# KV MODE (HOST LINK) SIO 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 indentified below.

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

| 2 | External Device Selection<br>Select the model (series) of the External Device and its connection method. | ☞ "2 External Device Selection" (page 8) |

| 3 | Communication Settings<br>This section describes setting examples for communicating between the Display and the External Device. | ☞ "3 Communication Settings" (page 9) |

| 4 | Setup Items<br>This section describes communication setup items on the Display.<br>Set the Display's communication settings in GP-Pro EX or in offline mode. | ☞ "4 Setup Items" (page 43) |

| 5 | Cable Diagrams<br>This section describes cables and adapters used to connect the Display and the External Device. | ☞ "5 Cable Diagrams" (page 48) |

Operation

# 1 System Configuration

The following table lists system configurations for connecting KEYENCE Corporation External Devices and the Display.

| Series | CPU | Link I/F | SIO Type | Setting Example | Cable Diagram |
|---|---|---|---|---|---|
| KV-700 Series | KV-700 | KV-L20V KV-L21V | RS-232C (Port 1 connection) | Setting Example 1 (page 9) | Cable Diagram 2 (page 50) |
| | | | RS-232C (Port 2 connection) | Setting Example 2 (page 11) | Cable Diagram 3 (page 52) |
| | | | RS-422/485 (4wire) (Port 2 connection) | Setting Example 3 (page 13) | Cable Diagram 4 (page 54) |
| KV-1000 Series | KV-1000 | KV-L20V KV-L21V | RS-232C (Port 1 connection) | Setting Example 1 (page 9) | Cable Diagram 2 (page 50) |
| | | | RS-232C (Port 2 connection) | Setting Example 2 (page 11) | Cable Diagram 3 (page 52) |
| | | | RS-422/485 (4wire) (Port 2 connection) | Setting Example 3 (page 13) | Cable Diagram 4 (page 54) |
| KV-3000 Series | KV-3000 | KV-L20V KV-L21V | RS-232C (Port 1 connection) | Setting Example 4 (page 15) | Cable Diagram 2 (page 50) |
| | | | RS-232C (Port 2 connection) | Setting Example 5 (page 17) | Cable Diagram 3 (page 52) |
| | | | RS-422/485 (4wire) (Port 2 connection) | Setting Example 6 (page 19) | Cable Diagram 4 (page 54) |
| KV-5000 Series | KV-5000 | KV-L20V KV-L21V | RS-232C (Port 1 connection) | Setting Example 4 (page 15) | Cable Diagram 2 (page 50) |
| | | | RS-232C (Port 2 connection) | Setting Example 5 (page 17) | Cable Diagram 3 (page 52) |
| | | | RS-422/485 (4wire) (Port 2 connection) | Setting Example 6 (page 19) | Cable Diagram 4 (page 54) |
| KV-5500 Series | KV-5500 | KV-L20V KV-L21V | RS-232C (Port 1 connection) | Setting Example 4 (page 15) | Cable Diagram 2 (page 50) |
| | | | RS-232C (Port 2 connection) | Setting Example 5 (page 17) | Cable Diagram 3 (page 52) |
| | | | RS-422/485 (4wire) (Port 2 connection) | Setting Example 6 (page 19) | Cable Diagram 4 (page 54) |

| Series | CPU | Link I/F | SIO Type | Setting Example | Cable Diagram |
|---|---|---|---|---|---|
| KV-7000 Series | KV-7300 | CPU Direct[*1] | RS232C | Setting Example 7 (page 21) | Cable Diagram 1 (page 48) |
| | | KV-L20V KV-L21V | RS232C (Port 1 connection) | Setting Example 8 (page 23) | Cable Diagram 2 (page 50) |
| | | | RS232C (Port 2 connection) | Setting Example 9 (page 25) | Cable Diagram 3 (page 52) |
| | | | RS-422/485 (4wire) (Port 2 connection) | Setting Example 10 (page 27) | Cable Diagram 4 (page 54) |
| | KV-7500 | KV-L20V KV-L21V | RS232C (Port 1 connection) | Setting Example 8 (page 23) | Cable Diagram 2 (page 50) |
| | | | RS232C (Port 2 connection) | Setting Example 9 (page 25) | Cable Diagram 3 (page 52) |
| | | | RS-422/485 (4wire) (Port 2 connection) | Setting Example 10 (page 27) | Cable Diagram 4 (page 54) |
| KV-Nano Series | KV-N14 KV-N24 KV-N40 KV-N60 | CPU Direct [*1] | RS232C | Setting Example 11 (page 29) | Cable Diagram 1 (page 48) |
| | | KV-N10L | RS232C | Setting Example 12 (page 31) | Cable Diagram 2 (page 50) |
| | | KV-N11L | RS-422/485 (4wire) | Setting Example 13 (page 33) | Cable Diagram 4 (page 54) |
| | KV-NC32T | CPU Direct [*1] | RS232C | Setting Example 11 (page 29) | Cable Diagram 1 (page 48) |
| | | KV-NC10L | RS232C | Setting Example 14 (page 35) | Cable Diagram 1 (page 48) |
| | | KV-NC20L | RS232C (Port 1 connection) | Setting Example 15 (page 37) | Cable Diagram 2 (page 50) |
| | | | RS232C (Port 2 connection) | Setting Example 16 (page 39) | Cable Diagram 3 (page 52) |
| | | | RS-422/485 (4wire) (Port 2 connection) | Setting Example 17 (page 41) | Cable Diagram 4 (page 54) |

*1    Using modular connector on CPU.

■ 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.
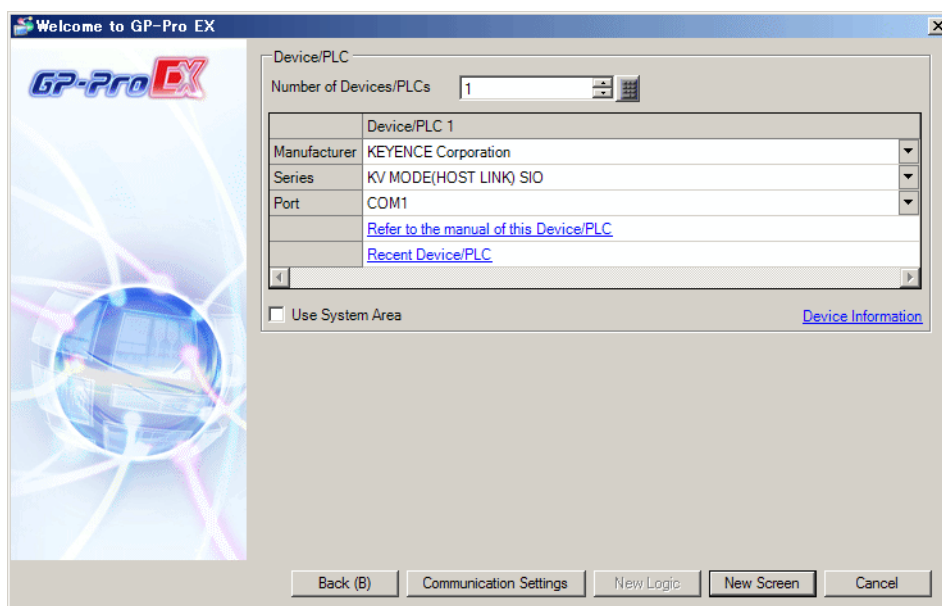
RS-422/485 (4 wire)

| 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 connect 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 "KEYENCE Corporation". |
| Series | Select the External Device model (series) and the connection method. Select "KV MODE (HOST LINK) SIO". In System configuration, make sure the External Device you are connecting is supported by "KV MODE (HOST LINK) SIO". <br> ☞ "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. <br> Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)" <br> This feature can also be set in GP-Pro EX or in the Display's offline mode. <br> Cf. GP-Pro EX Reference Manual "System Settings [Display Unit] - [System Area] Settings Guide" <br> 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

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



### ◆ 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] ▦ .

■ External Device Settings

Use the KEYENCE Corporation ladder software (KV STUDIO Ver. 8 or later) to configure communication settings for the External Device.

Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New Project] and display the [New Project] dialog box.

(3) Type a project name in [Project Name], select the External Device to use under [PLC model], and click [OK].

(4) Click [Yes] in the [Confirm unit setting information] dialog box and display the [Unit Editor] window.

(5) Select "KV-L2*V" from the displayed unit list on the [Select unit] tab, and drag & drop it to the unit placement area.

(6) Double-click "KV-L2*V" in the unit placement area.

(7) Configure the following communication settings on the [Setup unit] tab.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Port 1 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C (Fixed) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bit (Fixed) |
| | Stop Bit | 1 bit (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | None (Fixed) |
| | RS/CS Flow Control | Disabled |
| Station No. | Station No. | 0 |
| Detail Settings | Transfer Timeout (sec.) | 3 (Fixed) |

(8) From the [Convert] menu, select [Auto-assign relay/DM].

(9) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(10) Click [Yes].

(11) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(12) Check [Unit setting info] and [Program], and then click [Execute]. The setting information is transferred.

This completes the setting of the External Device.

## 3.2 Setting Example 2

### ■ GP-Pro EX Settings

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



### ◆ 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] ▥ .

■ External Device Settings

Use the KEYENCE Corporation ladder software (KV STUDIO Ver. 8 or later) to configure communication settings for the External Device.
Refer to your External Device manual for details.

(1)  Start up the ladder software.

(2)  From the [File] menu, select [New Project] and display the [New Project] dialog box.

(3)  Type a project name in [Project Name], select the External Device to use under [PLC model], and click [OK].

(4)  Click [Yes] in the [Confirm unit setting information] dialog box and display the [Unit Editor] window.

(5)  Select "KV-L2*V" from the displayed unit list on the [Select unit] tab, and drag & drop it to the unit placement area.

(6)  Double-click "KV-L2*V" in the unit placement area.

(7)  Configure the following communication settings on the [Setup unit] tab.

| Setup Items | | Setup Description |
|---|---|---|
| Port 2 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bit (Fixed) |
| | Stop Bit | 1 bit (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | None (Fixed) |
| Station No. | Station No. | 0 |
| Detail Settings | Transfer Timeout (sec.) | 3 (Fixed) |

(8)  From the [Convert] menu, select [Auto-assign relay/DM].

(9)  From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(10) Click [Yes].

(11) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(12) Check [Unit setting info] and [Program], and then click [Execute]. The setting information is transferred.

This completes the setting of the External Device.

## 3.3      Setting Example 3

### ■ GP-Pro EX 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    KEYENCE Corporation          Series    KV MODE (HOST LINK) SIO        Port    COM1

Text Data Mode      2    Change

Communication Settings

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

Speed             9600

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 Number      1          Add Device
of Devices/PLCs

No.   Device Name           Settings                                    Add Indirect
                                                                         Device
1     PLC1              Series=KV-700/1000,Station No=0

### ◆ 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] 　 .

Individual Device Settings

PLC1

Series      KV-700/1000

Station No  0

Please reconfirm all of address settings that
you are using if you have changed the series.

                                    Default

        OK (O)              Cancel

### ■ External Device Settings

Use the KEYENCE Corporation ladder software (KV STUDIO Ver. 8 or later) to configure communication settings for the External Device.
Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New Project] and display the [New Project] dialog box.

(3) Type a project name in [Project Name], select the External Device to use under [PLC model], and click [OK].

(4) Click [Yes] in the [Confirm unit setting information] dialog box and display the [Unit Editor] window.

(5) Select "KV-L2*V" from the displayed unit list on the [Select unit] tab, and drag & drop it to the unit placement area.

(6) Double-click "KV-L2*V" in the unit placement area.

(7) Configure the following communication settings on the [Setup unit] tab.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Port 2 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-422A/485 (4wire) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bit (Fixed) |
| | Stop Bit | 1 bit (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | None (Fixed) |
| Station No. | Station No. | 0 |
| Detail Settings | Transfer Timeout (sec.) | 3 (Fixed) |

(8) From the [Convert] menu, select [Auto-assign relay/DM].

(9) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(10)Click [Yes].

(11)From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(12)Check [Unit setting info] and [Program], and then click [Execute]. The setting information is transferred.

This completes the setting of the External Device.

## 3.4 Setting Example 4

### ■ GP-Pro EX 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 | KEYENCE Corporation | Series | KV MODE (HOST LINK) SIO | Port | COM1

Text Data Mode    2    Change

Communication Settings

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

Speed             9600

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 Number        Add Device
of Devices/PLCs    1

No.  Device Name        Settings                                       Add Indirect
                                                                       Device

1   PLC1                Series=KV-3000/5000,Station No=0

### ◆ 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] ▦ .

Individual Device Settings                           ✕

PLC1

Series       KV-3000/5000

Station No   0

Please reconfirm all of address settings that you are using if you have changed the series.

Default

OK (O)        Cancel

## ■ External Device Settings

Use the KEYENCE Corporation ladder software (KV STUDIO Ver. 8 or later) to configure communication settings for the External Device.
Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New Project] and display the [New Project] dialog box.

(3) Type a project name in [Project Name], select the External Device to use under [PLC model], and click [OK].

(4) Click [Yes] in the [Confirm unit setting information] dialog box and display the [Unit Editor] window.

(5) Select "KV-L2*V" from the displayed unit list on the [Select unit] tab, and drag & drop it to the unit placement area.

(6) Double-click "KV-L2*V" in the unit placement area.

(7) Configure the following communication settings on the [Setup unit] tab.

| Setup Items | | Setup Description |
|---|---|---|
| Port 1 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C (Fixed) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bit (Fixed) |
| | Stop Bit | 1 bit (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | None (Fixed) |
| | RS/CS Flow Control | Disabled |
| Station No. | Station No. | 0 |
| Detail Settings | Transfer Timeout (sec.) | 3 (Fixed) |

(8) From the [Convert] menu, select [Auto-assign relay/DM].

(9) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(10) Click [Yes].

(11) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(12) Check [Unit setting info] and [Program], and then click [Execute]. The setting information is transferred.

This completes the setting of the External Device.

## 3.5 Setting Example 5

■ GP-Pro EX Settings

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



◆ 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] .

■ External Device Settings

Use the KEYENCE Corporation ladder software (KV STUDIO Ver. 8 or later) to configure communication settings for the External Device.

Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New Project] and display the [New Project] dialog box.

(3) Type a project name in [Project Name], select the External Device to use under [PLC model], and click [OK].

(4) Click [Yes] in the [Confirm unit setting information] dialog box and display the [Unit Editor] window.

(5) Select "KV-L2*V" from the displayed unit list on the [Select unit] tab, and drag & drop it to the unit placement area.

(6) Double-click "KV-L2*V" in the unit placement area.

(7) Configure the following communication settings on the [Setup unit] tab.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Port 2 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bit (Fixed) |
| | Stop Bit | 1 bit (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | None (Fixed) |
| Station No. | Station No. | 0 |
| Detail Settings | Transfer Timeout (sec.) | 3 (Fixed) |

(8) From the [Convert] menu, select [Auto-assign relay/DM].

(9) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(10)Click [Yes].

(11)From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(12)Check [Unit setting info] and [Program], and then click [Execute]. The setting information is transferred.

This completes the setting of the External Device.

## 3.6 Setting Example 6

### ■ GP-Pro EX Settings

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



### ◆ 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].

■ External Device Settings

Use the KEYENCE Corporation ladder software (KV STUDIO Ver. 8 or later) to configure communication settings for the External Device.

Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New Project] and display the [New Project] dialog box.

(3) Type a project name in [Project Name], select the External Device to use under [PLC model], and click [OK].

(4) Click [Yes] in the [Confirm unit setting information] dialog box and display the [Unit Editor] window.

(5) Select "KV-L2*V" from the displayed unit list on the [Select unit] tab, and drag & drop it to the unit placement area.

(6) Double-click "KV-L2*V" in the unit placement area.

(7) Configure the following communication settings on the [Setup unit] tab.

| Setup Items | | Setup Description |
|---|---|---|
| Port 2 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-422A/485 (4wire) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bit (Fixed) |
| | Stop Bit | 1 bit (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | None (Fixed) |
| Station No. | Station No. | 0 |
| Detail Settings | Transfer Timeout (sec.) | 3 (Fixed) |

(8) From the [Convert] menu, select [Auto-assign relay/DM].

(9) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(10)Click [Yes].

(11)From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(12)Check [Unit setting info] and [Program], and then click [Execute]. The setting information is transferred.

This completes the setting of the External Device.

## 3.7 Setting Example 7

### ■ GP-Pro EX Settings

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



### ◆ 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]  .

■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) Select the [Setup unit (2)] tab.

(6) Configure the setup items as follows.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Built-in serial | Operation Mode | KV MODE (HOST LINK) |

(7) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(8) Click [Yes].

(9) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(10)Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.8　　　Setting Example 8

### ■ GP-Pro EX Settings

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



### ◆ 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] 📰 .

## ■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) On the [Select unit (1)] tab, from the displayed list of units select "KV-L2*V", then drag & drop to the unit placement area.

(6) In the unit placement area click "KV-L2*V" and then select the [Setup unit (2)] tab.

(7) Configure the setup items as follows.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Port 1 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C (Fixed) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bits (Fixed) |
| | Stop Bit | 1 bits (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | none (Fixed) |
| | RS/CS Flow Control | Disabled |
| Base | Node No. | 0 |
| Detail Settings | Transfer timeout time (secs) | 3 (Fixed) |

(8) From the [Convert] menu, select [Auto-assign relay/DM].

(9) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(10) Click [Yes].

(11) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(12) Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.9　Setting Example 9

### ■ GP-Pro EX Settings

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



### ◆ 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] 　.

### ■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) On the [Select unit (1)] tab, from the displayed list of units select "KV-L2*V", then drag & drop to the unit placement area.

(6) In the unit placement area click "KV-L2*V" and then select the [Setup unit (2)] tab.

(7) Configure the setup items as follows.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Port 2 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bits (Fixed) |
| | Stop Bit | 1 bits (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | none (Fixed) |
| Base | Node No. | 0 |
| Detail Settings | Transfer timeout time (secs) | 3 (Fixed) |

(8) From the [Convert] menu, select [Auto-assign relay/DM].

(9) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(10) Click [Yes].

(11) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(12) Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.10 Setting Example 10

### ■ GP-Pro EX Settings

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



### ◆ 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] .

### ■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) On the [Select unit (1)] tab, from the displayed list of units select "KV-L2*V", then drag & drop to the unit placement area.

(6) In the unit placement area click "KV-L2*V" and then select the [Setup unit (2)] tab.

(7) Configure the setup items as follows.

| Setup Items | | Setup Description |
|---|---|---|
| Port 2 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-422A/485 (4wire) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bits (Fixed) |
| | Stop Bit | 1 bits (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | none (Fixed) |
| Base | Node No. | 0 |
| Detail Settings | Transfer timeout time (secs) | 3 (Fixed) |

(8) From the [Convert] menu, select [Auto-assign relay/DM].

(9) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(10) Click [Yes].

(11) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(12) Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.11　　　Setting Example 11

### ■ GP-Pro EX Settings

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



### ◆ 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] [⬚] .

■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) Select the [Setup unit (2)] tab.

(6) Configure the setup items as follows.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Built-in serial | Operation Mode | KV MODE (HOST LINK) |

(7) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(8) Click [Yes].

(9) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(10) Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.12 Setting Example 12

### ■ GP-Pro EX Settings

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



### ◆ 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] .

## ■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1)  Start up the ladder software.

(2)  From the [File] menu, select [New project] to display the [New project] dialog box.

(3)  In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4)  In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5)  On the [Select unit (1)] tab, from the [Extension Cassette left (Port1)] area select "KV-N10L".

(6)  Configure the setup items as follows.

| Setup Items | | Setup Description |
|---|---|---|
| Port 1 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C (Fixed) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bits (Fixed) |
| | Stop Bit | 1 bits (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | none (Fixed) |
| | RS/CS Flow Control | Disabled |
| Base | Node No. | 0 |
| Detail Settings | Transfer timeout time (secs) | 3 (Fixed) |

(7)  From the [Convert] menu, select [Auto-assign relay/DM].

(8)  From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(9)  Click [Yes].

(10) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(11) Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.13 Setting Example 13

### ■ GP-Pro EX Settings

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



### ◆ 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] ⬚ .

■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) On the [Select unit (1)] tab, from the [Extension Cassette left (Port1)] area select "KV-N11L".

(6) Configure the setup items as follows.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Port 1 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-422A/485 (4wire) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bits (Fixed) |
| | Stop Bit | 1 bits (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | none (Fixed) |
| Base | Node No. | 0 |
| Detail Settings | Transfer timeout time (secs) | 3 (Fixed) |

(7) From the [Convert] menu, select [Auto-assign relay/DM].

(8) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(9) Click [Yes].

(10) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(11) Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.14 Setting Example 14

### ■ GP-Pro EX Settings

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



### ◆ 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] .

■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) On the [Select unit (1)] tab, from the [Extension Adapter Selection] area select "KV-NC10L".

(6) Configure the [Extension Adapter (Port1)] as follows.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Port 1 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C (Fixed) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bits (Fixed) |
| | Stop Bit | 1 bits (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | none (Fixed) |
| | RS/CS Flow Control | Disabled |
| Base | Node No. | 0 |
| Detail Settings | Transfer timeout time (secs) | 3 (Fixed) |

(7) From the [Convert] menu, select [Auto-assign relay/DM].

(8) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(9) Click [Yes].

(10)From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(11)Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.15 Setting Example 15

### ■ GP-Pro EX 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 | KEYENCE Corporation | Series | KV MODE (HOST LINK) SIO | Port | COM1

Text Data Mode   2  Change

Communication Settings

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

Speed         9600

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 Number of Devices/PLCs  1    Add Device                Add Indirect Device

No. | Device Name | Settings

1 | PLC1 | Series=KV-Nano,Station No=0

### ◆ 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] .

Individual Device Settings

PLC1

Series | KV-Nano

Station No | 0

Please reconfirm all of address settings that you are using if you have changed the series.

Default

OK (O)    Cancel

## ■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) On the [Select unit (1)] tab, from the [Extension Adapter Selection] area select "KV-NC20L".

(6) Configure the [Extension Adapter (Port1)] as follows.

| Setup Items | | Setup Description |
|---|---|---|
| Port 1 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C (Fixed) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bits (Fixed) |
| | Stop Bit | 1 bits (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | none (Fixed) |
| | RS/CS Flow Control | Disabled |
| Base | Node No. | 0 |
| Detail Settings | Transfer timeout time (secs) | 3 (Fixed) |

(7) From the [Convert] menu, select [Auto-assign relay/DM].

(8) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(9) Click [Yes].

(10)From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(11)Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.16 Setting Example 16

### ■ GP-Pro EX Settings

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



### ◆ 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] [icon].

■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) On the [Select unit (1)] tab, from the [Extension Adapter Selection] area select "KV-NC20L".

(6) Configure the [Extension Adapter (Port2)] as follows.

| Setup Items | | Setup Description |
|---|---|---|
| Port 2 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-232C |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bits (Fixed) |
| | Stop Bit | 1 bits (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | none (Fixed) |
| | RS/CS Flow Control | Disabled |
| Base | Node No. | 0 |
| Detail Settings | Transfer timeout time (secs) | 3 (Fixed) |

(7) From the [Convert] menu, select [Auto-assign relay/DM].

(8) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(9) Click [Yes].

(10) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(11) Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

## 3.17 Setting Example 17

### ■ GP-Pro EX Settings

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



◆ 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] ⊞ .

■ External Device Settings

Use ladder software KV STUDIO Ver. 8 or later to define the External Device communication settings. Refer to your External Device manual for details.

(1) Start up the ladder software.

(2) From the [File] menu, select [New project] to display the [New project] dialog box.

(3) In the [Project name] field enter the project name, in the [PLC model] property select the External Device, and click [OK].

(4) In the [Confirm unit setting information] dialog box click [Yes], and the [Unit Editor] window will display.

(5) On the [Select unit (1)] tab, from the [Extension Adapter Selection] area select "KV-NC20L".

(6) Configure the [Extension Adapter (Port2)] as follows.

| Setup Items | | Setup Description |
| --- | --- | --- |
| Port 2 | Operation Mode | KV MODE (HOST LINK) |
| | Interface | RS-422A/485 (4wire) |
| | Baud Rate | 9600 |
| | Data Bit Length | 8 bits (Fixed) |
| | Start Bit | 1 bits (Fixed) |
| | Stop Bit | 1 bits (Fixed) |
| | Parity | Even (Fixed) |
| | Check Sum | none (Fixed) |
| Base | Node No. | 0 |
| Detail Settings | Transfer timeout time (secs) | 3 (Fixed) |

(7) From the [Convert] menu, select [Auto-assign relay/DM].

(8) From the [File] menu, select [Close] and display the [Unit Editor] dialog box.

(9) Click [Yes].

(10) From the [Monitor/Simulator] menu, select [Transfer to PLC] to display the [Transfer Program] dialog box.

(11) Select the [Unit setting info] and [Program] check boxes, and then click [Execute]. The settings are transferred.

This completes the setting of the External Device.

# 4 Setup Items

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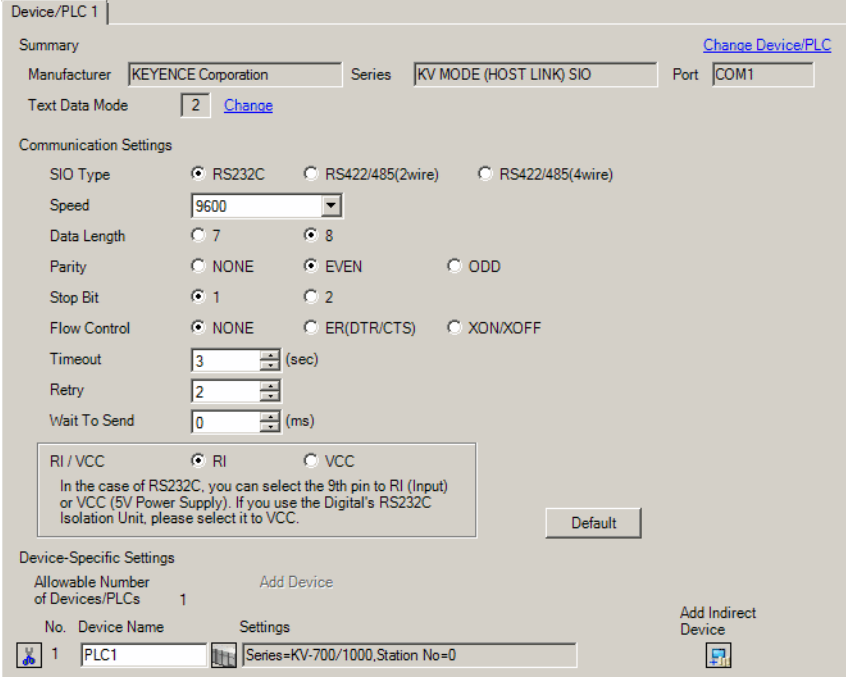
The setting of each parameter must match that of the External Device.

☞ "3 Communication Settings" (page 9)

## 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].



| Setup Items | Setup Description |
|---|---|
| SIO Type | Select the SIO type for communicating with the External Device. |
| Speed | Select the communication speed between the External Device and the Display. |
| Data Length | Select a data length. |
| Parity | Select how to check parity. |
| Stop Bit | Select a stop bit length. |
| Flow Control | Select the communication control method to prevent overflow of transmission and reception data. |
| Timeout | Enter the time (s) 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 (ms) from when the Display receives packets until it transmits the next command, from "0 to 255". |

| Setup Items | Setup Description |
|---|---|
| RI/VCC | You can switch between RI/VCC for the 9th pin when you select RS-232C for SIO type.<br>To connect to the IPC, switch between RI/5V using the IPC selector switch. Refer to your IPC manual for details. |

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] .
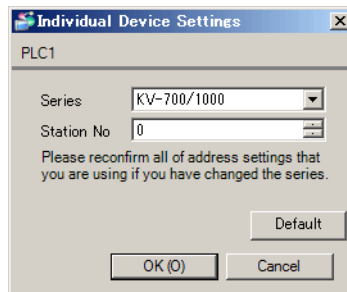
| Setup Items | Setup Description |
|---|---|
| Series | Select the series of the External Device. |
| Station No | Enter the station number, from "0" to "9". |

## 4.2 Setup Items in Offline Mode

### ■ 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 | | |
|---|---|---|---|---|
| | | | | |

KV MODE(HOST LINK) SIO                            [COM1]        Page 1/1

```
SIO Type        RS232C        ▼
Speed           9600          ▼
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 | 2019/10/17 15:19:32 |
|---|---|---|---|---|

| Setup Items | Setup Description |
|---|---|
| SIO Type | Select the SIO type for communicating with the External Device.<br><br>IMPORTANT<br>In the communication settings, set [SIO Type] correctly according to the serial interface specifications of the Display.<br>If you select an SIO type that the serial interface does not support, proper operation cannot be guaranteed.<br>Refer to your Display manual for details on the serial interface specifications. |
| Speed | Select the communication speed between the External Device and the Display. |
| Data Length | Data length is displayed. |
| Parity | The parity check method is displayed. |

| Setup Items | Setup Description |
|---|---|
| Stop Bit | Stop bit length is displayed. |
| Flow Control | The communication control method to prevent overflow of transmission and reception data. |
| Timeout | Enter the time (s) 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 (ms) from when the Display receives packets until it transmits the next command, from "0 to 255". |

■ Device Setting

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

| Comm. | Device | Option | | |
|---|---|---|---|---|
| | | | | |

KV MODE(HOST LINK) SIO               [COM1]      Page 1/1

Device/PLC Name     PLC1 ▼

Series         KV-7000

Station No        0 ▼ ▲

| | Exit | | Back | 2019/10/17 15:19:36 |

| Setup Items | Setup Description |
|---|---|
| Device/PLC Name | Select the External Device to set. Device/PLC Name is the title of the External Device set with GP-Pro EX. (Initial value [PLC1]) |
| Series | Displays the series of the External Device. |
| Station No | Enter the station number, from "0" to "9". |

■ Option

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

| Comm. | Device | Option | | |

KV MODE(HOST LINK) SIO                    [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 | 2019/10/17 15:19:39 |

| Setup Items | Setup Description |
| --- | --- |
| RI/VCC | You can switch between RI/VCC for the 9th pin when you select RS-232C for SIO type. To connect to the IPC, you need to switch between RI/5V using the IPC selector switch. Refer to your IPC manual for details. |

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

# 5 Cable Diagrams

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

- The FG pin on the External Device must be D-class grounded. Refer to your External Device manual for details.

- The SG and FG are connected inside the Display. If you connect the External Device to the SG, do not form any short-circuit loop in the system design.

- If the communication is not stable because of noise or other factors, connect an isolation unit.

Cable Diagram 1

| Display (Connection Port) | | Cable | Remarks |
|---|---|---|---|
| GP4000[*1] (COM1)<br>SP5000[*2] (COM1/2)<br>SP-5B00 (COM1)<br>ST6000 (COM1)<br>STM6000 (COM1)<br>STC6000 (COM1)<br>ET6000 (COM1)<br>IPC[*3]<br>PC/AT | 1A | D-sub 9Pin by KEYENCE Corporation<br>OP-26486<br>+<br>Modular cable by KEYENCE Corporation<br>OP-26487 (2.5m) | |
| GP-4105 (COM1)<br>GP-4115T (COM1)<br>GP-4115T3 (COM1) | 1B | User-created cable<br>+<br>D-sub 9Pin by KEYENCE Corporation<br>OP-26486<br>+<br>Modular cable by KEYENCE Corporation<br>OP-26487 (2.5m) | |

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

*2    Except SP-5B00

*3    Available only with COM ports that support RS-232C.
☞ ■ IPC COM Port (page 5)

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) |
| ER(DTR) | | | 4 | ER(DTR) |
| SG | | | 5 | SG |
| RS(RTS) | | | 7 | RS(RTS) |
| CS(CTS) | | | 8 | CS(CTS) |

Display

OP-26486

OP-26487

External Device

D-sub 9 pin (socket)

Modular connector 6 pin (plug)

User-created cable

Cable Diagram 2

| Display (Connection Port) | | Cable | Remarks |
|---|---|---|---|
| GP4000[*1] (COM1) SP5000[*2] (COM1/2) SP-5B00 (COM1) ST6000 (COM1) STM6000 (COM1) STC6000 (COM1) ET6000 (COM1) IPC[*3] PC/AT | 2A | User-created cable | The cable length must be 15m or less. |
| GP-4105 (COM1) GP-4115T (COM1) GP-4115T3 (COM1) | 2B | User-created cable | The cable length must be 15m or less. |
| LT-4*01TM (COM1) LT-Rear Module (COM1) | 2C | RJ45 RS-232C Cable (5m) by Pro-face PFXZLMCBRJR21 | The cable length must be 5m or less. |

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

*2    Except SP-5B00

*3    Available only with COM ports that support RS-232C.
☞ ■ IPC COM Port (page 5)

2A)

2B)

| Display side<br>Terminal block | Shield | External Device side<br>Dsub 9 pin (socket) | |
|---|---|---|---|
| Signal name | | Pin | Signal name |
| RD(RXD) | | 2 | RD(RXD) |
| SD(TXD) | | 3 | SD(TXD) |
| ER(DTR) | | 5 | SG |
| SG | | 7 | RS(RTS) |
| CS(CTS) | | 8 | CS(CTS) |

Display

2C)

| | External Device side<br>Dsub 9 pin (socket) | |
|---|---|---|
| | Pin | Signal name |
| TXD | 2 | RD(RXD) |
| RXD | 3 | SD(TXD) |
| GND | 5 | SG |
| | 7 | RS(RTS) |
| | 8 | CS(CTS) |

Display

(1)
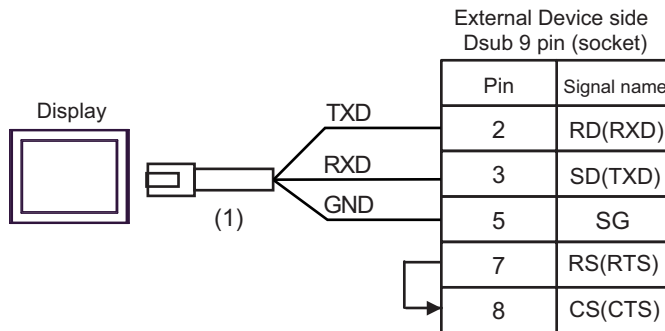
| Legend | Name | Note |
|---|---|---|
| (1) | RJ45 RS-232C Cable (5m) by Pro-face<br>PFXZLMCBRJR21 | |

Cable Diagram 3

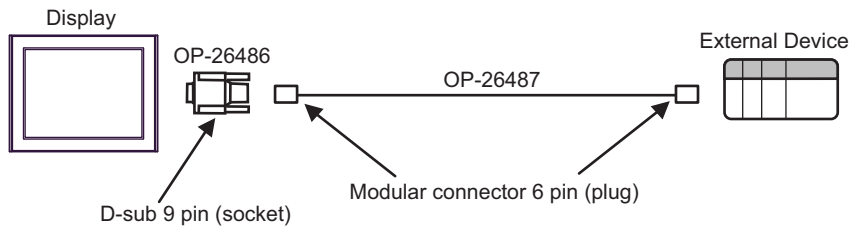| Display (Connection Port) | | Cable | Remarks |
|---|---|---|---|
| GP4000*1 (COM1)<br>SP5000*2 (COM1/2)<br>SP-5B00 (COM1)<br>ST6000 (COM1)<br>STM6000 (COM1)<br>STC6000 (COM1)<br>ET6000 (COM1)<br>IPC*3<br>PC/AT | 3A | User-created cable | The cable length must be 15m or less. |
| GP-4105 (COM1)<br>GP-4115T (COM1)<br>GP-4115T3 (COM1) | 3B | User-created cable | The cable length must be 15m or less. |
| LT-4*01TM (COM1)<br>LT-Rear Module (COM1) | 3C | RJ45 RS-232C Cable (5m) by Pro-face PFXZLMCBRJR21 | The cable length must be 5m or less. |

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

*2    Except SP-5B00

*3    Available only with COM ports that support RS-232C.
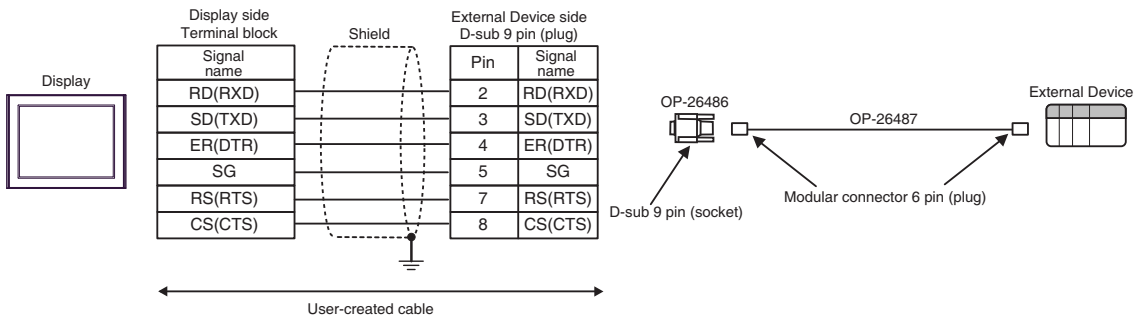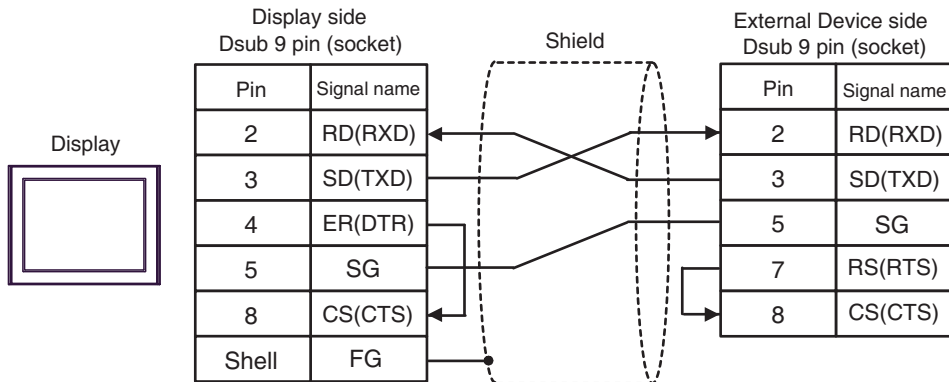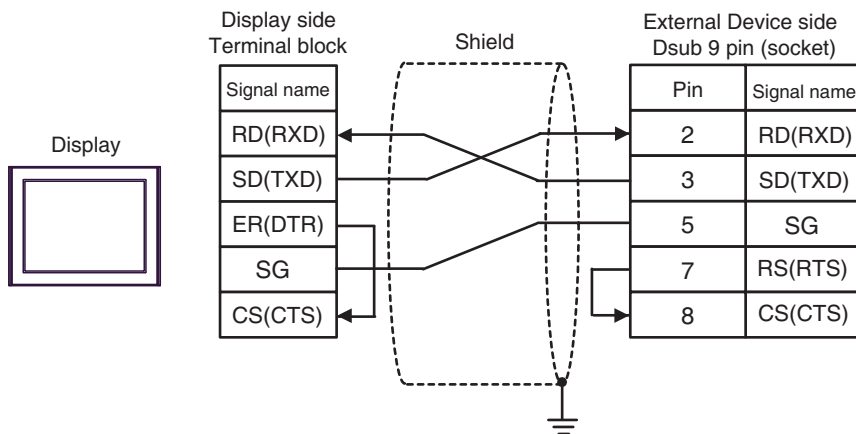☞ ■ IPC COM Port (page 5)

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

3A)

3B)

Display side
Terminal block

Shield

External Device side
Terminal block

| Signal name |
| --- |
| RD(RXD) |
| SD(TXD) |
| ER(DTR) |
| SG |
| CS(CTS) |

Display

| Pin | Signal name |
| --- | --- |
| 1 | SG |
| 3 | SD(TXD) |
| 5 | RD(RXD) |

3C)

External Device side
Terminal block

Display

GND

RXD

TXD

(1)
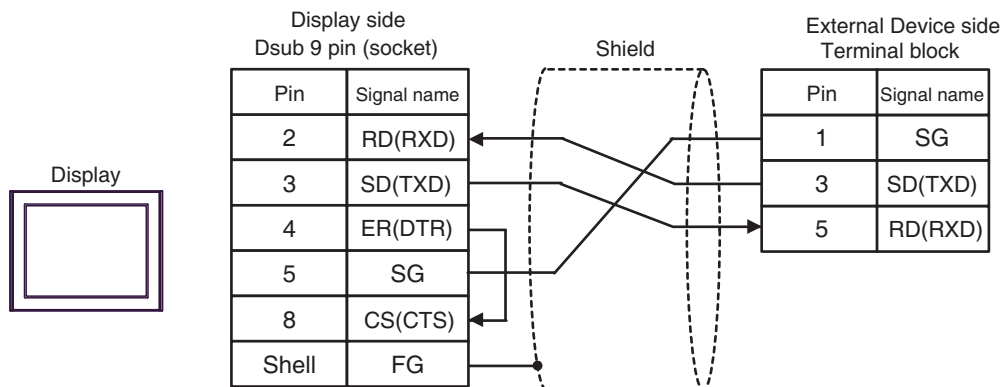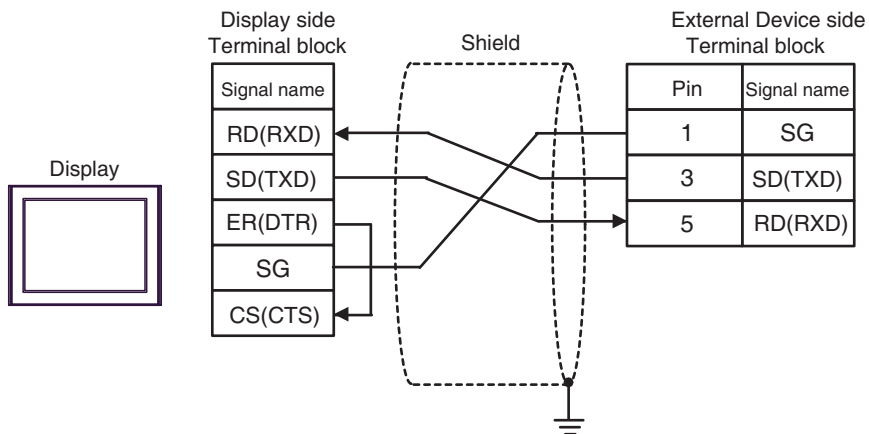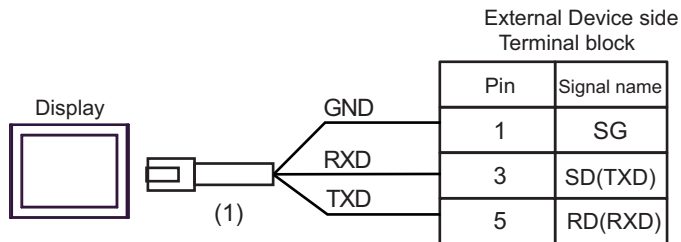
| Pin | Signal name |
| --- | --- |
| 1 | SG |
| 3 | SD(TXD) |
| 5 | RD(RXD) |

| Legend | Name | Note |
| --- | --- | --- |
| (1) | RJ45 RS-232C Cable (5m) by Pro-face<br>PFXZLMCBRJR21 | |

Cable Diagram 4

| Display (Connection Port) | | Cable | Remarks |
|---|---|---|---|
| GP-4*01TM (COM1) GP-Rear Module (COM1) IPC[*1] | 4A | COM port conversion adapter by Pro-face CA3-ADPCOM-01 + Connector terminal block conversion adapter by Pro-face CA3-ADPTRM-01 + User-created cable | The cable length must be 1000m or less. |
| | 4B | User-created cable | |
| GP-4106 (COM1) GP-4116T (COM1) | 4C | User-created cable | The cable length must be 1000m or less. |
| GP4000[*2] (COM2) GP-4201T (COM1) SP5000[*3] (COM1/2) SP-5B00 (COM2) ST6000[*4] (COM2) ST-6200 (COM1) STM6000 (COM1) STC6000 (COM1) ET6000[*5] (COM2) PS6000 (Basic Box) (COM1/2) | 4D | RS-422 Terminal Block Conversion Adapter by Pro-face PFXZCBADTM1[*6] + User-created cable | The cable length must be 1000m or less. |
| | 4B | User-created cable | |
| PE-4000B[*7] PS5000[*7] PS6000 (Optional Interface)[*7] | 4E | User-created cable | The cable length must be 1000m or less. |

*1    Available only with COM ports that support RS-422/485 (4wire).  (Except PE-4000B, PS5000, and PS6000)
      ☞ ■ IPC COM Port (page 5)

*2    All GP4000 models except GP-4100 Series, GP-4*01TM, GP-Rear Module, GP-4201T and GP-4*03T

*3    Except SP-5B00

*4    Except ST-6200

*5    Due to the COM port specifications, flow control is not possible. Omit wiring the control pins on the Display side of the cable diagram.

*6    When using a Terminal Block Conversion Adapter (CA3-ADPTRM-01) instead of the RS-422 Terminal Block Conversion Adapter, refer to Cable Diagram 4A.

*7    Available only with COM ports that support RS-422/485 (4wire).
      ☞ ■ IPC COM Port (page 5)

IMPORTANT
• Terminal number to be used for communication varies depending on the External Device. Terminal numbers corresponding to each series are shown below.

| Pin | KV-L20V KV-L21V | KV-N11L KV-NC20L |
|---|---|---|
| SDB(+) | 5 | 2 |
| SDA(-) | 3 | 1 |
| RDB(+) | 4 | 4 |
| RDA(-) | 2 | 3 |
| SG | 1 | 5 |

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.

4A)

4B)

| Display side D-Sub 9 pin (socket) | | | | External Device side 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 | | | | |

Termination resistance 220Ω 1/4W

Display

Termination resistance 220Ω 1/4W

Shield

4C)

Display side Terminal block

Shield

External Device side Terminal block

| Signal name | | Pin | Signal name |
|---|---|---|---|
| RDA | | 5 | SDB(+) |
| RDB | | 3 | SDA(-) |
| SDA | | 4 | RDB(+) |
| SDB | | 2 | RDA(-) |
| SG | | 1 | SG |
| ERA | | | |
| CSA | | | |
| ERB | | | |
| CSB | | | |

Termination resistance*1

Display

Termination resistance*1

*1    The resistance in the Display is used as the termination resistance. Set the value of the DIP Switch on the rear of the Display as shown in the table below.

| DIP Switch No. | Set Value |
|---|---|
| 1 | OFF |
| 2 | ON |
| 3 | OFF |
| 4 | ON |

4D)

Display

Termination resistance 220Ω 1/4W

Display side Terminal block

Shield

External Device side Terminal block

PFXZCBADTM1

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 | | | |

User-created cable

4E)

| Termination resistance 220Ω 1/4W | Display side D-Sub 9 pin (socket) | | Shield | External Device side Terminal block | |
|---|---|---|---|---|---|
| | Pin | Signal name | | Pin | Signal name |
| | 3 | Rx+ | | 5 | SDB(+) |
| | 4 | Rx- | | 3 | SDA(-) |
| | 2 | Tx+ | | 4 | RDB(+) |
| | 1 | Tx- | | 2 | RDA(-) |
| Termination resistance 220Ω 1/4W | 5 | GND | | 1 | SG |
| | 7 | NC | | | |
| | 8 | NC | | | |
| | 9 | NC | | | |
| | 6 | NC | | | |
| | Shell | FG | | | |

Display

# 6 Supported Device

The range of supported device addresses is shown in the table below. Please note that the actual supported range for devices varies depending on the external device that is used. Please check the actual range in the external device manual.

## 6.1 KV-700 Series

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

| Device | Bit Address | Word Address | 32 bits | Remarks |
|---|---|---|---|---|
| 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 | L / H | *2 |
| Counter (Setting Value) | ------ | CS000 - CS511 | | *2 |
| Timer (Current Value) | ------ | TC000 - TC511 | | *2 |
| Counter (Current Value) | ------ | CC000 - CC511 | | *2 |
| Data Memory | ------ | DM00000 - DM39999 | | Bit15 |
| Temporary Data Memory | ------ | TM000 - TM511 | | Bit15 |
| Control Memory | ------ | CM0000 - CM3999 | | Bit15 |
| Digital Trimmer | ------ | TRM0 - TRM7 | | *2 |
| High-speed Counter (Current Value) | ------ | CTH0 - CTH1 | | *2 |
| High-speed Counter Comparator (Setting Value) | ------ | CTC0 - CTC3 | | *2 |

*1 Write disable

*2 32-bit device

IMPORTANT
• When connecting KV-700 Series, use settings within the device address ranges above.
• If you try to access device addresses supported only by the KV-1000 Series devices, the following error messages display: "Error has been responded for device read command (Error Code(14)[(0x0E)]" or "Error has been responded for device write command (Error Code(14)[(0x0E)]".

NOTE
• Refer to the GP-Pro EX Reference Manual for system data area.

    Cf.    GP-Pro EXReference Manual "LS Area (Direct Access Method Area)"

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

    ☞ "Manual Symbols and Terminology"

## 6.2 KV-1000 Series

 : This address can be specified as system data area.

| Device | Bit Address | Word Address | 32 bits | Remarks |
|---|---|---|---|---|
| Input Relay | | | | *1 |
| Output Relay | 00000 - 59915 | 000 - 599 | | *1 |
| Internal Auxiliary Relay | | | ⌈L / H⌋ | *1 |
| 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 | | *3 |
| Timer (Current Value) | ------ | TC0000 - TC3999 | | *3 |
| Counter (Current Value) | ------ | CC0000 - CC3999 | | *3 |
| Data Memory | ------ | DM00000 - DM65534 | | Bit 15) |
| Extension Data Memory EM | ------ | EM00000 - EM65534 | | Bit 15) |
| Extension Data Memory FM | ------ | FM00000 - FM32766 | ⌈L / H⌋ | Bit 15) |
| Temporary Data Memory | ------ | TM000 - TM511 | | Bit 15) |
| Control Memory | ------ | CM00000 - CM11998 | | Bit 15) |
| Index Register | ------ | Z01 - Z12 | | Bit 15) *4 |
| Digital Trimmer | ------ | TRM0 - TRM7 | | *3 |
| High-speed Counter (Current Value) | ------ | CTH0 - CTH1 | | *3 |
| High-speed Counter Comparator (Setting Value) | ------ | CTC0 - CTC3 | | *3 |

*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 to the addresses Z11 and Z12. They are used in the system of the External Device.

NOTE

• Refer to the GP-Pro EX Reference Manual for system data area.

Cf.    GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"

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

☞ "Manual Symbols and Terminology"

## 6.3 KV-3000/5000/5500 Series

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

| Device | | Bit Address | Word Address | 32 bits | Remarks |
|---|---|---|---|---|---|
| Input Relay | | R00000 - R99915 | R000 - R999 | ⌐L / H⌐ | |
| Output Relay | | | | | |
| Internal Auxiliary Relay | | | | | |
| Link Relay | | B0000 - B3FFF | B000 - B3FF | | |
| Internal Auxiliary Relay | | MR00000 - MR99915 | MR000 - MR999 | | |
| Latch Relay | | LR00000 - LR99915 | LR000 - LR999 | | |
| Control Relay | | CR0000 - CR3915 | CR00 - CR39 | | |
| Work Relay | | VB0000 - VB3FFF | VB000 - VB3FF | | |
| Timer (Contact) | | T0000 - T3999 | ------ | - | |
| Counter (Contact) | | C0000 - C3999 | ------ | | |
| High-speed Counter Comparator (Contact) | | CTC0 - CTC3 | ------ | | *1 |
| Timer (Setting Value) | | ------ | TS0000 - TS3999 | ⌐L / H⌐ | *2 |
| Counter (Setting Value) | | ------ | CS0000 - CS3999 | | *2 |
| Timer (Current Value) | | ------ | TC0000 - TC3999 | | *2 |
| Counter (Current Value) | | ------ | CC0000 - CC3999 | | *2 |
| Data Memory | | ------ | DM00000 - DM65534 | | Bit15 |
| Extension Data Memory | | ------ | EM00000 - EM65534 | | Bit15 |
| File Register | Current Bank | ------ | FM00000 - FM32767 | | Bit15 |
| | Serial Number System | ------ | ZF000000 - ZF131071 | | Bit15 |
| Temporary Data Memory | | ------ | TM000 - TM511 | | Bit15 |
| Control Memory | | ------ | CM00000 - CM05999 | | Bit15 |
| Link Register | | ------ | W0000 - W3FFF | | BitF |
| Work Memory | | ------ | VM00000 - VM59999 | | Bit15 |
| Index Register | | ------ | Z01 - Z12 | | *2 *3 |
| Digital Trimmer | | ------ | TRM0 - TRM7 | | *2 |
| High-speed Counter (Current Value) | | ------ | CTH0 - CTH1 | | *2 |
| High-speed Counter Comparator (Setting Value) | | ------ | CTC0 - CTC3 | | *2 |

*1 Write disable

*2    32-bit device

*3    Do not write to the addresses Z11 and Z12. They are used in the system of the External Device.

---

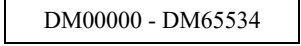NOTE   • Refer to the GP-Pro EX Reference Manual for system data area.

Cf.    GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"

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

☞ "Manual Symbols and Terminology"

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## 6.4 KV-7000 Series

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

| Device | | Bit Address | Word Address | 32 bits | Remarks |
|---|---|---|---|---|---|
| Input Relay | | R000000 - R199915 | R0000 - R1999 | ⌐L / H⌐ | *1 |
| Output Relay | | | | | *1 |
| Internal Auxiliary Relay | | | | | *1 |
| Link Relay | | B0000 - B7FFF | B000 - B7FF | | |
| Internal Auxiliary Relay | | MR000000 - MR399915 | MR0000 - MR3999 | | *2 |
| Latch Relay | | LR00000 - LR99915 | LR000 - LR999 | | |
| Control Relay | | CR0000 - CR7915 | CR00 - CR79 | | |
| Work Relay | | VB0000 - VBF9FF | VB000 - VBF9F | | |
| Timer (Contact) | | T0000 - T3999 | ------ | - | |
| Counter (Contact) | | C0000 - C3999 | ------ | | |
| Timer (Setting Value) | | ------ | TS0000 - TS3999 | ⌐L / H⌐ | *3 |
| Counter (Setting Value) | | ------ | CS0000 - CS3999 | | *3 |
| Timer (Current Value) | | ------ | TC0000 - TC3999 | | *3 |
| Counter (Current Value) | | ------ | CC0000 - CC3999 | | *3 |
| Data Memory | | ------ | DM00000 - DM65534 | | Bit 15 |
| Extension Data Memory | | ------ | EM00000 - EM65534 | | Bit 15 |
| File Register | Current Bank | ------ | FM00000 - FM32767 | | Bit 15 |
| | Serial Number System | ------ | ZF000000 - ZF524287 | | Bit 15 |
| Temporary Data Memory | | ------ | TM000 - TM511 | | Bit 15 |
| Control Memory | | ------ | CM0000 - CM5999 | | Bit 15 |
| Link Register | | ------ | W0000 - W7FFF | | Bit F |
| Work Memory | | ------ | VM00000 - VM50999 | | Bit 15 |
| Index Register | | ------ | Z01 - Z12 | | *3*4 |
| Digital Trimmer | | ------ | TRM0 - TRM7 | | *3*5 |

*1 When using KV-L20V and KV-L21V, the bit address range is R000000-R99915 and the word address range is R000-R999.

*2 When using KV-L20V and KV-L21V, the bit address range is MR000000-MR99915 and the word address range is MR000-MR999.

*3 32-bit device

*4 Do not write to the addresses Z11 and Z12. They are used in the system of the External Device.

*5 Write disable

NOTE
• Refer to the GP-Pro EX Reference Manual for system data area.

Cf.　　GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"

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

☞ "Manual Symbols and Terminology"

## 6.5 KV-Nano Series

<span>▭</span> : This address can be specified as system data area.

| Device | Bit Address | Word Address | 32 bits | Remarks |
|---|---|---|---|---|
| Input Relay | R00000 - R59915 | R000 - R599 | L / H | |
| Output Relay | | | | |
| Internal Auxiliary Relay | | | | |
| Link Relay | B0000 - B1FFF | B000 - B1FF | | |
| Internal Auxiliary Relay | MR00000 - MR59915 | MR000 - MR599 | | |
| Latch Relay | LR00000 - LR19915 | LR000 - LR199 | | |
| Control Relay | CR0000 - CR8915 | CR00 - CR89 | | |
| Work Relay | VB0000 - VB1FFF | VB000 - VB1FF | | |
| Timer (Contact) | T000 - T511 | ------ | - | |
| Counter (Contact) | C000 - C255 | ------ | | |
| High-speed Counter Comparator (Contact) | CTC0 - CTC7 | ------ | | *1 |
| Timer (Setting Value) | ------ | TS000 - TS511 | L / H | *2 |
| Counter (Setting Value) | ------ | CS000 - CS255 | | *2 |
| Timer (Current Value) | ------ | TC000 - TC511 | | *2 |
| Counter (Current Value) | ------ | CC000 - CC255 | | *2 |
| Data Memory | ------ | DM00000 - DM32767 | | Bit 15 |
| Temporary Data Memory | ------ | TM000 - TM511 | | Bit 15 |
| Control Memory | ------ | CM0000 - CM8999 | | Bit 15 |
| Link Register | ------ | W0000 - W3FFF | | Bit F |
| Work Memory | ------ | VM0000 - VM9499 | | Bit 15 |
| Index Register | ------ | Z01 - Z12 | | *2*3 |
| High-speed Counter (Current Value) | ------ | CTH0 - CTH3 | | *2*4 |
| High-speed Counter Comparator (Setting Value) | ------ | CTC0 - CTC7 | | *2*5 |

*1    Write disable

*2    32-bit device

*3    Do not write to the addresses Z11 and Z12. They are used in the system of the External Device.

*4    In the case of KV-NC32T, the maximum value of the address is CTH2. Reading of CTH3 is not a read error, but the value will be 0. If the written, it will write error.

*5    In the case of KV-NC32T, the maximum value of the address is CTC5. Reading of CTC6 and CTC7 is not a read error, but the value will be 0. If the written, it will write error.

NOTE
• Refer to the GP-Pro EX Reference Manual for system data area.

Cf.    GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"

• 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 if 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 Trimmer | 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 | | | |
| 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 | 0010 | Word Address |
| Extension Data Memory | FM | 0011 | Word Address |
| Temporary Data Memory | TM | 0001 | Word Address |
| Control Memory | CM | 0002 | Word Address |
| Index Register | Z | 0003 | Word Address [1] |
| Digital Trimmer | 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 |

[1] The "Z" device code on the KV-1000 is different from other series. If you change the external device series in the editor software, the device code also changes automatically.

## 7.3 KV-3000/5000/5500 Series

| Device | | Device Name | Device Code (HEX) | Address Code |
|---|---|---|---|---|
| Input Relay | | R | 0080 | Word Address |
| Output Relay | | | | |
| Internal Auxiliary Relay | | | | |
| Link Relay | | B | 008B | Word Address |
| Internal Auxiliary Relay | | MR | 0082 | Word Address |
| Latch Relay | | LR | 0084 | Word Address |
| Control Relay | | CR | 008A | Word Address |
| Work Relay | | VB | 008C | 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 | 0010 | Word Address |
| File Register | Current Bank | FM | 0011 | Word Address |
| | Serial Number System | ZF | 0012 | Word Address |
| Temporary Data Memory | | TM | 0001 | Word Address |
| Control Memory | | CM | 0002 | Word Address |
| Link Register | | W | 0013 | Word Address |
| Work Memory | | VM | 0014 | Word Address |
| Index Register | | Z | 0067 | Double Word Address |
| Digital Trimmer | | 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 |

## 7.4 KV-7000 Series

| Device | | Device Name | Device Code (HEX) | Address Code |
|---|---|---|---|---|
| Input Relay | | R | 0080 | Word Address |
| Output Relay | | | | |
| Internal Auxiliary Relay | | | | |
| Link Relay | | B | 008B | Word Address |
| Internal Auxiliary Relay | | MR | 0082 | Word Address |
| Latch Relay | | LR | 0084 | Word Address |
| Control Relay | | CR | 008A | Word Address |
| Work Relay | | VB | 008C | 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 | 0010 | Word Address |
| File Register | Current Bank | FM | 0011 | Word Address |
| | Serial Number System | ZF | 0012 | Word Address |
| Temporary Data Memory | | TM | 0001 | Word Address |
| Control Memory | | CM | 0002 | Word Address |
| Link Register | | W | 0013 | Word Address |
| Work Memory | | VM | 0014 | Word Address |
| Index Register | | Z | 0067 | Double Word Address |
| Digital Trimmer | | TRM | 0064 | Double Word Address |

## 7.5 KV-Nano Series

| Device | Device Name | Device Code (HEX) | Address Code |
|--------|-------------|-------------------|--------------|
| Input Relay | R | 0080 | Word Address |
| Output Relay | | | |
| Internal Auxiliary Relay | | | |
| Link Relay | B | 008B | Word Address |
| Internal Auxiliary Relay | MR | 0082 | Word Address |
| Latch Relay | LR | 0084 | Word Address |
| Control Relay | CR | 008A | Word Address |
| Work Relay | VB | 008C | 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 |
| Link Register | W | 0013 | Word Address |
| Work Memory | VM | 0014 | Word Address |
| Index Register | Z | 0067 | 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 an error has occurred. Device name is a 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.<br><br>**NOTE**<br>• IP address is displayed as "IP address (Decimal): MAC address (Hex)".<br>• Device address is displayed as "Address: Device address".<br>• Received error codes are displayed as "Decimal [Hex]". |

Display Examples of Error Messages

"RHAA035: PLC1: Error has been responded for device write command (Error Code: 1 [01H])"

**NOTE**
- Refer to your External Device manual for details on received error codes.
- Refer to "Display-related errors" in "Maintenance/Troubleshooting Manual" for details on the error messages common to the driver.

◆ Error Codes Specific to the External Device

| Error Code | Error Description | Cause |
|---|---|---|
| E0 | Device number error | • The specified External Device number, bank number, unit number, or address is out of range.<br>• Specified a timer, counter, high-speed counter (current value), or high-speed counter comparator (setting value) number that is not used in the program.<br>• An attempt was made to read an unregistered Display. |
| E1 | Command error | • Sent a command that is not supported by the CPU unit.<br>• The command specification format is incorrect.<br>• Before communication was established, sent a command but it was not the CR command. |
| E2 | No program registered | • The "M1 (Switch to RUN mode)" command was sent without the program registered in the CPU unit.<br>• The "M1 (Switch to RUN mode)" command was sent with the RUN / PROG switch on the CPU unit set to PROG. |
| E4 | Write protected | • In a write-protected program, an attempt was made to change the setting value of timer, counter, or high-speed counter comparator (setting value). |

| Error Code | Error Description | Cause |
|---|---|---|
| E5 | Main unit error | • The "M1 (Switch to RUN mode)" command was sent without first clearing the CPU module error. |
| E6 | No comment | • No comment is registered to the External Device specified by the "RDC (Read Comment)" command. |