Millenium 3 FBD Driver

Introduction

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

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

| 1 | System Configuration
This section lists the types of External Devices and SIO that you can connect. | ☞ "1 System Configuration" (page 3) |

| 2 | External Device Selection
Select a model (series) of the External Device and its connection method. | ☞ "2 External Device Selection" (page 9) |

| 3 | Communication Settings
This section shows setting examples for communicating between the Display and the External Device. | ☞ "3 Communication Settings" (page 10) |

| 4 | Setup Items
This section describes communication setup items on the Display.
Set the Display's communication settings in GP Pro-EX or in offline mode. | ☞ "4 Setup Items" (page 11) |

| 5 | Cable Diagrams
This section shows cables and adapters for connecting the Display and the External Device. | ☞ "5 Cable Diagrams" (page 14) |

Operation

1 System Configuration

The following section shows system configurations for connecting Crouzet External Devices and the Display.

Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
Millenium 3 Smart	CD12 24VDC SMART (88974041) CD12S 24VDC SMART (88974042) CD12 230VAC SMART (88974043) CD12 24VAC SMART (88974044) CD12 12VDC SMART (88974045) CD12S 12VDC SMART (88974046) CD20 24VDC SMART (88974051) CD20S 24VDC SMART (88974052) CD20S 230VAC SMART (88974053) CD20 24VAC SMART (88974054) CD20 12VDC SMART (88974055) XD10 24VDC SMART (88974141) XD10S 24VDC SMART (88974142) XD10 230VAC SMART (88974143) XD10 24VAC SMART (88974144) XD26 24VDC SMART (88974161) XD26S 24VDC SMART (88974162) XD26 230VAC SMART (88974163) XD26 24VAC SMART (88974164) XD26 12VDC SMART (88974165) XD26S 12VDC SMART (88974166) CD12RBT 24VDC SMART (88974441) XD26RBT 24VDC SMART (88974561) CB12 24VDC SMART (88974021) CB12 230VAC SMART (88974023)	Program port on CPU	RS232C	"Setting Example 1" (page 10)	"Cable Diagram 1" (page 14)

Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
Millenium 3 Smart	CB12 24VAC SMART (88974024) CB12S 12VDC SMART (88974026) CB20 24VDC SMART (88974031) CB20 230VAC SMART (88974033) CB20 24VAC SMART (88974034) XB10 24VDC SMART (88974131) XB10S 24VDC SMART (88974132) XB10 230VAC SMART (88974133) XB10 24VAC SMART (88974134) XB26 24VDC SMART (88974151) XB26S 24VDC SMART (88974152) XB26 230VAC SMART (88974153) XB26 24VAC SMART (88974154) XB26 12VDC SMART (88974155) NB12 24VDC SMART (88970001) NB12 230VAC SMART (88970003) NB12 12VDC SMART (88970005) NB20 24VDC SMART (88970011) NB20 230VAC SMART (88970013) NBR12 24VDC SMART (88973001) NBR12S 24VDC SMART (88973002) NBR26 24VDC SMART (88973061) NBR26S 24VDC SMART (88973062) NBR32 24VDC SMART (88973211) NBR40 24VDC SMART (88973231)	Program port on CPU	RS232C	"Setting Example 1" (page 10)	"Cable Diagram 1" (page 14)

Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
Millenium 3 Essential	CD12 24VDC ESSENTIAL (88970041) CD12S 24VDC ESSENTIAL (88970042) CD12 12VDC ESSENTIAL (88970045) CD20 24VDC ESSENTIAL (88970051) CD20S 24VDC ESSENTIAL (88970052) CD20 12VDC ESSENTIAL (88970055) CD12S 12VDC ESSENTIAL (88970865) XD10 24VDC ESSENTIAL (88970141) XD10S 24VDC ESSENTIAL (88970142) XD26 24VDC ESSENTIAL (88970161) XD26S 24VDC ESSENTIAL (88970162) XD26 12VDC ESSENTIAL (88970165) XD26S 12VDC ESSENTIAL (88970814) CB12 24VDC ESSENTIAL (88970021) CB12S 12VDC ESSENTIAL (88970840) CB20 24VDC ESSENTIAL (88970031) CB20S 24VDC ESSENTIAL (88970806) XB10 24VDC ESSENTIAL (88970131) XB10S 24VDC ESSENTIAL (88970132) XB26 24VDC ESSENTIAL (88970151) XB26S 24VDC ESSENTIAL (88970152) XB26 12VDC ESSENTIAL (88970155)	Program port on CPU	RS232C	"Setting Example 1" (page 10)	"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}
PE-4000B Atom N270	COM1, COM2	-	-
PE-4000B Atom N2600	COM1, COM2	COM3^{*4} , COM4^{*4}, COM5^{*4}, COM6^{*4}	COM3^{*4}, COM4^{*4}, COM5^{*4}, COM6^{*4}
PS5000 (Slim Panel Type Core i3 Model) $^{*5 *6}$	COM1, COM2^{*4}	COM2^{*4}	COM2^{*4}
PS5000 (Slim Panel Type Atom Model) $^{*5 *6}$	COM1, COM2^{*7}	COM2^{*7}	COM2^{*7}
PS5000 (Enclosed Panel Type)^{*8}	COM1	-	-
PS5000 (Modular Type PFXPU/PFXPP)$^{*5 *6}$ PS5000 (Modular Type PFXPL2B5-6)	COM1^{*7}	COM1^{*7}	COM1^{*7}
PS5000 (Modular Type PFXPL2B1-4)	COM1, COM2^{*7}	COM2^{*7}	COM2^{*7}
PS6000 (Advanced Box) PS6000 (Standard Box)	COM1^{*9}	*10	*10
PS6000 (Basic Box)	COM1^{*9}	COM1^{*9}	COM1^{*9}

*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.

*4   Set up the SIO type with the BIOS. Please refer to the IPC manual for details of BIOS.

*5   When setting up communication between an External Device and the RS-232C/422/485 interface module, use the IPC (RS-232C) or PS5000 (RS-422/485) cable diagrams. However, when using PFXZPBMPR42P2 in a RS-422/485 (4-wire) configuration with no flow control, connect 7.RTS+ and 8.CTS+, and connect 6.RTS- and 9.CTS-.
When using RS-422/485 communication with External Devices, you may need to reduce the transmission speed and increase the TX Wait time.

*6   To use RS-422/485 communication on the RS-232C/422/485 interface module, the DIP Switch setting is required. Please refer to "Knowledge Base" (FAQs) on the support site. (http://www.pro-face.com/trans/en/manual/1001.html)

Settings	FAQ ID
PFXZPBMPR42P2, RS422/485 change method	FA263858
PFXZPBMPR42P2 termination resistor setting	FA263974
PFXZPBMPR44P2, RS422/485 change method	FA264087
PFXZPBMPR44P2 termination resistor setting	FA264088

*7   Set up the SIO type with the DIP Switch. Please refer to the IPC manual for details of DIP Switch. The BOX Atom has not a switch to set the RS-232C, RS-422/485 mode. Use the BIOS for the setting.

*8   For the connection with the External Device, on the user-created cable read as if the connector on the Display-side is a M12 A-coding 8 pin socket. The pin assignment is the same as described in the cable diagram. For the M12 A-coding connector, use PFXZPSCNM122.

*9   In addition to COM1, you can also use the COM port on the optional interface.

*10   Install the optional interface in the expansion slot.

DIP Switch settings (PL3000 / PS3000 Series)

RS-232C

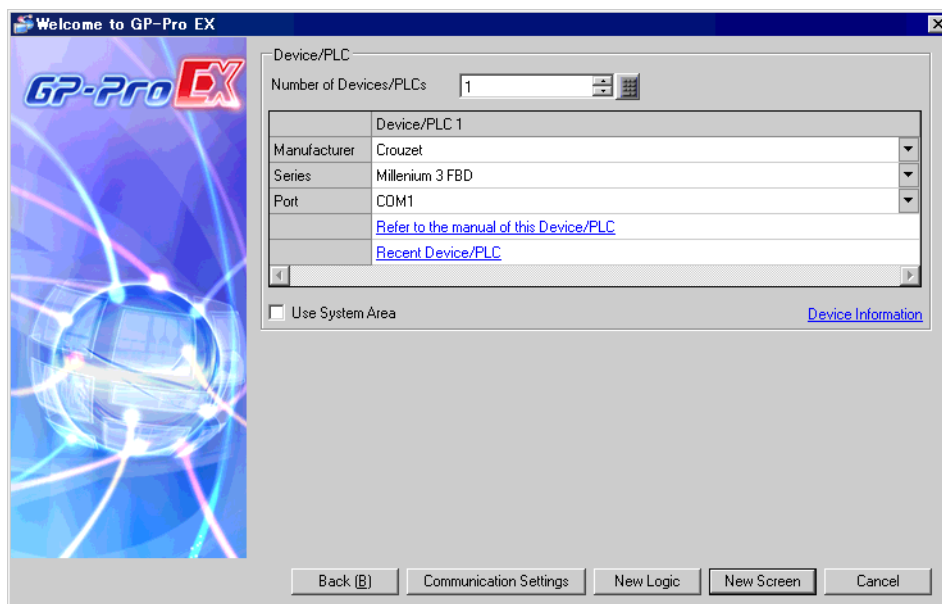| DIP Switch	Setting	Description
1	OFF[*1]	Reserved (always OFF)
2	OFF	SIO type: RS-232C
3	OFF	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	OFF	Short-circuit of SDA (TXA) 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.

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	

RS-422/485 (2 wire)

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

2 External Device Selection

Select the External Device to be connected to the Display.

Setup Items	Setup Description
Number of Devices/ PLCs	Use an integer from 1 to 4 to enter the number of Devices/PLCs to connect to the display.
Manufacturer	Select the manufacturer of the External Device to be connected. Select "Crouzet".
Series	Select a model (series) of the External Device and its connection method. Select "Millenium 3 FBD". In System configuration, check to make sure the External Device to which you are connecting is supported by the "Millenium 3 FBD" driver.)☞ "1 System Configuration" (page 3)
Port	Select the Display port to be connected 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　　　Communication Settings

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

3.1　　　Setting Example 1

■ GP-Pro EX Settings

◆ Communication Settings

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

■ External Device Settings

External Device communication settings are fixed as indicated below.

Setup Items	Setting Value
Baud Rate	115200
Character Length	7
Parity	EVEN
Stop Bit	1
Flow Control	NONE

4 Setup Items

Set up the Display's communication settings in GP Pro-EX or in the Display's offline mode.
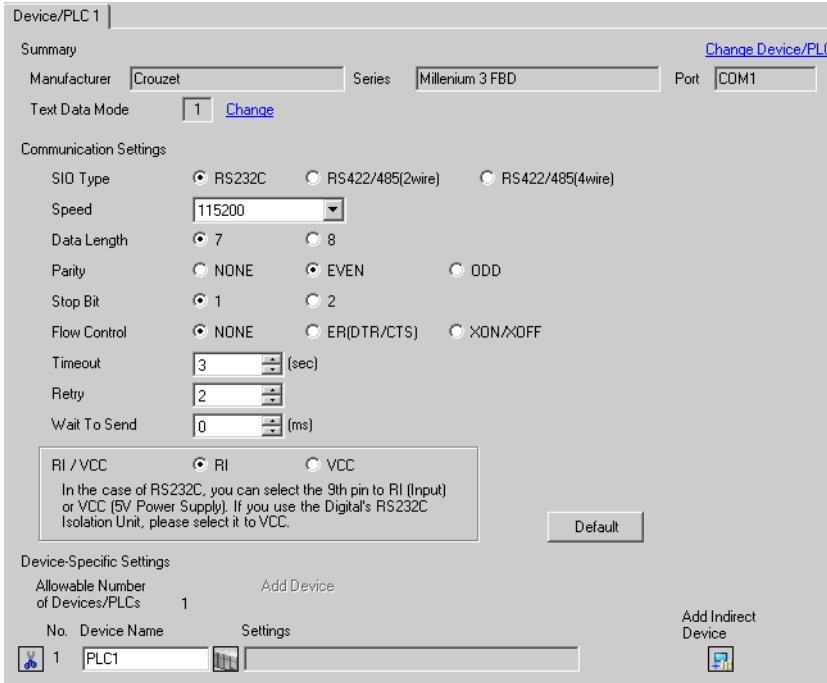
The setting of each parameter must match that of the External Device.

)"3 Communication Settings" (page 10)

4.1 Setup Items in GP Pro-EX

■ Communication

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

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 the 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	Enter the time (seconds) for which the Display waits for the response from the External Device, from "1 to 127".
Retry	In case of no response from the External Device, enter how many times the Display retransmits the command, from "0 to 255".
Wait To Send	Enter the standby time (milliseconds) from when the Display receives packets until it transmits the next command, from "0 to 255".
RI/VCC	Switches the 9th pin between RI and VCC.

4.2 Setup Items in Offline Mode

NOTE
• Refer to the Maintenance/Troubleshooting guide for information on how to enter offline mode or about 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

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

Comm.	Option			

Millenium 3 FBD   [COM1]   Page 1/1

        SIO Type   RS232C   ▼
        Speed   115200   ▼
        Data Length   ● 7   ○ 8
        Parity   ○ NONE   ● EVEN   ○ ODD
        Stop Bit   ● 1   ○ 2
        Flow Control   NONE   ▼

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

| | Exit | | Back | 2013/06/25 14:02:51 |

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 the communication speed between the External Device and the Display.
Data Length	Select the 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.

Setup Items	Setup Description
Timeout (s)	Enter the time (seconds) for which the Display waits for the response from the External Device, from "1 to 127".
Retry	In case of no response from the External Device, enter how many times the Display retransmits the command, from "0 to 255".
Wait To Send (ms)	Enter the standby time (milliseconds) from when the Display receives packets until it transmits the next command, from "0 to 255".

■ 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].
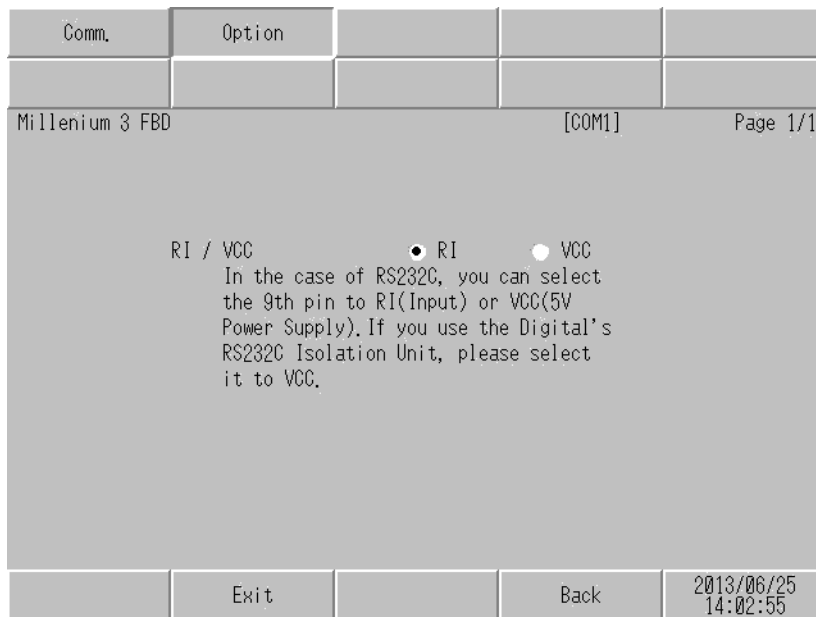
Setup Items	Setup Description
RI/VCC	Switches the 9th pin between RI and VCC.

NOTE	• GP-4100 series, GP-4*01TM and GP-Rear Module do not have the [Option] setting in the offline mode.

5 Cable Diagrams

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

- The FG pin of the External Device body must be grounded according to your country's applicable standard. Refer to your External Device manual for details.
- SG and FG are connected inside the Display. When connecting the External Device to SG, design your system to avoid short-circuit loops.
- Connect an isolation unit if the communication is not stable due to noise or other factors.

Cable Diagram 1

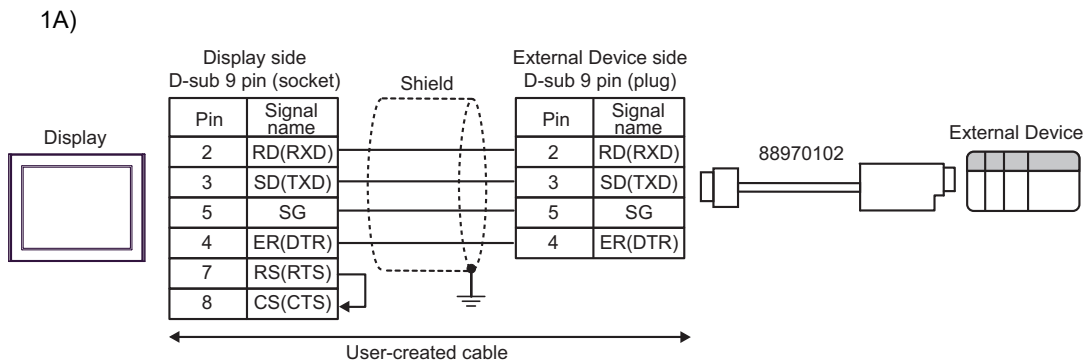| Display (Connection Port)		Cable	Notes
GP3000*1 (COM1) GP4000*2 (COM1) SP5000*3 (COM1/2) SP-5B00 (COM1) ST3000 (COM1) ST6000 (COM1) STM6000 (COM1) STC6000 (COM1) ET6000 (COM1) LT3000 (COM1) IPC*4 PC/AT	1A	User-created cable + 88970102 cable by Crouzet	Cable length: 15m or less
GP-4105 (COM1) GP-4115T (COM1) GP-4115T3 (COM1)	1B	User-created cable + 88970102 cable by Crouzet	

*1 All GP3000 models except GP3000H Series.

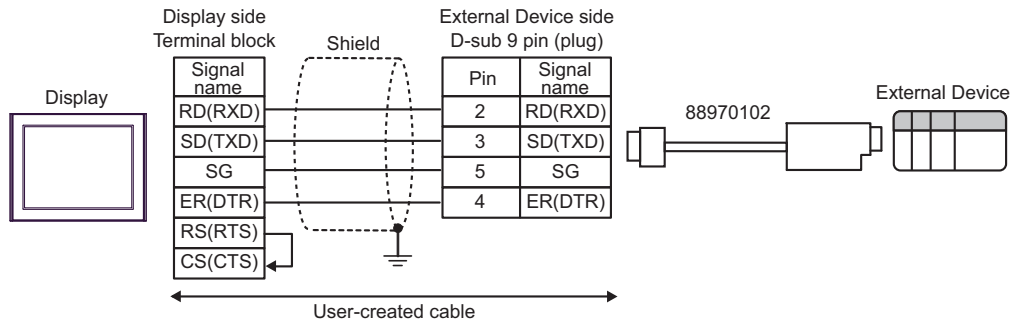*2 All GP4000 models except GP-4100 Series and GP-4203T

*3 Except SP-5B00

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

1A)

1B)

Display side
Terminal block — Shield

External Device side
D-sub 9 pin (plug)

Signal name		Pin	Signal name
RD(RXD)		2	RD(RXD)
SD(TXD)		3	SD(TXD)
SG		5	SG
ER(DTR)		4	ER(DTR)
RS(RTS)			
CS(CTS)			

Display

88970102

External Device

User-created cable

6 Supported Devices

The following table shows the range of supported device addresses.

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

Data Type	Bit Address	Word Address	32 bit	Notes
Serial Link Input	SLIN01.0 - SLIN24.F	SLIN01 - SLIN24	⌐L / H⌐	*1 *2
Serial Link Output	SLOUT25.0 - SLOUT48.F	SLOUT25 - SLOUT48		*1 *3
PLC State	STATE	-	-	*3 *4
Date and Time	-	DT1 - DT6	-	*5
Command	-	ORDER	-	*6 *7

*1   SLIN and SLOUT addresses are valid only when SL is used in the FBD.
      Word address: To specify the "Word Address26" of SL output in the FBD, set SLOUT26.
      Bit address: To specify the "Word Address2 bit1" of SL input in the FBD, set SLIN02.1.

*2   When bits are written, the Display reads the corresponding word address from the External Device, sets
      particular bits of that word address to ON, and then returns the resulting address to the External Device.
      Note that the data may not be written correctly if you write to the word address using the External Device
      while the Display is reading data from, and writing data to, the External Device.

*3   Write disable

*4   Contents of the device are as follows:
      0: Stop
      1: Run

*5   The date and time device contents are 6-word address.
      Address 1: second, Address 2: minute, Address 3: hour, Address 4: day, Address 5: month, Address 6: year
      To write time to the "Date and Time" device, write the time to all addresses at once using D-Script. If you
      write the time to the addresses individually, the time may be delayed for one second.

*6   Read disable

*7   Contents of the device are as follows:
      0x01: Stop
      0x02: Start (with Reset)
      0x03: Start (without Reset)

NOTE • You can set only Read Area Size for the system area available to use in the External Device.
        Please refer to the GP-Pro EX Reference Manual for Read Area Size.
        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
Serial Link Input	SLIN	0080	Word address
Serial Link Output	SLOUT	0081	Word address
Date and Time	DT	0060	Word address
Command	ORDER	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 number
Device Name	Name of the External Device where an error has occurred. Device/PLC name is the title of the External Device set with GP-Pro EX. (Initial value [PLC1])
Error Message	Displays messages related to an error that has occurred.
Error Occurrence Area	Displays the IP address or device address of the External Device where an error has occurred, or error codes received from the External Device. **NOTE** • IP address is displayed as "IP address (Decimal): MAC address (Hex)". • Device address is displayed as "Address: Device address". • Received error codes are displayed as "Decimal [Hex]".

Example Error Message

"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 Unique to External Device

Error Code	Error Message	Description
RHxx128	PLC1:Out of range value in write request (Address:DTn)	Indicates that the device value is out of range. If the inputted date and time are out of range, an error of the corresponding device will occur DT1: second, DT2: minutes, DT3: hour, DT4: date, DT5: month, DT6: year