





Device/PLC Connection Manuals



About the Device/PLC Connection Manuals

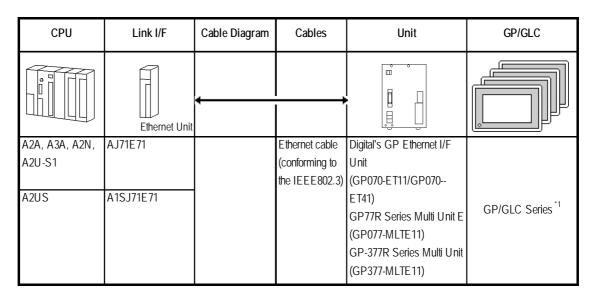
Prior to reading these manuals and setting up your device, be sure to read the "Important: Prior to reading the Device/PLC Connection manual" information. Also, be sure to download the "Preface for Trademark Rights, List of Units Supported, How to Read Manuals and Documentation Conventions" PDF file. Furthermore, be sure to keep all manual-related data in a safe, easy-to-find location.

7.2 Mitsubishi Electric

7.2.1 System Structure

This section explains the system structure for the Ethernet connection between a PLC made by Mitsubishi Electric and the GP.

■ MELSEC-A Series/AJ71E71, A1SJ71E71 (using Ethernet Unit)



^{*1} Refer to the following table for compatible GP/GLC units and Ethernet connection information.

Series Name		Product Name	Optional Ethernet I/F Unit	Built-in Ethernet Port
GP70 Series	GP-470 Series	GP-470E	Q	X
	GP-570 Series	GP-570S	Q	X
		GP-570T	•	Х
		GP-57JS	O	Х
		GP-570VM	O	X
	GP-571 Series	GP-571T	O	Х
	GP-675 Series	GP-675S	O	х
		GP-675T	O	х
	GP-870 Series	GP-870VM	O	Х
GP77R Series	GP-377R Series	GP-377RT	O*1 *2	х
	GP-477R Series	GP-477RE	O*2	х
	GP-577R Series	GP-577RS	o *2	х
		GP-577RT	o *2	Х
GP2000 Series	GP-2300 Series	GP-2300L	х	O
		GP-2300S	х	O
		GP-2300T	х	O
	GP-2400 Series	GP-2400T	х	O
	GP-2500 Series	GP-2500L	O*3*4	•
		GP-2500S	O*3*4	O
		GP-2500T	O*3*4	O
	GP-2501 Series	GP-2501L	O*2*3	х
		GP-2501S	O*2*3	х
		GP-2501T	O*2*3	х
	GP-2600 Series	GP-2600T	O*3*4	0
	GP-2601 Series	GP-2601T	O*2*3	х
GLC 2000 Series	GLC-2300 Series	GLC-2300L	х	0
		GLC-2300T	Х	O
	GLC-2400 Series	GLC-2400T	Х	•
	GLC-2500 Series	GLC-2500T	O*3*4	0
	GLC-2600 Series	GLC-2600T	O*3*4	•
ST Seires	•	ST403	х	O

^{*1} Only the Multi unit can be used.

^{*4} Using the optional Ethernet I/F Unit allows you to set up separate Class and Net No.s for 2-Way Driver applications (Pro-Server, GP-Web and others) and the PLC. When doing this, data transfer with the PLC is performed through the optional Ethernet I/F Unit.



• For cable connections, refer to the user's manual for each optional unit. For the GP2000 and GLC2000 series, however, refer to the user's manual for the main unit.

^{*2} The 2-Way Driver (Pro-server, GP-Web and others) cannot be used.

^{*3} When using the optional Ethernet I/F unit, a bus conversion unit (PSL-CONV00) is required.

■ MELSEC-Q Series

CPU	LinkI/F	Cable Diagram	Cables	Unit	GP/GLC
	Ethernet Unit	◀			
Q00CPU	QJ71E71		Ethernet cable	Digital's GP	
Q01CPU	QJ71E71-B2		(conforming to	Ethernet I/F Unit	
Q00JCPU	QJ71E71-100		the IEEE802.3)	GP070-ET11	
Q02CPU				GP070-ET41	00/0/ 0 0 1 *1
Q02HCPU				GP377-MLTE11	GP/GLC Series *1
Q06HCPU				GP377-MLTE41	
Q12HCPU				GP077-MLTE41	
Q25HCPU					

^{*1} Refer to the following table for compatible GP/GLC units and Ethernet connection information.

Sorio	es Name	Product Name	Optional	Built-in
Serie	S Name	Product Name	Ethernet I/F Unit	Ethernet Port
GP77R Series	GP-377R Series	GP-377RT	O*1 *2	х
	GP-477R Series	GP-477RE	O*2	х
	GP-577R Series	GP-577RS	O*2	х
		GP-577RT	O*2	х
GP2000 Series	GP-2300 Series	GP-2300L	х	O
		GP-2300S	х	0
		GP-2300T	х	O
	GP-2400 Series	GP-2400T	х	O
	GP-2500 Series	GP-2500L	O*3*4	O
		GP-2500S	O*3*4	O
		GP-2500T	O*3*4	O
	GP-2501 Series	GP-2501L	O*2*3	х
		GP-2501S	O*2*3	х
		GP-2501T	O*2*3	х
	GP-2600 Series	GP-2600T	O*3*4	O
	GP-2601 Series	GP-2601T	O*2*3	х
GLC 2000 Series	GLC-2300 Series	GLC-2300L	х	O
		GLC-2300T	х	O
	GLC-2400 Series	GLC-2400T	Х	O
	GLC-2500 Series	GLC-2500T	O*3*4	O
	GLC-2600 Series	GLC-2600T	O*3*4	O
ST Series	•	ST403	х	O

^{*1} Only Multi unit can be used.

^{*4} Using the optional Ethernet I/F Unit allows you to set up separate Class and Net No.s for 2-Way Driver applications (Pro-Server, GP-Web and others) and the PLC. When doing this, data transfer with the PLC is performed through the optional Ethernet I/F Unit.



For cable connections, refer to the user's manual for each optional unit. For the GP2000 and GLC2000 series, however, refer to the user's manual for the main unit.

^{*2} The 2-Way Driver (Pro-Server, GP-Web and others) cannot be used.

^{*3} When using optional Ethernet I/F unit, a bus conversion unit (PSL-CONV00) is required.

◆ Connction Structure Up to 16 units *1 Option Unit •GP070-ET11 •GP070-ET41 •GP377-MLTE11 •GP077-MLTE41 •GP077-MLTE41 HUB • Connction Structure Up to 16 units *1 Ethernet Unit •QJ71E71 •QJ71E71-B2 •QJ71E71-100

- *1 When transmitting data via the PLC's OPEN Setting feature instead of the Auto OPEN UDP Port feature, up to 16 GP units can be connected. Also, when using the PLC's Auto Open UDP Port feature, there is no limitation for for the number of GP units that can be connected.
- *2 When using a 10BASE-5 or a 10BASE-2 cable with the Mitsubishi PLC, use a transceiver to connect this cable with the 10BASE-T cable.

■ MELSEC-QnA Series

CPU	Link I/F	Cable Diagram	Cables	Unit	GP/GLC
	Ethernet Unit				
Q2A	AJ71QE71		Ethernet cable	Digital's GP	
Q2A-S1	AJ71QE71-B5		(conforming to	Ethernet I/F Unit	
Q3A			the IEEE802.3)	GP070-ET11	
Q4A				GP070-ET41	
Q4AR				GP377-MLTE11	GP/GLC Series *1
Q2AS	A1SJ71QE71-B2			GP377-MLTE41	
Q2AS-S1	A1SJ71QE71-B5			GP077-MLTE41	
Q2ASH					
Q2ASH-S1					

*1 Refer to the following table for compatible GP/GLC units and Ethernet connection information.

Series Name		Product Name	Optional	Built-in
Serie	es ivallie	Product Name	Ethernet I/F Unit	Ethernet Port
GP77R Series	GP-377R Series	GP-377RT	O*1*2	х
	GP-477R Series	GP-477RE	O *2	Х
	GP-577R Series	GP-577RS	O*2	Х
		GP-577RT	O*2	Х
GP2000 Series	GP-2300 Series	GP-2300L	х	•
		GP-2300S	х	O
		GP-2300T	х	0
	GP-2400 Series	GP-2400T	Х	O
	GP-2500 Series	GP-2500L	O*3*4	0
		GP-2500S	O*3*4	•
		GP-2500T	O*3*4	O
	GP-2501 Series	GP-2501L	O*2*3	Х
		GP-2501S	O*2*3	Х
		GP-2501T	O*2*3	Х
	GP-2600 Series	GP-2600T	O*3*4	O
	GP-2601 Series	GP-2601T	O*2*3	Х
GLC 2000 Series	GLC-2300 Series	GLC-2300L	Х	•
		GLC-2300T	х	O
	GLC-2400 Series	GLC-2400T	х	0
	GLC-2500 Series	GLC-2500T	O*3*4	O
	GLC-2600 Series	GLC-2600T	O*3*4	O
ST Series	•	ST403	х	0

^{*1} Only Multi unit can be used.

^{*4} Using the optional Ethernet I/F Unit allows you to set up separate Class and Net No.s for 2-Way Driver applications (Pro-Server, GP-Web and others) and the PLC. When doing this, data transfer with the PLC is performed through the optional Ethernet I/F Unit.

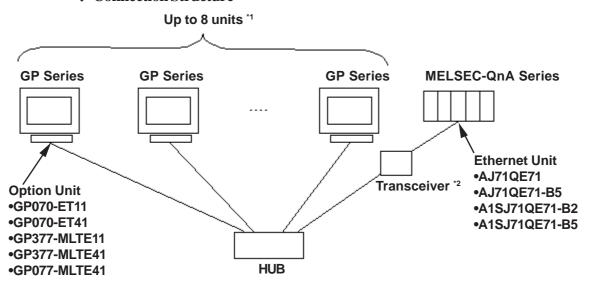


For cable connections, refer to the user's manual for each optional unit.
 For the GP2000 and GLC2000 series, however, refer to the user's manual for the main unit.

^{*2} The 2-Way Driver (Pro-Server, GP-Web and others) cannot be used.

^{*3} When using optional Ethernet I/F unit, a bus conversion unit (PSL-CONV00) is required.

♦ Connection Structure



- *1 When transmitting data via the PLC's OPEN Setting feature instead of the Auto OPEN UDP Port feature, up to 8 GP units can be connected. Also, when using the PLC's Auto Open UDP Port feature, there is no limitation for for the number of GP units that can be connected.
- *2 When using a 10BASE-5 or a 10BASE-2 cable with the Mitsubishi PLC, use a transceiver to connect this cable with the 10BASE-T cable.

7.2.2 Supported Devices

The following describes the range of devices supported by the GP.

■ MELSEC-A Series

\square S	Setup System	Area	here
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Device	Bit Address	Word Address	Particulars	
Input Relay	X0000 ~ X1FFF	X0000 ~ X07F0	[XXXO]	
Output Relay	Y0000 ~ Y1FFF	Y0000 ~ Y07F0	[XXXO]	
Internal Relay	M0000 ~ M8191	M0000 ~ M8176	<u>÷16</u> 1	
Latch Relay	L0000 ~ L8191			
Special Relay	M9000 ~ M9255	M9000 ~ M9240	<u>÷16</u> 1	
Annunciator	F0000 ~ F2047	F0000 ~ F2032	<u>÷16</u> 1	
Link Relay	B0000 ~ B0FFF			
Timer (contact)	TS0000 ~ TS2047			
Timer (coil)	TC0000 ~ TC2047			L/H
Counter (contact)	CS0000 ~ CS1023			
Counter (coil)	CC0000 ~ CC1023			
Timer (current value)		TN0000 ~ TN2047		
Counter (current value)		CN0000 ~ CN1023		
Data Register		D0000 ~ D6143	Bit 1 51	
Special Register		D9000 ~ D9255	Bit 1 51	
Link Register		W0000 ~ W0FFF	Bit F7	
File Register		R0000 ~ R8191	Bit] 5]	



Note: The range of supported devices may differ depending on your CPU. For the range of supported devices for each CPU, refer to the User's Manual for Model AJ71E71 Interface Unit by Mitsubishi Electric.

■ MELSEC-Q/MELSEC-QnA Series

Setup System Area here.

Device	Bit Address	Word Address	Particulars	6
Input Relay	X0000 ~ X1FFF	X0000 ~ X1FF0	[XXXO]	
Output Relay	Y0000 ~ Y1FFF	Y0000 ~ Y1FF0	[XXXO]	
Internal Relay	M0000 ~ M32767	M0000 ~ M32752	<u>÷16</u>	
Special Relay	SM0000 ~ SM2047	SM0000 ~ SM2032	<u>÷16</u> 1	
Latch Relay	L0000 ~ L32767	L0000 ~ L32752	<u>÷16</u> 1	
Annunciator	F0000 ~ F32767	F0000 ~ F32767	<u>÷16</u>	
Edge Relay	V0000 ~ V32767	V0000 ~ V32752	<u>÷16</u> 1	
Step Relay	S0000 ~ S8191	S0000 ~ S8176	<u>÷16</u> 1	
Link Relay	B0000 ~ B7FFF	B0000 ~ B7FF0	<u> </u>	
Special Link Relay	SB000 ~ SB7FF	SB000 ~ SB7F0	<u>xx</u> 01	
Timer (contact)	TS00000 ~ TS23087			
Timer (Coil)	TC00000 ~ TC23087			
Aggregate Timer (contact)	SS00000 ~ SS23087			
Aggregate Timer (coil)	SC00000 ~ SC23087			
Counter (contact)	CS00000 ~ CS23087			L/H
Counter (coil)	CC00000 ~ CC23087			
Timer (current value)		TN00000 ~ TN23087		
Aggregate Timer (current value)		SN00000 ~ SN23087		
Counter (current value)		CN00000 ~ CN23087		
Data Register		D00000 ~ D25983	Bit 151	
Special Register		SD0000 ~ SD2047	Bit] 5]	
Link Register		W0000 ~ W657F	Bit F	
Special Link Register		SW000 ~ SW7FF	Bit 1	
File Register (Normal)		R0000 ~ R32767	Bit 1 5 1	
		0R0000 ~ 0R7FFF	Bit F	
	·	1R0000 ~ 1R7FFF	Bit F	
File Register (Serial)	:	:	:	
		30R0000 ~ 30R7FFF	Bit F7	
	<u> </u>	31R0000 ~ 31R67FF	Bit F	



- Note:

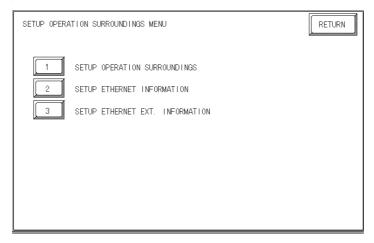
 The device ranges given here show the maximum range available for each parameter setting.
 - · When using File Regsters, depending on the type of unit used, a PLC Memory Card may be required. Depending on the size of the Memory Card, the device ranges will change. For details, refer to Mitsubishi Electric Co., Ltd's User's Manual.
 - When using the QnA series unit's File Registers, depending on the QnA unit's CPU version, certain usage restrictions will apply. For details, refer to Mitsubishi Electric Co., Ltd.'s User's Manual for QnA Series.

7.2.3 Environment Setup

■ GP Settings

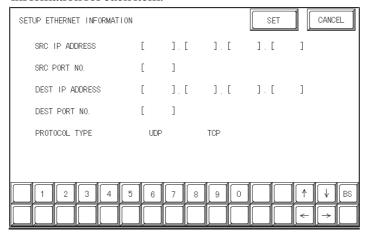
The communications settings for the GP, which are required for communications via the Ethernet, as shown below:

◆ SET UP OPERATION SURROUNDINGS Menu



◆ SET UP ETHERNET INFORMATION

Select "SET UP ETHERNET INFORMATION," and then enter the necessary information for each item.



SRC IP ADDRESS

Enter the IP address for the GP at your station. To do this, separate the 32 bits of the IP address into four segments of eight bits each, delimit those segments with a dot, and then enter them as decimal numbers.

SRC PORT NO.

Enter your station port number in the range from 1024 to 65535. (1025 to 65534, for MELSEC QnA and Q Series units)

DEST IP ADDRESS

Enter the IP address of the other station (the MELSEC).

• DEST PORT NO.

Enter the port number of the other station in the range from 1024 to 65535. (1025 to 65534, for MELSEC QnA and Q Series units)

PROTOCOLTYPE

You can select either UDP or TCP communication. If the power will be turned ON/OFF synchronously, it is recommended that you use UDP communications.



For the IP addresses, check with the network manager. Do not specify any duplicate IP address.



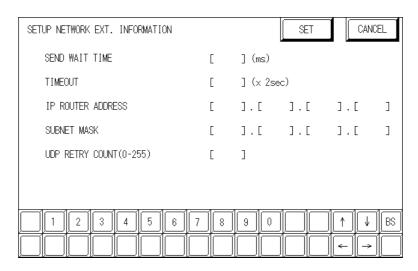
When using the built-in Ethernet port on a GP2000 or GLC2000 series unit, be sure not to set any duplicate "SRC PORT No." values.

Check the 2-way driver's "SRC PORT No." setting via the following menu:

GP OFFLINE mode's Main menu [INITIALIZE] -> [SETUP OPERATION SURROUNDINGS] -> [EXTENDED SETTINGS] -> [SETUP ETHERNET INFORMATION].

The default value is 8000. The 2-way driver uses this port and the following 9 ports (8000 ~ 8009). Be sure not to use Port No.s 5001 and 5002, since they are used by the PLC's Ethernet Unit.

◆ SET UP NETWORK EXT. INFORMATION



• SEND WAIT TIME (0 to 255)

Wait time can be added when a command is transmitted from the GP. Use the wait time if the traffic on the communications line is heavy. If no wait time is required, enter "0."

• TIMEOUT (0 to 65535)

Enter the desired timeout value. If no response is received from the other station within the specified time, a timeout occurs. If "0" is specified, the default time is 15 seconds when it is TCP communication, and is 5 seconds when it is UDP communication.

IP ROUTE ADDRESS

Enter the IP address of the router (only one). If no router is used, enter "0" in all fields.

SUBNET MASK

Enter subnet masks. If no subnet mask is used, enter "0" in all fields.

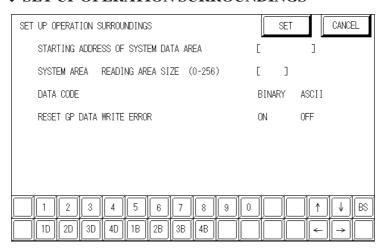
• UDP RETRY COUNT (0 to 255)

Designates the number of times the GP re-sends a command when there is no reply from the other port and a timeout occurs. When no reply is received after the re-try setting number is reached, an error message will appear on the GP screen.



If the memory is initialized in the OFFLINE mode, random values may be included. Be sure to check the displayed values.

♦ SET UP OPERATION SURROUNDINGS



• DATA CODE (Set only when connecting to a MELSEC-Q Series and MELSEC-QnA Series)

This selection controls the type of DATA CODE settings used. Select either BI-NARY or ASCII, and confirm that the PLC settings are the same.

■ Sample Ladder Program

♦ MELSEC-A Series (Ethernet interface unit: AJ71E71)

PLC's Ladder Program is needed to communicate with the GP.

Reference

For the complete details of settings, refer to the user's manual for Model AJ71E71 Ethernet Interface Unit (Mitsubishi Electric).

The follwing is a sample ladder.

<Sample Ladder>

LD	M9038	
DMOVF	Hxxxxxxxx	D100 (IP address of PLC)*1
MOVP	K0 D102	
MOV	H0100 D116	(Settings for UDP communications)
MOV	K1024 D124	(Port number of PLC)
MOV	K1024 D127	(Port number of GP)
DMOV	Hxxxxxxxx D125	(IP address of GP) *1
DMOV	HFFFFFFF	D128
MOV	HFFFF D130	
LD	M9036	
TOP	H0000 H0000	D100 K50
LD	X0019	
MOV	K5 D113	
TOP	H0000 K13	D113 K1
LD	M9036	
OUT	Y0019	
LD	M9036	
OUT	Y0008	
END		

^{*1} For the IP addresses, check with the network manager. "xxxxxxx" stands for an IP address in the hexadecimal notation. Do not specify any duplicate addresses.



Be sure that any addresses (D...) used in the communications settings for the PLC are not the same as the first address of the system on the GP.

♦ MELSEC-Q Series

Prior to GP starting GP communciation, the MNET/10H Ethernet settings must be set in the PLC's ladder logic software. The setting values are as shown below.

- 1. Network Parameter MNET/10H Ethernet Settings
- 2. Ethernet Operation Settings
- 3. OPEN Settings

1. Network Parameter MNET/10H Ethernet Settings

Items	PLC Settings
Network Classification	Ethernet
First I/O No.	Any number *1
Network No.	Any number *1
Group No.	Any number *1
Machine No.	Any number *1
Mode	Online

^{*1} This setting does not effect PLC/GP communication.

2. Ethernet Operation Settings

Recommended Settings

Items	PLC	Remarks	
Data Code Settings	BINARY Code	ASCII Code	Should be same as GP unit's data Code Settings.
Initial Timing Settings	Not waiting for OPEN Always waiting for OPEN		
IP Address Settings	Any	number *1	
Write Possible in RUN mode	Not allowed	lot allowed Allowed *2	
Send Frame Settings	Ethernet (V2.0)		
TCP Confirming Settings *3	KeepAlive	Ping	Both can be used.

^{*1} Please contact your computer network supervisor to confirm your setting data.

^{*2} When performing Write from a GP in RUN mode, set the Write Possible in RUN mode to "Allowed".

^{*3} This setting does not effect PLC/GP communication.

3. OPEN Settings

Items	PLC Settings			Remarks	
Protocol	TCP/IP		111	DP/IP	Should be same as GP unit's
1100001		101711	U	וו וכו	Communcation Format Settings.
OPEN Format *1	Active	Fullpassive	Unpassive	MELSOFT	Either Fullpassive or Unpassive
OPEN FOITIAL	ACIVE	i ulipassive	Ulipassive	connection	can be used.
SRC Port No.		Λην	numbor *2		Should be same as GP unit's
SICTUITIO.	RC Port No. Any number *2			DEST Port No.	
DEST IP Address		Λην η	umber *2 *3		Should be same as GP unit's
DEST II Address		Ally II	umbei		SRC IP Address.
DEST Port Address		Ληνιη	umber *2 *3		Should be same as GP unit's
DEST FULLAULIESS		Ally II	umbei		SRC Port No
Fixed Buffer	Tra	Transmission Subscription		Independent of GP.	
Fixed Buffer Method	Yes				
Paring Open		Yes No		Independent of GP.	
Confirming		No		Yes	Both can be used.

^{*1} Can be used only when Protocol is set to TCP/IP (Hexadecimal).

When the Auto Open UDP Port feature is used, the Table 3. OPEN Settings are not needed. When these settings are used, however, the PLC's port number is 5000 (default setting).

Reference For details, refer to Mitsubishi Electric's Q and QnA Series Ethernet Interface User Manuals.

♦ MELSEC-QnA Series

PLC's Ethernet Unit Dipswitch Settings and a Ladder Program are needed to communicate with the GP.

Ethernet Unit Settings

Operation Mode Setting Switch

Contents	Settings
Operation Mode Settings	0:Online

^{*2} Please contact your computer network supervisor to confirm your setting data.

^{*3} If OPEN Format is set to "Unpassive", this item does not need to be set

Communication Condition Setting Switch

Switch	Contents	Settings				
SW1	· ·	IIOFE WOED TOPAP TIMEOU	ON:When TCP/IP Timeout Error occurs, the line is not closed.			
SW2	Data Code Settings	OFF:BINARY Code	ON:ASCII Code			
SW3	Auto Start Settings	IIO F F : Periorm acilon(s) delined	ON:Regardless of Y19, after unit is turned ON again or is Reset, Initialization is performed.			
SW4~SW6	Cannot use (fixed to OFF)					
SW7	CPU Communication		ON:Write in RUN mode is			

Impossible.

time delay)

Recommended Settings

Possible.

ON:Normal Start (Start after 20

seconds time delay)

OFF:Quick Start (start without

Sample Ladder Program

SW8

This Sample Ladder Program is for communication via the Auto Open UDP Port No. (default:5000).

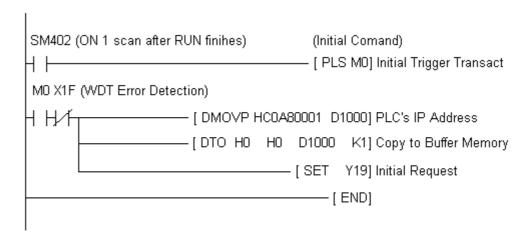
PLC IP Address: 192.168.0.1

Timing Settings *1

Initial Timing Settings

• PLC Port No.: 5000

When communicating via this function, the GP's IP Address and Port No. do not need to be set.



▼ Reference **▲**

The sample ladder above is the minimum ladder to communicate with GP via UDP/IP. For details about error processing and TCP/IP communication, refer to Mitsubishi Electric Co., Ltd.'s User's manual for QnA Series Ethernet Interface Unit (Detail manual).

^{*1} When performing Write From GP in RUN mode, set the CPU Comunication Timing Settings to ON.

Error Codes 7.2.4

Reference About the GP Ethernet Speicific Error Codes, refer to the "Protocol Stack Error Codes".

■PLC SPECIFIC ERROR CODES

PLC error codes are displayed by the "Host Communication Error (02:**:**)", and indicated in the left lower corner of the GP screen. (**:**indicates the PLC's specific error codes)

Error Code	Description	Status
0055	Write error in RUN mode	Write in RUN mode is set to OFF.
4031	CPU Device Settings Error	Designated device is outside allowable range.

Reference For more details about error codes, refer to Mitsubishi Electric Co., Ltd.'s User's Manuals for Q Series Ethernet Interface Unit and QnA Series Ethernet Interface Unit.

7.9 Protocol Stack Error Codes

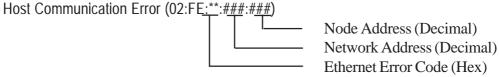
Protocol Stack Error Codes are displayed on the GP as follows.

Host communication error (02:FE:**)

** represents one of the following error codes, from 00 to F0.

Error Code	Description	Notes			
00	There is a setup error related to the IP address of your station at initialization.				
05	Initialization has failed.				
06	Cancelling of communications has failed.				
07	An attempt was made to establish a connection before initialization was successfully completed.				
08	Your station's port number is incorrect				
09	The destination station's port number is incorrect.				
0A	The IP address of the other station is incorrectl.				
0B	The same port number is already being used by UDP for establishing the connection.				
0C	The same port number is already being used by TCP for establishing the connection.				
0D	Protocol stack has refused connection establishment.				
0E	Protocol stack has returned the unsuccessful establishment of a connection.				
0F	The connection has been shut down.				
10	All connections are busy. No connection is available.				
13	Your station was aborted by a different station.				
30	There was no reply from the protocol stack.				
32	There was no reply from the other station.	*1 *2			
40	No network infofmation exists for the designated node.	*1			
41	I/O memory type of the random read-out response data is incorrect	*1			
42	Network information does not exist.				
F0	Undefined error.				

*1 When using an OMRON Corporation CS1/CJ/CJ1M Series unit, the error code will appear on the GP screen as shown below. Also, behind the Ethernet error code will appear the designated Network and Node addresses.



*2 When using a Hitachi Industrial Equipment Corporation's HIDIC H Series or a Schneider Corporation MODBUS TCP unit, the error code will appear on the GP screen as shown below. Also, behind the Ethernet error code will appear the designated Node address.

