



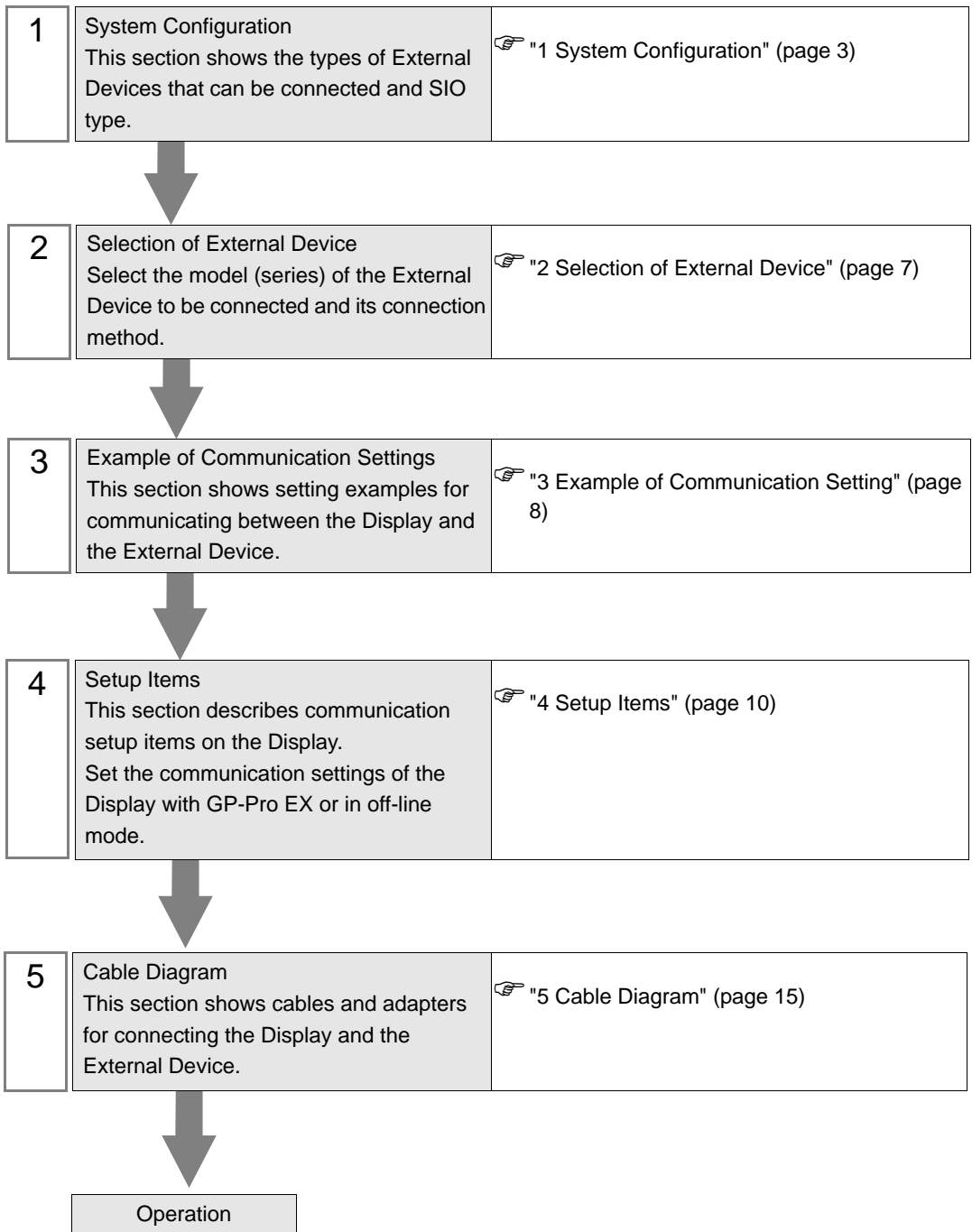
X-SEL Controller Driver

| | | |
|---|--|----|
| 1 | System Configuration..... | 3 |
| 2 | Selection of External Device | 7 |
| 3 | Example of Communication Setting | 8 |
| 4 | Setup Items..... | 10 |
| 5 | Cable Diagram | 15 |
| 6 | Supported Device..... | 18 |
| 7 | Device Code and Address Code..... | 34 |
| 8 | Error Messages..... | 36 |

Introduction

This manual describes how to connect the Display and the External Device.

In this manual, the connection procedure will be described by following the sections below.



1 System Configuration

The following shows the system configuration in which the External Device of IAI Corporation and the Display are connected.

| Series | CPU | Link I/F | SIO Type | Setting Example | Cable Diagram |
|---------------------------------------|--|---|----------|-------------------------------|------------------------------|
| X-SEL (Linear Actuator Controller) | XSEL-J | Serial port on the CPU unit (Teaching connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 1 (page 15) |
| | XSEL-K XSEL-KE XSEL-KT XSEL-KET | Serial port on the CPU unit (PC connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 2 (page 16) |
| | XSEL-P XSEL-Q | Serial port on the CPU unit (Teaching connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 1 (page 15) |
| X-SEL (SCARA Robot Controller) | XSEL-JX | Serial port on the CPU unit (Teaching connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 1 (page 15) |
| | XSEL-KX XSEL-KTX | Serial port on the CPU unit (PC connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 2 (page 16) |
| | XSEL-PX XSEL-QX | Serial port on the CPU unit (Teaching connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 1 (page 15) |
| SSEL | SSEL | Serial port on the CPU unit (Teaching connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 3 (page 17) |
| ASEL | ASEL | Serial port on the CPU unit (Teaching connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 3 (page 17) |
| PSEL | PSEL | Serial port on the CPU unit (Teaching connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 3 (page 17) |
| Table-Top Actuator | TT | Serial port on the CPU unit (Teaching connector) | RS232C | Setting Example 1 (page 8) | Cable Diagram 1 (page 15) |

■ Connection Configuration

- 1:1 Connection



■ IPC COM Port

When connecting IPC with an External Device, the COM port used depends on the series and SIO type. Please refer to the IPC manual for details.

Usable port

| Series | Usable Port | | |
|--|--|----------------------|----------------------|
| | RS-232C | RS-422/485(4 wire) | RS-422/485(2 wire) |
| PS-2000B | COM1 ^{*1} , COM2, COM3 ^{*1} , COM4 | - | - |
| PS-3450A, PS-3451A, PS3000-BA, PS3001-BD | COM1, COM2 ^{*1*2} | COM2 ^{*1*2} | COM2 ^{*1*2} |
| PS-3650A, PS-3651A | COM1 ^{*1} | - | - |
| PS-3700A (Pentium®4-M) PS-3710A | COM1 ^{*1} , COM2 ^{*1} , COM3 ^{*2} , COM4 | COM3 ^{*2} | COM3 ^{*2} |
| PS-3711A | COM1 ^{*1} , COM2 ^{*2} | COM2 ^{*2} | COM2 ^{*2} |
| PL-3000B, PL-3600T, PL-3600K, PL-3700T, PL-3700K, PL-3900T | COM1 ^{*1*2} , COM2 ^{*1} , COM3, COM4 | COM1 ^{*1*2} | COM1 ^{*1*2} |

*1 The RI/5V can be switched. Use the IPC's switch to change if necessary.

*2 Set up the SIO type with the DIP switch. Please set up as follows according to SIO type to be used.

DIP switch setting: RS-232C

| DIP switch | Setting | Description |
|------------|-------------------|---|
| 1 | OFF ^{*1} | Reserved (always OFF) |
| 2 | OFF | SIO type: RS-232C |
| 3 | OFF | |
| 4 | OFF | Output mode of SD (TXD) data: Always output |
| 5 | OFF | Terminal resistance (220Ω) insertion to SD (TXD): None |
| 6 | OFF | Terminal resistance (220Ω) insertion to RD (RXD): None |
| 7 | OFF | Short-circuit of SDA (TXA) and RDA (RXA): Not available |
| 8 | OFF | Short-circuit of SDB (TXB) and RDB (RXB): Not available |
| 9 | OFF | RS (RTS) Auto control mode: Disabled |
| 10 | OFF | |

*1 When using PS-3450A, PS-3451A, PS3000-BA and PS3001-BD, turn ON the set value.

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

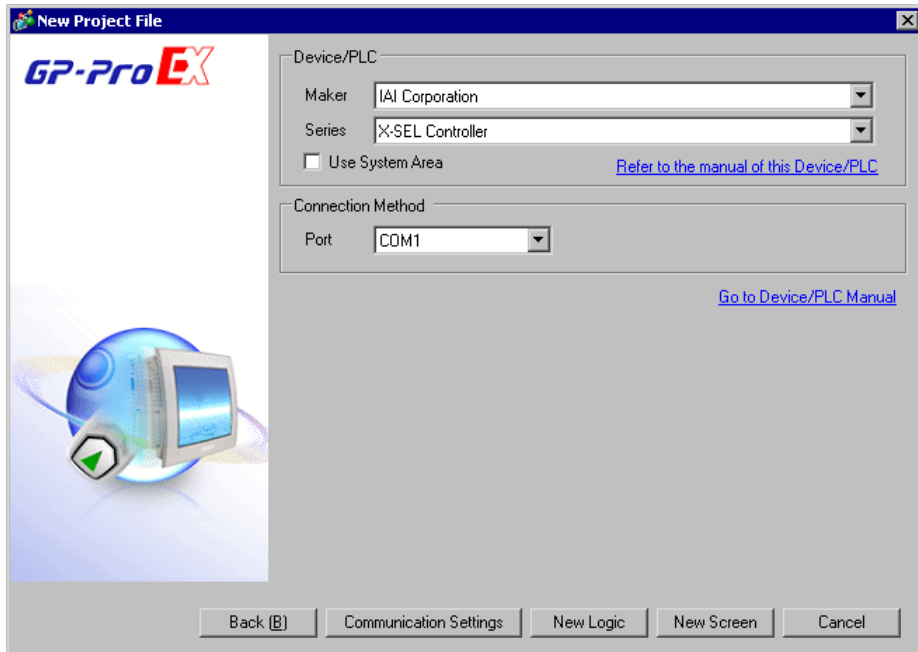
| DIP switch | Setting | Description |
|------------|---------|---|
| 1 | OFF | Reserved (always OFF) |
| 2 | ON | SIO type: RS-422/485 |
| 3 | ON | |
| 4 | OFF | Output mode of SD (TXD) data: Always output |
| 5 | OFF | Terminal resistance (220Ω) insertion to SD (TXD): None |
| 6 | OFF | Terminal resistance (220Ω) insertion to RD (RXD): None |
| 7 | OFF | Short-circuit of SDA (TXA) and RDA (RXA): Not available |
| 8 | OFF | Short-circuit of SDB (TXB) and RDB (RXB): Not available |
| 9 | OFF | RS (RTS) Auto control mode: Disabled |
| 10 | OFF | |

DIP switch setting: RS-422/485 (2 wire)

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

2 Selection of External Device

Select the External Device to be connected to the Display.



| Setup Items | Setup Description |
|-----------------|--|
| Maker | Select the maker of the External Device to be connected. Select "IAI Corporation". |
| Series | <p>Select the model (series) of the External Device to be connected and its connection method. Select "X-SEL Controller".</p> <p>Check the External Device that can be connected in "X-SEL Controller" in system configuration.</p> <p> "1 System Configuration" (page 3)</p> |
| Use System Area | <p>Check this option to synchronize the system data area of the Display and the device (memory) of the External Device. When they are synchronized, you can use the ladder program of the External Device to switch the display or to display a window on the Display.</p> <p>Cf. GP-Pro EX Reference Manual "Appendix 1.4 LS Area (Direct Access Method)"</p> <p>This can also be set with GP-Pro EX or in the Display off-line mode.</p> <p>Cf. GP-Pro EX Reference Manual "5.17.6 Setting Guide of [System Setting Window], Setting Guide of [Main Unit Settings], System Area Setting"</p> <p>Cf. Maintenance/Troubleshooting Manual "2.15.1 Common to the Display", Setting Guide of [Main Unit Settings], System Area Setting"</p> |
| Port | Select the port of the Display to be connected to the External Device. |

3 Example of Communication Setting

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

3.1 Setting Example 1

■ Settings of GP-Pro EX

◆ Communication Settings

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

Device/PLC 1

Summary

Maker: IAI Corporation Series: X-SEL Controller Port: COM1

Text Data Mode: 1 [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

| Number | Device Name | Settings |
|--------|-------------|------------------|
| 1 | PLC1 | Station Code=153 |

◆ Device Setting

To display the setting screen, click ([Setting]) of the External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

To connect multiple External Devices, click from [Device-Specific Settings] of [Device/PLC Settings] to add External Devices.

Individual Device Settings

PLC1

Station Code: 153

Default

OK (0) Cancel

■ Settings of External Device

Use the mode switch and the ladder software (PC Software for X-SEL) to configure communication settings for the External Device. Refer to your External Device manual for details.

- 1 Set the mode switch to "MANU", and turn on the power.
- 2 Start up the ladder software.
- 3 From the [Parameter] menu, select [Edit] to display the [Edit Parameter] dialog box.
- 4 Click the [I/O] tab and set the following parameters.

| No | Parameter Name | Setting Value |
|----|---|---------------|
| 90 | Usage of SIO channel 1 opened to user (AUTO mode) | 2 |
| 91 | Station code of SIO channel 1 opened to user | 153 |
| 92 | Baud rate type of SIO channel 1 opened to user | 0 |
| 93 | Data length of SIO channel 1 opened to user | 8 |
| 94 | Stop bit length of SIO channel 1 opened to user | 1 |
| 95 | Parity type of SIO channel 1 opened to user | 0 |

- 5 Click the [Transfer to Controller] button and transfer the communication settings.
- 6 Set the mode switch to "AUTO".

The communication settings are completed.

4 Setup Items

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

The setting of each parameter must match that of the External Device.

☞ "3 Example of Communication Setting" (page 8)

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.

Device/PLC 1

Summary [Change Device/PLC](#)

Maker: IAI Corporation Series: X-SEL Controller Port: COM1

Text Data Mode: 1 [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


| Number | Device Name | Settings |
|--------|-------------|------------------|
| 1 | PLC1 | Station Code=153 |


| 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 | Use an integer from 1 to 127 to enter the time (s) for which the Display waits for the response from the External Device. |

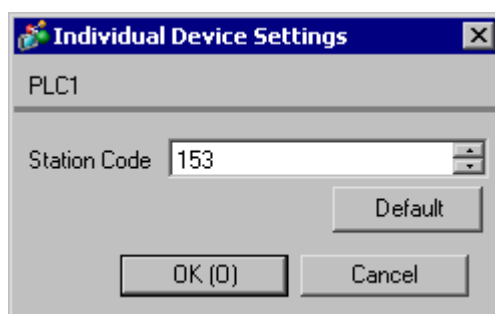
Continued to next page.

| Setup Items | Setup Description |
|--------------|---|
| 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". |
| RI/VCC | You can switch between RI/VCC of the 9th pin when you select RS232C for the SIO type. To connect to the IPC, you need to use the IPC selector switch to switch RI/5V. Refer to your IPC manual for details. |

■ Device Setting

To display the setting screen, click  ([Setting]) of the External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

To connect multiple External Devices, click  from [Device-Specific Settings] of [Device/PLC Settings] to add External Devices.



| Setup Items | Setup Description |
|--------------|--|
| Station Code | Use an integer from 0 to 255 to enter the station code of the External Device. |

4.2 Settings in Off-Line Mode

NOTE

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

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

■ Communication Settings

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Equipment Settings] in off-line mode.
Touch the External Device you want to set from the list that appears.

| Comm. | Device | Option | | |
|----------------------------------|--|--------|--|------------------------|
| X-SEL Controller [COM1] Page 1/1 | | | | |
| SIO Type | RS232C | | | |
| Speed | 9600 | | | |
| Data Length | <input type="radio"/> 7 <input checked="" type="radio"/> 8 | | | |
| Parity | <input checked="" type="radio"/> NONE <input type="radio"/> EVEN <input type="radio"/> ODD | | | |
| Stop Bit | <input checked="" type="radio"/> 1 <input type="radio"/> 2 | | | |
| Flow Control | NONE | | | |
| Timeout(s) | 3 | | | |
| Retry | 2 | | | |
| Wait to Send(ms) | 0 | | | |
| Exit | | Back | | 2008/02/21 02:02:58 |

| Setup Items | Setup Description |
|--------------|--|
| SIO Type | <p>Select the SIO type for communicating with the External Device.</p> <p>IMPORTANT</p> <p>In the communication settings, set [SIO Type] correctly according to the serial interface specifications of the Display. If you select an SIO type that the serial interface does not support, proper operation cannot be guaranteed. Refer to your Display manual for details on the serial interface specifications.</p> |
| 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. |

Continued to next page.

| Setup Items | Setup Description |
|--------------|---|
| Timeout | Use an integer from 1 to 127 to enter the time (s) for which the Display waits for the response from the External Device. |
| Retry | In case of no response from the External Device, 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 Equipment Settings]. Touch the External Device you want to set from the list that appears, and touch [Device].

| | | | | |
|------------------|--------|-----------------------------------|----------|------------------------|
| Comm. | Device | Option | | |
| | | | | |
| X-SEL Controller | | [COM1] | Page 1/1 | |
| Device/PLC Name | | <input type="text" value="PLC1"/> | | |
| Station Code | | <input type="text" value="153"/> | | |
| | Exit | | Back | 2008/02/21 02:03:01 |

| Setup Items | Setup Description |
|-----------------|---|
| Device/PLC Name | Select the External Device to set. The device name is the title of the External Device set with GP-Pro EX. (Initial value [PLC1]) |
| Station Code | Use an integer from 0 to 255 to enter the station code of the External Device. |

■ Option

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

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

X-SEL Controller [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 | 2008/02/21 02:03:07 |
|--|------|--|------|------------------------|

| Setup Items | Setup Description |
|-------------|---|
| RI/VCC | You can switch between RI/VCC of the 9th pin when you select RS232C for the SIO type. To connect to the IPC, you need to use the IPC selector switch to switch RI/5V. Refer to your IPC manual for details. |

5 Cable Diagram

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

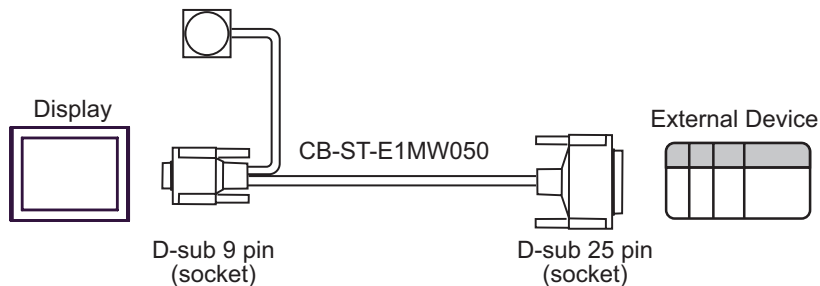
- The FG pin on the External Device must be D-class grounded. Refer to your External Device manual for details.
- The SG and FG are connected inside the Display. If you connect the External Device to the SG, do not form any short-circuit loop in the system design.
- If the communication is not stable because of noise or other factors, connect an isolation unit.

Cable Diagram 1

| Display (Connection Port) | Cable | Remarks |
|---|--|---------|
| GP (COM1) ST (COM1) LT (COM1) IPC*1 PC/AT | Connection cable by IAI Corporation CB-ST-E1MW050 | |

*1 Available only with a COM port that supports RS232C.

☞ ■ IPC COM Port (page 5)

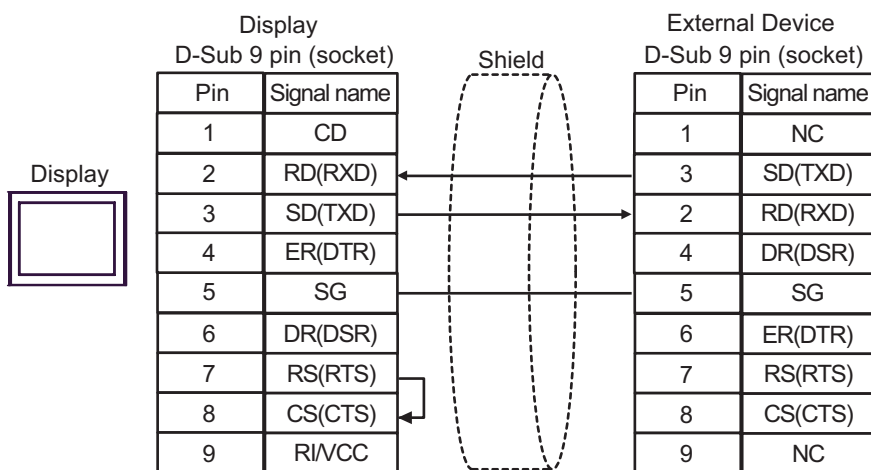


Cable Diagram 2

| Display (Connection Port) | Cable | Remarks |
|---|----------------|---------------------------------------|
| GP (COM1) ST (COM1) LT (COM1) IPC*1 PC/AT | Your own cable | The cable length must be 10m or less. |

*1 Available only with a COM port that supports RS232C.

☞ ■ IPC COM Port (page 5)

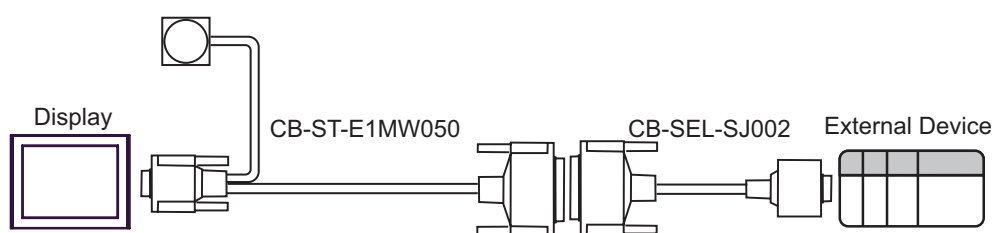


Cable Diagram 3

| Display (Connection Port) | Cable | Remarks |
|---|--|---------|
| GP (COM1) ST (COM1) LT (COM1) IPC*1 PC/AT | Connection cable by IAI Corporation CB-ST-E1MW050 + Connector conversion cable by IAI Corporation CB-SEL-SJ002 | |

*1 Available only with a COM port that supports RS232C.

☞ ■ IPC COM Port (page 5)



6 Supported Device

The following table shows the range of supported device addresses. Available type and range of device may vary depending on the CPU. Consult the appropriate CPU manual before use.

To avoid the External Device malfunction, do not access an out-of-range address.

 : This address can be specified as system data area.

| Device | Bit Address | Word Address | Double Word Address | 32 bits | Remarks |
|------------------------|--|--|---|---|---|
| Input Port | IP000 - IP299 | IP000 - IP272 | ----- | L / H | ÷ 16 *1 |
| Output Port | OP300 - OP599 | OP300 - OP572 | ----- | | ÷ 16 |
| Flag | FG000.600 - FG000.899 FG001.900 - FG128.999 | FG000.600 - FG000.872 FG001.900 - FG128.980 | ----- | | ÷ 16 *2 |
| Point Data Total Count | ----- | PDT0 | ----- | ----- | *1 |
| Integer | ----- | ----- | INT000.0200 - INT000.1299, INT001.0001 - INT128.1099 | L / H | *3 |
| Real | ----- | ----- | RL000.0300 - RL000.1399, RL001.0100 - RL128.1199 | | *4 |
| String | ----- | STR000.300 - STR000.998 STR001.001 - STR128.299 | ----- | | ÷ 2 *5 |
| Axis Status | ----- | AXST00 - AXST47 | ----- | | *1 *6 |
| Scara Axis Status | ----- | SAXS000 - SAXS3FF | ----- | | *1 *7 |
| Version | ----- | VR000 - VR3FF | ----- | | *1 *8 |
| Error Detail 0 | ----- | ----- | ER00000000 - ER0FFFFFFF | | *1 *9 |
| Error Detail 1 | ----- | ----- | ER10000000 - ER1FFFFFFF | | *1 *9 |
| Error Detail 2 | ----- | ----- | ER20000000 - ER2FFFFFFF | | *1 *9 |
| Error Detail 3 | ----- | ----- | ER30000000 - ER3FFFFFFF | | *1 *9 |

Continued to next page.

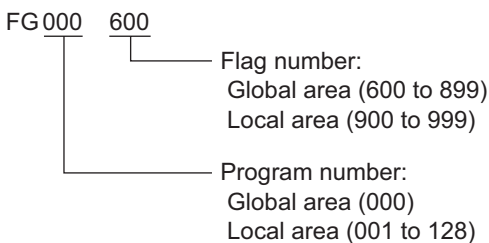
| Device | Bit Address | Word Address | Double Word Address | 32 bits | Remarks |
|-------------------------------------|--|--|-------------------------|--------------|---------|
| Error Detail 4 | ----- | ----- | ER40000000 - ER4FFFFFFF | [L/H] | *1 *9 |
| Error Detail 5 | ----- | ----- | ER50000000 - ER5FFFFFFF | | *1 *9 |
| Error Detail 6 | ----- | ----- | ER60000000 - ER6FFFFFFF | | *1 *9 |
| Error Detail 7 | ----- | ----- | ER70000000 - ER7FFFFFFF | | *1 *9 |
| Program Status | ----- | PGST000 - PGST511 | ----- | | *1 *10 |
| System Status | ----- | SYST0 - SYST6 | ----- | | *1 *11 |
| Program Control | ----- | PRG000 - PRG128 | ----- | | *12 *13 |
| Alarm Reset | ----- | AR0 | ----- | ----- | *12 |
| Software Reset | ----- | SR0 | ----- | | *12 *14 |
| Drive-Source Recovery | ----- | DSR0 | ----- | | *12 |
| Operation-Pause Reset | ----- | OPR0 | ----- | | *12 |
| Point Data Clear | PCLR001 - PCLRFA0 PCLR0001 - PCLR4E20 | PCLR001 - PCLRF91 PCLR0001 - PCLR4E11 | ----- | [L/H] | *12 *15 |
| Absolute Coordinate Movement | ----- | ----- | ACM0 - ACMC | | *16 |
| Relative Coordinate Movement | ----- | ----- | RCM0 - RCMC | | *17 |
| Jogging/Inching Movement | ----- | ----- | JIM0 - JIM6 | | *18 |
| Point Number Movement | ----- | PNM0 - PNM5 | ----- | | *19 |
| Point Data | ----- | ----- | PD00 - PD9E | | *20 |
| Servo | ----- | SV0 - SV2 | ----- | | *21 |
| Return to Origin | ----- | RO0 - RO3 | ----- | | *22 |
| Operation Stop/Cancel | ----- | OSC0 - OSC2 | ----- | | *23 |
| Coordinate Affiliate Data | ----- | ----- | CD0000 - CD1FFF | | *1 *24 |
| Simple Interference Check Zone Data | ----- | ----- | SD010 - SDFFF | | *1 *25 |

Continued to next page.

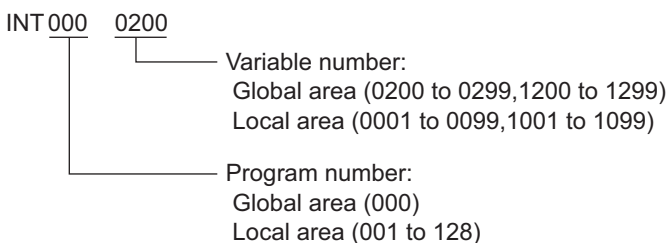
| Device | Bit Address | Word Address | Double Word Address | 32 bits | Remarks |
|------------------------------------|-------------|-----------------|---------------------|----------------|---------------------------|
| Scara Absolute Coordinate Movement | ----- | ----- | SACM0 - SACMD | [L / H] | *26 |
| Scara Relative Coordinate Movement | ----- | ----- | SRCM0 - SRCMD | | *27 |
| Scara Point Number Movement | ----- | SPNM0 - SPNM6 | ----- | | *28 |
| Feedback Current *29 | ----- | FC0 - FCA | ----- | | *1 *30 |
| Task Status | ----- | TAST00 - TAST80 | ----- | | [Bit 15] *1 *31 |
| Flash ROM | ----- | FR0 | ----- | | [Bit 15] *12*32 |

*1 Write disable

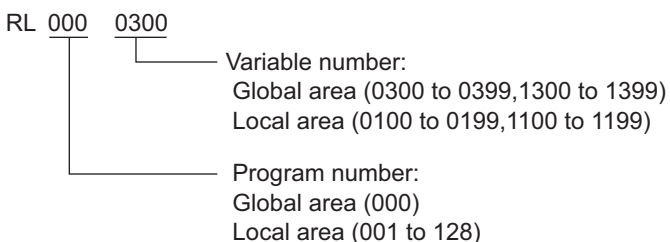
*2 The flag device descriptions are shown below.



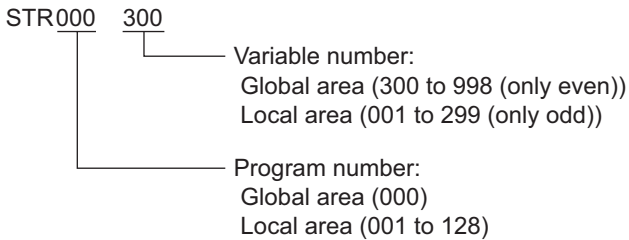
*3 The integer valuables device descriptions are shown below.



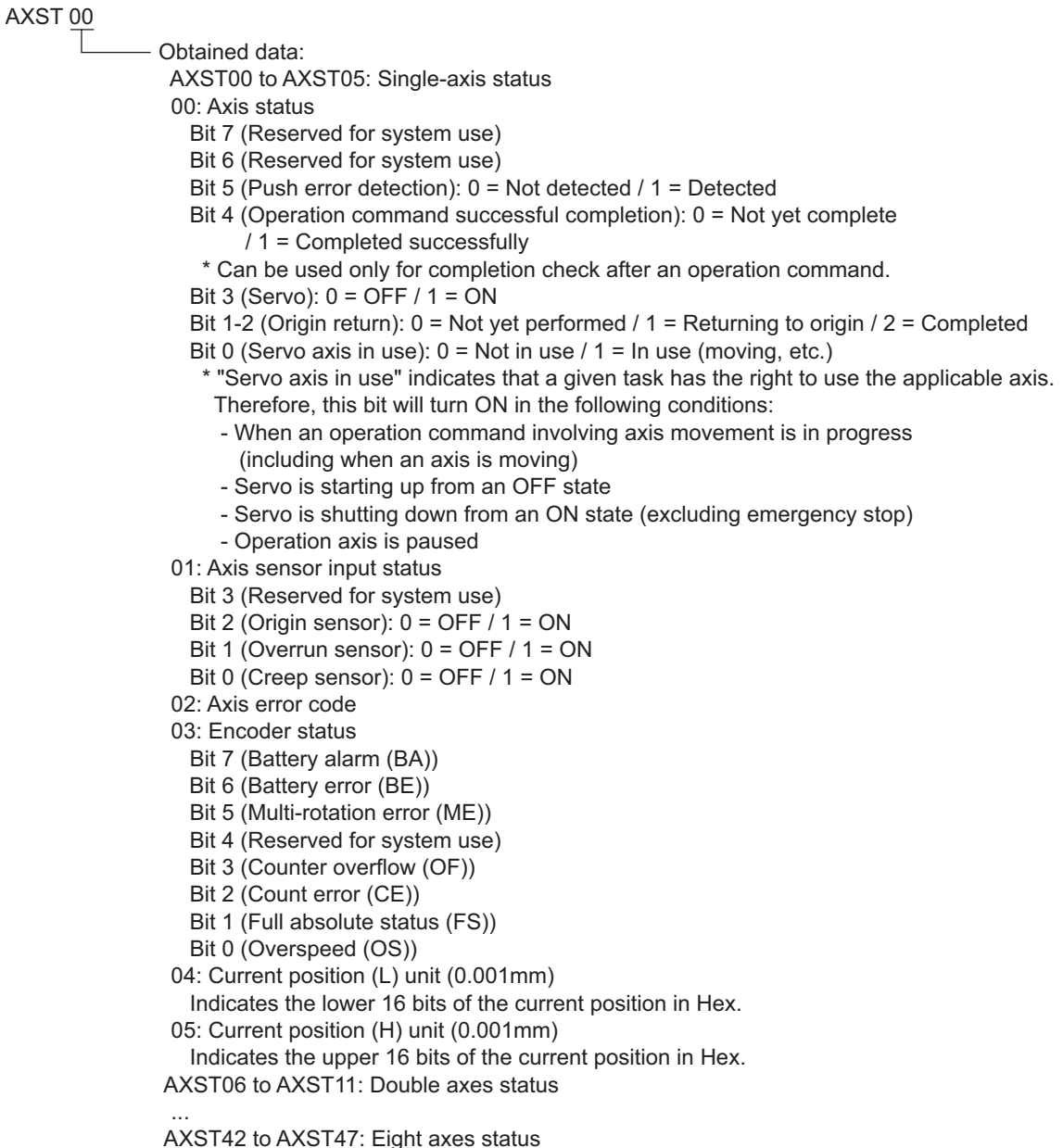
*4 The real valuables device descriptions are shown below.



*5 The string valuables device descriptions are shown below.



*6 The axis status device descriptions are shown below.



*7 The Scara axis status device descriptions are shown below.

SAXS 0 00

Obtained data:

00: Work coordinate system selection number

01: Tool coordinate system selection number

02: Common axis status

Bit 7 (Reserved for system use)

Bit 6 (Reserved for system use)

Bit 5 (Reserved for system use)

Bit 4 (Reserved for system use)

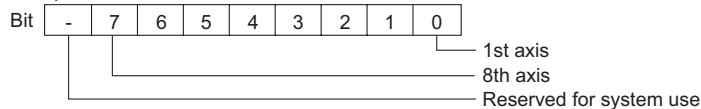
Bit 2-3 (Scara axis current position coordinate system type): 0 = Base coordinate system

/ 1 = Selected work coordinate system / 2 = Reserved for system use / 3 = Each axis system

Bit 0-1: (Scara axis current arm system): 0 = Right arm system / 1 = Left arm system

/ 2 = Indeterminable / 3 = Reserved for system use

03: Axis pattern



04 to 09: Single-axis status

04: Axis status

Bit 7 (Reserved for system use)

Bit 6 (Reserved for system use)

Bit 5 (Push error detection): 0 = Not detected / 1 = Detected

Bit 4 (Operation command successful completion):

0 = Not yet complete / 1 = Completed successfully

* Can be used only for completion check after an operation command.

(For positioning that includes any of the X, Y and R axes, be sure to check completion for all of the X, Y and R axes.)

Bit 3 (Servo): 0 = OFF / 1 = ON

Bit 1-2 (Origin return): 0 = Not yet performed / 1 = Returning to origin / 2 = Completed

Bit 0 (Servo axis in use): 0 = Not in use / 1 = In use (moving, etc.)

* "Servo axis in use" indicates that a given task has the right to use the applicable axis.

Therefore, this bit will turn ON in the following conditions:

- When an operation command involving axis movement is in progress (including when an axis is moving)
- Servo is starting up from an OFF state
- Servo is shutting down from an ON state (excluding emergency stop)
- Operation axis is paused

05: Axis sensor input status

Bit 3 (Reserved for system use)

Bit 2 (Origin sensor): 0 = OFF / 1 = ON

Bit 1 (Overrun sensor): 0 = OFF / 1 = ON

Bit 0 (Creep sensor): 0 = OFF / 1 = ON

06: Axis error code

07: Encoder status

Bit 7 (Battery alarm (BA))

Bit 6 (Battery error (BE))

Bit 5 (Multi-rotation error (ME))

Bit 4 (Reserved for system use)

Bit 3 (Counter overflow (OF))

Bit 2 (Count error (CE))

Bit 1 (Full absolute status (FS))

Bit 0 (Overspeed (OS))

08: Current position (L) unit (0.001mm or 0.001deg)

Indicates the lower 16 bits of the current position in Hex.

09: Current position (H) unit (0.001mm or 0.001deg)

Indicates the upper 16 bits of the current position in Hex.

0A to 0E: Double axes status

...

2E to 33: Eight axes status

34 to FF: Reserved for system use

Unit type (0 to F)

Bit 3 (Reserved for system use) Fixed to 0

Bit 2 (Reserved for system use) Fixed to 0

Bit 0-1 (Scara axis current position type): 0 = Base coordinate system

/ 1 = Selected work coordinate system / 2 = Reserved for system use / 3 = Each axis system

*8 The version device descriptions are shown below.

VR 0 0 0

Obtained data:
 0: Model code
 1: Unit code
 2: Version number
 3: Time (year)
 4: Time (month)
 5: Time (day)
 6: Time (hour)
 7: Time (min)
 8: Time (sec)
 9 to F: Reserved for system use
 Device number (0 to F)
 Unit type (0 to 3)
 0= Main CPU application / 1 = Main CPU core
 / 2= Driver CPU / 3 = Mount SIO

*9 The device descriptions of error detail 0 through error detail 7 are shown below.

ERO 00 000 00

Obtained data:
 00: Error number
 01: Detail information 1
 Other than system-down level error: Program number
 (Error source is indicated if the step number is not 0.)
 System-down level error: System down type
 02: Detail information 2
 Other than system-down level error: Step number (Error source)
 System-down level error: System down error code
 03: Detail information 3
 Other than system-down level error: Axis number
 System-down level error: System down information 1
 04: Detail information 4
 Other than system-down level error: Point number
 (Negative value at interpolation point)
 System-down level error: System down information 2
 05: Detail information 5
 06: Detail information 6
 07: Detail information 7
 08: Detail information 8
 09: Message bytes
 0A: Message 1 (4 bytes)
 10: Message 2 (4 bytes)
 ...
 49: Message 64 (4 bytes)
 50 to FF: Reserved for system use
 Reserved for system use
 Type 2 (0 to FF)
 System error: 0 = Critical level error / 1 = Latest error
 Axis-specific error: Axis number
 Program-specific error: Program number
 Error in error list record: Record number (1 to)
 Type 1
 0 = System error / 1 = Axis-specific error / 2 = Program-specific error
 / 3 = Error in error list record / 4 or later = Reserved for system use

*10 The program status device descriptions are shown below.

PGST 000

Obtained data:
 000 to 003: Program number 1 status
 000: Status
 Bit 3 (Reserved for system use)
 Bit 2 (Reserved for system use)
 Bit 1 (Reserved for system use)
 Bit 0 (Start): 0 = Not started / 1 = Started
 001: Execution program step number
 002: Program-dependent error code
 003: Error occurrence step number
 004 to 007: Program number 2 status
 ...
 508 to 511: Program number 128 status

*11 The system status device descriptions are shown below.

SYST 0

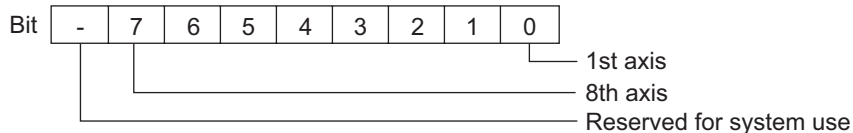
Obtained data:
 0: System mode
 0 = Indeterminable / 1 = AUTO mode / 2 = MANUAL mode
 / 3 = Slave update mode / 4 = Core update mode
 1 Critical level system error number
 2: Latest system error number
 3: System status byte 1
 Bit 7 (Reserved for system use)
 Bit 6 (Battery voltage error status) : 0 = No error / 1 = Error
 Bit 5 (Battery voltage low warning status): 0 = No low / 1 = Low
 Bit 4 (Power error status): 0 = Normal / 1 = Error
 Bit 3 (Emergency stop switch status): 0 = No emergency stop / 1 = Emergency stop
 Bit 2 (Safety gate status): 0 = CLOSE / 1 = OPEN
 * X-SEL (P/Q Series) (Multi axes/Scara)/SSEL/ASEL/PSEL: Enable switch
 (Deadman switch / Enable switch) status is indicated.
 Bit 1 (TP enable switch status): 0 = ON / 1 = OFF
 * X-SEL (P/Q Series) (Multi axes/Scara)/SSEL/ASEL/PSEL: This bit is disabled (fixed to 0).
 Bit 0 (Operation mode switch status): 0 = AUTO / 1 = MANUAL
 4: System status byte 2
 Bit 7 (Reserved for system use)
 Bit 6 (Reserved for system use)
 Bit 5 (Program run status): 0 = Not run / 1 = Running
 Bit 4 (Restart wait status): 0 = Not waiting / 1 = Waiting
 Bit 3 (I/O interlock status): 0 = No interlock / 1 = Interlock
 Bit 2 (Servo interlock status): 0 = No interlock / 1 = Interlock
 Bit 1 (Slave parameter writing status): 0 = Not writing / 1 = Writing
 Bit 0 (Application data flash ROM write status): 0 = Not writing/erasing / 1 = Writing/erasing
 * When the core program is in operation (Application update mode), only Bit 0 is enabled.
 Data for System mode, Critical level system error number, Latest system error number,
 System status byte 1, System status byte 3 and System status byte 4 is disabled.
 5: System status byte 3
 Bit 7 (Reserved for system use)
 Bit 6 (Reserved for system use)
 Bit 5 (Reserved for system use)
 Bit 4 (Operation mode): 0 = Program mode / 1 = Position mode
 Bit 3 (Reserved for system use)
 Bit 2 (System ready status): 0 = Not ready / 1 = Ready
 Bit 1 (System operation status): 0 = Not operating in AUTO mode / 1 = Operating in AUTO mode
 Bit 0 (Drive-source cutoff status): 0 = Not cut off / 1 = Cut off
 6: System status byte 4
 Reserved for system use

- *12 Read disable
- *13 The program control device sends different commands depending to write data.
Other write data than the following is processed as Private Error (0x80) inside the Display.
Write Data 0: Program Execution Command(0x253)
Write Data 1: Program Exit Command(0x254)
Write Data 2: Program Pause Command(0x255)
Write Data 3: Program 1 Step Execution Command(0x256)
Write Data 4: Program Restart Command(0x257)
- *14 In the event of SR (Software Reset), displays no response error after no communication for 20 seconds, and restarts communication.
- *15 Specifies the word address only for the value of which the last one digit is 1.
- *16 The absolute coordinate movement device descriptions are shown below.

ACM 0

Obtained data:

- 0: Command trigger
1 =Write / 4 =Clear
- 1: Axis pattern



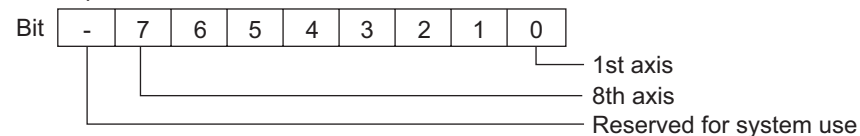
- 2: Acceleration unit (0.01G)
The parameter value becomes enabled when it is zero.
- 3: Deceleration unit (0.01G)
The parameter value becomes enabled when it is zero.
- 4: Speed unit (mm/sec)
The parameter value becomes enabled when it is zero.
(Safety limit is applied depending on the mode.)
- 5 to C: Absolute coordinate data unit (0.001mm)

- *17 The relative coordinate movement device descriptions are shown below.

RCM 0

Obtained data:

- 0: Command trigger
1 =Write / 4 =Clear
- 1: Axis pattern



- 2: Acceleration unit (0.01G)
The parameter value becomes enabled when it is zero.
- 3: Deceleration unit (0.01G)
The parameter value becomes enabled when it is zero.
- 4: Speed unit (mm/sec)
The parameter value becomes enabled when it is zero.
(Safety limit is applied depending on the mode.)
- 5 to C: Relative coordinate data unit (0.001mm)

*18 The jogging/inching movement device descriptions are shown below.

JIM 0

Obtained data:

0: Command trigger

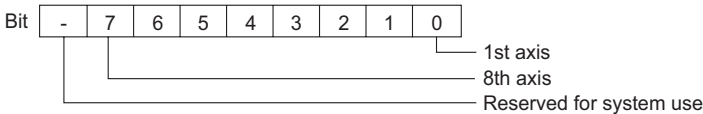
1 =Write / 4 =Clear

1: Axis pattern

Only single Scara axis can be specified for the Scara type
(Multiple axes can be specified).

For the Scara type, a jogging/inching command can be issued only when
none of the servo axes are operating.

X-SEL-PX/QX Series: The Scara and translation axes cannot be specified
simultaneously.



2: Acceleration unit (0.01G [for each axis, in %])

The parameter value becomes enabled when it is zero.

3: Deceleration unit (0.01G [for each axis, in %])

The parameter value becomes enabled when it is zero.

4: Speed unit (mm/sec [for each axis, in %])

The parameter value becomes enabled when it is zero.

(Safety limit is applied depending on the mode.)

5: Inching distance unit (0.001mm [for each axis, in 0.001deg])

Specify with the absolute value. Distance is not specified if it is zero (=jogging).

6: Operation type

Bit 3 (Reserved for system use) Fixed to 0

Bit 1-2 (Jogging/inching coordinate system (Scara only)): 0 = Base coordinate system

/ 1 = Selected work coordinate system / 2 = Selected tool coordinate system / 3 = Each axis system

Bit 0 (Jogging/inching direction): 0 = Negative direction on coordinate axis / 1 = Positive direction on coordinate axis

*19 The point number movement device descriptions are shown below.

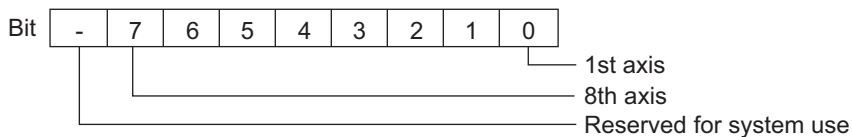
PNM 0

Obtained data:

0: Command trigger

1 =Write / 4 =Clear

1: Axis pattern



2: Acceleration unit (0.01G)

The applicable setting value in the position data becomes enabled when the
acceleration setting is zero.

If both above setting values are zero, the parameter setting value is enabled.

3: Deceleration unit (0.01G)

The applicable setting value in the position data becomes enabled when the
deceleration setting is zero.

If both above setting values are zero, the parameter setting value is enabled.

4: Speed unit (mm/sec)

The applicable setting value in the position data becomes enabled when the
speed setting is zero.

If both above setting values are zero, the parameter setting is enabled.

(Safety limit is applied depending on the mode.)

5: Point number

*20 The point data device descriptions are shown below.

PD 00

Obtained data:

00: Command trigger

1 =Write / 2 =Read / 4 =Clear

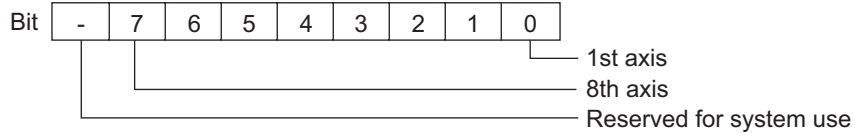
01: Starting point number

02: Number of point data

03 to 0F: Point data 1

03: Point number

04: Axis pattern



05: Acceleration unit (0.01G)

06: Deceleration unit (0.01G)

07: Speed unit (mm/sec)

08 to 0F: Position data unit (0.001 mm)

08: 1st axis position data

...

0F: 8th axis position data

10 to 1C: Point data 2

...

92 to 9E: Point data 12

*21 The servo device descriptions are shown below.

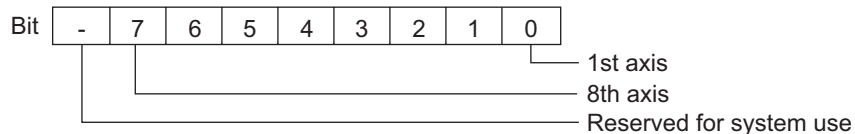
SV 0

Obtained data:

0: Command trigger

1 =Write / 4 =Clear

1: Axis pattern



2: Operation type

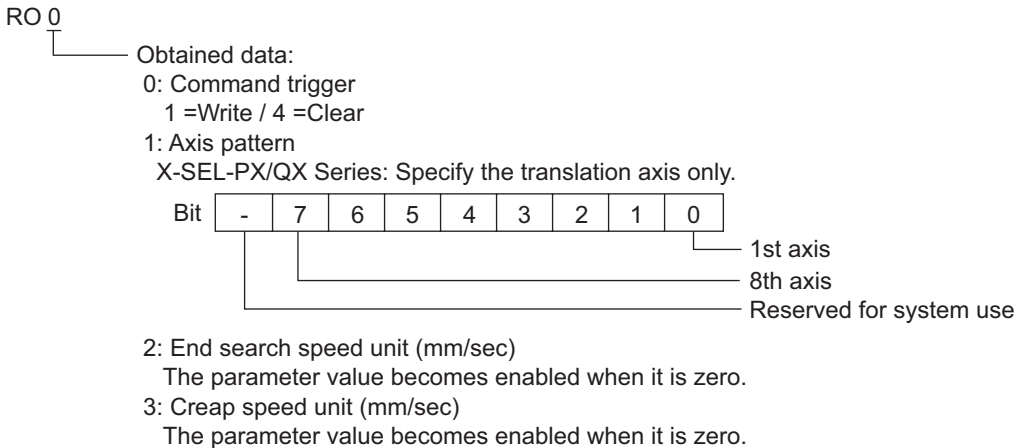
Bit 3 (Reserved for system use) Fixed to 0

Bit 2 (Reserved for system use) Fixed to 0

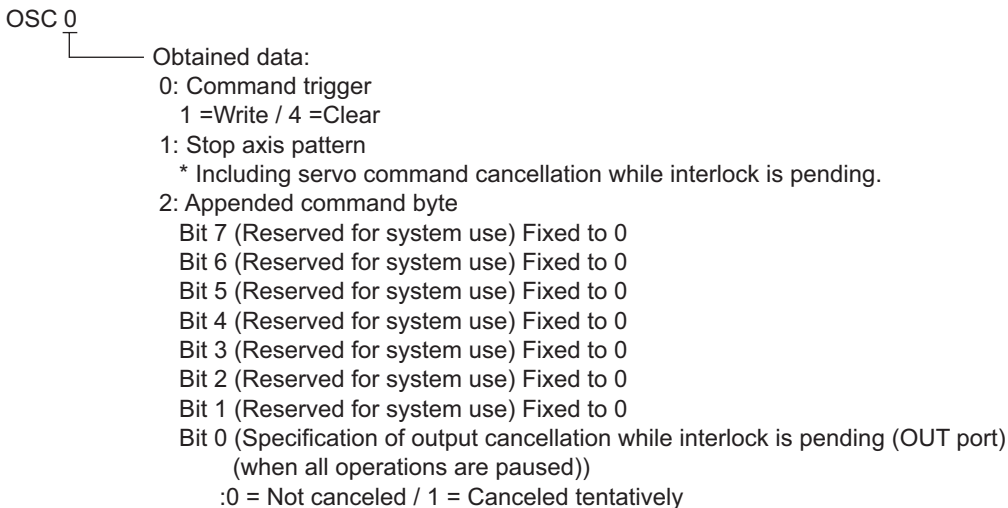
Bit 1 (Reserved for system use) Fixed to 0

Bit 0 (Servo ON/OFF): 0 = OFF / 1 = ON

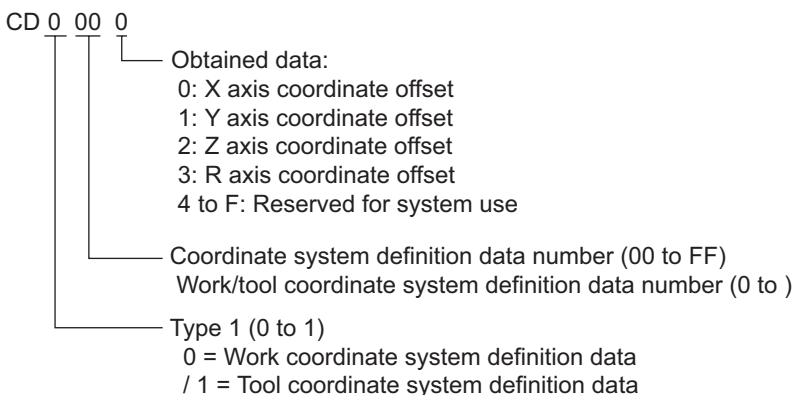
*22 The return to origin device descriptions are shown below.



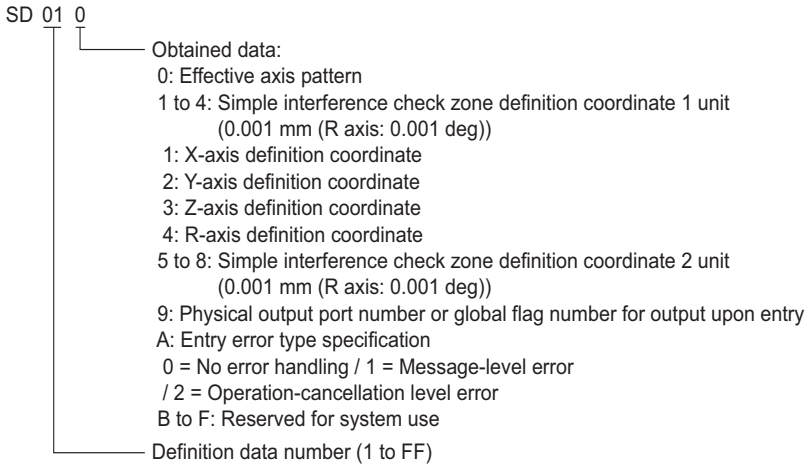
*23 The operation stop/cancel device descriptions are shown below.



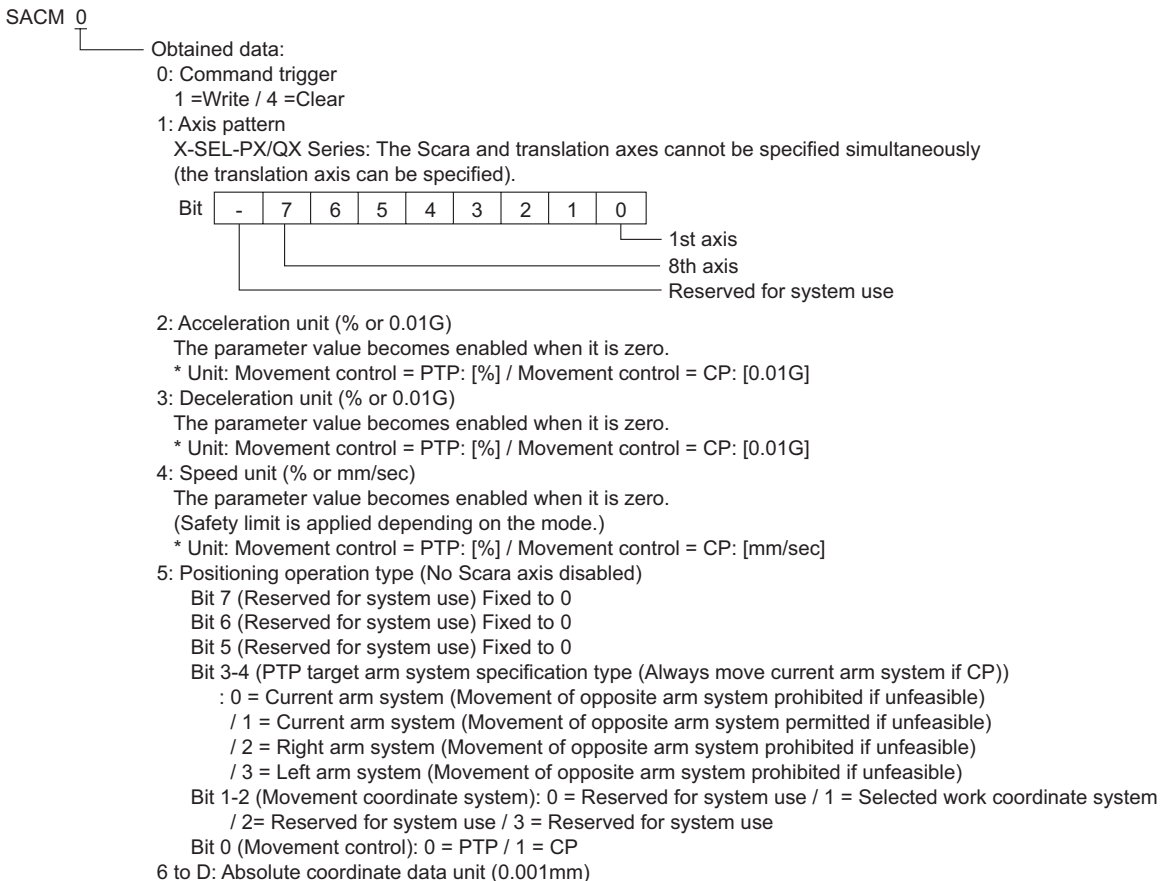
*24 The coordinate affiliate data device descriptions are shown below.



*25 The device descriptions of simple interference check zone data are shown below.

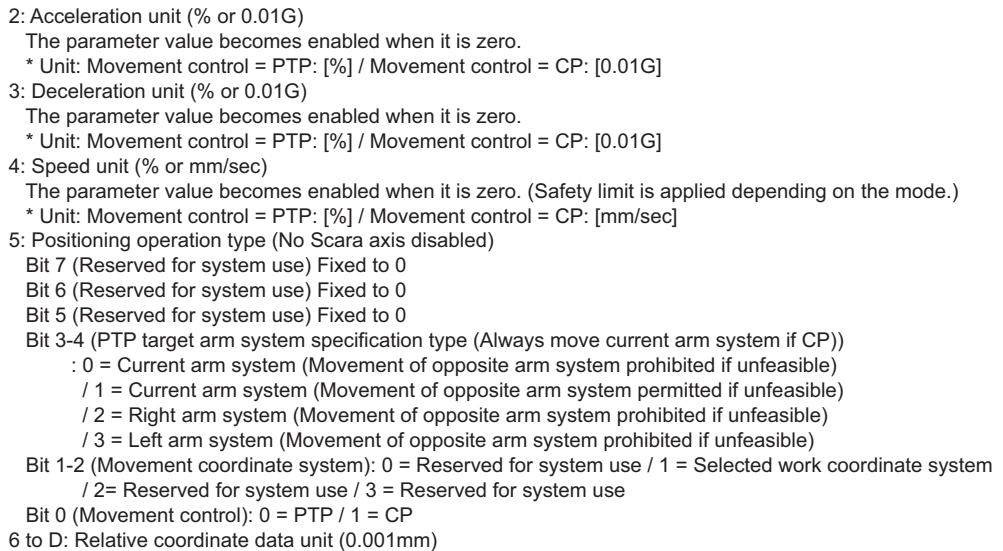


*26 The device descriptions of Scara absolute coordinate movement are shown below.



SRCM 0

└─ Obtained data:
0: Command trigger
1 =Write / 4 =Clear
1: Axis pattern
X-SEL-PX/QX Series: The Scara and translation axes cannot be specified simultaneously (the translation axis can be specified).



*28 The device descriptions of Scara point number movement are shown below.

SPNM 0

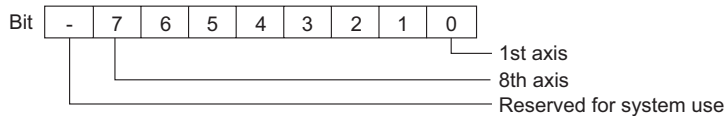
Obtained data:

0: Command trigger
1 = Write / 4 = Clear

1: Axis pattern

Used under an AND conditions with the axis pattern of the point number

X-SEL-PX/QX Series: The Scara and translation axes cannot be specified simultaneously (the translation axis can be specified).



2: Acceleration unit (% or 0.01G)

The applicable setting value in the position data becomes enabled when the acceleration setting is zero.

If both above setting values are zero, the parameter setting is enabled.

* Unit: Movement control = PTP: [%] / Movement control = CP: [0.01G]

3: Deceleration unit (% or 0.01G)

The applicable setting value in the position data becomes enabled when the deceleration setting is zero.

If both above setting values are zero, the parameter setting is enabled.

* Unit: Movement control = PTP: [%] / Movement control = CP: [0.01G]

4: Speed unit (% or mm/sec)

The applicable setting value in the position data becomes enabled when the speed setting is zero.

If both above setting values are zero, the parameter setting is enabled.

(Safety limit is applied depending on the mode.)

* Unit: Movement control = PTP: [%] / Movement control = CP: [mm/sec]

5: Positioning operation type (No Scara axis disabled)

Bit 7 (Reserved for system use) Fixed to 0

Bit 6 (Reserved for system use) Fixed to 0

Bit 5 (Reserved for system use) Fixed to 0

Bit 3-4 (PTP target arm system specification type (Always move current arm system if CP))

: 0 = Current arm system (Movement of opposite arm system prohibited if unfeasible)

/ 1 = Current arm system (Movement of opposite arm system permitted if unfeasible)

/ 2 = Right arm system (Movement of opposite arm system prohibited if unfeasible)

/ 3 = Left arm system (Movement of opposite arm system prohibited if unfeasible)

Bit 1-2 (Movement coordinate system): 0 = Reserved for system use / 1 = Selected work coordinate system

/ 2 = Reserved for system use / 3 = Reserved for system use

Bit 0 (Movement control): 0 = PTP / 1 = CP

6: Point number

*29 Feedback Current is supported from the following versions:

X-SEL-P/Q Controller Main Application Ver.0.40 or later

X-SEL-PX/QX Controller Main Application Ver.0.17 or later

SSEL Controller Main Application Ver.0.08 or later

ASEL Controller Main Application Ver.0.06 or later

PSEL Controller Main Application Ver.0.06 or later

*30 The device descriptions of Feedback current are shown below

FC 0

└─ Obtained data:
 0: Axis pattern
 1: System TICK (L)
 2: System TICK (H)
 3: Axis-1 Feedback current
 4: Axis-2 Feedback current
 5: Axis-3 Feedback current
 6: Axis-4 Feedback current
 7: Axis-5 Feedback current
 8: Axis-6 Feedback current
 9: Axis-7 Feedback current
 A: Axis-8 Feedback current

*31 The device descriptions of Task status are shown below

TAST 0

└─ Obtained data:
 00: Executed task count
 (01 to 05: Single-task status)
 01: Task status byte
 Bit 7 (Reserved for system use)
 Bit 6 (CANC input status)
 Bit 5 (HOLD input status)
 Bit 4 (WAIT progress)
 Bit 3 (Stopping executed)
 Bit 0-2 (Reserved for system use)
 02: Reserved for system use
 03: Executed No.
 04: Executed step No.
 05: Error generation step No.
 ...
 (76 to 80: 16-task status)
 76: Task status byte
 Bit 7 (Reserved for system use)
 Bit 6 (CANC input status)
 Bit 5 (HOLD input status)
 Bit 4 (WAIT progress)
 Bit 3 (Stopping executed)
 Bit 0-2 (Reserved for system use)
 77: Reserved for system use
 78: Executed No.
 79: Executed step No.
 80: Error generation step No.

*32 The device descriptions of Flash ROM are shown below

When "0" is written for an address, the External Device processes Bit0 to Bit3 as "1" (Specified). Be sure to write "0" for an address in the case of Flash ROM8Mbit version. It takes 30 seconds (Max.) in the writing of Flash ROM. Do not turn off the power of the External Device during the writing. The Display does not communicate with the External Device that is in the writing process.

The unit code value of the VR device is "70H" in the model of the Flash ROM8Mbit version.

FR 0

└── 0: Data type

Bit 3 (Parameter) : 0 = Not specified / 1= Specified

Bit 2 (Point-data, Coordinate system definition data (Scara only)): : 0 = Not specified / 1= Specified

Bit 1 (Symbol-definition table) : 0 = Not specified / 1= Specified

Bit 0 (SEL language program) : 0 = Not specified / 1= Specified

NOTE

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

Cf. GP-Pro EX Reference Manual "Appendix 1.4 LS Area (Direct Access Method)"

- 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 set "Device Type & Address" for the address type of the data display or other devices.

| Device | Device Name | Device Code (HEX) | Address Code |
|------------------------|-------------|-------------------|---|
| Input Port | IP | 0080 | Value of word address divided by 16 |
| Output Port | OP | 0081 | Value of (word address - 300) divided by 16 |
| Flag | FG | 0082 | Global Area Value of (flag number - 600) divided by 16 Local Area Value of (flag number - 900) divided by 16 |
| Point Data Total Count | PDT | 0060 | Word Address |
| Integer | INT | 0000 | Double Word Address |
| Real | RL | 0001 | Double Word Address |
| String | STR | 0002 | Global Area Value of (variable number - 300) divided by 2 Local Area Value of (variable number - 1) divided by 2 |
| Axis Status | AXST | 0061 | Word Address |
| Scara Axis Status | SAXS | 0062 | Word Address |
| Version | VR | 0063 | Word Address |
| Error Detail 0 | ER0 | 0020 | Double Word Address |
| Error Detail 1 | ER1 | 0021 | Double Word Address |
| Error Detail 2 | ER2 | 0022 | Double Word Address |
| Error Detail 3 | ER3 | 0023 | Double Word Address |
| Error Detail 4 | ER4 | 0024 | Double Word Address |
| Error Detail 5 | ER5 | 0025 | Double Word Address |
| Error Detail 6 | ER6 | 0026 | Double Word Address |
| Error Detail 7 | ER7 | 0027 | Double Word Address |
| Program Status | PGST | 0064 | Word Address |
| System Status | SYST | 0065 | Word Address |

Continued to next page.

| Device | Device Name | Device Code (HEX) | Address Code |
|-------------------------------------|-------------|-------------------|--|
| Program Control | PRG | 0066 | Word Address |
| Alarm Reset | AR | 0067 | Word Address |
| Software Reset | SR | 0068 | Word Address |
| Drive-Source Recovery | DSR | 0069 | Word Address |
| Operation-Pause Reset | OPR | 006A | Word Address |
| Point Data Clear | PCLR | 0083 | Value of word address from which 1 is deducted |
| Absolute Coordinate Movement | ACM | 006B | Double Word Address |
| Relative Coordinate Movement | RCM | 006C | Double Word Address |
| Jogging/Inching Movement | JIM | 006D | Double Word Address |
| Point Number Movement | PNM | 006E | Word Address |
| Point Data | PD | 006F | Double Word Address |
| Servo | SV | 0070 | Word Address |
| Return to Origin | RO | 0071 | Word Address |
| Operation Stop/Cancel | OSC | 0072 | Word Address |
| Coordinate Affiliate Data | CD | 0073 | Double Word Address |
| Simple Interference Check Zone Data | SD | 0074 | Double Word Address |
| Scara Absolute Coordinate Movement | SACM | 0075 | Double Word Address |
| Scara Relative Coordinate Movement | SRCM | 0076 | Double Word Address |
| Scara Point Number Movement | SPNM | 0077 | Word Address |
| Feedback Current | FC | 0078 | Word Address |
| Task Status | TAST | 0003 | Word Address |
| Flash ROM | FR | 0004 | 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 the title of the External Device set with GP-Pro EX. ((Initial value [PLC1]) |
| Error Message | Displays messages related to an error that has occurred. |
| Error Occurrence Area | <p>Displays the IP address or device address of the External Device where an error has occurred, or error codes received from the External Device.</p> <p>NOTE</p> <ul style="list-style-type: none"> • IP address is displayed as "IP address (Decimal): MAC address (Hex)". • Device address is displayed as "Address: Device address". • Received error codes are displayed as "Decimal [Hex]". |

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 "When an error is displayed (Error Code List)" in "Maintenance/Troubleshooting manual" for details on the error messages common to the driver.

■ Error Messages Specific to the External Device

| Error No. | Message | Description |
|-----------|--|---|
| RHxx128 | (Node Name): It was not possible to execute it by out of range data. | Data write beyond the data range was requested. |