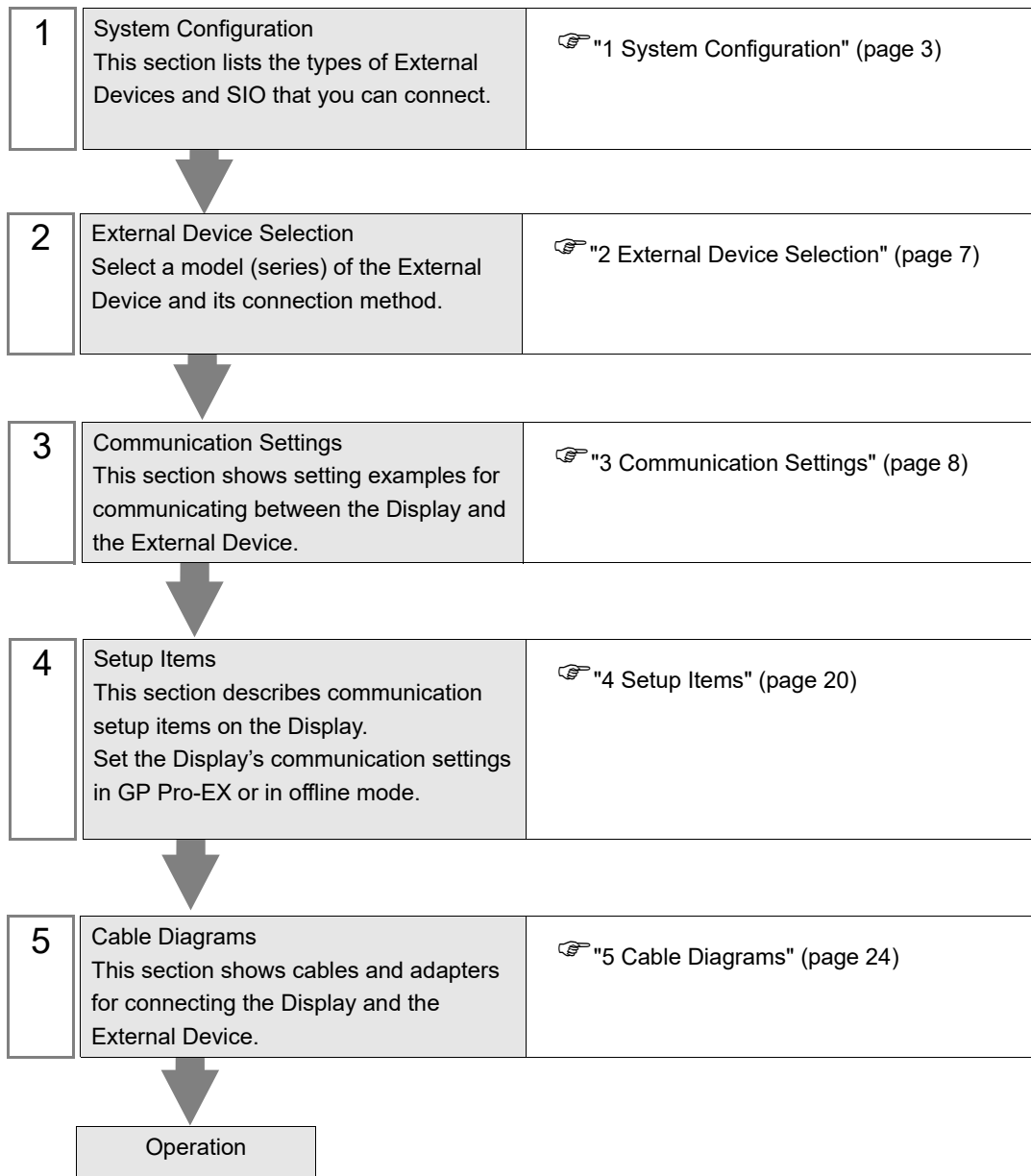# Inverter MODBUS RTU Driver

IMPORTANT
- The below Displays are no longer sold nor maintained by Pro-face. To reduce unplanned downtime due to aged hardware and to maximize your cyber security environment we recommend replacing your devices with a new, successor model. For details, please visit our homepage for "Recommended Substitution". Discontinued from GP-Pro EX 5.00 onwards: GP3000 Series, LT3000 Series, ST3000 Series, GP-4100 Series (Monochrome model), PL Series, PS3000/4000 Series, PE4000 Series.
- For details on the Displays supported by the driver, please check the "Connectable Devices" on our website. http://www.pro-face.com/trans/en/manual/1064.html

Introduction

This manual describes how to connect the Display and the External Device (target Inverter).

In this manual, the connection procedure is 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 a model (series) of the External Device and its connection method. | ☞ "2 External Device Selection" (page 7) |

| 3 | Communication Settings
This section shows setting examples for communicating between the Display and the External Device. | ☞ "3 Communication Settings" (page 8) |

| 4 | Setup Items
This section describes communication setup items on the Display.
Set the Display's communication settings in GP Pro-EX or in offline mode. | ☞ "4 Setup Items" (page 20) |

| 5 | Cable Diagrams
This section shows cables and adapters for connecting the Display and the External Device. | ☞ "5 Cable Diagrams" (page 24) |

Operation

1   System Configuration

The following table lists system configurations for connecting Hitachi Industrial Equipment Systems Co.,Ltd. External Devices and the Display.

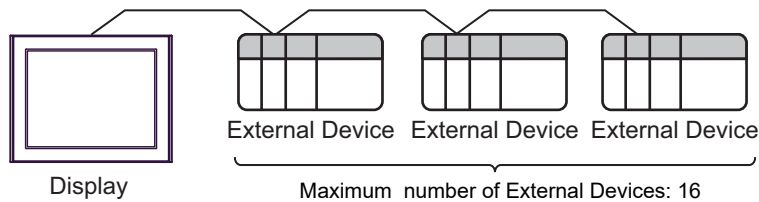| Series	Inverter*1	Link I/F	SIO Type	Setting Example	Cable Diagram
X200	X200-□□□□F□□	Serial port connector on the inverter	RS-422/485 (2 wire)	"Setting Example 1" (page 8)	" Cable Diagram 1" (page 24)
SJ700	SJ700-□□□■□F■F	RS485 port on the inverter	RS-422/485 (2 wire)	"Setting Example 2" (page 10)	" Cable Diagram 2" (page 37)
SJ700-2	SJ700-□□□■□F■F2	RS485 port on the inverter	RS-422/485 (2 wire)	"Setting Example 3" (page 12)	" Cable Diagram 2" (page 37)
SJ200	SJ200-□□□□F□□	Serial port connector on the inverter	RS-422/485 (2 wire)	"Setting Example 4" (page 14)	" Cable Diagram 1" (page 24)
L200	L200-□□□□F□□	Serial port connector on the inverter	RS-422/485 (2 wire)	"Setting Example 5" (page 16)	" Cable Diagram 1" (page 24)
WJ200	WJ200-□□□□F	Control terminal block on the inverter	RS-422/485 (2 wire)	"Setting Example 6" (page 18)	" Cable Diagram 2" (page 37)

*1   ■ is not added as an option. □ differs depending on the option.

■ Connection Configuration

• 1:1 Connection

Display   External Device
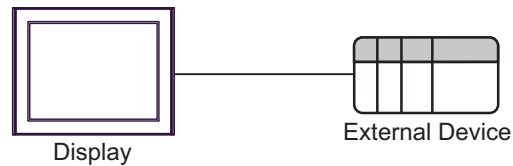
• 1:n Connection (when using either COM1 or COM2)

Display

External Device   External Device   External Device

Maximum number of External Devices: 16

■ IPC COM Port

When connecting IPC with an External Device, the COM port used depends on the series and SIO type. Please refer to the IPC manual 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, PS3000-BA, PS3001-BD	COM1, COM2^{*1*2}	COM2^{*1*2}	COM2^{*1*2}
PS-3650A (T41 model), PS-3651A (T41 model)	COM1^{*1}	-	-
PS-3650A (T42 model), PS-3651A (T42 model)	COM1^{*1*2}, COM2	COM1^{*1*2}	COM1^{*1*2}
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}
PS4000^{*3}	COM1, COM2	-	-
PL3000	COM1^{*1*2}, COM2^{*1}, COM3, COM4	COM1^{*1*2}	COM1^{*1*2}
PE-4000B Atom N270	COM1, COM2	-	-
PE-4000B Atom N2600	COM1, COM2	COM3^{*4}, COM4^{*4}, COM5^{*4}, COM6^{*4}	COM3^{*4}, COM4^{*4}, COM5^{*4}, COM6^{*4}
PS5000 (Slim Panel Type Core i3 Model) *5 *6	COM1, COM2^{*4}	COM2^{*4}	COM2^{*4}
PS5000 (Slim Panel Type Atom Model) *5 *6	COM1, COM2^{*7}	COM2^{*7}	COM2^{*7}
PS5000 (Enclosed Panel Type)^{*8}	COM1	-	-
PS5000 (Modular Type PFXPU/PFXPP)$^{*5 *6}$ PS5000 (Modular Type PFXPL2B5-6)	COM1^{*7}	COM1^{*7}	COM1^{*7}
PS5000 (Modular Type PFXPL2B1-4)	COM1, COM2^{*7}	COM2^{*7}	COM2^{*7}
PS6000 (Advanced Box) PS6000 (Standard Box)	COM1^{*9}	*10	*10
PS6000 (Basic Box)	COM1^{*9}	COM1^{*9}	COM1^{*9}

*1 The RI/5V can be switched. Use the IPC's switch to change if necessary.

*2 Set up the SIO type with the DIP Switch. Please set up as follows according to SIO type to be used.

*3 When making communication between an External Device and COM port on the Expansion slot, only RS-232C is supported. However, ER (DTR/CTS) control cannot be executed because of the specification of COM port.
For connection with External Device, use user-created cables and disable Pin Nos. 1, 4, 6 and 9. Please refer to the IPC manual for details of pin layout.

*4 Set up the SIO type with the BIOS. Please refer to the IPC manual for details of BIOS.

*5 When setting up communication between an External Device and the RS-232C/422/485 interface module, use the IPC (RS-232C) or PS5000 (RS-422/485) cable diagrams. However, when using PFXZPBMPR42P2 in a RS-422/485 (4-wire) configuration with no flow control, connect 7.RTS+ and 8.CTS+, and connect 6.RTS- and 9.CTS-.
When using RS-422/485 communication with External Devices, you may need to reduce the transmission speed and increase the TX Wait time.

*6 To use RS-422/485 communication on the RS-232C/422/485 interface module, the DIP Switch setting is required. Please refer to "Knowledge Base" (FAQs) on the support site. (http://www.pro-face.com/trans/en/manual/1001.html)

Settings	FAQ ID
PFXZPBMPR42P2, RS422/485 change method	FA263858
PFXZPBMPR42P2 termination resistor setting	FA263974
PFXZPBMPR44P2, RS422/485 change method	FA264087
PFXZPBMPR44P2 termination resistor setting	FA264088

*7 Set up the SIO type with the DIP Switch. Please refer to the IPC manual for details of DIP Switch. The BOX Atom has not a switch to set the RS-232C, RS-422/485 mode. Use the BIOS for the setting.

*8 For the connection with the External Device, on the user-created cable read as if the connector on the Display-side is a M12 A-coding 8 pin socket. The pin assignment is the same as described in the cable diagram. For the M12 A-coding connector, use PFXZPSCNM122.

*9 In addition to COM1, you can also use the COM port on the optional interface.

*10 Install the optional interface in the expansion slot.

DIP Switch settings (PL3000 / PS3000 Series)

RS-232C

DIP Switch	Setting	Description
1	OFF[*1]	Reserved (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): Not available
8	OFF	Short-circuit of SDB (TXB) and RDB (RXB): Not available
9	OFF	RS (RTS) Auto control mode: Disabled
10	OFF	

*1 When using PS-3450A, PS-3451A, PS3000-BA and PS3001-BD, turn ON the set value.

RS-422/485 (4 wire)

DIP Switch	Setting	Description
1	OFF	Reserved (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): Not available
8	OFF	Short-circuit of SDB (TXB) and RDB (RXB): Not available
9	OFF	RS (RTS) Auto control mode: Disabled
10	OFF	

RS-422/485 (2 wire)

DIP Switch	Setting	Description
1	OFF	Reserved (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): Available
8	ON	Short-circuit of SDB (TXB) and RDB (RXB): Available
9	ON	RS (RTS) Auto control mode: Enabled
10	ON	

2 External Device Selection

Select the External Device to be connected to the Display.
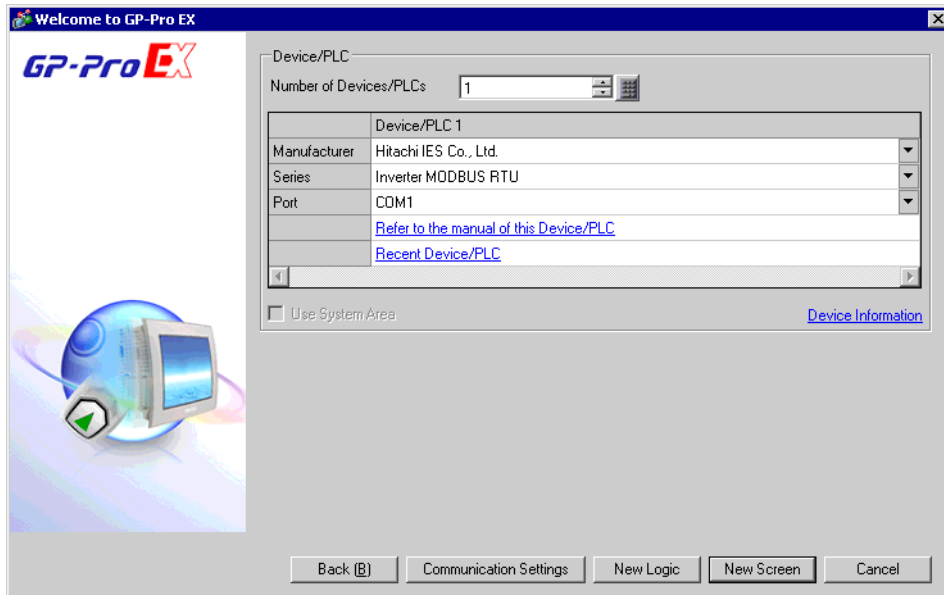
Setup Items	Setup Description
Number of Devices/ PLCs	Enter an integer from 1 to 4 to define the number of Devices/PLCs to connect to the display.
Manufacturer	Select the manufacturer of the External Device to connect. Select "Hitachi IES Co., Ltd.".
Series	Select the External Device model (series) and the connection method. Select "Inverter MODBUS RTU". In System configuration, make sure the External Device you are connecting is supported by "Inverter MODBUS RTU". ☞ "1 System Configuration" (page 3)
Port	Select the Display port to connect to the External Device.
Use System Area	Not available in this driver.

3 Communication Settings

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

3.1 Setting Example 1

■ GP-Pro EX Settings

◆ Communication Settings

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

◆ 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.

■ External Device Settings

For External Device communication settings, use the FUNC key, Up key, Down key, and STR key located in the keypad of the External Device.

Refer to your External Device manual for details.

1 Set OPE/485 switch to "485" position.
2 Turn ON the External Device.
3 Press FUNC key.
4 Press and hold Down key to display [C---].
5 Press FUNC key.
6 Press Up key to display the setting function code.
7 Press FUNC key.
8 Press Up key or Down key to select the setting value.
9 Press STR key.
10 Reboot the External Device.

◆ Setting Value

Function Code	Setting Value	Setup Description
C070	03	Selection of OPE/ModBus
C071	06	Communication speed selection
C072	1.	Node allocation
C074	00	Communication parity selection
C075	1	Communication stop bit selection
C076	02	Communication error select
C077	0.00	Communication error time-out
C078	0.	Communication wait time
A001	03	Frequency source setting
A002	03	Run command source setting

3.2　　Setting Example 2

■ GP-Pro EX Settings

◆ Communication Settings

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

◆ 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] ![icon]. To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.

■ External Device Settings

For External Device communication settings, use the FUNC key, Up key, Down key, and STR key located in the keypad of the External Device.

Refer to your External Device manual for details.

1 Turn ON the External Device.
2 Press FUNC key for 3 seconds or longer.
3 Press FUNC key to display [d001].
4 Press and hold Down key to display [C---].
5 Press FUNC key.
6 Press Up key to display the setting function code.
7 Press FUNC key.
8 Press Up key or Down key to select the setting value.
9 Press STR key.
10 Reboot the External Device.

◆ Setting Value

Function Code	Setting Value	Setup Description
C071	06	Communication speed selection
C072	1.	Node allocation
C073	8	Communication data length selection
C074	00	Communication parity selection
C075	1	Communication stop bit selection
C076	02	Selection of operation after communication error
C077	0.00	Communication trip limit time setting
C078	0.	Communication wait time
C079	01	Communication mode selection
A001	03	Frequency source setting
A002	03	Run command source setting

3.3 Setting Example 3

■ GP-Pro EX Settings

◆ 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	Hitachi IES Co., Ltd.	Series	Inverter MODBUS RTU	Port	COM1

Text Data Mode   1   Change

Communication Settings

SIO Type	○ RS232C ⊙ RS422/485(2wire) ○ RS422/485(4wire)
Speed	19200
Data Length	○ 7 ⊙ 8
Parity	⊙ NONE ○ EVEN ○ ODD
Stop Bit	⊙ 1 ○ 2
Flow Control	⊙ NONE ○ ER(DTR/CTS) ○ XON/XOFF
Timeout	3 (sec)
Retry	2
Wait To Send	2 (ms) ☑ Default Value

RI / VCC   ⊙ RI   ○ VCC

In the case of RS232C, you can select the 9th pin to RI (Input) or VCC (5V Power Supply). If you use the Digital's RS232C Isolation Unit, please select it to VCC.   Default

Device-Specific Settings

Allowable Number of Devices/PLCs   16   Add Device   Add Indirect Device

No.	Device Name	Settings	
1	PLC1		Series=SJ700-2,Slave address=1

◆ 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

Series	SJ700-2

If you change the series, please reconfirm all address settings.

Slave address	1

Default

OK (O)   Cancel

■ External Device Settings

For External Device communication settings, use the FUNC key, Up key, Down key, and STR key located in the keypad of the External Device.

Refer to your External Device manual for details.

1 Turn ON the External Device.
2 Press FUNC key for 3 seconds or longer.
3 Press FUNC key to display [d001].
4 Press and hold Down key to display [C---].
5 Press FUNC key.
6 Press Up key to display the setting function code.
7 Press FUNC key.
8 Press Up key or Down key to select the setting value.
9 Press STR key.
10 Reboot the External Device.

◆ Setting Value

Function Code	Setting Value	Setup Description
C071	06	Communication speed selection
C072	1.	Node allocation
C073	8	Communication data length selection
C074	00	Communication parity selection
C075	1	Communication stop bit selection
C076	02	Selection of operation after communication error
C077	0.00	Communication trip limit time setting
C078	0.	Communication wait time
C079	01	Communication mode selection
A001	03	Frequency source setting
A002	03	Run command source setting

3.4   Setting Example 4

■ GP-Pro EX Settings

◆ Communication Settings

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

◆ 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.

■ External Device Settings

For External Device communication settings, use the FUNC key, Up key, Down key, and STR key located in the keypad of the External Device.

Refer to your External Device manual for details.

1 Set OPE/485 switch to "485" position.
2 Turn ON the External Device.
3 Press FUNC key.
4 Press and hold Down key to display [C---].
5 Press FUNC key.
6 Press Up key to display the setting function code.
7 Press FUNC key.
8 Press Up key or Down key to select the setting value.
9 Press STR key.
10 Reboot the External Device.

◆ Setting Value

Function Code	Setting Value	Setup Description
C071	06	Communication speed selection
C072	1.	Node allocation
C074	00	Communication parity selection
C075	1	Communication stop bit selection
C078	0.	Communication wait time
A001	03	Frequency source setting
A002	03	Run command source setting

3.5 Setting Example 5

■ GP-Pro EX Settings

◆ 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	Hitachi IES Co., Ltd.	Series Inverter MODBUS RTU	Port COM1
Text Data Mode	1 Change		

Communication Settings

SIO Type	○ RS232C	● RS422/485(2wire)	○ RS422/485(4wire)
Speed	19200		
Data Length	○ 7	● 8	
Parity	● NONE	○ EVEN	○ ODD
Stop Bit	● 1	○ 2	
Flow Control	● NONE	○ ER(DTR/CTS)	○ XON/XOFF
Timeout	3 (sec)		
Retry	2		
Wait To Send	2 (ms)	☑ Default Value	

RI / VCC ● RI ○ VCC
In the case of RS232C, you can select the 9th pin to RI (Input) or VCC (5V Power Supply). If you use the Digital's RS232C Isolation Unit, please select it to VCC.   Default

Device-Specific Settings
Allowable Number of Devices/PLCs 16   Add Device

No.	Device Name	Settings	Add Indirect Device
1	PLC1	Series=L200,Slave address=1	✦

◆ 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

Series	L200	
If you change the series, please reconfirm all address settings.		
Slave address	1	
		Default
OK (O)	Cancel	

■ External Device Settings

For External Device communication settings, use the FUNC key, Up key, Down key, and STR key located in the keypad of the External Device.

Refer to your External Device manual for details.

1 Set OPE/485 switch to "485" position.
2 Turn ON the External Device.
3 Press FUNC key.
4 Press and hold Down key to display [C---].
5 Press FUNC key.
6 Press Up key to display the setting function code.
7 Press FUNC key.
8 Press Up key or Down key to select the setting value.
9 Press STR key.
10 Reboot the External Device.

◆ Setting Value

Function Code	Setting Value	Setup Description
C071	06	Communication speed selection
C072	1.	Node allocation
C074	00	Communication parity selection
C075	1	Communication stop bit selection
C078	0.	Communication wait time
A001	03	Frequency source setting
A002	03	Run command source setting

3.6 Setting Example 6

■ GP-Pro EX Settings

◆ 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  Hitachi IES Co., Ltd.        Series  Inverter MODBUS RTU    Port  COM1
  Text Data Mode    1   Change

Communication Settings
  SIO Type        ○ RS232C      ● RS422/485(2wire)    ○ RS422/485(4wire)
  Speed           19200              ▼
  Data Length     ○ 7           ● 8
  Parity          ● NONE        ○ EVEN          ○ ODD
  Stop Bit        ● 1           ○ 2
  Flow Control    ● NONE        ○ ER(DTR/CTS)   ○ XON/XOFF
  Timeout         3       ÷ (sec)
  Retry           2       ÷

  Wait To Send    2       ÷ (ms)   ☑ Default Value

  RI / VCC         ● RI          ○ VCC
  In the case of RS232C, you can select the 9th pin to RI (Input)
  or VCC (5V Power Supply). If you use the Digital's RS232C
  Isolation Unit, please select it to VCC.                    Default

Device-Specific Settings
  Allowable Number        Add Device
  of Devices/PLCs    16
                                                              Add Indirect
  No.  Device Name        Settings                            Device
  ⚙ 1  PLC1          🔧 Series=WJ200,Slave address=1           ➕
```

◆ 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

  Series        WJ200           ▼
  If you change the series, please
  reconfirm all address settings.

  Slave address   1             ÷

                        Default

      OK (O)          Cancel
```

■ External Device Settings

To define the External Device communication settings, use the External Device keypad's STOP/RESET, ESC, Up, Down, and SET keys.

Refer to your External Device manual for details.

1 Turn ON the External Device.
2 Press STOP/RESET to stop operations.
3 Press ESC to move to the Function Group.
4 Press ESC to select [C001].
5 Press Up or Down to select the function code.
6 Press SET.
7 Press Up or Down to select the value.
8 Press SET.
9 Restart the External Device.

◆ Setting Value

Function Code	Setting Value	Setup Description
C071	06	Communication speed (19200bps)
C072	1	Modbus address (Modbus slave address)
C074	00	Communication parity (Non-Parity)
C075	1	Communication stop bit (1 bit)
C096	00	Communication selection (Modbus-RTU)

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)

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
SIO Type	Select the SIO type to communicate with the External Device. **IMPORTANT** In the communication settings, set [SIO Type] correctly according to the serial interface specifications of the Display. If you select an SIO type that the serial interface does not support, proper operation cannot be guaranteed. Refer to your Display manual for details on the serial interface specifications.
Speed	Select communication speed between the External Device and the Display.
Data Length	Display data length.
Parity	Select how to check parity.
Stop Bit	Select stop bit length.

Setup Items	Setup Description
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. When the default value check box is selected, the Wait To Send value automatically changes in the formula below by changing each value for Speed/Data Length/Parity/Stop Bit. $$\text{Wait To Send (ms)} = \frac{3500 \times (1 + \text{Data Length} + \text{Stop Bit} + \text{Parity})}{\text{Speed (bps)}}$$ Value for the parity setting is shown below. No Parity = 0 Parity Even = 1 Parity Odd = 1 **NOTE** • After changing the Wait To Send value for the project, of which [Default Value] is checked, in the offline mode, the Wait To Send value will be recalculated when the project is received and communication settings are displayed.

NOTE
• 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.
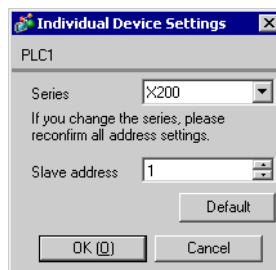
Setup Items	Setup Description
Series	Select the series of the External Device.
Slave address	Use an integer from 1 to 247 to enter the address of the External Device.

Setup Items	Setup Description
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.
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]. 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 to set. Device name is a title of the External Device set with GP-Pro EX. (Initial value [PLC1])
Series	Display the series of the External Device.
Slave address	Use an integer from 1 to 247 to enter the address of the External Device.

5 Cable Diagrams

The following cable diagrams may be different from cable diagrams recommended by Hitachi Industrial Equipment Systems Co.,Ltd. Please be assured there is no operational problem in applying the cable diagrams shown in this manual.

- The FG pin of the External Device body must be D-class grounded. Refer to your External Device manual for more details.
- The SG and FG are connected inside the Display. When connecting the External Device to the SG, design your system to avoid short-circuit loops.
- Connect an isolation unit if the communication is not stable due to noise or other factors.

Cable Diagram 1

Display (Connection Port)		Cable	Notes
GP3000[*1] (COM1) AGP-3302B (COM2) GP-4*01TM (COM1) GP-Rear Module (COM1) ST3000[*2] (COM2) LT3000 (COM1)	1A	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	Cable length: 250m or less
	1B	User-created cable	
GP3000[*3] (COM2)	1C	Online adapter by Pro-face CA4-ADPONL-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	Cable length: 250m or less
	1D	Online adapter by Pro-face CA4-ADPONL-01 + User-created cable	
IPC[*4]	1E	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	Cable length: 250m or less
	1F	User-created cable	
GP-4106 (COM1) GP-4116T (COM1)	1G	User-created cable	Cable length: 250m or less

Display (Connection Port)		Cable	Notes
GP-4107 (COM1) GP-4*03T[*5] (COM2) GP-4203T (COM1)	1H	User-created cable	Cable length: 250m or less
GP4000[*6] (COM2) GP-4201T (COM1) GP6000 (COM2) SP5000[*7] (COM1/2) SP-5B00 (COM2) ST6000[*8] (COM2) ST-6200 (COM1) STM6000 (COM1) STC6000 (COM1) ET6000[*9] (COM2) PS6000 (Basic Box) (COM1/2)	1I	RS-422 terminal block conversion adapter by Pro-face PFXZCBADTM1[*10] + User-created cable	Cable length: 250m or less
	1B	User-created cable	
LT-4*01TM (COM1) LT-Rear Module (COM1)	1J	RJ45 RS-485 Cable (5m) by Pro-face PFXZLMCBRJR81	Cable length: 200m or less
PE-4000B[*11] PS5000[*11] PS6000 (Optional Interface)[*11]	1K	User-created cable	Cable length: 250m or less

*1 All GP3000 models except AGP-3302B

*2 Except AST-3211A and AST-3302B

*3 All GP3000 models except GP-3200 series and AGP-3302B

*4 Only the COM port which can communicate by RS-422/485 (2 wire) can be used. (Except PE-4000B, PS5000, and PS6000)
☞ "■ IPC COM Port" (page 4)

*5 Except GP-4203T

*6 All GP4000 models except GP-4100 series, GP-4*01TM, GP-Rear Module, GP-4201T and GP-4*03T

*7 Except SP-5B00

*8 Except ST-6200

*9 Due to the COM port specifications, flow control is not possible. Omit wiring the control pins on the Display side of the cable diagram.

*10 When using a Terminal Block Conversion Adapter (CA3-ADPTRM-01) instead of the RS-422 Terminal Block Conversion Adapter, refer to Cable Diagram 1A.

*11 Only the COM port which can communicate by RS-422/485 (2 wire) can be used.
☞ "■ IPC COM Port" (page 4)

1A)

- 1:1 Connection

Display side
Terminal Block

User-created cable

- 1:n Connection

Display side
Terminal Block

User-created cable
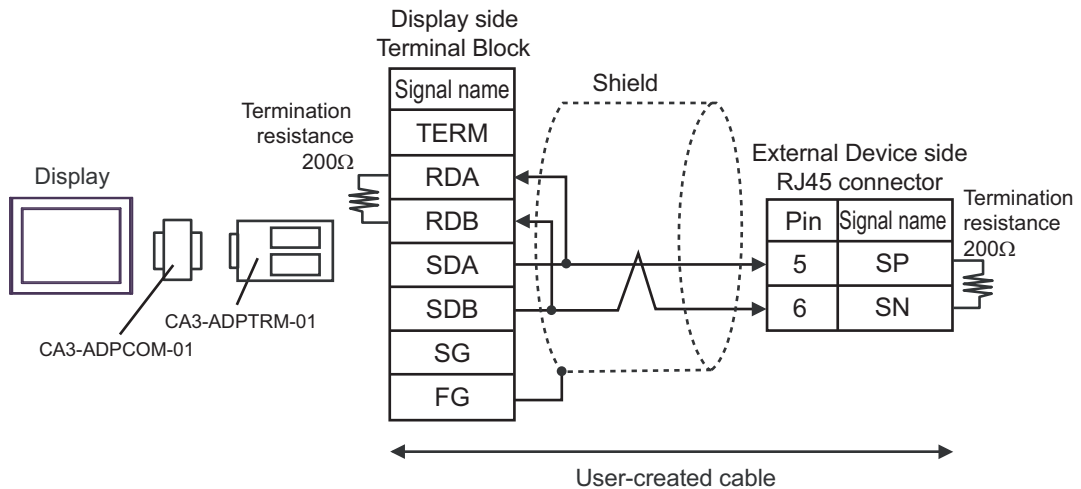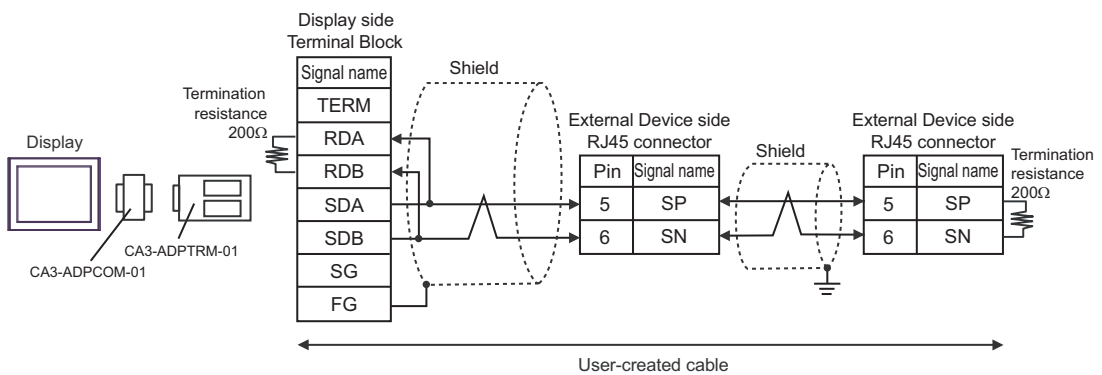
1B)
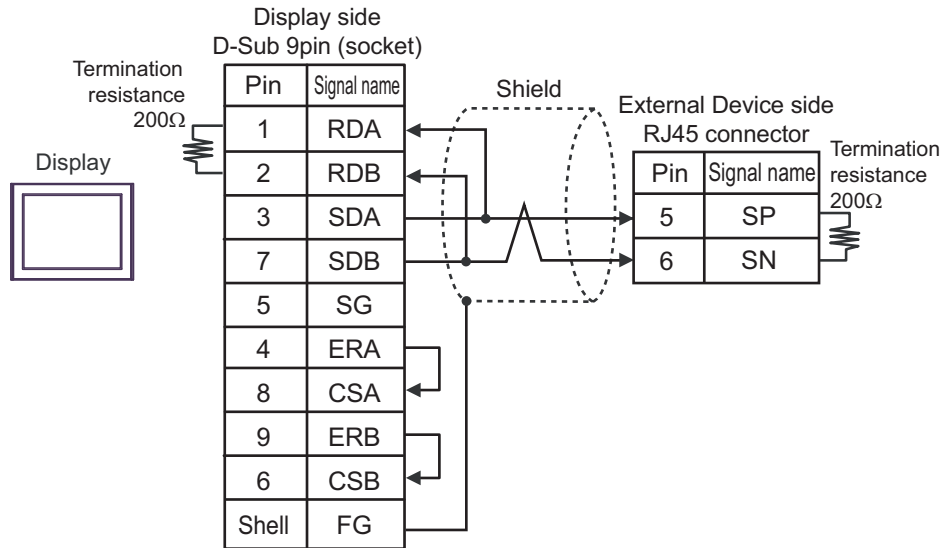
• 1:1 Connection
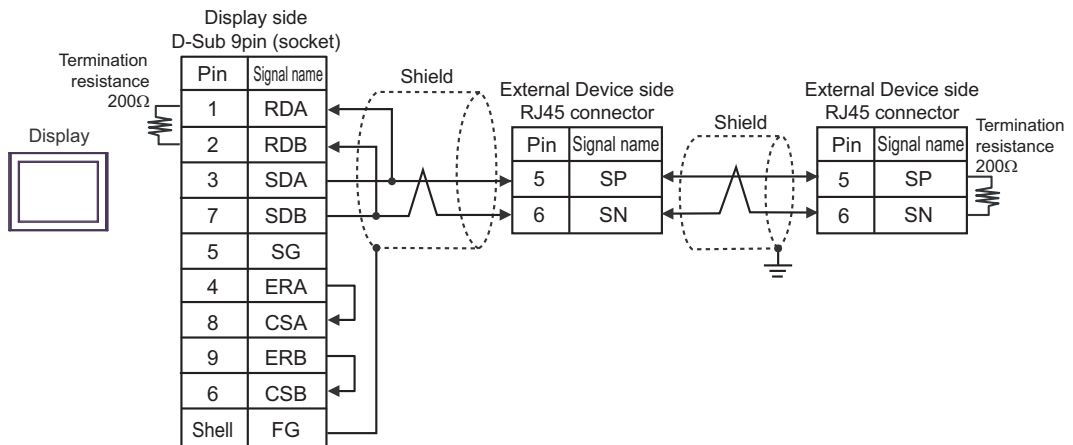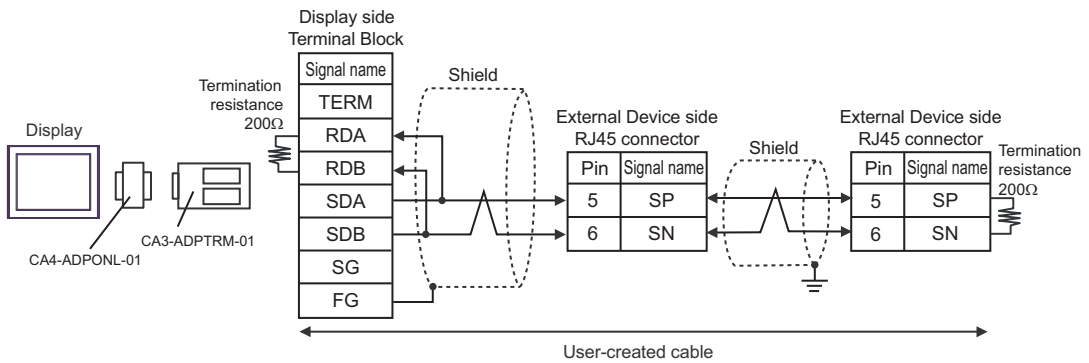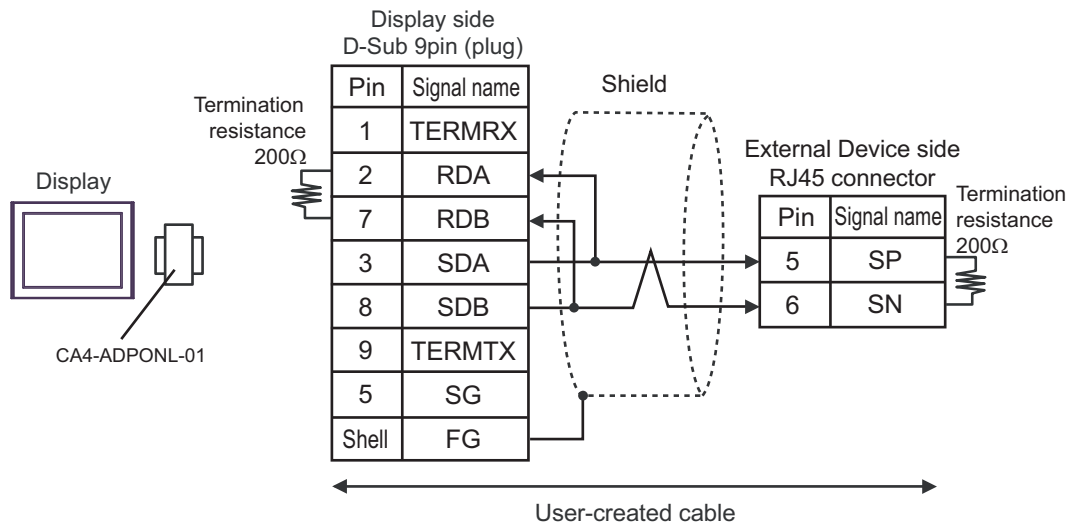

• 1:n Connection

1C)
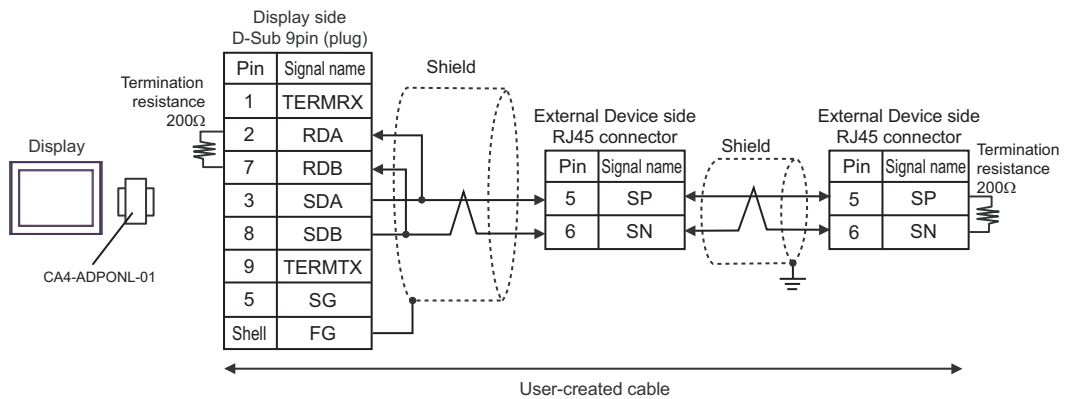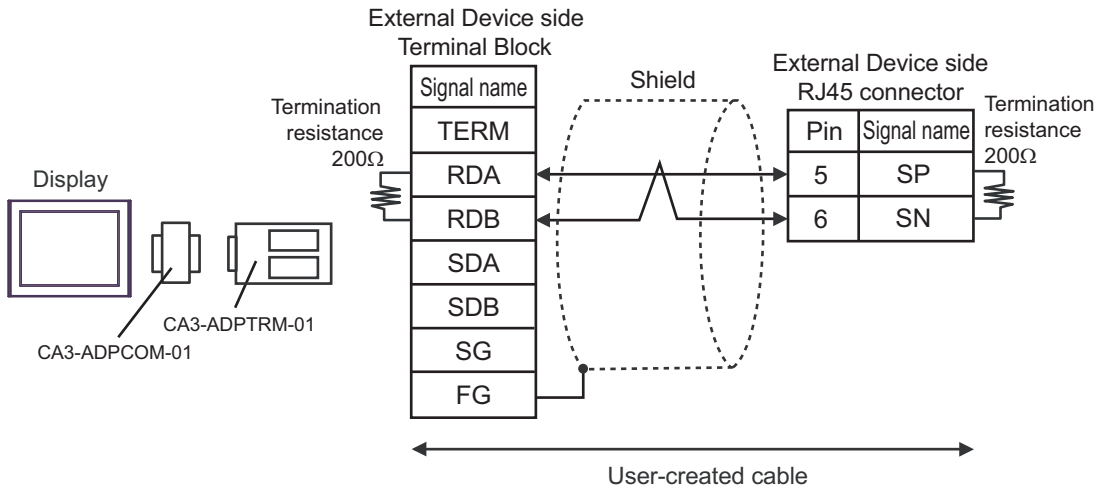
- 1:1 Connection
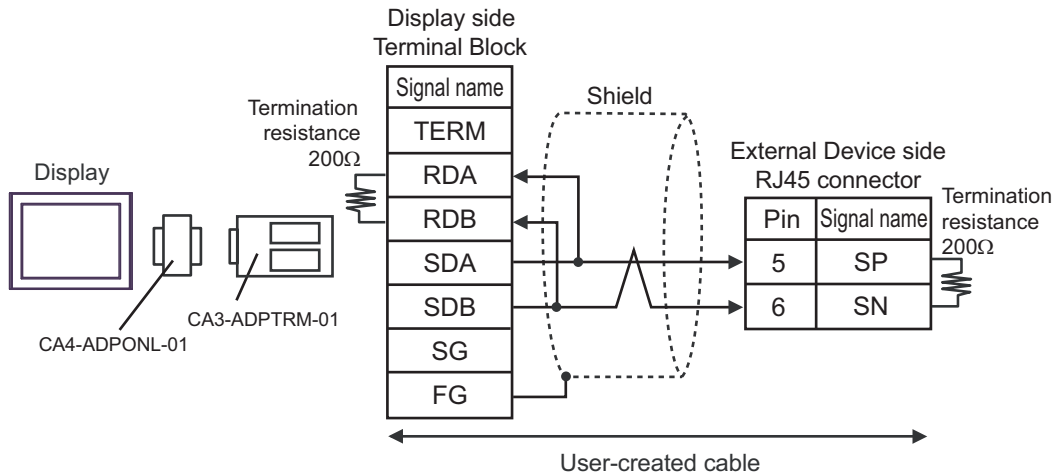
- 1:n Connection

1D)

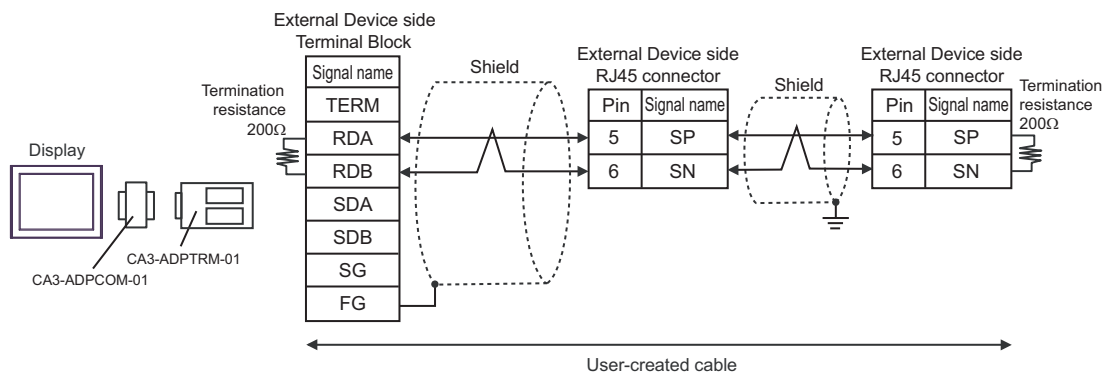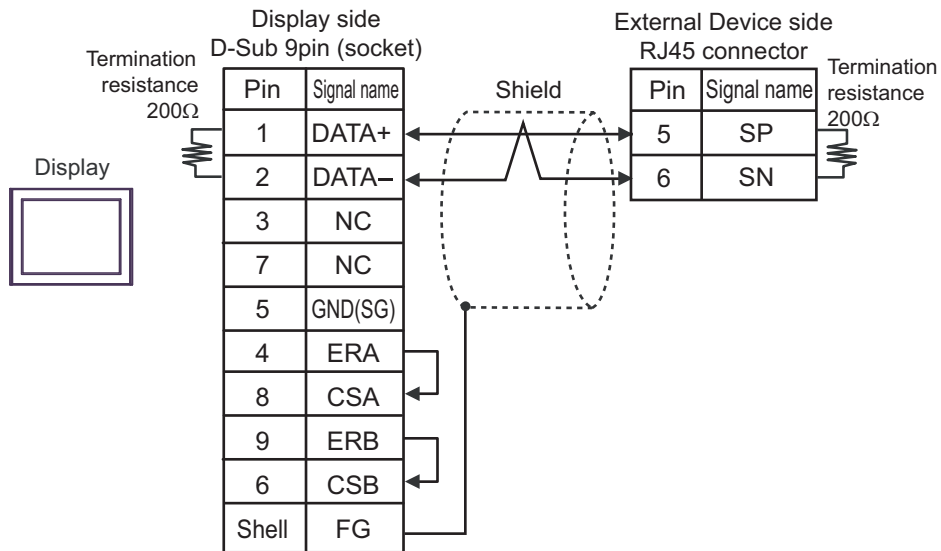- 1:1 Connection

- 1:n Connection
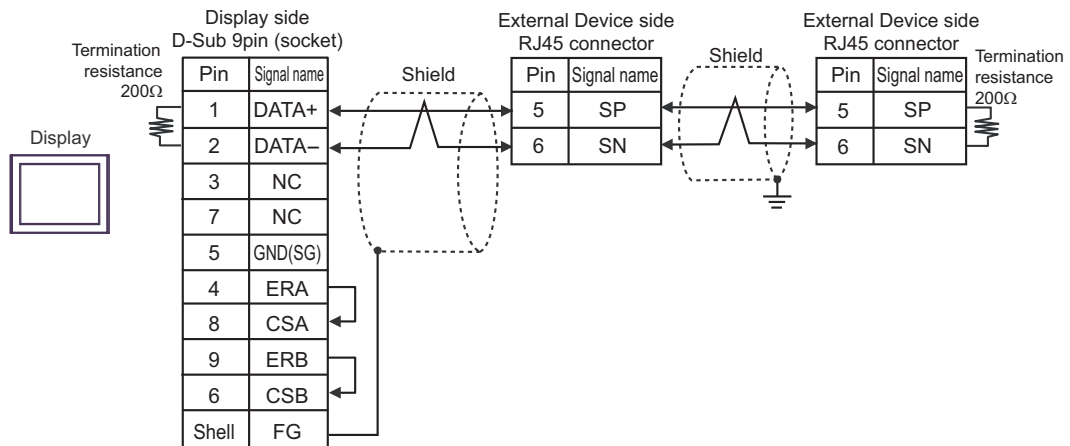
1E)

- 1:1 Connection

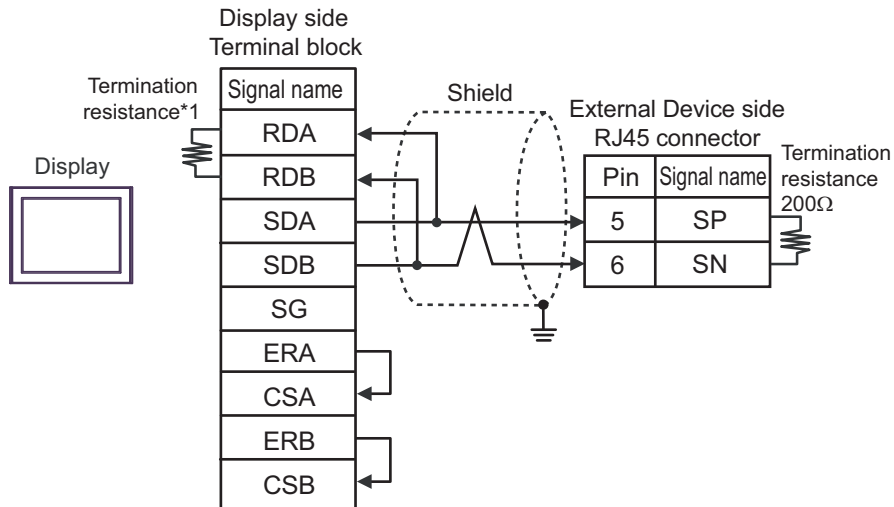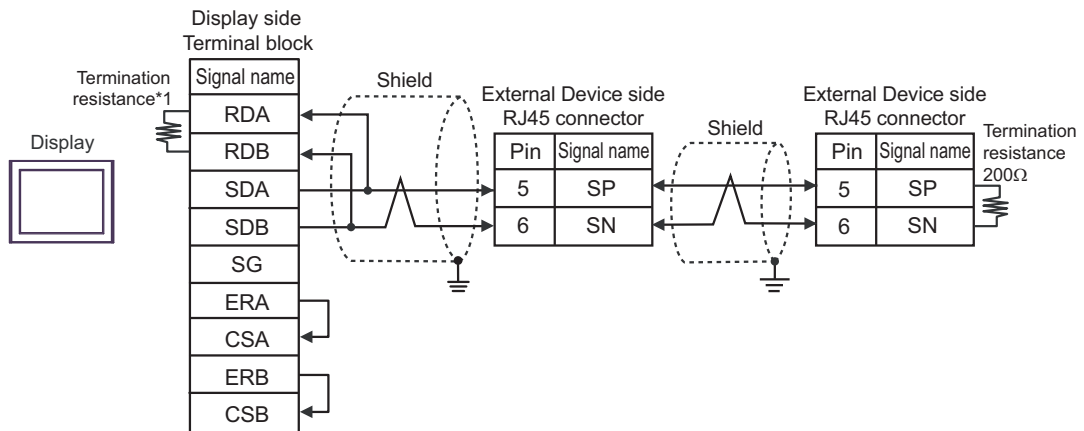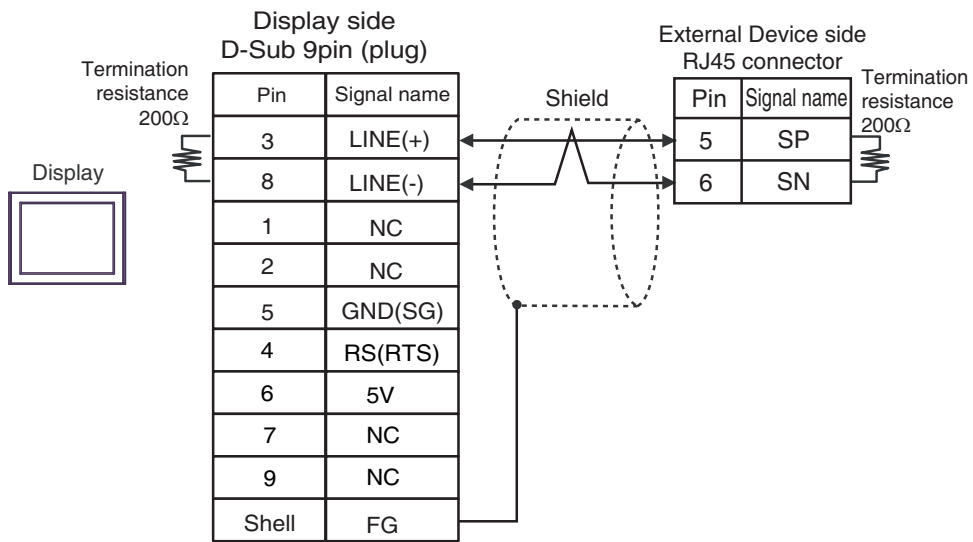

- 1:n Connection

1F)

• 1:1 Connection

• 1:n Connection

1G)

• 1:1 Connection

• 1:n Connection

*1   The resistance in the Display is used as the termination resistance. Set the value of the DIP Switch on the rear of the Display as shown in the table below.
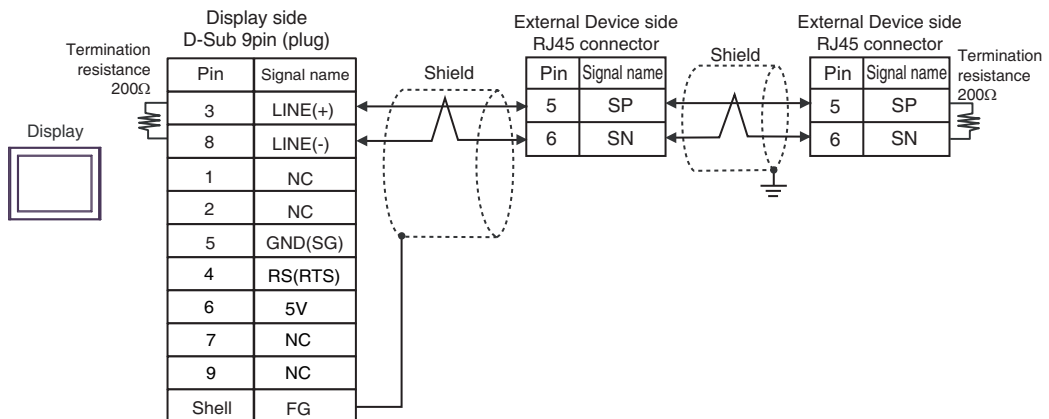
DIP Switch No.	Set Value
1	OFF
2	OFF
3	OFF
4	ON

1H)

• 1:1 Connection

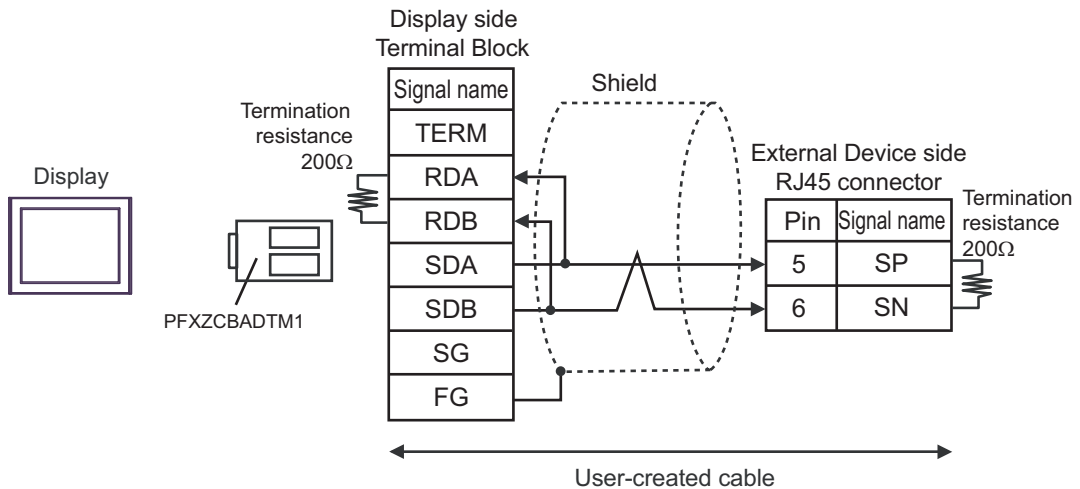

• 1:n Connection

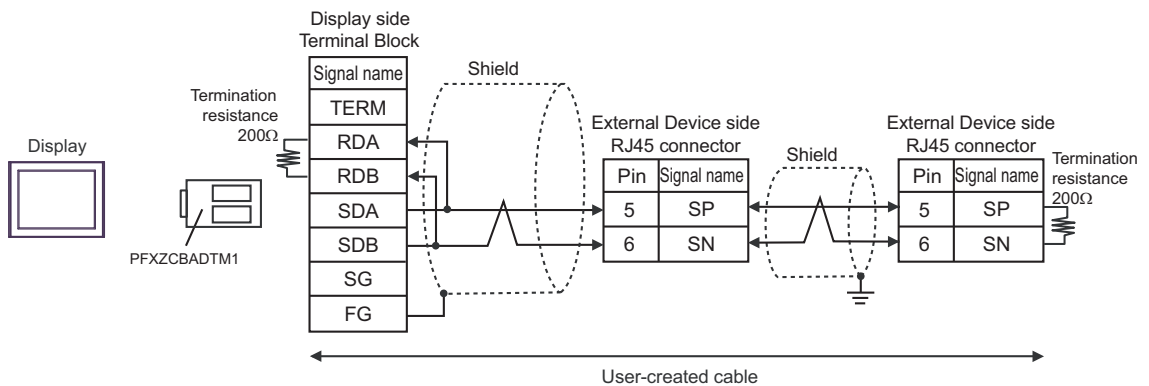| IMPORTANT | • The 5V output (Pin #6) on the Display is the power for the Siemens AG's PROFIBUS connector. Do not use it for other devices. |

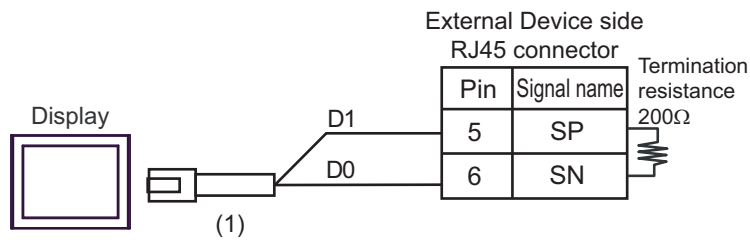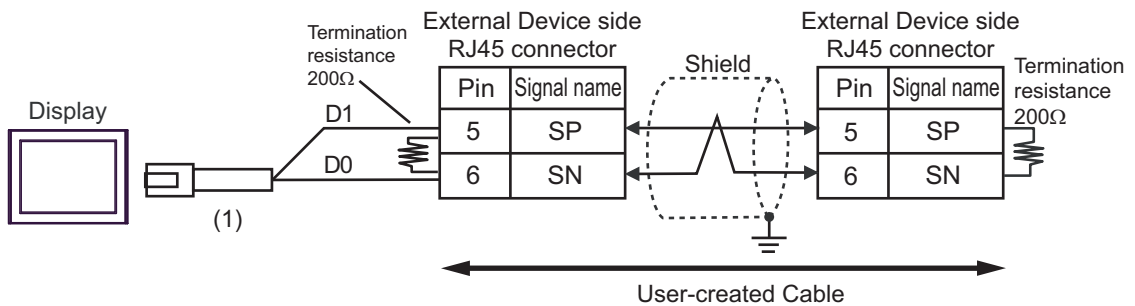| NOTE | • In COM on the GP-4107, the SG and FG terminals are isolated. |

1I)

• 1:1 Connection

Display side
Terminal Block

Termination resistance 200Ω

Display

PFXZCBADTM1

| Signal name |
| TERM |
| RDA |
| RDB |
| SDA |
| SDB |
| SG |
| FG |

Shield

External Device side
RJ45 connector

Termination resistance 200Ω

Pin	Signal name
5	SP
6	SN

User-created cable

• 1:n Connection

Display side
Terminal Block

Termination resistance 200Ω

Display

PFXZCBADTM1

| Signal name |
| TERM |
| RDA |
| RDB |
| SDA |
| SDB |
| SG |
| FG |

Shield

External Device side
RJ45 connector

Pin	Signal name
5	SP
6	SN

Shield

External Device side
RJ45 connector

Termination resistance 200Ω

Pin	Signal name
5	SP
6	SN

User-created cable

1J)

• 1:1 Connection

• 1:n Connection

Number	Name	Notes
(1)	RJ45 RS-485 Cable (5m) by Pro-face PFXZLMCBRJR81	

1K)

- 1:1 Connection

	Display side D-Sub 9pin (socket)			External Device side RJ45 connector	
Termination resistance 200Ω	Pin	Signal name	Shield	Pin	Signal name
	2	DATA+		5	SP
Display	1	DATA−		6	SN
	3	NC			
	7	NC			
	5	GND			
	4	NC			
	8	NC			
	9	NC			
	6	NC			
	Shell	FG			

(Termination resistance 200Ω on External Device side)

- 1:n Connection

	Display side D-Sub 9pin (socket)			External Device side RJ45 connector			External Device side RJ45 connector	
Termination resistance 200Ω	Pin	Signal name	Shield	Pin	Signal name	Shield	Pin	Signal name
	2	DATA+		5	SP		5	SP
Display	1	DATA−		6	SN		6	SN
	3	NC						
	7	NC						
	5	GND						
	4	NC						
	8	NC						
	9	NC						
	6	NC						
	Shell	FG						

(Termination resistance 200Ω on rightmost External Device side)

Cable Diagram 2

Display (Connection Port)		Cable	Notes
GP3000[*1] (COM1) AGP-3302B (COM2) GP-4*01TM (COM1) GP-Rear Module (COM1) ST3000[*2] (COM2) LT3000 (COM1)	2A	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	Cable length: 250m or less[*3]
	2B	User-created cable	
GP3000[*4] (COM2)	2C	Online adapter by Pro-face CA4-ADPONL-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	Cable length: 250m or less[*3]
	2D	Online adapter by Pro-face CA4-ADPONL-01 + User-created cable	
IPC[*5]	2E	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	Cable length: 250m or less[*3]
	2F	User-created cable	
GP-4106 (COM1) GP-4116T (COM1)	2G	User-created cable	Cable length: 250m or less[*3]
GP-4107 (COM1) GP-4*03T[*6] (COM2) GP-4203T (COM1)	2H	User-created cable	Cable length: 250m or less[*3]
GP4000[*7] (COM2) GP-4201T (COM1) GP6000 (COM2) SP5000[*8] (COM1/2) SP-5B00 (COM2) ST6000[*9] (COM2) ST-6200 (COM1) STM6000 (COM1) STC6000 (COM1) ET6000[*10] (COM2) PS6000 (Basic Box) (COM1/2)	2I	RS-422 terminal block conversion adapter by Pro-face PFXZCBADTM1[*11] + User-created cable	Cable length: 250m or less[*3]
	2B	User-created cable	

Display (Connection Port)		Cable		Notes
LT-4*01TM (COM1) LT-Rear Module (COM1)	2J	RJ45 RS-485 Cable (5m) by Pro-face PFXZLMCBRJR81		Cable length: 200m or less
PE-4000B[*12] PS5000[*12] PS6000 (Optional Interface)[*12]	2K	User-created cable		Cable length: 250m or less[*3]

*1   All GP3000 models except AGP-3302B

*2   Except AST-3211A and AST-3302B

*3   Cable length for the connection with WJ200 series is within 500m.

*4   All GP3000 models except GP-3200 series and AGP-3302B

*5   Only the COM port which can communicate by RS-422/485 (2 wire) can be used. (Except PE-4000B, PS5000, and PS6000)
    ☞ "■ IPC COM Port" (page 4)

*6   Except GP-4203T

*7   All GP4000 models except GP-4100 series, GP-4*01TM, GP-Rear Module, GP-4201T and GP-4*03T

*8   Except SP-5B00

*9   Except ST-6200

*10   Due to the COM port specifications, flow control is not possible. Omit wiring the control pins on the Display side of the cable diagram.

*11   When using a Terminal Block Conversion Adapter (CA3-ADPTRM-01) instead of the RS-422 Terminal Block Conversion Adapter, refer to Cable Diagram 2A.

*12   Only the COM port which can communicate by RS-422/485 (2 wire) can be used.
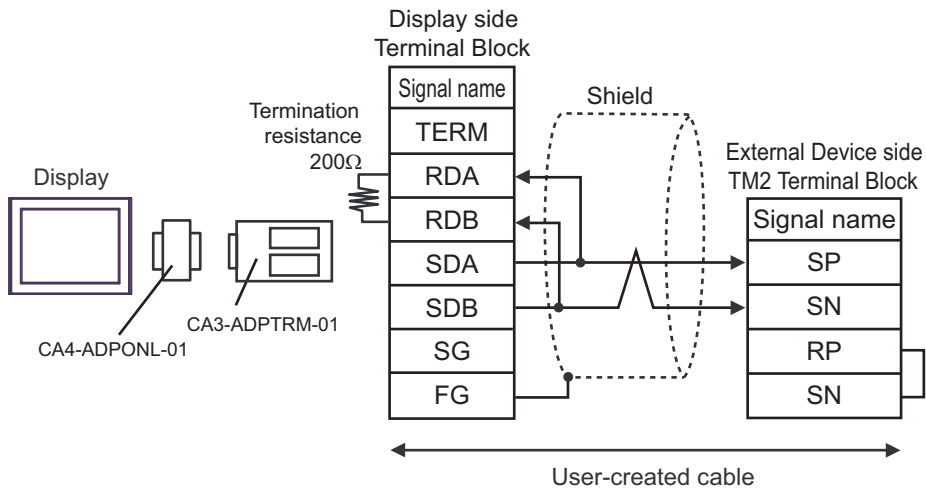   ☞ "■ IPC COM Port" (page 4)
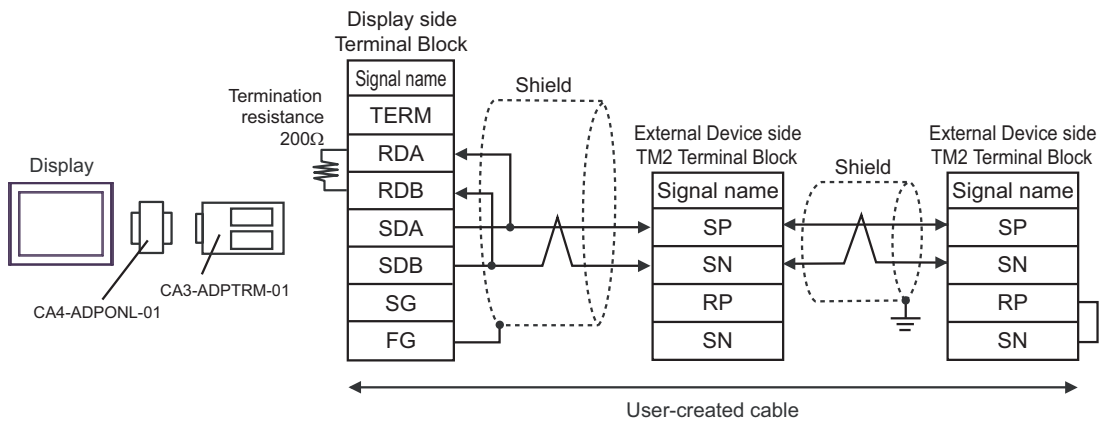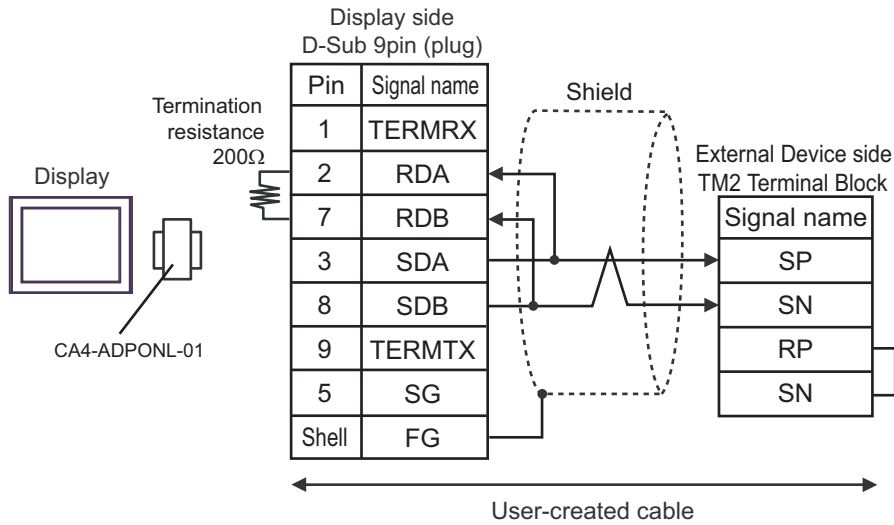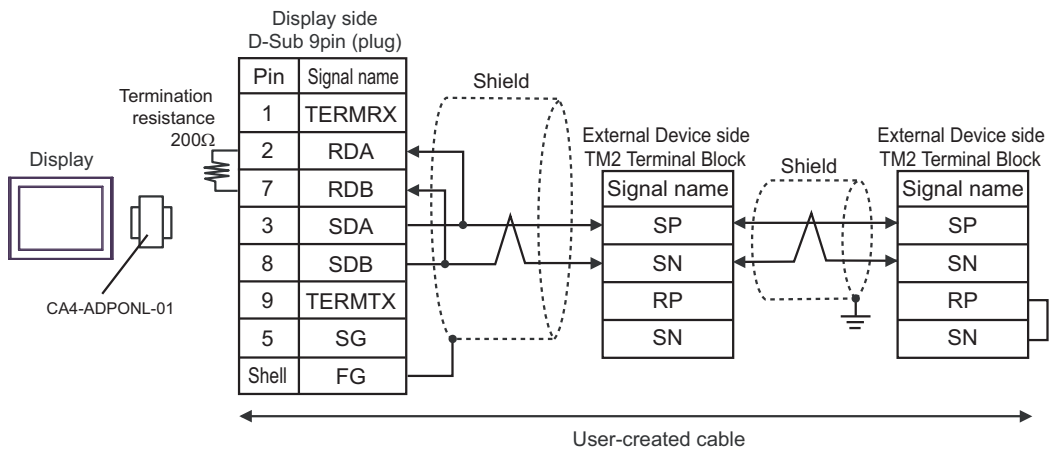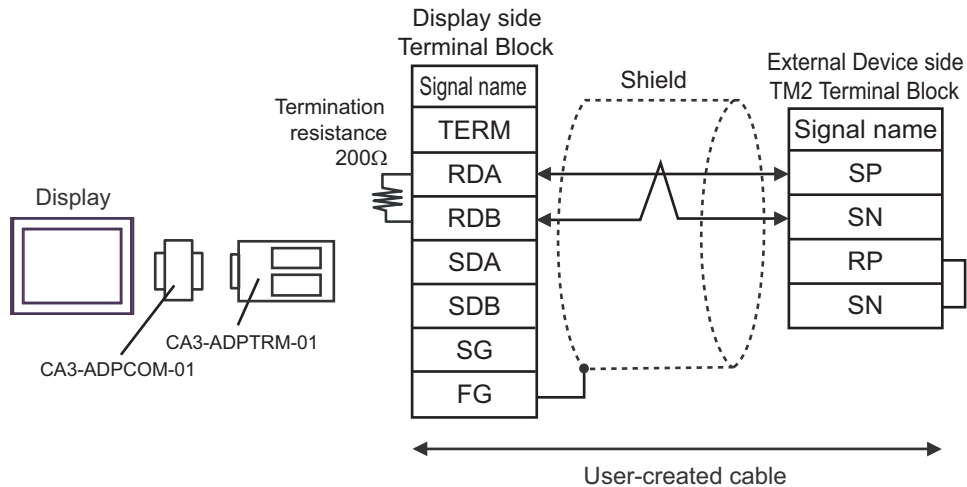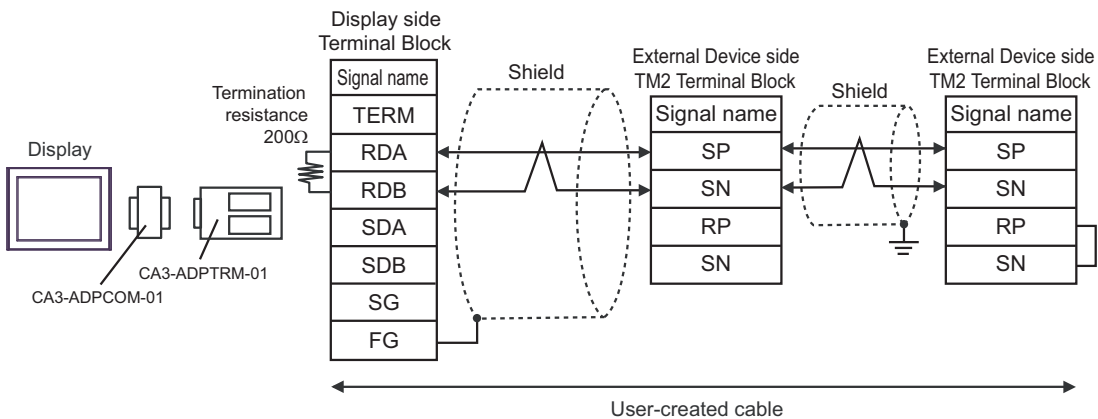
2A)

• 1:1 Connection
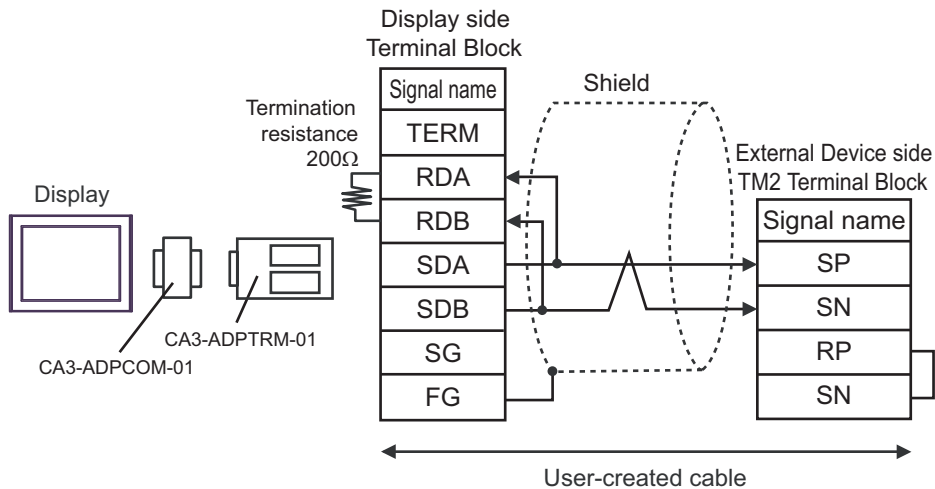
• 1:n Connection
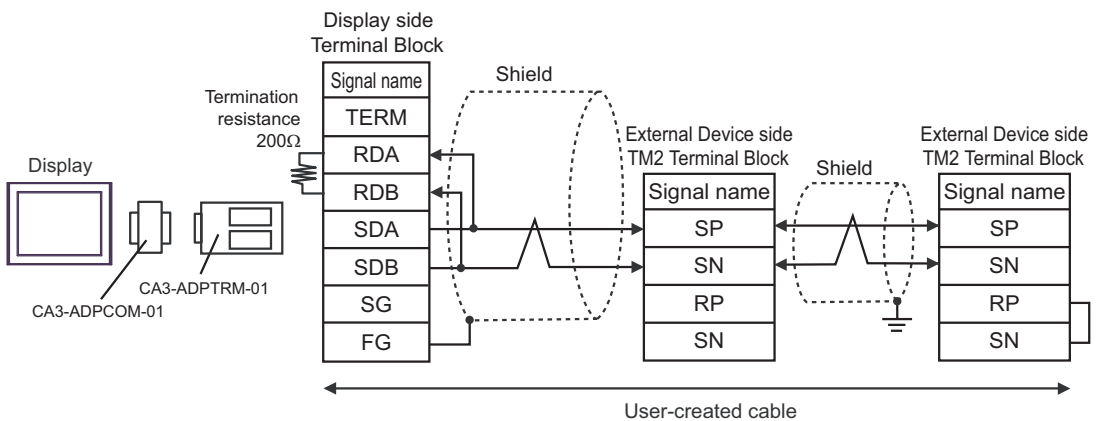
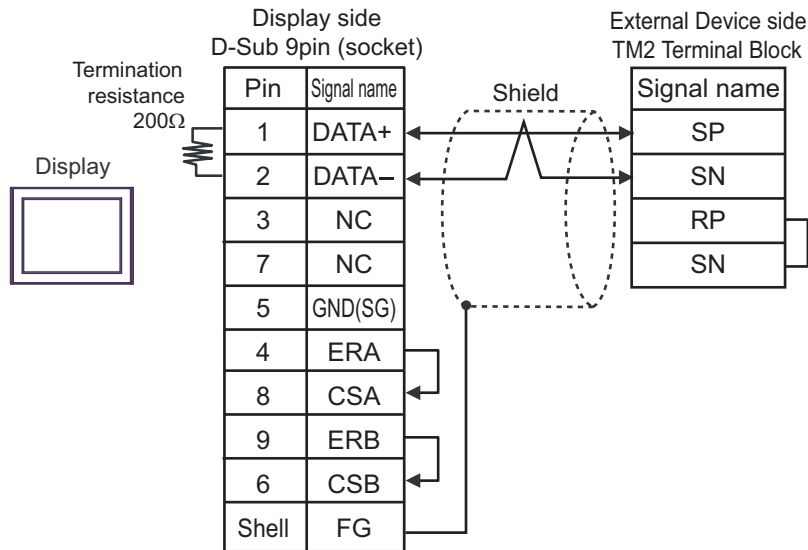| NOTE	• Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
	• To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2B)

• 1:1 Connection
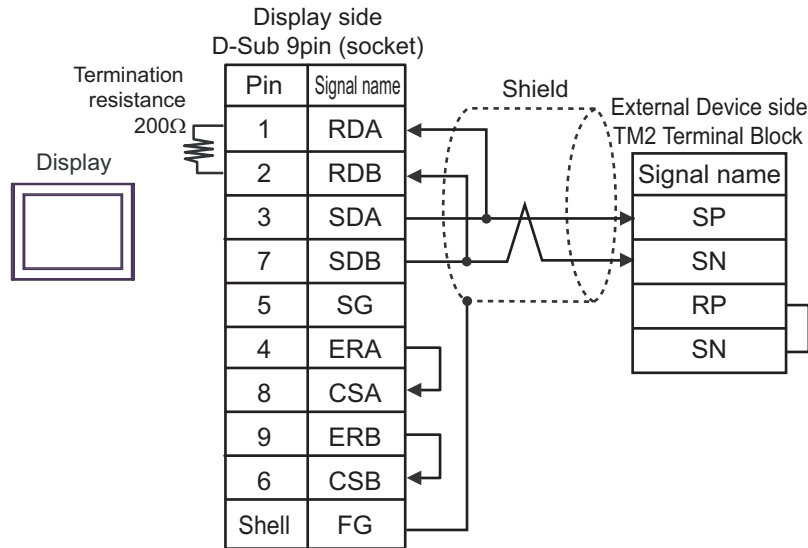
• 1:n Connection
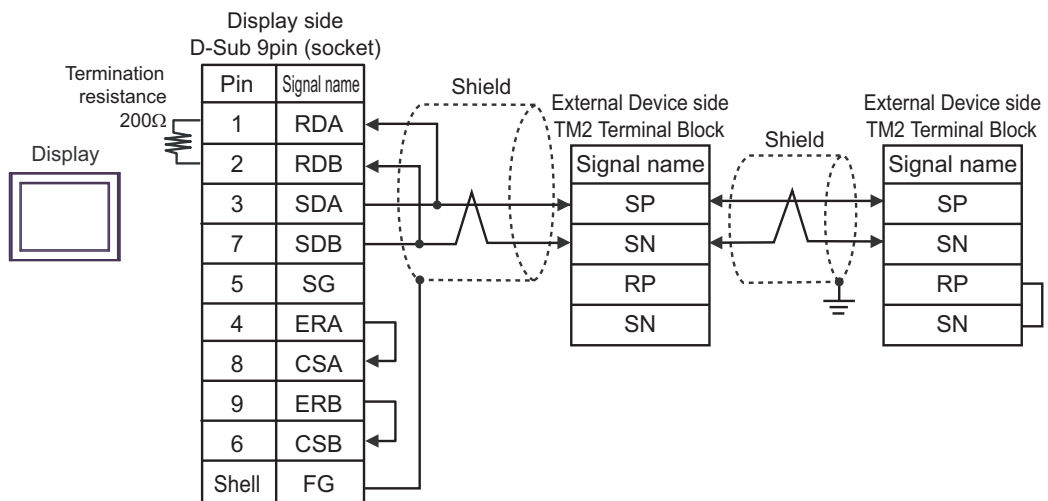
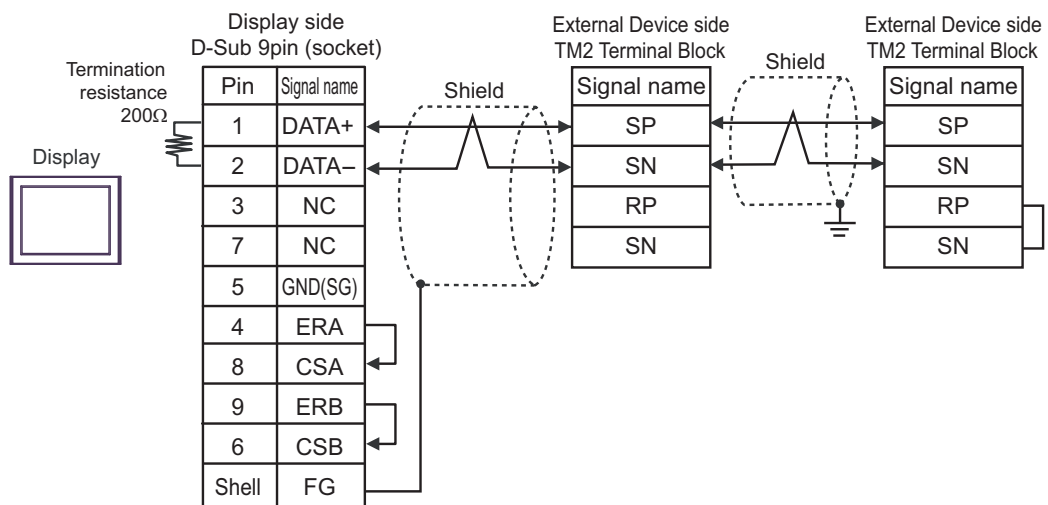| NOTE	• Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal. • To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2C)

- 1:1 Connection

- 1:n Connection

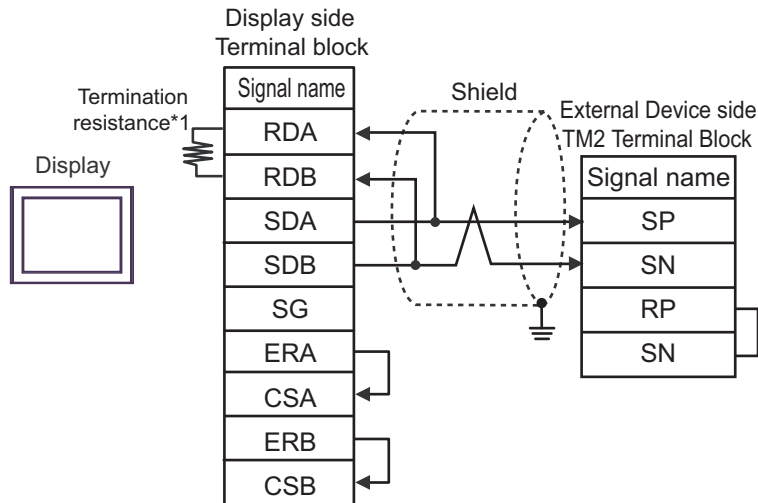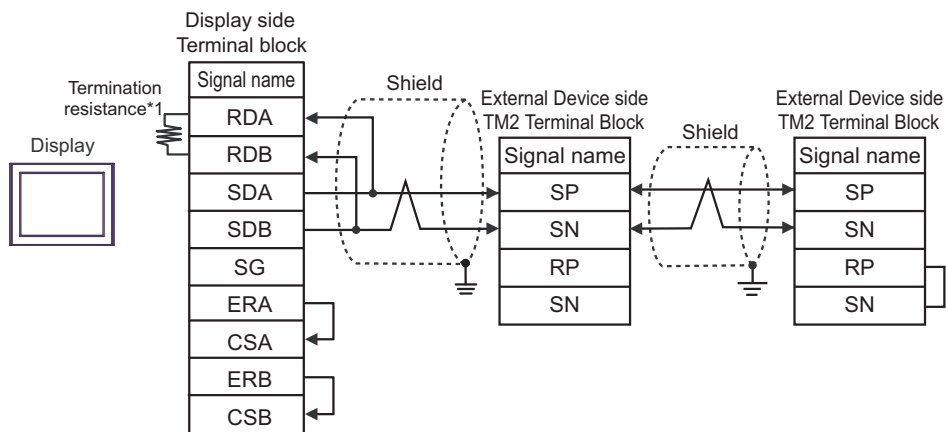| NOTE	• Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
	• To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2D)

- 1:1 Connection

- 1:n Connection

| NOTE | • Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
• To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor. |
| --- | --- |

2E)

• 1:1 Connection

• 1:n Connection

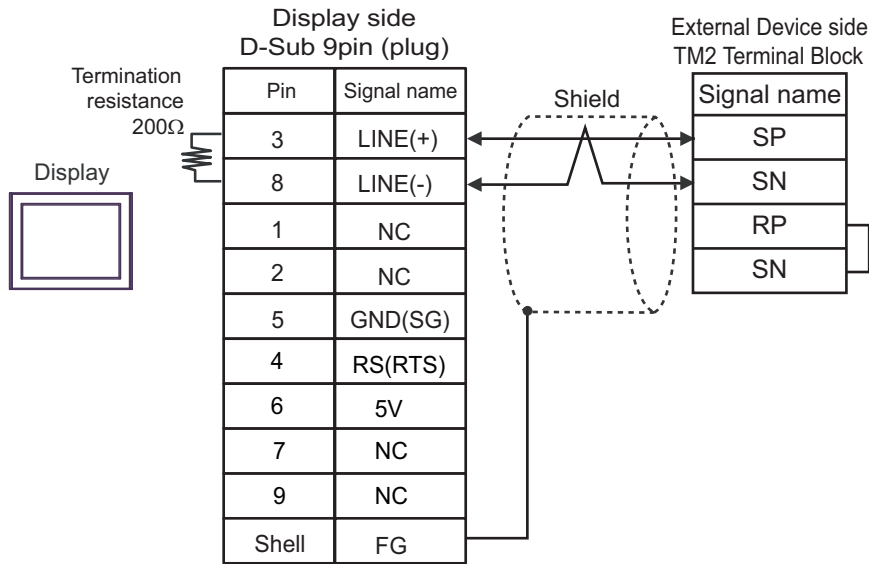| NOTE	• Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
	• To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2F)

• 1:1 Connection

• 1:n Connection

NOTE

• Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.

• To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2G)

• 1:1 Connection

• 1:n Connection

NOTE

• Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
• To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

*1   The resistance in the Display is used as the termination resistance. Set the value of the DIP Switch on the rear of the Display as shown in the table below.
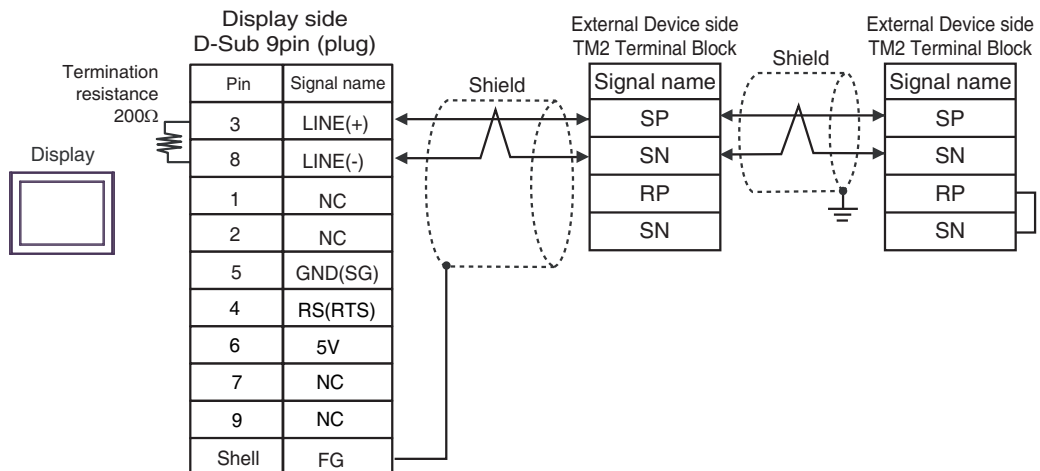
| DIP Switch No.	Set Value
1	OFF
2	OFF
3	OFF
4	ON

2H)

- 1:1 Connection

	Display side D-Sub 9pin (plug)		Shield	External Device side TM2 Terminal Block
Pin	Signal name			Signal name
3	LINE(+)			SP
8	LINE(-)			SN
1	NC			RP
2	NC			SN
5	GND(SG)			
4	RS(RTS)			
6	5V			
7	NC			
9	NC			
Shell	FG			

Termination resistance 200Ω

Display

- 1:n Connection

	Display side D-Sub 9pin (plug)		Shield	External Device side TM2 Terminal Block	Shield	External Device side TM2 Terminal Block
Pin	Signal name			Signal name		Signal name
3	LINE(+)			SP		SP
8	LINE(-)			SN		SN
1	NC			RP		RP
2	NC			SN		SN
5	GND(SG)					
4	RS(RTS)					
6	5V					
7	NC					
9	NC					
Shell	FG					

Termination resistance 200Ω

Display

IMPORTANT	• The 5V output (Pin #6) on the Display is the power source for the Siemens AG PROFIBUS connector. Do not use it for other devices.

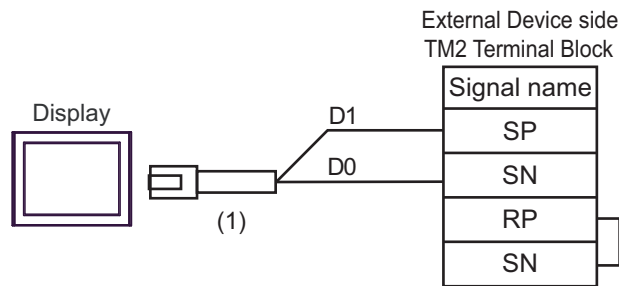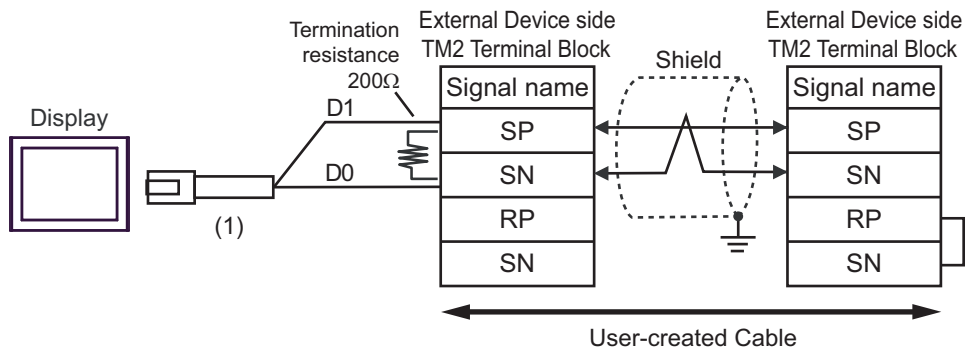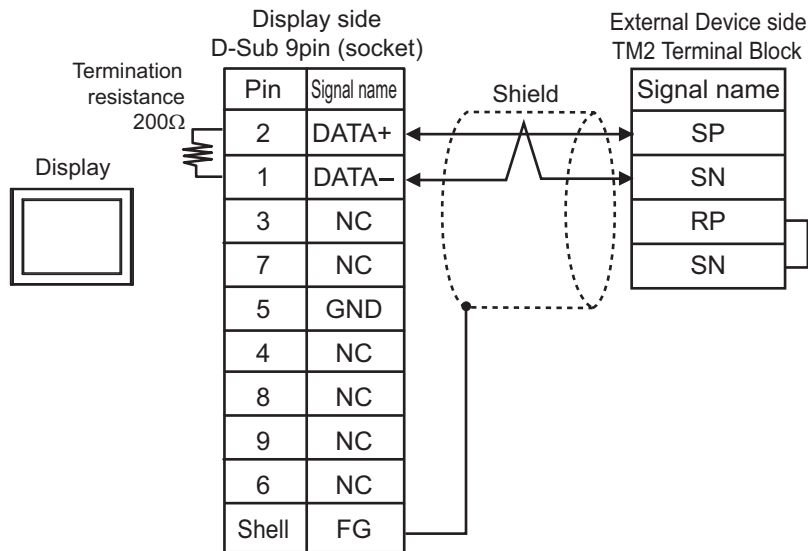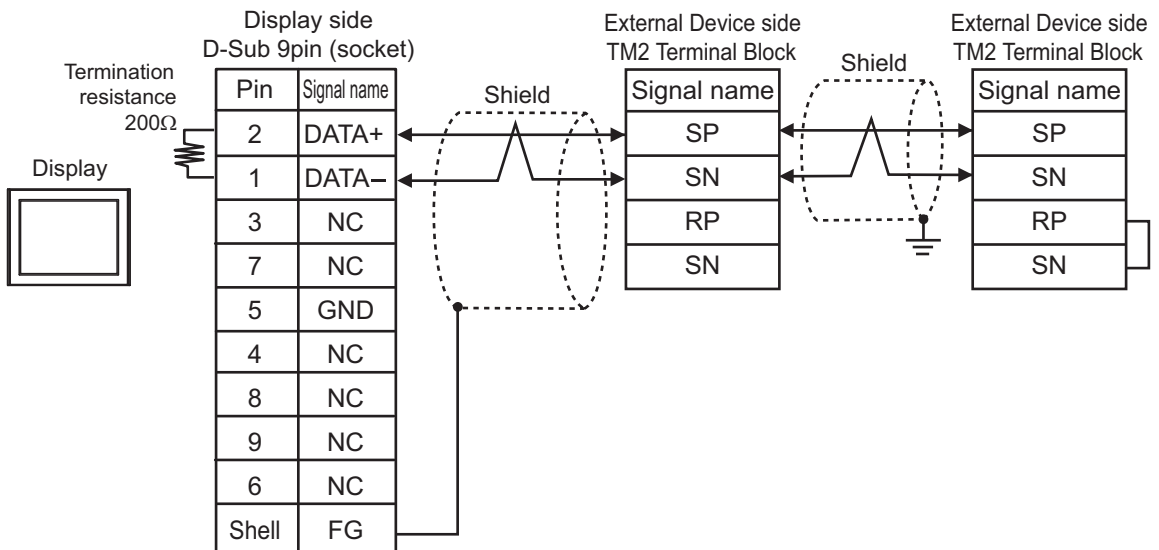| **NOTE**	• Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal. • To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor. • In COM on the GP-4107, the SG and FG terminals are isolated.

2I)

• 1:1 Connection
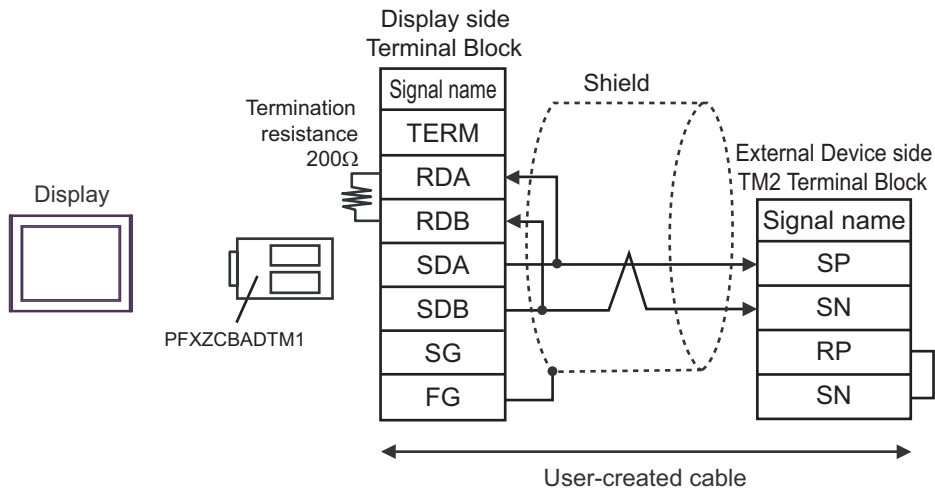
• 1:n Connection
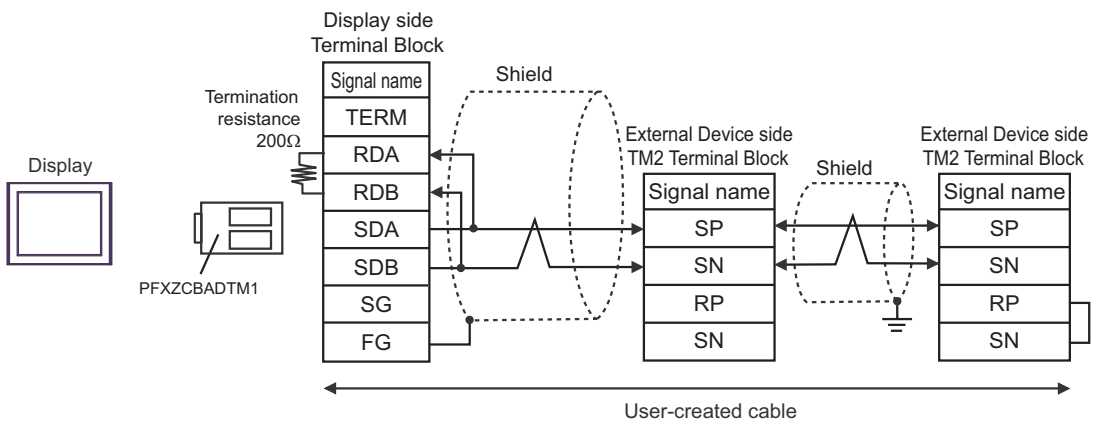
NOTE	• Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
	• To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2J)

• 1:1 Connection

External Device side
TM2 Terminal Block

Signal name
SP
SN
RP
SN

Display

D1

D0

(1)

• 1:n Connection

Termination
resistance
200Ω

External Device side
TM2 Terminal Block

Shield

External Device side
TM2 Terminal Block

Signal name
SP
SN
RP
SN

Signal name
SP
SN
RP
SN

Display

D1

D0

(1)

User-created Cable

NOTE

• Enable termination resistance by short-circuiting the terminatory External Device's RP
terminal and the terminatory External Device's SN terminal.
• To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for
Terminal resistor.

Number	Name	Notes
(1)	RJ45 RS-485 Cable (5m) by Pro-face PFXZLMCBRJR81	

2K)

• 1:1 Connection

• 1:n Connection

NOTE

• Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.

• To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

6   Supported Devices

The following table shows the range of supported device addresses. 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.

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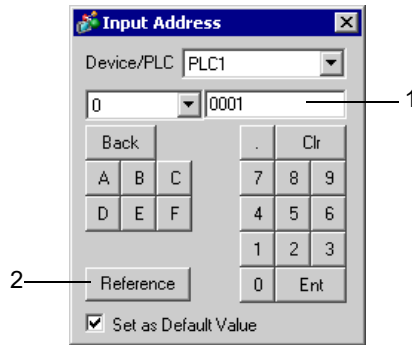
1.   Address   Enter the address.

2.   Reference   Available parameter list is displayed.
Click the parameter to use and press "Select", then the address is entered.

NOTE	• If you select the [Set as Default Value] option, the set value for a new address entry will be displayed as the default value.

6.1   X200 series

⬜ This address can be specified as system data area.

Device	Bit Address	Word Address	32bits	Notes
Coil	00001 - 0001F	00001	**H / L**	*1
Holding register	-	40001 - 41544	**Bit F**	

*1   Specify only the word address whose last digit is "1" .

NOTE	• Holding register number 0900h is an address for the command (enter command) to write in nonvolatile memory. By writing "1" in 0900h, writing to nonvolatile memory is enabled.
	• GP-Pro EX simulation does not synchronize the coil bit address and word address values.
	• You can only set the Read Area Size for the system area available to use in the External Device. Please refer to the GP Pro-EX Reference Manual for Read Area Size.
	  Cf. GP Pro-EX Reference Manual "LS Area (Direct Access Method Area)"
	• Refer to the precautions on manual notation for icons in the table.
	  ☞ "Manual Symbols and Terminology"

6.2　SJ700 series

☐ This address can be specified as system data area.

| Device	Bit Address	Word Address	32bits	Notes
Coil	00001 - 0004E	00001 - 00031	H / L	*1
Holding register	-	40001 - 43507		Bit F

*1　Specify only the word address whose last digit is "1".

NOTE

- Holding register number 0900h is an address for the command (enter command) to write in nonvolatile memory. By writing "1" in 0900h, writing to nonvolatile memory is enabled.
- GP-Pro EX simulation does not synchronize the coil bit address and word address values.
- You can only set the Read Area Size for the system area available to use in the External Device. Please refer to the GP Pro-EX Reference Manual for Read Area Size.
  Cf.　GP Pro-EX Reference Manual "LS Area (Direct Access Method Area)"
- Refer to the precautions on manual notation for icons in the table.

☞ "Manual Symbols and Terminology"

6.3　SJ700-2 series

☐ This address can be specified as system data area.

Device	Bit Address	Word Address	32bits	Notes
Coil	00001 - 00052	00001 - 00041	H / L	*1
Holding register	-	40001 - 43507		Bit F

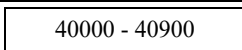*1　Specify only the word address whose last digit is "1".

NOTE

- Holding register number 0900h is an address for the command (enter command) to write in nonvolatile memory. By writing "1" in 0900h, writing to nonvolatile memory is enabled.
- GP-Pro EX simulation does not synchronize the coil bit address and word address values.
- You can only set the Read Area Size for the system area available to use in the External Device. Please refer to the GP Pro-EX Reference Manual for Read Area Size.
  Cf.　GP Pro-EX Reference Manual "LS Area (Direct Access Method Area)"
- Refer to the precautions on manual notation for icons in the table.

☞ "Manual Symbols and Terminology"

6.4　　　　SJ200 series

This address can be specified as system data area.

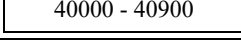| Device	Bit Address	Word Address	32bits	Notes
Coil	00000 - 0001F	00000 - 00010	H / L	***0)
Holding register	-	40000 - 40900		Bit F

NOTE
- Holding register number 0900h is an address for the command (enter command) to write in nonvolatile memory. By writing "1" in 0900h, writing to nonvolatile memory is enabled.
- GP-Pro EX simulation does not synchronize the coil bit address and word address values.
- You can only set the Read Area Size for the system area available to use in the External Device. Please refer to the GP Pro-EX Reference Manual for Read Area Size.
  Cf.　GP Pro-EX Reference Manual "LS Area (Direct Access Method Area)"
- Refer to the precautions on manual notation for icons in the table.

☞ "Manual Symbols and Terminology"

6.5　　　　L200 series

This address can be specified as system data area.

| Device	Bit Address	Word Address	32bits	Notes
Coil	00000 - 0001F	00000 - 00010	H / L	***0)
Holding register	-	40000 - 40900		Bit F

NOTE
- Holding register number 0900h is an address for the command (enter command) to write in nonvolatile memory. By writing "1" in 0900h, writing to nonvolatile memory is enabled.
- GP-Pro EX simulation does not synchronize the coil bit address and word address values.
- You can only set the Read Area Size for the system area available to use in the External Device. Please refer to the GP Pro-EX Reference Manual for Read Area Size.
  Cf.　GP Pro-EX Reference Manual "LS Area (Direct Access Method Area)"
- Refer to the precautions on manual notation for icons in the table.

☞ "Manual Symbols and Terminology"

6.6   WJ200 series

⬜ This address can be specified as system data area.

Device	Bit Address	Word Address	32bits	Notes
Coil	00001 - 00058	00001 - 00041	$\boxed{H/L}$	*1
Holding register	-	40001 - 4252D	$\boxed{Bit\ F}$	

*1   For word addresses, only specify addresses with "1" as the last digit.

NOTE

• Holding register 0900h is an address for writing to nonvolatile memory. By storing "1" in 0900h, writing to nonvolatile memory is enabled.
• GP-Pro EX simulation does not synchronize the coil bit address and word address values.
• You can only set the Read Area Size for the system area in the External Device. Please refer to the GP Pro-EX Reference Manual for Read Area Size.
    Cf.   GP Pro-EX Reference Manual "LS Area (Direct Access Method Area)"
• Refer to the precautions on manual notation for icons in the table.

☞ "Manual Symbols and Terminology"

7 Device Code and Address Code

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

7.1 X200 series

Device	Device Name	Device Code (HEX)	Address Code
Coil	0	0080	Value of (word address -1) divided by 0x10
Holding register	4	0000	Value of (word address - 1)

7.2 SJ700 series

Device	Device Name	Device Code (HEX)	Address Code
Coil	0	0080	Value of (word address -1) divided by 0x10
Holding register	4	0000	Value of (word address - 1)

7.3 SJ700-2 series

Device	Device Name	Device Code (HEX)	Address Code
Coil	0	0080	Value of (word address -1) divided by 0x10
Holding register	4	0000	Value of (word address - 1)

7.4 SJ200 series

Device	Device Name	Device Code (HEX)	Address Code
Coil	0	0080	Value of word address divided by 0x10
Holding register	4	0000	Word Address

7.5 L200 series

Device	Device Name	Device Code (HEX)	Address Code
Coil	0	0080	Value of word address divided by 0x10
Holding register	4	0000	Word Address

7.6　　　　WJ200 series

Device	Device Name	Device Code (HEX)	Address Code
Coil	0	0080	Value of (word address -1) divided by 0x10
Holding register	4	0000	Value of (word address - 1)

8 Error Messages

Error messages are displayed on the Display screen 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. Device/PLC 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]".

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 Unique to External Device

Error Code	Description
02h	The specified address does not exist.
21h	Invalid data is written in the inverter's holding register.
22h	These specified functions are not available to the inverter: • Attempted to change the content of a register that cannot be changed while the inverter is in service. • Attempted to use an ENTER command during running (UV). • Attempted to write in a register during tripping (UV). • Attempted to write in a register with software lock enabled.
23h[*1]	Attempted to write in a register with software lock enabled.

*1 The error code is supported by X200 series and WJ200 series only.