MITSUBISHI Electric Corporation

MELSEC FX Series

Ethernet Driver

MC Protocol 1E

Supported version TOP Design Studio V1.3.0 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 FX Series Ethernet (MC Protocol 1E)" is as follows:

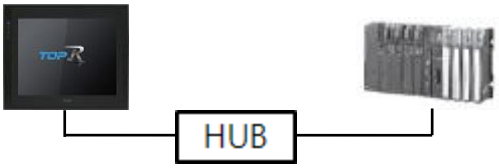
Series	CPU	Link I/F	Communication method	Communication setting	Cable
MELSEC-F	FX3U FX3UC	FX3U-ENET-L	Ethernet (TCP/UDP)	3. TOP communication setting 4. External device setting	Twisted pair cable*Note 1)

*Note 1) Twisted pair cable

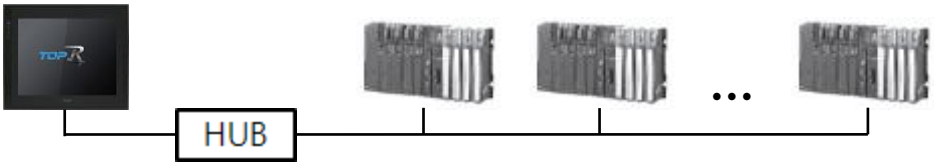
- Refer to STP (Shielded Twisted Pair Cable) or UTP (Unshielded Twisted Pair Cable) Category 3, 4, 5.
- Depending on the network configuration, you can connect to components such as the hub and transceiver, and in this case, use a direct cable.

■ Connectable configuration

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

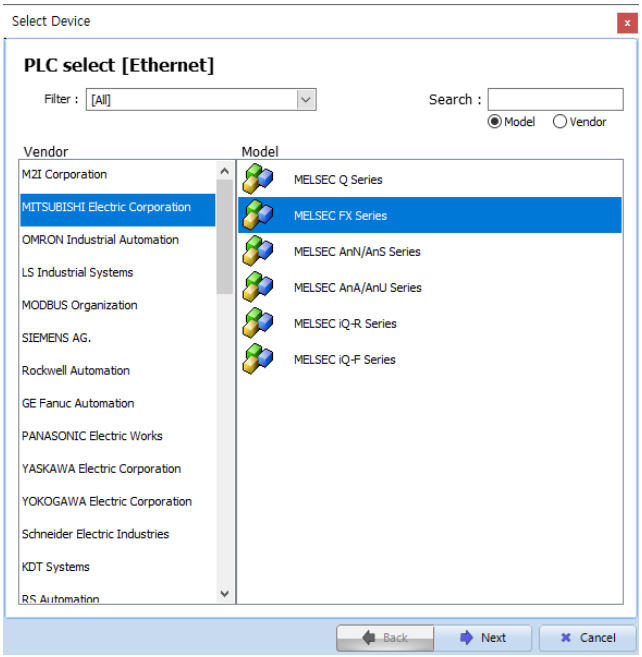


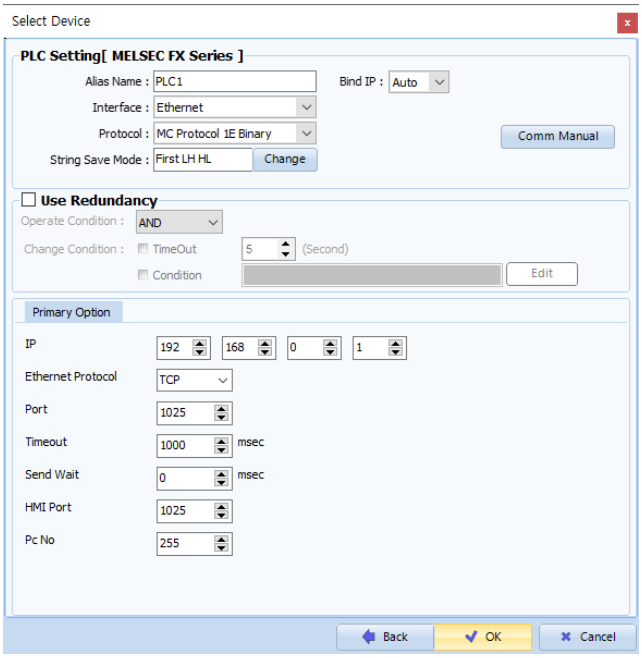
・1:N (one TOP and multiple external devices) connection



2. External device selection

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





Settings		Contents
TOP	Model	Check the display and process of TOP to select the touch model.
External device	Vendor	Select the vendor of the external device. Please select "MITSUBISHI Electric Corporation".
	Model	Select external device.

Model	Interface	Protocol
MELSEC FX Series	Ethernet	Set Users

Supported Protocol	
MC Protocol 1E Binary	MC Protocol 1E ASCII

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

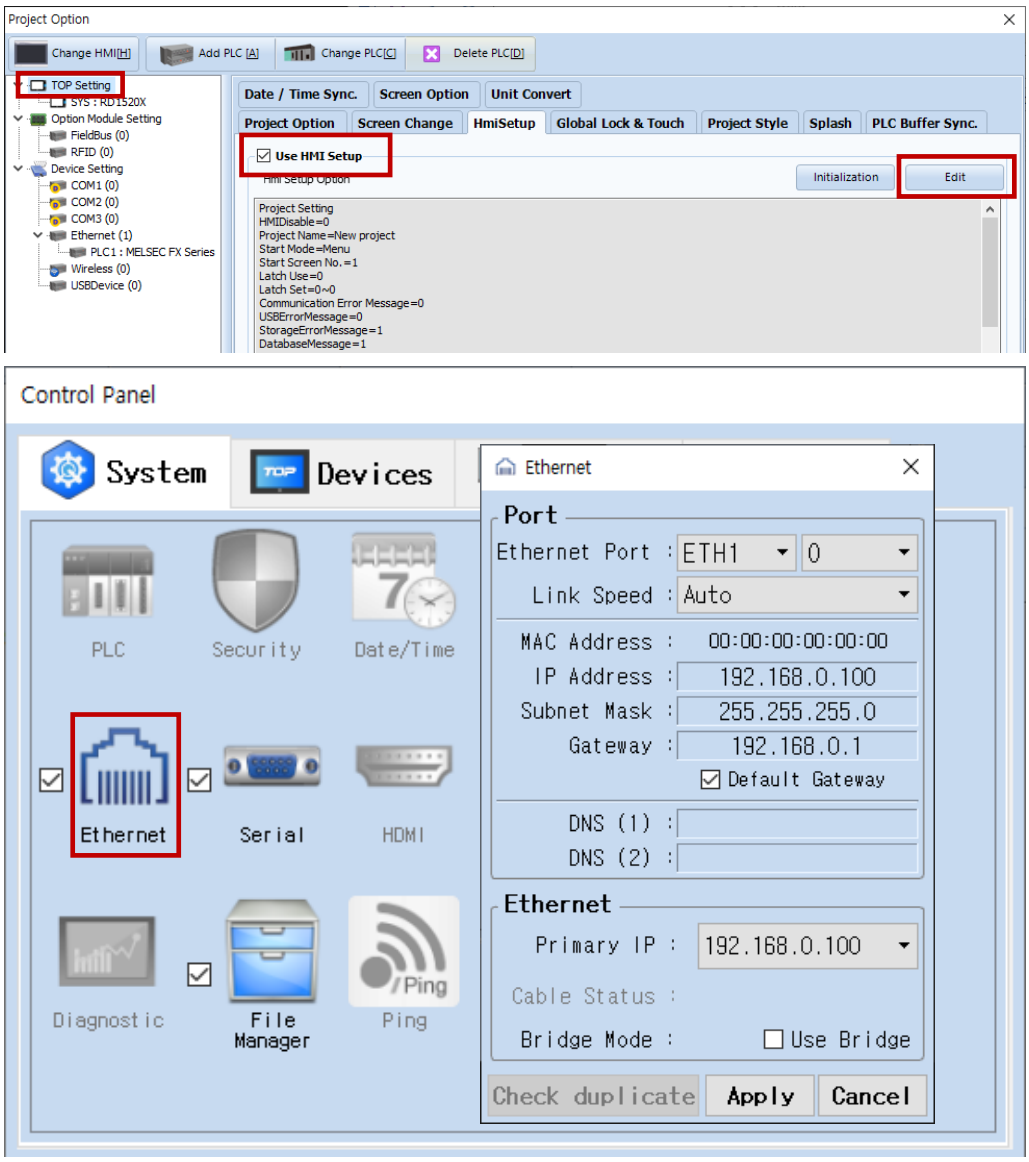
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project > Project Property > TOP Setting] → [Project Options > "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	192.168.0.50	*Note *Note 2)
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.

*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.

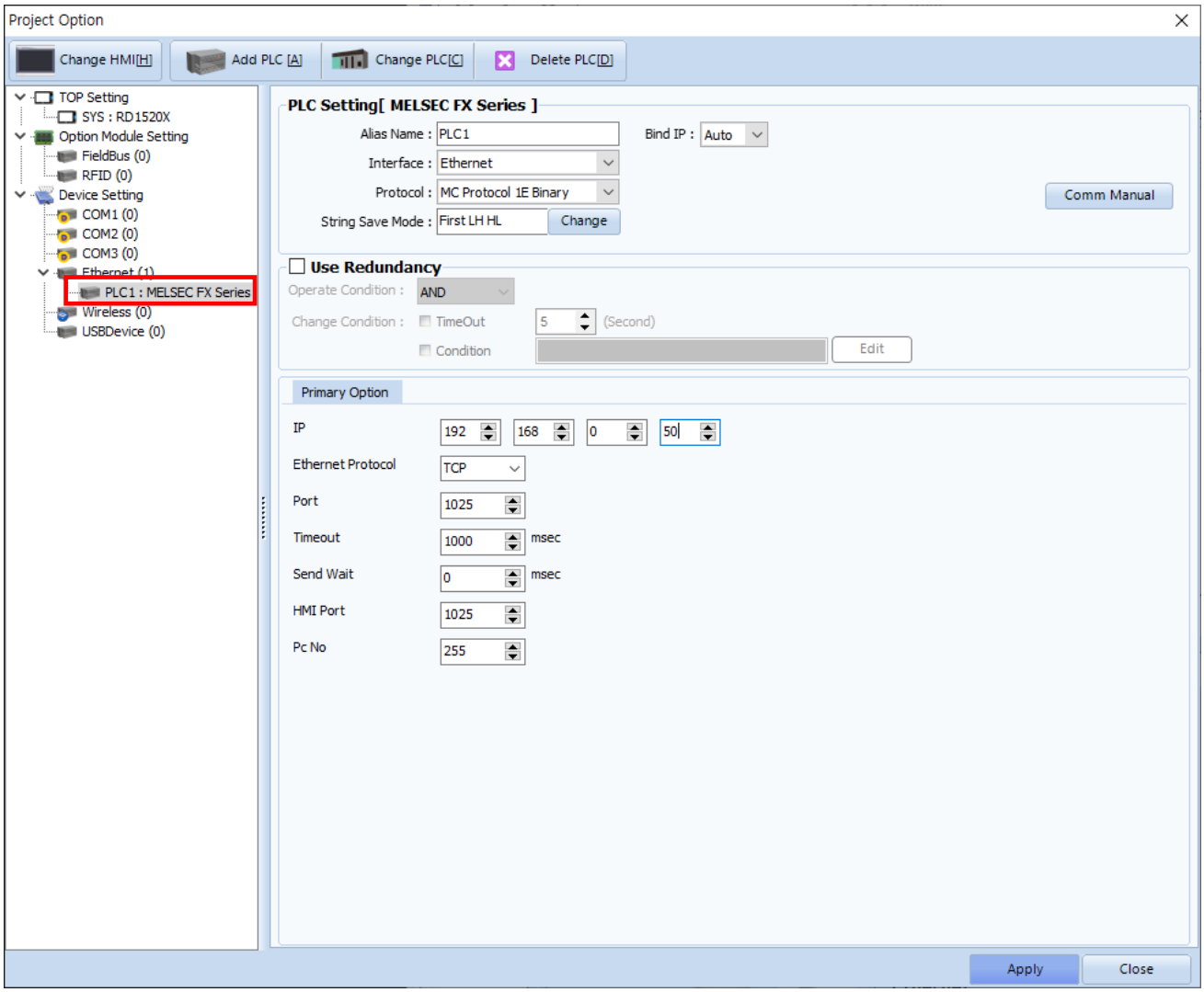
*Note 2) Do not use duplicate IP addresses over the same network.

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

■ [Project > Project Property > PLC Settings > ETHERNET > "PLC1 : MELSEC-FX Series"]

– Set the options of the MELSEC FX Series Ethernet (MC Protocol 1E) communication driver in TOP Design Studio.



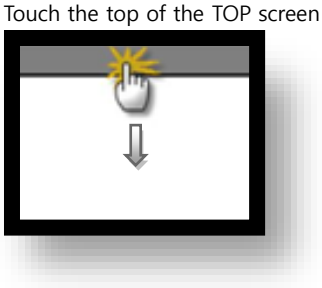
Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection".
Protocol	Select the communication protocol between the TOP and an external device.	
IP	Enter the IP address of the external device.	
Ethernet Protocol	Select the Ethernet protocol between the TOP and an external device.	
Port	Enter the Ethernet communication port number of 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.	
HMI Port	Enter the Ethernet communication port number of the TOP.	
PC No	Enter the prefix of PLC.	*Note 1)

*Note 1) The PLC number identifies which PLC to connect to on the CC-Link IE controller network, CC-Link IE field network, and MELSECNET/H, MELSECNET/10 network. The initial value is 255 (dec) and is 255 or in the range of 0 to 64 when configuring a multi-CPU.

3.2. Communication setting in TOP

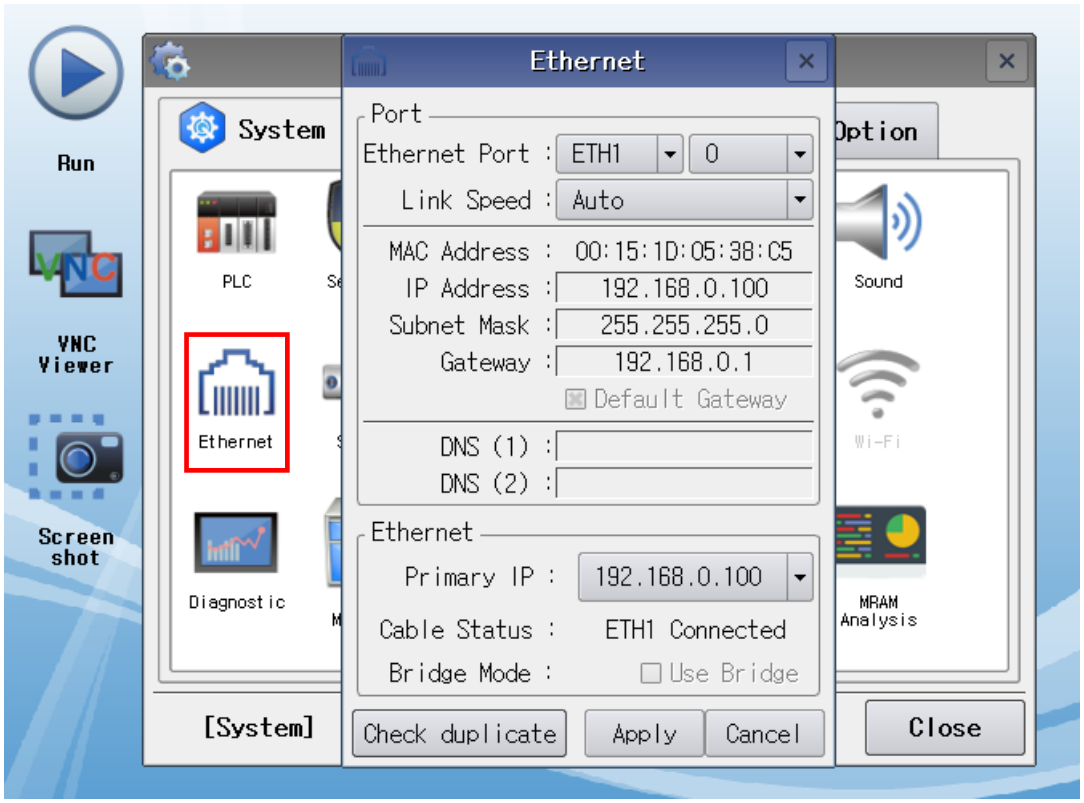
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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	192.168.0.100	192.168.0.50	*Note *Note 2)
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.

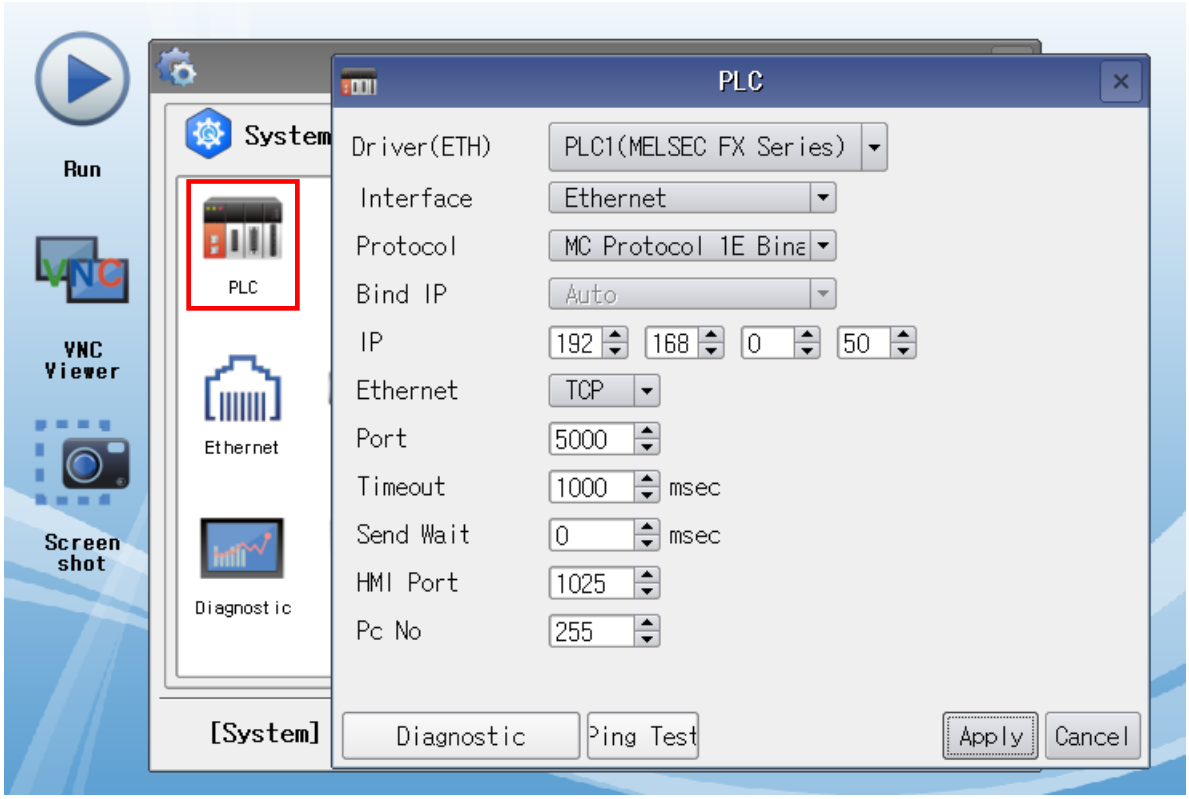
*Note 1) The network addresses of the TOP and the external device (the first three digits of the IP, 192 . 168 . 0 . 0) should match.

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

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

■ [Main Screen > Control Panel > PLC]



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 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.	
HMI Port	Enter the Ethernet communication port number of the TOP.	
PC No	Enter the prefix of PLC.	*Note 1)

*Note 1) The PLC number identifies which PLC to connect to on the CC-Link IE controller network, CC-Link IE field network, and MELSECNET/H, MELSECNET/10 network. The initial value is 255 (dec) and is 255 or in the range of 0 to 64 when configuring a multi-CPU.

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 if the port (ETH1/ETH2) settings you want to use in [Control Panel > Ethernet] are the same as those of the external device.

■ 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.)

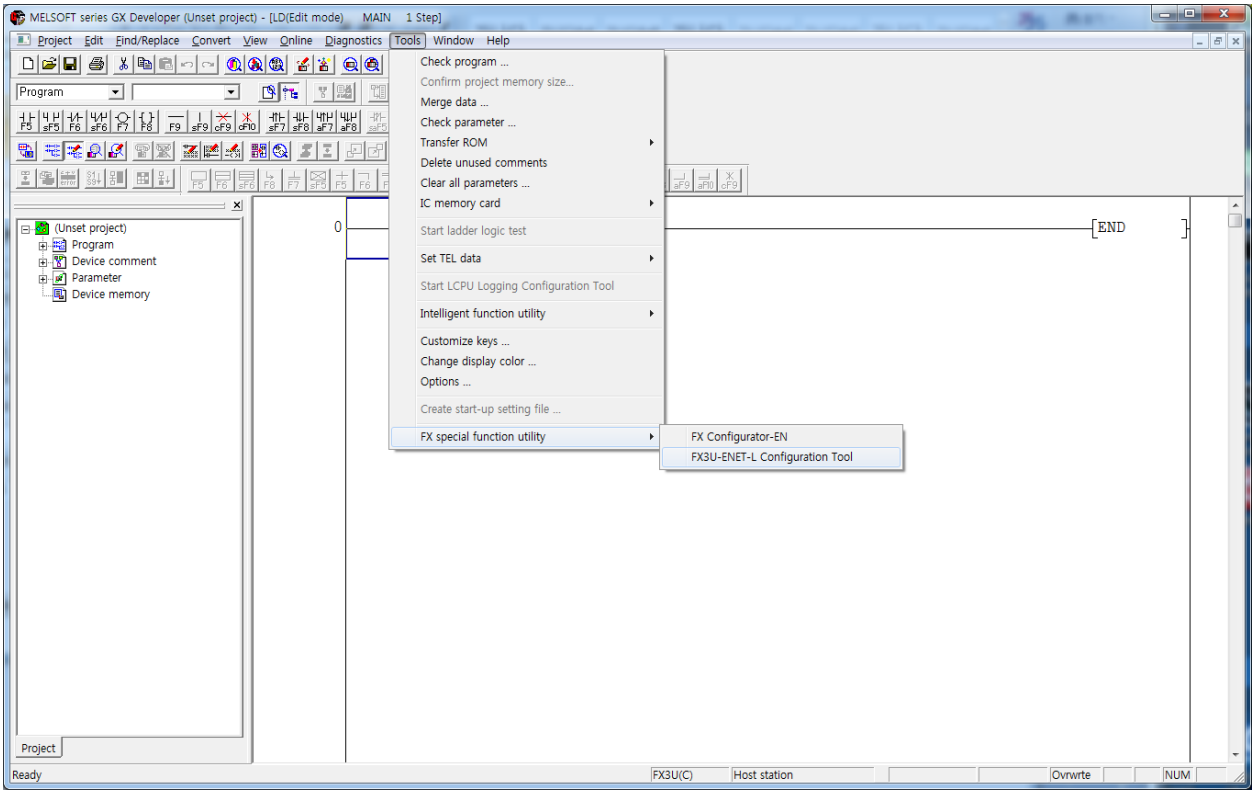
4. External device setting

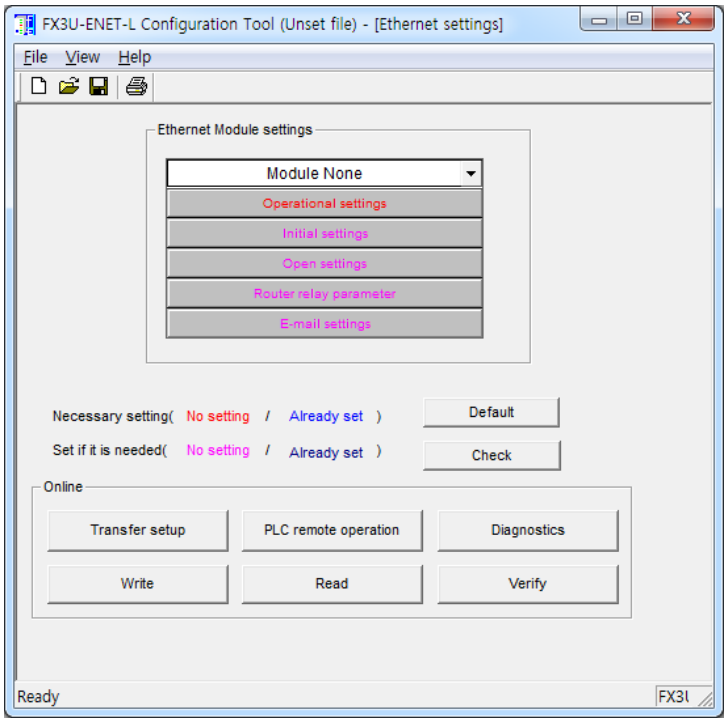
For a more detailed setting method than described in this example, refer to the corresponding vendor's user manual for the external device.

(1) Setting in GX Developer

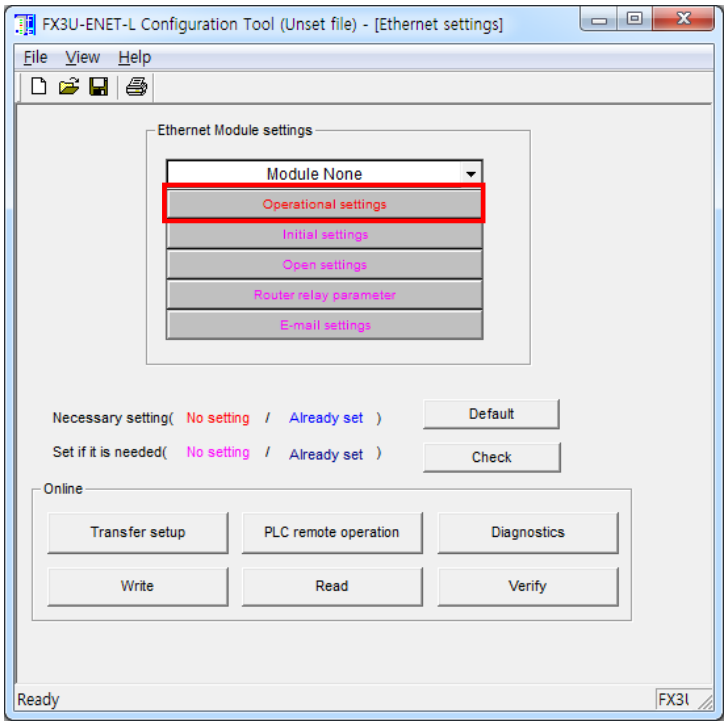
※ FX3U-ENET-L Configuration Tool must be installed.

Step 1. [Tools] → [FX special function utility] → [FX3U-ENET-L Congifuration Tool]



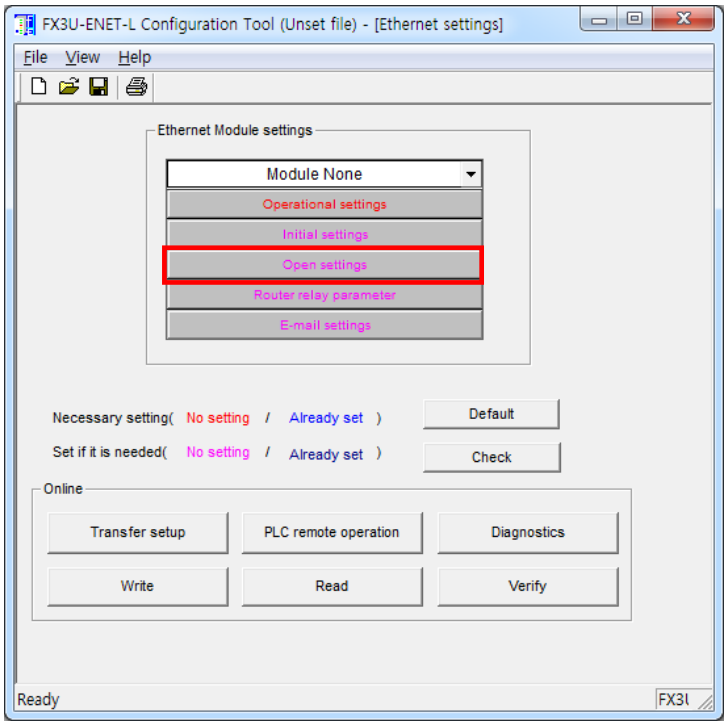


Step 2. [Operational settings]

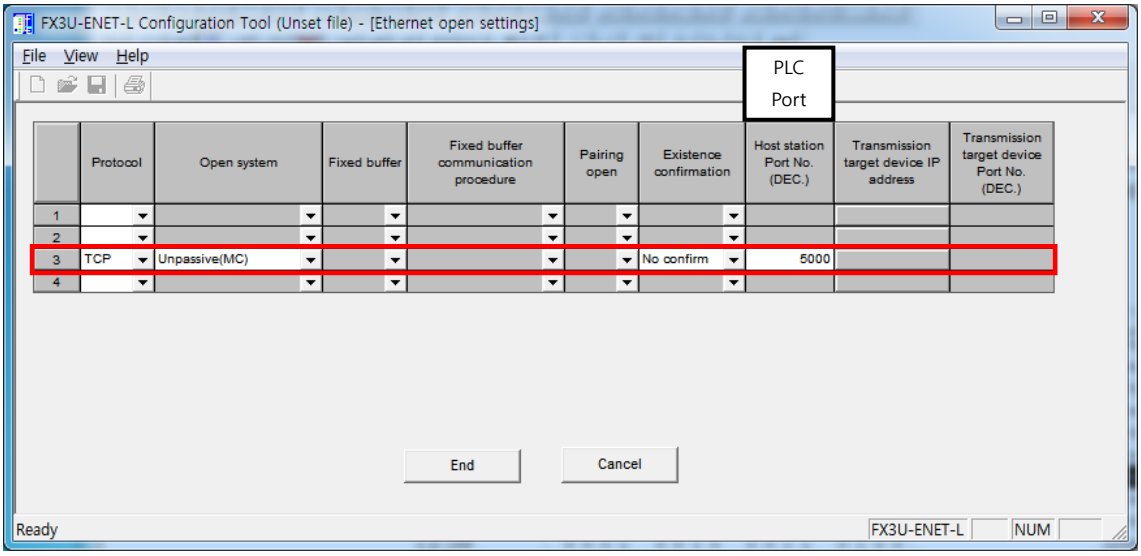


Items	Contents	Set Value	Remarks
Communication data code	Select protocol data type.	Binary code	Select the same protocol item at TOP.
Initial timing	Set time when communication is available.	Always wait for OPEN (Communications possible at STOP time)	Necessary setting
IP Address	Set PLC IP address.	192.168.0.50	
Send frame settings	Set frame type.	Ethernet(V2.0)	Necessary setting
TCP Existence confirmation setting	Set how TCP protocol communication checks connections with other devices.	Use the Ping	

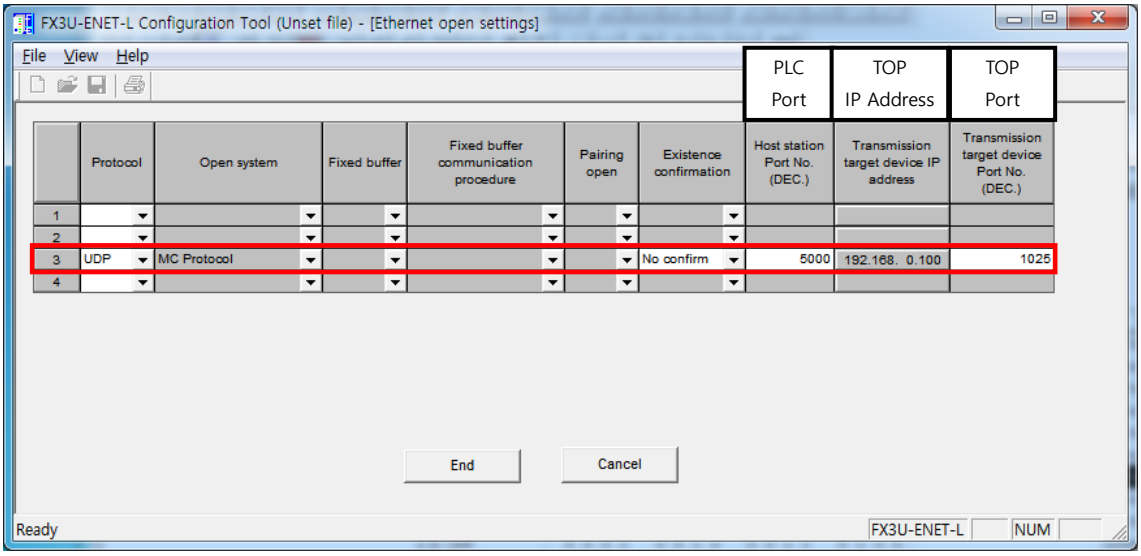
Step 3. [Open settings]



① Set as TCP

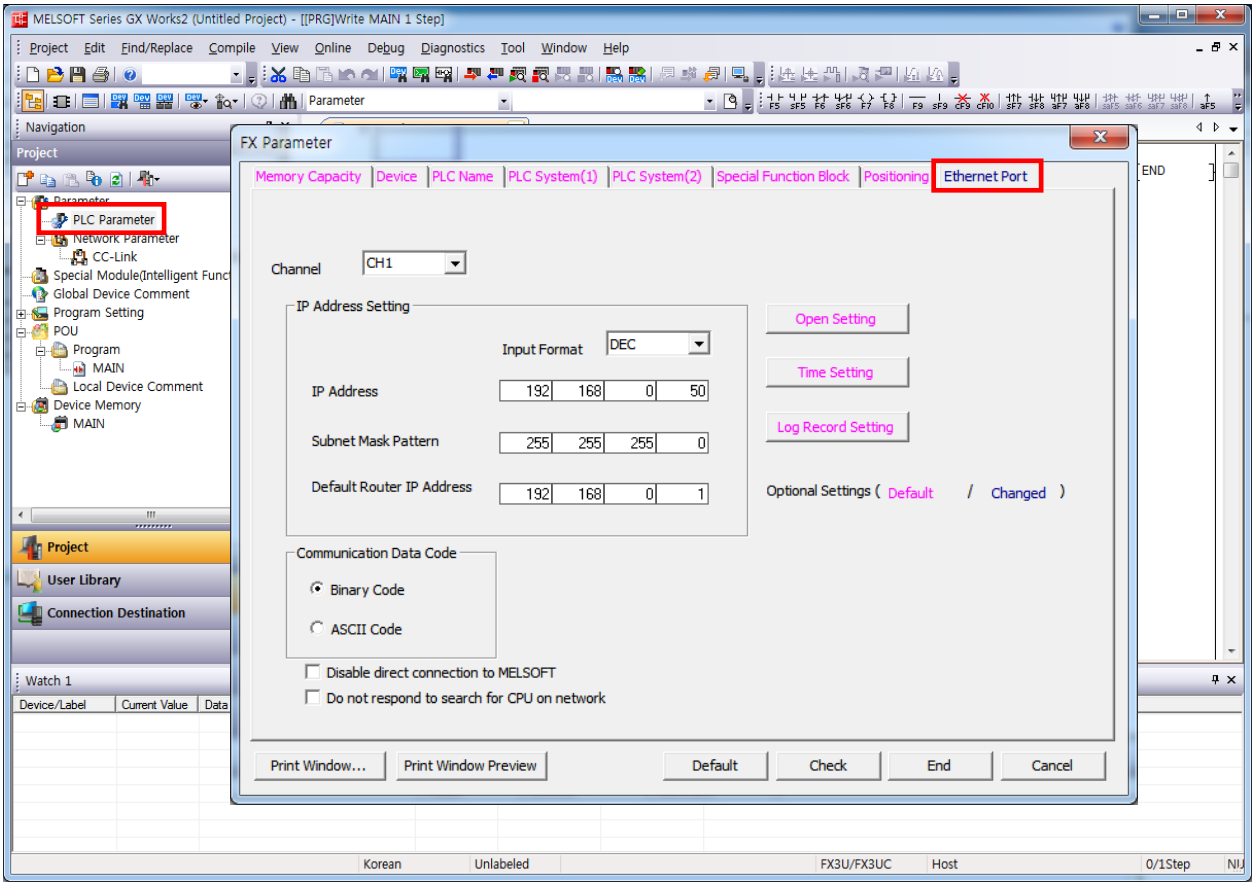


② Set as UDP



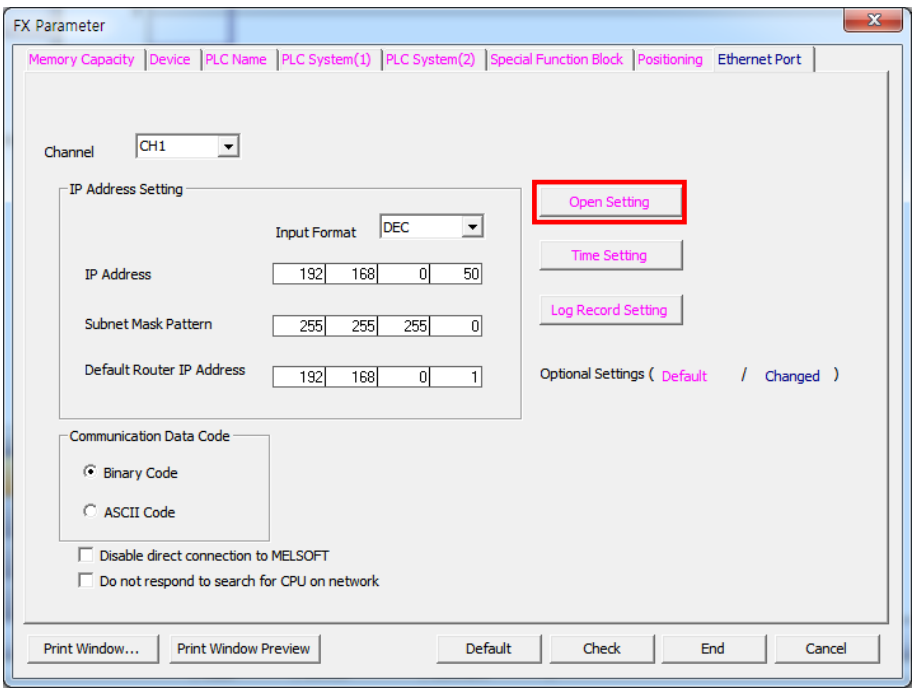
(2) Set in GX Works2

Step 1. [Parameter] → [PLC Parameter] → [Ethernet Port]

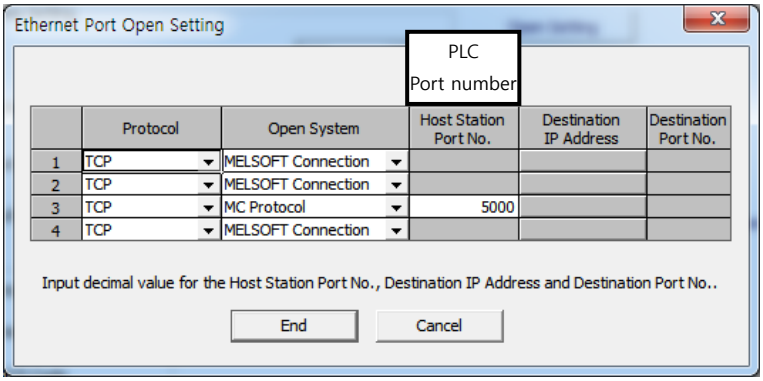


Items	Contents	Set Value	Remarks
Communication data code	Select protocol data type.	Binary code	Select the same protocol item at TOP.
IP Address	Set PLC IP address.	192.168.0.50	
Subnet Mask Pattern	Set subnet mask.	255.255.255.0	
Default Router IP Address	Set router IP address.	192.168.0.1	

Step 2. [Open Setting]

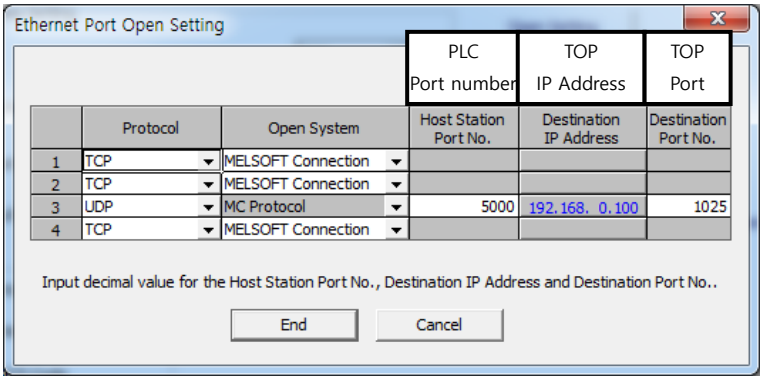


① **Set as TCP**



Items	Contents	Set Value	Remarks
Protocol	Set ethernet protocol.	TCP	Select the same protocol item at TOP.
Open System	Set open method.	MC Protocol	Necessary setting
Host Station Port No.	Set PLC port number.	5000	

② **Set as UDP**



Items	Contents	Set Value	Remarks
Protocol	Set ethernet protocol.	UDP	Select the same protocol item at TOP.
Open System	Set open method.	MC Protocol	Necessary setting
Host Station Port No.	Set PLC port number.	5000	
Destination IP Address	Set the IP address of the TOP.	192.168.0.100	
Destination Port No.	Enter TOP port number.	1025	

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	Remarks
Input Relay		X000 ~ X377	X000 ~ X360	Input data (hexadecimal)
Output Relay		Y000 ~ Y377	Y000 ~ Y360	Input data (hexadecimal)
Auxiliary Relay		M0000 ~ M7679	M0000 ~ M7664	
		M8000 ~ M8511	M8000 ~ M8496	
Timer	Current Value		TN000 ~ TN511	
	Contact	TS000 ~ TS511	TN000 ~ TN496	
Counter	Current Value		CN000 ~ CN199	
			HCN200 ~ HCN255	32 Bit address
	Contact	CS000 ~ CS255	CS000 ~ CS240	
State		S0000~S4095	S0000~S4080	
Data Register		D0000.0 ~ D8511.F	D0000 ~ D8511	
Extended Register		R00000.0~R32767.F	R00000~R32767	