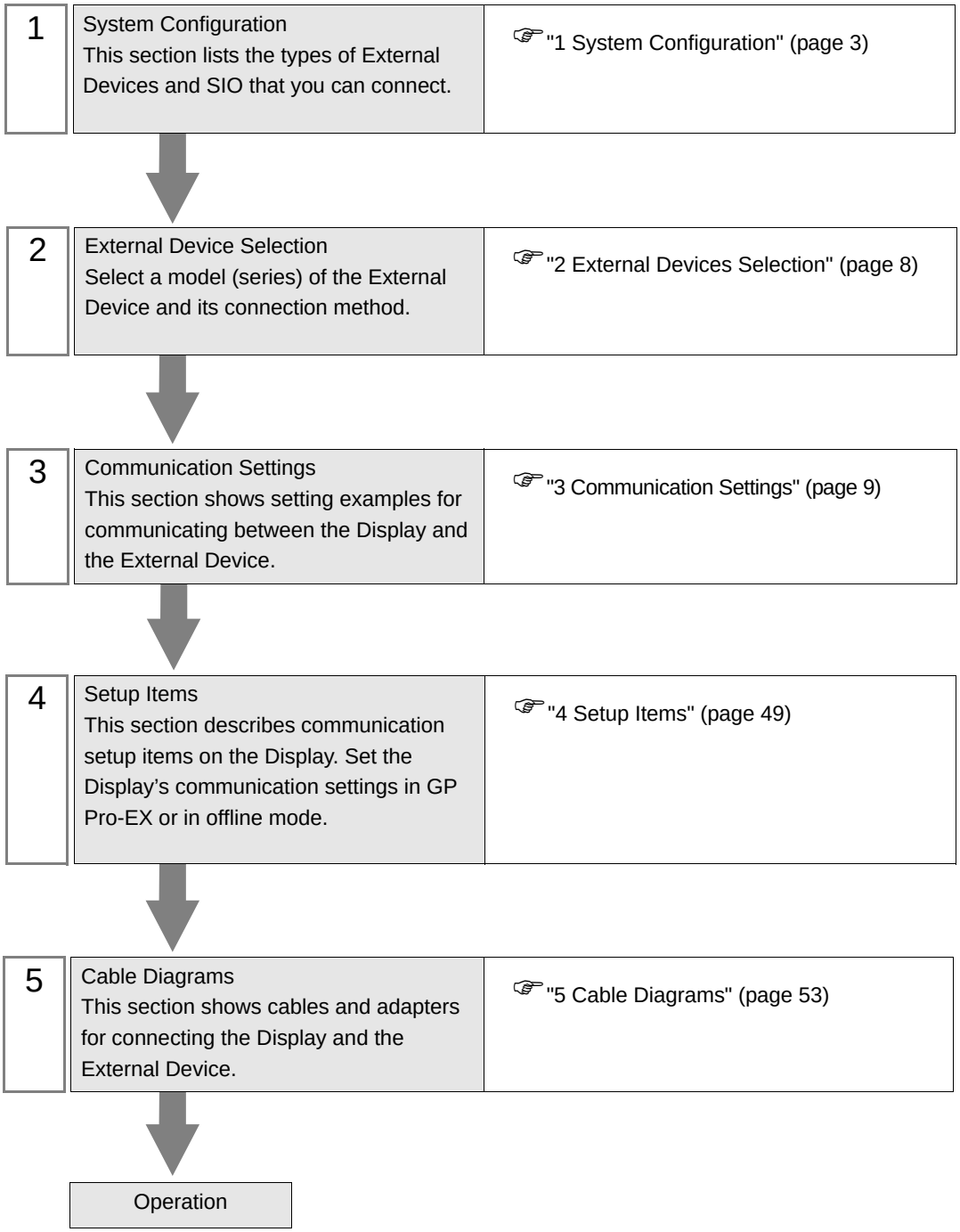
YASKAWA Electric Corporation

# INVERTER/ SERVO SIO Driver

## Introduction

This manual describes how to connect the Display and the External Device (target inverter/servo).

In this manual, the connection procedure is described in the sections identified below.



# 1 System Configuration

The following table lists system configurations for connecting YASKAWA Electric Corporation External Device and the Display.

## 1.1 Inverter

| Series | Inverter*1 | Link I/F | SIO Type | Setting Example | Cable Diagram |
|---|---|---|---|---|---|
| Varispeed F7 | CIMR-F7A□□□□ | Terminal Block on the inverter | RS-422/485 (4wire) | Setting Example 1 (page 9) | Cable Diagram 1 (page 53) |
| | | | RS-422/485 (2wire) | Setting Example 2 (page 11) | Cable Diagram 2 (page 59) |
| Varispeed G7 | CIMR-G7A□□□□ | Terminal Block on the inverter | RS-422/485 (4wire) | Setting Example 3 (page 13) | Cable Diagram 1 (page 53) |
| | | | RS-422/485 (2wire) | Setting Example 4 (page 15) | Cable Diagram 2 (page 59) |
| VS mini J7 | CIMR-J7□A□□□□ | Terminal Block on the SI-485/J7 RS-422/485 interface card | RS-422/485 (4wire) | Setting Example 5 (page 17) | Cable Diagram 1 (page 53) |
| | | | RS-422/485 (2wire) | Setting Example 6 (page 19) | Cable Diagram 2 (page 59) |
| VS mini V7/ VS-606V7 | CIMR-V7□A□□□□ | Terminal Block on the inverter | RS-422/485 (4wire) | Setting Example 7 (page 21) | Cable Diagram 1 (page 53) |
| | | | RS-422/485 (2wire) | Setting Example 8 (page 23) | Cable Diagram 2 (page 59) |
| Varispeed F7S | CIMR-F7S□□□□ | Terminal Block on the inverter | RS-422/485 (4wire) | Setting Example 9 (page 25) | Cable Diagram 1 (page 53) |
| | | | RS-422/485 (2wire) | Setting Example 10 (page 27) | Cable Diagram 2 (page 59) |
| Varispeed L7 | CIMR-L7B□□□□ | Terminal Block on the inverter | RS-422/485 (4wire) | Setting Example 11 (page 29) | Cable Diagram 1 (page 53) |
| | | | RS-422/485 (2wire) | Setting Example 12 (page 31) | Cable Diagram 2 (page 59) |

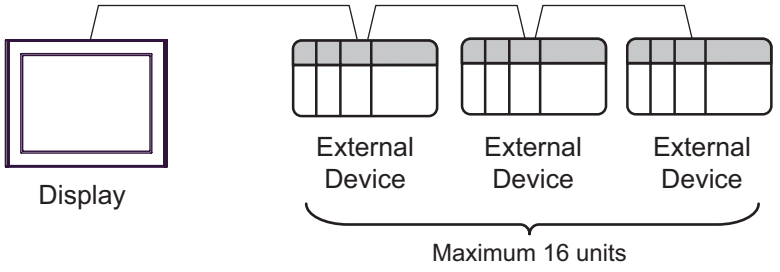
| Series | Inverter*1 | Link I/F | SIO Type | Setting Example | Cable Diagram |
|---|---|---|---|---|---|
| Varispeed AC | CIMR-ACA□□□□ | Terminal Block on the inverter | RS-422/485 (4wire) | Setting Example 13 (page 33) | Cable Diagram 1 (page 53) |
| | | | RS-422/485 (2wire) | Setting Example 14 (page 35) | Cable Diagram 2 (page 59) |
| V1000 | CIMR-VA□A□□□□ | Terminal Block on the inverter | RS-422/485 (4wire) | Setting Example 15 (page 37) | Cable Diagram 1 (page 53) |
| | | | RS-422/485 (2wire) | Setting Example 16 (page 39) | Cable Diagram 2 (page 59) |
| J1000 | CIMR-JA□A□□□□ | Terminal Block on the SI-485/J RS-422/485 interface card | RS-422/485 (4wire) | Setting Example 17 (page 41) | Cable Diagram 1 (page 53) |
| | | | RS-422/485 (2wire) | Setting Example 18 (page 43) | Cable Diagram 2 (page 59) |

*1 The □ symbol in the inverter model names represents the maximum applicable motor capacity and other specifications.

## ■ Connection Configuration

◆ 1:1 Connection


◆ 1:n Connection



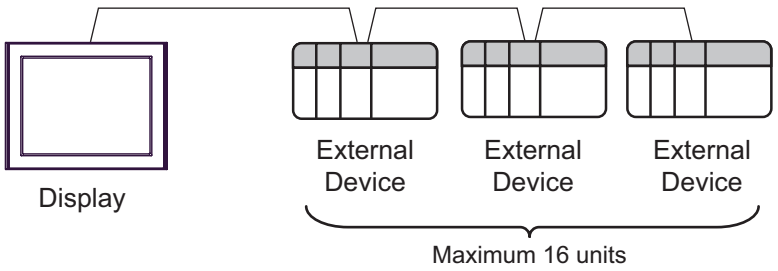
## 1.2 Σ-V series

| Series | CPU | Link I/F | SIO Type | Setting Example | Cable Diagram |
|---|---|---|---|---|---|
| Analog Voltage/Pulse Train Reference Type SERVOPACKs For Rotary Servomotors | SGDV-□□□□01 □□□□□□□ | CN3 Connector for digital operator on SERVOPACK | RS-422/485 (4wire) | Setting Example 19 (page 45) | Cable Diagram 3 (page 68) |
| Analog Voltage/Pulse Train Reference Type SERVOPACKs For Linear Servomotors | SGDV-□□□□05 □□□□□□□ | | RS-422/485 (4wire) | Setting Example 20 (page 47) | Cable Diagram 3 (page 68) |

### ■ Connection Configuration

◆ 1:1 Connection


◆ 1:n Connection



## ■ 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] |

*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[*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.

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

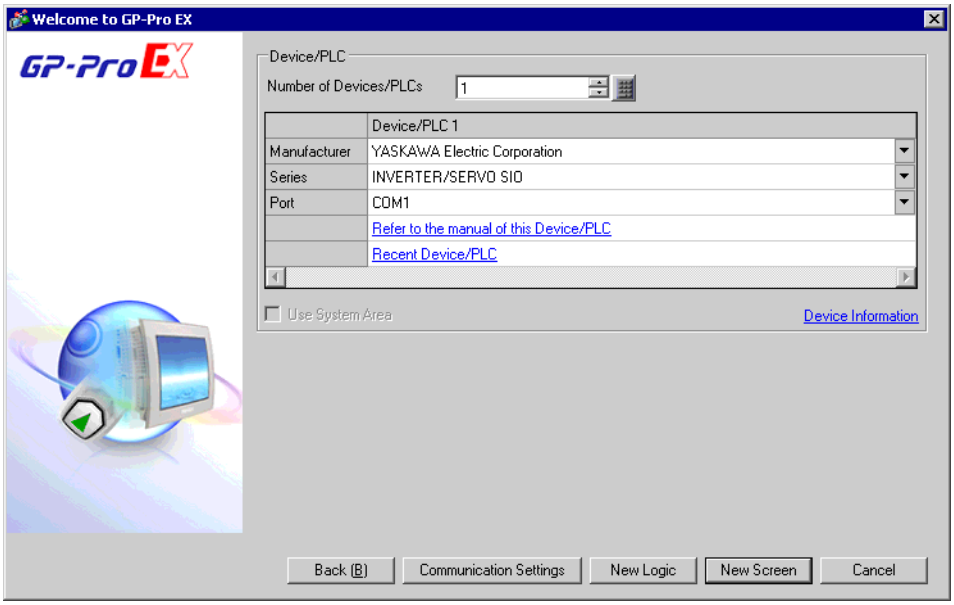
| DIP Switch | Setting | Description |
|---|---|---|
| 1 | OFF | Reserved (always OFF) |
| 2 | ON | SIO type: RS-422/485 |
| 3 | ON | |
| 4 | OFF | Output mode of SD (TXD) data: Always output |
| 5 | OFF | Terminal resistance (220Ω) insertion to SD (TXD): None |
| 6 | OFF | Terminal resistance (220Ω) 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 Devices Selection

Select the External Device to be connected to the Display.




| Setup Items | Setup Description |
|---|---|
| Number of Devices/ PLCs | Use an integer from 1 to 4 to enter the number of Devices/PLCs to connect to the display. |
| Manufacturer | Select the manufacturer of the External Device to be connected. Select "YASKAWA Electric Corporation". |
| Series | Select a model (series) of the External Device to be connected and connection method. Select "INVERTER/SERVO SIO".<br>In System configuration, check to make sure the external device to which you are connecting is supported in "INVERTER/SERVO SIO".<br>☞ "1 System Configuration" (page 3) |
| Port | Select the Display port to be connected to the External Device. |
| Use System Area | Not available in this driver. |

# 3 Communication Settings

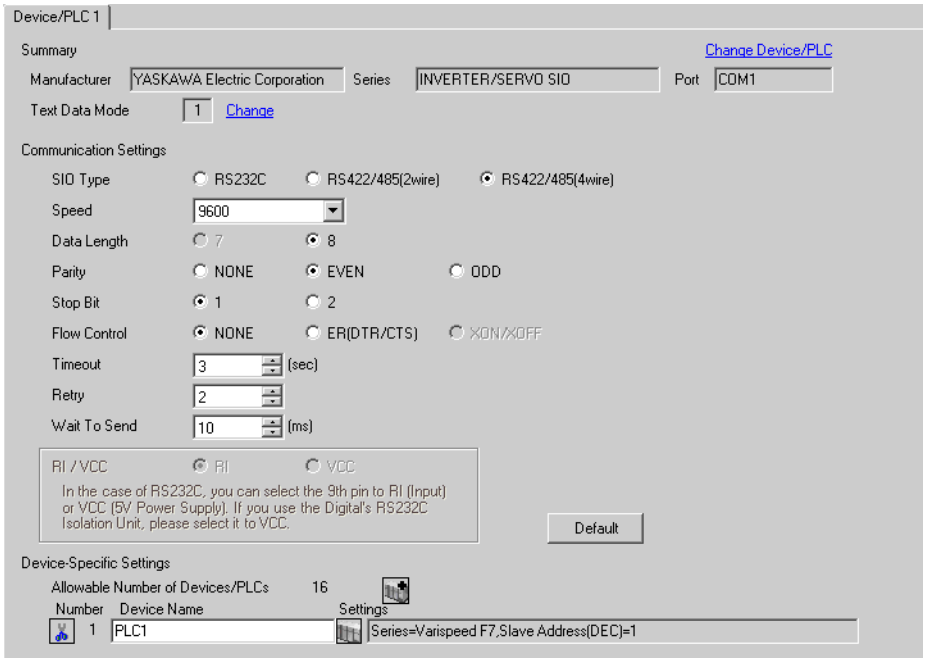
This section provides examples of communication settings recommended by Pro-face for the Display and the External Device.

## 3.1 Setting Example 1

### ■ GP-Pro EX Settings

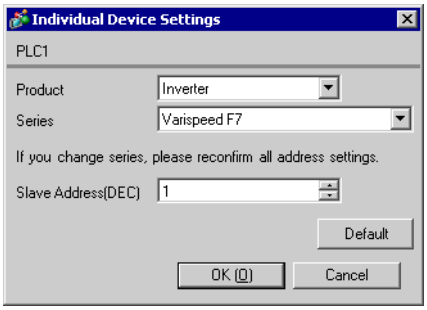
#### ◆ Communication Settings

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



◆ Device Setting

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




## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

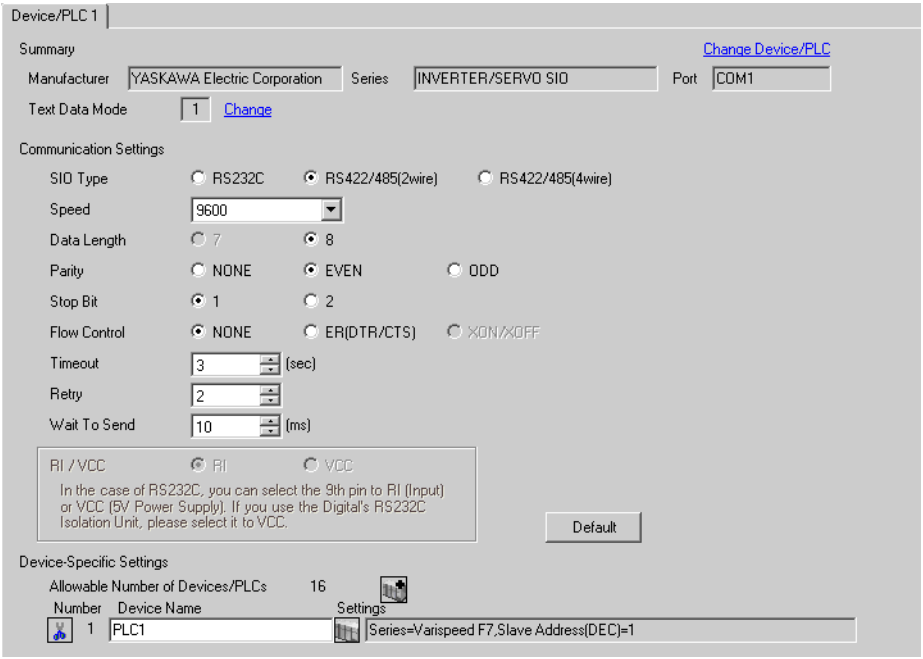
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.2 Setting Example 2

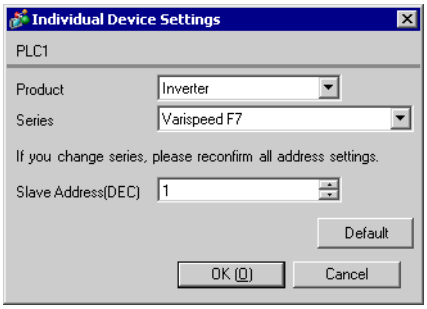
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

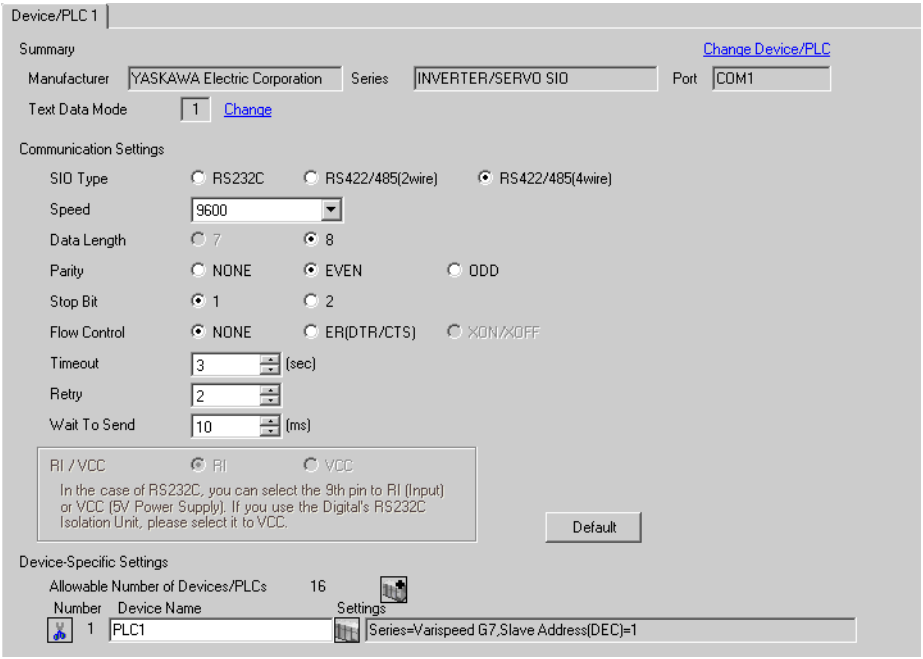
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.3 Setting Example 3

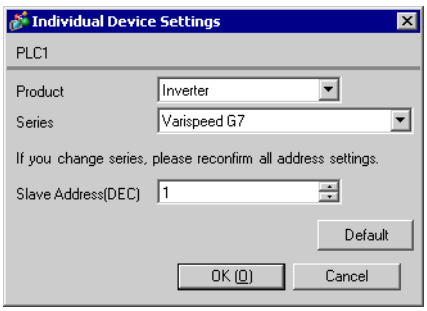
### ■ GP-Pro EX Settings

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




#### ◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

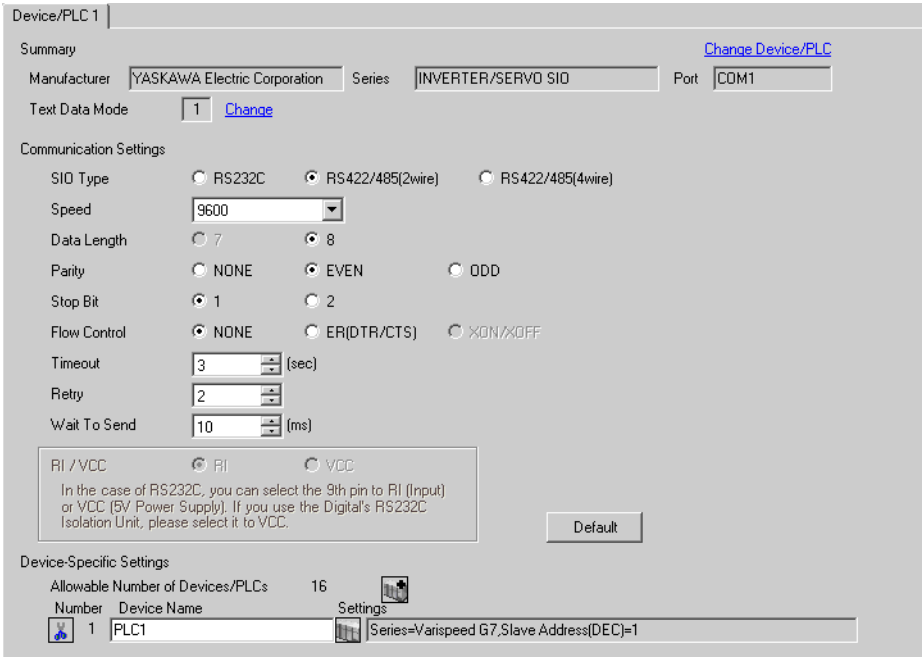
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.4 Setting Example 4

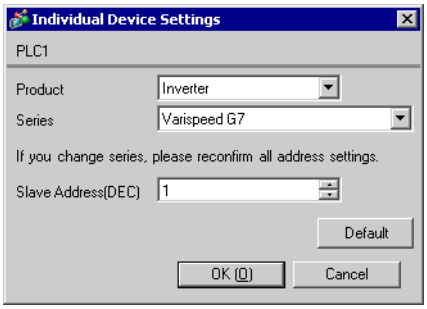
### ■ GP-Pro EX Settings

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




#### ◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

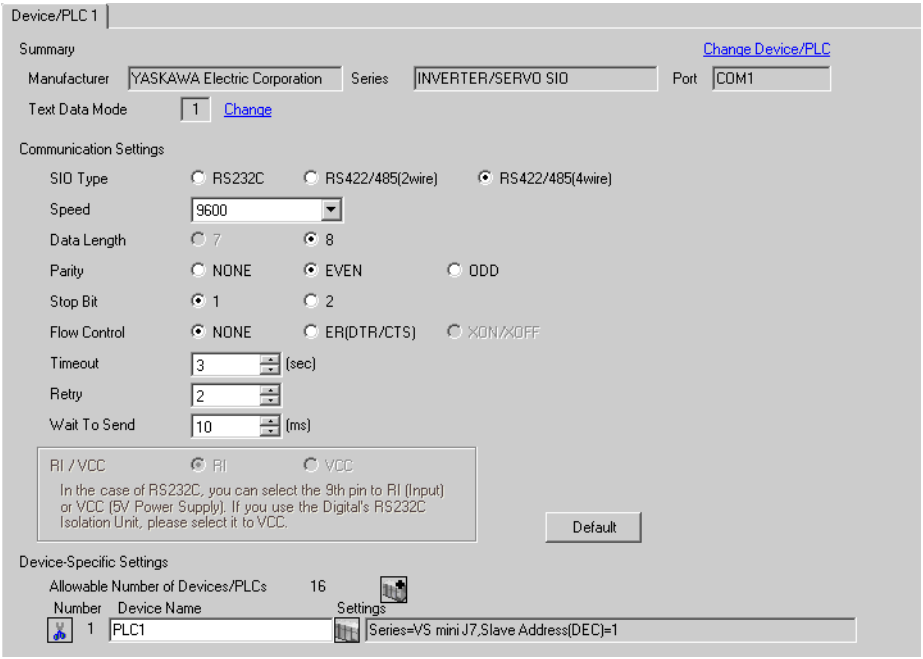
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.5 Setting Example 5

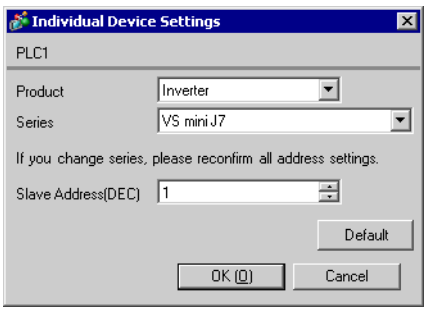
### ■ GP-Pro EX Settings

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




#### ◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the DSPL, DATA/ENTER, Up, or Down key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the DSPL key to select [PRGM].
2 Press the Up key to display the parameter you want to set.
3 Press the DATA/ENTER key.
4 Press the Up or Down key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| n02 | 2 | RUN Command Selection |
| n03 | 6 | Frequency Reference Selection |
| n70 | 1 | Slave Address Setting (DEC) |
| n71 | 2 | Baud Rate Selection |
| n72 | 0 | Parity Selection |
| n73 | 10 | Transmission Wait Time |
| n74 | 0 | RTS Control |

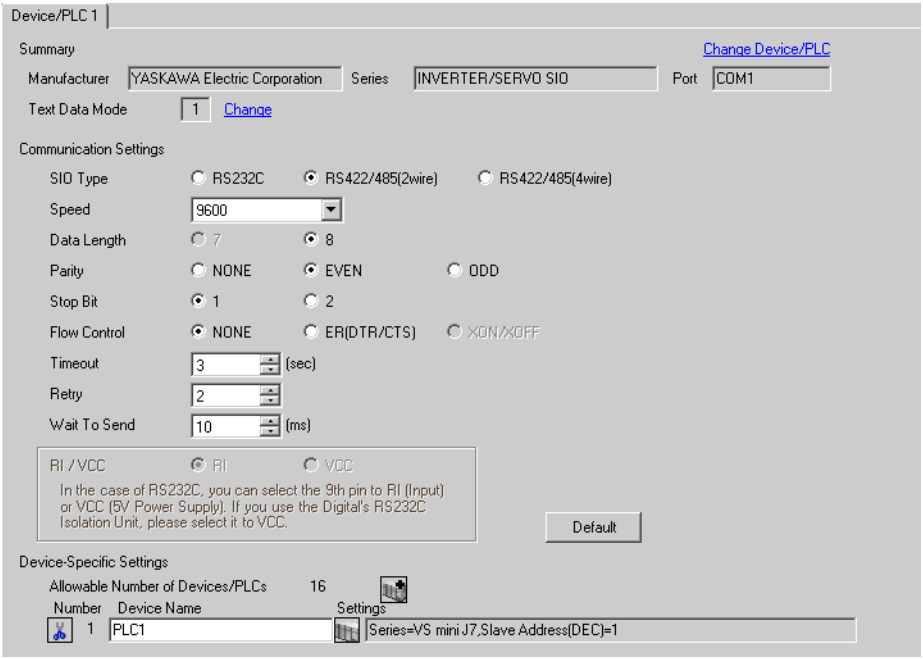
5 Press the DATA/ENTER key.
6 Reboot the External Device.

This completes the setting of the External Device.

## 3.6 Setting Example 6

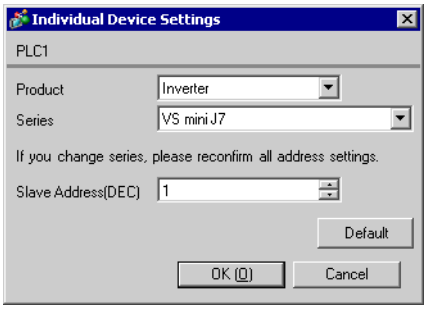
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the DSPL, DATA/ENTER, Up, or Down key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the DSPL key to select [PRGM].
2 Press the Up key to display the parameter you want to set.
3 Press the DATA/ENTER key.
4 Press the Up or Down key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| n02 | 2 | RUN Command Selection |
| n03 | 6 | Frequency Reference Selection |
| n70 | 1 | Slave Address Setting (DEC) |
| n71 | 2 | Baud Rate Selection |
| n72 | 0 | Parity Selection |
| n73 | 10 | Transmission Wait Time |
| n74 | 0 | RTS Control |

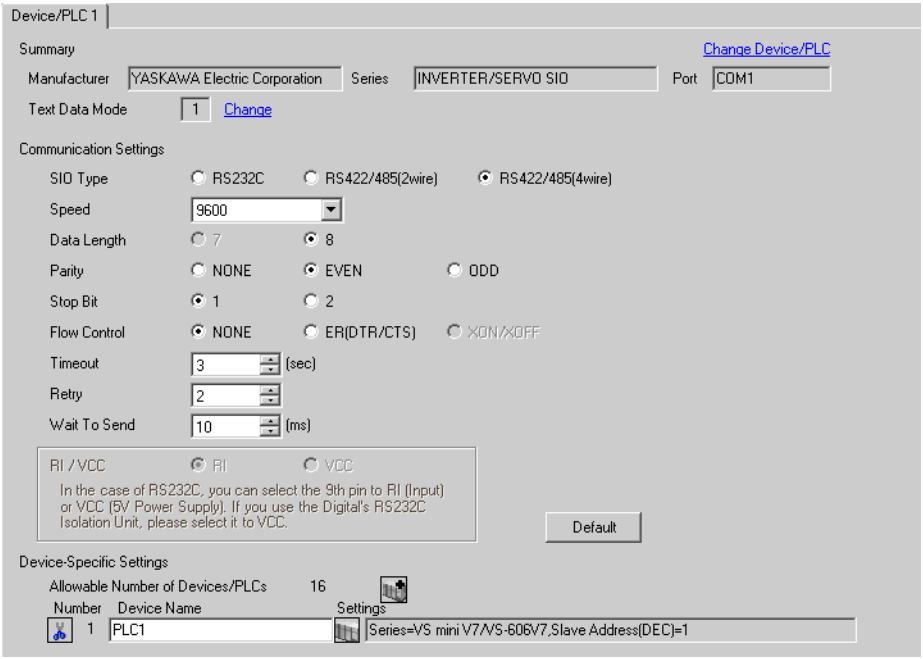
5 Press the DATA/ENTER key.
6 Reboot the External Device.

This completes the setting of the External Device.

## 3.7 Setting Example 7

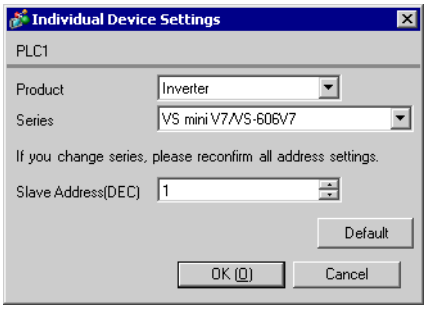
### ■ GP-Pro EX Settings

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




#### ◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the DSPL, DATA/ENTER, Up, or Down key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the DSPL key to select [PRGM].
2 Press the Up key to display the parameter you want to set.
3 Press the DATA/ENTER key.
4 Press the Up or Down key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| n03 | 2 | RUN Command Selection |
| n04 | 6 | Frequency Reference Selection |
| n153 | 1 | Slave Address Setting (DEC) |
| n154 | 2 | Baud Rate Selection |
| n155 | 0 | Parity Selection |
| n156 | 10 | Transmission Wait Time |
| n157 | 0 | RTS Control |

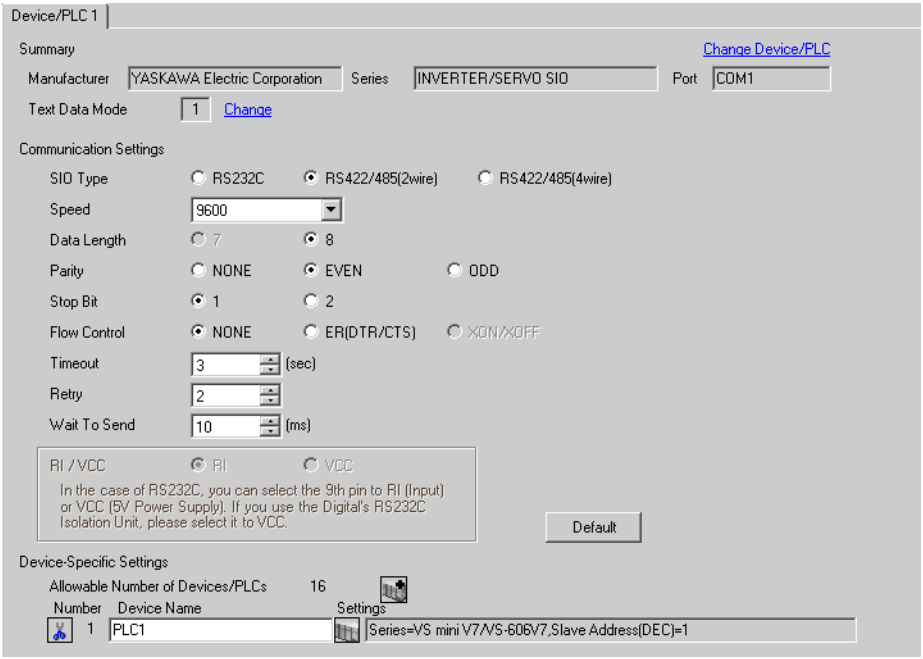
5 Press the DATA/ENTER key.
6 Reboot the External Device.

This completes the setting of the External Device.

## 3.8 Setting Example 8

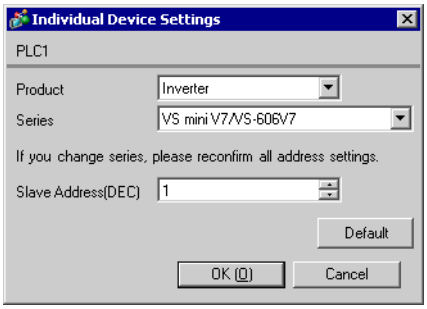
### ■ GP-Pro EX Settings

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




#### ◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the DSPL, DATA/ENTER, Up, or Down key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the DSPL key to select [PRGM].
2 Press the Up key to display the parameter you want to set.
3 Press the DATA/ENTER key.
4 Press the Up or Down key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| n03 | 2 | RUN Command Selection |
| n04 | 6 | Frequency Reference Selection |
| n153 | 1 | Slave Address Setting (DEC) |
| n154 | 2 | Baud Rate Selection |
| n155 | 0 | Parity Selection |
| n156 | 10 | Transmission Wait Time |
| n157 | 0 | RTS Control |

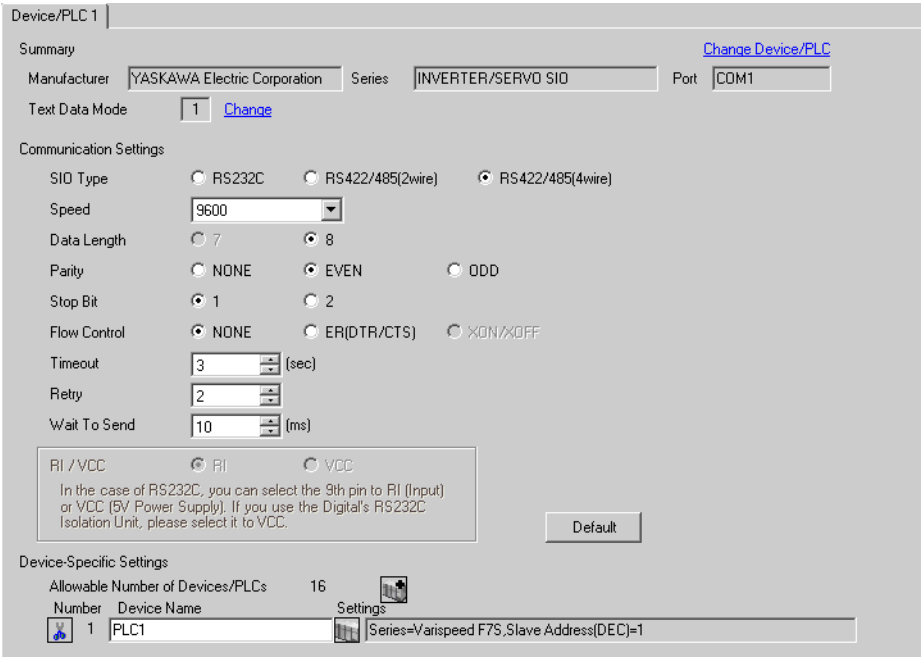
5 Press the DATA/ENTER key.
6 Reboot the External Device.

This completes the setting of the External Device.

## 3.9 Setting Example 9

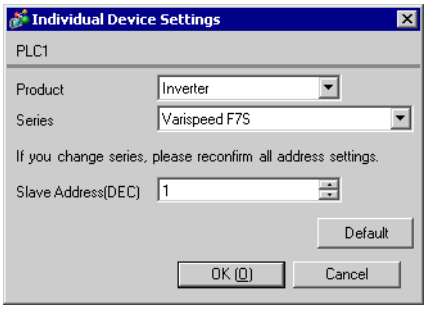
### ■ GP-Pro EX Settings

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




#### ◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

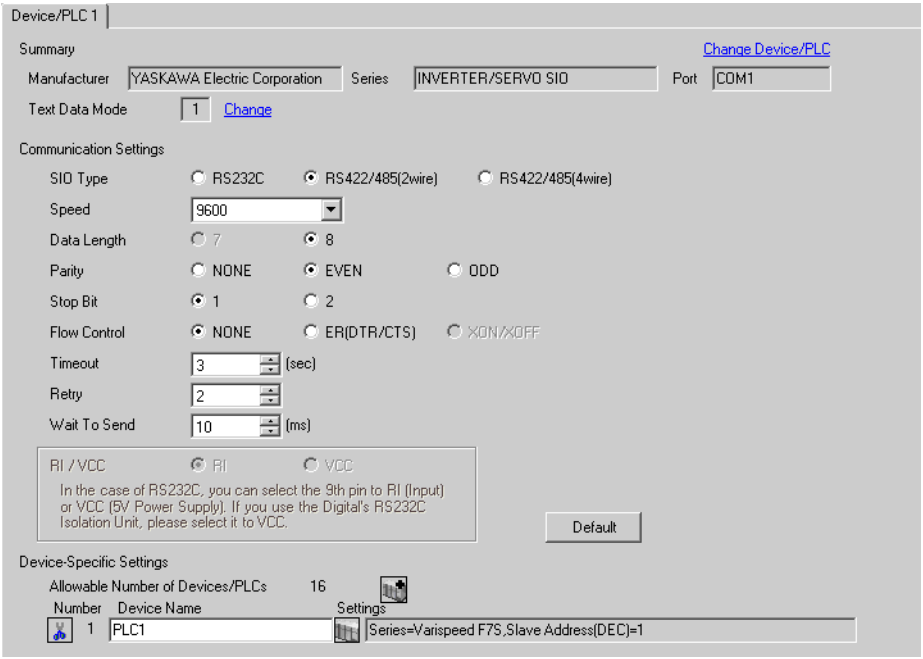
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.10 Setting Example 10

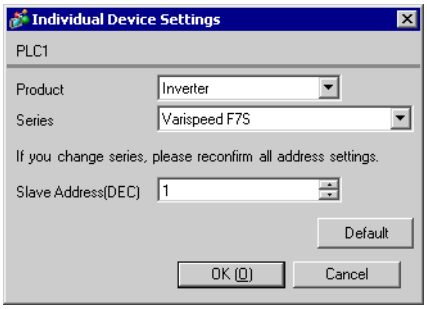
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

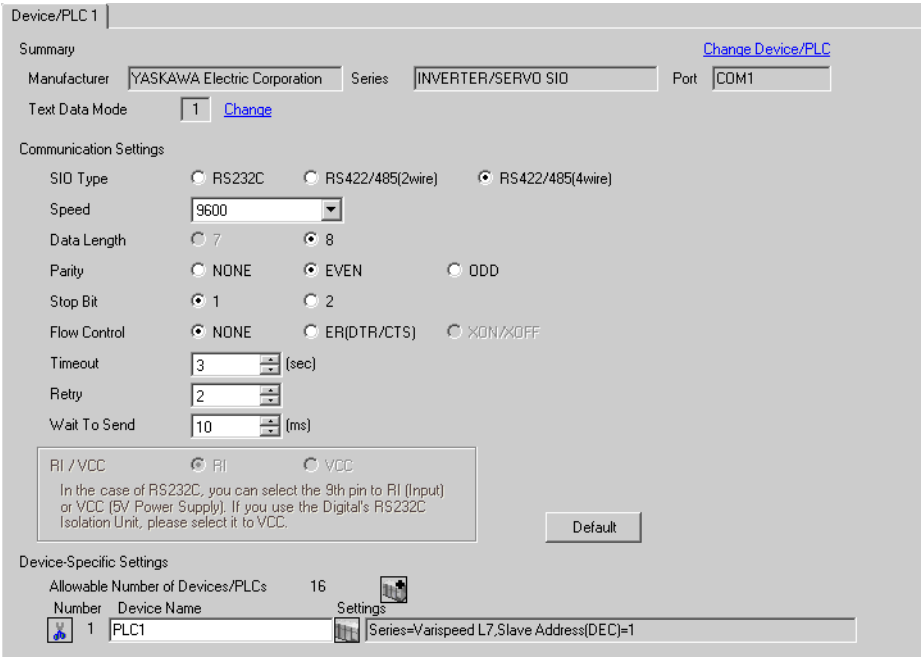
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.11 Setting Example 11

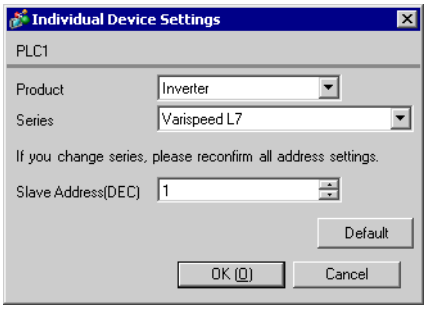
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up or Down key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

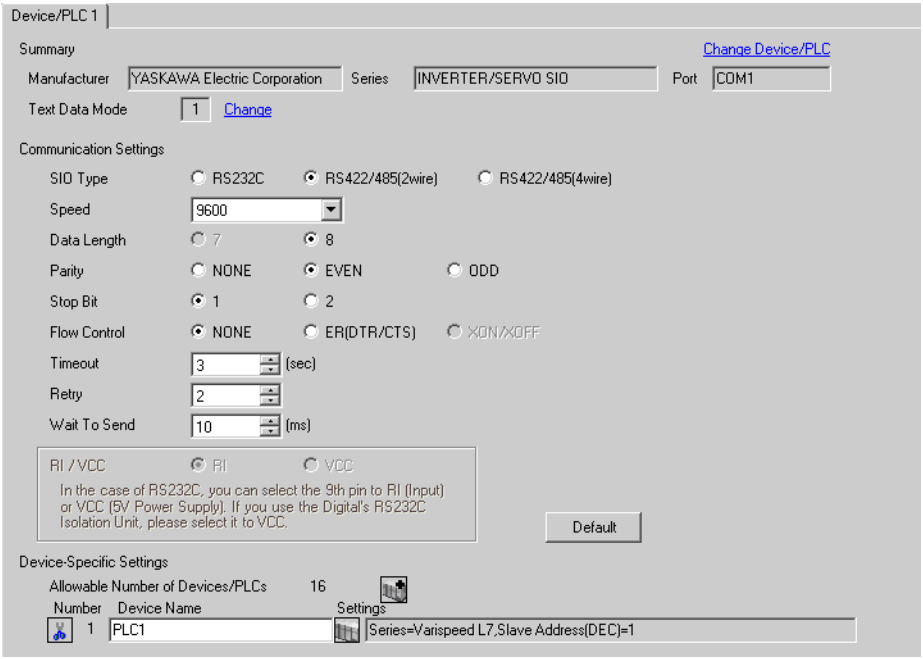
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.12 Setting Example 12

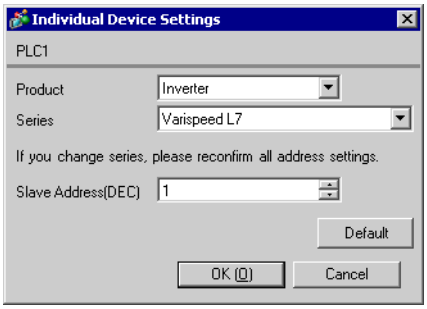
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up or Down key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

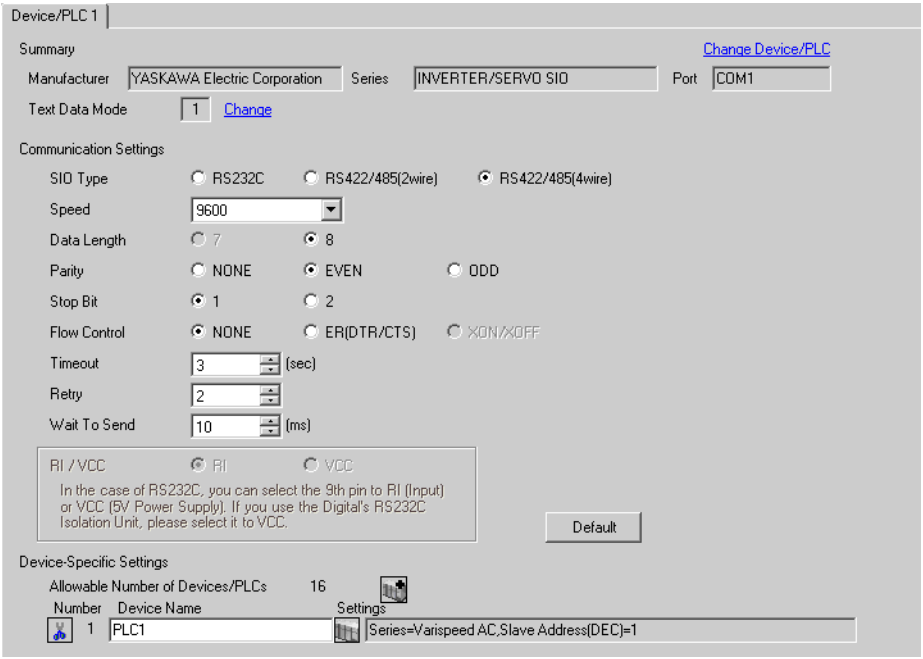
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.13 Setting Example 13

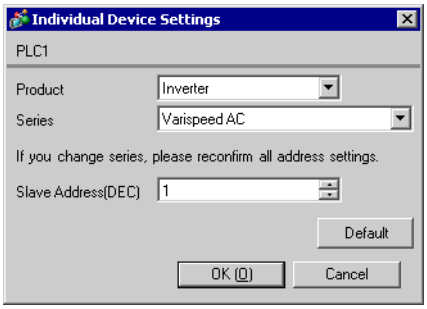
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

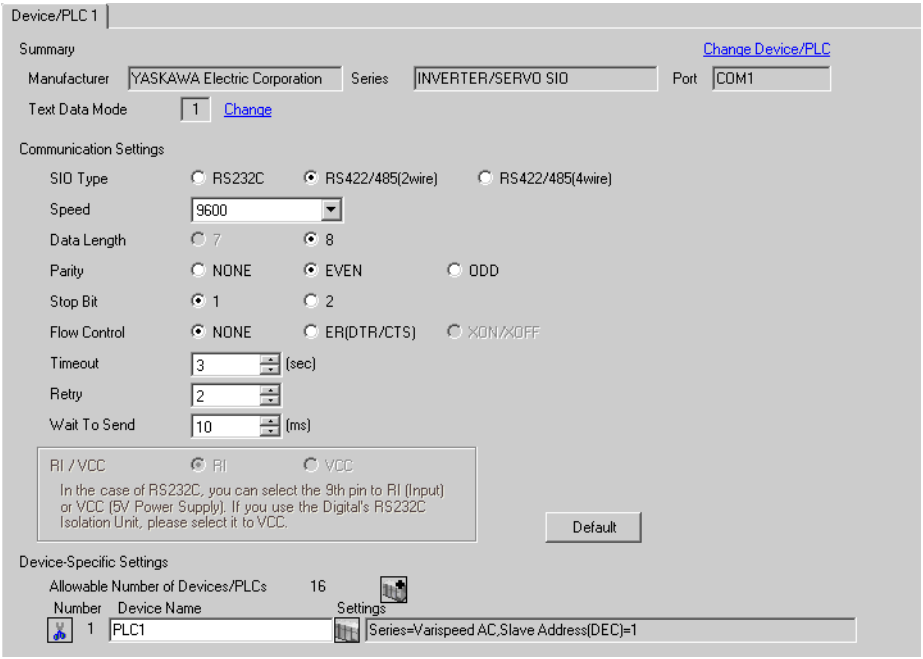
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.14 Setting Example 14

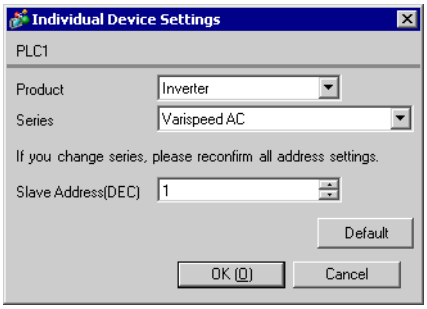
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the MENU, DATA/ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the MENU key to select [Programming].
2 Press the DATA/ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the DATA/ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| H5-01 | 01 | Slave address (HEX) |
| H5-02 | 3 | Communication speed selection |
| H5-03 | 1 | Communication parity selection |
| H5-04 | 3 | Stopping method after communication error |
| H5-05 | 1 | Communication error detection selection |
| H5-06 | 5 | Send wait time |
| H5-07 | 1 | RTS control ON/OFF |

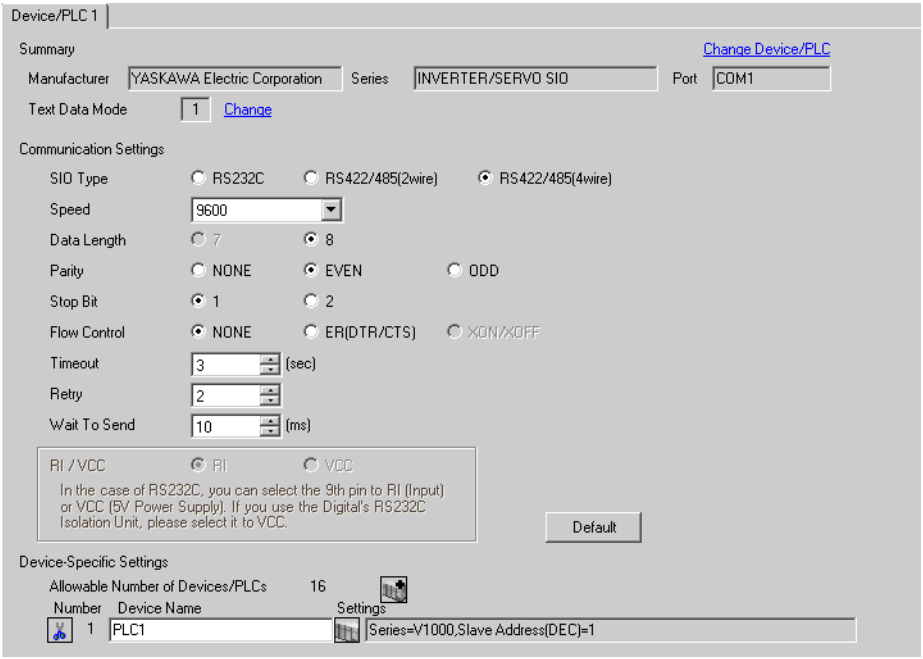
6 Press the DATA/ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.15 Setting Example 15

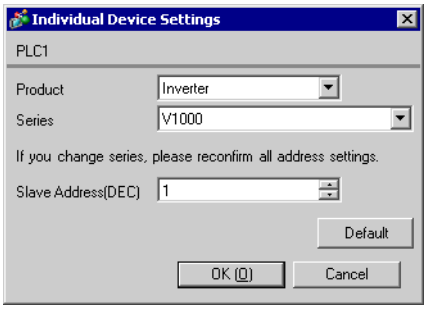
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the Up key to display [STUP].
2 Press the ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

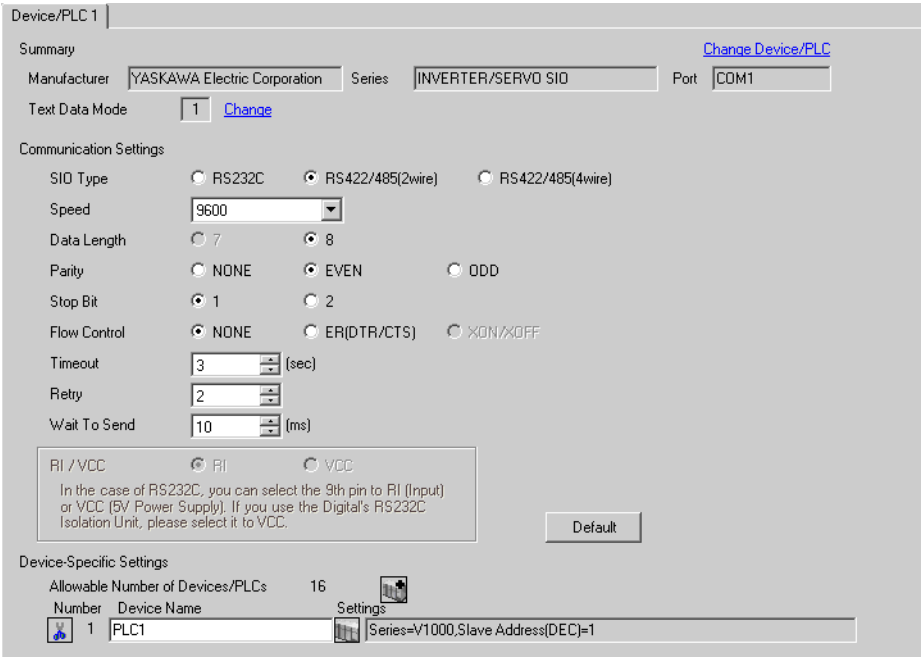
| Parameter No. | Settings | Setup Description |
|---|---|---|
| b1-01 | 2 | Frequency Reference Selection 1 |
| b1-02 | 2 | Run Command Selection 1 |
| H5-01 | 01 | Node Address Setting (HEX) |
| H5-02 | 3 | Communication Speed Selection |
| H5-03 | 1 | Communication Parity Selection |
| H5-04 | 3 | Stopping Method After Communication Error |
| H5-05 | 1 | Communication Fault Detection Selection |
| H5-06 | 5 | Drive Transmit Wait Time |
| H5-07 | 1 | RTS Control Selection |
| H5-09 | 2.0 | CE Detection Time |

6 Press the ENTER key.
7 Reboot the External Device.
This completes the setting of the External Device.

## 3.16 Setting Example 16

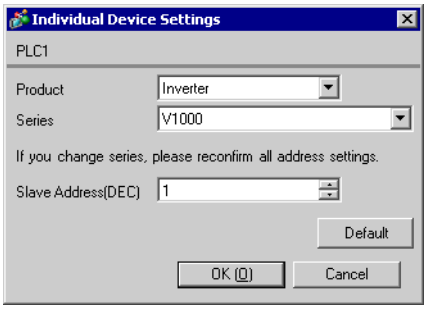
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the ENTER, Up, Down, or Shift/RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the Up key to display [STUP].
2 Press the ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the ENTER key.
5 Press the Up, Down, or Shift/RESET key to display the setting value.

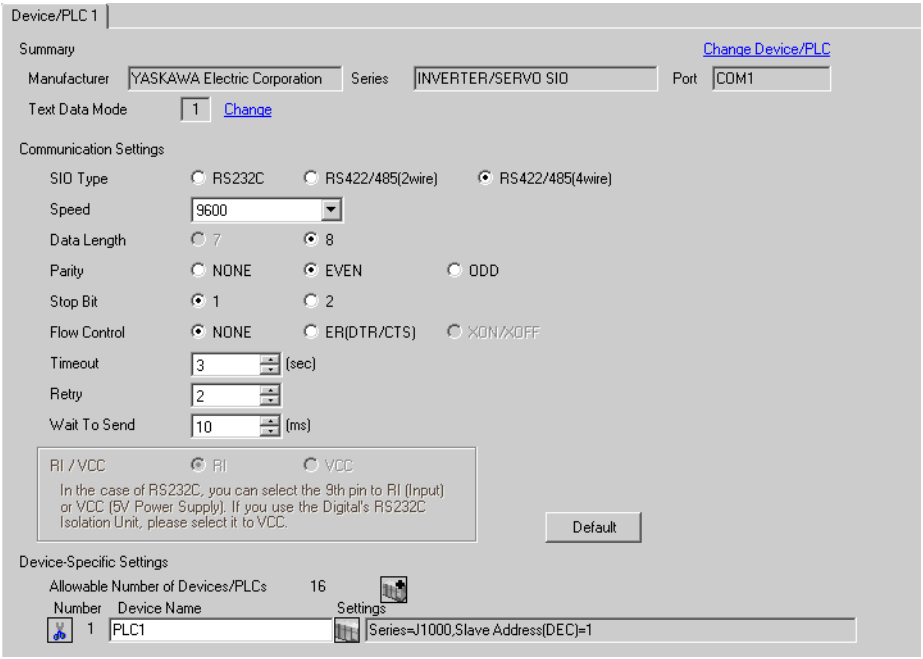
| Parameter No. | Settings | Setup Description |
|---|---|---|
| b1-01 | 2 | Frequency Reference Selection 1 |
| b1-02 | 2 | Run Command Selection 1 |
| H5-01 | 01 | Node Address Setting (HEX) |
| H5-02 | 3 | Communication Speed Selection |
| H5-03 | 1 | Communication Parity Selection |
| H5-04 | 3 | Stopping Method After Communication Error |
| H5-05 | 1 | Communication Fault Detection Selection |
| H5-06 | 5 | Drive Transmit Wait Time |
| H5-07 | 1 | RTS Control Selection |
| H5-09 | 2.0 | CE Detection Time |

6 Press the ENTER key.
7 Reboot the External Device.
This completes the setting of the External Device.

## 3.17 Setting Example 17

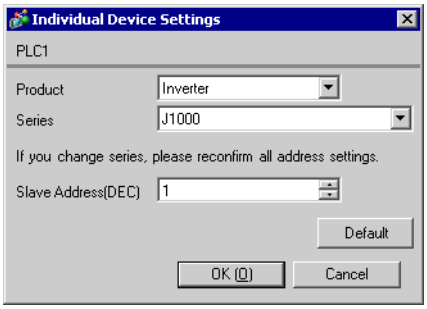
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the ENTER, Up, Down, or RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the Up key to display [STUP].
2 Press the ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the ENTER key.
5 Press the Up, Down, or RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| b1-01 | 2 | Frequency Reference Selection |
| b1-02 | 2 | Run Command Selection |
| H5-01 | 01 | Slave Address Setting (HEX) |
| H5-02 | 3 | Communication Speed Selection |
| H5-03 | 1 | Communication Parity Selection |
| H5-04 | 3 | Stopping Method After Communication Error |
| H5-05 | 1 | Communication Fault Detection Selection |
| H5-06 | 5 | Drive Transmit Wait Time |
| H5-07 | 1 | RTS Control Selection |

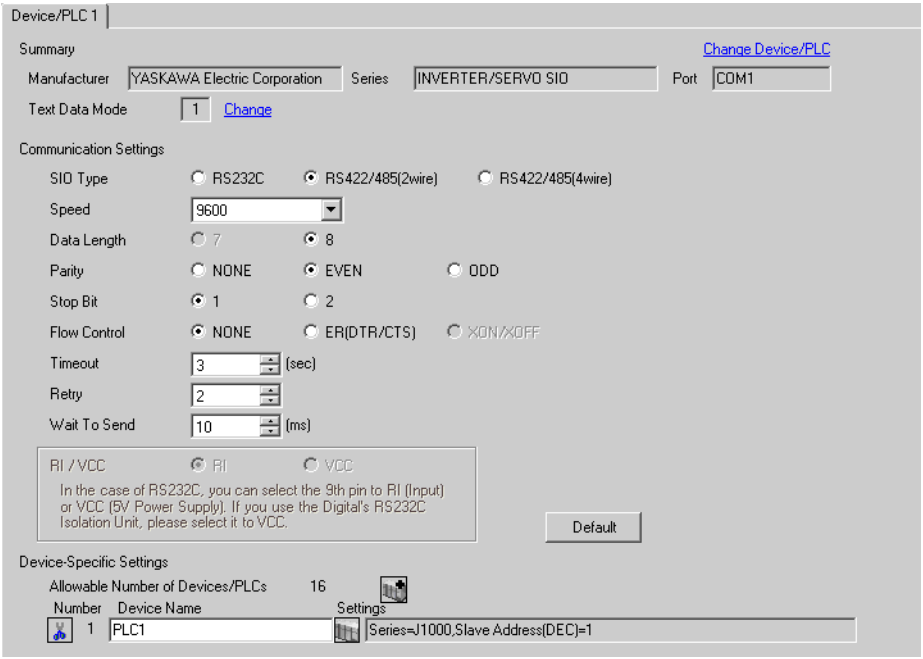
6 Press the ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.18 Setting Example 18

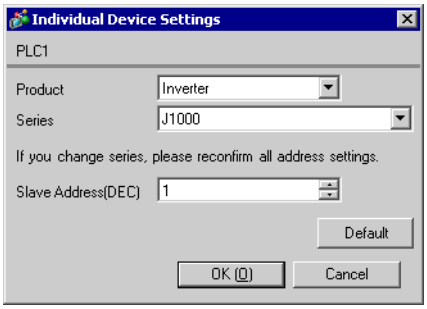
### ■ GP-Pro EX Settings

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




◆ Device Setting

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



## ■ External Device Settings

To configure communication settings, use the ENTER, Up, Down, or RESET key on the digital operator located on the front of the inverter. Refer to your External Device manual for details.

1 Press the Up key to display [STUP].
2 Press the ENTER key.
3 Press the Up key to display the parameter you want to set.
4 Press the ENTER key.
5 Press the Up, Down, or RESET key to display the setting value.

| Parameter No. | Settings | Setup Description |
|---|---|---|
| b1-01 | 2 | Frequency Reference Selection |
| b1-02 | 2 | Run Command Selection |
| H5-01 | 01 | Slave Address Setting (HEX) |
| H5-02 | 3 | Communication Speed Selection |
| H5-03 | 1 | Communication Parity Selection |
| H5-04 | 3 | Stopping Method After Communication Error |
| H5-05 | 1 | Communication Fault Detection Selection |
| H5-06 | 5 | Drive Transmit Wait Time |
| H5-07 | 1 | RTS Control Selection |

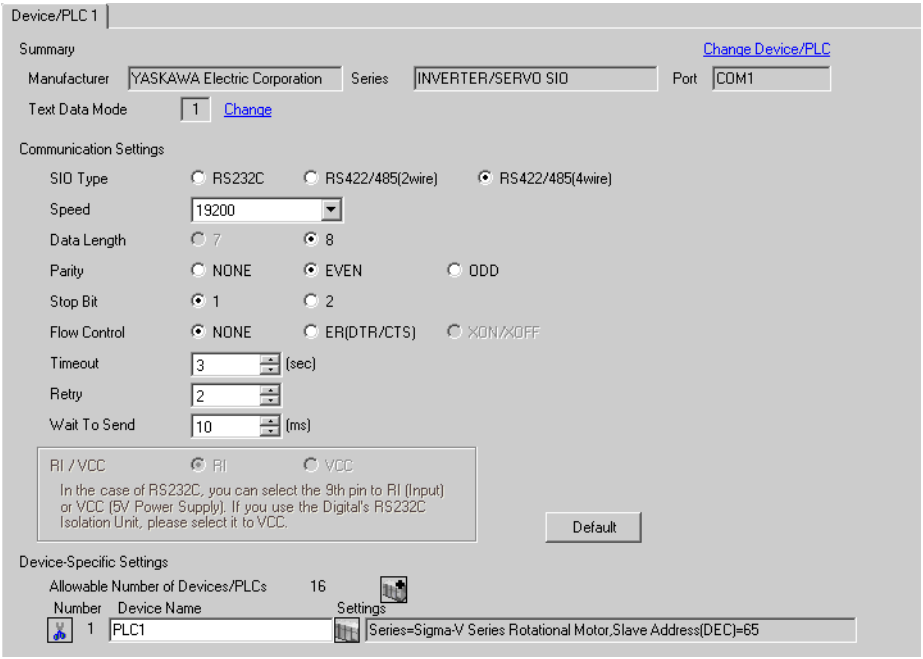
6 Press the ENTER key.
7 Reboot the External Device.

This completes the setting of the External Device.

## 3.19 Setting Example 19

### ■ GP-Pro EX Settings

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

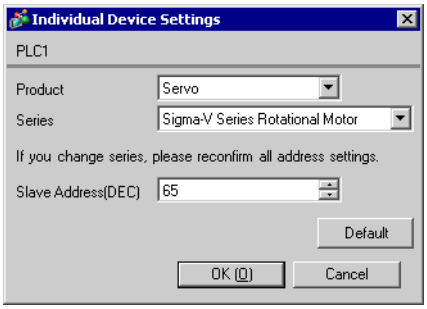



**IMPORTANT**

- To connect Σ-V series with 1:n connection, you need to set Wait To Send to 100ms or more.

◆ Device Setting

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




**IMPORTANT**

- To use Σ-V series, you need to set a Slave Address from "65" to "95."

## ■ External Device Settings

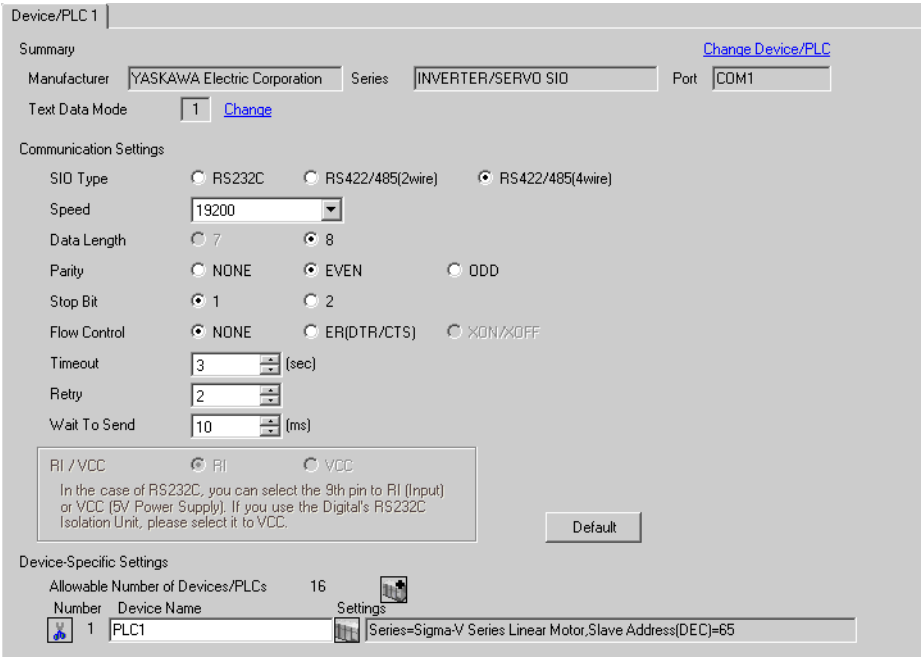
To configure communication settings, use the AC Servo Drive Engineering Tool (SigmaWin+). Refer to your External Device manual for details.

1 Select [Edit Parameters] from the [Parameter] menu to display the [Parameter Editing] dialog box.
2 Select [Pn010] on the [Function Selection(Pn0xx-)] tab and click [Edit].
3 Enter the slave address, "41H," in [Input value] and click [OK].
4 If the input address is correct, select the [Pn010] check box and click [Write].
Select [Software Reset] from the [Setup] menu to reboot the External Device as needed.
This completes the configuration of the External Device.

## 3.20 Setting Example 20

### ■ GP-Pro EX Settings

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

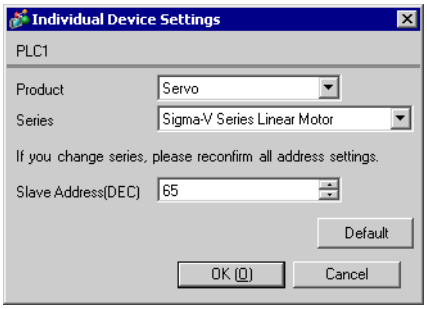



**IMPORTANT**

- To connect Σ-V series with 1:n connection, you need to set Wait To Send to 100ms or more.

#### ◆ Device Setting

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




**IMPORTANT**

- To use Σ-V series, you need to set a Slave Address from "65" to "95."

## ■ External Device Settings

To configure communication settings, use the AC Servo Drive Engineering Tool (SigmaWin+). Refer to your External Device manual for details.

1 Select [Edit Parameters] from the [Parameter] menu to display the [Parameter Editing] dialog box.
2 Select [Pn010] on the [Function Selection(Pn0xx-)] tab and click [Edit].
3 Enter the slave address, "41H," in [Input value] and click [OK].
4 If the input address is correct, select the [Pn010] check box and click [Write].
Select [Software Reset] from the [Setup] menu to reboot the External Device as needed.
This completes the configuration of the External Device.

# 4 Setup Items

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

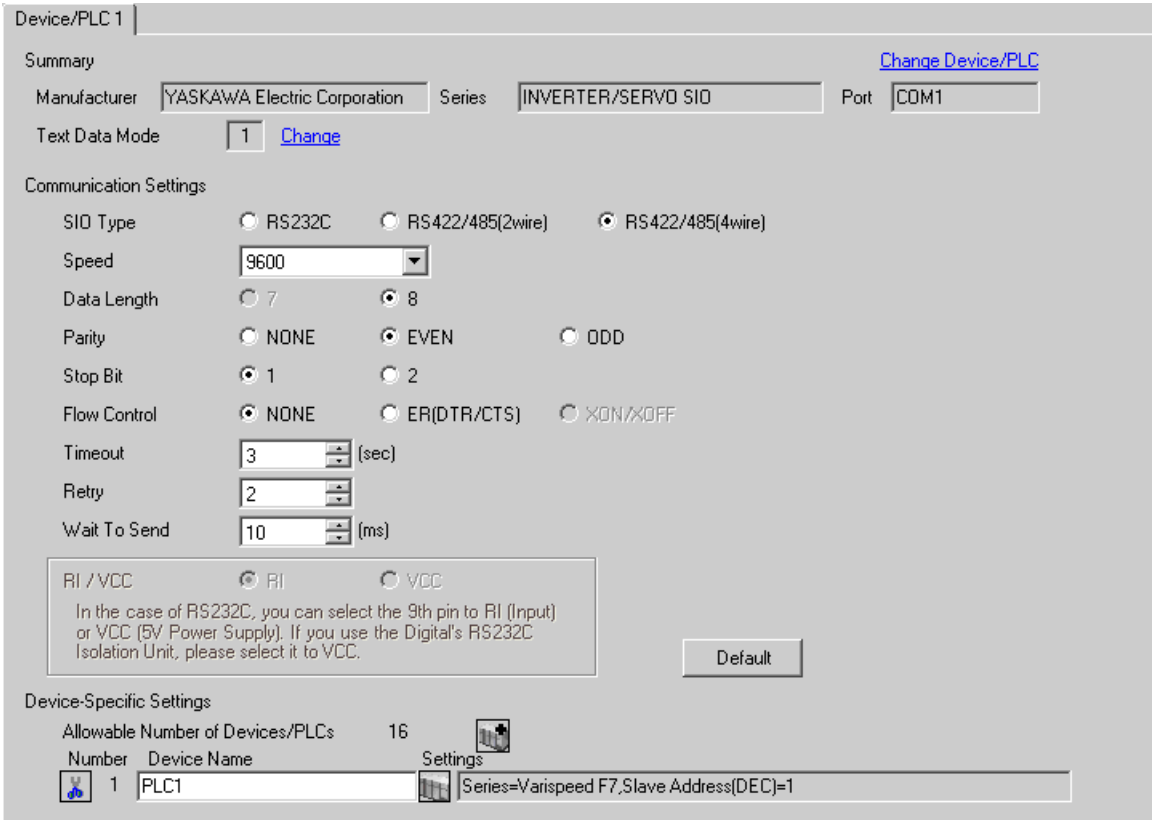
The setting of each parameter must match that of the External Device.

☞"3 Communication Settings" (page 9)

## 4.1 Setup Items in GP-Pro EX

### ■ Communication Settings

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



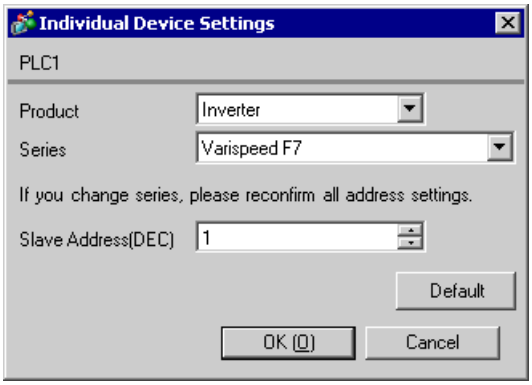

| Setup Items | Setup Description |
|---|---|
| SIO Type | Select the SIO type to communicate with the External Device.<br><br>IMPORTANT<br>In the communication settings, set [SIO Type] correctly according to the serial interface specifications of the Display.<br>If you select an SIO type that the serial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

Continues on the next page.

| Setup Items | Setup Description |
|---|---|
| Stop Bit | Select stop bit length. |
| Flow Control | Select the communication control method to prevent overflow of transmission and reception data. |
| Timeout | Use an integer from 1 to 127 to enter the time (s) for which the Display waits for the response from the External Device. |
| Retry | In case of no response from the External Device, use an integer from 0 to 255 to enter how many times the Display retransmits the command. |
| Wait To Send | Use an integer from 0 to 255 to enter standby time (ms) for the Display from receiving packets to transmitting next commands. |

## ■ Device Setting

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




| Setup Items | Setup Description |
|---|---|
| Product | Select the product name of the External Device. |
| Series | Select the series of the External Device. |
| Slave Address | Enter the slave address of the External Device, from 1 to 255 (DEC). |

## 4.2 Setup Items in Offline Mode

**NOTE**

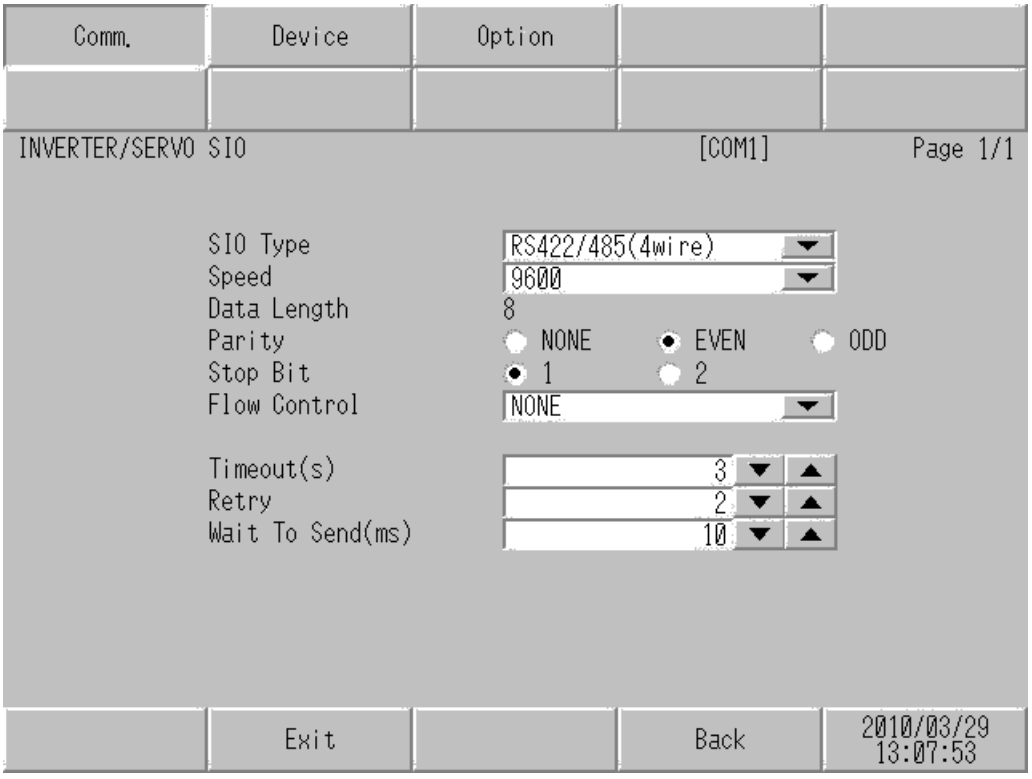
- Refer to the Maintenance/Troubleshooting guide for information on how to enter offline mode or about the operation.

  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 Equipment Settings] in offline mode. Touch the External Device you want to set from the display list.



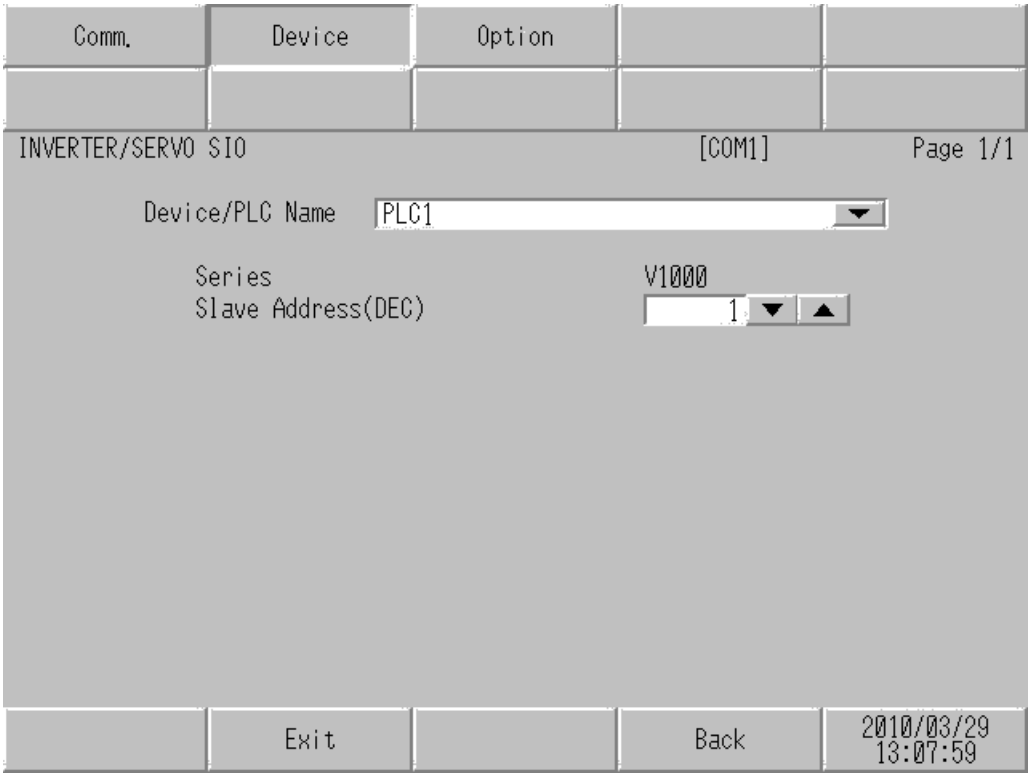

| Setup Items | Setup Description |
|---|---|
| SIO Type | Select the SIO type to communicate with the External Device.<br><br>**IMPORTANT**<br>In the communication settings, set [SIO Type] correctly according to the serial interface specifications of the Display.<br>If you select an SIO type that the serial interface does not support, proper operation cannot be guaranteed.<br>Refer to your Display manual for details on the serial interface specifications. |
| Speed | Select the communication speed between the External Device and the Display. |
| Data Length | Display data length. |

Continues on the next page.

| Setup Items | Setup Description |
|---|---|
| Parity | Select how to check parity. |
| Stop Bit | Select stop bit length. |
| Flow Control | 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. |

## ■ Device Setting

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




| Setup Items | Setup Description |
|---|---|
| Device/PLC Name | Select the External Device to set. Device name is the title of a External Device set with GP-Pro EX. (Initial value [PLC1]) |
| Series | Display the series of the External Device. |
| Slave Address | Enter the slave address of the External Device, from 1 to 255 (DEC). |

# 5 Cable Diagrams

The following cable diagrams may be different from cable diagram recommended by YASKAWA Electric Corporation. Please be assured there is no operational problem in applying the cable diagrams shown in this manual.

- Be sure to isolate the communication wiring from the main circuit wiring and other power and electrical lines.
- 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 | | Remarks |
|---|---|---|---|
| GP3000*1 (COM1)<br>AGP-3302B (COM2)<br>ST*2 (COM2)<br>LT (COM1)<br>IPC*3 | 1A | COM port conversion adapter by Pro-face<br>CA3-ADPCOM-01<br>+<br>Terminal block conversion adapter by Pro-face<br>CA3-ADPTRM-01<br>+<br>User-created cable | Cable length: 50m or less |
| | 1B | User-created cable | |
| GP3000*4 (COM2) | 1C | Online adapter by Pro-face<br>CA4-ADPONL-01<br>+<br>Terminal block conversion adapter by Pro-face<br>CA3-ADPTRM-01<br>+<br>User-created cable | |
| | 1D | Online adapter by Pro-face<br>CA4-ADPONL-01<br>+<br>User-created cable | |
| GP-4106 (COM1) | 1E | User-created cable | |

*1 All GP3000 models except AGP-3302B

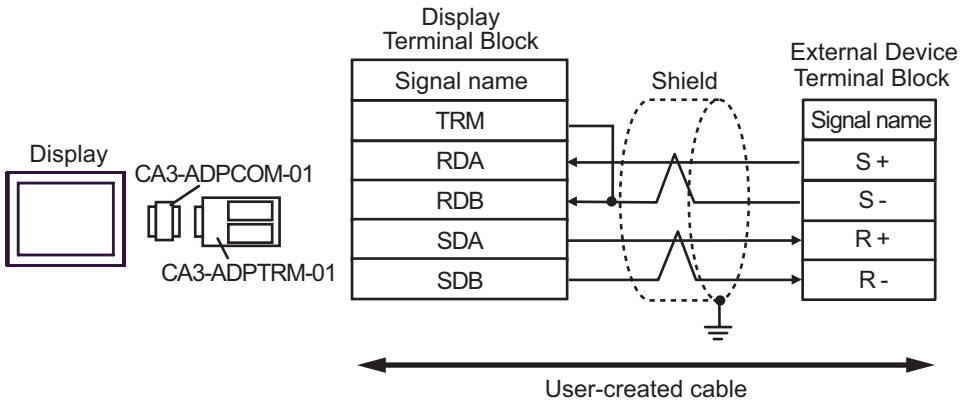
*2 All ST models except AST-3211A and AST-3302B

*3 Only the COM port which can communicate by RS-422/485 (4wire) can be used.
☞■ IPC COM Port (page 6)

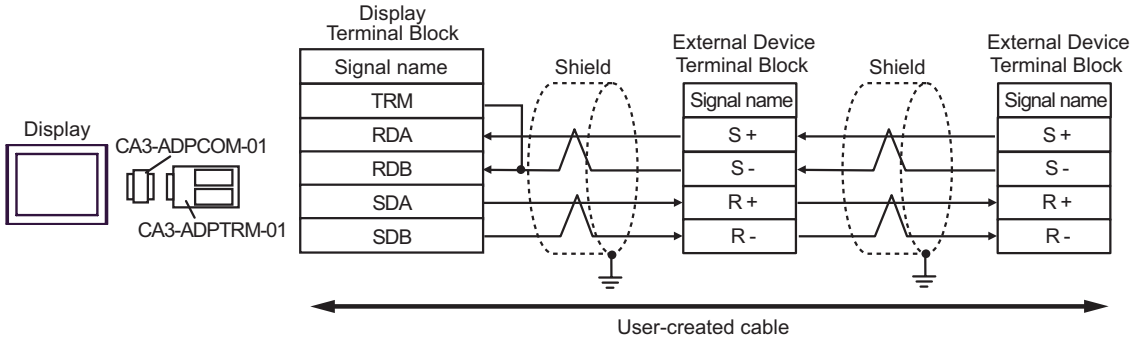
*4 All GP3000 models except GP-3200 series and AGP-3302B

1A)

- 1:1 Connection




- 1:n Connection

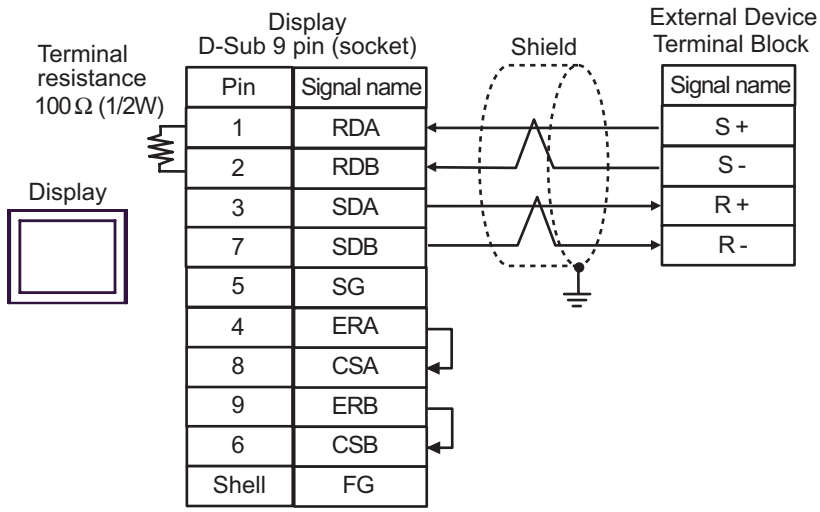



**NOTE**

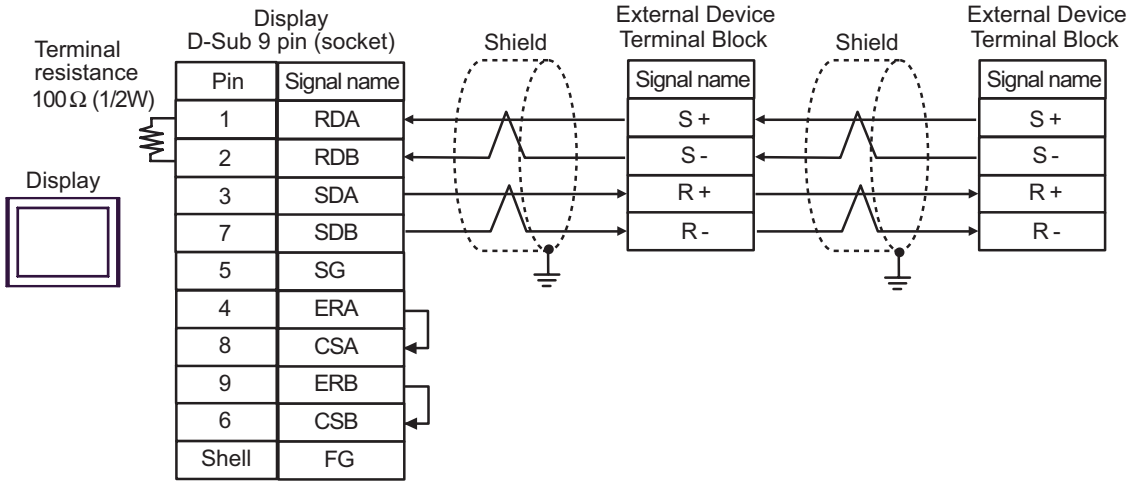
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

1B)

- 1:1 Connection




- 1:n Connection

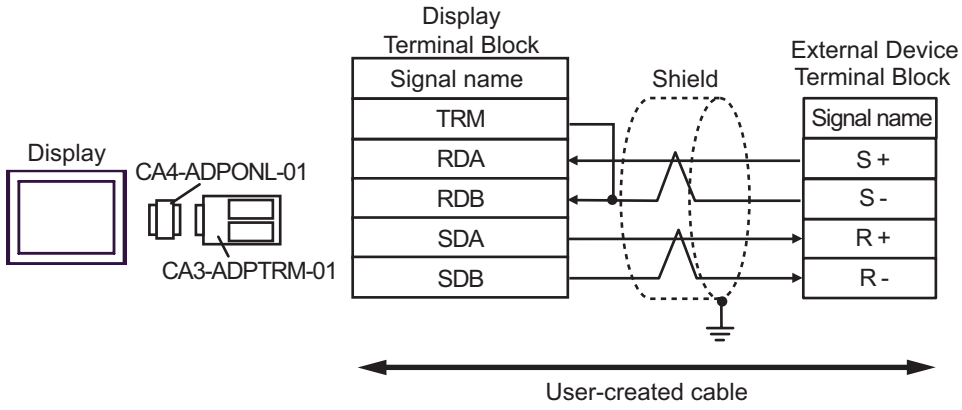



**NOTE**

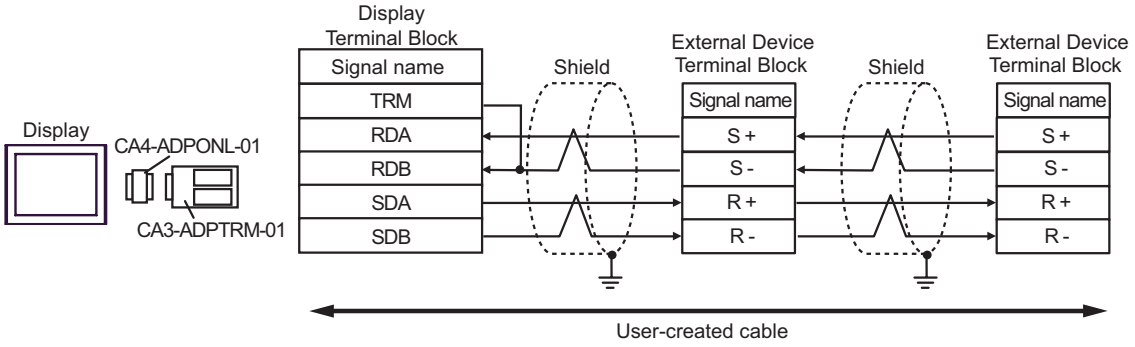
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

1C)

- 1:1 Connection




- 1:n Connection

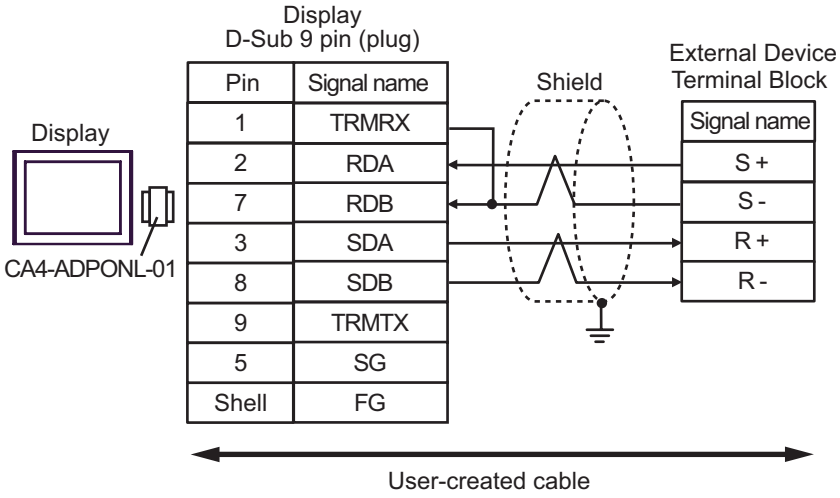



**NOTE**

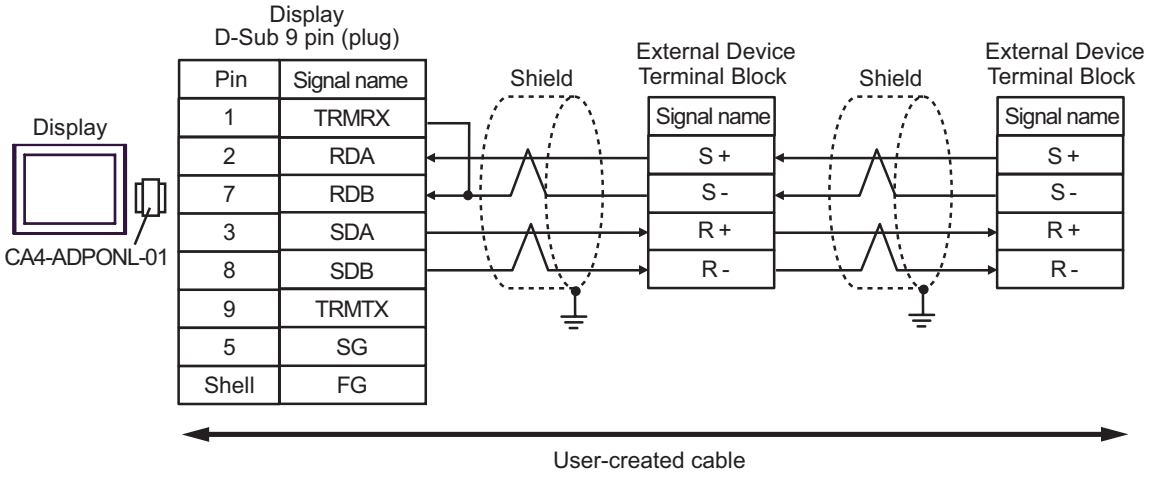
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

1D)

- 1:1 Connection




- 1:n Connection

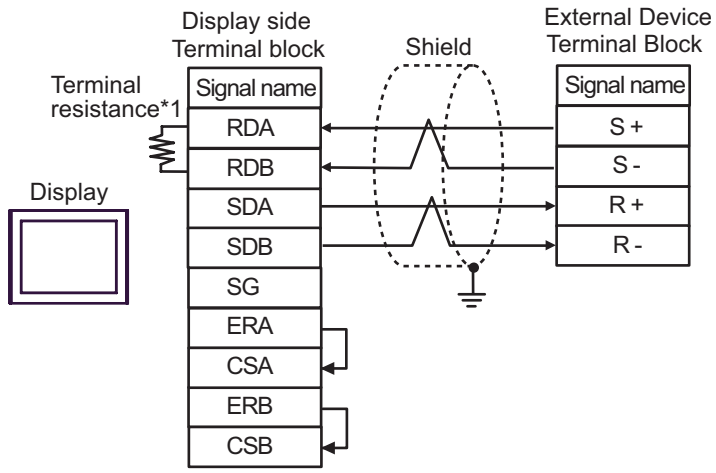



**NOTE**

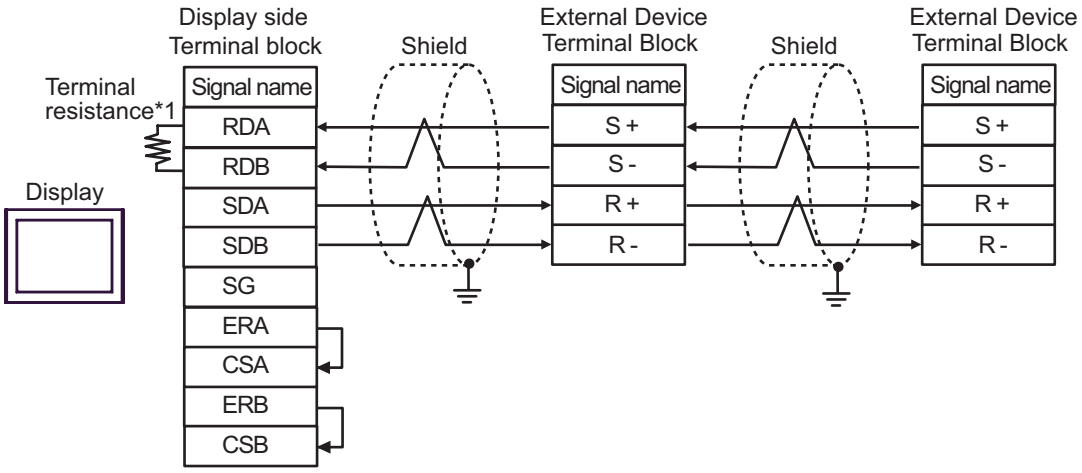
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

1E)

- 1:1 Connection




- 1:n Connection




**NOTE**

- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

*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 | ON |
| 4 | ON |

Cable Diagram 2

| Display (Connection Port) | Cable | | Remarks |
|---|---|---|---|
| GP3000[*1] (COM1)<br>AGP-3302B (COM2)<br>ST[*2] (COM2)<br>LT (COM1) | 2A | COM port conversion adapter by Pro-face<br>CA3-ADPCOM-01<br>+<br>Terminal block conversion adapter by Pro-face<br>CA3-ADPTRM-01<br>+<br>User-created cable | Cable length: 50m or less |
| | 2B | User-created cable | |
| GP3000[*3] (COM2) | 2C | Online adapter by Pro-face<br>CA4-ADPONL-01<br>+<br>Terminal block conversion adapter by Pro-face<br>CA3-ADPTRM-01<br>+<br>User-created cable | |
| | 2D | Online adapter by Pro-face<br>CA4-ADPONL-01<br>+<br>User-created cable | |
| IPC[*4] | 2E | COM port conversion adapter by Pro-face<br>CA3-ADPCOM-01<br>+<br>Terminal block conversion adapter by Pro-face<br>CA3-ADPTRM-01<br>+<br>User-created cable | |
| | 2F | User-created cable | |
| GP-4106 (COM1) | 2G | User-created cable | |
| GP-4107 (COM1) | 2H | User-created cable | |

*1 All GP3000 models except AGP-3302B

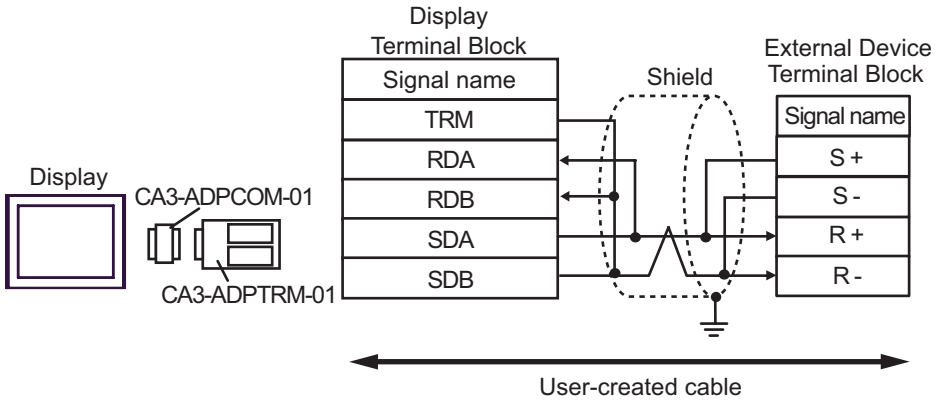
*2 All ST models except AST-3211A and AST-3302B

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

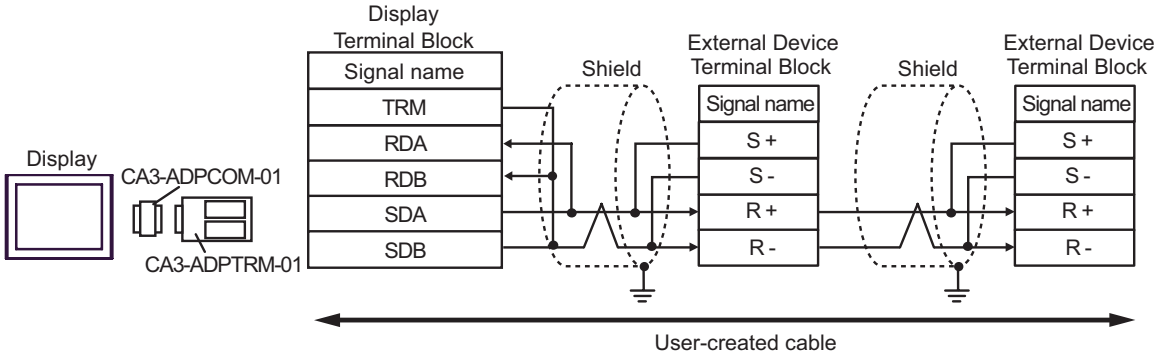
*4 Only the COM port which can communicate by RS-422/485 (2wire) can be used.
☞ ■ IPC COM Port (page 6)

2A)

- 1:1 Connection




- 1:n Connection

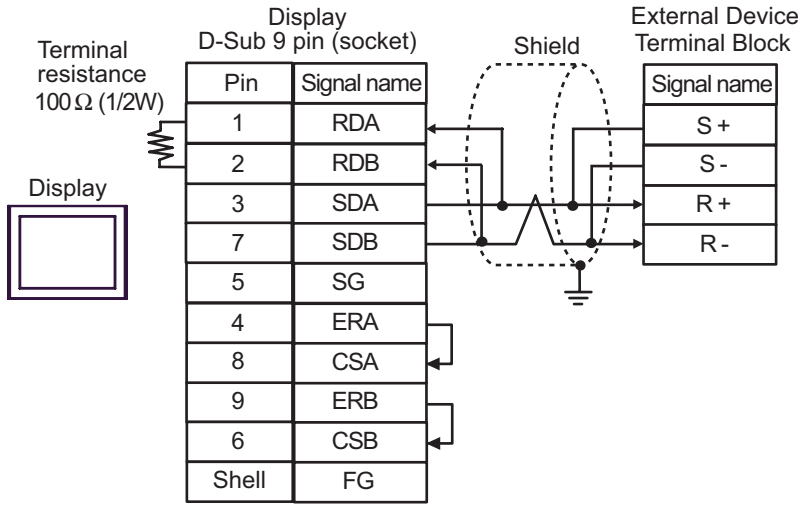



**NOTE**

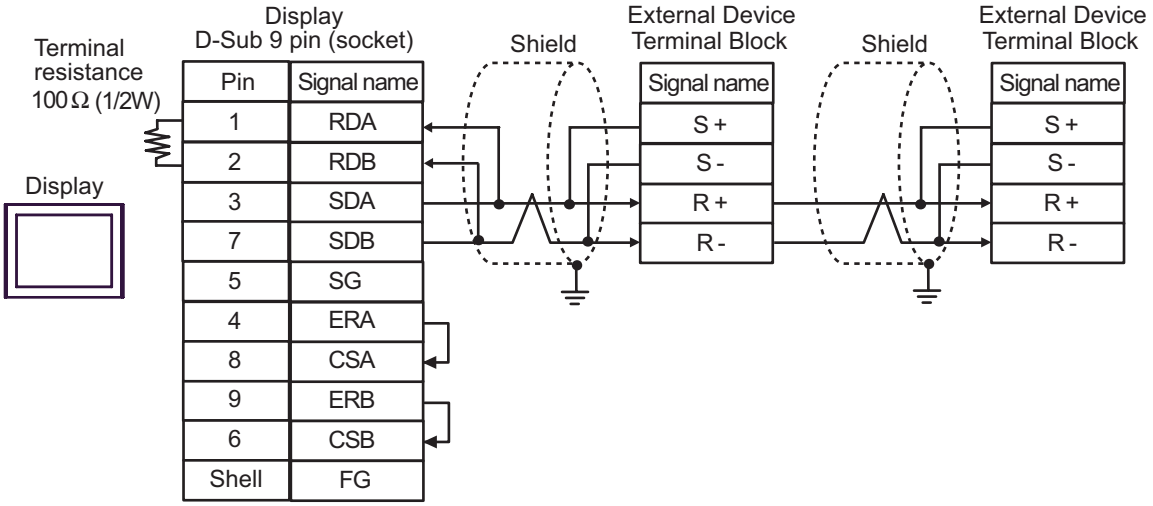
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

2B)

- 1:1 Connection




- 1:n Connection

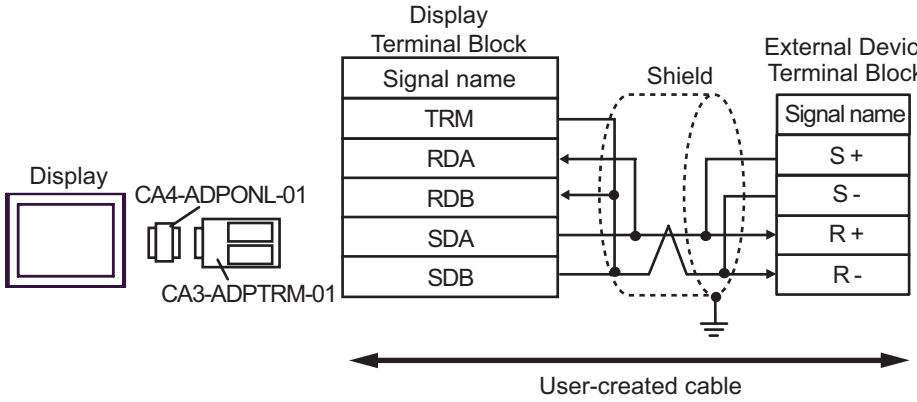



**NOTE**

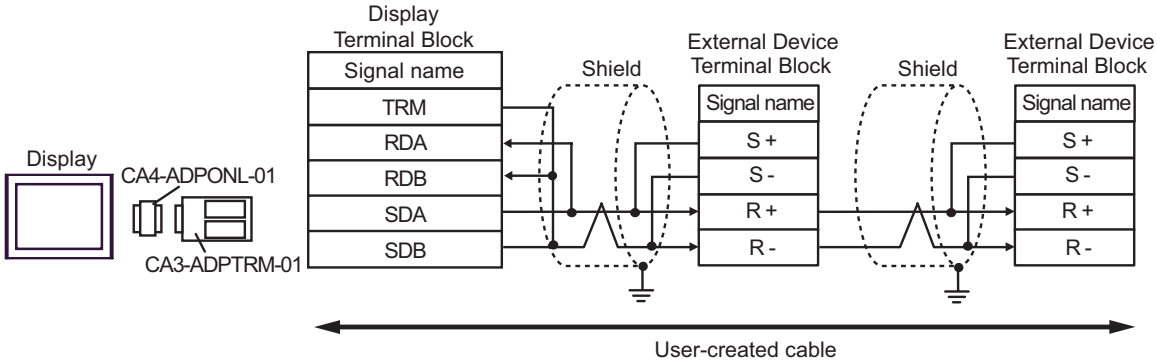
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

2C)

- 1:1 Connection




- 1:n Connection

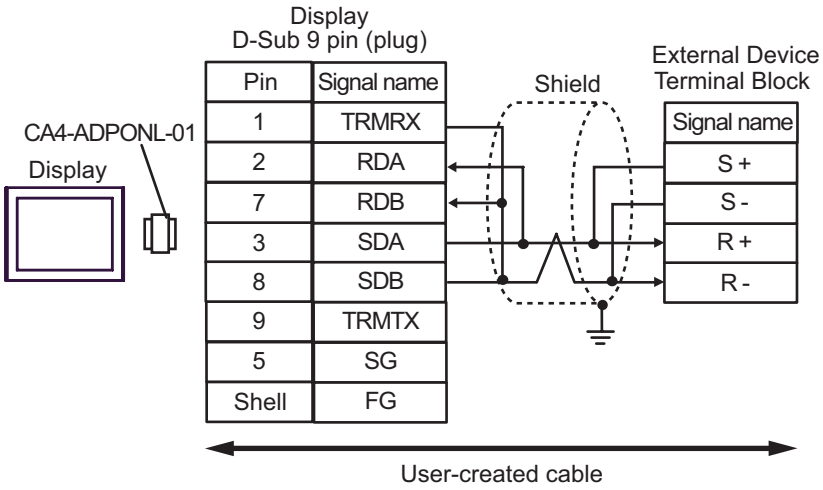



**NOTE**

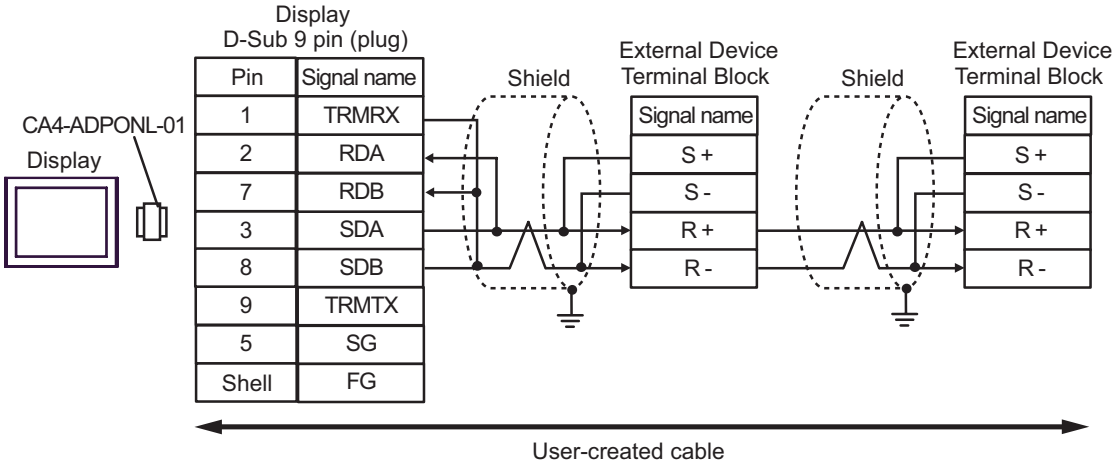
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

2D)

- 1:1 Connection




- 1:n Connection

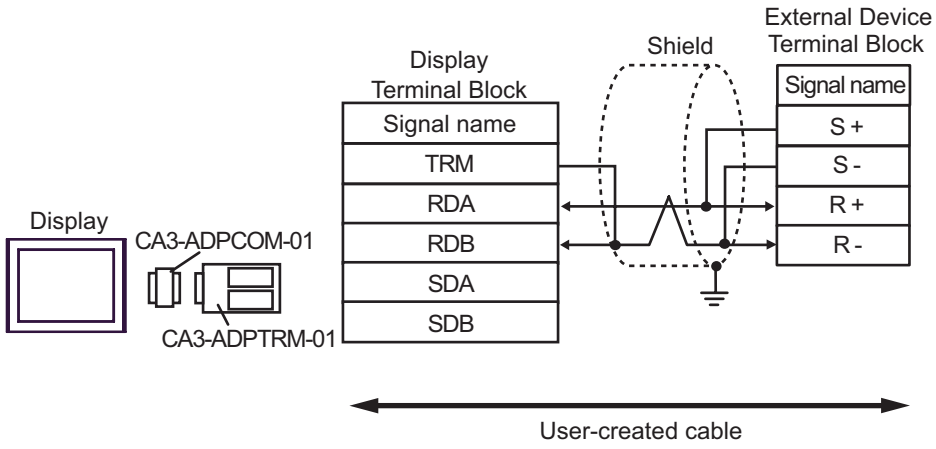



**NOTE**

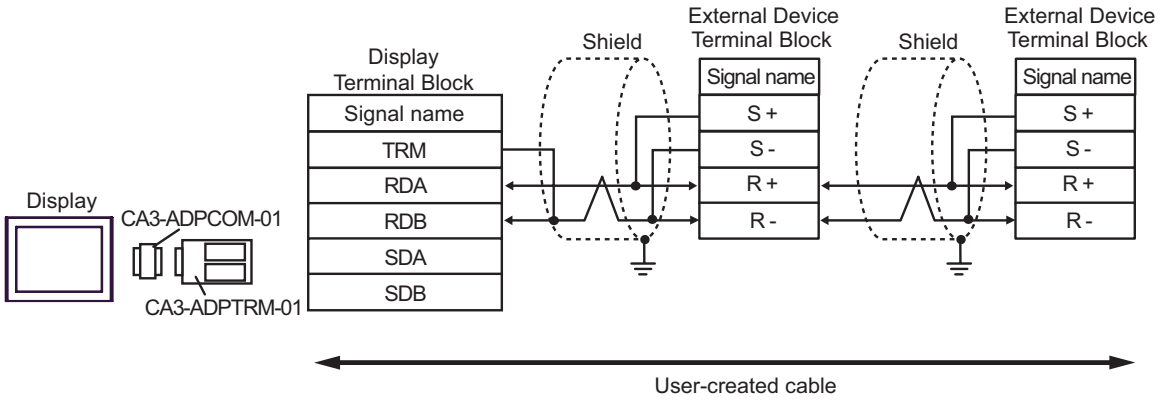
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

2E)

- 1:1 Connection




- 1:n Connection

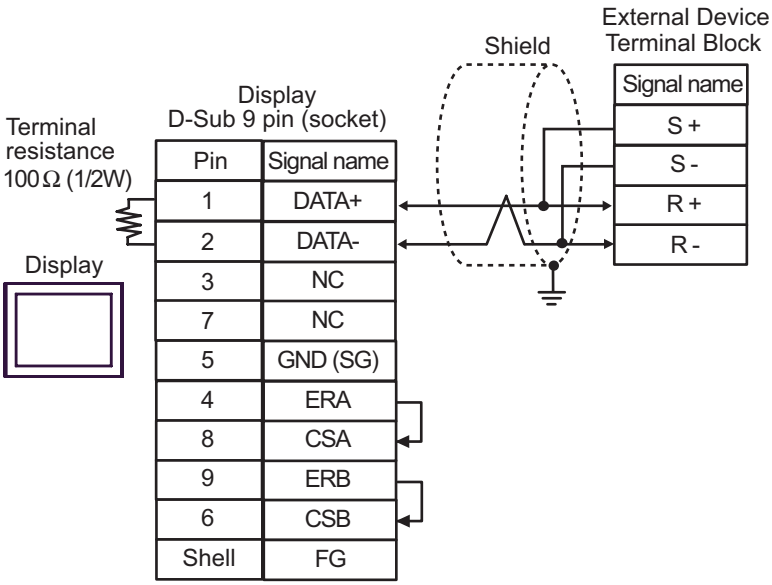



**NOTE**

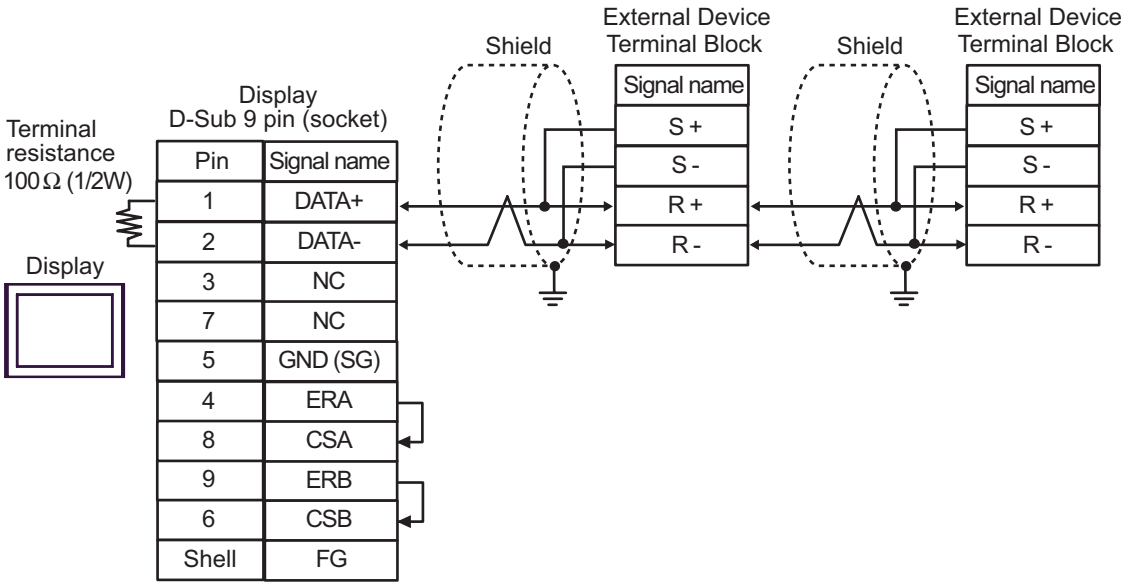
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

2F)

- 1:1 Connection




- 1:n Connection

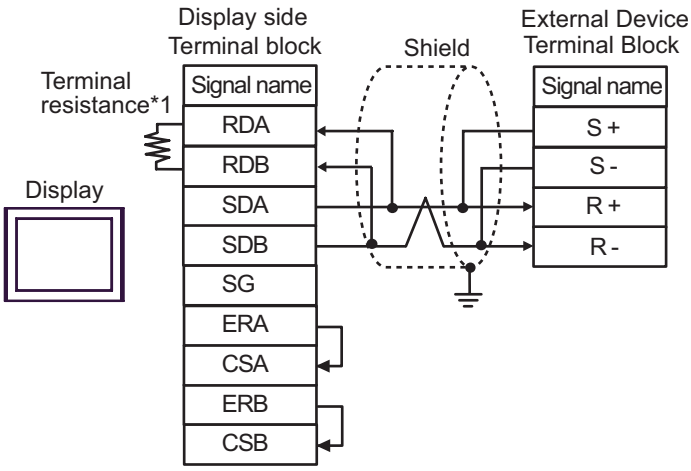



**NOTE**

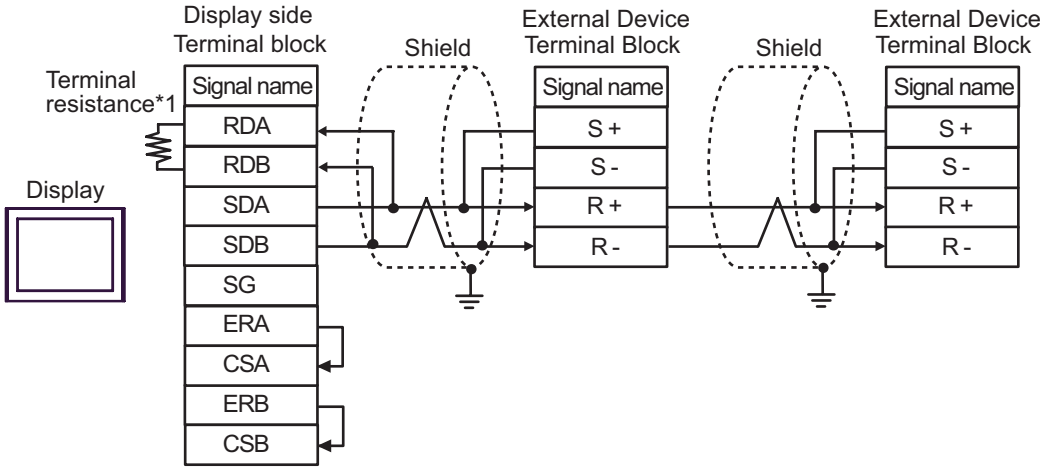
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

2G)

- 1:1 Connection




- 1:n Connection




**NOTE**

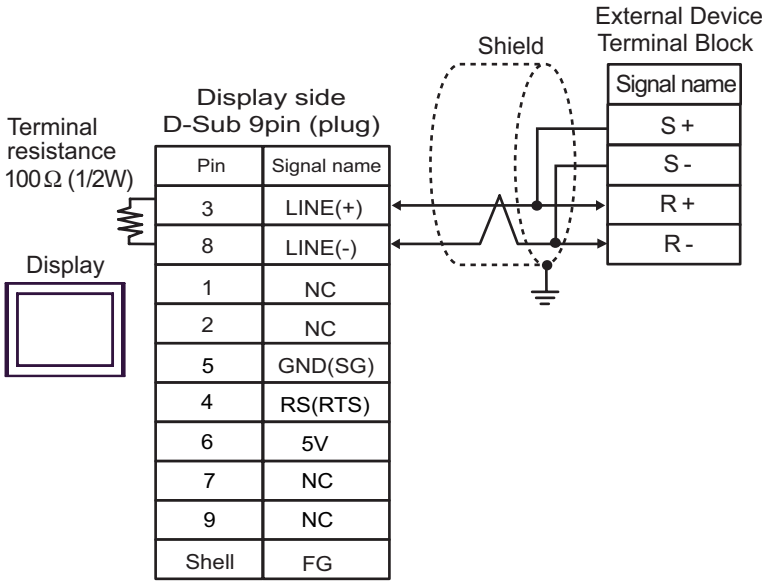
- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.

*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.

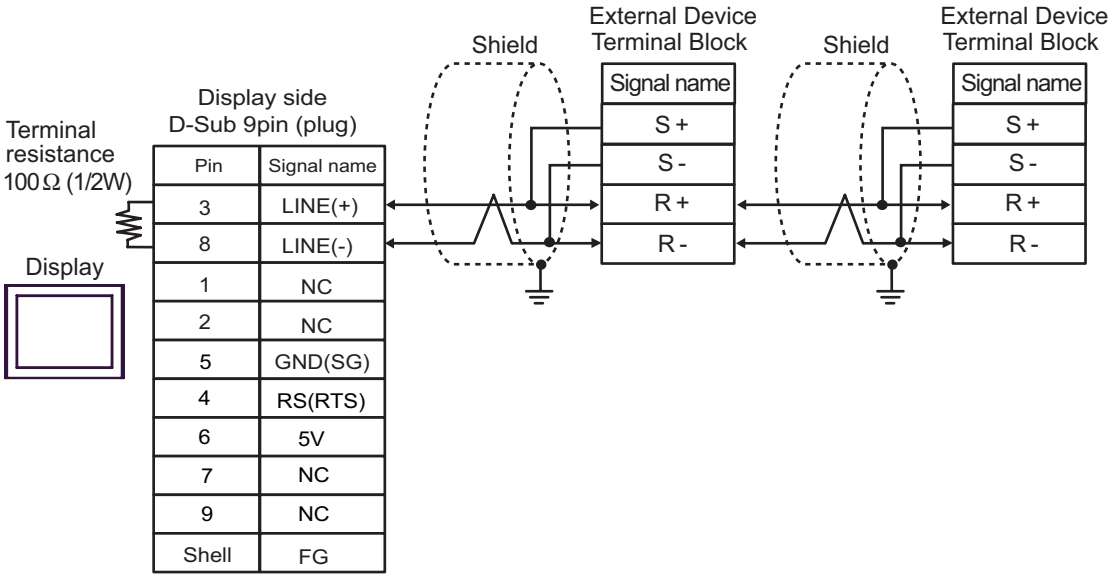
| DIP Switch No. | Set Value |
|---|---|
| 1 | OFF |
| 2 | OFF |
| 3 | ON |
| 4 | ON |

2H)

- 1:1 Connection




- 1:n Connection




**IMPORTANT**

- The 5V output (Pin #6) on the GP-4107 is the power for the Siemens AG's PROFIBUS connector. Do not use it for other devices.

**NOTE**

- For the shield ground, be sure to use the ground terminal on the External Device.
- Turn on the termination resistor switch on the External Device located at the end.
- In COM on the GP-4107, the SG and FG terminals are isolated.

Cable Diagram 3

| Display (Connection Port) | Cable | | Remarks |
|---|---|---|---|
| GP3000*1 (COM1)<br>AGP-3302B (COM2)<br>ST*2 (COM2)<br>LT (COM1)<br>IPC*3 | 3A | COM port conversion adapter by Pro-face<br>CA3-ADPCOM-01<br>+<br>Terminal block conversion adapter by Pro-face<br>CA3-ADPTRM-01<br>+<br>Cable by YASKAWA CONTROLS CO., LTD<br>FADHOWA-50 (0.5m) | Cable length: 30m or less |
| | 3B | COM port conversion adapter by Pro-face<br>CA3-ADPCOM-01<br>+<br>Terminal block conversion adapter by Pro-face<br>CA3-ADPTRM-01<br>+<br>User-created cable | |
| | 3C | User-created cable | |
| GP3000*4 (COM2) | 3D | Online adapter by Pro-face<br>CA4-ADPONL-01<br>+<br>Terminal block conversion adapter by Pro-face<br>CA3-ADPTRM-01<br>+<br>Cable by YASKAWA CONTROLS CO., LTD<br>FADHOWA-50 (0.5m) | |
| | 3E | Online adapter by Pro-face<br>CA4-ADPONL-01<br>+<br>Terminal block conversion adapter by Pro-face<br>CA3-ADPTRM-01<br>+<br>User-created cable | |
| | 3F | Online adapter by Pro-face<br>CA4-ADPONL-01<br>+<br>User-created cable | |
| GP-4106 (COM1) | 3G | Cable by YASKAWA CONTROLS CO., LTD<br>FADHOWA-50 (0.5m) | |
| | 3H | User-created cable | |

*1 All GP3000 models except AGP-3302B

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

*3 Only the COM port which can communicate by RS-422/485 (4wire) can be used.
☞■ IPC COM Port (page 6)

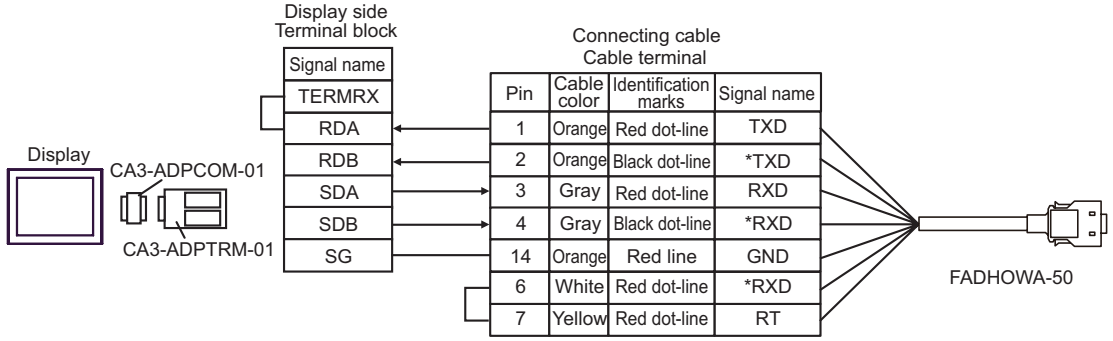
*4 All GP3000 models except GP-3200 series and AGP-3302B

**NOTE**

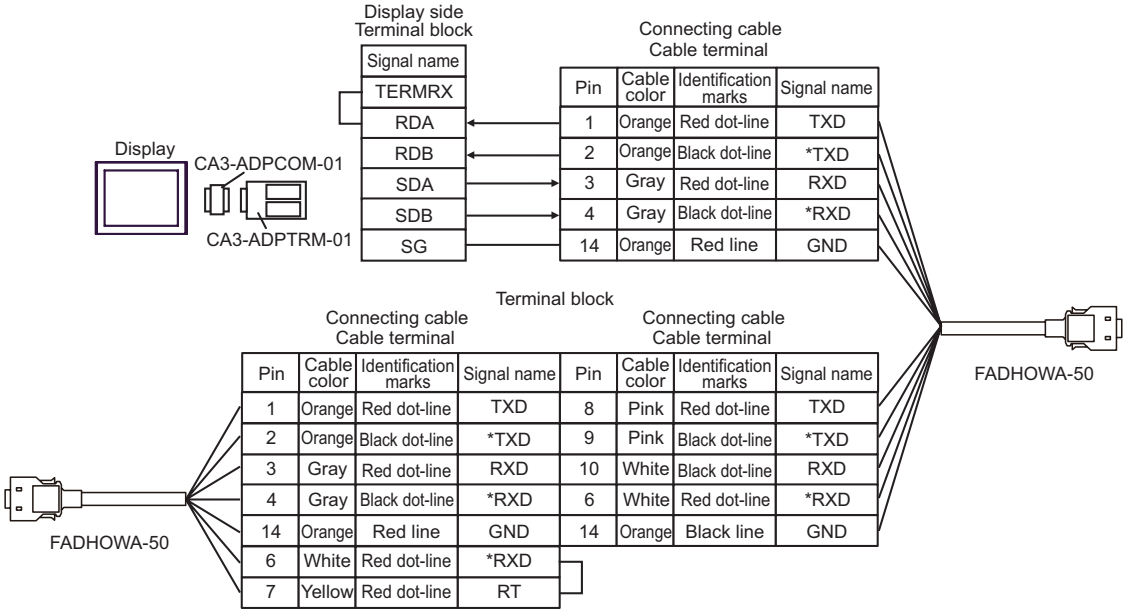
- Maximum cable length is 30m, however, communication may not be possible even when the cable length is less than 30m depending on the use environment. Verify the cable communicates correctly before use.
- To connect Σ-V series with 1:n connection, you need to set Wait To Send to 100ms or more.

3A)

- 1:1 Connection

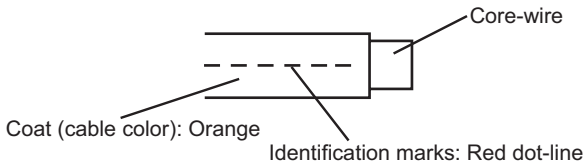



- 1:n Connection




**NOTE**

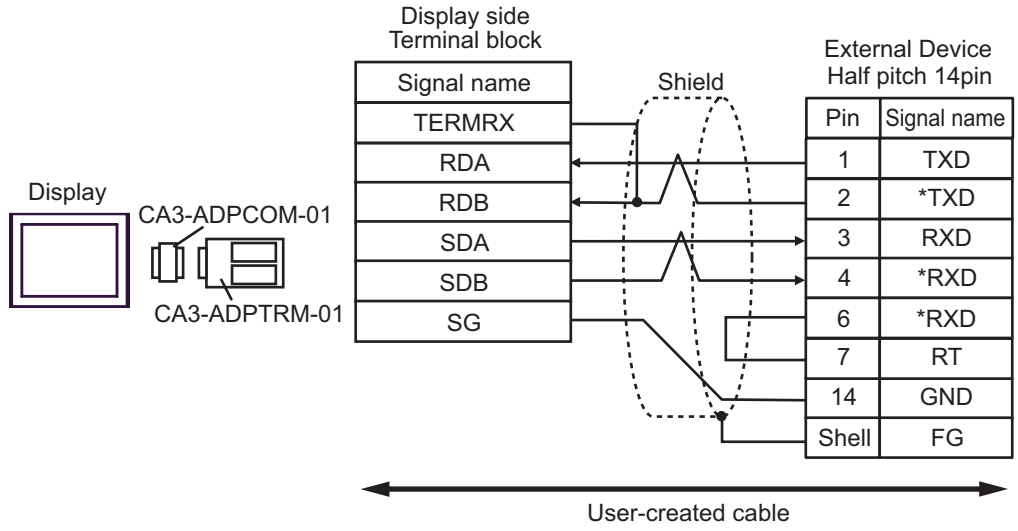
- Example of cable image



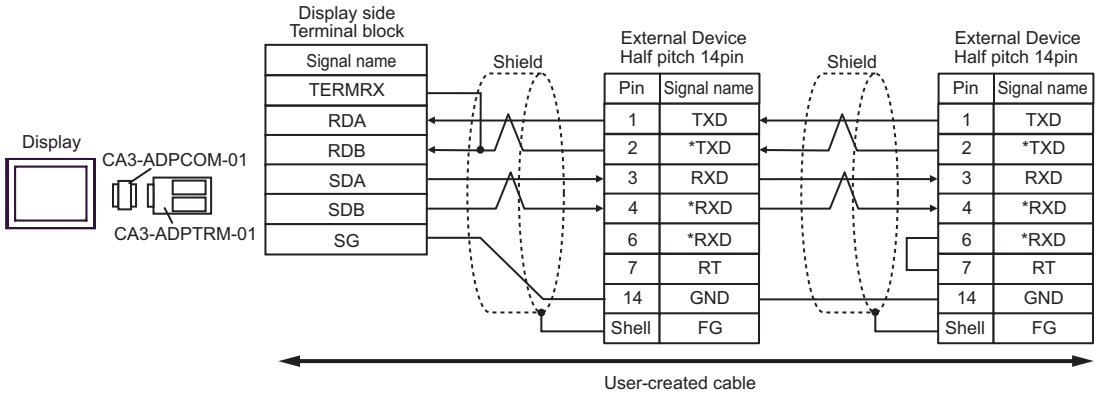

In the example above, the cable color is orange, and the identification mark shows red dot-line, which means TXD.

3B)

- 1:1 Connection




- 1:n Connection

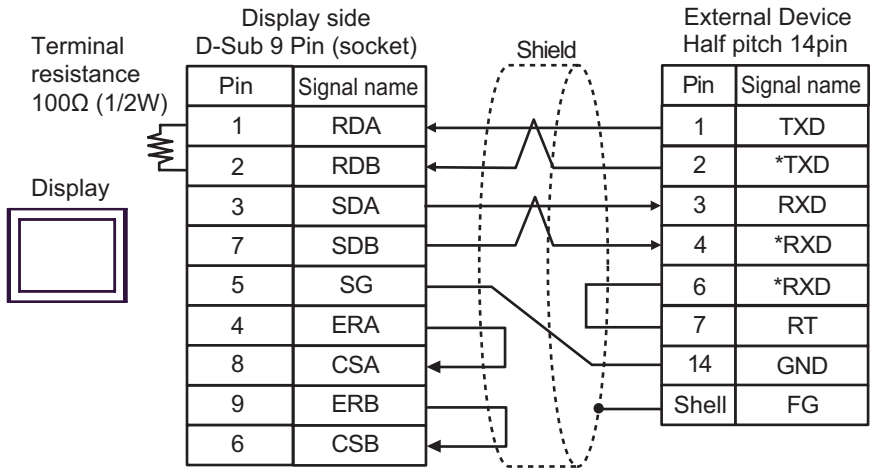



**NOTE**

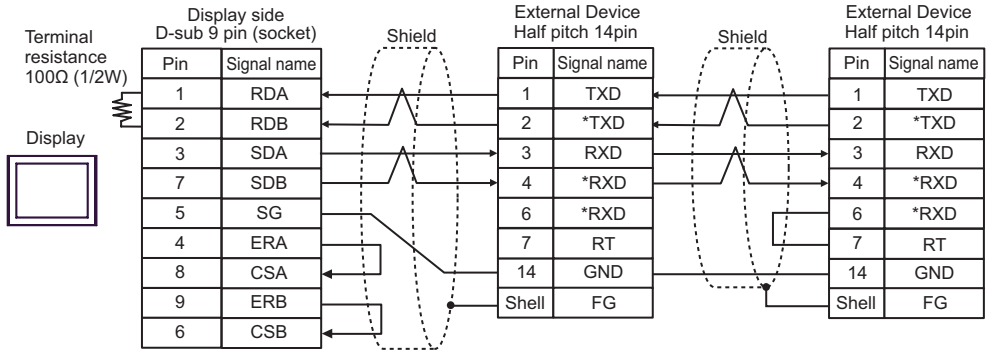
- We recommend following connector and case on the External Device side.
  Connector: HDR-E14MAG1+ by HONDA TSUSHIN KOGYO CO., LTD.
  Case: HDR-E14LPA5 by HONDA TSUSHIN KOGYO CO., LTD.

3C)

- 1:1 Connection




- 1:n Connection

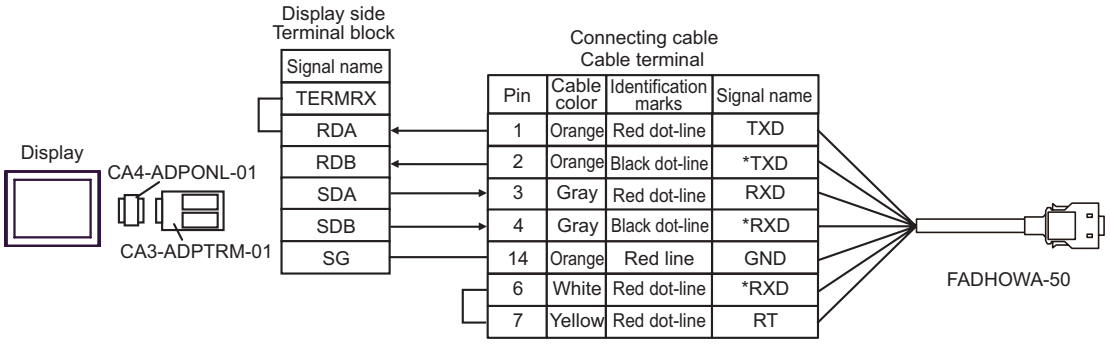



**NOTE**

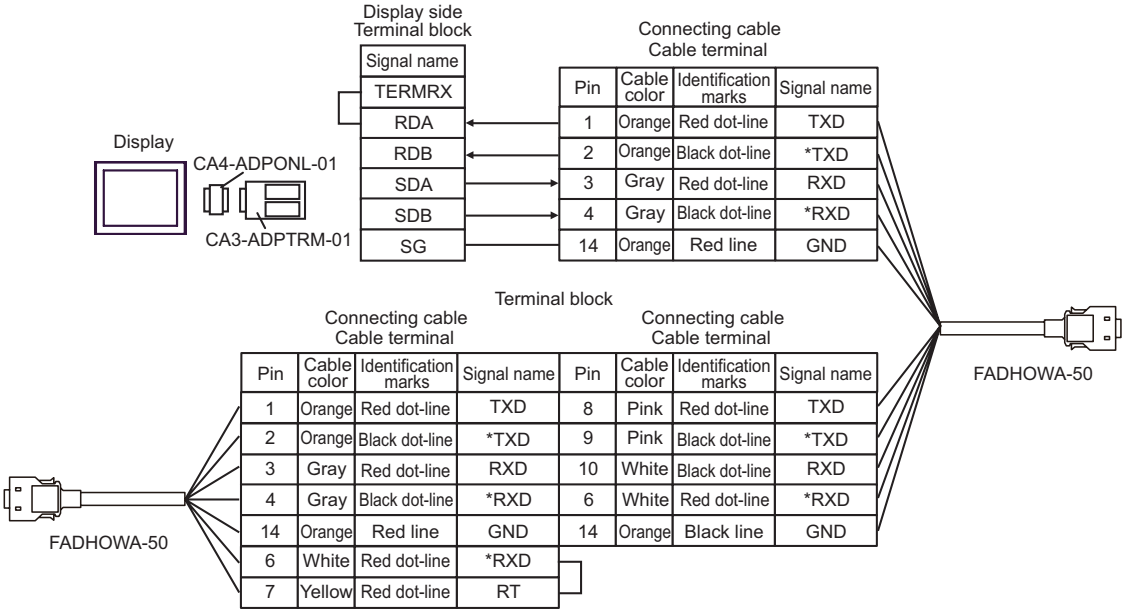
- We recommend following connector and case on the External Device side.
  Connector: HDR-E14MAG1+ by HONDA TSUSHIN KOGYO CO., LTD.
  Case: HDR-E14LPA5 by HONDA TSUSHIN KOGYO CO., LTD.

3D)

- 1:1 Connection

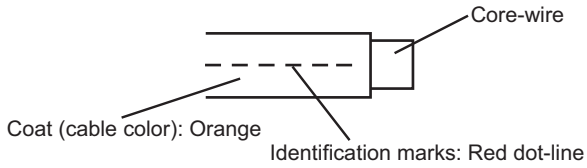



- 1:n Connection




**NOTE**

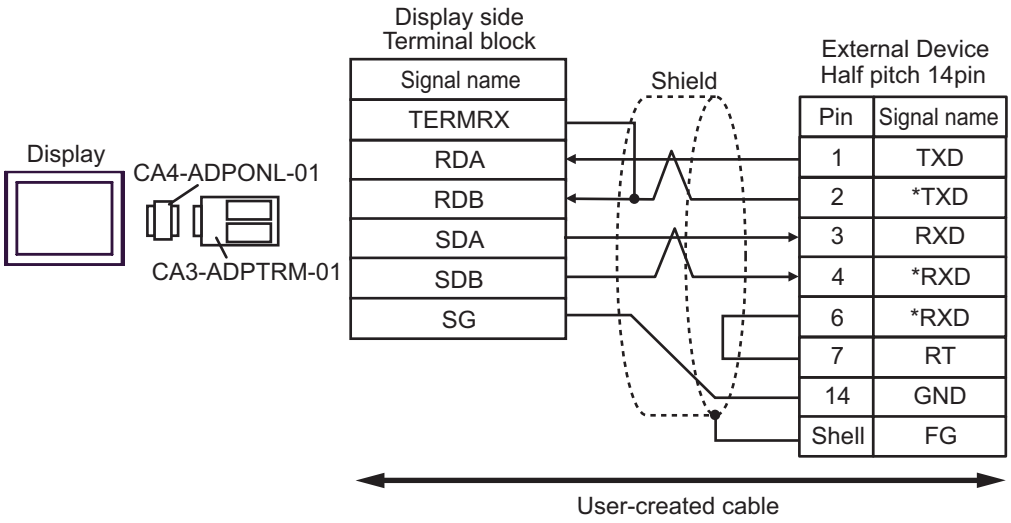
- Example of cable image



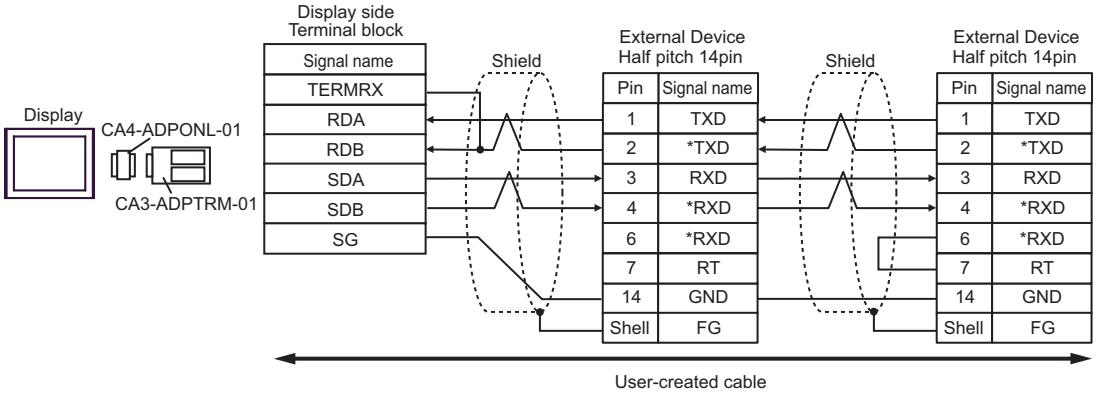

In the example above, the cable color is orange, and the identification mark shows red dot-line, which means TXD.

3E)

- 1:1 Connection




- 1:n Connection

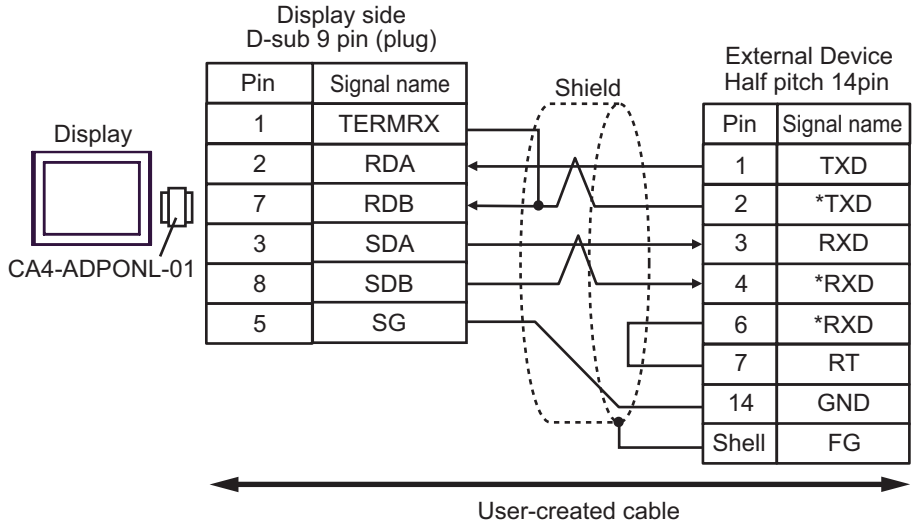



**NOTE**

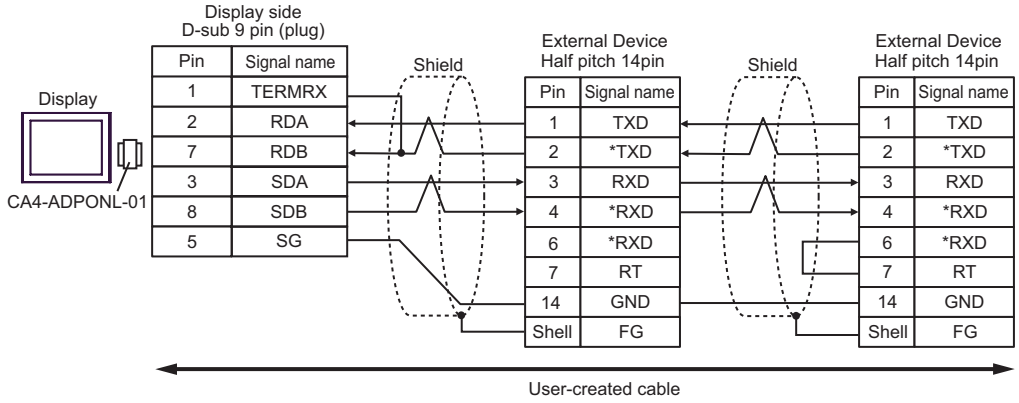
- We recommend following connector and case on the External Device side.
  Connector: HDR-E14MAG1+ by HONDA TSUSHIN KOGYO CO., LTD.
  Case: HDR-E14LPA5 by HONDA TSUSHIN KOGYO CO., LTD.

3F)

- 1:1 Connection




- 1:n Connection

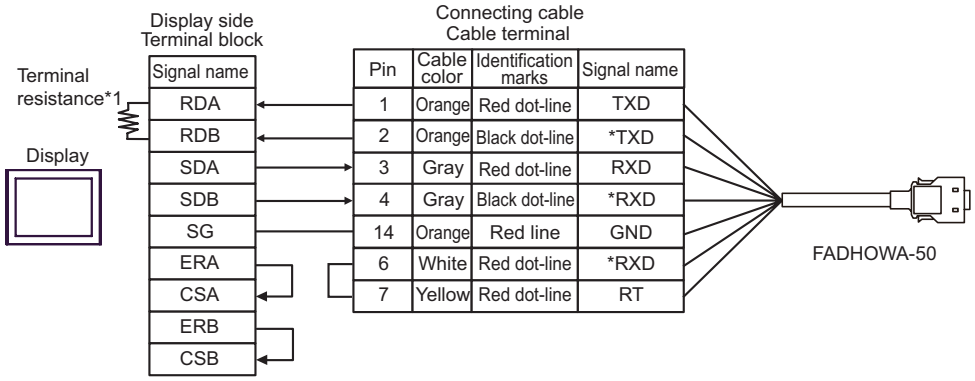



**NOTE**

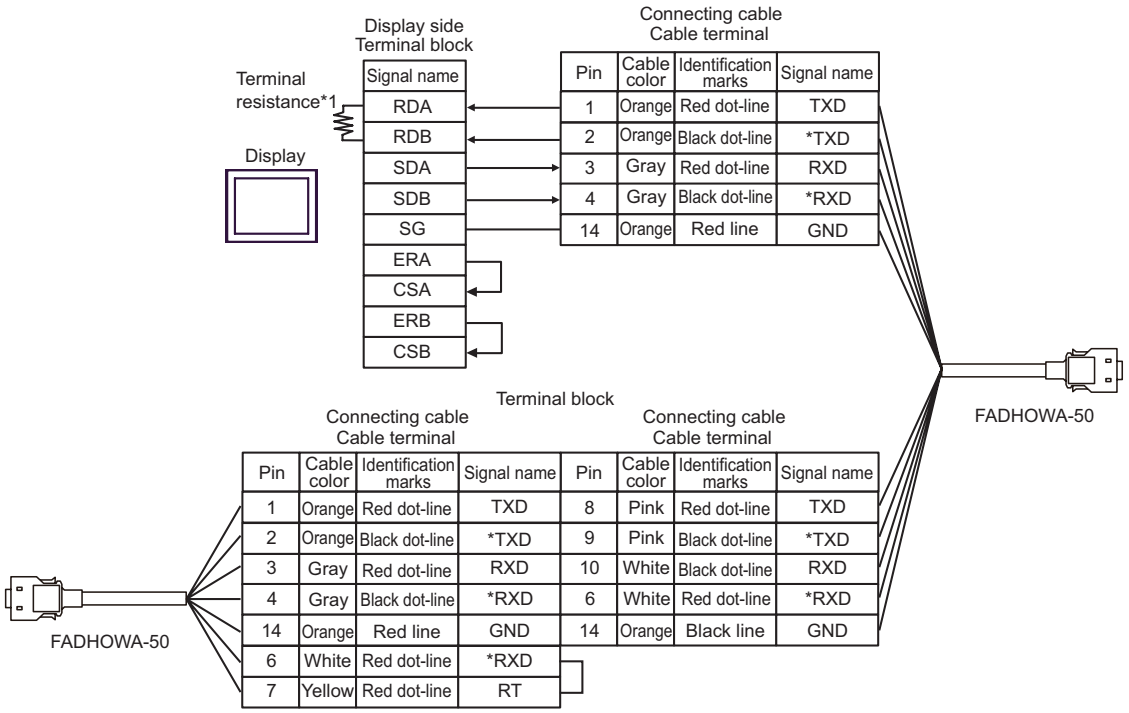
- We recommend following connector and case on the External Device side.
  Connector: HDR-E14MAG1+ by HONDA TSUSHIN KOGYO CO., LTD.
  Case: HDR-E14LPA5 by HONDA TSUSHIN KOGYO CO., LTD.

3G)

- 1:1 Connection

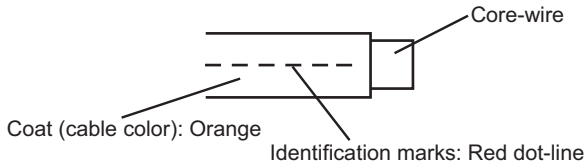



- 1:n Connection




**NOTE**

- Example of cable image



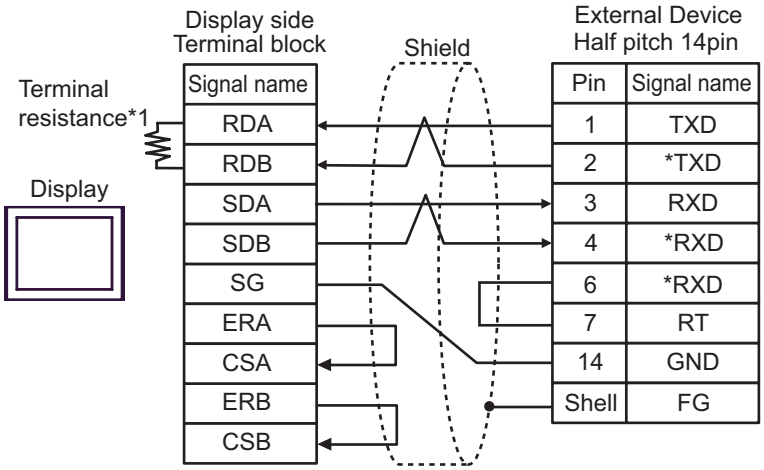

In the example above, the cable color is orange, and the identification mark shows red dot-line, which means TXD.

*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.

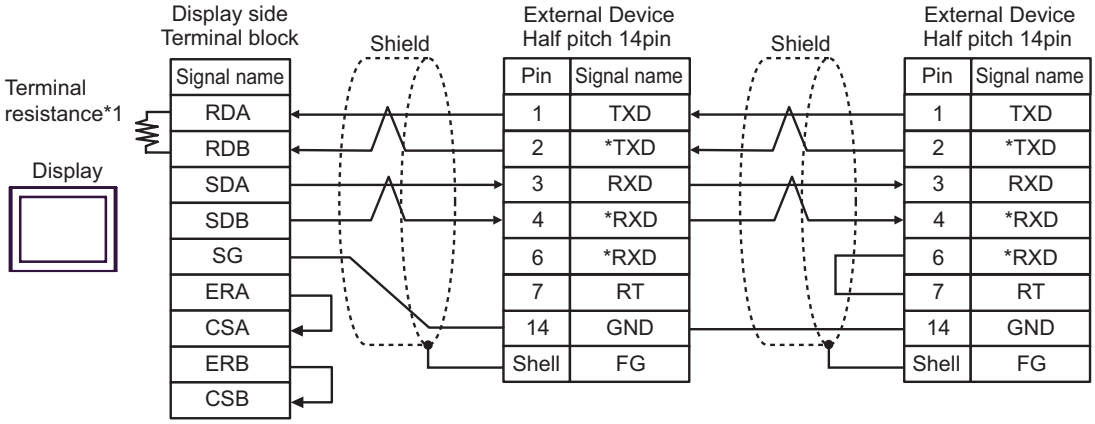
| DIP Switch No. | Set Value | DIP Switch No. | Set Value |
|---|---|---|---|
| 1 | OFF | 3 | ON |
| 2 | OFF | 4 | ON |

3H)

- 1:1 Connection




- 1:n Connection




**NOTE**

- We recommend following connector and case on the External Device side.
  Connector: HDR-E14MAG1+ by HONDA TSUSHIN KOGYO CO., LTD.
  Case: HDR-E14LPA5 by HONDA TSUSHIN KOGYO CO., LTD.

*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 | ON |
| 4 | ON |

# 6 Supported Device

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.

## 6.1 Inverter

: This address can be specified as system data area.

| Device | Bit Address | Word Address | 32 bits | Remarks |
|---|---|---|---|---|
| Bit Register*1 | BR0000.0 - BR1959.F | ------ | - | *2 |
| Register*1 | ------ | 0000 - 1959 | L/H | Bit F |

*1 The Bit Register and the Register are the same device, but their bit write operation differs. Use either as needed.

*2 When bits are written, the Display reads the corresponding word address from the External Device, sets particular bits of that word address to ON, and then returns the resulting address to the External Device. Note that the data may not be written correctly if you write to the word address using the ladder program while the Display is reading data from, and writing data to, the External Device. To write bits to the write-only register, use a registering device. Writing bits to the write-only register will cause a communication error to appear when the readout command is executed.

NOTE

- If you use a device, set the address to the MEMOBUS register No. corresponding to the parameter No. Refer to your External Device manual for details.

Example) Correspondence between the Inverter Constant Number and MEMOBUS register

| Constant No. | Name | Description | Setting Range | Default Value | Changes during Operation | Control mode | | | MEMOBUS Register |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | V/f without PG | V/f with PG | Vector without PG | |
| A1-02 | Selection of Control Mode | Select an inverter control mode.<br>0: V/f control without PG<br>1: V/f control with PG<br>2: Vector control without PG<br>The control mode is not initialized by selecting INITIALIZE. | 0 to 2 | 0 | × | Q | Q | Q | 102H |
| b1-01 | Selection of frequency command | Select a frequency command input method.<br>0: Digital operator<br>1: Control circuit terminal (analog input)<br>2: MEMOBUS communication<br>3: Optional card<br>4: Pulse column input | 0 to 4 | 1 | × | Q | Q | Q | 180H |

- 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.
- Please refer to the GP Pro-EX Reference Manual for System Data Area information.

Cf. GP Pro-EX Reference Manual "LS Area (Direct Access Method Area)"

- Please refer to the precautions on manual notation for icons in the table.

☞ "Manual Symbols and Terminology"

## 6.2 Σ-V series

This address can be specified as system data area.

| Device | Bit Address | Word Address | 32 bits | Notes |
|---|---|---|---|---|
| Normal Parameters Area | 0000.0 - 0FFF.F | 0000 - 0FFF | L/H | *1 *2 |
| Temporary Parameters Area | 1000.0 - 1FFF.F | 1000 - 1FFF | | *1 *2 |
| Monitor Area | E000.0 - EFFF.F | E000 - EFFF | | *1 *2 |

*1 When you write to the bit address, the Display reads the entire word, sets the defined bit, then returns the new word value to the External Device. If the ladder program writes data to this word address during the bit write process, the resulting data may be incorrect.

*2 The following addresses are 32 bit parameters. Please use two words when reading or writing.

- Normal Parameters Area
  020AH / 020EH / 0210H / 0212H / 0282H / 051BH / 0520H / 0522H / 0524H / 0526H / 0531H

- Temporary Parameters Area
  120AH / 120EH / 1210H / 1212H / 1282H / 151BH / 1520H / 1522H / 1524H / 1526H / 1531H

- Monitor Area
  E003H / E009H / E00EH / E010H / E012H / E016H / E01BH / E084H / E52AH / E52CH / E52EH / E530H / E532H / E534H / E536H / E538H / E53AH / E53CH / E601H / E603H / E605H / E705H / E707H / E110H / E120H / E130H

**NOTE**

- 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.
- Please refer to the GP-Pro EX Reference Manual for system data area.
  Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"
- Please refer to the precautions on manual notation for icons in the table.
  ☞ "Manual Symbols and Terminology"

### ■ Normal Parameters Area

This area is used to map the External Device's user constant parameters. The register number is defined by adding the Pn number and the offset value. The normal parameters area offset value is 0000H.

For details on the Pn number and register mapping, please refer to the manual of the External Device.

| Operation | Description |
|---|---|
| Read | Reads volatile memory such as RAM for values. Unable to read values from non-volatile memory such as EEPROM. |
| Write | Writes values to volatile memory such as RAM, and non-volatile memory such as EEPROM. |

**NOTE**

- You cannot run consecutive reads from, or consecutive writes to, different register groups. Example: When consecutively reading from or writing to 07FFH to 0800H, the message "Data Consistency Error (33H)" or "Access Denied Error (31H)" is displayed.
- If you specify a nonexistent register number, the message "Access Denied Error (31H)," is displayed.

## ■ Temporary Parameters Area

This area is used to map the External Device's user constant parameters. The register number is defined by adding the Pn number and the offset value. The temporary parameters area offset value is 1000H.

For details on the Pn number and register mapping, please refer to the manual of the External Device.

| Operation | Description |
|---|---|
| Read | Reads volatile memory such as RAM for values. |
| Write | Writes values to volatile memory such as RAM. |

Since writing to Temporary Parameters Area is run in volatile memory (such as RAM), values are cleared when the External Device is turned OFF.

If there is an operation, such as servo tuning, that requires an extreme number of write operations to memory, running the operation in the Temporary Parameters Area generates the following advantages.

- You can increase the life of non-volatile memory.
- You can reduce processing time.

**NOTE**

- You cannot run consecutive reads from, or consecutive writes to, different register groups. Example: When consecutively reading from or writing to 07FFH to 0800H, the message "Data Consistency Error (33H)" or "Access Denied Error (31H)" is displayed.
- If you specify a nonexistent register number, the message "Access Denied Error (31H)," is displayed.

## ■ Monitor Area

This area is used to reference internal information (such as operating condition, alarm status, and various status flags) on the External Device. By referring to the value of a register number, you can check the status of the External Device. While the External Device is running, register values change constantly.

| Register No. | Name | Unit | No. of Registers | Sign | Remarks |
|---|---|---|---|---|---|
| E000H | Motor Rotational/Translational Speed | Rotary: $min^{-1}$<br>Linear: mm/s | 1 | S | Un000 |
| E001H | Reference Speed | Rotary: $min^{-1}$<br>Linear: mm/s | 1 | S | Un001 |
| E002H | Internal Torque/Thrust Force Reference | % | 1 | S | Un002 |
| E003H | Rotational Angle 1<br>(Number of Pulses from the Origin) | Pulse | 2 | U | Un003 |
| E005H | Rotational Angle 2<br>(Angle from the Origin) | deg | 1 | U | Un004 |
| E006H | Input Signal Monitor | - | 1 | - | Un005 |
| E007H | Output Signal Monitor | - | 1 | - | Un006 |
| E008H | Input Reference Pulse Speed | Rotary: $min^{-1}$<br>Linear: mm/s | 1 | S | Un007 |
| E009H | Position Error Counter | Reference unit | 2 | S | Un008 |
| E00BH | Accumulated Load Rate | %(10s cycle) | 1 | U | Un009 |

| Register No. | Name | Unit | No. of Registers | Sign | Remarks |
|---|---|---|---|---|---|
| E00CH | Regenerative Load Rate | %(10s cycle) | 1 | U | Un00A |
| E00DH | Dynamic Break Consumption Power | %(10s cycle) | 1 | U | Un00B |
| E00EH | Input Reference Pulse Counter (32bit) | Pulse | 2 | S | Un00C |
| E010H | Feedback Pulse Counter (32bit) | Pulse | 2 | S | Un00D |
| E012H | Fully-closed Feedback Pulse Counter (32bit) | Pulse | 2 | S | Un00E |
| E016H | Total Operation Time | 100ms | 2 | U | Un012 |
| E018H | Upper Limit of Maximum Motor Speed | mm/s | 1 | U | Un010 (Available only in linear motor) |
| E019H | Upper Limit of Divided Pulse Output Setting | Pulse/Pitch | 1 | U | Un010 (Available only in linear motor) |
| E01AH | Magnetic Pole Sensor Information | - | 1 | - | Un011 |
| E01BH | Feedback Pulse Counter | Reference unit | 2 | S | Un013 |
| E01DH | Effective Gain Set Number | - | 1 | U | Un014 |
| E01EH | Safety I/O Signal Monitor | - | 1 | - | Un015 |
| E084H | Linear Scale Pitch | pm | 2 | U | Un084 |
| E086H | Linear Scale Pitch Scaling Exponent | Power of Ten | 1 | S | Un085 |
| E500H | Alarm History Alarm Code No. = 0 | Code | 1 | U | Fn000-0 |
| E501H | Alarm History Alarm Code No. = 1 | Code | 1 | U | Fn000-1 |
| E502H | Alarm History Alarm Code No. = 2 | Code | 1 | U | Fn000-2 |
| E503H | Alarm History Alarm Code No. = 3 | Code | 1 | U | Fn000-3 |
| E504H | Alarm History Alarm Code No. = 4 | Code | 1 | U | Fn000-4 |
| E505H | Alarm History Alarm Code No. = 5 | Code | 1 | U | Fn000-5 |
| E506H | Alarm History Alarm Code No. = 6 | Code | 1 | U | Fn000-6 |
| E507H | Alarm History Alarm Code No. = 7 | Code | 1 | U | Fn000-7 |
| E508H | Alarm History Alarm Code No. = 8 | Code | 1 | U | Fn000-8 |
| E509H | Alarm History Alarm Code No. = 9 | Code | 1 | U | Fn000-9 |
| E50AH | Current Alarm Information | Code | 1 | U | |
| E51BH | Servo Running Status | - | 1 | U | |
| E51CH | Control Mode Status | - | 1 | U | |
| E52AH | Alarm History Time Stamp No. = 0 | 100ms | 2 | U | |
| E52CH | Alarm History Time Stamp No. = 1 | 100ms | 2 | U | |
| E52EH | Alarm History Time Stamp No. = 2 | 100ms | 2 | U | |
| E530H | Alarm History Time Stamp No. = 3 | 100ms | 2 | U | |
| E532H | Alarm History Time Stamp No. = 4 | 100ms | 2 | U | |

| Register No. | Name | Unit | No. of Registers | Sign | Remarks |
|---|---|---|---|---|---|
| E534H | Alarm History Time Stamp No. = 5 | 100ms | 2 | U | |
| E536H | Alarm History Time Stamp No. = 6 | 100ms | 2 | U | |
| E538H | Alarm History Time Stamp No. = 7 | 100ms | 2 | U | |
| E53AH | Alarm History Time Stamp No. = 8 | 100ms | 2 | U | |
| E53CH | Alarm History Time Stamp No. = 9 | 100ms | 2 | U | |

- Input Signal Monitor (E006H)

  Analog/Pulse Interface Type / Command Option Card Interface Type

| Bit | Status Signal | Logic | Un No. |
|---|---|---|---|
| 0 | SI0(CN1-40) | 0 = Lo (Close)<br>1 = Hi (Open) | Un005 |
| 1 | SI1(CN1-41) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 2 | SI2(CN1-42) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 3 | SI3(CN1-43) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 4 | SI4(CN1-44) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 5 | SI5(CN1-45) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 6 | SI6(CN1-46) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 7 | SEN(CN1-4) | 0 = Lo<br>1 = Hi | |

- Output Signal Monitor (E007H)

  Analog/Pulse Interface Type / Command Option Card Interface Type

| Bit | Status Signal | Logic | Un No. |
|---|---|---|---|
| 0 | ALM(CN1-31,32) | 0 = Lo (Close)<br>1 = Hi (Open) | Un006 |
| 1 | SO1(CN1-25,26) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 2 | SO2(CN1-27,28) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 3 | SO3(CN1-29,30) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 4 | ALO1(CN1-37) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 5 | ALO2(CN1-38) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 6 | ALO3(CN1-39) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 7 | Reserved | | |

- Safety I/O Signal Monitor (E01EH)

| Bit | Status Signal | Logic | Un No. |
|---|---|---|---|
| 0 | /HWBB1(CN8-3,4) | 0 = Lo (Close)<br>1 = Hi (Open) | Un015 |
| 1 | /HWBB2(CN8-5,6) | 0 = Lo (Close)<br>1 = Hi (Open) | |
| 2 to 7 | Reserved | | |

**NOTE**

- /HWBB1 and /HWBB2 are valid only when the safety option card is not connected. When the safety option card is connected, they become indefinite.

- Servo Running Status (E51BH)

| Reading | Description |
|---|---|
| 0000H | Reserved (Initial State) |
| 0001H | Alarm Occurred (A.***) |
| 0002H | Hardwired Base Blocked (HWBB) |
| 0003H | Forward / Reverse Run Prohibited (PTNT) |
| 0004H | Forward Run Prohibited (P-OT) |
| 0005H | Reverse Run Prohibited (N-OT) |
| 0006H | Base Blocked (BB) |
| 0007H | Base Enabled (RUN) |
| 0008H | Magnetic Pole Detecting (PDET) |

- Control Mode Status (E51CH)

| Reading | Description |
|---|---|
| 0000H | Speed Control Mode |
| 0001H | Position Control Mode |
| 0002H | Torque Control Mode |

**NOTE**

- JOG Drive Mode, Origin Search Mode, and Internally Set Speed Control Mode become Speed control mode.
- Programmed JOG Drive Mode, Advanced Auto-Tuning Mode, and Easy FFT Mode become Position Control Mode.

# 7 Device Code and Address Code

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

## 7.1 Inverter

| Device | Device Name | Device Code (HEX) | Address Code |
|---|---|---|---|
| Register | - | 0000 | Word Address |

## 7.2 Σ-V series

| Device | Device Name | Device Code (HEX) | Address Code |
|---|---|---|---|
| Normal Parameters Area | 0 | 0000 | Word Address |
| Temporary Parameters Area | 1 | 0001 | Word Address |
| Monitor Area | E | 0009 | Word Address |

# 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.<br>NOTE<br>• Received error codes are displayed as "Decimal [Hex]".<br>• Device address is displayed as "Address: Device address".<br>• IP addresses are displayed as "IP address (Decimal): MAC address (Hex)". |

Examples of Error Messages

"RHAA035: PLC1: Error has been responded for device write command (Error Code: 1 [01H])"

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 (Inverter)

| Error Code | Description |
|---|---|
| 02H | Invalid register number error |
| 21H | Data setting error |
| 22H | Write mode error |
| 23H | Writing during main circuit undervoltage (UV) error |
| 24H | Writing error during constants processing |

◆ Error Codes Unique to External Device (Σ-V series)

| Error Code | Description |
|---|---|
| 01H | Function code error<br>• The function code or the sub function code which is not support. |
| 02H | Incorrect register number<br>• The register number being accessed has not been registered. |
| 03H | Incorrect number of data<br>• The read/write data quantity is not between 1 and the maximum quantity value (defined by each model).<br>• The number of data in the message is not equal to the quantity specified in the write mode. |
| 30H | Incorrect register number (High-level)<br>• The register number being accessed has not been registered. |
| 31H | Limited access<br>• Access to the specified register is not permitted. |
| 32H | Outside setting range<br>The data write value exceeds the upper/lower range. |
| 33H | Data consistency error<br>• Attempted to access a register in a range reserved for multiple register access.<br>• Attempted to access multiple registers which exceeds register group. |
| 34H | Condition error<br>• The contents of a command message cannot be processed because of a register specification condition. |
| 35H | Contention error<br>• Cannot process while another process is in progress (other channel may have priority). |