Azbil Corporation

MODBUS TCP Master Driver

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
This section lists the types of External Devices and SIO that you can connect. | ☞ "1 System Configuration" (page 3) |

| 2 | External Device Selection
Select the model (series) of the External Device and its connection method. | ☞ "2 External Device Selection" (page 5) |

| 3 | Communication Settings
This section shows setting examples for communicating between the Display and the External Device. | ☞ "3 Communication Setting" (page 6) |

| 4 | Setup Items
This section describes communication setup items on the Display.
Set the communication settings of the Display with GP-Pro EX or in offline mode. | ☞ "4 Setup Items" (page 8) |

Operation

1 System Configuration

The following table lists system configurations for connecting Azbil Corporation External Devices and the Display.

| Series	CPU	Link I/F	SIO Type	Setting Example
NX	NX-D15□□□□□□ NX-D25□□□□□□ NX-D35□□□□□□	NX-CL1□□□□□□ NX-CR1□□□□□□ NX-CB1□□□□□□	Ethernet (TCP)	Setting Example 1 (page 6)

NOTE
• When using the communication adapter (NX-CL1, NX-CR1) or the ports 3 and 4 of the communication box (NX-CB1), you need to use a switching HUB supporting the 100BASE-TX/ 10BASE-T auto negotiation function.
Refer to your External Device manual for details.

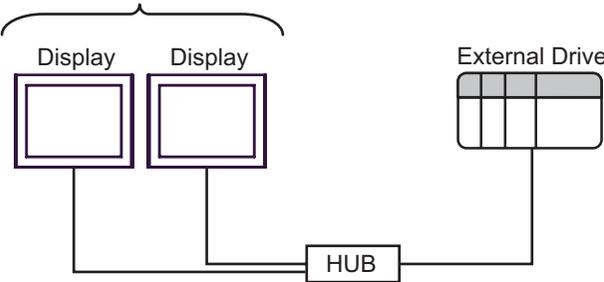■ Connection Configuration

• 1:1 Connection
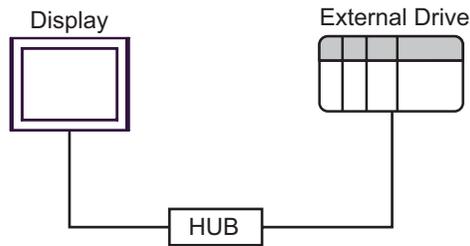
• 1: n Connection
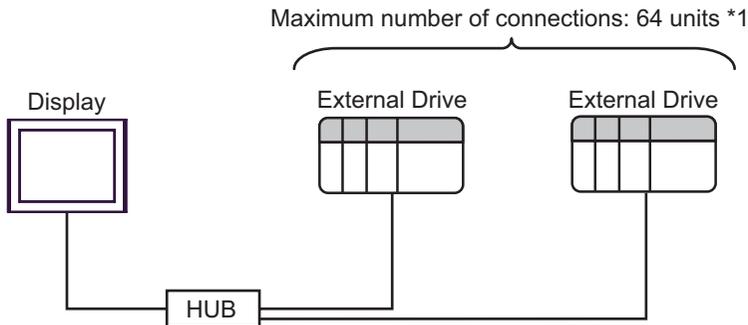
*1 When 33 or more External Devices are connected, it is necessary to check [Increase allowable number of Devices/PLCs].
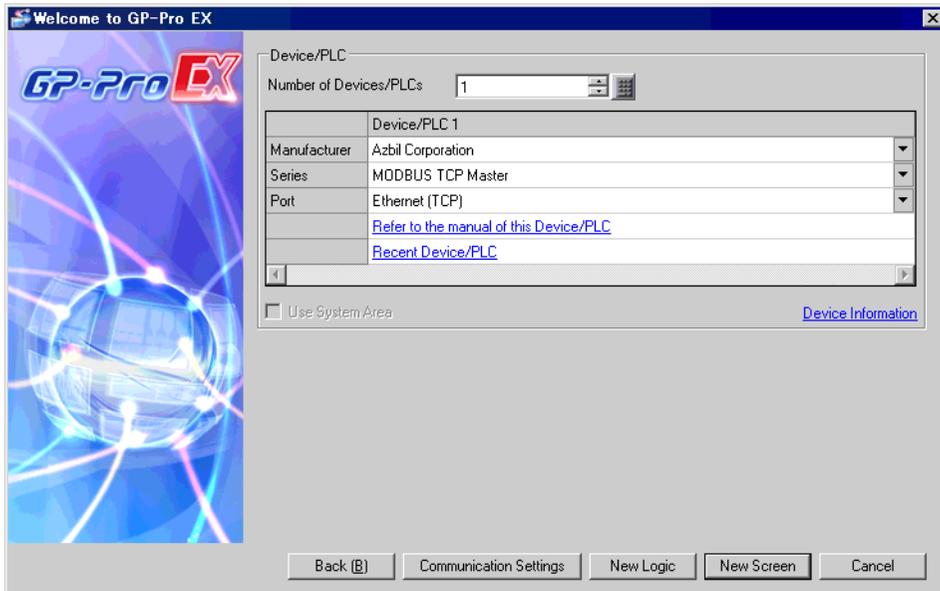
)"4.1 Setup Items in GP-Pro EX" (page 8)

• n: 1 Connection

Maximum number of connections: 2 units

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 "Azbil Corporation".
Series	Select the model (series) of the External Device to be connected and connection method. Select "MODBUS TCP Master". In the System Configuration, check to make sure the External Device you are connecting is supported in "MODBUS TCP Master". ☞ "1 System Configuration" (page 3)
Port	Select the port of the Display to be connected to the External Device.
Use System Area	Not available in this driver.

3　　　Communication Setting

This section provides examples of communication settings for the Display and the External Device, which are recommended by Pro-face.

3.1　　　Setting Example 1

■ GP-Pro EX Settings

◆ Communication Settings

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

◆ Device Setting

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

◆ Notes

- Check with your network administrator about the IP address you want to use.

- Do not duplicate IP addresses on the same network.

- In [Individual Device Settings], set the IP address of the External Device.

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

■ External Device Settings

Use Smart Loader Package (SLP-NX) for the External Device communication settings.

Refer to your External Device manual for details.

1 Start Smart Loader Package.

2 Display the configuration screen of the External Device.

3 Execute scanning of the External Device.

The External Devices being connected via network are displayed on the configuration screen.

| NOTE | • The factory default IP address of the External Device is 192.168.255.254. If no External Device is displayed on the screen, use Smart Loader Package and adjust the PC's IP address. |

4 Set the External Device IP address as follows:

Setup Items	Setting
IP Address	192.168.0.1

5 Transfer the settings to the External Device.

◆ Notes

- Check with your network administrator about the IP address you want to use.

- Do not duplicate IP addresses on the same network.

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.
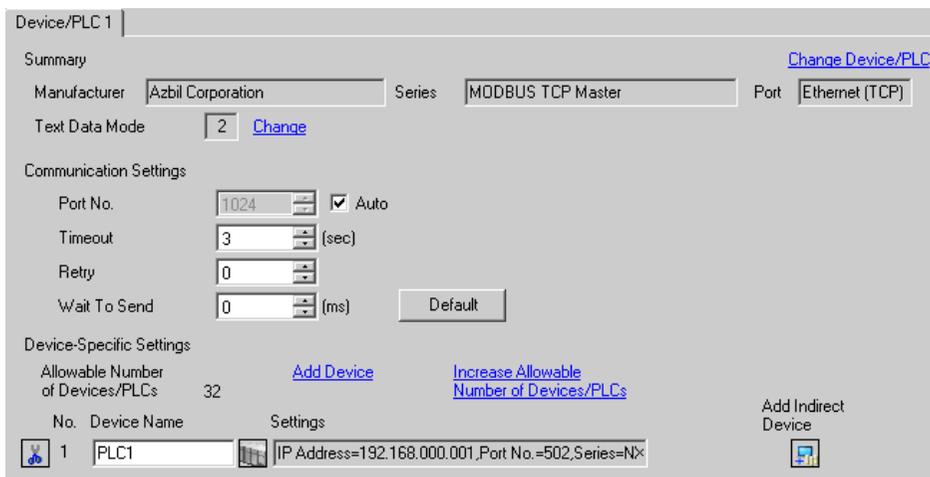
)"3 Communication Setting" (page 6)

| 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

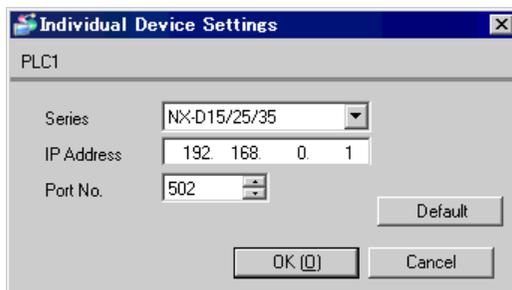To display the setup screen, from the [System Settings] workspace, select [Device/PLC].

Setup Items	Setup Description
Port No.	Use an integer from "1024 to 65535" to enter the port number of the Display. If you check [Auto], the port number will be automatically set.
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, enter how many times the Display retransmits the command, from "0 to 255".
Wait To Send	Enter the standby time (ms) from when the Display receives packets until it transmits the next command, from "0 to 5000".
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".
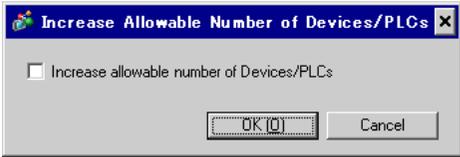
NOTE	• Refer to the GP-Pro EX Reference Manual for Indirect Device.

■ Device Setting

To display the [Individual Device Settings] dialog box, select the external device and click [Settings] from [Device-Specific Settings] in the [Device/PLC] window. 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
Series	Select a model of the External Device.
IP Address	Set the IP address of the External Device. **NOTE** • Check with your network administrator about the IP address you want to use. • Do not duplicate IP addresses on the same network.
Port No.	Use an integer from "1 to 65535" to enter the port number of the External Device.

4.2　　　Setup Items in 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.

Comm.	Device			

MODBUS TCP Master　　　　　　　　　　　　　　　　　[TCP]　　　Page 1/1

Port No.　　　　　　　　　○ Fixed　● Auto
　　　　　　　　　　　　　　　　　　1024　▼　▲

Timeout(s)　　　　　　　　　　　　　3　▼　▲
Retry　　　　　　　　　　　　　　　0　▼　▲
Wait To Send(ms)　　　　　　　　　　0　▼　▲

| | Exit | | Back | 2009/11/02 18:44:44 |

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 the Display waits for the response from the External Device.
Retry	In case of no response from the External Device, enter how many times the Display retransmits the command, from "0 to 255".
Wait To Send	Enter the standby time (ms) from when the Display receives packets until it transmits the next command, from "0 to 5000".

◆ 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].

Comm.	Device			

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Device/PLC Name   PLC1   ▼

IP Address   192 168   0   1
Port No.   502 ▼ ▲

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Setup Items	Setup Description
Device/PLC Name	Select the External Device to set. The device name is the title of the External Device set with GP-Pro EX.(Initial value [PLC1])
IP Address	Set the IP address of the External Device. **NOTE** • Check with your network administrator about the IP address you want to use. • Do not duplicate IP addresses on the same network.
Port No.	Use an integer from "1 to 65535" to enter the port number of the External Device.

5 Supported Device

The range of supported device addresses is shown in the table below. Please note that the actual supported range for devices varies depending on the external device that is used. Please check the actual range in the external device manual.

Enter the External Device address in the dialog box below.
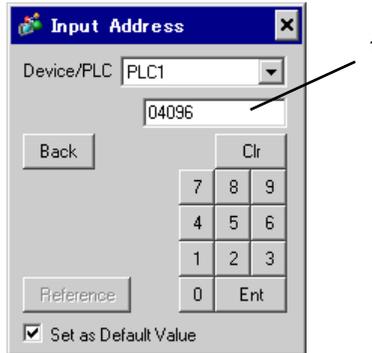
1. Address   Enter the address.

⬜⬜⬜⬜ : This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
Data	04096,00 -36678,15	04096 - 36678	⌐L / H⌐	*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 correct data may not be written if you change the word address using the ladder program while the Display reads data from the External Device and returns it.

> **IMPORTANT**
> - Setting [Enable System Data Area] in the system area setting of GP-Pro EX may cause malfunction. Do not set [Enable System Data Area].
> - Refer to your External Device manual for precautions on device reading and writing.

> **NOTE**
> - You can set only the reading area size in the External Device's system area setting. Refer to the GP-Pro EX Reference Manual for the reading area size.
>
>   Cf.   GP-Pro EXReference Manual "LS Area (Direct Access Method Area)"
>
> - Refer to the precautions on manual notation for icons in the table.
>
> ☞ "Manual Symbols and Terminology"
>
> - Even if you use a nonexistent address, the read error may not be displayed. In this case, "0" is retained for the read data. Note that the write error is displayed.

6   Device Code and Address Code

Use device code and address code when you set "Device Type & Address" for the address type of the data display or other devices.

Device	Device Name	Device Code (HEX)	Address Code
Data	---	0000	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 Number.
Device Name	Name of the External Device where an error has occurred. The Device name is the title of the External Device set with GP-Pro EX.(Initial value [PLC1])
Error Message	Displays messages related to an error that has occurred.
Error Occurrence Area	Displays the IP address or device address of the External Device where an error has occurred, or error codes received from the 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 Guide" for details on the error messages common to the driver.

■ Error Codes Specific to the External Device

Error Code (HEX)	Description
01	Does not support the corresponding Function Code.
02	The specified data address does not exist.
03	Data value error.
06	The External Device is in busy condition.[1]

[1]   When it become in busy condition, adjust the timeout setting according to the system.