

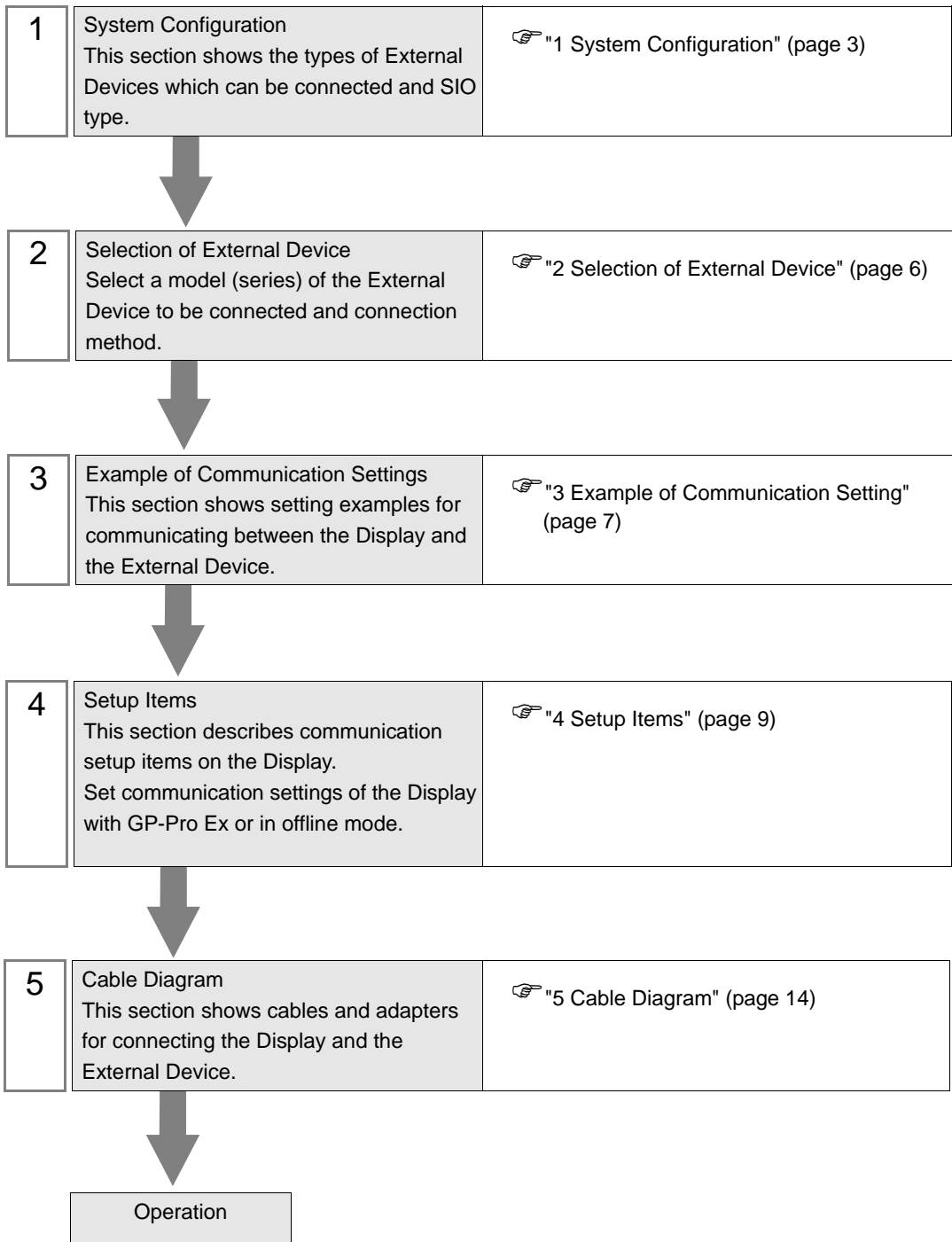
MP Series SIO (Extension) Driver

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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

The system configuration in the case when the External Device of YASKAWA Electric Corporation and the Display are connected is shown.

Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
MP2000	MP2300 MP2200 MP2310 MP2300S	Serial port on 218IF-01	RS232C	"3.1 Setting Example 1" (page 7)	"Cable Diagram 1" (page 14)
		Serial port on 218IF-02	RS232C	"3.1 Setting Example 1" (page 7)	"Cable Diagram 1" (page 14)
		Serial port on 260IF-01	RS232C	"3.1 Setting Example 1" (page 7)	"Cable Diagram 1" (page 14)
		Serial port on 261IF-01	RS232C	"3.1 Setting Example 1" (page 7)	"Cable Diagram 1" (page 14)
		PORT on 217IF-01	RS232C	"3.1 Setting Example 1" (page 7)	"Cable Diagram 1" (page 14)

■ Connection Configuration

- 1:1 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)

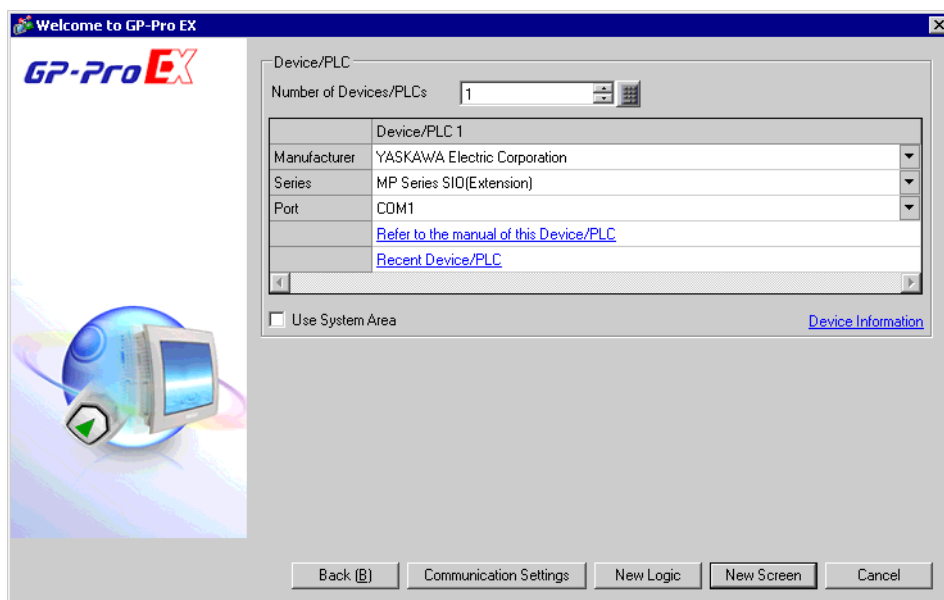
DIP Switch	Setting	Description
1	OFF	Reserved (always OFF)
2	ON	SIO type: RS-422/485
3	ON	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	OFF	Short-circuit of SDA (TXA) and RDA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

Select the External Device to be connected to the Display.



Setup Items	Setup Description
Number of Devices/ PLCs	Enter an integer from 1 to 4 to define the number of Devices/PLCs to connect to the display.
Manufacturer	Select the manufacturer of the External Device to connect. Select "YASKAWA Electric Corporation".
Series	Select the External Device model (series) and the connection method. Select "MP Series SIO (Extension)". In System configuration, make sure the External Device you are connecting is supported by "MP Series SIO (Extension)". ☞ "1 System Configuration" (page 3)
Port	Select the Display port to connect to the External Device.
Use System Area	Check this option to synchronize the system data area of the Display and the device (memory) of the External Device. When synchronized, you can use the External Device's ladder program to switch the display or display the window on the Display. Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)" This feature can also be set in GP-Pro EX or in the Display's offline mode. Cf. GP-Pro EX Reference Manual "System Settings [Display Unit] - [System Area] Settings Guide" Cf. Maintenance/Troubleshooting Guide "Main Unit - System Area Settings"

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

■ Settings of GP-Pro EX

◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

The screenshot shows the 'Device/PLC 1' configuration window. It includes a 'Summary' section with fields for Manufacturer (YASKAWA Electric Corporation), Series (MP Series SIO(Extension)), and Port (COM1). Below this is the 'Communication Settings' section, which contains radio buttons for SIO Type (RS232C, RS422/485(2wire), RS422/485(4wire)), a Speed dropdown (19200), Data Length (7, 8), Parity (NONE, EVEN, ODD), Stop Bit (1, 2), Flow Control (NONE, ER(DTR/CTS), XON/XOFF), and numeric input fields for Timeout (3 sec), Retry (2), and Wait To Send (0 ms). There are also radio buttons for RI/VCC (RI, VCC) and a 'Default' button. The 'Device-Specific Settings' section shows 'Allowable Number of Devices/PLCs' set to 1 and a table with one entry: No. 1, Device Name PLC1, Settings Station No.=1. An 'Add Indirect Device' button is also present.

◆ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the external device and click [Settings] .

The screenshot shows the 'Individual Device Settings' dialog box for PLC1. It features a 'Station No.' dropdown menu set to 1, a 'Default' button, and 'OK (O)' and 'Cancel' buttons at the bottom.

■ Settings of External Device

Communication setting of communication module by ladder software (MPE720).

Please refer to the manual of external device for more detail.

◆ Ladder Software Setting

- 1 Start ladder software, make an order folder and a PLC folder in a root folder.
- 2 Click the right button of the PLC which select logon in the displayed menu.

NOTE

- Logon after confirming that a check does not begin [online] of a displayed menu.
- Refer to User's Manual of the PLC about a method of logon.

- 3 Double-click the [Definition folder]-[Module constitution] of the PLC folder, and display [Engineering Manager].
- 4 Select the rack classification and communication module, the pull-down menu in [Controller] of [Engineering Manager].
Set the number corresponding to the slot number that a communication module uses.
Select the communication module, setting contents are displayed to [Module details] of [Engineering Manager].
- 5 Double-click the number part at No. in [Module details].
Double-click the slot number connecting the ethernet unit.

Setup Items	Setup Description
Transmission Protocol	MEMOBUS
Master/Slave	Slave
Device Address	Device address of the External Device
Serial I/F	RS-232C
Transmission Mode	RTU
Data Length	8Bit
Parity Bit	even
Stop Bit	1Stop
Baud Rate	19.2K
Sending	Disable
Automatically Reception	Disable

- 6 Double-click the "No.1", and set serial communication.
Use serial communication setting to forward communication setting and the ladder program to the PLC.
- 7 Save setting content and finish [Engineering Manager].
- 8 DIP switch "INIT" of a communication module is ON and spend a power supply.
- 9 Forward communication setting to a communication module.
- 10 Logon the PLC at online and write in the data which transferred at flash memory.
- 11 Power supply of PLC is OFF and DIP switch of the INIT is OFF, after spend the power supply of PLC.

4 Setup Items

Set communication settings of the Display with GP-Pro EX or in offline mode of the Display.

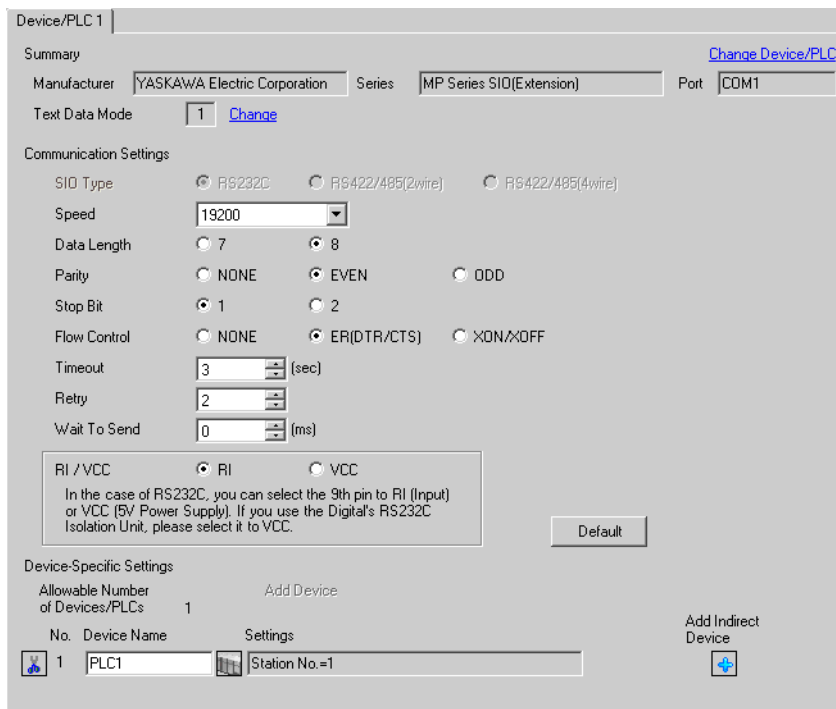
The setting of each parameter must be identical to that of External Device.

 "3 Example of Communication Setting" (page 7)

4.1 Setup Items in GP-Pro EX

■ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].



Device/PLC 1

Summary [Change Device/PLC](#)

Manufacturer Series Port

Text Data Mode [Change](#)

Communication Settings

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

Speed

Data Length 7 8

Parity NONE EVEN ODD

Stop Bit 1 2

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

Timeout (sec)

Retry

Wait To Send (ms)

RI / VCC RI VCC

In the case of RS232C, you can select the 9th pin to RI (Input) or VCC (5V Power Supply). If you use the Digital's RS232C Isolation Unit, please select it to VCC.

Device-Specific Settings [Add Device](#)

Allowable Number of Devices/PLCs

No.	Device Name	Settings
<input type="button" value="1"/>	<input type="text" value="PLC1"/>	<input type="text" value="Station No.=1"/>

[Add Indirect Device](#)

Setup Items	Setup Description
SIO Type	Display the SIO type to communicate with the External Device.
Speed	Select speed between External Device and 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 Display waits for the response from 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.


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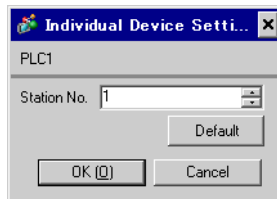
Setup Items	Setup Description
Wait To Send	Use an integer from 0 to 255 to enter standby time (ms) for the Display from receiving packets to transmitting next commands.
RI/VCC	You can switch RI/VCC of the 9th pin when you select RS232C for SIO type. It is necessary to change RI/5V by changeover switch of IPC when connect with IPC. Please refer to the manual of the IPC for more detail.

NOTE

- Refer to the GP-Pro EX Reference Manual for Indirect Device.
Cf. GP-Pro EX Reference Manual "Changing the Device/PLC at Runtime (Indirect Device)"

◆ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the external device and click [Settings] .



Setup Items	Setup Description
Station No.	Enter a station number of the External Device, using 1 to 63.

4.2 Setup Items in Offline Mode

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

◆ Communication Settings

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

Comm.	Device	Option		
MP Series SIO(Extension)			[COM1]	Page 1/1
SIO Type		RS232C		
Speed		19200		
Data Length		<input type="radio"/> 7 <input checked="" type="radio"/> 8		
Parity		<input type="radio"/> NONE <input checked="" type="radio"/> EVEN <input type="radio"/> ODD		
Stop Bit		<input checked="" type="radio"/> 1 <input type="radio"/> 2		
Flow Control		ER(DTR/CTS)		
Timeout(s)		3	▼ ▲	
Retry		2	▼ ▲	
Wait To Send(ms)		0	▼ ▲	
	Exit		Back	2038/08/01 14:40:07

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	Select speed between External Device and 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 Display waits for the response from External Device.

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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

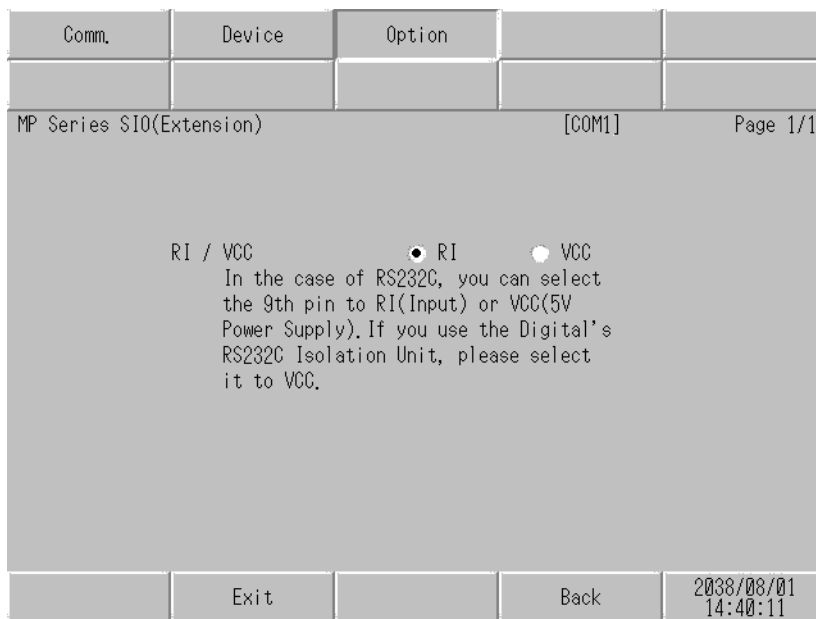
To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings]. Touch the External Device you want to set from the displayed list, and touch [Device].

Comm.	Device	Option		
MP Series SIO(Extension)		[COM1]	Page 1/1	
Device/PLC Name		[PLC1]		
Station No.		[1]		
Exit		Back		2038/08/01 14:40:09

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])
Station No.	Enter a station number of the External Device, using 1 to 63.

◆ 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].



Setup Items	Setup Description
RI/VCC	You can switch RI/VCC of the 9th pin when 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.

NOTE

- GP-4100 series and GP-4*0ITM do not have the [Option] setting in the offline mode.

5 Cable Diagram

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


- The FG pin of the External Device body 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

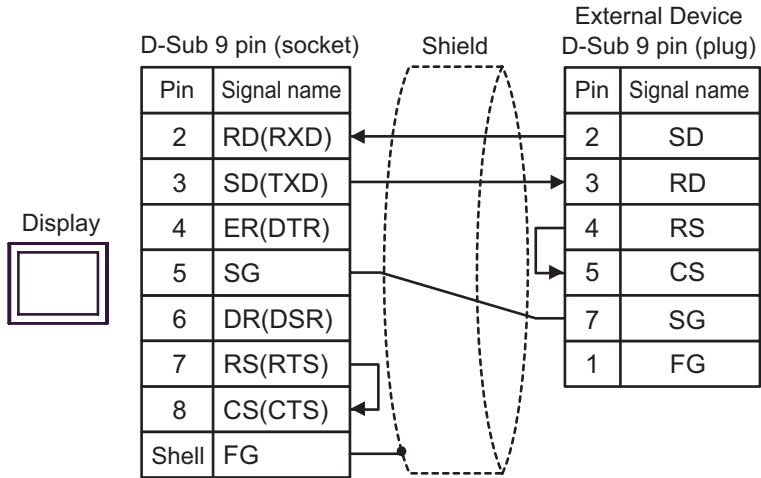
Display (Connection Port)	Cable		Remarks
GP3000 (COM1) GP4000* ¹ (COM1) ST (COM1) IPC* ² PC/AT	1A	User-created cable	The cable length must be 15m or less.
GP-4105 (COM1)	1B	User-created cable	

*1 All GP4000 models except GP-4100 series and GP-4203T

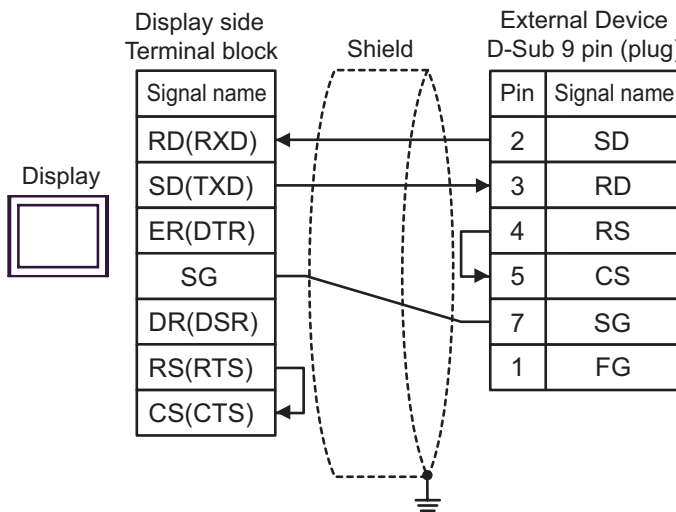
*2 Only the COM port which can communicate by RS-232C can be used.

 ■ IPC COM Port (page 4)

1A)






1B)



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 connecting equipment.

 This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Notes
System registers	SB000000 - SB08191F	SW00000 - SW08191		
Input registers	IB000000 - IBFFFFFF	IW00000 - IWFFFFF		*1
Output registers	OB000000 - OBFFFFFF	OW00000 - OWFFFFF		*1
Data registers	MB000000 - MB65534F	 MW00000 - MW65534		

*1 As for Input and Output registers, device 0x9000-0xFFFF cannot be written.

NOTE

- 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"

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	Device Name	Device Code (HEX)	Address Code
System registers	SW/SB	0080	Word address
Input registers	IW/IB	0001	Word address
Output registers	OW/OB	0081	Word address
Data registers	MW/MB	0000	Word address

8 Error Messages

Error messages are displayed on the screen of Display as follows: "No. : Device Name: Error Message (Error Occurrence Area)". Each description is shown below.

Item	Description
No.	Error No.
Device Name	Name of External Device where error occurs. Device name is a title of External Device set with GP-Pro EX. (Initial value [PLC1])
Error Message	Displays messages related to the error which occurs.
Error Occurrence Area	<p>Displays IP address or device address of External Device where error occurs, or error codes received from External Device.</p> <p>NOTE</p> <ul style="list-style-type: none"> • 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**
- 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 Code Peculiar to PLC

The error code peculiar to PLC is as follows.

Error code	Description
0x90	Transfer error.
0x92	Illegal parameter.
0x96	Register No. over.
0x9C	File is modified.
0x9D	Data access error.

■ Error Messages Specific to the External Device

Message ID	Error Message	Description
RHxx128	"(Node Name):PLC is busy now(Error Code: [Hex])"	PLC is "Busy"
RHxx129	"(Node Name):Option module is not mounted(Error Code: [Hex])"	Option module not mount.
RHxx130	"(Node Name):Module is not ready(Error Code: [Hex])"	Module is not ready
RHxx131	"(Node Name):CPU is stopped(Error Code: [Hex])"	CPU is stopped
RHxx132	"(Node Name): Write protected(Error Code: [Hex])"	Write protected

