DONGBU ROBOT CO., LTD

iM-U Series

Ethernet

Supported version TOP Design Studio V1.0 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 Page 2

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

2. External device selection Page 3

Select a TOP model and an external device.

3. TOP communication setting Page 4

Describes how to set the TOP communication.

4. External device setting Page 9

Describes how to set up communication for external devices.

5. Supported addresses Page 10

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

1. System configuration

The system configuration of TOP and "DongBu Robot Co,. Ltd – iM-U Series Ethernet" is as follows:

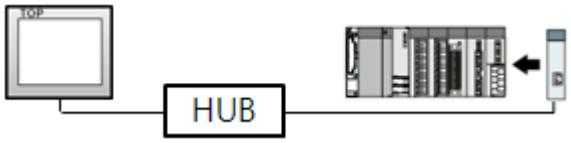
Series	CPU	Link I/F	Communication method	System setting	Cable
iM-U	All CPU	Ethernet Port	TCP	3. TOP communication setting 4. External device setting	Twisted pair cable*Note 1)

*Note 1) Twisted pair cable

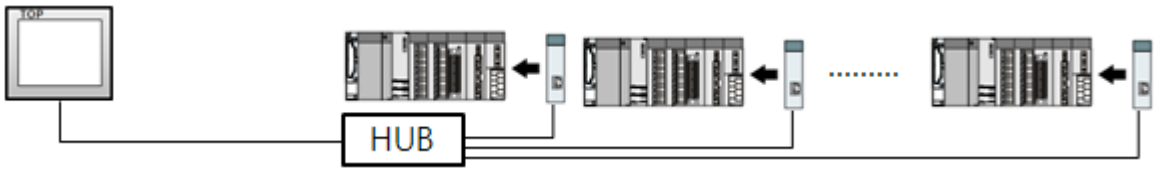
- Refer to STP (Shielded Twisted Pair Cable) or UTP (Unshielded Twisted Pair Cable) Category 3, 4, 5.
- Depending on the network configuration, you can connect to components such as the hub and transceiver, and in this case, use a direct cable.

■ Connectable configuration

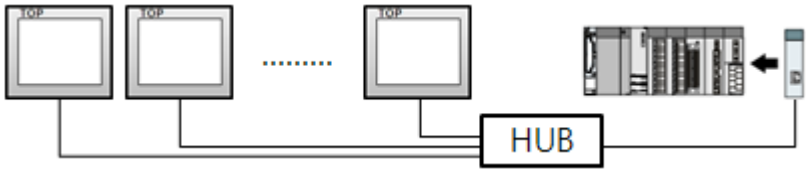
・1:1 connection (one TOP and one external device) connection



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

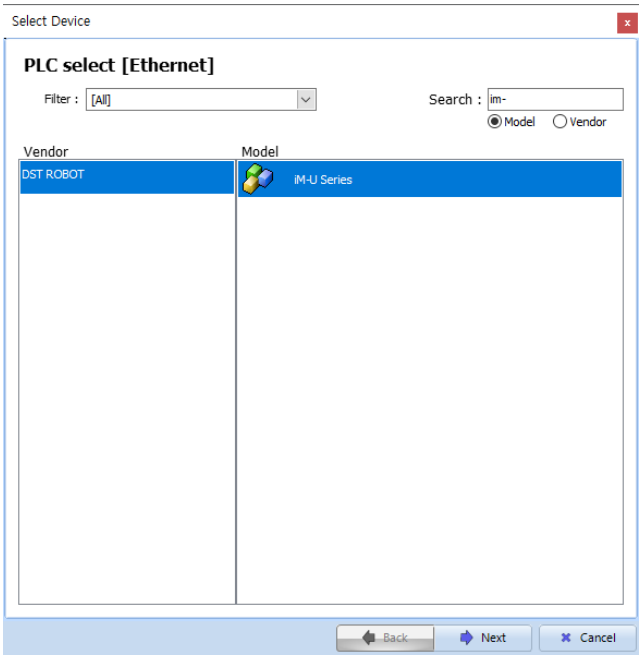


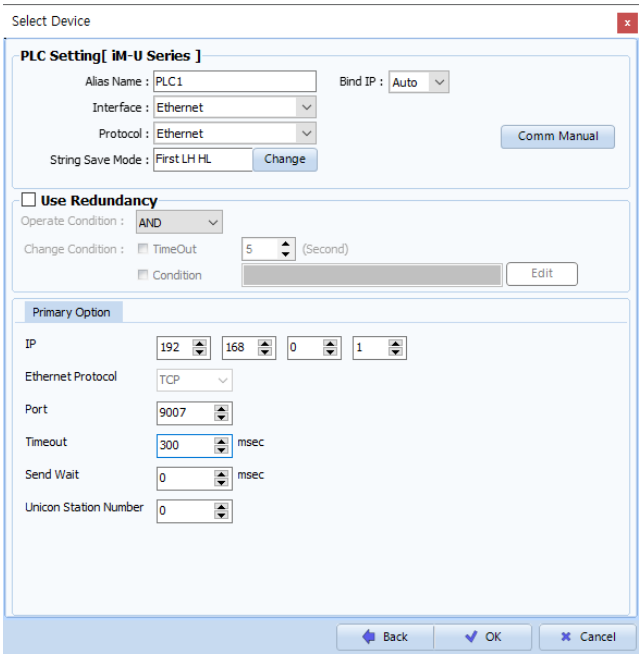
・N:1 connection (multiple TOPs and one external device) connection



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 "Dongbu (DASAROBOT)".
	PLC	Select the external device to be connected to the TOP. **Model** / **Interface** / **Protocol** iM-U Series / Ethernet / Ethernet 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

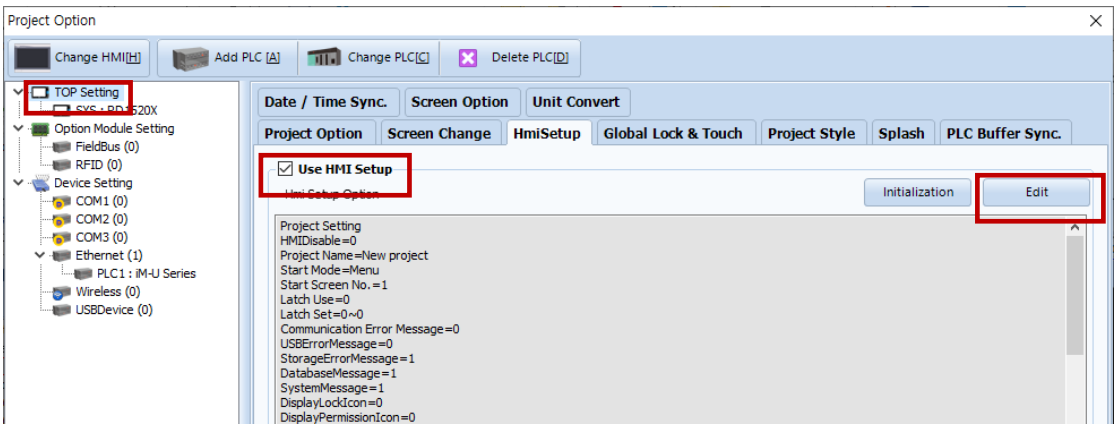
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

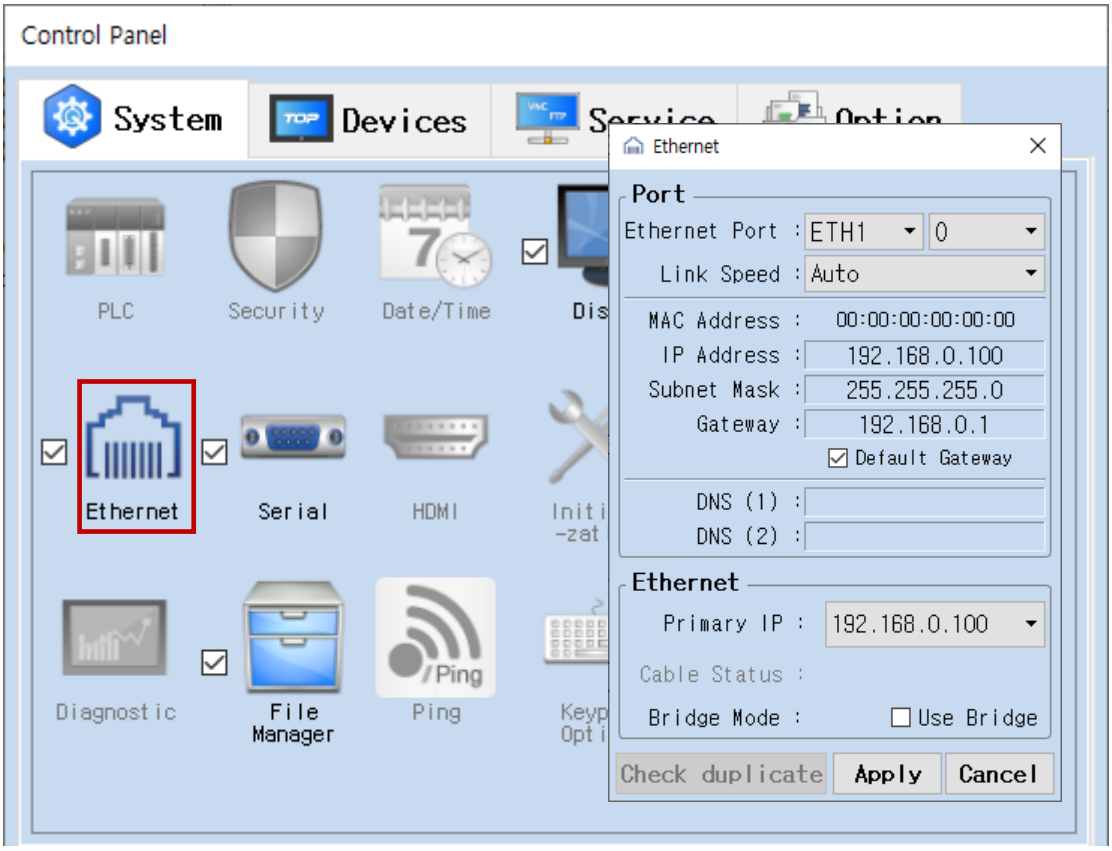
3.1 Communication setting in TOP Design Studio

(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)	192.168.0.50	192.168.0.51	
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.

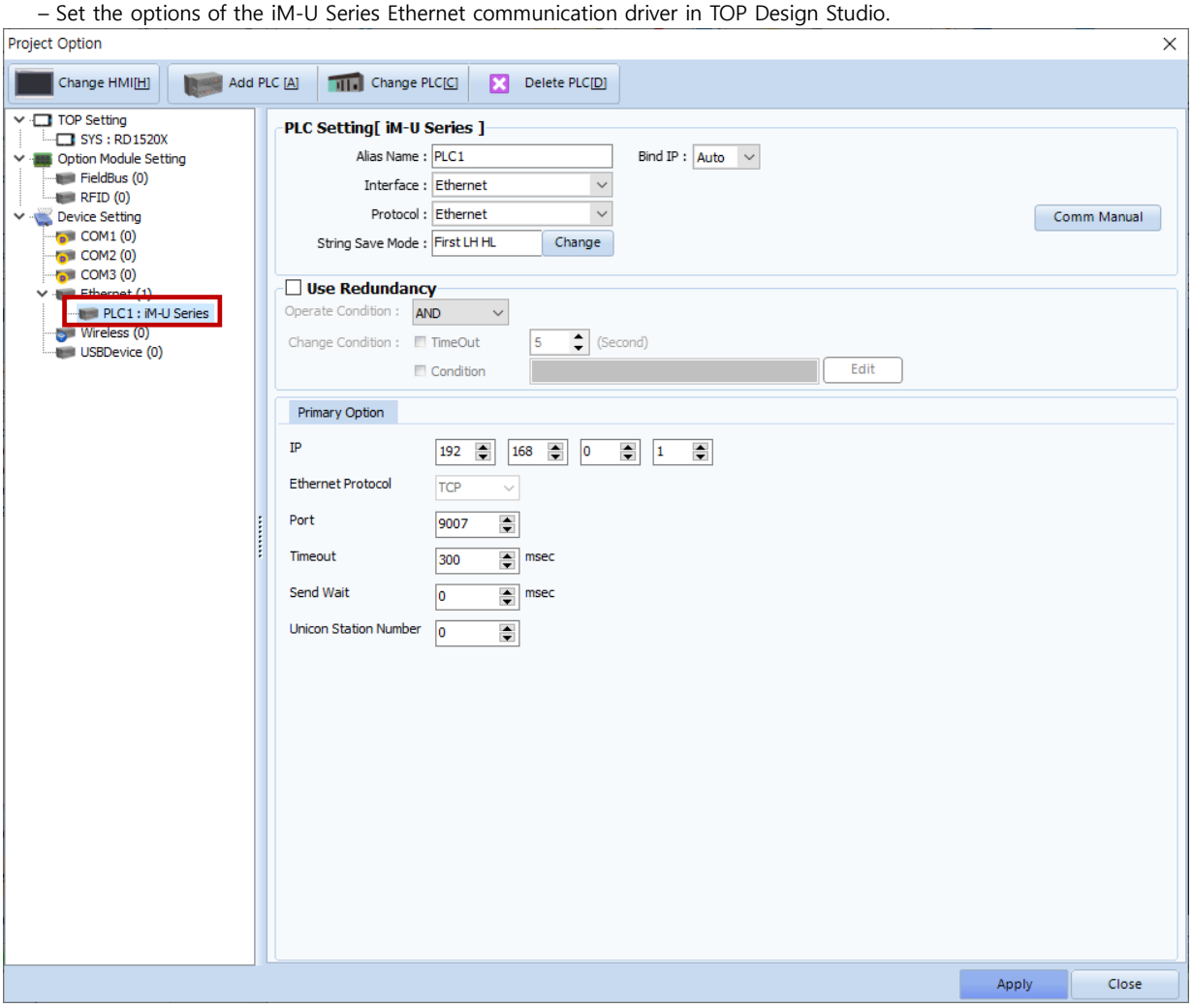
* The above settings are examples recommended by the company.

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

■ [Project > Project Property > Device Setting > ETHERNET (1) > "PLC1 : iM-U Series"]

– Set the options of the iM-U Series Ethernet communication driver in TOP Design Studio.



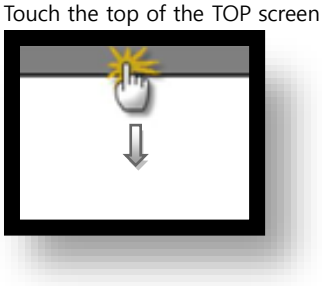
* The above settings are examples recommended by the company.

Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection".
Protocol	Select the communication protocol between the TOP and an external device.	
IP	Enter the IP address of the external device.	
Ethernet Protocol	Selects the Ethernet protocol **TCP** between the TOP and an external device.	**Fixed**
Port	Enter **9007**, which is the Ethernet communication port number of the external device.	**Fixed**
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.	
Unicon Station Number	Enter the prefix of an external device.	

3.2. Communication setting in TOP

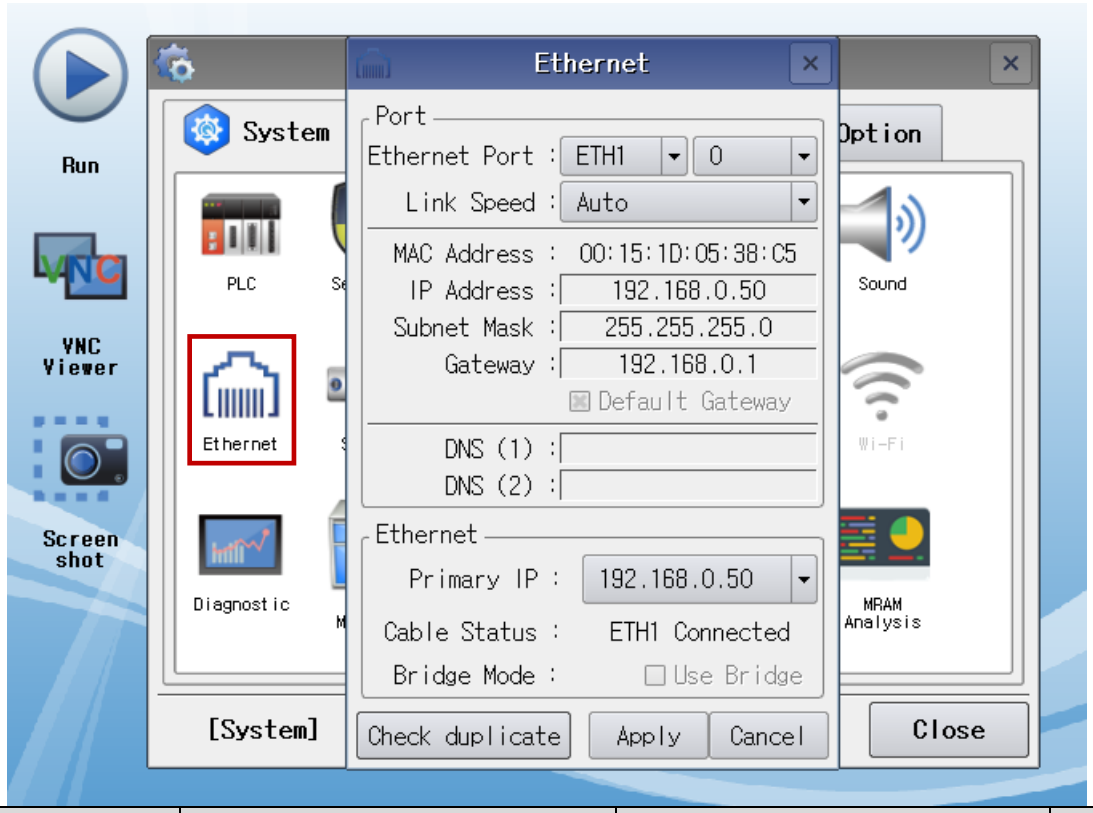
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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 > Ethernet]



Items	TOP	External device	Remarks
IP Address*Note 1) Note 2)	192.168.0.50	192.168.0.51	
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.

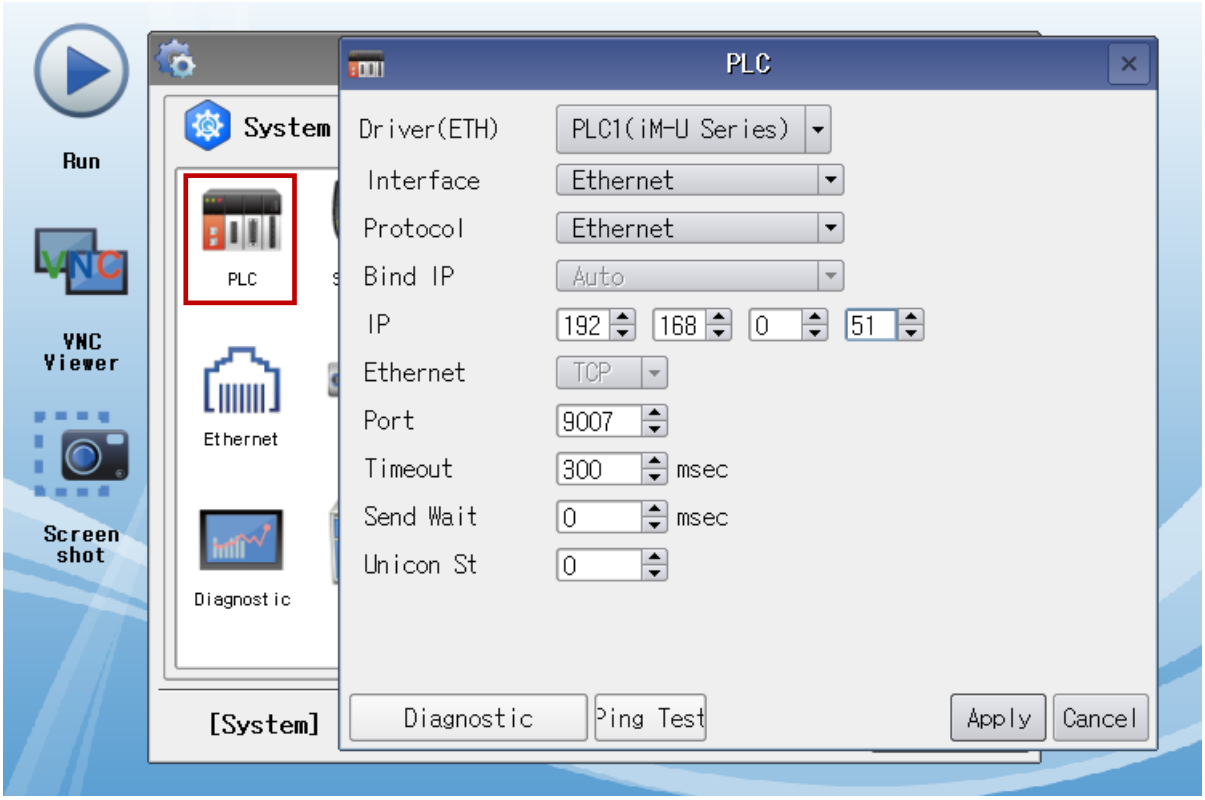
*Note 2) Do not use duplicate IP addresses over the same network.

* 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]



* The above settings are examples recommended by the company.

Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External device selection".
Protocol	Select the communication protocol between the TOP and an external device.	
IP	Enter the IP address of the external device.	
Ethernet Protocol	Selects the Ethernet protocol **TCP** between the TOP and an external device.	**Fixed**
Port	Enter **9007**, which is the Ethernet communication port number of the external device.	**Fixed**
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.	
Unicon Station Number	Enter the prefix of an external device.	

3.3 Communication diagnostics

■ Check the interface setting status between the TOP and 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 port (ETH1/ETH2) 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 "Operating Loader".

For a more detailed setting method than described in this example, refer to the user manual of the external device.

1. Set the product front prefix setting Rotary switch to "0". (SIO1, SIO2 prefixs are shared.)

2. Go to Main > "3Parameter Setting" > "1.Basic" > "4.Miscel" path. Set **EthProt** item.

Contents	Comment
EthProt	2 (Binary)

3. Set as below through Main > "3.Parameter Setting" > "3.System" – Enter Password > "3.Ethernet" path.

Contents		Comment
IP	(IP Address)	192.168.0.51
Sub	(Subnet Mask)	255.255.255.0
GW	(Gateway)	192.168.0.1

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.

(1) Controller status/control

Contents	Bit Address	Word Address	Remarks
Channel system status	STAT1/0.0 – STAT4/2.7	STAT1/0 – STAT4/2	*F1 *1 *4
Channel axis system status	STATA1/0/0.0 – STATA4/5/2.7	STATA1/0/0 – STATA4/5/2	*F2 *1 *5
System status information	SYS0.0 – SYS2.7	SYS0 – SYS2	*F5 *1 *6
Channel error code	———	ERR1 – ERR4	*F4 *1 *7
Channel error code (auxiliary)	———	ERRSUB1 – ERRSUB4	*F4 *1 *7
JOG move execution (CW/CCW)	JDIR1/0 – JDIR4/5	———	*F3 *2 *8
JOG move execution (CW)	JCW1/0 – JCW4/5	———	*F3 *2 *17
JOG move execution (CCW)	JCCW1/0 – JCCW4/5	———	*F3 *2 *18
JOG move	———	JMOV1 – JMOV4	*F4 *9
JOG motion	———	JMOT1 – JMOT4	*F4 *10
JOG speed	———	JSPD1 – JSPD4	*F4 *11
JOG moving speed	———	JMSPD1 – JMSPD4	*F4 *12
MPG ON/OFF	MPG1 – MPG4	———	*F4
MPG connecting axis	———	MPGA1 – MPGA4	*F4
ARCH	———	ARCH1 – ARCH4	*F4 *3 *13
Current motor position (Encoder)	———	MECD1/0 – MECD5	*F2 *3
Current motor position (Joint)	———	MJIT1/0 – MJIT4/5	*F3 *3 *14
Current motor position (XY)	———	MXY1/0 – MXY4/5	*F3 *3 *14
Current motor speed	———	MSPD1/0 – MSPD4/5	*F3 *3 *15
Alarm ON/OFF	ALM1 – ALM4	———	*F4 *2
Servo ON/OFF	SERVO1 – SERVO4	———	*F4 *2 *16

[Address format]

*F1	**Channel /information index**
*F2	**Channel /axis /information index**
*F3	**Channel /axis**
*F4	**Channel**
*F5	**Information index**

*1 Read only *2 Write only *3 32Bit address

*4 This refers to the following bit-by-bit contents for the information index.

Information index	Bit pos	Contents	Comment
0	0	Active	Indicate channel activation status.
	1	Run	Indicate that the device is running. (motion, origin, jog, etc.)
	2	PgmLoad	Indicate that the motion program has been successfully compiled to be loaded.
	3	Not decided	
	4	Not decided	
	5	ServoOn	Indicate the On/Off status of the axis.
	6	OrginOK	Indicate that origin run has been completed.
	7	Error	Indicate that a warning has occurred in the channel.
1	0	InPosition	All axes of the channel are within the range in InposRange of the parameter.
	1	InRange	All axes of the channel are within the range in InRangeL and InRangeR of the parameter.
	2	PgmRun	Indicates that motion program operation is running.
	3	StepRun	Indicates that the motion program is under step operation.
	4	DmoveRun	Indicates that a motion move is running.
	5	OrginRun	Indicates that the origin is running.
	6	JogRun	Indicates that jog is running.
	7	Not decided	
2	0	Not decided	

1	Not decided	
2	Not decided	
3	Not decided	
4	Not decided	
5	Not decided	
6	Not decided	
7	Not decided	

*5 Refer to the following bit-by-bit content for the information index.

Information index	Bit pos	Contents	Comment
0	0	Ready	Indicates that the axis is ready for movement.
	1	Not decided	
	2	Not decided	
	3	CAP	Indicates that the c-phase signal of the Amp has been caught.
	4	BreakOn	Indicates the magnetic break On/Off status of the axis.
	5	DBreakOn	Indicates the electric break On/Off status of the axis.
	6	ServoOn	Indicates the servo On/Off status of the axis.
	7	Fault	Indicates whether an error of the axis module occurred or not.
1	0	DesirVel0	Indicates that the Command velocity is zero, stopped state.
	1	InPosition	Indicates the state where the axis has entered within the range in InposRange of the parameter.
	2	InRange	Indicates the state where the axis has entered within the ranges of InRangeL and InRange of the parameter.
	3	Not decided	
	4	Not decided	
	5	Not decided	
	6	Not decided	
	7	Not decided	
2	0	FLS(soft)	Indicates whether the forward limit sensor set by the software has been detected or not.
	1	RLS(soft)	Indicates whether the reward limit sensor set by the software has been detected or not.
	2	ORG(soft)	Indicates whether the orgin sensor set by the software has been detected or not.
	3	Not decided	
	4	Not decided	
	5	FLS(hard)	Indicates whether the limit sensor in the increase direction of the encoder has been detected or not.
	6	RLS(hard)	Indicates whether the limit sensor in the decrease direction of the encoder has been detected or not.
	7	ORG(hard)	Indicates whether the origin sensor on the hardware has been detected or not.

*6 Refer to the following bit-by-bit content for the information index.

Information index	Bit pos	Contents	Comment
0	0	FromEMG	Indicates the emergency stop input, which is attached to the front panel of the controller.
	1	TboxEMG	Indicates the emergency stop input of the teaching pendant.
	2	OP EMG	Indicates the emergency stop input of the Operating Box.
	3	Not decided	
	4	Not decided	
	5	Not decided	
	6	UserSeqRun	Indicates that the user sequence program is running.
	7	SysSeqRun	Indicate that the system sequence program is running.
1	0	FrontKeyR	Indicates the input of STOP/RST SW, which is attached to the front panel of the controller.
	1	FrontKeyG	Indicates the input of START/ORG SW, which is attached to the front panel of the controller.
	2	FrontKey3	Not decided
	3	FrontKey4	Not decided
	4	FrontKey5	Not decided
	5	FrontKey6	Not decided
	6	Not decided	
	7	Not decided	
2	0	Not decided	
	1	Not decided	
	2	Not decided	
	3	Not decided	
	4	Not decided	

5	Not decided
6	Not decided
7	Not decided

*7 For detailed information, refer to the user manual for the device.

*8 Bit operation takes place in "ON : CW direction and OFF : CCW directions". (ON operation is not possible when inverted/pressed)

*9 Select a method when the JOG moves. Setup data (word value) has the following meanings.

Data (word value)	Comment
0	Continuous Jog
1	Inch Jog

*10 Select the JOG motion method. Setup data (word value) has the following meanings.

Data (word value)	Comment
0	XY
1	Joint

*11 Jog speed parameter. (Data setup range: 0–3)

JMOV setting value	Comment
0(Continuous Jog)	Refers to the values of JogSpd0 – JogSpd3
1(Inch Jog)	Refer to the values of JogSpd0 – JogSpd3 for speed and the values of JogInch0 – JogInch3 for travel distance.

*12 JOG speed ratio value (Data setup range: 1 to 100, unit: %) → Refer to JSPD setting value for detailed settings.

*13 Unit: mm (ARCH OFF when data is "0")

*14 "X 0.001" operation is required for data. *15 Unit: RPM

*16 Turns ON/OFF the servo. (invert operation not possible)

*17 [Bit operation: On] Jog CW direction movement (corresponding axis) / [Bit operation: Off] Jog stop (invert operation not possible)

*18 [Bit operation: On] Jog CCW direction movement (corresponding axis) / [Bit operation: Off] Jog stop (invert operation not possible)

(2) Program

Contents	Bit Address	Word Address	Remarks
Operation file ID	———	PID1 – PID4	*F1
Entire run	PALL1 – PALL4		*F1 *2 *4
Line run	PLIN1 – PLIN4	———	*F1 *2 *4
Stop	PSTOP1 – PSTOP4	———	*F1 *2 *4
Restart	PNEW1 – PNEW4	———	*F1 *2 *4
Reset	PRES1 – PRES4	———	*F1 *2 *4

[Address format]

*F1	**Channel**

*1 Read only *2 Write only *3 32Bit address

*4 Only Bit operation > ON, Bit operation > OFF is possible. ON function cannot be used when inverted/pressed.

(3) Sequence

Contents		Bit Address	Word Address	Remarks
Execute system sequence		SEQS	———	*2 *4
Execute	user sequence	SEQU	———	*2 *4 *5
	File ID	———	_SEQU_F	
User sequence file ID		———	SEQUID	*1

*1 Read only *2 Write only *3 32Bit address

*4 Operate with bit operation "ON: program stop, OFF: program execution". (ON operation is not possible when inverted/pressed.)

*5 Execute for the file ID set in "_SEQU_F".

(4) Robot movement – 1

Contents	Bit Address	Word Address	Remarks
Robot moving speed	———	RSPD1 – RSPD4	*F1 *4
Stop robot movement	RSTOP1 – RSTOP4	———	*F1 *2
Run robot origin	RORG1 – RORG4	———	*F1 *2

[Address format]

*F1	**Channel**

*1 Read only *2 Write only *3 32Bit address

*4 Range (1–100), Unit (%)

Refer to the Ref RPM parameter value for the reference speed upon PTP moving (MPTP, MINC).

Refer to the Basic Spd parameter value for the reference speed upon interpolation moving (MLIN, MCIR).

(5) Robot movement – 2

While the controller operates (origin execution/program execution/movement/JOG), the commands as below are not executed.

Contents			Bit Address	Word Address	Remarks
Movement of absolute position	Coordinate value *H1)	JOINT-PTP	AMCA1 – AMCA4	———	*F1 *2 *4
		JOINT-LINEAR	AMCB1 – AMCB4	———	*F1 *2 *4
		JOINT-ARC	AMCC1 – AMCC4	———	*F1 *2 *4
		JOINT-CIRCLE	AMCD1 – AMCD4	———	*F1 *2 *4
		XYZ-PTP	AMCE1 – AMCE4	———	*F1 *2 *4
		XYZ-LINEAR	AMCF1 – AMCF4	———	*F1 *2 *4
		XYZ-ARC	AMCG1 – AMCG4	———	*F1 *2 *4
		XYZ-CIRCLE	AMCH1 – AMCH4	———	*F1 *2 *4
		Reference coordinate value	———	_AMC1/0 – _AMC2/5	*F1 *3
	Position type variable *H2)	PTP	AMLA1 – AMLA4	———	*F1 *2 *5
		LINEAR	AMLB1 – AMLB4	———	*F1 *2 *5
		ARC	AMLC1 –AMLC4	———	*F1 *2 *5
		CIRCLE	AMLD1 – AMLD4	———	*F1 *2 *5
		Reference position type variable	———	_AML1 – _AML2	*F2
	Point file *H3)	PTP	AMPA1 – AMPA4	———	*F1 *2 *5
		LINEAR	AMPB1 – AMPB4	———	*F1 *2 *5
		ARC	AMPC1 – AMPC4	———	*F1 *2 *5
		CIRCLE	AMPD1 – AMPD4	———	*F1 *2 *5
		Reference point file ID	———	_AMP_F	
		Reference point number	———	_AMP1 – _AMP2	*F2
Movement of relative position	Coordinate value *H4)	JOINT-PTP	RMCA1 – RMCA4	———	*F1 *2 *4
		JOINT-LINEAR	RMCB1 – RMCB4	———	*F1 *2 *4
		XYZ-PTP	RMCE1 – RMCE4	———	*F1 *2 *4
		XYZ-LINEAR	RMCF1 – RMCF4	———	*F1 *2 *4
		Reference coordinate value	———	_RMC0 – _RMC5	*F3 *3
	Position type variable *H5)	PTP	RMLA1 – RMLA4	———	*F1 *2 *5
		LINEAR	RMLB1 – RMLB4	———	*F1 *2 *5
		Reference position type variable	———	_RML	*F2
	Point file *H6)	PTP	RMPA1 – RMPA4	———	*F1 *2 *5
		LINEAR	RMPB1 – RMPB4	———	*F1 *2 *5
		Reference point file ID	———	_RMP_F	
		Reference point number	———	_RMP	*F2

[Address format]

*F1	**Group index /data index**
*F2	**Group index**
*F3	**Data index**
*F4	**Channel**

☞ Continued on next page.

[Help]

*H1	– Move the robot (axis) from the current position to the specified absolute position. – Refer to group 1 (data 0–5) and group 2 (data 0–5) of "_AMC" area.
*H2	– Refer to the position value of the specified position type variable to move the robot (axis) to the absolute position. – Refer to group 1 and group 2 of "_AML" area.
*H3	– Refer to the position value in the point number within the specified point file to move the robot (axis) to the absolute position. – Refer to groups 1 and 2 of the "_AMP_F" area (file number) and "_AMP" area (point number).
*H4	– Compensate for the specified relative position (coordinate value) in the current position to move the robot (axis). – Refer to (data 0–5) of "_RMP" area.
*H5	Compensate for the position value of the specified position type variable in the current position to move the robot (axis). – Refer to group 1 of "RML" area.
*H6	Compensate for the position value in the point number of the specified point file in the current position to move the robot (axis). – Refers to group 1 of "_RMP_F" area (file number) and "_RMP" area (point number).

*1 Read only *2 Write only *3 32Bit address

*4 ON (Arm posture: Rignt) / OFF(Arm posture: Left)

*5 Only Bit operation > ON, Bit operation > OFF is possible. ON/OFF operates in the same way. ON function cannot be used when inverted/pressed.

☞ Continued on next page.

(6) Variable

Contents	Bit Address	Word Address	Remarks
I/O contact	IO0.0 – IO998.7	IO0 – IO998	*F1 *4
Integer type variable	———	GINT0 – GINT998	*F1 *3 *4
Real type variable	———	GFLT0 – GFLT998	*F1 *3 *4
Position type variable (axis/position)	———	POSA0/0 – POSA6/998	*F2 *3 *4

[Address format]

*F1	**Address**
*F2	**Internal variable index** / **Address** 0–5: each axis position data, 6: position information data

*1 Read only *2 Write only *3 32Bit address

*4 OFFSET function can be used for address.

(7) File

Contents		Bit Address	Word Address	Remarks
Point file (axis/position)		———	PNTA0/0 – PNTA6/999	*F1 *3 *6
	Channel	———	_PNTA_CH	
	File ID	———	_PNTA_F	
Delete file ID	Run	FDLT	———	*2 *4
	File ID	———	_FDLT_F	
Copy file ID	Run	FCPY	———	*2 *5
	Source File ID	———	_FCPY_SF	
	Destination channel	———	_FCPY_CH	
	Destination File ID	———	_FCPY_DF	

[Address format]

*F1	**Internal variable index** / **Address** 0–5: each axis position data, 6: position information data
*F2	**File ID**

*1 Read only *2 Write only *3 32Bit address

*4 Delete the setting File ID (_FDLT_F).

*5 Copy the Source File ID (_FCPY_SF) of the point file directory to the Destination channel (_FCPY_CH)/File ID (_FCPY_CF).

*6 OFFSET function can be used for address.

(8) Parameter

Contents	Bit Address	Word Address	Remarks
Parameter	———	PAR0/0 – PAR99/99	*F1 *3
Parameter version	———	PARV	*1 *3

[Address format]

*F1	**Field** / **Index**

*1 Read only *2 Write only *3 32Bit address