TOHO Electronics Inc.

TTM-000 Series

Serial Driver

Supported version TOP Design Studio V1.4.3 or higher

CONTENTS

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

1. System configuration

The system configuration of TOP and "TOHO Electronics Inc. – TTM-000 Series" is as follows.

Series	Model name	Interface	Communication method	Communication setting	Cable
TTM-000	TTM-002 TTM-004 TTM-005 TTM-006 TTM-007 TTM-009	Serial	RS-485 (2 wire)	3. TOP communication setting 4. External device setting	5. Cable table

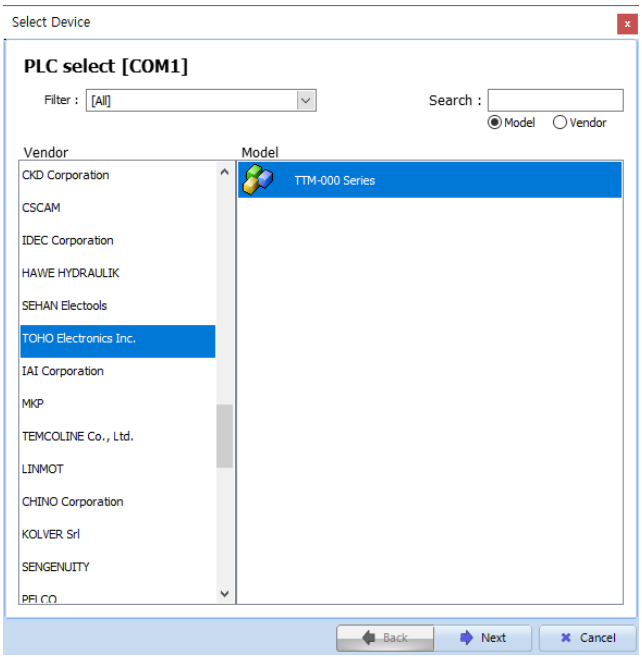
■ Connection configuration

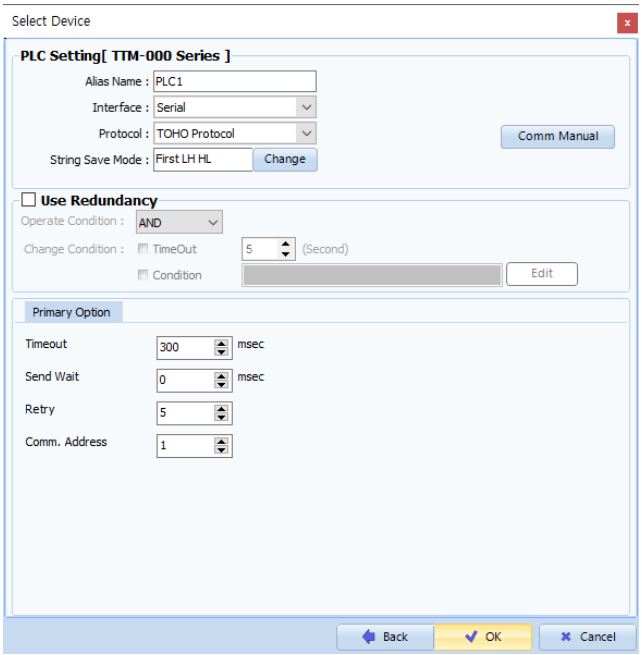
・1:1 (one TOP and one external device) connection

・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 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 "TOHO Electronics Inc.".
	PLC	Select an external device to connect to TOP.

Model	Interface	Protocol
TTM-000 Series	Serial	TOHO Protocol

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

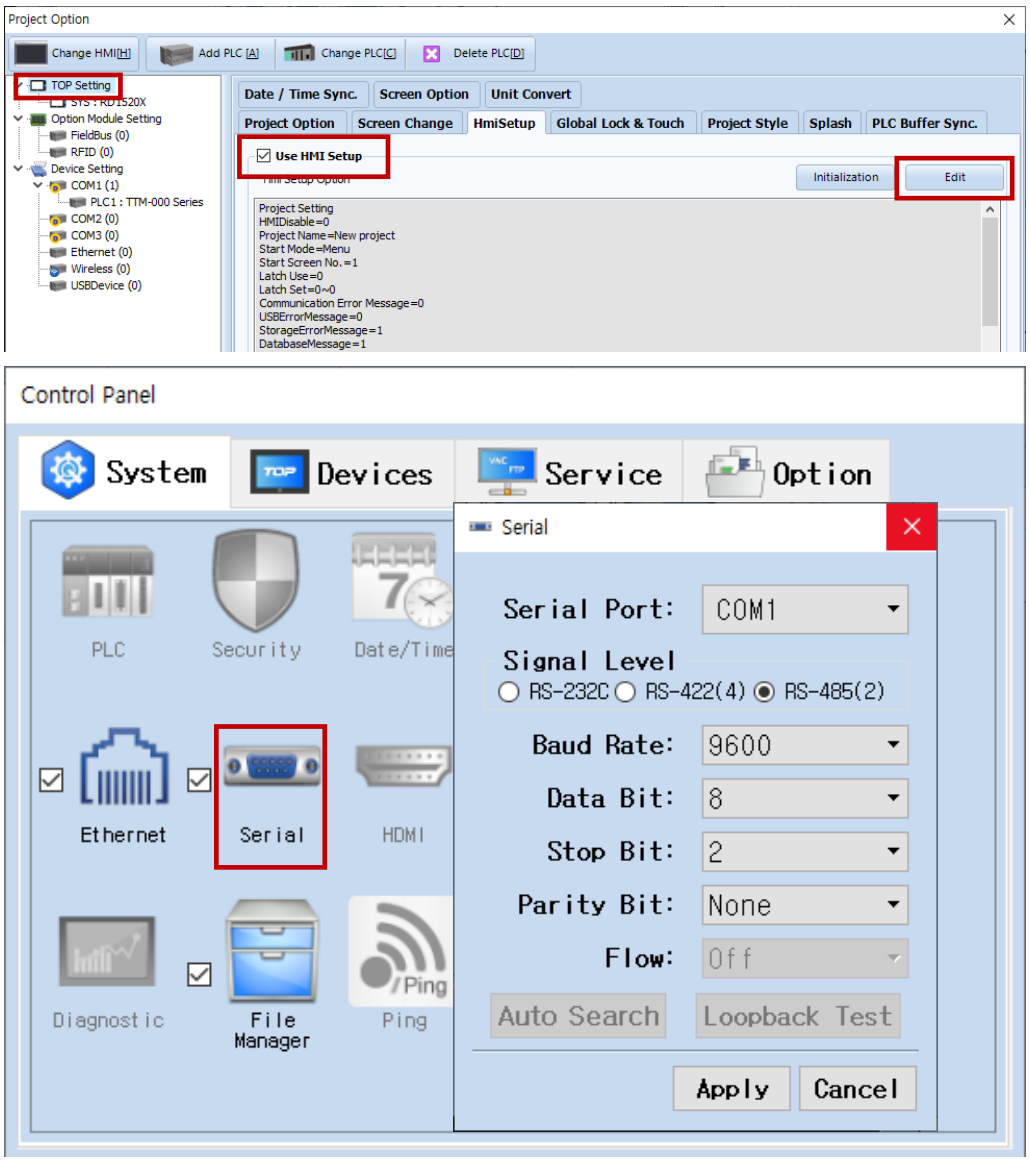
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project > Project properties > TOP settings] → [Project option > Check "Use HMI settings" > Edit > Serial]

– Set the TOP communication interface in TOP Design Studio.



Items	TOP	External device	Remarks
Signal Level (port)	RS-485	RS-485	Fixed
Baud Rate	9600		
Data Bit	8		
Stop Bit	2		
Parity Bit	None.		

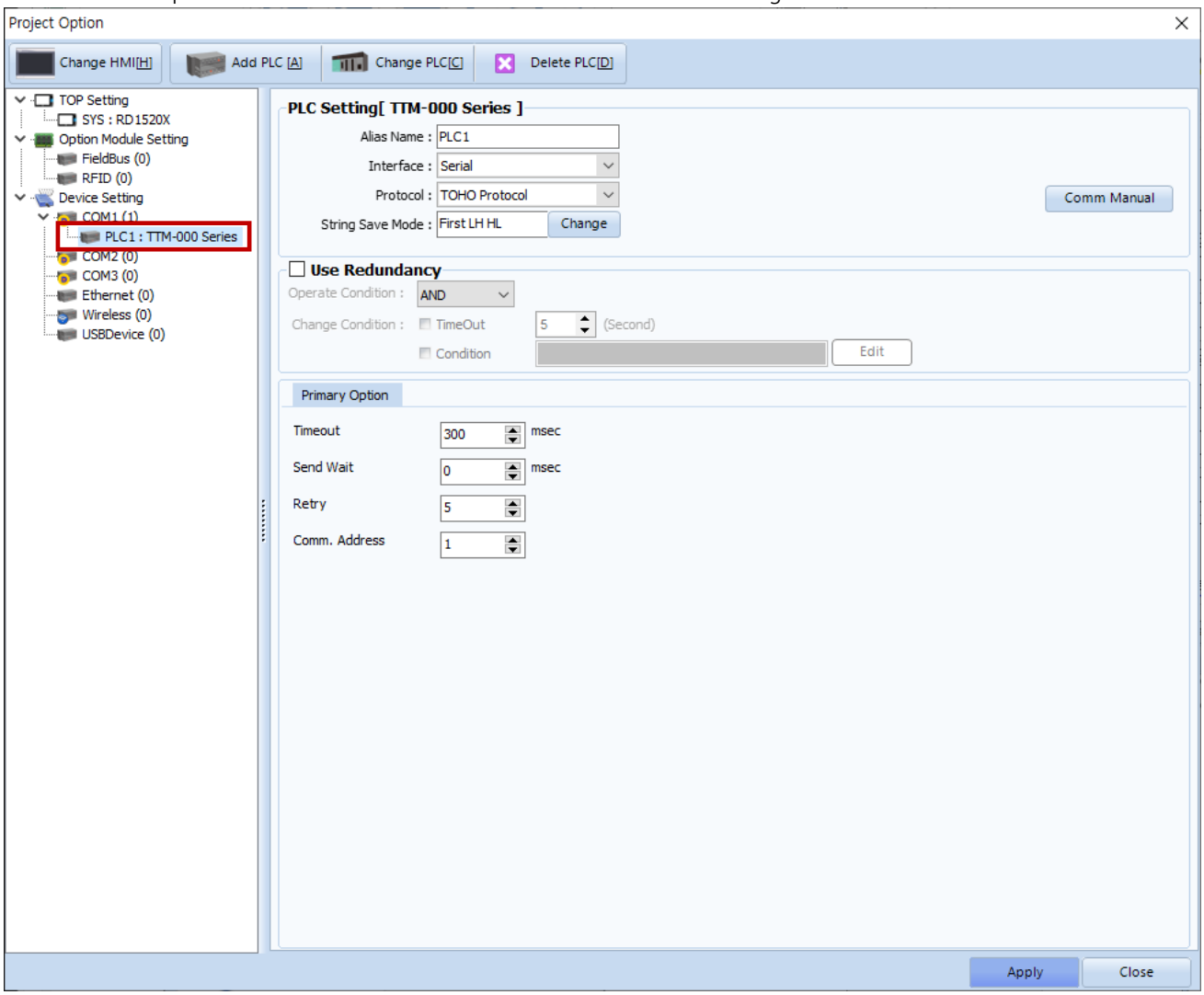
* The above settings are examples recommended by the company.

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 properties > PLC settings > COM1 > "PLC1 : TTM-000 Series"]

– Set the options of the communication driver of TTM-000 Series in TOP Design Studio.

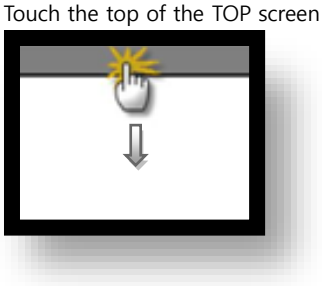


Items	Settings	Remarks
Interface	Select "Serial".	Refer to "2. External device selection".
Protocol	Select "TOHO Protocol".	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Comm. Address	Set the external device communication address (prefix).	

3.2. Communication setting in TOP

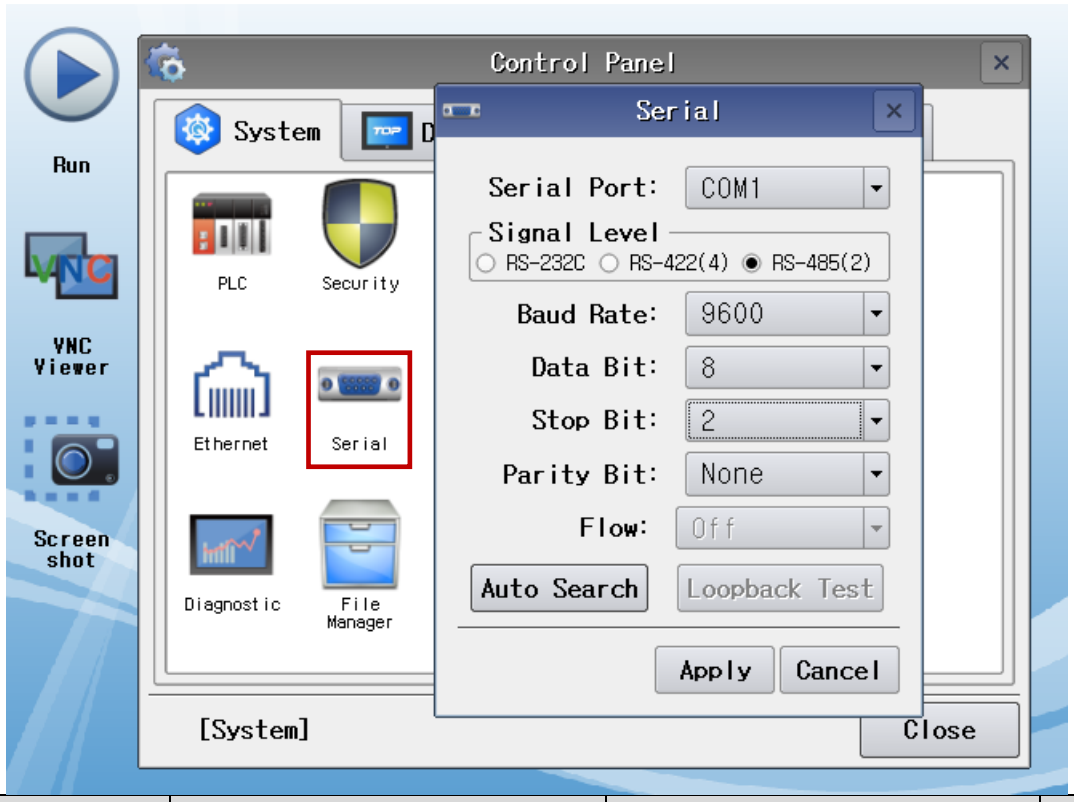
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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
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Baud Rate	9600		
Data Bit	8		
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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.
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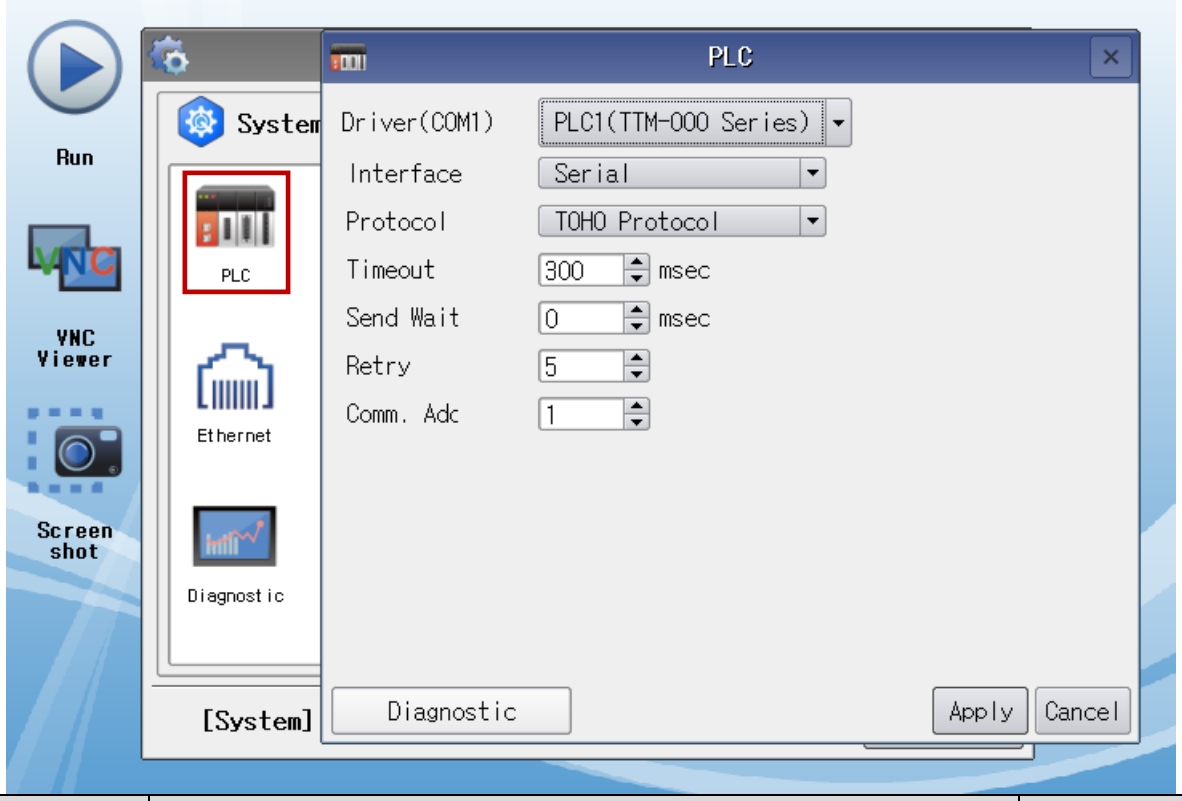
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

■ [Main screen > Control panel > PLC]



Items	Settings	Remarks
Interface	Select "Serial".	Refer to "2. External device selection".
Protocol	Select "TOHO Protocol".	
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.	
Comm. Address	Set the external device communication address (prefix).	

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.)

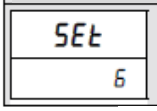
4. External device setting

The communication setting method of TTM-000 Series is as follows.

For details, refer to the manufacturer's user manual.

<SET6: Communication SET>

63. Communication configuration screen

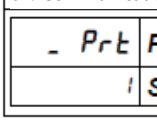


Communication configuration mode Call screen

After pressing the MODE button for 2 seconds or more, it changes to the communication setting screen.

↓ MODE Key

64. Communication protocol configuration



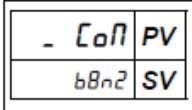
0 TOHO Protocol
1 MODBUS (RTU)
2 MODBUS (ASCII)

Set the PRT value to "0". **(Essential)**

Contents: TOHO Protocol

↓ MODE Key

65. Communication parameter configuration screen



<BCC Check>	<Data Bit>	<Parity Bit>	<Stop Bit>
SV n N/A	SV 7 7 Bit	SV n N/A	SV 1 1 Bit
b N/A	8 8 Bit	o Odd	2 2 Bit
		E Even	

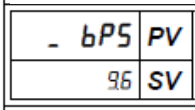
Set the COM value to b8n2.

Contents:

With checksum**(Essential)** / Data bit 8 / Parity bit none / Stop bit 2

↓ MODE Key

66. Communication speed configuration screen



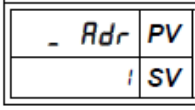
SV
12 1200bps
24 2400bps
48 4800bps
96 9600bps
192 19200bps

Set the BPS value to "9.6".

Contents: Baud Rate 9600 bps

↓ MODE Key

67. Communication address configuration screen



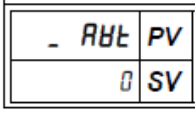
Configuration range: 1–99

Set the ADR value to "1".

Contents: Communication address (station number) 1

↓ MODE Key

68. Response latency configuration screen



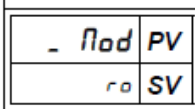
Configuration range: 0~250mS

Set the AWT value to "0".

Contents: response delay time 0 ms

↓ MODE Key

69. Communication mode configuration screen



SV
ro Read Communication (R)
rW Read, Write communication (RW)

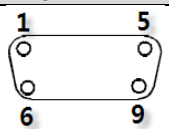
Set the MOD value to "rw".

Contents: Read/Write

5. Cable table

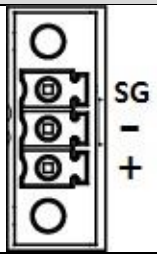
This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device.
(The cable diagram described in this section may differ from the recommendations of "TOHO Electronics Inc.".)

■ **RS-485** (1:1 connection)

COM			Cable connection	TTM-000	
Pin arrangement*Note 1)	Signal name	Pin number		Pin number	
 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	RDA	1		+	
		2		-	
		3			
	RDB	4			
	SG	5			
	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	TTM-000	
Pin arrangement	Signal name		Signal name	
	+		+	
	-		-	
	SG			

■ **RS-485** 1 : N - Refer to 1:1 connection to connect in the following method.

TOP	Cable connection and signal direction	TTM-000	Cable connection and signal direction	TTM-000
Signal name		Signal name		Signal name
+		+		+
-		-		-

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	Name	Bit address	Word address	Read/Write	Remarks
PV1	Measures (PV)		PV1	Read	
SV1	Measures (SV)	SV1.00 ~ SV1.15	SV1	Read/Write	*Note 1)
PR1	Priority screen function setting 1		PR1	Read/Write	*Note 1)
PR2	Priority screen function setting 2		PR2	Read/Write	*Note 1)
PR3	Priority screen function setting 3		PR3	Read/Write	*Note 1)
PR4	Priority screen function setting 4		PR4	Read/Write	*Note 1)
PR5	Priority screen function setting 5		PR5	Read/Write	*Note 1)
PR6	Priority screen function setting 6		PR6	Read/Write	*Note 1)
PR7	Priority screen function setting 7		PR7	Read/Write	*Note 1)
PR8	Priority screen function setting 8		PR8	Read/Write	*Note 1)
PR9	Priority screen function setting 9		PR9	Read/Write	*Note 1)
INP	Input type setting		INP	Read/Write	
PVG	PV compensation gain setting		PVG	Read/Write	
PVS	PV compensation zero setting		PVS	Read/Write	
PDF	Input filter setting		PDF	Read/Write	
DP	Decimal point setting	DP	DP	Read/Write	
FU	Function key feature setting		FU	Read/Write	
LOC	Key lock setting		LOC	Read/Write	
SLH	SV limit upper limit setting		SLH	Read/Write	
SLL	SV limit lower limit setting		SLL	Read/Write	
MD	Zero mode setting	MD.00 ~ MD.01	MD	Read/Write	
CNT	Control type setting		CNT	Read/Write	
DIR	Forward/backward operation conversion setting		DIR	Read/Write	
MV1	Output 1 manipulative volume		MV1	Read/Write	
TUN	Tuning type setting		TUN	Read/Write	
ATG	AT coefficient		ATG	Read/Write	
ATC	AT sensitivity		ATC	Read/Write	
P1	Output 1 proportional band setting		P1	Read/Write	
I1	Output 1 integral time setting		I1	Read/Write	
D1	Output 1 differential time setting		D1	Read/Write	
T1	Output 1 proportional cycle setting		T1	Read/Write	
ARW	Anti-reset wind-up		ARW	Read/Write	
MH1	Output 1 manipulative volume limit upper limit setting		MH1	Read/Write	
ML1	Output 1 manipulative volume limit lower limit setting		ML1	Read/Write	
C1	Output 1 control sensitivity setting		C1	Read/Write	
CP1	Output 1 OFF point position setting		CP1	Read/Write	
MV2	Output 2 manipulative volume		MV2	Read/Write	
P2	Output 2 proportional band setting		P2	Read/Write	
T2	Output 2 proportional cycle setting		T2	Read/Write	
MH2	Output 2 manipulative volume limit upper limit setting		MH2	Read/Write	

Device	Name	Bit address	Word address	Read/Write	Remarks
ML2	Output 2 manipulative volume limit lower limit setting		ML2	Read/Write	
PBB	Manual reset		PBB	Read/Write	
C2	Output 2 control sensitivity setting		C2	Read/Write	
CP2	Output 2 OFF point position setting		CP2	Read/Write	
DB	Dead band setting		DB	Read/Write	
E1F	PV event output 1 function setting		E1F	Read/Write	
E1H	Event output 1 upper limit setting		E1H	Read/Write	
E1L	Event output 1 lower limit setting		E1L	Read/Write	
E1C	Event output 1 sensitivity setting		E1C	Read/Write	
E1T	Event output 1 delay timer setting		E1T	Read/Write	
E1B	Special event output 1 function setting		E1B	Read/Write	
E1P	Event output 1 polarity setting		E1P	Read/Write	
CM1	CT input monitor		CM1	Read	
CT1	Event output 1 current error setting		CT1	Read/Write	
E2F	PV event output 2 function setting		E2F	Read/Write	
E2H	Event output 2 upper limit setting		E2H	Read/Write	
E2L	Event output 2 lower limit setting		E2L	Read/Write	
E2C	Event output 2 sensitivity setting		E2C	Read/Write	
E2T	Event output 2 delay timer setting		E2T	Read/Write	
E2B	Special event output 2 function setting		E2B	Read/Write	
E2P	Event output 2 polarity setting		E2P	Read/Write	
CM2	CT input monitor		CM2	Read/Write	
CT2	Event output 2 current error setting		CT2	Read	
DIF	DI input function setting		DIF	Read/Write	
DIP	DI polarity setting		DIP	Read/Write	
SV2	Control setting 2	SV2.00 ~ SV2.15	SV2	Read/Write	
COM	Communication parameter setting		COM	Read/Write	*Note 1)
BPS	Communication speed setting		BPS	Read/Write	
ADR	Communication address setting		ADR	Read/Write	
AWT	Reponse delay time setting		AWT	Read/Write	
MOD	Communication mode conversion setting	MOD	MOD	Read/Write	
TMO	Timer output location setting		TMO	Read/Write	
TMF	Timer function setting		TMF	Read/Write	
H/M	Timer unit conversiong		H/M	Read/Write	
TSV	Timer SV start permission width setting		TSV	Read/Write	
TIM	Timer time setting		TIM	Read/Write	
TIA	Timer remaining time monitor		TIA	Read	
TST	Timer start/stop	TST	TST	Write	
OM1	Output monitor		OM1	Read	
AT	AT operate/release	AT	AT	Read/Write	
STR	Data retention	STR	STR	Write	

*Note 1) String data

※ Write-only (command) device execution method

① Pop-up the object's property window → ② Effects and actions → ③Condition setting → ④Action setting
When setting an action, set to input data to the device.

The picture below is an example of setting an action that sends an STR command once to a square object with touchdown as the action condition.