YASKAWA Electric Corporation
High Speed Ethernet Server Driver

Supported version TOP Design Studio V1.4.2 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".

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Describes the devices required for connection, the setting of each device, cables, and configurable systems.

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Select a TOP model and an external device.

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Describes how to set up communication for external devices.

5. Supported addresses Page 11

Refer to this section to check the addresses which can communicate with an external device.

1. System configuration

The system configuration of TOP and "YASKAWA Electric Corp. – High Speed Ethernet Server" is as follows:

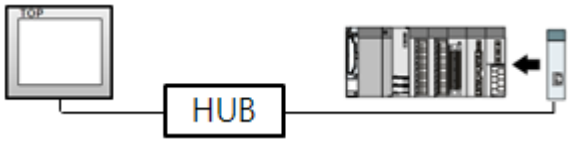
Series	CPU	Link I/F	Communication method	Communication setting	Cable
DX200	DX200	LAN port on the controller	Ethernet (UDP)	3. TOP communication setting 4. External device setting	Twisted pair Cable*Note 1)
DX100	DX100	LAN port on the controller	Ethernet (UDP)		
FS100	FS100	Ethernet port on the controller	Ethernet (UDP)		
DX200	DX200	LAN port on the controller	Ethernet (UDP)		
FS100L	FS100L	Ethernet port on the controller	Ethernet (UDP)		

*Note 1) Twisted pair cable

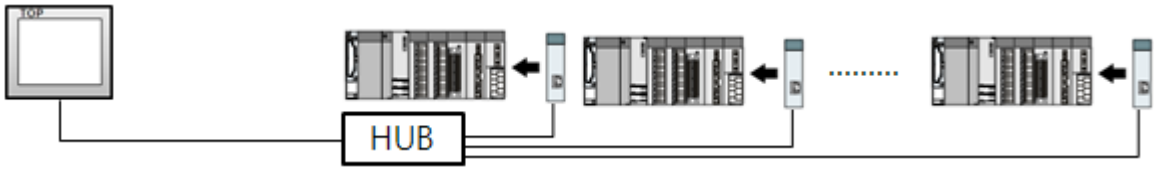
- Refer to STP (Shielded Twisted Pair Cable) or UTP (Unshielded Twisted Pair Cable) Category 3, 4, 5.
- Depending on the network configuration, you can connect to components such as the hub and transceiver, and in this case, use a direct cable.

■ Connectable configuration

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



• 1:N connection (one TOP and multiple external devices) connection



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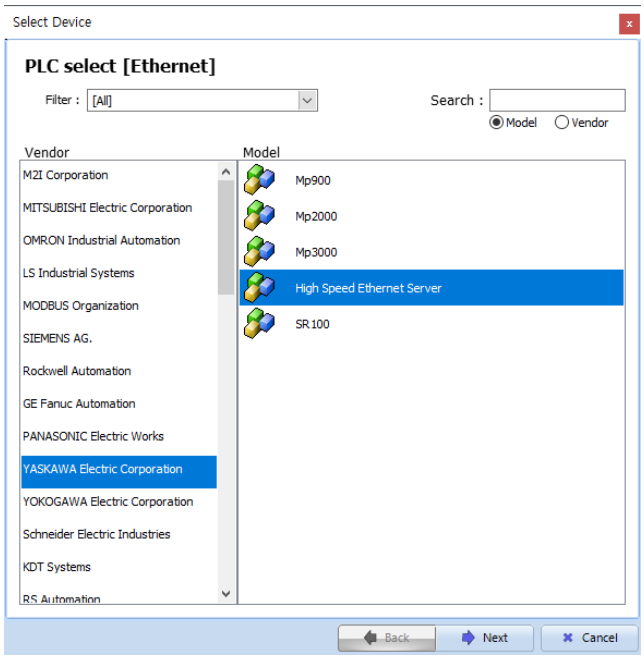
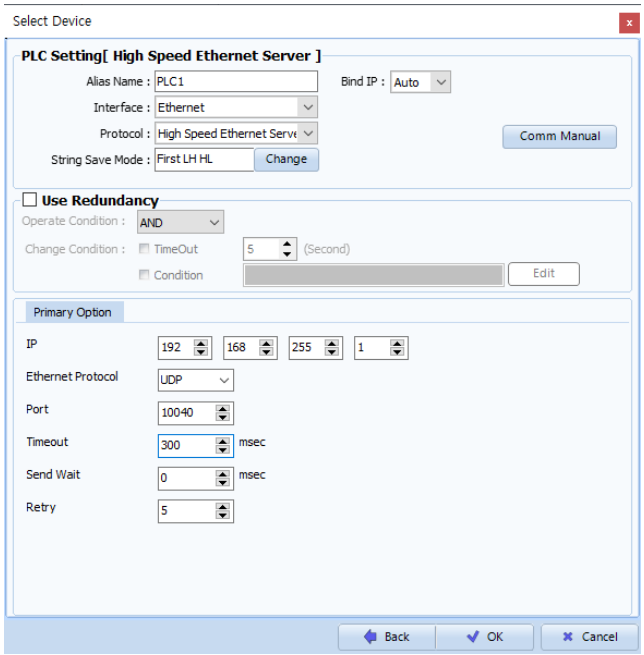
2. External device selection

■ 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 "YASKAWA Electric Corporation".
	PLC	Select the external device to be connected to the TOP.

Model	Interface	Protocol
High Speed Ethernet Server	Ethernet	High Speed Ethernet Server

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

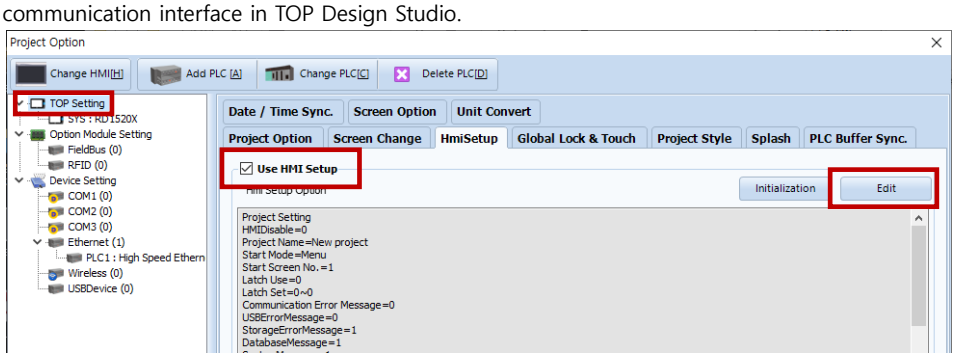
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

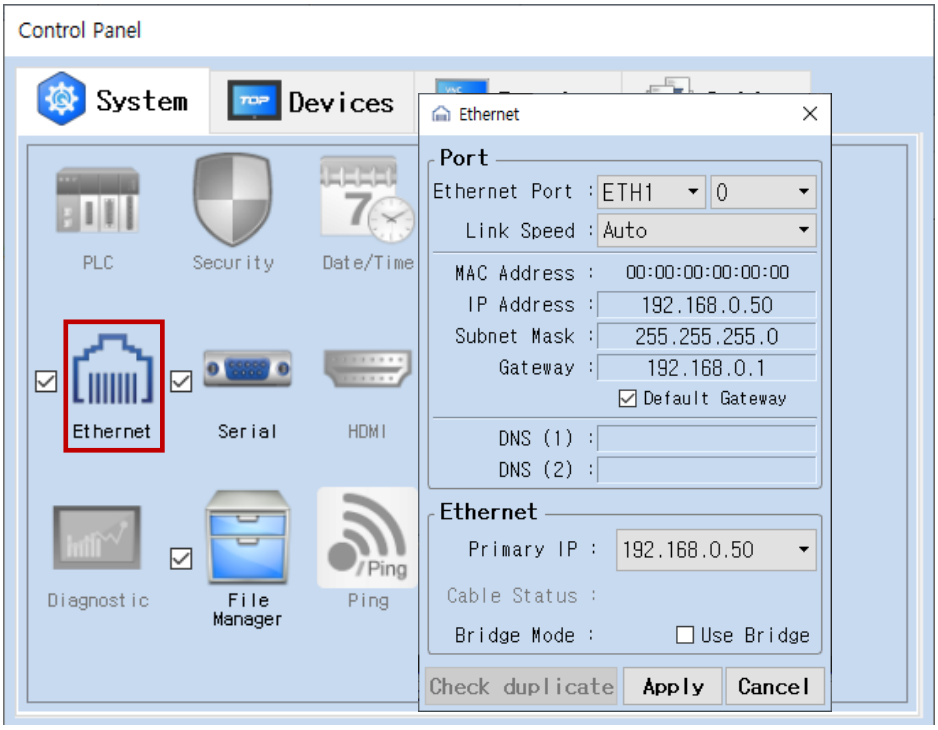
3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

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

– Set the TOP communication interface in TOP Design Studio.





Items	TOP	External device	Remarks
IP Address*Note 1) Note 2)	192.168.255.50	192.168.255.1	
Subnet Mask	255.255.255.0	255.255.255.0	
Gateway	192.168.0.1	192.168.0.1	

*Note 1) The network addresses of the TOP and the external device (the first three digits of the IP, 192 . 168 . 0 . 0) should match.

*Note 2) Do not use duplicate IP addresses over the same network.

* The above settings are examples recommended by the company.

Items	Description
IP Address	Set an IP address to be used by the TOP to use over the network.
Subnet Mask	Enter the subnet mask of the network.
Gateway	Enter the gateway of the network.

The default IP for each series is as follows.

– DX100, 200 Series: 192.168.255.1

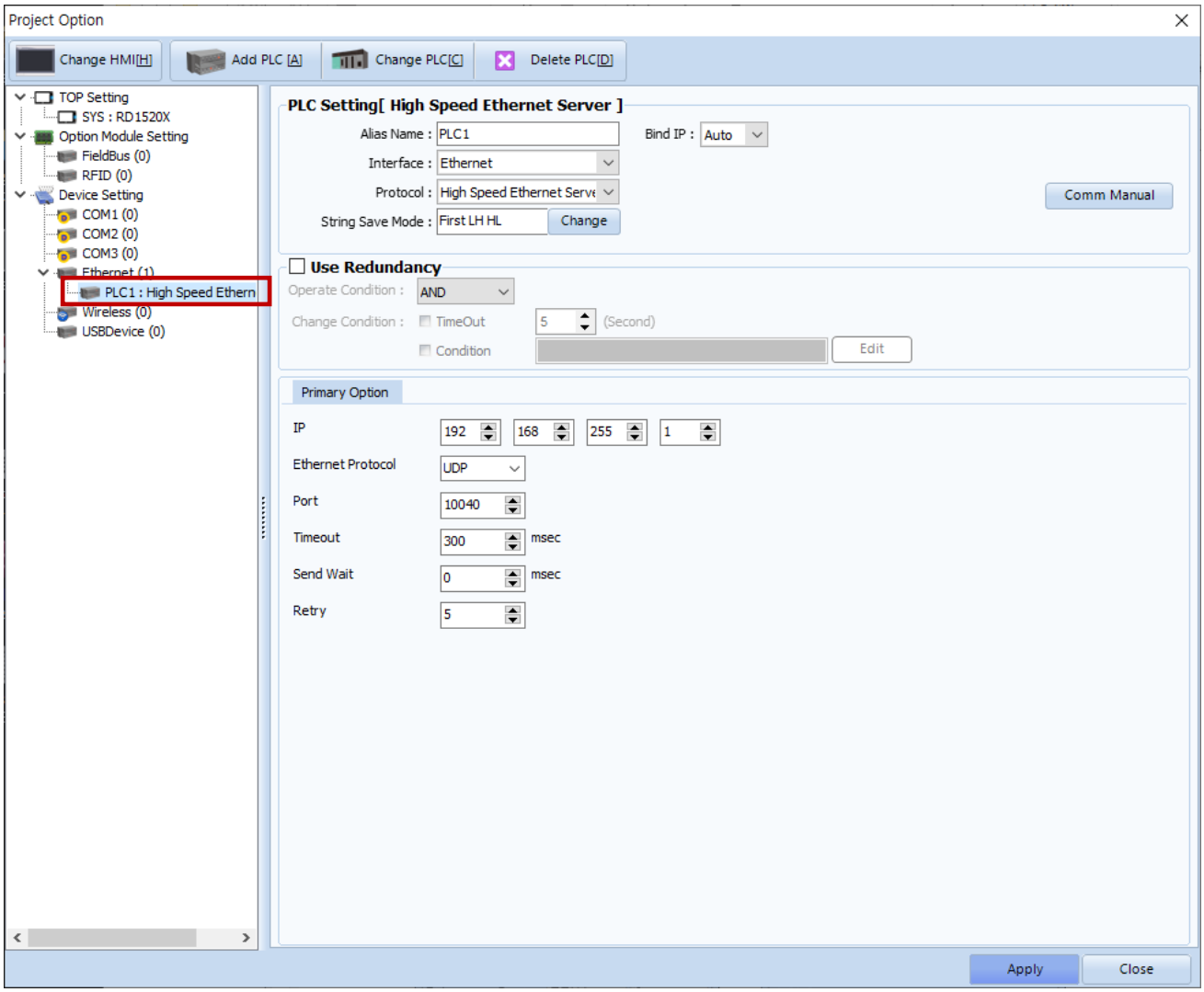
– FS100 Series: 10.0.0.2

– Port number: 10040

(2) Communication option setting

■ [Project > Project Property > Device Setting > ETHERNET > "PLC1 : High Speed Ethernet Server"]

– Set the options of the High Speed Ethernet Server communication driver in TOP Design Studio.

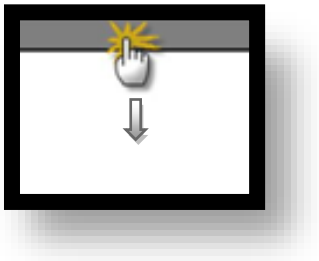


Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection".
Protocol	Select "High Speed Ethernet Server".	
IP	Enter the IP address of the external device.	
Ethernet Protocol	Select the Ethernet protocol between the TOP and an external device.	
Port	Enter the Ethernet communication port number of an external device.	
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.	

3.2. Communication setting in TOP

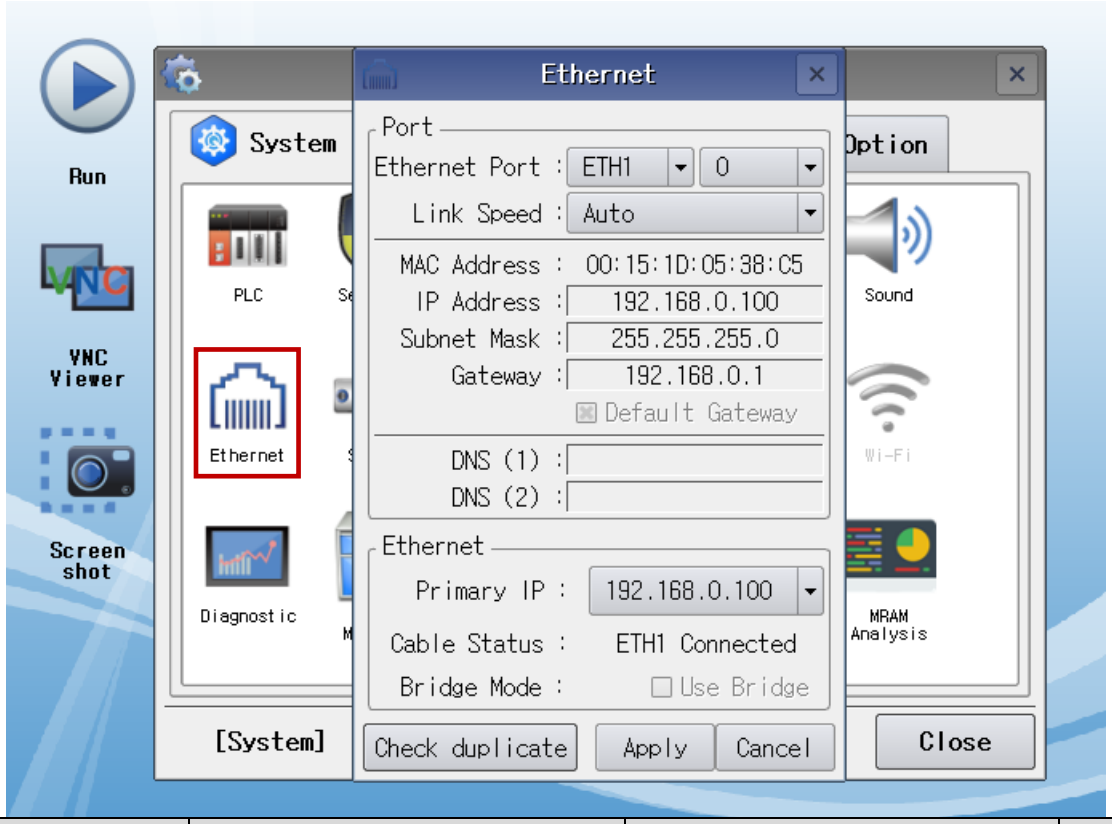
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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 > Ethernet]



Items	TOP	External device	Remarks
IP Address*Note 1) Note 2)	192.168.255.50	192.168.255.1	
Subnet Mask	255.255.255.0	255.255.255.0	
Gateway	192.168.0.1	192.168.0.1	

*Note 1) The network addresses of the TOP and the external device (the first three digits of the IP, 192 . 168 . 0 . 0) should match.

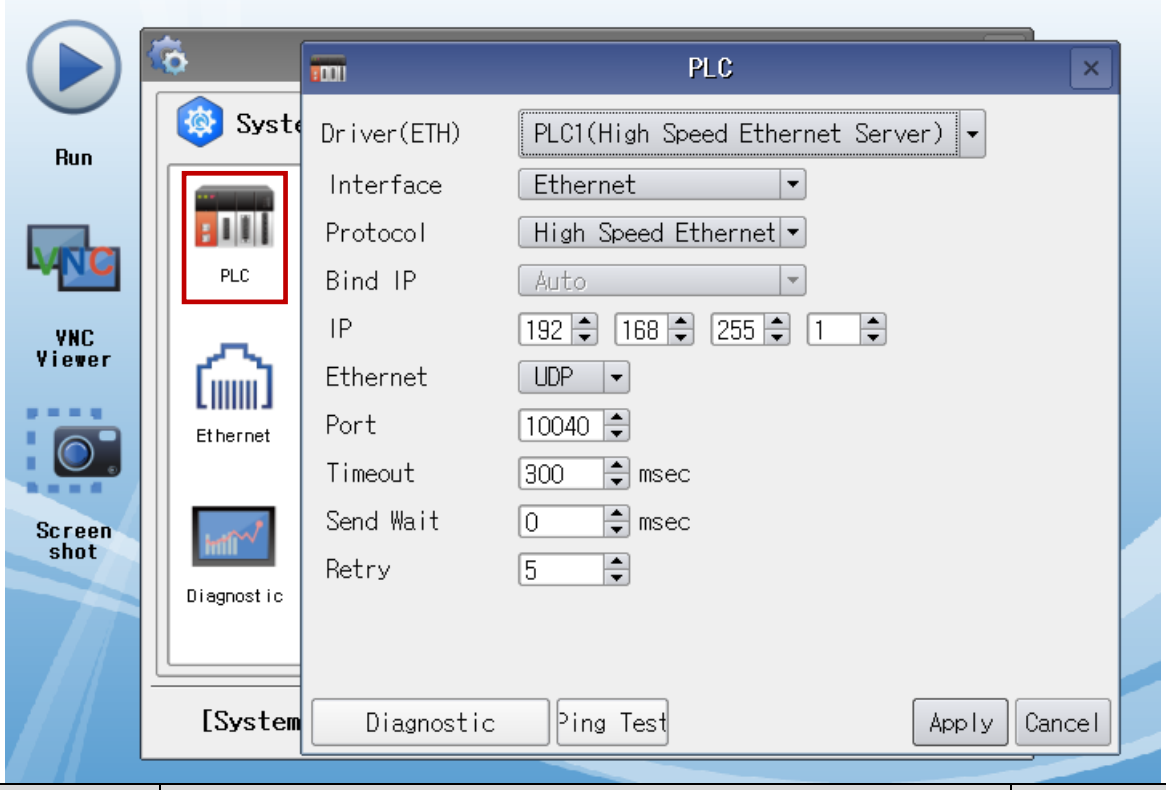
*Note 2) Do not use duplicate IP addresses over the same network.

* The above settings are examples recommended by the company.

Items	Description
IP Address	Set an IP address to be used by the TOP to use over the network.
Subnet Mask	Enter the subnet mask of the network.
Gateway	Enter the gateway of the network.

(2) Communication option setting

■ [Main Screen > Control Panel > PLC]



Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection".
Protocol	Select "High Speed Ethernet Server".	
IP	Enter the IP address of the external device.	
Ethernet Protocol	Select the Ethernet protocol between the TOP and an external device.	
Port	Enter the Ethernet communication port number of an external device.	
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.	

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 ETH port settings you want to use in [Control Panel > Ethernet] 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	
	Ethernet port setting	IP Address	OK	NG	
		Subnet Mask	OK	NG	
		Gateway	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	
	Ethernet port setting	IP Address	OK	NG	
		Subnet Mask	OK	NG	
		Gateway	OK	NG	
	Check address range		OK	NG	5. Supported addresses (For details, please refer to the PLC vendor's manual.)

4. External device setting

Set as below using "Browser". For more detailed setting method than that described in this example, refer to the PLC user manual.

Do not use duplicate IP addresses over the same network.

(2) External device setting

Set as below using "YASKAWA MOTOMAN". For more detailed setting method than that described in this example, refer to the YASKAWA user manual.

Check the configured IP using the following method.

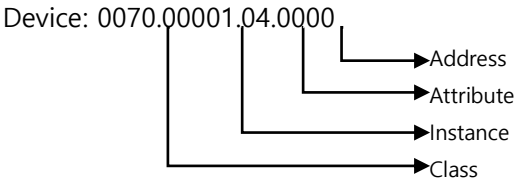
- From "security mode", change to "management mode".
- From the main menu, go to [SYSTEM INFO] -> [NETWORK SERVICE] to check the network settings.

5. 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.

■ Default system: Device & Address



Device	Class	Instance	Attribute	R/W	Remarks
Alarm	0x0070	1: The latest alarm 2: The second alarm from the latest 3: The third alarm from the latest 4: The fourth alarm from the latest	1: Alarm code 2: Alarm data 3: By alarm type 4: Alarm occurring time 5: Alarm character string name	R	
Alarm History	0x0071	1~100 : Major failure 1001~1100: Monitor alarm 2001~2100: User alarm (system) 3001~3100: User alarm (user) 4001~4100: OFF line alarm	1: Alarm code 2: Alarm data 3: Alarm type 4: Alarm occurring time 5: Alarm character strings name	R	
Status	0x0072	Fixed to '1'	1: Data 1 2: Data 2	R	
Job information	0x0073	1: Master task 2: Sub task 1 3: Sub task 2 4: Sub task 3 5: Sub task 4 6: Sub task 5 7: Sub task 6 8: Sub task 7 9: Sub task 8 10: Sub task 9 11: Sub task 10 12: Sub task 11 13: Sub task 12 14: Sub task 13 15: Sub task 14 16: Sub task 15	1: Job name 2: Line number 3: Step number 4: Speed override value	R	
Axis composition	0x0074	1 : R1~8 : R8 ...Robot (pulse value) 11 : B1~18 : B8 ...Base (pulse value) 21 : S1~44 : S24 ...Station (pulse value) 101 : R1~108 : R8 ...Robot (cartesian coordinate) 111 : B1~118 : B8 ...Base (cartesian coordinate)	1: "Axis name" of the first axis 2: "Axis name" of the second axis 3: "Axis name" of the third axis 4: "Axis name" of the fourth axis 5: "Axis name" of the fifth axis 6: "Axis name" of the sixth axis 7: "Axis name" of the seventh axis 8: "Axis name" of the eighth axis	R	
Robot Position	0x0075	1 : R1~8 : R8 ... Robot (pulse value) 11 : B1~18 : B8 ... Base (pulse value)	1: Data type 2: Form 3: Tool number	R	

Device	Class	Instance	Attribute	R/W	Remarks
		21 : S1~44 : S24 ... Station (pulse value) 101 : R1~108 : R8 ... Robot (cartesian coordinate	4: User coordinate number 5: Extended form 6: First axis data 7: Second axis data 8: Third axis data 9: Fourth axis data 10: Fifth axis data 11: Sixth axis data 12: Seventh axis data 13: Eighth axis data		
Each axis positional deflection	0x0076	1 : R1~8 : R8 ... Robot axis 11 : B1~18 : B8 ... Base axis 21 : S1~44 : S24 ... Station axis	1: First axis data 2: Second axis data 3: Third axis data 4: Fourth axis data 5: Fifth axis data 6: Sixth axis data 7: Seventh axis data 8: Eighth axis data	R	
Each shaft torque	0x0077	1 : R1~8 : R8 ... Robot axis 11 : B1~18 : B8 ... Base axis 21 : S1~44 : S24 ... Station axis	1: First axis data 2: Second axis data 3: Third axis data 4: Fourth axis data 5: Fifth axis data 6: Sixth axis data 7: Seventh axis data 8: Eighth axis data	R	
IO Data	0x78	• 1~512 : Robot user input signal • 1001~1512: Robot user output signal • 2001~2512: External input signal • 2701~2956: Network input signal • 3001~3512: External output signal • 3701~3956: Network output signal • 4001~4160: Robot system input signal	Fixed to "1".	R/W	
IO Data(Multi)	0x300	• 5001~5300: Robot system output signal • 6001~6064: Interface panel input signal • 7001~7999: Auxiliary relay signal • 8001~8128: Robot control status signal • 8201~8220: Pseudo input signal	Fixed to "0".	R/W	
Register data	0x79	0~ 999 (writable register: 0 ~559)	Fixed to "1".	R/W	
Register data(Multi)	0x301		Fixed to "0".	R/W	
B	0x7A	0~99 (for standard setting)	Fixed to "1".	R/W	
B(Multi)	0x302		Fixed to "0".	R/W	
I	0x7B	0~99 (for standard setting)	Fixed to "1".	R/W	
I(Multi)	0x303		Fixed to "0".	R/W	
D	0x7C	0~99 (for standard setting)	Fixed to "1".	R/W	
D(Multi)	0x304		Fixed to "0".	R/W	
R	0x7D	0~99 (for standard setting)	Fixed to "1".	R/W	

Device	Class	Instance	Attribute	R/W	Remarks
R(Multi)	0x305		Fixed to "0".	R/W	
S 16 byte	0x7E	0~99 (for standard setting)	Fixed to "1".	R/W	
S 16 byte(Multi)	0x306		Fixed to "0".	R/W	
P	0x7F	0~127 (for standard setting)	1: Data type 2: Form 3: Tool number 4: User coordinate number 5: Extended form 6: "Coordinated data" of the first axis 7: "Coordinated data" of the second axis 8: "Coordinated data" of the third axis 9: "Coordinated data" of the fourth axis 10: "Coordinated data" of the fifth axis 11: "Coordinated data" of the sixth axis 12: "Coordinated data" of the seventh axis 13: "Coordinated data" of the eighth axis	R/W	
P(Multi)	0x307		Fixed to "0".	R/W	
BP	0x80	0~127 (for standard setting)	1: Data type 2: "Coordinated data" of the first axis 3: "Coordinated data" of the second axis 4: "Coordinated data" of the third axis 5: "Coordinated data" of the fourth axis 6: "Coordinated data" of the fifth axis 7: "Coordinated data" of the sixth axis 8: "Coordinated data" of the seventh axis 9: "Coordinated data" of the eighth axis	R/W	
BP(Multi)	0x308		Fixed to "0".	R/W	
EX	0x81	0~127 (for standard setting)	1: Data type 2: "Coordinated data" of the first axis 3: "Coordinated data" of the second axis 4: "Coordinated data" of the third axis 5: "Coordinated data" of the fourth axis 6: "Coordinated data" of the fifth axis	R/W	

Device	Class	Instance	Attribute	R/W	Remarks
			7: "Coordinated data" of the sixth axis 8: "Coordinated data" of the seventh axis 9: "Coordinated data" of the eighth axis		
EX(Multi)	0x309		Fixed to "0".	R/W	
Alarm (detailed)	0x30A	1: The latest alarm 2: The second alarm from the latest 3: The third alarm from the latest 4: The fourth alarm from the latest	1: Alarm code 2: Alarm data 3: By alarm type 4: Alarm occurring time 5: Alarm character string name 6: Sub code data additional information character strings 7:Sub code data character strings 8:Sub code data character strings reverse display information	R	
Alarm history (detailed)	0x30B	1~100 : Major failure 1001~1100: Monitor alarm 2001~2100: User alarm (system) 3001~3100: User alarm (user) 4001~4100: OFF line alarm	1:Alarm code 2:Alarm data 3:Alarm type 4:Alarm occurring time 5:Alarm character strings name 6:Sub code data additional information character strings 7:Sub code data character strings 8:Sub code data character strings reverse display information	R	
Reset cancellation	0x0082	1: Resetting of alarm 2: Cancelling of error	Fixed to "1".	W	
On/off	0x0083	1: HOLD 2: Servo ON 3: HLOCK	Fixed to "1".	W	
Start switch	0x0084	2: CYCLE (switching of STEP/CYCLE/CONTINUE)	Fixed to "1".	W	
Sting display to pendant	0x0085	Fixed to "1".	Fixed to "1".	W	
Start	0x0086	Fixed to "1".	Fixed to "1".	W	
Job select	0x0087	1: Set the executing job 10: Set the master job (task 0) 11: Set the master job (task 1) 12: Set the master job (task 2) 13: Set the master job (task 3) 14: Set the master job (task 4) 15: Set the master job (task 5) 16: Set the master job (task 6) 17: Set the master job (task 7) 18: Set the master job (task 8) 19: Set the master job (task 9) 20: Set the master job (task 10) 21: Set the master job (task 11) 22: Set the master job (task 12) 23: Set the master job (task 13) 24: Set the master job (task 14) 25: Set the master job (task 15)	1: Job name 2: Line number (valid only when executing job setting.)	W	
Administration Hour	0x0088	1 :Control power ON time	1: Operation start time	R	

Device	Class	Instance	Attribute	R/W	Remarks
		10 :Servo power ON time (TOTAL) 11~18 :Servo power ON time (R1 to R8) 21~ 44 :Servo power ON time (S1~S24) 110 :Play back time (TOTAL) 111~118 :Play back time (R1~ R8) 121~144 :Play back time (S1~S24) 210 :Motion time (TOTAL) 211~218 :Motion time (R1~R8) 221~244 :Motion time (S1~S24) 301~308 :Operation time (application 1~ 8)	2: Elapse time		
System information	0x0089	11~18: Type information (R1~R8) 21~44: Type information (S1~24) 101~108: Application information (application 1~8)	1: System software version 2: Model name / application 3: Parameter version	R	
S 32 byte	0x8E	0~99 (for standard setting)	Fixed to "1".	R/W	
S 32 byte(Multi)	0x30C		Fixed to "0".	R/W	