MITSUBISHI Electric Corporation

MELSEC FX5U Series

SERIAL(MC Protocol Format1)

Supported version TOP Design Studio V1.4.11.31 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".

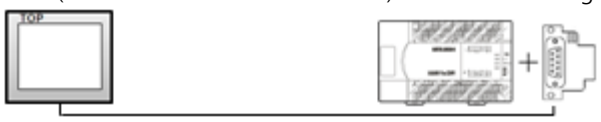
1. System configuration

The system configuration of TOP and "MITSUBISHI Electric Corporation - **MELSEC FX5U- SERIAL**" is as follows:

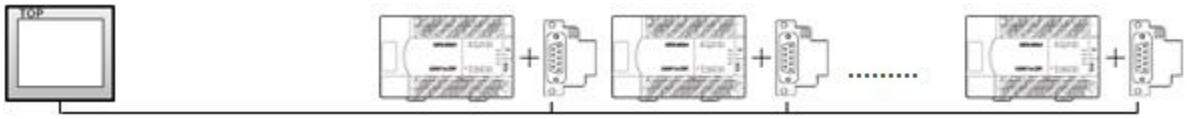
Series	CPU	Link I/F	Communication method	System setting	Cable
MELSEC-Q	FX5U	CPU port	RS-485	3. TOP communication setting 4. External device setting	5. Cable table

■ Connectable configuration

• 1:1 (one TOP and one external device) connection – configuration which is possible in RS–422/485 communication.

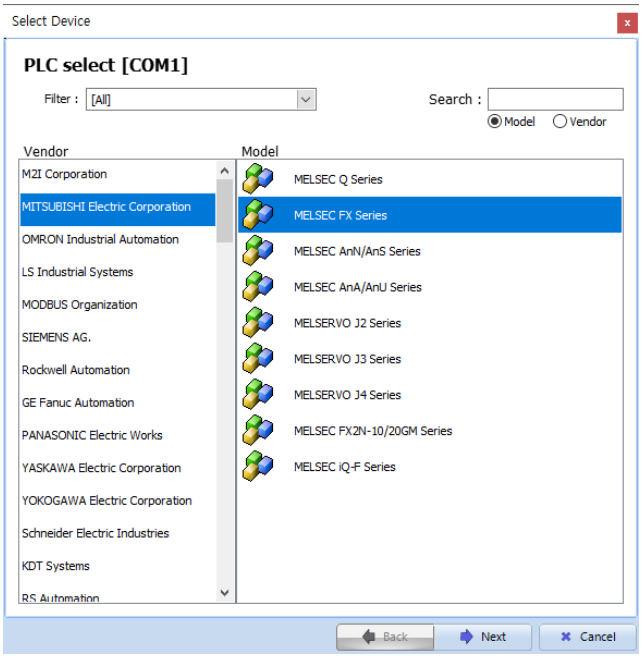


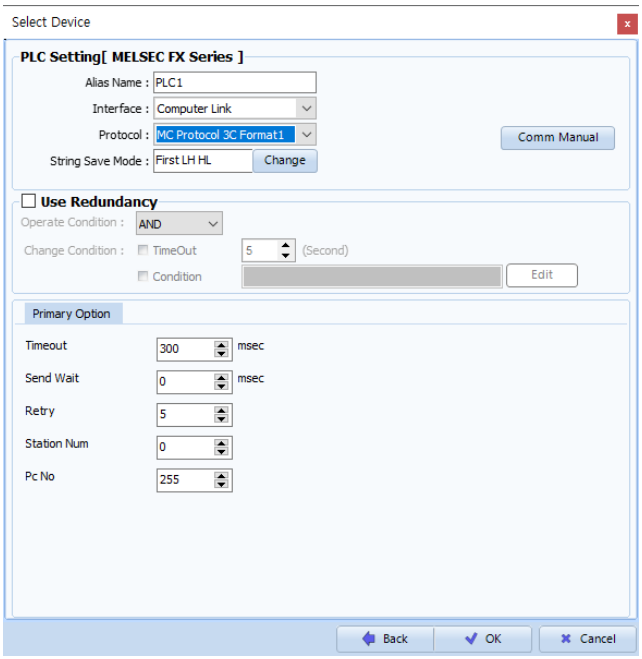
• 1:N (one TOP and multiple external devices) connection – configuration which is possible in RS–422/485 communication.



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 an external device to connect to TOP.

Model	Interface	Protocol
MELSEC FX Series	Computer Link	MC Protocol Format1 FX5U

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

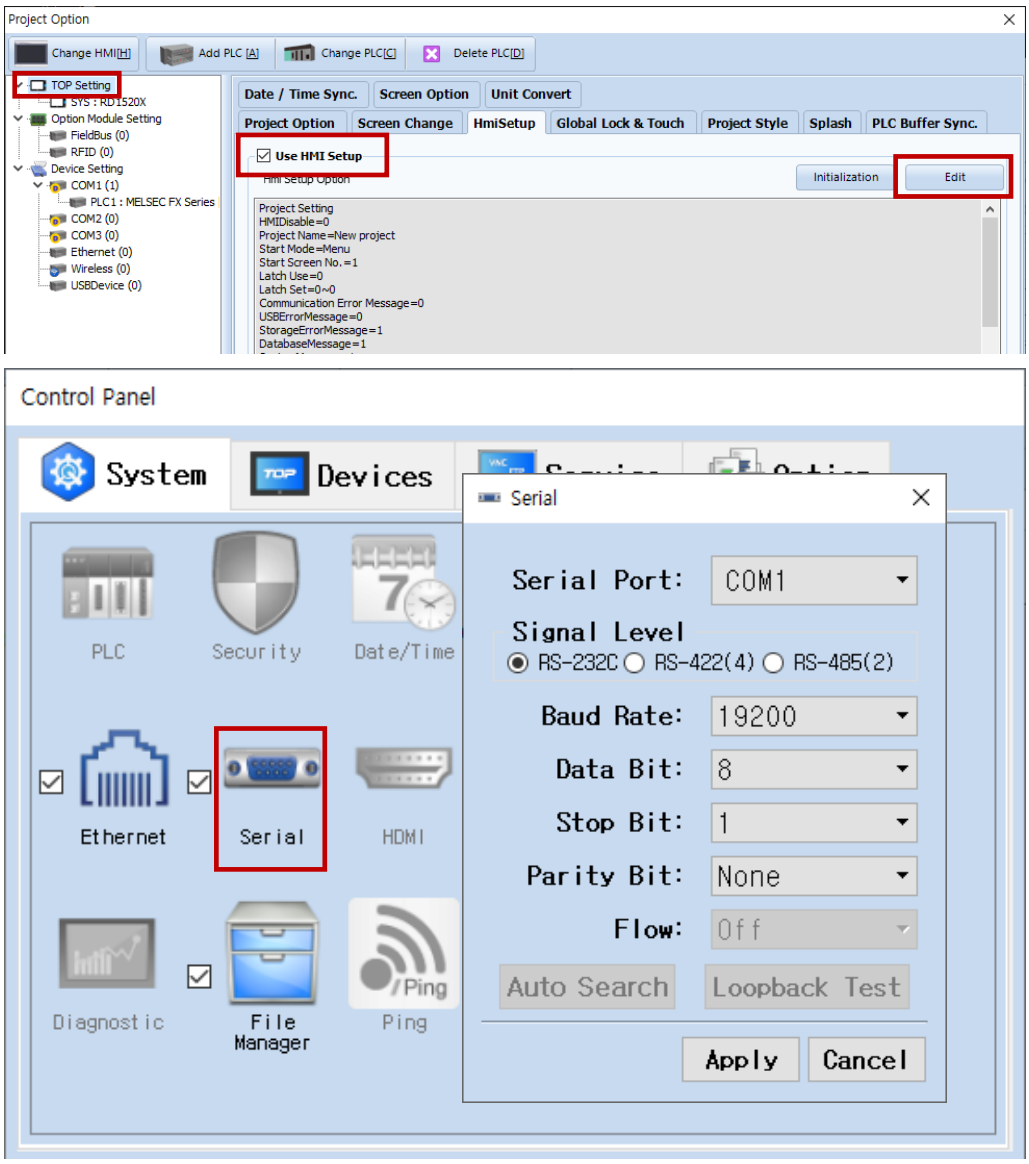
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project > Project Property > TOP Setting] → [Project Options > "Use HMI Setup" Check > Edit > Serial]

– Set the TOP communication interface in TOP Design Studio.



Items	TOP	External device	Remarks
Signal Level (port)	RS-485	RS-422/485	
Baud Rate	19200		
Data Bit	8		
Stop Bit	1		
Parity Bit	None.		

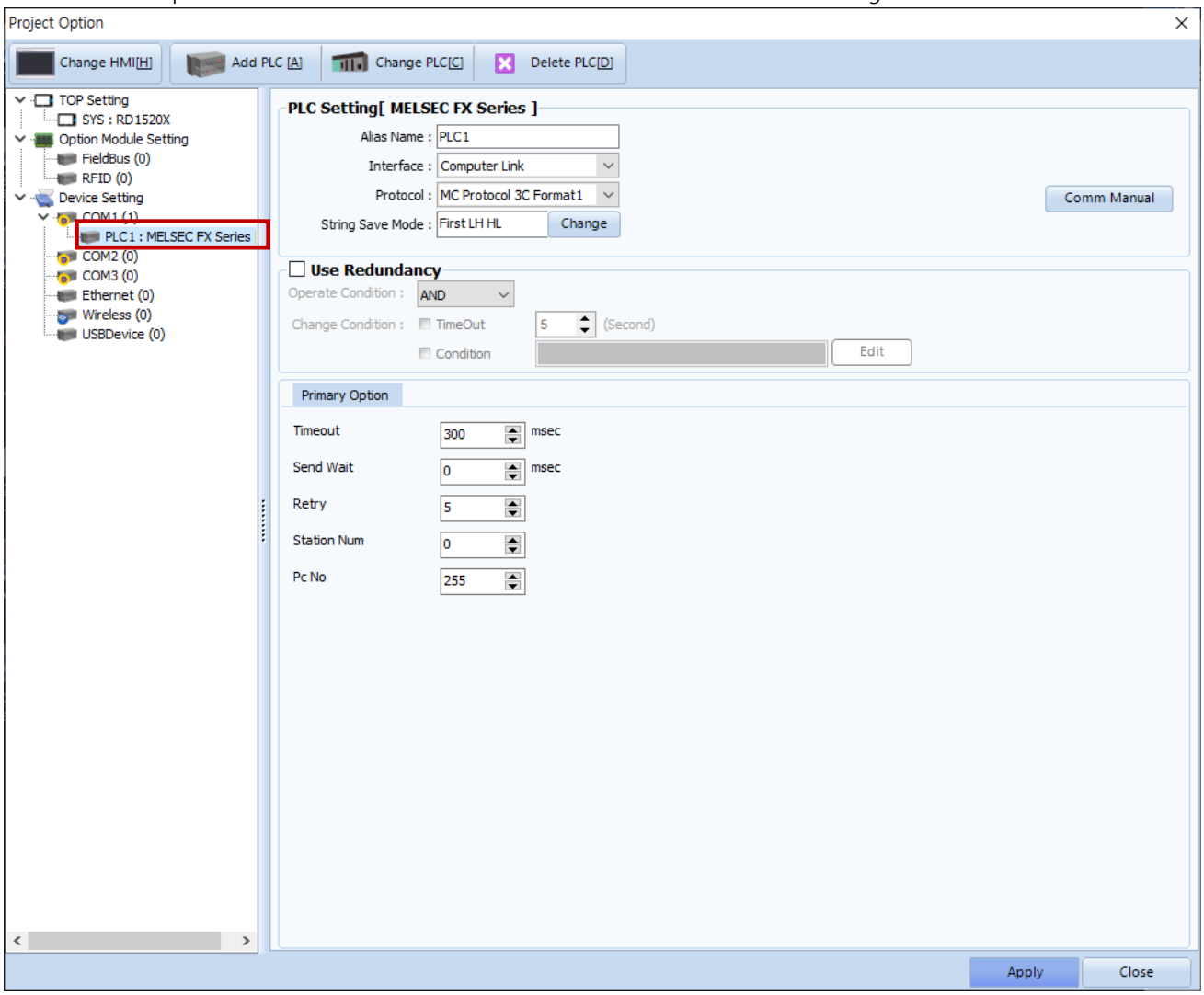
* The above settings are examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

■ [Project > Project Property > PLC Setting > COM > "PLC1 : MELSEC-FX Series"]

– Set the options of the MELSEC-FX Series CPU Direct communication driver in TOP Design Studio.

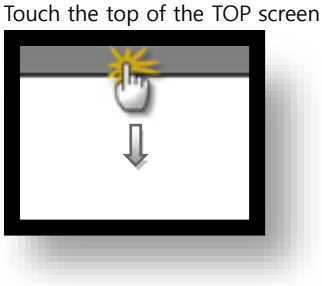


Items	Settings	Remarks
Interface	Select "Computer Link".	Fixed
Protocol	Select "MC Protocol 3C Format1 FX5U".	Fixed
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Station Num	Enter the prefix of an external device.	
PC No	Set the prefix of TOP.	

3.2. Communication setting in TOP

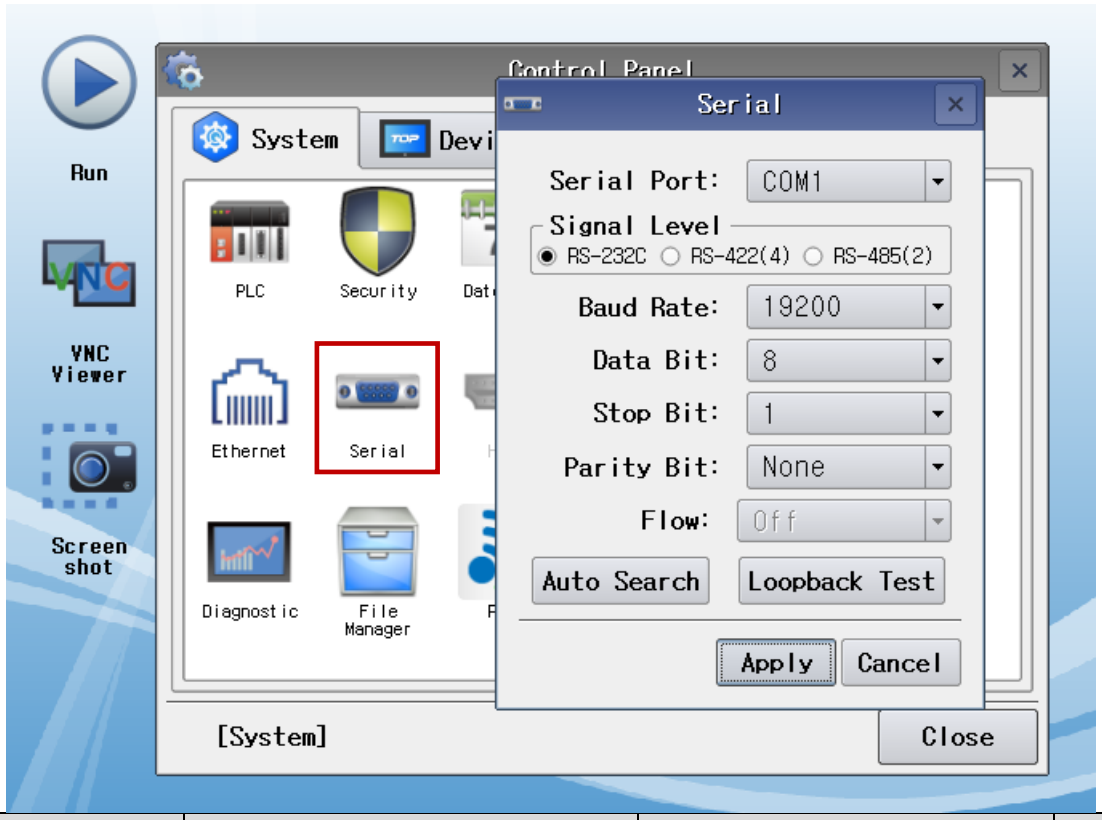
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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 > Serial]



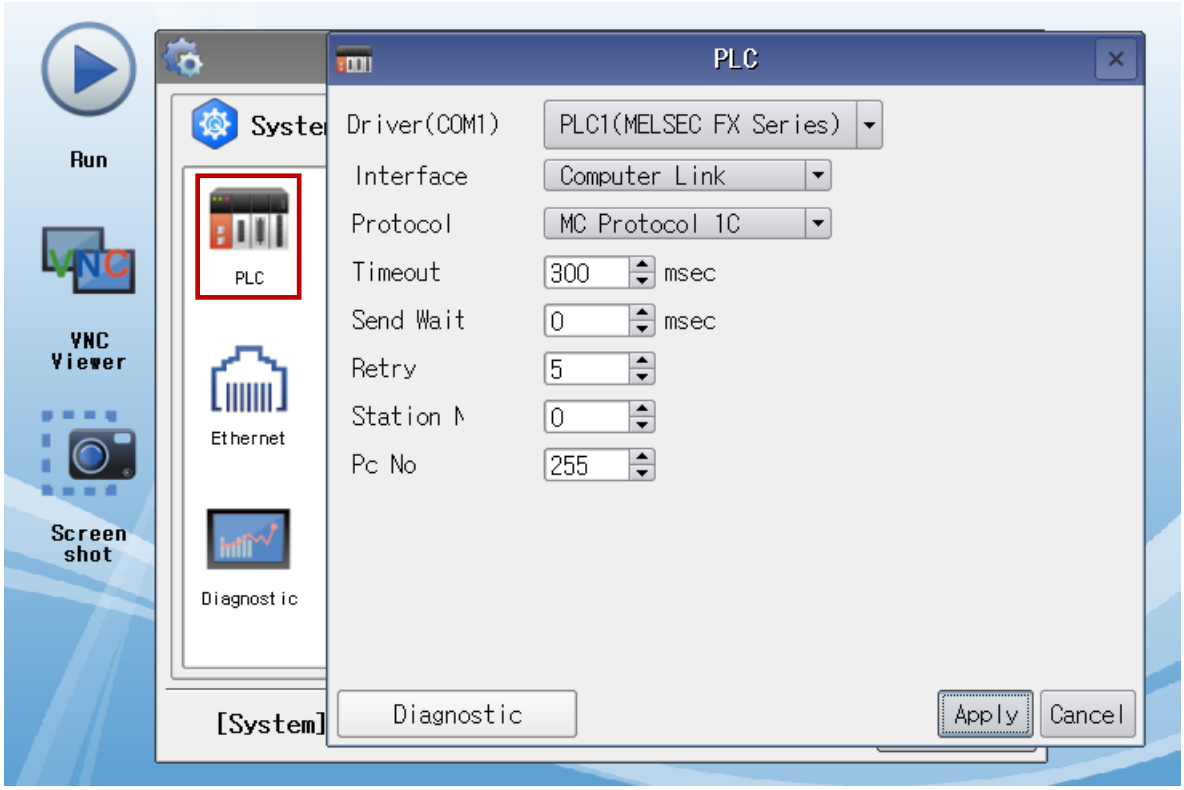
Items	TOP	External device	Remarks
Signal Level (port)	RS-422/485	RS-422/485	
Baud Rate	19200		
Data Bit	8		
Stop Bit	1		
Parity Bit	None.		

* The above settings are setting examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

■ [Main Screen > Control Panel > PLC]



Items	Settings	Remarks
Interface	Select "Computer Link".	Fixed
Protocol	Select "MC Protocol 3C Format1 FX5U".	Fixed
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.	
Station Num	Enter the prefix of an external device.	
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 if the COM port settings you want to use in [Control Panel > Serial] 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	
	Serial Parameter	Transmission Speed	OK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	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	
	Serial Parameter	Transmission Speed	OK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
	Check address range		OK	NG	6. Supported addresses (For details, please refer to the PLC vendor's manual.)

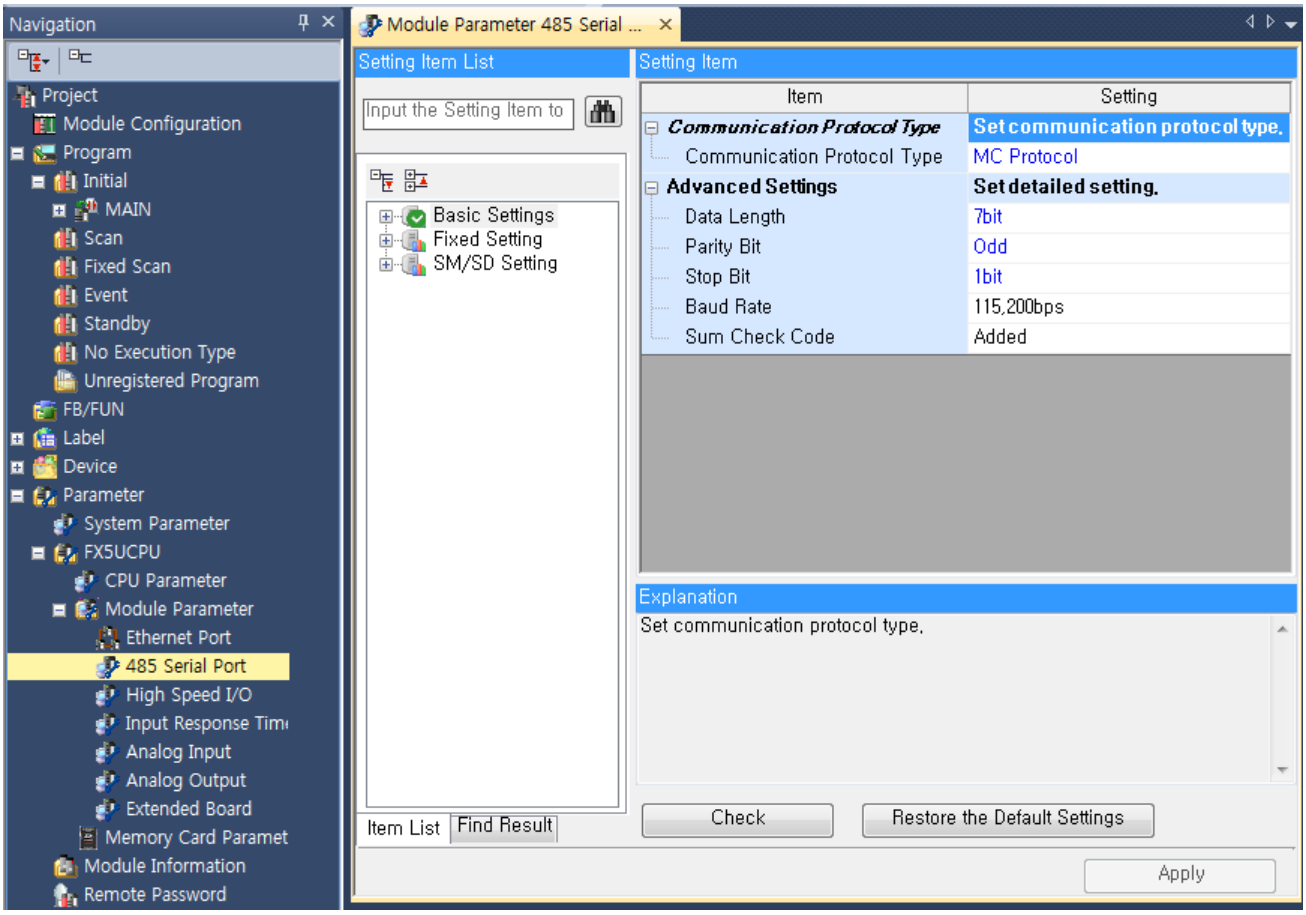
4. External device setting

There are two ways to set up communications in the MELSEC-FX series - by setting up parameters in the MELSEC series Ladder Software "**GX WORK3**", or by setting up data in the PLC's "**Special Data Register**". For more detailed setting method than that described in this example, refer to the PLC user manual.

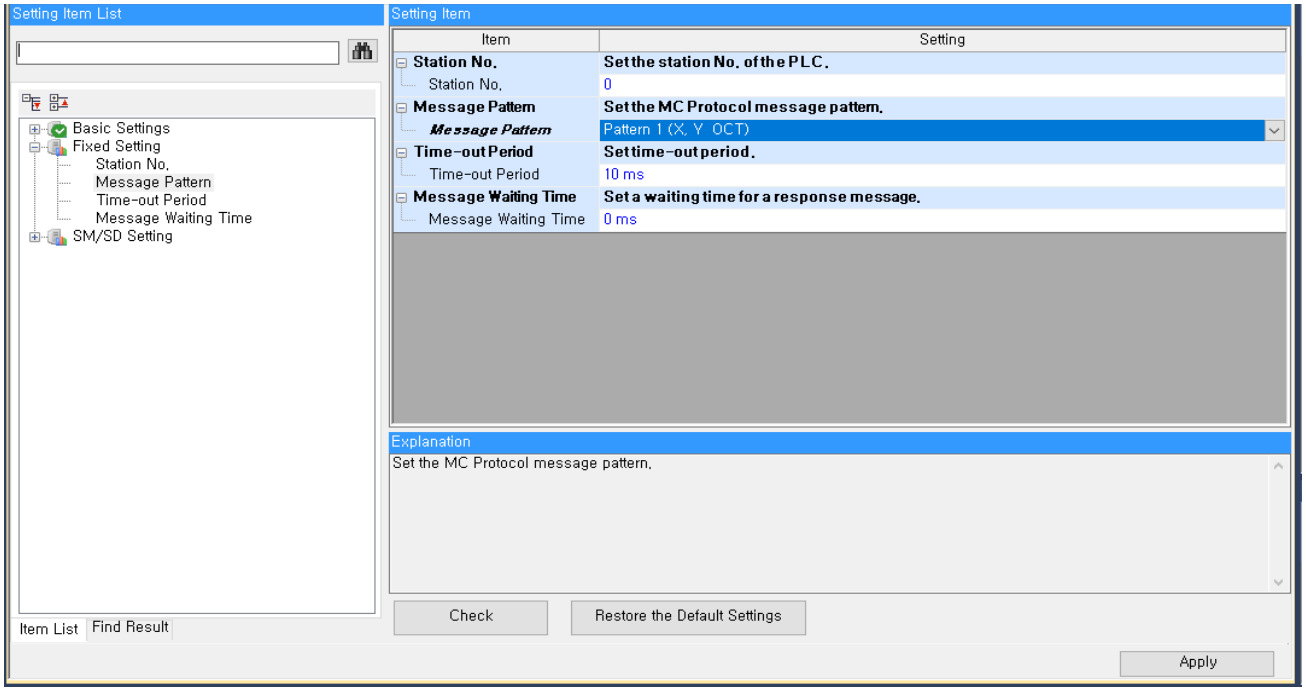
■ Method 1: "**GX WORK3**"Configure Parameter Settings

Step 1. From project window [Parameter] > double click [PLC parameter] and load pop-up Modul parameter.

Step 2. Configure the Communication Protocol Type as shown below.



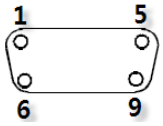
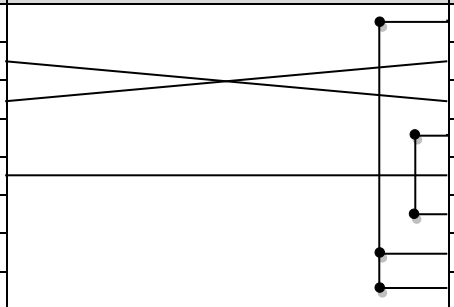
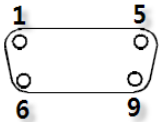
Step 3. [Online] > Transmit the parameter set to [Write to PLC] and reset the PLC.



5. Cable table

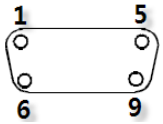
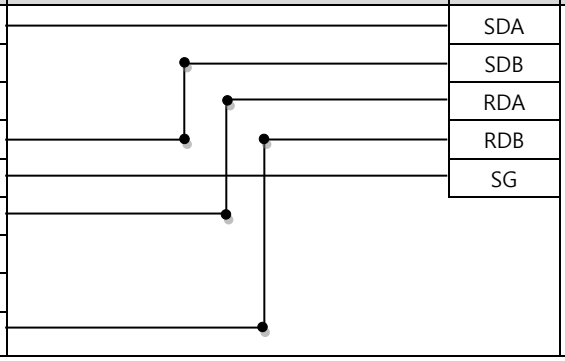
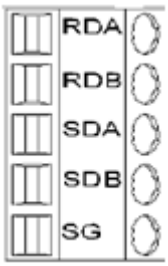
This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device.
(The cable diagram described in this section may differ from the recommendations of "Mitsubishi Electric Corporation")

■ **RS-232C** (1:1 connection)

COM			Cable connection	PLC		
Pin arrangement*Note 1)	Signal name	Pin number		Pin number	Signal name	Pin arrangement*Note 1)
 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	CD	1		1	CD	 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)
	RD	2		2	RD	
	SD	3		3	SD	
	DTR	4		4	DTR	
	SG	5		5	SG	
	DSR	6		6	DSR	
	RTS	7		7	RTS	
	CTS	8		8	CTS	
		9		9		

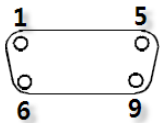
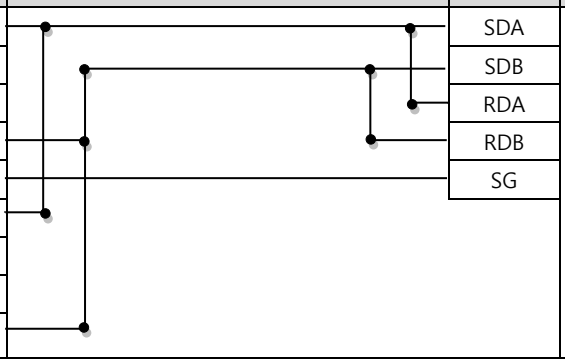
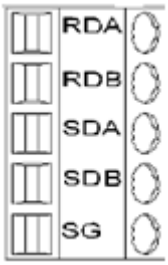
*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-422** (1:1 connection)

COM			Cable connection	PLC	
Pin arrangement*Note 1)	Signal name	Pin number		Signal name	Pin arrangement
 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	RDA	1		SDA	
		2		SDB	
		3		RDA	
	RDB	4		RDB	
	SG	5		SG	
	SDA	6			
		7			
		8			
	SDB	9			

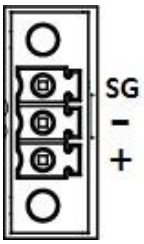
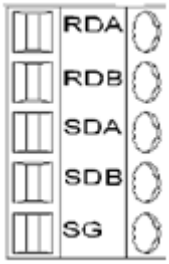
*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-485** (1:1 connection)

COM			Cable connection	PLC	
Pin arrangement*Note 1)	Signal name	Pin number		Signal name	Pin arrangement
 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	RDA	1		SDA	
		2		SDB	
		3		RDA	
	RDB	4		RDB	
	SG	5		SG	
	SDA	6			
		7			
		8			
	SDB	9			

*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-485** (1:1 connection)

COM		Cable connection	PLC	
Pin arrangement	Signal name		Signal name	Pin arrangement
	+ — SG		SDA SDB RDA RDB SG	

■ **RS-422**(1:N connection) – Refer to 1:1 connection to connect in the following way:

TOP	Cable connection and signal direction	PLC	Cable connection and signal direction	PLC
Signal name		Signal name		Signal name
RDA		SDA		SDA
RDB		SDB		SDB
SDA		RDA		RDA
SDB		RDB		RDB
SG		SG		SG

■ **RS-485** (1:N/N:1 connection) – Refer to 1:1 connection to connect in the following way.

TOP	Cable connection and signal direction	PLC	Cable connection and signal direction	PLC
Signal name		Signal name		Signal name
RDA		SDA		SDA
RDB		SDB		SDB
SDA		RDA		RDA
SDB		RDB		RDB
SG		SG		SG

6. 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 – X1777	X0000 – X1760	X***0 *Note 4)	
Output Relay	Y0000 - Y1777	Y0000 - Y1760	Y***0 *Note 4)	
Internal Relay	M0000 – M7679	M0000 – M7664	M0000 + 16*n *Note 2)	
Special Relay	SM0000 – SM9999	SM0000 – SM9984	SM0000 + 16*n *Note 2)	
Latch Relay	L0000 - L7679	L0000 - L7664	L0000 + 16*n *Note 2)	
Annunciator	F000 – F127	F000 – F112	F0000 + 16*n *Note 2)	
Step Relay	S0000 – S4095	S0000 - S4080	S0000 + 16*n *Note 2)	
Link Relay	B000 – B0FF (HEX)	B000 – B0F0 (HEX)	B***0 *Note 1)	
Special Link Relay	SB000 - SB0FF (HEX)	SB000 - SB0F0 (HEX)	SB***0 *Note 1)	
Timer (contact)	TS000 – TS511			
Timer (coil)	TC000 - TC511			
Aggregate Timer (contact)	SS000 – SS015			
Aggregate Timer (coil)	SC000 – SC015			L/H *Note 3)
Counter (contact)	CS000 - CS255			
Counter (coil)	CC000 - CC255			
Timer (current value)		TN000 - TN511		
Aggregate Timer (current value)		SN000 – SN015		
Counter (current value)		CN000 – CN255		
Data Register	D0000.00 – D7999.15	D0000 – D7999		
Special Data Register	SD00000.00–SD11999.15	SD00000 – SD11999		
Link register	W000.00~W1FF.15	W000~W1FF		
File registers	R00000.00~R32767.15	R00000~R32767		
Link special register	SW000.00~SW1FF.15	SW000~SW1FF.		

*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

*Note 4) Used with units of 20 (octal) when used as a word address. (Ex: X0, X20, X40, ..., X160)