Siemens AG

SIMATIC S5 CPU Direct Driver

PREFACE

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. | ☞ System Configuration (page 3) |

| 2 | Selection of External Device
Select a model (series) of the External Device to be connected and connection method. | ☞ Selection of External Device (page 6) |

| 3 | Example of Communication Settings
This section shows setting examples for communicating between the Display and the External Device. | ☞ Example of Communication Setting (page 7) |

| 4 | Setup Items
This section describes communication setup items on the Display.
Set communication settings of the Display with GP-Pro EX or in off-line mode. | ☞ Setup Items (page 8) |

| 5 | Cable Diagram
This section shows cables and adapters for connecting the Display and the External Device. | ☞ Cable Diagram (page 13) |

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 Name	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
Series 90U-115U	CPU 90U CPU 95U CPU 100 CPU 102 CPU 103 CPU 941 CPU 942 CPU 943 CPU 944	PG port on CPU	RS232C	Setting Example 1 (page 7)	Cable Diagram 1 (page 13)
Series 135U/155U	CPU 922 CPU 928 CPU 928B	PG port on CPU	RS232C		

■ Connection Configuration

[1:1 Connection]

CA6-CBLTTL/5M-01
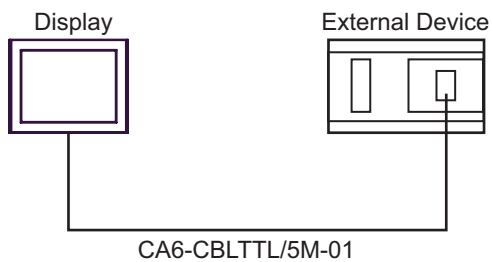
■ COM Port of IPC

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

Usable port

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

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

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

Dip switch setting: RS-232C

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

*1   It is necessary to turn ON the set value, only when using PS-3450A and PS-3451A.
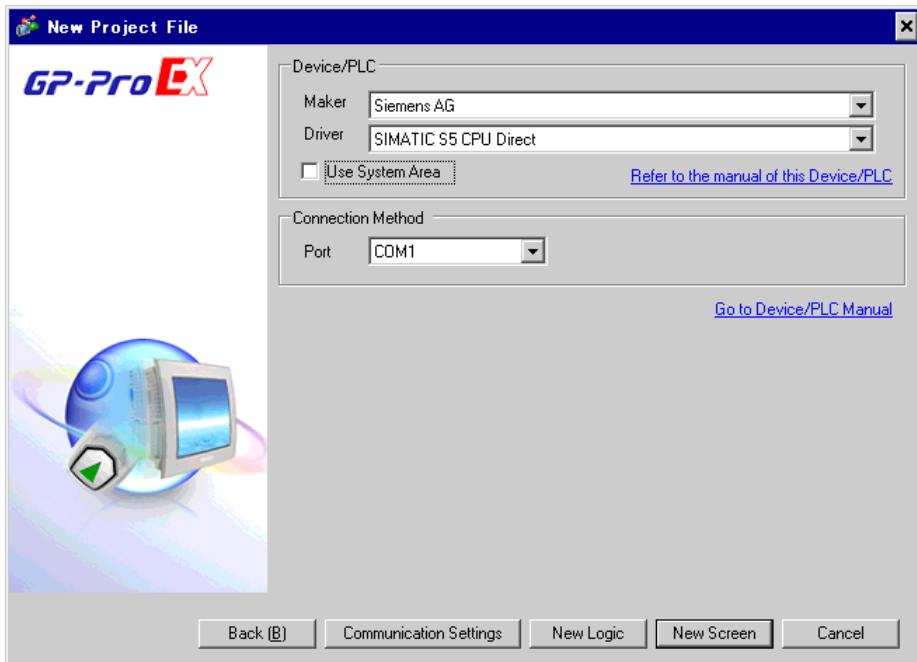
Dip switch setting: RS-422/485 (4 wire)

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

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

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

2 Selection of External Device

Select the External Device to be connected to the Display.

Setup Items	Setup Description
Maker	Select the maker of the External Device to be connected. Select "Siemens AG".
Driver	Select a model (series) of the External Device to be connected and connection method. Select "SIMATIC S5 CPU Direct". Check the External Device which can be connected in "SIMATIC S5 CPU Direct" in system configuration.)System Configuration (page 3)

Use System Area	Check this option when you synchronize the system data area of the Display and the device (memory) of the External Device. When synchronized, you can use the ladder program of the External Device to switch the display or display the window on the Display.
	  Cf. GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)"
	This can be also set with GP-Pro EX or in off-line mode of the Display.
	  Cf. GP-Pro EX Reference Manual " 5.14.6 Setting Guide of [System Setting Window]■[Main Unit Settings] Settings Guide◆System Area Setting"
	  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 Digital
Electronics Corp., are shown.

3.1   Setting Example 1

■ Settings of GP-Pro EX

◆ ◆Communication Settings

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

◆ ◆Device Setting

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

■ Settings of External Device

The communication setting of the External Device is fixed.
You need not set it.

4　　　Setup Items

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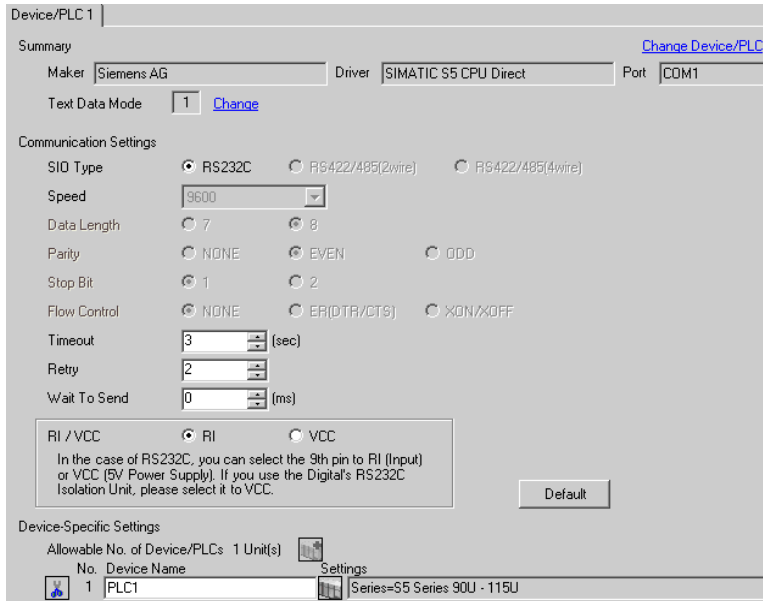
The setting of each parameter must be identical to that of External Device.

)Example of Communication Setting (page 7)

4.1　　　Setup Items in GP-Pro EX

■ Communication Settings

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

Setup Items	Setup Description
SIO Type	Displays the SIO type to communicate with the External Device.
Speed	Displays the communication speed between the External Device and the Display.
Data Length	Displays data length.
Parity	Displays how to check parity.
Stop Bit	Displays stop bit length.
Flow Control	Displays the communication control method to prevent overflow of transmission and reception data.
Timeout	Use an integer from "1 to 127" to enter the time (s) for which the Display waits for the response from the External Device.
Retry	In case of no response from the External Device, use an integer from "0 to 255" to enter how many times the Display retransmits the command.
Wait To Send	Use an integer from "0 to 255" to enter standby time (ms) for the Display from receiving packets to transmitting next commands.
RI/VCC	You can switch RI/VCC of the 9th pin if you select RS232C for SIO type. It is necessary to change RI/5V by changeover switch of IPC when connect with IPC. Please refer to the manual of the IPC for more detail.

■ Device Setting

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

Setup Items	Setup Description
Series	Select a model of the External Device.

4.2　　　　Settings 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 Equipment Settings] in the off-line mode. Touch the External Device you want to set from the displayed list.

Comm.	Device	Option		

SIMATIC S5 CPU Direct　　　　　　　　　　　[COM1]　　　　Page 1/1

```
        SIO Type        RS232C
        Speed           9600
        Data Length     8
        Parity          EVEN
        Stop Bit        1
        Flow Control    NONE

        Timeout(s)                        3  ▼ ▲
        Retry                             2  ▼ ▲
        Wait To Send(ms)                  0  ▼ ▲
```

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

Comm.	Device	Option		

SIMATIC S5 CPU Direct   [COM1]   Page 1/1

       Device/PLC Name   PLC1   ▼

          Series   S5 90U-115U

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Setup Items	Setup Description
Device/PLC Name	Select the External Device to set. Device name is a title of the External Device set with GP-Pro EX. (Initial value [PLC1])
Series	Display a model of the External Device.

◼ Option

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Equipment Settings].

Touch the External Device you want to set from the displayed list, and touch [Option].

Comm.	Device	Option		

SIMATIC S5 CPU Direct   [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.

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Setup Items	Setup Description
RI/VCC	You can switch RI/VCC of the 9th pin if you select RS232C for SIO type. It is necessary to change RI/5V by changeover switch of IPC when connect with IPC. Please refer to the manual of the IPC for more detail.

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..

Cable Diagram 1

Display (Connection Port)	Cable	Remarks
GP (COM1) IPC[*1] PC/AT	SIEMENS TTY converter cable by Pro-face CA6-CBLTTL/5M-01 (5m)	

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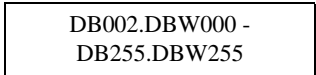)■ COM Port of IPC (page 4)
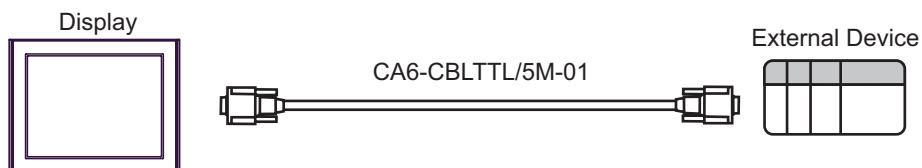
6   Supported Device

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

6.1   Series 90U-115U

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

Device	Bit Address	Word Address	32 bit	Remarks
Input Relay	I000.0 - I127.7	IW000 - IW126		÷2
Output Relay	Q000.0 - Q127.7	QW000 - QW126	H／L	÷2
Internal Relay	F000.0 - F255.7	FW000 - FW254		÷2
Timer	-	T000 - T255	L／H	
Counter	-	C000 - C255		
Data Block	DB002.DBX000.00 - DB255.DBX255.15	DB002.DBW000 - DB255.DBW255	H／L	

**NOTE** • Please refer to the GP-Pro EX Reference Manual for system data area.
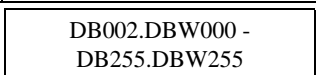
   Cf.   GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)"

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

   ☞ "Manual Symbols and Terminology"

6.2   Series 135U/155U

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

Device	Bit Address	Word Address	32 bit	Remarks
Input Relay	I000.0 - I127.7	IW000 - IW126		÷2
Output Relay	Q000.0 - Q127.7	QW000 - QW126	H／L	÷2
Internal Relay	F000.0 - F255.7	FW000 - FW254		÷2
Timer	-	T000 - T255	L／H	
Counter	-	C000 - C255		
Data Block	DB002.DBX000.00 - DB255.DBX255.15	DB002.DBW000 - DB255.DBW255	H／L	
Extended Data Block	X001.XBX000.00 - X255.XBX255.15	X001.XBW000 - X255.XBW255		

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.

7.1 Series 90U-115U

Device	Device Name	Device Code (HEX)	Address Code
Data Block	DB	0000	Value of (Data Block No. x 0x10000) + word address
Input	I	0080	Value of word address divided by 2
Output	Q	0081	Value of word address divided by 2
Internal Relay	F	0082	Value of word address divided by 2
Timer	T	0060	Word Address
Counter	C	0061	Word Address

7.2 Series 135U/155U

Device	Device Name	Device Code (HEX)	Address Code
Data Block	DB	0000	Value of (Data Block No. x 0x10000) + word address
Extended Data Block	X	0001	Value of (Extended Data Block No. x 0x10000) + word address
Input	I	0080	Value of word address divided by 2
Output	Q	0081	Value of word address divided by 2
Internal Relay	F	0082	Value of word address divided by 2
Timer	T	0060	Word Address
Counter	C	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 displayed such as "Address: Device address". • Received error codes are displayed such as "Decimal[Hex]".

Display Examples of Error Messages

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

NOTE • Please refer to the manual of the External Device for more detail of received error codes.
• Please refer to "If the error is displayed (Error Code List)" in "Maintenance/Troubleshooting Guide" for more detail of the error messages common to the driver.