KEYENCE Corporation

KV-700/1000 Series CPU Direct Driver

Introduction

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

In this manual, the connection procedure will be described by following the below sections:
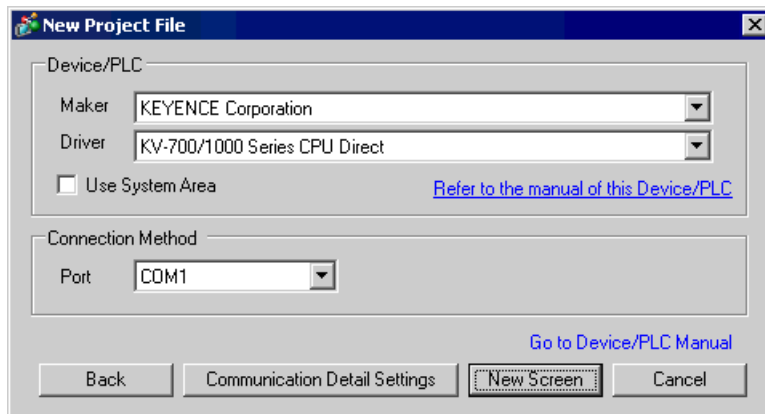
1	System Configuration This section shows the types of External Devices which can be connected and SIO type.	☞ "1 System Configuration" (page 3)

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 4)

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 5)

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 18)

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 KEYENCE Corporation and the display are connected is shown.

Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
KV-700 Series	KV-700	CPU Direct*1	RS232C	Setting Example 1 (page 5)	Cable Diagram 1 (page 24)
		KV-L20	RS232C (Port 1 connection)	Setting Example 2 (page 6)	Cable Diagram 2 (page 25)
			RS232C (Port 2 connection)	Setting Example 4 (page 10)	Cable Diagram 3 (page 26)
			RS422/485 (4wire) (Port 2 connection)	Setting Example 6 (page 14)	Cable Diagram 4 (page 27)
		KV-L20R	RS232C (Port 1 connection)	Setting Example 3 (page 8)	Cable Diagram 2 (page 25)
			RS232C (Port 2 connection)	Setting Example 5 (page 12)	Cable Diagram 3 (page 26)
			RS422/485 (4wire) (Port 2 connection)	Setting Example 7 (page 16)	Cable Diagram 4 (page 27)
KV-1000 Series	KV-1000	CPU Direct*1	RS232C	Setting Example 1 (page 5)	Cable Diagram 1 (page 24)
		KV-L20R	RS232C (Port 1 connection)	Setting Example 3 (page 8)	Cable Diagram 2 (page 25)
			RS232C (Port 2 connection)	Setting Example 5 (page 12)	Cable Diagram 3 (page 26)
			RS422/485 (4wire) (Port 2 connection)	Setting Example 7 (page 16)	Cable Diagram 4 (page 27)

*1   Using modular connector on CPU

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 "KEYENCE Corporation".
Series	Select a model (series) of the External Device to be connected and connection method. Select "KV-700/1000 Series CPU Direct". Check the External Device which can be connected in "KV-700/1000 Series CPU Direct" in system configuration. ☞ "1 System Configuration" (page 3)

Use System Area	Check this option when you synchronize the system data area of Display and the device (memory) of External Device. When synchronized, you can use the ladder program of 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 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 Pro-face, are shown.

3.1 Setting Example 1

■ Settings of GP-Pro EX

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

| NOTE | • You can set the speed to 9600-57600 for KV-700 Series, 9600-115200 for KV-1000 Series. |

■ Settings of External Device

There is no setting on the External Device. The speed automatically switches according to the display setting.

3.2   Setting Example 2

■ Settings of GP-Pro EX

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

NOTE   • You can set the speed to 9600-57600 for KV-700 Series, 9600-115200 for KV-1000 Series.

■ Settings of External Device

(1) Execute [New Project] from [File] on the menu bar of the ladder software "KV STUDIO".

(2) Enter the optional project name in the [New Project] dialog box. Check that [Support Model] shows the External Device, and click [OK].

(3) The project is created, and you are asked if you set the unit configuration or not. Click [Yes].

(4) The [Unit Editor] window is displayed. Click the [Unit Selection (2)] tab on the right of the window. Select "KV-L20" from the displayed unit list, and drag & drop it to the unit placement area on the left of the window.

(5) Double-click KV-L20, the External Device in the unit placement area. The [Unit Settings (3)] tab on the right of the window is displayed. The setting list of KV-L20 is displayed. Perform the communication settings as below.

Setup Items		Setup Description
Port 1	Operation Mode	KV-BUILDER Mode
	Interface	RS-232C
	Baud rate	Auto
	Data Bit Length	8 bits
	Start Bit	1 bit
	Stop Bit	1 bit
	Parity	Even
	Check Sum	None
	RS/CS Flow Control	Disable

(6) Next, execute [Relay/DM Auto Assign] from [Convert] on the menu bar.

(7) Execute [Save and Exit] from [File] on the menu bar.

3.3　　　　Setting Example 3

■ Settings of GP-Pro EX

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

Device/PLC 1	

Summary　　　　　　　　　　　　　　　　　　　　　　　　　　　　　Change Device/PLC

Maker　KEYENCE Corporation　　　　　Series　KV-700/1000 Series CPU Direct　　Port　COM1

Text Data Mode　　　2　Change

Communication Settings

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

Speed　　　　　　19200

Data Length　　　　○ 7　　　　⊙ 8

Parity　　　　　　　○ NONE　　⊙ EVEN　　　　　○ ODD

Stop Bit　　　　　⊙ 1　　　　○ 2

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

Timeout　　　　　3　　(sec)

Retry　　　　　　2

Wait To Send　　0　　(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.　　　　　　　　　Default

Device-Specific Settings

Allowable No. of Device/PLCs　1 Unit(s)

No.　Device Name　　　　　　　　Settings

1　PLC1

NOTE	• You can set the speed to 9600-57600 for KV-700 Series, 9600-115200 for KV-1000 Series.

■ Settings of External Device

(1) Execute [New Project] from [File] on the menu bar of the ladder software "KV STUDIO".

(2) Enter the optional project name in the [New Project] dialog box. Check that [Support Model] shows the External Device, and click [OK].

(3) The project is created, and you are asked if you set the unit configuration or not. Click [Yes].

(4) The [Unit Editor] window is displayed. Click the [Unit Selection (2)] tab on the right of the window. Select "KV-L20R" from the displayed unit list, and drag & drop it to the unit placement area on the left of the window.

(5) Double-click KV-L20R, the External Device in the unit placement area. The [Unit Settings (3)] tab on the right of the window is displayed. The setting list of KV-L20R is displayed. Perform the communication settings as below.

Setup Items		Setup Description
Port 1	Operation Mode	KV-BUILDER / KV-STUDIO Mode
	Interface	RS-232C
	Baud Rate	Auto
	Data Bit Length	8 bits
	Start Bit	1 bit
	Stop Bit	1 bit
	Parity	Even
	Check Sum	None
	RS/CS Flow Control	Disable
Station No.	Station No.	0
Detail Settings	Transfer Timeout	3

(6) Next, execute [Relay/DM Auto Assign] from [Convert] on the menu bar.

(7) Execute [Save and Exit] from [File] on the menu bar.

3.4   Setting Example 4

■ Settings of GP-Pro EX

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

Device/PLC 1

Summary   Change Device/PLC

Maker KEYENCE Corporation   Series KV-700/1000 Series CPU Direct   Port COM1

Text Data Mode   2   Change

Communication Settings

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

Speed   19200

Data Length   ○ 7   ⊙ 8

Parity   ○ NONE   ⊙ EVEN   ○ ODD

Stop Bit   ⊙ 1   ○ 2

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

Timeout   3   (sec)

Retry   2

Wait To Send   0   (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.   Default

Device-Specific Settings

Allowable No. of Device/PLCs 1 Unit(s)

No. Device Name   Settings

1 PLC1

NOTE   • You can set the speed to 9600-57600 for KV-700 Series, 9600-115200 for KV-1000 Series.

■ Settings of External Device

(1) Execute [New Project] from [File] on the menu bar of the ladder software "KV STUDIO".

(2) Enter the optional project name in the [New Project] dialog box. Check that [Support Model] shows the External Device, and click [OK].

(3) The project is created, and you are asked if you set the unit configuration or not. Click [Yes].

(4) The [Unit Editor] window is displayed. Click the [Unit Selection (2)] tab on the right of the window. Select "KV-L20" from the displayed unit list, and drag & drop it to the unit placement area on the left of the window.

(5) Double-click KV-L20, the External Device in the unit placement area. The [Unit Settings (3)] tab on the right of the window is displayed. The setting list of KV-L20 is displayed. Perform the communication settings as below.

Setup Items		Setup Description
Port 1	Operation Mode	KV-BUILDER Mode
	Interface	RS-232C
	Station No.	0
	Baud Rate	Auto
	Data Bit Length	8 bits
	Start Bit	1 bit
	Stop Bit	1 bit
	Parity	Even
	Check Sum	None

(6) Next, execute [Relay/DM Auto Assign] from [Convert] on the menu bar.

(7) Execute [Save and Exit] from [File] on the menu bar.

3.5   Setting Example 5

■ Settings of GP-Pro EX

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

Device/PLC 1		
Summary		Change Device/PLC
Maker KEYENCE Corporation	Series KV-700/1000 Series CPU Direct	Port COM1
Text Data Mode 2 Change		

Communication Settings

SIO Type	● RS232C	○ RS422/485(2wire)	○ RS422/485(4wire)
Speed	19200		
Data Length	○ 7	● 8	
Parity	○ NONE	● EVEN	○ ODD
Stop Bit	● 1	○ 2	
Flow Control	● NONE	○ ER(DTR/CTS)	○ XON/XOFF
Timeout	3 (sec)		
Retry	2		
Wait To Send	0 (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.   Default

Device-Specific Settings

Allowable No. of Device/PLCs 1 Unit(s)

	No.	Device Name	Settings
	1	PLC1	

NOTE   • You can set the speed to 9600-57600 for KV-700 Series, 9600-115200 for KV-1000 Series.

■ Settings of External Device

(1) Execute [New Project] from [File] on the menu bar of the ladder software "KV STUDIO".

(2) Enter the optional project name in the [New Project] dialog box. Check that [Support Model] shows the External Device, and click [OK].

(3) The project is created, and you are asked if you set the unit configuration or not. Click [Yes].

(4) The [Unit Editor] window is displayed. Click the [Unit Selection (2)] tab on the right of the window. Select "KV-L20R" from the displayed unit list, and drag & drop it to the unit placement area on the left of the window.

(5) Double-click KV-L20R, the External Device in the unit placement area. The [Unit Settings (3)] tab on the right of the window is displayed. The setting list of KV-L20R is displayed. Perform the communication settings as below.

Setup Items		Setup Description
Port 1	Operation Mode	KV-BUILDER / KV-STUDIO Mode
	Interface	RS-232C
	Baud Rate	Auto
	Data Bit Length	8 bits
	Start Bit	1 bit
	Stop Bit	1 bit
	Parity	Even
	Check Sum	None
Station No.	Station No.	0
Detail Settings	Transfer Timeout	3

(6) Next, execute [Relay/DM Auto Assign] from [Convert] on the menu bar.

(7) Execute [Save and Exit] from [File] on the menu bar.

3.6   Setting Example 6

■ Settings of GP-Pro EX

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

NOTE   • You can set the speed to 9600-57600 for KV-700 Series, 9600-115200 for KV-1000 Series.

■ Settings of External Device

(1) Execute [New Project] from [File] on the menu bar of the ladder software "KV STUDIO".

(2) Enter the optional project name in the [New Project] dialog box. Check that [Support Model] shows the External Device, and click [OK].

(3) The project is created, and you are asked if you set the unit configuration or not. Click [Yes].

(4) The [Unit Editor] window is displayed. Click the [Unit Selection (2)] tab on the right of the window. Select "KV-L20" from the displayed unit list, and drag & drop it to the unit placement area on the left of the window.

(5) Double-click KV-L20, the External Device in the unit placement area. The [Unit Settings (3)] tab on the right of the window is displayed. The setting list of KV-L20 is displayed. Perform the communication settings as below.

Setup Items		Setup Description
Port 1	Operation Mode	KV-BUILDER Mode
	Interface	RS-422A
	Station No.	0
	Baud Rate	Auto
	Data Bit Length	8 bits
	Start Bit	1 bit
	Stop Bit	1 bit
	Parity	Even
	Check Sum	None

(6) Next, execute [Relay/DM Auto Assign] from [Convert] on the menu bar.

(7) Execute [Save and Exit] from [File] on the menu bar.

3.7   Setting Example 7

■ Settings of GP-Pro EX

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

| NOTE | • You can set the speed to 9600-57600 for KV-700 Series, 9600-115200 for KV-1000 Series. |

■ Settings of External Device

(1) Execute [New Project] from [File] on the menu bar of the ladder software "KV STUDIO".

(2) Enter the optional project name in the [New Project] dialog box. Check that [Support Model] shows the External Device, and click [OK].

(3) The project is created, and you are asked if you set the unit configuration or not. Click [Yes].

(4) The [Unit Editor] window is displayed. Click the [Unit Selection (2)] tab on the right of the window. Select "KV-L20R" from the displayed unit list, and drag & drop it to the unit placement area on the left of the window.

(5) Double-click KV-L20R, the External Device in the unit placement area. The [Unit Settings (3)] tab on the right of the window is displayed. The setting list of KV-L20R is displayed. Perform the communication settings as below.

Setup Items		Setup Description
Port 1	Operation Mode	KV-BUILDER / KV-STUDIO Mode
	Interface	RS-422A/485 (4 wire)
	Baud Rate	Auto
	Data Bit Length	8 bits
	Start Bit	1 bit
	Stop Bit	1 bit
	Parity	Even
	Check Sum	None
Station No.	Station No.	0
Detail Settings	Transfer Timeout	3

(6) Next, execute [Relay/DM Auto Assign] from [Convert] on the menu bar.

(7) Execute [Save and Exit] from [File] on the menu bar.

4 Setup Items

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

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

)"3 Example of Communication Setting" (page 5)

4.1 Setup Items in GP-Pro EX

■ Communication Settings

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

Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device.
Speed	Select speed between the communication equipment 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.

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	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.

4.2　　　Setup Items in Off-Line Mode

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

■ Communication Settings To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings] in 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.
Speed	Select speed between the communication equipment and the display.
Data Length	Data length is displayed.
Parity	The parity check method is displayed.
Stop Bit	Stop bit length is displayed.
Flow Control	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.
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.

◼ Option

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

| Comm. | Option | | | |

| KV-700/1000 Series 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.

| | Exit | | Back | 2005/09/02 13:16:13 |

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

5   Cable Diagram

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

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

  Usable port

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

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

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

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

  Dip switch setting: RS-232C

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

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

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

Cable Diagram 1

Display (Connection Port)	Cable	Notes
GP (COM1) IPC[*1][*2]	Modular cable of KEYENCE Corporation OP-26487 (2.5m) + Dsub9Pin of KEYENCE Corporation OP-26486	

*1   Usable ports are different by the series.
☞Usable port (page 22)

*2   When use the COM3 of PS -3700A (Pentium®4-M) , set the SIO type of COM3 with Dip switch.
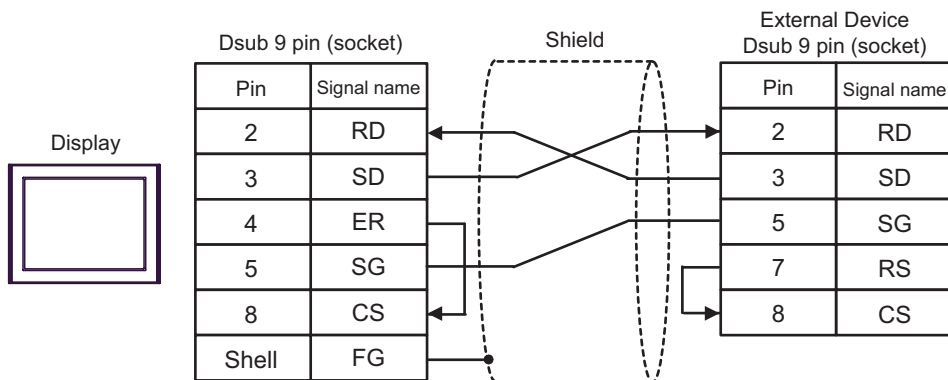☞Dip switch setting: RS-232C (page 22)
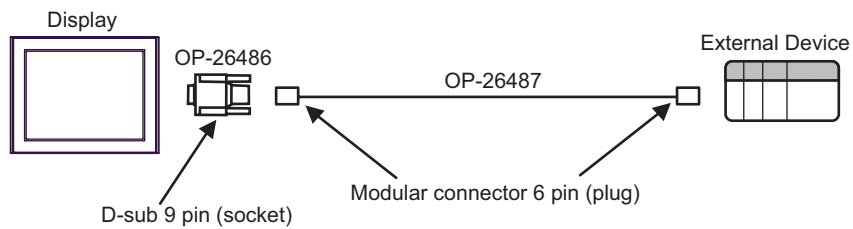
Cable Diagram 2

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

*1   Usable ports are different by the series.

☞Usable port (page 22)

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

☞Dip switch setting: RS-232C (page 22)

Cable Diagram 3

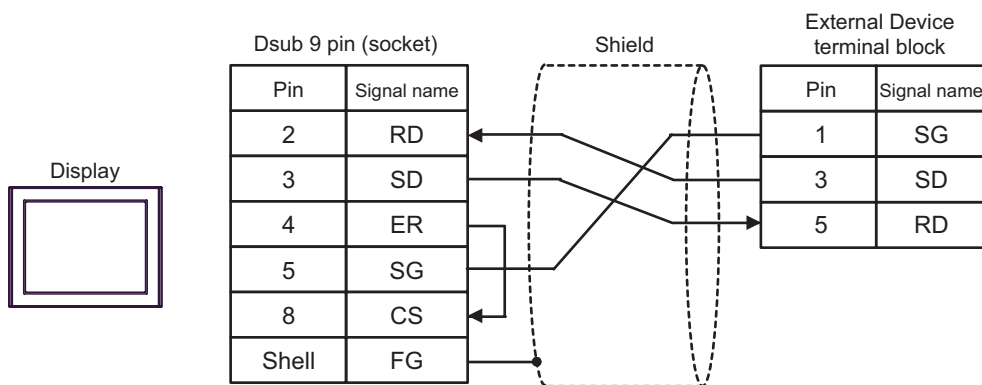| Display (Connection Port)	Cable	Notes
GP (COM1) IPC[*1][*2]	Your own cable	The cable length must be 15 meters or less.

*1   Usable ports are different by the series.
            ☞Usable port (page 22)

*2   When use the COM3 of PS -3700A (Pentium®4-M) , set the SIO type of COM3 with Dip switch.
            ☞Dip switch setting: RS-232C (page 22)

| NOTE | • Set the PORT2 toggle switch on the External Device to "232C". |

Dsub 9 pin (socket)   Shield   External Device terminal block

Pin	Signal name
2	RD
3	SD
4	ER
5	SG
8	CS
Shell	FG

Display

Pin	Signal name
1	SG
3	SD
5	RD

Cable Diagram 4

Display (Connection Port)		Cable	Notes
GP[*1] (COM1) AGP-3302B (COM2) IPC[*2] (COM3)	A	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + Your own cable	The cable length must be 500 meters or less.
	B	Your own cable	
GP[*3] (COM2)	C	Online adapter by Pro-face CA4-ADPONL-01 + Terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + Your own cable	The cable length must be 500 meters or less.
	D	Online adapter by Pro-face CA4-ADPONL-01 + Your own cable	

*1   All GP models except AGP-3302B

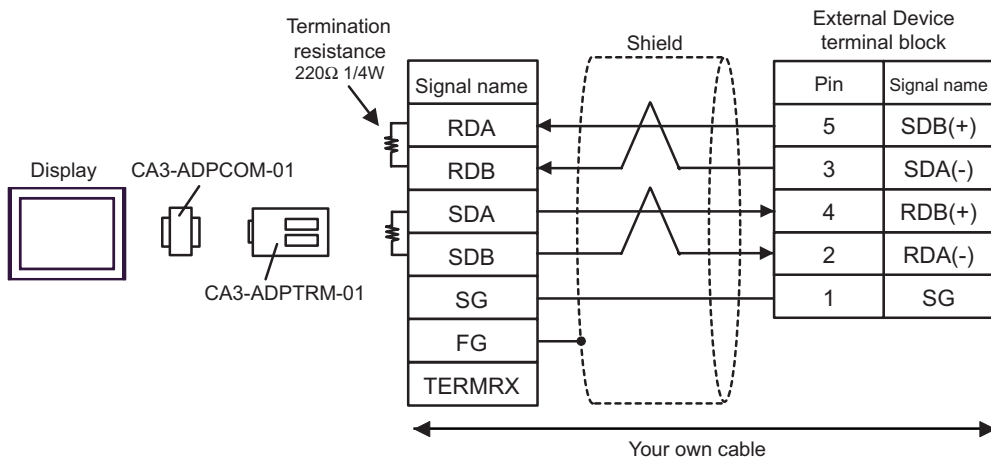*2   Only COM3 of PS -3700A (Pentium®4-M) can be used. When use the COM3, set the SIO type of COM3 with Dip switch.
☞ Dip switch setting: RS-422/485 (4 wire) (page 23)
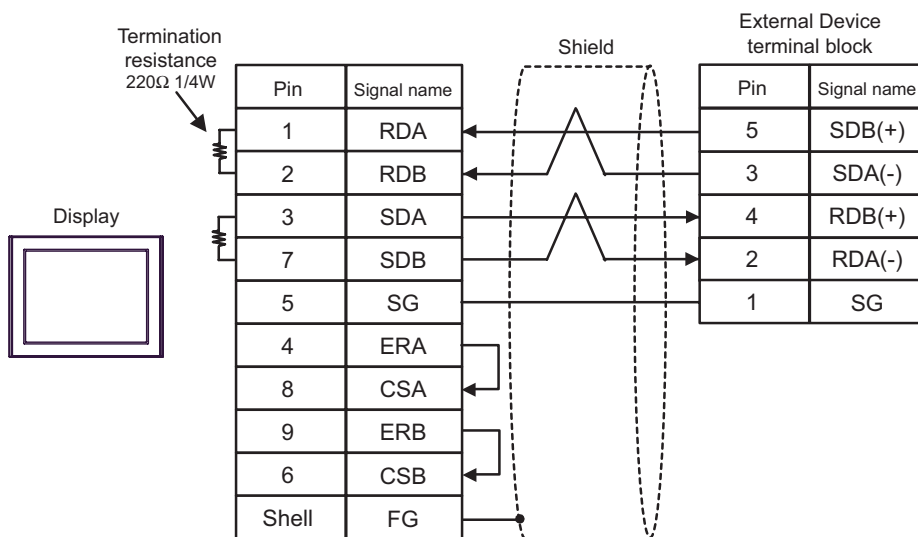
*3   All GP models except GP-3200 series and AGP-3302B

NOTE
- Set the PORT2 toggle switch on the External Device to "422A 485(4)". Also, turn ON the switch of the terminator.
- Pay attention that pole A and pole B are reversely named for the display and the External Device.
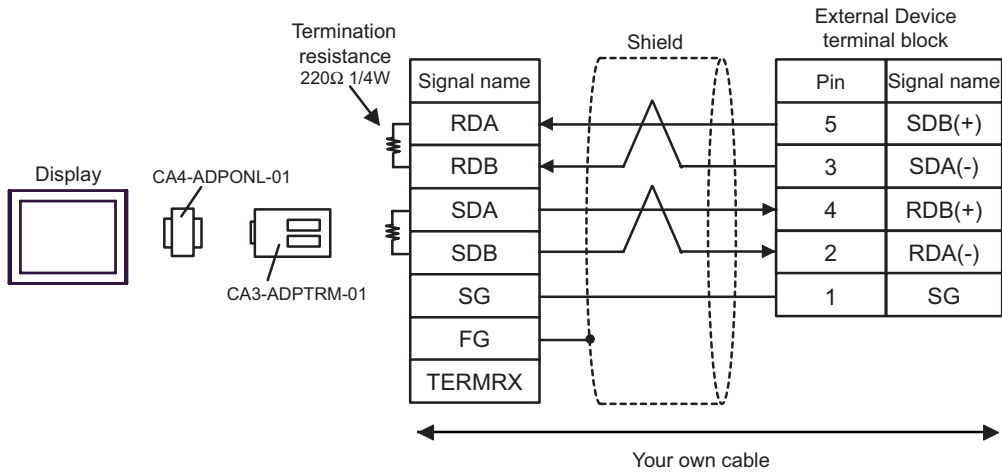
A) When using the COM port conversion adapter (CA3-ADPCOM-01), the terminal block conversion adapter (CA3-ADPTRM-01) by Pro-face, and your own cable..
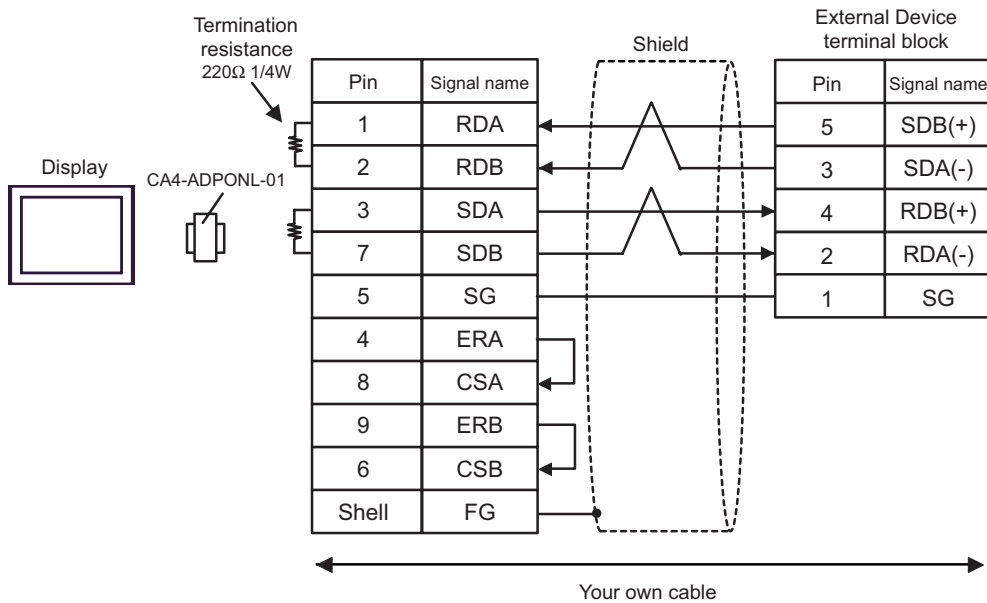
Termination resistance 220Ω 1/4W

Signal name		Pin	Signal name
RDA	←	5	SDB(+)
RDB	←	3	SDA(-)
SDA	→	4	RDB(+)
SDB	→	2	RDA(-)
SG		1	SG
FG			
TERMRX			

Display CA3-ADPCOM-01

CA3-ADPTRM-01

Shield

External Device terminal block

Your own cable

B) When using your own cable

Termination resistance 220Ω 1/4W

Pin	Signal name		Pin	Signal name
1	RDA	←	5	SDB(+)
2	RDB	←	3	SDA(-)
3	SDA	→	4	RDB(+)
7	SDB	→	2	RDA(-)
5	SG		1	SG
4	ERA			
8	CSA			
9	ERB			
6	CSB			
Shell	FG			

Display

Shield

External Device terminal block

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

Termination resistance 220Ω 1/4W		Shield	External Device terminal block	
Signal name			Pin	Signal name
RDA			5	SDB(+)
RDB			3	SDA(-)
SDA			4	RDB(+)
SDB			2	RDA(-)
SG			1	SG
FG				
TERMRX				

Display CA4-ADPONL-01 CA3-ADPTRM-01

Your own cable

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

Termination resistance 220Ω 1/4W			Shield	External Device terminal block	
Pin	Signal name			Pin	Signal name
1	RDA			5	SDB(+)
2	RDB			3	SDA(-)
3	SDA			4	RDB(+)
7	SDB			2	RDA(-)
5	SG			1	SG
4	ERA				
8	CSA				
9	ERB				
6	CSB				
Shell	FG				

Display CA4-ADPONL-01

Your own cable

6 Supported Device

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

6.1 KV-700 Series

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

| Device	Bit Address	Word Address	32 bit	Notes
Input Relay	00000 - 59915	000 - 599	⌐L / H⌐	
Output Relay				
Internal Auxiliary Relay				
Control Relay	CR0000 - CR3915	CR00 - CR39		
Timer (Contact)	T000 - T511	------		
Counter (Contact)	C000 - C511	------		
High-speed Counter Comparator (Contact)	CTC0 - CTC3	------		*1
Timer (Setting Value)	------	TS000 - TS511		*2
Counter (Setting Value)	------	CS000 - CS511		
Timer (Current Value)	------	TC000 - TC511		
Counter (Current Value)	------	CC000 - CC511		
Data Memory	------	DM00000 - DM39999		B i 15
Temporary Memory	------	TM000 - TM511		
Control Memory	------	CM0000 - CM3999		
Digital Trimming Machine	------	TRM0 - TRM7		*2
High-speed Counter (Current Value)	------	CTH0 - CTH1		
High-speed Counter Comparator (Setting Value)	------	CTC0 - CTC3		

*1   Write disable

*2   32-bit device

> **IMPORTANT**
> • When connecting KV-700 Series, use within the above range of device address.
> • When you try to access the device address supported only by KV-1000 Series, error messages of "Error has been responded for device read command (Error Code: (02)[(0x02)]" or "Error has been responded for device write command (Error Code: (02)[(0x02)]" are displayed.

6.2 KV-1000 Series

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

Device	Bit Address	Word Address	32 bits	Notes
Input Relay	00000 - 59915	000 - 599		*1
Output Relay				
Internal Auxiliary Relay	MR00000 - MR99915	MR000 - MR999		
Latch Relay	LR00000 - LR99915	LR000 - LR999		
Control Relay	CR0000 - CR3915	CR00 - CR39		
Timer (Contact)	T0000 - T3999	------		
Counter (Contact)	C0000 - C3999	------		
High-speed Counter Comparator (Contact)	CTC0 - CTC3	------		*2
Timer (Setting Value)	------	TS0000 - TS3999		*3
Counter (Setting Value)	------	CS0000 - CS3999		
Timer (Current Value)	------	TC0000 - TC3999	⌐L / H¬	
Counter (Current Value)	------	CC0000 - CC3999		
Data Memory	------	DM00000 - DM65534		
Extension Data Memory EM	------	EM00000 - EM65534		
Extension Data Memory FM	------	FM00000 - FM32766		[Bit 15]
Temporary Data Memory	------	TM000 - TM511		
Control Memory	------	CM00000 - CM11998		
Index Register	------	Z01 - Z12		[Bit 15] *4
Digital Trimming Machine	------	TRM0 - TRM7		*3
High-speed Counter (Current Value)	------	CTH0 - CTH1		
High-speed Counter Comparator (Setting Value)	------	CTC0 - CTC3		

*1 R000 to R599 (R00000 to R59915) are shown in KV-1000, but 000 to 599 (00000 to 59915) in GP-Pro EX.

*2 Write disable

*3 32-bit device

*4 Do not write in Z11 and Z12. They are used in the system of 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 (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 KV-700 Series

Device	Device Name	Device Code (HEX)	Address Code
Input Relay	------	0080	Word Address
Output Relay			
Internal Auxiliary Relay			
Control Relay	CR	008A	Word Address
Timer (Setting Value)	TS	0062	Double Word Address
Counter (Setting Value)	CS	0063	Double Word Address
Timer (Current Value)	TC	0060	Double Word Address
Counter (Current Value)	CC	0061	Double Word Address
Data Memory	DM	0000	Word Address
Temporary Data Memory	TM	0001	Word Address
Control Memory	CM	0002	Word Address
Digital Trimming Machine	TRM	0064	Double Word Address
High-speed Counter (Current Value)	CTH	0065	Double Word Address
High-speed Counter Comparator (Setting Value)	CTC	0066	Double Word Address

7.2   KV-1000 Series

Device	Device Name	Device Code (HEX)	Address Code
Input Relay	------	0080	Word Address
Output Relay			
Internal Auxiliary Relay	MR	0082	Word Address
Latch Relay	LR	0084	Word Address
Control Relay	CR	008A	Word Address
Timer (Setting Value)	TS	0062	Double Word Address
Counter (Setting Value)	CS	0063	Double Word Address
Timer (Current Value)	TC	0060	Double Word Address
Counter (Current Value)	CC	0061	Double Word Address
Data Memory	DM	0000	Word Address
Extension Data Memory EM	EM	0010	Word Address
Extension Data Memory FM	FM	0011	Word Address
Temporary Data Memory	TM	0001	Word Address
Control Memory	CM	0002	Word Address
Index Register	Z	0003	Word Address
Digital Trimming Machine	TRM	0064	Double Word Address
High-speed Counter (Current Value)	CTH	0065	Double Word Address
High-speed Counter Comparator (Setting Value)	CTC	0066	Double 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. Nodename is a title of the External Device set with GP-Pro EX. (Initial value [PLC1])
Error Message	Displays messages related to the error which occurs.
Error Occurrence Area	Displays IP address or device address of the External Device where error occurs, or error codes received from the External Device. NOTE • IP address is displayed such as "IP address(Decimal): MAC address(Hex)". • Device address is diplayed such as "Address: Device address". • Received error codes are displayed such as "Decimal[Hex]".

Display Examples of Error Messages

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

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

◆ Error Code List of External Device

Error Code (HEX)	Error Description
02	Executed illegal access. •Wrote in the write disable device. •Accessed the nonexistent device or address.
04	Tried to communicate in the communication baud rate not supported by the External Device.
31	Accessed the device not defined as device in the External Device. [*1]
0B	Performed monitor read with the monitor unregistered.

*1   When you write to Timer (Contact/Current Value/Setting Value), Counter (Contact/Current Value/Setting Value), High-speed Counter and High-speed Counter Comparator (Setting Value), the settings in the ladder program is necessary in advance.