MITSUBISHI Electric Corporation MELSEC FX Series

Computer Link 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".

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 4

Select a TOP model and an external device.

3. TOP communication setting Page 5

Describes how to set the TOP communication.

4. External device setting Page 10

Describes how to set up communication for external devices.

5. Cable table

Page 12

Describes the cable specifications required for connection.

6. Supported addresses

Page 14

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



1. System configuration

The system configuration of TOP and "MITSUBISHI Electric Corporation - MELSEC FX Computer Link" is as follows.

CPU	Link I/F ^{*Note 1)}	Communication method	System setting	Cable
	FX3G-232-BD FX3U-232ADP+ FX3G-CNV-ADP	RS-232C		
FX3G-14M FX3G-24M	FX3G-485-BD FX3U-485ADP+FX3G-CNV-ADP	RS422 (4 wire) RS-485		
		(2 wire)		
	When using channel 1 FX3G-232-BD (connect to the connector 1 of the additional unit)	RS-232C		
	FX3U-232ADP + FX3G-CNV-ADP	DC 422		
	FX3G-485-BD (connect to the connector 1 of	(4 wire)		
	the additional unit)	(4 wile) RS-485		
	FX3U-485ADP + FX3G-CNV-ADP	(2 wire)		
FX3G-40M	When using channel 2	(2 wite)		
FX3G-60M	FX3G-232-BD (connect to the connector 2 of the additional unit) FX3U-232ADP + FX3U-■ADP + FX3G-CNV- ADP	RS232C		
	FX3G-485-BD (connect to the connector 2 of	RS422		
	the additional unit)	(4 wire)		
	FX3U-485ADP + FX3U-■ADP + FX3G-CNV-	RS-485		
	ADP	(2 wire)	<u>3. TOP</u>	
	When using channel 1		communication	
	FX3U-232ADP	RS-232C	setting	5. Cable table
		RS422	4. External device	
	FA30-403ADF	(4 wire)	setting	
		RS-485		
FX3UC-□MT/D		(2 wire)		
FX3UC-DMT/DSS	When using channel 2]	
	FX3U-232ADP + FX3U-■ADP	RS-232C		
	FX3U-485ADP + FX3U-■ADP	RS422		
		(4 wire)		
		RS-485		
		(2 wire)		
	When using channel 1			
	FX3U-232-BD	RS-232C		
	FX3U-232ADP + FX3U-CNV-BD			
		RS422		
	FX3U-485-BD	(4 wire)		
	FX3U-485ADP + FX3U-CNV-BD	RS-485		
FX3UC-32MT-LT		(2 wire)		
FX3U	When using channel 2			
	FX3U-232ADP + FX3U-∐BD, FX3U-232ADP + FX3U- ■ ADP + FX3U-CNV-BD	RS-232C		
		RS422		
	FX3U-485ADP + FX3U-□BD	(4 wire)		
	FX3U-485ADP + FX3U-■ADP + FX3U-CNV-BD	RS-485		
		(2 wire)		



Solution Continued on next page.

CPU	Link I/F ^{*Note 1)}	Communication method	System setting	Cable
FX2N	FX2N-232-BD FX2NC-232ADP + FX2N-CNV-BD	RS-232C		
	FX2N-485-BD FX0N-485ADP + FX2N-CNV-BD FX2NC-485ADP + FX2N-CNV-BD	RS422 (4 wire)		
		RS-485 (2 wire)	<u>3. TOP</u> communication <u>setting</u> <u>4. External device</u>	
FX1N FX1S	FX1N-232-BD FX2NC-232ADP + FX1N-CNV-BD	RS-232C		
	FX1N-485-BD FX0N-485ADP + FX1N-CNV-BD FX2NC-485ADP + FX1N-CNV-BD	RS422 (4 wire)		5. Cable table
		RS-485 (2 wire)	<u>setting</u>	
	FX2NC-232ADP	RS-232C		
FX2NC		RS422		
FX1NC	FX0N-485ADP	(4 wire)		
FX0N	FX2NC-485ADP	RS-485		
		(2 wire)		

*Note 1) One of (232, 422, 485, USB) is entered in \Box in the Link I/F column. One of (232, 485) is entered in \blacksquare in the Link I/F column.

■ Connection configuration

• 1:1 (one TOP and one external device) connection – configuration which is possible in RS232C/422/485 communication.



• 1:N (one TOP and multiple external devices) connection - configuration which is possible in RS422/485 communication.





2. External device selection

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

PLC select [CO	M1]				
Filter : [All]			\sim	Search :	
				Mode	I O Vendor
Vendor		Model			
			MELSEC Q Series		
MITSUBISHI Electric Corp	oration		MELSEC FX Series		
OMRON Industrial Autom	ation	- 🌮	MELSEC AnN/AnS Series		
LS Industrial Systems		8	MELSEC AnA/AnU Series		
MODBUS Organization			MELSERVO J2 Series		
SIEMENS AG.			MELSERVO J3 Series		
Rockwell Automation			MELSERVO 14 Series		
GE Fanuc Automation			MELSERVO 54 Series		
PANASONIC Electric Work	ß		MELSEC FX2N-10/20GM	Series	
YASKAWA Electric Corpor	ation		MELSEC iQ-F Series		
YOKOGAWA Electric Corp	oration				
Schneider Electric Industr	ies				
KDT Systems					
RS Automation		*			
PLC Setting[MELSE	C FX Seri	es]			
Alias Name :	PLC1				
Interface :	Computer L	ink	~		
Protocol :	MC Protoco	I 1C	~	Co	mm Manual
String Save Mode :	Firet H HI	Cha	nne		
String Save Mode :	First LH HL	Cha	nge		
String Save Mode :	First LH HL	, Cha	nge		
String Save Mode : Use Redundancy Operate Condition : AN Change Condition :	First LH HL D ~ TimeOut	Cha	(Second)		
String Save Mode :	First LH HL D ~ TimeOut Condition	5 ((Second)		Edit
String Save Mode : Use Redundancy Operate Condition : AN Change Condition :	First LH HL D ~ TimeOut Condition	5 ((Second)		Edit
String Save Mode : Use Redundancy Operate Condition : AN Change Condition : Primary Option Timeout	First LH HL	5 ((Second)		Edit
String Save Mode : Use Redundancy Operate Condition : AN Change Condition : P Primary Option Timeout Send Wait	First LH HL D V TimeOut Condition 300 0	5 5	(Second)		Edit
String Save Mode : Use Redundancy Operate Condition : AN Change Condition : P Primary Option Timeout Send Wait Retry	First LH HL D Condition 300 0 5 6	Cha 5 msec • msec	(Second)		Edit
String Save Mode : Use Redundancy Operate Condition : AN Change Condition : Primary Option Timeout Send Wait Retry Station Num	First LH HL	Cha 5 (msec msec	(Second)		Edit
String Save Mode : Use Redundancy Operate Condition : An Change Condition : Primary Option Timeout Send Wait Retry Station Num Pc No	First LH HL D D V TimeOut Condition	Cha 5 () msec • msec •	(Second)		Edit
String Save Mode : Use Redundancy Operate Condition : An Change Condition : Primary Option Timeout Send Wait Retry Station Num Pc No	First LH HL D D TimeOut Condition 300 0 5 0 255	Cha 5 € 9 msec 9 msec 9	(Second)		Edit
String Save Mode : Use Redundancy Operate Condition : An Change Condition : Primary Option Timeout Send Wait Retry Station Num Pc No	First LH HL D D TimeOut Condition 300 [] 0 [] 255 []	Cha 5 5 7 8 9 8 9 8 9 9 9 9 9 9 9	(Second)		Edit
String Save Mode : Use Redundancy Operate Condition : AN Change Condition : Primary Option Timeout Send Wait Retry Station Num Pc No	First LH HL D Condition 300 0 5 0 255 0 255 0	Cha 5 () msec \$ msec \$ 0	(Second)		Edit
String Save Mode : Use Redundancy Operate Condition : AN Change Condition : Primary Option Timeout Send Wait Retry Station Num Pc No	First LH HL D Condition 300 5 6 255 6	Cha 5 (7 msec 7 msec 7 msec 7 msec 7 msec	(Second)		Edit

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 "MITSUBISHI Electric Corporation".				
	PLC	Select an external device to con	Select an external device to connect to TOP.			
		ModelInterfaceProtocolMELSEC FX SeriesComputer LinkMC Protocol 1C ACPL				
		Please check the system config connect is a model whose syste	guration in Chapter 1 to see if m can be configured.	the external device you want to		



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]



Items		ТОР			Remarks
Signal Level (port)			DC 405	RS-232C	
	KS-232C	KS-422	KS-485	RS-422/485	
Baud Rate	19200				
Data Bit	8				
Stop Bit	1				
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 Property > PLC Setting > COM > "PLC1 : MELSEC-FX Series"]
 - Set the options of the MELSEC-FX Series CPU Direct communication driver in TOP Design Studio.

Project Option				×
Change HMI[H] Add PL	A Change PLC[C]	Delete PLC[D]		
Charge HMILE Add PC TOP Setting SYS : RD IS20X Option Module Setting Fieldbus (0) RFID (0) Device Setting COM1 (1) PIC1 : MELSEC FX Series COM2 (0) Ethernet (0) Wireless (0) USBDevice (0)	PLC Setting[MELSEC FX Series Alias Name : Interface : Computer Link Protocol : MC Protocol IC String Save Mode : First LH HL Operate Condition : AND Change Condition : Timeout 300 * Send Wait 0 * Pc No 255 *	Jette PtC[] Change 5 (Second) Edit msec msec	Co	mm Manual
< >>			Apply	Close

Items	Settings	Remarks
Interface	Select "Computer Link".	Fixed
Protocol	Select "MC Protocol 1C ACPU".	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.	
Station Num	Enter the prefix of an external device.	
PC No	Set the prefix of TOP.	



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	ТОР			External device	Remarks
Signal Level (port)				RS-232C	
	K3-232C	KS-422	K3-400	RS-422/485	
Baud Rate		19200			
Data Bit	8				
Stop Bit	1				
Parity Bit	None.				

 \ast The above settings are setting $\underline{examples}$ 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

■ [Main screen > Control panel > PLC]



Items	Settings	Remarks
Interface	Select "Computer Link".	Fixed
Protocol	Select "MC Protocol 1C ACPU".	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.	
Station Num	Enter the prefix of an external device.	
PC No	Set the prefix of TOP.	



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.

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	Contents		eck	Remarks
System	How to connect the sy	stem	OK	NG	1 System configuration
configuration	Connection cable name	e	ОК	NG	<u>1. system configuration</u>
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	
		Communication	OK	NC	2. External device selection
		diagnostics	ОК	NG	3. Communication setting
	Serial Parameter	Transmission	ОК	NC	
		Speed		NG	
		Data Bit	ОК	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
External device	CPU name		OK	NG	
	Communication port n	ame (module name)	OK	NG	
	Protocol (mode)	OK	NG		
	Setup Prefix	OK	NG		
	Other detailed settings		OK	NG	4. External device setting
	Serial Parameter	Transmission	OK	NC	4. External device setting
		Speed	ÜK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
	Check address range				6. Supported addresses
			OK	NG	(For details, please refer to the PLC
					vendor's manual.)



4. External device setting

Communication setting of MELSEC-FX series has two methods: parameter settings in MELSEC series Ladder Software "**GX Developer**" or data setting in PLC's "special data register". For more detailed setting methods than described in this example, refer to the PLC user manual.

■ Method 1: Parameter setting in "GX Developer"

Step 1. Double-click [Parameter] > [PLC parameter] in the project window to pop-up the [FX Parameter] dialog box.

Step 2. Select [PC system settings (2)] tab in the [FX Parameter] dialog box, select to use "Operate Communication Setting" and then set as follows.

FX parameter	
Memory capacity Device PLC name I/O assignment F	PLC system(1) PLC system(2) Positioning the parameters will be cleared, sfered to the communication board, parameters _C must be cleard upon program transfer,)
Protocol Dedicated protocol	Control line
Bbit Parity None	Regular/RS-232C Control mode Invalid
Transmission speed	✓ Sum check Transmission control procedure Form 1/without CB LE
Header	Station number setting 00 H (00H0FH)
Terminator	1 X10ms (1255)
Default	Check End Cancel

Items	Selection	Remarks
	"CU1" or "CU2"	Select the channel for communication setting.
		(Items that can be set only on FX3UC, FX3U, and FX3G models.)
Operate Communication Setting	Check to use	(Fixed)
Protocol	Dedicated protocol	(Fixed)
Data length	8bit	
Parity	None	
Stop Bit	1bit	
Transmission Speed	19200	
H/W type	Regular/RS-232C	
Sum check	Check to use	(Fixed)
Transmission control procedure	Form1(without CR,LF)	(Fixed)
Station number setting	00	
Time out judge time	1	

■ Select "RS-485" in "H/W type" for RS-422/485.

* The above settings are setting examples recommended by the company.

Step 3. [Online] > Transmit the parameter set to [Write to PLC] and reset the PLC.



Method 2: Enter data to "special data register" in PLC.

Enter data to the special data register of MELSEC-FX. After input, reset the power of PLC.

To set the content set in the setting goal, enter the data as follows.

Speci	al register items	Data		
Channel 1	Channel 2 (FX3UC, FX3U, FX3G.)	Setting data(Hexadecimal)	Remarks	
D9120	09420	6891	RS-232C serial parameter setting data	
D0120	D8420	6091	RS-422/485 serial parameter setting data	
D8121	D8421	0	PLC station number	
D8129	D8429	1	Time out judge time	



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 "Mitsubishi Electric Corporation")

■ RS-232C (1:1 connection)

СОМ				PLC		
Pin	Signal	Pin	Cable connection	Pin	Signal	Pin
arrangement*Note 1)	name	number		number	name	arrangement*Note 1)
15	CD	1	P	1	CD	1 5
$(\circ \circ)$	RD	2		2	RD	$\left(\circ \circ \right)$
	SD	3		· 3	SD	
6 9 Basad an	DTR	4	 	4	DTR	6 9 Bacad an
	SG	5		5	SG	communication
cable connector	DSR	6	•	6	DSR	
front	RTS	7	•	· 7	RTS	front
D-SUB 9 Pin male	CTS	8	•	8	CTS	D-SUB 9 Pin male
(male, convex)		9		9		(male, convex)

*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-422** (1:1 connection)

COM				PLC		
Pin	Signal	Pin	Cable connection	Signal	Din arrangement	
arrangement*Note 1)	name	number		name	Pin analyement	
1 5	RDA	1		SDA		
$\left(\circ \circ \right)$		2	•	SDB	III RDA	
		3	•	RDA		
6 9 Based on	RDB	4	└─── ┥ │ ┡ ────	RDB		
communication	SG	5		SG	SDA	
cable connector	SDA	6	•		TT SDB A	
front		7				
D-SUB 9 Pin male		8			Ш ^{зс} ()	
(male, convex)	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					PLC
Pin	Signal	Pin	Cable connection	Signal	Din arrangement
arrangement*Note 1)	name	number		name	Pill allangement
15	RDA	1	•	SDA	
$\left(\circ \circ \right)$		2	• • • •	SDB	RDA
		3		RDA	
6 9 Deced on	RDB	4	•	RDB	
communication	SG	5		SG	SDA ()
cable connector	SDA	6			Ш SDB 🔿
front		7			
D-SUB 9 Pin male		8			Шsg D
(male, convex)	SDB	9	_		

*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.



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■ **RS-485** (1:1 connection)

COM			PLC	
Din arrangement	Signal	Cable connection	Signal	Din arrangement
Pin anangement	name		name	Pin arrangement
	+	•	SDA	
0	—	•	SDB	
101 SG	SG		RDA	
01 -		•	RDB	TT SDA
101 +			SG	
0				
				l sg

RS-422(1:N connection) – Refer to 1:1 connection to connect in the following way:

TOP	Cable connection and signal	PLC	Cable connection and signal	PLC
Signal name	direction	Signal name	direction	Signal name
RDA		SDA		SDA
RDB		SDB		SDB
SDA		RDA		RDA
SDB		RDB		RDB
SG		SG		SG

RS-485 (1:N/N:1 connection) – Refer to 1:1 connection to connect in the following way.

TOP	Cable connection and signal	PLC	Cable connection and signal	PLC
Signal name	direction	Signal name	direction	Signal name
RDA	• •	SDA	- p	SDA
RDB	+ • -	SDB	├ ╄ ─ ─ ╄ │ ─	SDB
SDA	-• •	RDA	-• •	RDA
SDB	─ ▲	RDB	b	RDB
SG		SG		SG



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.

Туре	Remarks	Bit designation address	Word designation address	32 bit	Property
Input	Bit	X0000 – X0377	X0000 – X0360		*Note 2) Note 3)
Output	Bit	Y0000 – Y0377	Y0000 - Y0360		*Note 3)
STEP relay	Bit	S0000 – S8191	S0000 – S8176		
Internal relay	Bit	M0000 – M7679	M0000 – M7664		
Special relay	Bit	M8000 – M8511	M8000 – M8496		*Note 4)
Data register	Word	D0000.00 - D0999.15	D0000 – D0999		
		D1000.00 – D7999.15	D1000 – D7999	L/H ^{*Note 1)}	
Special register	Word	D8000.00 – D8511.15	D8000 – D8511		*Note 4)
Timer - Contact	Bit	T000 – T511			
Timer-Current value	Word		TN000 – TN511		
Counter - Contact	Bit	C000 – C255			
Counter-Current value	Word		CN000 – CN199		
Counter-Current value	DWord		CN200 – CN255		*Note 5)

*Note 1) The lower 16BIT data of 32BIT data is saved in the screen registered address, and the upper 16BIT data is saved in the address next to the screen registered address.

x. When saving 32 BIT data hexadecimal dat	12345678 in address D00100	, it is saved to 16 BIT device	address as follows:
--	----------------------------	--------------------------------	---------------------

Items	32BIT	16BIT	
Address	D00100	D00100	D00101
Input data (hexadecimal)	12345678	5678	1234

*Note 2) It has a non-writable area. Please use it with caution.

*Note 3) When used as a word address, it is used in units of 20 (Octal-decimal). (Ex: X0, X20, X40, ..., X160)

*Note 4) As it may be used as a special area according to the address by the system, it may not be possible to execute Write Data. Refer to the manual of the external device for use.

*Note 5) 32 BIT device