Pro-face

Device/PLC Connection Manuals

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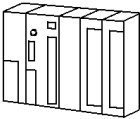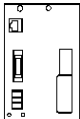
Prior to reading these manuals and setting up your device, be sure to read the "Important: Prior to reading the Device/PLC Connection manual" information. Also, be sure to download the "Preface for Trademark Rights, List of Units Supported, How to Read Manuals and Documentation Conventions" PDF file.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

8.10 Hitachi

8.10.1 System Structure

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

■ **S10V Series**

CPU	Link I/F	Cable	Unit	Target Machine
LQP510	LQE520	Ethernet Cable IEEE802.3 standard	Digital Corporation GP Ethernet I/F unit (GP070-ET11/GP070-ET41) GP-377R Series Multi Unit E (GP077-MLTE11, GP377-MLTE41) GP77R Series Multi Unit E (GP077-MLTE41)	GP/GLC Series [2]
LQP520[1]	LQE520			
	Ethernet I/F on CPU			

1 When using the LQP520, the LQP510 is also required.

2 When using GP/GLC and the optional Ethernet I/F unit, refer to the following page's List of Connectable GP/GLC Units.

Series Name		Product Name	Optional Ethernet I/F Unit	Built-in Ethernet Port
GP77R Series	GP-377R Series	GP-377RT	○ *1 *2	x
	GP-477R Series	GP-477RE	○ *2	x
	GP-577R Series	GP-577RS	○ *2	x
		GP-577RT	○ *2	x
GP2000 Series	GP-2300 Series	GP-2300L	x	○
		GP-2300S	x	○
		GP-2300T	x	○
	GP-2400 Series	GP-2400T	x	○
	GP-2500 Series	GP-2500L	○ *3 *4	○
		GP-2500S	○ *3 *4	○
		GP-2500T	○ *3 *4	○
	GP-2501 Series	GP-2501L	○ *2 *3	x
		GP-2501S	○ *2 *3	x
		GP-2501T	○ *2 *3	x
	GP-2600 Series	GP-2600T	○ *3 *4	○
	GP-2601 Series	GP-2601T	○ *2 *3	x
GLC2000 Series	GLC-2300 Series	GLC-2300L	x	○
		GLC-2300T	x	○
	GLC-2400 Series	GLC-2400T	x	○
	GLC-2500 Series	GLC-2500T	○ *3 *4	○
	GLC-2600 Series	GLC-2600T	○ *3 *4	○
ST Series		ST403	x	○

1 Only the Multi unit can be used.

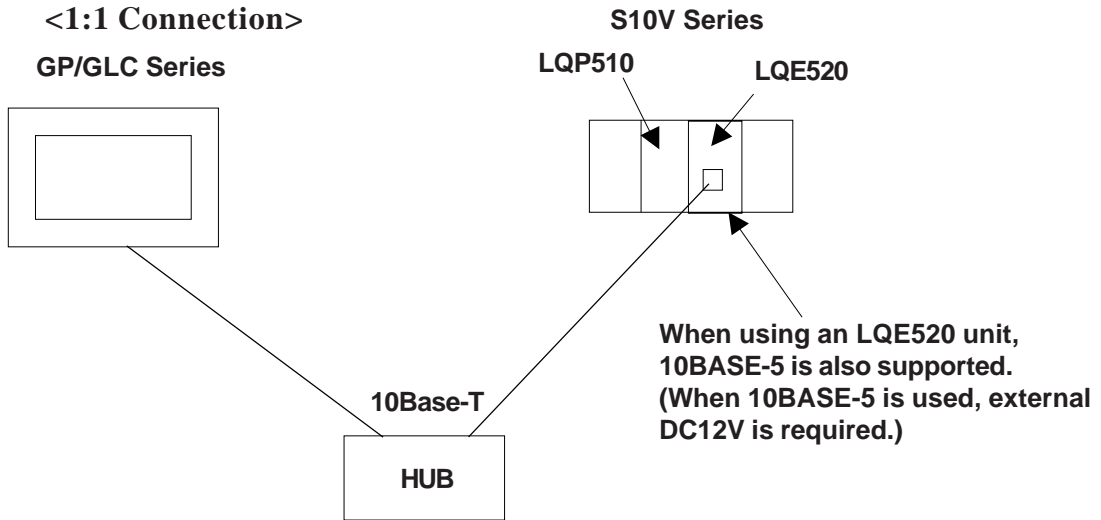*2 The 2-Way Driver (Pro-Server, GP-Web and others) cannot be used.*

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

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.

◆ Connection Layout

When using an LQE520 unit

<1:1 Connection>

GP/GLC Series

S10V Series

LQP510 **LQE520**

When using an LQE520 unit,
10BASE-5 is also supported.
(When 10BASE-5 is used, external
DC12V is required.)

10Base-T

HUB

* Fixed as TCP data transfer.

<1:n Connection>

4 units

GP/GLC Series

S10V Series

LQP510 **LQE520**

When using an LQE520 unit,
10BASE-5 is also supported.
(When 10BASE-5 is used, external
DC12V is required.)

10Base-T

HUB
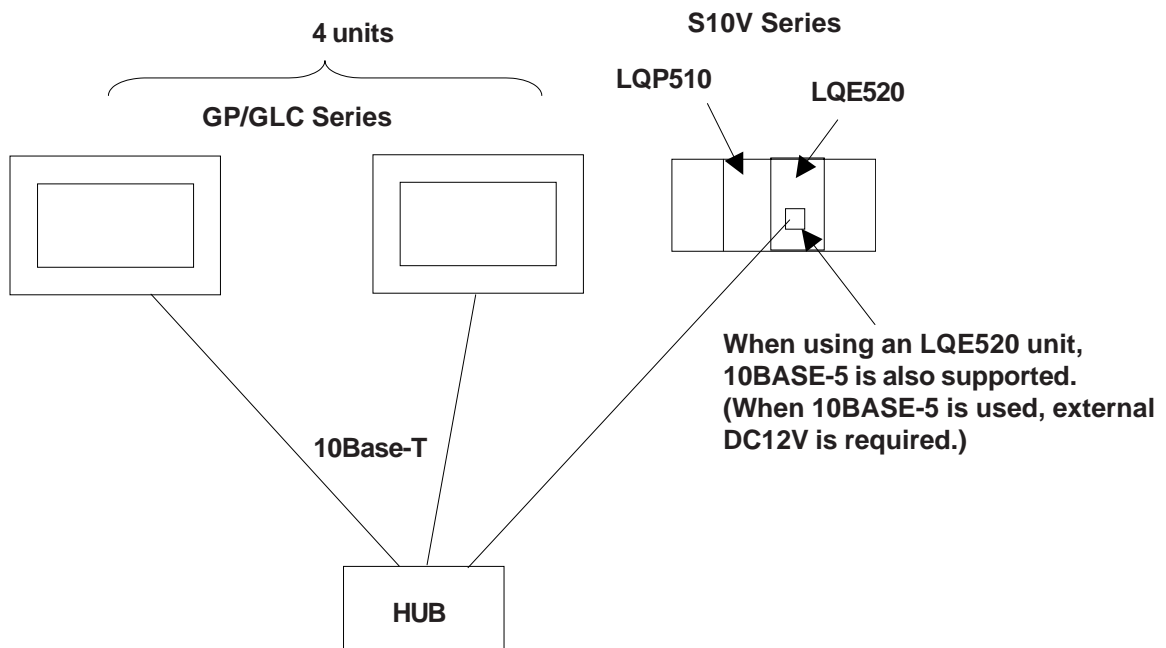
** Communication is fixed as TCP format.Maximum number of GP units is 4, based on
PLC specifications.*

*Maximum number of connectable units is assuming only GP units are conected. When
connecting other types of units via an Ethernet connection, the number of connectable
units will be limited. These units cannot be connected to PC Link or other types of
networks.*

◆ Connection Layout

When using an LQP520 unit

<1:1 Connection>
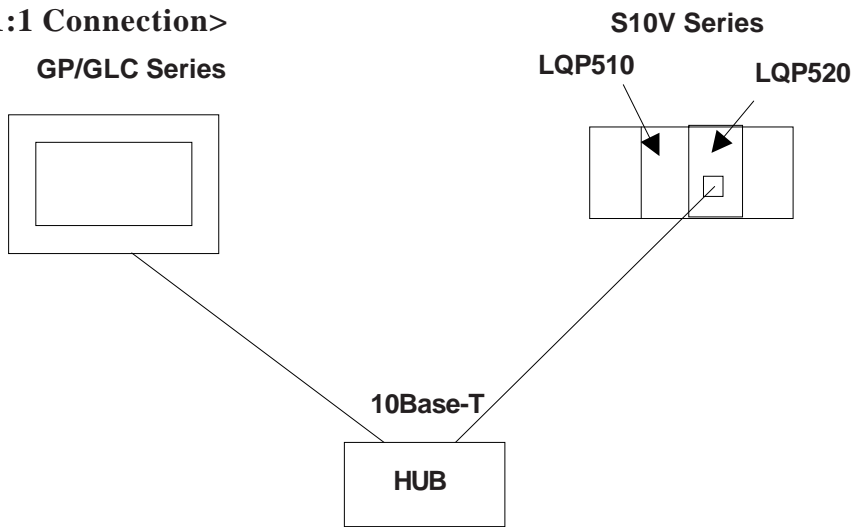
*   *LQP520 requires LQP510 unit.*
    Fixed as TCP data transfer.

<1:n Connection>

*   *LQP520 requires LQP510 unit.*
    Fixed as TCP data transfer.

8.10.2 Supported Devices

The following list shows the range of devices supported by the GP.
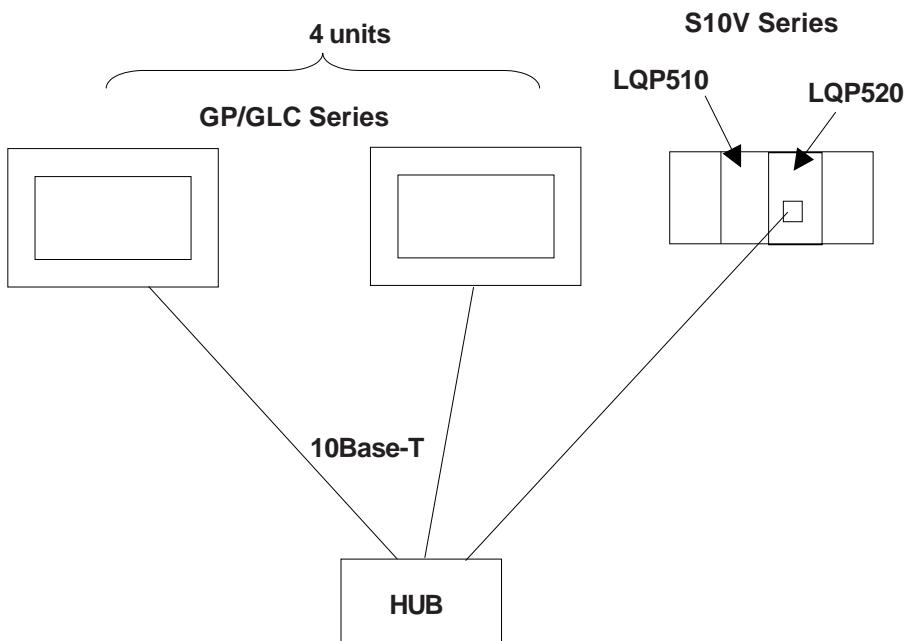
■ S10V Series

☐☐☐☐ Setup System Area here.

Device	Bit Address	Word Address	Reference	
External Input	X000 - XFFF	XW000 - XWFF0	***0 *1	
External Output	Y000 - YFFF	YW000 - YWFF0	***0 *1	
Internal Register	R000 - RFFF	RW000 - RWFF0	***0 *1	
Global Link Register	G000 - GFFF	GW000 - GWFF0	***0 *1	
Event Register	E000 - EFFF	EW000 - EWFF0	***0 *1	
Keep Relay	K000 - K0FF	KW000 - KWFF0	***0 *1	
System Register	S000 - SBFF	SW000 - SWBF0	***0 *1	H/L
On-delay Register	T000 - T1FF	TW000 - TW1F0	***0 *1,*2	
One-shot Timer	U000 - U0FF	UW000 - UW0F0	***0 *1	
Up/Down Counter	C000 - C0FF	CW000 - CW0F0	***0 *1	
Transfer Resistor	J000 - JFFF	JW000 - JWFF0	***0 *1	
Receive Register	Q000 - QFFF	QW000 - QWFF0	***0 *1	
Extended Internal Register	M000 - MFFF	MW000 - MWFF0	***0 *1	
Extended Internal Register	A000 - AFFF	AW000 - AWFF0	***0 *1	
Timer Calculation Value	---------	TC000 - TC1FF		
Timer Setting Value	---------	TS000 - TS1FF		
One-shot Timer Calculation value	---------	UC000 - UC0FF		
One-shot Timer Setting Value	---------	US000 - US0FF		L/H
Counter Calculation Value	---------	CC000 - CC0FF		
Counter Setting Value	---------	CS000 - CS0FF		
Work Register	---------	FW000 - FWBFF	Bit F	
Data Register	---------	DW000 - DWFFF	Bit F	
Work Register	LB0000 - LBFFFF	LBW0000 - LBWFFF0	***0 *1	
Data Converter Special Work Register	LR0000 - LRFFFF	LRW0000 - LRWFFF0	***0 *1	
Data Converter Special Work Register (Edge)	LV0000 - LV0FFF	LVW0000 - LVW0FF0	***0 *1	
Word Special Work Register	---------	LWW0000 - LWWFFFF	Bit F	H/L
Long Word Special Work Register	---------	LLL0000 - LLL1FFF	Bit 31 *3	
Single Precision Floating Decimal Point Work Register	---------	LF0000 - LF1FFF	*3,*4	
Word Work Register (Power-cut Retain)	---------	LXW0000 - LXW3FFF	Bit F	
Long Word Work Register (Power-cut Retain)	---------	LML0000 - LML1FFF	Bit 31 *3	
Single Precision Floating Decimal Point Work Register (Power-cut Retain)	---------	LG0000 - LG1FFF	*3,*4	

1 According to PLC specifications, the highest bit is "0" and the lowest bit is "15". When the highest bit turns ON, that bit is considered the highest and "32768(0x8000)" is written to that word.

Ex.   *When the GP unit's bit designation turns X000 "ON", the PLC unit's bit device "X000" turns ON. At this time the GP and PLC word device XW000 become "32768(0x8000)".*

2 Write is not possible.

3 A 32-bit device.

4 A floating decimal point device. Please use E and K-tag 32-bit Float setting.

| ***0 | : | *Designates a Word Address' right-most digit as "0".* |

| Bit 31 | : | *Designates data as Bit type. Attaches a bit position after the Word Address. Bit positions can be 0 to F. However, using bit designation to write datawill automatically set all other bits to "0" (OFF).* |

| Bit F | : | *Designates data as Bit type. Attaches a bit position after the Word Address. Bit positions can be 0 to 31. However, using bit designation to write data will automatically set all other bits to "0" (OFF).* |

H/L : When 2 Words (32-bit data) are used, their relationship is as shown below.

0	H (Higher)
1	L(Lower)

L/H : The relationship is the opposite of that shown above.

8.10.3 Environment Setup

■ S10V Series Settings

Using CPU Module (LQP520)

GP Settings		PLC Settings	
Source IP Address	GP Source IP Address [*1]	PLC Address [*4]	GP IP Address
Source IP Port No.	GP Port No. [*2]	----------	----------
Destination IP Address	PLC IP Address [*1]	IP Address [*4]	PLC IP Address
Destination IP Port No.	PLC Port No. [*3]	----------	----------
----------	----------	Station No. Setting Switch [*5]	0,0 or F,F

Using ET.NET Module (LQE520)

GP Settings		PLC Settings	
Source IP Address	GP Source IP Address [*1]	PLC Address [*4]	GP IP Address
Source IP Port No.	GP Port No. [*2]	----------	----------
Destination IP Address	PLC IP Address [*1]	IP Address [*4]	PLC IP Address
Destination IP Port No.	PLC Port No. [*6]	----------	----------
----------	----------	Station No. Setting Switch [*7]	0 or 2

1 Confirm these settings with your network administrator.

2 When using the 2-Way Driver feature with a GP2000 or GLC2000 Series unit, be sure to set port numbers so they do not overlap.

The 2-Way Driver feature port number settings are entered via the GP/GLC OFFLINE menu's [INITIALIZE] -> [SETUP OPERATION SURROUNDINGS] -> [EXTENDED SETTINGS] -> [SETUP ETHERNET INFORMATION] area.

Port No. base number's default is 8000, however 8000 to 8009 are reserved for the following settings and cannot be used.

Port No. Offset	Description
1	MtoMLan (GP-PRO/PBIII for Win screen transfer, etc.)
2	ProNet (ProServer with Pro-Studio for Win)
3	Reserved
4	GP-Web
5	Reserved
6	Pro-Control Editor
7	Reserved
8	GP-PRO/PBIII for Win Simulation
9	Reserved

3 When using the CPU module (LQP520), use numbers 4302 to 4305 for the PLC port number. Only one client can be connected to a single port.

4 Use ladder logic software to set this value.

5 If the PLC CPU's station number setting switch is set to 0,0, the PLC unit's IP address is enabled. When the switch is set to F, F, the PLC unit's IP address is set to 192.192.192.1

*6 When using the ET.NET module (LQE520) set the port number at 4302.Up to 4 clients can be connected to a single port.

*7 When the ET.NET module (LQE520) Module Number switch is set to "0", data is transferred using 10Base-5. "2" designates 10-Base-T.

◆ Special Settings

Screen Creation Software Settings

The Screen Creation software's [GP Setup] screen's [Communication Settings] screen is used to enter settings. The settings are as follows.

GP Settings - noname.tmp

GP Settings	I/O Settings	Mode Settings
Initial Screen Settings	Extended Settings	Communication Settings

Source IP Address   0. 0. 0. 0

Source IP Port No.   1024

Destination IP Address   0. 0. 0. 0

Destination IP Port No.   1024

Protocol Type   ◉ UDP   ○ TCP

Advanced ...

OK   Cancel   Defaults   Help
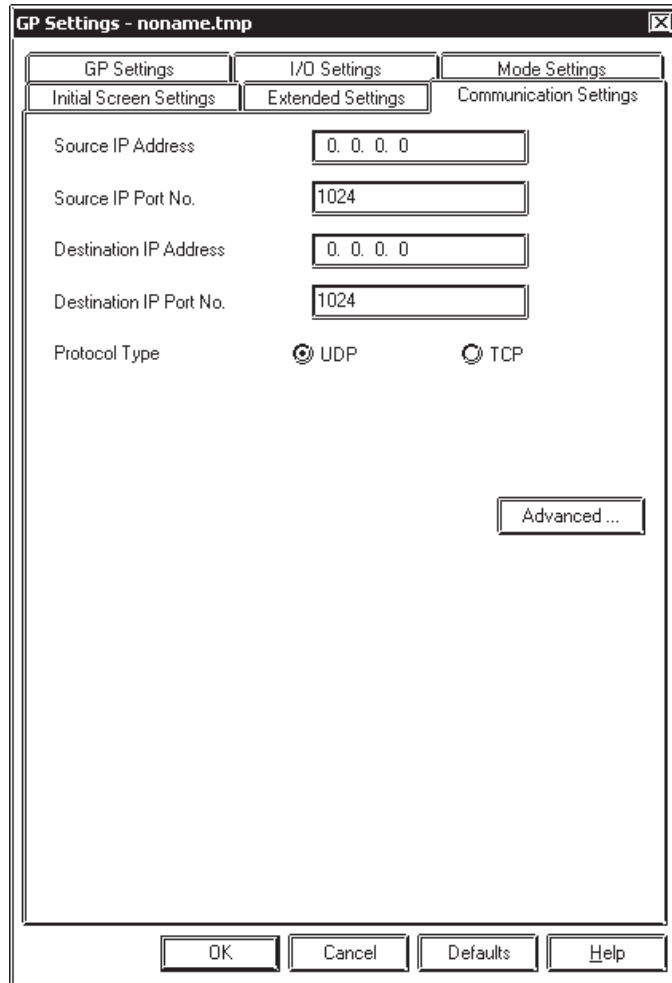
Here, the following settings should be entered.
- Source IP Address: GP unit's IP Address (Each byte: 0 to 255) Default: 0.0.0.0
- Source IP Port No. : GP unit's Port No. (1024 - 65535) Default: 1024
- Destination IP Address: PLC unit's IP Address (Each byte: 0 to 255) Default: 0.0.0.0
- Destination IP Port No. : GP unit's Port No. (1024 - 65535) Default: 1024

* Communcation settings are designated in the PLC specifications as only TCP. Even if UDP settings are set, TCP format will be used.

Communication Settings Advanced Settings

The Advanced Settings screen is as follows.

Advanced Communication Setup

Send Wait Time   0   msec   OK

Time Out   0   x2 sec   Cancel

IP Router Address   0. 0. 0. 0   Help

Subnet Mask   0. 0. 0. 0

UDP Retry Count   2
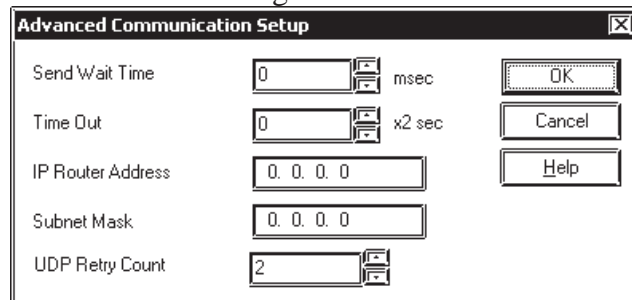
* Since communcation settings are designated in the PLC specifications as TCP, setting the UDP Retry Time is not required.

■ GP Settings

The GP unit's communication settings for Ethernet communication are as follows.

◆ SETUP OPERATION SURROUNDINGS

```
┌─────────────────────────────────────────────────────┐
│ SETUP OPERATION SURROUNDINGS MENU           [RETURN] │
│                                                       │
│                                                       │
│     [ 1 ]    SETUP OPERATION SURROUNDINGS            │
│                                                       │
│     [ 2 ]    SETUP ETHERNET INFORMATION              │
│                                                       │
│     [ 3 ]    SETUP ETHERNET EXT. INFORMATION         │
│                                                       │
│                                                       │
│                                                       │
│                                                       │
│                                                       │
└─────────────────────────────────────────────────────┘
```

◆ SETUP ETHERNET INFORMATION

```
┌─────────────────────────────────────────────────────┐
│ SETUP ETHERNET INFORMATION           [SET]  [CANCEL] │
│                                                       │
│   SRC IP ADDRESS      [     ].[     ].[     ].[     ] │
│                                                       │
│   SRC PORT NO.        [     ]                         │
│                                                       │
│   DEST IP ADDRESS     [     ].[     ].[     ].[     ] │
│                                                       │
│   DEST PORT NO.       [     ]                         │
│                                                       │
│                                                       │
│  [ ][1][2][3][4][5][6][7][8][9][0][ ][ ][↑][↓][BS]  │
│  [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][←][→][ ]  │
└─────────────────────────────────────────────────────┘
```

• SRC IP ADDRESS

Enter GP's SRC IP Address. Input a dot between every 8 bits to divide the IP Address (32 bits all together) into four groups, and enter decimal numbers in each groups.

• SRC PORT NO.

Set the SRC Port No. between 1024 and 65535.

• DEST IP ADDRESS

Set the PROSEC's DEST IP Address.

• DEST PORT NO.

When using CPU module (LQP520), set the DEST Port No. between 4302 and 4305. When using CPU module (LQE520), set the DEST Port No. at 4302.

⚠ **Important**   *When using the GP2000 or GLC2000 Series unit's built-in Ethernet port, be sure the [SRC PORT NO.] does not overlap the 2-Way Driver's port.*

The 2-Way Driver feature port number settings are entered via the GP/GLC Offline menu's [INITIALIZE] -> [SETUP OPERATION SURROUNDINGS] -> [EXTENDED SETTINGS] -> [SETUP ETHERNET INFORMATION] area. The default Port No. is 8000. The 2-Way Driver uses this port and the following 9 ports (Default: 8000 to 8009). Also, if the GP unit's IP Address is set to 0.0.0.0, the IP Address entered in the 2-Way Driver's [Ethernet Information Settings] area is enabled.

◆ **SETUP 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."

•**TCP 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.

•**IP ROUTER 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.

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

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.

Host Communication Error (02:FE:**:###:###)

Node Address (Decimal)
Network Address (Decimal)
Ethernet Error Code (Hex)
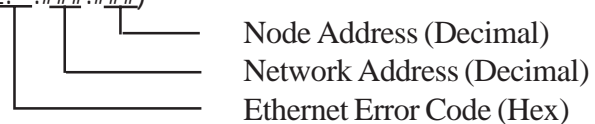
[2] When using a Hitachi Industrial Equipment Corporation's HIDIC H Series or a Schneider Corporation MODBUS TCP unit, the error code will appear on the GP screen as shown below. Also, behind the Ethernet error code will appear the designated Node address.

Host Communication Error (02:FE:**:###:###)

Node Address (Decimal)
Ethernet Error Code (Hex)