XGT Series Cnet 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 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 6)
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 7)
4	Setup Items This section describes communication setup items on the Display. Set communication settings of the Display with GP-Pro Ex or in off-line mode.	☞"4 Setup Items" (page 17)
5	Cable Diagram This section shows cables and adapters for connecting the Display and the External Device.	☞"5 Cable Diagram" (page 22)

Operation

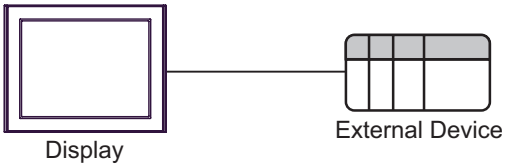
1 System Configuration

The system configuration in the case when the External Device of LS Industrial Systems and the Display are connected is shown.

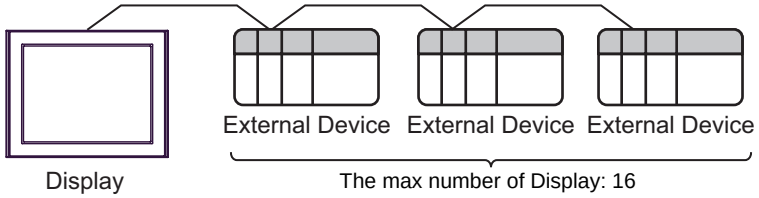
Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
XGK	XGK-CPUE XGK-CPUS XGK-CPUA XGK-CPUH	CH1 port on XGL-C22A	RS232C	"Setting Example 1" (page 7)	"Cable Diagram 1" (page 22)
		CH2 port on XGL-C22A	RS232C	"Setting Example 2" (page 9)	"Cable Diagram 1" (page 22)
		CH1 port on XGL-C42A	RS422/485 (4 wire)	"Setting Example 3" (page 11)	"Cable Diagram 2" (page 23)
		CH2 port on XGL-C42A	RS422/485 (4 wire)	"Setting Example 4" (page 13)	"Cable Diagram 2" (page 23)
		CH1 port on XGL-CH2A	RS232C	"Setting Example 1" (page 7)	"Cable Diagram 1" (page 22)
		CH2 port on XGL-CH2A	RS422/485 (4 wire)	"Setting Example 4" (page 13)	"Cable Diagram 2" (page 23)
XGB	XBM-DR16S XBM-DN16S XBM-DN32S	CH1 port on CPU	RS232C	"Setting Example 5" (page 15)	"Cable Diagram 3" (page 28)
		XBL-C21A	RS232C	"Setting Example 2" (page 9)	"Cable Diagram 1" (page 22)
		XBL-C41A	RS422/485 (4 wire)	"Setting Example 4" (page 13)	"Cable Diagram 2" (page 23)

■ Connection Configuration

- 1:1 Connection



- 1:n Connection



■ COM Port of IPC

When connecting IPC with External Device, the COM port which can be used changes with series and SIO type. Please refer to the manual of IPC for details.

Usable port

Series	Usable port		
	RS-232C	RS-422/485(4 wire)	RS-422/485(2 wire)
PS-2000B	COM1[*1], COM2, COM3[*1], COM4	-	-
PS-3450A, PS-3451A	COM1, COM2[*1*2]	COM2[*1*2]	COM2[*1*2]
PS-3650A, PS-3651A	COM1[*1]	-	-
PS-3700A (Pentium®4-M) PS-3710A	COM1[*1], COM2[*1], COM3[*2], COM4	COM3[*2]	COM3[*2]
PS-3711A	COM1[*1], COM2[*2]	COM2[*2]	COM2[*2]
PL-3000B	COM1[*1*2], COM2[*1], COM3, COM4	COM1[*1*2]	COM1[*1*2]

*1 The RI/5V can be switched. Please switch with the change switch of IPC.

*2 It is necessary to set up the SIO type with the Dip switch. Please set up as follows according to SIO type to be used.

Dip switch setting: RS-232C

Dip switch	Setting	Description
1	OFF[*1]	Reserve (always OFF)
2	OFF	SIO type: RS-232C
3	OFF	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	OFF	Short-circuit of SDA (TXA) and RDA (RXA): Does not Exist
8	OFF	Short-circuit of SDB (TXB) and RDB (RXB): Does not Exist
9	OFF	RS (RTS) Auto control mode: Disable
10	OFF	

*1 It is necessary to turn ON the set value, only when using PS-3450A and PS-3451A.

Dip switch setting: RS-422/485 (4 wire)

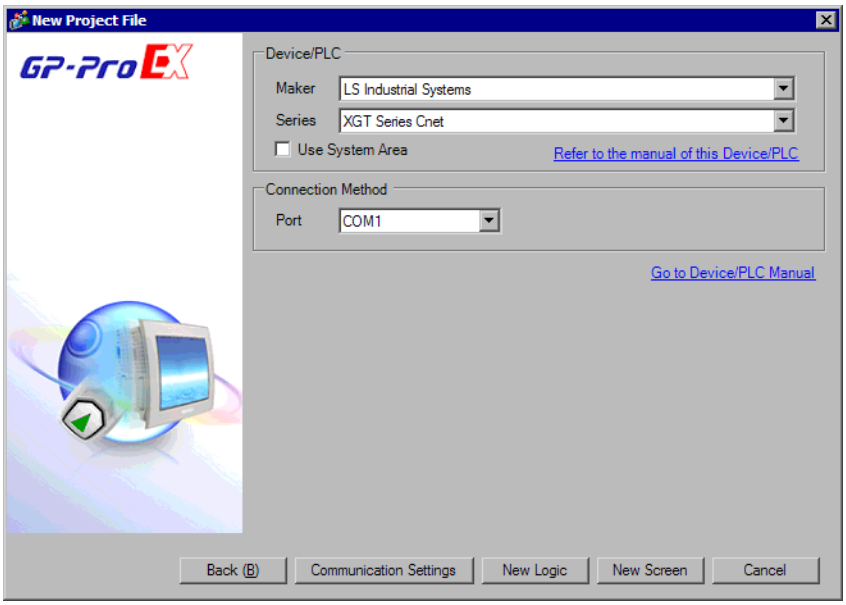
Dip switch	Setting	Description
1	OFF	Reserve (always OFF)
2	ON	SIO type: RS-422/485
3	ON	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	OFF	Short-circuit of SDA (TXA) and RDA (RXA): Does not Exist
8	OFF	Short-circuit of SDB (TXB) and RDB (RXB): Does not Exist
9	OFF	RS (RTS) Auto control mode: Disable
10	OFF	

Dip switch setting: RS-422/485 (2 wire)

Dip switch	Setting	Description
1	OFF	Reserve (always OFF)
2	ON	SIO type: RS-422/485
3	ON	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	ON	Short-circuit of SDA (TXA) and RDA (RXA): Exist
8	ON	Short-circuit of SDB (TXB) and RDB (RXB): Exist
9	ON	RS (RTS) Auto control mode: Enable
10	ON	

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 "LS Industrial Systems".
Series	Select a model (series) of the External Device to be connected and connection method. Select "XGT Series Cnet". Check the External Device which can be connected in "XGT Series Cnet" in system configuration. ☞ "1 System Configuration" (page 3)
Use System Area	Check this option when you synchronize the system data area of the Display and the device (memory) of the External Device. When synchronized, you can use the ladder program of the External Device to switch the display or display the window on the Display. Cf. GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)" This can be also set with GP-Pro EX or in off-line mode of the Display. Cf. GP-Pro EX Reference Manual "5.14.6 Setting Guide of [System Setting Window], Setting Guide of [Main Unit Settings], System Area Setting" Cf. Maintenance/Troubleshooting manual "2.14.1 Common to the Display", Setting Guide of [Main Unit Settings], System Area Setting"
Port	Select the Display port to be connected to the External Device.

3 Example of Communication Setting

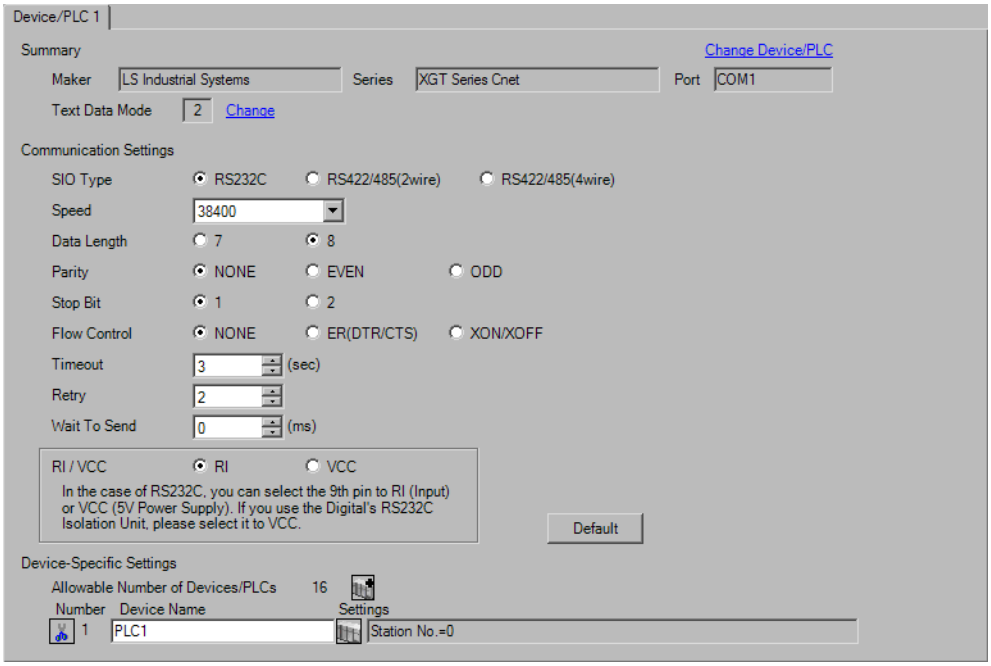
The following shows examples of communication settings of the Display and the External Device, which is recommended by Pro-face.

3.1 Setting Example 1

■ Settings of GP-Pro EX

◆ Communication Settings

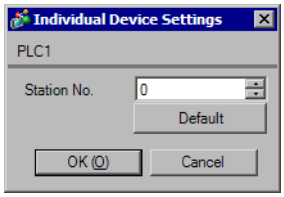
To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



◆ 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 multiple External Device, click  from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



■ Settings of External Device

Communication setting of External Device using setting tool (XG-PD Editor) by LS Industrial Systems.
Please refer to the manual of the External Device for more details.

1 Start up the setting tool.
2 Select base and slot which using module is connected from [Standard settings] tab in offline, and [Communication Module Settings] dialog box is displayed.
3 Select “Cnet” from [Type], and click [OK].
4 Select [Connect] from [Online] menu.
5 Select [Read IO Information] from the [Online] menu.
6 Double click [Cnet] from the [Standard settings] tab, and [Standard Settings-Cnet] dialog box is displayed.
7 Set [Channel 1] setup items as follows, and click [OK].

Setup Item	Setting Value
Type	RS232C
Speed	38400
Data Bit	8
Stop Bit	1
Parity Bit	NONE
Modem Type	Null Modem
Station	0
Active mode	XGT server

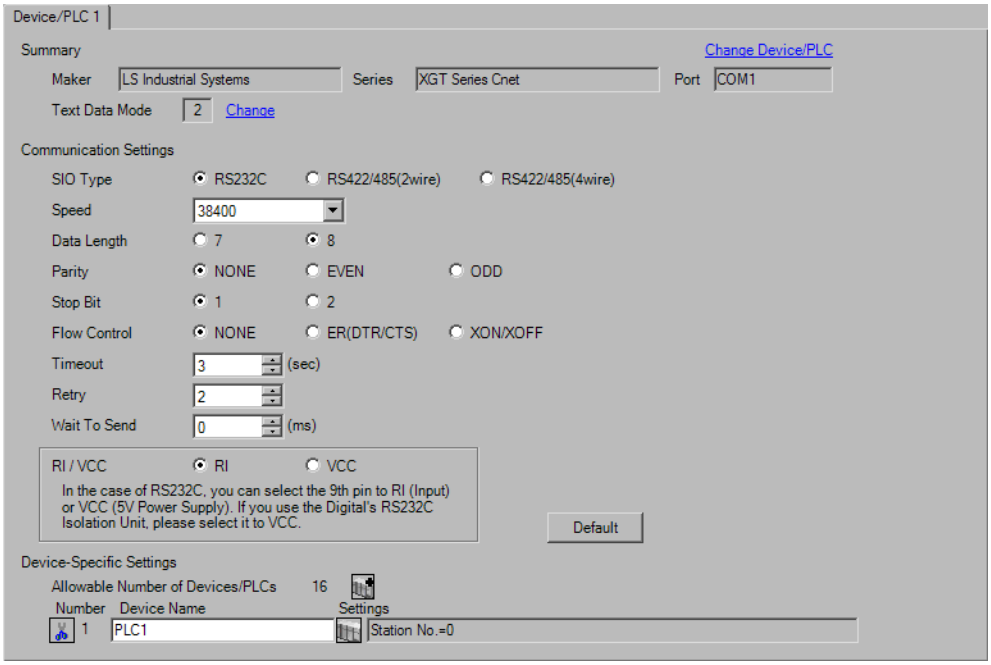
8 Select [Write Parameter] from the [Online] menu, and [Write Parameter] dialog box is displayed.
9 Select using module, and click [OK].
10 Select [Reset] from the [Online] menu.

3.2 Setting Example 2

■ Settings of GP-Pro EX

◆ Communication Settings

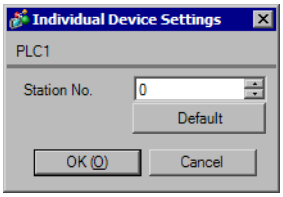
To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



◆ 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 multiple External Device, click  from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



■ Settings of External Device

Communication setting of External Device using setting tool (XG-PD Editor) by LS Industrial Systems.
Please refer to the manual of the External Device for more details.

1 Start up the setting tool.
2 Select base and slot which using module is connected from [Standard settings] tab in offline, and [Communication Module Settings] dialog box is displayed.
3 Select “Cnet” from [Type], and click [OK].
4 Select [Connect] from [Online] menu.
5 Select [Read IO Information] from the [Online] menu.
6 Double click [Cnet] from the [Standard settings] tab, and [Standard Settings-Cnet] dialog box is displayed.
7 Set [Channel 2] setup items as follows, and click [OK].

Setup Item	Setting Value
Type	RS232C
Speed	38400
Data Bit	8
Stop Bit	1
Parity Bit	NONE
Modem Type	Null Modem
Station	0
Active mode	XGT server

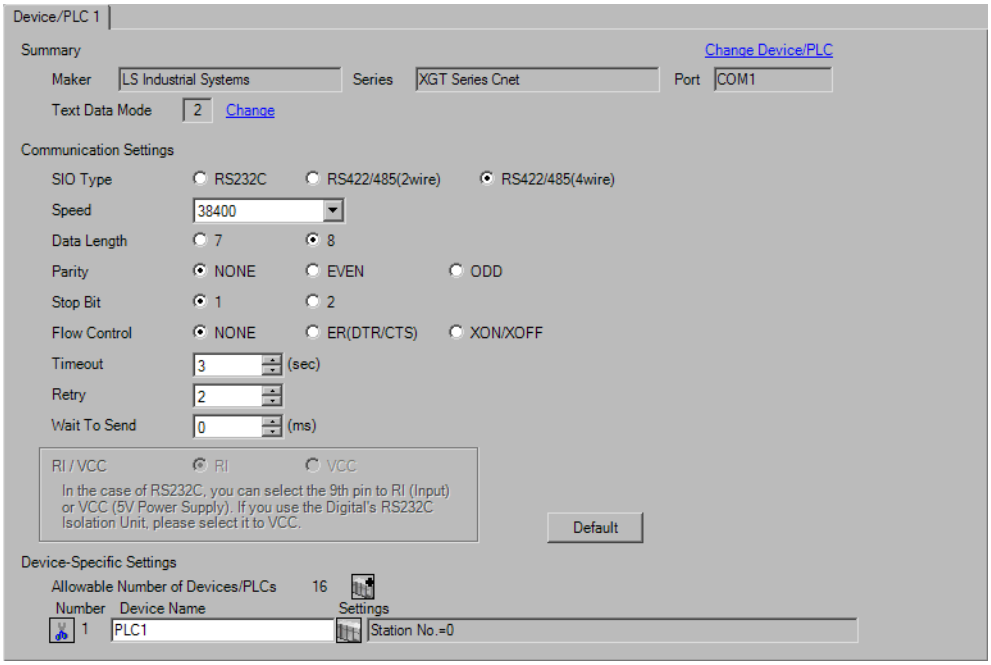
8 Select [Write Parameter] from the [Online] menu, and [Write Parameter] dialog box is displayed.
9 Select using module, and click [OK].
10 Select [Reset] from the [Online] menu.

3.3 Setting Example 3

■ Settings of GP-Pro EX

◆ Communication Settings

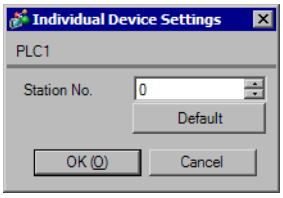
To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



◆ 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 multiple External Device, click  from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



■ Settings of External Device

Communication setting of External Device using setting tool (XG-PD Editor) by LS Industrial Systems.
Please refer to the manual of the External Device for more details.

1 Start up the setting tool.
2 Select base and slot which using module is connected from [Standard settings] tab in offline, and [Communication Module Settings] dialog box is displayed.
3 Select “Cnet” from [Type], and click [OK].
4 Select [Connect] from [Online] menu.
5 Select [Read IO Information] from the [Online] menu.
6 Double click [Cnet] from the [Standard settings] tab, and [Standard Settings-Cnet] dialog box is displayed.
7 Set [Channel 1] setup items as follows, and click [OK].

Setup Item	Setting Value
Type	RS485
Speed	38400
Data Bit	8
Stop Bit	1
Parity Bit	NONE
Modem Type	Null Modem
Station	0
Active mode	XGT server

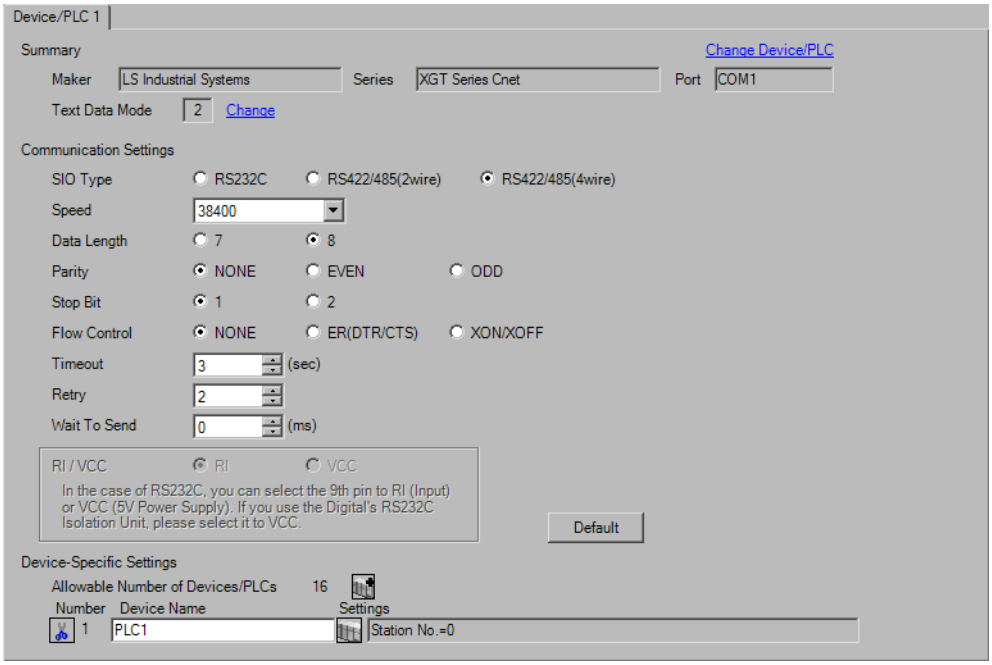
8 Select [Write Parameter] from the [Online] menu, and [Write Parameter] dialog box is displayed.
9 Select using module, and click [OK].
10 Select [Reset] from the [Online] menu.

3.4 Setting Example 4

■ Settings of GP-Pro EX

◆ Communication Settings

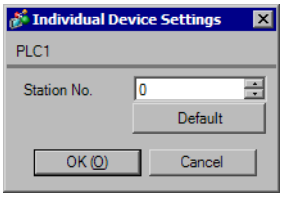
To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



◆ 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 multiple External Device, click  from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



■ Settings of External Device

Communication setting of External Device using setting tool (XG-PD Editor) by LS Industrial Systems.
Please refer to the manual of the External Device for more details.

1 Start up the setting tool.
2 Select base and slot which using module is connected from [Standard settings] tab in offline, and [Communication Module Settings] dialog box is displayed.
3 Select “Cnet” from [Type], and click [OK].
4 Select [Connect] from [Online] menu.
5 Select [Read IO Information] from the [Online] menu.
6 Double click [Cnet] from the [Standard settings] tab, and [Standard Settings-Cnet] dialog box is displayed.
7 Set [Channel 2] setup items as follows, and click [OK].

Setup Item	Setting Value
Type	RS485
Speed	38400
Data Bit	8
Stop Bit	1
Parity Bit	NONE
Modem Type	Null Modem
Station	0
Active mode	XGT server

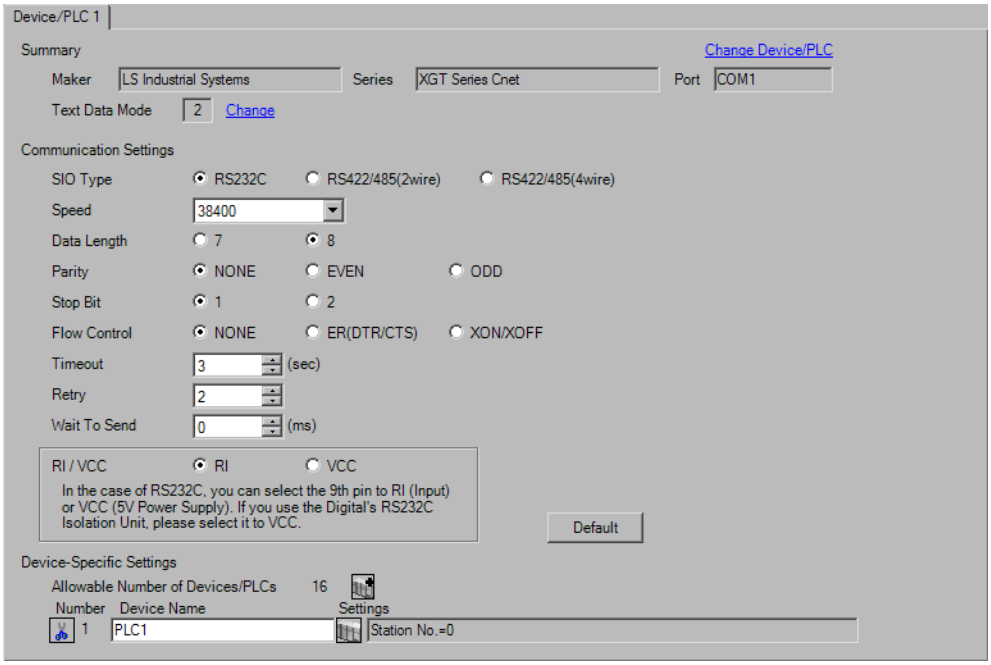
8 Select [Write Parameter] from the [Online] menu, and [Write Parameter] dialog box is displayed.
9 Select using module, and click [OK].
10 Select [Reset] from the [Online] menu.

3.5 Setting Example 5

■ Settings of GP-Pro EX

◆ Communication Settings

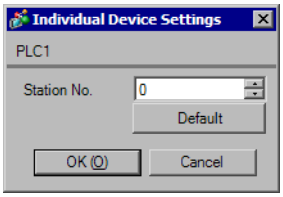
To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



◆ 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 multiple External Device, click  from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



■ Settings of External Device

Communication setting of External Device using setting tool (XG-PD Editor) by LS Industrial Systems.
Please refer to the manual of the External Device for more details.

1 Start up the setting tool.
2 Select base and slot which using module is connected from [Standard settings] tab in offline, and [Communication Module Settings] dialog box is displayed.
3 Select “Cnet” from [Type], and click [OK].
4 elect “Cnet” from [Type], and click [OK].
5 Select [Connect] from [Online] menu.
6 Select [Read IO Information] from the [Online] menu.
7 Double click [Cnet] from the [Standard settings] tab, and [Standard Settings-Cnet] dialog box is displayed.
8 Set [Channel 1] setup items as follows, and click [OK].

Setup Item	Setting Value
Speed	38400
Data Bit	8
Stop Bit	1
Parity Bit	NONE
Station	0
Active mode	XGT server

9 Select [Write Parameter] from the [Online] menu, and [Write Parameter] dialog box is displayed.
10 Select using module, and click [OK].
11 Select [Reset] from the [Online] menu.

4 Setup Items

Set communication settings of the Display with GP-Pro EX or in off-line mode of the Display.

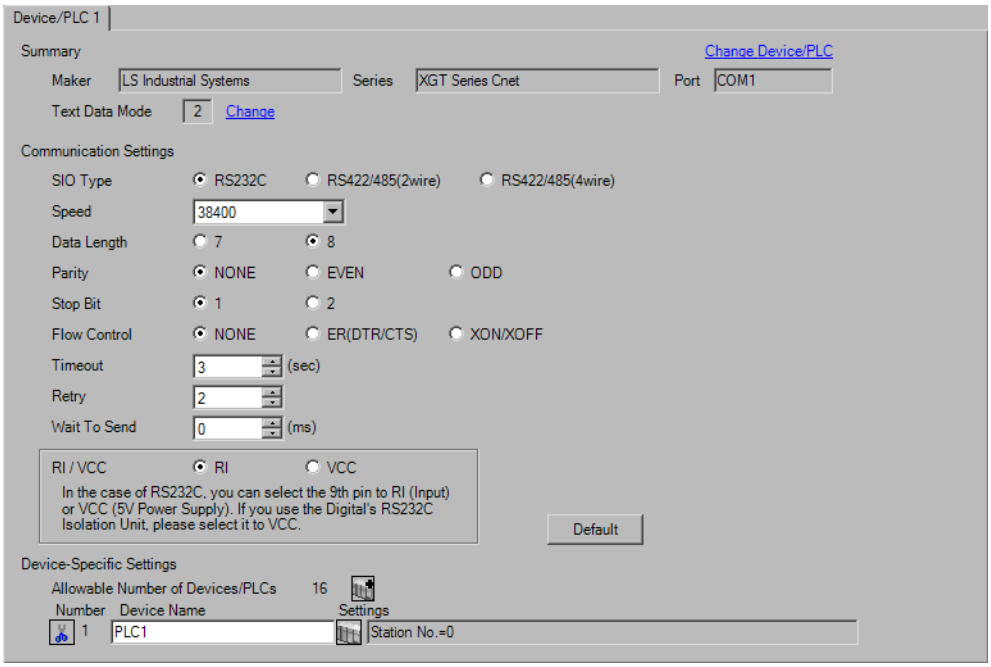
The setting of each parameter must be identical to that of External Device.

☞"3 Example of Communication Setting" (page 7)

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.

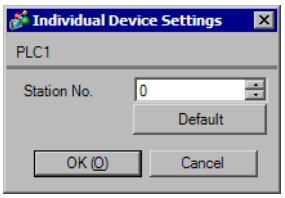


Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device.
Speed	Select speed between the External Device and the Display.
Data Length	Select data length.
Parity	Select how to check parity.
Stop Bit	Select stop bit length.
Flow Control	Select the communication control method to prevent overflow of transmission and reception data.
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.
RI/VCC	You can switch RI/VCC of the 9th pin when you select RS232C for SIO type. It is necessary to change RI/5V by changeover switch of IPC when connect with IPC. Please refer to the manual of the IPC for more detail.

■ 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 multiple External Device, click  from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



Setup Items	Setup Description
Station No.	Use an integer from 0 to 31 to enter the Station No. of the External Device. (Initial value [0])

4.2 Setup Items in Off-Line Mode

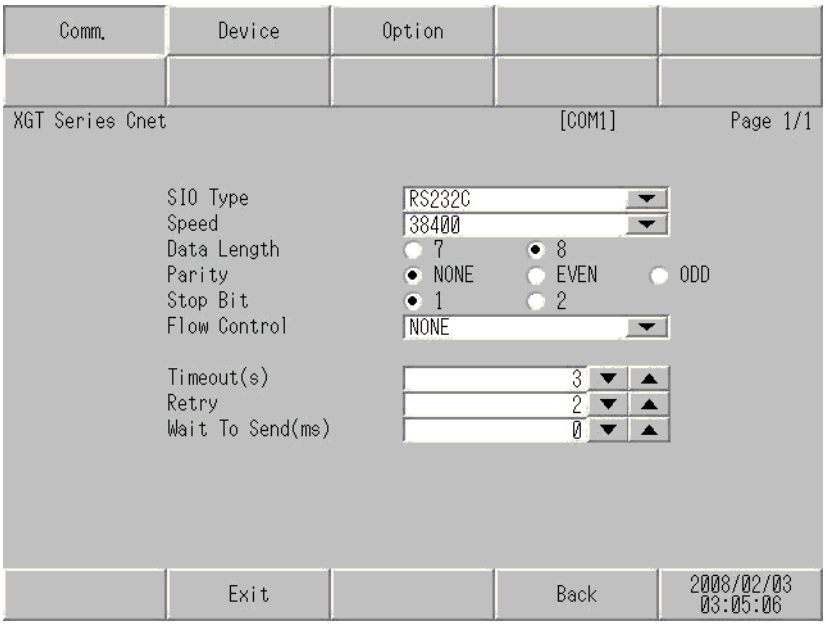
NOTE

- Please refer to Maintenance/Troubleshooting for more information on how to enter off-line mode or about operation.

  Cf. Maintenance/Troubleshooting "2.2 Offline Mode"

■ Communication Settings

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



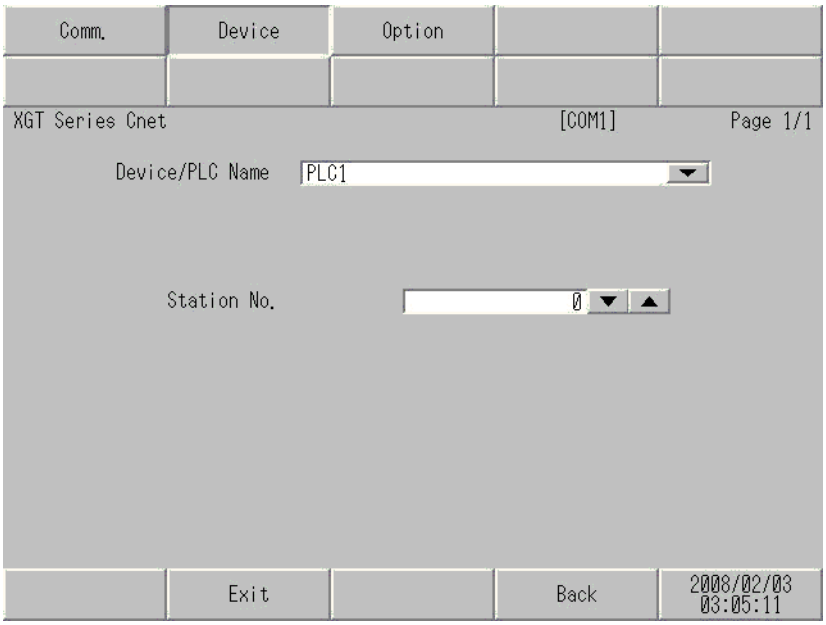
Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device. **IMPORTANT** To make the communication settings correctly, confirm the serial interface specifications of Display unit for [SIO Type]. We cannot guarantee the operation if a communication type that the serial interface does not support is specified. For details concerning the serial interface specifications, refer to the manual for Display unit.
Speed	Select speed between the External Device and the Display.
Data Length	Select data length.
Parity	Select how to check parity.
Stop Bit	Select stop bit length.
Flow Control	Select the communication control method to prevent overflow of transmission and reception data.
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.

Continues to the next page.

Setup Items	Setup Description
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

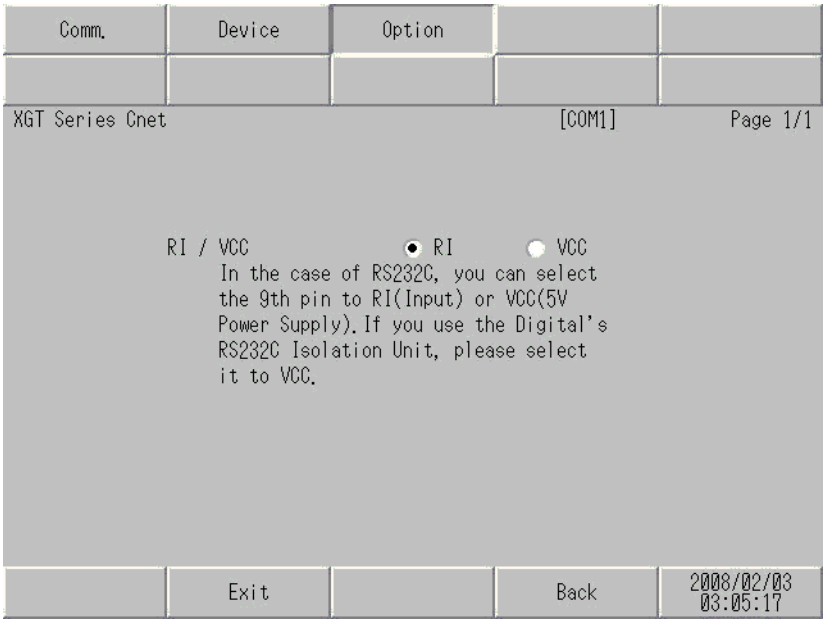
To display the setting screen, touch [Device/PLC Settings] from [Peripheral Equipment Settings]. Touch the External Device you want to set from the displayed list, and touch [Device Settings].



Setup Items	Setup Description
Device/PLC name	Select the External Device to set. Device name is a title of the External Device set with GP-Pro EX. (Initial value [PLC1])
Station No.	Use an integer from 0 to 31 to enter the Station No. of the External Device. (Initial value [0])

■ Option

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



Setup Items	Setup Description
RI/VCC	Switches RI/VCC of the 9th pin. It is necessary to change RI/5V by changeover switch of IPC when connect with IPC. Please refer to the manual of the IPC for more detail.

5 Cable Diagram

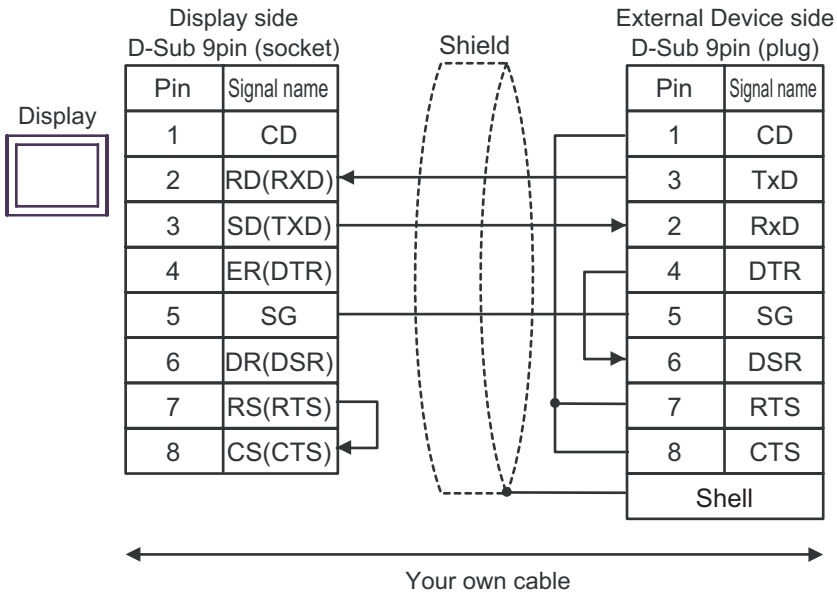
The cable diagram shown below may be different from the cable diagram recommended by LS Industrial Systems. Please be assured there is no operational problem in applying the cable diagram shown in this manual.

- The FG pin of the External Device body must be D-class grounded. Please refer to the manual of the External Device for more details.
- SG and FG are connected inside the Display. When connecting SG to the External Device, design the system not to form short-circuit loop.
- Connect the isolation unit, when communication is not stabilized under the influence of a noise etc.

Cable Diagram 1

Display (Connection Port)	Cable	Notes
GP (COM1) ST (COM1) IPC*1 PC/AT	Your own cable	Cable length: 15m or less

*1 Only the COM port which can communicate by RS-232C can be used.
☞"■ COM Port of IPC" (page 4)



Cable Diagram 2

Display (Connection Port)	Cable		Notes
GP[*1] (COM1) AGP-3302B (COM2) ST[*2] (COM2) IPC[*3]	A	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + Your own cable	Cable length: 500m or less
	B	Your own cable	
GP[*4] (COM2)	C	Online adapter by Pro-face CA4-ADPONL-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + Your own cable	
	D	Online adapter by Pro-face CA4-ADPONL-01 + Your own cable	

*1 All GP models except AGP-3302B

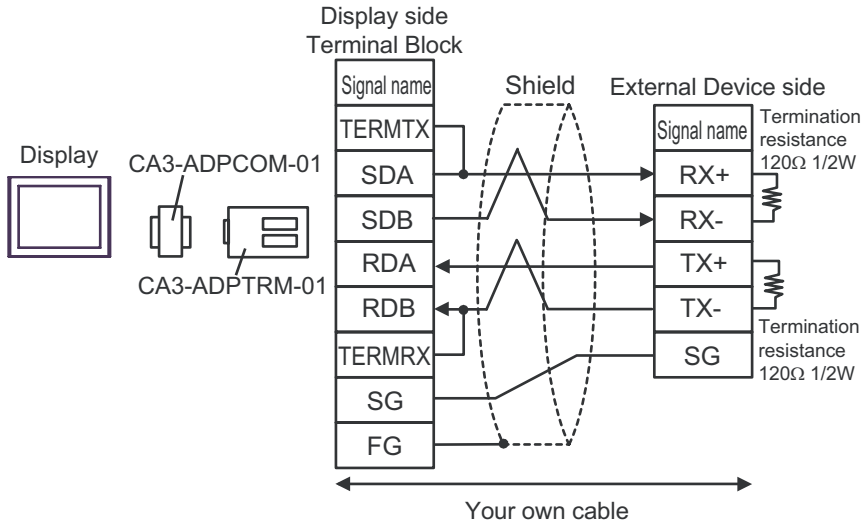
*2 All ST models except AST-3211A

*3 Only the COM port which can communicate by RS-422/485 (4 wire) can be used.
☞"■ COM Port of IPC" (page 4)

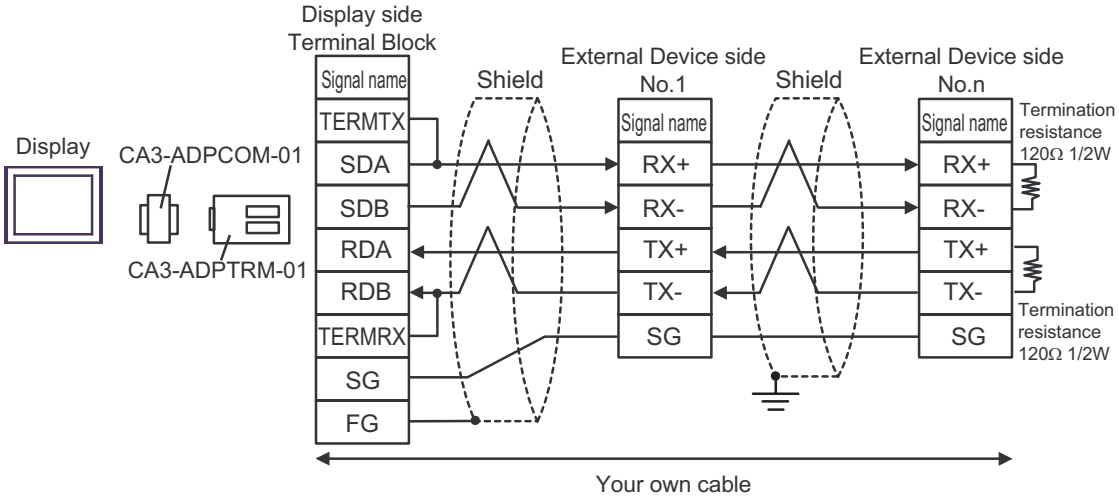
*4 All GP models except GP-3200 series and AGP-3302B

A) When using the COM port conversion adapter (CA3-ADPCOM-01), the terminal block conversion adapter (CA3-ADPTRM-01) by Pro-face and your own cable

- 1:1 Connection

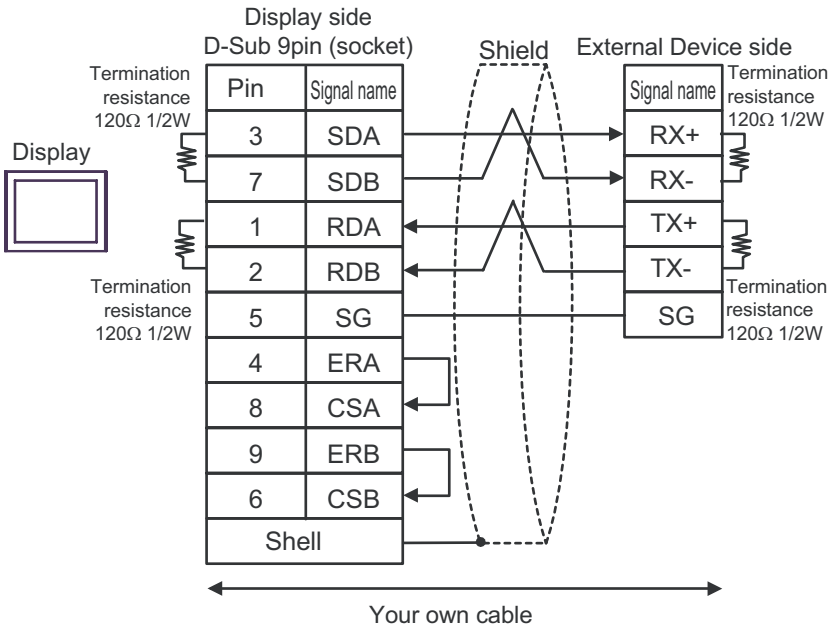


- 1:n Connection

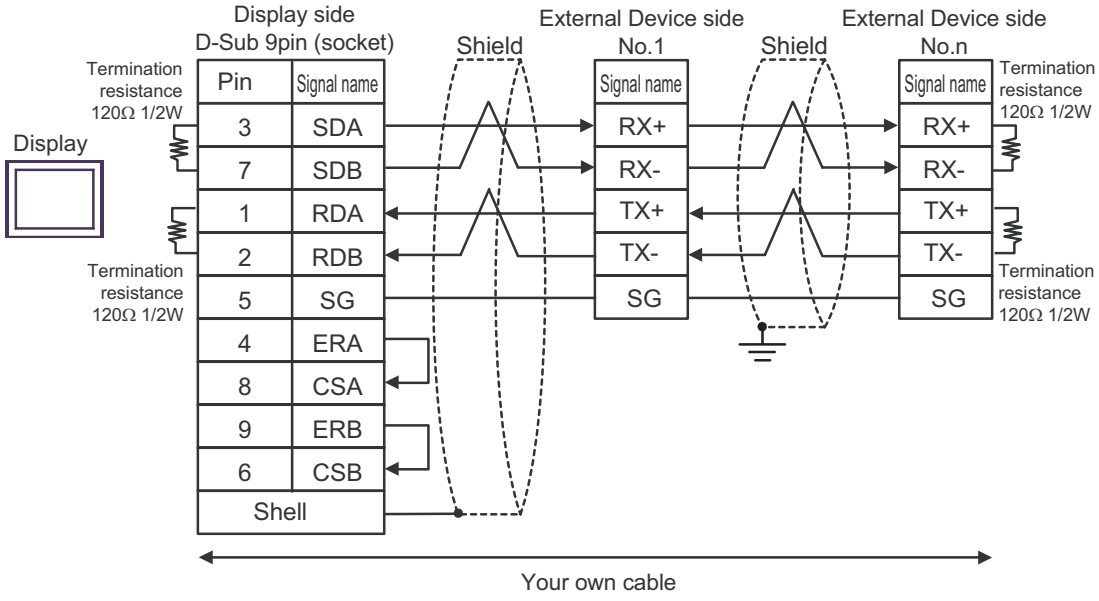


B) When using your own cable

- 1:1 Connection

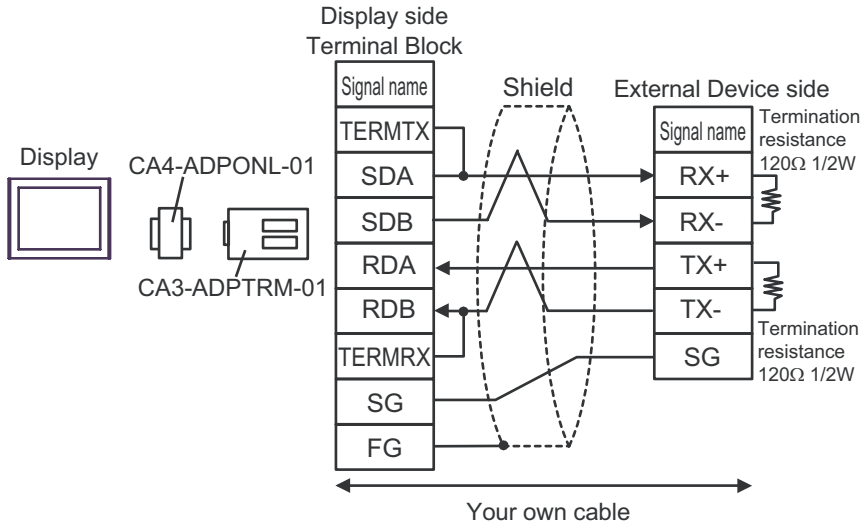


- 1:n Connection

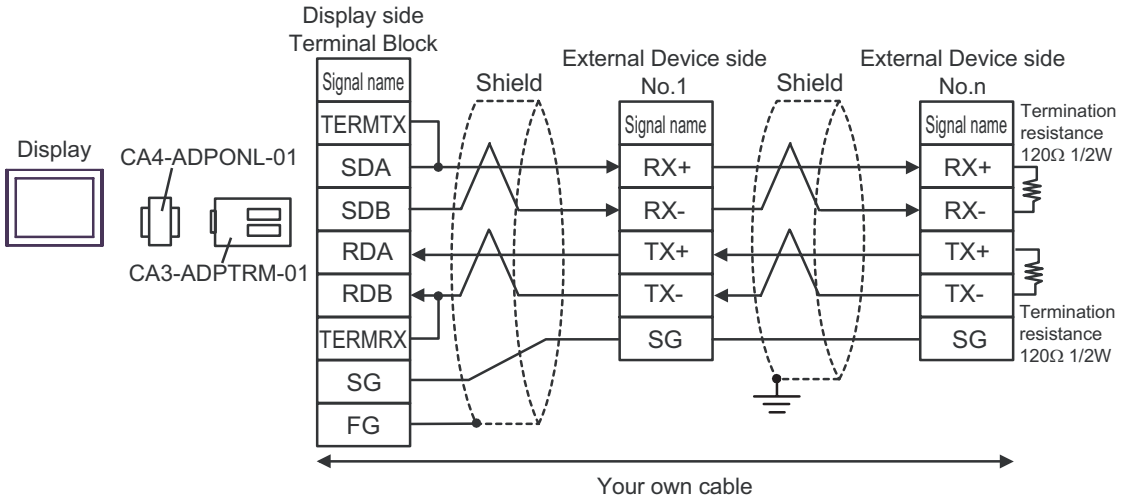


C) When using the online adapter (CA4-ADPONL-01), the terminal block conversion adapter (CA3-ADPTRM-01) by Pro-face and your own cable

- 1:1 Connection

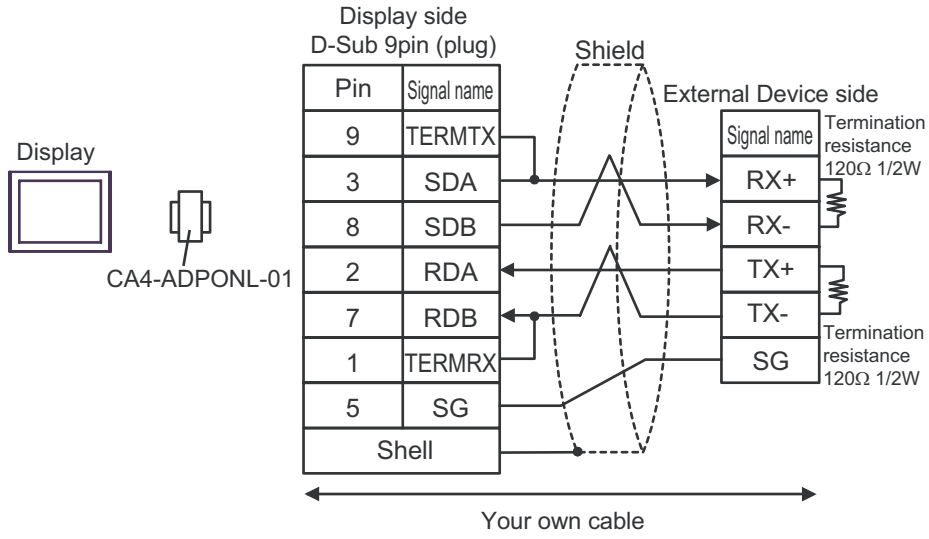


- 1:n Connection

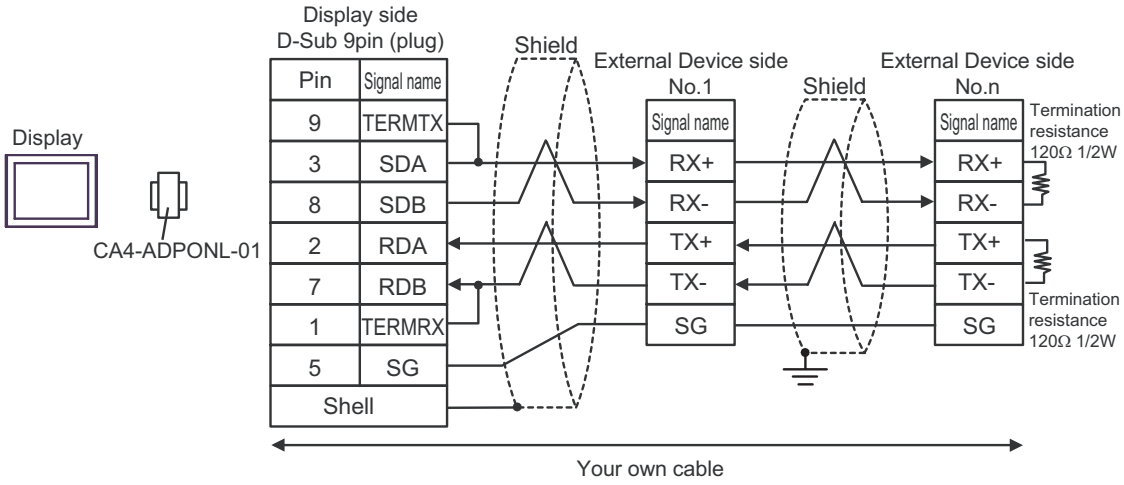


D) When using the online adapter (CA4-ADPONL-01) by Pro-face and your own cable

- 1:1 Connection



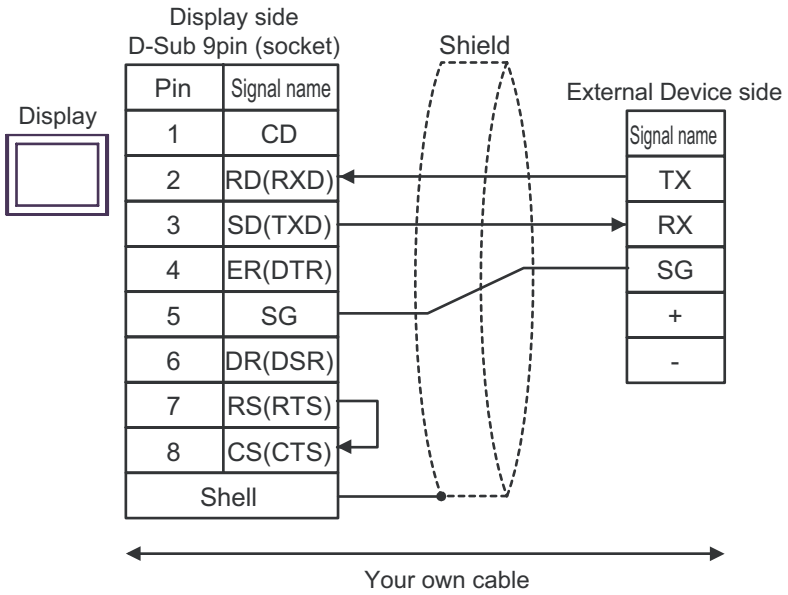
- 1:n Connection



Cable Diagram 3

Display (Connection Port)	Cable	Notes
GP (COM1) ST (COM1) IPC*1 PC/AT	Your own cable	Cable length: 15m or less

*1 Only the COM port which can communicate by RS-232C can be used.
☞"■ COM Port of IPC" (page 4)



6 Supported Device

Range of supported device address is shown in the table below.

This address can be specified as system data area.

Device	Bit Address	Word Address	32bits	Notes
Input / Output Relay	P00000 - P2047F	P0000 - P2047	L/H	
Auxiliary Relay	M00000 - M2047F	M0000 - M2047		
Keep Relay	K00000 - K2047F	K0000 - K2047		
Link Relay	L000000 - L11263F	L00000 - L11263		
Special Relay	F00000 - F2047F	F0000 - F2047		*1
Timer (Contact)	T0000 - T2047	-		
Counter (Contact)	C0000 - C2047	-		
Timer (Current Value)	-	T0000 - T2047		
Counter (Current Value)	-	C0000 - C2047		
Data Register	-	D00000 - D32767		Bit F
Special Module Register	-	U00.00 - U7F.31		Bit F *2
Communication Data Register	-	N00000 - N21503		*3
File Register	-	R00000 - R32767		Bit F *4
File Register	-	ZR00000 - ZR65535		Bit F *4

*1 Read only.

*2 The feature of U device is as follows.

U7F.31.F
- F: Bit Address (h0 to hF)
- 31: Special Module Inner Word Number: Slot (00 to 31)
- F: Slot Number (h0 to hF)
- 7: Base Number (0 to 7)

*3 This device is read only in the communication protocol of XGB.

*4 This device is not supported in the communication protocol of XGB series Cnet.

NOTE

- Please refer to the GP-Pro EX Reference Manual for system data area.
  Cf. GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)"
- Please refer to the precautions on manual notation for icons in the table.
  ☞ "Manual Symbols and Terminology""Manual Symbols and Terminology"

7 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 / Output Relay	P	0080	Word Address
Auxiliary Relay	M	0082	Word Address
Keep Relay	K	0083	Word Address
Link Relay	L	0084	Word Address
Special Relay	F	0085	Word Address
Timer (Current Value)	T	0060	Word Address
Counter (Current Value)	C	0061	Word Address
Data Register	D	0000	Word Address
Special Module Register	U	0002	Word Address*1
Communication Data Register	N	0064	Word Address
File Register	R	0001	Word Address
File Register	ZR	0003	Word Address

*1 Address indirect specification is supported in case of U device.
The formula converted for Uxx.dd is as follows:
Hexadecimal number: [xx] × h20 + [hexadecimal number of "dd" part]
Decimal number: [decimal number of "xx" part] × 32 + [dd]
("xx" is hexadecimal number, "dd" is decimal number.)

For example, "01.00" is converted into "0x20 (=32)", "10.00" is converted into "0x200 (=512)", "7F.00" is converted into "0xFE0 (=4064)" and so on.

8 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 such as "IP address (Decimal): MAC address (Hex)". • Device address is displayed such as "Address: Device address". • Received error codes are displayed such as "Decimal [Hex]".

Display Examples of Error Messages

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

NOTE

- Please refer to the manual of External Device for more detail of received error codes.
- Please refer to "When an error message is displayed (Error code list)" of "Maintenance/ Troubleshooting" for a common error message to the driver.