



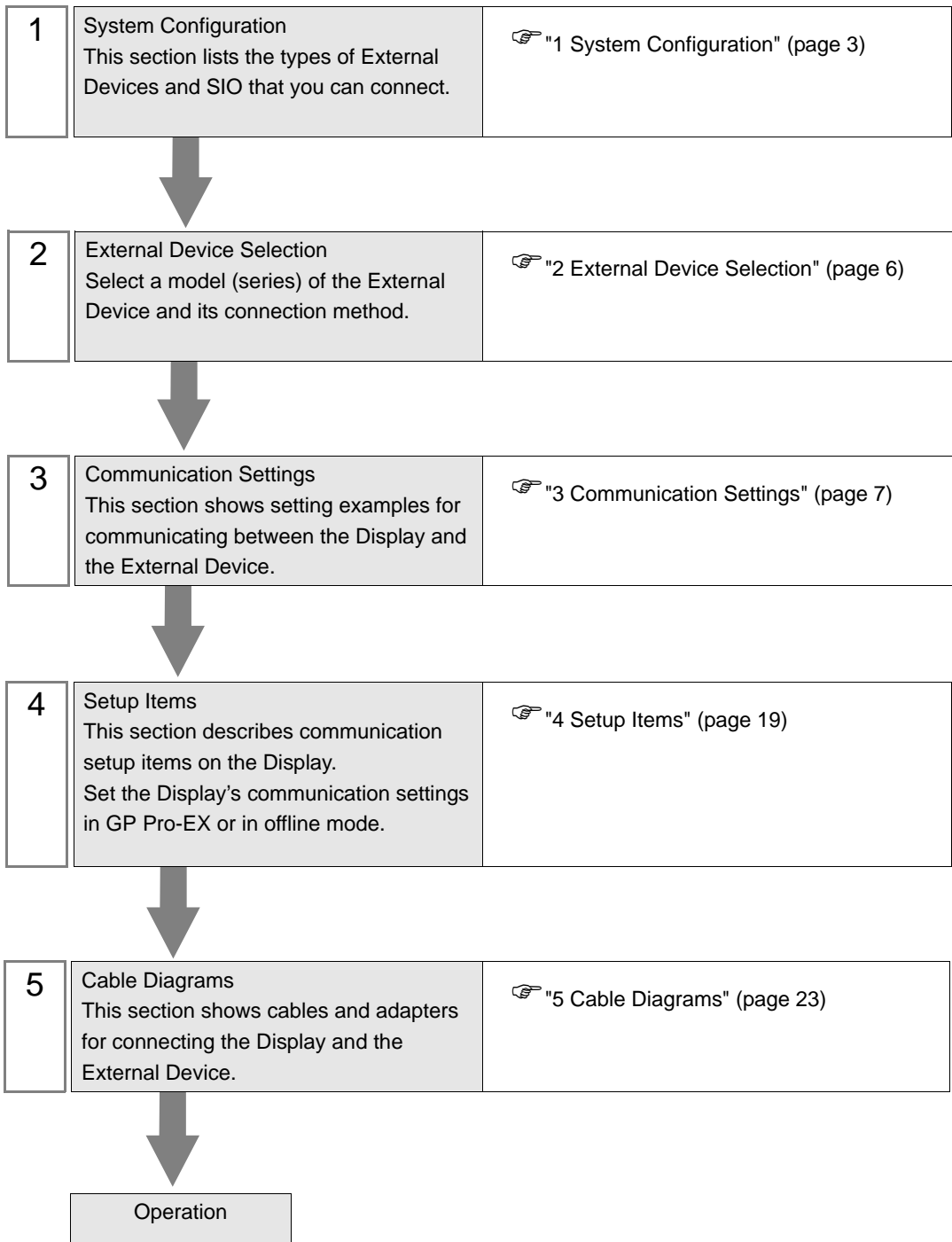
# Inverter MODBUS RTU Driver

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## 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

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

Series	Inverter <sup>*1</sup>	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 7)	"Cable Diagram 1" (page 23)
SJ700	SJ700-□□□■□F■F	RS485 port on the inverter	RS-422/485 (2 wire)	"Setting Example 2" (page 9)	"Cable Diagram 2" (page 35)
SJ700-2	SJ700-□□□■□F■F2	RS485 port on the inverter	RS-422/485 (2 wire)	"Setting Example 3" (page 11)	"Cable Diagram 2" (page 35)
SJ200	SJ200-□□□□F□□	Serial port connector on the inverter	RS-422/485 (2 wire)	"Setting Example 4" (page 13)	"Cable Diagram 1" (page 23)
L200	L200-□□□□F□□	Serial port connector on the inverter	RS-422/485 (2 wire)	"Setting Example 5" (page 15)	"Cable Diagram 1" (page 23)
WJ200	WJ200-□□□□F	Control terminal block on the inverter	RS-422/485 (2 wire)	"Setting Example 6" (page 17)	"Cable Diagram 2" (page 35)

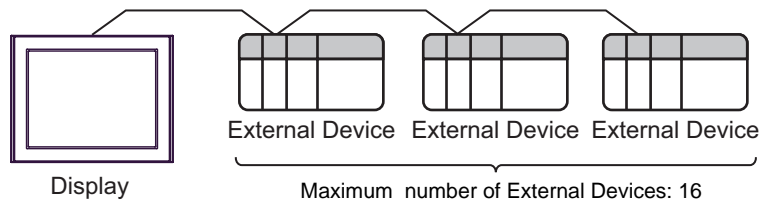
\*1 ■ is not added as an option. □ differs depending on the option.

## ■ Connection Configuration

- 1:1 Connection



- 1:n Connection (when using either COM1 or COM2)



## ■ 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 <sup>*1</sup> , COM2, COM3 <sup>*1</sup> , COM4	-	-
PS-3450A, PS-3451A, PS3000-BA, PS3001-BD	COM1, COM2 <sup>*1*2</sup>	COM2 <sup>*1*2</sup>	COM2 <sup>*1*2</sup>
PS-3650A (T41 model), PS-3651A (T41 model)	COM1 <sup>*1</sup>	-	-
PS-3650A (T42 model), PS-3651A (T42 model)	COM1 <sup>*1*2</sup> , COM2	COM1 <sup>*1*2</sup>	COM1 <sup>*1*2</sup>
PS-3700A (Pentium®4-M), PS-3710A	COM1 <sup>*1</sup> , COM2 <sup>*1</sup> , COM3 <sup>*2</sup> , COM4	COM3 <sup>*2</sup>	COM3 <sup>*2</sup>
PS-3711A	COM1 <sup>*1</sup> , COM2 <sup>*2</sup>	COM2 <sup>*2</sup>	COM2 <sup>*2</sup>
PS4000 <sup>*3</sup>	COM1, COM2	-	-
PL3000	COM1 <sup>*1*2</sup> , COM2 <sup>*1</sup> , COM3, COM4	COM1 <sup>*1*2</sup>	COM1 <sup>*1*2</sup>

\*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.

DIP Switch setting: RS-232C

DIP Switch	Setting	Description
1	OFF <sup>*1</sup>	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.

## DIP Switch setting: RS-422/485 (4 wire)

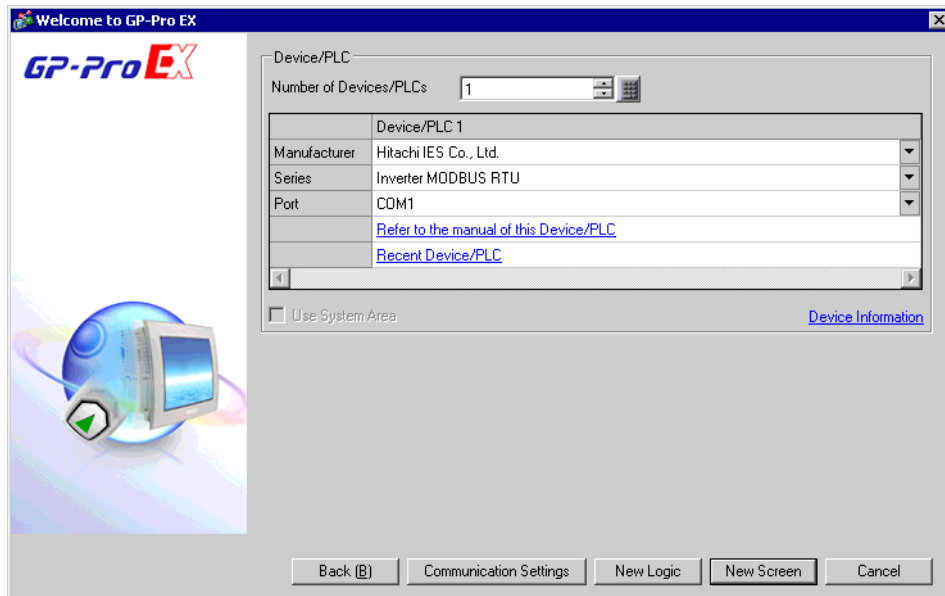
DIP Switch	Setting	Description
1	OFF	Reserved (always OFF)
2	ON	SIO type: RS-422/485
3	ON	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	OFF	Short-circuit of SDA (TXA) and RDA (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	

## DIP Switch setting: 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/PLC 1

Summary [Change Device/PLC](#)

Manufacturer  Series  Port

Text Data Mode  [Change](#)

Communication Settings

SIQ Type ☐ RS232C ☒ RS422/485(2wire) ☐ RS422/485(4wire)

Speed

Data Length ☐ 7 ☒ 8

Parity ☒ NONE ☐ EVEN ☐ ODD

Stop Bit ☒ 1 ☐ 2

Flow Control ☒ NONE ☐ ER(DTR/CTS) ☐ XON/XOFF

Timeout  (sec)

Retry

Wait To Send  (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.

Device-Specific Settings

Allowable Number of Devices/PLCs 16 [Add Device](#)

No.	Device Name	Settings
1	PLC1	Series=SJ700, 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

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

Slave address

## ■ 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

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

Text Data Mode: 1 [Change](#)

Communication Settings

SI0 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
1	PLC1	Series=SJ700-2, Slave address=1

Add Indirect Device

##### ◆ Device Setting

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

Individual Device Settings

PLC1

Series: SJ700-2

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

Slave address: 1

Default

OK 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].

The screenshot shows the 'Device/PLC 1' configuration window. It has a 'Summary' section with fields for Manufacturer (Hitachi IES Co., Ltd.), Series (Inverter MODBUS RTU), and Port (COM1). Below this is the 'Communication Settings' section with options for SIQ 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), and Retry (2). There is also a 'Wait To Send' field (2 ms) and a 'Default Value' checkbox. At the bottom, there is a 'Device-Specific Settings' section with a table showing the allowable number of devices (16) and a list of devices. The first device is 'PLC1' with settings 'Series=SJ200, Slave address=1'. There are buttons for 'Add Device' and 'Add Indirect Device'.

##### ◆ Device Setting

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

The screenshot shows the 'Individual Device Settings' dialog box for 'PLC1'. It has a 'Series' dropdown menu set to 'SJ200'. Below it is a note: 'If you change the series, please reconfirm all address settings.' There is a 'Slave address' field set to '1'. At the bottom, there are buttons for 'Default', 'OK (O)', and '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

### 3.5 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].

The screenshot shows the 'Device/PLC 1' configuration window. The 'Summary' section includes fields for Manufacturer (Hitachi IES Co., Ltd.), Series (Inverter MODBUS RTU), and Port (COM1). The 'Text Data Mode' is set to 1. The 'Communication Settings' section includes radio buttons for SIQ Type (RS232C, RS422/485(2wire), RS422/485(4wire)), a Speed dropdown (19200), Data Length (7, 8), Parity (NONE, EVEN, ODD), Stop Bit (1, 2), Flow Control (NONE, ER(DTR/CTS), XON/XOFF), Timeout (3 sec), and Retry (2). There is a 'Wait To Send' field (2 ms) and a 'Default Value' checkbox. Below this is a section for RI / VCC with radio buttons for RI and VCC, and a note about RS232C pin selection. The 'Device-Specific Settings' section shows 'Allowable Number of Devices/PLCs' as 16, with an 'Add Device' link. A table lists the device: No. 1, Device Name PLC1, Settings Series=L200, Slave address=1. There is an 'Add Indirect Device' button.

##### ◆ 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.

The screenshot shows the 'Individual Device Settings' dialog box for PLC1. It has a 'Series' dropdown menu set to L200. Below it is a note: 'If you change the series, please reconfirm all address settings.' The 'Slave address' is set to 1. There are 'Default', 'OK (O)', and 'Cancel' buttons.

## ■ 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

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

Text Data Mode: 1 [Change](#)

Communication Settings

SIQ 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
1	PLC1	Series=WJ200, Slave address=1

Add Indirect Device

##### ◆ Device Setting

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

Individual Device Settings

PLC1

Series: WJ200

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

Slave address: 1

Default

OK 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 7)

### 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].

Device/PLC 1

Summary

Manufacturer  Series  Port  [Change Device/PLC](#)

Text Data Mode  [Change](#)

Communication Settings

SIO Type ☐ RS232C ☒ RS422/485(2wire) ☐ RS422/485(4wire)

Speed

Data Length ☐ 7 ☒ 8

Parity ☒ NONE ☐ EVEN ☐ ODD

Stop Bit ☒ 1 ☐ 2

Flow Control ☒ NONE ☐ ER(DTR/CTS) ☐ XON/XOFF

Timeout  (sec)

Retry

Wait To Send  (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

1 PLC1 Series=X200, Slave address=1 [Add Indirect Device](#)

Setup Items	Setup Description
SIO Type	<p>Select the SIO type to communicate with the External Device.</p> <p><b>IMPORTANT</b></p> <p>In the communication settings, set [SIO Type] correctly according to the serial interface specifications of the Display.</p> <p>If you select an SIO type that the serial interface does not support, proper operation cannot be guaranteed.</p> <p>Refer to your Display manual for details on the serial interface specifications.</p>
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.

Continued on the next page.


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	<p>Use an integer from 0 to 255 to enter standby time (ms) for the Display from receiving packets to transmitting next commands.</p> <p>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.</p> $\text{Wait To Send (ms)} = \frac{3500 \times (1 + \text{Data Length} + \text{Stop Bit} + \text{Parity})}{\text{Speed (bps)}}$ <p>Value for the parity setting is shown below.</p> <p>No Parity = 0 Parity Even = 1 Parity Odd = 1</p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul>

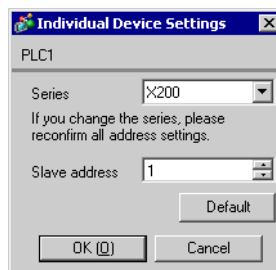
**NOTE**

- 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.

## 4.2 Setup Items in Offline Mode

**NOTE**

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

### ■ Communication Settings

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

Comm.	Device	Option		
Inverter MODBUS RTU [COM1] Page 1/1				
SIO Type	RS422/485(2wire)			
Speed	19200			
Data Length	8			
Parity	<input checked="" type="radio"/> NONE <input type="radio"/> EVEN <input type="radio"/> ODD			
Stop Bit	<input checked="" type="radio"/> 1 <input type="radio"/> 2			
Flow Control	NONE			
Timeout(s)	3			
Retry	2			
Wait To Send(ms)	2			
Exit		Back		2008/07/15 13:25:55

Setup Items	Setup Description
SIO Type	<p>Select the SIO type to communicate with the External Device.</p> <p><b>IMPORTANT</b></p> <p>In the communication settings, set [SIO Type] correctly according to the serial interface specifications of the Display.</p> <p>If you select an SIO type that the serial interface does not support, proper operation cannot be guaranteed.</p> <p>Refer to your Display manual for details on the serial interface specifications.</p>
Speed	Select the 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.

Continued on the next page.

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].

Comm.	Device	Option		
Inverter MODBUS RTU [COM1] Page 1/1				
Device/PLC Name <input type="text" value="PLC1"/>				
Series X200				
Slave address <input type="text" value="1"/>				
Exit		Back		2008/07/15 13:25:58

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 <sup>*1</sup> (COM1) AGP-3302B (COM2) GP-4*01TM (COM1) ST <sup>*2</sup> (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 <sup>*3</sup> (COM2)	1C	Online adapter by Pro-face CA4-ADPONL-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	
	1D	Online adapter by Pro-face CA4-ADPONL-01 + User-created cable	
IPC <sup>*4</sup>	1E	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	
	1F	User-created cable	
GP-4106 (COM1)	1G	User-created cable	
GP-4107 (COM1) GP-4*03T <sup>*5</sup> (COM2) GP-4203T (COM1)	1H	User-created cable	


Display (Connection Port)	Cable		Notes
GP4000 <sup>*6</sup> (COM2) GP-4201T (COM1)	1I	RS-422 terminal block conversion adapter by Pro-face PFXZCBADTM1 <sup>*7</sup> + User-created cable	Cable length: 250m or less
	1B	User-created cable	
LT-4*01TM (COM1)	1J	RJ45 RS-485 Cable (5m) by Pro-face PFXZLMCBJR81	

\*1 All GP3000 models except AGP-3302B

\*2 All ST models 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.

 "■ IPC COM Port" (page 4)

\*5 Except GP-4203T

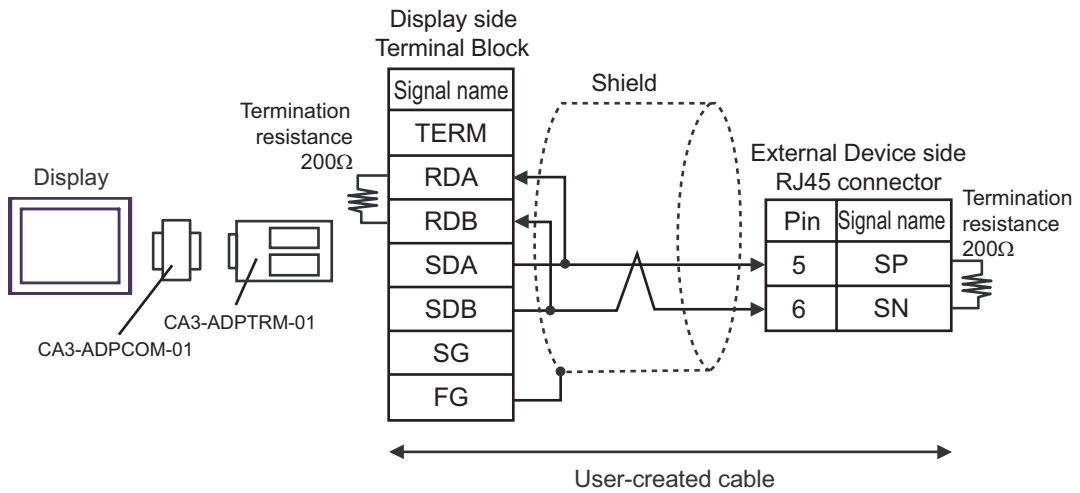
\*6 All GP4000 models except GP-4100 series, GP-4\*01TM, GP-4201T and GP-4\*03T

\*7 When using a Terminal Block Conversion Adapter (CA3-ADPTRM-01) instead of the RS-422 Terminal Block Conversion Adapter, refer to Cable Diagram 1A.

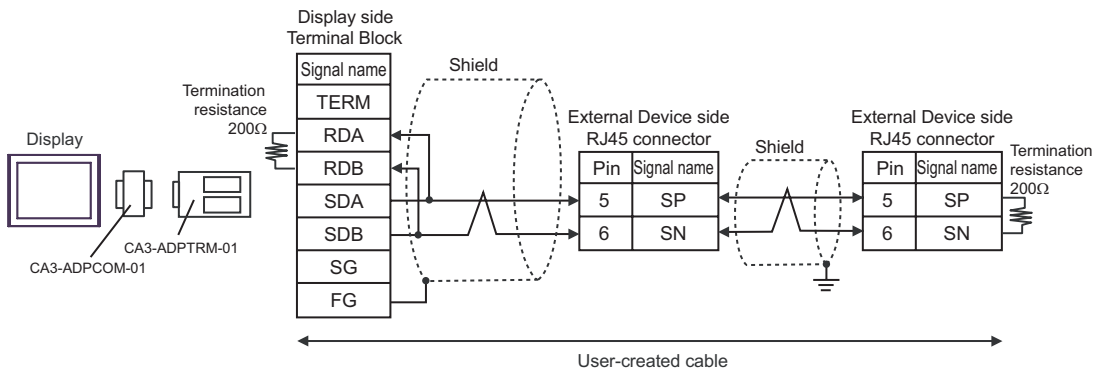


1A)

- 1:1 Connection

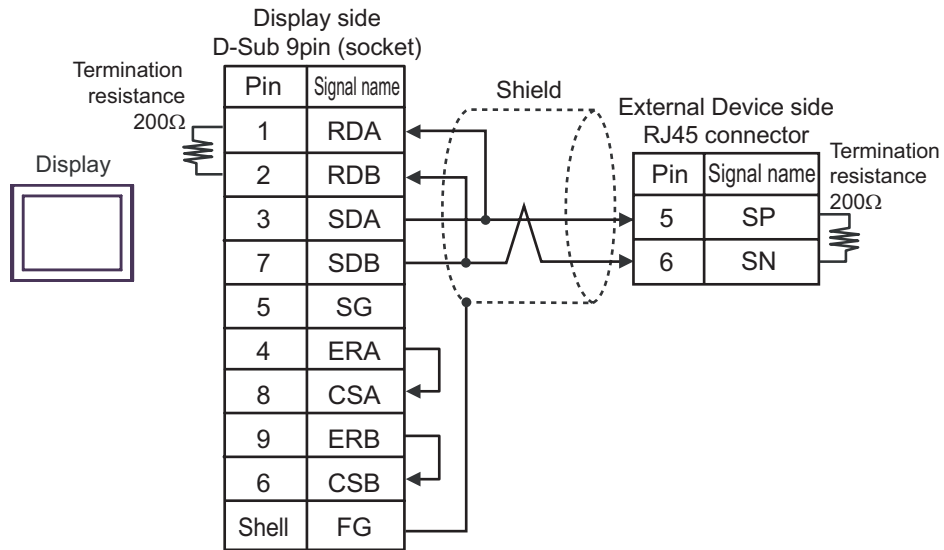


- 1:n Connection

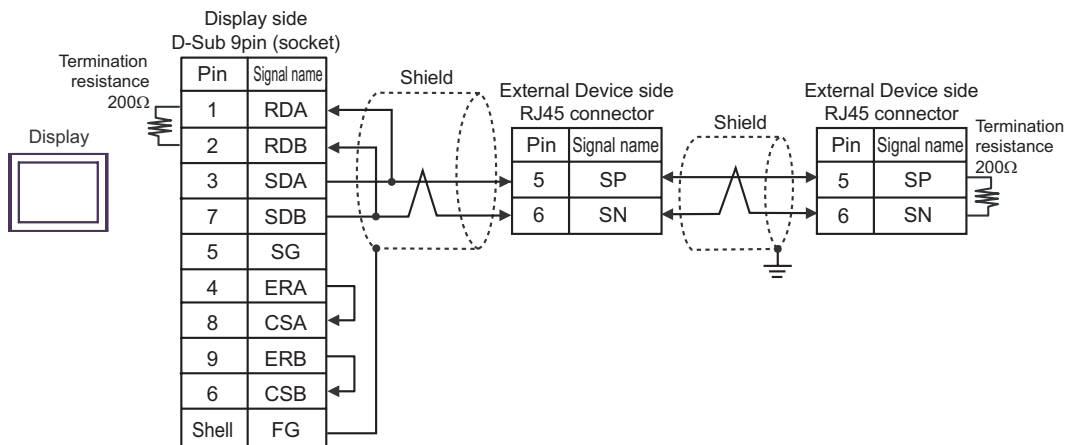


1B)

- 1:1 Connection

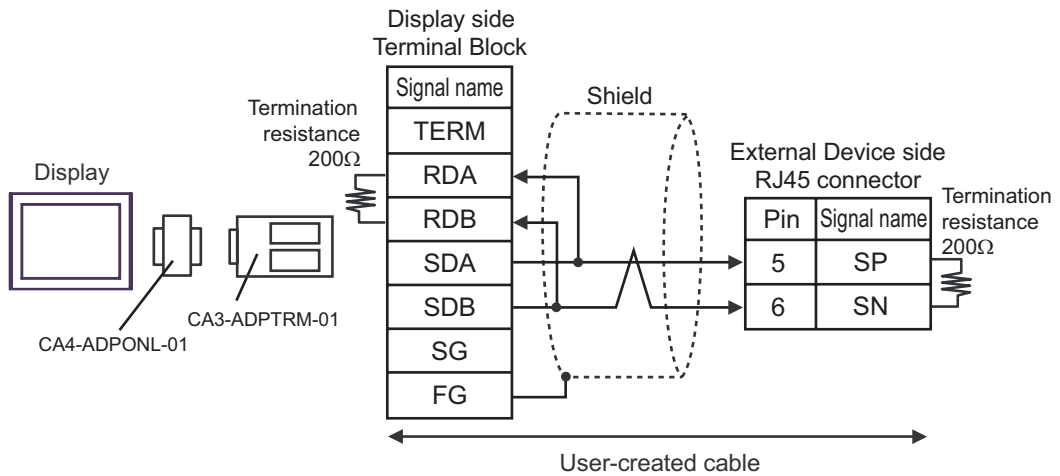


- 1:n Connection

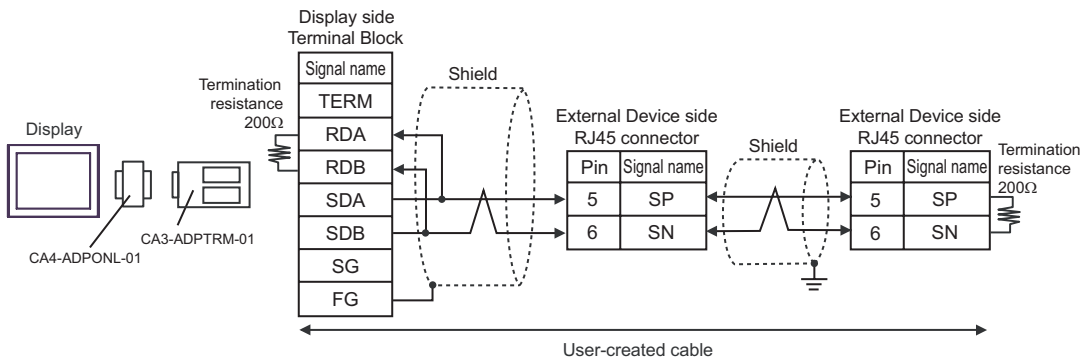


1C)

- 1:1 Connection

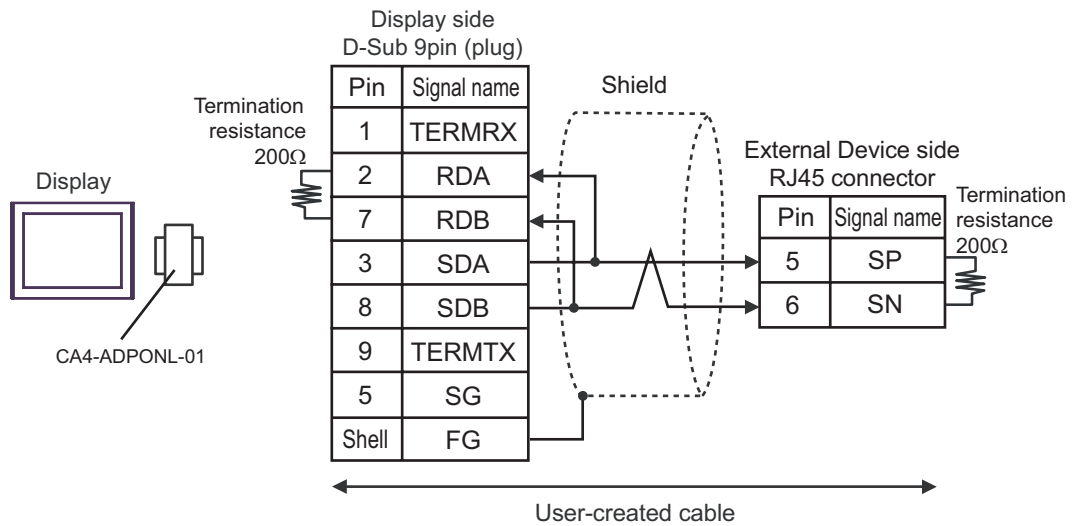


- 1:n Connection

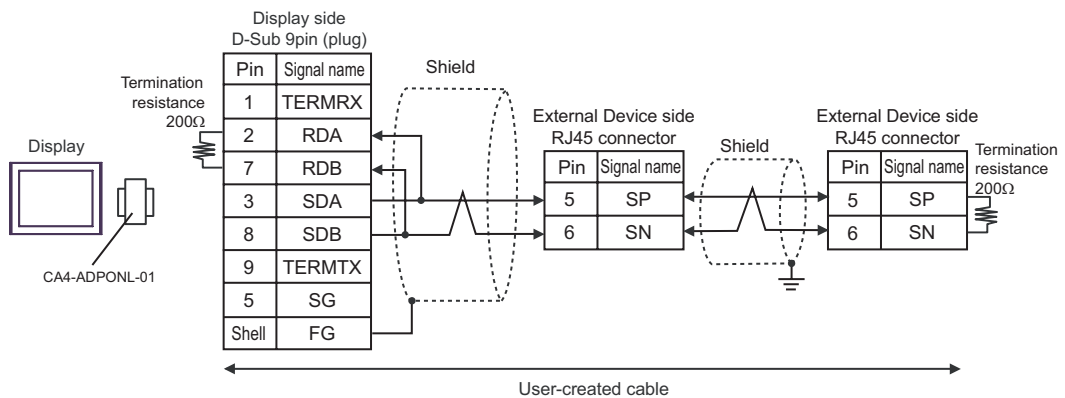


1D)

- 1:1 Connection

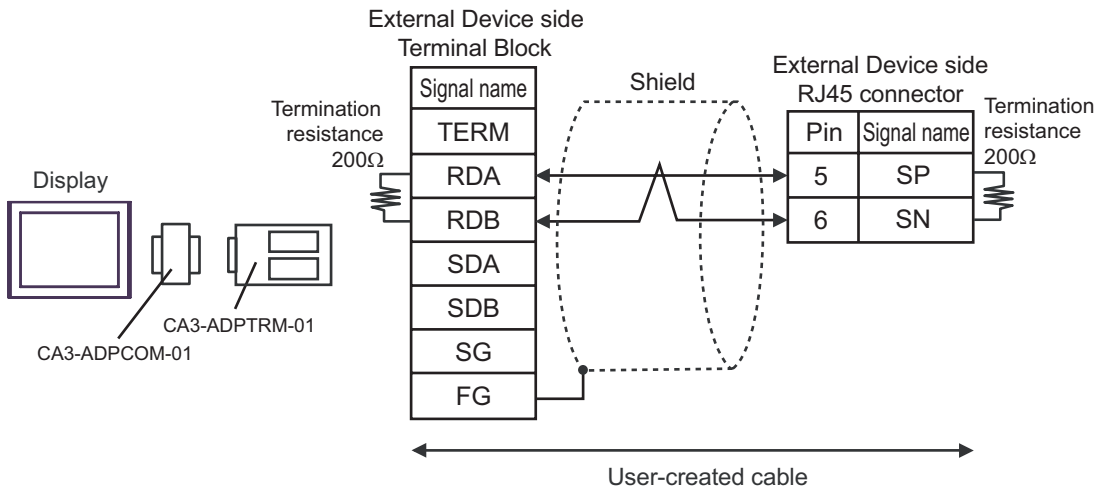


- 1:n Connection

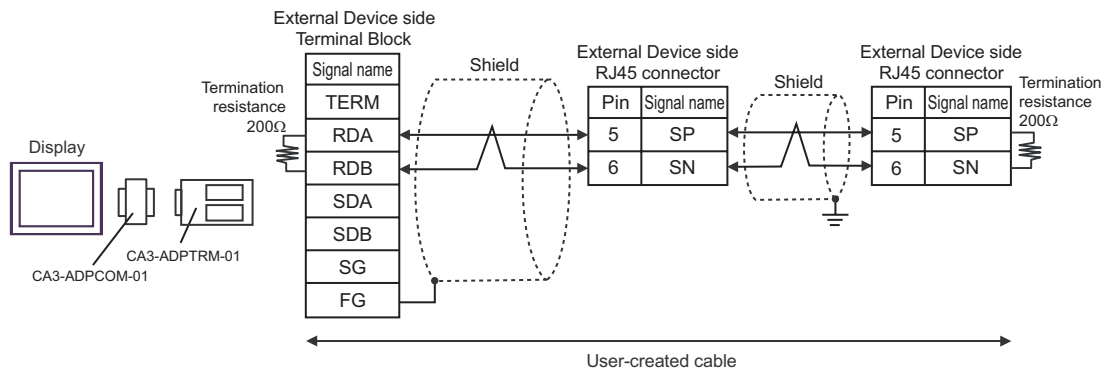


1E)

- 1:1 Connection

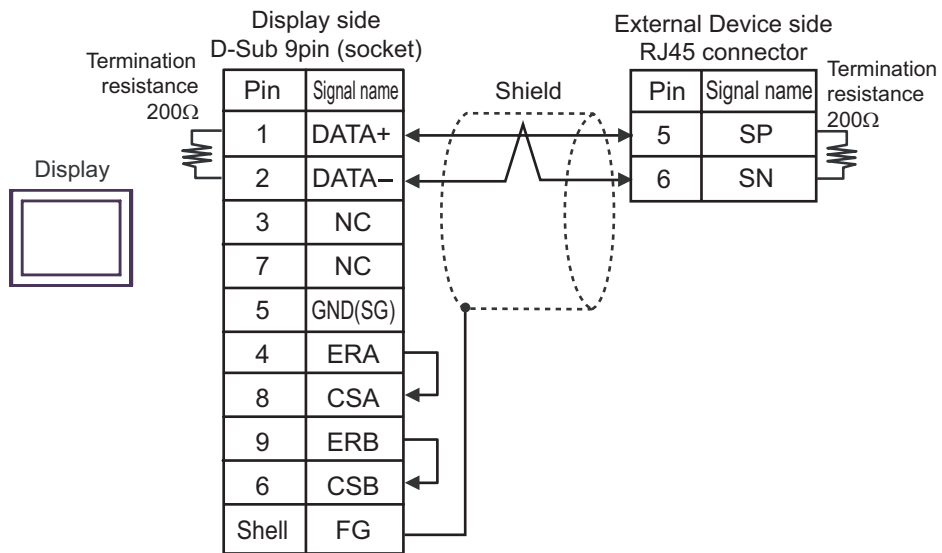


- 1:n Connection

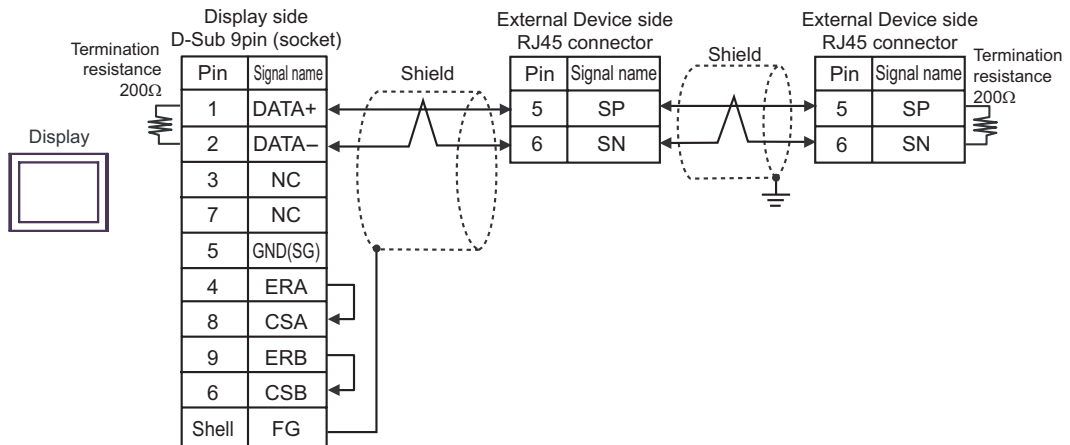


1F)

- 1:1 Connection

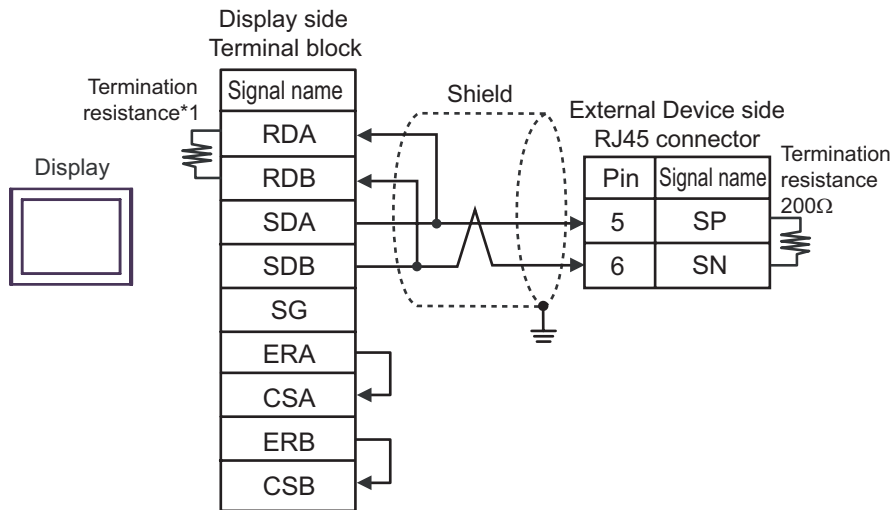


- 1:n Connection

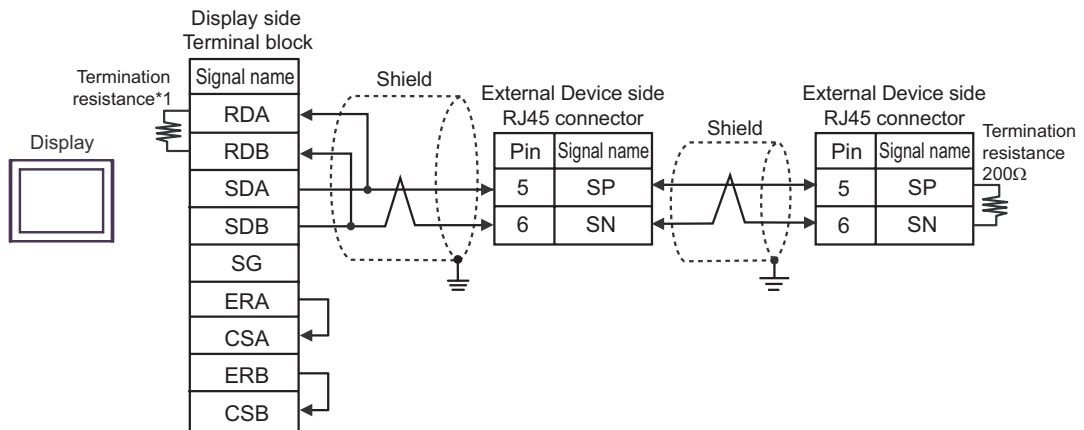


1G)

- 1:1 Connection



- 1:n Connection

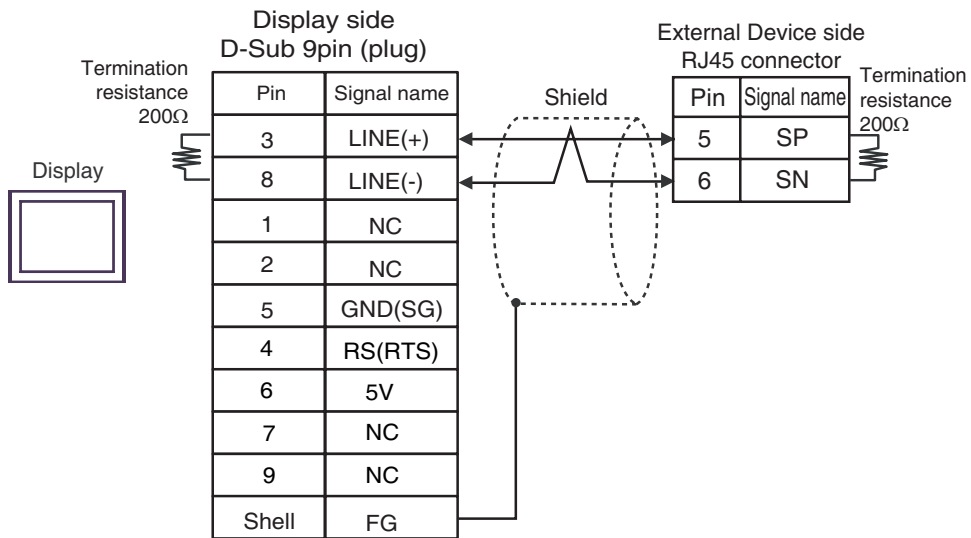


\*1 The resistance in the Display is used as the termination resistance. Set the value of the DIP Switch on the rear of the Display as shown in the table below.

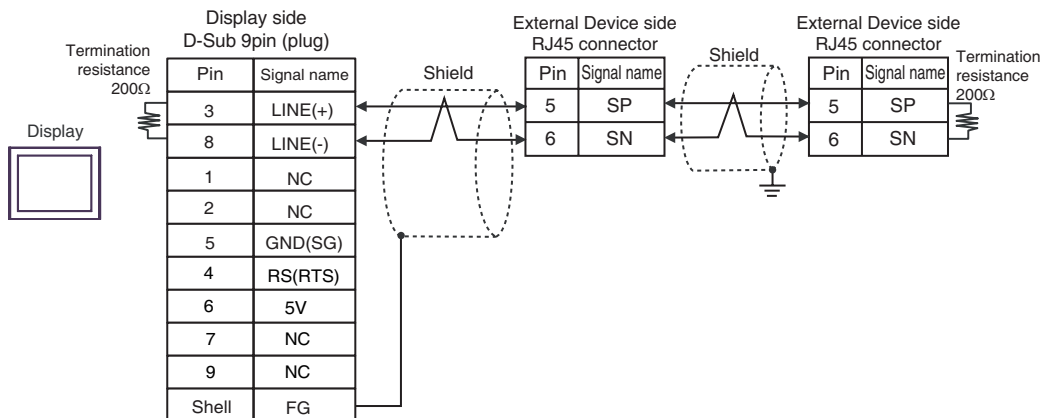
DIP Switch No.	Set Value
1	OFF
2	OFF
3	OFF
4	ON

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.

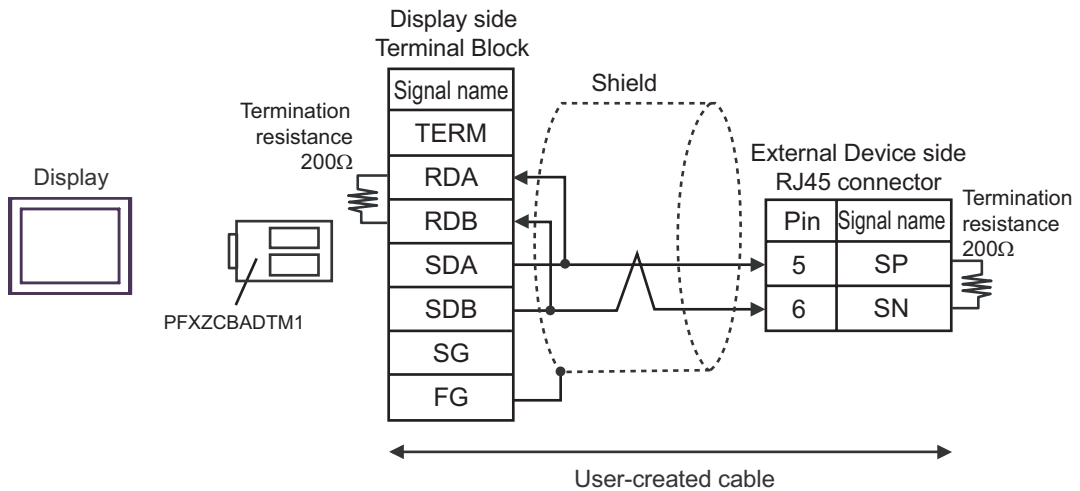
**NOTE**

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

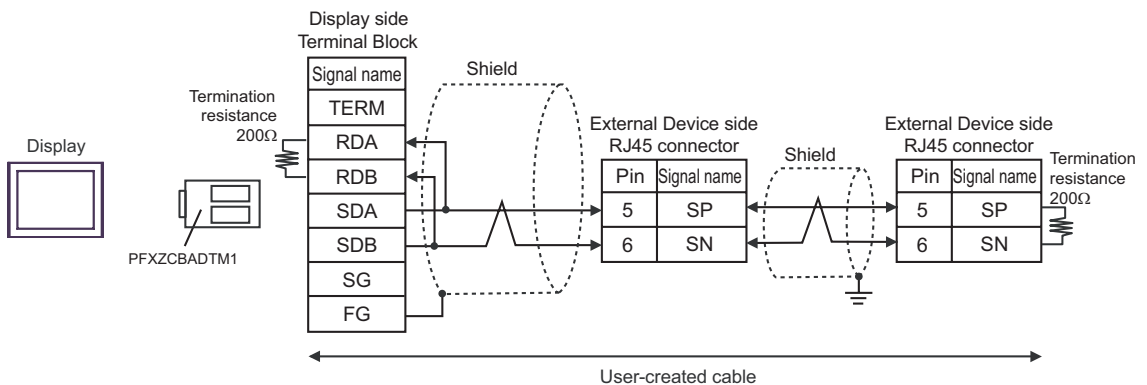


11)

- 1:1 Connection

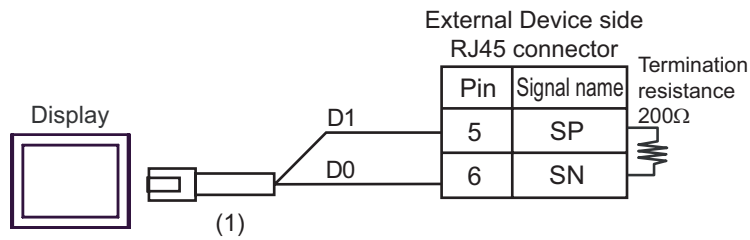


- 1:n Connection

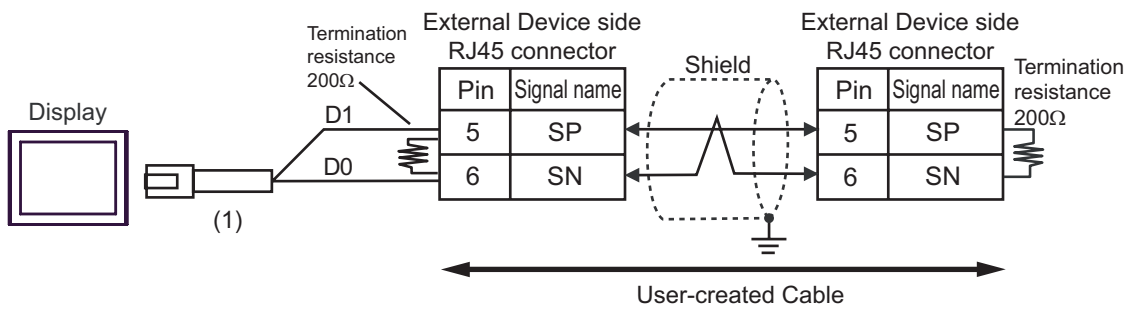


1J)

- 1:1 Connection



- 1:n Connection



Number	Name	Notes
(1)	RJ45 RS-485 Cable (5m) by Pro-face PFXZLMCBJR81	

Cable Diagram 2

Display (Connection Port)	Cable		Notes
GP3000 <sup>*1</sup> (COM1) AGP-3302B (COM2) GP-4*01TM (COM1) ST <sup>*2</sup> (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 <sup>*3</sup>
	2B	User-created cable	
GP3000 <sup>*4</sup> (COM2)	2C	Online adapter by Pro-face CA4-ADPONL-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	
	2D	Online adapter by Pro-face CA4-ADPONL-01 + User-created cable	
IPC <sup>*5</sup>	2E	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable	
	2F	User-created cable	
GP-4106 (COM1)	2G	User-created cable	
GP-4107 (COM1) GP-4*03T <sup>*6</sup> (COM2) GP-4203T (COM1)	2H	User-created cable	
GP4000 <sup>*7</sup> (COM2) GP-4201T (COM1)	2I	RS-422 terminal block conversion adapter by Pro-face PFXZCBADTM1 <sup>*8</sup> + User-created cable	
	2B	User-created cable	
LT-4*01TM (COM1)		RJ45 RS-485 Cable (5m) by Pro-face PFXZLMCBJR81	

\*1 All GP3000 models except AGP-3302B

\*2 All ST models except AST-3211A and AST-3302B

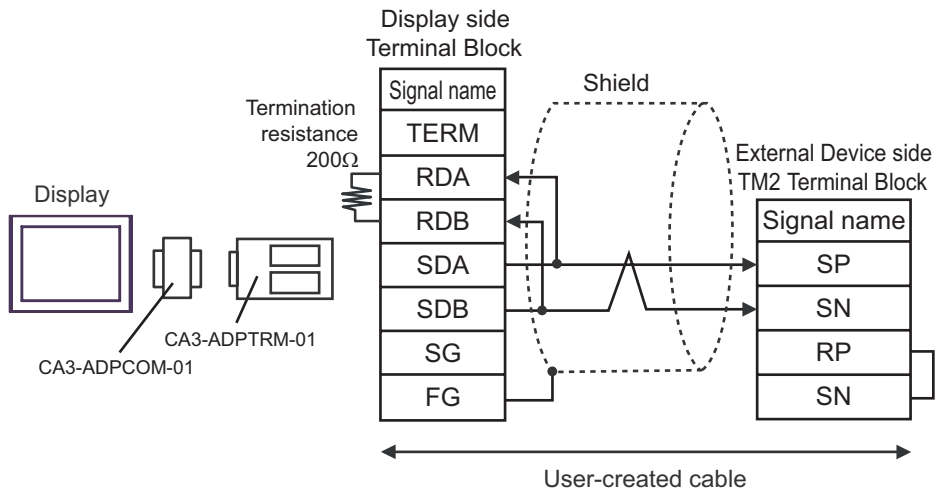
\*3 Cable length for the connection with WJ200 series is within 500m.

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

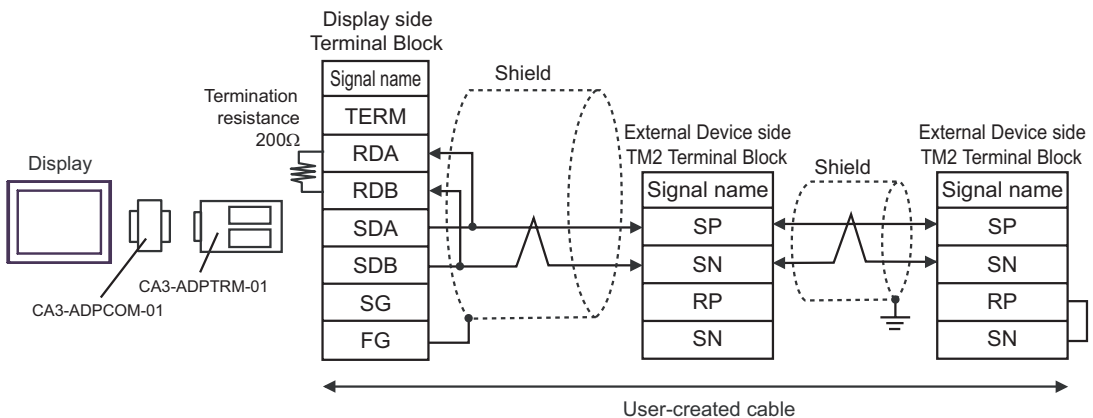
- \*5 Only the COM port which can communicate by RS-422/485 (2 wire) can be used.  
☞ "■ IPC COM Port" (page 4)
- \*6 Except GP-4203T
- \*7 All GP4000 models except GP-4100 series, GP-4\*01TM, GP-4201T and GP-4\*03T
- \*8 When using a Terminal Block Conversion Adapter (CA3-ADPTRM-01) instead of the RS-422 Terminal Block Conversion Adapter, refer to Cable Diagram 2A.

2A)

- 1:1 Connection



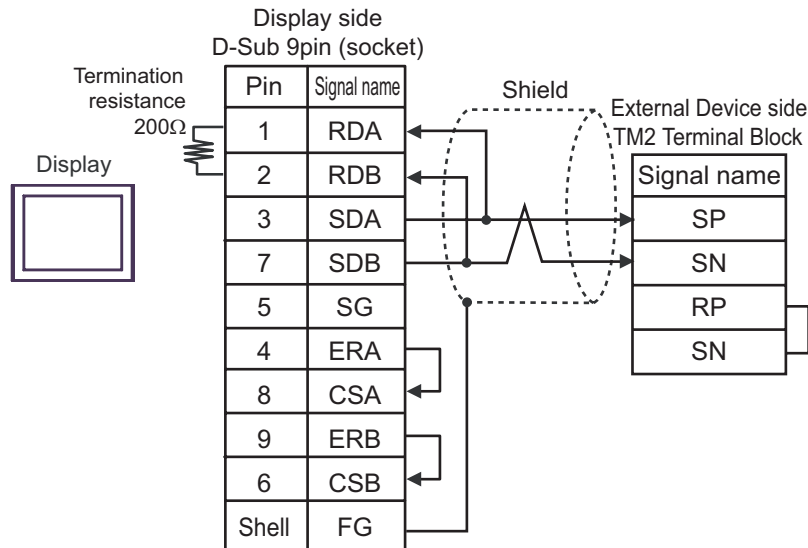
- 1:n Connection

**NOTE**

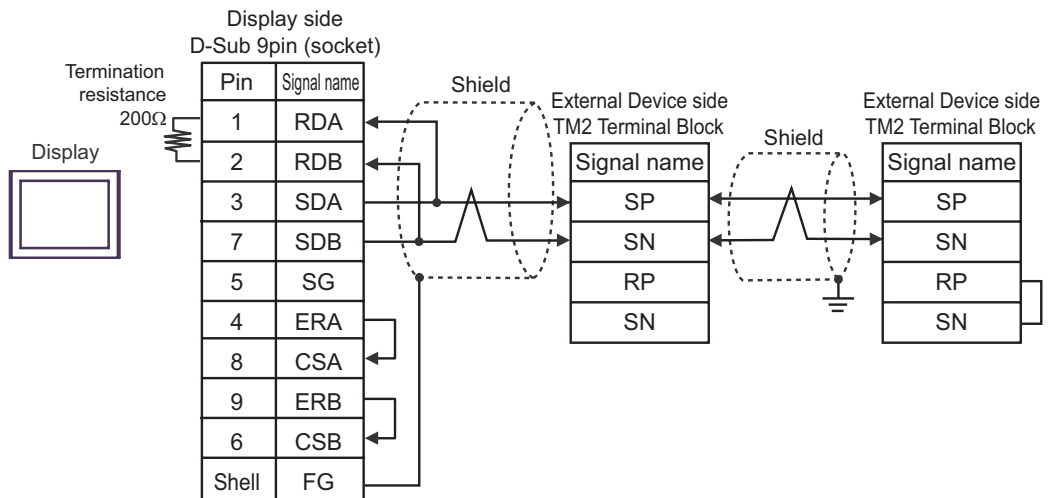
- Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
- To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2B)

- 1:1 Connection



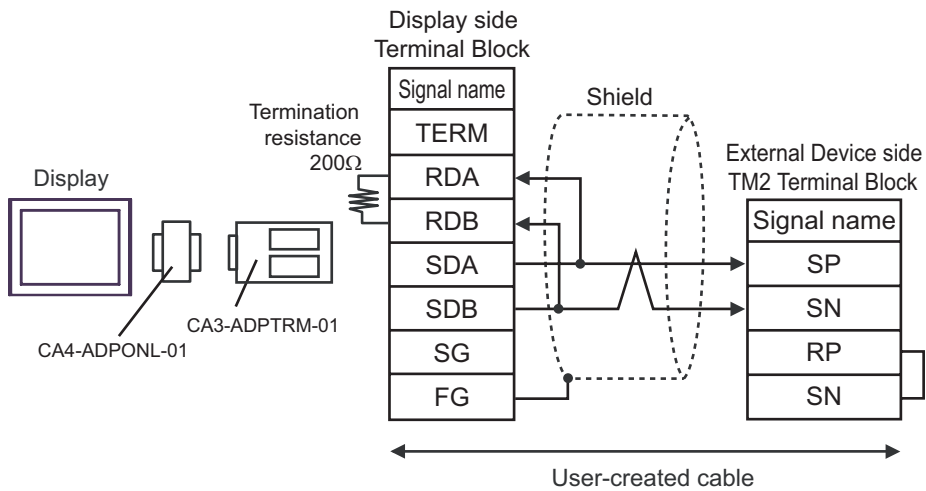
- 1:n Connection

**NOTE**

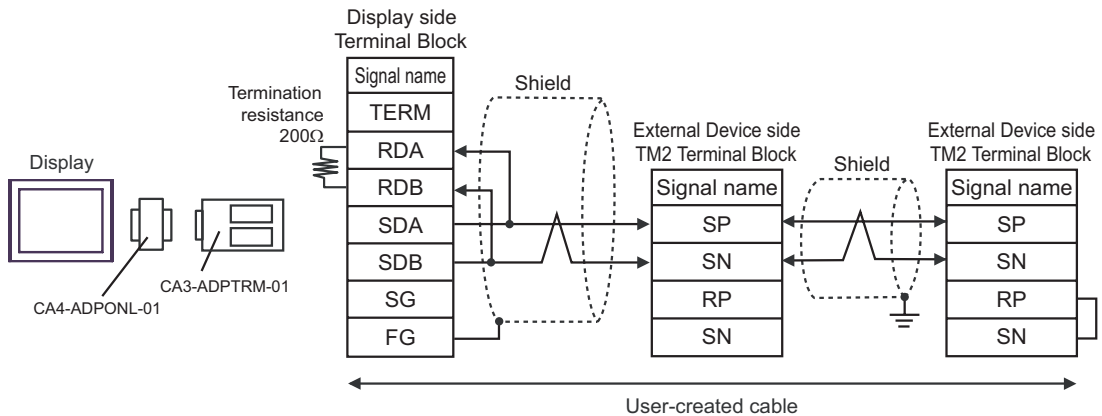
- Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
- To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2C)

- 1:1 Connection



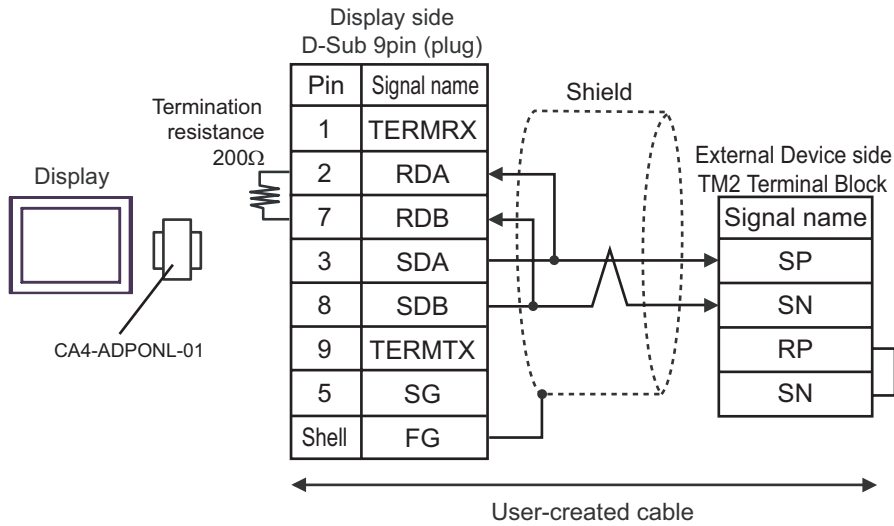
- 1:n Connection

**NOTE**

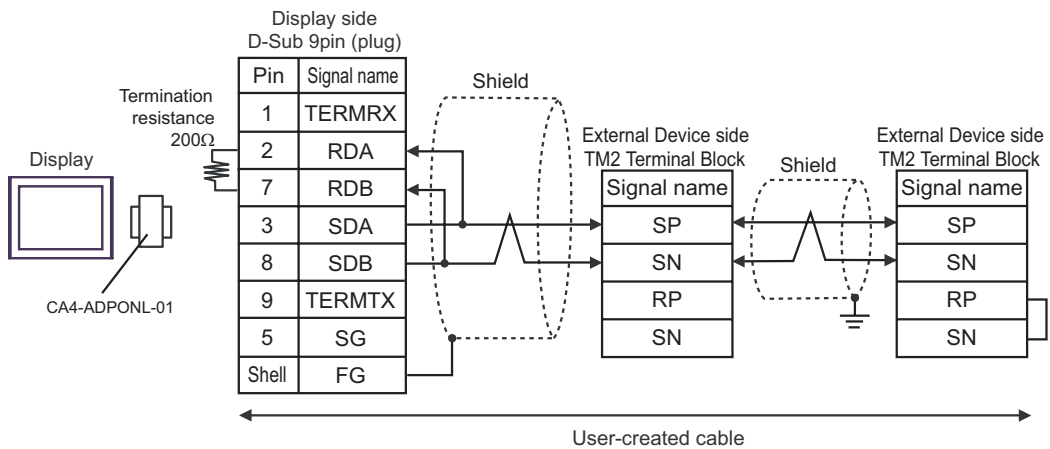
- Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
- To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2D)

- 1:1 Connection



- 1:n Connection

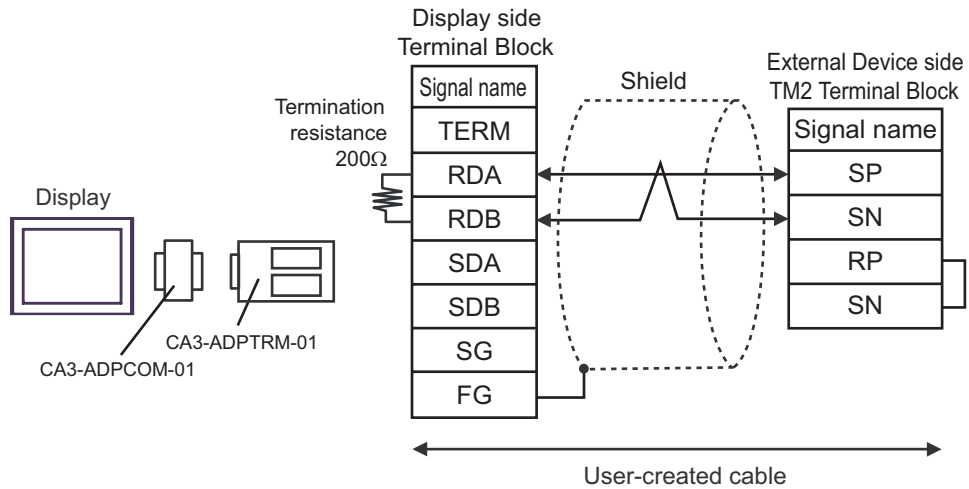
**NOTE**

- 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.

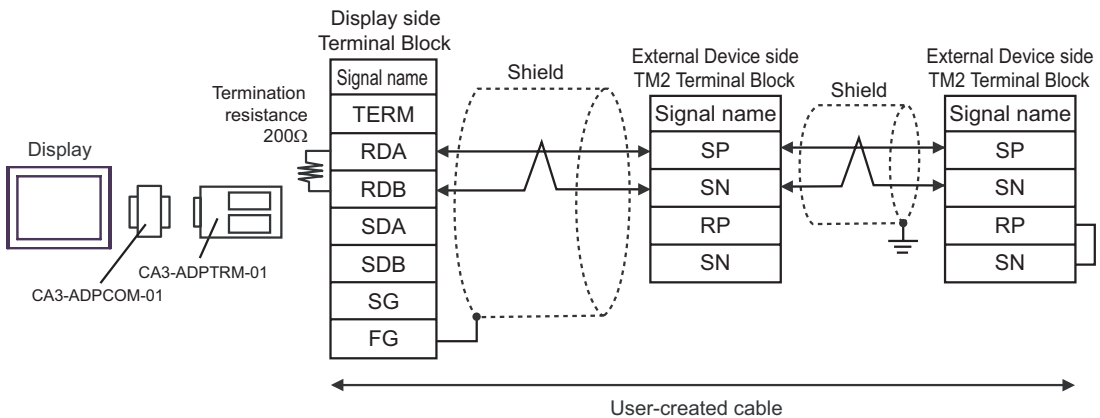


2E)

- 1:1 Connection



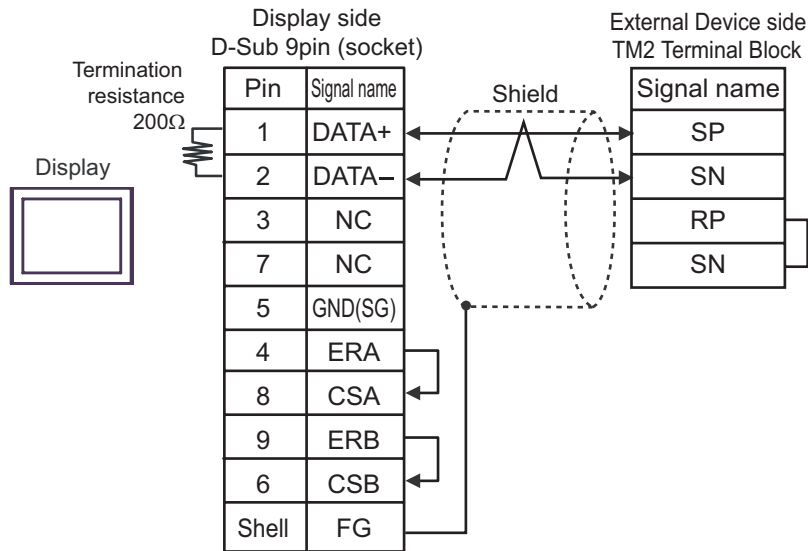
- 1:n Connection

**NOTE**

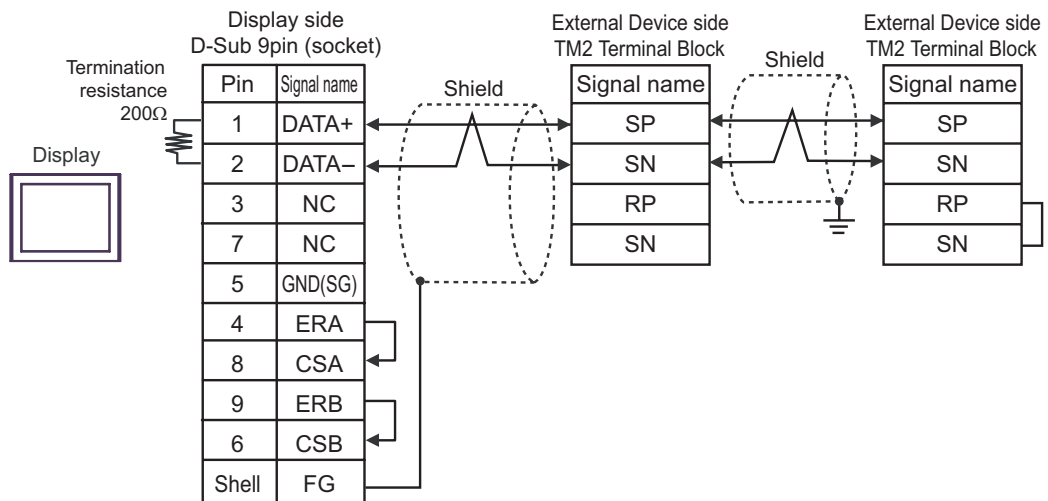
- Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
- To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2F)

- 1:1 Connection



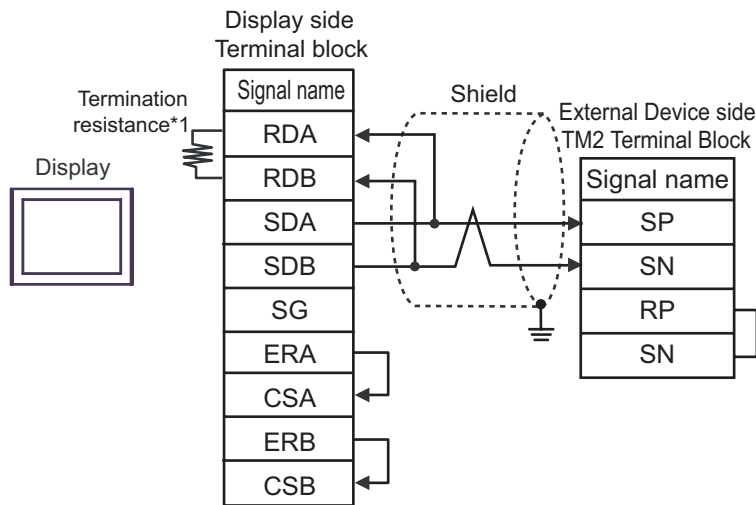
- 1:n Connection

**NOTE**

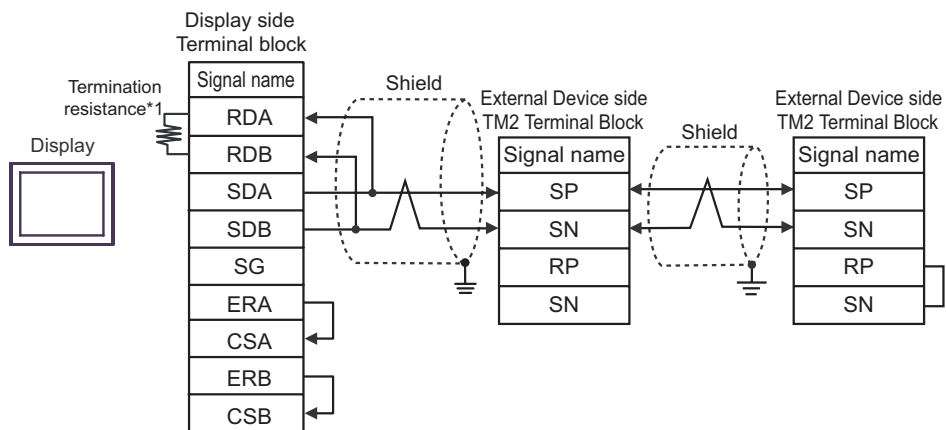
- Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
- To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2G)

- 1:1 Connection



- 1:n Connection

**NOTE**

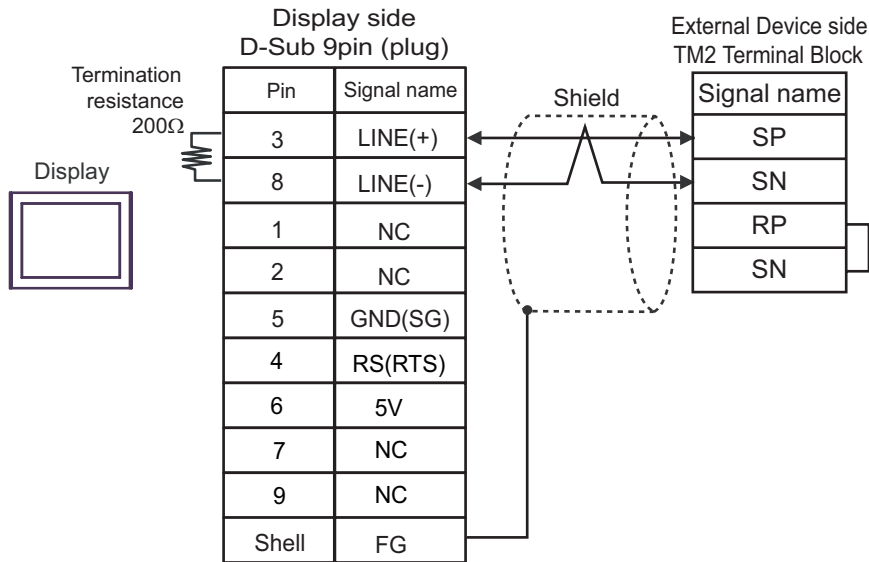
- Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
- To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

\*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.

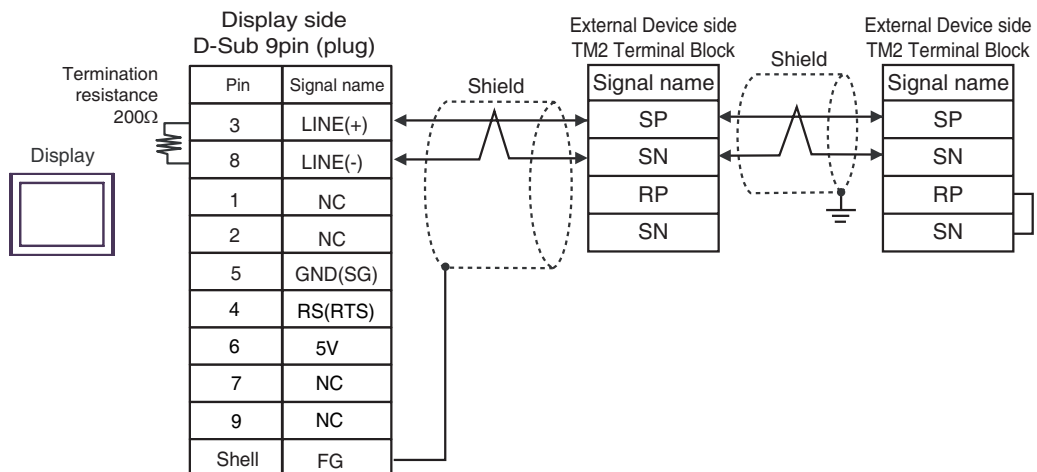
DIP Switch No.	Set Value
1	OFF
2	OFF
3	OFF
4	ON

2H)

- 1:1 Connection



- 1:n Connection

**IMPORTANT**

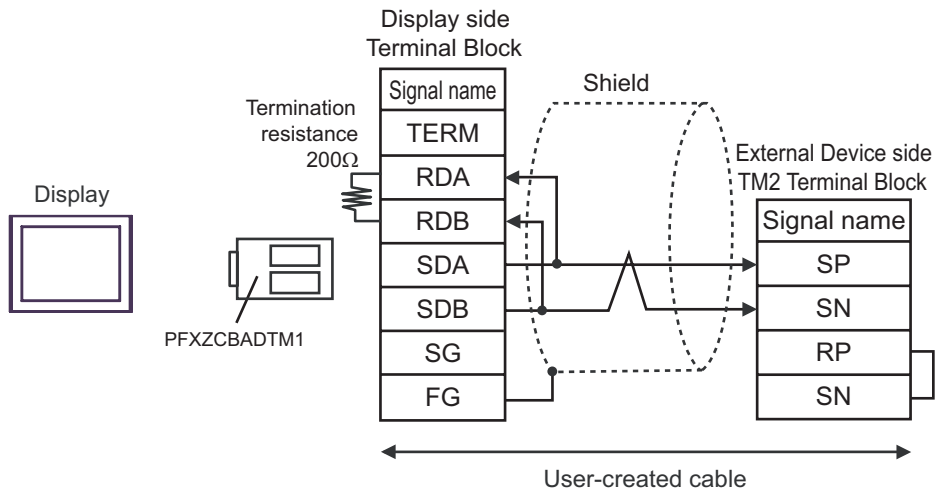
- The 5V output (Pin #6) on the Display is the power source for the Siemens AG PROFIBUS connector. Do not use it for other devices.

**NOTE**

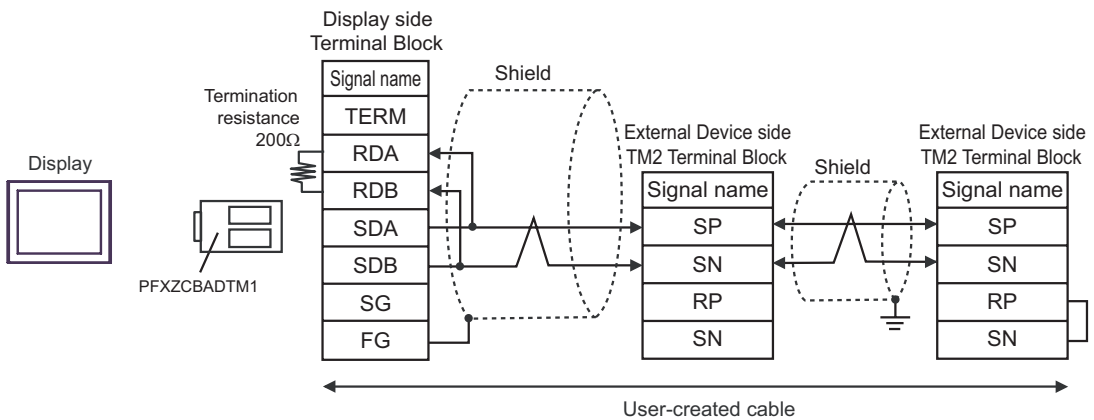
- Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
- To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.
- In COM on the GP-4107, the SG and FG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

2I)

- 1:1 Connection



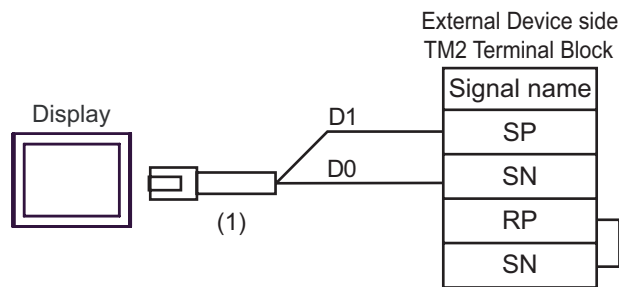
- 1:n Connection

**NOTE**

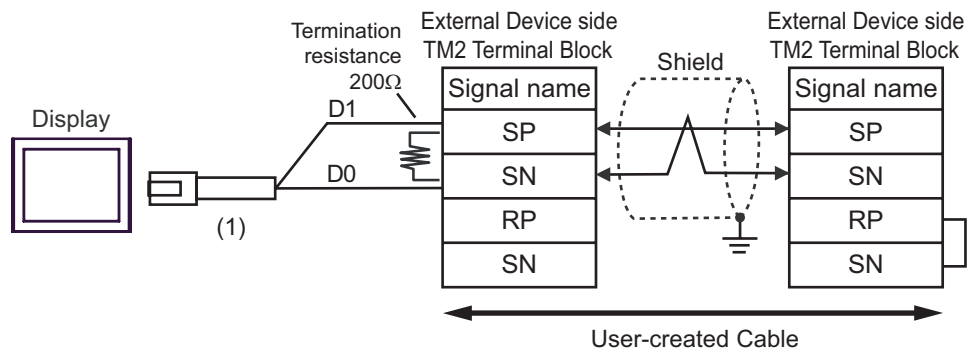
- Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
- To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

2J)

- 1:1 Connection



- 1:n Connection

**NOTE**

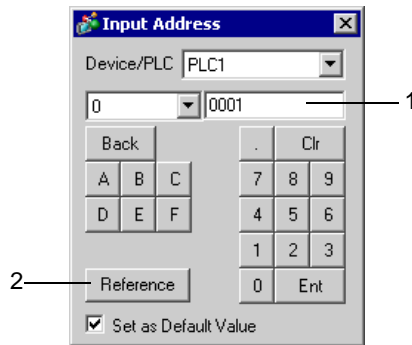
- Enable termination resistance by short-circuiting the terminatory External Device's RP terminal and the terminatory External Device's SN terminal.
- To activate termination resistance on the WJ200 series, turn ON the inverter's DIP Switch for Terminal resistor.

Number	Name	Notes
(1)	RJ45 RS-485 Cable (5m) by Pro-face PFXZLMCBJR81	

## 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

H/L This address can be specified as system data area.

Device	Bit Address	Word Address	32bits	Notes
Coil	00001 - 0001F	00001	<span style="border: 1px solid black; padding: 2px;">H/L</span>	*1
Holding register	-	<span style="border: 1px solid black; padding: 2px;">40001 - 41544</span>		<span style="border: 1px solid black; padding: 2px;">Bit F</span>


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


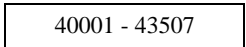

### NOTE

- 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.
- 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		*1
Holding register	-	 40001 - 43507		


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


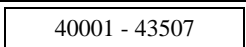

### NOTE

- 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.
- 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		*1
Holding register	-	 40001 - 43507		

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


### NOTE



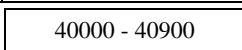

- Holding register number 0900h is an address for the command (enter command) to write in nonvolatile memory. By writing "1" in 0900h, writing to nonvolatile memory is enabled.
- You can only set the Read Area Size for the system area available to use in the External Device. Please refer to the GP Pro-EX 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		
Holding register	-	 40000 - 40900		



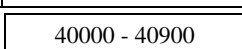

**NOTE**

- 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.
  - 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.

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## 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		
Holding register	-	 40000 - 40900		



**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.
  - 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		*1
Holding register	-	40001 - 4252D		

\*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.
  - 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.



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## 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	<p>Displays the IP address or device address of the External Device where an error has occurred, or error codes received from the External Device.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;"> <b>NOTE</b> </div> <ul style="list-style-type: none"> <li>• IP address is displayed as "IP address (Decimal): MAC address (Hex)".</li> <li>• Device address is displayed as "Address: Device address".</li> <li>• Received error codes are displayed as "Decimal [Hex]".</li> </ul>

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	<p>These specified functions are not available to the inverter:</p> <ul style="list-style-type: none"> <li>• Attempted to change the content of a register that cannot be changed while the inverter is in service.</li> <li>• Attempted to use an ENTER command during running (UV).</li> <li>• Attempted to write in a register during tripping (UV).</li> <li>• Attempted to write in a register with software lock enabled.</li> </ul>
23h <sup>*1</sup>	Attempted to write in a register with software lock enabled.

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