Hitachi, Ltd.

S10 Series SIO Driver

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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 3)
2	Selection of External Device Select a model (series) of the External Device to be connected and connection method.	☞ "2 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.	☞ "3 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.	☞ "4 Setup Items" (page 17)
5	Cable Diagram This section shows cables and adapters for connecting the Display and the External Device.	☞ "5 Cable Diagram" (page 22)

Operation

1 System Configuration

The system configuration in the case when the External Device of Hitachi, Ltd. and the Display are connected is shown.

Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
S10V	LQP510*1	UP LINK Connector on LPU Module	RS422/485 (4wire)	Setting Example 1 (page 7)	Cable Diagram 1 (page 22)
		LQE560 (CN1)	RS232C	Setting Example 2 (page 8)	Cable Diagram 2 (page 25)
		LQE560 (CN2)	RS232C	Setting Example 3 (page 9)	Cable Diagram 2 (page 25)
		LQE565 (CN1)	RS422/485 (4wire)	Setting Example 4 (page 10)	Cable Diagram 1 (page 22)
		LQE565 (CN2)	RS422/485 (4wire)	Setting Example 5 (page 11)	Cable Diagram 1 (page 22)
HIDIC-S10α	2α (LWP000) *2, 2αE (LWP040) *2, 2αH (LWP070) *2	Terminal Block on CPU Unit	RS422/485 (4wire)	Setting Example 6 (page 12)	Cable Diagram 3 (page 26)
	4α, 4αF	LWE805			
S10mini	Model S (LQP000), Model H (LQP010), Model F (LQP011), Model D (LQP120), Model L (LQP800)	LQE060 (CN1) LQE160 (CN1) LQE560 (CN1)	RS232C	Setting Example 7 (page 13)	Cable Diagram 2 (page 25)
		LQE060 (CN2) LQE160 (CN2) LQE560 (CN2)	RS232C	Setting Example 8 (page 14)	
		LQE165 (CN1) LQE565 (CN1)	RS422/485 (4wire)	Setting Example 9 (page 15)	Cable Diagram 1 (page 22)
		LQE165 (CN2) LQE565 (CN2)	RS422/485 (4wire)	Setting Example 10 (page 16)	

*1 To connect to the Display, a C revision or higher version of the LPU Module is required. Check the alphabet on the right end of the bar code seal (top surface of the LPU Module) for the revision number of the LPU Module.

*2 Connect to the CPU Module's HOST LINK COMPUTER LINK Input/Output Terminal (Upper Calculation I/F).

■ Connection Configuration

- 1:1 connection

■ 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)

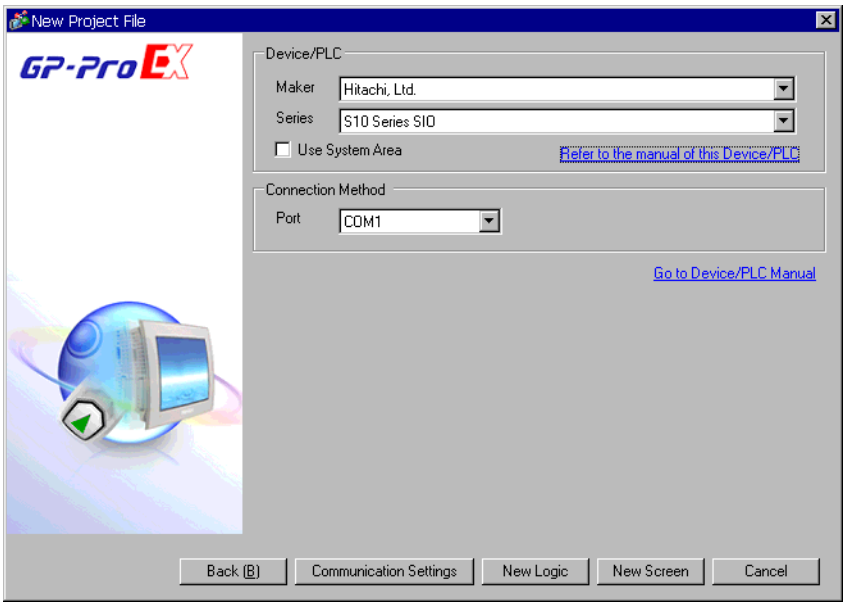
Dip switch	Setting	Description
1	OFF	Reserve (always OFF)
2	ON	SIO type: RS-422/485
3	ON	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	OFF	Short-circuit of SDA (TXA) and RDA (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 "Hitachi, Ltd.".
Series	Select a model (series) of the External Device to be connected and connection method. Select "S10 Series SIO". Check the External Device which can be connected in "S10 Series SIO" in system configuration. ☞ "1 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 (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 " 5.17.6 Setting Guide of [System Setting Window]■[Main Unit Settings] Settings Guide◆System Area Setting" Cf. Maintenance/Troubleshooting "2.15.1 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

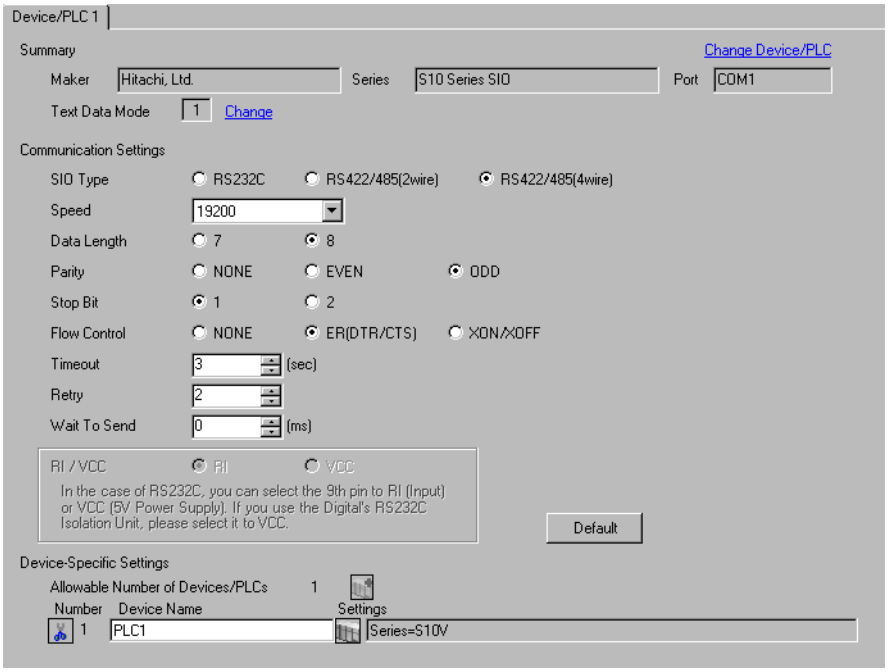
The following shows examples of communication settings of the Display and the External Device, which is recommended by Pro-face.

3.1 Setting Example 1

■ Settings of GP-Pro EX

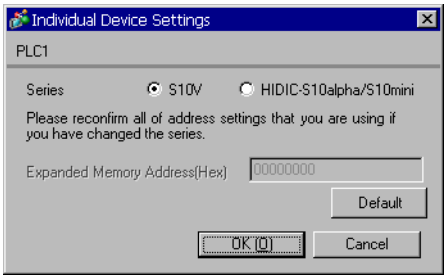
◆ Communication Settings

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

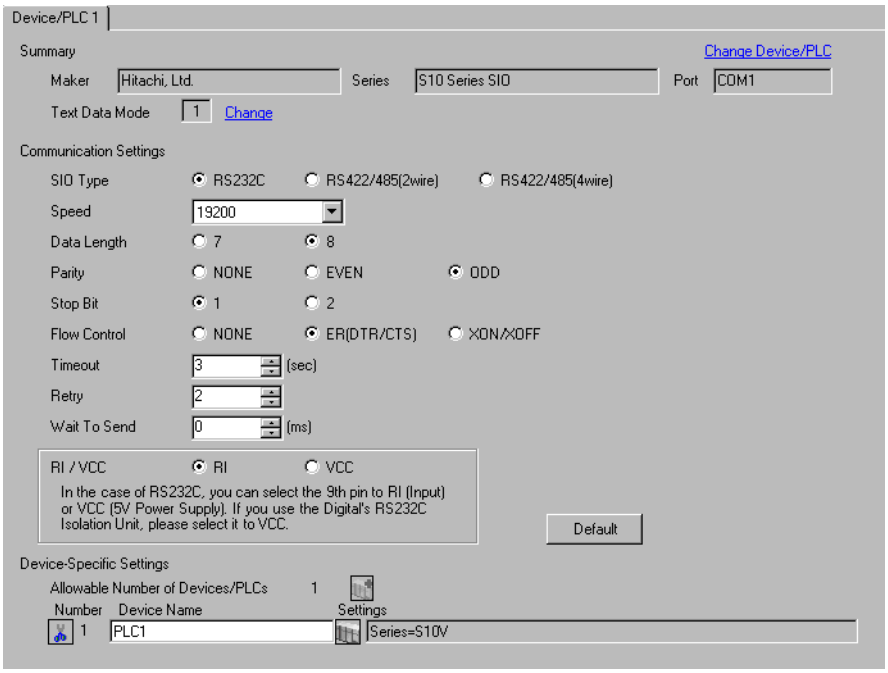
Communication setting of External Device is fixed. No setting is required.

3.2 Setting Example 2

■ Settings of GP-Pro EX

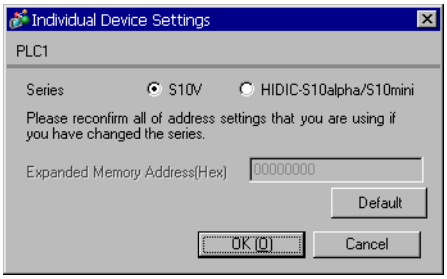
◆ Communication Settings

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

Communication setting of External Device is fixed. No setting is required.

Rotary switch of External Device needs to be set depending on the channel in use.

Set as shown in the table below.

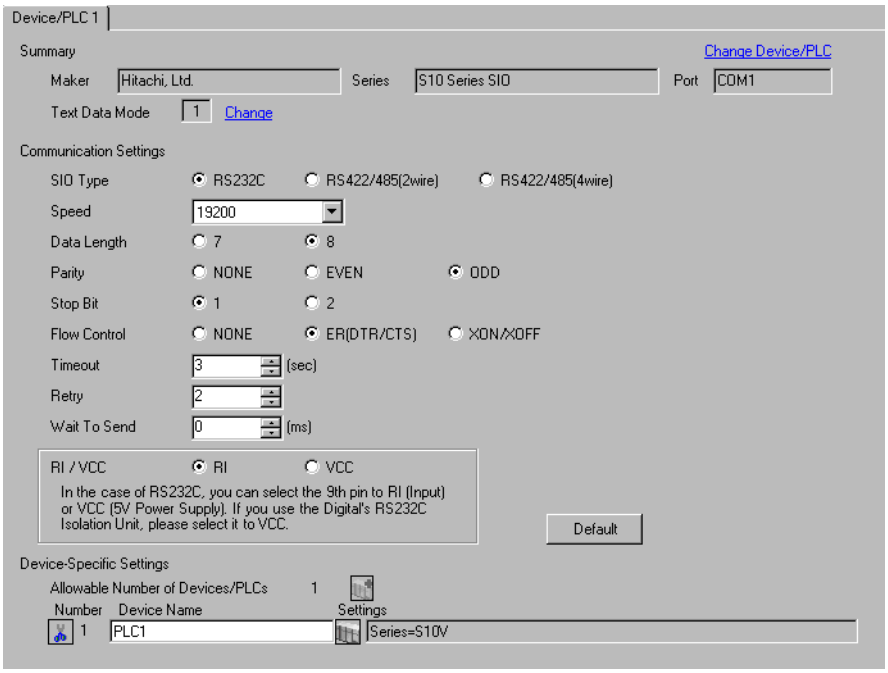
Channel in use	Rotary Switch
	CN1MODU
CN1	8

3.3 Setting Example 3

■ Settings of GP-Pro EX

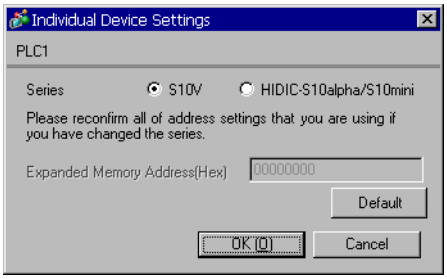
◆ Communication Settings

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

Communication setting of External Device is fixed. No setting is required.

Rotary switch of External Device needs to be set depending on the channel in use.

Set as shown in the table below.

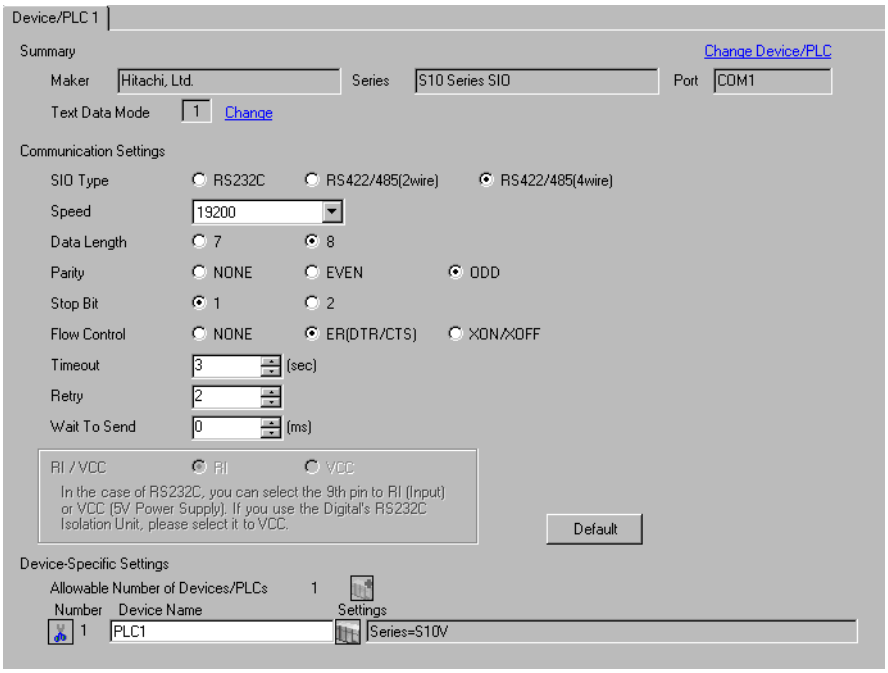
Channel in use	Rotary Switch
	CN2MODU
CN2	9

3.4 Setting Example 4

■ Settings of GP-Pro EX

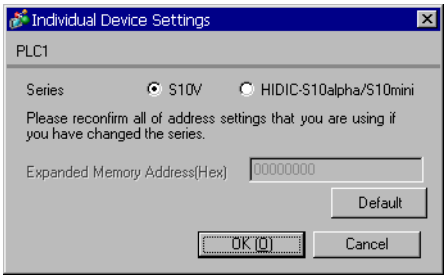
◆ Communication Settings

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

Communication setting of External Device is fixed. No setting is required.

Rotary switch of External Device needs to be set depending on the channel in use.

Set as shown in the table below.

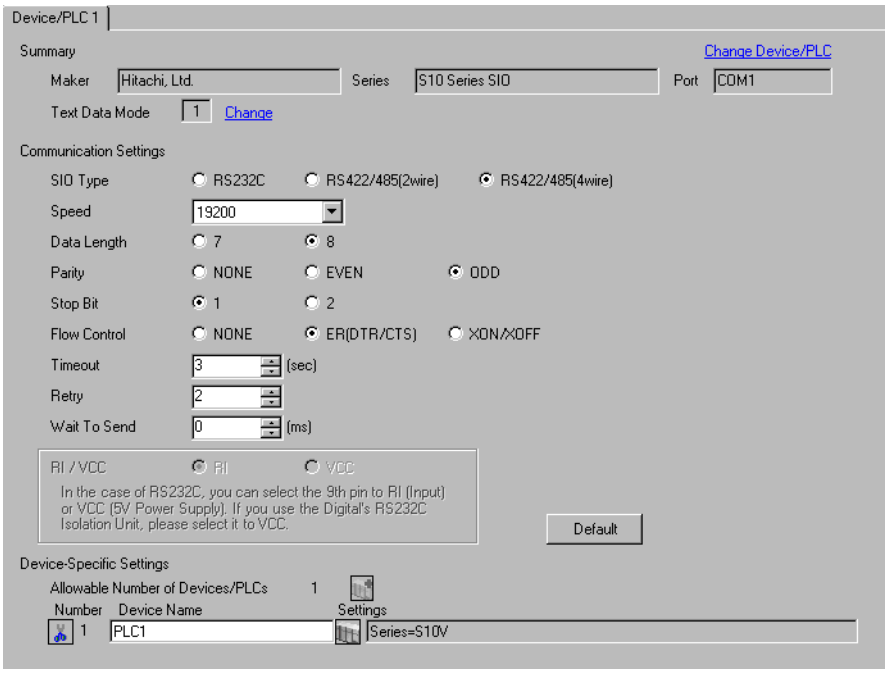
Channel in use	Rotary Switch
	CN1MODU
CN1	8

3.5 Setting Example 5

■ Settings of GP-Pro EX

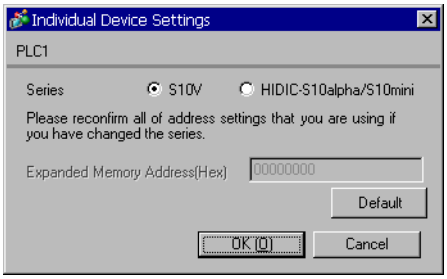
◆ Communication Settings

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

Communication setting of External Device is fixed. No setting is required.

Rotary switch of External Device needs to be set depending on the channel in use.

Set as shown in the table below.

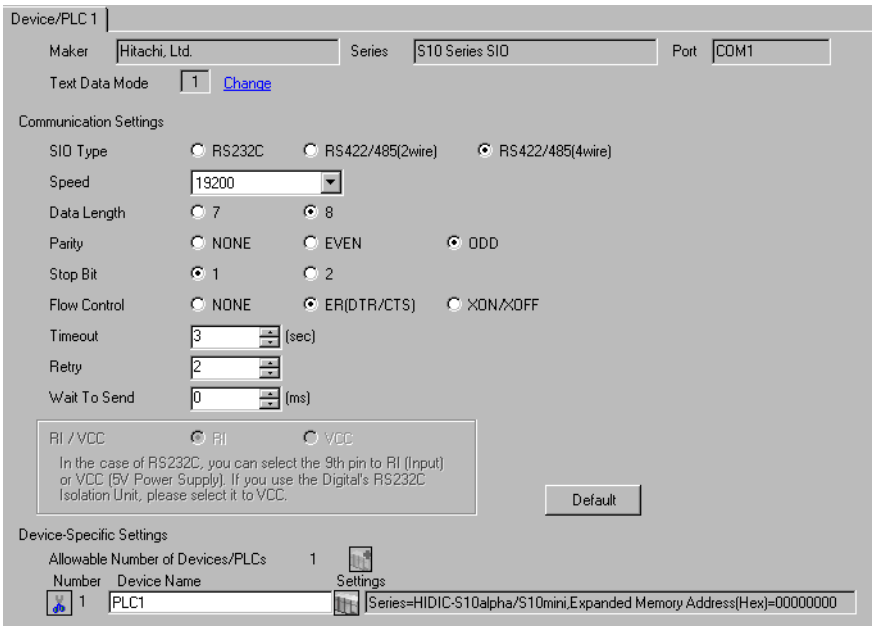
Channel in use	Rotary Switch
	CN2MODU
CN2	9

3.6 Setting Example 6

■ Settings of GP-Pro EX

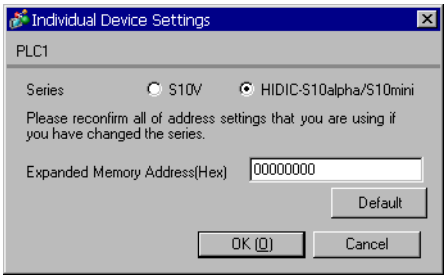
◆ Communication Settings

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

Communication setting of External Device is fixed. No setting is required.

Communication speed differs depending on the External Device in use.

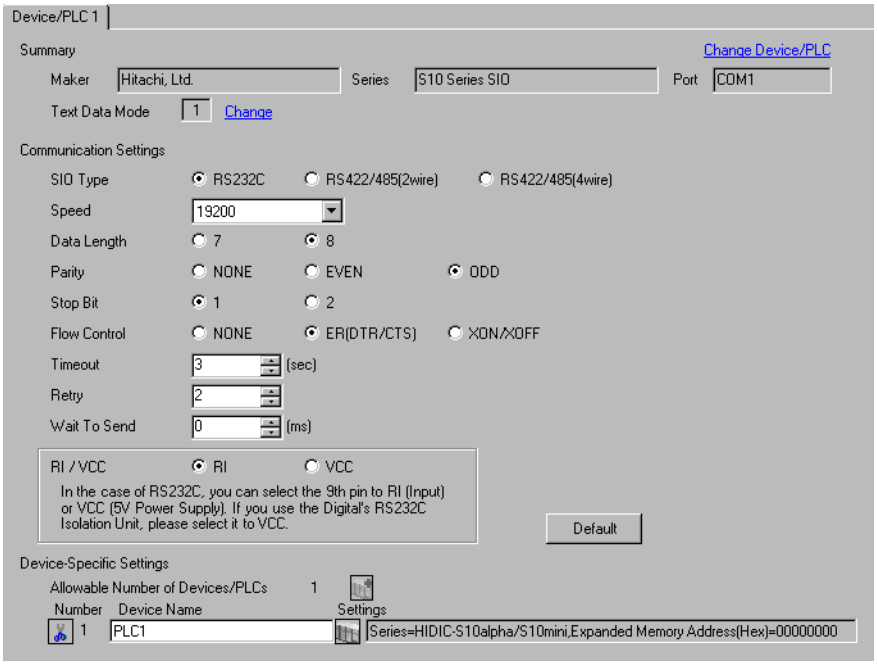
Please refer to the manual of the External Device for more details.

3.7 Setting Example 7

■ Settings of GP-Pro EX

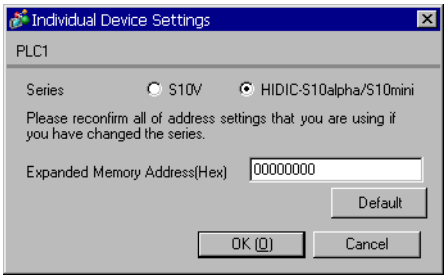
◆ Communication Settings

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

Communication setting of External Device is fixed. No setting is required.

Rotary switch of External Device needs to be set depending on the channel in use.

Set as shown in the table below.

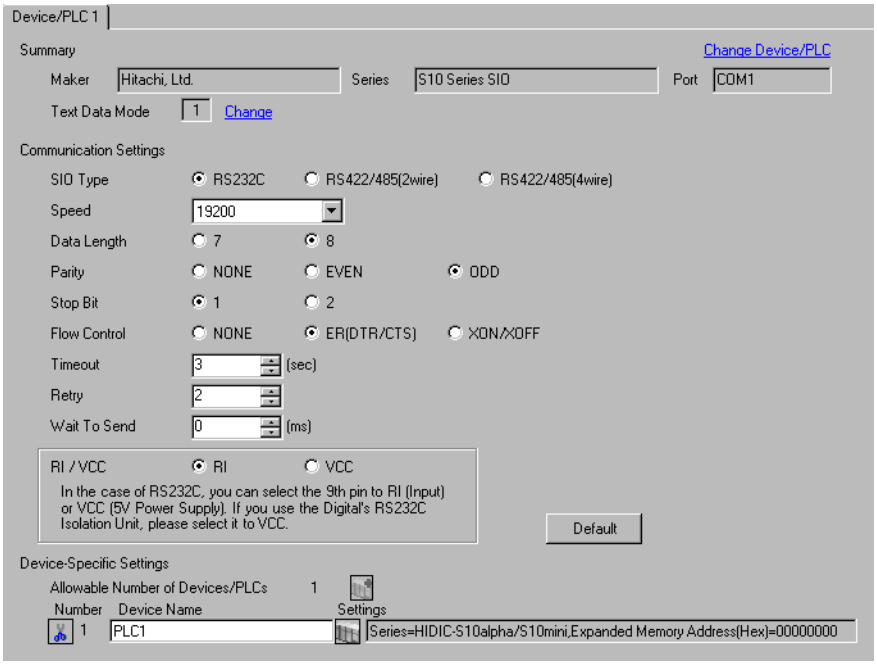
Channel in use	Rotary Switch
	CN1MODU
CN1	8

3.8 Setting Example 8

■ Settings of GP-Pro EX

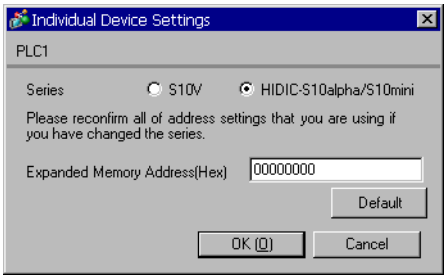
◆ Communication Settings

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

Communication setting of External Device is fixed. No setting is required.

Rotary switch of External Device needs to be set depending on the channel in use.

Set as shown in the table below.

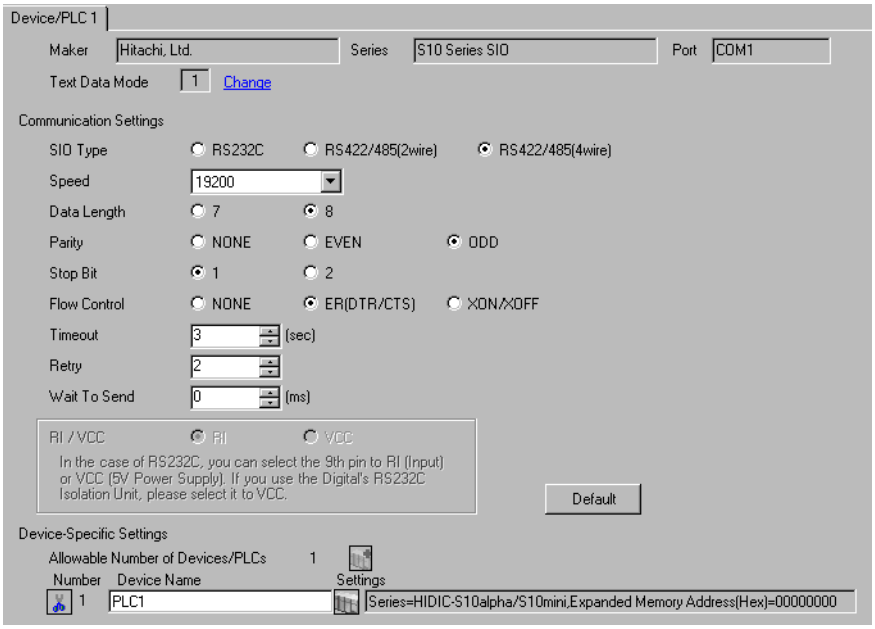
Channel in use	Rotary Switch
	CN2MODU
CN2	9

3.9 Setting Example 9

■ Settings of GP-Pro EX

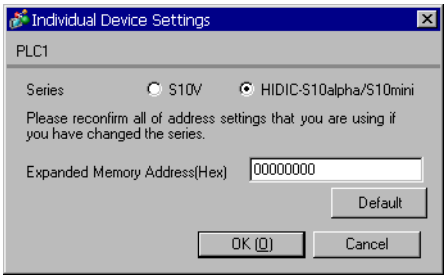
◆ Communication Settings

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

Communication setting of External Device is fixed. No setting is required.

Rotary switch of External Device needs to be set depending on the channel in use.

Set as shown in the table below.

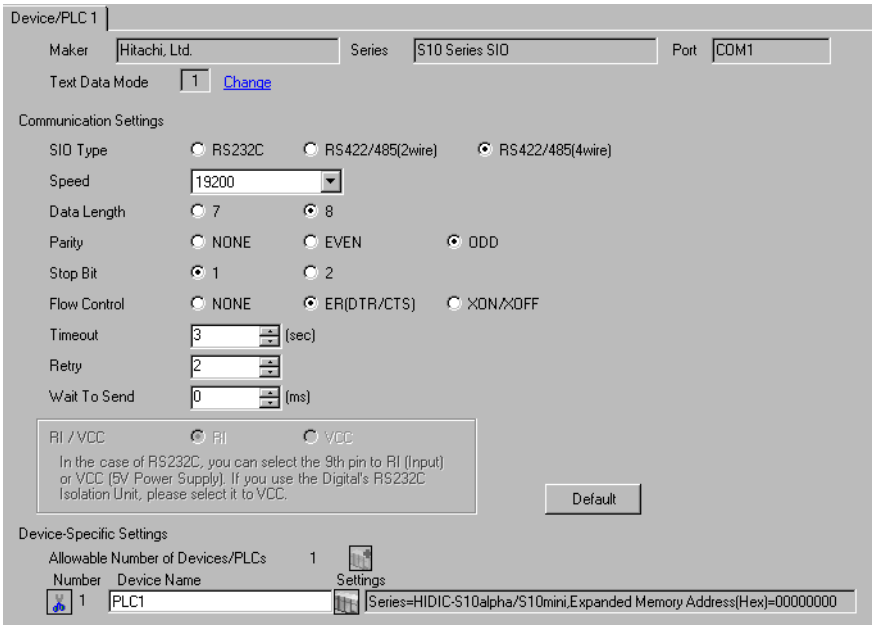
Channel in use	Rotary Switch
	CN1MODU
CN1	8

3.10 Setting Example 10

■ Settings of GP-Pro EX

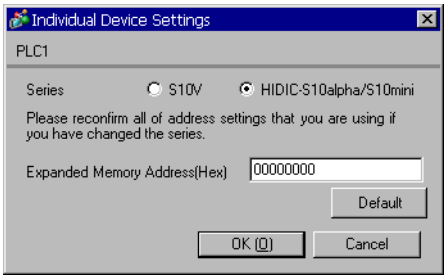
◆ Communication Settings

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

Communication setting of External Device is fixed. No setting is required.

Rotary switch of External Device needs to be set depending on the channel in use.

Set as shown in the table below.

Channel in use	Rotary Switch
	CN2MODU
CN2	9

4 Setup Items

Set communication settings of the Display with GP-Pro Ex or in off-line mode of the Display.

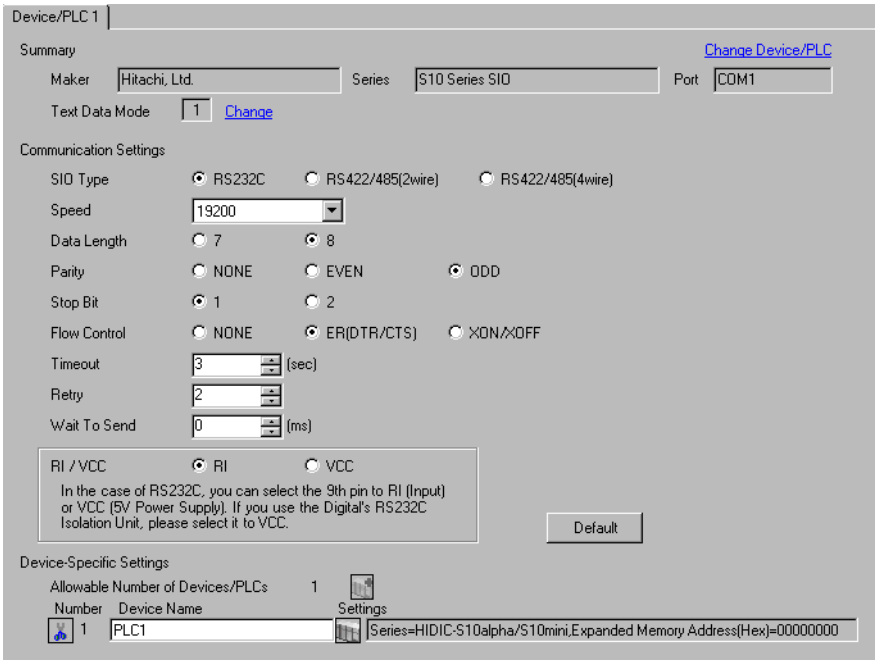
The setting of each parameter must be identical to that of the External Device.

☞"3 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.



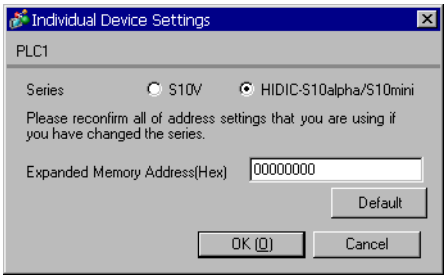
Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device.
Speed	Select the communication speed between the External Device and the Display.
Data Length	Select data length.
Parity	Select how to check parity.
Stop Bit	Select stop bit length.
Flow Control	Select 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.

Continues to the next page.

Setup Items	Setup Description
RI/VCC	You can switch RI/VCC of the 9th pin when you select RS232C for SIO type. When you connect to IPC, you need to use the IPC change switch to change RI/5V. Please refer to the manual of IPC for details.

■ 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 the series of the External Device.
Expanded Memory Address (HEX)	Enter the address of theexpanded memory with "00000000 to FFFFFFFF" (HEX).

4.2 Settings in Off-Line Mode

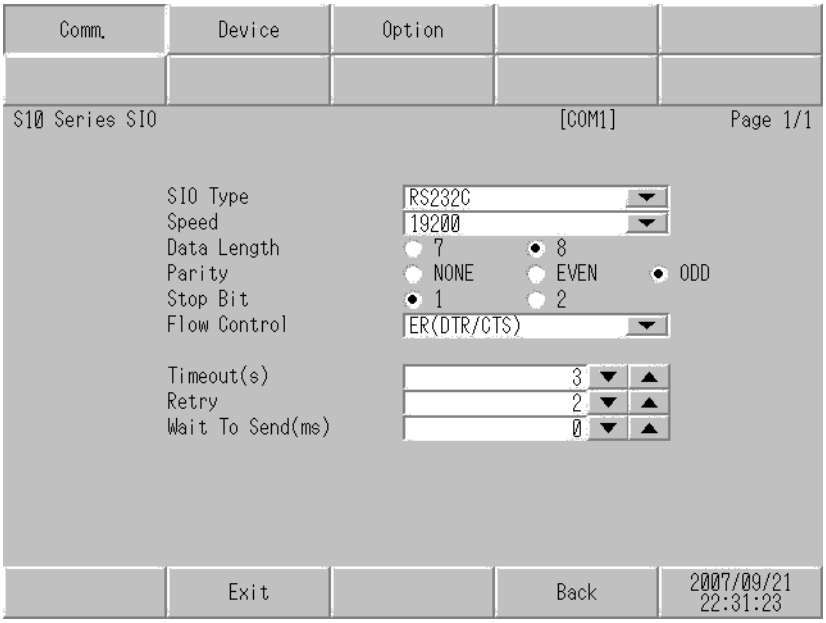
NOTE

- Refer to the Maintenance/Troubleshooting manual for information on how to enter off-line mode or about the operation.

  Cf. Maintenance/Troubleshooting Manual "2.2 Off-line 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.



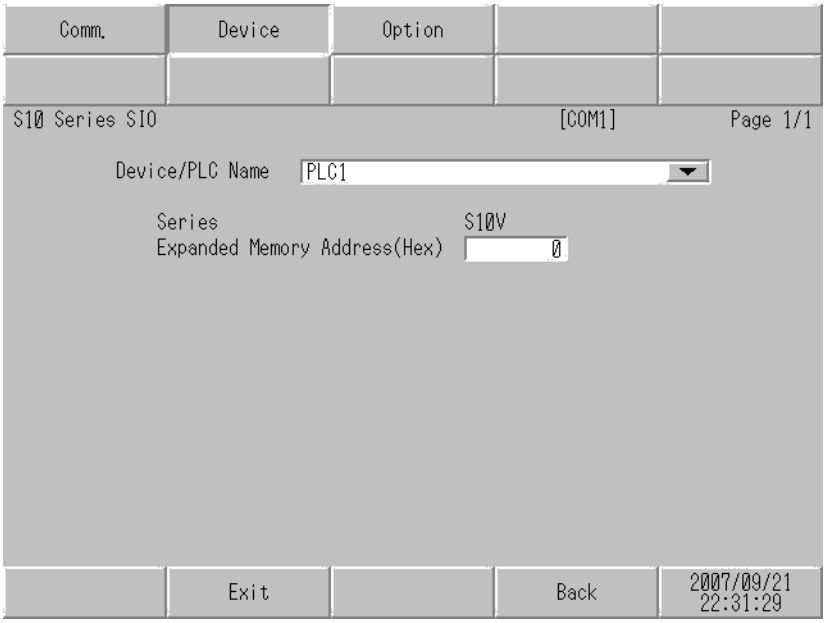
Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device. **IMPORTANT** In the communication setting, confirm the serial interface specifications of the Display and set [SIO Type] correctly. If you select the SIO type the serial interface does not support, we cannot guarantee the operation. Please refer to the manual of the Display for more detail on the serial interface specifications.
Speed	Select the communication 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 (s)	Use an integer from 1 to 127 to enter the time (s) for which the Display waits for the response from the External Device.

Continues to the next page.

Setup Items	Setup Description
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 (ms)	Use an integer from "0 to 255" to enter standby time (ms) for the Display from receiving packets to transmitting next commands.

■ Device Setting

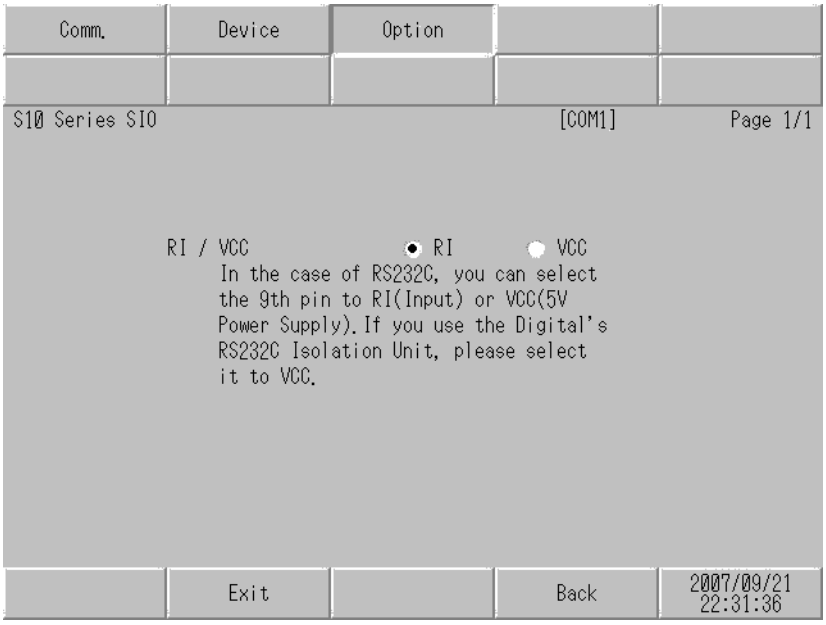
To display the setting screen, touch [Device/PLC Settings] from [Peripheral Equipment Settings]. Touch the External Device you want to set from the displayed list, and touch [Device Settings].



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	Dusplay the series of the External Device.
Expanded Memory Address (HEX)	Enter the address of theexpanded memory with "00000000 to FFFFFFFF" (HEX).

■ 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].



Setup Items	Setup Description
RI/VCC	You can switch RI/VCC of the 9th pin when you select RS232C for SIO type. When you connect to IPC, you need to use the IPC change switch to change RI/5V. Please refer to the manual of IPC for details.

5 Cable Diagram

The cable diagram shown below may be different from the cable diagram recommended by Hitachi, Ltd..
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.
- If the communication is not stable due to the noise or other factors, connect the isolation unit.

Cable Diagram 1

Display (Connection Port)	Cable		Remarks
GP[*1] (COM1) AGP-3302B (COM2) ST[*2] (COM2) IPC[*3]	A	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Connector terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + Your own cable	Cable length: 500m or less
	B	Your own cable	
GP[*4] (COM2)	C	Online adapter by Pro-face CA4-ADPONL-01 + Connector terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + Your own cable	
	D	Online adapter by Pro-face CA4-ADPONL-01 + Your own cable	

*1 All GP models except AGP-3302B

*2 All ST models except AST-3211A

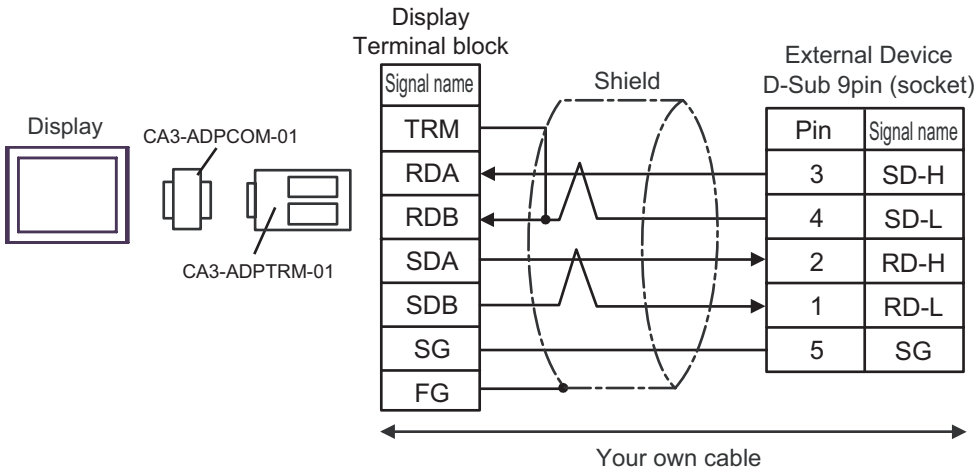
*3 Available to use only the COM ports which can communicate in RS422/485(4 wire).
☞"■ COM Port of IPC" (page 4)

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

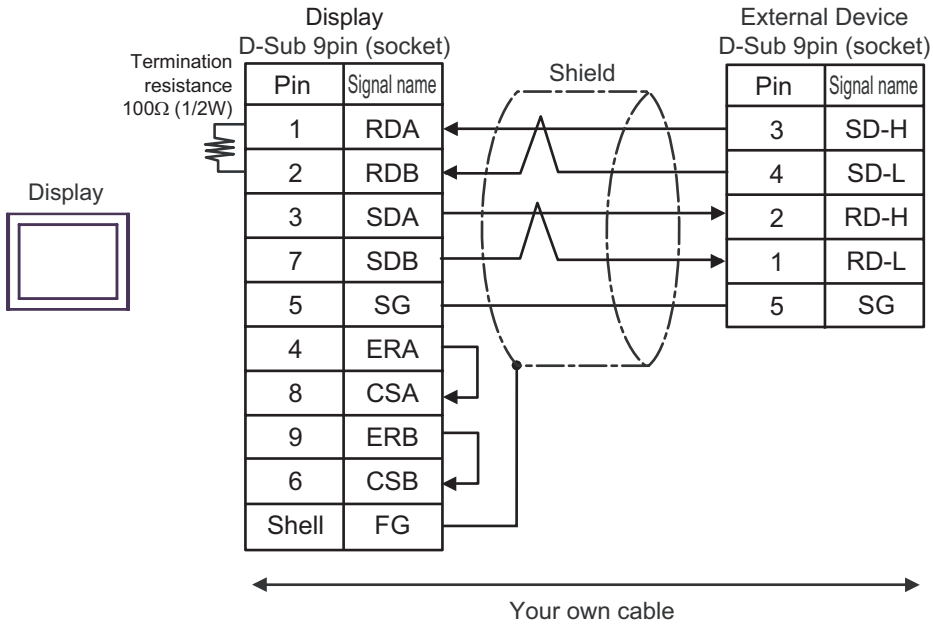
NOTE

- Termination resistance (100Ω) between RD-H and RD-L is incorporated in the LPU module and LQE565 of the External Device.

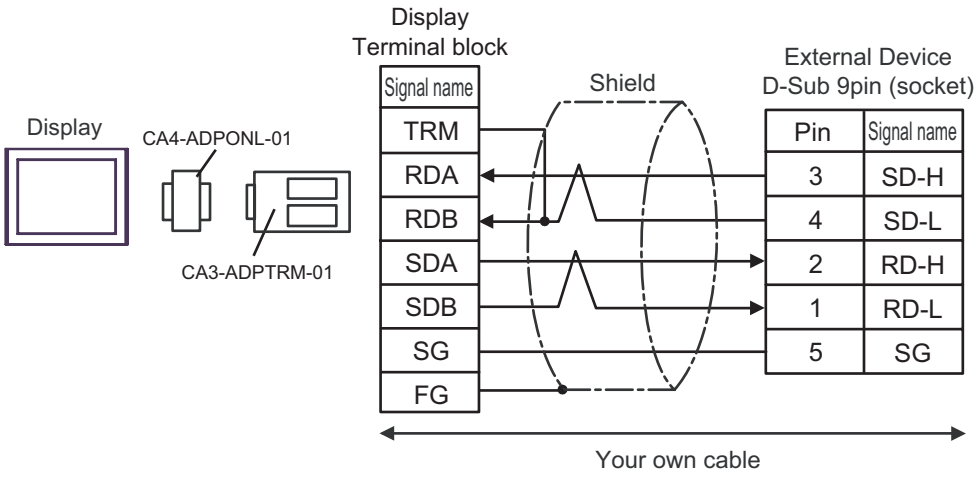
A) When using the COM port conversion adapter (CA3-ADPCOM-01), the connector terminal block conversion adapter (CA3-ADPTRM-01) by Pro-face and your own cable



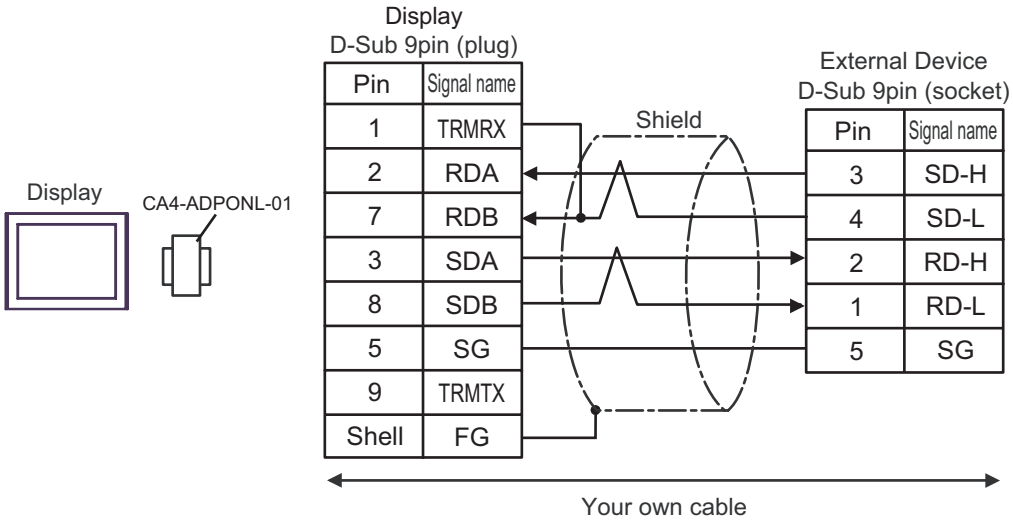
B) When your own cable is used



C) When using the online adapter (CA4-ADPONL-01), the connector terminal block conversion adapter (CA3-ADPTRM-01) by Pro-face and your own cable



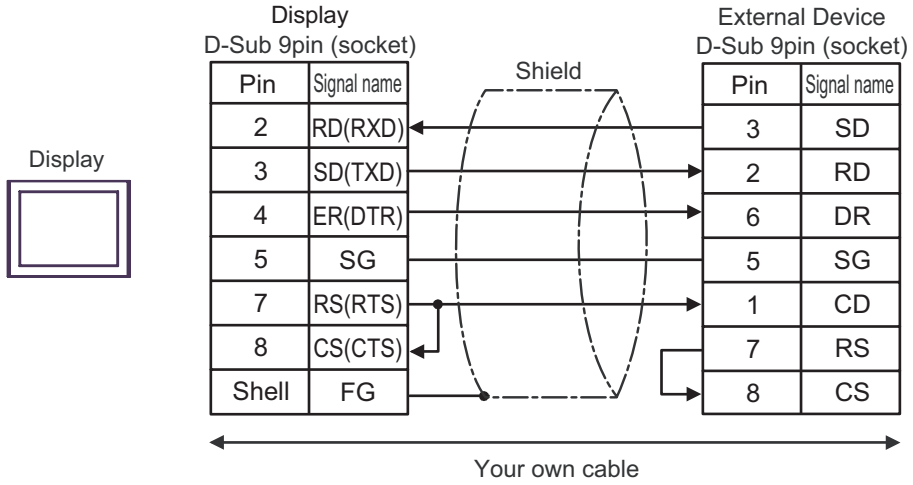
D) When using the online adapter (CA4-ADPONL-01) by Pro-face and your own cable



Cable Diagram 2

Display (Connection Port)	Cable	Remarks
GP (COM1) ST (COM1) IPC*1 PC/AT	Your own cable	Cable length: 15m or less

*1 Available to use only the COM ports which can communicate in RS232C.
☞"■ COM Port of IPC" (page 4)



Cable Diagram 3

Display (Connection Port)	Cable		Remarks
GP[*1] (COM1) AGP-3302B (COM2) ST[*2] (COM2) IPC[*3]	A	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Connector terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + Your own cable	Please refer to the manual of the External Device for cable length.
	B	Your own cable	
GP[*4] (COM2)	C	Online adapter by Pro-face CA4-ADPONL-01 + Connector terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + Your own cable	
	D	Online adapter by Pro-face CA4-ADPONL-01 + Your own cable	

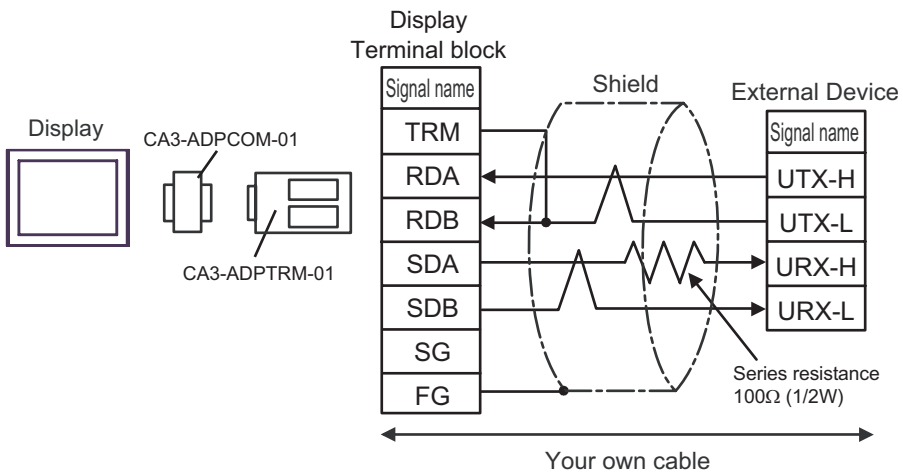
*1 All GP models except AGP-3302B

*2 All ST models except AST-3211A

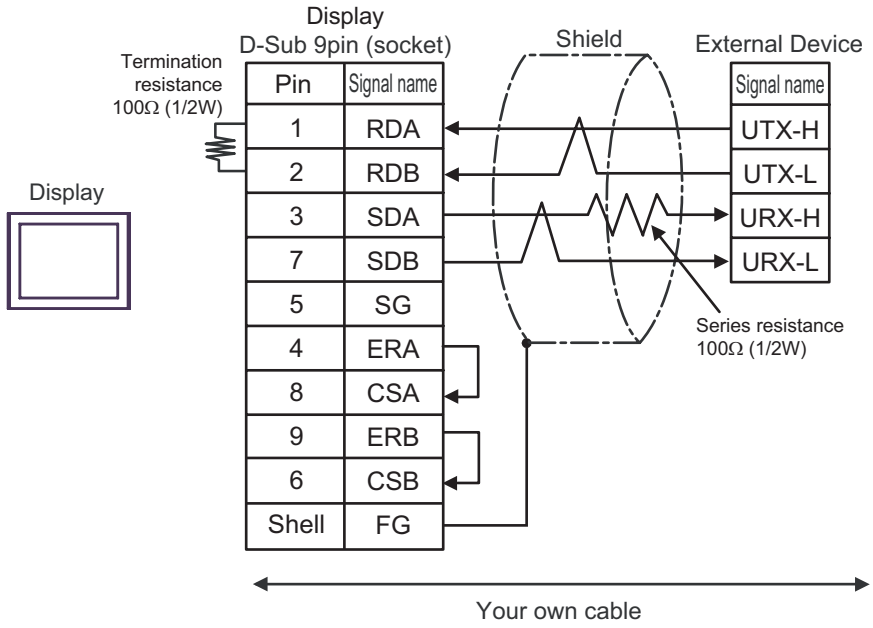
*3 Available to use only the COM ports which can communicate in RS422/485(4 wire).
☞"■ COM Port of IPC" (page 4)

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

A) When using the COM port conversion adapter (CA3-ADPCOM-01), the connector terminal block conversion adapter (CA3-ADPTRM-01) by Pro-face and your own cable



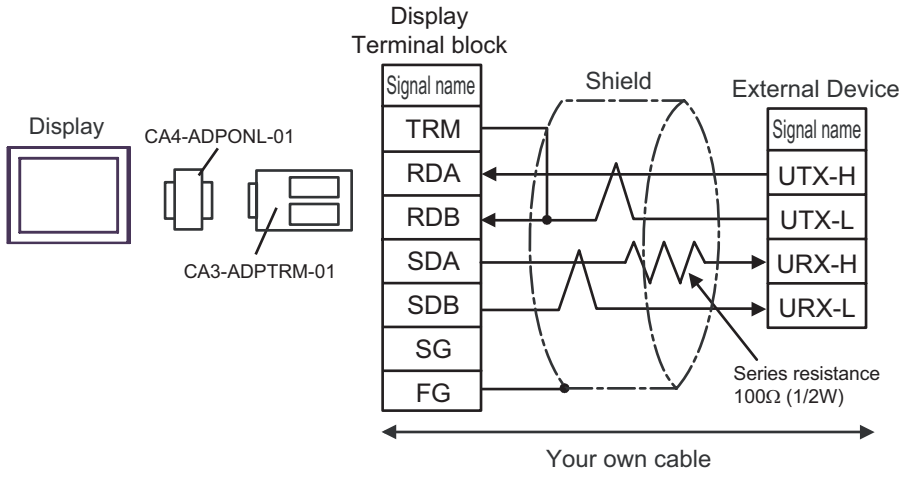
B) When your own cable is used



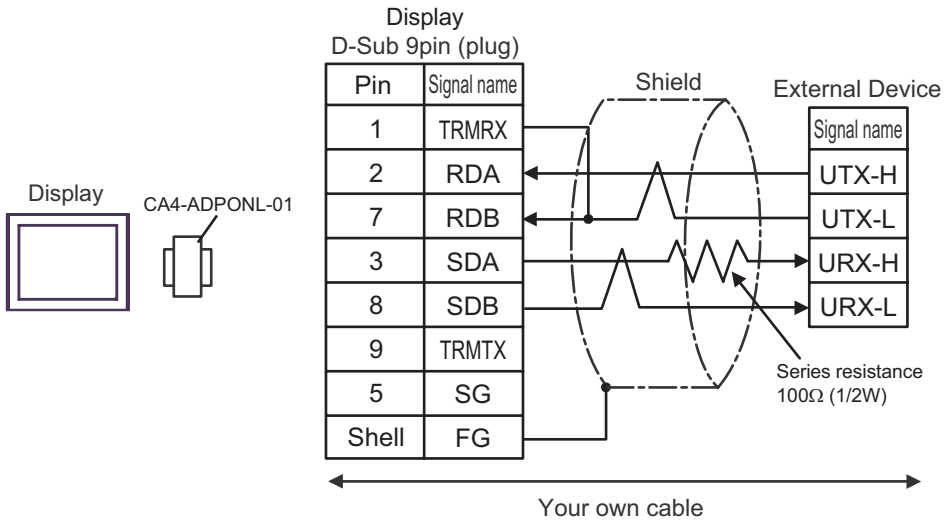
NOTE

- When making your own connections, we recommend using KPEV-SB-3P 0.5mm^2 cable by Hitachi Cable, Ltd..

C) When using the online adapter (CA4-ADPONL-01), the connector terminal block conversion adapter (CA3-ADPTRM-01) by Pro-face and your own cable



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



6 Supported Device

Range of supported device address is shown in the table below. Note that the actually supported range varies depending on the External Device to be used. Please check the actual range in the manual of your External Device.

6.1 S10V Series

: This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
External Input	X000 - XFFF	XW000 - XWFF0		*1
External Output	Y000 - YFFF	YW000 - YWFF0		*1
Internal Register	R000 - RFFF	RW000 - RWFF0		*1
Global Link Register	G000 - GFFF	GW000 - GWFF0		*1
Event Register	E000 - E3FF	EW000 - EW3F0		*1
Event Register	EW400 - EWFFF	EW400 - EWFF0		*1 *2
Keep Relay	K000 - KFFF	KW000 - KWFF0		*1
System Register	S000 - SBFF	SW000 - SWBF0	H / L	*1 *3
On-delay Timer	T000 - T7FF	TW000 - TW7F0		*1 *4
One-shot Timer	U000 - U0FF	UW000 - UW0F0		*1
Up-Down Counter	C000 - C0FF	CW000 - CW0F0		*1
Transfer Register	J000 - JFFF	JW000 - JWFF0		*1
Receive Register	Q000 - QFFF	QW000 - QWFF0		*1
Extended Internal Register	M000 - MFFF	MW000 - MWFF0		*1
Extended Internal Register	A000 - AFFF	AW000 - AWFF0		*1

Continues to the next page.

Device	Bit Address	Word Address	32 bits	Remarks
Timer (Elapsed Value)	-	TC000 - TC1FF	L/H	
Timer (Setup Value)	-	TS000 - TS1FF		
One-shot Timer (Elapsed Value)	-	UC000 - UC0FF		
One-shot Timer (Setup Value)	-	US000 - US0FF		
Counter (Elapsed Value)	-	CC000 - CC0FF		
Counter (Setup Value)	-	CS000 - CS0FF		
Work Register	-	FW000 - FWBFF	H/L	Bit F
Data Register	-	DW000 - DWFFF		Bit F
Work Register	LB0000 - LBFFFF	LBW0000 - LBWFFF0		*** 0
Work Register for Ladder Converter	LR0000 - LR0FFF	LRW0000 - LRW0FF0		*** 0
Work Register for Ladder Converter (Edge)	LV0000 - LV0FFF	LVW0000 - LVW0FF0		*** 0
Work Register for Word	-	LWW0000 - LWWFFFF		Bit F
Work Register for Long Word	-	LLL0000 - LLL1FFF		Bit 31 *5
Work Register for Floating Point	-	LF0000 - LF1FFF		*5 *6
Work Register for Word (Save during power OFF)	-	LXW0000 - LXW3FFF		Bit F
Work Register for Long Word (Save during power OFF)	-	LML0000 - LML1FFF		Bit 31 *5
Work Register for Floating Point (Save during power OFF)	-	LG0000 - LG1FFF		*5 *6
Direct Memory Address*7	-	DM00000000 - DMFFFFFFFE		Bit F ÷ 2

*1 According to External Device specification, the highest bit is "0" and the lowest bit is "15". When the highest bit turns ON, that bit is considered the highest and "32768" is written to that word.

Ex. When writing bit from the Display is "X000(ON)," the External Device's bit device "X000" turns ON. At this time the Display and External Device word device "XW000" become "32768(0x8000)".

*2 The higher and lower bit order will be reversed. When EW400 is turned ON, E40F will be turned ON on the External Device.

*3 Data cannot be written.

*4 If the CPU version is prior to Ver.1, the bit address becomes "T000 to T1FF" and the word address becomes "TW000 to TW1F0."

*5 A 32-bit device.

*6 A float decimal point device (32 bits).

*7 Used to access the memory address of the External Device.

IMPORTANT

- When you access the External Device using the Direct Memory Address, do not access the memory address that the system uses. If you conduct it, an error may occur. For details concerning the address, refer to the manual attached to the External Device.

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 (Direct Access Method)"

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

  ☞ "Manual Symbols and Terminology"

6.2 HIDIC-S10α

: This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
External Input	X000 - XFFF	XW000 - XWFF0		*1
External Output	Y000 - YFFF	YW000 - YWFF0		*1
Intermediate Register	R000 - RFFF	RW000 - RWFF0		*1
Global Link Register	G000 - GFFF	GW000 - GWFF0		*1
Event Register	E000 - E3FF	EW000 - EW3F0		*1
Keep Relay	K000 - KFFF	KW000 - KWFF0		*1
System Register	S000 - SBFF	SW000 - SWBF0	H / L	*1 *2
Timer	T000 - T1FF	TW000 - TW1F0		*1
One Shot	U000 - U0FF	UW000 - UW0F0		*1
Counter	C000 - C0FF	CW000 - CW0F0		*1
Transfer Register	J000 - JFFF	JW000 - JWFF0		*1
Receive Register	Q000 - QFFF	QW000 - QWFF0		*1
Extended Internal Register	M000 - MFFF	MW000 - MWFF0		*1
On-Delay Timer (Elapsed Value)	-	TC000 - TC1FF	L / H	
On-Delay Timer (Setup Value)	-	TS000 - TS1FF		
One Shot Timer (Elapsed Value)	-	UC000 - UC0FF		
One Shot Timer (Setup Value)	-	US000 - US0FF		
Up/Down Counter (Elapsed Value)	-	CC000 - CC0FF		
Up/Down Counter (Setup Value)	-	CS000 - CS0FF		

Continues to the next page.

Device	Bit Address	Word Address	32 bits	Remarks
Function Work Register	-	FW000 - FWBFF	H/L	Bit F
Function Data Register	-	DW000 - DWFFF		Bit F
Extended Register	-	MS000 - MSFFF		Bit F *3
Direct Memory Address*4	-	DM00000000 - DMFFFFFFFE		Bit F ÷ 2

*1 According to External Device specification, the highest bit is "0" and the lowest bit is "15". When the highest bit turns ON, that bit is considered the highest and "32768" is written to that word.

Ex. When writing bit from the Display is "X000(ON)," the External Device's bit device "X000" turns ON. At this time the Display and External Device word device "XW000" become "32768(0x8000)".

*2 Data cannot be written.

*3 In expanded memory in External Device (1 address = 8 bits), 4096 Words can be accessed.
Set top address of expanded memeory to be accessed by "Device Setting."
Refer to the External Device manual for how to set address area for External Device expanded memory.

◆ Accessed Expanded Memory Address
Access Address (The absolute address in External Device) = (1) + (2) + (3)

(1)	Top Address (HEX)	This value is been set in " ■ Device Setting" (page 18).
(2)	100000 (HEX)	Offset value
(3)	Device Address × 2 (HEX)	Since the External Device uses 8 bits for its expanded memory address, this number is doubled.

Ex. When the Top Address is "180000" and the Device Address is "MS1FF".
Then the absolute address in External Device (Access Address) is "180000 + 100000 + 3FE = 2803FE".

NOTE

- An error may occur on the External Device or Display if the area that is being used for programs on the External Device is accessed from the Display.
  We recommend that you set [Expanded Memory Addresses] to an area that is not used by the External Device.

*4 Used to access the memory address of the External Device.

IMPORTANT

- When you access the External Device using the Direct Memory Address, do not access the memory address that the system uses. If you conduct it, an error may occur. For details concerning the address, refer to the manual attached to the External Device.

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 (Direct Access Method)"

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

  ☞ "Manual Symbols and Terminology"

6.3 S10mini Series

: This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
External Input	X000 - XFFF	XW000 - XWFF0	H/L	*** 0 *1
External Output	Y000 - YFFF	YW000 - YWFF0		*** 0 *1
Internal Register	R000 - RFFF	RW000 - RWFF0		*** 0 *1
Global Link Register	G000 - GFFF	GW000 - GWFF0		*** 0 *1
Event Register	E000 - E3FF	EW000 - EW3F0		*** 0 *1
Event Register	EW400 - EWFFF	EW400 - EWFF0		*** 0 *1 *2
Keep Relay	K000 - KFFF	KW000 - KWFF0		*** 0 *1
System Register	S000 - SBFF	SW000 - SWBF0		*** 0 *1 *3
On-Delay Timer	T000 - T1FF	TW000 - TW1F0		*** 0 *1
One Shot Timer	U000 - U0FF	UW000 - UW0F0		*** 0 *1
Up/Down Counter	C000 - C0FF	CW000 - CW0F0		*** 0 *1
Transfer Register	J000 - JFFF	JW000 - JWFF0		*** 0 *1
Receive Register	Q000 - QFFF	QW000 - QWFF0		*** 0 *1
Extended Internal Register	M000 - MFFF	MW000 - MWFF0		*** 0 *1
On-Delay Timer (Elapsed Value)	-	TC000 - TC1FF	L/H	
On-Delay Timer (Setup Value)	-	TS000 - TS1FF		
One Shot Timer (Elapsed Value)	-	UC000 - UC0FF		
One Shot Timer (Setup Value)	-	US000 - US0FF		
Up/Down Counter (Elapsed Value)	-	CC000 - CC0FF		
Up/Down Counter (Setup Value)	-	CS000 - CS0FF		

Continues to the next page.

Device	Bit Address	Word Address	32 bits	Remarks
Work Register	-	FW000 - FWBFF	H/L	Bit F
Data Register	-	DW000 - DWFFF		Bit F
Extended Register	-	MS000 - MSFFF		Bit F *4
Direct Memory Address*5	-	DM00000000 - DMFFFFFFFE		Bit F ÷2

*1 According to External Device specification, the highest bit is "0" and the lowest bit is "15". When the highest bit turns ON, that bit is considered the highest and "32768" is written to that word.

Ex. When writing bit from the Display is "X000(ON)," the External Device's bit device "X000" turns ON. At this time the Display and External Device word device "XW000" become "32768(0x8000)".

*2 The higher and lower bit order will be reversed. When EW400 is turned ON, E40F will be turned ON on the External Device.

*3 Data cannot be written.

*4 In expanded memory in External Device (1 address = 8 bits), 4096 Words can be accessed.
Set top address of expanded memeory to be accessed by "Device Setting."
Refer to the External Device manual for how to set address area for External Device expanded memory.

◆ Accessed Expanded Memory Address
Access Address (The absolute address in External Device) = (1) + (2) + (3)

(1)	Top Address (HEX)	This value is been set in " ■ Device Setting" (page 18).
(2)	100000 (HEX)	Offset value
(3)	Device Address × 2 (HEX)	Since the External Device uses 8 bits for its expanded memory address, this number is doubled.

Ex. When the Top Address is "180000" and the Device Address is "MS1FF".
Then the absolute address in External Device (Access Address) is "180000 + 100000 + 3FE = 2803FE".

NOTE

- An error may occur on the External Device or Display if the area that is being used for programs on the External Device is accessed from the Display.
  We recommend that you set [Expanded Memory Addresses] to an area that is not used by the External Device.

*5 Used to access the memory address of the External Device.

IMPORTANT

- When you access the External Device using the Direct Memory Address, do not access the memory address that the system uses. If you conduct it, an error may occur. For details concerning the address, refer to the manual attached to the External Device.

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 (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 S10V Series

Device	Device Name	Device Code (HEX)	Address Code
External Input	X	0080	Value of word address divided by 0x10
	XW		
External Output	Y	0081	Value of word address divided by 0x10
	YW		
Internal Register	R	0082	Value of word address divided by 0x10
	RW		
Global Link Register	G	0083	Value of word address divided by 0x10
	GW		
Event Register	E	0084	Value of word address divided by 0x10
	EW		
Event Register	EW	0091	Value of word address divided by 0x10
	EW		
Keep Relay	K	0085	Value of word address divided by 0x10
	KW		
System Register	S	0086	Value of word address divided by 0x10
	SW		
On-delay Timer	T	0087	Value of word address divided by 0x10
	TW		
One-shot Timer	U	0088	Value of word address divided by 0x10
	UW		
Up-Down Counter	C	0089	Value of word address divided by 0x10
	CW		
Transfer Register	J	008A	Value of word address divided by 0x10
	JW		
Receive Register	Q	008B	Value of word address divided by 0x10
	QW		
Extended Internal Register	M	008C	Value of word address divided by 0x10
	MW		
Extended Internal Register	A	008D	Value of word address divided by 0x10
	AW		
Timer (Elapsed Value)	TC	0060	Word Address

Device	Device Name	Device Code (HEX)	Address Code
Timer (Setup Value)	TS	0061	Word Address
One-shot Timer (Elapsed Value)	UC	0062	Word Address
One-shot Timer (Setup Value)	US	0063	Word Address
Counter (Elapsed Value)	CC	0064	Word Address
Counter (Setup Value)	CS	0065	Word Address
Work Register	FW	0001	Word Address
Data Register	DW	0000	Word Address
Work Register	LB	008E	Value of word address divided by 0x10
	LBW		
Work Register for Ladder Converter	LR	008F	Value of word address divided by 0x10
	LRW		
Work Register for Ladder Converter (Edge)	LV	0090	Value of word address divided by 0x10
	LVW		
Work Register for Word	LWW	0002	Word Address
Work Register for Long Word	LLL	0003	Word Address
Work Register for Floating Point	LF	0066	Word Address
Work Register for Word (Save during power OFF)	LXW	0004	Word Address
Work Register for Long Word (Save during power OFF)	LML	0005	Word Address
Work Register for Floating Point (Save during power OFF)	LG	0067	Word Address
Direct Memory Address	DM	0007	Value of word address divided by 2

7.2 HIDIC-S10α

Device	Device Name	Device Code (HEX)	Address Code
External Input	X	0080	Value of word address divided by 0x10
	XW		
External Output	Y	0081	Value of word address divided by 0x10
	YW		
Intermediate Register	R	0082	Value of word address divided by 0x10
	RW		
Global Link Register	G	0083	Value of word address divided by 0x10
	GW		
Event Register	E	0084	Value of word address divided by 0x10
	EW		
Keep Relay	K	0085	Value of word address divided by 0x10
	KW		
System Register	S	0086	Value of word address divided by 0x10
	SW		
Timer	T	0087	Value of word address divided by 0x10
	TW		
One Shot	U	0088	Value of word address divided by 0x10
	UW		
Counter	C	0089	Value of word address divided by 0x10
	CW		
Transfer Register	J	008A	Value of word address divided by 0x10
	JW		
Receive Register	Q	008B	Value of word address divided by 0x10
	QW		
Extended Internal Register	M	008C	Value of word address divided by 0x10
	MW		
On-Delay Timer (Elapsed Value)	TC	0060	Word Address
On-Delay Timer (Setup Value)	TS	0061	Word Address
One Shot Timer (Elapsed Value)	UC	0062	Word Address
One Shot Timer (Setup Value)	US	0063	Word Address
Up/Down Counter (Elapsed Value)	CC	0064	Word Address
Up/Down Counter (Setup Value)	CS	0065	Word Address
Function Work Register	FW	0001	Word Address
Function Data Register	DW	0000	Word Address

Continues to the next page.

Device	Device Name	Device Code (HEX)	Address Code
Extended Register	MS	0006	Word Address
Direct Memory Address	DM	0007	Value of word address divided by 2

7.3 S10mini Series

Device	Device Name	Device Code (HEX)	Address Code
External Input	X	0080	Value of word address divided by 0x10
	XW		
External Output	Y	0081	Value of word address divided by 0x10
	YW		
Internal Register	R	0082	Value of word address divided by 0x10
	RW		
Global Link Register	G	0083	Value of word address divided by 0x10
	GW		
Event Register	E	0084	Value of word address divided by 0x10
	EW		
Event Register	EW	0091	Value of word address divided by 0x10
	EW		
Keep Relay	K	0085	Value of word address divided by 0x10
	KW		
System Register	S	0086	Value of word address divided by 0x10
	SW		
On-Delay Timer	T	0087	Value of word address divided by 0x10
	TW		
One Shot Timer	U	0088	Value of word address divided by 0x10
	UW		
Up/Down Counter	C	0089	Value of word address divided by 0x10
	CW		
Transfer Register	J	008A	Value of word address divided by 0x10
	JW		
Receive Register	Q	008B	Value of word address divided by 0x10
	QW		
Extended Internal Register	M	008C	Value of word address divided by 0x10
	MW		
On-Delay Timer (Elapsed Value)	TC	0060	Word Address
On-Delay Timer (Setup Value)	TS	0061	Word Address
One Shot Timer (Elapsed Value)	UC	0062	Word Address
One Shot Timer (Setup Value)	US	0063	Word Address
Up/Down Counter (Elapsed Value)	CC	0064	Word Address
Up/Down Counter (Setup Value)	CS	0065	Word Address

Continues to the next page.

Device	Device Name	Device Code (HEX)	Address Code
Work Register	FW	0001	Word Address
Data Register	DW	0000	Word Address
Extended Register	MS	0006	Word Address
Direct Memory Address	DM	0007	Value of word address divided by 2

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 an 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 that has occurred.
Error Occurrence Area	Displays IP address or device address of the External Device where an 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 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

- Refer to your External Device manual for details on received error codes.
- Refer to "When an error is displayed (Error Code List)" in "Maintenance/Troubleshooting Manual" for details on the error messages common to the driver.