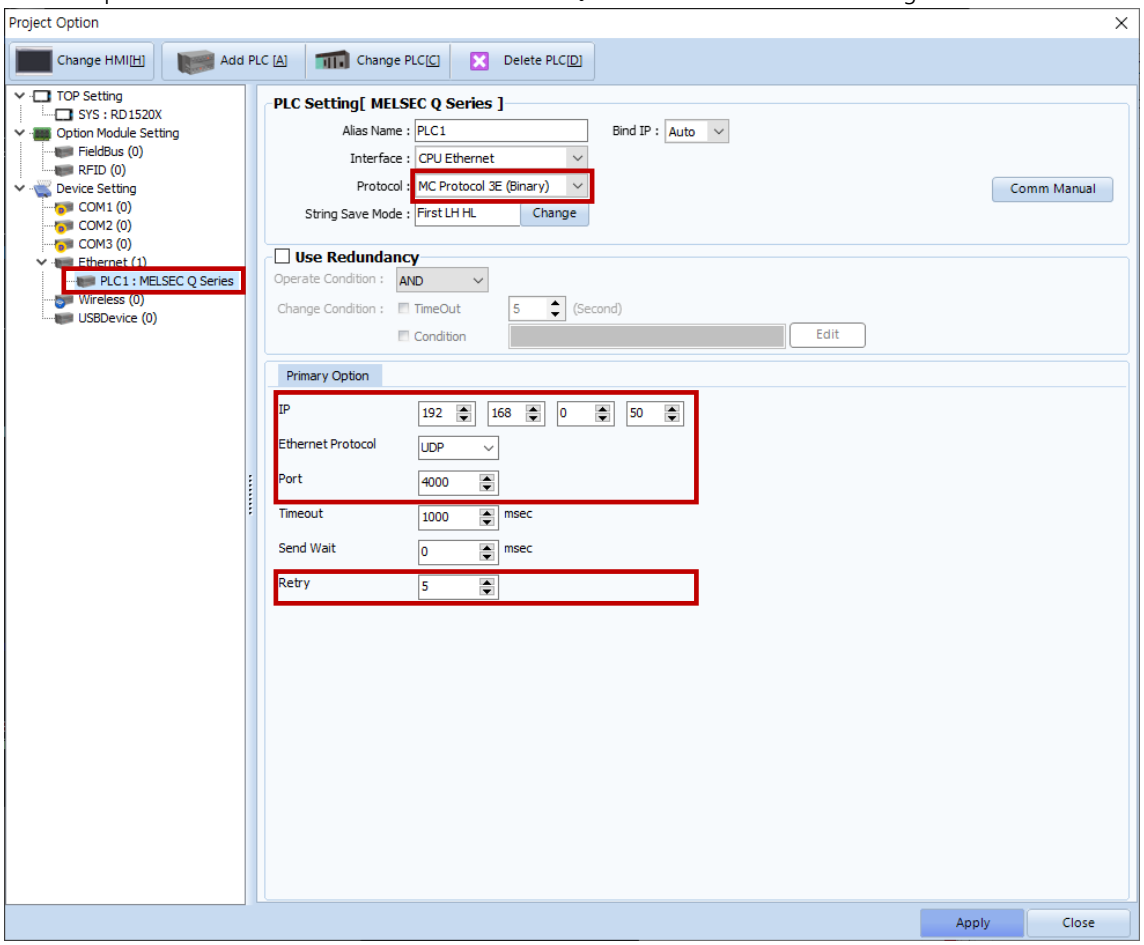
* The above settings are examples recommended by the company.

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 settings > ETHERNET > "PLC1 : MELSEC-Q Series"]

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



Items	Settings	Remarks
Interface	Select "CPU 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 an external device.	**Reference the table below**
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.	

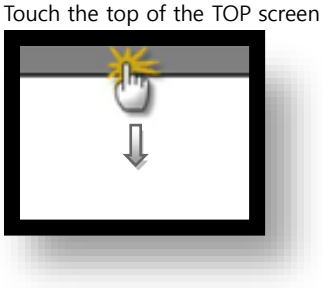
MELSEC Q Series CPU communication port number

Protocol	Port number		Remarks
MC Protocol 3E (UDP) (recommended)	Port number given in [Built-in Ethernet Port Setting > Open Setting]		
MC Protocol 3E (TCP) (N:1)	When using multiple TOPs, it is recommended to use TCP to avoid mistakes.		
MELSOFT Connection (UDP)	QnUDEH : 5006 DEC	QnUDV/QnUDPV : 5001 DEC	Fixed
MELSOFT Connection (TCP)	5007 DEC		Fixed

3.2. Communication setting in TOP

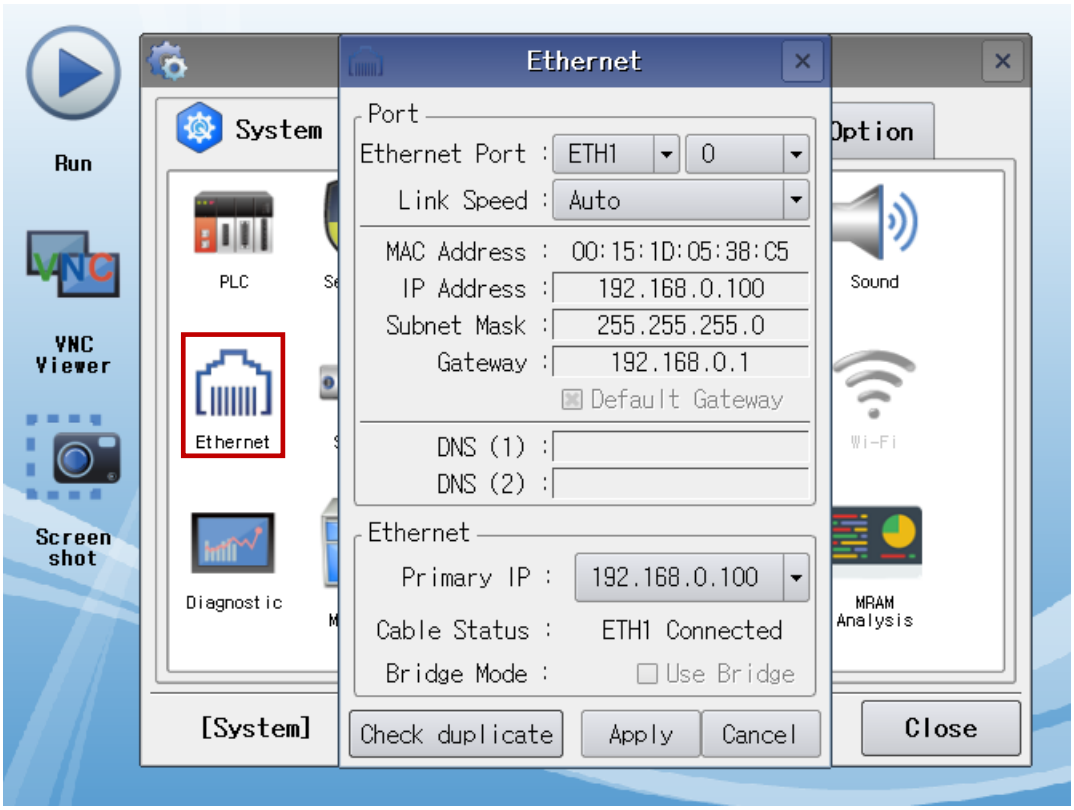
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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)	192.168.0.100	192.168.0.50	
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.

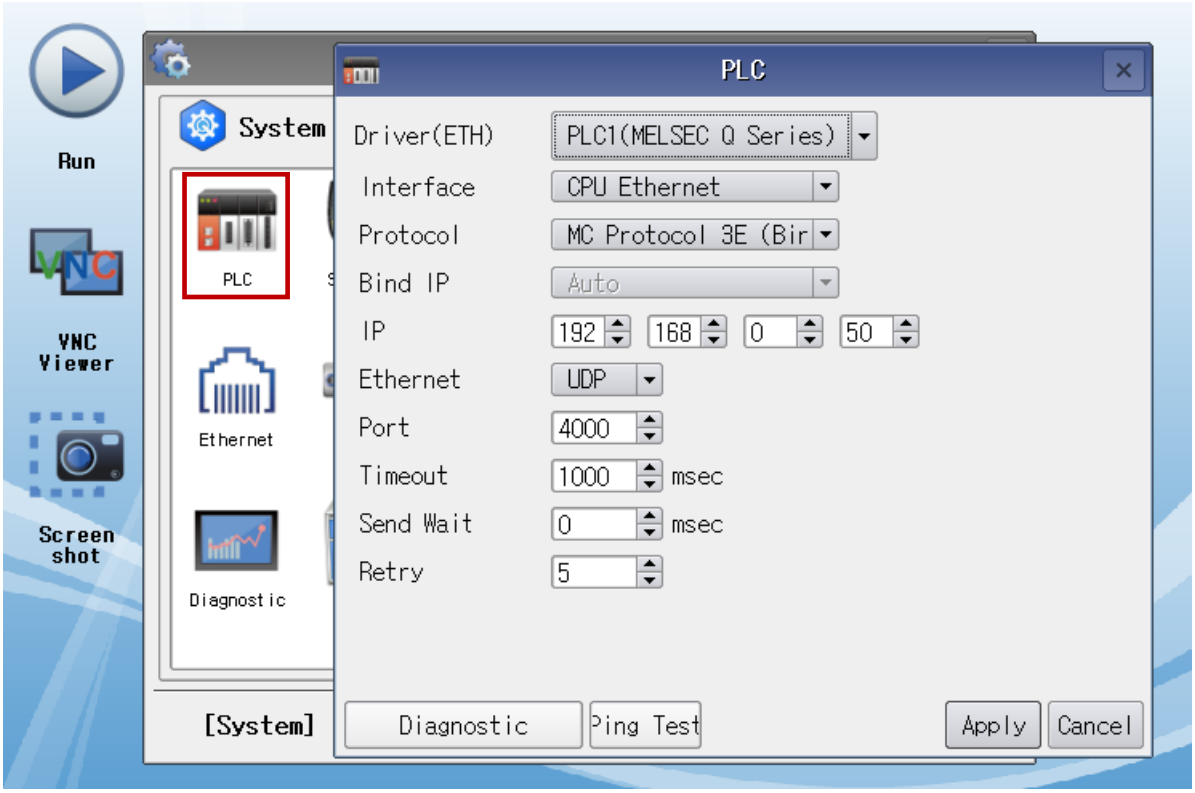
*Note 2) Do not use duplicate IP addresses over the same network.

* 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 "CPU 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 an external device.	**Reference the table below**
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.	

MELSEC Q Series CPU communication port number

Protocol	Port number		Remarks
MC Protocol 3E (UDP) (recommended)	Port number given in [Built-in Ethernet Port > Open Setting]		
MC Protocol 3E (TCP) (N:1)	When using multiple TOPs, it is recommended to use TCP to avoid mistakes.		
MELSOFT Connection (UDP)	QnUDEH : 5006 $_{DEC}$	QnUDV/QnUDPV : 5001 $_{DEC}$	Fixed
MELSOFT Connection (TCP)	5007 $_{DEC}$		Fixed

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** - 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.

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. 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 (For details, please refer to the PLC vendor's manual.)

4. External device setting

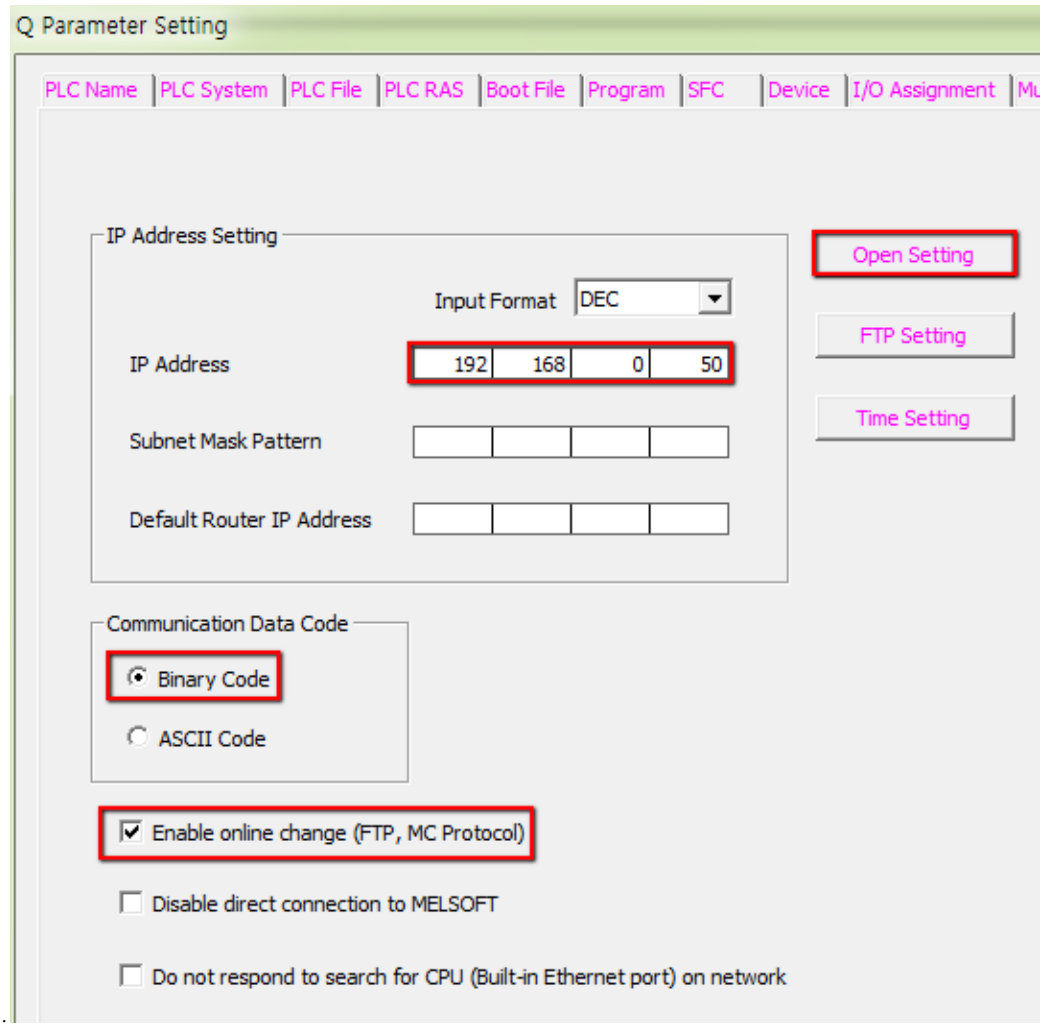
4.1 MC Protocol 3E (Binary / Ascii) setting

Use the MELSEC series Ladder Software "**GX Developer or GX Works**" to set as follows. For more detailed setting methods than described in this example, refer to the PLC user manual.

- The network addresses of the TOP and the external device (the first three digits of the IP, 192 . 168 . 0 . 0) should match.
- Do not use duplicate IP addresses over the same network.

Step 1. Double-click [Parameter] – [PLC parameter] in the [GPPW] software project window to open the [Q parameter setting].

Step 2. Select the [Built-in Ethernet port] tab in the [Q parameter setting] window to configure as below.

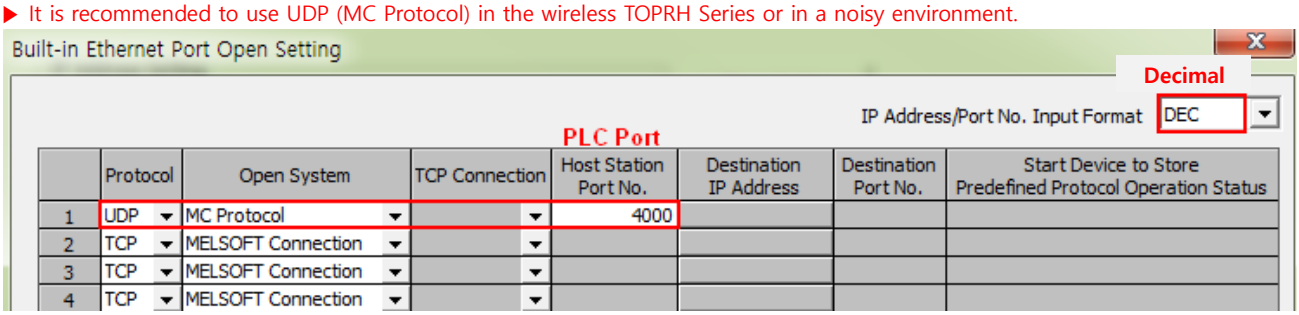


Items		Description
IP address	IP	MELSEC-Q CPU Ethernet port assigned IP
	Subnet mask pattern	Set when using subnet mask
	Default router IP	Set when using router
Communication data code		User settings (Binary code / ASCII code)
Enable online change (FTP, MC protocol)		Enable
Disable direct connection to MELSOFT		Not used
Do not resposd to search for CPU(Built-In Ethernet Port)on network		Not used

Step 3. Click [Open setting] in [Built-in Ethernet port] tab of the [Q parameter setting] window to set the following matters.

※ Add PLC ports as many as TOP units.

▶ It is recommended to use UDP (MC Protocol) in the wireless TOPRH Series or in a noisy environment.



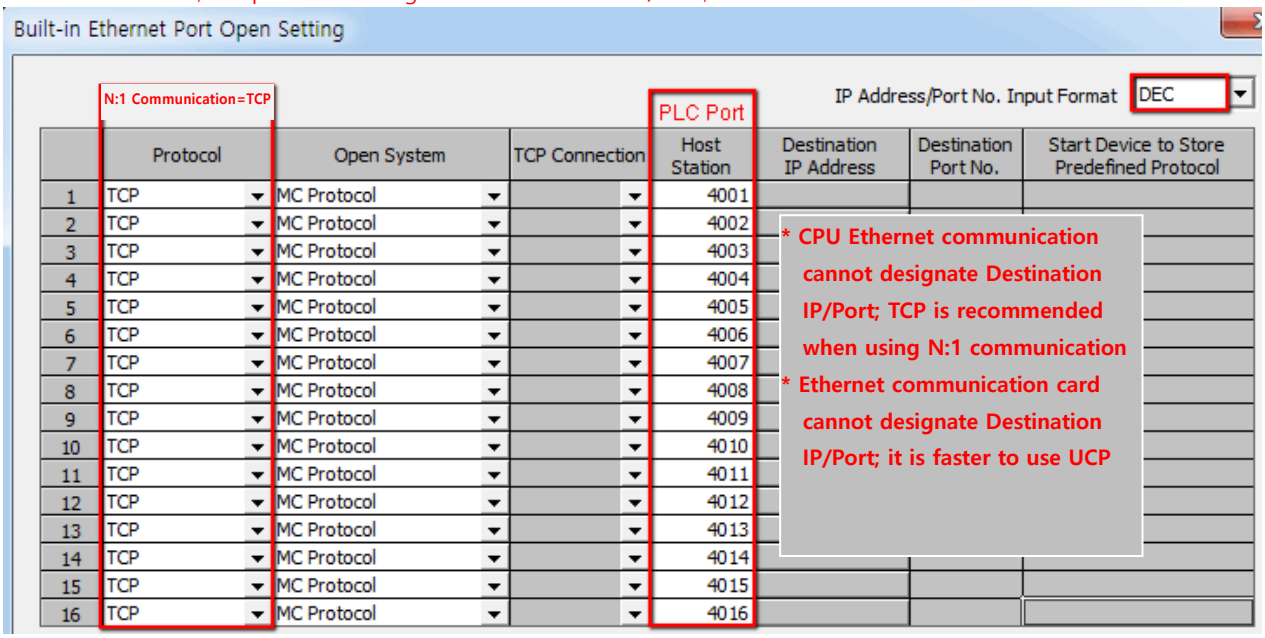
Items	Description	Remarks
IP Address or Port No Input Format	Select "DEC" (decimal).	
Protocol	Set the external device's Ethernet protocol to UDP. (TCP for N:1 communication)	Set Users
Open system	Select "MC Protocol".	Fixed
Host station port No (PLC port number)	Set the external device's Ethernet communication port number.	Set Users

It must be the same as TOP's communication option settings. (Remark)

※ The picture below is an example of communicating with TOP 16 units. However, the communication speed is reduced to 1/16.

▶ As shown in the picture below, when multiple TOPs are connected to the CPU, set "Send Wait (ms)" to "10~20 ms" in the TOP's communication option to reduce the load on PLC.

▶ As CPU Ethernet communication cannot designate the Destination IP/Port, it is easy for the user to make a serious mistake of using the same PLC port for N TOPs in case of N:1 communication. To prevent this, we recommend using TCP. In case of Ethernet communication card, it is possible to designate the Destination IP / Port, so it is faster to use UDP.



Step 4. After transmitting the parameters set in [Online] > [Write to PLC], reset PLC.

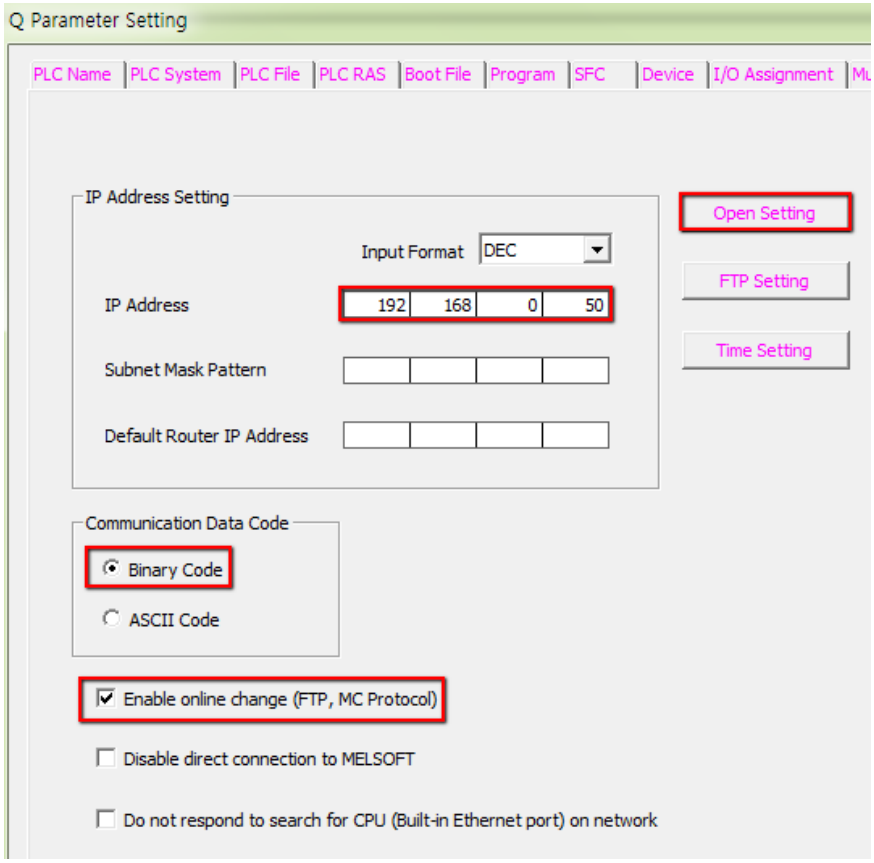
4.2 MELSOFT Connection setting

Use the MELSEC series Ladder Software "**GX Developer or GX Works**" to set as follows. For more detailed setting methods than described in this example, refer to the PLC user manual.

- The network addresses of the TOP and the external device (the first three digits of the IP, 192 . 168 . 0 . 0) should match.
- Do not use duplicate IP addresses over the same network.

Step 1. Double-click [Parameter] – [PLC parameter] in the [GPPW] software project window to open the [Q parameter setting].

Step 2. Select the [Built-in Ethernet port] tab in the [Q parameter setting] window to configure as below.



Items		Settings
IP address	IP	MELSEC-Q CPU Ethernet port assigned IP
	Subnet mask pattern	Set when using subnet mask
	Default router IP	Set when using router
Communication data code		Binary code (fixed)
Enable online change (FTP, MC protocol)		Enable
Disable direct connection to MELSOFT		Not used
Do not resposd to search for CPU(Built-In Ethernet Port)on network		Not used

Step 3. Click [Open setting] in the [Built-in Ethernet port] tab of the [Q parameter setting] window to set the following matters.

	Protocol	Open system	TCP connection	Host station port No.	Transmission target device IP address	Transmission target device port No.
1	UDP	MELSOFT connection				

Items	Description	Remarks
Protocol	Set the external device's Ethernet protocol.	Set Users
Open system	Select "MELSOFT connection".	Fixed

※ It must be the same as TOP's communication option setting. (Remark)

Step 4. After transmitting the parameters set in [Online] > [Write to PLC], reset PLC.

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.

Device	Bit Address	Word Address	Word Address NOTE	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 in 16BIT device address as follows.

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