YOKOGAWA Electric Corporation

FA-M3 Series

Ethernet Driver

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".

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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 the TOP communication.

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Describes how to set up communication for external devices.

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



1. System configuration

The system configuration of TOP and "YOKOGAWA Electric Corporation – FA-M3 Series Ethernet" is as follows:

Series	СРИ	Link I/F	Communication method	System setting	Cable
	F3SP21-0N F3SP25-2N F3SP28-3N	F3LE01-5T	Ethernet (UDP) Ethernet		
	F3SP35-5N F3SP38-6N F3SP53-4H		(TCP) Ethernet (UDP)	3. TOP communication	
FA-M3	F3SP58-6H F3SP28-3S F3SP38-6S F3SP53-4S F3SP58-6S	F3LE11-0T	T Ethernet (TCP)	4.1. External device setting 1	Twisted pair cable <mark>*Note 1)</mark>
	F3SP59-7S	F3SP59-7S			
	F3SP66-4S		Ethernet (UDP)	3. TOP communication	
	F3SP67-6S		Ethernet (TCP)	4.2. External device setting 2	

*Note 1) Twisted pair cable

- Refers 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





2. External device selection

Select a TOP model and a port, and then select an external device.

				x
PLC select [Ethernet]				
Filter : [All]	~		Search :	
			Model	() Vendor
Vendor	Model			
OMRON Industrial Automation	^ Micro	Recoder Series		
LS Industrial Systems	👔 🌮 ГА-М:	3 Series		
MODBUS Organization				
SIEMENS AG.				
Rockwell Automation				
GE Fanuc Automation				
PANASONIC Electric Works				
YASKAWA Electric Corporation				
YOKOGAWA Electric Corporation				
Schneider Electric Industries				
KDT Systems				
RS Automation				
FATEK Automation Corporation				
DST ROBOT	~			
		A Pack	Next	M. Cancel
		Dack	- Next	 Cancer
Select Device				
Select Defice				×
PLC Setting[FA-M3 Series]				x
PLC Setting[FA-M3 Series] Alias Name : PLC1		Bind IP : Auto	~	×
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet	~ ~	Bind IP : Auto	~	×
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL	ary) v	Bind IP : Auto	Co	x mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL	ary) V Change	Bind IP : Auto	Co	x mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL Use Redundancy Operate Condition : AND	ary) V Change	Bind IP : Auto	Con	mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL Use Redundancy Operate Condition : ND Change Condition : TimeOut	ary) V Change	Bind IP : Auto	Co	x mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut	ary) ✓ Change	Bind IP : Auto	 Co E 	mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut Condition Primary Option	ary) v Change	Bind IP : Auto	✓	mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut Condition Primary Option IP 192	ary) > Change 5 \$ (Sec	Bind IP : Auto	Co	mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut Primary Option IP Ethernet Protocol TcP	ary) Change 5 (Sec 168 () 0	Bind IP : Auto	Co	mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL Use Redundancy Operate Condition : And Change Condition : IP Ethernet Protocol TCP Port	ary) v Change 5 ¢ (Sec	Bind IP : Auto	Co	mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bin String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : IP IP Ethernet Protocol TCP Port I2289 Timeout	ary) ✓ Change 5 € (Sec	Bind IP : Auto	Co	mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bir. String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut Primary Option IP Ethernet Protocol TCP Port 12289 Timeout 3001	ary) ✓ Change 5 ♦ (Sec 168 ♦ 0	Bind IP : Auto	 Con E 	mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bir String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut Ethernet Protocol TCP Port 12289 Timeout 3001 Send Wait	ary) ✓ Change 5 ♦ (Sec 168 ♦ 0	Bind IP : Auto		mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bir String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut Condition Primary Option IP Port 12289 Timeout Sool Send Wait O Cpu No	ary) ✓ Change 5 ♦ (Sec 168 ♦ 0	Bind IP : Auto	••••	mm Manual
PLC Setting[FA-M3 Series] Alias Name: PLC1 Interface: Ethernet Protocol: PC Link (Bir String Save Mode: First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut Condition Primary Option IP 192 Ethernet Protocol TCP Port 12289 Timeout Sool Send Wait 0 Cpu No	ary) ✓ Change 5 ♦ (Sec 168 ♦ 0	Bind IP : Auto		mm Manual
PLC Setting[FA-M3 Series] Alias Name : PLC1 Interface : Ethernet Protocol : PC Link (Bir String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut Condition Primary Option IP 192 Ethernet Protocol TCP Port 12289 Timeout Sool Send Wait 0 Cpu No 1	ary) ✓ Change 5 ♦ (Sec 168 ♠ 0 ✓ ♥ msec ♥ msec ♥ msec	Bind IP : Auto		mm Manual

Settings			Co	ontents	
ТОР	Model	Check the TOP display and proc	ess to select th	he touch model.	
External device	Vendor	Select the vendor of the external device to be connected to TOP. Select "YOKOGAWA Electric Corporation".			
	PLC	Select the external device to be connected to the TOP.			
		Model	Interface		Protocol
		FA-M3 Series Ethernet			PC Link
		Supported Protocol			
		PC Link (ASCII) PC Link (Binary)			
		Please check the system configuration in Chapter 1 to see if the external device you wa			he external device you want to



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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.

 Project Option

 Change HMI[H]
 Add PLC [A]
 Change PLC[C]
 Delete PLC[D]

Image: Construction of the setting Date / Time Sync. Screen Option Unit Convert Image: Construction of the setting Project Option Screen Change HmiSetup Global Lock & Touch Project Style Splash PLC Buffer Sync. Image: Construction of the setting Image: Construction of the setting Image: Construction of the setting Image: Construction of the setting Image: Construction of the setting Image: Construction of the setting Image: Construction of the setting Image: Construction of the setting Image: Construction of the setting	Change HMI[H] Add	I PLC [A] TITT Change PLC[C] X Delete PLC[D]
Option Module Setting Project Option Screen Change HmiSetup Global Lock & Touch Project Style Splash PLC Buffer Sync. RFID (0) Use HMI Setup	TOP Setting	Date / Time Sync. Screen Option Unit Convert
FieldBus (0) RFID (0) Use HMI Setup	Y 📰 Option Module Setting	Project Option Screen Change HmiSetup Global Lock & Touch Project Style Splash PLC Buffer Sync.
Project Setting Initialization Edit Project Setting Project Setting A Project Name =New project Start Mode =0 Project Name =New project Wireless (0) US8Device (0) Start Mode =0 US8Device (0) US8Device (0) US8Device (0)	FieldBus (0) FieldBus (0) Device Setting COM1 (0) COM2 (0) COM2 (0) COM2 (0) Ethernet (1) PIC1 : FA-M3 Series Wreless (0) USBDevice (0)	✓ Use HMI Setup Initialization Hill Setup Option Edit Project Setting HMDisable=0 Project Setting Fill HMDisable=0 Fill Start Mode=Menu Start Screen No.=1 Latch Use=0 Latch Use=0 Latch Start Mode=Menu Start Screen No.=1 DatabaseMessage=1 Start Screen Scree



Items	ТОР	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 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 > PLC Setting > ETHERNET(1) > "PLC1 : FA-M3 Series"]
 - Set the options of the FA-M3 Series Ethernet communication driver in TOP Design Studio.

Project Option		×
Change HMI[H] Mdd PLC [A] The Change PLC C C Delete PLC D		
<pre>PLC Setting FA-H3 Series]</pre>	Cor	nm Manual
	Apply	Close

* The above settings are examples recommended by the	e company.
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Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External
Protocol	Select the communication protocol between the TOP and an external device.	device selection".
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.	
Cpu No	Enter the CPU no. of the 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]

	la de	Ethernet ×	×
Run	System	Port Ethernet Port : ETH1 • 0 •	Detion
VNC Viewer		MAC Address : 00:15:1D:00:00:00 IP Address : 192.168.0.50 Subnet Mask : 255.255.255.0 Gateway : 192.168.0.1	Sound
O .	Et hernet	DNS (1) : DNS (2) :	Wi-Fi
Screen	Diagnostic M	Primary IP : 192.168.0.50 Cable Status : ETH1 Connected Bridge Mode : Use Bridge	MRAM Analysis
	[System]	Check duplicate Apply Cancel	Close

Items	ТОР	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, <u>192</u>. <u>168</u>. <u>0</u>. 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]

	¢	:001	PLC	×	
Bun	🔯 System	Driver(ETH)	PLC1(FA-M3 Series) 🕶		
		Interface	Ethernet 💌		
		Protocol	PC Link (Binary)		
	PLC	Bind IP	Auto		
YNC		IP	192 - 168 - 0 - 51 -		
¥iewer	l Gail	Ethernet	TCP -		
	Ethernet	Port	12289 🜲		
		Timeout	300 🖨 msec		
Screen	word	Send Wait	0 🖨 msec		
shot	Imil	Cpu No	1		
	Diagnostic				
	[System]	Diagnostic	Ping Test	Apply Cancel	

* The above settings are examples recommended by the company.

Items	Settings	Remarks
Interface	Select "Ethernet".	Refer to "2. External
Protocol	Select the communication protocol between the TOP and an external device.	device selection".
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.	
Сри No	Enter the CPU no. of the 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 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.

ОК	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	Conte	ents	Ch	eck	Remarks	
System	How to connect the sys	stem	OK	NG	1 Custom configuration	
configuration	Connection cable name		OK	NG	1. System configuration	
ТОР	Version information		OK	NG		
	Port in use		OK	NG		
	Driver name		OK	NG		
	Other detailed settings		OK	NG		
	Relative prefix	Project setting	OK	NG	2. External device selection	
		Communication diagnostics	ОК	NG	3. Communication setting	
	Ethernet port setting	IP Address	OK	NG		
		Subnet Mask	OK	NG		
		Gateway	OK	NG		
External device	CPU name	OK	NG			
	Communication port na	OK	NG			
	Protocol (mode)	ОК	NG			
	Setup Prefix	OK	NG	4 External device setting		
	Other detailed settings	OK	NG	4. External device setting		
	Ethernet port setting	IP Address	OK	NG		
		Subnet Mask	OK	NG		
		Gateway	OK	NG		
	Check address range		ОК	NG	5. Supported addresses (For details, please refer to the PLC vendor's manual.)	



4. External device setting

4.1. External device setting 1 (Ethernet Interface Module)

Set up the Dip Switch located inside the side cover of the communication card to set up the communication. 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.

For detailed instructions on how to set up the "Dip Switch", check the attached documentation inside the side cover.



IP Address Setup Switch

Step 1. Operation Condition Setup Switch Settings

Switch Number	Contents	OFF	ON	Recommended settings	Remarks
SW1	Data format	ASCII	Binary	ON *Note 1)	
SW2	Write protection	Disabled	Enabled	OFF	Fixed
SW3					
SW4				055	
SW5	Always on			OFF	
SW6					
SW7	Line processing on TCP timeout	Close	Do not close	OFF	
SW8	Loopback test	Normal mode	Test mode	OFF	

*Note 1) Set the same as the TOP communication options. Switch off SW1 when communicating with ASCII.

Step 2. IP Address Setup Switch Settings

Set the IP address of the external device by changing the Rotary Switch to hexadecimal units. Please refer to the information below.



Step 3. Restart the power after configuring.



4.2. External device setting 2 (CPU Direct)

Set as below using "FA-M3 Series" Ladder Software "WideField3".

For more detailed setting method than that described in this example, refer to the PLC user manual.

Step 1. Set as below from [Project] – [Project Settings] – [CPU Properties] – [LOAD] and [SETUP].

Project Settings/Configuration					
Project Settings		_		D	
Project Settings	LOAD	1	NETWORK	Preset Value	Comment Comment O: No, 1:Yes
Executable Program	RENEW	2	FL-NET		Reserved
Common Tag Name Definition:		3	ETHERNET	1	ETHERNET setup load flag 0: No, 1:Yes
CPU Properties		4	SOCKET	0	SOCKET setup load flag 0: No, 1:Yes
		5	SOCKET_ADDRESS	0	SOCKET_ADDRESS setup load flag 0: No, 1:Yes
		6	HIGHER-LEVEL_LINK_SERVICE	1	HIGHER-LEVEL_LINK_SERVICE setup load flag 0: No, 1:Yes
		7	FTP_CLIENT	0	FTP_CLIENT setup load flag 0: No, 1:Yes
		8	FTP_CLIENT_ADDRESS	0	FTP_CLIENT_ADDRESS setup load flag 0: No, 1:Yes
Configuration		9	FTP_SERVER	0	FTP_SERVER setup load flag 0: No, 1:Yes
Run Operation Setup		10	ROTARY_SWITCH	0	ROTARY_SWITCH setup load flag 0: No, 1:Yes
Input/Output Setup	ROTARY_SWITCH	11	NET_FILTER	0	NET_FILTER setup load flag 0: No, 1:Yes
Device Area Setup	Int_FILTER				
Script Setup					
Built-in Functions Setup					
Error Handling Setup					
Inter-CPU Shared Memory Setup	Browse Save Sa	Browse Save Save As			
Sampling Trace Setup					1 1 1
I → III → IIII → IIII → III → II				OK Can	cel Default Help
1					·

• [LOAD]

Items	Settings	Settings	Remarks
NETWORK	1	NETWORK setup load flag On	Fixed
ETHERNET	1	ETHERNET setup load flag On	Fixed
HIGHER-LEVEL_LINK_SERVICE	1	HIGHER-LEVEL_LINK_SERVICE setup flag On	Fixed
Set up items	0		

• [SETUP - NETWORK]

Items	Settings	Remarks
NETWORK_SELECT	1	Fixed

• [SETUP - ETHERNET]

Items	Settings	Remarks
ETHER_MY_IPADDRESS	192.168.0.51	
ETHER_SUBNET_MASK	255.255.255.0	

• [SETUP – HIGHER-LEVEL-LINK-SERVICE]

Items	Settings	Settings	Remarks	
HLLINK_PROTOCOL_A	0	TCP/IP	1 = UDP/IP	
HLLINK_DATA_FORMAT_A	1	Binary	0 = ASCII	

Step 2. Send setting information via CPU.



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.

"TOP Design Studio" represents the CPU's "Device" in accordance with the "FA–M3 Series" Multi–CPU configuration (on Single Unit) as "CPU Number" + "Device Name" (one unit device). (Example) for Data Register

Multi–CPU	TOP Design Studio Device Name Shown
CPU 1 Data Register	1D
CPU 2 Data Register	2D
CPU 3 Data Register	3D
CPU 4 Data Register	4D

(Note) Multi-CPU configurations can extend to up to four CPUs.

Device		Bit Address	Word Address	32 Bit	Remarks
Input Relay		1X00201 – 4X71664	1X00201 – 4X71649		*Note 1) Note 2)
Output Re	lay	1Y00201 – 4Y71664	1Y00201 – 4Y71649		*Note 1)
Internal Re	lay	1100001 – 4165535	1100001 – 4165535		
Joint Relay	,	1E0001 – 4E4096	1E0001 – 4E4081		
Special Rel	ау	1M0001 – 4M9984	1M0001 – 4M9969		
Link Relay		1L00001 – 4L78192	1L00001 – 4L78177		*Note 3)
Timer	Contact	1T0001 – 4T3072			
	Current		1TP0001 – 4TP3072		
	Setup		1TS0001 – 4TS3072	L/H	
Counter	Contact	1C0001 – 4C3072			
	Current		1CP0001 – 4CP3072		
	Setup		1CS0001 – 4CS3072		
Data Regis	ter	1D0001.00 – 4D65535.15	1D0001 – 4D65535		
File Register		1B00001.00 - 4B262144.15	1B00001 – 4B262144		
Joint Register		1R0001.00 – 4R4096.15	1R0001 – 4R4096		
Special Reg	gister	1Z001.00 - 4Z1024.15	1Z001 – 4Z1024		
Link Regist	er	1W00001.00 – 4W78192.15	1W00001 – 4W78192		*Note 3)
*Nista 1)la		hausiaa laast (Outaut Dalassara aa fallassa			

Note 1)Instructions for showing Input/Output Relay are as follows..

(Example) X 0[Module Unit No.] 02[Module Slot No.] 01[Terminal No.]		
Items	Setting range	
Module Unit No.	0 – 7	
Module Slot No.	Module unit No is " 0 "	02 – 16
	Module unit No is "1-7"	01 – 16
Terminal No.	01 – 64	

*Note 2)Read-only Device

*Note 3) Instructions for showing link relay (L), link register (W) are as follows.

(Example) L 7[link Number] 1024[address]	
Items	Setting range
Link Number	0 – 7
address	0001 – 71009