MITSUBISHI Electric Corporation

MELSEC FX Series

CPU Direct Driver

Supported version TOP Design Studio V1.0 or higher

CONTENTS

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

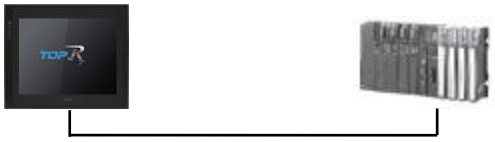
1. System configuration

The system configuration of TOP and "MITSUBISHI Electric Corporation - MELSEC FX CPU Direct" is as follows:

Series	CPU	Link I/F	Communication method	Communication setting	Cable
MELSEC-FX	FX3G FX3U FX3UC FX2N FX2NC FX1NC FX1N FX1S FX0N	CPU port	RS-422 (4 wire)	3. TOP communication setting 4. External device setting	5. Cable table

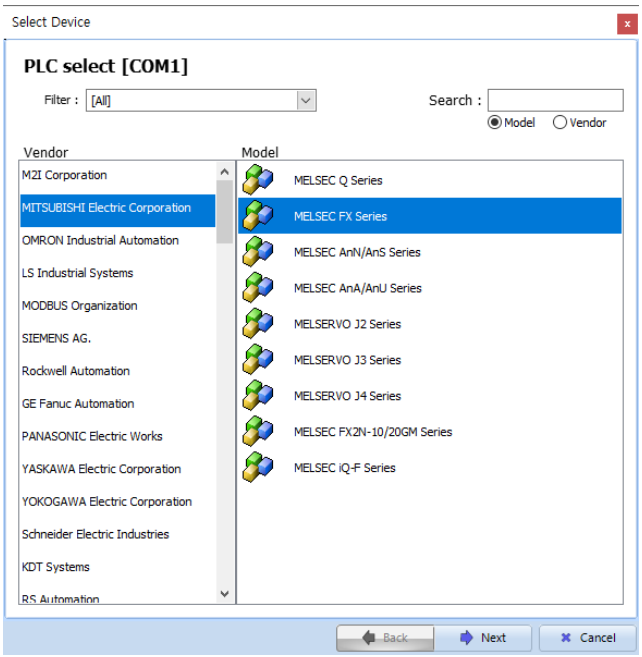
■ Connection configuration

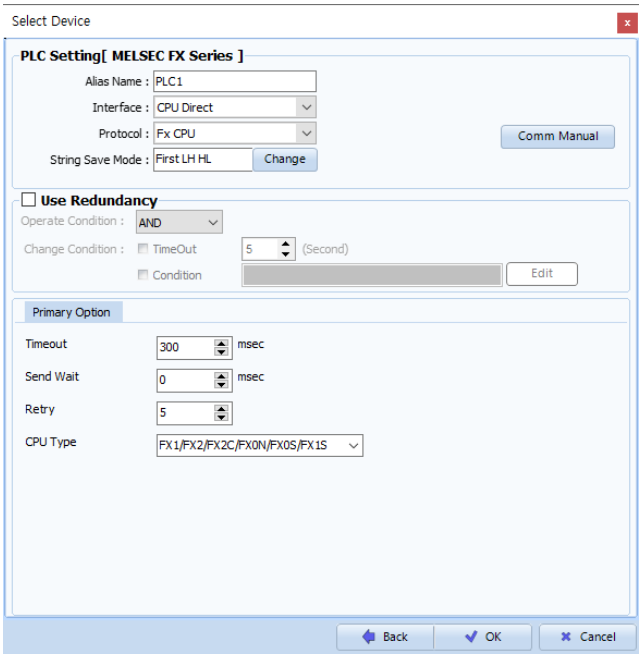
・1 : 1



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 an external device to connect to TOP.

Model	Interface	Protocol
MELSEC FX Series	CPU Direct	FX CPU

Supported Protocol (CPU type)		
FX1/FX2/FX2C/FX0N/FX0S/FX1S	FX1N/FX1N/FX2N/FX2NC	FX3U/FX3UC/FX3G/FX3S

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

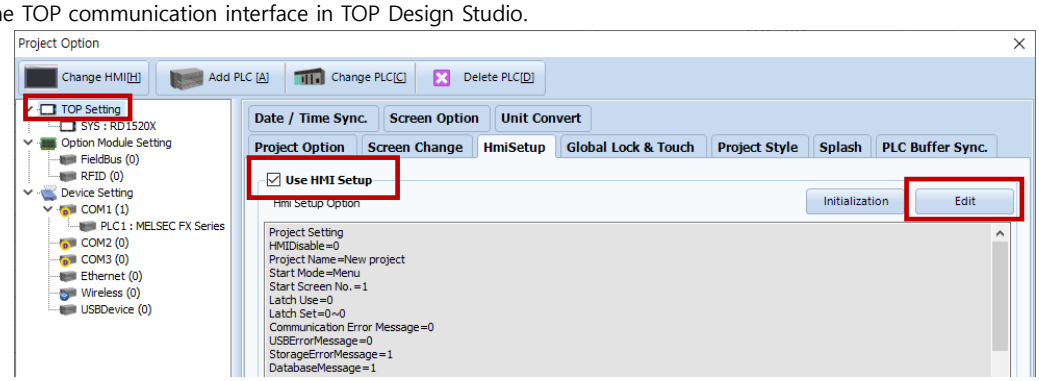
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

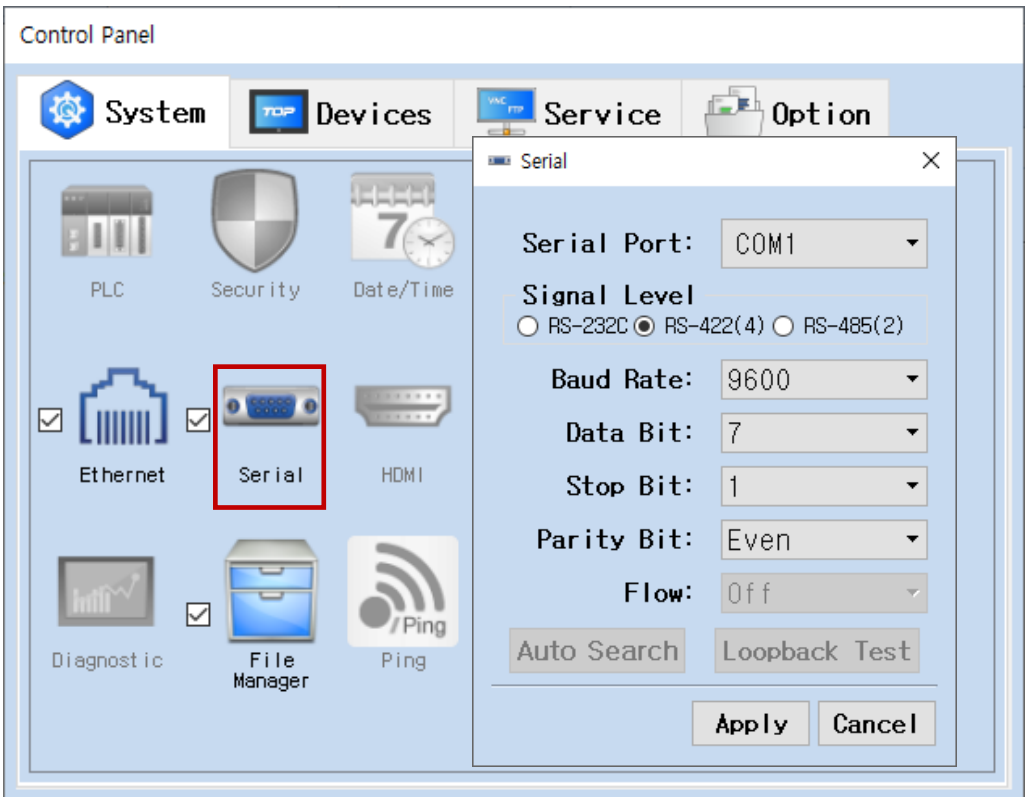
3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project] → [Property] → [TOP Setting] → [HMI Setup] → [Use HMI Setup Check] → [Edit] → [System] → [Serial]

– Set the TOP communication interface in TOP Design Studio.





Items	TOP	External device	Remarks
Signal Level (port)	RS-422	RS-422 (CPU port)	
Baud Rate	9600		
Data Bit	7		Fixed
Stop Bit	1		Fixed
Parity Bit	Even		Fixed

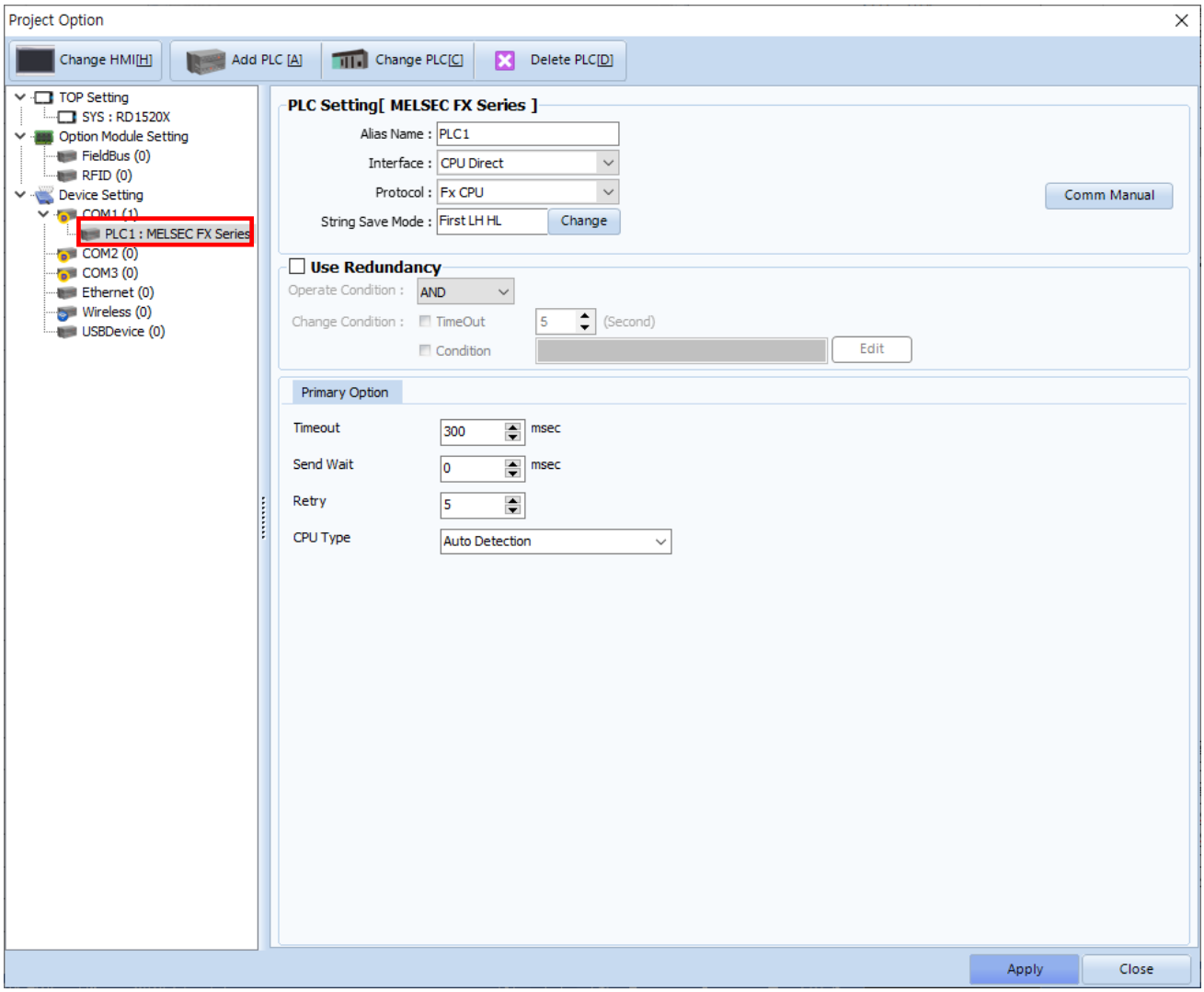
* The above settings are examples recommended by the company.

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] → [Device Setting > COM1 > MELSEC-FX Series]

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

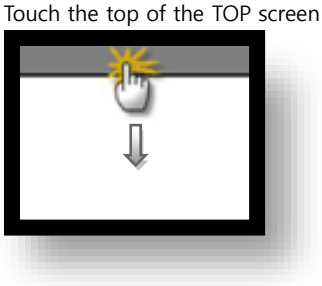


Items	Settings	Remarks
Interface	Select “CPU Direct”.	
Protocol	Select “FX CPU”.	
TimeOut (ms)	Set the time to wait for a response from an external device.	
SendWait (ms)	Set the waiting time before sending a data request to an external device.	
Retry	Set the number of request retries when the data request result is no response/negative response.	
CPU Type	Select the CPU type for the external device.	

3.2. Communication setting in TOP

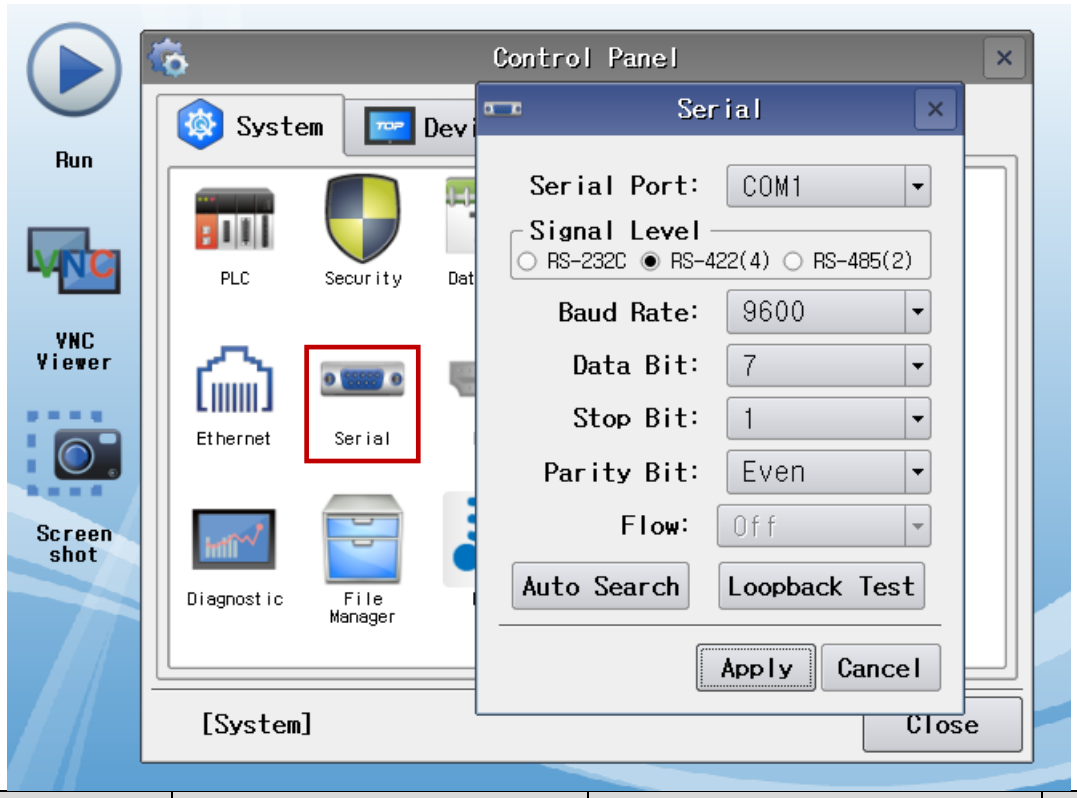
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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

■ [Control Panel] → [Serial]



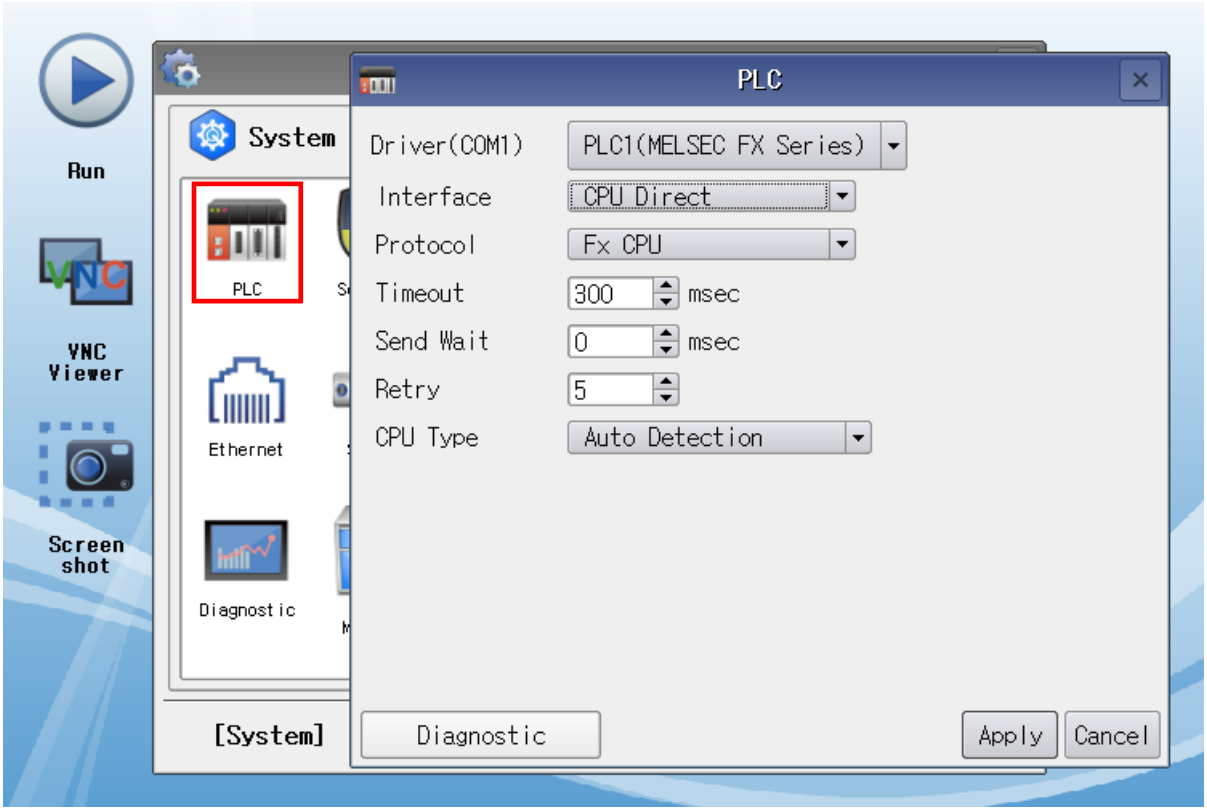
Items	TOP	External device	Remarks
Signal Level (port)	RS-422	RS-422 (CPU port)	
Baud Rate	9600		
Data Bit	7		Fixed
Stop Bit	1		Fixed
Parity Bit	Even		Fixed

* 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

■ [Control Panel] → [PLC]



Items	Settings	Remarks
Interface	Select "CPU Direct".	
Protocol	Select "FX CPU".	
TimeOut (ms)	Set the time to wait for a response from an external device.	
SendWait (ms)	Set the waiting time before sending a data request to an external device.	
Retry	Set the number of request retries when the data request result is no response/negative response.	
CPU Type	Select the CPU type for the external device.	

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] → [Serial] 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 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

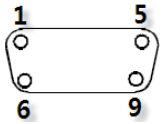
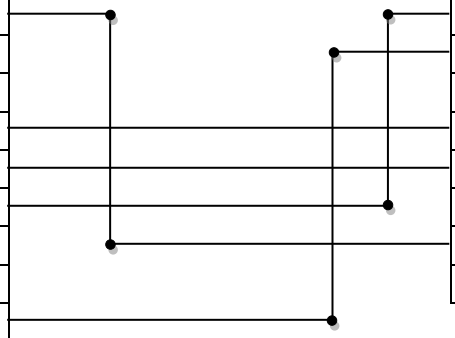
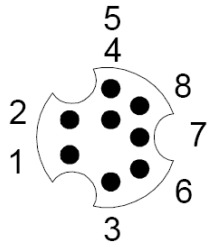
4. External device setting

The communication settings for MELSEC-FX Series CPU Direct (Loader) does not require a separate configuration.

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-422

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

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

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.

Type	Bit	Word	Remarks
Input	X0000 – X0377	X0000 – X0360	*Note 1) Note 2)
Output	Y0000 – Y0377	Y0000 – Y0360	*Note 2)
STEP relay	S0000 – S8191	S0000 – S8176	
Internal relay	M0000 – M7679	M0000 – M7664	
Special relay	M8000 – M8511	M8000 – M8496	*Note 3)
Data register	D0000.00 – D0999.15	D0000 – D0999	
	D1000.00 – D7999.15	D1000 – D7999	
Special register	D8000.00 – D8511.15	D8000 – D8511	*Note 3)
Timer - Contact	T000 – T511	-	
Timer-Current value	-	TN000 – TN511	
Counter - Contact	C000 – C255	-	
Counter-Current value	-	CN000 – CN199	
	-	CN200 – CN255	*Note 4)

*Note 1) Includes an area that cannot be written on. Use with caution.

*Note 2) Used with units of 20 (octal) when used as a word address. (Ex: X0, X20, X40, ..., X160)

*Note 3) A special area that may not be able to execute "write data" depending on the address usable by the system. Refer to the manual of the external device during use.

*Note 4) 32 BIT device

*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 32 BIT data hexadecimal data 12345678 in address D00100, it is saved to 16 BIT device address as follows:

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