Siemens AG

SIMATIC S7 3964(R)/ RK512 Driver

Introduction

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

In this manual, the connection procedure will be described by following the below sections:
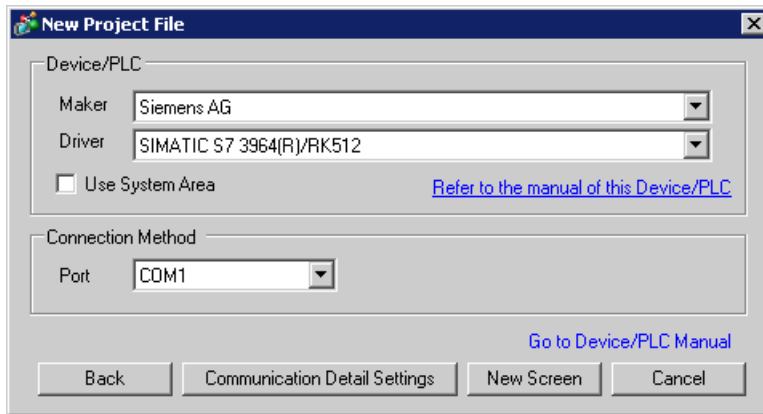
1	System Configuration This section shows the types of External Devices which can be connected and SIO type.	"1 System Configuration" (page 4)

2	Selection of External Device Select a model (series) of External Device to be connected and connection method.	"2 Selection of External Device" (page 5)

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

4	Setup Items This section describes communication setup items on the Display. Set communication settings of the Display with GP-Pro EX or in off-line mode.	"4 Setup Items" (page 12)

5	Cable Diagram This section shows cables and adapters for connecting the Display and the External Device.	"5 Cable Diagram" (page 17)

Operation

1   System Configuration

The system configuration in the case when the External Device of Siemens AG and the Display are connected is shown.

Series	CPU Module	Link I/F	SIO Type	Setting Example	Cable Diagram
SIMATIC S7-300 Series	CPU312IFM CPU313 CPU314 CPU314IFM CPU315 CPU315-2 DP CPU316 CPU316-2 DP CPU318-2	CP341 (RS232C)	RS232C	Setting Example 1 (page 6)	Cable Diagram 1 (page 19)
		CP341 (RS422/485)	RS422/485 (4wire)	Setting Example 2 (page 9)	Cable Diagram 2 (page 20)
SIMATIC S7-400 Series	CPU412-1 CPU412-2 DP CPU413-1 CPU413-2 DP CPU414-1 CPU414-2 DP CPU414-3 DP CPU416-1 CPU416-2 DP CPU416-3 DP CPU417-4	CP441-2	RS232C	Setting Example 1 (page 6)	Cable Diagram 1 (page 19)
			RS422/485 (4wire)	Setting Example 2 (page 9)	Cable Diagram 2 (page 20)

2　　Selection of External Device

Select the External Device to be connected to the Display.

Setup Items	Setup Description
Maker	Select the maker of the External Device to be connected. Select "Siemens AG".
Driver	Select a model (series) of the External Device to be connected and connection method. Select "SIMATIC S7 3964(R)/RK512". Check the External Device which can be connected in "SIMATIC S7 3964(R)/RK512" in system configuration. ☞ "1 System Configuration" (page 4)
Use System Area	Check this option when you synchronize the system data area of the Display and the device (memory) of the External Device. When synchronized, you can use the ladder program of the External Device to switch the display or display the window on the Display. 　Cf.　GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)" This can be also set with GP-Pro EX or in off-line mode of the Display. 　Cf.　GP-Pro EX Reference Manual "System Area Setting, 5.14.6 Setting Guide of [System Setting Window]" 　Cf.　Maintenance/Troubleshooting "2.14.1 Settings common to all Display models◆System Area Settings"
Port	Select the Display port to be connected to the External Device.

3 Example of Communication Setting

Examples of communication settings of the Display and the External Device, recommended by Pro-face, are shown.

3.1 Setting Example 1

■ Setting of GP-Pro EX

◆ Communication Settings

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

◆ Device Setting

To display the setting screen, click ![] ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

When [Allowable No. of Device/PLCs] is multiple, you can click ![] from [Device-Specific Settings] of [Device/PLC Settings] to add External Device which is available to set.

■ Settings of External Device

(1) Startup "SIMATIC Manager" and create the new project. Set the optional project name and click [OK]. New project is created.

(2) From the menu bar, select [Insert], [Station], [Name of CPU type to use] (ex: [1 SIMATIC 400 Station]) in this order.

(3) [(Name of CPU type to use)] (ex: [SIMATIC 400 (1)]) is created in the project. Double-click [Hardware] of the name of CPU type to use.

(4) When the [HW Config] screen displayed, open [(Name of CPU type to use)], [(RACK type to use)] (ex: [SIMATIC 400], [RACK-400]) in this order from the left tree and select the base unit of the using model.

(5) Drag & drop the selected base unit to the upper right window. The rack figure is created in the window.

(6) Drag & drop the using power unit in the rack.

(7) Similarly, drag & drop the using CPU unit.

(8) When using CPUxxx-xDP, the [Properties - PROFIBUS interface DP] dialog box is displayed. In that case, click [Cancel] and close the dialog box.

(9) Similarly, drag & drop the using link unit.

(10)Double-click the CPU unit dropped in the rack.

(11)When the [MPI port] setting dialog box is displayed, click [Properties].

(12)Click [Properties] as "MPI(1) 187.5 Kbps" is selected as default. The value entered in [Address] this time becomes the Destination Node No. (PLC Address) you set in GP-Pro EX. The default is "2".

(13)To change the speed [Transmission rate] and the highest value of the node No. [Highest MPI address], click the [Network Settings] tab.
Select [187.5Kbps] for [Transmission rate]. To change the highest value of the node No. (Highest MPI address), check [Change] to allow you to select from the list.

(14)When you finish setting, click [OK] and close the dialog box.

(15)Close other dialog boxes similarly.

(16) Select [(Name of CPU type to use)] in the project, and open [Blocks] in the program, then double-click [OB1].

(17) Here, you need to arrange the ladder program. Sample ladder program is shown below.

```
CALL  "P_RCV_RK" , DB7
  EN_R    :=TRUE
  R       :=FALSE
  LADDR   :=256
  DB_NO   :=
  DBB_NO  :=
  L_TYP   :=
  L_NO    :=
  L_OFFSET:=
  L_CF_BYT:=
  L_CF_BIT:=
  NDR     :=
  ERROR   :=
  LEN     :=
  STATUS  :=
```

(18) Next, double-click [Hardware] in the CPU.

(19) Double-click the link unit as the link unit to use is already registered by the previous operation.

(20) To enable the communication between the External Device and the Display, click the [Parameter] button.

(21) The Parameter window is displayed. Select [RK512] from the [Protocol] list box and double-click the [Protocol] image in the window.

(22) When the [Protocol] dialog box is displayed, set in the [RK 512] tab as below.

Setup Items	Setup Description
With Block Check	Check
Use Default Values	Check
Transmission Rate	9600 bps
Stop Bits	1
Parity	Even
Priority	Low

(23) When you finish setting, click [OK] and close the dialog box.

3.2 Setting Example 2

■ Setting of GP-Pro EX

◆ Communication Settings

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

◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

When [Allowable No. of Device/PLCs] is multiple, you can click from [Device-Specific Settings] of [Device/PLC Settings] to add External Device which is available to set.

■ Settings of External Device

(1) Startup "SIMATIC Manager" and create the new project. Set the optional project name and click [OK]. New project is created.

(2) From the menu bar, select [Insert], [Station], [(Name of CPU type to use)] in this order.

(3) [(Name of CPU type to use)] is created in the project. Double-click [Hardware] of the name of CPU type to use.

(4) When the [HW Config] screen displayed, open [(Name of CPU type to use)], [(RACK type to use)] in this order from the left tree and select the base unit of the using model.

(5) Drag & drop the selected base unit to the upper right window. The rack figure is created in the window.

(6) Drag & drop the using power unit in the rack.

(7) Similarly, drag & drop the using CPU unit.

(8) When using CPUxxx-x<u>DP</u>, the [Properties - PROFIBUS interface DP] dialog box is displayed. In that case, click [Cancel] and close the dialog box.

(9) Similarly, drag & drop the using link unit.

(10) Double-click the CPU unit dropped in the rack.

(11) When the [MPI port] setting dialog box is displayed, click [Properties].

(12) Click [Properties] as "MPI(1) 187.5 Kbps" is selected as default. The value entered in [Address] this time becomes the Destination Node No. (PLC Address) you set in GP-Pro EX. The default is "2".

(13) To change the speed [Transmission rate] and the highest value of the node No. [Highest MPI address], click the [Network Settings] tab.
Select [187.5Kbps] for [Transmission rate]. To change the highest value of the node No. (Highest MPI address), check [Change] to allow you to select from the list.

(14) When you finish setting, click [OK] and close the dialog box.

(15) Close other dialog boxes similarly.

(16) Select [(Name of CPU type to use)] in the project, and open [Blocks] in the program, then double-click [OB1].

(17) Here, you need to arrange the ladder program. Sample ladder program is shown below.

```
CALL  "P_RCV_RK" , DB7
  EN_R    :=TRUE
  R       :=FALSE
  LADDR   :=256
  DB_NO   :=
  DBB_NO  :=
  L_TYP   :=
  L_NO    :=
  L_OFFSET:=
  L_CF_BYT:=
  L_CF_BIT:=
  NDR     :=
  ERROR   :=
  LEN     :=
  STATUS  :=
```

(18) Next, double-click [Hardware] in the CPU.

(19) Double-click the link unit as the link unit to use is already registered by the previous operation.

(20) To enable the communication between the External Device and the Display, click the [Parameter] button.

(21) The Parameter window is displayed. Select [RK512] from the [Protocol] list box and double-click the [Protocol] image in the window.

(22) When the [Protocol] dialog box is displayed, set in the [RK 512] tab as below.

Setup Items	Setup Description
With Block Check	Check
Use Default Values	Check
Transmission Rate	9600 bps
Stop Bits	1
Parity	Even
Priority	Low

(23) When connecting CP341/CP441 with RS422/485, double-click the [Interface] tab and select [None] in [Initial State of the Receive Line].

(24) When you finish setting, click [OK] and close the dialog box.

4   Setup Items

Set communication settings of the Display with GP-Pro EX or in off-line mode of the Display.
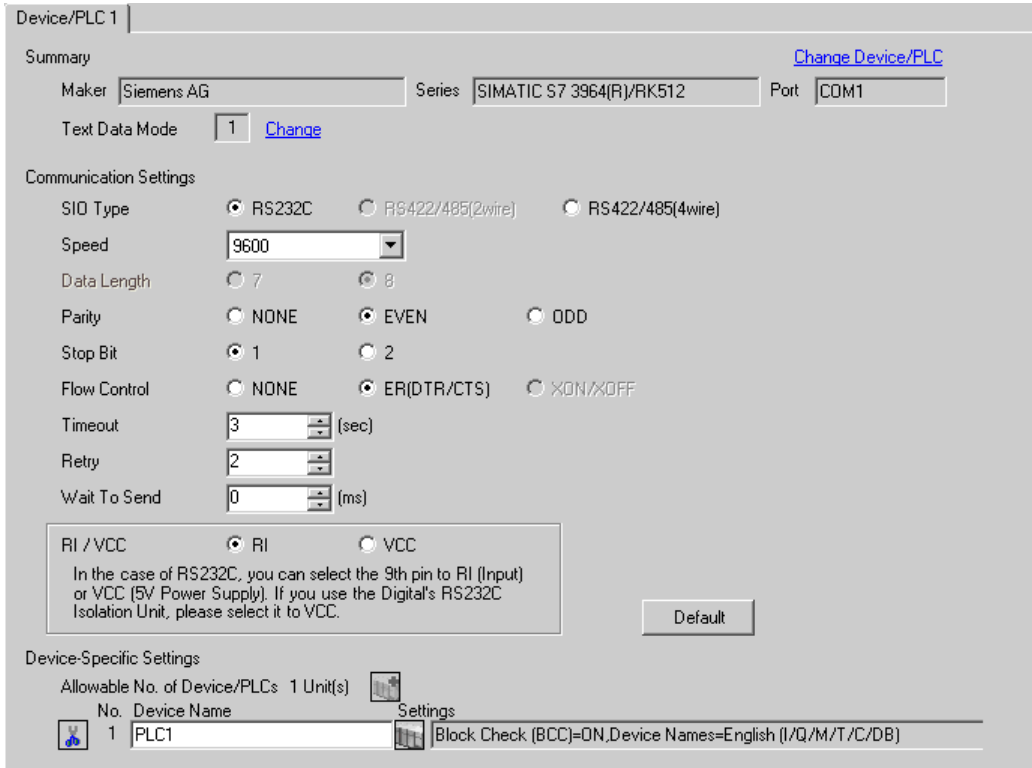
The setting of each parameter must be identical to that of External Device.

)"3 Example of Communication Setting" (page 6)

4.1   Setup Items in GP-Pro EX

■ Communication Settings

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

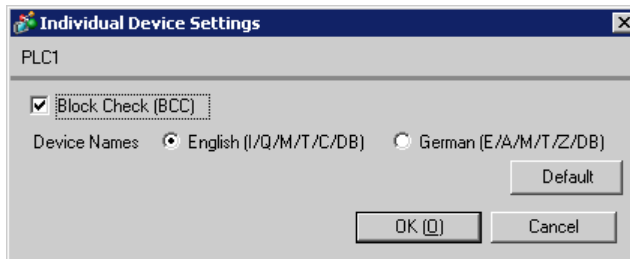| Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device.
Speed	Select speed between the External Device and the Display.
Data Length	Select data length.
Parity	Select how to check parity.
Stop Bit	Select stop bit length.
Flow Control	Select the communication control method to prevent overflow of transmission and reception data.
Timeout	Use an integer from 1 to 127 to enter the time (s) for which the Display waits for the response from the External Device.
Retry	In case of no response from the External Device, use an integer from 0 to 255 to enter how many times the Display retransmits the command.

Setup Items	Setup Description
Wait To Send	Use an integer from 0 to 255 to enter standby time (ms) for the Display from receiving packets to transmitting next commands.
RI/VCC	Switch the 9th pin setting when you select RS232C for SIO type.

■ Device Setting

To display the setting screen, click [ ] ([Setting]) of the External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

When [Allowable No. of Device/PLCs] is multiple, you can click [ ] from [Device-Specific Settings] of [Device/PLC Settings] to add the External Device which is available to set.

Setup Items	Setup Description
Block Check (BCC)	Check to enable the check sum.
Device Names	Select whether the device name is described in English (I/Q/M/T/C/DB) or German (E/A/M/T/Z/DB).

4.2　　　　Setup Items in Off-Line Mode

NOTE | • Please refer to Maintenance/Troubleshooting for more information on how to enter off-line mode
or about operation.
Cf.　Maintenance/Troubleshooting "2.2 Offline Mode"

■ Communication Settings

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

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

◼ 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 Settings].

Comm.	Device	Option		

SIMATIC S7 3964(R)/RK512   [COM1]   Page 1/1

         Device/PLC Name   [PLC1   ▼]

         Block Check (BCC)   [Enable   ▼]

	Exit		Back	2005/09/02 13:03:28

Setup Items	Setup Description
Device/PLC Name	Select the External Device for device setting. Device name is a title of External Device set with GP-Pro EX.(Initial value [PLC1])
Block Check (BCC)	Select [Enable] to enable the check sum.

◼ Option

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 [Option].

| Comm. | Device | Option | | |

SIMATIC S7 3964(R)/RK512   [COM1]   Page 1/1

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.

| | Exit | | Back | 2005/09/02 13:03:31 |

Setup Items	Setup Description
RI/VCC	You can switch RI/VCC of the 9th pin when you select RS232C for SIO type.

5   Cable Diagram

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

- The FG pin of the main body of the External Device must be D-class grounded. Please refer to the manual of the External Device for more details.
- SG and FG are connected inside the Display. When connecting SG to the External Device, design the system not to form short-circuit loop.
- Connect the isolation unit, when communication is not stabilized under the influence of a noise etc..
- When connecting IPC with External Device by RS-232C, the COM port which can be used changes with series. Please refer to the manual of IPC for details.

    Usable port

Series	Usable port
PS-2000B	COM1[*1] , COM2, COM3[*1], COM4
PS-3650A, PS-3651A	COM1[*1]
PS-3700A (Pentium®4-M)	COM1[*1], COM2[*1], COM3[*2] , COM4

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

    *2   It is necessary to set up the SIO type with the Dip switch.

- When connecting to the COM3 of PS-3700A (Pentium®4-M) with External Device, it is necessary to set up the SIO type of COM3 with a Dip switch. Please refer to the manual of PS-3700A (Pentium®4-M) for details.

    Dip switch setting: RS-232C

Dip switch	Setting	Description
1	OFF	Reserve (always OFF)
2	OFF	SIO type of COM3: RS-232C
3	OFF	
4	OFF	Output mode of TX data: Always output
5	OFF	Terminal resistance insertion to TX (220Ω): None
6	OFF	Terminal resistance insertion to RX (220Ω): None
7	OFF	Short-circuit of TXA and RXA: Does not Exist
8	OFF	Short-circuit of TXB and RXB: Does not Exist
9	OFF	Auto Detection: Disable
10	OFF	

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

| Dip switch	Setting	Description
1	OFF	Reserve (always OFF)
2	ON	SIO type of COM3: RS-422/485
3	ON	
4	OFF	Output mode of TX data: Always output
5	OFF	Terminal resistance insertion to TX (220Ω): None
6	OFF	Terminal resistance insertion to RX (220Ω): None
7	OFF	Short-circuit of TXA and RXA: Does not Exist
8	OFF	Short-circuit of TXB and RXB: Does not Exist
9	OFF	Auto Detection: Disable
10	OFF	

Cable Diagram 1

Display (Connection Port)	Cable	Remarks
GP (COM1) IPC[*1*2]	Your own cable	The cable length must be 15m or less.

*1   Usable ports are different by the series.
    ☞Usable port (page 17)

*2   When use the COM3 of PS -3700A (Pentium®4-M) , set the SIO type of COM3 with Dip switch.
    ☞Dip switch setting: RS-232C (page 17)
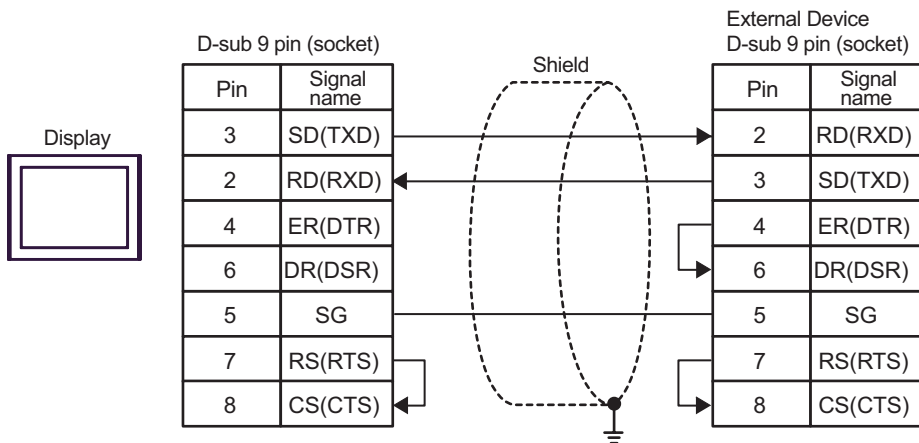
Cable Diagram 2

| Display (Connection Port)		Cable	Remarks
GP[*1] (COM1) AGP-3302B (COM2) IPC[*2] (COM3)	A	Your own cable	Arrange the cable length as below according to the speed.
GP[*3] (COM2)	B	Online adapter by Pro-face CA4-ADPONL-01 + Your own cable	19200 or less: 1000m or less 38400 : 500m or less 115200 : 200m or less

*1   All GP models except AGP-3302B

*2   Only COM3 of PS -3700A (Pentium®4-M) can be used. When use the COM3, set the SIO type of COM3 with Dip switch.

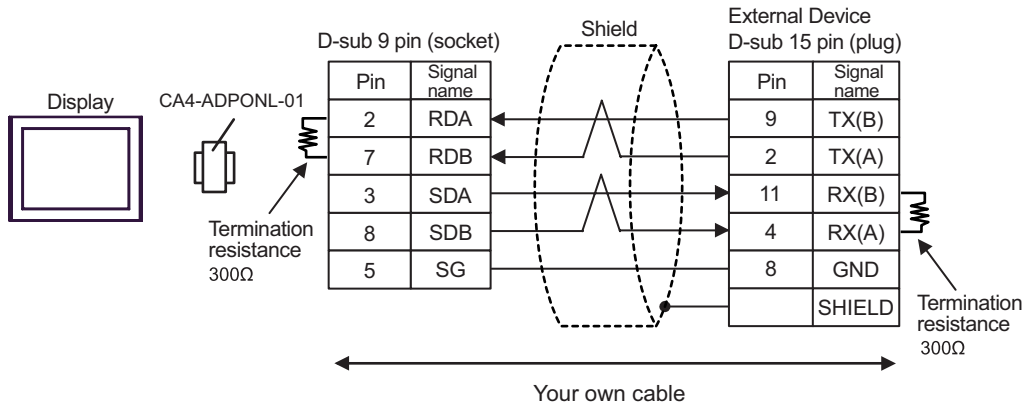☞ Dip switch setting: RS-422/485 (4 wire) (page 18)

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

A) When using your own cable
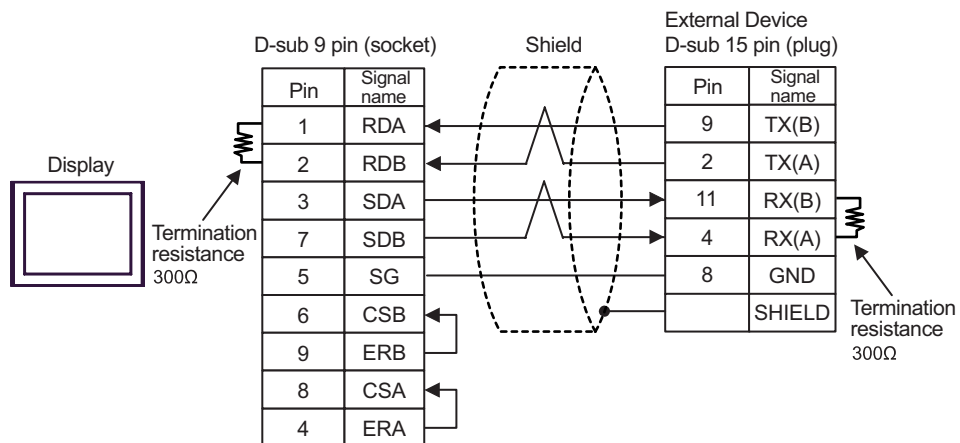
NOTE	• We recommend that the termination resistance should be attached when using the cable in 50m or more length.

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


Your own cable

| NOTE | • We recommend that the termination resistance should be attached when using the cable in 50m or more length. |

6 Supported Device

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

☐☐☐☐☐ This address can be specified as system data area.

Device	Bit Address		Word Address		32 bits	Remarks
	English	German	English	German		
Data Block	DB001.DBX000.0 - DB255.DBX511.7		DB001.DBW000 - DB255.DBW510			÷2 [*1]
Input	I000.0 - I127.7	E000.0-E127.7	IW000 - IW126	EW000-EW126		÷2 [*2]
Output	Q000.0 - Q127.7	A000.0-A127.7	QW000 - QW126	AW000 - AW126	L / H	÷2 [*2]
Internal Marker	M000.0 - M255.7		MW000 - MW254			÷2 [*2]
Timer	-----		T000 - T255			[*2]
Counter	-----		C000 - C255	Z000 - Z255		[*2]

*1   When you write the bit address, the Display reads the word address corresponding to that of the External Device first. Change only the target bit address among the word data once read, and write the word data to the External Device.
Note that the correct data may not be written if you change the word address value in the ladder program while the Display reads the data of the External Device and writes it to the External Device.

*2   Write disable

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

7   Device Code and Address Code

Use device code and address code when you select "Device Type & Address" for the address type in data displays.

Device	Word Address		Device Code (HEX)	Address Code
	English	German		
Data Block	DB	DB	0000	(Data Block No. x 0x10000) + Value of (word address divided by 2)
Input	I	E	0080	Value of word address divided by 2
Output	Q	A	0081	Value of word address divided by 2
Internal Marker	M	M	0082	Value of word address divided by 2
Timer	T	T	0060	Word Address
Counter	C	Z	0061	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 No.
Device Name	Name of the External Device where error occurs. Device name is a title of the External Device set with GP-Pro EX. (Initial value [PLC1])
Error Message	Displays messages related to the error which occurs.
Error Occurrence Area	Displays IP address or device address of the External Device where error occurs, or error codes received from the External Device. **NOTE** • IP address is displayed such as "IP address(Decimal): MAC address(Hex)". • Device address is diplayed such as "Address: Device address". • Received error codes are displayed such as "Decimal[Hex]".

Display Examples of Error Messages

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

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