Pro-face

Digital
Human Machine Interface

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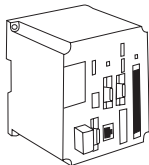
About the Device/PLC Connection Manuals
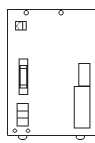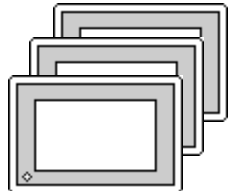
Prior to reading these manuals and setting up your device, be sure to read the "Important: Prior to reading the Device/PLC Connection manual" information. Also, be sure to download the "Preface for Trademark Rights, List of Units Supported, How to Read Manuals and Documentation Conventions" PDF file.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

7.8 Yaskawa Electric Corporation

7.8.1 System Structure for Ethernet Connection

This section explains the system structures available for the Ethernet connection between Yaskawa Electric Corporation PLCs and GP/GLC units.

■ MP2300 Series

CPU	LinkI/F	Cables	Unit	GP
	Ethernet Unit			
JEPMC-MP2300	218IF-01 (JAPMC-CM2300)	Ethernet cable (IEEE802.3 Compliant)	Digital's GP Ethernet I/F Unit GP070-ET11 GP070-ET41 GP377-MLTE11 GP377-MLTE41 GP077-MLTE41	GP/GLC Series *1

*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
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 optional Ethernet I/F unit, a bus conversion unit (PSL-CONV000) 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.

■ MP920 Series

CPU	LinkI/F	Cables	Unit	GP
	Ethernet Unit			
JEPMC-CP200 JEPMC-CP210	218IF (JEPMC-CM210)	Ethernet cable (IEEE802.3 Compliant)	Digital's GP Ethernet I/F Unit GP070-ET11 GP070-ET41 GP377-MLTE11 GP377-MLTE41 GP077-MLTE41	GP/GLC Series [*1]

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

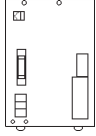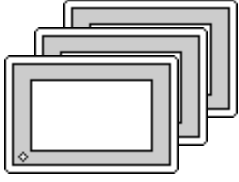| Series Name		Product Name	Optional Ethernet I/F Unit	Built-in Ethernet Port
GP77R Series	GP-377R Series	GP-377RT	○ [*1 *2]	x
	GP-477R Series	GP-477RE	○ [*2]	x
	GP-577R Series	GP-577RS	○ [*2]	x
		GP-577RT	○ [*2]	x
GP2000 Series	GP-2300 Series	GP-2300L	x	○
		GP-2300S	x	○
		GP-2300T	x	○
	GP-2400 Series	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
GLC 2000 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 optional Ethernet I/F unit, a bus conversion unit (PSL-CONV000) 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.

GP-PRO/PBIII for Windows Device/PLC Connection Manual

Note: **For cable connection and Optional Unit information, refer to the user's manual for each optional unit. For GP2000 and GLC2000 series units, and refer to that unit's User Manual.**

◆**Connection Structure**

<1 : 1 connection>

GP/GLC Series   MP2300/MP920 Series

10BASE-T Cable

HUB

Optional Unit
•**GP070-ET11**
•**GP070-ET41**
•**GP377-MLTE11**
•**GP377-MLTE41**
•**GP077-MLTE41**

<n :1 connection>
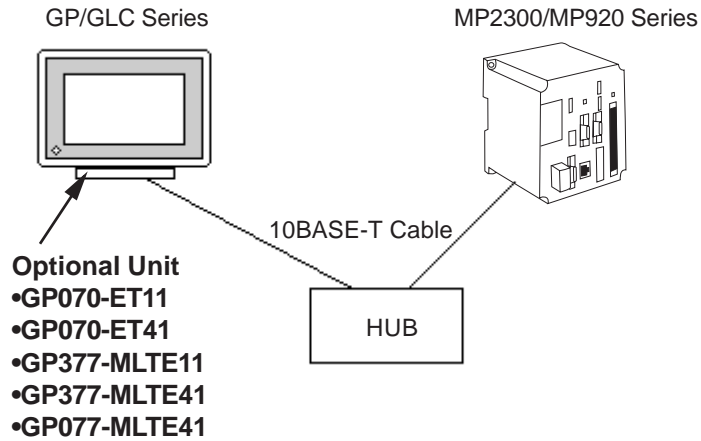
TCP Communication : Up to 10 units
UDP Communication : Up to 10 units

GP/GLC Series   GP/GLC Series   MP2300/MP920 Series

. . . .

10BASE-T Cable

HUB

Optional Unit
•**GP070-ET11**
•**GP070-ET41**
•**GP377-MLTE11**
•**GP377-MLTE41**
•**GP077-MLTE41**
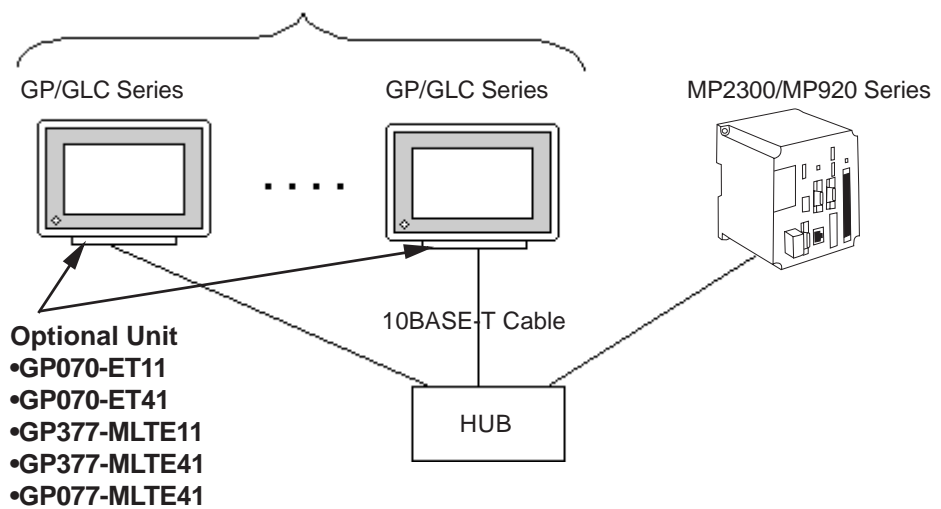
7.8.2 Supported Devices

The following list shows the range of devices supported by the GP/GLC.

■MP2300/MP920 Series

Setup System Area here.

Device	Bit Address	Word Address	Remark
Coil [*1]	GMB00000 ~ GMB4095F	GMB0000 ~ GMB4095	
Input Relay [*1]	GIB00000 ~ GIB0FFFF	GIB0000 ~ GIB0FFF	
Keep Register	—	GMW00000 ~ GMW32767	Bit
Input Register	—	GIW0000 ~ GIW7FFF	Bit

*1 Data cannot be written from the GP unit. If data write is attempted, a host
communication error (02:FB) message will appear.*

The GP unit's addresses are based on the PLC's actual addresses, with an offset
added. The available GP and PLC addresses are listed below.

Device	Data in the GP	Data in the PLC
Coil (Bit)	GMB00000 ~ GMB4095F	MB00000+Offset ~ MB4095F+Offset
Coil (Word)	GMB0000 ~ GMB4095	MB0000+Offset ~ MB4095+Offset
Input Relay (Bit)	GIB00000 ~ GIB0FFFF	IB00000+Offset ~ IB0FFFF+Offset
Input Relay (Word)	GIB0000 ~ GIB0FFF	IB0000+Offset ~ IB0FFF+Offset
Keep Register	GMW00000 ~ GMW32767	MW00000+Offset ~ MW32767+Offset
Input Register	GMW0000 ~ GIW7FFF	IW0000+Offset ~ IW7FFF+Offset

Ex. If address GMW00000 is used, the offset value is added to the PLC's
MW000000 and the result is used as the Start (top) address.

7.8.3 Environment Setup

The following table show Digital's recommended Yaskawa Electric Corporation PLC Ethernet communication settings and their corresponding settings on the GP.

GP Setting		PLC Setting	
SRC IP Address	GP IP Address *1	DEST IP Addres	GP IP Address
SRC Port No.	GP Port No. *2	Dest Port No.	GP Port No.
DEST IP Address	PLC IP Address *1	SRC IP Address	PLC IP Address
DEST Port No.	PLC Port No.	SRC Port No.	PLC Port No.
Communication Method	TCP or UDP	Connection Type	TCP or UDP
Data Code Setting	Binary or ASCII	Code	BIN or ASCII
—	—	Driver Type	Exp. Memo Bus

■ GP Unit Setup

The following describes GP settings for using Ethernet communication.

```
SETUP OPERATION SURROUNDINGS MENU                    RETURN

    1    SETUP OPERATION SURROUNDINGS

    2    SETUP ETHERNET INFORMATION

    3    SETUP ETHERNET EXT. INFORMATION
```

◆ SET UP OPERATION SURROUNDINGS

```
SET UP OPERATION SURROUNDINGS              SET      CANCEL

    STARTING ADDRESS OF SYSTEM DATA AREA      [        ]

    SYSTEM AREA   READING AREA SIZE  (0-256)  [    ]

    DATA CODE                            BINARY    ASCII

    RESET GP DATA WRITE ERROR            ON      OFF




    1   2   3   4   5   6   7   8   9   0           ↑   ↓   BS
    1D  2D  3D  4D  1B  2B  3B  4B                  ←   →
```

•DATA CODE

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

```
SETUP ETHERNET INFORMATION                    [ SET ]  [ CANCEL ]

    SRC IP ADDRESS        [      ].[      ].[      ].[      ]

    SRC PORT NO.          [      ]

    DEST IP ADDRESS       [      ].[      ].[      ].[      ]

    DEST PORT NO.         [      ]

    PROTOCOL TYPE            UDP        TCP


 [ ] [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.

Set the DEST Port No. between 1024 and 65535.

• PROTOCOL TYPE

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

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

! *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 (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**

```
┌──────────────────────────────────────────────────────────┐
│ SETUP NETWORK EXT. INFORMATION          [ SET ]  [ CANCEL ]│
│                                                            │
│    SEND WAIT TIME              [    ] (ms)                 │
│                                                            │
│    TIMEOUT                     [    ] (x 2sec)             │
│                                                            │
│    IP ROUTER ADDRESS      [    ].[    ].[    ].[    ]      │
│                                                            │
│    SUBNET MASK            [    ].[    ].[    ].[    ]      │
│                                                            │
│    UDP RETRY COUNT(0-255)      [    ]                      │
│                                                            │
│                                                            │
│   ┌──┐┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐┌──┐┌──┐┌─┐┌─┐┌──┐      │
│   │  ││1││2││3││4││5││6││7││8││9││0 ││  ││↑││↓││BS│      │
│   └──┘└─┘└─┘└─┘└─┘└─┘└─┘└─┘└─┘└─┘└──┘└──┘└─┘└─┘└──┘      │
│   ┌──┐┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐┌──┐┌──┐┌─┐┌─┐┌──┐      │
│   │  ││ ││ ││ ││ ││ ││ ││ ││ ││ ││  ││  ││←││→││  │      │
│   └──┘└─┘└─┘└─┘└─┘└─┘└─┘└─┘└─┘└─┘└──┘└──┘└─┘└─┘└──┘      │
└──────────────────────────────────────────────────────────┘
```

•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.

⚠ **Important**

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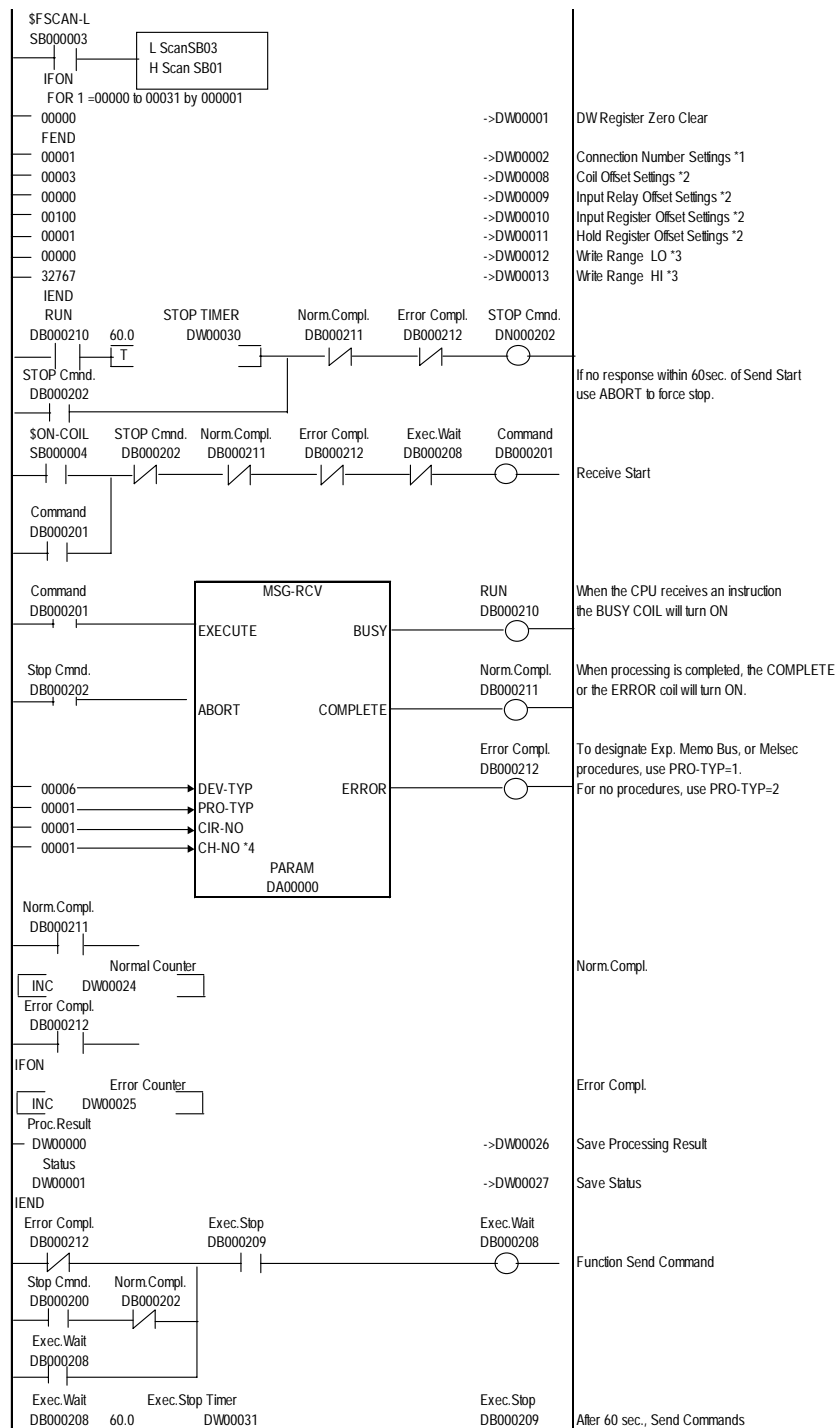
■ PLC Setting

Settings are entered using the CPMC-MPE720 Programming Software (Ver. 4.4 or later) [Parameter Setup] screen.

When transferring data between a GP to an MP2300/MP920 Series unit, the PLC's [Message Received Ladder Program] is required. When connecting multiple GP Series units via a single ladder program, be sure to insert special ladder program data for each GP connected. For details,

▼ **Reference** ▲ *Yaskawa's Machine Controller MP2300 Communication Module User Manual.*

◆ **MP2300/MP920 Series Message Received Ladder Program (Slavefunction<MSB-RCV>)**

```
$FSCAN-L
SB000003
   ┤├              L ScanSB03
                   H Scan SB01
  IFON
   FOR 1 =00000 to 00031 by 000001
 — 00000                                    ->DW00001    DW Register Zero Clear
  FEND
 — 00001                                    ->DW00002    Connection Number Settings *1
 — 00003                                    ->DW00008    Coil Offset Settings *2
 — 00000                                    ->DW00009    Input Relay Offset Settings *2
 — 00100                                    ->DW00010    Input Register Offset Settings *2
 — 00001                                    ->DW00011    Hold Register Offset Settings *2
 — 00000                                    ->DW00012    Write Range  LO *3
 — 32767                                    ->DW00013    Write Range  HI *3
  IEND
  RUN           STOP TIMER   Norm.Compl.  Error Compl.  STOP Cmnd.
  DB000210  60.0  DW00030    DB000211     DB000212      DN000202
   ┤├        |T|   ┤├          ┤/├          ┤/├           ( )
  STOP Cmnd.                                                      If no response within 60sec. of Send Start
  DB000202                                                        use ABORT to force stop.
   ┤├

  $ON-COIL   STOP Cmnd.  Norm.Compl.  Error Compl.  Exec.Wait   Command
  SB000004   DB000202    DB000211     DB000212      DB000208    DB000201
   ┤├         ┤/├         ┤/├          ┤/├           ┤/├          ( )      Receive Start

  Command
  DB000201
   ┤├

  Command                  MSG-RCV              RUN          When the CPU receives an instruction
  DB000201                                      DB000210     the BUSY COIL will turn ON
   ┤├        EXECUTE            BUSY              ( )

  Stop Cmnd.                                     Norm.Compl.  When processing is completed, the COMPLETE
  DB000202                                       DB000211     or the ERROR coil will turn ON.
   ┤├        ABORT           COMPLETE             ( )

                                                 Error Compl.  To designate Exp. Memo Bus, or Melsec
                                                 DB000212      procedures, use PRO-TYP=1.
 — 00006 ———→ DEV-TYP        ERROR                ( )          For no procedures, use PRO-TYP=2
 — 00001 ———→ PRO-TYP
 — 00001 ———→ CIR-NO
 — 00001 ———→ CH-NO *4
                             PARAM
                             DA00000

  Norm.Compl.
  DB000211
   ┤├
              Normal Counter                                   Norm.Compl.
  | INC   DW00024            |
  Error Compl.
  DB000212
   ┤├
  IFON
              Error Counter                                    Error Compl.
  | INC   DW00025            |
  Proc.Result
 — DW00000                                       ->DW00026    Save Processing Result
  Status
  DW00001                                        ->DW00027    Save Status
  IEND
  Error Compl.          Exec.Stop          Exec.Wait
  DB000212              DB000209           DB000208
   ┤/├                   ┤├                 ( )        Function Send Command
  Stop Cmnd.  Norm.Compl.
  DB000200    DB000202
   ┤/├         ┤├
  Exec.Wait
  DB000208
   ┤├

  Exec.Wait   Exec.Stop Timer              Exec.Stop
  DB000208  60.0   DW00031                 DB000209   After 60 sec., Send Commands
```

1 When connecting multiple GP units, be sure to designate unique connection numbers for each GP.

2 Be sure to enter the offset value for each device used.

3 Be sure to designate the Hold Register's write area (range).

4 When connecting multiple GP units, be sure to designate unique channel numbers for each GP.

7.8.4	Error Code

▼**Reference**◣ *About the GP Ethernet Specific Error Codes, refer to the"Protocol Stack Error Codes".*

■PLC ERROR CODES

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

• MP2300/MP920 Series

Error Code	Contents
01	Function Code error
02	Coil, Input Relay, Register address error
03	Coil, Input Relay, Register amount error

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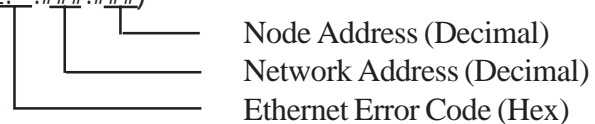
*2   When using a Hitachi Industrial Equipment Corporation's HIDIC H Series or a Schneider Corporation MODBUS TCP unit, the error code will appear on the GP screen as shown below. Also, behind the Ethernet error code will appear the designated Node address.

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

Node Address (Decimal)
Ethernet Error Code (Hex)