MITSUBISHI Electric Corporation
MELSEC Q 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.
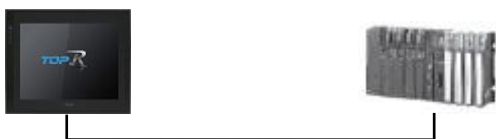
1. System configuration

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

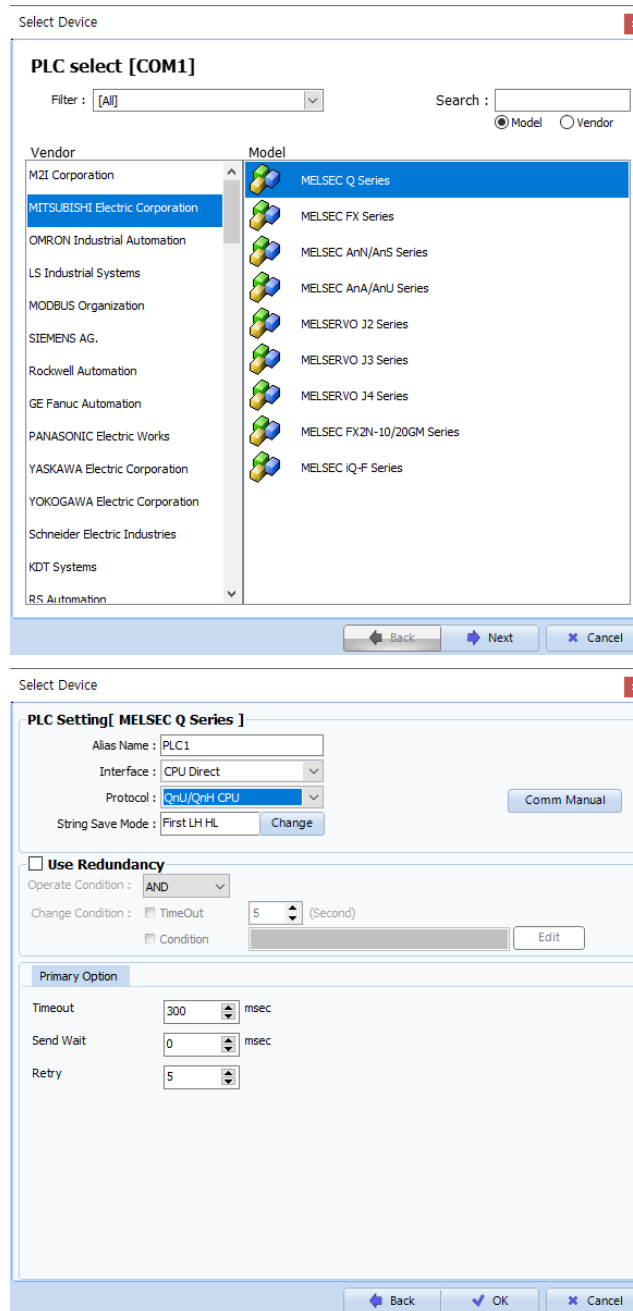| Series	CPU	Link I/F	Communication method	Communication setting	Cable
MELSEC Q	**00/00J/01 CPU** Q00 Q01 Q00J **QnH CPU** Q02 Q02H Q06H Q12H Q25H	CPU port	RS-232C	3. TOP communication setting 4. External device setting	5. Cable table
	QnU CPU Q00UJ Q00U Q01U Q02U Q03UD Q04UDH Q06UDH Q10UDH Q13UDH Q20UDH Q26UDH	QJ71C24 QJ71C24-R2 QJ71C24N QJ71C24N-R2 QJ71C24N-R4	RS-232C		
			RS-422/485		
MELSEC iQ-R	All CPUs	RJ71C24 RJ71C24-R2 RJ71C24-R4	RS-232C		
			RS-422/485		

■ Connectable configuration

・1:1 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 to be connected to TOP. Please select "MITSUBISHI Electric Corporation".
	PLC	Select an external device to connect to TOP.

Model	Interface	Protocol
MELSEC Q Series	CPU Direct	Set Users

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.
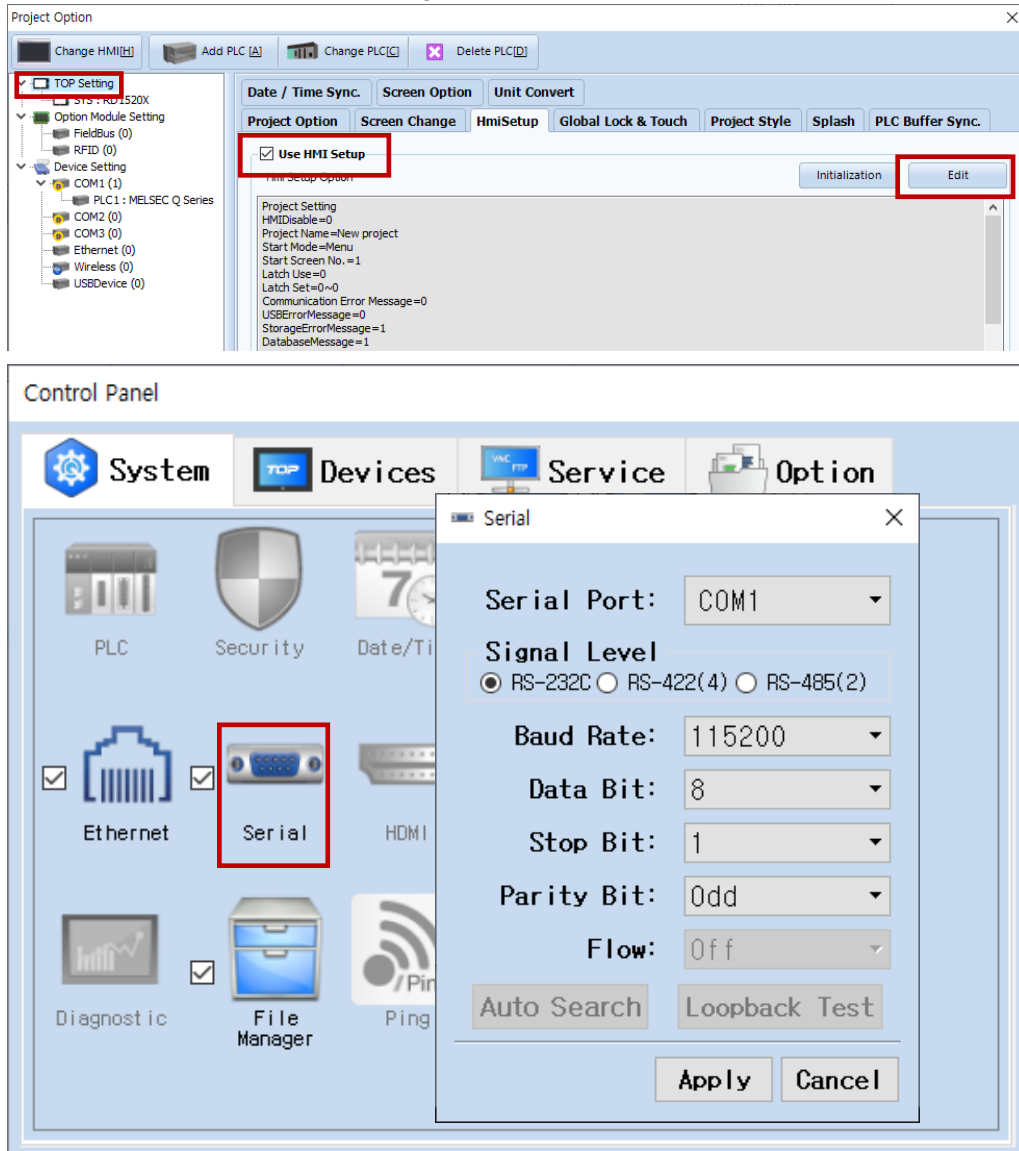
3. TOP communication setting

The communication can be set in TOP Design Studio or TOP system menu.

3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project] → [Property] → [TOP Setting] → [HMI Setup] → [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-422/485	RS-232C RS-422/485	
Baud Rate	115200		
Data Bit	8		
Stop Bit	1		
Parity Bit	Odd		

* The above settings are <u>examples</u> 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 > MELSEC Q Series]

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

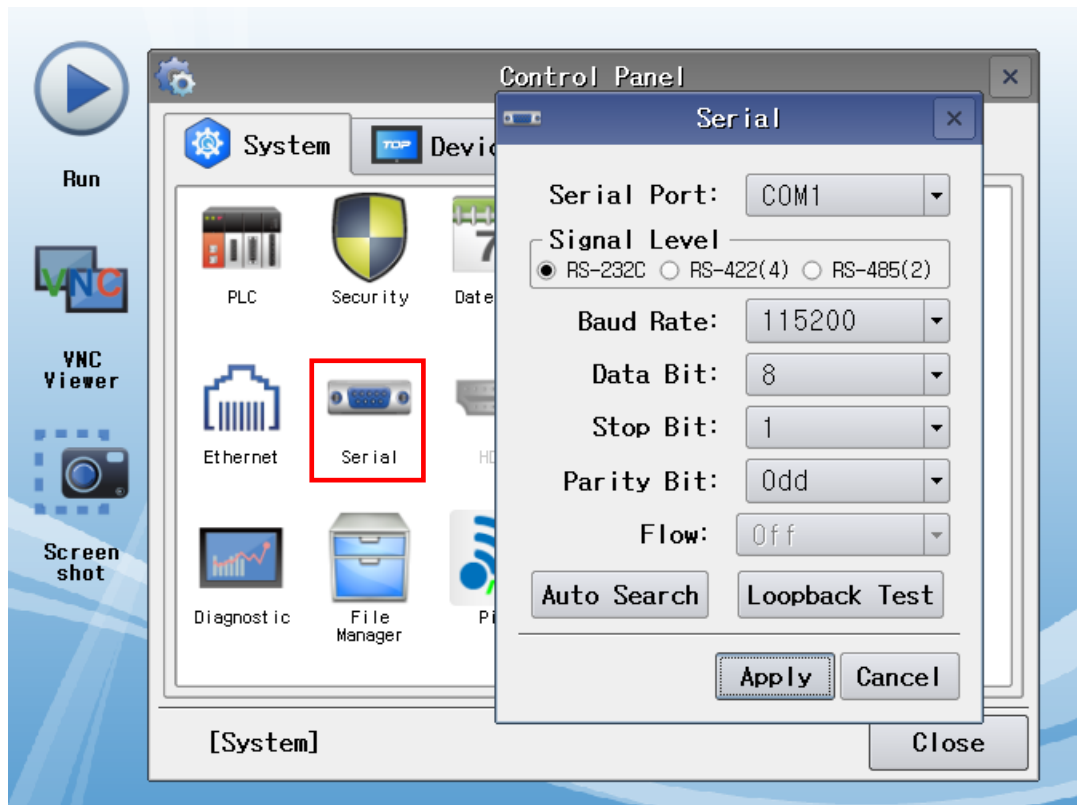| Items	Settings	Remarks
Interface	Select "CPU Direct".	Refer to "2. External device selection".
Protocol	Select the communication protocol between the TOP and an external device.	
TimeOut (ms)	Set the time to wait for a response from an external device.	
SendWait (ms)	Set the waiting time before sending a data request to an external device.	

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 <u>drag</u> it down. Touch "EXIT" in the pop-up window to go to the main screen.

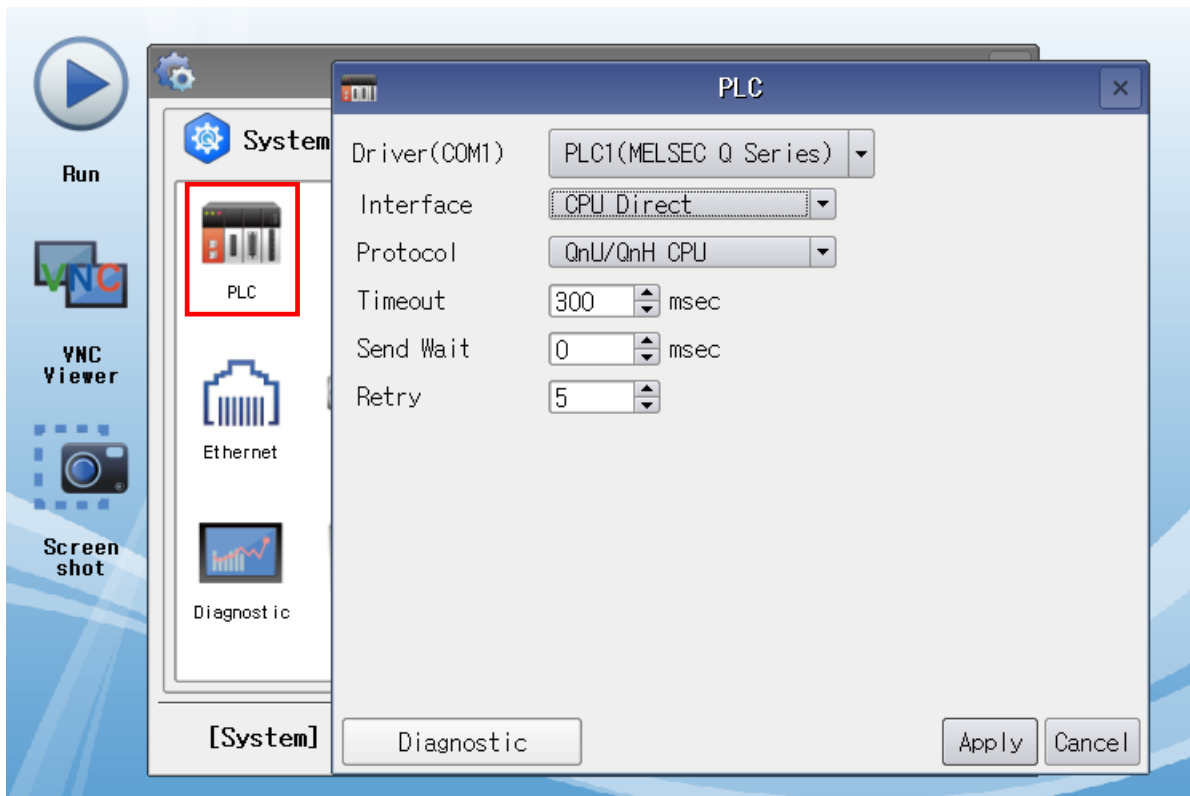### (1) Communication interface setting

■ [Control Panel] → [Serial]

Items	TOP	External device	Remarks
Signal Level (port)	RS-232C	RS-232C	
	RS-422/485	RS-422/485	
Baud Rate	115200		
Data Bit	8		
Stop Bit	1		
Parity Bit	Odd		

* The above settings are <u>examples</u> 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".	Refer to "2. External device selection".
Protocol	Select the communication protocol between the TOP and an external device.	
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.	

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	
	Port in use		OK	NG	
	Driver name		OK	NG	
	Other detailed settings		OK	NG	
	Relative prefix	Project setting	OK	NG	
		Communication diagnostics	OK	NG	2. External device selection 3. Communication setting
	Serial Parameter	Transmission Speed	OK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
External device	CPU name		OK	NG	
	Communication port name (module name)		OK	NG	
	Protocol (mode)		OK	NG	
	Setup Prefix		OK	NG	
	Other detailed settings		OK	NG	4. External device setting
	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

4.1. CPU port

· The loader port communication interface for MELSEC-Q Series do not require a separate configuration.

· Communication speed automatically adjusts to the TOP's configuration.

4.2. Serial communication module

· Configure the switch set value of channels as 0.

Switch Setting for I/O and Intelligent Function Module

Input Format HEX

	Slot	Type	Model Name	Switch1	Switch2	Switch3	Switch4	Switch5
0	PLC	PLC						
1	0(*-0)	Intelligent	QJ71C24N					
2	1(*-1)							
3	2(*-2)							
4	3(*-3)							
5	4(*-4)							
6	5(*-5)							
7	6(*-6)							
8	7(*-7)							
9	8(*-8)							
10	9(*-9)							
11	10(*-10)							
12	11(*-11)							
13	12(*-12)							
14	13(*-13)							
15	14(*-14)							

If you use Intelligent Function Module, able to set each module with pulldown format by following function.
- Switch Setting of Intelligent Function Module in project tree.

End   Cancel

Switch Setting 0000:QJ71C24N

	Item	CH1	CH2
Transmission Setting	Operation setting	Independent	Independent
	Data Bit	7	7
	Parity Bit	None	None
	Even/odd parity	Odd	Odd
	Stop bit	1	1
	Sum check code	None	None
	Online Change	Disable	Disable
	Setting modifications	Disable	Disable
Communication rate setting		Auto Setting	Auto Setting
Communication protocol setting		MELSOFT Connection	MELSOFT Connection
Station number setting (0 to 31)		0	

The following setting is available for product information 101220000000000-B or later.
Communication protocol setting
- Predefined protocol

* This dialog setting is linked to the Switch Setting of the PLC parameter.
  Default value will be shown in the dialog
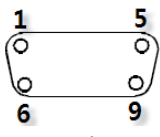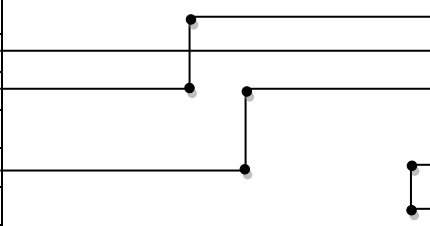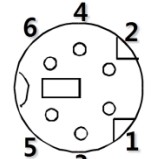 if the Switch Setting of the PLC parameter contains an out-of-range value.

OK   Cancel

5. Cable table

This chapter introduces a cable diagram for normal communication between the TOP-R and the corresponding device.

(The cable diagram described in this section may differ from the recommendations of "Mitsubishi Electric Corporation")
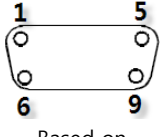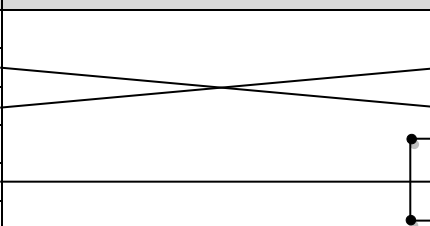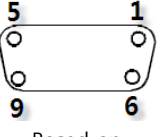
5.1. CPU port

■ **RS-232C** (1:1 connection)

TOP			Cable connection	External device		
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	RD	Based on communication cable connector front, D-SUB 6 Pin male (male, convex)
	RD	2		2	SD	
	SD	3		3	SG	
	DTR	4		4		
	SG	5		5	DSR	
	DSR	6		6	DTR	
	RTS	7				
	CTS	8				
		9				

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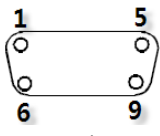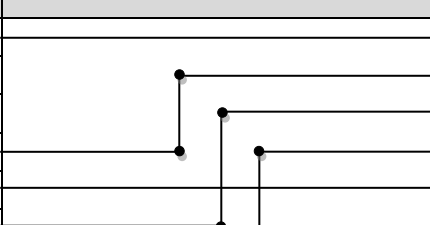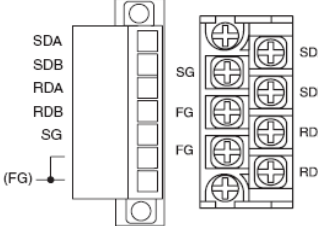
5.2. Serial communication module

■ **RS-232C** (1:1 connection)

TOP			Cable connection	External device		
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)

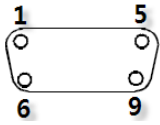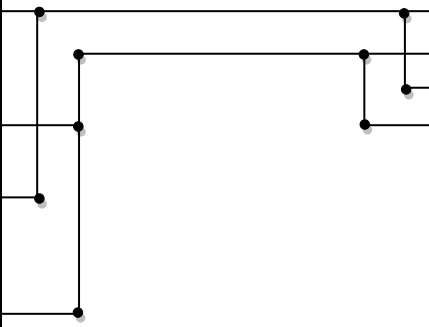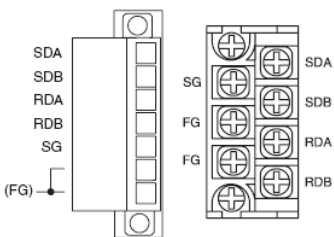| TOP			Cable connection	External device	
Pin arrangement*Note 1)	Signal name	Pin number		Signal name	Pin arrangement
Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	RDA	1		SDA	
		2		SDB	
		3		RDA	
	RDB	4		RDB	
	SG	5		SG	
	SDA	6			
		7			
		8			
	SDB	9			

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

■ RS-485 (1:1 connection)

TOP			Cable connection	PLC	
Pin arrangement*Note 1)	Signal name	Pin number		Signal name	Pin arrangement
1　　5 6　　9 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	RDA	1		SDA	SDA SDB RDA RDB SG (FG)　　SG FG FG　SDA SDB RDA RDB
		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.

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 ~ X1FFF (HEX)	X0000 ~ X1FF0 (HEX)	X***0 *Note 1)	
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		L/H *Note 3)
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		
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 to 16BIT device address as follows:

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