Pro-face

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Digital Human Machine Interface

# Device/PLC Connection Manuals

## About the Device/PLC Connection Manuals

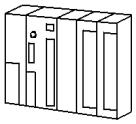
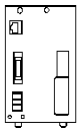
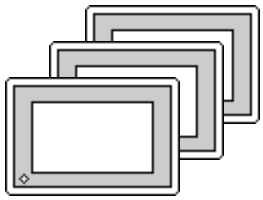
Prior to reading these manuals and setting up your device, be sure to read the "Important: Prior to reading the Device/PLC Connection manual" information. Also, be sure to download the "Preface for Trademark Rights, List of Units Supported, How to Read Manuals and Documentation Conventions" PDF file.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

# 7.3 Toshiba

## 7.3.1 System Structure

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

### ■ PROSEC T Series (using Ethernet unit)

| CPU | Link I/F | Cables | Unit | GP/GLC |
|---|---|---|---|---|
|  | Ethernet Unit |  |  |  |
| T3H | EN311 | Ethernet cable (conforms to the IEEE802.3) | Digital's GP Ethernet I/F unit (GP070-ET11/GP070-ET41) GP77R Series Multi Unit E (GP077-MLTE11) GP377R Series Multi Unit (GP377-MLTE11) | GP/GLC Series *1 |
| T2N | PU-235N PU-245N | | | |

**1 When using GP/GLC and the optional Ethernet I/F unit, refer to the following List of Connectable GP/GLC Units.*

| Series Name | | Product Name | Optional Ethernet I/F Unit | Built-in Ethernet Port |
|---|---|---|---|---|
| GP70 Series | GP-470 Series | GP-470E | ❍ | x |
| | GP-570 Series | GP-570S | ❍ | x |
| | | GP-570T | ❍ | x |
| | | GP-57JS | ❍ | x |
| | | GP-570VM | ❍ | x |
| | GP-571 Series | GP-571T | ❍ | x |
| | GP-675 Series | GP-675S | ❍ | x |
| | | GP-675T | ❍ | x |
| | GP-870 Series | GP-870VM | ❍ | x |
| 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 Seires | | ST403 | x | ❍ |

**1 Only the Multi unit can be used.*

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

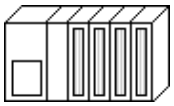
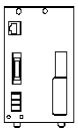
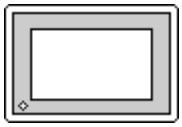
**3 When using the optional Ethernet I/F unit, a bus conversion unit (PSL-CONV00) is required.*

**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.*

Note:

- **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.**

## ■ V Series (using CPU unit Link I/F)

| CPU | Link I/F | Cable | Unit | GP/GLC |
|---|---|---|---|---|
|  | Ethernet Unit |  |  |  |
| S3PU45A S3PU55A S3PU65A | EN711 EN721 EN731 EN741 EN751 EN761 FN711 | Ethernet cable (conforms to the IEEE802.3) | Digital's GP Ethernet I/F unit (GP070-ET11/GP070-ET41) GP77R Series Multi Unit E (GP077-MLTE11) GP377R Series Multi Unit (GP377-MLTE11) | GP/GLC Series |
| S2PU72A S2PU72D | EN611 EN621 EB621 EN631 EN641 EB641 | | | |

**1 When using GP/GLC and the optional Ethernet I/F unit, refer to the following List of Connectable GP/GLC Units.*

| Series Name | | Product Name | Optional Ethernet I/F Unit | Built-in Ethernet Port |
|---|---|---|---|---|
| GP70 Series | GP-470 Series | GP-470E | ❍ | x |
| | GP-570 Series | GP-570S | ❍ | x |
| | | GP-570T | ❍ | x |
| | | GP-57JS | ❍ | x |
| | | GP-570VM | ❍ | x |
| | GP-571 Series | GP-571T | ❍ | x |
| | GP-675 Series | GP-675S | ❍ | x |
| | | GP-675T | ❍ | x |
| | GP-870 Series | GP-870VM | ❍ | x |
| 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 Seires | | 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.*

- **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.**

## 7.3.2 Supported Devices

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

### ■ PROSEC T Series (T3H)

Setup System Area here.

| Device | Bit Address | Word Address | Particular | |
|---|---|---|---|---|
| Input Device | X0000 ~ X511F | XW000 ~ XW511 | | L/H |
| Output Device | Y0000 ~ Y511F | YW000 ~ YW511 | | |
| Auxiliary Relay | R0000 ~ R999F | RW000 ~ RW999 | | |
| Special Relay | S0000 ~ S255F | SW000 ~ SW255 | | |
| Link Register Relay | Z0000 ~ Z999F | - | | |
| Link Relay | L0000 ~ L255F | LW000 ~ LW255 | | |
| Timer (contact) | T000 ~ T999 | - | Read only | |
| Counter (contact) | C000 ~ C511 | - | Read only | |
| Timer (current value) | - | T000 ~ T999 | | |
| Counter (current value) | - | C000 ~ C511 | | |
| Data Register | - | D0000 ~ D8191 | Bit 15 | |
| Link Register | - | W0000 ~ W2047 | Bit 15 | |
| File Register | - | F00000 ~ F32767 | Bit 15 | |

Note: **The range of supported devices may be different depending on your CPU. For details, refer to Toshiba PLC's user's manual.**

Important ***If you Write in Read Only Timer (contact) device or in Read Only Counter (contact) device, the "PLC COM. ERROR (02:10)" message will appear.***

## ■ PROSEC T Series (T2N)

Setup System Area here.

| Device | Bit Address | Word Address | Particular | |
|---|---|---|---|---|
| Input Device | X0000 ~ X127F | XW000 ~ XW127 | | L/H |
| Output Device | Y0000 ~ Y127F | YW000 ~ YW127 | | |
| Auxiliary Relay | R0000 ~ R255F | RW000 ~ RW255 | | |
| Special Relay | S0000 ~ S255F | SW000 ~ SW255 | | |
| Link Register Relay | Z0000 ~ Z999F | - | | |
| Link Relay | L0000 ~ L255F | LW000 ~ LW255 | | |
| Timer (contact) | T000 ~ T511 | - | Read Only | |
| Counter (contact) | C000 ~ C511 | - | Read Only | |
| Timer (current value) | - | T000 ~ T511 | | |
| Counter (current value) | - | C000 ~ C511 | Bit 15 | |
| Data Register | - | D0000 ~ D8191 | Bit 15 | |
| Link Register | - | W0000 ~ W2047 | Bit 15 | |
| File Register | - | F0000 ~ F1023 | | |

Important

***If you Write in Read Only Timer (contact) device or in Read Only Counter (contact) device, the "PLC COM. ERROR (02:10)" message will appear.***

## ■ V Series

Setup System Area here.

| Device | Bit Address | Word Address | Particulars | |
|---|---|---|---|---|
| External Input | X00000 ~ X8191FF | XW0000 ~ XW8191 | | L/H |
| External Output | Y00000 ~ Y8191F | YW0000 ~ YW8191 | | |
| Auxilary Relay | R00000 ~ R4095F | RW0000 ~ RW4095 | | |
| Special Relay | S00000 ~ S511F | SW000 ~ SW511 | | |
| Data Register | --- | D00000 ~ D4095 | Bit 15 | |

Note: **The Device Range may differ depending on the CPU type. For the details, refer to the Toshiba's PLC manual.**

Important

- ***PLC I/O and Controller Internal Memory data is treated as a variable. The variables that the GP unit can handle are as follows. When handling all PLC variables with the GP, use the following variables in the ladder program.***

  ***Please note that memory variables differ from GP unit's device name.***

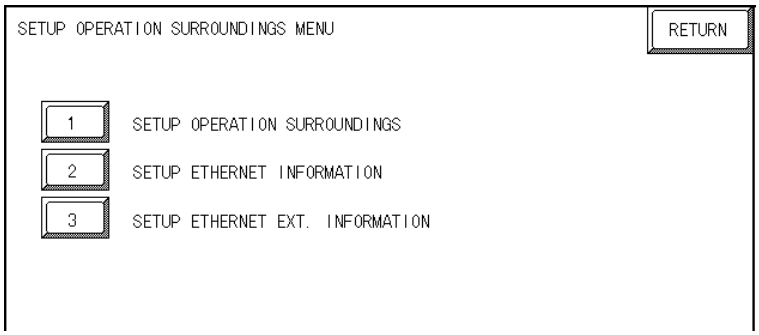
| GP Device Name | | PLC Controller Memory Valiable Name | Details |
|---|---|---|---|
| X, XW<br>Y, YW | ←→ | I/O Valiable (IQ) | X, XW and Y, YW use the same memory area (have the same range). |
| R, RW<br>D | ←→ | Data Register Variable (DW) | R, RW device and D device use the same area. Designate the R device when doing bit write from the GP unit. |
| S, SW | ←→ | Special Register Variable | |

* *Although local variables, control global variables and station global variables exist outside of the above-mentioned device, they are not accessible from the GP unit.*

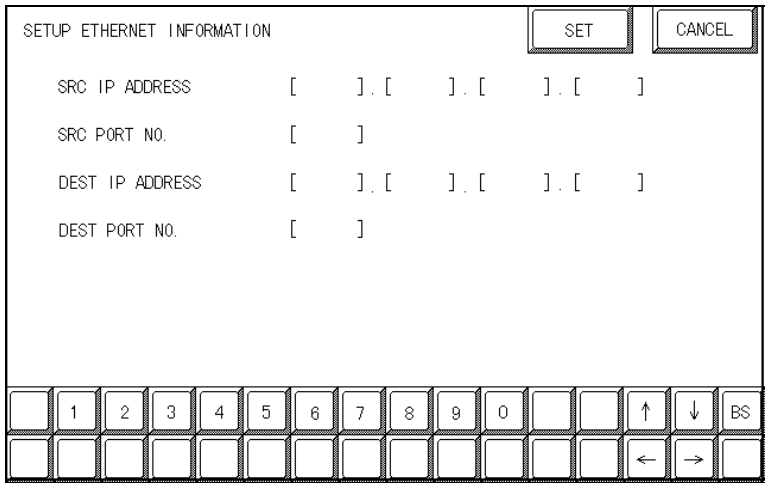
## 7.3.3 Environment Setup

### ■ GP Unit Setup

The following describes GP settings for using Ethernet communicaiton.




***Important*** ***Set the station No. to "0" for [1] SET UP OPERATION SURROUNDINGS.***




**Select "SETUP ETHERNET INFORMATION" and set up the Addresses and Port Numbers.**

**• 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 gorups, 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 DST IP Address.

**• DEST PORT NO.**

Set the DEST Port No. between 1024 and 65535.

***Note:*** **The communication method is UDP format.**

Important

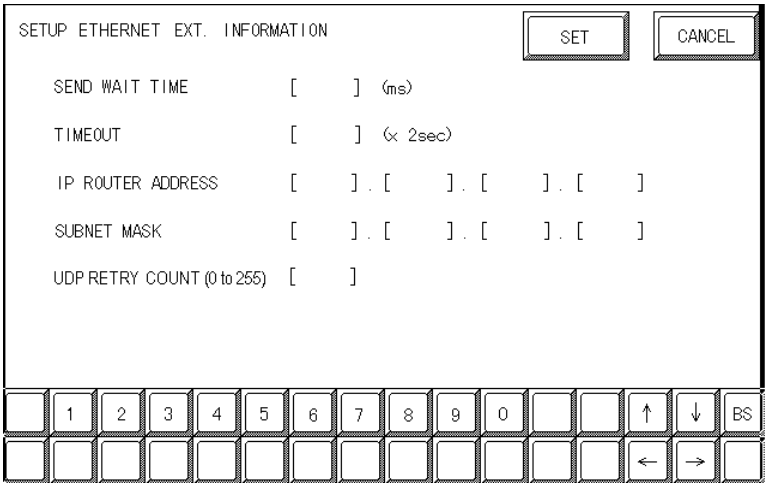
***When using the built-in Ethernet port on a GP2000 or GLC2000 series unit, be sure not to set any duplicate "SRC PORT No." values.***

***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.***

**Regarding the IP Address and the Port No., please confirm these points with your Network supervisor. You must not duplicate the number you have already used for an IP Address setting.**




**SEND WAIT TIME**

You can display the waiting time while GP's command is actually sent. This function is useful when there is a lot of traffic in your system. If not using, set it to "0".

**TIMEOUT**

You can set time for waiting for a replay from the destination. If any replay is not made by the destination within time you set to, the communication will be timeout. "0" setting is the default value as 15 second-setting for timeout.

**IP ROUTER ADDRESS**

Set Router's IP Address. (There is only one setting for Router.) If not using, set all values to "0".

**SUBNET MASK**

Set the Subnet Mask . If not using, set all values to "0".

**UDP RETRY COUNT (0 to 255)**

Important

- ***If you intialize the memory from the OFFLINE mode, some values might be automatically set to the factory settings. Please confirm all values after intialization.***
- ***Refer to the PLC's users manual for PLC settings.***
- ***Set the Ethernet module to the RUN mode after you have set the IP Address and the Port No.***

## ■ PLC Setup

### ◆PROSEC T Series

The following is the Sample Program shown in the Toshiba's Ethernet Module Users Manual.

**IP Address \ Port No. settings**

```
   | R0502                                                                                  R0602        |
1  |---||-------------------------------------------------------------------------------------( )-----------------|
   |                                                                  /*  Parameter setting request  */
   | R0602
2  |---||----------  +[12544  MOV  RW000  ]  [00018  MOV  RW001 ]------------------------------------ |
   |       |                                                          /* Set Module and CMD No.*/
   |       |                                                                                          |
   |       |       +[**** MOV RW002] [**** MOV RW003]  [**** MOV  RW004]------------------------ |
   |       |                                                         /* Set IP Address and Port No.*/
   |       |                                                                                          |
   |       |       +[RW000 SEND RW010]  [RST R0502]------------------------------------------------- |
   |                                                                  /* Set Request                */
   |                                                                                                  |
```

Important

***Please contact your computer network supervisor  to confirm your IP Address and Port No.***

### ◆Operation Mode control

```
   | R0503                                                                                  R0603        |
1  |---||-----------------------------------------------------------------------------------( )-----------------|
   |                                                                  /*  Control request          */
   | R0603
2  |---||----------  +[12544  MOV  RW000  ]  [00019  MOV  RW001 ]------------------------------------ |
   |       |                                                          /* Set Module and CMD No.*/
   |       |                                                                                          |
   |       |       +[04144 MOV RW002]------------------------------------------------------------------ |
   |       |                                                          /* Set designation data*/
   |       |                                                                                          |
   |       |       +[RW000 SEND RW010]  [RST R0503]---------------------------------------------------- |
   |                                                                  /* Set Request              */
   |                                                                                                  |
```

**Important**

***After setting an IP Address, you need to switch the system to LINE Mode.***

### ◆V Series

To perform the following settings, use a ladder program.

| Items | PLC Setup |
|---|---|
| IP Address Primary | PLC IP Address *1 |
| UDP Port No. | PLC Port No. |

**1 Set the IP Address last byte (192. 168, 0, 1) from the rotary switch on the side of PLC Ethernet Module.*

**Important**

- ***For Ethernet communication with the GP unit, use the Ethernet module's EN-A connector.***

  ***It is not possible to communicate with the GP unit using the EN-B connector.***
- ***Note that for the V Series, it is possible to connect up to 8 GP units to a single PLC.***

# 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.

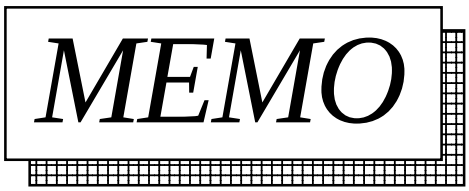
Host Communication Error (02:FE:**:###:###)

- 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)


MEMO