Mitsubishi Electric Corp.

A Series Ethernet Driver

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Introduction

This manual describes how to connect the display and the External Device (target PLC).

In this manual, the connection procedure will be described by following the below sections:

1	System Configuration This section shows the types of External Devices which can be connected and SIO type.	☞"1 System Configuration" (page 3)
2	Selection of External Device Select a model (series) of the External Device to be connected and connection method.	☞"2 Selection of External Device" (page 5)
3	Example of Communication Settings This section shows setting examples for communicating between the display and the External Device.	☞"3 Example of Communication Setting" (page 6)
4	Setup Items This section describes communication setup items on the display. Set communication settings of the display with GP-Pro Ex or in offline mode.	☞"4 Setup Items" (page 19)

Operation

1 System Configuration

The system configuration in the case when the External Device of Mitsubishi Electric Corp. and the display are connected is shown.

Series	CPU	Link I/F	SIO Type	Setting Example
MELSEC A Series	A0J2H A2A A2A-S1 A3A A2U A2U-S1 A3U A4U A1N A2N	AJ71E71	Ethernet (UDP)	Setting Example 1 (page 6)
			Ethernet (TCP)	Setting Example 2 (page 10)
		AJ71E71-S3	Ethernet (UDP)	Setting Example 1 (page 6)
			Ethernet (TCP)	Setting Example 2 (page 10)
	A2US A2US-S1 A1S A1S-C24 A1SJ A2S A2S-S1	A1SJ71E71-B2	Ethernet (UDP)	Setting Example 3 (page 13)
			Ethernet (TCP)	Setting Example 4 (page 16)
		A1SJ71E71-B5	Ethernet (UDP)	Setting Example 3 (page 13)
			Ethernet (TCP)	Setting Example 4 (page 16)
	A2US A2US-S1 A2USH-S1 A1SJ A2SJH A1SH A2SH A1S A2S	A1SJ71E71-B2-S3	Ethernet (UDP)	Setting Example 3 (page 13)
			Ethernet (TCP)	Setting Example 4 (page 16)
		A1SJ71E71-B5-S3	Ethernet (UDP)	Setting Example 3 (page 13)
			Ethernet (TCP)	Setting Example 4 (page 16)

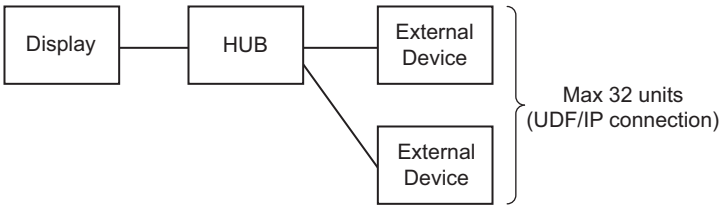
NOTE

- This driver does not support GP-4100 series.

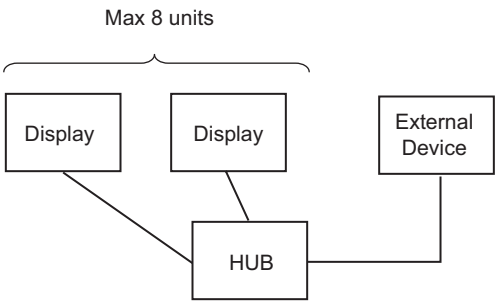
■ Connection Configuration

- 1:1 Connection

- 1:n Connection

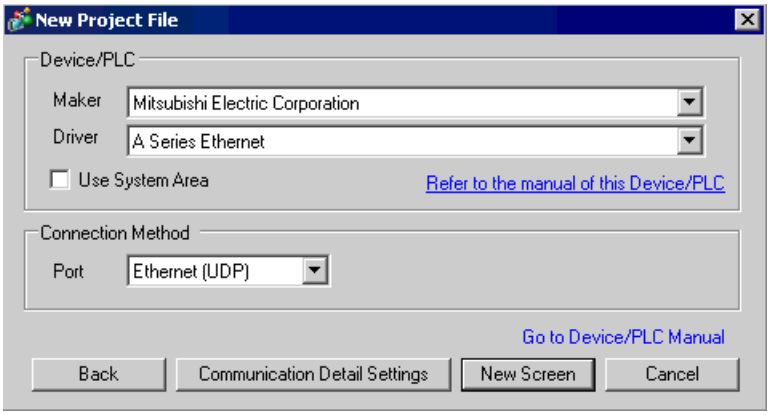


- n : 1 Connection



2 Selection of External Device

Select the External Device to be connected to the display.



Setup Items	Setup Description
Maker	Select the maker of the External Device to be connected. Select "Mitsubishi Electric Corp.".
Driver	Select a model (series) of the External Device to be connected and connection method. Select "A Series Ethernet". Check the External Device which can be connected in "A Series Ethernet" in system configuration. ☞ "1 System Configuration" (page 3)
Use System Area	Check this option when you synchronize the system data area of Display and the device (memory) of External Device. When synchronized, you can use the ladder program of External Device to switch the display or display the window on the Display. Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)" This can also be set in GP-Pro EX or in the Display's offline mode. Cf. GP-Pro EX Reference Manual "Display Unit (System Area) Settings Guide" Cf. Maintenance/Troubleshooting Guide "Main Unit - System Area Settings"
Port	Select the display port to be connected to the External Device.

3 Example of Communication Setting

Examples of communication settings of the display and the External Device, recommended by Pro-face, are shown.

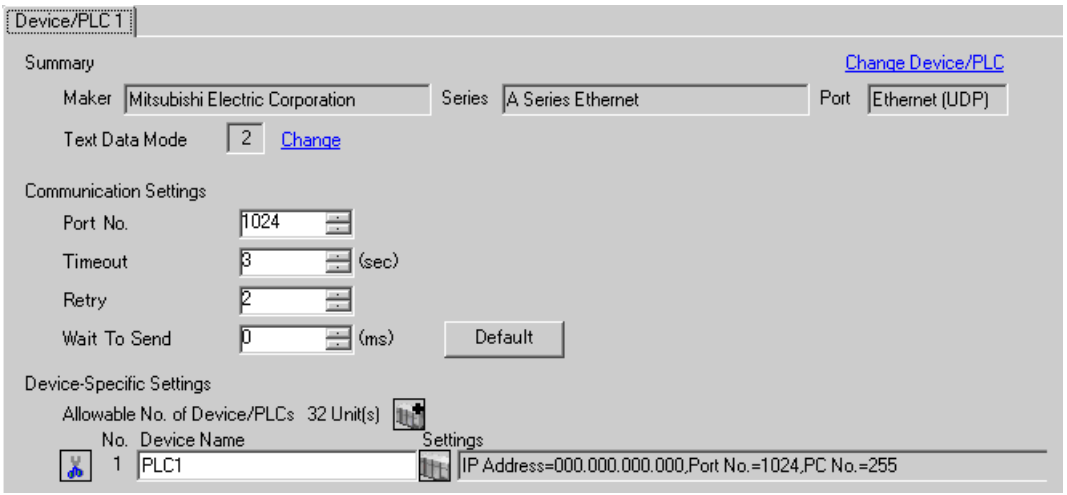
When using MELSEC A Series, use GP-Pro EX and the ladder software to set as below.

3.1 Setting Example 1

■ Settings of GP-Pro EX

◆ Communication Settings

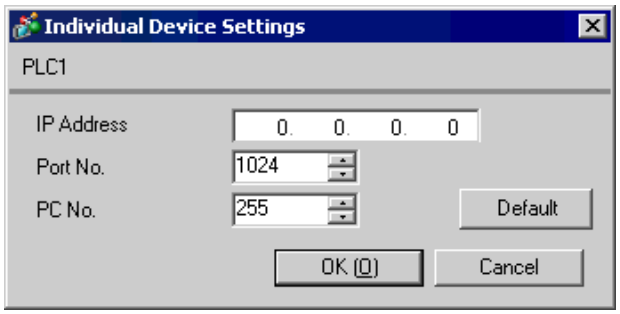
To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

When you connect multipleExternal Device, click from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



◆ Notes

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device for IP address in Device-specific settings.
- You need to set IP address on the display in the offline mode of the display.
- Limitations when you use UDP/IP to access the multiple PLCs via network are shown below.
  - When you set the retry frequency to zero, the error message of "Response timed out for initial communication command" is displayed at startup.
  - At startup, you cannot read the device data until timeout time elapses once.

■ Setting of External Device

To communicate MELSEC-A Series (Ethernet Interface Unit) with the display, you need to set the ladder program of the External Device and the DIP switch of the Ethernet Interface Unit. Settings of the sample ladder program and the DIP switch are shown below.

◆ Example of Ladder Program

```
LD      M9038
DMOVP   Hxxxxxxxx  D100      : IP address of External Device*1
MOVP    K0  D102
MOV     H0100  D116          : Connecting method (UDP)
MOV     K1024  D124          : Port No. of External Device (in case of entering "1024" for
                               example)
MOV     K1024  D127          : Port No. of display (in case of entering "1024" for example)
DMOV    Hxxxxxxxx  D125      : IP address of display*1
DMOV    HFFFFFFFF  D128
MOV     HFFFF  D130
LD      M9036
TOP     H0000  H0000  D100  K50
LD      X19
MOV     K5  D113
TOP     H0000  K13  D113  K1
LD      M9036
OUT     Y0019
LD      M9036
OUT     Y0008
END
```

*1 : xxxxxxxx shows IP address (in Hex). Check with a network administrator about IP address. Do not set the duplicate IP address.

IMPORTANT

- Do not repeat the address used for communication settings on the External Device (D100 or higher in case of above) for the system area head address on the display for setting.

◆ Settings of Interface Unit

Mode Setting Switch

Settings	Setup Description
0	On-line

Communication Condition Setting Switch

DIP Switch	Settings	Setup Description
SW1	OFF	Selection of line processing at TCP timeout error
SW2	OFF	Data Code Setting
SW3	OFF	Disable (Fixed to OFF)
SW4	OFF	Disable (Fixed to OFF)
SW5	OFF	Disable (Fixed to OFF)
SW6	OFF	Disable (Fixed to OFF)
SW7	ON	CPU Communication Timing Settings
SW8	OFF	Initial Timing Settings

◆ Notes

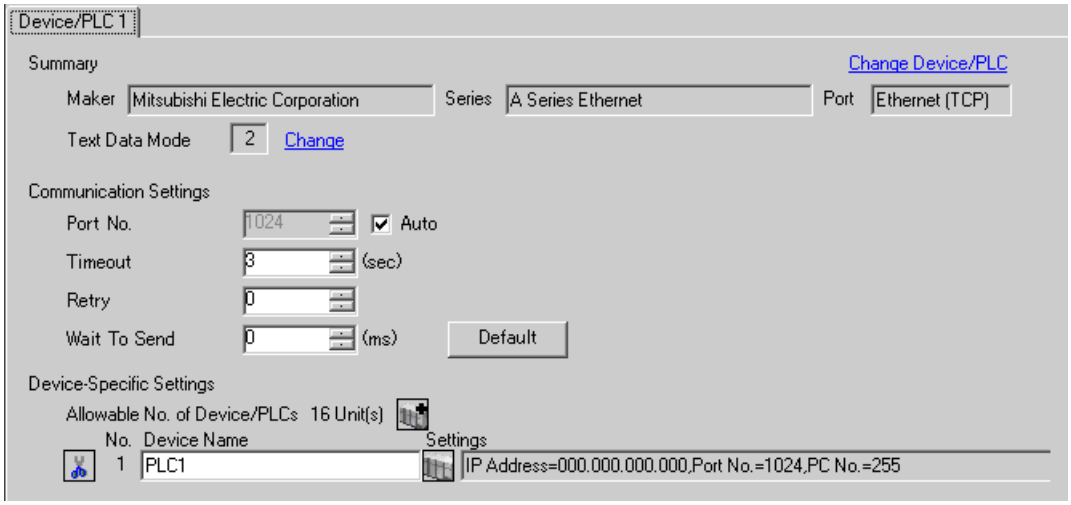
- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Always turn OFF (binary code) the data code switch of the External Device.
- When you write from the display during operation of the External Device, set to write enable.

3.2 Setting Example 2

■ Settings of GP-Pro EX

◆ Communication Settings

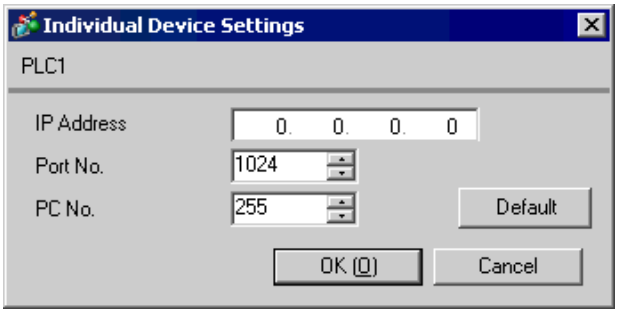
To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

When you connect multipleExternal Device, click from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



◆ Notes

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device for IP address in Device-specific settings.
- You need to set IP address on the display in the offline mode of the display.

■ Setting of External Device

To communicate MELSEC-A Series (Ethernet Interface Unit) with the display, you need to set the ladder program of the External Device and the DIP switch of the Ethernet Interface Unit. Settings of the sample ladder program and the DIP switch are shown below.

◆ Example of Ladder Program

```
LD      M9038
DMOVP   Hxxxxxxxx  D100      : IP address of External Device*1
MOVP    K0  D102
MOV     H8000  D116          : Connecting method (TCP)
MOV     K1024  D124          : Port No. of External Device (in case of entering "1024" for
                               example)
DMOV    Hxxxxxxxx  D125      : IP address of display*1
DMOV    HFFFFFFFF  D128
MOV     HFFFF  D130
LD      M9036
TOP     H0000  H0000  D100  K50
LD      X19
MOV     K5  D113
TOP     H0000  K13  D113  K1
LD      M9036
OUT     Y0019
LD      M9036
OUT     Y0008
END
```

*1 : xxxxxxxx shows IP address (in Hex). Check with a network administrator about IP address. Do not set the duplicate IP address.

IMPORTANT

- Do not repeat the address used for communication settings on the External Device (D100 or higher in case of above) for the system area head address on the display for setting.

◆ Settings of Interface Unit

Mode Setting Switch

Settings	Setup Description
0	On-line

Communication Condition Setting Switch

DIP Switch	Settings	Setup Description
SW1	OFF	Selection of line processing at TCP timeout error
SW2	OFF	Data Code Setting
SW3	OFF	Disable (Fixed to OFF)
SW4	OFF	Disable (Fixed to OFF)
SW5	OFF	Disable (Fixed to OFF)
SW6	OFF	Disable (Fixed to OFF)
SW7	ON	CPU Communication Timing Settings
SW8	OFF	Initial Timing Settings

◆ Notes

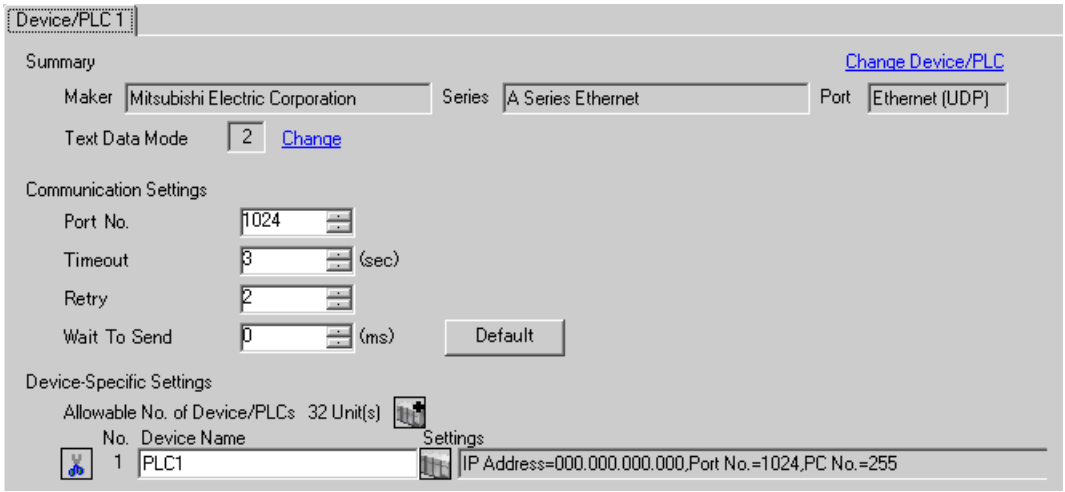
- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Always turn OFF (binary code) the data code switch of the External Device.
- When you write from the display during operation of the External Device, set to write enable.

3.3 Setting Example 3

■ Settings of GP-Pro EX

◆ Communication Settings

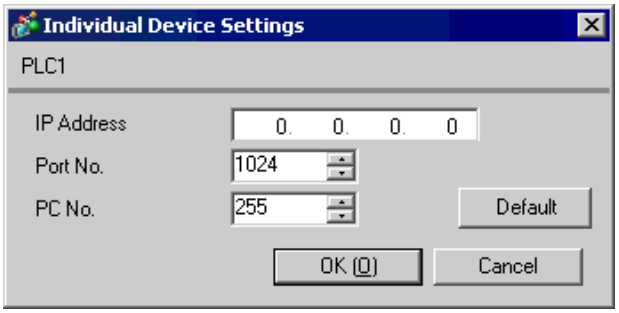
To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

When you connect multipleExternal Device, click from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



◆ Notes

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device for IP address in Device-specific settings.
- You need to set IP address on the display in the offline mode of the display.
- Limitations when you use UDP/IP to access the multiple PLCs via network are shown below.
  - When you set the retry frequency to zero, the error message of "Response timed out for initial communication command" is displayed at startup.
  - At startup, you cannot read the device data until timeout time elapses once.

■ Setting of External Device

To communicate MELSEC-A Series (Ethernet Interface Unit) with the display, you need to set the ladder program of the External Device and the DIP switch of the Ethernet Interface Unit. Settings of the sample ladder program and the DIP switch are shown below.

◆ Example of Ladder Program

```
LD      M9038
DMOVP   Hxxxxxxxx  D100      : IP address of External Device*1
MOVP    K0  D102
MOV     H0100  D116          : Connecting method (UDP)
MOV     K1024  D124          : Port No. of External Device (in case of entering "1024" for
                               example)
MOV     K1024  D127          : Port No. of display (in case of entering "1024" for example)
DMOV    Hxxxxxxxx  D125      : IP address of display*1
DMOV    HFFFFFFFF  D128
MOV     HFFFF  D130
LD      M9036
TOP     H0000  H0000  D100  K50
LD      X19
MOV     K5  D113
TOP     H0000  K13  D113  K1
LD      M9036
OUT     Y0019
LD      M9036
OUT     Y0008
END
```

*1 : xxxxxxxx shows IP address (in Hex). Check with a network administrator about IP address. Do not set the duplicate IP address.

IMPORTANT

- Do not repeat the address used for communication settings on the External Device (D100 or higher in case of above) for the system area head address on the display for setting.

◆ Settings of Interface Unit

Mode Setting Switch

Settings	Setup Description
0	On-line

Communication Condition Setting Switch

DIP Switch	Settings	Setup Description
SW1	OFF	Selection of line processing at TCP timeout error
SW2	OFF	Data Code Setting
SW3	ON	CPU Communication Timing Settings
SW4	OFF	Initial Timing Settings

◆ Notes

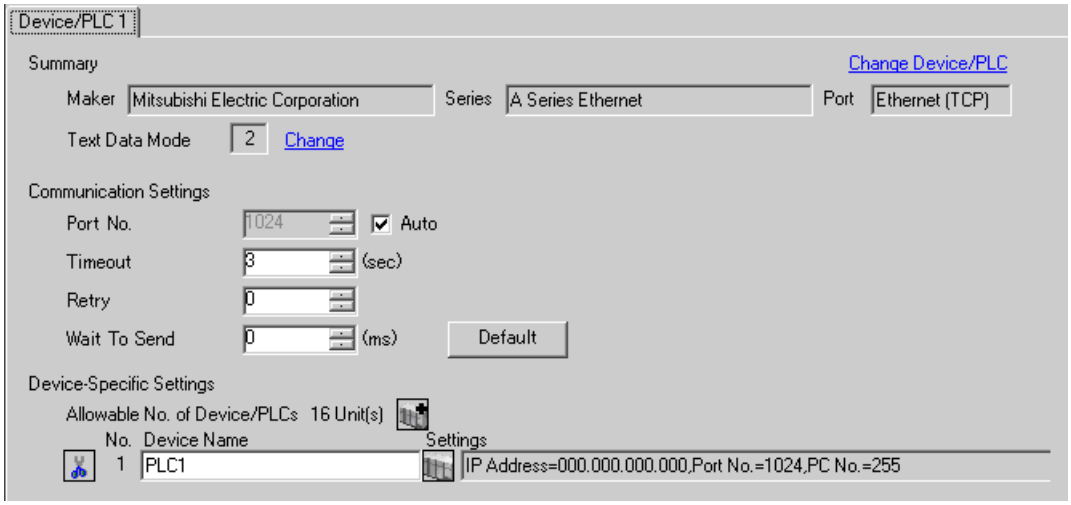
- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Always turn OFF (binary code) the data code switch of the External Device.
- When you write from the display during operation of the External Device, set to write enable.

3.4 Setting Example 4

■ Settings of GP-Pro EX

◆ Communication Settings

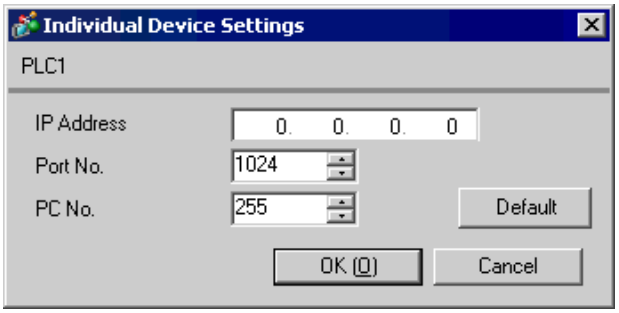
To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

When you connect multipleExternal Device, click from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



◆ Notes

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device for IP address in Device-specific settings.
- You need to set IP address on the display in the offline mode of the display.

■ Setting of External Device

To communicate MELSEC-A Series (Ethernet Interface Unit) with the display, you need to set the ladder program of the External Device and the DIP switch of the Ethernet Interface Unit. Settings of the sample ladder program and the DIP switch are shown below.

◆ Example of Ladder Program

```
LD      M9038
DMOVP   Hxxxxxxxx  D100      : IP address of External Device*1
MOVP    K0  D102
MOV     H8000  D116          : Connecting method (TCP)
MOV     K1024  D124          : Port No. of External Device (in case of entering "1024" for
                               example)
DMOV    Hxxxxxxxx  D125      : IP address of display*1
DMOV    HFFFFFFFF  D128
MOV     HFFFF  D130
LD      M9036
TOP     H0000  H0000  D100  K50
LD      X19
MOV     K5  D113
TOP     H0000  K13  D113  K1
LD      M9036
OUT     Y0019
LD      M9036
OUT     Y0008
END
```

*1 : xxxxxxxx shows IP address (in Hex). Check with a network administrator about IP address. Do not set the duplicate IP address.

IMPORTANT

- Do not repeat the address used for communication settings on the External Device (D100 or higher in case of above) for the system area head address on the display for setting.

◆ Settings of Interface Unit

Mode Setting Switch

Settings	Setup Description
0	On-line

Communication Condition Setting Switch

DIP Switch	Settings	Setup Description
SW1	OFF	Selection of line processing at TCP timeout error
SW2	OFF	Data Code Setting
SW3	ON	CPU Communication Timing Settings
SW4	OFF	Initial Timing Settings

◆ Notes

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Always turn OFF (binary code) the data code switch of the External Device.
- When you write from the display during operation of the External Device, set to write enable.

4 Setup Items

Set communication settings of the display with GP-Pro Ex or in offline mode of the display.

The setting of each parameter must be identical to that of External Device.

☞"3 Example of Communication Setting" (page 6)

NOTE

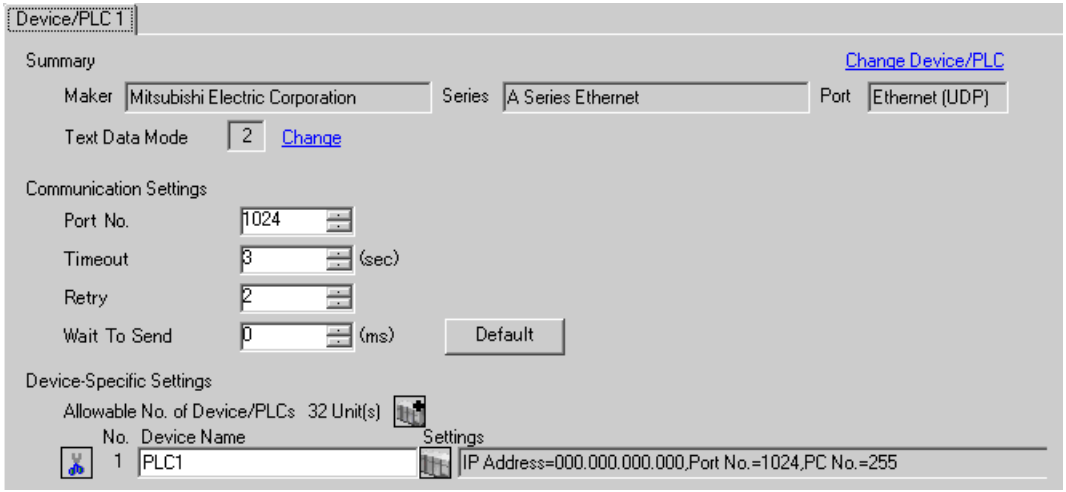
- Set the Display's IP address in offline mode.

  Cf. Maintenance/Troubleshooting Guide "Ethernet Settings"

4.1 Setup Items in GP-Pro EX

■ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.

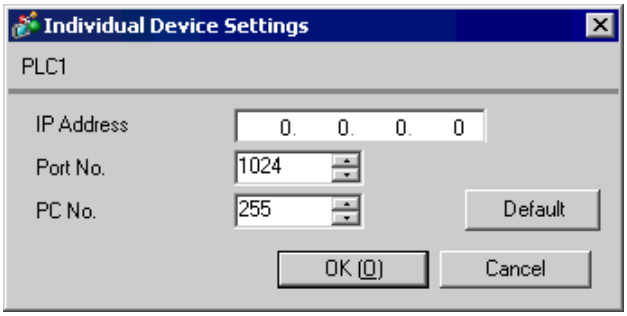


Setup Items	Setup Description
Port No.	Use an integer from 1024 to 65535 to enter the port No. of the display. When you check the option of [Auto Assign], the port No. will be automatically set. **NOTE** • [Auto Assign] option is available to set only when you select "Ethernet (TCP)" in [Connecting Method].
Timeout	Use an integer from 1 to 127 to enter the time (s) for which the display waits for the response from the External Device.
Retry	In case of no response from the External Device, use an integer from 0 to 255 to enter how many times the display retransmits the command.
Wait To Send	Use an integer from 0 to 255 to enter standby time (ms) for the display from receiving packets to transmitting next commands.

■ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

When [Allowable No. of Device/PLCs] is multiple, click from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



Setup Items	Setup Description
IP Address	Set IP address of the External Device. **NOTE** • Check with a network administrator about IP address. Do not set the duplicate IP address.
Port No.	Use an integer from 1024 to 65535 to enter the port No. of the External Device.
PC No.	Set PC No. when you communicate via network. Use an integer from 0 to 64 to enter PC No. of the External Device to communicate. If you do not communicate via network, enter 255.

4.2 Setup Items in Offline Mode

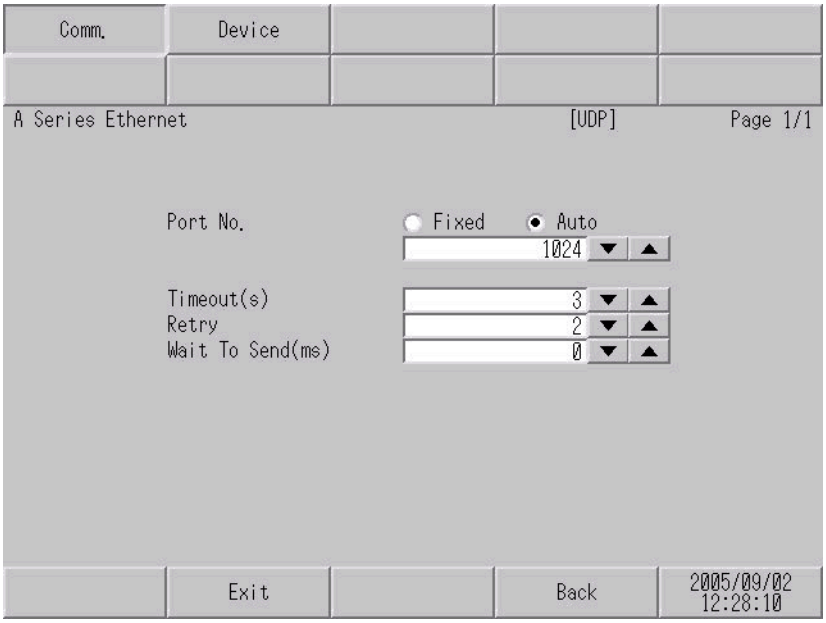
NOTE

- Refer to the Maintenance/Troubleshooting guide for information on how to enter offline mode or about the operation.

  Cf. Maintenance/Troubleshooting Guide "Offline Mode"

■ Communication Settings

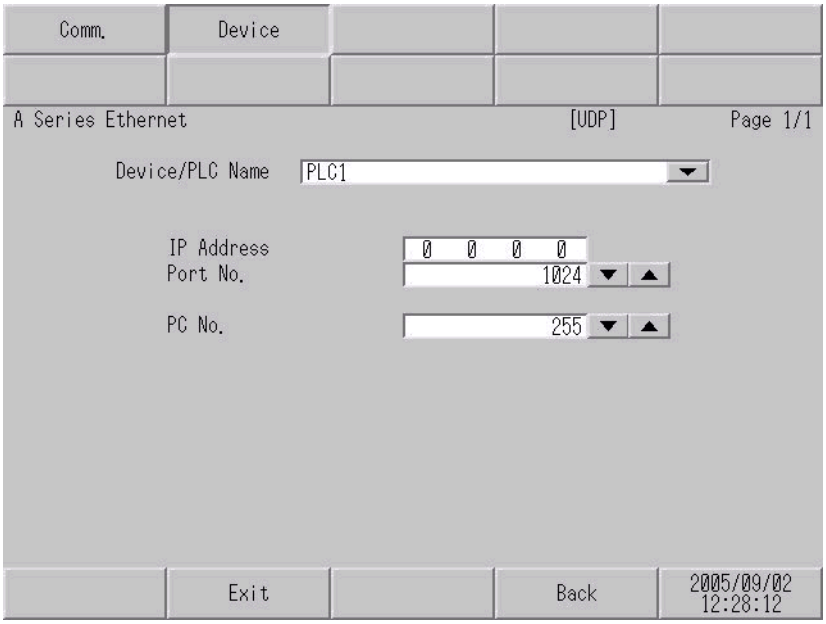
To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings] in offline mode. Touch the External Device you want to set from the displayed list.



Setup Items	Setup Description
Port No.	Set the Port No. of the display. In UDP connection, entered port No. will be assigned regardless of whether you select [Fixed] or [Auto]. In TCP connection, select either of [Fixed] or [Auto]. When you select [Fixed], use an integer from 1024 to 65535 to enter the port No. of the display. When you select [Auto], the port No. will be automatically assigned regardless of the entered value.
Timeout (s)	Use an integer from 1 to 127 to enter the time (s) for which the display waits for the response from the External Device.
Retry	In case of no response from the External Device, use an integer from 0 to 255 to enter how many times the display retransmits the command.
Wait To Send (ms)	Use an integer from 0 to 255 to enter standby time (ms) for the display from receiving packets to transmitting next commands.

■ Device Setting

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings]. Touch the External Device you want to set from the displayed list, and touch [Device].



Setup Items	Setup Description
Device/PLC Name	Select the External Device for device setting. Device name is a title of External Device set with GP-Pro EX.(Initial value [PLC1])
IP Address	Set IP address of the External Device. **NOTE** • Check with a network administrator about IP address. Do not set the duplicate IP address.
Port No.	Use an integer from 1024 to 65535 to enter the port No. of the External Device.
PC No.	Set PC No. when you communicate via network. Use an integer from 0 to 64 to enter PC No. of the External Device to communicate. If you do not communicate via network, enter 255.

5 Supported Device

Range of supported device address is shown in the table below. Please note that the actually supported range of the devices varies depending on the External Device to be used. Please check the actual range in the manual of your External Device.

This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Notes
Input	X0000 - X07FF	X0000 - X07F0		***0
Output	Y0000 - Y07FF	Y0000 - Y07F0		***0
Internal Relay	M0000 - M8191	M0000 - M8176		÷16
Special Relay	M9000 - M9255	M9000 - M9240		÷16
Latch Relay	L0000 - L8191	L0000 - L8176		÷16
Step Relay	S0000 - S8191	S0000 - S8176		÷16
Annunciator	F0000 - F2047	F0000 - F2032		÷16
Link Relay	B0000 - B0FFF	B0000 - B0FF0		***0
Timer (Contact)	TS0000 - TS2047	------		
Timer (Coil)	TC0000 - TC2047	------		
Counter (Contact)	CS0000 - CS1023	------		
Counter (Coil)	CC0000 - CC1023	------		
Timer (Current Value)	------	TN0000 - TN2047	L/H	
Counter (Current Value)	------	CN0000 - CN1023		
Data Register	------	D0000 - D6143		Bit15
Special Register	------	D9000 - D9255		Bit15
Link Register	------	W0000 - W0FFF		BitF
File Register	------	R0000 - R8191		Bit15
Extension File Register (0R - 64R)	------	0R0000 - 0R8191		Bit15
	------	1R0000 - 1R8191		Bit15
	------	2R0000 - 2R8191		Bit15
	:	:		:
	------	63R0000 - 63R8191		Bit15
	------	64R0000 - 64R8191		Bit15

NOTE

- Please refer to the GP-Pro EX Reference Manual for system data area.
  Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"
- Please refer to the precautions on manual notation for icons in the table.
  ☞ "Manual Symbols and Terminology"

6 Device Code and Address Code

Use device code and address code when you select "Device Type & Address" for the address type in data displays.

Device	Device Name	Device Code (HEX)	Address Code
Input	X	0080	Value of word address divided by 0x10
Output	Y	0081	Value of word address divided by 0x10
Internal Relay	M (0000-8999)	0082	Value of word address divided by 16
Special Relay	M (9000-9999)	0083	Value of (word address - 9000) divided by 16
Latch Relay	L	0084	Value of word address divided by 16
Step Relay	S	0087	Value of word address divided by 16
Annunciator	F	0085	Value of word address divided by 16
Link Relay	B	0088	Value of word address divided by 0x10
Timer (Current Value)	TN	0060	Word Address
Counter (Current Value)	CN	0061	Word Address
Data Register	D	0000	Word Address
Special Register			
Link Register	W	0002	Word Address
File Register	R	000F	Word Address
Extension File Register (0R - 64R)	0R	0010	Word Address
	1R	0011	Word Address
	2R	0012	Word Address
	:	:	:
	63R	004F	Word Address
	64R	0050	

7 Error Messages

Error messages are displayed on the screen of Display as follows: "No. : Device Name: Error Message (Error Occurrence Area)". Each description is shown below.

Item	Description
No.	Error No.
Device Name	Name of External Device where error occurs. Device name is a title of External Device set with GP-Pro EX.(Initial value [PLC1])
Error Message	Displays messages related to the error which occurs.
Error Occurrence Area	Displays IP address or device address of External Device where error occurs, or error codes received from External Device. **NOTE** • IP address is displayed as "IP address (Decimal): MAC address (Hex)". • Device address is displayed as "Address: Device address". • Received error codes are displayed as "Decimal [Hex]".

Display Examples of Error Messages

"RHAA035: PLC1: Error has been responded for device write command (Error Code: 2 [02H])"

NOTE

- Refer to your External Device manual for details on received error codes.
- Refer to "Display-related errors" in "Maintenance/Troubleshooting Manual" for details on the error messages common to the driver.