



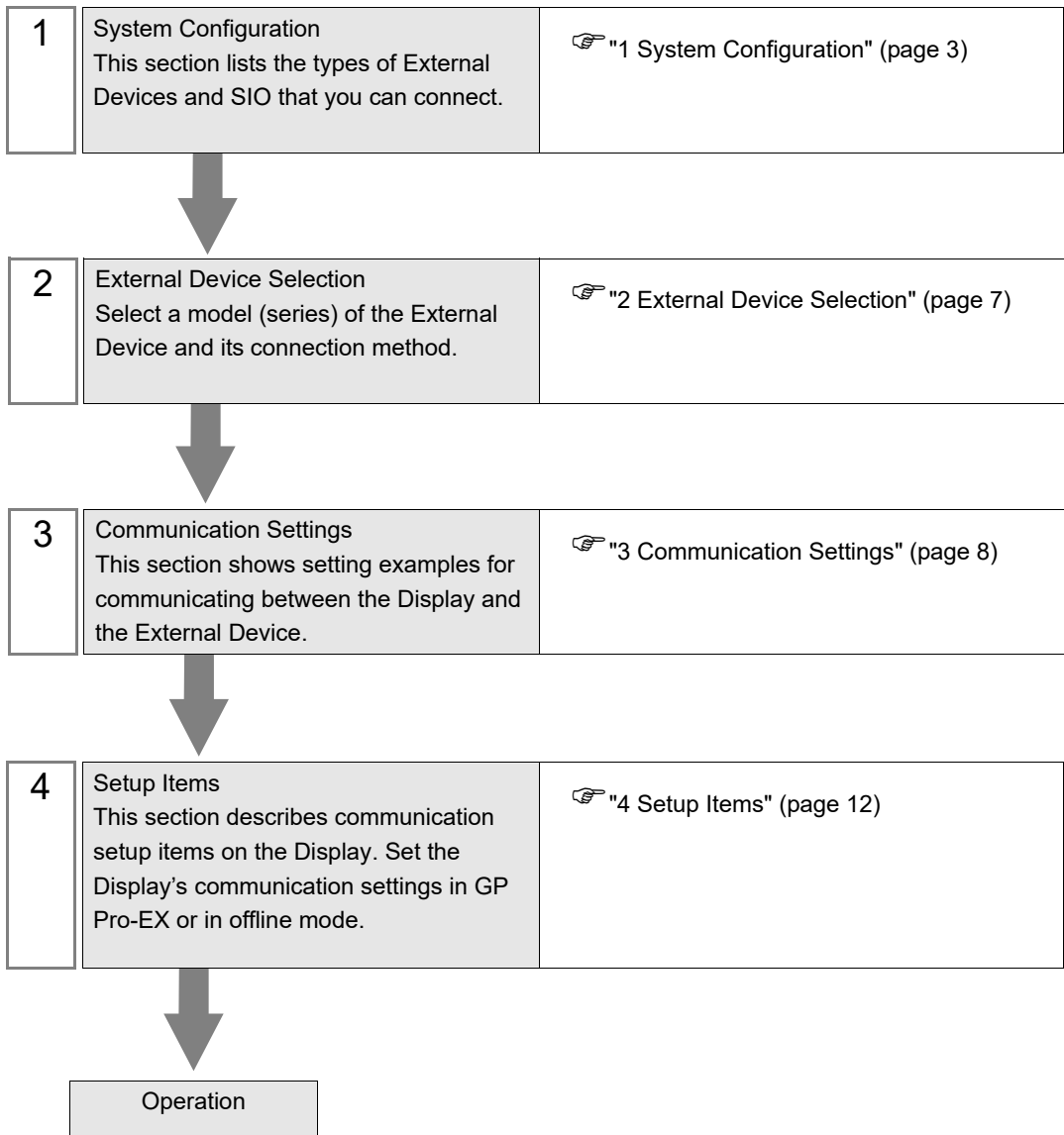
# Saia Ether-S-Bus Driver

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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 in the sections identified below:



# 1 System Configuration

The system configuration in the case when the External Device of Saia-Burgess Controls Ltd. and the Display are connected is shown.

Series	CPU	Link I/F	SIO Type	Setting Example
PCD1	PCD1.M2120	Built-in ETH1 or ETH2 interface	Ethernet (UDP)	"Setting Example 1" (page 8)
	PCD1.M135F65x* <sup>1</sup>	RJ45/Ethernet interface of PCD7.F65x	Ethernet (UDP)	"Setting Example 2" (page 10)
PCD2	PCD2.M150F65x* <sup>1</sup> PCD2.M480F65x-2* <sup>1</sup> PCD2.M170	RJ45/Ethernet interface of PCD7.F65x	Ethernet (UDP)	"Setting Example 2" (page 10)
PCD3	PCD3.M2130V6 PCD3.M2330A4T1 PCD3.M2330A4T3 PCD3.M2330A4T5 PCD3.M3120 PCD3.M3330 PCD3.M5340 PCD3.M5540 PCD3.M5560 PCD3.M6340 PCD3.M6360 PCD3.M6540 PCD3.M6560	Built-in Ethernet interface	Ethernet (UDP)	"Setting Example 1" (page 8)

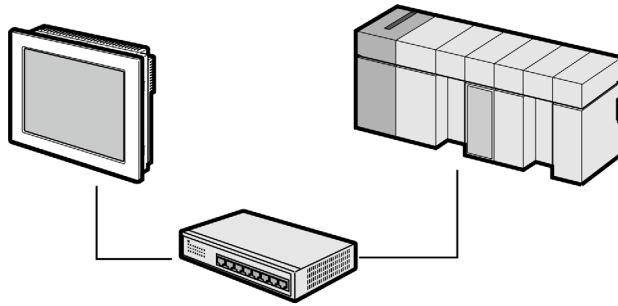
\*1 Ethernet I/F module (PCD7.F65x) is installed in the controller.

**MEMO**

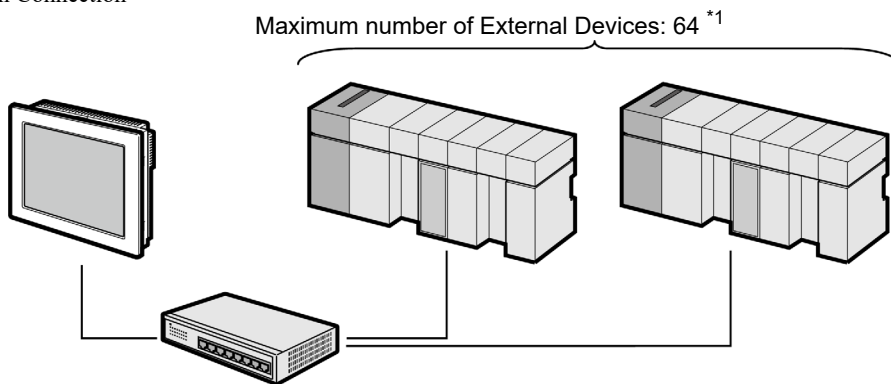
- This driver does not support GP3000 series.

## ■ Connection Configuration

- 1:1 Connection



- 1:n Connection



- \*1 When 33 or more External Devices are connected, it is necessary to check [Increase allowable number of Devices/PLCs].

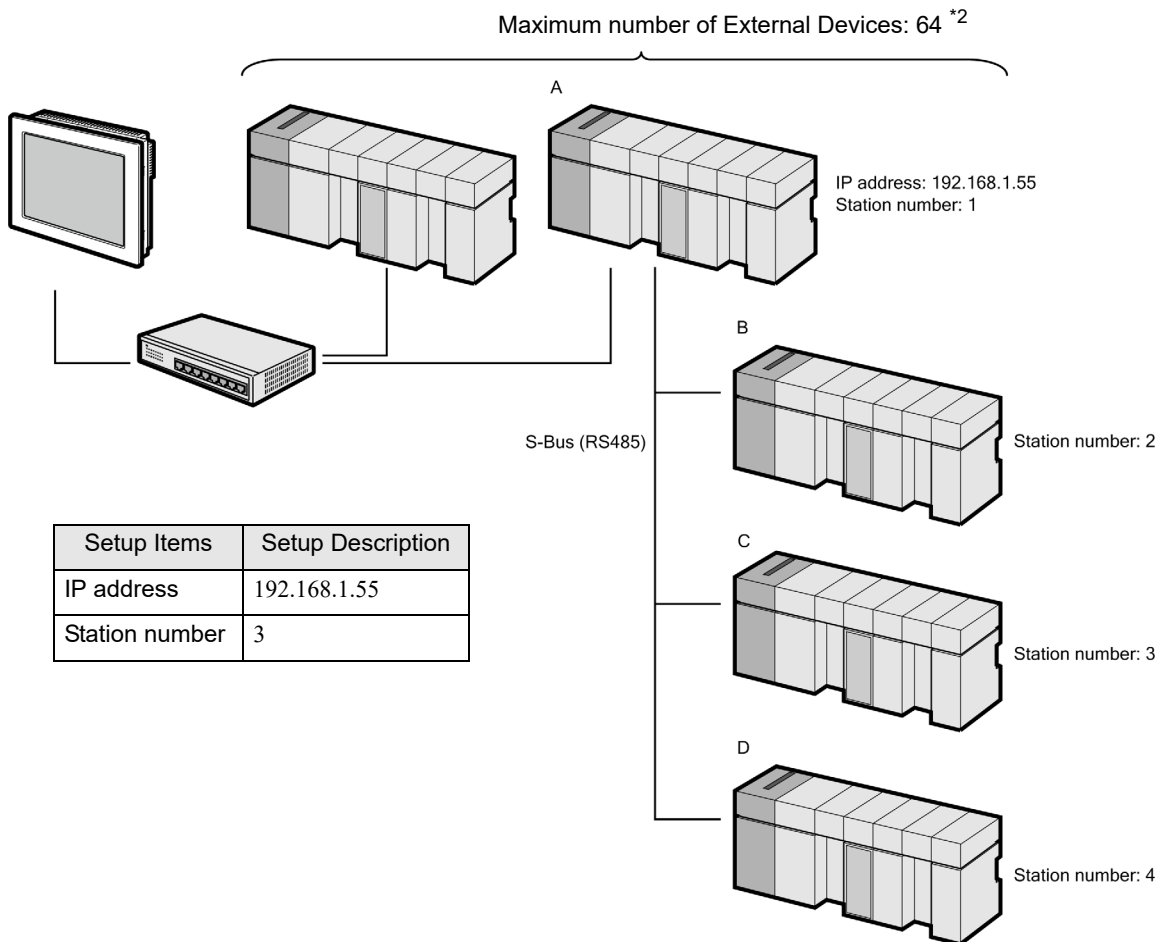
☞ "4.1 Setup Items in GP-Pro EX" (page 12)

- 1:n Connection (Gateway Connection)

Using the External Device that acts as a gateway, connect the Display to the External Device on the S-Bus (RS485) network.

On the Display, specify the IP address of the External Device (gateway) and the station number of the target External Device on the S-Bus (RS485) network.

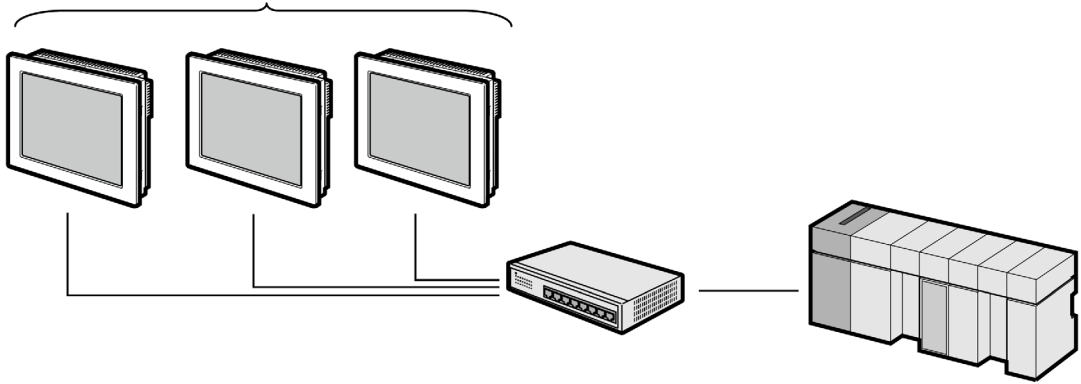
The following is an example configuration for connecting the Display through External Device A to External Device C on the S-Bus (RS485) network.



\*2 When 33 or more External Devices are connected, it is necessary to check [Increase allowable number of Devices/PLCs].

☞ "4.1 Setup Items in GP-Pro EX" (page 12)

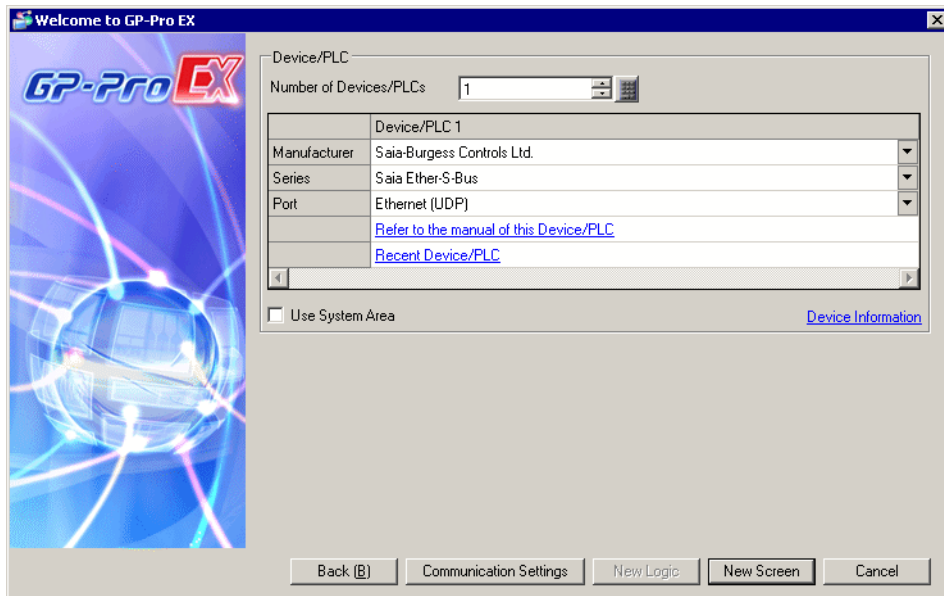
- n:1 Connection  
Maximum number of External Devices\*<sup>3</sup>



\*<sup>3</sup> Please check the specifications of the External Device which can be connected to the unit.

## 2 External Device Selection

Select the External Device to be connected to the Display.



Setup Items	Setup Description
Number of Devices/PLCs	Use an integer from 1 to 4 to enter the number of Devices/PLCs to connect to the display.
Manufacturer	Select the manufacturer of the External Device to be connected. Select "Saia-Burgess Controls Ltd.".
Series	Select a model (series) of the External Device to be connected and connection method. Select "Saia Ether-S-Bus". Check the External Device which can be connected in "Saia Ether-S-Bus" in system configuration. ☞ "1 System Configuration" (page 3)
Port	Select the Display port to be connected to the External Device. Select "Ethernet (UDP)".
Use System Area	Check this option to synchronize the system data area of the Display and the device (memory) of the External Device. When synchronized, you can use the External Device's ladder program to switch the display or display the window on the Display. Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)" This feature can also be set in GP-Pro EX or in the Display's offline mode. Cf. GP-Pro EX Reference Manual "System Settings [Display Unit] - [System Area] Settings Guide" Cf. Maintenance/Troubleshooting Guide "Main Unit - System Area Settings"

## 3 Communication Settings

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

### 3.1 Setting Example 1

#### ■ Settings of GP-Pro EX

##### ◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

Device/PLC 1

Summary [Change Device/PLC](#)

Manufacturer  Series  Port

Text Data Mode  [Change](#)

Communication Settings

Port No.   Auto

Timeout  (sec)

Retry

Wait To Send  (ms)

Device-Specific Settings

Allowable Number of Devices/PLCs 32 [Add Device](#) [Increase Allowable Number of Devices/PLCs](#)

No.	Device Name	Settings	Add Indirect Device
1	PLC1	IP Address=192.168.0.001, Station No.=0	<input type="button" value="Add Indirect Device"/>

##### ◆ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the External Device and click [Settings] . To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.

Individual Device Settings

PLC1

IP Address

Station No.

#### MEMO

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device address in the [Individual Device Settings] dialog box.
- You need to set IP address on the Display in the offline mode of the Display.



## ■ External Device Settings

Use the PCD Programming tool "PG5" to configure communication settings on the External Device.

For details on communication settings, please refer to the manual for the External Device.

- 1 Open [Device Configurator].
- 2 In [Device], select the CPU to set up.
- 3 In [Properties], set up [S-Bus] as follows:

Setup Items	Setting Value
S-Bus Station Number	0

- 4 In [Onboard Communications], select [Ethernet].
- 5 In [Properties], set up [TCP/IP] as follows:

Setup Items	Setting Value
IP Address	192.168.0.1
Subnet Mask	255.255.255.0

- 6 Save your settings, then write to the External Device.

## 3.2 Setting Example 2

### ■ Settings of GP-Pro EX

#### ◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

Device/PLC 1

Summary [Change Device/PLC](#)

Manufacturer  Series  Port

Text Data Mode  [Change](#)

Communication Settings

Port No.   Auto

Timeout  (sec)

Retry


Wait To Send  (ms)

Device-Specific Settings

Allowable Number of Devices/PLCs 32 [Add Device](#) [Increase Allowable Number of Devices/PLCs](#)

No.	Device Name	Settings	Add Indirect Device
1	PLC1	IP Address=192.168.0.001, Station No.=0	<input type="button" value="Add"/>

#### ◆ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the External Device and click [Settings] . To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.

Individual Device Settings

PLC1

IP Address

Station No.

#### MEMO

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device address in the [Individual Device Settings] dialog box.
- You need to set IP address on the Display in the offline mode of the Display.

## ■ External Device Settings

Use the PCD Programming tool "PG5" to configure communication settings on the External Device.

For details on communication settings, please refer to the manual for the External Device.

- 1 Open [Device Configurator].
- 2 In [Device], select the CPU to set up.
- 3 In [Properties], set up [S-Bus] as follows:

Setup Items	Setting Value
S-Bus Station Number	0

- 4 In [Selector], from the [Communication Modules PCD7 for PCD1/2/3] list select [PCD7.F650/655 Ethernet TCP/IP], then drag into the [Onboard Communications] socket.
- 5 In [Properties], set up [TCP/IP] as follows:

Setup Items	Setting Value
IP Address	192.168.0.1
Subnet Mask	255.255.255.0

- 6 Save your settings, then write to the External Device.

## 4 Setup Items

Set up the Display's communication settings in GP Pro-EX or in the Display's offline mode.

The setting of each parameter must match that of the External Device.

☞ "3 Communication Settings" (page 8)

### MEMO

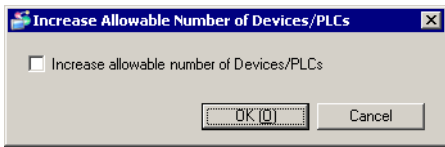
- Set the Display's IP address in offline mode.

Cf. Maintenance/Troubleshooting Guide "Ethernet Settings"

### 4.1 Setup Items in GP-Pro EX

#### ■ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].


Setup Items	Setup Description
Port No.	Enter a port number of the Display, using 1024 to 65535. Check into [Auto], and a port number is set automatically.
Timeout	Use an integer from 1 to 127 to enter the time (s) for which Display waits for the response from 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.
Increase Allowable Number of Devices/PLCs	When clicked, the [Increase Allowable Number of Devices/PLCs] dialog box is displayed. When you check [Increase allowable number of Devices/PLCs], the settings for [Allowable Number of Devices/PLCs] can be extended to "64". 

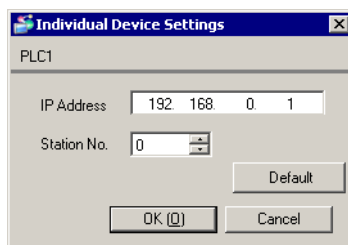
### MEMO

- Refer to the GP-Pro EX Reference Manual for Indirect Device.

Cf. GP-Pro EX Reference Manual "Changing the Device/PLC at Runtime (Indirect Device)"

## ■ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the External Device and click [Settings] . To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.



Setup Items	Setup Description
IP Address	Set IP address of the External Device. <b>MEMO</b> <ul style="list-style-type: none"> <li>Check with a network administrator about IP address. Do not set the duplicate IP address.</li> </ul>
Station No.	Use an integer from 0 to 253 to enter the Station No. of the External Device.

## 4.2 Setup Items in Offline Mode

### MEMO

- Please refer to Maintenance/Troubleshooting Guide for more information on how to enter offline mode or about operation.  
Cf. Maintenance/Troubleshooting Guide "Offline Mode"
- The number of the setup items to be displayed for 1 page in the offline mode depends on the Display in use. Please refer to the Reference manual for details.

### ■ 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.

Comm.	Device			
Saia Ether-S-Bus			[UDP]	Page 1/1
Port No.	<input type="radio"/> Fixed <input checked="" type="radio"/> Auto	<input type="text" value="1024"/> ▼ ▲		
Timeout(s)	<input type="text" value="3"/> ▼ ▲			
Retry	<input type="text" value="2"/> ▼ ▲			
Wait To Send(ms)	<input type="text" value="0"/> ▼ ▲			
Exit		Back		2012/07/09 03:37:39

Setup Items	Setup Description
Port No.	Set the Port No. of the Display. Select either of [Fixed] or [Auto]. When you select [Fixed], use an integer from "1024 to 65535" to enter the port number of the Display. When you select [Auto], the port number will be automatically assigned regardless of the entered value.
Timeout	Use an integer from 1 to 127 to enter the time (s) for which Display waits for the response from 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

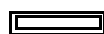
To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings] in offline mode. Touch the External Device you want to set from the displayed list, and touch [Device].




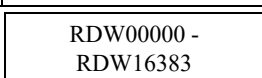

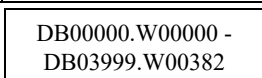

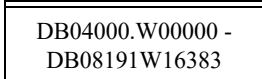

Comm.	Device			
Saia Ether-S-Bus		[UDP]	Page 1/1	
Device/PLC Name		PLC1		
IP Address		192 168 0 1		
Station No.		0		
Exit		Back		2012/07/09 03:37:44

Setup Items	Setup Description
IP Address	Set IP address of the External Device. <b>MEMO</b> <ul style="list-style-type: none"> <li>Check with a network administrator about IP address. Do not set the duplicate IP address.</li> </ul>
Station No.	Use an integer from 0 to 253 to enter the Station No. of the External Device.

## 5 Supported Devices

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 connecting equipment.

 This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Notes
Internal Bit (Flag)	F00000 - F14335	F00000 - F14320	L / H	 *1
Input Bit	I00000 - I01023	I00000 - I01008		 *2
Output Bit	O00000 - O01023	O00000 - O01008		 *1
Register Dword	RDX00000.00 - RDX16383.31	 RDW00000 - RDW16383	-	 *1
Timer Word	-	T00000 - T01599		
Counter Word	-	C00000 - C01599		
Data Block (0 ~ 3999)	DB00000.W00000.00 - DB03999.W00382.31	 DB00000.W00000 - DB03999.W00382		 *1
Data Block (4000 ~ 8191)	DB04000.W00000.00 - DB08191.W16383.31	 DB04000.W00000 - DB08191W16383		 *1

\*1 When bits are written, the Display reads the corresponding word address from the External Device, sets particular bits of that word address to ON, and then returns the resulting address to the External Device. Note that the data may not be written correctly if you write to the word address using the External Device while the Display is reading data from, and writing data to, the External Device.

\*2 Write disable

### MEMO

- 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 Relay	I	0080	Word address divided by 16
Output Relay	O	0081	Word address divided by 16
Internal Bit (Flag)	F	0082	Word address divided by 16
Timer Word	T	0060	Word address
Counter Word	C	0061	Word address
Data Block	DB	0000	(Data block number x 0x10000) + Word address
Register DWord	RD	0001	Word address

## 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. <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;"><b>MEMO</b></div> <ul style="list-style-type: none"> <li>• IP address is displayed such as "IP address (Decimal): MAC address (Hex)".</li> <li>• Device address is displayed such as "Address: Device address".</li> <li>• Received error codes are displayed such as "Decimal [Hex]".</li> </ul>

Display Examples of Error Messages

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

**MEMO**

- Please refer to the manual of External Device for more detail of received error codes.
- Please refer to "Display-related errors" of "Maintenance/Troubleshooting Guide" for a common error message to the driver.

### ■ Error Codes Unique to External Device

Error code	Description
0x01	NAK error