RS Automation, Inc.

Modbus Modicon F50

Supported version TOP Design Studio V1.4.3 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 "RS Automation, Inc. – Modbus Modicon F50" is as follows:

Series	CPU	Link I/F	Communication method	System setting	Cable
RS Automation	Modbus Modicon F50		RS-232C	3. TOP communication setting 4. External device setting	5.1. Cable table 1
			RS-422(4 wire)	3. TOP communication setting 4. External device setting	5.2. Cable table 2
			RS-485 (2 wire)	3. TOP communication setting 4. External device setting	5.3. Cable table 3

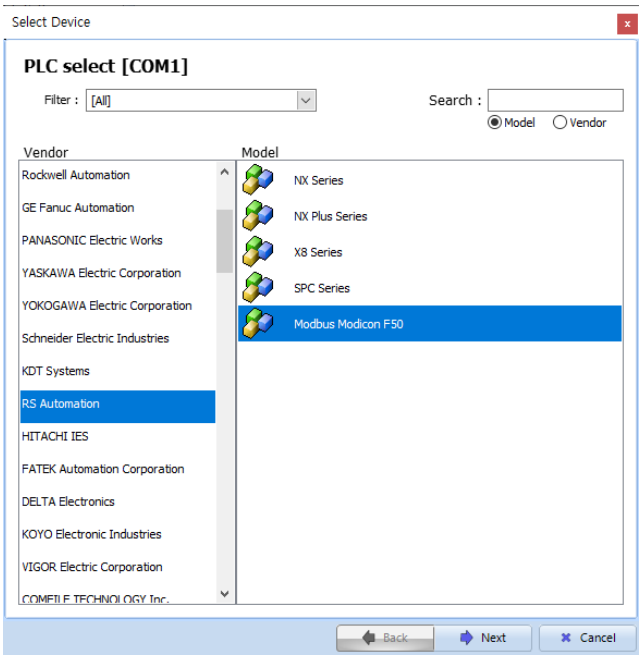
■ Connection configuration

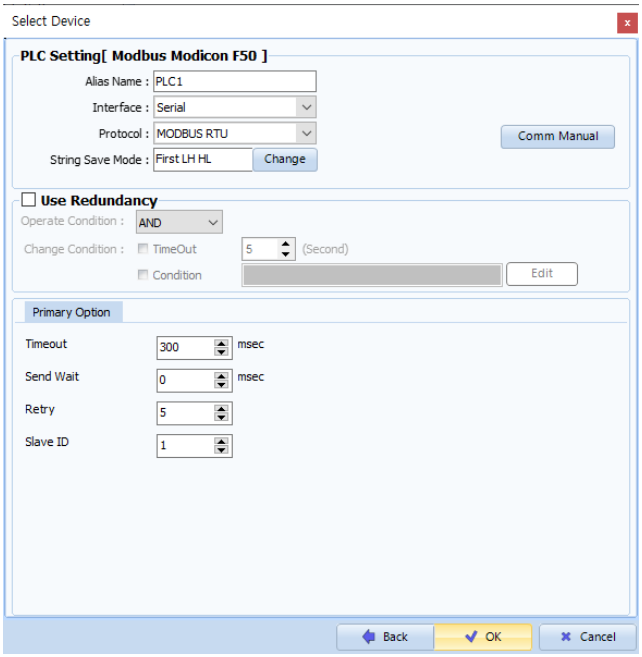
• 1:1 (one TOP and one external device) connection – configuration which is possible in RS232C/422/485 communication.

• 1:N (one TOP and multiple external devices) connection – configuration which is possible in RS422/485 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. Select “RS Automation”.
	PLC	Select an external device to connect to TOP. **Model** / **Interface** / **Protocol** Modbus Modicon F50 / Serial / MODBUS RTU 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

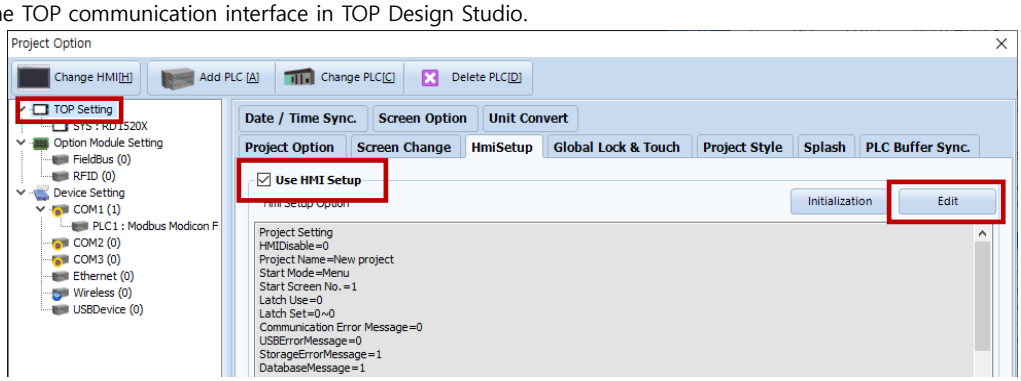
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

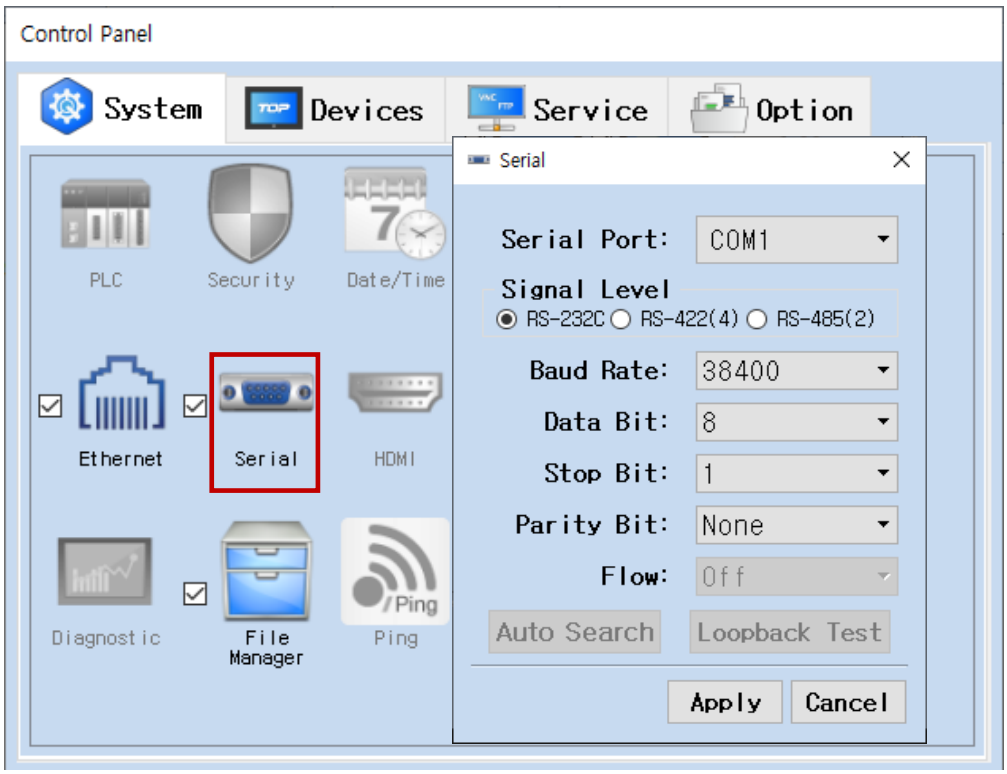
3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

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

– Set the TOP communication interface in TOP Design Studio.





Items	TOP	External device	Remarks
Signal Level (port)	RS-232C RS-422 RS-485	RS-232C RS-422 RS-485	
Baud Rate	38400		
Data Bit	8		
Stop Bit	1		
Parity Bit	None.		

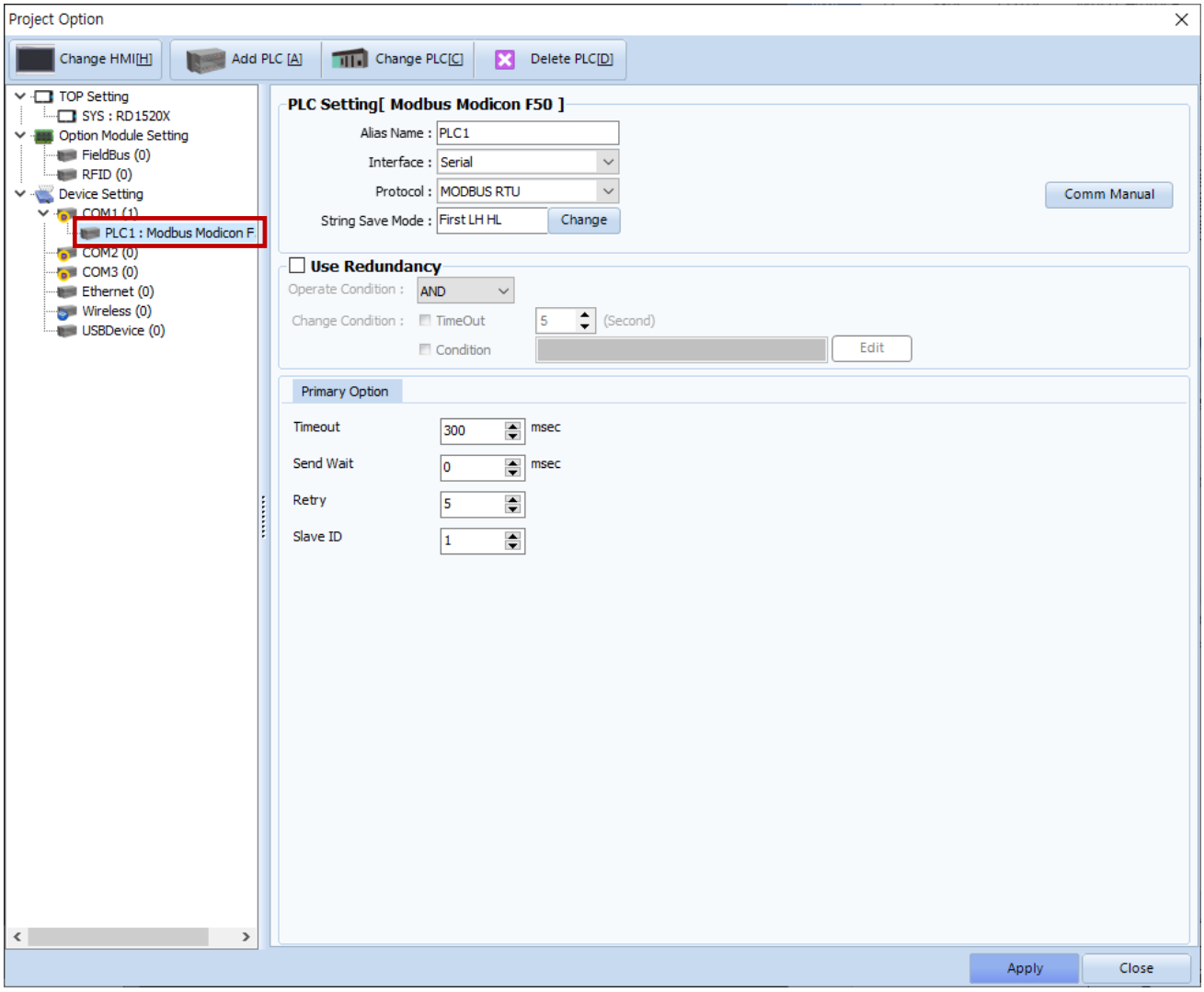
* The above settings are examples recommended by the company.

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 > Device Setting > COM > "PLC1: Modbus modicon F50"]

– Set the options of the Modbus modicon F50 communication driver in TOP Design Studio.

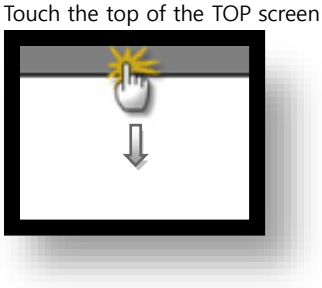


Items	Settings	Remarks
Interface	Select "Serial".	Refer to "2. External device selection".
Protocol	Select "MODBUS RTU".	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Slave ID	Enter the prefix of an external device.	

3.2. Communication setting in TOP

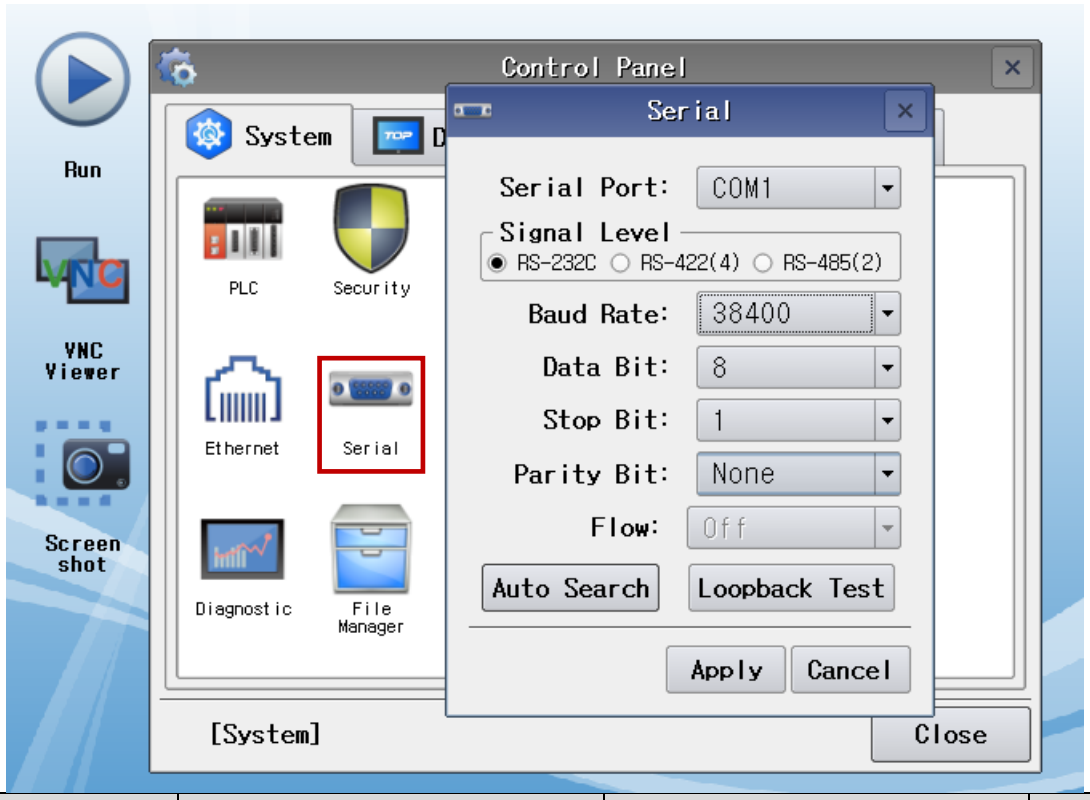
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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

■ [Main Screen > Control Panel > Serial]



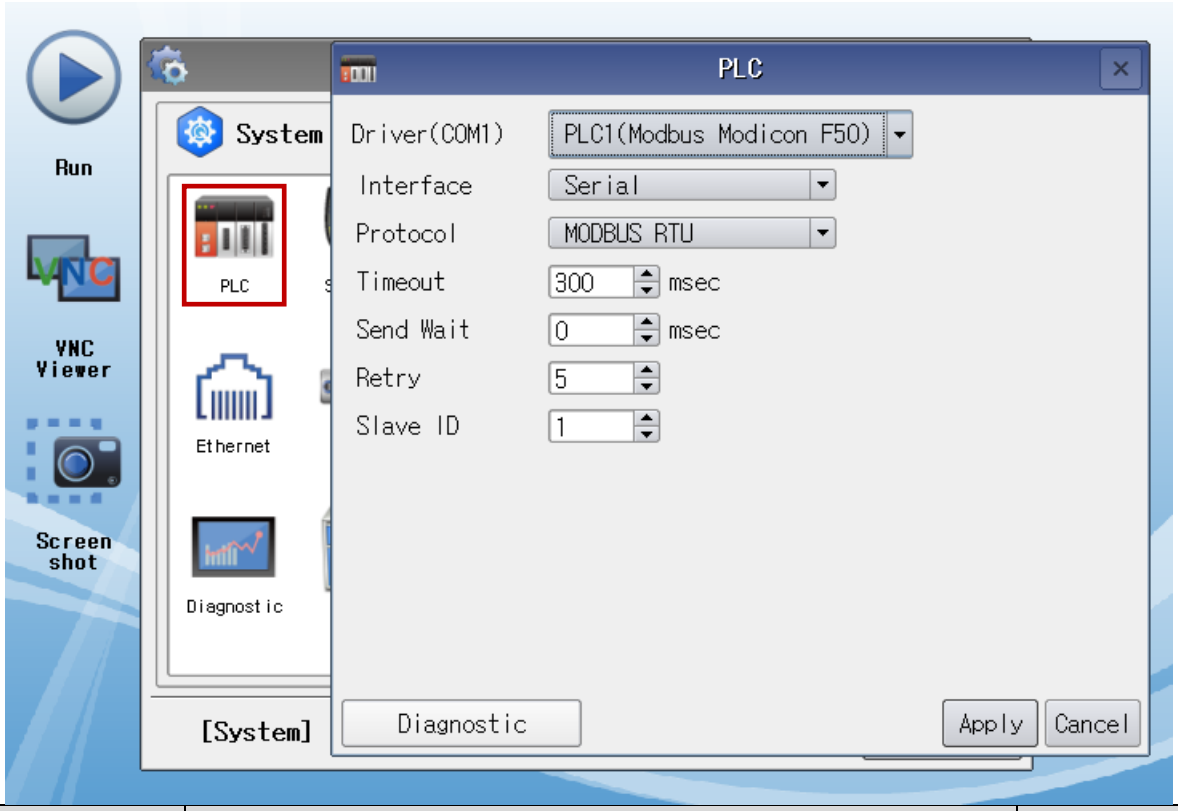
Items	TOP	External device	Remarks
Signal Level (port)	RS-232C RS-422 RS-485	RS-232C RS-422 RS-485	
Baud Rate	38400		
Data Bit	8		
Stop Bit	1		
Parity Bit	None.		

* 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 "Serial".	Refer to "2. External device selection".
Protocol	Select "MODBUS RTU".	
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.	
Slave ID	Enter the prefix of an 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 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

Configure the communication settings of the external device by referring to the vendor's user manual.

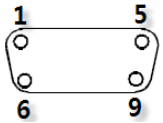
5. Cable table

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 "RS Automation.")

5.1 Cable table 1

■ 1:1 connection (RS-232C)

TOP COM Port (9 pin)

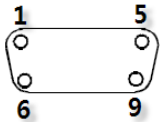
COM			Cable connection	PLC
Pin arrangement*Note 1)	Signal name	Pin number		Signal name
 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	CD	1		
	RD	2		SD
	SD	3		RD
	DTR	4		DTR
	SG	5		SG
	DSR	6		DSR
	RTS	7		RTS
	CTS	8		CTS
		9		

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

5.2. Cable table 2

■ 1:1 connection (RS-422)

TOP COM Port (9 pin)

COM			Cable connection	PLC
Pin arrangement*Note 1)	Signal name	Pin number		Signal name
	RDA	1		SDA
		2		SDB
		3		RDA
	RDB	4		RDB
	SG	5		SG
	SDA	6		
		7		
		8		
	SDB	9		

Based on communication cable connector front, D-SUB 9 Pin male (male, convex)

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

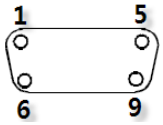
■ 1:N connection – Refer to 1:1 connection to connect in the following way.

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

5.3 Cable table 3

■ 1:1 connection (RS-485)

TOP COM Port (9 pin)

COM			Cable connection	PLC
Pin arrangement*Note 1)	Signal name	Pin number		Signal name
	RDA	1		SDA
		2		SDB
		3		RDA
	RDB	4		RDB
	SG	5		SG
	SDA	6		
		7		
		8		
	SDB	9		

Based on communication cable connector front, D-SUB 9 Pin male (male, convex)

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

■ 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

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.

	Bit Address	Word Address	R/W	Remarks
U0	0001.00 ~ 0017.15	0001 ~ 0017	R	Inverter operation status
U1	0101 .00~ 0115.15	0101 ~ 0115	R	Operation status in case of abnormality
U2	9920, 9922, 9924, 9926	9920, 9922, 9924, 9926	R/W	Abnormality history
U3	N/A	N/A		Constant test record, communication does not allow R/W
B0	1001 .00~ 1014.15	1001 ~ 1014	R/W	Operation basic settings
B1	1101.00 ~ 1103.15	1101 ~ 1103	R/W	System initialization
B2	1201 .00~ 1203.15	1201 ~ 1203	R/W	Capacity, control mode setting
F0	2001 .00~ 2009.15	2001 ~ 2009	R/W	Frequency Command
F1	2101 .00~ 2110.15	2101 ~ 2110	R/W	Frequency Command Range Limit
F2	2201 .00~ 2206.15	2201 ~ 2206	R/W	Acceleration/deceleration time
F3	2301.00 ~ 2304.15	2301 ~ 2304	R/W	S Acceleration/deceleration time
F4	2401 .00~ 2016.15	2401 ~ 2016	R/W	Pattern operation setting
S0	3001 .00~ 3004.15	3001 ~ 3004	R/W	Direct brake function
S1	3101 .00~ 3104.15	3101 ~ 3104	R/W	Speed search function
S2	3201.00 ~ 3204.15	3201 ~ 3204	R/W	Dwell operation
S3	3301 .00~ 3304.15	3301 ~ 3304	R/W	Energy saving operation
S4	3401.00 ~ 3403.15	3401 ~ 3403	R/W	Slip correction
S5	3501.00 ~ 3502.15	3501 ~ 3502	R/W	Torque correction
S6	3601.00 ~ 3603.15	3601 ~ 3603	R/W	System error correction
S7	3701.00 ~ 3721.15	3701 ~ 3721	R/W	PID operation settings
C0	4001.00 ~ 4008.15	4001 ~ 4008	R/W	V/F settings
C1	4101.00 ~ 4105.15	4101 ~ 4105	R/W	Modification method
C2	4201.00 ~ 4208.15	4201 ~ 4208	R/W	Motor constant
C3	4301.00 ~ 4310.15	4301 ~ 4310	R/W	H/W adjustment constant
H0	5001.00 ~ 5007.15	5001 ~ 5007	R/W	Multifunction Input Contact
H1	5101 .00~ 5106.15	5101 ~ 5106	R/W	Multifunction Output Contact
H2	5201.00 ~ 5213.15	5201 ~ 5213	R/W	Multifunction Analog, pulse train input
H3	5301 .00~ 5306.15	5301 ~ 5306	R/W	Multifunction Analog, pulse train output
H4	5401.00 ~ 5406.15	5401 ~ 5406	R/W	Digital Operator settings
P0	6001.00 ~ 6003.15	6001 ~ 6003	R/W	Motor protection function
P1	6101.00 ~ 6106.15	6101 ~ 6106	R/W	Immediate power outage function
P2	6201 .00~ 6206.15	6201 ~ 6206	R/W	Stall prevention
P3	6301.00 ~ 6303.15	6301 ~ 6303	R/W	Excess torque detection
P4	6401.00 ~ 6402.15	6401 ~ 6402	R/W	Abnormal retry setting
P5	6501.15	6501	R/W	Fan Inspection Status
P6	6601.15	6601	R/W	PID constant
EU	9900.00 ~ 9901.15	9900 ~ 9901	R	Show error notation
SU	9500.15	9500	R/W	Device function status notation
FreQ	9501.15	9501	R/W	Communication frequency command
Reset	9910.15	9910	W	Clear fault