# YASKAWA Electric Corporation Machine Controller MP3000 Series Extended MEMOBUS Driver

Supported version TOP Design Studio V1.4.3 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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2. External device selection

## Page 2

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

#### 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 10

Describes how to set up communication for external devices.

## **5.** Supported addresses

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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 "YASKAWA Electric Corporation – MP3000 Series Ethernet" is as follows:

Series	CPU	Link I/F	Communication method	System setting	Cable
MP3000	CPU 201	Ethernet Connector on CPU unit	Ethernet( UDP )	3. TOP communication setting 4 Extended MEMOBUS	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





# 2. External device selection

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

Select Device				x
DLC coloct [Ethomat	1			
PLC select [Ethernet]	I			
Filter : [All]		$\sim$	Search :	
Vendor	Model		0	0.111
M2I Corporation	^ <u>80</u>	Mp900		
MITSUBISHI Electric Corporation		Mp2000		
OMRON Industrial Automation		11/2000		
LS Industrial Systems		Mp3000		
MODBUS Organization	- 🎾	High Speed Ethernet Ser	ver	
STEMENS AG.	<b>\$</b>	SR 100		
Rockwell Automation				
CE Eanur Automation				
DANACONIC Electric Works				
PANASONIC Electric Works				
TASKAWA Electric Corporation				
TOKOGAWA Electric Corporation				
Schneider Electric Industries				
KDT Systems				
RS Automation	*			
		Back	🔷 Next	X Cancel
Salact Davica				
Select Device				×
Select Device PLC Setting[ Mp3000 ] Alias Name - PLC 1		Bind IP - Auto		×
Select Device PLC Setting[ Mp3000 ] Alias Name : PLC1 Interface : Ethernet		Bind IP : Auto	~	×
Select Device PLC Setting[ Mp3000 ] Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E	xtended Memo	Bind IP : Auto	<b>.</b>	× Comm Manual
Select Device PLC Setting[ Mp3000 ] Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E: String Save Mode : First LH HL	xtended Memo	Bind IP : Auto	<b>`</b>	X Comm Manual
Select Device PLC Setting[ Mp3000 ] Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HL Use Redundancy	xtended Memo	Bind IP : Auto	<b>v</b>	Comm Manual
Select Device PLC Setting[ Mp3000 ] Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HL Operate Condition : AND	xtended Memo	Bind IP : Auto	×	Comm Manual
Select Device PLC Setting[ Mp3000 ] Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HL Operate Condition : AND Change Condition : TimeOut	xtended Memo Cha	Bind IP : Auto		Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HL  Operate Condition : AND Change Condition : TimeOut Condition	xtended Memo Cha 5 ;	Bind IP : Auto	×	Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HL  Operate Condition : AND Change Condition : TimeOut Condition Primary Option	xtended Memo	Bind IP : Auto	×	Comm Manual
Select Device  PLC Setting[ Mp3000 ] Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E: String Save Mode : First LH HL Use Redundancy Operate Condition : AND Change Condition : TimeOut Change Condition Primary Option IP 192	xtended Memc	Bind IP : Auto		Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E: String Save Mode : First LH HL  Operate Condition : AND Change Condition : AND Change Condition : TimeOut IP Ethernet Protocol TCP	xtended Memo	Bind IP : Auto		Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HL  Operate Condition : AND Change Condition : I TimeOut Primary Option IP Ethernet Protocol TCP Port 1024	xtended Memo Cha 5 168 V	Bind IP : Auto	· ·	Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HI  Operate Condition : AND Change Condition : TimeOut Primary Option IP Ethernet Protocol TCP Port 1024 Timeout 300	xtended Memo Cha 5 168	Bind IP : Auto		Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HL  Operate Condition : AND Change Condition : TimeOut Primary Option  IP Primary Option  IP Port 1024 Timeout 300 Send Wait 0	xtended Memo Cha 5 158	Bind IP : Auto		Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E: String Save Mode : First LH HL  Operate Condition : AND Change Condition : TimeOut Change Condition : TimeOut Primary Option IP Primary Option IP Port 1024 Timeout 300 Send Wait 0 HMI Port 1025	xtended Memor Cha 5 5 158 • • • • • • • • • • • • • • • • •	Bind IP : Auto		Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E: String Save Mode : First LH HL  Operate Condition : AND Change Condition : AND Change Condition : TimeOut Primary Option IP 192 Ethernet Protocol TCP Port 1024 Timeout 300 Send Wait 0 HMI Port 1025 Data Code BINARY	xtended Memc Cha 5 5 108 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Bind IP : Auto		Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HL  Operate Condition : AND Change Condition : AND Change Condition : TimeOut IP 192 Ethernet Protocol IP Port 1024 Timeout 300 Send Wait 0 HMI Port 1025 Data Code BINARY	xtended Memo	Bind IP : Auto		Comm Manual
Select Device  PLC Setting[ Mp3000 ]  Alias Name : PLC1 Interface : Ethernet Protocol : MP3000 E String Save Mode : First LH HI  Operate Condition : AND Change Condition : TImeOut Change Condition : TImeOut Primary Option IP Ethernet Protocol Port 1024 Timeout 300 Send Wait 0 HMI Port 1025 Data Code BINARY	xtended Memo	Bind IP : Auto		Comm Manual

Settings			Contents		
TOP	Model	Check the TOP display an	Check the TOP display and process to select the touch model.		
External device	Vendor	Select the vendor of the e Select "YASKAWA Electric	Select the vendor of the external device to be connected to TOP. Select "YASKAWA Electric Corporation".		
		Model MP3000 Series	Interface Ethernet	Protocol MP3000 Extended Memobus RTU	

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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.



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 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 > "PLC1 : Mp3000"]
  - Set the options of the MP3000 Series Ethernet communication driver in TOP Design Studio.

Project Option	×
Change HMI[H] Add PLC [A] Thange PLC[C] X Delete PLC[D]	
COM1 (0)     COM2 (0)	Bind IP : Auto 🗸
Wreless (0)     Change Condition :     AND ∨       Wreless (0)     Change Condition :     TimeOut     5 ♦ (St       Condition     Condition     Condition	cond) Edit
Primary Option         IP       192         IP       192         Ethernet Protocol       TCP         Port       1024         Timeout       300         Send Wait       0         HMI Port       1025         Data Code       BINARY	
	Apply Close
* 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".
① Communication option	s when selecting Extended Memobus RTU	
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 the 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.	
HMI Port	Enter the Ethernet communication port number of the TOP.	
Data Code	Select the data code between the TOP and an external device.	
② Communication option	s when selecting MP Extension Ethernet	
IP	Enter the IP address of the external device.	
Port	Enter the Ethernet communication port number of the 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.	
Ethernet Protocol	Select the Ethernet protocol between the TOP and 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	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]

	õ		PLC	×	
Bun	🔯 Syst	Driver(ETH)	PLC1(Mp3000) -		
nan		Interface	Ethernet 💌		
	<b>1</b> 00	Protocol	MP3000 Extended Merr -		
	PLC	Bind IP	Auto		
VNC		IP	192 - 168 - 0 - 1 -		
Viewer	(論)	Ethernet	TCP 💌		
	Ethernet	Port	1024 🖨		
		Timeout	300 🖨 msec		
Screen	word	Send Wait	0 🖨 msec		
shot	mill	HMI Port	1025 ≑		
	Diagnostic	Data Code	BINAR -		
	[System	Diagnostic	Ping Test	Apply Cancel	

 $^{\star}$  The above settings are  $\underline{\text{examples}}$  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".
Communication options w	when selecting Extended Memobus RTU	
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 the 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.	
HMI Port	Enter the Ethernet communication port number of the TOP.	
Data Code	Select the data code between the TOP and an external device.	
② Communication option	is when selecting MP Extension Ethernet	
IP	Enter the IP address of the external device.	
Port	Enter the Ethernet communication port number of the 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.	
Ethernet Protocol	Select the Ethernet protocol between the TOP and 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 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	Contents		Check		Remarks	
System	How to connect the system Connection cable name		OK	NG	1 Custom configuration	
configuration			OK	NG	1. System configuration	
ТОР	Version information	OK	NG			
	Port in use	OK	NG			
	Driver name	Driver name				
	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 n	OK	NG			
	Protocol (mode)	OK	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	<u>5. Supported addresses</u> (For details, please refer to the PLC vendor's manual.)	



# 4. External device setting

Set as below using "MP Series" Ladder Software "MPE720". 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.

- 1. Run the "MPE720" software.
- 2. Create a new project file or open an existing file.
- 3. Click "Module Configuration".
- 4. Double-click "218FD" to open the configuration window.
- 5. Configure as follows. (Example shown below.)

Detail - [218IFD]								
File Edit View								
PT#:- CPU#:-		CI	R#05 00000-007FF					
Transmission Parameters   Status			A					
- Transmission Paramaters								
In Advance of the set								
IP Address : 1/32 - 1/168 - 1/1 - (1/-26-) Equipment name CONTROLLER NAME								
Subnet Mask : [255 🔄 [255 🔄 0 🚍 (0-255)								
Gateway IP Address : 0 🛨 0 🛨 0 🛨 0 -255 ) Detail Definition								
Connection Parameter								
Message Communication								
Easy setting Connections(C NO) 01-10 can be set to r	ommunications can be easily set, receive data automatically,							
	nnect Protocol							
CNO Port Node IP Address Port	Type Type Co	ode Detail	Node Nar-					
01 05100 192.168.001.002 05000 UDP	Extended MEMOBUS     BIN	<ul> <li>Setting*</li> </ul>						
02	▼	<ul> <li>Setting*</li> </ul>						
03	<u> </u>	<ul> <li>Setting*</li> </ul>						
04	<u> </u>	<ul> <li>Setting*</li> </ul>						
05	· ·	▼ Setting <sup>™</sup>						
07		<ul> <li>Setting*</li> </ul>						
	4 4	Jetting						
Cannot the overlap to local station port number used by t	në communicatë the 170 message,							
I/O Message Communication								
C Disable								
C Enable								
Easy setting It is possible to set easily that communicate the I/O message.								
Data update timing Low Scan								
Read/ Local Node IP Address Node C Write Port Node IP Address Port	onnect Protocol C Type Type C	ode Detail	Node Name					
For Help, press F1		, , ,						

(For more details on configuration, refer to the Ladder Software manual.)

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 ${\bf 6.}$  Double-click "Detail" to open the configuration window.

Detail Set	tting	×
Autom	natically Reception	
	<ul> <li>○ Disable</li> <li>○ Disable</li> <li>Unable to automated reception, when the protocol type is no control sequence,</li> </ul>	
-	Transmission Buffer 1	
5	Slave I/F Register Settings       Head REG         Readout of Input Relay       IW00000         Readout of Input Register       IW00000         Readout / Write-in of Coil       MW00000         Readout / Write-in of Hold Register       MW00000         Readout / Write-in of Data Relay       GW00000         Readout / Write-in of Data Register       GW00000         Readout / Write-in of Output Coil       OW00000         Readout / Write-in of Output Coil       OW00000         Readout / Write-in of Output Register       OW00000         Readout / Write-in of Output Register       OW00000         Hit       MW00000	
	Write - in width of Data Relay/Register LO: GW00000 HI: GW2097151	
	Write - in width of Output Coil/Register LO: 0000000 HI: 00017FFF	
A .	Automatic input processing delay 0 ms (0-100)	
	The influence on a low-speed scanning can be adjusted according to this parameter. [ Attention ] It is not in the setting of the communication period of an automatic reception,	
	OK Cance	!



 $\ensuremath{\textbf{7}}.$  Write the "MSG-SND LADDER PROGRAM ".

	sample program of sending nessage for 218IF
	initializing setting parameters for MSG-SND function during first scan after power on. SB000003 for low sach and SB000001 for high scan.
	first scan after power on
	IF B0 000 03==true;
070	
	cicar all D registers
1/2	NL 2 [W] Dest [V] Data [W] Width DWDD000 00000 00032
	set for connection No. (PARAMI2)
2	NL EXPRESSION
2 /5	<sup>2</sup> DWD00D2=1
	set for function code (PARAM04)
3	NL EXPRESSION
3 /7	<sup>2</sup> DWD00D4=Dx000B: //OBH=writing hold register (Extended)
	set for data address (PARAWO5) and data size (PARAMO6)
4	EXPRESSION
4/9	<sup>2</sup> DWD0005=0; //data address (0)
	DWDUUD6=100; //data size (100 words)
	set for CPU No. (PARAMU7)
5/13	Image: Non-Expression         Image: Non-Expression           2         DWD00000-1
	DW00007-1
6	set for offest. (PAKAMU8-PAKAMII)
6/15	2 DWD00D8=D: //coil_offset (PARAMD8)
	DWD0009=0: //input relay offset (PARAMD9)
	DW00011=0; //input register offset (PARAMID)
	clear system register. (PARAMI2)
7/28	NL EXPRESSION
1720	LW00012=1
8	END_IF
8/25	treatment for all time
	abort for timeout if not completed in 10s after sending command
3	DB000200 DB000201  TONE10ms1 01000 DW00031
9/26	execute abort timeout

						7	대한민 Touch	국대표 터치패널 Operation Panel
10	DB000204		DB000211					DE000201
13/31	timeout DB000212		complete					abort
	BB000201							
	abort		release s	sending comman	d in 60s afte	r aborted		
	DB000201		DB000209					DE000208
18/36	abort		waiting end ed					waiting
	DB000208							
	vaiting							DE000000
		- TON[10ms]	[V]Set 06000	[W] Counit DW0 002.8				DB010209
	vaiting	ι			lon startion s	and for Fo		waiting end ed
	SB000034	_	SBOODO3A f	or low scan at	nd SB00001A fo	r high sean.		DB00020D
13 25/44	After 5.0s, Scan Stort-							5 s- 0N
	up Relay DB00020D	DB000211	DB000212	DB000208		[W]Set	[W] Count	DB000200
27/46	5s-ON	complete	er ror	waiting	TON[10ns]	00100	DW00030	execute
15 3 3/53							- NSG	- SND
							[B]Execute DB000200 execute	[B] Busy DB000210
							[B]Abort DB000201	[B]Complete DB000211
							abort [W]Dev-Typ	complete [BlError
							00006	DB000212
							[W]Pro-Typ	
							[W]Cir-No	
-							[W]Ch-No	
							00001 [A]Param	
							DA00000	
				finished	pormellu			1
16	IF 🖺 📥	DB000211==t	rue	T Hill Blied	liotmetty			
17	DB0.002.01						-	[WL]Dest
35/71 2	abort						INC	count norma
	END_IF						L	
37775				finished a	abnormally			
38/76	IF 🖆 📥	DB0 002 12==t	rue	1				1
20 N	L						INC	DW00025
39/78 4							L	count abnor nally
	EXPRESSION		8	aving the ree	ult and status	3		₽.
40773 2	DW00026=DW0 DW00027=DW0	)0000; //res )0001; //sta	ult itus					
22	END_IF							
41/83	DECOSCO	ED402402		treatment	for tineput			BR000 000
23								
	timeput	on pulse						timeout occ ured

			7	대한민 Touch	국대표 터치패널 Operation Panel
45/87	)B00020C==true				
25 46/83 2				- INC	[WL]Deet DW00023 count timeo
26END_IF				L	ut
48/91		END			

7. Send the configuration details to the device by using "Transfer".

8. Boot up the device once the transfer is complete.



# 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.

Device	Bit Address	Word Address	32bit	Remarks
Holding Registers	MB 0 – 1048576F	MW 0 – 1048576		
Data Registers	GB 0 – 2097152F	GW 0 – 2097152		
Input Registers	IB 0 – 17FFFF	IW 0 – 17FFF	L/H	*Note 1)
Output Registers	OB 0 – 17FFFF	OW 0 – 17FFF		
System Registers	SB 0 – 65534F	SW 0 – 65534		*Note 1)

\*Note 1) Cannot be written